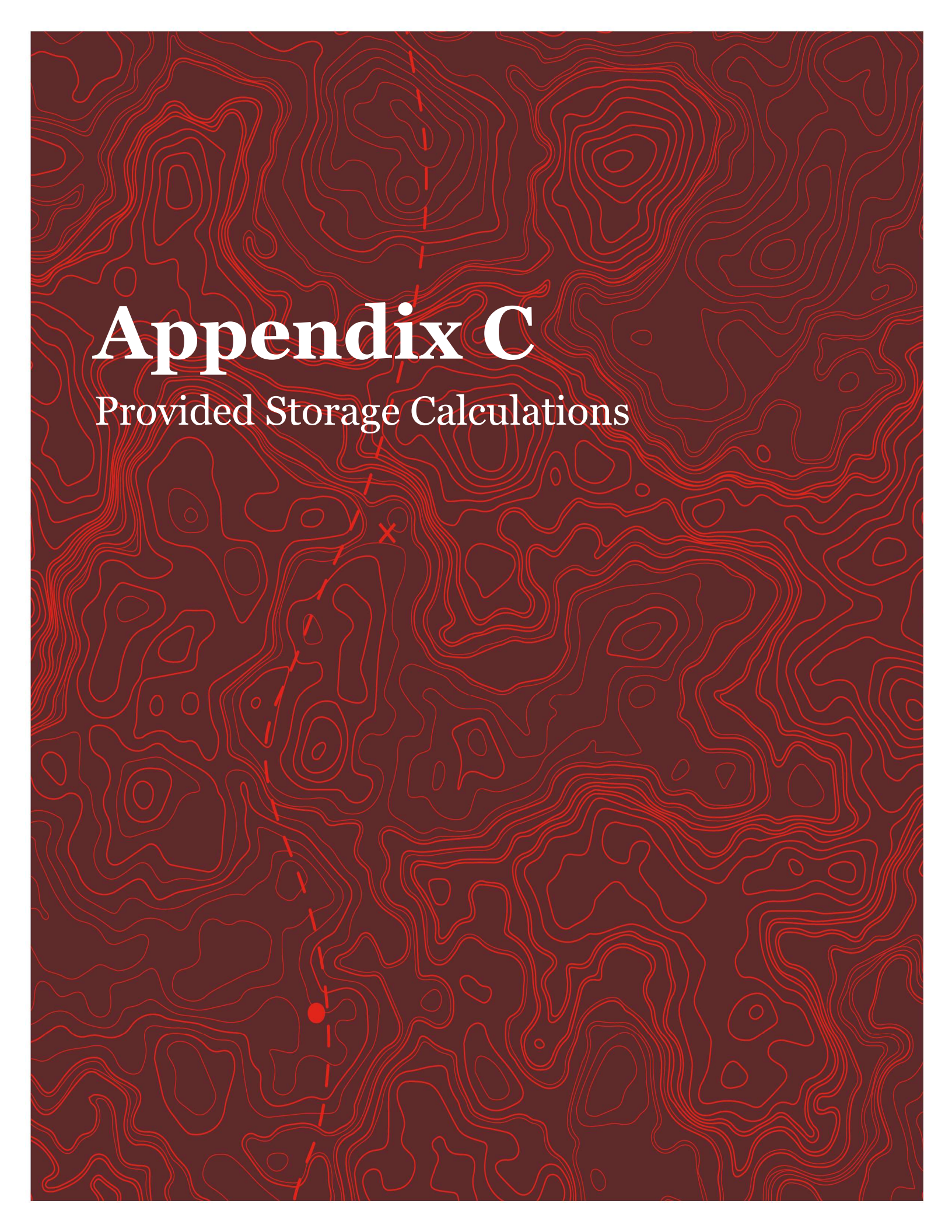


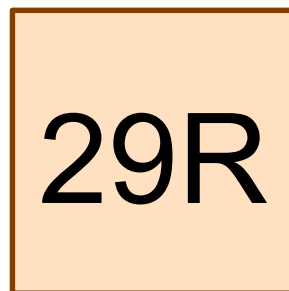


Appendix C

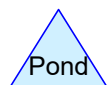
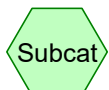
Provided Storage Calculations



100 LF of road

A gray downward-pointing arrow.

Ex Wet Swale



2024-04-17 Agricola Wet Swale Sizing

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10-yr	NY-Agricola 24-hr S1	10-yr	Default	24.00	1	3.58	2
2	100-yr	NY-Agricola 24-hr S1	100-yr	Default	24.00	1	5.49	2

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.004	98	Paved parking, HSG D (22S)
0.004	98	TOTAL AREA

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.004	0.000	0.004	Paved parking	22S
0.000	0.000	0.000	0.004	0.000	0.004	TOTAL AREA	

2024-04-17 Agricola Wet Swale Sizing

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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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 Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 22S: 100 LF of road

Runoff Area=0.004 ac 100.00% Impervious Runoff Depth=3.35"

Flow Length=50' Slope=0.0400 '/' Tc=0.7 min CN=98 Runoff=0.02 cfs 0.001 af

Reach 29R: Ex Wet Swale

Avg. Flow Depth=0.01' Max Vel=0.61 fps Inflow=0.02 cfs 0.001 af

n=0.035 L=100.0' S=0.0400 '/' Capacity=144.09 cfs Outflow=0.02 cfs 0.001 af

Total Runoff Area = 0.004 ac Runoff Volume = 0.001 af Average Runoff Depth = 3.35"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.004 ac

2024-04-17 Agricola Wet Swale Sizing

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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Summary for Subcatchment 22S: 100 LF of road

Runoff = 0.02 cfs @ 11.96 hrs, Volume= 0.001 af, Depth= 3.35"
Routed to Reach 29R : Ex Wet Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

Area (ac)	CN	Description
0.004	98	Paved parking, HSG D
0.004		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0400	1.22		Lag/CN Method,

2024-04-17 Agricola Wet Swale Sizing

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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Summary for Reach 29R: Ex Wet Swale

Inflow Area = 0.004 ac, 100.00% Impervious, Inflow Depth = 3.35" for 10-yr event
Inflow = 0.02 cfs @ 11.96 hrs, Volume= 0.001 af
Outflow = 0.02 cfs @ 12.05 hrs, Volume= 0.001 af, Atten= 21%, Lag= 5.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.61 fps, Min. Travel Time= 2.7 min

Avg. Velocity = 0.61 fps, Avg. Travel Time= 2.7 min

Peak Storage= 3 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.01', Surface Width= 2.09'

Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 144.09 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds

Side Slope Z-value= 3.0 '/' Top Width= 14.00'

Length= 100.0' Slope= 0.0400 '/'

Inlet Invert= 4.00', Outlet Invert= 0.00'



2024-04-17 Agricola Wet Swale Sizing

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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Stage-Area-Storage for Reach 29R: Ex Wet Swale

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
4.00	0.0	0	5.04	5.3	532
4.02	0.0	4	5.06	5.5	549
4.04	0.1	8	5.08	5.7	566
4.06	0.1	13	5.10	5.8	583
4.08	0.2	18	5.12	6.0	600
4.10	0.2	23	5.14	6.2	618
4.12	0.3	28	5.16	6.4	636
4.14	0.3	34	5.18	6.5	654
4.16	0.4	40	5.20	6.7	672
4.18	0.5	46	5.22	6.9	691
4.20	0.5	52	5.24	7.1	709
4.22	0.6	59	5.26	7.3	728
4.24	0.7	65	5.28	7.5	748
4.26	0.7	72	5.30	7.7	767
4.28	0.8	80	5.32	7.9	787
4.30	0.9	87	5.34	8.1	807
4.32	0.9	95	5.36	8.3	827
4.34	1.0	103	5.38	8.5	847
4.36	1.1	111	5.40	8.7	868
4.38	1.2	119	5.42	8.9	889
4.40	1.3	128	5.44	9.1	910
4.42	1.4	137	5.46	9.3	931
4.44	1.5	146	5.48	9.5	953
4.46	1.6	155	5.50	9.8	975
4.48	1.7	165	5.52	10.0	997
4.50	1.8	175	5.54	10.2	1,019
4.52	1.9	185	5.56	10.4	1,042
4.54	2.0	195	5.58	10.6	1,065
4.56	2.1	206	5.60	10.9	1,088
4.58	2.2	217	5.62	11.1	1,111
4.60	2.3	228	5.64	11.3	1,135
4.62	2.4	239	5.66	11.6	1,159
4.64	2.5	251	5.68	11.8	1,183
4.66	2.6	263	5.70	12.1	1,207
4.68	2.7	275	5.72	12.3	1,232
4.70	2.9	287	5.74	12.6	1,256
4.72	3.0	300	5.76	12.8	1,281
4.74	3.1	312	5.78	13.1	1,307
4.76	3.3	325	5.80	13.3	1,332
4.78	3.4	339	5.82	13.6	1,358
4.80	3.5	352	5.84	13.8	1,384
4.82	3.7	366	5.86	14.1	1,410
4.84	3.8	380	5.88	14.4	1,436
4.86	3.9	394	5.90	14.6	1,463
4.88	4.1	408	5.92	14.9	1,490
4.90	4.2	423	5.94	15.2	1,517
4.92	4.4	438	5.96	15.4	1,544
4.94	4.5	453	5.98	15.7	1,572
4.96	4.7	468	6.00	16.0	1,600
4.98	4.8	484			
5.00	5.0	500			
5.02	5.2	516			

2024-04-17 Agricola Wet Swale Sizing*NY-Agricola 24-hr S1 100-yr Rainfall=5.49"*

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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 Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 22S: 100 LF of road

Runoff Area=0.004 ac 100.00% Impervious Runoff Depth=5.25"

Flow Length=50' Slope=0.0400 '/' Tc=0.7 min CN=98 Runoff=0.04 cfs 0.002 af

Reach 29R: Ex Wet Swale

Avg. Flow Depth=0.02' Max Vel=0.68 fps Inflow=0.04 cfs 0.002 af

n=0.035 L=100.0' S=0.0400 '/' Capacity=144.09 cfs Outflow=0.03 cfs 0.002 af

Total Runoff Area = 0.004 ac Runoff Volume = 0.002 af Average Runoff Depth = 5.25"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.004 ac

2024-04-17 Agricola Wet Swale Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Subcatchment 22S: 100 LF of road

Runoff = 0.04 cfs @ 11.96 hrs, Volume= 0.002 af, Depth= 5.25"
Routed to Reach 29R : Ex Wet Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.004	98	Paved parking, HSG D
0.004		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0400	1.22		Lag/CN Method,

2024-04-17 Agricola Wet Swale Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Reach 29R: Ex Wet Swale

Inflow Area = 0.004 ac, 100.00% Impervious, Inflow Depth = 5.25" for 100-yr event
Inflow = 0.04 cfs @ 11.96 hrs, Volume= 0.002 af
Outflow = 0.03 cfs @ 12.04 hrs, Volume= 0.002 af, Atten= 19%, Lag= 5.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.68 fps, Min. Travel Time= 2.4 min

Avg. Velocity = 0.61 fps, Avg. Travel Time= 2.7 min

Peak Storage= 5 cf @ 12.00 hrs

Average Depth at Peak Storage= 0.02' , Surface Width= 2.13'

Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 144.09 cfs

2.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds

Side Slope Z-value= 3.0 '/' Top Width= 14.00'

Length= 100.0' Slope= 0.0400 '/'

Inlet Invert= 4.00', Outlet Invert= 0.00'



2024-04-17 Agricola Wet Swale Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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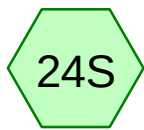
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Stage-Area-Storage for Reach 29R: Ex Wet Swale

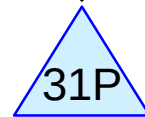
Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
4.00	0.0	0	5.04	5.3	532
4.02	0.0	4	5.06	5.5	549
4.04	0.1	8	5.08	5.7	566
4.06	0.1	13	5.10	5.8	583
4.08	0.2	18	5.12	6.0	600
4.10	0.2	23	5.14	6.2	618
4.12	0.3	28	5.16	6.4	636
4.14	0.3	34	5.18	6.5	654
4.16	0.4	40	5.20	6.7	672
4.18	0.5	46	5.22	6.9	691
4.20	0.5	52	5.24	7.1	709
4.22	0.6	59	5.26	7.3	728
4.24	0.7	65	5.28	7.5	748
4.26	0.7	72	5.30	7.7	767
4.28	0.8	80	5.32	7.9	787
4.30	0.9	87	5.34	8.1	807
4.32	0.9	95	5.36	8.3	827
4.34	1.0	103	5.38	8.5	847
4.36	1.1	111	5.40	8.7	868
4.38	1.2	119	5.42	8.9	889
4.40	1.3	128	5.44	9.1	910
4.42	1.4	137	5.46	9.3	931
4.44	1.5	146	5.48	9.5	953
4.46	1.6	155	5.50	9.8	975
4.48	1.7	165	5.52	10.0	997
4.50	1.8	175	5.54	10.2	1,019
4.52	1.9	185	5.56	10.4	1,042
4.54	2.0	195	5.58	10.6	1,065
4.56	2.1	206	5.60	10.9	1,088
4.58	2.2	217	5.62	11.1	1,111
4.60	2.3	228	5.64	11.3	1,135
4.62	2.4	239	5.66	11.6	1,159
4.64	2.5	251	5.68	11.8	1,183
4.66	2.6	263	5.70	12.1	1,207
4.68	2.7	275	5.72	12.3	1,232
4.70	2.9	287	5.74	12.6	1,256
4.72	3.0	300	5.76	12.8	1,281
4.74	3.1	312	5.78	13.1	1,307
4.76	3.3	325	5.80	13.3	1,332
4.78	3.4	339	5.82	13.6	1,358
4.80	3.5	352	5.84	13.8	1,384
4.82	3.7	366	5.86	14.1	1,410
4.84	3.8	380	5.88	14.4	1,436
4.86	3.9	394	5.90	14.6	1,463
4.88	4.1	408	5.92	14.9	1,490
4.90	4.2	423	5.94	15.2	1,517
4.92	4.4	438	5.96	15.4	1,544
4.94	4.5	453	5.98	15.7	1,572
4.96	4.7	468	6.00	16.0	1,600
4.98	4.8	484			
5.00	5.0	500			
5.02	5.2	516			



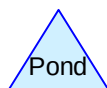
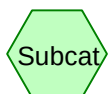
Substation and O&M
Location - Proposed



POI - Proposed



POI Basin



2024-04-16 Agricola Facility Basin Sizing

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Project Notes

Copied 7 events from NY-Agricola 24-hr S1 storm

2024-04-16 Agricola Facility Basin Sizing

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.690	58	Meadow, non-grazed, HSG B (24S, 32S)
1.030	78	Meadow, non-grazed, HSG D (24S, 32S)
3.700	98	Paved parking, HSG B (24S, 32S)
8.420	78	TOTAL AREA

2024-04-16 Agricola Facility Basin Sizing

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
7.390	HSG B	24S, 32S
0.000	HSG C	
1.030	HSG D	24S, 32S
0.000	Other	
8.420		TOTAL AREA

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Subcatchment 24S: Substation and O&M Location - Proposed

Runoff = 18.52 cfs @ 12.09 hrs, Volume= 1.175 af, Depth= 3.13"
Routed to Pond 25P :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.160	78	Meadow, non-grazed, HSG D
2.200	98	Paved parking, HSG B
2.140	58	Meadow, non-grazed, HSG B
4.500	78	Weighted Average
2.300		51.11% Pervious Area
2.200		48.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	683	0.0590	1.11		Lag/CN Method,

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Subcatchment 32S: POI - Proposed

Runoff = 14.86 cfs @ 12.12 hrs, Volume= 1.023 af, Depth= 3.13"
Routed to Pond 31P : POI Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
1.500	98	Paved parking, HSG B
0.870	78	Meadow, non-grazed, HSG D
1.550	58	Meadow, non-grazed, HSG B
3.920	78	Weighted Average
2.420		61.73% Pervious Area
1.500		38.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	661	0.0400	0.91		Lag/CN Method,

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Pond 25P:

Inflow Area = 4.500 ac, 48.89% Impervious, Inflow Depth = 3.13" for 100-yr event
 Inflow = 18.52 cfs @ 12.09 hrs, Volume= 1.175 af
 Outflow = 0.57 cfs @ 15.64 hrs, Volume= 0.622 af, Atten= 97%, Lag= 213.1 min
 Discarded = 0.14 cfs @ 15.64 hrs, Volume= 0.416 af
 Primary = 0.44 cfs @ 15.64 hrs, Volume= 0.206 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,220.06' @ 15.64 hrs Surf.Area= 0.447 ac Storage= 0.828 af

Plug-Flow detention time= 802.4 min calculated for 0.622 af (53% of inflow)
 Center-of-Mass det. time= 681.4 min (1,514.3 - 832.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,218.00'	1.035 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,218.00	0.360	0.000	0.000
1,219.00	0.400	0.380	0.380
1,220.00	0.440	0.420	0.800
1,220.50	0.500	0.235	1.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,220.00'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	1,218.00'	0.300 in/hr Exfiltration over Surface area Phase-In= 0.05'

Discarded OutFlow Max=0.14 cfs @ 15.64 hrs HW=1,220.06' (Free Discharge)

↑**2=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.43 cfs @ 15.64 hrs HW=1,220.06' (Free Discharge)

↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 0.70 fps)

2024-04-16 Agricola Facility Basin Sizing*NY-Agricola 24-hr S1 100-yr Rainfall=5.49"*

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Stage-Area-Storage for Pond 25P:

Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,218.00	0.360	0.000
1,218.05	0.362	0.018
1,218.10	0.364	0.036
1,218.15	0.366	0.054
1,218.20	0.368	0.073
1,218.25	0.370	0.091
1,218.30	0.372	0.110
1,218.35	0.374	0.128
1,218.40	0.376	0.147
1,218.45	0.378	0.166
1,218.50	0.380	0.185
1,218.55	0.382	0.204
1,218.60	0.384	0.223
1,218.65	0.386	0.242
1,218.70	0.388	0.262
1,218.75	0.390	0.281
1,218.80	0.392	0.301
1,218.85	0.394	0.320
1,218.90	0.396	0.340
1,218.95	0.398	0.360
1,219.00	0.400	0.380
1,219.05	0.402	0.400
1,219.10	0.404	0.420
1,219.15	0.406	0.440
1,219.20	0.408	0.461
1,219.25	0.410	0.481
1,219.30	0.412	0.502
1,219.35	0.414	0.522
1,219.40	0.416	0.543
1,219.45	0.418	0.564
1,219.50	0.420	0.585
1,219.55	0.422	0.606
1,219.60	0.424	0.627
1,219.65	0.426	0.648
1,219.70	0.428	0.670
1,219.75	0.430	0.691
1,219.80	0.432	0.713
1,219.85	0.434	0.734
1,219.90	0.436	0.756
1,219.95	0.438	0.778
1,220.00	0.440	0.800
1,220.05	0.446	0.822
1,220.10	0.452	0.845
1,220.15	0.458	0.867
1,220.20	0.464	0.890
1,220.25	0.470	0.914
1,220.30	0.476	0.937
1,220.35	0.482	0.961
1,220.40	0.488	0.986
1,220.45	0.494	1.010
1,220.50	0.500	1.035

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Pond 31P: POI Basin

Inflow Area = 3.920 ac, 38.27% Impervious, Inflow Depth = 3.13" for 100-yr event
 Inflow = 14.86 cfs @ 12.12 hrs, Volume= 1.023 af
 Outflow = 0.36 cfs @ 17.84 hrs, Volume= 0.594 af, Atten= 98%, Lag= 343.7 min
 Primary = 0.17 cfs @ 17.84 hrs, Volume= 0.520 af
 Secondary = 0.19 cfs @ 17.84 hrs, Volume= 0.073 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,246.53' @ 17.84 hrs Surf.Area= 0.341 ac Storage= 0.756 af

Plug-Flow detention time= 932.8 min calculated for 0.594 af (58% of inflow)
 Center-of-Mass det. time= 815.4 min (1,650.0 - 834.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,244.00'	0.920 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,244.00	0.260	0.000	0.000
1,245.00	0.290	0.275	0.275
1,246.00	0.320	0.305	0.580
1,247.00	0.360	0.340	0.920

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,246.50'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Device 3	1,244.00'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.05'
#3	Primary	1,241.00'	6.0" Round Culvert L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,241.00' / 1,240.00' S= 0.0200 ' /' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.17 cfs @ 17.84 hrs HW=1,246.53' (Free Discharge)

↑ **3=Culvert** (Passes 0.17 cfs of 1.15 cfs potential flow)

↑ **2=Exfiltration** (Exfiltration Controls 0.17 cfs)

Secondary OutFlow Max=0.17 cfs @ 17.84 hrs HW=1,246.53' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.51 fps)

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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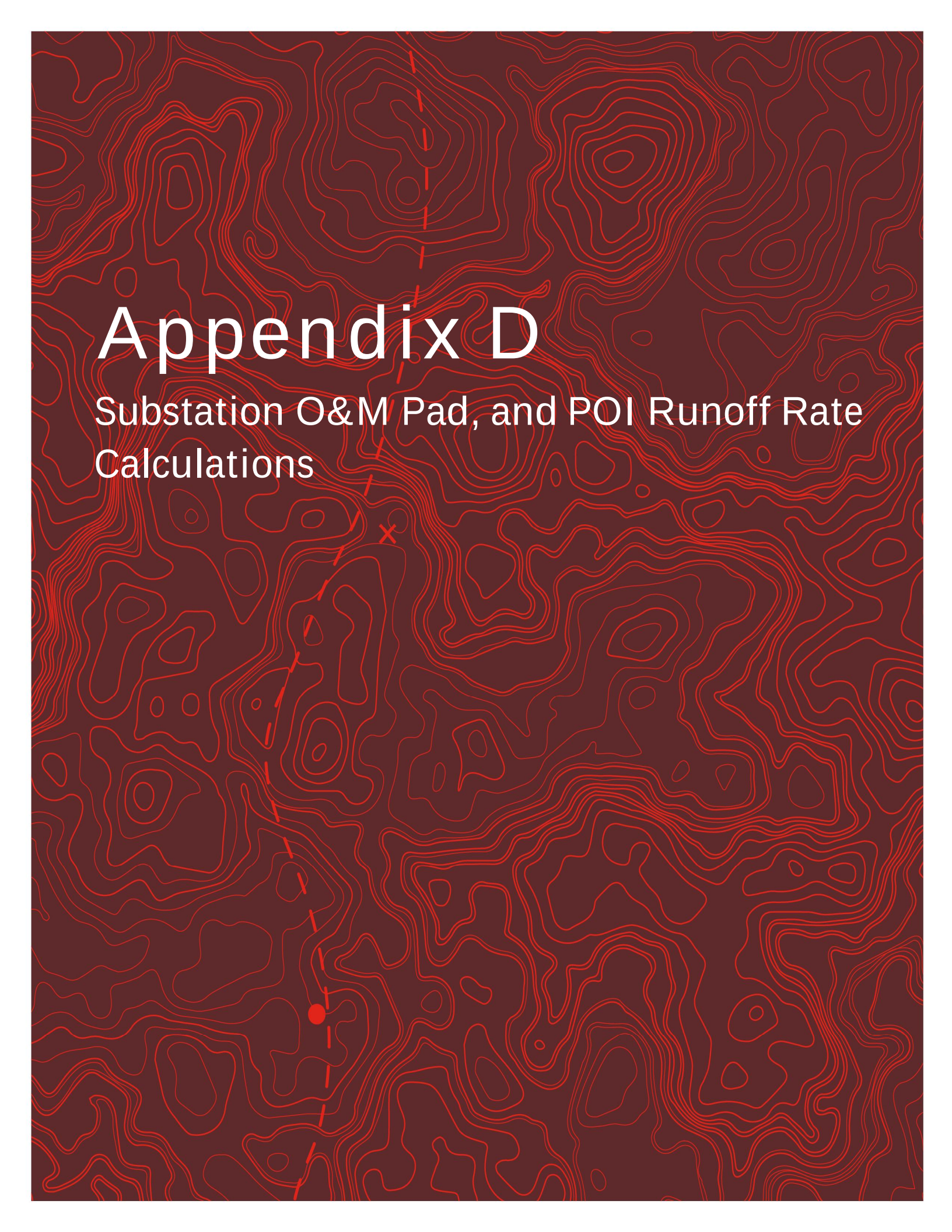
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Stage-Area-Storage for Pond 31P: POI Basin

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,244.00	0.260	0.000	1,246.70	0.348	0.814
1,244.05	0.261	0.013	1,246.75	0.350	0.831
1,244.10	0.263	0.026	1,246.80	0.352	0.849
1,244.15	0.265	0.039	1,246.85	0.354	0.866
1,244.20	0.266	0.053	1,246.90	0.356	0.884
1,244.25	0.267	0.066	1,246.95	0.358	0.902
1,244.30	0.269	0.079	1,247.00	0.360	0.920
1,244.35	0.270	0.093			
1,244.40	0.272	0.106			
1,244.45	0.274	0.120			
1,244.50	0.275	0.134			
1,244.55	0.276	0.148			
1,244.60	0.278	0.161			
1,244.65	0.280	0.175			
1,244.70	0.281	0.189			
1,244.75	0.283	0.203			
1,244.80	0.284	0.218			
1,244.85	0.285	0.232			
1,244.90	0.287	0.246			
1,244.95	0.289	0.261			
1,245.00	0.290	0.275			
1,245.05	0.291	0.290			
1,245.10	0.293	0.304			
1,245.15	0.295	0.319			
1,245.20	0.296	0.334			
1,245.25	0.297	0.348			
1,245.30	0.299	0.363			
1,245.35	0.300	0.378			
1,245.40	0.302	0.393			
1,245.45	0.304	0.409			
1,245.50	0.305	0.424			
1,245.55	0.306	0.439			
1,245.60	0.308	0.454			
1,245.65	0.310	0.470			
1,245.70	0.311	0.485			
1,245.75	0.312	0.501			
1,245.80	0.314	0.517			
1,245.85	0.315	0.532			
1,245.90	0.317	0.548			
1,245.95	0.319	0.564			
1,246.00	0.320	0.580			
1,246.05	0.322	0.596			
1,246.10	0.324	0.612			
1,246.15	0.326	0.628			
1,246.20	0.328	0.645			
1,246.25	0.330	0.661			
1,246.30	0.332	0.678			
1,246.35	0.334	0.694			
1,246.40	0.336	0.711			
1,246.45	0.338	0.728			
1,246.50	0.340	0.745			
1,246.55	0.342	0.762			
1,246.60	0.344	0.779			
1,246.65	0.346	0.796			

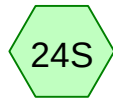


Appendix D

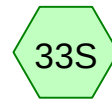
Substation O&M Pad, and POI Runoff Rate
Calculations



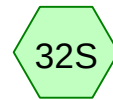
Substation and O&M
Location - Existing



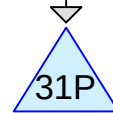
Substation and O&M
Location - Proposed



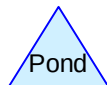
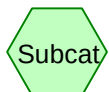
POI - Existing



POI - Proposed



POI Basin



Routing Diagram for 2024-04-16 Agricola Facility Basin Sizing
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2024-04-16 Agricola Facility Basin Sizing

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Project Notes

Copied 7 events from NY-Agricola 24-hr S1 storm

2024-04-16 Agricola Facility Basin Sizing

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
10.720	58	Meadow, non-grazed, HSG B (23S, 24S, 32S, 33S)
2.420	78	Meadow, non-grazed, HSG D (23S, 24S, 32S, 33S)
3.700	98	Paved parking, HSG B (24S, 32S)
16.840	70	TOTAL AREA

2024-04-16 Agricola Facility Basin Sizing

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
14.420	HSG B	23S, 24S, 32S, 33S
0.000	HSG C	
2.420	HSG D	23S, 24S, 32S, 33S
0.000	Other	
16.840		TOTAL AREA

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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Summary for Subcatchment 23S: Substation and O&M Location - Existing

Runoff = 1.44 cfs @ 12.25 hrs, Volume= 0.197 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

Area (ac)	CN	Description
0.170	78	Meadow, non-grazed, HSG D
4.330	58	Meadow, non-grazed, HSG B
4.500	59	Weighted Average
4.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	683	0.0590	0.66		Lag/CN Method,

Summary for Subcatchment 24S: Substation and O&M Location - ProposedRunoff = 8.89 cfs @ 12.10 hrs, Volume= 0.584 af, Depth= 1.56"
Routed to Pond 25P :Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

Area (ac)	CN	Description
0.160	78	Meadow, non-grazed, HSG D
2.200	98	Paved parking, HSG B
2.140	58	Meadow, non-grazed, HSG B
4.500	78	Weighted Average
2.300		51.11% Pervious Area
2.200		48.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	683	0.0590	1.11		Lag/CN Method,

Summary for Subcatchment 32S: POI - ProposedRunoff = 7.13 cfs @ 12.12 hrs, Volume= 0.509 af, Depth= 1.56"
Routed to Pond 31P : POI BasinRunoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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Area (ac)	CN	Description
1.500	98	Paved parking, HSG B
0.870	78	Meadow, non-grazed, HSG D
1.550	58	Meadow, non-grazed, HSG B
3.920	78	Weighted Average
2.420		61.73% Pervious Area
1.500		38.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	661	0.0400	0.91		Lag/CN Method,

Summary for Subcatchment 33S: POI - Existing

Runoff = 2.31 cfs @ 12.22 hrs, Volume= 0.244 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

Area (ac)	CN	Description
1.220	78	Meadow, non-grazed, HSG D
2.700	58	Meadow, non-grazed, HSG B
3.920	64	Weighted Average
3.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	615	0.0400	0.61		Lag/CN Method,

Summary for Pond 25P:

Inflow Area = 4.500 ac, 48.89% Impervious, Inflow Depth = 1.56" for 10-yr event
 Inflow = 8.89 cfs @ 12.10 hrs, Volume= 0.584 af
 Outflow = 0.12 cfs @ 24.09 hrs, Volume= 0.367 af, Atten= 99%, Lag= 719.4 min
 Discarded = 0.12 cfs @ 24.09 hrs, Volume= 0.367 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,219.18' @ 24.09 hrs Surf.Area= 0.407 ac Storage= 0.452 af

Plug-Flow detention time= 1,028.8 min calculated for 0.367 af (63% of inflow)
 Center-of-Mass det. time= 907.6 min (1,763.3 - 855.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,218.00'	1.035 af	Custom Stage Data (Prismatic) Listed below (Recalc)

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,218.00	0.360	0.000	0.000
1,219.00	0.400	0.380	0.380
1,220.00	0.440	0.420	0.800
1,220.50	0.500	0.235	1.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,220.00'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	1,218.00'	0.300 in/hr Exfiltration over Surface area Phase-In= 0.05'

Discarded OutFlow Max=0.12 cfs @ 24.09 hrs HW=1,219.18' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.12 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=1,218.00' (Free Discharge)↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond 31P: POI Basin**

Inflow Area = 3.920 ac, 38.27% Impervious, Inflow Depth = 1.56" for 10-yr event
 Inflow = 7.13 cfs @ 12.12 hrs, Volume= 0.509 af
 Outflow = 0.15 cfs @ 21.16 hrs, Volume= 0.442 af, Atten= 98%, Lag= 542.7 min
 Primary = 0.15 cfs @ 21.16 hrs, Volume= 0.442 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Peak Elev= 1,245.26' @ 21.16 hrs Surf.Area= 0.298 ac Storage= 0.352 af

Plug-Flow detention time= 960.7 min calculated for 0.441 af (87% of inflow)

Center-of-Mass det. time= 896.8 min (1,754.1 - 857.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,244.00'	0.920 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,244.00	0.260	0.000	0.000
1,245.00	0.290	0.275	0.275
1,246.00	0.320	0.305	0.580
1,247.00	0.360	0.340	0.920

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,246.50'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Device 3	1,244.00'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.05'
#3	Primary	1,241.00'	6.0" Round Culvert L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,241.00' / 1,240.00' S= 0.0200 ' /' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.20 sf

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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Primary OutFlow Max=0.15 cfs @ 21.16 hrs HW=1,245.26' (Free Discharge)

↑ **3=Culvert** (Passes 0.15 cfs of 1.02 cfs potential flow)

↑ **2=Exfiltration** (Exfiltration Controls 0.15 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,244.00' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Subcatchment 23S: Substation and O&M Location - Existing

Runoff = 6.12 cfs @ 12.21 hrs, Volume= 0.571 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.170	78	Meadow, non-grazed, HSG D
4.330	58	Meadow, non-grazed, HSG B
4.500	59	Weighted Average
4.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	683	0.0590	0.66		Lag/CN Method,

Summary for Subcatchment 24S: Substation and O&M Location - ProposedRunoff = 18.52 cfs @ 12.09 hrs, Volume= 1.175 af, Depth= 3.13"
Routed to Pond 25P :Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.160	78	Meadow, non-grazed, HSG D
2.200	98	Paved parking, HSG B
2.140	58	Meadow, non-grazed, HSG B
4.500	78	Weighted Average
2.300		51.11% Pervious Area
2.200		48.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	683	0.0590	1.11		Lag/CN Method,

Summary for Subcatchment 32S: POI - ProposedRunoff = 14.86 cfs @ 12.12 hrs, Volume= 1.023 af, Depth= 3.13"
Routed to Pond 31P : POI BasinRunoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Area (ac)	CN	Description
1.500	98	Paved parking, HSG B
0.870	78	Meadow, non-grazed, HSG D
1.550	58	Meadow, non-grazed, HSG B
3.920	78	Weighted Average
2.420		61.73% Pervious Area
1.500		38.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	661	0.0400	0.91		Lag/CN Method,

Summary for Subcatchment 33S: POI - Existing

Runoff = 7.19 cfs @ 12.19 hrs, Volume= 0.623 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
1.220	78	Meadow, non-grazed, HSG D
2.700	58	Meadow, non-grazed, HSG B
3.920	64	Weighted Average
3.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	615	0.0400	0.61		Lag/CN Method,

Summary for Pond 25P:

Inflow Area = 4.500 ac, 48.89% Impervious, Inflow Depth = 3.13" for 100-yr event
 Inflow = 18.52 cfs @ 12.09 hrs, Volume= 1.175 af
 Outflow = 0.57 cfs @ 15.64 hrs, Volume= 0.622 af, Atten= 97%, Lag= 213.1 min
 Discarded = 0.14 cfs @ 15.64 hrs, Volume= 0.416 af
 Primary = 0.44 cfs @ 15.64 hrs, Volume= 0.206 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,220.06' @ 15.64 hrs Surf.Area= 0.447 ac Storage= 0.828 af

Plug-Flow detention time= 802.4 min calculated for 0.622 af (53% of inflow)
 Center-of-Mass det. time= 681.4 min (1,514.3 - 832.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,218.00'	1.035 af	Custom Stage Data (Prismatic) Listed below (Recalc)

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,218.00	0.360	0.000	0.000
1,219.00	0.400	0.380	0.380
1,220.00	0.440	0.420	0.800
1,220.50	0.500	0.235	1.035

Device	Routing	Invert	Outlet Devices
#1	Primary	1,220.00'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Discarded	1,218.00'	0.300 in/hr Exfiltration over Surface area Phase-In= 0.05'

Discarded OutFlow Max=0.14 cfs @ 15.64 hrs HW=1,220.06' (Free Discharge)↑**2=Exfiltration** (Exfiltration Controls 0.14 cfs)**Primary OutFlow** Max=0.43 cfs @ 15.64 hrs HW=1,220.06' (Free Discharge)↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 0.70 fps)**Summary for Pond 31P: POI Basin**

Inflow Area = 3.920 ac, 38.27% Impervious, Inflow Depth = 3.13" for 100-yr event
 Inflow = 14.86 cfs @ 12.12 hrs, Volume= 1.023 af
 Outflow = 0.36 cfs @ 17.84 hrs, Volume= 0.594 af, Atten= 98%, Lag= 343.7 min
 Primary = 0.17 cfs @ 17.84 hrs, Volume= 0.520 af
 Secondary = 0.19 cfs @ 17.84 hrs, Volume= 0.073 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Peak Elev= 1,246.53' @ 17.84 hrs Surf.Area= 0.341 ac Storage= 0.756 af

Plug-Flow detention time= 932.8 min calculated for 0.594 af (58% of inflow)

Center-of-Mass det. time= 815.4 min (1,650.0 - 834.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,244.00'	0.920 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,244.00	0.260	0.000	0.000
1,245.00	0.290	0.275	0.275
1,246.00	0.320	0.305	0.580
1,247.00	0.360	0.340	0.920

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,246.50'	10.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#2	Device 3	1,244.00'	0.500 in/hr Exfiltration over Surface area Phase-In= 0.05'
#3	Primary	1,241.00'	6.0" Round Culvert L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,241.00' / 1,240.00' S= 0.0200 ' /' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.20 sf

2024-04-16 Agricola Facility Basin Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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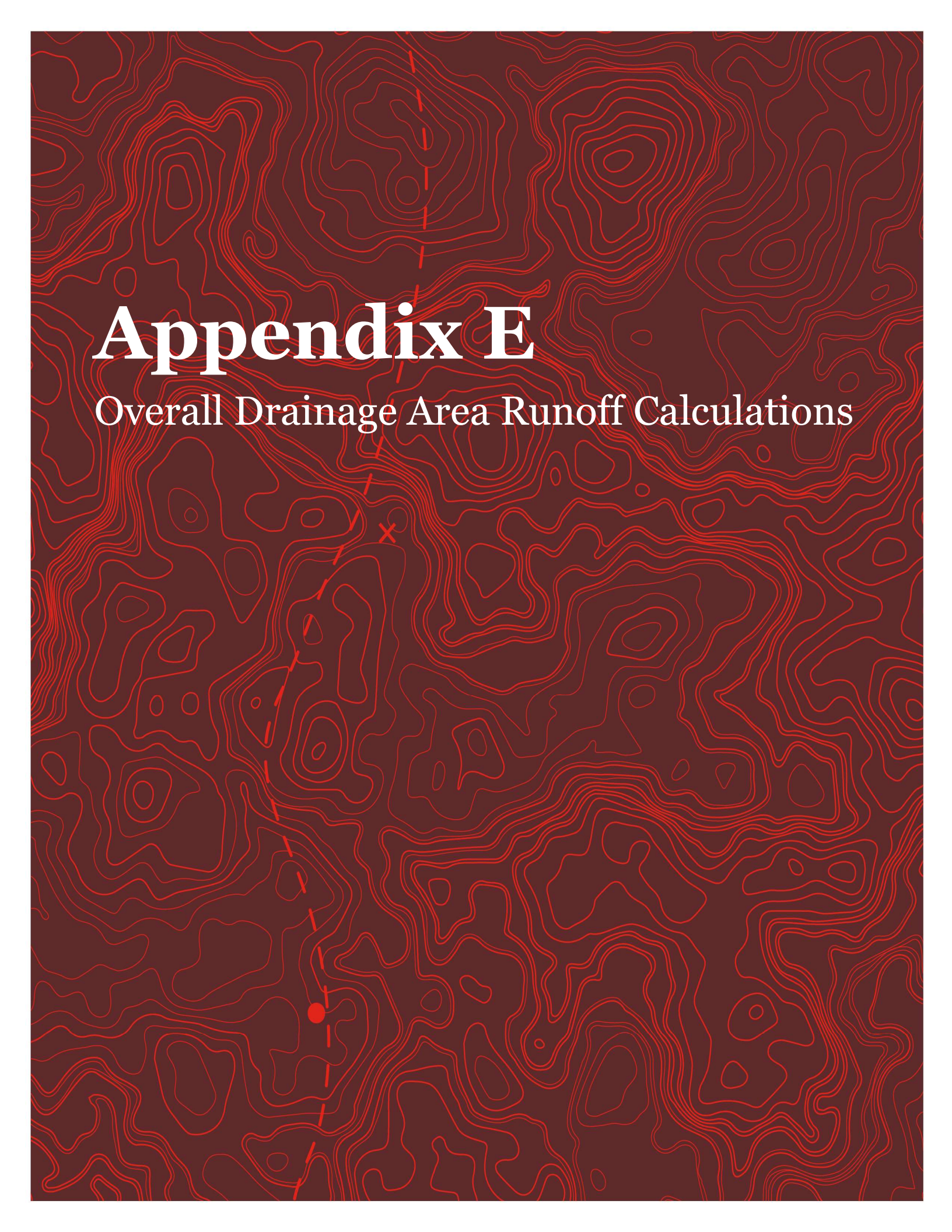
Primary OutFlow Max=0.17 cfs @ 17.84 hrs HW=1,246.53' (Free Discharge)

↑ **3=Culvert** (Passes 0.17 cfs of 1.15 cfs potential flow)

↑ **2=Exfiltration** (Exfiltration Controls 0.17 cfs)

Secondary OutFlow Max=0.17 cfs @ 17.84 hrs HW=1,246.53' (Free Discharge)

↑ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.51 fps)



Appendix E

Overall Drainage Area Runoff Calculations

Existing

Proposed



DA01- West



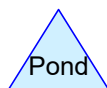
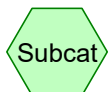
DA02- East



DA01- West



DA02- East



Routing Diagram for 2024-04-25 Agricola PrePost Analysis
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2024-04-25 Agricola PrePost Analysis

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	NY-Agricola 24-hr S1	1-yr	Default	24.00	1	1.96	2
2	10-yr	NY-Agricola 24-hr S1	10-yr	Default	24.00	1	3.58	2
3	100-yr	NY-Agricola 24-hr S1	100-yr	Default	24.00	1	5.49	2

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5,809.400	76	Weighted (1ES, 1PS)
2,540.400	79	Weighted (2ES, 2PS)
8,349.800	77	TOTAL AREA

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	8,349.800	8,349.800	Weighted	1ES, 1PS, 2ES, 2PS
0.000	0.000	0.000	0.000	8,349.800	8,349.800	TOTAL AREA	

2024-04-25 Agricola PrePost Analysis

NY-Agricola 24-hr S1 1-yr Rainfall=1.96"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1ES: DA01- West Runoff Area=2,904.700 ac 0.00% Impervious Runoff Depth=0.39"
Flow Length=10,243' Slope=0.0230 '/' Tc=152.0 min CN=76 Runoff=228.45 cfs 95.214 af

Subcatchment 1PS: DA01- West Runoff Area=2,904.700 ac 0.00% Impervious Runoff Depth=0.39"
Flow Length=10,243' Slope=0.0230 '/' Tc=152.0 min CN=76 Runoff=228.45 cfs 95.214 af

Subcatchment 2ES: DA02- East Runoff Area=1,270.200 ac 0.00% Impervious Runoff Depth=0.50"
Flow Length=8,870' Slope=0.0160 '/' Tc=148.5 min CN=79 Runoff=139.56 cfs 52.845 af

Subcatchment 2PS: DA02- East Runoff Area=1,270.200 ac 0.00% Impervious Runoff Depth=0.50"
Flow Length=8,870' Slope=0.0160 '/' Tc=148.5 min CN=79 Runoff=139.56 cfs 52.845 af

Total Runoff Area = 8,349.800 ac Runoff Volume = 296.118 af Average Runoff Depth = 0.43"
100.00% Pervious = 8,349.800 ac 0.00% Impervious = 0.000 ac

2024-04-25 Agricola PrePost Analysis

NY-Agricola 24-hr S1 1-yr Rainfall=1.96"

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Summary for Subcatchment 1ES: DA01- West

Runoff = 228.45 cfs @ 14.35 hrs, Volume= 95.214 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 1-yr Rainfall=1.96"

Area (ac)	CN	Description
* 2,904.700	76	Weighted
2,904.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
152.0	10,243	0.0230	1.12		Lag/CN Method,

Summary for Subcatchment 1PS: DA01- West

Runoff = 228.45 cfs @ 14.35 hrs, Volume= 95.214 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 1-yr Rainfall=1.96"

Area (ac)	CN	Description
* 2,904.700	76	Weighted
2,904.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
152.0	10,243	0.0230	1.12		Lag/CN Method,

Summary for Subcatchment 2ES: DA02- East

Runoff = 139.56 cfs @ 14.03 hrs, Volume= 52.845 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 1-yr Rainfall=1.96"

Area (ac)	CN	Description
* 1,270.200	79	Weighted
1,270.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
148.5	8,870	0.0160	1.00		Lag/CN Method,

2024-04-25 Agricola PrePost Analysis

NY-Agricola 24-hr S1 1-yr Rainfall=1.96"

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Summary for Subcatchment 2PS: DA02- East

Runoff = 139.56 cfs @ 14.03 hrs, Volume= 52.845 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

NY-Agricola 24-hr S1 1-yr Rainfall=1.96"

Area (ac)	CN	Description
* 1,270.200	79	Weighted
1,270.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
148.5	8,870	0.0160	1.00		Lag/CN Method,

2024-04-25 Agricola PrePost Analysis*NY-Agricola 24-hr S1 10-yr Rainfall=3.58"*

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1ES: DA01- West Runoff Area=2,904.700 ac 0.00% Impervious Runoff Depth=1.42"
Flow Length=10,243' Slope=0.0230 '/' Tc=152.0 min CN=76 Runoff=1,005.26 cfs 344.604 af

Subcatchment 1PS: DA01- West Runoff Area=2,904.700 ac 0.00% Impervious Runoff Depth=1.42"
Flow Length=10,243' Slope=0.0230 '/' Tc=152.0 min CN=76 Runoff=1,005.26 cfs 344.604 af

Subcatchment 2ES: DA02- East Runoff Area=1,270.200 ac 0.00% Impervious Runoff Depth=1.63"
Flow Length=8,870' Slope=0.0160 '/' Tc=148.5 min CN=79 Runoff=523.08 cfs 172.364 af

Subcatchment 2PS: DA02- East Runoff Area=1,270.200 ac 0.00% Impervious Runoff Depth=1.63"
Flow Length=8,870' Slope=0.0160 '/' Tc=148.5 min CN=79 Runoff=523.08 cfs 172.364 af

Total Runoff Area = 8,349.800 ac Runoff Volume = 1,033.934 af Average Runoff Depth = 1.49"
100.00% Pervious = 8,349.800 ac 0.00% Impervious = 0.000 ac

2024-04-25 Agricola PrePost Analysis

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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Summary for Subcatchment 1ES: DA01- West

Runoff = 1,005.26 cfs @ 14.02 hrs, Volume= 344.604 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

Area (ac)	CN	Description
* 2,904.700	76	Weighted
2,904.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
152.0	10,243	0.0230	1.12		Lag/CN Method,

Summary for Subcatchment 1PS: DA01- West

Runoff = 1,005.26 cfs @ 14.02 hrs, Volume= 344.604 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

Area (ac)	CN	Description
* 2,904.700	76	Weighted
2,904.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
152.0	10,243	0.0230	1.12		Lag/CN Method,

Summary for Subcatchment 2ES: DA02- East

Runoff = 523.08 cfs @ 14.02 hrs, Volume= 172.364 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

Area (ac)	CN	Description
* 1,270.200	79	Weighted
1,270.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
148.5	8,870	0.0160	1.00		Lag/CN Method,

2024-04-25 Agricola PrePost Analysis

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

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Summary for Subcatchment 2PS: DA02- East

Runoff = 523.08 cfs @ 14.02 hrs, Volume= 172.364 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

NY-Agricola 24-hr S1 10-yr Rainfall=3.58"

Area (ac)	CN	Description
* 1,270.200	79	Weighted
1,270.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
148.5	8,870	0.0160	1.00		Lag/CN Method,

2024-04-25 Agricola PrePost Analysis

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1ES: DA01- West Runoff Area=2,904.700 ac 0.00% Impervious Runoff Depth=2.94"
Flow Length=10,243' Slope=0.0230 '/' Tc=152.0 min CN=76 Runoff=2,173.96 cfs 712.747 af

Subcatchment 1PS: DA01- West Runoff Area=2,904.700 ac 0.00% Impervious Runoff Depth=2.94"
Flow Length=10,243' Slope=0.0230 '/' Tc=152.0 min CN=76 Runoff=2,173.96 cfs 712.747 af

Subcatchment 2ES: DA02- East Runoff Area=1,270.200 ac 0.00% Impervious Runoff Depth=3.23"
Flow Length=8,870' Slope=0.0160 '/' Tc=148.5 min CN=79 Runoff=1,064.55 cfs 341.669 af

Subcatchment 2PS: DA02- East Runoff Area=1,270.200 ac 0.00% Impervious Runoff Depth=3.23"
Flow Length=8,870' Slope=0.0160 '/' Tc=148.5 min CN=79 Runoff=1,064.55 cfs 341.669 af

Total Runoff Area = 8,349.800 ac Runoff Volume = 2,108.833 af Average Runoff Depth = 3.03"
100.00% Pervious = 8,349.800 ac 0.00% Impervious = 0.000 ac

2024-04-25 Agricola PrePost Analysis

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Subcatchment 1ES: DA01- West

Runoff = 2,173.96 cfs @ 14.02 hrs, Volume= 712.747 af, Depth= 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
* 2,904.700	76	Weighted
2,904.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
152.0	10,243	0.0230	1.12		Lag/CN Method,

Summary for Subcatchment 1PS: DA01- West

Runoff = 2,173.96 cfs @ 14.02 hrs, Volume= 712.747 af, Depth= 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
* 2,904.700	76	Weighted
2,904.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
152.0	10,243	0.0230	1.12		Lag/CN Method,

Summary for Subcatchment 2ES: DA02- East

Runoff = 1,064.55 cfs @ 14.02 hrs, Volume= 341.669 af, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
* 1,270.200	79	Weighted
1,270.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
148.5	8,870	0.0160	1.00		Lag/CN Method,

2024-04-25 Agricola PrePost Analysis

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Subcatchment 2PS: DA02- East

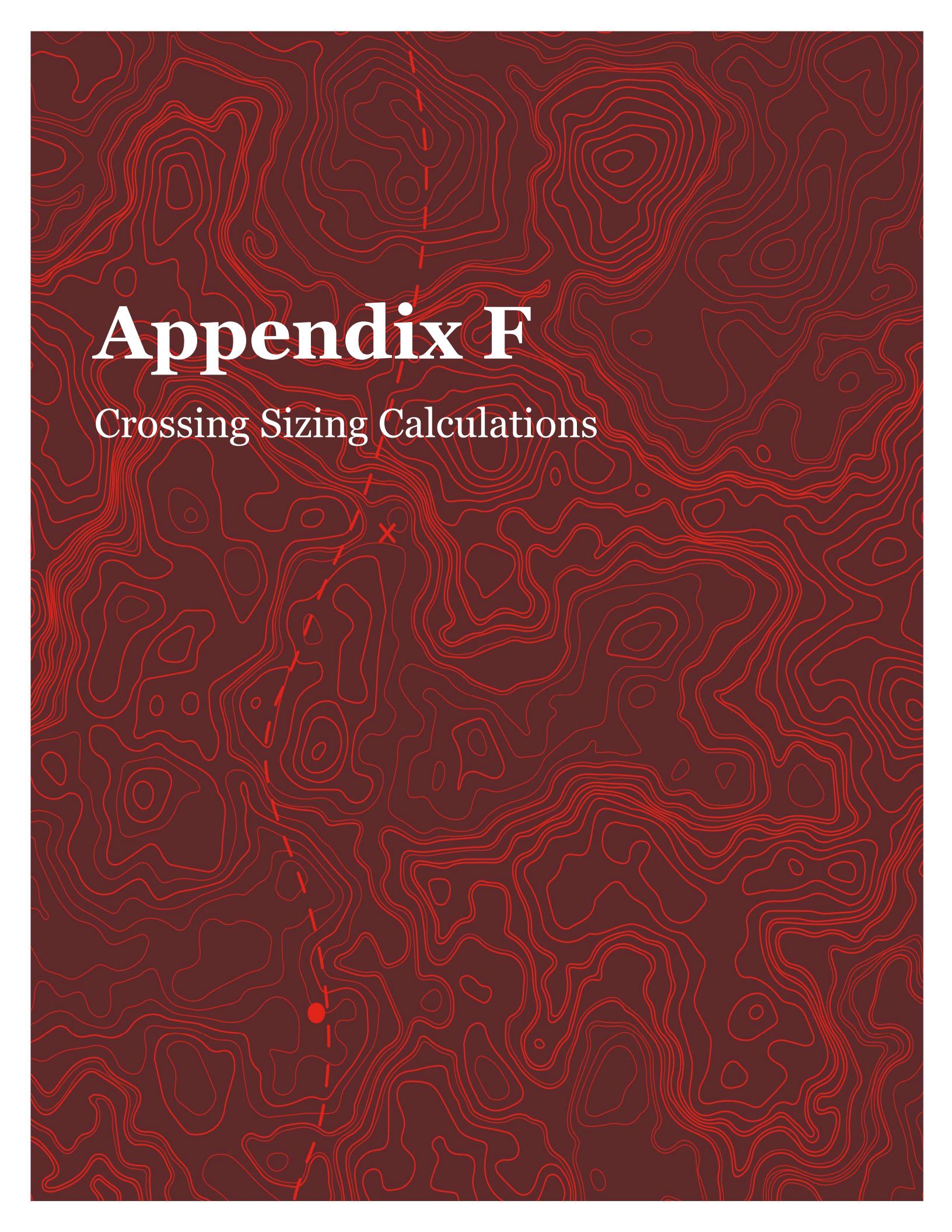
Runoff = 1,064.55 cfs @ 14.02 hrs, Volume= 341.669 af, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
* 1,270.200	79	Weighted
1,270.200		100.00% Pervious Area

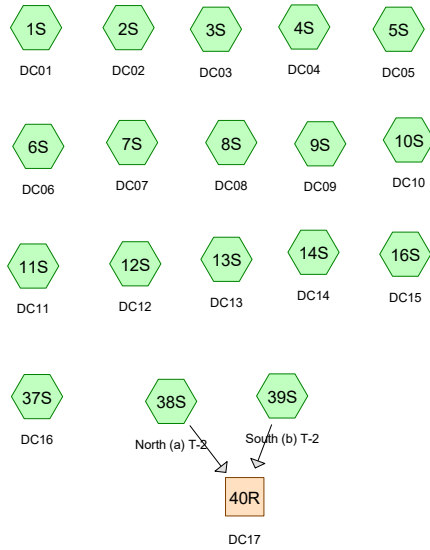
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
148.5	8,870	0.0160	1.00		Lag/CN Method,

The background of the page is a dark red color with a complex pattern of lighter red, wavy contour lines, resembling a topographic map. A dashed red line runs diagonally from the top left towards the bottom center. A solid red dot is located on this dashed line in the lower-left quadrant, and a red 'X' is located further up and to the right, also on the dashed line.

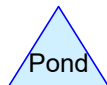
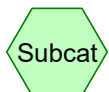
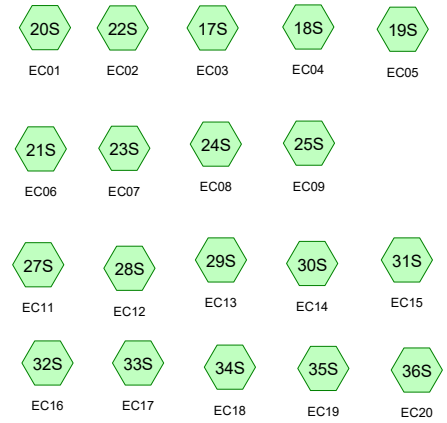
Appendix F

Crossing Sizing Calculations

Internal Crossings



Entrance Culvert



2024-04-10 Agricola Crossing Sizing

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	100-yr	NY-Agricola 24-hr S1	100-yr	Default	24.00	1	5.49	2

2024-04-10 Agricola Crossing Sizing

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
15.200	92	1/8 acre lots, 65% imp, HSG D (1S)
3.020	85	Gravel roads, HSG B (18S, 19S, 21S, 24S, 25S, 29S, 31S, 36S)
2.300	91	Gravel roads, HSG D (17S, 24S, 29S, 34S, 36S)
1.000	67	Row crops, straight row, Good, HSG A (12S)
852.710	78	Row crops, straight row, Good, HSG B (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 12S, 13S, 14S, 16S, 20S, 22S, 23S, 27S, 30S, 32S, 35S, 37S, 38S, 39S)
1,382.230	89	Row crops, straight row, Good, HSG D (1S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 16S, 22S, 27S, 28S, 30S, 32S, 33S, 35S, 37S, 38S, 39S)
4.200	98	Unconnected pavement, HSG D (3S)
2,260.660	85	TOTAL AREA

2024-04-10 Agricola Crossing Sizing

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	15.200	0.000	15.200	1/8 acre lots, 65% imp	1S
0.000	3.020	0.000	2.300	0.000	5.320	Gravel roads	17S
							,
							18S
							,
							19S
							,
							21S
							,
							24S
							,
							25S
							,
							29S
							,
							31S
							,
							34S
							,
							36S
1.000	852.710	0.000	1,382.230	0.000	2,235.940	Row crops, straight row, Good	1S,
							2S,
							3S,
							4S,
							5S,
							6S,
							7S,
							8S,
							9S,
							10S
							,
							11S
							,
							12S
							,
							13S
							,
							14S
							,
							16S
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							20S
							,
							22S
							,
							23S

2024-04-10 Agricola Crossing Sizing

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Ground Covers (selected nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	4.200	0.000	4.200	Unconnected pavement	3S
1.000	855.730	0.000	1,403.930	0.000	2,260.660	TOTAL AREA	

2024-04-10 Agricola Crossing Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: DC01	Runoff Area=499.700 ac 1.98% Impervious Runoff Depth>3.19"
Flow Length=10,032' Slope=0.0190 '/' Tc=132.4 min CN=83	Runoff=508.58 cfs 132.691 af
Subcatchment 2S: DC02	Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>2.86"
Flow Length=988' Slope=0.0180 '/' Tc=24.9 min CN=78	Runoff=21.91 cfs 2.027 af
Subcatchment 3S: DC03	Runoff Area=266.000 ac 1.58% Impervious Runoff Depth>3.44"
Flow Length=6,758' Slope=0.0180 '/' Tc=92.6 min CN=85	Runoff=366.79 cfs 76.275 af
Subcatchment 4S: DC04	Runoff Area=54.200 ac 0.00% Impervious Runoff Depth>3.18"
Flow Length=3,072' Slope=0.0100 '/' Tc=73.2 min CN=82	Runoff=81.66 cfs 14.345 af
Subcatchment 5S: DC05	Runoff Area=24.500 ac 0.00% Impervious Runoff Depth>3.52"
Flow Length=1,378' Slope=0.0100 '/' Tc=34.8 min CN=85	Runoff=63.10 cfs 7.184 af
Subcatchment 6S: DC06	Runoff Area=323.900 ac 0.00% Impervious Runoff Depth>3.41"
Flow Length=9,028' Slope=0.0200 '/' Tc=110.8 min CN=85	Runoff=395.67 cfs 92.158 af
Subcatchment 7S: DC07	Runoff Area=281.600 ac 0.00% Impervious Runoff Depth>3.54"
Flow Length=7,920' Slope=0.0200 '/' Tc=96.3 min CN=86	Runoff=386.43 cfs 82.961 af
Subcatchment 8S: DC08	Runoff Area=203.300 ac 0.00% Impervious Runoff Depth>3.47"
Flow Length=5,121' Slope=0.0050 '/' Tc=135.8 min CN=86	Runoff=219.50 cfs 58.858 af
Subcatchment 9S: DC09	Runoff Area=167.200 ac 0.00% Impervious Runoff Depth>3.57"
Flow Length=3,690' Slope=0.0100 '/' Tc=73.9 min CN=86	Runoff=275.90 cfs 49.701 af
Subcatchment 10S: DC10	Runoff Area=37.100 ac 0.00% Impervious Runoff Depth>3.63"
Flow Length=1,937' Slope=0.0240 '/' Tc=28.5 min CN=86	Runoff=109.90 cfs 11.213 af
Subcatchment 11S: DC11	Runoff Area=7.500 ac 0.00% Impervious Runoff Depth>3.94"
Flow Length=1,165' Slope=0.0250 '/' Tc=16.6 min CN=89	Runoff=31.86 cfs 2.465 af
Subcatchment 12S: DC12	Runoff Area=24.100 ac 0.00% Impervious Runoff Depth>3.74"
Flow Length=2,193' Slope=0.0500 '/' Tc=21.0 min CN=87	Runoff=86.77 cfs 7.505 af
Subcatchment 13S: DC13	Runoff Area=18.500 ac 0.00% Impervious Runoff Depth>3.32"
Flow Length=2,539' Slope=0.0360 '/' Tc=32.0 min CN=83	Runoff=47.55 cfs 5.126 af
Subcatchment 14S: DC14	Runoff Area=39.800 ac 0.00% Impervious Runoff Depth>3.62"
Flow Length=2,069' Slope=0.0180 '/' Tc=34.7 min CN=86	Runoff=105.22 cfs 12.003 af
Subcatchment 16S: DC15	Runoff Area=56.800 ac 0.00% Impervious Runoff Depth>3.72"
Flow Length=3,042' Slope=0.0310 '/' Tc=34.7 min CN=87	Runoff=153.62 cfs 17.608 af
Subcatchment 17S: EC03	Runoff Area=1.000 ac 0.00% Impervious Runoff Depth>4.15"
Flow Length=1,114' Slope=0.0250 '/' Tc=14.8 min CN=91	Runoff=4.69 cfs 0.345 af

2024-04-10 Agricola Crossing Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Subcatchment 18S: EC04	Runoff Area=0.500 ac 0.00% Impervious Runoff Depth>3.55"
Flow Length=632' Slope=0.0210 '/' Tc=12.9 min CN=85	Runoff=2.19 cfs 0.148 af
Subcatchment 19S: EC05	Runoff Area=0.420 ac 0.00% Impervious Runoff Depth>3.55"
Flow Length=232' Slope=0.0170 '/' Tc=6.4 min CN=85	Runoff=2.48 cfs 0.124 af
Subcatchment 20S: EC01	Runoff Area=1.100 ac 0.00% Impervious Runoff Depth>2.88"
Flow Length=351' Slope=0.0310 '/' Tc=8.3 min CN=78	Runoff=4.88 cfs 0.264 af
Subcatchment 21S: EC06	Runoff Area=0.200 ac 0.00% Impervious Runoff Depth>3.55"
Flow Length=430' Slope=0.0130 '/' Tc=12.0 min CN=85	Runoff=0.92 cfs 0.059 af
Subcatchment 22S: EC02	Runoff Area=18.600 ac 0.00% Impervious Runoff Depth>3.63"
Flow Length=2,130' Slope=0.0360 '/' Tc=25.1 min CN=86	Runoff=59.15 cfs 5.628 af
Subcatchment 23S: EC07	Runoff Area=2.000 ac 0.00% Impervious Runoff Depth>2.88"
Flow Length=476' Slope=0.0260 '/' Tc=11.6 min CN=78	Runoff=7.68 cfs 0.479 af
Subcatchment 24S: EC08	Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>3.65"
Flow Length=626' Slope=0.0300 '/' Tc=10.3 min CN=86	Runoff=3.01 cfs 0.182 af
Subcatchment 25S: EC09	Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>3.55"
Flow Length=556' Slope=0.0200 '/' Tc=11.9 min CN=85	Runoff=2.77 cfs 0.177 af
Subcatchment 27S: EC11	Runoff Area=15.700 ac 0.00% Impervious Runoff Depth>3.86"
Flow Length=3,587' Slope=0.0064 '/' Tc=80.6 min CN=89	Runoff=26.13 cfs 5.055 af
Subcatchment 28S: EC12	Runoff Area=13.500 ac 0.00% Impervious Runoff Depth>3.88"
Flow Length=2,243' Slope=0.0041 '/' Tc=69.2 min CN=89	Runoff=24.88 cfs 4.364 af
Subcatchment 29S: EC13	Runoff Area=0.300 ac 0.00% Impervious Runoff Depth>3.76"
Flow Length=238' Slope=0.0240 '/' Tc=5.1 min CN=87	Runoff=1.93 cfs 0.094 af
Subcatchment 30S: EC14	Runoff Area=99.200 ac 0.00% Impervious Runoff Depth>3.36"
Flow Length=49' Slope=0.0200 '/' Tc=1.8 min CN=83	Runoff=695.21 cfs 27.785 af
Subcatchment 31S: EC15	Runoff Area=0.300 ac 0.00% Impervious Runoff Depth>3.56"
Flow Length=134' Slope=0.0130 '/' Tc=4.7 min CN=85	Runoff=1.91 cfs 0.089 af
Subcatchment 32S: EC16	Runoff Area=16.900 ac 0.00% Impervious Runoff Depth>3.41"
Flow Length=1,752' Slope=0.0100 '/' Tc=43.7 min CN=84	Runoff=36.94 cfs 4.800 af
Subcatchment 33S: EC17	Runoff Area=1.200 ac 0.00% Impervious Runoff Depth>3.95"
Flow Length=367' Slope=0.0300 '/' Tc=6.0 min CN=89	Runoff=7.85 cfs 0.395 af
Subcatchment 34S: EC18	Runoff Area=0.800 ac 0.00% Impervious Runoff Depth>4.15"
Flow Length=307' Slope=0.0100 '/' Tc=8.3 min CN=91	Runoff=4.89 cfs 0.277 af
Subcatchment 35S: EC19	Runoff Area=24.300 ac 0.00% Impervious Runoff Depth>3.83"
Flow Length=1,902' Slope=0.0180 '/' Tc=30.1 min CN=88	Runoff=73.06 cfs 7.750 af

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Subcatchment 36S: EC20 Runoff Area=0.600 ac 0.00% Impervious Runoff Depth>3.85"
Flow Length=364' Slope=0.0200 '/' Tc=7.6 min CN=88 Runoff=3.59 cfs 0.193 af

Subcatchment 37S: DC16 Runoff Area=0.640 ac 0.00% Impervious Runoff Depth>3.76"
Flow Length=271' Slope=0.0480 '/' Tc=4.0 min CN=87 Runoff=4.46 cfs 0.200 af

Subcatchment 38S: North (a) T-2 Runoff Area=16.600 ac 0.00% Impervious Runoff Depth>3.05"
Flow Length=1,169' Slope=0.0400 '/' Tc=18.0 min CN=80 Runoff=54.17 cfs 4.226 af

Subcatchment 39S: South (b) T-2 Runoff Area=32.900 ac 0.00% Impervious Runoff Depth>3.15"
Flow Length=1,457' Slope=0.0400 '/' Tc=20.8 min CN=81 Runoff=101.98 cfs 8.625 af

Reach 40R: DC17 Inflow=155.30 cfs 12.851 af
Outflow=155.30 cfs 12.851 af

Total Runoff Area = 2,260.660 ac Runoff Volume = 643.378 af Average Runoff Depth = 3.42"
99.38% Pervious = 2,246.580 ac 0.62% Impervious = 14.080 ac

2024-04-10 Agricola Crossing Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Subcatchment 1S: DC01

Runoff = 508.58 cfs @ 13.69 hrs, Volume= 132.691 af, Depth> 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
206.700	89	Row crops, straight row, Good, HSG D
277.800	78	Row crops, straight row, Good, HSG B
15.200	92	1/8 acre lots, 65% imp, HSG D
499.700	83	Weighted Average
489.820		98.02% Pervious Area
9.880		1.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
132.4	10,032	0.0190	1.26		Lag/CN Method,

Summary for Subcatchment 2S: DC02

Runoff = 21.91 cfs @ 12.29 hrs, Volume= 2.027 af, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
8.500	78	Row crops, straight row, Good, HSG B
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	988	0.0180	0.66		Lag/CN Method,

Summary for Subcatchment 3S: DC03

Runoff = 366.79 cfs @ 13.19 hrs, Volume= 76.275 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
170.300	89	Row crops, straight row, Good, HSG D
91.500	78	Row crops, straight row, Good, HSG B
4.200	98	Unconnected pavement, HSG D
266.000	85	Weighted Average
261.800		98.42% Pervious Area
4.200		1.58% Impervious Area
4.200		100.00% Unconnected

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
92.6	6,758	0.0180	1.22		Lag/CN Method,

Summary for Subcatchment 4S: DC04

Runoff = 81.66 cfs @ 12.94 hrs, Volume= 14.345 af, Depth> 3.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
35.700	78	Row crops, straight row, Good, HSG B
18.500	89	Row crops, straight row, Good, HSG D
54.200	82	Weighted Average
54.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
73.2	3,072	0.0100	0.70		Lag/CN Method,

Summary for Subcatchment 5S: DC05

Runoff = 63.10 cfs @ 12.42 hrs, Volume= 7.184 af, Depth> 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
8.600	78	Row crops, straight row, Good, HSG B
15.900	89	Row crops, straight row, Good, HSG D
24.500	85	Weighted Average
24.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.8	1,378	0.0100	0.66		Lag/CN Method,

Summary for Subcatchment 6S: DC06

Runoff = 395.67 cfs @ 13.41 hrs, Volume= 92.158 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

2024-04-10 Agricola Crossing Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Area (ac)	CN	Description
207.500	89	Row crops, straight row, Good, HSG D
116.400	78	Row crops, straight row, Good, HSG B
323.900	85	Weighted Average
323.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.8	9,028	0.0200	1.36		Lag/CN Method,

Summary for Subcatchment 7S: DC07

Runoff = 386.43 cfs @ 13.19 hrs, Volume= 82.961 af, Depth> 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
69.000	78	Row crops, straight row, Good, HSG B
212.600	89	Row crops, straight row, Good, HSG D
281.600	86	Weighted Average
281.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
96.3	7,920	0.0200	1.37		Lag/CN Method,

Summary for Subcatchment 8S: DC08

Runoff = 219.50 cfs @ 13.73 hrs, Volume= 58.858 af, Depth> 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
150.400	89	Row crops, straight row, Good, HSG D
52.900	78	Row crops, straight row, Good, HSG B
203.300	86	Weighted Average
203.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
135.8	5,121	0.0050	0.63		Lag/CN Method,

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NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Subcatchment 9S: DC09

Runoff = 275.90 cfs @ 12.91 hrs, Volume= 49.701 af, Depth> 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
43.100	78	Row crops, straight row, Good, HSG B
124.100	89	Row crops, straight row, Good, HSG D
167.200	86	Weighted Average
167.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
73.9	3,690	0.0100	0.83		Lag/CN Method,

Summary for Subcatchment 10S: DC10

Runoff = 109.90 cfs @ 12.34 hrs, Volume= 11.213 af, Depth> 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
8.700	78	Row crops, straight row, Good, HSG B
28.400	89	Row crops, straight row, Good, HSG D
37.100	86	Weighted Average
37.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.5	1,937	0.0240	1.13		Lag/CN Method,

Summary for Subcatchment 11S: DC11

Runoff = 31.86 cfs @ 12.17 hrs, Volume= 2.465 af, Depth> 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
7.500	89	Row crops, straight row, Good, HSG D
7.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	1,165	0.0250	1.17		Lag/CN Method,

2024-04-10 Agricola Crossing Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Summary for Subcatchment 12S: DC12

Runoff = 86.77 cfs @ 12.23 hrs, Volume= 7.505 af, Depth> 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
20.800	89	Row crops, straight row, Good, HSG D
2.300	78	Row crops, straight row, Good, HSG B
1.000	67	Row crops, straight row, Good, HSG A
24.100	87	Weighted Average
24.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0	2,193	0.0500	1.74		Lag/CN Method,

Summary for Subcatchment 13S: DC13

Runoff = 47.55 cfs @ 12.38 hrs, Volume= 5.126 af, Depth> 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
9.100	89	Row crops, straight row, Good, HSG D
9.400	78	Row crops, straight row, Good, HSG B
18.500	83	Weighted Average
18.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	2,539	0.0360	1.32		Lag/CN Method,

Summary for Subcatchment 14S: DC14

Runoff = 105.22 cfs @ 12.42 hrs, Volume= 12.003 af, Depth> 3.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
9.500	78	Row crops, straight row, Good, HSG B
30.300	89	Row crops, straight row, Good, HSG D
39.800	86	Weighted Average
39.800		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.7	2,069	0.0180	0.99		Lag/CN Method,

Summary for Subcatchment 16S: DC15

Runoff = 153.62 cfs @ 12.42 hrs, Volume= 17.608 af, Depth> 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
8.600	78	Row crops, straight row, Good, HSG B
48.200	89	Row crops, straight row, Good, HSG D
56.800	87	Weighted Average
56.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.7	3,042	0.0310	1.46		Lag/CN Method,

Summary for Subcatchment 17S: EC03

Runoff = 4.69 cfs @ 12.15 hrs, Volume= 0.345 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
1.000	91	Gravel roads, HSG D
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	1,114	0.0250	1.26		Lag/CN Method,

Summary for Subcatchment 18S: EC04

Runoff = 2.19 cfs @ 12.13 hrs, Volume= 0.148 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.500	85	Gravel roads, HSG B
0.500		100.00% Pervious Area

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NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.9	632	0.0210	0.82		Lag/CN Method,

Summary for Subcatchment 19S: EC05

Runoff = 2.48 cfs @ 12.05 hrs, Volume= 0.124 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.420	85	Gravel roads, HSG B
0.420		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	232	0.0170	0.60		Lag/CN Method,

Summary for Subcatchment 20S: EC01

Runoff = 4.88 cfs @ 12.07 hrs, Volume= 0.264 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
1.100	78	Row crops, straight row, Good, HSG B
1.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	351	0.0310	0.70		Lag/CN Method,

Summary for Subcatchment 21S: EC06

Runoff = 0.92 cfs @ 12.11 hrs, Volume= 0.059 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.200	85	Gravel roads, HSG B
0.200		100.00% Pervious Area

2024-04-10 Agricola Crossing Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	430	0.0130	0.60		Lag/CN Method,

Summary for Subcatchment 22S: EC02

Runoff = 59.15 cfs @ 12.29 hrs, Volume= 5.628 af, Depth> 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
12.800	89	Row crops, straight row, Good, HSG D
5.800	78	Row crops, straight row, Good, HSG B
18.600	86	Weighted Average
18.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	2,130	0.0360	1.41		Lag/CN Method,

Summary for Subcatchment 23S: EC07

Runoff = 7.68 cfs @ 12.11 hrs, Volume= 0.479 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
2.000	78	Row crops, straight row, Good, HSG B
2.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	476	0.0260	0.69		Lag/CN Method,

Summary for Subcatchment 24S: EC08

Runoff = 3.01 cfs @ 12.10 hrs, Volume= 0.182 af, Depth> 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.500	85	Gravel roads, HSG B
0.100	91	Gravel roads, HSG D
0.600	86	Weighted Average
0.600		100.00% Pervious Area

2024-04-10 Agricola Crossing Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	626	0.0300	1.01		Lag/CN Method,

Summary for Subcatchment 25S: EC09

Runoff = 2.77 cfs @ 12.11 hrs, Volume= 0.177 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.600	85	Gravel roads, HSG B
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	556	0.0200	0.78		Lag/CN Method,

Summary for Subcatchment 27S: EC11

Runoff = 26.13 cfs @ 12.99 hrs, Volume= 5.055 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
15.600	89	Row crops, straight row, Good, HSG D
0.100	78	Row crops, straight row, Good, HSG B
15.700	89	Weighted Average
15.700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
80.6	3,587	0.0064	0.74		Lag/CN Method,

Summary for Subcatchment 28S: EC12

Runoff = 24.88 cfs @ 12.85 hrs, Volume= 4.364 af, Depth> 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
13.500	89	Row crops, straight row, Good, HSG D
13.500		100.00% Pervious Area

2024-04-10 Agricola Crossing Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
69.2	2,243	0.0041	0.54		Lag/CN Method,

Summary for Subcatchment 29S: EC13

Runoff = 1.93 cfs @ 12.03 hrs, Volume= 0.094 af, Depth> 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.200	85	Gravel roads, HSG B
0.100	91	Gravel roads, HSG D
0.300	87	Weighted Average
0.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	238	0.0240	0.77		Lag/CN Method,

Summary for Subcatchment 30S: EC14

Runoff = 695.21 cfs @ 11.98 hrs, Volume= 27.785 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
46.700	89	Row crops, straight row, Good, HSG D
52.500	78	Row crops, straight row, Good, HSG B
99.200	83	Weighted Average
99.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	49	0.0200	0.45		Lag/CN Method,

Summary for Subcatchment 31S: EC15

Runoff = 1.91 cfs @ 12.02 hrs, Volume= 0.089 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.300	85	Gravel roads, HSG B
0.300		100.00% Pervious Area

2024-04-10 Agricola Crossing Sizing

NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	134	0.0130	0.47		Lag/CN Method,

Summary for Subcatchment 32S: EC16

Runoff = 36.94 cfs @ 12.54 hrs, Volume= 4.800 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
8.100	78	Row crops, straight row, Good, HSG B
8.800	89	Row crops, straight row, Good, HSG D
16.900	84	Weighted Average
16.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.7	1,752	0.0100	0.67		Lag/CN Method,

Summary for Subcatchment 33S: EC17

Runoff = 7.85 cfs @ 12.04 hrs, Volume= 0.395 af, Depth> 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
1.200	89	Row crops, straight row, Good, HSG D
1.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	367	0.0300	1.02		Lag/CN Method,

Summary for Subcatchment 34S: EC18

Runoff = 4.89 cfs @ 12.06 hrs, Volume= 0.277 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.800	91	Gravel roads, HSG D
0.800		100.00% Pervious Area

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NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	307	0.0100	0.62		Lag/CN Method,

Summary for Subcatchment 35S: EC19

Runoff = 73.06 cfs @ 12.36 hrs, Volume= 7.750 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
3.000	78	Row crops, straight row, Good, HSG B
21.300	89	Row crops, straight row, Good, HSG D
24.300	88	Weighted Average
24.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.1	1,902	0.0180	1.05		Lag/CN Method,

Summary for Subcatchment 36S: EC20

Runoff = 3.59 cfs @ 12.06 hrs, Volume= 0.193 af, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
0.300	85	Gravel roads, HSG B
0.300	91	Gravel roads, HSG D
0.600	88	Weighted Average
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	364	0.0200	0.80		Lag/CN Method,

Summary for Subcatchment 37S: DC16

Runoff = 4.46 cfs @ 12.01 hrs, Volume= 0.200 af, Depth> 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

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Area (ac)	CN	Description
0.530	89	Row crops, straight row, Good, HSG D
0.110	78	Row crops, straight row, Good, HSG B
0.640	87	Weighted Average
0.640		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	271	0.0480	1.12		Lag/CN Method,

Summary for Subcatchment 38S: North (a) T-2

Runoff = 54.17 cfs @ 12.20 hrs, Volume= 4.226 af, Depth> 3.05"
 Routed to Reach 40R : DC17

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
13.600	78	Row crops, straight row, Good, HSG B
3.000	89	Row crops, straight row, Good, HSG D
16.600	80	Weighted Average
16.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	1,169	0.0400	1.08		Lag/CN Method,

Summary for Subcatchment 39S: South (b) T-2

Runoff = 101.98 cfs @ 12.24 hrs, Volume= 8.625 af, Depth> 3.15"
 Routed to Reach 40R : DC17

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 NY-Agricola 24-hr S1 100-yr Rainfall=5.49"

Area (ac)	CN	Description
24.400	78	Row crops, straight row, Good, HSG B
8.500	89	Row crops, straight row, Good, HSG D
32.900	81	Weighted Average
32.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.8	1,457	0.0400	1.17		Lag/CN Method,

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Summary for Reach 40R: DC17

Inflow Area = 49.500 ac, 0.00% Impervious, Inflow Depth > 3.12" for 100-yr event
Inflow = 155.30 cfs @ 12.22 hrs, Volume= 12.851 af
Outflow = 155.30 cfs @ 12.22 hrs, Volume= 12.851 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Culvert Design Report
DC01

Peak Discharge Method: User-Specified					
Design Discharge		508.58 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,114.50 ft	Invert Downstream		1,111.50 ft
Length		75.00 ft	Slope		0.040000 ft/ft
Drop		3.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			

Culvert Design Report

DC01

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,120.39 ft	Discharge	508.58 cfs
Headwater Depth/Height	1.18	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,119.86 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,120.39 ft		
Grades			
Upstream Invert	1,114.50 ft	Downstream Invert	1,111.50 ft
Length	75.00 ft	Constructed Slope	0.040000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	2.39 ft
Slope Type	Steep	Normal Depth	2.35 ft
Flow Regime	Supercritical	Critical Depth	3.23 ft
Velocity Downstream	13.70 ft/s	Critical Slope	0.014503 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	5.00 ft
Section Size	60 inch	Rise	5.00 ft
Number Sections	4		
Outlet Control Properties			
Outlet Control HW Elev.	1,120.39 ft	Upstream Velocity Head	1.40 ft
Ke	0.90	Entrance Loss	1.26 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,119.86 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	78.5 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

DC02

Peak Discharge Method: User-Specified					
Design Discharge		21.91 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,302.00 ft	Invert Downstream		1,301.50 ft
Length		80.00 ft	Slope		0.006250 ft/ft
Drop		0.50 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x Trial-1	2-24 inch Circular	21.91 cfs	1,304.13 ft	5.64 ft/s	

Culvert Design Report

DC02

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,304.13 ft	Discharge	21.91 cfs
Headwater Depth/Height	1.07	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,303.94 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,304.13 ft		
Grades			
Upstream Invert	1,302.00 ft	Downstream Invert	1,301.50 ft
Length	80.00 ft	Constructed Slope	0.006250 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	1.19 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.19 ft
Velocity Downstream	5.64 ft/s	Critical Slope	0.018317 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	2		
Outlet Control Properties			
Outlet Control HW Elev.	1,304.13 ft	Upstream Velocity Head	0.23 ft
Ke	0.90	Entrance Loss	0.21 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,303.94 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	6.3 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
DC03

Peak Discharge Method: User-Specified					
Design Discharge		366.79 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,222.00 ft	Invert Downstream		1,219.00 ft
Length		75.00 ft	Slope		0.040000 ft/ft
Drop		3.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			

Culvert Design Report

DC03

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,227.74 ft	Discharge	366.79 cfs
Headwater Depth/Height	1.15	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,227.21 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,227.74 ft		
Grades			
Upstream Invert	1,222.00 ft	Downstream Invert	1,219.00 ft
Length	75.00 ft	Constructed Slope	0.040000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	2.34 ft
Slope Type	Steep	Normal Depth	2.30 ft
Flow Regime	Supercritical	Critical Depth	3.16 ft
Velocity Downstream	13.57 ft/s	Critical Slope	0.014225 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	5.00 ft
Section Size	60 inch	Rise	5.00 ft
Number Sections	3		
Outlet Control Properties			
Outlet Control HW Elev.	1,227.74 ft	Upstream Velocity Head	1.36 ft
Ke	0.90	Entrance Loss	1.22 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,227.21 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	58.9 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
DC04

Peak Discharge Method: User-Specified					
Design Discharge		81.66 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,287.00 ft	Invert Downstream		1,286.50 ft
Length		40.00 ft	Slope		0.012500 ft/ft
Drop		0.50 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			

Culvert Design Report

DC04

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,290.74 ft	Discharge	81.66 cfs
Headwater Depth/Height	1.25	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,290.63 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,290.74 ft		
Grades			
Upstream Invert	1,287.00 ft	Downstream Invert	1,286.50 ft
Length	40.00 ft	Constructed Slope	0.012500 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	2.08 ft
Slope Type	Mild	Normal Depth	2.49 ft
Flow Regime	Subcritical	Critical Depth	2.08 ft
Velocity Downstream	7.80 ft/s	Critical Slope	0.018664 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	2		
Outlet Control Properties			
Outlet Control HW Elev.	1,290.74 ft	Upstream Velocity Head	0.70 ft
Ke	0.90	Entrance Loss	0.63 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,290.63 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	14.1 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
DC05

Peak Discharge Method: User-Specified					
Design Discharge		63.10 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,157.50 ft	Invert Downstream		1,156.50 ft
Length		90.00 ft	Slope		0.011111 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	3-30 inch Circular	63.10 cfs	1,160.21 ft	6.54 ft/s

Culvert Design Report

DC05

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,160.21 ft	Discharge	63.10 cfs
Headwater Depth/Height	1.08	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,160.09 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,160.21 ft		
Grades			
Upstream Invert	1,157.50 ft	Downstream Invert	1,156.50 ft
Length	90.00 ft	Constructed Slope	0.011111 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	1.56 ft
Slope Type	Mild	Normal Depth	1.85 ft
Flow Regime	Subcritical	Critical Depth	1.56 ft
Velocity Downstream	6.54 ft/s	Critical Slope	0.017695 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.50 ft
Section Size	30 inch	Rise	2.50 ft
Number Sections	3		
Outlet Control Properties			
Outlet Control HW Elev.	1,160.21 ft	Upstream Velocity Head	0.45 ft
Ke	0.90	Entrance Loss	0.41 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,160.09 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	14.7 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

DC06

Peak Discharge Method: User-Specified					
Design Discharge		395.67 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,165.00 ft	Invert Downstream		1,164.00 ft
Length		100.00 ft	Slope		0.010000 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x Trial-1		4-54 inch Circular	395.67 cfs	1,170.14 ft	9.05 ft/s

Culvert Design Report

DC06

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,170.14 ft	Discharge	395.67 cfs
Headwater Depth/Height	1.14	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,169.94 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,170.14 ft		
Grades			
Upstream Invert	1,165.00 ft	Downstream Invert	1,164.00 ft
Length	100.00 ft	Constructed Slope	0.010000 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	2.92 ft
Slope Type	Mild	Normal Depth	3.43 ft
Flow Regime	Subcritical	Critical Depth	2.92 ft
Velocity Downstream	9.05 ft/s	Critical Slope	0.015117 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.50 ft
Section Size	54 inch	Rise	4.50 ft
Number Sections	4		
Outlet Control Properties			
Outlet Control HW Elev.	1,170.14 ft	Upstream Velocity Head	0.92 ft
Ke	0.90	Entrance Loss	0.83 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,169.94 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	63.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
DC07

Peak Discharge Method: User-Specified					
Design Discharge		386.43 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,172.00 ft	Invert Downstream		1,171.00 ft
Length		60.00 ft	Slope		0.016667 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	4-54 inch Circular	386.43 cfs	1,177.26 ft	9.36 ft/s

Culvert Design Report

DC07

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,177.26 ft	Discharge	386.43 cfs
Headwater Depth/Height	1.17	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,176.84 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,177.26 ft		
Grades			
Upstream Invert	1,172.00 ft	Downstream Invert	1,171.00 ft
Length	60.00 ft	Constructed Slope	0.016667 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	2.78 ft
Slope Type	Steep	Normal Depth	2.78 ft
Flow Regime	Supercritical	Critical Depth	2.89 ft
Velocity Downstream	9.36 ft/s	Critical Slope	0.014935 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.50 ft
Section Size	54 inch	Rise	4.50 ft
Number Sections	4		
Outlet Control Properties			
Outlet Control HW Elev.	1,177.26 ft	Upstream Velocity Head	1.25 ft
Ke	0.90	Entrance Loss	1.12 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,176.84 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	63.6 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

DC08

Peak Discharge Method: User-Specified							
Design Discharge		219.50	cfs	Check Discharge		0.00	cfs
Grades Model: Inverts							
Invert Upstream		1,315.00	ft	Invert Downstream		1,314.50	ft
Length		50.00	ft	Slope		0.010000	ft/ft
Drop		0.50	ft				
Headwater Model: Unspecified							
Tailwater Conditions: Constant Tailwater							
Tailwater Elevation		N/A	ft				
Name		Description	Discharge	HW Elev.	Velocity		
x	Trial-1	4-42 inch Circular	219.50 cfs	1,319.10 ft	8.11 ft/s		

Culvert Design Report

DC08

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,319.10 ft	Discharge	219.50 cfs
Headwater Depth/Height	1.17	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,318.96 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,319.10 ft		
Grades			
Upstream Invert	1,315.00 ft	Downstream Invert	1,314.50 ft
Length	50.00 ft	Constructed Slope	0.010000 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	2.32 ft
Slope Type	Mild	Normal Depth	2.89 ft
Flow Regime	Subcritical	Critical Depth	2.32 ft
Velocity Downstream	8.11 ft/s	Critical Slope	0.016785 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.50 ft
Section Size	42 inch	Rise	3.50 ft
Number Sections	4		
Outlet Control Properties			
Outlet Control HW Elev.	1,319.10 ft	Upstream Velocity Head	0.72 ft
Ke	0.90	Entrance Loss	0.65 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,318.96 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	38.5 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

DC09

Peak Discharge Method: User-Specified							
Design Discharge		275.90	cfs	Check Discharge		0.00	cfs
Grades Model: Inverts							
Invert Upstream		1,329.50	ft	Invert Downstream		1,329.00	ft
Length		50.00	ft	Slope		0.010000	ft/ft
Drop		0.50	ft				
Headwater Model: Unspecified							
Tailwater Conditions: Constant Tailwater							
Tailwater Elevation		N/A	ft				
Name		Description	Discharge	HW Elev.	Velocity		
x	Trial-1	4-48 inch Circular	275.90 cfs	1,333.88 ft	8.31 ft/s		

Culvert Design Report

DC09

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,333.88 ft	Discharge	275.90 cfs
Headwater Depth/Height	1.09	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,333.68 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,333.88 ft		
Grades			
Upstream Invert	1,329.50 ft	Downstream Invert	1,329.00 ft
Length	50.00 ft	Constructed Slope	0.010000 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	2.51 ft
Slope Type	Mild	Normal Depth	2.93 ft
Flow Regime	Subcritical	Critical Depth	2.51 ft
Velocity Downstream	8.31 ft/s	Critical Slope	0.015217 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	4.00 ft
Section Size	48 inch	Rise	4.00 ft
Number Sections	4		
Outlet Control Properties			
Outlet Control HW Elev.	1,333.88 ft	Upstream Velocity Head	0.80 ft
Ke	0.90	Entrance Loss	0.72 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,333.68 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	50.3 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
DC10

Peak Discharge Method: User-Specified					
Design Discharge		109.90 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,344.50 ft	Invert Downstream		1,343.00 ft
Length		70.00 ft	Slope		0.021429 ft/ft
Drop		1.50 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			

Culvert Design Report

DC10

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,348.11 ft	Discharge	109.90 cfs
Headwater Depth/Height	1.20	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,347.83 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,348.11 ft		
Grades			
Upstream Invert	1,344.50 ft	Downstream Invert	1,343.00 ft
Length	70.00 ft	Constructed Slope	0.021429 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	1.84 ft
Slope Type	Steep	Normal Depth	1.84 ft
Flow Regime	Supercritical	Critical Depth	1.97 ft
Velocity Downstream	8.08 ft/s	Critical Slope	0.017493 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	3		
Outlet Control Properties			
Outlet Control HW Elev.	1,348.11 ft	Upstream Velocity Head	0.86 ft
Ke	0.90	Entrance Loss	0.78 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,347.83 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	21.2 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

DC11

Peak Discharge Method: User-Specified					
Design Discharge		31.86 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,334.50 ft	Invert Downstream		1,333.50 ft
Length		50.00 ft	Slope		0.020000 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x Trial-1	2-24 inch Circular		31.86 cfs	1,337.17 ft	6.58 ft/s

Culvert Design Report

DC11

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,337.17 ft	Discharge	31.86 cfs
Headwater Depth/Height	1.33	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,337.06 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,337.17 ft		
Grades			
Upstream Invert	1,334.50 ft	Downstream Invert	1,333.50 ft
Length	50.00 ft	Constructed Slope	0.020000 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	1.44 ft
Slope Type	Mild	Normal Depth	1.51 ft
Flow Regime	Subcritical	Critical Depth	1.44 ft
Velocity Downstream	6.58 ft/s	Critical Slope	0.022469 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	2		
Outlet Control Properties			
Outlet Control HW Elev.	1,337.17 ft	Upstream Velocity Head	0.61 ft
Ke	0.90	Entrance Loss	0.55 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,337.06 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	6.3 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
DC12

Peak Discharge Method: User-Specified					
Design Discharge		86.77 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,061.00 ft	Invert Downstream		1,061.00 ft
Length		80.00 ft	Slope		0.000000 ft/ft
Drop		0.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	3-36 inch Circular	86.77 cfs	1,064.29 ft	6.80 ft/s

Culvert Design Report

DC12

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,064.29 ft	Discharge	86.77 cfs
Headwater Depth/Height	1.10	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,063.83 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,064.29 ft		
Grades			
Upstream Invert	1,061.00 ft	Downstream Invert	1,061.00 ft
Length	80.00 ft	Constructed Slope	0.000000 ft/ft
Hydraulic Profile			
Profile	H2	Depth, Downstream	1.74 ft
Slope Type	Horizontal	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.74 ft
Velocity Downstream	6.80 ft/s	Critical Slope	0.015741 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	3		
Outlet Control Properties			
Outlet Control HW Elev.	1,064.29 ft	Upstream Velocity Head	0.28 ft
Ke	0.90	Entrance Loss	0.25 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,063.83 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	21.2 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
DC13

Peak Discharge Method: User-Specified					
Design Discharge		47.55 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,076.00 ft	Invert Downstream		1,074.00 ft
Length		60.00 ft	Slope		0.033333 ft/ft
Drop		2.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			

Culvert Design Report

DC13

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,079.05 ft	Discharge	47.55 cfs
Headwater Depth/Height	1.22	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,078.81 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,079.05 ft		
Grades			
Upstream Invert	1,076.00 ft	Downstream Invert	1,074.00 ft
Length	60.00 ft	Constructed Slope	0.033333 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	1.38 ft
Slope Type	Steep	Normal Depth	1.38 ft
Flow Regime	Supercritical	Critical Depth	1.66 ft
Velocity Downstream	8.59 ft/s	Critical Slope	0.018840 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.50 ft
Section Size	30 inch	Rise	2.50 ft
Number Sections	2		
Outlet Control Properties			
Outlet Control HW Elev.	1,079.05 ft	Upstream Velocity Head	0.73 ft
Ke	0.90	Entrance Loss	0.66 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,078.81 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	9.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

DC14

Peak Discharge Method: User-Specified					
Design Discharge		105.22 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,339.00 ft	Invert Downstream		1,338.50 ft
Length		90.00 ft	Slope		0.005556 ft/ft
Drop		0.50 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x Trial-1	2-42 inch Circular	105.22 cfs	1,343.11 ft	7.97 ft/s	

Culvert Design Report

DC14

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,343.11 ft	Discharge	105.22 cfs
Headwater Depth/Height	1.17	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,342.84 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,343.11 ft		
Grades			
Upstream Invert	1,339.00 ft	Downstream Invert	1,338.50 ft
Length	90.00 ft	Constructed Slope	0.005556 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	2.27 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.27 ft
Velocity Downstream	7.97 ft/s	Critical Slope	0.016411 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.50 ft
Section Size	42 inch	Rise	3.50 ft
Number Sections	2		
Outlet Control Properties			
Outlet Control HW Elev.	1,343.11 ft	Upstream Velocity Head	0.53 ft
Ke	0.90	Entrance Loss	0.47 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,342.84 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	19.2 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
DC15

Peak Discharge Method: User-Specified					
Design Discharge		153.62 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,271.00 ft	Invert Downstream		1,269.50 ft
Length		85.00 ft	Slope		0.017647 ft/ft
Drop		1.50 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	3-42 inch Circular	153.62 cfs	1,275.07 ft	8.16 ft/s

Culvert Design Report

DC15

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,275.07 ft	Discharge	153.62 cfs
Headwater Depth/Height	1.16	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,274.74 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,275.07 ft		
Grades			
Upstream Invert	1,271.00 ft	Downstream Invert	1,269.50 ft
Length	85.00 ft	Constructed Slope	0.017647 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	2.17 ft
Slope Type	Steep	Normal Depth	2.17 ft
Flow Regime	Supercritical	Critical Depth	2.24 ft
Velocity Downstream	8.16 ft/s	Critical Slope	0.016188 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.50 ft
Section Size	42 inch	Rise	3.50 ft
Number Sections	3		
Outlet Control Properties			
Outlet Control HW Elev.	1,275.07 ft	Upstream Velocity Head	0.97 ft
Ke	0.90	Entrance Loss	0.87 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,274.74 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	28.9 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

DC16

Peak Discharge Method: User-Specified					
Design Discharge		4.46 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,279.00 ft	Invert Downstream		1,278.00 ft
Length		45.00 ft	Slope		0.022222 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	1-18 inch Circular	4.46 cfs	1,280.43 ft	4.86 ft/s

Culvert Design Report

DC16

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,280.43 ft	Discharge	4.46 cfs
Headwater Depth/Height	0.95	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,280.27 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,280.43 ft		
Grades			
Upstream Invert	1,279.00 ft	Downstream Invert	1,278.00 ft
Length	45.00 ft	Constructed Slope	0.022222 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	0.77 ft
Slope Type	Steep	Normal Depth	0.77 ft
Flow Regime	Supercritical	Critical Depth	0.81 ft
Velocity Downstream	4.86 ft/s	Critical Slope	0.018986 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,280.43 ft	Upstream Velocity Head	0.33 ft
Ke	0.90	Entrance Loss	0.29 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,280.27 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
DC17

Peak Discharge Method: User-Specified					
Design Discharge		155.30 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,235.00 ft	Invert Downstream		1,225.00 ft
Length		100.00 ft	Slope		0.100000 ft/ft
Drop		10.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	3-42 inch Circular	155.30 cfs	1,239.10 ft	15.66 ft/s

Culvert Design Report

DC17

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,239.10 ft	Discharge	155.30 cfs
Headwater Depth/Height	1.17	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,238.63 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,239.10 ft		
Grades			
Upstream Invert	1,235.00 ft	Downstream Invert	1,225.00 ft
Length	100.00 ft	Constructed Slope	0.100000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	1.32 ft
Slope Type	Steep	Normal Depth	1.32 ft
Flow Regime	Supercritical	Critical Depth	2.25 ft
Velocity Downstream	15.66 ft/s	Critical Slope	0.016277 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.50 ft
Section Size	42 inch	Rise	3.50 ft
Number Sections	3		
Outlet Control Properties			
Outlet Control HW Elev.	1,239.10 ft	Upstream Velocity Head	0.97 ft
Ke	0.90	Entrance Loss	0.88 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,238.63 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	28.9 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

EC01

Peak Discharge Method: User-Specified					
Design Discharge		4.88 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,286.00 ft	Invert Downstream		1,285.50 ft
Length		70.00 ft	Slope		0.007143 ft/ft
Drop		0.50 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	1-18 inch Circular	4.88 cfs	1,287.50 ft	4.73 ft/s

Culvert Design Report

EC01

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,287.50 ft	Discharge	4.88 cfs
Headwater Depth/Height	1.00	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,287.36 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,287.50 ft		
Grades			
Upstream Invert	1,286.00 ft	Downstream Invert	1,285.50 ft
Length	70.00 ft	Constructed Slope	0.007143 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	0.85 ft
Slope Type	Mild	Normal Depth	1.25 ft
Flow Regime	Subcritical	Critical Depth	0.85 ft
Velocity Downstream	4.73 ft/s	Critical Slope	0.019527 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,287.50 ft	Upstream Velocity Head	0.16 ft
Ke	0.90	Entrance Loss	0.15 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,287.36 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

EC02

Peak Discharge Method: User-Specified					
Design Discharge		59.15 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,221.80 ft	Invert Downstream		1,221.00 ft
Length		30.00 ft	Slope		0.026667 ft/ft
Drop		0.80 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x Trial-1		3-30 inch Circular	59.15 cfs	1,224.51 ft	7.54 ft/s

Culvert Design Report

EC02

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,224.51 ft	Discharge	59.15 cfs
Headwater Depth/Height	1.08	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,224.25 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,224.51 ft		
Grades			
Upstream Invert	1,221.80 ft	Downstream Invert	1,221.00 ft
Length	30.00 ft	Constructed Slope	0.026667 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	1.31 ft
Slope Type	Steep	Normal Depth	1.31 ft
Flow Regime	Supercritical	Critical Depth	1.51 ft
Velocity Downstream	7.54 ft/s	Critical Slope	0.017207 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.50 ft
Section Size	30 inch	Rise	2.50 ft
Number Sections	3		
Outlet Control Properties			
Outlet Control HW Elev.	1,224.51 ft	Upstream Velocity Head	0.63 ft
Ke	0.90	Entrance Loss	0.57 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,224.25 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	14.7 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC03

Peak Discharge Method: User-Specified				
Design Discharge		4.69 cfs	Check Discharge 0.00 cfs	
Grades Model: Inverts				
Invert Upstream		1,289.00 ft	Invert Downstream 1,288.00 ft	
Length		50.00 ft	Slope 0.020000 ft/ft	
Drop		1.00 ft		
Headwater Model: Unspecified				
Tailwater Conditions: Constant Tailwater				
Tailwater Elevation		N/A ft		
Tailwater Conditions: Constant Tailwater				
Tailwater Elevation		N/A ft		

Culvert Design Report

EC03

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,290.47 ft	Discharge	4.69 cfs
Headwater Depth/Height	0.98	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,290.32 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,290.47 ft		
Grades			
Upstream Invert	1,289.00 ft	Downstream Invert	1,288.00 ft
Length	50.00 ft	Constructed Slope	0.020000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	0.82 ft
Slope Type	Steep	Normal Depth	0.82 ft
Flow Regime	Supercritical	Critical Depth	0.83 ft
Velocity Downstream	4.73 ft/s	Critical Slope	0.019276 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,290.47 ft	Upstream Velocity Head	0.34 ft
Ke	0.90	Entrance Loss	0.30 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,290.32 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC04

Peak Discharge Method: User-Specified					
Design Discharge		2.19 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,331.00 ft	Invert Downstream		1,330.50 ft
Length		35.00 ft	Slope		0.014286 ft/ft
Drop		0.50 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			

Culvert Design Report

EC04

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,331.93 ft	Discharge	2.19 cfs
Headwater Depth/Height	0.62	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,331.81 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,331.93 ft		
Grades			
Upstream Invert	1,331.00 ft	Downstream Invert	1,330.50 ft
Length	35.00 ft	Constructed Slope	0.014286 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	0.56 ft
Slope Type	Mild	Normal Depth	0.59 ft
Flow Regime	Subcritical	Critical Depth	0.56 ft
Velocity Downstream	3.65 ft/s	Critical Slope	0.016941 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,331.93 ft	Upstream Velocity Head	0.18 ft
Ke	0.90	Entrance Loss	0.16 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,331.81 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC05

Peak Discharge Method: User-Specified					
Design Discharge		2.48 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,162.50 ft	Invert Downstream		1,161.50 ft
Length		80.00 ft	Slope		0.012500 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
</					

Culvert Design Report

EC05

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,163.49 ft	Discharge	2.48 cfs
Headwater Depth/Height	0.66	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,163.37 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,163.49 ft		
Grades			
Upstream Invert	1,162.50 ft	Downstream Invert	1,161.50 ft
Length	80.00 ft	Constructed Slope	0.012500 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	0.60 ft
Slope Type	Mild	Normal Depth	0.65 ft
Flow Regime	Subcritical	Critical Depth	0.60 ft
Velocity Downstream	3.79 ft/s	Critical Slope	0.017109 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,163.49 ft	Upstream Velocity Head	0.18 ft
Ke	0.90	Entrance Loss	0.16 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,163.37 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

EC06

Peak Discharge Method: User-Specified					
Design Discharge		0.92 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,319.00 ft	Invert Downstream		1,318.00 ft
Length		50.00 ft	Slope		0.020000 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x Trial-1	1-18 inch Circular	0.92 cfs	1,319.60 ft	3.03 ft/s	

Culvert Design Report

EC06

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,319.60 ft	Discharge	0.92 cfs
Headwater Depth/Height	0.40	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,319.48 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,319.60 ft		
Grades			
Upstream Invert	1,319.00 ft	Downstream Invert	1,318.00 ft
Length	50.00 ft	Constructed Slope	0.020000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	0.34 ft
Slope Type	Steep	Normal Depth	0.34 ft
Flow Regime	Supercritical	Critical Depth	0.36 ft
Velocity Downstream	3.03 ft/s	Critical Slope	0.016879 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,319.60 ft	Upstream Velocity Head	0.13 ft
Ke	0.90	Entrance Loss	0.11 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,319.48 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

EC07

Peak Discharge Method: User-Specified					
Design Discharge		7.68 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,335.00 ft	Invert Downstream		1,334.00 ft
Length		65.00 ft	Slope		0.015385 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x Trial-1	1-18 inch Circular	7.68 cfs	1,336.97 ft	5.67 ft/s	

Culvert Design Report

EC07

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,336.97 ft	Discharge	7.68 cfs
Headwater Depth/Height	1.32	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,336.91 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,336.97 ft		
Grades			
Upstream Invert	1,335.00 ft	Downstream Invert	1,334.00 ft
Length	65.00 ft	Constructed Slope	0.015385 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	1.07 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.07 ft
Velocity Downstream	5.67 ft/s	Critical Slope	0.024541 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,336.97 ft	Upstream Velocity Head	0.32 ft
Ke	0.90	Entrance Loss	0.29 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,336.91 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC08

Peak Discharge Method: User-Specified					
Design Discharge		3.01 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,320.00 ft	Invert Downstream		1,319.00 ft
Length		35.00 ft	Slope		0.028571 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	1-18 inch Circular	3.01 cfs	1,321.14 ft	4.81 ft/s

Culvert Design Report

EC08

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,321.14 ft	Discharge	3.01 cfs
Headwater Depth/Height	0.76	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,320.97 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,321.14 ft		
Grades			
Upstream Invert	1,320.00 ft	Downstream Invert	1,319.00 ft
Length	35.00 ft	Constructed Slope	0.028571 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	0.58 ft
Slope Type	Steep	Normal Depth	0.58 ft
Flow Regime	Supercritical	Critical Depth	0.66 ft
Velocity Downstream	4.81 ft/s	Critical Slope	0.017475 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,321.14 ft	Upstream Velocity Head	0.25 ft
Ke	0.90	Entrance Loss	0.23 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,320.97 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC09

Peak Discharge Method: User-Specified					
Design Discharge		2.77 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,296.00 ft	Invert Downstream		1,293.00 ft
Length		100.00 ft	Slope		0.030000 ft/ft
Drop		3.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	1-18 inch Circular	2.77 cfs	1,297.09 ft	4.79 ft/s

Culvert Design Report

EC09

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,297.09 ft	Discharge	2.77 cfs
Headwater Depth/Height	0.72	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,296.92 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,297.09 ft		
Grades			
Upstream Invert	1,296.00 ft	Downstream Invert	1,293.00 ft
Length	100.00 ft	Constructed Slope	0.030000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	0.54 ft
Slope Type	Steep	Normal Depth	0.54 ft
Flow Regime	Supercritical	Critical Depth	0.63 ft
Velocity Downstream	4.79 ft/s	Critical Slope	0.017319 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,297.09 ft	Upstream Velocity Head	0.24 ft
Ke	0.90	Entrance Loss	0.21 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,296.92 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC10

Peak Discharge Method: User-Specified					
Design Discharge		4.46 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,282.50 ft	Invert Downstream		1,280.00 ft
Length		75.00 ft	Slope		0.033333 ft/ft
Drop		2.50 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			

Culvert Design Report

EC10

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,283.93 ft	Discharge	4.46 cfs
Headwater Depth/Height	0.95	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,283.76 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,283.93 ft		
Grades			
Upstream Invert	1,282.50 ft	Downstream Invert	1,280.00 ft
Length	75.00 ft	Constructed Slope	0.033333 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	0.69 ft
Slope Type	Steep	Normal Depth	0.69 ft
Flow Regime	Supercritical	Critical Depth	0.81 ft
Velocity Downstream	5.65 ft/s	Critical Slope	0.018986 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,283.93 ft	Upstream Velocity Head	0.33 ft
Ke	0.90	Entrance Loss	0.29 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,283.76 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC11

Peak Discharge Method: User-Specified					
Design Discharge		26.13 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,323.00 ft	Invert Downstream		1,320.00 ft
Length		75.00 ft	Slope		0.040000 ft/ft
Drop		3.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	1-30 inch Circular	26.13 cfs	1,326.25 ft	9.42 ft/s

Culvert Design Report

EC11

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,326.25 ft	Discharge	26.13 cfs
Headwater Depth/Height	1.30	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,326.01 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,326.25 ft		
Grades			
Upstream Invert	1,323.00 ft	Downstream Invert	1,320.00 ft
Length	75.00 ft	Constructed Slope	0.040000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	1.38 ft
Slope Type	Steep	Normal Depth	1.38 ft
Flow Regime	Supercritical	Critical Depth	1.74 ft
Velocity Downstream	9.42 ft/s	Critical Slope	0.019954 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.50 ft
Section Size	30 inch	Rise	2.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,326.25 ft	Upstream Velocity Head	0.80 ft
Ke	0.90	Entrance Loss	0.72 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,326.01 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	4.9 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

EC12

Peak Discharge Method: User-Specified					
Design Discharge		20.82 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,335.00 ft	Invert Downstream		1,334.00 ft
Length		90.00 ft	Slope		0.011111 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x Trial-1	1-30 inch Circular		20.82 cfs	1,337.69 ft	6.51 ft/s

Culvert Design Report

EC12

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,337.69 ft	Discharge	20.82 cfs
Headwater Depth/Height	1.08	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,337.57 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,337.69 ft		
Grades			
Upstream Invert	1,335.00 ft	Downstream Invert	1,334.00 ft
Length	90.00 ft	Constructed Slope	0.011111 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	1.55 ft
Slope Type	Mild	Normal Depth	1.84 ft
Flow Regime	Subcritical	Critical Depth	1.55 ft
Velocity Downstream	6.51 ft/s	Critical Slope	0.017608 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.50 ft
Section Size	30 inch	Rise	2.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,337.69 ft	Upstream Velocity Head	0.45 ft
Ke	0.90	Entrance Loss	0.41 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,337.57 ft	Flow Control	Unsubmerged
Inlet Type	Projecting	Area Full	4.9 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

EC13

Peak Discharge Method: User-Specified					
Design Discharge		1.93 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,341.00 ft	Invert Downstream		1,340.00 ft
Length		50.00 ft	Slope		0.020000 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x Trial-1		1-18 inch Circular	1.93 cfs	1,341.89 ft	3.74 ft/s

Culvert Design Report

EC13

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,341.89 ft	Discharge	1.93 cfs
Headwater Depth/Height	0.59	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,341.74 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,341.89 ft		
Grades			
Upstream Invert	1,341.00 ft	Downstream Invert	1,340.00 ft
Length	50.00 ft	Constructed Slope	0.020000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	0.50 ft
Slope Type	Steep	Normal Depth	0.50 ft
Flow Regime	Supercritical	Critical Depth	0.52 ft
Velocity Downstream	3.74 ft/s	Critical Slope	0.016823 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,341.89 ft	Upstream Velocity Head	0.19 ft
Ke	0.90	Entrance Loss	0.17 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,341.74 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC14

Peak Discharge Method: User-Specified					
Design Discharge		695.21 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,248.00 ft	Invert Downstream		1,247.00 ft
Length		90.00 ft	Slope		0.011111 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			

Culvert Design Report

EC14

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,254.32 ft	Discharge	695.21 cfs
Headwater Depth/Height	1.05	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,253.87 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,254.32 ft		
Grades			
Upstream Invert	1,248.00 ft	Downstream Invert	1,247.00 ft
Length	90.00 ft	Constructed Slope	0.011111 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	3.59 ft
Slope Type	Mild	Normal Depth	3.77 ft
Flow Regime	Subcritical	Critical Depth	3.59 ft
Velocity Downstream	9.83 ft/s	Critical Slope	0.012787 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	6.00 ft
Section Size	72 inch	Rise	6.00 ft
Number Sections	4		
Outlet Control Properties			
Outlet Control HW Elev.	1,254.32 ft	Upstream Velocity Head	1.35 ft
Ke	0.90	Entrance Loss	1.21 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,253.87 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	113.1 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC15

Peak Discharge Method: User-Specified					
Design Discharge		1.91 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,272.50 ft	Invert Downstream		1,271.50 ft
Length		100.00 ft	Slope		0.010000 ft/ft
Drop		1.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	1-18 inch Circular	1.91 cfs	1,273.35 ft	3.50 ft/s

Culvert Design Report

EC15

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,273.35 ft	Discharge	1.91 cfs
Headwater Depth/Height	0.56	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,273.25 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,273.35 ft		
Grades			
Upstream Invert	1,272.50 ft	Downstream Invert	1,271.50 ft
Length	100.00 ft	Constructed Slope	0.010000 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	0.52 ft
Slope Type	Mild	Normal Depth	0.60 ft
Flow Regime	Subcritical	Critical Depth	0.52 ft
Velocity Downstream	3.50 ft/s	Critical Slope	0.016815 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,273.35 ft	Upstream Velocity Head	0.13 ft
Ke	0.90	Entrance Loss	0.12 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,273.25 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

EC16

Peak Discharge Method: User-Specified									
Design Discharge		36.94	cfs	Check Discharge		0.00	cfs		
Grades Model: Inverts									
Invert Upstream		1,370.00	ft	Invert Downstream		1,369.00	ft		
Length		40.00	ft	Slope		0.025000	ft/ft		
Drop		1.00	ft						
Headwater Model: Unspecified									
Tailwater Conditions: Constant Tailwater									
Tailwater Elevation		N/A						ft	
Name		Description		Discharge	HW Elev.	Velocity			
x	Trial-1	2-30 inch Circular		36.94	cfs	1,372.60	ft	7.25	ft/s

Culvert Design Report

EC16

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,372.60 ft	Discharge	36.94 cfs
Headwater Depth/Height	1.04	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,372.34 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,372.60 ft		
Grades			
Upstream Invert	1,370.00 ft	Downstream Invert	1,369.00 ft
Length	40.00 ft	Constructed Slope	0.025000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	1.29 ft
Slope Type	Steep	Normal Depth	1.29 ft
Flow Regime	Supercritical	Critical Depth	1.46 ft
Velocity Downstream	7.25 ft/s	Critical Slope	0.016777 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.50 ft
Section Size	30 inch	Rise	2.50 ft
Number Sections	2		
Outlet Control Properties			
Outlet Control HW Elev.	1,372.60 ft	Upstream Velocity Head	0.60 ft
Ke	0.90	Entrance Loss	0.54 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,372.34 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	9.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC17

Peak Discharge Method: User-Specified					
Design Discharge		7.85 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,373.50 ft	Invert Downstream		1,372.00 ft
Length		75.00 ft	Slope		0.020000 ft/ft
Drop		1.50 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	1-18 inch Circular	7.85 cfs	1,375.49 ft	5.73 ft/s

Culvert Design Report

EC17

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,375.49 ft	Discharge	7.85 cfs
Headwater Depth/Height	1.33	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,375.44 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,375.49 ft		
Grades			
Upstream Invert	1,373.50 ft	Downstream Invert	1,372.00 ft
Length	75.00 ft	Constructed Slope	0.020000 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	1.09 ft
Slope Type	Mild	Normal Depth	1.20 ft
Flow Regime	Subcritical	Critical Depth	1.09 ft
Velocity Downstream	5.73 ft/s	Critical Slope	0.024950 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,375.49 ft	Upstream Velocity Head	0.42 ft
Ke	0.90	Entrance Loss	0.38 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,375.44 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

EC18

Peak Discharge Method: User-Specified					
Design Discharge		4.89 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,360.00 ft	Invert Downstream		1,357.00 ft
Length		100.00 ft	Slope		0.030000 ft/ft
Drop		3.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			
Name	Description	Discharge	HW Elev.	Velocity	
x Trial-1	1-18 inch Circular	4.89 cfs	1,361.51 ft	5.57 ft/s	

Culvert Design Report

EC18

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,361.51 ft	Discharge	4.89 cfs
Headwater Depth/Height	1.01	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,361.35 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,361.51 ft		
Grades			
Upstream Invert	1,360.00 ft	Downstream Invert	1,357.00 ft
Length	100.00 ft	Constructed Slope	0.030000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	0.75 ft
Slope Type	Steep	Normal Depth	0.75 ft
Flow Regime	Supercritical	Critical Depth	0.85 ft
Velocity Downstream	5.57 ft/s	Critical Slope	0.019540 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,361.51 ft	Upstream Velocity Head	0.35 ft
Ke	0.90	Entrance Loss	0.31 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,361.35 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report

EC19

Peak Discharge Method: User-Specified					
Design Discharge		73.06	cfs	Check Discharge	
				0.00 cfs	
Grades Model: Inverts					
Invert Upstream		1,176.00	ft	Invert Downstream	
Length		60.00	ft	Slope	
Drop		0.50	ft	0.008333 ft/ft	
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A	ft		
Name		Description	Discharge	HW Elev.	Velocity
x	Trial-1	2-36 inch Circular	73.06 cfs	1,179.49 ft	7.44 ft/s

Culvert Design Report

EC19

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,179.49 ft	Discharge	73.06 cfs
Headwater Depth/Height	1.16	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,179.34 ft	Control Type	Outlet Control
Outlet Control HW Elev.	1,179.49 ft		
Grades			
Upstream Invert	1,176.00 ft	Downstream Invert	1,175.50 ft
Length	60.00 ft	Constructed Slope	0.008333 ft/ft
Hydraulic Profile			
Profile	M2	Depth, Downstream	1.97 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.97 ft
Velocity Downstream	7.44 ft/s	Critical Slope	0.017463 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	2		
Outlet Control Properties			
Outlet Control HW Elev.	1,179.49 ft	Upstream Velocity Head	0.53 ft
Ke	0.90	Entrance Loss	0.47 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,179.34 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	14.1 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Culvert Design Report
EC20

Peak Discharge Method: User-Specified					
Design Discharge		3.59 cfs	Check Discharge		0.00 cfs
Grades Model: Inverts					
Invert Upstream		1,181.00 ft	Invert Downstream		1,179.00 ft
Length		50.00 ft	Slope		0.040000 ft/ft
Drop		2.00 ft			
Headwater Model: Unspecified					
Tailwater Conditions: Constant Tailwater					
Tailwater Elevation		N/A ft			

Culvert Design Report

EC20

Design: Trial-1

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	N/A ft	Storm Event	Design
Computed Headwater Elevation	1,182.26 ft	Discharge	3.59 cfs
Headwater Depth/Height	0.84	Tailwater Elevation	N/A ft
Inlet Control HW Elev.	1,182.08 ft	Control Type	Entrance Control
Outlet Control HW Elev.	1,182.26 ft		
Grades			
Upstream Invert	1,181.00 ft	Downstream Invert	1,179.00 ft
Length	50.00 ft	Constructed Slope	0.040000 ft/ft
Hydraulic Profile			
Profile	S2	Depth, Downstream	0.58 ft
Slope Type	Steep	Normal Depth	0.58 ft
Flow Regime	Supercritical	Critical Depth	0.72 ft
Velocity Downstream	5.71 ft/s	Critical Slope	0.018020 ft/ft
Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		
Outlet Control Properties			
Outlet Control HW Elev.	1,182.26 ft	Upstream Velocity Head	0.28 ft
Ke	0.90	Entrance Loss	0.25 ft
Inlet Control Properties			
Inlet Control HW Elev.	1,182.08 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	1.8 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Table 1:Low Water Crossing Sizing - Access Roads

Current Crossing Number	Crossing Number - Permitting Plans	Ditch Slope (%)	100-yr Max Flow Depth (ft)	design storm (yr)	Heavy Duty LWC Max Depth Required	Standard LWC Minimum Depth Required	Heavy Duty LWC Length (ft)	Standard LWC Length (not including Heavy Duty length if applicable)
				100				
DC01		4.7	1.51	HEAVY DUTY	0	0		
DC02		0.3	2.2	NO CROSSING NEEDED	0	0		
DC03		4.3	2.36	HEAVY DUTY	0	0		
DC04		1.9	1.45	STANDARD DUTY	0	0		
DC05		0.5	1.08	NO CROSSING NEEDED	0	0		
DC06		3.3	1.58	HEAVY DUTY	0	0		
DC07		1.6	2.2	STANDARD DUTY	0	0		
DC08		1.3	1.67	STANDARD DUTY	0	0		
DC09		1.5	2.11	STANDARD DUTY	0	0		
DC10		1.9	0.91	STANDARD DUTY	0	0		
DC11		0.3	0.6	NO CROSSING NEEDED	0	0		
DC12		1.5	1.48	STANDARD DUTY	0	0		
DC13		2.4	0.76	STANDARD DUTY	0	0		
DC14		0.5	1.6	NO CROSSING NEEDED	0	0		
DC15		1.7	1.58	STANDARD DUTY	0	0		
DC16		4.8	0.79	STANDARD DUTY	0	0		
DC17		5	0.5	STANDARD DUTY	0	0		