

**Routing Diagram for Ditch Calcs - Fitchrona & Lacy FINAL**  
 Prepared by Montgomery Associates, Printed 6/11/2015  
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## Ditch Calcs - Fitchrona & Lacy FINAL

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### Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.558	98	(19S, 24S, 28S)
118.036	61	(21S, 25S, 29S, 47S)
0.682	61	Grass & Perm Pavement (30S)
0.508	61	Grass & Permeable Pavement (13S)
0.718	61	Grass & Pervious Path (22S)
0.366	61	Grass + Perm. Pavement (27S)
0.618	61	Grass + Permeable Bike Path (41S)
0.294	61	Grass and Perm. Pavement (10S)
0.168	98	Impermeable Pavement (10S, 13S)
0.640	98	Impervious Pavement (27S, 30S)
0.156	98	Lacy Road Pavement (41S)
0.149	98	Road (22S)
<b>122.893</b>	<b>62</b>	<b>TOTAL AREA</b>

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 10-Year Rainfall=4.20"

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**Summary for Subcatchment 10S: N WS**

Runoff = 1.00 cfs @ 11.98 hrs, Volume= 0.043 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.294	61	Grass and Perm. Pavement
* 0.099	98	Impermeable Pavement
0.393	70	Weighted Average
0.294		74.81% Pervious Area
0.099		25.19% Impervious Area

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

**Summary for Subcatchment 13S: Central WS**

Runoff = 1.12 cfs @ 11.98 hrs, Volume= 0.049 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.508	61	Grass & Permeable Pavement
* 0.069	98	Impermeable Pavement
0.577	65	Weighted Average
0.508		88.04% Pervious Area
0.069		11.96% Impervious Area

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

**Summary for Subcatchment 19S: EC WS IMP**

Runoff = 0.70 cfs @ 11.96 hrs, Volume= 0.038 af, Depth> 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.121	98	
0.121		100.00% Impervious Area

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

**Summary for Subcatchment 21S: EC WS PERV**

Runoff = 0.34 cfs @ 11.99 hrs, Volume= 0.015 af, Depth&gt; 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.226	61	
0.226		100.00% Pervious Area

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

**Summary for Subcatchment 22S: EC WS - Road and Path**

Runoff = 1.89 cfs @ 11.98 hrs, Volume= 0.082 af, Depth&gt; 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.718	61	Grass & Pervious Path
* 0.149	98	Road
0.867	67	Weighted Average
0.718		82.81% Pervious Area
0.149		17.19% Impervious Area

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

**Summary for Subcatchment 24S: WC WS IMP**

Runoff = 0.99 cfs @ 11.96 hrs, Volume= 0.053 af, Depth&gt; 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.170	98	
0.170		100.00% Impervious Area

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

**Summary for Subcatchment 25S: WC WS PERV**

Runoff = 0.47 cfs @ 11.99 hrs, Volume= 0.021 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.315	61	
0.315		100.00% Pervious Area

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

**Summary for Subcatchment 27S: WC WS - Road and Path**

Runoff = 1.33 cfs @ 11.98 hrs, Volume= 0.058 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.366	61	Grass + Perm. Pavement
* 0.133	98	Impervious Pavement
0.499	71	Weighted Average
0.366		73.35% Pervious Area
0.133		26.65% Impervious Area

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

**Summary for Subcatchment 28S: W WS IMP**

Runoff = 1.55 cfs @ 11.96 hrs, Volume= 0.084 af, Depth> 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.267	98	
0.267		100.00% Impervious Area

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Type II 24-hr 10-Year Rainfall=4.20"

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

**Summary for Subcatchment 29S: W WS PERV**

Runoff = 0.74 cfs @ 11.99 hrs, Volume= 0.033 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.495	61	
0.495		100.00% Pervious Area

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

**Summary for Subcatchment 30S: W WS - Road and Path**

Runoff = 4.04 cfs @ 11.97 hrs, Volume= 0.179 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.682	61	Grass & Perm Pavement
* 0.507	98	Impervious Pavement
1.189	77	Weighted Average
0.682		57.36% Pervious Area
0.507		42.64% Impervious Area

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

**Summary for Subcatchment 41S: Lacy Rd WS - Road and Path**

Runoff = 1.78 cfs @ 11.98 hrs, Volume= 0.078 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 0.618	61	Grass + Permeable Bike Path
* 0.156	98	Lacy Road Pavement
0.774	68	Weighted Average
0.618		79.84% Pervious Area
0.156		20.16% Impervious Area

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Type II 24-hr 10-Year Rainfall=4.20"

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

**Summary for Subcatchment 47S: SE WS**

Runoff = 44.06 cfs @ 12.76 hrs, Volume= 7.629 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 10-Year Rainfall=4.20"

Area (ac)	CN	Description
* 117.000	61	
117.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0219	0.12		<b>Sheet Flow,</b>
					Grass: Dense n= 0.240 P2= 2.90"
48.8	3,900	0.0219	1.33		<b>Shallow Concentrated Flow,</b>
					Cultivated Straight Rows Kv= 9.0 fps
63.3	4,000	Total			

**Summary for Reach 3R: Lacy Ditch**

Inflow Area = 4.923 ac, 30.53% Impervious, Inflow Depth > 0.27" for 10-Year event  
Inflow = 4.03 cfs @ 12.05 hrs, Volume= 0.113 af  
Outflow = 3.40 cfs @ 12.15 hrs, Volume= 0.112 af, Atten= 16%, Lag= 6.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 2.26 fps, Min. Travel Time= 3.8 min  
Avg. Velocity = 0.57 fps, Avg. Travel Time= 14.9 min

Peak Storage= 792 cf @ 12.09 hrs  
Average Depth at Peak Storage= 0.27'  
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 153.37 cfs

5.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 17.00'  
Length= 512.0' Slope= 0.0410 '/'  
Inlet Invert= 1,001.00', Outlet Invert= 980.00'



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### Summary for Reach 9R: Northward Fitchrona Ditch

Inflow Area = 122.500 ac, 1.28% Impervious, Inflow Depth > 0.76" for 10-Year event  
Inflow = 44.33 cfs @ 12.76 hrs, Volume= 7.790 af  
Outflow = 44.17 cfs @ 12.81 hrs, Volume= 7.762 af, Atten= 0%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.14 fps, Min. Travel Time= 1.7 min  
Avg. Velocity = 1.90 fps, Avg. Travel Time= 2.9 min

Peak Storage= 4,603 cf @ 12.78 hrs  
Average Depth at Peak Storage= 1.60'  
Bank-Full Depth= 4.00' Flow Area= 64.0 sf, Capacity= 339.25 cfs

4.00' x 4.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 28.00'  
Length= 327.0' Slope= 0.0112 '/'  
Inlet Invert= 979.00', Outlet Invert= 975.33'



### Summary for Reach 11R: Southward Fitchrona Ditch

Inflow Area = 0.393 ac, 25.19% Impervious, Inflow Depth > 1.33" for 10-Year event  
Inflow = 1.00 cfs @ 11.98 hrs, Volume= 0.043 af  
Outflow = 0.84 cfs @ 12.09 hrs, Volume= 0.043 af, Atten= 16%, Lag= 6.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.86 fps, Min. Travel Time= 4.2 min  
Avg. Velocity = 0.29 fps, Avg. Travel Time= 12.2 min

Peak Storage= 218 cf @ 12.02 hrs  
Average Depth at Peak Storage= 0.22'  
Bank-Full Depth= 3.00' Flow Area= 39.0 sf, Capacity= 145.37 cfs

4.00' x 3.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 22.00'  
Length= 215.0' Slope= 0.0078 '/'  
Inlet Invert= 977.00', Outlet Invert= 975.33'



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## Summary for Reach 19R: West Ditch

Inflow Area = 4.149 ac, 32.47% Impervious, Inflow Depth > 1.62" for 10-Year event  
Inflow = 9.15 cfs @ 11.99 hrs, Volume= 0.562 af  
Outflow = 8.45 cfs @ 12.06 hrs, Volume= 0.559 af, Atten= 8%, Lag= 4.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 3.34 fps, Min. Travel Time= 2.5 min  
Avg. Velocity = 0.87 fps, Avg. Travel Time= 9.7 min

Peak Storage= 1,292 cf @ 12.02 hrs  
Average Depth at Peak Storage= 0.47'  
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 147.95 cfs

4.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 ' / ' Top Width= 16.00'  
Length= 505.0' Slope= 0.0485 ' / '  
Inlet Invert= 1,025.00', Outlet Invert= 1,000.50'



## Summary for Reach 40R: Ditch 1

Inflow Area = 1.214 ac, 22.24% Impervious, Inflow Depth > 1.34" for 10-Year event  
Inflow = 2.91 cfs @ 11.98 hrs, Volume= 0.136 af  
Outflow = 2.30 cfs @ 12.13 hrs, Volume= 0.134 af, Atten= 21%, Lag= 9.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.13 fps, Min. Travel Time= 5.9 min  
Avg. Velocity = 0.30 fps, Avg. Travel Time= 22.0 min

Peak Storage= 817 cf @ 12.03 hrs  
Average Depth at Peak Storage= 0.59'  
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 31.28 cfs

2.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 2.5 ' / ' Top Width= 12.00'  
Length= 400.0' Slope= 0.0050 ' / '  
Inlet Invert= 1,035.00', Outlet Invert= 1,033.00'



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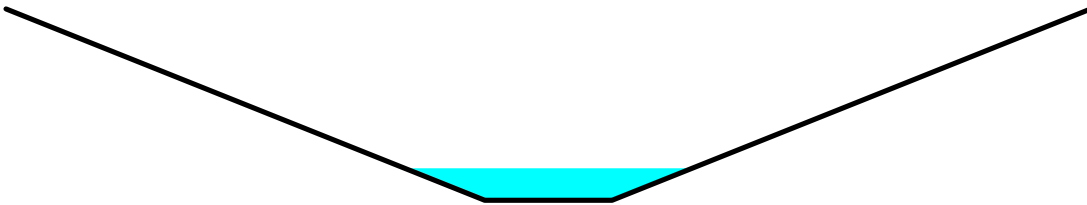
### Summary for Reach 42R: Ditch 2

Inflow Area = 2.198 ac, 26.07% Impervious, Inflow Depth > 1.45" for 10-Year event  
Inflow = 3.71 cfs @ 12.00 hrs, Volume= 0.266 af  
Outflow = 3.51 cfs @ 12.06 hrs, Volume= 0.266 af, Atten= 5%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 2.20 fps, Min. Travel Time= 1.7 min  
Avg. Velocity = 0.67 fps, Avg. Travel Time= 5.5 min

Peak Storage= 357 cf @ 12.02 hrs  
Average Depth at Peak Storage= 0.50'  
Bank-Full Depth= 3.00' Flow Area= 28.5 sf, Capacity= 172.47 cfs

2.00' x 3.00' deep channel, n= 0.050  
Side Slope Z-value= 2.5 ' / ' Top Width= 17.00'  
Length= 220.0' Slope= 0.0227 ' / '  
Inlet Invert= 1,033.00', Outlet Invert= 1,028.00'



### Summary for Pond 12R: Fitchrona Culvert

Inflow Area = 122.893 ac, 1.36% Impervious, Inflow Depth > 3.19" for 10-Year event  
Inflow = 59.26 cfs @ 12.81 hrs, Volume= 32.660 af  
Outflow = 59.26 cfs @ 12.81 hrs, Volume= 32.660 af, Atten= 0%, Lag= 0.0 min  
Primary = 59.26 cfs @ 12.81 hrs, Volume= 32.660 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 979.01' @ 12.81 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	975.33'	<b>48.0" Round Culvert</b> L= 62.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 975.33' / 974.71' S= 0.0100 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 12.57 sf

**Primary OutFlow** Max=59.21 cfs @ 12.81 hrs HW=979.01' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 59.21 cfs @ 6.41 fps)

### Summary for Pond 33P: SW Interception Point

Inflow Area = 4.149 ac, 32.47% Impervious, Inflow Depth > 1.62" for 10-Year event  
Inflow = 8.45 cfs @ 12.06 hrs, Volume= 0.559 af  
Outflow = 8.39 cfs @ 12.06 hrs, Volume= 0.559 af, Atten= 1%, Lag= 0.2 min  
Primary = 2.94 cfs @ 12.06 hrs, Volume= 0.035 af  
Secondary = 5.45 cfs @ 12.06 hrs, Volume= 0.524 af

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Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 1,002.22' @ 12.06 hrs Surf.Area= 297 sf Storage= 329 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.6 min ( 788.1 - 787.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.50'	597 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,000.50	13	0	0
1,001.00	170	46	46
1,002.00	272	221	267
1,003.00	388	330	597

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,000.50'	<b>15.0" Round Culvert</b> L= 118.3' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,000.50' / 998.73' S= 0.0150 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Primary	1,002.00'	<b>12.0' long x 7.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

**Primary OutFlow** Max=2.78 cfs @ 12.06 hrs HW=1,002.21' (Free Discharge)  
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 2.78 cfs @ 1.10 fps)

**Secondary OutFlow** Max=5.43 cfs @ 12.06 hrs HW=1,002.21' (Free Discharge)  
 ↳ **1=Culvert** (Inlet Controls 5.43 cfs @ 4.42 fps)

**Summary for Pond 40P: West Culvert & Storage**

Inflow Area = 2.198 ac, 26.07% Impervious, Inflow Depth > 1.45" for 10-Year event  
 Inflow = 3.51 cfs @ 12.06 hrs, Volume= 0.266 af  
 Outflow = 3.52 cfs @ 12.07 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.4 min  
 Primary = 3.52 cfs @ 12.07 hrs, Volume= 0.265 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1,028.70' @ 12.07 hrs Surf.Area= 231 sf Storage= 96 cf

Plug-Flow detention time= 0.7 min calculated for 0.265 af (100% of inflow)  
 Center-of-Mass det. time= 0.5 min ( 790.0 - 789.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,028.00'	3,413 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,028.00	45	0	0
1,029.00	310	178	178
1,030.00	800	555	733
1,031.00	1,520	1,160	1,893
1,032.00	1,520	1,520	3,413

Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	<b>30.0" W x 19.0" H, R=33.0" Elliptical Culvert</b> L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 1,028.00' / 1,025.00' S= 0.0309 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.28 sf

**Primary OutFlow** Max=3.46 cfs @ 12.07 hrs HW=1,028.69' (Free Discharge)

↑**1=Culvert** (Inlet Controls 3.46 cfs @ 2.48 fps)

**Summary for Pond 41P: 15" Pipe - Outlot 15**

Inflow	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af,	Incl. 15.00 cfs Base Flow
Outflow	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af,	Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af	

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 984.07' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	977.00'	<b>15.0" Round Culvert</b> L= 58.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 977.00' / 976.70' S= 0.0052 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

**Primary OutFlow** Max=15.00 cfs @ 0.00 hrs HW=984.07' (Free Discharge)

↑**1=Culvert** (Inlet Controls 15.00 cfs @ 12.22 fps)

**Summary for Pond 44P: Culvert Under Bike Path**

Inflow Area =	4.923 ac, 30.53% Impervious, Inflow Depth > 0.27" for 10-Year event
Inflow	= 3.40 cfs @ 12.15 hrs, Volume= 0.112 af
Outflow	= 3.36 cfs @ 12.16 hrs, Volume= 0.111 af, Atten= 1%, Lag= 0.8 min
Primary	= 3.36 cfs @ 12.16 hrs, Volume= 0.111 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 980.66' @ 12.16 hrs Surf.Area= 437 sf Storage= 248 cf

Plug-Flow detention time= 3.7 min calculated for 0.111 af (100% of inflow)

Center-of-Mass det. time= 2.1 min ( 794.2 - 792.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	980.00'	4,253 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 10-Year Rainfall=4.20"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
980.00	315	0	0
981.00	500	408	408
982.00	925	713	1,120
983.00	1,780	1,353	2,473
984.00	1,780	1,780	4,253

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	<b>24.0" Round Culvert</b> L= 52.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 980.00' / 979.00' S= 0.0192 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Primary	984.00'	<b>65.0' long x 35.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=3.26 cfs @ 12.16 hrs HW=980.65' (Free Discharge)

- ↑ 1=Culvert (Barrel Controls 3.26 cfs @ 5.51 fps)
- ↳ 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 48P: Lacy Culvert**

Inflow Area = 117.000 ac, 0.00% Impervious, Inflow Depth > 0.78" for 10-Year event  
 Inflow = 44.06 cfs @ 12.76 hrs, Volume= 7.629 af  
 Outflow = 44.06 cfs @ 12.76 hrs, Volume= 7.629 af, Atten= 0%, Lag= 0.0 min  
 Primary = 44.06 cfs @ 12.76 hrs, Volume= 7.629 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 982.35' @ 12.76 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	979.42'	<b>48.0" Round Culvert</b> L= 123.0' Ke= 0.500 Inlet / Outlet Invert= 979.42' / 979.00' S= 0.0034 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Primary	984.00'	<b>50.0' long x 22.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=44.01 cfs @ 12.76 hrs HW=982.34' (Free Discharge)

- ↑ 1=Culvert (Barrel Controls 44.01 cfs @ 6.24 fps)
- ↳ 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Link 37L: Culvert to Outlot 7 (4)**

Inflow = 5.45 cfs @ 12.06 hrs, Volume= 0.524 af  
 Primary = 5.45 cfs @ 12.06 hrs, Volume= 0.524 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 25-Year Rainfall=4.80"

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**Summary for Subcatchment 10S: N WS**

Runoff = 1.29 cfs @ 11.98 hrs, Volume= 0.056 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.294	61	Grass and Perm. Pavement
* 0.099	98	Impermeable Pavement
0.393	70	Weighted Average
0.294		74.81% Pervious Area
0.099		25.19% Impervious Area

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

**Summary for Subcatchment 13S: Central WS**

Runoff = 1.51 cfs @ 11.98 hrs, Volume= 0.066 af, Depth> 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.508	61	Grass & Permeable Pavement
* 0.069	98	Impermeable Pavement
0.577	65	Weighted Average
0.508		88.04% Pervious Area
0.069		11.96% Impervious Area

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

**Summary for Subcatchment 19S: EC WS IMP**

Runoff = 0.80 cfs @ 11.96 hrs, Volume= 0.044 af, Depth> 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.121	98	
0.121		100.00% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 25-Year Rainfall=4.80"

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

**Summary for Subcatchment 21S: EC WS PERV**

Runoff = 0.48 cfs @ 11.98 hrs, Volume= 0.021 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.226	61	
0.226		100.00% Pervious Area

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

**Summary for Subcatchment 22S: EC WS - Road and Path**

Runoff = 2.50 cfs @ 11.98 hrs, Volume= 0.109 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.718	61	Grass & Pervious Path
* 0.149	98	Road
0.867	67	Weighted Average
0.718		82.81% Pervious Area
0.149		17.19% Impervious Area

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

**Summary for Subcatchment 24S: WC WS IMP**

Runoff = 1.13 cfs @ 11.96 hrs, Volume= 0.061 af, Depth> 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.170	98	
0.170		100.00% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 25-Year Rainfall=4.80"

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

**Summary for Subcatchment 25S: WC WS PERV**

Runoff = 0.66 cfs @ 11.98 hrs, Volume= 0.029 af, Depth&gt; 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.315	61	
0.315		100.00% Pervious Area

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

**Summary for Subcatchment 27S: WC WS - Road and Path**

Runoff = 1.71 cfs @ 11.98 hrs, Volume= 0.075 af, Depth&gt; 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.366	61	Grass + Perm. Pavement
* 0.133	98	Impervious Pavement
0.499	71	Weighted Average
0.366		73.35% Pervious Area
0.133		26.65% Impervious Area

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

**Summary for Subcatchment 28S: W WS IMP**

Runoff = 1.77 cfs @ 11.96 hrs, Volume= 0.096 af, Depth&gt; 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.267	98	
0.267		100.00% Impervious Area



**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 25-Year Rainfall=4.80"

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

**Summary for Subcatchment 29S: W WS PERV**

Runoff = 1.04 cfs @ 11.98 hrs, Volume= 0.046 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.495	61	
0.495		100.00% Pervious Area

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

**Summary for Subcatchment 30S: W WS - Road and Path**

Runoff = 5.02 cfs @ 11.97 hrs, Volume= 0.224 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.682	61	Grass & Perm Pavement
* 0.507	98	Impervious Pavement
1.189	77	Weighted Average
0.682		57.36% Pervious Area
0.507		42.64% Impervious Area

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

**Summary for Subcatchment 41S: Lacy Rd WS - Road and Path**

Runoff = 2.34 cfs @ 11.98 hrs, Volume= 0.102 af, Depth> 1.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.618	61	Grass + Permeable Bike Path
* 0.156	98	Lacy Road Pavement
0.774	68	Weighted Average
0.618		79.84% Pervious Area
0.156		20.16% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 25-Year Rainfall=4.80"

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

**Summary for Subcatchment 47S: SE WS**

Runoff = 64.37 cfs @ 12.74 hrs, Volume= 10.542 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 25-Year Rainfall=4.80"

Area (ac)	CN	Description
* 117.000	61	
117.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0219	0.12		<b>Sheet Flow,</b>
					Grass: Dense n= 0.240 P2= 2.90"
48.8	3,900	0.0219	1.33		<b>Shallow Concentrated Flow,</b>
					Cultivated Straight Rows Kv= 9.0 fps
63.3	4,000	Total			

**Summary for Reach 3R: Lacy Ditch**

Inflow Area = 4.923 ac, 30.53% Impervious, Inflow Depth > 0.44" for 25-Year event  
 Inflow = 6.57 cfs @ 12.04 hrs, Volume= 0.179 af  
 Outflow = 5.95 cfs @ 12.13 hrs, Volume= 0.178 af, Atten= 9%, Lag= 5.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 2.69 fps, Min. Travel Time= 3.2 min  
 Avg. Velocity = 0.62 fps, Avg. Travel Time= 13.9 min

Peak Storage= 1,131 cf @ 12.08 hrs  
 Average Depth at Peak Storage= 0.36'  
 Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 153.37 cfs

5.00' x 2.00' deep channel, n= 0.050  
 Side Slope Z-value= 3.0 '/' Top Width= 17.00'  
 Length= 512.0' Slope= 0.0410 '/'  
 Inlet Invert= 1,001.00', Outlet Invert= 980.00'



## Ditch Calcs - Fitchrona & Lacy FINAL

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Type II 24-hr 25-Year Rainfall=4.80"

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### Summary for Reach 9R: Northward Fitchrona Ditch

Inflow Area = 122.500 ac, 1.28% Impervious, Inflow Depth > 1.06" for 25-Year event  
Inflow = 64.72 cfs @ 12.74 hrs, Volume= 10.785 af  
Outflow = 64.49 cfs @ 12.79 hrs, Volume= 10.753 af, Atten= 0%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.47 fps, Min. Travel Time= 1.6 min  
Avg. Velocity = 1.98 fps, Avg. Travel Time= 2.8 min

Peak Storage= 6,090 cf @ 12.76 hrs  
Average Depth at Peak Storage= 1.91'  
Bank-Full Depth= 4.00' Flow Area= 64.0 sf, Capacity= 339.25 cfs

4.00' x 4.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 28.00'  
Length= 327.0' Slope= 0.0112 '/'  
Inlet Invert= 979.00', Outlet Invert= 975.33'



### Summary for Reach 11R: Southward Fitchrona Ditch

Inflow Area = 0.393 ac, 25.19% Impervious, Inflow Depth > 1.72" for 25-Year event  
Inflow = 1.29 cfs @ 11.98 hrs, Volume= 0.056 af  
Outflow = 1.11 cfs @ 12.07 hrs, Volume= 0.056 af, Atten= 14%, Lag= 5.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.94 fps, Min. Travel Time= 3.8 min  
Avg. Velocity = 0.31 fps, Avg. Travel Time= 11.7 min

Peak Storage= 262 cf @ 12.01 hrs  
Average Depth at Peak Storage= 0.26'  
Bank-Full Depth= 3.00' Flow Area= 39.0 sf, Capacity= 145.37 cfs

4.00' x 3.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 22.00'  
Length= 215.0' Slope= 0.0078 '/'  
Inlet Invert= 977.00', Outlet Invert= 975.33'



‡

# Ditch Calcs - Fitchrona & Lacy FINAL

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Type II 24-hr 25-Year Rainfall=4.80"

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## Summary for Reach 19R: West Ditch

Inflow Area = 4.149 ac, 32.47% Impervious, Inflow Depth > 2.03" for 25-Year event  
Inflow = 11.68 cfs @ 11.99 hrs, Volume= 0.702 af  
Outflow = 10.81 cfs @ 12.06 hrs, Volume= 0.699 af, Atten= 7%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 3.61 fps, Min. Travel Time= 2.3 min  
Avg. Velocity = 0.92 fps, Avg. Travel Time= 9.1 min

Peak Storage= 1,539 cf @ 12.01 hrs  
Average Depth at Peak Storage= 0.54'  
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 147.95 cfs

4.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 ' / ' Top Width= 16.00'  
Length= 505.0' Slope= 0.0485 ' / '  
Inlet Invert= 1,025.00', Outlet Invert= 1,000.50'



## Summary for Reach 40R: Ditch 1

Inflow Area = 1.214 ac, 22.24% Impervious, Inflow Depth > 1.72" for 25-Year event  
Inflow = 3.77 cfs @ 11.98 hrs, Volume= 0.174 af  
Outflow = 3.02 cfs @ 12.12 hrs, Volume= 0.172 af, Atten= 20%, Lag= 8.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.21 fps, Min. Travel Time= 5.5 min  
Avg. Velocity = 0.32 fps, Avg. Travel Time= 20.6 min

Peak Storage= 1,003 cf @ 12.03 hrs  
Average Depth at Peak Storage= 0.68'  
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 31.28 cfs

2.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 2.5 ' / ' Top Width= 12.00'  
Length= 400.0' Slope= 0.0050 ' / '  
Inlet Invert= 1,035.00', Outlet Invert= 1,033.00'



## Ditch Calcs - Fitchrona & Lacy FINAL

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Type II 24-hr 25-Year Rainfall=4.80"

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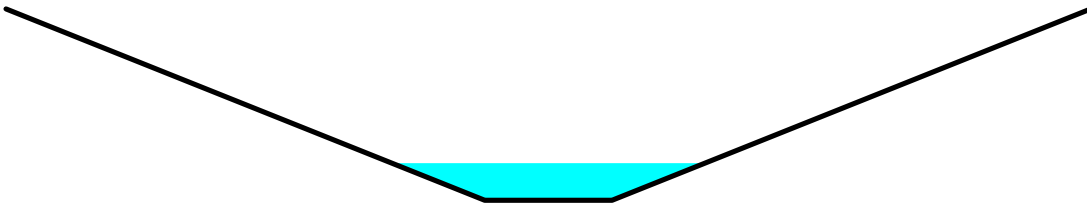
### Summary for Reach 42R: Ditch 2

Inflow Area = 2.198 ac, 26.07% Impervious, Inflow Depth > 1.84" for 25-Year event  
Inflow = 4.94 cfs @ 12.00 hrs, Volume= 0.337 af  
Outflow = 4.69 cfs @ 12.06 hrs, Volume= 0.336 af, Atten= 5%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 2.38 fps, Min. Travel Time= 1.5 min  
Avg. Velocity = 0.71 fps, Avg. Travel Time= 5.2 min

Peak Storage= 441 cf @ 12.02 hrs  
Average Depth at Peak Storage= 0.58'  
Bank-Full Depth= 3.00' Flow Area= 28.5 sf, Capacity= 172.47 cfs

2.00' x 3.00' deep channel, n= 0.050  
Side Slope Z-value= 2.5 ' / ' Top Width= 17.00'  
Length= 220.0' Slope= 0.0227 ' / '  
Inlet Invert= 1,033.00', Outlet Invert= 1,028.00'



### Summary for Pond 12R: Fitchrona Culvert

Inflow Area = 122.893 ac, 1.36% Impervious, Inflow Depth > 3.48" for 25-Year event  
Inflow = 79.60 cfs @ 12.78 hrs, Volume= 35.664 af  
Outflow = 79.60 cfs @ 12.78 hrs, Volume= 35.664 af, Atten= 0%, Lag= 0.0 min  
Primary = 79.60 cfs @ 12.78 hrs, Volume= 35.664 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 979.92' @ 12.79 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	975.33'	<b>48.0" Round Culvert</b> L= 62.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 975.33' / 974.71' S= 0.0100 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 12.57 sf

**Primary OutFlow** Max=79.51 cfs @ 12.78 hrs HW=979.92' (Free Discharge)  
↑ **1=Culvert** (Barrel Controls 79.51 cfs @ 6.92 fps)

### Summary for Pond 33P: SW Interception Point

Inflow Area = 4.149 ac, 32.47% Impervious, Inflow Depth > 2.02" for 25-Year event  
Inflow = 10.81 cfs @ 12.06 hrs, Volume= 0.699 af  
Outflow = 10.75 cfs @ 12.06 hrs, Volume= 0.701 af, Atten= 1%, Lag= 0.2 min  
Primary = 5.07 cfs @ 12.06 hrs, Volume= 0.078 af  
Secondary = 5.67 cfs @ 12.06 hrs, Volume= 0.623 af

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 25-Year Rainfall=4.80"

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Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 1,002.31' @ 12.06 hrs Surf.Area= 308 sf Storage= 356 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.5 min ( 785.0 - 784.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.50'	597 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,000.50	13	0	0
1,001.00	170	46	46
1,002.00	272	221	267
1,003.00	388	330	597

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,000.50'	<b>15.0" Round Culvert</b> L= 118.3' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,000.50' / 998.73' S= 0.0150 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Primary	1,002.00'	<b>12.0' long x 7.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

**Primary OutFlow** Max=4.93 cfs @ 12.06 hrs HW=1,002.30' (Free Discharge)  
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 4.93 cfs @ 1.36 fps)

**Secondary OutFlow** Max=5.66 cfs @ 12.06 hrs HW=1,002.30' (Free Discharge)  
 ↳ **1=Culvert** (Inlet Controls 5.66 cfs @ 4.61 fps)

**Summary for Pond 40P: West Culvert & Storage**

Inflow Area = 2.198 ac, 26.07% Impervious, Inflow Depth > 1.83" for 25-Year event  
 Inflow = 4.69 cfs @ 12.06 hrs, Volume= 0.336 af  
 Outflow = 4.70 cfs @ 12.06 hrs, Volume= 0.336 af, Atten= 0%, Lag= 0.4 min  
 Primary = 4.70 cfs @ 12.06 hrs, Volume= 0.336 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1,028.83' @ 12.06 hrs Surf.Area= 264 sf Storage= 127 cf

Plug-Flow detention time= 0.7 min calculated for 0.335 af (100% of inflow)  
 Center-of-Mass det. time= 0.5 min ( 787.4 - 786.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,028.00'	3,413 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 25-Year Rainfall=4.80"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,028.00	45	0	0
1,029.00	310	178	178
1,030.00	800	555	733
1,031.00	1,520	1,160	1,893
1,032.00	1,520	1,520	3,413

Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	<b>30.0" W x 19.0" H, R=33.0" Elliptical Culvert</b> L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 1,028.00' / 1,025.00' S= 0.0309 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.28 sf

**Primary OutFlow** Max=4.63 cfs @ 12.06 hrs HW=1,028.82' (Free Discharge)

↑**1=Culvert** (Inlet Controls 4.63 cfs @ 2.71 fps)

**Summary for Pond 41P: 15" Pipe - Outlot 15**

Inflow	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af,	Incl. 15.00 cfs Base Flow
Outflow	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af,	Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af	

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 984.07' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	977.00'	<b>15.0" Round Culvert</b> L= 58.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 977.00' / 976.70' S= 0.0052 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

**Primary OutFlow** Max=15.00 cfs @ 0.00 hrs HW=984.07' (Free Discharge)

↑**1=Culvert** (Inlet Controls 15.00 cfs @ 12.22 fps)

**Summary for Pond 44P: Culvert Under Bike Path**

Inflow Area =	4.923 ac, 30.53% Impervious, Inflow Depth > 0.43" for 25-Year event
Inflow	= 5.95 cfs @ 12.13 hrs, Volume= 0.178 af
Outflow	= 5.93 cfs @ 12.14 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.9 min
Primary	= 5.93 cfs @ 12.14 hrs, Volume= 0.178 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 980.91' @ 12.14 hrs Surf.Area= 484 sf Storage= 365 cf

Plug-Flow detention time= 2.8 min calculated for 0.178 af (100% of inflow)

Center-of-Mass det. time= 1.7 min ( 778.6 - 776.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	980.00'	4,253 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 25-Year Rainfall=4.80"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
980.00	315	0	0
981.00	500	408	408
982.00	925	713	1,120
983.00	1,780	1,353	2,473
984.00	1,780	1,780	4,253

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	<b>24.0" Round Culvert</b> L= 52.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 980.00' / 979.00' S= 0.0192 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Primary	984.00'	<b>65.0' long x 35.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=5.85 cfs @ 12.14 hrs HW=980.91' (Free Discharge)

- 1=Culvert (Barrel Controls 5.85 cfs @ 6.22 fps)
- 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 48P: Lacy Culvert**

Inflow Area = 117.000 ac, 0.00% Impervious, Inflow Depth > 1.08" for 25-Year event  
 Inflow = 64.37 cfs @ 12.74 hrs, Volume= 10.542 af  
 Outflow = 64.37 cfs @ 12.74 hrs, Volume= 10.542 af, Atten= 0%, Lag= 0.0 min  
 Primary = 64.37 cfs @ 12.74 hrs, Volume= 10.542 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 983.15' @ 12.74 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	979.42'	<b>48.0" Round Culvert</b> L= 123.0' Ke= 0.500 Inlet / Outlet Invert= 979.42' / 979.00' S= 0.0034 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Primary	984.00'	<b>50.0' long x 22.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=64.29 cfs @ 12.74 hrs HW=983.14' (Free Discharge)

- 1=Culvert (Barrel Controls 64.29 cfs @ 6.86 fps)
- 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Link 37L: Culvert to Outlot 7 (4)**

Inflow = 5.67 cfs @ 12.06 hrs, Volume= 0.623 af  
 Primary = 5.67 cfs @ 12.06 hrs, Volume= 0.623 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs



**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 50-Year Rainfall=5.30"

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**Summary for Subcatchment 10S: N WS**

Runoff = 1.55 cfs @ 11.98 hrs, Volume= 0.068 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.294	61	Grass and Perm. Pavement
* 0.099	98	Impermeable Pavement
0.393	70	Weighted Average
0.294		74.81% Pervious Area
0.099		25.19% Impervious Area

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

**Summary for Subcatchment 13S: Central WS**

Runoff = 1.86 cfs @ 11.98 hrs, Volume= 0.081 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.508	61	Grass & Permeable Pavement
* 0.069	98	Impermeable Pavement
0.577	65	Weighted Average
0.508		88.04% Pervious Area
0.069		11.96% Impervious Area

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

**Summary for Subcatchment 19S: EC WS IMP**

Runoff = 0.89 cfs @ 11.96 hrs, Volume= 0.048 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.121	98	
0.121		100.00% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 50-Year Rainfall=5.30"

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

**Summary for Subcatchment 21S: EC WS PERV**

Runoff = 0.60 cfs @ 11.98 hrs, Volume= 0.026 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.226	61	
0.226		100.00% Pervious Area

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

**Summary for Subcatchment 22S: EC WS - Road and Path**

Runoff = 3.04 cfs @ 11.98 hrs, Volume= 0.132 af, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.718	61	Grass & Pervious Path
* 0.149	98	Road
0.867	67	Weighted Average
0.718		82.81% Pervious Area
0.149		17.19% Impervious Area

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

**Summary for Subcatchment 24S: WC WS IMP**

Runoff = 1.25 cfs @ 11.96 hrs, Volume= 0.068 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.170	98	
0.170		100.00% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 50-Year Rainfall=5.30"

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

**Summary for Subcatchment 25S: WC WS PERV**

Runoff = 0.84 cfs @ 11.98 hrs, Volume= 0.037 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.315	61	
0.315		100.00% Pervious Area

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

**Summary for Subcatchment 27S: WC WS - Road and Path**

Runoff = 2.02 cfs @ 11.97 hrs, Volume= 0.089 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.366	61	Grass + Perm. Pavement
* 0.133	98	Impervious Pavement
0.499	71	Weighted Average
0.366		73.35% Pervious Area
0.133		26.65% Impervious Area

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

**Summary for Subcatchment 28S: W WS IMP**

Runoff = 1.96 cfs @ 11.96 hrs, Volume= 0.107 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.267	98	
0.267		100.00% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 50-Year Rainfall=5.30"

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

**Summary for Subcatchment 29S: W WS PERV**

Runoff = 1.31 cfs @ 11.98 hrs, Volume= 0.057 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.495	61	
0.495		100.00% Pervious Area

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

**Summary for Subcatchment 30S: W WS - Road and Path**

Runoff = 5.86 cfs @ 11.97 hrs, Volume= 0.263 af, Depth> 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.682	61	Grass & Perm Pavement
* 0.507	98	Impervious Pavement
1.189	77	Weighted Average
0.682		57.36% Pervious Area
0.507		42.64% Impervious Area

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

**Summary for Subcatchment 41S: Lacy Rd WS - Road and Path**

Runoff = 2.82 cfs @ 11.98 hrs, Volume= 0.123 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 0.618	61	Grass + Permeable Bike Path
* 0.156	98	Lacy Road Pavement
0.774	68	Weighted Average
0.618		79.84% Pervious Area
0.156		20.16% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 50-Year Rainfall=5.30"

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

**Summary for Subcatchment 47S: SE WS**

Runoff = 83.03 cfs @ 12.73 hrs, Volume= 13.188 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 50-Year Rainfall=5.30"

Area (ac)	CN	Description
* 117.000	61	
117.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0219	0.12		<b>Sheet Flow,</b>
					Grass: Dense n= 0.240 P2= 2.90"
48.8	3,900	0.0219	1.33		<b>Shallow Concentrated Flow,</b>
					Cultivated Straight Rows Kv= 9.0 fps
63.3	4,000	Total			

**Summary for Reach 3R: Lacy Ditch**

Inflow Area = 4.923 ac, 30.53% Impervious, Inflow Depth > 0.59" for 50-Year event  
 Inflow = 8.83 cfs @ 12.04 hrs, Volume= 0.242 af  
 Outflow = 8.27 cfs @ 12.12 hrs, Volume= 0.241 af, Atten= 6%, Lag= 4.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.00 fps, Min. Travel Time= 2.8 min  
 Avg. Velocity = 0.65 fps, Avg. Travel Time= 13.1 min

Peak Storage= 1,412 cf @ 12.07 hrs  
 Average Depth at Peak Storage= 0.44'  
 Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 153.37 cfs

5.00' x 2.00' deep channel, n= 0.050  
 Side Slope Z-value= 3.0 '/' Top Width= 17.00'  
 Length= 512.0' Slope= 0.0410 '/'  
 Inlet Invert= 1,001.00', Outlet Invert= 980.00'



## Ditch Calcs - Fitchrona & Lacy FINAL

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Type II 24-hr 50-Year Rainfall=5.30"

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### Summary for Reach 9R: Northward Fitchrona Ditch

Inflow Area = 122.500 ac, 1.28% Impervious, Inflow Depth > 1.32" for 50-Year event  
Inflow = 83.44 cfs @ 12.73 hrs, Volume= 13.509 af  
Outflow = 83.17 cfs @ 12.77 hrs, Volume= 13.473 af, Atten= 0%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.71 fps, Min. Travel Time= 1.5 min  
Avg. Velocity = 2.03 fps, Avg. Travel Time= 2.7 min

Peak Storage= 7,353 cf @ 12.75 hrs  
Average Depth at Peak Storage= 2.15'  
Bank-Full Depth= 4.00' Flow Area= 64.0 sf, Capacity= 339.25 cfs

4.00' x 4.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 28.00'  
Length= 327.0' Slope= 0.0112 '/'  
Inlet Invert= 979.00', Outlet Invert= 975.33'



### Summary for Reach 11R: Southward Fitchrona Ditch

Inflow Area = 0.393 ac, 25.19% Impervious, Inflow Depth > 2.07" for 50-Year event  
Inflow = 1.55 cfs @ 11.98 hrs, Volume= 0.068 af  
Outflow = 1.36 cfs @ 12.07 hrs, Volume= 0.067 af, Atten= 12%, Lag= 5.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.01 fps, Min. Travel Time= 3.6 min  
Avg. Velocity = 0.32 fps, Avg. Travel Time= 11.4 min

Peak Storage= 298 cf @ 12.01 hrs  
Average Depth at Peak Storage= 0.29'  
Bank-Full Depth= 3.00' Flow Area= 39.0 sf, Capacity= 145.37 cfs

4.00' x 3.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 22.00'  
Length= 215.0' Slope= 0.0078 '/'  
Inlet Invert= 977.00', Outlet Invert= 975.33'



‡

# Ditch Calcs - Fitchrona & Lacy FINAL

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Type II 24-hr 50-Year Rainfall=5.30"

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## Summary for Reach 19R: West Ditch

Inflow Area = 4.149 ac, 32.47% Impervious, Inflow Depth > 2.39" for 50-Year event  
Inflow = 13.89 cfs @ 11.99 hrs, Volume= 0.825 af  
Outflow = 12.87 cfs @ 12.05 hrs, Volume= 0.822 af, Atten= 7%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 3.80 fps, Min. Travel Time= 2.2 min  
Avg. Velocity = 0.97 fps, Avg. Travel Time= 8.7 min

Peak Storage= 1,744 cf @ 12.01 hrs  
Average Depth at Peak Storage= 0.60'  
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 147.95 cfs

4.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 ' / ' Top Width= 16.00'  
Length= 505.0' Slope= 0.0485 ' / '  
Inlet Invert= 1,025.00', Outlet Invert= 1,000.50'



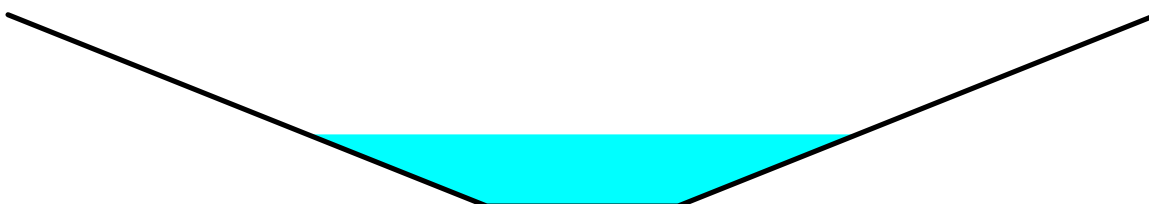
## Summary for Reach 40R: Ditch 1

Inflow Area = 1.214 ac, 22.24% Impervious, Inflow Depth > 2.05" for 50-Year event  
Inflow = 4.52 cfs @ 11.98 hrs, Volume= 0.207 af  
Outflow = 3.66 cfs @ 12.11 hrs, Volume= 0.205 af, Atten= 19%, Lag= 8.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.28 fps, Min. Travel Time= 5.2 min  
Avg. Velocity = 0.34 fps, Avg. Travel Time= 19.7 min

Peak Storage= 1,161 cf @ 12.02 hrs  
Average Depth at Peak Storage= 0.75'  
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 31.28 cfs

2.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 2.5 ' / ' Top Width= 12.00'  
Length= 400.0' Slope= 0.0050 ' / '  
Inlet Invert= 1,035.00', Outlet Invert= 1,033.00'



## Ditch Calcs - Fitchrona & Lacy FINAL

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Type II 24-hr 50-Year Rainfall=5.30"

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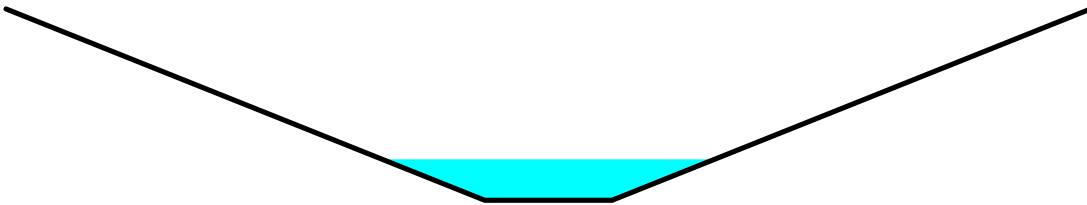
### Summary for Reach 42R: Ditch 2

Inflow Area = 2.198 ac, 26.07% Impervious, Inflow Depth > 2.18" for 50-Year event  
Inflow = 6.05 cfs @ 12.00 hrs, Volume= 0.399 af  
Outflow = 5.75 cfs @ 12.05 hrs, Volume= 0.398 af, Atten= 5%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 2.52 fps, Min. Travel Time= 1.5 min  
Avg. Velocity = 0.74 fps, Avg. Travel Time= 5.0 min

Peak Storage= 511 cf @ 12.02 hrs  
Average Depth at Peak Storage= 0.64'  
Bank-Full Depth= 3.00' Flow Area= 28.5 sf, Capacity= 172.47 cfs

2.00' x 3.00' deep channel, n= 0.050  
Side Slope Z-value= 2.5 ' / ' Top Width= 17.00'  
Length= 220.0' Slope= 0.0227 ' / '  
Inlet Invert= 1,033.00', Outlet Invert= 1,028.00'



### Summary for Pond 12R: Fitchrona Culvert

Inflow Area = 122.893 ac, 1.36% Impervious, Inflow Depth > 3.75" for 50-Year event  
Inflow = 98.29 cfs @ 12.77 hrs, Volume= 38.395 af  
Outflow = 98.29 cfs @ 12.77 hrs, Volume= 38.395 af, Atten= 0%, Lag= 0.0 min  
Primary = 98.29 cfs @ 12.77 hrs, Volume= 38.395 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 981.21' @ 12.77 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	975.33'	<b>48.0" Round Culvert</b> L= 62.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 975.33' / 974.71' S= 0.0100 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 12.57 sf

**Primary OutFlow** Max=98.16 cfs @ 12.77 hrs HW=981.21' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 98.16 cfs @ 7.81 fps)

### Summary for Pond 33P: SW Interception Point

Inflow Area = 4.149 ac, 32.47% Impervious, Inflow Depth > 2.38" for 50-Year event  
Inflow = 12.87 cfs @ 12.05 hrs, Volume= 0.822 af  
Outflow = 12.81 cfs @ 12.05 hrs, Volume= 0.822 af, Atten= 0%, Lag= 0.2 min  
Primary = 6.98 cfs @ 12.05 hrs, Volume= 0.119 af  
Secondary = 5.84 cfs @ 12.06 hrs, Volume= 0.703 af



**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 50-Year Rainfall=5.30"

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Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 1,002.38' @ 12.05 hrs Surf.Area= 316 sf Storage= 378 cf

Plug-Flow detention time= 0.8 min calculated for 0.820 af (100% of inflow)  
 Center-of-Mass det. time= 0.6 min ( 782.9 - 782.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.50'	597 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,000.50	13	0	0
1,001.00	170	46	46
1,002.00	272	221	267
1,003.00	388	330	597

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,000.50'	<b>15.0" Round Culvert</b> L= 118.3' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,000.50' / 998.73' S= 0.0150 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Primary	1,002.00'	<b>12.0' long x 7.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

**Primary OutFlow** Max=6.87 cfs @ 12.05 hrs HW=1,002.37' (Free Discharge)  
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 6.87 cfs @ 1.53 fps)

**Secondary OutFlow** Max=5.83 cfs @ 12.06 hrs HW=1,002.37' (Free Discharge)  
 ↳ **1=Culvert** (Inlet Controls 5.83 cfs @ 4.75 fps)

**Summary for Pond 40P: West Culvert & Storage**

Inflow Area = 2.198 ac, 26.07% Impervious, Inflow Depth > 2.17" for 50-Year event  
 Inflow = 5.75 cfs @ 12.05 hrs, Volume= 0.398 af  
 Outflow = 5.75 cfs @ 12.06 hrs, Volume= 0.398 af, Atten= 0%, Lag= 0.4 min  
 Primary = 5.75 cfs @ 12.06 hrs, Volume= 0.398 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1,028.93' @ 12.06 hrs Surf.Area= 291 sf Storage= 156 cf

Plug-Flow detention time= 0.6 min calculated for 0.397 af (100% of inflow)  
 Center-of-Mass det. time= 0.5 min ( 785.4 - 784.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,028.00'	3,413 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 50-Year Rainfall=5.30"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,028.00	45	0	0
1,029.00	310	178	178
1,030.00	800	555	733
1,031.00	1,520	1,160	1,893
1,032.00	1,520	1,520	3,413

Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	<b>30.0" W x 19.0" H, R=33.0" Elliptical Culvert</b> L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 1,028.00' / 1,025.00' S= 0.0309 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.28 sf

**Primary OutFlow** Max=5.68 cfs @ 12.06 hrs HW=1,028.92' (Free Discharge)

↑**1=Culvert** (Inlet Controls 5.68 cfs @ 2.89 fps)

**Summary for Pond 41P: 15" Pipe - Outlot 15**

Inflow	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af,	Incl. 15.00 cfs Base Flow
Outflow	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af,	Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af	

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 984.07' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	977.00'	<b>15.0" Round Culvert</b> L= 58.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 977.00' / 976.70' S= 0.0052 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

**Primary OutFlow** Max=15.00 cfs @ 0.00 hrs HW=984.07' (Free Discharge)

↑**1=Culvert** (Inlet Controls 15.00 cfs @ 12.22 fps)

**Summary for Pond 44P: Culvert Under Bike Path**

Inflow Area =	4.923 ac, 30.53% Impervious, Inflow Depth > 0.59" for 50-Year event
Inflow	= 8.27 cfs @ 12.12 hrs, Volume= 0.241 af
Outflow	= 8.13 cfs @ 12.13 hrs, Volume= 0.240 af, Atten= 2%, Lag= 0.9 min
Primary	= 8.13 cfs @ 12.13 hrs, Volume= 0.240 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 981.10' @ 12.13 hrs Surf.Area= 544 sf Storage= 461 cf

Plug-Flow detention time= 2.4 min calculated for 0.240 af (100% of inflow)

Center-of-Mass det. time= 1.5 min ( 771.0 - 769.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	980.00'	4,253 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 50-Year Rainfall=5.30"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
980.00	315	0	0
981.00	500	408	408
982.00	925	713	1,120
983.00	1,780	1,353	2,473
984.00	1,780	1,780	4,253

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	<b>24.0" Round Culvert</b> L= 52.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 980.00' / 979.00' S= 0.0192 ' /' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Primary	984.00'	<b>65.0' long x 35.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=7.92 cfs @ 12.13 hrs HW=981.09' (Free Discharge)

- ↑ 1=Culvert (Barrel Controls 7.92 cfs @ 6.59 fps)
- ↳ 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 48P: Lacy Culvert**

Inflow Area = 117.000 ac, 0.00% Impervious, Inflow Depth > 1.35" for 50-Year event  
 Inflow = 83.03 cfs @ 12.73 hrs, Volume= 13.188 af  
 Outflow = 83.03 cfs @ 12.73 hrs, Volume= 13.188 af, Atten= 0%, Lag= 0.0 min  
 Primary = 83.03 cfs @ 12.73 hrs, Volume= 13.188 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 983.91' @ 12.73 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	979.42'	<b>48.0" Round Culvert</b> L= 123.0' Ke= 0.500 Inlet / Outlet Invert= 979.42' / 979.00' S= 0.0034 ' /' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Primary	984.00'	<b>50.0' long x 22.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=82.87 cfs @ 12.73 hrs HW=983.90' (Free Discharge)

- ↑ 1=Culvert (Barrel Controls 82.87 cfs @ 7.35 fps)
- ↳ 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Link 37L: Culvert to Outlot 7 (4)**

Inflow = 5.84 cfs @ 12.06 hrs, Volume= 0.703 af  
 Primary = 5.84 cfs @ 12.06 hrs, Volume= 0.703 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 100-Year Rainfall=6.00"

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**Summary for Subcatchment 10S: N WS**

Runoff = 1.90 cfs @ 11.97 hrs, Volume= 0.084 af, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.294	61	Grass and Perm. Pavement
* 0.099	98	Impermeable Pavement
0.393	70	Weighted Average
0.294		74.81% Pervious Area
0.099		25.19% Impervious Area

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

**Summary for Subcatchment 13S: Central WS**

Runoff = 2.36 cfs @ 11.98 hrs, Volume= 0.103 af, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.508	61	Grass & Permeable Pavement
* 0.069	98	Impermeable Pavement
0.577	65	Weighted Average
0.508		88.04% Pervious Area
0.069		11.96% Impervious Area

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

**Summary for Subcatchment 19S: EC WS IMP**

Runoff = 1.01 cfs @ 11.96 hrs, Volume= 0.055 af, Depth> 5.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.121	98	
0.121		100.00% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

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Type II 24-hr 100-Year Rainfall=6.00"

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

**Summary for Subcatchment 21S: EC WS PERV**

Runoff = 0.78 cfs @ 11.98 hrs, Volume= 0.034 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.226	61	
0.226		100.00% Pervious Area

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

**Summary for Subcatchment 22S: EC WS - Road and Path**

Runoff = 3.82 cfs @ 11.98 hrs, Volume= 0.167 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.718	61	Grass & Pervious Path
* 0.149	98	Road
0.867	67	Weighted Average
0.718		82.81% Pervious Area
0.149		17.19% Impervious Area

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

**Summary for Subcatchment 24S: WC WS IMP**

Runoff = 1.41 cfs @ 11.96 hrs, Volume= 0.077 af, Depth> 5.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.170	98	
0.170		100.00% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 100-Year Rainfall=6.00"

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

**Summary for Subcatchment 25S: WC WS PERV**

Runoff = 1.09 cfs @ 11.98 hrs, Volume= 0.048 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.315	61	
0.315		100.00% Pervious Area

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

**Summary for Subcatchment 27S: WC WS - Road and Path**

Runoff = 2.49 cfs @ 11.97 hrs, Volume= 0.111 af, Depth> 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.366	61	Grass + Perm. Pavement
* 0.133	98	Impervious Pavement
0.499	71	Weighted Average
0.366		73.35% Pervious Area
0.133		26.65% Impervious Area

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

**Summary for Subcatchment 28S: W WS IMP**

Runoff = 2.22 cfs @ 11.96 hrs, Volume= 0.122 af, Depth> 5.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.267	98	
0.267		100.00% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 100-Year Rainfall=6.00"

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

**Summary for Subcatchment 29S: W WS PERV**

Runoff = 1.72 cfs @ 11.98 hrs, Volume= 0.075 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.495	61	
0.495		100.00% Pervious Area

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

**Summary for Subcatchment 30S: W WS - Road and Path**

Runoff = 7.05 cfs @ 11.97 hrs, Volume= 0.319 af, Depth> 3.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.682	61	Grass & Perm Pavement
* 0.507	98	Impervious Pavement
1.189	77	Weighted Average
0.682		57.36% Pervious Area
0.507		42.64% Impervious Area

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

**Summary for Subcatchment 41S: Lacy Rd WS - Road and Path**

Runoff = 3.53 cfs @ 11.98 hrs, Volume= 0.155 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 0.618	61	Grass + Permeable Bike Path
* 0.156	98	Lacy Road Pavement
0.774	68	Weighted Average
0.618		79.84% Pervious Area
0.156		20.16% Impervious Area

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 100-Year Rainfall=6.00"

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

**Summary for Subcatchment 47S: SE WS**

Runoff = 111.15 cfs @ 12.72 hrs, Volume= 17.176 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 100-Year Rainfall=6.00"

Area (ac)	CN	Description
* 117.000	61	
117.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0219	0.12		<b>Sheet Flow,</b>
					Grass: Dense n= 0.240 P2= 2.90"
48.8	3,900	0.0219	1.33		<b>Shallow Concentrated Flow,</b>
					Cultivated Straight Rows Kv= 9.0 fps
63.3	4,000	Total			

**Summary for Reach 3R: Lacy Ditch**

Inflow Area = 4.923 ac, 30.53% Impervious, Inflow Depth > 0.84" for 100-Year event  
Inflow = 12.19 cfs @ 12.03 hrs, Volume= 0.343 af  
Outflow = 11.50 cfs @ 12.11 hrs, Volume= 0.342 af, Atten= 6%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.35 fps, Min. Travel Time= 2.5 min  
Avg. Velocity = 0.69 fps, Avg. Travel Time= 12.3 min

Peak Storage= 1,781 cf @ 12.06 hrs  
Average Depth at Peak Storage= 0.53'  
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 153.37 cfs

5.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 ' / ' Top Width= 17.00'  
Length= 512.0' Slope= 0.0410 ' / '  
Inlet Invert= 1,001.00', Outlet Invert= 980.00'





## Ditch Calcs - Fitchrona & Lacy FINAL

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Type II 24-hr 100-Year Rainfall=6.00"

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### Summary for Reach 9R: Northward Fitchrona Ditch

Inflow Area = 122.500 ac, 1.28% Impervious, Inflow Depth > 1.73" for 100-Year event  
Inflow = 111.65 cfs @ 12.72 hrs, Volume= 17.620 af  
Outflow = 111.37 cfs @ 12.75 hrs, Volume= 17.579 af, Atten= 0%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.99 fps, Min. Travel Time= 1.4 min  
Avg. Velocity = 2.09 fps, Avg. Travel Time= 2.6 min

Peak Storage= 9,132 cf @ 12.73 hrs  
Average Depth at Peak Storage= 2.46'  
Bank-Full Depth= 4.00' Flow Area= 64.0 sf, Capacity= 339.25 cfs

4.00' x 4.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 28.00'  
Length= 327.0' Slope= 0.0112 '/'  
Inlet Invert= 979.00', Outlet Invert= 975.33'



### Summary for Reach 11R: Southward Fitchrona Ditch

Inflow Area = 0.393 ac, 25.19% Impervious, Inflow Depth > 2.57" for 100-Year event  
Inflow = 1.90 cfs @ 11.97 hrs, Volume= 0.084 af  
Outflow = 1.73 cfs @ 12.06 hrs, Volume= 0.084 af, Atten= 9%, Lag= 5.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.09 fps, Min. Travel Time= 3.3 min  
Avg. Velocity = 0.33 fps, Avg. Travel Time= 10.9 min

Peak Storage= 348 cf @ 12.01 hrs  
Average Depth at Peak Storage= 0.33'  
Bank-Full Depth= 3.00' Flow Area= 39.0 sf, Capacity= 145.37 cfs

4.00' x 3.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 22.00'  
Length= 215.0' Slope= 0.0078 '/'  
Inlet Invert= 977.00', Outlet Invert= 975.33'



‡

## Ditch Calcs - Fitchrona & Lacy FINAL

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Type II 24-hr 100-Year Rainfall=6.00"

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### Summary for Reach 19R: West Ditch

Inflow Area = 4.149 ac, 32.47% Impervious, Inflow Depth > 2.90" for 100-Year event  
Inflow = 17.11 cfs @ 11.99 hrs, Volume= 1.004 af  
Outflow = 15.88 cfs @ 12.05 hrs, Volume= 1.001 af, Atten= 7%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 4.05 fps, Min. Travel Time= 2.1 min  
Avg. Velocity = 1.03 fps, Avg. Travel Time= 8.2 min

Peak Storage= 2,027 cf @ 12.01 hrs  
Average Depth at Peak Storage= 0.67'  
Bank-Full Depth= 2.00' Flow Area= 20.0 sf, Capacity= 147.95 cfs

4.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 3.0 '/' Top Width= 16.00'  
Length= 505.0' Slope= 0.0485 '/'  
Inlet Invert= 1,025.00', Outlet Invert= 1,000.50'



### Summary for Reach 40R: Ditch 1

Inflow Area = 1.214 ac, 22.24% Impervious, Inflow Depth > 2.53" for 100-Year event  
Inflow = 5.55 cfs @ 11.97 hrs, Volume= 0.256 af  
Outflow = 4.60 cfs @ 12.10 hrs, Volume= 0.254 af, Atten= 17%, Lag= 7.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.37 fps, Min. Travel Time= 4.9 min  
Avg. Velocity = 0.36 fps, Avg. Travel Time= 18.5 min

Peak Storage= 1,379 cf @ 12.02 hrs  
Average Depth at Peak Storage= 0.84'  
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 31.28 cfs

2.00' x 2.00' deep channel, n= 0.050  
Side Slope Z-value= 2.5 '/' Top Width= 12.00'  
Length= 400.0' Slope= 0.0050 '/'  
Inlet Invert= 1,035.00', Outlet Invert= 1,033.00'



## Ditch Calcs - Fitchrona & Lacy FINAL

Prepared by Montgomery Associates

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Type II 24-hr 100-Year Rainfall=6.00"

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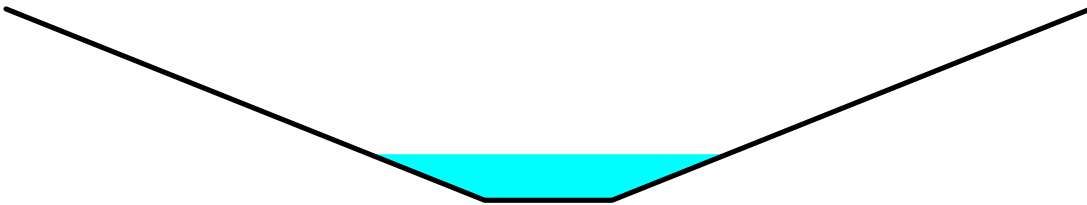
### Summary for Reach 42R: Ditch 2

Inflow Area = 2.198 ac, 26.07% Impervious, Inflow Depth > 2.67" for 100-Year event  
Inflow = 7.69 cfs @ 12.00 hrs, Volume= 0.490 af  
Outflow = 7.31 cfs @ 12.05 hrs, Volume= 0.489 af, Atten= 5%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
Max. Velocity= 2.69 fps, Min. Travel Time= 1.4 min  
Avg. Velocity = 0.78 fps, Avg. Travel Time= 4.7 min

Peak Storage= 609 cf @ 12.02 hrs  
Average Depth at Peak Storage= 0.73'  
Bank-Full Depth= 3.00' Flow Area= 28.5 sf, Capacity= 172.47 cfs

2.00' x 3.00' deep channel, n= 0.050  
Side Slope Z-value= 2.5 ' / ' Top Width= 17.00'  
Length= 220.0' Slope= 0.0227 ' / '  
Inlet Invert= 1,033.00', Outlet Invert= 1,028.00'



### Summary for Pond 12R: Fitchrona Culvert

Inflow Area = 122.893 ac, 1.36% Impervious, Inflow Depth > 4.15" for 100-Year event  
Inflow = 126.52 cfs @ 12.75 hrs, Volume= 42.518 af  
Outflow = 126.52 cfs @ 12.75 hrs, Volume= 42.518 af, Atten= 0%, Lag= 0.0 min  
Primary = 126.52 cfs @ 12.75 hrs, Volume= 42.518 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 982.86' @ 12.75 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	975.33'	<b>48.0" Round Culvert</b> L= 62.0' Square-edged headwall, Ke= 0.500 Inlet / Outlet Invert= 975.33' / 974.71' S= 0.0100 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 12.57 sf

**Primary OutFlow** Max=126.50 cfs @ 12.75 hrs HW=982.86' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 126.50 cfs @ 10.07 fps)

### Summary for Pond 33P: SW Interception Point

Inflow Area = 4.149 ac, 32.47% Impervious, Inflow Depth > 2.89" for 100-Year event  
Inflow = 15.88 cfs @ 12.05 hrs, Volume= 1.001 af  
Outflow = 15.83 cfs @ 12.05 hrs, Volume= 1.000 af, Atten= 0%, Lag= 0.1 min  
Primary = 9.79 cfs @ 12.05 hrs, Volume= 0.188 af  
Secondary = 6.03 cfs @ 12.05 hrs, Volume= 0.812 af

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 100-Year Rainfall=6.00"

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Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 3  
 Peak Elev= 1,002.46' @ 12.05 hrs Surf.Area= 326 sf Storage= 406 cf

Plug-Flow detention time= 0.6 min calculated for 1.000 af (100% of inflow)  
 Center-of-Mass det. time= 0.6 min ( 780.0 - 779.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.50'	597 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,000.50	13	0	0
1,001.00	170	46	46
1,002.00	272	221	267
1,003.00	388	330	597

Device	Routing	Invert	Outlet Devices
#1	Secondary	1,000.50'	<b>15.0" Round Culvert</b> L= 118.3' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,000.50' / 998.73' S= 0.0150 '/ Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Primary	1,002.00'	<b>12.0' long x 7.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

**Primary OutFlow** Max=9.76 cfs @ 12.05 hrs HW=1,002.46' (Free Discharge)  
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 9.76 cfs @ 1.75 fps)

**Secondary OutFlow** Max=6.03 cfs @ 12.05 hrs HW=1,002.46' (Free Discharge)  
 ↳ **1=Culvert** (Inlet Controls 6.03 cfs @ 4.92 fps)

**Summary for Pond 40P: West Culvert & Storage**

Inflow Area = 2.198 ac, 26.07% Impervious, Inflow Depth > 2.67" for 100-Year event  
 Inflow = 7.31 cfs @ 12.05 hrs, Volume= 0.489 af  
 Outflow = 7.31 cfs @ 12.06 hrs, Volume= 0.488 af, Atten= 0%, Lag= 0.5 min  
 Primary = 7.31 cfs @ 12.06 hrs, Volume= 0.488 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1,029.07' @ 12.06 hrs Surf.Area= 344 sf Storage= 200 cf

Plug-Flow detention time= 0.6 min calculated for 0.488 af (100% of inflow)  
 Center-of-Mass det. time= 0.5 min ( 782.7 - 782.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,028.00'	3,413 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 100-Year Rainfall=6.00"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,028.00	45	0	0
1,029.00	310	178	178
1,030.00	800	555	733
1,031.00	1,520	1,160	1,893
1,032.00	1,520	1,520	3,413

Device	Routing	Invert	Outlet Devices
#1	Primary	1,028.00'	<b>30.0" W x 19.0" H, R=33.0" Elliptical Culvert</b> L= 97.0' Ke= 0.500 Inlet / Outlet Invert= 1,028.00' / 1,025.00' S= 0.0309 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.28 sf

**Primary OutFlow** Max=7.23 cfs @ 12.06 hrs HW=1,029.06' (Free Discharge)

↑**1=Culvert** (Inlet Controls 7.23 cfs @ 3.14 fps)

**Summary for Pond 41P: 15" Pipe - Outlot 15**

Inflow	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af,	Incl. 15.00 cfs Base Flow
Outflow	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af,	Atten= 0%, Lag= 0.0 min
Primary	=	15.00 cfs @	0.00 hrs,	Volume=	24.855 af	

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 984.07' @ 0.00 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	977.00'	<b>15.0" Round Culvert</b> L= 58.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 977.00' / 976.70' S= 0.0052 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

**Primary OutFlow** Max=15.00 cfs @ 0.00 hrs HW=984.07' (Free Discharge)

↑**1=Culvert** (Inlet Controls 15.00 cfs @ 12.22 fps)

**Summary for Pond 44P: Culvert Under Bike Path**

Inflow Area =	4.923 ac,	30.53% Impervious,	Inflow Depth > 0.83" for 100-Year event
Inflow	=	11.50 cfs @	12.11 hrs, Volume= 0.342 af
Outflow	=	11.34 cfs @	12.12 hrs, Volume= 0.341 af, Atten= 1%, Lag= 0.8 min
Primary	=	11.34 cfs @	12.12 hrs, Volume= 0.341 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 981.36' @ 12.12 hrs Surf.Area= 653 sf Storage= 615 cf

Plug-Flow detention time= 2.1 min calculated for 0.341 af (100% of inflow)

Center-of-Mass det. time= 1.3 min ( 763.5 - 762.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	980.00'	4,253 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

**Ditch Calcs - Fitchrona & Lacy FINAL**

Type II 24-hr 100-Year Rainfall=6.00"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
980.00	315	0	0
981.00	500	408	408
982.00	925	713	1,120
983.00	1,780	1,353	2,473
984.00	1,780	1,780	4,253

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	<b>24.0" Round Culvert</b> L= 52.0' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 980.00' / 979.00' S= 0.0192 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Primary	984.00'	<b>65.0' long x 35.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=11.04 cfs @ 12.12 hrs HW=981.34' (Free Discharge)

- ↑ 1=Culvert (Barrel Controls 11.04 cfs @ 7.01 fps)
- ↳ 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 48P: Lacy Culvert**

Inflow Area = 117.000 ac, 0.00% Impervious, Inflow Depth > 1.76" for 100-Year event  
 Inflow = 111.15 cfs @ 12.72 hrs, Volume= 17.176 af  
 Outflow = 111.15 cfs @ 12.72 hrs, Volume= 17.176 af, Atten= 0%, Lag= 0.0 min  
 Primary = 111.15 cfs @ 12.72 hrs, Volume= 17.176 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 984.28' @ 12.72 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	979.42'	<b>48.0" Round Culvert</b> L= 123.0' Ke= 0.500 Inlet / Outlet Invert= 979.42' / 979.00' S= 0.0034 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 12.57 sf
#2	Primary	984.00'	<b>50.0' long x 22.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=110.96 cfs @ 12.72 hrs HW=984.28' (Free Discharge)

- ↑ 1=Culvert (Barrel Controls 90.77 cfs @ 7.55 fps)
- ↳ 2=Broad-Crested Rectangular Weir (Weir Controls 20.19 cfs @ 1.43 fps)

**Summary for Link 37L: Culvert to Outlot 7 (4)**

Inflow = 6.03 cfs @ 12.05 hrs, Volume= 0.812 af  
 Primary = 6.03 cfs @ 12.05 hrs, Volume= 0.812 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs