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Phase 1 - Tree Trenches

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
14.850	98	(2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 40S, 44S, 60S, 100S, 400)
0.320	61	(5S)
0.710	61	>75% Grass cover, Good, HSG B (3S, 6S, 44S, 400)
0.960	74	>75% Grass cover, Good, HSG C (4S, 7S, 9S, 40S, 60S)
2.240	80	>75% Grass cover, Good, HSG D (2S)

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MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

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Summary for Subcatchment 2S: To Field

Runoff = 3.61 cfs @ 12.03 hrs, Volume= 0.183 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 0.710	98	
2.240	80	>75% Grass cover, Good, HSG D
2.950	84	Weighted Average
2.240		75.93% Pervious Area
0.710		24.07% Impervious Area

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

Summary for Subcatchment 3S: EAST CENTRAL ROAD

Runoff = 2.15 cfs @ 12.09 hrs, Volume= 0.134 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 1.070	98	
0.150	61	>75% Grass cover, Good, HSG B
1.220	93	Weighted Average
0.150		12.30% Pervious Area
1.070		87.70% Impervious Area

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

Summary for Subcatchment 4S: NW Road

Runoff = 1.68 cfs @ 12.10 hrs, Volume= 0.112 af, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 0.780	98	
0.070	74	>75% Grass cover, Good, HSG C
0.850	96	Weighted Average
0.070		8.24% Pervious Area
0.780		91.76% Impervious Area

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

Summary for Subcatchment 5S: Parking E

Runoff = 3.44 cfs @ 12.09 hrs, Volume= 0.213 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 1.750	98	
* 0.320	61	
2.070	92	Weighted Average
0.320		15.46% Pervious Area
1.750		84.54% Impervious Area

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

Summary for Subcatchment 6S: Plaza SW

Runoff = 0.39 cfs @ 12.10 hrs, Volume= 0.029 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 0.320	98	
0.340	61	>75% Grass cover, Good, HSG B
0.660	79	Weighted Average
0.340		51.52% Pervious Area
0.320		48.48% Impervious Area

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

Summary for Subcatchment 7S: E ROAD

Runoff = 2.65 cfs @ 12.10 hrs, Volume= 0.172 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

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MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

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Area (ac)	CN	Description
* 1.250	98	
0.320	74	>75% Grass cover, Good, HSG C
1.570	93	Weighted Average
0.320		20.38% Pervious Area
1.250		79.62% Impervious Area

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

Summary for Subcatchment 8S: LOADING DOCK

Runoff = 1.20 cfs @ 12.08 hrs, Volume= 0.080 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 0.540	98	
0.540		100.00% Impervious Area

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

Summary for Subcatchment 9S: SW ROAD

Runoff = 1.42 cfs @ 12.10 hrs, Volume= 0.092 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 0.680	98	
0.160	74	>75% Grass cover, Good, HSG C
0.840	93	Weighted Average
0.160		19.05% Pervious Area
0.680		80.95% Impervious Area

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

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MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

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Summary for Subcatchment 10S: WEST ROOF AREA N

Runoff = 1.29 cfs @ 12.08 hrs, Volume= 0.086 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 0.580	98	
0.580		100.00% Impervious Area

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

Summary for Subcatchment 11S: NORTH ROOF IRRIGATION

Runoff = 1.69 cfs @ 12.08 hrs, Volume= 0.112 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 0.760	98	
0.760		100.00% Impervious Area

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

Summary for Subcatchment 12S: East Roof

Runoff = 2.56 cfs @ 12.08 hrs, Volume= 0.170 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 1.150	98	
1.150		100.00% Impervious Area

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

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Summary for Subcatchment 40S: W Road

Runoff = 1.07 cfs @ 12.10 hrs, Volume= 0.071 af, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 0.500	98	
0.040	74	>75% Grass cover, Good, HSG C
0.540	96	Weighted Average
0.040		7.41% Pervious Area
0.500		92.59% Impervious Area

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

Summary for Subcatchment 44S: EAST CENTRAL ROAD

Runoff = 2.71 cfs @ 12.08 hrs, Volume= 0.175 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 1.240	98	
0.020	61	>75% Grass cover, Good, HSG B
1.260	97	Weighted Average
0.020		1.59% Pervious Area
1.240		98.41% Impervious Area

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

Summary for Subcatchment 60S: OFF SOUTH

Runoff = 0.61 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 0.280	98	
0.370	74	>75% Grass cover, Good, HSG C
0.650	84	Weighted Average
0.370		56.92% Pervious Area
0.280		43.08% Impervious Area

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

Summary for Subcatchment 100S: WEST ROOF AREA

Runoff = 2.99 cfs @ 12.08 hrs, Volume= 0.198 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 1.340	98	
1.340		100.00% Impervious Area

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

Summary for Subcatchment 400: F

Runoff = 3.91 cfs @ 12.09 hrs, Volume= 0.244 af, Depth= 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

Area (ac)	CN	Description
* 1.900	98	
0.200	61	>75% Grass cover, Good, HSG B
2.100	94	Weighted Average
0.200		9.52% Pervious Area
1.900		90.48% Impervious Area

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

Summary for Reach 56R: (new Reach)

Inflow Area = 5.510 ac, 94.01% Impervious, Inflow Depth = 1.49" for 2" event

Inflow = 5.37 cfs @ 12.20 hrs, Volume= 0.686 af

Outflow = 5.37 cfs @ 12.20 hrs, Volume= 0.686 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

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Summary for Reach 64R: (new Reach)

Inflow Area = 2.760 ac, 94.20% Impervious, Inflow Depth > 1.09" for 2" event
 Inflow = 0.35 cfs @ 12.69 hrs, Volume= 0.251 af
 Outflow = 0.35 cfs @ 12.69 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Reach 72R: (new Reach)

Inflow Area = 9.500 ac, 68.11% Impervious, Inflow Depth > 0.94" for 2" event
 Inflow = 2.02 cfs @ 12.10 hrs, Volume= 0.741 af
 Outflow = 2.02 cfs @ 12.10 hrs, Volume= 0.741 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Pond 2P: (new Pond)

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth = 0.74" for 2" event
 Inflow = 3.61 cfs @ 12.03 hrs, Volume= 0.183 af
 Outflow = 0.21 cfs @ 23.86 hrs, Volume= 0.029 af, Atten= 94%, Lag= 709.6 min
 Primary = 0.21 cfs @ 23.86 hrs, Volume= 0.057 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 907.12' @ 24.00 hrs Surf.Area= 37,908 sf Storage= 7,469 cf

Plug-Flow detention time= 2,078.5 min calculated for 0.029 af (16% of inflow)

Center-of-Mass det. time= 1,940.9 min (2,789.2 - 848.3)

Volume	Invert	Avail.Storage	Storage Description
#1	909.00'	36,504 cf	260.00'W x 400.00'L x 1.17'H Prismatoid 121,680 cf Overall x 30.0% Voids
#2	905.82'	45,159 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 150,529 cf Overall x 30.0% Voids
#3	910.17'	52,000 cf	260.00'W x 400.00'L x 0.50'H Prismatoid
		133,663 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
905.82	600	0	0
906.00	5,700	567	567
907.50	49,000	41,025	41,592
909.00	96,250	108,938	150,529

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.48'	18.0" Round Culvert X 2.00 L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 905.48' / 903.21' S= 0.0100 '/ Cc= 0.900 n= 0.020, Flow Area= 1.77 sf
#2	Primary	904.21'	18.0" Round Culvert L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 904.21' / 903.31' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

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Primary OutFlow Max=0.00 cfs @ 23.86 hrs HW=907.11' TW=907.12' (Dynamic Tailwater)↑ **2=Culvert** (Controls 0.00 cfs)↑ **1=Culvert** (Controls 0.00 cfs)**Summary for Pond 3P: ETT**

Inflow Area = 1.220 ac, 87.70% Impervious, Inflow Depth = 1.31" for 2" event
 Inflow = 2.15 cfs @ 12.09 hrs, Volume= 0.134 af
 Outflow = 0.46 cfs @ 12.59 hrs, Volume= 0.146 af, Atten= 78%, Lag= 30.1 min
 Discarded = 0.01 cfs @ 0.00 hrs, Volume= 0.026 af
 Primary = 0.46 cfs @ 12.59 hrs, Volume= 0.120 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 910.50' Surf.Area= 3,600 sf Storage= 540 cf

Peak Elev= 912.71' @ 12.59 hrs Surf.Area= 3,600 sf Storage= 2,924 cf (2,384 cf above start)

Plug-Flow detention time= 292.1 min calculated for 0.134 af (100% of inflow)

Center-of-Mass det. time= 247.2 min (1,059.1 - 811.9)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	5,400 cf	8.00'W x 450.00'L x 5.00'H Prismatic 18,000 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		25,400 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

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Discarded OutFlow Max=0.01 cfs @ 0.00 hrs HW=910.50' (Free Discharge)↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.46 cfs @ 12.59 hrs HW=912.71' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 0.46 cfs @ 2.33 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=910.50' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Controls 0.00 cfs)↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond 4P: NWTT**

Inflow Area = 2.110 ac, 95.73% Impervious, Inflow Depth = 1.52" for 2" event
 Inflow = 3.03 cfs @ 12.18 hrs, Volume= 0.267 af
 Outflow = 3.01 cfs @ 12.19 hrs, Volume= 0.267 af, Atten= 1%, Lag= 0.6 min
 Discarded = 0.00 cfs @ 6.82 hrs, Volume= 0.010 af
 Primary = 0.53 cfs @ 12.19 hrs, Volume= 0.198 af
 Secondary = 2.47 cfs @ 12.19 hrs, Volume= 0.059 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 913.32' @ 12.19 hrs Surf.Area= 1,480 sf Storage= 1,473 cf

Plug-Flow detention time= 73.8 min calculated for 0.267 af (100% of inflow)

Center-of-Mass det. time= 74.1 min (920.3 - 846.2)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	2,220 cf	8.00'W x 185.00'L x 5.00'H Prismatic 7,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,220 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

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Discarded OutFlow Max=0.00 cfs @ 6.82 hrs HW=910.07' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.53 cfs @ 12.19 hrs HW=913.32' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 0.53 cfs @ 2.72 fps)

Secondary OutFlow Max=2.45 cfs @ 12.19 hrs HW=913.32' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 2.45 cfs of 4.45 cfs potential flow)

↑ **4=Sharp-Crested Rectangular Weir** (Weir Controls 2.45 cfs @ 1.98 fps)

Summary for Pond 5P: EP-sand filter

Inflow Area = 2.070 ac, 84.54% Impervious, Inflow Depth = 1.24" for 2" event
Inflow = 3.44 cfs @ 12.09 hrs, Volume= 0.213 af
Outflow = 0.49 cfs @ 12.68 hrs, Volume= 0.212 af, Atten= 86%, Lag= 35.4 min
Primary = 0.49 cfs @ 12.68 hrs, Volume= 0.212 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 907.48' @ 12.68 hrs Surf.Area= 6,120 sf Storage= 4,558 cf

Plug-Flow detention time= 175.0 min calculated for 0.212 af (100% of inflow)

Center-of-Mass det. time= 173.1 min (990.5 - 817.4)

Volume	Invert	Avail.Storage	Storage Description
#1	905.00'	4,590 cf	72.00'W x 85.00'L x 2.50'H Prismatoid 15,300 cf Overall x 30.0% Voids
#2	907.50'	15,300 cf	72.00'W x 85.00'L x 2.50'H Prismatoid
		19,890 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 905.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	905.00'	12.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 904.75' S= 0.0050 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	907.75'	9.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.49 cfs @ 12.68 hrs HW=907.48' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.49 cfs of 4.73 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 0.49 cfs @ 2.51 fps)

↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 6P: (new Pond)

Inflow Area = 0.660 ac, 48.48% Impervious, Inflow Depth = 0.52" for 2" event
Inflow = 0.39 cfs @ 12.10 hrs, Volume= 0.029 af
Outflow = 0.58 cfs @ 0.00 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min
Primary = 0.58 cfs @ 0.00 hrs, Volume= 0.056 af

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 906.25' Surf.Area= 0.047 ac Storage= 0.027 af

Peak Elev= 906.25' @ 0.00 hrs Surf.Area= 0.047 ac Storage= 0.027 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	903.00'	0.021 af	7.90'W x 130.00'L x 3.00'H Prismaoid 0.071 af Overall x 30.0% Voids
#2	906.00'	0.119 af	8.00'W x 130.00'L x 5.00'H Prismaoid
		0.141 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 3	906.25'	4.0" Round Culvert X 2.00 L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 906.25' / 905.75' S= 0.0050 ' / Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 3	903.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 903.00' S= 0.0000 ' / Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#3	Primary	903.00'	8.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 902.00' S= 0.0100 ' / Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=0.58 cfs @ 0.00 hrs HW=906.25' (Free Discharge)

3=Culvert (Passes 0.58 cfs of 2.02 cfs potential flow)

1=Culvert (Controls 0.00 cfs)

2=Culvert (Barrel Controls 0.58 cfs @ 2.96 fps)

Summary for Pond 7P: SETT

Inflow Area = 1.570 ac, 79.62% Impervious, Inflow Depth = 1.31" for 2" event
 Inflow = 2.65 cfs @ 12.10 hrs, Volume= 0.172 af
 Outflow = 0.37 cfs @ 0.00 hrs, Volume= 0.299 af, Atten= 86%, Lag= 0.0 min
 Secondary = 0.37 cfs @ 0.00 hrs, Volume= 0.299 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 913.00' Surf.Area= 6,200 sf Storage= 5,580 cf

Peak Elev= 913.00' @ 0.00 hrs Surf.Area= 6,200 sf Storage= 5,580 cf

Plug-Flow detention time= 257.0 min calculated for 0.171 af (99% of inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	9,300 cf	20.00'W x 310.00'L x 5.00'H Prismaoid 31,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,300 cf	Total Available Storage

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	21.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' /' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height

Secondary OutFlow Max=0.37 cfs @ 0.00 hrs HW=913.00' (Free Discharge)

2=Culvert (Passes 0.37 cfs of 12.48 cfs potential flow)
1=Culvert (Barrel Controls 0.37 cfs @ 1.90 fps)
3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 9P: SWTT

Inflow Area = 0.840 ac, 80.95% Impervious, Inflow Depth = 1.31" for 2" event
Inflow = 1.42 cfs @ 12.10 hrs, Volume= 0.092 af
Outflow = 1.17 cfs @ 12.19 hrs, Volume= 0.092 af, Atten= 17%, Lag= 5.2 min
Secondary = 1.17 cfs @ 12.19 hrs, Volume= 0.092 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 913.15' @ 12.19 hrs Surf.Area= 1,000 sf Storage= 946 cf

Plug-Flow detention time= 44.2 min calculated for 0.092 af (100% of inflow)

Center-of-Mass det. time= 43.7 min (856.5 - 812.8)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	1,500 cf	8.00'W x 125.00'L x 5.00'H Prismatic 5,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		16,500 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.50' S= 0.0050 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

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#3 Device 2 913.00' **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
1.0' Crest Height

Secondary OutFlow Max=1.11 cfs @ 12.19 hrs HW=913.14' (Free Discharge)

2=Culvert (Passes 1.11 cfs of 4.76 cfs potential flow)

1=Culvert (Barrel Controls 0.38 cfs @ 1.96 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 0.73 cfs @ 1.27 fps)

Summary for Pond 10P: WRTT

Inflow Area = 0.580 ac, 100.00% Impervious, Inflow Depth = 1.77" for 2" event
 Inflow = 1.29 cfs @ 12.08 hrs, Volume= 0.086 af
 Outflow = 0.10 cfs @ 16.14 hrs, Volume= 0.086 af, Atten= 92%, Lag= 243.1 min
 Discarded = 0.01 cfs @ 8.18 hrs, Volume= 0.031 af
 Primary = 0.10 cfs @ 16.14 hrs, Volume= 0.054 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 912.08' @ 14.46 hrs Surf.Area= 4,500 sf Storage= 2,808 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 672.9 min (1,443.2 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	6,750 cf	20.00'W x 225.00'L x 5.00'H Prismatoid 22,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		21,750 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	9.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

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Discarded OutFlow Max=0.01 cfs @ 8.18 hrs HW=910.06' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.10 cfs @ 16.14 hrs HW=911.82' TW=911.65' (Dynamic Tailwater)↳ **2=Culvert** (Passes 0.10 cfs of 1.21 cfs potential flow)↳ **1=Culvert** (Outlet Controls 0.10 cfs @ 0.50 fps)↳ **3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)↳ **4=Orifice/Grate** (Controls 0.00 cfs)**Summary for Pond 11P: IT**

Inflow Area = 0.760 ac, 100.00% Impervious, Inflow Depth = 1.77" for 2" event
 Inflow = 1.69 cfs @ 12.08 hrs, Volume= 0.112 af
 Outflow = 1.05 cfs @ 12.20 hrs, Volume= 0.124 af, Atten= 38%, Lag= 7.1 min
 Primary = 1.05 cfs @ 12.20 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 919.80' Surf.Area= 0.073 ac Storage= 0.062 af

Peak Elev= 920.18' @ 12.20 hrs Surf.Area= 0.074 ac Storage= 0.077 af (0.014 af above start)

Plug-Flow detention time= 289.5 min calculated for 0.061 af (54% of inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	920.01'	0.005 af	15.0" Round Pipe Storage L= 168.0' S= 0.0150 '/'
#2	924.00'	0.001 af	3.00'D x 3.00'H Vertical Cone/Cylinder x 2
#3	916.00'	0.033 af	8.00'W x 200.00'L x 3.00'H Prismatic 0.110 af Overall x 30.0% Voids
#4	919.00'	0.184 af	8.00'W x 200.00'L x 5.00'H Prismatic
		0.222 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	919.50'	11.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 919.50' / 919.30' S= 0.0040 '/' Cc= 0.900 n= 0.013, Flow Area= 0.66 sf

Primary OutFlow Max=1.05 cfs @ 12.20 hrs HW=920.18' TW=0.00' (Dynamic Tailwater)↳ **1=Culvert** (Barrel Controls 1.05 cfs @ 2.77 fps)**Summary for Pond 12P: ERTT**

Inflow Area = 1.150 ac, 100.00% Impervious, Inflow Depth = 1.77" for 2" event
 Inflow = 2.56 cfs @ 12.08 hrs, Volume= 0.170 af
 Outflow = 0.34 cfs @ 0.00 hrs, Volume= 0.331 af, Atten= 87%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 0.00 hrs, Volume= 0.059 af
 Primary = 0.33 cfs @ 0.00 hrs, Volume= 0.272 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Phase 1 - Tree Trenches

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Starting Elev= 913.00' Surf.Area= 7,800 sf Storage= 7,020 cf
 Peak Elev= 913.00' @ 0.00 hrs Surf.Area= 7,800 sf Storage= 7,020 cf

Plug-Flow detention time= 627.8 min calculated for 0.170 af (100% of inflow)
 Center-of-Mass det. time= 97.0 min (867.3 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	11,700 cf	20.00'W x 390.00'L x 5.00'H Prismaoid 39,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		26,700 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	7.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 0.00 hrs HW=913.00' (Free Discharge)

↑ **5=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.33 cfs @ 0.00 hrs HW=913.00' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.33 cfs of 5.07 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 0.33 cfs @ 1.70 fps)

↑ **3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

↑ **4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 20P: (new Pond)

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth = 0.23" for 2" event
 Inflow = 0.21 cfs @ 23.86 hrs, Volume= 0.057 af
 Outflow = 0.02 cfs @ 24.05 hrs, Volume= 0.056 af, Atten= 89%, Lag= 11.1 min
 Primary = 0.02 cfs @ 24.05 hrs, Volume= 0.056 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 907.03' Surf.Area= 0.116 ac Storage= 0.521 af

Peak Elev= 907.12' @ 24.05 hrs Surf.Area= 0.116 ac Storage= 0.527 af (0.006 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 245.1 min (3,394.0 - 3,149.0)

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Volume	Invert	Avail.Storage	Storage Description
#1A	899.75'	0.000 af	43.00'W x 118.00'L x 9.00'H Field A 1.048 af Overall - 0.556 af Embedded = 0.493 af x 0.0% Voids
#2A	900.25'	0.556 af	CMP_Round 96 x 20 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.20 sf x 20.00'L = 1,004.1 cf Overall Size= 96.0"W x 96.0"H x 20.00'L 4 Rows of 5 Chambers 41.00' Header x 50.20 sf x 2 = 4,116.8 cf Inside
#3	902.55'	0.012 af	30.0" Round Pipe Storage L= 107.0' S= 0.0065 '/'
#4	903.25'	0.006 af	18.0" Round Pipe Storage L= 151.0' S= 0.0065 '/'
#5	904.10'	0.001 af	18.0" Round Pipe Storage L= 15.0' S= 0.0050 '/'
		0.574 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	907.03'	18.0" Round Culvert L= 145.0' Ke= 0.500 Inlet / Outlet Invert= 907.03' / 906.52' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.02 cfs @ 24.05 hrs HW=907.12' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.02 cfs @ 0.84 fps)

Summary for Pond 40P: WTT

Inflow Area = 0.540 ac, 92.59% Impervious, Inflow Depth = 1.57" for 2" event
Inflow = 1.07 cfs @ 12.10 hrs, Volume= 0.071 af
Outflow = 0.43 cfs @ 12.34 hrs, Volume= 0.071 af, Atten= 60%, Lag= 14.2 min
Discarded = 0.00 cfs @ 7.44 hrs, Volume= 0.008 af
Primary = 0.43 cfs @ 12.34 hrs, Volume= 0.062 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 918.50' @ 12.34 hrs Surf.Area= 1,200 sf Storage= 1,052 cf

Plug-Flow detention time= 200.1 min calculated for 0.071 af (100% of inflow)
Center-of-Mass det. time= 200.5 min (992.5 - 792.0)

Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	2,100 cf	8.00'W x 150.00'L x 5.00'H Prismatic 6,000 cf Overall x 35.0% Voids
#2	921.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
921.00	2,000	0	0
922.00	9,000	5,500	5,500
923.00	20,000	14,500	20,000

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Device	Routing	Invert	Outlet Devices
#1	Device 2	916.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.50' / 916.50' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	916.30'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.30' / 915.80' S= 0.0050 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	916.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	919.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.00 cfs @ 7.44 hrs HW=916.07' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.43 cfs @ 12.34 hrs HW=918.50' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.43 cfs of 3.82 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 0.43 cfs @ 2.19 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 44P: NTT

Inflow Area = 1.260 ac, 98.41% Impervious, Inflow Depth = 1.67" for 2" event
 Inflow = 2.71 cfs @ 12.08 hrs, Volume= 0.175 af
 Outflow = 1.76 cfs @ 12.20 hrs, Volume= 0.176 af, Atten= 35%, Lag= 7.1 min
 Discarded = 0.00 cfs @ 6.32 hrs, Volume= 0.020 af
 Primary = 1.76 cfs @ 12.20 hrs, Volume= 0.156 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 913.41' @ 12.20 hrs Surf.Area= 2,880 sf Storage= 2,944 cf

Plug-Flow detention time= 230.2 min calculated for 0.175 af (100% of inflow)

Center-of-Mass det. time= 230.5 min (1,012.3 - 781.8)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	4,320 cf	8.00'W x 360.00'L x 5.00'H Prismatic 14,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,320 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Device 4	910.40'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.40' / 909.25' S= 0.0115 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#3	Device 4	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

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#4 Primary 910.00' 0.5' Crest Height
15.0" Round Culvert L= 60.0' Ke= 0.500
 Inlet / Outlet Invert= 910.00' / 909.40' S= 0.0100 ' /' Cc= 0.900
 n= 0.013, Flow Area= 1.23 sf

Discarded OutFlow Max=0.00 cfs @ 6.32 hrs HW=910.07' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=1.76 cfs @ 12.20 hrs HW=913.41' TW=913.31' (Dynamic Tailwater)

↑ **4=Culvert** (Outlet Controls 1.76 cfs @ 1.43 fps)

↑ **1=Culvert** (Passes < 0.11 cfs potential flow)

↑ **3=Sharp-Crested Rectangular Weir** (Passes < 2.35 cfs potential flow)

Summary for Pond 55P: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	3,218 cf	6.50'W x 330.00'L x 5.00'H Prismatic 10,725 cf Overall x 30.0% Voids
#2	915.00'	5,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,218 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	8,000	5,000	5,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	913.00'	24.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 913.00' / 912.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

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

↑ **1=Culvert** (Controls 0.00 cfs)

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

↑ **2=Culvert** (Controls 0.00 cfs)

Summary for Pond 100P: WRTT

Inflow Area = 1.920 ac, 100.00% Impervious, Inflow Depth = 1.58" for 2" event
 Inflow = 2.99 cfs @ 12.08 hrs, Volume= 0.253 af
 Outflow = 0.35 cfs @ 12.69 hrs, Volume= 0.251 af, Atten= 88%, Lag= 36.3 min
 Primary = 0.35 cfs @ 12.69 hrs, Volume= 0.251 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Phase 1 - Tree Trenches

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Peak Elev= 912.75' @ 12.69 hrs Surf.Area= 5,500 sf Storage= 4,531 cf

Plug-Flow detention time= 214.5 min calculated for 0.251 af (100% of inflow)

Center-of-Mass det. time= 212.0 min (1,056.8 - 844.7)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	8,250 cf	20.00'W x 275.00'L x 5.00'H Prismatic 27,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		23,250 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	8.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.35 cfs @ 12.69 hrs HW=912.75' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 0.35 cfs of 4.85 cfs potential flow)
 1=Culvert (Barrel Controls 0.35 cfs @ 1.80 fps)
 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
 4=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond 400P: (new Pond)

Inflow Area = 2.100 ac, 90.48% Impervious, Inflow Depth = 1.40" for 2" event
 Inflow = 3.91 cfs @ 12.09 hrs, Volume= 0.244 af
 Outflow = 1.11 cfs @ 12.45 hrs, Volume= 0.243 af, Atten= 72%, Lag= 21.7 min
 Primary = 1.11 cfs @ 12.45 hrs, Volume= 0.243 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 917.00' Surf.Area= 10,934 sf Storage= 13,999 cf

Peak Elev= 917.60' @ 12.45 hrs Surf.Area= 10,934 sf Storage= 18,520 cf (4,520 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= 174.7 min (980.5 - 805.8)

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 1-yr 2" Rainfall=2.00"

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Volume	Invert	Avail.Storage	Storage Description
#1A	914.00'	0 cf	71.00'W x 154.00'L x 7.00'H Field A 76,538 cf Overall - 35,511 cf Embedded = 41,027 cf x 0.0% Voids
#2A	914.50'	35,511 cf	CMP_Round 72 x 56 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.23 sf x 20.00'L = 564.6 cf Overall Size= 72.0"W x 72.0"H x 20.00'L 8 Rows of 7 Chambers 69.00' Header x 28.23 sf x 2 = 3,895.5 cf Inside
		35,511 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	917.00'	10.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 917.00' / 916.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=1.11 cfs @ 12.45 hrs HW=917.60' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 1.11 cfs @ 2.64 fps)

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

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Summary for Subcatchment 2S: To Field

Runoff = 7.01 cfs @ 12.03 hrs, Volume= 0.337 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 0.710	98	
2.240	80	>75% Grass cover, Good, HSG D
2.950	84	Weighted Average
2.240		75.93% Pervious Area
0.710		24.07% Impervious Area

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

Summary for Subcatchment 3S: EAST CENTRAL ROAD

Runoff = 3.44 cfs @ 12.09 hrs, Volume= 0.212 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 1.070	98	
0.150	61	>75% Grass cover, Good, HSG B
1.220	93	Weighted Average
0.150		12.30% Pervious Area
1.070		87.70% Impervious Area

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

Summary for Subcatchment 4S: NW Road

Runoff = 2.54 cfs @ 12.10 hrs, Volume= 0.168 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 0.780	98	
0.070	74	>75% Grass cover, Good, HSG C
0.850	96	Weighted Average
0.070		8.24% Pervious Area
0.780		91.76% Impervious Area

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

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

Summary for Subcatchment 5S: Parking E

Runoff = 5.62 cfs @ 12.09 hrs, Volume= 0.344 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 1.750	98	
* 0.320	61	
2.070	92	Weighted Average
0.320		15.46% Pervious Area
1.750		84.54% Impervious Area

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

Summary for Subcatchment 6S: Plaza SW

Runoff = 0.91 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 0.320	98	
0.340	61	>75% Grass cover, Good, HSG B
0.660	79	Weighted Average
0.340		51.52% Pervious Area
0.320		48.48% Impervious Area

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

Summary for Subcatchment 7S: E ROAD

Runoff = 4.25 cfs @ 12.10 hrs, Volume= 0.272 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

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Area (ac)	CN	Description
* 1.250	98	
0.320	74	>75% Grass cover, Good, HSG C
1.570	93	Weighted Average
0.320		20.38% Pervious Area
1.250		79.62% Impervious Area

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

Summary for Subcatchment 8S: LOADING DOCK

Runoff = 1.76 cfs @ 12.08 hrs, Volume= 0.117 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 0.540	98	
0.540		100.00% Impervious Area

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

Summary for Subcatchment 9S: SW ROAD

Runoff = 2.27 cfs @ 12.10 hrs, Volume= 0.146 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 0.680	98	
0.160	74	>75% Grass cover, Good, HSG C
0.840	93	Weighted Average
0.160		19.05% Pervious Area
0.680		80.95% Impervious Area

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

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

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Summary for Subcatchment 10S: WEST ROOF AREA N

Runoff = 1.90 cfs @ 12.08 hrs, Volume= 0.125 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 0.580	98	
0.580		100.00% Impervious Area

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

Summary for Subcatchment 11S: NORTH ROOF IRRIGATION

Runoff = 2.48 cfs @ 12.08 hrs, Volume= 0.164 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 0.760	98	
0.760		100.00% Impervious Area

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

Summary for Subcatchment 12S: East Roof

Runoff = 3.76 cfs @ 12.08 hrs, Volume= 0.248 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 1.150	98	
1.150		100.00% Impervious Area

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

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MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

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Summary for Subcatchment 40S: W Road

Runoff = 1.61 cfs @ 12.10 hrs, Volume= 0.107 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 0.500	98	
0.040	74	>75% Grass cover, Good, HSG C
0.540	96	Weighted Average
0.040		7.41% Pervious Area
0.500		92.59% Impervious Area

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

Summary for Subcatchment 44S: EAST CENTRAL ROAD

Runoff = 4.03 cfs @ 12.08 hrs, Volume= 0.260 af, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 1.240	98	
0.020	61	>75% Grass cover, Good, HSG B
1.260	97	Weighted Average
0.020		1.59% Pervious Area
1.240		98.41% Impervious Area

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

Summary for Subcatchment 60S: OFF SOUTH

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 0.280	98	
0.370	74	>75% Grass cover, Good, HSG C
0.650	84	Weighted Average
0.370		56.92% Pervious Area
0.280		43.08% Impervious Area

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

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

Summary for Subcatchment 100S: WEST ROOF AREA

Runoff = 4.38 cfs @ 12.08 hrs, Volume= 0.289 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 1.340	98	
1.340		100.00% Impervious Area

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

Summary for Subcatchment 400: F

Runoff = 6.15 cfs @ 12.09 hrs, Volume= 0.381 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

Area (ac)	CN	Description
* 1.900	98	
0.200	61	>75% Grass cover, Good, HSG B
2.100	94	Weighted Average
0.200		9.52% Pervious Area
1.900		90.48% Impervious Area

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

Summary for Reach 56R: (new Reach)

Inflow Area = 5.510 ac, 94.01% Impervious, Inflow Depth = 2.29" for 2-yr event
 Inflow = 9.71 cfs @ 12.19 hrs, Volume= 1.051 af
 Outflow = 9.71 cfs @ 12.19 hrs, Volume= 1.051 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

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Summary for Reach 64R: (new Reach)

Inflow Area = 2.760 ac, 94.20% Impervious, Inflow Depth = 1.65" for 2-yr event
 Inflow = 1.24 cfs @ 12.42 hrs, Volume= 0.380 af
 Outflow = 1.24 cfs @ 12.42 hrs, Volume= 0.380 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Reach 72R: (new Reach)

Inflow Area = 9.500 ac, 68.11% Impervious, Inflow Depth > 3.03" for 2-yr event
 Inflow = 4.12 cfs @ 12.20 hrs, Volume= 2.398 af
 Outflow = 4.12 cfs @ 12.20 hrs, Volume= 2.398 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Pond 2P: (new Pond)

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth = 1.37" for 2-yr event
 Inflow = 7.01 cfs @ 12.03 hrs, Volume= 0.337 af
 Outflow = 0.75 cfs @ 12.25 hrs, Volume= 0.135 af, Atten= 89%, Lag= 13.0 min
 Primary = 0.75 cfs @ 12.25 hrs, Volume= 1.404 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 907.28' @ 14.64 hrs Surf.Area= 42,559 sf Storage= 9,413 cf

Plug-Flow detention time= 334.0 min calculated for 0.135 af (40% of inflow)

Center-of-Mass det. time= 219.5 min (1,047.0 - 827.6)

Volume	Invert	Avail.Storage	Storage Description
#1	909.00'	36,504 cf	260.00'W x 400.00'L x 1.17'H Prisma 121,680 cf Overall x 30.0% Voids
#2	905.82'	45,159 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 150,529 cf Overall x 30.0% Voids
#3	910.17'	52,000 cf	260.00'W x 400.00'L x 0.50'H Prisma
		133,663 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
905.82	600	0	0
906.00	5,700	567	567
907.50	49,000	41,025	41,592
909.00	96,250	108,938	150,529

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.48'	18.0" Round Culvert X 2.00 L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 905.48' / 903.21' S= 0.0100 ' /' Cc= 0.900 n= 0.020, Flow Area= 1.77 sf
#2	Primary	904.21'	18.0" Round Culvert L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 904.21' / 903.31' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

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Primary OutFlow Max=0.32 cfs @ 12.25 hrs HW=907.05' TW=907.05' (Dynamic Tailwater)↑ **2=Culvert** (Passes 0.32 cfs of 0.32 cfs potential flow)↑ **1=Culvert** (Outlet Controls 0.32 cfs @ 0.11 fps)**Summary for Pond 3P: ETT**

Inflow Area = 1.220 ac, 87.70% Impervious, Inflow Depth = 2.08" for 2-yr event
 Inflow = 3.44 cfs @ 12.09 hrs, Volume= 0.212 af
 Outflow = 2.21 cfs @ 12.21 hrs, Volume= 0.224 af, Atten= 36%, Lag= 7.3 min
 Discarded = 0.01 cfs @ 0.00 hrs, Volume= 0.026 af
 Primary = 0.53 cfs @ 12.21 hrs, Volume= 0.164 af
 Secondary = 1.68 cfs @ 12.21 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 910.50' Surf.Area= 3,600 sf Storage= 540 cf

Peak Elev= 913.25' @ 12.21 hrs Surf.Area= 3,600 sf Storage= 3,506 cf (2,966 cf above start)

Plug-Flow detention time= 207.2 min calculated for 0.212 af (100% of inflow)

Center-of-Mass det. time= 181.9 min (979.3 - 797.4)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	5,400 cf	8.00'W x 450.00'L x 5.00'H Prismatic 18,000 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		25,400 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

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Discarded OutFlow Max=0.01 cfs @ 0.00 hrs HW=910.50' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.52 cfs @ 12.21 hrs HW=913.24' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 0.52 cfs @ 2.67 fps)

Secondary OutFlow Max=1.65 cfs @ 12.21 hrs HW=913.24' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 1.65 cfs of 4.38 cfs potential flow)

↑ **4=Sharp-Crested Rectangular Weir** (Weir Controls 1.65 cfs @ 1.71 fps)

Summary for Pond 4P: NWTT

Inflow Area = 2.110 ac, 95.73% Impervious, Inflow Depth = 2.32" for 2-yr event
Inflow = 5.55 cfs @ 12.11 hrs, Volume= 0.408 af
Outflow = 5.29 cfs @ 12.16 hrs, Volume= 0.408 af, Atten= 5%, Lag= 2.6 min
Discarded = 0.00 cfs @ 5.42 hrs, Volume= 0.010 af
Primary = 0.57 cfs @ 12.16 hrs, Volume= 0.252 af
Secondary = 4.72 cfs @ 12.16 hrs, Volume= 0.146 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 913.60' @ 12.16 hrs Surf.Area= 1,480 sf Storage= 1,599 cf

Plug-Flow detention time= 53.8 min calculated for 0.408 af (100% of inflow)

Center-of-Mass det. time= 54.1 min (879.4 - 825.3)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	2,220 cf	8.00'W x 185.00'L x 5.00'H Prismatic 7,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,220 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' / ' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 ' / ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

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Discarded OutFlow Max=0.00 cfs @ 5.42 hrs HW=910.07' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.56 cfs @ 12.16 hrs HW=913.60' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 0.56 cfs @ 2.88 fps)

Secondary OutFlow Max=4.72 cfs @ 12.16 hrs HW=913.60' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Barrel Controls 4.72 cfs @ 6.01 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Passes 4.72 cfs of 6.75 cfs potential flow)

Summary for Pond 5P: EP-sand filter

Inflow Area = 2.070 ac, 84.54% Impervious, Inflow Depth = 1.99" for 2-yr event
Inflow = 5.62 cfs @ 12.09 hrs, Volume= 0.344 af
Outflow = 0.80 cfs @ 12.67 hrs, Volume= 0.343 af, Atten= 86%, Lag= 34.9 min
Primary = 0.80 cfs @ 12.67 hrs, Volume= 0.343 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 908.02' @ 12.67 hrs Surf.Area= 12,240 sf Storage= 7,748 cf

Plug-Flow detention time= 178.4 min calculated for 0.343 af (100% of inflow)

Center-of-Mass det. time= 176.5 min (978.7 - 802.2)

Volume	Invert	Avail.Storage	Storage Description
#1	905.00'	4,590 cf	72.00'W x 85.00'L x 2.50'H Prismatoid 15,300 cf Overall x 30.0% Voids
#2	907.50'	15,300 cf	72.00'W x 85.00'L x 2.50'H Prismatoid
		19,890 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 905.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	905.00'	12.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 904.75' S= 0.0050 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	907.75'	9.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.80 cfs @ 12.67 hrs HW=908.02' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 0.80 cfs of 5.41 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 0.56 cfs @ 2.83 fps)

↑ **3=Orifice/Grate** (Orifice Controls 0.25 cfs @ 1.76 fps)

Summary for Pond 6P: (new Pond)

Inflow Area = 0.660 ac, 48.48% Impervious, Inflow Depth = 1.06" for 2-yr event
Inflow = 0.91 cfs @ 12.10 hrs, Volume= 0.058 af
Outflow = 0.58 cfs @ 0.00 hrs, Volume= 0.086 af, Atten= 36%, Lag= 0.0 min
Primary = 0.58 cfs @ 0.00 hrs, Volume= 0.086 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 906.25' Surf.Area= 0.047 ac Storage= 0.027 af

Peak Elev= 906.25' @ 0.00 hrs Surf.Area= 0.047 ac Storage= 0.027 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	903.00'	0.021 af	7.90'W x 130.00'L x 3.00'H Prismaoid 0.071 af Overall x 30.0% Voids
#2	906.00'	0.119 af	8.00'W x 130.00'L x 5.00'H Prismaoid
		0.141 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 3	906.25'	4.0" Round Culvert X 2.00 L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 906.25' / 905.75' S= 0.0050 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 3	903.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 903.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#3	Primary	903.00'	8.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 902.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=0.58 cfs @ 0.00 hrs HW=906.25' (Free Discharge)

3=Culvert (Passes 0.58 cfs of 2.02 cfs potential flow)

1=Culvert (Controls 0.00 cfs)

2=Culvert (Barrel Controls 0.58 cfs @ 2.96 fps)

Summary for Pond 7P: SETT

Inflow Area = 1.570 ac, 79.62% Impervious, Inflow Depth = 2.08" for 2-yr event
 Inflow = 4.25 cfs @ 12.10 hrs, Volume= 0.272 af
 Outflow = 1.34 cfs @ 12.44 hrs, Volume= 0.400 af, Atten= 68%, Lag= 20.6 min
 Secondary = 1.34 cfs @ 12.44 hrs, Volume= 0.400 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 913.00' Surf.Area= 6,200 sf Storage= 5,580 cf

Peak Elev= 913.17' @ 12.44 hrs Surf.Area= 6,200 sf Storage= 5,902 cf (322 cf above start)

Plug-Flow detention time= 226.6 min calculated for 0.271 af (100% of inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	9,300 cf	20.00'W x 310.00'L x 5.00'H Prismaoid 31,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,300 cf	Total Available Storage

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	21.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height

Secondary OutFlow Max=1.34 cfs @ 12.44 hrs HW=913.17' (Free Discharge)

2=Culvert (Passes 1.34 cfs of 13.32 cfs potential flow)

1=Culvert (Barrel Controls 0.39 cfs @ 1.97 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 0.95 cfs @ 1.39 fps)

Summary for Pond 9P: SWTT

Inflow Area = 0.840 ac, 80.95% Impervious, Inflow Depth = 2.08" for 2-yr event
 Inflow = 2.27 cfs @ 12.10 hrs, Volume= 0.146 af
 Outflow = 2.26 cfs @ 12.11 hrs, Volume= 0.146 af, Atten= 1%, Lag= 0.5 min
 Secondary = 2.26 cfs @ 12.11 hrs, Volume= 0.146 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 913.27' @ 12.11 hrs Surf.Area= 1,000 sf Storage= 981 cf

Plug-Flow detention time= 32.9 min calculated for 0.146 af (100% of inflow)

Center-of-Mass det. time= 33.4 min (831.7 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	1,500 cf	8.00'W x 125.00'L x 5.00'H Prismatic 5,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		16,500 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.50' S= 0.0050 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

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#3 Device 2 913.00' **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
1.0' Crest Height

Secondary OutFlow Max=2.25 cfs @ 12.11 hrs HW=913.27' (Free Discharge)

2=Culvert (Passes 2.25 cfs of 4.87 cfs potential flow)

1=Culvert (Barrel Controls 0.39 cfs @ 2.00 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 1.86 cfs @ 1.75 fps)

Summary for Pond 10P: WRTT

Inflow Area = 0.580 ac, 100.00% Impervious, Inflow Depth = 2.59" for 2-yr event
 Inflow = 1.90 cfs @ 12.08 hrs, Volume= 0.125 af
 Outflow = 0.13 cfs @ 16.02 hrs, Volume= 0.125 af, Atten= 93%, Lag= 236.4 min
 Discarded = 0.01 cfs @ 6.48 hrs, Volume= 0.033 af
 Primary = 0.12 cfs @ 16.02 hrs, Volume= 0.092 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 913.01' @ 13.69 hrs Surf.Area= 4,500 sf Storage= 4,068 cf

Plug-Flow detention time= 610.9 min calculated for 0.125 af (100% of inflow)

Center-of-Mass det. time= 611.2 min (1,372.6 - 761.4)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	6,750 cf	20.00'W x 225.00'L x 5.00'H Prismatoid 22,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		21,750 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	9.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

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Discarded OutFlow Max=0.01 cfs @ 6.48 hrs HW=910.06' (Free Discharge)

↳ **5=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.12 cfs @ 16.02 hrs HW=912.60' TW=912.33' (Dynamic Tailwater)

↳ **2=Culvert** (Passes 0.12 cfs of 1.52 cfs potential flow)

↳ **1=Culvert** (Outlet Controls 0.12 cfs @ 0.62 fps)

↳ **3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

↳ **4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 11P: IT

Inflow Area = 0.760 ac, 100.00% Impervious, Inflow Depth = 2.59" for 2-yr event
Inflow = 2.48 cfs @ 12.08 hrs, Volume= 0.164 af
Outflow = 1.61 cfs @ 12.20 hrs, Volume= 0.175 af, Atten= 35%, Lag= 6.7 min
Primary = 1.61 cfs @ 12.20 hrs, Volume= 0.175 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 919.80' Surf.Area= 0.073 ac Storage= 0.062 af

Peak Elev= 920.40' @ 12.20 hrs Surf.Area= 0.074 ac Storage= 0.085 af (0.022 af above start)

Plug-Flow detention time= 213.3 min calculated for 0.113 af (69% of inflow)

Center-of-Mass det. time= 3.7 min (765.1 - 761.4)

Volume	Invert	Avail.Storage	Storage Description
#1	920.01'	0.005 af	15.0" Round Pipe Storage L= 168.0' S= 0.0150 '/'
#2	924.00'	0.001 af	3.00'D x 3.00'H Vertical Cone/Cylinder x 2
#3	916.00'	0.033 af	8.00'W x 200.00'L x 3.00'H Prismatic 0.110 af Overall x 30.0% Voids
#4	919.00'	0.184 af	8.00'W x 200.00'L x 5.00'H Prismatic
		0.222 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	919.50'	11.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 919.50' / 919.30' S= 0.0040 '/ Cc= 0.900 n= 0.013, Flow Area= 0.66 sf

Primary OutFlow Max=1.61 cfs @ 12.20 hrs HW=920.40' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Barrel Controls 1.61 cfs @ 3.08 fps)

Summary for Pond 12P: ERTT

Inflow Area = 1.150 ac, 100.00% Impervious, Inflow Depth = 2.59" for 2-yr event
Inflow = 3.76 cfs @ 12.08 hrs, Volume= 0.248 af
Outflow = 0.44 cfs @ 12.69 hrs, Volume= 0.410 af, Atten= 88%, Lag= 36.4 min
Discarded = 0.01 cfs @ 0.00 hrs, Volume= 0.061 af
Primary = 0.43 cfs @ 12.69 hrs, Volume= 0.349 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

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Starting Elev= 913.00' Surf.Area= 7,800 sf Storage= 7,020 cf

Peak Elev= 913.16' @ 12.69 hrs Surf.Area= 7,800 sf Storage= 7,392 cf (372 cf above start)

Plug-Flow detention time= 528.2 min calculated for 0.248 af (100% of inflow)

Center-of-Mass det. time= 136.4 min (897.8 - 761.4)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	11,700 cf	20.00'W x 390.00'L x 5.00'H Prismaoid 39,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		26,700 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	7.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 0.00 hrs HW=913.00' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.43 cfs @ 12.69 hrs HW=913.16' TW=0.00' (Dynamic Tailwater)↳ **2=Culvert** (Passes 0.43 cfs of 5.20 cfs potential flow)↳ **1=Culvert** (Barrel Controls 0.35 cfs @ 1.77 fps)↳ **3=Sharp-Crested Rectangular Weir** (Passes 0.08 cfs of 0.84 cfs potential flow)↳ **4=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.36 fps)**Summary for Pond 20P: (new Pond)**

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth > 5.71" for 2-yr event
 Inflow = 0.75 cfs @ 12.25 hrs, Volume= 1.404 af
 Outflow = 0.21 cfs @ 14.81 hrs, Volume= 1.392 af, Atten= 73%, Lag= 154.0 min
 Primary = 0.21 cfs @ 14.81 hrs, Volume= 1.392 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 907.03' Surf.Area= 0.116 ac Storage= 0.521 af

Peak Elev= 907.28' @ 14.81 hrs Surf.Area= 0.116 ac Storage= 0.536 af (0.015 af above start)

Plug-Flow detention time= 3,017.2 min calculated for 0.871 af (62% of inflow)

Center-of-Mass det. time= 33.0 min (4,433.4 - 4,400.4)

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Volume	Invert	Avail.Storage	Storage Description
#1A	899.75'	0.000 af	43.00'W x 118.00'L x 9.00'H Field A 1.048 af Overall - 0.556 af Embedded = 0.493 af x 0.0% Voids
#2A	900.25'	0.556 af	CMP_Round 96 x 20 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.20 sf x 20.00'L = 1,004.1 cf Overall Size= 96.0"W x 96.0"H x 20.00'L 4 Rows of 5 Chambers 41.00' Header x 50.20 sf x 2 = 4,116.8 cf Inside
#3	902.55'	0.012 af	30.0" Round Pipe Storage L= 107.0' S= 0.0065 '/'
#4	903.25'	0.006 af	18.0" Round Pipe Storage L= 151.0' S= 0.0065 '/'
#5	904.10'	0.001 af	18.0" Round Pipe Storage L= 15.0' S= 0.0050 '/'
		0.574 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	907.03'	18.0" Round Culvert L= 145.0' Ke= 0.500 Inlet / Outlet Invert= 907.03' / 906.52' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.21 cfs @ 14.81 hrs HW=907.28' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.21 cfs @ 1.62 fps)

Summary for Pond 40P: WTT

Inflow Area = 0.540 ac, 92.59% Impervious, Inflow Depth = 2.38" for 2-yr event
 Inflow = 1.61 cfs @ 12.10 hrs, Volume= 0.107 af
 Outflow = 1.21 cfs @ 12.19 hrs, Volume= 0.107 af, Atten= 25%, Lag= 5.7 min
 Discarded = 0.00 cfs @ 5.94 hrs, Volume= 0.009 af
 Primary = 1.21 cfs @ 12.19 hrs, Volume= 0.098 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3
 Peak Elev= 919.14' @ 12.19 hrs Surf.Area= 1,200 sf Storage= 1,318 cf

Plug-Flow detention time= 146.8 min calculated for 0.107 af (100% of inflow)
 Center-of-Mass det. time= 147.1 min (927.3 - 780.2)

Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	2,100 cf	8.00'W x 150.00'L x 5.00'H Prismatic 6,000 cf Overall x 35.0% Voids
#2	921.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
921.00	2,000	0	0
922.00	9,000	5,500	5,500
923.00	20,000	14,500	20,000

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Device	Routing	Invert	Outlet Devices
#1	Device 2	916.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.50' / 916.50' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	916.30'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.30' / 915.80' S= 0.0050 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	916.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	919.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.00 cfs @ 5.94 hrs HW=916.07' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=1.19 cfs @ 12.19 hrs HW=919.14' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 1.19 cfs of 4.47 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 0.51 cfs @ 2.61 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Weir Controls 0.68 cfs @ 1.25 fps)

Summary for Pond 44P: NTT

Inflow Area = 1.260 ac, 98.41% Impervious, Inflow Depth = 2.48" for 2-yr event
 Inflow = 4.03 cfs @ 12.08 hrs, Volume= 0.260 af
 Outflow = 3.12 cfs @ 12.22 hrs, Volume= 0.260 af, Atten= 23%, Lag= 8.1 min
 Discarded = 0.00 cfs @ 4.96 hrs, Volume= 0.020 af
 Primary = 3.11 cfs @ 12.22 hrs, Volume= 0.240 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 913.89' @ 12.16 hrs Surf.Area= 2,880 sf Storage= 3,357 cf

Plug-Flow detention time= 174.0 min calculated for 0.260 af (100% of inflow)

Center-of-Mass det. time= 174.3 min (945.6 - 771.2)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	4,320 cf	8.00'W x 360.00'L x 5.00'H Prismatic 14,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,320 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Device 4	910.40'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.40' / 909.25' S= 0.0115 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#3	Device 4	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

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#4 Primary 910.00' 0.5' Crest Height
15.0" Round Culvert L= 60.0' Ke= 0.500
 Inlet / Outlet Invert= 910.00' / 909.40' S= 0.0100 '/' Cc= 0.900
 n= 0.013, Flow Area= 1.23 sf

Discarded OutFlow Max=0.00 cfs @ 4.96 hrs HW=910.07' (Free Discharge)

↳ **2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=3.15 cfs @ 12.22 hrs HW=913.78' TW=913.49' (Dynamic Tailwater)

↳ **4=Culvert** (Outlet Controls 3.15 cfs @ 2.57 fps)

↳ **1=Culvert** (Passes < 0.19 cfs potential flow)

↳ **3=Sharp-Crested Rectangular Weir** (Passes < 8.03 cfs potential flow)

Summary for Pond 55P: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	3,218 cf	6.50'W x 330.00'L x 5.00'H Prismatic 10,725 cf Overall x 30.0% Voids
#2	915.00'	5,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,218 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	8,000	5,000	5,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	913.00'	24.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 913.00' / 912.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

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

↳ **1=Culvert** (Controls 0.00 cfs)

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

↳ **2=Culvert** (Controls 0.00 cfs)

Summary for Pond 100P: WRTT

Inflow Area = 1.920 ac, 100.00% Impervious, Inflow Depth = 2.38" for 2-yr event
 Inflow = 4.38 cfs @ 12.08 hrs, Volume= 0.381 af
 Outflow = 1.24 cfs @ 12.42 hrs, Volume= 0.380 af, Atten= 72%, Lag= 20.4 min
 Primary = 1.24 cfs @ 12.42 hrs, Volume= 0.380 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr Rainfall=2.82"

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Peak Elev= 913.55' @ 12.42 hrs Surf.Area= 5,500 sf Storage= 5,857 cf

Plug-Flow detention time= 193.9 min calculated for 0.380 af (100% of inflow)

Center-of-Mass det. time= 192.2 min (1,044.2 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	8,250 cf	20.00'W x 275.00'L x 5.00'H Prismatic 27,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		23,250 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	8.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.24 cfs @ 12.42 hrs HW=913.55' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 1.24 cfs of 5.51 cfs potential flow)

1=Culvert (Barrel Controls 0.41 cfs @ 2.10 fps)

3=Sharp-Crested Rectangular Weir (Passes 0.83 cfs of 5.52 cfs potential flow)

4=Orifice/Grate (Orifice Controls 0.83 cfs @ 2.52 fps)

Summary for Pond 400P: (new Pond)

Inflow Area = 2.100 ac, 90.48% Impervious, Inflow Depth = 2.18" for 2-yr event
 Inflow = 6.15 cfs @ 12.09 hrs, Volume= 0.381 af
 Outflow = 1.83 cfs @ 12.42 hrs, Volume= 0.380 af, Atten= 70%, Lag= 20.2 min
 Primary = 1.83 cfs @ 12.42 hrs, Volume= 0.380 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 917.00' Surf.Area= 10,934 sf Storage= 13,999 cf

Peak Elev= 917.90' @ 12.42 hrs Surf.Area= 10,934 sf Storage= 20,793 cf (6,794 cf above start)

Plug-Flow detention time= 964.2 min calculated for 0.058 af (15% of inflow)

Center-of-Mass det. time= 138.6 min (930.6 - 792.0)

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Volume	Invert	Avail.Storage	Storage Description
#1A	914.00'	0 cf	71.00'W x 154.00'L x 7.00'H Field A 76,538 cf Overall - 35,511 cf Embedded = 41,027 cf x 0.0% Voids
#2A	914.50'	35,511 cf	CMP_Round 72 x 56 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.23 sf x 20.00'L = 564.6 cf Overall Size= 72.0"W x 72.0"H x 20.00'L 8 Rows of 7 Chambers 69.00' Header x 28.23 sf x 2 = 3,895.5 cf Inside
		35,511 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	917.00'	10.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 917.00' / 916.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=1.83 cfs @ 12.42 hrs HW=917.90' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 1.83 cfs @ 3.36 fps)

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MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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Summary for Subcatchment 2S: To Field

Runoff = 21.43 cfs @ 12.03 hrs, Volume= 1.032 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 0.710	98	
2.240	80	>75% Grass cover, Good, HSG D
2.950	84	Weighted Average
2.240		75.93% Pervious Area
0.710		24.07% Impervious Area

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

Summary for Subcatchment 3S: EAST CENTRAL ROAD

Runoff = 8.22 cfs @ 12.08 hrs, Volume= 0.527 af, Depth= 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 1.070	98	
0.150	61	>75% Grass cover, Good, HSG B
1.220	93	Weighted Average
0.150		12.30% Pervious Area
1.070		87.70% Impervious Area

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

Summary for Subcatchment 4S: NW Road

Runoff = 5.67 cfs @ 12.10 hrs, Volume= 0.392 af, Depth= 5.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 0.780	98	
0.070	74	>75% Grass cover, Good, HSG C
0.850	96	Weighted Average
0.070		8.24% Pervious Area
0.780		91.76% Impervious Area

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

Summary for Subcatchment 5S: Parking E

Runoff = 13.77 cfs @ 12.08 hrs, Volume= 0.874 af, Depth= 5.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 1.750	98	
* 0.320	61	
2.070	92	Weighted Average
0.320		15.46% Pervious Area
1.750		84.54% Impervious Area

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

Summary for Subcatchment 6S: Plaza SW

Runoff = 3.33 cfs @ 12.09 hrs, Volume= 0.202 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 0.320	98	
0.340	61	>75% Grass cover, Good, HSG B
0.660	79	Weighted Average
0.340		51.52% Pervious Area
0.320		48.48% Impervious Area

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

Summary for Subcatchment 7S: E ROAD

Runoff = 10.15 cfs @ 12.10 hrs, Volume= 0.678 af, Depth= 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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Area (ac)	CN	Description
* 1.250	98	
0.320	74	>75% Grass cover, Good, HSG C
1.570	93	Weighted Average
0.320		20.38% Pervious Area
1.250		79.62% Impervious Area

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

Summary for Subcatchment 8S: LOADING DOCK

Runoff = 3.81 cfs @ 12.08 hrs, Volume= 0.259 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 0.540	98	
0.540		100.00% Impervious Area

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

Summary for Subcatchment 9S: SW ROAD

Runoff = 5.43 cfs @ 12.10 hrs, Volume= 0.363 af, Depth= 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 0.680	98	
0.160	74	>75% Grass cover, Good, HSG C
0.840	93	Weighted Average
0.160		19.05% Pervious Area
0.680		80.95% Impervious Area

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

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MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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Summary for Subcatchment 10S: WEST ROOF AREA N

Runoff = 4.09 cfs @ 12.08 hrs, Volume= 0.278 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 0.580	98	
0.580		100.00% Impervious Area

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

Summary for Subcatchment 11S: NORTH ROOF IRRIGATION

Runoff = 5.36 cfs @ 12.08 hrs, Volume= 0.365 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 0.760	98	
0.760		100.00% Impervious Area

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

Summary for Subcatchment 12S: East Roof

Runoff = 8.11 cfs @ 12.08 hrs, Volume= 0.552 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 1.150	98	
1.150		100.00% Impervious Area

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

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Summary for Subcatchment 40S: W Road

Runoff = 3.60 cfs @ 12.10 hrs, Volume= 0.249 af, Depth= 5.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 0.500	98	
0.040	74	>75% Grass cover, Good, HSG C
0.540	96	Weighted Average
0.040		7.41% Pervious Area
0.500		92.59% Impervious Area

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

Summary for Subcatchment 44S: EAST CENTRAL ROAD

Runoff = 8.84 cfs @ 12.08 hrs, Volume= 0.593 af, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 1.240	98	
0.020	61	>75% Grass cover, Good, HSG B
1.260	97	Weighted Average
0.020		1.59% Pervious Area
1.240		98.41% Impervious Area

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

Summary for Subcatchment 60S: OFF SOUTH

Runoff = 3.72 cfs @ 12.09 hrs, Volume= 0.227 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 0.280	98	
0.370	74	>75% Grass cover, Good, HSG C
0.650	84	Weighted Average
0.370		56.92% Pervious Area
0.280		43.08% Impervious Area

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

Summary for Subcatchment 100S: WEST ROOF AREA

Runoff = 9.45 cfs @ 12.08 hrs, Volume= 0.643 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 1.340	98	
1.340		100.00% Impervious Area

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

Summary for Subcatchment 400: F

Runoff = 14.33 cfs @ 12.08 hrs, Volume= 0.927 af, Depth= 5.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

Area (ac)	CN	Description
* 1.900	98	
0.200	61	>75% Grass cover, Good, HSG B
2.100	94	Weighted Average
0.200		9.52% Pervious Area
1.900		90.48% Impervious Area

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

Summary for Reach 56R: (new Reach)

Inflow Area = 5.510 ac, 94.01% Impervious, Inflow Depth = 5.43" for 6" event

Inflow = 15.45 cfs @ 12.14 hrs, Volume= 2.494 af

Outflow = 15.45 cfs @ 12.14 hrs, Volume= 2.494 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

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Summary for Reach 64R: (new Reach)

Inflow Area = 2.760 ac, 94.20% Impervious, Inflow Depth = 3.85" for 6" event
 Inflow = 3.10 cfs @ 12.36 hrs, Volume= 0.885 af
 Outflow = 3.10 cfs @ 12.36 hrs, Volume= 0.885 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Reach 72R: (new Reach)

Inflow Area = 9.500 ac, 68.11% Impervious, Inflow Depth > 4.15" for 6" event
 Inflow = 15.37 cfs @ 12.18 hrs, Volume= 3.289 af
 Outflow = 15.37 cfs @ 12.18 hrs, Volume= 3.289 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Pond 2P: (new Pond)

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth = 4.20" for 6" event
 Inflow = 21.43 cfs @ 12.03 hrs, Volume= 1.032 af
 Outflow = 2.96 cfs @ 12.06 hrs, Volume= 0.875 af, Atten= 86%, Lag= 2.1 min
 Primary = 2.96 cfs @ 12.06 hrs, Volume= 0.994 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 908.11' @ 12.57 hrs Surf.Area= 68,136 sf Storage= 23,152 cf

Plug-Flow detention time= 292.4 min calculated for 0.875 af (85% of inflow)

Center-of-Mass det. time= 228.5 min (1,027.1 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	909.00'	36,504 cf	260.00'W x 400.00'L x 1.17'H Prisma 121,680 cf Overall x 30.0% Voids
#2	905.82'	45,159 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 150,529 cf Overall x 30.0% Voids
#3	910.17'	52,000 cf	260.00'W x 400.00'L x 0.50'H Prisma
		133,663 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
905.82	600	0	0
906.00	5,700	567	567
907.50	49,000	41,025	41,592
909.00	96,250	108,938	150,529

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.48'	18.0" Round Culvert X 2.00 L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 905.48' / 903.21' S= 0.0100 ' /' Cc= 0.900 n= 0.020, Flow Area= 1.77 sf
#2	Primary	904.21'	18.0" Round Culvert L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 904.21' / 903.31' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

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Primary OutFlow Max=2.94 cfs @ 12.06 hrs HW=907.73' TW=907.60' (Dynamic Tailwater)└─**2=Culvert** (Outlet Controls 2.94 cfs @ 1.66 fps)└─**1=Culvert** (Passes 2.94 cfs of 3.10 cfs potential flow)**Summary for Pond 3P: ETT**

Inflow Area = 1.220 ac, 87.70% Impervious, Inflow Depth = 5.18" for 6" event
 Inflow = 8.22 cfs @ 12.08 hrs, Volume= 0.527 af
 Outflow = 5.99 cfs @ 12.17 hrs, Volume= 0.539 af, Atten= 27%, Lag= 5.3 min
 Discarded = 0.01 cfs @ 0.00 hrs, Volume= 0.026 af
 Primary = 0.64 cfs @ 12.17 hrs, Volume= 0.299 af
 Secondary = 5.34 cfs @ 12.17 hrs, Volume= 0.214 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 910.50' Surf.Area= 3,600 sf Storage= 540 cf

Peak Elev= 914.33' @ 12.17 hrs Surf.Area= 3,600 sf Storage= 4,682 cf (4,142 cf above start)

Plug-Flow detention time= 109.0 min calculated for 0.527 af (100% of inflow)

Center-of-Mass det. time= 98.0 min (872.7 - 774.7)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	5,400 cf	8.00'W x 450.00'L x 5.00'H Prismatic 18,000 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		25,400 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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Discarded OutFlow Max=0.01 cfs @ 0.00 hrs HW=910.50' (Free Discharge)↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.64 cfs @ 12.17 hrs HW=914.33' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 0.64 cfs @ 3.26 fps)**Secondary OutFlow** Max=5.34 cfs @ 12.17 hrs HW=914.33' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Barrel Controls 5.34 cfs @ 6.80 fps)↑ **4=Sharp-Crested Rectangular Weir** (Passes 5.34 cfs of 24.84 cfs potential flow)**Summary for Pond 4P: NWTT**

Inflow Area = 2.110 ac, 95.73% Impervious, Inflow Depth = 5.48" for 6" event
 Inflow = 8.72 cfs @ 12.07 hrs, Volume= 0.963 af
 Outflow = 6.74 cfs @ 12.25 hrs, Volume= 0.963 af, Atten= 23%, Lag= 10.7 min
 Discarded = 0.01 cfs @ 12.25 hrs, Volume= 0.011 af
 Primary = 0.72 cfs @ 12.25 hrs, Volume= 0.462 af
 Secondary = 6.02 cfs @ 12.25 hrs, Volume= 0.490 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 915.23' @ 12.25 hrs Surf.Area= 5,075 sf Storage= 2,857 cf

Plug-Flow detention time= 31.8 min calculated for 0.963 af (100% of inflow)

Center-of-Mass det. time= 32.0 min (830.2 - 798.2)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	2,220 cf	8.00'W x 185.00'L x 5.00'H Prismatic 7,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,220 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' / ' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 ' / ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

Phase 1 - Tree Trenches

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Discarded OutFlow Max=0.01 cfs @ 12.25 hrs HW=915.23' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.72 cfs @ 12.25 hrs HW=915.23' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 0.72 cfs @ 3.67 fps)

Secondary OutFlow Max=6.02 cfs @ 12.25 hrs HW=915.23' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Barrel Controls 6.02 cfs @ 7.66 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Passes 6.02 cfs of 59.69 cfs potential flow)

Summary for Pond 5P: EP-sand filter

Inflow Area = 2.070 ac, 84.54% Impervious, Inflow Depth = 5.07" for 6" event
Inflow = 13.77 cfs @ 12.08 hrs, Volume= 0.874 af
Outflow = 3.20 cfs @ 12.54 hrs, Volume= 0.873 af, Atten= 77%, Lag= 27.3 min
Primary = 3.20 cfs @ 12.54 hrs, Volume= 0.873 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 909.50' @ 12.54 hrs Surf.Area= 12,240 sf Storage= 16,834 cf

Plug-Flow detention time= 130.2 min calculated for 0.873 af (100% of inflow)

Center-of-Mass det. time= 129.5 min (908.2 - 778.7)

Volume	Invert	Avail.Storage	Storage Description
#1	905.00'	4,590 cf	72.00'W x 85.00'L x 2.50'H Prismatoid 15,300 cf Overall x 30.0% Voids
#2	907.50'	15,300 cf	72.00'W x 85.00'L x 2.50'H Prismatoid
		19,890 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 905.00' S= 0.0000 ' / Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	905.00'	12.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 904.75' S= 0.0050 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	907.75'	9.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=3.20 cfs @ 12.54 hrs HW=909.50' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 3.20 cfs of 6.97 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 0.70 cfs @ 3.57 fps)

↑ **3=Orifice/Grate** (Orifice Controls 2.49 cfs @ 5.65 fps)

Summary for Pond 6P: (new Pond)

Inflow Area = 0.660 ac, 48.48% Impervious, Inflow Depth = 3.68" for 6" event
Inflow = 3.33 cfs @ 12.09 hrs, Volume= 0.202 af
Outflow = 1.14 cfs @ 12.39 hrs, Volume= 0.230 af, Atten= 66%, Lag= 18.2 min
Primary = 1.14 cfs @ 12.39 hrs, Volume= 0.230 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 906.25' Surf.Area= 0.047 ac Storage= 0.027 af

Peak Elev= 907.56' @ 12.39 hrs Surf.Area= 0.047 ac Storage= 0.058 af (0.031 af above start)

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	903.00'	0.021 af	7.90'W x 130.00'L x 3.00'H Prismaoid 0.071 af Overall x 30.0% Voids
#2	906.00'	0.119 af	8.00'W x 130.00'L x 5.00'H Prismaoid
		0.141 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 3	906.25'	4.0" Round Culvert X 2.00 L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 906.25' / 905.75' S= 0.0050 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 3	903.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 903.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#3	Primary	903.00'	8.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 902.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=1.14 cfs @ 12.39 hrs HW=907.56' (Free Discharge)

3=Culvert (Passes 1.14 cfs of 2.36 cfs potential flow)

1=Culvert (Barrel Controls 0.44 cfs @ 2.51 fps)

2=Culvert (Barrel Controls 0.71 cfs @ 3.59 fps)

Summary for Pond 7P: SETT

Inflow Area = 1.570 ac, 79.62% Impervious, Inflow Depth = 5.18" for 6" event

Inflow = 10.15 cfs @ 12.10 hrs, Volume= 0.678 af

Outflow = 9.70 cfs @ 12.13 hrs, Volume= 0.805 af, Atten= 4%, Lag= 1.8 min

Secondary = 9.70 cfs @ 12.13 hrs, Volume= 0.805 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 913.00' Surf.Area= 6,200 sf Storage= 5,580 cf

Peak Elev= 913.77' @ 12.13 hrs Surf.Area= 6,200 sf Storage= 7,009 cf (1,429 cf above start)

Plug-Flow detention time= 137.4 min calculated for 0.677 af (100% of inflow)

Center-of-Mass det. time= 20.4 min (796.1 - 775.7)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	9,300 cf	20.00'W x 310.00'L x 5.00'H Prismaoid 31,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,300 cf	Total Available Storage

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	21.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' /' Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height

Secondary OutFlow Max=9.64 cfs @ 12.13 hrs HW=913.77' (Free Discharge)

2=Culvert (Passes 9.64 cfs of 15.85 cfs potential flow)

1=Culvert (Barrel Controls 0.43 cfs @ 2.17 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 9.22 cfs @ 3.13 fps)

Summary for Pond 9P: SWTT

Inflow Area = 0.840 ac, 80.95% Impervious, Inflow Depth = 5.18" for 6" event
 Inflow = 5.43 cfs @ 12.10 hrs, Volume= 0.363 af
 Outflow = 5.18 cfs @ 12.13 hrs, Volume= 0.363 af, Atten= 5%, Lag= 1.7 min
 Secondary = 5.18 cfs @ 12.13 hrs, Volume= 0.363 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 913.64' @ 12.13 hrs Surf.Area= 1,000 sf Storage= 1,091 cf

Plug-Flow detention time= 22.2 min calculated for 0.363 af (100% of inflow)

Center-of-Mass det. time= 22.0 min (797.6 - 775.7)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	1,500 cf	8.00'W x 125.00'L x 5.00'H Prismatic 5,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		16,500 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.50' S= 0.0050 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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#3 Device 2 913.00' **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
1.0' Crest Height

Secondary OutFlow Max=5.18 cfs @ 12.13 hrs HW=913.63' (Free Discharge)

2=Culvert (Barrel Controls 5.18 cfs @ 6.59 fps)

1=Culvert (Passes < 0.42 cfs potential flow)

3=Sharp-Crested Rectangular Weir (Passes < 6.82 cfs potential flow)

Summary for Pond 10P: WRTT

Inflow Area = 0.580 ac, 100.00% Impervious, Inflow Depth = 5.76" for 6" event
 Inflow = 4.09 cfs @ 12.08 hrs, Volume= 0.278 af
 Outflow = 1.69 cfs @ 13.25 hrs, Volume= 0.278 af, Atten= 59%, Lag= 70.1 min
 Discarded = 0.02 cfs @ 12.69 hrs, Volume= 0.036 af
 Primary = 1.67 cfs @ 13.25 hrs, Volume= 0.242 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 915.16' @ 12.69 hrs Surf.Area= 16,147 sf Storage= 8,533 cf

Plug-Flow detention time= 404.6 min calculated for 0.278 af (100% of inflow)

Center-of-Mass det. time= 405.0 min (1,152.7 - 747.7)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	6,750 cf	20.00'W x 225.00'L x 5.00'H Prismatoid 22,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		21,750 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	9.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

Phase 1 - Tree Trenches

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Discarded OutFlow Max=0.02 cfs @ 12.69 hrs HW=915.16' (Free Discharge)↑ **5=Exfiltration** (Exfiltration Controls 0.02 cfs)**Primary OutFlow** Max=1.66 cfs @ 13.25 hrs HW=915.01' TW=914.51' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.66 cfs of 2.06 cfs potential flow)↑ **1=Culvert** (Outlet Controls 0.17 cfs @ 0.84 fps)↑ **3=Sharp-Crested Rectangular Weir** (Passes 1.49 cfs of 27.65 cfs potential flow)↑ **4=Orifice/Grate** (Orifice Controls 1.49 cfs @ 3.38 fps)**Summary for Pond 11P: IT**

Inflow Area = 0.760 ac, 100.00% Impervious, Inflow Depth = 5.76" for 6" event
 Inflow = 5.36 cfs @ 12.08 hrs, Volume= 0.365 af
 Outflow = 3.05 cfs @ 12.22 hrs, Volume= 0.376 af, Atten= 43%, Lag= 8.3 min
 Primary = 3.05 cfs @ 12.22 hrs, Volume= 0.376 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 919.80' Surf.Area= 0.073 ac Storage= 0.062 af

Peak Elev= 921.30' @ 12.22 hrs Surf.Area= 0.075 ac Storage= 0.119 af (0.056 af above start)

Plug-Flow detention time= 145.9 min calculated for 0.314 af (86% of inflow)

Center-of-Mass det. time= 13.9 min (761.7 - 747.7)

Volume	Invert	Avail.Storage	Storage Description
#1	920.01'	0.005 af	15.0" Round Pipe Storage L= 168.0' S= 0.0150 '/'
#2	924.00'	0.001 af	3.00'D x 3.00'H Vertical Cone/Cylinder x 2
#3	916.00'	0.033 af	8.00'W x 200.00'L x 3.00'H Prismatic 0.110 af Overall x 30.0% Voids
#4	919.00'	0.184 af	8.00'W x 200.00'L x 5.00'H Prismatic
		0.222 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	919.50'	11.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 919.50' / 919.30' S= 0.0040 '/ Cc= 0.900 n= 0.013, Flow Area= 0.66 sf

Primary OutFlow Max=3.05 cfs @ 12.22 hrs HW=921.30' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 3.05 cfs @ 4.63 fps)**Summary for Pond 12P: ERTT**

Inflow Area = 1.150 ac, 100.00% Impervious, Inflow Depth = 5.76" for 6" event
 Inflow = 8.11 cfs @ 12.08 hrs, Volume= 0.552 af
 Outflow = 2.20 cfs @ 12.44 hrs, Volume= 0.714 af, Atten= 73%, Lag= 21.5 min
 Discarded = 0.03 cfs @ 12.44 hrs, Volume= 0.063 af
 Primary = 2.17 cfs @ 12.44 hrs, Volume= 0.651 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

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Starting Elev= 913.00' Surf.Area= 7,800 sf Storage= 7,020 cf

Peak Elev= 915.03' @ 12.44 hrs Surf.Area= 18,118 sf Storage= 12,023 cf (5,003 cf above start)

Plug-Flow detention time= 320.4 min calculated for 0.552 af (100% of inflow)

Center-of-Mass det. time= 137.0 min (884.7 - 747.7)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	11,700 cf	20.00'W x 390.00'L x 5.00'H Prismaoid 39,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		26,700 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	7.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.03 cfs @ 12.44 hrs HW=915.03' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.03 cfs)**Primary OutFlow** Max=2.17 cfs @ 12.44 hrs HW=915.03' TW=0.00' (Dynamic Tailwater)↳ **2=Culvert** (Passes 2.17 cfs of 6.56 cfs potential flow)↳ **1=Culvert** (Barrel Controls 0.47 cfs @ 2.41 fps)↳ **3=Sharp-Crested Rectangular Weir** (Passes 1.70 cfs of 42.49 cfs potential flow)↳ **4=Orifice/Grate** (Orifice Controls 1.70 cfs @ 6.35 fps)**Summary for Pond 20P: (new Pond)**

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth = 4.04" for 6" event
 Inflow = 2.96 cfs @ 12.06 hrs, Volume= 0.994 af
 Outflow = 2.80 cfs @ 12.59 hrs, Volume= 0.992 af, Atten= 6%, Lag= 31.7 min
 Primary = 2.80 cfs @ 12.59 hrs, Volume= 0.992 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 907.03' Surf.Area= 0.116 ac Storage= 0.521 af

Peak Elev= 907.98' @ 12.59 hrs Surf.Area= 0.116 ac Storage= 0.569 af (0.048 af above start)

Plug-Flow detention time= 1,059.9 min calculated for 0.471 af (47% of inflow)

Center-of-Mass det. time= 37.2 min (1,298.5 - 1,261.3)

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Volume	Invert	Avail.Storage	Storage Description
#1A	899.75'	0.000 af	43.00'W x 118.00'L x 9.00'H Field A 1.048 af Overall - 0.556 af Embedded = 0.493 af x 0.0% Voids
#2A	900.25'	0.556 af	CMP_Round 96 x 20 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.20 sf x 20.00'L = 1,004.1 cf Overall Size= 96.0"W x 96.0"H x 20.00'L 4 Rows of 5 Chambers 41.00' Header x 50.20 sf x 2 = 4,116.8 cf Inside
#3	902.55'	0.012 af	30.0" Round Pipe Storage L= 107.0' S= 0.0065 '/'
#4	903.25'	0.006 af	18.0" Round Pipe Storage L= 151.0' S= 0.0065 '/'
#5	904.10'	0.001 af	18.0" Round Pipe Storage L= 15.0' S= 0.0050 '/'
		0.574 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	907.03'	18.0" Round Culvert L= 145.0' Ke= 0.500 Inlet / Outlet Invert= 907.03' / 906.52' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=2.80 cfs @ 12.59 hrs HW=907.98' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 2.80 cfs @ 3.36 fps)

Summary for Pond 40P: WTT

Inflow Area = 0.540 ac, 92.59% Impervious, Inflow Depth = 5.53" for 6" event
Inflow = 3.60 cfs @ 12.10 hrs, Volume= 0.249 af
Outflow = 3.59 cfs @ 12.11 hrs, Volume= 0.249 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.00 cfs @ 3.12 hrs, Volume= 0.009 af
Primary = 3.59 cfs @ 12.11 hrs, Volume= 0.240 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 919.36' @ 12.11 hrs Surf.Area= 1,200 sf Storage= 1,412 cf

Plug-Flow detention time= 76.9 min calculated for 0.249 af (100% of inflow)
Center-of-Mass det. time= 77.2 min (838.7 - 761.5)

Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	2,100 cf	8.00'W x 150.00'L x 5.00'H Prismatic 6,000 cf Overall x 35.0% Voids
#2	921.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
921.00	2,000	0	0
922.00	9,000	5,500	5,500
923.00	20,000	14,500	20,000

Phase 1 - Tree Trenches

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MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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Device	Routing	Invert	Outlet Devices
#1	Device 2	916.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.50' / 916.50' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	916.30'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.30' / 915.80' S= 0.0050 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	916.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	919.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.00 cfs @ 3.12 hrs HW=916.07' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=3.57 cfs @ 12.11 hrs HW=919.36' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 3.57 cfs of 4.68 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 0.54 cfs @ 2.74 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Weir Controls 3.03 cfs @ 2.14 fps)

Summary for Pond 44P: NTT

Inflow Area = 1.260 ac, 98.41% Impervious, Inflow Depth = 5.64" for 6" event
 Inflow = 8.84 cfs @ 12.08 hrs, Volume= 0.593 af
 Outflow = 4.68 cfs @ 12.59 hrs, Volume= 0.593 af, Atten= 47%, Lag= 30.7 min
 Discarded = 0.01 cfs @ 12.30 hrs, Volume= 0.021 af
 Primary = 4.68 cfs @ 12.60 hrs, Volume= 0.571 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 915.61' @ 12.30 hrs Surf.Area= 9,133 sf Storage= 6,827 cf

Plug-Flow detention time= 109.5 min calculated for 0.593 af (100% of inflow)

Center-of-Mass det. time= 109.9 min (864.5 - 754.6)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	4,320 cf	8.00'W x 360.00'L x 5.00'H Prismatic 14,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,320 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Device 4	910.40'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.40' / 909.25' S= 0.0115 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#3	Device 4	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

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MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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#4 Primary 910.00' 0.5' Crest Height
15.0" Round Culvert L= 60.0' Ke= 0.500
 Inlet / Outlet Invert= 910.00' / 909.40' S= 0.0100 '/ Cc= 0.900
 n= 0.013, Flow Area= 1.23 sf

Discarded OutFlow Max=0.01 cfs @ 12.30 hrs HW=915.61' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=4.69 cfs @ 12.60 hrs HW=915.26' TW=914.60' (Dynamic Tailwater)

↑ **4=Culvert** (Outlet Controls 4.69 cfs @ 3.82 fps)

↑ **1=Culvert** (Passes < 0.28 cfs potential flow)

↑ **3=Sharp-Crested Rectangular Weir** (Passes < 43.11 cfs potential flow)

Summary for Pond 55P: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	3,218 cf	6.50'W x 330.00'L x 5.00'H Prismatic 10,725 cf Overall x 30.0% Voids
#2	915.00'	5,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,218 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	8,000	5,000	5,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	913.00'	24.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 913.00' / 912.00' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

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

↑ **1=Culvert** (Controls 0.00 cfs)

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

↑ **2=Culvert** (Controls 0.00 cfs)

Summary for Pond 100P: WRTT

Inflow Area = 1.920 ac, 100.00% Impervious, Inflow Depth = 5.54" for 6" event
 Inflow = 9.45 cfs @ 12.08 hrs, Volume= 0.886 af
 Outflow = 3.10 cfs @ 12.36 hrs, Volume= 0.885 af, Atten= 67%, Lag= 16.8 min
 Primary = 3.10 cfs @ 12.36 hrs, Volume= 0.885 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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Peak Elev= 915.21' @ 12.36 hrs Surf.Area= 17,644 sf Storage= 10,623 cf

Plug-Flow detention time= 128.6 min calculated for 0.884 af (100% of inflow)

Center-of-Mass det. time= 128.1 min (950.1 - 822.0)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	8,250 cf	20.00'W x 275.00'L x 5.00'H Prismaoid 27,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		23,250 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	8.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=3.10 cfs @ 12.36 hrs HW=915.21' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 3.10 cfs of 6.68 cfs potential flow)

1=Culvert (Barrel Controls 0.51 cfs @ 2.61 fps)

3=Sharp-Crested Rectangular Weir (Passes 2.59 cfs of 48.71 cfs potential flow)

4=Orifice/Grate (Orifice Controls 2.59 cfs @ 6.57 fps)

Summary for Pond 400P: (new Pond)

Inflow Area = 2.100 ac, 90.48% Impervious, Inflow Depth = 5.30" for 6" event
 Inflow = 14.33 cfs @ 12.08 hrs, Volume= 0.927 af
 Outflow = 2.96 cfs @ 12.58 hrs, Volume= 0.926 af, Atten= 79%, Lag= 29.6 min
 Primary = 2.96 cfs @ 12.58 hrs, Volume= 0.926 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 917.00' Surf.Area= 10,934 sf Storage= 13,999 cf

Peak Elev= 919.36' @ 12.58 hrs Surf.Area= 10,934 sf Storage= 30,819 cf (16,819 cf above start)

Plug-Flow detention time= 294.6 min calculated for 0.604 af (65% of inflow)

Center-of-Mass det. time= 108.6 min (879.1 - 770.5)

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MN-St Paul 24-hr S1 2-yr 6" Rainfall=6.00"

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Volume	Invert	Avail.Storage	Storage Description
#1A	914.00'	0 cf	71.00'W x 154.00'L x 7.00'H Field A 76,538 cf Overall - 35,511 cf Embedded = 41,027 cf x 0.0% Voids
#2A	914.50'	35,511 cf	CMP_Round 72 x 56 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.23 sf x 20.00'L = 564.6 cf Overall Size= 72.0"W x 72.0"H x 20.00'L 8 Rows of 7 Chambers 69.00' Header x 28.23 sf x 2 = 3,895.5 cf Inside
		35,511 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	917.00'	10.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 917.00' / 916.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=2.96 cfs @ 12.58 hrs HW=919.36' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 2.96 cfs @ 5.43 fps)

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

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Summary for Subcatchment 2S: To Field

Runoff = 13.27 cfs @ 12.03 hrs, Volume= 0.631 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 0.710	98	
2.240	80	>75% Grass cover, Good, HSG D
2.950	84	Weighted Average
2.240		75.93% Pervious Area
0.710		24.07% Impervious Area

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

Summary for Subcatchment 3S: EAST CENTRAL ROAD

Runoff = 5.60 cfs @ 12.09 hrs, Volume= 0.349 af, Depth= 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 1.070	98	
0.150	61	>75% Grass cover, Good, HSG B
1.220	93	Weighted Average
0.150		12.30% Pervious Area
1.070		87.70% Impervious Area

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

Summary for Subcatchment 4S: NW Road

Runoff = 3.96 cfs @ 12.10 hrs, Volume= 0.266 af, Depth= 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 0.780	98	
0.070	74	>75% Grass cover, Good, HSG C
0.850	96	Weighted Average
0.070		8.24% Pervious Area
0.780		91.76% Impervious Area

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MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

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

Summary for Subcatchment 5S: Parking E

Runoff = 9.29 cfs @ 12.09 hrs, Volume= 0.574 af, Depth= 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 1.750	98	
* 0.320	61	
2.070	92	Weighted Average
0.320		15.46% Pervious Area
1.750		84.54% Impervious Area

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

Summary for Subcatchment 6S: Plaza SW

Runoff = 1.93 cfs @ 12.09 hrs, Volume= 0.118 af, Depth= 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 0.320	98	
0.340	61	>75% Grass cover, Good, HSG B
0.660	79	Weighted Average
0.340		51.52% Pervious Area
0.320		48.48% Impervious Area

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

Summary for Subcatchment 7S: E ROAD

Runoff = 6.92 cfs @ 12.10 hrs, Volume= 0.449 af, Depth= 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

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Area (ac)	CN	Description
* 1.250	98	
0.320	74	>75% Grass cover, Good, HSG C
1.570	93	Weighted Average
0.320		20.38% Pervious Area
1.250		79.62% Impervious Area

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

Summary for Subcatchment 8S: LOADING DOCK

Runoff = 2.69 cfs @ 12.08 hrs, Volume= 0.179 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 0.540	98	
0.540		100.00% Impervious Area

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

Summary for Subcatchment 9S: SW ROAD

Runoff = 3.70 cfs @ 12.10 hrs, Volume= 0.240 af, Depth= 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 0.680	98	
0.160	74	>75% Grass cover, Good, HSG C
0.840	93	Weighted Average
0.160		19.05% Pervious Area
0.680		80.95% Impervious Area

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

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Summary for Subcatchment 10S: WEST ROOF AREA N

Runoff = 2.89 cfs @ 12.08 hrs, Volume= 0.193 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 0.580	98	
0.580		100.00% Impervious Area

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

Summary for Subcatchment 11S: NORTH ROOF IRRIGATION

Runoff = 3.78 cfs @ 12.08 hrs, Volume= 0.252 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 0.760	98	
0.760		100.00% Impervious Area

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

Summary for Subcatchment 12S: East Roof

Runoff = 5.72 cfs @ 12.08 hrs, Volume= 0.382 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 1.150	98	
1.150		100.00% Impervious Area

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

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

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Summary for Subcatchment 40S: W Road

Runoff = 2.52 cfs @ 12.10 hrs, Volume= 0.169 af, Depth= 3.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 0.500	98	
0.040	74	>75% Grass cover, Good, HSG C
0.540	96	Weighted Average
0.040		7.41% Pervious Area
0.500		92.59% Impervious Area

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

Summary for Subcatchment 44S: EAST CENTRAL ROAD

Runoff = 6.21 cfs @ 12.08 hrs, Volume= 0.406 af, Depth= 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 1.240	98	
0.020	61	>75% Grass cover, Good, HSG B
1.260	97	Weighted Average
0.020		1.59% Pervious Area
1.240		98.41% Impervious Area

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

Summary for Subcatchment 60S: OFF SOUTH

Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.139 af, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 0.280	98	
0.370	74	>75% Grass cover, Good, HSG C
0.650	84	Weighted Average
0.370		56.92% Pervious Area
0.280		43.08% Impervious Area

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MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

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

Summary for Subcatchment 100S: WEST ROOF AREA

Runoff = 6.67 cfs @ 12.08 hrs, Volume= 0.445 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 1.340	98	
1.340		100.00% Impervious Area

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

Summary for Subcatchment 400: F

Runoff = 9.85 cfs @ 12.09 hrs, Volume= 0.620 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

Area (ac)	CN	Description
* 1.900	98	
0.200	61	>75% Grass cover, Good, HSG B
2.100	94	Weighted Average
0.200		9.52% Pervious Area
1.900		90.48% Impervious Area

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

Summary for Reach 56R: (new Reach)

Inflow Area = 5.510 ac, 94.01% Impervious, Inflow Depth = 3.67" for 10-yr event

Inflow = 12.91 cfs @ 12.16 hrs, Volume= 1.684 af

Outflow = 12.91 cfs @ 12.16 hrs, Volume= 1.684 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

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MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

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Summary for Reach 64R: (new Reach)

Inflow Area = 2.760 ac, 94.20% Impervious, Inflow Depth = 2.62" for 10-yr event
 Inflow = 2.63 cfs @ 12.31 hrs, Volume= 0.602 af
 Outflow = 2.63 cfs @ 12.31 hrs, Volume= 0.602 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Reach 72R: (new Reach)

Inflow Area = 9.500 ac, 68.11% Impervious, Inflow Depth > 5.01" for 10-yr event
 Inflow = 9.70 cfs @ 12.15 hrs, Volume= 3.966 af
 Outflow = 9.70 cfs @ 12.15 hrs, Volume= 3.966 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Pond 2P: (new Pond)

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth = 2.57" for 10-yr event
 Inflow = 13.27 cfs @ 12.03 hrs, Volume= 0.631 af
 Outflow = 2.15 cfs @ 12.05 hrs, Volume= 0.415 af, Atten= 84%, Lag= 1.6 min
 Primary = 2.15 cfs @ 12.05 hrs, Volume= 2.410 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 907.65' @ 12.62 hrs Surf.Area= 53,768 sf Storage= 14,811 cf

Plug-Flow detention time= 216.2 min calculated for 0.415 af (66% of inflow)

Center-of-Mass det. time= 123.2 min (932.7 - 809.6)

Volume	Invert	Avail.Storage	Storage Description
#1	909.00'	36,504 cf	260.00'W x 400.00'L x 1.17'H Prismatoid 121,680 cf Overall x 30.0% Voids
#2	905.82'	45,159 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 150,529 cf Overall x 30.0% Voids
#3	910.17'	52,000 cf	260.00'W x 400.00'L x 0.50'H Prismatoid
		133,663 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
905.82	600	0	0
906.00	5,700	567	567
907.50	49,000	41,025	41,592
909.00	96,250	108,938	150,529

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.48'	18.0" Round Culvert X 2.00 L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 905.48' / 903.21' S= 0.0100 ' /' Cc= 0.900 n= 0.020, Flow Area= 1.77 sf
#2	Primary	904.21'	18.0" Round Culvert L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 904.21' / 903.31' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

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Primary OutFlow Max=2.10 cfs @ 12.05 hrs HW=907.25' TW=907.18' (Dynamic Tailwater)└─**2=Culvert** (Outlet Controls 2.10 cfs @ 1.19 fps)└─**1=Culvert** (Passes 2.10 cfs of 2.30 cfs potential flow)**Summary for Pond 3P: ETT**

Inflow Area = 1.220 ac, 87.70% Impervious, Inflow Depth = 3.43" for 10-yr event
 Inflow = 5.60 cfs @ 12.09 hrs, Volume= 0.349 af
 Outflow = 5.19 cfs @ 12.12 hrs, Volume= 0.362 af, Atten= 7%, Lag= 2.2 min
 Discarded = 0.01 cfs @ 0.00 hrs, Volume= 0.026 af
 Primary = 0.55 cfs @ 12.12 hrs, Volume= 0.220 af
 Secondary = 4.63 cfs @ 12.12 hrs, Volume= 0.115 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 910.50' Surf.Area= 3,600 sf Storage= 540 cf

Peak Elev= 913.50' @ 12.12 hrs Surf.Area= 3,600 sf Storage= 3,782 cf (3,242 cf above start)

Plug-Flow detention time= 142.7 min calculated for 0.349 af (100% of inflow)

Center-of-Mass det. time= 127.5 min (911.3 - 783.8)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	5,400 cf	8.00'W x 450.00'L x 5.00'H Prismatic 18,000 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		25,400 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

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Discarded OutFlow Max=0.01 cfs @ 0.00 hrs HW=910.50' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.55 cfs @ 12.12 hrs HW=913.50' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.55 cfs @ 2.82 fps)**Secondary OutFlow** Max=4.63 cfs @ 12.12 hrs HW=913.50' TW=0.00' (Dynamic Tailwater)↑**2=Culvert** (Barrel Controls 4.63 cfs @ 5.89 fps)↑**4=Sharp-Crested Rectangular Weir** (Passes 4.63 cfs of 5.07 cfs potential flow)**Summary for Pond 4P: NWTT**

Inflow Area = 2.110 ac, 95.73% Impervious, Inflow Depth = 3.71" for 10-yr event
 Inflow = 7.29 cfs @ 12.10 hrs, Volume= 0.652 af
 Outflow = 6.36 cfs @ 12.19 hrs, Volume= 0.652 af, Atten= 13%, Lag= 4.9 min
 Discarded = 0.00 cfs @ 3.94 hrs, Volume= 0.011 af
 Primary = 0.68 cfs @ 12.19 hrs, Volume= 0.343 af
 Secondary = 5.68 cfs @ 12.19 hrs, Volume= 0.298 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 914.77' @ 12.19 hrs Surf.Area= 1,480 sf Storage= 2,116 cf

Plug-Flow detention time= 39.3 min calculated for 0.652 af (100% of inflow)

Center-of-Mass det. time= 39.6 min (847.4 - 807.8)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	2,220 cf	8.00'W x 185.00'L x 5.00'H Prismatoid 7,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,220 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

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Discarded OutFlow Max=0.00 cfs @ 3.94 hrs HW=910.07' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.68 cfs @ 12.19 hrs HW=914.76' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 0.68 cfs @ 3.46 fps)

Secondary OutFlow Max=5.68 cfs @ 12.19 hrs HW=914.76' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Barrel Controls 5.68 cfs @ 7.23 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Passes 5.68 cfs of 39.92 cfs potential flow)

Summary for Pond 5P: EP-sand filter

Inflow Area = 2.070 ac, 84.54% Impervious, Inflow Depth = 3.33" for 10-yr event
Inflow = 9.29 cfs @ 12.09 hrs, Volume= 0.574 af
Outflow = 2.16 cfs @ 12.56 hrs, Volume= 0.573 af, Atten= 77%, Lag= 28.6 min
Primary = 2.16 cfs @ 12.56 hrs, Volume= 0.573 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 908.65' @ 12.56 hrs Surf.Area= 12,240 sf Storage= 11,611 cf

Plug-Flow detention time= 145.6 min calculated for 0.573 af (100% of inflow)

Center-of-Mass det. time= 145.4 min (933.5 - 788.1)

Volume	Invert	Avail.Storage	Storage Description
#1	905.00'	4,590 cf	72.00'W x 85.00'L x 2.50'H Prismatoid 15,300 cf Overall x 30.0% Voids
#2	907.50'	15,300 cf	72.00'W x 85.00'L x 2.50'H Prismatoid
		19,890 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 905.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	905.00'	12.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 904.75' S= 0.0050 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	907.75'	9.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=2.16 cfs @ 12.56 hrs HW=908.65' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 2.16 cfs of 6.12 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 0.62 cfs @ 3.17 fps)

↑ **3=Orifice/Grate** (Orifice Controls 1.54 cfs @ 3.48 fps)

Summary for Pond 6P: (new Pond)

Inflow Area = 0.660 ac, 48.48% Impervious, Inflow Depth = 2.14" for 10-yr event
Inflow = 1.93 cfs @ 12.09 hrs, Volume= 0.118 af
Outflow = 0.75 cfs @ 12.38 hrs, Volume= 0.146 af, Atten= 61%, Lag= 17.1 min
Primary = 0.75 cfs @ 12.38 hrs, Volume= 0.146 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 906.25' Surf.Area= 0.047 ac Storage= 0.027 af

Peak Elev= 906.48' @ 12.38 hrs Surf.Area= 0.047 ac Storage= 0.033 af (0.006 af above start)

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	903.00'	0.021 af	7.90'W x 130.00'L x 3.00'H Prismaoid 0.071 af Overall x 30.0% Voids
#2	906.00'	0.119 af	8.00'W x 130.00'L x 5.00'H Prismaoid
		0.141 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 3	906.25'	4.0" Round Culvert X 2.00 L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 906.25' / 905.75' S= 0.0050 ' / Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 3	903.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 903.00' S= 0.0000 ' / Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#3	Primary	903.00'	8.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 902.00' S= 0.0100 ' / Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=0.75 cfs @ 12.38 hrs HW=906.48' (Free Discharge)

3=Culvert (Passes 0.75 cfs of 2.09 cfs potential flow)

1=Culvert (Barrel Controls 0.15 cfs @ 1.58 fps)

2=Culvert (Barrel Controls 0.61 cfs @ 3.08 fps)

Summary for Pond 7P: SETT

Inflow Area = 1.570 ac, 79.62% Impervious, Inflow Depth = 3.43" for 10-yr event
 Inflow = 6.92 cfs @ 12.10 hrs, Volume= 0.449 af
 Outflow = 5.56 cfs @ 12.18 hrs, Volume= 0.576 af, Atten= 20%, Lag= 4.8 min
 Secondary = 5.56 cfs @ 12.18 hrs, Volume= 0.576 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 913.00' Surf.Area= 6,200 sf Storage= 5,580 cf

Peak Elev= 913.52' @ 12.18 hrs Surf.Area= 6,200 sf Storage= 6,555 cf (975 cf above start)

Plug-Flow detention time= 167.0 min calculated for 0.448 af (100% of inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	9,300 cf	20.00'W x 310.00'L x 5.00'H Prismaoid 31,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,300 cf	Total Available Storage

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' / Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	21.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' / Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height

Secondary OutFlow Max=5.55 cfs @ 12.18 hrs HW=913.52' (Free Discharge)

2=Culvert (Passes 5.55 cfs of 14.87 cfs potential flow)

1=Culvert (Barrel Controls 0.41 cfs @ 2.09 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 5.14 cfs @ 2.52 fps)

Summary for Pond 9P: SWTT

Inflow Area = 0.840 ac, 80.95% Impervious, Inflow Depth = 3.43" for 10-yr event
 Inflow = 3.70 cfs @ 12.10 hrs, Volume= 0.240 af
 Outflow = 3.69 cfs @ 12.11 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.4 min
 Secondary = 3.69 cfs @ 12.11 hrs, Volume= 0.240 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 913.39' @ 12.11 hrs Surf.Area= 1,000 sf Storage= 1,017 cf

Plug-Flow detention time= 26.0 min calculated for 0.240 af (100% of inflow)

Center-of-Mass det. time= 25.8 min (810.5 - 784.7)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	1,500 cf	8.00'W x 125.00'L x 5.00'H Prismatic 5,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		16,500 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 ' / Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.50' S= 0.0050 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

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#3 Device 2 913.00' **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
1.0' Crest Height

Secondary OutFlow Max=3.68 cfs @ 12.11 hrs HW=913.39' (Free Discharge)

2=Culvert (Passes 3.68 cfs of 4.97 cfs potential flow)

1=Culvert (Barrel Controls 0.40 cfs @ 2.04 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 3.28 cfs @ 2.14 fps)

Summary for Pond 10P: WRTT

Inflow Area = 0.580 ac, 100.00% Impervious, Inflow Depth = 3.98" for 10-yr event
 Inflow = 2.89 cfs @ 12.08 hrs, Volume= 0.193 af
 Outflow = 0.78 cfs @ 12.78 hrs, Volume= 0.193 af, Atten= 73%, Lag= 41.5 min
 Discarded = 0.01 cfs @ 4.60 hrs, Volume= 0.034 af
 Primary = 0.78 cfs @ 12.78 hrs, Volume= 0.159 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 914.30' @ 12.61 hrs Surf.Area= 4,500 sf Storage= 5,798 cf

Plug-Flow detention time= 481.3 min calculated for 0.193 af (100% of inflow)

Center-of-Mass det. time= 481.6 min (1,234.8 - 753.2)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	6,750 cf	20.00'W x 225.00'L x 5.00'H Prismatoid 22,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		21,750 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	9.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

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Discarded OutFlow Max=0.01 cfs @ 4.60 hrs HW=910.06' (Free Discharge)

↳ **5=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.78 cfs @ 12.78 hrs HW=914.13' TW=914.03' (Dynamic Tailwater)

↳ **2=Culvert** (Passes 0.78 cfs of 0.96 cfs potential flow)

↳ **1=Culvert** (Outlet Controls 0.08 cfs @ 0.39 fps)

↳ **3=Sharp-Crested Rectangular Weir** (Passes 0.70 cfs of 7.94 cfs potential flow)

↳ **4=Orifice/Grate** (Orifice Controls 0.70 cfs @ 1.58 fps)

Summary for Pond 11P: IT

Inflow Area = 0.760 ac, 100.00% Impervious, Inflow Depth = 3.98" for 10-yr event
Inflow = 3.78 cfs @ 12.08 hrs, Volume= 0.252 af
Outflow = 2.25 cfs @ 12.22 hrs, Volume= 0.263 af, Atten= 41%, Lag= 7.9 min
Primary = 2.25 cfs @ 12.22 hrs, Volume= 0.263 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 919.80' Surf.Area= 0.073 ac Storage= 0.062 af

Peak Elev= 920.80' @ 12.22 hrs Surf.Area= 0.075 ac Storage= 0.100 af (0.037 af above start)

Plug-Flow detention time= 169.7 min calculated for 0.201 af (80% of inflow)

Center-of-Mass det. time= 10.3 min (763.6 - 753.2)

Volume	Invert	Avail.Storage	Storage Description
#1	920.01'	0.005 af	15.0" Round Pipe Storage L= 168.0' S= 0.0150 '/'
#2	924.00'	0.001 af	3.00'D x 3.00'H Vertical Cone/Cylinder x 2
#3	916.00'	0.033 af	8.00'W x 200.00'L x 3.00'H Prismatic 0.110 af Overall x 30.0% Voids
#4	919.00'	0.184 af	8.00'W x 200.00'L x 5.00'H Prismatic
		0.222 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	919.50'	11.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 919.50' / 919.30' S= 0.0040 '/ Cc= 0.900 n= 0.013, Flow Area= 0.66 sf

Primary OutFlow Max=2.25 cfs @ 12.22 hrs HW=920.80' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Barrel Controls 2.25 cfs @ 3.40 fps)

Summary for Pond 12P: ERTT

Inflow Area = 1.150 ac, 100.00% Impervious, Inflow Depth = 3.98" for 10-yr event
Inflow = 5.72 cfs @ 12.08 hrs, Volume= 0.382 af
Outflow = 1.48 cfs @ 12.48 hrs, Volume= 0.543 af, Atten= 74%, Lag= 23.8 min
Discarded = 0.01 cfs @ 0.00 hrs, Volume= 0.062 af
Primary = 1.47 cfs @ 12.48 hrs, Volume= 0.482 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

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Starting Elev= 913.00' Surf.Area= 7,800 sf Storage= 7,020 cf

Peak Elev= 913.97' @ 12.48 hrs Surf.Area= 7,800 sf Storage= 9,301 cf (2,281 cf above start)

Plug-Flow detention time= 397.0 min calculated for 0.382 af (100% of inflow)

Center-of-Mass det. time= 137.6 min (890.9 - 753.2)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	11,700 cf	20.00'W x 390.00'L x 5.00'H Prismaoid 39,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		26,700 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	7.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.01 cfs @ 0.00 hrs HW=913.00' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=1.47 cfs @ 12.48 hrs HW=913.97' TW=0.00' (Dynamic Tailwater)↳ **2=Culvert** (Passes 1.47 cfs of 5.83 cfs potential flow)↳ **1=Culvert** (Barrel Controls 0.41 cfs @ 2.07 fps)↳ **3=Sharp-Crested Rectangular Weir** (Passes 1.06 cfs of 13.40 cfs potential flow)↳ **4=Orifice/Grate** (Orifice Controls 1.06 cfs @ 3.98 fps)**Summary for Pond 20P: (new Pond)**

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth > 9.81" for 10-yr event
Inflow = 2.15 cfs @ 12.05 hrs, Volume= 2.410 af
Outflow = 1.19 cfs @ 12.64 hrs, Volume= 2.396 af, Atten= 44%, Lag= 35.2 min
Primary = 1.19 cfs @ 12.64 hrs, Volume= 2.396 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 907.03' Surf.Area= 0.116 ac Storage= 0.521 af

Peak Elev= 907.63' @ 12.64 hrs Surf.Area= 0.116 ac Storage= 0.555 af (0.034 af above start)

Plug-Flow detention time= 1,830.3 min calculated for 1.874 af (78% of inflow)

Center-of-Mass det. time= 23.6 min (4,164.2 - 4,140.6)

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Volume	Invert	Avail.Storage	Storage Description
#1A	899.75'	0.000 af	43.00'W x 118.00'L x 9.00'H Field A 1.048 af Overall - 0.556 af Embedded = 0.493 af x 0.0% Voids
#2A	900.25'	0.556 af	CMP_Round 96 x 20 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.20 sf x 20.00'L = 1,004.1 cf Overall Size= 96.0"W x 96.0"H x 20.00'L 4 Rows of 5 Chambers 41.00' Header x 50.20 sf x 2 = 4,116.8 cf Inside
#3	902.55'	0.012 af	30.0" Round Pipe Storage L= 107.0' S= 0.0065 '/'
#4	903.25'	0.006 af	18.0" Round Pipe Storage L= 151.0' S= 0.0065 '/'
#5	904.10'	0.001 af	18.0" Round Pipe Storage L= 15.0' S= 0.0050 '/'
		0.574 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	907.03'	18.0" Round Culvert L= 145.0' Ke= 0.500 Inlet / Outlet Invert= 907.03' / 906.52' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.19 cfs @ 12.64 hrs HW=907.63' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.19 cfs @ 2.68 fps)

Summary for Pond 40P: WTT

Inflow Area = 0.540 ac, 92.59% Impervious, Inflow Depth = 3.76" for 10-yr event
 Inflow = 2.52 cfs @ 12.10 hrs, Volume= 0.169 af
 Outflow = 2.51 cfs @ 12.11 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.7 min
 Discarded = 0.00 cfs @ 4.36 hrs, Volume= 0.009 af
 Primary = 2.51 cfs @ 12.11 hrs, Volume= 0.160 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3
 Peak Elev= 919.27' @ 12.11 hrs Surf.Area= 1,200 sf Storage= 1,375 cf

Plug-Flow detention time= 102.6 min calculated for 0.169 af (100% of inflow)
 Center-of-Mass det. time= 103.0 min (872.0 - 769.0)

Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	2,100 cf	8.00'W x 150.00'L x 5.00'H Prismatic 6,000 cf Overall x 35.0% Voids
#2	921.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
921.00	2,000	0	0
922.00	9,000	5,500	5,500
923.00	20,000	14,500	20,000

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Device	Routing	Invert	Outlet Devices
#1	Device 2	916.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.50' / 916.50' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	916.30'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.30' / 915.80' S= 0.0050 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	916.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	919.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.00 cfs @ 4.36 hrs HW=916.07' (Free Discharge)↑ **3=Exfiltration** (Exfiltration Controls 0.00 cfs)**Primary OutFlow** Max=2.48 cfs @ 12.11 hrs HW=919.27' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 2.48 cfs of 4.60 cfs potential flow)↑ **1=Culvert** (Barrel Controls 0.53 cfs @ 2.69 fps)↑ **4=Sharp-Crested Rectangular Weir** (Weir Controls 1.96 cfs @ 1.82 fps)**Summary for Pond 44P: NTT**

Inflow Area = 1.260 ac, 98.41% Impervious, Inflow Depth = 3.87" for 10-yr event
Inflow = 6.21 cfs @ 12.08 hrs, Volume= 0.406 af
Outflow = 3.98 cfs @ 12.30 hrs, Volume= 0.406 af, Atten= 36%, Lag= 12.9 min
Discarded = 0.01 cfs @ 12.22 hrs, Volume= 0.021 af
Primary = 3.97 cfs @ 12.30 hrs, Volume= 0.386 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 915.11' @ 12.22 hrs Surf.Area= 5,663 sf Storage= 4,588 cf

Plug-Flow detention time= 131.3 min calculated for 0.406 af (100% of inflow)

Center-of-Mass det. time= 131.7 min (893.0 - 761.3)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	4,320 cf	8.00'W x 360.00'L x 5.00'H Prismatic 14,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,320 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Device 4	910.40'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.40' / 909.25' S= 0.0115 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#3	Device 4	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

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#4 Primary 910.00' 0.5' Crest Height
15.0" Round Culvert L= 60.0' Ke= 0.500
 Inlet / Outlet Invert= 910.00' / 909.40' S= 0.0100 '/ Cc= 0.900
 n= 0.013, Flow Area= 1.23 sf

Discarded OutFlow Max=0.01 cfs @ 12.22 hrs HW=915.11' (Free Discharge)

2=Exfiltration (Exfiltration Controls 0.01 cfs)
Primary OutFlow Max=4.00 cfs @ 12.30 hrs HW=915.02' TW=914.55' (Dynamic Tailwater)

4=Culvert (Outlet Controls 4.00 cfs @ 3.26 fps)


1=Culvert (Passes < 0.24 cfs potential flow)


3=Sharp-Crested Rectangular Weir (Passes < 33.12 cfs potential flow)
Summary for Pond 55P: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	3,218 cf	6.50'W x 330.00'L x 5.00'H Prismatic 10,725 cf Overall x 30.0% Voids
#2	915.00'	5,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,218 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	8,000	5,000	5,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	913.00'	24.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 913.00' / 912.00' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

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

1=Culvert (Controls 0.00 cfs)
Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)

2=Culvert (Controls 0.00 cfs)
Summary for Pond 100P: WRTT

Inflow Area = 1.920 ac, 100.00% Impervious, Inflow Depth = 3.77" for 10-yr event
 Inflow = 6.67 cfs @ 12.08 hrs, Volume= 0.604 af
 Outflow = 2.63 cfs @ 12.31 hrs, Volume= 0.602 af, Atten= 61%, Lag= 13.7 min
 Primary = 2.63 cfs @ 12.31 hrs, Volume= 0.602 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 10-yr Rainfall=4.22"

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Peak Elev= 914.64' @ 12.31 hrs Surf.Area= 5,500 sf Storage= 7,659 cf

Plug-Flow detention time= 152.3 min calculated for 0.602 af (100% of inflow)

Center-of-Mass det. time= 151.3 min (984.5 - 833.2)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	8,250 cf	20.00'W x 275.00'L x 5.00'H Prismatic 27,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		23,250 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	8.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=2.63 cfs @ 12.31 hrs HW=914.64' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 2.63 cfs of 6.30 cfs potential flow)

1=Culvert (Barrel Controls 0.48 cfs @ 2.45 fps)

3=Sharp-Crested Rectangular Weir (Passes 2.15 cfs of 30.31 cfs potential flow)

4=Orifice/Grate (Orifice Controls 2.15 cfs @ 5.46 fps)

Summary for Pond 400P: (new Pond)

Inflow Area = 2.100 ac, 90.48% Impervious, Inflow Depth = 3.54" for 10-yr event
Inflow = 9.85 cfs @ 12.09 hrs, Volume= 0.620 af
Outflow = 2.42 cfs @ 12.53 hrs, Volume= 0.618 af, Atten= 75%, Lag= 26.6 min
Primary = 2.42 cfs @ 12.53 hrs, Volume= 0.618 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 917.00' Surf.Area= 10,934 sf Storage= 13,999 cf

Peak Elev= 918.51' @ 12.53 hrs Surf.Area= 10,934 sf Storage= 25,231 cf (11,231 cf above start)

Plug-Flow detention time= 388.5 min calculated for 0.297 af (48% of inflow)

Center-of-Mass det. time= 116.7 min (895.8 - 779.1)

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Volume	Invert	Avail.Storage	Storage Description
#1A	914.00'	0 cf	71.00'W x 154.00'L x 7.00'H Field A 76,538 cf Overall - 35,511 cf Embedded = 41,027 cf x 0.0% Voids
#2A	914.50'	35,511 cf	CMP_Round 72 x 56 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.23 sf x 20.00'L = 564.6 cf Overall Size= 72.0"W x 72.0"H x 20.00'L 8 Rows of 7 Chambers 69.00' Header x 28.23 sf x 2 = 3,895.5 cf Inside
		35,511 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	917.00'	10.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 917.00' / 916.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=2.42 cfs @ 12.53 hrs HW=918.51' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 2.42 cfs @ 4.43 fps)

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

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Summary for Subcatchment 2S: To Field

Runoff = 25.44 cfs @ 12.03 hrs, Volume= 1.371 af, Depth= 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 0.710	98	
2.240	80	>75% Grass cover, Good, HSG D
2.950	84	Weighted Average
2.240		75.93% Pervious Area
0.710		24.07% Impervious Area

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

Summary for Subcatchment 3S: EAST CENTRAL ROAD

Runoff = 9.51 cfs @ 12.08 hrs, Volume= 0.674 af, Depth= 6.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 1.070	98	
0.150	61	>75% Grass cover, Good, HSG B
1.220	93	Weighted Average
0.150		12.30% Pervious Area
1.070		87.70% Impervious Area

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

Summary for Subcatchment 4S: NW Road

Runoff = 6.52 cfs @ 12.10 hrs, Volume= 0.495 af, Depth= 6.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 0.780	98	
0.070	74	>75% Grass cover, Good, HSG C
0.850	96	Weighted Average
0.070		8.24% Pervious Area
0.780		91.76% Impervious Area

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

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

Summary for Subcatchment 5S: Parking E

Runoff = 15.98 cfs @ 12.09 hrs, Volume= 1.123 af, Depth= 6.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 1.750	98	
* 0.320	61	
2.070	92	Weighted Average
0.320		15.46% Pervious Area
1.750		84.54% Impervious Area

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

Summary for Subcatchment 6S: Plaza SW

Runoff = 4.14 cfs @ 12.09 hrs, Volume= 0.275 af, Depth= 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 0.320	98	
0.340	61	>75% Grass cover, Good, HSG B
0.660	79	Weighted Average
0.340		51.52% Pervious Area
0.320		48.48% Impervious Area

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

Summary for Subcatchment 7S: E ROAD

Runoff = 11.77 cfs @ 12.10 hrs, Volume= 0.867 af, Depth= 6.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

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MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

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Area (ac)	CN	Description
* 1.250	98	
0.320	74	>75% Grass cover, Good, HSG C
1.570	93	Weighted Average
0.320		20.38% Pervious Area
1.250		79.62% Impervious Area

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

Summary for Subcatchment 8S: LOADING DOCK

Runoff = 4.34 cfs @ 12.08 hrs, Volume= 0.325 af, Depth= 7.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 0.540	98	
0.540		100.00% Impervious Area

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

Summary for Subcatchment 9S: SW ROAD

Runoff = 6.30 cfs @ 12.10 hrs, Volume= 0.464 af, Depth= 6.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 0.680	98	
0.160	74	>75% Grass cover, Good, HSG C
0.840	93	Weighted Average
0.160		19.05% Pervious Area
0.680		80.95% Impervious Area

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

Phase 1 - Tree Trenches

MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

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Summary for Subcatchment 10S: WEST ROOF AREA N

Runoff = 4.66 cfs @ 12.08 hrs, Volume= 0.349 af, Depth= 7.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 0.580	98	
0.580		100.00% Impervious Area

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

Summary for Subcatchment 11S: NORTH ROOF IRRIGATION

Runoff = 6.11 cfs @ 12.08 hrs, Volume= 0.457 af, Depth= 7.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 0.760	98	
0.760		100.00% Impervious Area

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

Summary for Subcatchment 12S: East Roof

Runoff = 9.25 cfs @ 12.08 hrs, Volume= 0.692 af, Depth= 7.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 1.150	98	
1.150		100.00% Impervious Area

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

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MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

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Summary for Subcatchment 40S: W Road

Runoff = 4.14 cfs @ 12.10 hrs, Volume= 0.314 af, Depth= 6.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 0.500	98	
0.040	74	>75% Grass cover, Good, HSG C
0.540	96	Weighted Average
0.040		7.41% Pervious Area
0.500		92.59% Impervious Area

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

Summary for Subcatchment 44S: EAST CENTRAL ROAD

Runoff = 10.10 cfs @ 12.08 hrs, Volume= 0.746 af, Depth= 7.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 1.240	98	
0.020	61	>75% Grass cover, Good, HSG B
1.260	97	Weighted Average
0.020		1.59% Pervious Area
1.240		98.41% Impervious Area

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

Summary for Subcatchment 60S: OFF SOUTH

Runoff = 4.49 cfs @ 12.09 hrs, Volume= 0.302 af, Depth= 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 0.280	98	
0.370	74	>75% Grass cover, Good, HSG C
0.650	84	Weighted Average
0.370		56.92% Pervious Area
0.280		43.08% Impervious Area

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

Summary for Subcatchment 100S: WEST ROOF AREA

Runoff = 10.78 cfs @ 12.08 hrs, Volume= 0.806 af, Depth= 7.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 1.340	98	
1.340		100.00% Impervious Area

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

Summary for Subcatchment 400: F

Runoff = 16.51 cfs @ 12.08 hrs, Volume= 1.180 af, Depth= 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs
MN-St Paul 24-hr S1 100-yr Rainfall=7.46"

Area (ac)	CN	Description
* 1.900	98	
0.200	61	>75% Grass cover, Good, HSG B
2.100	94	Weighted Average
0.200		9.52% Pervious Area
1.900		90.48% Impervious Area

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

Summary for Reach 56R: (new Reach)

Inflow Area = 5.510 ac, 94.01% Impervious, Inflow Depth = 6.88" for 100-yr event

Inflow = 16.72 cfs @ 12.15 hrs, Volume= 3.160 af

Outflow = 16.72 cfs @ 12.15 hrs, Volume= 3.160 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

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Summary for Reach 64R: (new Reach)

Inflow Area = 2.760 ac, 94.20% Impervious, Inflow Depth = 4.85" for 100-yr event
 Inflow = 3.23 cfs @ 12.45 hrs, Volume= 1.116 af
 Outflow = 3.23 cfs @ 12.45 hrs, Volume= 1.116 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Reach 72R: (new Reach)

Inflow Area = 9.500 ac, 68.11% Impervious, Inflow Depth > 7.52" for 100-yr event
 Inflow = 20.96 cfs @ 12.32 hrs, Volume= 5.953 af
 Outflow = 20.96 cfs @ 12.32 hrs, Volume= 5.953 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Summary for Pond 2P: (new Pond)

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth = 5.58" for 100-yr event
 Inflow = 25.44 cfs @ 12.03 hrs, Volume= 1.371 af
 Outflow = 3.92 cfs @ 12.55 hrs, Volume= 1.156 af, Atten= 85%, Lag= 31.4 min
 Primary = 3.92 cfs @ 12.55 hrs, Volume= 3.073 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 908.44' @ 12.56 hrs Surf.Area= 78,510 sf Storage= 30,396 cf

Plug-Flow detention time= 174.3 min calculated for 1.156 af (84% of inflow)

Center-of-Mass det. time= 107.6 min (900.0 - 792.4)

Volume	Invert	Avail.Storage	Storage Description
#1	909.00'	36,504 cf	260.00'W x 400.00'L x 1.17'H Prismatoid 121,680 cf Overall x 30.0% Voids
#2	905.82'	45,159 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 150,529 cf Overall x 30.0% Voids
#3	910.17'	52,000 cf	260.00'W x 400.00'L x 0.50'H Prismatoid
		133,663 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
905.82	600	0	0
906.00	5,700	567	567
907.50	49,000	41,025	41,592
909.00	96,250	108,938	150,529

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.48'	18.0" Round Culvert X 2.00 L= 227.0' Ke= 0.500 Inlet / Outlet Invert= 905.48' / 903.21' S= 0.0100 ' /' Cc= 0.900 n= 0.020, Flow Area= 1.77 sf
#2	Primary	904.21'	18.0" Round Culvert L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 904.21' / 903.31' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

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Primary OutFlow Max=3.92 cfs @ 12.55 hrs HW=908.44' TW=908.20' (Dynamic Tailwater)↑ **2=Culvert** (Outlet Controls 3.92 cfs @ 2.22 fps)↑ **1=Culvert** (Passes 3.92 cfs of 4.13 cfs potential flow)**Summary for Pond 3P: ETT**

Inflow Area = 1.220 ac, 87.70% Impervious, Inflow Depth = 6.63" for 100-yr event
 Inflow = 9.51 cfs @ 12.08 hrs, Volume= 0.674 af
 Outflow = 6.49 cfs @ 12.19 hrs, Volume= 0.686 af, Atten= 32%, Lag= 6.6 min
 Discarded = 0.01 cfs @ 0.00 hrs, Volume= 0.026 af
 Primary = 0.69 cfs @ 12.19 hrs, Volume= 0.363 af
 Secondary = 5.79 cfs @ 12.19 hrs, Volume= 0.297 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 910.50' Surf.Area= 3,600 sf Storage= 540 cf

Peak Elev= 914.92' @ 12.19 hrs Surf.Area= 3,600 sf Storage= 5,311 cf (4,771 cf above start)

Plug-Flow detention time= 94.2 min calculated for 0.674 af (100% of inflow)

Center-of-Mass det. time= 85.0 min (854.6 - 769.7)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	5,400 cf	8.00'W x 450.00'L x 5.00'H Prismatoid 18,000 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		25,400 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

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Discarded OutFlow Max=0.01 cfs @ 0.00 hrs HW=910.50' (Free Discharge)↑**3=Exfiltration** (Exfiltration Controls 0.01 cfs)**Primary OutFlow** Max=0.69 cfs @ 12.19 hrs HW=914.91' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.69 cfs @ 3.53 fps)**Secondary OutFlow** Max=5.79 cfs @ 12.19 hrs HW=914.91' TW=0.00' (Dynamic Tailwater)↑**2=Culvert** (Barrel Controls 5.79 cfs @ 7.37 fps)↑**4=Sharp-Crested Rectangular Weir** (Passes 5.79 cfs of 45.99 cfs potential flow)**Summary for Pond 4P: NWTT**

Inflow Area = 2.110 ac, 95.73% Impervious, Inflow Depth = 6.93" for 100-yr event
 Inflow = 9.60 cfs @ 12.11 hrs, Volume= 1.218 af
 Outflow = 6.89 cfs @ 12.30 hrs, Volume= 1.218 af, Atten= 28%, Lag= 11.3 min
 Discarded = 0.01 cfs @ 12.30 hrs, Volume= 0.011 af
 Primary = 0.74 cfs @ 12.30 hrs, Volume= 0.553 af
 Secondary = 6.15 cfs @ 12.30 hrs, Volume= 0.654 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 915.41' @ 12.30 hrs Surf.Area= 6,363 sf Storage= 3,638 cf

Plug-Flow detention time= 28.5 min calculated for 1.218 af (100% of inflow)

Center-of-Mass det. time= 28.8 min (822.0 - 793.2)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	2,220 cf	8.00'W x 185.00'L x 5.00'H Prismatic 7,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,220 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' / ' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	911.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 911.00' / 910.00' S= 0.0100 ' / ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

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Discarded OutFlow Max=0.01 cfs @ 12.30 hrs HW=915.41' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.74 cfs @ 12.30 hrs HW=915.41' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 0.74 cfs @ 3.75 fps)

Secondary OutFlow Max=6.15 cfs @ 12.30 hrs HW=915.41' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Barrel Controls 6.15 cfs @ 7.83 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Passes 6.15 cfs of 68.50 cfs potential flow)

Summary for Pond 5P: EP-sand filter

Inflow Area = 2.070 ac, 84.54% Impervious, Inflow Depth = 6.51" for 100-yr event
Inflow = 15.98 cfs @ 12.09 hrs, Volume= 1.123 af
Outflow = 7.27 cfs @ 12.32 hrs, Volume= 1.122 af, Atten= 55%, Lag= 14.4 min
Primary = 7.27 cfs @ 12.32 hrs, Volume= 1.122 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 916.25' @ 12.32 hrs Surf.Area= 12,240 sf Storage= 19,890 cf

Plug-Flow detention time= 121.4 min calculated for 1.122 af (100% of inflow)

Center-of-Mass det. time= 121.6 min (895.0 - 773.4)

Volume	Invert	Avail.Storage	Storage Description
#1	905.00'	4,590 cf	72.00'W x 85.00'L x 2.50'H Prismatoid 15,300 cf Overall x 30.0% Voids
#2	907.50'	15,300 cf	72.00'W x 85.00'L x 2.50'H Prismatoid
		19,890 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 2	905.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 905.00' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	905.00'	12.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 905.00' / 904.75' S= 0.0050 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	907.75'	9.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=6.87 cfs @ 12.32 hrs HW=915.47' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 6.87 cfs of 11.22 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 1.11 cfs @ 5.63 fps)

↑ **3=Orifice/Grate** (Orifice Controls 5.76 cfs @ 13.05 fps)

Summary for Pond 6P: (new Pond)

Inflow Area = 0.660 ac, 48.48% Impervious, Inflow Depth = 5.01" for 100-yr event
Inflow = 4.14 cfs @ 12.09 hrs, Volume= 0.275 af
Outflow = 1.35 cfs @ 12.46 hrs, Volume= 0.303 af, Atten= 67%, Lag= 22.4 min
Primary = 1.35 cfs @ 12.46 hrs, Volume= 0.303 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 906.25' Surf.Area= 0.047 ac Storage= 0.027 af

Peak Elev= 908.54' @ 12.46 hrs Surf.Area= 0.047 ac Storage= 0.082 af (0.055 af above start)

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	903.00'	0.021 af	7.90'W x 130.00'L x 3.00'H Prismaoid 0.071 af Overall x 30.0% Voids
#2	906.00'	0.119 af	8.00'W x 130.00'L x 5.00'H Prismaoid
		0.141 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Device 3	906.25'	4.0" Round Culvert X 2.00 L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 906.25' / 905.75' S= 0.0050 ' / Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#2	Device 3	903.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 903.00' S= 0.0000 ' / Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#3	Primary	903.00'	8.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 903.00' / 902.00' S= 0.0100 ' / Cc= 0.900 n= 0.013, Flow Area= 0.35 sf

Primary OutFlow Max=1.35 cfs @ 12.46 hrs HW=908.54' (Free Discharge)

3=Culvert (Passes 1.35 cfs of 2.59 cfs potential flow)

1=Culvert (Barrel Controls 0.57 cfs @ 3.24 fps)

2=Culvert (Barrel Controls 0.79 cfs @ 4.01 fps)

Summary for Pond 7P: SETT

Inflow Area = 1.570 ac, 79.62% Impervious, Inflow Depth = 6.63" for 100-yr event
Inflow = 11.77 cfs @ 12.10 hrs, Volume= 0.867 af
Outflow = 11.37 cfs @ 12.13 hrs, Volume= 0.994 af, Atten= 3%, Lag= 1.7 min
Secondary = 11.37 cfs @ 12.13 hrs, Volume= 0.994 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 913.00' Surf.Area= 6,200 sf Storage= 5,580 cf

Peak Elev= 913.85' @ 12.13 hrs Surf.Area= 6,200 sf Storage= 7,170 cf (1,590 cf above start)

Plug-Flow detention time= 123.9 min calculated for 0.866 af (100% of inflow)

Center-of-Mass det. time= 30.8 min (801.4 - 770.6)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	9,300 cf	20.00'W x 310.00'L x 5.00'H Prismaoid 31,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,300 cf	Total Available Storage

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	21.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.013, Flow Area= 2.41 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height

Secondary OutFlow Max=11.32 cfs @ 12.13 hrs HW=913.85' (Free Discharge)

2=Culvert (Passes 11.32 cfs of 16.19 cfs potential flow)

1=Culvert (Barrel Controls 0.43 cfs @ 2.20 fps)

3=Sharp-Crested Rectangular Weir (Weir Controls 10.88 cfs @ 3.33 fps)

Summary for Pond 9P: SWTT

Inflow Area = 0.840 ac, 80.95% Impervious, Inflow Depth = 6.63" for 100-yr event
 Inflow = 6.30 cfs @ 12.10 hrs, Volume= 0.464 af
 Outflow = 5.67 cfs @ 12.15 hrs, Volume= 0.464 af, Atten= 10%, Lag= 3.0 min
 Secondary = 5.67 cfs @ 12.15 hrs, Volume= 0.464 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 914.25' @ 12.15 hrs Surf.Area= 1,000 sf Storage= 1,274 cf

Plug-Flow detention time= 20.0 min calculated for 0.464 af (100% of inflow)

Center-of-Mass det. time= 20.5 min (791.1 - 770.6)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	1,500 cf	8.00'W x 125.00'L x 5.00'H Prismatic 5,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		16,500 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.50' S= 0.0050 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

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#3 Device 2 913.00' **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
1.0' Crest Height

Secondary OutFlow Max=5.66 cfs @ 12.15 hrs HW=914.24' (Free Discharge)

2=Culvert (Barrel Controls 5.66 cfs @ 7.20 fps)

1=Culvert (Passes < 0.46 cfs potential flow)

3=Sharp-Crested Rectangular Weir (Passes < 19.43 cfs potential flow)

Summary for Pond 10P: WRTT

Inflow Area = 0.580 ac, 100.00% Impervious, Inflow Depth = 7.22" for 100-yr event
 Inflow = 4.66 cfs @ 12.08 hrs, Volume= 0.349 af
 Outflow = 1.79 cfs @ 13.92 hrs, Volume= 0.349 af, Atten= 62%, Lag= 110.1 min
 Discarded = 0.02 cfs @ 12.77 hrs, Volume= 0.038 af
 Primary = 1.77 cfs @ 13.92 hrs, Volume= 0.311 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 915.35' @ 12.77 hrs Surf.Area= 17,954 sf Storage= 10,800 cf

Plug-Flow detention time= 376.6 min calculated for 0.349 af (100% of inflow)

Center-of-Mass det. time= 377.0 min (1,121.8 - 744.9)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	6,750 cf	20.00'W x 225.00'L x 5.00'H Prismatoid 22,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		21,750 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 '/' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	9.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

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Discarded OutFlow Max=0.02 cfs @ 12.77 hrs HW=915.35' (Free Discharge)↑ **5=Exfiltration** (Exfiltration Controls 0.02 cfs)**Primary OutFlow** Max=1.77 cfs @ 13.92 hrs HW=915.01' TW=914.45' (Dynamic Tailwater)↑ **2=Culvert** (Passes 1.77 cfs of 2.20 cfs potential flow)↑ **1=Culvert** (Outlet Controls 0.18 cfs @ 0.90 fps)↑ **3=Sharp-Crested Rectangular Weir** (Passes 1.60 cfs of 29.08 cfs potential flow)↑ **4=Orifice/Grate** (Orifice Controls 1.60 cfs @ 3.61 fps)**Summary for Pond 11P: IT**

Inflow Area = 0.760 ac, 100.00% Impervious, Inflow Depth = 7.22" for 100-yr event
 Inflow = 6.11 cfs @ 12.08 hrs, Volume= 0.457 af
 Outflow = 3.48 cfs @ 12.23 hrs, Volume= 0.468 af, Atten= 43%, Lag= 9.0 min
 Primary = 3.48 cfs @ 12.23 hrs, Volume= 0.468 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 919.80' Surf.Area= 0.073 ac Storage= 0.062 af

Peak Elev= 921.62' @ 12.23 hrs Surf.Area= 0.075 ac Storage= 0.131 af (0.069 af above start)

Plug-Flow detention time= 132.0 min calculated for 0.406 af (89% of inflow)

Center-of-Mass det. time= 15.3 min (760.2 - 744.9)

Volume	Invert	Avail.Storage	Storage Description
#1	920.01'	0.005 af	15.0" Round Pipe Storage L= 168.0' S= 0.0150 '/'
#2	924.00'	0.001 af	3.00'D x 3.00'H Vertical Cone/Cylinder x 2
#3	916.00'	0.033 af	8.00'W x 200.00'L x 3.00'H Prismatic 0.110 af Overall x 30.0% Voids
#4	919.00'	0.184 af	8.00'W x 200.00'L x 5.00'H Prismatic
		0.222 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	919.50'	11.0" Round Culvert L= 50.0' Ke= 0.500 Inlet / Outlet Invert= 919.50' / 919.30' S= 0.0040 '/ Cc= 0.900 n= 0.013, Flow Area= 0.66 sf

Primary OutFlow Max=3.48 cfs @ 12.23 hrs HW=921.62' TW=0.00' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 3.48 cfs @ 5.27 fps)**Summary for Pond 12P: ERTT**

Inflow Area = 1.150 ac, 100.00% Impervious, Inflow Depth = 7.22" for 100-yr event
 Inflow = 9.25 cfs @ 12.08 hrs, Volume= 0.692 af
 Outflow = 2.32 cfs @ 12.55 hrs, Volume= 0.853 af, Atten= 75%, Lag= 28.2 min
 Discarded = 0.03 cfs @ 12.55 hrs, Volume= 0.065 af
 Primary = 2.29 cfs @ 12.55 hrs, Volume= 0.789 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

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Starting Elev= 913.00' Surf.Area= 7,800 sf Storage= 7,020 cf

Peak Elev= 915.25' @ 12.55 hrs Surf.Area= 20,339 sf Storage= 14,562 cf (7,542 cf above start)

Plug-Flow detention time= 287.1 min calculated for 0.692 af (100% of inflow)

Center-of-Mass det. time= 138.1 min (883.0 - 744.9)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	11,700 cf	20.00'W x 390.00'L x 5.00'H Prismaoid 39,000 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		26,700 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.50'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.50' / 910.50' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	7.0" Vert. Orifice/Grate C= 0.600
#5	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.03 cfs @ 12.55 hrs HW=915.25' (Free Discharge)↳ **5=Exfiltration** (Exfiltration Controls 0.03 cfs)**Primary OutFlow** Max=2.29 cfs @ 12.55 hrs HW=915.25' TW=0.00' (Dynamic Tailwater)↳ **2=Culvert** (Passes 2.29 cfs of 6.71 cfs potential flow)↳ **1=Culvert** (Barrel Controls 0.49 cfs @ 2.48 fps)↳ **3=Sharp-Crested Rectangular Weir** (Passes 1.80 cfs of 50.10 cfs potential flow)↳ **4=Orifice/Grate** (Orifice Controls 1.80 cfs @ 6.74 fps)**Summary for Pond 20P: (new Pond)**

Inflow Area = 2.950 ac, 24.07% Impervious, Inflow Depth > 12.50" for 100-yr event
 Inflow = 3.92 cfs @ 12.55 hrs, Volume= 3.073 af
 Outflow = 3.92 cfs @ 12.57 hrs, Volume= 3.058 af, Atten= 0%, Lag= 1.4 min
 Primary = 3.92 cfs @ 12.57 hrs, Volume= 3.058 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 907.03' Surf.Area= 0.116 ac Storage= 0.521 af

Peak Elev= 908.20' @ 12.57 hrs Surf.Area= 0.116 ac Storage= 0.574 af (0.053 af above start)

Plug-Flow detention time= 1,411.4 min calculated for 2.537 af (83% of inflow)

Center-of-Mass det. time= 16.5 min (3,432.1 - 3,415.6)

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Volume	Invert	Avail.Storage	Storage Description
#1A	899.75'	0.000 af	43.00'W x 118.00'L x 9.00'H Field A 1.048 af Overall - 0.556 af Embedded = 0.493 af x 0.0% Voids
#2A	900.25'	0.556 af	CMP_Round 96 x 20 Inside #1 Effective Size= 96.0"W x 96.0"H => 50.20 sf x 20.00'L = 1,004.1 cf Overall Size= 96.0"W x 96.0"H x 20.00'L 4 Rows of 5 Chambers 41.00' Header x 50.20 sf x 2 = 4,116.8 cf Inside
#3	902.55'	0.012 af	30.0" Round Pipe Storage L= 107.0' S= 0.0065 '/'
#4	903.25'	0.006 af	18.0" Round Pipe Storage L= 151.0' S= 0.0065 '/'
#5	904.10'	0.001 af	18.0" Round Pipe Storage L= 15.0' S= 0.0050 '/'
		0.574 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	907.03'	18.0" Round Culvert L= 145.0' Ke= 0.500 Inlet / Outlet Invert= 907.03' / 906.52' S= 0.0035 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.92 cfs @ 12.57 hrs HW=908.20' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 3.92 cfs @ 3.66 fps)

Summary for Pond 40P: WTT

Inflow Area = 0.540 ac, 92.59% Impervious, Inflow Depth = 6.98" for 100-yr event
Inflow = 4.14 cfs @ 12.10 hrs, Volume= 0.314 af
Outflow = 4.13 cfs @ 12.11 hrs, Volume= 0.314 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.00 cfs @ 2.50 hrs, Volume= 0.009 af
Primary = 4.13 cfs @ 12.11 hrs, Volume= 0.305 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 919.40' @ 12.11 hrs Surf.Area= 1,200 sf Storage= 1,429 cf

Plug-Flow detention time= 64.9 min calculated for 0.314 af (100% of inflow)
Center-of-Mass det. time= 65.2 min (822.6 - 757.4)

Volume	Invert	Avail.Storage	Storage Description
#1	916.00'	2,100 cf	8.00'W x 150.00'L x 5.00'H Prismatic 6,000 cf Overall x 35.0% Voids
#2	921.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		22,100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
921.00	2,000	0	0
922.00	9,000	5,500	5,500
923.00	20,000	14,500	20,000

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Device	Routing	Invert	Outlet Devices
#1	Device 2	916.50'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.50' / 916.50' S= 0.0000 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	916.30'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 916.30' / 915.80' S= 0.0050 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	916.00'	0.060 in/hr Exfiltration over Surface area
#4	Device 2	919.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.00 cfs @ 2.50 hrs HW=916.07' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=4.11 cfs @ 12.11 hrs HW=919.40' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 4.11 cfs of 4.72 cfs potential flow)

↑ **1=Culvert** (Barrel Controls 0.54 cfs @ 2.76 fps)

↑ **4=Sharp-Crested Rectangular Weir** (Weir Controls 3.56 cfs @ 2.27 fps)

Summary for Pond 44P: NTT

Inflow Area = 1.260 ac, 98.41% Impervious, Inflow Depth = 7.10" for 100-yr event
 Inflow = 10.10 cfs @ 12.08 hrs, Volume= 0.746 af
 Outflow = 5.10 cfs @ 12.80 hrs, Volume= 0.746 af, Atten= 49%, Lag= 42.8 min
 Discarded = 0.01 cfs @ 12.35 hrs, Volume= 0.022 af
 Primary = 5.09 cfs @ 12.80 hrs, Volume= 0.724 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 915.83' @ 12.35 hrs Surf.Area= 10,659 sf Storage= 8,356 cf

Plug-Flow detention time= 99.7 min calculated for 0.746 af (100% of inflow)

Center-of-Mass det. time= 100.1 min (851.1 - 751.0)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	4,320 cf	8.00'W x 360.00'L x 5.00'H Prismatic 14,400 cf Overall x 30.0% Voids
#2	915.00'	20,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		24,320 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	9,000	5,500	5,500
917.00	20,000	14,500	20,000

Device	Routing	Invert	Outlet Devices
#1	Device 4	910.40'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.40' / 909.25' S= 0.0115 ' /' Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Discarded	910.00'	0.060 in/hr Exfiltration over Surface area
#3	Device 4	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

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#4 Primary 910.00' 0.5' Crest Height
15.0" Round Culvert L= 60.0' Ke= 0.500
 Inlet / Outlet Invert= 910.00' / 909.40' S= 0.0100 '/ Cc= 0.900
 n= 0.013, Flow Area= 1.23 sf

Discarded OutFlow Max=0.01 cfs @ 12.35 hrs HW=915.83' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=5.10 cfs @ 12.80 hrs HW=915.32' TW=914.54' (Dynamic Tailwater)

↑ **4=Culvert** (Outlet Controls 5.10 cfs @ 4.16 fps)

↑ **1=Culvert** (Passes < 0.31 cfs potential flow)

↑ **3=Sharp-Crested Rectangular Weir** (Passes < 47.36 cfs potential flow)

Summary for Pond 55P: (new Pond)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	3,218 cf	6.50'W x 330.00'L x 5.00'H Prismatic 10,725 cf Overall x 30.0% Voids
#2	915.00'	5,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,218 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	2,000	0	0
916.00	8,000	5,000	5,000

Device	Routing	Invert	Outlet Devices
#1	Primary	910.00'	6.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Secondary	913.00'	24.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 913.00' / 912.00' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

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

↑ **1=Culvert** (Controls 0.00 cfs)

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

↑ **2=Culvert** (Controls 0.00 cfs)

Summary for Pond 100P: WRTT

Inflow Area = 1.920 ac, 100.00% Impervious, Inflow Depth = 6.98" for 100-yr event
 Inflow = 10.78 cfs @ 12.08 hrs, Volume= 1.117 af
 Outflow = 3.23 cfs @ 12.45 hrs, Volume= 1.116 af, Atten= 70%, Lag= 22.0 min
 Primary = 3.23 cfs @ 12.45 hrs, Volume= 1.116 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

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Peak Elev= 915.40' @ 12.45 hrs Surf.Area= 19,480 sf Storage= 13,022 cf

Plug-Flow detention time= 119.4 min calculated for 1.116 af (100% of inflow)

Center-of-Mass det. time= 119.1 min (938.0 - 818.9)

Volume	Invert	Avail.Storage	Storage Description
#1	910.00'	8,250 cf	20.00'W x 275.00'L x 5.00'H Prismatic 27,500 cf Overall x 30.0% Voids
#2	915.00'	15,000 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		23,250 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
915.00	10,000	0	0
916.00	20,000	15,000	15,000

Device	Routing	Invert	Outlet Devices
#1	Device 2	910.00'	6.0" Round Culvert L= 230.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 910.00' S= 0.0000 '/ Cc= 0.900 n= 0.020, Flow Area= 0.20 sf
#2	Primary	910.00'	12.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 910.00' / 909.00' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	913.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 3	913.00'	8.5" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=3.23 cfs @ 12.45 hrs HW=915.40' TW=0.00' (Dynamic Tailwater)

2=Culvert (Passes 3.23 cfs of 6.80 cfs potential flow)

1=Culvert (Barrel Controls 0.52 cfs @ 2.66 fps)

3=Sharp-Crested Rectangular Weir (Passes 2.71 cfs of 55.28 cfs potential flow)

4=Orifice/Grate (Orifice Controls 2.71 cfs @ 6.88 fps)

Summary for Pond 400P: (new Pond)

Inflow Area = 2.100 ac, 90.48% Impervious, Inflow Depth = 6.75" for 100-yr event

Inflow = 16.51 cfs @ 12.08 hrs, Volume= 1.180 af

Outflow = 3.46 cfs @ 12.61 hrs, Volume= 1.179 af, Atten= 79%, Lag= 31.3 min

Primary = 3.46 cfs @ 12.61 hrs, Volume= 1.179 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-140.00 hrs, dt= 0.02 hrs / 3

Starting Elev= 917.00' Surf.Area= 10,934 sf Storage= 13,999 cf

Peak Elev= 920.28' @ 12.61 hrs Surf.Area= 10,934 sf Storage= 35,115 cf (21,115 cf above start)

Plug-Flow detention time= 268.2 min calculated for 0.858 af (73% of inflow)

Center-of-Mass det. time= 105.8 min (871.4 - 765.6)

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Volume	Invert	Avail.Storage	Storage Description
#1A	914.00'	0 cf	71.00'W x 154.00'L x 7.00'H Field A 76,538 cf Overall - 35,511 cf Embedded = 41,027 cf x 0.0% Voids
#2A	914.50'	35,511 cf	CMP_Round 72 x 56 Inside #1 Effective Size= 72.0"W x 72.0"H => 28.23 sf x 20.00'L = 564.6 cf Overall Size= 72.0"W x 72.0"H x 20.00'L 8 Rows of 7 Chambers 69.00' Header x 28.23 sf x 2 = 3,895.5 cf Inside
		35,511 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	917.00'	10.0" Round Culvert L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 917.00' / 916.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.55 sf

Primary OutFlow Max=3.46 cfs @ 12.61 hrs HW=920.28' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 3.46 cfs @ 6.35 fps)