

Name... DP 4

File... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 4.PPW

Storm... TypeIII 24hr Tag: 50 YR

SUMMARY FOR HYDROGRAPH ADDITION  
at Node: DP 4

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP4            JUNCTION              JUNCTION      50 YR
=====

```

INFLOWS TO: DP 4

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time    Peak Flow
              ac-ft         hrs          ac-ft       hrs          cfs
-----
              JUNCTION      50 YR        1.234       12.3000     8.92
-----

```

TOTAL FLOW INTO: DP 4

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time    Peak Flow
              ac-ft         hrs          ac-ft       hrs          cfs
-----
              DP 4          50 YR        1.234       12.3000     8.92
-----

```

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 4

HYG Tag = 50 YR

-----  
 Peak Discharge = 8.92 cfs  
 Time to Peak = 12.3000 hrs  
 HYG Volume = 1.234 ac-ft  
 -----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs  
 Time on left represents time for first value in each row.

Time hrs					
11.2000	.00	.00	.02	.07	.15
11.7000	.32	.67	1.32	2.65	5.26
12.2000	8.06	8.92	8.16	6.96	5.70
12.7000	4.60	3.82	3.33	2.99	2.72
13.2000	2.51	2.35	2.24	2.15	2.07
13.7000	2.00	1.93	1.86	1.79	1.73
14.2000	1.66	1.62	1.58	1.54	1.51
14.7000	1.47	1.44	1.41	1.38	1.35
15.2000	1.32	1.29	1.26	1.23	1.19
15.7000	1.16	1.13	1.09	1.06	1.02
16.2000	.99	.96	.94	.92	.90
16.7000	.88	.85	.83	.81	.79
17.2000	.77	.74	.71	.69	.66
17.7000	.64	.61	.58	.56	.53
18.2000	.51	.49	.48	.47	.45
18.7000	.44	.43	.43	.42	.41
19.2000	.41	.40	.39	.39	.38
19.7000	.38	.38	.37	.37	.37
20.2000	.36	.36	.36	.35	.35
20.7000	.35	.34	.34	.34	.34
21.2000	.33	.33	.33	.32	.32
21.7000	.32	.32	.31	.31	.31
22.2000	.30	.30	.30	.29	.29
22.7000	.29	.29	.28	.28	.28
23.2000	.27	.27	.27	.27	.26
23.7000	.26	.26	.25	.25	.23
24.2000	.16	.08	.04	.02	.01
24.7000	.00	.00	.00		

SUMMARY FOR HYDROGRAPH ADDITION  
at Node: DP 4

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP4            JUNCTION                               JUNCTION      100 YR
=====

```

INFLOWS TO: DP 4

```

-----
HYG file          HYG ID          HYG tag        Volume      Peak Time     Peak Flow
                   ac-ft          hrs            cfs
-----
                JUNCTION        100 YR         1.638       12.3000      11.97
-----

```

TOTAL FLOW INTO: DP 4

```

-----
HYG file          HYG ID          HYG tag        Volume      Peak Time     Peak Flow
                   ac-ft          hrs            cfs
-----
                DP 4            100 YR         1.638       12.3000      11.97
-----

```

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 4

HYG Tag = 100 YR

Peak Discharge = 11.97 cfs

Time to Peak = 12.3000 hrs

HYG Volume = 1.638 ac-ft

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time hrs	Time on left represents time for first value in each row.				
10.8000	.00	.00	.02	.05	.09
11.3000	.15	.23	.32	.46	.73
11.8000	1.28	2.22	4.07	7.55	11.18
12.3000	11.97	10.78	9.37	7.89	6.48
12.8000	5.42	4.71	4.19	3.78	3.45
13.3000	3.20	3.01	2.86	2.73	2.61
13.8000	2.50	2.39	2.29	2.20	2.11
14.3000	2.03	1.97	1.91	1.86	1.81
14.8000	1.76	1.72	1.68	1.63	1.59
15.3000	1.55	1.51	1.47	1.43	1.40
15.8000	1.36	1.32	1.27	1.24	1.20
16.3000	1.17	1.14	1.12	1.09	1.07
16.8000	1.05	1.02	1.00	.98	.95
17.3000	.93	.91	.88	.86	.83
17.8000	.81	.78	.75	.72	.69
18.3000	.67	.65	.63	.61	.59
18.8000	.58	.56	.55	.54	.53
19.3000	.52	.50	.49	.49	.48
19.8000	.47	.46	.46	.45	.44
20.3000	.44	.44	.43	.43	.42
20.8000	.42	.42	.41	.41	.41
21.3000	.40	.40	.40	.39	.39
21.8000	.39	.38	.38	.37	.37
22.3000	.37	.36	.36	.36	.35
22.8000	.35	.35	.34	.34	.33
23.3000	.33	.33	.32	.32	.32
23.8000	.31	.31	.30	.27	.19
24.3000	.10	.05	.02	.01	.01
24.8000	.00	.00			

Type.... vol: Elev-Area  
Name.... POND 1

Page 7.01

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 4.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	$A1+A2+\text{sqr}(A1*A2)$ (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1432.50	-----	.1131	.0000	.000	.000
1435.20	-----	.1131	.3393	.305	.305

POND VOLUME EQUATIONS

\* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment  
Area1, Area2 = Areas computed for EL1, EL2, respectively  
Volume = Incremental volume between EL1 and EL2

Type.... Outlet Input Data  
Name.... Outlet 1

Page 6.01

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 4.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 1432.50 ft  
Increment = .10 ft  
Max. Elev.= 1435.20 ft

\*\*\*\*\*  
OUTLET CONNECTIVITY  
\*\*\*\*\*

---> Forward Flow Only (UpStream to DnStream)  
<--- Reverse Flow Only (DnStream to UpStream)  
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Orifice-Circular	2	--->	TW	1434.000	1435.200
Orifice-Circular	1	--->	TW	1433.000	1435.200
TW SETUP, DS Channel					

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 4.PPW

OUTLET STRUCTURE INPUT DATA

Structure ID = 2  
Structure Type = Orifice-Circular  
-----  
# of Openings = 1  
Invert Elev. = 1434.00 ft  
Diameter = .6670 ft  
Orifice Coeff. = .600

Structure ID = 1  
Structure Type = Orifice-Circular  
-----  
# of Openings = 1  
Invert Elev. = 1433.00 ft  
Diameter = .3330 ft  
Orifice Coeff. = .600

Structure ID = TW  
Structure Type = TW SETUP, DS Channel  
-----

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...  
Maximum Iterations= 30  
Min. TW tolerance = .01 ft  
Max. TW tolerance = .01 ft  
Min. HW tolerance = .01 ft  
Max. HW tolerance = .01 ft  
Min. Q tolerance = .10 cfs  
Max. Q tolerance = .10 cfs

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 4.PPW

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)  
 DNstream ID = TW (Pond Outfall)

WS Elev, Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
1432.50	.00	Free Outfall		HW & TW below invert
1432.60	.00	Free Outfall		HW & TW below invert
1432.70	.00	Free Outfall		HW & TW below invert
1432.80	.00	Free Outfall		HW & TW below invert
1432.90	.00	Free Outfall		HW & TW below invert
1433.00	.00	Free Outfall		HW & TW below invert
1433.10	.00	Free Outfall		HW & TW below invert
1433.20	.00	Free Outfall		HW & TW below invert
1433.30	.00	Free Outfall		HW & TW below invert
1433.40	.00	Free Outfall		HW & TW below invert
1433.50	.00	Free Outfall		HW & TW below invert
1433.60	.00	Free Outfall		HW & TW below invert
1433.70	.00	Free Outfall		HW & TW below invert
1433.80	.00	Free Outfall		HW & TW below invert
1433.90	.00	Free Outfall		HW & TW below invert
1434.00	.00	Free Outfall		Upstream HW & DNstream TW < Inv.El
1434.10	.03	Free Outfall		CRIT.DEPTH CONTROL Vh= .027ft Dcr= .073ft CRIT.DEPTH
1434.20	.11	Free Outfall		CRIT.DEPTH CONTROL Vh= .052ft Dcr= .148ft CRIT.DEPTH
1434.30	.23	Free Outfall		CRIT.DEPTH CONTROL Vh= .081ft Dcr= .219ft CRIT.DEPTH
1434.40	.39	Free Outfall		CRIT.DEPTH CONTROL Vh= .110ft Dcr= .289ft CRIT.DEPTH
1434.50	.58	Free Outfall		CRIT.DEPTH CONTROL Vh= .143ft Dcr= .357ft CRIT.DEPTH
1434.60	.79	Free Outfall		CRIT.DEPTH CONTROL Vh= .180ft Dcr= .421ft CRIT.DEPTH
1434.70	1.02	Free Outfall		H =.37
1434.80	1.15	Free Outfall		H =.47
1434.90	1.27	Free Outfall		H =.57
1435.00	1.37	Free Outfall		H =.67
1435.10	1.47	Free Outfall		H =.77
1435.20	1.57	Free Outfall		H =.87



Type... Pond Routing Summary  
Name... POND 1 OUT Tag: 100 YR  
File... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 4.PPW  
Storm... TypeIII 24hr Tag: 100 YR

Page 9.08  
Event: 100 yr

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
Inflow HYG file = NONE STORED - POND 1 IN 100 YR  
Outflow HYG file = NONE STORED - POND 1 OUT 100 YR

Pond Node Data = POND 1  
Pond Volume Data = POND 1  
Pond Outlet Data = Outlet 1

Infiltration = 3.0000 in/hr

INITIAL CONDITIONS

-----  
Starting WS Elev = 1432.50 ft  
Starting Volume = .000 ac-ft  
Starting Outflow = .00 cfs  
Starting Infiltr. = .00 cfs  
Starting Total Qout = .00 cfs  
Time Increment = .1000 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====  
Peak Inflow = 5.67 cfs at 12.3000 hrs  
Peak Outflow = 1.37 cfs at 12.8000 hrs  
Peak Infiltration = .34 cfs at 11.6000 hrs  
-----  
Peak Elevation = 1434.63 ft  
Peak Storage = .241 ac-ft  
=====

MASS BALANCE (ac-ft)

-----  
+ Initial Vol = .000  
+ HYG Vol IN = .639  
- Infiltration = .371  
- HYG Vol OUT = .268  
- Retained Vol = .000  
-----  
Unrouted Vol = .000 ac-ft (.000% of Inflow Volume)

## Index of Starting Page Numbers for ID Names

## ----- D -----

DP 4 2 YR... 6.01, 6.03, 6.05, 6.07,  
6.09

## ----- L -----

Litchfield Co.... 2.01, 2.02

## ----- O -----

Outlet 1... 8.01, 8.03, 8.05

## ----- P -----

POND 1... 7.01, 9.01, 9.02  
POND 1            OUT 2 YR... 9.04, 9.05,  
9.06, 9.07, 9.08  
PRDA 4D... 3.01, 4.01, 5.03, 5.04,  
5.05, 5.06, 5.07  
PRDA 4ND... 3.04, 4.02, 5.08, 5.09,  
5.10, 5.11, 5.12

## ----- W -----

Watershed... 1.01

## **Existing Flows – DL5**

Table of Contents

\*\*\*\*\* MASTER SUMMARY \*\*\*\*\*

Watershed..... Master Network Summary ..... 1.01

\*\*\*\*\* DESIGN STORMS SUMMARY \*\*\*\*\*

Litchfield Co... Design Storms ..... 2.01

Litchfield Co... 2 YR  
Design Storms ..... 2.02

\*\*\*\*\* TC CALCULATIONS \*\*\*\*\*

EXDA 5..... Tc Calcs ..... 3.01

\*\*\*\*\* CN CALCULATIONS \*\*\*\*\*

EXDA 5..... Runoff CN-Area ..... 4.01

\*\*\*\*\* RUNOFF HYDROGRAPHS \*\*\*\*\*

Unit Hyd. Equations ..... 5.01

EXDA 5..... 2 YR  
Unit Hyd. Summary ..... 5.03

EXDA 5..... 10 YR  
Unit Hyd. Summary ..... 5.04

Table of Contents (continued)

EXDA 5..... 25 YR  
Unit Hyd. Summary ..... 5.05

EXDA 5..... 50 YR  
Unit Hyd. Summary ..... 5.06

EXDA 5..... 100 YR  
Unit Hyd. Summary ..... 5.07

\*\*\*\*\* HYG ADDITION \*\*\*\*\*

DP 5..... 2 YR  
Node: Addition Summary ..... 6.01

DP 5..... 10 YR  
Node: Addition Summary ..... 6.04

DP 5..... 25 YR  
Node: Addition Summary ..... 6.07

DP 5..... 50 YR  
Node: Addition Summary ..... 6.10

DP 5..... 100 YR  
Node: Addition Summary ..... 6.13

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Litchfield Co.

Return Event	Total Depth in	Rainfall Type	RNF ID
2 YR	3.2000	Synthetic Curve	TypeIII 24hr
10 YR	4.7000	Synthetic Curve	TypeIII 24hr
25 YR	5.5000	Synthetic Curve	TypeIII 24hr
50 YR	6.2000	Synthetic Curve	TypeIII 24hr
100 YR	7.0000	Synthetic Curve	TypeIII 24hr

MASTER NETWORK SUMMARY  
SCS Unit Hydrograph Method

(\*Node=Outfall; +Node=Diversion;)  
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*DP 5	JCT	2	.140		12.7000	.45		
*DP 5	JCT	10	.467		12.6000	2.51		
*DP 5	JCT	25	.693		12.5500	4.11		
*DP 5	JCT	50	.914		12.5500	5.67		
*DP 5	JCT	100	1.188		12.5000	7.64		
EXDA 5	AREA	2	.140		12.7000	.45		
EXDA 5	AREA	10	.467		12.6000	2.51		
EXDA 5	AREA	25	.693		12.5500	4.11		
EXDA 5	AREA	50	.914		12.5500	5.67		
EXDA 5	AREA	100	1.188		12.5000	7.64		

Type.... Design Storms  
Name.... Litchfield Co.

File.... C:\Program Files\Haestad\PPKW\PPW\  
Title... Project Date: 4/16/2009  
Project Engineer: Curtis Jones  
Project Title: Watershed  
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File, ID = Litchfield Co.

Storm Tag Name = 2 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 2 yr  
Total Rainfall Depth= 3.2000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 10 yr  
Total Rainfall Depth= 4.7000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 25 yr  
Total Rainfall Depth= 5.5000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 50 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 50 yr  
Total Rainfall Depth= 6.2000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 100 yr  
Total Rainfall Depth= 7.0000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Type... Design Storms  
Name... Litchfield Co.  
File... C:\Program Files\Haestad\PPKW\PPW\  
Storm... TypeIII 24hr Tag: 2 YR

Page 2.02  
Event: 2 yr

DESIGN STORMS SUMMARY

Design Storm File, ID = Litchfield Co.

Storm Tag Name = 2 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 2 yr  
Total Rainfall Depth= 3.2000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 10 yr  
Total Rainfall Depth= 4.7000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 25 yr  
Total Rainfall Depth= 5.5000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 50 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 50 yr  
Total Rainfall Depth= 6.2000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 100 yr  
Total Rainfall Depth= 7.0000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs



File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW

.....  
TIME OF CONCENTRATION CALCULATOR  
.....

-----  
Segment #1: Tc: TR-55 Sheet

Mannings n           .4000  
Hydraulic Length    250.00 ft  
2yr, 24hr P         3.2000 in  
Slope                .030000 ft/ft

Avg.Velocity         .11 ft/sec

Segment #1 Time:    .6334 hrs

-----  
Segment #2: Tc: TR-55 Shallow

Hydraulic Length    265.00 ft  
Slope                .057000 ft/ft  
Unpaved

Avg.Velocity         3.85 ft/sec

Segment #2 Time:    .0191 hrs

-----  
=====

Total Tc:           .6525 hrs

=====

Type.... Tc Calcs  
Name.... EXDA 5

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW

-----  
Tc Equations used...  
-----

==== SCS TR-55 Sheet Flow =====

$$Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))$$

Where: Tc = Time of concentration, hrs  
n = Mannings n  
Lf = Flow length, ft  
P = 2yr, 24hr Rain depth, inches  
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow =====

Unpaved surface:  
 $V = 16.1345 * (Sf**0.5)$

Paved surface:  
 $V = 20.3282 * (Sf**0.5)$

$$Tc = (Lf / V) / (3600sec/hr)$$

Where: V = Velocity, ft/sec  
Sf = Slope, ft/ft  
Tc = Time of concentration, hrs  
Lf = Flow length, ft

Type.... Runoff CN-Area  
Name.... EXDA 5

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW

RUNOFF CURVE NUMBER DATA

.....

-----

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Soil Type B - Wooded	55	6.710			55.00

COMPOSITE AREA & WEIGHTED CN --->                   6.710                   55.00 (55)  
.....

Name....

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW

SCS UNIT HYDROGRAPH METHOD  
(Computational Notes)

## DEFINITION OF TERMS: -----

At = Total area (acres):  $At = Ai + Ap$   
 Ai = Impervious area (acres)  
 Ap = Pervious area (acres)  
 CNi = Runoff curve number for impervious area  
 CNp = Runoff curve number for pervious area  
 fLoss = f loss constant infiltration (depth/time)  
 gKs = Saturated Hydraulic Conductivity (depth/time)  
 Md = Volumetric Moisture Deficit  
 Psi = Capillary Suction (length)  
 hK = Horton Infiltration Decay Rate (time<sup>-1</sup>)  
 fo = Initial Infiltration Rate (depth/time)  
 fc = Ultimate (capacity) Infiltration Rate (depth/time)  
 Ia = Initial Abstraction (length)  
 dt = Computational increment (duration of unit excess rainfall)  
 Default dt is smallest value of  $0.1333Tc$ ,  $r_{tm}$ , and  $t_h$   
 (Smallest dt is then adjusted to match up with  $T_p$ )  
 UDDt = User specified override computational main time increment  
 (only used if UDDt is =>  $.1333Tc$ )  
 D(t) = Point on distribution curve (fraction of P) for time step t  
  
 K =  $2 / (1 + (T_r/T_p))$ : default K = 0.75: (for  $T_r/T_p = 1.67$ )  
 Ks = Hydrograph shape factor  
 = Unit Conversions \* K:  
 =  $((1\text{hr}/3600\text{sec}) * (1\text{ft}/12\text{in}) * ((5280\text{ft})^2/\text{sq.mi})) * K$   
 Default Ks =  $645.333 * 0.75 = 484$   
  
 Lag = Lag time from center of excess runoff (dt) to  $T_p$ : Lag =  $0.6T_c$   
 P = Total precipitation depth, inches  
 Pa(t) = Accumulated rainfall at time step t  
 Pi(t) = Incremental rainfall at time step t  
 qp = Peak discharge (cfs) for lin. runoff, for 1hr, for 1 sq.mi.  
 =  $(K_s * A * Q) / T_p$  (where Q = lin. runoff, A=sq.mi.)  
 Qu(t) = Unit hydrograph ordinate (cfs) at time step t  
 Q(t) = Final hydrograph ordinate (cfs) at time step t  
 Rai(t) = Accumulated runoff (inches) at time step t for impervious area  
 Rap(t) = Accumulated runoff (inches) at time step t for pervious area  
 Rii(t) = Incremental runoff (inches) at time step t for impervious area  
 Rip(t) = Incremental runoff (inches) at time step t for pervious area  
 R(t) = Incremental weighted total runoff (inches)  
 Rtm = Time increment for rainfall table  
 Si = S for impervious area:  $Si = (1000/CNi) - 10$   
 Sp = S for pervious area:  $Sp = (1000/CNp) - 10$   
 t = Time step (row) number  
 Tc = Time of concentration  
 Tb = Time (hrs) of entire unit hydrograph:  $Tb = T_p + T_r$   
 Tp = Time (hrs) to peak of a unit hydrograph:  $Tp = (dt/2) + Lag$   
 Tr = Time (hrs) of receding limb of unit hydrograph:  $Tr = \text{ratio of } T_p$

Name....

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW

SCS UNIT HYDROGRAPH METHOD  
(Computational Notes)

PRECIPITATION: -----

Column (1): Time for time step t  
 Column (2):  $D(t)$  = Point on distribution curve for time step t  
 Column (3):  $P_i(t) = P_a(t) - P_a(t-1)$ : Col.(4) - Preceding Col.(4)  
 Column (4):  $P_a(t) = D(t) \times P$ : Col.(2) x P

PERVIOUS AREA RUNOFF (using SCS Runoff CN Method) -----

Column (5):  $Rap(t)$  = Accumulated pervious runoff for time step t  
 If  $(P_a(t) \text{ is } \leq 0.2Sp)$  then use:  $Rap(t) = 0.0$   
 If  $(P_a(t) \text{ is } > 0.2Sp)$  then use:  

$$Rap(t) = (Col.(4) - 0.2Sp)^2 / (Col.(4) + 0.8Sp)$$
  
 Column (6):  $Rip(t)$  = Incremental pervious runoff for time step t  
 $Rip(t) = Rap(t) - Rap(t-1)$   
 $Rip(t) = Col.(5) \text{ for current row} - Col.(5) \text{ for preceding row.}$

IMPERVIOUS AREA RUNOFF -----

Column (7 & 8)... Did not specify to use impervious areas.

INCREMENTAL WEIGHTED RUNOFF: -----

Column (9):  $R(t) = (A_p/A_t) \times Rip(t) + (A_i/A_t) \times Rii(t)$   
 $R(t) = (A_p/A_t) \times Col.(6) + (A_i/A_t) \times Col.(8)$

SCS UNIT HYDROGRAPH METHOD: -----

Column (10):  $Q(t)$  is computed with the SCS unit hydrograph method  
 using  $R(t)$  and  $Qu()$ .

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm

Duration = 24.0000 hrs Rain Depth = 3.2000 in

Rain Dir = C:\Program Files\Haestad\PPKW\PPW\

Rain File -ID = - TypeIII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\

HYG File - ID = - EXDA 5 2 YR

Tc = .6525 hrs

Drainage Area = 6.710 acres Runoff CN= 55

=====  
Computational Time Increment = .08700 hrs  
Computed Peak Time = 12.7891 hrs  
Computed Peak Flow = .45 cfs

Time Increment for HYG File = .0500 hrs  
Peak Time, Interpolated Output = 12.7500 hrs  
Peak Flow, Interpolated Output = .45 cfs  
=====

DRAINAGE AREA

-----  
ID:EXDA 5  
CN = 55  
Area = 6.710 acres  
S = 8.1818 in  
0.2S = 1.6364 in

Cumulative Runoff

-----  
.2509 in  
.140 ac-ft

HYG Volume... .140 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .65250 hrs (ID: EXDA 5)  
Computational Incr, Tm = .08700 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 11.65 cfs  
Unit peak time Tp = .43500 hrs  
Unit receding limb, Tr = 1.74001 hrs  
Total unit time, Tb = 2.17502 hrs

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm  
 Duration = 24.0000 hrs Rain Depth = 4.7000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - EXDA 5 10 YR  
 Tc = .6525 hrs  
 Drainage Area = 6.710 acres Runoff CN= 55

=====  
 Computational Time Increment = .08700 hrs  
 Computed Peak Time = 12.6151 hrs  
 Computed Peak Flow = 2.51 cfs  
  
 Time Increment for HYG File = .0500 hrs  
 Peak Time, Interpolated Output = 12.6000 hrs  
 Peak Flow, Interpolated Output = 2.51 cfs  
 =====

DRAINAGE AREA

-----  
 ID:EXDA 5  
 CN = 55  
 Area = 6.710 acres  
 S = 8.1818 in  
 0.2S = 1.6364 in

Cumulative Runoff

-----  
 .8346 in  
 .467 ac-ft

HYG Volume... .467 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .65250 hrs (ID: EXDA 5)  
 Computational Incr, Tm = .08700 hrs = 0.20000 Tp  
  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
  
 Unit peak, qp = 11.65 cfs  
 Unit peak time Tp = .43500 hrs  
 Unit receding limb, Tr = 1.74001 hrs  
 Total unit time, Tb = 2.17502 hrs

Type.... Unit Hyd. Summary Page 5.05  
 Name.... EXDA 5 Tag: 25 YR Event: 25 yr  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW  
 Storm... TypeIII 24hr Tag: 25 YR

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm  
 Duration = 24.0000 hrs Rain Depth = 5.5000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - EXDA 5 25 YR  
 Tc = .6525 hrs  
 Drainage Area = 6.710 acres Runoff CN= 55

=====  
 Computational Time Increment = .08700 hrs  
 Computed Peak Time = 12.5281 hrs  
 Computed Peak Flow = 4.13 cfs  
  
 Time Increment for HYG File = .0500 hrs  
 Peak Time, Interpolated Output = 12.5500 hrs  
 Peak Flow, Interpolated Output = 4.11 cfs  
 =====

DRAINAGE AREA

-----  
 ID:EXDA 5  
 CN = 55  
 Area = 6.710 acres  
 S = 8.1818 in  
 0.2S = 1.6364 in

Cumulative Runoff

-----  
 1.2393 in  
 .693 ac-ft

HYG Volume... .693 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .65250 hrs (ID: EXDA 5)  
 Computational Incr, Tm = .08700 hrs = 0.20000 Tp  
  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
  
 Unit peak, qp = 11.65 cfs  
 Unit peak time, Tp = .43500 hrs  
 Unit receding limb, Tr = 1.74001 hrs  
 Total unit time, Tb = 2.17502 hrs



SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm  
 Duration = 24.0000 hrs Rain Depth = 6.2000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - EXDA 5 50 YR  
 Tc = .6525 hrs  
 Drainage Area = 6.710 acres Runoff CN= 55

=====  
 Computational Time Increment = .08700 hrs  
 Computed Peak Time = 12.5281 hrs  
 Computed Peak Flow = 5.72 cfs

Time Increment for HYG File = .0500 hrs  
 Peak Time, Interpolated Output = 12.5500 hrs  
 Peak Flow, Interpolated Output = 5.67 cfs  
 =====

DRAINAGE AREA

-----  
 ID:EXDA 5  
 CN = 55  
 Area = 6.710 acres  
 S = 8.1818 in  
 0.2S = 1.6364 in

Cumulative Runoff

-----  
 1.6341 in  
 .914 ac-ft

HYG Volume... .914 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .65250 hrs (ID: EXDA 5)  
 Computational Incr, Tm = .08700 hrs = 0.20000 Tp  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
 Unit peak, qp = 11.65 cfs  
 Unit peak time, Tp = .43500 hrs  
 Unit receding limb, Tr = 1.74001 hrs  
 Total unit time, Tb = 2.17502 hrs

Type.... Unit Hyd. Summary Page 5.07  
 Name.... EXDA 5 Tag: 100 YR Event: 100 yr  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW  
 Storm... TypeIII 24hr Tag: 100 YR

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm  
 Duration = 24.0000 hrs Rain Depth = 7.0000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - EXDA 5 100 YR  
 Tc = .6525 hrs  
 Drainage Area = 6.710 acres Runoff CN= 55

=====  
 Computational Time Increment = .08700 hrs  
 Computed Peak Time = 12.5281 hrs  
 Computed Peak Flow = 7.69 cfs  
  
 Time Increment for HYG File = .0500 hrs  
 Peak Time, Interpolated Output = 12.5000 hrs  
 Peak Flow, Interpolated Output = 7.64 cfs  
 =====

DRAINAGE AREA

-----  
 ID:EXDA 5  
 CN = 55  
 Area = 6.710 acres  
 S = 8.1818 in  
 0.2S = 1.6364 in

Cumulative Runoff

-----  
 2.1239 in  
 1.188 ac-ft

HYG Volume... 1.188 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .65250 hrs (ID: EXDA 5)  
 Computational Incr, Tm = .08700 hrs = 0.20000 Tp  
  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
  
 Unit peak, qp = 11.65 cfs  
 Unit peak time, Tp = .43500 hrs  
 Unit receding limb, Tr = 1.74001 hrs  
 Total unit time, Tb = 2.17502 hrs

Type.... Node: Addition Summary Page 6.01  
 Name.... DP 5 Event: 2 yr  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW  
 Storm... TypeIII 24hr Tag: 2 YR

SUMMARY FOR HYDROGRAPH ADDITION  
 at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP 5           EXDA 5                EXDA 5        2 YR
=====

```

INFLOWS TO: DP 5

```

-----
HYG file          HYG ID          HYG tag          Volume          Peak Time          Peak Flow
ac-ft             hrs              cfs
-----
                EXDA 5          2 YR             .140            12.7000           .45
-----

```

TOTAL FLOW INTO: DP 5

```

-----
HYG file          HYG ID          HYG tag          Volume          Peak Time          Peak Flow
ac-ft             hrs              cfs
-----
                DP 5            2 YR             .140            12.7000           .45
-----

```

Type.... Node: Addition Summary  
 Name.... DP 5  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW  
 Storm... TypeIII 24hr Tag: 2 YR

Page 6.02  
 Event: 2 yr

TOTAL NODE INFLOW...

HYG file =  
 HYG ID = DP 5  
 HYG Tag = 2 YR

-----  
 Peak Discharge = .45 cfs  
 Time to Peak = 12.7000 hrs  
 HYG Volume = .140 ac-ft  
 -----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time |  
 hrs | Time on left represents time for first value in each row.

Time (hrs)	0.00	0.01	0.02	0.04
12.0000	.00	.01	.02	.04
12.2500	.07	.11	.16	.22
12.5000	.32	.37	.40	.45
12.7500	.45	.45	.44	.41
13.0000	.39	.38	.37	.34
13.2500	.33	.32	.31	.30
13.5000	.29	.28	.28	.27
13.7500	.26	.26	.25	.25
14.0000	.25	.24	.24	.23
14.2500	.23	.23	.22	.22
14.5000	.22	.21	.21	.21
14.7500	.21	.21	.20	.20
15.0000	.20	.20	.20	.19
15.2500	.19	.19	.19	.18
15.5000	.18	.18	.18	.17
15.7500	.17	.17	.17	.16
16.0000	.16	.16	.15	.15
16.2500	.15	.15	.14	.14
16.5000	.14	.14	.14	.13
16.7500	.13	.13	.13	.13
17.0000	.13	.12	.12	.12
17.2500	.12	.12	.12	.12
17.5000	.11	.11	.11	.11
17.7500	.11	.11	.11	.10
18.0000	.10	.10	.10	.10
18.2500	.10	.10	.10	.09
18.5000	.09	.09	.09	.09
18.7500	.09	.09	.09	.09
19.0000	.09	.09	.09	.09
19.2500	.09	.09	.09	.08
19.5000	.08	.08	.08	.08

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time on left represents time for first value in each row.

---

Time hrs					
19.7500	.08	.08	.08	.08	.08
20.0000	.08	.08	.08	.08	.08
20.2500	.08	.08	.08	.08	.08
20.5000	.08	.08	.08	.08	.08
20.7500	.08	.08	.08	.08	.08
21.0000	.07	.07	.07	.07	.07
21.2500	.07	.07	.07	.07	.07
21.5000	.07	.07	.07	.07	.07
21.7500	.07	.07	.07	.07	.07
22.0000	.07	.07	.07	.07	.07
22.2500	.07	.07	.07	.07	.07
22.5000	.07	.07	.07	.07	.07
22.7500	.07	.06	.06	.06	.06
23.0000	.06	.06	.06	.06	.06
23.2500	.06	.06	.06	.06	.06
23.5000	.06	.06	.06	.06	.06
23.7500	.06	.06	.06	.06	.06
24.0000	.06	.06	.06	.05	.05
24.2500	.05	.04	.04	.03	.03
24.5000	.03	.02	.02	.01	.01
24.7500	.01	.01	.01	.01	.00
25.0000	.00	.00	.00	.00	.00
25.2500	.00	.00	.00	.00	.00

Type.... Node: Addition Summary Page 6.04  
 Name.... DP 5 Event: 10 yr  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW  
 Storm... TypeIII 24hr Tag: 10 YR

SUMMARY FOR HYDROGRAPH ADDITION  
 at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP 5           EXDA 5                EXDA 5        10 YR
=====
  
```

INFLOWS TO: DP 5

```

-----
HYG file      HYG ID        HYG tag        Volume      Peak Time     Peak Flow
              HYG ID        HYG tag        ac-ft       hrs           cfs
-----
              EXDA 5        10 YR          .467        12.6000      2.51
  
```

TOTAL FLOW INTO: DP 5

```

-----
HYG file      HYG ID        HYG tag        Volume      Peak Time     Peak Flow
              HYG ID        HYG tag        ac-ft       hrs           cfs
-----
              DP 5          10 YR          .467        12.6000      2.51
  
```

TOTAL NODE INFLOW...

HYG file =  
 HYG ID = DP 5  
 HYG Tag = 10 YR

-----  
 Peak Discharge = 2.51 cfs  
 Time to Peak = 12.6000 hrs  
 HYG Volume = .467 ac-ft  
 -----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time on left represents time for first value in each row.

Time hrs					
11.7500	.00	.00	.01	.03	.07
12.0000	.13	.26	.42	.67	.95
12.2500	1.27	1.58	1.89	2.12	2.32
12.5000	2.44	2.51	2.51	2.45	2.37
12.7500	2.24	2.12	1.98	1.85	1.72
13.0000	1.61	1.50	1.40	1.32	1.24
13.2500	1.17	1.11	1.06	1.01	.97
13.5000	.93	.90	.87	.85	.82
13.7500	.80	.79	.77	.75	.74
14.0000	.72	.71	.69	.68	.67
14.2500	.65	.64	.63	.62	.61
14.5000	.60	.60	.59	.58	.57
14.7500	.57	.56	.56	.55	.54
15.0000	.54	.53	.53	.52	.51
15.2500	.51	.50	.50	.49	.48
15.5000	.48	.47	.47	.46	.45
15.7500	.45	.44	.43	.43	.42
16.0000	.41	.41	.40	.39	.39
16.2500	.38	.38	.37	.36	.36
16.5000	.35	.35	.35	.34	.34
16.7500	.33	.33	.33	.32	.32
17.0000	.32	.31	.31	.31	.31
17.2500	.30	.30	.30	.29	.29
17.5000	.29	.28	.28	.28	.27
17.7500	.27	.27	.27	.26	.26
18.0000	.26	.25	.25	.25	.24
18.2500	.24	.24	.23	.23	.23
18.5000	.23	.23	.22	.22	.22
18.7500	.22	.22	.22	.22	.22
19.0000	.21	.21	.21	.21	.21
19.2500	.21	.21	.21	.21	.21

HYDROGRAPH ORDINATES (cfs)  
Output Time increment = .0500 hrs

Time on left represents time for first value in each row.

Time hrs					
19.5000	.21	.20	.20	.20	.20
19.7500	.20	.20	.20	.20	.20
20.0000	.20	.20	.19	.19	.19
20.2500	.19	.19	.19	.19	.19
20.5000	.19	.19	.19	.19	.18
20.7500	.18	.18	.18	.18	.18
21.0000	.18	.18	.18	.18	.18
21.2500	.18	.18	.17	.17	.17
21.5000	.17	.17	.17	.17	.17
21.7500	.17	.17	.17	.17	.17
22.0000	.17	.16	.16	.16	.16
22.2500	.16	.16	.16	.16	.16
22.5000	.16	.16	.16	.16	.16
22.7500	.15	.15	.15	.15	.15
23.0000	.15	.15	.15	.15	.15
23.2500	.15	.15	.15	.14	.14
23.5000	.14	.14	.14	.14	.14
23.7500	.14	.14	.14	.14	.14
24.0000	.14	.13	.13	.13	.12
24.2500	.11	.10	.09	.08	.07
24.5000	.06	.05	.04	.03	.03
24.7500	.02	.02	.02	.01	.01
25.0000	.01	.01	.01	.00	.00
25.2500	.00	.00	.00	.00	.00
25.5000	.00	.00	.00	.00	.00



SUMMARY FOR HYDROGRAPH ADDITION  
at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP 5           EXDA 5                EXDA 5        25 YR
=====

```

INFLOWS TO: DP 5

```

----- Volume      Peak Time      Peak Flow
HYG file  HYG ID        HYG tag        ac-ft         hrs           cfs
-----
          EXDA 5          25 YR          .693          12.5500        4.11

```

TOTAL FLOW INTO: DP 5

```

----- Volume      Peak Time      Peak Flow
HYG file  HYG ID        HYG tag        ac-ft         hrs           cfs
-----
          DP 5           25 YR          .693          12.5500        4.11

```

Type.... Node: Addition Summary  
 Name.... DP 5  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW  
 Storm... TypeIII 24hr Tag: 25 YR

Page 6.08  
 Event: 25 yr

TOTAL NODE INFLOW...

HYG file =  
 HYG ID = DP 5  
 HYG Tag = 25 YR

-----  
 Peak Discharge = 4.11 cfs  
 Time to Peak = 12.5500 hrs  
 HYG Volume = .693 ac-ft  
 -----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time |  
 hrs | Time on left represents time for first value in each row.

Time hrs	0.00	1.03	2.06	3.09	4.12
11.5500	.00	.00	.01	.01	.03
11.8000	.06	.10	.17	.29	.45
12.0500	.72	1.03	1.47	1.94	2.46
12.3000	2.93	3.38	3.69	3.95	4.07
12.5500	4.11	4.05	3.91	3.73	3.50
12.8000	3.27	3.04	2.82	2.61	2.42
13.0500	2.24	2.09	1.95	1.83	1.72
13.3000	1.63	1.54	1.46	1.40	1.34
13.5500	1.29	1.25	1.21	1.17	1.14
13.8000	1.11	1.09	1.06	1.04	1.02
14.0500	.99	.97	.95	.93	.92
14.3000	.90	.88	.87	.85	.84
14.5500	.83	.82	.81	.80	.79
14.8000	.78	.77	.76	.75	.75
15.0500	.74	.73	.72	.71	.70
15.3000	.69	.68	.68	.67	.66
15.5500	.65	.64	.63	.62	.61
15.8000	.61	.60	.59	.58	.57
16.0500	.56	.55	.54	.53	.52
16.3000	.52	.51	.50	.49	.49
16.5500	.48	.47	.47	.46	.46
16.8000	.45	.45	.44	.44	.43
17.0500	.43	.43	.42	.42	.41
17.3000	.41	.40	.40	.39	.39
17.5500	.39	.38	.38	.37	.37
17.8000	.36	.36	.36	.35	.35
18.0500	.34	.34	.33	.33	.33
18.3000	.32	.32	.32	.31	.31
18.5500	.31	.30	.30	.30	.30
18.8000	.30	.30	.29	.29	.29
19.0500	.29	.29	.29	.29	.28

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time on left represents time for first value in each row.

---

Time hrs					
19.3000	.28	.28	.28	.28	.28
19.5500	.28	.28	.27	.27	.27
19.8000	.27	.27	.27	.27	.26
20.0500	.26	.26	.26	.26	.26
20.3000	.26	.26	.26	.25	.25
20.5500	.25	.25	.25	.25	.25
20.8000	.25	.25	.24	.24	.24
21.0500	.24	.24	.24	.24	.24
21.3000	.24	.24	.23	.23	.23
21.5500	.23	.23	.23	.23	.23
21.8000	.23	.23	.22	.22	.22
22.0500	.22	.22	.22	.22	.22
22.3000	.22	.22	.21	.21	.21
22.5500	.21	.21	.21	.21	.21
22.8000	.21	.21	.20	.20	.20
23.0500	.20	.20	.20	.20	.20
23.3000	.20	.19	.19	.19	.19
23.5500	.19	.19	.19	.19	.19
23.8000	.19	.18	.18	.18	.18
24.0500	.18	.18	.17	.16	.15
24.3000	.14	.12	.11	.09	.08
24.5500	.07	.05	.04	.04	.03
24.8000	.03	.02	.02	.01	.01
25.0500	.01	.01	.01	.01	.00
25.3000	.00	.00	.00	.00	.00
25.5500	.00	.00	.00		

Type.... Node: Addition Summary

Name.... DP 5

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW

Storm... TypeIII 24hr Tag: 50 YR

SUMMARY FOR HYDROGRAPH ADDITION  
at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP 5           EXDA 5                EXDA 5        50 YR
=====

```

INFLOWS TO: DP 5

```

----- Volume      Peak Time      Peak Flow
HYG file  HYG ID        HYG tag        ac-ft         hrs           cfs
-----
           EXDA 5          50 YR          .914          12.5500       5.67

```

TOTAL FLOW INTO: DP 5

```

----- Volume      Peak Time      Peak Flow
HYG file  HYG ID        HYG tag        ac-ft         hrs           cfs
-----
DP 5      50 YR          .914          12.5500       5.67

```

Name.... DP 5

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 5.PPW

Storm... TypeIII 24hr Tag: 50 YR

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 5

HYG Tag = 50 YR

Peak Discharge = 5.67 cfs

Time to Peak = 12.5500 hrs

HYG Volume = .914 ac-ft

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time on left represents time for first value in each row.

Time hrs					
11.2500	.00	.00	.00	.01	.01
11.5000	.02	.03	.05	.07	.11
11.7500	.15	.22	.32	.45	.65
12.0000	.90	1.30	1.75	2.36	3.00
12.2500	3.69	4.31	4.89	5.25	5.56
12.5000	5.66	5.67	5.55	5.32	5.04
12.7500	4.71	4.38	4.06	3.75	3.46
13.0000	3.19	2.95	2.74	2.55	2.39
13.2500	2.24	2.11	2.00	1.89	1.81
13.5000	1.73	1.66	1.60	1.55	1.50
13.7500	1.46	1.42	1.38	1.35	1.32
14.0000	1.29	1.26	1.23	1.21	1.18
14.2500	1.16	1.14	1.11	1.10	1.08
14.5000	1.06	1.05	1.03	1.02	1.01
14.7500	.99	.98	.97	.96	.95
15.0000	.94	.92	.91	.90	.89
15.2500	.88	.87	.86	.85	.84
15.5000	.83	.81	.80	.79	.78
15.7500	.77	.76	.75	.73	.72
16.0000	.71	.70	.69	.68	.66
16.2500	.65	.64	.63	.62	.61
16.5000	.61	.60	.59	.58	.58
16.7500	.57	.56	.56	.55	.55
17.0000	.54	.53	.53	.52	.52
17.2500	.51	.51	.50	.50	.49
17.5000	.49	.48	.47	.47	.46
17.7500	.46	.45	.45	.44	.44
18.0000	.43	.43	.42	.42	.41
18.2500	.40	.40	.40	.39	.39
18.5000	.38	.38	.38	.38	.37
18.7500	.37	.37	.37	.36	.36

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time on left represents time for first value in each row.

---

Time hrs					
19.0000	.36	.36	.36	.36	.35
19.2500	.35	.35	.35	.35	.35
19.5000	.34	.34	.34	.34	.34
19.7500	.34	.33	.33	.33	.33
20.0000	.33	.33	.32	.32	.32
20.2500	.32	.32	.32	.32	.31
20.5000	.31	.31	.31	.31	.31
20.7500	.31	.30	.30	.30	.30
21.0000	.30	.30	.30	.30	.29
21.2500	.29	.29	.29	.29	.29
21.5000	.29	.29	.28	.28	.28
21.7500	.28	.28	.28	.28	.28
22.0000	.27	.27	.27	.27	.27
22.2500	.27	.27	.27	.26	.26
22.5000	.26	.26	.26	.26	.26
22.7500	.26	.25	.25	.25	.25
23.0000	.25	.25	.25	.25	.24
23.2500	.24	.24	.24	.24	.24
23.5000	.24	.24	.23	.23	.23
23.7500	.23	.23	.23	.23	.22
24.0000	.22	.22	.22	.21	.20
24.2500	.19	.17	.15	.13	.11
24.5000	.10	.08	.07	.06	.05
24.7500	.04	.03	.03	.02	.02
25.0000	.01	.01	.01	.01	.01
25.2500	.01	.00	.00	.00	.00
25.5000	.00	.00	.00	.00	.00

SUMMARY FOR HYDROGRAPH ADDITION  
at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP 5           EXDA 5                EXDA 5        100 YR
=====

```

INFLOWS TO: DP 5

```

-----
HYG file          HYG ID          HYG tag        Volume      Peak Time    Peak Flow
                   ac-ft          hrs              cfs
-----
                EXDA 5          100 YR         1.188      12.5000     7.64
-----

```

TOTAL FLOW INTO: DP 5

```

-----
HYG file          HYG ID          HYG tag        Volume      Peak Time    Peak Flow
                   ac-ft          hrs              cfs
-----
                DP 5           100 YR         1.188      12.5000     7.64
-----

```

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 5

HYG Tag = 100 YR

-----  
 Peak Discharge = 7.64 cfs  
 Time to Peak = 12.5000 hrs  
 HYG Volume = 1.188 ac-ft  
 -----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time |  
 hrs | Time on left represents time for first value in each row.

Time hrs					
10.9000	.00	.00	.00	.01	.01
11.1500	.02	.03	.04	.05	.07
11.4000	.09	.11	.14	.17	.21
11.6500	.26	.33	.40	.52	.67
11.9000	.87	1.17	1.52	2.08	2.70
12.1500	3.51	4.36	5.26	6.04	6.77
12.4000	7.20	7.55	7.64	7.60	7.39
12.6500	7.05	6.64	6.19	5.73	5.29
12.9000	4.88	4.48	4.13	3.80	3.53
13.1500	3.28	3.06	2.86	2.69	2.54
13.4000	2.41	2.29	2.19	2.10	2.02
13.6500	1.95	1.89	1.84	1.79	1.74
13.9000	1.70	1.65	1.61	1.58	1.54
14.1500	1.51	1.48	1.45	1.42	1.39
14.4000	1.37	1.34	1.32	1.30	1.29
14.6500	1.27	1.25	1.24	1.22	1.21
14.9000	1.19	1.18	1.16	1.15	1.13
15.1500	1.12	1.11	1.09	1.08	1.06
15.4000	1.05	1.04	1.02	1.01	.99
15.6500	.98	.97	.95	.94	.92
15.9000	.91	.89	.88	.86	.85
16.1500	.83	.82	.81	.79	.78
16.4000	.77	.76	.75	.74	.73
16.6500	.72	.71	.70	.69	.69
16.9000	.68	.67	.67	.66	.65
17.1500	.64	.64	.63	.62	.62
17.4000	.61	.60	.60	.59	.58
17.6500	.58	.57	.56	.56	.55
17.9000	.54	.54	.53	.52	.52
18.1500	.51	.50	.50	.49	.49
18.4000	.48	.48	.47	.47	.46



HYDROGRAPH ORDINATES (cfs)  
Output Time increment = .0500 hrs

Time on left represents time for first value in each row.

---

Time hrs						
18.6500		.46	.46	.46	.45	.45
18.9000		.45	.44	.44	.44	.44
19.1500		.44	.43	.43	.43	.43
19.4000		.43	.42	.42	.42	.42
19.6500		.42	.41	.41	.41	.41
19.9000		.41	.40	.40	.40	.40
20.1500		.40	.39	.39	.39	.39
20.4000		.39	.38	.38	.38	.38
20.6500		.38	.38	.37	.37	.37
20.9000		.37	.37	.37	.36	.36
21.1500		.36	.36	.36	.36	.36
21.4000		.35	.35	.35	.35	.35
21.6500		.35	.34	.34	.34	.34
21.9000		.34	.34	.34	.33	.33
22.1500		.33	.33	.33	.33	.32
22.4000		.32	.32	.32	.32	.32
22.6500		.32	.31	.31	.31	.31
22.9000		.31	.31	.30	.30	.30
23.1500		.30	.30	.30	.29	.29
23.4000		.29	.29	.29	.29	.29
23.6500		.28	.28	.28	.28	.28
23.9000		.28	.27	.27	.27	.26
24.1500		.25	.24	.23	.21	.18
24.4000		.16	.14	.12	.10	.08
24.6500		.07	.06	.05	.04	.03
24.9000		.03	.02	.02	.01	.01
25.1500		.01	.01	.01	.01	.00
25.4000		.00	.00	.00	.00	.00
25.6500		.00	.00			

Index of Starting Page Numbers for ID Names

----- D -----  
DP 5 2 YR... 6.01, 6.04, 6.07, 6.10,  
6.13

----- E -----  
EXDA 5... 3.01, 4.01, 5.03, 5.04,  
5.05, 5.06, 5.07

----- L -----  
Litchfield Co.... 2.01, 2.02

----- W -----  
Watershed... 1.01

## **Proposed Flows – DL5**

## Table of Contents

***** MASTER SUMMARY *****	
Watershed..... Master Network Summary .....	1.01
***** DESIGN STORMS SUMMARY *****	
Litchfield Co... Design Storms .....	2.01
Litchfield Co... 2 YR Design Storms .....	2.02
***** RAINFALL DATA *****	
TypeIII 24hr.... 100 YR Synthetic Curve .....	3.01
***** TC CALCULATIONS *****	
PRDA 5D..... Tc Calcs .....	4.01
PRDA 5ND..... Tc Calcs .....	4.03
***** CN CALCULATIONS *****	
PRDA 5D..... Runoff CN-Area .....	5.01
PRDA 5ND..... Runoff CN-Area .....	5.02
***** RUNOFF HYDROGRAPHS *****	
Unit Hyd. Equations .....	6.01

Table of Contents (continued)

PRDA 5D..... 2 YR  
 Unit Hyd. Summary ..... 6.03

PRDA 5D..... 10 YR  
 Unit Hyd. Summary ..... 6.04

PRDA 5D..... 25 YR  
 Unit Hyd. Summary ..... 6.05

PRDA 5D..... 50 YR  
 Unit Hyd. Summary ..... 6.06

PRDA 5D..... 100 YR  
 Unit Hyd. Summary ..... 6.07

PRDA 5ND..... 2 YR  
 Unit Hyd. Summary ..... 6.08

PRDA 5ND..... 10 YR  
 Unit Hyd. Summary ..... 6.09

PRDA 5ND..... 25 YR  
 Unit Hyd. Summary ..... 6.10

PRDA 5ND..... 50 YR  
 Unit Hyd. Summary ..... 6.11

PRDA 5ND..... 100 YR  
 Unit Hyd. Summary ..... 6.12

\*\*\*\*\* HYG ADDITION \*\*\*\*\*

DP 5..... 2 YR  
 Node: Addition Summary ..... 7.01

DP 5..... 10 YR  
 Node: Addition Summary ..... 7.03

DP 5..... 25 YR  
 Node: Addition Summary ..... 7.05

DP 5..... 50 YR  
 Node: Addition Summary ..... 7.07

DP 5..... 100 YR  
 Node: Addition Summary ..... 7.09

Table of Contents (continued)

\*\*\*\*\* POND VOLUMES \*\*\*\*\*

UNDER DET 5..... Vol: Elev-Area ..... 8.01

\*\*\*\*\* OUTLET STRUCTURES \*\*\*\*\*

Outlet 1..... Outlet Input Data ..... 9.01  
                   Individual Outlet Curves ..... 9.03  
                   Composite Rating Curve ..... 9.05

\*\*\*\*\* POND ROUTING \*\*\*\*\*

UNDER DET 5..... Pond Infiltration Calcs ..... 10.01  
                   Pond E-V-Q Table ..... 10.02

UNDER DET 5   OUT 2 YR  
                   Pond Routing Summary ..... 10.04

UNDER DET 5   OUT 10 YR  
                   Pond Routing Summary ..... 10.05

UNDER DET 5   OUT 25 YR  
                   Pond Routing Summary ..... 10.06

UNDER DET 5   OUT 50 YR  
                   Pond Routing Summary ..... 10.07

UNDER DET 5   OUT 100 YR  
                   Pond Routing Summary ..... 10.08

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Litchfield Co.

Return Event	Total Depth in	Rainfall Type	RNF ID
2 YR	3.2000	Synthetic Curve	TypeIII 24hr
10 YR	4.7000	Synthetic Curve	TypeIII 24hr
25 YR	5.5000	Synthetic Curve	TypeIII 24hr
50 YR	6.2000	Synthetic Curve	TypeIII 24hr
100 YR	7.0000	Synthetic Curve	TypeIII 24hr

MASTER NETWORK SUMMARY  
 SCS Unit Hydrograph Method

(\*Node=Outfall; +Node=Diversion;)  
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*DP 5	JCT	2	.115		12.6000	.46		
*DP 5	JCT	10	.424		12.5000	2.39		
*DP 5	JCT	25	.654		12.4000	3.95		
*DP 5	JCT	50	.880		12.4000	5.44		
*DP 5	JCT	100	1.160		12.4000	7.23		
JUNCTION	JCT	2	.115		12.6000	.46		
JUNCTION	JCT	10	.424		12.5000	2.39		
JUNCTION	JCT	25	.654		12.4000	3.95		
JUNCTION	JCT	50	.880		12.4000	5.44		
JUNCTION	JCT	100	1.160		12.4000	7.23		
PRDA 5D	AREA	2	.101		12.4000	.68		
PRDA 5D	AREA	10	.236		12.4000	1.79		
PRDA 5D	AREA	25	.318		12.4000	2.46		
PRDA 5D	AREA	50	.396		12.4000	3.08		
PRDA 5D	AREA	100	.488		12.4000	3.81		

MASTER NETWORK SUMMARY  
 SCS Unit Hydrograph Method

(\*Node=Outfall; +Node=Diversion;)  
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
PRDA 5ND	AREA	2	.115		12.6000	.46		
PRDA 5ND	AREA	10	.367		12.4000	2.33		
PRDA 5ND	AREA	25	.539		12.4000	3.76		
PRDA 5ND	AREA	50	.706		12.4000	5.15		
PRDA 5ND	AREA	100	.913		12.4000	6.85		
UNDER DET 5	IN POND	2	.101		12.4000	.68		
UNDER DET 5	IN POND	10	.236		12.4000	1.79		
UNDER DET 5	IN POND	25	.318		12.4000	2.46		
UNDER DET 5	IN POND	50	.396		12.4000	3.08		
UNDER DET 5	IN POND	100	.488		12.4000	3.81		
UNDER DET 5	OUT POND	2	.000		11.7000	.00	1434.84	.025
UNDER DET 5	OUT POND	10	.057		13.2000	.28	1435.61	.080
UNDER DET 5	OUT POND	25	.115		13.1000	.43	1436.10	.115
UNDER DET 5	OUT POND	50	.174		12.9000	.89	1436.42	.138
UNDER DET 5	OUT POND	100	.247		12.8000	1.56	1436.72	.159



Type... Design Storms  
Name... Litchfield Co.

File... C:\Program Files\Haestad\PPKW\PPW\  
Title... Project Date: 4/16/2009  
Project Engineer: Curtis Jones  
Project Title: Watershed  
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File, ID = Litchfield Co.

Storm Tag Name = 2 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 2 yr  
Total Rainfall Depth= 3.2000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 10 yr  
Total Rainfall Depth= 4.7000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 25 yr  
Total Rainfall Depth= 5.5000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 50 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 50 yr  
Total Rainfall Depth= 6.2000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 100 yr  
Total Rainfall Depth= 7.0000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

DESIGN STORMS SUMMARY

Design Storm File, ID = Litchfield Co.

Storm Tag Name = 2 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 2 yr  
Total Rainfall Depth= 3.2000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 10 yr  
Total Rainfall Depth= 4.7000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 25 yr  
Total Rainfall Depth= 5.5000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 50 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 50 yr  
Total Rainfall Depth= 6.2000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100 YR

-----  
Data Type, File, ID = Synthetic Storm TypeIII 24hr  
Storm Frequency = 100 yr  
Total Rainfall Depth= 7.0000 in  
Duration Multiplier = 1  
Resulting Duration = 24.0000 hrs  
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

CUMULATIVE RAINFALL FRACTIONS  
 Output Time increment = .1000 hrs  
 Time on left represents time for first value in each row.

Time hrs						
.0000		.000	.001	.002	.003	.004
.5000		.005	.006	.007	.008	.009
1.0000		.010	.011	.012	.013	.014
1.5000		.015	.016	.017	.018	.019
2.0000		.020	.021	.022	.023	.024
2.5000		.025	.026	.027	.028	.030
3.0000		.031	.032	.033	.034	.035
3.5000		.037	.038	.039	.040	.042
4.0000		.043	.044	.046	.047	.048
4.5000		.050	.051	.052	.054	.055
5.0000		.057	.058	.060	.061	.063
5.5000		.064	.066	.067	.069	.070
6.0000		.072	.074	.075	.077	.079
6.5000		.081	.083	.084	.086	.088
7.0000		.091	.093	.095	.097	.099
7.5000		.102	.104	.106	.109	.111
8.0000		.114	.117	.119	.122	.125
8.5000		.128	.132	.135	.138	.142
9.0000		.146	.150	.153	.158	.162
9.5000		.166	.170	.175	.179	.184
10.0000		.189	.194	.199	.205	.211
10.5000		.217	.223	.229	.236	.243
11.0000		.250	.258	.266	.276	.287
11.5000		.298	.314	.339	.373	.416
12.0000		.500	.584	.627	.661	.686
12.5000		.702	.713	.724	.734	.742
13.0000		.750	.757	.764	.771	.777
13.5000		.784	.789	.795	.801	.806
14.0000		.811	.816	.821	.825	.830
14.5000		.834	.838	.842	.847	.850
15.0000		.854	.858	.862	.865	.868
15.5000		.872	.875	.878	.881	.883
16.0000		.886	.889	.891	.894	.896
16.5000		.898	.901	.903	.905	.907
17.0000		.910	.912	.914	.916	.918
17.5000		.919	.921	.923	.925	.926
18.0000		.928	.930	.931	.933	.934
18.5000		.936	.937	.939	.940	.942
19.0000		.943	.945	.946	.948	.949
19.5000		.950	.952	.953	.954	.956
20.0000		.957	.958	.960	.961	.962
20.5000		.963	.965	.966	.967	.968
21.0000		.969	.971	.972	.973	.974
21.5000		.975	.976	.977	.979	.980

Type.... Synthetic Curve  
Name.... TypeIII 24hr Tag: 100 YR  
File.... C:\Program Files\Haestad\PPKW\PPW\

CUMULATIVE RAINFALL FRACTIONS  
Output Time increment = .1000 hrs  
Time on left represents time for first value in each row.

---

Time hrs						
22.0000		.981	.982	.983	.984	.985
22.5000		.986	.987	.988	.989	.990
23.0000		.991	.992	.993	.994	.995
23.5000		.996	.997	.997	.998	.999
24.0000		1.000				

Type.... Tc Calcs  
Name.... PRDA 5D

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

.....  
TIME OF CONCENTRATION CALCULATOR  
.....

-----

Segment #1: Tc: TR-55 Sheet

Mannings n .3000  
Hydraulic Length 200.00 ft  
2yr, 24hr P 3.2000 in  
Slope .035000 ft/ft

Avg.Velocity .14 ft/sec

Segment #1 Time: .3957 hrs

-----

Segment #2: Tc: TR-55 Shallow

Hydraulic Length 502.00 ft  
Slope .010000 ft/ft  
Unpaved

Avg.Velocity 1.61 ft/sec

Segment #2 Time: .0864 hrs

-----

=====  
Total Tc: .4822 hrs  
=====

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

-----  
Tc Equations used...  
-----

==== SCS TR-55 Sheet Flow =====

$$Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))$$

Where: Tc = Time of concentration, hrs  
n = Mannings n  
Lf = Flow length, ft  
P = 2yr, 24hr Rain depth, inches  
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow =====

Unpaved surface:

$$V = 16.1345 * (Sf**0.5)$$

Paved surface:

$$V = 20.3282 * (Sf**0.5)$$

$$Tc = (Lf / V) / (3600sec/hr)$$

Where: V = Velocity, ft/sec  
Sf = Slope, ft/ft  
Tc = Time of concentration, hrs  
Lf = Flow length, ft

Type.... Tc Calcs  
Name.... PRDA 5ND

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

.....  
TIME OF CONCENTRATION CALCULATOR  
.....

-----  
Segment #1: Tc: TR-55 Sheet

Mannings n           .4000  
Hydraulic Length    250.00 ft  
2yr, 24hr P         3.2000 in  
Slope                .060000 ft/ft

Avg.Velocity         .14 ft/sec

Segment #1 Time:     .4800 hrs

-----  
=====  
Total Tc:            .4800 hrs  
=====

Type.... Tc Calcs  
Name.... PRDA 5ND

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

-----  
Tc Equations used...  
-----

==== SCS TR-55 Sheet Flow =====

$$Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))$$

Where: Tc = Time of concentration, hrs  
n = Mannings n  
Lf = Flow length, ft  
P = 2yr, 24hr Rain depth, inches  
Sf = Slope, %



File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

RUNOFF CURVE NUMBER DATA

.....

-----

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Soil Type B - Grass/Meadow	60	1.220			60.00
Soil Type B - Wooded	55	.200			55.00
Impervious Area	98	.350			98.00

COMPOSITE AREA & WEIGHTED CN --->                    1.770                    66.95 (67)

.....

Type.... Runoff CN-Area  
Name.... PRDA 5ND

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

RUNOFF CURVE NUMBER DATA

.....

-----

Soil/Surface Description	CN	Area acres	Impervious		Adjusted CN
			Adjustment %C	%UC	
Soil Type B - Wooded	55	4.090			55.00
Soil Type B - Grass/Meadow	60	.800			60.00
Impervious	98	.050			98.00

COMPOSITE AREA & WEIGHTED CN --->                   4.940                   56.24 (56)  
.....

Name....

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

SCS UNIT HYDROGRAPH METHOD  
(Computational Notes)

## DEFINITION OF TERMS: -----

At = Total area (acres):  $At = Ai + Ap$   
 Ai = Impervious area (acres)  
 Ap = Pervious area (acres)  
 CNi = Runoff curve number for impervious area  
 CNp = Runoff curve number for pervious area  
 fLoss = f loss constant infiltration (depth/time)  
 gKs = Saturated Hydraulic Conductivity (depth/time)  
 Md = Volumetric Moisture Deficit  
 Psi = Capillary Suction (length)  
 hK = Horton Infiltration Decay Rate (time<sup>-1</sup>)  
 fo = Initial Infiltration Rate (depth/time)  
 fc = Ultimate (capacity) Infiltration Rate (depth/time)  
 Ia = Initial Abstraction (length)  
 dt = Computational increment (duration of unit excess rainfall)  
 Default dt is smallest value of  $0.1333Tc$ ,  $r_{tm}$ , and  $t_h$   
 (Smallest dt is then adjusted to match up with  $T_p$ )  
 UDDt = User specified override computational main time increment  
 (only used if UDDt is =>  $.1333Tc$ )  
 D(t) = Point on distribution curve (fraction of P) for time step t  
  
 K =  $2 / (1 + (T_r/T_p))$ : default K = 0.75: (for  $T_r/T_p = 1.67$ )  
 Ks = Hydrograph shape factor  
 = Unit Conversions \* K:  
 =  $((1\text{hr}/3600\text{sec}) * (1\text{ft}/12\text{in}) * ((5280\text{ft})^2/\text{sq.mi})) * K$   
 Default Ks =  $645.333 * 0.75 = 484$   
  
 Lag = Lag time from center of excess runoff (dt) to  $T_p$ : Lag =  $0.6T_c$   
 P = Total precipitation depth, inches  
 Pa(t) = Accumulated rainfall at time step t  
 Pi(t) = Incremental rainfall at time step t  
 qp = Peak discharge (cfs) for lin. runoff, for 1hr, for 1 sq.mi.  
 =  $(K_s * A * Q) / T_p$  (where Q = lin. runoff, A=sq.mi.)  
 Qu(t) = Unit hydrograph ordinate (cfs) at time step t  
 Q(t) = Final hydrograph ordinate (cfs) at time step t  
 Rai(t) = Accumulated runoff (inches) at time step t for impervious area  
 Rap(t) = Accumulated runoff (inches) at time step t for pervious area  
 Rii(t) = Incremental runoff (inches) at time step t for impervious area  
 Rip(t) = Incremental runoff (inches) at time step t for pervious area  
 R(t) = Incremental weighted total runoff (inches)  
 Rtm = Time increment for rainfall table  
 Si = S for impervious area:  $Si = (1000/CNi) - 10$   
 Sp = S for pervious area:  $Sp = (1000/CNp) - 10$   
 t = Time step (row) number  
 Tc = Time of concentration  
 Tb = Time (hrs) of entire unit hydrograph:  $Tb = T_p + T_r$   
 Tp = Time (hrs) to peak of a unit hydrograph:  $Tp = (dt/2) + Lag$   
 Tr = Time (hrs) of receding limb of unit hydrograph:  $Tr = \text{ratio of } T_p$

Name....

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

SCS UNIT HYDROGRAPH METHOD  
(Computational Notes)

PRECIPITATION: -----  
 Column (1): Time for time step t  
 Column (2): D(t) = Point on distribution curve for time step t  
 Column (3): Pi(t) = Pa(t) - Pa(t-1): Col.(4) - Preceding Col.(4)  
 Column (4): Pa(t) = D(t) x P: Col.(2) x P

PERVIOUS AREA RUNOFF (using SCS Runoff CN Method) -----  
 Column (5): Rap(t) = Accumulated pervious runoff for time step t  
 If (Pa(t) is <= 0.2Sp) then use: Rap(t) = 0.0  
 If (Pa(t) is > 0.2Sp) then use:  

$$\text{Rap}(t) = (\text{Col.}(4) - 0.2\text{Sp})^{**2} / (\text{Col.}(4) + 0.8\text{Sp})$$
  
 Column (6): Rip(t) = Incremental pervious runoff for time step t  

$$\text{Rip}(t) = \text{Rap}(t) - \text{Rap}(t-1)$$
  
 Rip(t) = Col.(5) for current row - Col.(5) for preceding row.

IMPERVIOUS AREA RUNOFF -----  
 Column (7 & 8)... Did not specify to use impervious areas.

INCREMENTAL WEIGHTED RUNOFF: -----  
 Column (9): R(t) = (Ap/At) x Rip(t) + (Ai/At) x Rii(t)  

$$\text{R}(t) = (\text{Ap}/\text{At}) \times \text{Col.}(6) + (\text{Ai}/\text{At}) \times \text{Col.}(8)$$

SCS UNIT HYDROGRAPH METHOD: -----  
 Column (10): Q(t) is computed with the SCS unit hydrograph method  
 using R() and Qu().

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm  
 Duration = 24.0000 hrs Rain Depth = 3.2000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - PRDA 5D 2 YR  
 Tc = .4822 hrs  
 Drainage Area = 1.770 acres Runoff CN= 67

=====  
 Computational Time Increment = .06429 hrs  
 Computed Peak Time = 12.4079 hrs  
 Computed Peak Flow = .68 cfs  
  
 Time Increment for HYG File = .1000 hrs  
 Peak Time, Interpolated Output = 12.4000 hrs  
 Peak Flow, Interpolated Output = .68 cfs  
 =====

DRAINAGE AREA

-----  
 ID:PRDA 5D  
 CN = 67  
 Area = 1.770 acres  
 S = 4.9254 in  
 0.2S = .9851 in

Cumulative Runoff

-----  
 .6871 in  
 .101 ac-ft

HYG Volume... .101 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48217 hrs (ID: PRDA 5D)  
 Computational Incr, Tm = .06429 hrs = 0.20000 Tp  
  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
  
 Unit peak, qp = 4.16 cfs  
 Unit peak time, Tp = .32145 hrs  
 Unit receding limb, Tr = 1.28579 hrs  
 Total unit time, Tb = 1.60724 hrs

Type.... Unit Hyd. Summary Page 6.04  
Name.... PRDA 5D Tag: 10 YR Event: 10 yr  
File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW  
Storm... TypeIII 24hr Tag: 10 YR

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm  
Duration = 24.0000 hrs Rain Depth = 4.7000 in  
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
Rain File -ID = - TypeIII 24hr  
Unit Hyd Type = Default Curvilinear  
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
HYG File - ID = - PRDA 5D 10 YR  
Tc = .4822 hrs  
Drainage Area = 1.770 acres Runoff CN= 67

=====  
Computational Time Increment = .06429 hrs  
Computed Peak Time = 12.3436 hrs  
Computed Peak Flow = 1.79 cfs

Time Increment for HYG File = .1000 hrs  
Peak Time, Interpolated Output = 12.4000 hrs  
Peak Flow, Interpolated Output = 1.79 cfs  
=====

DRAINAGE AREA

-----  
ID:PRDA 5D  
CN = 67  
Area = 1.770 acres  
S = 4.9254 in  
0.2S = .9851 in

Cumulative Runoff

-----  
1.5972 in  
.236 ac-ft

HYG Volume... .236 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48217 hrs (ID: PRDA 5D)  
Computational Incr, Tm = .06429 hrs = 0.20000 Tp  
  
Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
  
Unit peak, qp = 4.16 cfs  
Unit peak time Tp = .32145 hrs  
Unit receding limb, Tr = 1.28579 hrs  
Total unit time, Tb = 1.60724 hrs

Name.... PRDA 5D

Tag: 25 YR

Event: 25 yr

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

Storm... TypeIII 24hr Tag: 25 YR

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm  
 Duration = 24.0000 hrs Rain Depth = 5.5000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - PRDA 5D 25 YR  
 Tc = .4822 hrs  
 Drainage Area = 1.770 acres Runoff CN= 67

=====  
 Computational Time Increment = .06429 hrs  
 Computed Peak Time = 12.3436 hrs  
 Computed Peak Flow = 2.48 cfs

Time Increment for HYG File = .1000 hrs  
 Peak Time, Interpolated Output = 12.4000 hrs  
 Peak Flow, Interpolated Output = 2.46 cfs  
 =====

DRAINAGE AREA

-----  
 ID:PRDA 5D  
 CN = 67  
 Area = 1.770 acres  
 S = 4.9254 in  
 0.2S = .9851 in

Cumulative Runoff

-----  
 2.1593 in  
 .318 ac-ft

HYG Volume... .318 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48217 hrs (ID: PRDA 5D)  
 Computational Incr, Tm = .06429 hrs = 0.20000 Tp  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
 Unit peak, qp = 4.16 cfs  
 Unit peak time, Tp = .32145 hrs  
 Unit receding limb, Tr = 1.28579 hrs  
 Total unit time, Tb = 1.60724 hrs

Type.... Unit Hyd. Summary Page 6.06  
 Name.... PRDA 5D Tag: 50 YR Event: 50 yr  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW  
 Storm... TypeIII 24hr Tag: 50 YR

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm  
 Duration = 24.0000 hrs Rain Depth = 6.2000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - PRDA 5D 50 YR  
 Tc = .4822 hrs  
 Drainage Area = 1.770 acres Runoff CN= 67

```

=====
Computational Time Increment = .06429 hrs
Computed Peak Time          = 12.3436 hrs
Computed Peak Flow          = 3.12 cfs

Time Increment for HYG File = .1000 hrs
Peak Time, Interpolated Output = 12.4000 hrs
Peak Flow, Interpolated Output = 3.08 cfs
=====

```

DRAINAGE AREA

```

-----
ID: PRDA 5D
CN = 67
Area = 1.770 acres
S = 4.9254 in
0.2S = .9851 in

```

Cumulative Runoff

```

-----
2.6819 in
.396 ac-ft

```

HYG Volume... .396 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48217 hrs (ID: PRDA 5D)  
 Computational Incr, Tm = .06429 hrs = 0.20000 Tp  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
 Unit peak, qp = 4.16 cfs  
 Unit peak time, Tp = .32145 hrs  
 Unit receding limb, Tr = 1.28579 hrs  
 Total unit time, Tb = 1.60724 hrs



Name.... PRDA 5D

Tag: 100 YR

Event: 100 yr

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

Storm... TypeIII 24hr Tag: 100 YR

## SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm

Duration = 24.0000 hrs Rain Depth = 7.0000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - PRDA 5D 100 YR  
 Tc = .4822 hrs  
 Drainage Area = 1.770 acres Runoff CN= 67

=====  
 Computational Time Increment = .06429 hrs  
 Computed Peak Time = 12.3436 hrs  
 Computed Peak Flow = 3.88 cfs

Time Increment for HYG File = .1000 hrs  
 Peak Time, Interpolated Output = 12.4000 hrs  
 Peak Flow, Interpolated Output = 3.81 cfs  
 WARNING: The difference between calculated peak flow  
 and interpolated peak flow is greater than 1.50%  
 =====

## DRAINAGE AREA

-----  
 ID:PRDA 5D  
 CN = 67  
 Area = 1.770 acres  
 S = 4.9254 in  
 0.2S = .9851 in

## Cumulative Runoff

-----  
 3.3070 in  
 .488 ac-ft

HYG Volume... .488 ac-ft (area under HYG curve)

## \*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48217 hrs (ID: PRDA 5D)  
 Computational Incr, Tm = .06429 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 4.16 cfs  
 Unit peak time Tp = .32145 hrs  
 Unit receding limb, Tr = 1.28579 hrs  
 Total unit time, Tb = 1.60724 hrs

Type.... Unit Hyd. Summary  
Name.... PRDA 5ND Tag: 2 YR  
File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW  
Storm... TypeIII 24hr Tag: 2 YR

Page 6.08  
Event: 2 yr

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm  
Duration = 24.0000 hrs Rain Depth = 3.2000 in  
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
Rain File -ID = - TypeIII 24hr  
Unit Hyd Type = Default Curvilinear  
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
HYG File - ID = - PRDA 5ND 2 YR  
Tc = .4800 hrs  
Drainage Area = 4.940 acres Runoff CN= 56

=====  
Computational Time Increment = .06400 hrs  
Computed Peak Time = 12.6086 hrs  
Computed Peak Flow = .46 cfs  
  
Time Increment for HYG File = .1000 hrs  
Peak Time, Interpolated Output = 12.6000 hrs  
Peak Flow, Interpolated Output = .46 cfs  
=====

DRAINAGE AREA

-----  
ID:PRDA 5ND  
CN = 56  
Area = 4.940 acres  
S = 7.8571 in  
0.2S = 1.5714 in

Cumulative Runoff

-----  
.2796 in  
.115 ac-ft

HYG Volume... .115 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48002 hrs (ID: PRDA 5ND)  
Computational Incr, Tm = .06400 hrs = 0.20000 Tp  
  
Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
  
Unit peak, qp = 11.66 cfs  
Unit peak time, Tp = .32002 hrs  
Unit receding limb, Tr = 1.28006 hrs  
Total unit time, Tb = 1.60008 hrs

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm  
 Duration = 24.0000 hrs Rain Depth = 4.7000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - PRDA 5ND 10 YR  
 Tc = .4800 hrs  
 Drainage Area = 4.940 acres Runoff CN= 56

=====  
 Computational Time Increment = .06400 hrs  
 Computed Peak Time = 12.4166 hrs  
 Computed Peak Flow = 2.36 cfs

Time Increment for HYG File = .1000 hrs  
 Peak Time, Interpolated Output = 12.4000 hrs  
 Peak Flow, Interpolated Output = 2.33 cfs  
 =====

DRAINAGE AREA

-----  
 ID:PRDA 5ND  
 CN = 56  
 Area = 4.940 acres  
 S = 7.8571 in  
 0.2S = 1.5714 in

Cumulative Runoff

-----  
 .8910 in  
 .367 ac-ft

HYG Volume... .367 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48002 hrs (ID: PRDA 5ND)  
 Computational Incr, Tm = .06400 hrs = 0.20000 Tp  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
 Unit peak, qp = 11.66 cfs  
 Unit peak time Tp = .32002 hrs  
 Unit receding limb, Tr = 1.28006 hrs  
 Total unit time, Tb = 1.60008 hrs

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm  
 Duration = 24.0000 hrs Rain Depth = 5.5000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - PRDA 5ND 25 YR  
 Tc = .4800 hrs  
 Drainage Area = 4.940 acres Runoff CN= 56

=====  
 Computational Time Increment = .06400 hrs  
 Computed Peak Time = 12.4166 hrs  
 Computed Peak Flow = 3.78 cfs  
 Time Increment for HYG File = .1000 hrs  
 Peak Time, Interpolated Output = 12.4000 hrs  
 Peak Flow, Interpolated Output = 3.76 cfs  
 =====

DRAINAGE AREA

-----  
 ID:PRDA 5ND  
 CN = 56  
 Area = 4.940 acres  
 S = 7.8571 in  
 0.2S = 1.5714 in

Cumulative Runoff

-----  
 1.3095 in  
 .539 ac-ft

HYG Volume... .539 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48002 hrs (ID: PRDA 5ND)  
 Computational Incr, Tm = .06400 hrs = 0.20000 Tp  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
 Unit peak, qp = 11.66 cfs  
 Unit peak time, Tp = .32002 hrs  
 Unit receding limb, Tr = 1.28006 hrs  
 Total unit time, Tb = 1.60008 hrs

Type.... Unit Hyd. Summary Page 6.11  
 Name.... PRDA 5ND Tag: 50 YR Event: 50 yr  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW  
 Storm... TypeIII 24hr Tag: 50 YR

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm  
 Duration = 24.0000 hrs Rain Depth = 6.2000 in  
 Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Rain File -ID = - TypeIII 24hr  
 Unit Hyd Type = Default Curvilinear  
 HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 HYG File - ID = - PRDA 5ND 50 YR  
 Tc = .4800 hrs  
 Drainage Area = 4.940 acres Runoff CN= 56

=====  
 Computational Time Increment = .06400 hrs  
 Computed Peak Time = 12.4166 hrs  
 Computed Peak Flow = 5.15 cfs  
  
 Time Increment for HYG File = .1000 hrs  
 Peak Time, Interpolated Output = 12.4000 hrs  
 Peak Flow, Interpolated Output = 5.15 cfs  
 =====

DRAINAGE AREA

-----  
 ID:PRDA 5ND  
 CN = 56  
 Area = 4.940 acres  
 S = 7.8571 in  
 0.2S = 1.5714 in

Cumulative Runoff

-----  
 1.7159 in  
 .706 ac-ft

HYG Volume... .706 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48002 hrs (ID: PRDA 5ND)  
 Computational Incr, Tm = .06400 hrs = 0.20000 Tp  
  
 Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
 K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))  
 Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
  
 Unit peak, qp = 11.66 cfs  
 Unit peak time, Tp = .32002 hrs  
 Unit receding limb, Tr = 1.28006 hrs  
 Total unit time, Tb = 1.60008 hrs

Type.... Unit Hyd. Summary  
Name.... PRDA 5ND Tag: 100 YR  
File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW  
Storm... TypeIII 24hr Tag: 100 YR

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm  
Duration = 24.0000 hrs Rain Depth = 7.0000 in  
Rain Dir = C:\Program Files\Haestad\PPKW\PPW\  
Rain File -ID = - TypeIII 24hr  
Unit Hyd Type = Default Curvilinear  
HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
HYG File - ID = - PRDA 5ND 100 YR  
Tc = .4800 hrs  
Drainage Area = 4.940 acres Runoff CN= 56

=====  
Computational Time Increment = .06400 hrs  
Computed Peak Time = 12.3526 hrs  
Computed Peak Flow = 6.88 cfs

Time Increment for HYG File = .1000 hrs  
Peak Time, Interpolated Output = 12.4000 hrs  
Peak Flow, Interpolated Output = 6.85 cfs  
=====

DRAINAGE AREA

-----  
ID:PRDA 5ND  
CN = 56  
Area = 4.940 acres  
S = 7.8571 in  
0.2S = 1.5714 in

Cumulative Runoff

-----  
2.2181 in  
.913 ac-ft

HYG Volume... .913 ac-ft (area under HYG curve)

\*\*\*\*\* SCS UNIT HYDROGRAPH PARAMETERS \*\*\*\*\*

Time Concentration, Tc = .48002 hrs (ID: PRDA 5ND)  
Computational Incr, Tm = .06400 hrs = 0.20000 Tp  
Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)  
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))  
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)  
Unit peak, qp = 11.66 cfs  
Unit peak time, Tp = .32002 hrs  
Unit receding limb, Tr = 1.28006 hrs  
Total unit time, Tb = 1.60008 hrs

SUMMARY FOR HYDROGRAPH ADDITION  
at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID      HYG tag
-----
TO DP5            JUNCTION      JUNCTION      2 YR
=====

```

INFLOWS TO: DP 5

```

----- Volume      Peak Time      Peak Flow
HYG file  HYG ID      HYG tag      ac-ft      hrs      cfs
-----
          JUNCTION      2 YR      .115      12.6000      .46

```

TOTAL FLOW INTO: DP 5

```

----- Volume      Peak Time      Peak Flow
HYG file  HYG ID      HYG tag      ac-ft      hrs      cfs
-----
          DP 5            2 YR      .115      12.6000      .46

```

TOTAL NODE INFLOW...

HYG file =  
HYG ID = DP 5  
HYG Tag = 2 YR

-----  
Peak Discharge = .46 cfs  
Time to Peak = 12.6000 hrs  
HYG Volume = .115 ac-ft  
-----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time |  
hrs | Time on left represents time for first value in each row.

Time hrs					
12.0000	.00	.02	.09	.22	.35
12.5000	.44	.46	.43	.38	.34
13.0000	.31	.28	.26	.24	.23
13.5000	.22	.21	.21	.20	.20
14.0000	.19	.19	.18	.18	.17
14.5000	.17	.17	.16	.16	.16
15.0000	.16	.15	.15	.15	.14
15.5000	.14	.14	.13	.13	.13
16.0000	.12	.12	.11	.11	.11
16.5000	.11	.10	.10	.10	.10
17.0000	.10	.10	.09	.09	.09
17.5000	.09	.09	.08	.08	.08
18.0000	.08	.08	.07	.07	.07
18.5000	.07	.07	.07	.07	.07
19.0000	.07	.07	.07	.07	.07
19.5000	.07	.07	.06	.06	.06
20.0000	.06	.06	.06	.06	.06
20.5000	.06	.06	.06	.06	.06
21.0000	.06	.06	.06	.06	.06
21.5000	.06	.06	.06	.05	.05
22.0000	.05	.05	.05	.05	.05
22.5000	.05	.05	.05	.05	.05
23.0000	.05	.05	.05	.05	.05
23.5000	.05	.05	.05	.05	.04
24.0000	.04	.04	.04	.03	.02
24.5000	.01	.01	.00	.00	.00
25.0000	.00				



SUMMARY FOR HYDROGRAPH ADDITION  
at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID      HYG tag
-----
TO DP5           JUNCTION                JUNCTION     10 YR
=====

```

INFLOWS TO: DP 5

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time      Peak Flow
ac-ft         hrs          cfs
-----
                JUNCTION     10 YR        .424        12.5000       2.39
-----

```

TOTAL FLOW INTO: DP 5

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time      Peak Flow
ac-ft         hrs          cfs
-----
                DP 5         10 YR        .424        12.5000       2.39
-----

```

Type.... Node: Addition Summary  
 Name.... DP 5  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW  
 Storm... TypeIII 24hr Tag: 10 YR

Page 7.04  
 Event: 10 yr

TOTAL NODE INFLOW...

HYG file =  
 HYG ID = DP 5  
 HYG Tag = 10 YR

-----  
 Peak Discharge = 2.39 cfs  
 Time to Peak = 12.5000 hrs  
 HYG Volume = .424 ac-ft  
 -----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs  
 Time on left represents time for first value in each row.

Time hrs					
11.7000	.00	.01	.05	.24	.70
12.2000	1.42	2.05	2.35	2.39	2.24
12.7000	1.98	1.70	1.47	1.30	1.18
13.2000	1.08	1.00	.95	.90	.87
13.7000	.84	.81	.79	.76	.74
14.2000	.71	.69	.67	.65	.62
14.7000	.60	.58	.56	.54	.52
15.2000	.50	.48	.46	.44	.42
15.7000	.40	.39	.37	.36	.34
16.2000	.32	.31	.29	.28	.27
16.7000	.27	.26	.25	.25	.24
17.2000	.23	.22	.22	.21	.21
17.7000	.20	.20	.19	.19	.18
18.2000	.18	.18	.17	.17	.17
18.7000	.17	.17	.16	.16	.16
19.2000	.16	.16	.16	.16	.15
19.7000	.15	.15	.15	.15	.15
20.2000	.15	.14	.14	.14	.14
20.7000	.14	.14	.14	.14	.14
21.2000	.13	.13	.13	.13	.13
21.7000	.13	.13	.13	.13	.12
22.2000	.12	.12	.12	.12	.12
22.7000	.12	.12	.11	.11	.11
23.2000	.11	.11	.11	.11	.11
23.7000	.11	.10	.10	.10	.10
24.2000	.08	.06	.04	.02	.01
24.7000	.01	.00	.00	.00	.00

SUMMARY FOR HYDROGRAPH ADDITION  
at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID      HYG tag
-----
TO DP5            JUNCTION            JUNCTION      25 YR
=====

```

INFLOWS TO: DP 5

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time      Peak Flow
ac-ft        hrs          cfs
-----
                JUNCTION      25 YR        .654        12.4000        3.95
-----

```

TOTAL FLOW INTO: DP 5

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time      Peak Flow
ac-ft        hrs          cfs
-----
                DP 5          25 YR        .654        12.4000        3.95
-----

```

Name.... DP 5

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

Storm... TypeIII 24hr Tag: 25 YR

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 5

HYG Tag = 25 YR

-----  
Peak Discharge = 3.95 cfs  
Time to Peak = 12.4000 hrs  
HYG Volume = .654 ac-ft  
-----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time hrs	Time on left represents time for first value in each row.				
11.4000	.00	.00	.01	.04	.12
11.9000	.30	.71	1.49	2.60	3.51
12.4000	3.95	3.85	3.46	2.97	2.51
12.9000	2.17	1.91	1.72	1.57	1.46
13.4000	1.37	1.30	1.25	1.20	1.16
13.9000	1.13	1.09	1.06	1.03	1.00
14.4000	.98	.95	.93	.91	.89
14.9000	.87	.85	.83	.81	.78
15.4000	.76	.74	.72	.69	.67
15.9000	.64	.62	.59	.56	.54
16.4000	.51	.49	.47	.45	.43
16.9000	.41	.39	.38	.36	.35
17.4000	.34	.32	.31	.30	.29
17.9000	.28	.27	.26	.25	.24
18.4000	.24	.23	.23	.22	.22
18.9000	.22	.22	.22	.21	.21
19.4000	.21	.21	.21	.20	.20
19.9000	.20	.20	.20	.19	.19
20.4000	.19	.19	.19	.19	.19
20.9000	.18	.18	.18	.18	.18
21.4000	.18	.17	.17	.17	.17
21.9000	.17	.17	.17	.16	.16
22.4000	.16	.16	.16	.16	.15
22.9000	.15	.15	.15	.15	.15
23.4000	.15	.14	.14	.14	.14
23.9000	.14	.14	.13	.11	.08
24.4000	.05	.03	.02	.01	.01
24.9000	.00	.00	.00	.00	

SUMMARY FOR HYDROGRAPH ADDITION  
at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP5           JUNCTION              JUNCTION      50 YR
=====

```

INFLOWS TO: DP 5

```

----- Volume      Peak Time      Peak Flow
HYG file  HYG ID        HYG tag        ac-ft         hrs           cfs
-----
          JUNCTION      50 YR          .880          12.4000       5.44

```

TOTAL FLOW INTO: DP 5

```

----- Volume      Peak Time      Peak Flow
HYG file  HYG ID        HYG tag        ac-ft         hrs           cfs
-----
          DP 5           50 YR          .880          12.4000       5.44

```

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 5

HYG Tag = 50 YR

-----  
 Peak Discharge = 5.44 cfs  
 Time to Peak = 12.4000 hrs  
 HYG Volume = .880 ac-ft  
 -----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time | Time on left represents time for first value in each row.

Time hrs					
11.1000	.00	.00	.01	.03	.05
11.6000	.10	.18	.34	.63	1.23
12.1000	2.32	3.79	5.04	5.44	5.18
12.6000	4.64	4.11	3.61	3.17	2.80
13.1000	2.51	2.26	2.05	1.89	1.76
13.6000	1.66	1.56	1.49	1.43	1.37
14.1000	1.31	1.27	1.22	1.19	1.16
14.6000	1.13	1.11	1.08	1.06	1.04
15.1000	1.01	.99	.97	.94	.92
15.6000	.89	.87	.84	.81	.79
16.1000	.76	.73	.71	.68	.66
16.6000	.64	.62	.60	.57	.55
17.1000	.53	.51	.49	.47	.45
17.6000	.43	.41	.39	.38	.36
18.1000	.35	.33	.32	.31	.30
18.6000	.30	.29	.29	.28	.28
19.1000	.27	.27	.26	.26	.26
19.6000	.25	.25	.25	.25	.24
20.1000	.24	.24	.24	.24	.23
20.6000	.23	.23	.23	.23	.22
21.1000	.22	.22	.22	.22	.21
21.6000	.21	.21	.21	.21	.21
22.1000	.20	.20	.20	.20	.20
22.6000	.19	.19	.19	.19	.19
23.1000	.18	.18	.18	.18	.18
23.6000	.17	.17	.17	.17	.17
24.1000	.16	.13	.10	.06	.04
24.6000	.02	.01	.01	.00	.00
25.1000	.00	.00			

Type.... Node: Addition Summary Page 7.09  
 Name.... DP 5 Event: 100 yr  
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW  
 Storm... TypeIII 24hr Tag: 100 YR

SUMMARY FOR HYDROGRAPH ADDITION  
 at Node: DP 5

HYG Directory: C:\Program Files\Haestad\PPKW\PPW\

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID      HYG tag
-----
TO DP5            JUNCTION      .              JUNCTION    100 YR
=====
  
```

INFLOWS TO: DP 5

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time      Peak Flow
              ac-ft       hrs          cfs
-----
              JUNCTION    100 YR       1.160       12.4000       7.23
  
```

TOTAL FLOW INTO: DP 5

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time      Peak Flow
              ac-ft       hrs          cfs
-----
              DP 5        100 YR       1.160       12.4000       7.23
  
```

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 5

HYG Tag = 100 YR

-----  
Peak Discharge = 7.23 cfs

Time to Peak = 12.4000 hrs

HYG Volume = 1.160 ac-ft  
-----

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time hrs	Time on left represents time for first value in each row.				
10.7000	.00	.00	.01	.02	.04
11.2000	.07	.10	.15	.20	.28
11.7000	.41	.65	1.07	1.90	3.36
12.2000	5.37	6.86	7.23	7.05	6.60
12.7000	5.92	5.13	4.45	3.87	3.40
13.2000	3.01	2.70	2.45	2.25	2.10
13.7000	1.97	1.87	1.78	1.69	1.62
14.2000	1.55	1.49	1.43	1.39	1.35
14.7000	1.32	1.29	1.25	1.23	1.20
15.2000	1.17	1.15	1.12	1.09	1.06
15.7000	1.04	1.01	.98	.95	.92
16.2000	.89	.86	.83	.81	.79
16.7000	.77	.75	.73	.71	.69
17.2000	.67	.64	.62	.60	.57
17.7000	.55	.53	.51	.48	.46
18.2000	.44	.42	.41	.40	.39
18.7000	.38	.37	.36	.35	.34
19.2000	.34	.33	.33	.32	.32
19.7000	.31	.31	.31	.30	.30
20.2000	.29	.29	.29	.29	.28
20.7000	.28	.28	.28	.27	.27
21.2000	.27	.27	.26	.26	.26
21.7000	.26	.25	.25	.25	.25
22.2000	.25	.24	.24	.24	.24
22.7000	.23	.23	.23	.23	.22
23.2000	.22	.22	.22	.21	.21
23.7000	.21	.21	.20	.20	.19
24.2000	.16	.12	.08	.04	.03
24.7000	.02	.01	.01	.00	.00
25.2000	.00	.00			



File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqrt(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1434.50	-----	.0720	.0000	.000	.000
1437.00	-----	.0720	.2160	.180	.180

POND VOLUME EQUATIONS

\* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment  
Area1, Area2 = Areas computed for EL1, EL2, respectively  
Volume = Incremental volume between EL1 and EL2

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 1434.50 ft  
Increment = .10 ft  
Max. Elev.= 1437.00 ft

\*\*\*\*\*  
OUTLET CONNECTIVITY  
\*\*\*\*\*

- > Forward Flow Only (UpStream to DnStream)
- <--- Reverse Flow Only (DnStream to UpStream)
- <---> Forward and Reverse Both Allowed

Structure	No.	Outfall	E1, ft	E2, ft
Orifice-Circular	2	---> TW	1436.000	1437.000
Orifice-Circular	1	---> TW	1435.000	1437.000

TW SETUP, DS Channel

File... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

OUTLET STRUCTURE INPUT DATA

Structure ID = 2  
Structure Type = Orifice-Circular  
-----  
# of Openings = 1  
Invert Elev. = 1436.00 ft  
Diameter = .6670 ft  
Orifice Coeff. = .600

Structure ID = 1  
Structure Type = Orifice-Circular  
-----  
# of Openings = 1  
Invert Elev. = 1435.00 ft  
Diameter = .3330 ft  
Orifice Coeff. = .600

Structure ID = TW  
Structure Type = TW SETUP, DS Channel  
-----

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...  
Maximum Iterations= 30  
Min. TW tolerance = .01 ft  
Max. TW tolerance = .01 ft  
Min. HW tolerance = .01 ft  
Max. HW tolerance = .01 ft  
Min. Q tolerance = .10 cfs  
Max. Q tolerance = .10 cfs

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 2 (Orifice-Circular)  
 -----  
 Upstream ID = (Pond Water Surface)  
 DNstream ID = TW (Pond Outfall)

WS Elev, Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
1434.50	.00	Free Outfall		HW & TW below invert
1434.60	.00	Free Outfall		HW & TW below invert
1434.70	.00	Free Outfall		HW & TW below invert
1434.80	.00	Free Outfall		HW & TW below invert
1434.90	.00	Free Outfall		HW & TW below invert
1435.00	.00	Free Outfall		HW & TW below invert
1435.10	.00	Free Outfall		HW & TW below invert
1435.20	.00	Free Outfall		HW & TW below invert
1435.30	.00	Free Outfall		HW & TW below invert
1435.40	.00	Free Outfall		HW & TW below invert
1435.50	.00	Free Outfall		HW & TW below invert
1435.60	.00	Free Outfall		HW & TW below invert
1435.70	.00	Free Outfall		HW & TW below invert
1435.80	.00	Free Outfall		HW & TW below invert
1435.90	.00	Free Outfall		HW & TW below invert
1436.00	.00	Free Outfall		Upstream HW & DNstream TW < Inv. El
1436.10	.03	Free Outfall		CRIT.DEPTH CONTROL Vh= .027ft Dcr= .073ft CRIT.DEPTH
1436.20	.11	Free Outfall		CRIT.DEPTH CONTROL Vh= .052ft Dcr= .148ft CRIT.DEPTH
1436.30	.23	Free Outfall		CRIT.DEPTH CONTROL Vh= .081ft Dcr= .219ft CRIT.DEPTH
1436.40	.39	Free Outfall		CRIT.DEPTH CONTROL Vh= .110ft Dcr= .289ft CRIT.DEPTH
1436.50	.58	Free Outfall		CRIT.DEPTH CONTROL Vh= .143ft Dcr= .357ft CRIT.DEPTH
1436.60	.79	Free Outfall		CRIT.DEPTH CONTROL Vh= .180ft Dcr= .421ft CRIT.DEPTH
1436.70	1.02	Free Outfall		H =.37
1436.80	1.15	Free Outfall		H =.47
1436.90	1.27	Free Outfall		H =.57
1437.00	1.37	Free Outfall		H =.67

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)  
 DNstream ID = TW (Pond Outfall)

WS Elev, Device Q		Tail Water		Notes
WS Elev. ft	Q cfs	TW Elev ft	Converge +/-ft	Computation Messages
1434.50	.00	Free Outfall		HW & TW below invert
1434.60	.00	Free Outfall		HW & TW below invert
1434.70	.00	Free Outfall		HW & TW below invert
1434.80	.00	Free Outfall		HW & TW below invert
1434.90	.00	Free Outfall		HW & TW below invert
1435.00	.00	Free Outfall		Upstream HW & DNstream TW < Inv.El
1435.10	.02	Free Outfall		CRIT.DEPTH CONTROL Vh= .027ft Dcr= .073ft CRIT.DEPTH
1435.20	.07	Free Outfall		CRIT.DEPTH CONTROL Vh= .054ft Dcr= .146ft CRIT.DEPTH
1435.30	.14	Free Outfall		CRIT.DEPTH CONTROL Vh= .092ft Dcr= .208ft CRIT.DEPTH
1435.40	.20	Free Outfall		H =.23
1435.50	.24	Free Outfall		H =.33
1435.60	.28	Free Outfall		H =.43
1435.70	.31	Free Outfall		H =.53
1435.80	.33	Free Outfall		H =.63
1435.90	.36	Free Outfall		H =.73
1436.00	.38	Free Outfall		H =.83
1436.10	.40	Free Outfall		H =.93
1436.20	.43	Free Outfall		H =1.03
1436.30	.45	Free Outfall		H =1.13
1436.40	.47	Free Outfall		H =1.23
1436.50	.48	Free Outfall		H =1.33
1436.60	.50	Free Outfall		H =1.43
1436.70	.52	Free Outfall		H =1.53
1436.80	.54	Free Outfall		H =1.63
1436.90	.55	Free Outfall		H =1.73
1437.00	.57	Free Outfall		H =1.83

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

\*\*\*\*\* COMPOSITE OUTFLOW SUMMARY \*\*\*\*\*

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
1434.50	.00	Free Outfall		None contributing
1434.60	.00	Free Outfall		None contributing
1434.70	.00	Free Outfall		None contributing
1434.80	.00	Free Outfall		None contributing
1434.90	.00	Free Outfall		None contributing
1435.00	.00	Free Outfall		None contributing
1435.10	.02	Free Outfall		1
1435.20	.07	Free Outfall		1
1435.30	.14	Free Outfall		1
1435.40	.20	Free Outfall		1
1435.50	.24	Free Outfall		1
1435.60	.28	Free Outfall		1
1435.70	.31	Free Outfall		1
1435.80	.33	Free Outfall		1
1435.90	.36	Free Outfall		1
1436.00	.38	Free Outfall		1
1436.10	.43	Free Outfall		2 +1
1436.20	.53	Free Outfall		2 +1
1436.30	.67	Free Outfall		2 +1
1436.40	.85	Free Outfall		2 +1
1436.50	1.06	Free Outfall		2 +1
1436.60	1.29	Free Outfall		2 +1
1436.70	1.54	Free Outfall		2 +1
1436.80	1.68	Free Outfall		2 +1
1436.90	1.82	Free Outfall		2 +1
1437.00	1.94	Free Outfall		2 +1

INFILTRATION RATING TABLE CALCULATIONS

Infilt.(cfs) = (3.0000 (in/hr) \* Area) \* Ku  
 Where: Ku = units conversion factor

	W.S.Elev ft	Total Area acres	Infilt. cfs
-----			
No storage at this elevation... infiltration set to zero.			
	1434.50	.0720	.00
	1434.60	.0720	.22
	1434.70	.0720	.22
	1434.80	.0720	.22
	1434.90	.0720	.22
	1435.00	.0720	.22
	1435.10	.0720	.22
	1435.20	.0720	.22
	1435.30	.0720	.22
	1435.40	.0720	.22
	1435.50	.0720	.22
	1435.60	.0720	.22
	1435.70	.0720	.22
	1435.80	.0720	.22
	1435.90	.0720	.22
	1436.00	.0720	.22
	1436.10	.0720	.22
	1436.20	.0720	.22
	1436.30	.0720	.22
	1436.40	.0720	.22
	1436.50	.0720	.22
	1436.60	.0720	.22
	1436.70	.0720	.22
	1436.80	.0720	.22
	1436.90	.0720	.22
	1437.00	.0720	.22

Name.... UNDER DET 5

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Inflow HYG file = NONE STORED - UNDER DET 5 IN 2 YR  
 Outflow HYG file = NONE STORED - UNDER DET 5 OUT 2 YR

Pond Node Data = UNDER DET 5  
 Pond Volume Data = UNDER DET 5  
 Pond Outlet Data = Outlet 1

Infiltration = 3.0000 in/hr

INITIAL CONDITIONS

-----  
 Starting WS Elev = 1434.50 ft  
 Starting Volume = .000 ac-ft  
 Starting Outflow = .00 cfs  
 Starting Infiltr. = .00 cfs  
 Starting Total Qout = .00 cfs  
 Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infiltr. cfs	Q Total cfs	2S/t + O cfs
1434.50	.00	.000	.0720	.00	.00	.00
1434.60	.00	.007	.0720	.22	.22	1.96
1434.70	.00	.014	.0720	.22	.22	3.70
1434.80	.00	.022	.0720	.22	.22	5.45
1434.90	.00	.029	.0720	.22	.22	7.19
1435.00	.00	.036	.0720	.22	.22	8.93
1435.10	.02	.043	.0720	.22	.24	10.69
1435.20	.07	.050	.0720	.22	.29	12.48
1435.30	.14	.058	.0720	.22	.36	14.30
1435.40	.20	.065	.0720	.22	.42	16.10
1435.50	.24	.072	.0720	.22	.46	17.88
1435.60	.28	.079	.0720	.22	.49	19.66
1435.70	.31	.086	.0720	.22	.52	21.43
1435.80	.33	.094	.0720	.22	.55	23.20
1435.90	.36	.101	.0720	.22	.58	24.97
1436.00	.38	.108	.0720	.22	.60	26.74
1436.10	.43	.115	.0720	.22	.65	28.53
1436.20	.53	.122	.0720	.22	.75	30.37
1436.30	.67	.130	.0720	.22	.89	32.26
1436.40	.85	.137	.0720	.22	1.07	34.18



Name.... UNDER DET 5

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW

LEVEL POOL ROUTING DATA

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Inflow HYG file = NONE STORED - UNDER DET 5 IN 2 YR  
 Outflow HYG file = NONE STORED - UNDER DET 5 OUT 2 YR

Pond Node Data = UNDER DET 5  
 Pond Volume Data = UNDER DET 5  
 Pond Outlet Data = Outlet 1

Infiltration = 3.0000 in/hr

INITIAL CONDITIONS

-----  
 Starting WS Elev = 1434.50 ft  
 Starting Volume = .000 ac-ft  
 Starting Outflow = .00 cfs  
 Starting Infiltr. = .00 cfs  
 Starting Total Qout = .00 cfs  
 Time Increment = .1000 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infiltr. cfs	Q Total cfs	2S/t + O cfs
1436.50	1.06	.144	.0720	.22	1.28	36.13
1436.60	1.29	.151	.0720	.22	1.51	38.10
1436.70	1.54	.158	.0720	.22	1.75	40.09
1436.80	1.68	.166	.0720	.22	1.90	41.98
1436.90	1.82	.173	.0720	.22	2.04	43.85
1437.00	1.94	.180	.0720	.22	2.16	45.72

Type... Pond Routing Summary  
Name... UNDER DET 5 OUT Tag: 2 YR  
File... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW  
Storm... TypeIII 24hr Tag: 2 YR

Page 10.04  
Event: 2 yr

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
Inflow HYG file = NONE STORED - UNDER DET 5 IN 2 YR  
Outflow HYG file = NONE STORED - UNDER DET 5 OUT 2 YR

Pond Node Data = UNDER DET 5  
Pond Volume Data = UNDER DET 5  
Pond Outlet Data = Outlet 1

Infiltration = 3.0000 in/hr

INITIAL CONDITIONS

-----  
Starting WS Elev = 1434.50 ft  
Starting Volume = .000 ac-ft  
Starting Outflow = .00 cfs  
Starting Infiltr. = .00 cfs  
Starting Total Qout = .00 cfs  
Time Increment = .1000 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====  
Peak Inflow = .68 cfs at 12.4000 hrs  
Peak Outflow = .00 cfs at 11.7000 hrs  
Peak Infiltration = .22 cfs at 12.4000 hrs  
-----

Peak Elevation = 1434.84 ft  
Peak Storage = .025 ac-ft  
=====

MASS BALANCE (ac-ft)

-----  
+ Initial Vol = .000  
+ HYG Vol IN = .101  
- Infiltration = .101  
- HYG Vol OUT = .000  
- Retained Vol = .000  
-----  
Unrouted Vol = .000 ac-ft (.000% of Inflow Volume)

type.... Pond Routing Summary  
Name.... UNDER DET 5 OUT Tag: 10 YR  
File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW  
Storm... TypeIII 24hr Tag: 10 YR

Page 10.05  
Event: 10 yr

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
Inflow HYG file = NONE STORED - UNDER DET 5 IN 10 YR  
Outflow HYG file = NONE STORED - UNDER DET 5 OUT 10 YR

Pond Node Data = UNDER DET 5  
Pond Volume Data = UNDER DET 5  
Pond Outlet Data = Outlet 1

Infiltration = 3.0000 in/hr

INITIAL CONDITIONS

-----  
Starting WS Elev = 1434.50 ft  
Starting Volume = .000 ac-ft  
Starting Outflow = .00 cfs  
Starting Infiltr. = .00 cfs  
Starting Total Qout = .00 cfs  
Time Increment = .1000 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====  
Peak Inflow = 1.79 cfs at 12.4000 hrs  
Peak Outflow = .28 cfs at 13.2000 hrs  
Peak Infiltration = .22 cfs at 12.1000 hrs  
-----

Peak Elevation = 1435.61 ft  
Peak Storage = .080 ac-ft  
=====

MASS BALANCE (ac-ft)

-----  
+ Initial Vol = .000  
+ HYG Vol IN = .236  
- Infiltration = .178  
- HYG Vol OUT = .057  
- Retained Vol = .000  
-----  
Unrouted Vol = -.000 ac-ft (.002% of Inflow Volume)

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
 Inflow HYG file = NONE STORED - UNDER DET 5 IN 25 YR  
 Outflow HYG file = NONE STORED - UNDER DET 5 OUT 25 YR

Pond Node Data = UNDER DET 5  
 Pond Volume Data = UNDER DET 5  
 Pond Outlet Data = Outlet 1

Infiltration = 3.0000 in/hr

INITIAL CONDITIONS

```

-----
Starting WS Elev = 1434.50 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout = .00 cfs
Time Increment = .1000 hrs
  
```

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

```

=====
Peak Inflow = 2.46 cfs at 12.4000 hrs
Peak Outflow = .43 cfs at 13.1000 hrs
Peak Infiltration = .22 cfs at 12.0000 hrs
-----
Peak Elevation = 1436.10 ft
Peak Storage = .115 ac-ft
=====
  
```

MASS BALANCE (ac-ft)

```

-----
+ Initial Vol = .000
+ HYG Vol IN = .318
- Infiltration = .203
- HYG Vol OUT = .115
- Retained Vol = .000
-----
Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)
  
```

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\Program Files\Haestad\PPKW\PPW\  
Inflow HYG file = NONE STORED - UNDER DET 5 IN 50 YR  
Outflow HYG file = NONE STORED - UNDER DET 5 OUT 50 YR

Pond Node Data = UNDER DET 5  
Pond Volume Data = UNDER DET 5  
Pond Outlet Data = Outlet 1

Infiltration = 3.0000 in/hr

INITIAL CONDITIONS

-----  
Starting WS Elev = 1434.50 ft  
Starting Volume = .000 ac-ft  
Starting Outflow = .00 cfs  
Starting Infiltr. = .00 cfs  
Starting Total Qout = .00 cfs  
Time Increment = .1000 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====  
Peak Inflow = 3.08 cfs at 12.4000 hrs  
Peak Outflow = .89 cfs at 12.9000 hrs  
Peak Infiltration = .22 cfs at 11.8000 hrs  
-----  
Peak Elevation = 1436.42 ft  
Peak Storage = .138 ac-ft  
=====

MASS BALANCE (ac-ft)

-----  
+ Initial Vol = .000  
+ HYG Vol IN = .396  
- Infiltration = .222  
- HYG Vol OUT = .174  
- Retained Vol = .000  
-----  
Unrouted Vol = .000 ac-ft (.001% of Inflow Volume)

```

Type.... Pond Routing Summary
Name.... UNDER DET 5 OUT Tag: 100 YR
File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 5.PPW
Storm... TypeIII 24hr Tag: 100 YR

```

```

Page 10.00
Event: 100 yr

```

LEVEL POOL ROUTING SUMMARY

```

HYG Dir           = C:\Program Files\Haestad\PPKW\PPW\
Inflow HYG file  = NONE STORED - UNDER DET 5 IN 100 YR
Outflow HYG file = NONE STORED - UNDER DET 5 OUT 100 YR

```

```

Pond Node Data = UNDER DET 5
Pond Volume Data = UNDER DET 5
Pond Outlet Data = Outlet 1

```

Infiltration = 3.0000 in/hr

INITIAL CONDITIONS

```

-----
Starting WS Elev = 1434.50 ft
Starting Volume  = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout = .00 cfs
Time Increment   = .1000 hrs

```

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

```

=====
Peak Inflow      = 3.81 cfs at 12.4000 hrs
Peak Outflow     = 1.56 cfs at 12.8000 hrs
Peak Infiltration = .22 cfs at 11.6000 hrs
-----
Peak Elevation   = 1436.72 ft
Peak Storage     = .159 ac-ft
=====

```

MASS BALANCE (ac-ft)

```

-----
+ Initial Vol = .000
+ HYG Vol IN  = .488
- Infiltration = .240
- HYG Vol OUT = .247
- Retained Vol = .000
-----
Unrouted Vol = .000 ac-ft (.001% of Inflow Volume)

```

Index of Starting Page Numbers for ID Names

----- D -----

DP 5 2 YR... 7.01, 7.03, 7.05, 7.07,  
7.09

----- L -----

Litchfield Co.... 2.01, 2.02

----- O -----

Outlet 1... 9.01, 9.03, 9.05

----- P -----

PRDA 5D... 4.01, 5.01, 6.03, 6.04,  
6.05, 6.06, 6.07  
PRDA 5ND... 4.03, 5.02, 6.08, 6.09,  
6.10, 6.11, 6.12, 3.01

----- U -----

UNDER DET 5... 8.01, 10.01, 10.02  
UNDER DET 5 OUT 2 YR... 10.04,  
10.05, 10.06, 10.07, 10.08

----- W -----

Watershed... 1.01