

**STORMWATER MANAGEMENT PLAN WITH
STORMWATER POLLUTION PREVENTION PLAN
(SWPPP)
VOLUME 2**

**WIND COLEBROOK SOUTH
COLEBROOK, CONNECTICUT**

Prepared for:



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Producer of green clean energy

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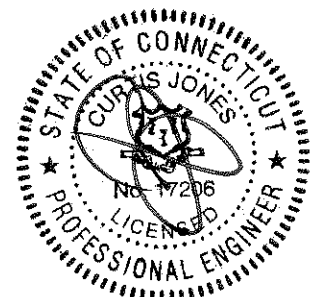
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**CONNECTICUT
SITING COUNCIL**

CIVIL C1
Civil Engineers

**CIVIL 1
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Woodbury, CT 06798**

AUGUST 2011



Existing Flows – DL3

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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 3	JCT	2	.146		12.4000	.73		
*DP 3	JCT	10	.448		12.3000	3.49		
*DP 3	JCT	25	.653		12.2500	5.53		
*DP 3	JCT	50	.850		12.2500	7.49		
*DP 3	JCT	100	1.093		12.2500	9.90		
EXDA 3	AREA	2	.146		12.4000	.73		
EXDA 3	AREA	10	.448		12.3000	3.49		
EXDA 3	AREA	25	.653		12.2500	5.53		
EXDA 3	AREA	50	.850		12.2500	7.49		
EXDA 3	AREA	100	1.093		12.2500	9.90		

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

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.PPW

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

Segment #1: Tc: TR-55 Sheet

Mannings n .3000
Hydraulic Length 250.00 ft
2yr, 24hr P 3.2000 in
Slope .120000 ft/ft

Avg.Velocity .24 ft/sec

Segment #1 Time: .2890 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length 335.00 ft
Slope .131000 ft/ft
Unpaved

Avg.Velocity 5.84 ft/sec

Segment #2 Time: .0159 hrs

Total Tc: .3049 hrs
=====

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.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

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.PPW

RUNOFF CURVE NUMBER DATA

.....

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Soil Type B - Wooded	55	4.710			55.00
Soil Type B - Grass/Meadow	60	.820			60.00
Impervious	98	.140			98.00

COMPOSITE AREA & WEIGHTED CN ---> 5.670 56.78 (57)

.....

Name....

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.PPW

SCS UNIT HYDROGRAPH METHOD
(Computational Notes)

DEFINITION OF TERMS: -----

At = Total area (acres): $A_t = A_i + A_p$
 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⁻¹)
 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, rtm, and th
 (Smallest dt is then adjusted to match up with Tp)
 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 = $2 / (1 + (Tr/Tp))$: default K = 0.75: (for Tr/Tp = 1.67)
 Ks = Hydrograph shape factor
 = Unit Conversions * K:
 = $((1hr/3600sec) * (1ft/12in) * ((5280ft)**2/sq.mi)) * K$
 Default Ks = 645.333 * 0.75 = 484

 Lag = Lag time from center of excess runoff (dt) to Tp: Lag = 0.6Tc
 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.
 = $(Ks * A * Q) / Tp$ (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: $S_i = (1000/CN_i) - 10$
 Sp = S for pervious area: $S_p = (1000/CN_p) - 10$
 t = Time step (row) number
 Tc = Time of concentration
 Tb = Time (hrs) of entire unit hydrograph: $T_b = T_p + T_r$
 Tp = Time (hrs) to peak of a unit hydrograph: $T_p = (dt/2) + Lag$
 Tr = Time (hrs) of receding limb of unit hydrograph: Tr = ratio of Tp

Name....

File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.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
 Rip(t) = Rap(t) - 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)
 R(t) = (Ap/At) x Col.(6) + (Ai/At) x 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 = - EXDA 3 2 YR
 Tc = .3049 hrs
 Drainage Area = 5.670 acres Runoff CN= 57

=====
 Computational Time Increment = .04066 hrs
 Computed Peak Time = 12.4414 hrs
 Computed Peak Flow = .74 cfs

 Time Increment for HYG File = .0500 hrs
 Peak Time, Interpolated Output = 12.4500 hrs
 Peak Flow, Interpolated Output = .73 cfs
 =====

DRAINAGE AREA

 ID:EXDA 3
 CN = 57
 Area = 5.670 acres
 S = 7.5439 in
 0.2S = 1.5088 in

Cumulative Runoff

 .3097 in
 .146 ac-ft

HYG Volume... .146 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30494 hrs (ID: EXDA 3)
 Computational Incr, Tm = .04066 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 = 21.07 cfs
 Unit peak time Tp = .20329 hrs
 Unit receding limb, Tr = .81316 hrs
 Total unit time, Tb = 1.01645 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 3 10 YR
 Tc = .3049 hrs
 Drainage Area = 5.670 acres Runoff CN= 57

=====
 Computational Time Increment = .04066 hrs
 Computed Peak Time = 12.2788 hrs
 Computed Peak Flow = 3.52 cfs

Time Increment for HYG File = .0500 hrs
 Peak Time, Interpolated Output = 12.3000 hrs
 Peak Flow, Interpolated Output = 3.49 cfs
 =====

DRAINAGE AREA

 ID:EXDA 3
 CN = 57
 Area = 5.670 acres
 S = 7.5439 in
 0.2S = 1.5088 in

Cumulative Runoff

 .9487 in
 .448 ac-ft

HYG Volume... .448 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30494 hrs (ID: EXDA 3)
 Computational Incr, Tm = .04066 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 = 21.07 cfs
 Unit peak time Tp = .20329 hrs
 Unit receding limb, Tr = .81316 hrs
 Total unit time, Tb = 1.01645 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 = - EXDA 3 25 YR
 Tc = .3049 hrs
 Drainage Area = 5.670 acres Runoff CN= 57

=====
 Computational Time Increment = .04066 hrs
 Computed Peak Time = 12.2381 hrs
 Computed Peak Flow = 5.53 cfs

Time Increment for HYG File = .0500 hrs
 Peak Time, Interpolated Output = 12.2500 hrs
 Peak Flow, Interpolated Output = 5.53 cfs
 =====

DRAINAGE AREA

 ID:EXDA 3
 CN = 57
 Area = 5.670 acres
 S = 7.5439 in
 0.2S = 1.5088 in

Cumulative Runoff

 1.3810 in
 .653 ac-ft

HYG Volume... .653 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30494 hrs (ID: EXDA 3)
 Computational Incr, Tm = .04066 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 = 21.07 cfs
 Unit peak time Tp = .20329 hrs
 Unit receding limb, Tr = .81316 hrs
 Total unit time, Tb = 1.01645 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 3 50 YR
 Tc = .3049 hrs
 Drainage Area = 5.670 acres Runoff CN= 57

=====
 Computational Time Increment = .04066 hrs
 Computed Peak Time = 12.2381 hrs
 Computed Peak Flow = 7.51 cfs

Time Increment for HYG File = .0500 hrs
 Peak Time, Interpolated Output = 12.2500 hrs
 Peak Flow, Interpolated Output = 7.49 cfs
 =====

DRAINAGE AREA

 ID:EXDA 3
 CN = 57
 Area = 5.670 acres
 S = 7.5439 in
 0.2S = 1.5088 in

Cumulative Runoff

 1.7987 in
 .850 ac-ft

HYG Volume... .850 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30494 hrs (ID: EXDA 3)
 Computational Incr, Tm = .04066 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 = 21.07 cfs
 Unit peak time Tp = .20329 hrs
 Unit receding limb, Tr = .81316 hrs
 Total unit time, Tb = 1.01645 hrs

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 3 100 YR
 Tc = .3049 hrs
 Drainage Area = 5.670 acres Runoff CN= 57

=====
 Computational Time Increment = .04066 hrs
 Computed Peak Time = 12.2381 hrs
 Computed Peak Flow = 9.95 cfs

Time Increment for HYG File = .0500 hrs
 Peak Time, Interpolated Output = 12.2500 hrs
 Peak Flow, Interpolated Output = 9.90 cfs
 =====

DRAINAGE AREA

 ID:EXDA 3
 CN = 57
 Area = 5.670 acres
 S = 7.5439 in
 0.2S = 1.5088 in

Cumulative Runoff

 2.3133 in
 1.093 ac-ft

HYG Volume... 1.093 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30494 hrs (ID: EXDA 3)
 Computational Incr, Tm = .04066 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 = 21.07 cfs
 Unit peak time Tp = .20329 hrs
 Unit receding limb, Tr = .81316 hrs
 Total unit time, Tb = 1.01645 hrs

Type.... Node: Addition Summary
 Name.... DP 3
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.PPW
 Storm... TypeIII 24hr Tag: 2 YR

Page 6.01
 Event: 2 yr

SUMMARY FOR HYDROGRAPH ADDITION
 at Node: DP 3

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

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP 3           EXDA 3
=====
  
```

INFLOWS TO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time     Peak Flow
ac-ft         hrs           cfs
-----
                EXDA 3        2 YR         .146        12.4000       .73
  
```

TOTAL FLOW INTO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time     Peak Flow
ac-ft         hrs           cfs
-----
                DP 3          2 YR         .146        12.4000       .73
  
```

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 3

HYG Tag = 2 YR

Peak Discharge = .73 cfs

Time to Peak = 12.4000 hrs

HYG Volume = .146 ac-ft

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time hrs	Time on left represents time for first value in each row.				
11.9500	.00	.00	.03	.09	.22
12.2000	.38	.53	.64	.70	.73
12.4500	.73	.71	.67	.61	.55
12.7000	.50	.45	.42	.39	.37
12.9500	.35	.34	.32	.31	.30
13.2000	.29	.28	.27	.27	.26
13.4500	.26	.26	.26	.25	.25
13.7000	.25	.24	.24	.24	.24
13.9500	.23	.23	.23	.22	.22
14.2000	.22	.21	.21	.21	.21
14.4500	.21	.20	.20	.20	.20
14.7000	.20	.20	.19	.19	.19
14.9500	.19	.19	.19	.18	.18
15.2000	.18	.18	.18	.17	.17
15.4500	.17	.17	.16	.16	.16
15.7000	.16	.16	.15	.15	.15
15.9500	.15	.14	.14	.14	.14
16.2000	.13	.13	.13	.13	.13
16.4500	.13	.13	.13	.12	.12
16.7000	.12	.12	.12	.12	.12
16.9500	.12	.12	.12	.11	.11
17.2000	.11	.11	.11	.11	.11
17.4500	.11	.11	.10	.10	.10
17.7000	.10	.10	.10	.10	.10
17.9500	.09	.09	.09	.09	.09
18.2000	.09	.09	.09	.09	.09
18.4500	.09	.09	.09	.09	.08
18.7000	.08	.08	.08	.08	.08
18.9500	.08	.08	.08	.08	.08
19.2000	.08	.08	.08	.08	.08
19.4500	.08	.08	.08	.08	.08

Name... DP 3

Event: 2 yr

File... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.PPW

Storm... TypeIII 24hr Tag: 2 YR

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

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

Time hrs					
19.7000	.08	.08	.08	.08	.08
19.9500	.08	.08	.08	.08	.07
20.2000	.07	.07	.07	.07	.07
20.4500	.07	.07	.07	.07	.07
20.7000	.07	.07	.07	.07	.07
20.9500	.07	.07	.07	.07	.07
21.2000	.07	.07	.07	.07	.07
21.4500	.07	.07	.07	.07	.07
21.7000	.07	.07	.07	.07	.07
21.9500	.07	.07	.06	.06	.06
22.2000	.06	.06	.06	.06	.06
22.4500	.06	.06	.06	.06	.06
22.7000	.06	.06	.06	.06	.06
22.9500	.06	.06	.06	.06	.06
23.2000	.06	.06	.06	.06	.06
23.4500	.06	.06	.06	.06	.06
23.7000	.06	.05	.05	.05	.05
23.9500	.05	.05	.05	.05	.04
24.2000	.03	.02	.01	.01	.01
24.4500	.00	.00	.00	.00	.00

Type.... Node: Addition Summary Page 6.04
 Name.... DP 3 Event: 10 yr
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.PPW
 Storm... TypeIII 24hr Tag: 10 YR

SUMMARY FOR HYDROGRAPH ADDITION
 at Node: DP 3

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

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP 3           EXDA 3
=====
  
```

INFLOWS TO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time      Peak Flow
              HYG ID        HYG tag      ac-ft       hrs            cfs
-----
              EXDA 3        10 YR        .448        12.3000       3.49
  
```

TOTAL FLOW INTO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time      Peak Flow
              HYG ID        HYG tag      ac-ft       hrs            cfs
-----
              DP 3          10 YR        .448        12.3000       3.49
  
```

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 3

HYG Tag = 10 YR

 Peak Discharge = 3.49 cfs
 Time to Peak = 12.3000 hrs
 HYG Volume = .448 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	1	2	3	4	5	6
11.6500	.00	.00	.02	.05	.13	
11.9000	.25	.44	.78	1.31	1.98	
12.1500	2.68	3.23	3.48	3.49	3.35	
12.4000	3.15	2.91	2.66	2.38	2.10	
12.6500	1.83	1.61	1.43	1.29	1.18	
12.9000	1.10	1.03	.97	.92	.87	
13.1500	.83	.80	.77	.75	.74	
13.4000	.72	.71	.70	.69	.68	
13.6500	.67	.66	.65	.64	.63	
13.9000	.62	.61	.60	.59	.58	
14.1500	.57	.56	.55	.54	.54	
14.4000	.53	.53	.52	.51	.51	
14.6500	.50	.50	.49	.49	.48	
14.9000	.48	.47	.47	.46	.46	
15.1500	.45	.44	.44	.43	.43	
15.4000	.42	.42	.41	.40	.40	
15.6500	.39	.39	.38	.37	.37	
15.9000	.36	.35	.35	.34	.34	
16.1500	.33	.32	.32	.32	.31	
16.4000	.31	.31	.30	.30	.30	
16.6500	.29	.29	.29	.29	.28	
16.9000	.28	.28	.28	.27	.27	
17.1500	.27	.26	.26	.26	.26	
17.4000	.25	.25	.25	.24	.24	
17.6500	.24	.24	.23	.23	.23	
17.9000	.22	.22	.22	.22	.21	
18.1500	.21	.21	.21	.20	.20	
18.4000	.20	.20	.20	.20	.20	
18.6500	.20	.20	.20	.19	.19	
18.9000	.19	.19	.19	.19	.19	
19.1500	.19	.19	.19	.19	.19	

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

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

Time hrs					
19.4000	.18	.18	.18	.18	.18
19.6500	.18	.18	.18	.18	.18
19.9000	.18	.18	.17	.17	.17
20.1500	.17	.17	.17	.17	.17
20.4000	.17	.17	.17	.17	.17
20.6500	.16	.16	.16	.16	.16
20.9000	.16	.16	.16	.16	.16
21.1500	.16	.16	.16	.16	.16
21.4000	.16	.15	.15	.15	.15
21.6500	.15	.15	.15	.15	.15
21.9000	.15	.15	.15	.15	.15
22.1500	.15	.14	.14	.14	.14
22.4000	.14	.14	.14	.14	.14
22.6500	.14	.14	.14	.14	.14
22.9000	.13	.13	.13	.13	.13
23.1500	.13	.13	.13	.13	.13
23.4000	.13	.13	.13	.13	.12
23.6500	.12	.12	.12	.12	.12
23.9000	.12	.12	.12	.11	.10
24.1500	.09	.07	.05	.03	.02
24.4000	.01	.01	.01	.00	.00
24.6500	.00	.00	.00		

Type.... Node: Addition Summary Page 6.07
 Name.... DP 3 Event: 25 yr
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.PPW
 Storm... TypeIII 24hr Tag: 25 YR

SUMMARY FOR HYDROGRAPH ADDITION
 at Node: DP 3

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

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP 3           EXDA 3                EXDA 3        25 YR
=====
  
```

INFLOWS TO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time    Peak Flow
ac-ft         hrs           cfs
-----
                EXDA 3        25 YR        .653        12.2500     5.53
  
```

TOTAL FLOW INTO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time    Peak Flow
ac-ft         hrs           cfs
-----
                DP 3          25 YR        .653        12.2500     5.53
  
```


TOTAL NODE INFLOW...

HYG file =
 HYG ID = DP 3
 HYG Tag = 25 YR

 Peak Discharge = 5.53 cfs
 Time to Peak = 12.2500 hrs
 HYG Volume = .653 ac-ft

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs
 Time on left represents time for first value in each row.

Time hrs					
11.3500	.00	.00	.01	.02	.04
11.6000	.06	.11	.17	.26	.39
11.8500	.57	.82	1.17	1.73	2.56
12.1000	3.56	4.55	5.28	5.53	5.43
12.3500	5.12	4.73	4.33	3.91	3.47
12.6000	3.04	2.64	2.30	2.03	1.83
12.8500	1.67	1.55	1.45	1.36	1.29
13.1000	1.22	1.16	1.12	1.08	1.05
13.3500	1.02	1.00	.99	.97	.95
13.6000	.94	.92	.91	.90	.88
13.8500	.87	.85	.84	.82	.81
14.1000	.79	.78	.76	.75	.74
14.3500	.73	.73	.72	.71	.70
14.6000	.70	.69	.68	.67	.67
14.8500	.66	.65	.64	.63	.63
15.1000	.62	.61	.60	.60	.59
15.3500	.58	.57	.56	.55	.55
15.6000	.54	.53	.52	.51	.50
15.8500	.50	.49	.48	.47	.46
16.1000	.45	.44	.44	.43	.43
16.3500	.42	.42	.41	.41	.40
16.6000	.40	.40	.39	.39	.39
16.8500	.38	.38	.37	.37	.37
17.1000	.36	.36	.36	.35	.35
17.3500	.34	.34	.34	.33	.33
17.6000	.32	.32	.32	.31	.31
17.8500	.30	.30	.30	.29	.29
18.1000	.28	.28	.28	.27	.27
18.3500	.27	.27	.27	.27	.27
18.6000	.26	.26	.26	.26	.26
18.8500	.26	.26	.26	.26	.25

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

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

19.1000	.25	.25	.25	.25	.25
19.3500	.25	.25	.25	.24	.24
19.6000	.24	.24	.24	.24	.24
19.8500	.24	.23	.23	.23	.23
20.1000	.23	.23	.23	.23	.23
20.3500	.23	.22	.22	.22	.22
20.6000	.22	.22	.22	.22	.22
20.8500	.22	.21	.21	.21	.21
21.1000	.21	.21	.21	.21	.21
21.3500	.21	.21	.21	.20	.20
21.6000	.20	.20	.20	.20	.20
21.8500	.20	.20	.20	.20	.19
22.1000	.19	.19	.19	.19	.19
22.3500	.19	.19	.19	.19	.18
22.6000	.18	.18	.18	.18	.18
22.8500	.18	.18	.18	.18	.18
23.1000	.17	.17	.17	.17	.17
23.3500	.17	.17	.17	.17	.17
23.6000	.17	.16	.16	.16	.16
23.8500	.16	.16	.16	.16	.15
24.1000	.14	.12	.09	.06	.04
24.3500	.03	.02	.01	.01	.01
24.6000	.00	.00	.00	.00	.00

type.... Node: Addition Summary Page 6.10
 Name.... DP 3 Event: 50 yr
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.PPW
 Storm... TypeIII 24hr Tag: 50 YR

SUMMARY FOR HYDROGRAPH ADDITION
 at Node: DP 3

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

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID      HYG tag
-----
TO DP 3           EXDA 3                EXDA 3        50 YR
=====
  
```

INFLOWS TO: DP 3

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time      Peak Flow
              ac-ft       hrs          cfs
-----
              EXDA 3      50 YR        .850        12.2500       7.49
  
```

TOTAL FLOW INTO: DP 3

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time      Peak Flow
              ac-ft       hrs          cfs
-----
              DP 3        50 YR        .850        12.2500       7.49
  
```

TOTAL NODE INFLOW...

HYG file =
 HYG ID = DP 3
 HYG Tag = 50 YR

 Peak Discharge = 7.49 cfs
 Time to Peak = 12.2500 hrs
 HYG Volume = .850 ac-ft

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

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

Time hrs					
11.0000	.00	.00	.01	.02	.03
11.2500	.04	.06	.08	.11	.14
11.5000	.17	.21	.26	.33	.44
11.7500	.59	.80	1.07	1.43	1.92
12.0000	2.69	3.80	5.11	6.37	7.25
12.2500	7.49	7.28	6.80	6.24	5.67
12.5000	5.09	4.50	3.92	3.40	2.95
12.7500	2.60	2.33	2.13	1.97	1.84
13.0000	1.73	1.63	1.54	1.47	1.41
13.2500	1.36	1.32	1.29	1.26	1.24
13.5000	1.22	1.20	1.18	1.16	1.14
13.7500	1.12	1.10	1.08	1.06	1.05
14.0000	1.03	1.01	.99	.97	.95
14.2500	.94	.93	.92	.90	.89
14.5000	.88	.87	.87	.86	.85
14.7500	.84	.83	.82	.81	.80
15.0000	.79	.78	.77	.76	.75
15.2500	.74	.73	.72	.71	.70
15.5000	.69	.68	.67	.66	.64
15.7500	.63	.62	.61	.60	.59
16.0000	.58	.57	.56	.55	.54
16.2500	.53	.53	.52	.51	.51
16.5000	.50	.50	.49	.49	.48
16.7500	.48	.48	.47	.47	.46
17.0000	.46	.45	.45	.44	.44
17.2500	.43	.43	.42	.42	.41
17.5000	.41	.40	.40	.39	.39
17.7500	.38	.38	.37	.37	.36
18.0000	.36	.35	.35	.34	.34
18.2500	.34	.34	.33	.33	.33
18.5000	.33	.33	.33	.32	.32

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

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

Time hrs					
18.7500	.32	.32	.32	.32	.32
19.0000	.31	.31	.31	.31	.31
19.2500	.31	.31	.30	.30	.30
19.5000	.30	.30	.30	.30	.29
19.7500	.29	.29	.29	.29	.29
20.0000	.28	.28	.28	.28	.28
20.2500	.28	.28	.28	.27	.27
20.5000	.27	.27	.27	.27	.27
20.7500	.27	.27	.26	.26	.26
21.0000	.26	.26	.26	.26	.26
21.2500	.26	.25	.25	.25	.25
21.5000	.25	.25	.25	.25	.25
21.7500	.24	.24	.24	.24	.24
22.0000	.24	.24	.24	.24	.23
22.2500	.23	.23	.23	.23	.23
22.5000	.23	.23	.23	.22	.22
22.7500	.22	.22	.22	.22	.22
23.0000	.22	.21	.21	.21	.21
23.2500	.21	.21	.21	.21	.21
23.5000	.20	.20	.20	.20	.20
23.7500	.20	.20	.20	.19	.19
24.0000	.19	.19	.17	.14	.11
24.2500	.08	.05	.03	.02	.01
24.5000	.01	.01	.00	.00	.00
24.7500	.00	.00			

Type.... NODE: ADDITION SUMMARY Page 0.13
 Name.... DP 3 Event: 100 yr
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 EXDA 3.PPW
 Storm... TypeIII 24hr Tag: 100 YR

SUMMARY FOR HYDROGRAPH ADDITION
 at Node: DP 3

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

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP 3           EXDA 3                EXDA 3        100 YR
=====
  
```

INFLOWS TO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time    Peak Flow
ac-ft        hrs          cfs
-----
                EXDA 3        100 YR      1.093      12.2500     9.90
  
```

TOTAL FLOW INTO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time    Peak Flow
ac-ft        hrs          cfs
-----
                DP 3          100 YR      1.093      12.2500     9.90
  
```

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 3

HYG Tag = 100 YR

 Peak Discharge = 9.90 cfs
 Time to Peak = 12.2500 hrs
 HYG Volume = 1.093 ac-ft

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

Time hrs	Time on left represents time for first value in each row.				
10.5500	.00	.00	.00	.01	.02
10.8000	.03	.04	.06	.07	.09
11.0500	.11	.13	.15	.17	.20
11.3000	.23	.26	.30	.34	.39
11.5500	.45	.52	.63	.79	1.02
11.8000	1.33	1.72	2.20	2.87	3.89
12.0500	5.35	7.04	8.62	9.68	9.90
12.3000	9.53	8.85	8.06	7.28	6.51
12.5500	5.74	4.98	4.30	3.73	3.28
12.8000	2.94	2.67	2.47	2.30	2.16
13.0500	2.03	1.93	1.83	1.76	1.69
13.3000	1.64	1.60	1.57	1.54	1.51
13.5500	1.49	1.46	1.44	1.41	1.39
13.8000	1.37	1.34	1.32	1.29	1.27
14.0500	1.24	1.22	1.20	1.18	1.16
14.3000	1.14	1.13	1.12	1.10	1.09
14.5500	1.08	1.07	1.05	1.04	1.03
14.8000	1.02	1.01	.99	.98	.97
15.0500	.96	.94	.93	.92	.91
15.3000	.89	.88	.87	.86	.84
15.5500	.83	.82	.80	.79	.78
15.8000	.76	.75	.74	.72	.71
16.0500	.70	.68	.67	.66	.65
16.3000	.64	.64	.63	.62	.62
16.5500	.61	.60	.60	.59	.59
16.8000	.58	.58	.57	.56	.56
17.0500	.55	.55	.54	.53	.53
17.3000	.52	.52	.51	.50	.50
17.5500	.49	.49	.48	.47	.47
17.8000	.46	.46	.45	.44	.44
18.0500	.43	.43	.42	.42	.41

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .0500 hrs

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

Time hrs					
18.3000	.41	.41	.40	.40	.40
18.5500	.40	.40	.39	.39	.39
18.8000	.39	.39	.39	.38	.38
19.0500	.38	.38	.38	.37	.37
19.3000	.37	.37	.37	.37	.36
19.5500	.36	.36	.36	.36	.36
19.8000	.35	.35	.35	.35	.35
20.0500	.34	.34	.34	.34	.34
20.3000	.34	.34	.33	.33	.33
20.5500	.33	.33	.33	.33	.32
20.8000	.32	.32	.32	.32	.32
21.0500	.32	.31	.31	.31	.31
21.3000	.31	.31	.31	.31	.30
21.5500	.30	.30	.30	.30	.30
21.8000	.30	.29	.29	.29	.29
22.0500	.29	.29	.29	.28	.28
22.3000	.28	.28	.28	.28	.28
22.5500	.27	.27	.27	.27	.27
22.8000	.27	.27	.26	.26	.26
23.0500	.26	.26	.26	.26	.25
23.3000	.25	.25	.25	.25	.25
23.5500	.25	.24	.24	.24	.24
23.8000	.24	.24	.24	.23	.23
24.0500	.22	.21	.17	.13	.09
24.3000	.06	.04	.03	.02	.01
24.5500	.01	.01	.00	.00	.00
24.8000	.00				

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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 3	JCT	2	.162		12.4000	.95		
*DP 3	JCT	10	.507		12.3000	3.41		
*DP 3	JCT	25	.737		12.3000	5.00		
*DP 3	JCT	50	.958		12.3000	6.73		
*DP 3	JCT	100	1.231		12.3000	9.19		
JUNCTION	JCT	2	.162		12.4000	.95		
JUNCTION	JCT	10	.507		12.3000	3.41		
JUNCTION	JCT	25	.737		12.3000	5.00		
JUNCTION	JCT	50	.958		12.3000	6.73		
JUNCTION	JCT	100	1.231		12.3000	9.19		
POND 1	IN	POND	2		12.1000	1.36		
POND 1	IN	POND	10		12.1000	3.38		
POND 1	IN	POND	25		12.1000	4.60		
POND 1	IN	POND	50		12.1000	5.71		
POND 1	IN	POND	100		12.1000	7.03		

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
POND 1	OUT POND	2	.056		12.5000	.43	1443.97	.030
POND 1	OUT POND	10	.182		12.5000	.92	1444.69	.084
POND 1	OUT POND	25	.263		12.5000	1.15	1445.12	.122
POND 1	OUT POND	50	.341		12.5000	1.70	1445.43	.151
POND 1	OUT POND	100	.437		12.4000	2.47	1445.71	.180
PRDA 3D	AREA	2	.133		12.1000	1.36		
PRDA 3D	AREA	10	.297		12.1000	3.38		
PRDA 3D	AREA	25	.397		12.1000	4.60		
PRDA 3D	AREA	50	.490		12.1000	5.71		
PRDA 3D	AREA	100	.600		12.1000	7.03		
PRDA 3ND	AREA	2	.106		12.4000	.54		
PRDA 3ND	AREA	10	.326		12.3000	2.55		
PRDA 3ND	AREA	25	.474		12.3000	3.95		
PRDA 3ND	AREA	50	.618		12.2000	5.33		
PRDA 3ND	AREA	100	.794		12.2000	7.11		

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 PRDA 3.PPW

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

Segment #1: Tc: User Defined

Segment #1 Time: .1300 hrs

=====
Total Tc: .1300 hrs
=====

Type.... Tc Calcs
Name.... PRDA 3D

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW

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

Segment #1: Tc: User Defined

Segment #1 Time: .3000 hrs

=====
Total Tc: .3000 hrs
=====

Type... Tc Calcs
Name... PRDA 3ND

Page 3.04

File... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW

RUNOFF CURVE NUMBER DATA

.....

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Soil Type B - Grass/Meadow	60	1.520			60.00
Soil Type B - Wooded	55	.030			55.00
Impervious Area	98	.500			98.00

COMPOSITE AREA & WEIGHTED CN ---> 2.050 69.20 (69)
.....

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW

RUNOFF CURVE NUMBER DATA

.....

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Soil Type B - Wooded	55	2.730			55.00
Soil Type B - Grass/Meadow	58	1.320			58.00
Impervious	98	.070			98.00

COMPOSITE AREA & WEIGHTED CN ---> 4.120 56.69 (57)
.....

Name....

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW

SCS UNIT HYDROGRAPH METHOD
(Computational Notes)

DEFINITION OF TERMS: -----

At = Total area (acres): $A_t = A_i + A_p$
 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⁻¹)
 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 $0.1333T_c$, 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 => $.1333T_c$)
 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: $S_i = (1000/CN_i) - 10$
 Sp = S for pervious area: $S_p = (1000/CN_p) - 10$
 t = Time step (row) number
 Tc = Time of concentration
 Tb = Time (hrs) of entire unit hydrograph: $T_b = T_p + T_r$
 Tp = Time (hrs) to peak of a unit hydrograph: $T_p = (dt/2) + Lag$
 Tr = Time (hrs) of receding limb of unit hydrograph: $T_r = \text{ratio of } T_p$

Name....

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.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
 Rip(t) = Rap(t) - 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)
 R(t) = (Ap/At) x Col.(6) + (Ai/At) x 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 3D 2 YR
 Tc = .1300 hrs
 Drainage Area = 2.050 acres Runoff CN= 69

=====
 Computational Time Increment = .01733 hrs
 Computed Peak Time = 12.1333 hrs
 Computed Peak Flow = 1.45 cfs

Time Increment for HYG File = .1000 hrs
 Peak Time, Interpolated Output = 12.1000 hrs
 Peak Flow, Interpolated Output = 1.36 cfs
 WARNING: The difference between calculated peak flow
 and interpolated peak flow is greater than 1.50%
 =====

DRAINAGE AREA

 ID:PRDA 3D
 CN = 69
 Area = 2.050 acres
 S = 4.4928 in
 0.2S = .8986 in

Cumulative Runoff

 .7796 in
 .133 ac-ft

HYG Volume... .133 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .13000 hrs (ID: PRDA 3D)
 Computational Incr, Tm = .01733 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 = 17.87 cfs
 Unit peak time Tp = .08667 hrs
 Unit receding limb, Tr = .34667 hrs
 Total unit time, Tb = .43333 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 3D 10 YR
 Tc = .1300 hrs
 Drainage Area = 2.050 acres Runoff CN= 69

=====
 Computational Time Increment = .01733 hrs
 Computed Peak Time = 12.1333 hrs
 Computed Peak Flow = 3.50 cfs

Time Increment for HYG File = .1000 hrs
 Peak Time, Interpolated Output = 12.1000 hrs
 Peak Flow, Interpolated Output = 3.38 cfs
 WARNING: The difference between calculated peak flow
 and interpolated peak flow is greater than 1.50%
 =====

DRAINAGE AREA

 ID:PRDA 3D
 CN = 69
 Area = 2.050 acres
 S = 4.4928 in
 0.2S = .8986 in

Cumulative Runoff

 1.7423 in
 .298 ac-ft

HYG Volume... .297 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .13000 hrs (ID: PRDA 3D)
 Computational Incr, Tm = .01733 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 = 17.87 cfs
 Unit peak time Tp = .08667 hrs
 Unit receding limb, Tr = .34667 hrs
 Total unit time, Tb = .43333 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 3D 25 YR
 Tc = .1300 hrs
 Drainage Area = 2.050 acres Runoff CN= 69

=====
 Computational Time Increment = .01733 hrs
 Computed Peak Time = 12.1333 hrs
 Computed Peak Flow = 4.72 cfs

Time Increment for HYG File = .1000 hrs
 Peak Time, Interpolated Output = 12.1000 hrs
 Peak Flow, Interpolated Output = 4.60 cfs
 WARNING: The difference between calculated peak flow
 and interpolated peak flow is greater than 1.50%
 =====

DRAINAGE AREA

 ID:PRDA 3D
 CN = 69
 Area = 2.050 acres
 S = 4.4928 in
 0.2S = .8986 in

Cumulative Runoff

 2.3282 in
 .398 ac-ft

HYG Volume... .397 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .13000 hrs (ID: PRDA 3D)
 Computational Incr, Tm = .01733 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 = 17.87 cfs
 Unit peak time Tp = .08667 hrs
 Unit receding limb, Tr = .34667 hrs
 Total unit time, Tb = .43333 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 = - PRDA 3D 50 YR
 Tc = .1300 hrs
 Drainage Area = 2.050 acres Runoff CN= 69

=====
 Computational Time Increment = .01733 hrs
 Computed Peak Time = 12.1333 hrs
 Computed Peak Flow = 5.84 cfs

Time Increment for HYG File = .1000 hrs
 Peak Time, Interpolated Output = 12.1000 hrs
 Peak Flow, Interpolated Output = 5.71 cfs
 WARNING: The difference between calculated peak flow
 and interpolated peak flow is greater than 1.50%
 =====

DRAINAGE AREA

 ID: PRDA 3D
 CN = 69
 Area = 2.050 acres
 S = 4.4928 in
 0.2S = .8986 in

Cumulative Runoff

 2.8696 in
 .490 ac-ft

HYG Volume... .490 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .13000 hrs (ID: PRDA 3D)
 Computational Incr, Tm = .01733 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 = 17.87 cfs
 Unit peak time, Tp = .08667 hrs
 Unit receding limb, Tr = .34667 hrs
 Total unit time, Tb = .43333 hrs

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 3D 100 YR
Tc = .1300 hrs
Drainage Area = 2.050 acres Runoff CN= 69

Computational Time Increment = .01733 hrs
Computed Peak Time = 12.1160 hrs
Computed Peak Flow = 7.16 cfs

Time Increment for HYG File = .1000 hrs
Peak Time, Interpolated Output = 12.1000 hrs
Peak Flow, Interpolated Output = 7.03 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%

DRAINAGE AREA

ID:PRDA 3D
CN = 69
Area = 2.050 acres
S = 4.4928 in
0.2S = .8986 in

Cumulative Runoff

3.5140 in
.600 ac-ft

HYG Volume... .600 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .13000 hrs (ID: PRDA 3D)
Computational Incr, Tm = .01733 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 = 17.87 cfs
Unit peak time Tp = .08667 hrs
Unit receding limb, Tr = .34667 hrs
Total unit time, Tb = .43333 hrs

Type.... Unit Hyd. Summary
Name.... PRDA 3ND Tag: 2 YR
File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW
Storm... TypeIII 24hr Tag: 2 YR

Page 5.08
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 3ND 2 YR
Tc = .3000 hrs
Drainage Area = 4.120 acres Runoff CN= 57

=====
Computational Time Increment = .04000 hrs
Computed Peak Time = 12.4400 hrs
Computed Peak Flow = .54 cfs

Time Increment for HYG File = .1000 hrs
Peak Time, Interpolated Output = 12.4000 hrs
Peak Flow, Interpolated Output = .54 cfs
=====

DRAINAGE AREA

ID:PRDA 3ND
CN = 57
Area = 4.120 acres
S = 7.5439 in
0.2S = 1.5088 in

Cumulative Runoff

.3097 in
.106 ac-ft

HYG Volume... .106 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30000 hrs (ID: PRDA 3ND)
Computational Incr, Tm = .04000 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 = 15.56 cfs
Unit peak time Tp = .20000 hrs
Unit receding limb, Tr = .80000 hrs
Total unit time, Tb = 1.00000 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 3ND 10 YR
 Tc = .3000 hrs
 Drainage Area = 4.120 acres Runoff CN= 57

=====
 Computational Time Increment = .04000 hrs
 Computed Peak Time = 12.2800 hrs
 Computed Peak Flow = 2.57 cfs

Time Increment for HYG File = .1000 hrs
 Peak Time, Interpolated Output = 12.3000 hrs
 Peak Flow, Interpolated Output = 2.55 cfs
 =====

DRAINAGE AREA

 ID:PRDA 3ND
 CN = 57
 Area = 4.120 acres
 S = 7.5439 in
 0.2S = 1.5088 in

Cumulative Runoff

 .9487 in
 .326 ac-ft

HYG Volume... .326 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30000 hrs (ID: PRDA 3ND)
 Computational Incr, Tm = .04000 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 = 15.56 cfs
 Unit peak time, Tp = .20000 hrs
 Unit receding limb, Tr = .80000 hrs
 Total unit time, Tb = 1.00000 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 3ND 25 YR
 Tc = .3000 hrs
 Drainage Area = 4.120 acres Runoff CN= 57

=====
 Computational Time Increment = .04000 hrs
 Computed Peak Time = 12.2400 hrs
 Computed Peak Flow = 4.05 cfs

Time Increment for HYG File = .1000 hrs
 Peak Time, Interpolated Output = 12.3000 hrs
 Peak Flow, Interpolated Output = 3.95 cfs
 WARNING: The difference between calculated peak flow
 and interpolated peak flow is greater than 1.50%
 =====

DRAINAGE AREA

 ID:PRDA 3ND
 CN = 57
 Area = 4.120 acres
 S = 7.5439 in
 0.2S = 1.5088 in

Cumulative Runoff

 1.3810 in
 .474 ac-ft

HYG Volume... .474 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30000 hrs (ID: PRDA 3ND)
 Computational Incr, Tm = .04000 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 = 15.56 cfs
 Unit peak time Tp = .20000 hrs
 Unit receding limb, Tr = .80000 hrs
 Total unit time, Tb = 1.00000 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 = - PRDA 3ND 50 YR

Tc = .3000 hrs

Drainage Area = 4.120 acres Runoff CN= 57

Computational Time Increment = .04000 hrs
Computed Peak Time = 12.2400 hrs
Computed Peak Flow = 5.50 cfs

Time Increment for HYG File = .1000 hrs
Peak Time, Interpolated Output = 12.2000 hrs
Peak Flow, Interpolated Output = 5.33 cfs

WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%

DRAINAGE AREA

ID:PRDA 3ND
CN = 57
Area = 4.120 acres
S = 7.5439 in
0.2S = 1.5088 in

Cumulative Runoff

1.7987 in
.618 ac-ft

HYG Volume... .618 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30000 hrs (ID: PRDA 3ND)
Computational Incr, Tm = .04000 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 = 15.56 cfs
Unit peak time Tp = .20000 hrs
Unit receding limb, Tr = .80000 hrs
Total unit time, Tb = 1.00000 hrs

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 3ND 100 YR
 Tc = .3000 hrs
 Drainage Area = 4.120 acres Runoff CN= 57

=====
 Computational Time Increment = .04000 hrs
 Computed Peak Time = 12.2400 hrs
 Computed Peak Flow = 7.27 cfs

Time Increment for HYG File = .1000 hrs
 Peak Time, Interpolated Output = 12.2000 hrs
 Peak Flow, Interpolated Output = 7.11 cfs
 WARNING: The difference between calculated peak flow
 and interpolated peak flow is greater than 1.50%
 =====

DRAINAGE AREA

 ID:PRDA 3ND
 CN = 57
 Area = 4.120 acres
 S = 7.5439 in
 0.2S = 1.5088 in

Cumulative Runoff

 2.3133 in
 .794 ac-ft

HYG Volume... .794 ac-ft (area under HYG curve)

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

Time Concentration, Tc = .30000 hrs (ID: PRDA 3ND)
 Computational Incr, Tm = .04000 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 = 15.56 cfs
 Unit peak time Tp = .20000 hrs
 Unit receding limb, Tr = .80000 hrs
 Total unit time, Tb = 1.00000 hrs

Type.... Node: Addition Summary
 Name.... DP 3
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW
 Storm... TypeIII 24hr Tag: 2 YR

Page 6.01
 Event: 2 yr

SUMMARY FOR HYDROGRAPH ADDITION
 at Node: DP 3

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

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP3            JUNCTION              JUNCTION      2 YR
=====
  
```

INFLOWS TO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time    Peak Flow
              HYG ID        HYG tag      ac-ft       hrs          cfs
-----
              JUNCTION      2 YR         .162        12.4000     .95
  
```

TOTAL FLOW INTO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time    Peak Flow
              HYG ID        HYG tag      ac-ft       hrs          cfs
-----
              DP 3          2 YR         .162        12.4000     .95
  
```

Type.... Node: Addition Summary
 Name.... DP 3
 File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW
 Storm... TypeIII 24hr Tag: 2 YR

Page 6.02
 Event: 2 yr

TOTAL NODE INFLOW...

HYG file =
 HYG ID = DP 3
 HYG Tag = 2 YR

 Peak Discharge = .95 cfs
 Time to Peak = 12.4000 hrs
 HYG Volume = .162 ac-ft

HYDROGRAPH ORDINATES (cfs)

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

Time hrs					
11.6000	.00	.00	.00	.01	.03
12.1000	.18	.53	.82	.95	.95
12.6000	.86	.74	.64	.57	.52
13.1000	.47	.43	.40	.38	.36
13.6000	.34	.32	.31	.29	.28
14.1000	.26	.25	.24	.23	.22
14.6000	.22	.21	.20	.19	.19
15.1000	.18	.17	.17	.16	.15
15.6000	.14	.14	.13	.13	.12
16.1000	.12	.12	.11	.11	.11
16.6000	.11	.10	.10	.10	.10
17.1000	.10	.09	.09	.09	.09
17.6000	.09	.08	.08	.08	.08
18.1000	.08	.07	.07	.07	.07
18.6000	.07	.07	.07	.07	.07
19.1000	.07	.07	.07	.07	.07
19.6000	.07	.06	.06	.06	.06
20.1000	.06	.06	.06	.06	.06
20.6000	.06	.06	.06	.06	.06
21.1000	.06	.06	.06	.06	.06
21.6000	.06	.06	.05	.05	.05
22.1000	.05	.05	.05	.05	.05
22.6000	.05	.05	.05	.05	.05
23.1000	.05	.05	.05	.05	.05
23.6000	.05	.05	.05	.04	.04
24.1000	.04	.03	.01	.01	.00
24.6000	.00	.00	.00	.00	.00

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

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

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
TO DP3	JUNCTION		JUNCTION	10 YR

INFLOWS TO: DP 3

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	JUNCTION	10 YR	.507	12.3000	3.41

TOTAL FLOW INTO: DP 3

HYG file	HYG ID	HYG tag	Volume ac-ft	Peak Time hrs	Peak Flow cfs
	DP 3	10 YR	.507	12.3000	3.41

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 3

HYG Tag = 10 YR

 Peak Discharge = 3.41 cfs
 Time to Peak = 12.3000 hrs
 HYG Volume = .507 ac-ft

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

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

Time hrs					
10.5000	.00	.00	.00	.00	.00
11.0000	.01	.01	.01	.01	.01
11.5000	.01	.02	.03	.10	.32
12.0000	.92	2.09	3.16	3.41	3.18
12.5000	2.84	2.42	2.05	1.79	1.64
13.0000	1.52	1.42	1.34	1.27	1.22
13.5000	1.17	1.12	1.07	1.03	.97
14.0000	.93	.87	.81	.75	.71
14.5000	.67	.64	.61	.59	.56
15.0000	.54	.52	.50	.48	.46
15.5000	.45	.43	.41	.39	.38
16.0000	.36	.34	.33	.32	.31
16.5000	.30	.29	.28	.27	.27
17.0000	.26	.25	.24	.23	.23
17.5000	.22	.21	.20	.20	.19
18.0000	.18	.18	.17	.17	.17
18.5000	.16	.16	.16	.16	.16
19.0000	.16	.15	.15	.15	.15
19.5000	.15	.15	.15	.14	.14
20.0000	.14	.14	.14	.14	.14
20.5000	.14	.13	.13	.13	.13
21.0000	.13	.13	.13	.13	.13
21.5000	.12	.12	.12	.12	.12
22.0000	.12	.12	.12	.12	.11
22.5000	.11	.11	.11	.11	.11
23.0000	.11	.11	.11	.10	.10
23.5000	.10	.10	.10	.10	.10
24.0000	.10	.09	.05	.03	.01
24.5000	.01	.01	.00	.00	.00
25.0000	.00	.00	.00	.00	.00

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

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

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP3           JUNCTION              JUNCTION      25 YR
=====

```

INFLOWS TO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time     Peak Flow
ac-ft         hrs           cfs
-----
              JUNCTION      25 YR        .737        12.3000      5.00
-----

```

TOTAL FLOW INTO: DP 3

```

-----
HYG file      HYG ID        HYG tag      Volume      Peak Time     Peak Flow
ac-ft         hrs           cfs
-----
              DP 3          25 YR        .737        12.3000      5.00
-----

```


TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 3

HYG Tag = 25 YR

Peak Discharge = 5.00 cfs

Time to Peak = 12.3000 hrs

HYG Volume = .737 ac-ft

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

Time hrs	Time on left represents time for first value in each row.				
9.9000	.00	.00	.00	.00	.00
10.4000	.00	.01	.01	.01	.01
10.9000	.01	.01	.01	.02	.02
11.4000	.02	.05	.10	.21	.45
11.9000	.92	1.85	3.43	4.84	5.00
12.4000	4.54	3.97	3.33	2.76	2.39
12.9000	2.17	2.01	1.88	1.78	1.71
13.4000	1.65	1.59	1.54	1.49	1.44
13.9000	1.39	1.33	1.28	1.23	1.18
14.4000	1.13	1.09	1.04	1.00	.96
14.9000	.90	.84	.79	.75	.72
15.4000	.68	.65	.62	.59	.57
15.9000	.54	.52	.49	.47	.45
16.4000	.44	.43	.41	.40	.39
16.9000	.38	.36	.35	.34	.33
17.4000	.32	.31	.31	.30	.29
17.9000	.28	.27	.26	.25	.24
18.4000	.24	.23	.23	.22	.22
18.9000	.21	.21	.21	.20	.20
19.4000	.20	.20	.20	.19	.19
19.9000	.19	.19	.19	.18	.18
20.4000	.18	.18	.18	.18	.17
20.9000	.17	.17	.17	.17	.17
21.4000	.17	.16	.16	.16	.16
21.9000	.16	.16	.16	.15	.15
22.4000	.15	.15	.15	.15	.15
22.9000	.14	.14	.14	.14	.14
23.4000	.14	.13	.13	.13	.13
23.9000	.13	.13	.11	.07	.04
24.4000	.02	.01	.01	.00	.00
24.9000	.00	.00	.00	.00	.00

Type.... Node: Addition Summary

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Name.... DP 3

Event: 25 yr

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW

Storm... TypeIII 24hr Tag: 25 YR

HYDROGRAPH ORDINATES (cfs)
Output Time increment = .1000 hrs
Time |
hrs	Time on left represents time for first value in each row.
25.4000 | .00

Type.... Node: Addition Summary

Page 6.08
Event: 50 yr

Name.... DP 3

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW

Storm... TypeIII 24hr Tag: 50 YR

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

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

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP3           JUNCTION              JUNCTION      50 YR
=====

```

INFLOWS TO: DP 3

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time    Peak Flow
              HYG ID      HYG tag      ac-ft       hrs          cfs
-----
              JUNCTION    50 YR        .958        12.3000     6.73
-----

```

TOTAL FLOW INTO: DP 3

```

-----
HYG file      HYG ID      HYG tag      Volume      Peak Time    Peak Flow
              HYG ID      HYG tag      ac-ft       hrs          cfs
-----
              DP 3        50 YR        .958        12.3000     6.73
-----

```

TOTAL NODE INFLOW...

HYG file =

HYG ID = DP 3

HYG Tag = 50 YR

 Peak Discharge = 6.73 cfs
 Time to Peak = 12.3000 hrs
 HYG Volume = .958 ac-ft

HYDROGRAPH ORDINATES (cfs)

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

Time hrs					
9.4000	.00	.00	.00	.00	.00
9.9000	.00	.00	.01	.01	.01
10.4000	.01	.01	.01	.01	.02
10.9000	.02	.02	.03	.05	.09
11.4000	.14	.20	.29	.49	.88
11.9000	1.55	2.68	4.70	6.45	6.73
12.4000	6.16	5.38	4.45	3.63	3.07
12.9000	2.71	2.45	2.25	2.11	2.01
13.4000	1.94	1.89	1.83	1.78	1.72
13.9000	1.67	1.61	1.55	1.50	1.45
14.4000	1.40	1.36	1.31	1.27	1.22
14.9000	1.18	1.13	1.09	1.04	1.00
15.4000	.93	.88	.83	.78	.74
15.9000	.70	.67	.64	.61	.58
16.4000	.56	.54	.53	.51	.50
16.9000	.48	.47	.45	.44	.43
17.4000	.41	.40	.39	.37	.36
17.9000	.35	.34	.33	.32	.31
18.4000	.31	.30	.29	.29	.29
18.9000	.28	.28	.27	.27	.26
19.4000	.26	.25	.25	.25	.24
19.9000	.24	.23	.23	.23	.22
20.4000	.22	.22	.22	.22	.21
20.9000	.21	.21	.21	.21	.20
21.4000	.20	.20	.20	.20	.20
21.9000	.19	.19	.19	.19	.19
22.4000	.18	.18	.18	.18	.18
22.9000	.17	.17	.17	.17	.17
23.4000	.17	.16	.16	.16	.16
23.9000	.16	.15	.14	.14	.14
24.4000	.02	.01	.01	.01	.00

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

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

Time hrs					
24.9000	.00	.00	.00	.00	.00
25.4000	.00	.00			

SUMMARY FOR HYDROGRAPH ADDITION
at Node: DP 3

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

```

=====
Upstream Link ID  Upstream Node ID  HYG file      HYG ID        HYG tag
-----
TO DP3            JUNCTION              JUNCTION      100 YR
=====

```

INFLOWS TO: DP 3

```

-----
HYG file          HYG ID          HYG tag        Volume      Peak Time    Peak Flow
ac-ft            hrs              cfs
-----
                JUNCTION        100 YR         1.231       12.3000     9.19
-----

```

TOTAL FLOW INTO: DP 3

```

-----
HYG file          HYG ID          HYG tag        Volume      Peak Time    Peak Flow
ac-ft            hrs              cfs
-----
                DP 3            100 YR         1.231       12.3000     9.19
-----

```

TOTAL NODE INFLOW...

HYG file =
 HYG ID = DP 3
 HYG Tag = 100 YR

 Peak Discharge = 9.19 cfs
 Time to Peak = 12.3000 hrs
 HYG Volume = 1.231 ac-ft

HYDROGRAPH ORDINATES (cfs)
 Output Time increment = .1000 hrs

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

8.9000	.00	.00	.00	.00	.00
9.4000	.00	.00	.01	.01	.01
9.9000	.01	.01	.01	.01	.01
10.4000	.02	.02	.02	.03	.05
10.9000	.08	.11	.15	.20	.25
11.4000	.34	.44	.58	.88	1.45
11.9000	2.25	3.69	6.25	8.80	9.19
12.4000	8.30	7.15	5.85	4.72	3.93
12.9000	3.41	3.04	2.75	2.52	2.37
13.4000	2.26	2.18	2.11	2.05	1.99
13.9000	1.94	1.87	1.81	1.76	1.70
14.4000	1.66	1.61	1.57	1.52	1.47
14.9000	1.43	1.38	1.34	1.29	1.24
15.4000	1.19	1.14	1.09	1.05	.98
15.9000	.92	.87	.81	.77	.74
16.4000	.71	.69	.66	.64	.62
16.9000	.60	.59	.57	.55	.54
17.4000	.52	.51	.49	.47	.46
17.9000	.44	.43	.41	.40	.39
18.4000	.38	.38	.37	.37	.36
18.9000	.35	.35	.34	.34	.33
19.4000	.33	.33	.32	.32	.31
19.9000	.31	.30	.30	.29	.29
20.4000	.29	.28	.28	.27	.27
20.9000	.27	.26	.26	.26	.25
21.4000	.25	.25	.24	.24	.24
21.9000	.23	.23	.23	.23	.23
22.4000	.22	.22	.22	.22	.21
22.9000	.21	.21	.21	.20	.20
23.4000	.20	.20	.20	.19	.19
23.9000	.19	.19	.17	.11	.05

HYDROGRAPH ORDINATES (cfs)

Output Time increment = .1000 hrs

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

Time hrs					
24.4000	.03	.02	.01	.01	.00
24.9000	.00	.00	.00	.00	.00
25.4000	.00	.00	.00	.00	.00

File.... C:\Program Files\Haestad\PPKW\PPW\3092 PRDA 3.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1443.50	-----	.0600	.0000	.000	.000
1445.50	-----	.1000	.2375	.158	.158
1447.50	-----	.1400	.3583	.239	.397

POND VOLUME EQUATIONS

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

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

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