PONDS WORKSHOP

EXAMPLE PROBLEMS USING PONDS VERSION 3

- Review input parameters for example problem.
- Project site has 3 drainage basins
- One of the basins has a wet cow pond and the other depressions are dry
- One of the dry basins extends off the property and is graded to increase the storage volume

Table 6: Drainage Area & CN Parameters for Basin 1
Predevelopment & Postdevelopment Conditions

PARAMETER	Unit	MAGNITUDE
PREDEVELOPMENT		
Area of contributing drainage basin	ft^2	2,175,000
Area of contributing drainage basin	acre	49.93
Time of concentration	min	28
Area of HSG “A” Soil	ft^2	1,551,995
Curve Number (CN) for HSG “A” Soil	-	39
Area of HSG “D” Soil	ft^2	618,005
Curve Number (CN) for HSG “D” Soil	-	80
Roadway	ft^2	5,000
Building	ft^2	0
Curve Number (CN) for impervious area	-	98
Weighted Curve Number for Predevelopment	-	51
POSTDEVELOPMENT		
Area of contributing drainage basin	ft^2	2,175,000
Area of contributing drainage basin	acre	49.93
Time of concentration	min	28
Area of HSG “A” Soil	ft^2	1,515,795
Curve Number (CN) for HSG “A” Soil	-	39
Area of HSG “D” Soil	ft^2	618,005
Curve Number (CN) for HSG “D” Soil	-	80
Roadway	ft^2	41,200
Building	ft^2	89,250
Curve Number (CN) for impervious area	-	98
Weighted Curve Number for Postdevelopment	-	56
Water quality volume	ft^3	181,250

Table 7: Drainage Area & CN Parameters for Basin 2
Predevelopment & Postdevelopment Conditions

PARAMETER	Unit	MAGNITUDE
PREDEVELOPMENT		
Area of contributing drainage basin	ft^2	1,914,000
Area of contributing drainage basin	acre	43.94
Time of concentration	min	26
Area of HSG “A” Soil	ft^2	1,914,000
Curve Number (CN) for HSG “A” Soil	-	39
Area of HSG “D” Soil	ft^2	0
Curve Number (CN) for HSG “D” Soil	-	80
Roadway	ft^2	0
Building	ft^2	0
Curve Number (CN) for impervious area	-	98
Weighted Curve Number for Predevelopment	-	39
POSTDEVELOPMENT		
Area of contributing drainage basin	ft^2	1,914,000
Area of contributing drainage basin	acre	43.94
Time of concentration	min	26
Area of HSG “A” Soil	ft^2	1,905,250
Curve Number (CN) for HSG “A” Soil	-	39
Area of HSG “D” Soil	ft^2	0
Curve Number (CN) for HSG “D” Soil	-	80
Roadway	ft^2	8,750
Building	ft^2	42,000
Curve Number (CN) for impervious area	-	98
Weighted Curve Number for Postdevelopment	-	41
Water quality volume	ft^3	159,500

Table 8: Drainage Area & CN Parameters for Basin 3
Predevelopment & Postdevelopment Conditions

PARAMETER	Unit	MAGNITUDE
PREDEVELOPMENT		
Area of contributing drainage basin	ft^2	473,000
Area of contributing drainage basin	acre	10.86
Time of concentration	min	23
Area of HSG “A” Soil	ft^2	456,750
Curve Number (CN) for HSG “A” Soil	-	39
Area of HSG “D” Soil	ft^2	0
Curve Number (CN) for HSG “D” Soil	-	80
Roadway	ft^2	16,250
Building	ft^2	0
Curve Number (CN) for impervious area	-	98
Weighted Curve Number for Predevelopment	-	41
POSTDEVELOPMENT		
Area of contributing drainage basin	ft^2	473,000
Area of contributing drainage basin	acre	10.86
Time of concentration	min	23
Area of HSG “A” Soil	ft^2	448,208
Curve Number (CN) for HSG “A” Soil	-	39
Area of HSG “D” Soil	ft^2	0
Curve Number (CN) for HSG “D” Soil	-	80
Roadway	ft^2	24,792
Building	ft^2	3,750
Curve Number (CN) for impervious area	-	98
Weighted Curve Number for Postdevelopment	-	43
Water quality volume	ft^3	39,417

Table 9: Stage-Area Data for Basins 1, 2, & 3

Basin 1 (Pre & Postdevelopment)		Basin 2 (Predevelopment)		Basin 2 (Postdevelopment)		Basin 3 (Postdevelopment)	
Stage (ft NGVD)	Area (ft^2)	Stage (ft NGVD)	Area (ft^2)	Stage (ft NGVD)	Area (ft^2)	Stage (ft NGVD)	Area (ft^2)
47.0	17,500	63.5	0	62.5	9,000	63.5	0
50.0	34,000	64.0	470	63.0	21,000	64.0	1,770
51.0	36,300	65.0	79,300	63.3	25,000	64.5	6,500
52.0	51,800	66.0	177,000	64.0	35,500	65.0	15,000
53.0	78,100			65.0	79,300	65.5	33,100
54.0	120,300			66.0	177,000	66.0	62,000
55.0	171,500					66.3	80,000
56.0	223,900						
57.0	277,900						
58.0	323,700						
59.0	372,100						
60.0	425,100						
61.0	482,900						
62.0	544,900						
63.0	630,500						
64.0	744,400						
65.0	920,400						
65.5	1,096,400						

Table 10: Key Parameters for Rainfall Event Analyzed

Recurrence Interval	Duration	Rainfall Depth	Peaking Factor	Rainfall Distribution
100 yr	24 hr	11.0 inch	484	SCSII (Fl Mod)

Table 11: Recommended Aquifer Parameter for Each Basin

Parameter	Unit	Magnitude		
		Basin 1	Basin 2	Basin 3
Base of mobilized aquifer	ft NGVD	+48.0	+49.0	+49.0
Seasonal high water table	ft NGVD	+48.5	+50.0	+50.0
Horizontal hydraulic conductivity	ft/day	10	n.a.	n.a.
Fillable porosity	%	30	30	30
Unsaturated vertical infiltration rate	ft/day	4	4	4
Note: Basins 2 & 3 recover solely by unsaturated flow.				

Table 12 (revised): Summary of Results (100 yr/24 hr storm)

Parameter Description	Unit	Basin 1	Basin 2		Basin 3
		POST	PRE	POST	POST
100 YR / 24 HR STORM					
Runoff volume	in	5.14	2.64	2.93	3.23
Runoff volume	ft^3	924,227	421,674	467,210	127,229
Peak inflow rate	cfs	152.17	60.24	67.73	20.41
Time to peak inflow rate	hr	12.13	12.19	12.20	12.11
Infiltration volume during storm	ft^3	496,776	351,154	346,202	113,234
Infiltration volume 3 days after storm	ft^3	874,905	421,674	467,210	127,229
Infiltration volume 14 days after storm	ft^3	910,876	421,674	467,210	127,229
Water quality volume	ft^3	181,250	-	159,500	39,417
Peak stage	ft NGVD	56.04	66.09	66.02	66.19
Time to peak stage	hr	16.24	14.79	15.00	14.21