

Appendix A

Runoff Calculations



Data for Coos Bay - 25 Year, Basins H - L
 TYPE IA 24-HOUR RAINFALL= 5.50 IN

Page 1

Prepared by HBH Consulting Engineers, Inc.

6 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 1

Basin H

PEAK= 173.1 CFS @ 8.67 HRS, VOLUME= 40.09 AF

ACRES	CN		SCS TR-20 METHOD
218.29	76	Forest - Group C Soil	TYPE IA 24-HOUR
99.34	65	Forest - Group B Soil	RAINFALL= 5.50 IN
8.10	85	1/8 Acre Res - Group B Soil	SPAN= 6-12 HRS, dt=.02 HRS
15.84	87	1/5 Acre Res - Group C Soil	
32.72	80	1/5 Acre Res - Group B Soil	
5.04	91	Newly Graded - Group C Soil	
6.44	98	Paved Streets	
385.77	75		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	1	6.8
Woodland Kv=5 L=450' s=.0488 '/' V=1.1 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	2	13.6
Woodland Kv=5 L=1323' s=.1058 '/' V=1.63 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	3	25.4
Woodland Kv=5 L=1132' s=.0221 '/' V=.74 fps		
CHANNEL FLOW	4	7.8
a=6 sq-ft Pw=6.5' r=.923'		
s=.0224 '/' n=.04 V=5.27 fps L=2456' Capacity=31.6 cfs		
CHANNEL FLOW	5	2.0
a=7 sq-ft Pw=6.5' r=1.077'		
s=.122 '/' n=.04 V=13.63 fps L=1641' Capacity=95.4 cfs		
CHANNEL FLOW	6	6.3
a=10 sq-ft Pw=8.5' r=1.176'		
s=.0068 '/' n=.07 V=1.95 fps L=735' Capacity=19.5 cfs		
Total Length= 7737 ft Total Tc=		61.9

Data for Coos Bay - 25 Year, Basins H - L
 TYPE IA 24-HOUR RAINFALL= 5.50 IN
 Prepared by HBH Consulting Engineers, Inc.
 HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

Page 4

6 Jan 06

SUBCATCHMENT 3 Basin J - Overall

PEAK= 90.05 CFS @ 7.97 HRS, VOLUME= 14.52 AF

ACRES	CN		SCS TR-20 METHOD
6.60	98	Paved Streets	TYPE IA 24-HOUR
14.64	77	Brush - Group C Soil	RAINFALL= 5.50 IN
39.02	94	Commercial - Group C Soil	SPAN= 6-12 HRS, dt=.02 HRS
7.54	85	1/8 Acre Res - Group B Soil	
11.91	90	1/8 Acre Res - Group C Soil	
79.71	90		

Method	Comment	Tc (min)
DIRECT ENTRY	Overland Flow	6.9
CIRCULAR CHANNEL	10" Pipe	2.8
10" Diameter a=.55 sq-ft Pw=2.6' r=.208'		
s=.028 '/' n=.013 V=6.72 fps L=1141' Capacity=3.7 cfs		
CIRCULAR CHANNEL	15" Pipe	.2
15" Diameter a=1.23 sq-ft Pw=3.9' r=.313'		
s=.029 '/' n=.013 V=8.96 fps L=105' Capacity=11 cfs		
CIRCULAR CHANNEL	24" Pipe	.4
24" Diameter a=3.14 sq-ft Pw=6.3' r=.5'		
s=.029 '/' n=.013 V=12.26 fps L=271' Capacity=38.5 cfs		
CIRCULAR CHANNEL	36" Pipe	.6
36" Diameter a=7.07 sq-ft Pw=9.4' r=.75'		
s=.007 '/' n=.013 V=7.89 fps L=297' Capacity=55.8 cfs		
CIRCULAR CHANNEL	48" Pipe	.2
48" Diameter a=12.57 sq-ft Pw=12.6' r=1'		
s=.005 '/' n=.011 V=9.55 fps L=90' Capacity=120 cfs		
Total Length= 1904 ft Total Tc=		11.1

Data for Coos Bay - 25 Year, Basins H - L
 TYPE IA 24-HOUR RAINFALL= 5.50 IN

Page 8

Prepared by HBH Consulting Engineers, Inc.

6 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 6

Basin K - Subbasin 2

PEAK= 70.99 CFS @ 8.02 HRS, VOLUME= 11.60 AF

ACRES	CN		SCS TR-20 METHOD
10.82	98	Paved Streets	TYPE IA 24-HOUR
13.91	91	Commercial/Industrial	RAINFALL= 5.50 IN
4.22	81	1/3 Acre Res - Group C Soil	SPAN= 6-12 HRS, dt=.02 HRS
2.75	77	Forest/Brush - Group C Soil	
2.46	67	Forest/Brush - Group B Soil	
26.57	85	1/8 Acre Res - Group B Soil	
12.27	74	Cemetery - Group C Soil	
73.00	85		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	13.1

SUBCATCHMENT 6 RUNOFF PEAK= 70.99 CFS @ 8.02 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	10.61	10.72	10.84	10.97	11.11	11.27	11.45	11.63	11.81	12.00
6.20	12.18	12.35	12.52	12.68	12.82	12.96	13.10	13.23	13.35	13.48
6.40	13.59	13.70	13.82	13.92	14.01	14.12	14.21	14.28	14.34	14.37
6.60	14.36	14.33	14.29	14.23	14.18	14.14	14.12	14.11	14.14	14.18
6.80	14.23	14.31	14.39	14.49	14.60	14.72	14.85	15.00	15.15	15.31
7.00	15.49	15.68	15.87	16.07	16.29	16.52	16.75	17.00	17.26	17.52
7.20	17.80	18.09	18.39	18.70	19.03	19.35	19.70	20.06	20.42	20.80
7.40	21.19	21.59	22.00	22.44	22.87	23.32	23.87	24.61	25.74	27.44
7.60	29.83	32.89	36.41	40.17	43.92	47.54	50.92	53.92	56.53	58.86
7.80	60.90	62.70	64.33	65.75	66.96	68.04	68.94	69.64	70.23	70.67
8.00	70.91	70.98	70.80	70.19	69.07	67.43	65.21	62.61	59.90	57.13
8.20	54.44	51.95	49.69	47.65	45.84	44.19	42.63	41.20	39.88	38.62
8.40	37.44	36.36	35.31	34.33	33.42	32.56	31.74	31.02	30.41	29.91
8.60	29.58	29.39	29.28	29.23	29.21	29.15	29.07	28.96	28.78	28.57
8.80	28.35	28.10	27.83	27.57	27.30	27.01	26.73	26.45	26.15	25.86
9.00	25.59	25.30	25.01	24.74	24.45	24.16	23.88	23.60	23.31	23.04
9.20	22.78	22.51	22.26	22.03	21.79	21.56	21.36	21.14	20.94	20.76
9.40	20.57	20.39	20.22	20.06	19.90	19.76	19.62	19.49	19.39	19.31
9.60	19.24	19.21	19.19	19.17	19.16	19.15	19.12	19.09	19.06	19.01
9.80	18.95	18.90	18.84	18.77	18.71	18.65	18.57	18.51	18.44	18.37
10.00	18.29	18.23	18.15	18.07	17.99	17.90	17.80	17.71	17.62	17.52
10.20	17.43	17.34	17.25	17.18	17.11	17.03	16.96	16.90	16.84	16.77
10.40	16.73	16.67	16.61	16.57	16.52	16.47	16.43	16.40	16.37	16.36
10.60	16.36	16.37	16.39	16.41	16.42	16.43	16.44	16.43	16.41	16.39
10.80	16.36	16.32	16.29	16.25	16.21	16.17	16.12	16.07	16.03	15.98
11.00	15.93	15.88	15.84	15.78	15.73	15.68	15.63	15.58	15.53	15.48
11.20	15.42	15.38	15.33	15.27	15.22	15.17	15.12	15.06	15.02	14.96
11.40	14.91	14.86	14.81	14.75	14.70	14.65	14.59	14.54	14.49	14.42
11.60	14.35	14.28	14.20	14.12	14.05	13.98	13.91	13.86	13.80	13.75
11.80	13.70	13.66	13.61	13.58	13.55	13.51	13.48	13.46	13.43	13.40

TYPE IA 24-HOUR RAINFALL= 5.50 IN

Prepared by HBH Consulting Engineers, Inc.

6 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 8 Basin L - Overall

PEAK= 149.2 CFS @ 8.32 HRS, VOLUME= 29.76 AF

ACRES	CN		SCS TR-20 METHOD
8.20	98	Paved Streets	TYPE IA 24-HOUR
38.14	85	1/8 Acre Res - Group B Soil	RAINFALL= 5.50 IN
24.76	75	1/4 Acre Res - Group B Soil	SPAN= 6-12 HRS, dt=.02 HRS
5.21	65	2 Acre Res - Group B Soil	
10.36	88	Industrial	
23.53	92	Commercial	
77.21	65	Forest - Group B Soil	
76.11	76	Forest - Group C Soil	
263.52	76		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	37.5

SUBCATCHMENT 8 RUNOFF PEAK= 149.2 CFS @ 8.32 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	13.3	13.6	13.8	14.0	14.3	14.5	14.8	15.0	15.2	15.5
6.20	15.8	16.1	16.3	16.6	16.9	17.2	17.5	17.9	18.2	18.5
6.40	18.8	19.2	19.5	19.9	20.2	20.6	20.9	21.3	21.6	22.0
6.60	22.3	22.7	23.0	23.3	23.6	23.9	24.2	24.5	24.8	25.1
6.80	25.3	25.5	25.8	26.0	26.2	26.4	26.6	26.9	27.1	27.3
7.00	27.5	27.7	28.0	28.2	28.5	28.8	29.0	29.3	29.6	30.0
7.20	30.3	30.7	31.1	31.5	31.9	32.4	32.8	33.3	33.8	34.3
7.40	34.9	35.5	36.1	36.7	37.3	38.0	38.7	39.4	40.2	41.0
7.60	42.0	43.0	44.2	45.5	47.1	48.8	50.7	52.8	55.4	58.1
7.80	61.3	64.6	68.2	72.1	76.2	80.4	84.8	89.3	93.8	98.4
8.00	103.0	107.7	112.3	116.6	121.0	125.2	129.2	132.7	136.1	139.2
8.20	142.1	144.1	146.0	147.4	148.7	149.1	149.2	149.0	148.7	147.7
8.40	146.4	145.0	143.5	141.6	139.5	137.3	135.1	132.8	130.2	127.7
8.60	125.2	122.8	120.2	117.7	115.4	113.2	111.0	108.8	107.0	105.1
8.80	103.3	101.6	100.1	98.6	97.2	95.8	94.5	93.4	92.2	91.0
9.00	90.0	89.0	88.0	87.0	86.0	85.2	84.3	83.4	82.5	81.7
9.20	80.9	80.0	79.0	78.3	77.5	76.6	75.7	75.0	74.2	73.4
9.40	72.6	71.8	71.1	70.4	69.6	68.9	68.2	67.6	66.8	66.2
9.60	65.6	65.0	64.4	63.7	63.2	62.7	62.2	61.7	61.3	60.9
9.80	60.4	60.0	59.7	59.4	59.0	58.7	58.4	58.2	57.9	57.6
10.00	57.3	57.2	56.9	56.7	56.4	56.3	56.1	55.8	55.6	55.5
10.20	55.3	55.0	54.8	54.6	54.4	54.2	53.9	53.8	53.6	53.4
10.40	53.1	52.9	52.7	52.5	52.3	52.1	51.9	51.7	51.5	51.3
10.60	51.2	51.0	50.8	50.6	50.5	50.4	50.2	50.1	50.0	49.9
10.80	49.8	49.6	49.6	49.5	49.4	49.3	49.3	49.3	49.2	49.1
11.00	49.0	49.0	48.9	48.8	48.7	48.7	48.6	48.5	48.4	48.3
11.20	48.3	48.2	48.0	47.9	47.9	47.7	47.6	47.5	47.4	47.3
11.40	47.1	47.0	46.9	46.8	46.6	46.5	46.4	46.3	46.1	46.0

Data for Coos Bay - 25 Year, Basins S - U
 TYPE IA 24-HOUR RAINFALL= 5.50 IN

Page 1

Prepared by HBH Consulting Engineers, Inc.

9 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 1 Basin S

PEAK= 123.3 CFS @ 8.06 HRS, VOLUME= 20.63 AF

ACRES	CN		SCS TR-20 METHOD
90.48	85	1/8 Acre Res - Group B Soil	TYPE IA 24-HOUR
14.61	89	Paved Streets w/ Ditches	RAINFALL= 5.50 IN
30.34	65	Forest/Meadow/Wetlands	SPAN= 6-12 HRS, dt=.02 HRS
4.98	92	Commercial	
1.44	85	Gravel Lot	
3.80	88	School/Industrial	
2.16	61	Park	
147.81	81		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	16.1

SUBCATCHMENT 1 RUNOFF PEAK= 123.3 CFS @ 8.06 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	15.5	15.7	15.9	16.1	16.3	16.6	16.8	17.1	17.4	17.7
6.20	18.0	18.3	18.6	18.9	19.2	19.4	19.7	20.0	20.2	20.4
6.40	20.7	20.9	21.1	21.3	21.5	21.7	21.9	22.1	22.3	22.4
6.60	22.5	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.7
6.80	22.7	22.8	23.0	23.1	23.3	23.5	23.7	23.9	24.1	24.4
7.00	24.6	25.0	25.3	25.6	25.9	26.3	26.7	27.1	27.5	27.9
7.20	28.4	28.8	29.3	29.8	30.4	30.9	31.5	32.1	32.7	33.3
7.40	33.9	34.6	35.3	36.0	36.8	37.5	38.4	39.4	40.8	42.7
7.60	45.3	48.8	53.0	58.0	63.3	69.0	74.6	80.2	85.5	90.5
7.80	95.1	99.1	102.9	106.2	109.3	112.0	114.5	116.6	118.5	120.1
8.00	121.4	122.5	123.0	123.3	122.7	121.6	119.6	116.9	113.6	109.8
8.20	106.0	101.9	97.9	94.0	90.4	87.1	83.9	81.1	78.4	75.9
8.40	73.5	71.3	69.2	67.2	65.3	63.5	61.9	60.3	58.9	57.7
8.60	56.7	55.8	55.2	54.7	54.4	54.1	53.8	53.6	53.3	53.1
8.80	52.7	52.3	51.9	51.5	51.0	50.5	50.1	49.6	49.1	48.6
9.00	48.1	47.6	47.1	46.6	46.1	45.6	45.1	44.6	44.1	43.6
9.20	43.1	42.6	42.2	41.7	41.3	40.8	40.4	40.0	39.6	39.2
9.40	38.9	38.5	38.2	37.9	37.6	37.3	37.0	36.7	36.5	36.3
9.60	36.1	36.0	35.9	35.8	35.7	35.7	35.6	35.6	35.5	35.5
9.80	35.4	35.3	35.2	35.1	35.0	34.9	34.8	34.7	34.6	34.4
10.00	34.3	34.2	34.1	33.9	33.8	33.7	33.5	33.4	33.2	33.0
10.20	32.9	32.7	32.6	32.4	32.3	32.1	32.0	31.8	31.7	31.6
10.40	31.5	31.4	31.3	31.2	31.1	31.0	30.9	30.8	30.8	30.7
10.60	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.8	30.7	30.7
10.80	30.7	30.7	30.6	30.6	30.5	30.4	30.4	30.3	30.2	30.1
11.00	30.1	30.0	29.9	29.8	29.7	29.7	29.5	29.5	29.4	29.3
11.20	29.2	29.1	29.0	28.9	28.8	28.7	28.6	28.5	28.5	28.4
11.40	28.3	28.2	28.1	28.0	27.9	27.8	27.7	27.6	27.5	27.4
11.60	27.3	27.2	27.0	26.9	26.8	26.7	26.5	26.4	26.3	26.2
11.80	26.1	26.0	25.9	25.8	25.7	25.7	25.6	25.5	25.5	25.4

Data for Coos Bay - 50 Year, Basins H - L
 TYPE IA 24-HOUR RAINFALL= 6.00 IN
 Prepared by HBH Consulting Engineers, Inc.
 HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

Page 1

3 Jan 06

SUBCATCHMENT 1 Basin H

PEAK= 194.4 CFS @ 8.66 HRS, VOLUME= 45.01 AF

ACRES	CN		SCS TR-20 METHOD
218.29	76	Forest - Group C Soil	TYPE IA 24-HOUR
99.34	65	Forest - Group B Soil	RAINFALL= 6.00 IN
8.10	85	1/8 Acre Res - Group B Soil	SPAN= 6-12 HRS, dt=.02 HRS
20.52	83	1/4 Acre Res - Group C Soil	
34.48	75	1/4 Acre Res - Group B Soil	
5.04	91	Newly Graded - Group C Soil	
385.77	74		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	1	6.8
Woodland Kv=5 L=450' s=.0488 '/' V=1.1 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	2	13.6
Woodland Kv=5 L=1323' s=.1058 '/' V=1.63 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	3	25.4
Woodland Kv=5 L=1132' s=.0221 '/' V=.74 fps		
CHANNEL FLOW	4	7.8
a=6 sq-ft Pw=6.5' r=.923'		
s=.0224 '/' n=.04 V=5.27 fps L=2456' Capacity=31.6 cfs		
CHANNEL FLOW	5	2.0
a=7 sq-ft Pw=6.5' r=1.077'		
s=.122 '/' n=.04 V=13.63 fps L=1641' Capacity=95.4 cfs		
CHANNEL FLOW	6	6.3
a=10 sq-ft Pw=8.5' r=1.176'		
s=.0068 '/' n=.07 V=1.95 fps L=735' Capacity=19.5 cfs		
Total Length= 7737 ft Total Tc=		61.9

Data for Coos Bay - 50 Year, Basins H - L
 TYPE IA 24-HOUR RAINFALL= 6.00 IN
 Prepared by HBH Consulting Engineers, Inc.
 HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

Page 4

3 Jan 06

SUBCATCHMENT 3 Basin J - Overall

PEAK= 100.1 CFS @ 7.97 HRS, VOLUME= 16.13 AF

ACRES	CN		SCS TR-20 METHOD
6.60	98	Paved Streets	TYPE IA 24-HOUR
14.64	77	Brush - Group C Soil	RAINFALL= 6.00 IN
39.02	94	Commercial - Group C Soil	SPAN= 6-12 HRS, dt=.02 HRS
7.54	85	1/8 Acre Res - Group B Soil	
11.91	90	1/8 Acre Res - Group C Soil	
79.71	90		

Method	Comment	Tc (min)
DIRECT ENTRY	Overland Flow	6.9
CIRCULAR CHANNEL	10" Pipe	2.8
10" Diameter a=.55 sq-ft Pw=2.6' r=.208'		
s=.028 '/' n=.013 V=6.72 fps L=1141' Capacity=3.7 cfs		
CIRCULAR CHANNEL	15" Pipe	.2
15" Diameter a=1.23 sq-ft Pw=3.9' r=.313'		
s=.029 '/' n=.013 V=8.96 fps L=105' Capacity=11 cfs		
CIRCULAR CHANNEL	24" Pipe	.4
24" Diameter a=3.14 sq-ft Pw=6.3' r=.5'		
s=.029 '/' n=.013 V=12.26 fps L=271' Capacity=38.5 cfs		
CIRCULAR CHANNEL	36" Pipe	.6
36" Diameter a=7.07 sq-ft Pw=9.4' r=.75'		
s=.007 '/' n=.013 V=7.89 fps L=297' Capacity=55.8 cfs		
CIRCULAR CHANNEL	48" Pipe	.2
48" Diameter a=12.57 sq-ft Pw=12.6' r=1'		
s=.005 '/' n=.011 V=9.55 fps L=90' Capacity=120 cfs		
Total Length= 1904 ft		Total Tc= 11.1

SUBCATCHMENT 6

Basin K - Subbasin 2

PEAK= 80.06 CFS @ 8.01 HRS, VOLUME= 13.06 AF

ACRES	CN		SCS TR-20 METHOD
10.82	98	Paved Streets	TYPE IA 24-HOUR
13.91	91	Commercial/Industrial	RAINFALL= 6.00 IN
4.22	81	1/3 Acre Res - Group C Soil	SPAN= 6-12 HRS, dt=.02 HRS
2.75	77	Forest/Brush - Group C Soil	
2.46	67	Forest/Brush - Group B Soil	
26.57	85	1/8 Acre Res - Group B Soil	
12.27	74	Cemetery - Group C Soil	
73.00	85		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	13.1

SUBCATCHMENT 6 RUNOFF PEAK= 80.06 CFS @ 8.01 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	12.44	12.56	12.70	12.85	13.01	13.19	13.39	13.59	13.80	14.02
6.20	14.22	14.41	14.60	14.78	14.94	15.10	15.26	15.40	15.54	15.68
6.40	15.80	15.93	16.05	16.16	16.27	16.38	16.48	16.55	16.62	16.65
6.60	16.63	16.60	16.54	16.46	16.40	16.35	16.32	16.31	16.33	16.37
6.80	16.43	16.51	16.60	16.71	16.83	16.97	17.11	17.27	17.45	17.63
7.00	17.82	18.04	18.25	18.48	18.73	18.98	19.24	19.52	19.81	20.10
7.20	20.42	20.75	21.08	21.43	21.80	22.17	22.56	22.96	23.37	23.79
7.40	24.24	24.69	25.15	25.64	26.12	26.63	27.25	28.08	29.36	31.28
7.60	34.00	37.46	41.45	45.71	49.95	54.04	57.85	61.23	64.17	66.78
7.80	69.05	71.05	72.87	74.43	75.76	76.94	77.92	78.68	79.30	79.76
8.00	79.99	80.04	79.80	79.07	77.79	75.91	73.38	70.44	67.37	64.23
8.20	61.19	58.37	55.81	53.52	51.47	49.60	47.84	46.22	44.73	43.30
8.40	41.98	40.75	39.57	38.47	37.45	36.47	35.55	34.74	34.05	33.48
8.60	33.11	32.90	32.77	32.71	32.68	32.61	32.51	32.39	32.18	31.94
8.80	31.70	31.41	31.11	30.82	30.51	30.18	29.86	29.55	29.21	28.89
9.00	28.58	28.25	27.93	27.62	27.30	26.97	26.66	26.34	26.01	25.72
9.20	25.42	25.12	24.84	24.58	24.30	24.06	23.82	23.58	23.35	23.15
9.40	22.93	22.73	22.55	22.37	22.18	22.03	21.87	21.72	21.61	21.52
9.60	21.44	21.40	21.38	21.36	21.35	21.34	21.31	21.27	21.23	21.17
9.80	21.11	21.05	20.98	20.90	20.84	20.77	20.68	20.61	20.53	20.45
10.00	20.36	20.29	20.20	20.11	20.02	19.92	19.81	19.71	19.60	19.49
10.20	19.39	19.30	19.20	19.11	19.03	18.94	18.87	18.80	18.73	18.66
10.40	18.60	18.54	18.47	18.43	18.37	18.31	18.27	18.24	18.20	18.19
10.60	18.19	18.20	18.22	18.24	18.26	18.26	18.27	18.26	18.24	18.22
10.80	18.18	18.14	18.10	18.06	18.01	17.96	17.92	17.86	17.80	17.76
11.00	17.70	17.64	17.59	17.53	17.47	17.42	17.36	17.30	17.25	17.19
11.20	17.13	17.07	17.02	16.96	16.90	16.85	16.78	16.72	16.67	16.61
11.40	16.55	16.50	16.44	16.37	16.32	16.26	16.20	16.14	16.08	16.00
11.60	15.92	15.85	15.76	15.67	15.60	15.51	15.44	15.38	15.31	15.25
11.80	15.20	15.16	15.10	15.06	15.03	14.98	14.95	14.93	14.89	14.86

TYPE IA 24-HOUR RAINFALL= 6.00 IN

Prepared by HBH Consulting Engineers, Inc.

3 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 8 Basin L - Overall

PEAK= 174.1 CFS @ 8.31 HRS, VOLUME= 34.59 AF

ACRES	CN		SCS TR-20 METHOD
8.20	98	Paved Streets	TYPE IA 24-HOUR
38.14	85	1/8 Acre Res - Group B Soil	RAINFALL= 6.00 IN
24.76	75	1/4 Acre Res - Group B Soil	SPAN= 6-12 HRS, dt=.02 HRS
5.21	65	2 Acre Res - Group B Soil	
10.36	88	Industrial	
23.53	92	Commercial	
77.21	65	Forest - Group B Soil	
76.11	76	Forest - Group C Soil	
263.52	76		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	37.5

SUBCATCHMENT 8 RUNOFF PEAK= 174.1 CFS @ 8.31 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	17.6	17.9	18.2	18.4	18.7	19.0	19.3	19.6	19.8	20.2
6.20	20.5	20.8	21.1	21.5	21.8	22.2	22.5	22.9	23.3	23.7
6.40	24.0	24.4	24.9	25.3	25.6	26.0	26.5	26.9	27.3	27.7
6.60	28.1	28.5	28.8	29.2	29.6	29.9	30.2	30.5	30.9	31.2
6.80	31.4	31.7	32.0	32.2	32.5	32.7	32.9	33.2	33.4	33.6
7.00	33.9	34.1	34.4	34.7	34.9	35.3	35.6	35.9	36.2	36.6
7.20	37.1	37.5	37.9	38.4	38.9	39.4	39.9	40.4	41.0	41.7
7.40	42.3	42.9	43.6	44.4	45.1	45.9	46.7	47.5	48.4	49.3
7.60	50.5	51.7	53.1	54.6	56.4	58.4	60.7	63.1	66.1	69.3
7.80	73.0	76.8	81.2	85.6	90.4	95.3	100.4	105.6	110.9	116.2
8.00	121.6	127.0	132.3	137.3	142.3	147.1	151.7	155.7	159.6	163.1
8.20	166.3	168.6	170.7	172.3	173.6	174.0	174.0	173.7	173.2	172.0
8.40	170.4	168.7	166.9	164.6	162.1	159.4	156.8	154.0	151.0	148.0
8.60	145.1	142.2	139.2	136.2	133.5	130.9	128.3	125.8	123.6	121.4
8.80	119.3	117.2	115.4	113.7	112.1	110.4	108.9	107.5	106.2	104.8
9.00	103.5	102.4	101.2	100.0	98.9	97.9	96.9	95.8	94.7	93.7
9.20	92.8	91.7	90.7	89.7	88.8	87.8	86.8	85.9	85.0	84.1
9.40	83.1	82.2	81.4	80.5	79.6	78.8	78.0	77.3	76.4	75.6
9.60	75.0	74.3	73.5	72.8	72.2	71.7	71.0	70.4	69.9	69.5
9.80	69.0	68.5	68.1	67.7	67.3	66.9	66.6	66.3	66.0	65.6
10.00	65.4	65.1	64.9	64.6	64.3	64.1	63.9	63.6	63.3	63.1
10.20	62.9	62.7	62.4	62.2	62.0	61.7	61.4	61.2	61.0	60.7
10.40	60.4	60.2	60.0	59.7	59.4	59.2	59.0	58.8	58.5	58.3
10.60	58.1	57.9	57.7	57.5	57.4	57.2	57.0	56.8	56.7	56.7
10.80	56.5	56.4	56.3	56.2	56.1	56.0	55.9	55.9	55.8	55.7
11.00	55.6	55.6	55.5	55.4	55.3	55.2	55.1	55.0	54.9	54.8
11.20	54.7	54.6	54.4	54.3	54.3	54.1	53.9	53.8	53.7	53.6
11.40	53.4	53.3	53.2	53.0	52.8	52.7	52.6	52.4	52.3	52.1

Data for Coos Bay - 50 Year, Basins S - U
 TYPE IA 24-HOUR RAINFALL= 6.00 IN

Page 1

Prepared by HBH Consulting Engineers, Inc.
 HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

4 Jan 06

SUBCATCHMENT 1 Basin S

PEAK= 140.9 CFS @ 8.05 HRS, VOLUME= 23.51 AF

ACRES	CN		SCS TR-20 METHOD
90.48	85	1/8 Acre Res - Group B Soil	TYPE IA 24-HOUR
14.61	89	Paved Streets w/ Ditches	RAINFALL= 6.00 IN
30.34	65	Forest/Meadow/Wetlands	SPAN= 6-12 HRS, dt=.02 HRS
4.98	92	Commercial	
1.44	85	Gravel Lot	
3.80	88	School/Industrial	
2.16	61	Park	
147.81	81		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	16.1

SUBCATCHMENT 1 RUNOFF PEAK= 140.9 CFS @ 8.05 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	18.8	19.0	19.2	19.5	19.7	20.0	20.3	20.6	21.0	21.3
6.20	21.6	22.0	22.3	22.6	23.0	23.3	23.6	23.9	24.1	24.4
6.40	24.7	24.9	25.2	25.4	25.7	25.9	26.1	26.3	26.5	26.6
6.60	26.7	26.8	26.8	26.8	26.8	26.8	26.7	26.7	26.7	26.8
6.80	26.9	27.0	27.1	27.3	27.5	27.6	27.9	28.1	28.4	28.7
7.00	29.0	29.3	29.7	30.1	30.4	30.9	31.3	31.7	32.2	32.7
7.20	33.2	33.7	34.3	34.9	35.5	36.1	36.8	37.4	38.1	38.9
7.40	39.6	40.3	41.1	41.9	42.8	43.6	44.6	45.8	47.4	49.6
7.60	52.6	56.5	61.4	67.1	73.3	79.8	86.2	92.7	98.7	104.4
7.80	109.6	114.2	118.4	122.1	125.6	128.6	131.4	133.7	135.8	137.6
8.00	139.0	140.1	140.7	140.8	140.1	138.8	136.4	133.3	129.5	125.1
8.20	120.7	116.0	111.5	107.0	102.8	99.0	95.4	92.2	89.0	86.2
8.40	83.4	80.9	78.5	76.2	74.0	72.0	70.1	68.3	66.8	65.3
8.60	64.2	63.2	62.5	61.9	61.5	61.2	60.9	60.6	60.3	60.0
8.80	59.6	59.1	58.7	58.1	57.7	57.1	56.6	56.0	55.4	54.9
9.00	54.3	53.7	53.1	52.6	52.0	51.4	50.8	50.3	49.7	49.1
9.20	48.6	48.0	47.5	47.0	46.5	46.0	45.5	45.1	44.6	44.2
9.40	43.8	43.4	43.0	42.6	42.3	41.9	41.6	41.3	41.1	40.8
9.60	40.6	40.5	40.3	40.2	40.2	40.1	40.0	40.0	39.9	39.9
9.80	39.8	39.7	39.6	39.4	39.3	39.2	39.1	38.9	38.8	38.7
10.00	38.5	38.4	38.2	38.1	37.9	37.8	37.6	37.4	37.3	37.1
10.20	36.9	36.7	36.5	36.3	36.2	36.0	35.9	35.7	35.6	35.5
10.40	35.3	35.2	35.1	35.0	34.9	34.8	34.7	34.6	34.5	34.5
10.60	34.4	34.4	34.4	34.4	34.4	34.5	34.5	34.5	34.5	34.5
10.80	34.4	34.4	34.3	34.2	34.2	34.1	34.0	33.9	33.9	33.8
11.00	33.7	33.6	33.5	33.4	33.3	33.2	33.1	33.0	32.9	32.8
11.20	32.7	32.6	32.5	32.4	32.3	32.2	32.1	32.0	31.8	31.7
11.40	31.6	31.5	31.4	31.3	31.2	31.1	31.0	30.9	30.8	30.6
11.60	30.5	30.4	30.2	30.1	30.0	29.8	29.7	29.5	29.4	29.3
11.80	29.2	29.1	29.0	28.9	28.8	28.7	28.6	28.5	28.5	28.4

Data for Coos Bay - 25 Year, Basins H - L, Future

Page 1

TYPE IA 24-HOUR RAINFALL= 5.50 IN

Prepared by HBH Consulting Engineers, Inc.

6 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 1

Basin H

PEAK= 205.7 CFS @ 8.65 HRS, VOLUME= 47.57 AF

ACRES	CN		SCS TR-20 METHOD
215.72	76	Forest - Group C Soil	TYPE IA 24-HOUR
15.57	65	Forest - Group B Soil	RAINFALL= 5.50 IN
24.60	85	1/8 Acre Res - Group B Soil	SPAN= 6-12 HRS, dt=.02 HRS
5.77	90	1/8 Acre Res - Group C Soil	
81.05	80	1/5 Acre Res - Group B Soil	
20.52	87	1/5 Acre Res - Group C Soil	
21.21	98	Paved Streets	
1.33	72	Open Space	
385.77	79		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	1	6.8
Woodland Kv=5 L=450' s=.0488 '/' V=1.1 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	2	13.6
Woodland Kv=5 L=1323' s=.1058 '/' V=1.63 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	3	25.4
Woodland Kv=5 L=1132' s=.0221 '/' V=.74 fps		
CHANNEL FLOW	4	7.8
a=6 sq-ft Pw=6.5' r=.923'		
s=.0224 '/' n=.04 V=5.27 fps L=2456' Capacity=31.6 cfs		
CHANNEL FLOW	5	2.0
a=7 sq-ft Pw=6.5' r=1.077'		
s=.122 '/' n=.04 V=13.63 fps L=1641' Capacity=95.4 cfs		
CHANNEL FLOW	6	6.3
a=10 sq-ft Pw=8.5' r=1.176'		
s=.0068 '/' n=.07 V=1.95 fps L=735' Capacity=19.5 cfs		
Total Length= 7737 ft Total Tc=		61.9

Data for Coos Bay - 25 Year, Basins H - L, Future

Page 4

TYPE IA 24-HOUR RAINFALL= 5.50 IN

Prepared by HBH Consulting Engineers, Inc.

6 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 3

Basin J - Overall

PEAK= 96.44 CFS @ 7.96 HRS, VOLUME= 15.52 AF

ACRES	CN		SCS TR-20 METHOD
6.60	98	Paved Streets	TYPE IA 24-HOUR
.44	77	Brush - Group C Soil	RAINFALL= 5.50 IN
52.26	94	Commercial - Group C Soil	SPAN= 6-12 HRS, dt=.02 HRS
7.54	85	1/8 Acre Res - Group B Soil	
12.87	90	1/8 Acre Res - Group C Soil	
79.71	93		

Method	Comment	Tc (min)
DIRECT ENTRY	Overland Flow	6.9
CIRCULAR CHANNEL	10" Pipe	2.8
10" Diameter a=.55 sq-ft Pw=2.6' r=.208'		
s=.028 '/' n=.013 V=6.72 fps L=1141' Capacity=3.7 cfs		
CIRCULAR CHANNEL	15" Pipe	.2
15" Diameter a=1.23 sq-ft Pw=3.9' r=.313'		
s=.029 '/' n=.013 V=8.96 fps L=105' Capacity=11 cfs		
CIRCULAR CHANNEL	24" Pipe	.4
24" Diameter a=3.14 sq-ft Pw=6.3' r=.5'		
s=.029 '/' n=.013 V=12.26 fps L=271' Capacity=38.5 cfs		
CIRCULAR CHANNEL	36" Pipe	.6
36" Diameter a=7.07 sq-ft Pw=9.4' r=.75'		
s=.007 '/' n=.013 V=7.89 fps L=297' Capacity=55.8 cfs		
CIRCULAR CHANNEL	48" Pipe	.2
48" Diameter a=12.57 sq-ft Pw=12.6' r=1'		
s=.005 '/' n=.011 V=9.55 fps L=90' Capacity=120 cfs		
Total Length= 1904 ft Total Tc=		11.1

TYPE IA 24-HOUR RAINFALL= 5.50 IN

Prepared by HBH Consulting Engineers, Inc.

6 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 8 Basin L - Overall

PEAK= 211.1 CFS @ 8.29 HRS, VOLUME= 41.38 AF

ACRES	CN		SCS TR-20 METHOD
34.54	98	Paved Streets	TYPE IA 24-HOUR
52.43	85	1/8 Acre Res - Group B Soil	RAINFALL= 5.50 IN
43.71	75	1/4 Acre Res - Group B Soil	SPAN= 6-12 HRS, dt=.02 HRS
5.21	65	2 Acre Res - Group B Soil	
18.29	88	Industrial	
35.99	92	Commercial	
22.59	65	Forest / Open Space	
50.86	90	1/8 Acre Res - Group C Soil	
263.62	85		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	37.5

SUBCATCHMENT 8 RUNOFF PEAK= 211.1 CFS @ 8.29 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	32.4	32.7	33.0	33.3	33.6	34.0	34.3	34.6	34.9	35.3
6.20	35.7	36.0	36.4	36.8	37.2	37.6	38.1	38.5	39.0	39.5
6.40	39.9	40.4	40.9	41.4	41.8	42.3	42.8	43.3	43.7	44.2
6.60	44.7	45.1	45.5	45.9	46.3	46.7	47.0	47.4	47.7	48.0
6.80	48.3	48.5	48.7	49.0	49.2	49.3	49.5	49.8	50.0	50.1
7.00	50.3	50.6	50.8	51.1	51.3	51.6	52.0	52.3	52.6	53.0
7.20	53.5	53.9	54.3	54.9	55.4	56.0	56.5	57.2	57.9	58.6
7.40	59.3	60.0	60.9	61.7	62.5	63.4	64.4	65.4	66.4	67.5
7.60	68.9	70.3	72.0	73.8	76.0	78.4	81.2	84.1	87.8	91.7
7.80	96.1	100.8	106.0	111.5	117.2	123.1	129.2	135.4	141.7	147.9
8.00	154.2	160.5	166.6	172.3	178.0	183.4	188.6	193.0	197.2	200.9
8.20	204.3	206.6	208.6	209.9	211.0	210.9	210.5	209.6	208.5	206.6
8.40	204.2	201.8	199.2	196.1	192.7	189.2	185.8	182.1	178.2	174.4
8.60	170.7	167.0	163.2	159.4	156.0	152.7	149.4	146.3	143.5	140.7
8.80	138.1	135.5	133.2	131.1	128.9	126.8	125.0	123.2	121.5	119.7
9.00	118.1	116.7	115.2	113.7	112.3	111.0	109.8	108.4	107.1	105.9
9.20	104.7	103.4	102.1	100.9	99.8	98.6	97.3	96.2	95.2	94.1
9.40	92.9	91.8	90.9	89.8	88.7	87.7	86.8	85.9	84.9	84.0
9.60	83.2	82.3	81.5	80.6	79.9	79.2	78.5	77.8	77.2	76.6
9.80	76.0	75.4	74.9	74.5	74.0	73.5	73.1	72.8	72.4	72.0
10.00	71.6	71.4	71.0	70.7	70.3	70.1	69.8	69.5	69.2	68.9
10.20	68.7	68.3	68.0	67.7	67.5	67.1	66.8	66.5	66.3	66.0
10.40	65.6	65.3	65.1	64.8	64.5	64.2	64.0	63.7	63.4	63.1
10.60	62.9	62.7	62.4	62.2	62.0	61.8	61.6	61.4	61.2	61.1
10.80	60.9	60.8	60.7	60.6	60.4	60.3	60.2	60.1	60.0	59.9
11.00	59.8	59.7	59.6	59.5	59.3	59.3	59.2	59.0	58.8	58.8
11.20	58.7	58.5	58.3	58.2	58.1	57.9	57.7	57.6	57.4	57.3
11.40	57.0	56.9	56.8	56.6	56.4	56.2	56.1	55.9	55.7	55.5

Data for Coos Bay - 25 Year, Basins S - U, Future

Page 1

TYPE IA 24-HOUR RAINFALL= 5.50 IN

Prepared by HBH Consulting Engineers, Inc.

9 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 1

Basin S

PEAK= 123.3 CFS @ 8.06 HRS, VOLUME= 20.63 AF

ACRES	CN		SCS TR-20 METHOD
90.48	85	1/8 Acre Res - Group B Soil	TYPE IA 24-HOUR
14.61	89	Paved Streets w/ open ditches	RAINFALL= 5.50 IN
30.34	65	Forest/Meadow/Wetlands	SPAN= 6-12 HRS, dt=.02 HRS
4.98	92	Commercial	
1.44	85	Gravel Lot	
3.80	88	School/Industrial	
2.16	61	Park	
147.81	81		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	16.1

SUBCATCHMENT 1 RUNOFF PEAK= 123.3 CFS @ 8.06 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	15.5	15.7	15.9	16.1	16.3	16.6	16.8	17.1	17.4	17.7
6.20	18.0	18.3	18.6	18.9	19.2	19.4	19.7	20.0	20.2	20.4
6.40	20.7	20.9	21.1	21.3	21.5	21.7	21.9	22.1	22.3	22.4
6.60	22.5	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.7
6.80	22.7	22.8	23.0	23.1	23.3	23.5	23.7	23.9	24.1	24.4
7.00	24.6	25.0	25.3	25.6	25.9	26.3	26.7	27.1	27.5	27.9
7.20	28.4	28.8	29.3	29.8	30.4	30.9	31.5	32.1	32.7	33.3
7.40	33.9	34.6	35.3	36.0	36.8	37.5	38.4	39.4	40.8	42.7
7.60	45.3	48.8	53.0	58.0	63.3	69.0	74.6	80.2	85.5	90.5
7.80	95.1	99.1	102.9	106.2	109.3	112.0	114.5	116.6	118.5	120.1
8.00	121.4	122.5	123.0	123.3	122.7	121.6	119.6	116.9	113.6	109.8
8.20	106.0	101.9	97.9	94.0	90.4	87.1	83.9	81.1	78.4	75.9
8.40	73.5	71.3	69.2	67.2	65.3	63.5	61.9	60.3	58.9	57.7
8.60	56.7	55.8	55.2	54.7	54.4	54.1	53.8	53.6	53.3	53.1
8.80	52.7	52.3	51.9	51.5	51.0	50.5	50.1	49.6	49.1	48.6
9.00	48.1	47.6	47.1	46.6	46.1	45.6	45.1	44.6	44.1	43.6
9.20	43.1	42.6	42.2	41.7	41.3	40.8	40.4	40.0	39.6	39.2
9.40	38.9	38.5	38.2	37.9	37.6	37.3	37.0	36.7	36.5	36.3
9.60	36.1	36.0	35.9	35.8	35.7	35.7	35.6	35.6	35.5	35.5
9.80	35.4	35.3	35.2	35.1	35.0	34.9	34.8	34.7	34.6	34.4
10.00	34.3	34.2	34.1	33.9	33.8	33.7	33.5	33.4	33.2	33.0
10.20	32.9	32.7	32.6	32.4	32.3	32.1	32.0	31.8	31.7	31.6
10.40	31.5	31.4	31.3	31.2	31.1	31.0	30.9	30.8	30.8	30.7
10.60	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.8	30.7	30.7
10.80	30.7	30.7	30.6	30.6	30.5	30.4	30.4	30.3	30.2	30.1
11.00	30.1	30.0	29.9	29.8	29.7	29.7	29.5	29.5	29.4	29.3
11.20	29.2	29.1	29.0	28.9	28.8	28.7	28.6	28.5	28.5	28.4
11.40	28.3	28.2	28.1	28.0	27.9	27.8	27.7	27.6	27.5	27.4
11.60	27.3	27.2	27.0	26.9	26.8	26.7	26.5	26.4	26.3	26.2
11.80	26.1	26.0	25.9	25.8	25.7	25.7	25.6	25.5	25.5	25.4

Data for Coos Bay - 50 Year, Basins H - L, Future

Page 1

TYPE IA 24-HOUR RAINFALL= 6.00 IN

Prepared by HBH Consulting Engineers, Inc.

9 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 1

Basin H

PEAK= 237.1 CFS @ 8.65 HRS, VOLUME= 54.85 AF

ACRES	CN		SCS TR-20 METHOD
215.72	76	Forest - Group C Soil	TYPE IA 24-HOUR
15.57	65	Forest - Group B Soil	RAINFALL= 6.00 IN
24.60	85	1/8 Acre Res - Group B Soil	SPAN= 6-12 HRS, dt=.02 HRS
5.77	90	1/8 Acre Res - Group C Soil	
81.05	80	1/5 Acre Res - Group B Soil	
20.52	87	1/5 Acre Res - Group C Soil	
21.21	98	Paved Streets	
1.33	72	Open Space	
385.77	79		

Method	Comment	Tc (min)
SHALLOW CONCENTRATED/UPLAND FLOW	1	6.8
Woodland Kv=5 L=450' s=.0488 '/' V=1.1 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	2	13.6
Woodland Kv=5 L=1323' s=.1058 '/' V=1.63 fps		
SHALLOW CONCENTRATED/UPLAND FLOW	3	25.4
Woodland Kv=5 L=1132' s=.0221 '/' V=.74 fps		
CHANNEL FLOW	4	7.8
a=6 sq-ft Pw=6.5' r=.923'		
s=.0224 '/' n=.04 V=5.27 fps L=2456' Capacity=31.6 cfs		
CHANNEL FLOW	5	2.0
a=7 sq-ft Pw=6.5' r=1.077'		
s=.122 '/' n=.04 V=13.63 fps L=1641' Capacity=95.4 cfs		
CHANNEL FLOW	6	6.3
a=10 sq-ft Pw=8.5' r=1.176'		
s=.0068 '/' n=.07 V=1.95 fps L=735' Capacity=19.5 cfs		
Total Length= 7737 ft Total Tc=		61.9

Data for Coos Bay - 50 Year, Basins H - L, Future

Page 4

TYPE IA 24-HOUR RAINFALL= 6.00 IN

Prepared by HBH Consulting Engineers, Inc.

9 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 3

Basin J - Overall

PEAK= 106.4 CFS @ 7.96 HRS, VOLUME= 17.11 AF

ACRES	CN		SCS TR-20 METHOD
6.60	98	Paved Streets	TYPE IA 24-HOUR
.44	77	Brush - Group C Soil	RAINFALL= 6.00 IN
52.26	94	Commercial - Group C Soil	SPAN= 6-12 HRS, dt=.02 HRS
7.54	85	1/8 Acre Res - Group B Soil	
12.87	90	1/8 Acre Res - Group C Soil	
79.71	93		

Method	Comment	Tc (min)
DIRECT ENTRY	Overland Flow	6.9
CIRCULAR CHANNEL	10" Pipe	2.8
10" Diameter a=.55 sq-ft Pw=2.6' r=.208'		
s=.028 '/' n=.013 V=6.72 fps L=1141' Capacity=3.7 cfs		
CIRCULAR CHANNEL	15" Pipe	.2
15" Diameter a=1.23 sq-ft Pw=3.9' r=.313'		
s=.029 '/' n=.013 V=8.96 fps L=105' Capacity=11 cfs		
CIRCULAR CHANNEL	24" Pipe	.4
24" Diameter a=3.14 sq-ft Pw=6.3' r=.5'		
s=.029 '/' n=.013 V=12.26 fps L=271' Capacity=38.5 cfs		
CIRCULAR CHANNEL	36" Pipe	.6
36" Diameter a=7.07 sq-ft Pw=9.4' r=.75'		
s=.007 '/' n=.013 V=7.89 fps L=297' Capacity=55.8 cfs		
CIRCULAR CHANNEL	48" Pipe	.2
48" Diameter a=12.57 sq-ft Pw=12.6' r=1'		
s=.005 '/' n=.011 V=9.55 fps L=90' Capacity=120 cfs		
Total Length= 1904 ft Total Tc=		11.1

TYPE IA 24-HOUR RAINFALL= 6.00 IN

Prepared by HBH Consulting Engineers, Inc.

9 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 8 Basin L - Overall

PEAK= 238.4 CFS @ 8.29 HRS, VOLUME= 46.68 AF

ACRES	CN		SCS TR-20 METHOD
34.54	98	Paved Streets	TYPE IA 24-HOUR
52.43	85	1/8 Acre Res - Group B Soil	RAINFALL= 6.00 IN
43.71	75	1/4 Acre Res - Group B Soil	SPAN= 6-12 HRS, dt=.02 HRS
5.21	65	2 Acre Res - Group B Soil	
18.29	88	Industrial	
35.99	92	Commercial	
22.59	65	Forest / Open Space	
50.86	90	1/8 Acre Res - Group C Soil	
263.62	85		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	37.5

SUBCATCHMENT 8 RUNOFF PEAK= 238.4 CFS @ 8.29 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	38.4	38.7	39.1	39.4	39.7	40.1	40.4	40.8	41.1	41.6
6.20	42.0	42.4	42.8	43.3	43.8	44.2	44.7	45.2	45.7	46.2
6.40	46.7	47.3	47.9	48.4	48.9	49.4	50.0	50.6	51.0	51.6
6.60	52.1	52.6	53.0	53.5	54.0	54.4	54.7	55.1	55.5	55.8
6.80	56.1	56.3	56.6	56.8	57.0	57.2	57.4	57.7	57.9	58.1
7.00	58.3	58.6	58.8	59.0	59.3	59.7	60.0	60.4	60.7	61.2
7.20	61.7	62.1	62.6	63.2	63.9	64.5	65.1	65.8	66.6	67.4
7.40	68.1	69.0	70.0	70.9	71.8	72.8	73.9	75.0	76.1	77.4
7.60	78.9	80.6	82.4	84.5	87.0	89.7	92.8	96.1	100.3	104.7
7.80	109.7	115.0	120.9	127.0	133.5	140.1	147.0	154.0	161.1	168.1
8.00	175.1	182.2	189.0	195.5	201.8	207.9	213.7	218.6	223.3	227.4
8.20	231.1	233.6	235.8	237.2	238.4	238.2	237.6	236.5	235.3	233.0
8.40	230.3	227.5	224.5	221.0	217.1	213.1	209.1	205.0	200.6	196.2
8.60	192.0	187.8	183.4	179.2	175.4	171.6	167.9	164.3	161.1	158.0
8.80	155.0	152.1	149.5	147.0	144.6	142.2	140.1	138.1	136.2	134.2
9.00	132.4	130.7	129.1	127.4	125.7	124.3	122.9	121.3	119.8	118.5
9.20	117.1	115.6	114.2	112.9	111.6	110.2	108.8	107.6	106.4	105.1
9.40	103.8	102.6	101.5	100.3	99.1	98.0	97.0	95.9	94.8	93.8
9.60	92.8	91.9	90.9	90.0	89.2	88.4	87.6	86.8	86.1	85.5
9.80	84.8	84.1	83.6	83.1	82.6	82.0	81.5	81.2	80.7	80.2
10.00	79.8	79.5	79.2	78.7	78.4	78.1	77.8	77.4	77.0	76.8
10.20	76.5	76.1	75.7	75.4	75.1	74.8	74.4	74.1	73.8	73.4
10.40	73.0	72.7	72.5	72.1	71.8	71.4	71.2	70.9	70.5	70.2
10.60	70.0	69.8	69.4	69.2	69.0	68.8	68.5	68.3	68.1	68.0
10.80	67.8	67.6	67.5	67.4	67.2	67.0	66.9	66.9	66.7	66.6
11.00	66.4	66.4	66.3	66.1	65.9	65.9	65.8	65.6	65.4	65.3
11.20	65.2	65.0	64.8	64.6	64.5	64.3	64.1	63.9	63.8	63.6
11.40	63.4	63.2	63.1	62.9	62.6	62.4	62.3	62.1	61.9	61.6
11.60	61.5	61.3	61.1	60.8	60.7	60.5	60.2	60.0	59.8	59.6

Data for Coos Bay - 50 Year, Basins M - R, Future

Page 1

TYPE IA 24-HOUR RAINFALL= 6.00 IN

Prepared by HBH Consulting Engineers, Inc.

9 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 1

Basin M - Overall

PEAK= 91.88 CFS @ 9.07 HRS, VOLUME= 22.94 AF

ACRES	CN		SCS TR-20 METHOD
7.90	98	Paved Streets	TYPE IA 24-HOUR
22.80	85	1/8 Acre Res - Group B Soil	RAINFALL= 6.00 IN
13.90	92	Commercial	SPAN= 6-12 HRS, dt=.02 HRS
7.00	88	Industrial	
80.00	73	Wetlands	
145.40	58	Forest - Group B Soil	
277.00	68		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	85.0

SUBCATCHMENT 1 RUNOFF PEAK= 91.88 CFS @ 9.07 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	.86	.92	.99	1.07	1.15	1.23	1.31	1.40	1.49	1.59
6.20	1.69	1.78	1.89	2.01	2.12	2.23	2.35	2.48	2.61	2.74
6.40	2.87	3.01	3.16	3.31	3.45	3.60	3.76	3.93	4.09	4.26
6.60	4.43	4.61	4.79	4.97	5.16	5.34	5.54	5.74	5.93	6.13
6.80	6.33	6.54	6.75	6.96	7.18	7.39	7.61	7.83	8.04	8.26
7.00	8.49	8.72	8.95	9.18	9.41	9.64	9.88	10.11	10.34	10.58
7.20	10.83	11.07	11.32	11.57	11.81	12.06	12.31	12.56	12.81	13.09
7.40	13.36	13.63	13.91	14.19	14.47	14.76	15.04	15.33	15.65	15.99
7.60	16.33	16.67	17.02	17.40	17.79	18.18	18.57	19.00	19.52	20.04
7.80	20.57	21.09	21.70	22.38	23.06	23.74	24.43	25.29	26.19	27.09
8.00	28.00	28.95	30.08	31.24	32.40	33.55	34.81	36.22	37.63	39.04
8.20	40.46	42.03	43.68	45.33	46.98	48.64	50.39	52.15	53.92	55.68
8.40	57.45	59.24	61.02	62.80	64.58	66.30	67.97	69.63	71.29	72.94
8.60	74.41	75.80	77.19	78.59	79.95	81.13	82.29	83.44	84.60	85.62
8.80	86.36	87.10	87.83	88.57	89.18	89.70	90.22	90.74	91.23	91.42
9.00	91.55	91.67	91.79	91.88	91.85	91.82	91.78	91.75	91.59	91.26
9.20	90.93	90.61	90.28	89.90	89.50	89.10	88.70	88.28	87.75	87.19
9.40	86.63	86.08	85.52	84.97	84.43	83.88	83.33	82.75	82.15	81.55
9.60	80.95	80.36	79.80	79.26	78.72	78.17	77.63	77.07	76.50	75.94
9.80	75.37	74.84	74.34	73.84	73.34	72.84	72.33	71.82	71.30	70.79
10.00	70.28	69.82	69.37	68.92	68.47	68.01	67.55	67.08	66.62	66.15
10.20	65.72	65.33	64.94	64.54	64.15	63.75	63.35	62.95	62.54	62.15
10.40	61.82	61.49	61.16	60.83	60.50	60.16	59.81	59.47	59.13	58.83
10.60	58.56	58.28	58.01	57.74	57.45	57.16	56.87	56.57	56.30	56.07
10.80	55.84	55.61	55.39	55.15	54.90	54.66	54.41	54.17	53.96	53.77
11.00	53.59	53.40	53.21	53.01	52.80	52.59	52.39	52.19	52.04	51.89
11.20	51.74	51.59	51.42	51.25	51.07	50.90	50.72	50.59	50.46	50.34
11.40	50.21	50.08	49.93	49.78	49.63	49.47	49.34	49.23	49.12	49.01
11.60	48.90	48.77	48.64	48.50	48.36	48.22	48.12	48.01	47.91	47.81
11.80	47.70	47.57	47.43	47.29	47.16	47.04	46.94	46.83	46.73	46.62

TYPE IA 24-HOUR RAINFALL= 6.00 IN
 Prepared by HBH Consulting Engineers, Inc.
 HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

9 Jan 06

SUBCATCHMENT 8

Basin P

PEAK= 123.7 CFS @ 8.16 HRS, VOLUME= 22.18 AF

ACRES	CN		SCS TR-20 METHOD
21.56	89	Paved Streets w/ open ditches	TYPE IA 24-HOUR
7.57	75	1/4 Acre Res - Group B Soil	RAINFALL= 6.00 IN
53.87	65	Forest/Brush - Group B Soil	SPAN= 6-12 HRS, dt=.02 HRS
65.00	85	1/8 Acre Res - Group B Soil	
4.00	92	Commercial	
3.00	61	Parks/Open Space	
155.00	78		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	25.0

SUBCATCHMENT 8 RUNOFF PEAK= 123.7 CFS @ 8.16 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	14.3	14.5	14.7	14.9	15.1	15.3	15.5	15.7	15.9	16.2
6.20	16.4	16.7	17.0	17.2	17.5	17.8	18.1	18.4	18.7	18.9
6.40	19.2	19.5	19.8	20.0	20.3	20.5	20.8	21.0	21.3	21.5
6.60	21.7	21.9	22.1	22.3	22.4	22.5	22.6	22.8	22.8	22.9
6.80	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.9	24.1
7.00	24.3	24.5	24.7	25.0	25.2	25.5	25.8	26.1	26.4	26.8
7.20	27.2	27.5	28.0	28.4	28.8	29.3	29.7	30.3	30.8	31.3
7.40	31.9	32.5	33.0	33.7	34.3	35.0	35.7	36.4	37.3	38.3
7.60	39.5	40.9	42.7	44.8	47.4	50.5	53.9	57.7	61.8	66.1
7.80	70.5	75.0	79.6	84.1	88.4	92.7	96.8	100.7	104.4	107.7
8.00	110.7	113.6	116.1	118.4	120.3	121.7	122.9	123.5	123.7	123.5
8.20	122.5	121.2	119.6	117.3	115.0	112.6	109.7	107.0	104.1	101.1
8.40	98.3	95.5	92.6	90.1	87.5	85.1	82.9	80.6	78.5	76.5
8.60	74.6	72.9	71.2	69.7	68.4	67.2	66.1	65.1	64.2	63.4
8.80	62.8	62.0	61.5	60.9	60.2	59.7	59.2	58.6	58.1	57.5
9.00	56.9	56.3	55.7	55.2	54.6	54.0	53.4	52.9	52.3	51.7
9.20	51.2	50.6	50.1	49.5	49.0	48.4	47.9	47.4	46.9	46.4
9.40	45.9	45.5	45.0	44.6	44.2	43.7	43.4	43.0	42.6	42.3
9.60	41.9	41.7	41.4	41.1	40.9	40.6	40.4	40.3	40.1	40.0
9.80	39.9	39.7	39.6	39.5	39.4	39.3	39.2	39.0	39.0	38.8
10.00	38.7	38.6	38.4	38.3	38.2	38.0	37.9	37.8	37.6	37.5
10.20	37.3	37.2	37.0	36.8	36.7	36.6	36.4	36.2	36.1	35.9
10.40	35.8	35.6	35.5	35.4	35.2	35.1	35.0	34.8	34.8	34.7
10.60	34.5	34.5	34.4	34.3	34.3	34.2	34.2	34.2	34.1	34.1
10.80	34.1	34.1	34.1	34.1	34.0	34.0	33.9	33.9	33.9	33.8
11.00	33.7	33.7	33.6	33.5	33.4	33.3	33.3	33.2	33.1	33.0
11.20	32.9	32.8	32.8	32.6	32.6	32.5	32.4	32.3	32.2	32.1
11.40	32.0	31.9	31.8	31.7	31.6	31.5	31.4	31.3	31.2	31.1
11.60	31.0	30.9	30.8	30.6	30.5	30.4	30.3	30.2	30.0	29.9
11.80	29.8	29.6	29.5	29.4	29.3	29.2	29.1	29.0	28.9	28.8

Data for Coos Bay - 50 Year, Basins S - U, Future

Page 1

TYPE IA 24-HOUR RAINFALL= 6.00 IN

Prepared by HBH Consulting Engineers, Inc.

9 Jan 06

HydroCAD 5.11 001354 (c) 1986-1999 Applied Microcomputer Systems

SUBCATCHMENT 1

Basin S

PEAK= 140.9 CFS @ 8.05 HRS, VOLUME= 23.51 AF

ACRES	CN		SCS TR-20 METHOD
90.48	85	1/8 Acre Res - Group B Soil	TYPE IA 24-HOUR
14.61	89	Paved Streets w/ open ditches	RAINFALL= 6.00 IN
30.34	65	Forest/Meadow/Wetlands	SPAN= 6-12 HRS, dt=.02 HRS
4.98	92	Commercial	
1.44	85	Gravel Lot	
3.80	88	School/Industrial	
2.16	61	Park	
147.81	81		

Method	Comment	Tc (min)
DIRECT ENTRY	Longest Path (Velocity Method)	16.1

SUBCATCHMENT 1 RUNOFF PEAK= 140.9 CFS @ 8.05 HOURS

HOUR	0.00	.02	.04	.06	.08	.10	.12	.14	.16	.18
6.00	18.8	19.0	19.2	19.5	19.7	20.0	20.3	20.6	21.0	21.3
6.20	21.6	22.0	22.3	22.6	23.0	23.3	23.6	23.9	24.1	24.4
6.40	24.7	24.9	25.2	25.4	25.7	25.9	26.1	26.3	26.5	26.6
6.60	26.7	26.8	26.8	26.8	26.8	26.8	26.7	26.7	26.7	26.8
6.80	26.9	27.0	27.1	27.3	27.5	27.6	27.9	28.1	28.4	28.7
7.00	29.0	29.3	29.7	30.1	30.4	30.9	31.3	31.7	32.2	32.7
7.20	33.2	33.7	34.3	34.9	35.5	36.1	36.8	37.4	38.1	38.9
7.40	39.6	40.3	41.1	41.9	42.8	43.6	44.6	45.8	47.4	49.6
7.60	52.6	56.5	61.4	67.1	73.3	79.8	86.2	92.7	98.7	104.4
7.80	109.6	114.2	118.4	122.1	125.6	128.6	131.4	133.7	135.8	137.6
8.00	139.0	140.1	140.7	140.8	140.1	138.8	136.4	133.3	129.5	125.1
8.20	120.7	116.0	111.5	107.0	102.8	99.0	95.4	92.2	89.0	86.2
8.40	83.4	80.9	78.5	76.2	74.0	72.0	70.1	68.3	66.8	65.3
8.60	64.2	63.2	62.5	61.9	61.5	61.2	60.9	60.6	60.3	60.0
8.80	59.6	59.1	58.7	58.1	57.7	57.1	56.6	56.0	55.4	54.9
9.00	54.3	53.7	53.1	52.6	52.0	51.4	50.8	50.3	49.7	49.1
9.20	48.6	48.0	47.5	47.0	46.5	46.0	45.5	45.1	44.6	44.2
9.40	43.8	43.4	43.0	42.6	42.3	41.9	41.6	41.3	41.1	40.8
9.60	40.6	40.5	40.3	40.2	40.2	40.1	40.0	40.0	39.9	39.9
9.80	39.8	39.7	39.6	39.4	39.3	39.2	39.1	38.9	38.8	38.7
10.00	38.5	38.4	38.2	38.1	37.9	37.8	37.6	37.4	37.3	37.1
10.20	36.9	36.7	36.5	36.3	36.2	36.0	35.9	35.7	35.6	35.5
10.40	35.3	35.2	35.1	35.0	34.9	34.8	34.7	34.6	34.5	34.5
10.60	34.4	34.4	34.4	34.4	34.4	34.5	34.5	34.5	34.5	34.5
10.80	34.4	34.4	34.3	34.2	34.2	34.1	34.0	33.9	33.9	33.8
11.00	33.7	33.6	33.5	33.4	33.3	33.2	33.1	33.0	32.9	32.8
11.20	32.7	32.6	32.5	32.4	32.3	32.2	32.1	32.0	31.8	31.7
11.40	31.6	31.5	31.4	31.3	31.2	31.1	31.0	30.9	30.8	30.6
11.60	30.5	30.4	30.2	30.1	30.0	29.8	29.7	29.5	29.4	29.3
11.80	29.2	29.1	29.0	28.9	28.8	28.7	28.6	28.5	28.5	28.4

