CHERRYWOOD PARC
DETENTION REPORT

Detention Required For:

Cherrywood Parc	-	95.01 Ac	(Residential)
Owen's Commercial	-	1.51 Ac	
Erker's Commercial	-	7.69 Ac	
	-	2.60 Ac	
Library	-	2.78 Ac	

Detention for 18.06 Ac tributary to the east will be satisfied by a basin at the east property line (East Basin). The remainder of the detention will be provided in the "Southwest Basin".

"East Basin" (Future)
Differential Runoff

15 yr.
18.06 (2.64 - 1.87) = 13.91 c.f.s.

25 yr.
18.06 (3.26 - 2.31) = 17.16 c.f.s.

"Southwest Basin

T_c = 12 min. 8-16-94

Inflow: 15 yr Q = 522.28

25 yr $Q = 522.28(1.18) = 616.29$ c.f.s.

Differential: 76.95 Ac Residential (Tributary to Basin)
14.58 Ac Commercial

15 yr.		25 yr.	
76.95 (2.64 − 1.87)	= 59.25	76.95 (3.26 − 2.31)	= 73.10
14.58 (3.85 − 1.87)	= 28.87	14.58 (4.75 − 2.31)	= 35.58
	88.12		108.68

Allowable Discharge:

(15 yr.) 522.28 − 88.12 = 434.16
(25 yr.) 616.29 − 108.68 = 507.61

100 yr. $Q = 522.28(1.39) = 725.97$ c.f.s.

Use two 66" pipes @ ft elev. 517.00 (in)
64' long @ 1.2% 516.23 (out)
Spillway 15' long @ 523.90
100 yr. Highwater (see routing) 524.65

Tc

Watershed extends 2000± ft. offsite which is presently undeveloped. The average slope for this area is .0325 ft.

Using Figure 3-1 (attached), unpaved velocity = 2.9 f.p.s., paved velocity = 3.65 f.p.s. Assuming at least part of this area will be developed, we will use an average between paved and unpaved to account for future development. Therefore, 3.65 + 2.90 ÷ 2 = 3.25 f.p.s.

On-site the water will travel thru an enclosed system ranging from 48" to 60" pipe. The velocities for these pipes ($V = Q/A$) will average 13.5 f.p.s. for a length of 1450 feet.

Tc = 2000 ft. ÷ (3.25 f.p.s.) = 615 sec.
1450 ft ÷ (13.5 f.p.s.) = 107 sec.
722 sec. = 12 min.

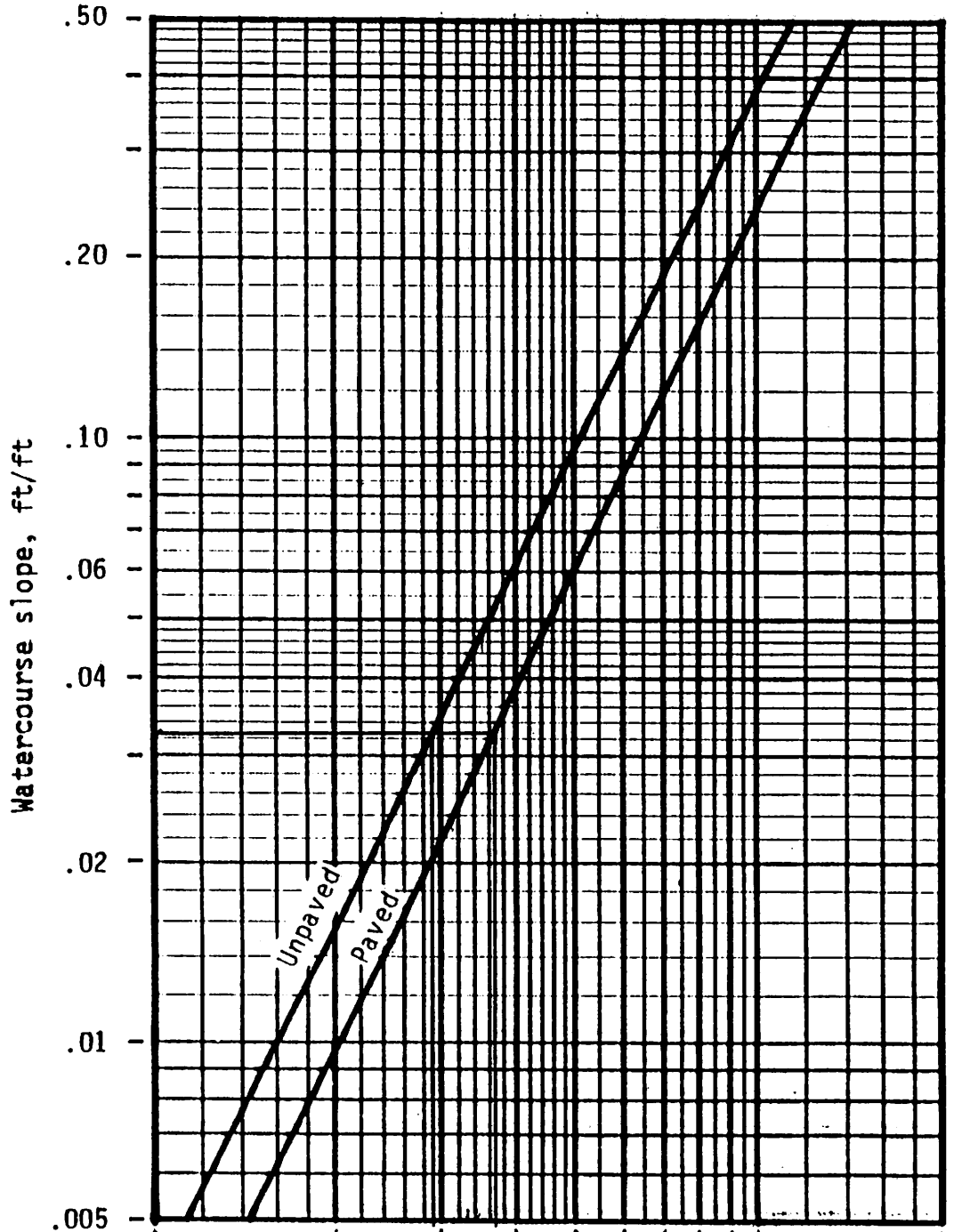


Figure 3-1.—Average velocities for estimating travel time for shallow concentrated flow.

Detention Basin
Sediment Storage

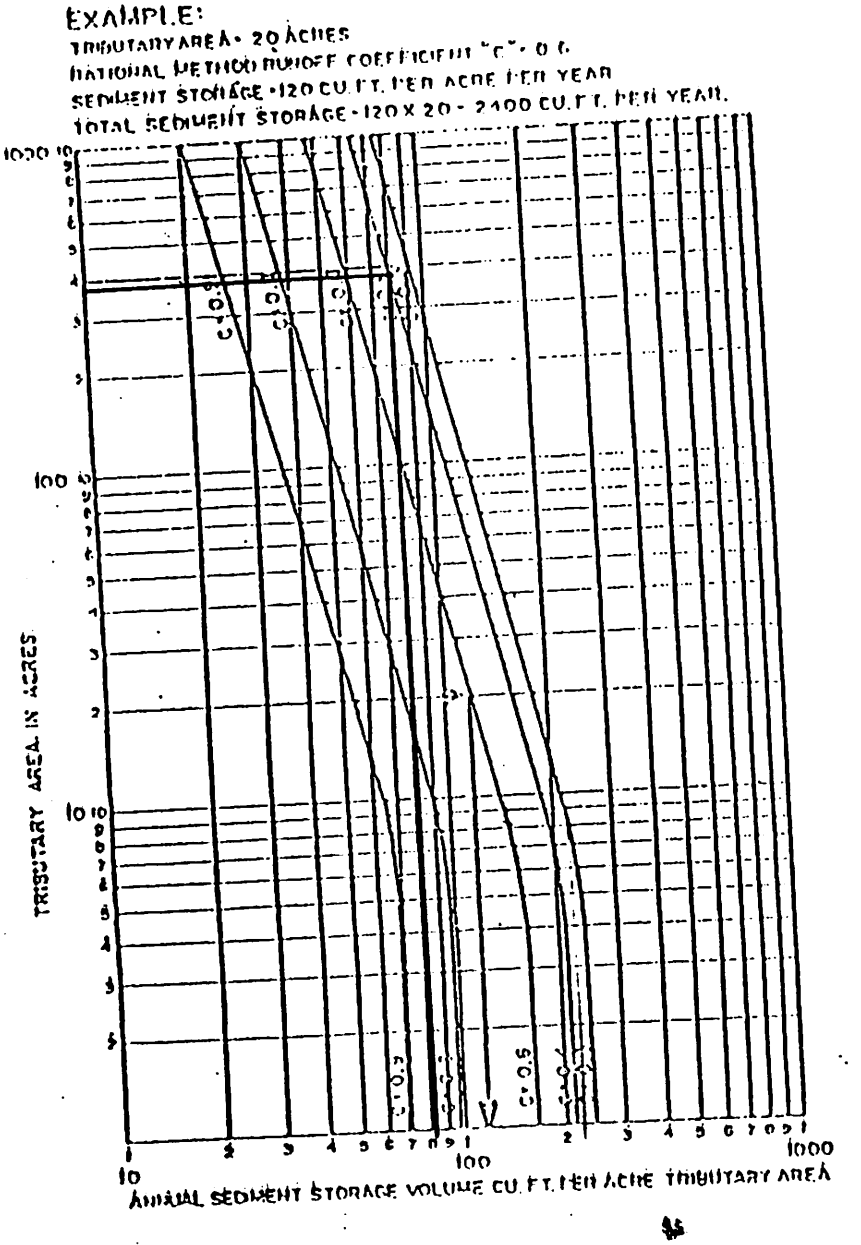
Total area tributary to basin is 183.72 Acres. 27 Ac is zoned commercial but will not likely be developed within the two year period. Therefore we will use a Rational Runoff coefficient of 0.4 as an average. Sediment Storage required = 183.72 (80) 2yr = 29,395 Cu. Ft.

Surface area of basin @ Elev. 524.0 = 65,177 sq. ft. . 29,395 ÷ 65,177 = 0.45'

Routing 100 year storm results in a high water of 524.65. Adding 0.45' for future volume loss due to sediment results in a revised highwater of 525.10

Top of Berm Elev. for basin = 526.50 Resulting in 1.40' of freeboard with sediment accumulation figure in.

DETENTION BASIN



ANNUAL SEDIMENT STORAGE

FIG. 1

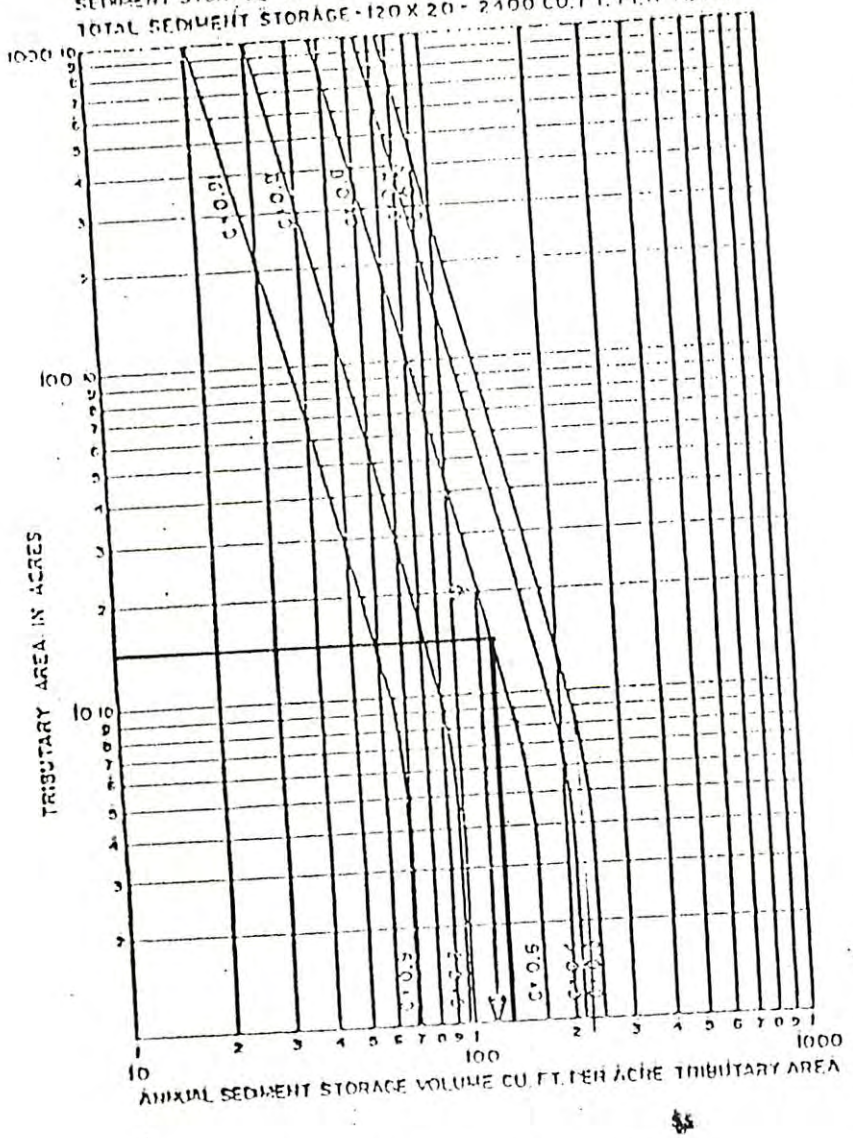
80 Cu. Ft. / Acre

"CHERRYWOOD PARC"

BASIN 'A' DETENTION & SILTATION CALCS.

10/5/94

EXAMPLE:
TRIBUTARY AREA - 20 ACRES
RATIONAL METHOD RUNOFF COEFFICIENT "C" - 0.6
SEDIMENT STORAGE - 120 CU. FT. PER ACRE PER YEAR
TOTAL SEDIMENT STORAGE - 120 X 20 - 2400 CU. FT. PER YEAR.

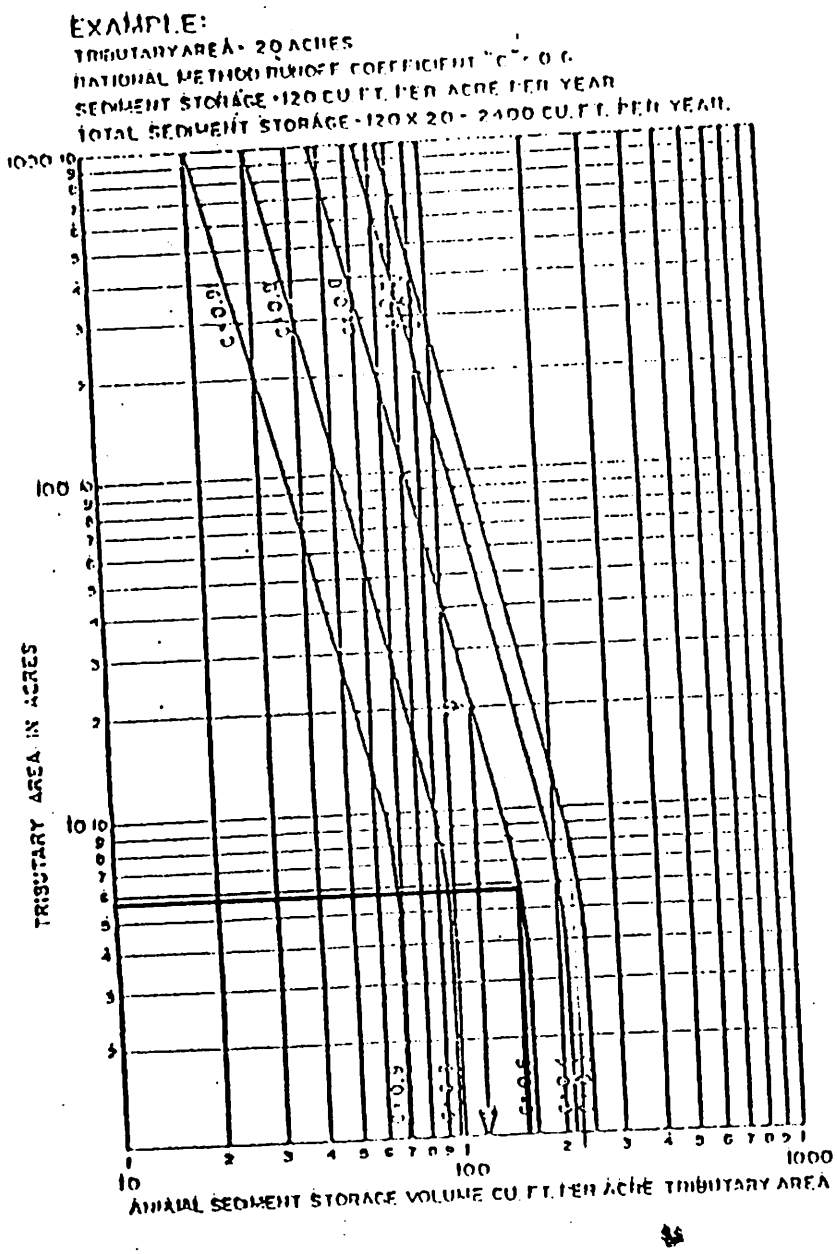


ANNUAL SEDIMENT STORAGE

FIG. 1

130 . Cu. Ft. / Ac

BASIN 'B'

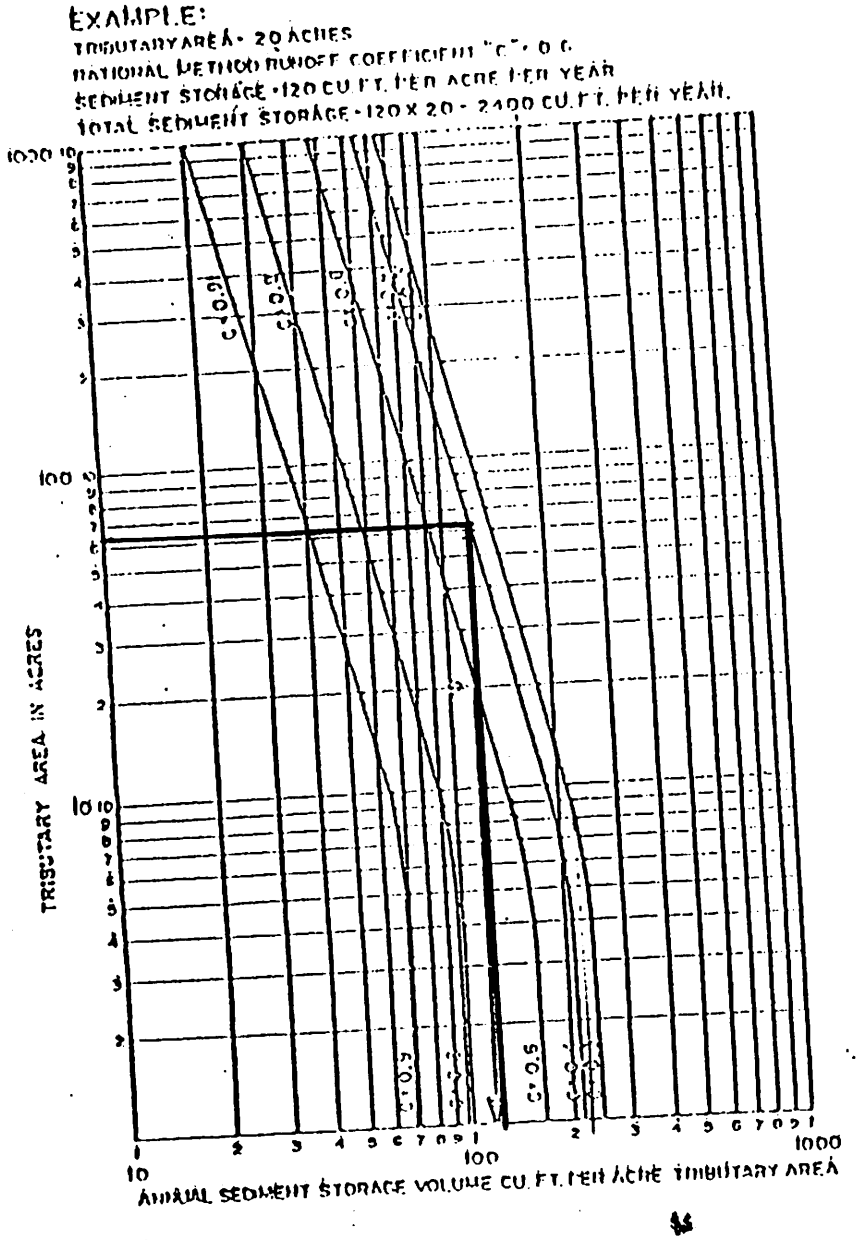


ANNUAL SEDIMENT STORAGE

FIG. 1

.170 Cu. Ft. / Ac

BASIN 'C'

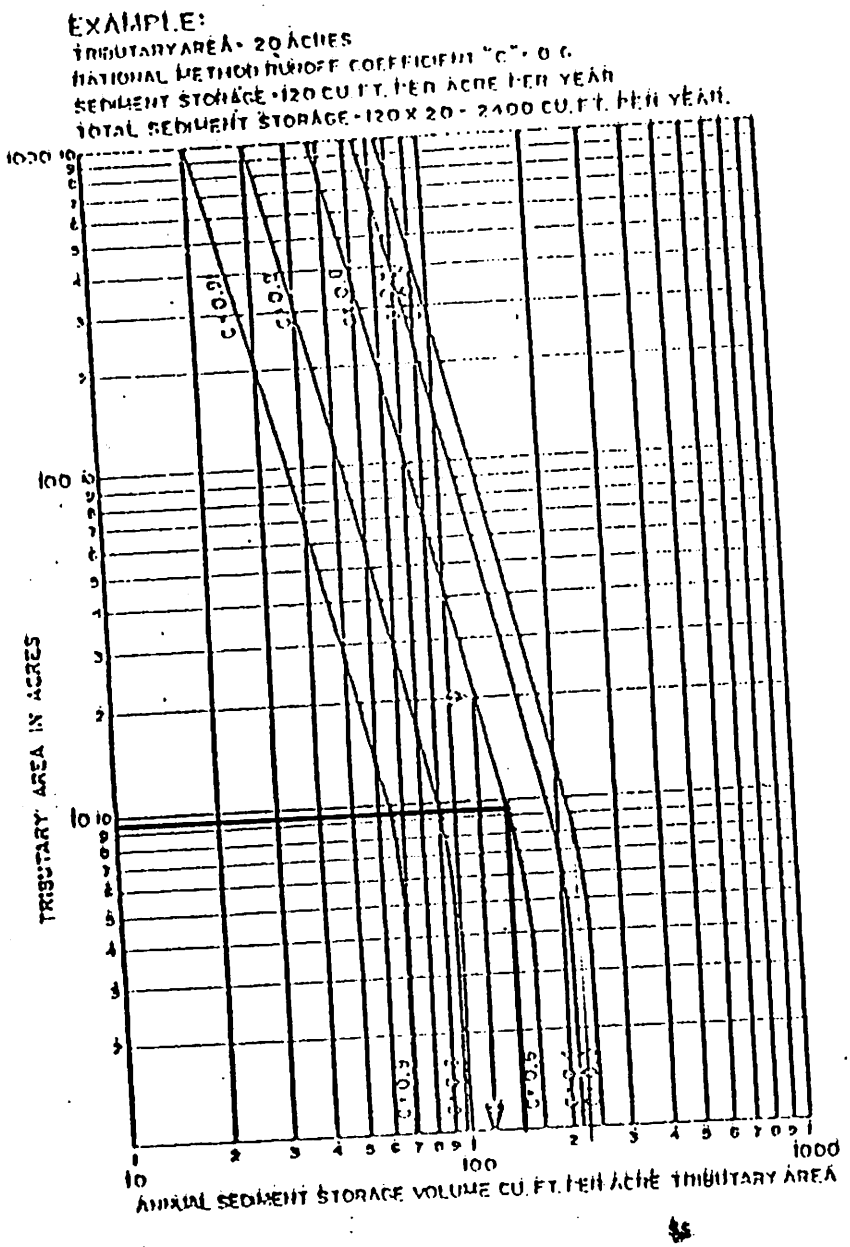


ANNUAL SEDIMENT STORAGE

FIG. 1

120 Cu. Ft. / Ac

BASIN 'D'



ANNUAL SEDIMENT STORAGE

FIG. 1

150 Cu. Ft./Acre

POND-2 Version: 5.17
S/N:

CHERRYWOOD PARK
LARGE BASIN

CALCULATED 08-16-1994 14:07:13
DISK FILE: C:\PONDPACK\CALCS\CHERRYWO.VOL

Planimeter scale: 1 inch = 10 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
517.00	0.00	0	0	0	0
518.00	163.91	16,391	16,391	5,464	5,464
520.00	428.57	42,857	85,752	57,168	62,632
522.00	545.60	54,560	145,773	97,182	159,814
524.00	651.77	65,177	179,370	119,580	279,393
526.00	840.87	84,087	223,295	148,863	428,257

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

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*
* CHERRYWOOD PARK
* 15YR./20MIN. STORM
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Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY15.HYD
Rating Table file: C:\PONDPACK\CALCS\CHERRY15.PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
517.00	0.0	0
518.00	16.4	5,464
519.00	61.0	27,431
520.00	126.6	62,632
521.00	209.0	108,297
522.00	297.5	159,814
523.00	390.5	216,949
524.00	479.1	279,393
525.00	549.3	349,097
526.00	610.4	428,257

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
91.1	107.5
457.2	518.2
1044.0	1170.6
1805.1	2014.1
2663.8	2961.3
3616.2	4006.7
4657.0	5136.1
5818.9	6368.2
7138.3	7748.7

Time increment (t) = 2.0 min.

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

INFLOW HYDROGRAPH

TIME (min)	INFLOW (cfs)
0.0	0.00
2.0	87.04
4.0	174.09
6.0	261.13
8.0	348.18
10.0	435.22
12.0	522.27
14.0	522.27
16.0	522.27
18.0	522.27
20.0	522.27
22.0	435.22
24.0	348.18
26.0	261.13
28.0	174.09
30.0	87.04
32.0	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
-----	0.0	0.0	0.00	517.00
87.0	60.5	87.0	13.28	517.81
261.1	242.3	321.6	39.65	518.52
435.2	523.5	677.5	77.02	519.24
609.3	887.2	1132.8	122.80	519.94
783.4	1319.7	1670.6	175.44	520.59
957.5	1810.0	2277.2	233.58	521.28
1044.5	2279.5	2854.6	287.53	521.89
1044.5	2664.5	3324.1	329.77	522.35
1044.5	2981.0	3709.1	364.02	522.72
1044.5	3241.6	4025.6	391.98	523.02
957.5	3387.9	4199.1	405.59	523.17
783.4	3364.5	4171.3	403.41	523.15
609.3	3198.6	3973.8	387.57	522.97
435.2	2919.2	3633.9	357.33	522.64
261.1	2546.4	3180.3	316.98	522.21
87.0	2099.7	2633.4	266.86	521.65

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

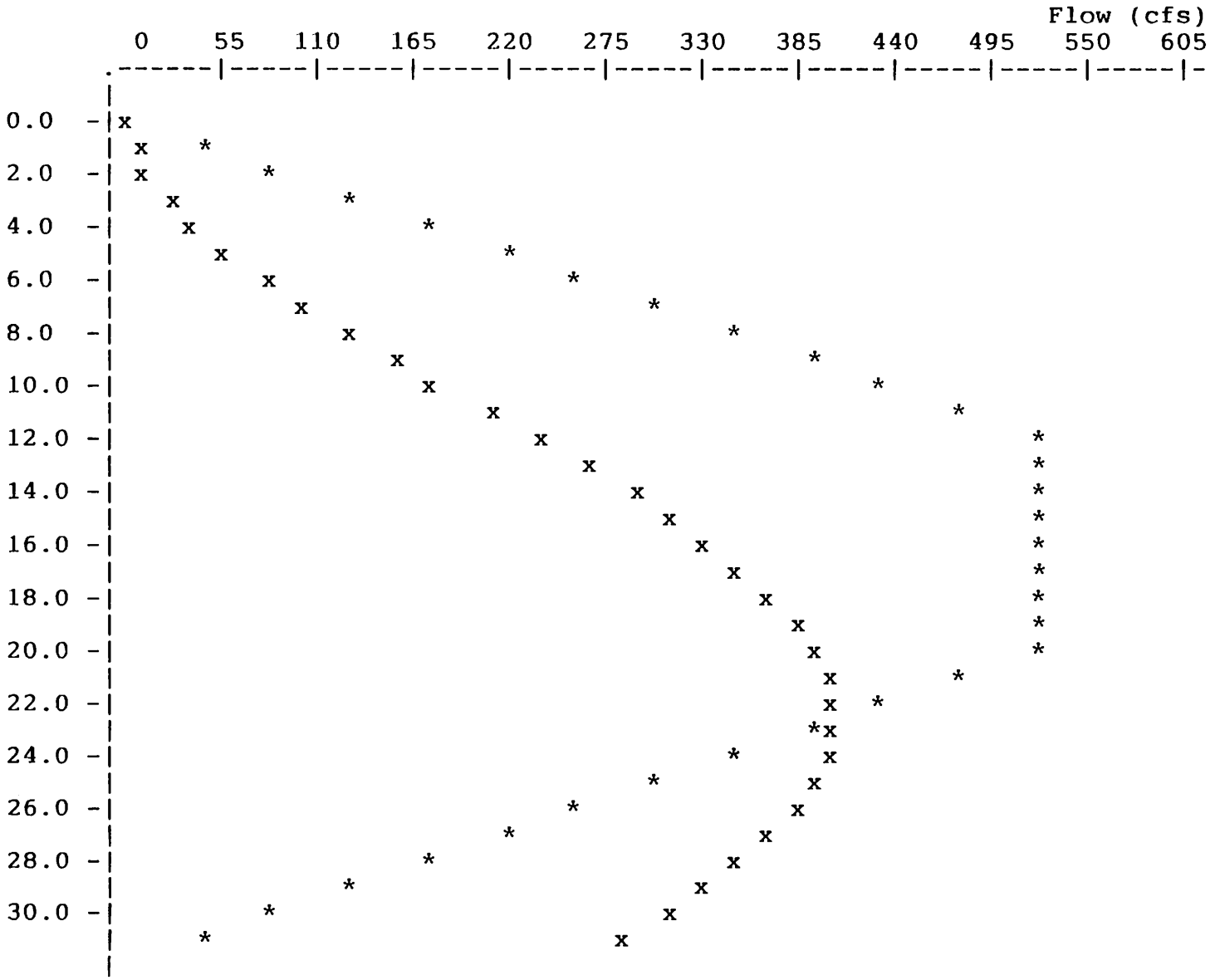
Peak Inflow	=	522.27 cfs
Peak Outflow	=	405.59 cfs
Peak Elevation	=	523.17 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	227,586 cu-ft
Total Storage in Pond	=	227,586 cu-ft

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD
EXECUTED: 08-18-1994
09:36:53

Peak Inflow = 522.27 cfs
Peak Outflow = 405.59 cfs
Peak Elevation = 523.17 ft



* File: C:\PONDPACK\CALCS\CHERRY15.HYD Qmax = 522.3 cfs
x File: C:\PONDPACK\CALCS\OUT .HYD Qmax = 405.6 cfs

Quick TR-55 Ver.5.46 S/N:
Executed: 09:28:16 06-18-1994

>>>>> I-D-F Curve <<<<<

15 YR 20 MIN. STORM Tc=12 MIN.

Recurrence Frequency = 15

DURATION minutes	INTENSITY inches/hour
12	4.6
20	4.6
34	0

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* CHERRYWOOD PARK *
* 25YR./20MIN. STORM *
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Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY25.HYD
Rating Table file: C:\PONDPACK\CALCS\CHERRY15.PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
517.00	0.0	0
518.00	16.4	5,464
519.00	61.0	27,431
520.00	126.6	62,632
521.00	209.0	108,297
522.00	297.5	159,814
523.00	390.5	216,949
524.00	479.1	279,393
525.00	549.3	349,097
526.00	610.4	428,257

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
91.1	107.5
457.2	518.2
1044.0	1170.6
1805.1	2014.1
2663.8	2961.3
3616.2	4006.7
4657.0	5136.1
5818.9	6368.2
7138.3	7748.7

Time increment (t) = 2.0 min.

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY25.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

INFLOW HYDROGRAPH

TIME (min)	INFLOW (cfs)
0.0	0.00
2.0	102.72
4.0	205.43
6.0	308.15
8.0	410.86
10.0	513.58
12.0	616.30
14.0	616.30
16.0	616.30
18.0	616.30
20.0	616.30
22.0	513.58
24.0	410.86
26.0	308.15
28.0	205.43
30.0	102.72
32.0	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
-----	0.0	0.0	0.00	517.00
102.7	71.4	102.7	15.67	517.96
308.2	287.6	379.5	45.94	518.66
513.6	622.3	801.2	89.46	519.43
719.0	1054.8	1341.3	143.28	520.20
924.4	1568.0	1979.2	205.59	520.96
1129.9	2152.1	2697.9	272.89	521.72
1232.6	2714.4	3384.7	335.17	522.41
1232.6	3176.6	3947.0	385.19	522.94
1232.6	3565.1	4409.2	422.08	523.36
1232.6	3892.6	4797.7	452.55	523.70
1129.9	4082.1	5022.4	470.18	523.90
924.4	4068.6	5006.5	468.93	523.89
719.0	3884.1	4787.7	451.76	523.69
513.6	3555.4	4397.7	421.17	523.35
308.2	3108.0	3863.5	377.76	522.86
102.7	2571.3	3210.7	319.69	522.24

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY25.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	616.30 cfs
Peak Outflow	=	470.18 cfs
Peak Elevation	=	523.90 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	273,108 cu-ft
Total Storage in Pond	=	273,108 cu-ft

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY25.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

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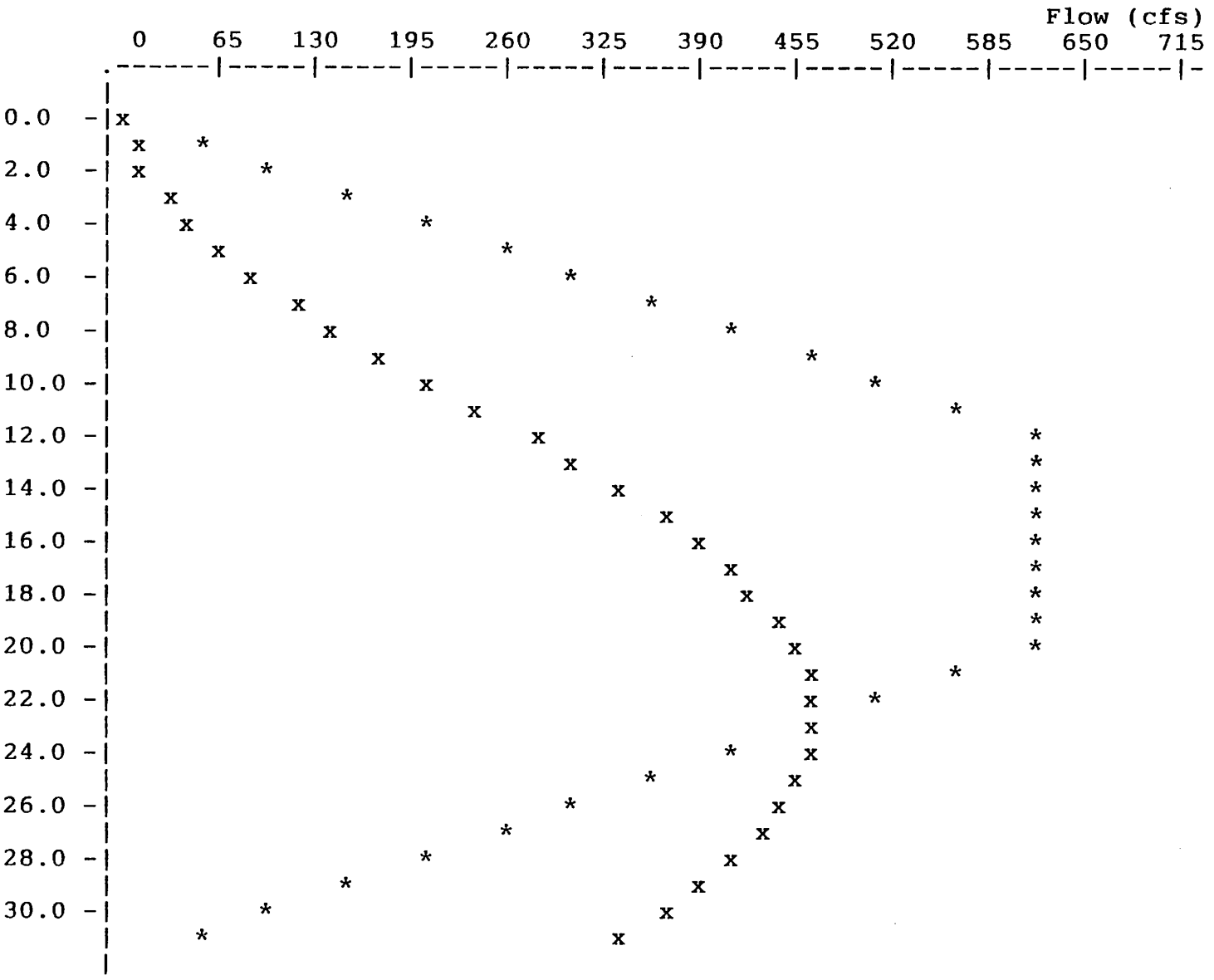
09:38:41

Peak Inflow = 616.30 cfs
Peak Outflow = 470.18 cfs
Peak Elevation = 523.90 ft



* File: C:\PONDPACK\CALCS\CHERRY25.HYD Qmax = 616.3 cfs
x File: C:\PONDPACK\CALCS\OUT .HYD Qmax = 470.2 cfs

Quick TR-55 Ver.5.46 S/N:
Executed: 09:29:06 [illegible]-18-1994

>>>>> I-D-F Curve <<<<<

25 YR 20 MIN. STORM Tc=12 MIN.

Recurrence Frequency = 25

DURATION minutes	INTENSITY inches/hour
12	6.71
20	6.71
32	0

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* *
* CHERRYWOOD PARK *
* 100YR./20MIN. STORM *
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* *
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Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY10.HYD
Rating Table file: C:\PONDPACK\CALCS\CHERRY10.PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
517.00	0.0	0	0.0	0.0
518.00	16.4	5,464	91.1	107.5
519.00	61.0	27,431	457.2	518.2
520.00	126.6	62,632	1044.0	1170.6
521.00	209.0	108,297	1805.1	2014.1
522.00	297.5	159,814	2663.8	2961.3
523.00	390.5	216,949	3616.2	4006.7
524.00	480.5	279,393	4657.0	5137.5
525.00	600.5	349,097	5818.9	6419.4
526.00	743.5	428,257	7138.3	7881.8

Time increment (t) = 2.0 min.

Pond File: C:\PONDPACK\CALCS\CHERRY10.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY10.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

INFLOW HYDROGRAPH

TIME (min)	INFLOW (cfs)
0.0	0.00
2.0	120.99
4.0	241.99
6.0	362.98
8.0	483.97
10.0	604.96
12.0	725.96
14.0	725.96
16.0	725.96
18.0	725.96
20.0	725.96
22.0	604.96
24.0	483.97
26.0	362.98
28.0	241.99
30.0	120.99
32.0	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
-----	0.0	0.0	0.00	517.00
121.0	85.3	121.0	17.87	518.03
363.0	341.4	448.2	53.40	518.83
605.0	738.3	946.4	104.06	519.66
847.0	1251.0	1585.2	167.11	520.49
1088.9	1861.1	2340.0	239.44	521.34
1330.9	2556.0	3192.0	318.02	522.22
1451.9	3226.7	4007.9	390.59	523.00
1451.9	3790.6	4678.6	443.98	523.59
1451.9	4261.9	5242.6	490.33	524.08
1451.9	4644.9	5713.8	534.45	524.45
1330.9	4857.9	5975.8	558.98	524.65
1088.9	4834.3	5946.8	556.26	524.63
847.0	4618.4	5681.2	531.40	524.42
605.0	4246.3	5223.4	488.54	524.07
363.0	3732.4	4609.3	438.46	523.53
121.0	3099.7	3853.4	376.86	522.85

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\CALCS\CHERRY10.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY10.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

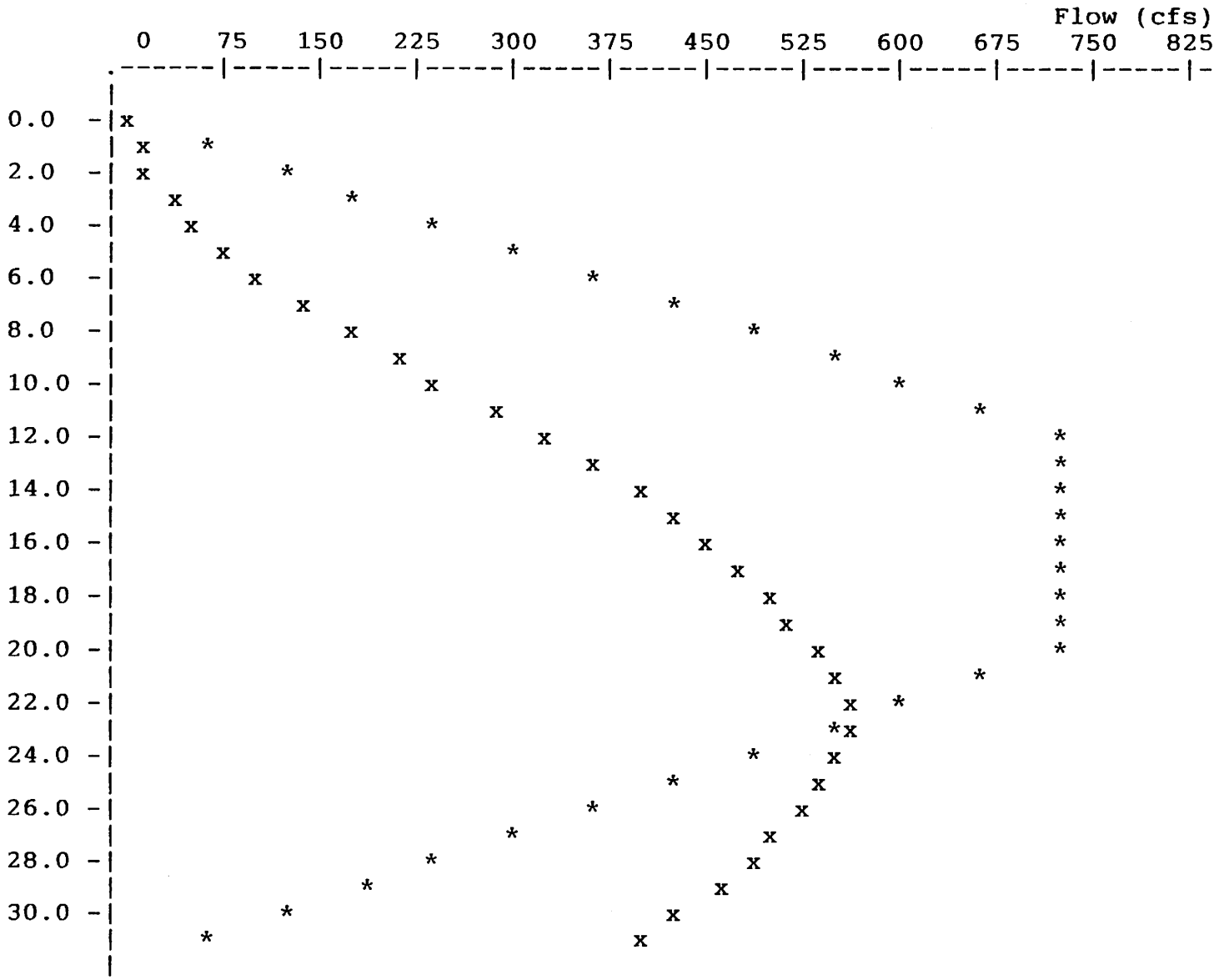
Peak Inflow	=	725.96 cfs
Peak Outflow	=	558.98 cfs
Peak Elevation	=	524.65 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	324,979 cu-ft
Total Storage in Pond	=	324,979 cu-ft

Pond File: C:\PONDPACK\CALCS\CHERRY10.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY10.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD
EXECUTED: 08-18-1994 09:50:10

Peak Inflow = 725.96 cfs
Peak Outflow = 558.98 cfs
Peak Elevation = 524.65 ft



* File: C:\PONDPACK\CALCS\CHERRY10.HYD Qmax = 726.0 cfs
x File: C:\PONDPACK\CALCS\OUT .HYD Qmax = 559.0 cfs

Quick TR-55 Ver.5.46 S/N:
Executed: 09:30:21 08-18-1994

>>>>> I-D-F Curve <<<<<

100YR STORM 12 MIN. Tc

Recurrence Frequency = 100

DURATION minutes	INTENSITY inches/hour
12	7.55
20	7.55
32	0

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

>>>>>> Structure No. 1 <<<<<<
(Input Data)

CULVERT-CR
Circular Culvert (With Inlet Control)

E1 elev.(ft)?	517
E2 elev.(ft)?	526.001
Diam. (ft)?	5.5
Inv. el.(ft)?	517
Slope (ft/ft)?	.01
T1 ratio?	
T2 ratio?	
K Coeff.?	.0045
M Coeff.?	2.0
c Coeff.?	.0317
Y Coeff.?	.69
Form 1 or 2?	1
Slope factor?	-0.5

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages		
517.00	0.0	No headwater		
518.00	8.2	Equ.1: HW =1.0	dc=.763	Ac=1.994
519.00	30.5	Equ.1: HW =2.0	dc=1.492	Ac=5.212
520.00	63.3	Equ.1: HW =3.0	dc=2.177	Ac=8.75
521.00	104.5	Equ.1: HW =4.0	dc=2.828	Ac=12.309
522.00	148.8	Equ.1: HW =5.0	dc=3.402	Ac=15.429
523.00	195.2	Transition: HW =6.0		
524.00	239.6	Submerged: HW =7.0		
525.00	274.7	Submerged: HW =8.0		
526.00	305.2	Submerged: HW =9.0		

Used Unsubmerged Equ. Form (1) for elev. less than 523.0 ft
Used Submerged Equation for elevations greater than 523.56 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:

E1=523.0 ft; Q1=195.01 cfs; Dc=3.91 ft; E2=523.56 ft; Q2=222.87 cfs

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

>>>>>> Structure No. 2 <<<<<<
(Input Data)

CULVERT-CR
Circular Culvert (With Inlet Control)

E1 elev.(ft)?	517
E2 elev.(ft)?	526.001
Diam. (ft)?	5.5
Inv. el.(ft)?	517
Slope (ft/ft)?	.01
T1 ratio?	
T2 ratio?	
K Coeff.?	.0045
M Coeff.?	2.0
c Coeff.?	.0317
Y Coeff.?	.69
Form 1 or 2?	1
Slope factor?	-0.5

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

Outflow Rating Table for Structure #2
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages		
517.00	0.0	No headwater		
518.00	8.2	Equ.1: HW =1.0	dc=.763	Ac=1.994
519.00	30.5	Equ.1: HW =2.0	dc=1.492	Ac=5.212
520.00	63.3	Equ.1: HW =3.0	dc=2.177	Ac=8.75
521.00	104.5	Equ.1: HW =4.0	dc=2.828	Ac=12.309
522.00	148.8	Equ.1: HW =5.0	dc=3.402	Ac=15.429
523.00	195.2	Transition: HW =6.0		
524.00	239.6	Submerged: HW =7.0		
525.00	274.7	Submerged: HW =8.0		
526.00	305.2	Submerged: HW =9.0		

Used Unsubmerged Equ. Form (1) for elev. less than 523.0 ft
Used Submerged Equation for elevations greater than 523.56 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:

E1=523.0 ft; Q1=195.01 cfs; Dc=3.91 ft; E2=523.56 ft; Q2=222.87 cfs

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

>>>>>> Structure No. 3 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	523.9
E2 elev.(ft)?	526.001
Weir coefficient?	3.0
Weir elev.(ft)?	523.90
Length (ft)?	15
Contracted/Suppressed (C/S)?	C

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

Outflow Rating Table for Structure #3
WEIR-VR Weir - Vertical Rectangular

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
517.00	0.0	E < Inv.El.= 523.9
518.00	0.0	E < Inv.El.= 523.9
519.00	0.0	E < Inv.El.= 523.9
520.00	0.0	E < Inv.El.= 523.9
521.00	0.0	E < Inv.El.= 523.9
522.00	0.0	E < Inv.El.= 523.9
523.00	0.0	E < Inv.El.= 523.9
524.00	1.4	H =.1
525.00	51.2	H =1.1
526.00	133.1	H =2.1

C = 3 L (ft) = 15
H (ft) = Table elev. - Invert elev. (523.9 ft)
Q (cfs) = C * (L-.2H) * (H**1.5) -- Contracted Weir

Outlet Structure File: CHERRYWO.STR

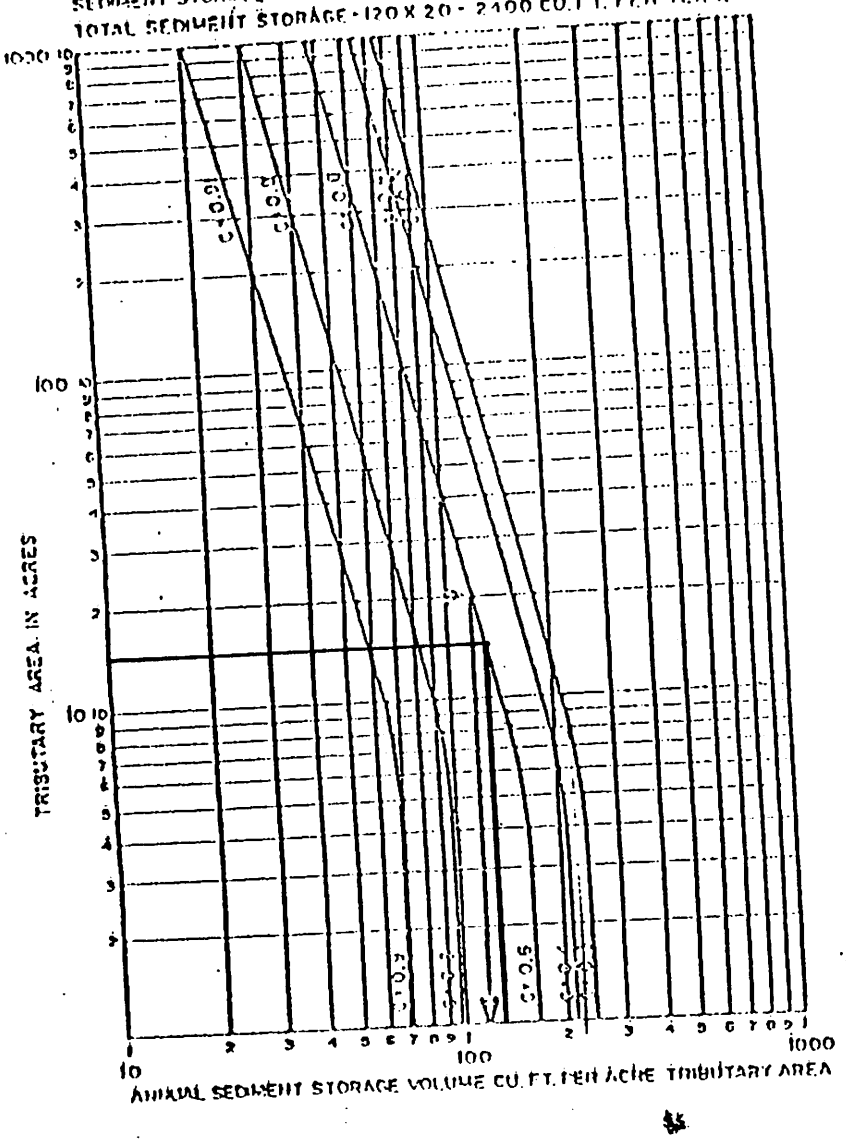
POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

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

Elevation (ft)	Q (cfs)	Contributing Structures
517.00	0.0	1 +2
518.00	16.4	1 +2
519.00	61.0	1 +2
520.00	126.6	1 +2
521.00	209.0	1 +2
522.00	297.5	1 +2
523.00	390.5	1 +2
524.00	480.5	3 +1 +2
525.00	600.5	3 +1 +2
526.00	743.5	3 +1 +2

BASIN 'A'

EXAMPLE:
TRIBUTARY AREA = 20 ACRES
RATIONAL METHOD RUNOFF COEFFICIENT "C" = 0.6
SEDIMENT STORAGE = 120 CU. FT. PER ACRE PER YEAR
TOTAL SEDIMENT STORAGE = 120 X 20 = 2400 CU. FT. PER YEAR.

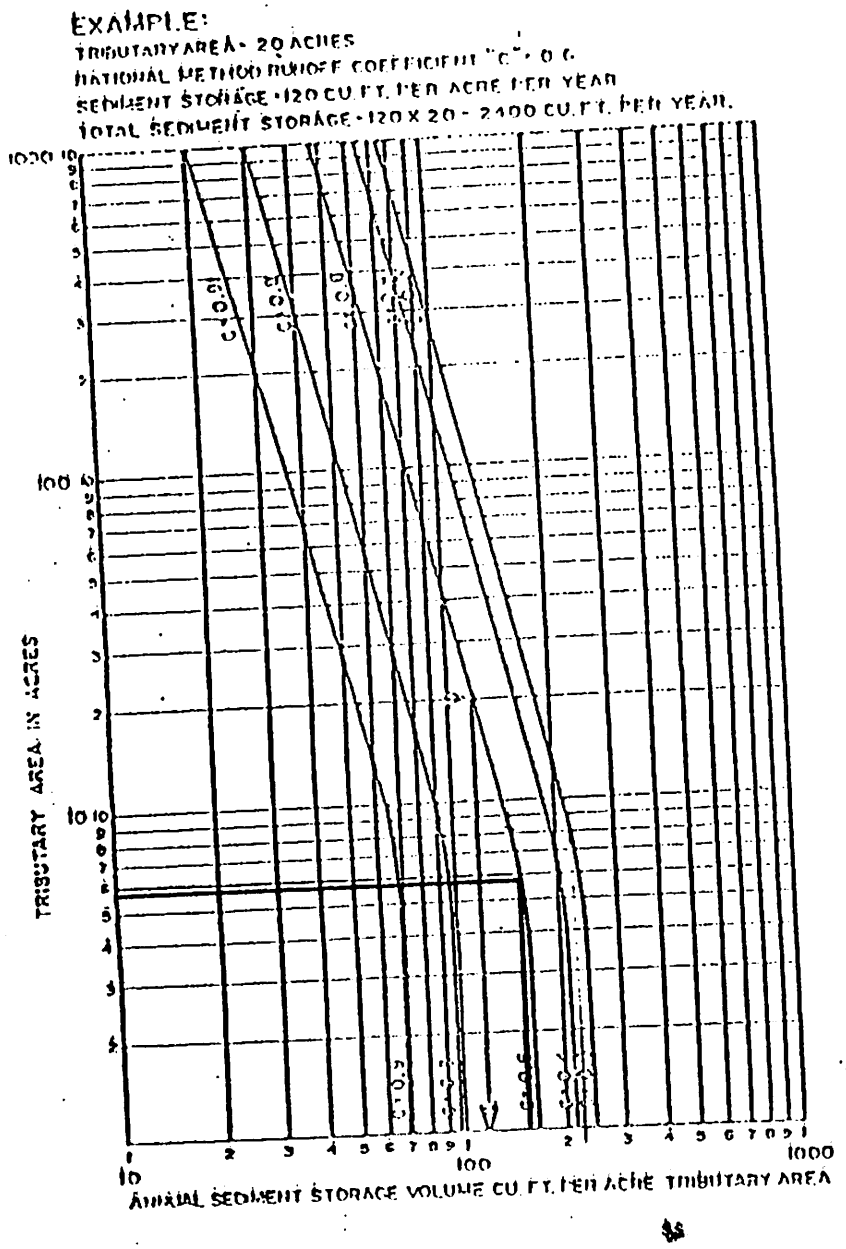


ANNUAL SEDIMENT STORAGE

FIG. 1

130 . Cu. Ft. / Ac

BASIN 'B'

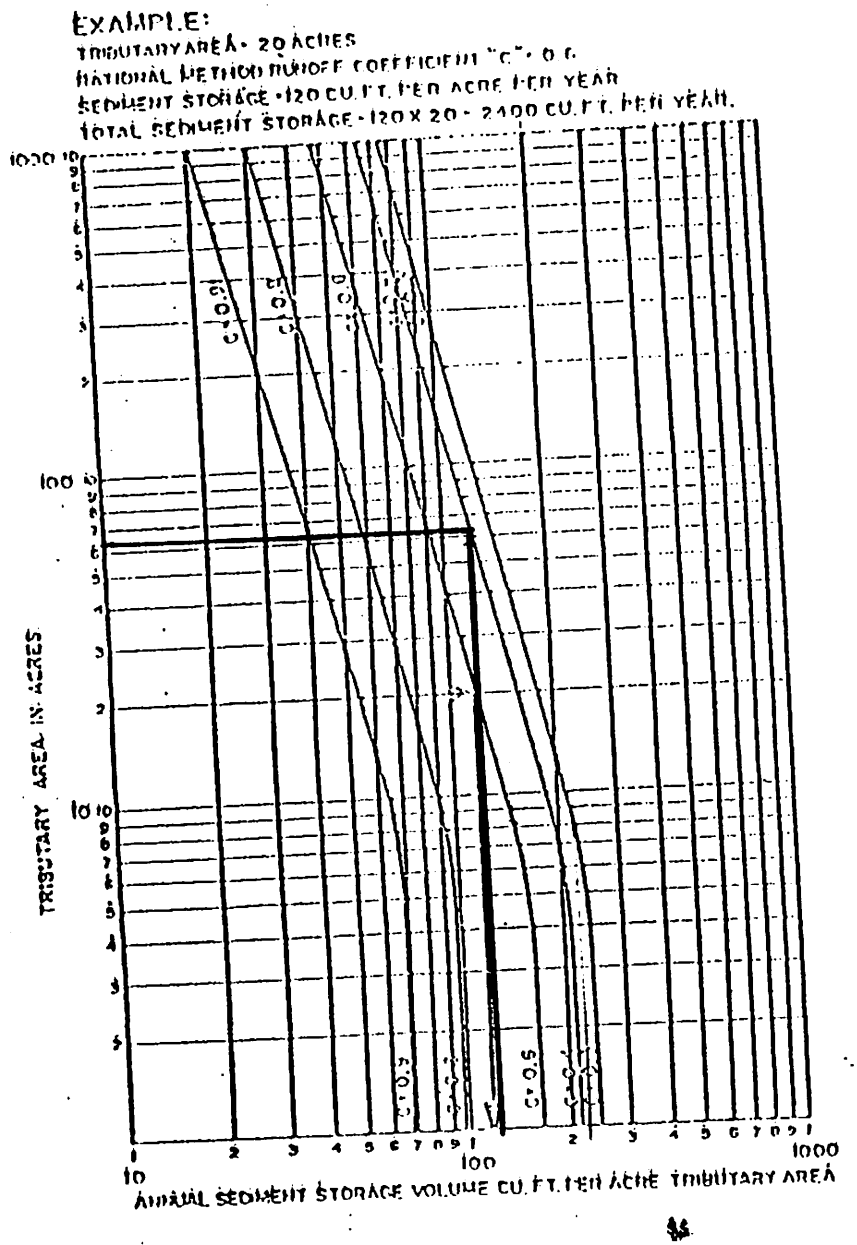


ANNUAL SEDIMENT STORAGE

FIG. 1

.170 Cu. Ft. / Ac

BASIN 'C'

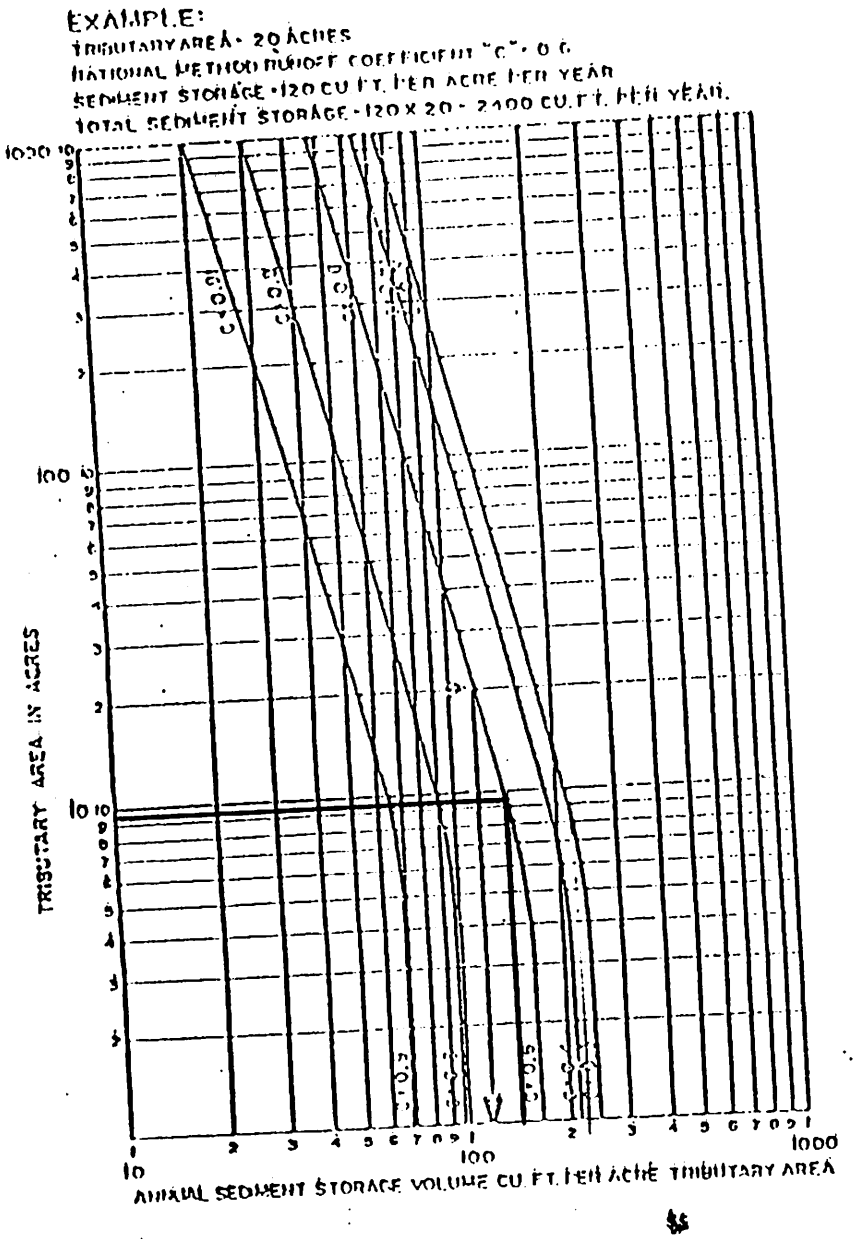


ANNUAL SEDIMENT STORAGE

FIG. 1

120 Cu. Ft. / Ac

BASIN 'D'



ANNUAL SEDIMENT STORAGE

FIG. 1

150 Cu. Ft. / Acre

CHERRYWOOD PARC
DETENTION REPORT

Detention Required For:

Cherrywood Parc	-	95.01 Ac	(Residential)
Owen's Commercial	-	1.51 Ac	
Erker's Commercial	-	7.69 Ac	
	-	2.60 Ac	
Library	-	2.78 Ac	

Detention for 18.06 Ac tributary to the east will be satisfied by a basin at the east property line (East Basin). The remainder of the detention will be provided in the "Southwest Basin".

"East Basin" (Future)
Differential Runoff

15yr.
18.06 (2.64 - 1.87) = 13.91 c.f.s.

25yr.
18.06 (3.26 - 2.31) = 17.16 c.f.s.

Flow to Southwest (15 year)
(95.01 - 18.06) x 2.64 = 211.33
14.58 x 3.85 = 56.13
offsite

"Southwest Basin"

T_c = 12 min. 8-16-94

Inflow: 15 yr Q = 522.28

25 yr Q = 522.28 (1.18) = 616.29 c.f.s.

Differential: 76.95 Ac Residential (Tributary to Basin)
14.58 Ac Commercial

15 yr.		25 yr.	
76.95 (2.64 − 1.87)	= 59.25	76.95 (3.26 − 2.31)	= 73.10
14.58 (3.85 − 1.87)	= 28.87	14.58 (4.75 − 2.31)	= 35.58
	88.12		108.68

Allowable Discharge:

(15 yr.) 522.28 − 88.12 = 434.16
(25 yr.) 616.29 − 108.68 = 507.61

100 yr. Q = 522.28 (1.39) = 725.97 c.f.s.

Use two 66" pipes @ ℄ elev. 517.00 (in)
64' long @ 1.2% 516.23 (out)
Spillway 15' long @ 523.90
100 yr. Highwater (see routing) 524.65

Tc

Watershed extends 2000 ± ft. offsite which is presently undeveloped. The average slope for this area is .0325 ft.

Using Figure 3-1 (attached), unpaved velocity = 2.9 f.p.s., paved velocity = 3.65 f.p.s. Assuming at least part of this area will be developed, we will use an average between paved and unpaved to account for future development. Therefore, 3.65 + 2.90 ÷ 2 = 3.25 f.p.s.

On-site the water will travel thru an enclosed system ranging from 48" to 60" pipe. The velocities for those pipes ($V = Q/A$) will average 13.5 f.p.s. for a length of 1450 feet.

T_c = 2000 ft. ÷ (3.25 f.p.s.) = 615 sec.
1450 ft ÷ (13.5 f.p.s.) = 107 sec.
722 sec. = 12 min.

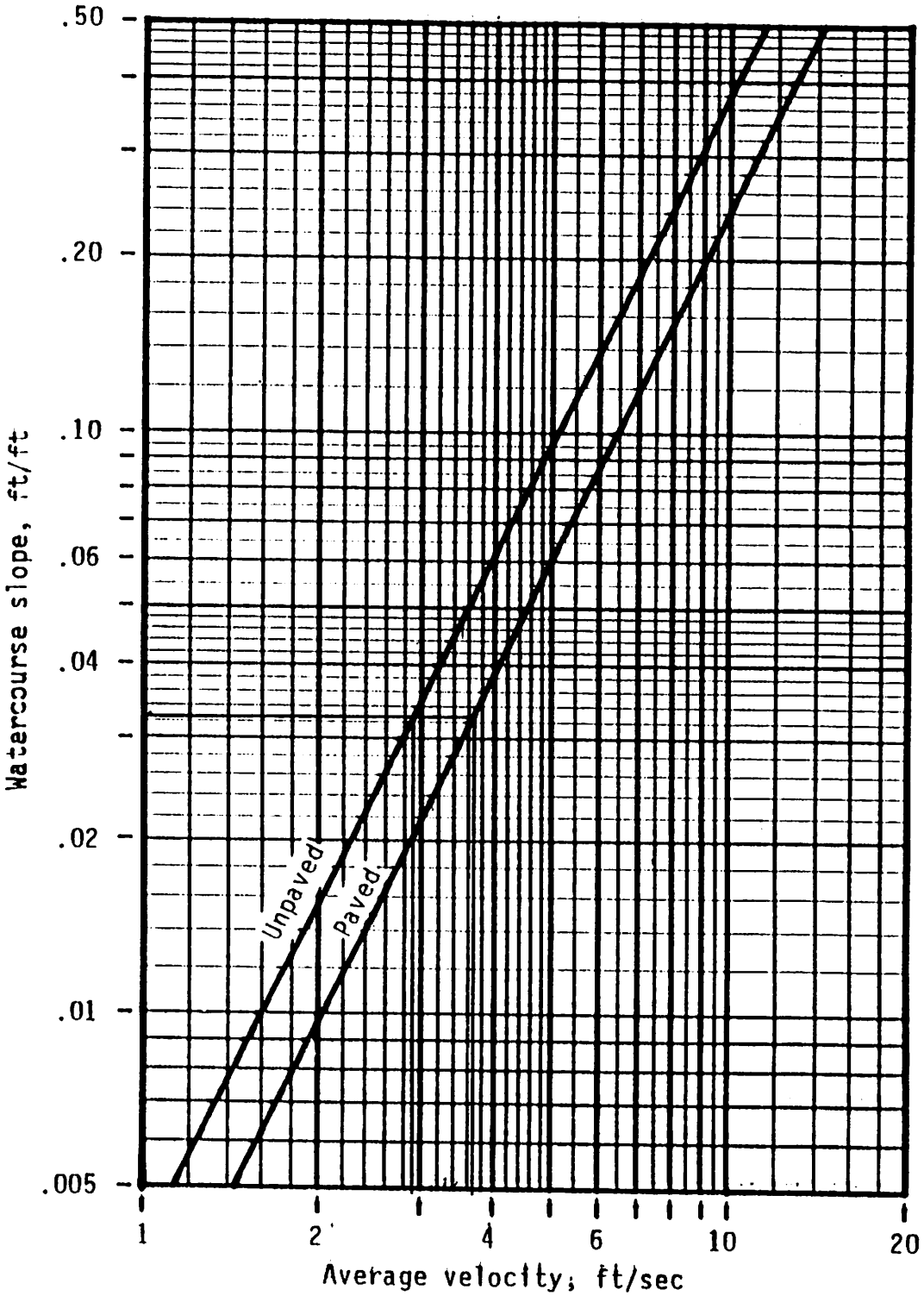


Figure 3-1.—Average velocities for estimating travel time for shallow concentrated flow.

Detention Basin
Sediment Storage

Total area tributary to basin is 183.72 Acres. 27 Ac is zoned commercial but will not likely be developed within the two year period. Therefore we will use a Rational Runoff coefficient of 0.4 as an average. Sediment Storage required = 183.72 (80) 24r = 29,395 Cu. Ft.

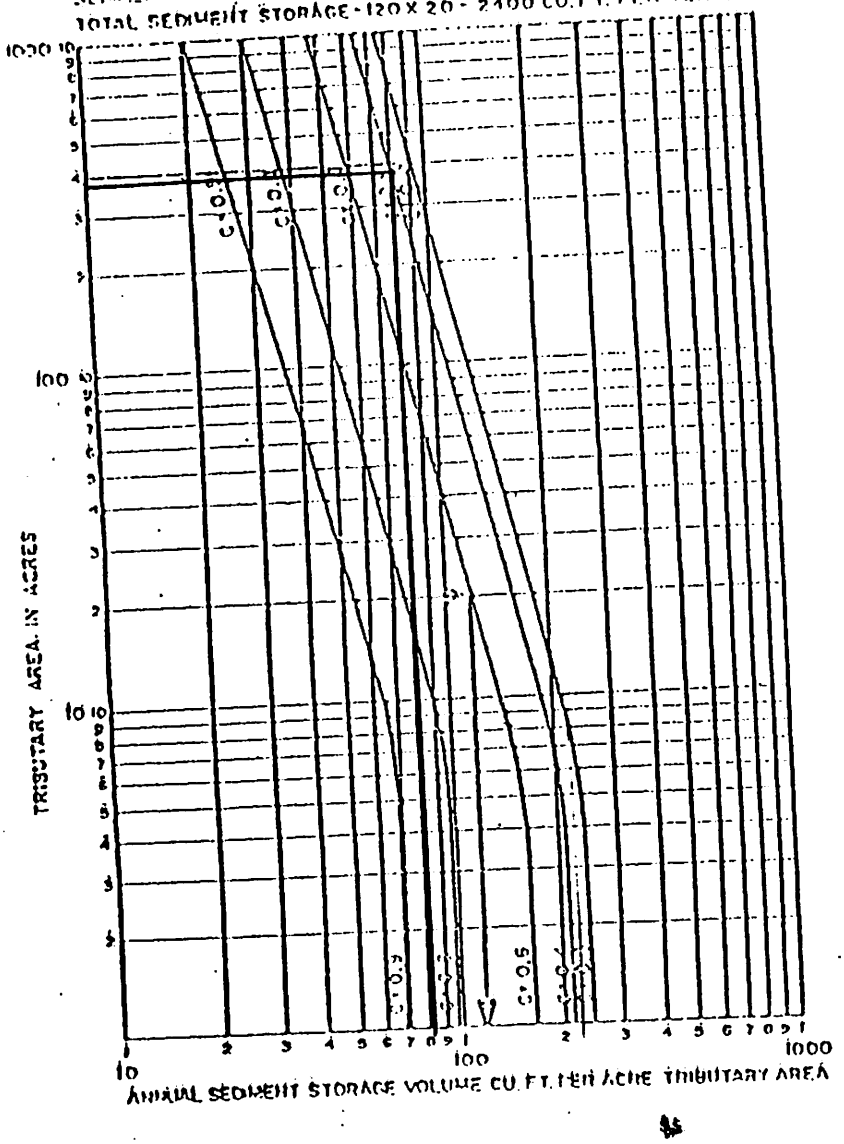
Surface area of basin @ Elev. 524.0 = 65,177 sq. ft. . 29,395 ÷ 65,177 = 0.45'

Routing 100 year storm results in a high water of 524.65. Adding 0.45' for future volume loss due to sediment results in a revised highwater of 525.10

Top of Berm Elev. for basin = 526.50 Resulting in 1.40' of freeboard with sediment accumulation figure in.

DETENTION BASIN

EXAMPLE:
TRIBUTARY AREA - 20 ACRES
RATIONAL METHOD RUNOFF COEFFICIENT "C" = 0.6
SEDIMENT STORAGE = 120 CU. FT. PER ACRE PER YEAR
TOTAL SEDIMENT STORAGE = 120 X 20 = 2400 CU. FT. PER YEAR.



ANNUAL SEDIMENT STORAGE

FIG. 1

80 Cu. Ft. / Acre

POND-2 Version: 5.17
S/N:

CHERRYWOOD PARK
LARGE BASIN

CALCULATED 08-16-1994 14:07:13
DISK FILE: C:\PONDPACK\CALCS\CHERRYWO.VOL

Planimeter scale: 1 inch = 10 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
517.00	0.00	0	0	0	0
518.00	163.91	16,391	16,391	5,464	5,464
520.00	428.57	42,857	85,752	57,168	62,632
522.00	545.60	54,560	145,773	97,182	159,814
524.00	651.77	65,177	179,370	119,580	279,393
526.00	840.87	84,087	223,295	148,863	428,257

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

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*                        *
*   CHERRYWOOD PARK      *
*  15YR./20MIN. STORM    *
*                        *
*                        *
*                        *
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Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY15.HYD
Rating Table file: C:\PONDPACK\CALCS\CHERRY15.PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
517.00	0.0	0	0.0	0.0
518.00	16.4	5,464	91.1	107.5
519.00	61.0	27,431	457.2	518.2
520.00	126.6	62,632	1044.0	1170.6
521.00	209.0	108,297	1805.1	2014.1
522.00	297.5	159,814	2663.8	2961.3
523.00	390.5	216,949	3616.2	4006.7
524.00	479.1	279,393	4657.0	5136.1
525.00	549.3	349,097	5818.9	6368.2
526.00	610.4	428,257	7138.3	7748.7

Time increment (t) = 2.0 min.

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	517.00
2.0	87.04	87.0	60.5	87.0	13.28	517.81
4.0	174.09	261.1	242.3	321.6	39.65	518.52
6.0	261.13	435.2	523.5	677.5	77.02	519.24
8.0	348.18	609.3	887.2	1132.8	122.80	519.94
10.0	435.22	783.4	1319.7	1670.6	175.44	520.59
12.0	522.27	957.5	1810.0	2277.2	233.58	521.28
14.0	522.27	1044.5	2279.5	2854.6	287.53	521.89
16.0	522.27	1044.5	2664.5	3324.1	329.77	522.35
18.0	522.27	1044.5	2981.0	3709.1	364.02	522.72
20.0	522.27	1044.5	3241.6	4025.6	391.98	523.02
22.0	435.22	957.5	3387.9	4199.1	405.59	523.17
24.0	348.18	783.4	3364.5	4171.3	403.41	523.15
26.0	261.13	609.3	3198.6	3973.8	387.57	522.97
28.0	174.09	435.2	2919.2	3633.9	357.33	522.64
30.0	87.04	261.1	2546.4	3180.3	316.98	522.21
32.0	0.00	87.0	2099.7	2633.4	266.86	521.65

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

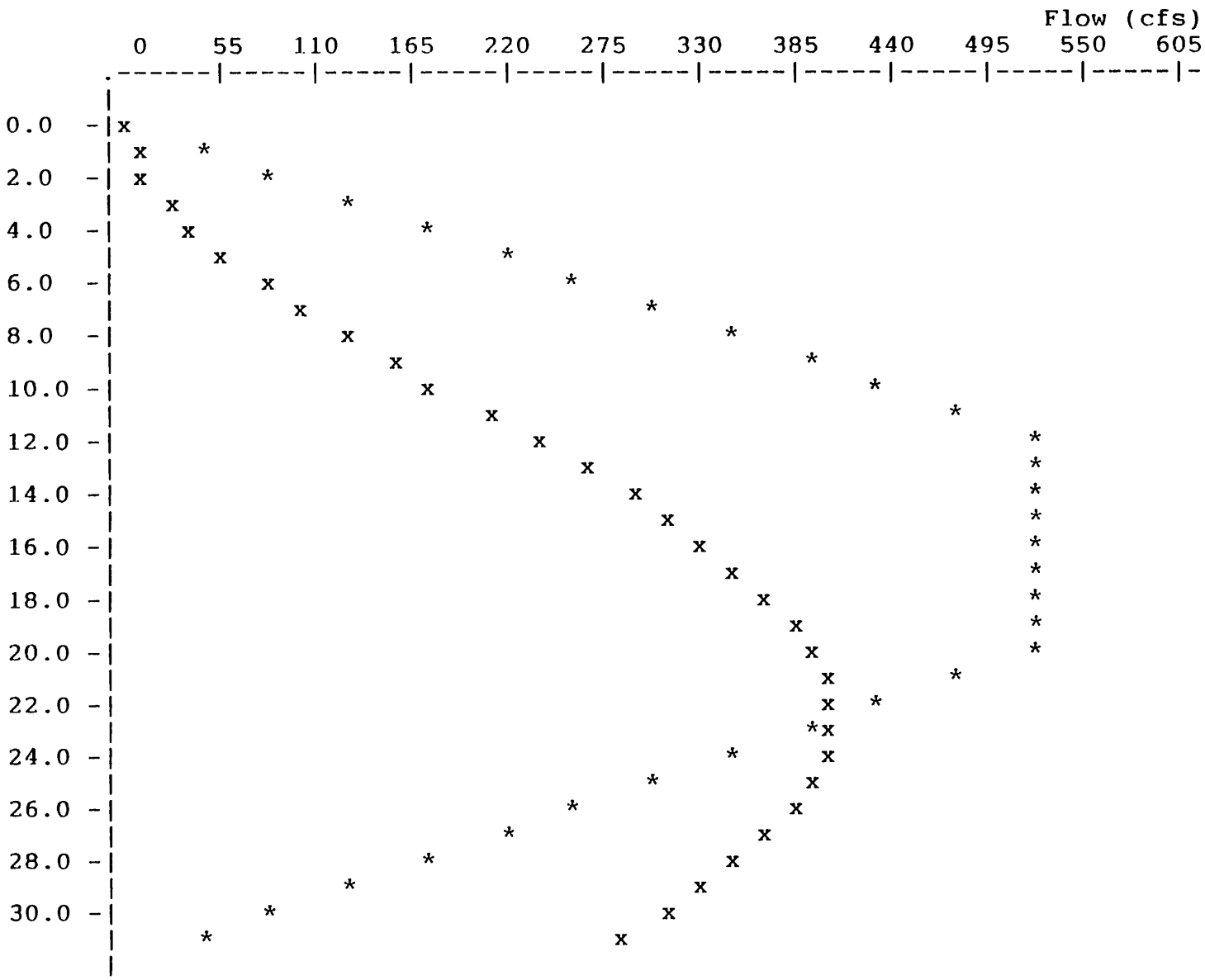
Peak Inflow	=	522.27 cfs
Peak Outflow	=	405.59 cfs
Peak Elevation	=	523.17 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	227,586 cu-ft
Total Storage in Pond	=	227,586 cu-ft

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD
EXECUTED: 08-18-1994 09:36:53

Peak Inflow = 522.27 cfs
Peak Outflow = 405.59 cfs
Peak Elevation = 523.17 ft



* File: C:\PONDPACK\CALCS\CHERRY15.HYD Qmax = 522.3 cfs
x File: C:\PONDPACK\CALCS\OUT .HYD Qmax = 405.6 cfs

Quick TR-55 Ver.5.46 S/N:
Executed: 09:28:16 08-18-1994

>>>>> I-D-F Curve <<<<<

15 YR 20 MIN. STORM Tc=12 MIN.

Recurrence Frequency = 15

DURATION minutes	INTENSITY inches/hour
12	4.6
20	4.6
34	0

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**************************
*                        *
*   CHERRYWOOD PARK      *
*  25YR./20MIN. STORM    *
*                        *
*                        *
*                        *
**************************
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Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY25.HYD
Rating Table file: C:\PONDPACK\CALCS\CHERRY15.PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
517.00	0.0	0
518.00	16.4	5,464
519.00	61.0	27,431
520.00	126.6	62,632
521.00	209.0	108,297
522.00	297.5	159,814
523.00	390.5	216,949
524.00	479.1	279,393
525.00	549.3	349,097
526.00	610.4	428,257

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
91.1	107.5
457.2	518.2
1044.0	1170.6
1805.1	2014.1
2663.8	2961.3
3616.2	4006.7
4657.0	5136.1
5818.9	6368.2
7138.3	7748.7

Time increment (t) = 2.0 min.

n)

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY25.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	517.00
2.0	102.72	102.7	71.4	102.7	15.67	517.96
4.0	205.43	308.2	287.6	379.5	45.94	518.66
6.0	308.15	513.6	622.3	801.2	89.46	519.43
8.0	410.86	719.0	1054.8	1341.3	143.28	520.20
10.0	513.58	924.4	1568.0	1979.2	205.59	520.96
12.0	616.30	1129.9	2152.1	2697.9	272.89	521.72
14.0	616.30	1232.6	2714.4	3384.7	335.17	522.41
16.0	616.30	1232.6	3176.6	3947.0	385.19	522.94
18.0	616.30	1232.6	3565.1	4409.2	422.08	523.36
20.0	616.30	1232.6	3892.6	4797.7	452.55	523.70
22.0	513.58	1129.9	4082.1	5022.4	470.18	523.90
24.0	410.86	924.4	4068.6	5006.5	468.93	523.89
26.0	308.15	719.0	3884.1	4787.7	451.76	523.69
28.0	205.43	513.6	3555.4	4397.7	421.17	523.35
30.0	102.72	308.2	3108.0	3863.5	377.76	522.86
32.0	0.00	102.7	2571.3	3210.7	319.69	522.24

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY25.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	616.30 cfs
Peak Outflow	=	470.18 cfs
Peak Elevation	=	523.90 ft

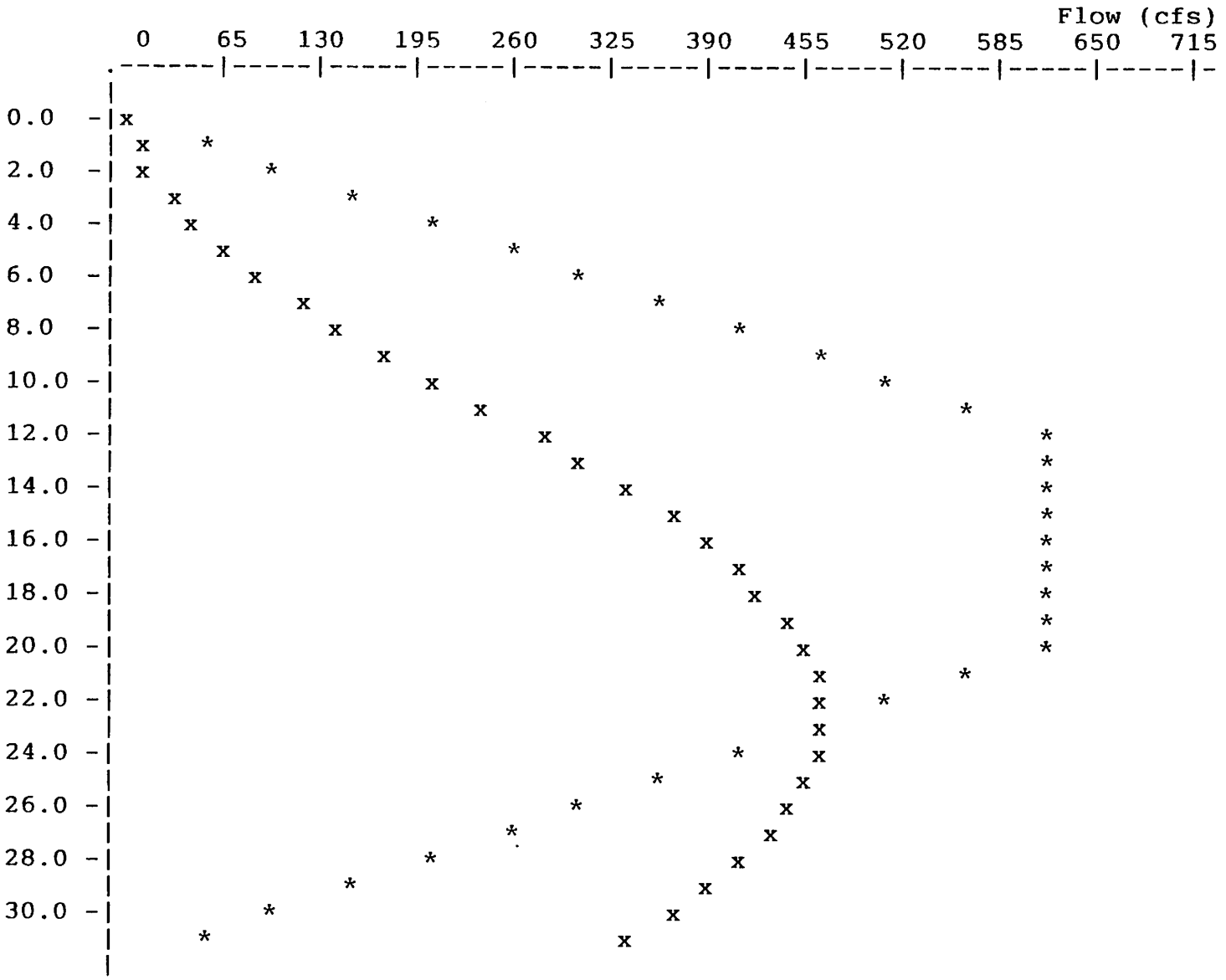
***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	273,108 cu-ft
Total Storage in Pond	=	273,108 cu-ft

Pond File: C:\PONDPACK\CALCS\CHERRY15.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY25.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

EXECUTED: 08-18-1994
09:38:41

Peak Inflow = 616.30 cfs
Peak Outflow = 470.18 cfs
Peak Elevation = 523.90 ft



* File: C:\PONDPACK\CALCS\CHERRY25.HYD Qmax = 616.3 cfs
x File: C:\PONDPACK\CALCS\OUT .HYD Qmax = 470.2 cfs

Quick TR-55 Ver.5.46 S/N:
Executed: 09:29:06 08-18-1994

>>>>> I-D-F Curve <<<<<

25 YR 20 MIN. STORM Tc=12 MIN.

Recurrence Frequency = 25

DURATION minutes	INTENSITY inches/hour
12	6.71
20	6.71
32	0

****
* *
* CHERRYWOOD PARK *
* 100YR./20MIN. STORM *
* *
* *
* *
****

Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY10.HYD
Rating Table file: C:\PONDPACK\CALCS\CHERRY10.PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
517.00	0.0	0	0.0	0.0
518.00	16.8	5,464	91.1	107.9
519.00	61.0	27,431	457.2	518.2
520.00	128.2	62,632	1044.0	1172.2
521.00	209.0	108,297	1805.1	2014.1
522.00	299.1	159,814	2663.8	2962.9
523.00	391.0	216,949	3616.2	4007.2
524.00	482.1	279,393	4657.0	5139.1
525.00	600.5	349,097	5818.9	6419.4
526.00	743.5	428,257	7138.3	7881.8

Time increment (t) = 2.0 min.

Pond File: C:\PONDPACK\CALCS\CHERRY10.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY10.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	517.00
2.0	120.99	121.0	84.6	121.0	18.21	518.03
4.0	241.99	363.0	340.8	447.5	53.39	518.83
6.0	362.98	605.0	735.9	945.7	104.93	519.65
8.0	483.97	847.0	1247.6	1582.8	167.61	520.49
10.0	604.96	1088.9	1857.3	2336.5	239.62	521.34
12.0	725.96	1330.9	2550.4	3188.2	318.93	522.22
14.0	725.96	1451.9	3221.2	4002.3	390.57	523.00
16.0	725.96	1451.9	3783.9	4673.1	444.59	523.59
18.0	725.96	1451.9	4253.7	5235.8	491.04	524.08
20.0	725.96	1451.9	4636.7	5705.6	534.49	524.44
22.0	604.96	1330.9	4850.1	5967.6	558.72	524.65
24.0	483.97	1088.9	4826.9	5939.1	556.08	524.62
26.0	362.98	847.0	4610.8	5673.9	531.55	524.42
28.0	241.99	605.0	4237.4	5215.7	489.18	524.06
30.0	120.99	363.0	3722.9	4600.3	438.74	523.52
32.0	0.00	121.0	3090.6	3843.8	376.63	522.84

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\CALCS\CHERRY10.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY10.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	725.96 cfs
Peak Outflow	=	558.72 cfs
Peak Elevation	=	524.65 ft

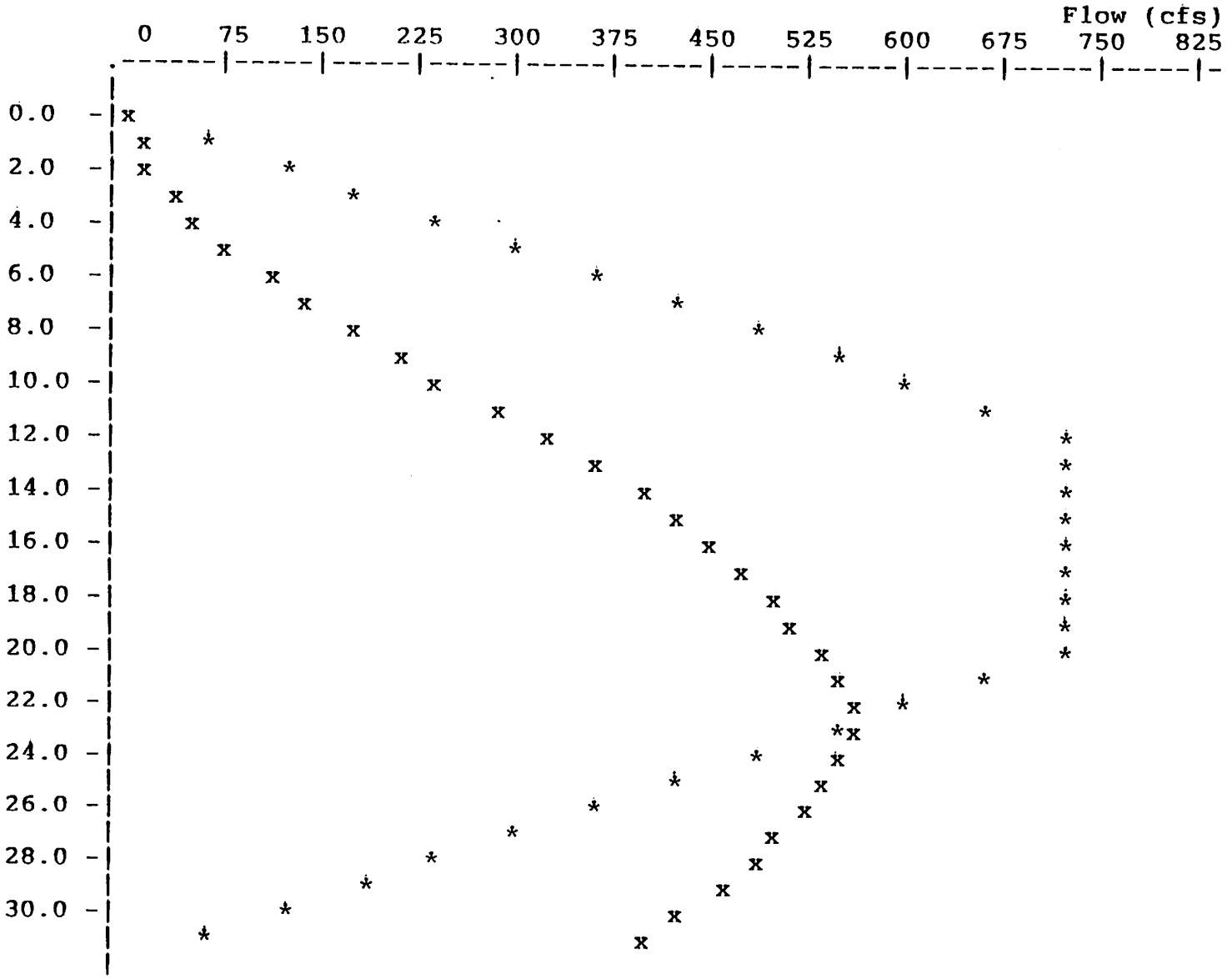
***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	324,498 cu-ft
Total Storage in Pond	=	324,498 cu-ft

Pond File: C:\PONDPACK\CALCS\CHERRY10.PND
Inflow Hydrograph: C:\PONDPACK\CALCS\CHERRY10.HYD
Outflow Hydrograph: C:\PONDPACK\CALCS\OUT .HYD

EXECUTED: 11-03-1994
15:03:24

Peak Inflow = 725.96 cfs
Peak Outflow = 558.72 cfs
Peak Elevation = 524.65 ft



* File: C:\PONDPACK\CALCS\CHERRY10.HYD Qmax = 726.0 cfs
x File: C:\PONDPACK\CALCS\OUT .HYD Qmax = 558.7 cfs

Quick TR-55 Ver.5.46 S/N:
Executed: 09:30:21 08-18-1994

>>>>> I-D-F Curve <<<<<

100YR STORM 12 MIN. Tc

Recurrence Frequency = 100

DURATION minutes	INTENSITY inches/hour
12	7.55
20	7.55
32	0

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

>>>>>> Structure No. 1 <<<<<<
(Input Data)

CULVERT-CR
Circular Culvert (With Inlet Control)

E1 elev.(ft)?	517
E2 elev.(ft)?	526.001
Diam. (ft)?	5.5
Inv. el.(ft)?	517
Slope (ft/ft)?	.012
T1 ratio?	
T2 ratio?	
K Coeff.?	.0045
M Coeff.?	2.0
c Coeff.?	.0317
Y Coeff.?	.69
Form 1 or 2?	1
Slope factor?	-0.5

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages		
517.00	0.0	No headwater		
518.00	8.4	Equ.1: HW =1.0	dc=.772	Ac=2.03
519.00	30.5	Equ.1: HW =2.0	dc=1.492	Ac=5.212
520.00	64.1	Equ.1: HW =3.0	dc=2.19	Ac=8.823
521.00	104.5	Equ.1: HW =4.0	dc=2.828	Ac=12.309
522.00	149.5	Equ.1: HW =5.0	dc=3.411	Ac=15.477
523.00	195.5	Transition: HW =6.0		
524.00	240.3	Submerged: HW =7.0		
525.00	274.7	Submerged: HW =8.0		
526.00	305.2	Submerged: HW =9.0		

Used Unsubmerged Equ. Form (1) for elev. less than 522.99 ft
Used Submerged Equation for elevations greater than 523.55 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:

E1=522.99 ft; Q1=195.01 cfs; Dc=3.91 ft; E2=523.55 ft; Q2=222.87 cfs

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

>>>>>> Structure No. 2 <<<<<<
(Input Data)

CULVERT-CR
Circular Culvert (With Inlet Control)

E1 elev.(ft)?	517
E2 elev.(ft)?	526.001
Diam. (ft)?	5.5
Inv. el.(ft)?	517
Slope (ft/ft)?	.012
T1 ratio?	
T2 ratio?	
K Coeff.?	.0045
M Coeff.?	2.0
c Coeff.?	.0317
Y Coeff.?	.69
Form 1 or 2?	1
Slope factor?	-0.5

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

Outflow Rating Table for Structure #2
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages		
517.00	0.0	No headwater		
518.00	8.4	Equ.1: HW =1.0	dc=.772	Ac=2.03
519.00	30.5	Equ.1: HW =2.0	dc=1.492	Ac=5.212
520.00	64.1	Equ.1: HW =3.0	dc=2.19	Ac=8.823
521.00	104.5	Equ.1: HW =4.0	dc=2.828	Ac=12.309
522.00	149.5	Equ.1: HW =5.0	dc=3.411	Ac=15.477
523.00	195.5	Transition: HW =6.0		
524.00	240.3	Submerged: HW =7.0		
525.00	274.7	Submerged: HW =8.0		
526.00	305.2	Submerged: HW =9.0		

Used Unsubmerged Equ. Form (1) for elev. less than 522.99 ft
Used Submerged Equation for elevations greater than 523.55 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:

E1=522.99 ft; Q1=195.01 cfs; Dc=3.91 ft; E2=523.55 ft; Q2=222.87 cfs

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

>>>>>> Structure No. 3 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	523.9
E2 elev.(ft)?	526.001
Weir coefficient?	3.0
Weir elev.(ft)?	523.90
Length (ft)?	15
Contracted/Suppressed (C/S)?	C

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

Outflow Rating Table for Structure #3
WEIR-VR Weir - Vertical Rectangular

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
517.00	0.0	E < Inv.El.= 523.9
518.00	0.0	E < Inv.El.= 523.9
519.00	0.0	E < Inv.El.= 523.9
520.00	0.0	E < Inv.El.= 523.9
521.00	0.0	E < Inv.El.= 523.9
522.00	0.0	E < Inv.El.= 523.9
523.00	0.0	E < Inv.El.= 523.9
524.00	1.4	H =.1
525.00	51.2	H =1.1
526.00	133.1	H =2.1

C = 3 L (ft) = 15
H (ft) = Table elev. - Invert elev. (523.9 ft)
Q (cfs) = C * (L-.2H) * (H**1.5) -- Contracted Weir

Outlet Structure File: CHERRYWO.STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

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

Elevation (ft)	Q (cfs)	Contributing Structures
517.00	0.0	1 +2
518.00	16.8	1 +2
519.00	61.0	1 +2
520.00	128.2	1 +2
521.00	209.0	1 +2
522.00	299.1	1 +2
523.00	391.0	1 +2
524.00	482.1	3 +1 +2
525.00	600.5	3 +1 +2
526.00	743.5	3 +1 +2

1/5

CHERRYWOOD PARK
ST. CHARLES ENGR & SURVEYING
HYDROSTATIC UPLIFT CALCULATIONS
12 SEP 97

ANALYZE PIPE AT FE-3

ϕ = 24" I.D. ⇒ O.D. = 27.80" = 2.32'

γ_{dry} = 110 pcf γ_{sat} = 130 pcf

elev. of grade = 557 ft

elev of H_2O = 555.36 ft (100 yr).

elev. of top of pipe = 553.25

* CALCULATE VERTICAL UPLIFT FORCE (U) lb/L.F of pipe

$U = \frac{\pi}{4} D^2 \gamma_w$ D = O.D (ft)

γ_w = 62.4 pcf

U = 263.79 lb/ft

THIS FORCE MUST BE BALANCED IN ORDER TO REMAIN IN EQUILIBRIUM.

* CALCULATE WT. DUE TO SOIL

$$W_{soil} = \gamma_{dry} H_{dry} D + (\gamma_{sat} - \gamma_w)(H_{sub} + 0.1073D) D$$

where:
see attached page
for definitions

2/5

$$W_{soil} = (110\ pcf)(1.64')(2.32') + (130\ pcf - 62.4\ pcf)\left[(2.11' + 0.1073(2.32')\right]2.32'$$

$$W_{soil} = (418.5\ lb/ft) + (67.6\ pcf)(2.36\ ft)(2.32\ ft)$$

$$W_{soil} = 418.5\ lb/ft + 369.96\ lb/ft$$

$$W_{soil} = 788.5\ lb/ft$$

$$W_{TOTAL} = W_{soil} + W_{pipe}$$

$$W_{TOTAL} = 788.5\ lb/ft + 11.23\ lb/ft$$

$$W_{TOTAL} = 799.7\ lb/ft$$

$$F.S._{FLOAT} = \frac{W_{TOTAL}}{U} = \frac{799.7\ lb/ft}{263.79\ lb/ft}$$

$$F.S._{FLOAT} = 3.03$$

FE-3

3/5

This hydrostatic uplift force must be balanced by soil overburden and the weight of the pipe in order to insure that the pipe will not float. Soil loads experienced by a pipe at varying water table depths (W_{soil}) can be calculated from Equation 2. Figure 1 illustrates each of the three cases seen in field installations where buoyancy becomes a concern, and also clarifies all of the parameters contained within Equation 2.

$$W_{soil} = \delta_{dry} H_{dry} D + (\delta_{sat} - \delta_w)(H_{sub} + 0.1073D)D \qquad (2)$$

where W_{soil} = weight of soil overburden, lb/linear ft of pipe
δ_{dry} = dry unit weight of the soil, lb/ft^3
H_{dry} = depth of dry soil, ft.
H_{sub} = depth of submerged soil over top of pipe, ft
δ_{sat} = saturated unit weight of the soil, lb/ft^3
$\delta_{sat} - \delta_w$ = submerged unit weight of the soil, lb/ft^3

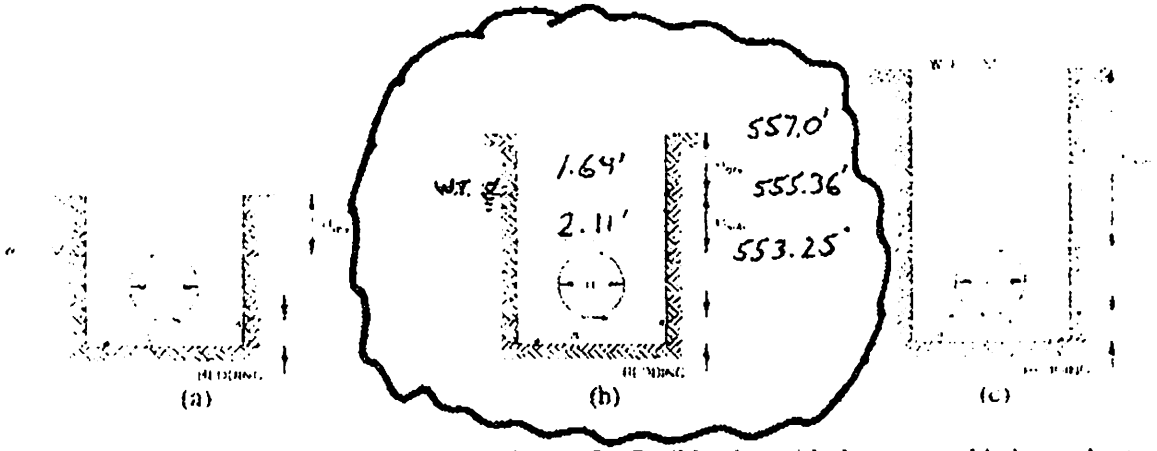


Figure 1: Illustration for minimum depth of cover for flexible pipe with the water table located (a) on top of the pipe, (b) between the top of pipe and top of grade, and (c) at top of grade

The typical weights (W_{pipe}) and O.Ds of ADS N-12 pipe for diameters 12"-48" are shown in Table 2.

Table 2: Typical Weights and O.Ds of ADS N-12 Pipe

Nominal Diameter, in.	*O.D., Average, in.(ft)*	*Weight (lb/ft)*
12	14.45 (1.20)	3.19
15	17.57 (1.46)	4.63
18	21.20 (1.77)	6.43
24	27.80 (2.32)	11.23
30	36.07 (3.01)	15.42
36	42.46 (3.54)	18.06
42	46.75 (3.90)	26.50
48	52.70 (4.39)	32.00

The minimum depth of cover (H) required to resist uplift can be calculated from Equations 3 and 4 below.

$$U = W_{soil} + W_{pipe} \qquad (3)$$

where W_{pipe} = weight of the pipe, lb/linear ft of pipe

$$H = H_{dry} + H_{sub} \qquad (4)$$

4/5

ANALYZE PIPE AT FE-11

I.D. ϕ = 30" O.D. ϕ = 36.07" = 3.01' say 3'

γ_{dry} = 110 pcf γ_{sat} = 130 pcf

elev. of grade = 558'

elev. of H_2O = 555.36' (100 yr)

elev. of top of pipe = 554.0'

* calculate vertical uplift force (U)

$$U = \frac{\pi}{4} D^2 \gamma_w = \frac{3.14}{4} (3')^2 (62.4 \text{ pcf})$$

$$U = 441.08 \text{ lb/ft}$$

* calculate wt. due to soil

$$W_{soil} = \gamma_{dry} H_{dry} D + (\gamma_{sat} - \gamma_w)(H_{sub} + 0.1073D) D$$

$$W_{soil} = (110 \text{ pcf})(2.64')(3') + (130 \text{ pcf} - 62.4 \text{ pcf})[(1.36' + 0.1073(3')]3 \text{ ft}$$

W_{soil} = 871.2 lb/ft + (67.6 pcf)(5.05 ft²)

W_{soil} = 1,212.3 lb/ft

W_{pipe} = 15.4 lb/ft

W_{TOTAL} = 1227.70 lb/ft

$$F.S._{FLOAT} = \frac{1227.70}{441.08} = 2.78$$

FE-11

5/5

This hydrostatic uplift force must be balanced by soil overburden and the weight of the pipe in order to insure that the pipe will not float. Soil loads experienced by a pipe at varying water table depths (W_{soil}) can be calculated from Equation 2. Figure 1 illustrates each of the three cases seen in field installations where buoyancy becomes a concern, and also clarifies all of the parameters contained within Equation 2.

$$W_{soil} = \delta_{dry} H_{dry} D + (\delta_{sat} - \delta_w)(H_{sub} + 0.1073D)D \qquad (2)$$

where W_{soil} = weight of soil overburden, lb/linear ft of pipe
δ_{dry} = dry unit weight of the soil, lb/ft^3
H_{dry} = depth of dry soil, ft
H_{sub} = depth of submerged soil over top of pipe, ft.
δ_{sat} = saturated unit weight of the soil, lb/ft^3
$\delta_{sub} = \delta_w$ = submerged unit weight of the soil, lb/ft^3

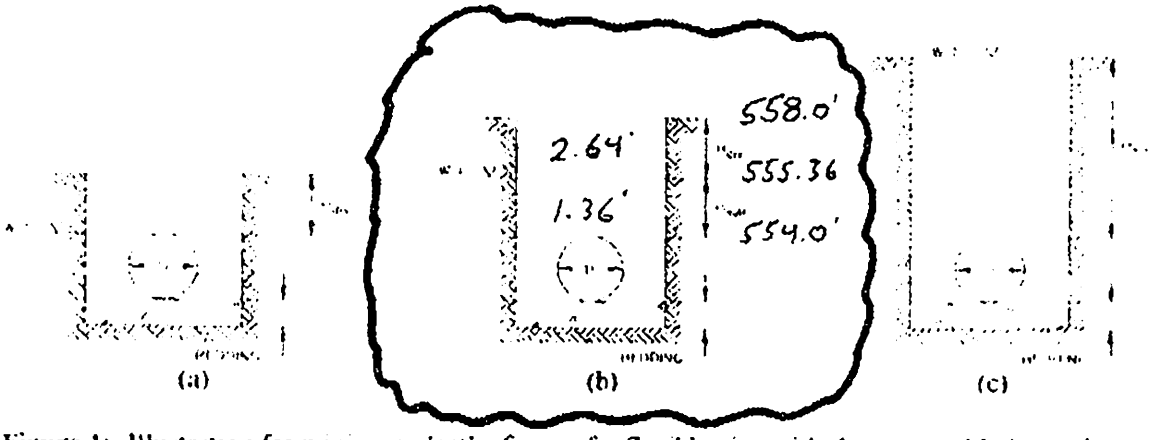


Figure 1: Illustration for minimum depth of cover for flexible pipe with the water table located (a) on top of the pipe, (b) between the top of pipe and top of grade, and (c) at top of grade

The typical weights (W_{pipe}) and O.Ds of ADS N-12 pipe for diameters 12"-48" are shown in Table 2.

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Nominal Diameter, in.	*O.D., Average, in.(ft)*	*Weight (lb/ft)*
12	14.45 (1.20)	3.19
15	17.57 (1.46)	4.63
18	21.20 (1.77)	6.43
24	27.80 (2.32)	11.23
30	36.07 (3.01)	15.42
36	42.46 (3.54)	18.06
42	46.75 (3.90)	26.50
48	52.70 (4.39)	32.00

The minimum depth of cover (H) required to resist uplift can be calculated from Equations 3 and 4 below.

$$U = W_{soil} + W_{pipe} \qquad (3)$$

where W_{pipe} = weight of the pipe, lb/linear ft of pipe

$$H = H_{dry} + H_{sub} \qquad (4)$$

****
* *
* outflow hydrograph entering hand calced flows *
* *
* 100 yr *
* *
* *
****

Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY10.HYD
Rating Table file: F:\PONDPACK\CALCS\CHERRYZ .PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
517.00	0.0	0
518.00	6.8	5,464
519.00	19.3	27,431
520.00	64.3	62,632
521.00	137.0	108,297
522.00	219.5	159,814
523.00	284.6	216,949
524.00	333.5	279,393
525.00	375.8	349,097
525.50	607.4	388,677
526.00	1013.8	428,257

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
91.1	97.9
457.2	476.5
1044.0	1108.3
1805.1	1942.1
2663.8	2883.3
3616.2	3900.8
4657.0	4990.5
5818.9	6194.7
6478.6	7086.0
7138.3	8152.2

Time increment (t) = 2.0 min.

8

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY10.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

INFLOW HYDROGRAPH

TIME (min)	INFLOW (cfs)
0.0	0.00
2.0	120.99
4.0	241.99
6.0	362.98
8.0	483.97
10.0	604.96
12.0	725.96
14.0	725.96
16.0	725.96
18.0	725.96
20.0	725.96
22.0	604.96
24.0	483.97
26.0	362.98
28.0	241.99
30.0	120.99
32.0	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
-----	0.0	0.0	0.00	517.00
121.0	105.9	121.0	7.56	518.06
363.0	430.8	468.8	19.01	518.98
605.0	917.5	1035.8	59.15	519.89
847.0	1521.4	1764.5	121.51	520.79
1088.9	2219.2	2610.4	195.56	521.71
1330.9	3025.8	3550.2	262.18	522.66
1451.9	3856.7	4477.7	310.49	523.53
1451.9	4619.3	5308.7	344.66	524.26
1451.9	5328.3	6071.3	371.50	524.90
1451.9	5724.2	6780.2	527.97	525.33
1330.9	5856.3	7055.2	599.42	525.48
1088.9	5803.5	6945.3	570.86	525.42
847.0	5662.0	6650.5	494.27	525.26
605.0	5477.7	6266.9	394.61	525.04
363.0	5113.9	5840.7	363.38	524.71
121.0	4550.8	5234.9	342.06	524.20

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY10.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	725.96 cfs
Peak Outflow	=	599.42 cfs
Peak Elevation	=	525.48 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	387,305 cu-ft
Total Storage in Pond	=	387,305 cu-ft

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY10.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

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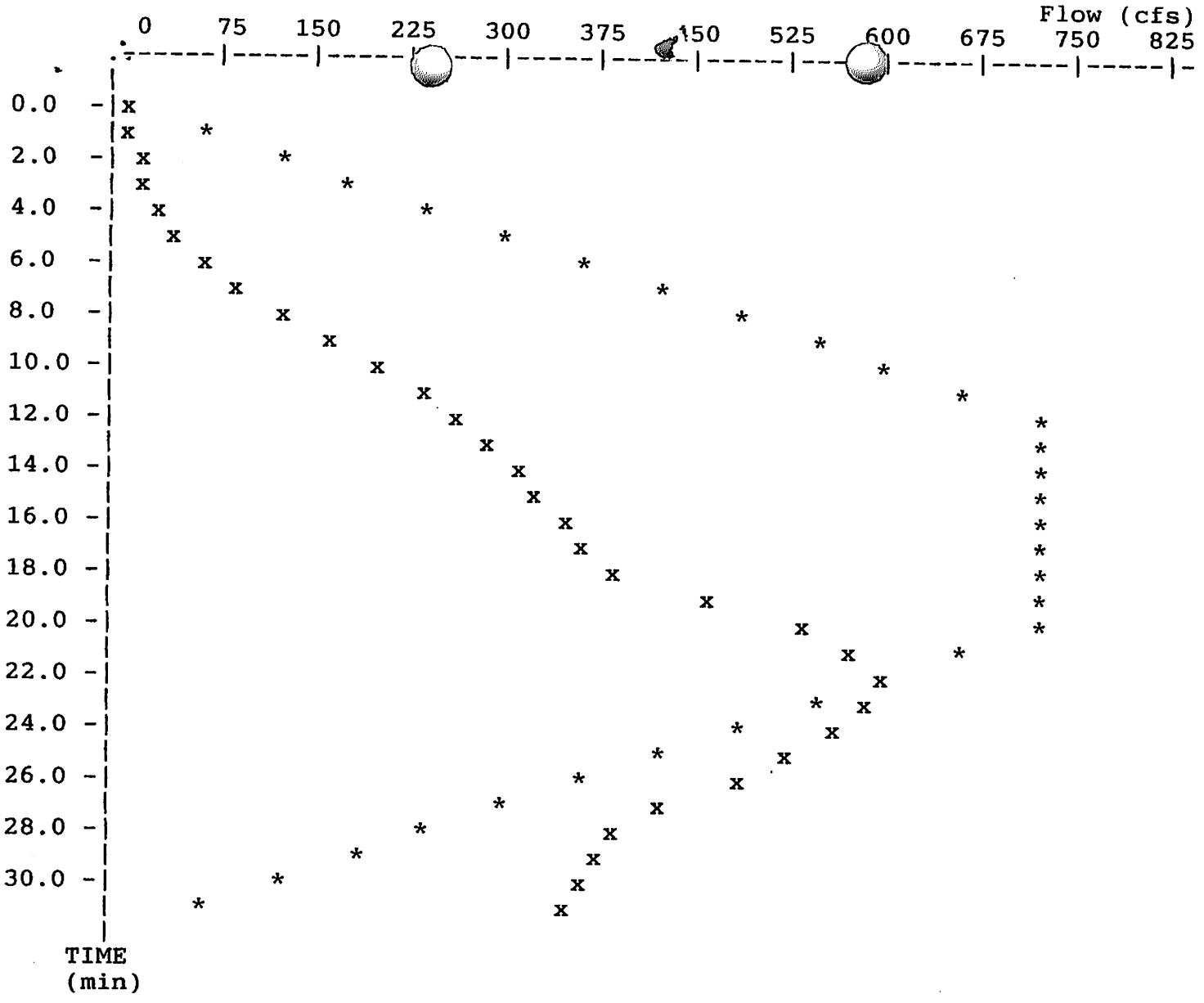
Peak Inflow = 725.96 cfs
Peak Outflow = 599.42 cfs
Peak Elevation = 525.48 ft



* File: F:\PONDPACK\CALCS\CHERRY10.HYD Qmax = 726.0 cfs
x File: F:\PONDPACK\CALCS\CHEROUT .HYD Qmax = 599.4 cfs

****
*
* outflow hydrograph entering hand calced flows *
*
* 15YR *
*
* Undeveloped Offsite *
*
****

Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY15.HYD
Rating Table file: F:\PONDPACK\CALCS\CHERRYZ .PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
517.00	0.0	0	0.0	0.0
518.00	6.8	5,464	91.1	97.9
519.00	19.3	27,431	457.2	476.5
520.00	64.3	62,632	1044.0	1108.3
521.00	137.0	108,297	1805.1	1942.1
522.00	219.5	159,814	2663.8	2883.3
523.00	284.6	216,949	3616.2	3900.8
524.00	333.5	279,393	4657.0	4990.5
525.00	375.8	349,097	5818.9	6194.7
526.00	413.8	428,257	7138.3	7552.2

Time increment (t) = 2.0 min.

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	517.00
2.0	66.96	67.0	57.7	67.0	4.65	517.68
4.0	133.92	200.9	234.4	258.5	12.09	518.42
6.0	200.87	334.8	517.4	569.2	25.87	519.15
8.0	267.83	468.7	874.9	986.1	55.61	519.81
10.0	334.79	602.6	1284.5	1477.5	96.50	520.44
12.0	401.75	736.5	1733.2	2021.1	143.92	521.08
14.0	401.75	803.5	2158.5	2536.7	189.11	521.63
16.0	401.75	803.5	2513.0	2962.0	224.52	522.08
18.0	401.75	803.5	2822.0	3316.5	247.22	522.43
20.0	401.75	803.5	3091.5	3625.5	267.01	522.73
22.0	334.79	736.5	3268.1	3828.0	279.98	522.93
24.0	267.83	602.6	3305.3	3870.7	282.71	522.97
26.0	200.87	468.7	3220.9	3774.0	276.52	522.88
28.0	133.92	334.8	3030.7	3555.7	262.54	522.66
30.0	66.96	200.9	2748.0	3231.5	241.78	522.34
32.0	0.00	67.0	2388.0	2814.9	213.49	521.93

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	401.75 cfs
Peak Outflow	=	282.71 cfs
Peak Elevation	=	522.97 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	215,258 cu-ft
Total Storage in Pond	=	215,258 cu-ft

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

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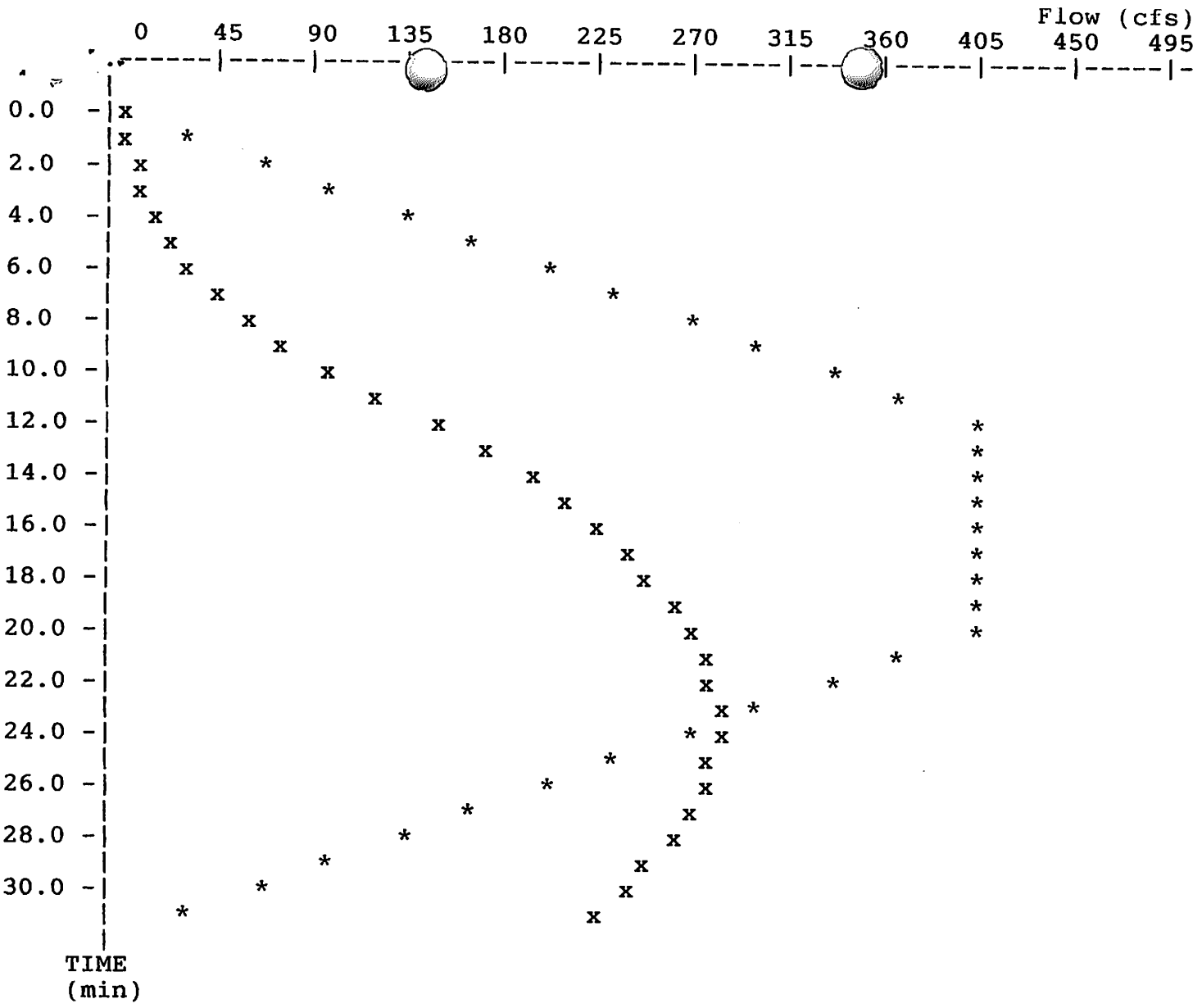
Peak Inflow = 401.75 cfs
Peak Outflow = 282.71 cfs
Peak Elevation = 522.97 ft



* File: F:\PONDPACK\CALCS\CHERRY15.HYD Qmax = 401.8 cfs
x File: F:\PONDPACK\CALCS\CHEROUT .HYD Qmax = 282.7 cfs

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* outflow hydrograph entering hand calced flows *
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* 25 YR *
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Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY25.HYD
Rating Table file: F:\PONDPACK\CALCS\CHERRYZ .PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
517.00	0.0	0
518.00	6.8	5,464
519.00	19.3	27,431
520.00	64.3	62,632
521.00	137.0	108,297
522.00	219.5	159,814
523.00	284.6	216,949
524.00	333.5	279,393
525.00	375.8	349,097
526.00	413.8	428,257

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
0.0	0.0
91.1	97.9
457.2	476.5
1044.0	1108.3
1805.1	1942.1
2663.8	2883.3
3616.2	3900.8
4657.0	4990.5
5818.9	6194.7
7138.3	7552.2

Time increment (t) = 2.0 min.

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY25.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	517.00
2.0	102.72	102.7	88.8	102.7	6.96	518.01
4.0	205.43	308.2	363.7	397.0	16.64	518.79
6.0	308.15	513.6	781.6	877.2	47.84	519.63
8.0	410.86	719.0	1303.5	1500.6	98.51	520.47
10.0	513.58	924.4	1903.9	2228.0	162.05	521.30
12.0	616.30	1129.9	2575.5	3033.8	229.12	522.15
14.0	616.30	1232.6	3250.7	3808.1	278.70	522.91
16.0	616.30	1232.6	3861.8	4483.3	310.74	523.53
18.0	616.30	1232.6	4420.2	5094.4	337.12	524.09
20.0	616.30	1232.6	4939.3	5652.8	356.77	524.55
22.0	513.58	1129.9	5326.3	6069.2	371.42	524.90
24.0	410.86	924.4	5495.9	6250.7	377.41	525.04
26.0	308.15	719.0	5462.1	6214.9	376.41	525.01
28.0	205.43	513.6	5239.4	5975.7	368.13	524.82
30.0	102.72	308.2	4841.5	5547.6	353.07	524.46
32.0	0.00	102.7	4281.4	4944.2	331.39	523.96

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY25.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	616.30 cfs
Peak Outflow	=	377.41 cfs
Peak Elevation	=	525.04 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	352,363 cu-ft
Total Storage in Pond	=	352,363 cu-ft

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY25.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

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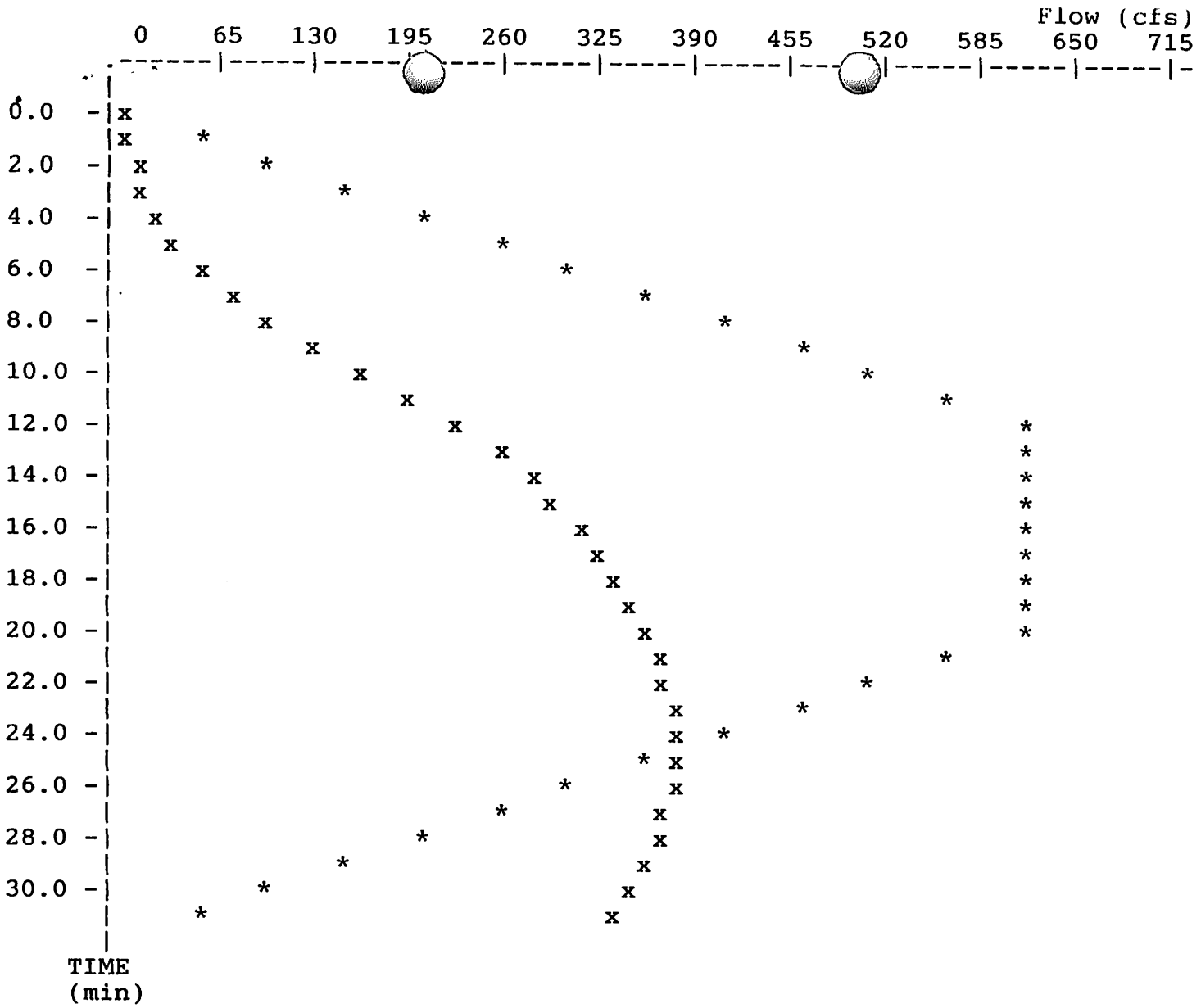
Peak Inflow = 616.30 cfs
Peak Outflow = 377.41 cfs
Peak Elevation = 525.04 ft



* File: F:\PONDPACK\CALCS\CHERRY25.HYD Qmax = 616.3 cfs
x File: F:\PONDPACK\CALCS\CHEROUT .HYD Qmax = 377.4 cfs

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* outflow hydrograph entering hand calced flows *
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* 15 YR *
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Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY15.HYD
Rating Table file: F:\PONDPACK\CALCS\CHERRYZ .PND

----INITIAL CONDITIONS----
Elevation = 517.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
517.00	0.0	0	0.0	0.0
518.00	6.8	5,464	91.1	97.9
519.00	19.3	27,431	457.2	476.5
520.00	64.3	62,632	1044.0	1108.3
521.00	137.0	108,297	1805.1	1942.1
522.00	219.5	159,814	2663.8	2883.3
523.00	284.6	216,949	3616.2	3900.8
524.00	333.5	279,393	4657.0	4990.5
525.00	375.8	349,097	5818.9	6194.7
526.00	413.8	428,257	7138.3	7552.2

Time increment (t) = 2.0 min.

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

INFLOW HYDROGRAPH

TIME (min)	INFLOW (cfs)
0.0	0.00
2.0	87.04
4.0	174.09
6.0	261.13
8.0	348.18
10.0	435.22
12.0	522.27
14.0	522.27
16.0	522.27
18.0	522.27
20.0	522.27
22.0	435.22
24.0	348.18
26.0	261.13
28.0	174.09
30.0	87.04
32.0	0.00

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
-----	0.0	0.0	0.00	517.00
87.0	74.9	87.0	6.05	517.89
261.1	306.8	336.1	14.64	518.63
435.2	665.6	742.0	38.20	519.42
609.3	1117.2	1274.9	78.85	520.20
783.4	1633.9	1900.6	133.38	520.95
957.5	2203.6	2591.4	193.90	521.69
1044.5	2762.4	3248.1	242.84	522.36
1044.5	3249.7	3807.0	278.63	522.91
1044.5	3689.7	4294.3	302.27	523.36
1044.5	4090.3	4734.3	321.98	523.76
957.5	4376.8	5047.8	335.48	524.05
783.4	4481.4	5160.2	339.43	524.14
609.3	4416.7	5090.7	336.99	524.08
435.2	4197.4	4851.9	327.25	523.87
261.1	3839.3	4458.5	309.63	523.51
87.0	3354.8	3926.3	285.78	523.02

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

Starting Pond W.S. Elevation = 517.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow	=	522.27 cfs
Peak Outflow	=	339.43 cfs
Peak Elevation	=	524.14 ft

***** Summary of Approximate Peak Storage *****

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	289,221 cu-ft
Total Storage in Pond	=	289,221 cu-ft

Pond File: F:\PONDPACK\CALCS\CHERRYZ .PND
Inflow Hydrograph: F:\PONDPACK\CALCS\CHERRY15.HYD
Outflow Hydrograph: F:\PONDPACK\CALCS\CHEROUT .HYD

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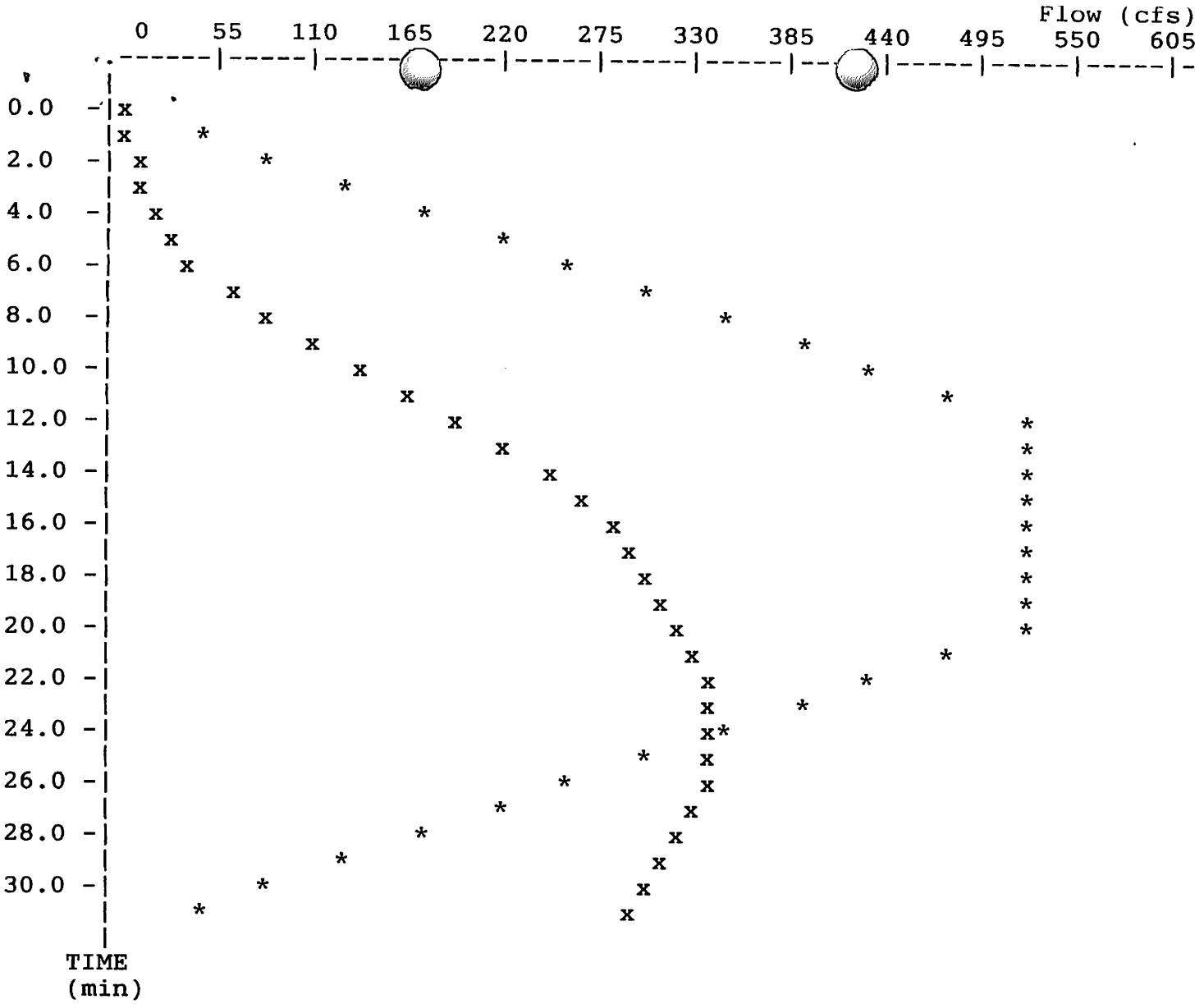
Peak Inflow = 522.27 cfs
Peak Outflow = 339.43 cfs
Peak Elevation = 524.14 ft

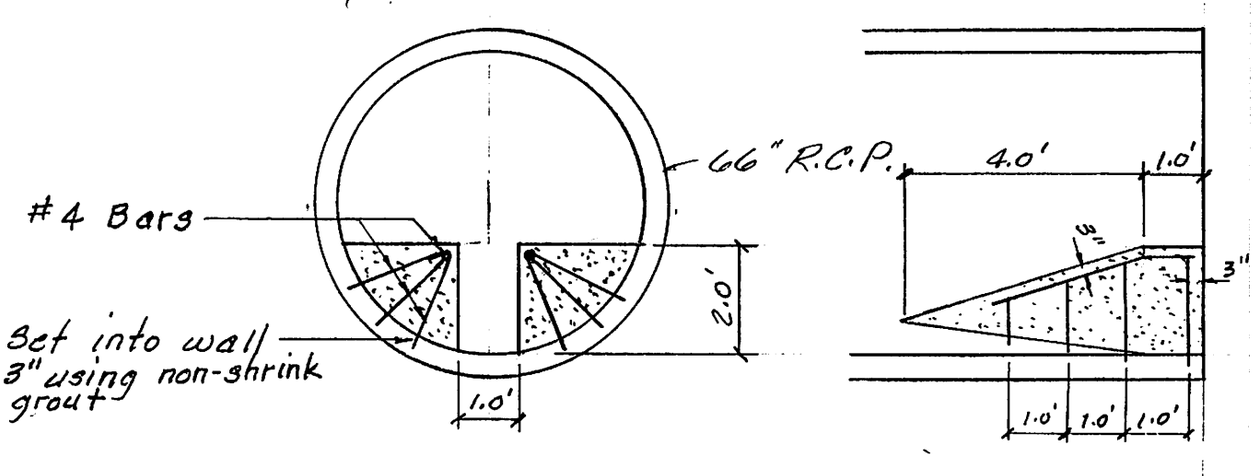


* File: F:\PONDPACK\CALCS\CHERRY15.HYD Qmax = 522.3 cfs
x File: F:\PONDPACK\CALCS\CHEROUT .HYD Qmax = 339.4 cfs

CHERRYWOOD PARC
Revised DETENTION STUDY

9-28-95

Recent problems with the existing storm pipes under Tranquility Lane have warranted a second look at the detention basin outfall pipe. Although detention for the Cherrywood Parc development is provided with the two 66" pipes now in place, we have investigated different options which would detain even more water. As a result, we are proposing to choke down the opening to the two pipes as shown below.



25YR STORM Routed with this design will allow a peak discharge of 377.41 c.f.s.

Q_{in} = 616.30 c.f.s.

Q_{out} = 377.41 c.f.s.

238.89 c.f.s. detained

Previously

Q_{in} = 616.30 c.f.s.

Q_{out} = 470.18 c.f.s.

146.12 c.f.s.

CHERRYWOOD PARC
Revised Detention Study (cont.)

We have also included the routing for a 15YR. STORM and a routing for the 15YR STORM using undeveloped runoff volumes for the offsite drainage areas which would reflect the present conditions.

15YR STORM Qin 522.27 c.f.s.
Qout 339.43 c.f.s.
182.84 c.f.s. detained

Previously Qin 522.27 c.f.s.
405.59 c.f.s.
116.68 c.f.s.

15YR STORM (Undeveloped Offsite)*
Qin 401.75 c.f.s.
Qout 282.71 c.f.s.
119.04 c.f.s. detained

* This should approximate conditions as they now exists.
Before any construction began on this site the total runoff @ the basin location, was 188 Ac @ 1.87 = 351.56 c.f.s.. As a result of modifying these pipes, the runoff will be reduced by 68.85 c.f.s.

CHERRYWOOD PARC
Revised Detention Study (cont.)

The last storm to be considered is the 100YR. The detaining of more water has caused the highwater to rise. The highwater for the 25YR will be 525.04 therefore, the spillway elevation must be raised to 525.04. Also the width of the spillway must be increased to 100 feet. The attached routing for the 100YR STORM used these modifications.

100YR STORM Q_{in} 725.96 c.f.s.
Q_{out} 599.42 c.f.s. @ Elev. 525.48

Top of Dam = 526.50
525.48
1.02 freeboard