File
~~Westwood~~
O'Fallon Bus. Park

ENGINEERING

PLANNING

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STORMWATER DETENTION ANALYSIS
O'FALLON BUSINESS PARK
BAX PROJECT NO. 95-7941
AUGUST 5, 1996

INTRODUCTION:

The purpose of this report is to analyze the storm water detention basin proposed for O'Fallon Business Park and shown on a Site Plan by Bax Engineering Company, Inc.

Stormwater detention requirements for the City of O'Fallon are such that storage volume and outflow rates shall be proportioned to insure that the peak rate of runoff leaving the site under post developed conditions is less than or equal to the peak rate of runoff leaving the site under pre-developed conditions for the required design storms. A basin is proposed for the Southwest property corner of the site. The basin shall provide detention such that the peak rate of runoff leaving the subwatershed at the discharge point West subwatershed under post developed conditions is less than or equal to the peak rate under pre-developed conditions. The East subwatershed will not require detention. The basin shall be analyzed for the 25 year - 20 minute design storm and the 100 year - 20 minute design storm as required by the City.

General Site Data and Runoff Calculations:

1) Area of tract: 5.58 Acres

2) The pre-developed P.I. Factors to be used for the analysis are:

Onsite: 25 year - 20 minute storm
(0% - 5% impervious) 2.31 cfs/Ac
100 year 20 - minute storm
(0% - 5% impervious) 2.95 cfs/Ac

3) Post developed P.I. Factors to be used for the analysis are:

Onsite: 25 year - 20 minute storm
(0% - 5% impervious) 2.31 cfs/Ac
(100% impervious) 4.75 cfs/Ac
100 year - 20 minute storm
(0% - 5% impervious) 2.95 cfs/Ac
(100% impervious) 6.08 cfs/Ac

STATE OF MISSOURI
SCOTT D. KOLKMEYER
NUMBER
E-24744
PROFESSIONAL ENGINEER

BAX ENGINEERING CO., INC.
1052 South Cloverleaf Drive
St. Peters, MO 63376-6445
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STORMWATER DETENTION ANALYSIS
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4) The required attenuation due to proposed development of the project site is:

A. West Subwatershed

Pre-Developed runoff (25 year - 20 minute storm)

8.86 Ac

Onsite: (2.56 Ac) (2.31 c.f.s./Ac) = 5.91c.f.s
*Offsite: (6.3 Ac) (4.75 c.f.s./Ac) = 29.93 c.f.s.
$Q_{25/20}$ - Pre = 35.84 c.f.s

Pre-Developed runoff (100 year - 20 minute storm)

Onsite: (2.56 Ac) (2.95 c.f.s./Ac) = 7.55 c.f.s
*Offsite: (6.3 Ac) (6.08 c.f.s./Ac) = 38.30 c.f.s
$Q_{100/20}$ - Pre = 45.85 c.f.s

Post-Developed runoff (25 year - 20 minute storm) (I) - Site Partially Developed.

Onsite: (1.11 Ac.) (4.75 c.f.s./Ac) = 5.27 c.f.s.
(1.35 Ac)(2.31 c.f.s./Ac) = 3.12 c.f.s.

8.76 Ac

*Offsite: (6.3 Ac) (4.75 c.f.s./Ac) = 29.93 c.f.s.
$Q_{25/20}$ - Post I = 38.32 c.f.s.

Post-Developed runoff (100 year - 20 minute storm) (I) - Site Partially Developed.

Onsite: (1.11 Ac.) (6.08 c.f.s./Ac) = 6.74 c.f.s.
(1.35 Ac) (2.95 c.f.s./Ac) = 3.98 c.f.s.

*Offsite: (6.3 Ac) (6.08 c.f.s./Ac) = 38.30 c.f.s.
$Q_{100/20}$ - Post I = 49.04 c.f.s.

*Offsite Q Calculated from U.S.G.S. Map.

<u>Post-Developed runoff (25 year - 20 minute storm) (II) - Site Fully Developed.</u>

Onsite: (3.46 Ac.) (4.75 c.f.s./Ac) = 16.44 c.f.s. 14.68
(1.35 Ac) (2.31 c.f.s./Ac) = 3.12 c.f.s.

*Offsite: (6.3 Ac) (4.75 c.f.s./Ac) = <u>29.93 c.f.s.</u>
$Q_{25/20}$ - Post II = 49.49 c.f.s.

<u>Post-Developed runoff (100 year - 20 minute storm) (II) - Site Fully Developed.</u>

Onsite: (3.46 Ac.) (6.08 c.f.s./Ac) = 21.04 c.f.s. 3.09 x 6.08 = 18.81
(1.35 Ac) (2.95 c.f.s./Ac) = 3.98 c.f.s.

*Offsite: (6.3 Ac) (6.08 c.f.s./Ac) = <u>38.30 c.f.s.</u>
$Q_{100/20}$ - Post II = 63.32 c.f.s. 61.09

<u>Required Attenuation:</u>
25 year - 20 minute storm
49.49 c.f.s - 35.84 c.f.s. = 13.65 c.f.s. 47.73 - 35.84 = 11.89
100 year - 20 minute storm
63.32 c.f.s. - 45.85 c.f.s. = 17.47 c.f.s. 61.09 - 45.85 = 15.24

B. East subwatershed

<u>Pre-Developed runoff (25 year - 20 minute storm)</u>

Onsite: (3.02 Ac) (2.31 c.f.s./Ac) = 6.98 c.f.s.

<u>Pre-Developed runoff (100 year - 20 minute storm)</u>

Onsite: (3.02 Ac) (2.95 c.f.s./Ac) = 8.91 c.f.s.

*Offsite Q Calculated from U.S.G.S. Map.

Post-Developed runoff (25 year - 20 minute storm) (II) - Site Fully Developed.

Onsite: (.55 Ac) (4.75 c.f.s./Ac) = 2.61 c.f.s.

Post-Developed runoff (100 year - 20 minute storm) (II) - Site Fully Developed.

Onsite: (.55 Ac) (6.08 c.f.s./Ac) = 3.34 c.f.s.

25 year - 20 minute storm
2.61 c.f.s. <6.98 c.f.s.

100 year - 20 minute storm
3.34 c.f.s. <8.91 c.f.s.

Therefore, no detention is required.

5) Of the flows which inflow to the proposed detention basin, the most remote point of origin lies offsite to the Northwest. Offsite time of travel will be conservatively estimated as shown below. Onsite the water will flow an additonal 220 feet via the storm sewer system to the detention basin. The time of concentration is therefore estimated as follows:

A. T_{T220}: L = 220 at an estimated velocity of 7ft/sec.
T_{T220} = 220/7ft/sec = 33.57 sec. = .56 min.

Note: We will conservatively assume T_c = 1 min. Since no information regarding offsite time of travel was available.

6) The permitted release rate of the detention basin will be equal to the pre-developed runoff rate less the amount of direct runoff which bypasses basin.

25 year - 20 minute storm:
Permitted release rate = 35.84 c.f.s. - (.22 Ac) (2.31 c.f.s./Ac) = 35.33 c.f.s.

100 year - 20 minute storm
Permitted release rate: 45.86 c.f.s - (.22 Ac) (2.75 c.f.s./Ac) = 45.21 c.f.s.

*.22 Ac bypasses basin.

Routing Calculations and Results:

A computer program "Pondpack" was utilitzed in routing the design storms through the basin. As found in the routing calculations, the results of each analysis are as follows:

25 year - 20 minute storm:
Peak release rate = 33.75 (< 35.33 c.f.s.)
Peak elevation = 492.20

100 year - 20 minute storm:
Peak release rate = 40.39 (<45.21 c.f.s.)
Peak elevation = 492.88

Detention Basin Characteristics Summary:

25 year - 20 minute storm highwater = 492.20
100 year - 20 minute storm highwater = 492.88

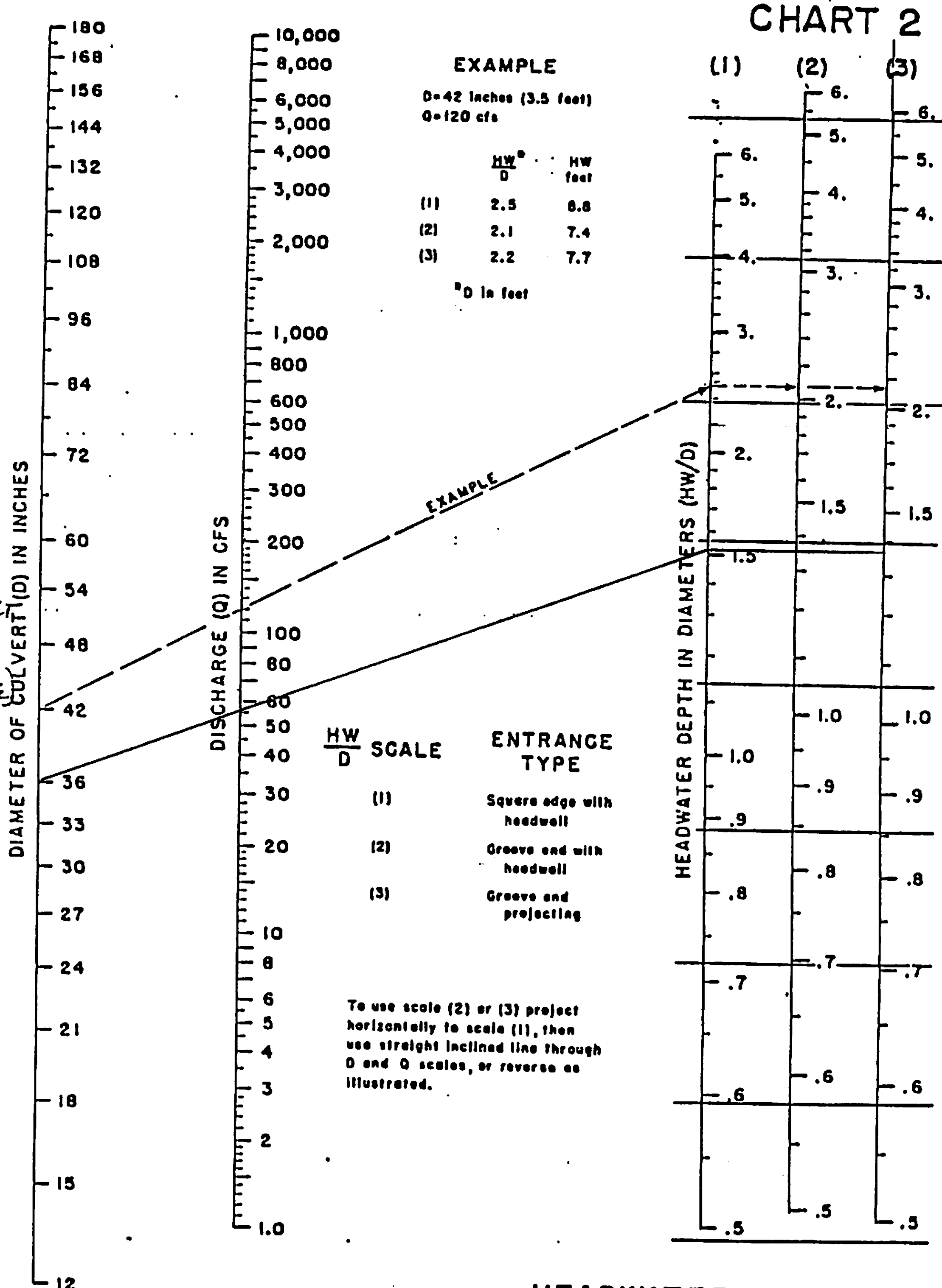
Overflow Structure:
48" Standard grated inlet
Flowline of pipe (out 36" diameter) = 488.30
Flowline of low flow slot I - (12"w x 24"h) = 488.50
Flowline of low flow slot II - (19"w x 38"h) = 488.50
Flowline of emergency overflow = 493.03
Top of berm = 495.0

**Note: I - This opening size is for the structure before the site is fully developed.
II - This opening size is for the structure when the site is fully developed.

BAX ENGINEERING

SHEET ____ of ____
Project: O'FALLON BUSINESS PARK
Date: 7/8/96 Project No: 95-794
Designed: ________ Checked: ________

CHART 2



FL OUT OF STRUCT
488.3 + 1/2
PIPE DIA = (36/2)(1/12)
= 3' + H.W.

= 488.3 + 1.5' + 4.14
= 493.94 < 495

HW/D = 1.38
HW = 4.14

HEADWATER SCALES 2&3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR
CONCRETE PIPE CULVERTS
WITH INLET CONTROL

1052 South Cloverleaf Drive
St. Peters, MO 63376-6445
314-928-5552 FAX 928-1718

POND-2 Version: 5.17 S/N:

›››››› HYDROGRAPH PRINTOUT ‹‹‹‹‹‹

08-02-1996   05:05:11

Hydrograph file: OFPK25-1.HYD

HYDROGRAPH ORDINATES (cfs)
Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	38.32	38.32	38.32	38.32	38.32	38.32
7.00	38.32	38.32	38.32	38.32	38.32	38.32	38.32
14.00	38.32	38.32	38.32	38.32	38.32	38.32	38.32
21.00	0.00						

POND-2 Version: 5.17
S/N:

O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 1, 1996

CALCULATED 08-02-1996 05:05:34
DISK FILE: OFPARK .VOL

Planimeter scale: 1 inch = 30 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
488.50	0.00	0.00	0.00	0.00	0.00
490.00	12.58	0.26	0.26	0.13	0.13
492.00	15.49	0.32	0.87	0.58	0.71
494.00	18.88	0.39	1.06	0.71	1.42
495.00	19.84	0.41	1.20	0.40	1.82

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

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

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

Outlet Structure File: OFPARK1 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

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

Elevation (ft)	Q (cfs)	Contributing Structures
488.50	0.0	1
488.70	0.3	1
488.90	0.8	1
489.10	1.4	1
489.30	2.1	1
489.50	0.0	2
489.70	3.9	1
489.90	5.0	1
490.10	6.1	1
490.30	7.2	1
490.50	8.5	1
490.70	9.8	1
490.90	11.2	1
491.10	12.2	2
491.30	12.9	2
491.50	13.6	2
491.70	14.3	2
491.90	14.9	2
492.10	15.5	2
492.30	16.1	2
492.50	16.7	2
492.70	17.2	2
492.90	17.8	2
493.10	45.3	2 +3
493.30	56.5	2 +3
493.50	68.8	2 +3
493.70	82.2	2 +3
493.90	96.5	2 +3
494.10	111.7	2 +3
494.30	127.8	2 +3
494.50	144.6	2 +3
494.70	162.2	2 +3
494.90	180.5	2 +3
495.00	0.0	

Outlet Structure File: OFPARK1 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

Outlet Structure File: OFPARK1 .STR
Planimeter Input File: OFPARK .VOL
Rating Table Output File: OFPARK1 .PND

Min. Elev.(ft) = 488.5 Max. Elev.(ft) = 495 Incr.(ft) = .2

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	1		->	1
ORIFICE	2	? 1	->	A
WEIR-VR	3		->	3

Outflow rating table summary was stored in file:
OFPARK1 .PND

Outlet Structure File: OFPARK1 .STR

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

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****************************************
        O'FALLON BUSINESS PARK
          DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
             JULY 8, 1996
****************************************
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```
     >>>>>> Structure No. 1 <<<<<<
            (Input Data)

      WEIR-VR
      Weir - Vertical Rectangular


      E1 elev.(ft)?           488.50
      E2 elev.(ft)?           495.00
      Weir coefficient?       3
      Weir elev.(ft)?         488.50
      Length (ft)?            1.0
      Contracted/Suppressed (C/S)?  S
```

Outlet Structure File: OFPARK1 .STR

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

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O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
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›››››› Structure No. 2 ‹‹‹‹‹‹
(Input Data)

ORIFICE
Orifice - Based on Area and Datum Elevation

E1 elev.(ft)?	489.50
E2 elev.(ft)?	495.00
Orifice coeff.?	0.6
Invert elev.(ft)?	488.50
Datum elev.(ft) ?	489.50
Orifice area (sq ft)?	2.00

Outlet Structure File: OFPARK1 .STR

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

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***************************************
        O'FALLON BUSINESS PARK
          DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
             JULY 8, 1996
***************************************
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>>>>>> Structure No. 3 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	493.01
E2 elev.(ft)?	495.00
Weir coefficient?	3
Weir elev.(ft)?	492.30
Length (ft)?	12.57
Contracted/Suppressed (C/S)?	S

Date Executed Time Executed

[illegible] BUSINESS [illegible]
[illegible] ANALYSIS
PREPARED BY: MAY ENGINEERING CO., INC
JULY 8, 1996
****

INPUT DATA

WEIR-[illegible]

E1 elev.(ft) 489.91
E2 elev.(ft) 495.00
Weir coefficient 3
[illegible]

Outlet Structure File: OFPARK1 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

Outflow Rating Table for Structure #1
WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
488.50	0.0	H =0.0
488.70	0.3	H =.2
488.90	0.8	H =.4
489.10	1.4	H =.6
489.30	2.1	H =.8
489.50	3.0	H =1.0
489.70	3.9	H =1.2
489.90	5.0	H =1.4
490.10	6.1	H =1.6
490.30	7.2	H =1.8
490.50	8.5	H =2.0
490.70	9.8	H =2.2
490.90	11.2	H =2.4
491.10	12.6	H =2.6
491.30	14.1	H =2.8
491.50	15.6	H =3.0
491.70	17.2	H =3.2
491.90	18.8	H =3.4
492.10	20.5	H =3.6
492.30	22.2	H =3.8
492.50	24.0	H =4.0
492.70	25.8	H =4.2
492.90	27.7	H =4.4
493.10	29.6	H =4.6
493.30	31.5	H =4.8
493.50	33.5	H =5.0
493.70	35.6	H =5.2
493.90	37.6	H =5.4
494.10	39.8	H =5.6
494.30	41.9	H =5.8
494.50	44.1	H =6.0
494.70	46.3	H =6.2
494.90	48.6	H =6.4
495.00	0.0	E = or > E2=495.00

C = 3 L (ft) = 1
H (ft) = Table elev. - Invert elev. (488.5 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Date Executed: Time Executed:

DETENTION ANALYSIS

PREPARED BY BAY ENGINEERING CO., INC.

JULY 8, 1996

Rating Table for Structure #1

Weir - Vertical Rectangular

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

[illegible]

Outlet Structure File: OFPARK1 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

Outflow Rating Table for Structure #2
ORIFICE Orifice - Based on Area and Datum Elevation

Elevation (ft)	Q (cfs)	Computation Messages
488.50	0.0	E < E1=489.50
488.70	0.0	E < E1=489.50
488.90	0.0	E < E1=489.50
489.10	0.0	E < E1=489.50
489.30	0.0	E < E1=489.50
489.50	0.0	H =0.0
489.70	4.3	H =.2
489.90	6.1	H =.4
490.10	7.5	H =.6
490.30	8.6	H =.8
490.50	9.6	H =1.0
490.70	10.5	H =1.2
490.90	11.4	H =1.4
491.10	12.2	H =1.6
491.30	12.9	H =1.8
491.50	13.6	H =2.0
491.70	14.3	H =2.2
491.90	14.9	H =2.4
492.10	15.5	H =2.6
492.30	16.1	H =2.8
492.50	16.7	H =3.0
492.70	17.2	H =3.2
492.90	17.8	H =3.4
493.10	18.3	H =3.6
493.30	18.8	H =3.8
493.50	19.3	H =4.0
493.70	19.7	H =4.2
493.90	20.2	H =4.4
494.10	20.7	H =4.6
494.30	21.1	H =4.8
494.50	21.5	H =5.0
494.70	22.0	H =5.2
494.90	22.4	H =5.4
495.00	0.0	E = or > E2=495.00

C = .6 A = 2 sq.ft.
H (ft) = Table elev. - Datum elev. (489.5 ft)
Q (cfs) = C * A * sqr(2g * H)

[illegible]

DATE EXECUTED: TIME EXECUTED:

[illegible]

PREPARED BY: AAA ENGINEERING CO., INC

JULY 2, 1996

****

[illegible]

ORIFICE --BASED ON AREA AND DATUM ELEVATION

ELEVATION	FLOW (CFS)	[illegible]
[illegible]	[illegible]	[illegible]

Outlet Structure File: OFPARK1 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

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

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

Elevation (ft)	Q (cfs)	Computation Messages
488.50	0.0	E < Inv.El.= 492.3
488.70	0.0	E < Inv.El.= 492.3
488.90	0.0	E < Inv.El.= 492.3
489.10	0.0	E < Inv.El.= 492.3
489.30	0.0	E < Inv.El.= 492.3
489.50	0.0	E < Inv.El.= 492.3
489.70	0.0	E < Inv.El.= 492.3
489.90	0.0	E < Inv.El.= 492.3
490.10	0.0	E < Inv.El.= 492.3
490.30	0.0	E < Inv.El.= 492.3
490.50	0.0	E < Inv.El.= 492.3
490.70	0.0	E < Inv.El.= 492.3
490.90	0.0	E < Inv.El.= 492.3
491.10	0.0	E < Inv.El.= 492.3
491.30	0.0	E < Inv.El.= 492.3
491.50	0.0	E < Inv.El.= 492.3
491.70	0.0	E < Inv.El.= 492.3
491.90	0.0	E < Inv.El.= 492.3
492.10	0.0	E < Inv.El.= 492.3
492.30	0.0	E < E1=493.01
492.50	0.0	E < E1=493.01
492.70	0.0	E < E1=493.01
492.90	0.0	E < E1=493.01
493.10	27.0	H =.8
493.30	37.7	H =1.0
493.50	49.6	H =1.2
493.70	62.5	H =1.4
493.90	76.3	H =1.6
494.10	91.1	H =1.8
494.30	106.7	H =2.0
494.50	123.1	H =2.2
494.70	140.2	H =2.4
494.90	158.1	H =2.6
495.00	0.0	E = or > E2=495.00

C = 3 L (ft) = 12.57
H (ft) = Table elev. - Invert elev. (492.3 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Date Executed: Time Executed:

PREPARED BY: ... ENGINEERING CO., INC.
JUNE 6, 1990
****

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

PRINTED IN U.S.A.

Outlet Structure File: OFPARK1 .STR

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

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O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

Outflow Rating Table A
Table A = 1 ? 2

Elevation (ft)	Q (cfs)	Contributing Structures
488.50	0.0	1
488.70	0.3	1
488.90	0.8	1
489.10	1.4	1
489.30	2.1	1
489.50	0.0	2
489.70	3.9	1
489.90	5.0	1
490.10	6.1	1
490.30	7.2	1
490.50	8.5	1
490.70	9.8	1
490.90	11.2	1
491.10	12.2	2
491.30	12.9	2
491.50	13.6	2
491.70	14.3	2
491.90	14.9	2
492.10	15.5	2
492.30	16.1	2
492.50	16.7	2
492.70	17.2	2
492.90	17.8	2
493.10	18.3	2
493.30	18.8	2
493.50	19.3	2
493.70	19.7	2
493.90	20.2	2
494.10	20.7	2
494.30	21.1	2
494.50	21.5	2
494.70	22.0	2
494.90	22.4	2
495.00	0.0	-

O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 2, 1996

Inflow Hydrograph: OFPK25-1.HYD
Rating Table file: OFPARK1 .PND

----INITIAL CONDITIONS----
Elevation = 488.50 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
488.50	0.0	0.000	0.0	0.0
488.70	0.3	0.000	0.5	0.8
488.90	0.8	0.002	3.6	4.4
489.10	1.4	0.008	12.1	13.5
489.30	2.1	0.020	28.6	30.7
489.70	3.9	0.067	96.6	100.5
489.90	5.0	0.106	153.4	158.4
490.10	6.1	0.156	226.6	232.7
490.30	7.2	0.209	303.8	311.0
490.50	8.5	0.264	382.6	391.1
490.70	9.8	0.319	463.2	473.0
490.90	11.2	0.376	545.4	556.6
491.10	12.2	0.433	629.4	641.6
491.30	12.9	0.493	715.1	728.0
491.50	13.6	0.553	802.6	816.2
491.70	14.3	0.614	891.9	906.2
491.90	14.9	0.677	983.0	997.9
492.10	15.5	0.741	1076.0	1091.5
492.30	16.1	0.806	1170.9	1187.0
492.50	16.7	0.873	1267.7	1284.4
492.70	17.2	0.941	1366.6	1383.8
492.90	17.8	1.011	1467.4	1485.2
493.10	45.3	1.081	1570.3	1615.6
493.30	56.5	1.154	1675.2	1731.7
493.50	68.8	1.227	1782.1	1850.9
493.70	82.2	1.302	1891.2	1973.4
493.90	96.5	1.379	2002.3	2098.8
494.10	111.7	1.457	2115.5	2227.2
494.30	127.8	1.536	2229.9	2357.7
494.50	144.6	1.615	2345.5	2490.1
494.70	162.2	1.696	2462.2	2624.4

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DISK FILES: OFPK25-1.HYD ; OFPARK1 .PND

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
494.90	180.5	1.777	2580.1	2760.6

Time increment (t) = 1.0 min.

EXECUTED: 08-02-1996 05:06:24

Pond File: OFPARK1 .PND
Inflow Hydrograph: OFPK25-1.HYD
Outflow Hydrograph: 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	488.50
1.0	38.32	38.3	33.7	38.3	2.30	489.34
2.0	38.32	76.6	102.2	110.4	4.09	489.73
3.0	38.32	76.6	168.2	178.8	5.30	489.95
4.0	38.32	76.6	232.3	244.9	6.27	490.13
5.0	38.32	76.6	294.6	309.0	7.17	490.29
6.0	38.32	76.6	354.9	371.3	8.18	490.45
7.0	38.32	76.6	413.3	431.5	9.14	490.60
8.0	38.32	76.6	469.7	489.9	10.08	490.74
9.0	38.32	76.6	524.3	546.4	11.03	490.88
10.0	38.32	76.6	577.5	601.0	11.72	491.00
11.0	38.32	76.6	629.6	654.2	12.30	491.13
12.0	38.32	76.6	680.7	706.2	12.72	491.25
13.0	38.32	76.6	731.1	757.4	13.13	491.37
14.0	38.32	76.6	780.7	807.8	13.53	491.48
15.0	38.32	76.6	829.5	857.3	13.92	491.59
16.0	38.32	76.6	877.5	906.1	14.30	491.70
17.0	38.32	76.6	924.9	954.2	14.61	491.80
18.0	38.32	76.6	971.7	1001.6	14.92	491.91
19.0	38.32	76.6	1017.9	1048.4	15.22	492.01
20.0	38.32	76.6	1063.5	1094.6	15.52	492.11
21.0	0.00	38.3	1070.7	1101.9	15.57	492.12

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

Pond File: OFPARK1 .PND
Inflow Hydrograph: OFPK25-1.HYD
Outflow Hydrograph: OUT .HYD

Starting Pond W.S. Elevation = 488.50 ft

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

Peak Inflow = 38.32 cfs
Peak Outflow = 15.57 cfs
Peak Elevation = 492.12 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.75 ac-ft

Total Storage in Pond	=	0.75 ac-ft

Pond File: OFPARK1 .PND
Inflow Hydrograph: OFPK25-1.HYD
Outflow Hydrograph: OUT   .HYD

EXECUTED: 08-02-1996
05:06:24

Peak Inflow   =   38.32 cfs
Peak Outflow   =   15.57 cfs
Peak Elevation =   492.12 ft

```
                                                            Flow (cfs)
       0.0   4.0   8.0  12.0  16.0  20.0  24.0  28.0  32.0  36.0  40.0  44.0
       .------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-
       |
 1.0  -|   X                                                     *
       |     X                                                   *
 2.0  -|      X                                                  *
       |       X                                                 *
 3.1  -|        X                                                *
       |         X                                               *
 4.1  -|         X                                               *
       |          X                                              *
 5.1  -|           X                                             *
       |            X                                            *
 6.1  -|            X                                            *
       |             X                                           *
 7.1  -|              X                                          *
       |              X                                          *
 8.2  -|               X                                         *
       |                X                                        *
 9.2  -|                 X                                       *
       |                 X                                       *
10.2  -|                  X                                      *
       |                  X                                      *
11.2  -|                  X                                      *
       |                   X                                     *
12.2  -|                   X                                     *
       |                   X                                     *
13.3  -|                    X                                    *
       |                    X                                    *
14.3  -|                    X                                    *
       |                     X                                   *
15.3  -|                     X                                   *
       |                     X                                   *
16.3  -|                     X                                   *
       |                      X                                  *
17.3  -|                      X                                  *
       |                      X                                  *
18.4  -|                      X                                  *
       |                       X                                 *
19.4  -|                       X                                 *
       |                       X                                 *
       |
     TIME
     (min)
```

X File: OFPK25-1.HYD   Qmax =   15.6 cfs
* File: OUT   .HYD   Qmax =   38.3 cfs

Inflow Hydrograph: [illegible]-1.HYD
Outflow Hydrograph OUT [illegible].HYD

EXECUTED: 08-03-1990

Flow (cfs)

0.0 4.0 8.0 12.0 16.0 20.0 24.0 28.0 32.0 36.0 40.0 44.0

POND-2 Version: 5.17 S/N:

>>>>> HYDROGRAPH PRINTOUT <<<<<

08-02-1996   05:07:05

Hydrograph file: OPPK25-2.HYD

HYDROGRAPH ORDINATES (cfs)

Time increment = 1.00 Minutes

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

Time Minutes							
0.00	0.00	49.49	49.49	49.49	49.49	49.49	49.49
7.00	49.49	49.49	49.49	49.49	49.49	49.49	49.49
14.00	49.49	49.49	49.49	49.49	49.49	49.49	49.49
21.00	0.00						

Outlet Structure File: OFPARK2 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

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

Elevation (ft)	Q (cfs)	Contributing Structures
488.50	0.0	1
488.70	0.4	1
488.90	1.2	1
489.10	2.2	1
489.30	3.4	1
489.50	4.7	1
489.70	6.2	1
489.90	7.9	1
490.10	3.1	2
490.30	11.2	2
490.50	13.4	1
490.70	15.5	1
490.90	17.7	1
491.10	19.9	1
491.30	22.3	1
491.50	24.7	1
491.70	27.2	1
491.90	29.8	1
492.10	32.4	1
492.30	35.2	1
492.50	37.5	2
492.70	39.1	2
492.90	40.5	2
493.10	41.9	2
493.30	43.3	2
493.50	44.6	2
493.70	45.9	2
493.90	47.2	2
494.10	48.4	2
494.30	49.6	2
494.50	50.7	2
494.70	51.9	2
494.90	53.0	2
495.00	0.0	

Outlet Structure File: OFPARK2 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

Outlet Structure File: OFPARK2 .STR
Planimeter Input File: OFPARK .VOL
Rating Table Output File: OFPARK2 .PND

Min. Elev.(ft) = 488.5 Max. Elev.(ft) = 495 Incr.(ft) = .2

Additional elevations (ft) to be included in table:
* *

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	1		->	1
ORIFICE	2	? 1	->	A
WEIR-VR	3		->	3

Outflow rating table summary was stored in file:
OFPARK2 .PND

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Outlet Structure File: OFPARK2 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

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

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	488.50
E2 elev.(ft)?	495.00
Weir coefficient?	3
Weir elev.(ft)?	488.50
Length (ft)?	1.5833
Contracted/Suppressed (C/S)?	S

Date Executed: [illegible] Time Executed: [illegible]

FALCON BUSINESS PARK

DETENTION ANALYSIS

[illegible] ENGINEERING CO., INC.

JULY 8, [illegible]

Input Data

[illegible]

Q1 discharge [illegible] 498.00

Q2 discharge [illegible] 493.00

Weir coefficient [illegible] 3

Weir area [illegible]

Weir length [illegible]

Contraction [illegible]

Outlet Structure File: OFPARK2 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

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

ORIFICE
Orifice - Based on Area and Datum Elevation

E1 elev.(ft)?	490.0833
E2 elev.(ft)?	495.00
Orifice coeff.?	0.6
Invert elev.(ft)?	488.50
Datum elev.(ft) ?	490.0833
Orifice area (sq ft)?	5.01368

DATE EXECUTED: [illegible] TIME EXECUTED

[illegible]

PREPARED BY: [illegible] ENGINEERING CO., INC.
JULY 8, 1996

[illegible]

OUTLIER [illegible]

[illegible]

Outlet Structure File: OFPARK2 .STR

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

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****************************************
        O'FALLON BUSINESS PARK
          DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
             JULY 8, 1996
****************************************
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>>>>>> Structure No. 3 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	493.01
E2 elev.(ft)?	495.00
Weir coefficient?	3
Weir elev.(ft)?	495.00
Length (ft)?	12.57
Contracted/Suppressed (C/S)?	S

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Outlet Structure File: OFPARK2 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

Outflow Rating Table for Structure #1
WEIR-VR   Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
488.50	0.0	H =0.0
488.70	0.4	H =.2
488.90	1.2	H =.4
489.10	2.2	H =.6
489.30	3.4	H =.8
489.50	4.7	H =1.0
489.70	6.2	H =1.2
489.90	7.9	H =1.4
490.10	9.6	H =1.6
490.30	11.5	H =1.8
490.50	13.4	H =2.0
490.70	15.5	H =2.2
490.90	17.7	H =2.4
491.10	19.9	H =2.6
491.30	22.3	H =2.8
491.50	24.7	H =3.0
491.70	27.2	H =3.2
491.90	29.8	H =3.4
492.10	32.4	H =3.6
492.30	35.2	H =3.8
492.50	38.0	H =4.0
492.70	40.9	H =4.2
492.90	43.8	H =4.4
493.10	46.9	H =4.6
493.30	50.0	H =4.8
493.50	53.1	H =5.0
493.70	56.3	H =5.2
493.90	59.6	H =5.4
494.10	62.9	H =5.6
494.30	66.3	H =5.8
494.50	69.8	H =6.0
494.70	73.3	H =6.2
494.90	76.9	H =6.4
495.00	0.0	E = or > E2=495.00

C = 3   L (ft) = 1.5833
H (ft) = Table elev. - Invert elev. (488.5 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

JULY 8, 1996

Outlet Structure File: OFPARK2 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

Outflow Rating Table for Structure #2
ORIFICE　　Orifice - Based on Area and Datum Elevation

Elevation (ft)	Q (cfs)	Computation Messages
488.50	0.0	E < E1=490.0833
488.70	0.0	E < E1=490.0833
488.90	0.0	E < E1=490.0833
489.10	0.0	E < E1=490.0833
489.30	0.0	E < E1=490.0833
489.50	0.0	E < E1=490.0833
489.70	0.0	E < E1=490.0833
489.90	0.0	E < E1=490.0833
490.10	3.1	H =.017
490.30	11.2	H =.217
490.50	15.6	H =.417
490.70	19.0	H =.617
490.90	21.8	H =.817
491.10	24.3	H =1.017
491.30	26.6	H =1.217
491.50	28.7	H =1.417
491.70	30.7	H =1.617
491.90	32.5	H =1.817
492.10	34.3	H =2.017
492.30	35.9	H =2.217
492.50	37.5	H =2.417
492.70	39.1	H =2.617
492.90	40.5	H =2.817
493.10	41.9	H =3.017
493.30	43.3	H =3.217
493.50	44.6	H =3.417
493.70	45.9	H =3.617
493.90	47.2	H =3.817
494.10	48.4	H =4.017
494.30	49.6	H =4.217
494.50	50.7	H =4.417
494.70	51.9	H =4.617
494.90	53.0	H =4.817
495.00	0.0	E = or > E2=495.00

C = .6　　A = 5.01368 sq.ft.
H (ft) = Table elev. - Datum elev. (490.0833 ft)
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: OFPARK2 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

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

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

Elevation (ft)	Q (cfs)	Computation Messages
488.50	0.0	E < Inv.El.= 495
488.70	0.0	E < Inv.El.= 495
488.90	0.0	E < Inv.El.= 495
489.10	0.0	E < Inv.El.= 495
489.30	0.0	E < Inv.El.= 495
489.50	0.0	E < Inv.El.= 495
489.70	0.0	E < Inv.El.= 495
489.90	0.0	E < Inv.El.= 495
490.10	0.0	E < Inv.El.= 495
490.30	0.0	E < Inv.El.= 495
490.50	0.0	E < Inv.El.= 495
490.70	0.0	E < Inv.El.= 495
490.90	0.0	E < Inv.El.= 495
491.10	0.0	E < Inv.El.= 495
491.30	0.0	E < Inv.El.= 495
491.50	0.0	E < Inv.El.= 495
491.70	0.0	E < Inv.El.= 495
491.90	0.0	E < Inv.El.= 495
492.10	0.0	E < Inv.El.= 495
492.30	0.0	E < Inv.El.= 495
492.50	0.0	E < Inv.El.= 495
492.70	0.0	E < Inv.El.= 495
492.90	0.0	E < Inv.El.= 495
493.10	0.0	E < Inv.El.= 495
493.30	0.0	E < Inv.El.= 495
493.50	0.0	E < Inv.El.= 495
493.70	0.0	E < Inv.El.= 495
493.90	0.0	E < Inv.El.= 495
494.10	0.0	E < Inv.El.= 495
494.30	0.0	E < Inv.El.= 495
494.50	0.0	E < Inv.El.= 495
494.70	0.0	E < Inv.El.= 495
494.90	0.0	E < Inv.El.= 495
495.00	0.0	E = or > E2=495.00

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Outlet Structure File: OFPARK2 .STR

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

****
O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
JULY 8, 1996
****

Outflow Rating Table A
Table A = 1 ? 2

Elevation (ft)	Q (cfs)	Contributing Structures
488.50	0.0	1
488.70	0.4	1
488.90	1.2	1
489.10	2.2	1
489.30	3.4	1
489.50	4.7	1
489.70	6.2	1
489.90	7.9	1
490.10	3.1	2
490.30	11.2	2
490.50	13.4	1
490.70	15.5	1
490.90	17.7	1
491.10	19.9	1
491.30	22.3	1
491.50	24.7	1
491.70	27.2	1
491.90	29.8	1
492.10	32.4	1
492.30	35.2	1
492.50	37.5	2
492.70	39.1	2
492.90	40.5	2
493.10	41.9	2
493.30	43.3	2
493.50	44.6	2
493.70	45.9	2
493.90	47.2	2
494.10	48.4	2
494.30	49.6	2
494.50	50.7	2
494.70	51.9	2
494.90	53.0	2
495.00	0.0	-

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********************************************
*                                          *
*        O'FALLON BUSINESS PARK            *
*          DETENTION ANALYSIS              *
*  PREPARED BY: BAX ENGINEERING CO., INC.  *
*            AUGUST 2, 1996                *
*                                          *
********************************************
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Inflow Hydrograph: OFPK25-2.HYD
Rating Table file: OFPARK2 .PND

----INITIAL CONDITIONS----
Elevation = 488.50 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
488.50	0.0	0.000	0.0	0.0
488.70	0.4	0.000	0.5	0.9
488.90	1.2	0.002	3.6	4.8
489.10	2.2	0.008	12.1	14.3
489.30	3.4	0.020	28.6	32.0
489.50	4.7	0.039	55.9	60.6
489.70	6.2	0.067	96.6	102.8
489.90	7.9	0.106	153.4	161.3
490.10	3.1	0.156	226.6	229.7
490.30	11.2	0.209	303.8	315.0
490.50	13.4	0.264	382.6	396.0
490.70	15.5	0.319	463.2	478.7
490.90	17.7	0.376	545.4	563.1
491.10	19.9	0.433	629.4	649.3
491.30	22.3	0.493	715.1	737.4
491.50	24.7	0.553	802.6	827.3
491.70	27.2	0.614	891.9	919.1
491.90	29.8	0.677	983.0	1012.8
492.10	32.4	0.741	1076.0	1108.4
492.30	35.2	0.806	1170.9	1206.1
492.50	37.5	0.873	1267.7	1305.2
492.70	39.1	0.941	1366.6	1405.7
492.90	40.5	1.011	1467.4	1507.9
493.10	41.9	1.081	1570.3	1612.2
493.30	43.3	1.154	1675.2	1718.5
493.50	44.6	1.227	1782.1	1826.7
493.70	45.9	1.302	1891.2	1937.1
493.90	47.2	1.379	2002.3	2049.5
494.10	48.4	1.457	2115.5	2163.9
494.30	49.6	1.536	2229.9	2279.5
494.50	50.7	1.615	2345.5	2396.2

DISK FILES: OFPK25-2.HYD ; OFPARK2 .PND

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
494.70	51.9	1.696	2462.2	2514.1
494.90	53.0	1.777	2580.1	2633.1

Time increment (t) = 1.0 min.

EXECUTED: 08-02-1996 05:07:56

Pond File: OFPARK2 .PND
Inflow Hydrograph: OFPK25-2.HYD
Outflow Hydrograph: OUT .HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - 0 (cfs)	2S/t + 0 (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	488.50
1.0	49.49	49.5	41.1	49.5	4.19	489.42
2.0	49.49	99.0	125.5	140.1	7.28	489.83
3.0	49.49	99.0	217.6	224.5	3.47	490.08
4.0	49.49	99.0	294.1	316.5	11.24	490.30
5.0	49.49	99.0	366.4	393.0	13.32	490.49
6.0	49.49	99.0	435.1	465.4	15.16	490.67
7.0	49.49	99.0	500.1	534.0	16.94	490.83
8.0	49.49	99.0	561.9	599.1	18.62	490.98
9.0	49.49	99.0	620.4	660.9	20.22	491.13
10.0	49.49	99.0	675.8	719.4	21.81	491.26
11.0	49.49	99.0	728.2	774.8	23.30	491.38
12.0	49.49	99.0	777.8	827.2	24.70	491.50
13.0	49.49	99.0	824.7	876.8	26.05	491.61
14.0	49.49	99.0	869.0	923.6	27.33	491.71
15.0	49.49	99.0	910.9	968.0	28.55	491.80
16.0	49.49	99.0	950.4	1009.8	29.72	491.89
17.0	49.49	99.0	987.8	1049.4	30.79	491.98
18.0	49.49	99.0	1023.2	1086.8	31.81	492.05
19.0	49.49	99.0	1056.5	1122.1	32.79	492.13
20.0	49.49	99.0	1088.0	1155.5	33.75	492.20
21.0	0.00	49.5	1071.0	1137.5	33.23	492.16

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

Pond File: OFPARK2 .PND
Inflow Hydrograph: OFPK25-2.HYD
Outflow Hydrograph: OUT .HYD

Starting Pond W.S. Elevation = 488.50 ft

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

Peak Inflow = 49.49 cfs
Peak Outflow = 33.75 cfs
Peak Elevation = 492.20 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.77 ac-ft

Total Storage in Pond	=	0.77 ac-ft

Pond File: OFPARK2 .PND
Inflow Hydrograph: OFPK25-2.HYD
Outflow Hydrograph: OUT   .HYD

EXECUTED: 08-02-1996
05:07:56

Peak Inflow   =   49.49 cfs
Peak Outflow   =   33.75 cfs
Peak Elevation =   492.20 ft

```
                                                               Flow (cfs)
       0.0   5.0  10.0  15.0  20.0  25.0  30.0  35.0  40.0  45.0  50.0  55.0
       .------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-
       |
  1.0 -|     X                                                     *
       |       X                                                   *
  2.0 -|         X                                                 *
       |      X                                                    *
  3.1 -|    X                                                      *
       |         X                                                 *
  4.1 -|             X                                             *
       |               X                                           *
  5.1 -|                X                                          *
       |                 X                                         *
  6.1 -|                  X                                        *
       |                   X                                       *
  7.1 -|                    X                                      *
       |                     X                                     *
  8.2 -|                      X                                    *
       |                       X                                   *
  9.2 -|                        X                                  *
       |                         X                                 *
 10.2 -|                          X                                *
       |                           X                               *
 11.2 -|                            X                              *
       |                             X                             *
 12.2 -|                              X                            *
       |                              X                            *
 13.3 -|                               X                           *
       |                                X                          *
 14.3 -|                                 X                         *
       |                                  X                        *
 15.3 -|                                  X                        *
       |                                   X                       *
 16.3 -|                                    X                      *
       |                                    X                      *
 17.3 -|                                     X                     *
       |                                      X                    *
 18.4 -|                                      X                    *
       |                                       X                   *
 19.4 -|                                       X                   *
       |                                        X                  *
       |
       |
     TIME
     (min)
```

x File: OFPK25-2.HYD   Qmax =   33.8 cfs
* File: OUT   .HYD   Qmax =   49.5 cfs

INFLOW HYDROGRAPH: ...
OUTFLOW HYDROGRAPH: ...

EXECUTED: 06-03-1996

FLOW (CFS)

0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 55.0

FORM 1411 ½ GB

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POND-2 Version: 5.17 S/N:

>>>>> HYDROGRAPH PRINTOUT <<<<<

08-02-1996 05:08:25

Hydrograph file: OFPK1001.HYD

HYDROGRAPH ORDINATES (cfs)

Time increment = 1.00 Minutes

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

Time Minutes							
0.00	0.00	49.04	49.04	49.04	49.04	49.04	49.04
7.00	49.04	49.04	49.04	49.04	49.04	49.04	49.04
14.00	49.04	49.04	49.04	49.04	49.04	49.04	49.04
21.00	0.00						

EXECUTED: 08-02-1996 05:08:49

```
*******************************************
*                                         *
*        O'FALLON BUSINESS PARK           *
*          DETENTION ANALYSIS             *
* PREPARED BY: BAX ENGINEERING CO., INC.  *
*            AUGUST 2, 1996               *
*                                         *
*******************************************
```

Inflow Hydrograph: OFPK1001.HYD
Rating Table file: OFPARK1 .PND

----INITIAL CONDITIONS----
Elevation = 488.50 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
488.50	0.0	0.000	0.0	0.0
488.70	0.3	0.000	0.5	0.8
488.90	0.8	0.002	3.6	4.4
489.10	1.4	0.008	12.1	13.5
489.30	2.1	0.020	28.6	30.7
489.70	3.9	0.067	96.6	100.5
489.90	5.0	0.106	153.4	158.4
490.10	6.1	0.156	226.6	232.7
490.30	7.2	0.209	303.8	311.0
490.50	8.5	0.264	382.6	391.1
490.70	9.8	0.319	463.2	473.0
490.90	11.2	0.376	545.4	556.6
491.10	12.2	0.433	629.4	641.6
491.30	12.9	0.493	715.1	728.0
491.50	13.6	0.553	802.6	816.2
491.70	14.3	0.614	891.9	906.2
491.90	14.9	0.677	983.0	997.9
492.10	15.5	0.741	1076.0	1091.5
492.30	16.1	0.806	1170.9	1187.0
492.50	16.7	0.873	1267.7	1284.4
492.70	17.2	0.941	1366.6	1383.8
492.90	17.8	1.011	1467.4	1485.2
493.10	45.3	1.081	1570.3	1615.6
493.30	56.5	1.154	1675.2	1731.7
493.50	68.8	1.227	1782.1	1850.9
493.70	82.2	1.302	1891.2	1973.4
493.90	96.5	1.379	2002.3	2098.8
494.10	111.7	1.457	2115.5	2227.2
494.30	127.8	1.536	2229.9	2357.7
494.50	144.6	1.615	2345.5	2490.1
494.70	162.2	1.696	2462.2	2624.4

DISK FILES: OFPK1001.HYD ; OFPARK1 .PND

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
494.90	180.5	1.777	2580.1	2760.6

Time increment (t) = 1.0 min.

Pond File: OFPARK1 .PND
Inflow Hydrograph: OFPK1001.HYD
Outflow Hydrograph: 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	488.50
1.0	49.04	49.0	43.9	49.0	2.57	489.40
2.0	49.04	98.1	132.6	142.0	4.69	489.84
3.0	49.04	98.1	218.5	230.7	6.07	490.09
4.0	49.04	98.1	302.0	316.6	7.29	490.31
5.0	49.04	98.1	382.8	400.1	8.64	490.52
6.0	49.04	98.1	461.0	480.9	9.93	490.72
7.0	49.04	98.1	536.7	559.1	11.23	490.91
8.0	49.04	98.1	610.5	634.7	12.12	491.08
9.0	49.04	98.1	683.1	708.6	12.74	491.26
10.0	49.04	98.1	754.5	781.2	13.32	491.42
11.0	49.04	98.1	824.9	852.6	13.88	491.58
12.0	49.04	98.1	894.1	922.9	14.41	491.74
13.0	49.04	98.1	962.5	992.2	14.86	491.89
14.0	49.04	98.1	1029.9	1060.5	15.30	492.03
15.0	49.04	98.1	1096.6	1128.0	15.73	492.18
16.0	49.04	98.1	1162.4	1194.6	16.15	492.32
17.0	49.04	98.1	1227.3	1260.4	16.55	492.45
18.0	49.04	98.1	1291.6	1325.4	16.91	492.58
19.0	49.04	98.1	1355.2	1389.7	17.23	492.71
20.0	49.04	98.1	1418.1	1453.3	17.61	492.84
21.0	0.00	49.0	1431.7	1467.1	17.69	492.86

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

```
Pond File:          OFPARK1 .PND
Inflow Hydrograph:  OFPK1001.HYD
Outflow Hydrograph: OUT     .HYD


Starting Pond W.S. Elevation =   488.50 ft


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

                Peak Inflow    =    49.04 cfs
                Peak Outflow   =    17.69 cfs
                Peak Elevation =   492.86 ft


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

            Initial Storage         =     0.00 ac-ft
            Peak Storage From Storm =     1.00 ac-ft
                                       ---------------
            Total Storage in Pond   =     1.00 ac-ft
```

Pond File: OFPARK1 .PND
Inflow Hydrograph: OFPK1001.HYD
Outflow Hydrograph: OUT   .HYD

EXECUTED: 08-02-1996
05:08:49

Peak Inflow   =   49.04 cfs
Peak Outflow   =   17.69 cfs
Peak Elevation =   492.86 ft

```
                                                                    Flow (cfs)
       0.0   5.0  10.0  15.0  20.0  25.0  30.0  35.0  40.0  45.0  50.0  55.0
       .------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-
       |
  1.0 -|   X                                                       *
       |    X                                                      *
  2.0 -|      X                                                    *
       |      X                                                    *
  3.1 -|       X                                                   *
       |        X                                                  *
  4.1 -|         X                                                 *
       |          X                                                *
  5.1 -|          X                                                *
       |           X                                               *
  6.1 -|            X                                              *
       |             X                                             *
  7.1 -|             X                                             *
       |              X                                            *
  8.2 -|               X                                           *
       |               X                                           *
  9.2 -|               X                                           *
       |                X                                          *
 10.2 -|                X                                          *
       |                X                                          *
 11.2 -|                 X                                         *
       |                 X                                         *
 12.2 -|                 X                                         *
       |                  X                                        *
 13.3 -|                  X                                        *
       |                  X                                        *
 14.3 -|                  X                                        *
       |                   X                                       *
 15.3 -|                   X                                       *
       |                   X                                       *
 16.3 -|                   X                                       *
       |                    X                                      *
 17.3 -|                    X                                      *
       |                    X                                      *
 18.4 -|                    X                                      *
       |                    X                                      *
 19.4 -|                     X                                     *
       |                     X                                     *
       |
     TIME
     (min)
```

X File: OFPK1001.HYD   Qmax =   17.7 cfs
* File: OUT   .HYD   Qmax =   49.0 cfs

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POND-2 Version: 5.17 S/N:

>>>>> HYDROGRAPH PRINTOUT <<<<<

08-02-1996 05:09:18

Hydrograph file: OFPK1002.HYD

HYDROGRAPH ORDINATES (cfs)
Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	63.32	63.32	63.32	63.32	63.32	63.32
7.00	63.32	63.32	63.32	63.32	63.32	63.32	63.32
14.00	63.32	63.32	63.32	63.32	63.32	63.32	63.32
21.00	0.00						

O'FALLON BUSINESS PARK
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 2, 1996

Inflow Hydrograph: OFPK1002.HYD
Rating Table file: OFPARK2 .PND

----INITIAL CONDITIONS----
Elevation = 488.50 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
488.50	0.0	0.000	0.0	0.0
488.70	0.4	0.000	0.5	0.9
488.90	1.2	0.002	3.6	4.8
489.10	2.2	0.008	12.1	14.3
489.30	3.4	0.020	28.6	32.0
489.50	4.7	0.039	55.9	60.6
489.70	6.2	0.067	96.6	102.8
489.90	7.9	0.106	153.4	161.3
490.10	3.1	0.156	226.6	229.7
490.30	11.2	0.209	303.8	315.0
490.50	13.4	0.264	382.6	396.0
490.70	15.5	0.319	463.2	478.7
490.90	17.7	0.376	545.4	563.1
491.10	19.9	0.433	629.4	649.3
491.30	22.3	0.493	715.1	737.4
491.50	24.7	0.553	802.6	827.3
491.70	27.2	0.614	891.9	919.1
491.90	29.8	0.677	983.0	1012.8
492.10	32.4	0.741	1076.0	1108.4
492.30	35.2	0.806	1170.9	1206.1
492.50	37.5	0.873	1267.7	1305.2
492.70	39.1	0.941	1366.6	1405.7
492.90	40.5	1.011	1467.4	1507.9
493.10	41.9	1.081	1570.3	1612.2
493.30	43.3	1.154	1675.2	1718.5
493.50	44.6	1.227	1782.1	1826.7
493.70	45.9	1.302	1891.2	1937.1
493.90	47.2	1.379	2002.3	2049.5
494.10	48.4	1.457	2115.5	2163.9
494.30	49.6	1.536	2229.9	2279.5
494.50	50.7	1.615	2345.5	2396.2

DISK FILES: OFPK1002.HYD ; OFPARK2 .PND

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
494.70	51.9	1.696	2462.2	2514.1
494.90	53.0	1.777	2580.1	2633.1

Time increment (t) = 1.0 min.

EXECUTED: 08-02-1996 05:09:35

Pond File: OFPARK2 .PND
Inflow Hydrograph: OFPK1002.HYD
Outflow Hydrograph: 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	488.50
1.0	63.32	63.3	53.7	63.3	4.80	489.51
2.0	63.32	126.6	167.2	180.4	6.56	489.96
3.0	63.32	126.6	275.5	293.9	9.19	490.25
4.0	63.32	126.6	375.0	402.1	13.56	490.51
5.0	63.32	126.6	469.5	501.7	16.10	490.75
6.0	63.32	126.6	559.0	596.1	18.54	490.98
7.0	63.32	126.6	643.9	685.7	20.89	491.18
8.0	63.32	126.6	724.1	770.5	23.18	491.37
9.0	63.32	126.6	800.1	850.8	25.34	491.55
10.0	63.32	126.6	871.9	926.8	27.41	491.72
11.0	63.32	126.6	939.8	998.6	29.40	491.87
12.0	63.32	126.6	1003.9	1066.4	31.26	492.01
13.0	63.32	126.6	1064.5	1130.5	33.03	492.15
14.0	63.32	126.6	1121.6	1191.1	34.77	492.27
15.0	63.32	126.6	1175.8	1248.2	36.18	492.38
16.0	63.32	126.6	1227.6	1302.5	37.44	492.49
17.0	63.32	126.6	1277.7	1354.2	38.28	492.60
18.0	63.32	126.6	1326.2	1404.3	39.08	492.70
19.0	63.32	126.6	1373.3	1452.8	39.75	492.79
20.0	63.32	126.6	1419.2	1500.0	40.39	492.88
21.0	0.00	63.3	1402.2	1482.5	40.15	492.85

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

Pond File:           OFPARK2 .PND
Inflow Hydrograph:   OFPK1002.HYD
Outflow Hydrograph:  OUT     .HYD

Starting Pond W.S. Elevation =   488.50 ft

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

                  Peak Inflow    =    63.32 cfs
                  Peak Outflow   =    40.39 cfs
                  Peak Elevation =   492.88 ft

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

             Initial Storage         =     0.00 ac-ft
             Peak Storage From Storm =     1.01 ac-ft
                                         ---------------
             Total Storage in Pond   =     1.01 ac-ft
```

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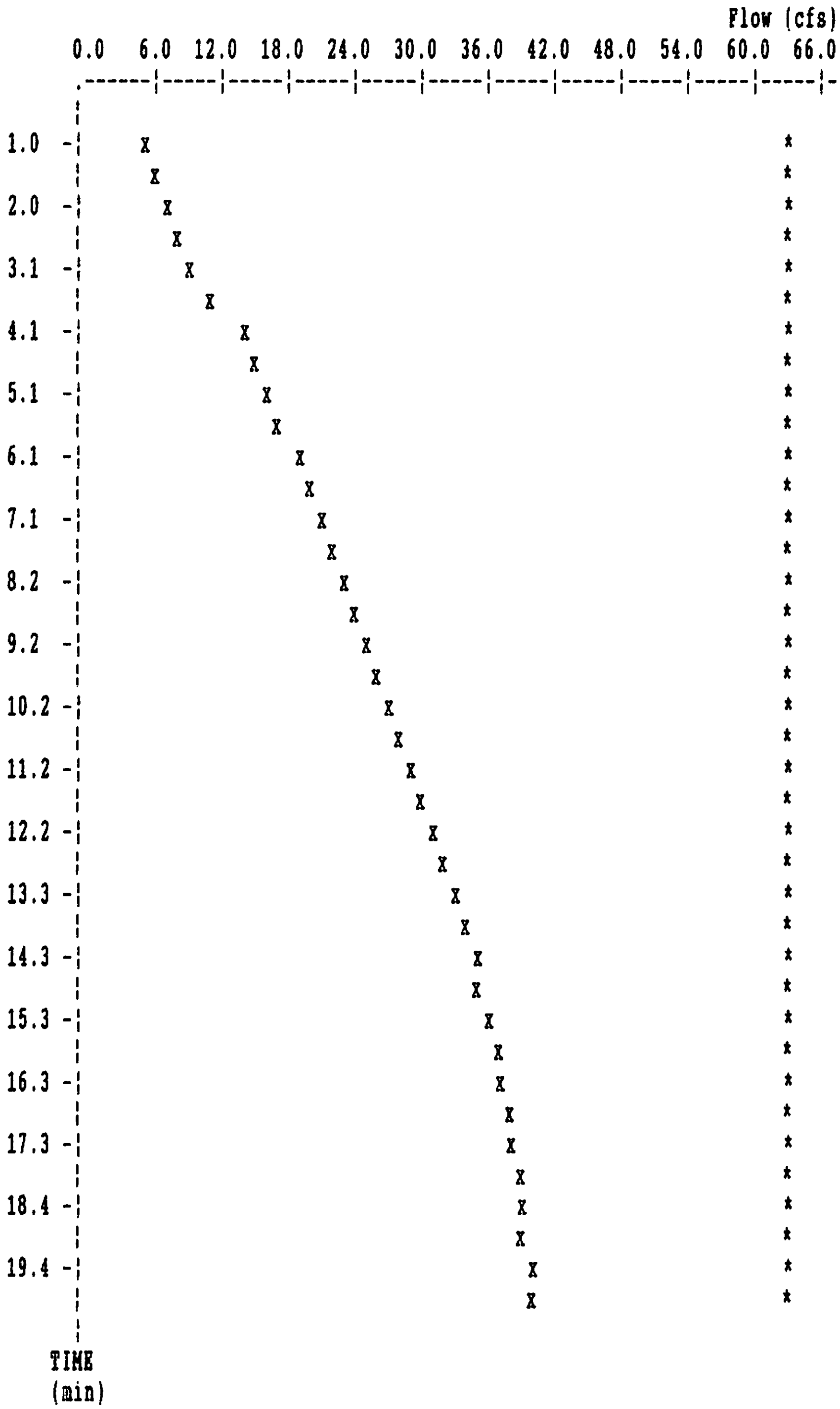
Pond File: OFPARK2 .PND
Inflow Hydrograph: OFPK1002.HYD
Outflow Hydrograph: OUT .HYD

EXECUTED: 08-02-1996
05:09:35

Peak Inflow = 63.32 cfs
Peak Outflow = 40.39 cfs
Peak Elevation = 492.88 ft



x File: OFPK1002.HYD Qmax = 40.4 cfs
* File: OUT .HYD Qmax = 63.3 cfs

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