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STORMWATER DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.

INDIAN SPRINGS SUBDIVISION - O'FALLON
BAX PROJECT NO. 97-8861
MARCH 11, 1997 - REVISED MARCH 14, 1997

INTRODUCTION:

The tract of land is presently an undeveloped site located in the City of O'Fallon, Missouri. It is proposed that the tract, consisting of 44.69 acres, be developed into a residential subdivision. The site can be divided into three watersheds which drain to the North, South and West. Two dry stormwater detention basins will be constructed for the North and West watersheds and a lake will be constructed for the South watershed. These basins will provide detention for the development when considering the increased runoff for the site as required by the City of O'Fallon. The storage volume and outflow rates will be proportioned to insure that the peak rate of runoff leaving each watershed under post-developed conditions is less than or equal to the peak rate of runoff under pre-developed conditions for the required design storms. The basins have been analyzed for the 2, 5, 15, and 25 year frequency - 20 minute duration design storm and checked for safe passage of the 100 year frequency - 20 minute design storm.

GENERAL SITE DATA AND RUNOFF CALCULATIONS:

The pre-developed P.I. factors to be used for the analysis are:
20 minute storms cfs/ac.(assumed 5% impervious):

2 year	1.15
5 year	1.41
15 year	1.87
25 year	2.31

The post-developed P.I. factors to be used for the analysis are:
20 minute storms cfs/ac.(residential on-site and off-site):

2 year	1.61
5 year	1.98
15 year	2.64
25 year	3.26
100 year	4.17

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TIME OF CONCENTRATION:

North Of the inflows to the north basin, the most remote point of origin lies to the north. It will flow approximately 900 feet overland to the basin. Time of concentration is estimated as follows:

T(overland) : L = 900 feet
Elevation difference = 628 - 604 = 24 feet
T(overland) = 12 minutes : See figure 1

Total time = 12.0 use **12 minutes.**

South Of the inflows to the south basin, the most remote point of origin lies to the northwest near Treaty Ct. It will flow approximately 200 feet overland to an area-inlet then an additional 700 feet via the storm sewer to the detention basin. Time of concentration is estimated as follows:

T(overland) : L = 200 feet
Elevation difference = 626 - 620 = 6 feet
T(overland) = 3.4 minutes : See figure 1

T(stormpipe) : L = 700 feet
Estimated velocity 7 feet/second
T(stormpipe) = 700 feet / 7 feet/sec.
= 100 sec. >> 1.7 minutes

Total time = 5.1 use **5 minutes.**

West Of the inflows to the west basin, the most remote point of origin lies to the northwest approximately 300 feet west of Gray Wolf Dr. It will flow approximately 200 feet overland to an area-inlet then an additional 700 feet via the storm sewer to the detention basin. Time of concentration is estimated as follows:

T(overland) : L = 200 feet
Elevation difference = 638 - 635 = 3 feet
T(overland) = 4.6 minutes : See figure 1

T(stormpipe) : L = 700 feet
Estimated velocity 7 feet/second
T(stormpipe) = 700 feet / 7 feet/sec.
= 100 sec. >> 1.7 minutes

Total time = 6.3 use **6 minutes.**

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BASIN PEAK INFLOW:

Inflows to the basin have been estimated from the drainage area map of the project. (see construction plans)

North

Storm	PI cfs/ac	On-site 40% imp. 17.37 ac cfs	Off-site 40% imp. 11.98 ac cfs	Total cfs
2	1.61	27.97	19.29	47.25
5	1.98	34.39	23.72	58.11
15	2.64	45.86	31.63	77.48
25	3.26	56.62	39.05	95.68
100	4.17	72.43	49.96	122.39

South

Storm	PI cfs/ac	On-site 40% imp. 14.29 ac cfs	Off-site 40% imp. 4.40 ac cfs	Total cfs
2	1.61	23.01	7.08	30.09
5	1.98	28.29	8.72	37.01
15	2.64	37.73	11.62	49.34
25	3.26	46.59	14.34	60.93
100	4.17	59.60	18.35	77.94

West

Storm	PI cfs/ac	On-site 40% imp. 6.03 ac cfs	Off-site 40% imp. 0.36 ac cfs	Total cfs
2	1.61	9.71	0.58	10.29
5	1.98	11.94	0.71	12.65
15	2.64	15.92	0.95	16.87
25	3.26	19.66	1.17	20.83
100	4.17	25.15	1.50	26.65

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REQUIRED ATTENUATION: 20 minute storms
(see attached pre and post-developed site drainage maps)

North

Storm	Post Dev. Ac.	x	Post Dev. PI	-	Pre Dev. Ac.	x	Pre Dev. PI		
2	17.56		1.61		16.32		1.15	=	9.50 cfs
5	17.56		1.98		16.32		1.41	=	11.76 cfs
15	17.56		2.64		16.32		1.87	=	15.84 cfs
25	17.56		3.26		16.32		2.31	=	19.55 cfs

South

Storm	Post Dev. Ac.	x	Post Dev. PI	-	Pre Dev. Ac.	x	Pre Dev. PI		
2	19.05		1.61		19.84		1.15	=	7.85 cfs
5	19.05		1.98		19.84		1.41	=	9.75 cfs
15	19.05		2.64		19.84		1.87	=	13.19 cfs
25	19.05		3.26		19.84		2.31	=	16.27 cfs

West

Storm	Post Dev. Ac.	x	Post Dev. PI	-	Pre Dev. Ac.	x	Pre Dev. PI		
2	8.07		1.61		8.53		1.15	=	3.18 cfs
5	8.07		1.98		8.53		1.41	=	3.95 cfs
15	8.07		2.64		8.53		1.87	=	5.35 cfs
25	8.07		3.26		8.53		2.31	=	6.60 cfs

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PERMITTED RELEASE RATE:

The permitted release rate of the basin is found by subtracting the required attenuation from the peak inflow to the basin for the design storm. Inflows to the basin have been estimated from the drainage area map of the project.

North

Storm	Peak Inflow cfs	-	Required Attenuation cfs		
2	47.25		9.50	=	37.75 cfs
5	58.11		11.76	=	46.35 cfs
15	77.48		15.84	=	61.64 cfs
25	95.68		19.55	=	76.13 cfs

South

Storm	Peak Inflow cfs	-	Required Attenuation cfs		
2	30.09		7.85	=	22.24 cfs
5	37.01		9.75	=	27.26 cfs
15	49.34		13.19	=	36.15 cfs
25	60.93		16.27	=	44.66 cfs

West

Storm	Peak Inflow cfs	-	Required Attenuation cfs		
2	10.29		3.18	=	7.11 cfs
5	12.65		3.95	=	8.70 cfs
15	16.87		5.35	=	11.52 cfs
25	20.83		6.60	=	14.23 cfs

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STORM ROUTING CALCULATIONS AND RESULTS:

A computer program, PONDPACK, was used in routing the 20-minute design storms through the basin. As found in the routing calculations, the results are as follows:

North

20 MIN STORM	PERMITTED RELEASE RATE	CALCULATED RELEASE RATE	PEAK ELEVATION
2	37.75 cfs	37.03 cfs	602.79
5	46.35 cfs	44.56 cfs	603.09
15	61.64 cfs	57.54 cfs	603.57
25	76.13 cfs	67.20 cfs	603.96

South

20 MIN STORM	PERMITTED RELEASE RATE	CALCULATED RELEASE RATE	PEAK ELEVATION
2	22.24 cfs	16.26 cfs	593.43
5	27.26 cfs	22.20 cfs	593.65
15	36.15 cfs	32.84 cfs	593.99
25	44.66 cfs	43.04 cfs	594.29

West

20 MIN STORM	PERMITTED RELEASE RATE	CALCULATED RELEASE RATE	PEAK ELEVATION
2	7.11 cfs	4.12 cfs	613.44
5	8.70 cfs	4.48 cfs	613.97
15	11.52 cfs	5.01 cfs	614.83
25	14.23 cfs	5.37 cfs	615.55

As shown above, the calculated release rates are less than the permitted release rates as required for the detention basins.

CHECK 100-YEAR OUTFLOW

North

Wier Flow: $Q = C \times L \times H^{(3/2)}$

where: 100 yr	Q =	122.39	cfs
	C =	3.0	
	L =	15.7	ft
	H =	1.89	ft
	overflow sill =	604.00	
	100-yr h/w =	**605.89**	

South

Wier Flow: $Q = C \times L \times H^{(3/2)}$

where: 100 yr	Q =	77.94	cfs
	C =	3.0	
	L =	20.0	ft
	H =	1.19	ft
	overflow sill =	594.50	
	100-yr h/w =	**595.69**	

West

Wier Flow: $Q = C \times L \times H^{(3/2)}$

where: 100 yr	Q =	26.65	cfs
	C =	3.0	
	L =	11.7	ft
	H =	0.83	ft
	overflow sill =	616.00	
	100-yr h/w =	**616.83**	

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SUMMARY

North - "OS LL"

2 year-20min H.W.		602.79 ft.
5 year-20min H.W.		603.09 ft.
15 year-20min H.W.		603.57 ft.
25 year-20min H.W.		603.96 ft.
100 year-20min H.W.(low flow blocked)		605.89 ft.
LOW-FLOW OUTLET *1*	48" WIDE x 19" HIGH	
LOW-FLOW SILL ELEVATION		601.75 ft.
LOW-FLOW OUTLET *2*	40" WIDE x 12" HIGH	
LOW-FLOW SILL ELEVATION		600.00 ft.
OVERFLOW SILL ELEVATION *(60" standpipe)*		604.00 ft.
TOP OF BERM		607.00 ft.

South - "OS B"

2 year-20min H.W.		593.43 ft.
5 year-20min H.W.		593.65 ft.
15 year-20min H.W.		593.99 ft.
25 year-20min H.W.		594.29 ft.
100 year-20min H.W.(low flow blocked)		595.69 ft.
LOW-FLOW OUTLET	72" WIDE x 24" HIGH	
LOW-FLOW SILL ELEVATION *(Normal Pool)*		592.50 ft.
OVERFLOW SILL ELEVATION		594.50 ft.
TOP OF BERM		597.00 ft.

West - "OS W"

2 year-20min H.W.		613.44 ft.
5 year-20min H.W.		613.97 ft.
15 year-20min H.W.		614.83 ft.
25 year-20min H.W.		615.55 ft.
100 year-20min H.W.(low flow blocked)		616.83 ft.
LOW-FLOW OUTLET	6" WIDE x 12" HIGH	
LOW-FLOW SILL ELEVATION		610.00 ft.
OVERFLOW SILL ELEVATION *(standard A.I.)*		616.00 ft.
TOP OF BERM		618.00 ft.

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Additional cap. needed is provided in the rest of the basin

SEDIMENT STORAGE CALCULATIONS
INDIAN SPRINGS - **SOUTH BASIN**
BAX PROJECT NO. 96-8861
APRIL 11, 1997

Sediment storage will be provided by over excavation of the lake bottom. The following calculations are based on an attached nomograph provided by the City of O'Fallon.

Total disturbed area tributary to lake: 14.29 AC.
Rational Method "C" Factor: 0.40%

FROM FIGURE 1:

The required volume for 5 year construction period:

5 x ~~118~~ 165 Cu.Ft./Ac. x 14.29 Ac. = 8,430 Cu.Ft.
= 11,789

Volume Calculation:

ELEVATION	AREA	VOLUME	TOTAL VOLUME
586.0	9,195 s.f.	0 c.f.	0 c.f.
585.0	8,010 s.f.	8,603 c.f.	8,603 c.f.

Based on the above calculations the lake will be required to be over-excavated **1.00'** (8,603 c.f.) to provide storage for the anticipated sediment run-off.

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SOUTH BASIN

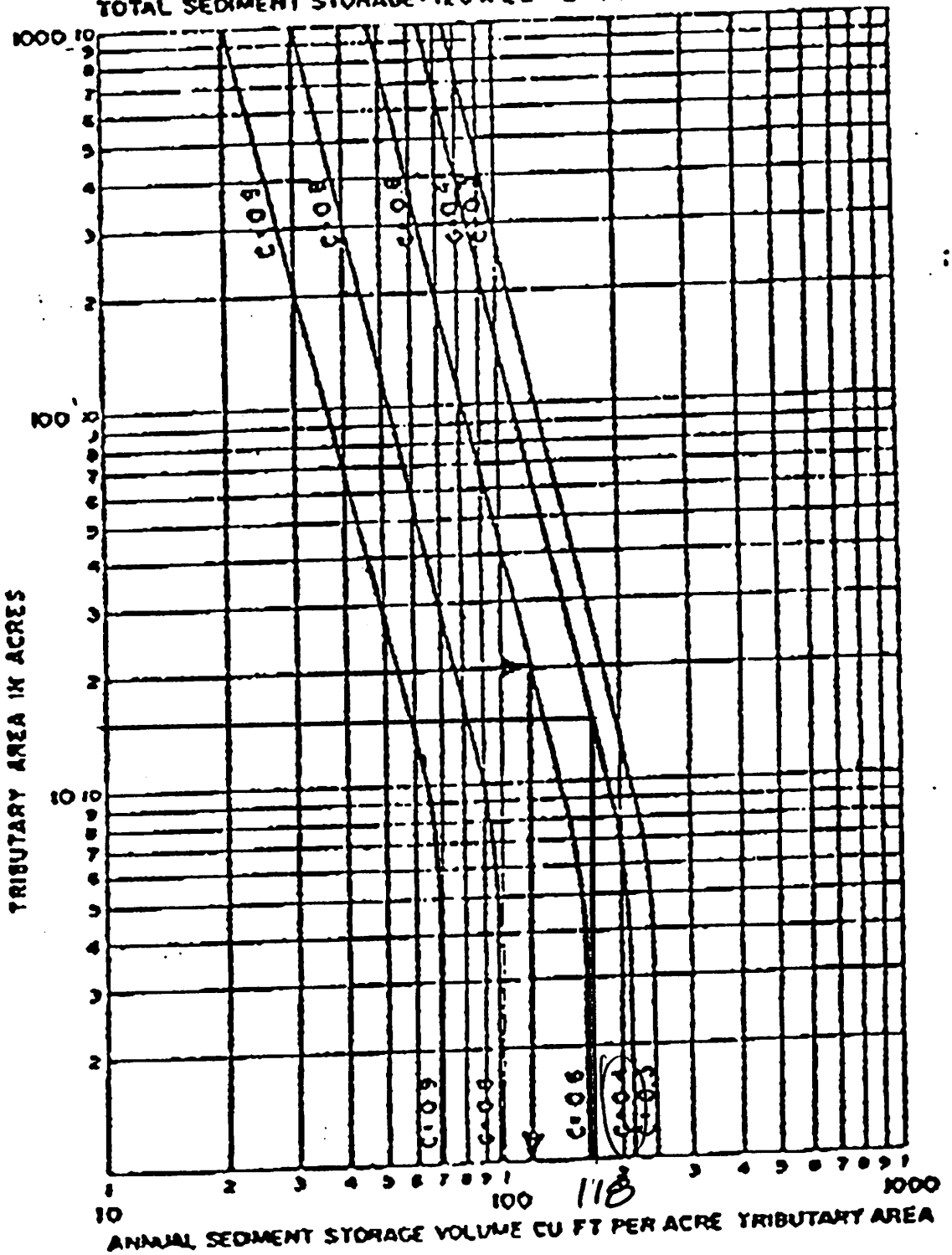
EXAMPLE:

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.



118

ANNUAL SEDIMENT STORAGE

FIG. 1

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SEDIMENT STORAGE CALCULATIONS
INDIAN SPRINGS - **NORTH BASIN**
BAX PROJECT NO. 96-8861
APRIL 11, 1997

Sediment storage will be provided by over excavation of the lake bottom. The following calculations are based on an attached nomograph provided by the City of O'Fallon.

Total disturbed area tributary to lake: 17.37 AC.
Rational Method "C" Factor: 0.40%

FROM FIGURE 1:

The required volume for 5 year construction period:

5 x ~~117~~ 160 Cu.Ft./Ac. x 17.37 Ac. = 10,160 Cu.Ft.

Volume Calculation: 13,896

ELEVATION	AREA	VOLUME	TOTAL VOLUME
602.0	10,038 s.f.	0 c.f.	0 c.f.
601.0	8,810 s.f.	9,424 c.f.	9,424 c.f. — 11,482
600.0	7,659 s.f.	8,235 c.f.	17,659 c.f.

Based on the above calculations the lake will be required to be over-excavated **1.25'** (11,590 c.f.) to provide storage for the anticipated sediment run-off.

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NORTH BASIN

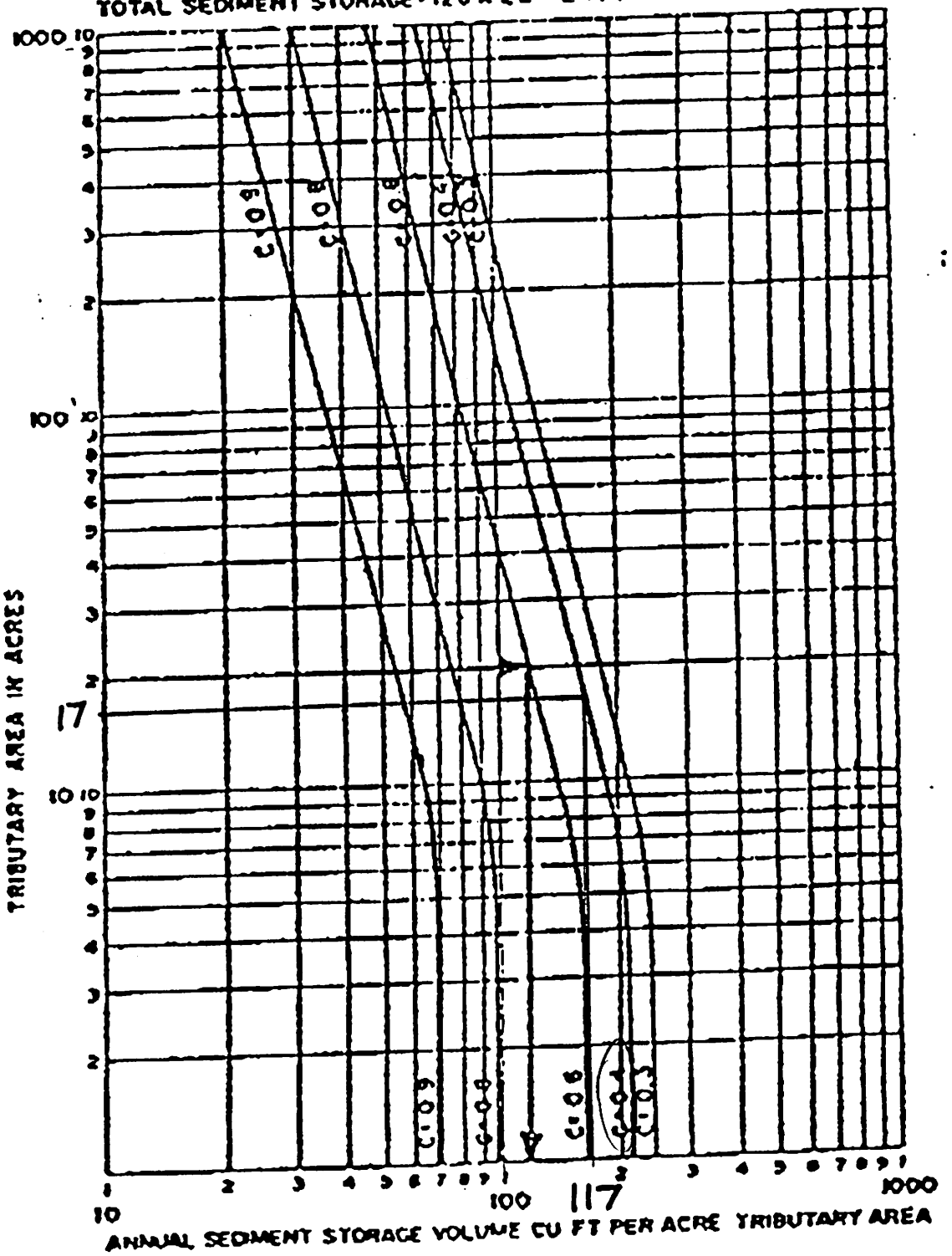
EXAMPLE:

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

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SEDIMENT STORAGE CALCULATIONS
INDIAN SPRINGS - **WEST BASIN**
BAX PROJECT NO. 96-8861
APRIL 11, 1997

Sediment storage will be provided by over excavation of the lake bottom. The following calculations are based on an attached nomograph provided by the City of O'Fallon.

Total disturbed area tributary to lake: 6.03 AC.
Rational Method "C" Factor: 0.40%

FROM FIGURE 1:

The required volume for 5 year construction period:

5 x ~~120~~ 220 Cu.Ft./Ac. x 6.03 Ac. = 3,620 ~~Cu.Ft.~~ 6,633

Volume Calculation:

ELEVATION	AREA	VOLUME	TOTAL VOLUME
612.0	3,319 s.f.	0 c.f.	0 c.f.
611.0	2,650 s.f.	2,985 c.f.	2,985 c.f.
610.0	2,052 s.f.	2,351 c.f.	5,336 c.f.

Based on the above calculations the lake will be required to be over-excavated **1.25'** (3,629 c.f.) to provide storage for the anticipated sediment run-off.

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WEST BASIN

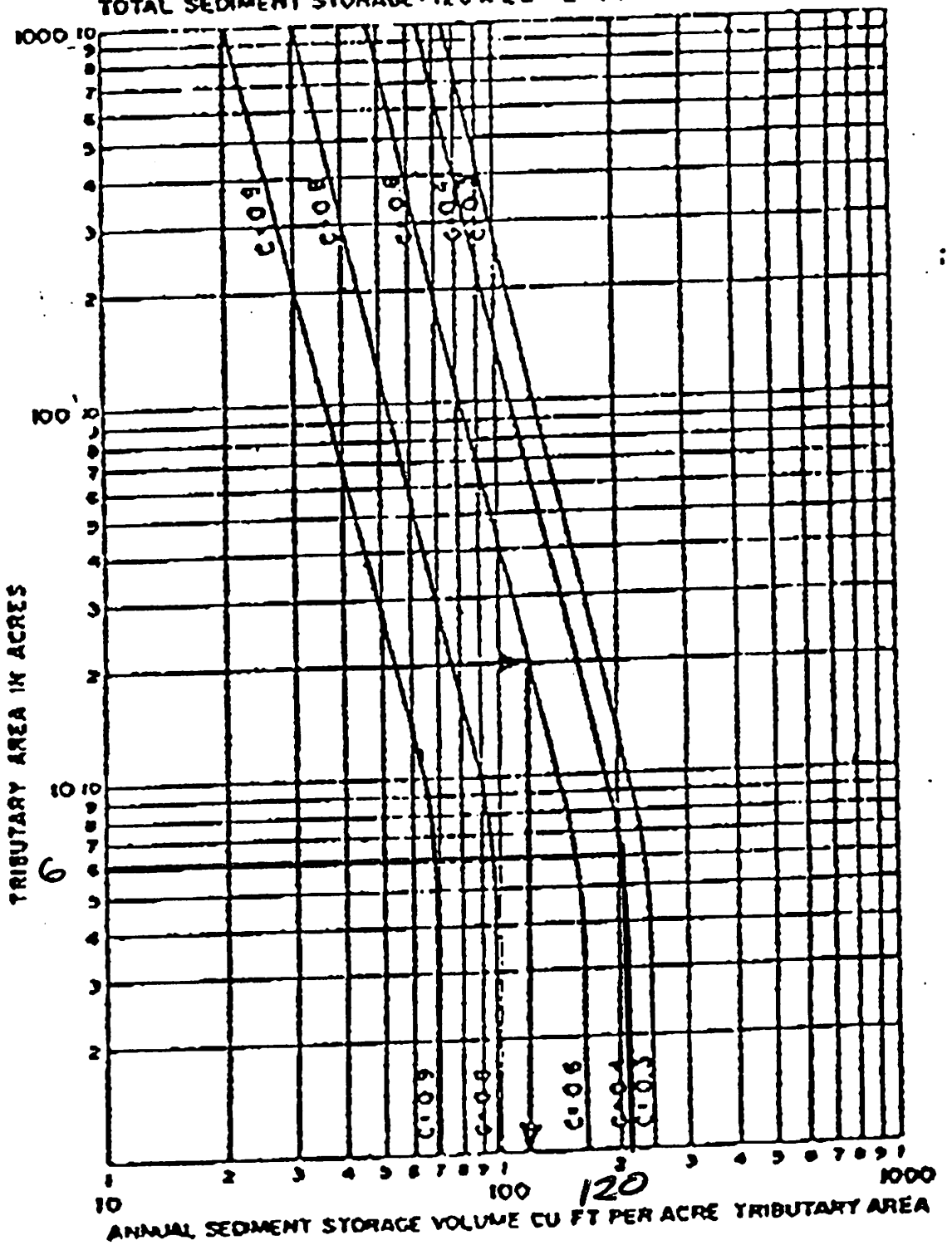
EXAMPLE:

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

DAVID W. HOUSE
FIRE CHIEF

O'FALLON FIRE PROTECTION DISTRICT
119 EAST ELM STREET, O'FALLON, MISSOURI 63366-2600
(314) 272-3493
240-5312
FAX 272-7857

June 18, 1997

Mr. David Jones
Bax Engineering
1052 South Cloverleaf Drive
St. Peters, Missouri 63376-6445

RE: Indian Springs Water Improvement Plan

Dear Mr. Jones:

Our office has reviewed and approved the Water Improvement Plan (dated 3-12-97) for the proposed Indian Springs subdivision .

Should you have any questions concerning the above please do not hesitate to contact our office.

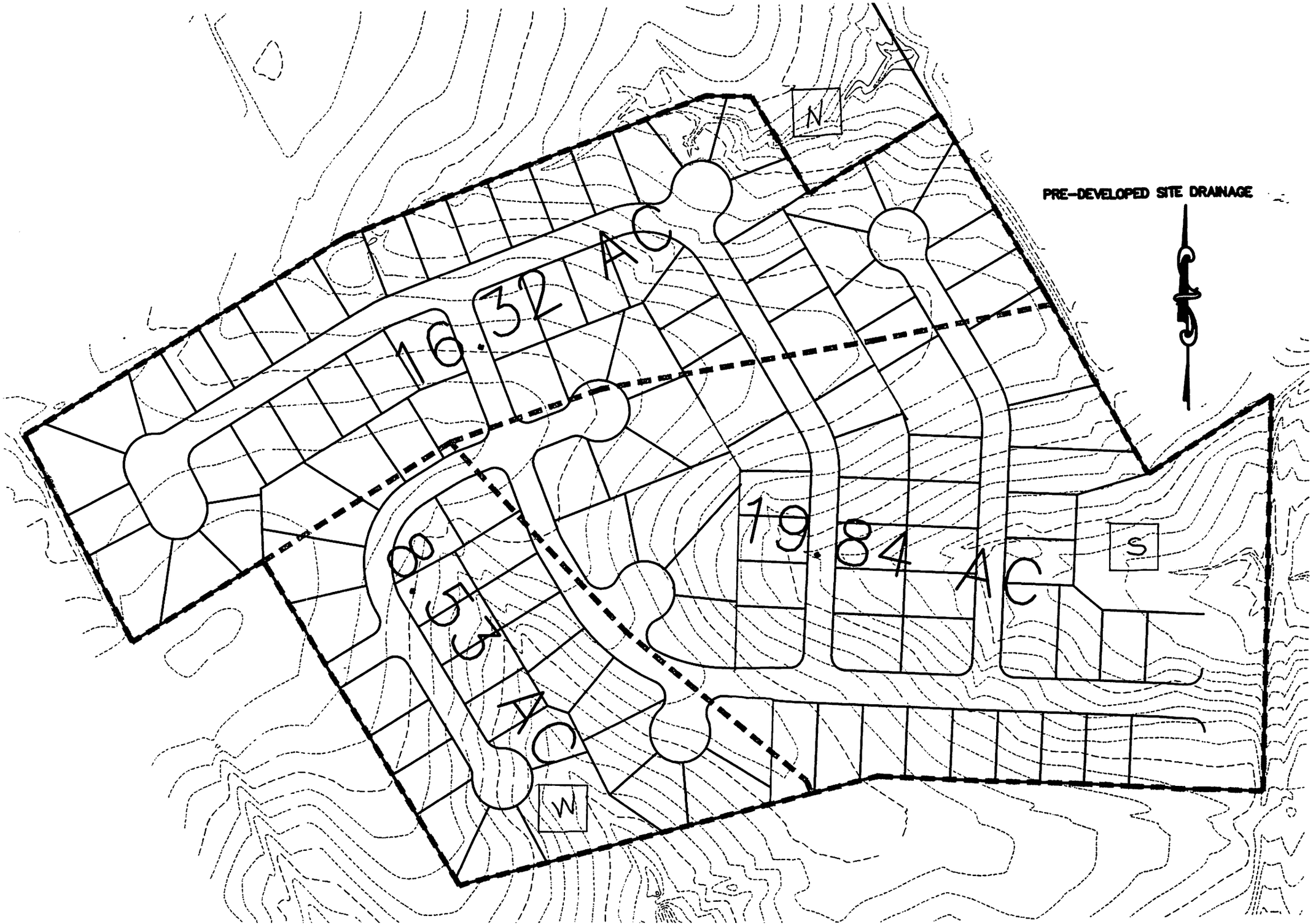
Sincerely,

David W. House
Fire Chief

cc: O'Fallon Engineering Dept.

11


POST-DEVELOPED SITE DRAINAGE
N
17.56 AC
8.07 AC
19.05 AC
S
W


PRE-DEVELOPED SITE DRAINAGE
N
S
W
16.32 AC
19.84 AC
5.54 AC

```
**********************************************************************
*                                                                    *
*  INDIAN SPRINGS                                  NORTH WATERSHE    *
*                        DETENTION ANALYSIS                          *
*              PREPARED BY: BAX ENGINEERING CO., INC.                *
*                           MARCH 5, 1997                            *
*                                                                    *
**********************************************************************
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********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: 8861N .PND
Inflow Hydrograph: 8861N002.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 600.00 ft

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

Peak Inflow	=	47.25 cfs
Peak Outflow	=	37.03 cfs
Peak Elevation	=	602.79 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.39 ac-ft
Total Storage in Pond	=	0.39 ac-ft

```
**************************************************************************
*                                                                        *
*  INDIAN SPRINGS                                        NORTH WATERSHE  *
*                          DETENTION ANALYSIS                            *
*                PREPARED BY: BAX ENGINEERING CO., INC.                  *
*                             MARCH 5, 1997                              *
*                                                                        *
**************************************************************************
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********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: 8861N .PND
Inflow Hydrograph: 8861N005.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 600.00 ft

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

Peak Inflow	=	58.11 cfs
Peak Outflow	=	44.56 cfs
Peak Elevation	=	603.09 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.51 ac-ft
Total Storage in Pond	=	0.51 ac-ft

****
* *
* INDIAN SPRINGS NORTH WATERSHE *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* MARCH 5, 1997 *
* *
****

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

Pond File: 8861N .PND
Inflow Hydrograph: 8861N015.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 600.00 ft

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

Peak Inflow	=	77.48 cfs
Peak Outflow	=	57.54 cfs
Peak Elevation	=	603.57 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.74 ac-ft
Total Storage in Pond	=	0.74 ac-ft

****
*
* INDIAN SPRINGS NORTH WATERSHE *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* MARCH 5, 1997 *
*
****

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

Pond File: 8861N .PND
Inflow Hydrograph: 8861N025.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 600.00 ft

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

Peak Inflow	=	95.70 cfs
Peak Outflow	=	67.20 cfs
Peak Elevation	=	603.96 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.98 ac-ft
Total Storage in Pond	=	0.98 ac-ft

Outlet Structure File: BASIN .STR

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

****

INDIAN SPRINGS NORTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

Elevation (ft)	Q (cfs)	Contributing Structures
600.00	0.0	2
600.20	0.9	2
600.40	2.5	2
600.60	4.6	2
600.80	7.2	2
601.00	10.0	2
601.20	13.1	2
601.40	15.2	1
601.60	16.8	1
601.80	18.4	4 +1
602.00	21.2	4 +1
602.20	24.5	4 +1
602.40	28.4	4 +1
602.60	32.7	4 +1
602.80	37.3	4 +1
603.00	42.1	4 +1
603.20	47.3	4 +1
603.40	52.8	4 +1
603.60	58.5	4 +1
603.80	64.4	4 +1
604.00	67.9	3 +1
604.20	71.1	3 +1
604.40	74.2	3 +1
604.60	77.1	3 +1
604.80	79.9	3 +1
605.00	82.7	5 +3 +1
605.20	88.4	5 +3 +1
605.40	96.7	5 +3 +1
605.60	106.6	5 +3 +1
605.80	117.7	5 +3 +1
606.00	130.0	5 +3 +1

Outlet Structure File: 8861N .STR

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

****
INDIAN SPRINGS NORTH BASIN
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997
****

Outlet Structure File: 8861N .STR
Planimeter Input File: 8861N .VOL
Rating Table Output File: 8861N .PND

Min. Elev.(ft) = 600 Max. Elev.(ft) = 606 Incr.(ft) = .2

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

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	5		->	5
WEIR-VR	4		->	4
ORIFICE	3	? 4	->	A
WEIR-VR	2		->	2
ORIFICE	1	? 2	->	B

Outflow rating table summary was stored in file:
8861N .PND

Outlet Structure File: 8861N .STR

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

****
INDIAN SPRINGS NORTH BASIN
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997
****

>>>>>> Structure No. 5 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	605
E2 elev.(ft)?	606.001
Weir coefficient?	3
Weir elev.(ft)?	605.000
Length (ft)?	11.67
Contracted/Suppressed (C/S)?	S

Outlet Structure File: 8861N .STR

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

****
INDIAN SPRINGS NORTH BASIN
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997
****

>>>>>> Structure No. 4 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	601.75
E2 elev.(ft)?	606.001
Weir coefficient?	3
Weir elev.(ft)?	601.75
Length (ft)?	4.0
Contracted/Suppressed (C/S)?	S

Outlet Structure File: 8861N .STR

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

****
INDIAN SPRINGS NORTH BASIN
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997
****

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

ORIFICE
Orifice - Based on Area and Datum Elevation

E1 elev.(ft)?	603.25
E2 elev.(ft)?	606.001
Orifice coeff.?	0.6
Invert elev.(ft)?	601.6667
Datum elev.(ft) ?	602.4583
Orifice area (sq ft)?	6.333333

Outlet Structure File: 8861N .STR

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

****

INDIAN SPRINGS NORTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	600
E2 elev.(ft)?	606.001
Weir coefficient?	3
Weir elev.(ft)?	600
Length (ft)?	3.333333
Contracted/Suppressed (C/S)?	S

Outlet Structure File: 8861N .STR

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

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INDIAN SPRINGS NORTH BASIN

DETENTION ANALYSIS

PREPARED BY: BAX ENGINEERING CO., INC.

MARCH 5, 1997

****

>>>>>> Structure No. 1 <<<<<<

(Input Data)

ORIFICE

Orifice - Based on Area and Datum Elevation

E1 elev.(ft)?	601
E2 elev.(ft)?	606.001
Orifice coeff.?	.6
Invert elev.(ft)?	600
Datum elev.(ft) ?	600.5
Orifice area (sq ft)?	3.333333

Outlet Structure File: 8861N .STR

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

****
INDIAN SPRINGS NORTH BASIN
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997
****

Outflow Rating Table for Structure #5
WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
600.00	0.0	E < Inv.El.= 605
600.20	0.0	E < Inv.El.= 605
600.40	0.0	E < Inv.El.= 605
600.60	0.0	E < Inv.El.= 605
600.80	0.0	E < Inv.El.= 605
601.00	0.0	E < Inv.El.= 605
601.20	0.0	E < Inv.El.= 605
601.40	0.0	E < Inv.El.= 605
601.60	0.0	E < Inv.El.= 605
601.80	0.0	E < Inv.El.= 605
602.00	0.0	E < Inv.El.= 605
602.20	0.0	E < Inv.El.= 605
602.40	0.0	E < Inv.El.= 605
602.60	0.0	E < Inv.El.= 605
602.80	0.0	E < Inv.El.= 605
603.00	0.0	E < Inv.El.= 605
603.20	0.0	E < Inv.El.= 605
603.40	0.0	E < Inv.El.= 605
603.60	0.0	E < Inv.El.= 605
603.80	0.0	E < Inv.El.= 605
604.00	0.0	E < Inv.El.= 605
604.20	0.0	E < Inv.El.= 605
604.40	0.0	E < Inv.El.= 605
604.60	0.0	E < Inv.El.= 605
604.80	0.0	E < Inv.El.= 605
605.00	0.0	H =0.0
605.20	3.1	H =.2
605.40	8.9	H =.4
605.60	16.3	H =.6
605.80	25.1	H =.8
606.00	35.0	H =1.0

C = 3 L (ft) = 11.67
H (ft) = Table elev. - Invert elev. (605 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: 8861N .STR

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

****
INDIAN SPRINGS NORTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

Outflow Rating Table for Structure #4
WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
600.00	0.0	E < Inv.El.= 601.75
600.20	0.0	E < Inv.El.= 601.75
600.40	0.0	E < Inv.El.= 601.75
600.60	0.0	E < Inv.El.= 601.75
600.80	0.0	E < Inv.El.= 601.75
601.00	0.0	E < Inv.El.= 601.75
601.20	0.0	E < Inv.El.= 601.75
601.40	0.0	E < Inv.El.= 601.75
601.60	0.0	E < Inv.El.= 601.75
601.80	0.1	H =.05
602.00	1.5	H =.25
602.20	3.6	H =.45
602.40	6.3	H =.65
602.60	9.4	H =.85
602.80	12.9	H =1.05
603.00	16.8	H =1.25
603.20	21.0	H =1.45
603.40	25.4	H =1.65
603.60	30.2	H =1.85
603.80	35.2	H =2.05
604.00	40.5	H =2.25
604.20	46.0	H =2.45
604.40	51.8	H =2.65
604.60	57.7	H =2.85
604.80	63.9	H =3.05
605.00	70.3	H =3.25
605.20	76.9	H =3.45
605.40	83.7	H =3.65
605.60	90.7	H =3.85
605.80	97.8	H =4.05
606.00	105.1	H =4.25

C = 3 L (ft) = 4
H (ft) = Table elev. - Invert elev. (601.75 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: 8861N .STR

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

****
INDIAN SPRINGS NORTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

Outflow Rating Table for Structure #3
ORIFICE Orifice - Based on Area and Datum Elevation

Elevation (ft)	Q (cfs)	Computation Messages
600.00	0.0	E < E1=603.25
600.20	0.0	E < E1=603.25
600.40	0.0	E < E1=603.25
600.60	0.0	E < E1=603.25
600.80	0.0	E < E1=603.25
601.00	0.0	E < E1=603.25
601.20	0.0	E < E1=603.25
601.40	0.0	E < E1=603.25
601.60	0.0	E < E1=603.25
601.80	0.0	E < E1=603.25
602.00	0.0	E < E1=603.25
602.20	0.0	E < E1=603.25
602.40	0.0	E < E1=603.25
602.60	0.0	E < E1=603.25
602.80	0.0	E < E1=603.25
603.00	0.0	E < E1=603.25
603.20	0.0	E < E1=603.25
603.40	29.6	H =.942
603.60	32.6	H =1.142
603.80	35.3	H =1.342
604.00	37.9	H =1.542
604.20	40.2	H =1.742
604.40	42.5	H =1.942
604.60	44.6	H =2.142
604.80	46.7	H =2.342
605.00	48.6	H =2.542
605.20	50.5	H =2.742
605.40	52.3	H =2.942
605.60	54.1	H =3.142
605.80	55.7	H =3.342
606.00	57.4	H =3.542

C = .6 A = 6.333333 sq.ft.
H (ft) = Table elev. - Datum elev. (602.4583 ft)
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: 8861N .STR

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

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INDIAN SPRINGS NORTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

Outflow Rating Table for Structure #2
WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
600.00	0.0	H =0.0
600.20	0.9	H =.2
600.40	2.5	H =.4
600.60	4.6	H =.6
600.80	7.2	H =.8
601.00	10.0	H =1.0
601.20	13.1	H =1.2
601.40	16.6	H =1.4
601.60	20.2	H =1.6
601.80	24.1	H =1.8
602.00	28.3	H =2.0
602.20	32.6	H =2.2
602.40	37.2	H =2.4
602.60	41.9	H =2.6
602.80	46.9	H =2.8
603.00	52.0	H =3.0
603.20	57.2	H =3.2
603.40	62.7	H =3.4
603.60	68.3	H =3.6
603.80	74.1	H =3.8
604.00	80.0	H =4.0
604.20	86.1	H =4.2
604.40	92.3	H =4.4
604.60	98.7	H =4.6
604.80	105.2	H =4.8
605.00	111.8	H =5.0
605.20	118.6	H =5.2
605.40	125.5	H =5.4
605.60	132.5	H =5.6
605.80	139.7	H =5.8
606.00	147.0	H =6.0

C = 3 L (ft) = 3.333333
H (ft) = Table elev. - Invert elev. (600 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: 8861N .STR

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

****
INDIAN SPRINGS NORTH BASIN
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997
****

Outflow Rating Table for Structure #1
ORIFICE Orifice - Based on Area and Datum Elevation

Elevation (ft)	Q (cfs)	Computation Messages
600.00	0.0	E < E1=601
600.20	0.0	E < E1=601
600.40	0.0	E < E1=601
600.60	0.0	E < E1=601
600.80	0.0	E < E1=601
601.00	11.3	H =.5
601.20	13.4	H =.7
601.40	15.2	H =.9
601.60	16.8	H =1.1
601.80	18.3	H =1.3
602.00	19.7	H =1.5
602.20	20.9	H =1.7
602.40	22.1	H =1.9
602.60	23.3	H =2.1
602.80	24.3	H =2.3
603.00	25.4	H =2.5
603.20	26.4	H =2.7
603.40	27.3	H =2.9
603.60	28.3	H =3.1
603.80	29.2	H =3.3
604.00	30.0	H =3.5
604.20	30.9	H =3.7
604.40	31.7	H =3.9
604.60	32.5	H =4.1
604.80	33.3	H =4.3
605.00	34.0	H =4.5
605.20	34.8	H =4.7
605.40	35.5	H =4.9
605.60	36.2	H =5.1
605.80	36.9	H =5.3
606.00	37.6	H =5.5

C = .6 A = 3.333333 sq.ft.
H (ft) = Table elev. - Datum elev. (600.5 ft)
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: 8861N .STR

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

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INDIAN SPRINGS NORTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

Outflow Rating Table A
Table A = 4 ? 3

Elevation (ft)	Q (cfs)	Contributing Structures
600.00	0.0	-
600.20	0.0	-
600.40	0.0	-
600.60	0.0	-
600.80	0.0	-
601.00	0.0	-
601.20	0.0	-
601.40	0.0	-
601.60	0.0	-
601.80	0.1	4
602.00	1.5	4
602.20	3.6	4
602.40	6.3	4
602.60	9.4	4
602.80	12.9	4
603.00	16.8	4
603.20	21.0	4
603.40	25.4	4
603.60	30.2	4
603.80	35.2	4
604.00	37.9	3
604.20	40.2	3
604.40	42.5	3
604.60	44.6	3
604.80	46.7	3
605.00	48.6	3
605.20	50.5	3
605.40	52.3	3
605.60	54.1	3
605.80	55.7	3
606.00	57.4	3

Outlet Structure File: 8861N .STR

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

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INDIAN SPRINGS NORTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

Outflow Rating Table B
Table B = 2 ? 1

Elevation (ft)	Q (cfs)	Contributing Structures
600.00	0.0	2
600.20	0.9	2
600.40	2.5	2
600.60	4.6	2
600.80	7.2	2
601.00	10.0	2
601.20	13.1	2
601.40	15.2	1
601.60	16.8	1
601.80	18.3	1
602.00	19.7	1
602.20	20.9	1
602.40	22.1	1
602.60	23.3	1
602.80	24.3	1
603.00	25.4	1
603.20	26.4	1
603.40	27.3	1
603.60	28.3	1
603.80	29.2	1
604.00	30.0	1
604.20	30.9	1
604.40	31.7	1
604.60	32.5	1
604.80	33.3	1
605.00	34.0	1
605.20	34.8	1
605.40	35.5	1
605.60	36.2	1
605.80	36.9	1
606.00	37.6	1

```
**********************************************************************
*                                                                    *
*  INDIAN SPRINGS                                                    *
*                                                  SOUTH WATERSHE    *
*                        DETENTION ANALYSIS                          *
*                PREPARED BY: BAX ENGINEERING CO., INC.              *
*                             MARCH 5, 1997                          *
*                                                                    *
**********************************************************************
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********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: 8861S .PND
Inflow Hydrograph: 8861S002.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 592.00 ft

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

Peak Inflow	=	30.09 cfs
Peak Outflow	=	16.26 cfs
Peak Elevation	=	593.43 ft

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

Initial Storage	=	1.84 ac-ft
Peak Storage From Storm	=	0.63 ac-ft
Total Storage in Pond	=	2.46 ac-ft

****
* INDIAN SPRINGS SOUTH WATERSHE *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* MARCH 5, 1997 *
****

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

Pond File: 8861S .PND
Inflow Hydrograph: 8861S005.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 592.00 ft

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

Peak Inflow	=	37.01 cfs
Peak Outflow	=	22.20 cfs
Peak Elevation	=	593.65 ft

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

Initial Storage	=	1.84 ac-ft
Peak Storage From Storm	=	0.73 ac-ft
Total Storage in Pond	=	2.56 ac-ft

****
* *
* INDIAN SPRINGS SOUTH WATERSHE *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* MARCH 5, 1997 *
* *
****

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

Pond File: 8861S .PND
Inflow Hydrograph: 8861S015.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 592.00 ft

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

Peak Inflow	=	49.34 cfs
Peak Outflow	=	32.84 cfs
Peak Elevation	=	593.99 ft

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

Initial Storage	=	1.84 ac-ft
Peak Storage From Storm	=	0.89 ac-ft
Total Storage in Pond	=	2.73 ac-ft

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**************************************************************************
*                                                                        *
*  INDIAN SPRINGS                                        SOUTH WATERSHE  *
*                          DETENTION ANALYSIS                            *
*                PREPARED BY: BAX ENGINEERING CO., INC.                  *
*                             MARCH 5, 1997                              *
*                                                                        *
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********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: 8861S .PND
Inflow Hydrograph: 8861S025.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 592.00 ft

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

Peak Inflow	=	60.93 cfs
Peak Outflow	=	43.04 cfs
Peak Elevation	=	594.29 ft

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

Initial Storage	=	1.84 ac-ft
Peak Storage From Storm	=	1.04 ac-ft
Total Storage in Pond	=	2.87 ac-ft

Outlet Structure File: 8861S .STR

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

****
INDIAN SPRINGS SOUTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

Elevation (ft)	Q (cfs)	Contributing Structures
592.00	0.0	
592.25	0.0	
592.50	0.0	3
592.75	2.3	3
593.00	6.4	3
593.25	11.7	3
593.50	18.0	3
593.75	25.2	3
594.00	33.1	3
594.25	41.7	3
594.50	50.9	3
594.75	60.8	3
595.00	71.2	3
595.25	82.1	3
595.50	93.5	3
595.75	105.5	3
596.00	117.9	3

Outlet Structure File: 8861S .STR

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

****
INDIAN SPRINGS SOUTH BASIN
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997
****

Outlet Structure File: 8861S .STR
Planimeter Input File: 8861S .VOL
Rating Table Output File: 8861S .PND

Min. Elev.(ft) = 592 Max. Elev.(ft) = 596 Incr.(ft) = .25

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

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	3		->	3

Outflow rating table summary was stored in file:
8861S .PND

Outlet Structure File: 8861S .STR

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

****
INDIAN SPRINGS SOUTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	592.5
E2 elev.(ft)?	596.001
Weir coefficient?	3
Weir elev.(ft)?	592.500
Length (ft)?	6.0
Contracted/Suppressed (C/S)?	S

Outlet Structure File: 8861S .STR

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

****
INDIAN SPRINGS SOUTH BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

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

Elevation (ft)	Q (cfs)	Computation Messages
592.00	0.0	E < Inv.El.= 592.5
592.25	0.0	E < Inv.El.= 592.5
592.50	0.0	H =0.0
592.75	2.3	H =.25
593.00	6.4	H =.5
593.25	11.7	H =.750
593.50	18.0	H =1.0
593.75	25.2	H =1.25
594.00	33.1	H =1.5
594.25	41.7	H =1.75
594.50	50.9	H =2.0
594.75	60.8	H =2.25
595.00	71.2	H =2.5
595.25	82.1	H =2.75
595.50	93.5	H =3.0
595.75	105.5	H =3.25
596.00	117.9	H =3.5

C = 3 L (ft) = 6
H (ft) = Table elev. - Invert elev. (592.5 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

****
*
* INDIAN SPRINGS WEST WATERSHE *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* MARCH 5, 1997 *
*
****

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

Pond File: 8861W .PND
Inflow Hydrograph: 8861W002.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 610.00 ft

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

Peak Inflow	=	10.29 cfs
Peak Outflow	=	4.12 cfs
Peak Elevation	=	613.44 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.18 ac-ft
Total Storage in Pond	=	0.18 ac-ft

****
* INDIAN SPRINGS WEST WATERSHE *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* MARCH 5, 1997 *
****

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

Pond File: 8861W .PND
Inflow Hydrograph: 8861W005.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 610.00 ft

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

Peak Inflow	=	12.65 cfs
Peak Outflow	=	4.48 cfs
Peak Elevation	=	613.97 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.23 ac-ft
Total Storage in Pond	=	0.23 ac-ft

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**************************************************************************
*                                                                        *
*  INDIAN SPRINGS                                        WEST WATERSHE   *
*                          DETENTION ANALYSIS                            *
*                PREPARED BY: BAX ENGINEERING CO., INC.                  *
*                             MARCH 5, 1997                              *
*                                                                        *
**************************************************************************
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********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: 8861W .PND
Inflow Hydrograph: 8861W015.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 610.00 ft

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

Peak Inflow	=	16.87 cfs
Peak Outflow	=	5.01 cfs
Peak Elevation	=	614.83 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.34 ac-ft
Total Storage in Pond	=	0.34 ac-ft

****
* INDIAN SPRINGS WEST WATERSHE *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* MARCH 5, 1997 *
****

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

Pond File: 8861W .PND
Inflow Hydrograph: 8861W025.HYD
Outflow Hydrograph:

Starting Pond W.S. Elevation = 610.00 ft

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

Peak Inflow	=	20.80 cfs
Peak Outflow	=	5.37 cfs
Peak Elevation	=	615.55 ft

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

Initial Storage	=	0.00 ac-ft
Peak Storage From Storm	=	0.43 ac-ft
Total Storage in Pond	=	0.43 ac-ft

Outlet Structure File: 66BIW .STR

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

****
INDIAN SPRINGS WEST BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

Elevation (ft)	Q (cfs)	Contributing Structures
610.00	0.0	1
610.20	0.1	1
610.40	0.4	1
610.60	0.7	1
610.80	1.1	1
611.00	1.5	1
611.20	2.0	1
611.40	2.3	2
611.60	2.5	2
611.80	2.7	2
612.00	2.9	2
612.20	3.1	2
612.40	3.3	2
612.60	3.5	2
612.80	3.7	2
613.00	3.8	2
613.20	4.0	2
613.40	4.1	2
613.60	4.2	2
613.80	4.4	2
614.00	4.5	2
614.20	4.6	2
614.40	4.8	2
614.60	4.9	2
614.80	5.0	2
615.00	5.1	2
615.20	5.2	2
615.40	5.3	2
615.60	5.4	2
615.80	5.5	2
616.00	5.6	2
616.20	5.7	2
616.40	5.8	2
616.60	5.9	2
616.80	6.0	2
617.00	6.1	3 +2
617.20	9.4	3 +2
617.40	15.2	3 +2
617.60	22.7	3 +2
617.80	31.6	3 +2
618.00	41.6	3 +2

Outlet Structure File: 8861W .STR

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

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INDIAN SPRINGS WEST BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

Outlet Structure File: 8861W .STR
Planimeter Input File: 8861W .VOL
Rating Table Output File: 8861W .PND

Min. Elev.(ft) = 610 Max. Elev.(ft) = 618 Incr.(ft) = .2

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

****
SYSTEM CONNECTIVITY
****

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

Outflow rating table summary was stored in file:
8861W .PND

Outlet Structure File: 8861W .STR

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

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INDIAN SPRINGS WEST BASIN
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997
****

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

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)? 617
E2 elev.(ft)? 618.001
Weir coefficient? 3
Weir elev.(ft)? 617.000
Length (ft)? 11.67
Contracted/Suppressed (C/S)? S

Outlet Structure File: 8861W .STR

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

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INDIAN SPRINGS WEST BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

›››››› Structure No. 1 ‹‹‹‹‹‹
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	610
E2 elev.(ft)?	618.001
Weir coefficient?	3
Weir elev.(ft)?	610.00
Length (ft)?	.500000
Contracted/Suppressed (C/S)?	S

Outlet Structure File: 8861W .STR

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

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INDIAN SPRINGS WEST BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

ORIFICE
Orifice - Based on Area and Datum Elevation

E1 elev.(ft)?	611.00
E2 elev.(ft)?	618.001
Orifice coeff.?	0.6
Invert elev.(ft)?	610.000
Datum elev.(ft) ?	610.5000
Orifice area (sq ft)?	0.50000

Outlet Structure File: 8861W .STR

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

****
INDIAN SPRINGS WEST BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

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

Elevation (ft)	Q (cfs)	Computation Messages
610.00	0.0	E < Inv.El.= 617
610.20	0.0	E < Inv.El.= 617
610.40	0.0	E < Inv.El.= 617
610.60	0.0	E < Inv.El.= 617
610.80	0.0	E < Inv.El.= 617
611.00	0.0	E < Inv.El.= 617
611.20	0.0	E < Inv.El.= 617
611.40	0.0	E < Inv.El.= 617
611.60	0.0	E < Inv.El.= 617
611.80	0.0	E < Inv.El.= 617
612.00	0.0	E < Inv.El.= 617
612.20	0.0	E < Inv.El.= 617
612.40	0.0	E < Inv.El.= 617
612.60	0.0	E < Inv.El.= 617
612.80	0.0	E < Inv.El.= 617
613.00	0.0	E < Inv.El.= 617
613.20	0.0	E < Inv.El.= 617
613.40	0.0	E < Inv.El.= 617
613.60	0.0	E < Inv.El.= 617
613.80	0.0	E < Inv.El.= 617
614.00	0.0	E < Inv.El.= 617
614.20	0.0	E < Inv.El.= 617
614.40	0.0	E < Inv.El.= 617
614.60	0.0	E < Inv.El.= 617
614.80	0.0	E < Inv.El.= 617
615.00	0.0	E < Inv.El.= 617
615.20	0.0	E < Inv.El.= 617
615.40	0.0	E < Inv.El.= 617
615.60	0.0	E < Inv.El.= 617
615.80	0.0	E < Inv.El.= 617
616.00	0.0	E < Inv.El.= 617
616.20	0.0	E < Inv.El.= 617
616.40	0.0	E < Inv.El.= 617
616.60	0.0	E < Inv.El.= 617

Outlet Structure File: 8861W .STR

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

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

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

Elevation (ft)	Q (cfs)	Computation Messages
616.80	0.0	E < Inv.El.= 617
617.00	0.0	H =0.0
617.20	3.1	H =.2
617.40	8.9	H =.4
617.60	16.3	H =.6
617.80	25.1	H =.8
618.00	35.0	H =1.0

C = 3 L (ft) = 11.67
H (ft) = Table elev. - Invert elev. (617 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: 8861W .STR

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

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INDIAN SPRINGS WEST BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

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

Elevation (ft)	Q (cfs)	Computation Messages
610.00	0.0	H =0.0
610.20	0.1	H =.2
610.40	0.4	H =.4
610.60	0.7	H =.6
610.80	1.1	H =.8
611.00	1.5	H =1.0
611.20	2.0	H =1.2
611.40	2.5	H =1.4
611.60	3.0	H =1.6
611.80	3.6	H =1.8
612.00	4.2	H =2.0
612.20	4.9	H =2.2
612.40	5.6	H =2.4
612.60	6.3	H =2.6
612.80	7.0	H =2.8
613.00	7.8	H =3.0
613.20	8.6	H =3.2
613.40	9.4	H =3.4
613.60	10.2	H =3.6
613.80	11.1	H =3.8
614.00	12.0	H =4.0
614.20	12.9	H =4.2
614.40	13.8	H =4.4
614.60	14.8	H =4.6
614.80	15.8	H =4.8
615.00	16.8	H =5.0
615.20	17.8	H =5.2
615.40	18.8	H =5.4
615.60	19.9	H =5.6
615.80	21.0	H =5.8
616.00	22.0	H =6.0
616.20	23.2	H =6.2
616.40	24.3	H =6.4
616.60	25.4	H =6.6

Outlet Structure File: 88r1W .STR

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

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INDIAN SPRINGS WEST BASIN

DETENTION ANALYSIS

PREPARED BY: BAX ENGINEERING CO., INC.

MARCH 5, 1997

****

Outflow Rating Table for Structure #1

WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
610.00	0.0	H =0.0
610.20	0.1	H =.2
610.40	0.4	H =.4
610.60	0.7	H =.6
610.80	1.1	H =.8
611.00	1.5	H =1.0
611.20	2.0	H =1.2
611.40	2.5	H =1.4
611.60	3.0	H =1.6
611.80	3.6	H =1.8
612.00	4.2	H =2.0
612.20	4.9	H =2.2
612.40	5.6	H =2.4
612.60	6.3	H =2.6
612.80	7.0	H =2.8
613.00	7.8	H =3.0
613.20	8.6	H =3.2
613.40	9.4	H =3.4
613.60	10.2	H =3.6
613.80	11.1	H =3.8
614.00	12.0	H =4.0
614.20	12.9	H =4.2
614.40	13.8	H =4.4
614.60	14.8	H =4.6
614.80	15.8	H =4.8
615.00	16.8	H =5.0
615.20	17.8	H =5.2
615.40	18.8	H =5.4
615.60	19.9	H =5.6
615.80	21.0	H =5.8
616.00	22.0	H =6.0
616.20	23.2	H =6.2
616.40	24.3	H =6.4
616.60	25.4	H =6.6

Outlet Structure File: 8861W .STR

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

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

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

Elevation (ft)	Q (cfs)	Computation Messages
616.80	26.6	H =6.8
617.00	27.8	H =7.0
617.20	29.0	H =7.2
617.40	30.2	H =7.400
617.60	31.4	H =7.6
617.80	32.7	H =7.8
618.00	33.9	H =8.0

C = 3 L (ft) = .5
H (ft) = Table elev. - Invert elev. (610 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: 8861W .STR

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

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INDIAN SPRINGS WEST BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

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

Elevation (ft)	Q (cfs)	Computation Messages
610.00	0.0	E < E1=611.00
610.20	0.0	E < E1=611.00
610.40	0.0	E < E1=611.00
610.60	0.0	E < E1=611.00
610.80	0.0	E < E1=611.00
611.00	1.7	H =.5
611.20	2.0	H =.7
611.40	2.3	H =.9
611.60	2.5	H =1.1
611.80	2.7	H =1.3
612.00	2.9	H =1.5
612.20	3.1	H =1.7
612.40	3.3	H =1.9
612.60	3.5	H =2.1
612.80	3.7	H =2.3
613.00	3.8	H =2.5
613.20	4.0	H =2.7
613.40	4.1	H =2.9
613.60	4.2	H =3.1
613.80	4.4	H =3.3
614.00	4.5	H =3.5
614.20	4.6	H =3.7
614.40	4.8	H =3.9
614.60	4.9	H =4.1
614.80	5.0	H =4.3
615.00	5.1	H =4.5
615.20	5.2	H =4.7
615.40	5.3	H =4.9
615.60	5.4	H =5.1
615.80	5.5	H =5.3
616.00	5.6	H =5.5
616.20	5.7	H =5.7
616.40	5.8	H =5.9
616.60	5.9	H =6.1

Outlet Structure File: 8861W .STR

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

>>>>> CONTINUED from previous page <<<<<

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

Elevation (ft)	Q (cfs)	Computation Messages
616.80	6.0	H =6.3
617.00	6.1	H =6.5
617.20	6.2	H =6.7
617.40	6.3	H =6.9
617.60	6.4	H =7.1
617.80	6.5	H =7.3
618.00	6.6	H =7.5

C = .6 A = .5 sq.ft.
H (ft) = Table elev. - Datum elev. (610.5 ft)
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: 8861W .STR

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

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INDIAN SPRINGS WEST BASIN

DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
MARCH 5, 1997

****

Outflow Rating Table A
Table A = 1 ? 2

Elevation (ft)	Q (cfs)	Contributing Structures
610.00	0.0	1
610.20	0.1	1
610.40	0.4	1
610.60	0.7	1
610.80	1.1	1
611.00	1.5	1
611.20	2.0	1
611.40	2.3	2
611.60	2.5	2
611.80	2.7	2
612.00	2.9	2
612.20	3.1	2
612.40	3.3	2
612.60	3.5	2
612.80	3.7	2
613.00	3.8	2
613.20	4.0	2
613.40	4.1	2
613.60	4.2	2
613.80	4.4	2
614.00	4.5	2
614.20	4.6	2
614.40	4.8	2
614.60	4.9	2
614.80	5.0	2
615.00	5.1	2
615.20	5.2	2
615.40	5.3	2
615.60	5.4	2
615.80	5.5	2
616.00	5.6	2
616.20	5.7	2
616.40	5.8	2
616.60	5.9	2
616.80	6.0	2
617.00	6.1	2
617.20	6.2	2
617.40	6.3	2
617.60	6.4	2
617.80	6.5	2
618.00	6.6	2

ENGINEERING

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Need 5 yrs.

SEDIMENT STORAGE CALCULATIONS
INDIAN SPRINGS - **NORTH BASIN**
BAX PROJECT NO. 96-8861
APRIL 11, 1997

Sediment storage will be provided by over excavation of the lake bottom. The following calculations are based on an attached nomograph provided by the City of O'Fallon.

Total disturbed area tributary to lake: 17.37 AC.
Rational Method "C" Factor: 0.40%

FROM FIGURE 1:

The required volume for 1 year construction period:

117 Cu.Ft./Ac. x 17.37 Ac. = 2,032 Cu.Ft.

Volume Calculation:

ELEVATION	AREA	VOLUME	TOTAL VOLUME
602.0	10,038 s.f.	0 c.f.	0 c.f.
601.0	8,810 s.f.	9,424 c.f.	9,424 c.f.

Based on the above calculations the lake will be required to be over excavated 0.22' (2,073 c.f.) to provide storage for the anticipated sediment run-off.

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

NORTH BASIN

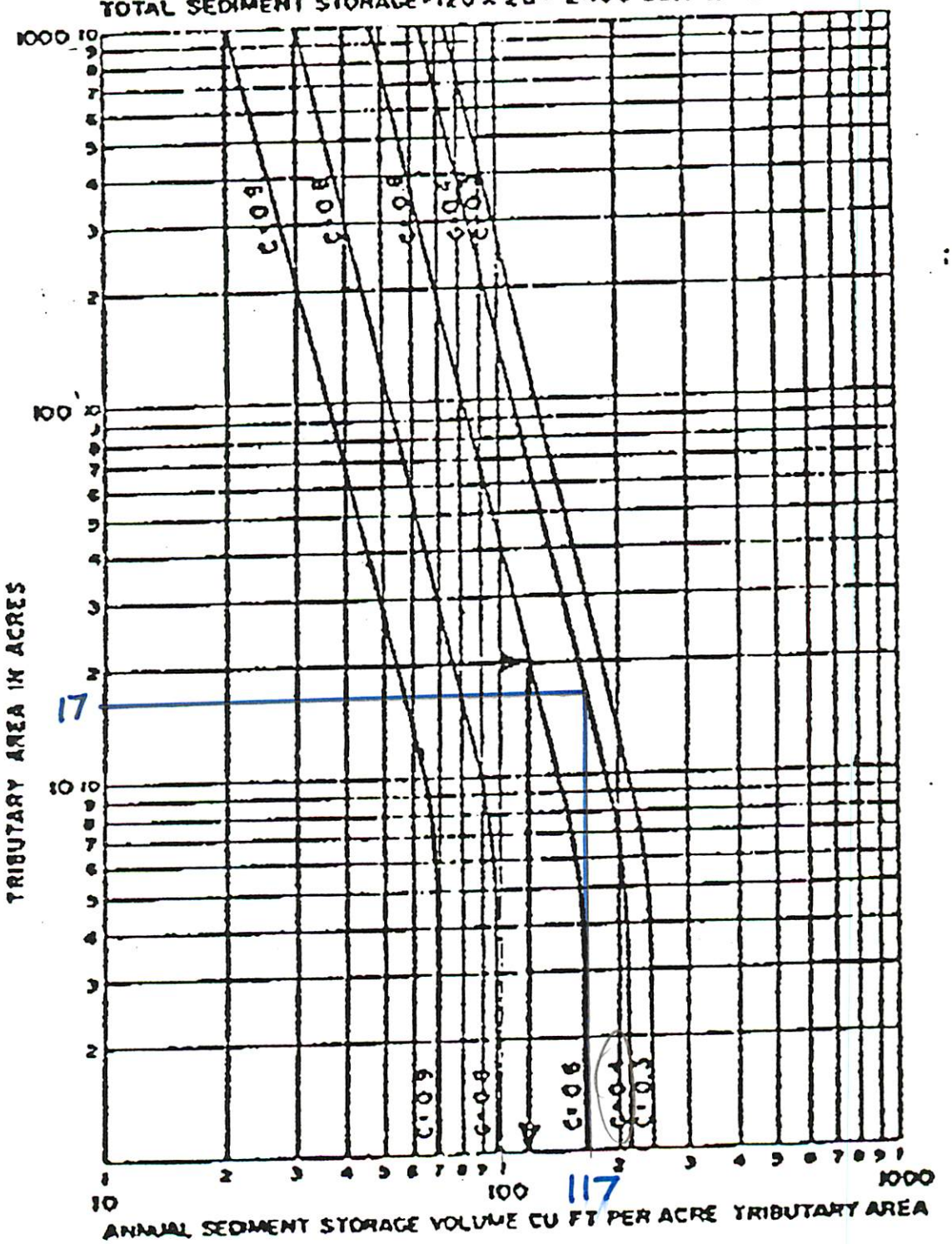
EXAMPLE:

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

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Need 5 yrs.

SEDIMENT STORAGE CALCULATIONS
INDIAN SPRINGS - **SOUTH BASIN**
BAX PROJECT NO. 96-8861
APRIL 11, 1997

Sediment storage will be provided by over excavation of the lake bottom. The following calculations are based on an attached nomograph provided by the City of O'Fallon.

Total disturbed area tributary to lake: 14.29 AC.
Rational Method "C" Factor: 0.40%

FROM FIGURE 1:

The required volume for 1 year construction period:

118 Cu.Ft./Ac. x 14.29 Ac. = 1,686 Cu.Ft.

Volume Calculation:

ELEVATION	AREA	VOLUME	TOTAL VOLUME
586.0	9,186 s.f.	0 c.f.	0 c.f.
585.0	8,000 s.f.	8,593 c.f.	8,593 c.f.

Based on the above calculations the lake will be required to be over excavated **0.20'** (1,719 c.f.) to provide storage for the anticipated sediment run-off.

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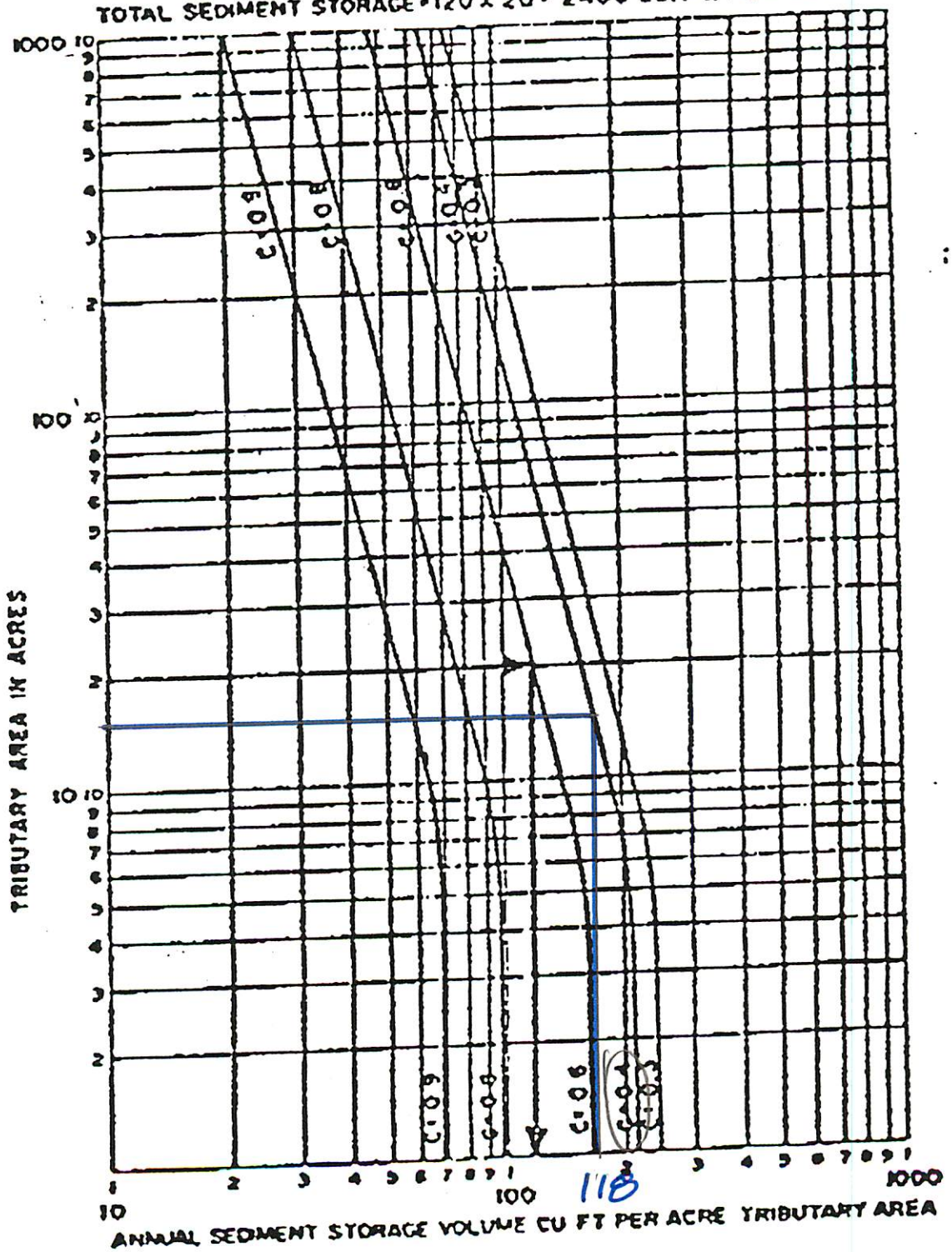
1052 South Cloverleaf Drive
St. Peters, MO 63376-6445
314-928-5552 FAX 928-1718

SOUTH 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

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Need 5 yrs.

SEDIMENT STORAGE CALCULATIONS
INDIAN SPRINGS - **WEST BASIN**
BAX PROJECT NO. 96-8861
APRIL 11, 1997

Sediment storage will be provided by over excavation of the lake bottom. The following calculations are based on an attached nomograph provided by the City of O'Fallon.

Total disturbed area tributary to lake: 6.03 AC.
Rational Method "C" Factor: 0.40%

FROM FIGURE 1:

The required volume for 1 year construction period:

120 Cu.Ft./Ac. x 6.03 Ac. = 724 Cu.Ft.

Volume Calculation:

ELEVATION	AREA	VOLUME	TOTAL VOLUME
612.0	3,319 s.f.	0 c.f.	0 c.f.
611.0	2,650 s.f.	2,985 c.f.	2,985 c.f.

Based on the above calculations the lake will be required to be over excavated **0.25'** (746 c.f.) to provide storage for the anticipated sediment run-off.

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WEST BASIN

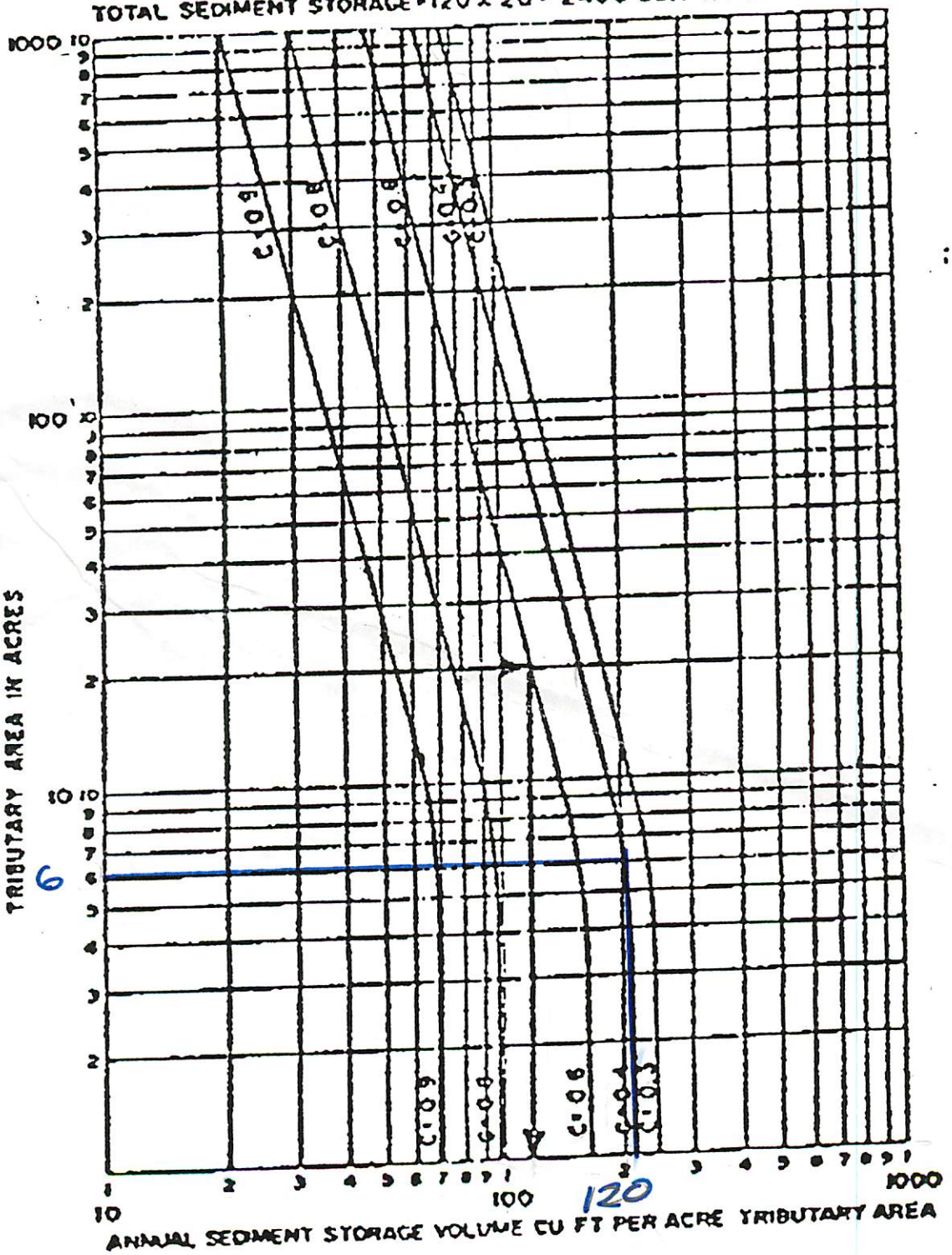
EXAMPLE:

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