

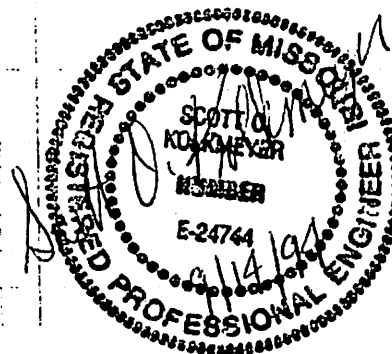


STORMWATER DETENTION ANALYSIS
MIDPOINT INDUSTRIAL PARK - LOT 12 PLAT 3
PREPARED BY: BAX ENGINEERING CO. INC.
SEPTEMBER 14, 1994

INTRODUCTION

The purpose of this analysis is to analyze the stormwater detention basin proposed for Midpoint Industrial Park - Lot 12 Plat 3 and shown on a site plan prepared for such lot by Bax Engineering Co. Inc. Upon development of the Midpoint Industrial Park, detention was not provided for development of the individual lots. It is therefore required that each lot construct a detention basin to comply with City of O'Fallon development requirements as part of the development of each lot. Stormwater detention requirements for the City of O'Fallon are such that the 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 design 25 year frequency - 20 minute duration storm. Detention of the 100 year - 20 minute design storm is not required, however it is required to be checked for safe passage through the detention basin.

Although it is not required, this analysis shall go beyond the requirements of the City of O'Fallon and analyze a 2 year - 20 minute storm and a 100 year - 20 minute storm in addition to the required 25 year - 20 minute storm. It shall further be analyzed that detention not only for the site as a whole be checked but that additional detention if required be provided to insure that the post developed flow leaving the site at the point of the detention basin discharge is less than the pre-developed flow leaving the site at that point for the design storms analyzed.





Project: _____

Date: _____ Project No: _____

Designed: _____ Checked: _____

GENERAL SITE DATA & RUNOFF CALCULATIONS

1.) Area of tract: 0.73 Acres

2.) The pre-developed P.I. factors to be used for the analysis are: *
(All areas assumed 0% - 5% impervious)

2 year - 20 minute storm: 1.09 c.f.s./A²

25 year - 20 minute storm: 2.31 c.f.s./A²

100 year - 20 minute storm: 2.95 c.f.s./A²

3.) The post-developed P.I. factors to be used for the analysis are: *
(Areas which are 100% impervious)

2 year - 20 minute storm: 2.39 c.f.s./A²

25 year - 20 minute storm: 4.75 c.f.s./A²

100 year - 20 minute storm: 6.08 c.f.s./A²

* P.I. factors for the 25 year - 20 minute storm and 100 year - 20 minute storm used in the analysis are per City of O'Fallon Subdivision and Land Development Ordinance - July 1987. The P.I. factor for the 2 year - 20 minute storm used in the analysis is per The Metropolitan St. Louis Sewer District Rules and Regulations and Engineering Design Requirements for Sanitary Sewage and Stormwater Drainage Facilities, - Dec. 1993



Project: _____

Date: _____ Project No: _____

Designed: _____ Checked: _____

4) From the drainage area map of the project, the storm inflows to the basin are found as:

2 Year - 20 Minute Storm:

$$\text{ONSITE: } 0.20A^E @ 1.09 \text{ c.f.s./A}^E = 0.22 \text{ c.f.s.}$$

$$0.25A^E @ 2.39 \text{ c.f.s./A}^E = 0.60 \text{ c.f.s.}$$

$$\text{OFFSITE: } 0.60A^E @ 1.09 \text{ c.f.s./A}^E = 0.65 \text{ c.f.s.}$$

$$\text{TOTAL } Q_{2/20} = 1.47 \text{ c.f.s.}$$

25 Year - 20 Minute Storm:

$$\text{ONSITE: } 0.20A^E @ 2.31 \text{ c.f.s./A}^E = 0.46 \text{ c.f.s.}$$

$$0.25A^E @ 4.75 \text{ c.f.s./A}^E = 1.19 \text{ c.f.s.}$$

$$\text{OFFSITE: } 0.60A^E @ 2.31 \text{ c.f.s./A}^E = 1.39 \text{ c.f.s.}$$

$$\text{TOTAL } Q_{25/20} = 3.04 \text{ c.f.s.}$$

100 Year - 20 Minute Storm:

$$\text{ONSITE: } 0.20A^E @ 2.95 \text{ c.f.s./A}^E = 0.59 \text{ c.f.s.}$$

$$0.25A^E @ 6.08 \text{ c.f.s./A}^E = 1.52 \text{ c.f.s.}$$

$$\text{OFFSITE: } 0.60A^E @ 2.95 \text{ c.f.s./A}^E = 1.77 \text{ c.f.s.}$$

$$\text{TOTAL } Q_{100/20} = 3.88 \text{ c.f.s.}$$

** 100 Year - 20 Minute Storm: (Assumes offsite area fully developed without any provided detention)

$$\text{ONSITE: } 0.20A^E @ 2.95 \text{ c.f.s./A}^E = 0.59 \text{ c.f.s.}$$

$$0.25A^E @ 6.08 \text{ c.f.s./A}^E = 1.52 \text{ c.f.s.}$$

$$\text{OFFSITE: } 0.60A^E @ 6.08 \text{ c.f.s./A}^E = 3.65 \text{ c.f.s.}$$

$$\text{TOTAL } Q_{100/20} = 5.76 \text{ c.f.s.}$$

** This is considered a severe case in which no offsite detention takes place when the offsite area is fully developed at 100% impervious, even though it is assumed some sort of detention will be required when offite areas are developed. Detention will be checked for onsite areas alone.



Project: _____

Date: _____ Project No: _____

Designed: _____ Checked: _____

5.) Of the flows that will inflow to the proposed detention basin, the most remote point of origination lies offsite approximately 100 feet north of the north property line of the site. It is assumed that this area may eventually be developed and served by storm sewers and therefore the travel time is estimated by assuming the stormwater to travel via storm sewers at an average velocity of 7 ft./sec for a distance of 350 feet to the detention basin. The travel time is then $350 \text{ ft.} / 7 \text{ ft./sec.} = 50 \text{ secs.} = 0.83 \text{ min.} \Rightarrow$ Use 1 minute. (It is estimated that under existing conditions of the offsite drainage area, the travel time will be slightly higher, which would result in a shorter time period in which the peak flow would be contributing. It is therefore considered conservative to use the condition for the shortest travel time.) The time of concentration to be used for the analysis shall be 1 minute.

6.) It has been estimated that the development will contain $0.41 A^c$ of 100% impervious area. The remaining area shall be grassed and assumed at 0%-5% impervious. The required attenuation due to development of the site as a whole is therefore estimated at: *

2 year-20 minute storm:

$$0.41 A^c (2.39 \text{ c.f.s./A}^c - 1.09 \text{ c.f.s./A}^c) = 0.53 \text{ c.f.s.}$$

25 year-20 minute storm:

$$0.41 A^c (4.75 \text{ c.f.s./A}^c - 2.31 \text{ c.f.s./A}^c) = 1.00 \text{ c.f.s.}$$

100 year-20 minute storm:

$$0.41 A^c (6.08 \text{ c.f.s./A}^c - 2.95 \text{ c.f.s./A}^c) = 1.28 \text{ c.f.s.}$$

* 2 year and 100 year-20 minute storm detention not required per City of O'Fallon.



Project: _____

Date: _____ Project No: _____

Designed: _____ Checked: _____

7) The area of the southwest property corner of the site shall be considered to see if the post developed rate of runoff at that point is less than or equal to the pre-developed rate of runoff at that point.

PRE-DEVELOPED RATE OF RUNOFF:

2 Year - 20 Minute Storm:

$$0.9A^E @ 1.09 \text{ c.f.s./A}^E = 0.98 \text{ c.f.s.}$$

25 Year - 20 Minute Storm:

$$0.9A^E @ 2.31 \text{ c.f.s./A}^E = 2.08 \text{ c.f.s.}$$

100 Year - 20 Minute Storm:

$$0.9A^E @ 2.95 \text{ c.f.s./A}^E = 2.66 \text{ c.f.s.}$$

POST DEVELOPED RATE OF RUNOFF: (Assumes no detention and offsite area undeveloped)

2 Year - 20 Minute storm:

$$0.85A^E @ 1.09 \text{ c.f.s./A}^E + 0.25A^E @ 2.39 \text{ c.f.s./A}^E = 1.53 \text{ c.f.s.}$$

25 Year - 20 Minute Storm:

$$0.85A^E @ 2.31 \text{ c.f.s./A}^E + 0.25A^E @ 4.75 \text{ c.f.s./A}^E = 3.15 \text{ c.f.s.}$$

100 Year - 20 Minute Storm:

$$0.85A^E @ 2.95 \text{ c.f.s./A}^E + 0.25A^E @ 6.08 \text{ c.f.s./A}^E = 4.03 \text{ c.f.s.}$$

The required attenuation is found by subtracting the pre-developed rate of runoff from the post-developed rate of runoff.

2 Year - 20 Minute Storm:

$$\text{Required Attenuation} = 1.53 \text{ c.f.s.} - 0.98 \text{ c.f.s.} = 0.55 \text{ c.f.s.} \quad (> 0.53 \text{ c.f.s. (}\#6\text{-sheet 4)})$$

25 Year - 20 Minute Storm:

$$\text{Required Attenuation} = 3.15 \text{ c.f.s.} - 2.08 \text{ c.f.s.} = 1.07 \text{ c.f.s.} \quad (> 1.00 \text{ c.f.s. (}\#6\text{-sheet 4)})$$

100 Year - 20 Minute Storm:

$$\text{Required Attenuation} = 4.03 \text{ c.f.s.} - 2.66 \text{ c.f.s.} = 1.37 \text{ c.f.s.} \quad (> 1.28 \text{ c.f.s. (}\#6\text{-sheet 4)})$$

The required attenuation found above is greater than those found on sheet 4, item 6 and therefore the above attenuation shall be used to calculate the permitted release rate of the basin.



Project: _____

Date: _____ Project No: _____

Designed: _____ Checked: _____

8.) The permitted release rate of the detention basin is found by subtracting the required attenuation from the peak inflow to the basin. The permitted release rates are as follows:

2 Year-20 Minute Storm:

$$\text{Permitted Release Rate} = 1.47 \text{ c.f.s.} - 0.55 \text{ c.f.s.} = 0.92 \text{ c.f.s.}$$

25 Year-20 Minute Storm:

$$\text{Permitted Release Rate} = 3.04 \text{ c.f.s.} - 1.07 \text{ c.f.s.} = 1.97 \text{ c.f.s.}$$

100 Year-20 Minute Storm:

$$\text{Permitted Release Rate} = 3.88 \text{ c.f.s.} - 1.37 \text{ c.f.s.} = 2.51 \text{ c.f.s.}$$

100 Year-20 Minute Storm: (Offsite flow assumed fully developed)

$$\text{Permitted Release Rate} = 5.76 \text{ c.f.s.} - 1.37 \text{ c.f.s.} = 4.39 \text{ c.f.s.}$$



Project: _____

Date: _____ Project No: _____

Designed: _____ Checked: _____

ROUTING CALCULATIONS AND RESULTS

A computer program "PONDPACK" was utilized in routing the design storms through the basin. As found in the routing calculations the results of such analysis are as follows:

2 Year-20 Minute Storm: (Sheet 20)

Peak Release Rate = 0.72 c.f.s. (< 0.92 c.f.s. ✓)

Peak Elevation = 607.85

25 Year-20 Minute Storm: (Sheet 24)

Peak Release Rate = 0.99 c.f.s. (< 1.97 c.f.s. ✓)

Peak Elevation = 608.67

100 Year-20 Minute Storm: (Sheet 28)

Peak Release Rate = 1.14 c.f.s. (< 2.51 c.f.s. ✓)

Peak Elevation = 609.04

100 Year-20 Minute Storm: (Sheet 32)

Peak Release Rate = 3.93 c.f.s. (< 4.37 c.f.s. ✓)

Peak Elevation = 609.50

As shown above, when the peak release rate is compared to the permitted release rate for that design storm, all peak release rates are less than the permitted release rate of the basin for that design storm.

A 15 year-20 minute storm was also routed through the detention basin only for the purpose of estimating the 15 year-20 minute storm highwater of the basin. Detention is not required for this design storm.

$Q_{15/20 in} = \text{ONSITE: } 0.20 A^e @ 1.87 \text{ c.f.s. } / A^e$

$0.25 A^e @ 3.85 \text{ c.f.s. } / A^e$

$\text{OFFSITE: } 0.60 A^e @ 1.87 \text{ c.f.s. } / A^e$

$Q_{15/20} = 2.45 \text{ c.f.s.}$

Results (Sheet 36)

Peak Release Rate = 0.89 c.f.s.

Peak Elevation = 608.39

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
SEPTEMBER 14, 1994

CALCULATED 09-14-1994 10:00:33
DISK FILE: MDPTXX .VOL

Planimeter scale: 1 inch = 20 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	$A1+A2+\text{sq}r(A1*A2)$ (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
606.00	0.00	0.00	0.00	0.00	0.00
608.00	4.71	0.04	0.04	0.03	0.03
610.00	9.07	0.08	0.19	0.12	0.15
610.75	10.44	0.10	0.27	0.07	0.22

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

POND-2 Version: 5.17
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MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
DETENTION ANALYSIS
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SEPTEMBER 14, 1994

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

Elevation (ft)	Q (cfs)	Contributing Structures
-----	-----	-----
606.00	0.0	1
606.20	0.1	1
606.40	0.2	1
606.60	0.3	1
606.80	0.4	2
607.00	0.5	2
607.20	0.6	2
607.40	0.6	2
607.60	0.7	2
607.80	0.7	2
608.00	0.8	2
608.20	0.8	2
608.40	0.9	2
608.60	0.9	2
608.80	1.0	2
609.00	1.0	3 +2
609.20	1.8	3 +2
609.40	3.1	3 +2
609.60	4.8	3 +2
609.80	6.9	3 +2
610.00	9.2	3 +2
610.20	11.7	3 +2
610.40	14.5	3 +2
610.60	17.5	3 +2
610.75	0.0	

9/87

Outlet Structure File: MDPTXX .STR

POND-2 Version: 5.17

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DETENTION ANALYSIS
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SEPTEMBER 14, 1994

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

Min. Elev.(ft) = 606 Max. Elev.(ft) = 610.75 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:
MDPTXX .PND

10/47

Outlet Structure File: MDPTXX .STR

POND-2 Version: 5.17

S/N:

Date Executed:

Time Executed:

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
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>>>>> Structure No. 3 <<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	609.00
E2 elev.(ft)?	610.75
Weir coefficient?	3
Weir elev.(ft)?	609.00
Length (ft)?	2.67
Contracted/Suppressed (C/S)?	S

11/97

Outlet Structure File: MDPTXX .STR

POND-2 Version: 5.17

S/N:

Date Executed:

Time Executed:

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
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>>>>> Structure No. 1 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	606.00
E2 elev.(ft)?	610.75
Weir coefficient?	3
Weir elev.(ft)?	606.00
Length (ft)?	0.25
Contracted/Suppressed (C/S)?	S

12/97

Outlet Structure File: MDPTXX .STR

POND-2 Version: 5.17

S/N:

Date Executed:

Time Executed:

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
DETENTION ANALYSIS
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>>>>> Structure No. 2 <<<<<<
(Input Data)

ORIFICE

Orifice - Based on Area and Datum Elevation

E1 elev.(ft)?	606.25
E2 elev.(ft)?	610.75
Orifice coeff.?	0.6
Invert elev.(ft)?	606.00
Datum elev.(ft) ?	606.25
Orifice area (sq ft)?	0.1250

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
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Outflow Rating Table for Structure #3
WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
606.00	0.0	E < Inv.El. = 609
606.20	0.0	E < Inv.El. = 609
606.40	0.0	E < Inv.El. = 609
606.60	0.0	E < Inv.El. = 609
606.80	0.0	E < Inv.El. = 609
607.00	0.0	E < Inv.El. = 609
607.20	0.0	E < Inv.El. = 609
607.40	0.0	E < Inv.El. = 609
607.60	0.0	E < Inv.El. = 609
607.80	0.0	E < Inv.El. = 609
608.00	0.0	E < Inv.El. = 609
608.20	0.0	E < Inv.El. = 609
608.40	0.0	E < Inv.El. = 609
608.60	0.0	E < Inv.El. = 609
608.80	0.0	E < Inv.El. = 609
609.00	0.0	H = 0.0
609.20	0.7	H = .2
609.40	2.0	H = .4
609.60	3.7	H = .6
609.80	5.7	H = .8
610.00	8.0	H = 1.0
610.20	10.5	H = 1.2
610.40	13.3	H = 1.4
610.60	16.2	H = 1.6
610.75	0.0	E = or > E2=610.75

C = 3 L (ft) = 2.67
H (ft) = Table elev. - Invert elev. (609 ft)
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

14/97

 MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
 DETENTION ANALYSIS
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 SEPTEMBER 14, 1994

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

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

Elevation (ft)	Q (cfs)	Computation Messages
606.00	0.0	H =0.0
606.20	0.1	H =.2
606.40	0.2	H =.4
606.60	0.3	H =.6
606.80	0.5	H =.8
607.00	0.8	H =1.0
607.20	1.0	H =1.2
607.40	1.2	H =1.4
607.60	1.5	H =1.6
607.80	1.8	H =1.8
608.00	2.1	H =2.0
608.20	2.4	H =2.2
608.40	2.8	H =2.4
608.60	3.1	H =2.6
608.80	3.5	H =2.8
609.00	3.9	H =3.0
609.20	4.3	H =3.2
609.40	4.7	H =3.4
609.60	5.1	H =3.6
609.80	5.6	H =3.8
610.00	6.0	H =4.0
610.20	6.5	H =4.2
610.40	6.9	H =4.4
610.60	7.4	H =4.6
610.75	0.0	E = or > E2=610.75

$C = 3 \quad L \text{ (ft)} = .25$

$H \text{ (ft)} = \text{Table elev.} - \text{Invert elev. (606 ft)}$

$Q \text{ (cfs)} = C * L * (H^{*1.5}) \text{ -- Suppressed Weir}$

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 MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
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 SEPTEMBER 14, 1994

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

Elevation (ft)	Q (cfs)	Computation Messages
606.00	0.0	E < E1=606.25
606.20	0.0	E < E1=606.25
606.40	0.2	H =.15
606.60	0.4	H =.35
606.80	0.4	H =.55
607.00	0.5	H =.750
607.20	0.6	H =.95
607.40	0.6	H =1.15
607.60	0.7	H =1.35
607.80	0.7	H =1.55
608.00	0.8	H =1.75
608.20	0.8	H =1.95
608.40	0.9	H =2.15
608.60	0.9	H =2.35
608.80	1.0	H =2.55
609.00	1.0	H =2.75
609.20	1.0	H =2.95
609.40	1.1	H =3.15
609.60	1.1	H =3.35
609.80	1.1	H =3.55
610.00	1.2	H =3.75
610.20	1.2	H =3.95
610.40	1.2	H =4.15
610.60	1.3	H =4.35
610.75	0.0	E = or > E2=610.75

$C = .6$ $A = .125 \text{ sq.ft.}$

$H \text{ (ft)} = \text{Table elev.} - \text{Datum elev. (606.25 ft)}$

$Q \text{ (cfs)} = C * A * \text{sqr}(2g * H)$

16/99

POND-2 Version: 5.17
Date Executed:

S/N:
Time Executed:

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
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SEPTEMBER 14, 1994

Outflow Rating Table A
Table A = 1 ? 2

<u>Elevation (ft)</u>	<u>Q (cfs)</u>	<u>Contributing Structures</u>
606.00	0.0	1
606.20	0.1	1
606.40	0.2	1
606.60	0.3	1
606.80	0.4	2
607.00	0.5	2
607.20	0.6	2
607.40	0.6	2
607.60	0.7	2
607.80	0.7	2
608.00	0.8	2
608.20	0.8	2
608.40	0.9	2
608.60	0.9	2
608.80	1.0	2
609.00	1.0	2
609.20	1.0	2
609.40	1.1	2
609.60	1.1	2
609.80	1.1	2
610.00	1.2	2
610.20	1.2	2
610.40	1.2	2
610.60	1.3	2
610.75	0.0	-

17/47

 *
 * MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3 *
 * DETENTION ANALYSIS *
 * PREPARED BY: BAX ENGINEERING CO., INC. *
 * SEPTEMBER 14, 1994 *
 *

Inflow Hydrograph: MDPT02 .HYD
 Rating Table file: MDPTXX .PND

----INITIAL CONDITIONS----
 Elevation = 606.00 ft
 Outflow = 0.00 cfs
 Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
606.00	0.0	0.000
606.20	0.1	0.000
606.40	0.2	0.000
606.60	0.3	0.001
606.80	0.4	0.002
607.00	0.5	0.004
607.20	0.6	0.006
607.40	0.6	0.010
607.60	0.7	0.015
607.80	0.7	0.021
608.00	0.8	0.029
608.20	0.8	0.038
608.40	0.9	0.047
608.60	0.9	0.058
608.80	1.0	0.069
609.00	1.0	0.081
609.20	1.8	0.094
609.40	3.1	0.107
609.60	4.8	0.122
609.80	6.9	0.137
610.00	9.2	0.153
610.20	11.7	0.170
610.40	14.5	0.188
610.60	17.5	0.206

INTERMEDIATE ROUTING
 COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
0.0	0.0
0.0	0.1
0.3	0.5
1.1	1.4
2.7	3.1
5.2	5.7
9.0	9.6
14.3	14.9
21.4	22.1
30.5	31.2
41.8	42.6
54.9	55.7
68.9	69.8
84.0	84.9
100.2	101.2
117.5	118.5
136.0	137.8
155.7	158.8
176.6	181.4
198.8	205.7
222.3	231.5
247.0	258.7
272.6	287.1
299.2	316.7

Time increment (t) = 1.0 min.

18/47

Pond File: MDPTXX .PND
 Inflow Hydrograph: MDPT02 .HYD
 Outflow Hydrograph: 02MT .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	606.00
1.0	1.47	1.5	0.9	1.5	0.30	606.60
2.0	1.47	2.9	3.0	3.8	0.43	606.86
3.0	1.47	2.9	4.9	5.9	0.50	607.01
4.0	1.47	2.9	6.7	7.8	0.55	607.11
5.0	1.47	2.9	8.5	9.7	0.60	607.20
6.0	1.47	2.9	10.2	11.4	0.60	607.27
7.0	1.47	2.9	11.9	13.1	0.60	607.33
8.0	1.47	2.9	13.7	14.9	0.60	607.40
9.0	1.47	2.9	15.4	16.6	0.62	607.45
10.0	1.47	2.9	17.0	18.3	0.65	607.49
11.0	1.47	2.9	18.6	20.0	0.67	607.54
12.0	1.47	2.9	20.2	21.6	0.69	607.58
13.0	1.47	2.9	21.7	23.1	0.70	607.62
14.0	1.47	2.9	23.3	24.7	0.70	607.66
15.0	1.47	2.9	24.8	26.2	0.70	607.69
16.0	1.47	2.9	26.3	27.7	0.70	607.72
17.0	1.47	2.9	27.9	29.3	0.70	607.76
18.0	1.47	2.9	29.4	30.8	0.70	607.79
19.0	1.47	2.9	30.9	32.4	0.71	607.82
20.0	1.47	2.9	32.4	33.9	0.72	607.85
21.0	0.00	1.5	32.4	33.9	0.72	607.85
22.0	0.00	0.0	31.0	32.4	0.71	607.82
23.0	0.00	0.0	29.6	31.0	0.70	607.80

19/47

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

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT02 .HYD
Outflow Hydrograph: 02MT .HYD

Starting Pond W.S. Elevation = 606.00 ft

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

Peak Inflow = 1.47 cfs
Peak Outflow = 0.72 cfs
Peak Elevation = 607.85 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.02 ac-ft

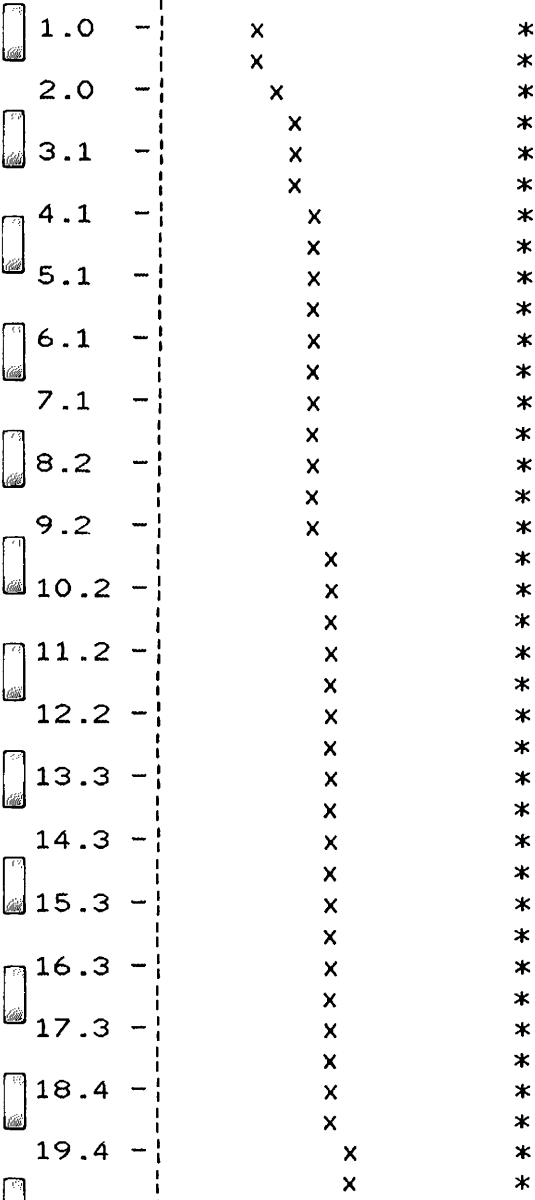
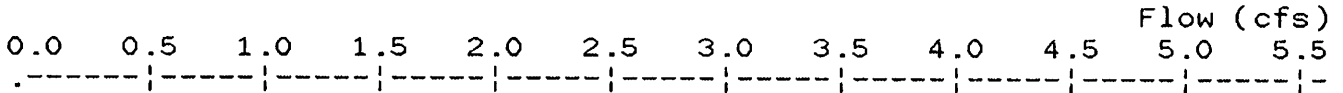
Total Storage in Pond = 0.02 ac-ft

20/47

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT02 .HYD
Outflow Hydrograph: 02MT .HYD

EXECUTED: 09-14-1994
10:50:21

Peak Inflow = 1.47 cfs
Peak Outflow = 0.72 cfs
Peak Elevation = 607.85 ft



TIME
(min)

x File: MDPT02 .HYD Qmax = 0.7 cfs
* File: 02MT .HYD Qmax = 1.5 cfs

21/47

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*****
*
* MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3 *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* SEPTEMBER 14, 1994 *
*
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Inflow Hydrograph: MDPT25 .HYD
 Rating Table file: MDPTXX .PND

----INITIAL CONDITIONS----

Elevation = 606.00 ft
 Outflow = 0.00 cfs
 Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
606.00	0.0	0.000
606.20	0.1	0.000
606.40	0.2	0.000
606.60	0.3	0.001
606.80	0.4	0.002
607.00	0.5	0.004
607.20	0.6	0.006
607.40	0.6	0.010
607.60	0.7	0.015
607.80	0.7	0.021
608.00	0.8	0.029
608.20	0.8	0.038
608.40	0.9	0.047
608.60	0.9	0.058
608.80	1.0	0.069
609.00	1.0	0.081
609.20	1.8	0.094
609.40	3.1	0.107
609.60	4.8	0.122
609.80	6.9	0.137
610.00	9.2	0.153
610.20	11.7	0.170
610.40	14.5	0.188
610.60	17.5	0.206

INTERMEDIATE ROUTING
 COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
0.0	0.0
0.0	0.1
0.3	0.5
1.1	1.4
2.7	3.1
5.2	5.7
9.0	9.6
14.3	14.9
21.4	22.1
30.5	31.2
41.8	42.6
54.9	55.7
68.9	69.8
84.0	84.9
100.2	101.2
117.5	118.5
136.0	137.8
155.7	158.8
176.6	181.4
198.8	205.7
222.3	231.5
247.0	258.7
272.6	287.1
299.2	316.7

Time increment (t) = 1.0 min.

22/47

Pond File: MDPTXX .PND
 Inflow Hydrograph: MDPT25 .HYD
 Outflow Hydrograph: 25MT .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	606.00
1.0	3.04	3.0	2.2	3.0	0.40	606.80
2.0	3.04	6.1	7.2	8.3	0.57	607.13
3.0	3.04	6.1	12.1	13.3	0.60	607.34
4.0	3.04	6.1	16.9	18.2	0.64	607.49
5.0	3.04	6.1	21.5	22.9	0.70	607.62
6.0	3.04	6.1	26.2	27.6	0.70	607.72
7.0	3.04	6.1	30.9	32.3	0.71	607.82
8.0	3.04	6.1	35.5	37.0	0.75	607.90
9.0	3.04	6.1	40.0	41.5	0.79	607.98
10.0	3.04	6.1	44.4	46.0	0.80	608.05
11.0	3.04	6.1	48.9	50.5	0.80	608.12
12.0	3.04	6.1	53.4	55.0	0.80	608.19
13.0	3.04	6.1	57.8	59.5	0.83	608.25
14.0	3.04	6.1	62.2	63.9	0.86	608.32
15.0	3.04	6.1	66.5	68.3	0.89	608.38
16.0	3.04	6.1	70.8	72.6	0.90	608.44
17.0	3.04	6.1	75.1	76.9	0.90	608.49
18.0	3.04	6.1	79.3	81.1	0.90	608.55
19.0	3.04	6.1	83.6	85.4	0.90	608.61
20.0	3.04	6.1	87.8	89.7	0.93	608.66
21.0	0.00	3.0	89.0	90.9	0.94	608.67
22.0	0.00	0.0	87.1	89.0	0.93	608.65
23.0	0.00	0.0	85.3	87.1	0.91	608.63

23/47

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

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT25 .HYD
Outflow Hydrograph: 25MT .HYD

Starting Pond W.S. Elevation = 606.00 ft

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

Peak Inflow = 3.04 cfs
Peak Outflow = 0.94 cfs
Peak Elevation = 608.67 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.06 ac-ft

Total Storage in Pond = 0.06 ac-ft

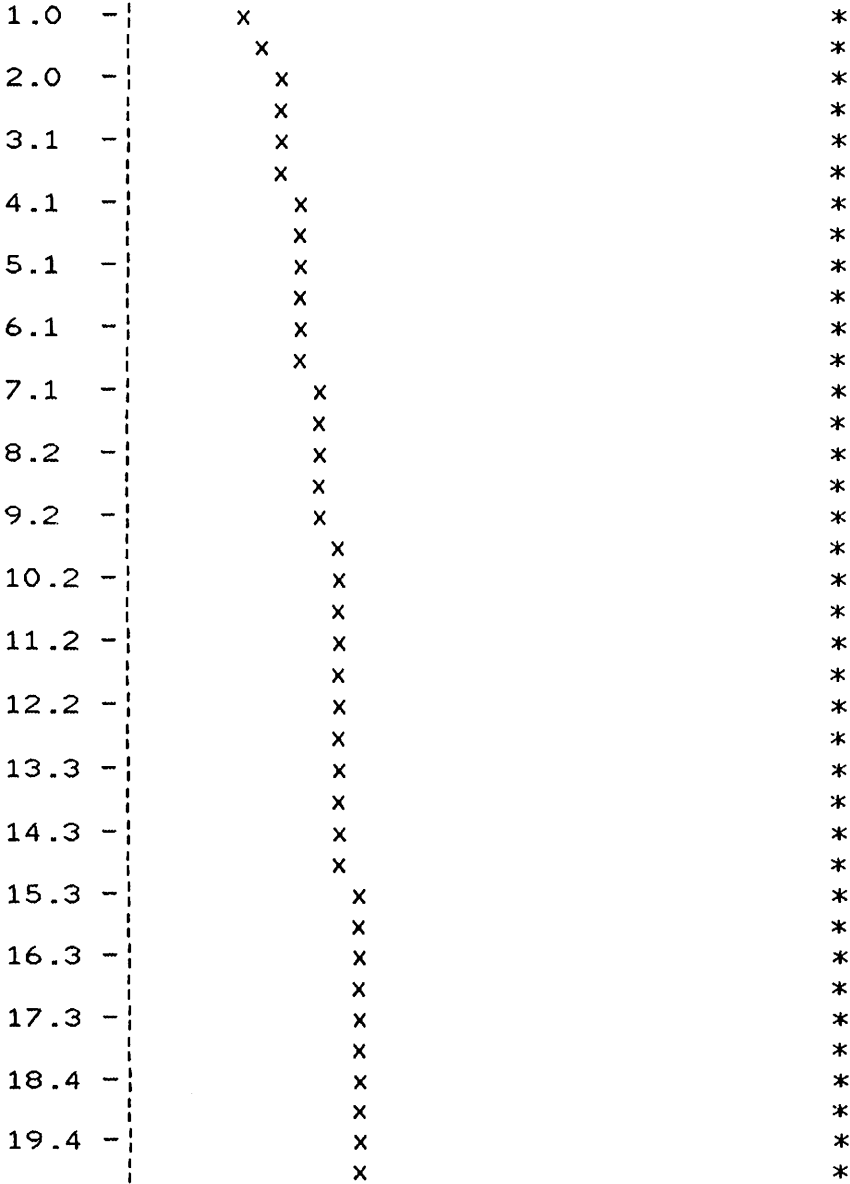
24/47

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT25 .HYD
Outflow Hydrograph: 25MT .HYD

EXECUTED: 09-14-1994
10:50:21

Peak Inflow = 3.04 cfs
Peak Outflow = 0.94 cfs
Peak Elevation = 608.67 ft

Flow (cfs)
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5



TIME (min)

x File: MDPT25 .HYD Qmax = 0.9 cfs
* File: 25MT .HYD Qmax = 3.0 cfs

25/97

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*****
*
* MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3 *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* SEPTEMBER 14, 1994 *
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Inflow Hydrograph: MDPT100E.HYD
 Rating Table file: MDPTXX .PND

----INITIAL CONDITIONS----

Elevation = 606.00 ft
 Outflow = 0.00 cfs
 Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
606.00	0.0	0.000
606.20	0.1	0.000
606.40	0.2	0.000
606.60	0.3	0.001
606.80	0.4	0.002
607.00	0.5	0.004
607.20	0.6	0.006
607.40	0.6	0.010
607.60	0.7	0.015
607.80	0.7	0.021
608.00	0.8	0.029
608.20	0.8	0.038
608.40	0.9	0.047
608.60	0.9	0.058
608.80	1.0	0.069
609.00	1.0	0.081
609.20	1.8	0.094
609.40	3.1	0.107
609.60	4.8	0.122
609.80	6.9	0.137
610.00	9.2	0.153
610.20	11.7	0.170
610.40	14.5	0.188
610.60	17.5	0.206

INTERMEDIATE ROUTING
 COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
0.0	0.0
0.0	0.1
0.3	0.5
1.1	1.4
2.7	3.1
5.2	5.7
9.0	9.6
14.3	14.9
21.4	22.1
30.5	31.2
41.8	42.6
54.9	55.7
68.9	69.8
84.0	84.9
100.2	101.2
117.5	118.5
136.0	137.8
155.7	158.8
176.6	181.4
198.8	205.7
222.3	231.5
247.0	258.7
272.6	287.1
299.2	316.7

Time increment (t) = 1.0 min.

26/47

Pond File: MDPTXX .PND
 Inflow Hydrograph: MDPT100E.HYD
 Outflow Hydrograph: 100EMT .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	606.00
1.0	3.88	3.9	3.0	3.9	0.43	606.86
2.0	3.88	7.8	9.6	10.8	0.60	607.24
3.0	3.88	7.8	16.1	17.3	0.63	607.47
4.0	3.88	7.8	22.4	23.8	0.70	607.64
5.0	3.88	7.8	28.8	30.2	0.70	607.78
6.0	3.88	7.8	35.1	36.6	0.75	607.89
7.0	3.88	7.8	41.2	42.8	0.80	608.00
8.0	3.88	7.8	47.4	49.0	0.80	608.10
9.0	3.88	7.8	53.5	55.1	0.80	608.19
10.0	3.88	7.8	59.6	61.3	0.84	608.28
11.0	3.88	7.8	65.6	67.4	0.88	608.37
12.0	3.88	7.8	71.6	73.4	0.90	608.45
13.0	3.88	7.8	77.5	79.3	0.90	608.53
14.0	3.88	7.8	83.5	85.3	0.90	608.60
15.0	3.88	7.8	89.4	91.2	0.94	608.68
16.0	3.88	7.8	95.2	97.1	0.98	608.75
17.0	3.88	7.8	100.9	102.9	1.00	608.82
18.0	3.88	7.8	106.7	108.7	1.00	608.89
19.0	3.88	7.8	112.5	114.5	1.00	608.95
20.0	3.88	7.8	118.1	120.2	1.07	609.02
21.0	0.00	3.9	119.7	122.0	1.14	609.04
22.0	0.00	0.0	117.6	119.7	1.05	609.01
23.0	0.00	0.0	115.6	117.6	1.00	608.99

27/47

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

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT100E.HYD
Outflow Hydrograph: 100EMT .HYD

Starting Pond W.S. Elevation = 606.00 ft

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

Peak Inflow = 3.88 cfs
Peak Outflow = 1.14 cfs
Peak Elevation = 609.04 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.08 ac-ft

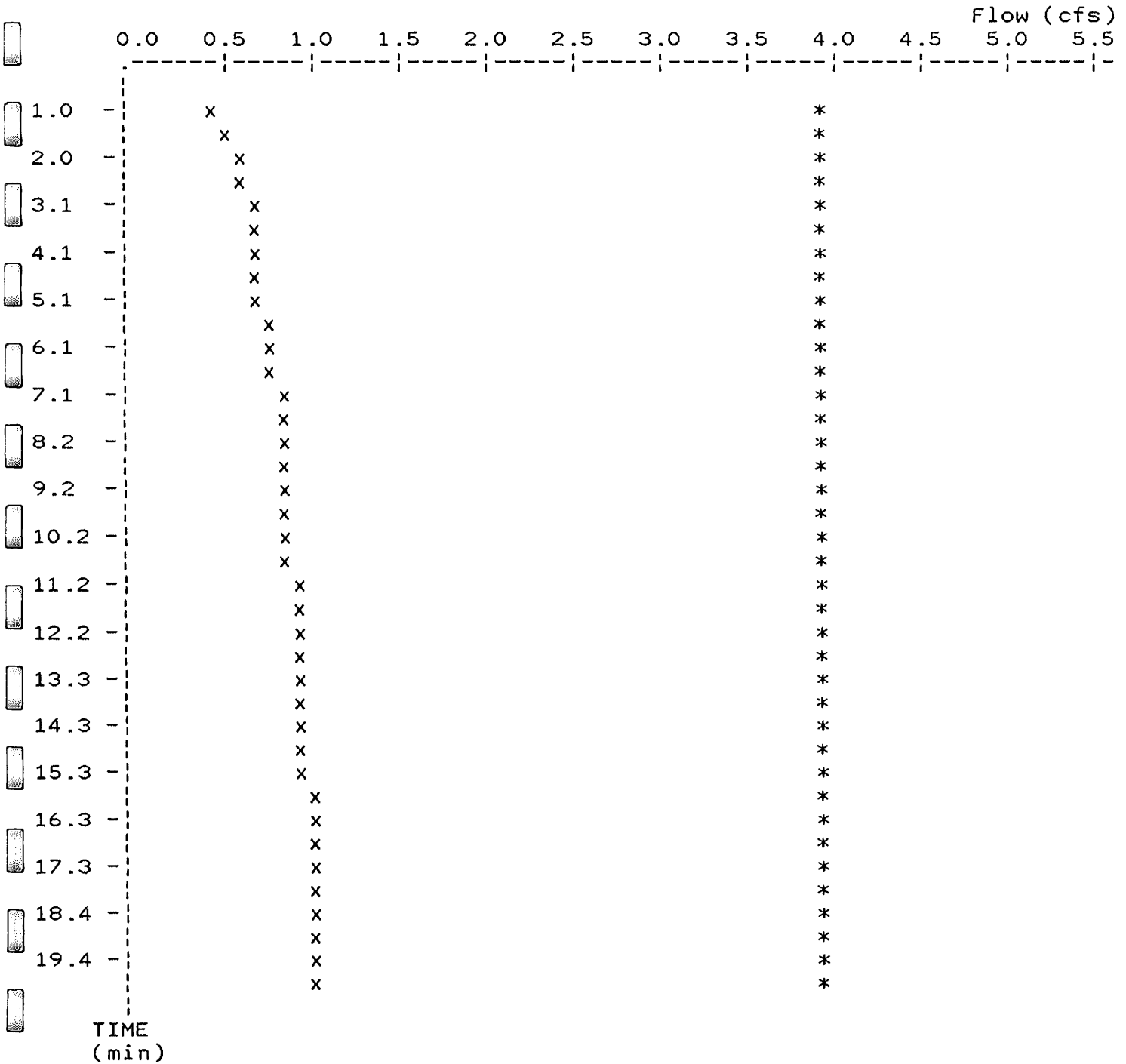
Total Storage in Pond = 0.08 ac-ft

23/47

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT100E.HYD
Outflow Hydrograph: 100EMT .HYD

EXECUTED: 09-14-1994
10:50:21

Peak Inflow = 3.88 cfs
Peak Outflow = 1.14 cfs
Peak Elevation = 609.04 ft



x File: MDPT100E.HYD Qmax = 1.1 cfs
* File: 100EMT .HYD Qmax = 3.9 cfs

29/47

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*****
*
* MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3 *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* SEPTEMBER 14, 1994 *
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Inflow Hydrograph: MDPT100F.HYD
 Rating Table file: MDPTXX .PND

----INITIAL CONDITIONS----
 Elevation = 606.00 ft
 Outflow = 0.00 cfs
 Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
606.00	0.0	0.000
606.20	0.1	0.000
606.40	0.2	0.000
606.60	0.3	0.001
606.80	0.4	0.002
607.00	0.5	0.004
607.20	0.6	0.006
607.40	0.6	0.010
607.60	0.7	0.015
607.80	0.7	0.021
608.00	0.8	0.029
608.20	0.8	0.038
608.40	0.9	0.047
608.60	0.9	0.058
608.80	1.0	0.069
609.00	1.0	0.081
609.20	1.8	0.094
609.40	3.1	0.107
609.60	4.8	0.122
609.80	6.9	0.137
610.00	9.2	0.153
610.20	11.7	0.170
610.40	14.5	0.188
610.60	17.5	0.206

INTERMEDIATE ROUTING
 COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
0.0	0.0
0.0	0.1
0.3	0.5
1.1	1.4
2.7	3.1
5.2	5.7
9.0	9.6
14.3	14.9
21.4	22.1
30.5	31.2
41.8	42.6
54.9	55.7
68.9	69.8
84.0	84.9
100.2	101.2
117.5	118.5
136.0	137.8
155.7	158.8
176.6	181.4
198.8	205.7
222.3	231.5
247.0	258.7
272.6	287.1
299.2	316.7

Time increment (t) = 1.0 min.

30/47

Pond File: MDPTXX .PND
 Inflow Hydrograph: MDPT100F.HYD
 Outflow Hydrograph: 100FMT .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	606.00
1.0	5.76	5.8	4.8	5.8	0.50	607.00
2.0	5.76	11.5	15.0	16.3	0.62	607.44
3.0	5.76	11.5	25.2	26.6	0.70	607.70
4.0	5.76	11.5	35.2	36.7	0.75	607.90
5.0	5.76	11.5	45.1	46.7	0.80	608.06
6.0	5.76	11.5	55.0	56.6	0.81	608.21
7.0	5.76	11.5	64.8	66.5	0.88	608.35
8.0	5.76	11.5	74.5	76.3	0.90	608.49
9.0	5.76	11.5	84.2	86.0	0.91	608.61
10.0	5.76	11.5	93.8	95.7	0.97	608.73
11.0	5.76	11.5	103.3	105.3	1.00	608.85
12.0	5.76	11.5	112.8	114.8	1.00	608.96
13.0	5.76	11.5	121.9	124.4	1.24	609.06
14.0	5.76	11.5	130.2	133.4	1.62	609.15
15.0	5.76	11.5	137.6	141.7	2.04	609.24
16.0	5.76	11.5	144.1	149.1	2.50	609.31
17.0	5.76	11.5	149.8	155.6	2.90	609.37
18.0	5.76	11.5	154.8	161.3	3.29	609.42
19.0	5.76	11.5	158.9	166.3	3.66	609.47
20.0	5.76	11.5	162.5	170.5	3.98	609.50
21.0	0.00	5.8	160.6	168.3	3.81	609.48
22.0	0.00	0.0	154.2	160.6	3.24	609.42
23.0	0.00	0.0	148.5	154.2	2.81	609.36

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

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT100F.HYD
Outflow Hydrograph: 100FMT .HYD

Starting Pond W.S. Elevation = 606.00 ft

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

Peak Inflow = 5.76 cfs
Peak Outflow = 3.98 cfs
Peak Elevation = 609.50 ft

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

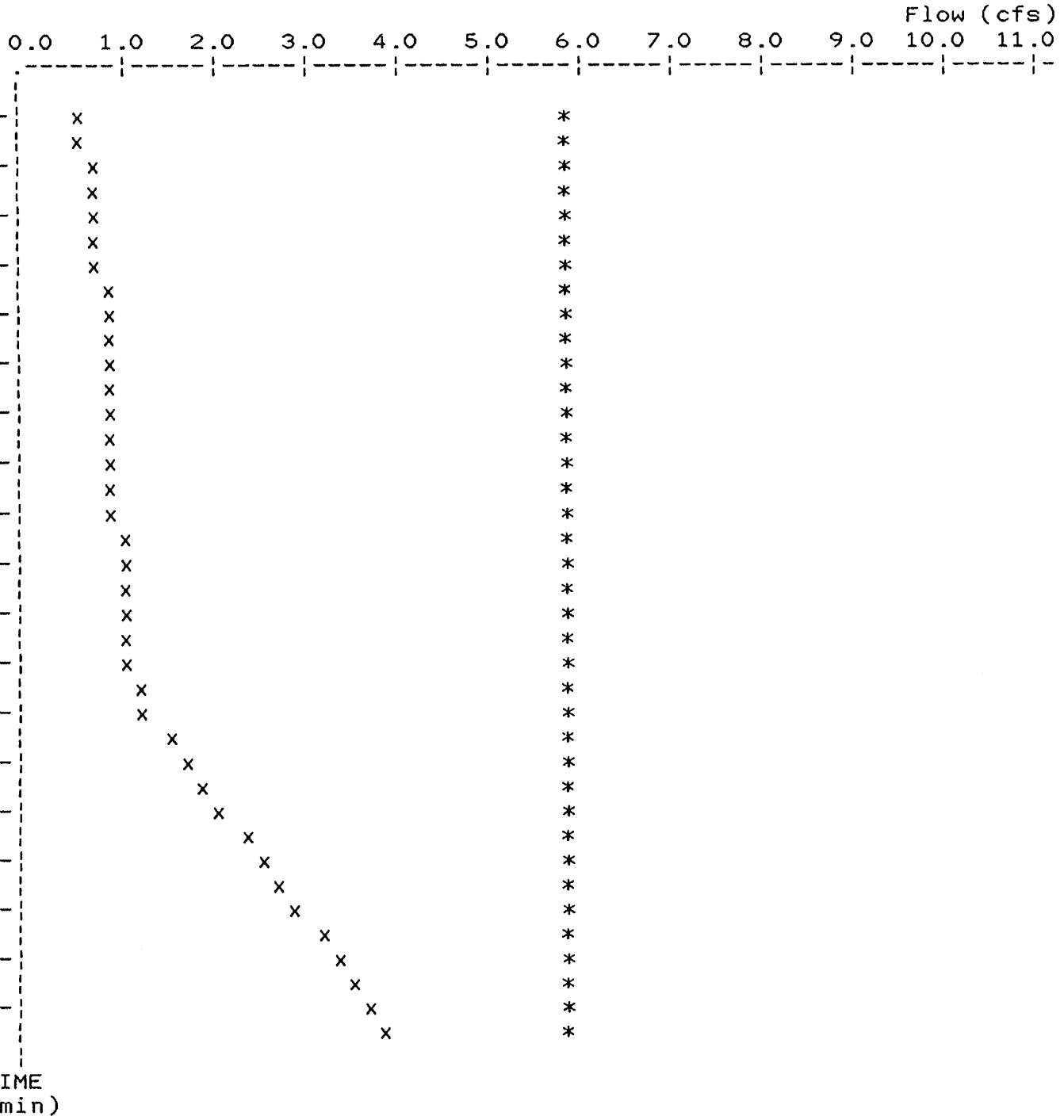
Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.11 ac-ft

Total Storage in Pond = 0.11 ac-ft

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT100F.HYD
Outflow Hydrograph: 100FMT .HYD

EXECUTED: 09-14-1994
10:50:21

Peak Inflow = 5.76 cfs
Peak Outflow = 3.98 cfs
Peak Elevation = 609.50 ft



x File: MDPT100F.HYD Qmax = 4.0 cfs
* File: 100FMT .HYD Qmax = 5.8 cfs

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*****
*
* MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3 *
* DETENTION ANALYSIS *
* PREPARED BY: BAX ENGINEERING CO., INC. *
* SEPTEMBER 14, 1994 *
*
*****
    
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Inflow Hydrograph: MDPT15 .HYD
 Rating Table file: MDPTXX .PND

----INITIAL CONDITIONS----

Elevation = 606.00 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)
606.00	0.0	0.000	0.0	0.0
606.20	0.1	0.000	0.0	0.1
606.40	0.2	0.000	0.3	0.5
606.60	0.3	0.001	1.1	1.4
606.80	0.4	0.002	2.7	3.1
607.00	0.5	0.004	5.2	5.7
607.20	0.6	0.006	9.0	9.6
607.40	0.6	0.010	14.3	14.9
607.60	0.7	0.015	21.4	22.1
607.80	0.7	0.021	30.5	31.2
608.00	0.8	0.029	41.8	42.6
608.20	0.8	0.038	54.9	55.7
608.40	0.9	0.047	68.9	69.8
608.60	0.9	0.058	84.0	84.9
608.80	1.0	0.069	100.2	101.2
609.00	1.0	0.081	117.5	118.5
609.20	1.8	0.094	136.0	137.8
609.40	3.1	0.107	155.7	158.8
609.60	4.8	0.122	176.6	181.4
609.80	6.9	0.137	198.8	205.7
610.00	9.2	0.153	222.3	231.5
610.20	11.7	0.170	247.0	258.7
610.40	14.5	0.188	272.6	287.1
610.60	17.5	0.206	299.2	316.7

Time increment (t) = 1.0 min.

34/47

Pond File: MDPTXX .PND
 Inflow Hydrograph: MDPT15 .HYD
 Outflow Hydrograph: 15MT .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	606.00
1.0	2.45	2.5	1.7	2.5	0.36	606.72
2.0	2.45	4.9	5.6	6.6	0.52	607.05
3.0	2.45	4.9	9.3	10.5	0.60	607.23
4.0	2.45	4.9	13.0	14.2	0.60	607.37
5.0	2.45	4.9	16.6	17.9	0.64	607.48
6.0	2.45	4.9	20.1	21.5	0.69	607.58
7.0	2.45	4.9	23.6	25.0	0.70	607.66
8.0	2.45	4.9	27.1	28.5	0.70	607.74
9.0	2.45	4.9	30.6	32.0	0.71	607.81
10.0	2.45	4.9	34.0	35.5	0.74	607.88
11.0	2.45	4.9	37.4	38.9	0.77	607.94
12.0	2.45	4.9	40.7	42.3	0.80	607.99
13.0	2.45	4.9	44.0	45.6	0.80	608.05
14.0	2.45	4.9	47.3	48.9	0.80	608.10
15.0	2.45	4.9	50.6	52.2	0.80	608.15
16.0	2.45	4.9	53.9	55.5	0.80	608.20
17.0	2.45	4.9	57.2	58.8	0.82	608.24
18.0	2.45	4.9	60.4	62.1	0.85	608.29
19.0	2.45	4.9	63.5	65.3	0.87	608.34
20.0	2.45	4.9	66.6	68.4	0.89	608.38
21.0	0.00	2.5	67.3	69.1	0.89	608.39
22.0	0.00	0.0	65.5	67.3	0.88	608.36
23.0	0.00	0.0	63.8	65.5	0.87	608.34

35/47

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

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT15 .HYD
Outflow Hydrograph: 15MT .HYD

Starting Pond W.S. Elevation = 606.00 ft

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

Peak Inflow = 2.45 cfs
Peak Outflow = 0.89 cfs
Peak Elevation = 608.39 ft

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

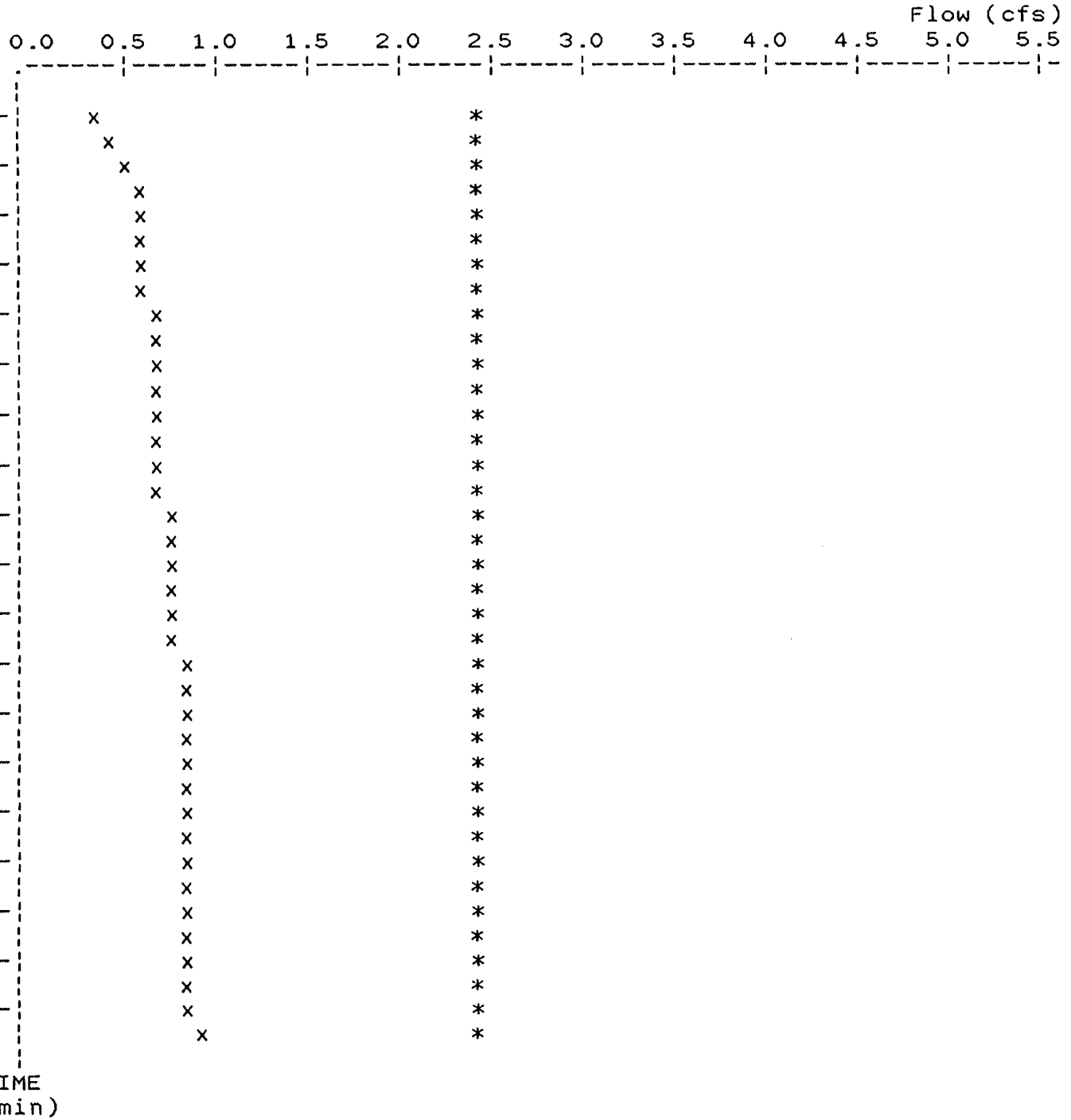
Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.05 ac-ft

Total Storage in Pond = 0.05 ac-ft

Pond File: MDPTXX .PND
Inflow Hydrograph: MDPT15 .HYD
Outflow Hydrograph: 15MT .HYD

EXECUTED: 09-14-1994
10:50:21

Peak Inflow = 2.45 cfs
Peak Outflow = 0.89 cfs
Peak Elevation = 608.39 ft



x File: MDPT15 .HYD Qmax = 0.9 cfs
* File: 15MT .HYD Qmax = 2.5 cfs

37/47



Project: _____

Date: _____ Project No: _____

Designed: _____ Checked: _____

LOW FLOW BLOCKED

The detention basin shall be analyzed to determine the effects of the low flow becoming blocked. This is provided only to determine the amount of freeboard provided to the top of berm of the basin. A 100 year - 20 minute storm with offsite flows fully developed will be analyzed for the situation which is considered a severe case with the low flow assumed blocked. As found in the attached routing calculations, the results are as follows:

100 year - 20 Minute Storm (Offsite fully developed)

Peak Release Rate = 4.23 c.f.s.

Peak Elevation = 609.65

Top of berm = 610.75 \therefore Freeboard = 1.10' ($> 1.0'$ ✓)

NOTE: Detention is also provided in this situation

$Q_{in} = 5.76$ c.f.s.

\therefore Attenuation provided = 5.76 c.f.s. - 4.23 c.f.s. = 1.53 c.f.s. (> 1.37 c.f.s. ✓)

POND-2 Version: 5.17
Date Executed:

S/N:
Time Executed:

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 26, 1994

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

<u>Elevation (ft)</u>	<u>Q (cfs)</u>	<u>Contributing Structures</u>
606.00	0.0	
606.20	0.0	
606.40	0.0	
606.60	0.0	
606.80	0.0	
607.00	0.0	
607.20	0.0	
607.40	0.0	
607.60	0.0	
607.80	0.0	
608.00	0.0	
608.20	0.0	
608.40	0.0	
608.60	0.0	
608.80	0.0	
609.00	0.0	3
609.20	0.7	3
609.40	2.0	3
609.60	3.7	3
609.80	5.7	3
610.00	8.0	3
610.20	10.5	3
610.40	13.3	3
610.60	16.2	3
610.75	0.0	

Outlet Structure File: MDPT00 .STR

POND-2 Version: 5.17

S/N:

Date Executed:

Time Executed:

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 26, 1994

Outlet Structure File: MDPT00 .STR
Planimeter Input File: MDPTXX .VOL
Rating Table Output File: MDPT00 .PND

Min. Elev.(ft) = 606 Max. Elev.(ft) = 610.75 Incr.(ft) = .2

Additional elevations (ft) to be included in table:

SYSTEM CONNECTIVITY

<u>Structure</u>	<u>No.</u>	<u>Q Table</u>	<u>Q Table</u>
WEIR-VR	3	->	3

Outflow rating table summary was stored in file:
MDPT00 .PND

Outlet Structure File: MDPT00 .STR

POND-2 Version: 5.17

S/N:

Date Executed:

Time Executed:

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 26, 1994

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

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)?	609.00
E2 elev.(ft)?	610.75
Weir coefficient?	3
Weir elev.(ft)?	609.00
Length (ft)?	2.67
Contracted/Suppressed (C/S)?	S

Outlet Structure File: MDPT00 .STR

POND-2 Version: 5.17

S/N:

Date Executed:

Time Executed:

MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 26, 1994

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

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

Elevation (ft)	Q (cfs)	Computation Messages
606.00	0.0	E < Inv.El.= 609
606.20	0.0	E < Inv.El.= 609
606.40	0.0	E < Inv.El.= 609
606.60	0.0	E < Inv.El.= 609
606.80	0.0	E < Inv.El.= 609
607.00	0.0	E < Inv.El.= 609
607.20	0.0	E < Inv.El.= 609
607.40	0.0	E < Inv.El.= 609
607.60	0.0	E < Inv.El.= 609
607.80	0.0	E < Inv.El.= 609
608.00	0.0	E < Inv.El.= 609
608.20	0.0	E < Inv.El.= 609
608.40	0.0	E < Inv.El.= 609
608.60	0.0	E < Inv.El.= 609
608.80	0.0	E < Inv.El.= 609
609.00	0.0	H =0.0
609.20	0.7	H =.2
609.40	2.0	H =.4
609.60	3.7	H =.6
609.80	5.7	H =.8
610.00	8.0	H =1.0
610.20	10.5	H =1.2
610.40	13.3	H =1.4
610.60	16.2	H =1.6
610.75	0.0	E = or > E2=610.75

C = 3 L (ft) = 2.67

H (ft) = Table elev. - Invert elev. (609 ft)

Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

42/47

 *
 * MIDPOINT INDUSTRIAL PARK LOT 12 PLAT 3 *
 * DETENTION ANALYSIS (LOW FLOW BLOCKED) *
 * PREPARED BY: BAX ENGINEERING CO., INC. *
 * SEPTEMBER 14, 1994 *
 *

Inflow Hydrograph: MDPT100F.HYD
 Rating Table file: MDPT00 .PND

----INITIAL CONDITIONS----
 Elevation = 606.00 ft
 Outflow = 0.00 cfs
 Storage = 0.00 ac-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)
606.00	0.0	0.000
606.20	0.0	0.000
606.40	0.0	0.000
606.60	0.0	0.001
606.80	0.0	0.002
607.00	0.0	0.004
607.20	0.0	0.006
607.40	0.0	0.010
607.60	0.0	0.015
607.80	0.0	0.021
608.00	0.0	0.029
608.20	0.0	0.038
608.40	0.0	0.047
608.60	0.0	0.058
608.80	0.0	0.069
609.00	0.0	0.081
609.20	0.7	0.094
609.40	2.0	0.107
609.60	3.7	0.122
609.80	5.7	0.137
610.00	8.0	0.153
610.20	10.5	0.170
610.40	13.3	0.188
610.60	16.2	0.206

INTERMEDIATE ROUTING
 COMPUTATIONS

2S/t (cfs)	2S/t + 0 (cfs)
0.0	0.0
0.0	0.0
0.3	0.3
1.1	1.1
2.7	2.7
5.2	5.2
9.0	9.0
14.3	14.3
21.4	21.4
30.5	30.5
41.8	41.8
54.9	54.9
68.9	68.9
84.0	84.0
100.2	100.2
117.5	117.5
136.0	136.7
155.7	157.7
176.6	180.3
198.8	204.5
222.3	230.3
247.0	257.5
272.6	285.9
299.2	315.4

Time increment (t) = 1.0 min.

Pond File: MDPT00 .PND
 Inflow Hydrograph: MDPT100F.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	606.00
1.0	5.76	5.8	5.8	5.8	0.00	607.03
2.0	5.76	11.5	17.3	17.3	0.00	607.48
3.0	5.76	11.5	28.8	28.8	0.00	607.76
4.0	5.76	11.5	40.3	40.3	0.00	607.97
5.0	5.76	11.5	51.8	51.8	0.00	608.15
6.0	5.76	11.5	63.4	63.4	0.00	608.32
7.0	5.76	11.5	74.9	74.9	0.00	608.48
8.0	5.76	11.5	86.4	86.4	0.00	608.63
9.0	5.76	11.5	97.9	97.9	0.00	608.77
10.0	5.76	11.5	109.4	109.4	0.00	608.91
11.0	5.76	11.5	120.7	121.0	0.13	609.04
12.0	5.76	11.5	131.2	132.2	0.54	609.15
13.0	5.76	11.5	140.5	142.7	1.07	609.26
14.0	5.76	11.5	148.8	152.1	1.65	609.35
15.0	5.76	11.5	155.9	160.3	2.19	609.42
16.0	5.76	11.5	161.9	167.4	2.73	609.49
17.0	5.76	11.5	167.1	173.5	3.19	609.54
18.0	5.76	11.5	171.5	178.6	3.57	609.59
19.0	5.76	11.5	175.1	183.0	3.92	609.62
20.0	5.76	11.5	178.2	186.7	4.23	609.65
21.0	0.00	5.8	176.0	184.0	4.00	609.63
22.0	0.00	0.0	169.2	176.0	3.37	609.56
23.0	0.00	0.0	163.5	169.2	2.87	609.50

44/47

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

Pond File: MDPT00 .PND
Inflow Hydrograph: MDPT100F.HYD
Outflow Hydrograph: OUT .HYD

Starting Pond W.S. Elevation = 606.00 ft

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

Peak Inflow = 5.76 cfs
Peak Outflow = 4.23 cfs
Peak Elevation = 609.65 ft

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

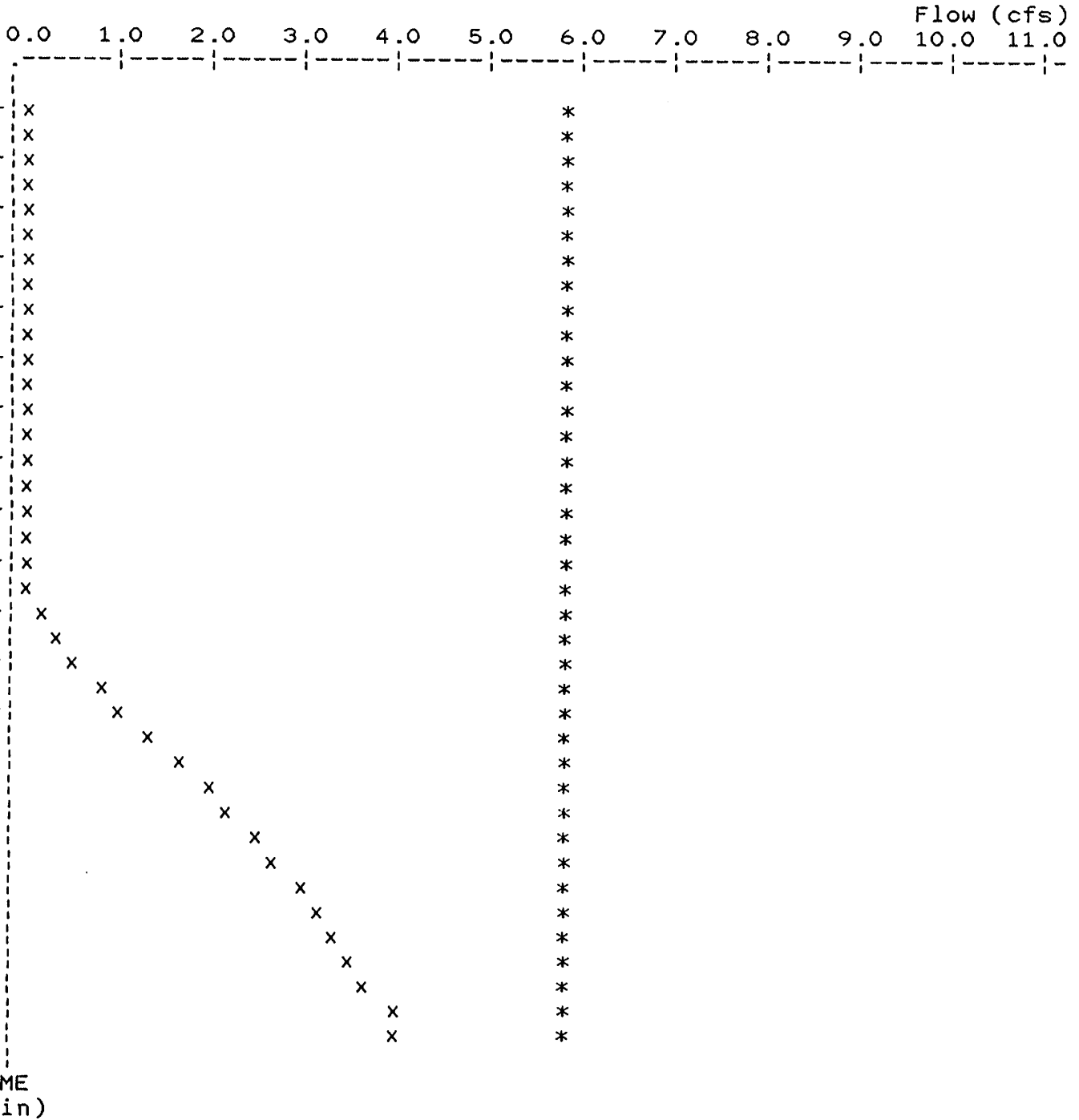
Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.13 ac-ft

Total Storage in Pond = 0.13 ac-ft

Pond File: MDPT00 .PND
 Inflow Hydrograph: MDPT100F.HYD
 Outflow Hydrograph: OUT .HYD

EXECUTED: 09-14-1994
 11:08:17

Peak Inflow = 5.76 cfs
 Peak Outflow = 4.23 cfs
 Peak Elevation = 609.65 ft



x File: MDPT100F.HYD Qmax = 4.2 cfs
 * File: OUT .HYD Qmax = 5.8 cfs

46/147



Project: _____

Date: _____ Project No: _____

Designed: _____ Checked: _____

DETENTION BASIN CHARACTERISTICS SUMMARY

2 Year - 20 Minute Storm Highwater = 607.85

15 Year - 20 Minute Storm Highwater = 608.39

25 Year - 20 Minute Storm Highwater = 608.67

100 Year - 20 Minute Storm Highwater (WORST CASE) = 609.65

TOP OF BERM = 610.75

OVERFLOW STRUCTURE:

FE PIPE OUT = 604.50

FE LOW SLOT 3"W x 6"H = 606.00

FE SILL OVERFLOW WEIR = 609.00 1-32" SIDE OPEN ON AREA INLET

TOP OF OVERFLOW STRUCTURE = 610.08 (0.65' opening between sill and top)