

DRAINAGE PLAN
RIVENDALE
ADDITION
TO
WICHITA, SEDGWICK COUNTY, KANSAS



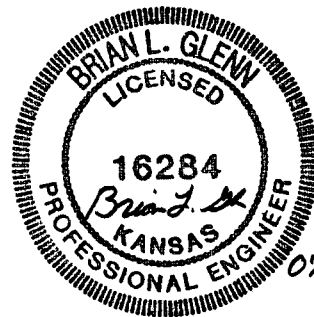
DRAINAGE PLAN
**RIVENDALE
ADDITION**

TO
WICHITA, SEDGWICK COUNTY, KANSAS

Prepared By

 **BAUGHMAN COMPANY, P.A.**
ENGINEERING, SURVEYING & PLANNING
316/262-7271 FAX 316/262-0149 WICHITA, KANSAS 67211

July 15, 2003



07/15/2003

INTRODUCTION

This report provides information and supporting documentation to support the "Drainage Plan" for the property located in the Southeast Quarter of Section 21, T-28-S, R-1-E in Sedgwick County, Kansas.

The "Drainage Plan" being submitted herein is intended to serve as a guide for the design of detention facilities, parking lots, and storm water sewer improvements to the proposed developments. Modifications to structures, pipes, etc. may be made as necessary during the final design in order to obtain the most economical design and construction possible.

The existing sand pit that is located on the property will be utilized as a retention facility, with no designed outfall. The 100-yr water surfaced has been determined using the 100-yr 24-hr rainfall depth applied over the contributing drainage area, with no reduction due to infiltration or other minor losses.

$$\text{C.D.A.} = 43 \text{ acres}$$

$$100\text{-yr, 24-hr rainfall depth} = 7.9 \text{ inches}$$

$$\text{Rainfall Volume} = 43 * (7.9 / 12) = 28.3 \text{ ac-ft}$$

$$\text{Area of Existing Pond} = 6.9 \text{ acres}$$

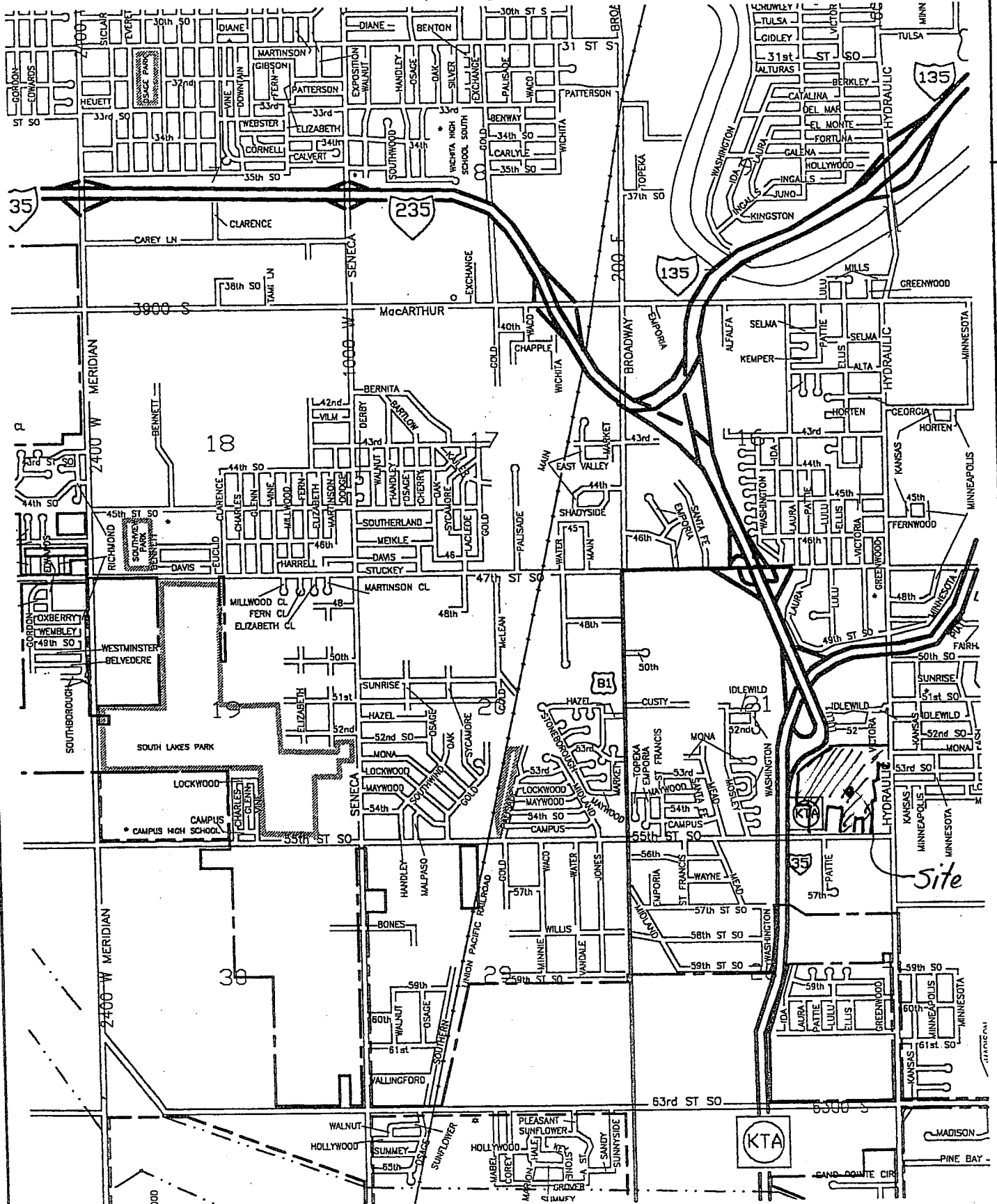
$$\text{Change in WS} = 28.3 / 6.9 = 4.1 \text{ ft}$$

$$\text{Approx. Static WS elev.} = 70.5$$

$$100\text{-yr WS elev.} = 70.5 + 4.1 = 74.6 \text{ city datum,}$$

use 75.0 as 100-yr WS

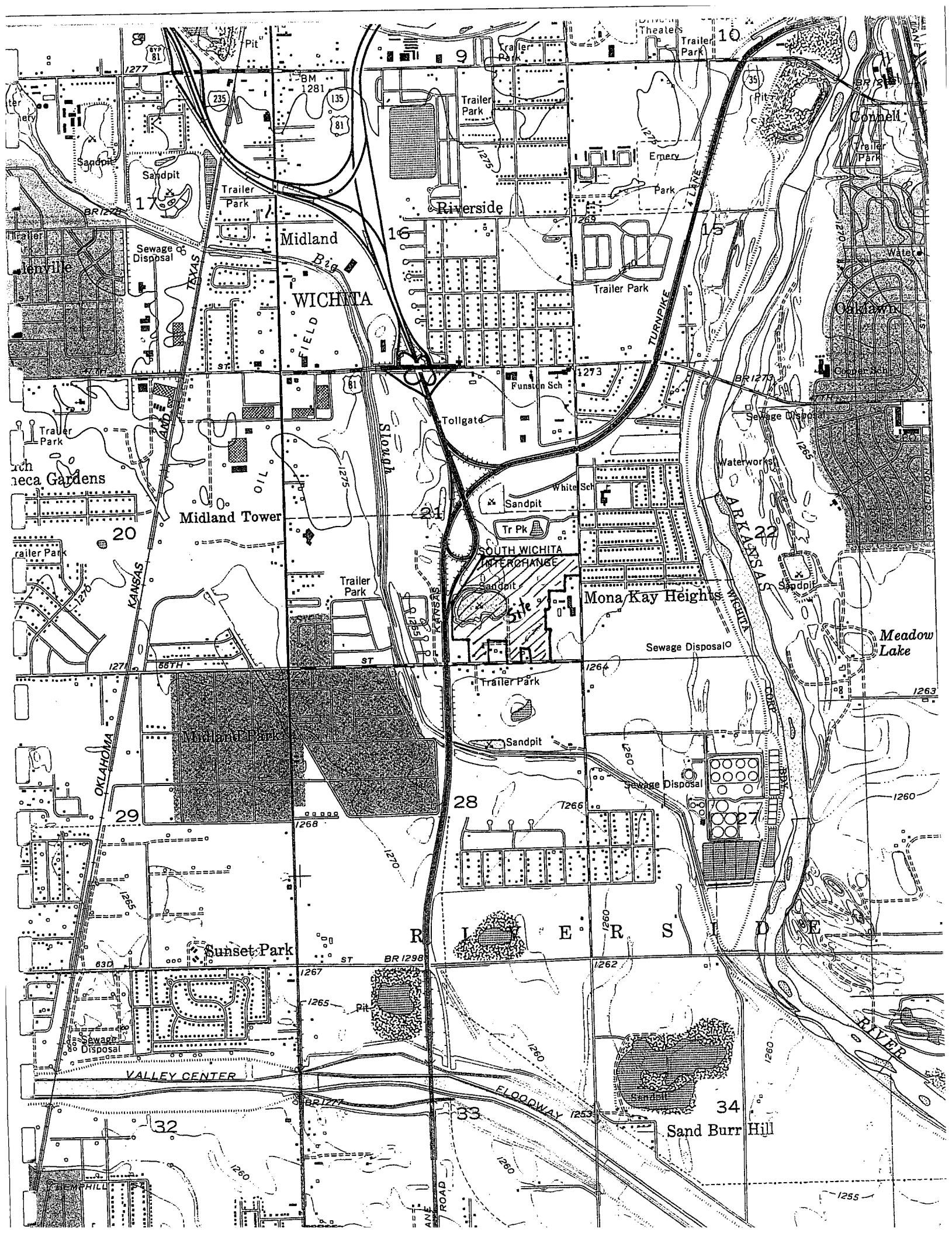
(See Page 30)



(See Page 41)

© Kansas Blue Print Co., Inc.





1277

235

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

BR 1273

27

34

10

15

BR 1273

27

34

17

20

29

32

135

16

81

28

28

33

9

15

1273

27

34

10

15

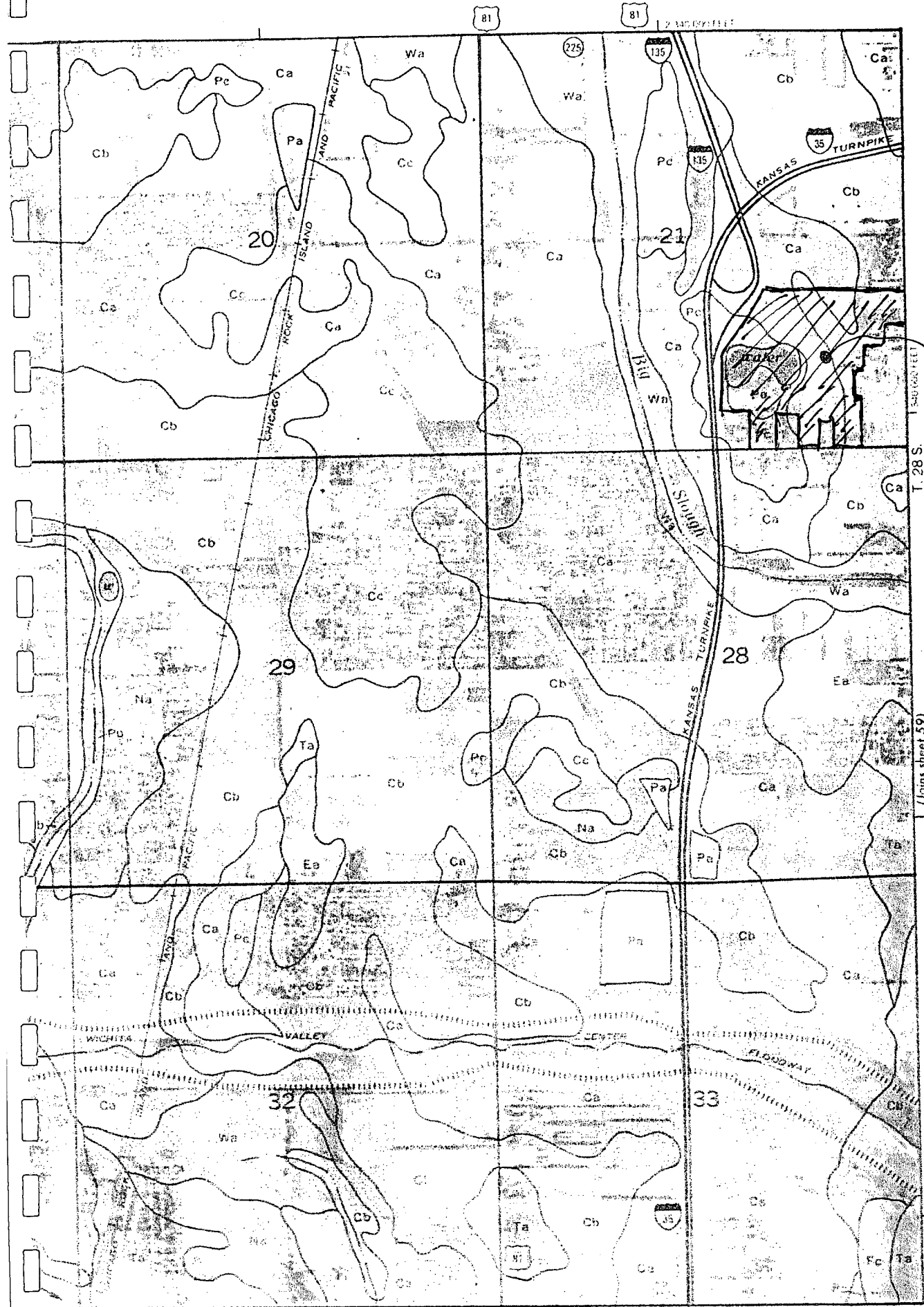
BR 1273

27

34

10

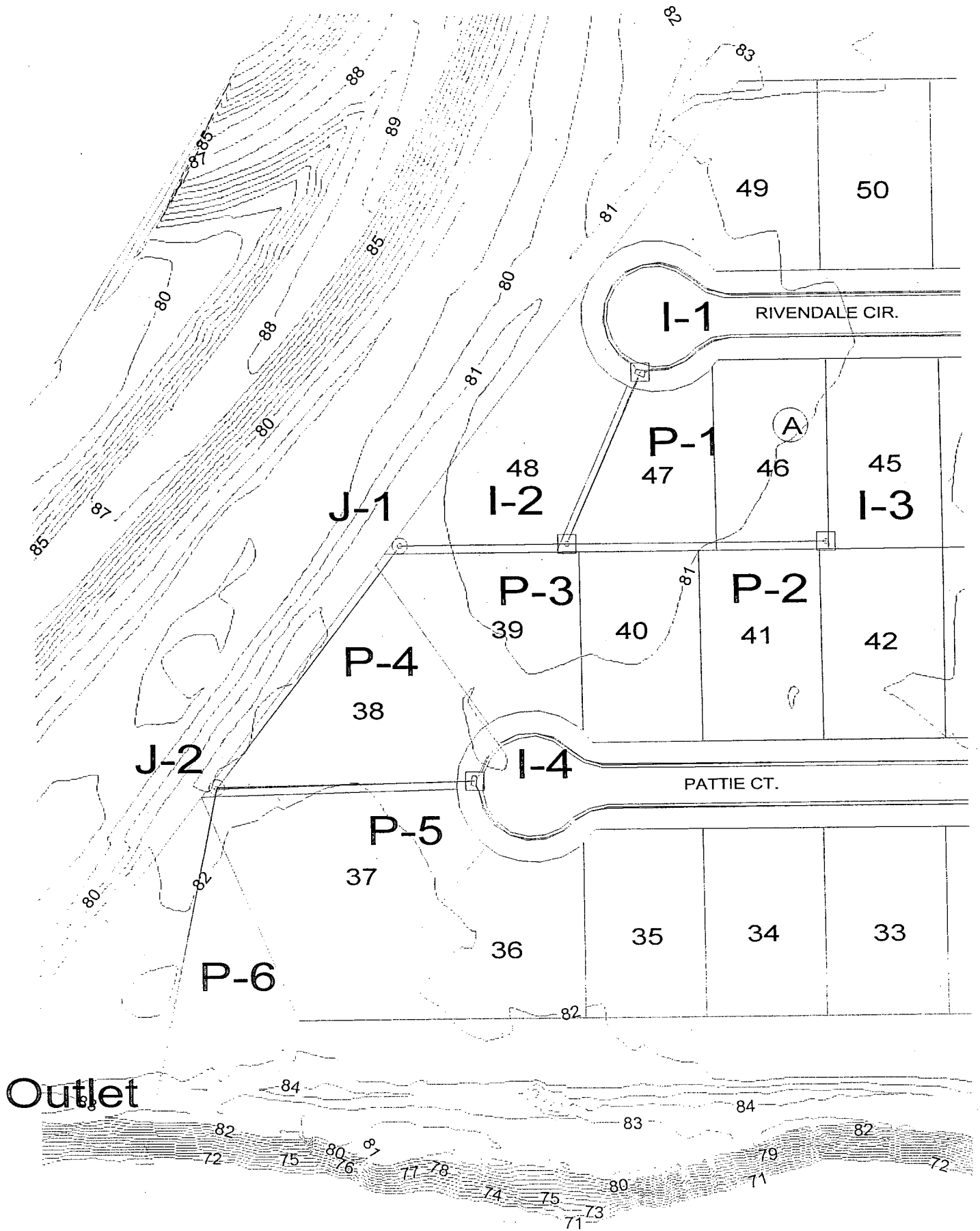
15</



Site

(Joins sheet 59)

Copyright © 1988 by the U.S. Geological Survey. All rights reserved. This map is a reproduction of a map published by the U.S. Geological Survey. It is not to be used for any purpose other than that for which it was originally published.



System Report

Pipe	Additional Flow (cfs)	Total Upstream Discharge (cfs)	Structure Upstream Downstream	Section-Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Ground-Stream Upstream Downstream (ft)	HGL- Upstream Downstream (ft)	Slope- Energy Constructed (ft/ft)	Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-5	2.40	0.00	I-4	Circular	75.90	72.50	78.90	76.49	0.008952	2.40	172.00	2.55	
P-2	1.50	0.00	J-2	18 inch	74.50	73.80	81.00	75.14	0.019767	14.77	171.00	1.51	
P-1	3.30	0.00	I-3	Circular	75.60	73.50	76.80	75.31	0.000594	4.13	123.00	3.00	
P-3	1.50	4.80	I-2	15 inch	73.00	72.70	79.10	75.23	0.004094	3.30	111.00	1.33	
P-4	N/A	6.30	J-1	Circular	72.50	72.00	81.00	76.29	0.010344	6.30	201.00	1.28	
P-6	N/A	8.70	J-2	18 inch	71.80	70.00	81.00	75.22	0.000220	8.70	249.00	1.77	
			Outlet	30 inch			80.00	75.11	0.000450	20.46			
								75.00	0.007229	34.87			

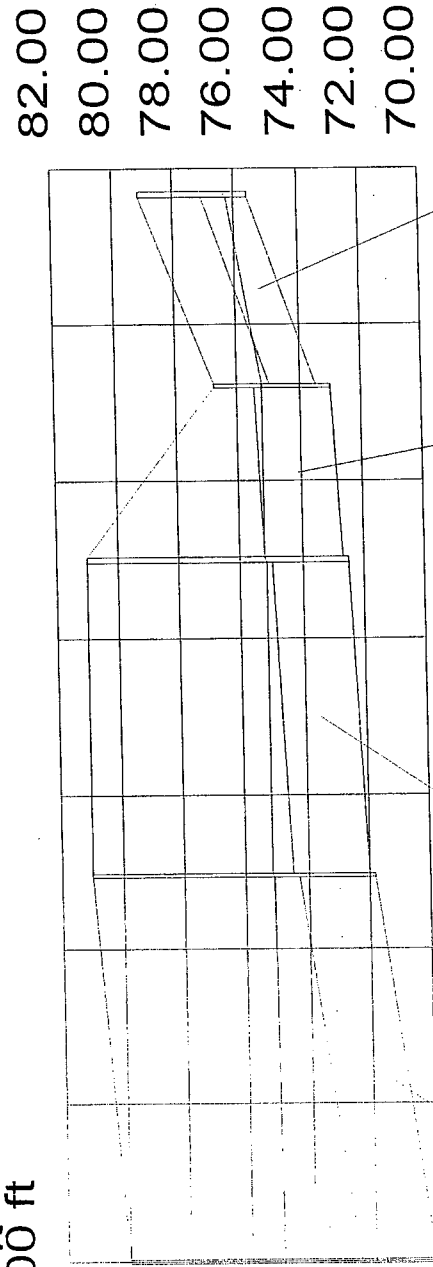
Inlet: I-2
 Rim: 76.80 ft
 Sump: 73.00 ft

Inlet: I-1
 Rim: 79.10 ft
 Sump: 75.60 ft

Junction: J-1
 Rim: 81.00 ft
 Sump: 72.50 ft

Junction: J-2
 Rim: 81.00 ft
 Sump: 71.80 ft

Outlet: Outlet
 Rim: 80.00 ft
 Sump: 70.00 ft



0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00

Station ft

Elevation ft

Pipe: P-4
 Up Invert: 72.50 ft
 Dh Invert: 72.00 ft
 Length: 201.00 ft
 Size: 30 inch

Pipe: P-1
 Up Invert: 75.60 ft
 Dh Invert: 73.50 ft
 Length: 123.00 ft
 Size: 18 inch

Pipe: P-3
 Up Invert: 73.00 ft
 Dh Invert: 72.70 ft
 Length: 111.00 ft
 Size: 30 inch

Pipe: P-6
 Up Invert: 71.80 ft
 Dh Invert: 70.00 ft
 Length: 249.00 ft
 Size: 30 inch

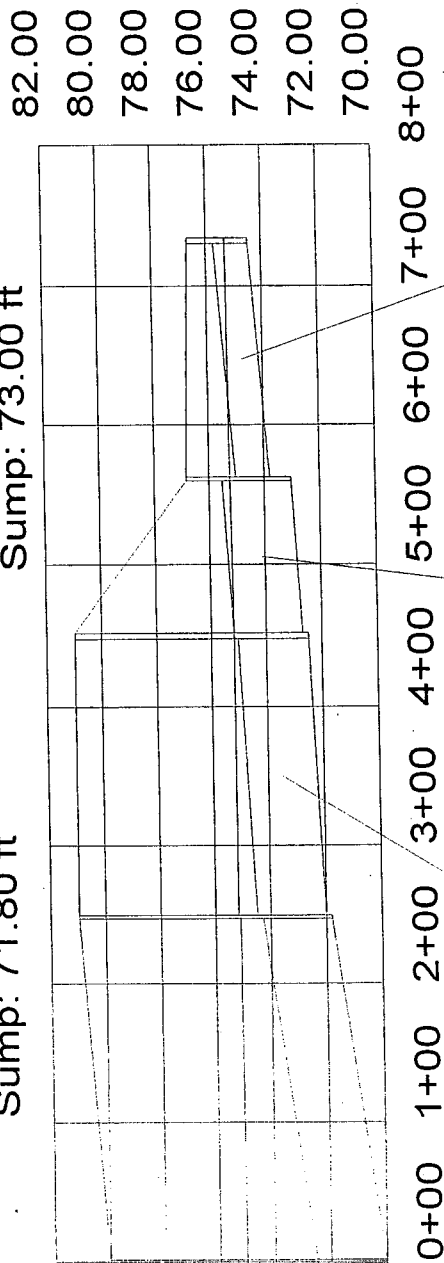
Inlet: I-3
Rim: 76.70 ft
Sump: 74.50 ft

Junction: J-1
Rim: 81.00 ft
Sump: 72.50 ft

Junction: J-2
Rim: 81.00 ft
Sump: 71.80 ft

Inlet: I-2
Rim: 76.80 ft
Sump: 73.00 ft

Outlet: Outlet
Rim: 80.00 ft
Sump: 70.00 ft



Pipe: P-2
Up Invert: 74.50 ft
Dn Invert: 73.80 ft
Length: 171.00 ft
Size: 15 inch

Pipe: P-3
Up Invert: 73.00 ft
Dn Invert: 72.70 ft
Length: 111.00 ft
Size: 30 inch

Pipe: P-4
Up Invert: 72.50 ft
Dn Invert: 72.00 ft
Length: 201.00 ft
Size: 30 inch

Pipe: P-6
Up Invert: 71.80 ft
Dn Invert: 70.00 ft
Length: 249.00 ft
Size: 30 inch

Elevation ft

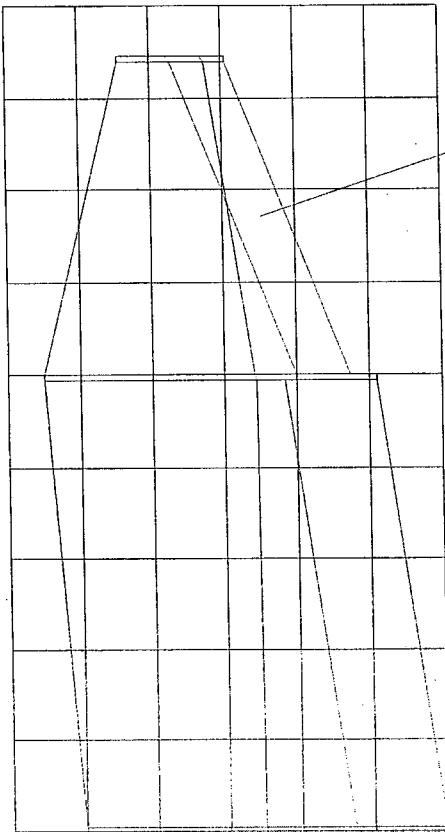
Station ft

Inlet: I-4
 Rim: 78.90 ft
 Sump: 75.90 ft

Junction: J-2
 Rim: 81.00 ft
 Sump: 71.80 ft

Outlet: Outlet
 Rim: 80.00 ft
 Sump: 70.00 ft

82.00
 80.00
 78.00
 76.00
 74.00
 72.00
 70.00



0+00+50+00+50+00+50+00+50+00+50

Station ft

Elevation ft

Pipe: P-5
 Up Invert: 75.90 ft
 Dn Invert: 72.50 ft
 Length: 172.00 ft
 Size: 18 inch

Pipe: P-6
 Up Invert: 71.80 ft
 Dn Invert: 70.00 ft
 Length: 249.00 ft
 Size: 30 inch

System Report

Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	Node- Upstream Downstream	Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-5	7.10	0.00	7.10	I-4	Circular	75.90	72.50	78.90	76.93	0.005562	7.10	72.00	4.75	
P-2	4.40	0.00	4.40	I-3	Circular	74.50	73.80	76.70	77.59	0.004640	4.40	71.00	3.59	
P-1	9.80	0.00	9.80	I-1	Circular	75.60	73.50	76.80	77.87	0.008705	9.80	23.00	5.55	
P-3	4.40	14.20	18.60	I-2	Circular	73.00	72.70	76.80	76.80	0.017073	13.72	11.00	3.79	
P-4	N/A	18.60	18.60	J-1	30 inch	72.50	72.00	81.00	76.72	0.002703	21.32	201.00	3.79	
P-6	N/A	25.70	25.70	J-2	30 inch	71.80	70.00	81.00	76.19	0.002488	20.46	249.00	5.24	
				Outlet	30 inch			80.00	75.00	0.007229	34.87			

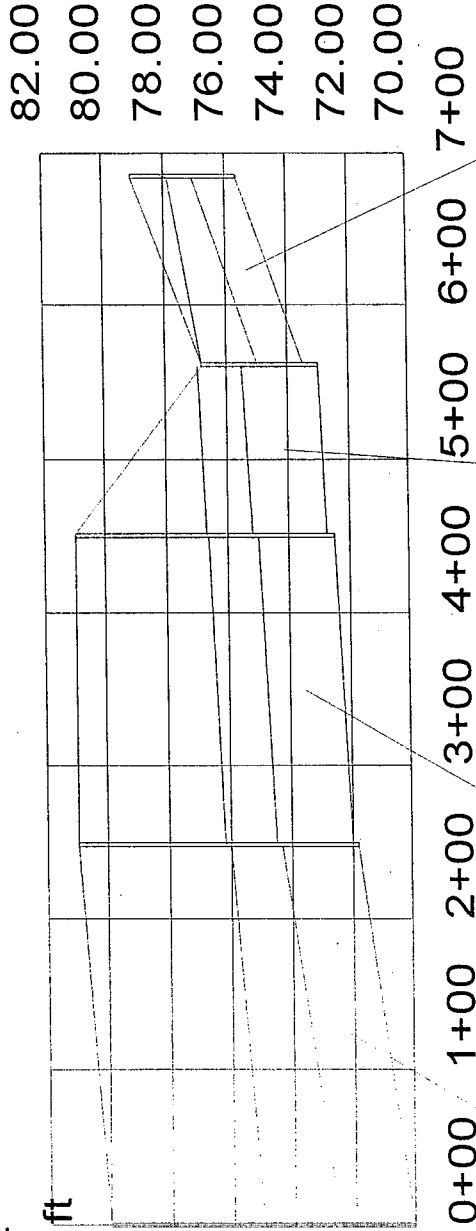
Junction: J-1
 Rim: 81.00 ft
 Sump: 72.50 ft

Inlet: I-1
 Rim: 79.10 ft
 Sump: 75.60 ft

Junction: J-2
 Rim: 81.00 ft
 Sump: 71.80 ft

Inlet: I-2
 Rim: 76.80 ft
 Sump: 73.00 ft

Outlet: Outlet
 Rim: 80.00 ft
 Sump: 70.00 ft



Pipe: P-1
 Up Invert: 75.60 ft
 Dn Invert: 73.50 ft
 Length: 123.00 ft
 Size: 18 inch

Pipe: P-4
 Up Invert: 72.50 ft
 Dn Invert: 72.00 ft
 Length: 201.00 ft
 Size: 30 inch

Pipe: P-3
 Up Invert: 73.00 ft
 Dn Invert: 72.70 ft
 Length: 111.00 ft
 Size: 30 inch

Pipe: P-6
 Up Invert: 71.80 ft
 Dn Invert: 70.00 ft
 Length: 249.00 ft
 Size: 30 inch

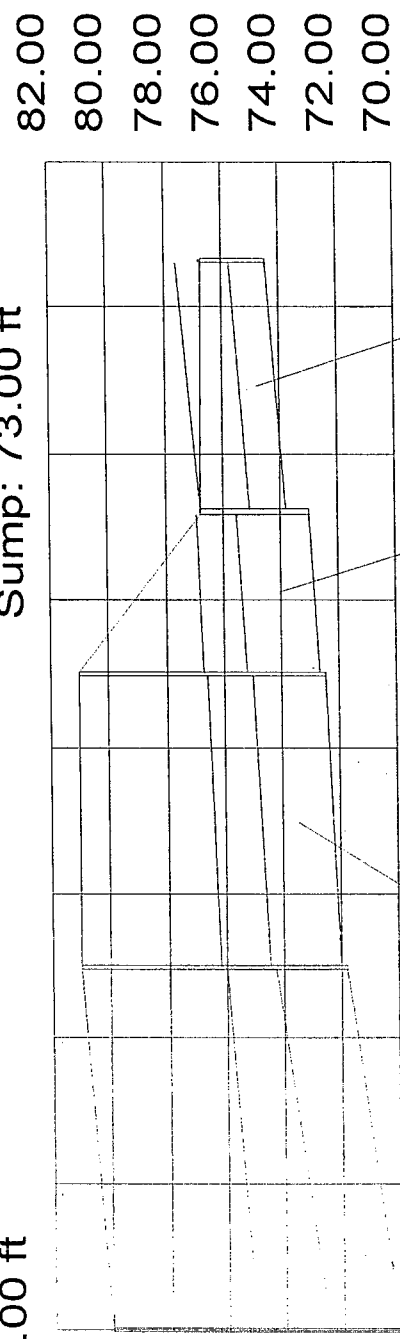
Inlet: I-3
Rim: 76.70 ft
Sump: 74.50 ft

Junction: J-1
Rim: 81.00 ft
Sump: 72.50 ft

Junction: J-2
Rim: 81.00 ft
Sump: 71.80 ft

Inlet: I-2
Rim: 76.80 ft
Sump: 73.00 ft

Outlet: Outlet
Rim: 80.00 ft
Sump: 70.00 ft



Elevation ft

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00

Station ft

Pipe: P-6
Up Invert: 71.80 ft
Dn Invert: 70.00 ft
Length: 249.00 ft
Size: 30 inch

Pipe: P-2
Up Invert: 74.50 ft
Dn Invert: 73.80 ft
Length: 171.00 ft
Size: 15 inch

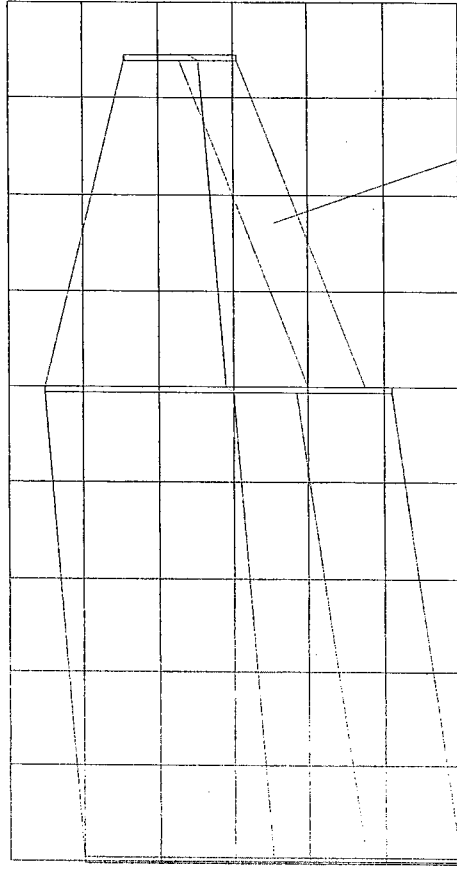
Pipe: P-4
Up Invert: 72.50 ft
Dn Invert: 72.00 ft
Length: 201.00 ft
Size: 30 inch

Pipe: P-3
Up Invert: 73.00 ft
Dn Invert: 72.70 ft
Length: 111.00 ft
Size: 30 inch

Inlet: I-4
 Rim: 78.90 ft
 Sump: 75.90 ft

Junction: J-2
 Rim: 81.00 ft
 Sump: 71.80 ft

Outlet: Outlet
 Rim: 80.00 ft
 Sump: 70.00 ft



Elevation ft

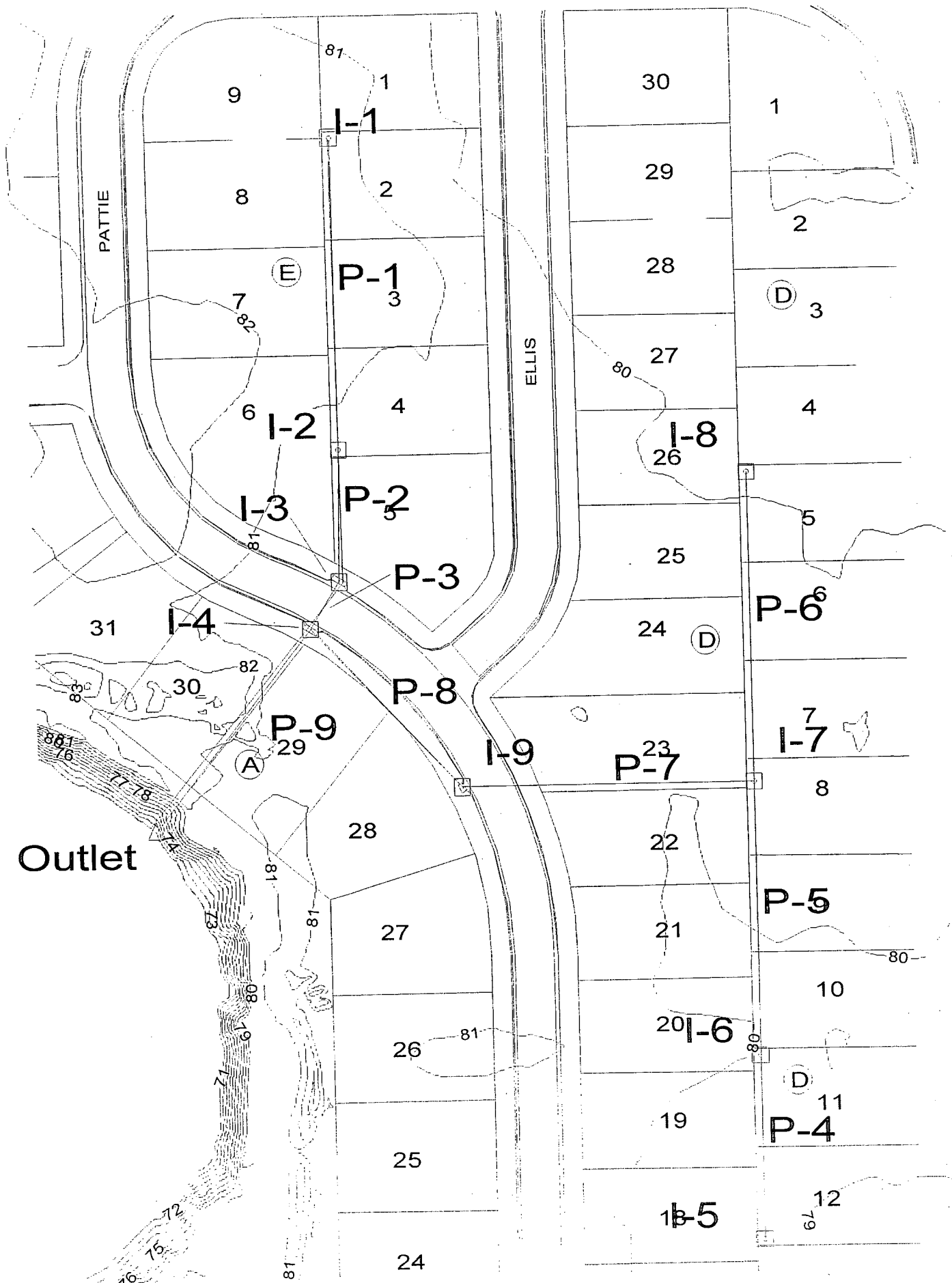
Station ft

82.00
 80.00
 78.00
 76.00
 74.00
 72.00
 70.00

0+00+50+00+52+02+53+03+54+04+50

Pipe: P-5
 Up Invert: 75.90 ft
 Dn Invert: 72.50 ft
 Length: 172.00 ft
 Size: 18 inch

Pipe: P-6
 Up Invert: 71.80 ft
 Dn Invert: 70.00 ft
 Length: 249.00 ft
 Size: 30 inch



Drainage area, acres	0.8
Li = Inlet Length	10
So = street grade, ft/ft	0.005263
Sx = 'cross slope, ft/ft	0.03125
Manning's n	0.022
Z in Izzard's Eq. = 1/Sx	32

	2-yr	5-yr	100-yr
Rainfall Intensity, in/hr	3.83	4.56	7.37
Rational "C"	0.48	0.53	0.74
Flowrate, cfs	1.5	1.9	4.4
Additional Flow, cfs	0.0	0.0	0.0
Total Flowrate, cfs	1.5	1.9	4.4
depth of flow, ft	0.25	0.28	0.38
Flow width, ft	8.01	8.88	12.04
Froude Number	0.68588	0.69770	0.73411
Length 1, ft	4.84	5.45	7.78
Length 2, ft	3.18	3.58	5.11
Length 3, ft	9.07	10.22	14.59
case 1, Li < L2 intercepted flow bypassed flow	NO GOOD 3.0 0.0	NO GOOD 3.5 0.0	NO GOOD 5.6 0.0
case 2, Li > L2 intercepted flow bypassed flow	VALID 1.5 0.0	VALID 1.9 0.0	VALID 3.8 0.6

System Report

Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	-Node- Upstream Downstream	-Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	-Ground- Upstream Downstream	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-6	2.20	0.00	2.20	I-8	Circular	74.10	73.20	77.80	75.64	0.001160	2.20	228.00	1.79	
				I-7	15 inch			76.00	75.37	0.003947	4.06			
P-4	1.70	0.00	1.70	I-5	Circular	74.50	73.90	77.00	75.43	0.000318	1.70	134.00	1.22	
				I-6	18 inch			77.00	75.41	0.004478	7.03			
P-5	0.90	1.70	2.60	I-6	Circular	73.60	72.90	77.00	75.40	0.000130	2.60	204.00	0.85	
				I-7	24 inch			76.00	75.37	0.003431	13.25			
P-7	2.60	4.80	7.40	I-7	Circular	72.40	71.90	76.00	75.36	0.000326	7.40	218.00	1.51	
				I-9	30 inch			79.90	75.29	0.002294	19.64			
P-8	1.50	7.40	8.90	I-9	Circular	71.70	71.30	79.90	75.27	0.000178	8.90	161.00	1.26	
				I-4	36 inch			78.80	75.24	0.002484	33.24			
P-1	1.10	0.00	1.10	I-1	Circular	75.20	74.30	77.90	75.65	0.001674	1.10	230.00	1.89	
				I-2	15 inch			77.60	75.37	0.003913	4.04			
P-2	1.50	1.10	2.60	I-2	Circular	74.00	73.70	77.60	75.35	0.000591	2.60	98.00	1.51	
				I-3	18 inch			78.80	75.29	0.003061	5.81			
P-3	6.80	2.60	9.40	I-3	Circular	72.50	71.00	78.80	75.27	0.000525	9.40	41.00	1.91	
				I-4	30 inch			78.80	75.24	0.036585	78.45			
P-9	2.20	18.30	20.50	I-4	Circular	70.60	67.00	78.80	75.18	0.000945	20.50	190.00	2.90	
				Outlet	36 inch			76.00	75.00	0.018947	91.80			

Inlet: I-3
 Rim: 78.80 ft
 Sump: 72.50 ft

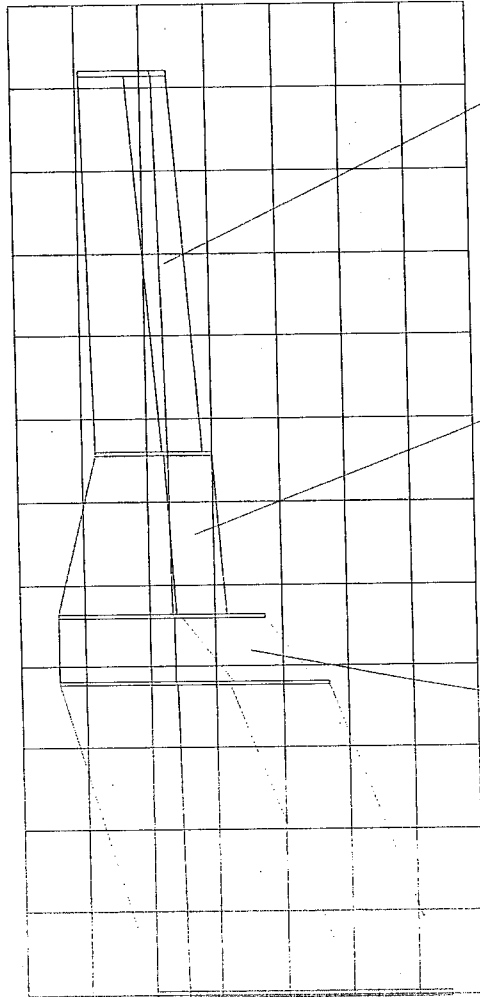
Inlet: I-1
 Rim: 77.90 ft
 Sump: 75.20 ft

Inlet: I-2
 Rim: 77.60 ft
 Sump: 74.00 ft

Inlet: I-4
 Rim: 78.80 ft
 Sump: 70.60 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft

80.00
 78.00
 76.00
 74.00
 72.00
 70.00
 68.00
 66.00



0+00+50+00+52+00+53+00+54+00+55+00+56+00

Station ft

Elevation ft

Pipe: P-1
 Up Invert: 75.20 ft
 Dn Invert: 74.30 ft
 Length: 230.00 ft
 Size: 15 inch

Pipe: P-9
 Up Invert: 70.60 ft
 Dn Invert: 67.00 ft
 Length: 190.00 ft
 Size: 36 inch

Pipe: P-3
 Up Invert: 72.50 ft
 Dn Invert: 71.00 ft
 Length: 41.00 ft
 Size: 30 inch

Pipe: P-2
 Up Invert: 74.00 ft
 Dn Invert: 73.70 ft
 Length: 98.00 ft
 Size: 18 inch

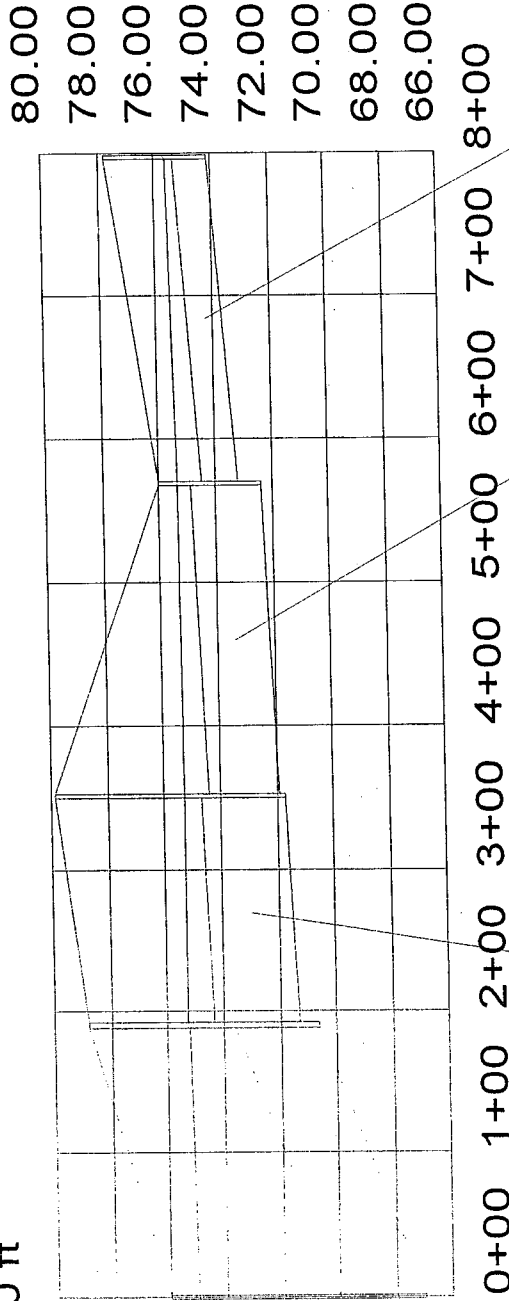
Inlet: I-8
 Rim: 77.80 ft
 Sump: 74.10 ft

Inlet: I-9
 Rim: 79.90 ft
 Sump: 71.70 ft

Inlet: I-7
 Rim: 76.00 ft
 Sump: 72.40 ft

Inlet: I-4
 Rim: 78.80 ft
 Sump: 70.60 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft



Pipe: P-9
 Up Invert: 70.60 ft
 Dn Invert: 67.00 ft
 Length: 190.00 ft
 Size: 36 inch

Pipe: P-8
 Up Invert: 71.70 ft
 Dn Invert: 71.30 ft
 Length: 161.00 ft
 Size: 36 inch

Pipe: P-7
 Up Invert: 72.40 ft
 Dn Invert: 71.90 ft
 Length: 218.00 ft
 Size: 30 inch

Pipe: P-6
 Up Invert: 74.10 ft
 Dn Invert: 73.20 ft
 Length: 228.00 ft
 Size: 15 inch

Elevation ft

Station ft

Inlet: I-9
Rim: 79.90 ft
Sump: 71.70 ft

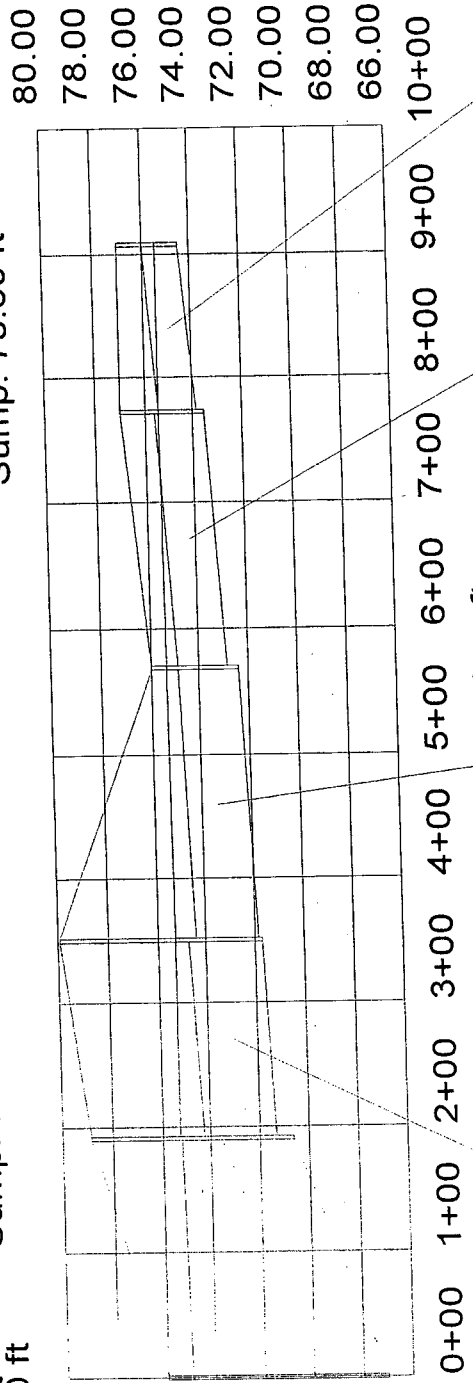
Inlet: I-5
Rim: 77.00 ft
Sump: 74.50 ft

Inlet: I-7
Rim: 76.00 ft
Sump: 72.40 ft

Inlet: I-6
Rim: 77.00 ft
Sump: 73.60 ft

Inlet: I-4
Rim: 78.80 ft
Sump: 70.60 ft

Outlet: Outlet
Rim: 76.00 ft
Sump: 67.00 ft



Pipe: P-9
Up Invert: 70.60 ft
Dn Invert: 67.00 ft
Length: 190.00 ft
Size: 36 inch

Pipe: P-8
Up Invert: 71.70 ft
Dn Invert: 71.30 ft
Length: 161.00 ft
Size: 36 inch

Pipe: P-7
Up Invert: 72.40 ft
Dn Invert: 71.90 ft
Length: 218.00 ft
Size: 30 inch

Pipe: P-5
Up Invert: 73.60 ft
Dn Invert: 72.90 ft
Length: 204.00 ft
Size: 24 inch

Pipe: P-4
Up Invert: 74.50 ft
Dn Invert: 73.90 ft
Length: 134.00 ft
Size: 18 inch

Elevation ft

Station ft

System Report

Pipe	Additional Flow (cfs)	Total Upstream Discharge (cfs)	Structure Discharge (cfs)	-Node- Upstream Downstream	-Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	-Ground- Upstream Downstream	-HGL- Upstream Downstream	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	-Length (ft)	Average Velocity (ft/s)	Description
P-6	6.50	0.00	6.50	I-8	Circular	74.10	73.20	77.80	79.76	0.010126	6.50	228.00	5.30	
				I-7	15 inch			76.00	77.46	0.003947	4.06			
P-4	4.90	0.00	4.90	I-5	Circular	74.50	73.90	77.00	77.75	0.002176	4.90	134.00	2.77	
				I-6	18 inch			77.00	77.46	0.004478	7.03			
P-5	2.70	4.90	7.60	I-6	Circular	73.60	72.90	77.00	77.69	0.001129	7.60	204.00	2.42	
				I-7	24 inch			76.00	77.46	0.003431	13.25			
P-7	7.60	14.10	21.70	I-7	Circular	72.40	71.90	76.00	78.07	0.002799	21.70	218.00	4.42	
				I-9	30 inch			79.90	77.46	0.002294	19.64			
P-8	3.80	21.70	25.50	I-9	Circular	71.70	71.30	79.90	77.35	0.001462	25.50	161.00	3.61	
				I-4	36 inch			78.80	77.12	0.002484	33.24			
P-1	3.30	0.00	3.30	I-1	Circular	75.20	74.30	77.90	78.20	0.002610	3.30	230.00	2.69	
				I-2	15 inch			77.60	77.60	0.003913	4.04			
P-2	4.40	3.30	7.70	I-2	Circular	74.00	73.70	77.60	77.90	0.005374	7.70	98.00	4.36	
				I-3	18 inch			78.80	77.37	0.003061	5.81			
P-3	13.50	7.70	21.20	I-3	Circular	72.50	71.00	78.80	77.23	0.002672	21.20	41.00	4.32	
				I-4	30 inch			78.80	77.12	0.036585	78.45			
P-9	13.60	46.70	60.30	I-4	Circular	70.60	67.00	78.80	76.55	0.008174	60.30	190.00	8.53	
				Outlet	36 inch			76.00	75.00	0.018947	91.80			

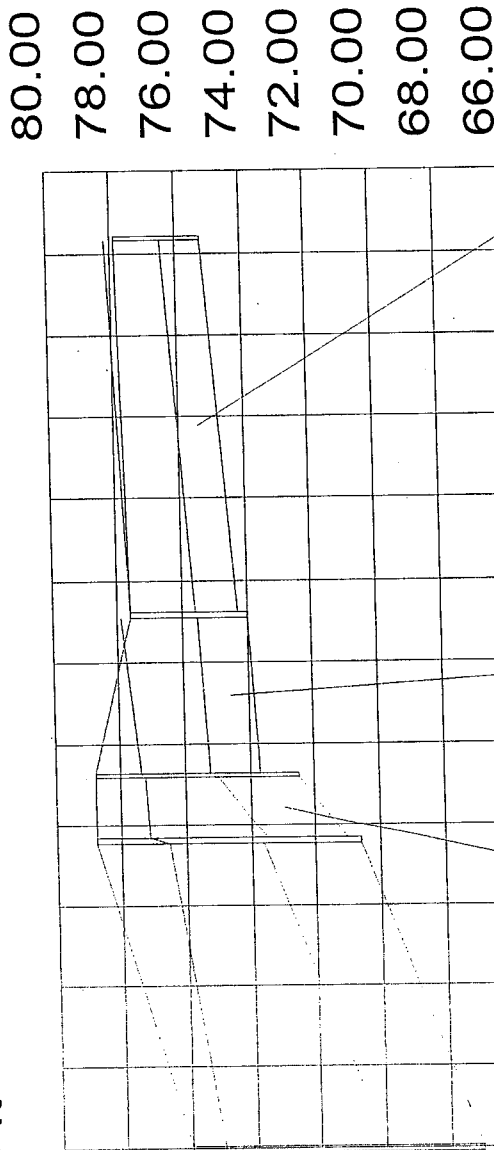
Inlet: I-4
 Rim: 78.80 ft
 Sump: 70.60 ft

Inlet: I-2
 Rim: 77.60 ft
 Sump: 74.00 ft

Inlet: I-1
 Rim: 77.90 ft
 Sump: 75.20 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft

Inlet: I-3
 Rim: 78.80 ft
 Sump: 72.50 ft



0+00+50+00+52+00+58+00+54+00+50+00+56+00+56+00

Station ft

Elevation ft

Pipe: P-9
 Up Invert: 70.60 ft
 Dn Invert: 67.00 ft
 Length: 190.00 ft
 Size: 36 inch

Pipe: P-2
 Up Invert: 74.00 ft
 Dn Invert: 73.70 ft
 Length: 98.00 ft
 Size: 18 inch

Pipe: P-1
 Up Invert: 75.20 ft
 Dn Invert: 74.30 ft
 Length: 230.00 ft
 Size: 15 inch

Pipe: P-3
 Up Invert: 72.50 ft
 Dn Invert: 71.00 ft
 Length: 41.00 ft
 Size: 30 inch

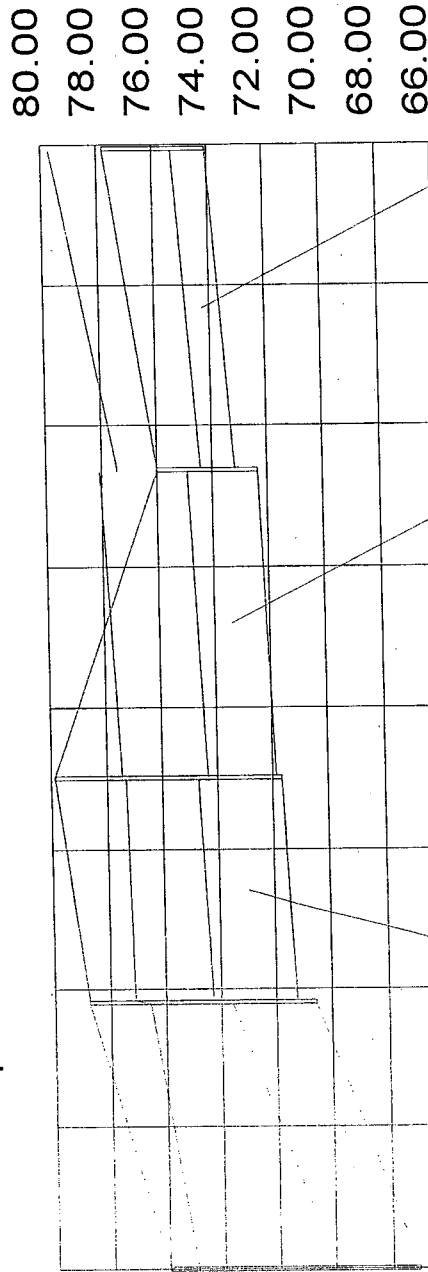
Inlet: I-9
 Rim: 79.90 ft
 Sump: 71.70 ft

Inlet: I-8
 Rim: 77.80 ft
 Sump: 74.10 ft

Inlet: I-7
 Rim: 76.00 ft
 Sump: 72.40 ft

Inlet: I-4
 Rim: 78.80 ft
 Sump: 70.60 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft



Pipe: P-9
 Up Invert: 70.60 ft
 Dn Invert: 67.00 ft
 Length: 190.00 ft
 Size: 36 inch

Pipe: P-8
 Up Invert: 71.70 ft
 Dn Invert: 71.30 ft
 Length: 161.00 ft
 Size: 36 inch

Pipe: P-7
 Up Invert: 72.40 ft
 Dn Invert: 71.90 ft
 Length: 218.00 ft
 Size: 30 inch

Pipe: P-6
 Up Invert: 74.10 ft
 Dn Invert: 73.20 ft
 Length: 228.00 ft
 Size: 15 inch

Elevation ft

Station ft

Inlet: I-6
 Rim: 77.00 ft
 Sump: 73.60 ft

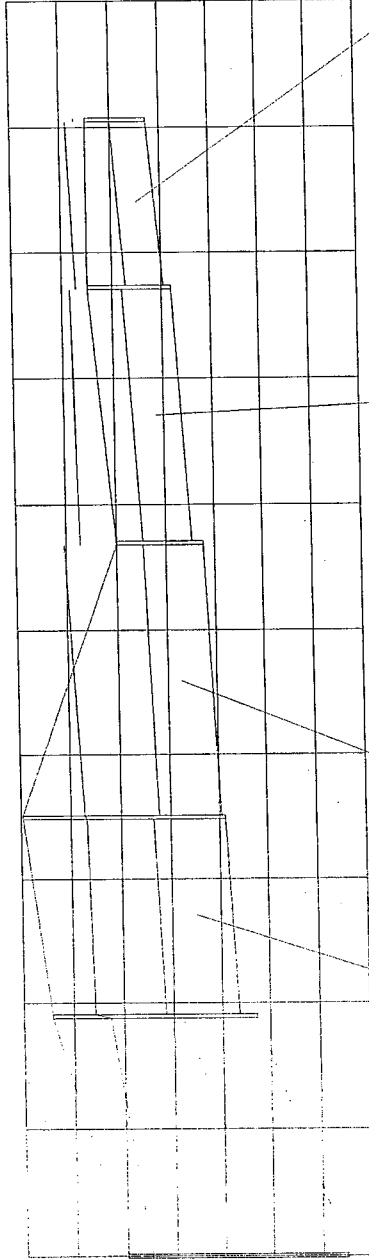
Inlet: I-4
 Rim: 78.80 ft
 Sump: 70.60 ft

Inlet: I-9
 Rim: 79.90 ft
 Sump: 71.70 ft

Inlet: I-7
 Rim: 76.00 ft
 Sump: 72.40 ft

Inlet: I-5
 Rim: 77.00 ft
 Sump: 74.50 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft



Elevation ft

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00

Station ft

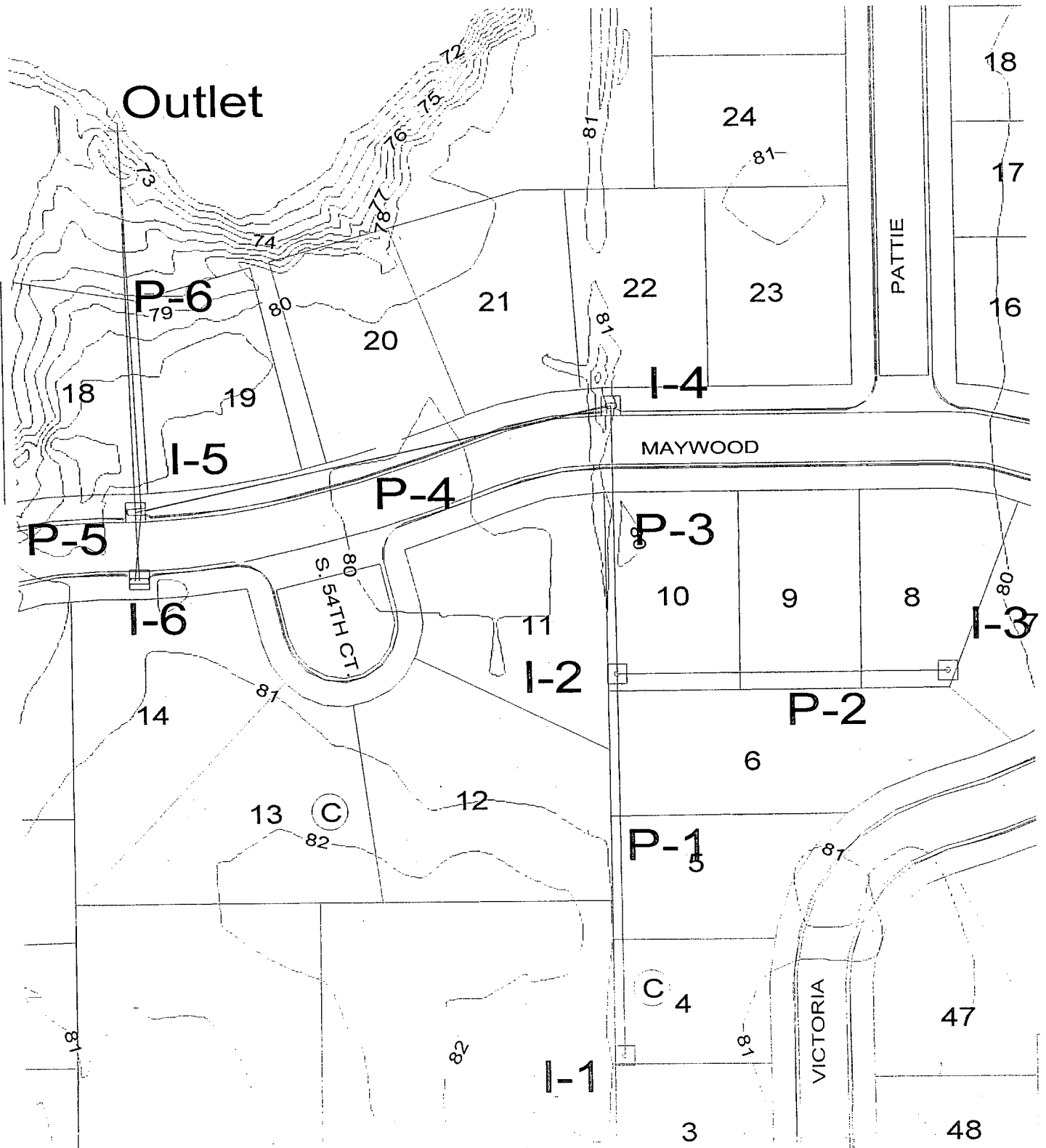
Pipe: P-9
 Up Invert: 70.60 ft
 Dn Invert: 67.00 ft
 Length: 190.00 ft
 Size: 36 inch

Pipe: P-8
 Up Invert: 71.70 ft
 Dn Invert: 71.30 ft
 Length: 161.00 ft
 Size: 36 inch

Pipe: P-7
 Up Invert: 72.40 ft
 Dn Invert: 71.90 ft
 Length: 218.00 ft
 Size: 30 inch

Pipe: P-5
 Up Invert: 73.60 ft
 Dn Invert: 72.90 ft
 Length: 204.00 ft
 Size: 24 inch

Pipe: P-4
 Up Invert: 74.50 ft
 Dn Invert: 73.90 ft
 Length: 134.00 ft
 Size: 18 inch



System Report

Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	-Node- Upstream Downstream	-Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-5	5.30	0.00	5.30	I-6	Circular	74.60	74.40	78.70	75.54	0.005036	5.30	41.00	4.70	
P-2	0.70	0.00	0.70	I-3	18 inch Circular	76.00	75.90	78.50	75.29	0.004878	7.34	203.00	1.23	
P-1	0.70	0.00	0.70	I-2	15 inch Circular	76.80	75.90	79.40	76.48	0.000493	1.43	233.00	1.85	
P-3	1.80	1.40	3.20	I-2	15 inch Circular	75.60	75.10	79.40	77.15	0.003178	4.01	163.00	3.74	
P-4	1.20	3.20	4.40	I-4	18 inch Circular	74.60	73.90	80.40	76.39	0.003240	5.82	300.00	2.66	
P-6	1.80	9.70	11.50	I-5	24 inch Circular	73.60	67.00	78.50	75.78	0.003067	4.40	237.00	3.14	
				Outlet	30 inch			76.00	75.50	0.001438	10.93			
									75.04	0.000816	11.50			
									75.00	0.027848	68.44			

Rivendale Addition, SWS No.3, Inlet No.4

Drainage area, acres	0.8
Li = Inlet Length	5
So = street grade, ft/ft	0.0051694
Sx = cross slope, ft/ft	0.03125
Manning's n	0.022
Z in Izzard's Eq. = 1/Sx	32

	2-yr	5-yr	100-yr
Rainfall Intensity, in/hr	3.83	4.56	7.37
Rational "C"	0.48	0.53	0.74
Flowrate, cfs	1.5	1.9	4.4
Additional Flow, cfs	0.0	0.0	0.0
Total Flowrate, cfs	1.5	1.9	4.4
depth of flow, ft	0.25	0.28	0.38
Flow width, ft	8.04	8.91	12.08
Froude Number	0.68013	0.69186	0.72796
Length 1, ft	4.81	5.42	7.74
Length 2, ft	3.16	3.56	5.08
Length 3, ft	9.02	10.17	14.51
case 1, Li < L2 intercepted flow bypassed flow	NO GOOD 1.5 0.0	NO GOOD 1.8 0.2	VALID 2.8 1.5
case 2, Li > L2 intercepted flow bypassed flow	VALID 1.2 0.3	VALID 1.5 0.5	NO GOOD 2.8 1.5

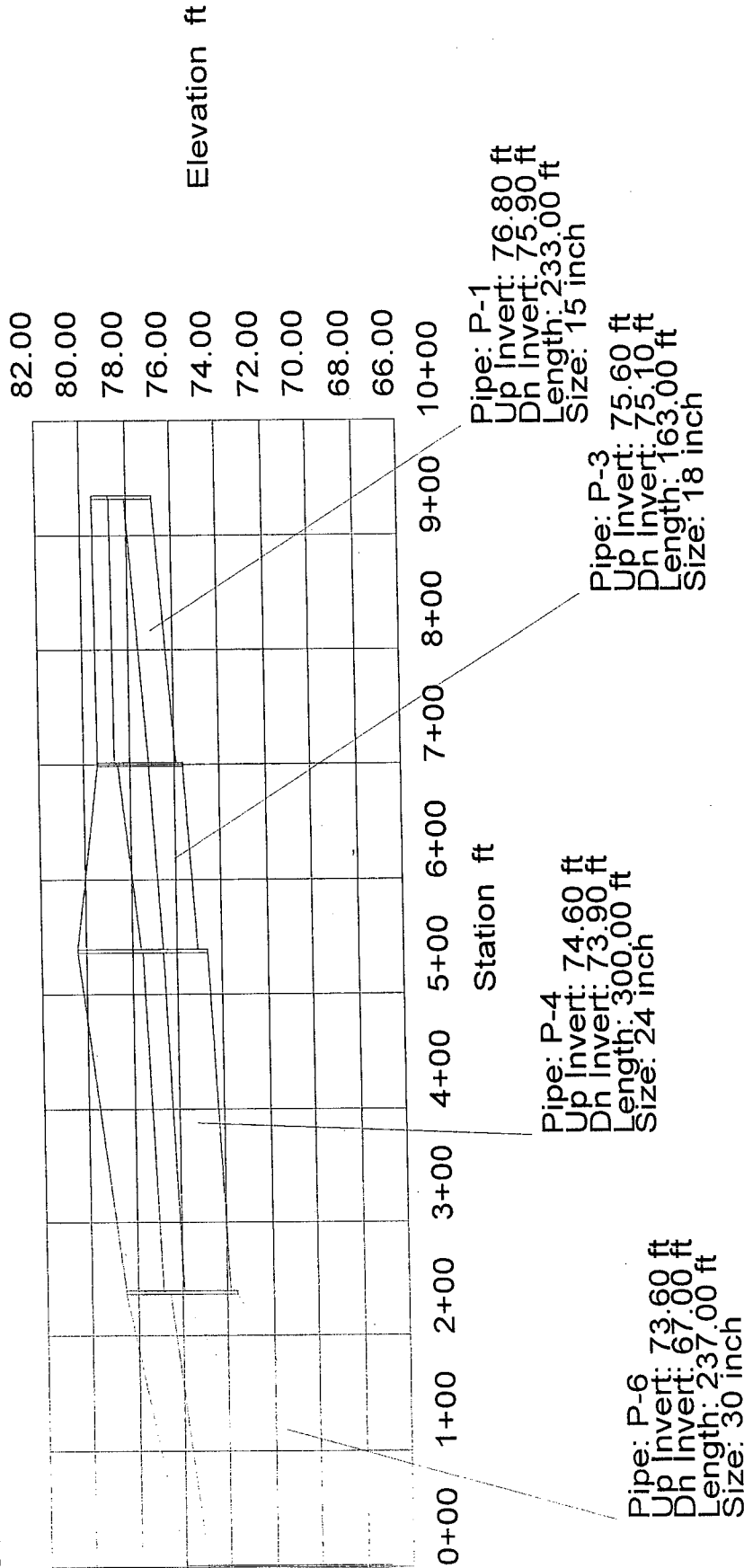
Inlet: I-1
 Rim: 79.50 ft
 Sump: 76.80 ft

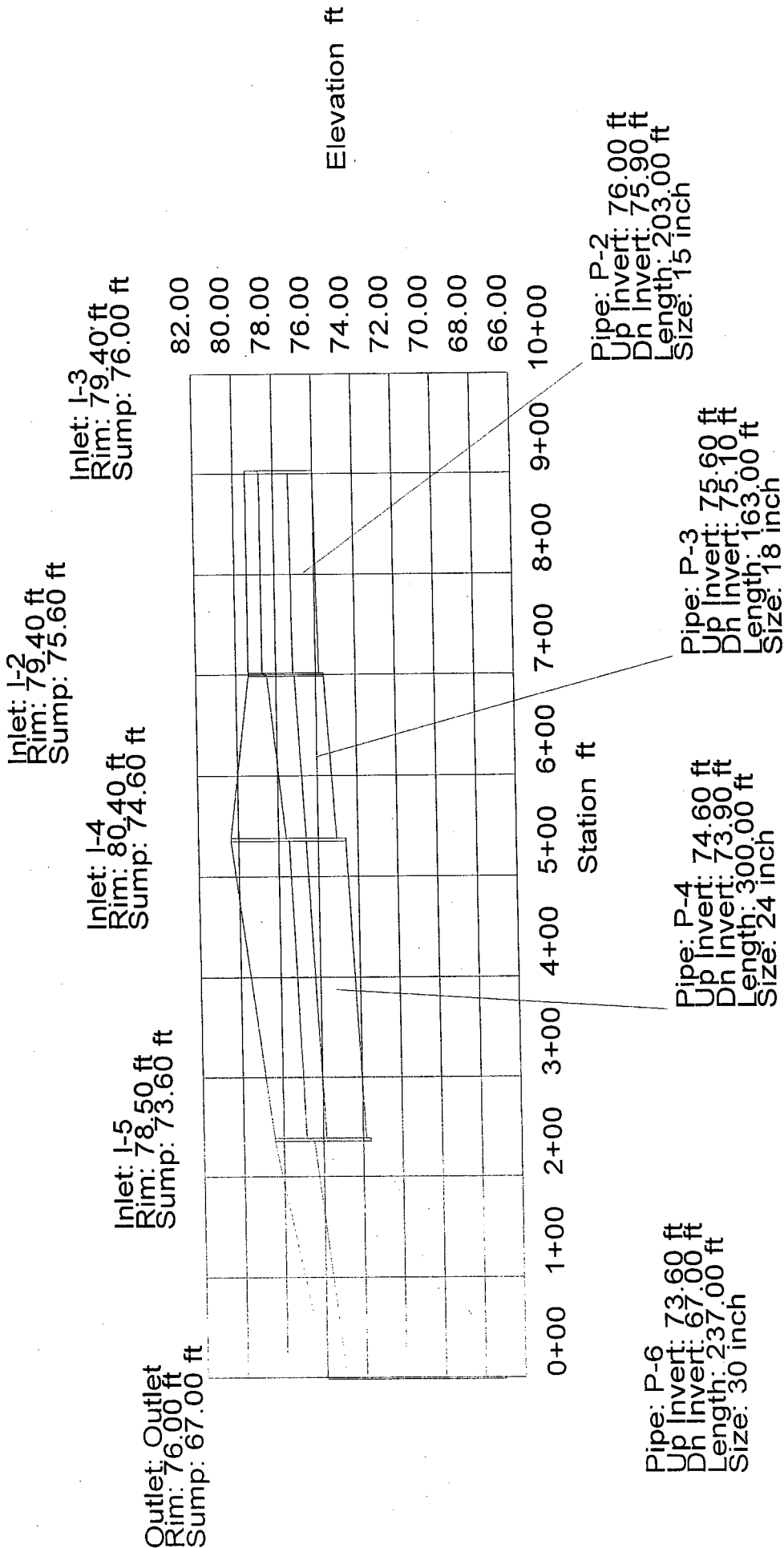
Inlet: I-2
 Rim: 79.40 ft
 Sump: 75.60 ft

Inlet: I-4
 Rim: 80.40 ft
 Sump: 74.60 ft

Inlet: I-5
 Rim: 78.50 ft
 Sump: 73.60 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft

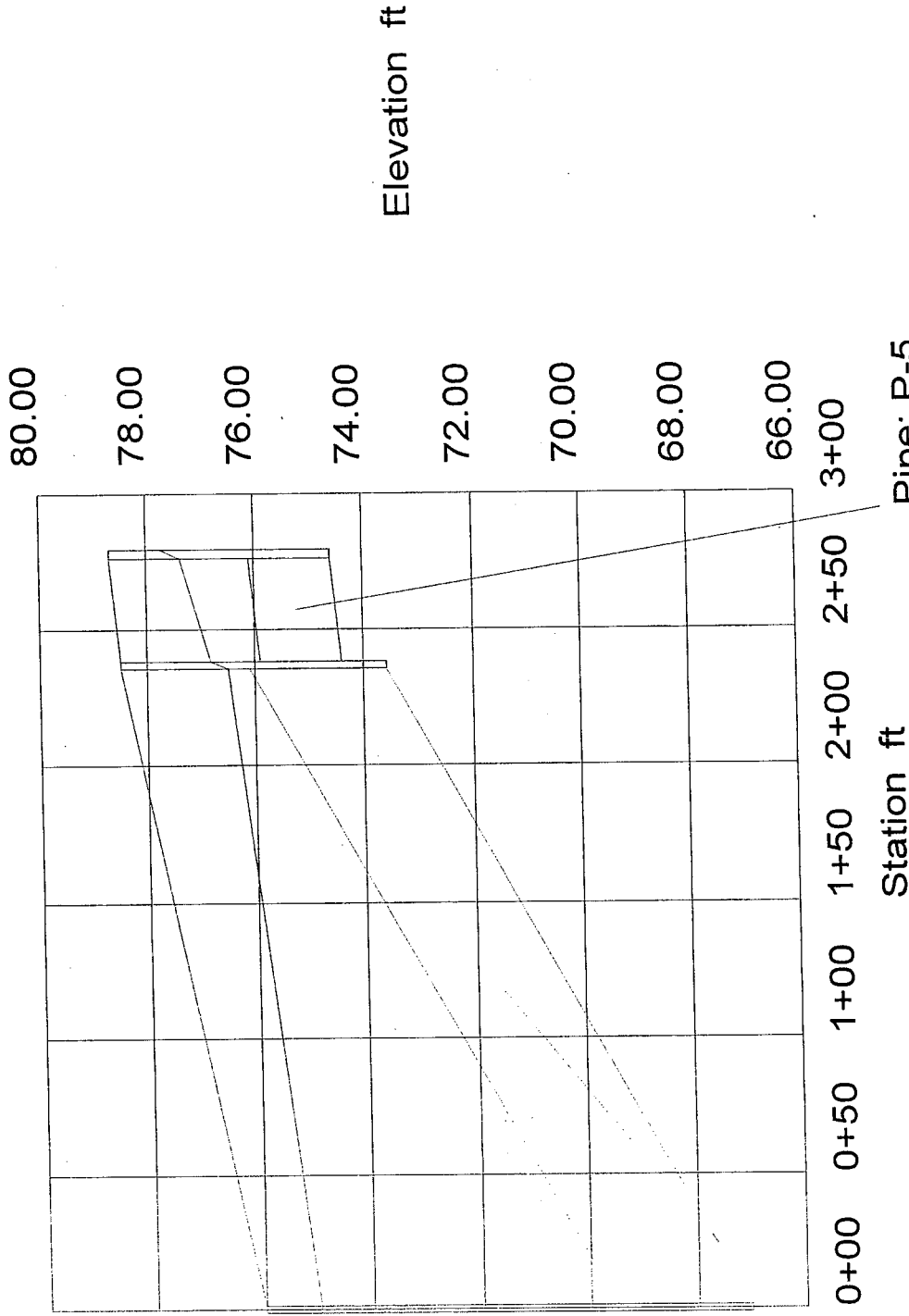




Inlet: I-6
 Rim: 78.70 ft
 Sump: 74.60 ft

Inlet: I-5
 Rim: 78.50 ft
 Sump: 73.60 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft



Pipe: P-5
 Up Invert: 74.60 ft
 Dn Invert: 74.40 ft
 Length: 41.00 ft
 Size: 18 inch

Pipe: P-6
 Up Invert: 73.60 ft
 Dn Invert: 67.00 ft
 Length: 237.00 ft
 Size: 30 inch

System Report

Pipe	Additional Flow (cfs)	Total Upstream Discharge (cfs)	Structure Discharge (cfs)	Node- Upstream Downstream	Section- Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-5	12.00	0.00	12.00	I-6	74.60	74.40	78.70	77.38	0.013052	12.00	41.00	6.79	
				I-5			78.50	76.84	0.004878	7.34			
P-2	1.20	0.00	1.20	I-3	76.00	75.90	79.40	78.75	0.000345	1.20	203.00	0.98	
				I-2			79.40	78.68	0.000493	1.43			
P-1	1.20	0.00	1.20	I-1	76.80	75.90	79.50	78.76	0.000345	1.20	233.00	0.98	
				I-2			79.40	78.68	0.003863	4.01			
P-3	5.50	2.40	7.90	I-2	75.60	75.10	79.40	78.52	0.005657	7.90	163.00	4.47	
				I-4			80.40	77.60	0.003067	5.82			
P-4	2.80	7.90	10.70	I-4	74.60	73.90	80.40	77.51	0.002237	10.70	300.00	3.41	
				I-5			78.50	76.84	0.002333	10.93			
P-6	9.90	22.70	32.60	I-5	73.60	67.00	78.50	76.50	0.006318	32.60	237.00	6.64	
				Outlet			76.00	75.00	0.027848	68.44			

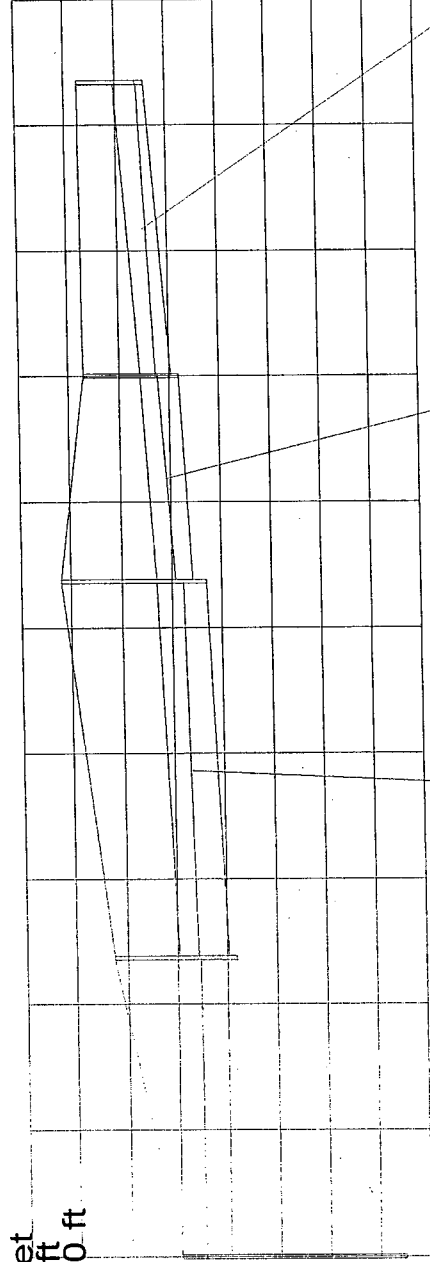
Inlet: I-1
 Rim: 79.50 ft
 Sump: 76.80 ft

Inlet: I-2
 Rim: 79.40 ft
 Sump: 75.60 ft

Inlet: I-4
 Rim: 80.40 ft
 Sump: 74.60 ft

Inlet: I-5
 Rim: 78.50 ft
 Sump: 73.60 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft



Elevation ft

10+00

9+00

8+00

7+00

6+00

5+00

4+00

3+00

2+00

1+00

0+00

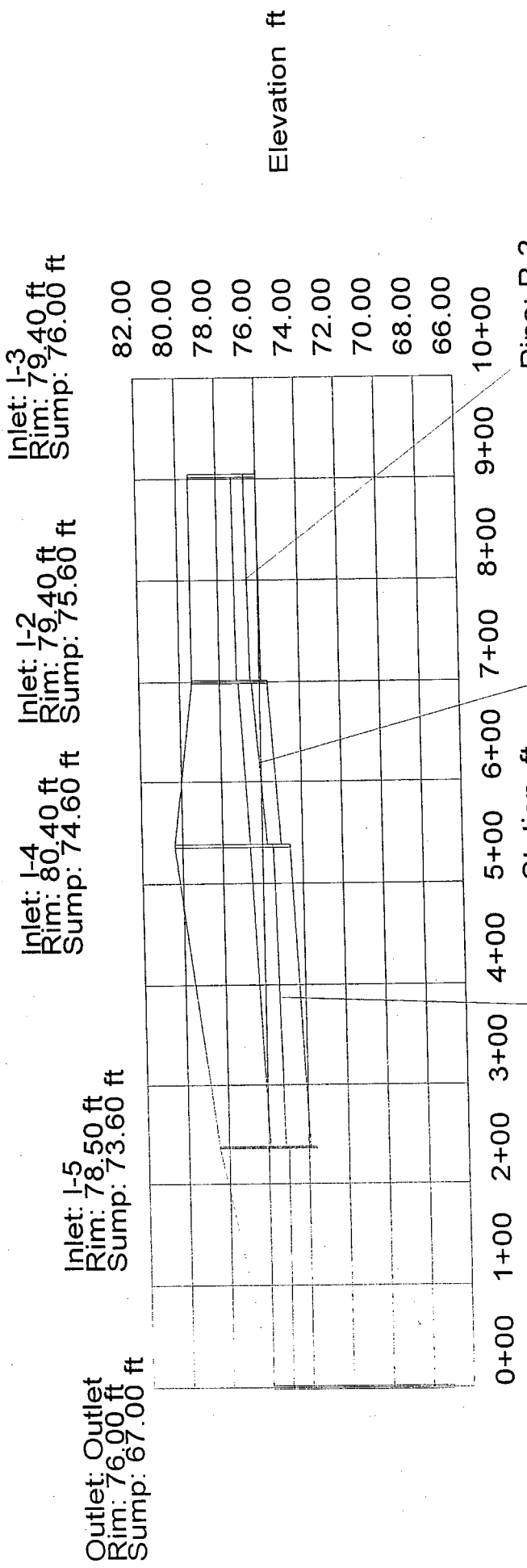
Pipe: P-1
 Up Invert: 76.80 ft
 Dn Invert: 75.90 ft
 Length: 233.00 ft
 Size: 15 inch

Pipe: P-3
 Up Invert: 75.60 ft
 Dn Invert: 75.10 ft
 Length: 163.00 ft
 Size: 18 inch

Pipe: P-4
 Up Invert: 74.60 ft
 Dn Invert: 73.90 ft
 Length: 300.00 ft
 Size: 24 inch

Pipe: P-6
 Up Invert: 73.60 ft
 Dn Invert: 67.00 ft
 Length: 237.00 ft
 Size: 30 inch

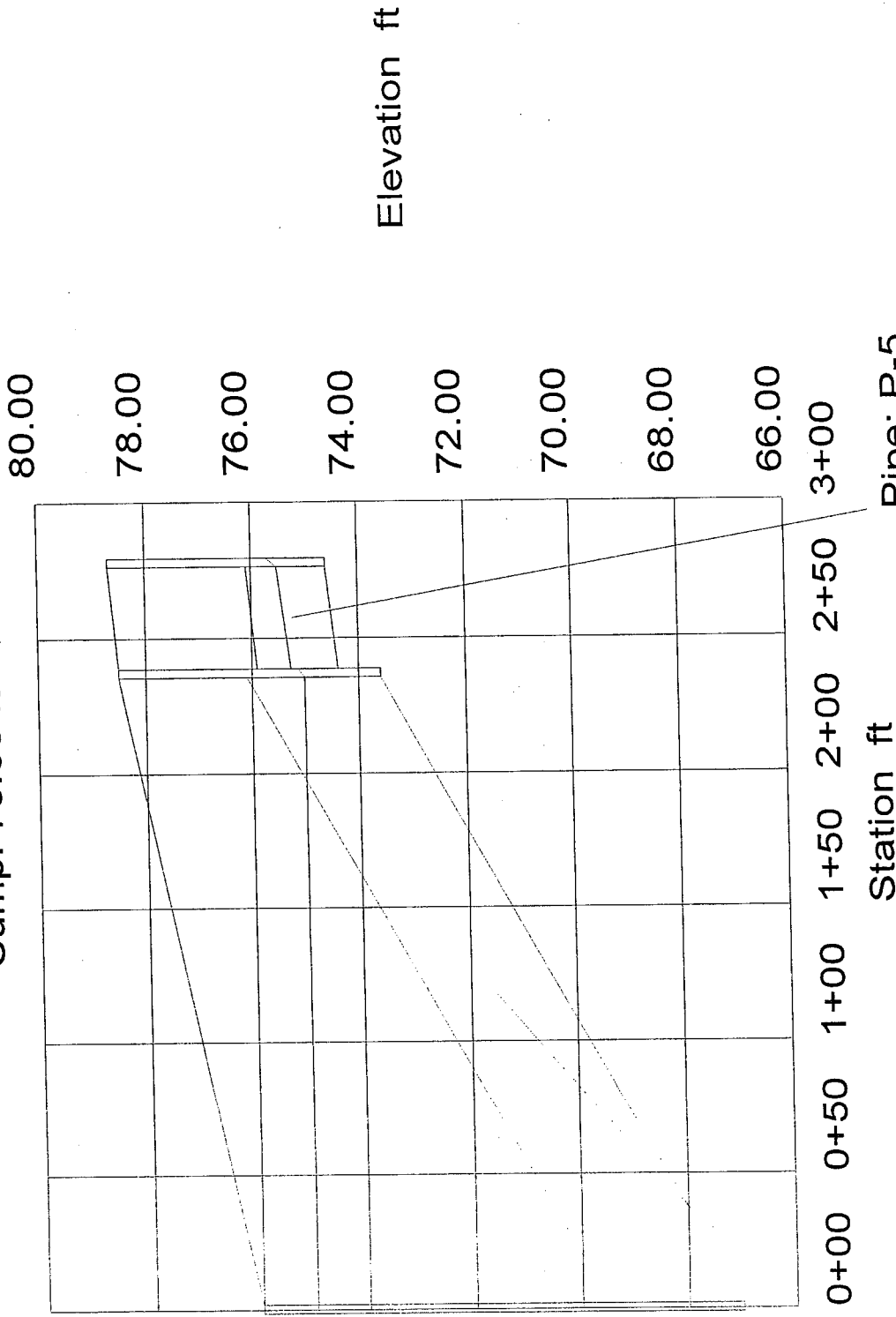
Station ft



Inlet: I-6
 Rim: 78.70 ft
 Sump: 74.60 ft

Inlet: I-5
 Rim: 78.50 ft
 Sump: 73.60 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft



Elevation ft

Station ft

Pipe: P-5
 Up Invert: 74.60 ft
 Dn Invert: 74.40 ft
 Length: 41.00 ft
 Size: 18 inch

Pipe: P-6
 Up Invert: 73.60 ft
 Dn Invert: 67.00 ft
 Length: 237.00 ft
 Size: 30 inch

System Report

Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	Node- Upstream Downstream	Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-1	0.70	0.00	0.70	I-1	Circular	75.50	74.80	78.40	75.85	0.002947	0.70	179.00	1.84	
P-2	0.40	0.70	1.10	I-2	15 inch Circular	74.50	74.00	78.50	75.40	0.003911	4.04	144.00	0.83	
P-3	1.80	1.10	2.90	I-3	18 inch Circular	73.80	73.40	79.20	75.39	0.000148	6.19	122.00	1.64	
P-4	2.40	2.90	5.30	I-4	18 inch Circular	72.90	72.70	79.00	75.36	0.000762	6.01	36.00	1.69	
P-5	1.50	5.30	6.80	I-5	24 inch Circular	72.40	67.00	79.00	75.24	0.000549	16.86	204.00	2.16	
				Outlet	24 inch Circular			76.00	75.22	0.005556	6.80			
									75.18	0.000904	36.80			
									75.00	0.026471				

Inlet: I-1
 Rim: 78.40 ft
 Sump: 75.50 ft

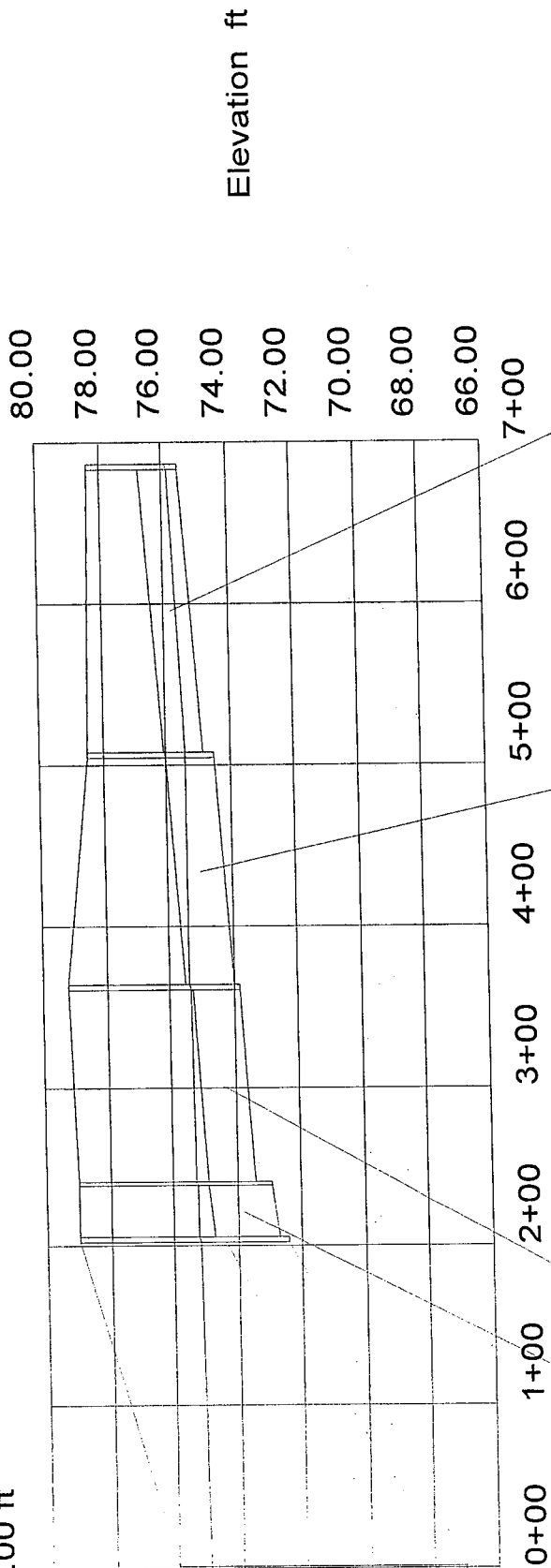
Inlet: I-2
 Rim: 78.50 ft
 Sump: 74.50 ft

Inlet: I-4
 Rim: 79.00 ft
 Sump: 72.90 ft

Inlet: I-3
 Rim: 79.20 ft
 Sump: 73.80 ft

Inlet: I-5
 Rim: 79.00 ft
 Sump: 72.40 ft

Outlet: Outlet
 Rim: 76.00 ft
 Sump: 67.00 ft



Pipe: P-1
 Up Invert: 75.50 ft
 Dn Invert: 74.80 ft
 Length: 179.00 ft
 Size: 15 inch

Pipe: P-2
 Up Invert: 74.50 ft
 Dn Invert: 74.00 ft
 Length: 144.00 ft
 Size: 18 inch

Pipe: P-3
 Up Invert: 73.80 ft
 Dn Invert: 73.40 ft
 Length: 122.00 ft
 Size: 18 inch

Pipe: P-4
 Up Invert: 72.90 ft
 Dn Invert: 72.70 ft
 Length: 36.00 ft
 Size: 24 inch

Pipe: P-5
 Up Invert: 72.40 ft
 Dn Invert: 67.00 ft
 Length: 204.00 ft
 Size: 24 inch

System Report

Pipe	Additional Flow (cfs)	Total Upstream Discharge (cfs)		Structure Discharge (cfs)	Node- Upstream Discharge (cfs)		Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Ground- Upstream Downstream (ft)		-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length- (ft)	Average Velocity (ft/s)	Description
		Added (cfs)	0.00		Upstream	Downstream				Upstream	Downstream						
P-1	2.20	0.00	2.20	2.20	I-1	I-1	Circular	75.50	74.80	78.40	78.40	78.71	0.001160	2.20	179.00	1.79	
P-2	1.10	2.20	3.30	3.30	I-2	I-2	15 inch Circular	74.50	74.00	78.50	78.50	78.50	0.003911	4.04	144.00	1.87	
P-3	5.50	3.30	8.80	8.80	I-3	I-3	18 inch Circular	73.80	73.40	79.20	79.20	78.39	0.003472	6.19	122.00	4.98	
P-4	7.10	8.80	15.90	15.90	I-4	I-4	18 inch Circular	72.90	72.70	79.00	79.00	77.34	0.003279	6.01	36.00	5.06	
P-5	4.40	15.90	20.30	20.30	I-5	I-5	24 inch Circular	72.40	67.00	79.00	79.00	76.97	0.005556	16.86	204.00	6.46	
					Outlet		24 inch			76.00	76.00	75.00	0.026471	36.80			

Inlet: I-2
Rim: 78.50 ft
Sump: 74.50 ft

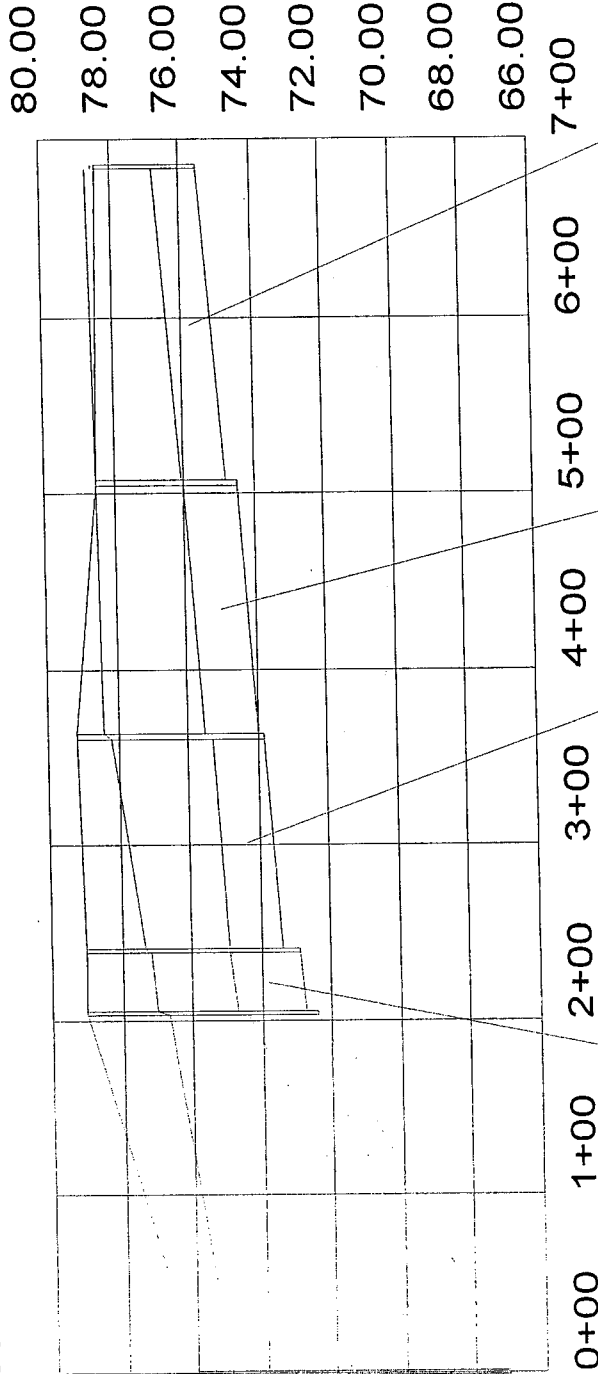
Inlet: I-4
Rim: 79.00 ft
Sump: 72.90 ft

Inlet: I-1
Rim: 78.40 ft
Sump: 75.50 ft

Inlet: I-3
Rim: 79.20 ft
Sump: 73.80 ft

Inlet: I-5
Rim: 79.00 ft
Sump: 72.40 ft

Outlet: Outlet
Rim: 76.00 ft
Sump: 67.00 ft



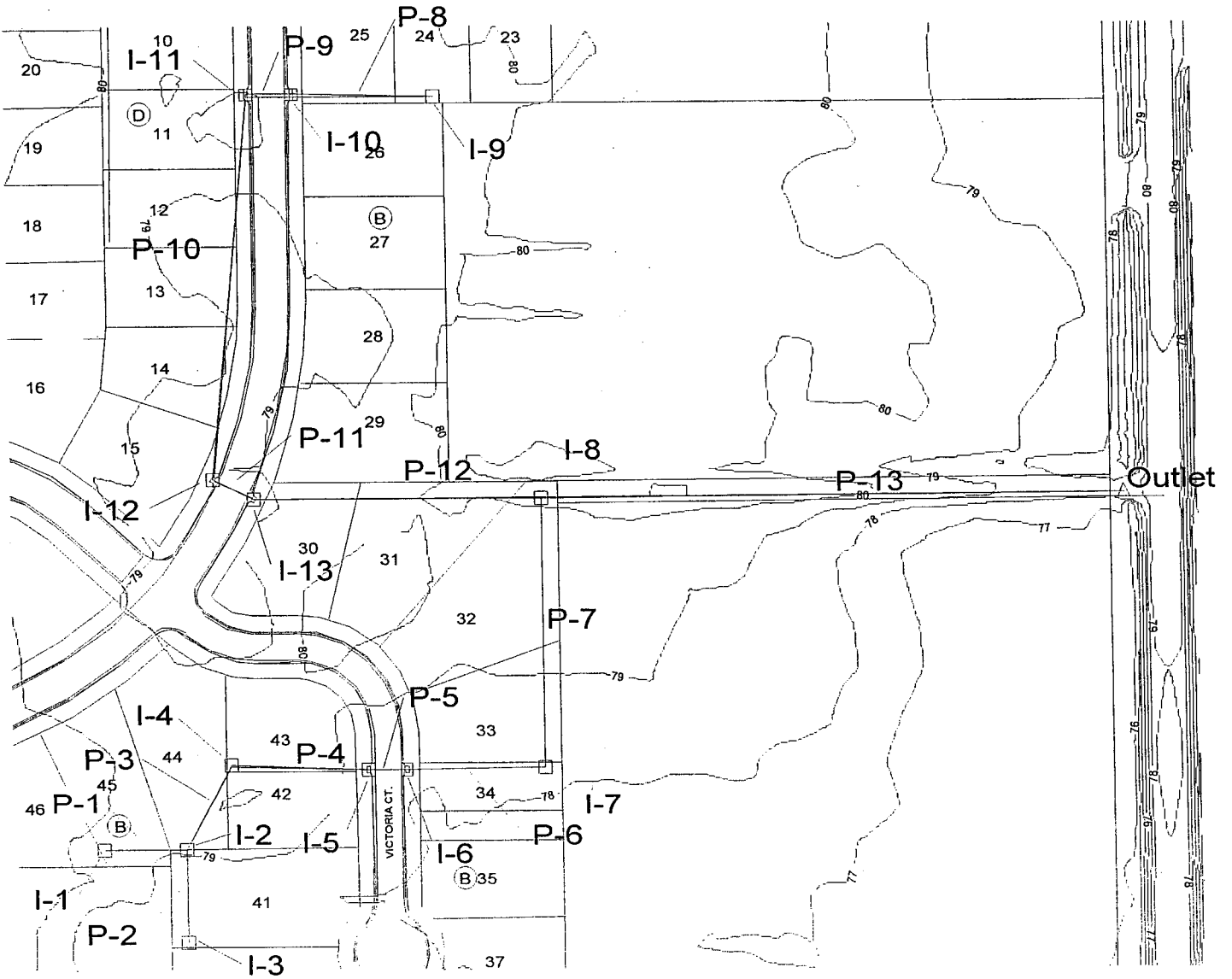
Pipe: P-5
Up Invert: 72.40 ft
Dn Invert: 67.00 ft
Length: 204.00 ft
Size: 24 inch

Pipe: P-4
Up Invert: 72.90 ft
Dn Invert: 72.70 ft
Length: 36.00 ft
Size: 24 inch

Pipe: P-3
Up Invert: 73.80 ft
Dn Invert: 73.40 ft
Length: 122.00 ft
Size: 18 inch

Pipe: P-2
Up Invert: 74.50 ft
Dn Invert: 74.00 ft
Length: 144.00 ft
Size: 18 inch

Pipe: P-1
Up Invert: 75.50 ft
Dn Invert: 74.80 ft
Length: 179.00 ft
Size: 15 inch



Drainage area, acres	0.5
Li = Inlet Length	5
So = street grade, ft/ft	0.005302
Sx = cross slope, ft/ft	0.03125
Manning's n	0.022
Z in Izzard's Eq. = 1/Sx	32

	2-yr	5-yr	100-yr
Rainfall Intensity, in/hr	3.83	4.56	7.37
Rational "C"	0.48	0.53	0.74
Flowrate, cfs	0.9	1.2	2.7
Additional Flow, cfs	0.0	0.0	0.0
Total Flowrate, cfs	0.9	1.2	2.7
depth of flow, ft	0.21	0.23	0.32
Flow width, ft	6.71	7.43	10.08
Froude Number	0.66833	0.67985	0.71533
Length 1, ft	3.95	4.45	6.35
Length 2, ft	2.59	2.92	4.17
Length 3, ft	7.40	8.34	11.90
case 1, Li < L2 intercepted flow bypassed flow	NO GOOD 1.2 0.0	NO GOOD 1.4 0.0	NO GOOD 2.1 0.6
case 2, Li > L2 intercepted flow bypassed flow	VALID 0.8 0.1	VALID 1.0 0.2	VALID 1.9 0.8

Drainage area, acres	0.2
Li = Inlet Length	5
So = street grade, ft/ft	0.005302
Sx = 'cross slope, ft/ft	0.03125
Manning's n	0.022
Z in Izzard's Eq. = 1/Sx	32

	2-yr	5-yr	100-yr
Rainfall Intensity, in/hr	3.83	4.56	7.37
Rational "C"	0.48	0.53	0.74
Flowrate, cfs	0.4	0.5	1.1
Additional Flow, cfs	0.0	0.0	0.0
Total Flowrate, cfs	0.4	0.5	1.1
depth of flow, ft	0.15	0.16	0.22
Flow width, ft	4.76	5.27	7.15
Froude Number	0.63113	0.64201	0.67552
Length 1, ft	2.64	2.98	4.25
Length 2, ft	1.74	1.96	2.79
Length 3, ft	4.95	5.58	7.97
case 1, Li < L2 intercepted flow bypassed flow	NO GOOD 0.7 0.0	NO GOOD 0.8 0.0	NO GOOD 1.3 0.0
case 2, Li > L2 intercepted flow bypassed flow	VALID 0.4 0.0	VALID 0.5 0.0	VALID 0.9 0.2

System Report

Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	Node- Upstream Downstream	Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Ground- Upstream Downstream	-HGL- Upstream Downstream	-Slope- Energy Constructed (ft/ft)	Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-8	1.50	0.00	1.50	I-9	Circular	74.60	74.20	77.60	75.54	0.000263	1.50	31.00	1.10	
				I-10	18 inch			77.30	75.52	0.003053	5.80			
P-9	9.20	1.50	10.70	I-10	Circular	73.20	73.00	77.30	75.48	0.000602	10.70	41.00	2.23	
				I-11	30 inch			77.30	75.46	0.004878	28.65			
P-10	4.10	10.70	14.80	I-11	Circular	72.50	72.00	77.30	75.43	0.000486	14.80	353.00	2.10	
				I-12	36 inch			79.30	75.25	0.001416	25.10			
P-11	0.80	14.80	15.60	I-12	Circular	71.80	71.70	79.30	75.22	0.000547	15.60	42.00	2.21	
				I-13	36 inch			79.30	75.19	0.002381	32.54			
P-12	0.40	15.60	16.00	I-13	Circular	71.50	71.00	79.30	75.15	0.000576	16.00	266.00	2.26	
				I-8	36 inch			78.20	75.00	0.001880	28.92			
P-2	1.50	0.00	1.50	I-3	Circular	74.80	74.40	77.70	75.33	0.001869	1.50	86.00	2.35	
				I-2	15 inch			78.60	75.27	0.004651	4.41			
P-1	0.70	0.00	0.70	I-1	Circular	76.50	75.70	79.40	76.83	0.010358	0.70	75.00	3.13	
				I-2	15 inch			78.60	75.97	0.010667	6.67			
P-3	0.00	2.20	2.20	I-2	Circular	74.50	74.20	78.60	75.21	0.001351	2.20	89.00	2.26	
				I-4	18 inch			78.10	75.15	0.003371	6.10			
P-4	0.00	2.20	2.20	I-4	Circular	73.70	73.40	78.10	75.14	0.000104	2.20	126.00	0.83	
				I-5	24 inch			78.20	75.13	0.002381	11.04			
P-5	2.90	2.20	5.10	I-5	Circular	73.20	73.00	78.20	75.11	0.000491	5.10	36.00	1.64	
				I-6	24 inch			78.20	75.10	0.005556	16.86			
P-6	1.80	5.10	6.90	I-6	Circular	72.50	72.20	78.20	75.08	0.000283	6.90	128.00	1.41	
				I-7	30 inch			78.00	75.04	0.002344	19.86			
P-7	0.90	6.90	7.80	I-7	Circular	72.00	71.00	78.00	75.03	0.000137	7.80	247.00	1.10	
				I-8	36 inch			78.20	75.00	0.004049	42.44			
P-13	1.70	23.80	25.50	I-8	Circular	70.00	66.80	78.20	74.95	0.000642	25.50	539.00	2.65	
				Outlet	42 inch			76.00	74.60	0.005937	77.52			

Inlet: I-4
Rim: 78.10 ft
Sump: 73.70 ft

Inlet: I-1
Rim: 79.40 ft
Sump: 76.50 ft

Inlet: I-6
Rim: 78.20 ft
Sump: 72.50 ft

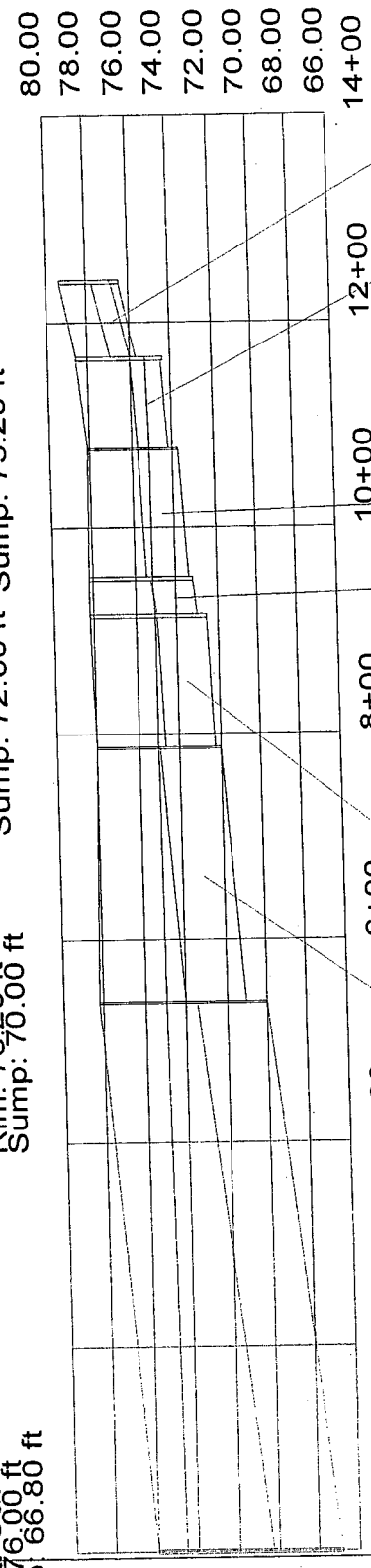
Inlet: I-2
Rim: 78.60 ft
Sump: 74.40 ft

Inlet: I-7
Rim: 78.00 ft
Sump: 72.00 ft

Inlet: I-5
Rim: 78.20 ft
Sump: 73.20 ft

Inlet: I-8
Rim: 78.20 ft
Sump: 70.00 ft

Outlet
Rim: 76.00 ft
Sump: 66.80 ft



Pipe: P-1
Up Invert: 76.50 ft
Dn Invert: 75.70 ft
Length: 75.00 ft
Size: 15 inch

Pipe: P-3
Up Invert: 74.50 ft
Dn Invert: 74.20 ft
Length: 89.00 ft
Size: 18 inch

Pipe: P-4
Up Invert: 73.70 ft
Dn Invert: 73.40 ft
Length: 126.00 ft
Size: 24 inch

Pipe: P-5
Up Invert: 73.20 ft
Dn Invert: 73.00 ft
Length: 36.00 ft
Size: 24 inch

Pipe: P-6
Up Invert: 72.50 ft
Dn Invert: 72.20 ft
Length: 128.00 ft
Size: 30 inch

Pipe: P-7
Up Invert: 72.00 ft
Dn Invert: 71.00 ft
Length: 247.00 ft
Size: 36 inch

Pipe: P-13
Up Invert: 70.00 ft
Dn Invert: 66.80 ft
Length: 539.00 ft
Size: 42 inch

Inlet: I-3
Rim: 77.70 ft
Sump: 74.80 ft

Inlet: I-4
Rim: 78.10 ft
Sump: 73.70 ft

Inlet: I-6
Rim: 78.20 ft
Sump: 72.50 ft

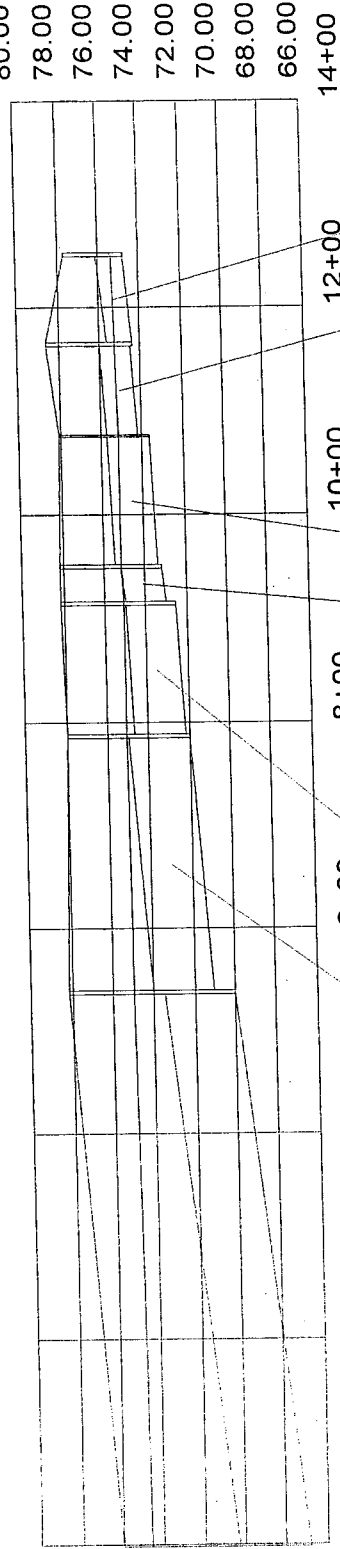
Inlet: I-2
Rim: 78.60 ft
Sump: 74.40 ft

Inlet: I-5
Rim: 78.20 ft
Sump: 73.20 ft

Inlet: I-7
Rim: 78.00 ft
Sump: 72.00 ft

Inlet: I-8
Rim: 78.20 ft
Sump: 70.00 ft

Outlet: Outlet
Rim: 76.00 ft
Sump: 66.80 ft



Pipe: P-2
Up Invert: 74.80 ft
Dn Invert: 74.40 ft
Length: 86.00 ft
Size: 15 inch

Pipe: P-4
Up Invert: 73.70 ft
Dn Invert: 73.40 ft
Length: 126.00 ft
Size: 24 inch

Pipe: P-6
Up Invert: 72.50 ft
Dn Invert: 72.20 ft
Length: 128.00 ft
Size: 30 inch

Pipe: P-3
Up Invert: 74.50 ft
Dn Invert: 74.20 ft
Length: 89.00 ft
Size: 18 inch

Pipe: P-5
Up Invert: 73.20 ft
Dn Invert: 73.00 ft
Length: 36.00 ft
Size: 24 inch

Pipe: P-7
Up Invert: 72.00 ft
Dn Invert: 71.00 ft
Length: 247.00 ft
Size: 36 inch

Pipe: P-13
Up Invert: 70.00 ft
Dn Invert: 66.80 ft
Length: 539.00 ft
Size: 42 inch

Inlet: I-9
Rim: 77.60 ft
Sump: 74.60 ft

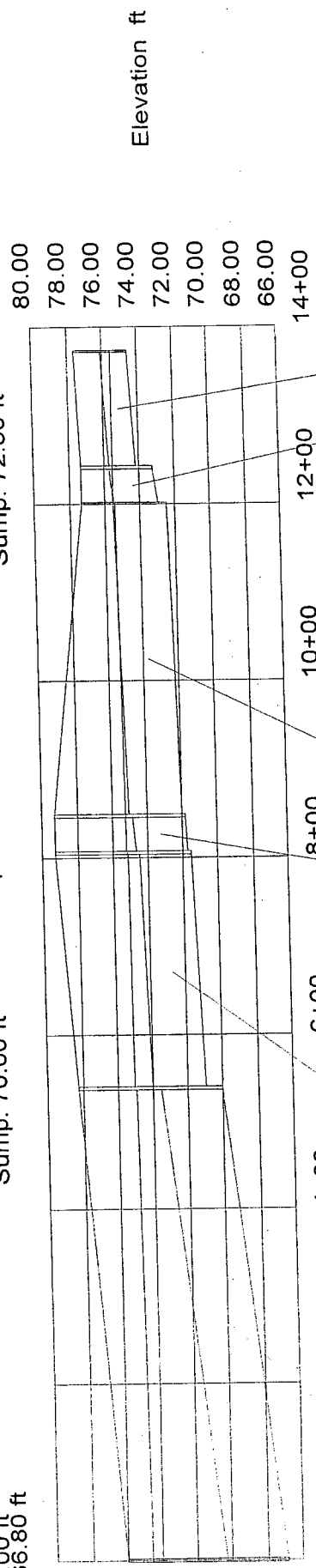
Inlet: I-10
Rim: 77.30 ft
Sump: 73.20 ft

Inlet: I-12
Rim: 79.30 ft
Sump: 71.80 ft

Inlet: I-13
Rim: 79.30 ft
Sump: 71.50 ft

Inlet: I-8
Rim: 78.20 ft
Sump: 70.00 ft

Outlet: Outlet
Rim: 76.00 ft
Sump: 66.80 ft



Pipe: P-8
Up Invert: 74.60 ft
Dn Invert: 74.20 ft
Length: 131.00 ft
Size: 18 inch

Pipe: P-9
Up Invert: 73.20 ft
Dn Invert: 73.00 ft
Length: 41.00 ft
Size: 30 inch

Pipe: P-10
Up Invert: 72.50 ft
Dn Invert: 72.00 ft
Length: 353.00 ft
Size: 36 inch

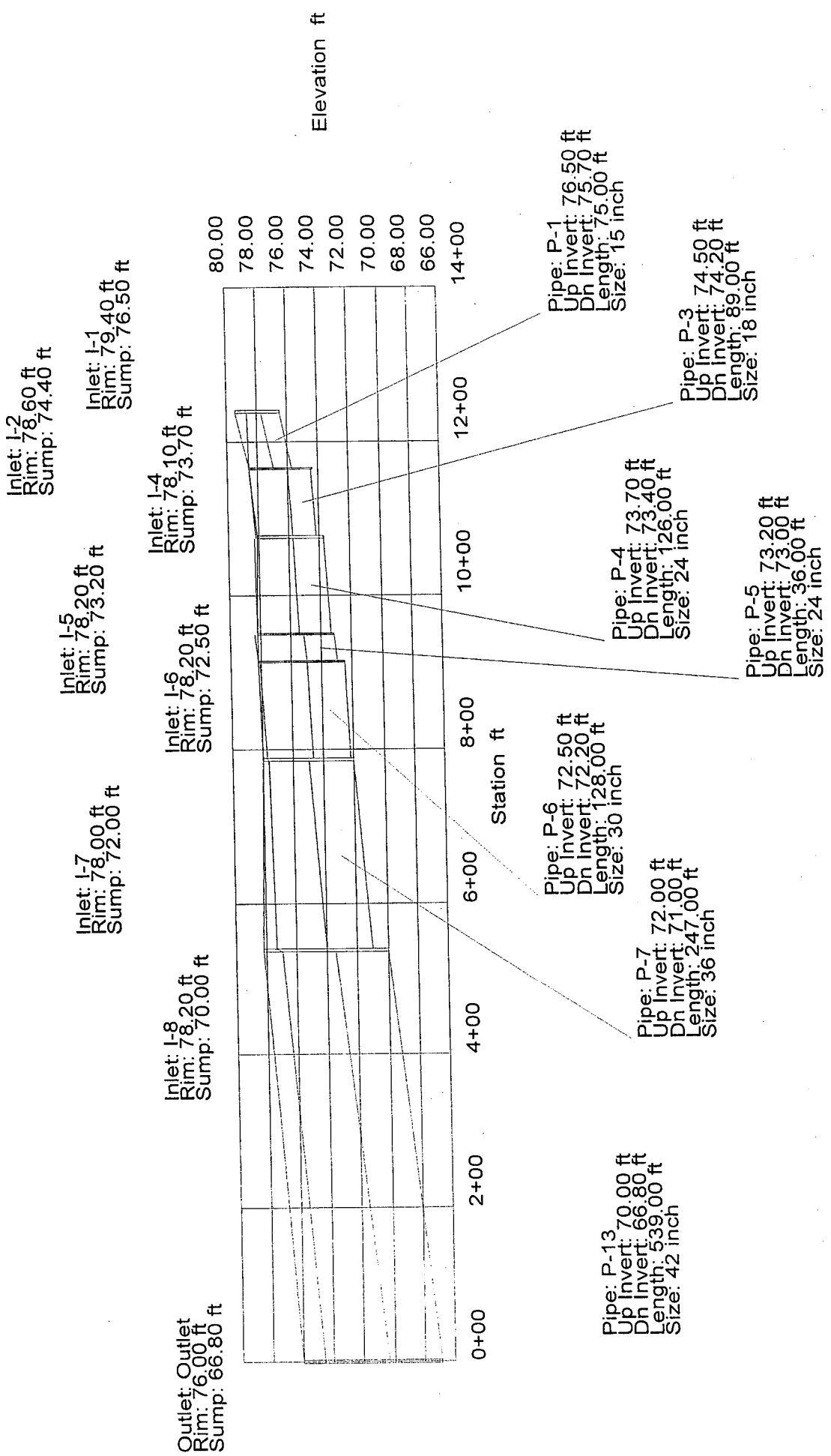
Pipe: P-11
Up Invert: 71.80 ft
Dn Invert: 71.70 ft
Length: 42.00 ft
Size: 36 inch

Pipe: P-12
Up Invert: 71.50 ft
Dn Invert: 71.00 ft
Length: 266.00 ft
Size: 36 inch

Pipe: P-13
Up Invert: 70.00 ft
Dn Invert: 66.80 ft
Length: 539.00 ft
Size: 42 inch

System Report

Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	-Node- Upstream Downstream	Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	-Ground- Upstream Downstream	-HGL- Upstream Downstream	-Slope- Energy Dissipation (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-8	4.40	0.00	4.40	I-9	Circular 18 inch	74.60	74.20	77.60	79.01	0.001755	4.40	131.00	2.49	
P-9	18.00	4.40	22.40	I-10	Circular 30 inch	73.20	73.00	77.30	78.78	0.002983	22.40	41.00	4.56	
P-10	13.00	22.40	35.40	I-11	Circular 36 inch	72.50	72.00	77.30	78.78	0.004878	35.40	353.00	5.01	
P-11	1.90	35.40	37.30	I-12	Circular 36 inch	71.80	71.70	79.30	78.78	0.001416	37.30	42.00	5.28	
P-12	0.90	37.30	38.20	I-13	Circular 36 inch	71.50	71.00	79.30	78.43	0.002381	38.20	266.00	5.40	
P-2	4.40	0.00	4.40	I-8	Circular 15 inch	74.80	74.40	77.70	77.33	0.001880	4.40	86.00	3.59	
P-1	2.20	0.00	2.20	I-2	Circular 15 inch	76.50	75.70	79.40	78.60	0.004651	4.41	75.00	1.79	
P-3	0.00	6.60	6.60	I-2	Circular 18 inch	74.50	74.20	78.60	78.69	0.010667	6.60	89.00	3.73	
P-4	0.00	6.60	6.60	I-4	Circular 24 inch	73.70	73.40	78.10	78.60	0.003948	6.10	126.00	2.10	
P-5	8.70	6.60	15.30	I-5	Circular 24 inch	73.20	73.00	78.20	78.31	0.000851	11.04	36.00	4.87	
P-6	5.50	15.30	20.80	I-6	Circular 30 inch	72.50	72.20	78.20	78.20	0.002381	15.30	128.00	4.24	
P-7	2.70	20.80	23.50	I-7	Circular 36 inch	72.00	71.00	78.00	78.06	0.002572	20.80	247.00	3.32	
P-13	4.90	61.70	66.60	I-8	Circular 42 inch	70.00	66.80	78.20	77.73	0.002344	19.86	339.00	6.92	
				Outlet				76.00	77.33	0.004049	42.44			



Inlet: I-3
Rim: 77.70 ft
Sump: 74.80 ft

Inlet: I-4
Rim: 78.10 ft
Sump: 73.70 ft

Inlet: I-6
Rim: 78.20 ft
Sump: 72.50 ft

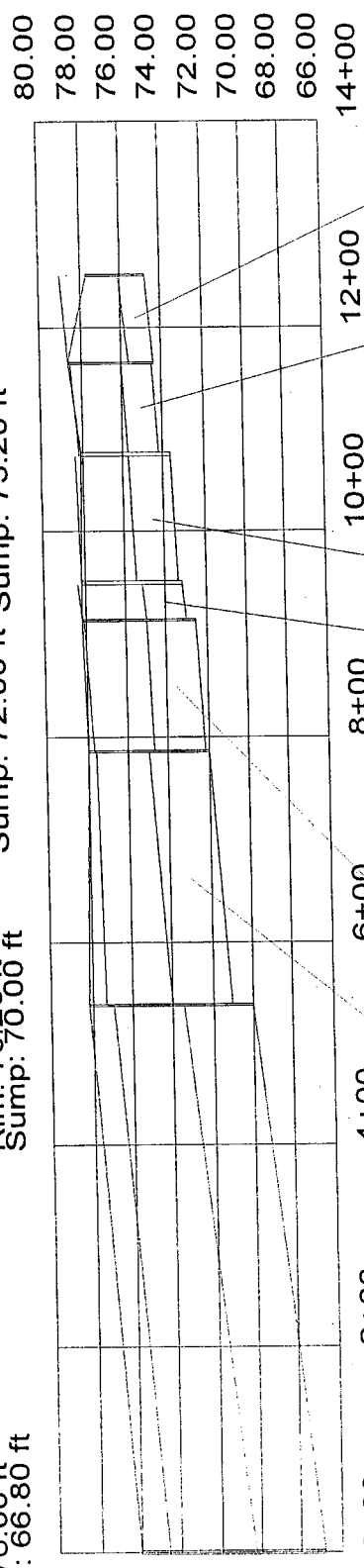
Inlet: I-2
Rim: 78.60 ft
Sump: 74.40 ft

Inlet: I-5
Rim: 78.20 ft
Sump: 73.20 ft

Inlet: I-7
Rim: 78.00 ft
Sump: 72.00 ft

Inlet: I-8
Rim: 78.20 ft
Sump: 70.00 ft

Outlet: Outlet
Rim: 76.00 ft
Sump: 66.80 ft



Pipe: P-2
Up Invert: 74.80 ft
Dh Invert: 74.40 ft
Length: 86.00 ft
Size: 15 inch

Pipe: P-3
Up Invert: 74.50 ft
Dh Invert: 74.20 ft
Length: 89.00 ft
Size: 18 inch

Pipe: P-4
Up Invert: 73.70 ft
Dh Invert: 73.40 ft
Length: 126.00 ft
Size: 24 inch

Pipe: P-5
Up Invert: 73.20 ft
Dh Invert: 73.00 ft
Length: 36.00 ft
Size: 24 inch

Pipe: P-6
Up Invert: 72.50 ft
Dh Invert: 72.20 ft
Length: 128.00 ft
Size: 30 inch

Pipe: P-7
Up Invert: 72.00 ft
Dh Invert: 71.00 ft
Length: 247.00 ft
Size: 36 inch

Pipe: P-13
Up Invert: 70.00 ft
Dh Invert: 66.80 ft
Length: 539.00 ft
Size: 42 inch

Inlet: I-12
Rim: 79.30 ft
Sump: 71.80 ft

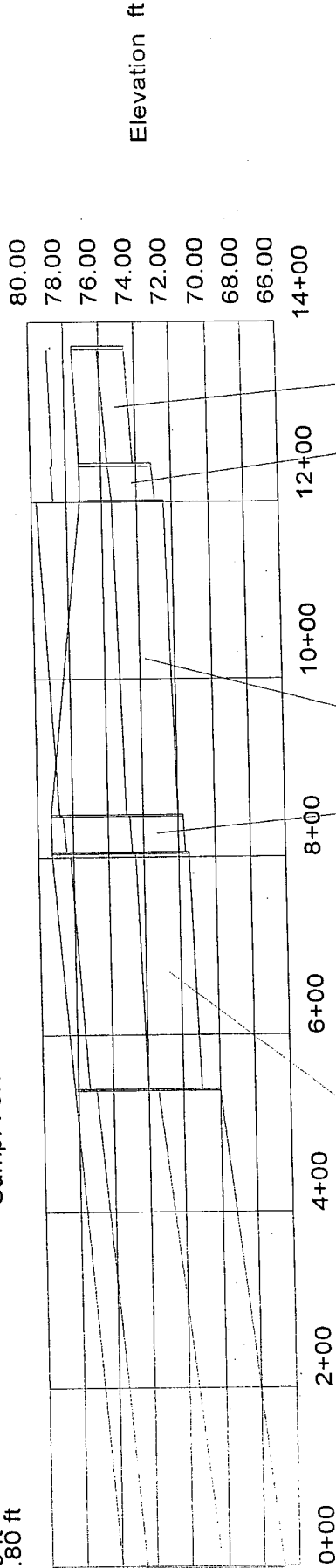
Inlet: I-10
Rim: 77.30 ft
Sump: 73.20 ft

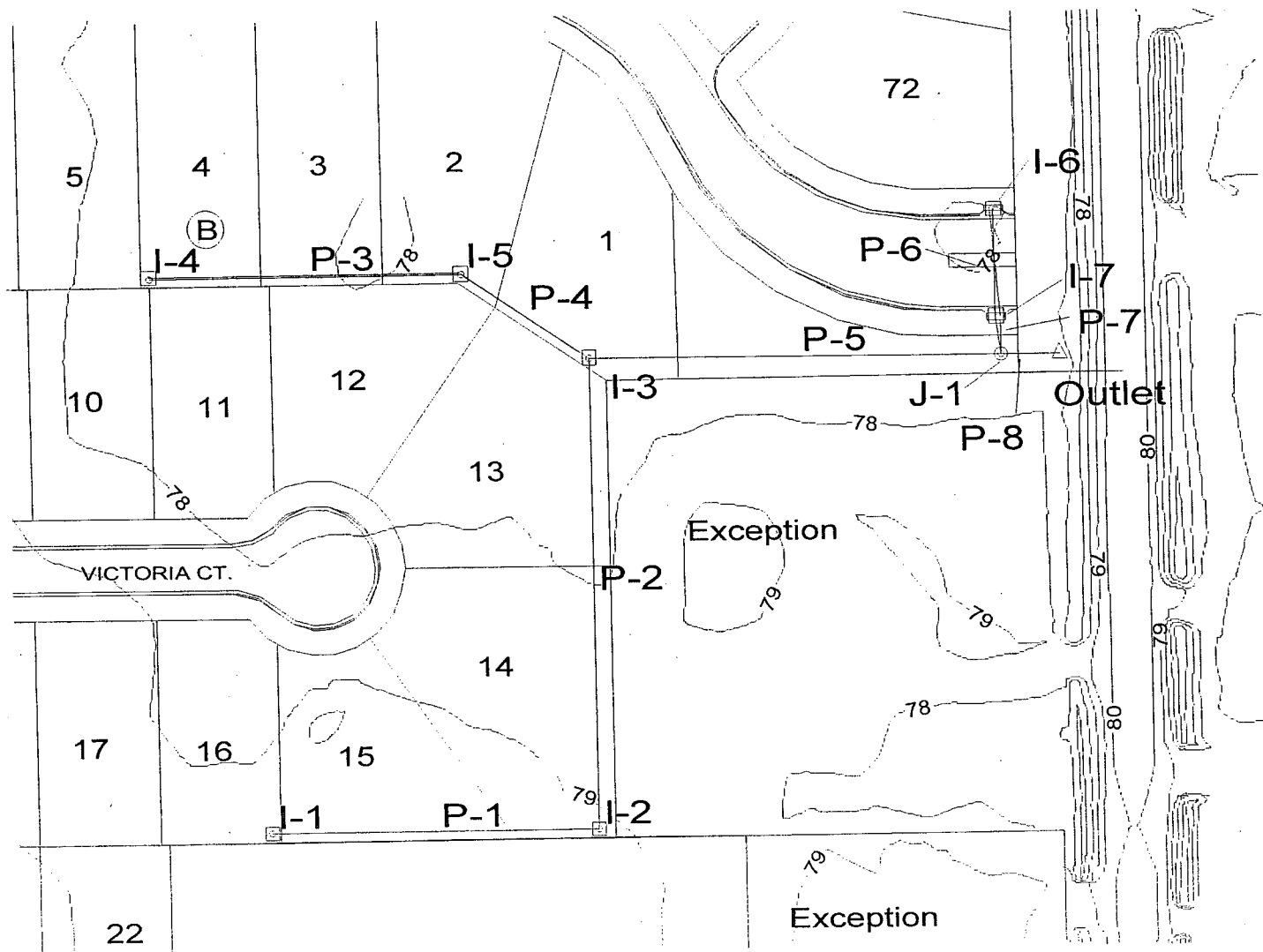
Inlet: I-13
Rim: 79.30 ft
Sump: 71.50 ft

Inlet: I-9
Rim: 77.60 ft
Sump: 74.60 ft

Inlet: I-8
Rim: 78.20 ft
Sump: 70.00 ft

Outlet: Outlet
Rim: 76.00 ft
Sump: 66.80 ft





System Report

Pipe	Additional Flow (cfs)	Total Upstream Discharge (cfs)	Structure Discharge (cfs)	Node- Upstream Downstream	Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Ground- Upstream Downstream (ft)	HGL- Upstream Downstream (ft)	Slope- Energy Constructed (ft/ft)	Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-6	2.80	0.00	2.80	I-6	Circular	73.50	73.30	78.00	77.11	0.000711	2.80	61.00	1.58	
P-7	2.40	2.80	5.20	I-7	18 inch	72.80	72.60	78.00	77.06	0.003279	6.01	22.00	1.66	
P-3	2.20	0.00	2.20	J-1	Circular	74.50	73.80	77.50	77.03	0.000528	5.20	181.00	1.24	
P-4	1.10	2.20	3.30	I-4	24 inch	73.50	73.20	77.00	77.03	0.009091	2.20	89.00	1.05	
P-1	1.70	0.00	1.70	I-5	Circular	75.10	74.30	76.30	77.05	0.000439	6.53	190.00	1.39	
P-2	0.00	1.70	1.70	I-3	18 inch	74.00	73.10	79.00	77.03	0.003867	3.30	271.00	0.96	
P-5	1.30	5.00	6.30	I-2	24 inch	72.60	72.00	76.30	77.03	0.000213	3.30	240.00	0.89	
P-8	N/A	11.50	11.50	J-1	Circular	71.50	67.80	77.50	77.03	0.003371	13.13	34.00	1.63	
				Outlet	36 inch			77.00	77.01	0.000693	1.70			
										0.004211	4.19			
										0.00262	1.70			
										0.003321	6.05			
										0.00089	6.30			
										0.002500	33.35			
										0.000297	11.50			
										0.108824	220.02			

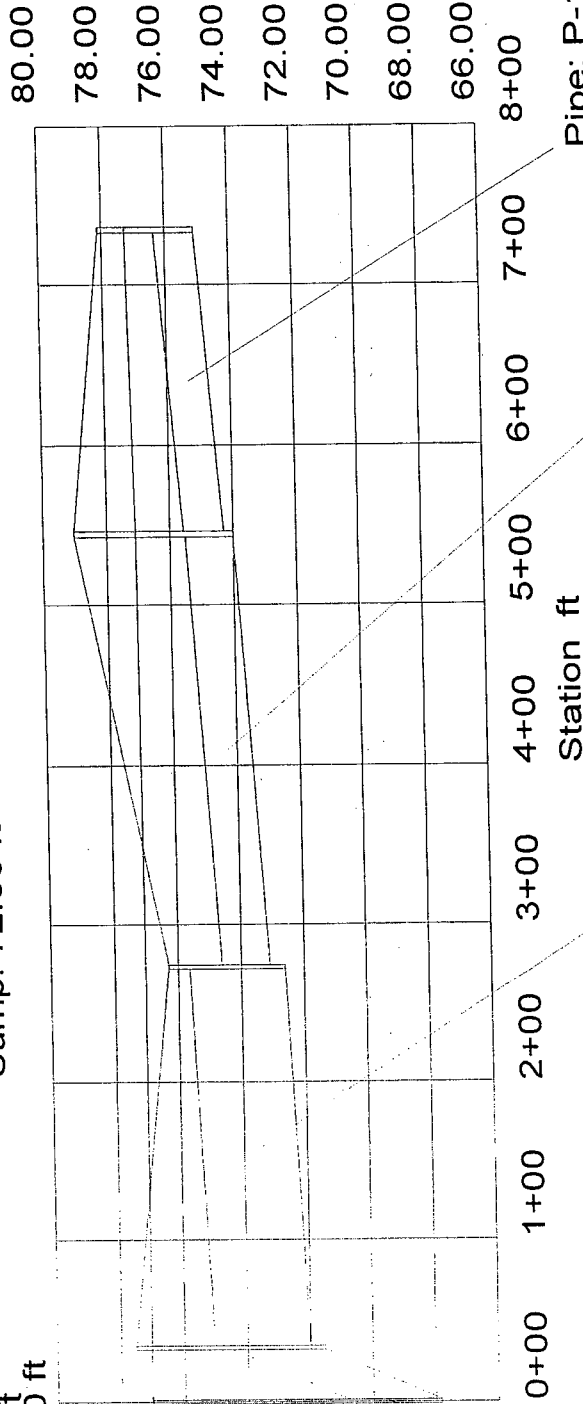
Junction: J-1
 Rim: 77.50 ft
 Sump: 71.50 ft

Inlet: I-2
 Rim: 79.00 ft
 Sump: 74.00 ft

Inlet: I-1
 Rim: 78.10 ft
 Sump: 75.10 ft

Inlet: I-3
 Rim: 76.30 ft
 Sump: 72.60 ft

Outlet: Outlet
 Rim: 77.00 ft
 Sump: 67.80 ft



Pipe: P-8
 Up Invert: 71.50 ft
 Dn Invert: 67.80 ft
 Length: 34.00 ft
 Size: 36 inch

Pipe: P-5
 Up Invert: 72.60 ft
 Dn Invert: 72.00 ft
 Length: 240.00 ft
 Size: 36 inch

Pipe: P-2
 Up Invert: 74.00 ft
 Dn Invert: 73.10 ft
 Length: 271.00 ft
 Size: 18 inch

Pipe: P-1
 Up Invert: 75.10 ft
 Dn Invert: 74.30 ft
 Length: 190.00 ft
 Size: 15 inch

Elevation ft

Station ft

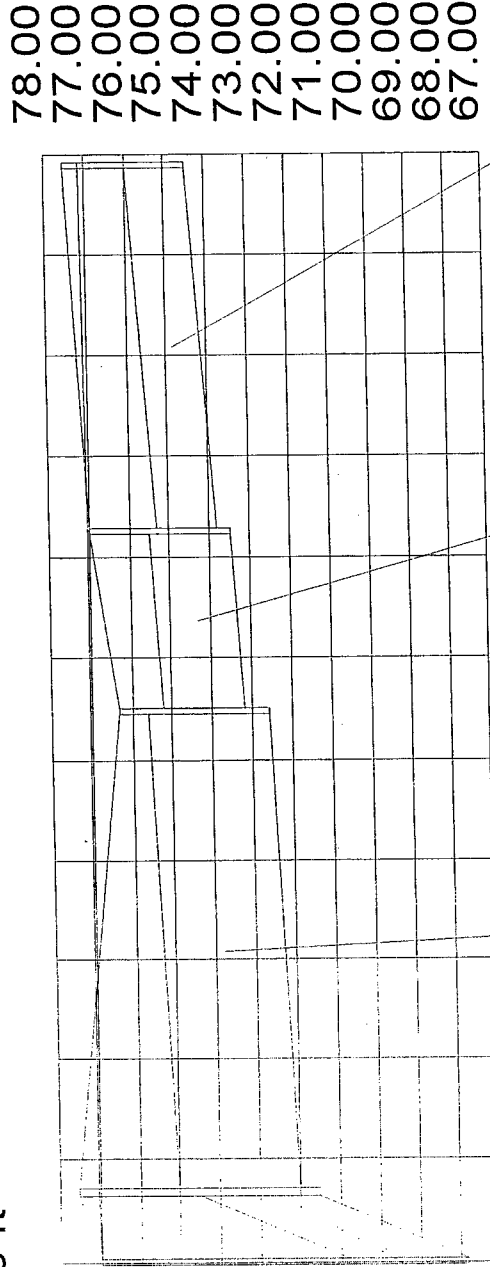
Junction: J-1
 Rim: 77.50 ft
 Sump: 71.50 ft

Inlet: I-5
 Rim: 77.00 ft
 Sump: 73.50 ft

Inlet: I-4
 Rim: 77.50 ft
 Sump: 74.50 ft

Inlet: I-3
 Rim: 76.30 ft
 Sump: 72.60 ft

Outlet: Outlet
 Rim: 77.00 ft
 Sump: 67.80 ft



Elevation ft

0+00+501+001+502+002+503+003+504+004+505+005+50

Station ft

Pipe: P-8
 Up Invert: 71.50 ft
 Dn Invert: 67.80 ft
 Length: 34.00 ft
 Size: 36 inch

Pipe: P-5
 Up Invert: 72.60 ft
 Dn Invert: 72.00 ft
 Length: 240.00 ft
 Size: 36 inch

Pipe: P-4
 Up Invert: 73.50 ft
 Dn Invert: 73.20 ft
 Length: 89.00 ft
 Size: 24 inch

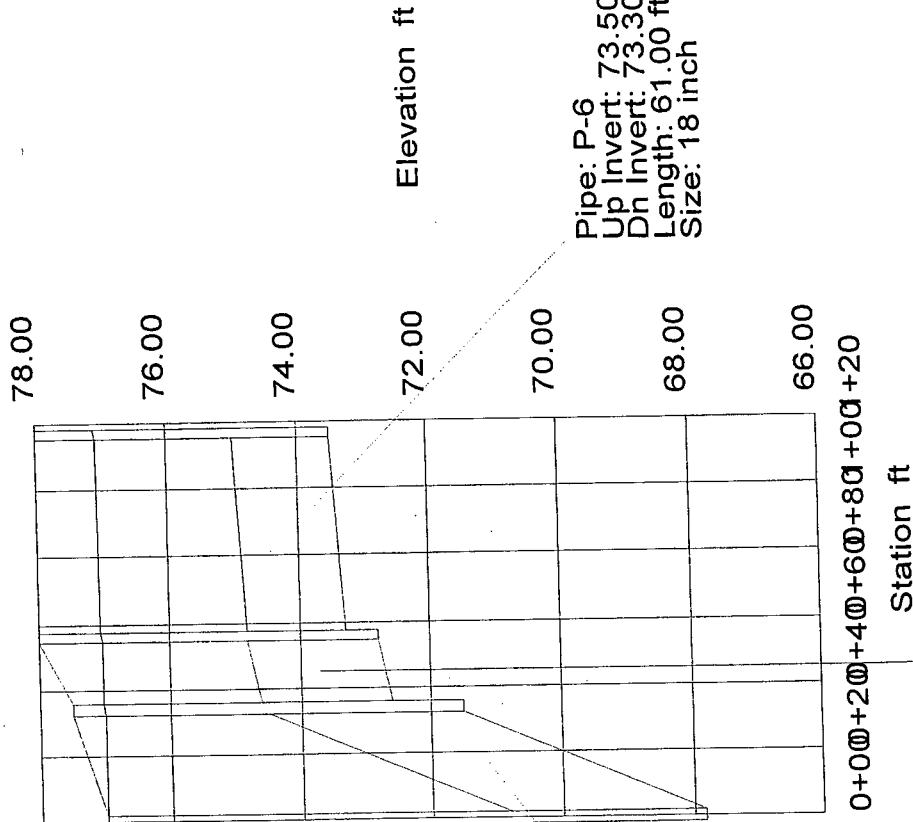
Pipe: P-3
 Up Invert: 74.50 ft
 Dn Invert: 73.80 ft
 Length: 181.00 ft
 Size: 18 inch

Inlet: I-7
 Rim: 78.00 ft
 Sump: 72.80 ft

Inlet: I-6
 Rim: 78.00 ft
 Sump: 73.50 ft

Junction: J-1
 Rim: 77.50 ft
 Sump: 71.50 ft

Outlet: Outlet
 Rim: 77.00 ft
 Sump: 67.80 ft



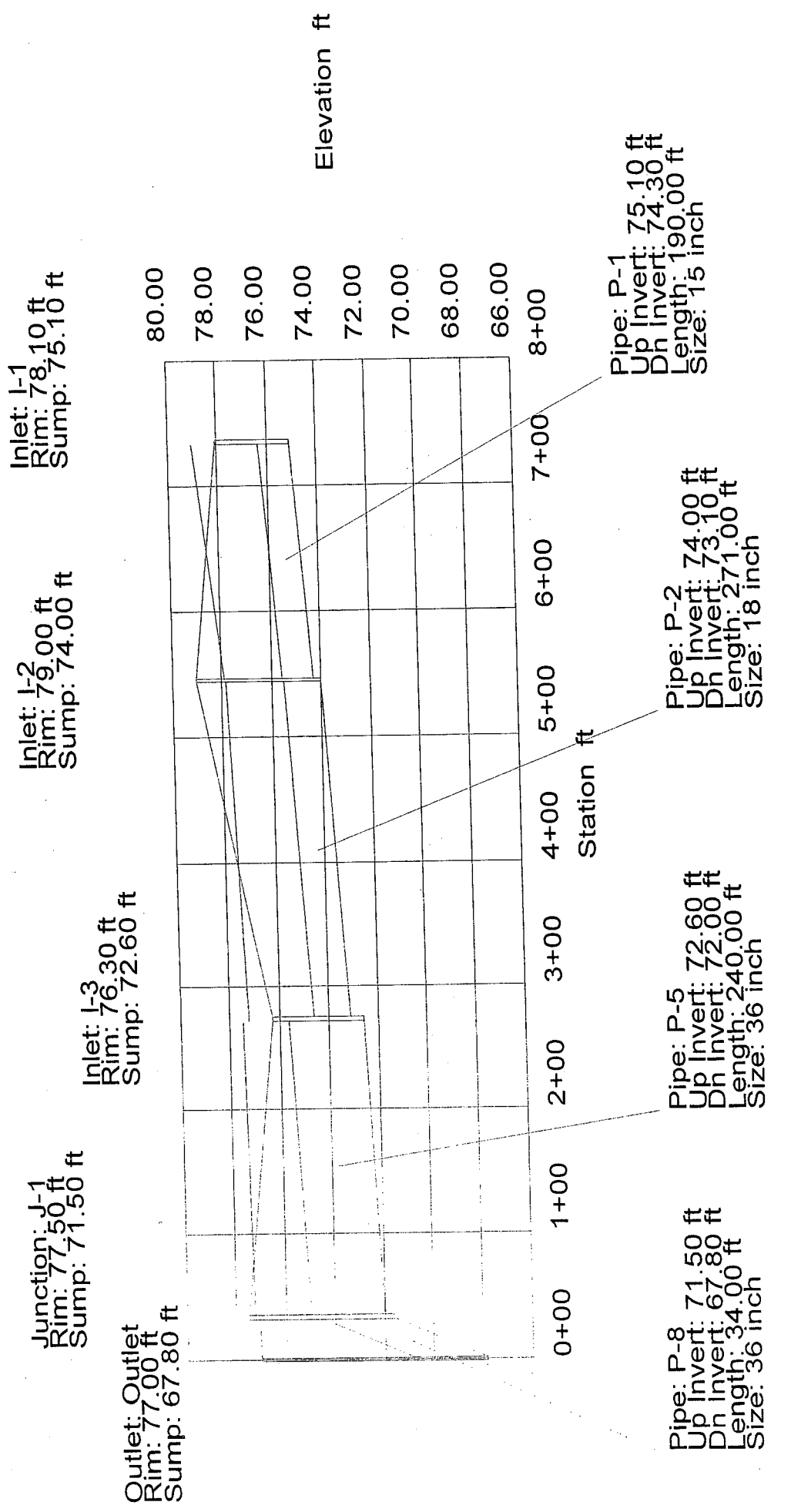
Pipe: P-8
 Up Invert: 71.50 ft
 Dn Invert: 67.80 ft
 Length: 34.00 ft
 Size: 36 inch

Pipe: P-7
 Up Invert: 72.80 ft
 Dn Invert: 72.60 ft
 Length: 22.00 ft
 Size: 24 inch

Pipe: P-6
 Up Invert: 73.50 ft
 Dn Invert: 73.30 ft
 Length: 61.00 ft
 Size: 18 inch

System Report

Pipe	Additional Flow (cfs)	Total Upstream Discharge (cfs)	Structure		Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
			Upstream (cfs)	Downstream (cfs)									
P-6	8.20	0.00	8.20	I-6	73.50	73.30	78.00	77.92	0.006094	8.20	61.00	4.64	
				I-7			78.00	77.55	0.003279	6.01			
P-7	7.10	8.20	15.30	I-7	72.80	72.60	78.00	77.37	0.004575	15.30	22.00	4.87	
				J-1			77.50	77.26	0.009091	21.57			
P-3	6.50	0.00	6.50	I-4	74.50	73.80	77.50	77.96	0.003829	6.50	181.00	3.68	
				I-5			77.00	77.26	0.003867	6.53			
P-4	3.30	6.50	9.80	I-5	73.50	73.20	77.00	77.43	0.001877	9.80	89.00	3.12	
				I-3			76.30	77.26	0.003371	13.13			
P-1	4.90	0.00	4.90	I-1	75.10	74.30	78.10	79.01	0.005754	4.90	190.00	3.99	
				I-2			79.00	77.91	0.004211	4.19			
P-2	0.00	4.90	4.90	I-2	74.00	73.10	79.00	77.85	0.002176	4.90	271.00	2.77	
				I-3			76.30	77.26	0.003321	6.05			
P-5	3.80	14.70	18.50	I-3	72.60	72.00	76.30	77.45	0.000769	18.50	240.00	2.62	
				J-1			77.50	77.26	0.002500	33.35			
P-8	N/A	33.80	33.80	J-1	71.50	67.80	77.50	77.09	0.002568	33.80	34.00	4.78	
				Outlet			77.00	77.00	0.108824	220.02			



Junction: J-1
 Rim: 77.50 ft
 Sump: 71.50 ft

Inlet: I-5
 Rim: 77.00 ft
 Sump: 73.50 ft

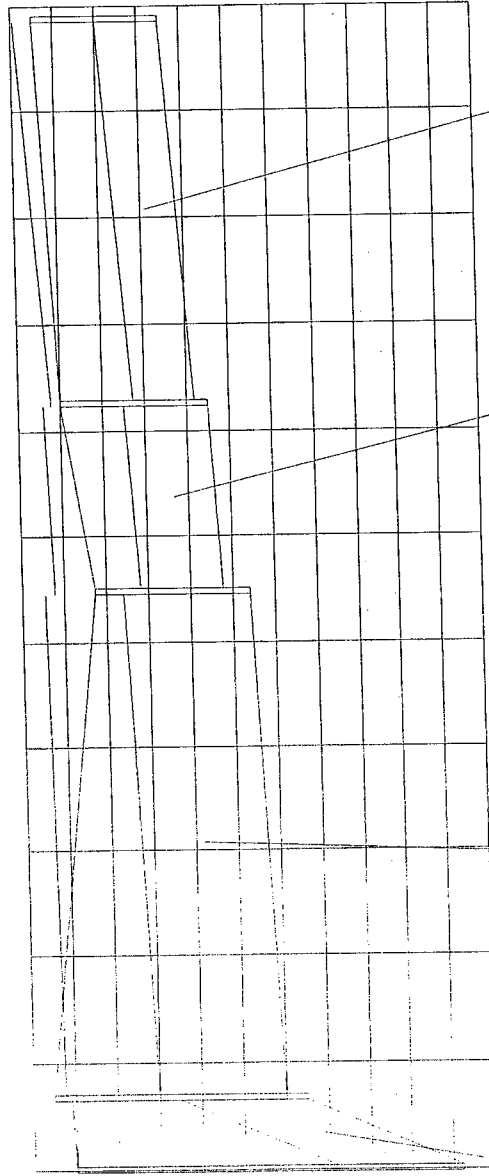
Inlet: I-4
 Rim: 77.50 ft
 Sump: 74.50 ft

Outlet: Outlet
 Rim: 77.00 ft
 Sump: 67.80 ft

Inlet: I-3
 Rim: 76.30 ft
 Sump: 72.60 ft

78.00
 77.00
 76.00
 75.00
 74.00
 73.00
 72.00
 71.00
 70.00
 69.00
 68.00
 67.00

Elevation ft



0+00+501+001+502+002+503+003+504+004+505+005+50

Station ft

Pipe: P-5
 Up Invert: 72.60 ft
 Dh Invert: 72.00 ft
 Length: 240.00 ft
 Size: 36 inch

Pipe: P-3
 Up Invert: 74.50 ft
 Dh Invert: 73.80 ft
 Length: 181.00 ft
 Size: 18 inch

Pipe: P-8
 Up Invert: 71.50 ft
 Dh Invert: 67.80 ft
 Length: 34.00 ft
 Size: 36 inch

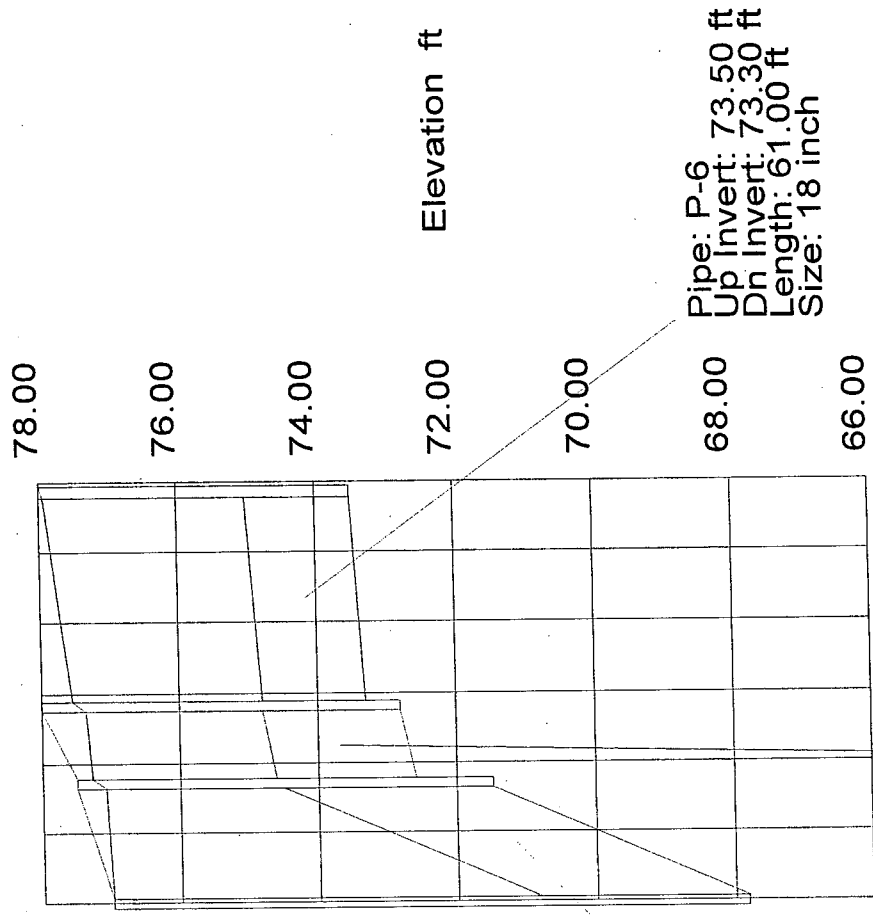
Pipe: P-4
 Up Invert: 73.50 ft
 Dh Invert: 73.20 ft
 Length: 89.00 ft
 Size: 24 inch

Inlet: I-7
 Rim: 78.00 ft
 Sump: 72.80 ft

Junction: J-1
 Rim: 77.50 ft
 Sump: 71.50 ft

Inlet: I-6
 Rim: 78.00 ft
 Sump: 73.50 ft

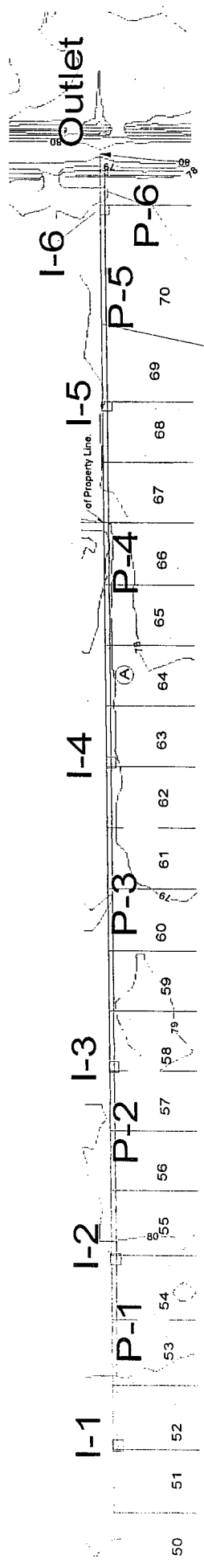
Outlet: Outlet
 Rim: 77.00 ft
 Sump: 67.80 ft



Pipe: P-6
 Up Invert: 73.50 ft
 Dn Invert: 73.30 ft
 Length: 61.00 ft
 Size: 18 inch

Pipe: P-8
 Up Invert: 71.50 ft
 Dn Invert: 67.80 ft
 Length: 34.00 ft
 Size: 36 inch

Pipe: P-7
 Up Invert: 72.80 ft
 Dn Invert: 72.60 ft
 Length: 22.00 ft
 Size: 24 inch



Inlet: I-6
Rim: 77.10 ft
Sump: 70.00 ft

Inlet: I-4
Rim: 77.50 ft
Sump: 72.20 ft

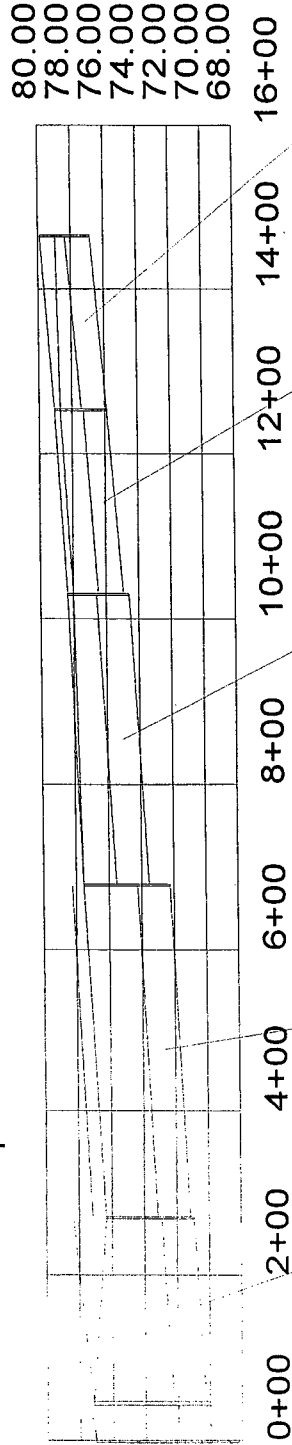
Inlet: I-2
Rim: 79.00 ft
Sump: 75.80 ft

Outlet: Outlet
Rim: 77.00 ft
Sump: 68.20 ft

Inlet: I-5
Rim: 76.30 ft
Sump: 70.90 ft

Inlet: I-3
Rim: 78.30 ft
Sump: 74.60 ft

Inlet: I-1
Rim: 79.80 ft
Sump: 76.80 ft



Pipe: P-6
Up Invert: 70.00 ft
Dn Invert: 68.20 ft
Length: 45.00 ft
Size: 24 inch

Pipe: P-4
Up Invert: 72.20 ft
Dn Invert: 71.10 ft
Length: 410.00 ft
Size: 24 inch

Pipe: P-5
Up Invert: 70.90 ft
Dn Invert: 70.20 ft
Length: 225.00 ft
Size: 24 inch

Pipe: P-3
Up Invert: 74.60 ft
Dn Invert: 73.50 ft
Length: 350.00 ft
Size: 24 inch

Pipe: P-2
Up Invert: 75.80 ft
Dn Invert: 74.90 ft
Length: 224.00 ft
Size: 18 inch

Pipe: P-1
Up Invert: 76.80 ft
Dn Invert: 75.90 ft
Length: 212.00 ft
Size: 18 inch

Elevation ft

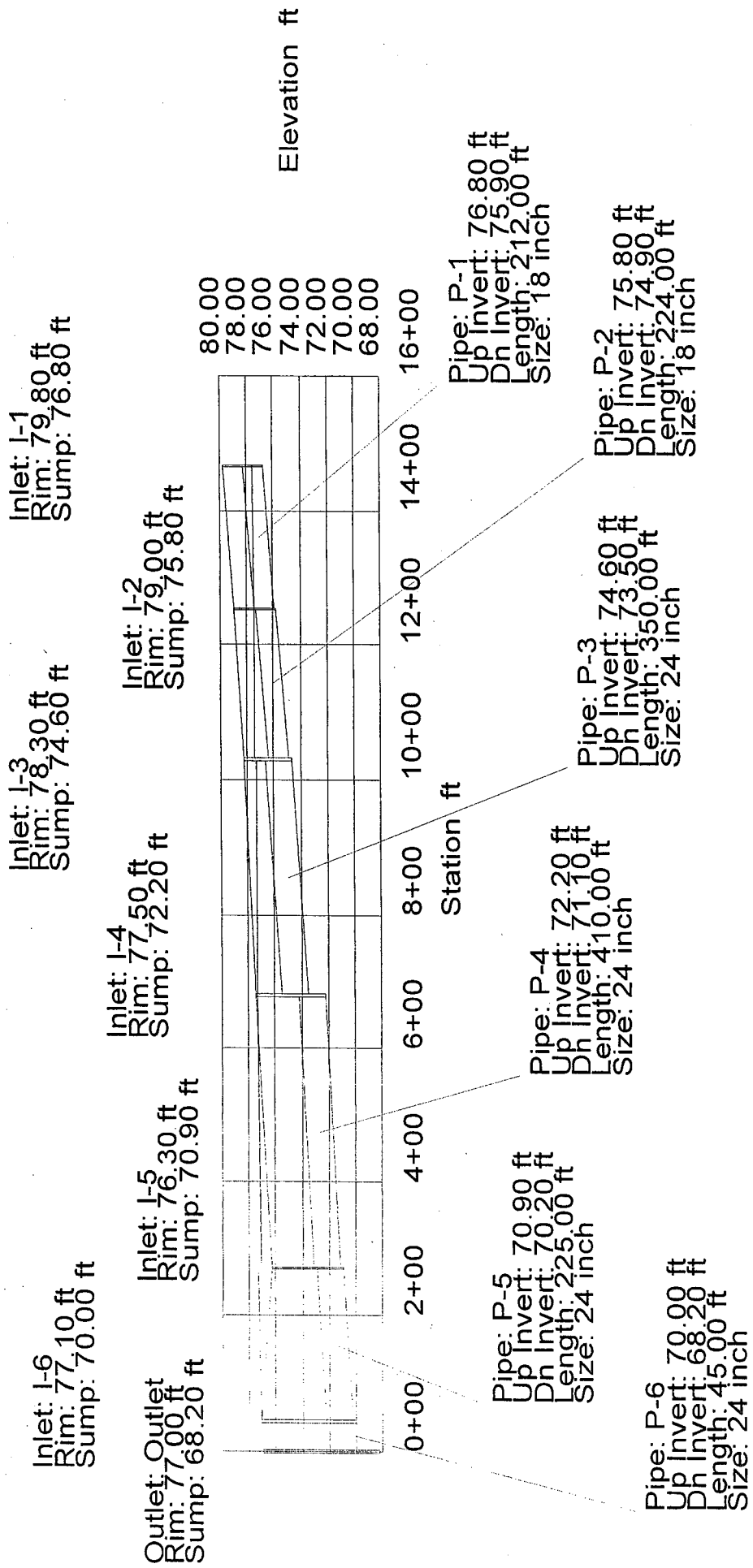
Station ft

System Report

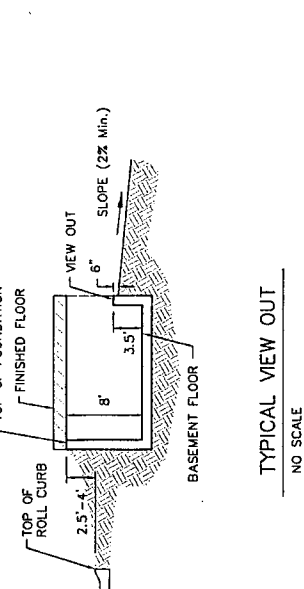
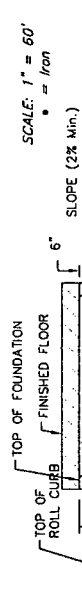
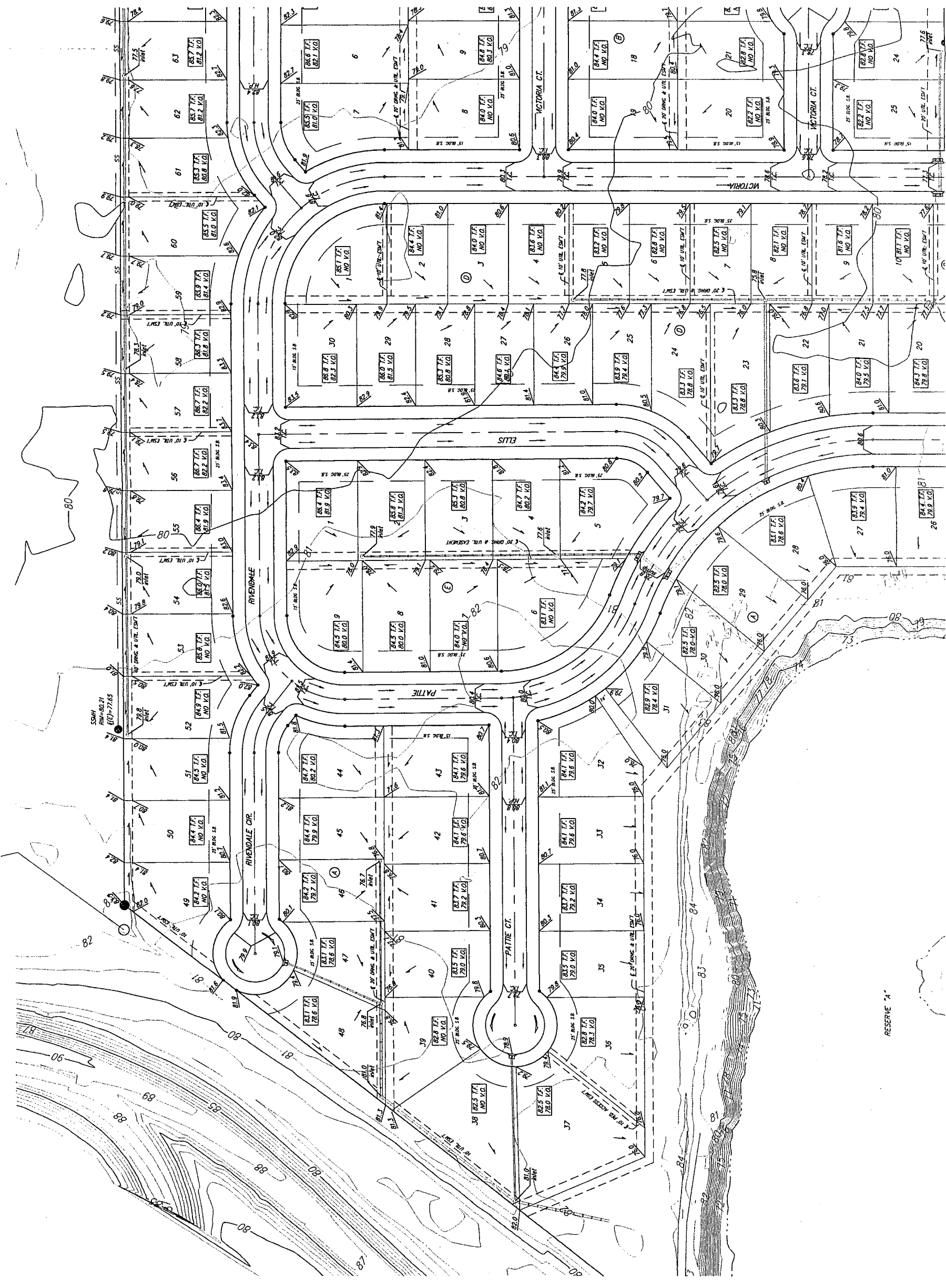
Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	-Node- Upstream Downstream	-Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-1	3.30	0.00	3.30	I-1	Circular 18 inch	76.80	75.90	79.80	78.91	0.000987	3.30	12.00	1.87	
P-2	2.20	3.30	5.50	I-2	Circular 18 inch	75.80	74.90	79.00	78.70	0.004245	6.84	24.00	3.11	
P-3	2.70	5.50	8.20	I-3	Circular 24 inch	74.60	73.50	78.30	78.01	0.004018	6.66	50.00	2.61	
P-4	3.80	8.20	12.00	I-4	Circular 24 inch	72.20	71.10	77.50	77.50	0.003143	12.68	10.00	3.82	
P-5	4.40	12.00	16.40	I-5	Circular 24 inch	70.90	70.20	76.30	77.10	0.002683	11.72	25.00	5.22	
P-6	2.70	16.40	19.10	I-6	Circular 24 inch	70.00	68.20	77.10	77.10	0.003111	12.62	45.00	6.08	
				Outlet	Circular 24 inch			77.00	77.00	0.040000	45.24			

System Report

Pipe	Additional Flow (cfs)	Total Upstream Added (cfs)	Structure Discharge (cfs)	-Node- Upstream Downstream	-Section- Shape Size	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	Length (ft)	Average Velocity (ft/s)	Description
P-1	1.10	0.00	1.10	I-1	Circular 18 inch	76.80	75.90	79.80	77.52	0.000181	1.10	12.00	0.97	
P-2	1.00	1.10	2.10	I-2	Circular 18 inch	75.80	74.90	79.00	77.49	0.000400	2.10	24.00	1.19	
P-3	1.20	2.10	3.30	I-3	Circular 24 inch	74.60	73.50	78.30	77.39	0.000213	3.30	35.00	1.05	
P-4	1.70	3.30	5.00	I-4	Circular 24 inch	72.20	71.10	77.50	77.32	0.003143	5.00	10.00	1.59	
P-5	1.90	5.00	6.90	I-5	Circular 24 inch	70.90	70.20	76.30	77.10	0.002683	6.90	25.00	2.20	
P-6	1.20	6.90	8.10	I-6	Circular 24 inch	70.00	68.20	77.10	77.06	0.001282	8.10	45.00	2.58	
				Outlet	Circular 24 inch			77.00	77.00	0.040000	45.24			



REVISIONS



NOTES:
Proposed Top of Foundation Elevations Are Shown On Plans.
Contractor to Set Finished Floor Elevations.
All Street Elevations Shown on Plans Are for Top of Curb.
This Grading Plan is Designed with Here-Only.
Elevations Shown of Pave of House (C&G 10).
If any other elevations are shown on this plan, refer to the
contract documents for this information.
* - - - Error Step Foundation May Be Required

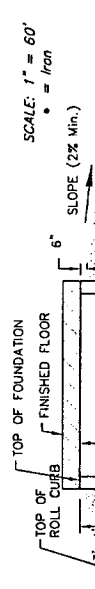
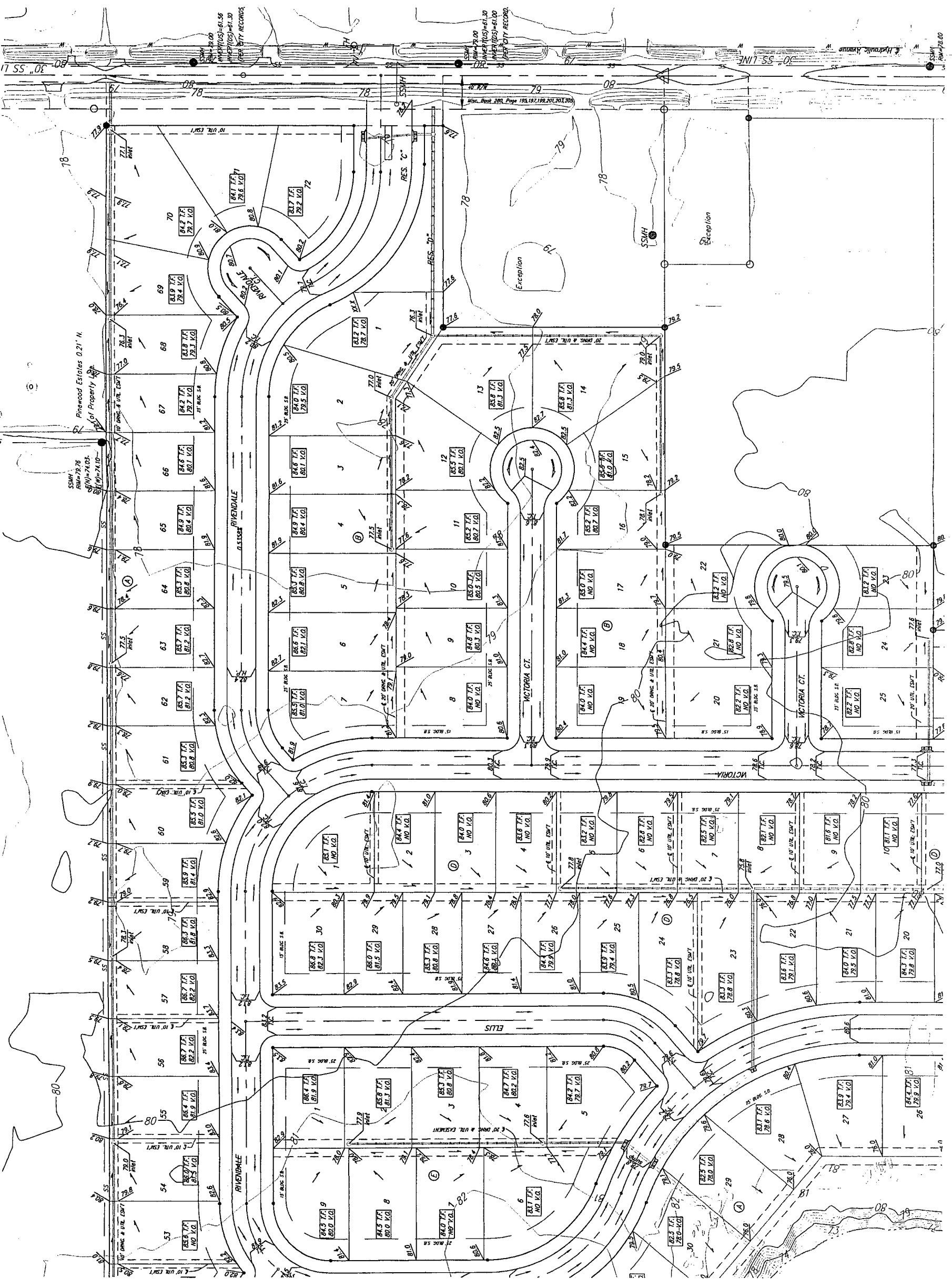
RIVENDALE ADDITION
MASTER GRADING PLAN
CITY OF WICHITA, KANSAS

BAUGHMAN COMPANY, P.A.
ENGINEERING, SURVEYING, & PLANNING

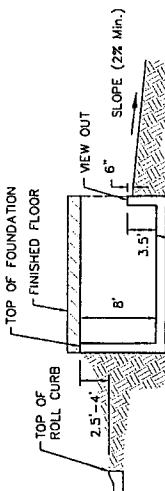
PROJECT NUMBER: 03-01-POO7
DATE: 10/27/01
APPROVED: [Signature]

SCALE: 1" = 60'
SHEET: 1 OF 4

REVISIONS



TYPICAL NON-VIEW OUT
NO SCALE



TYPICAL VIEW OUT
NO SCALE

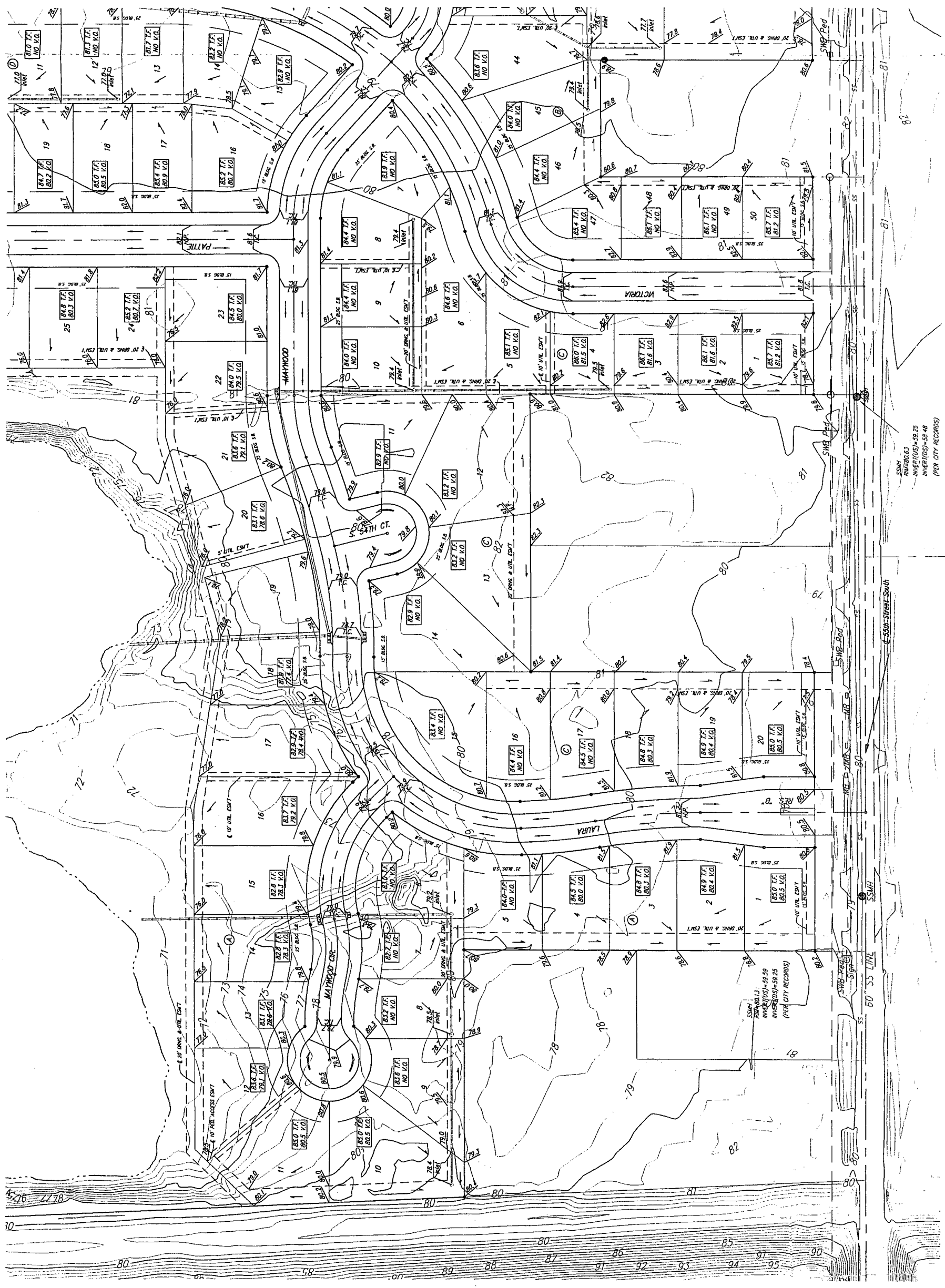
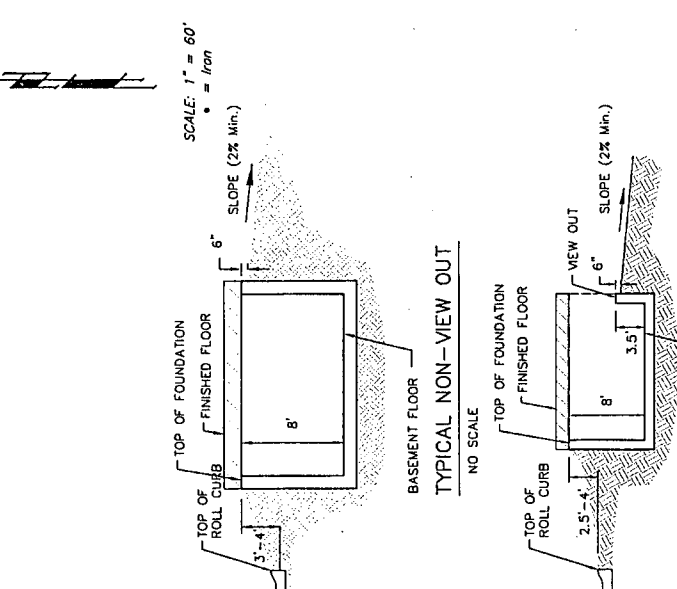
NOTES:
Proposed Top of Foundation Elevations Are Shown On Plans.
Contractor to Set Finished Floor Elevations.
All Street Elevations Shown on Plans Are for Top of Curb.
This Grading Plan is Designed with 1/4"=1'-0".
Elevations Shown at Rear of House (SEE 103).
If any discrepancy exists between this plan and the
Surveying Plan for this site, the surveying plan shall govern.
* - - Extra Deep Foundation May Be Required

RIVENDALE ADDITION
MASTER GRADING PLAN
CITY OF WICHITA, KANSAS

BAUGHMAN COMPANY P.A.
ENGINEERING, SURVEYING, & PLANNING

PROJECT NUMBER: 09-01-PO07
DATE: 10/20/07
SCALE: 1"=60'
SHEET: 2 OF 4

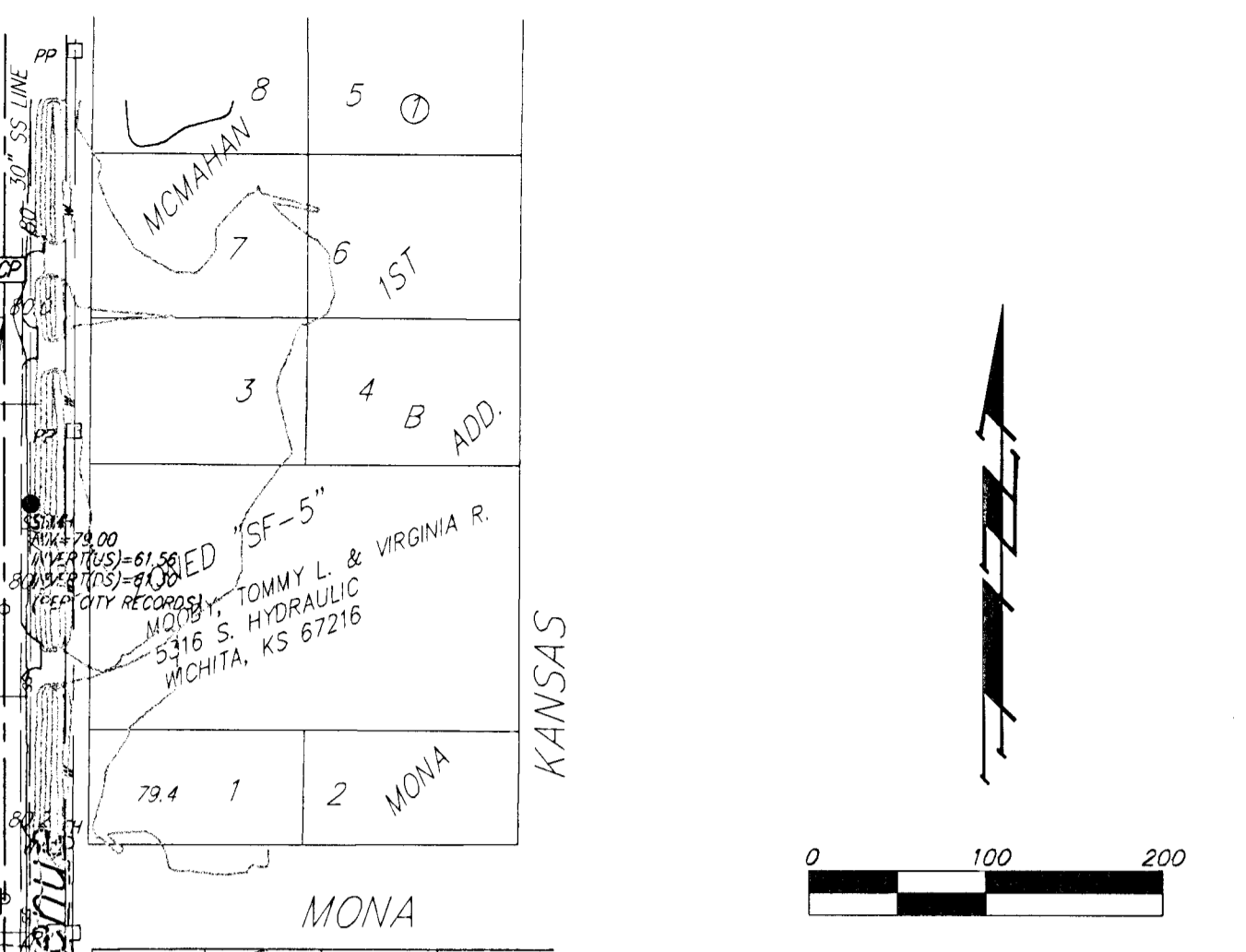
Notes:
 Proposed Top of Foundation Elevations Are Shown On Plans.
 Contractor to Set Finished Floor Elevations.
 All Street Elevations Shown on Plans Are for Top of Curb.
 This Grading Plan is Designed with Meter-Only.
 Elevations Shown of Floor of House (R&R 110).
 All other elevations shown on this plan, refer to the
 accompanying information.
 * - Extra Step Foundation May Be Required



BENCHMARK

SHOW
 11-11-03
 11-11-03
 11-11-03
 (FOR CITY RECORDS)

DRAINAGE PLAN RIVENDALE ADDITION WICHITA, SEDGWICK COUNTY, KANSAS



Basin ID	Area acres	C2	C5	C100	Q2 cfs	Q5 cfs	Q100 cfs
1	0.6	0.48	0.53	0.74	1.1	1.5	3.3
2	0.4	0.48	0.53	0.74	0.7	1.0	2.2
3	0.5	0.48	0.53	0.74	0.9	1.2	2.7
4	0.7	0.48	0.53	0.74	1.3	1.7	3.8
5	0.8	0.48	0.53	0.74	1.5	1.9	4.4
6	0.5	0.48	0.53	0.74	0.9	1.2	2.7
7	1.5	0.48	0.53	0.74	2.8	3.6	8.2
8	1.3	0.48	0.53	0.74	2.4	3.1	7.1
9	0.6	0.48	0.53	0.74	1.1	1.5	3.3
10	0.7	0.48	0.53	0.74	1.3	1.7	3.8
11	1.2	0.48	0.53	0.74	2.2	2.9	6.5
12	1.2	0.48	0.53	0.74	2.2	2.9	6.5
13	0.6	0.48	0.53	0.74	1.1	1.5	3.3
14	1.8	0.48	0.53	0.74	3.3	4.4	9.8
15	0.8	0.48	0.53	0.74	1.5	1.9	4.4
16	0.8	0.48	0.53	0.74	1.5	1.9	4.4
17	1.3	0.48	0.53	0.74	2.4	3.1	7.1
18	1.2	0.48	0.53	0.74	2.2	2.9	6.5
19	0.8	0.48	0.53	0.74	1.5	1.9	4.4
20	3.7	0.48	0.53	0.74	6.8	8.9	20
21	1.4	0.48	0.53	0.74	2.6	3.4	7.6
22	2.2	0.48	0.53	0.74	4.0	5.3	12
23	5.0	0.48	0.53	0.74	9.2	12	27
24	0.9	0.48	0.53	0.74	1.7	2.2	4.9
25	0.8	0.48	0.53	0.74	1.5	1.9	4.4
26	0.5	0.48	0.53	0.74	0.9	1.2	2.7
27	0.8	0.48	0.53	0.74	1.5	1.9	4.4
28	0.9	0.48	0.53	0.74	1.7	2.2	4.9
29	0.9	0.48	0.53	0.74	1.7	2.2	4.9
30	0.2	0.48	0.53	0.74	0.4	0.5	1.1
31	0.5	0.48	0.53	0.74	0.9	1.2	2.7
32	1.1	0.48	0.53	0.74	2.0	2.7	6.0
33	0.4	0.48	0.53	0.74	0.7	1.0	2.2
34	0.8	0.48	0.53	0.74	1.5	1.9	4.4
35	1.6	0.48	0.53	0.74	2.9	3.9	8.7
36	1.0	0.48	0.53	0.74	1.8	2.4	5.5
37	0.5	0.48	0.53	0.74	0.9	1.2	2.7
38	1.0	0.48	0.53	0.74	1.8	2.4	5.5
39	0.3	0.48	0.53	0.74	0.6	0.7	1.6
40	0.3	0.48	0.53	0.74	0.6	0.7	1.6
41	0.3	0.48	0.53	0.74	0.6	0.7	1.6
42	0.4	0.48	0.53	0.74	0.7	1.0	2.2
43	1.0	0.48	0.53	0.74	1.8	2.4	5.5
44	0.4	0.48	0.53	0.74	0.7	1.0	2.2
45	0.4	0.48	0.53	0.74	0.7	1.0	2.2
46	0.8	0.48	0.53	0.74	1.5	1.9	4.4
47	2.9	0.48	0.53	0.74	5.3	7.0	16
48	0.5	0.48	0.53	0.74	0.9	1.2	2.7
49	0.3	0.48	0.53	0.74	0.6	0.7	1.6
50	0.3	0.48	0.53	0.74	0.6	0.7	1.6
51	1.0	0.48	0.53	0.74	1.8	2.4	5.5
52	1.3	0.48	0.53	0.74	2.4	3.1	7.1
53	0.8	0.48	0.53	0.74	1.5	1.9	4.4
54	0.2	0.48	0.53	0.74	0.4	0.5	1.1
55	0.4	0.48	0.53	0.74	0.7	1.0	2.2
56	17.4	0.48	0.53	0.74	32	42	95