FINAL IDOT PUMP STATION #25
HYDRAULIC REPORT (HR) APPENDICES
(VOLUME ONE OF TWO)

Route/Roadway:	**IDOT Pump Station #25**
	IL-43 Harlem Avenue and 95th Street
Limits:	**From 79th Street to Stony Creek**
Municipality/County:	**Bridgeview/Cook County**
PTB Number:	**154/020 Work Order No.12**
Job No:	**MCI #2099**

Prepared For:

DISTRICT ONE
HYDRAULICS SECTION
BUREAU OF PROGRAMMING
IDOT- DIVISION OF HIGHWAYS

Prepared By:

MACKIE CONSULTANTS

Mackie Consultants, LLC
9575 W. Higgins Road, Suite 500
Rosemont, IL 60018
(847)696-1400
www.mackieconsult.com

Dated: August 15, 2012
Revised: November 21, 2012

APPENDIX TABLE OF CONTENTS

<u>APPENDIX</u>

APPENDIX A

FIELD SURVEY NOTES

W/ DISK

ROBERT E. HAMILTON
CONSULTING ENGINEERS, INC.

Robert E. Hamilton Consulting Engineers · Established 1955

LETTER OF TRANSMITTAL

TO: Mackie Consultants LLC
9575 W. Higgins Road Suite 500
Rosemont, Illinois 60018

DATE: 04-12-12
JOB NO: P-91-247-11 WO#4
ATTENTION: Mr. Anthony Martini
RE: Harlem Ave & 95th Street Topo

WE ARE SENDING YOU ☒ Attached ☐ Under Separate Cover via ________ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change Order ☐ ____________________

COPIES	DATE	NO.	DESCRIPTION
2	3-28-12		Topo survey of detention & misc areas
1	3-28-12		CD-ROM containing topo drawing, spreadsheets, photos, and points

RECEIVED
APR 16 2012
MACKIE CONSULTANTS, LLC

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit ______ copies for approval
☒ For your use ☐ Approved as Noted ☐ Submit ______ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return ______ corrected prints
☐ For review and comment ☐ ____________________
☐ FOR BIDS DUE ____________ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS: Please note we finally found the outfall for the most westerly area at the NW intersection of I-294 and 95th Street point Number 5798. If you have any questions call.

COPY TO: Anthony Martini- Mackie

SIGNED: Lee R Kaelh

	BS	HI	FS	EL	
ME 1770				616.79	
	1.07	617.86			
TCP			5.04	612.82	
	613.20				
	612.82				
	.38				
	OLD			NEW	
100	618.551			618.171	
101	618.561			618.181	
102	608.980			608.603	
103	609.424			609.044	
104	620.513			620.133	
105	648.852			648.472	
106	613.20			612.82	
AJ 2780	608.00			607.62	

(1)

BM RUN 2-28-2012

ARE LR

⊼ @ AJ 2780 ELEV
608.00

LOCATE X CUT IN WALK
EAST SIDE HARLEM ?
NEAR SHOP + SAVE MARKED
100
101 X CUT ¢ HARLEM + 95TH
SET 3/8 X 8" SPIKE NAILS
102 + 103 IN DETENTION
AREA

⊼ BASE @ 100
LOCATE X CUT ON TRAFFIC
SIGNAL HH @ ¢ HARLEM
+ SOUTH OF 79TH
# 104
# 105 X CUT ON BRIDGE
OVER RR TRACKS @ 79TH
ST. NORTH WALK

⊼ BASE @ 105
LOCATE # 106 PK IN
CEMETARY 613.20

(2)

BASE ⊼ @ 110	CHECK ME 1850	
REC = 604.44	M = 604.57	

02-29-12

⊼ @ 102 BS 103	HI
TOPO PT#	- 5349
BASE @ 103	
TOPO PT#	- 1239

02-28-12

LRK - LR

⊼ T/S @ 103 BS = 102

⊼ HI = 5.01 BS HI = 5.25 PTS 1000-1159

BASE @ 102 GPS TOPO

PTS 5000-5163

02-29-12

⊼ @ AJ 2780

CONTROL SOUTH ON HARLEM

#107

SET 3/8" X 8" NAIL ℄ HARLEM IN GRASS MEDIAN ACROSS FROM SAFEGUARD STORAGE JUST NORTH OF 294

#108

SET X CUT ON ℄ HARLEM @ STONEY CR BRIDGE SOUTH SIDE

#109 PK SET IN STRIPES FOR MEDIAN IN ℄ HARLEM NEAR 108TH PL (100 SOUTH)

⊼ @ 109

SET 3/4" X 8" SPIKE @ NW CORNER HARLEM + RT 83 #110

11508-4	LR		03-01-2012	
~~BASE~~	@	102		
TOPO	PT.	# 1240		

	LRK – LR			03-02-2012	
PT#	STR. DESC	SZ	TYPE	DIR	INV
1484	MH 4'	18"	RCP	N	3.30 N
		18		S	3.40 S
1503	INL 2'	15"	RCP	E	3.40
1504	INL 4'	24"	RCP	NW	4.15
		15"	RCP	SE	4.40
		15"	RCP	W	3.97
1388		48	RCP	S	12.65
		48"	RCP	NW	10.80
1594	INL	15"	RCP	S	4.20
1593	MH	24"	RCP	E	5.50
		15"	RCP	N	5.30
		15"	RCP	W	5.40
1591	INL	15"	RCP	W	3.50
		15"	RCP	E	3.75
		15"	RCP	S	3.40

(5)

~~5171~~ 171	INL 2'	15"	SW RCP	-5.00
		15"	NE RCP	-5.20
		6" UD	N	-3.35
1596	~~CB~~ INL 4'	15"	S	-4.25
5184	CB 2'	15"	SE	-2.30
5188	CB 2	15"	SE	3.80
		15"	NW	3.60
5235	CB 2'	12"	N	-2.25
5284	CB 2'	12"	N	-2.50
1157	MH 4'	~~30"~~ 24"	N	-12.00
		30"	S	-12.30
5301	CB 4'	SUMP		-3.55
		NO PIPES VISIBLE		
5309	CB 4'	10"	N	-3.85
BOX WITH NO GRATE 6' x 4'				
5330	CB 4'	12"	N	-3.90

(4)

1535	2'	INV	SW	12"	-2.30
1536	BOX	2' X 4'		N 12"	4.25
				NE 30"	5.05
				W 24	5.05
1597	24" BOX WITH GRATE				
1598	INL FULL OF DIRT				
1599	12" RCP				
1544	2' ☐		N	12" N	-3.90
			E	6" PLASTIC	-3.30
1549	2'			TOP OF SILT	1.55
1576	1 X 4 BOX			15" E CMP	-3.50
1588				15" W CMP	3.80
				N 42X60	8.37
				S 42X60	8.37
1000 = 18"					

PLASTIC

1000 3'X2' ☐ 6" N INV -3.40

1001 GRD

1569 N+S 42"X60 -10.25

CAN'T TIE W

LOOK FOR MH NORTH 4' OF 5330

LOOK FOR MH 4' NORTH OF 5301 + 5309

LOOK FOR MH 4' NORTH 5301

CHECK SIZE 1000 + 1001

CHECK SIZE 5240 + 5268

CHECK WATER FLOW 1536 NE?

CHECK 1312 PIC + MDS

-13.85 60" SW + NW

MH NORTH OF 5301 5350

8" E+W = 5.60 N = 4.20 6"

COMBO 8"

MH NORTH OF 5330 5351

-6.80 24" E W -6.08" W -4.08" E

-7.20 30" SE

30

03-05-2017 LR

BASE @ 102

TOPO PT # 5350 - 5374

	STRU			
5372	2'		10" E	-1.75
5373	2'		10" SW	-2.15 E: 2" OUT
5374	4'		N 15"	-3.15
			W 10"	-3.30
			SE 15"	-3.40
A 5374	2'		SW	6" CMP 1.90
5370			NE 24"	-10.00
			S 24"	-10.20
~~5371~~ ~~B~~	2.5' X 5' BOX WITH GRATE		SW 24"	-4.65
C 5394	2'		15" CMP SE	-2.55
D 5389	2'		10" RCP E	-2.50
E 5390	CAN'T OPEN		SW	
F 5391	2'		10 RCP SW	-2.00

(5)

G - 5392	4' MH	~~18"~~ 15" RCP	N	-4.60
		15" RCP	W	-4.60
		15" RCP	S	-4.60
H 5393	4'	15" RCP	W	3.40
		15" CMP	E	3.40
I 5395	MH COLLAPSE	12" E		2.55
5380	4'	24" NW		-7.55
		24" SE		10.75
5398	4'	12" SE		-4.40
5399	4'	24" NE		-10.60
		30" S		-11.35
		12" W		-11.10
5401	4'	15 X 18" SW		-2.55
5364	4'	~~21"~~ 24" CMP	N	-5.65
		30"	E + W	-7.40
		30" ~~21"~~ CMP	SW	-7.32

5366		FULL OF WATER			
5367	8'x5' BOX		30"	E	4.65
			24"	W	2.55
5403	4'		24	NW	7.42
10.30			24"	E	10.30
			RCP		
5358	2'	CMP STRU	12 ~~18~~"	E	2.45
5359	2'	CMP STRU	12 ~~18~~"	W	2.10
			12 ~~18~~"	E	2.85
5360	2'	CMP STRU	12 ~~18~~"	W	3.20
			12 ~~18~~"	E	3.25
5361	2'		12"	2-W	3.42
	TO. 5364 RCP		12"	2-E	3.25
			10" CMP	S	3.24
5362	2'		RCP 12"	E	2.60
			RCP 12"	W	2.55
5363	2'		12"	W	2.65

(6)

03-06-12

LRK LR

BASE T.C. AJ-2780

5370 - 5421

5380 CHANGE CODE TO
SD MH

(21 24 45)

5365	4'	12" CMP	E	2.95
5368	4'	CMP 24"	N	4.62
		CMP 24"	S	11.75

3.35 - NE
4.26

5369	4'	24" CMP	N	5.44
		24" CMP	S	~~8.10~~ 9.93
1589	4'	18"	S	8.95
		18"	E	8.87

5352	4'		6" EMP 0.80 REMAINING FULL OF BRICK
5353	2'	10" 18" S	- 4.19
5354	2' RCP STRU	12" E	- 3.05
5355	2' RCP STRU	12" E	3.40
		12" W	3.15
5356	2' RCP STRU	12" W	- 3.15
		E	- 3.55
5357	2' RCP STRU	12" W	- 4.15
		18" NE	- 4.55
5404	6' STRU	30" NW	- 10.05
		48" SE	- 10.10
		18" W	- 10.05
5405	4' 8' STRU	18" W	- 4.03
		18" E	- 4.10
5406	2' STRU	10" S	- 4.65

5407	4' STRU	30" NE	- 19.82
		30" SE	- 20.02
5408	4' STRU	15" N	- 9.90
		24" E	- 6.30
		30" SW	- 9.72
5409	4' STRU	15" S	- 3.75
5410	2' STRU	FULL OF DIRT	
5411	4' STRU	18" S	8.70
		15" N	8.45
		8" W	4.78
5412	2' STRU	8" E	- 3.40
5413	2' STRU	15" SE	- 3.60
5414	2' STRU	12" E	- 1.53 T/WATER
5415	2' STRU	10" S	- 1.63
5416	2' STRU	10" SW	- 3.75

(8)

5417	4' STRU			10" NE	-6.15
				30' N	-12.55
				36" E	-12.40
5418	2' STRU			8" SW	-3.78
419	2' STRU			FULL	DIRT
420	2' STRU			12" S-	1.45
				TOP of DIRT	
421	2' STRU			12" E-	1.65
				TOP WATER	
422	4' STRU	18"	N		-7.40
		24	W		-7.05
		15	SE		-7.50
5423	2' STRU			12"	N -2.30
424	2' STRU			12" E	-4.23
425	4' STRU			42" SW	-4.30
	BLOCKED			42" NE	-4.30
426	4' STRU			54" W	-4.78
		FULL OF WATER		60' E	SUMP
				10 E	

BASE AT AJ- 2780
5422 - 5471

5427	4'	10" W	4.87
		FULL WATER	
5428	4'	10" W	6.60
		FULL WATER	
5429	4'	12" W	3.44
5430	4'	10" NE	4.87
5431	4'	10" SW	4.55
		12" E	4.67
5432	2'	12" E	2.57
5433	2'	12" E	2.60 TOP MUD
		FULL of MUD	
5434	2'	12" S	2.53
5435	4'6	66" N	- 9.72
		60 W	- 12.70
		12 NW	-2.71
		46" S	- 12.42

(4)

5436	2'			12" N	-2.10
5437	2'	BROKEN		12"	NW 3.87
5438	2'		FULL OF DIRT + WATER		
5439	4	BEEHIVE		18" S	- 4.23
5440	6'			48 E	11.45
				48 W	11.63
				18" N	11.12
5441	6'			66" N	-10.78
				66" S	-12.49
				48" E	-12.12
5442	4'			12 E	-8.22
				12 W	-8.10
5443	4'x4' BOX	BOTTOM FULL SILT		42 N	6.75
				42 SW	5.80
5444	4'			~~9" SW~~	
				12 E	-3.40
5445	4'			12" SW	-4.50

5446	4'		10" SE	-3.70
5447	4'	FULL OF SILT TO TOP		
5448	4'	"		
5449	4'		15" W	-4.20
5450		FULL OF DIRT		
5451	4'		18" E (10)	4.05
5452	4' ON BOX		60" N	-12.50
			66" S	-14.00
			36" W	-13.20
			15" SE	-12.90
5453	4' ON BOX		42 N	-8.10
	2' SILT ON BOTTOM		42 S"	-8.35
5454	4'		8" SE	-3.95
5455	4'		42 W	15.13
			42 S	15.20
			10" N	7.55

5456	4'			10" SE	4.24
5457	~~4'~~ 2'			8" SW	4.15
5458	4'			42" N	15.00
				42" SE	15.00
				810' NE	6.40
5459	4'			12" W	4.52
5460	4'			12 SE	[illegible].23
5461	2'			18" SW	-10.18
5462	4'			10" SW	-3.70
5463	4'			10" SW	-3.10
				10" E	2.95
5464	JUNCTION BOX			72" S	-10.41
				72" NW	-10.41
5465	JUNCTION BOX			72" N+S	-12.10
5466	"	"		72 N+S	-12.76

5467	JUNCTION BOX	60" ~~SW~~	12.62
		60" N	12.~~70~~ 55
5468	6' STRU	60 N	12.30
		60 S	12.30
5469		60 S	11.76
		60 N	11.65
5470		60" S	-10.65
		60" N	-10.65
5471		60" S	-9.55

3-09-12
LRE-CR
INT N. HARLEM
+ 95 TH

BASE C AJ-2780
5472 - 5516

5472	4'	12" SW	-3.64
5473	4'	8" SE	-3.75
5474	4'	10" SW	-4.17
		10" E	-3.63
5475	4'	10" SW	-3.75
		10" E	-3.60

(11)

5476	4'			8" SE	-4.55
5477	4'			10" SW	-3.40
				10" E	-3.40
5478	4'			8" SE	-4.02
5479	4'			10" SW	-2.85
5480	6'			10 S	-16.07
				10" N	-13.95
				24" NE	-8.06
5481	4'			8" SW	-2.55
5482	4'			24 N	-7.65
				24" S	-9.10
5483	4'			10" SW	-4.25
5484	4'			24" S	-6.74
				24x42	6.75
5485	4'			15" N	-5.87
				8" NW	-5.63
5486	4'			8" SE	-4.66
5487	4'			8" E	-4.29
5488	4'			8" E	-4.78
5489	4'			18" N	-8.45
				15" S	-8.70
				8" W	-9.00
				6" NE	-4.55

5490	4'	SW 8"	-4.05
5491	4'	N 18"	-3.40
		S 21"	-3.45
5492	4'	SW 12"	-7.20
		SE 12"	-7.20
5493	2'	SW 10"	-1.97
5494	4'	NE 10"	-3.56
		S 24"	-9.09
5495	4'	SW 8"	-3.92
5496		FES	
5497	4'	8" 24"	-5.85
		42"	-8.50 S
5498	2'	8" SW	-2.48
5499	4'	12" SE	3.96
5500	4'	10" SE	-4.84
		10" N	-2.71
		10" S	-4.12
		10" W	-3.90
5501	2'	10" S	-3.12
5502	2'	10" E	-3.41
5503	2'	10" E	-2.63
5504	2'	10" N	-3.07
		10" W	-2.92
5505		10" W	-4.10

		10" ~~12"~~ W	4.~~00~~
5506	4	S ~~30~~" cmp	-4.20
		18" N cmp	-4.17
5507	4		~~-5.40~~
		24" S	-5.20
		12" E	-6.38
		N 24"	-6.47
5508	4'	S 24"	-5.11
		W 12"	-3.94
5509	4'	SE 8"	-4.32
5510	4'	E 8"	-4.17
5511	4'	W 10"	-4.22
5512	4	W 8"	-2.82
5513	4'	W 10"	-2.40
5514	~~4~~' 2	W 10"	-3.35
5515	2'	W 10"	
		SKIPPED ONE CAR	-3.52
		W 10"	
5516	2'		

BASE @ 107

5517 - 5529

5517 - INV 42"

5518 - 5520 HEADWALL SUMP 11.52

5521 2' 2' SILT

5522	JUNCTION BOX	72" N	-15.71
		72" S	-15.75
		12" NE	-8.03
		15" S	-3.73
5523	4'	12" E	-3.39
		15" N	-5.38
5524	4'	15" S	-5.25
		12" E	-3.30
		18" W	-5.78
		15" W	-5.19
5525	4'	15" S	-2.75
5526	4	18" E	-4.95
5527	4	18" W	-5.10
		15" N	-4.90
		72" N	-16.40
5528	BOX	72" S	-16.40
		18" E	-7.30
		8" NE	-4.00
5529	4'		

5472 - 5829

5530	4'	cmp 2" SE	-2.27
5531	4	cmp 12" NE	-6.35
		cmp 15" SE	-6.61
		cmp 12" NW	-6.45
		6" PVC	-6.53
5532	4'	cmp 12" SW	-2.53

03-14-2012		11509-4	LR	
~~BASE~~ @ 107				
~~PT #~~ 5530 - 5571				
5533	4'	PVC S	6"	- 7.89
		PVC NW	6"	-7.68
5534	4	15"	NW	- 11.45
		12"	N	- 8.30
		~~8" NE~~		
		18"	SE	-11.50
5535	4	8"	SW	-4.37
5536	2'	8"	SW	-3.95
5537	2'	8"	NW	-3.92
5538	4'	12"	N	-5.37
		12"	S	-5.38
		8"	SE	-4.91
5539	4'	8"	SW	-3.96
5540	4'	8"	NW	-4.26
5541	4'	12"	N	-5.41
		12"	S	-5.57
		8"	SE	-5.19
5542	4'	10"	SW	-3.76
5543	4	10"	W	-4.95
5544	4'	10"	E	-4.31
		12"	S	-4.55

(13)

5545	4'		S 12"	-5.00
			W 10"	-4.57
5546	4'		E 10"	-4.09
5547	2'		NW 8"	-2.58
5548	4'		~~N 12"~~	
			~~E 12"~~ 10"	-4.06
			SE 8"	-2.88
5549	2'		8" E	-4.28
5550	4'		12" N	-4.92
			12" S	-5.07
			~~10~~ 8" W	-4.55
5551	4'		8" E	-4.21
5552	4'		8" E	-4.28
5553	4'		12" N	-5.20
			12" S	-5.25
			8" W	-4.55
5554	4'		8" E	-5.13
5555	4'		8" W	-3.60
5556	4'	CAN'T OPEN	24" S	
			8" E	
5557	4		8" W	-5.20
5558	4'		FULL DIRT	
5559	4'		8" SW	-5.20
5560	4'		N 12"	-2.77
			E 12"	-2.77

5561	2'			12"S	-2.90
5562	4'		CAN'T SEE PIPE	- 7.71	SUMP
5563	2'	12" S -	4.55	12" NE -	-4.42
5564	2'		12"	SW	-3.25
5565	4'		8"	E	-4.53
5566	2'		10"	W	-3.22
5567	4'			N -	14.90
				S -	16.50
	CANT	SEE	ANYMORE PIPES		
		12" SILT BOTTOM			
5568					
THIS MH WAS REPAIRED					
+ RESHOT			S	-2.58	
			N	-2.89	
5570	BOX INL		30" N	-4.04	
			30" W	-3.57	
5569	"	"			
		30" S		-3.57	
5571		30"	RCP		

(14)

TO DO

1. DUMP DATA COLLECTOR 5472 - 5571 LAYER STRUCTURE
2. DUMP PICTURES + LABEL
3. WORK ON SPREADSHEET
4. WORK ON FINDING UTILITY PAGES FOR 95TH + 294 FROM ISTHA

(15)

LRK - LR

T @ AJ 2780 03-16-12

5572 - 5623

JUNCTION BOX

8'x8' □

		SE 54"	-13.00
		NW 54"	-12.62
5572			
5573	4'	SW 48	-10.80
		NE 48	-10.40
		N 24'	-9.51
5574	2'	NE 18"	-4.12
5575	2'	SW 10"	-2.45
5576	4'	N ~~24"~~ 18"	-9.06
		S 24'	-9.90
		SW 18	-9.62
		~~NE~~ 10	-5.40
5577	4'	NW 10"	-4.20
5578	4'	S 18"	-8.55
		N 18"	-8.35
		SE 10"	-6.05
5579	4'	S 18"	-4.09
5580	4'	FILLED WITH DIRT	
5581	4'	" " "	
5582	2'	10" SE	-6.30
		FULL WATER SUMP	
5583	4'	48" E	-11.00
		48" W	-11.39
		24" NW	-10.45
		15" SW	-9.12

5584	4'	15" NE	-4.48
5585	4'	8" SW	-4.15
5586	4'	8" SW	-4.20
5587	2'	~~8" SE~~	~~-2.06~~
		8" N	2.76
5588	4'	8" S	-3.53
		8" SE	4.05
5589	4'	48" W	-9.87
		30" E	9.28
		8" NW	5.19
		30" ~~24"~~ N	9.70
5590	4'	8" SW	5.16
5591	4'	30" E	9.68
		30" SW	9.85
		12" S	7.92
5592	4'	8" NW	-3.30
5593	4'	10" ~~12"~~ N	-2.83
5594	4'	10" N	-3.00
5595	2'	6" S	-4.18
		8" ~~18"~~ NE	-4.13
5596	4'	12" SW	-2.90
5597	4'	12" SW	-3.65
		12" NE	-1.75
5598	4'	10" NW	-3.35

5599	4'		30" E	9.05
			30" W	9.20
			15" NE	-7.95
			10" SE	-6.92
5600	4'	FULL WATER	TO SUMP	-5.30
5601	4'		30" E	9.80
			24" W	9.35
			30" S	9.85
			10" E	5.40
5602	4'		24" E	7.87
			12" ~~10"~~ NW	3.88
			18" N	-7.77
5603	4		12 SE	-3.40
5604	4		15" SW	-6.85
			12" E	CAN'T -
			~~10"~~ SE	SEE
5605	2'		10 NW	-3.65
5606	2'		12" S	-4.25
			12" NE	-3.80
5607	2'		10" ~~12"~~ E	-2.50
5608	4'		~~12" S~~	
			12" W	-3.20
			10" ~~18"~~ SE	-3.45
5609			CAN'T OPEN	

5610	2'		12" S	-2.55
5611	4'		15" W	-5.36
5612	4'		18" SW	8.45
			~~18" NE~~	~~8.45~~
			12" SE	8.75
5613	4'		12" NW	-8.15
			12" E	-8.15
5614	4'		18" S	-9.04
			18" NE	-8.85
			12 ~~10"~~ NE	-4.05
5615	4'		12 ~~10"~~ SW	-3.60
			10" NE	-3.75
			12" N	-3.90
5616	4'		24" S	-13.70
			18" SW	-13.70
			15" NW	-13.68
			12" W	-6.05
5617	2'	CMP	15" SE	-4.75
			12" N	-6.80
		CMP	15" SE	-6.90
5618	2'	PVC	12" W	-2.35
5619	4'	CMP	24" SE	-4.00
			10" N	-5.60

5620	2'		12"SW	2.40	
5621	2'		12" SE	1.80	
5622	2'		12" S	-2.68	
5623	4'		12 SE	-3.05	
			12" N	-3.60	

03-19-2012 LR-KN

BASE @ 107
PT # 5623 - 5679

PT#	TYPE/STR	SZ	TYPE	DIR	MD
5623	INL 4'	8" Ø	RCP	SE	5.50'
5624	INL 4'	8" Ø	RCP	E	5.26'
5625	INL 4'	8" Ø	RCP	E	5.50'
5626	INL 4'	8" Ø	RCP	E	5.07'
5627	INL 4'	10" Ø	RCP	E	5.05'
5628	INL 4'	10" Ø	RCP	E	5.21'
5629	INL 4'	10" Ø	RCP	E	5.29'
5630	INL 4'	10" Ø	RCP	E	5.41'
5631	INL 4'	8" Ø	RCP	E	5.29'
5632	INL 4'	10" Ø	RCP	E	5.81'
5633	CB 2'	8" Ø	RCP	E	2.38'
5634	MH 6'	8"	RCP	W	3.84'
"	"	60" Ø	RCP	N	12.47'
"	"	60 Ø	RCP	S	12.49'

08-19-2012 LR-KN

[illegible]

[illegible] # 5 [illegible]

PT #	TYPE/STR	SZ	TYPE	DIR	MD
5635	INLET 4'	15" Ø	RCP	S.	3,95'
5636	INLET 4'	8" Ø	RCP	E.	3,57'
5637	INLET 4'	10" Ø	RCP	E.	5,02'
5638	INLET 4'	10" Ø	RCP	SE	5,73'
5639	INLET 2'	8" Ø	RCP	E	5,40'
"	"	8" Ø	RCP	W	3,15'
5640	MH 6'	18" Ø	RCP	N	8,25'
"	"	18" Ø	RCP	S	8,35'
"	"	18" Ø	RCP	E	8,15'
5641	INLET 2'	8" Ø	RCP	SW	2,57'
5642	CB 4'	8" Ø	RCP	NE	2,90'
"	"	12" Ø	RCP	E	8,71
5643	INLET 4'	10" Ø	RCP	E	6,45
5644	INLET 2'	10" Ø	RCP	S	3,35
5645	MH 4'	10" Ø	RCP	N	5,35
"	"	12" Ø	RCP	E	5,70
5646	INLET 2'	–	–	SUMP	4,30
5647	MH 4'	18" Ø	RCP	N	5,63
"	"	8 Ø	RCP	S	5,20
5648	MH 4'	8" Ø	RCP	N	5,67
"	"	10" Ø	"	W	4,30

(18)

03-19-2012 LR-KN

PT #	TYPE/STR	SZ	TYPE	DIR	MD
5649	INLET 2'	10" Ø	RCP	E	3,27
5650	MH 4'	8" Ø	RCP	E	4,52
5651	MH 4'	8" Ø	RCP	N	6,03
"	"	18" Ø	RCP	S	7,62
5652	"	10" Ø	RCP	W	4,35
"	"	8" Ø	RCP	S	5,10
5653	INLET 2x2	10" Ø	RCP	E	3,08
5654	MH 4'	8" Ø	RCP	W	4,05
"	"	8" Ø	RCP	W	5,70
5655	INLET 2'	—	—	SUMP	3,65
5656	MH 4'	10" Ø	RCP	W	3,30
"	"	10" Ø	RCP	E	5,65
5657	INLET 2'	10" Ø	RCP	E	2,60
5658	INLET 2'	8" Ø	RCP	E	3,00
5659	MH 4'	10" Ø	RCP	W	5,44
"	"	8" Ø	RCP	W	4,40
5660	" 4'	8" Ø	RCP	W	5,67
"	" 4'	8" Ø	RCP	W	3,53'
5661	INLET 2'	10" Ø	RCP	E	2,25'
5662	INLET 2'	18" Ø	RCP	W	2,70

(14)

03-19-2012 LR-KN

PT #	TYPE/STR	SZ Ø	TYPE	DIR	MD
5663	INLET 4'	15" Ø	RCP	N	4,13'
"	"	10" Ø	RCP	S	3,80'
"	"	12" Ø	RCP	W	3,40'
5665	INLET 4'	12" Ø	RCP	SW	2,74'
5664	MH 4'	8" Ø	RCP	SW	3,83'
5666	INLET 4'	12" Ø	RCP	S	3,08'
5667	MH 4'	18" Ø	RCP	E	5,35'
"	"	18" Ø	RCP	E	4,05'
5668	INLET 2'	8" Ø	RCP	W	3,14'
5669	MH 4'	8" Ø	RCP	E	5,06'
5670	INLET 2'	8" Ø	RCP	W	2,84'
5671	MH 4'	10" Ø	RCP	E	5,57'
5672	INLET 2'	10" Ø	RCP	W	3,07'
5673	INLET 4'	8" Ø	RCP	NE	3,86
5674	INLET 4'	8" Ø	RCP	E	5,03
5675	INLET 4'	8" Ø	RCP	E	5,21
5676	INLET 4'	8" Ø	RCP	E	5,31
5677	MH 4'	12" Ø	RCP	N	9,70
"	"	15" Ø	RCP	E	9,90
"	"	15" Ø	RCP	S	9,45
"	"	12" Ø	RCP	W	5,80
5678	" 4'	8" Ø	RCP	W	4,10
5679	INLET	8" Ø	CLAY	E	2,80

(20)

πC 108		3-20-12			
LRK-LR		5680 - 5714			
	TYPE	SIZE	TYPE	DIR	MD
5680	MH 4	18"	RCP	S	12.72
		18"	RCP	N	12.62
5681	MH 4'	18"	RCP	N	12.45
		18"	RCP	S	12.45
		6"	RCP	NE	8.97
5682	MH 4'	18"	RCP	N	12.51
		18"	"	S	12.55
		6"	"	E	10.00
5683	MH 4' SAN?	18"	RCP	N	11.60
		18"	"	S	11.55
5684	MH 4' SAN?	LIFT STATION			
5685	MH 4'		RCP	N	13.55
			RCP	SE	13.25
5686	TOP OF	HEADWALL 72"			-8.80
5687-5692		BRIDGE DECK			
5688	MD TO	CREEK BOTTOM			-14.05
5691	MD "	"	"		-13.42
5693	MH 4'	12"	RCP	E	6.40
		8"	RCP	E	4.42

			8"	RCP	N	3.90
5694	INL	2'	8"	RCP	W	3.39
5695	INL	2'	8"	"	S	3.08
5696	MH	4'	8"	"	E	5.95
			6"	"	E	3.74
5697	INL	2'	8"	"	W	3.09
5698	MH	4'	10"	"	E	5.25
			8"	"	NNE	4.24
5699	MH	4'	72"	"	N	10.45
					S	10.50
5700	INL	2'	8"	"	SW	2.66
5701	MH	4'	8"	"	E	5.65
5702	INL	2'	8"	"	W	2.57
5703	MH	4'	8"	"	E	5.50
			8"	"	E	4.45
5704	INL	2	8"	"	W	2.85
5705	INL	2'	10"	"	W	2.81
5706	MH	4'	18"	"	N	4.44
			18"	"	S	4.65
			8"	"	W	3.85
5707	INL	2'	12"	"	W	3.05
5708	INL	2'	12"	"	W	3.16
5709	MH	4'	18"	"	N	5.35
			18"		S	5.83
			12"		NW	4.12
			12"		SW	4.46

5710	INL 2	12"	RCP	W	2.80
5711	MH 4'	18	"	N	FILLED WITH DEBRIS
		18	"	S	
		12	"	E	6.04
5712	INL 4'	8"	"	SW	5.58
5713	INL 4'	FULL WATER	"	SUMP	7.00
5714	PIPE IN CONC HEADWALL				
TC 100	SHOOTING	N. HARLEM			
5715 —	5745				
5715	INL 4'	8"	RCP	NE	4.88
5716	INL 4'	8"	RCP	NE	5.60
5717	MH 4'	18"	"	N	9.05
		18"	"	S	12.00
		24"	"	W	13.00
		8"	DIP	SE	4.80
		8"	DIP	SW	7.25
5718	INL 4'	NO PIPES VISIBLE		TO SUMP	4.50
5719	INL 4'	8"	RCP	SE	4.40
5720	MH 4'	12"	"	E	5.60
		8"	"	E	2.23
5721	INL 2'	8"	"	W	1.74
5722	INL 2'	10"	"	W	2.15
5723	MH 4'	10"	"	E	2.90
		12"	"	SE	5.63

(21)

5724	MH 4'	18	RCP	N	4.65
		18	"	S	4.50
5725	MH 4'	12"	"	E	3.20
5726	INL 2'	12"	"	W	2.90
5727	INL 4'	8"	"	N	4.20
5728	MH 4'	15"	"	N	5.85
		15"	"	S	5.70
		8"	"	E	5.38
5729	INL 4'	8"	"	NE	5.36
5730	INL 4'	12"	"	NE	4.87
5731	BEHIVE 8'	12"	"	NW	3.98
5732	MH 4'	15"	"	N	8.55
		15"	"	S	8.25
		18"	"	W	8.95
5733	INL 4'	10"	"	SE	4.97
5734	INL 4'	10"	"	SE	5.90
5735	MH 4'	15"	"	N	6.09
		15"	"	S	6.14
5736	INL 2'	10"	"	SW	5.04
5737	INL 4'	10"	"	SE	4.20
5738	INL 2'	10"	"	SE	3.35
5739	MH 4'	18"	"	N	6.35
		15"	"	S	5.03
5740	INL 2'	8"	"	NE	4.60
5741	INL 2'		"	NW	SUMP
			"	SW	7.60

(22)

5742	MH 4'	18"	RCP	S	7.45
		18"	"	N	7.70
5743	MH 4'	8"	"	NW	4.82
5744	MH 4'	8"	"	NW	5.14
5745	MH 4'	18"	RCP	N	9.80
		18"	RCP	S	10.68
		24"	"	E	14.13
		36		W	14.02

3-21-12 LRK-1R

BASE C 100 NORTH HARLEM

5746 - 5766 (5730 + NORTH NEW WATER SHED)

5746	MH 4'	8"	RCP	S	5.36
5747	INL 4'	10"	RCP	S	4.93
5748	MH 4'	15"	RCP	N	7.42
		18"	RCP	S	7.48
5749	MH 4'	12"	"	SW	4.67
5750		10"	"	SW	5.03
5751	BEEHIVE 2'	10	"	SW	4.85
5752	MH 4	15"	"	N	7.05
		15"	"	S	6.75
5753	MH 4'	12"	"	NE	5.22

5754	INL 4'	10"	RCP	E	4.73
5755	INL 4	8"/10"	"	NE	4.62
5756	MH 4'	24"	RCP	N	8.76
		18"	"	S	8.78
5757	INL 4'	8"	"	NE	3.80
5758	BEEHIVE 4	6" CMP		E	3.55
5759	INL 4'	NO PIPES VIS		SUMP	4.87
5760	INL 4'	10"	RCP	E	4.65
5761	MH 4'	NO PIPES VISIBLE		SUMP	1.45
5762	INL 4'	10"	RCP	E	4.12
5763	INL 4'	NO PIPES VISIBLE			8.60
5764	MH 4'	15"	RCP	S	6.20
		12"	"	N	5.57
5765	BEEHIVE	NO PIPES VISIBLE			7.70
5766	INL 4'	8"	RCP	NE	4.41

BASE C 104 N. HARLEM

5767 - 5794

5767	INL 4'	8"	RCP	NE	5.53
5768	INL 4'	NPV		SUMP	4.90
5769	INL 4'	8"	RCP	NW	4.96
5770	MH 4'	15"	RCP	W	6.52
5771	MH	24"	RCP	W	11.62
		18"	"	N	11.60
		18"	"	S	11.55
		10"	"	S	8.22

5772	INL 4'	18"	RCP	E	5.00
5773	INL 4'	[illegible]	RCP	E	4.90
5774	INL 4'	8"	RCP	E	4.95
5775	INL 4'	8"	NMP	E	4.67
5776	INL 4'	8"	"	E	4.82
5777	INL 4'	8"	"	E	4.50
5778	INL 4'	8	"	SW	4.38
5779	BEEHIVE 4'	6"	DIP	NW	3.80
5780	INL 4'	10"	RCP	SE	3.74
5781	INL 4'	8"	"	NE	4.98
5782	MH 4'	15	RCP	N	5.55
		15	"	S	5.50
5783	BEEHIVE 4'		NPV		7.06
5784	INL 4'	8"	RCP	E	5.00
5785	INL 4'	8" 10"	"	SE	5.00
5786	INL 4'	8"	DIP	E	2.02
5787	MH 4'	8"	RCP	W	3.10
		8"	"	SE	5.85
5788	MH 4'		SUMP	NPV	3.10
5789	INL 4'	10"	RCP	N	2.85
5790	INL 4'	10"	RCP	SW	3.14
5791	MH 4'	12"	"	SE	3.37
		12"	"	N	3.90

(23)

5792 MH 4'	12"	RCP	N	3.83
5793 MH 4'	8"	"	SE	3.25
	30	TRENCH	E	4.75
	30	"	W	4.25
5794 MH 4'	30"	TRENCH	E	4.05
	30"	"	W	4.20

BASE @ 108 SHOOTING 3 MHS ON SOUTH HARLEM
5795 → 5797

5795 MH 4'				
	18"	RCP	W	6.85
	18"	RCP	E	5.20
5796 MH 4'	72"	"	N	12.15
	72"	"	S	12.30
5797 MH 4'	12"	"	N	3.95
	18"	"	S	4.35
	6"	CMP	NW	3.95

BEEHIVE MH FOUND @ NE QUAD OF 95TH & HARLEM NEED TO LOCATE

18" E - 3.20

LOCATE SE 23 NE QUAD

(24)

04-03-12
LRK LR

KC AJ 2780
LOCATE 2 RANDOM PTS THEN N-HARLEM
5798 + 5799, 5800 - 5845

5798	MH 4'	RCP	N	48	15.35
			SW	48	15.32
5799	BEEHIVE 4'	RCP	E	18"	3.20
5800	INL 2'	RCP	W	12"	2.80
5801	INL 2'	RCP	NPV	SUMP	9.00
5802	MH 4'	RCP	S	10"	6.07
			NW	10"	5.72
5803	BEEHIVE 4'	RCP	SE	10"	4.65
			N	10"	4.70
5804	INL 4'	RCP	DIP	4"	1.76
			SW	10"	5.07
5805	INL 4'	RCP	SW	10"	5.68
5806	MH 4'	RCP	E	21"	8.50
NEW CAMERA			N	18"	8.84
			S	24"	9.52
5807	INL 4'	RCP	SW	10"	5.18
5808	INL 2'	RCP	SW	10"	4.94
5809	INL 4'	RCP	SW	10"	5.00
5810	INL 4	RCP	SW	10"	5.38
5811	MH 4'	RCP	N	27	10.65
			S	27	10.90

5812	INL 4'	RCP	SW	10"	5.15
5813	INL 4'	"	W	10"	4.84
5814	MH 4'	RCP	N	30"	11.40
			S	10"	11.70
			NW	10"	5.83
5815	INL 4'	RCP	SW	10"	4.68
5816	INL 4'	RCP	SW	10"	4.72
5817	INL 4'	RCP	N	30"	12.05
		"	S	30"	12.05
		PVC	NW	6"	4.20
5818	INL 4'	RCP	S	10"	5.60
5819	INL 4'	RCP	S	10"	5.10
			N	10"	5.10
5820	MH 4'	RCP	N	30"	12.93
			S	39"	13.63
			E	24"	12.32
5821	INL 4'	RCP	S	10"	5.00
5822	MH 4'	RCP	N	6"	5.50
			S	6"	5.45
5823	INL 4'	RCP	S	10"	5.15
5824	MH 4'	RCP	N	39"	13.50
			S	39"	13.50
5825	INL 4'	RCP	S	10"	5.08
5826	INL 4'	RCP	SW	10"	5.00

(25)

5827	MH 4'	RCP	N	12	5.60
			S	15	5.62
			W	10	5.65
			E	10	5.97
5828	INL 4'	RCP	W	10"	4.80
5829	MH 4'	RCP	N	15"	5.46
			S	12"	5.12
5830	INL 4'	RCP	SW	8"	4.63
5831	MH 4'	RCP	N	8'	7.37
			S	8"	7.35
			NW	6"	6.40
5832	INL 4'	RCP	SW	8"	4.78
5833	INL 4	RCP	SW	8"	4.67
5834	MH 4	RCP	N	39"	15.02
			S	48"	15.85
5835	INL 4'	RCP	SW	10"	4.82
5836	INL 4'	RCP	SW	10"	3.90
5837	MH 4'	RCP	N	48"	16.55
			S	48"	16.55
			W	6"	6.83
5838	INL 4'	RCP	SW	8"	4.63
5839	INL 4'	RCP	SW	8"	5.02
5840	MH 4	RCP	N	48"	17.22
			S	54"	17.00
			NW	12"	11.53
			SW	10"	6.60

5841	INL 4'	RCP	SW	10"	4.95
5842	INL 4'	RCP	SW	10"	4.65
5843	MH 4'	RCP	N	54"	16.85
			S	54"	16.75
			W	18"	11.53
5844	INL 4'	RCP	NU PSOMP		8.22
5845	INL 4'	RCP	SW	10"	6.64

BASE @ 100 5846-5865
79TH ST SOUTH W. SIDE

5846	INL 4'	RCP	S	10"	4.97
5847	INL 4'	RCP	S	10"	4.42
5848	MH 4'	RCP	SE	10"	6.25
			SW	10"	3.95
5849	INL 4'	RCP	SW	10"	4.42
5850	INL 4'	RCP	SW	10"	5.18
5851	INL 4'	RCP	N	54"	16.45
			S	54"	16.45
5852	INL 4'	RCP	SW	10"	5.10
5853	INL 4'	RCP	S	10"	5.39
5854	INL 4'	RCP	S	10"	5.05
5855	INL 4'	RCP	S	18"	5.38
5856	INL 4'	RCP	SW	8"	5.48

NEW WATERSHED

5857	INL 4	RCP	NW	8"	5.11
5858	MH 4'	RCP	N	54"	18.32
			S	54"	18.30
			E	24"	9.95
			W	12"	6.70
5859	SAN				
5860	INL 2'	RCP	SE	8"	6.35
		PVC	SW	10"	3.05
5861	INL 4'	RCP	SW	12"	2.37
5862	INL 2'	RCP	SE	12"	2.38
5863	MH 4'	RCP	NW	12"	2.65
			SW	12"	5.10
5864	INL 2'	RCP	SE	10"	2.96
5865	MH 4'	RCP	NW	10"	3.10
		RCP	SW	10"	5.95
				4-04-12	
BASE @	100				
	5866 — 5878				
5866	MH 4'	RCP	SE	12"	3.65
			N	12"	3.60
5867	MH 4'	RCP	N	54"	19.00
			S	54"	18.98
			W	10"	7.02
5868	INL 2'	RCP	SE	12"	3.56

5869	MH 4'	RCP	NW	12"	4.05
			SW	12"	5.37
5870	INL 2'	RCP	SW	12"	3.60
5871	INL 2'	RCP	NW	12"	3.19
			SE	12"	3.30
5872	MH 4'	RCP	NW	12"	3.50
			SW	12"	5.40
5873	INL 4'	RCP	NW	8"	5.29
5874	MH 2'	RCP	NVR	SUMP	6.35
5875	MH 4'	RCP	N	54"	16.05
			S	54"	16.00
			SE	10" ~~12"~~	6.60
5876	INL ~~4~~	RCP	NW	~~10"~~	~~5.06~~
5877	INL 4'	RCP	~~SW~~	~~10"~~	5.52
5878	FES		N	15"	
				4-11-12	
				LRK-LR	
BASE @ 100			SHOOTING		
87TH ST					
	5879 — 5927				
5879	~~MH~~ 4'	RCP	~~N~~		
			~~S~~		
			E	13.50	~~54"~~ 48"
	9.50		W	13.40	~~54"~~ 48"

5880	INL 4'	RCP	N		
	SAN MH		S		
			E		
			W	12"	9.38
~~5881~~			~~S~~	15"	6.10
5881	INL 4'	RCP	N	15"	6.10
5882	INL 4'	RCP	N	15"	7.08
5883	SAN	MH			
5884	INL 4'	RCP	E	48"	5.19
5885	MH 4'	RCP	NE	48"	14.30
			SW	48"	1[illegible].10
			SE	12"	7.48
~~5886~~			N	24"	12.50
5886	INL 4'	RCP	E W	10"	5.17
5887	INL 4'	RCP	E	10"	5.10
5888	MH 4'	RCP	N	48"	16.64
			S	"	17.00
			E	"	14.92
			W	"	15.51
5889	MH 4'	RCP	E	27"	13.45
			W	27"	13.28
			NW	10"	6.54
5890	INL 4'	RCP	SE	10"	5.09
5891	INL 4'	RCP	SE	10"	5.18

(27)

5892	INL 4'	RCP		SW	12"	5.20
5893	INL 4'	RCP		SW	12"	4.90
5894	INL 4'	RCP		E	12"	9.84
				W	18" ~~15"~~	9.75
5895	INL 4'	RCP		NVP	sump	3.95
5896	INL 4'	RCP		W	12"	4.88
5897	MH 4'	RCP		E	12" ~~15"~~	8.13
				W	12" 15"	8.30
				E	12" 15"	5.90
5898	MH 4'	RCP		E	15"	6.02
				W	15"	6.27
				SE	12	5.23
5899	INL 4'	RCP		NW	12"	5.35
		DIP		SE	~~12"~~ 8"	2.91
5900	MH 4'	RCP	TWIN	SE	10" ~~12"~~	4.70
				W	~~12"~~ 10"	5.00
5901	INL 4'	RCP		NW	10"	2.54
				SE	10"	2.54
5902	MH 4'	RCP		NW	10"	4.58
5903	INL 2'	RCP		SW	10"	2.72
5904	INL 4'	RCP		NE	12"	3.22
5905	MH 4	RCP		SE	12"	3.25
				E	12"	4.81
				W	15"	4.78
5906	INL	RCP		NW	12"	2.84

5907	INL 4'	RCP	SW	12"	2.22
5908	INL 2'	RCP	S	12"	2.34
5909	MH 4'	RCP	SAN MH		
5910	INL 4'	RCP	S	12"	5.20
5911	INL 2'	RCP	W	10"	2.55
5912	INL 4'	RCP	S	12"	3.60
			E	10"	3.58
5913	MH 4'	RCP	E	15"	9.65
			W	15"	9.61
5914	INL 4'	RCP	W	8"	4.20
5915	INL 4'	RCP	NW	12"	5.05
5916	INL 4'	RCP	NE	8"	5.30
5917	INL 4'	RCP	N	12"	4.68
5918	INL 2'	RCP	NE	10"	3.84
5919	MH 4'	RCP	E	12"	5.21
			W	10"	5.21
5920	INL 4'	RCP	NW / NE	8" 8"	5.00 5.10
5921	MH 4'	RCP	W	12"	6.14
			SE	8"	5.90
5922	INL 4'	RCP	NW	8"	5.20
5923	MH 4'	RCP	E	12"	7.75
			W	21"	9.50
			S	27"	9.93
5924	INL 4'	RCP	SE	12"	5.75

5925	INL 4'	RCP	NE	12	7.10
5926	MH 4'	CAN'T OPEN			
5927	INL 4'	RCP	W	12"	5.55

	A	B	C	D	E	F	G	H	I
1	**Point**	Descripition	**Rim**	Pipe Size	Type	Direction	Measure	**Invert**	Flow
2		LUCAS WATERSHED							
3	**999**	CULVERT		42"X60"	RCP	S		**593.40**	
4									
5	**1000**	POND RELEASE STRUC		18"	RCP	S		**597.29**	
6									
7	**1001**	POND RELEASE STRU		18"	RCP	S		**597.20**	
8									
9	**1157**	MH 4'	**608.90**	24"	RCP	N	12.00	**596.90**	
10			**608.90**	30"	RCP	S	12.30	**596.60**	
11									
12	**1214**	CULVERT		36"	RCP			**600.84**	
13									
14	**1215**	CULVERT		15"	RCP			**602.38**	
15									
16	**1216**	CULVERT		36"	RCP			**601.57**	
17									
18	**1298**	CULVERT		18"	RCP			**618.85**	
19									
20	**1312**	MH 4'	**612.37**	60"	RCP	NW&SW	13.85	**598.52**	
21									
22	**1316**	FES W/GRATE		18"	RCP			**609.29**	
23									
24	**1330**	FES W/GRATE		60"	RCP			**597.80**	
25									
26	**1331**	FES		24"	RCP			**602.32**	
27									
28	**1358**	CULVERT		48"	RCP			**596.98**	
29									
30	**1388**	MH	**606.52**	48"	RCP	S	12.65	**593.87**	
31			**606.52**	48"	RCP	NW	10.80	**595.72**	
32									
33									
34	**1477**	CULVERT		24"	RCP			**602.67**	
35									
36	**1484**	MH 4'	**610.47**	18"	RCP	N	3.30	**607.17**	
37				18"	RCP	S	3.40	**607.07**	
38									
39									
40	**1503**	INL 2'	**606.95**	15"	RCP	E	3.40	**603.55**	
41									
42	**1504**	INL 4'	**607.11**	24"	RCP	NW	4.15	**602.96**	
43			**607.11**	15"	RCP	SE	4.40	**602.71**	
44			**607.11**	15"	RCP	W	3.97	**603.14**	
45									
46	**1523**	FES		18"	RCP			**606.69**	
47									
48	**1535**	INL 2'	**604.04**	12"	RCP	SW	2.30	**601.74**	
49									
50	**1536**	2' X 4' DROP INLET	**600.67**	12"	RCP	N	4.25	**596.42**	
51			**600.67**	30"	RCP	NE	5.05	**595.62**	

	A	B	C	D	E	F	G	H	I
52			600.67	24"	RCP	W	5.05	595.62	
53									
54	1544	INL 2'	602.89	12"	RCP	N	3.90	598.99	
55				6"	PLASTIC	E	3.30	599.59	
56									
57	1549	2' DROP INLET	602.09	TOP	OF	SILT	1.55	600.54	
58									
59	1550	CULVERT		24"	RCP			595.52	
60									
61	1557	CULVERT		6"	CMP			605.47	
62									
63	1568	TWIN 5' X 7' BOX	593.45					593.45	
64		CULVERTS							
65	1569	MH JUNCTION BOX	593.45	60"	RCP	N	10.25	583.20	
66			593.45	60"	RCP	S	10.25	583.20	
67									
68									
69	1576	INL 1' X 4' BOX	603.53	15"	CMP	E	3.50	600.03	
70									
71	1588	MH	602.49	15"	CMP	W	3.80	598.69	
72			602.49	42" X 60"	RCP	N	8.37	594.12	
73			602.49	42" X 60"	RCP	S	8.37	594.12	
74									
75	1589	MH 4'	592.60	24"	RCP	S	5.44	587.16	
76			592.60	24"	RCP	E	10.93	581.67	
77									
78	1590	CULVERT		36"	RCP			601.94	
79									
80	1591	INL	605.77	15"	RCP	W	3.50	602.27	
81			605.77	15"	RCP	E	3.35	602.42	
82			605.77	15"	RCP	S	3.40	602.37	
83									
84	1592	CULVERT		15"	RCP			602.71	
85									
86	1593	MH	607.42	24"	RCP	E	5.50	601.92	
87			607.42	15"	RCP	N	5.50	601.92	
88			607.42	15"	RCP	W	5.40	602.02	
89									
90	1594	INL	606.25	15"	RCP	S	4.20	602.05	
91									
92	1595	CULVERT		24"	RCP			601.52	
93									
94	1596	INL 4'	607.97	15"	RCP	S	4.25	603.72	
95									
96	1597	DROP INLET 24" SQ	597.20					597.20	
97									
98	1598	INL	596.52	CLOGGED				596.52	
99									
100	1599	CULVERT		24"	RCP			592.68	
101									
102	1600	DROP INLET 24" X 36"	604.39	6"			3.00	601.39	

	A	B	C	D	E	F	G	H	I
103									
104	**1601**	GROUND NEAR PIPE?		6"	PLASTIC			**596.11**	
105									
106	**5000**	72" FES			RCP			**599.53**	
107									
108	**5001**	18" PIPE			RCP			**598.94**	
109									
110	**5002**	18" PIPE			RCP			**598.65**	
111									
112	**5003**	18" PIPE			RCP			**598.85**	
113									
114	**5004**	18" PIPE			RCP			**598.89**	
115									
116									
117									
118	**5171**	INL 2'	**608.08**	15"		SW	5.00	**603.08**	
119			**608.08**	15"		NE	5.20	**602.88**	
120			**608.08**	6"		N	3.95	**604.13**	
121									
122	**5184**	INL 2'	**604.77**	15"		SE	2.30	**602.47**	
123									
124	**5188**	INL 2'	**605.00**	15"	RCP	SE	3.80	**601.20**	
125			**605.00**	15"	RCP	NW	3.60	**601.40**	
126									
127	**5192**	CULVERT		30"	RCP			**600.27**	
128									
129	**5220**	CULVERT		12"	RCP			**601.69**	
130									
131	**5235**	INL 2'	**604.57**	12"	RCP	N	2.25	**602.32**	
132									
133	**5240**	CULVERT		30"	RCP			**600.04**	
134									
135	**5268**	CULVERT		30"	RCP			**599.63**	
136									
137	**5284**	INL 2'	**602.43**	12"	RCP	N	2.50	**599.93**	
138									
139	**5301**	INL 4'	**598.38**	NO PIPES	VIS.	SUMP	3.50		
140									
141	**5309**	INL 4'	**593.69**	10"	RCP	N	3.85	**589.84**	
142									
143	**5324**	DROP INLET 3' X 5'	**587.22**	24"	RCP	SE		**582.67**	
144		NO GRATE ON STRUCTURE							
145									
146									
147	**5330**	INL 4' DROP BOX NO	**588.52**	12"	RCP	N	3.90	**584.62**	
148		GRATE OPEN MH							
149									
150	**5350**	MH	**598.83**	8"		E	5.60	**593.23**	
151			**598.83**	8"		W	5.60	**593.23**	
152			**598.83**	6"		N	4.20	**594.63**	
153									

	A	B	C	D	E	F	G	H	I
154	**5351**	MH	**589.50**	24"		NW	6.80	**582.70**	
155			**589.50**	8"		W	6.08	**583.42**	
156			**589.50**	8"		E	4.08	**585.42**	
157			**589.50**	30"		SE	7.20	**582.30**	
158									
159	**5352**	MH 4' BEEHIVE	**586.38**	6"	PLASTIC	S	2.58	**583.80**	
160		THIS IS REPAIRED MH		12"	RCP	N	2.89	**583.49**	
161									
162									
163	**5353**	MH 2' GRATE	**587.89**	10"	RCP	S	4.19	**583.70**	
164									
165	**5354**	INL 2'	**586.92**	12"	RCP	E	3.05	**583.87**	
166									
167	**5355**	INL 2'	**587.02**	12"	RCP	E	3.40	**583.62**	
168			**587.02**	12"	RCP	W	3.15	**583.87**	
169									
170	**5356**	INL 2'	**587.00**	12"	RCP	W	3.15	**583.85**	
171			**587.00**	12"	RCP	E	3.55	**583.45**	
172									
173	**5357**	INL 2'	**587.00**	12"	RCP	W	4.15	**582.85**	
174			**587.00**	18"	RCP	NE	4.55	**582.45**	
175									
176	**5358**	INL 2' CMP STR	**585.07**	12"	RCP	E	2.45	**582.62**	
177									
178	**5359**	INL 2' CMP STR	**585.15**	12"	RCP	W	2.70	**582.45**	
179			**585.15**	12"	RCP	E	2.85	**582.30**	
180									
181	**5360**	INL 2' CMP STR	**585.00**	12"	RCP	W	3.20	**581.80**	
182			**585.00**	12"	RCP	E	3.75	**581.25**	
183									
184	**5361**	INL 2'	**585.06**	12"	RCP	W	3.42	**581.64**	
185			**585.06**	12"	RCP	E	3.25	**581.81**	
186			**585.06**	10"	CMP	S	3.24	**581.82**	
187			**585.06**	30"	CMP	NE	3.35	**581.71**	
188									
189	**5362**	INL 2'	**585.00**	12"	RCP	E	2.60	**582.40**	
190			**585.00**	12"	RCP	W	2.55	**582.45**	
191									
192	**5363**	INL 2'	**585.02**	12"	RCP	W	2.65	**582.37**	
193									
194	**5364**	MH 4' BEEHIVE	**585.97**	24"	CMP	N	5.65	**580.32**	
195			**585.97**	30"	RCP	E	7.40	**578.57**	
196			**585.97**	30"	RCP	W	7.40	**578.57**	
197			**585.97**	30"	RCP	SW	7.32	**578.65**	
198									
199	**5365**	MH 4' GRATE	**586.03**	10"	CMP	E	2.95	**583.08**	
200									
201	**5366**	MH 4'	FULL OF WATER					**0.00**	
202								**0.00**	
203	**5367**	DROP BOX 3'X5'	**583.80**	30"	RCP	E	4.65	**579.15**	
204				24"	RCP	W	2.55	**581.25**	

	A	B	C	D	E	F	G	H	I
205	**5368**	MH 4'	**591.43**	24"	CMP	N	4.62	**586.81**	
206				24"	CMP	S	11.75	**679.68**	
207									
208								**0.00**	
209	**5369**	MH 4' GRATE	**600.11**	24"	CMP	N	5.44	**594.67**	
210				24"	CMP	S	10.93	**589.18**	
211									
212								**0.00**	
213	**5370**	MH 4'	**608.44**	24"	CMP	NE	10.00	**598.44**	
214				24"	CMP	S	10.20	**598.24**	
215								**0.00**	
216	**5371**	DROP BOX 2.5' X 5'	**603.69**	24"	CMP	SW	4.65	**599.04**	
217								**0.00**	
218	**5372**	INL 2'	**607.11**	10"	RCP	E	1.75	**605.36**	
219								**0.00**	
220	**5373**	INL 2'	**607.19**	10"	RCP	W	2.15	**605.04**	
221				10"	RCP	E	2.20	**604.99**	
222	**5374**	MH 4'	**607.39**	15"	RCP	N	3.15	**604.24**	
223				10"	RCP	W	3.30	**604.09**	
224				15"	RCP	SE	3.40	**603.99**	
225								**0.00**	
226	**5376**	INL 2'	**606.42**	6"	CMP	SW	1.90	**604.52**	
227									
228	**5377**	CULVERT		24"	RCP	SE		**601.85**	
229	**5378**	HEADWALL	**608.95**						
230	**5379**	HEADWALL	**608.66**						
231								**0.00**	
232	**5380**	MH 4'	**597.01**	24"	RCP	SE	10.75	**586.26**	
233				24"	RCP	NW	7.55	**589.46**	
234	**5381**	DITCH SHOT						**604.42**	
235	**5382**	DITCH SHOT						**605.11**	
236									
237	**5383**	CMP		12"	CMP			**603.67**	
238									
239	**5384**	CMP		12"	CMP			**603.65**	
240									
241	**5385**	CMP		15"	CMP			**603.38**	
242									
243	**5386**	CMP		15"	CMP			**603.23**	
244									
245	**5387**	CMP		15"	CMP			**603.44**	
246									
247	**5388**	CMP		15"	CMP			**603.62**	
248									
249	**5389**	INL 2'	**606.71**	10"	RCP	E	2.50	**604.21**	
250								**0.00**	
251	**5390**	MH 4'	**606.71**	CAN'T OPEN				**0.00**	
252								**0.00**	
253	**5391**	INL 2	**606.87**	10"	RCP	SW	2.00	**604.87**	
254									
255	**5392**	MH 4'	**607.32**	15"	RCP	N	4.60	**602.72**	

	A	B	C	D	E	F	G	H	I
256			607.32	15"	RCP	W	4.60	602.72	
257			607.32	15"	RCP	S	4.60	602.72	
258	5393	BEEHIVE MH 4'	605.60	15"	RCP	W	3.40	602.20	
259			605.60	15"	RCP	E	3.40	602.20	
260	5394	INL 2'	608.38	15"	CMP	SE	2.55	605.83	
261								0.00	
262	5395	INL 2' BRICK FALL IN	608.89	12"	CMP	E	2.55	606.34	
263									
264	5396	FES	593.41	12"	CMP				
265									
266	5397	FES	592.70	15"	CMP				
267									
268	5398	BEEHIVE 4'	599.29	12"	CMP	SE	4.40	594.89	
269								0.00	
270	5399	MH 4'	604.67	24"	RCP	NE	10.50	594.17	
271			604.67	30	RCP	S	11.35	593.32	
272			604.67	12"	RCP	W	11.10	593.57	
273									
274	5400	FES	604.36	12"	CMP				
275								0.00	
276	5401	BEEHIVE MH 4'	596.40	15"x18"	RCP	SW	2.55	593.85	
277									
278	5402	FES	588.36	12"	RCP				
279								0.00	
280	5403	MH 4'	592.16	24"	RCP	NW	7.42	584.74	
281				24"	RCP	E	10.30	581.86	
282	5404	MH 6'	587.99	30"	RCP	NW	10.05	577.94	
283			587.99	48"	RCP	SE	10.10	577.89	
284			587.99	18"	RCP	W	10.05	577.94	
285								0.00	
286	5405	MH 4'	584.87	18"	RCP	W	4.03	580.84	
287			584.87	18"	RCP	E	4.10	580.77	
288	5406	INL 2'	588.66	10"	RCP	S	4.65	584.01	
289								0.00	
290	5407	MH 4'	599.19	30"	RCP	NE	19.82	579.37	
291			599.19	30"	RCP	SE	20.02	579.17	
292	5408	MH 4'	589.94	15"	RCP	N	9.90	580.04	
293			589.94	24"	RCP	E	6.30	583.64	
294			589.94	30"	RCP	SW	9.72	580.22	
295	5409	BEEHIVE 4'	585.83	15"	RCP	S	3.75	582.08	
296								0.00	
297	5410	INL 2'	596.88	FULL OF DIRT				0.00	
298								0.00	
299	5411	MH 4'	594.51	18"	RCP	S	8.70	585.81	
300			594.51	15"	RCP	N	8.45	586.06	
301			594.51	8"	RCP	W	4.78	589.73	
302								0.00	
303	5412	INL 2'	594.11	8"	RCP	E	3.40	590.71	
304								0.00	
305	5413	BEEHIVE 2'	590.00	15"	RCP	SE	3.60	586.40	
306								0.00	

	A	B	C	D	E	F	G	H	I
307	**5414**	INL 2'	**596.13**	12"	RCP	E	2.53	**593.60**	
308								**0.00**	
309	**5415**	INL 2'	**603.86**	10"	RCP	S	1.63	**602.23**	
310								**0.00**	
311	**5416**	INL 2'	**611.38**	10"	RCP	SW	3.75	**607.63**	
312									
313	**5417**	MH 4'	**604.15**	10"	RCP	NE	6.15	**598.00**	
314			**604.15**	30"	RCP	N	12.55	**591.60**	
315			**604.15**	36"	RCP	E	12.40	**591.75**	
316									
317	**5418**	INL 2'	**590.87**	8"	RCP	SW	3.78	**587.09**	
318									
319	**5419**	INL 2'	**592.58**		FULL OF DIRT			**0.00**	
320									
321	**5420**	INL 2'	**594.98**	12"	RCP	S	3.45	**591.53**	
322									
323	**5421**	INL 2'	**595.40**	12"	RCP	E	2.65	**592.75**	
324									
325	**5422**	MH 4'	**592.46**	18"	RCP	N	7.60	**584.86**	
326			**592.46**	24"	RCP	W	7.05	**585.41**	
327			**592.46**	15"	RCP	SE	7.50	**584.96**	
328									
329	**5423**	INL 2'	**609.66**	12"	RCP	N	2.30	**607.36**	
330									
331	**5424**	BEEHIVE 2'	**595.41**	12"	RCP	E	4.23	**591.18**	
332									
333	**5425**	MH 4'	**599.40**	42"	RCP	SW	4.30	**595.10**	
334		BLOCKED	**599.40**	42"	RCP	NE	4.30	**595.10**	
335									
336	**5426**	BEEHIVE 4'	**597.97**	54"	RCP	W		**0.00**	
337		MH FULL OF WATER	**597.97**	60"	RCP	SE		**0.00**	
338			**597.97**	10"	RCP	E		**0.00**	
339									
340	**5427**	INL 4'	**623.62**	10"	RCP	W	4.87	**618.75**	
341		INL FULL WATER							
342	**5428**	INL 4'	**627.42**	10"	RCP	W	6.60	**620.82**	
343		INL FULL OF WATER						**0.00**	
344	**5429**	INL 4'	**619.37**	12"	RCP	W	3.44	**615.93**	
345									
346	**5430**	INL 4'	**620.56**	10"	RCP	NE	4.87	**615.69**	
347									
348	**5431**	INL 4'	**619.11**	10"	RCP	SW	4.55	**614.56**	
349			**619.11**	12"	RCP	E	4.67	**614.44**	
350	**5432**	INL 2'	**623.15**	12"	RCP	E	2.57	**620.58**	
351									
352	**5433**	INL 2'	**626.08**		FULL OF MUD			**0.00**	
353									
354	**5434**	INL 2'	**625.25**	12"	RCP	S	2.53	**622.73**	
355	**5435**	MH 4'	**597.98**	66"	RCP	N	9.72	**588.26**	
356			**597.98**	60"	RCP	N	12.70	**585.28**	
357			**597.98**	12"	RCP	NW	2.71	**595.27**	

	A	B	C	D	E	F	G	H	I
358			597.98	66"	RCP	S	12.42	585.56	
359									
360	5436	INL 2'	611.79	12"	RCP	N	2.10	609.69	
361									
362	5437	INL 2'	601.69	12"	RCP	NW	3.87	597.82	
363									
364	5438	INL 2'	599.60	FULL OF DIRT & WATER				0.00	
365									
366	5439	BEEHIVE 4'	596.71	18"	RCP	S	4.23	592.48	
367									
368	5440	MH 6'	600.21	48"	RCP	E	11.45	588.76	
369			600.21	48"	RCP	W	11.63	588.58	
370			600.21	18"	RCP	N	11.12	589.09	
371									
372	5441	MH 6'	600.61	66"	RCP	N	10.78	589.83	
373			600.61	66"	RCP	S	12.49	588.12	
374			600.61	48"	RCP	E	12.12	588.49	
375									
376	5442	MH 4'	600.93	12"	RCP	E	8.22	592.71	
377			600.93	12"	RCP	W	8.10	592.83	
378									
379	5443	MH 4'X4' BOX	601.02	42"	RCP	N	6.45	594.57	
380		SILTY BOTTOM	601.02	42"	RCP	SW	5.80	595.22	
381									
382	5444	INL 4'	599.59	12"	RCP	E	3.40	596.19	
383									
384	5445	INL 4'	600.37	12"	RCP	SW	4.50	595.87	
385									
386	5446	INL 4'	599.08	10"	RCP	SE	3.70	595.38	
387									
388	5447	INL 4'	599.76	FULL OF SILT				0.00	
389									
390	5448	INL 4'	600.98	FULL OF SILT				0.00	
391									
392	5449	BEEHIVE 4'	597.18	15"	RCP	W	4.20	592.98	
393									
394	5450	INL 4'	605.87	FULL OF DIRT				0.00	
395									
396	5451	INL 4'	612.17	10"	RCP	E	4.05	608.12	
397									
398	5452	MH 4' JUNCTION BOX	604.16	60"	RCP	N	12.50	591.66	
399			604.16	66"	RCP	S	14.00	590.16	
400			604.16	36"	RCP	W	13.20	590.96	
401			604.16	15"	RCP	SE	12.90	591.26	
402									
403	5453	MH 4' JUNCTION BOX	602.97	42"	RCP	N	8.10	594.87	
404			602.97	42"	RCP	S	8.35	594.62	
405	5454	INL 4'	610.85	8"	RCP	SE	3.95	606.90	
406									
407	5455	MH 4'	610.61	42"	RCP	W	15.13	595.48	
408			610.61	42"	RCP	S	15.20	595.41	

	A	B	C	D	E	F	G	H	I
409			610.61	10"	RCP	N	7.55	603.06	
410									
411	5456	INL 4'	610.21	10"	RCP	SE	4.26	605.95	
412									
413	5457	INL 2'	611.48	8"	RCP	SW	4.15	607.33	
414									
415	5458	MH 4'	611.91	42"	RCP	N	15.00	596.91	
416			611.91	42"	RCP	SE	15.00	596.91	
417			611.91	8"	RCP	NE	6.40	605.51	
418									
419	5459	INL 4'	611.12	12"	RCP	W	4.52	606.60	
420									
421	5460	BEEHIVE 4'	601.44	12"	RCP	SE	4.23	597.21	
422									
423	5461	BEEHIVE 2'	608.34	18"	RCP	SW	10.18	598.16	
424									
425	5462	INL 4'	609.55	10"	RCP	W	3.70	605.85	
426									
427	5463	INL 4'	609.53	10"	RCP	SW	3.10	606.43	
428			609.53	10"	RCP	E	2.95	606.58	
429									
430	5464	MH 4' JUNCTION BOX	609.43	72"	RCP	S	10.41	599.02	
431			609.43	72"	RCP	NW	10.41	599.02	
432									
433	5465	JUNCTION BOX MH	612.76	72"	RCP	S	12.10	600.66	
434			612.76	72"	RCP	N	12.10	600.66	
435	5466	JUNCTION BOX MH	615.69	72"	RCP	N	12.76	602.93	
436			615.69	72"	RCP	S	12.76	602.93	
437	5467	JUNCTION BOX MH	616.48	60"	RCP	W	12.62	603.86	
438			616.48	60"	RCP	N	12.55	603.93	
439	5468	JUNCTION BOX MH	617.54	60"	RCP	N	12.30	605.24	
440			617.54	60"	RCP	S	12.30	605.24	
441	5469	MH 6'	618.15	60"	RCP	N	11.65	606.50	
442			618.15	60"	RCP	S	11.76	606.39	
443	5470	MH 6' GRATE	617.75	60"	RCP	S	10.65	607.10	
444			617.75	60"	RCP	S	10.65	607.10	
445	5471	MH 6'	617.62	60"	RCP	S	9.55	608.07	
446									
447	5472	MH 4' BEEHIVE	607.22	12"	RCP	SW	3.64	603.58	
448									
449	5473	INL 4'	610.38	8"	RCP	SE	3.75	606.63	
450									
451	5474	INL 4'	609.75	10"	RCP	SW	4.17	605.58	
452			609.75	10"	RCP	E	3.63	606.12	
453	5475	INL 4'	609.70	10"	RCP	W	3.75	605.95	
454			609.70	10"	RCP	E	3.60	606.10	
455	5476	INL 4'	610.54	8"	RCP	SE	4.55	605.99	
456									
457	5477	INL 4'	609.89	10"	RCP	W	3.40	606.49	
458			609.89	10"	RCP	E	3.40	606.49	
459	5478	INL 4'	610.85	8"	RCP	SE	4.02	606.83	

	A	B	C	D	E	F	G	H	I
460									
461	**5479**	INL 4'	**609.69**	10"	RCP	SW	2.85	**606.84**	
462									
463	**5480**	MH 6'	**611.01**	60"	RCP	S	16.07	**594.94**	
464			**611.01**	60"	RCP	N	13.95	**597.06**	
465			**611.01**	24"	RCP	NE	8.06	**602.95**	
466									
467	**5481**	BEEHIVE 4'	**608.45**	8"	RCP	SW	2.55	**605.90**	
468									
469	**5482**	MH 4'	**611.20**	24"	RCP	N	7.65	**603.55**	
470			**611.20**	24"	RCP	S	9.10	**602.10**	
471									
472	**5483**	INL 4'	**611.11**	10"	RCP	SW	4.25	**606.86**	
473									
474	**5484**	MH 4'	**611.10**	24"	RCP	S	6.74	**604.36**	
475			**611.10**	24"x42"	RCP	N	6.74	**604.36**	
476									
477	**5485**	MH 4'	**611.07**	15"	RCP	N	5.87	**605.20**	
478			**611.07**	8"	RCP	NW	5.63	**605.44**	
479									
480	**5486**	INL 4'	**610.93**	8"	RCP	SE	4.66	**606.27**	
481									
482	**5487**	INL 4'	**610.93**	8"	RCP	E	4.29	**606.64**	
483									
484	**5488**	INL 4'	**611.80**	8"	RCP	E	4.78	**607.02**	
485									
486	**5489**	MH 4'	**611.96**	18"	RCP	N	8.45	**603.51**	
487			**611.96**	15"	RCP	S	8.70	**603.26**	
488			**611.96**	8"	RCP	W	5.00	**606.95**	
489			**611.96**	6"	RCP	NE	4.55	**607.41**	
490									
491	**5490**	INL 4'	**611.87**	8"	RCP	SW	4.05	**607.82**	
492									
493	**5491**	MH 4'	**612.14**	18"	RCP	N	3.40	**608.74**	
494			**612.14**	21"	RCP	S	3.45	**608.69**	
495									
496	**5492**	BEEHIVE 4'	**611.06**	12"	RCP	SW	7.20	**603.86**	
497			**611.06**	12"	RCP	SE	7.20	**603.86**	
498									
499	**5493**	INL 2'	**611.18**	10:"	RCP	SW	1.97	**609.21**	
500									
501	**5494**	INL 4'	**611.17**	10"	RCP	NE	3.56	**607.61**	
502			**611.17**	24"	RCP	S	9.09	**602.08**	
503									
504	**5495**	MH 4'	**611.70**	8"	RCP	SW	3.92	**607.78**	
505									
506	**5496**	FES	**607.10**	24"	RCP				
507									
508	**5497**	BEEHIVE 4'	**606.04**	8"	RCP	NE	5.85	**600.19**	
509			**606.04**	42"	RCP	S	8.30	**597.74**	
510									

	A	B	C	D	E	F	G	H	I
511	**5498**	INL 2'	**611.17**	8"	RCP	SW	2.68	**608.49**	
512									
513	**5499**	BEEHIVE 4'	**606.65**	12"	RCP	SE	3.96	**602.69**	
514									
515	**5500**	INL 4'	**610.00**	10"	RCP	SE	4.04	**605.96**	
516			**610.00**	10"	RCP	N	2.71	**607.29**	
517			**610.00**	10"	RCP	S	4.12	**605.88**	
518			**610.00**	10"	RCP	W	3.90	**606.10**	
519									
520	**5501**	INL 2'	**610.41**	10"	RCP	S	3.12	**607.29**	
521									
522	**5502**	INL 2'	**610.08**	10"	RCP	E	3.41	**606.67**	
523									
524	**5503**	INL 2'	**609.50**	10"	RCP	E	2.63	**606.87**	
525									
526	**5504**	INL 2'	**609.58**	10"	RCP	N	3.07	**606.51**	
527			**609.58**	10"	RCP	W	2.92	**606.66**	
528									
529	**5505**	INL 2'	**611.23**	10"	RCP	W	4.10	**607.13**	
530									
531	**5506**	MH 4'	**610.11**	10"	RCP	W	4.20	**605.91**	
532			**610.11**	36"	CMP	S	4.20	**605.91**	
533									
534	**5507**	BEEHIVE 4'	**609.13**	18"	CMP	N	4.17	**604.96**	
535			**609.13**	24"	RCP	S	5.40	**603.73**	
536			**609.13**	12"	RCP	E	5.26	**603.87**	
537									
538	**5508**	INL 4'	**610.72**	24"	RCP	N	6.38	**604.34**	
539			**610.72**	24"	RCP	S	6.47	**604.25**	
540			**610.72**	12"	RCP	W	5.11	**605.61**	
541									
542	**5509**	MH 4'	**610.91**	8"	RCP	SE	3.94	**606.97**	
543									
544	**5510**	INL 4'	**611.46**	8"	RCP	E	4.32	**607.14**	
545									
546	**5511**	INL 4'	**610.99**	10"	RCP	W	4.17	**606.82**	
547									
548	**5512**	INL 4'	**611.02**	8"	RCP	W	4.22	**606.80**	
549									
550	**5513**	INL 4'	**608.72**	10"	RCP	W	2.82	**605.90**	
551									
552	**5514**	INL 2'	**609.03**	10"	RCP	W	2.40	**606.63**	
553									
554	**5515**	INL 2'	**609.20**	10"	RCP	W	3.35	**605.85**	
555									
556	**5516**	INL 2'	**610.91**	10"	RCP	W	3.52	**607.39**	
557									
558	**5517**	INV PIPE/HEADWALL	**594.41**	42"	RCP				
559									
560	**5518**	HEADWALL	**597.43**						
561	**5519**	HEADWALL	**598.47**						

	A	B	C	D	E	F	G	H	I
562	**5520**	HEADWALL	**597.04**						
563									
564	**5521**	MH 2'	**601.94**	2' SILT		SUMP	11.52	**590.42**	
565									
566	**5522**	MH JUNCTION BOX	**601.19**	72"	RCP	N	15.71	**585.48**	
567			**601.19**	72"	RCP	S	15.75	**585.44**	
568			**601.19**	12	RCP	NE	8.03	**593.16**	
569									
570	**5523**	BEEHIVE 4'	**599.24**	15"	RCP	S	3.73	**595.51**	
571									
572	**5524**	MH 4'	**600.73**	15"	RCP	N	5.38	**595.35**	
573			**600.73**	15"	RCP	S	5.25	**595.48**	
574			**600.73**	12"	RCP	E	3.30	**597.43**	
575			**600.73**	18"	RCP	W	5.48	**595.25**	
576									
577	**5525**	BEEHIVE 4'	**600.15**	15"	RCP	N	5.19	**594.96**	
578									
579	**5526**	BEEHIVE 4'	**597.42**	15"	RCP	S	2.95	**594.47**	
580									
581	**5527**	MH 4'	**598.78**	18"	RCP	E	4.95	**593.83**	
582			**598.78**	18'	RCP	W	5.10	**593.68**	
583			**598.78**	15"	RCP	N	4.90	**593.88**	
584									
585	**5528**	MH JUNCTION BOX	**601.50**	72"	RCP	N	16.40	**585.10**	
586			**601.50**	72"	RCP	S	16.40	**585.10**	
587			**601.50**	18"	RCP	E	7.30	**594.20**	
588									
589	**5529**	MH 4' GRATE	**601.37**	8"	RCP	SE	4.00	**597.37**	
590									
591	**5530**	BEEHIVE 4'	**595.90**	12"	CMP	SE	2.27	**593.63**	
592									
593	**5531**	MH 4'	**598.02**	12"	CMP	SE	2.27	**595.75**	
594			**598.02**	12"	CMP	NE	6.35	**591.67**	
595			**598.02**	15"	CMP	SE	6.61	**591.41**	
596			**598.02**	12"	CMP	NW	6.45	**591.57**	
597			**598.02**	6"	PVC	E	6.53	**591.49**	
598									
599	**5532**	BEEHIVE 4'	**594.43**	12"	CMP	SW	2.53	**591.90**	
600									
601	**5533**	MH 4'	**599.99**	6"	PVC	S	7.89	**592.10**	
602			**599.99**	6"	PVC	NW	7.68	**592.31**	
603									
604	**5534**	MH 4'	**601.74**	15"	RCP	NW	11.45	**590.29**	
605			**601.74**	12"	RCP	NW	8.30	**593.44**	
606			**601.74**	18"	RCP	SE	11.50	**590.24**	
607									
608	**5535**	INL 4'	**601.96**	8"	RCP	SW	4.37	**597.59**	
609									
610	**5536**	INL 2'	**604.42**	8"	RCP	SW	3.95	**600.47**	
611									
612	**5537**	INL 2'	**608.40**	8"	RCP	NW	3.92	**604.48**	

	A	B	C	D	E	F	G	H	I
613									
614	**5538**	MH 4'	**608.62**	12"	RCP	N	5.37	**603.25**	
615			**608.62**	12"	RCP	S	5.38	**603.24**	
616			**608.62**	8"	RCP	SE	4.91	**603.71**	
617									
618	**5539**	INL 4'	**612.65**	8"	RCP	SW	3.96	**608.69**	
619									
620	**5540**	INL 4'	**617.11**	8"	RCP	NW	4.26	**612.85**	
621									
622	**5541**	MH 4'	**617.33**	12"	RCP	N	5.41	**611.92**	
623			**617.33**	12"	RCP	S	5.57	**611.76**	
624			**617.33**	8"	RCP	SE	5.19	**612.14**	
625									
626	**5542**	INL 4'	**621.20**	10"	RCP	SW	3.76	**617.44**	
627									
628	**5543**	INL 4'	**627.28**	10"	RCP	W	4.95	**622.33**	
629									
630	**5544**	MH 4'	**626.16**	10"	RCP	E	4.31	**621.85**	
631			**626.16**	12"	RCP	S	4.55	**621.61**	
632									
633	**5545**	MH 4'	**625.13**	12"	RCP	S	5.00	**620.13**	
634			**625.13**	10"	RCP	W	4.57	**620.56**	
635									
636	**5546**	INL 4'	**625.43**	10"	RCP	E	4.09	**621.34**	
637									
638	**5547**	INL 2'	**620.68**	8"	RCP	NW	2.58	**618.10**	
639									
640	**5548**	MH 4'	**620.93**	10"	RCP	E	4.06	**616.87**	
641			**620.93**	8"	RCP	SE	2.88	**618.05**	
642									
643	**5549**	INL2'	**616.26**	8"	RCP	E	4.28	**611.98**	
644									
645	**5550**	MH 4'	**616.33**	12"	RCP	N	4.92	**611.41**	
646			**616.33**	12"	RCP	S	5.07	**611.26**	
647			**616.33**	10"	RCP	W	4.55	**611.78**	
648									
649	**5551**	INL 4'	**611.72**	8"	RCP	E	4.21	**607.51**	
650									
651	**5552**	INL 4'	**607.12**	8"	RCP	E	4.28	**602.84**	
652									
653	**5553**	MH 4'	**607.28**	12"	RCP	N	5.20	**602.08**	
654			**607.28**	12"	RCP	S	5.25	**602.03**	
655			**607.28**	8"	RCP	W	4.55	**602.73**	
656									
657	**5554**	INL 4'	**603.50**	8"	RCP	E	5.13	**598.37**	
658									
659	**5555**	INL 4'	**600.00**	8"	RCP	W	3.60	**596.40**	
660									
661	**5556**	MH CAN'T OPEN	**599.93**					**0.00**	
662									
663	**5557**	INL 4'	**599.17**	8"	RCP	W	5.20	**593.97**	

	A	B	C	D	E	F	G	H	I
664									
665	5558	INL 4'	598.45		FULL OF DIRT			0.00	
666									
667	5559	MH 4' GRATE	598.06	8"	RCP	SW	5.20	592.86	
668									
669	5560	INL 4'	599.10	12"	RCP	N	2.77	596.33	
670			599.10	12"	RCP	E	2.77	596.33	
671									
672	5561	INL 2'	599.08	12"	RCP	S	2.90	596.18	
673									
674	5562	BEEHIVE 4'	599.69		NO PIPES VISIBLE		7.77 SU	591.92	
675									
676	5563	MH 4'	599.35	12"	RCP	S	4.55	594.80	
677			599.35	12"	RCP	NE	4.42	594.94	
678									
679	5564	INL 2'	599.15	12"	RCP	SW	3.75	595.40	
680									
681	5565	MH 4'	600.05	8"	RCP	E	4.53	595.52	
682									
683	5566	INL 2'	609.79	10"	RCP	W	3.22	606.57	
684									
685	5567	MH JUNCTION BOX	609.10	42"	RCP	N	14.90	594.20	
686			609.10	42"	RCP	S	16.50	592.60	
687		PLATE COVERING MH IS BURIED BY 18" NO OTHER PIPES VISIBLE							
688									
689	5569	DROP BOX 2.5'x5'	594.55	30"	RCP	S	3.57	590.98	
690									
691	5570	DROP BOX 2.5'x5'	594.44	30"	RCP	N	4.04	590.40	
692			594.44	30"	RCP	W	3.57	590.87	
693									
694	5571	30" RCP	NA	30"	RCP			594.94	
695									
696	5572	MH JUNCTION BOX	599.97	54"	RCP	SE	13.00	586.97	
697			599.97	54"	RCP	NW	12.62	587.35	
698									
699	5573	MH 4'	599.80	48"	RCP	SW	10.80	589.00	
700			599.80	48"	RCP	NE	10.60	589.20	
701			599.80	24"	RCP	N	9.51	590.29	
702									
703	5574	BEEHIVE 2'	598.20	18"	RCP	NE	4.12	594.08	
704									
705	5575	INL 2'	601.02	10"	RCP	SW	2.45	598.57	
706									
707	5576	MH 4'	601.51	18"	RCP	N	9.06	592.45	
708			601.51	24"	RCP	S	9.90	591.61	
709			601.51	18"	RCP	SW	9.62	591.89	
710			601.51	10"	RCP	NE	5.40	596.11	
711									
712	5577	INL 4'	601.01	10"	RCP	NW	4.20	596.81	
713									
714	5578	MH 4'	601.72	18"	RCP	S	8.55	593.17	

	A	B	C	D	E	F	G	H	I
715			601.72	18"	RCP	N	8.35	593.37	
716			601.72	10"	RCP	SE	6.05	595.67	
717									
718	5579	BEEHIVE 4'	597.68	18"	RCP	S	4.09	593.59	
719									
720	5580	INL 4'	601.04	FILLED WITH DIRT				0.00	
721									
722	5581	INL 4'	601.12	FILLED WITH DIRT				0.00	
723									
724	5582	INL 2'	600.95	10"	RCP	SE	6.30	594.65	
725									
726	5583	MH 4'	600.46	48"	RCP	E	11.00	589.46	
727			600.46	48"	RCP	W	11.39	589.07	
728			600.46	24"	RCP	N	10.45	590.01	
729			600.46	15"	RCP	SW	9.12	591.34	
730									
731	5584	BEEHIVE 4'	596.37	15"	RCP	NE	4.48	591.89	
732									
733	5585	INL 4'	600.79	8"	RCP	SW	4.15	596.64	
734									
735	5586	INL 4'	600.83	8"	RCP	SW	4.20	596.63	
736									
737	5587	INL 4'	600.89	8"	RCP	N	2.76	598.13	
738									
739	5588	MH 4'	601.14	8"	RCP	S	3.53	597.61	
740			601.14	8"	RCP	SE	4.05	597.09	
741									
742	5589	MH 4'	599.98	48"	RCP	W	9.87	590.11	
743			599.98	30"	RCP	E	9.28	590.70	
744			599.98	8"	RCP	NW	5.19	594.79	
745			599.98	30"	RCP	N	9.70	590.28	
746									
747	5590	INL 4'	600.95	8"	RCP	SW	5.16	595.79	
748									
749	5591	MH 4'	601.34	30"	RCP	E	9.68	591.66	
750			601.34	30"	RCP	SW	9.85	591.49	
751			601.34	12"	RCP	S	7.92	593.42	
752									
753	5592	INL 4'	600.65	8"	RCP	NW	3.30	597.35	
754									
755	5593	INL 4'	600.83	10"	RCP	N	2.83	598.00	
756									
757	5594	INL 4'	600.39	6"	RCP	N	3.00	597.39	
758									
759	5595	MH 2'	601.06	6"	RCP	S	4.18	596.88	
760			601.06	8"	RCP	N	4.13	596.93	
761									
762	5596	INL 4'	599.86	12"	RCP	SW	2.80	597.06	
763									
764	5597	BEEHIVE 4'	597.14	12"	RCP	SW	3.65	593.49	
765			597.14	12"	RCP	NE	1.75	595.39	

	A	B	C	D	E	F	G	H	I
766									
767	**5598**	INL 4'	**601.12**	10"	RCP	NW	3.35	**597.77**	
768									
769	**5599**	MH 4'	**601.70**	30"	RCP	E	9.05	**592.65**	
770			**601.70**	30"	RCP	W	9.20	**592.50**	
771			**601.70**	15"	RCP	NE	7.95	**593.75**	
772			**601.70**	10"	RCP	SE	6.92	**594.78**	
773									
774	**5600**	INL4'	**601.28**	FULL OF	WATER		5.30	**595.98**	
775							SUMP		
776	**5601**	MH 4'	**601.41**	30"	RCP	E	9.80	**591.61**	
777			**601.41**	24"	RCP	W	9.35	**592.06**	
778			**601.41**	30"	RCP	S	9.85	**591.56**	
779			**601.41**	10"	RCP	E	5.40	**596.01**	
780									
781	**5602**	MH 4'	**601.34**	24"	RCP	E	7.87	**593.47**	
782			**601.34**	12"	RCP	NW	3.88	**597.46**	
783			**601.34**	18"	RCP	N	7.77	**593.57**	
784									
785	**5603**	INL 4'	**601.12**	12"	RCP	SE	3.40	**597.72**	
786									
787	**5604**	MH 4'	**602.37**	15"	RCP	SW	6.85	**595.52**	
788			**602.37**	12"	RCP	E	6.85	**595.52**	
789			**602.37**	10"	RCP	SE	6.85	**595.52**	
790									
791	**5605**	INL 2'	**601.27**	10"	RCP	NW	3.65	**597.62**	
792									
793	**5606**	INL 2'	**601.72**	12"	RCP	S	4.25	**597.47**	
794			**601.72**	12"	RCP	NE	3.80	**597.92**	
795									
796	**5607**	INL 2'	**601.27**	10"	RCP	E	2.50	**598.77**	
797									
798	**5608**	INL 4'	**601.42**	12"	RCP	W	3.20	**598.22**	
799			**601.42**	10"	RCP	SE	3.45	**597.97**	
800									
801	**5609**	MH	**601.87**		CAN'T	OPEN		**0.00**	
802									
803	**5610**	INL 2'	**602.60**	12"	RCP	S	2.55	**600.05**	
804									
805	**5611**	BEEHIVE 4'	**603.06**	15"	RCP	W	5.36	**597.70**	
806									
807	**5612**	MH 4'	**603.23**	18"	RCP	SW	8.45	**594.78**	
808			**603.23**	12"	RCP	SE	8.75	**594.48**	
809									
810	**5613**	MH 4'	**603.15**	12"	RCP	NW	8.15	**595.00**	
811			**603.15**	12"	RCP	E	8.15	**595.00**	
812									
813	**5614**	MH 4'	**603.29**	18"	RCP	S	9.04	**594.25**	
814			**603.29**	18"	RCP	NE	8.85	**594.44**	
815			**603.29**	12"	RCP	NNE	4.05	**599.24**	
816									

	A	B	C	D	E	F	G	H	I
817	**5615**	MH 4'	**603.10**	12"	RCP	SW	3.60	**599.50**	
818			**603.10**	10"	RCP	NE	3.75	**599.35**	
819			**603.10**	12"	RCP	N	3.90	**599.20**	
820									
821	**5616**	MH 4'	**606.32**	24"	RCP	S	13.70	**592.62**	
822			**606.32**	18"	RCP	SW	13.70	**592.62**	
823			**606.32**	15"	RCP	NW	13.68	**592.64**	
824			**606.32**	12"	RCP	N	6.05	**600.27**	
825									
826	**5617**	INL 2'	**606.74**	15"	RCP	SE	4.75	**601.99**	
827			**606.74**	12"	RCP	N	6.80	**599.94**	
828			**606.74**	24"	CMP	SE	6.90	**599.84**	
829									
830	**5618**	INL 2'	**605.94**	12"	PVC	W	2.35	**603.59**	
831									
832	**5619**	INL 4'	**606.75**	24"	CMP	SE	6.00	**600.75**	
833			**606.75**	10"	RCP	N	5.60	**601.15**	
834									
835	**5620**	INL 2'	**606.71**	12"	RCP	SW	2.40	**604.31**	
836									
837	**5621**	INL 2'	**606.57**	12"	RCP	SE	1.80	**604.77**	
838									
839	**5622**	INL 2'	**607.68**	12"	RCP	S	2.68	**605.00**	
840									
841	**5623**	INL 4'	**594.84**	8"	RCP	SE	5.50	**589.34**	
842									
843	**5624**	INL 4'	**595.60**	8"	RCP	E	5.26	**590.34**	
844									
845	**5625**	INL 4'	**595.52**	8"	RCP	E	5.50	**590.02**	
846									
847	**5626**	INL 4'	**595.57**	8"	RCP	E	5.07	**590.50**	
848									
849	**5627**	INL 4'	**595.44**	8"	RCP	E	5.05	**590.39**	
850									
851	**5628**	INL 4'	**595.65**	8"	RCP	E	5.21	**590.44**	
852									
853	**5629**	INL 4'	**595.52**	8"	RCP	E	5.29	**590.23**	
854									
855	**5630**	INL 4'	**595.52**	8"	RCP	E	5.41	**590.11**	
856									
857	**5631**	INL 4'	**595.70**	8"	RCP	E	5.29	**590.41**	
858									
859	**5632**	INL 4'	**596.11**	8"	RCP	E	5.81	**590.30**	
860									
861	**5633**	INL 2'	**596.04**	8"	RCP	E	2.38	**593.66**	
862									
863	**5634**	MH 6'	**596.88**	8"	RCP	W	3.84	**593.04**	
864			**596.88**	60"	RCP	N	12.47	**584.41**	
865			**596.88**	60"	RCP	S	12.49	**584.39**	
866									
867	**5635**	INL 4'	**595.59**	15"	RCP	S	3.95	**591.64**	

	A	B	C	D	E	F	G	H	I
868									
869	**5636**	INL 4'	**595.45**	8"	RCP	E	3.57	**591.88**	
870									
871	**5637**	INL 4'	**595.36**	10"	RCP	E	5.02	**590.34**	
872									
873	**5638**	INL 4'	**595.25**	10"	RCP	SE	5.73	**589.52**	
874									
875	**5639**	BEEHIVE 2'	**595.12**	8"	RCP	E	5.40	**589.72**	
876			**595.12**	8"	RCP	W	3.15	**591.97**	
877									
878	**5640**	MH 6'	**595.57**	18"	RCP	N	8.25	**587.32**	
879			**595.57**	18"	RCP	S	8.35	**587.22**	
880			**595.57**	18"	RCP	E	8.15	**587.42**	
881									
882	**5641**	INL 2'	**595.26**	8"	RCP	SW	2.57	**592.69**	
883									
884	**5642**	MH 4'	**595.77**	8"	RCP	NE	2.90	**592.87**	
885			**595.77**	12"	RCP	N	8.71	**587.06**	
886									
887	**5643**	INL 4'	**595.32**	10"	RCP	E	6.45	**588.87**	
888									
889	**5644**	INL 2'	**595.32**	10"	RCP	S	3.35	**591.97**	
890									
891	**5645**	MH 4'	**595.33**	10"	RCP	N	5.35	**589.98**	
892			**595.33**	12"	RCP	E	5.70	**589.63**	
893									
894	**5646**	INL 2'	**595.21**		SUMP		4.30	**590.91**	
895									
896	**5647**	MH 4'	**595.61**	18"	RCP	N	5.63	**589.98**	
897			**595.61**	8"	RCP	S	5.20	**590.41**	
898									
899	**5648**	MH 4'	**595.65**	8"	RCP	N	5.67	**589.98**	
900			**595.65**	10"	RCP	W	4.30	**591.35**	
901									
902	**5649**	INL 2'	**595.09**	10"	RCP	E	3.27	**591.82**	
903									
904	**5650**	MH 4'	**595.75**	8"	RCP	E	4.52	**591.23**	
905									
906	**5651**	MH 4'	**594.42**	8"	RCP	N	6.03	**588.39**	
907			**594.42**	18"	RCP	S	7.62	**586.80**	
908									
909	**5652**	MH 4'	**595.01**	10"	RCP	W	4.35	**590.66**	
910			**595.01**	8"	RCP	S	5.10	**589.91**	
911									
912	**5653**	INL 2'x2'	**594.33**	10"	RCP	E	3.08	**591.25**	
913									
914	**5654**	MH 4'	**595.10**	8"	RCP	W	4.05	**591.05**	
915			**595.10**	8"	RCP	W	5.70	**589.40**	
916									
917	**5655**	INL 2'	**594.60**			SUMP	3.65	**590.95**	
918									

	A	B	C	D	E	F	G	H	I
919	**5656**	MH 4'	**594.78**	10"	RCP	W	3.30	**591.48**	
920			**594.78**	10"	RCP	E	5.65	**586.14**	
921									
922	**5657**	INL 2'	**594.22**	10"	RCP	E	2.60	**591.62**	
923									
924	**5658**	INL 2'	**593.84**	8"	RCP	E	3.00	**590.84**	
925									
926	**5659**	MH 4'	**594.18**	10"	RCP	W	5.44	**588.74**	
927			**594.18**	8"	RCP	W	4.40	**589.78**	
928									
929	**5674**	INL 4'	**594.16**	8"	RCP	E	5.03	**589.13**	
930									
931	**5675**	INL 4'	**594.51**	8"	RCP	E	5.21	**589.30**	
932									
933	**5676**	INL 4'	**594.74**	8"	RCP	E	5.31	**589.43**	
934									
935	**5715**	INL 4'	**612.70**	8"	RCP	NE	4.88	**607.82**	
936									
937	**5716**	INL 4'	**613.49**	8"	RCP	NE	5.60	**607.89**	
938									
939	**5717**	MH 4'	**614.14**	18"	RCP	N	9.05	**605.09**	
940			**614.14**	18"	RCP	S	12.00	**602.14**	
941			**614.14**	24"	RCP	W	13.00	**601.14**	
942			**614.14**	8"	RCP	SE	4.80	**609.34**	
943			**614.14**	8"	RCP	SW	7.25	**606.89**	
944									
945	**5718**	INL 4'	**614.27**			SUMP	4.50	**609.77**	
946			NO PIPES VISIBLE						
947	**5719**	INL 4'	**615.40**	8"	RCP	SE	4.40	**611.00**	
948									
949	**5720**	MH 4'	**616.02**	12"	RCP	E	5.60	**610.42**	
950			**616.02**	8"	RCP	E	2.23	**613.79**	
951									
952	**5721**	INL 2'	**616.03**	8"	RCP	W	1.74	**614.29**	
953									
954	**5722**	INL 2'	**616.87**	18"	RCP	W	2.15	**614.72**	
955									
956	**5723**	MH 4'	**616.93**	10"	RCP	E	2.90	**614.03**	
957			**616.93**	12"	RCP	SE	5.63	**611.30**	
958									
959	**5724**	MH 4'	**617.76**	15"	RCP	N	4.65	**613.11**	
960			**617.76**	18"	RCP	S	4.50	**613.26**	
961									
962	**5725**	MH 4'	**617.14**	12"	RCP	E	3.20	**613.94**	
963									
964	**5726**	INL 2'	**616.77**	12"	RCP	W	2.90	**613.87**	
965									
966	**5727**	INL 4'	**617.12**	8"	RCP	N	4.20	**612.92**	
967									
968	**5728**	MH 4'	**617.38**	15"	RCP	N	5.85	**611.53**	
969			**617.38**	15"	RCP	S	5.70	**611.68**	

	A	B	C	D	E	F	G	H	I
970			**617.38**	8"	RCP	E	5.38	**612.00**	
971									
972	**5729**	INL 4'	**617.09**	8"	RCP	NE	5.36	**611.73**	
973									
974	**5795**	MH 4' BEEHIVE	**594.61**	10"	RCP	W	6.85	**587.76**	
975			**594.61**	10"	RCP	E	5.20	**589.41**	
976									
977	**5796**	MH JUNCTION BOX	**596.15**	72"	RCP	N	12.15	**584.00**	
978			**596.15**	72"	RCP	S	12.30	**583.85**	
979								**0.00**	
980	**5798**	MH JUNCTION BOX	**609.02**	48"	RCP	N	15.35	**593.67**	
981			**609.02**	48"	RCP	SW	15.32	**593.70**	
982									
983	**5799**	BEEHIVE 4'	**595.86**	18"	RCP	E	3.20	**592.66**	
984									
985	**5857**	INL 4'	**617.16**	8"	RCP	NW	511.00	**106.16**	
986									
987	**5858**	MH 4'	**617.58**	54"	RCP	N	18.32	**599.26**	
988			**617.58**	54"	RCP	S	18.30	**599.28**	
989			**617.58**	24"	RCP	E	9.95	**607.63**	
990			**617.58**	12"	RCP	W	6.70	**610.88**	
991									
992	**5859**	SAN MH	**617.57**					**617.57**	
993									
994	**5860**	INL 2'	**617.42**	8"	RCP	SE	6.35	**611.07**	
995			**617.42**	10"	RCP	SW	3.05	**614.37**	
996									
997	**5861**	INL 4'	**617.12**	12"	RCP	SW	2.37	**614.75**	
998									
999	**5862**	INL 2'	**617.06**	12"	RCP	SE	2.38	**614.68**	
1000									
1001	**5863**	MH 4'	**617.30**	12"	RCP	NW	2.65	**614.65**	
1002			**617.30**	12"	RCP	SW	5.16	**612.14**	
1003									
1004	**5864**	INL 2'	**616.74**	10"	RCP	SE	2.96	**613.78**	
1005									
1006	**5865**	MH 4'	**616.92**	10"	RCP	NW	3.10	**613.82**	
1007			**616.92**	10"	RCP	SW	5.95	**610.97**	
1008									
1009	**5866**	MH 4	**608.18**	12"	RCP	SE	3.65	**604.53**	
1010			**608.18**	12"	RCP	N	3.60	**604.58**	
1011									
1012	**5867**	MH 4'	**617.50**	54"	RCP	N	19.00	**598.50**	
1013			**617.50**	54"	RCP	S	18.78	**598.72**	
1014			**617.50**	10"	RCP	W	7.02	**610.48**	
1015									
1016	**5868**	INL 2'	**616.55**	12"	RCP	SE	3.56	**612.99**	
1017									
1018	**5869**	MH 4'	**616.71**	12"	RCP	NW	4.05	**612.66**	
1019			**616.71**	12"	RCP	SW	5.37	**611.34**	
1020									

	A	B	C	D	E	F	G	H	I
1021	**5870**	INL 2'	**615.93**	12"	RCP	SW	3.60	**612.33**	
1022									
1023	**5871**	INL 2'	**614.83**	12"	RCP	NW	3.19	**611.64**	
1024			**614.83**	12"	RCP	SE	3.30	**611.53**	
1025									
1026	**5872**	MH 4' BEEHIVE	**615.13**	12"	RCP	NW	3.50	**611.63**	
1027			**615.13**	12"	RCP	SW	5.40	**609.73**	
1028									
1029	**5873**	INL 4'	**613.92**	8"	RCP	NW	5.29	**608.63**	
1030									
1031	**5874**	MH 2' GRATE	**614.86**	NO PIPES	VISIBLE	SUMP	6.35	**608.51**	
1032									
1033	**5875**	MH 4'	**613.97**	54"	RCP	N	16.05	**597.92**	
1034			**613.97**	54'	RCP	S	16.00	**597.97**	
1035			**613.97**	10"	RCP	SE	6.60	**607.37**	
1036									
1037	**5876**	INL 4'	**613.25**	10"	RCP	NW	5.66	**607.59**	
1038									
1039	**5877**	INL 4'	**612.40**	10"	RCP	SW	5.52	**606.88**	
1040									
1041	**5878**	FES	**610.03**	15"	RCP	N	0.00	**610.03**	
1042									
1043								**0.00**	
1044								**0.00**	
1045								**0.00**	
1046								**0.00**	
1047								**0.00**	
1048								**0.00**	
1049								**0.00**	
1050								**0.00**	
1051								**0.00**	
1052								**0.00**	
1053								**0.00**	
1054								**0.00**	
1055								**0.00**	
1056								**0.00**	
1057								**0.00**	
1058								**0.00**	
1059								**0.00**	
1060								**0.00**	
1061								**0.00**	
1062								**0.00**	
1063								**0.00**	
1064								**0.00**	
1065								**0.00**	
1066								**0.00**	
1067								**0.00**	
1068								**0.00**	
1069								**0.00**	
1070								**0.00**	
1071								**0.00**	

	A	B	C	D	E	F	G	H	I
1	**Point**	Description	**Rim**	Pipe Size	Type	Direction	Measure	**Invert**	Flow
2	BELVINA WATERSHED								
3	**5730**	INL 4'	**617.51**	12"	RCP	NE	4.87	**612.64**	
4									
5	**5731**	BEEHIVE 2'	**616.43**	12"	RCP	NW	3.98	**612.45**	
6									
7	**5732**	MH 4'	**618.26**	15"	RCP	N	8.55	**609.71**	
8			**618.26**	15"	RCP	S	8.25	**610.01**	
9			**618.26**	18"	RCP	W	8.95	**609.31**	
10									
11	**5733**	INL 4'	**617.22**	10"	RCP	SE	4.97	**612.25**	
12									
13	**5734**	INL 4'	**617.21**	10"	RCP	SE	5.90	**611.31**	
14									
15	**5735**	MH 4'	**617.54**	15"	RCP	N	6.09	**611.45**	
16			**617.54**	15"	RCP	S	6.14	**611.40**	
17									
18	**5736**	INL 2'	**617.30**	10"	RCP	SW	5.04	**612.26**	
19									
20	**5737**	INL 4'	**617.07**	10"	RCP	SE	4.20	**612.87**	
21									
22	**5738**	INL 2'	**616.94**	10"	RCP	SE	3.35	**613.59**	
23									
24	**5739**	MH 4'	**617.60**	18"	RCP	N	6.35	**611.25**	
25			**617.60**	15"	RCP	S	5.03	**612.57**	
26									
27	**5740**	INL 2'	**617.02**	8"	RCP	NE	4.60	**612.42**	
28									
29	**5741**	INL 2'	**616.98**	8"	RCP	NW	7.60	**609.38**	
30			**616.98**	8"	RCP	SW	7.60	**609.38**	
31									
32	**5742**	MH 4'	**617.11**	18"	RCP	S	7.45	**609.66**	
33			**617.11**	18"	RCP	N	7.70	**609.41**	
34									
35	**5743**	MH 4'	**617.25**	8"	RCP	NW	4.82	**612.43**	
36									
37	**5744**	MH 4'	**617.33**	8"	RCP	NW	5.14	**612.19**	
38									
39	**5745**	**MH 4'**	**618.33**	**18"**	RCP	**N**	9.8	**608.53**	
40			**618.33**	**18"**	RCP	**S**	10.68	**607.65**	
41			**618.33**	**24"**	RCP	**E**	14.13	**604.20**	
42			**618.33**	**36"**	RCP	**W**	14.02	**604.31**	
43									
44	**5746**	MH 4'	**617.76**	8"	RCP	S	5.36	**612.40**	
45									
46	**5747**	INL 4'	**617.78**	10"	RCP	S	4.93	**612.85**	
47									
48	**5748**	MH 4'	**618.05**	15"	RCP	N	7.42	**610.63**	
49			**618.05**	18"	RCP	S	7.48	**610.57**	
50									
51	**5749**	MH 4'	**617.98**	12"	RCP	SW	4.67	**613.31**	
52									
53	**5750**	MH 4'	**618.14**	10"	RCP	SW	5.03	**613.11**	
54									
55	**5751**	BEEHIVE 4'	**618.72**	10"	RCP	SW	4.85	**613.87**	
56									

	A	B	C	D	E	F	G	H	I
1	**Point**	Descripition	**Rim**	Pipe Size	Type	Direction	Measure	**Invert**	Flow
57	**5752**	MH 4'	**618.97**	15"	RCP	N	7.05	**611.92**	
58			**618.97**	15"	RCP	S	6.75	**612.22**	
59									
60	**5753**	INL 4'	**618.37**	12"	RCP	NE	5.22	**613.15**	
61									
62	**5754**	INL 4'	**618.30**	10"	RCP	E	4.73	**613.57**	
63									
64	**5755**	INL 4'	**618.30**	8"	RCP	NE	4.62	**613.68**	
65									
66	**5756**	MH 4'	**618.98**	24"	RCP	N	8.76	**610.22**	
67			**618.98**	18"	RCP	S	8.78	**610.20**	
68									
69	**5757**	INL 4'	**618.20**	8"	RCP	NE	3.80	**614.40**	
70									
71	**5758**	BEEHIVE 4'	**618.36**	6"	CMP	E	3.55	**614.81**	
72									
73	**5759**	INL 4'	**618.37**	NO PIPES	VISIBLE	SUMP	4.87	**613.50**	
74									
75	**5760**	INL 4'	**618.49**	10"	RCP	E	4.65	**613.84**	
76									
77	**5761**	MH 4'	**619.15**	NO PIPES	VISIBLE	SUMP	2.45	**616.70**	
78									
79	**5762**	INL 4'	**618.66**	10"	RCP	E	4.12	**614.54**	
80									
81	**5763**	INL 4'	**618.41**	NO PIPES	VISIBLE	SUMP	8.60	**609.81**	
82									
83	**5764**	MH 4'	**618.63**	15"	RCP	S	6.20	**612.43**	
84			**518.63**	12"	RCP	N	5.57	**513.06**	
85									
86	**5765**	BEEHIVE4'	**618.01**	NO PIPES	VISIBLE	SUMP	7.10	**610.91**	
87									
88	**5766**	INL 4'	**618.17**	8"	RCP	NE	4.41	**613.76**	
89									
90	**5767**	INL 4'	**618.22**	8"	RCP	NE	5.53	**612.69**	
91									
92	**5768**	INL 4'	**618.21**	NO PIPES	VISIBLE	SUMP	4.90	**613.31**	
93									
94	**5769**	INL 4'	**618.37**	8"	RCP	NW	4.96	**613.41**	
95									
96	**5770**	MH 4'	**619.02**	15"	RCP	W	6.52	**612.50**	
97									
98	**5771**	MH 4'	**619.01**	24"	RCP	W	11.62	**607.39**	
99			**619.01**	18"	RCP	N	11.60	**607.41**	
100			**619.01**	18"	RCP	S	11.55	**607.46**	
101			**619.01**	10"	RCP	S	8.22	**610.79**	
102									
103	**5772**	INL 4'	**618.46**	12"	RCP	E	5.00	**613.46**	
104									
105	**5773**	INL 4'	**618.46**	8"	RCP	E	4.90	**613.56**	
106									
107	**5774**	INL 4'	**618.74**	8"	RCP	E	4.95	**613.79**	
108									
109	**5775**	INL 4'	**618.69**	8"	RCP	E	4.67	**614.02**	
110									
111	**5776**	INL 4'	**618.63**	8"	RCP	E	4.82	**613.81**	

	A	B	C	D	E	F	G	H	I
1	**Point**	Descripition	**Rim**	Pipe Size	Type	Direction	Measure	**Invert**	Flow
112									
113	**5777**	INL 4'	**618.96**	8'	RCP	E	4.50	**614.46**	
114									
115	**5778**	INL 4'	**618.96**	8"	RCP	SW	4.38	**614.58**	
116									
117	**5779**	BEEHIVE 4'	**618.56**	6"	DIP	NW	3.80	**614.76**	
118									
119	**5780**	INL 4'	**618.97**	10"	RCP	SE	3.74	**615.23**	
120									
121	**5781**	INL 4'	**619.14**	8"	RCP	NE	4.80	**614.34**	
122									
123	**5782**	MH 4'	**619.61**	15"	RCP	N	5.55	**614.06**	
124			**619.61**	15"	RCP	S	5.50	**614.11**	
125									
126	**5783**	BEEHIVE 4'	**619.58**	NO PIPES	VISIBLE	SUMP	7.06	**612.52**	
127									
128	**5784**	INL 4'	**619.28**	8"	RCP	E	5.00	**614.28**	
129									
130	**5785**	INL 4'	**619.44**	10"	RCP	SE	5.00	**614.44**	
131									
132	**5786**	INL 2'	**619.24**	8"	DIP	E	2.02	**617.22**	
133									
134	**5787**	MH 4'	**620.01**	8"	RCP	W	3.10	**616.91**	
135			**620.01**	8"	RCP	SE	5.85	**614.16**	
136									
137	**5788**	MH 4'	**619.67**	NO PIPES	VISIBLE	SUMP	5.10	**614.57**	
138									
139	**5789**	INL 4'	**618.34**	10"	RCP	N	2.85	**615.49**	
140									
141	**5790**	INL 4'	**618.66**	10"	RCP	SW	3.14	**615.52**	
142									
143	**5791**	MH 4'	**619.07**	12"	RCP	SE	3.37	**615.70**	
144			**619.07**	12"	RCP	N	3.90	**615.17**	
145									
146	**5792**	MH 4'	**619.12**	12"	RCP	N	3.83	**615.29**	
147									
148	**5793**	MH 4'	**619.38**	8"	RCP	SE	3.25	**616.13**	
149			**619.38**	30" SQ	RCP	E	4.75	**614.63**	
150			**619.38**	30" SQ	RCP	W	4.25	**615.13**	
151									
152	**5794**	MH 4'	**619.15**	30" SQ	RCP	E	4.05	**615.10**	
153			**619.15**	30" SQ	RCP	W	4.20	**614.95**	
154									
155	**5800**	INL 2'	**618.23**	12"	RCP	W	2.80	**615.43**	
156									
157	**5801**	INL 2'	**618.99**	NO PIPES	VISIBLE	SUMP	9.00	**609.99**	
158									
159	**5802**	MH 4'	**619.34**	10"	RCP	S	6.07	**613.27**	
160			**619.34**	10"	RCP	NW	5.72	**613.62**	
161									
162	**5803**	BEEHIVE 4'	**618.84**	10"	RCP	SE	4.65	**614.19**	
163			**618.84**	10"	RCP	N	4.70	**614.14**	
164									
165	**5804**	INL 4'	**619.31**	4"	DIP	SE	1.76	**617.55**	
166			**619.31**	10'	RCP	SW	5.07	**614.24**	

	A	B	C	D	E	F	G	H	I
1	**Point**	Descripition	**Rim**	Pipe Size	Type	Direction	Measure	**Invert**	Flow
167									
168	**5805**	INL 4'	**619.34**	10"	RCP	SW	5.68	**613.66**	
169									
170	**5806**	MH 4'	**620.11**	21"	RCP	E	8.50	**611.61**	
171			**620.11**	18"	RCP	N	8.84	**611.27**	
172			**620.11**	24"	RCP	S	9.52	**610.59**	
173									
174	**5807**	INL 4'	**619.09**	10"	RCP	SW	5.18	**613.91**	
175									
176	**5808**	INL 2'	**619.10**	10"	RCP	SW	4.94	**614.16**	
177									
178	**5809**	INL 4'	**618.91**	10"	RCP	SW	5.00	**613.91**	
179									
180	**5810**	INL 4'	**618.76**	10"	RCP	SW	5.38	**613.38**	
181									
182	**5811**	MH 4'	**619.43**	27"	RCP	N	10.65	**608.78**	
183			**619.43**	27"	RCP	S	10.90	**608.53**	
184									
185	**5812**	INL 4'	**618.50**	10"	RCP	SW	5.15	**613.35**	
186									
187	**5813**	INL 4'	**618.42**	10"	RCP	W	4.84	**613.58**	
188									
189	**5814**	MH 4'	**619.52**	30"	RCP	N	11.60	**607.92**	
190			**619.52**	10"	RCP	S	11.70	**607.82**	
191			**619.52**	10"	RCP	NW	5.83	**613.69**	
192									
193	**5815**	INL 4'	**618.63**	10"	RCP	SW	4.68	**613.95**	
194									
195	**5816**	INL 4'	**618.55**	10"	RCP	SW	4.72	**613.83**	
196									
197	**5817**	INL 4'	**618.96**	30"	RCP	N	12.05	**606.91**	
198			**618.96**	30"	RCP	S	12.05	**606.91**	
199			**618.96**	6"	PVC	NW	4.20	**614.76**	
200									
201	**5818**	INL 4'	**618.56**	10"	RCP	S	5.60	**612.96**	
202									
203	**5819**	INL 4'	**618.49**	10"	RCP	S	5.10	**613.39**	
204			**618.49**	10"	RCP	N	5.10	**613.39**	
205									
206	**5820**	MH 4'	**618.99**	30"	RCP	N	12.93	**606.06**	
207			**618.99**	39"	RCP	S	13.63	**605.36**	
208			**618.99**	24"	RCP	E	12.32	**606.67**	
209									
210	**5821**	INL 4'	**618.28**	10"	RCP	S	5.00	**613.28**	
211									
212	**5822**	MH 4'	**618.92**	6"	RCP	N	5.50	**613.42**	
213			**618.92**	6"	RCP	S	5.45	**613.47**	
214									
215	**5823**	INL 4'	**618.34**	10"	RCP	S	5.15	**613.19**	
216									
217	**5824**	MH 4'	**618.66**	39"	RCP	N	13.50	**605.16**	
218			**618.66**	39"	RCP	S	13.50	**605.16**	
219									
220	**5825**	INL 4'	**618.07**	10"	RCP	S	5.08	**612.99**	
221									

	A	B	C	D	E	F	G	H	I
1	**Point**	Description	**Rim**	Pipe Size	Type	Direction	Measure	**Invert**	Flow
222	**5826**	INL 4'	**618.36**	10"	RCP	SW	5.00	**613.36**	
223									
224	**5827**	MH 4' GRATE	**619.08**	12"	RCP	N	5.60	**613.48**	
225			**619.08**	15"	RCP	S	5.62	**613.46**	
226			**619.08**	10"	RCP	W	5.65	**613.43**	
227			**619.08**	10"	RCP	E	5.97	**613.11**	
228									
229	**5828**	INL 4'	**618.43**	10"	RCP	W	4.80	**613.63**	
230									
231	**5829**	MH 4'	**619.16**	15"	RCP	N	5.46	**613.70**	
232			**619.16**	12"	RCP	S	5.12	**614.04**	
233									
234	**5830**	INL 4'	**618.43**	8"	RCP	SW	4.63	**613.80**	
235									
236	**5831**	MH 4'	**618.69**	8"	RCP	N	7.37	**611.32**	
237			**618.69**	8"	RCP	S	7.35	**611.34**	
238			**618.69**	6"	RCP	NW	6.40	**612.29**	
239									
240	**5832**	INL 4'	**618.43**	8"	RCP	SW	4.78	**613.65**	
241									
242	**5833**	INL 4'	**618.22**	8"	RCP	SW	4.67	**613.55**	
243									
244	**5834**	MH 4'	**618.51**	39"	RCP	N	15.02	**603.49**	
245			**618.51**	48"	RCP	S	15.85	**602.66**	
246									
247	**5835**	INL 4'	**618.31**	10"	RCP	SW	4.82	**613.49**	
248									
249	**5836**	INL 4'	**618.25**	10"	RCP	SW	3.90	**614.35**	
250									
251	**5837**	MH 4'	**619.20**	48"	RCP	N	16.55	**602.65**	
252			**619.20**	48"	RCP	S	16.55	**602.65**	
253			**619.20**	6"	RCP	W	6.83	**612.37**	
254									
255	**5838**	INL 4'	**618.12**	8"	RCP	SW	4.63	**613.49**	
256									
257	**5839**	INL 4'	**618.31**	8"	RCP	SW	5.02	**613.29**	
258									
259	**5840**	MH 4'	**619.06**	48'	RCP	N	17.22	**601.84**	
260			**619.06**	54"	RCP	S	17.00	**602.06**	
261			**619.06**	12"	RCP	NW	11.53	**607.53**	
262			**619.06**	10"	RCP	SW	6.60	**612.46**	
263									
264	**5841**	INL 4'	**618.20**	10"	RCP	SW	4.95	**613.25**	
265									
266	**5842**	INL 4'	**617.90**	10"	RCP	SW	4.65	**613.25**	
267									
268	**5843**	MH 4'	**618.34**	54"	RCP	N	16.85	**601.49**	
269			**618.34**	54"	RCP	S	16.73	**601.61**	
270			**618.34**	18"	RCP	W	11.53	**606.81**	
271									
272	**5844**	INL 4'	**617.55**	NO PIPES	VISIBLE	SUMP	8.22	**609.33**	
273									
274	**5845**	INL 4'	**617.63**	10"	RCP	SW	6.64	**610.99**	
275									
276	**5846**	INL 4'	**617.10**	10"	RCP	S	4.97	**612.13**	

	A	B	C	D	E	F	G	H	I
1	**Point**	Descripition	**Rim**	Pipe Size	Type	Direction	Measure	**Invert**	Flow
277									
278	**5847**	INL 4'	**616.98**	10"	RCP	S	4.42	**612.56**	
279									
280	**5848**	MH 4'	**617.52**	10"	RCP	SE	6.25	**611.27**	
281			**617.52**	10"	RCP	SW	3.95	**613.57**	
282									
283	**5849**	INL 4'	**616.95**	10"	RCP	SW	4.42	**612.53**	
284									
285	**5850**	INL 4'	**617.22**	10"	RCP	SW	5.18	**612.04**	
286									
287	**5851**	INL 4'	**616.69**	54"	RCP	N	16.45	**600.24**	
288			**616.69**	54"	RCP	S	16.45	**600.24**	
289									
290	**5852**	INL 4'	**616.90**	10"	RCP	SW	5.10	**611.80**	
291									
292	**5853**	INL 4'	**616.69**	10"	RCP	S	5.39	**611.30**	
293									
294	**5854**	INL 4'	**617.04**	10"	RCP	S	5.05	**611.99**	
295									
296	**5855**	INL 4'	**616.98**	8"	RCP	S	5.38	**611.60**	
297									
298	**5856**	INL 4'	**617.27**	8"	RCP	SW	5.48	**611.79**	
299									
300	**5879**	MH 4'	**618.01**	48"	RCP	E	13.50	**604.51**	
301			**618.01**	48"	RCP	W	13.40	**604.61**	
302									
303	**5880**	SAN MH	**617.75**					**0.00**	
304									
305	**5881**	INL 4'	**618.03**	15"	RCP	N	6.10	**611.93**	
306									
307	**5882**	INL 4'	**617.21**	15"	RCP	N	7.08	**610.13**	
308									
309	**5883**	SAN MH	**618.14**					**0.00**	
310									
311	**5884**	INL 4'	**617.29**	48"	RCP	E	5.19	**612.10**	
312									
313	**5885**	MH 4'	**618.05**	48"	RCP	E	14.30	**603.75**	
314			**618.05**	48"	RCP	W	14.10	**603.95**	
315			**618.06**	12"	RCP	SE	7.48	**610.58**	
316			**618.06**	24"	RCP	N	12.50	**605.56**	
317									
318	**5886**	INL 4'	**617.26**	10"	RCP	E	5.17	**612.09**	
319									
320	**5887**	INL 4'	**617.16**	10"	RCP	E	5.10	**612.06**	
321									
322	**5888**	MH 4'	**617.64**	48"	RCP	N	16.64	**601.00**	
323			**617.64**	48"	RCP	S	17.00	**600.64**	
324			**617.64**	48"	RCP	E	14.92	**602.72**	
325			**617.64**	48"	RCP	W	15.51	**602.13**	
326									
327	**5889**	MH 4'	**617.50**	27"	RCP	E	13.45	**604.05**	
328			**617.50**	27"	RCP	W	13.28	**604.22**	
329			**617.50**	10"	RCP	NW	6.54	**610.96**	
330									
331	**5890**	INL 4'	**616.75**	10"	RCP	SE	5.09	**611.66**	

	A	B	C	D	E	F	G	H	I
1	**Point**	Description	**Rim**	Pipe Size	Type	Direction	Measure	**Invert**	Flow
332									
333	**5891**	INL 4'	**616.74**	10"	RCP	SE	5.18	**611.56**	
334									
335	**5892**	INL 4'	**616.56**	12"	RCP	SW	5.20	**611.36**	
336									
337	**5893**	INL 4'	**616.45**	12"	RCP	SW	4.90	**611.55**	
338									
339	**5894**	INL 4'	**616.32**	15"	RCP	E	9.84	**606.48**	
340			**616.32**	18"	RCP	W	9.75	**606.57**	
341									
342	**5895**	INL 4'	**616.18**	NO PIPES	VISIBLE	SUMP	3.95	**612.23**	
343									
344	**5896**	INL 4'	**616.08**	12"	RCP	W	4.88	**611.20**	
345									
346	**5897**	MH 4'	**616.64**	12"	RCP	E	8.13	**608.51**	
347			**616.64**	12"	RCP	W	8.30	**608.34**	
348			**616.64**	12"	RCP	E	5.90	**610.74**	
349		EAST PIPES STACKED ON TOP OF EACH OTHER							
350	**5898**	MH 4'	**615.23**	15"	RCP	E	6.02	**609.21**	
351			**615.23**	15"	RCP	W	6.27	**608.96**	
352			**615.23**	12"	RCP	SE	5.23	**610.00**	
353									
354	**5899**	INL 4'	**615.04**	12"	RCP	NW	5.35	**609.69**	
355			**615.04**	8"	DIP	SE	2.91	**612.13**	
356									
357	**5900**	MH 4'	**614.44**	TWIN 10"	RCP	SE	4.70	**609.74**	
358			**614.44**	10"	RCP	W	5.00	**609.44**	
359									
360	**5901**	INL 2'	**614.09**	10"	RCP	NW	2.54	**611.55**	
361			**614.09**	10"	RCP	SE	2.54	**611.55**	
362									
363	**5902**	MH 4'	**614.21**	10"	RCP	NW	4.58	**609.63**	
364									
365	**5903**	INL 2'	**614.03**	10"	RCP	SW	2.72	**611.31**	
366									
367	**5904**	INL 4'	**614.53**	12"	RCP	NE	3.22	**611.31**	
368									
369	**5905**	MH 4'	**614.96**	12"	RCP	SE	3.25	**611.71**	
370			**614.96**	12"	RCP	E	4.81	**610.15**	
371			**614.96**	15"	RCP	W	4.78	**610.18**	
372									
373	**5906**	INL 2'	**615.12**	12"	RCP	NW	2.84	**612.28**	
374									
375	**5907**	INL 2'	**614.90**	12"	RCP	SW	2.72	**612.18**	
376									
377	**5908**	INL 2'	**615.48**	12"	RCP	S	2.34	**613.14**	
378									
379	**5909**	SAN MH	**616.29**					**0.00**	
380									
381	**5910**	INL 4'	**615.85**	12"	RCP	S	5.20	**610.65**	
382									
383	**5911**	INL 2'	**616.06**	10"	RCP	W	2.55	**613.51**	
384									
385	**5912**	INL 4'	**616.23**	12"	RCP	S	3.60	**612.63**	
386			**616.23**	10"	RCP	E	3.58	**612.65**	

	A	B	C	D	E	F	G	H	I
1	**Point**	Descripition	**Rim**	Pipe Size	Type	Direction	Measure	**Invert**	Flow
387									
388	**5913**	MH 4'	**616.76**	15"	RCP	E	9.65	**607.11**	
389			**616.76**	15"	RCP	W	9.61	**607.15**	
390									
391	**5914**	INL 4'	**616.06**	8"	RCP	W	4.70	**611.36**	
392									
393	**5915**	INL 4'	**616.58**	12"	RCP	NW	5.05	**611.53**	
394									
395	**5916**	INL 4'	**616.72**	8"	RCP	NE	5.30	**611.42**	
396									
397	**5917**	INL 4'	**616.90**	12"	RCP	N	4.68	**612.22**	
398									
399	**5918**	INL 2'	**616.69**	10"	RCP	NE	3.84	**612.85**	
400									
401	**5919**	MH 4'	**617.35**	12"	RCP	E	5.21	**612.14**	
402			**617.35**	10"	RCP	W	5.21	**612.14**	
403									
404	**5920**	INL 4'	**617.30**	8"	RCP	NW	5.00	**612.30**	
405			**617.30**	8"	RCP	NE	5.10	**612.20**	
406									
407	**5921**	MH 4'	**618.01**	12"	RCP	W	6.14	**611.87**	
408			**618.01**	8"	RCP	SE	5.90	**612.11**	
409									
410	**5922**	INL 4'	**617.17**	8"	RCP	NW	5.20	**611.97**	
411									
412	**5923**	MH 4'	**617.61**	12"	RCP	E	7.75	**609.86**	
413			**617.61**	21"	RCP	W	9.50	**608.11**	
414			**617.61**	27"	RCP	S	9.93	**607.68**	
415									
416	**5924**	INL 4'	**618.08**	12"	RCP	SE	5.75	**612.33**	
417									
418	**5925**	INL 4'	**617.28**	12"	RCP	NE	7.10	**610.18**	
419									
420	**5926**	MH 4'	**617.46**		CAN'T OPEN			**617.46**	
421									
422	**5927**	INL 4'	**617.32**	12"	RCP	W	5.55	**611.77**	
423								**0.00**	
424								**0.00**	
425								**0.00**	
426								**0.00**	
427								**0.00**	
428								**0.00**	
429								**0.00**	
430								**0.00**	
431								**0.00**	
432								**0.00**	
433								**0.00**	
434								**0.00**	
435								**0.00**	
436								**0.00**	
437								**0.00**	
438								**0.00**	
439								**0.00**	
440								**0.00**	
441								**0.00**	

	A	B	C	D	E	F	G	H	I	J	K
1	**Point**	Descripition	**Rim**	Pipe Size	Type	Directio	Measure	**Invert**	Flow		
2	STONY CREEK WATERSHED										
3	**5660**	MH 4'	**593.81**	8"	RCP	W	5.67	**588.14**			
4			**593.81**	8"	RCP	W	3.53	**590.28**			
5											
6	**5661**	INL 2'	**593.38**	10"	RCP	E	2.25	**591.13**			
7											
8	**5662**	INL 2'	**592.93**	18"	RCP	W	2.7	**590.23**			
9											
10	**5663**	MH 4'	**593.15**	15"	RCP	N	4.13	**589.02**			
11			**593.16**	10"	RCP	S	3.8	**589.36**			
12			**593.16**	12"	RCP	W	3.4	**589.76**			
13											
14	**5664**	MH 4'	**593.18**	8"	RCP	S	3.08	**590.10**			
15											
16	**5665**	INL 4'	**592.48**	12"	RCP	SW	2.74	**589.74**			
17											
18	**5666**	INL 4'	**592.18**	12"	RCP	S	3.08	**589.10**			
19											
20	**5667**	MH 4'	**592.40**	8"	RCP	E	5.35	**587.05**			
21			**592.40**	8"	RCP	E	4.05	**588.35**			
22											
23	**5668**	INL 2'	**592.09**	8"	RCP	W	3.14	**588.95**			
24											
25	**5669**	MH 4'	**592.78**	8"	RCP	E	5.06	**587.72**			
26											
27	**5670**	INL 2'	**592.55**	8"	RCP	W	2.84	**589.71**			
28											
29	**5671**	MH 4'	**593.38**	10"	RCP	E	5.57	**587.81**			
30											
31	**5672**	INL 2'	**593.17**	10"	RCP	W	3.07	**590.10**			
32											
33	**5673**	INL 4'	**593.38**	8"	RCP	NE	3.86	**589.52**			
34											
35	**5677**	MH 4'	**594.31**	12"	RCP	N	9.7	**584.61**			
36			**594.31**	15"	RCP	E	9.9	**584.41**			
37			**594.31**	15"	RCP	S	9.45	**584.86**			
38			**594.31**	12"	RCP	W	5.3	**589.01**			
39											
40	**5678**	MH 4'	**594.18**	8"	RCP	W	5.1	**589.08**			
41											
42	**5679**	INL 4	**593.49**	8"	RCP	E	2.5	**590.99**			
43											
44	**5680**	MH 4'	**594.50**	18'	RCP	S	12.72	**581.78**			
45			**594.50**	18"	RCP	N	12.62	**581.88**			
46											
47	**5681**	MH 4'	**593.92**	18"	RCP	N	12.45	**581.47**			
48			**593.92**	18"	RCP	S	12.45	**581.47**			
49			**593.92**	6"	RCP	NE	8.97	**584.95**			
50											
51	**5682**	MH 4'	**593.38**	18"	RCP	N	12.51	**580.87**			
52			**593.38**	18"	RCP	S	12.55	**580.83**			
53			**593.38**	6"	RCP	E	10	**583.38**			
54											
55	**5683**	MH 4'	**591.94**	18"	RCP	N	11.5	**580.44**			
56			**591.94**	18"	RCP	S	11.55	**580.39**			

	A	B	C	D	E	F	G	H	I	J	K
1	**Point**	Descripition	**Rim**	Pipe Size	Type	Directio	Measure	**Invert**	Flow		
57											
58	**5684**	MH 6'	**592.38**	LIFT STATION				**592.38**			
59											
60	**5685**	MH 4'	**591.68**	72"	RCP	N	13.55	**578.13**			
61			**591.68**	72"	RCP	SE	13.25	**578.43**			
62											
63	**5686**	TOP HEADWALL	**586.91**	72"	RCP	S	8.8	**578.11**	OUTFALL		
64											
65	**5687**	BRIDGE DECK	**592.02**								
66											
67	**5688**	BRIDGE DECK	**592.17**	CREEK			14.05	**578.12**	OUTFALL		
68											
69	**5689**	BRIDGE DECK	**592.20**								
70											
71	**5690**	BRIDGE DECK	**591.87**								
72									OUTFALL		
73	**5691**	BRIDGE DECK	**592.00**	CREEK			13.42	**578.58**			
74											
75	**5692**	BRIDGE DECK	**592.07**								
76											
77	**5693**	MH 4'	**590.87**	12"	RCP	E	6.4	**584.47**			
78			**590.87**	8"	RCP	E	4.42	**586.45**			
79			**590.87**	8"	RCP	N	3.4	**587.47**			
80											
81	**5694**	INL 2'	**590.64**	8"	RCP	W	3.34	**587.30**			
82											
83	**5695**	INL 2'	**590.54**	8"	RCP	S	3.08	**587.46**			
84											
85	**5696**	MH 4'	**591.11**	8"	RCP	E	5.95	**585.16**			
86			**591.11**	8"	RCP	E	3.74	**587.37**			
87											
88	**5697**	INL 2'	**590.84**	8"	RCP	W	3.09	**587.75**			
89											
90	**5698**	MH 4'	**591.90**	10"	RCP	E	5.25	**586.65**			
91			**591.90**	8"	RCP	NNE	4.24	**587.66**			
92											
93	**5699**	MH 4' GRATE	**592.36**	72'	RCP	N	10.45	**581.91**			
94			**592.36**	72"	RCP	S	10.5	**581.86**			
95											
96	**5700**	INL 2'	**591.61**	8"	RCP	S	2.66	**588.95**			
97											
98	**5701**	MH 4'	**592.11**	8"	RCP	E	5.65	**586.46**			
99											
100	**5702**	INL 2'	**591.86**	8"	RCP	W	2.57	**589.29**			
101											
102	**5703**	MH 4'	**592.26**	8"	RCP	E	5.5	**586.76**			
103			**592.26**	8"	RCP	E	4.45	**587.81**			
104											
105	**5704**	INL 2'	**591.92**	8"	RCP	W	2.85	**589.07**			
106											
107	**5705**	INL 2'	**591.75**	10"	RCP	W	2.81	**588.94**			
108											
109	**5706**	MH 4'	**592.21**	18"	RCP	N	4.44	**587.77**			
110			**592.21**	18'	RCP	S	4.65	**587.56**			
111			**592.21**	8"	RCP	W	3.85	**588.36**			

	A	B	C	D	E	F	G	H	I	J	K
1	**Point**	Descripition	**Rim**	Pipe Size	Type	Directio	Measure	**Invert**	Flow		
112											
113	**5707**	INL 2'	**591.75**	12"	RCP	W	3.05	**588.70**			
114											
115	**5708**	INL 2'	**591.76**	12"	RCP	W	3.16	**588.60**			
116											
117	**5709**	MH 4'	**592.01**	18'	RCP	N	5.35	**586.66**			
118			**592.01**	18"	RCP	S	5.83	**586.18**			
119			**592.01**	12"	RCP	NW	4.12	**587.89**			
120			**592.01**	12"	RCP	SW	4.46	**587.55**			
121											
122	**5710**	INL 2'	**591.32**	12"	RCP	W	2.8	**588.52**			
123											
124	**5711**	MH 4'	**591.78**	18"	RCP	N	DEBRIS				
125			**591.78**	18"	RCP	S	DEBRIS				
126			**591.78**	12"	RCP	E	6.04	**585.74**			
127											
128	**5712**	INL 4'	**590.94**	8"	RCP	SW	5.58	**585.36**			
129											
130	**5713**	INL 4'	**590.87**	WATER	FILLED	SUMP	7	**583.87**			
131											
132	**5714**	PIPE IN HEADWALL	**577.70**					**577.70**			
133											
134	**5797**	MH 4'	**592.51**	12"	RCP	N	3.95	**588.56**			
135			**592.51**	18"	RCP	S	4.35	**588.16**			
136			**592.51**	6"	CMP	NW	3.95	**588.56**			
137								**0.00**			
138								**0.00**			
139								**0.00**			
140								**0.00**			
141								**0.00**			
142								**0.00**			
143								**0.00**			
144								**0.00**			
145								**0.00**			
146								**0.00**			
147								**0.00**			
148								**0.00**			
149								**0.00**			
150								**0.00**			
151								**0.00**			
152								**0.00**			
153								**0.00**			
154								**0.00**			
155								**0.00**			
156								**0.00**			
157								**0.00**			
158								**0.00**			
159								**0.00**			
160								**0.00**			
161								**0.00**			
162								**0.00**			
163								**0.00**			
164								**0.00**			
165								**0.00**			
166								**0.00**			

APPENDIX B

COPY OF SELECTED REFERENCE MATERIALS

STORM WATER MANAGEMENT PLAN
VILLAGE OF BRIDGEVIEW
FOR THE AREA BETWEEN
87th STREET AND 95th STREET
AND HARLEM AVE. AND TRI STATE TOLLWAY

MAY 1987

REVISED MARCH 1988

REVISED APRIL 1988

84-157

ROBINSON ENGINEERING, LTD.
CONSULTING REGISTERED PROFESSIONAL ENGINEERS
357 EAST 170TH STREET - P.O. BOX 386 - SOUTH HOLLAND, ILLINOIS 60473-0386
LOCAL (312) 331-6700 CHICAGO (312) 468-1955 FAX (312) 331-3826

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EXHIBITS

Exhibit No.	TITLE
1	Parcel Map
2	Letter from Village of Bridgeview certifying the need for the use of the 95th Street right-of-way as a detention pond.
3	Letter from the City of Hickory Hills certifying the need for the use of the 95th Street right-of-way as a detention pond.
4	Letter from Village of Bridgeview concurring with this report's recommendation.
5	Letter from City of Hickory Hills concurring with this report's recommendation.
6	Drainage Conditions before Tollway
7	Existing drainage conditions
8	Existing drainage at 95th Street & B&OCT RR
9	Actual Central Detention Pond Release Rate Calculation
10	Required detention volume calculation
11	Actual detention volume calculation
12	Detention Pond Rating Curve
13	Calculation of Estimated Upstream Detention in Subwatersheds 1 & 2
14	Typical Detention Pond Cross Section
15	Proposed Drainage Conditions
16	Overflow into State Pump Station
17	Proposed Drainage and Storm Sewer Plan for Subwatershed 2E.
18	Sizing of storm sewer from the detention pond to the 60-inch tollway culvert.

19	Storm Sewer Calculations Trunk Sewer on Oketo Avenue from detention pond to 600'± South of 90th Street.
20	Storm Sewer Calculations in the vicinity of 93rd Street and Odell Avenue (Subarea 2E)
21	Design of 84-inch equivalent ditch from 60-inch tollway culvert to proposed detention pond.
22	Proposed storm sewer in vicinity of 95th Street and Tollway in Hickory Hills
23	Scheme 1 Storm Sewer Calculations Hickory Hills
24	Scheme 2 Storm Sewer Calculations Hickory Hills
25	Scheme 3 Storm Sewer Calculations Hickory Hills
26A-26E	Calculation of Expected Runoff for Subwatershed 1 & 2
27	Letter from IDOT dated July 14, 1987 and response from Robinson Engineering Company, Ltd.
28	Illinois State Toll Highway Authority Drainage Report March 9, 1988

1.0 INTRODUCTION

The Village of Bridgeview is requesting that the Illinois Department of Transportation (IDOT) grant a permit for the use of parcel 23-1-409-008 which is shown in Exhibit No. 1 as Parcel 3 for the construction of a central detention pond. The area of this parcel is 2.20 acres. IDOT is in the process of selling this property at an Excess Land Sale Auction. The Village of Bridgeview is investigating purchasing this property at the Excess Land Sale Auction. Purchase of this land by the Village of Bridgeview or another purchaser would allow this project to be constructed without the review and approval of Federal Highway Administration (FHWA). The Village is also in the process of obtaining Parcel No. 1 and Parcel No. 2 from Commonwealth Edison & Hartz Construction Company, respectively. The total area of all three parcels to be used for the central detention pond is 9.01 acres. The IDOT owned parcel represents 24.0% of the total central detention pond area. The proposed central detention pond site is bounded on the west by the Tri State Tollway, on the east by the Oketo Avenue right-of-way, on the north by the B&O CT Railroad, and on the south by 95th Street.

The Village of Bridgeview proposes to construct the central detention pond to provide storm water drainage for the area approximately bounded by the Tri-State Tollway on the west, Harlem Avenue on the east, by 87th Street on the north and 95th Street on the south. The central detention pond would provide storm water management facilities for approximately 285 acres. These areas are currently partially developed. Significant further development in this area is not possible without the construction of the central detention pond. Small upstream detention sites are not feasible because a large area of the watershed has already been developed without adequate detention facilities or storm sewers. Small upstream detention sites also are generally not maintained by their private owners and inevitably become an eyesore and nuisance. The proposed central detention pond will be operated and maintained by the Village of Bridgeview. The Village of Bridgeview has determined that the proposed central detention pond site is the only feasible site to construct the storm water management facilities that will allow development of the watershed. Exhibits No. 2 and 3 are letters from Bridgeview and Hickory Hills certifying the need for the use of the IDOT parcel to construct the Central Detention Pond. Letters of concurrence with this report's recommendations are included as Exhibits 4 & 5.

2.0 DRAINAGE CONDITIONS BEFORE TOLLWAY

The drainage conditions before the tollway was constructed (circa) 1953 are shown in Exhibit 6. The area north of the existing 60-inch culvert under the tollway between the tollway, the B&OCT Railroad and 87th Street (subwatershed 1) drained to the southwest into an existing Lucas Ditch tributary and eventually into the Calumet Sag Channel. The area between the watershed divide, Harlem Avenue, 95th Street and the Tollway (subwatershed 2) drained to the southeast into another Lucas Ditch tributary which eventually drained into the Calumet Sag Channel.

The proposed central detention pond project would divert flows from 100-year storms from watershed 1 into the central detention pond. Subwatershed 2 would be diverted from a Lucas ditch tributary located approximately 300 feet west of Harlem Avenue at 95th Street to the central detention pond with its outlet approximately 1000' west of Harlem Avenue on 95th Street and discharging into the same Lucas Ditch tributary.

3.0 EXISTING DRAINAGE CONDITIONS

The existing drainage conditions are shown in Exhibit 7. Subwatershed 1, which has an area of 110 acres, drains into the 60-inch culvert under the Tri-State tollway and flows through the Hickory Hills ditch and storm sewer system into a 6' x 12' box culvert under 95th Street. Storm water then flows into the Bridgeview storm sewer system into Lucas Ditch, and eventually into the Calumet Sag Channel. It is likely that some storm water also flows into the Tollway ditch which drains south into a 30-inch culvert under the tollway, and then east, eventually discharging into the State pump station. The existing drainage arrows at the west end of the 30" culvert in Exhibit 7 show this in more detail. 100-year expected flow from subwatershed 1 would be diverted from one of these two paths into the proposed central detention pond whose outlet is eventually Lucas ditch. Portions of Subwatershed 1 in the vicinity of the 60-inch tollway culvert currently act as natural detention areas.

Subwatershed 2 which has an area of 175 acres drains overland and through the Bridgeview ditch system from the northwest to southeast into the State pump station and also into an existing 24-inch storm sewer. Storm water enters that State pump station through an 18-inch storm sewer located in a swale on Avon Avenue (Harlem Avenue/95th Street frontage road) into the 24, 30, and 48-inch storm sewer discharging into the State pump station at the southeast corner of 95th Street and the B&OCT Railroad. Storm water also flows through the 24-inch storm sewer and does not enter the pump station flowing south to Stony Creek. This is detailed in Exhibit 8.

After construction of the State pump station water flowed to the southeast discharging south on Harlem Avenue and eventually discharging into Stony Creek on Harlem Avenue, one block north of the Southwest Highway.

The north 25 acres of watershed 2 which is designated as subarea 2G originally drained to the South. However, this was changed when a trailer court was constructed and a berm was constructed to prevent subarea 2G from flowing to the south. A portion of this area appears to drain to the existing Harlem Avenue storm sewer.

Construction of the proposed central detention pond and the upstream sewer system will significantly reduce the expected flow into the State pump station by diverting it into the central detention pond. The State pump station has 6-6000 gpm pumps with a total capacity of 36,000 gpm (80.3 cfs). Flooding of 95th Street occurs when the pump station cannot pump all storm water which enters it.

4.0 PROPOSED CENTRAL DETENTION POND AND STORM SEWER

The Village of Bridgeview is proposing to construct, operate and maintain a central detention pond at the site previously described. The detention pond will be constructed on an area of 9.01 acres. The central detention pond will drain all of subwatershed 1, and subwatershed 2, except approximately the south 3.0± acres of subarea 2E which will still drain into the State pump station and subarea 2G which drains to the north. In the existing condition approximately 25 acres or 100% of subwatershed 2E drains into the State pump station. The absolute minimum area of watershed 2E will remain tributary to the State pump station. Only that portion of subwatershed 2E which is below the detention pond freeboard elevation of 609.50 and cannot be raised to elevation 609.50 will remain tributary to the State pump station. This will keep the storm water flow into the State pump to an absolute minimum and provide relief to the 95th Street underpass (See Exhibit No. 17). The release rate from the central detention pond will be controlled by a 30-inch storm sewer with a 24-inch restrictor release rate of 42.37 cfs. The allowable release rate is 42.75 cfs (See exhibit 9). The required detention volume is 42.9 acre feet (see Exhibit 10). A detention pond rating curve was developed and is shown in Exhibit 12. The 100-year water elevation is 607.50, which will provide 42.9 acre feet of detention volume. This does not include an estimated 8.46 acre feet of existing and proposed upstream detention in the proposed storm sewers and one existing detention pond. (See exhibit 13). This upstream detention of 8.46 acre feet represents 19% of the required 42.9 acres which will provide a substantial factor of safety. A freeboard elevation was set 2 feet above the 100-year water elevation of 607.50 at 609.50. The detention volume below 609.50 is 60 acre feet or 17.1 acre-feet more than the required 100-year volume of 42.9 acre-ft. The top of berm will be set at 610.00 providing a total detention volume in the pond before overflow begins of 64 acre feet. Adding the upstream detention of 8.46 acre feet, there is 72.46 acre feet of detention volume available at elevation 610.0. This is 29.56 acre feet more than the required 100-year detention volume of 42.9 acre feet providing a safety factor of 1.68.

The volume required to completely store a 100-year storm with no release rate for the watershed is only 66.5 acre-feet. (285 acres x 5.6 inch/12 x .5 = 66.5 ac-ft).

Based on the above, we are confident that the detention pond provides an adequate volume to insure that overflow will not occur during any storm less than or equal to a 100-year intensity. A typical detention pond cross section is shown in Exhibit 14. The central detention pond plan submitted to Mr. Richard Garrity, Planning Services Section Chief, IDOT, by letter dated March 2, 1987 with a plan date of February 20, 1986 will be revised upon approval of this report. The revisions will include raising the proposed top of berm elevation 610.0 and all work on the 95th Street right-of-way except the required 30-inch storm sewer crossing will be eliminated.

Exhibit No. 15 shows the proposed drainage conditions and the proposed overflow locations. To provide a freeboard elevation of 609.50, 2 feet above high water without overflow, it will not be possible to drain the south 3.0 acres $\pm$ of subarea 2E into the detention pond because ground elevations are below 609.50. This area which is at the frontage road (Avon Street) and Odell and Octavia Streets will drain to the State pump station as it currently does.

The original report dated May 1987 recommended that approximately 7.5 acres ± of subarea 2E remain tributary to the detention pond. However, by increasing the release rate from the 14.8 cfs calculated in the May 1987 report to 42.37 cfs the freeboard elevation has dropped 1-foot from 610.50 to 609.50 allowing an additional 4.5± acres of subwatershed 2E to flow into the retention pond instead of flowing into the State pump station. Only that portion of subwatershed 2E that is below elevation 609.50 and that cannot be raised to elevation 609.50 will remain tributary to the State pump station when the roadways are improved. It is estimated that approximately 3± acres will remain tributary to the State pump station. This will keep future flows into the State pump station to an absolute minimum and provide substantial relief to the 95th Street underpass.

Overflow will begin to occur if the water elevation in the detention pond would rise to an elevation slightly higher than 610.0 backing up through proposed catch basins located on Odell Avenue and Octavia Avenue approximately 500' south of 93rd Street. The overflow would then flow overland into the State storm sewer at Avon Street between Odell and Octavia and into the State pump station. The overflow rate when the water rises slightly higher than elevation 610.0 is estimated to be approximately 4 cfs. (See Exhibit 16). As previously stated, the total detention volume in the watershed would be 72.46 acre-feet, 29.56 acre-feet more than the required 100-year detention volume. Because of the large safety factor, it is unlikely that overflow from the detention pond into the State pump station would ever occur. Determining the frequency of a storm that would cause this overflow was not within the scope of this project.

A second overflow will occur at the existing 60-inch culvert under the tollway when the capacity of the proposed 84" storm sewer or equivalent ditch that conveys storm water from subwatershed 1 to the central detention pond is exceeded. The flow line of the 60-inch tollway culvert is 613.10 or 3.6 feet above the freeboard elevation. The total detention volume at elevation 613.10 is 95.46 acre feet. Because of this large detention volume, it is very unlikely that the water elevation in the central detention pond would ever reach elevation 613.1. Therefore, backup from the pond into the 60-inch tollway culvert is very unlikely, even if the berm was raised to an elevation of approximately 615.0 to allow backup into this culvert.

The ceiling of this 84-inch or equivalent ditch will be set at elevation 613.6 or higher which is at least .5 feet higher than the flow line of the 60-inch tollway culvert. Low flow will occur into the 60-inch tollway culvert through a 54-inch culvert to be constructed by the tollway.

The tollway is proposing the construction of a 54-inch storm sewer which would drain the west side of the tollway from the 60-inch tollway culvert in a southwesterly direction (See Exhibit 28). This will allow a portion of the flow from subwatershed 1 to flow through Hickory Hills as it currently does and minimize the impact of diverting this water from Hickory Hills into the proposed detention pond.

5.0 PROPOSED STORM SEWERS

5.1 PROPOSED STORM SEWERS IN THE VILLAGE OF BRIDGEVIEW

The Village of Bridgeview will construct storm sewers in two phases as follows:

Phase 1

Phase 1 will consist of storm sewers to be constructed as part of the proposed central detention pond as follows:

a) 200'± 84-inch storm sewer at the northeast corner of the detention pond which will provide for the main inlet into the detention pond for subwatershed 2.

b) 1000 ± of 84-inch storm sewer or equivalent ditch from the northwest corner of the detention pond to the 60-inch tollway culvert. Tollway -?

This will be the main inlet into the detention pond for subwatershed 1. The Village of Bridgeview will secure the necessary storm sewer or ditch easement.

Phase 2

Phase 2 will consist of the construction of the remaining storm sewer in the watershed. This construction will proceed as development occurs.

Exhibit No. 17 shows a detailed map of the proposed storm sewer in the vicinity of 93rd Street and Odell (subarea 2E). Storm sewer and ditch calculations are presented as Exhibits 18, 19, 20 and 21.

5.2 PROPOSED STORM SEWERS IN THE CITY OF HICKORY HILLS

4 different schemes were considered in Exhibit 22 and 28 as follows:

Scheme 1: Drain tributary portions of Hickory Hills and the tollway.

Scheme 2: Drain tributary portions of Hickory Hills only and excluding the tollway.

Scheme 3: Drain tributary portions of the tollway only excluding Hickory Hills.

Scheme 4: This scheme is presented by the Illinois State Toll Highway Authority in their drainage report dated March 9, 1988 and is presented as Exhibit 28. As part of the Tri-State Tollway and 95th Street Interchange Improvement a

54-inch diameter storm sewer will be constructed from the 60-inch diameter culvert at Station 1121+50, running south along the west side of the Tollway and the northwest ramp to approximately Station 11+50 (NW Ramp) and then crosses beneath the northwest ramp into the infield area bounded by the northwest ramp, mainline Tollway and 95th Street. At this time, approximately one (1) acre foot of detention can be provided in this area. The proposed storm sewer will continue south under 95th Street into the infield of Ramp C and then head southwest to a connection with the existing 60-inch diameter storm sewer at the intersection of Ramp C1 and 76th avenue.

As of the date of this report, it appears that Scheme 4 will be the scheme that will be constructed by the Illinois State Toll Highway Authority.

The construction of any one of these schemes will facilitate the low flow from watershed 1 flowing into the 60-inch tollway culvert. Exhibits 23, 24 and 25 are the storm sewer calculations for each of these schemes.

6.0 IMPACTS

The construction of the proposed central detention pond and storm sewer will have the following impacts:

1. The expected 50-year runoff into the State pump station from subwatershed 2 will decrease from 113.0 cfs (See Exhibit 26A) to 13.4 cfs (See Exhibit 26B). The State pump station capacity is only 80.3 cfs. There will be a significant positive benefit to the State pump station. Surcharging caused by inadequate pump station capacity will be experienced much less frequency.

2. In the fully developed conditions the 50-year expected runoff from subwatershed 2 into the State pump station will decrease from 306.6 cfs (See Exhibit 26C) to 13.4 cfs (See Exhibit 26B).

3. The 10-year expected runoff into Hickory Hills from subwatershed 1 through the 60-inch tollway culvert will be reduced from 92.1 cfs (See Exhibit 26D) to approximately 20± cfs. This flow will occur through the proposed 54-inch culvert proposed by the tollway.

4. We estimate that approximately 50% of the 92.1 cfs which flows through the 60-inch tollway culvert mentioned in 2 above also flows into the State pump station via a 30" culvert under the tollway on 95th Street. This flow into the State pump station from subwatershed 1 will be reduced to 0 cfs.

5. The 10-year expected runoff into Hickory Hills from subwatershed 1 through the 60-inch culvert in the fully developed State will decrease from 138.8 cfs to 20 cfs. We estimate that 50% of this flow (69.4 cfs) could in the future enter the State pump station. If the pond is constructed 0 cfs would enter the State pump station.

6. The total detention volume in the watershed at elevation 610, the elevation at which overflow into the State pump station begins, is 72.46 acre feet. This is 29.56 acre feet more than the 100-year detention volume required of 42.9 acre. This provides a 1.68 safety factor. Therefore, overflows will be an extremely rare occurrence.

7. The Village of Bridgeview will be able to allow development of subwatersheds 1 and 2.

Impacts 1 thru 7 are all positive benefits to the Village of Bridgeview, the City of Hickory Hills and to IDOT. We expect no negative impacts from the proposed central detention pond.

7.0 RECOMMENDATIONS

We recommend the following construction:

1. Construction of a central detention pond with a top of berm elevation of 610.0.

2. Construction of 200' ± of 84-inch storm sewer at the northeast corner of the detention pond to serve as the main trunk sewer for subwatershed 2 into the central detention pond.

3. Construction of 1000 feet of 84" storm sewer or equivalent ditch from the northwest corner of the central detention pond to the 60-inch

tollway culvert. The ceiling of the storm sewer will be set at elevation 613.6 or higher which would be at least 6 inches higher than the flow line of the 60-inch tollway culvert.

4. The area of subwatershed 2E which is below 609.50 or cannot be raised above 609.50 in the vicinity of 93rd Street and Odell Avenue will not be drained into the central detention pond, but will drain as it currently does into the State pump station. This will minimize the area that remains tributary to the State pump station and substantially benefit the 95th Street underpass.

EXHIBIT NO. 1

PARCEL MAP

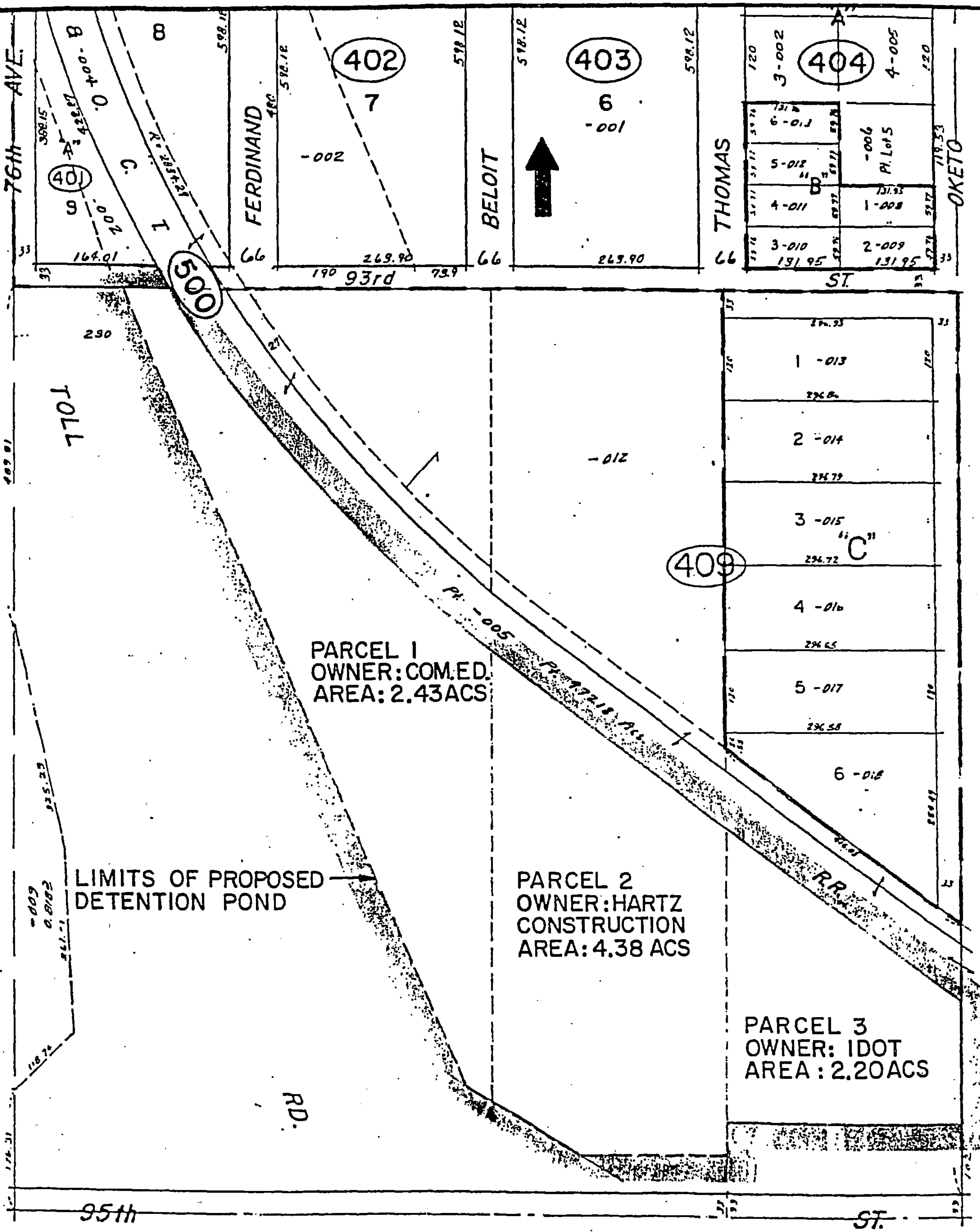


EXHIBIT NO. 1

PARCEL MAP

84-157

EXHIBIT NO. 2

LETTER FROM THE VILLAGE OF BRIDGEVIEW
CERTIFYING THE NEED FOR THE USE OF THE
95TH STREET RIGHT-OF-WAY AS A RETENTION POND

Village of Bridgeview

COUNTY OF COOK
STATE OF ILLINOIS

Municipal Building

7500 SOUTH OKETO AVENUE
BRIDGEVIEW, ILLINOIS 60455
TELEPHONE 594-2525

JOHN A. OREMUS
President

April 8, 1987

Mr. Ralph C. Wehner, District Engineer
Illinois Department of Transportation
Division of Highways/District 1
201 West Center Court
Schaumburg, IL 60196-1096

RE: Certification of the Need
For 95th Street Right-of-Way
To be Used for A Detention Pond

Dear Mr. Wehner:

Please be advised that the Village of Bridgeview certifies its need to use a part of the 95th Street right-of-way for a detention pond, as shown on R. W. Robinson and Associates plan project Number 84-157. This pond is required to provide detention for residents in the Village of Bridgeview and to minimize the flooding in Hickory Hills.

This project is an integral part of the Village's storm water management plan.

Yours very truly,

VILLAGE OF BRIDGEVIEW

John A. Oremus

John A. Oremus, President

JAO/ac

EXHIBIT NO. 3

LETTER FROM THE CITY OF HICKORY HILLS
CERTIFYING THE NEED FOR THE USE OF THE
95TH STREET RIGHT-OF-WAY AS A
DETENTION POND

City of Hickory Hills
8652 WEST 95th STREET
HICKORY HILLS, ILLINOIS 60457

April 8, 1987

Mr. Ralph C. Wehner, District Engineer
Illinois Department of Transportation
Division of Highways/District 1
201 West Center Court
Schaumburg, IL 60196-1096

RE: Certification of the Need
For 95th Street Right-of-Way
To be Used for A Detention Pond

Dear Mr. Wehner:

Please be advised that the City of Hickory Hills concurs with the Village of Bridgeview's certification by letter dated April 8, 1987 regarding its need to use a part of the 95th Street right-of-way for a detention pond, as shown on R. W. Robinson and Associates plan project Number 84-157. This pond is required to provide detention for residents in the Village of Bridgeview and to minimize the flooding in Hickory Hills.

Yours very truly,

CITY OF HICKORY HILLS

Raymond L. Kay, Mayor

RAK/grm

EXHIBIT 4

LETTER FORM BRIDGEVIEW CONCURRING
WITH THIS REPORT'S RECOMMENDATION

Village of Bridgeview

COUNTY OF COOK
STATE OF ILLINOIS

Municipal Building

7500 SOUTH OKETO AVENUE
BRIDGEVIEW, ILLINOIS 60455
TELEPHONE 594-2525

JOHN A. OREMUS
President

April 27, 1987

Mr. Ralph C. Wehner, District Engineer
Illinois Department of Transportation
Division of Highways/District 1
201 West Center Court
Schaumburg, IL 60196-1096

RE: Concurrence With Storm Water
Management Plan

Gentlemen:

The Village of Bridgeview concurs with the recommendations contained in the Storm Water Management Plan for the Village of Bridgeview for the area between 87th Street and 95th Street and Harlem Avenue and the Tri State Tollway dated May 1987.

Yours very truly,

VILLAGE OF BRIDGEVIEW

John A. Oremus

John A. Oremus, President

JAO/ac

EXHIBIT 5

LETTER FORM HICKORY HILLS
CONCURRING WITH THIS REPORT'S
RECOMMENDATIONS

City of Hickory Hills
8652 WEST 95th STREET
HICKORY HILLS, ILLINOIS 60457

April 27, 1987

Mr. Ralph C. Wehner, District Engineer
Illinois Department of Transportation
Division of Highways/District 1
201 West Center Court
Schaumburg, IL 60196-1096

RE: Concurrence With Storm Water
Management Plan

Gentlemen:

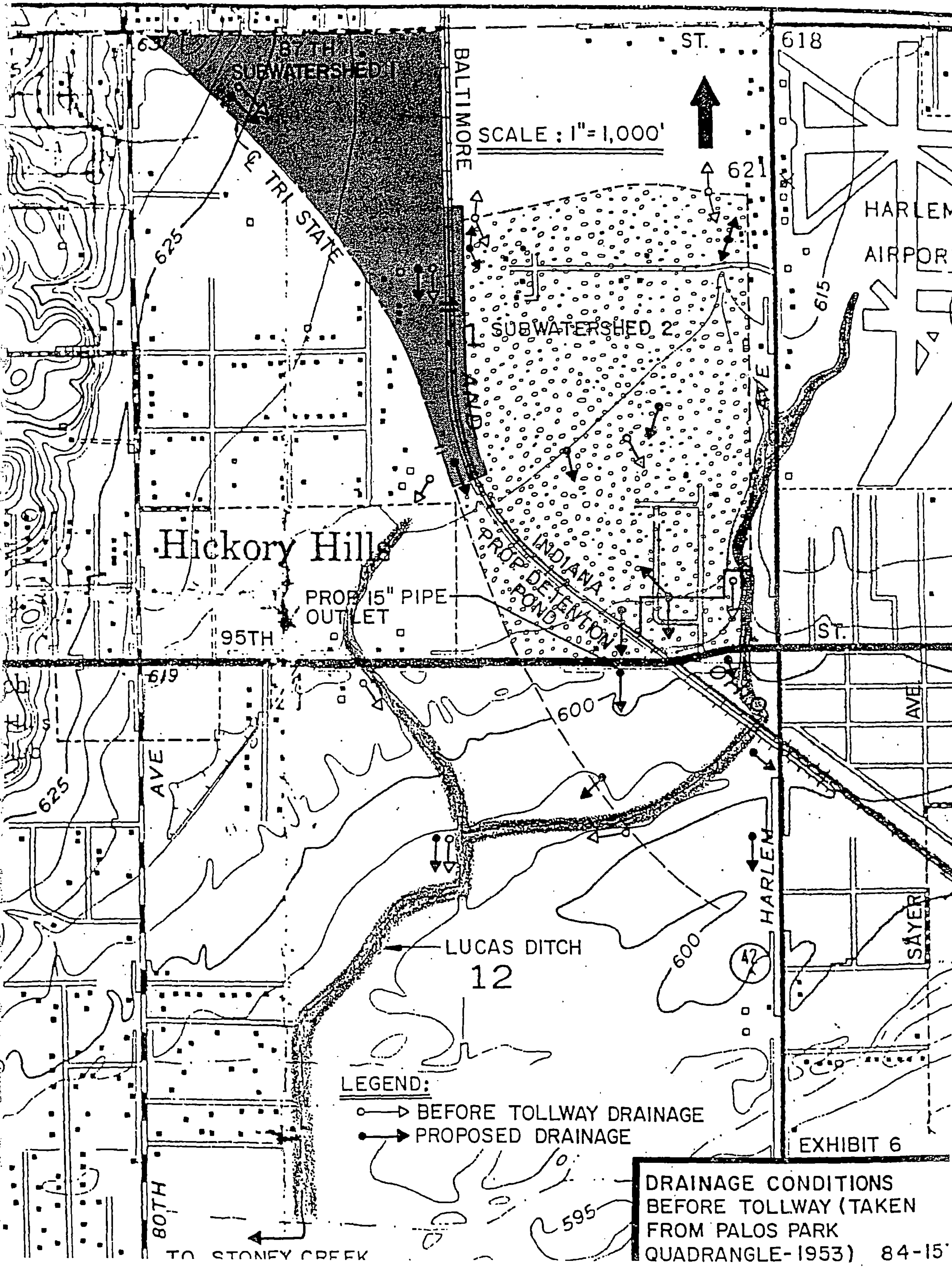
The City of Hickory Hills concurs with the recommendations contained in the Storm Water Management Plan for the City of Hickory Hills for the area between 87th Street and 95th Street and Harlem Avenue and the Tri State Tollway dated May 1987.

Yours very truly,

CITY OF HICKORY HILLS

Raymond L. Kay, Mayor

RLK/grm



DRAINAGE CONDITIONS BEFORE TOLLWAY (TAKEN FROM PALOS PARK QUADRANGLE-1953) 84-15

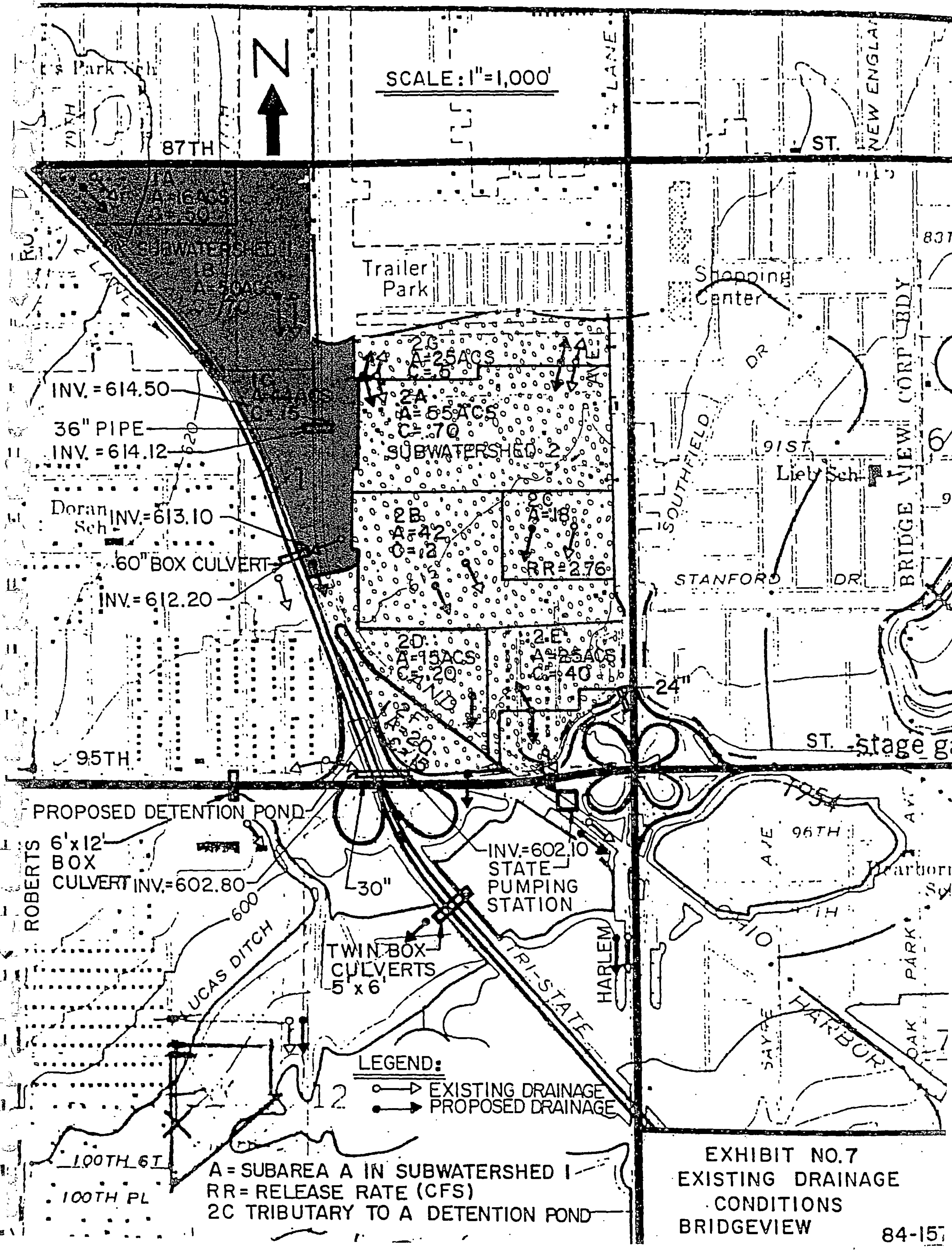


EXHIBIT NO.7
EXISTING DRAINAGE CONDITIONS
BRIDGEVIEW

84-157

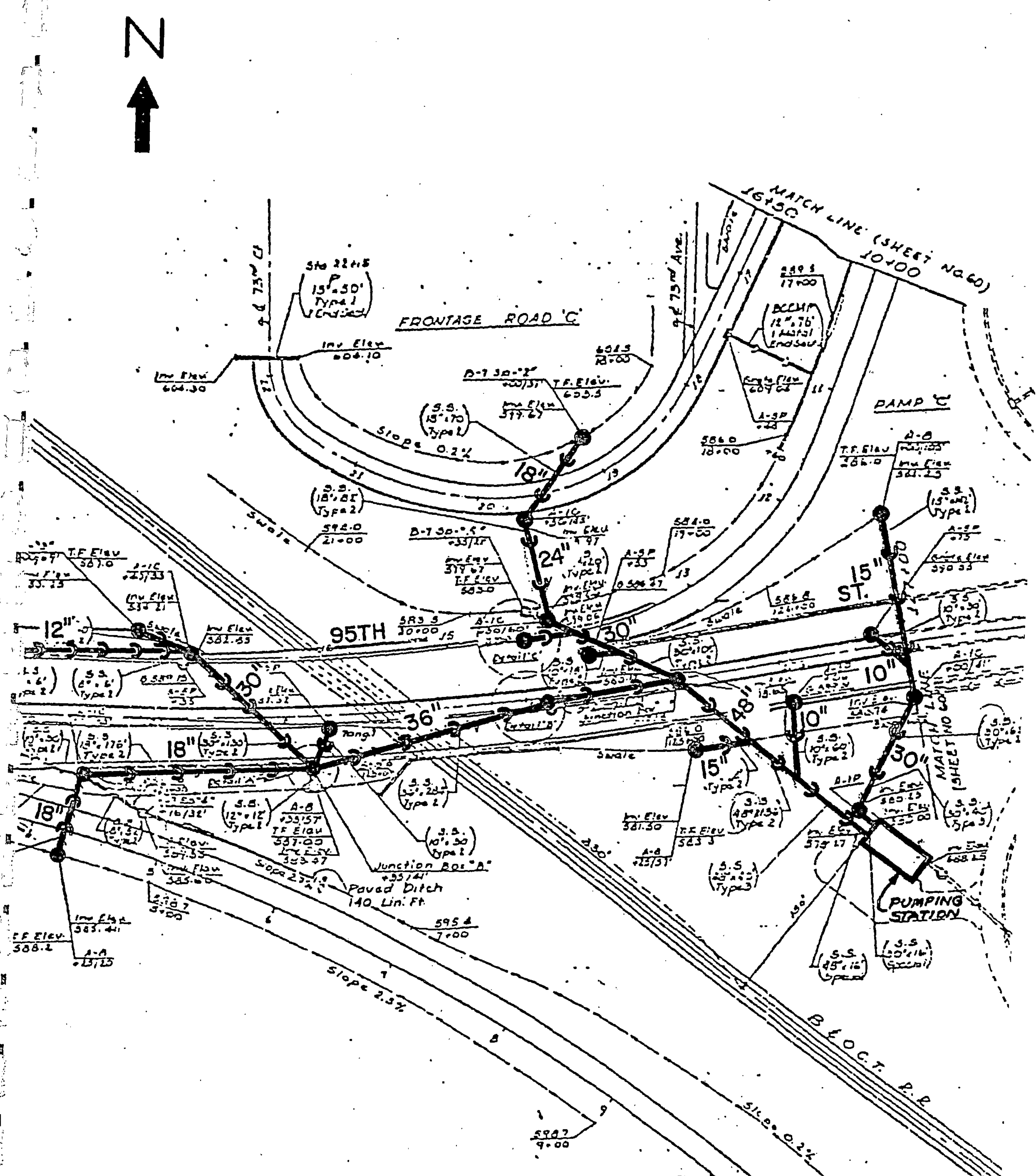


EXHIBIT NO. 8
EXISTING DRAINAGE
AT 95TH ST. & B.&O.C.T.R.R
BRIDGEVIEW 84-157

EXHIBIT NO. 9

ACTUAL CENTRAL DETENTION POND
RELEASE RATE CALCULATION

From USGS: High Elev = 6731.00 @ NW X

Low Elev @ Baltimore & Ind. & Ohio Railroad
= 618.00
Distance = 2100'

Slope = 0.0062

(Surface Runoff) - Assume Poor Grass

From MSD Nomograph t_c = 40 minutes
Travel time to proposed pond t_t
Existing Swale (Assume 1'/sec)
Length = 4800'
t_t = 4800 seconds = 80 minutes

Total Time = $t_c + t_t$ = 40 + 80 = 120 minutes

Intensity of a 120 min. 3-yr. frequency storm (I_3) = 1 in/hr.
Tributary Area (A) = 285 acres
Allowable calculated release rate (Q)

$Q = .15\ I_3A$
$Q = .15 \times 1 \times 285$
$Q = 42.75$ Total Release

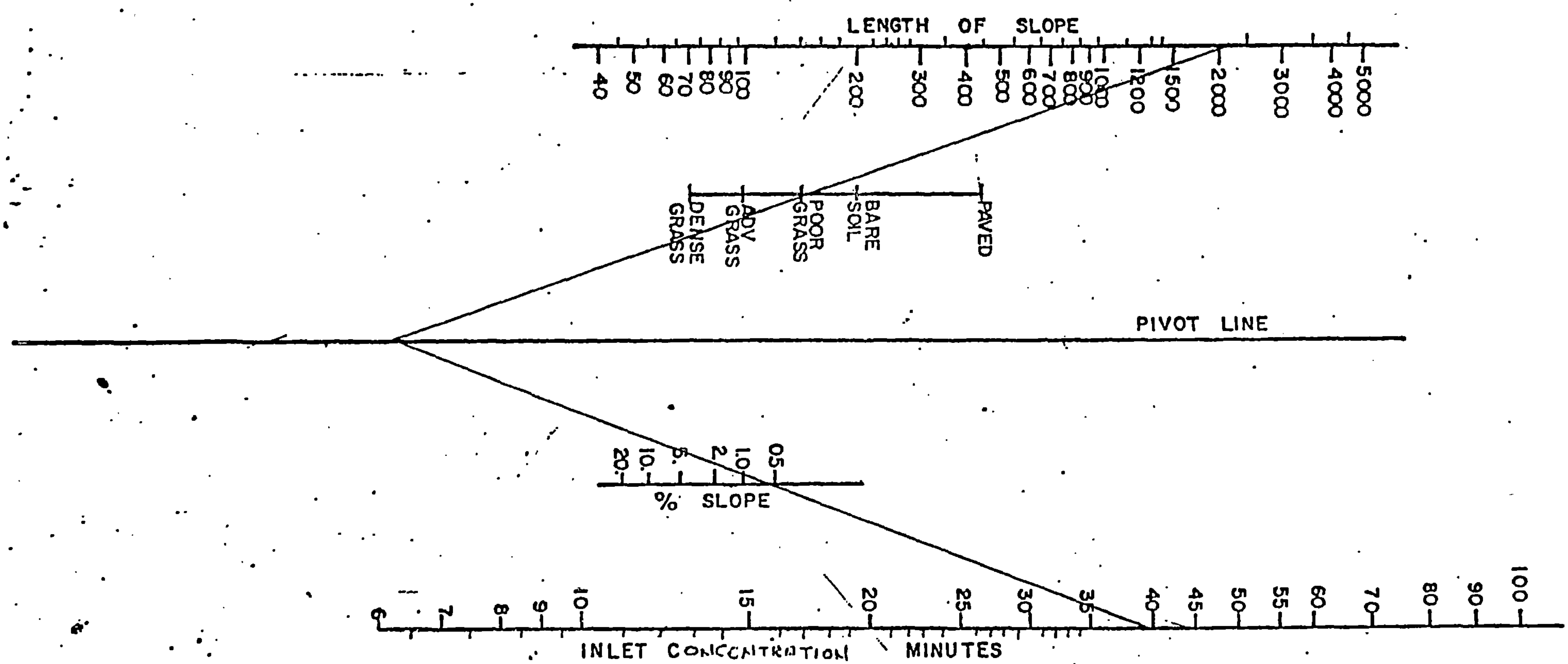

LENGTH OF SLOPE
40 50 60 70 80 90 100 200 300 400 500 600 700 800 900 1000 1200 1500 2000 3000 4000 5000
DENSE GRASS
ADV GRASS
POOR GRASS
BARE SOIL
PAVED
PIVOT LINE
20. 10. 5. 2 1.0 .05
% SLOPE
6 7 8 9 10 15 20 25 30 35 40 45 50 55 60 70 80 90 100
INLET CONCENTRATION MINUTES

EXHIBIT NO. 10

REQUIRED DETENTION VOLUME CALCULATION

DATE 03-11-1988 PROJECT # 84-157

R.W. ROBINSON & ASSOC. DETENTION DATA

PROJECT NAME: I294 & 95TH ST
POND NUMBER: 1

TOTAL CONTIGUOUS AREA = 285 ACRES
TOTAL PROJ AREA = 285 ACRES
IMPERVIOUS AREA = 162.86 ACRES @ Runoff Coeff. = 0.90
PERVIOUS AREA = 122.14 ACRES @ Runoff Coeff. = 0.20
OTHER IMPERV AREAS = 0 ACRES @ Runoff Coeff. = 0.00
Composite runoff coeff. `C' = 0.60

OVERLAND FLOW TIME, EXISTING CONDITIONS = 120 min.
INTENSITY OF A 120 MIN. 3-yr FREQUENCY STORM = 1 in/hr.
ALLOWABLE CALCULATED RELEASE RATE Q = 42.75CFS.

****
DETENTION SUMMARY
****

STORM DURATION t, hrs	100 yr RAINFALL INTENSITY I , in/hr	INFLOW RATE, cfs Q =CI A	STORAGE RATE, cfs Q =Q -Q	STORAGE REQ'D, ac.ft. V=Q *t/12
0.17	7.60	1299.60	1256.85	17.805
0.33	5.50	940.50	897.75	24.688
0.50	4.40	752.40	709.65	29.569
0.67	3.70	632.70	589.95	32.939
0.83	3.20	547.20	504.45	34.891
1.00	2.80	478.80	436.05	36.337
1.50	2.10	359.10	316.35	39.544
2.00	1.70	290.70	247.95	41.325
3.00	1.20	205.20	162.45	40.613
4.00	1.00	171.00	128.25	42.750 <<MAX
5.00	0.84	143.64	100.89	42.038
6.00	0.73	124.83	82.08	41.040
7.00	0.65	111.15	68.40	39.900
8.00	0.58	99.18	56.43	37.620
9.00	0.53	90.63	47.88	35.910
10.00	0.49	83.79	41.04	34.200

RELEASE SUMMARY

FORMULA USED -- ORIFICE
HIGH WATER ELEV -- 607.5
=================
CENTER ELEV OF RESTR = 596.12
RESTR. SIZE = 24 IN.
RESTR TYPE IS: PROJ EDGE @ `C'= .5
ACTUAL RELEASE = 42.37 cfs

UME REQD. USING CALCULATED RESTRICTOR
R.W. ROBINSON & ASSOC. DETENTION DATA

PROJECT NAME: I294 & 95TH ST
POND NUMBER: 1

TOTAL CONTIGUOUS AREA = 285 ACRES
TOTAL PROJ AREA = 285 ACRES
IMPERVIOUS AREA = 162.86 ACRES @ Runoff Coeff. = 0.90
PERVIOUS AREA = 122.14 ACRES @ Runoff Coeff. = 0.20
OTHER IMPERV AREAS = 0 ACRES @ Runoff Coeff. = 0.00
Composite runoff coeff. `C' = 0.60

OVERLAND FLOW TIME, EXISTING CONDITIONS = 120 min.
INTENSITY OF A 120 MIN. 3-yr FREQUENCY STORM = 1 in/hr.
RELEASE RATE USED 42.37 cfs.
ALLOWABLE RELEASE RATE 42.75 cfs.

****
DETENTION SUMMARY
****

STORM DURATION t, hrs	RAINFALL INTENSITY I , in/hr	INFLOW RATE, cfs Q =CI A	STORAGE RATE, cfs Q =Q -Q	STORAGE REQ'D, ac.ft. V=Q *t/12
0.17	7.60	1299.60	1257.23	17.811
0.33	5.50	940.50	898.13	24.699
0.50	4.40	752.40	710.03	29.585
0.67	3.70	632.70	590.33	32.960
0.83	3.20	547.20	504.83	34.917
1.00	2.80	478.80	436.43	36.369
1.50	2.10	359.10	316.73	39.591
2.00	1.70	290.70	248.33	41.388
3.00	1.20	205.20	162.83	40.708
4.00	1.00	171.00	128.63	42.877 <<MAX
5.00	0.84	143.64	101.27	42.196
6.00	0.73	124.83	82.46	41.230
7.00	0.65	111.15	68.78	40.122
8.00	0.58	99.18	56.81	37.873
9.00	0.53	90.63	48.26	36.195
10.00	0.49	83.79	41.42	34.517

EXHIBIT NO. 11

ACTUAL DETENTION POND
VOLUME CALCULATIONS

84-157P APR/19/86 84-157E

84-157

STATION	CUT VOLUME	CUT AREA	FILL VOLUME	FILL AREA	EXCAV. + EMBANK.-	MASS
0+00.00		0		0		0
	0		0		0	
0+04.00		0		0		0
	0		-1022		-1022	
0+50.00		0		-1200		-1022
	0		-10331		-10331	
1+90.00		0		-2786		-11353
	0		-20015		-20015	
3+60.00		0		-3572		-31368
	0		-5752		-5752	
4+00.00		0		-4193		-37120
	0		-24144		-24144	
5+10.00		0		-7660		-61264
	0		-25559		-25559	
6+20.00		0		-4887		-86823
	0		-3620		-3620	
6+60.00		0		0		-90443

TOTAL CUT = 0 TOTAL FILL = -90443 NET = -90443

56.05 Ac ft.

BEGINNING SLOPES

0.00 C   0.00 F

1	-40.00	610.00
2	-36.00	609.00
3	515.00	609.00
4	519.00	610.00

ENDING SLOPES

0.00 C   0.00 F

6+20.00

BEGINNING SLOPES

0.00 C   0.00 F

1	0.00	610.00
2	4.00	609.00
3	595.00	609.00
4	600.00	610.00

ENDING SLOPES

0.00 C   0.00 F

6+60.00

BEGINNING SLOPES

0.00 C   0.00 F

1	0.00	610.00
2	630.00	610.00

ENDING SLOPES

0.00 C   0.00 F

1+90.00

BEGINNING SLOPES

0.00 C   0.00 F

1	0.00	610.00
2	4.00	609.00
3	280.00	609.00
4	284.00	610.00

ENDING SLOPES

0.00 C   0.00 F

3+60.00

BEGINNING SLOPES

0.00 C   0.00 F

1	0.00	610.00
2	4.00	609.00
3	406.00	609.00
4	410.00	610.00

ENDING SLOPES

0.00 C   0.00 F

4+00.00

BEGINNING SLOPES

0.00 C   0.00 F

1	-40.00	610.00
2	-36.00	609.00
3	430.00	609.00
4	434.00	610.00

ENDING SLOPES

0.00 C   0.00 F

5+10.00

FINISHED GRADES

0+00.00

BEGINNING SLOPES

0.00 C 0.00 F

1	0.00	610.00
2	155.00	610.00

ENDING SLOPES

0.00 C 0.00 F

0+04.00

BEGINNING SLOPES

0.00 C 0.00 F

1	0.00	610.00
2	4.00	609.00
3	151.00	609.00
4	155.00	610.00

ENDING SLOPES

0.00 C 0.00 F

0+50.00

BEGINNING SLOPES

0.00 C 0.00 F

1	0.00	610.00
2	4.00	609.00
3	180.00	609.00
4	184.00	610.00

ENDING SLOPES

0.00 C 0.00 F

EXISTING GRADES

0+00.00

1	0.00	610.00
2	155.00	610.00

0+04.00

1	0.00	610.00
2	4.00	609.00
3	151.00	609.00
4	155.00	610.00

0+50.00

1	0.00	610.00
2	4.00	609.00
3	50.00	598.00
4	70.00	598.00
5	83.00	606.00
6	100.00	606.00
7	112.00	598.00
8	135.00	598.00
9	180.00	609.00
10	184.00	610.00

1+90.00

1	0.00	610.00
2	4.00	609.00
3	60.00	595.50
4	160.00	596.00
5	225.00	598.00
6	280.00	609.00
7	284.00	610.00

3+60.00

1	0.00	610.00
2	4.00	609.00
3	40.00	600.00
4	100.00	599.50
5	160.00	600.00
6	350.00	597.25

7	406.00	609.00
8	410.00	610.00

4+00.00

1	-40.00	610.00
2	-36.00	609.00
3	0.00	600.00
4	120.00	599.25
5	200.00	600.00
6	380.00	597.30
7	430.00	609.00
8	434.00	610.00

5+10.00

1	-40.00	610.00
2	-36.00	609.00
3	0.00	600.00
4	115.00	598.00
5	230.00	600.00
6	340.00	568.00
7	400.00	599.00
8	460.00	598.25
9	515.00	609.00
10	519.00	610.00

6+20.00

1	0.00	610.00
2	4.00	609.00
3	50.00	600.00
4	545.00	600.00
5	595.00	609.00
6	600.00	610.00

6+60.00

1	0.00	610.00
2	630.00	610.00

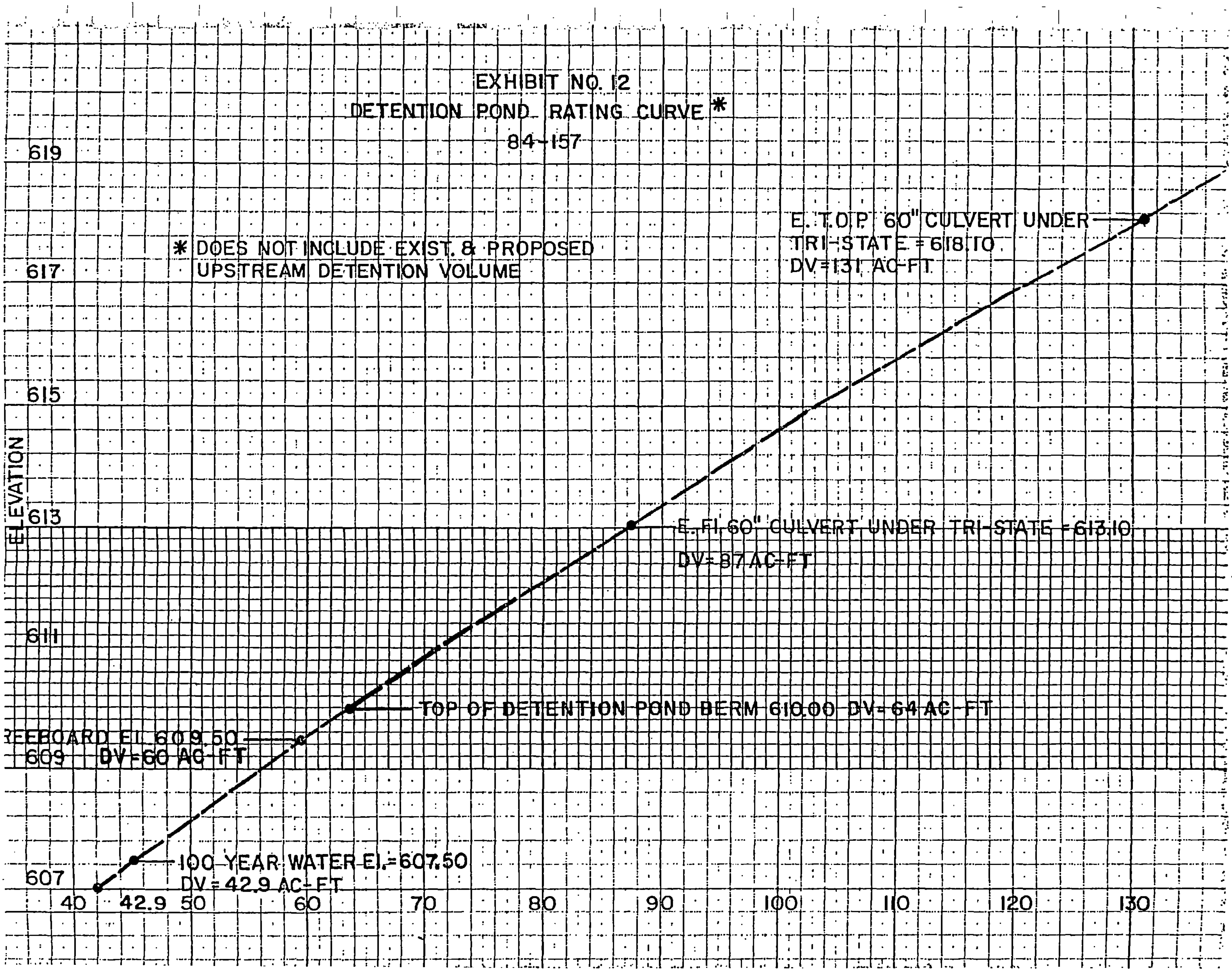


EXHIBIT NO. 12
DETENTION POND RATING CURVE *
84-157
* DOES NOT INCLUDE EXIST. & PROPOSED UPSTREAM DETENTION VOLUME
E. T.O.P. 60" CULVERT UNDER TRI-STATE = 618.10
DV=131 AC-FT
E. FI. 60" CULVERT UNDER TRI-STATE = 613.10
DV=87 AC-FT
TOP OF DETENTION POND BERM 610.00 DV=64 AC-FT
FREEBOARD EL. 609.50
DV=60 AC-FT
100 YEAR WATER EL.=607.50
DV=42.9 AC-FT
ELEVATION
619
617
615
613
611
609
607
40
42.9
50
60
70
80
90
100
110
120
130

EXHIBIT NO. 13

CALCULATION OF ESTIMATED UPSTREAM DETENTION IN SUBWATERSHEDS 1 AND 2

ESTIMATED UPSTREAM DETENTION IN SUBWATERSHEDS 1 & 2
VILLAGE OF BRIDGEVIEW
DEVELOPED CONDITION STORM SEWER CONSTRUCTED

PIPE DIA (IN)	PIPE LENGTH (FT)	CROSS SECTIONAL AREA (SQ FT)	DETENTION VOLUME (AC-FT)
84	1400	38.47	1.24
78	1100	33.17	0.84
72	600	28.26	0.39
60	1100	19.63	0.50
54	500	15.90	0.18
48	900	12.56	0.26
42	900	9.62	0.20
36	1500	7.07	0.24
30	1700	4.91	0.19
24	2200	3.14	0.16
21	1000	2.40	0.06
18	1800	1.77	0.07
15	5500	1.23	0.15
12	6000	0.79	0.11
SUBTOTALS	26200		4.58

MANHOLE DIA (FT)	NUMBER	AVG DEPTH (FT)	
5	87	7	0.28
4	87	7	0.18
SUBTOTALS	175		0.45

CB DIA (FT)	NUMBER	AVG DEPTH (FT)	
4	349	5	0.50
SUBTOTALS	349		0.50

EXIST DETENTION POND @ WAREHOUSE CLUB	2.92
TOTAL UPSTREAM DETENTION	8.46

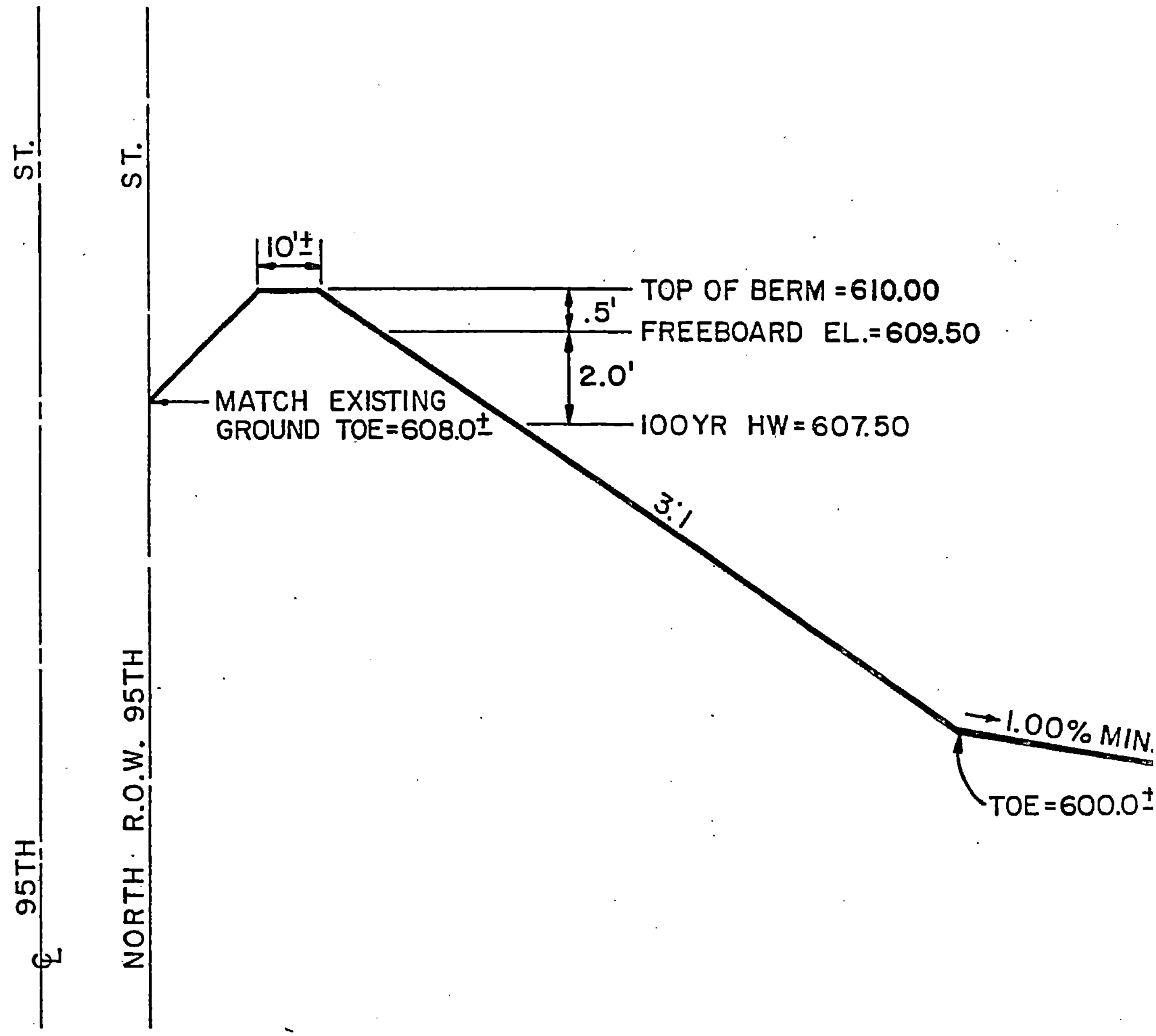


EXHIBIT NO. 14
TYPICAL DETENTION POND
CROSS SECTION

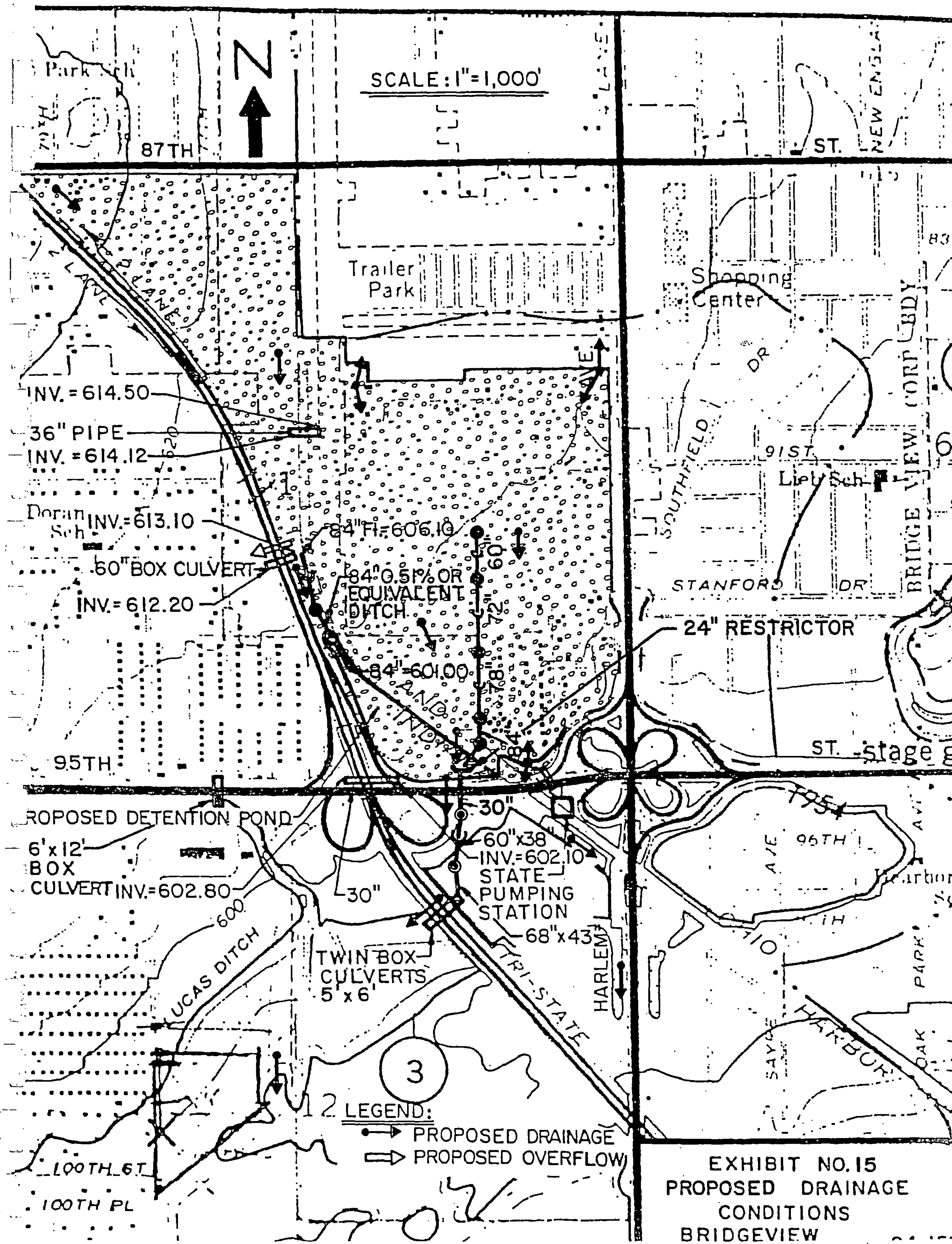


EXHIBIT NO. 15
PROPOSED DRAINAGE CONDITIONS
BRIDGEVIEW

EXHIBIT NO. 16

OVERFLOW INTO THE STATE PUMP STATION

OVERFLOW FROM DETENTION POND INTO STATE PUMP STATION

OVERFLOW OCCURS ONLY ABOVE FREEBOARD ELEVATION OF 610.5
FOR 2 LOWEST MH RIMS ON ODELL & OCTAVIA 500 FT S OF 93RD ST
RIM ELEVATION = 610.5

PIPE DIA INCHES	FEET	LENGTH FT	FLOW CFS	HYDRAULIC SLOPE FT/FT	WATER ELEV IN POND	HYDRAULIC GRADE LINE
84	7	400	2	0.0000001	611	611.00
78	6.5	650	2	0.0000001	611	611.00
30	2.5	350	2	0.0000241	611	610.99
24	2	350	2	0.0000794	611	610.96
15	1.25	500	2	0.0009764	611	610.48

TOTAL OVERFLOW = 2 MH @ 2CFS = 4CFS

EXHIBIT NO. 18

SIZING OF STORM SEWER FROM THE
DETENTION POND TO THE 60" TOLLWAY CULVERT

SIZING OF STORM SEWER FORM DETENTION POND
TO 60" CULVERT UNDER THE TRI STATE TOLLWAY

Design Considerations: Storm Sewer is designed for 100-year expected runoff to prevent 100-year expected flow from watershed 1 from flowing into 60" culvert under Tri State Tollway.

Ceiling of storm sewer set at flow line of 60" culvert under Tri State Tollway.

Flow line of 60" culvert under Tri State	613.10
Ceiling of proposed 84" storm sewer at 60" culvert under Tri State	$613.^{6}$
Flow line of proposed 84" storm sewer at 60" culvert under Tri State	$606.^{6}$
Flow line of 84" storm sewer at north line of detention pond	$601.^{50}$
Length	1000 feet
Slope (606.6 - $601.^{50}$)/1000	.51%
N (Roughness Coefficient)	0.13
Q (Discharge)	450 cfs
100-year expected flow	231.7 cfs
(Totally developed condition) See Exhibit No. 26E	5.2 fps

Conclusion - 84" is OK

EXHIBIT NO. 19

STORM SEWER CALCULATIONS

TRUNK SEWER ON OKETO AVE.
FROM DETENTION POND TO 600'±
SOUTH OF 90TH STREET
(STATION 25+00 ON OKETO AVE.
OKETO AVE. 600'± SOUTH OF
90th STREET)

LEG NUMBER 1

STARTING UPSTREAM INVELEV. 609

DESIGN DIAMETER OF PIPE	CAPACITY FULL	VELOCITY FPS		INVERT ELEVATION		MANHOLE INVERT DROP	SLOPE OF SEWER	SLOPE OF HGL	UPSTREAM RIM ELEVATION	DOWN STREAM RIM ELEVATION	COVER AT UPSTREAM MH	COVER AT DOWN STREAM MH	RCCP PIPE CLASS
		FLOWING FULL	DESIGN FLOW	UPPER END	LOWER END								
INCHES	CFS						FT/FT	FT/FT			(FT)	(FT)	
60	107.41	5.47	5.31	609.00	606.23	0.00	0.0037	0.0017	616.00	615.5	1.50	3.77	2
72	174.76	6.18	6.27	606.23	603.82	0.00	0.0037	0.0017	615.50	613.51	2.69	3.11	2
78	216.41	6.52	5.80	603.82	601.60	0.00	0.0037	0.0017	613.51	611.5	2.56	2.77	1
84	263.76	6.86	5.35	601.60	599.29	0.00	0.0037	0.0017	611.50	610	2.23	3.05	2

'ORM SEWER COMPUTATION SHEET

MPUTED GB

HECKED GB

R PROJECT NO. 84-157

ROUTE OKETO AVE
STA 25+00=600' S OF 90TH ST ON OKETO

SECTION BRIDGEVIEW

COUNTY COOK

10 YEAR STORM FREQUENCY ?

ROUGHNESS COEFFICIENT(N)= 0.013

STATION		LENGTH (FEET)	DRAINAGE AREA "A" (ACRES)		RUNOFF COEFFI-CIENT "C"	"A" * "C"		FLOW TIME MIN.		RAINFALL INTENSITY "I" IN/HOUR	TOTAL RUNOFF Q=CIA (CFS)	DIAMETER FOR DESIGN PURPOSES IF THE VELOCITY IS EQUAL TO:		
ROM	TO		INCREMENT	TOTAL		INCREMENT	TOTAL	TO UPPER END	IN SECTION			2FPS INCHES	3FPS INCHES	5FPS INCHES
5+00	18+75	750	55	55	0.7	38.5	38.5	33.00	4.17	2.71	104.25	97.76	73.82	61.83
3+75	12+25	650	60	115	0.53	31.8	70.3	37.17	3.61	2.52	177.17	127.45	104.06	80.60
2+25	6+25	600	15	130	0.7	10.5	80.8	40.78	3.33	2.38	192.28	132.77	108.40	83.97
6+25	OUTFALL	625	25	155	0.4	10	90.8	44.11	3.47	2.26	205.63	137.30	112.10	86.84

EXHIBIT NO. 20

STORM SEWER CALCULATIONS IN THE
VICINITY OF 93RD STREET AND ODELL AVE.
(SUBWATERSHED 2E)

LEG NUMBER NA

STARTING UPSTREAM INVELEV. NA

DESIGN DIAMETER OF PIPE	CAPACITY FULL	VELOCITY FPS		INVERT ELEVATION		MANHOLE INVERT DROP	SLOPE OF SEWER	SLOPE OF HGL	UPSTREAM RIM ELEVATION	DOWN STREAM RIM ELEVATION	COVER AT UPSTREAM MH	COVER AT DOWN STREAM MH	RCCP PIPE CLASS
		FLOWING FULL	DESIGN FLOW	UPPER END	LOWER END								
INCHES	CFS						FT/FT	FT/FT			(FT)	(FT)	
15	4.98	4.06	4.02	609.25	607.45	0.00	0.006	0.006	613.00	612.33	2.31	3.41	4
24	15.95	5.08	4.90	607.45	605.70	0.00	0.005	0.005	612.33	613.17	2.63	5.22	4
30	25.89	5.28	4.73	605.70	604.30	0.00	0.004	0.004	613.17	613.5	4.68	6.41	3
15	4.98	4.06	3.68	608.00	605.00	0.00	0.006	0.006	611.50	612.33	2.06	5.89	4
15	4.55	3.71	3.08	608.00	605.75	0.00	0.005	0.005	611.50	613.17	2.06	5.98	4
15	4.55	3.71	3.08	610.00	608.50	0.00	0.005	0.005	614.00	612.71	2.56	2.77	4
18	7.40	4.19	3.54	608.50	607.00	0.00	0.005	0.005	612.71	614.5	2.50	5.79	4
24	15.95	5.08	4.37	607.00	605.25	0.00	0.005	0.005	614.50	613.91	5.25	6.41	3
30	22.42	4.57	3.82	605.25	604.35	0.00	0.003	0.003	613.91	615.87	5.87	8.73	3
12	3.17	4.04	3.76	610.00	607.60	0.00	0.008	0.008	613.61	613.91	2.44	5.14	4
15	4.98	4.06	4.02	610.00	607.90	0.00	0.006	0.006	615.00	614.5	614.50	5.16	3

STORM SEWER COMPUTATION SHEET

COMPUTED gb — ROUTE SUBWATERSHED 2E — 10 YEAR STORM FREQUENCY

CHECKED gb — SECTION NA — ROUGHNESS COEFFICIENT(N)= 0.013

RWR PROJECT NO. 84-157 — COUNTY COOK

STATION FROM	STATION TO	LENGTH (FEET)	DRAINAGE AREA "A" (ACRES) INCREMENT	DRAINAGE AREA "A" (ACRES) TOTAL	RUNOFF COEFFICIENT "C"	"A" x "C" INCREMENT	"A" x "C" TOTAL	FLOW TIME MIN. TO UPPER END	FLOW TIME MIN. IN SECTION	RAINFALL INTENSITY "I" IN/HOUR	TOTAL RUNOFF Q=CIA (CFS)	DIAMETER FOR DESIGN PURPOSES IF THE VELOCITY IS EQUAL TO: 2FPS INCHES	3FPS INCHES	5FPS INCHES
1	2	300	3	3	0.4	1.2	1.2	15.00	1.67	4.10	4.93	21.25	17.35	13.44
2	3	350	6.85	9.85	0.4	2.74	3.94	16.67	1.94	3.91	15.40	37.57	30.68	23.76
3	4	350	5.8	15.65	0.4	2.32	6.26	18.61	1.94	3.70	23.19	46.11	37.64	29.16
5	2	500	2.75	2.75	0.4	1.1	1.1	15.00	2.78	4.10	4.51	20.34	16.61	12.87
6	2	450	2.3	2.3	0.4	0.92	0.92	15.00	2.50	4.10	3.78	18.61	15.19	11.77
7	8	300	2.3	2.3	0.4	0.92	0.92	15.00	1.67	4.10	3.78	18.61	15.19	11.77
8	9	300	1.7	4	0.4	0.68	1.6	16.67	1.67	3.91	6.25	23.94	19.55	15.14
9	10	350	5.2	9.2	0.4	2.08	3.68	18.33	1.94	3.73	13.73	35.48	28.97	22.44
10	11	300	4	13.2	0.4	1.6	5.28	20.28	1.67	3.55	18.73	41.44	33.83	26.21
12	10	300	1.8	1.8	0.4	0.72	0.72	15.00	1.67	4.10	2.96	16.46	13.44	10.41
13	9	350	3	3	0.4	1.2	1.2	15.00	1.94	4.10	4.93	21.25	17.35	13.44

EXHIBIT NO. 21

DESIGN OF 84-INCH EQUIVALENT DITCH
FROM 60" TOLLWAY CULVERT TO THE
PROPOSED DETENTION POND

CALCULATION OF TRAPEZOIDAL DITCH DISCHARGE

STATION /LOCATION OR PROJECT NO.	DITCH FROM DETENTION POND TO 60" CULVERT	
ENTER ROUGHNESS COEFFICIENT	0.03	
ENTER LENGTH OF BOTTOM (FT)	4	
ENTER DEPTH OF FLOW (FT)	4	
ENTER LEFT SIDE SLOPE (X:1)	3	
ENTER RIGHT SIDE SLOPE (Y:1)	3	
ENTER LONGITUDINAL SLOPE (FT/FT)	0.0051	
WIDTH OF FLOW	28.00	
CROSS SECTIONAL AREA OF FLOW (SQ FT)	64.00	
LENGTH OF LEFT SLOPE (FT)	12.65	
LENGTH OF RIGHT SLOPE (FT)	12.65	
WETTED PERIMETER (FT)	29.30	
HYDRAULIS RADIUS (FT)	2.18	
HYDRAULIC RADIUS (2/3)	1.69	
SQUARE ROOT OF LONGITUDINAL SLOPE	0.07	
DISCHARGE OF DITCH (CFS)	382.14	100YR EXPECTED FLOW=231.7 CFS OK
VELOCITY(FPS)	5.97	
CONVEYANCE (KD)	5350.99	

EXHIBIT NO. 23
SCHEME 1

STORM SEWER CALCULATIONS FOR
AREA WEST OF THE TOLLWAY AND
NORTH OF 95TH ST. IN
HICKORY HILLS

DRAIN TRIBUTARY PORTIONS OF HICKORY HILLS
AND TOLLWAY

STORM SEWER COMPUTATION SHEET

COMPUTED GB

ROUTE 95TH ST &TRI STATE

10 YEAR STORM FREQUENCY

CHECKED GB

CITY HICKORY HILLS

ROUGHNESS COEFFICIENT(N)= 0.013

RWR PROJECT NO. 84-157

COUNTY COOK

STATION FROM	STATION TO	LENGTH (FEET)	DRAINAGE AREA "A" (ACRES) INCREMENT	DRAINAGE AREA "A" (ACRES) TOTAL	RUNOFF COEFFICIENT "C"	"A" * "C" INCREMENT	"A" * "C" TOTAL	FLOW TIME MIN. TO UPPER END	FLOW TIME MIN. IN SECTION	RAINFALL INTENSITY "I" IN/HOUR	TOTAL RUNOFF Q=CIA (CFS)	DIAMETER IF VELOCITY 2FPS INCHES	DIAMETER IF VELOCITY 3FPS INCHES	DIAMETER IF VELOCITY 5FPS INCHES	DESIGN DIAMETER OF PIPE INCHES
1	2	450	49.3	49.3	0.43	21.199	21.199	28.00	2.50	2.98	63.16	76.09	62.13	48.12	48
2	3	1200	2	51.3	0.5	1	22.199	30.50	6.67	2.84	62.96	75.97	62.03	48.05	48
3	4	1900	17.1	68.4	0.5	8.55	30.749	37.17	10.56	2.52	77.49	84.29	68.82	53.31	54
4	5	300	9.4	77.8	0.5	4.7	35.449	47.72	1.67	2.15	76.33	83.65	68.30	52.91	54
5	6	300	7.1	84.9	0.5	3.55	38.999	49.39	1.67	2.11	82.13	86.77	70.85	54.88	54
6	7	150	20.6	105.5	0.5	10.3	49.299	51.06	0.83	2.06	101.60	96.51	78.80	61.04	60
8	5	1300	7.1	7.1	0.5	3.55	3.55	23.00	7.22	3.32	11.79	32.88	26.84	20.79	30
9	5	2500	20.6	20.6	0.5	10.3	10.3	30.00	13.89	2.86	29.49	52.00	42.46	32.89	36
10	7	4000	125	125	0.5	62.5	62.5	47.00	22.22	2.17	135.91	111.62	91.14	70.60	66

LEG NUMBER NA

STARTING UPSTREAM INVELEV. NA

CAPACITY FULL	VELOCITY FPS		INVERT ELEVATION		MANHOLE INVERT DROP	SLOPE OF SEWER	SLOPE OF HGL	UPSTREAM RIM ELEVATION	DOWN STREAM RIM ELEVATION	COVER AT UPSTREAM MH	COVER AT DOWN STREAM MH	RCCP PIPE CLASS
	FLOWING FULL	DESIGN FLOW	UPPER END	LOWER END								
CFS						FT/FT	FT/FT			(FT)	(FT)	
71.79	5.72	5.03	609.00	607.88	0.00	0.0025	0.0025	615.00	614	1.58	1.71	2
71.79	5.72	5.01	607.88	604.88	0.00	0.0025	0.0025	614.00	613	1.71	3.71	3
98.31	6.18	4.87	604.88	600.13	0.00	0.0025	0.0025	613.00	616	3.17	10.92	4
98.31	6.18	4.80	600.13	599.38	0.00	0.0025	0.0025	616.00	613	10.92	8.67	4
98.31	6.18	5.17	599.38	598.63	0.00	0.0025	0.0025	613.00	613	8.67	9.42	2
130.25	6.64	5.18	598.63	598.25	0.00	0.0025	0.0025	613.00	613	8.88	9.25	2
20.47	4.17	2.40	603.50	600.25	0.00	0.0025	0.0025	614.00	613	7.71	9.96	3
33.30	4.71	4.17	606.00	599.75	0.00	0.0025	0.0025	614.00	613	4.67	9.92	3
168.00	7.07	5.72	607.00	597.00	0.00	0.0025	0.0025	615.00	613	1.96	9.96	2

EXHIBIT NO. 24
SCHEME 2

STORM SEWER CALCULATIONS FOR THE AREA WEST OF THE TOLLWAY AND NORTH OF 95th STREET IN HICKORY HILLS EXCLUDING THE TOLLWAY IN HICKORY HILLS.

STORM SEWER COMPUTATION SHEET

COMPUTED GB | ROUTE 95TH ST &TRI STATE | 10 YEAR STORM FREQUENCY

CHECKED GB | CITY HICKORY HILLS EXCLUDING TOLLWAY TRIBUTARY AREA | ROUGHNESS COEFFICIENT(N)= 0.01

RHR PROJECT NO. 84-157 | COUNTY COOK

STATION		LENGTH (FEET)	DRAINAGE AREA "A" (ACRES)		RUNOFF COEFFI-CIENT "C"	"A" * "C"		FLOW TIME MIN.		RAINFALL INTENSITY "I" IN/HOUR	TOTAL RUNOFF Q=CIA (CFS)	DIAMETER FOR DESIGN PURPOSE IF THE VELOCITY IS EQUAL TO 2FPS	3FPS	5FPS
FROM	TO		INCREMENT	TOTAL		INCREMENT	TOTAL	TO UPPER END	IN SECTION			INCHES	INCHES	INCHES
1	2	450	41	41	0.41	16.81	16.81	28.00	2.50	2.98	50.08	67.76	55.32	42.[illegible]
2	3	1200	2	43	0.5	1	17.81	30.50	6.67	2.84	50.51	68.05	55.56	43.[illegible]
3	4	1900	0	43	0.5	0	17.81	37.17	10.56	2.52	44.89	64.15	52.37	40.[illegible]
4	5	300	4.7	47.7	0.5	2.35	20.16	47.72	1.67	2.15	43.41	63.09	51.51	39.[illegible]
5	6	300	7.1	54.8	0.5	3.55	23.71	49.39	1.67	2.11	49.93	67.66	55.24	42.[illegible]
6	7	150	20.6	75.4	0.5	10.3	34.01	51.06	0.83	2.06	70.09	80.16	65.45	50.[illegible]
8	5	1300	7.1	7.1	0.5	3.55	3.55	23.00	7.22	3.32	11.79	32.88	26.84	20.[illegible]
9	5	2500	20.6	20.6	0.5	10.3	10.3	30.00	13.89	2.86	29.49	52.00	42.46	32.[illegible]
10	7	4000	125	125	0.5	62.5	62.5	47.00	22.22	2.17	135.91	111.62	91.14	70.[illegible]

LEG NUMBER NA

STARTING UPSTREAM INVELEV. NA

DESIGN DIAMETER OF PIPE INCHES	CAPACITY FULL CFS	VELOCITY FPS FLOWING FULL	VELOCITY FPS DESIGN FLOW	INVERT ELEVATION UPPER END	INVERT ELEVATION LOWER END	MANHOLE INVERT DROP	SLOPE OF SEWER FT/FT	SLOPE OF HGL FT/FT	UPSTREAM RIM ELEVATION	DOWN STREAM RIM ELEVATION	COVER AT UPSTREAM MH (FT)	COVER AT DOWN STREAM MH (FT)	RCCP PIPE CLASS
42	50.26	5.23	5.21	609.00	607.88	0.00	0.0025	0.0025	615.00	614	2.13	2.25	2
42	50.26	5.23	5.25	607.88	604.88	0.00	0.0025	0.0025	614.00	613	2.25	4.25	3
42	50.26	5.23	4.67	604.88	600.13	0.00	0.0025	0.0025	613.00	616	4.25	12.00	4
42	50.26	5.23	4.51	600.13	599.38	0.00	0.0025	0.0025	616.00	613	12.00	9.75	4
42	50.26	5.23	5.19	599.38	598.63	0.00	0.0025	0.0025	613.00	613	9.75	10.50	4
48	71.79	5.72	5.58	598.63	598.25	0.00	0.0025	0.0025	613.00	613	9.96	10.33	4
30	20.47	4.17	2.40	603.50	600.25	0.00	0.0025	0.0025	614.00	613	7.71	9.96	3
36	33.30	4.71	4.17	606.00	599.75	0.00	0.0025	0.0025	614.00	613	4.67	9.92	3
66	168.00	7.07	5.72	607.00	597.00	0.00	0.0025	0.0025	615.00	613	1.96	9.96	2

EXHIBIT NO. 25
SCHEME 3

STORM SEWER CALCULATIONS FOR THE
TOLLWAY ONLY IN HICKORY HILLS

STORM SEWER COMPUTATION SHEET

COMPUTED GB

ROUTE 95TH ST &TRI STATE

10 YEAR STORM FREQUENCY

CHECKED GB

CITY HICKORY HILLS
DRAIN TOLLWAY ONLY INTO 6'*12'BOX ON 95TH ST

ROUGHNESS COEFFICIENT(N)= 0.013

RWR PROJECT NO. 84-157

COUNTY COOK

STATION		LENGTH (FEET)	DRAINAGE AREA "A" (ACRES)		RUNOFF COEFFI-CIENT '"C"	'"A" * "C"		FLOW TIME MIN.		RAINFALL INTENSITY "I" IN/HOUR	TOTAL RUNOFF Q=CIA (CFS)	DIAMETER FOR DESIGN PURPOSES IF THE VELOCITY IS EQUAL TO:			DESIGN DIAMETE OF PIPE
FROM	TO		INCREMENT	TOTAL		INCREMENT	TOTAL	TO UPPER END	IN SECTION			2FPS INCHES	3FPS INCHES	5FPS INCHES	INCHES
1	2	450	8.3	8.3	0.5	4.15	4.15	28.00	2.50	2.98	12.36	33.67	27.49	21.29	2
2	3	1200	0	8.3	0.5	0	4.15	30.50	6.67	2.84	11.77	32.85	26.82	20.78	2
3	4	1900	17.1	25.4	0.5	8.55	12.7	37.17	10.56	2.52	32.01	54.17	44.23	34.26	3
4	5	300	4.7	30.1	0.5	2.35	15.05	47.72	1.67	2.15	32.41	54.51	44.50	34.47	3
5	6	300	0	30.1	0.5	0	15.05	49.39	1.67	2.11	31.69	53.90	44.01	34.09	3
6	7	150	0	30.1	0.5	0	15.05	51.06	0.83	2.06	31.02	53.32	43.54	33.72	3

LEG NUMBER NA

STARTING UPSTREAM INVELEV. NA

CAPACITY FULL CFS	VELOCITY FPS FLOWING FULL	VELOCITY FPS DESIGN FLOW	INVERT ELEVATION UPPER END	INVERT ELEVATION LOWER END	MANHOLE INVERT DROP	SLOPE OF SEWER FT/FT	SLOPE OF HGL FT/FT	UPSTREAM RIM ELEVATION	DOWN STREAM RIM ELEVATION	COVER AT UPSTREAM MH (FT)	COVER AT DOWN STREAM MH (FT)	RCCP PIPE CLASS
11.28	3.59	3.94	609.00	607.88	0.00	0.0025	0.0025	615.00	614	3.75	3.88	3
11.28	3.59	3.75	607.88	604.88	0.00	0.0025	0.0025	614.00	613	3.88	5.88	3
33.30	4.71	4.53	604.88	600.13	0.00	0.0025	0.0025	613.00	616	4.79	12.54	4
33.30	4.71	4.59	600.13	599.38	0.00	0.0025	0.0025	616.00	613	12.54	10.29	4
33.30	4.71	4.49	599.38	598.63	0.00	0.0025	0.0025	613.00	613	10.29	11.04	4
33.30	4.71	4.39	598.63	598.25	0.00	0.0025	0.0025	613.00	613	11.04	11.42	4

EXHIBITS 26A - 26E

CALCULATION OF EXPECTED
RUNOFF FOR SUBWATERSHEDS 1 & 2

EXHIBIT 26A

CALCULATION OF EXPECTED RUNOFF AND REQUIRED STORM SEWER SIZES

PROJECT NO.	84-157
TOWN	BRIDGEVIEW
AREA DESCRIPTION	SUBWATERSHED 2
UPSTREAM LOCATION	300 FT E OF BOCTT RR &1800 FT S OF 87TH ST
DOWNSTREAM LOCATION	STATE PUMP STATION
CONDITION	EXISTING

I.INITIAL TIME OF CONCENTRATION(Ti)	0 MINUTES
II.OVERLAND FLOW TIME(To)	
HIGH GROUND ELEVATION	618
LOW GROUND ELEVATION	612
HYDRAULIC LENGTH(L)	2500 FEET
RUNOFF COEFFICIENT(Co)	0.45
AVERAGE GROUND SLOPE	0.24 %
OVERLAND FLOW TIME(To)	94.1 MINUTES
III.DITCH FLOW TIME(Td)	
LENGTH OF DITCH	1200 FEET
DITCH VELOCITY	1.67 FPS
DITCH FLOW TIME(Td)	12.0 MINUTES
IV.STORM SEWER TRAVEL TIME(Ts)	
LENGTH OF STORM SEWER	470 FEET
STORM SEWER VELOCITY	3 FPS
STORM SEWER TRAVEL TIME(Ts)	2.6 MINUTES
V.TOTAL TIME OF CONCENTRATION(Tc) (Ti+To+Td+Ts)	108.7 MINUTES
VI.RUNOFF COEFFICIENT(C)	
SUBAREA 2A	55 ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2A	0.7
SUBAREA 2B	42 ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2B	0.2
SUBAREA 2D	15 ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2D	0.2
SUBAREA 2E	25 ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2E	0.4
SUBAREA 2F	20 ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2F	0.15
TOTAL OF SUBAREAS(A)	157 ACRES
RUNOFF COEFFICIENT(C)	0.40
VII.RETENTION POND RELEASE RATE	
AREA OF SUBAREA 2C	18 ACRES
RELEASE RATE OF POND IN SUBAREA 2	2.76 CFS
AREA OF SUBAREA	0 ACRES
RELEASE RATE OF POND IN SUBAREA	0 CFS
AREA TRIBUTARY TO PONDS(Ar)	18 ACRES
RELEASE RATE OF POND 1+2(RR)	2.76 CFS
TOTAL TRIBUTARY AREA(At=A+Ar)	175 ACRES

VIII.STORM INTENSITIES(I5,I10,I50,I100)	
I5	1.03 IN/
I10	1.22 IN/
I50	1.75 IN/
I100	2.06 IN/
IX.EXPECTED RUNOFF(Q5,Q10,Q50,Q100)	
Q5(Q5=C*I5*A+RR)	67.4 CFS
Q10(Q10=C*I10*A+RR)	79.6 CFS
Q50(Q50=C*I50*A+RR)	113.0 CFS
Q100(Q100=C*I100*A+RR)	132.1 CFS
X.REQUIRED STORM SEWER SIZES	
A.REQUIRED FOR 5YR STORM IF:	
V=2FPS	79 INC
V=3FPS	64 INC
V=5FPS	50 INC
B.REQUIRED FOR 10YR STORM IF:	
V=2FPS	85 INC
V=3FPS	70 INC
V=5FPS	54 INC
C.REQUIRED FOR 50YR STORM IF:	
V=2FPS	102 INC
V=3FPS	83 INC
V=5FPS	64 INC
D.REQUIRED FOR 100YR STORM IF:	
V=2FPS	110 INC
V=3FPS	90 INC
V=5FPS	70 INC

CALCULATION OF EXPECTED RUNOFF AND REQUIRED STORM SEWER SIZES

PROJECT NO.	84-157
TOWN	BRIDGEVIEW
AREA DESCRIPTION	SUBWATERSHED 2 S 1/3 SUBAREA 2E ONLY
UPSTREAM LOCATION	OCTAVIA 200 FT N OF FRONTAGE ROAD
DOWNSTREAM LOCATION	STATE PUMP STATION
CONDITION	PROPOSED (TO ALLOW FOR 3 FT FREEBOARD BEFORE OVERFLOW

I.INITIAL TIME OF CONCENTRATION(Ti)	15	MINUTES
II.OVERLAND FLOW TIME(To)		
HIGH GROUND ELEVATION	NA	
LOW GROUND ELEVATION	NA	
HYDRAULIC LENGTH(L)	NA	FEET
RUNOFF COEFFICIENT(Co)	NA	
AVERAGE GROUND SLOPE	NA	%
OVERLAND FLOW TIME(To)	0.0	MINUTES
III.DITCH FLOW TIME(Td)		
LENGTH OF DITCH	800	FEET
DITCH VELOCITY	1.67	FPS
DITCH FLOW TIME(Td)	8.0	MINUTES
IV.STORM SEWER TRAVEL TIME(Ts)		
LENGTH OF STORM SEWER	470	FEET
STORM SEWER VELOCITY	3	FPS
STORM SEWER TRAVEL TIME(Ts)	2.6	MINUTES
V.TOTAL TIME OF CONCENTRATION(Tc) (Ti+To+Td+Ts)	25.6	MINUTES
VI.RUNOFF COEFFICIENT(C)		
SUBAREA 2E	7.5	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2E	0.4	
SUBAREA 2B	0	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2B	0	
SUBAREA 2D	0	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2D	0	
SUBAREA 2E	0	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2E	0	
SUBAREA 2F	0	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2F	0	
TOTAL OF SUBAREAS(A)	7.5	ACRES
RUNOFF COEFFICIENT(C)	0.40	
VII.RETENTION POND RELEASE RATE		
AREA OF SUBAREA 2C	0	ACRES
RELEASE RATE OF POND IN SUBAREA 2	0	CFS
AREA OF SUBAREA	0	ACRES
RELEASE RATE OF POND IN SUBAREA	0	CFS
AREA TRIBUTARY TO PONDS(Ar)	0	ACRES
RELEASE RATE OF POND 1+2(RR)	0	CFS
TOTAL TRIBUTARY AREA(At=A+Ar)	7.5	ACRES

VIII.STORM INTENSITIES(I5,I10,I50,I100)	
I5	2.59 IN/H
I10	3.13 IN/H
I50	4.46 IN/H
I100	5.18 IN/H
IX.EXPECTED RUNOFF(Q5,Q10,Q50,Q100)	
Q5(Q5=C*I5*A+RR)	7.8 CFS
Q10(Q10=C*I10*A+RR)	9.4 CFS
Q50(Q50=C*I50*A+RR)	13.4 CFS
Q100(Q100=C*I100*A+RR)	15.5 CFS
X.REQUIRED STORM SEWER SIZES	
A.REQUIRED FOR 5YR STORM IF:	
V=2FPS	27 INCH
V=3FPS	22 INCH
V=5FPS	17 INCH
B.REQUIRED FOR 10YR STORM IF:	
V=2FPS	29 INCH
V=3FPS	24 INCH
V=5FPS	19 INCH
C.REQUIRED FOR 50YR STORM IF:	
V=2FPS	35 INCH
V=3FPS	29 INCH
V=5FPS	22 INCH
D.REQUIRED FOR 100YR STORM IF:	
V=2FPS	38 INCH
V=3FPS	31 INCH
V=5FPS	24 INCH

EXHIBIT 26C

CALCULATION OF EXPECTED RUNOFF AND REQUIRED STORM SEWER SIZES

PROJECT NO.	84-157
TOWN	BRIDGEVIEW
AREA DESCRIPTION	SUBWATERSHED 2
UPSTREAM LOCATION	300 FT E OF BOCTT RR &1800 FT S OF 87TH ST
DOWNSTREAM LOCATION	DETENTION POND
CONDITION	TOTALLY DEVELOPED(FUTURE)

I.INITIAL TIME OF CONCENTRATION(Ti) 15 MINUTES

II.OVERLAND FLOW TIME(To)

HIGH GROUND ELEVATION	NA	
LOW GROUND ELEVATION	NA	
HYDRAULIC LENGTH(L)	NA	FEET
RUNOFF COEFFICIENT(Co)	NA	
AVERAGE GROUND SLOPE	NA	%
OVERLAND FLOW TIME(To)	0.0	MINUTES

III.DITCH FLOW TIME(Td)

LENGTH OF DITCH	0	FEET
DITCH VELOCITY	1.67	FPS
DITCH FLOW TIME(Td)	0.0	MINUTES

IV.STORM SEWER TRAVEL TIME(Ts)

LENGTH OF STORM SEWER	4500	FEET
STORM SEWER VELOCITY	3	FPS
STORM SEWER TRAVEL TIME(Ts)	25.0	MINUTES

V.TOTAL TIME OF CONCENTRATION(Tc) 40.0 MINUTES
(Ti+To+Td+Ts)

VI.RUNOFF COEFFICIENT(C)

SUBAREA 2A	55	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2A	0.7	
SUBAREA 2B	42	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2B	0.7	
SUBAREA 2D	15	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2D	0.7	
SUBAREA 2E	25	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2E	0.4	
SUBAREA 2F	0	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 2F	0	
TOTAL OF SUBAREAS(A)	137	ACRES
RUNOFF COEFFICIENT(C)	0.65	

VII.RETENTION POND RELEASE RATE

AREA OF SUBAREA 2C	18	ACRES
RELEASE RATE OF POND IN SUBAREA 2	2.76	CFS
AREA OF SUBAREA	0	ACRES
RELEASE RATE OF POND IN SUBAREA	0	CFS
AREA TRIBUTARY TO PONDS(Ar)	18	ACRES
RELEASE RATE OF POND 1+2(RR)	2.76	CFS
TOTAL TRIBUTARY AREA(At=A+Ar)	155	ACRES

VIII.STORM INTENSITIES(I5,I10,I50,I100)

I5	2.00 IN/H
I10	2.41 IN/H
I50	3.44 IN/H
I100	4.01 IN/H

IX.EXPECTED RUNOFF(Q5,Q10,Q50,Q100)

Q5(Q5=C*I5*A+RR)	179.9 CFS
Q10(Q10=C*I10*A+RR)	215.7 CFS
Q50(Q50=C*I50*A+RR)	306.6 CFS
Q100(Q100=C*I100*A+RR)	357.1 CFS

X.REQUIRED STORM SEWER SIZES

A.REQUIRED FOR 5YR STORM IF:

V=2FPS	128 INCH
V=3FPS	105 INCH
V=5FPS	81 INCH

B.REQUIRED FOR 10YR STORM IF:

V=2FPS	141 INCH
V=3FPS	115 INCH
V=5FPS	89 INCH

C.REQUIRED FOR 50YR STORM IF:

V=2FPS	168 INCH
V=3FPS	137 INCH
V=5FPS	106 INCH

D.REQUIRED FOR 100YR STORM IF:

V=2FPS	181 INCH
V=3FPS	148 INCH
V=5FPS	114 INCH

EXHIBIT 26E

CALCULATION OF EXPECTED RUNOFF AND REQUIRED STORM SEWER SIZES

PROJECT NO.	84-157
TOWN	BRIDGEVIEW
AREA DESCRIPTION	SUBWATERSHED 1
UPSTREAM LOCATION	TRI STATE & 87TH ST
DOWNSTREAM LOCATION	DETENTION POND
CONDITION	TOTALLY DEVELOPED(FUTURE)

I.INITIAL TIME OF CONCENTRATION(Ti) 15 MINUTES

II.OVERLAND FLOW TIME(To)

HIGH GROUND ELEVATION	NA	
LOW GROUND ELEVATION	NA	
HYDRAULIC LENGTH(L)	NA	FEET
RUNOFF COEFFICIENT(Co)	NA	
AVERAGE GROUND SLOPE	NA	%
OVERLAND FLOW TIME(To)	0.0	MINUTES

III.DITCH FLOW TIME(Td)

LENGTH OF DITCH	0	FEET
DITCH VELOCITY	1.67	FPS
DITCH FLOW TIME(Td)	0.0	MINUTES

IV.STORM SEWER TRAVEL TIME(Ts)

LENGTH OF STORM SEWER	6000	FEET
STORM SEWER VELOCITY	3	FPS
STORM SEWER TRAVEL TIME(Ts)	33.3	MINUTES

V.TOTAL TIME OF CONCENTRATION(Tc) 48.3 MINUTES
(Ti+To+Td+Ts)

VI.RUNOFF COEFFICIENT(C)

SUBAREA 1A	16	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 1A	0.5	
SUBAREA 1B	50	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 1B	0.7	
SUBAREA 1C	44	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 1C	0.5	
SUBAREA 1D	0	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 1D	0	
SUBAREA 1E	0	ACRES
RUNOFF COEFFICIENT FOR SUBAREA 1E	0	
TOTAL OF SUBAREAS(A)	110	ACRES
RUNOFF COEFFICIENT(C)	0.59	

VII.RETENTION POND RELEASE RATE

RETENTION POND 1 TRIBUTARY AREA	0	ACRES
RELEASE RATE OF POND 1	0	CFS
RETENTION POND 2 TRIBUTARY AREA	0	ACRES
RELEASE RATE OF POND 2	0	CFS
AREA TRIBUTARY TO PONDS(Ar)	0	ACRES
RELEASE RATE OF POND 1+2(RR)	0	CFS
TOTAL TRIBUTARY AREA(At=A+Ar)	110	ACRES

VIII.STORM INTENSITIES(I5,I10,I50,I100)

I5	1.78 IN/H
I10	2.14 IN/H
I50	3.05 IN/H
I100	3.56 IN/H

IX.EXPECTED RUNOFF(Q5,Q10,Q50,Q100)

Q5(Q5=C*I5*A+RR)	115.8 CFS
Q10(Q10=C*I10*A+RR)	138.8 CFS
Q50(Q50=C*I50*A+RR)	198.4 CFS
Q100(Q100=C*I100*A+RR)	231.7 CFS

X.REQUIRED STORM SEWER SIZES

A.REQUIRED FOR 5YR STORM IF:

V=2FPS	103 INCH
V=3FPS	84 INCH
V=5FPS	65 INCH

B.REQUIRED FOR 10YR STORM IF:

V=2FPS	113 INCH
V=3FPS	92 INCH
V=5FPS	71 INCH

C.REQUIRED FOR 50YR STORM IF:

V=2FPS	135 INCH
V=3FPS	110 INCH
V=5FPS	85 INCH

D.REQUIRED FOR 100YR STORM IF:

V=2FPS	146 INCH
V=3FPS	119 INCH
V=5FPS	92 INCH

EXHIBIT 27

LETTER FROM IDOT DATED JULY 14, 1987
AND RESPONSE FROM ROBINSON ENGINEERING
COMPANY, LTD.

Illinois Department of Transportation

Division of Highways/District 1
201 West Center Court/Schaumburg, Illinois/60196-1096

July 14, 1987

Mr. George Budwash
Project Engineer
R.W. Robinson & Associates Co.
357 East 170th Street
P.O. Box 386
South Holland, Illinois 60473-0386

Dear Mr. Budwash:

This is in reference to your letter dated June 13, 1987 regarding the feasibility of providing a detention pond overflow in the course of natural drainage rather than to the State pumping station as contained in the May 1987 report.

Please note that for subwatershed No. 2 that the proposed conveyance storm sewer is designed for a ten (10) year storm frequency. Depending on the actual development of the property in this subwatershed that under head this proposed storm sewer could convey a larger storm frequency. In addition, for storms of greater frequency the runoff would be accelerated which is dependent upon the actual development (the time of concentration, the change in the runoff coefficients, and the routing of the overflow).

It is to be noted that with the latest submittal that by installing a flapgate on the proposed 84 inch storm sewer near Oketo Avenue that the overflow for this area would occur into the 95th Street subway via sub-area 2E (see Exhibit No. 7). In addition, a point which was previously discussed was related to the computations for the existing rate of discharge rather than merely a proposed release rate of 14.8 cfs. Therefore, to evaluate the impact to the 95th Street subway the existing rate of discharge for existing conditions to the various outlets would have to be provided if only one detention pond is pursued.

The reasoning for this request is related to the proposed storm sewer to be constructed on the west side of the Tri-State Toll Road and the diversion of subwatershed No. 1 which would include a portion of the area west of the Toll Road. Our interpretation of the proposal is that all of this area would be diverted to the proposed detention pond except for the low flow to be conveyed on the west side of the Toll Road and only a portion of the overland flow that has not been shown on Exhibit No. 7.

The essential factors in developing the Storm Water Management Plan is the volume of water and the overflows because of the sensitivity of the outlets. Therefore, it is suggested that the inflow/outflow hydrographs as published in TR-55 by USDA-Soil Conservation Service be developed for existing and proposed conditions if one detention pond is pursued.

To minimize the calculations it is suggested as an alternate a detention pond be constructed to meter the flow through the existing 60 inch box culvert (a berm would be required to prevent overflow to the originally proposed detention pond). Another alternate for consideration would be to construct a berm to prevent overflow from sub-area 2E to the pump station which includes making provision to divert the runoff to the originally proposed detention pond.

In addition to a new outfall as proposed to the west of the Tri-State Toll Road, it is further suggested that consideration be given to providing an easement for overflow or to discharge the overflow in the course of natural drainage by design.

Prior to proceeding it is suggested that you ascertain the cost and time that would be required to develop the necessary calculations to proceed with utilizing one detention pond and if this cost is prohibitive you may wish to arrange a meeting to discuss the feasibility of pursuing the suggested alternates.

Very truly yours,

Ralph C. Wehner
District Engineer

By:
Richard L. Garrity
Planning Services Section Chief

RLG/db

R. W. ROBINSON and ASSOCIATES CO.
CONSULTING ENGINEERS — LAND SURVEYORS
357 EAST 170TH STREET - P.O. BOX 386 - SOUTH HOLLAND, ILLINOIS 60473-0386
(312) 331-6700 - (312) 468-1955

February 10, 1988

Mr. Ralph C. Wehner, District Engineer
Illinois Department of Transportation
Division of Highways/District 1
201 West Center Court
Schaumburg, IL 60196-1096

RE: Response to July 14, 1987 Letter

Gentlemen:

In response to your letter dated July 14, 1987, we offer the following:

1) The storm sewer for subwatershed 2 is designed for a 10-year storm frequency. Flow will be accelerated from subwatershed 2 to the proposed detention pond. The detention pond will then control the flow and prevent any increase in flow downstream of the detention pond.

2) We have calculated the MSD release rate to be 42.75 cfs. (See Exhibit No. 9) We are proposing a 24-inch detention pond outlet pipe with a release rate of 38.5 cfs. As mentioned in the section 6.0 Impacts we anticipate this project will have a substantial benefit to the 95th Street subway.

3) We have utilized the MSD method of storm water detention. At the time of the inception of this project there was never any requirement to use the TR-55 method. The substantial safety factor provided allows us to state that this design method is reasonable and adequate.

4) A second detention pond to meter the flow through the 60-inch box culvert is not feasible due to the inability of the village to obtain the land.

5) The construction of a berm around subarea 2E would be unsightly, a nuisance to maintain, may not function correctly in an emergency, and would create unusual and undesirable site grading. Therefore, the village does not wish to consider this option.

6) An overflow easement from the proposed detention would not function to discharge overflow because the ground rises rapidly on the south side of 95th Street preventing overflow to flow south.

I hope this information is sufficient. If you have questions, please call.

Very truly yours,

ROBINSON ENGINEERING, LTD.

George Budwash

George Budwash, P.E.
Project Engineer
GDB:ap

EXHIBIT NO. 28
ILLINOIS STATE TOLL HIGHWAY AUTHORITY
DRAINAGE REPORT

March 9, 1988

The Illinois State Toll Highway Authority

ILLINOIS TOLLWAY

2001 W. 22nd. STREET/OAK BROOK, ILLINOIS 60521/(312) 574-2000 (Chicago 242-3620)

March 9, 1988

Mr. Ralph C. Wehner
Illinois Department of Transportation
201 West Center Court
Schaumburg, IL 60196-1096

Attention: Mr. Bob Murzyn

RE: 95th Street Interchange

Gentlemen:

In accordance with your requests, per your letter dated March 25, 1987 to the Illinois State Toll Highway Authority, the following will address items #1 and #2 only as agreed to during the December 9, 1987 meeting.

The host communities are anticipating construction to begin during late spring of 1988. The designer has anticipated a two-week turnaround of this submittal in order to stay on schedule.

It would be greatly appreciated if you would return your review and comments by March 24, 1988 in order for construction to proceed as scheduled.

Sincerely,

Kelly K Knauz

Kelly K. Knauz
Project Coordinator

KKK:pm

cc: Duane Carlson
Mayor Ray Kay
Mayor John Oremus
R.W. Robinson

DRAINAGE REPORT

TRI-STATE TOLLWAY & 95TH STREET

INTERCHANGE IMPROVEMENT

I. BRIEF PROJECT DESCRIPTION

The project will include the construction of new diamond ramps in the southwest (Ramp D) and southeast (Ramp B) quadrants of the interchange. In addition, the loop ramps in the southwest (Ramp C) and southeast (Ramp A) quadrants will be realigned and an exclusive exit ramp (Ramp C1) for southbound tollway traffic directly to 76th Avenue will be constructed. Ramp C1 will diverge from Ramp C and proceed directly to 76th Avenue. The existing ramps in the northwest and northeast quadrants will be resurfaced.

II. EXISTING DRAINAGE PATTERNS AND FACILITIES

Exhibit 1 shows the existing geometry of the interchange along with the existing drainage patterns and outfalls. For mainline tollway there are two (2) major existing structures, the first is a 60-inch diameter culvert at Station 1121+50 and the other is a twin 7'x5' box culvert at Station 987+60.

The existing 60-inch diameter culvert drains approximately 110 acres (Area 1) as shown on Exhibit 2. The runoff is conveyed from the eastside of the Tollway to the westside of the Tollway and proceeds southerly in a ditch along the westside of the Tollway. Currently, storm water ponds to a depth of approximately four (4) feet before flow commences to the south. At approximately Station 1116+00 a portion of the ditch flow is conveyed westerly through an existing 15-inch diameter storm sewer (See Exhibit 1) and eventually outfalls at the 6'x12' box culvert on 95th Street at approximately Station 3+00. The remaining storm runoff continues flowing south towards 95th Street along the westside of the Northwest ramp. It then passes through an 18-inch diameter storm sewer and proceeds easterly along the northside of 95th Street and eventually outfalls at the IDOT pumping station at the southeast corner of 95th Street and the B&O CT Railroad.

The storm water runoff in the southeast quadrant of (Area 5, Exhibit 2) of the interchange along the proposed Ramp B alignment flows southerly to the existing twin 7'x5' box culvert at Station 987+60. The flow through the culvert is conveyed south and west via a 60-inch and 72-inch storm sewer and outfalls into Lucas Ditch, west of 76th Avenue. As shown on Exhibit A, a portion of the infield of Ramp A and all of the infield of Ramp C drains to the IDOT Pumping Station.

The storm runoff in the vicinity of proposed Ramp D is conveyed in the existing ditch along the westside of the Tollway to the existing twin 7'x5' box culvert at Station 987+60 and is conveyed via storm sewer to Lucas Ditch.

Reference is made to a report entitled "Storm Water Management Plan, Village of Bridgeview, for the area between 87th Street and 95th Street and Harlem Avenue and Tri-State Tollway," May 1987 by R.W. Robinson and Associates Co. The report primarily addresses existing and future drainage considerations in the northeast quadrant of the interchange.

III. PROPOSED DRAINAGE PLAN

As referenced earlier, the Robinson report proposes the construction of a detention pond on approximately 9 acres bounded on the west by the Tri-State Tollway, on the east by the Oketo Avenue right-of-way, on the north by the B&O CT Railroad, and on the south by 95th Street. The release from the proposed detention will be made by a 15-inch diameter storm sewer under 95th Street which will connect into the proposed storm on the westside of Ramp B. The runoff from the infields of Ramps A & C that currently drain to the IDOT pumping station will, under the proposed drainage plan, be conveyed to the new Ramp B main drain which outlets into the existing box culvert at Station 987+60 of the Tollway. (See Drawing No. 54). This drainage scheme is consistent with the Robinson report.

Drainage of proposed Ramp D will be accomplished by means of ditches and new storm sewer. (See Exhibit 3). This area will continue to drain to the existing box culvert at Station 987+60 and then proceed south and west via existing storm sewer to Lucas Ditch. (See Drawing No. 46 & 55).

Exhibit No. 22 in the Robinson report shows alternative designs of an enclosed storm sewer along the westside of the Tollway to accommodate existing drainage from a 49 acre parcel immediately west of the Tollway and north 90th Street. As part of the Tri-State Tollway and 95th Street Interchange Improvement a 54-inch diameter storm sewer will be constructed from the 60-inch diameter culvert at Station 1121+50, running south along the westside of the Tollway and the northwest ramp to approximately Station 11+50 (NW Ramp) and then crosses beneath the northwest ramp into the infield area bounded by the northwest ramp, mainline Tollway and 95th Street. At this time approximately one (1) acre foot of detention can be provided in this area. The proposed storm sewer will continue south under 95th Street into the infield of Ramp C and then head southwest to a connection with the existing 60-inch diameter storm sewer at the intersection of Ramp C1 and 76th Avenue. (See Exhibit 3).

VILLAGE OF BRIDGEVIEW, IL
TRI-STATE INDUSTRIAL PARK
STORM SEWER, SOUTHFIELD SUBDIVISION
OUTLET AND CENTRAL DETENTION
POND DRAINAGE STUDY

02-383

MAY 2003

PREPARED BY:

ROBINSON ENGINEERING, LTD.
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VILLAGE OF BRIDGEVIEW
DRAINAGE STUDY
2003

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LIST OF EXHIBITS

VILLAGE OF BRIDGEVIEW

EXECUTIVE SUMMARY

If IDOT is allowed to modify the central detention pond (CDP) as it is seeking, some of the areas of the Tri-State Industrial Park that are currently experiencing drainage problems will experience them more frequently. While the model showed that no flooding at storm structures currently occurs during a 5-year (or 20% annual chance) storm event, under the proposed IDOT modifications to the CDP, drainage structures located roughly 500' west of Industrial Drive on 100th Place for example will flood approximately 3 inches.

Additionally the depth of flooding experienced in some areas of the industrial park will increase if IDOT is allowed to modify the CDP. For example the above mentioned drainage structures along 100th Place were identified by the model to currently overtop up to 9-inches during the 10-year (or 10% annual chance) storm event. However under the modifications proposed by IDOT, these structures could flood up to 2 ½ feet during a 10-year storm event, at which point storm water will flow down the street and be collected in the curb inlets near 76th Avenue.

There are a couple of potential improvements that could be made within the industrial park to help mitigate these adverse impacts at 100th Place although they require land acquisition and are expensive to construct. Both improvements would involve the construction of detention basins. One location is the northeast corner of 103rd Street and 76th Avenue and would cost roughly $1.4 million plus land acquisition. The other location is a vacant lot on the east side of 76th Avenue south of 98th Place and would cost roughly $1.4 million plus land acquisition. Constructing detention basins within the ComEd ROW was investigated but found to be infeasible based on the presence of pipelines.

The feasibility of building a detention facility in the northwest infield (NWI) of Harlem Avenue and 95th Street and/or modifying the CDP to eliminate the nuisance flooding experienced in the Southfield subdivision was investigated. However, these solutions were determined to be impractical to construct and at a cost of roughly $8.3 and $8.4 million respectively, economically infeasible as well. A smaller pond could be built in the NWI however the results that could be achieved would be less than desired and the cost would still make it economically infeasible.

INTRODUCTION

On January 10, 2003 staff from our office met with Bridgeview officials at the Village Hall to discuss IDOT's December 13, 2002 response letter regarding potential modifications to the central detention pond (CDP) located north of 95th Street and east of I-294. We also discussed the Village's desire to have our office perform additional drainage studies in the area.

The objectives of this report could be summarized as follows:

- Perform field topography of the storm sewer system within the Tri-State Industrial Park to determine the existing conditions in the sewer. This information will be displayed on aerial photography and parcel mapping. Field inspection forms will be prepared for each storm structure inspected providing maintenance recommendations where applicable.
- Study the effects on the Tri-State Industrial Park area near 100th Place resulting from raising the high water level and removing the restrictor of the CDP.
- Investigate the potential for additional detention capacity within the industrial park and ComEd ROW to help mitigate the adverse impacts of modifying the CDP.
- Investigate the feasibility of routing the Southfield area storm water into the northwest infield that may be available for detention. This is the area that IDOT may not have a need for if the Village allows it to modify the central detention pond as it is requesting.
- Investigate the possibility of routing the Southfield area storm water outlet to the CDP and deepening the pond to provide detention volume for the additional runoff. This option would require the construction of a storm water lift (pump) station to fully drain the pond.

TRI-STATE INDUSTRIAL PARK

For years, the Tri-State Industrial Park has had drainage problems. The modification to the CDP as requested by IDOT will allow additional storm water to flow through the industrial park. The additional water will increase the burden on the existing storm sewer system through the industrial park.

Major storm sewer structures were field located and plotted on an aerial photo of the Village to serve as an atlas for the area and also as a tool for modeling the storm sewer system (Exhibit A). Invert elevations and pipe sizes were picked up for incoming and outgoing pipes and have also been displayed. Field inspection reports were completed for each structure located, copies of which are enclosed in the appendix. These forms are also informative with respect to recommended maintenance.

TRI-STATE INDUSTRIAL PARK STORM SEWER

A StormCAD model was developed to analyze the flow of storm water through the industrial park during various rainfall events. The storm sewer was modeled both in its "existing condition" and in the "proposed condition", based on the removal of the 15" restrictor and increase in the high water level in the CDP.

Our analysis involved calculating the storm water runoff from various sub-basins within the industrial park. Sub-basin areas are shown on the enclosed exhibit C. The composite runoff coefficient for each sub-basin was taken by measuring the impervious area from the aerial photograph on exhibit C. The time of concentration, (T_c) was determined for each sub-basin using the TR-55 methodology, however, a minimum T_c of 20 minutes was used to account for initial abstraction. Sub-basin areas, composite runoff coefficients, and corresponding times of concentration were entered into the StormCAD model to determine peak flow rates from each sub-basin area. See Exhibit C for a summary of sub-basin data. Bulletin-70 rainfall data was used to determine the storm water runoff for each sub-basin. The 2-year, 10-year, and 100-year storm events were analyzed to determine impacts to the storm sewer system.

The industrial park storm sewer also conveys storm water from the CDP north of 95th Street and east of I-294. Storm water discharges for various storm frequencies were taken from analysis previously performed by this office using the TR-20 computer program and input into the StormCAD model. See exhibit E for a summary of discharges from the CDP.

Storm water is conveyed through the industrial park through 3 separate storm sewer systems. One system conveys storm water from the CDP, Richard Road, Industrial Drive, and the west half of 100th Place. This storm sewer outlets through a 72" pipe into Lucas Ditch Cut-Off. A second system conveys storm water from 98th Place and 76th Avenue. This storm sewer outlets through a separate 72" pipe into Lucas Ditch Cut-Off. The third storm sewer system conveys storm water from the east half of 100th Place, rear yard of the K-Mart shopping plaza and the north half of 103rd Street. This storm sewer outlets into Lucas Ditch Cut-Off at 103rd Street. Each storm sewer remains separate until the systems converge at the Lucas Ditch Cut-

Off. Therefore only the first storm sewer system was modeled for impacts due to the IDOT proposed modifications to the CDP.

The flows for each tributary sub-basin were then modeled through the storm sewer using a StormCAD backwater model to determine the water surface elevations at each drainage structure. The starting water surface elevations for Lucas Ditch Cut-Off were taken from the Flood Insurance Rate Map (FIRM) prepared by FEMA. During more significant storm events, the water level in Lucas Ditch Cut-Off rises, which restricts the conveyance capabilities of the storm sewers in the subdivision by imparting a tail water condition. The water surface elevations (or hydraulic grades) were calculated for each structure by the StormCAD backwater model. The Drainage Structure ID Tables (Exhibit F) show the hydraulic grade calculated by the model for each of the drainage structures. Structures that overtopped are identified as "flooded" in the tables. The model somewhat conservatively considered all storm water conveyance to be within the pipes and did not consider any overland flow that may occur.

EFFECTS ON TRI-STATE INDUSTRIAL PARK

According to the StormCAD model, the storm sewer system through the industrial park currently functions without any flooding for storm events up to the 5-year (or 20% annual chance) event. The model also shows that most of the existing storm sewer system through the industrial park currently operates under pressure flow to near full capacity during a 10-year (or 10% annual chance) storm event. As shown in Exhibit G, the increased storm water flows resulting from IDOT's proposed modifications to the CDP will cause additional storm sewer structures to overtop during more frequent storm events. For example, the model showed that no flooding currently occurs during a 5-year (or 20% annual chance) storm event. However, according to the model, the proposed IDOT modifications will cause structures 8E and 8F to flood approximately 3 inches during a 5-year storm event. Storm sewer structures 8E and 8F along 100th Place, were identified by the model to currently overtop up to 9-inches during the 10-year storm event. With the proposed modifications, these structures will flood up to 2 ½ feet during a 10-year storm event, at which point storm water will flow on the pavement and be collected in the curb inlets near 76th Avenue. The model also identified that the structures in the rear yards of properties between Industrial Drive and I-294 will begin to overtop during the 10-year storm event.

In summary the proposed modifications to the CDP were found by the model to cause an increased frequency and depth of flooding in the Tri-State Industrial Park. Therefore it is our recommendation that the pond is not modified unless additional measures are taken to reduce the flooding in the Industrial Park. The next section discusses a few potential mitigation alternatives however through conversation with IDOT drainage staff such improvements would be considered as *off-site* by IDOT and thus would not be eligible for State funding.

POTENTIAL MITIGATION PROJECTS WITHIN TRI-STATE INDUSTRIAL PARK

Alternate 1

One possible solution to reduce the frequency of flooding for the structures along 100th Place is the construction of an additional detention pond on the property at the northeast corner of 103rd Street and 76th Avenue to attenuate the flooding. With this alternative, a detention pond would be constructed adjacent to the Lucas Ditch Cut-Off Tributary. A portion of this property is in Zone A floodplain, so floodplain regulations will have to be considered in the construction of the pond. Storm sewer structures 8E, 8F, 9E, 9F, 9I, and 9J would be rerouted to the new detention pond. The rim elevations for the existing curb inlets along 100th Place are at approximately 593 NGVD as shown on Exhibit A. The detention pond should be sized to hold approximately 20 acre-feet of storm water detention at an elevation lower than the curb inlets at 100th Place. To provide the storage at this elevation, a lift station and pump will be required for the detention pond outlet. Storm water would flow into pond through a storm sewer and would be pumped out through the lift station. This property north of 103rd Street and east of 76th Avenue is currently vacant. At such time that this property is developed; the developer would typically be required to provide storm water detention. A larger storm water detention facility could be constructed on this property to provide both the required detention for the site and the storage required to mitigate the flooding on 100th Place. Such co-mingling of storm water management facilities could also help to lower the cost of the Village's share of the construction. We estimate a preliminary construction and engineering cost, excluding land acquisition for this alternate to be roughly $1.4 million.

Alternate 2

A second possible solution to reduce the frequency of flooding is the construction of a detention pond at the vacant property on the east side of 76th Avenue south of 98th Place. Storm sewers for this alternate would be rerouted from 100th Place to the new detention pond. Storm sewer structures 8E, 8F, 9E, 9F, 9I, and 9J would be rerouted to the new detention pond. The rim elevations for the existing curb inlets along 100th Place are at approximately 593 NGVD as shown on Exhibit A. The detention pond should be sized to hold approximately 20 acre-feet of storm water detention at an elevation lower than the curb inlets at 100th Place. To provide the storage at this elevation, a lift station and pump will be required for the detention pond outlet. Storm water would flow into pond through a storm sewer and would be pumped out through the lift station. We estimate a preliminary construction and engineering cost, excluding land acquisition for this alternate to also be roughly $1.4 million.

It should be noted that the above costs are preliminary. Both above alternates offer a reduction in the frequency of flooding for structures 8E 8F, 9E, 9F, 9I, and 9J along 100th Place. However, additional engineering studies would be required to evaluate the effectiveness of these improvements.

Alternate 3

The Village also requested that the feasibility of constructing storm water detention facilities within the ComEd ROW along the Lucas Ditch Cut-Off and 76th Avenue be investigated as a possible means of mitigating the effects of modifying the CDP. Based on field reconnaissance there are pipelines present within the ROW. Construction of detention facilities within the ComEd ROW and their appurtenances would most likely require the permanent and/or temporary relocation of the pipelines and thus disrupt their operation making such an improvement cost prohibitive.

Additionally as the area is downstream of the storm sewer outlet for the industrial park, any such detention facilities could not reduce the flow rates needing to be conveyed through the industrial park therefore their effectiveness would be limited. They could however, depending on the amount of storage that could be achieved, possibly help to slightly lower the flood stages on the Lucas Ditch Cut-Off, lowering the tail water on the storm sewer outlet, and thus marginally lower the flood heights within the industrial park. The potential benefits however would be insignificant when compared to the associated cost to construct the basins.

NORTHWEST INFIELD AREA AS DETENTION FOR SOUTHFIELD SUBDIVISION

Through conversations with Bridgeview officials we understand that the Southfield area periodically experiences nuisance flooding, namely at the intersection of Southfield Drive and Dover Street. This intersection is near the outlet of the subdivision's storm sewer system and is in a low area. From storm sewer plans and the USGS Quadrangle maps we discerned the drainage area tributary to this point to be approximately 140 acres (see Exhibit B). Effectively no storm water detention exists for any of this area. The sewer connects to the IDOT 60" storm sewer on Harlem Avenue through a 24" pipe, which under these conditions acts as a restrictor. Once the capacity of this restriction is exceeded the drainage structures apparently surcharge in the low areas resulting in the reported nuisance flooding.

The peak 100-year runoff from Southfield was calculated using the rational method (Q = CiA). A composite runoff coefficient, C of 0.65 was assumed. Using the storm sewer maps to plot out the longest flow path, an assumed overall velocity of 3 fps and an initial t_c of 25 minutes, a total time of concentration, T_c of 50 minutes was calculated. Using a corresponding Bulletin 70 rainfall intensity of 4.03 in/hr yields a peak discharge of 367 cfs.

Due to the proposed reconfiguration of the interchange of Harlem Avenue and 95th Street, IDOT has indicated that there may be real estate available in the area of the existing ramp within the northwest quadrant, or the northwest infield (NWI). The Village has asked that the feasibility of using this area for detention for Southfield be evaluated. Through conversations with IDOT Drainage personnel they have indicated that the land would have to be purchased by the Village through the State's auction and that any detention facilities would have to be designed and constructed by the Village and subject to review by IDOT. They also indicated that the overflow from the pond would have to be directed to the north away from any State routes. This could pose a risk to low lying areas around Odell and Octavia Avenues near the frontage road. It is also important to recognize that a dam safety permit would probably be required from the Illinois Department of Natural Resources – Office of Water Resources.

Nevertheless an available potential storage volume of approximately 50 acre-feet was calculated within the area based on the elevation of the existing 15" outlet, assuming a HWL of 609, 3H:1V side slopes, minimal setbacks and a 10' top width. As the NWI drains to an IDOT pumping station the allowable release from any pond located here would be minimal and regulated by IDOT. For calculation purposes it was assumed that an allowable release of 0.15 cfs/acre (NIPC release rate) would be permitted for the balance of the quadrant not being used by the proposed reconfiguration. This yields 0.69 cfs assuming that 4.6 acres of ROW will be vacated/sold. Routing Southfield through the detention pond we find that the required storage for a 100-year Bulletin 70, 24-hr storm[1] is 56 acre-feet, which is more than the 50 acre-feet potentially available.

A possible solution to this deficit might be to route a portion of the runoff from Southfield to the CDP and provide the 6 acre-feet of storage balance there. To avoid displacing existing storage within the CDP the pond would have to be excavated down (deepened) approximately 2 feet and pump evacuated. While the construction of the NWI pond and modification of the CDP would probably render this solution cost prohibitive, a larger problem yet lies in trying to convey the 100-year flow from Southfield to the ponds. To convey the entire 100-year runoff (367 cfs) across Harlem Avenue and south just to 93rd Street and the Frontage Road would require 1125 feet of twin (2) 12'S X 4'R box culverts. This presents a practical problem as the box culverts have to be placed very shallow to go over the IDOT 60" storm sewer on Harlem Avenue. As a result the boxes would be out of the ground or have inadequate cover and could thus not be built. Alternatively an inverted siphon could be constructed at a higher cost and with additional maintenance requirements.

Such a large system is needed partly because of how little hydraulic gradient is available (i.e. the high water levels in the ponds are so high relative to the ground elevations at Southfield and Dover). In fact backflow prevention would have to be provided to prevent the CDP from flowing back into Southfield as IDOT is seeking to raise the high water level to 610.5 which will at times produce a negative hydraulic gradient (zero flow). As such we do not feel that this solution is appropriate if IDOT is permitted to modify the CDP as it is seeking. Additional excavation could conceivably be performed to lower the existing and proposed HWLs and thus perhaps slightly smaller conveyance culverts/pipes could be used. However, the additional excavation would more than offset the savings from using smaller pipes making it that much less economically viable. We estimate the preliminary costs for construction and engineering of this alternative to be roughly $8.4 million.

Another alternative might be to settle for providing substandard detention (less than 100–year protection) and only convey some *overflow*, or excess amount of runoff. This would be accomplished by constructing an overflow chamber that would allow water to be directed to the

[1] Storm durations in excess of 24 hours required greater storage however, often only up to a 24-hour storm is considered for regulatory purposes.

ponds once the IDOT sewer's capacity had been reached. Unfortunately the aforementioned economic and construction issues would exist with this alternative too and as the capacity of the IDOT sewer via the 24" restrictor is so limited, the overflow rate would be nearly as great as the 100-year runoff rate. Therefore as the required conveyance system would be impractical to build, the results yielded by this alternative may be marginal making it that much less attractive. Additionally IDOT may not permit the construction of a facility sized for less than the 100-year storm adjacent to its ROW.

DEEPENED CDP AS DETENTION FOR SOUTHFIELD SUBDIVISION

As illustrated above a detention pond in the NWI is not a feasible solution to the Southfield drainage problems. Therefore the feasibility of modifying the CDP to solve the problem was investigated. As the Southfield subdivision is not *naturally* tributary to the CDP the allowable release rate is not obvious. Southfield is however naturally tributary to the same sub-watershed as the CDP's outlet. Thus it is not inappropriate to route the runoff from Southfield through the CDP. The discharge from the CDP flows to the Lucas Ditch Cut-Off via the Tri-State Industrial Park storm sewer system. Good storm water management would limit the total discharge to the existing peak gravity discharge rate, which is 24.42 cfs. Again to avoid displacing existing storage within the CDP the pond would have to be excavated down (deepened) to below the elevation of its gravity outlet and pump evacuated. Assigning a somewhat arbitrary but conservative release rate for Southfield of 0.15 cfs/acre (NIPC release rate) for the 140 acres we get an allowable release rate of 21 cfs. Taking the lesser of this versus the existing peak gravity discharge rate of 24.42 cfs yields a pumping rate of 21 cfs.

Routing the 140 acres of Southfield through the modified CDP with an allowable release rate of 21 cfs produces a required storage volume of 33 acre-feet. By excavating down to elevation 588, or roughly 11 feet, the required storage could be obtained. This is feasible barring very poor soil conditions or high groundwater. Even if present these problems could probably be overcome by using flatter side slopes, a clay liner and/or slurry walls if necessary however these items would add considerably to the cost..

While the modification of the CDP including pump station would probably render this solution cost prohibitive, a larger problem yet again lies in trying to convey the 100-year flow from Southfield to the CDP. To convey the entire 100-year runoff (367 cfs) across Harlem Avenue, then south to 93rd Street and the Frontage Road, then west to 93rd Street and Oketo Avenue, and finally south to the CDP would require 3300 feet of twin (2) 12'S X 4'R box culverts. This presents a practical problem as the box culverts have to be placed very shallow near the upstream end of the run to go over the existing IDOT 60" storm sewer on Harlem Avenue. As a result the boxes would be out of the ground or have inadequate cover and could thus not be built.

Such a large system is needed partly because of how little hydraulic gradient is available (i.e. the high water levels (HWLs) in the pond are so high relative to the ground elevations at Southfield and Dover). In fact backflow prevention would have to be provided to prevent water from flowing back into Southfield if IDOT was allowed to modify the CDP as it is seeking. Under the IDOT proposed modifications the high water level would be raised to 610.5 which will at times produce a negative hydraulic gradient (zero flow). As such we do not feel that this solution is appropriate if IDOT is permitted to modify the CDP as it is seeking. Additional excavation could conceivably be performed to lower the existing and proposed HWLs and thus perhaps slightly smaller conveyance culverts/pipes could be used. However, the additional excavation would more than offset the savings from using smaller pipes making it that much less economically viable. We estimate the preliminary costs for construction and engineering of this alternative to be roughly $8.3 million.

2-Year Storm Frequency
Existing Conditions

	Area (acres)	Inlet C	Inlet CA (acres)	System CA (acres)	Time of Concentration (min)	Upstream Time Of Concentration (min)	System Flow Time (min)	System Intensity (in/hr)	System Rational Flow (cfs)	Additional Carryover (cfs)	Upstream Additional Flow (cfs)	Total System Flow (cfs)	Rim Elevation (ft)	Hydraulic Grade Line Out (ft)	Local Intensity (in/hr)	Local Rational Flow (cfs)	Depth of Flooding*
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	596.07	0	0	
FES2	0	0	0	0	0	0	0	0	0	1	0	1	597.4	595.85	0	0	
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	595.85	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	596.07	0	0	
2B	0	0	0	0	0	5.62	5.62	0	0	0	1	1	596.53	595.85	0	0	
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	595.74	0	0	
2C	4.7	0.6	2.82	2.82	20	13.94	20	2.93	8.34	0	1	9.34	596.53	595.85	2.93	8.34	
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	595.74	0	0	
2D	0	0	0	2.82	0	20.4	20.4	2.91	8.26	0	1	9.26	596.34	595.76	0	0	
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	595.74	0	0	
2E	0	0	0	2.82	0	21.99	21.99	2.8	7.95	0	1	8.95	596.62	595.69	0	0	
FES1	0	0	0	0	0	0	0	0	0	15.94	0	15.94	610	599.9	0	0	
1G	0.99	0.3	0.3	0.3	20	0	20	2.93	0.88	0	0	0.88	598.3	595.74	2.93	0.88	
2F	0	0	0	2.82	0	22.4	22.4	2.77	7.86	0	1	8.86	596.46	595.6	0	0	
1A	0	0	0	0	0	0.39	0.39	0	0	0	15.94	15.94	609.59	598.83	0	0	
1H	0	0	0	0.3	0	20.88	20.88	2.87	0.86	0	0	0.86	597.6	595.71	0	0	
2G	0	0	0	2.82	0	23.03	23.03	2.72	7.74	0	1	8.74	596.42	595.42	0	0	
1J	7.45	0.6	4.47	4.47	20	3.88	20	2.93	13.22	0	15.94	29.16	604.74	597.27	2.93	13.22	
1I				0.3			22.7	2.75	0.82			0.82	596.91	595.12			
2I				2.82			23.57	2.69	7.64			8.64	596.16	594.84			
I-80	20.3	0.64	12.93	20.52	20	26.36	26.36	2.49	51.55	0	16.94	68.49	601.91	594.82	2.93	38.23	
5A1	0	0	0	20.52	0	27.28	27.28	2.43	50.23	0	16.94	67.17	599.53	594.81	0	0	
8E	0.6	0.5	0.3	0.3	20	0	20	2.93	0.89	0	0	0.89	593.1	592.73	2.93	0.89	
8F	2.04	0.65	1.33	1.33	20	0	20	2.93	3.92	0	0	3.92	595.03	592.82	2.93	3.92	
5A	0	0	0	20.52	0	27.48	27.48	2.41	49.93	0	16.94	66.87	598.88	594.4	0	0	
8C	0.6	0.5	0.3	1.93	20	20.96	20.96	2.87	5.56	0	0	5.56	595.03	592.64	2.93	0.89	
5B	10.3	0.6	6.18	26.7	20	28.78	28.78	2.32	62.56	0	16.94	79.5	597.9	593.5	2.93	18.27	
8B	0	0	0	1.93	0	21.95	21.95	2.8	5.43	0	0	5.43	595.06	592.47	0	0	
4E	4.34	0.5	2.17	2.17	20	0	20	2.93	6.42	2.5	0	8.92	596.42	591.69	2.93	6.42	
5C	5.3	0.6	3.18	29.88	20	30.15	30.15	2.24	67.34	0	16.94	84.28	598.59	592.17	2.93	9.4	
8A	14.8	0.75	11.1	13.03	20	23.01	23.01	2.72	35.78	0	0	35.78	598.33	591.42	2.93	32.82	
4D	0	0	0	2.17	0	24.71	24.71	2.61	5.7	0	2.5	8.2	597.15	591.45	0	0	
4C	14.4	0.85	12.24	57.31	20	31.56	31.56	2.2	126.98	0	19.44	146.42	597.33	591.4	2.93	36.19	
I-22	0	0	0	57.31	0	33.25	33.25	2.15	124.33	0	19.44	143.77	595.2	589.55	0	0	
3A				57.31			33.54	2.14	123.88			143.32	593.7	588.75			

2-Year Storm Frequency
Proposed Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding*
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	596.07	0	0	
FES2	0	0	0	0	0	0	0	0	0	1	0	1	597.4	595.85	0	0	
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	595.85	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	596.07	0	0	
2B	0	0	0	0	0	5.64	5.64	0	0	0	1	1	596.53	595.85	0	0	
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	595.74	0	0	
2C	4.7	0.6	2.82	2.82	20	13.96	20	2.93	8.34	0	1	9.34	596.53	595.85	2.93	8.34	
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	595.74	0	0	
2D	0	0	0	2.82	0	20.4	20.4	2.91	8.26	0	1	9.26	596.34	595.77	0	0	
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	595.74	0	0	
2E	0	0	0	2.82	0	21.99	21.99	2.8	7.95	0	1	8.95	596.62	595.69	0	0	
FES1	0	0	0	0	0	0	0	0	0	27.7	0	27.7	610	604.42	0	0	
1G	0.99	0.3	0.3	0.3	20	0	20	2.93	0.88	0	0	0.88	598.3	595.74	2.93	0.88	
2F	0	0	0	2.82	0	22.41	22.41	2.77	7.86	0	1	8.86	596.46	595.6	0	0	
1A	0	0	0	0	0	0.26	0.26	0	0	0	27.7	27.7	609.59	602.39	0	0	
1H	0	0	0	0.3	0	20.88	20.88	2.87	0.86	0	0	0.86	597.6	595.71	0	0	
2G	0	0	0	2.82	0	23.03	23.03	2.72	7.74	0	1	8.74	596.42	595.42	0	0	
1J	7.45	0.6	4.47	4.47	20	2.85	20	2.93	13.22	0	27.7	40.92	604.74	598.38	2.93	13.22	
1I				0.3			22.7	2.75	0.82			0.82	596.91	595.12			
2I				2.82			23.62	2.68	7.62			8.62	596.16	594.93			
I-80	20.3	0.64	12.99	20.58	20	26.88	26.88	2.46	50.95	0	28.7	79.65	601.91	594.91	2.93	38.41	
5A1	0	0	0	20.58	0	27.76	27.76	2.4	49.69	0	28.7	78.39	599.53	595.1	0	0	
8E	0.6	0.5	0.3	0.3	20	0	20	2.93	0.89	0	0	0.89	593.1	592.81	2.93	0.89	
8F	2.04	0.65	1.33	1.33	20	0	20	2.93	3.92	0	0	3.92	595.03	592.89	2.93	3.92	
5A	0	0	0	20.58	0	27.96	27.96	2.38	49.39	0	28.7	78.09	598.88	594.82	0	0	
8C	1	0.5	0.5	2.13	20	21	21	2.86	6.14	0	0	6.14	595.03	592.72	2.93	1.48	
5B	21.6	0.85	18.36	38.94	20	29.39	29.39	2.28	89.59	0	28.7	118.29	597.9	594.45	2.93	54.29	
8B	0	0	0	2.13	0	21.96	21.96	2.8	6	0	0	6	595.06	592.54	0	0	
4E	4.34	0.5	2.17	2.17	20	0	20	2.93	6.42	2.5	0	8.92	596.42	592.23	2.93	6.42	
5C	0	0	0	38.94	0	30.62	30.62	2.22	87.26	0	28.7	115.96	598.59	592.95	0	0	
8A	14.8	0.75	11.1	13.23	20	22.97	22.97	2.73	36.36	0	0	36.36	598.33	591.95	2.93	32.82	
4D	0	0	0	2.17	0	24.72	24.72	2.61	5.7	0	2.5	8.2	597.15	591.99	0	0	
4C	14.4	0.85	12.24	66.58	20	31.9	31.9	2.19	146.88	0	31.2	178.08	597.33	591.94	2.93	36.19	
I-22	0	0	0	66.58	0	33.5	33.5	2.15	143.97	0	31.2	175.17	595.2	590.01	0	0	
3A				66.58			33.78	2.14	143.48			174.68	593.7	589.11			

5-Year Storm Frequency
Existing Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding*
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	596.07	0	0	
FES2	0	0	0	0	0	0	0	0	0	1.5	0	1.5	597.4	596.07	0	0	
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	596.07	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	596.07	0	0	
2B	0	0	0	0	0	5.62	5.62	0	0	0	1.5	1.5	596.53	596.07	0	0	
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	595.86	0	0	
2C	4.7	0.6	2.82	2.82	20	13.94	20	7.33	20.85	0	1.5	22.35	596.53	596.07	7.33	20.85	
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	595.86	0	0	
2D	0	0	0	2.82	0	20.4	20.4	7.3	20.74	0	1.5	22.24	596.34	595.97	0	0	
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	595.86	0	0	
2E	0	0	0	2.82	0	21.99	21.99	7.16	20.34	0	1.5	21.84	596.62	595.87	0	0	
FES1	0	0	0	0	0	0	0	0	0	19	0	19	610	600.66	0	0	
1G	0.99	0.3	0.3	0.3	20	0	20	7.33	2.2	0	0	2.2	598.3	595.86	7.33	2.2	
2F	0	0	0	2.82	0	22.4	22.4	7.12	20.24	0	1.5	21.74	596.46	595.77	0	0	
1A	0	0	0	0	0	0.39	0.39	0	0	0	19	19	609.59	599.71	0	0	
1H	0	0	0	0.3	0	20.88	20.88	7.26	2.17	0	0	2.17	597.6	595.82	0	0	
2G	0	0	0	2.82	0	23.03	23.03	7.06	20.06	0	1.5	21.56	596.42	595.56	0	0	
1J	7.45	0.6	4.47	4.47	20	3.88	20	7.33	33.04	0	19	52.04	604.74	597.84	7.33	33.04	
1I				0.3			22.7	6.94	2.08			2.08	596.91	595.14			
2I				2.82			23.57	6.97	19.83			21.33	596.16	594.98			
I-80	20.3	0.64	12.93	20.52	20	26.36	26.36	0	0	0	20.5	20.5	601.91	594.96	7.33	95.58	
5A1	0	0	0	20.52	0	27.28	27.28	0	0	0	20.5	20.5	599.53	595.15	0	0	
8E	0.6	0.5	0.3	0.3	20	0	20	7.33	2.22	0	0	2.22	593.1	592.98	7.33	2.22	
8F	2.04	0.65	1.33	1.33	20	0	20	7.33	9.8	0	0	9.8	595.03	593.14	7.33	9.8	
5A	0	0	0	20.52	0	27.48	27.48	0	0	0	20.5	20.5	598.88	594.73	0	0	
8C	0.6	0.5	0.3	1.93	20	20.96	20.96	7.26	14.1	0	0	14.1	595.03	592.83	7.33	2.22	
5B	10.3	0.6	6.18	26.7	20	28.78	28.78	0	0	0	20.5	20.5	597.9	594.01	7.33	45.68	
8B	0	0	0	1.93	0	21.95	21.95	7.16	13.9	0	0	13.9	595.06	592.64	0	0	
4E	4.34	0.5	2.17	2.17	20	0	20	7.33	16.04	2.5	0	18.54	596.42	592.44	7.33	16.04	
5C	5.3	0.6	3.18	29.88	20	30.15	30.15	0	0	0	20.5	20.5	598.59	592.8	7.33	23.51	
8A	14.8	0.75	11.1	13.03	20	23.01	23.01	7.02	92.22	0	0	92.22	598.33	592.05	7.33	82.05	
4D	0	0	0	2.17	0	24.71	24.71	6.94	15.18	0	2.5	17.68	597.15	592.1	0	0	
4C	14.4	0.85	12.24	57.31	20	31.56	31.56	0	0	0	23	23	597.33	592.03	7.33	90.48	
I-22	0	0	0	57.31	0	33.25	33.25	0	0	0	23	23	595.2	590.07	0	0	
3A				57.31			33.54	0	0			23	593.7	589.16			

5-Year Storm Frequency
Proposed Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding*
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	597.15	0	0	
FES2	0	0	0	0	0	0	0	0	0	1.5	0	1.5	597.4	596.8	0	0	
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	596.8	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	597.15	0	0	
2B	0	0	0	0	0	5.64	5.64	0	0	0	1.5	1.5	596.53	596.8	0	0	0.27
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	597.15	0	0	
2C	4.7	0.6	2.82	2.82	20	13.96	20	3.69	10.48	0	1.5	11.98	596.53	596.8	3.69	10.48	0.27
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	597.15	0	0	
2D	0	0	0	2.82	0	20.4	20.4	3.65	10.38	0	1.5	11.88	596.34	596.7	0	0	0.36
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	597.15	0	0	
2E	0	0	0	2.82	0	21.99	21.99	3.52	10.01	0	1.5	11.51	596.62	596.59	0	0	
FES1	0	0	0	0	0	0	0	0	0	32	0	32	610	607.77	0	0	
1G	0.99	0.3	0.3	0.3	20	0	20	3.69	1.1	0	0	1.1	598.3	597.15	3.69	1.1	
2F	0	0	0	2.82	0	22.41	22.41	3.49	9.91	0	1.5	11.41	596.46	596.5	0	0	0.04
1A	0	0	0	0	0	0.26	0.26	0	0	0	32	32	609.59	605.07	0	0	
1H	0	0	0	0.3	0	20.88	20.88	3.61	1.08	0	0	1.08	597.6	597.1	0	0	
2G	0	0	0	2.82	0	23.03	23.03	3.43	9.74	0	1.5	11.24	596.42	596.35	0	0	
1J	7.45	0.6	4.47	4.47	20	2.85	20	3.69	16.61	0	32	48.61	604.74	599.72	3.69	16.61	
1I				0.3			22.7	3.29	0.98			0.98	596.91	596.91			
2I				2.82			23.62	3.35	9.52			11.02	596.16	596.16			
I-80	20.3	0.64	12.99	20.58	20	26.88	26.88	0	0	0	33.5	33.5	601.91	597.18	3.69	48.28	
5A1	0	0	0	20.58	0	27.76	27.76	0	0	0	33.5	33.5	599.53	597.2	0	0	
8E	0.6	0.5	0.3	0.3	20	0	20	3.69	1.11	0	0	1.11	593.1	593.38	3.69	1.11	0.28
8F	2.04	0.65	1.33	1.33	20	0	20	3.69	4.93	0	0	4.93	595.03	593.54	3.69	4.93	
5A	0	0	0	20.58	0	27.96	27.96	0	0	0	33.5	33.5	598.88	597.08	0	0	
8C	1	0.5	0.5	2.13	20	21	21	3.61	7.75	0	0	7.75	595.03	593.23	3.69	1.86	
5B	21.6	0.85	18.36	38.94	20	29.39	29.39	0	0	0	33.5	33.5	597.9	596.4	3.69	68.23	
8B	0	0	0	2.13	0	21.96	21.96	3.52	7.55	0	0	7.55	595.06	593.08	0	0	
4E	4.34	0.5	2.17	2.17	20	0	20	3.69	8.06	2.5	0	10.56	596.42	593.25	3.69	8.06	
5C	0	0	0	38.94	0	30.62	30.62	0	0	0	33.5	33.5	598.59	594.55	0	0	
8A	14.8	0.75	11.1	13.23	20	22.97	22.97	3.4	45.3	0	0	45.3	598.33	592.84	3.69	41.25	
4D	0	0	0	2.17	0	24.72	24.72	3.34	7.31	0	2.5	9.81	597.15	592.91	0	0	
4C	14.4	0.85	12.24	66.58	20	31.9	31.9	0	0	0	36	36	597.33	592.83	3.69	45.49	
I-22	0	0	0	66.58	0	33.5	33.5	0	0	0	36	36	595.2	590.58	0	0	
3A				66.58			33.78	0	0			36	593.7	589.55			

10-Year Storm Frequency
Existing Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding*
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	596.07	0	0	
FES2	0	0	0	0	0	0	0	0	0	2	0	2	597.4	595.85	0	0	
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	595.85	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	596.07	0	0	
2B	0	0	0	0	0	4.49	4.49	0	0	0	2	2	596.53	595.85	0	0	
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	595.74	0	0	
2C	4.7	0.6	2.82	2.82	20	9.52	20	4.33	12.3	0	2	14.3	596.53	595.85	4.33	12.3	
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	595.74	0	0	
2D	0	0	0	2.82	0	20.32	20.32	4.29	12.2	0	2	14.2	596.34	595.76	0	0	
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	595.74	0	0	
2E	0	0	0	2.82	0	21.59	21.59	4.16	11.83	0	2	13.83	596.62	595.69	0	0	
FES1	0	0	0	0	0	0	0	0	0	21.5	0	21.5	610	599.9	0	0	
1G	0.99	0.3	0.3	0.3	20	0	20	4.33	1.3	0	0	1.3	598.3	595.74	4.33	1.3	
2F	0	0	0	2.82	0	21.93	21.93	4.13	11.74	0	2	13.74	596.46	595.6	0	0	
1A	0	0	0	0	0	0.33	0.33	0	0	0	21.5	21.5	609.59	598.83	0	0	
1H	0	0	0	0.3	0	20.71	20.71	4.25	1.27	0	0	1.27	597.6	595.71	0	0	
2G	0	0	0	2.82	0	22.51	22.51	4.07	11.57	0	2	13.57	596.42	595.42	0	0	
1J	7.45	0.6	4.47	4.47	20	3.67	20	4.33	19.49	0	21.5	40.99	604.74	597.27	4.33	19.49	
1I				0.3			23.91	3.93	1.18			1.18	596.91	595.12			
2I				2.82			23.26	3.99	11.35			13.35	596.16	594.84			
I-80	20.3	0.64	12.93	20.52	20	100.02	100.02	0.5	10.32	0	23.5	33.82	601.91	594.82	4.33	56.39	
5A1	0	0	0	20.52	0	102.09	102.09	0.42	8.61	0	23.5	32.11	599.53	594.96	0	0	
8E	0.6	0.5	0.3	0.3	20	0	20	4.33	1.31	0	0	1.31	593.1	593.91	4.33	1.31	0.81
8F	2.04	0.65	1.33	1.33	20	0	20	4.33	5.78	0	0	5.78	595.03	594.02	4.33	5.78	
5A	0	0	0	20.52	0	102.36	102.36	0.41	8.39	0	23.5	31.89	598.88	594.77	0	0	
8C	0.6	0.5	0.3	1.93	20	20.71	20.71	4.25	8.26	0	0	8.26	595.03	593.82	4.33	1.31	
5B	10.3	0.6	6.18	26.7	20	103.97	103.97	0.34	9.18	0	23.5	32.68	597.9	594.54	4.33	26.95	
8B	0	0	0	1.93	0	21.69	21.69	4.15	8.06	0	0	8.06	595.06	593.73	0	0	
4E	4.34	0.5	2.17	2.17	20	0	20	4.33	9.46	2.5	0	11.96	596.42	593.9	4.33	9.46	
5C	5.3	0.6	3.18	29.88	20	105.5	105.5	0.28	8.43	0	23.5	31.93	598.59	594.15	4.33	13.87	
8A	14.8	0.75	11.1	13.03	20	23.06	23.06	4.01	52.68	0	0	52.68	598.33	593.61	4.33	48.41	
4D	0	0	0	2.17	0	23.51	23.51	3.97	8.67	0	2.5	11.17	597.15	593.66	0	0	
4C	14.4	0.85	12.24	57.31	20	106.97	106.97	0.22	12.78	0	26	38.78	597.33	593.61	4.33	53.38	
I-22	0	0	0	57.31	0	108.79	108.79	0.15	8.57	0	26	34.57	595.2	592.75	0	0	
3A				57.31			109.14	0.13	7.75			33.75	593.7	592.6			

* Depth of Flooding is actually the hydraulic grade required to push the stormwater though the storm sewer. Overland flow may occur at a lower elevation, which could reduce the actual depth of flooding.

What?
Is total
Area here?

10-Year Storm Frequency
Proposed Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	597.24	0	0	
FES2	0	0	0	0	0	0	0	0	0	2	0	2	597.4	597.17	0	0	
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	597.17	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	597.24	0	0	
2B	0	0	0	0	0	4.49	4.49	0	0	0	2	2	596.53	597.17	0	0	0.64
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	597.24	0	0	
2C	4.7	0.6	2.82	2.82	20	9.52	20	4.33	12.3	0	2	14.3	596.53	597.16	4.33	12.3	0.63
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	597.24	0	0	
2D	0	0	0	2.82	0	20.32	20.32	4.29	12.2	0	2	14.2	596.34	597.01	0	0	0.67
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	597.24	0	0	
2E	0	0	0	2.82	0	21.59	21.59	4.16	11.83	0	2	13.83	596.62	596.84	0	0	0.22
FES1	0	0	0	0	0	0	0	0	0	36	0	36	610	609.15	0	0	
1G	0.99	0.3	0.3	0.3	20	0	20	4.33	1.3	0	0	1,3	598.3	597.24	4.33	1.3	
2F	0	0	0	2.82	0	21.93	21.93	4.13	11.74	0	2	13.74	596.46	596.7	0	0	0.24
1A	0	0	0	0	0	0.2	0.2	0	0	0	36	36	609.59	607.12	0	0	
1H	0	0	0	0.3	0	20.71	20.71	4.25	1.27	0	0	1.27	597.6	597.17	0	0	
2G	0	0	0	2.82	0	22.51	22.51	4.07	11.57	0	2	13.57	596.42	596.46	0	0	0.04
1J	7.45	0.6	4.47	4.47	20	2.19	20	4.33	19.49	0	36	55.49	604.74	603.11	4.33	19.49	
1I				0.3			23.91	3.93	1.18			1.18	596.91	596.91			
2I				2.82			23.26	3.99	11.35			13.35	596.16	596.16			
I-80	20.3	0.64	12.99	20.58	20	130.04	130.04	0	0	0	38	38	601.91	600.72	4.33	56.66	
5A1	0	0	0	20.58	0	132.04	132.04	0	0	0	38	38	599.53	600.7	0	0	1.17
8E	0.6	0.5	0.3	0.3	20	0	20	4.33	1.31	0	0	1.31	593.1	596.24	4.33	1.31	3.14
8F	2.04	0.65	1.33	1.33	20	0	20	4.33	5.78	0	0	5.78	595.03	596.46	4.33	5.78	1.43
5A	0	0	0	20.58	0	132.27	132.27	0	0	0	38	38	598.88	600.56	0	0	1.68
8C	1	0.5	0.5	2.13	20	20.71	20.71	4.25	9.12	0	0	9.12	595.03	596.04	4.33	2.18	1.01
5B	21.6	0.85	18.36	38.94	20	133.68	133.68	0	0	0	38	38	597.9	599.74	4.33	80.07	1.84
8B	0	0	0	2.13	0	21.6	21.6	4.16	8.92	0	0	8.92	595.06	595.79	0	0	0.73
4E	4.34	0.5	2.17	2.17	20	0	20	4.33	9.46	2.5	0	11.96	596.42	595.99	4.33	9.46	
5C	0	0	0	38.94	0	134.71	134.71	0	0	0	38	38	598.59	597.45	0	0	
8A	14.8	0.75	11.1	13.23	20	22.84	22.84	4.04	53.8	0	0	53.8	598.33	595.46	4.33	48.41	
4D	0	0	0	2.17	0	23.51	23.51	3.97	8.67	0	2.5	11.17	597.15	595.55	0	0	
4C	14.4	0.85	12.24	66.58	20	135.78	135.78	0	0	0	40.5	40.5	597.33	595.46	4.33	53.38	
I-22	0	0	0	66.58	0	137.3	137.3	0	0	0	40.5	40.5	595.2	592.95	0	0	
3A				66.58			137.6	0	0			40.5	593.7	592.6			

* Depth of Flooding is actually the hydraulic grade requi-ed to push the stormwater though the storm sewer. Overland flow may occur at a lower elevation which could reduce the actual depth of flooding.

25-Year Storm Frequency
Existing Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding*
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	597.6	0	0	
FES2	0	0	0	0	0	0	0	0	0	2.5	0	2.5	597.4	598.22	0	0	0.82
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	598.22	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	597.6	0	0	
2B	0	0	0	0	0	4.49	4.49	0	0	0	2.5	2.5	596.53	598.22	0	0	1.69
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	597.6	0	0	
2C	4.7	0.6	2.82	2.82	20	9.52	20	6.26	17.79	0	2.5	20.29	596.53	598.21	6.26	17.79	1.68
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	597.6	0	0	
2D	0	0	0	2.82	0	20.32	20.32	6.23	17.7	0	2.5	20.2	596.34	597.91	0	0	1.57
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	597.6	0	0	
2E	0	0	0	2.82	0	21.59	21.59	6.09	17.32	0	2.5	19.82	596.62	597.56	0	0	0.94
FES1	0	0	0	0	0	0	0	0	0	25	0	25	610	611.28	0	0	1.28
1G	0.99	0.3	0.3	0.3	20	0	20	6.26	1.87	0	0	1.87	598.3	597.6	6.26	1.87	
2F	0	0	0	2.82	0	21.93	21.93	6.06	17.22	0	2.5	19.72	596.46	597.27	0	0	0.81
1A	0	0	0	0	0	0.33	0.33	0	0	0	25	25	609.59	609.63	0	0	0.04
1H	0	0	0	0.3	0	20.71	20.71	6.19	1.85	0	0	1.85	597.6	597.47	0	0	
2G	0	0	0	2.82	0	22.51	22.51	6	17.05	0	2.5	19.55	596.42	596.78	0	0	0.36
1J	7.45	0.6	4.47	4.47	20	3.67	20	6.26	28.21	0	25	53.21	604.74	606.36	6.26	28.21	1.62
1I				0.3			23.91	5.86	1.75			1.75	596.91	596.91			
2I				2.82			23.26	5.92	16.84			19.34	596.16	596.16			
I-80	20.3	0.64	12.93	20.52	20	100.02	100.02	0	0	0	27.5	27.5	601.91	603.32	6.26	81.59	1.41
5A1	0	0	0	20.52	0	102.09	102.09	0	0	0	27.5	27.5	599.53	603.28	0	0	3.75
8E	0.6	0.5	0.3	0.3	20	0	20	6.26	1.89	0	0	1.89	593.1	598.47	6.26	1.89	5.37
8F	2.04	0.65	1.33	1.33	20	0	20	6.26	8.37	0	0	8.37	595.03	598.93	6.26	8.37	3.9
5A	0	0	0	20.52	0	102.36	102.36	0	0	0	27.5	27.5	598.88	603.04	0	0	4.16
8C	0.6	0.5	0.3	1.93	20	20.71	20.71	6.19	12.01	0	0	12.01	595.03	598.05	6.26	1.89	3.02
5B	10.3	0.6	6.18	26.7	20	103.97	103.97	0	0	0	27.5	27.5	597.9	601.6	6.26	39	3.7
8B	0	0	0	1.93	0	21.69	21.69	6.09	11.82	0	0	11.82	595.06	597.61	0	0	2.55
4E	4.34	0.5	2.17	2.17	20	0	20	6.26	13.69	2.5	0	16.19	596.42	598	6.26	13.69	1.58
5C	5.3	0.6	3.18	29.88	20	105.5	105.5	0	0	0	27.5	27.5	598.59	599.33	6.26	20.07	0.74
8A	14.8	0.75	11.1	13.03	20	23.06	23.06	5.95	78.11	0	0	78.11	598.33	597.04	6.26	70.04	
4D	0	0	0	2.17	0	23.51	23.51	5.88	12.85	0	2.5	15.35	597.15	597.2	0	0	0.05
4C	14.4	0.85	12.24	57.31	20	106.97	106.97	0	0	0	30	30	597.33	597.02	6.26	77.24	
I-22	0	0	0	57.31	0	108.79	108.79	0	0	0	30	30	595.2	593.47	0	0	
3A				57.31			109.14	0	0			30	593.7	593			

* Depth of Flooding is actually the hydraulic grade required to push the stormwater though the storm sewer. Overland flow may occur at a lower elevation, which could reduce the actual depth of flooding.

25-Year Storm Frequency
Proposed Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	597.41	0	0	
FES2	0	0	0	0	0	0	0	0	0	2.5	0	2.5	597.4	597.72	0	0	0.32
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	597.71	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	597.41	0	0	
2B	0	0	0	0	0	4.49	4.49	0	0	0	2.5	2.5	596.53	597.71	0	0	1.18
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	597.41	0	0	
2C	4.7	0.6	2.82	2.82	20	9.52	20	5.33	15.16	0	2.5	17.66	596.53	597.7	5.33	15.16	1.17
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	597.41	0	0	
2D	0	0	0	2.82	0	20.32	20.32	5.3	15.07	0	2.5	17.57	596.34	597.47	0	0	1.13
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	597.41	0	0	
2E	0	0	0	2.82	0	21.59	21.59	5.17	14.7	0	2.5	17.2	596.62	597.22	0	0	0.6
FES1	0	0	0	0	0	0	0	0	0	40	0	40	610	623.55	0	0	13.55
1G	0.99	0.3	0.3	0.3	20	0	20	5.33	1.6	0	0	1.6	598.3	597.41	5.33	1.6	
2F	0	0	0	2.82	0	21.93	21.93	5.14	14.6	0	2.5	17.1	596.46	596.99	0	0	0.53
1A	0	0	0	0	0	0.2	0.2	0	0	0	40	40	609.59	619.33	0	0	9.74
1H	0	0	0	0.3	0	20.71	20.71	5.26	1.58	0	0	1.58	597.6	597.31	0	0	
2G	0	0	0	2.82	0	22.51	22.51	5.08	14.44	0	2.5	16.94	596.42	596.62	0	0	0.2
1J	7.45	0.6	4.47	4.47	20	2.19	20	5.33	24.03	0	40	64.03	604.74	610.97	5.33	24.03	6.23
1I				0.3			23.91	4.94	1.48			1.48	596.91	596.91			
2I				2.82			23.26	5	14.23			16.73	596.16	596.16			
I-80	20.3	0.64	12.99	20.58	20	130.04	130.04	0	0	0	42.5	42.5	601.91	606.57	5.33	69.84	4.66
5A1	0	0	0	20.58	0	132.04	132.04	0	0	0	42.5	42.5	599.53	606.53	0	0	7
8E	0.6	0.5	0.3	0.3	20	0	20	5.33	1.61	0	0	1.61	593.1	599.01	5.33	1.61	5.91
8F	2.04	0.65	1.33	1.33	20	0	20	5.33	7.13	0	0	7.13	595.03	599.34	5.33	7.13	4.31
5A	0	0	0	20.58	0	132.27	132.27	0	0	0	42.5	42.5	598.88	606.29	0	0	7.41
8C	1	0.5	0.5	2.13	20	20.71	20.71	5.26	11.28	0	0	11.28	595.03	598.7	5.33	2.69	3.67
5B	21.6	0.85	18.36	38.94	20	133.68	133.68	0	0	0	42.5	42.5	597.9	604.91	5.33	98.7	7.01
8B	0	0	0	2.13	0	21.6	21.6	5.17	11.08	0	0	11.08	595.06	598.32	0	0	3.26
4E	4.34	0.5	2.17	2.17	20	0	20	5.33	11.67	2.5	0	14.17	596.42	598.55	5.33	11.67	2.13
5C	0	0	0	38.94	0	134.71	134.71	0	0	0	42.5	42.5	598.59	601.1	0	0	2.51
8A	14.8	0.75	11.1	13.23	20	22.84	22.84	5.05	67.27	0	0	67.27	598.33	597.81	5.33	59.67	
4D	0	0	0	2.17	0	23.51	23.51	4.96	10.85	0	2.5	13.35	597.15	597.93	0	0	0.78
4C	14.4	0.85	12.24	66.58	20	135.78	135.78	0	0	0	45	45	597.33	597.8	5.33	65.8	0.47
I-22	0	0	0	66.58	0	137.3	137.3	0	0	0	45	45	595.2	593.63	0	0	
3A				66.58			137.6	0	0			45	593.7	593			

* Depth of Flooding is actually the hydraulic grade required to push the stormwater though the storm sewer. Overland flow may occur at a lower elevation, which could reduce the actual depth of flooding.

50-Year Storm Frequency
Existing Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	597.6	0	0	
FES2	0	0	0	0	0	0	0	0	0	0	0	3	597.4	598.33	0	0	0.93
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	598.33	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	597.6	0	0	
2B	0	0	0	0	0	4.49	4.49	0	0	0	3	3	596.53	598.33	0	0	1.8
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	597.6	0	0	
2C	4.7	0.6	2.82	2.82	20	9.52	20	6.26	12.3	17.79	3	20.79	596.53	598.32	6.26	17.79	1.79
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	597.6	0	0	
2D	0	0	0	2.82	0	20.32	20.32	6.23	12.2	17.7	3	20.7	596.34	598	0	0	1.66
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	597.6	0	0	
2E	0	0	0	2.82	0	21.59	21.59	6.1	11.83	17.34	3	20.34	596.62	597.64	0	0	1.02
FES1	0	0	0	0	0	0	0	0	0	0	0	26	610	612.27	0	0	2.27
1G	0.99	0.3	0.3	0.3	20	0	20	6.26	1.3	1.87	0	1.87	598.3	597.6	6.26	1.87	
2F	0	0	0	2.82	0	21.93	21.93	6.06	11.74	17.24	3	20.24	596.46	597.33	0	0	0.87
1A	0	0	0	0	0	0.2	0.2	0	0	0	26	26	609.59	610.48	0	0	0.89
1H	0	0	0	0.3	0	20.71	20.71	6.19	1.27	1.85	0	1.85	597.6	597.47	0	0	
2G	0	0	0	2.82	0	22.51	22.51	6.01	11.57	17.07	3	20.07	596.42	596.81	0	0	0.39
1J	7.45	0.6	4.47	4.47	20	2.19	20	6.26	19.49	28.21	26	54.21	604.74	606.95	6.26	28.21	2.21
1I				0.3			23.91	5.86	1.18	1.75		1.75	596.91	596.91			
2I				2.82			23.26	5.93	11.35	16.86		19.86	596.16	596.16			
I-80	20.3	0.64	12.99	20.58	20	130.04	130.04	0	0	0	29	29	601.91	603.79	6.26	81.59	1.88
5A1	0	0	0	20.58	0	132.04	132.04	0	0	0	29	29	599.53	603.75	0	0	4.22
8E	0.6	0.5	0.3	0.3	20	0	20	6.26	1.31	1.89	0	1.89	593.1	598.91	6.26	1.89	5.81
8F	2.04	0.65	1.33	1.33	20	0	20	6.26	5.78	8.37	0	8.37	595.03	599.38	6.26	8.37	4.35
5A	0	0	0	20.58	0	132.27	132.27	0	0	0	29	29	598.88	603.5	0	0	4.62
8C	1	0.5	0.5	2.13	20	20.71	20.71	6.19	9.12	12.01	0	12.01	595.03	598.49	6.26	1.89	3.46
5B	21.6	0.85	18.36	38.94	20	133.68	133.68	0	0	0	29	29	597.9	602.04	6.26	39	4.14
8B	0	0	0	2.13	0	21.6	21.6	6.09	8.92	11.82	0	11.82	595.06	598.06	0	0	3
4E	4.34	0.5	2.17	2.17	20	0	20	6.26	9.46	13.69	0	16.19	596.42	598.45	6.26	13.69	2.03
5C	0	0	0	38.94	0	134.71	134.71	0	0	0	29	29	598.59	599.77	6.26	20.07	1.18
8A	14.8	0.75	11.1	13.23	20	22.84	22.84	5.95	53.8	78.11	0	78.11	598.33	597.48	6.26	70.04	
4D	0	0	0	2.17	0	23.51	23.51	5.88	8.67	12.85	2.5	15.35	597.15	597.65	0	0	0.5
4C	14.4	0.85	12.24	66.58	20	135.78	135.78	0	0	0	31.5	31.5	597.33	597.47	6.26	77.24	0.14
I-22	0	0	0	66.58	0	137.3	137.3	0	0	0	31.5	31.5	595.2	593.97	0	0	
3A				66.58			137.6	0	0	0		31.5	593.7	593.5			

* Depth of Flooding is actually the hydraulic grade required to push the stormwater though the storm sewer. Overland flow may occur at a lower elevation, which could reduce the actual depth of flooding.

50-Year Storm Frequency
Proposed Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding*
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	597.6	0	0	
FES2	0	0	0	0	0	0	0	0	0	0	0	3	597.4	598.33	0	0	0.93
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	598.33	0	0	
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	597.6	0	0	
2B	0	0	0	0	0	4.49	4.49	0	0	0	3	3	596.53	598.33	0	0	1.8
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	597.6	0	0	
2C	4.7	0.6	2.82	2.82	20	9.52	20	6.26	6.26	0	3	20.79	596.53	598.32	6.26	17.79	1.79
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	597.6	0	0	
2D	0	0	0	2.82	0	20.32	20.32	6.23	6.23	0	3	20.7	596.34	598	0	0	1.66
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	597.6	0	0	
2E	0	0	0	2.82	0	21.59	21.59	6.1	6.1	0	3	20.34	596.62	597.64	0	0	1.02
FES1	0	0	0	0	0	0	0	0	0	0	0	47	610	635.8	0	0	25.8
1G	0.99	0.3	0.3	0.3	20	0	20	6.26	6.26	0	0	1.87	598.3	597.6	6.26	1.87	
2F	0	0	0	2.82	0	21.93	21.93	6.06	6.06	0	3	20.24	596.46	597.33	0	0	0.87
1A	0	0	0	0	0	0.33	0.33	0	0	0	47	47	609.59	629.97	0	0	20.38
1H	0	0	0	0.3	0	20.71	20.71	6.19	6.19	0	0	1.85	597.6	597.47	0	0	
2G	0	0	0	2.82	0	22.51	22.51	6.01	6.01	0	3	20.07	596.42	596.81	0	0	0.39
1J	7.45	0.6	4.47	4.47	20	3.67	20	6.26	6.26	0	47	75.21	604.74	618.43	6.26	28.21	13.69
1I				0.3			23.91	5.86	5.86			1.75	596.91	596.91			
2I				2.82			23.26	5.93	5.93			19.86	596.16	596.16			
I-80	20.3	0.64	12.93	20.52	20	100.02	100.02	0	0	0	50	50	601.91	612.35	6.26	81.98	10.44
5A1	0	0	0	20.52	0	102.09	102.09	0	0	0	50	50	599.53	612.3	0	0	12.77
8E	0.6	0.5	0.3	0.3	20	0	20	6.26	6.26	0	0	1.89	593.1	601.85	6.26	1.89	8.75
8F	2.04	0.65	1.33	1.33	20	0	20	6.26	6.26	0	0	8.37	595.03	602.31	6.26	8.37	7.28
5A	0	0	0	20.52	0	102.36	102.36	0	0	0	50	50	598.88	611.97	0	0	13.09
8C	0.6	0.5	0.3	1.93	20	20.71	20.71	6.19	6.19	0	0	13.26	595.03	601.43	6.26	3.16	6.4
5B	10.3	0.6	6.18	26.7	20	103.97	103.97	0	0	0	50	50	597.9	610.03	6.26	115.85	12.13
8B	0	0	0	1.93	0	21.69	21.69	6.1	6.1	0	0	13.07	595.06	600.9	0	0	5.84
4E	4.34	0.5	2.17	2.17	20	0	20	6.26	6.26	0	0	16.19	596.42	601.16	6.26	13.69	4.74
5C	5.3	0.6	3.18	29.88	20	105.5	105.5	0	0	0	50	50	598.59	604.74	0	0	6.15
8A	14.8	0.75	11.1	13.03	20	23.06	23.06	5.97	5.97	0	0	79.62	598.33	600.19	6.26	70.04	1.86
4D	0	0	0	2.17	0	23.51	23.51	5.88	5.88	0	2.5	15.35	597.15	600.36	0	0	3.21
4C	14.4	0.85	12.24	57.31	20	106.97	106.97	0	0	0	52.5	52.5	597.33	600.18	6.26	77.24	2.85
I-22	0	0	0	57.31	0	108.79	108.79	0	0	0	52.5	52.5	595.2	594.39	0	0	
3A				57.31			109.14	0	0			52.5	593.7	593.5			

* Depth of Flooding is actually the hydraulic grade required to push the stormwater though the storm sewer. Overland flow may occur at a lower elevation, which could reduce the actual depth of flooding.

100-Year Storm Frequency
Existing Conditions

	Area *(acres)*	Inlet C	Inlet CA *(acres)*	System CA *(acres)*	Time of Concentration *(min)*	Upstream Time Of Concentration *(min)*	System Flow Time *(min)*	System Intensity *(in/hr)*	System Rational Flow *(cfs)*	Additional Carryover *(cfs)*	Upstream Additional Flow *(cfs)*	Total System Flow *(cfs)*	Rim Elevation *(ft)*	Hydraulic Grade Line Out *(ft)*	Local Intensity *(in/hr)*	Local Rational Flow *(cfs)*	Depth of Flooding*
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	597.86	0	0	
FES2	0	0	0	0	0	0	0	0	0	4	0	4	597.4	599.29	0	0	1.89
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	599.29	0	0	0.91
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	597.86	0	0	
2B	0	0	0	0	0	2.27	2.27	0	0	0	4	4	596.53	599.29	0	0	2.76
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	597.86	0	0	
2C	4.7	0.6	2.82	2.82	20	4.79	20	7.33	20.85	0	4	24.85	596.53	599.26	7.33	20.85	2.73
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	597.86	0	0	
2D	0	0	0	2.82	0	20.19	20.19	7.3	20.75	0	4	24.75	596.34	598.81	0	0	2.47
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	597.86	0	0	
2E	0	0	0	2.82	0	20.91	20.91	7.18	20.4	0	4	24.4	596.62	598.29	0	0	1.67
FES1	0	0	0	0	0	0	0	0	0	25	0	25	610	615.49	0	0	5.49
1G	0.99	0.3	0.3	0.3	20	0	20	7.33	2.2	0	0	2.2	598.3	597.86	7.33	2.2	
2F	0	0	0	2.82	0	21.11	21.11	7.14	20.3	0	4	24.3	596.46	597.85	0	0	1.39
1A	0	0	0	0	0	0.28	0.28	0	0	0	25	25	609.59	613.85	0	0	4.26
1H	0	0	0	0.3	0	20.42	20.42	7.26	2.17	0	0	2.17	597.6	597.68	0	0	0.08
2G	0	0	0	2.82	0	21.43	21.43	7.08	20.14	0	4	24.14	596.42	597.1	0	0	0.68
1J	7.45	0.6	4.47	4.47	20	3.16	20	7.33	33.04	0	25	58.04	604.74	610.58	7.33	33.04	5.84
1I				0.3			22.29	6.94	2.08			2.08	596.91	596.91			
2I				2.82			21.85	7.01	19.93			23.93	596.16	596.16			
I-80	20.3	0.64	12.93	20.52	20	86.63	86.63	1.75	36.17	0	29	65.17	601.91	606.96	7.33	95.58	5.05
5A1	0	0	0	20.52	0	88.37	88.37	1.63	33.73	0	29	62.73	599.53	606.91	0	0	7.38
8E	0.6	0.5	0.3	0.3	20	0	20	7.33	2.22	0	0	2.22	593.1	601.27	7.33	2.22	8.17
8F	2.04	0.65	1.33	1.33	20	0	20	7.33	9.8	0	0	9.8	595.03	601.9	7.33	9.8	6.87
5A	0	0	0	20.52	0	88.57	88.57	1.62	33.44	0	29	62.44	598.88	606.59	0	0	7.71
8C	0.6	0.5	0.3	1.93	20	20.42	20.42	7.26	14.1	0	0	14.1	595.03	600.69	7.33	2.22	5.66
5B	10.3	0.6	6.18	26.7	20	89.8	89.8	1.53	41.28	0	29	70.28	597.9	604.76	7.33	45.68	6.86
8B	0	0	0	1.93	0	20.99	20.99	7.16	13.9	0	0	13.9	595.06	600.09	0	0	5.03
4E	4.34	0.5	2.17	2.17	20	0	20	7.33	16.04	2.5	0	18.54	596.42	600.56	7.33	16.04	4.14
5C	5.3	0.6	3.18	29.88	20	90.94	90.94	1.46	43.85	0	29	72.85	598.59	602.08	7.33	23.51	3.49
8A	14.8	0.75	11.1	13.03	20	21.79	21.79	7.02	92.22	0	0	92.22	598.33	599.29	7.33	82.05	0.96
4D	0	0	0	2.17	0	22.27	22.27	6.94	15.18	0	2.5	17.68	597.15	599.51	0	0	2.36
4C	14.4	0.85	12.24	57.31	20	92.01	92.01	1.38	79.91	0	31.5	111.41	597.33	599.27	7.33	90.48	1.94
I-22	0	0	0	57.31	0	93.32	93.32	1.29	74.76	0	31.5	106.26	595.2	595.01	0	0	
3A				57.31			93.57	1.28	73.78			105.28	593.7	594.45			0.75

* Depth of Flooding is actually the hydraulic grade required to push the stormwater though the storm sewer. Overland flow may occur at a lower elevation, which could reduce the actual depth of flooding.

100-Year Storm Frequency
Proposed Conditions

	Area (acres)	Inlet C	Inlet CA (acres)	System CA (acres)	Time of Concentration (min)	Upstream Time Of Concentration (min)	System Flow Time (min)	System Intensity (in/hr)	System Rational Flow (cfs)	Additional Carryover (cfs)	Upstream Additional Flow (cfs)	Total System Flow (cfs)	Rim Elevation (ft)	Hydraulic Grade Line Out (ft)	Local Intensity (in/hr)	Local Rational Flow (cfs)	Depth of Flooding*
1B	0	0	0	0	0	0	0	0	0	0	0	0	598.21	597.86	0	0	
FES2	0	0	0	0	0	0	0	0	0	4	0	4	597.4	599.29	0	0	1.89
2A	0	0	0	0	0	0	0	0	0	0	0	0	598.38	599.29	0	0	0.91
1C	0	0	0	0	0	0	0	0	0	0	0	0	599.25	597.86	0	0	
2B	0	0	0	0	0	2.27	2.27	0	0	0	4	4	596.53	599.29	0	0	2.76
1D	0	0	0	0	0	0	0	0	0	0	0	0	598.65	597.86	0	0	
2C	4.7	0.6	2.82	2.82	20	4.79	20	7.33	20.85	0	4	24.85	596.53	599.26	7.33	20.85	2.73
1E	0	0	0	0	0	0	0	0	0	0	0	0	598.49	597.86	0	0	
2D	0	0	0	2.82	0	20.19	20.19	7.3	20.75	0	4	24.75	596.34	598.81	0	0	2.47
1F	0	0	0	0	0	0	0	0	0	0	0	0	598.43	597.86	0	0	
2E	0	0	0	2.82	0	20.91	20.91	7.18	20.4	0	4	24.4	596.62	598.29	0	0	1.67
FES1	0	0	0	0	0	0	0	0	0	53	0	53	610	648.9	0	0	38.9
1G	0.99	0.3	0.3	0.3	20	0	20	7.33	2.2	0	0	2.2	598.3	597.86	7.33	2.2	
2F	0	0	0	2.82	0	21.11	21.11	7.14	20.3	0	4	24.3	596.46	597.85	0	0	1.39
1A	0	0	0	0	0	0.13	0.13	0	0	0	53	53	609.59	641.49	0	0	31.9
1H	0	0	0	0.3	0	20.42	20.42	7.26	2.17	0	0	2.17	597.6	597.68	0	0	0.08
2G	0	0	0	2.82	0	21.43	21.43	7.08	20.14	0	4	24.14	596.42	597.1	0	0	0.68
1J	7.45	0.6	4.47	4.47	20	1.49	20	7.33	33.04	0	53	86.04	604.74	626.81	7.33	33.04	22.07
1I				0.3			22.29	6.94	2.08			2.08	596.91	596.91			
2I				2.82			21.85	7.01	19.93			23.93	596.16	596.16			
I-80	20.3	0.64	12.99	20.58	20	80.44	80.44	2.17	45.02	0	57	102.02	601.91	618.86	7.33	96.04	16.95
5A1	0	0	0	20.58	0	82.64	82.64	2.02	41.91	0	57	98.91	599.53	618.79	0	0	19.26
8E	0.6	0.5	0.3	0.3	20	0	20	7.33	2.22	0	0	2.22	593.1	605.56	7.33	2.22	12.46
8F	2.04	0.65	1.33	1.33	20	0	20	7.33	9.8	0	0	9.8	595.03	606.19	7.33	9.8	11.16
5A	0	0	0	20.58	0	82.91	82.91	2	41.53	0	57	98.53	598.88	618.36	0	0	19.48
8C	1	0.5	0.5	2.13	20	20.42	20.42	7.26	15.56	0	0	15.56	595.03	604.98	7.33	3.7	9.95
5B	21.6	0.85	18.36	38.94	20	84.5	84.5	1.89	74.34	0	57	131.34	597.9	615.86	7.33	135.72	17.96
8B	0	0	0	2.13	0	20.94	20.94	7.17	15.37	0	0	15.37	595.06	604.25	0	0	9.19
4E	4.34	0.5	2.17	2.17	20	0	20	7.33	16.04	2.5	0	18.54	596.42	604.54	7.33	16.04	8.12
5C	0	0	0	38.94	0	85.83	85.83	1.8	70.78	0	57	127.78	598.59	609.23	0	0	10.64
8A	14.8	0.75	11.1	13.23	20	21.66	21.66	7.05	93.93	0	0	93.93	598.33	603.27	7.33	82.05	4.94
4D	0	0	0	2.17	0	22.27	22.27	6.94	15.18	0	2.5	17.68	597.15	603.49	0	0	6.34
4C	14.4	0.85	12.24	66.58	20	87.19	87.19	1.71	114.82	0	59.5	174.32	597.33	603.25	7.33	90.48	5.92
I-22	0	0	0	66.58	0	89.28	89.28	1.57	105.3	0	59.5	164.8	595.2	595.65	0	0	0.45
3A				66.58			89.68	1.54	103.46			162.96	593.7	594.45			0.75

* Depth of Flooding is actually the hydraulic grade required to push the stormwater though the storm sewer. Overland flow may occur at a lower elevation, which could reduce the actua. depth of flooding.

Table of Additional Flooded Structures

Structure	2-Year Storm	5-Year Storm	10-Year Storm	25-Year Storm	50-Year Storm	100-Year Storm
1B						
FES2						
2A						
1C						
2B		X	X			
1D						
2C		X	X			
1E						
2D		X	X			
1F						
2E			X			
FES1						
1G						
2F		X	X			
1A						
1H						
2G			X			
1J						
1I						
2I						
I-80						
5A1			X			
8E		X				
8F			X			
5A			X			
8C			X			
5B			X			
8B			X			
4E						
5C						
8A					X	
4D						
4C				X		
I-22						X
3A						

* X indicates structures that under existing conditions do not experience flooding (overtopping) but will experience flooding (overtopping) under the IDOT proposed modifications to the central detention pond

BASIS OF CONTROL

THE HORIZONTAL CONTROL IS BASED UPON NGS PID-AJ-2780. A STANDARD STEEL ROD IN A MONUMENT WITH CAP LOCATED IN THE NORTHEASTERLY CLOVER-LEAF AT THE INTERSECTION OF 95TH STREET AND HARLEM AVENUE.

AJ-2780 = NORTH 1,841,100.56 EAST 1,130,307.58

THE VERTICAL CONTROL IS BASED UPON NGS PID-ME1770. A STANDARD DISK SET IN THE EAST FACE OF A CHURCH. THIS WAS CHECKED TO NGS PID-ME1850 A STANDARD DISK IN A HEADWALL.

AJ-2780 = 607.62

ME-1770 = 616.57

ME-1850 = 604.42

PLEASE SEE THE DRAWING FILE D1-P-91-247-11-GSHOTS.DGN FOR ADDITIONAL MANHOLES LOCATED. SEE THE SPREADSHEET FILE D1-P91-247-11-STRM-SEWER.XLS FOR RIMS AND INVERT ELEVATIONS.

STATE OF ILLINOIS)
S.S.
COUNTY OF WILL)

WE, ROBERT E. HAMILTON CONSULTING ENGINEERS INC. HAVE SURVEYED THE ABOVE DESCRIBED PROPERTY UNDER THE DIRECTION OF AN ILLINOIS PROFESSIONAL LAND SURVEYOR AND SAID PLAT IS A CORRECT REPRESENTATION OF SAID SURVEY, THAT CONFORMS TO THE CURRENT ILLINOIS MINIMUM STANDARDS FOR A TOPOGRAPHIC SURVEY. ALL DIMENSIONS ARE IN U.S. SURVEY FEET AND DECIMAL PARTS THEREOF.

SURVEY DATE: 3-28-2012

Lee R Koehler

LEE R KOEHLER ILLINOIS PROFESSIONAL LAND SURVEYOR NO.: 35-2717
EXPIRES 11-30-2012

PROFESSIONAL DESIGN FIRM NO. 184-003205

PROFESSIONAL LAND SURVEYOR
LEE R. KOEHLER
035-002717
JOLIET, ILLINOIS
STATE OF ILLINOIS

FILE NAME =	USER NAME = dws	DESIGNED -	REVISED - 4-12-2012
F:\Projects\survey\0-2011\11S08-4\GEOPAK\	D1-P91-247-11-sht-plan.dgn	DRAWN - DWS	REVISED -
	PLOT SCALE = 60.0000 ' / in.	CHECKED - LRK	REVISED -
	PLOT DATE = 4/12/2012	DATE - 3-28-2012	REVISED -

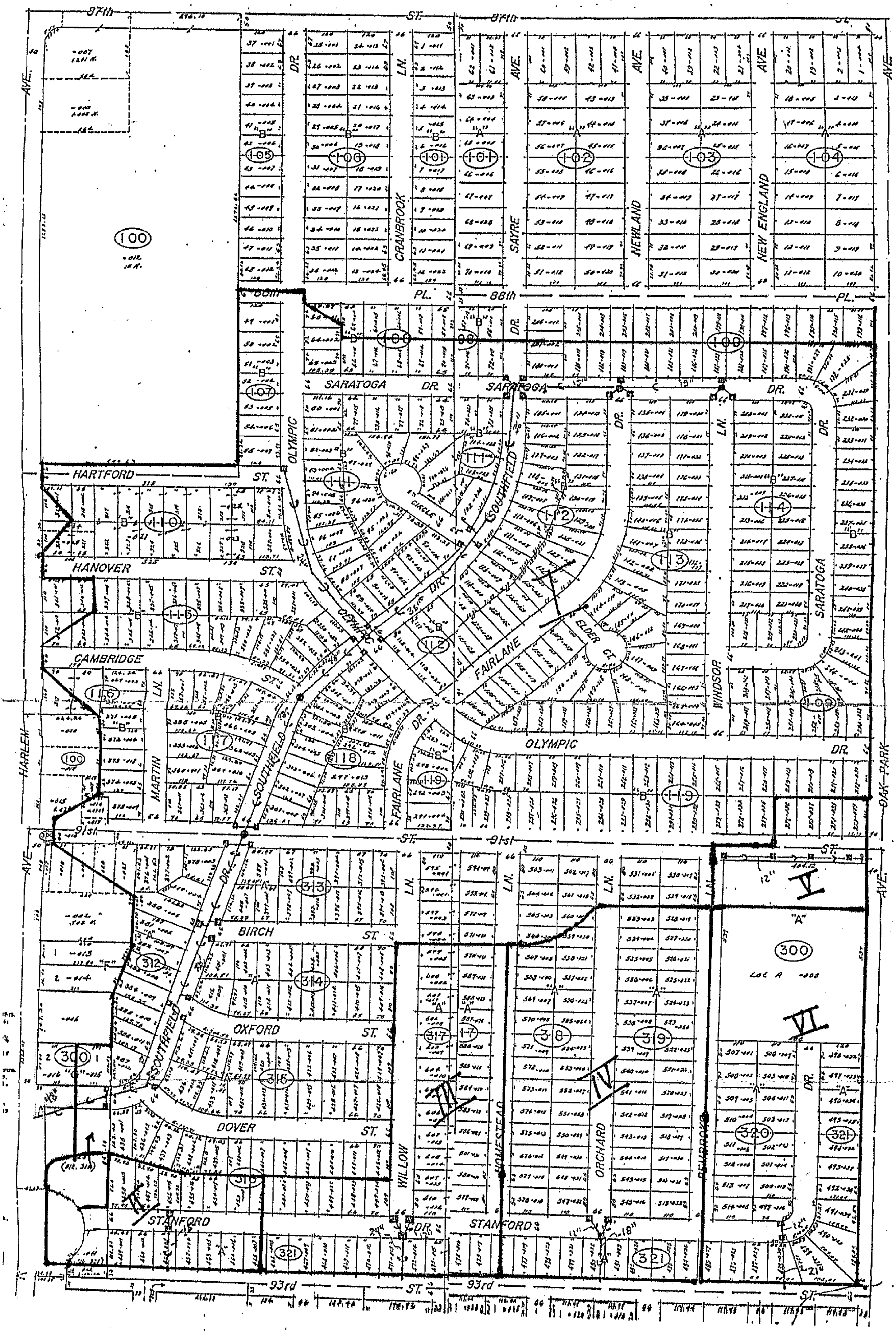
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

95 th and HARLEM AVENUE
TOPOGRAPHIC SURVEY

SCALE: 1" = 60' | SHEET 1 OF 1 SHEETS | STA. TO STA.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		COOK	1	1
CONTRACT NO.: P-91-247-11 w/o4		CONTRACT NO.		
PTB-158-012	ILLINOIS FED. AID PROJECT			

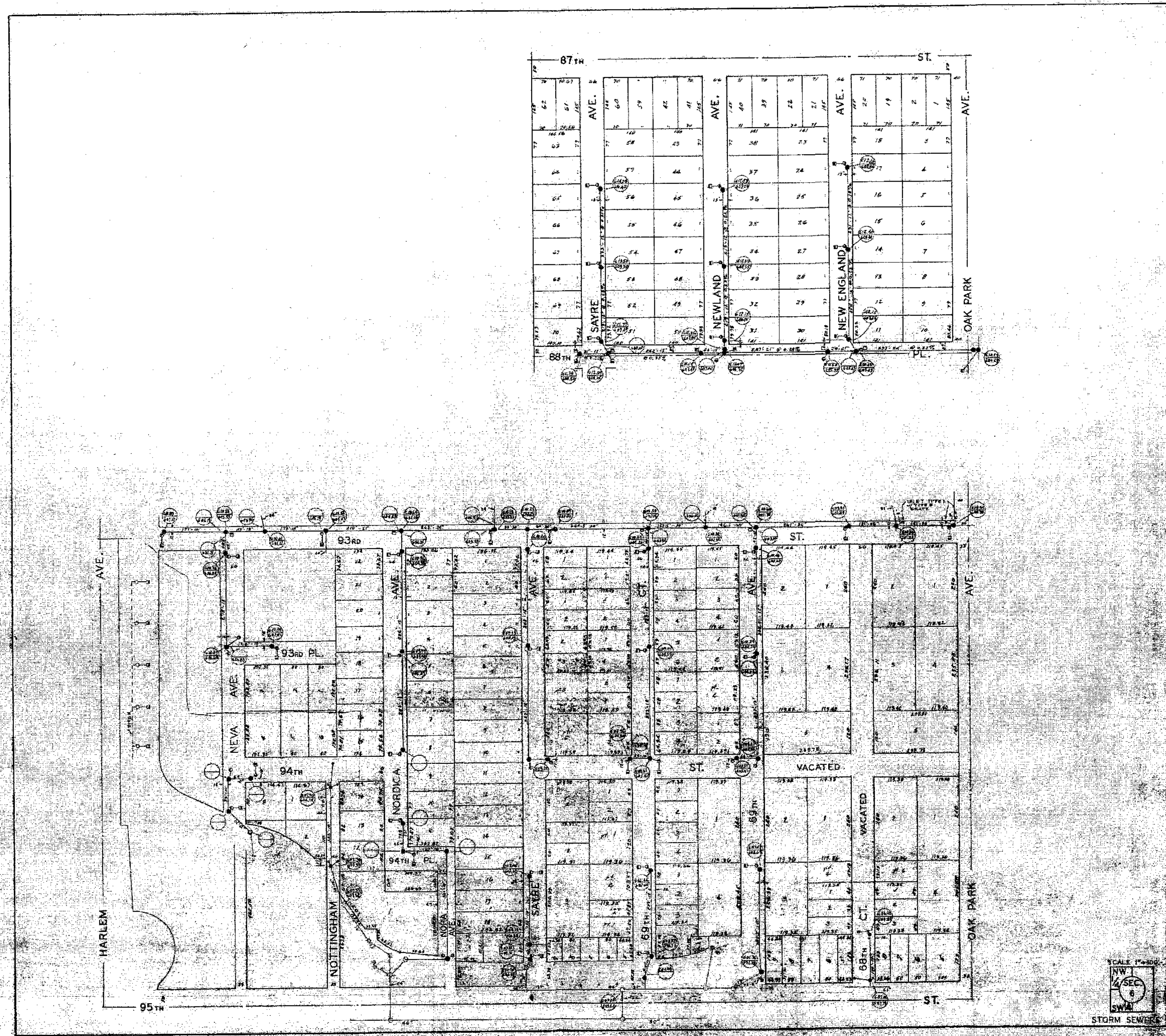
EX - APP A-1



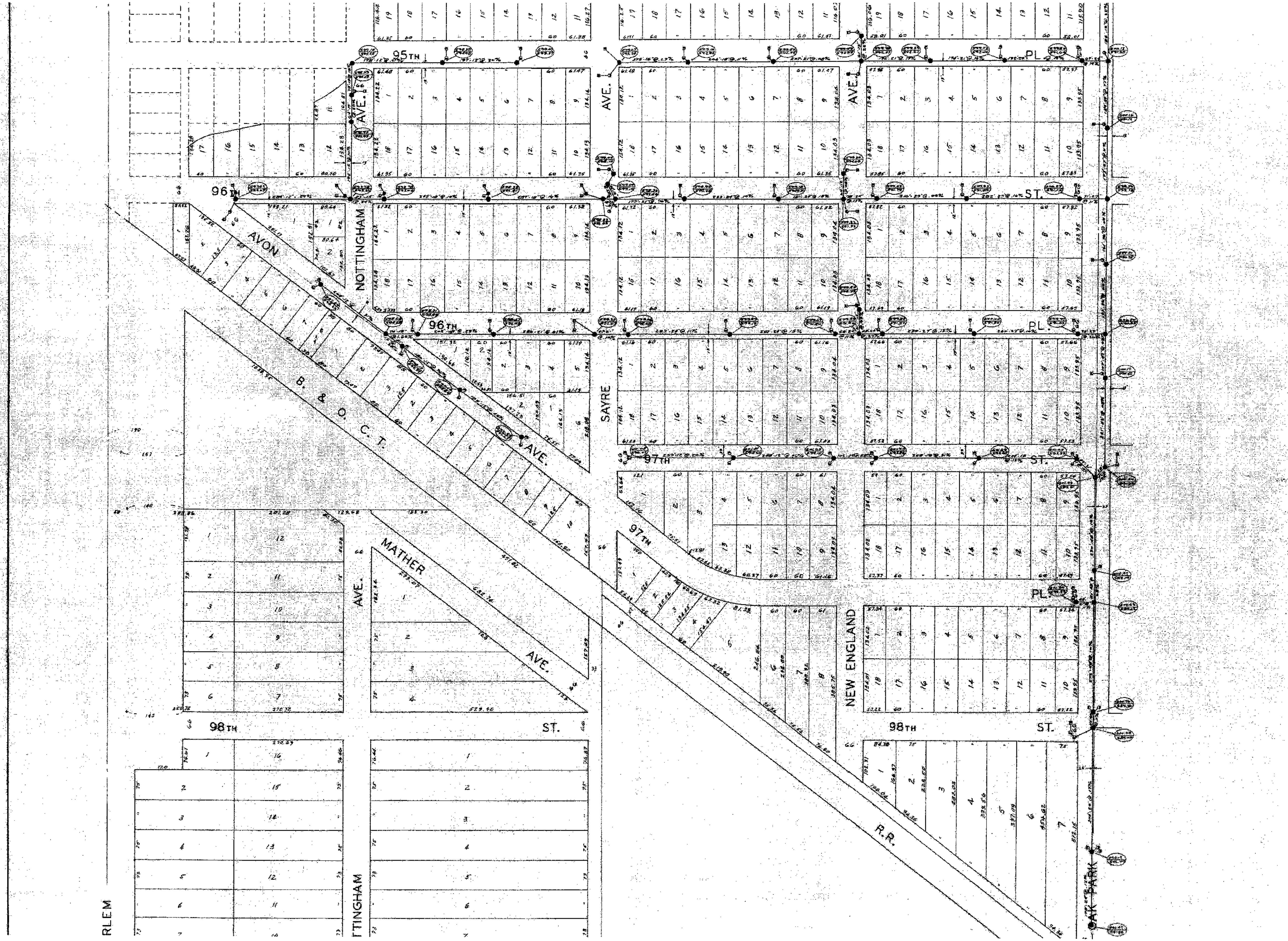
SOUTHFIELD SUBDIVISION

EXISTING DRAINAGE EX - APP B-1

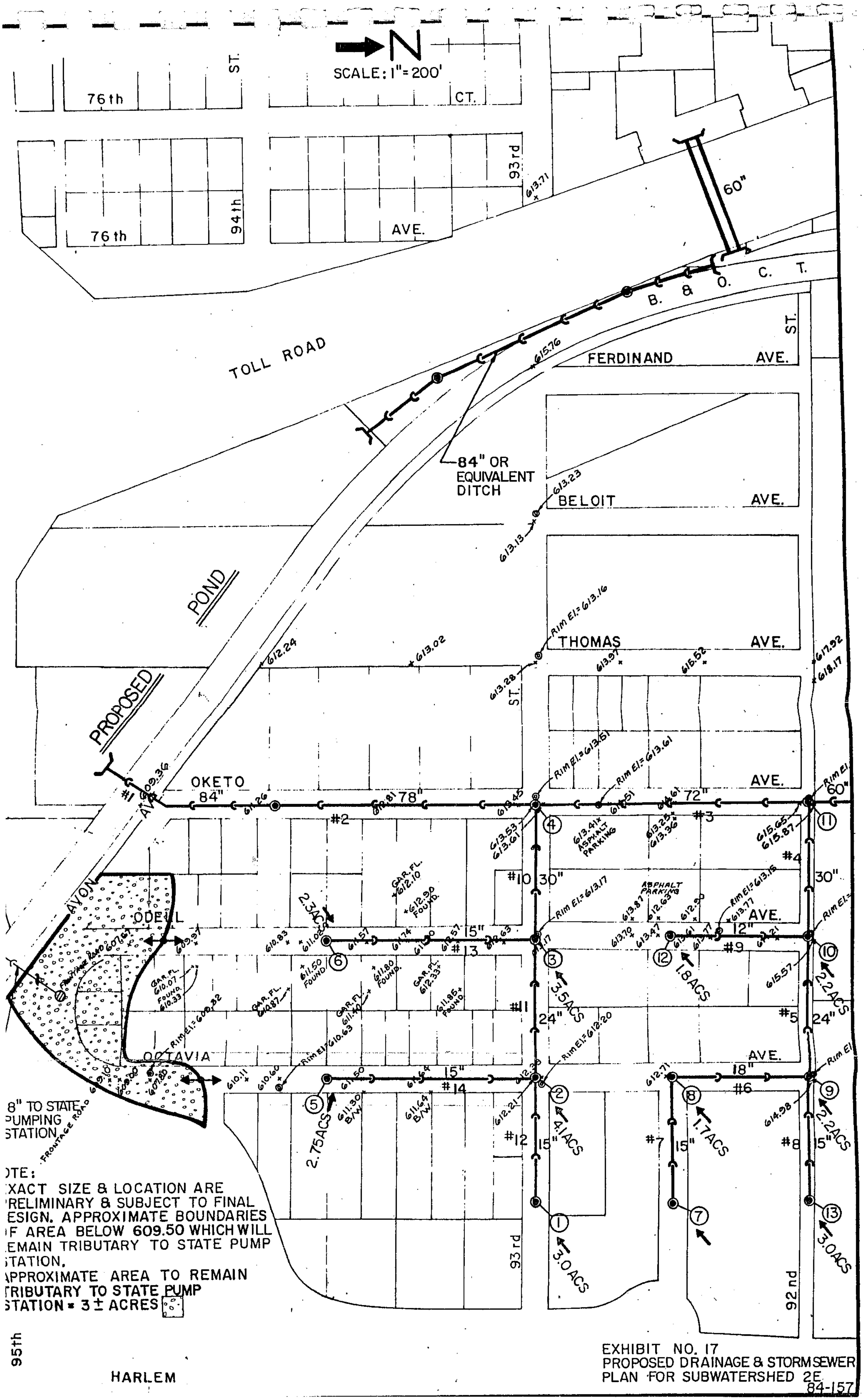
EX. APP. B-2A



OAK LAWN
ATLASES


95TH
PL.
AVE.
96TH
ST.
NOTTINGHAM
AVON
AVE.
96TH
PL.
SAYRE
B. & O. C. T.
R.R.
97TH
ST.
97TH
PL.
MATHER
AVE.
NEW ENGLAND
98TH
ST.

EX. APP. B-2B



NOTE:
EXACT SIZE & LOCATION ARE PRELIMINARY & SUBJECT TO FINAL DESIGN. APPROXIMATE BOUNDARIES OF AREA BELOW 609.50 WHICH WILL REMAIN TRIBUTARY TO STATE PUMP STATION.
APPROXIMATE AREA TO REMAIN TRIBUTARY TO STATE PUMP STATION = 3 ± ACRES

EXHIBIT NO. 17
PROPOSED DRAINAGE & STORMSEWER PLAN FOR SUBWATERSHED 2E

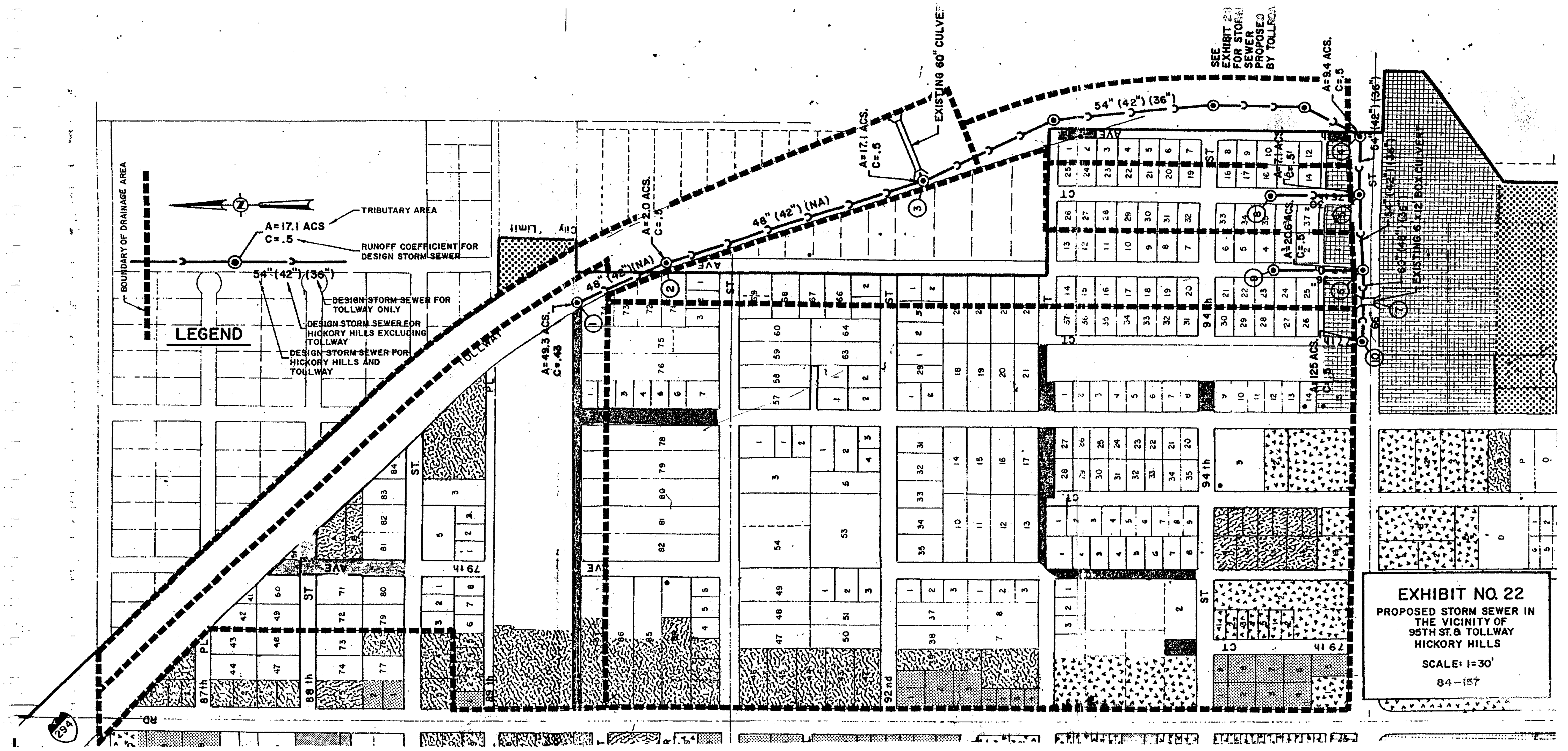


EXHIBIT NO. 22
PROPOSED STORM SEWER IN THE VICINITY OF 95TH ST. & TOLLWAY HICKORY HILLS
SCALE: 1=30'
84-157
LEGEND
BOUNDARY OF DRAINAGE AREA
TRIBUTARY AREA
A=17.1 ACS
C=.5
RUNOFF COEFFICIENT FOR DESIGN STORM SEWER
54" (42") (36")
DESIGN STORM SEWER FOR TOLLWAY ONLY
DESIGN STORM SEWER FOR HICKORY HILLS EXCLUDING TOLLWAY
DESIGN STORM SEWER FOR HICKORY HILLS AND TOLLWAY
TOLLWAY
294
EXISTING 60" CULVERT
EXISTING 6x12 BOX CULVERT
SEE EXHIBIT 23 FOR STORM SEWER PROPOSED BY TOLLROAD
A=49.3 ACS. C=.43
A=2.0 ACS. C=.5
A=17.1 ACS. C=.5
A=9.4 ACS. C=.5
A=20.6 ACS. C=.5
A=125 ACS. C=.5
48" (42") (NA)
60" (48") (36")
94th
87th
88th
92nd
79th
RD
AVE
ST
CT
PL

TRI-STATE INDUSTRIAL PARK
STORM SEWER

N

200 0 200

SCALE: 1"= 200'

BRIDGEVIEW CORPORATE BOUNDRY

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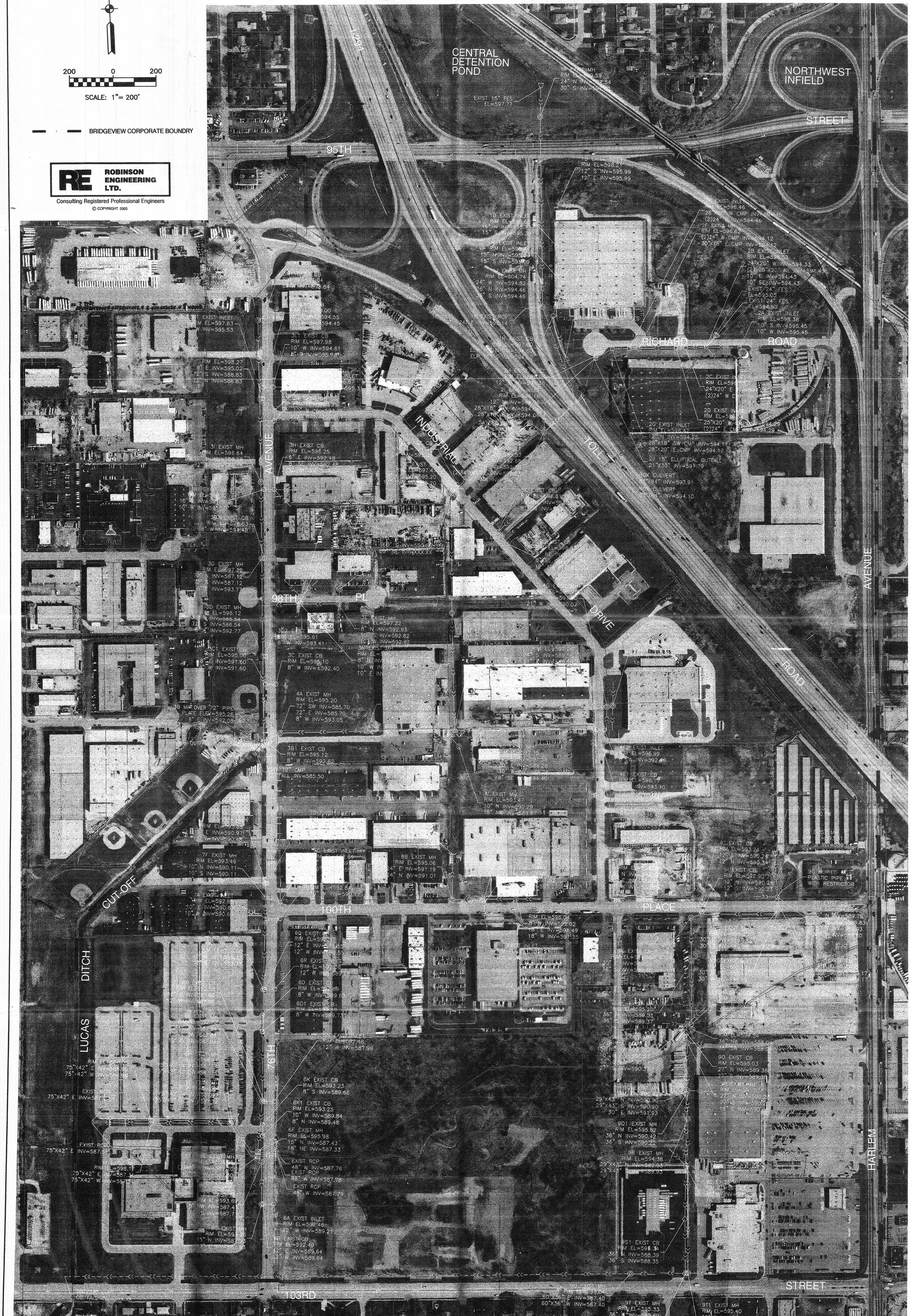

02383-MISC-01

VILLAGE OF BRIDGEVIEW
SOUTHFIELD SUBDIVISION

02383–SOUTHFIELD

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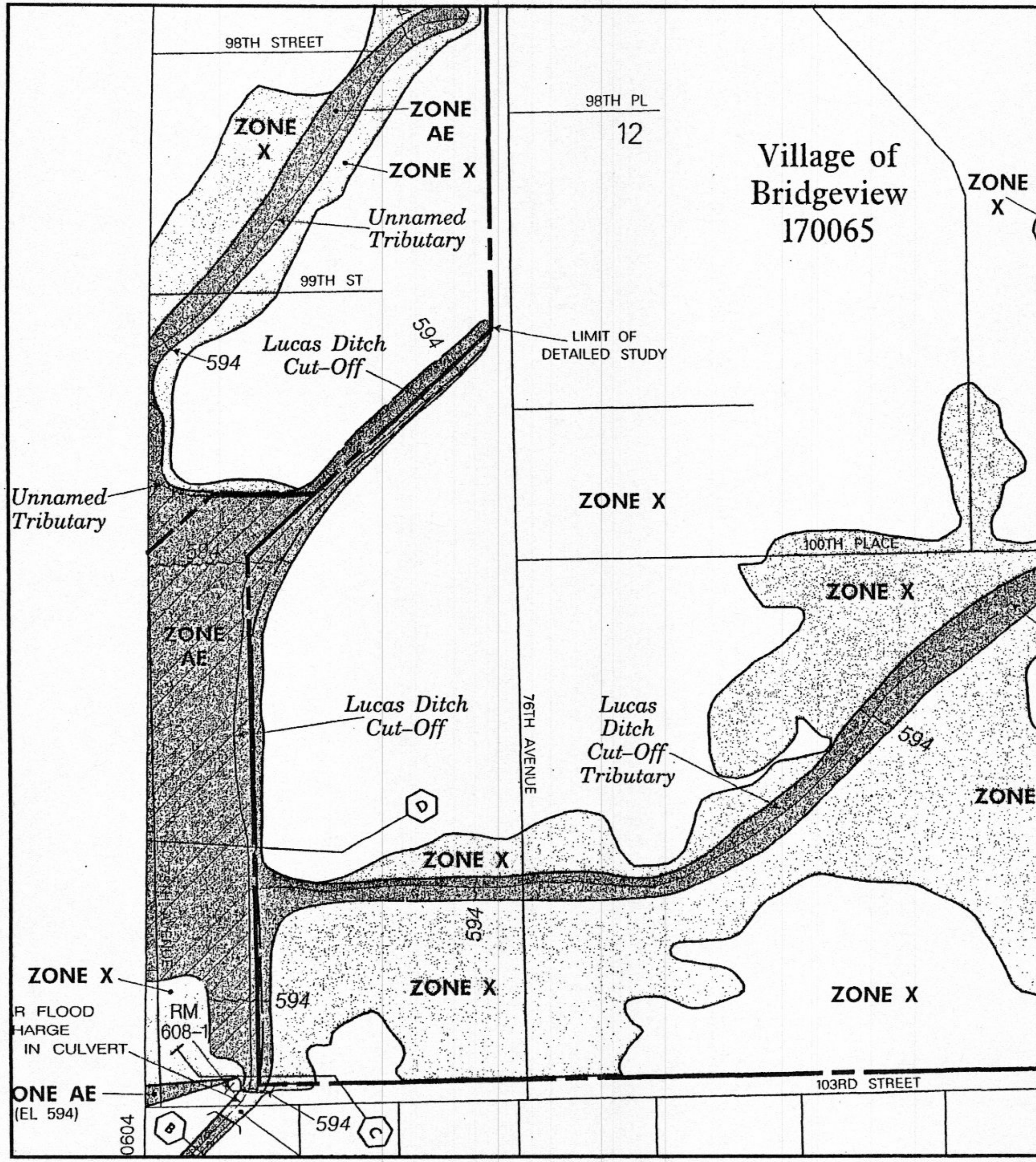


APPROXIMATE SCALE

500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
COOK COUNTY,
ILLINOIS
AND INCORPORATED AREAS

PANEL 608 OF 832

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BRIDGEVIEW, VILLAGE OF	170065	0608	F
CHICAGO RIDGE, VILLAGE OF	170076	0608	F
COOK COUNTY	170054	0608	F
HICKORY HILLS, CITY OF	170103	0608	F
OAK LAWN, VILLAGE OF	170137	0608	F
PALOS HILLS, CITY OF	170143	0608	F
WORTH, VILLAGE OF	170177	0608	F

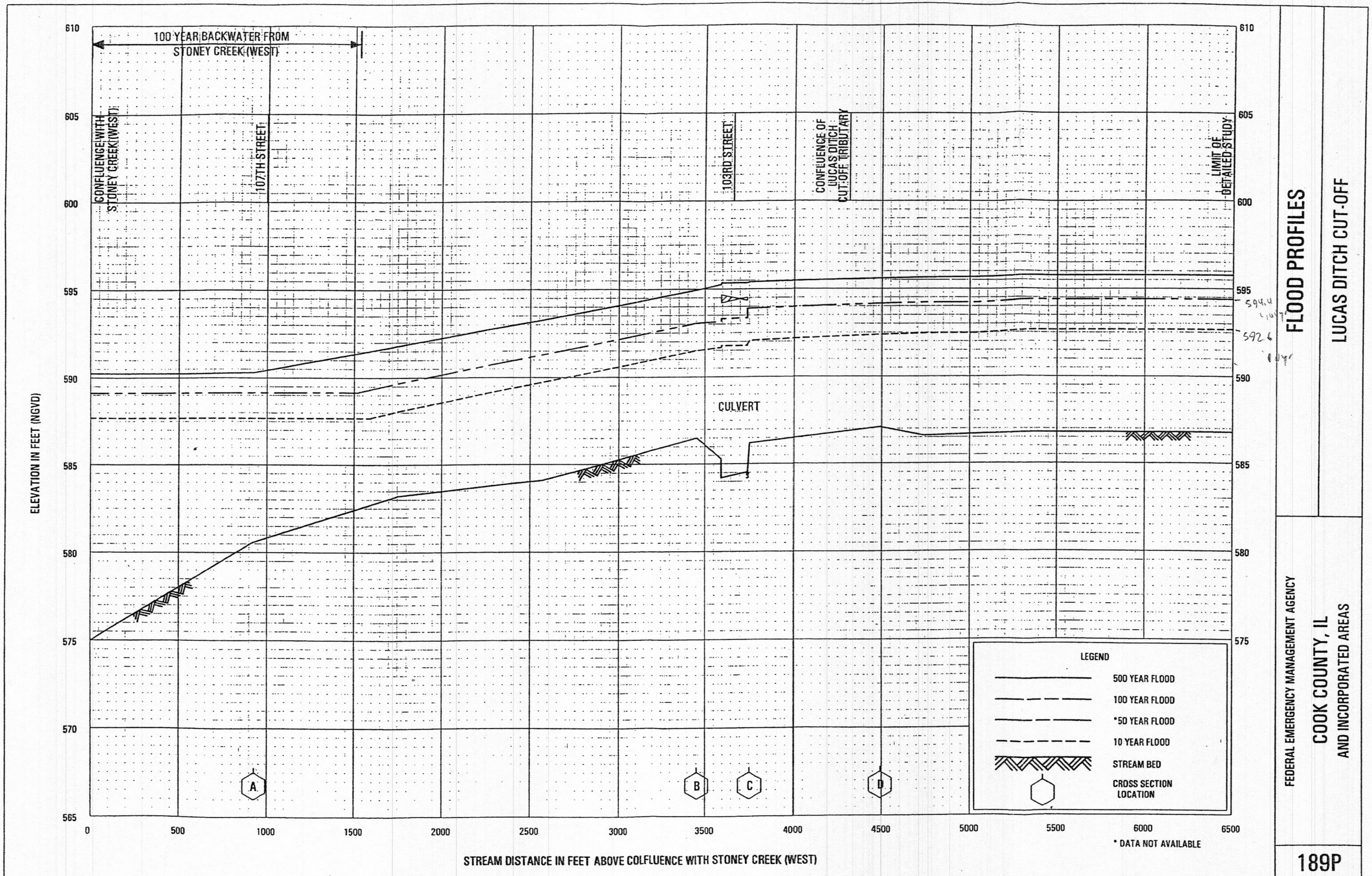
Notice to User: The MAP NUMBER shown below should be used when placing map orders: the COMMUNITY NUMBER shown above should be used on insurance applications for the subject community.

MAP NUMBER
17031C0608 F

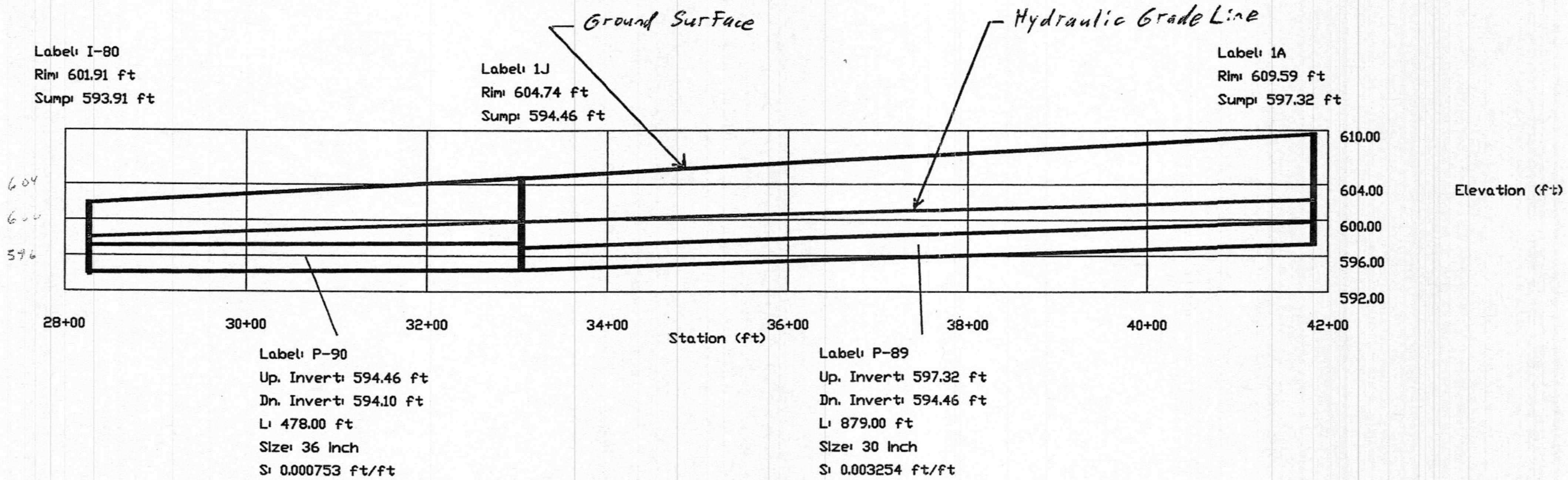
EFFECTIVE DATE:
NOVEMBER 6, 2000

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov


100 YEAR BACKWATER FROM STONEY CREEK (WEST)
CONFLUENCE WITH STONEY CREEK (WEST)
107TH STREET
103RD STREET
CONFLUENCE OF LUCAS DITCH CUT-OFF TRIBUTARY
LIMIT OF DETAILED STUDY
CULVERT
ELEVATION IN FEET (NGVD)
STREAM DISTANCE IN FEET ABOVE COLFLUENCE WITH STONEY CREEK (WEST)
LEGEND
500 YEAR FLOOD
100 YEAR FLOOD
*50 YEAR FLOOD
10 YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION
* DATA NOT AVAILABLE
A
B
C
D
FEDERAL EMERGENCY MANAGEMENT AGENCY
COOK COUNTY, IL
AND INCORPORATED AREAS
FLOOD PROFILES
LUCAS DITCH CUT-OFF
189P

Existing 10-Yr Profile
1A to I80



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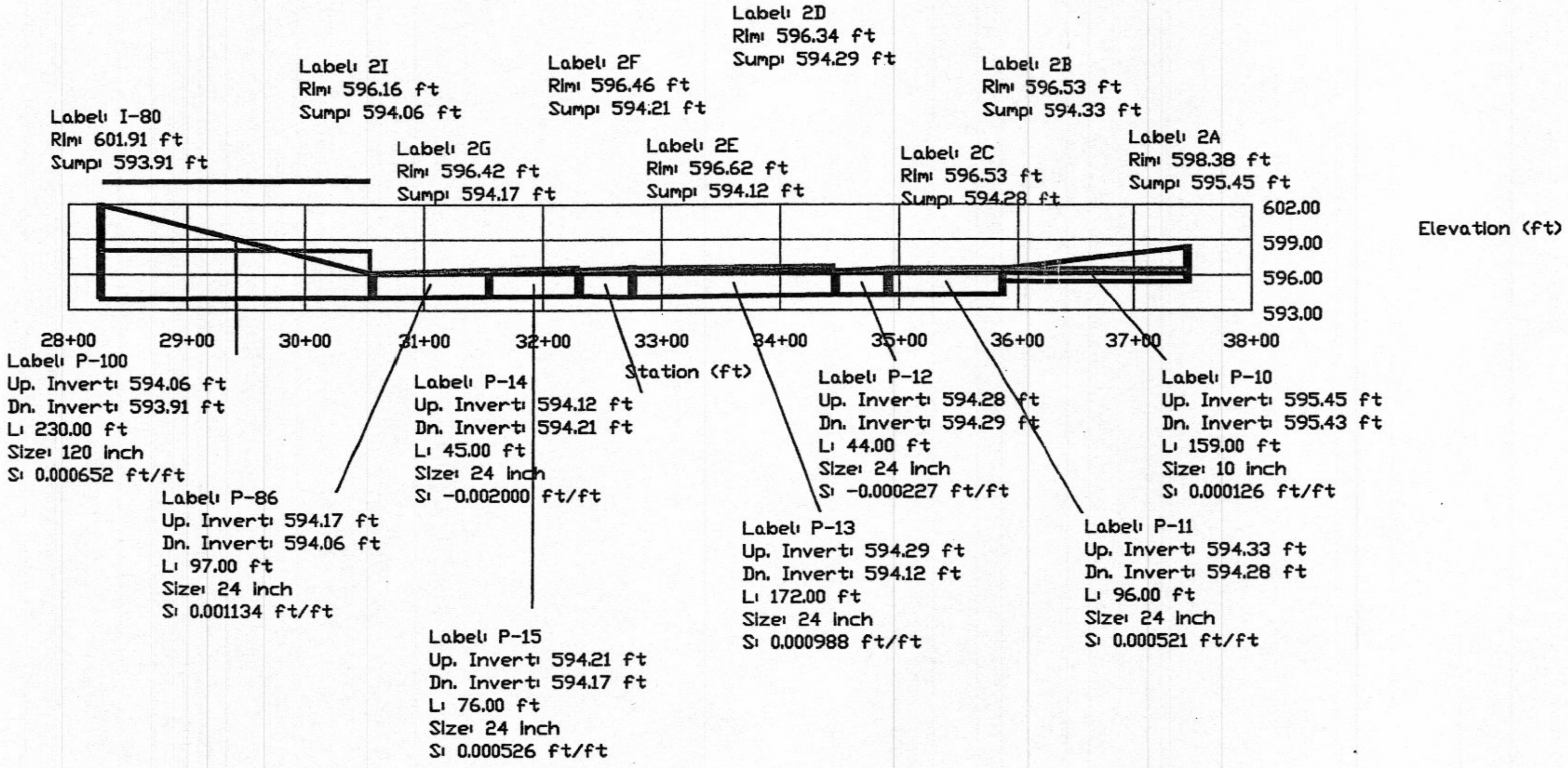
Existing 10-Yr Profile
2A to I80



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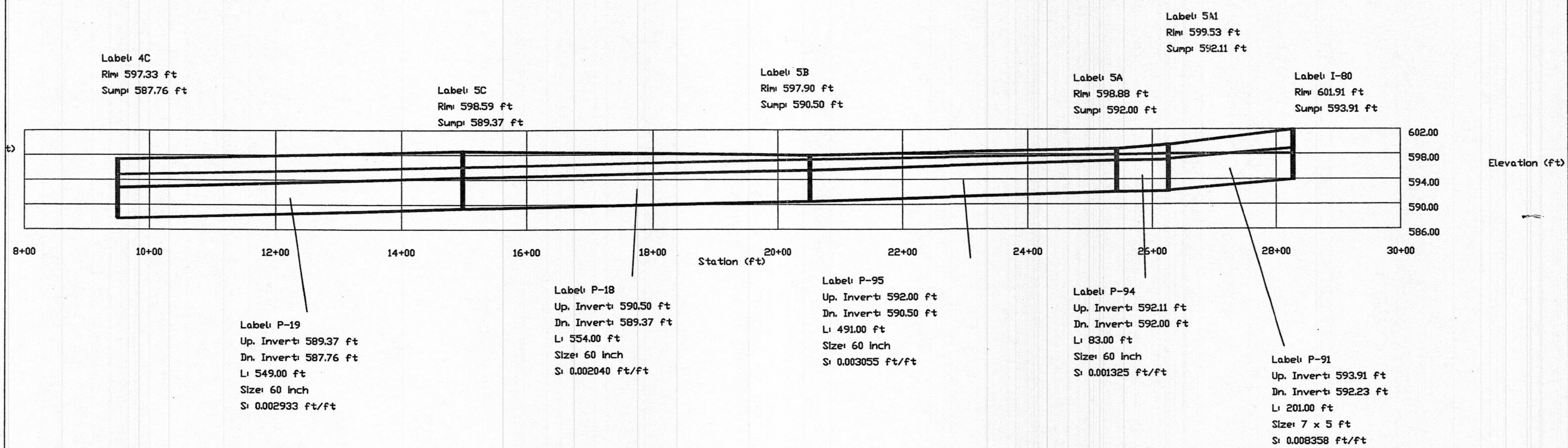
Existing 10-Yr Profile

I80 to 4C



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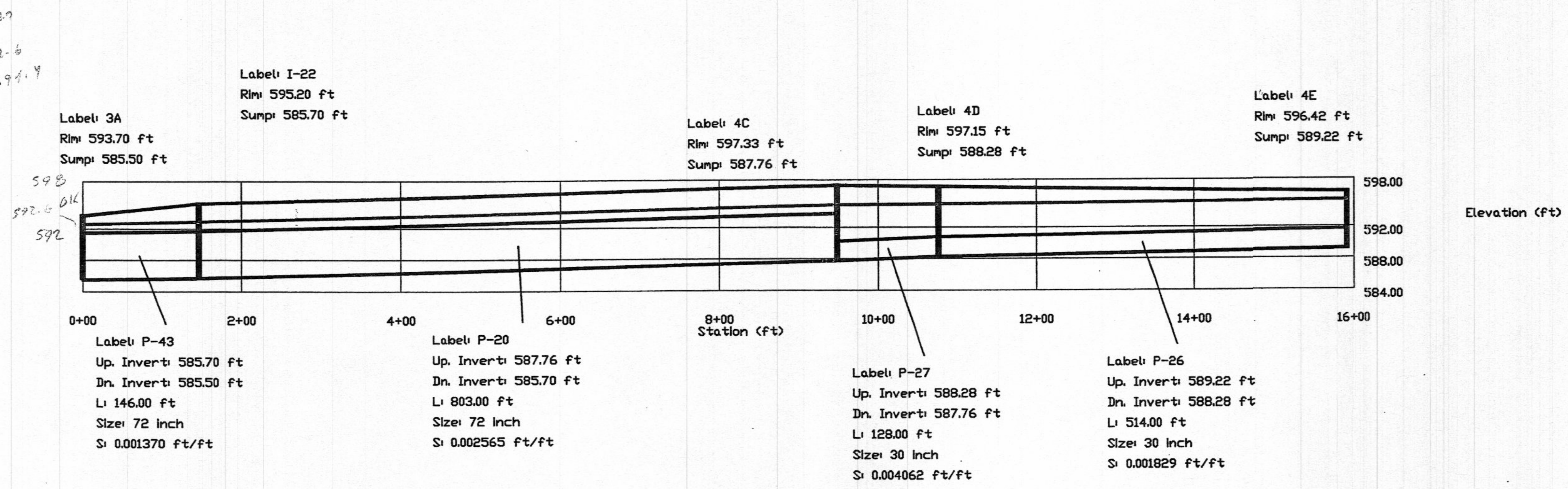
Existing 10-Yr Profile

4E to 3A



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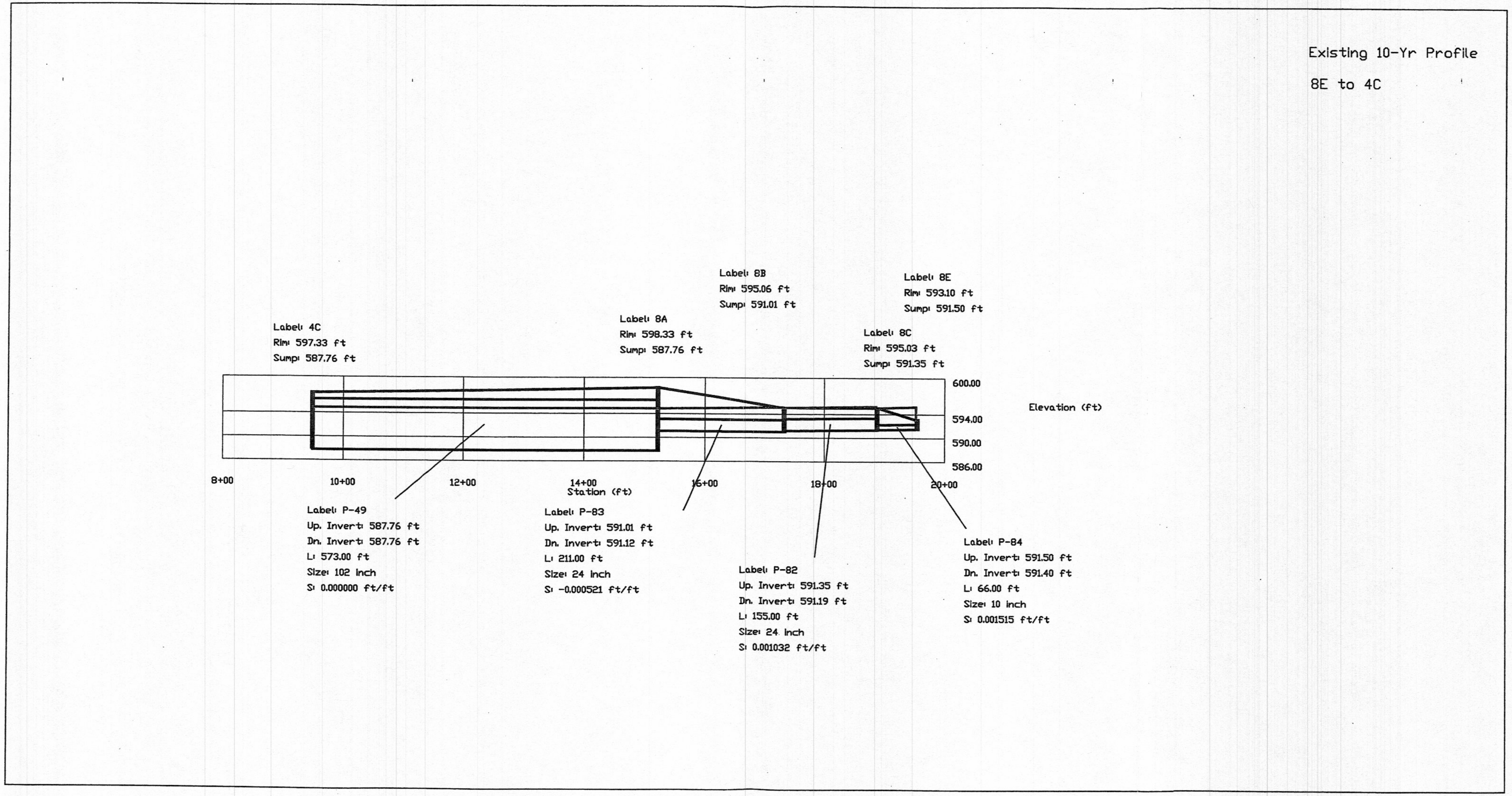

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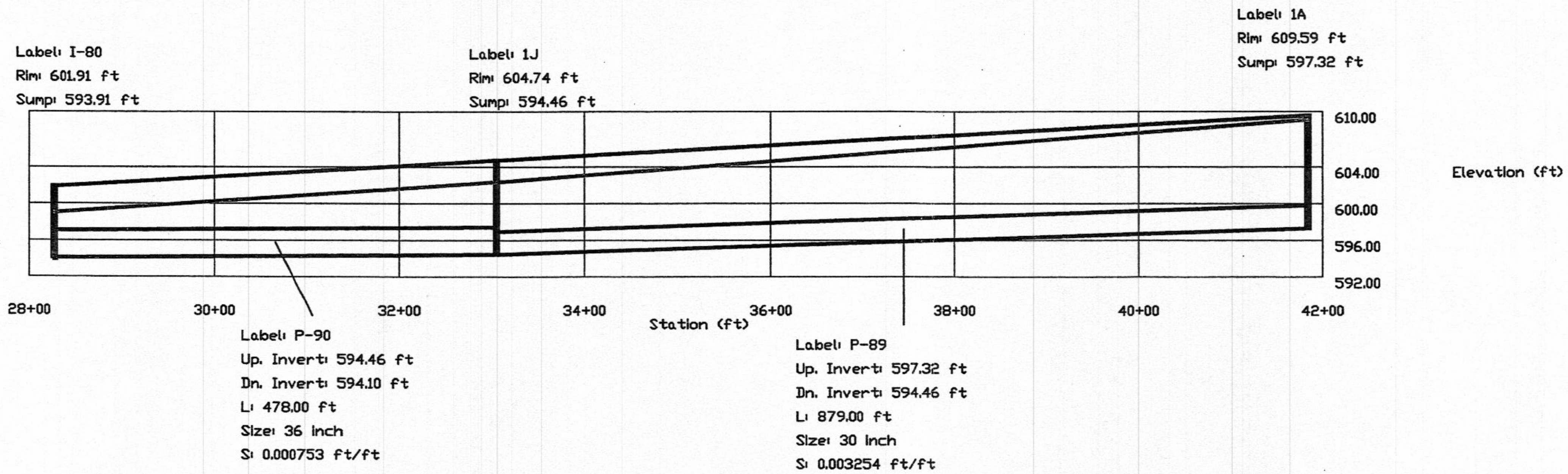
Proposed 10-Yr Profile

1A to I80



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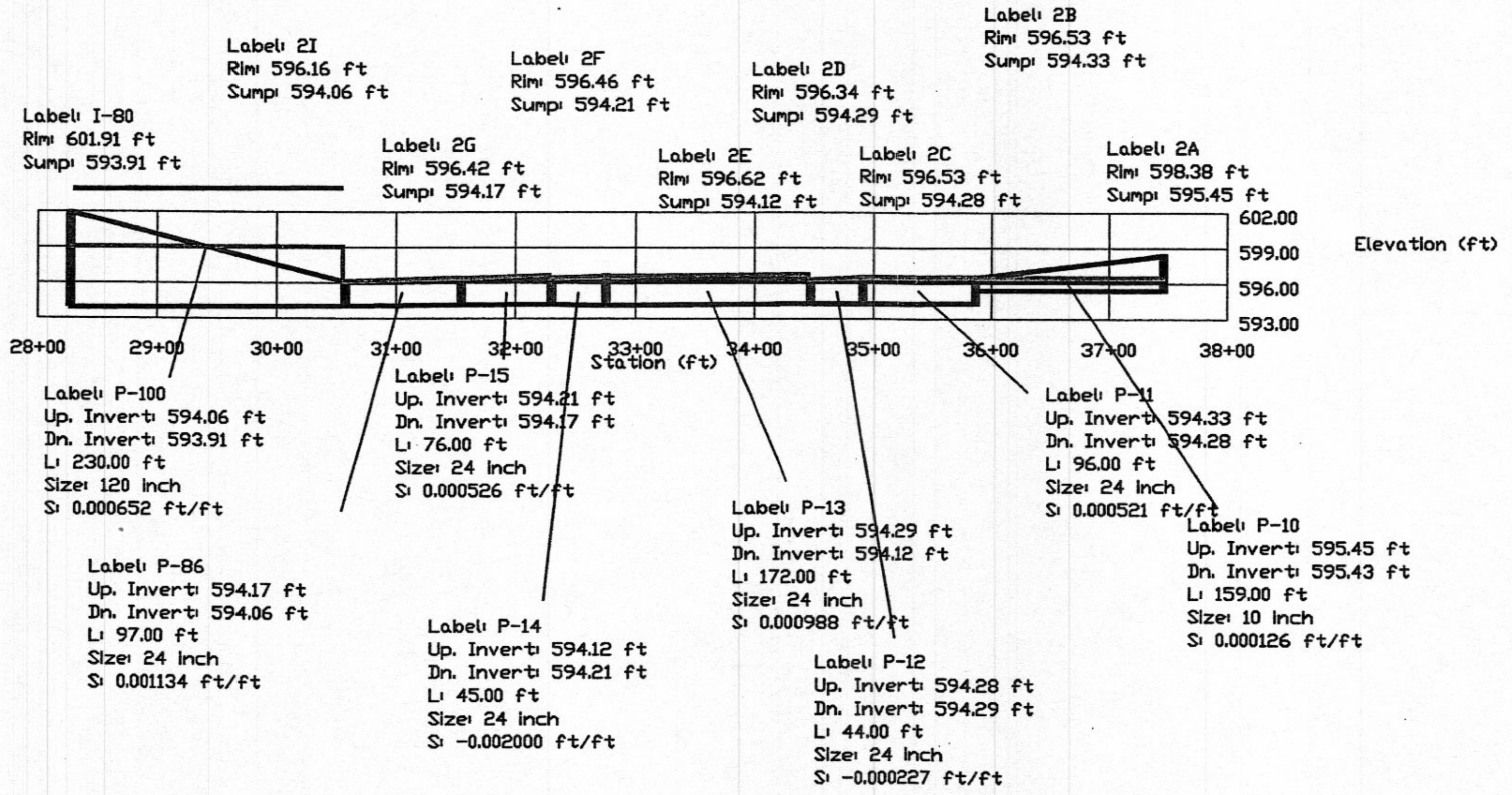
Proposed 10-Yr Profile
2A to I80



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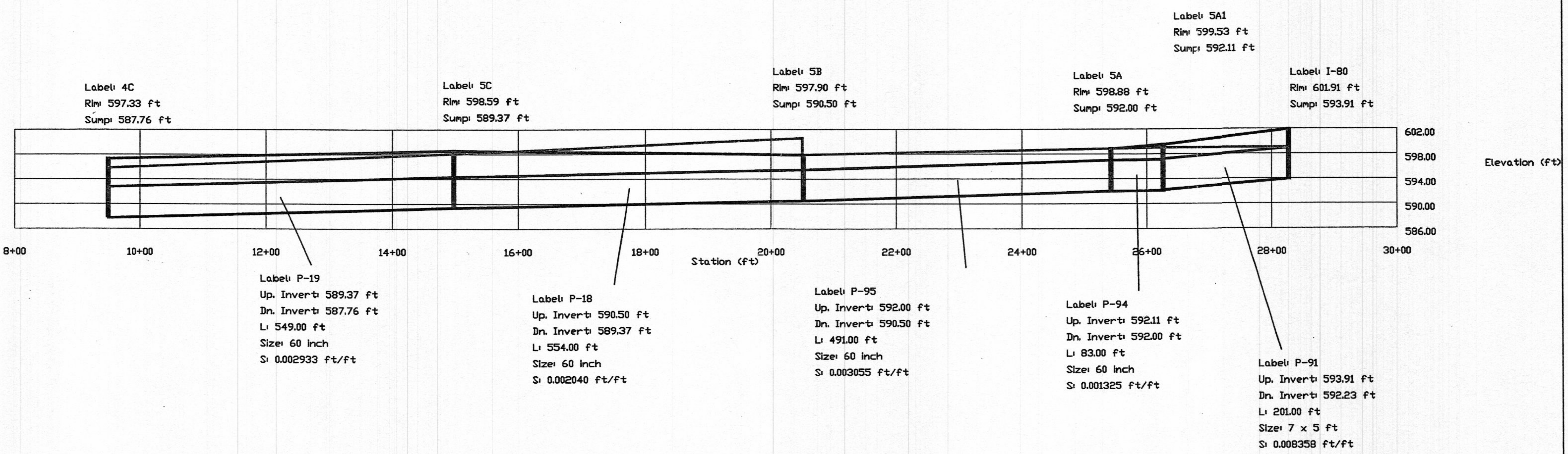
Proposed 10-Yr Profile

I80 to 4C



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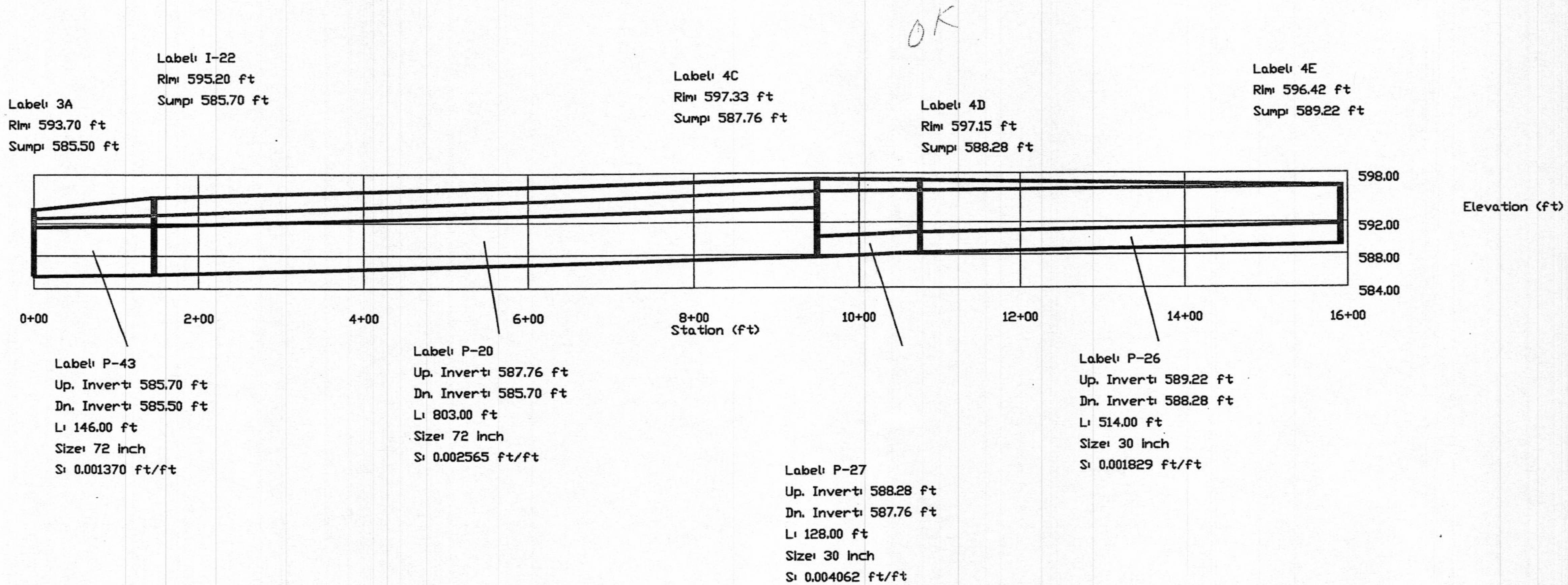
Proposed 10-Yr Profile

4E to 3A



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Proposed 10-Yr Profile

8E to 4C

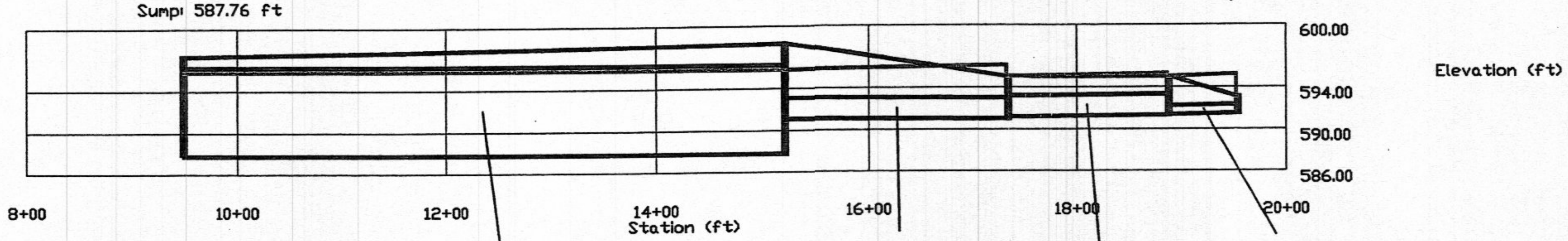
Label: 8C
Rim: 595.03 ft
Sump: 591.35 ft

Label: 4C
Rim: 597.33 ft
Sump: 587.76 ft

Label: 8A
Rim: 598.33 ft
Sump: 587.76 ft

Label: 8B
Rim: 595.06 ft
Sump: 591.01 ft

Label: 8E
Rim: 593.10 ft
Sump: 591.50 ft



Label: P-49
Up. Invert: 587.76 ft
Dn. Invert: 587.76 ft
L: 573.00 ft
Size: 102 inch
S: 0.000000 ft/ft

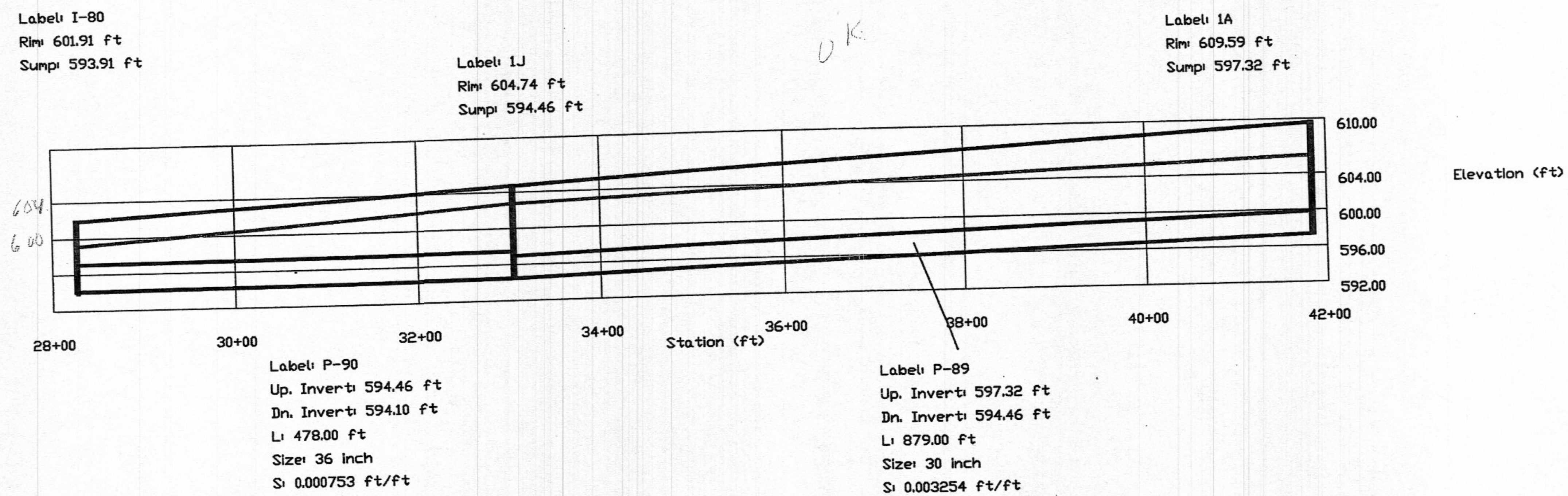
Label: P-83
Up. Invert: 591.01 ft
Dn. Invert: 591.12 ft
L: 211.00 ft
Size: 24 inch
S: -0.000521 ft/ft

Label: P-82
Up. Invert: 591.35 ft
Dn. Invert: 591.19 ft
L: 155.00 ft
Size: 24 inch
S: 0.001032 ft/ft

Label: P-84
Up. Invert: 591.50 ft
Dn. Invert: 591.40 ft
L: 66.00 ft
Size: 10 inch
S: 0.001515 ft/ft

Existing 100-Yr Profile

1A to I80



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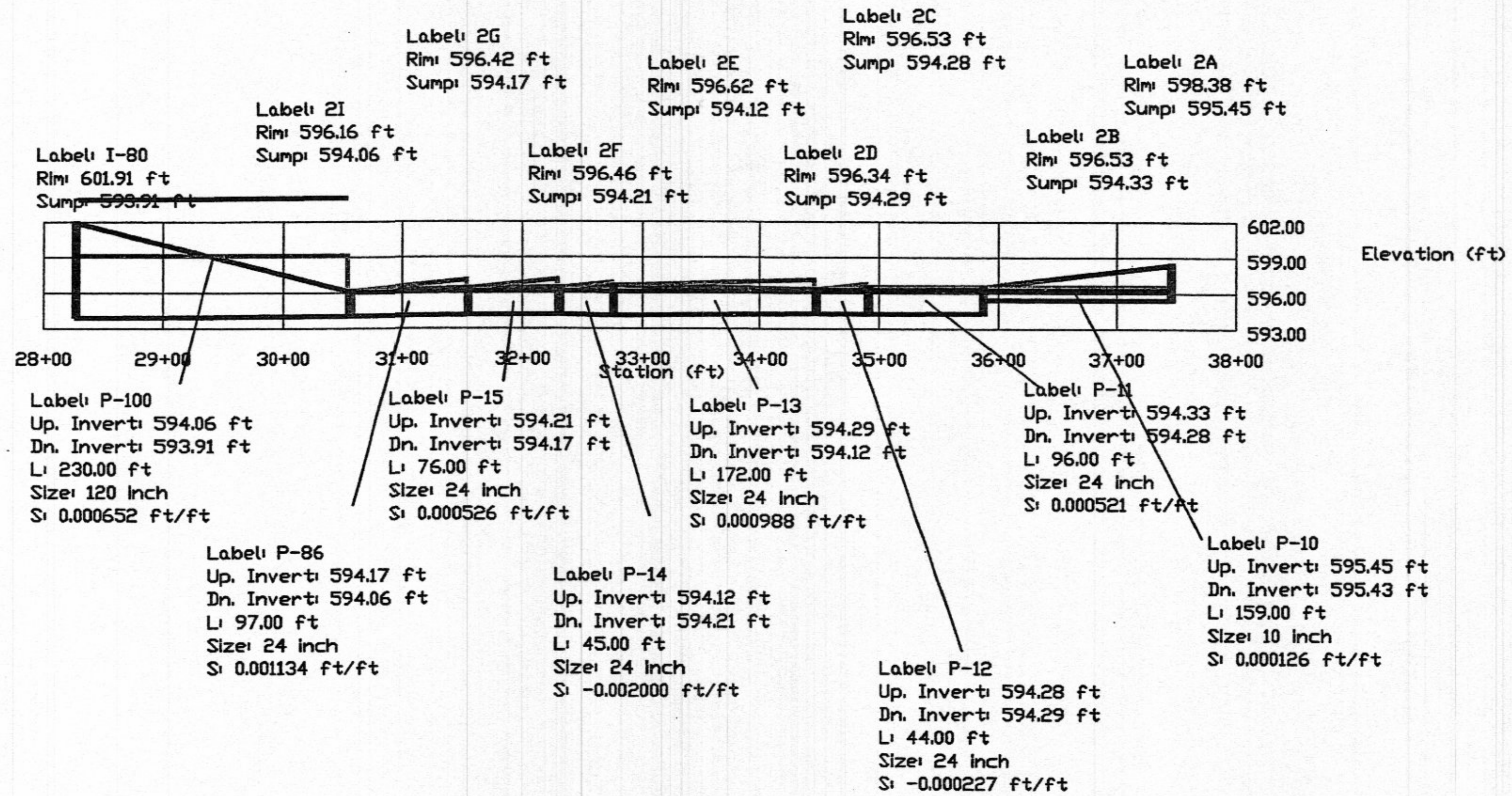
Existing 100-Yr Profile
2A to I80



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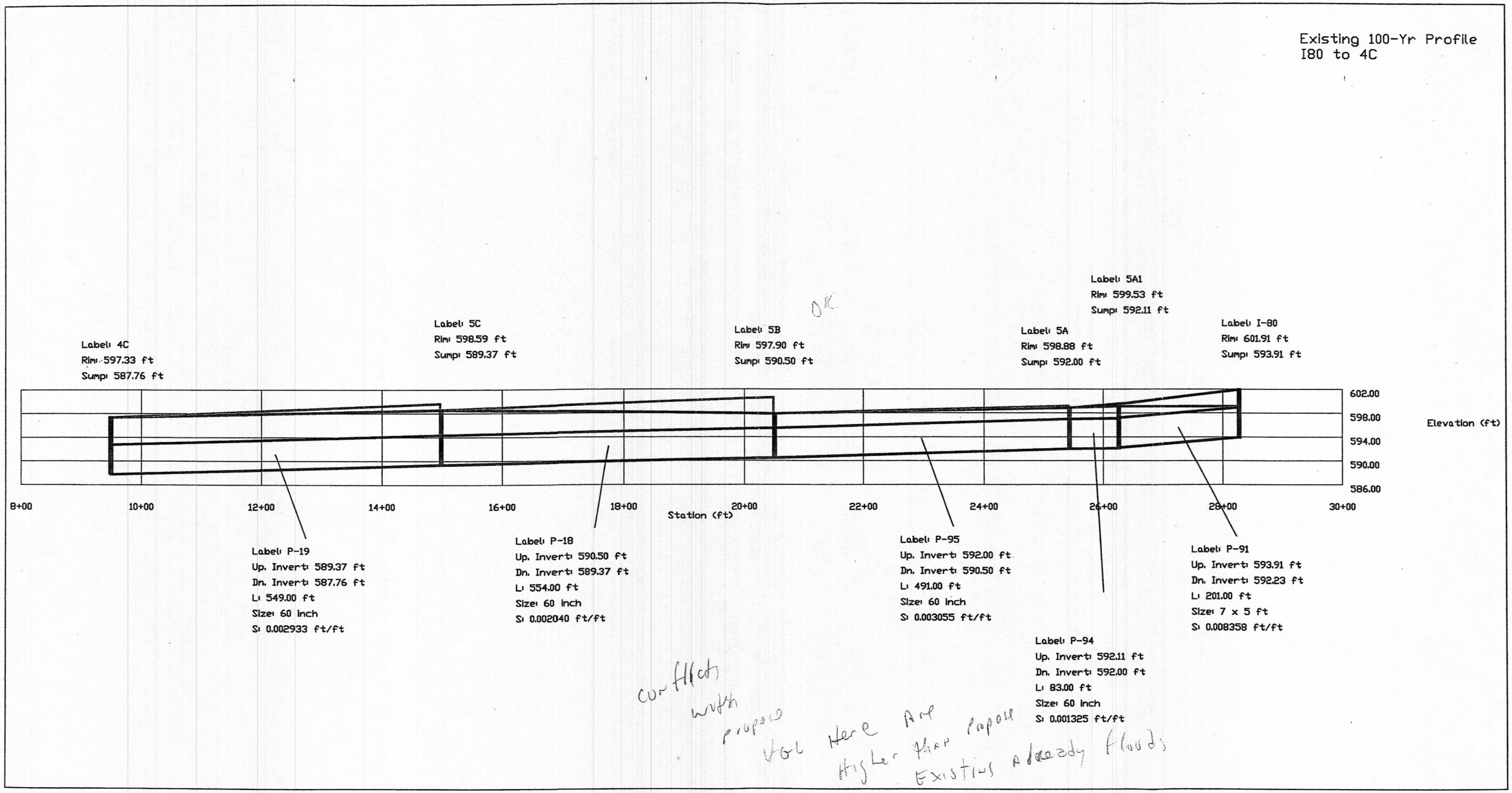

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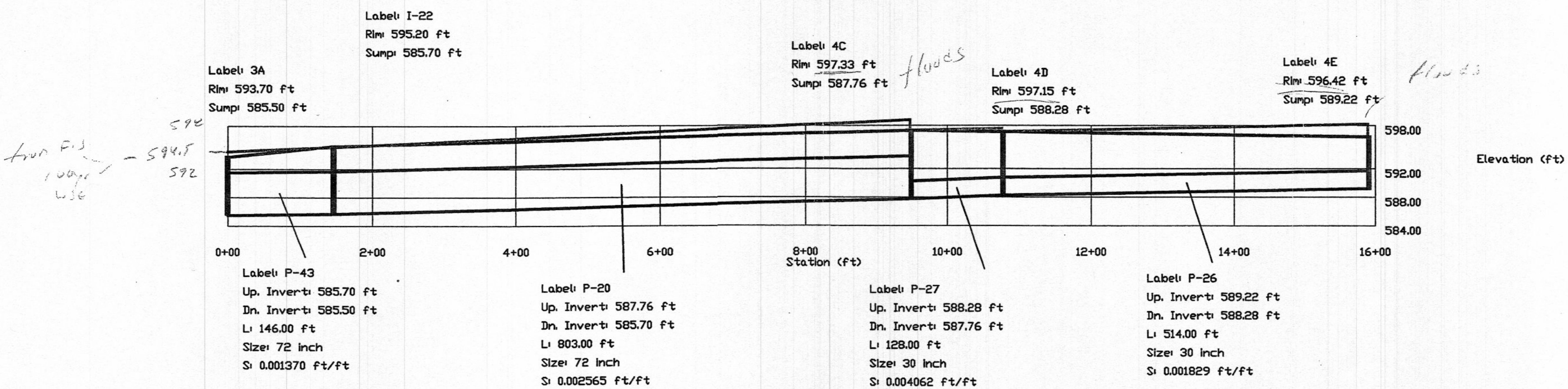
Existing 100-Yr Profile
4E to 3A



HGL conflicts with proposed

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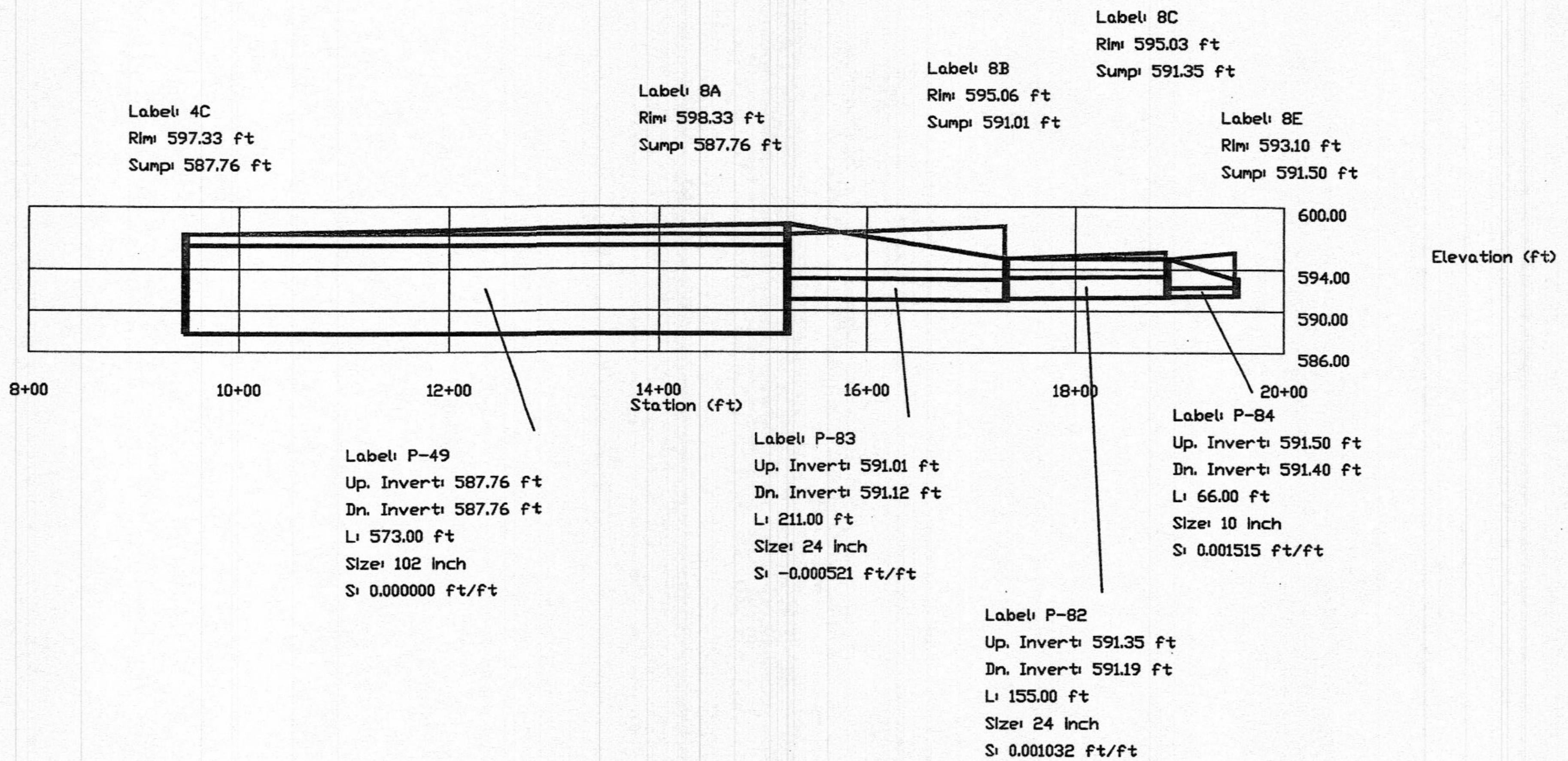
Existing 100 Yr Profile
8E to 4C



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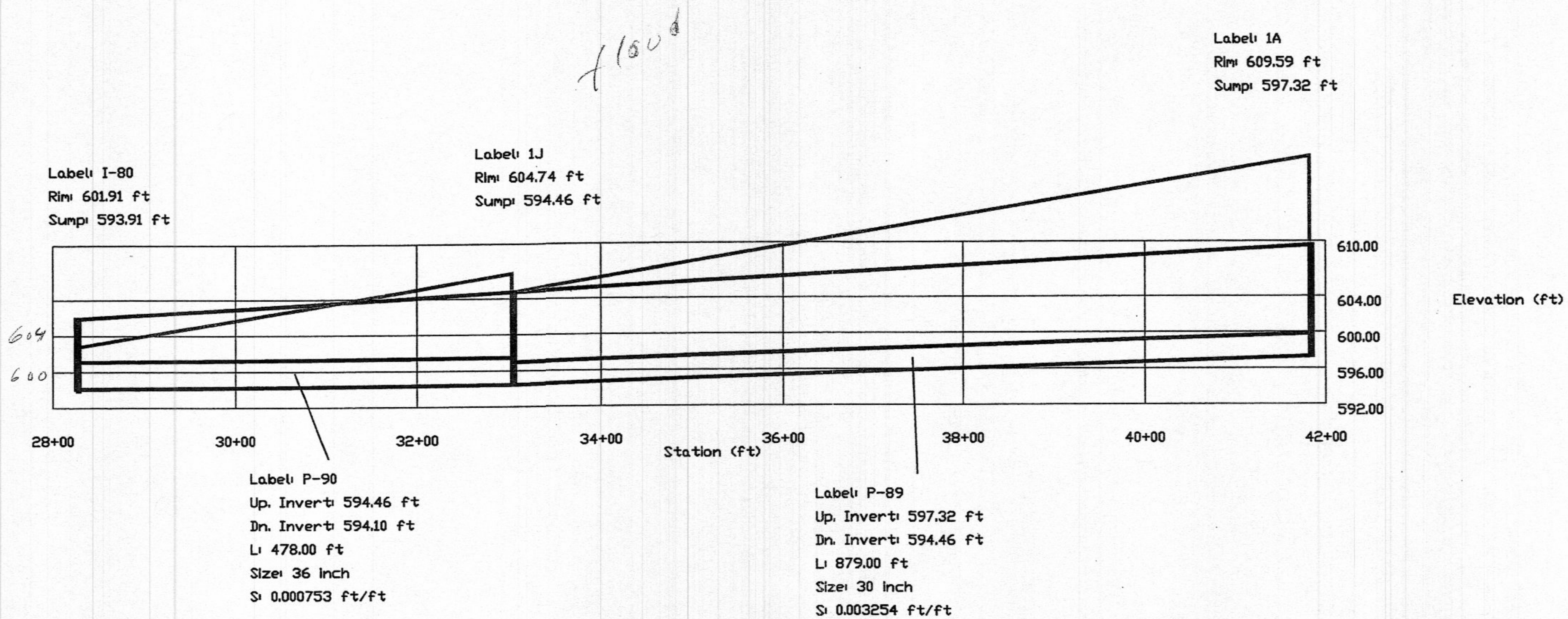
Proposed 100-Yr Profile

1A to I80



can we make these bigger?
D/S is not too bad

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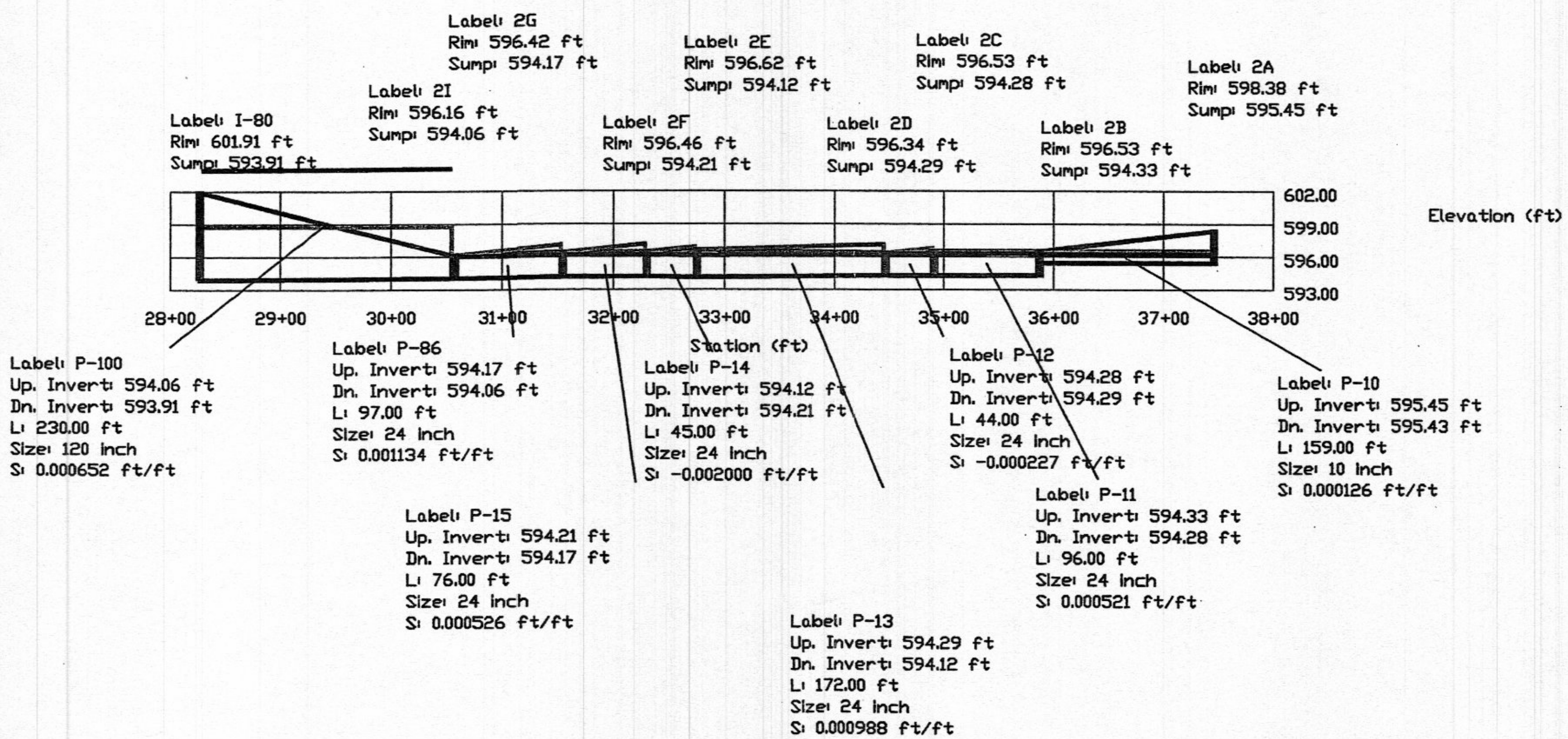
Proposed 100-Yr Profile

2A to I80



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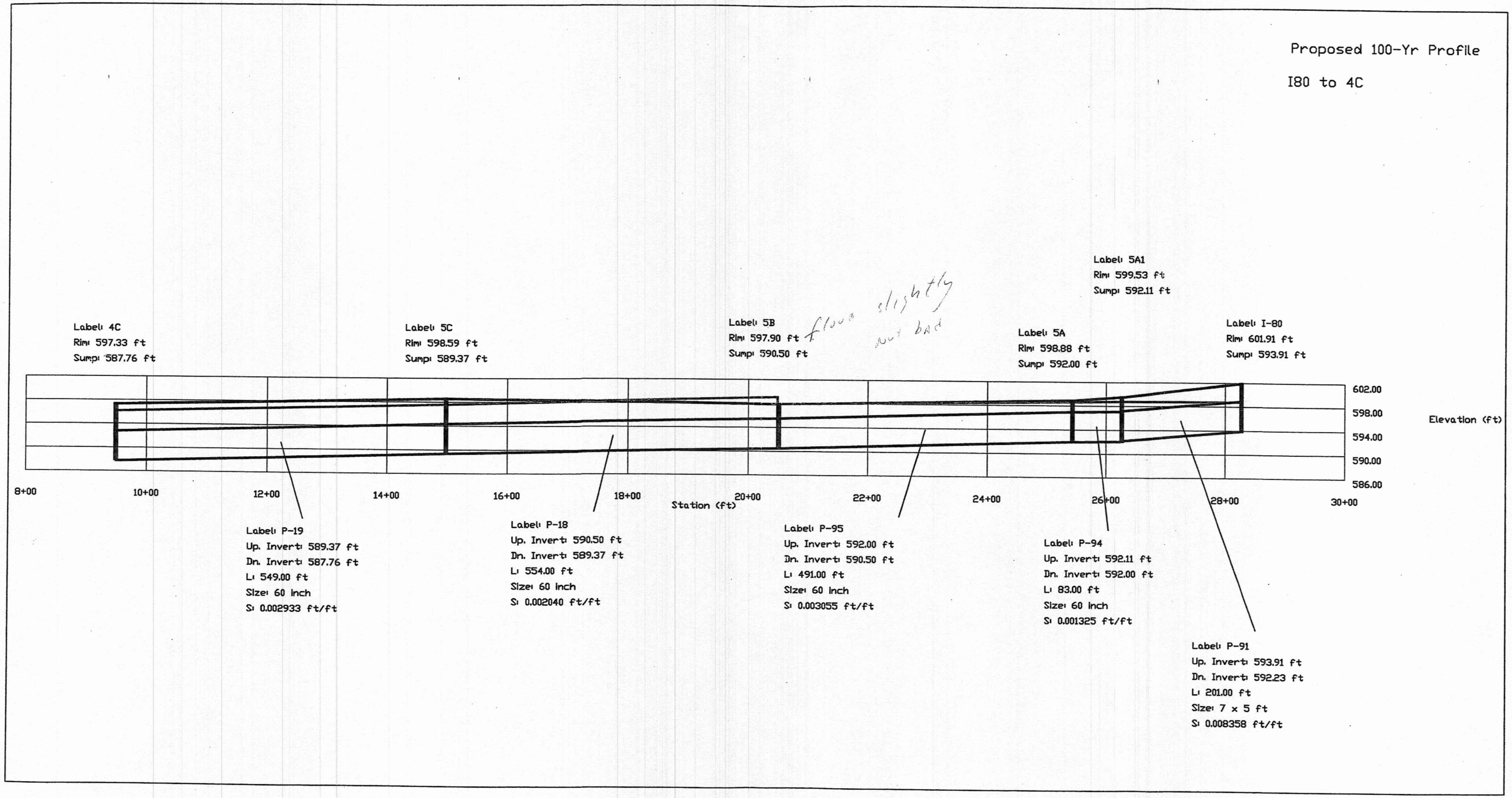

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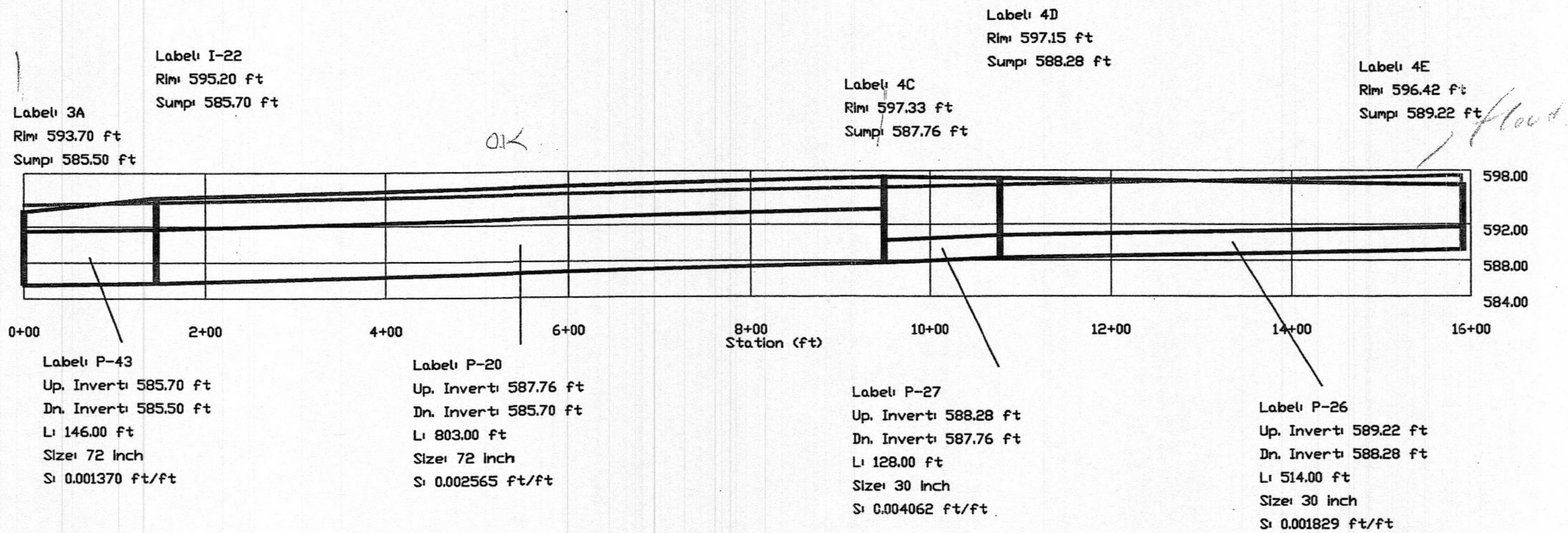
Proposed 100-Yr Profile

4E to 3A



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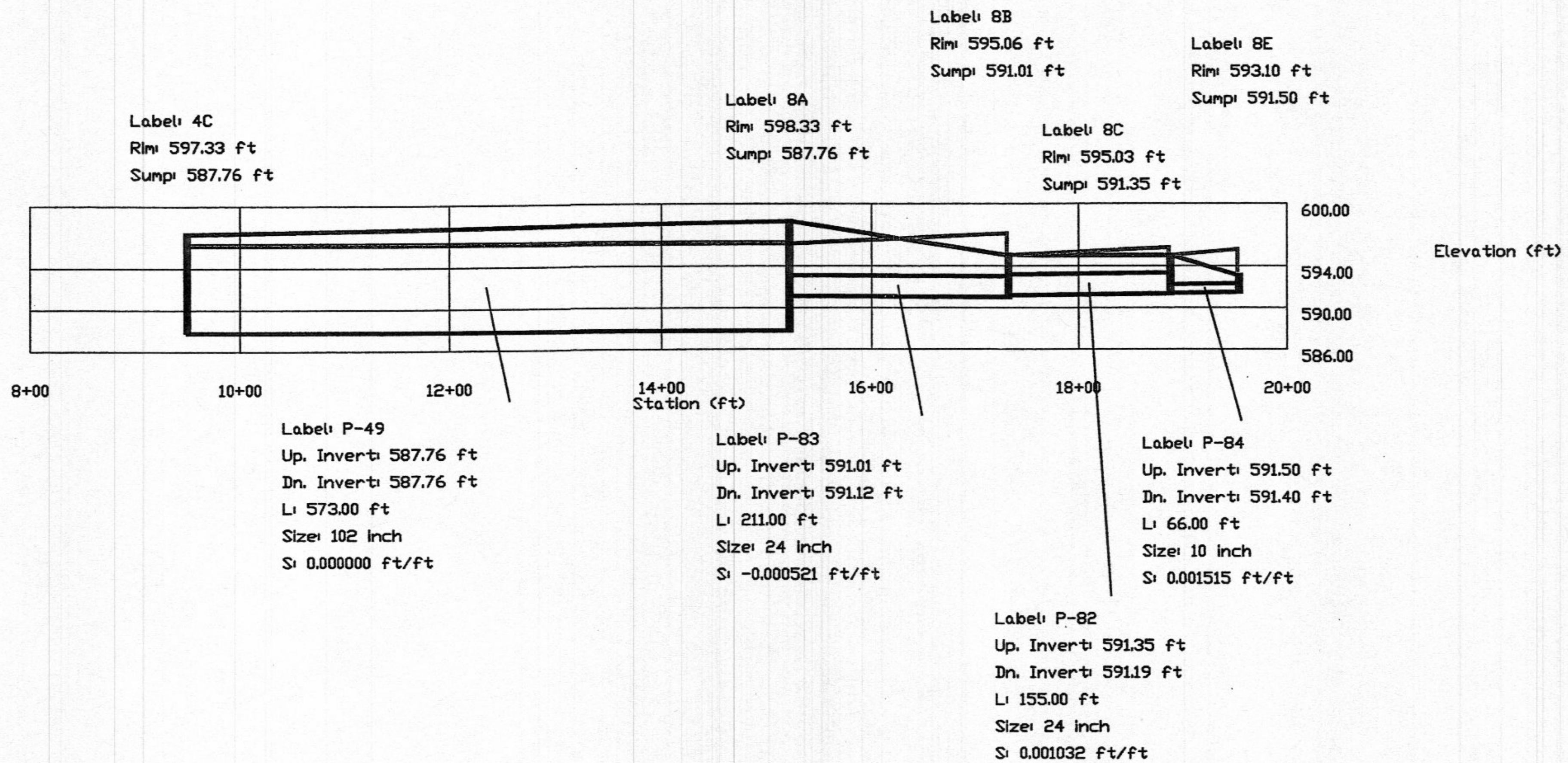
Proposed 100-Yr Profile

8E to 4C



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