

SANITARY SEWER SYSTEM INVESTIGATION SUPPLEMENTAL REPORT

Minuteman and Shattuck Road area
Andover, MA

March 17, 2022

Sewer Video Investigation Conducted by:
BMC Corp., Billerica, MA

Prepared For:
IQHQ-1 Corporate, LLC and
IQHQ-4 Corporate, LLC
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Coordinated by:
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SEWER MAIN VIDEO REVIEW

The following notes were obtained from a review of the video survey of the sewer lines conducted by BMC Corp., Billerica, MA between December 14, 2021, and January 21, 2022. The general direction of the notes is from north (at the sewer interceptor adjacent to the Merrimac River) to south.

Sewer lines have been designated as A, A-1, B, C and C-1 and are shown on the Sanitary Sewer Investigation prepared by Linden Engineering Partners, LLC for IQHQ-1 Corporate, LLC and IWHW-4 Corporate, LLC in January 2022. Pages referenced herein refer to that original report.

Each sewer line has been stationed based on the video length shown on the original report. The enlarged aerial photo plans are added to show the stationing.

A review of this information will indicate that while there are a few areas of cracked or broken pipe, in general there are no serious defects in the sewer lines. There are several areas where roots have intruded into the pipe and pose a hazard to flow passage.

IQHQ-1 Corporate, LLC and IQHQ-4 Corporate, LLC will commit to expending a total of \$ 100,000 for the repair and rehabilitation of the existing sewer lines downstream of their project site. This expenditure is in addition to the approximately \$ 35,000 that they have spent on the sewer investigation. The exact scope of the repairs and rehabilitation to be done will be worked out with the Andover Town Engineer and the Superintendent of the Department of Public Works. The work will be completed prior to the occupancy of the renovated One Corporate Drive Building and addition,

Major Defect Codes

B-Broken

BSV-Broken Soil Visible

BVV- Void Visible

HSV Hole Soil Visible

HVV-Hole Void Visible

FH-Fracture Hinge

IR-Infiltration Runner

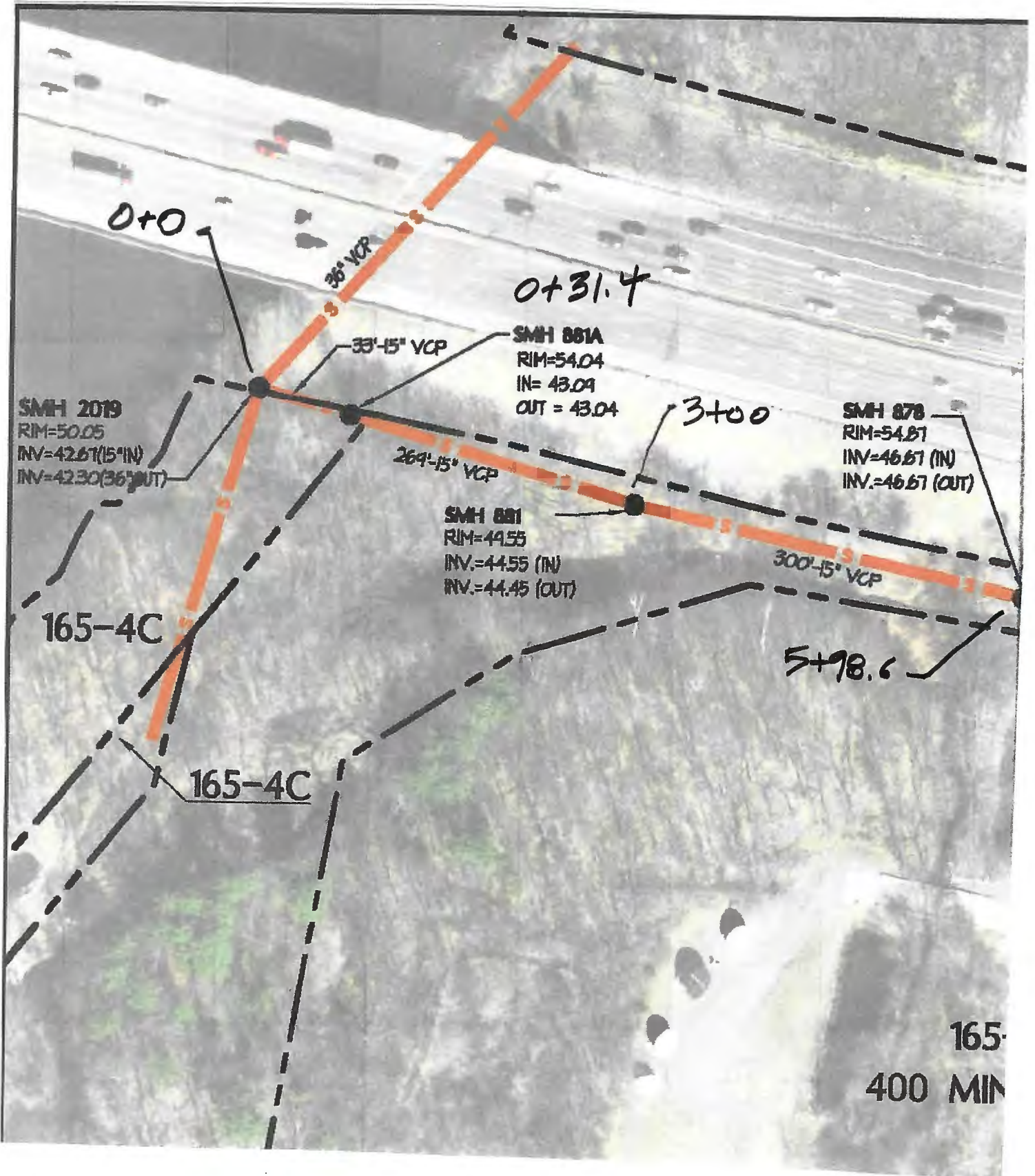
IRJ-Infiltration Runner Joint

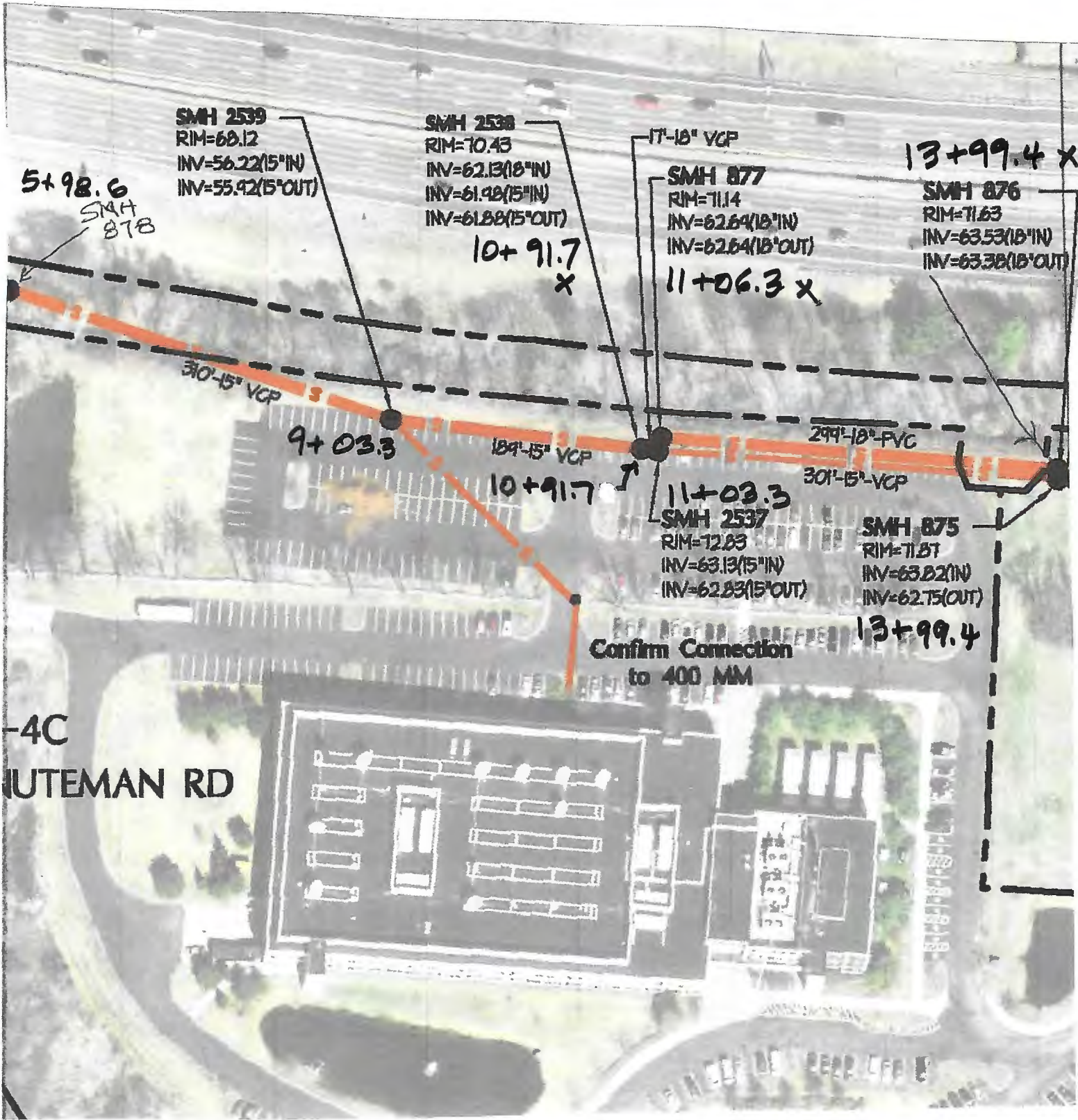
IRC-Infiltration runner connection

Basically anything with an **(IR)** or **(IG)** Infiltration Runner

IG-Infiltration Gusher

OBI-Object intruding through wall





SMH 2539
RIM=60.12
INV=56.22(15"IN)
INV=55.92(15"OUT)

SMH 2538
RIM=70.43
INV=62.13(18"IN)
INV=61.90(15"IN)
INV=61.88(15"OUT)

17'-18" VCP
SMH 877
RIM=71.14
INV=62.64(18"IN)
INV=62.64(18"OUT)

13+99.4 x
SMH 876
RIM=71.63
INV=63.53(18"IN)
INV=63.38(18"OUT)

5+98.6
SMH 878

10+91.7 x

11+06.3 x

310'-15" VCP

9+03.3

189'-15" VCP

10+91.7

11+03.3

299'-18" PVC

301'-15" VCP

SMH 2537
RIM=72.83
INV=63.13(15"IN)
INV=62.83(15"OUT)

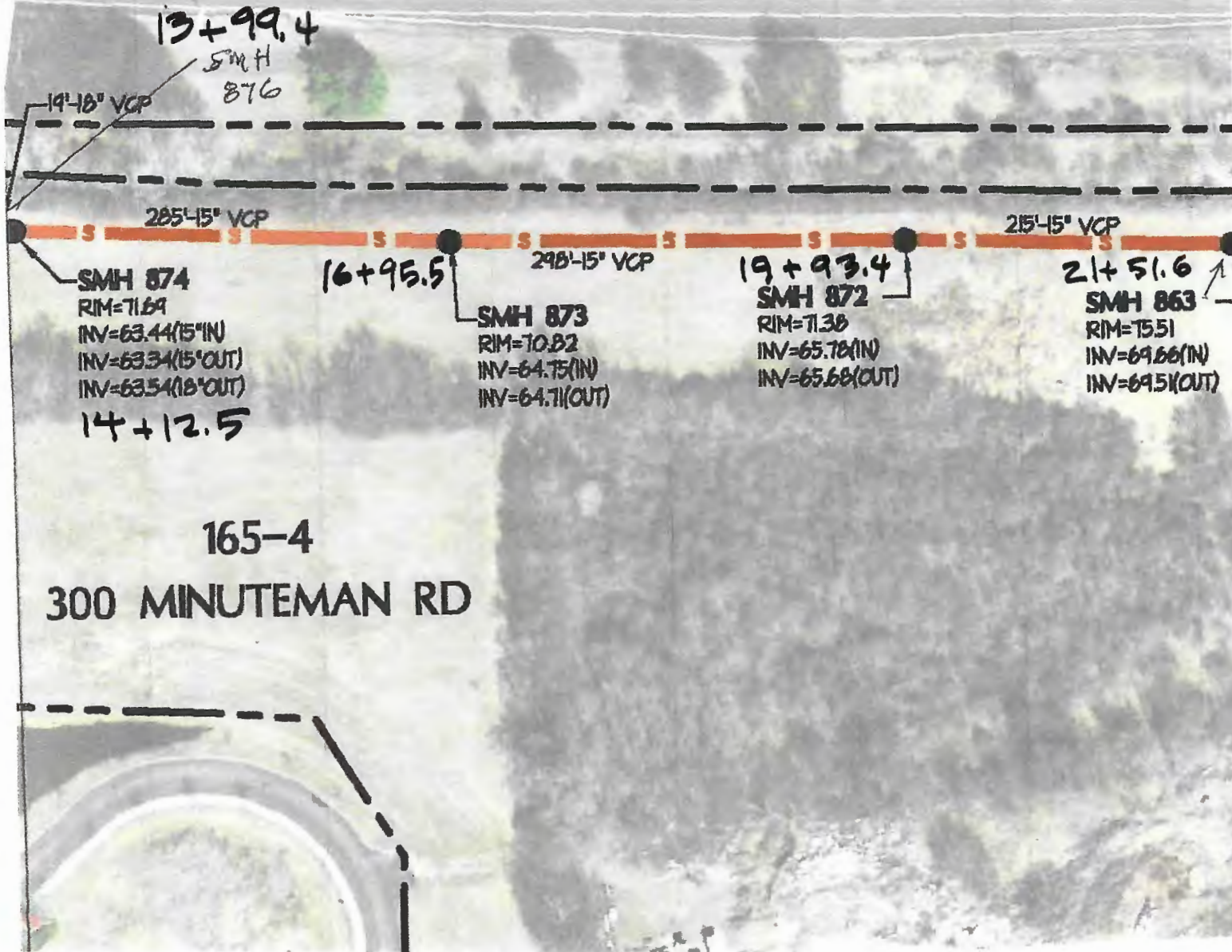
SMH 875
RIM=71.87
INV=63.82(18"IN)
INV=62.75(OUT)

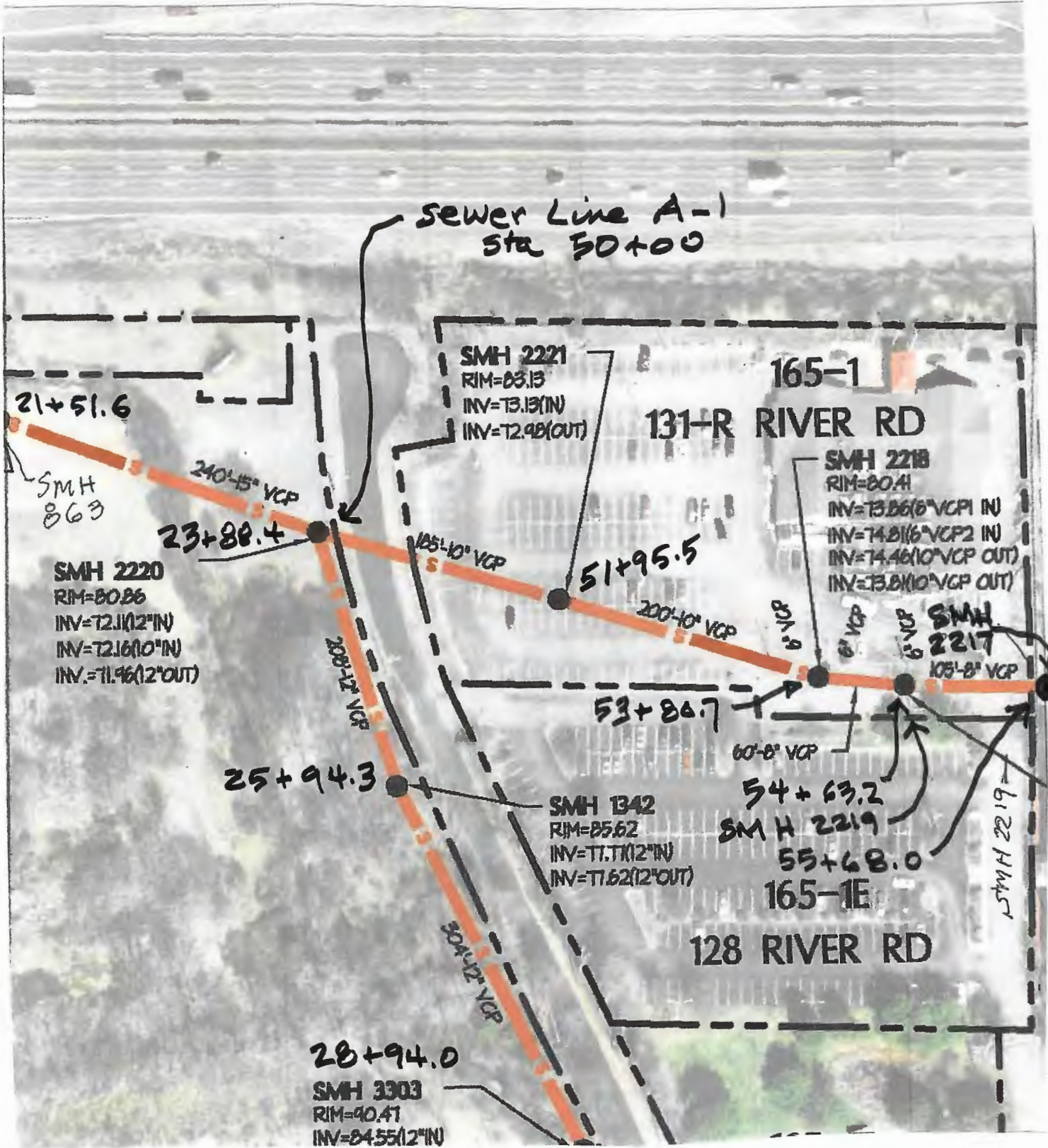
Confirm Connection
to 400 MM

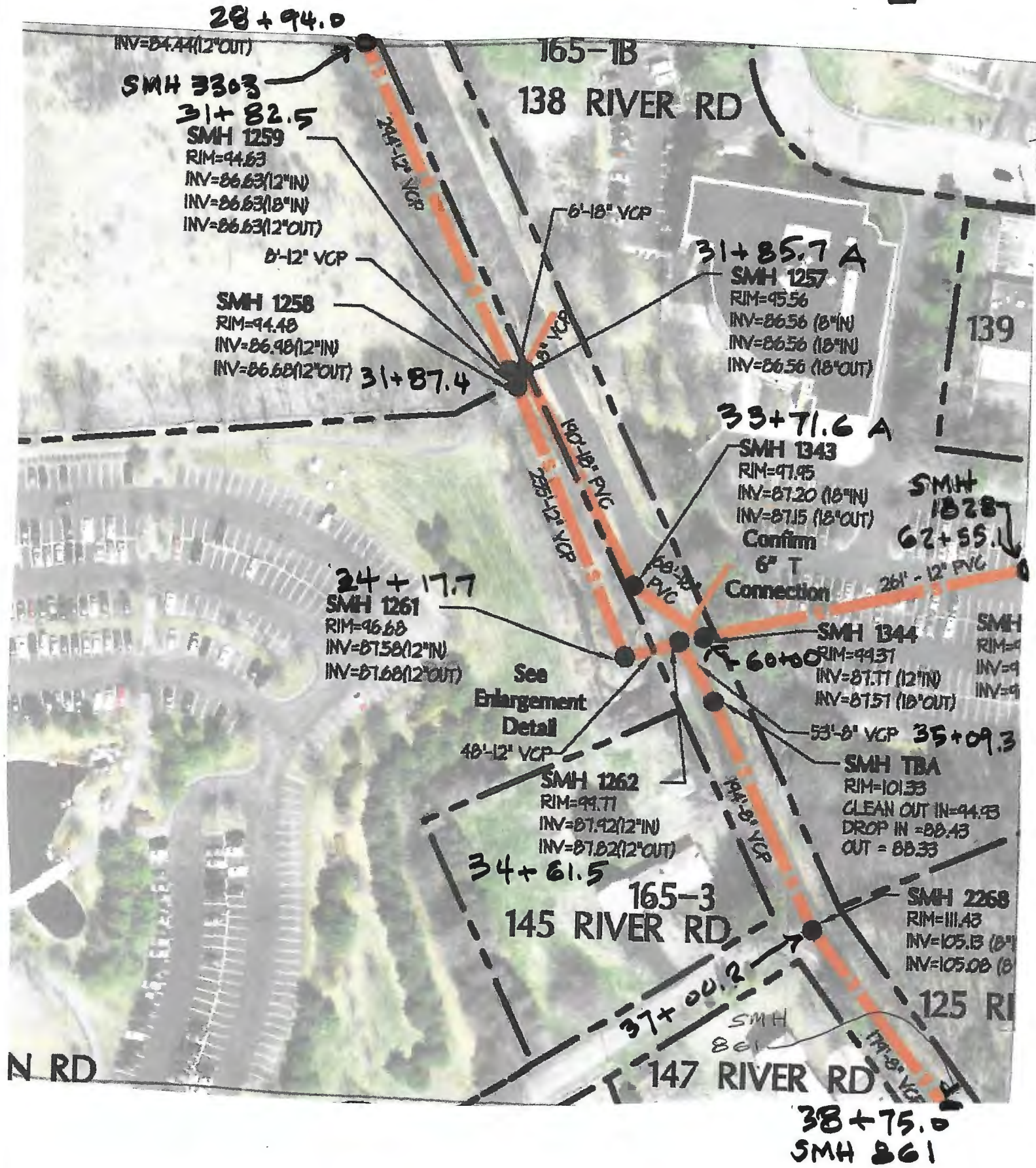
13+99.4

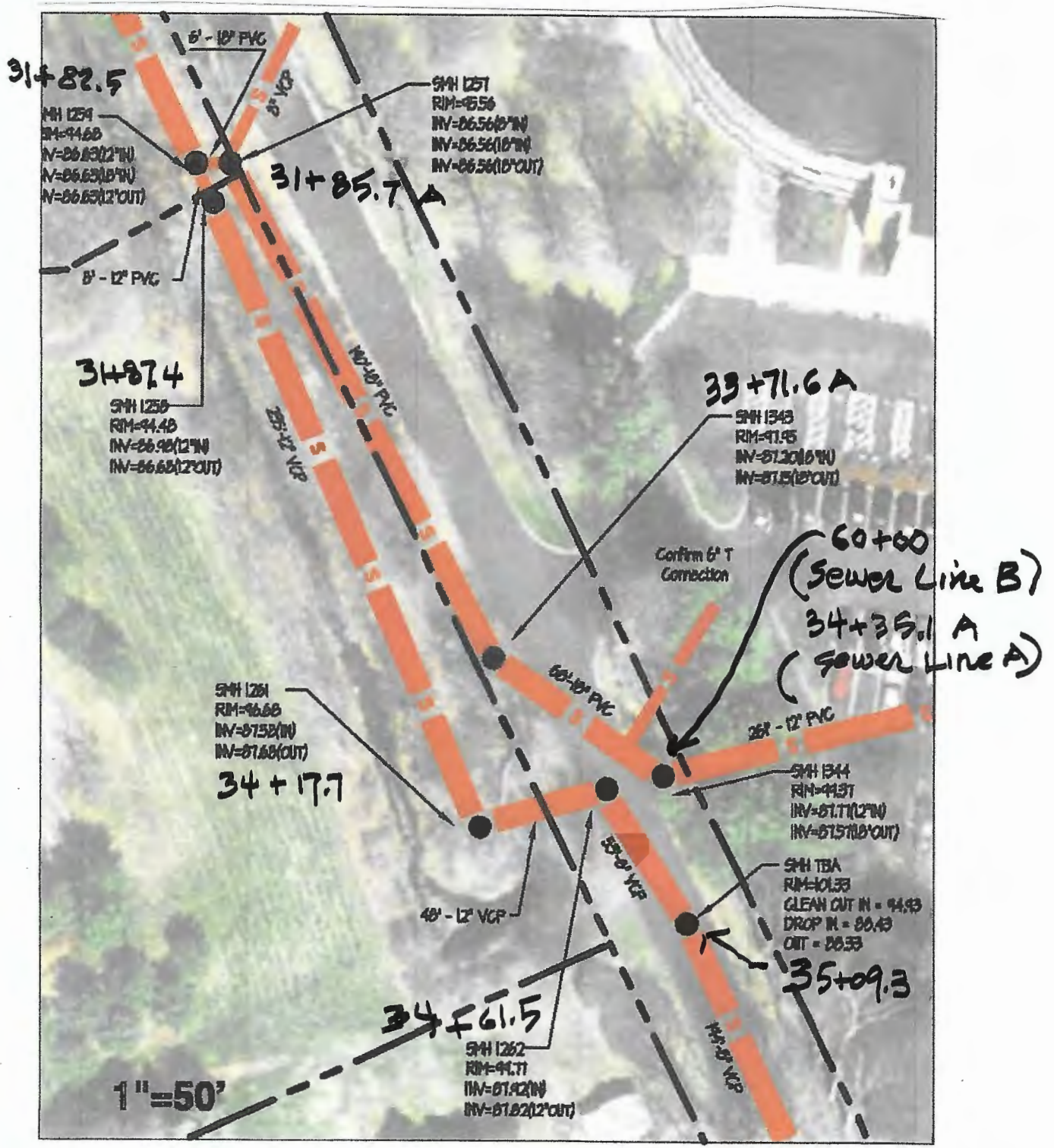
-4C
MUTEMAN RD

ROUTE 93

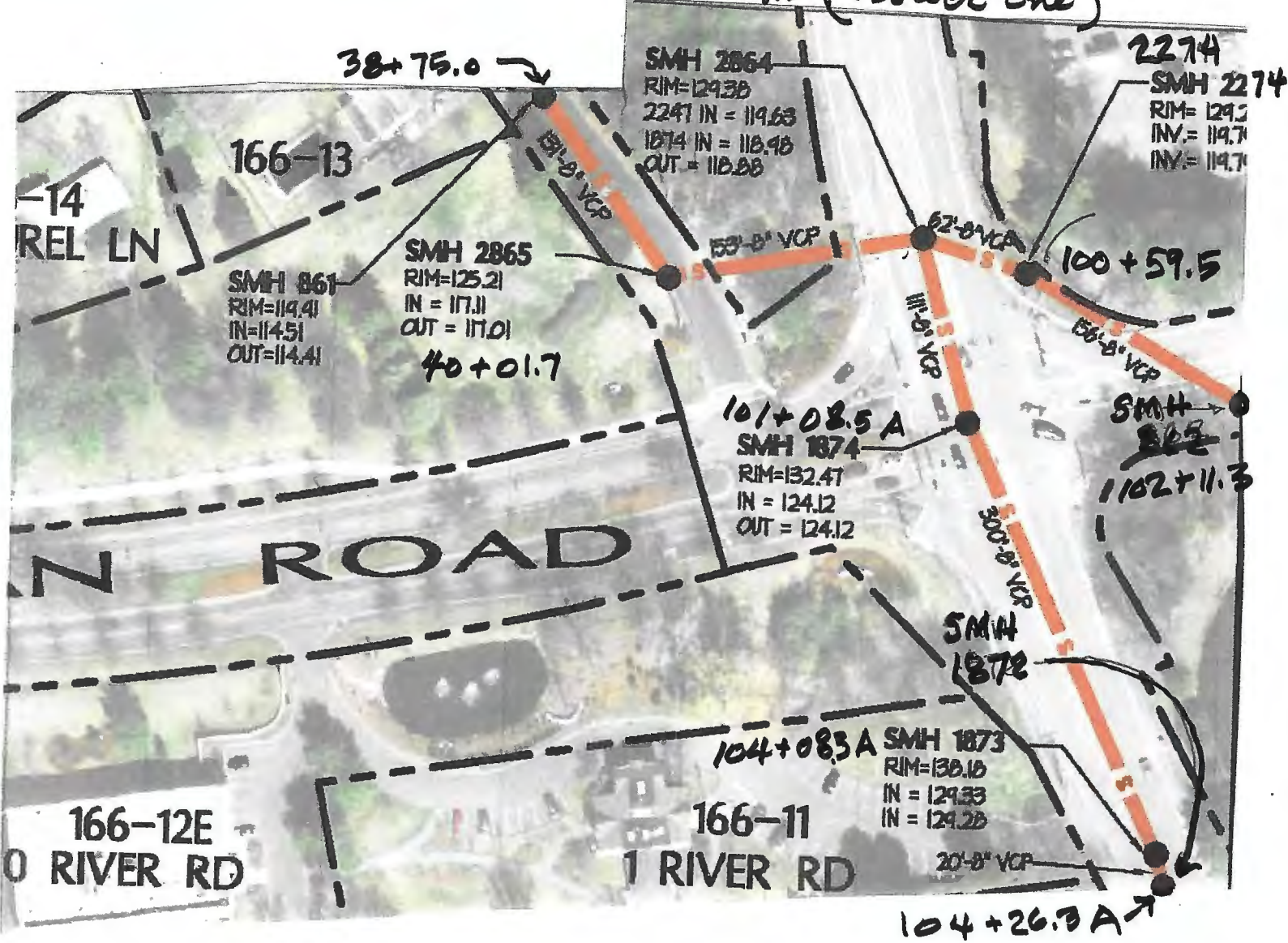




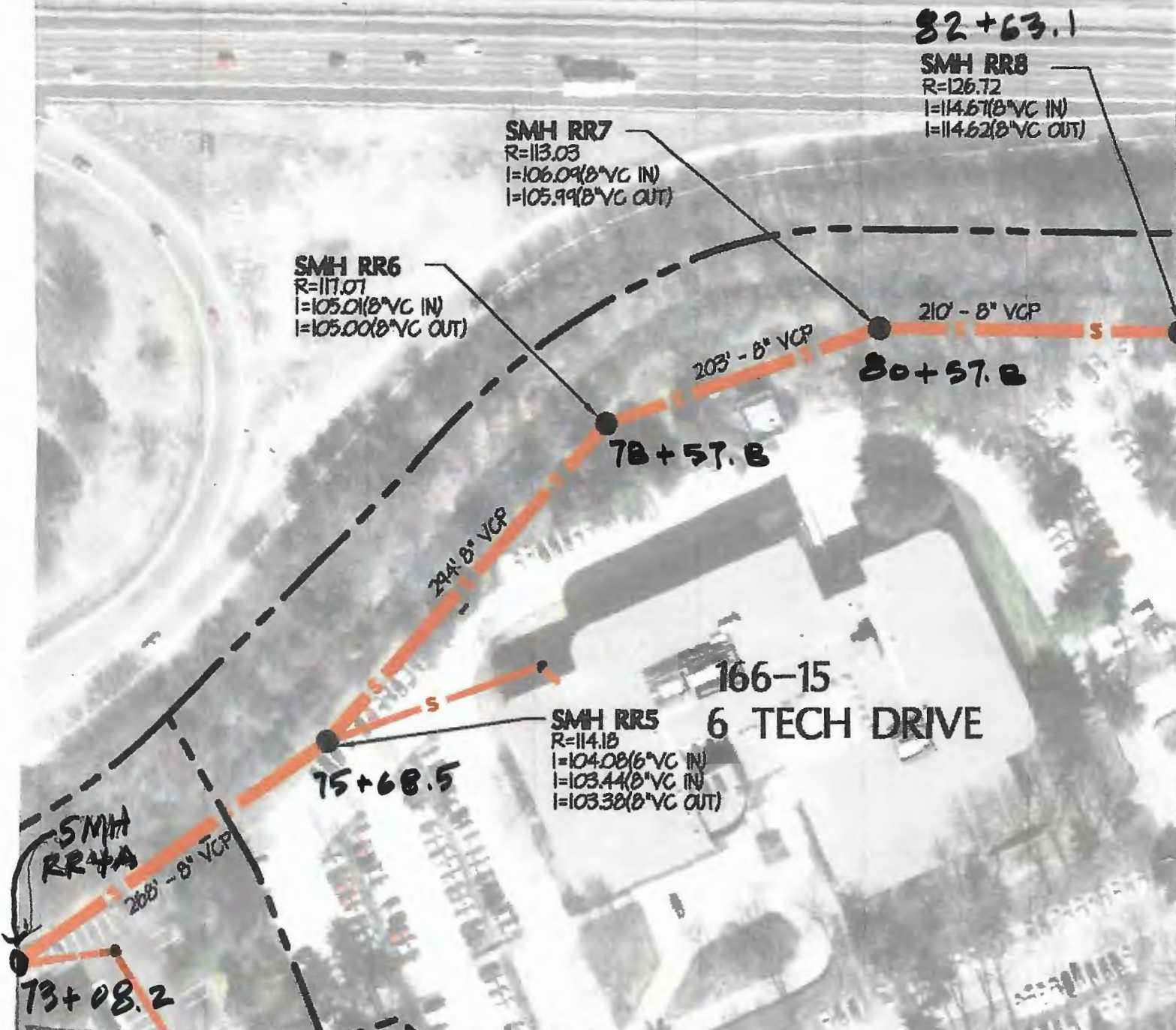


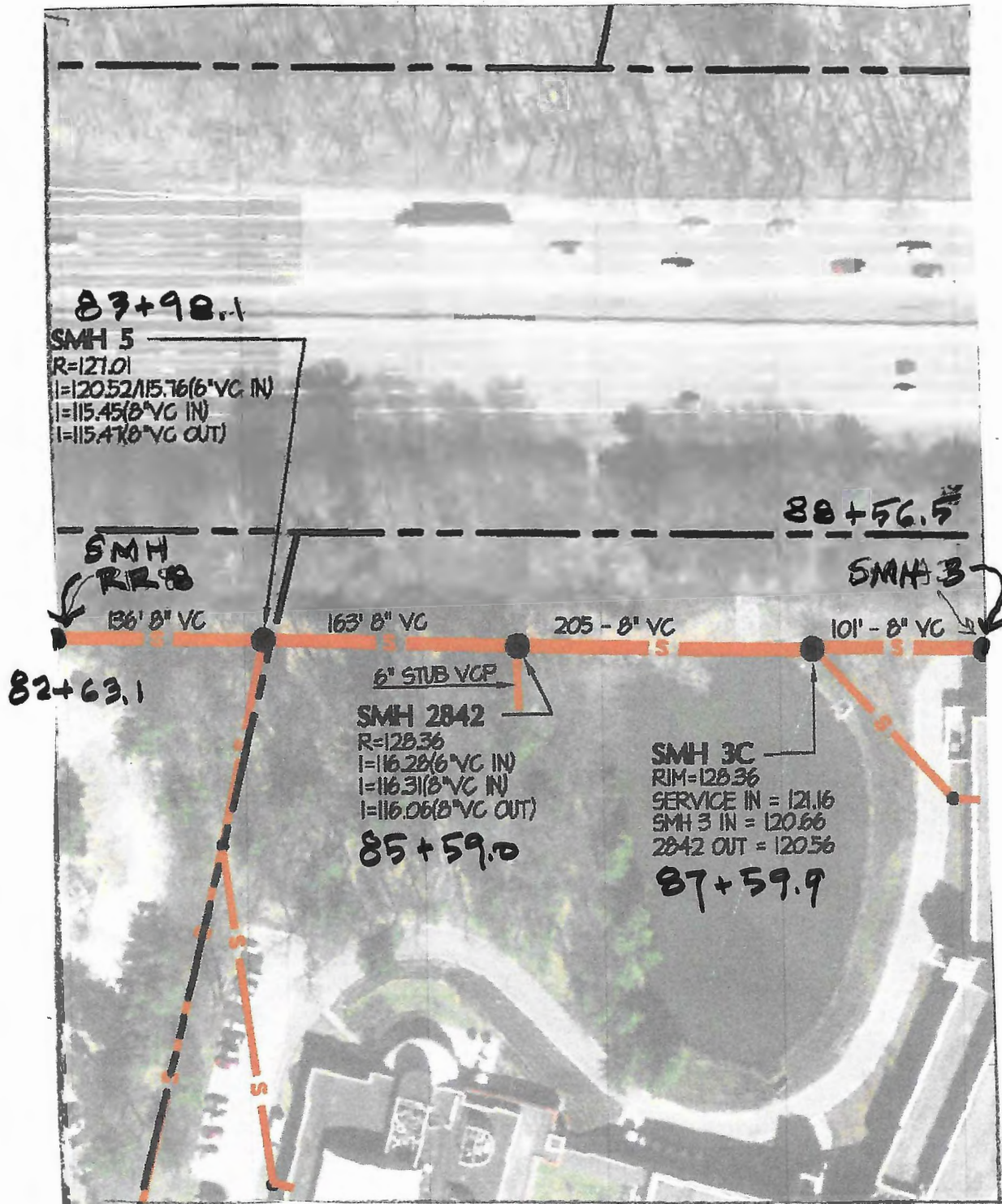


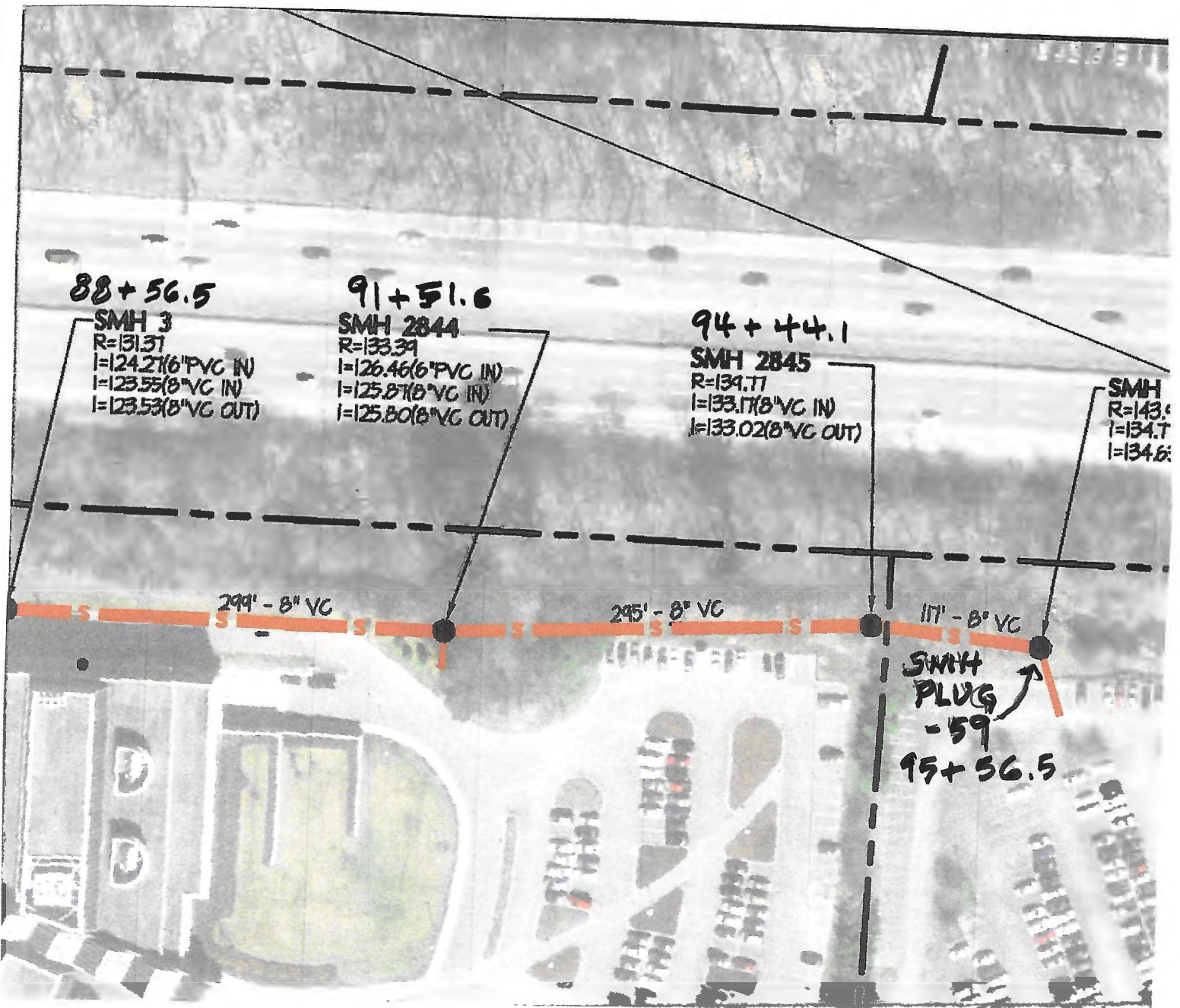
100+00^A C-1 Sewer Line
100+00 C Sewer Line
41+49.1 (A sewer Line)



ROUTE 93







88 + 56.5

SMH 3
R=131.37
I=124.27(6" PVC IN)
I=123.55(8" VC IN)
I=123.53(8" VC OUT)

91 + 51.6

SMH 2844
R=133.39
I=126.46(6" PVC IN)
I=125.87(8" VC IN)
I=125.80(8" VC OUT)

94 + 44.1

SMH 2845
R=134.77
I=133.17(8" VC IN)
I=133.02(8" VC OUT)

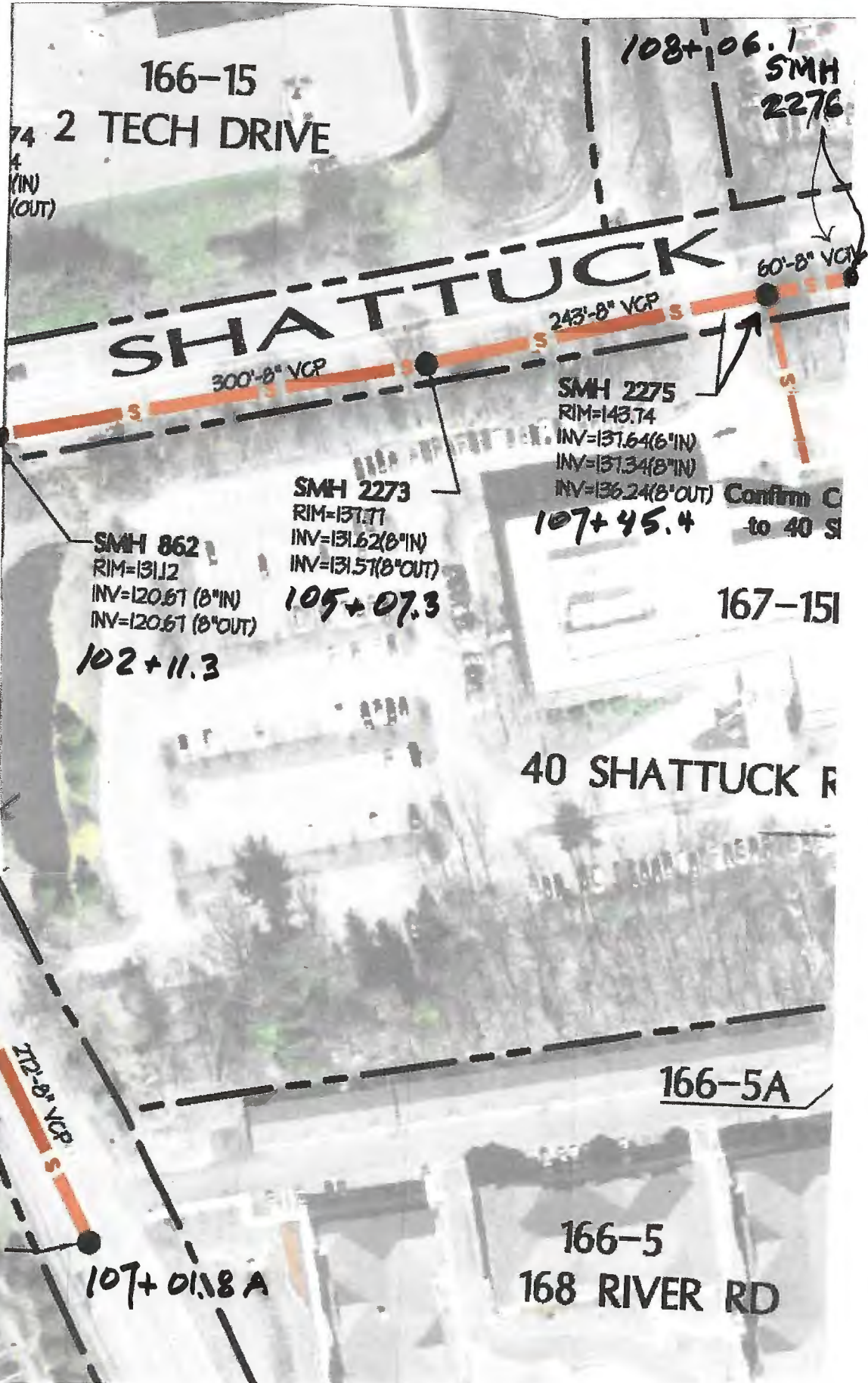
SMH
R=143.6
I=134.7
I=134.6

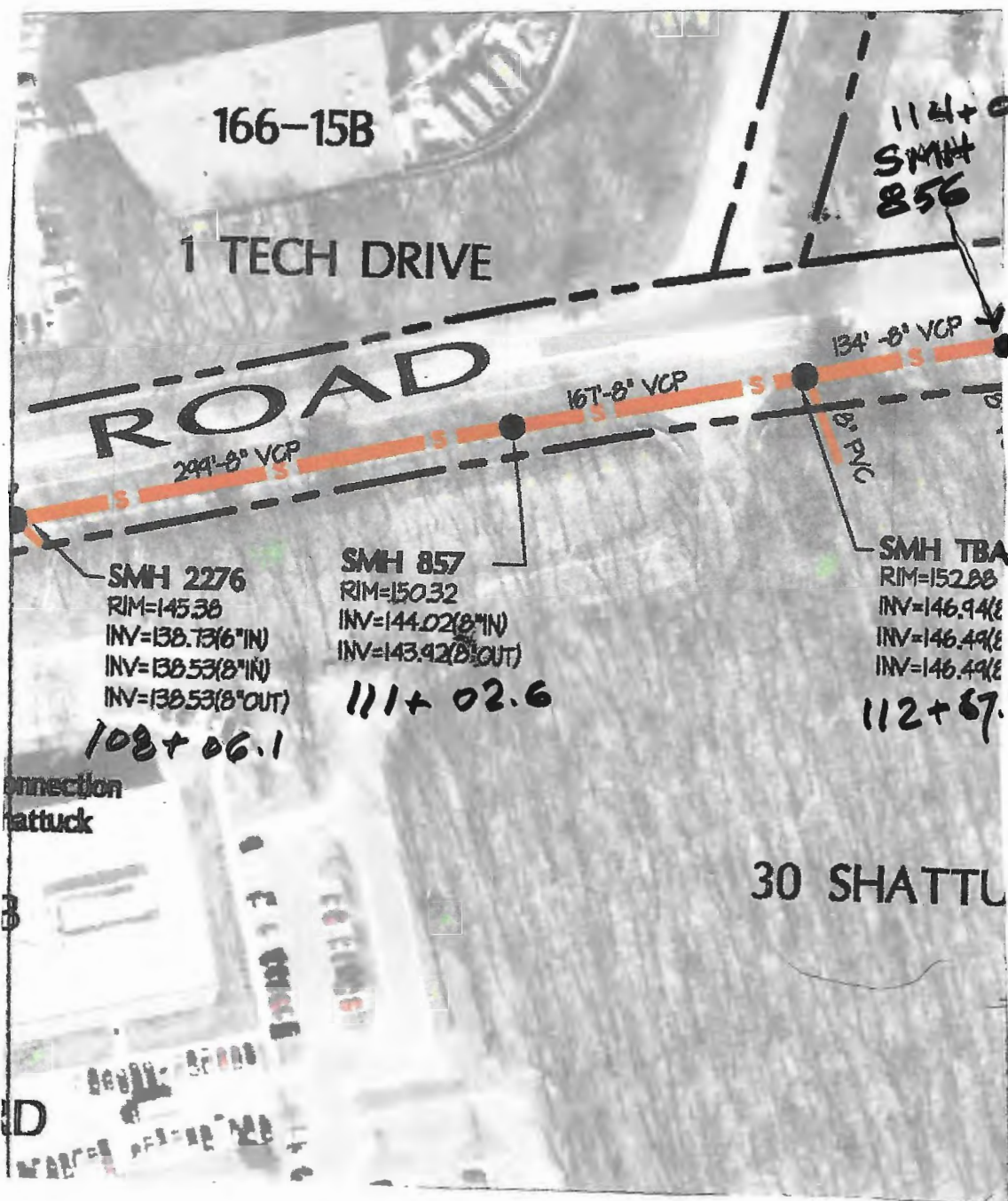
299' - 8" VC

295' - 8" VC

117' - 8" VC

SMH
PLUG
-59
95 + 36.5





166-15B

1 TECH DRIVE

ROAD

114+01.2
SMH
856

294'-8" VCP

167'-8" VCP

134'-8" VCP

8" PVC

SMH 2276
RIM=145.38
INV=138.73(6"IN)
INV=138.53(8"IN)
INV=138.53(8"OUT)

108+06.1

SMH 857
RIM=150.32
INV=144.02(6"IN)
INV=143.92(8"OUT)

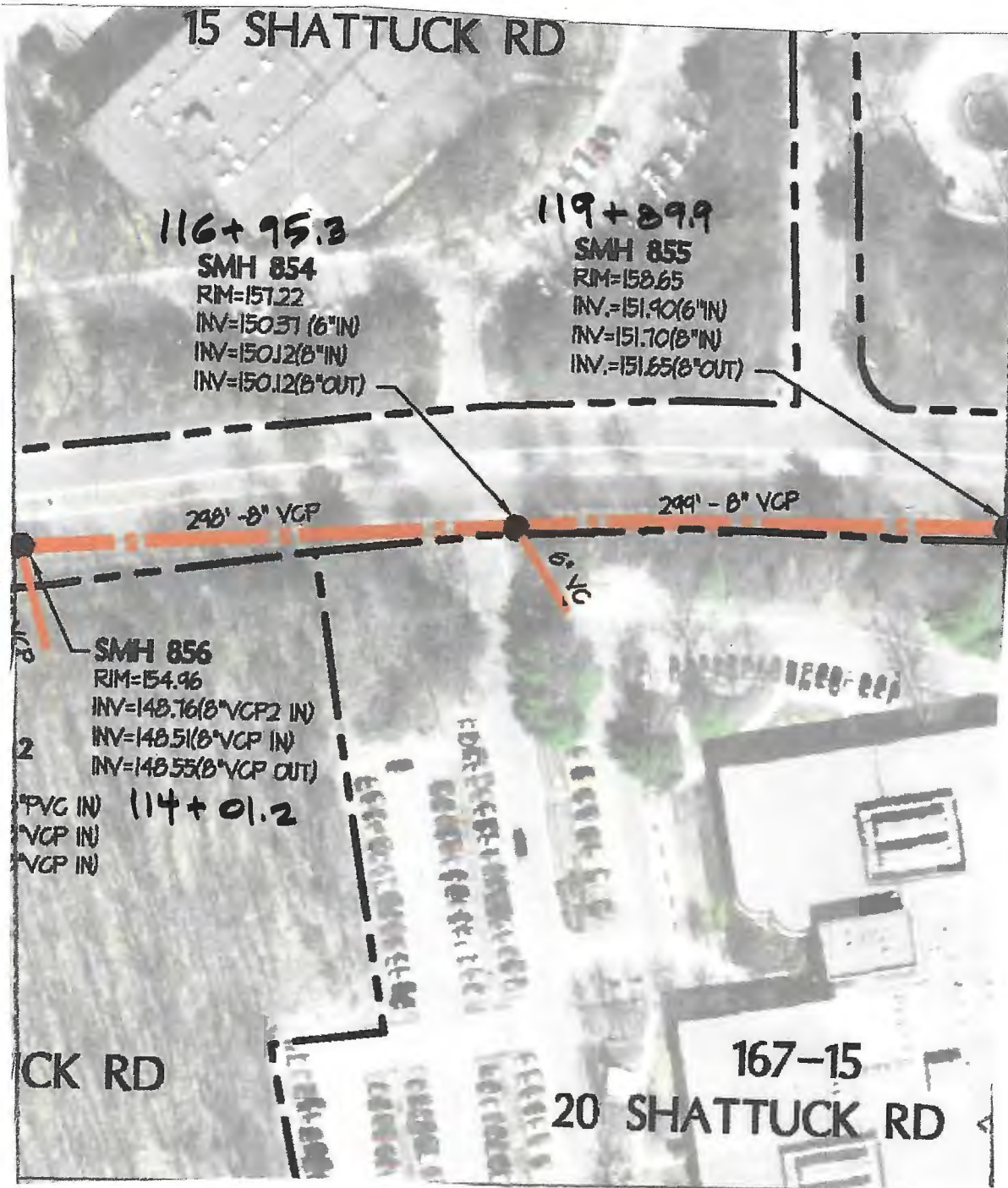
111+02.6

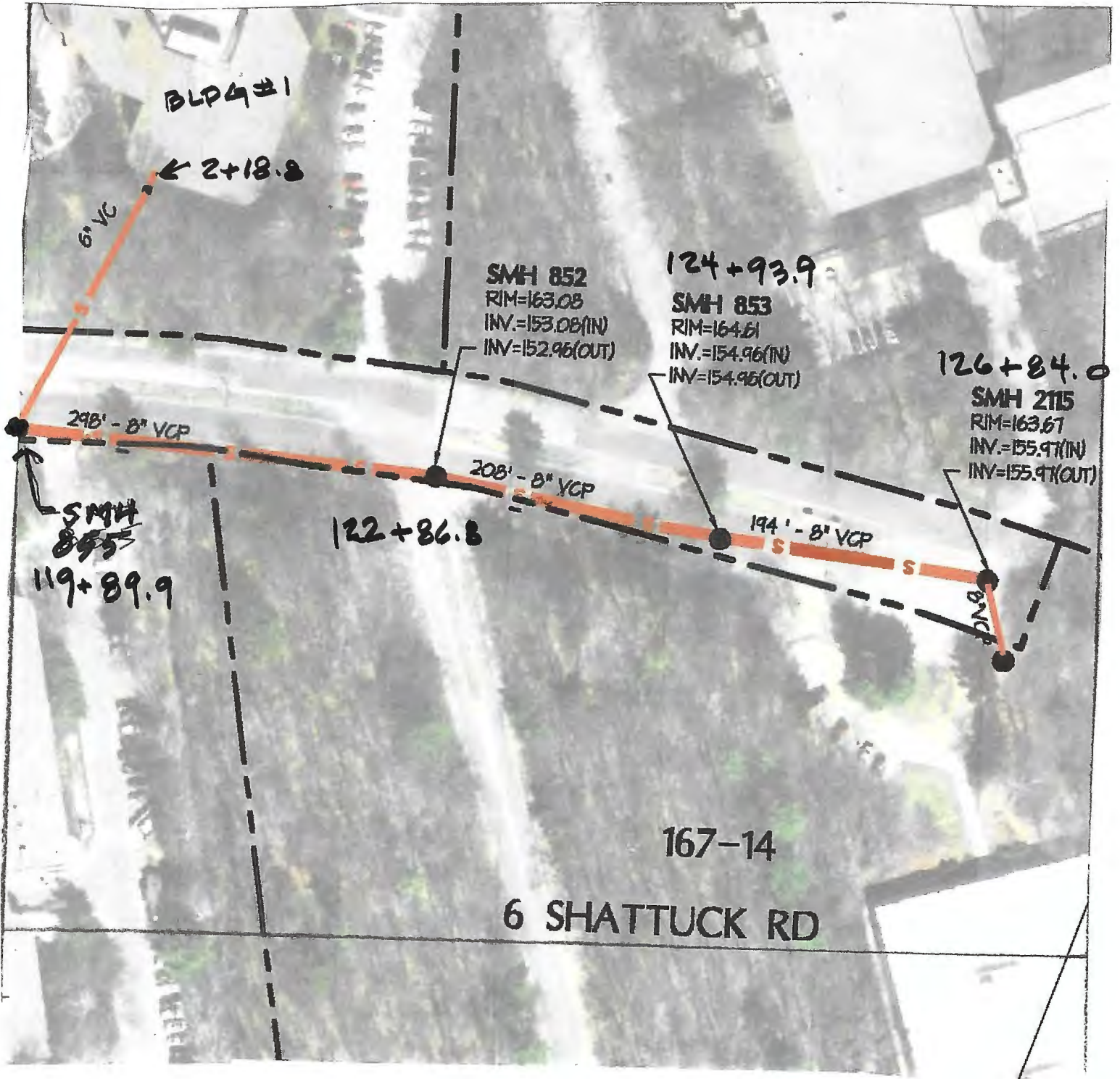
SMH TBA 2
RIM=152.88
INV=146.94(6"
INV=146.49(8"
INV=146.49(8"

112+87.3

connection
shattuck

30 SHATTU





SEWER LINE A

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PLAN PAGE	SHT #	SET UP	STA TO SMH #	STA TO SMH #	MAJOR ISSUES
I	7	56	0+00 - 2019	0+31.4 - 881A	None
	9	55	0+31.4 - 881A	3+00 - 881	"
	11	54	3+00 - 881	5+98.6 - 878	IDJ @ 136.2
II	13	53	5+98.6 - 878	9+03.3 - 2539	IDJ @ 215.4
	16	49	9+03.3 - 2539	10+91.7 - 2538	15J @ 104.4
	18	52	10+91.7 - 2538	11+063X - 877	None
	20	50	11+06.3X - 877	13+99.4X - 876	"
III	22	51	13+99.4 ^X - 876	14+12.5 ^X - 874	"
	31	46	14+12.5 - 874	16+95.5 - 873	Roots
	33	47	16+95.5 - 873	19+93.4 - 872	Roots
	36	71	19+93.4 - 872	21+51.6 - 863	FL @ 50.5 CL @ 58.0, 89.4 @ 157.4 F5J @ 134.9
IV	38	68	21+51.6 - 863	23+88.4 - 2220	Roots

SEWER LINE A (CONT.)

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PLAN PAGE	SHT #	SET UP	STA SMH #	TD	STA SMH #	MAJOR ISSUES
IV	41	35	23+88.4 2220	-	25+94.3 1342	None
	44	34	25+94.3 1342	-	28+94.0 3303	Roots (Excessive)
V	48	33	28+94.0 3303	-	31+82.5 1259	Roots (Excessive)
	58	36	31+82.5 1259	-	31+87.4 1258	None
	60	37	31+87.4 1258	-	34+17.7 1261	Roots
	62	41	34+17.7 1261	-	34+61.5 1262	None
	64	29	34+61.5 1262	-	35+09.3 TBA	"
	66	30	35+09.3 TBA	-	37+00.2 2268	TB @ 72.5
	68	31	37+00.2 2268	-	38+75.0 861	TBA @ 42.5
VI	52	38	31+82.5 1259	-	31+85.7 A 1257	None
	54	39	31+85.7 A 1257	-	33+71.6 A 1343	"
	56	40	33+71.6 A 1343	-	34+35.1 A 1344	TBA @ 58.7

SEWER LINE A

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PLAN PAGE	SHT #	SET UP	STA TO SMH #	STA TO SMH #	MAJOR ISSUES
VII	70	32	38+75.0 - 861	40+01.7 - 2865	Roots
	72	65	40+01.7 - 2865	41+49.1 - 2864	IDJC @ 119.4
SEWER LINE A-1					
IV	77	69	50+00 - 2220	51+95.5 - 2221	ISJC @ 87.5
	80	58	51+95.5 - 2221	53+86.7 - 2218	ISJC @ 173.0, DAE @ 117.8
	82	59	53+86.7 - 2218	54+63.2 - 2219	ISJC @ 32.1, 37.0, 57.3, 66.3
	84	60	54+63.2 - 2219	55+68.0 - 2217	ISJC @ 8.4, 12.1, 17.7, 22.5, 27.3, 42.9, 47.9, 87.6
SEWER LINE B					
V	88	42	60+00 - 1344	62+55.1 - 1828	None
VIII	90	43	62+55.1 - 1828	65+50.9 - 1835	"
	92	87	65+50.9 - 1835	67+92.0 - 1836	"
	95	70	67+92.0 - 1836	70+79.2 - 1837	IS @ 43.9, ISJC @ 223.2
	97	20	70+79.2 - 1837	73+08.2 - RR4A	ISJC @ 27.0, 111.9, 226.2 IDJC @ 216.0

SEWER LINE B (CONT.)

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PLAN PAGE	SHT #	SET UP	STA TO SMH #	STA SMH #	MAJOR ISSUES
IX	99	19	73+08.2 RR4A	75+68.5 RR5	Roots (excessive) DAGS @ 42.7
	101	17	75+68.5 RR5	78+57.8 RR6	Roots, IRJ @ 180.0
	105	18	78+57.8 RR6	80+57.8 RR7	None
	108	25	80+57.8 RR7	82+63.1 RR8	Roots, IRJ @ 22.7, 32.8, 37.6, 47.7, PC @ 101.4
X	111	24	82+63.1 RR8	83+98.1 5	DAGS @ 8.3, 11.7, 16.6, 30.2, 81.5 106.2, Roots
	115	23	83+98.1 5	85+59.0 2842	IRJ @ 7.5, 17.2, ISJ @ 47.7, 77.6, 107.6, PAE @ 97.6, DAGS @ 103.4, B @ 158.5, RPP @ 159.5
	119	22	85+59.0 2842	87+59.9 3C	ISJ @ 102.8, 107.8, IDJ @ 147.4 187.7, 197.7
	122	21	87+59.9 3C	88+56.5 3	None
XI	124	26	88+56.5 3	91+51.6 2844	IR @ 36.2, IDJ @ 125.3, ISJ @ 185.9, 230.5
	126	27	91+51.6 2844	94+44.1 2845	ISJ @ 11.0, 242.0
	129	28	94+44.1 2845	95+56.5 PLUG-59	Roots

SEWER LINE C

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PLAN PAGE	SHT #	SET UP	STA SMH #	TO STA SMH #	MAJOR ISSUES
<u>VII</u>	133	66	100+00 2864	100+59.5 2274	FL @ 55.7, 10J @ 55.8
	135	12	100+59.5 2274	102+11.3 862	DAG @ 86.2, 115.1, 144.4
<u>XII</u>	138	10	102+11.3 862	105+07.3 2273	1S @ 6.6, 11.5
	140	11	105+07.3 2273	107+45.4 2275	FL @ 236.5
	142	9	107+45.4 2275	108+06.1 2276	TFA @ 60.0
<u>XIII</u>	144	8	108+06.1 2276	111+02.6 857	TFA @ 296.3
	147	7	111+02.6 857	112+67.3 TBA 2	CM @ 18.8
	149	6	112+67.3 TBA 2	114+01.2 856	None
<u>XIV</u>	151	5	114+01.2 856	116+95.3 854	CL @ 6.0, 25.7, 66.5, 69.2, CM @ 76.4.
	153	4	116+95.3 854	119+89.9 855	CL @ 180.2, CC @ 187.4
<u>XV</u>	156	3	119+89.9 855	122+86.8 852	CL @ 151.0
	160	2	122+86.8 852	124+93.9 853	CL @ 1.5
	162	1	124+93.9 853	126+84.0 2115	None

SEWER LINE C (CONT)

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PLAN PAGE	SHT #	SET UP	STA TO SMH #	STA TO SMH #	MAJOR ISSUES
<u>XV</u>	158	13	119+89.9 0+00 855	- 2+18.8 1	None
SEWER LINE C-1					
<u>VII</u>	166	61	100+00A 2864	- 101+08.5A 1874	None
	168	62	101+08.5A 1874	- 104+08.3A 1873	"
	170	63	104+08.3A 1873	- 104+26.3A 1872	"
<u>XII</u>	172	64	104+26.3A 1872	- 107+01.8A 1630	"
SEWER LINE A					
<u>II</u>	24	48	10+91.7X 2538	- 11+03.3X 2537	None
	26	44	11+03.3X 2537	- 13+99.5X 875	"
	28	45	13+99.5X 875	- 14+12.4X 874	"