

PAID #



002-000-83

GOVERNMENT
BLOCK
Book #1
82 0022

Field Book

50% rag paper
32 pages

4⁵/₈" x 7¹/₄"

Keuffel & Esser Co. Morristown, N.J. 07960 Made in U.S.A.

CURVE FORMULAS

$$T = R \tan \frac{1}{2} I$$

$$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$$

$$\text{Sin. } \frac{1}{2} D = \frac{50}{R}$$

$$\text{Sin. } \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$$

$$R = T \cot. \frac{1}{2} I$$

$$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$$

$$E = R \text{ ex. sec } \frac{1}{2} I$$

$$E = T \tan \frac{1}{4} I$$

$$\text{Chord def.} = \frac{\text{chord}^2}{R}$$

$$\text{No. chords} = \frac{I}{D}$$

$$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. 10. $10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875 = \text{Base}$.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574 d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{1}{3} d^2$. The combined correction is negative.

PROBABLE ERROR. If d_1, d_2, d_3 , etc. are the discrepancies of various results from the mean, and if $\sum d^2$ = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean = $\pm 0.6745 \sqrt{\frac{\sum d^2}{n(n-1)}}$

MINUTES IN DECIMALS OF A DEGREE

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1-16	3-32	$\frac{1}{8}$	3-16	$\frac{1}{4}$	5-16	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

TITLE PAGE

GOVERNMENT BLOCK

BOSUN 1/20/03

PROJ. # 02-000-83

1/20/83

Scott

Ross

LOW 30°

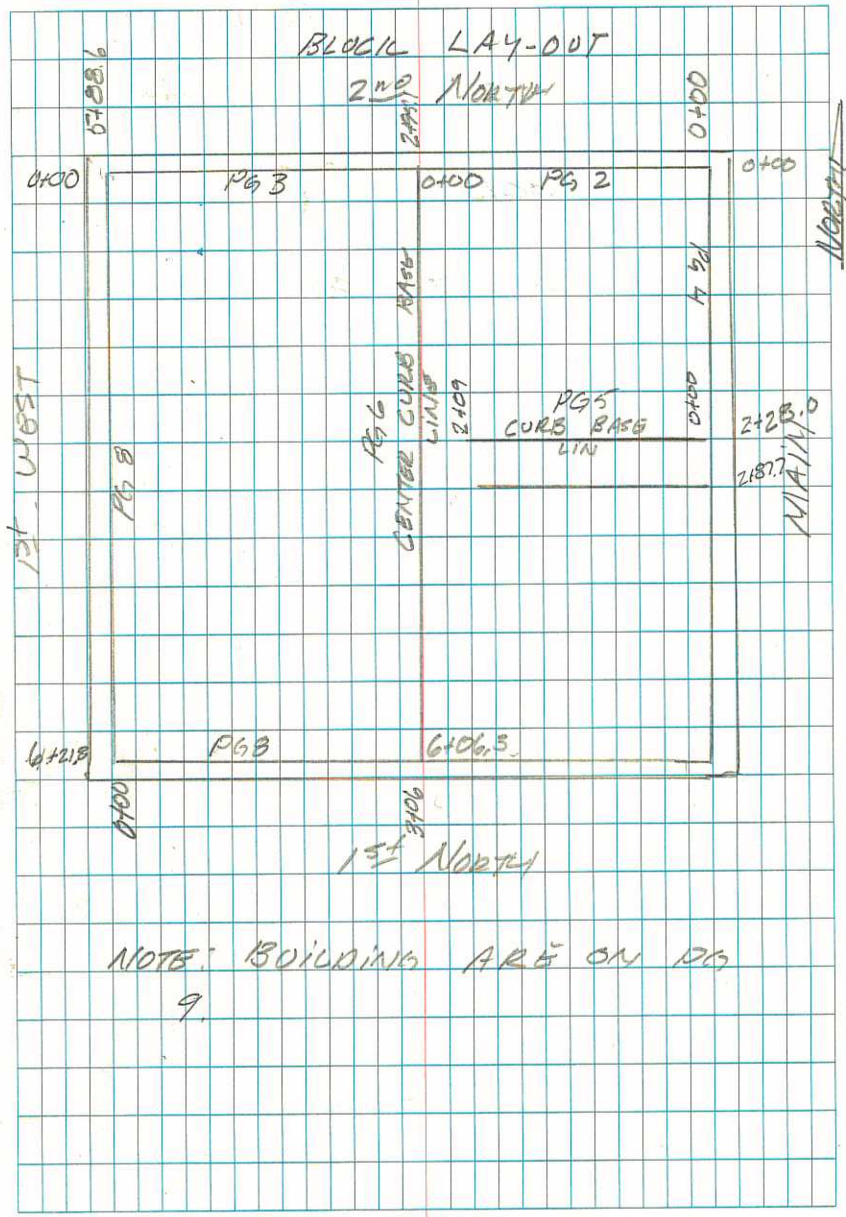
Cloudy

CAUM

BLOCK LAY-OUT

02-001-83

①



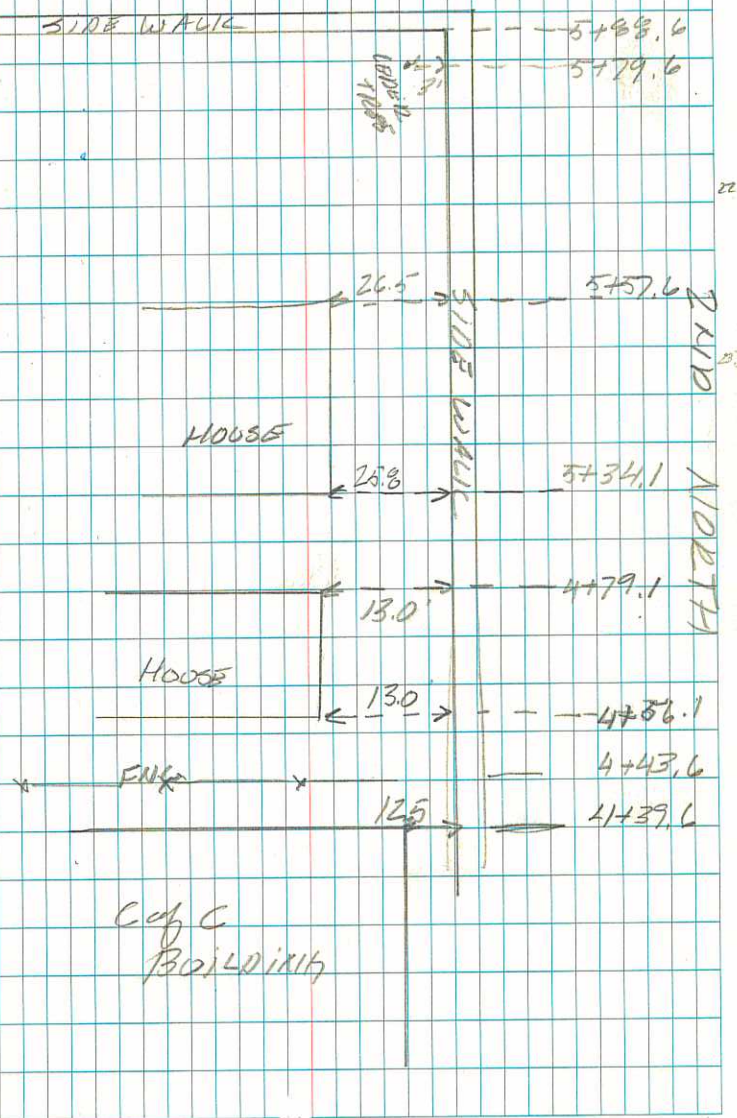
NOTE: BUILDING ARE ON PG 9.

NOTES

THERE ARE SHRUBS AT
THE FRONT OF THE
C of C BUILDING & HOMES.

3

1st WEST



MAIN ST. BASE LINE

NOTES

AL

2nd NORTH

0+00

4

SIDE WALK
(BASE IS ON PLY 2)

Mon 1/2 SIDE WALK

0+55

5' SIDEWALK

0+72

206

205

180

FLAG 2010

0+89

85'

0+92.5

1/2 SIDE WALK
DO NOT
HURRY

SIDEWALK

MINI
575

50' CORN

85'

1+50.0

23'

1+73.0

244

91'

1+89.0

1/2 SIDE WALK
36"

275'

2+02.5

241"

61.5'

2+14.5

15" TREE

135

CURB

2+28.0

PARKING

577

BUILDING

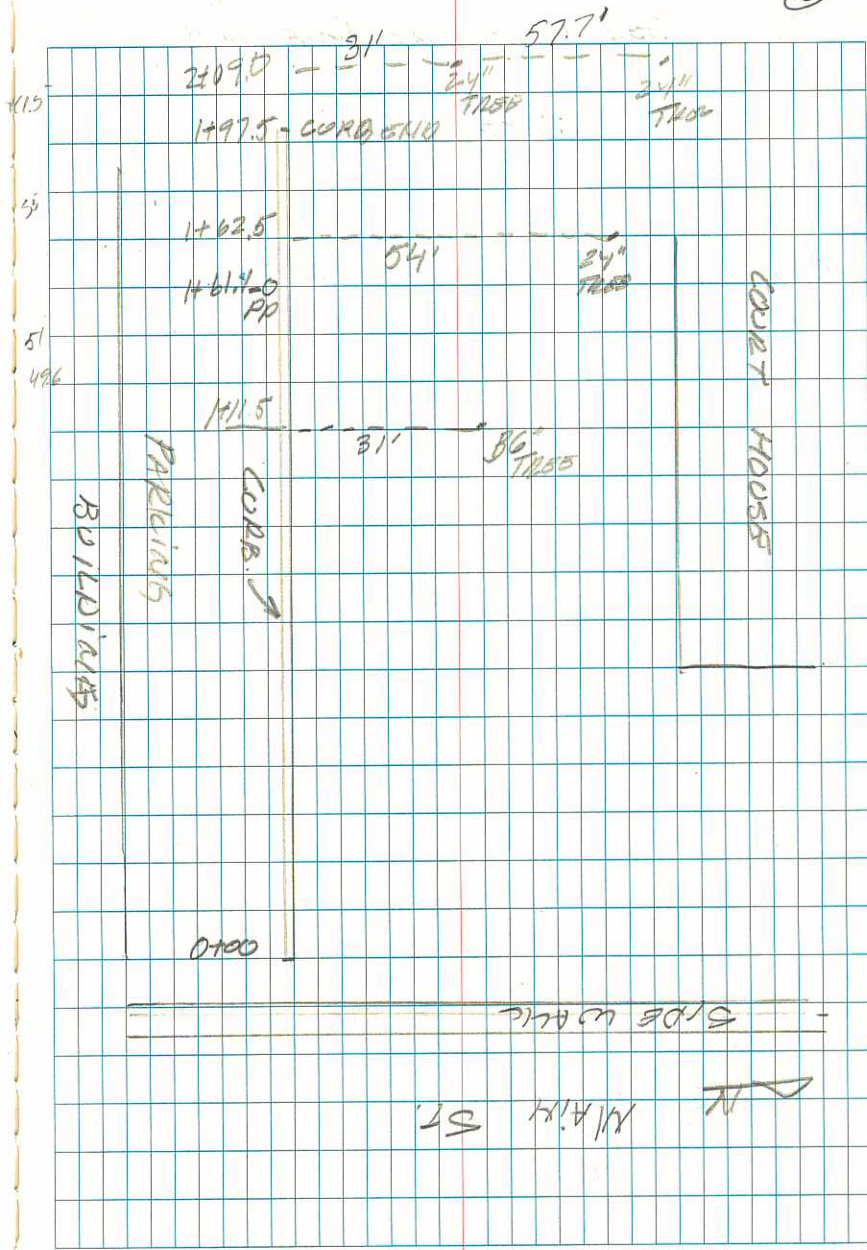
6' 2+87.7

SOUTH PARKING CORP BASE LINE

NOTES

BASE LINE IS CORP AT STA 2+28.0
Pg. 4.

③



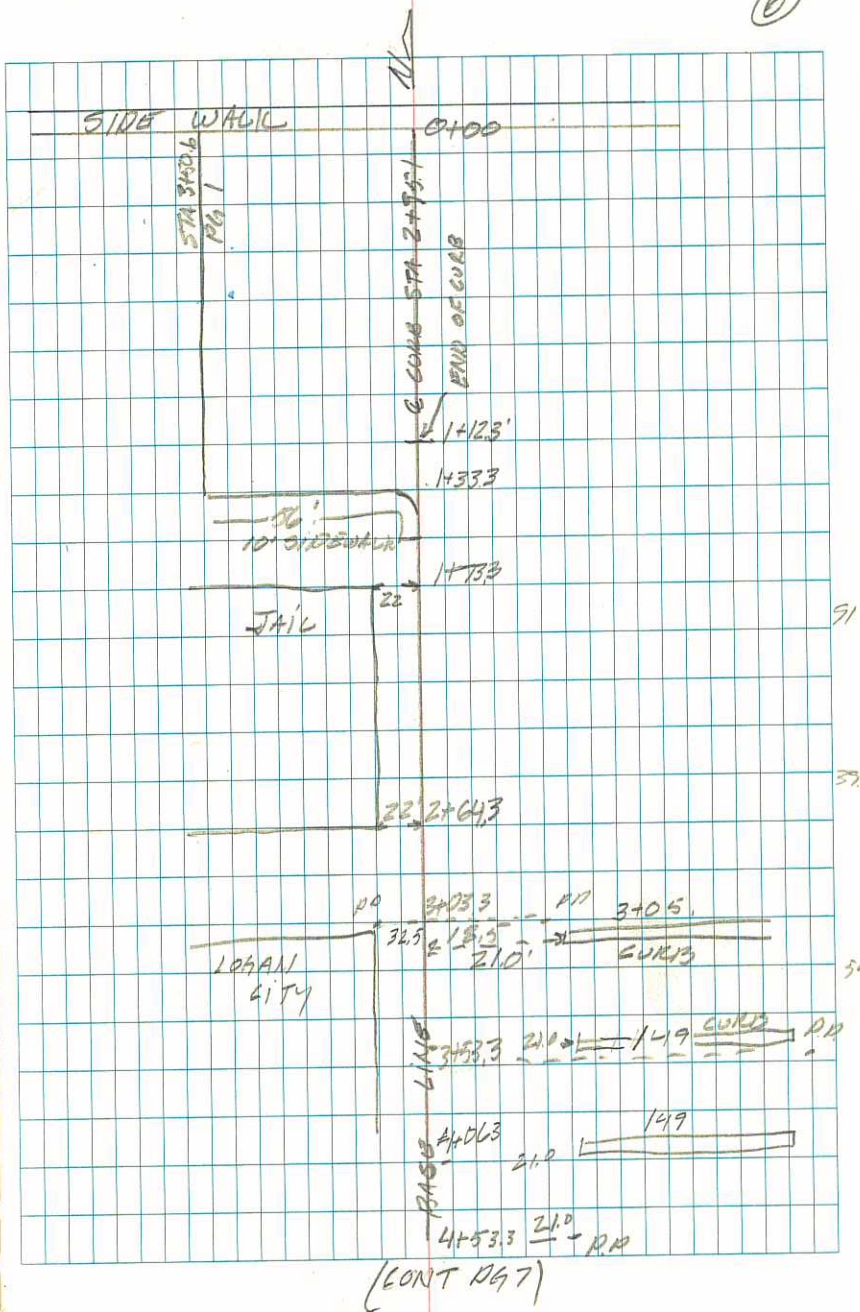
CENTER BOOK CURB BASE LINE

NOTES

BASE LINE 16 CURB AT STA 2+95.1
 DG. 2.

2ND NORTH

⑥



NOTES

CONT FR. PG 6

LOGAN CITY
BUILDING

H+53.3 P.P.

5+46.3

BASE LINE

BUILDING

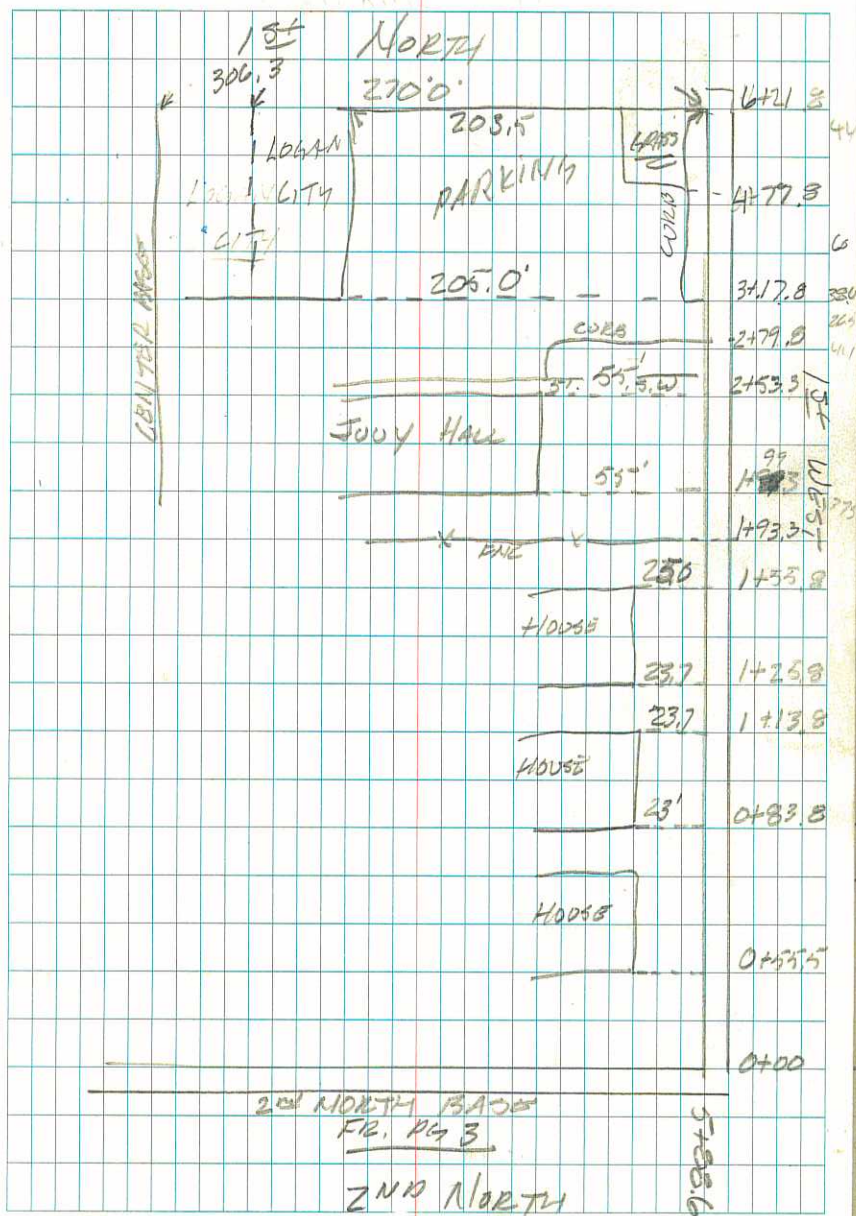
SIDEWALK 6+06.3

1ST NORTH

156 WEST BASE LINE

30.3

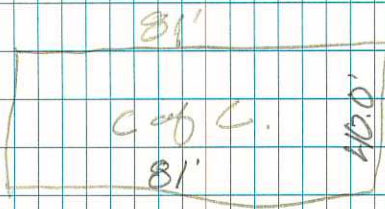
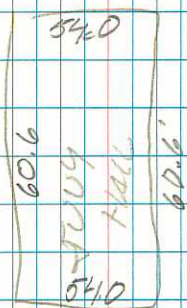
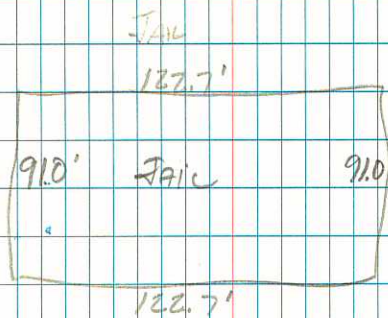
②



BOICDIAGS.

NOTES

9



TRAV. BETWEEN LOGAN CITY
MONUMENTS @ THE INTERSECTIONS
OF THEIR STREETS BkL DISTANCE
= 700.01

STA → STA HORIZA S DIST VERT A

2ND NORTH 1ST WEST MAIN 2ND N.	90° 29' 20"		
B.S. MAIN 1ST N.	90° 12' 05"	715.85	90° 29' 40"
INT. RT.	0° 28' 20"	715.83	269° 31'
		715.85	

MON #1 → B.S.

0° 00' 00" 700.01

MON #1 → MON #2 90° 07' 05" 715.85 90° 28' 50"

B.S. MON. #4 90° 07' 05" 715.85 90° 28' 40"

INT RT. 0° 28' 20" 715.85 269° 31' 00"

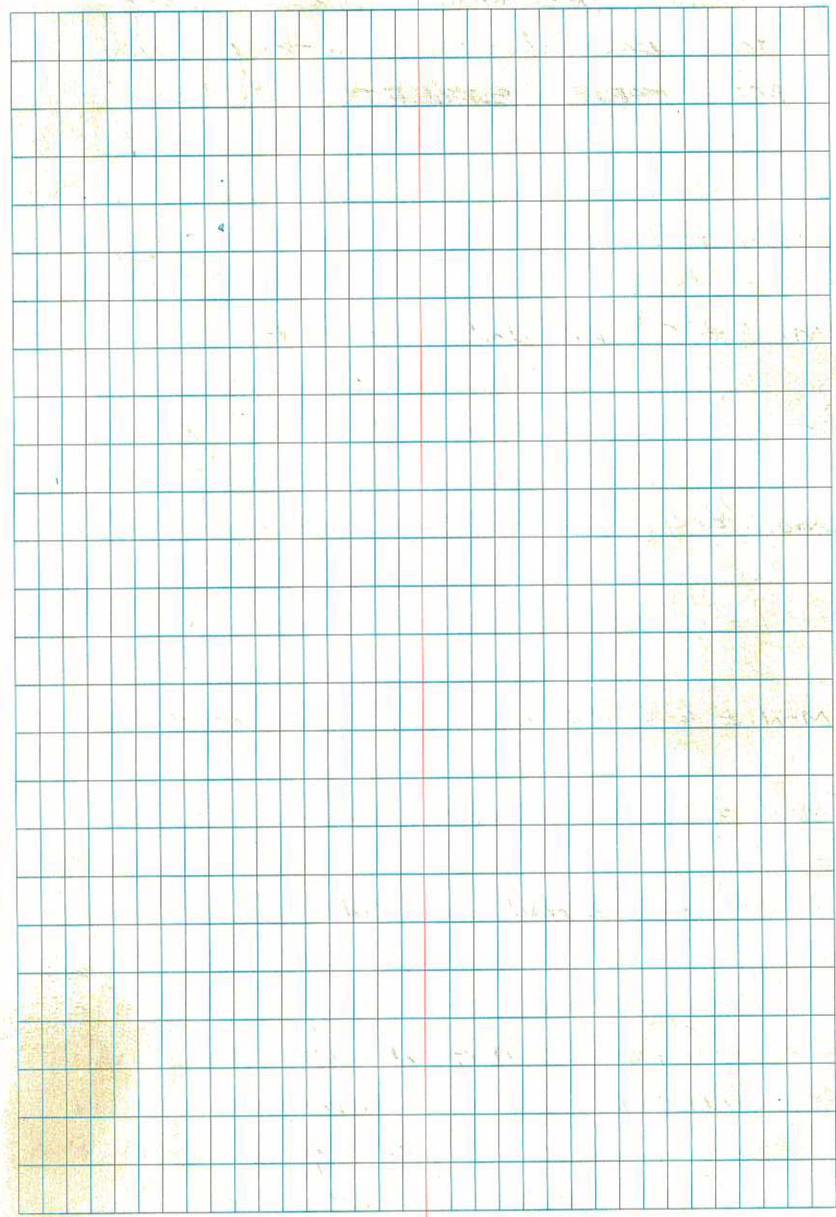
TO ESTABLISH MON 1a on
LINE BETWEEN MON 1 & 2.

MON 1 → 1a 0° 00' 00" 366.54

B.S. MON 2 366.53

716.96
366.54

311.40
311.54
311.40



TRAVERSING COURTHOUSE BLOCK
TO ESTABLISH CONTROLL NET
FOR TOPO. SURVEY

MON. # 1 ORIG. MON. NE. COR. BLK 19

MON # 2 PK NAIL ON LINE BETWEEN 1 & 3

MON. # 3 ORIG. MON NW. COR BLK 19

MON. # 4 PK. NAIL ON LINE BTWN 3 & 5

MON. # 5 ORIG. MON. S.W. COR BLK 19

MON. # 6 P.K. NAIL ON LINE BTWN 5 & 7

MON # 7 ORIG. MON. S.E. COR OF BLK 19

MON # 8 PK NAIL ON LINE BTWN 7 & 1

ALL ORIGINAL MONUMENTS ARE
IN GOOD CONDITION AND ARE
INCLOSED IN A PROTECTIVE SURVEY
BOX LOCATED @ THE APPROX INTERSECTIONS
OF THE COURTHOUSE BLOCK AS IT
STANDS TODAY AUG. 30, 1983
ROSS, G. LAPRAY & JAMES L. BISHOP

SEPT. 9, 1983

STA → STA HORIZ S. DIST VERT A

MON 1 → MON 7 0°00'00" 700.01 90°29'20"

BACKSIGHT

MON # 1 → MON # 3 90°01'05" 715.85 90°28'50"

B.S. MON 7 90°01'05" 715.85 90°28'40"

INT RT. 0°28'20" 715.85 269°31'00"

MON. # 1 → MON # 2 90°01'05" 306.54

B.S. MON # 7

INT RT S.S.

MON # 1 → MON # 8 0°00'00" 369.60

B.S. MON # 7 311.60

INT RT. S.S.

MON. # 3 B.S. MON 2 00°00'

MON # 3 → MON # 2 0°00'00" 349.27 89°53'

349.27

MON # 3 → MON # 4

B.S. MON # 2 89°52'55" 699.98 89°45'05"

INT RT. 359°33'30" 699.97 270°11'40"

MON # 3 → MON # 4

B.S. MON # 2

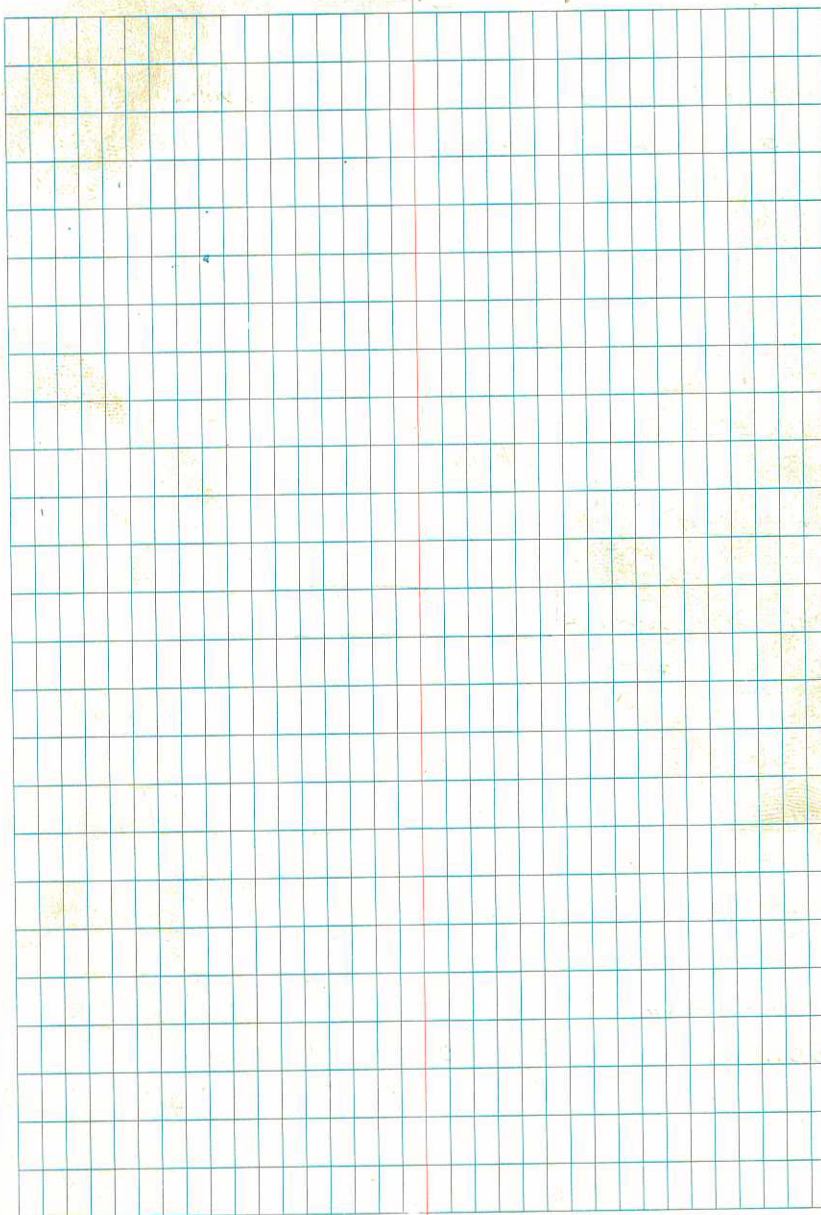
INT RT.

700.00
89°52'50" 700.00 89°52'10"
359°30'15" 700.00 270°07'40"

ROSS T
JIM P

WARM 70° F.
BREEZY 10 MPH.

(12)



STA. → STA. Horiz & S. DIST VERT &

MON # 5 → MON # 6	90°06'30"	354.85	89°45'
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B.S. MON. # 3

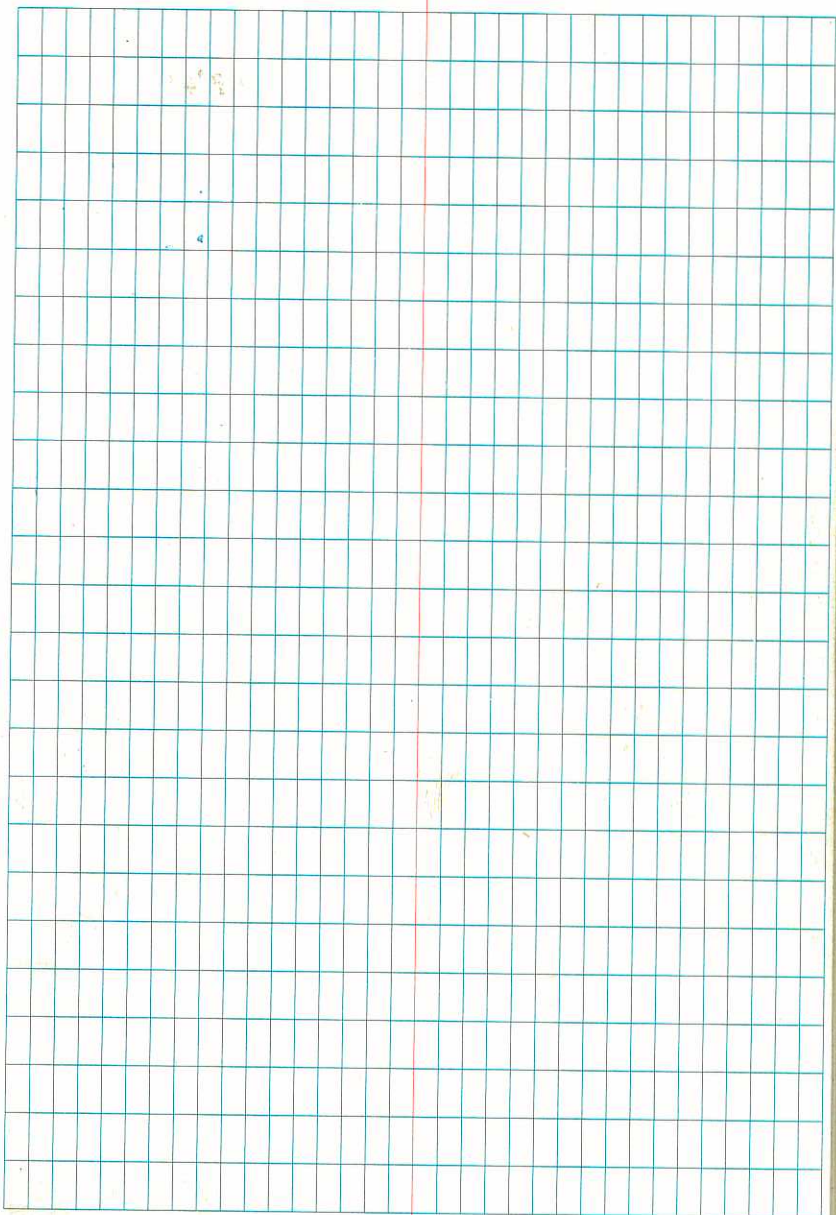
INT RT.

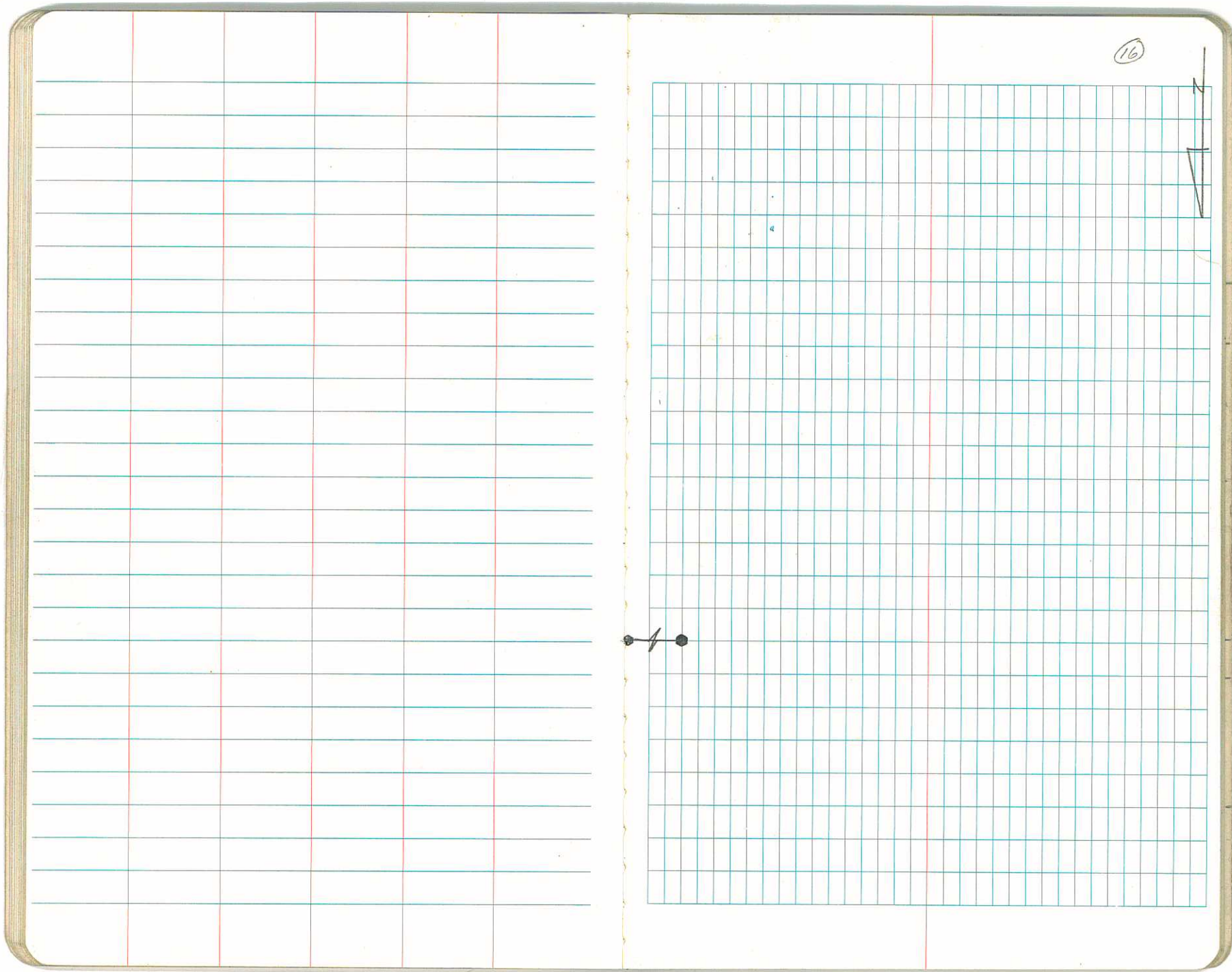
MON # 7 → MON # 8	89°52'33"	388.35	90°37'00"
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B.S. MON # 5	89°52'30"	388.35	90°37'
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INT RT.	359°30'10"	388.35	269.23
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(5)





16

TOP MAP COURTHOUSE

STA →	STA	HORIZ. S. DIST	VERT. &	
A	N	134°46'50"	69.51	91°00' L
A	O	103°04'10"	416.01	91°37' L
A	P	149°56'10"	11.21	91°37' L
A	Q	173°49'30"	49.28	91°37' L
A	R	123°19'30"	85.45	90°39' L
A	S	121°44'20"	104.58	90°30' L
A	T	140°20'50" 120°	39.51	89°18' 90°30' L
A	U	165°33'	65.66	91°01' R
A	V	166°25'	73.84	91°01' R
NOTE 1.0' SOUTH STREET SIGN.				
A	W	161°05'	32.15	91°34'30" R
A	X	88°32'30"	10.88	98°57' R

INTERSECTION OF SIDEWALK
SW COR. MON. BASE GRADE
NW COR. MON. BASE GRADE
NE COR. MON. BASE
TREE
FLAG POLE
N.W. COR. OF MON.
POWER POLE
TOP BACK OF CURVE
TREE
TREE

TOPO MAP COURTHOUSE

STA →	STA	HORIZ &	S. DIST	VERT &	
A	Y	19° 28' 30"	31. ³⁰	93° 05'	R
A	Z	26° 26' 30"	37. ⁰³	93° 13'	R
A	A 1	10° 03'	61. ⁶⁵	91° 29'	R
A	A 2	6° 48' 30"	90. ⁸⁹	91° 14' 00"	R
A	A 3	0° 41' 30"	101. ⁵⁴	91° 14' 10"	L
A	A 4	5° 08'	121. ⁹⁵	91° 08'	R
A	A 5	7° 46' 00"	130. ⁸³	91° 08'	R
A	A 6	7° 20' 30"	130. ⁸³	91° 08'	R

(19)

TREE

POWER POLE

TREE

TREE

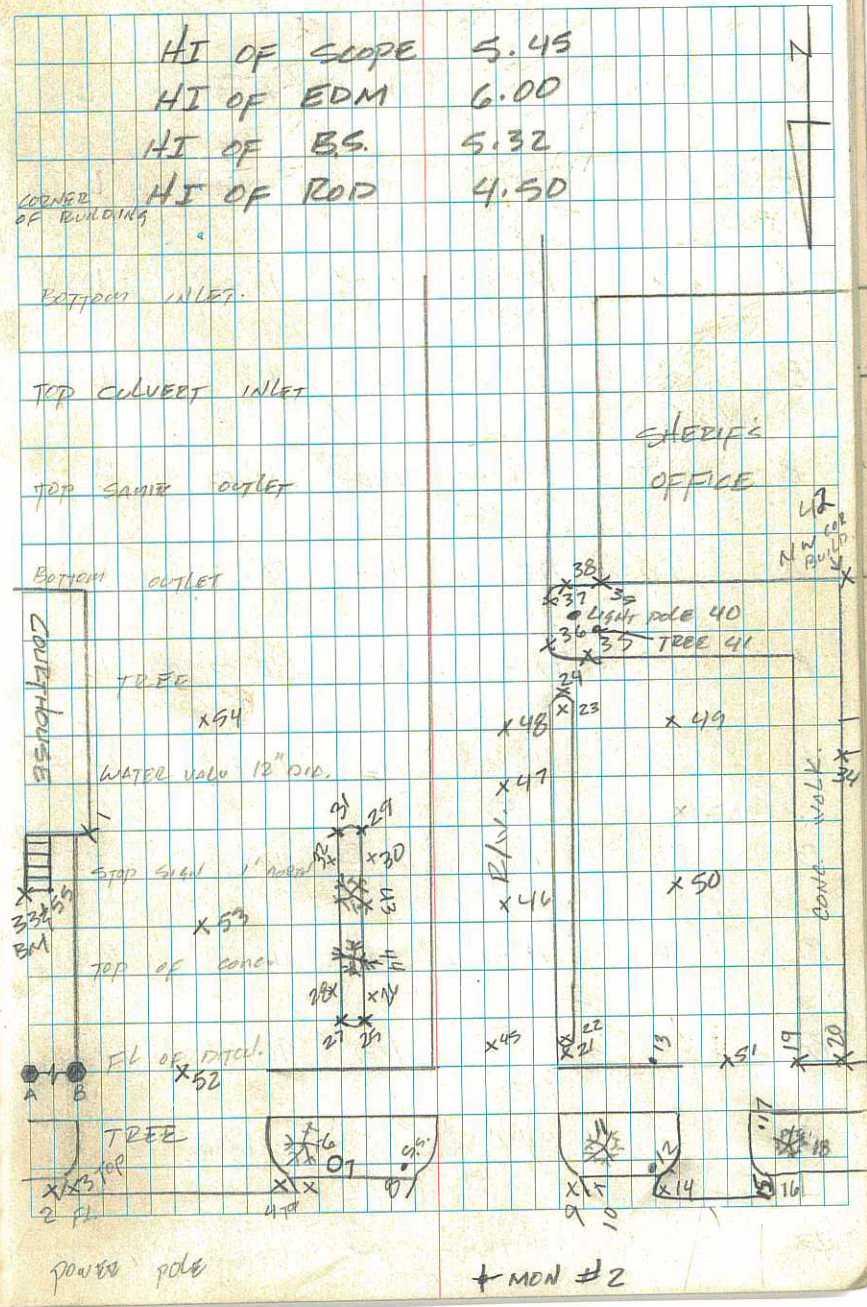
GAS MANHOLE &

TREE

T.B.C.

P.P

STA	→ STA	Horiz & S. DIST	VERT &
B	A	0°00'00" 131.90	89°46'30"
B	1	91°46' 86.60	89°31'10" R
B	2	111°53' 20.63	96°49' L
B	3	111°53' 20.75	93°52'30" L
B	4	155°35'40" 46.23	92°05' L
B	5	155°35'40" 46.23	93°12' L
B	6	167°50'10" 51.17	91°30" L
B	7	168°34'30" 75.34	91°30" L
B	8	168°50'30" 80.41	91°18" L
B	9	169°46'00" 105.79	91°10" L
B	10	169°46' 106.38	91°39' L
B	11	173°51'30" 106.71	91°30'30" L
B	12	171°16' 111.93	91°05' L



STA	→ STA	HORIZ & S. DIST	VERT &	
B	13	179°51'10"	110. ⁸³	90°56' L
B	14	170°52'30"	123. ³⁶	91°04' L
B	15	172°20'10"	138. ⁶¹	90°58' L
B	16	172°26'10"	138. ⁸⁶	91°13' L
B	17	176°50'	140. ³⁶	91°55' L
B	18	175°57'30"	160. ⁰⁰	90°45' L
B	19	179°56'40"	156. ⁶¹	90°44'30" L
B	20	179°56'40"	166. ⁷⁷	90°44'30" L
B	21	179°10'	101. ⁸¹	90°56' R
B	22	178°59'50"	101. ⁶⁹	90°34' R
B	23	132°13'50"	149. ⁶⁶	90°08' R
B	24	132°12'30"	149. ⁸³	90°14'10" R
B	25	177°13'50"	63. ²²	90°58' R

(21)

GUY WIRE TO PP.

TOP OF DRIVE EAST-

TOP OF DRIVE WEST

F.L.

2 HR PARKING SIGN.

TREE

WALK INTERSECTION EAST

WALK INTERSECTION WEST

ASPHALT BY CURB.

TOP CONC CURB

TOP OF CONC CURB

ASPHALT BY CURB

TOP OF CURB

STA	→ STA	HORIZ &	S. DIST	VERT &	
B	26	177°08'	63. ⁴⁵	91°05'	R
B	27	176°18'10"	58. ⁸³	91°05'	R
B	28	176°18'10"	58. ⁵⁷	91°21'	R
B	29	125°53'	107. ⁷⁶	90°24'20"	R
B	30	125°52'	108. ³³	90°29'	R
B	31	124°00'	104. ⁸⁹	90°14'25"	R
B	32	123°52'	104. ⁶³	90°29'	R
B	33	83°42'00"	73.76	89°20'30"	B.M. R
B	→ MON #2	0.00'00"	108. ⁷⁶	90°36'	—
B	→ A	151°37'35"	131. ⁹⁴	89°41'10"	—
BS. MON. #2					
INT RT			700. ⁰²	89°51'40"	-----
MON #2 → PT B		61°03'10"	108. ⁷⁰	90°44'	
BS. MON #6					
INT LEFT					

ASPHALT BY CURBE

TOP OF CURBE

ASPHALT BY CURBE

TOP OF CURBE

ASPHALT BY CURBE

TOP OF CURBE

ASPHALT BY CURBE

X MARK @ B.M ON CONC. WALL BY DUMP TO BOILER ROOM

BACKSITE MON # 2 FROM PT B.

ROD 10 = CI. 45

BS. MON # 6 S. DIST. & VERT &

STA →	STA	HORIZ A	S. DIST	VERT Δ	
B	34	148° 35"			R
B	35	127° 53' 15"	166 ⁹²	90° 07' 45"	R
B	36	126° 52' 10"	167 ²⁴	90° 07' 45"	R
B	37	120° 31' 45"	197 ⁰²	90° 00'	R
B	38	121° 52' 46"	200 ²¹	89° 55' 30"	R
B	39	124° 36' 00"	207 ⁹⁹	89° 45"	R
B	40	122° 40'	188 ⁵⁹	90° 01' 89° 45"	R.
B	41	125° 21'	190 ¹⁸	89° 57'	R
B	42	145° 12' 00"	297 ⁷³	88° 43' 30"	R
B	43	129° 23'	90 ⁹⁸	90° 51'	R
B	44	137° 58' 15"	77 ⁷⁹	91° 10"	R
B	45	177° 28'	87° 79'	91° 15'	R
B	46	153° 07' 50"	98 ⁰⁰	90° 59'	R

9-15-83

(23)

HI OF SLOPE = 5⁵⁵
 WALK INTER HI OF EDM = 6¹⁰
 HI OF B.S. = 5²⁰
 PC CONC: WALK TO HI OF ROD = 4⁵⁰
 55 TO ASPHALT.
 PT .42 TO ASPHALT.
 PC .80 TO ASPHALT.
 PT .6 TO ASPHALT.
 COR JAIL WALL PROJEDES EAST.
 LIGHT POLE
 TREE
 7.60 FROM BOTTOM ROD TO GROUND. JAIL COR.
 TREE
 TREE
 FL. ON DRIVE
 FL. ON DRIVE

STA	→ STA	HORIZ & S. DIST.	VERT &
B	47	136°13'10" 121 ¹⁷	90°40'30" R
B	48	127°12'30" 144 ⁰²	90°29' R
B	49	144°18' 158 ¹⁸	90°23'30" R
B	50	163°15'30" 133 ⁰²	90°39' R
B	51	179°51'10" 128 ⁶⁵	90°58' L
B	52	179°54'50" 28 ⁹⁸	93°06'30" L
B	53	116°10'50" 68 ⁸³	90°30' R
B	54	103°40'30" 131 ²⁸	90°04' R
B	55	83°48'25" 73 ⁶⁶	89°31' R
B	56		R
B	57		R
B	58		R
B	59		R

FL DRIVE

FL DRIVE

CROWN OF DRIVE

CROWN OF DRIVE

CROWN OF DRIVE @ INTERSECTION W/ SIDEWALK

PT ON ASPHALT

PT ON ASPHALT

PT ON ASPHALT.

BM ON CONC. WALL @ RAMP TO BUILDG.

9-15-83

TO ESTABLISH ELEVATIONS ON
PT A & B USING B.M. ON CACHE
COUNTY COURTHOUSE STEPS

STA → STA HORIZ & S. DIST VERT &

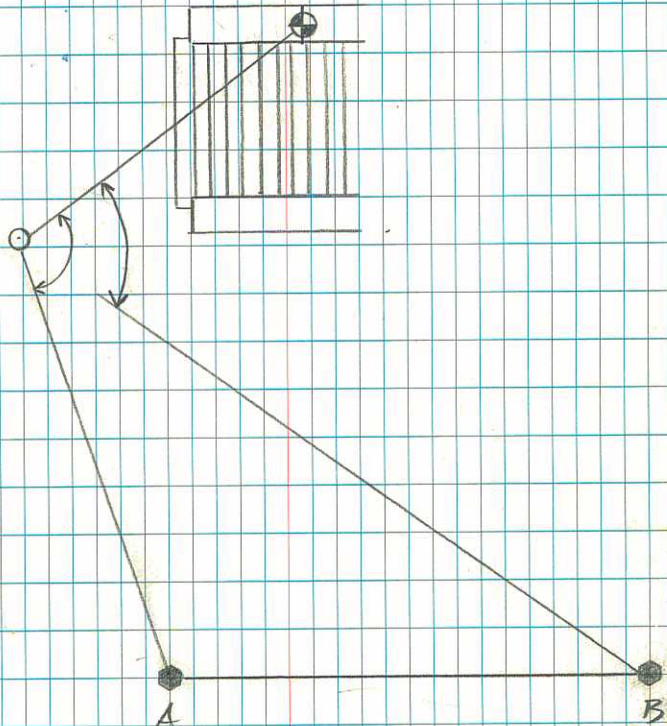
① → B.M. 0°00'00" 58.72 85°12'30"

① → A 140°02' 80.82 91°21'20" R

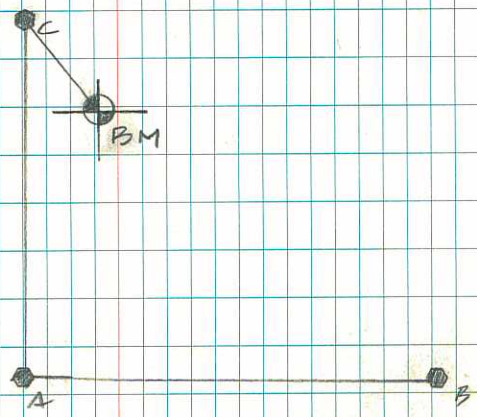
① → B 90°09'10" 168.72 90°53'55" R

25

HT ROD = 4.5



HI OF ROD = 4.5



STA → STA HORIZ & S. DIST VERT Δ

PT (A) → (B) 0°00'00" 132.20 90°21'25"
 BACK SIGHT

PT (A) → (C) 88°39'10" 163.64 90°09'10"
 B.S. B. INT
 LEFT

PT (C) → BM 11°52'30" 33.67 82°02'10"
 B.S. A INT
 LEFT

C	O	5°35'	119.51	90°36'	R
C	P	3°41'55"	158.26	90°23'50"	R
C	56	39°40'	138.89	90°28'10"	R
C	57	34°43'10"	130.55	90°37'	R
C	58	52°51'	111.68	90°27'15"	R
C	59	57°39'	109.00	90°46'30"	R

- SW COR. MON BASE TOP OF WALL
- NW COR. MON BASE TOP OF WALL
- TREE
- SIDE WALK INTER.
- TREE
- LAMP POST

STA	→ STA	HORIZ Δ	S. DIST	VERT Δ
C	60	73° 18'	94. ²⁴	90° 23' 40" R
C	61	97° 22'	92° 07'	90° 07' R
C	62	111° 53' 40"	102. ⁰⁵	90° 20' 30" R
C	63	120° 59'	113. ⁰⁴	90° 33' 50" R
C	64	111° 32' 30"	83. ⁷⁸	90° 19' R
C	65	30° 10' 30"	181. ⁹⁵	90° 49' 45" R
C	66	96° 12'	54. ⁵⁴	91° 02' R
C	67	124° 57'	60. ⁹⁷	90° 48' R
C	68	138° 02' 45"	80. ⁵⁶	90° 26' 30" R
C	69	160° 07'	51. ⁵³	91° 13' 30" R
C	70	150° 45'	28. ³⁶	92° 57' 30" L
C	71	31° 05' 10"	16. ²⁰	94° 19' 30" L
C	72	128° 14' 30"	49. ⁷⁷	91° 30' L

(27)

TREE

TREE

LAMP POST

FL CURVE IN LINE W/ RETAINING WALL BEAR. WEST

CONC. WALK INTERSECTION

FL. GUTTER @ 2ND ADJ. TO MAIN

TREE

TREE

EDGE OF PLANTER

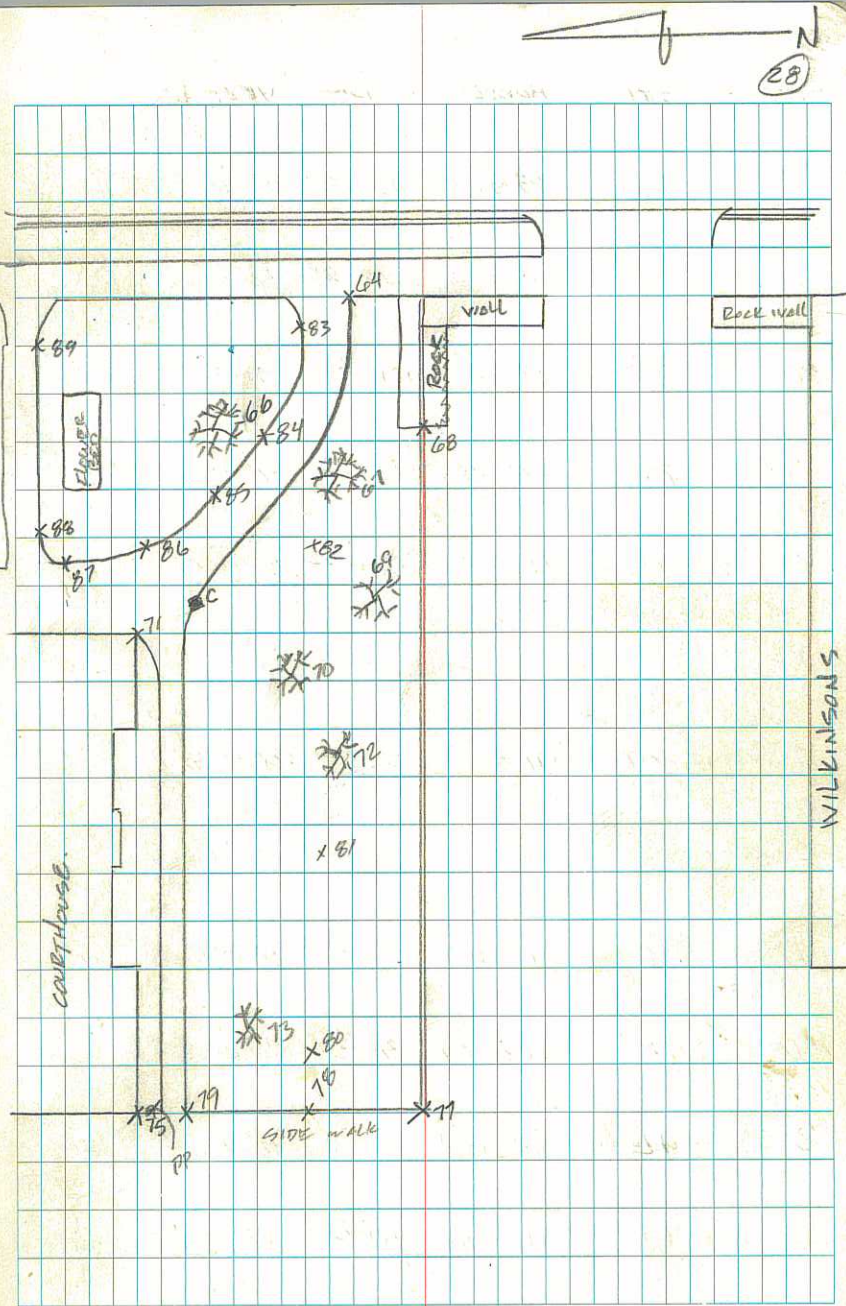
TREE

TREE

SECOR COURTHOUSE

TREE

STA	→ STA	HORIZ	S. DIST	VERT	DIR.	OBJECT
C	73	95°52'30"	91°15'	91°00'	L	TREE
C	74	93°41'30"	135. ⁸⁵	90°31'30"	L	TREE
C	75	87°05'	131. ⁰⁵	90°45'	L	BUILD EDGE
C	76	104°15'	139. ⁰⁰	90°35'	L	TREE
C	77	117°52'55"	138. ⁷⁸	90°32'30"	L	CONC REINFORCED WALL NOT 5'00"
C	78	106°51'00"	146. ⁹⁴	90°39'	L	WALK
C	79	91°55'	135. ⁸⁰	90°42'30"	L	WALK COR
C	80	103°21'	127. ²⁵	90°54'	L	GRASS
C	81	113°22'	77. ⁷³	91°33'	L	GRASS
C	82	149°50'45"	39. ¹⁴	91°52'30"	R	WALL
C	83 83	105°52'30"	~~~~~	90°26'	R	WALK
C	84	108°54'30"	49. ⁹⁷	91°05'40"	R	WALK
C	85	98°40'30"	24. ¹³	92°49'30"	R	WALK



STA → STA HORIZ & S. DIST VERT &

C 86 28°06'10" 16.⁴³ 94°37'10" R

C 87 11°46'30" 34.⁰⁸ 92°14' R

C 88 18°28' 41.⁶⁹ 91°57' R

C 89 59°48' 82.⁰⁸ 90°47'30" R

C → D 126°04'45" 178.¹³ 90°03'05"

B.S. A INT
LEFT

C → BM. 11°50'45" 33.⁸⁹ 80°55'30"

B.S. A INT
LEFT

D 90 40°06'30" 220.⁸⁴ 88°54'30" R

D 91 49°26'45" 86.⁴⁴ 90°21'30" R

D 92 63°33' 95.⁵³ 90°13'15" R

D 93 71°14'50" 117.²² 88°23' R

D 94 74°32'45" 109.⁰⁹ 90°11'50" R

CONC. WALK

CONC. WALK

WALK

WALK

HI OF SCOPE 5.65
HI OF EDM 6.20
HI OF ROD 4.47

4.37 + HI ROD COR. WILKINSON'S

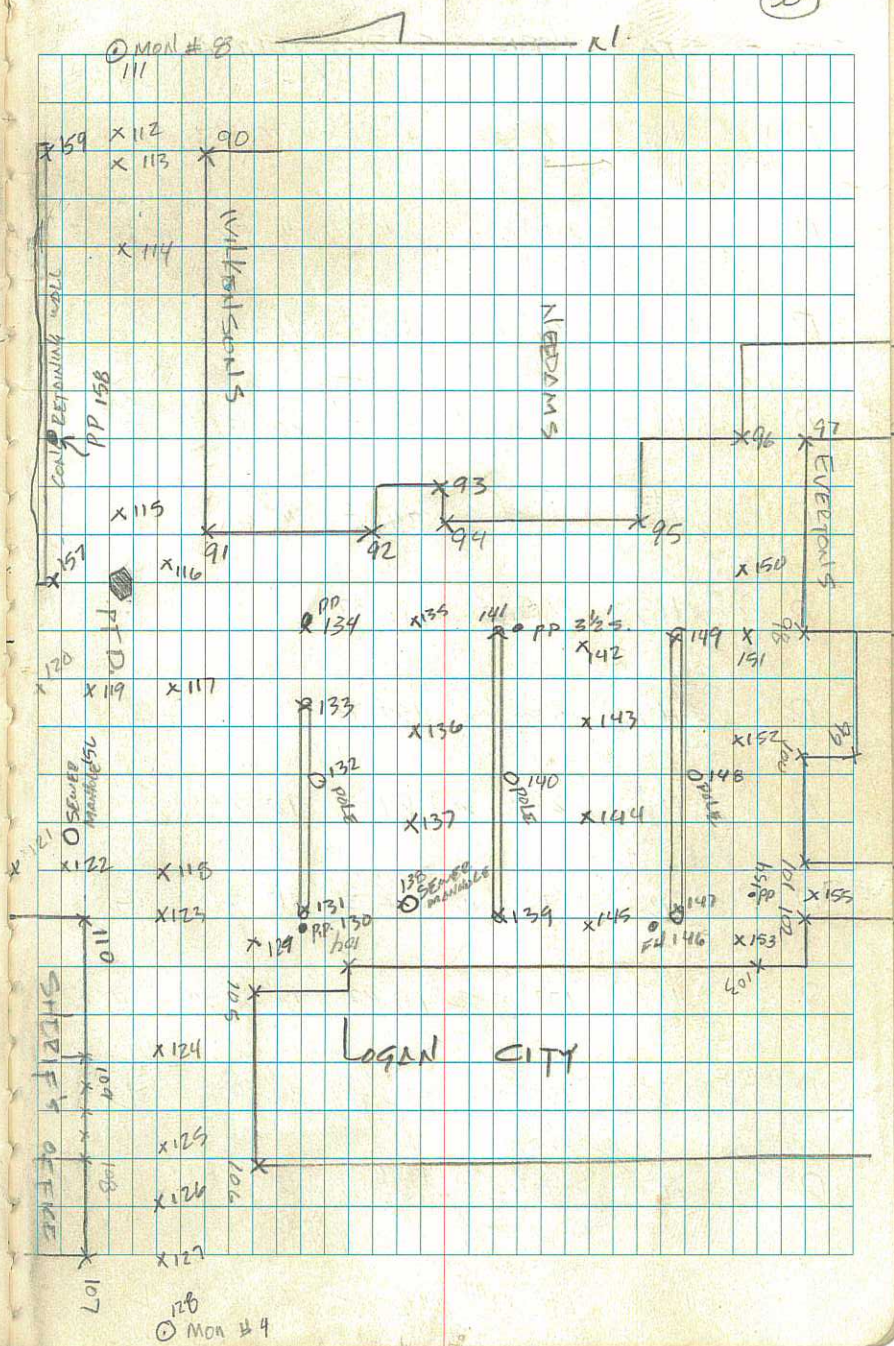
COR WILKINSON'S

COR WILKINSON'S

INSIDE COR. BUILDING 3.26 + HI TO GROUND

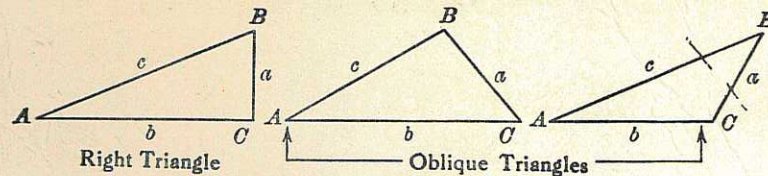
COR NEEDAMS

STA	→ STA	HORIZ	S. DIST	VERTA	
D	95	92°35'	157.43	89°52'30"	R COR BUILD
D	96	96°46'55"	213.01	88°21'30"	3.75 + HI TO GROUND R
D	97	104°06'10"	199.80	88°59'	2.92 + HI TO GROUND R
D	98	126°35'25"	187.78	90°13'	R COR. BUILD
D	99	132°02'05"	279.82	88°52'50"	5.54 + HI TO GROUND. R
D	100	133°17'50"	241.58	90°07'50"	INSIDE COR BUILD
D	101	140°14'35"	247.81	90°09'30"	R COR BUILD
D	102	140°20'40"	289.57	90°05'	R COR BUILD
D	103	149°48'30"	236.52	90°10'55"	R COR BUILD
D	104	175°38'10"	128.65	90°36'10"	R COR BUILD
D	105	164°31'10"	119.45	90°30'20"	R COR BUILD
D	106	157°01'05"	183.13	90°43'10"	R COR BUILD
D	107	144°45'35"	225.54	90°41'20"	R COR BUILD



STA →	STA	HORIZ & S. DIST	VERT	A	
D	108	144° 39' 25"	188.39	90° 44'	L COR PAVLD.
D	109	144° 26' 05"	140.19	90° 50'	L COR PAVLD.
D	110	144° 05' 50"	103.43	90° 51'	L COR PAVLD.
D	111	33° 45' 50"	289.91	89° 58'	R 100' ±
D	112	32° 04' 30"	242.07	90° 20'	R FL CURB
D	113	31° 50'	215.37	90° 03'	R BEGIN DRIVE
D	114	30° 59' 30"	159.51	90° 13'	R ASPHALT
D	115	29° 13' 30"	84.26	90° 35'	R ASPHALT
D	116	53° 51' 10"	35.56	91° 50"	R ASPHALT
D	117	177° 07'	18.83	94° 38' 30"	R ASPHALT.
D	118	156° 24' 50"	69.17	91° 48' 30"	L ASPHALT
D	119	70° 00' 50"	50.13	92° 09'	L ASPHALT
D	120	63° 08'	110.04	91° 11'	L ASPHALT.

TRIGONOMETRIC FORMULAS



Solution of Right Triangles

For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{a}$, $\text{cosec} = \frac{c}{a}$

Given	Required	Formulas
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B$, $c = \sqrt{a^2 + b^2} = a \sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B$, $b = \sqrt{(c+a)(c-a)} = c \sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90^\circ - A$, $b = a \cot A$, $c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90^\circ - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90^\circ - A$, $a = c \sin A$, $b = c \cos A$

Solution of Oblique Triangles

Given	Required	Formulas
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180^\circ - C$, $\tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$, $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a + b + c}{2}$, $\sin \frac{1}{2}A = \sqrt{\frac{(s - b)(s - c)}{bc}}$, $\sin \frac{1}{2}B = \sqrt{\frac{(s - a)(s - c)}{ac}}$, $C = 180^\circ - (A + B)$
a, b, c	Area	$s = \frac{a + b + c}{2}$, $\text{area} = \sqrt{s(s - a)(s - b)(s - c)}$
A, b, c	Area	$\text{area} = \frac{bc \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL

Slope distance
Vert. Angle
Horizontal distance

Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10'. Since $\cos 5^\circ 10' = .9959$, horizontal distance = $319.4 \times .9959 = 318.09$ ft.

Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. $\cos 5^\circ 10' = .9959$. $1 - .9959 = .0041$. $319.4 \times .0041 = 1.31$. $319.4 - 1.31 = 318.09$ ft.

When the rise is known, the horizontal distance is approximately the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.