

FIELD BOOK

33

KEUFFEL & ESSER CO.

DRAWING MATERIALS

AND

SURVEYING INSTRUMENTS.

NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.

FOR SINGLE TRACK EXCAVATION.

"Copyright, 1895, by Keuffel & Esser Co."

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	0
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	1
2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	2
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	3
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	4
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	5
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	6
7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	7
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	8
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	9
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	10
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	11
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	12
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	14
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	15
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	16
17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	17
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	18
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	19
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	20
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	21
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	22
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	23
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	24
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	25
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	26
27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	27
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	28
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	29
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	30
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	31
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	32
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	33
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	34
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	35
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

For Keith's Railroad Curve Tables see end of book.

Property of
County Engineers Office
Court House
Waterloo Iowa

Entered 1922 CPH →

1921 Page
D.A. and Loc. of 1931 Br. & Col. 1-57

Location Recommended size and kind

Description of old Location

Direction of flow Angle of skew

Dr. Area. Xsects and profiles

Xsects of road Sketch of Dr. Area.

Profile of road

Profile of stream

Amt. of water

B.M.s.

Reference stakes

Angle of skew

Pictures of Pony
Truss Sec. 10 Spr Creek
Page 77

Note: References to Book #2 (Culvert)
are Field Book No 34.

Entered 2-1923 CPH →

Budget Culvert Surveys

Sec	Twp	Page	Sec	Twp	Page
33-34	Orange	58	11-14	Poplar	72
26-35	Blk Fork	59	28-29	Benn.	73
5	Lincolnton	60	20-21	Benn	74
26-35	"	61	18-19	"	75
21-22	Eagle	62	15-16	Int. Benn.	76
9-16	Orange	65	10	Spr Cr.	77
32	Buckley	66	19	Spr Cr	78
6	Box	67			
35-36	Buckley	68	3-4	Benn.	69-70
2-11	Poplar	71			

Near center E. side 13 Orange.
Old 12" corr pipe → W
Build 18" corr.

N of S and E. side 13 Orange
 Old 12" corr → W
 Build 2x2

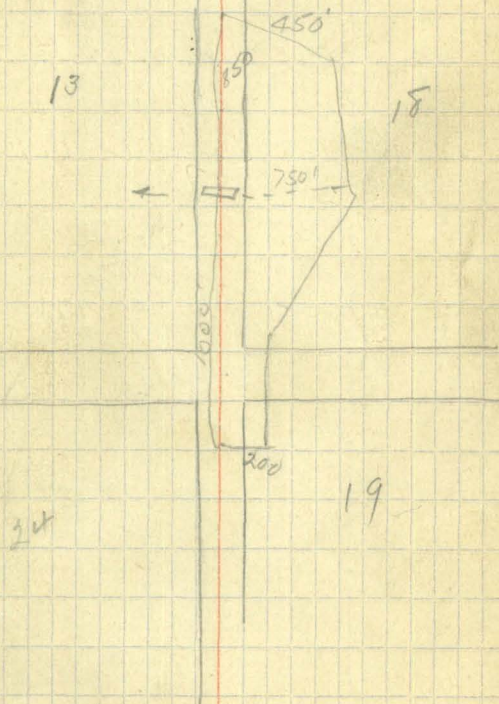
$$\frac{P4 \text{ B2}}{53 + C21}$$

2 x 2 x 22

Wings Straight
 Plan C-1

D.A. = 20 Acres

N
1



W. End Cedar 18-19

003

across intersection E end 13-24

Orange → N

Old 12" corr.

Build 2x2x

340 ft. West of Intersection

D.A. = 8 A.

$$\frac{P_{32} \cdot 82}{P_{31} \cdot 13}$$

$$\frac{B+C}{2}$$

Cedar 18-19 West End

Broken 12" Corr. Pipe

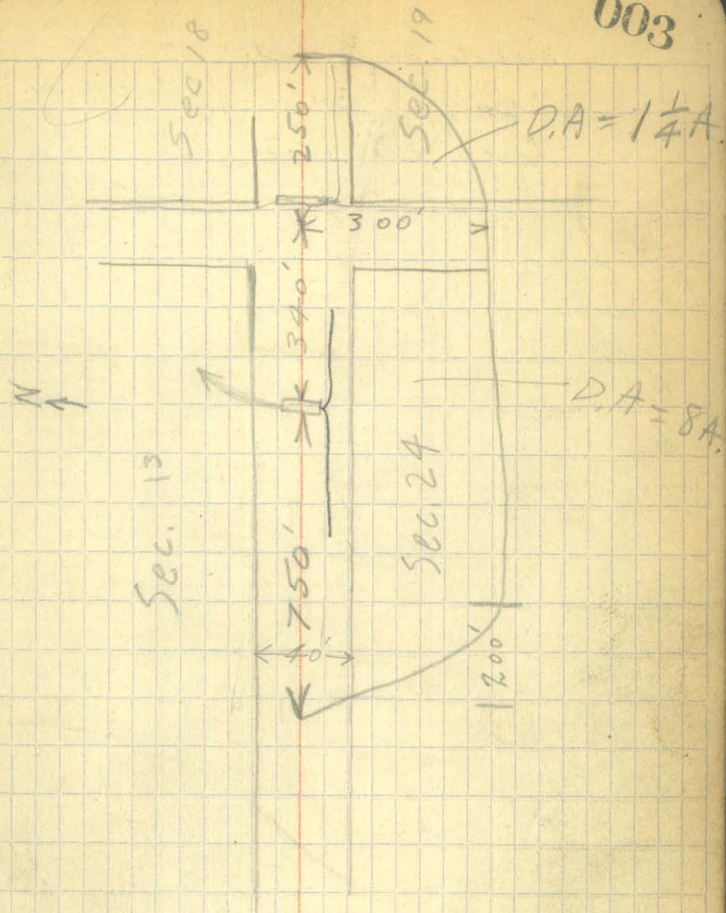
Build 2'x2'x32'

Flow N. →

D.A. = $1\frac{1}{4}$ A.

Plan C-22

Str. Wings on 30° Skew

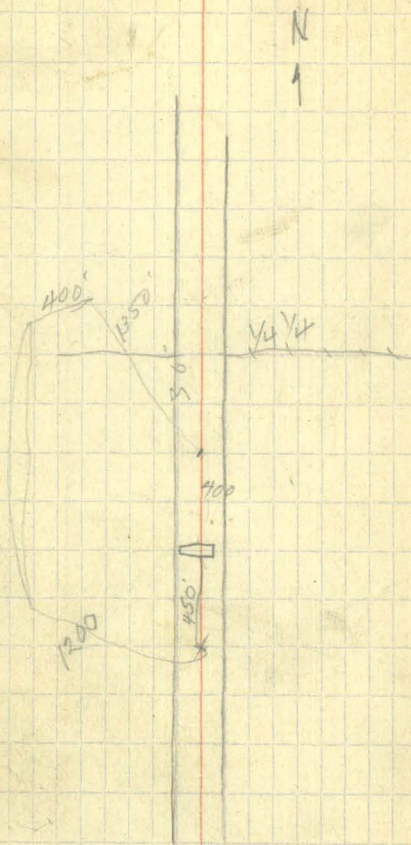


N of center E side 24 Orange
 Old 12" corr and S.P.
 Deep ditch $\rightarrow$ E
 Build Conc.

$$\frac{P.2-B.2}{T3+C-21}$$

2 x 2 x 24
 45° Wings
 Plan C-1

D.A. = 32 A.



5

005

8 of center 24-25 Orange
 → S Old 12" corr.
 Build 3x3 in low place E of
 old.

~~P34B2
 B+C2~~

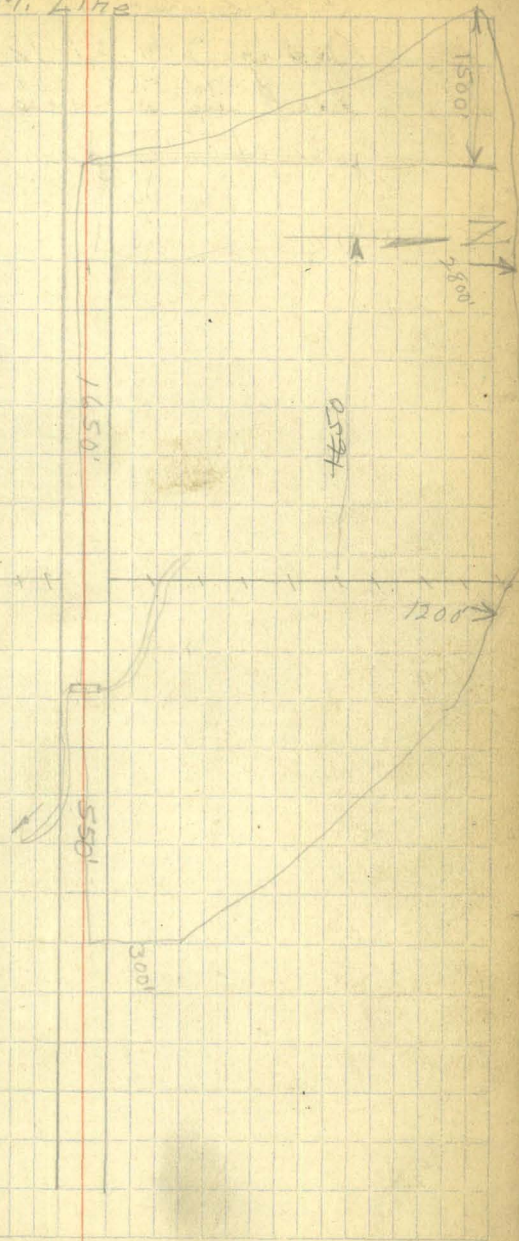
D.A. 140 A.

3 x 3 x 22

Plan C-3
 Str. Wings

Profile

25' E $\frac{1}{2}$ Mi. Line



Across intersection N end 25-26
 Orange Old 12" corr. $\rightarrow$ NE
 Bent in middle

Move 6' North. toward Int.

Put in 15" Corr.

D.A. = $1\frac{1}{2}$ A.

26



25

E of Carter 11-14 Eagle
 Old 16' Wood → N
 Build I on filing skew.

26' x 16' J-Beam
 30° STEW ✓

P. 25-26 21
 13-14 21

D.A. = 4200 Acres ✓

Net area = 104.0'

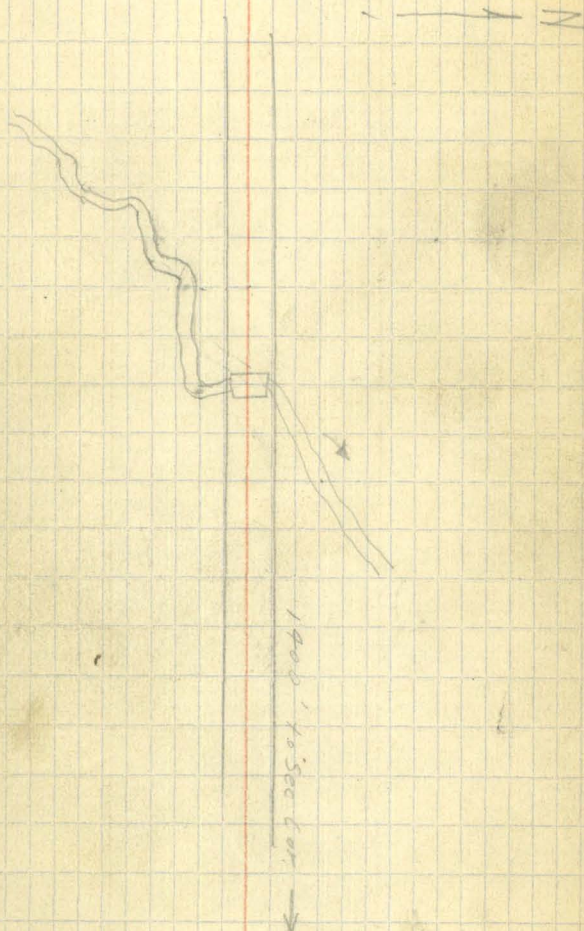
26' x 4' = 104.0

Footings 4' below flow line
 E prop. str. to be 10' W. of E Wood Br.

Profile

51520
 1040' Road.

← scale →
 500'



22' x 16' I-Beam

500' scale

2	3
---	---

24

N
↑

24

25

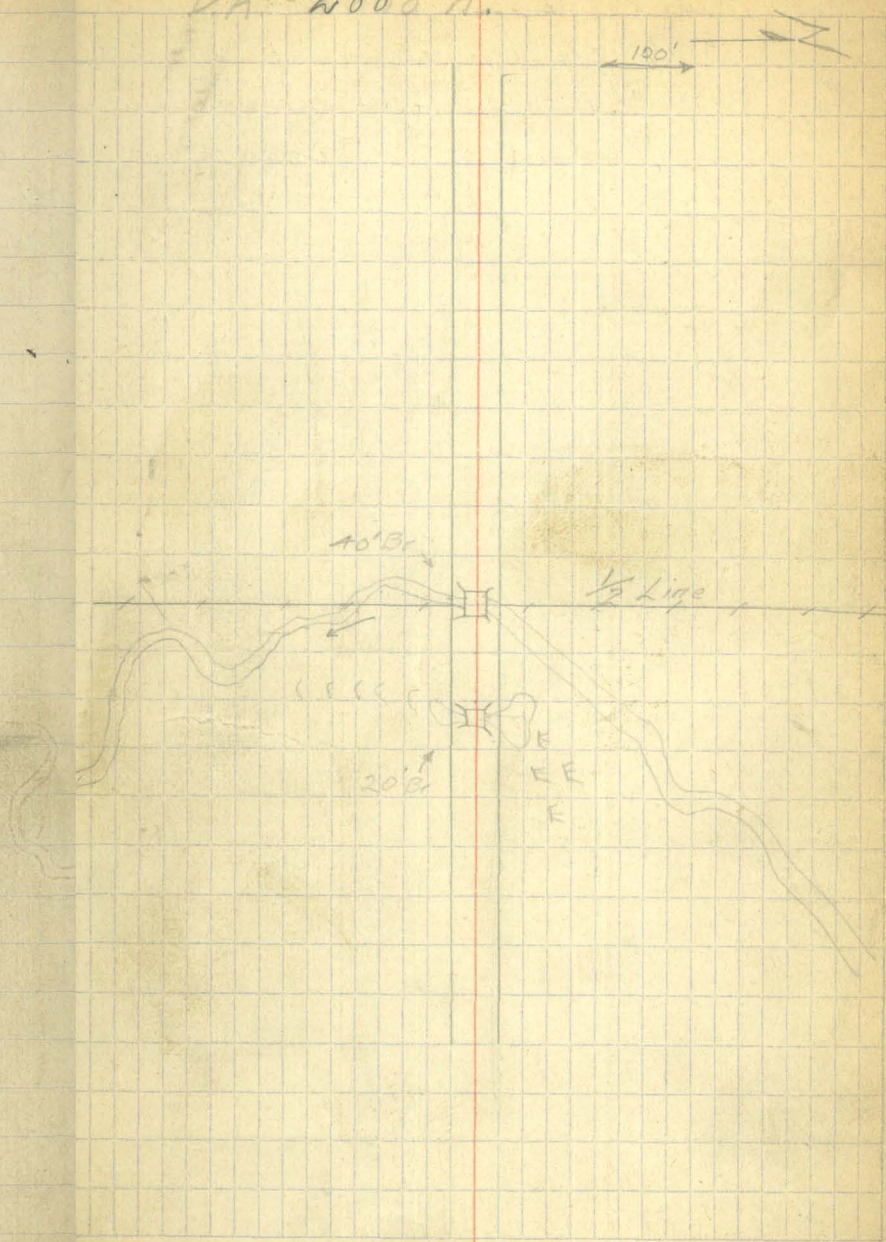
13-24 Lincoln ^Q 2 Wood
→ S

DA = 2880 A.

P39B2
B+C 21

30 X 20

8 X 8



Near center 8-9 Lincoln
 306 Wood See about
 channel change to eliminate
 2 bridges.

P37 B2
 B+C 21

D. H. = 3600 ft. ⁰¹⁰ approximate

Across intersection at Wend
 29-32 Eagle
 Build 2x2 → N

P40B2
 B+C21

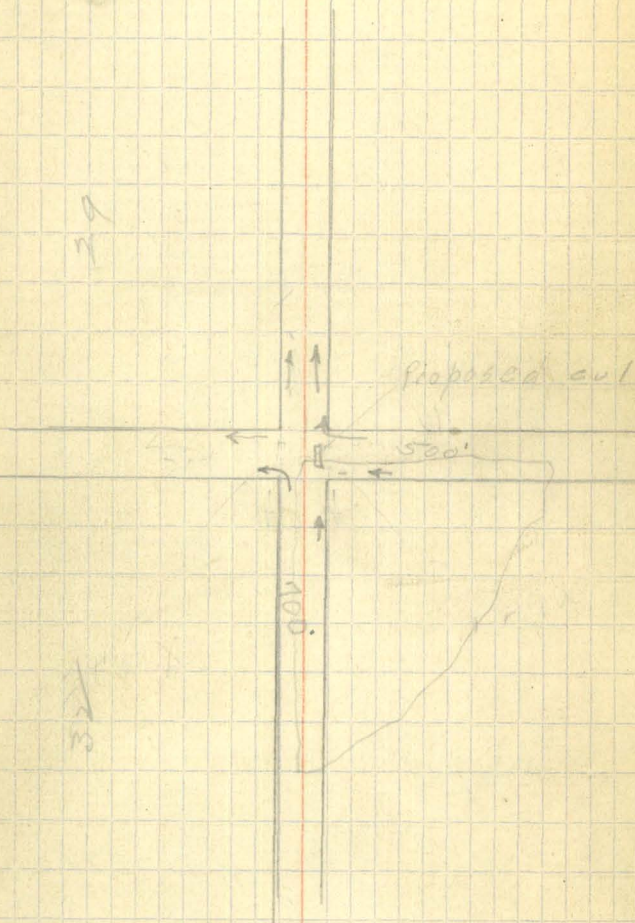
2x2x32

Plan C-22

5th Wings on skew

Profile

D.A. = 4 Acres



S of N end 29-30 Eagle
Old 3x3 Wood → E
Build conc.

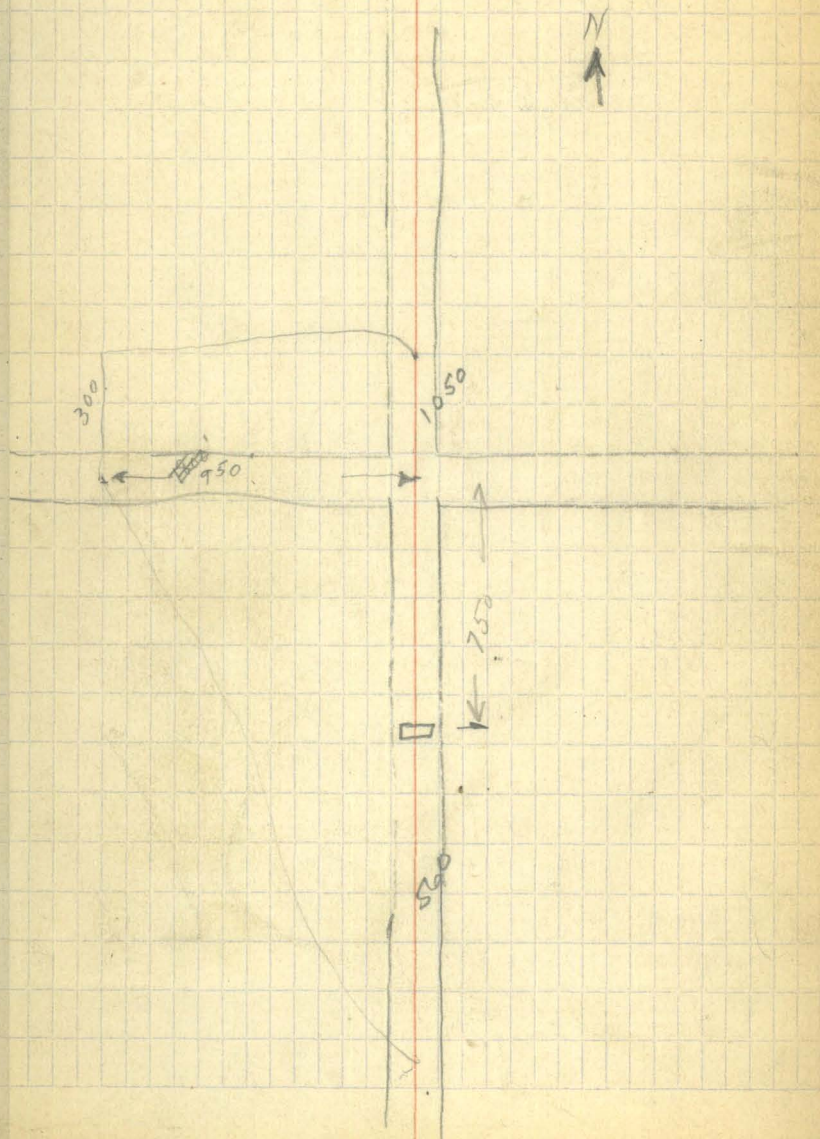
2x2x22

Plan C-2

Profile

S of X

D.A. = 21 A.



Across intersection Wend

4-9 Orange → N

Build 2x2 at intersection or
just E

None in

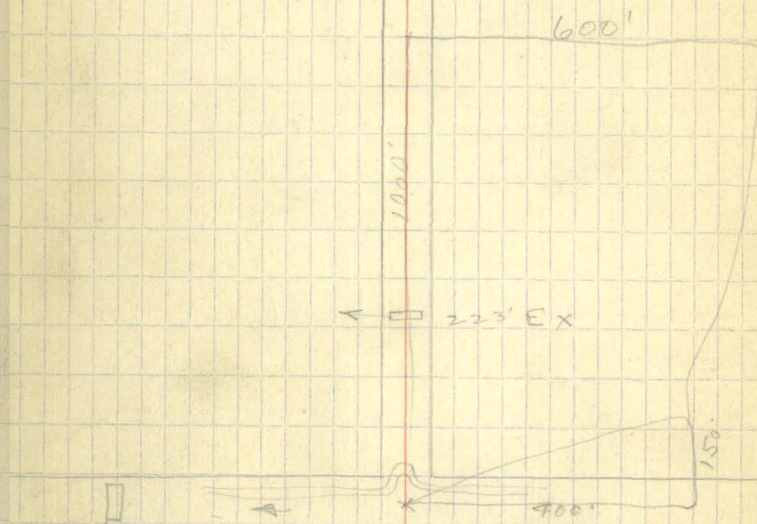
$$\frac{P33/B2}{B+C21}$$

2x2x32

Plan C-22



D.A. = 13A.



14

~~at Cony gravel pit~~

$$\frac{P.13 - B.2}{B + C.21}$$

~~Orange sup.~~S of Center 19-20 Lincoln
→ W Old tin

Build Conc.

2 x 2 x 22

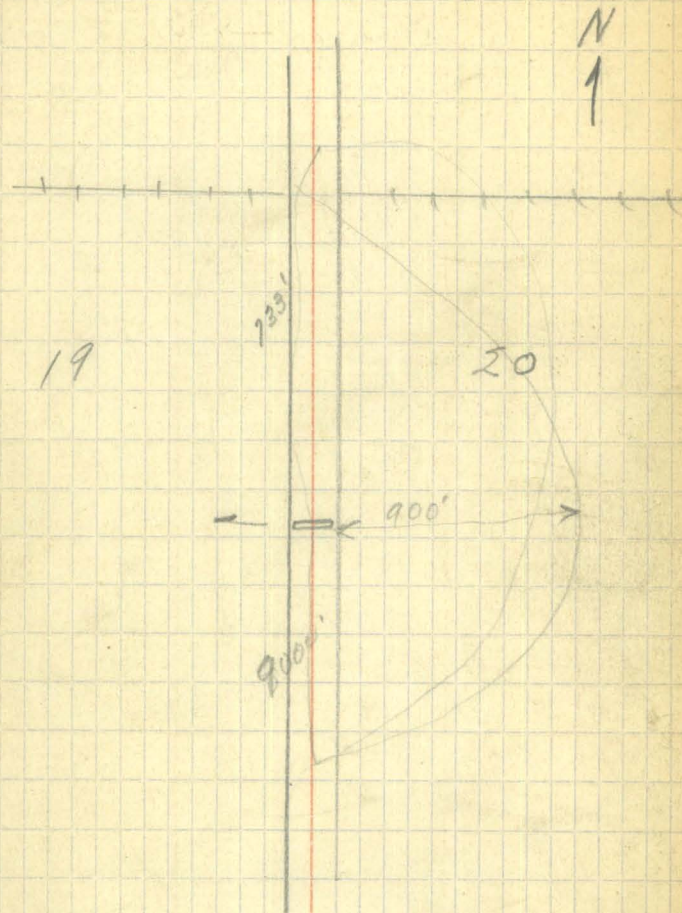
Plan C-1

Profile

D.A. = 20 A.

531 S of $\frac{1}{2}$ Line

014



15

P. 12. B. 1.
B. 1. C. 2. 1

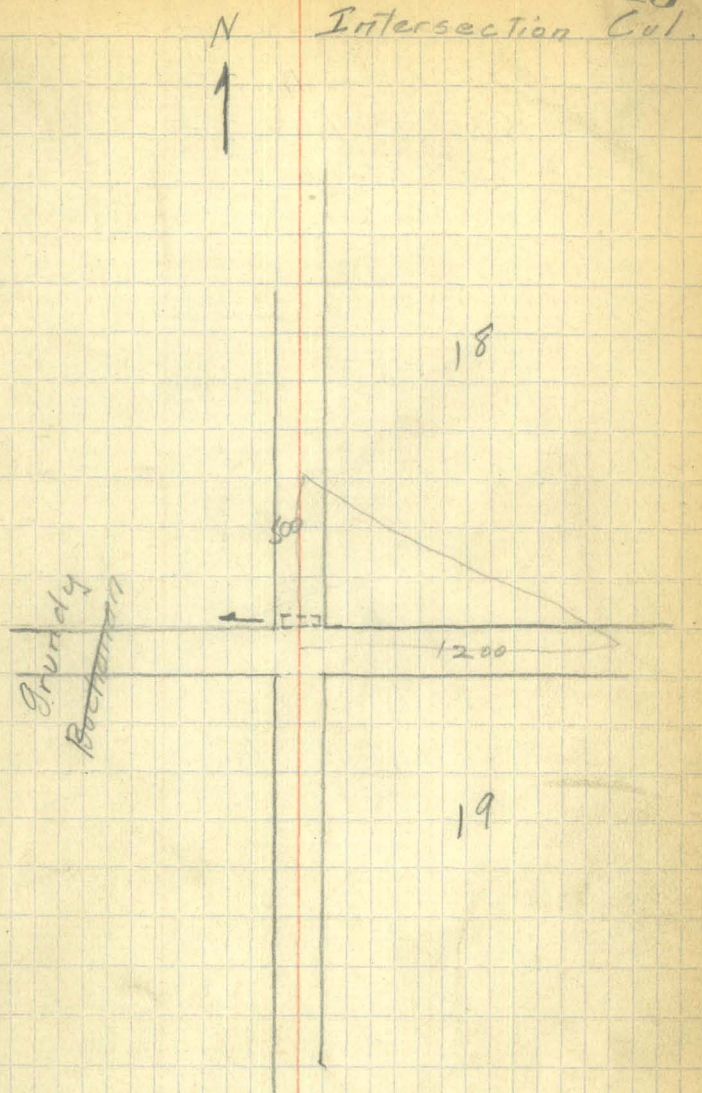
~~and 18~~ SW cor 18 Lincoln
 Across top line Rd.
 None in
 Build cone $\rightarrow$ W

2' x 2' - 32'
 Plan C-22

D. A. = 7 A.

015

Intersection Cul.



E side of intersection

10 & 15 BH

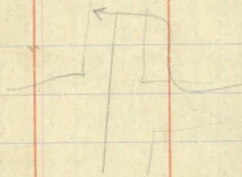
Build 15 x 30 Tin →

Pair Corr in

P. 10. B. 2
B+C2

E of W end 11 + 14 B H
 → N off line
 Build 2x2x22

Plan C-1

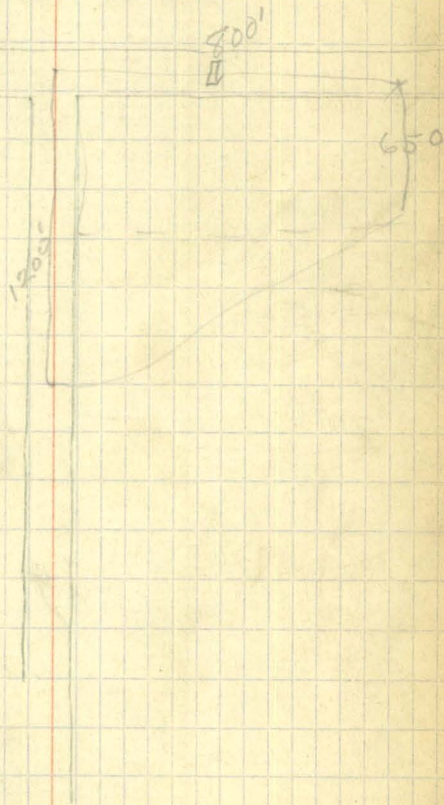


D.A. = 18 Acres

017

N
↑

346' E of T



P. 9-B. 2
B. 21

E of center 11414 BH

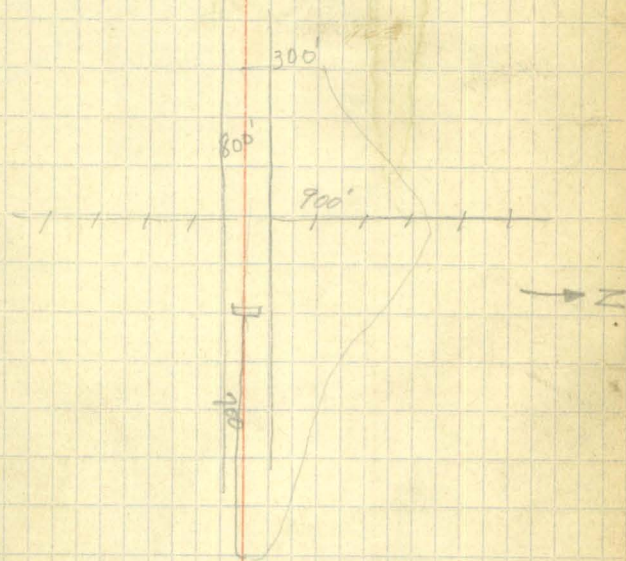
→ S Old V.T.

Build 2x2x22

Plan C-1

D.A. = 21 Acres 018

111' E of 1/2 Line



~~E side of intersection at W of~~
~~church 2-11 BH~~
~~→ N~~

~~Build 15 x 20 tin~~

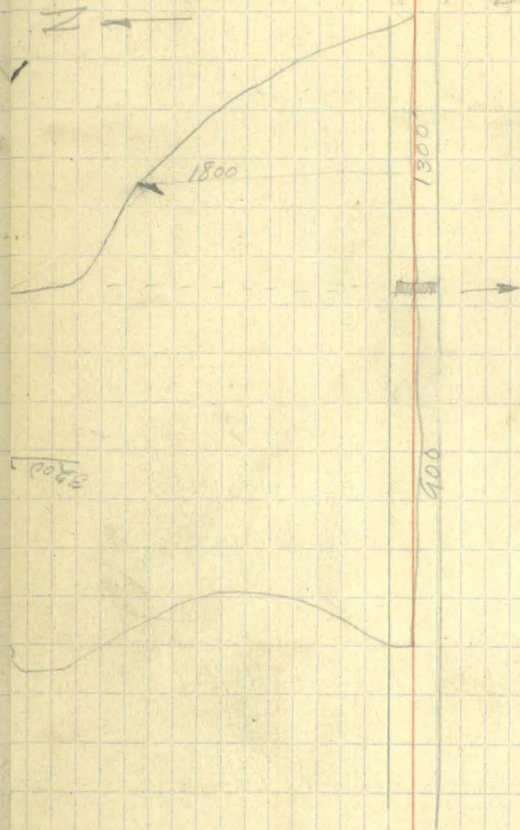
~~Sample~~ Near W $\frac{1}{4}$ cor 2411 BH
 Old core broken $\rightarrow$ S
 Build core

3X3X24

Plan C-4

profile

907. 'E of $\frac{1}{2}$ Mi Line
 " " Divide



3 plank

1 piling N side

9 joint $3 \times 12 \times 20$

12 back plank

2-2x8-20

2-2x6-20

2-2x4-20

2-4x4-16

2-8x10x16

4 piling 3 wings

10-3x12x16

15"x20 cov. Between 31 & 32 Waterloo

8 plank & bolt on N rail

Middle bridge Truplane BH

1 2x4x16 3 rail 2nd br.

2 3x12x16 joint W span

4 ~~2~~-20 piling

6 back plank W end

1 2x4x16

1 2x6x16 rail W span

4 back plank E end

20 plank here

E side Sec 1 Luster → W

Old Wood

Bldg Conc if Buchanan Co agrees

↑

Built by Buchanan Co 1920

N+S road NE $\frac{1}{4}$ Sec 22 Section
new floor & 1/16' piling

1 piling & caps

Center 33-34 Beam
Old 18" V.P. → E

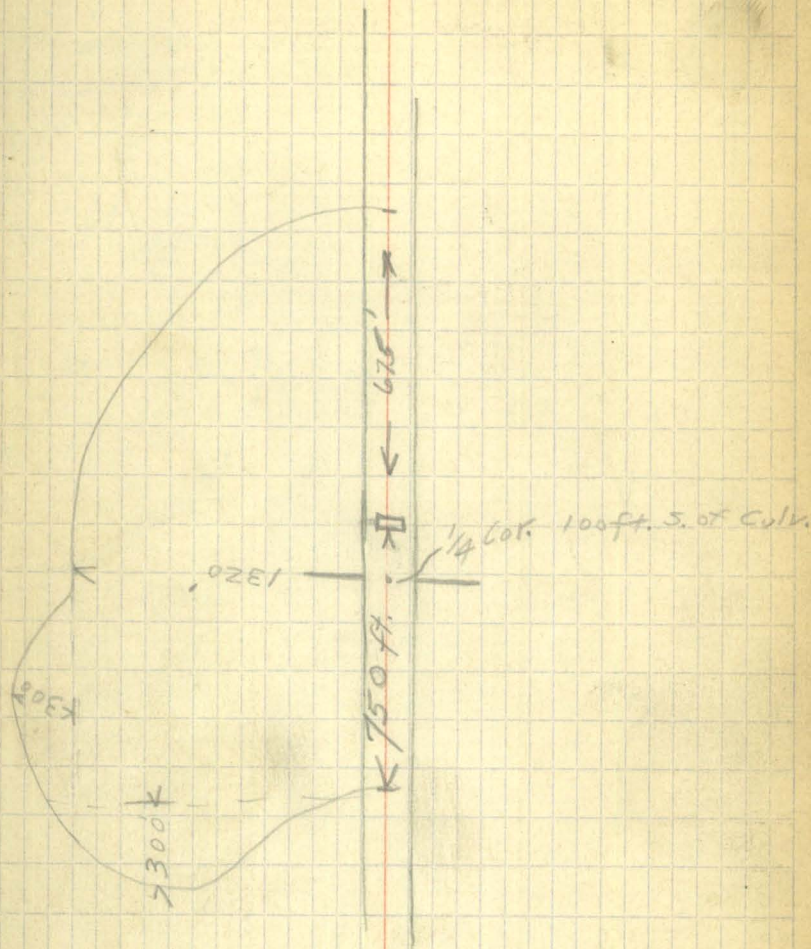
Build Conc.

1st Cul 5 of Wm. Widdell house,
100 ft. N. of $\frac{1}{4}$ Corner

D.A. = 48 A.

2x2x22 $\frac{759.82}{13+621}$

Plan C-1



Profile

5 line 34 beam

6 BP - E side

1-16' pile E side

6-8' pile NW wing

1-16' pile NW wing

N of S end 15416 Mt. V.

Qd 12' wood →

Build I

This should be Mt. V. Sec. 21 & 22

See Prel. June 1920, p. 6.

D.A. = 1450A Approx.

777

Repaired fall 1920

CP47 this Book1st bridge E of G Home
Build I

N of Center Sec 12 Spr. Creek
→ W

Old 12" rim

(Owns land on both sides road)

↓
Mr Border wants to have

this large enough for
runway for Hogs 3x3 will

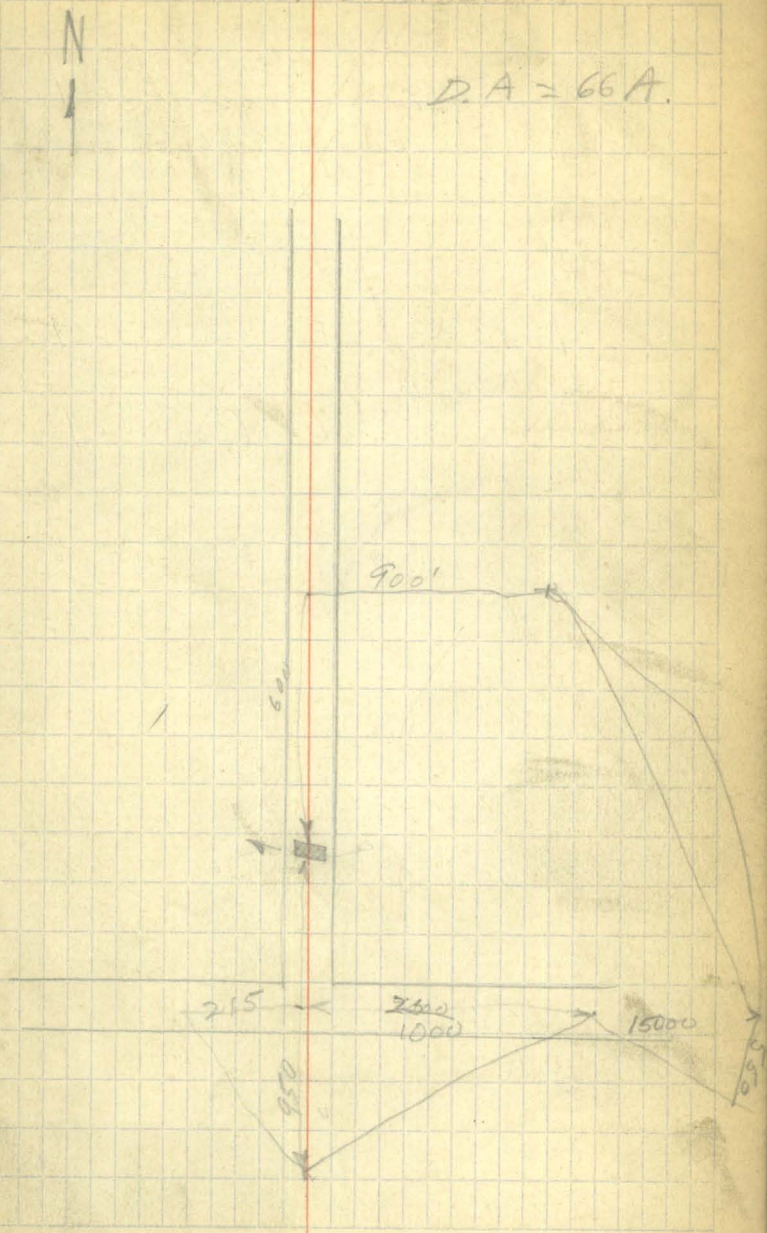
be large enough

3x3x22

Plan C-3

495 to Intersection

D.A = 66 A.



4-16' piling of cap
at long wood bridge E end on
N side of Sec 2
Spring Creek.

1-15" x 20 Tin in second
hollow N of E $\frac{1}{4}$ cor Sec 25.
Spring Creek. (Co Line)

2nd Cul E of W end
N side 21 Big Creek
→ S Co. Rd.

Old conc. broken with plank top.
Build Conc.

2x2x26

Plan C-1

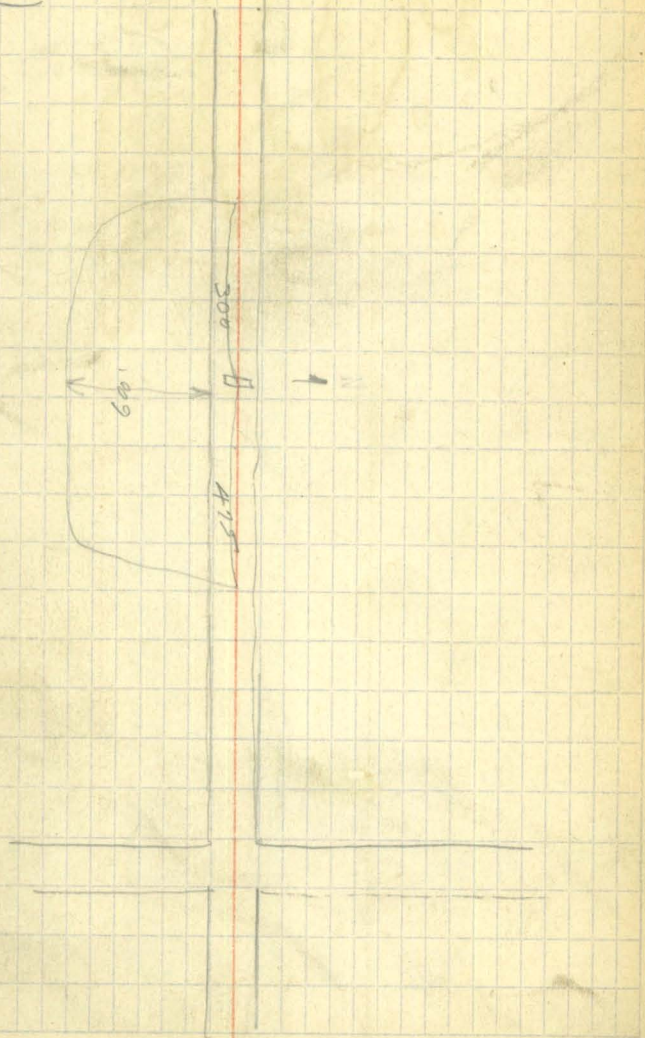
Profile

P19-B.2
B+C.21

473' E of Cul

D.A. = 10 A.

← Z



2 of Went 11-14 Fox

old conc.

Build upon on Kend

Sun 19-20 Barclay

2 wood

New pile bent in center of N one.

New deck on S one.

Went 9-16 Fox

Old inc cone → N

Build new

2X 2X32

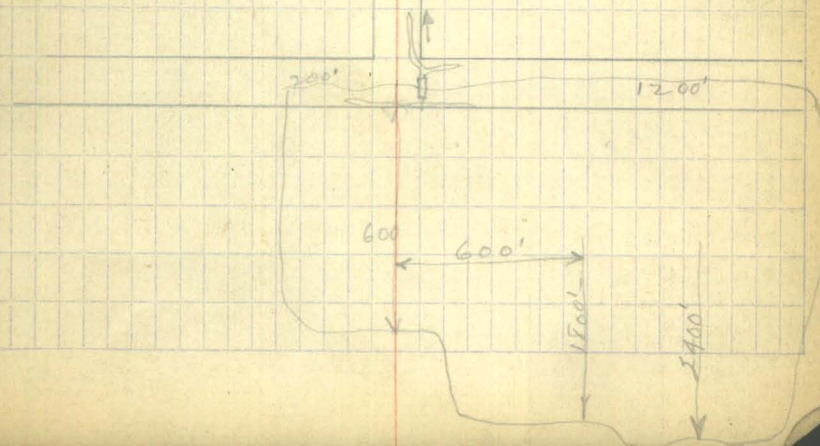
P35 B1
B4C21

Plan C-22

Profile

D. A. = 47 Acres

N
↑



E side of 25 Barclay
at N end of mile
Old Cone.

New floor and curtain wall needed.

P. 15.22
10+2180' Truss at School S. of Gilbertville.
New abutts needed.

D.A. = 14,000 ft

F.L. South



School

or Pond

353.6

218.2

36

P. 17-B. 2
73 + C 21

N line of 6 Spring Creek.
Over hill ^E from 3x3
old 18" tin → S
Build Conc.

3x2 x 22

Plan C-31

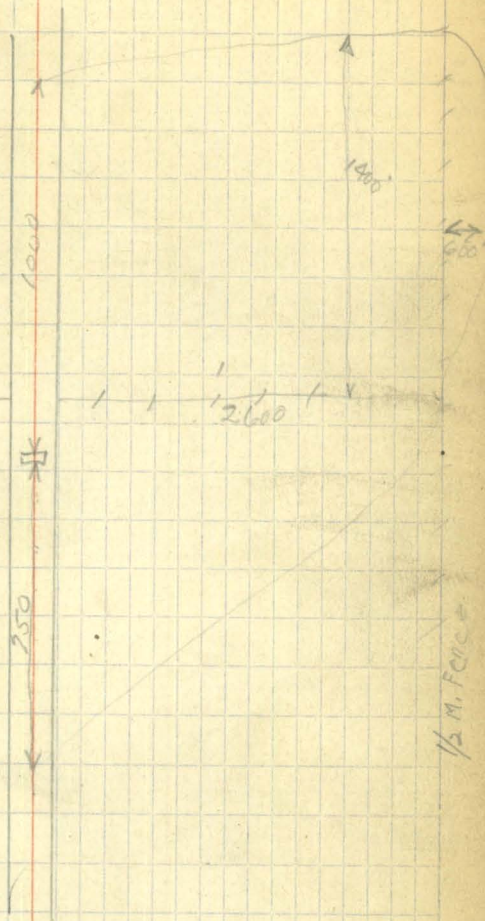
74' E 1/2 Line

036

D.A. = 100 A.

→ N

1/2 Mi. Fence



New bent W end on Millers Creek
at E end 33 & 4 Cedar

→ S

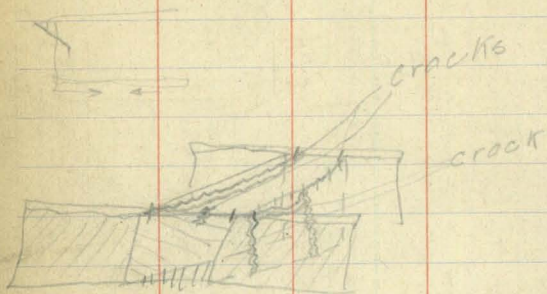
Some new joint.

1st Cabaret W of Hillback

Build cone floor. 3x5

→ S

N side of Cedar

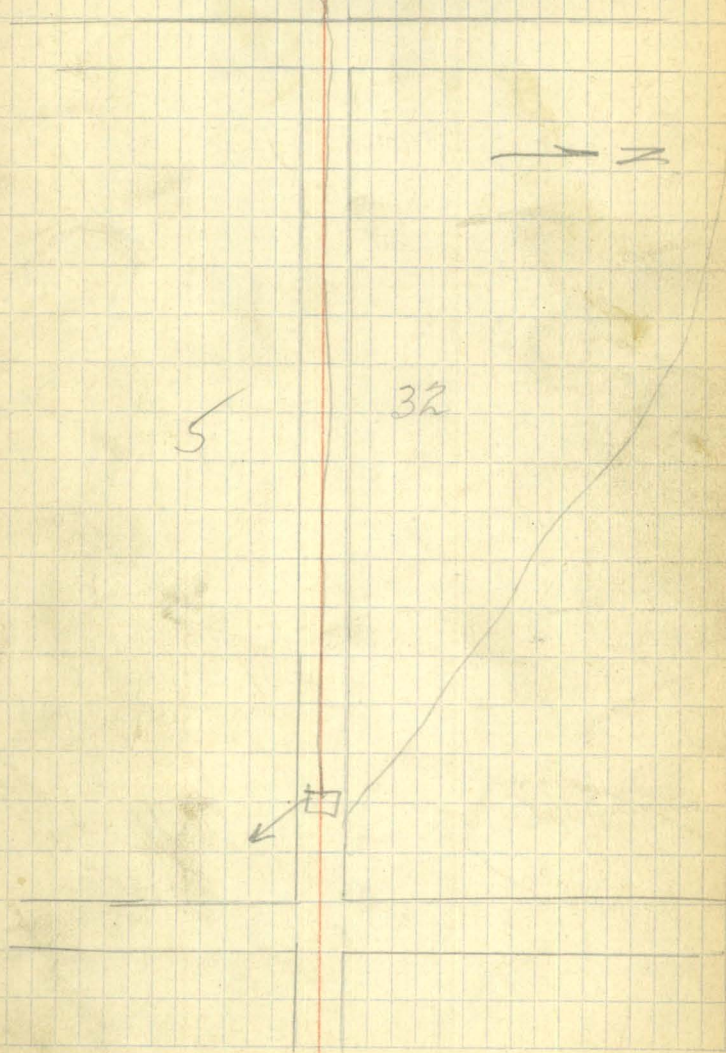


P. 4-13.2
B. 6.21

Showing cracks in present
structure

D.A. shown on Cedar Twp. Map

D.A. 600 ft



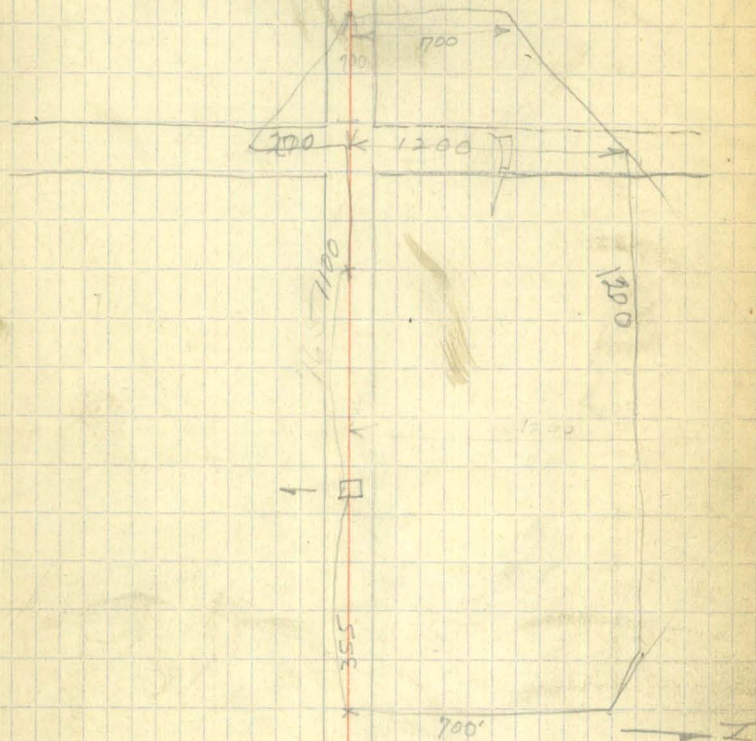
~~Newton Bridges Cedar Gap.~~

On Edw. C. Rd. Big Creek & Cedar
1st Cut E of W. end
16 Cedar and 21 Big Creek
Build Cove → S

2x2x26

Plan C-1

D.A. = 49A.



Between Sec. 9-10 E. Waterloo
1140 feet South of N.W. Cor.
Sec. 10 E.

D.A. = 28 A.

Old 15" Clay Pipe 23' long

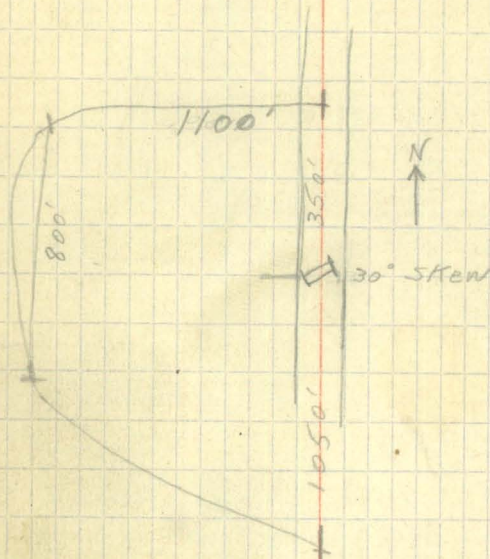
P. 5 - B. 2
B. 0.2 h

80' 10" 2' x 2' x 22"

Area 30'

Plan C-1

Profile

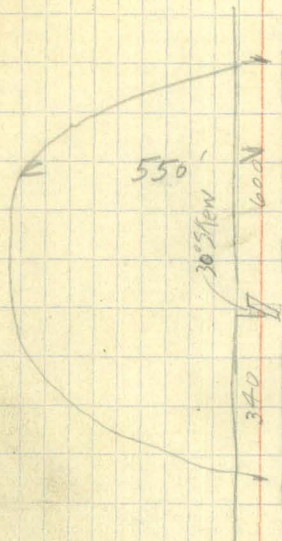


Between Sec. 9-10 E. Waterloo
 452 ft. South of N-W Cor. Sec. 10.
 Old Culv. 8" Cla. Pipe

D. A. = 10 A.



Plan. C-2



Profile

Between Sect-6 East Waterloo
 12" G. I. Culvert 20' Pipe
 1170 ft. South of N-W. Cor. Sec. 6
 2 x 2 x 22

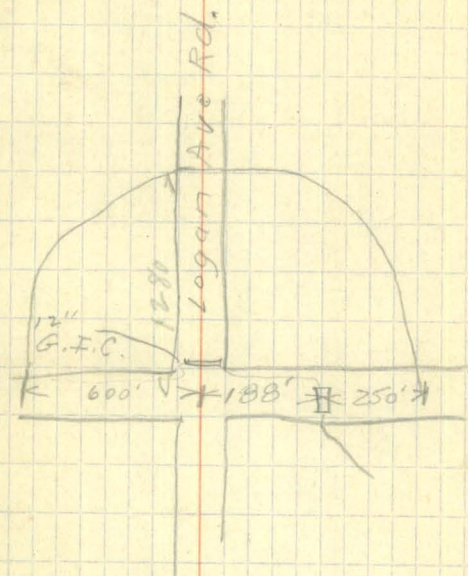
Plan C-1



188 ft. E. of N.W. Cor. Sec. 1
 East Waterloo Twp.
 12" G.I. Culvert 18' Long
 2 x 2 x 22

plan C-1

D.A. = 24 A.

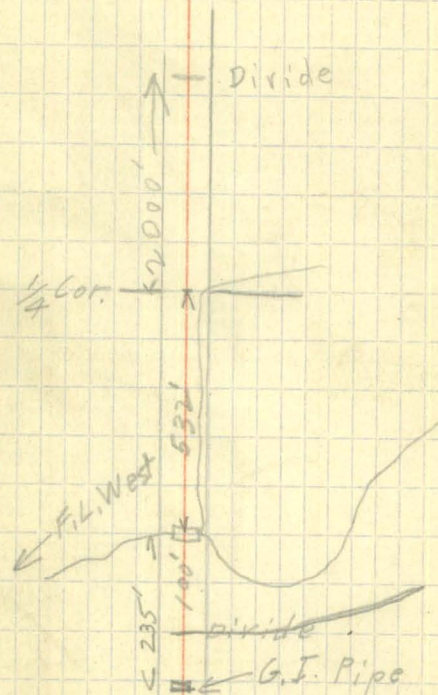


532' S. of $\frac{1}{4}$ Corner between
Sec. 2-3 East Waterloo
24" Sewer Pipe 19' Long

3x3x22'

Plan C-3

D.A. = 160 A.



47

Mt. Vernon Twp.

Old Wood 32' Bridge Between Sec. 27-34
 973 ft. ~~East~~^{West} of S.E. Cor.
 of Sec. 27.

Just East of Co. Farm



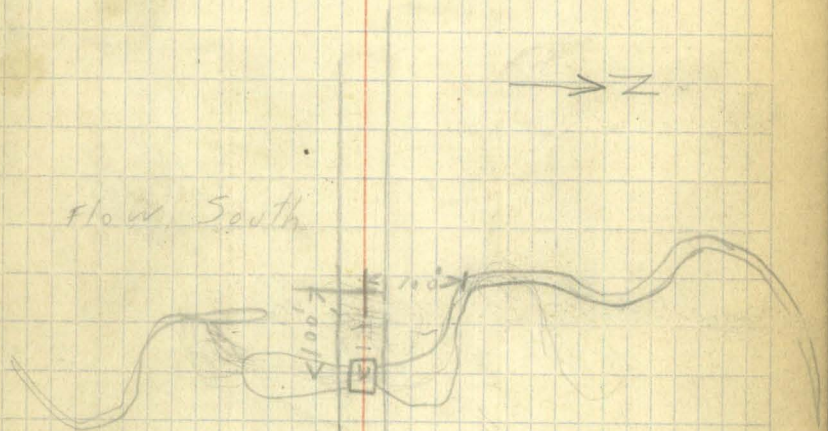
P. 27 B. 21
 B. 21 C. 21

Note - Consider location of ^{new} Br
 approx - 38 ft. West of west end of
 old bridge.

New Br. Loc. 38 ft. West of West
 end old bridge.

D. A. = 2600 A.

047



Old Conc. Box North Line
Sec. 2 E. Waterloo Twp.

1540 ft. West of E Logan Ave. Rd
Old 5x3x16 without floor, - built in 1912.
Construct

3' x 2' x 2'

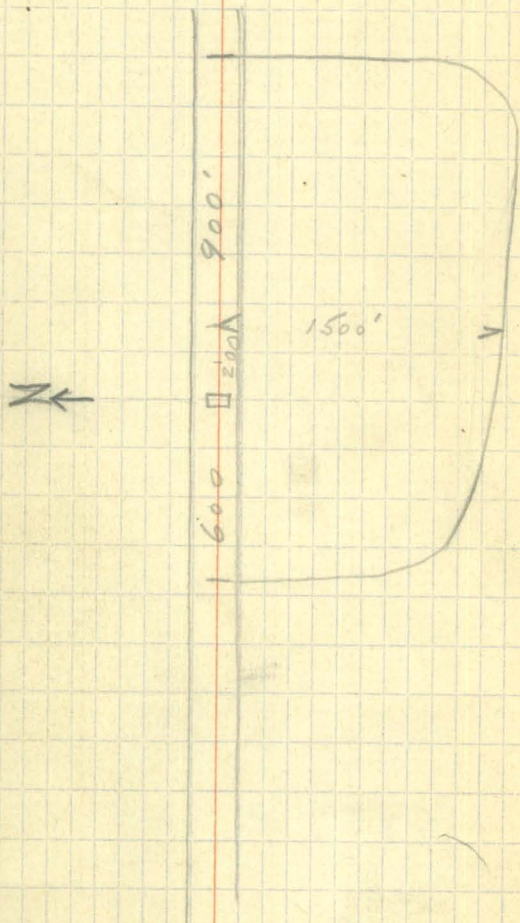
Plan C-31

P28 B2
R4021

Channel on North should be
cleaned out.

D.A. = 50A

048



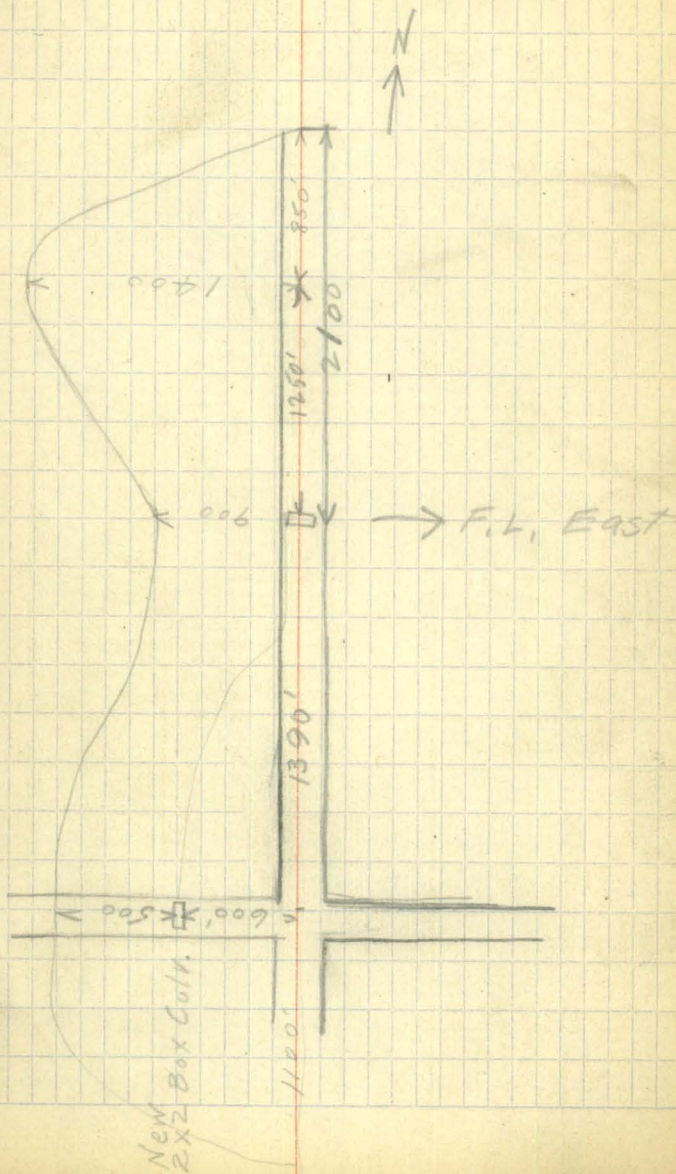
T89N, R 12W.

$$3 \times 3 \times 22$$

Plan C-3

~~P30 B2~~
~~Bd 221~~

D.A. = 98 Acres



Meas. of opening in Hand Rail
on 60x20 Pony. Sect 9x10
E. Waterloo.

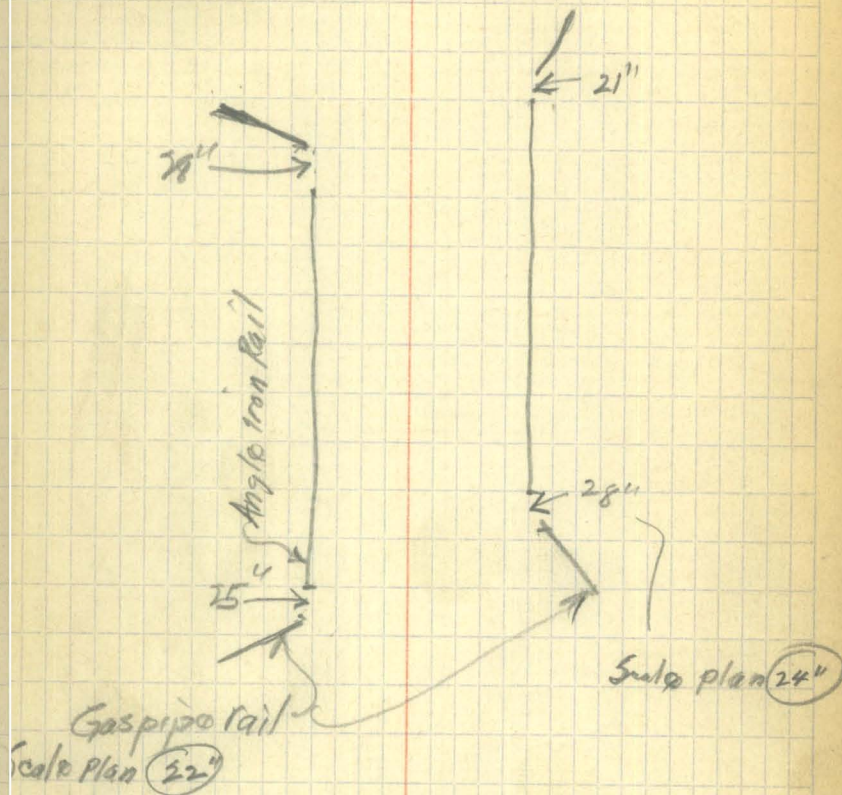
3/2/24

W.D.N. &

for Shirley.

N.

A

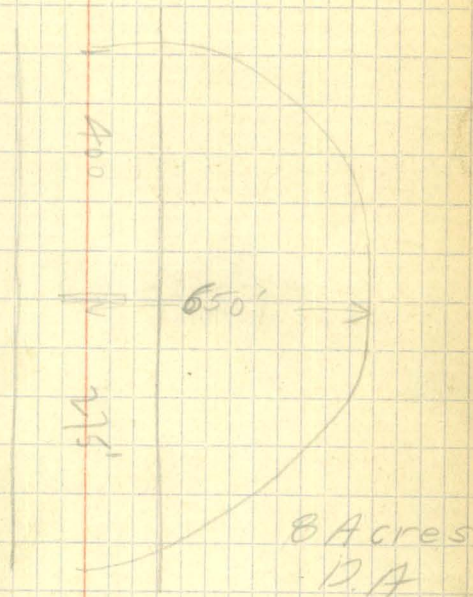


Middle Sec. 25 Cedar Falls
 Old home in place
 Build $2 \times 2 \times 30$ Wings 75°
 Water standing on East side

$2 \times 2 \times 30$

Plan C-2

W,



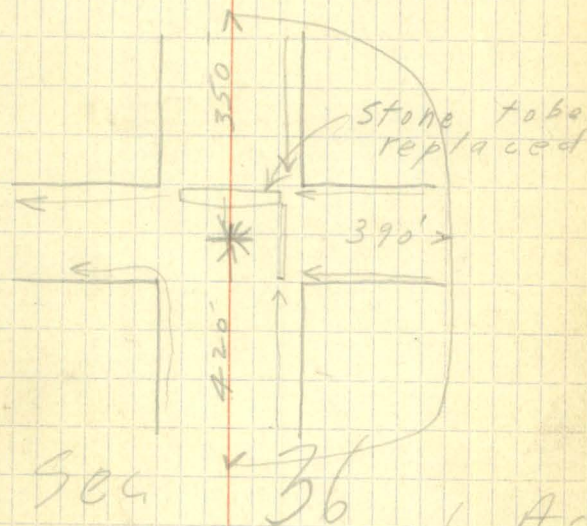
On South end Sec. 25 Cedar Falls
Road run North
Build $2 \times 2 \times 32$

Plan C. 22

July 5, 1924

Spencer
Lyons

Sec. 25

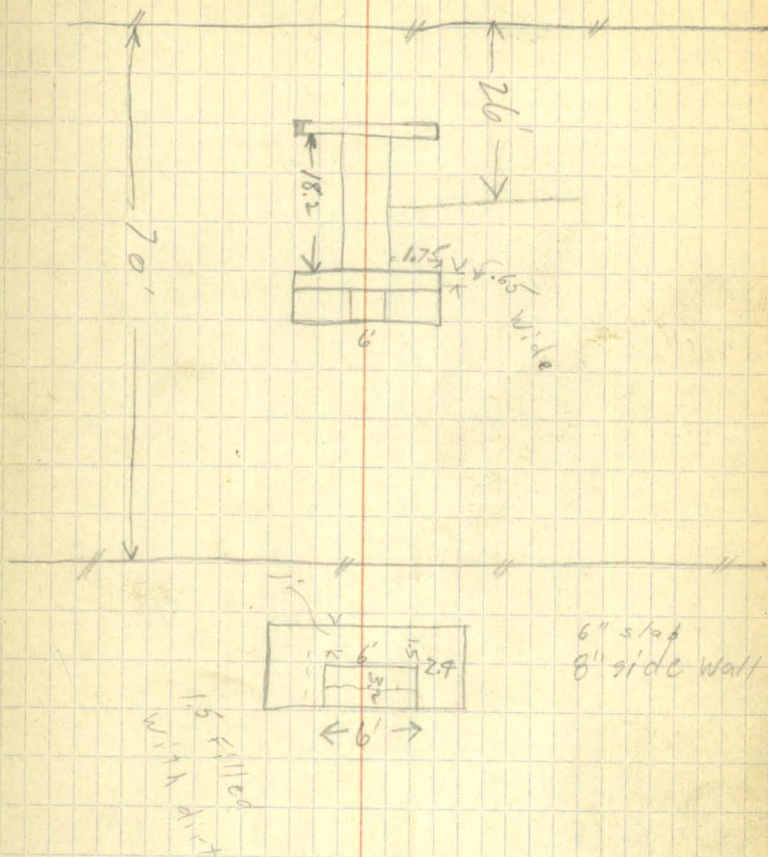


6 Acres
D.A.

Old 6x3 Conc.

Just East of Center

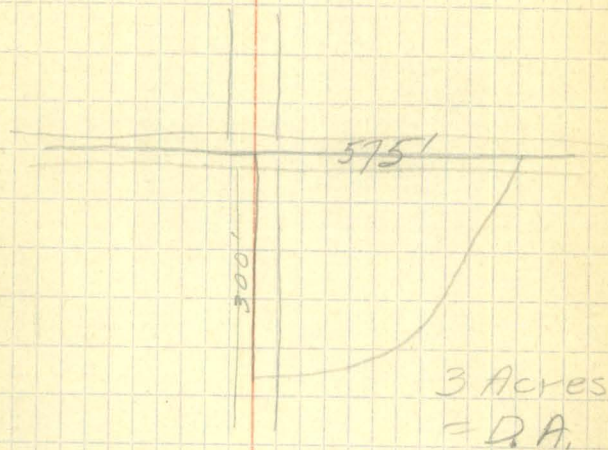
Eagle 18-19 053



North end Black Hawk 36
 Orange 31
 12" sheet iron

Build 2 x 2 x 32

See Book 34
 Page 45



Cedar Falls Sec 16-21
 approx. $\frac{1}{2}$ mile W. of S.E. cor.
 of 16 Cedar Falls Twp.
 new loc. just East of
 old stone culv.

D.A. = 750 acres

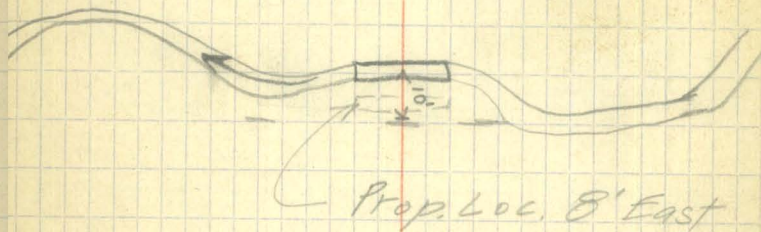
8x5x26 Parallel wings

43 cu. yds.
 2680 # steel

See Book 34

Page 47

055



Adar Falls. Twp.

Sec. 16-21

See Book 34

Page 46

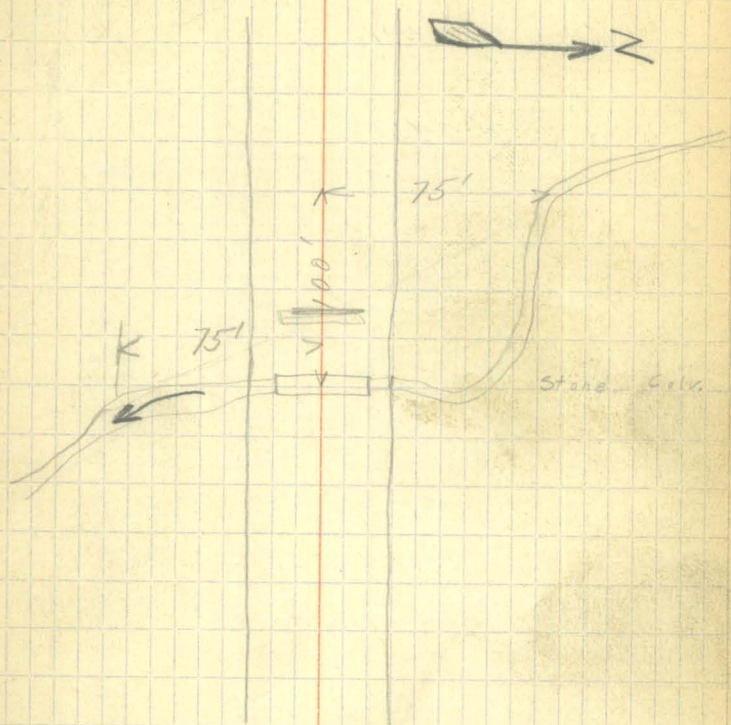
056

approx 1/2 mile West of S.E.
 cor. of Sec. 16, consider
 new location just west
 of old stone cul.
 D.A. = 260 A,

~~773~~ -

6x4x26 Parallel Wings

29.1 Cu. yds.
 1773 # steel



Cedar Falls 30-31
 $\frac{1}{3}$ mi. W. of School House

Broken down stone slab.

Flow North

Build 3x3x22 Parallel wings

Plan C-3

Conc. 15.4

792# Steel

Rein.

20'x16' - Wood Pole Br. 15 Joists - 8 pili.

Orange Twp. 33-34

Build 18'-20' - I-Beam

same location

B.M. 3.13 165.23 162.10

1.13 160.68 5.68 159.55

B.M. 773 157.62 10.79 149.89

D.A. = 1200 AC.

Tail in W. Headwall Culv.

Tail in Red Post on West side opp. N. Abot.

West

East

-300

-200

-100

-15

+15

+100

+200

+300

N-W

148.5

9.1

147.8

9.8

147.9

10.5

147.4

8.3

149.3

4.8

150.2

7.4

152.8

4.8

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

148.6

9.0

146.3

11.3

145.6

12.0

145.0

12.6

149.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.5

9.1

147.8

9.8

147.9

10.5

147.4

8.3

149.3

4.8

150.2

7.4

152.8

4.8

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

148.6

9.0

146.3

11.3

145.6

12.0

145.0

12.6

149.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.5

9.1

147.8

9.8

147.9

10.5

147.4

8.3

149.3

4.8

150.2

7.4

152.8

4.8

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

148.6

9.0

146.3

11.3

145.6

12.0

145.0

12.6

149.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.5

9.1

147.8

9.8

147.9

10.5

147.4

8.3

149.3

4.8

150.2

7.4

152.8

4.8

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

148.6

9.0

146.3

11.3

145.6

12.0

145.0

12.6

149.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.5

9.1

147.8

9.8

147.9

10.5

147.4

8.3

149.3

4.8

150.2

7.4

152.8

4.8

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

148.6

9.0

146.3

11.3

145.6

12.0

145.0

12.6

149.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.5

9.1

147.8

9.8

147.9

10.5

147.4

8.3

149.3

4.8

150.2

7.4

152.8

4.8

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

148.6

9.0

146.3

11.3

145.6

12.0

145.0

12.6

149.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.3

8.3

148.5

9.1

147.8

9.8

147.9

10.5

147.4

8.3

149.3

4.8

150.2

7.4

152.8

4.8

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

153.2

4.4

Sec. 26-35, Black Hawk 300' E. of Center

D.A. = 8 Acres Rolling

B.M. 3.35 103.35 100.00

Nail ~~into~~ in Trans pole N. side, 22' W. of C. of

S. side

N. side

250' W

$$\begin{array}{r} 102.35 \\ 10 \end{array}$$

200' W

$$\begin{array}{r} 101.45 \\ 1.9 \end{array}$$

100' W

$$\begin{array}{r} 100.05 \\ 3.3 \end{array}$$

$$\begin{array}{r} 97.55 \\ 5.8 \text{ ditch} \end{array}$$

$$\begin{array}{r} 91.35 \quad 98.85 \quad 96.25 \quad 96.35 \\ 120.95 \quad 7.1 \quad 7.0 \\ 200.100 \quad 24 \quad 14 \end{array}$$

$$\begin{array}{r} 97.85 \\ 5.5 \\ 10 \end{array}$$

$$\begin{array}{r} 98.75 \\ 4.6 \\ 10 \end{array}$$

$$\begin{array}{r} 98.25 \\ 5.1 \\ 10 \end{array}$$

$$\begin{array}{r} 98.15 \\ 5.2 \\ 14 \end{array}$$

$$\begin{array}{r} 96.45 \\ 6.9 \\ 17 \end{array}$$

$$\begin{array}{r} 97.35 \\ 6.3 \\ 21 \end{array}$$

$$\begin{array}{r} 98.15 \\ 5.2 \\ 24 \end{array}$$

100' E

$$\begin{array}{r} 98.15 \\ 5.2 \end{array}$$

$$\begin{array}{r} 96.45 \\ 6.9 \\ 17 \end{array}$$

pitch

200' E

$$\begin{array}{r} 98.85 \\ 4.5 \end{array}$$

300' E

$$\begin{array}{r} 98.95 \\ 4.4 \end{array}$$

400' E

$$\begin{array}{r} 95.95 \\ 7.4 \end{array}$$
F.L.
96.05F.L.
96.45

Const. 2x2x26

str. Head walls

Plan. C20

Mar. 9, 1922

Sec 5 Lincoln Twp.

 $2\frac{1}{2}' \times 2' \times 16\frac{2}{3}'$

D.A. from Drain #12 Map = 84.00

B.M.	3.98	103.98	100.00
300' W		5.4	<u>N. side</u>

200' W		5.4
--------	--	-----

100' W	South	
	sq side	4.7
	FL	9.08

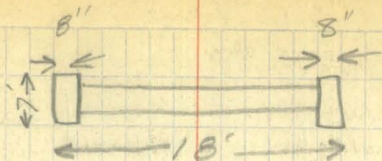
6.0	7.5	8.0	4.8	4.9	5.3	8.5	8.0
24	19	9	8.5		8.5	9	30

100' E		4.4
--------	--	-----

200' E		3.1
--------	--	-----

300' E		1.4
--------	--	-----

Ext. each end 5'



tail in tel pole S. side of Rd.

Aprox. $\frac{1}{4}$ mi. East of West end
Sec. 26-35 Lincoln
9'-16' Piling Br. 12 Joists

Good-Condition

D.A. = 90 AC. Rolling

£ of New Br. to be on £ of Old Br.

B.M. 5.5 105.5 100.00 Tail in Trans. pole N. of Br.

300' W $\frac{105.8}{-0.3}$

200' W $\frac{103.4}{2.1}$

100' W $\frac{102.0}{3.5}$

£ Br.	$\frac{14.6}{300}$	$\frac{12.5}{200}$	$\frac{11.6}{100}$	$\frac{10.6}{8}$	$\frac{9.6}{8}$	$\frac{8.6}{8}$	$\frac{7.6}{8}$	$\frac{6.6}{8}$	$\frac{5.6}{8}$	$\frac{4.6}{8}$	$\frac{3.6}{8}$	$\frac{2.6}{8}$	$\frac{1.6}{8}$	$\frac{0.6}{8}$

100' E $\frac{101.8}{3.7}$

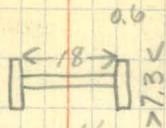
200' E $\frac{101.9}{0.6}$

Build 6x4x22

Plan C-62
Conc 25.4 C.Y.
R. Steel = 13/9#

D.A. = 33 Ac. Rolling

West Headwall


$$\begin{array}{r} 100.1 \\ 3.3 \end{array}$$
$$\begin{array}{r} 98.6 \\ \hline 4.8 \end{array}$$
$$\begin{array}{r} 98.1 \\ \hline 5.3 \end{array}$$

$$\begin{array}{r} 98.9 \quad 97.8 \quad 95.9 \\ \hline 4.5 \quad 5.6 \quad 7.5 \\ \hline 200 \quad 100 \quad 9 \end{array}$$

$$\begin{array}{r} 99.7 \quad 98.8 \\ \hline 3.7 \quad 4.6 \\ \hline 8.5 \quad 8 \end{array}$$

$$\begin{array}{r} 98.5 \\ \hline 4.9 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 98.4 \\ \hline 5.0 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 100.0 \\ \hline 3.4 \quad 7.5 \\ \hline 9 \quad 9.5 \end{array}$$

$$\begin{array}{r} 95.9 \\ \hline 94.9 \quad 93.7 \\ \hline 8.5 \quad 9.3 \\ \hline 100 \quad 20 \quad 300 \end{array}$$

$$\frac{100.1}{3.3}$$
$$\begin{array}{r} 101.4 \\ \hline 20 \end{array}$$
$$\begin{array}{r} 103.6 \\ - 0.2 \\ \hline \end{array}$$

Extend East end 8'

Item 26
Aug. 1922

Orange 28-33 063
Build ~x~x~6

B.M. 7.50 107.5 100.00

175'E 20 105.5

100'E 6.0

100'W. 6.0

200'W 2.7

218'W. 2.6

175' West of Eagle Center Road

Orange 9-16004

Tel. pole North side Pot Road

South

North

5.5

F.L.

F.L.

4.8	6.8	7.5	8.6	8.7	7.1	6.7	6.9	9.3	10.5	11.6	13.3
100	100	23	14	11	9	9	9	10	20	100	200

x2 BOV

No Colv. prop

Void

B.M. 5.08 105.08 100.00 1/1 intel. pole on North side of Highway

Road Profile

1 1/2 %

300' W. of Culv.	1.7	
200' W	3.1	
100' W	4.3	100.8
4	5.8	99.3
100' E.	4.6	100.5
200' E.	3.3	
300' E.	1.4	

100.4	99.8	97.7	97.5	97.5	97.3	98.9	97.4	97.2	96.8	95.9
4.7	5.3	7.4	7.6	5.6	5.8	6.2	7.7	7.9	8.3	9.2
200	100	23	11	10	5.8	9	10	23	100	200

$$\begin{array}{r} 12 \\ 97.4 \end{array}$$

Proposed

$$\begin{array}{r} 12 \\ 97.0 \end{array}$$

Staked 6/29/22

Hoff
Wade
Francis

B.M. 4.72 104.72 100.00

Build 4x3x24

$$\begin{array}{r} 98.84 \\ 5.88 \\ 15 \end{array}$$

$$\begin{array}{r} 98.84 \\ 97.40 \\ 1.44 \\ \text{Cut } 1'-5'' \end{array}$$

97.77

O.K.

$$\begin{array}{r} 6.95 \\ 15 \end{array}$$

Completed

$$\begin{array}{r} 97.77 \\ 97.00 \\ .77 \\ \text{Cut } 10' \end{array}$$

66

Barclay 32
Fox 6

June 29, 1921

 $\frac{1}{2}$ mile from East end.Spencer
Farrell
Michel 066

Nail in

B.M. 4.85 104.85

100.00 Tel. pole east of 12" Cor. pipe, South side of Rd.

X-Sec. 28' West of old culv.

X-Sec. old 12" culv.

South										North			
100.2	99.1	97.6	97.0	98.7	99.3	98.6	96.5	96.5	97.2				
4.7	5.8	7.2	7.9	6.2	5.6	6.2	8.3	8.3	7.7				
200	25	20	14	9	5.6	9	16	19	21				
98.8	97.8	97.5	96.4	96.1	98.7	99.4	98.8	95.4	95.0	95.0	94.6	94.4	94.2
6.1	7.1	7.4	8.5	8.8	6.2	9.4	6.1	9.5	9.9	9.9	10.3	10.3	11.9
23	22	16	14	10	7	5.5	8	10	14	19	26	100	200

F.L.

350'

F.L.

300' West

3.2 101.65

200' "

4.3 100.55

100' "

5.7 99.15

4' Culv.

5.5 99.35

100' East

5.5 99.35

200' "

3.2 101.65

300' "

0.5 104.35

400 104.00

100.00

S. Hub

Cut 10' 10"

.85

7.05

96.95

96.1

N. Hub

Cut 10' 7 1/2"

8.07

95.93

95.3

Z Z

D.A. = 12 AC.

Rolling

Build

2x2x2 1/2'
Parallel Wings.
Plans C 20

Item 7

conc. 10.5 C.Y.

Rein. 585#

Barclay 32
Fox 6

12" Corr. in place
2 rod West of East End

067

B.M.	3.45	103.45	100.00
------	------	--------	--------

Vail in Tel. pole No. 411.

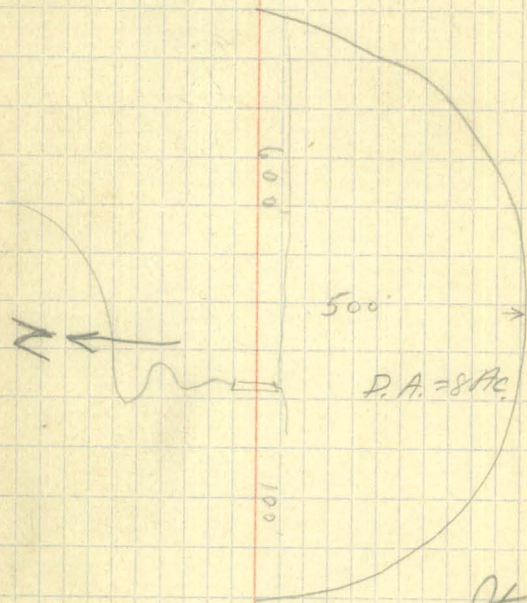
[illegible]

300' West	6.1	97.4
200' West	4.7	98.8
100' West	4.9	98.6
± C.V.	4.8	98.7
100 East	3.8	99.7
200 East	2.0	101.5
300 "	-2.0	105.5

3.04	103.04	100.00
------	--------	--------

S. Hub.	Cut 0'-7"	6.43	96.61	96.0
---------	-----------	------	-------	------

N. Hub.	Cut 0.75"	7.62	95.42	95.0
---------	-----------	------	-------	------



Item 8.

Build $2 \times 2 \times 22$

Parallel Wings

Plan C 20

Conc. 10.0 C.Y.

Rein. 550[#]

B.M. 5.4 105.4 100.00

Center of Conc. Bulk Head 20' N. of Br. West of Rd.
24'

West

$$\begin{array}{r} 99.1 \quad 7.9 \quad 96.9 \quad 96.7 \quad 96.8 \\ 6.3 \quad 7.5 \quad 8.5 \quad 8.5 \quad 8.6 \\ \hline 200.100 \quad 23 \quad 14 \quad 8 \end{array}$$

$$\begin{array}{r} 100.7 \\ 4.7 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 100.6 \\ 4.8 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 100.5 \\ 4.7 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 98.4 \\ 7.0 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 96.7 \quad 96.6 \quad 95.6 \quad 95.5 \\ 8.7 \quad 8.8 \quad 9.8 \quad 9.9 \\ \hline 23 \quad 34 \quad 100 \quad 200 \end{array}$$

96.9 96.4

300' North 1.9 103.5
 200' North 3.2 102.2
 100' North 4.6 100.8
 E. Colv. 4.8 100.6
 100' South 4.3 101.1
 200 " 1.8 103.6
 225' " 0.2 105.2

D.A. = 170 Ac.

5.55 105.55
 W. Hub. 6.43 Cut 0'-5" 8.22 97.33 96.9
 E. Hub. Cut 2.27-2'-3" 6.88 98.67 96.4

Staked 5/11/23,

Item 5

Build 5x4x22

45° Wings

Plan C 51.

Conc. 22.3 C.Y.

Rein. 1470 #

2x2x15 About 150' North of South End. 4x3x14.6 900' North of South End. 069

D.A.

Flat

July 13, 1922

B.M. 4.95 104.95 100.00

high point on Rock at Tel. pole East of 2x2x15

100' South 5.3

4 2x2x 4.8

100' North

200' North

300' North

400' North

500' North

600' North

700' North

7+37 4x3x15 Culv.

100' North 4x3 Culv.

B.M. 3.17 101.78

West 97.75
F.L.
5.4 6.2 7.3 7.2 5.0 4.8 5.1 7.4 6.4 7.2 6.7
120 22 17 8 8 7 8 24 50 130

97.55 East
F.L.
Pitch down
50'

7.3
ditch 5.3 7.3
Pitch

7.2
d. 5.1 7.1
d.

6.4
d. 5.1 6.3
d.

6.7
d. 4.4 6.3
d.

6.5
d. 3.9 5.8
d.

7.0
d. 4.4 6.3
d.

96.95 7.4
F.L. d. 4.0 7.3
d.

5.3 6.2 7.2 8.0 3.1 3.3 3.2 8.2 8.2 7.4 6.8
120 26 21 8 7 8 8 21 26 130

6.6
d. 4.4 6.7
d.

enter East Headwall 4x3 Arch. Culv.
4x3x14.6

Void

Benn-3-4
About 130 Rod North of South End

2x2x16

0.0

B.M. 7.35 107.35 100.00

Nail in Tel. pole East of Culv.

200' South 4.1

100' South 5.8

100' North 6.1

200' North 3.9

300' " -0.5 107.9

East

100'	99.0	100'	98.6	98.6	101.3	101.5	101.8	98.2	98.0	97.8	97.1	96.8
7.0	8.4	7.1	8.1	8.7	6.0	5.8	6.3	9.1	9.3	9.5	10.3	11.6
100	75	28	15	10	9	5.8	7	9	17	30	100	200

98.6

98.2

5/26/23.

2x2x24 130 Rod N. of S. end Benn. 3-4

B.M. 6.39 106.39 100.00

E. Hub Cut 0.29 = 0'-3 1/2" 7.90 98.49 98.2

W. Hub Cut 0.19 = 0'-2 1/2" 7.60 98.79 98.6

4x3x24 900' N. of S. end Benn. 3-4

B.M. 4.01 105.79 101.78

E. Hub Cut 0.34 = 0'-3" 8.75 97.04 97.0

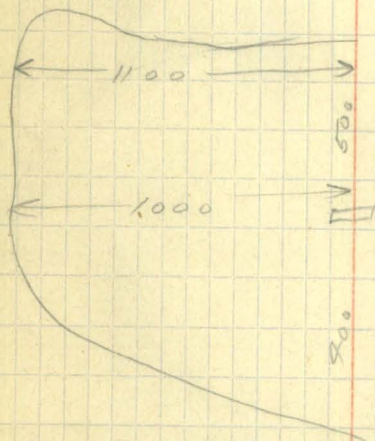
W. Hub Cut 0.37 = 0'-4 1/2" 7.82 97.97 97.6

2x2x24 - 150' N. of S. End Benn. 3-4

B.M. 4.90 104.90 100.00

W. Hub Cut 0.35 = 0'-4" 6.75 98.15 97.80

E. Hub Cut 0.8 = 0'-10" 6.60 98.30 97.5



D.A. = 20 Ac. Rolling

Void

Poyner 2-11, T88 R12
 $\frac{1}{3}$ mi. East

B.M. 3.75 103.75 100.00

Nails in Tel. Pole East of Cul.
 on North Side of Rd.

57.0	81	8.7	8.1	8.4	9.1	57	9.5	8.0	94.2	93.8		
2000	40	35	30	17	9	7	5.2	10	9.5	9.9	25	90
											20	19
											15	12.1
											190	200

F.L. F.L.

071

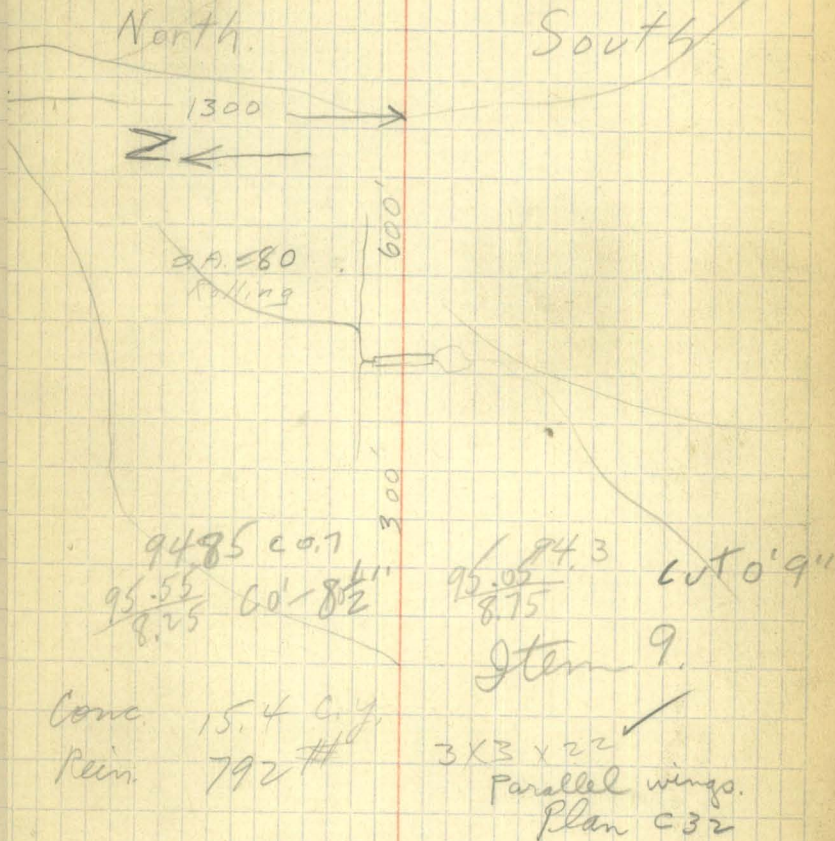
Spencer

Francis

300' East	-0.4	104.15
200' East	2.2	101.55
100' East	3.9	99.85
+	5.2	98.55
100' West	5.4	98.35
200' "	3.8	99.95
250' "	2.5	101.25
300' "	0.8	102.95

3.8 103.8 100.00

staked Oct. 26, 1922
 Spencer



24" Sewer Pipe in place covered
 with Lime Stone Rock.

Water standing in ditch on South side

Poyner Sec. 11-14
T88 R12,

July 20, 1922

1/3 mi. West of East End, 072

B.M. 4.06 104.06 100.00

Nails in Tel. pole South side of Rd.
West of Col.

300' East

200' " 0.6 103.5

100' " 3.0 101.1

4 5.2 98.9

100' West 6.7 97.4

200' " 7.5 96.6

300' " 7.0 97.1

230' West 12" Corr. Pipe Col. 96.7

3.6 103.6 100.00

South

North

96.2
7.4

96.1
7.5

95.7

94.7

Cut 0.5

Cut 1.4

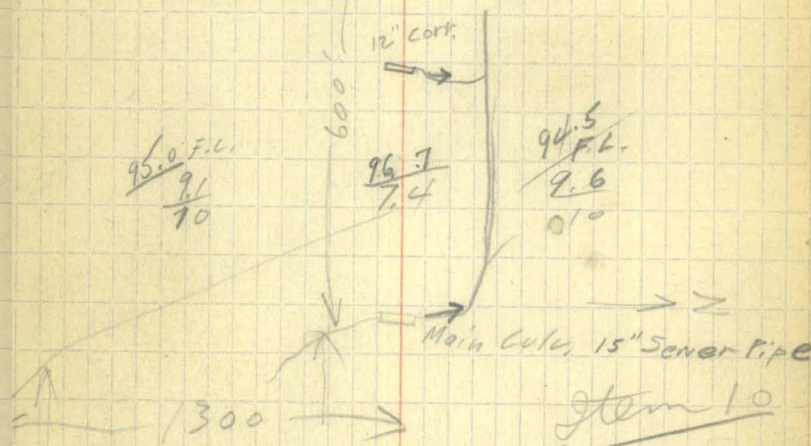
Cut 0'-6"

Cut 1'-5"

staked

Oct. 26, 1922
Spencer

South North 94.4
95.6 96.1 95.7 98.5 98.9 98.6 98.1 F.L.
8.5 8.2 8.4 5.6 5.2 5.5 6.0 9.7 9.6 10.1
24 19 10 9 5.2 8 10 11 17 100
F.L. 10.7
180



D.A. = 45 Ac.
Rolling

3X3 X22

45° Wings,

Plan C33

conc. 13.6 c. y.
steel 760.

15" Sewer Pipe covered

with Lime Stone Rock

Spring on South side of Road
at Fence.

B.M. 5.0 105.00 100.00

Prof: 1c $\frac{1}{2}$ Rd.

300' South 2.3

200' South 2.7

100' South. 4.9 100.1

$\frac{1}{2}$ Culv. Stream $\frac{1}{2}$ 100.1

100' North Rd. 4.2 100.8

" " W. Ditch 6.0

200' " Rd. 2.9 102.1

" " W. Ditch 5.1

300' North Rd. 1.4 103.6

300' " W. Ditch 3.1

400' North Rd. 0.3 104.7

" " W. Ditch 2.3

West

97.3

East

97.0

B.M. 5.22 105.22 100.00

E. Hub $C 1.08 = 1'-01"$ 7.14 98.08 97.0

W. Hub $C 0.90 = 0'-10\frac{1}{2}"$ 7.02 98.20 97.3

ail in Telipole N. of Culv. E. side Rd. Francis

East

100.5	98.7	98.6	97.0	99.5	100.1	99.8	97.0	97.2	98.2	97.7	96.5
4.5	6.3	6.4	6.9	8.0	5.5	4.9	5.2	8.0	7.8	6.8	7.3
200	100	25	19	1	9	8	8	10	13	23	33
							F.L.	97.0	200		
							97.3	97.0	200		



4x2x24 ✓
Item 16

074

Vail in Fence Post West of West end Cul

West

East

5.5	5.9	99.5	98.2	98.7	101.0	101.3	98.5	98.0			
<u>200</u>	<u>100</u>	<u>61</u>	<u>7.4</u>	<u>6.9</u>	<u>4.6</u>	<u>4.3</u>	<u>7.1</u>	<u>7.6</u>	<u>6.5</u>	<u>6.5</u>	<u>6.9</u>
		29	17	9	8	8	9	16	31	100	200
							F.L.				

B, M ₁	5.87	105.87		100.00	
W. Hub	Cut 0.08 = 0'-1"	7.29	98.58	98.5	
E. Hub	Cut 0.26 = 0'-3"	7.41	98.46	98.2	

Very Flat

2000

Tile Overlay

7x2x2v

Item 17

old conc. culv. cracked

1/4 mi. West of East End.

075

July 20, 1922

B.M. 5.1 105.1 100.00

Nail in Tel. pole N. of Culv.

300' East 5.8

200 4.7

100' East 5.1

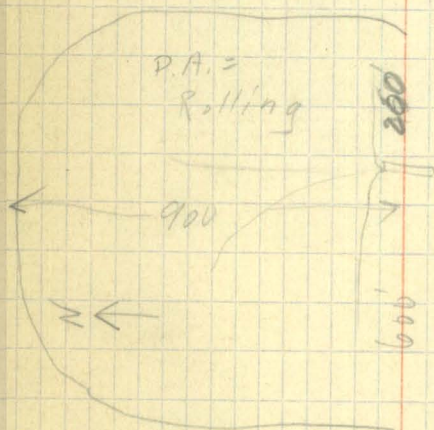
& Culv. & Stream, 5.3

100' West 4.6

200' " 2.4 102.7

300 " 0.1 105.0

North											
98.0	97.5										
100.1	99.3	97.0	100.0	99.8	100.1	97.0	96.9	96.9	95.6		
5.0	5.8	7.1	7.6	8.1	5.1	99.8	100.1	97.0	96.9	95.6	
200	100	25	13	9	7	5.3	5.0	8.1	8.2	8.2	9.5
								8	32	100	200
F.L.											
97.5											
South											
97.0											

Build 2 x 2 ft
22' Rdway.

Parallel

Plan C 20

Conc. 10.0 c. y

Rein 550

Item 18.

76

Mt Vernon 15-16

Middle of Mile

B.M. 6.25 106.25 100.00

B.M. 2.92 103.33

250' South 0.2

200' South 1.8

100' South 3.8

¢ Culv. & Stream 5.0 101.25

100 North 5.0

200 " 5.1

300 " 6.6

4.83 106.08 101.25

106.1 7.7 98.4 98.4

7.1 99.0

98.4

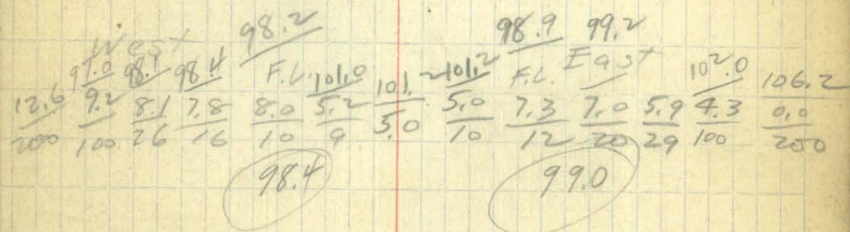
99.0

18" sheet iron
with sewer pipe Ext.Limestone Rock Cover
on Ends.Nail in C.R. post about 100' N. of Culv. W. side
of Road

Top of large Rock W. of Culv.

July 20, 1922

076

Spencer
Francis

Item 19.

Cone. 10.5 c.g.
Rein. 585#

Build

2 x 2 x 24"

Plan 620

See Decker

Parallel Wings.

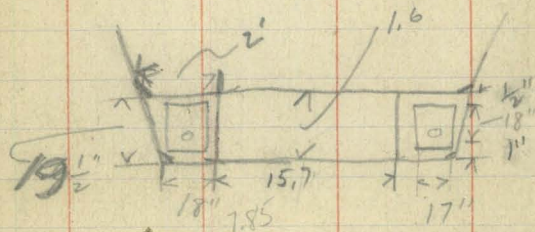
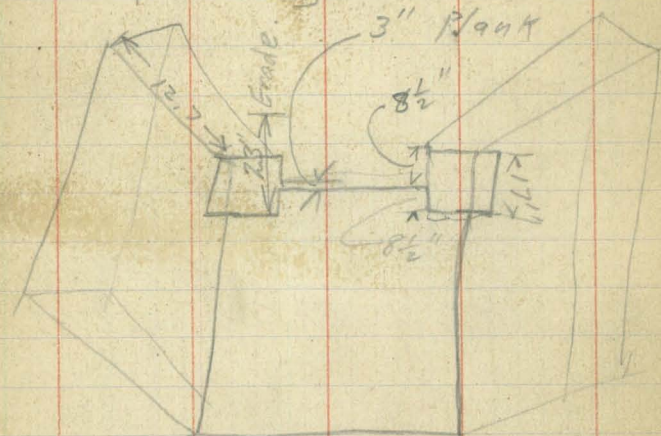
Pony Truss Sec. 10

98.3 ft. F. to F. Abuts.

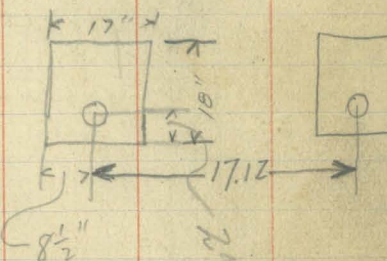
Floor in Poor Condition

100'-00" C. to C. of bearings.

16' Road way.



Bolt in each bearing plate.



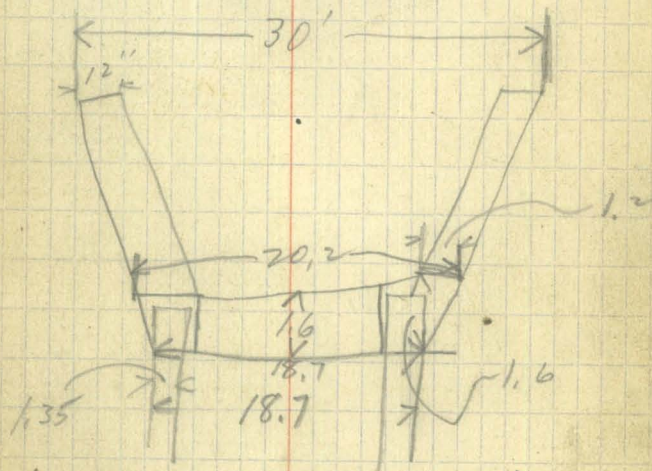
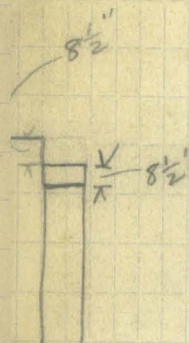
Spr. Creek Twp.

July 29, 1922

077

7'-8" I-Beams

2-8" I.S. on Each Side



124' Wood Pile Bridge
8 spans. - 16' Roadway.

Sec. 19 Spr. Creek
on County Road.

Profile $\pm$ of Roadway.

Prop
Bottom of Footing El. 82.00
Grade 99.60

17'-0" Abut.

100' E. of E end 5.8 94.2

200' W. of W. end Br. 5.6 94.4

100' W. of W. end 6.4 93.6

Top W. end. 3.2 96.8

14' E. of W. end 1.9 98.1

14' W. of E. end 2.0 98.0

Top E. end Br. 3.2 96.8

B. M. 5.51 100.00 194.49

	88.6	88.9
Prop. W. Abut	11.4	86.4
Str. Bed	9	13.6
Prop. E. Abut.	90.1	9
	9.9	9.9
	9	9

Nail in Tel. pole East of Wood piling Br.
South side of Road.

✓ S of Turners Cor. 9-10-15-16
15" S 12"E 10"W

✓ N of Turners 9+10 10" tin Build 15" tin

✓ S of Thomas Barbers Build Cone.
15" VT → E 9+10

✓ N of Thomas Barbers 9+10
1st cul S of school 10" VT → E

✓ N of J O Cole 4-5 → E Build Cone.

See page 72

3.56 103.56 100.00

S. Hub .61 Cul 7" 7.25 96.31 95.7

N. Hub 1.16 Cul 1'-2" 7.70 95.86 94.7

4.73 104.73 100.00

8.42 96.31

8.86 95.87

✓ N of Fowler Farm Old 12" tin 2-26
on W end broken See 18

✓ S of Matt Frost - Old Barron Farm
7+8 Old 15" x 12' tin → W 7+8

✓ E end of 6+7 at School #7 → N
Build Cone.

✓ S of Baish 1+6 N 1/4 1/4 cor. →
Old 10" tin x 16'

✓ Just E of Logan Arc on N Twp line
Old 12" tin → S

✓ W of Logan on N Twp line
Old cone → N

✓ 2 caps needed - Head of C. Rd.

✓ Center of 2+3 Burton Arc
Old 24" VT → E
Build Cone.

- 1 E side center 13 Orange
Old 12" Cor. Build 18" curve. $\rightarrow W$
- 2 N of S end & side 13 Orange
Old tin. Build 2x2 $\rightarrow W$
- 3 E end 13-24 Orange
Across Intersection tin whistle $\rightarrow N$
- 4 N of center 24 Orange & side
Old 15" tin & SP. $\rightarrow E$ Deep ditch
Old 12" tin
- 5 Just E of center 24-25 Orange
Build Curve in low place. E of old
- 6 Across N+S road at N end 25-26 Orange
Old 12" corr 10A $\rightarrow E$. Bent in middle.
- 7 E of center 11-14 Eagle Old 16" W $\rightarrow N$
Build I on piling skew-channel change.
- 8 N of center 23-24 Eagle Old 32" Wood
 $\rightarrow E$ Build I(P)
- 9 2-Wood 13-24 Lincoln $\rightarrow S$
- 10
- 11 Cor 29-30-31-32 Eagle
Build 2x2x32 on W end 29-32.
- 12 29-30 Eagle S of N end Old 3x3 Wood $\rightarrow E$
Build 2x2
- 13 At W end 4-9 Orange $\rightarrow N$
Build 2x2

KEITH'S RAILROAD CURVE TABLES. 080

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HOW TO USE KEITH'S TABLES.

EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle
of Intersection or I. P. = $23^{\circ} 20'$ to the R. at Station
542+72.

Ext. in Tab. IV opposite $23^{\circ} 20' = 120.87$
 $120.87 + 12 = 10.07$. Say a 10° Curve.

Tan. in Tab. IV opp. $23^{\circ} 20' = 1183.1$
 $1183.1 + 10 = 118.31$.

Tab. V. correction for A. $23^{\circ} 20'$ for a 10° Cur. = 0.16
 $118.31 + 0.16 = 118.47 =$ corrected Tangent.

(If corrected Ext. is required find in same way)
Ang. $23^{\circ} 20' = 23.33^{\circ} + 10 = 2.3333 =$ L. C.

$2^{\circ} 19\frac{1}{2}' =$ def. for sta. 542	I. P. = sta. 542+72
$4^{\circ} 49\frac{1}{2}' =$ " " " +50	Tan. = 1.18.47
$7^{\circ} 19\frac{1}{2}' =$ " " " 543	B. C. = sta. 541+53.53
$9^{\circ} 49\frac{1}{2}' =$ " " " +50	L. C. = 2.33.33
$11^{\circ} 40' =$ " " " 543+	E. C. = sta. 543+86.86
86.86	

$100 - 53.53 = 46.47 \times 3' =$ (def. for 1 ft. of 10° Cur.) = 139.41' -
 $2^{\circ} 19\frac{1}{2}' =$ def. for sta. 542.

Def. for 50 ft. = $2^{\circ} 30'$ for a 10° Curve.

Def. for 36.86 ft. = $1^{\circ} 50\frac{1}{2}'$ for a 10° Curve

(These tables are published in Field Books of
KEUFFEL & ESSER CO., New York, N. Y.)

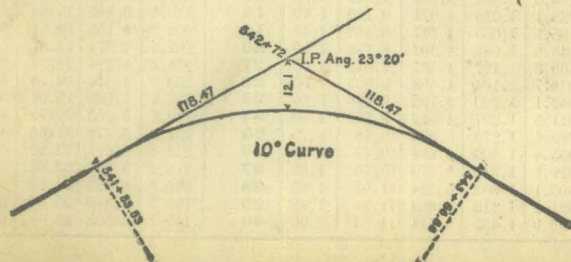


TABLE I. — Minutes in Decimals of a Degree.

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

TABLE II. — Inches in Decimals of a Foot.

1-16	3-32	1/8	3-16	1/4	5-16	3/8	1/2	5/8	3/4	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

TABLE III. — Radii, Ordinates and Deflections.

Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot
0° 10'	34377.	.036	.145	.291	0.05	7°	819.0	1.523	6.105	12.21	2.10
20	17189.	.073	.291	.582	0.10	20'	781.8	1.600	6.395	12.79	2.20
30	11459.	.109	.436	.873	0.15	30	764.5	1.637	6.540	13.08	2.25
40	8594.4	.145	.582	1.164	0.20	40	747.9	1.673	6.685	13.37	2.30
50	6875.5	.182	.727	1.454	0.25	50	716.8	1.746	6.976	13.95	2.40
1 10	5729.6	.218	.873	1.745	0.30	60	688.2	1.819	7.266	14.53	2.50
20	4911.2	.255	1.018	2.036	0.35	70	674.7	1.855	7.411	14.82	2.55
30	4297.3	.291	1.164	2.327	0.40	80	661.7	1.892	7.556	15.11	2.60
40	3819.8	.327	1.309	2.618	0.45	90	637.3	1.965	7.846	15.69	2.70
50	3437.9	.364	1.454	2.909	0.50	100	614.6	2.037	8.136	16.27	2.80
1 10	3125.4	.400	1.600	3.200	0.55	110	603.8	2.074	8.281	16.56	2.85
20	2864.9	.436	1.745	3.490	0.60	120	593.4	2.110	8.426	16.85	2.90
30	2644.6	.473	1.891	3.781	0.65	130	573.7	2.183	8.716	17.43	3.00
40	2455.7	.509	2.036	4.072	0.70	140	546.4	2.292	9.150	18.30	3.15
50	2292.0	.545	2.181	4.363	0.75	150	521.7	2.402	9.585	19.16	3.30
1 10	2148.8	.582	2.327	4.654	0.80	160	499.1	2.511	10.02	20.04	3.45
20	2022.4	.618	2.472	4.945	0.85	170	478.3	2.620	10.45	20.91	3.60
30	1910.1	.655	2.618	5.235	0.90	180	459.3	2.730	10.89	21.77	3.75
40	1809.6	.691	2.763	5.526	0.95	190	441.7	2.839	11.32	22.64	3.90
50	1719.1	.727	2.908	5.817	1.00	200	425.4	2.949	11.75	23.51	4.05
1 10	1637.3	.764	3.054	6.108	1.05	210	410.3	3.058	12.18	24.37	4.20
20	1562.9	.800	3.199	6.398	1.10	220	396.2	3.168	12.62	25.24	4.35
30	1495.0	.836	3.345	6.689	1.15	230	383.1	3.277	13.05	26.11	4.50
40	1432.7	.873	3.490	6.980	1.20	240	370.8	3.387	13.49	26.97	4.65
50	1375.4	.909	3.635	7.271	1.25	250	359.3	3.496	13.92	27.84	4.80
1 10	1322.5	.945	3.718	7.561	1.30	260	348.5	3.606	14.35	28.70	4.95
20	1273.6	.982	3.926	7.852	1.35	270	338.3	3.716	14.78	29.56	5.10
30	1228.1	1.018	4.071	8.143	1.40	280	319.6	3.935	15.64	31.29	5.40
40	1185.8	1.055	4.217	8.433	1.45	290	302.9	4.155	16.51	33.01	5.70
50	1146.3	1.091	4.362	8.724	1.50	300	287.9	4.374	17.37	34.73	6.00
1 10	1109.3	1.127	4.507	9.014	1.55	310	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	320	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	330	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	340	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	350	231.0	5.476	21.64	43.28	7.50
1 10	955.4	1.309	5.234	10.47	1.80	360	222.3	5.697	22.50	44.99	7.80
20	929.6	1.346	5.379	10.76	1.85	370	214.2	5.918	23.35	46.69	8.10
30	905.1	1.382	5.524	11.05	1.90	380	206.7	6.139	24.19	48.38	8.40
40	881.9	1.418	5.669	11.34	1.95	390	199.7	6.360	25.04	50.07	8.70
50	859.9	1.455	5.814	11.63	2.00	400	193.2	6.583	25.88	51.76	9.00

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
1°	50.00	.22	11°	551.70	26.50	21°	1061.9	97.57
10'	58.34	.30	10'	560.11	27.31	10'	1070.6	99.16
20	66.67	.39	20	568.53	28.14	20	1079.2	100.75
30	75.01	.49	30	576.95	28.97	30	1087.8	102.35
40	83.34	.61	40	585.36	29.82	40	1096.4	103.97
50	91.68	.73	50	593.79	30.68	50	1105.1	105.60
2	100.01	.87	12	602.21	31.56	22	1113.7	107.24
10	108.35	1.02	10	610.64	32.45	10	1122.4	108.90
20	116.68	1.19	20	619.07	33.35	20	1131.0	110.57
30	125.02	1.36	30	627.50	34.26	30	1139.7	112.25
40	133.36	1.55	40	635.93	35.18	40	1148.4	113.95
50	141.70	1.75	50	644.37	36.12	50	1157.0	115.66
3	150.04	1.96	13	652.81	37.07	23	1165.7	117.38
10	158.38	2.19	10	661.25	38.03	10	1174.4	119.12
20	166.72	2.43	20	669.70	39.01	20	1183.1	120.87
30	175.06	2.67	30	678.15	39.99	30	1191.8	122.63
40	183.40	2.93	40	686.60	40.99	40	1200.5	124.41
50	191.74	3.21	50	695.06	42.00	50	1209.2	126.20
4	200.08	3.49	14	703.51	43.03	24	1217.9	128.00
10	208.43	3.79	10	711.97	44.07	10	1226.6	129.82
20	216.77	4.10	20	720.44	45.12	20	1235.3	131.65
30	225.12	4.42	30	728.90	46.18	30	1244.0	133.50
40	233.47	4.76	40	737.37	47.25	40	1252.8	135.35
50	241.81	5.10	50	745.85	48.34	50	1261.5	137.23
5	250.16	5.46	15	754.32	49.44	25	1270.2	139.11
10	258.51	5.83	10	762.80	50.55	10	1279.0	141.01
20	266.86	6.21	20	771.29	51.68	20	1287.7	142.93
30	275.21	6.61	30	779.77	52.89	30	1296.5	144.85
40	283.57	7.01	40	788.26	53.97	40	1305.3	146.79
50	291.92	7.43	50	796.75	55.13	50	1314.0	148.75
6	300.28	7.86	16	805.25	56.31	26	1322.8	150.71
10	308.64	8.31	10	813.75	57.50	10	1331.6	152.69
20	316.99	8.76	20	822.25	58.70	20	1340.4	154.69
30	325.35	9.23	30	830.76	59.91	30	1349.2	156.70
40	333.71	9.71	40	839.27	61.14	40	1358.0	158.72
50	342.08	10.20	50	847.78	62.38	50	1366.8	160.76
7	350.44	10.71	17	856.30	63.63	27	1375.6	162.81
10	358.81	11.22	10	864.82	64.90	10	1384.4	164.86
20	367.17	11.75	20	873.35	66.18	20	1393.2	166.95
30	375.54	12.29	30	881.88	67.47	30	1402.0	169.04
40	383.91	12.85	40	890.41	68.77	40	1410.9	171.15
50	392.28	13.41	50	898.95	70.09	50	1419.7	173.27
8	400.66	13.99	18	907.49	71.42	28	1428.6	175.41
10	409.03	14.58	10	916.03	72.76	10	1437.4	177.55
20	417.41	15.18	20	924.58	74.12	20	1446.3	179.72
30	425.79	15.80	30	933.13	75.49	30	1455.1	181.89
40	434.17	16.43	40	941.69	76.86	40	1464.0	184.08
50	442.55	17.07	50	950.25	78.26	50	1472.9	186.29
9	450.93	17.72	19	958.81	79.67	29	1481.8	188.51
10	459.32	18.38	10	967.38	81.09	10	1490.7	190.74
20	467.71	19.05	20	975.96	82.53	20	1499.6	192.99
30	476.10	19.75	30	984.53	83.97	30	1508.5	195.25
40	484.49	20.45	40	993.12	85.43	40	1517.4	197.53
50	492.88	21.16	50	1001.7	86.90	50	1526.3	199.82
10	501.28	21.89	20	1010.3	88.39	30	1535.3	202.12
10	509.68	22.62	10	1018.9	89.89	10	1544.2	204.44
20	518.06	23.38	20	1027.5	91.40	20	1553.1	206.77
30	526.48	24.14	30	1036.1	92.92	30	1562.1	209.12
40	534.89	24.91	40	1044.7	94.46	40	1571.0	211.48
50	543.29	25.70	50	1053.3	96.01	50	1580.0	213.86

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
31°	1589.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
10'	1598.0	218.7	10'	2151.7	390.7	10'	2743.1	622.8
20	1606.9	221.1	20	2161.2	394.1	20	2753.4	627.2
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226.0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32°	1643.0	230.9	42°	2199.4	407.6	52°	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33°	1697.2	246.1	43°	2257.0	428.5	53°	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34°	1751.7	261.8	44°	2314.9	450.0	54°	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35°	1806.6	278.1	45°	2373.3	472.1	55°	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.3	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36°	1861.7	294.9	46°	2432.1	494.8	56°	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37°	1917.1	312.2	47°	2491.3	518.2	57°	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954.3	324.1	40	2531.1	534.2	40	3154.2	810.9
50	1963.6	327.1	50	2541.0	538.2	50	3165.1	816.1
38°	1972.9	330.2	48°	2551.0	542.2	58°	3176.0	821.4
10	1982.2	333.2	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39°	2029.0	348.6	49°	2611.2	566.9	59°	3241.7	853.5
10	2038.4	351.8	10	2621.2	571.1	10	3252.7	858.9
20	2047.8	354.9	20	2631.3	575.3	20	3263.7	864.3
30	2057.2	358.1	30	2641.4	579.5	30	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40°	2085.4	367.7	50°	2671.8	592.3	60°	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
61°	3375.0	920.2	71°	4086.9	1308.2	81°	4893.6	1805.3
10'	3386.3	925.9	10'	4099.5	1315.6	10'	4908.0	1814.7
20	3397.5	931.6	20	4112.1	1322.9	20	4922.5	1824.1
30	3408.8	937.3	30	4124.8	1330.3	30	4937.0	1833.6
40	3420.1	943.1	40	4137.4	1337.7	40	4951.5	1843.1
50	3431.4	948.9	50	4150.1	1345.1	50	4966.1	1852.6
62°	3442.7	954.8	72°	4162.8	1352.6	82°	4980.7	1862.2
10	3454.1	960.6	10	4175.6	1360.1	10	4995.4	1871.8
20	3465.4	966.5	20	4188.5	1367.6	20	5010.0	1881.5
30	3476.8	972.4	30	4201.2	1375.2	30	5024.8	1891.2
40	3488.3	978.3	40	4214.0	1382.8	40	5039.5	1900.9
50	3499.7	984.3	50	4226.8	1390.4	50	5054.3	1910.7
63°	3511.1	990.2	73°	4239.7	1398.0	83°	5069.2	1920.5
10	3522.6	996.2	10	4252.6	1405.7	10	5084.0	1930.4
20	3534.1	1002.3	20	4265.6	1413.5	20	5099.0	1940.3
30	3545.6	1008.3	30	4278.5	1421.2	30	5113.9	1950.3
40	3557.2	1014.4	40	4291.5	1429.0	40	5128.9	1960.2
50	3568.7	1020.5	50	4304.6	1436.8	50	5143.9	1970.3
64°	3580.3	1026.6	74°	4317.6	1444.6	84°	5159.0	1980.4
10	3591.9	1032.8	10	4330.7	1452.5	10	5174.1	1990.5
20	3603.5	1039.0	20	4343.8	1460.4	20	5189.3	2000.6
30	3615.1	1045.2	30	4356.9	1468.4	30	5204.4	2010.8
40	3626.8	1051.4	40	4370.1	1476.4	40	5219.7	2021.1
50	3638.5	1057.7	50	4383.3	1484.4	50	5234.9	2031.4
65°	3650.2	1063.9	75°	4396.5	1492.4	85°	5250.3	2041.7
10	3661.9	1070.2	10	4409.8	1500.5	10	5265.6	2052.1
20	3673.7	1076.6	20	4423.1	1508.6	20	5281.0	2062.5
30	3685.4	1082.9	30	4436.4	1516.7	30	5296.4	2073.0
40	3697.2	1089.3	40	4449.7	1524.9	40	5311.9	2083.5
50	3709.0	1095.7	50	4463.1	1533.1	50	5327.4	2094.1
66°	3720.9	1102.2	76°	4476.5	1541.4	86°	5343.0	2104.7
10	3732.7	1108.6	10	4489.9	1549.7	10	5358.6	2115.3
20	3744.6	1115.1	20	4503.4	1558.0	20	5374.2	2126.0
30	3756.5	1121.7	30	4516.9	1566.3	30	5389.9	2136.7
40	3768.5	1128.2	40	4530.4	1574.7	40	5405.6	2147.5
50	3780.4	1134.8	50	4544.0	1583.1	50	5421.4	2158.4
67°	3792.4	1141.4	77°	4557.6	1591.6	87°	5437.2	2169.2
10	3804.4	1148.0	10	4571.2	1600.1	10	5453.1	2180.2
20	3816.4	1154.7	20	4584.8	1608.6	20	5469.0	2191.1
30	3828.4	1161.3	30	4598.5	1617.1	30	5484.9	2202.2
40	3840.5	1168.1	40	4612.2	1625.7	40	5500.9	2213.2
50	3852.6	1174.8	50	4626.0	1634.4	50	5517.0	2224.3
68°	3864.7	1181.6	78°	4639.8	1643.0	88°	5533.1	2235.5
10	3876.8	1188.4	10	4653.6	1651.7	10	5549.2	2246.7
20	3889.0	1195.2	20	4667.4	1660.5	20	5565.4	2258.0
30	3901.2	1202.0	30	4681.3	1669.2	30	5581.6	2269.3
40	3913.4	1208.9	40	4695.2	1678.1	40	5597.8	2280.6
50	3925.6	1215.8	50	4709.2	1686.9	50	5614.2	2292.0
69°	3937.9	1222.7	79°	4723.2	1695.8	89°	5630.5	2303.5
10	3950.2	1229.7	10	4737.2	1704.7	10	5646.9	2315.0
20	3962.5	1236.7	20	4751.2	1713.7	20	5663.4	2326.6
30	3974.8	1243.7	30	4765.3	1722.7	30	5679.9	2338.2
40	3987.2	1250.8	40	4779.4	1731.7	40	5696.4	2349.8
50	3999.5	1257.9	50	4793.6	1740.8	50	5713.0	2361.5
70°	4011.9	1265.0	80°	4807.7	1749.9	90°	5729.7	2373.8
10	4024.4	1272.1	10	4822.0	1759.0	10	5746.3	2385.1
20	4036.8	1279.3	20	4836.2	1768.2	20	5763.1	2397.0
30	4050.0	1286.5	30	4850.5	1777.4	30	5779.9	2408.9
40	4064.8	1293.8	40	4864.8	1786.7	40	5796.7	2420.9
50	4079.2	1299.0	50	4879.2	1796.0	50	5813.6	2432.9

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
91°	5830.5	2444.9	101°	6950.6	3278.1	111°	8336.7	4386.1
10'	5847.5	2457.1	10'	6971.3	3294.1	10'	8362.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8388.9	4429.2
30	5881.7	2481.5	30	7012.7	3326.1	30	8415.1	4450.9
40	5898.8	2493.8	40	7033.6	3342.3	40	8441.5	4472.7
50	5916.0	2506.1	50	7054.5	3358.5	50	8468.0	4494.6
92°	5933.2	2518.5	102°	7075.5	3374.9	112°	8494.6	4516.6
10	5950.5	2531.0	10	7096.6	3391.2	10	8521.3	4538.8
20	5967.9	2543.5	20	7117.8	3407.7	20	8548.1	4561.1
30	5985.3	2556.0	30	7139.0	3424.3	30	8575.0	4583.4
40	6002.7	2568.6	40	7160.3	3440.9	40	8602.1	4606.0
50	6020.2	2581.3	50	7181.7	3457.6	50	8629.3	4628.6
93°	6037.8	2594.0	103°	7203.2	3474.4	113°	8656.6	4651.3
10	6055.4	2606.8	10	7224.7	3491.3	10	8684.0	4674.2
20	6073.1	2619.7	20	7246.3	3508.2	20	8711.5	4697.2
30	6090.8	2632.6	30	7268.0	3525.2	30	8739.2	4720.3
40	6108.6	2645.5	40	7289.8	3542.4	40	8767.0	4743.6
50	6126.4	2658.5	50	7311.7	3559.6	50	8794.9	4766.9
94°	6144.3	2671.6	104°	7333.6	3576.8	114°	8822.9	4790.4
10	6162.6	2684.7	10	7355.6	3594.2	10	8851.0	4814.1
20	6180.2	2697.9	20	7377.8	3611.7	20	8879.3	4837.8
30	6198.3	2711.2	30	7399.9	3629.2	30	8907.7	4861.7
40	6216.4	2724.5	40	7422.2	3646.8	40	8936.3	4885.7
50	6234.6	2737.9	50	7444.6	3664.5	50	8965.0	4909.9
95°	6252.8	2751.3	105°	7467.0	3682.3	115°	8992.8	4934.1
10	6271.1	2764.8	10	7489.6	3700.2	10	9022.7	4958.6
20	6289.4	2778.3	20	7512.2	3718.2	20	9051.7	4983.1
30	6307.9	2792.0	30	7534.9	3736.2	30	9080.9	5007.8
40	6326.3	2805.6	40	7557.7	3754.4	40	9110.3	5032.6
50	6344.8	2819.4	50	7580.5	3772.6	50	9139.8	5057.6
96°	6363.4	2833.2	106°	7603.5	3791.0	116°	9169.4	5082.7
10	6382.1	2847.0	10	7626.6	3809.4	10	9199.1	5107.9
20	6400.8	2861.0	20	7649.7	3827.9	20	9229.0	5133.3
30	6419.5	2875.0	30	7672.9	3846.5	30	9259.0	5158.8
40	6438.4	2889.0	40	7696.3	3865.2	40	9289.2	5184.5
50	6457.3	2903.1	50	7719.7	3884.0	50	9319.5	5210.3
97°	6476.2	2917.3	107°	7743.2	3902.9	117°	9349.9	5236.2
10	6495.2	2931.6	10	7766.8	3921.9	10	9380.5	5262.3
20	6514.3	2945.9	20	7790.5	3940.9	20	9411.3	5288.6
30	6533.4	2960.3	30	7814.3	3960.1	30	9442.2	5315.0
40	6552.6	2974.7	40	7838.1	3979.4	40	9473.2	5341.5
50	6571.9	2989.2	50	7862.1	3998.7	50	9504.4	5368.2
98°	6591.2	3003.8	108°	7886.2	4018.2	118°	9535.7	5395.1
10	6610.6	3018.4	10	7910.4	4037.8	10	9567.2	5422.1
20	6630.1	3033.1	20	7934.6	4057.4	20	9598.9	5449.2
30	6649.6	3047.9	30	7959.0	4077.2	30	9630.7	5476.5
40	6669.2	3062.8	40	7983.5	4097.1	40	9662.6	5504.0
50	6688.8	3077.7	50	8008.0	4117.0	50	9694.7	5531.7
99°	6708.6	3092.7	109°	8032.7	4137.1	119°	9727.0	5559.4
10	6728.4	3107.7	10	8057.4	4157.3	10	9759.4	5587.4
20	6748.2	3122.9	20	8082.3	4177.5	20	9792.0	5615.5
30	6768.1	3138.1	30	8107.3	4197.9	30	9824.8	5643.8
40	6788.1	3153.3	40	8132.3	4218.4	40	9857.7	5672.3
50	6808.2	3168.7	50	8157.5	4239.0	50	9890.8	5700.9
100°	6828.3	3184.1	110°	8182.8	4259.7	120°	9924.0	5729.7
10	6848.5	3199.6	10	8208.2	4280.5	10	9957.5	5759.7
20	6868.8	3215.1	20	8233.7	4301.4	20	9991.1	5790.0
30	6889.2	3230.8	30	8259.3	4322.4	30		
40	6909.6	3246.5	40	8285.0	4343.6	40		
50	6930.1	3262.3	50	8310.8	4364.9	50		

H.I. 103.7

South

5.4

98.3

97.5

0.8

6.4

97.3

North

4.4

99.3

97.9

1.4

217-30

8-7 1/2

83