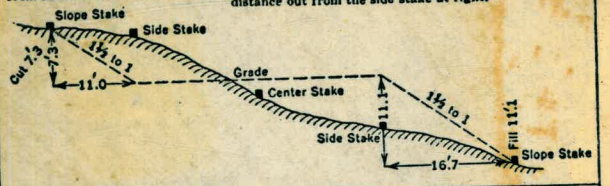
DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2 4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19 5	19.7	19·8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59 7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

KEUFFEL & ESSER CO., N. Y.

Book 622
Plotted & Listed
thru
pg 65
Book 614
also completed

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INDEX

FINAL CROSS SECTIONS
OF KEYWAY - EAST SLOPE
I-65

FINAL CROSS SECTION OF KEYWAY — EAST SLOPE

MAR 18, 1942

DICKINSON
ROGERS – ⊼
POLAK – □
COLE – P
KING – φ

	+	H.I.	–	I.S.	Elev.
A. 31 B.M.	10.86	674.02			663.16
T.P.			0.64		673.38
	12.67	686.05			
T.P.			3.48		682.57
	10.01	692.58			
		13+10			
20S				1.4	691.2
10S				4.6	688.0
Axis				9.1	683.5
10N				9.9	682.7
20N				12.6	680.0
		13+00			
50S				4.3	688.3 ✓
40S				4.8	687.8 ✓
30S				4.1	688.5 ✓

3/18/42 (2)

	+	H.I.	-	I.S.	El.
13+09		692.58			
20S				8.6	684.0
		12+90			
60S				8.1	684.5
50S				10.7	681.9
40S				12.2	680.4
30S				12.4	680.2
		12+85			
32S				13.3	679.3
50S				11.3	681.3
60S				10.8	681.8
T.P.			12.13		680.45
	2.30	682.75			
		12+85			
10S				6.1	676.4
30S				6.1	676.7

	+	H.I.	-	I.S.	El
		682.75			
		13+10			
30N				6.2	676.6
		13+00			
10N				10.2	672.6
Axis				8.1	674.7
10S				2.9	679.9
		12+90			
10S				9.4	673.4
20S				6.5	676.3
		12+85			
20S				9.5	673.3
25S				7.6	675.2
T.P.			12.20		670.55
	0.61	671.16			
		13+00			
40N				4.4	666.8

	+	H.	-	I.S	El.
		671.16			
30N				3.2	668.0
20N				2.3	668.9
		12+90			
40N				13.3	657.9
30N				11.1	660.1
20N				11.0	660.2
Axis				10.6	660.6
		12+87			
10S				8.7	662.5
		12+80			
20S				10.2	661.0
30S				2.3	668.9
		12+70			
30S				9.6	661.6
60S				9.9	661.3
50S				9.9	661.3

3/18/42 (5)

	+	H.	-	I. S.	El.
12+70		671.16			
40S				9.8	661.4
		12+60			
70S				10.0	661.2
60S				9.8	661.4
50S				10.6	660.6
		12+50			
80S				10.3	660.9
70S				9.7	661.5
60S				13.2	658.0
61S				11.0	660.2
		12+40			
80S				9.7	661.5
70S				11.4	659.8
		12+30			
80S				10.7	660.5

3/18/42 (6)

	+	H.I.	-	I.S.	El.
		671.16			
		12+20			
90S				10.9	660.3 ✓
		12+10			
100S				11.4	659.8 ✓
		12+00			
110S				11.7	659.5 ✓
		11+90			
120S				13.5	657.7 ✓
		12+65			
40S				10.2	661.0 ✓
30S				12.6	658.6 ✓
		12+60			
40S				5.1	665.8 ✓
50S				8.9	662.3 ✓

✓

3/18/42 (7)

	+	H.	−	I.S.	El.
		671.16			
		12+88			
Axis				12.2	659.0 ✓
		12+87			
3S				12.2	659.0 ✓
		12+85			
5S				12.2	659.0 ✓
		12+83			
10S				12.2	659.0 ✓
		12+81			
14S				12.2	659.0 ✓
T.P			12.21		658.95 ✓
	0.21	659.16 ✓			
		12+80			
50N				8.7	650.5 ✓
40N				7.2	652.0 ✓
30N				5.0	654.2 ✓

Keyway of Limit

	+	H.	-	I.S.	El
12+80		659.16			
20N				6.6	652.6
10N				7.1	652.1
Axis				8.7	650.5
10S				2.4	656.8
		12+90			
10N				2.3	656.9
		12+70			
50N				12.3	646.9
40N				11.6	647.6
30N				12.2	647.0
20N				12.9	646.3
		12+65			
25S				2.1	657.1
		12+70			
20S				1.2	658.0
17S				5.6	653.6

	+	H.I.	-	I.S.	El
		659.16			
		12+65			
20S				4.8	654.4
16S				12.2	647.0
		12+60			
49S				2.9	656.3
40S				4.3	654.9
30S				6.3	652.9
20S				11.8	647.4
		12+50			
50S				11.4	647.8
		12+25			
80S				0.7	658.5
70S				1.0	658.2
		12+45			
60S				2.8	656.4

	+	H.I.	−	I.S.	El
		659.16			
		12+40			
60S				9.7	649.5
		12+10			
95S				0.0	659.2
		12+00			
100S				1.9	654.3
		11+90			
110S				5.7	653.5
110S		11+70		13.5	645.7
		11+80			
110S				9.5	649.7
120S				8.7	650.5
		12+80			
Axis				8.7	650.5
14S				2.0	657.2
		12+70			
14S				10.0	649.2

LIMIT OF RIGHT-WAY

	+	H.I.	−	I.S.	El
T.P.			11.96		647.20
	4.75	651.95			
		11+70			
120S				6.6	645.4
		12+60			
30N				12.8	639.2
10N				8.9	643.1
30N				11.7	640.3
20N				12.2	639.8
10N				12.7	639.3
7N				13.1	638.9
		12+70			
10N				7.8	644.2
4N				9.8	642.2
2N				13.2	638.8
Axis				12.5	639.5

3/18/42 (2)

+	H.	−	I.S.	El.
	651.95			
	12+60			
10S			13.3	638.7
	12+75			
2.7N			8.8	643.2
	12+70			
2.4N			11.9	640.1
	12+60			
14.4S			10.7	641.3
	12+50			
30S			11.3	640.7
40S			6.0	646.0
	12+20			
70S			9.3	642.7
	12+30			
60S			11.0	641.0

KEYWAY OF LIMIT

	+	H.	-	I.S.	El
		651.95			
		12+10			
BOS				10.8	641.2
		11+90			
100S				8.2	643.8
T.P.			13.05		638.90
	0.43	639.33			
		12+50			
50N				9.4	629.9
40N				8.3	631.0
30N				7.0	632.3
20N				6.1	633.2
10N				5.9	633.4
6N				6.6	632.7
		12+60			
3N				6.5	632.8
Axis				6.7	632.6

3/18/42 (4)

	+	H.I.	-	I.S.	El
		639.33			
5S				5.8	633.5
		12+50			
3N				11.4	627.9
Axis				11.2	628.1
10S				8.3	631.0
		12+52			
10S				4.8	634.5
5S				8.5	630.8
		12+50			
20S				1.8	637.5
		12+48			
20S				6.2	633.1
		12+40			
30S				11.5	627.8
20S				12.7	626.6
40N				12.4	626.9

3/18/42 (15)

+	H.I.	-	I.S.	El.
12+40	639.33			
30N			9.4	629.9
20N			10.4	628.9
10N			10.4	628.9
5N			12.6	626.7
	12+60			
3.2N			6.6	632.7
	12+50			
3.3N			11.2	628.1
16.5S			4.8	634.5
	12+40			
20.8S			12.7	626.6
	11+90			
8.5S			6.7	632.6
9.0S			3.4	635.9
	11+80			
10.0S			2.3	637.0

Keyway of Limit

3/18/42 (16)

	+	H.I.	-	I.S.	El
		639.33			
90S				9.6	629.7
85S				11.4	627.9
		11+70			
100S				2.7	636.6
		11+60			
100S				5.8	633.5
		11+50			
110S				7.5	631.8
		11+40			
110S				12.2	627.1
T.P.			12.85		626.48
	2.96	629.44			
		12+40			
~~4N~~				~~5.1~~	~~624.3~~
Axis				6.5	622.9
10S				4.4	625.0

See pg. 19

	+	H.I.	-	I.S.	El
12+40		629.44			
40 S				4.4	625.0
50 S				5.2	624.2
		12+30			
30 S				12.0	617.4
10 S				12.7	616.7
Axis				13.2	616.2
4 N				13.0	616.4
8 N				8.9	620.5
10 N				8.5	620.9
20 N				8.1	621.3
30 N				5.7	623.7
40 N				5.1	624.3
50 N				6.2	623.2
		11+80			
80 S				10.2	619.2

3/18/42 (18)

	+	H.	-	I.S.	El.
		629.44			
		11+70			
90S				5.5	623.9
		11+60			
90S				12.0	617.4
		11+50			
90S				12.0	617.4
100S				3.9	625.5
		11+40			
100S				8.1	621.3
		11+30			
100S				9.1	620.3
		11+20			
100S				9.8	619.6
		11+10			
100S				11.0	618.4

	+	H.	−	I.S.	El
		629.44			
		12+40			
3.8N				6.0	623.4
		12+30			
4.4N				13.0	616A
26.6S				11.7	617.7
T.P.			13.09		616.35
	0.47	616.82			
		11+80			
70S				9.2	607.6
		11+70			
80S				3.4	613.4
		11+60			
80S				9.1	607.7
		11+40			
90S				2.0	614.8

LIMIT OF KEYWAY

+	H_1	-	I.S.	EI	=
	616.82				
	11+30				
90S			5.5	611.3	
	11+20				
90S			6.4	610.4	
	11+10				
90S			7.6	609.2	
	11+00				
90S			7.5	609.3	
100S			2.3	614.5	
	10+90				
90S			8.1	608.7	
	10+80				
80S			13.0	603.8	
90S			10.8	606.0	
	10+70				
90S			12.1	604.7	

	+	H.I.	−	I.S.	El.
		616.82			
		12+30			
20 S				1.2	615.6
40 S				1.1	615.7
50 S				3.0	613.8
		12+20			
55 S				7.2	609.6
50 S				8.9	607.9
40 S				8.6	608.2
30 S				7.8	609.0
20 S				8.1	608.7
10 S				6.3	610.5
Axis				7.8	609.0
4 N				7.8	609.0
5 N				6.7	610.1
10 N				5.9	610.9
20 N				4.7	612.1

+	H.I.	-	I.S.	El
12+20	616.82			
30N			2.6	614.2
40N			2.6	614.2
50N			2.7	614.1
	12+10			
50N			10.8	606.0
40N			9.8	607.0
30N			9.1	607.7
20N			12.7	604.1
	12+00			
50N			9.3	607.5
40N			9.3	607.5
30N			8.7	608.1
	11+90			
50N			9.6	607.2
40N			9.1	607.7
30N			8.9	607.9

3/8/42 (23)

	+	H.I.	-	I.S.	El	
		616.82				
26N				9.7	607.1	
		11+80				
40N				10.0	606.8	
30N				10.5	606.3	
		12+20				
4.7N						
~~5N~~				6.9	609.9	~~See pg. 21~~ ok
33.3S				7.9	608.9	
T.B.M.			5.15		611.67	El. Marked — 611.60
A.32 B.M.	5.34	631.40				
		12+20				
60S				0.2	631.2	
A.32 B.M.			5.34		626.06	El. Marked — 626.06

LIMIT OF REVISION

3/19/42

	+	H.	-	I. S.	El
T. B. M.					611.60
	5.02	616.62			
		12+10			
60S				3.0	613.6
55S				11.0	605.6
T. P.			10.98		605.64
	2.46	608.10			
		12+10			
50S				5.8	602.3
		12+15			
50S				3.1	605.0
40S				2.6	605.5
30S				2.8	605.3
		12+16			
20S				11	607.0
		12+15			
20S				3.0	605.1

3/19/42

(20)

	+	H.I.	-	I.S.	El.
12+15		608.10			
10S				3.5	604.6
		12+10			
40S				10.7	597.4
30S				7.1	601.0
20S				7.4	600.7
10S				6.5	601.6
Axis				7.3	600.8
		12+07			
20S				10.0	598.1
10S				9.0	599.1
		12+10			
6N				6.2	601.9
5N				7.8	600.3
10N				6.3	601.8
		12+00			
20N				5.0	603.1

	+	H.I.	−	I.S.	El
		608.10			
		11+90			
27N				0.5	607.6
		11+80			
20N				9.1	599.0
16N				12.0	596.1
		11+70			
30N				6.4	601.7
20N				12.4	595.7
		11+90			
60S				7.8	600.3
		11+80			
60S				13.4	594.7
		11+70			
70S				7.7	600.4
		11+60			
70S				13.1	595.0

	+	H.	-	I.S.	El
		608.10			
		11+40			
80S				8.8	599.3
		11+50			
80S				5.7	602.4
		11+30			
80S				13.0	595.1
		11+10			
80S				10.8	597.3
77S				11.3	596.8
		10+90			
80S				5.3	602.8
		10+80			
75S				5.1	603.0
		10+70			
75S				5.9	602.2
		10+60			
80S				8.2	599.9
75S				8.7	599.4

	+	H.	-	I.S.	El
		608.10			
90S				7.5	600.6
		10+60			
70S				13.5	594.6
		12+10			
5.4N				7.7	600.4
41.5S				10.0	598.1
T.P.			12.63		595.47
	0.18	595.65			
		11+20			
80S				3.3	592.4
		11+00			
80S				1.8	593.9
75S				4.3	591.4
		11+50			
70S				2.5	593.2
60S				9.1	586.6

LIMIT OF KEYWAY

3/19/12 (29)

	+	H_i	−	I.S.	El.
		595.65			
		11+60			
60S				5.9	589.8
57S				6.8	588.9
		11+70			
60S				2.5	593.2
		11+40			
60S				8.8	586.9
70S				6.2	589.5
		11+30			
70S				8.0	587.7
		11+35			
60S				8.7	587.0
68S				7.6	588.1
		11+21			
70S				10.9	584.8

	+	H.I. 595.65	-	I.S	El
		11+23			
70S				13.2	582.5
		11+20			
70S				13.5	582.2
		11+30			
60S				12.6	583.1
		11+20			
76S				12.6	583.1
		10+60			
66S				4.4	591.3
		10+54			
80S				+2.9	598.6
		10+50			
70S				5.8	589.9
		10+53			
80S				2.5	593.2

	+	H.I.	-	I.S.	El
		595.65			
		10+50			
80S				3.6	592.1
90S				1.6	594.1
		10+48			
80S				7.8	587.9
70S		10+42		15.7	580.0
		10+40			
80S				12.2	583.5
		12+00			
50S				2.6	593.1
45S				7.1	588.6
40S				9.7	586.0
		12+08			
40S				6.5	589.2
		12+00			
30S				10.9	584.8
20S				10.5	585.2

	+	H.I.	-	I.S.	El	
12+00		595.65				
10S				8.9	586.8	
		11+99				
10S				11.0	584.7	
		12+00				
Axis				7.3	588.4	
		12+01				
Axis				4.3	591.4	
		12+00				
6N				8.2	587.5	
7N				4.8	590.9	
10N				2.4	593.3	
		11+97				
Axis				12.0	583.7	
		11+90				
~~10N~~				~~12.0~~	~~583.7~~	See book 654, pg. 16
12N				8.0	587.7	

+	H.I.	−	I.S.	El	
	595.65				
	11+96				
50S			8.2	587.5	
	11+90				
53S			7.0	588.7	
~~50S~~			~~9.8~~	~~585.9~~	See book 654, pg 16-17
~~40S~~			~~13.1~~	~~582.6~~	
	11+96				
40S			10.9	584.8	
	~~11+80~~				
~~50S~~			~~12.8~~	~~582.9~~	See book 654, pg 15
	11+85				
45S			13.0	582.7	
	12+00				
~~47.4S~~			~~6.0~~	~~589.7~~	ok
~~63N~~			~~4.7~~	~~591.0~~	
	11+90				
~~51.4S~~			~~9.9~~	~~585.8~~	

✓

	+	H.I.	-	I.S.	El	
		595.65				
		11+70				
50N				3.9	591.8	
10N				+4.3	600.0	
		11+70				
~~20N~~				1.7	~~594.0~~	See pg. 26
		11+60				
50N				7.2	588.5	
40N				3.8	593.9	
30N				1.0	594.7	
24N				2.8	592.9	
		11+50				
50N				8.6	587.2	
40N				8.6	587.1	
30N				7.7	588.0	
		11+40				
50N				10.6	585.1	

	+	H.	−	I.S.	El
		595.65			
40N				10.2	585.5
30N				10.4	585.3
		11+30			
50N				11.9	583.8
40N				11.3	584.4
32N				13.0	582.7
		11+20			
50N				12.3	583.4
40N				11.6	584.1
37N				12.2	583.5
32N				15.2	580.5
		11+10			
50N				12.1	583.6
40N				12.8	582.9
36N				13.8	581.9

	+	H.I.	-	I.S.	El.
T.P.			11.97		583.68
	1.98	585.66			
		11+00			
50N				8.3	577.4
40N				11.0	574.7
		11+90			
35S				5.1	580.6
30S				5.5	580.2
20S				5.8	579.9
10S				5.9	579.8
Axis				6.3	579.4
4N				5.6	580.1
		11+80			
15N				4.4	581.3
10N				10.4	575.3
8N				12.6	573.1
Axis				11.9	573.8

ok

See book 654, pgs. 16-17

	+	H.I.	−	I.S.	El
11+80		585.66			
10S				10.4	575.3
20S				7.6	578.1
24S				5.7	580.0
30S				6.3	579.4
40S				8.3	577.4
T.B.M.			4.51		581.15
T.B.M.	2.55	583.69			581.14
		11+73			
30S				4.0	579.7
		11+74			
30S				6.5	577.2
		11+70			
55S				2.0	581.7
50S				4.6	579.1
40S				8.9	574.8

El. MARKED — 581.14

	+	H.	-	I.S.	El
	11+70	583.69			
30S				8.5	575.2
20S				7.8	576.1
15S				11.1	572.6
10S				12.1	571.6
6S				12.9	570.8
		11+65			
10S				13.1	570.6
20S				10.5	573.2
		11+60			
57S				4.0	579.7
50S				6.3	577.4
40S				9.4	574.3
35S				10.5	573.2
34S				12.0	571.7
30S				13.0	570.7
20S				12.4	571.3

	+	Hi	-	I.S.	El
		583.69			
		11+50			
57S				4.6	579.1
50S				6.4	577.3
40S				10.0	573.7
30S				12.7	571.0
		11+40			
54S				5.9	577.8
50S				7.5	576.2
40S				10.5	573.2
30S				12.3	571.4
		11+30			
53S				8.1	575.6
50S				9.4	574.3
		11+20			
64S				2.5	581.2
60S				6.1	577.6

	+	H_i	−	I.S.	El
		583.69			
50S				8.8	574.9
		11+10			
74S				2.2	581.5
70S				4.2	579.5
60S				7.5	576.2
50S				11.2	572.5
		11+00			
70S				2.6	581.1
60S				7.2	576.5
50S				10.7	573.0
40S				12.0	571.7
		11+06			
40S				12.9	570.8
		10+90			
70S				3.8	579.9
60S				6.3	577.4

	+	H.I.	−	I.S.	El
		583.69			
			10+90		
50S				9.5	574.2
40S				12.1	571.6
		10+80			
68S				1.8	581.9
60S				5.2	578.5
55S				5.9	577.8
50S				8.3	575.4
45S				8.7	575.0
40S				11.5	572.2
		10+70			
60S				6.1	577.6
57S				9.6	574.1
50S				10.5	573.2
45S				10.4	573.3
40S				13.1	570.6

3/19/42 (12)

	+	H.	−	I. S.	El
		583.69			
60S		10+60		7.8	575.9
56S				12.6	571.1
50S				13.2	570.5
46S				11.9	571.8
40S				12.6	571.1
		10+55			
40S				12.4	571.3
		10+50			
60S				11.6	572.1
		11+90			
7N				2.0	581.7
		11+80			
8N				10.4	573.3
		11+80			
525.8				0.7	583.0

KEYWAY OF LIMIT

3/19/42 (13)

+	H.I.	−	I.S.	El
	583.69			
	11+70			
53.8S			2.7	581.0
	11+60			
55.4S			4.1	579.6
	11+50			
55.8S			5.0	578.7
	11+40			
54.6S			3.3	580.4
	11+30			
55.3S			5.1	578.6
	11+20			
57.3S			6.7	577.0
	11+10			
58.1S			7.9	575.8
	11+00			
57.8S			7.9	575.8

KEY WAY OF LIMIT

3/19/42 (4)

+	H.	-	I.S.	El.
	583.69			
	10+90			
57.15			6.3	577.4
	10+80			
56.65			5.3	578.4
	10+70			
58.25			8.5	575.2
	10+60			
58.65			8.2	575.5
	10+50			
61.15			11.1	572.6
T.P.		12.23		571.46
	572.29			
	11+00			
30N			2.5	569.8
25N			7.3	565.0

KEY WAY

LIMIT OF

	+	H.I.	−	I.S.	El
		572.29			
		11+10			
20N				8.6	563.8
		11+20			
20N				7.6	564.7
		11+30			
20N				7.1	565.2
		11+40			
20N				2.7	569.6
		11+50			
20N				3.3	569.0
		11+70			
10N				8.4	563.9
		11+73			
~~8N~~				7.1	~~565.2~~
		~~11+76~~			VOID
~~8N~~				1.5	570.8

3/19/42 (48)

	+	H.I.	-	I.S.	El
		572.29			
		11+70			
Axis				7.1	565.2
		11+60			
14N				9.2	563.1
10N				10.6	561.7
8N				12.2	560.1
Axis				11.9	560.4
		11+50			
13N				12.6	559.7
		11+40			
15N				12.2	560.1
		10+90			
50N				3.1	569.2
40N				3.6	568.7
35N				5.3	567.0

3/19/42 (47)

	+	H.I.	-	I.S.	El
		572.29			
		10+80			
50N				9.3	563.0
40N				9.6	562.7
33N				11.7	560.6
		10+70			
50N				10.2	562.1
47N				9.8	562.5
		10+60			
50N				13.2	559.1
		11+70			
~~6S~~				~~1.5~~	~~570.8~~
		11+60			
~~10S~~				~~1.6~~	~~570.7~~
		11+50			
~~27S~~				~~5.1~~	~~567.2~~
~~20S~~				~~7.9~~	~~564.4~~

	+	H.I.	−	I.S.	El
11+50		572.29			
~~40s~~				12.3	560.0
		11+40			
~~25s~~				4.0	568.3
		11+30			
40s				2.4	569.9
34s				1.9	570.4
30s				2.9	569.4
24s				5.8	566.5
		11+20			
44s				2.0	570.3
40s				3.2	569.1
36s				3.6	568.7
30s				6.9	565.4
24s				9.2	563.1
20s				12.0	560.3

	+	HI 512.29	-	I.S.	El.
		11+15			
30S				7.9	564.4
		11+10			
40S				4.1	568.2
30S				8.8	563.5
26S				9.4	562.9
		11+06			
30S				5.2	567.1
28S				8.0	564.3
		11+00			
30S				4.4	567.9
20S				8.4	563.9
		10+90			
30S				4.5	567.8
25S				6.5	565.8
20S				8.5	563.8
16S				9.8	562.5

3/19/42 (50)

	+	HI ✓ 572.29	-	I.S.	El
		10+80			
30S				3.4	568.9 ✓
20S				10.2	562.1 ✓
		10+70			
30S				5.3	567.0 ✓
26S				8.5	563.8 ✓
20S				10.4	561.9 ✓
16S				11.8	560.5 ✓
		10+60			
30S				5.9	566.4 ✓
		10+65			
30S				6.2	566.1 ✓
20S				11.3	561.0 ✓
		10+60			
20S				9.4	562.9 ✓
		10+50			
50S				4.8	567.5 ✓

+	H.I.	−	I.S.	El
10+50	572.29			
46S			5.4	566.9
40S			2.9	569.4
30S			7.2	565.1
25S			10.9	561.4
	10+55			
20S			11.2	561.1
	10+40			
60S			5.8	566.5
50S			9.0	563.3
70S			3.0	569.3
78S			1.4	570.9
	10+33			
80S			2.5	569.8
	10+30			
80S			6.7	565.6
90S			+1.0	573.3

+	H.I.	-	I.S.	El	
10+30	572.29				
70S			9.7	562.6	
60S			10.2	562.1	
	10+40				
40S			8.2	564.1	
30S			10.7	561.6	
	~~10+30~~				
~~50S~~			12.0	560.3	See page 60
~~10S~~			12.7	559.6	
~~32S~~			13.1	559.2	
	10+40				
64S			5.5	566.8	
	10+30				
69.4S			9.9	562.1	
	11+70				
9N			8.1	564.2	

KEYWAY 05 KEYWAY

	+	H.	-	I.S.	El
		572.29			
		11+60			
9.7N				10.9	561.4
T.P.			12.95		559.34
	1.40	560.74			
		10+50			
50N				4.6	556.1
		10+40			
50N				10.7	550.0
		10+30			
50N				12.9	547.8
		10+20			
50N				13.8	546.9
40N				14.1	546.3
		10+30			
40N				13.9	546.8
30N				12.7	548.0

LIMIT OF EXCAVATION

	+	H.I.	-	I.S.	El
		560.74			
		10+40			
40N				12.2	548.5
30N				13.1	547.6
20N				14.2	546.5
		10+50			
20N				12.4	548.3
30N				12.2	548.5
40N				9.7	551.0
		10+60			
40N				7.4	553.3
30N				11.3	549.4
20N				11.7	549.0
		10+70			
20N				9.5	551.2
30N				10.6	550.1
40N				6.7	554.0

3/19/42

	+	H.	-	I. S.	El
		560.74			
		10+80			
30N				8.1	552.6
20N				9.0	551.7
		10+90			
23N				7.9	552.8
20N				7.8	552.9
13N				9.6	551.1
~~10N~~				~~12.3~~	~~548.4~~
Axis				11.4	549.3
~~10S~~				~~4.8~~	~~555.9~~
		11+00			
16S				5.6	555.1
10S				7.9	552.8
		~~10+98~~			
10S				5.7	555.0
5S				9.1	551.6

See book 654, pg. 42

3/9/42 (56)

+ H. -	I.S.	El	
560.74			
11+00			
Axis	10.3	550.4	
10N	10.5	550.2	
20N	6.5	554.2	
~~10+90~~			
~~5S~~	9.6	551.1	ok
11+10			
~~20S~~	3.1	557.6	
~~13.5~~	4.1	556.3	
~~10S~~	9.1	551.6	VOID
~~Axis~~	10.5	550.2	
~~10N~~	10.2	550.5	
11+15			
20S	3.7	557.0	VOID
15S	8.3	552.4	

✓

3/19/42 (57)

	+	H.I.	-	I.S.	El	
		560.74				
		11+20				
17S				5.4	555.3	
~~10S~~				7.9	552.8	
Axis				9.8	550.9	VOID
10N				9.6	551.1	
		11+30				
~~20S~~				3.0	557.7	
10S				5.6	555.1	
Axis				6.1	554.6	
10N				6.0	554.7	
13N				5.2	555.5	OK
		11+40				
10N				4.0	556.7	
Axis				4.9	555.8	
10S				4.3	556.4	
20S				2.3	558.4	

3/19/42 (58)

+	H.I.	-	I.S.	El
	560.74			
	11+50			
~~10N~~			~~2.2~~	~~558.5~~
Axis			4.0	556.7
	10+80			
15S			3.9	556.8
~~10S~~			~~5.3~~	~~555.4~~
	~~10+70~~			
~~10S~~			~~6.0~~	~~554.7~~
	10+60			
10.S			5.3	555.4
	10+50			
20S			2.3	558.4
15S			5.6	555.1
10S			6.1	554.3
	11+50			
~~10N~~			2.2	558.5

LIMIT OF ERROR

see book 654, pg 41

3/19/42 (59)

+	H.I.	−	I.S.	El
	560.71			
		11+10		
10.5N			3.3	557.4
		11+30		
10.8N			5.9	554.8
		11+20		
11.1N			9.5	551.2
		11+10		
11.1N			9.3	551.4
		11+00		
11.1N			9.9	550.8
		10+90		
11.3N			12.0	548.7
T.P.		4.62		556.12
3.90	560.02			
		10+40		
25S			2.6	557.4

KEY WAY

OF

LIMIT

3/19/42 (60)

	+	H.I.	-	I.S.	El
	10+40	560.02			
20S				5.2	554.8
10S				8.4	551.6
7S				11.6	548.4
		10+30			
50S				0.6	559.4
40S				1.0	559.0
37S				1.3	558.7
31S				1.1	558.9
30S				4.1	555.9
20S				6.8	553.2
10S				10.5	549.5
		10+20			
100S				+3.1	563.4
90S				3.1	556.9
80S				6.7	553.3
70S				5.5	554.5

5/19/42 (6)

	+	H.	−	I.S.	El
	10+20	560.02			
60S				5.1	554.6
55S				5.1	554.9
50S				4.4	555.6
40S				6.3	553.7
30S				6.3	553.7
27S				7.1	552.9
20S				11.4	548.6
		10+20			
74.4S				5.4	554.6
T.P.			10.44		549.58
	20S	551.63			
T.B.M.			7.22		544.41

Limit of leveling

Elev. Marked — 544.42

	+	H.I.	−	I.S.	El	
T.B.M					544.42	
	3.15	547.57				
		10+80				
~~Axis~~				0.3	~~547.3~~	see book 654, pg. 42
~~10N~~				0.7	~~546.9~~	
12N				0.6	547.0	
13N				+1.6	549.2	
		10+70				
~~Axis~~				1.3	~~546.3~~	
~~10N~~				2.2	~~545.4~~	see book 654, pg. 41
~~12N~~				2.2	~~545.4~~	
16N				+1.8	549.4	
		10+60				
Axis				3.0	544.6	
~~10N~~				4.1	~~543.5~~	
~~12N~~				4.1	~~543.5~~	see book 654, pg. 41

	+	H.I.	-	I.S.	El	
		547.57				
		10+50				
~~Axis~~				3.7	543.9	see book 654, pg. 41
~~10N~~				4.4	543.2	
16N				2.7	544.9	
		10+40				
Axis				4.1	543.5	
10N				5.3	542.3	
12N				5.7	541.9	
		10+30				
~~Axis~~				7.4	540.2	see book 654, pg. 39, 40
~~10N~~				8.2	539.4	
16 N				7.9	439.7	
20N				3.6	544.0	
		10+23				
Axis				8.2	539.1	
6N				10.3	537.3	

3/20/42 (24)

	+	H.I.	-	I.S.	El
		547.57			
10N				11.4	536.2
16N				9.5	538.1
10S				0.7	546.9
		10+20			
10S				3.4	544.2
Axis				9.2	538.4
5N				10.7	536.9
10N				13.4	534.2
12N				11.6	536.0
17N				10.4	537.2
20N				8.1	539.5
30N				3.1	544.5
		10+80			
11.5N				0.7	5469
		10+70			
11.8N				2.1	545.5

Limit of Runway

See book 654, pg 39

	+	H.I.	-	I.S.	El
		547.57			
		10+60			
11.8N				2.8	544.8
		10+50			
12N				3.9	543.7
		10+40			
12.1N				6.0	541.6
		10+30			
12.3N				8.3	539.3
		10+20			
12.5N				11.7	535.2
T.B.M.			3.15		544.42

Limit of Keyway

El. Marked — 544.42

4/27/42
Soper
Foster
King
Davis

66

T.B.M	1.28	484.89			483.61
		9+40			
123'S				2.2	482.7
130S				1.6	483.3
140S				2.9	482.0
~~150S~~				~~1.2~~	~~483.7~~
TP	10.76	493.57	208	482.81	482.81
~~160S~~				~~7.4~~	~~486.2~~
170S				8.0	485.6
180S				8.3	485.3
190S				3.7	489.9
200S				2.5	491.1
		9+45			
150S				8.9	484.7
140S				7.0	486.6
		9+40			
122'S				6.8	486.8

See book 654, pg. 19-20

493.57

9+40

110 S			4.3	OK 489.3'
100 S			4.0	489.6'
90 S			2.3	491.3'
80 S			2.2	491.4'
70 S			1.2	492.4'
60 S			0.9	492.7'
50 S			1.7	491.9'
40 S			0.1	493.5'
Axis			2.3	491.3'
10 N			3.7	489.9'
20 N			0.1	493.5'
TP	12.55	505.50 ✓	0.63	492.94'
30 S			10.3	495.2'
20 S			10.8	494.7'
10 S			10.9	494.6'
1 S			12.8	492.7'
26 N			11.8	494.5'

✓

505.50

9+40

30 N	7.0	498.5'
~~30 S~~	6.2	499.3'

9+50

170 S	2.1	503.4'
160 S	2.7	502.8'
150 S	7.6	497.9'

9+48

150 S	11.8	493.7'
140 S	14.5	491.0'

9+50

140 S	9.4	496.1'

9+48

130 S	13.7	491.8'

9+50

130 S	9.3	496.2'
120 S	11.0	494.5'

496.0
115.79

D.S. toe

505.50

110S	6.0	499.5'
100S	6.1	499.4'
90S	5.2	500.3'
80S	5.0	500.5'
9+47		
80S	9.4	496.1'
70S	11.2	494.3'
9+50		
70S	5.6	499.9'
60S	5.4	500.1'
50S	5.8	499.7'
40S	3.8	501.7'
30S	1.6	503.9'
20S	0.4	505.1'
9+48		
20S	3.5	502.0'
10S	3.7	501.8'

505.50

9+50

10 S		0.5	505.0'
Axis		4.5	501.0'
2 N.		8.4	497.1'
10 N		9.9	495.6'
15 N		9.3	496.2'
18 N		4.0	501.5'
30 ~~TH~~		4.2	501.3'

9+40

35 N		+1.8	507.3'
40 N.		+1.8	507.3'
TP	10.22 514.72'	1.00	504.50'

9+50

23 N		13.1	501.6'
30 N		9.8	504.9'
34 N		6.7	508.0'
40 N		5.2	509.5'

514.72

9760

30'N	0.6	514.1'	
25'N	5.3	509.4'	
	3.21	511.51'	ck. on B.M. marked 511.52
20N	5.7	509.0'	
18N	6.0	508.7'	
17'N	10.8	503.9'	
10N	10.7	504.0'	
T7xis	8.4	506.3'	
2S	6.8	507.9'	
10S	5.6	509.1'	
20S	5.5	509.2'	
30S	5.8	508.9'	
40S	3.5	511.2'	
44S	3.6	511.1'	
47S	6.9	507.8'	
50S	6.6	508.1'	

514.72

9+58

50 S	8.6	506.1'
60 S	10.0	504.7'

9+62

60 S	3.3	511.4'

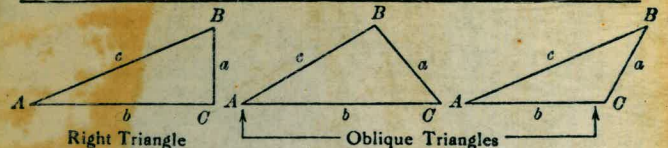
9+60

70 S	9.2	505.5'
80 S	7.4	507.3'
90 S	8.0	506.7'
100 S	8.3	506.4'
110 S	7.2	507.5'
120 S	5.9	508.8'
130 S	6.1	508.6'
140 S	4.7	510.0'
150 S	3.8	510.9'
160 S	2.6	512.1'

507.5
110.03

D.S. toe

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

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

Given	Required	
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	$B = 90° - A$, $b = a \cot A$, $c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90° - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90° - A$, $a = c \sin A$, $b = c \cos A$,

Solution of Oblique Triangles

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

REDUCTION TO HORIZONTAL

Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10′. From Table, Page IX. cos 5° 10′ = .9959. Horizontal distance = 319.4 × .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. Cosine 5° 10′ = .9959. 1 − .9959 = .0041. 319.4 × .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.