

015823

"Kite in the Rain"
WEATHERPROOF



LEVEL



NOTEBOOK NO. 311

~~DARAS L~~ JOHNSON

VLF NOTES

FEB. 1972

Lewis Riv. Reece

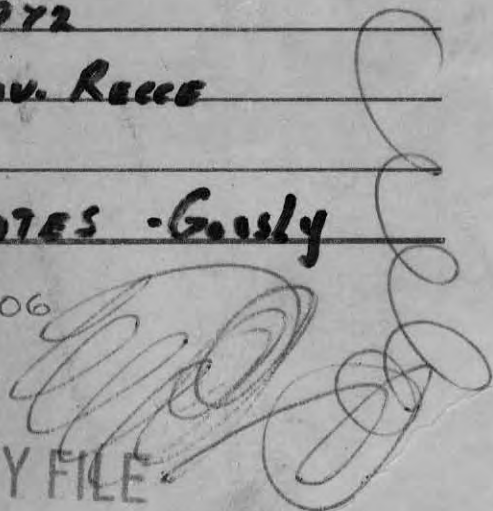
JEM NOTES - Goussly

93L261-06

Lewis

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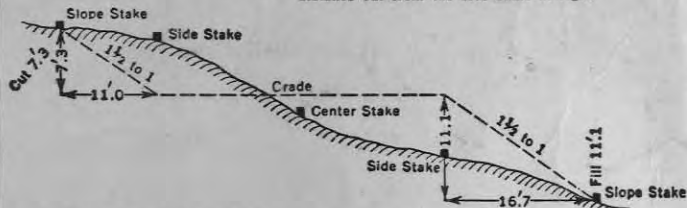
PROPERTY FILE



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes $1\frac{1}{2}$ 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	Distance out from Side or Shoulder Stake											Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	
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	

92 E ✓ 100 N
96 N

20 - 100 - 200 NORTH

N 2 200 NORTH

200 NORTH

	H no		E no				
	H1	L1	H1	L1	H2	L2	
1	+15	15	+12	+3	+13	+2	0
2	+17	+18	+4	+3	+2	+16	2
3	+17	+17	+4	+3	+5	+2	4
4	+16	+17	+17	+1	+16	-	6
5	+17	+16	+16	+1	+15	+1	8
6	+20	+20	+19	+1	+15	+4	10
7	+21	+21	+20	+1	+21	0	12
8	+23	+25	-23	0	-22	+1	14
9	+21	+22	-24	-3	-23	-	16
10	+22	+22	-23	-1	-23	-	18
11	+21	+21	-20	+1	-20	+1	20
12	+18	+19	-18	0	-19	0	22
13	+16	+16	+16	0	-17	-	24
14	+25	+25	-25	0	-25	0	26
16	+20	+18	-18	+2	-17	+1	28
17	+17	+15	-17	0	-16	-	30
18	+17	+17	-17	0	-17	0	32
19	+20	+20	-20	0	-20	0	34
20	+20	+20	-21	-1	-20	0	36
21	+20	+20	-20	0	-21	-1	38
22	+14	+19	-20	-1	-19	0	40
23	+14	+14	-14	0	-14	0	42
24	+14	+14	-16	-2	-14	0	44
25	+12	+13	-15	-3	-13	0	46
26	+13	+14	-16	-3	-14	0	48

	HELPER		CHIEF		
	H1	L1	H1	L1	
27	+10	+10	-10	0	50
28	+14	+15	+14	0	52
29	+15	+15	-15	0	54
31	+20	+20	-22	-2	56
32	+18	+18	-26	-8	58
33	+10	+14	-15	-2	60
	+11	+10	-12	0	62

1200
OFFICE
JOINT

LEWES RIVER AREA REECE V.L.F. SURVEY
9341

GRID PLOTTED ON 1:50,000 GEOLOGY MAP
(PREDM. PRELIMINARY MAP #6)

AND

AIR PHOTO DC 5300-225

LEWES LINE	RIVER STN	ULF DIP	FEB 6 1971 QUAD	N.P.G. REMARKS	
	00 S	00 W	-14	-2	ROAD, 1
		2	-9	+2	
		4	-11	-2	
		6	-8	-2	
		8	-1	0	Swampy
	→	10	+2	+2	" 11-0, +4
		12	-6	+5	EDGE OF BUSH
18 E 28 S, 24 W →		14	-2	+6	13. -6, +8
		16	-9	-1	
		18	-5	0	
		20	0	0	
		22	-5	-2	
		24	-9	-6	
		26	-10	0	
		28	-10	-4	
→		30 W	+6	-4	Swampy
		32	0	+1	
		34	-7	+5	
		36	-5	+2	
		38	-5	-2	
		40	-3	-2	
		2 E	-10	-2	
		4	-10	-1	
		6	-12	+2	
		8	-18	-2	
		10 E	-25	-6	

LINE	STN	% DIP	% QUAD	REMARKS
10 S	40 W	0	+2	
	38	-4	+2	- TOPOGRAPHY -
	36	-5	+2	ALL SLOPES
	34	-2	+1	LOWER TO S.W.
	32	-2	+1	UNLESS NOTED
	30 W	0	0	OTHERWISE
	28	-5	-1	
	26	-6	+2	
	24	-10	+2	
	22	-3	0	
	20 W	-4	+4	
	18	-3	+1	
	16	-3	+2	
	14	-5	+1	
	12	-9	+2	
	10 W	-4	+1	
	8	-6	0	
	6	-9	0	
	4	-14	0	HILL
	2	-16	0	
LINE 10 S	00	-11	0	ROAD
	2 E	-13	-2	
	4	-15	-9	
	6	-4	-10	(7 E +6, -3)
→	8	+6	-5	(9 E +2, -6)
	10 E	-4	-7	

LINE	STN	% DIP	% Quad	REMARKS	LINE	STN	% DIP	% Quad	REMARKS
205 →	00	+1	-12	Road	305	90W	0	+1	
	2	-8	-9	6W -9, -10		38	0	+1	
	4	-12	-2			36	-8	0	
	6	-7	0			34	-5	+2	
	8	-9	-2	8+50=222S, 79W		32	-2	+1	
	10W	-9	-2			30W	+3	+2	29(+8+4)
	12	-6	-2			28	+7	+3	27+6+1
	14	-7	-1	TIMBER		26	+4	0	LANE PLSS
	16	-7	-2			24	0	+4	
	18	-4	0			22	0	+2	
	20W	-2	-1	LANE 400'S.E 615 DAM		20W	0	+2	
	22	0	+2	"		18	+2	+2	
	24	-2	+1	BUSH 2550		16	-4	+1	
	26	-3	+3	UP		14	-3	+2	
→	28	+6	-1	HILL TO SW		12	-5	+1	HILL EDGE OF CLASH
	30W	+5	-1	TOP OF HILL		10W	-8	0	9+50 L 30S 1 3 W
	32	-7	-4			8	-12	0	
	34	-9	-2			6	-8	0	
	36	-7	-2			4	-11	+2	
	38	-3	+1			2W	-11	+1	
	40W	-6	-2		L 30S	00	-12	-1	



LINE	STN.	% DIP	% QUAD	REMARKS
40 S	2 W	-8	-9	ROAD
	4	-9	-1	
	6	-8	-2	
	8	-7	-1	
	10 W	-5	0	
	12	-8	-1	
	14	-5	-1	
	16	-6	-1	
	18	0	0	FLAT
	20 W	0	0	LAKE
	22	0	-1	"
	24	-2	-2	"
	26	+2	+2	
	28	-6	+9	
	30 W	+1	0	
	32	+1	-5	33 BUSH
	34	-9	-2	
	36	-9	-1	
	38	-5	-1	
	40 W	-9	0	

LINE	STN	% DIP	% QUAD	REMARKS
50 S	40 W	-9	0	
	38	0	0	
	36	0	-5	
	34	-1	0	
	32	-2	-2	
	30 W	-1	+5	
	28	+2	+4	LAKE SHORE
	26	+1	+1	
	24	0	+1	
	22	0	+1	FLAT
	20 W	0	+1	
	18	+1	0	
	16	0	+1	
	14	-5	0	
	12	-5	0	
	10 W	-5	0	
	8	-5	0	
	6	-7	0	
	4	-5	+1	
	2	-6	0	
LINE 50 S	00 W	-8	0	ROAD
	2 E	-8	-2	
	4 E	-7	-9	
	6 E	-4	-5	7E 0 -6
	8 E	+3	-4	9E -6, +1
	10 E	-9	0	

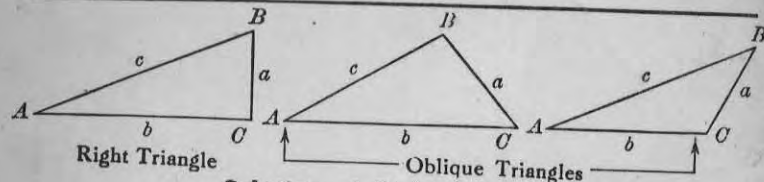
LEWES	RIVER	ETA -16			
LINE	STN	% DIP	% QUAD	REMARKS	
20S	2E	-22	-11	HILL	
	4	-22	-4	3E (-27, -10)	
	6	-10	+1E	5E (-15, -2)	
	8	-3	+3	7E (-9, +2)	
	10E	-15	-3	9E (-10, 0)	
	0.50E	-6	-14	ROAD	
30S	10E	-5	-8	9+50 +4, -7	
	9E	+7	-6	8+50 +5, -6	
	8E	-10	-4	7E (-25, -3)	
	6	-8	-3		
	4	-11	-7		
	2	-10	-3		
40S	00	-7	-4	CL. POST 100' S.E.	
	2E	-6	-5		
	4E	-6	-7	5E (-3, -8)	
	6E	0	-8		
	7	+5	-8		
	8	+21	-3		
	8+50	+22	-1		
	9	+21	+2		
	9+50E	+18	+4		
	10E	+7	+2		
	11E	-5	-1		
	12E	-8	+3		

LINE	STN	% DIP	% QUAD	REMARKS
40S	13E	-17	+3	
	14E	-22	+4	
	15	-21	+11	
	16	-25	+6	
70S	10W			ROAD
	8	-6	0	
	6	-6	0	
	4W	-6	0	
	2W	-6	0	
	0	-4	+2	
	2E	-5	0	
	4	+4	+1	
	6	-4	-1	
	8E	-5	-5	
	10E	0	-2	
	11E	0	-2	FLAT + SWAMPY
	12E	-1	-2	
	14E	+2	-1	
	16	+4	+3	
	18	-7	+6	19E: -5, +6
	20	-2	+4	
	22	0	+3	
	24E	-2	+2	

LEWES RIVER EM-14				REMARKS
LINE	STN	% DIP	% QUAD	
70 S	26E	-4	0	
	29	-3	-2	
	30E	-3	0	
60 S	30E	-3	-1	
	28	-5	+2	
	26	-5	-2	
	24	-3	0	
	22	+1	0	
	20E	0	+3	19E -1 +5
	18	-8	+4	
	16	-9	+7	
	14	-6	+2	
	12	+1	-3	
	10E	+3	-10	
	8	-8	-10	
	6	-10	-6	
	4	-8	-2	
	2E	-8	-2	1E ROAD
	00E	-7	-1	
	2W	-3	+1	
	4	-4	-1	
	6	-7	-3	
	8W	-5	0	

LEWES RIVER EM-16				REMARKS
LINE	STN	% DIP	% QUAD	
60 S	10W	-3	0	
	12	-3	-1	
	14	-2	0	
	16			
	18			
	20W			

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

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

Given a, b Required 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 Required 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 Required B, b, c

$B = 90^\circ - A$, $b = a \cot A$, $c = \frac{a}{\sin A}$

A, b Required B, a, c

$B = 90^\circ - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$

A, c Required B, a, b

$B = 90^\circ - A$, $a = c \sin A$, $b = c \cos A$

Solution of Oblique Triangles

Given A, B, a Required 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 Required 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 Required 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 Required 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

$s = \frac{a + b + c}{2}$, area = $\sqrt{s(s - a)(s - b)(s - c)}$

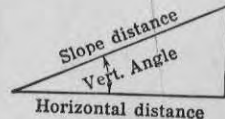
A, b, c Area

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 = $5^\circ 10'$. From Table, Page IX, $\cos 5^\circ 10' = .9959$. 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.