

LAKE
BENCH MARKS

BOOK No. 2

K&L
MINING
TRANSIT BOOK
363 A

LAKE BENCH MARKS
BOOK No. 2

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.

Original Field Notes

by J. A. Gjelhaug

LAKE LEVELS

Recd by Eng.

(from Stouder) Oct. 5, 1937

a

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CASS LAKE and all LAKES Controlled ✓ by KNUTSON Dam.				8

 WINNIBIGOSHISH LAKE and
 all Lakes Controlled by WINNIE DAM 9

LEACH LAKE and all lakes
 Controlled by FEDERAL DAM 9

140
100.75
102.15
101.70

116.5
101.0
1.55

N.W. 1/4
Sec. 31 - T145N.
R. 28W.

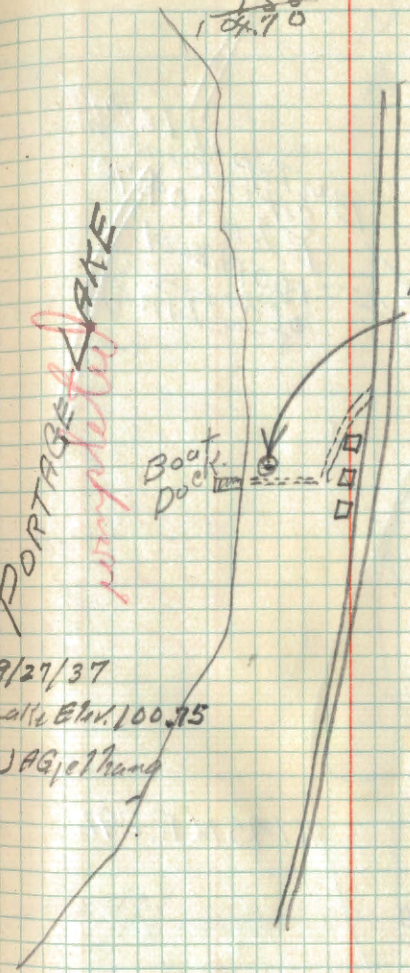
B.M. Top of 1 1/2" Pipe 1x12"
set in Cement
Elev. 104.70
Pump in well East 80 ft.

Sunset Beach
Resort.

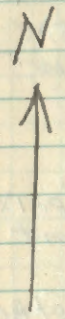
PORTAGE LAKE
Pump Station

Boat
Dock

9/27/37
Lake Elev. 100.35
JAG:elhang



1270
85
4.20
4.40
04.40



LITTLE PORTAGE LAKE

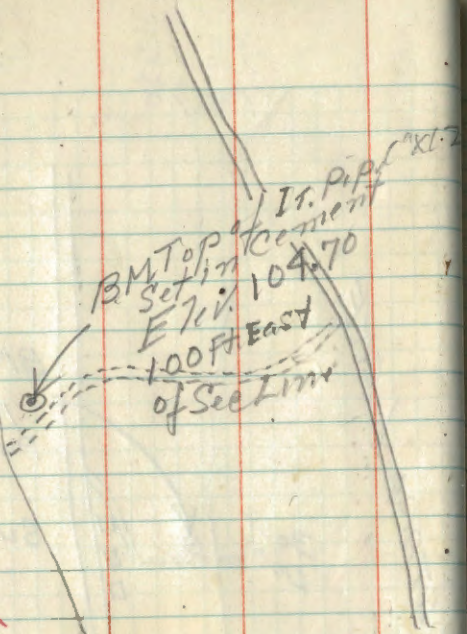
Sec. Line

completed

15 14
22 23

T. 145 N. R. 29 W.

9/27/37
Lake Elev. 100.50
JAGjelhang



SIX MILE LAKE

completed

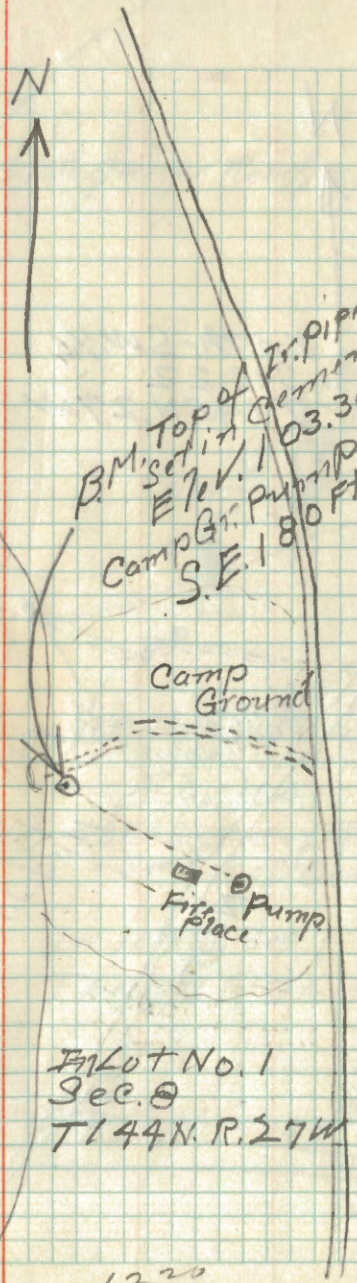
BM Top of 1 1/2\"/>
Set in Cement
Elev. 103.30
Camp Gr. Pump
S.E. 180 Ft.

Camp Ground

Fix. Place

9/27/37
Lake Elev. 100.00
JAGjelhang

Lot No. 1
Sec. 8
T. 144 N. R. 27 W.



1220
890
3.30

N



In the SW 1/4
Sec. 22
T. 145 N. R. 27 W.

GOCHE
LAKE

9/27/37
Lake Elev. 101.00
JAGjelhang

sampled

Sign Post
Goche Lake

B.M. Top of 1 1/2" x 1 1/2"
Set in Cement
Elev. 104.80
M. Rd. J. P. 179.9' N.E. 5.5 Ft.

NUSHA
TRAIL

12.40
5.60
3.80
101.50
104.50

BALL CLUB
LAKE

sampled

9/27/37
Lake Elev. 101.90
JAGjelhang

State gauge Reads 3.10

N



Ball Club
Dam

B.M. Top of 1 1/2" x 1 1/2"
Set in Cement
Elev. 104.10
18 Ft. S 35° W. of TP
S.W. Cor. of Dam

In NW 1/4 Sec. 1
T. 144 N. R. 26 W

Gate

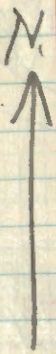
State H. W. No. 2

NUSHKA
LAKE

9/27/37
Lake Elev. 101.80
JAG, Thang

Completed

1110
14180
102.90



B.M. Top of Ir. Pipe
Set in Cement
Elev. 102.90
on Sec. Line
MK'd with 5" N.E. 6" E

Sec. 34

9.00 chs.

Sec. 35

T. 145 N. R. 27 W.

T. H. No. 2



T. H. No. 2

Sec 33

Sec 34

T. 145 N. R. 27 W.

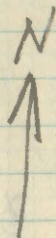
MILE POST
140

28 chs

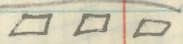
PRICE LAKE

9/28/37
Lake Elev. 101.50
JAG, Thang

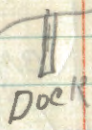
B.M. Top of Ir. Pipe
Set in Cement
Elev. 103.70
on South edge of
Path leading to
Lake 50 ft. West
of Timber Line
MK'd. Aspen 10"
N 80° E 55 ft.



LITTLE Winnie
Resort



In Sec. 30.
T146N. R. 26W.



Sign Post

B.M. Top of Mr. Piper
Set in Cement
Elev. 104.50
90 Ft. North of Sign Post

LITTLE WINNIE
LAKE

9/28/37
Lake Elev. 103.50
J. A. Jethany

T. 146 N. R. 31 W.

SILVER
LAKE

completed

9/29/37

Lake Elev. 100.50

JAG Johnson

B.M. Top of Ir. Pipe 1" x 12"
Set in Cement
Elev. 106.50
On sec. line
95. Ft. West of Sec. Cor.

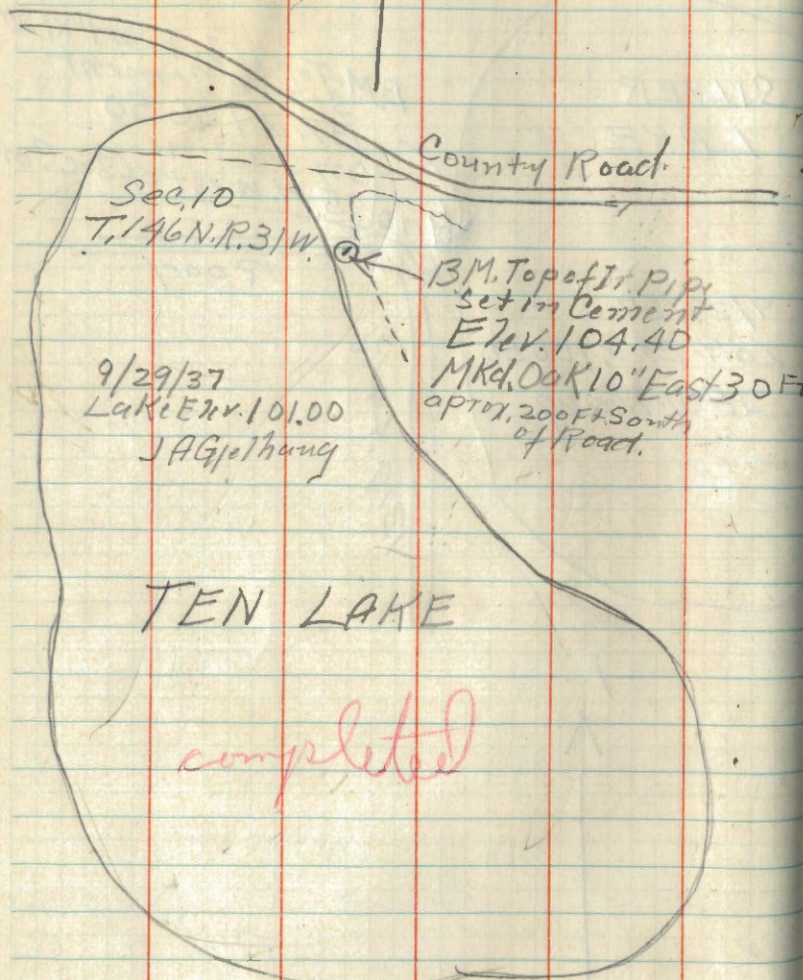
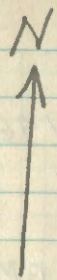
16/15

Road

13/9 24/12

N.



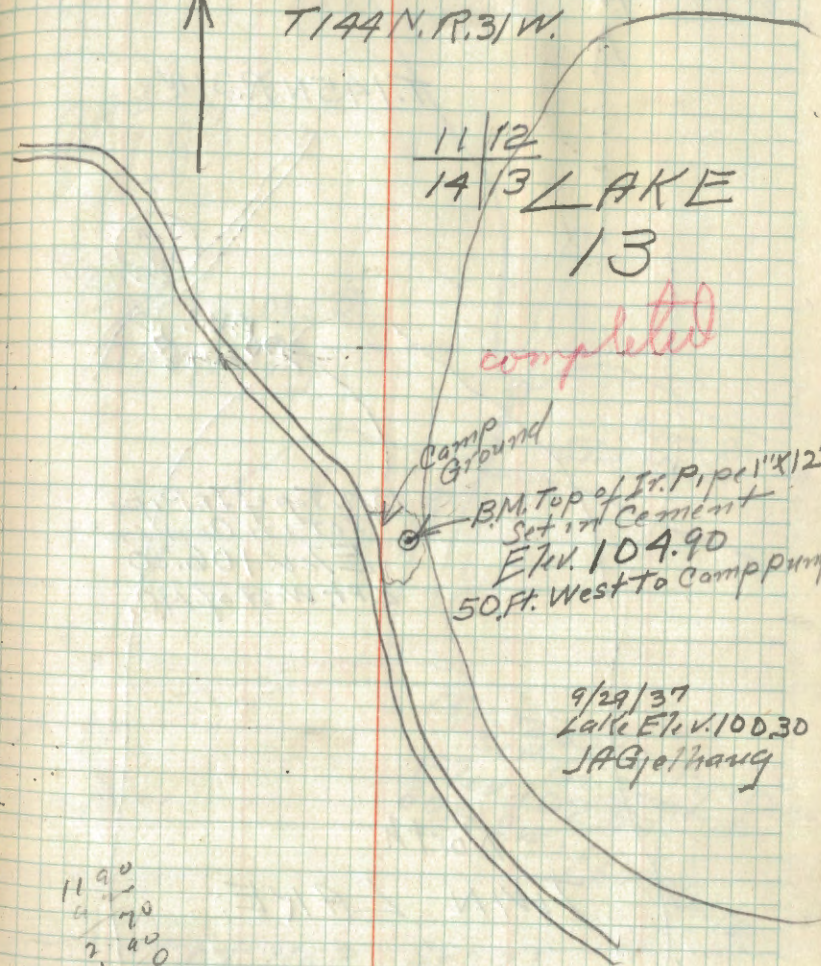
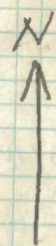


Sec. 10
T. 146 N. R. 31 W.

9/29/37
Lake Elev. 101.00
JAG Jelhaug

TEN LAKE

completed



T. 144 N. R. 31 W.

11/12
14/3 LAKE
13

completed

Camp Ground
B.M. Top of Ir. Pipe 1" x 1/2"
Set in Cement
Elev. 104.90
50 ft. West to Camp Pump

9/29/37
Lake Elev. 100.30
JAG Jelhaug

1190
210
240
460
433
104.90



T.145N.R.31W.

Sec. 36
COT.

FMC
2.240

B.M. Top of Ir. Pipe
Set in Cement
Elev. 106.20
2 Ft. West of M.C.

completed

North
TWIN LAKE.

9/29/37
Lake Elev. 100.50
J.A. Gjelhang

completed

CASS
LAKE

9/29/37
Lake Elev. 101.50
J.A. Gjelhang

Down Stream
Elev. 101.20



B.M. Top of Ir. Pipe 1" x 1/2"
Set in Cement
Elev. 102.50
80 Ft. S.W. of DAM GATE.

Lot No 3 Sec. 21
T.146N.R.30W.

8

9

WINNIBIGOSHISH LAKE or any
Lakes Controlled by WINNIE DAM.
See the Care-taker of DAM and ask
for the Water Gauge reading for
whatever date you want, and add
or deduct from the Elevation given
for the year the Lake was Surveyed.

Lake Elevations of Winnibigoshish Lake:

	Elevation	Gauge reading
Jan. 15-1934	1291.37	1.29
" " 1935	1290.83	0.75
" " 1936	1293.26	3.18
" " 1937	1293.80	3.72
Sept. 28-1937	1298.17	8.09

Gauge 0° set
at -1290.08

FOR LEACH LAKE

	Elevation
Jan. 31-1934	1293.26
" " 1935	1291.65
" " 1936	1293.94

Sept. 20-1937 1295.22

(Gauge 0° set)
at -1293.76

J.A. Gjelhaug.

END OF
BOOK

1295.22 AM. 9/20/37

1293.94 AM. 1/31/36

1291.65 AM. 1/31/35

AM. 1/31/34

1293.76

- 0.50

1293.26

G.O. = 1290.08

1298.17 Sept 28 1937 +8.09

1934 Jan 157 1.29

35 " 15 + 0.75

36 " 15 + 3.18

37 " 15 + 3.72

Apr. 1935 Start of measurement

Leach Lake
Elev.

Winnin
Dam

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1 1/2 TO 1.

FOR SINGLE TRACK EMBANKMENT.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

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

MADE IN GERMANY.