

Walker Remer

- XSECTIONS -

FIELD BOOK

380

ta

to

24

AREA'S

Cubic Yds.

Remarks

EXCAVATION

Embankment

Excav.

Embank.

(B.M.)	spike in fence post	1ft. sta.	
(1330.0)	1784+93		
	spike in tel. pole	25' Rt.	
(1327.52)	1798+65	line runs into Remer	
	spike in tel. pole	35' Rt.	
1333.24	1813.80	W. of Remer Lumber	office
	spike in Norway Pine	36' Rt.	
1331.4	1817		
	spike in fence post		
1329.71	1754+90		

SECTION.

STA.	ELEVA.	GRADE	CUT OR FILL.		
			LEFT	C.	RIGHT
started chaining for 1/4 cor 56.29m					
3-sta. 1794+68.0 = "1/4" 1741+03					
P.G. = 1792+60.3					
start B.M.	sta	1784+93	spike in F.P. Left		
1792+60.3 = P.G.	1329.0	B.S.	H.I.	F.S. El.	
92	1329.0	4.17	1334.17	4.17	
91	1329.2	6.2	1336.2	1330.0	
90	1329.4	5.81	1335.81		
89	1329.6				
88	1329.8				
87	1330.3				
86	1330.8				
85	1331.3		B.M.	1330.0	
84	1331.0	To be changed			
83	1331.0				
82	1330.0				
+30	1329.5				

AREA'S				Cubic Yds.		Remarks
EXCAVATION		Embankment		Excav.	Embank.	
1303 133	F15 14.2	F15 11	F0.3 8	F0.4	Elev 8.0	E7.0 F6.3 F5.4 F3.2 24 27 29 33 1330.0
1300 19	F1.9 14.8	F1.4 9	F0.8 7	F0.3	F0.3 F1.7 7 12	F0.4 F1.4 F1.5 F1.7 F0.3 8.0 13 14.2 18 22
	F2.0 15	F2.0 11	F0.2 7	F0.1	F0.3 F1.4 8 11	F1.6 F1.7 F6.2 14.4 18 22
	F2.0 15	F1.8 13	F0.4 8	F0.2	E0.5 E1.8 4 7	F2.0 15
	F2.4 15.6	F2.4 13	F0.2 8	F0.1	F0.1 F2.0 4 9	F2.3 15.5
	F2.0 15	F1.7 13	F0.3 8	F0.2	F0.2 F1.8 4 9	F2.1 15.2
	F2.2 15.3	2.1 11	F0.3 5	F0.3	F2.2 F1.7 6 11	F2.1 15.2
+50	F2.3 15.5	F1.7 11	0.0 6	C0.5	00.0 F1.6 3 14.4	F2.3 15.5
	F2.8 16.2	F1.7 12	0.0 3	C0.4	0.0 F1.7 6 12	F2.3 15.5
	F2.7 16	F1.8 13	0.0 8	C0.5	C0.5 0.0 5 7	F1.4 F2.0 11 15
		2.7 12.5	29.00 12.5	C0.2	0.0 C2.0 F2.7 6 11 16.1	
0000	F1.6 18	16.1 11	0.0 7	C0.3	0.0 F1.3 F1.3 5 13 14.1	
	F1.2 13.8	F1.2 11	0.0 10	C1.6	C1.5 0.0 5 10	F0.8 F1.0 F1.2 F2.3 12 16 21 24
					F12.0 F0.9 Level 29 32	

Ditch continues 14m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

M. W. Barnard, Son
1 N. G. Barnard.

Gentlemen:—

Re FAP #175.

The specifications governing the above numbered project require that the road shall be brought to proper grade & cross section before any partial estimate is given. This requirement was waived last season but will be enforced this year. It will not be necessary to do any finishing work until the earth is in a workable condition for producing smooth finish, for this reason the Wapiti estimate will be given on rough grading but after that the grade ~~but must~~ be brought to the finishing stakes and the slope properly trimmed and dressed before partial payment is made. Rocks will be classified as the bottom of fills as directed by the engineer.

Leave must be taken by the sub-contractors not to disturb any of the existing government corners as this renders the liable to a fine of \$350.00 for each corner removed or

disturbed.

You are hereby notified to instruct your
subcontractors to remove all logs and brush, to
do the required cutting of stumps and any
necessary grubbing as the engineer may direct.
This will be paid for on a force account
basis. The price of labor per hour to be
agreed upon by the engineer and contractor
before the work is started.

yours truly,
Oswald L. L.
Asst. Engineer

SECTION.

STA.	ELEVA.	GRADE	CUT OR FILL.		
			LEFT	C.	RIGHT
81+30		1329.3			
81+24					
+14					
81410					
1781+00		1329.0			
+88					
1780		1329.2			
1779		1329.4			
T.P. stump	30' left	sta 1778			
	B.S.	HI	F.S.	T.P.	
		1335.81	467	1330.94	
		2.44	1333.38		
1778		1329.6			
1777		1329.8			
1776		1330.0			
1775		1330.2			
1774		1330.4			
1773		1330.6			
1772		1330.8			
71		1331.0			

AREA'S		Cubic Yds.		Remarks
EXCAVATION	Embankment	Excav.	Embank.	
Level F1.0 135	F0.9 11	C0.8	C1.6 10	F0.8 17
			F0.8 19	F5.1 30
				F6.2 33
				F5.1 36
				F5.1 42
Ditch Level	F6.4 18	F5.0 17	F0.8 16	00
			C1.0 10	00
			F5.1 11	F6.2 12
			F0.3 11	F5.0 13
				Bottom Level Ditch
Ditch Bank			00 20	00 20
			00	00
			C6.0 15	C5.6 28.4
				Topbank Level
			F1.0 18.7	F0.8 13.5
			00 5	C1.0 3
			00 20	00 20
			00 20	C0.3 20.3
			00 20	00 20
			00 20	00 20
			F0.1 20.1	F0.3 20.1
			F0.9 19.2	F0.8 19.1
			F1.7 19.3	F1.6 18.5
			2.2 15.3	F2.3 15.5
			F2.1 15.3	F2.1 15.3
			F1.5 19	F1.3 19
			F0.8 13.2	F1.4 14.1
			00 20	00 20
			F0.3 13.2	F1.4 14.1
			00 20	00 20

SECTION.

STA.	ELEVA.	GRADE	CUT OR FILL.		
			LEFT	C.	RIGHT
		B.S.	HI	F.S.	F.I.
			1333.38	0.1	1333.28
		3.72	1337.00		
		Grade.			
1770	1331.2	4.1	1334.16	-6.94	1330.06
1769	1331.4				
1768	1331.6				
67	1331.8				
67+15					
66	1331.7				
65	1331.5				
+55			Sta. 1754 + 90 = B.M. 25		
64	1331.2		right E1	1329.71	
63	1330.9	4.87	1334.54	4.87	
62	1330.6				
61	1330.3	6.21		1329.71	
60	1330.0		1335.92		
1759	1329.7				
1758	1329.4				
1757	1329.1				
+50					
1756	1329.7				
+43	1329.7				
1755	1329.7				

AREA'S		Cubic Yds.		Remarks
EXCAVATION	Embankment	Excav.	Embank.	
	+20.00		00	00
	20		20	
	01.6		01.6	
	21.6	C17	21.6	
	03.9		02.5	
	23.9	C29	22.5	
	00		00	
	20	00	20	
	01.2	F03	00	
	19.2	12.5	F0.6	20
	00		00	
	20	00	20	
	00.3		00.3	
	20.3	C05	20.3	
	00.6		00.8	
	20.6	C08	20.8	
	00		00	
	20	00	20	
	00.00	F1.2	F1.7	00.00
	18	14.9	14.6	18
	00.00	F1.5	F1.6	00.00
	18	14.3	14.4	18
	01.12	F1.1	F1.6	00.00
	19.2	13.7	14.4	18
	00.00	F1.4	F0.5	01.0
	18	13.7	12.8	19
	01.11	F0.6	F0.5	01.13
	19.1	12.9	12.8	19.3
	00.10	F0.4	F0.3	01.15
	19	12.6	13.4	19.5
	00.00	F1.1	F1.6	00.00
	18.8	13.7	14.4	18
	00.00	F1.8	F2.4	00.00
	18	14.7	15.6	18
	00		00	01.15
	20	00	12	19.5
	00.6		00	F0.2
	20.6	C05	6.5	12.3
	00.5		00	01.6
	20.5	00	20	19.6
	01.0	F1.3	F1.7	00.00
	19.0	14.1	14.6	18

SECTION.

STA.	ELEVA.	1335.92 GRADE	CUT. OR FILL.		
			LEFT	C.	RIGHT
1754		1330.0			
1753		1330.3			
52		1330.6			
51		1330.9	6.39		1329.71
5		1336.10			
+20		1331.2		4.50	
50		1331.2			
49		1331.5			
48		1331.0			
47		1330.5	2.94		1331.60
46		1330.0		1334.54	
45		1329.5		3.82	
44		1329.0			1330.72
43		1328.5	0.22		1330.94
42		1328.0			
1741+04 = Section cor.					
41		1327.5			
40		1327.0			B.M.
39		1326.5	2.0		1327.64
+10				1329.64	
38		1326.5			
1737+40 B.M. sp. in birch 40' RT. ←					
El. 1327.64					

sec cor.
1705 + 41.7

spk in Birch 40' RT. 14
1737 + 40
El. 1327.64

AREA'S

Cubic Yds.

Remarks

EXCAVATION		Embankment		Excav.	Embank.
	→	$\frac{F2.6}{15.9}$		$\frac{F2.5}{15.7}$	
	→	$\frac{F3.0}{16.5}$	F1.9	$\frac{F2.5}{15.7}$	
	→	$\frac{F1.0}{18}$ $\frac{F1.4}{14.1}$	F2.4	$\frac{F1.0}{13.5}$	$\frac{C1.0}{19}$
	→	$\frac{F2.6}{18.6}$ $\frac{F1.8}{14.7}$	F1.1	$\frac{F1.0}{13.5}$	$\frac{C1.0}{19}$
	→	$\frac{0.0}{20}$		00	$\frac{0.0}{20}$
	→	$\frac{0.0}{20}$	C0.4		$\frac{0.0}{20}$
	→	$\frac{C0.7}{20.7}$		C1.2	$\frac{C1.2}{21.2}$
	→	$\frac{0.0}{20}$		00	$\frac{0.0}{20}$
	→	$\frac{C0.5}{20.5}$		C0.3	$\frac{C0.5}{20.5}$
	→	$\frac{C1.1}{21.1}$		C1.1	$\frac{C0.8}{20.8}$
+07 = 00	→	$\frac{C0.5}{19.5}$ $\frac{F0.5}{12.7}$		F0.6	$\frac{C1.3}{19.3}$
	→	$\frac{0.0}{20.0}$		C0.2	$\frac{0.0}{13.3}$
	→	$\frac{0.0}{20}$		00	$\frac{0.0}{20}$
	→	$\frac{C0.8}{20.8}$		C1.0	$\frac{C1.2}{21.2}$
	→	$\frac{C2.1}{21.1}$		C1.5	$\frac{C1.3}{21.3}$
	→	$\frac{C0.7}{20.7}$		C1.0	$\frac{C0.7}{20.7}$
	→	$\frac{C0.7}{20.7}$		C0.7	$\frac{0.0}{20}$
	→	$\frac{0.0}{20}$		00	$\frac{0.0}{20}$
	→	$\frac{C2.0}{20}$ $\frac{F0.3}{12.5}$		F0.2	$\frac{C1.7}{19.7}$

Set finish stakes to here Sept 15-20

SECTION.

STA.	ELEVA.	1329.64 GRADE	CUT OR FILL.	
			LEFT	RIGHT
1737		1326.5		
36		26.5		
35		26.5		
			1329.64	3.15 T.P.
3A		26.5	285	1326.49
33		26.5		1329.34 4.58
32		26.5	5.10	1324.76
31		26.5		1329.86
30		26.5		
1729		26.5		1329.32
28		26.5		
27		26.5		
26		26.5		
25		26.5		
BM 1725				-30' Rt. sp. 8" tamarack
24		26.5		B.M.EI. 1327.12
23		26.5		
22		26.5		
21		26.5		
20		26.5		
19		26.5		
18		26.5		

15

Note. Yardage for side ditches computed using a 3' Base with a slope of 1:1 on outside & 1/2:1 on inside.

AREA'S		Cubic Yds.		Remarks
EXCAVATION	Embankment	Excav.	Embank.	
EA. CY.				EA. CY.
00	105 185	F15 14.2	F15 14.2	105 185
153	283	F2.2 19.5	F2.2 15.3	50.2 19.8
128	52.0	F2.2 19.5	F2.2 15.3	50.2 19.7
110	44.1	F2.2 25	F2.3 15.3	50.2 19.9
118	50.6	F2.0 19.4	F2.0 15.3	50.2 19.8
163	60.4	F2.2 19.4	F2.0 15	50.2 19.7
1721	62.0	F2.2 19.3	F1.8 15.0	50.2 19.3
163	62.0	F2.4 19.4	F2.2 15.6	50.2 19.4
182	63.9	F2.2 19.2	F2.4 15	50.2 19.3
203	71.3	F2.0 19	F2.2 15	50.3 19
2581	85.4	F2.0 185	F2.2 15	50.35 18.5
203	85.4	F2.2 19	F2.2 14.6	50.3 18.9
203	75.2	F2.1 19	F2.1 14.7	50.33 18.7
2581	86.4	F2.2 18.5	F2.3 15	50.31 18.9
1921	83.3	F1.8 19.1	F2.3 14.7	50.28 19.2
182	69.5	F2.2 19.2	F2.3 15.3	50.32 18.8
203	71.3	F2.2 19	F2.3 15.3	50.30 19
163	67.2	F2.2 19.4	F2.4 15.3	50.25 19.5
1721	62.0	F1.7 19.3	F2.2 14.8	50.24 19.6
13.51	56.9	F2.2 19.7	F2.3 15.3	50.24 19.6

Ditch notes on page 78

6x12" concrete box culvert

Offtake ditch connect

with county ditch #8

SECTION.

1706 + 58.3

16

STA.	ELEVA.	GRADE	CUT OR FILL.	
			LEFT	RIGHT
		372		1331.16
1717	1326.5		1334.88	
16	1326.5			
+55	1326.5			
B.M.	1744+80	sp. 16" birch 35' Rt		
+18	26.5		B.M. E.L. 1331.16	
1715	26.5			
1714+50	1327.1			
1714	1327.7			
1713	1328.9			
12	1330.1			
11	1331.8			
1710	1332.5			
sec. cor. sta 1705+417. Δ 29°32' Rt.				
1698+06.6 Δ 46°43' Rt.				
1677+29.0 Δ 16°16' Lt.				
1665+0 Δ 0°36' Lt.				
1645+46.7 Δ				

EXCAVATION		Embankment		Excav.	Embank.	Remarks	
E.F.	C.Y.					E.A.	C.Y.
14.4	51.7	5024	F1.9	F2.0	F1.4	50.24	14.4 53.3
		19.6	14.9		14.1	19.6	
16.0	47.0	502.0	F1.8	F2.1	F1.4	50.23	13.51 51.7
		20	14.7		14.1	19.7	
11.8	140	502.1	F1.8	F1.8	F1.6	35.22	12.7 11.5
		19.9	14.7		14.3	19.8	
GT. 1353.7							1330.7
		00			00	00	
		20		00	20		
		C2.1			C1.5		
		22.1		C2.0	21.5		
		C3.2			C3.4		
		23.2		C3.0	23.1		
		C3.6			C3.6		
		23.6		C3.9	23.6		
		C1.7			C1.7		
		21.7		C1.7	21.7		
		C1.1			C0.5		
		21.1		C0.7	20.5		
		C1.6			C1.3		
		21.6		C1.4	21.3		
		C1.6			C1.1		
		21.6		C1.3	21.1		

60% complete

1354
1330
2684
60
1610.40
1610 Cu Yds

Traced to 1754

FINAL SECTION.5

Remar.

STA.	ELEVA.	GRADE	CUT OR FILL.	
			LEFT	RIGHT
1334.32				
H.D. Sorenson & E.G. Baker. Nov. 20, 1920				
Ed Acivence - chairman @ \$5.00 per day - 1 day				
This was left & right going WEST 50				
Note: according to Hoyle these directions must be plotted vice-versa in order to have them in their respective places, i.e. Right becomes left & left becomes right.				
I don't know if I should use this book for final sections but it is the only one I have. If this book should not have been used will you kindly copy these notes into some other book please - HDS				
1797+608			6.8 5.4 15.0 12.0	5.7 7.0 12.0 22.0 22.0 28.0 28.0
1792	28.6		5.7 5.4 12.0 12.0	5.7 6.0 7.2 7.0 7.8 7.2 6.8 12.0 15.0 22.0 22.0 28.0 28.0
1791	29.1		6.4 5.6 15.0 12.0	5.4 7.0 7.1 7.2 7.7 6.8 15.0 14.0 22.0 24.0 28.0 28.0
1790	29.3		6.6 5.4 15.0 12.0	5.0 5.1 7.0 7.4 7.8 7.2 7.0 12.0 15.0 22.0 22.0 28.0 28.0
1789	29.6		6.6 5.4 16.0 12.0	4.7 5.0 6.8 7.2 7.6 7.8 6.9 12.0 15.0 22.0 22.0 27.0 27.0
1788	29.8		6.4 4.8 15.0 12.0	4.5 4.7 6.3 7.2 7.2 7.2 6.9 12.0 15.0 22.0 22.0 28.0 28.0
1787	30.3		6.0 4.3 14.0 12.0	4.0 4.1 6.1 6.6 7.2 7.3 6.1 12.0 15.0 22.0 22.0 27.0 28.0
1786	30.7		5.0 3.6 14.0 12.0	3.6 3.9 5.1 5.6 6.8 6.8 5.4 12.0 12.0 22.0 22.0 28.0 30.0
TP.	4.61	1335.24	367	1330.63
B.M.		1335.24	5.24	1330.00 ^{sta 2} 1784+93
1785	31.1		5.8 4.4 15.0 12.0	4.4 6.4 6.6 7.9 7.9 6.7 12.0 16.0 21.0 23.0 28.0 30.0
1784	31.0		5.7 4.4 14.0 12.0	4.3 6.4 6.3 7.4 7.6 6.0 12.0 15.0 20.0 22.0 27.0 30.0
1783	30.6		6.4 4.8 15.0 12.0	4.6 6.3 6.9 8.3 8.4 7.0 12.0 15.0 21.0 22.0 28.0 28.0
1782	30.0	End of Ditch on North.	6.4 5.3 14.0 12.0	5.3 5.6 6.4 6.9 8.3 9.8 6.9 12.0 14.0 20.0 21.0 26.0 28.0
1781	29.4		2.1 5.9 15.0 12.0	5.8 6.0 6.7 9.2 9.0 6.7 12.0 20.0 23.0 28.0 32.0 ??
1780	29.6		6.2 1.6 18.0 17.0	5.9 6.8 10.0 13.0

AREA'S Cubic Yds. Remarks

EXCAVATION	Embankment	Excav.	Embank.	Remarks
Note:				
I used finishing stakes for line as they were all in good shape. To be truthful it was the only thing I could use as there was no referenced point within a radius 50 miles. HDS				
Question as to distance out Note: Moved last 4' toward center				

SECTION.

STA.	ELEVA.	GRADE	CUT OR FILL.			AREA'S		Cubic Yds.		Remarks
			LEFT	C.	RIGHT	EXCAVATION	Embankment	Excav.	Embank.	
		1335.24								
1780	29.6		$\frac{5.8}{17.0}$	$\frac{7.5}{19.0}$	$\frac{5.9}{12.0}$	$\frac{5.8}{12.0}$	$\frac{6.0}{14.0}$	$\frac{7.6}{19.0}$	$\frac{6.2}{24.0}$	
1779	29.8		$\frac{5.5}{20.0}$	$\frac{7.2}{18.0}$	$\frac{5.8}{12.0}$	$\frac{5.5}{12.0}$	$\frac{6.9}{18.0}$	$\frac{5.8}{20.0}$		
T.P.	45.6	1335.73	4.07			1331.17				
1778	29.9		$\frac{6.0}{17.0}$	$\frac{7.6}{18.0}$	$\frac{6.0}{12.0}$	$\frac{5.8}{12.0}$	$\frac{7.4}{18.0}$	$\frac{5.9}{20.0}$		
1777	29.9		$\frac{6.5}{19.0}$	$\frac{8.0}{18.0}$	$\frac{6.2}{12.0}$	$\frac{5.8}{12.0}$	$\frac{7.4}{17.0}$	$\frac{6.5}{19.0}$		
1776	29.9		$\frac{7.2}{15.0}$	$\frac{6.1}{12.0}$	$\frac{5.8}{12.0}$	$\frac{6.1}{12.0}$	$\frac{7.0}{15.0}$		00 sec.	
1775	30.0		$\frac{7.2}{14.0}$	$\frac{5.8}{12.0}$	$\frac{5.7}{12.0}$	$\frac{5.7}{12.0}$	$\frac{7.2}{14.0}$			
1774	30.5		$\frac{6.9}{14.0}$	$\frac{5.6}{15.0}$	$\frac{5.2}{12.0}$	$\frac{5.4}{12.0}$	$\frac{6.7}{15.0}$			
+50-00 LT.										
1773	30.7		$\frac{7.0}{18.0}$	$\frac{6.9}{12.0}$	$\frac{5.1}{12.0}$	$\frac{5.1}{12.0}$	$\frac{7.0}{17.0}$	$\frac{6.8}{19.0}$		00 RT.
1772	30.9		$\frac{5.7}{19.0}$	$\frac{6.9}{17.0}$	$\frac{4.8}{12.0}$	$\frac{4.8}{12.0}$	$\frac{5.5}{18.0}$	$\frac{5.9}{19.0}$		
1771	31.2		$\frac{4.3}{20.0}$	$\frac{6.6}{18.0}$	$\frac{4.9}{12.0}$	$\frac{4.5}{12.0}$	$\frac{4.7}{18.0}$	$\frac{6.5}{19.0}$		
+45	31.3		$\frac{2.8}{21.0}$	$\frac{6.7}{18.0}$	$\frac{4.8}{12.0}$	$\frac{4.4}{12.0}$	$\frac{4.6}{18.0}$	$\frac{3.5}{22.0}$		
1770	31.3		$\frac{2.4}{22.0}$	$\frac{6.7}{18.0}$	$\frac{4.5}{12.0}$	$\frac{4.4}{12.0}$	$\frac{6.3}{18.0}$	$\frac{2.6}{22.0}$		
+40	31.4		$\frac{1.8}{20.0}$	$\frac{6.1}{18.0}$	$\frac{4.5}{12.0}$	$\frac{4.3}{12.0}$	$\frac{4.4}{18.0}$	$\frac{6.1}{22.0}$		
1769	31.5		$\frac{1.6}{22.0}$	$\frac{6.0}{18.0}$	$\frac{4.2}{12.0}$	$\frac{4.1}{12.0}$	$\frac{5.8}{18.0}$	$\frac{00}{24.0}$		
1768	32.0		$\frac{4.0}{20.0}$	$\frac{5.7}{19.0}$	$\frac{4.1}{12.0}$	$\frac{3.7}{12.0}$	$\frac{3.8}{18.0}$	$\frac{3.9}{20.0}$		
T.P.	5.80	1337.60	3.93			1331.80				
+60	31.6		$\frac{6.3}{20.0}$	$\frac{7.7}{20.0}$	$\frac{6.0}{12.0}$	$\frac{5.7}{12.0}$	$\frac{7.7}{18.0}$	$\frac{6.8}{19.0}$		
1767	32.2		$\frac{5.5}{20.0}$	$\frac{7.4}{18.0}$	$\frac{5.9}{12.0}$	$\frac{5.4}{12.0}$	$\frac{7.3}{18.0}$	$\frac{6.1}{19.0}$		
1766	32.6		$\frac{5.3}{19.0}$	$\frac{7.2}{18.0}$	$\frac{5.3}{12.0}$	$\frac{4.9}{12.0}$	$\frac{6.4}{18.0}$	$\frac{5.0}{19.0}$		
1765	32.2		$\frac{5.2}{20.0}$	$\frac{7.1}{18.0}$	$\frac{5.5}{12.0}$	$\frac{5.4}{12.0}$	$\frac{6.8}{18.0}$	$\frac{5.2}{20.0}$		
+55	31.6	00 LT.	$\frac{7.0}{16.0}$	$\frac{6.7}{11.0}$	$\frac{6.0}{12.0}$	$\frac{6.1}{12.0}$	$\frac{7.6}{17.0}$	$\frac{6.6}{19.0}$		

SECTION.

STA.	ELEVA.	GRADE	CUT OR FILL.			AREA'S		Cubic Yds.	Remarks			
			LEFT	C.	RIGHT	EXCAVATION	Embankment					
		1337.60										
1764	31.4		$\frac{7.4}{16.0}$	$\frac{6.6}{12.0}$	6.2	$\frac{6.4}{11.0}$	$\frac{8.7}{18.0}$	$\frac{8.2}{19.0}$				
1763	30.6		$\frac{8.2}{15.0}$	$\frac{7.1}{12.0}$	7.0	$\frac{7.0}{12.0}$	$\frac{9.0}{18.0}$					
1762	30.2		$\frac{8.2}{14.0}$	$\frac{7.4}{12.0}$	7.4	$\frac{7.4}{12.0}$	$\frac{7.9}{13.0}$					
+65.00R 1761	30.2		$\frac{7.5}{14.0}$	$\frac{9.3}{23.0}$	$\frac{9.5}{17.0}$	$\frac{7.8}{12.0}$	7.4	$\frac{7.8}{12.0}$	$\frac{9.5}{18.0}$	$\frac{8.5}{19.0}$	00L.T.	
T.P.	4.48	1334.68	7.40			1330.20						
1760			$\frac{5.7}{20.0}$	$\frac{6.6}{24.0}$	$\frac{6.8}{15.0}$	$\frac{4.9}{12.0}$	4.8	$\frac{4.8}{10.0}$	$\frac{6.3}{18.0}$	$\frac{5.3}{19.0}$		
1759			$\frac{5.3}{24.0}$	$\frac{6.5}{24.0}$	$\frac{6.6}{16.0}$	$\frac{5.0}{14.0}$	4.9	$\frac{5.0}{12.0}$	$\frac{6.5}{17.0}$	$\frac{6.4}{21.0}$	$\frac{5.2}{22.0}$	
1758			$\frac{6.5}{14.0}$	$\frac{5.7}{12.0}$	5.6	$\frac{5.6}{10.0}$	$\frac{6.5}{15.0}$	7.4	$\frac{7.4}{18.0}$	$\frac{7.4}{20.0}$	$\frac{6.4}{20.0}$	
1757			$\frac{7.5}{15.0}$	$\frac{5.8}{10.0}$	5.8	$\frac{5.8}{12.0}$	7.7	$\frac{7.7}{19.0}$				
+65			$\frac{7.3}{14.0}$	$\frac{5.9}{12.0}$	5.7	$\frac{5.6}{12.0}$	7.1	$\frac{7.1}{16.0}$	7.2	$\frac{7.2}{22.0}$		
1756			$\frac{5.6}{23.0}$	$\frac{7.1}{21.0}$	$\frac{7.1}{16.0}$	$\frac{5.5}{12.0}$	5.2	$\frac{5.3}{12.0}$	$\frac{7.3}{18.0}$	$\frac{7.2}{24.0}$	$\frac{4.5}{26.0}$	
+35			$\frac{6.0}{23.0}$	$\frac{7.5}{20.0}$	$\frac{7.5}{16.0}$	$\frac{5.5}{12.0}$	5.2	$\frac{5.4}{12.0}$	$\frac{7.3}{17.0}$	$\frac{7.2}{24.0}$	$\frac{4.2}{26.0}$	
1755			$\frac{7.0}{24.0}$	$\frac{7.6}{21.0}$	$\frac{7.6}{17.0}$	$\frac{5.3}{11.0}$	5.3	$\frac{5.2}{12.0}$	$\frac{7.4}{17.0}$	$\frac{7.5}{24.0}$	$\frac{4.8}{25.0}$	
+65												
1754	00L.T.		$\frac{7.0}{14.0}$	$\frac{5.2}{10.0}$	4.9	$\frac{5.2}{12.0}$	7.5	$\frac{7.5}{16.0}$				
B.M.	5.14	1334.85	5.14			1329.54						
1753			$\frac{6.7}{15.0}$	$\frac{5.0}{12.0}$	4.6	$\frac{5.0}{12.0}$	7.2	$\frac{7.2}{16.0}$				
1752			$\frac{5.8}{15.0}$	$\frac{4.8}{12.0}$	4.4	$\frac{4.5}{12.0}$	5.8	$\frac{5.8}{15.0}$				
+20 1751			$\frac{4.3}{21.0}$	$\frac{5.7}{20.0}$	$\frac{5.7}{15.0}$	$\frac{4.3}{12.0}$	4.2	$\frac{4.4}{12.0}$	6.0	$\frac{6.0}{15.0}$		
T.P.	6.03	1336.98	3.90			1330.95						
+30	31.0		$\frac{5.8}{20.0}$	$\frac{7.3}{22.0}$	$\frac{7.6}{16.0}$	$\frac{6.3}{12.0}$	6.0	$\frac{6.4}{12.0}$	$\frac{7.7}{15.0}$	$\frac{7.3}{22.0}$	$\frac{6.5}{22.0}$	
1750	31.1		$\frac{5.7}{20.0}$	$\frac{7.4}{22.0}$	$\frac{7.6}{16.0}$	$\frac{6.2}{12.0}$	5.9	$\frac{5.9}{12.0}$	$\frac{7.6}{16.0}$	$\frac{7.5}{21.0}$	$\frac{5.6}{23.0}$	

1335.7

~~31~~
4.7

1757

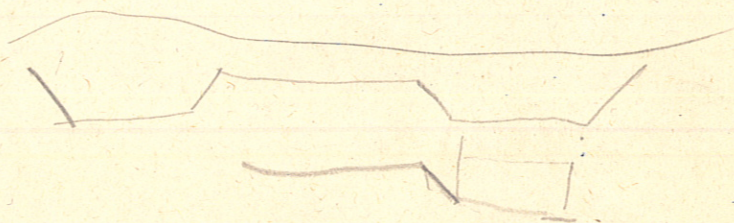
~~1744~~

13

Perth ditto

13270.2

1329.1



$$\begin{array}{r} .5 \\ 12 \overline{) .60} \\ \underline{.60} \\ .00 \end{array}$$

$$\begin{array}{r} .16 \\ 13 \overline{) 2.1} \\ \underline{13} \\ 80 \end{array}$$

Both ditch etc =

- 17 37 = 1327.6
- 56 = 1327.55
- 55 = 1327.5
- 54 = 1327.45
- 53 = 1327.4
- 52 = 1327.35
- 51 = 1327.3
- 50 = 1327.25
- 49 = 1327.2
- 48 = 1327.15
- 47 = 1327.1
- 46 = 1327.05
- 45 = 1327.05
- 44 = 1327.00



$$\begin{array}{r}
 1326.5 = \text{Grade} \\
 \underline{1321.4} = \text{Ditch bottom} \\
 5.1 \\
 \cdot \frac{2}{29} = 3.10 \text{ ft.}
 \end{array}$$

$$\begin{array}{r}
 106.13 = \text{Road} \\
 \underline{100.00} = \text{Bottom Ditch} \\
 6.13 = \text{Lower than Road} \\
 \underline{3} \text{ ditch} = 3 \text{ ft lower} \\
 3.13 = \text{Lower than ditch}
 \end{array}$$

1321.4

$$\begin{array}{r}
 30 \overline{) 3.13}
 \end{array}$$

$$\begin{array}{l}
 4.8 = 3.0. \\
 24.4 = 4
 \end{array}$$

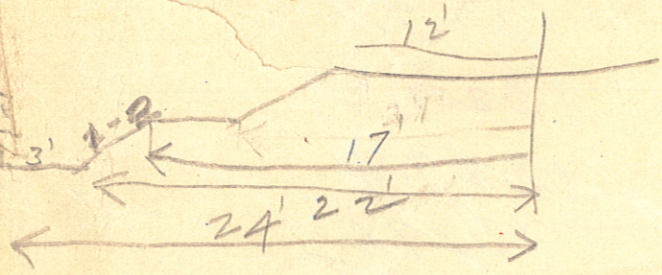
$$\begin{array}{r}
 24.4 \\
 \underline{1317.5} \\
 6.9 \\
 \underline{3.8} \\
 3.1
 \end{array}$$

1715 - 1322.5
 1716 - 22.4
 1717 - 22.3
 1718 - 22.2
 1719 - 22.1
 20 - 22.0
 21 - 21.9
 22 - 21.8
 23 - 21.7
 24 -

40 - 1327.0
 1739 - 1326.5
 38
 1735 + 50 = 00.
 grade 1326.5

25 - 21.5
 26 - 21.4
 27 - 21.4
 28 - 21.5
 29 - 21.6
 30 - 21.7
 31 - 21.8
 32 - 21.9
 33 - 22.0
 34 - 22.1
 35 - 22.3
 36 - 1322.4

1714 + 50 = 1327.1
 1714 = 1327.1
 1713 = 1328.9
 1712 = 1330.1
 1711 = 1331.8
 1710 = 1332.5
 88.0
 58.3
 41.7



OFFICE OF DISTRICT ENGINEER
 A. W. MOULSTER
 PINE RIVER, MINNESOTA

STATE HIGHWAY COMMISSION
 OF MINNESOTA

C. M. BABCOCK, CHAIRMAN, ELK RIVER
 C. I. MCNAIR, CLOQUET
 F. B. LYNCH, ST. PAUL
 GEO. W. COOLEY,
 SECRETARY AND STATE ENGINEER

JOHN H. MULLEN, DEPUTY ENGINEER, ROADS
 CARL E. NAGEL, DEPUTY ENGINEER, BRIDGES
 179.5
 15.54
 179.5
 163.5
 15.00

1771 - 1331.0
 70 - 1331.2
 69 - 1331.4
 68 - 1331.6
 67 - 1331.8
 +50 = 1331.9
~~66 - 1331.9~~
 65 - 1331.5
 64 - 1331.4
 63 - 1330.9
 62 - 1330.6
 61 - 1330.3
 60 - 1330.0
 59 - 1329.7
 58 - 1329.4
 57 - 1329.1
 56 - 1329.7
 55 - 1329.7
 54 - 1329.0
 53 - 1330.3
 52 - 1330.6
 51 - 1330.9
 50 - 1331.2
 49 - 1331.5
 48 - 1331.0
 7 - 1330.5
 6 - 1330.0
 5 - 1329.5
 4 - 1329.0
 3 - 1328.5
 2 - 1328.0
 1 - 1327.5

~~86 - 1329.0~~
 95 - 1329.0
 94 - 1329.0
 93 - 1329.0
 92 - 1329.0
 91 - 1329.2
 90 - 1329.4
 89 - 1329.6
 87 - 1329.8
 88 - 1329.8
 87 - 1330.3
 86 - 1330.8
 85 - 1331.3
 +50 = 1331.55
 84 = 1331.75
 +50 = 1331.3
 83 - 1331.0
 82 - 1330.0
 81 - 1329.0
 80 - 1329.2
 79 - 1329.4
 78 - 1329.6
 77 - 1329.8
 76 - 1330.0
 75 - 1330.2
 74 - 1330.4
 73 - 1330.6
 72 - 1330.8

4378.8

STATE HIGHWAY COMMISSION

SECTION.

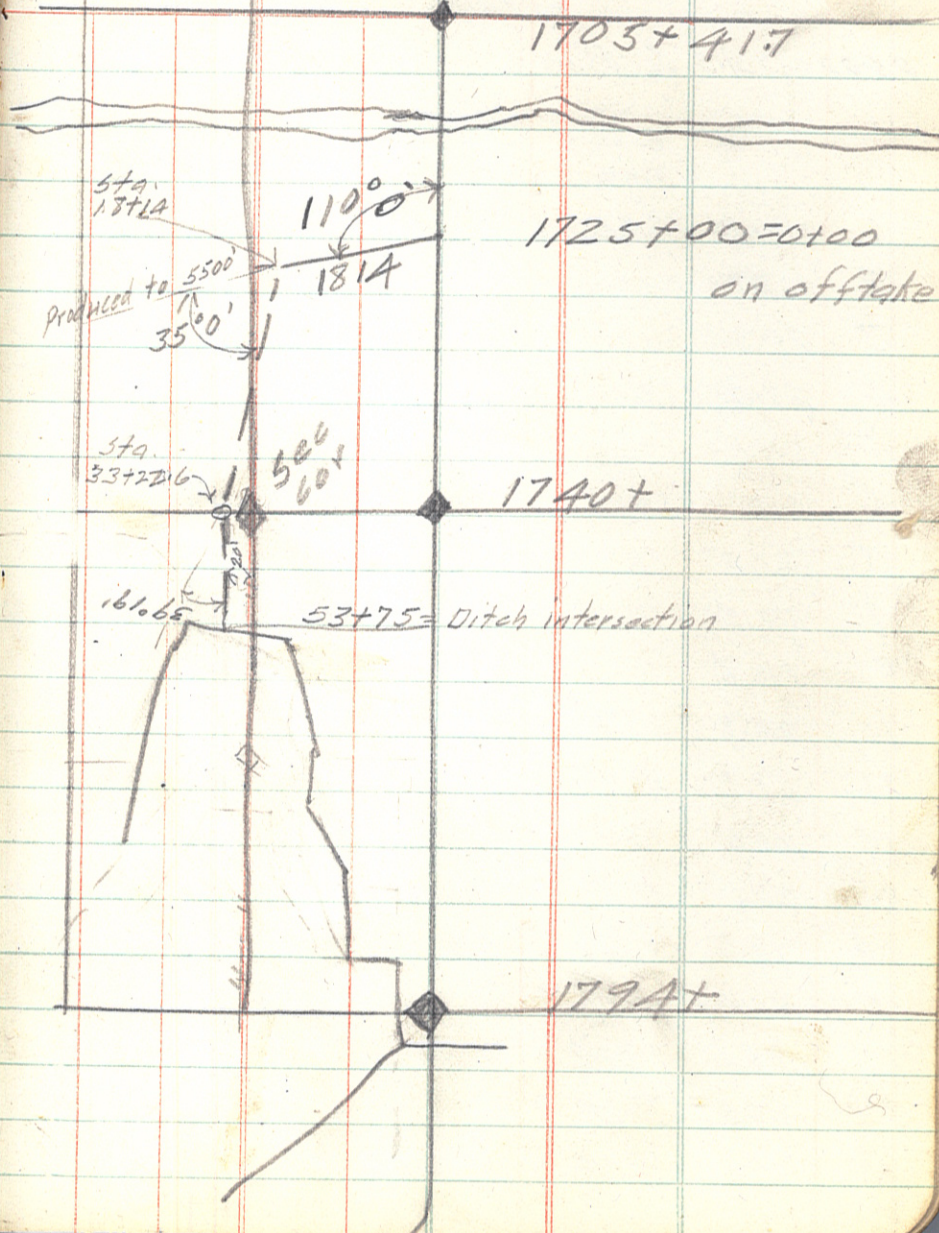
Proposed Offtake ditch 76
 Ras-9-15-20

STA.	ELEVA.	GRADE	CUT OR FILL.		
			LEFT	C.	RIGHT

EXCAVATION	Embankment	Cubic Yds.		Remarks
		Excav.	Embank.	

Offtake starts at sta. 1725+00
 running S.E.
 Sta. 1725+00 = 0+00 on offtake

1705+41.7



1705+41.7

1725+00=0+00
 on offtake

1740+

53+75 = Ditch intersection

1794+

SECTION.

Note E.A's computed using ⁷⁷
a 4' Base with a 1:1 Slope.

STA.	Grade Eleva. <i>Bot ditch</i>	Ground GRADE <i>line</i>	CUT OR FILL.		
			LEFT	C.	RIGHT
<i>Levels - HI.</i>					
<i>0400 = 1321.5 & Road. Sta 1725+00 = 1324.4</i>					
	<i>Ground line</i>	<i>4.2 = 1328.82</i>			
1	21.48	1324.62			<i>7.9</i>
2	21.47	1324.22			<i>4.2</i>
3	21.3	1324.32			<i>4.6</i>
4	21.2	1324.02			<i>4.5</i>
5	21.1	1324.3			<i>4.8</i>
6	21.0	1323.9			<i>4.5</i>
7	21.0	1323.9			<i>4.9</i>
8	20.9	1323.7	<i>4.83</i>	<i>4.87</i>	<i>5.2</i> <i>T.P.</i> <i>1324.00</i>
9	20.8	1324.1			<i>1328.87-4.8</i>
10	20.8	1323.8			<i>5.1</i>
11	20.7	1324.0			<i>4.9</i>
12	20.6	1323.4			<i>5.5</i>
13	20.6	1323.5			<i>5.4</i> <i>TR</i>
14	20.5	1323.5	<i>5.21</i>	<i>3.90</i>	<i>5.4</i> <i>1323.60</i>
15	20.4	1323.3			<i>1327.56-4.3</i>
16	20.4	1323.1			<i>4.5</i>
17	20.3	1322.9			<i>4.7</i>
18	20.2	1322.9	<i>3.00</i>		<i>4.7</i> <i>1324.56</i>

AREA'S		Cubic Yds.		Remarks
EXCAVATION	Embankment	Excav.	Embank.	
				<i>Ditch &</i>
				<i>EA</i> <i>Cy.</i>
				<i>29</i> <i>20.0</i>
				<i>CA2 7.35</i> <i>23.0</i> <i>79.6</i>
				<i>C2.8</i> <i>19.0</i> <i>77.8</i>
				<i>C3.0</i> <i>21.0</i> <i>74.1</i>
				<i>C2.8</i> <i>19.0</i> <i>74.1</i>
				<i>C2.8</i> <i>19.0</i> <i>70.4</i>
				<i>C2.9</i> <i>20.0</i> <i>72.2</i>
				<i>C2.9</i> <i>20.0</i> <i>74.1</i>
				<i>C2.8</i> <i>19.0</i> <i>72.2</i>
				<i>C3.3</i> <i>24.1</i> <i>79.8</i>
				<i>C3.0</i> <i>21.0</i> <i>83.5</i>
				<i>C3.3</i> <i>24.1</i> <i>83.5</i>
				<i>C2.8</i> <i>19.0</i> <i>79.8</i>
				<i>C2.9</i> <i>20.0</i> <i>72.2</i>
				<i>C3.0</i> <i>21.0</i> <i>75.9</i>
				<i>C2.9</i> <i>20.0</i> <i>75.9</i>
				<i>C2.7</i> <i>18.7</i> <i>70.5</i>
				<i>C2.7</i> <i>18.7</i> <i>67.0</i>
				<i>C2.7</i> <i>18.1</i> <i>67.0</i>
				<i>(1349.6)</i>

SECTION.

STA.	ELEVA. <i>Grade</i>	GRADE <i>Ground line</i>	CUT OR FILL.			AREA'S		Cubic Yds.		Remarks
			LEFT	C.	RIGHT	EXCAVATION	Embankment	Excav.	Embank.	
19	20.2	1322.9	3.54	1328.10						
20	20.1	1322.7								
21	20.0	1322.7			5.4					
22	20.0	1322.6			5.5					
23	19.9	1322.6			5.5					
24	19.9	1322.6			5.5					
25	19.8	1323.0			5.1					
26	19.8	1322.8			5.3					
27	19.7	1322.7			5.4					
28	19.6	1322.7	4.38	4.00	5.4	1323.72				
29	19.6	1322.6			1327.72-51					
30	19.5	1322.5			5.2					
31	19.5	1322.2			5.5					
32	19.4	1322.4			5.3					
33	19.3	1322.3			5.1					
33+	22.6	Δ	sec. cov. B.M. Top. pipe El. B.M. 1324.37							
			3.85							
34	19.3	1322.3			1327.20-49					
35	19.2	1322.2			5.0					
36	19.1	1322.4			4.8					
37	19.1	1322.5			4.7					
38	19.0	1322.1			5.1					

AREA'S

Cubic Yds.

Remarks

EXCAVATION

Embankment

Excav.

Embank.

C27

18.1

67.0

C26

17.2

65.4

C27

18.1

65.4

C24

17.2

65.4

C27

18.1

65.4

C27

18.1

67.0

C3.2

23.0

76.1

C3.0

21.0

81.5

C30

21.0

77.8

C31

22.0

79.6

C30

21.0

79.6

C30

21.0

77.8

C27

18.1

72.4

C3.0

21.0

72.4

C3.0

21.0

77.8

C30

21.0

79.6

C30

21.0

77.8

C30

21.0

77.8

C30

21.0

77.8

C30

21.0

77.8

C3.3

24.1

83.5

C3.4

25.2

91.3

C3.1

22.0

87.6

SECTION.

STA.	ELEVA.	GRADE	CUT OR FILL.		
			LEFT	C.	RIGHT
39	18.9	1322.1		13272-5.1	
40	18.9	1322.0			5.2
41	18.8	1322.1			5.1
42	18.8	1321.9			5.3
43	18.7	1321.9		2.50	132470
44	18.6	1321.8	1.95	1326.65	
45	18.6	1322.0			4.6
46	18.5	1321.8			4.9
47	18.4	1321.7			5.0
48	18.4	1321.7		5	5.0
49	18.3	1321.8			4.9
50	18.3	1321.8			4.9
51	18.2	1321.7			5.0
52	18.1	1321.3			5.4
53	18.0	1321.0			5.6
53+73 =					5.9

53+75 }
 54 1318.0 → 1317.50 Bottom ditch #8. 9.15

AREA'S

Cubic Yds.

Remarks

EXCAVATION	Embankment	Excav.	Cubic Yds.		Remarks
			E.A.	C.Y.	
	C32		23.0	89.3	
	C31		22.0	83.3	
	C33		24.1	85.4	
	C31		22.0	85.4	
	C32		23.0	83.3	
	C32		23.0	85.2	
	C34		25.2	89.3	
	C33		24.1	91.3	
	C33		24.1	89.3	
	C33		24.1	89.3	
	C35		26.3	93.3	
	C34		25.2	95.4	
	C35		26.3	95.4	
	C3.2		23.0	91.3	
	C3.0		21.0	81.5	

4219 C.Y.
 70%
 2953.30

Total C.Y. 4218.9

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES $1\frac{1}{2}$ 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.