S.P. 27-516-01 & 62-511-01

STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS

LEVEL BOOK

8333

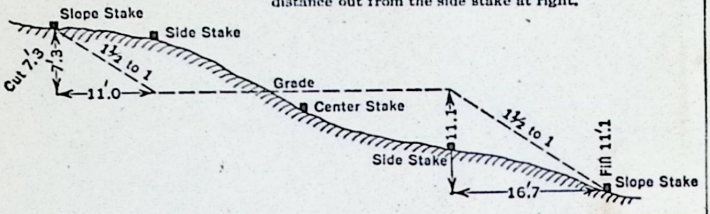
BLUE TOPS & HAUL TRUCK DATA

5

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

#3

Page	to	Page	Sta	to	Sta.	
2	"	4	0+50	"	12+83.7 & 0+00	Blk. Tops
4	"	22	0+00	"	23+78.7	" "
11	"	46	80+00	"	105+50	" "
15	"	16	46+00	"	54+50	" "

B.M.	0.70	945.03		944.33
0+50				45.37
1				45.38
+50				44.7
2				43.95
+50				43.2
3				42.65
			3.83	
			3.33	
+50			41.7	
			4.58	
			4.08	
4			40.95	

0.70.

SPK in 20" oak 50' lt. Sta. 1+00

4.5

5.2

5.8

		945.03		5.29	
				4.77	
4+50				40.24	
				5.84	
				5.34	
5				39.69	
				6.25	
				5.75	
+50				39.28	
				6.49	
				5.99	
6				39.04	
				6.59	
				6.09	
+50				38.94	
T.P.	5.44	944.87	5.60	939.43	
				5.87	
7				39.0	6.37
				5.65	
+50				39.22	6.15
				5.28	
8				39.59	5.78
				4.76	
+50				40.11	5.26

5.6	5.4
5.6	7.3
7.0	6.6
6.7	6.8
6.5	6.9
6.3	6.7
6.3	6.4
6.2	6.4
5.9	6.1

		944.87			
9				4.05 40.82	4.55
+50				3.27 41.60	3.77
10				2.47 42.4	2.97
+50				1.67 43.2	2.17
11				0.87 44.0	1.37
T.P.	8.46	953.10	0.23	944.64	
+50				8.3 44.8	8.8
12				7.5 45.6	8.0
+56				6.7 46.4	7.2
+8367 -	0+00			6.16 46.94	6.66

5.9	5.7
4.77	5.7
3.8	3.4
2.6	2.6
1.6	1.4
9.2	8.9
8.1	8.0
7.1	7.3
6.6	6.5

		953.10			
0+50				5.40 47.66	5.94
1				4.87 48.29	5.31
+50				4.27 48.83	4.77
2				3.81 49.29	4.31
+50				3.45 49.65	3.95
3				3.26 49.94	3.76
+50				2.99 50.11	3.49
4				2.89 50.21	3.39
T.P	4.59	954.31	3.38	949.72	
+50				4.09 50.22	4.59
B.M	3.26	954.27	3.26	951.05	951.01

5.7	5.9
5.1	5.2
5.0	5.0
4.8	4.9
4.4	4.8
4.4	4.4
4.2	4.5
4.0	4.9
5.2	6.0

Rock St Cor Porch 6th Ho. 103' St 3+4s

		954.27			
5				4.27 50.01	4.73
+50				4.30 49.97	4.8
6				4.55 49.72	5.05
+50				4.81 49.46	5.31
7				5.08 49.19	5.54
+50				5.28 48.99	5.78
8				5.37 48.9	5.87
+50				5.33 48.94	5.83
TP	8.64	957.07	584	948.43	
9				4.77 49.10	8.47

5.3	5.2
5.3	5.3
5.9	5.4
6.2	5.8
6.3	6.5
6.4	6.6
6.4	6.9
6.3	6.5
9.1	9.0

		957.07			
9+50				7.1 49.37	8.2
10				7.3 49.77	7.8
+50				6.78 50.29	7.28
11				6.14 50.93	6.64
+50				5.44 51.63	5.94
12				4.74 52.33	5.24
+50				4.04 53.03	4.54
13				3.74 53.73	3.41
+50				2.64 54.43	3.14
14				2.05 55.02	2.55
B.M.	8.32	959.80	5.60	951.47	951.48 8.27

9.1 9.1

8.5 8.8

7.7 8.0

7.1

6.7

5.8

5.1

4.1

3.8

3.3

30" oak 103'2" 13+26

		959.80		
14+50				4.4 55.40
15				55.56
+50				4.3 55.30
16				4.6 55.21
+50				5.1 54.71
17				5.8 54.0
+50				6.7 53.06
18				7.8 52.01
T.P.	2.11	953.63	8.78	951.52
+50				2.7 50.96
19				3.7 49.91

4.9	4.9
4.7	4.7
4.8	4.8
5.1	5.1
5.6	5.6
6.3	6.3
7.2	7.2
8.3	8.3
3.2	3.2
4.2	4.2

		953.63		
19+50				4.8 48.86
20				5.8 47.81
+50				6.9 46.76
21				7.9 45.71
+50				9.0 44.66
22				10.1 43.55
T.P.	0.47	943.51	1.59	943.04
+50				1.2 42.39
23				2.5 41.0
+50				4.0 39.56
24				5.4 38.06

5.3	5.3
6.3	6.3
7.4	7.4
8.4	8.4
9.5	9.5
10.6	10.6
1.7	1.7
~~3.0~~	3.0
4.5	4.5
cl.l 4.8 5.9	5.9

		94351		
24+24				6.2 37.35
+50				6.9 36.65
25				7.7 35.85
+24				35.71
+60				7.9 35.61
26				8.0 35.50
+16				35.46
+50				8.1 35.36
T.P.	2.08	937.00	8.59	934.92
+68				35.31
+90				35.25

7.5	
5.9 ✓	✓
7.4	7.4
60.8	60.8
7.4	7.4
8.2	8.2
✓	✓
8.4	8.4
✓	✓
8.5	8.5
✓	
8.6	8.6

		937.00			
27				F.9 36.08	
+50				2.5 34.49	
28				3.2 33.77	
+50				4.0 33.04	
29				4.7 32.31	
+50				5.2 31.59	
B.M	1.07	933.24	4.81	932.19	932.17
30				2.4 30.87	
+50				3.1 30.15	
31				3.8 29.42	
+50				4.5 28.69	
T					

Sept. 12 1942

2.4	2.4
3.0	3.0
3.7	3.7
4.5	4.5
5.2	5.2
5.9	5.9

PK in 18" Elm 5.2 Rt. 29+75

2.9	2.9
3.6	3.6
4.3	4.3
5.0	5.0

		93324		
32				5.3 27.97
+50				6.0 27.22
33				6.8 26.45
+50				7.6 25.65
34				8.4 24.80
+50				9.3 23.93
35				10.2 23.02
T.P.	6.73	929.26	10.71	922.55 7.2 22.09
+50				
36				8.1 21.17
+50				9.0 20.24

5.8	5.8
6.5	6.5
7.3	7.3
8.1	8.1
8.9	8.9
9.8	9.8
10.7	10.7
7.7	7.7
8.6	8.6
9.5	9.5

		929.26			
37				9.9 19.32	
BM			4.46	924.80	924.80
+50				10.9 18.39	
38				11.8 17.47	
+50				12.7 16.58	
T.P.	2.41	918.41	13.26	916.00	
39				2.66 15.75	
+50				3.4 15.03	
40				4.1 14.35	
+50				4.67 13.78	
41				5.14 13.27	

10.4	10.4

12" Boxelder 65' Rt. 36+69

11.4	11.4
12.3	12.3
13.2	13.2
3.16	3.16
3.9	3.9
4.6	4.6
5.13	5.13
5.64	5.64

		918.41		
41+50				5.62 12.79
42				6.1 12.32
+50				6.58 11.83
43				7.1 11.32
T.P.	2.74	913.95	7.20	911.21
+50				3.16 10.79
44				3.73 10.22
+50				4.9 09.64
45				4.90 09.02
+50				5.55 08.40
B.M			2.53	911.42

X 6.12	✓ 6.12
/ 6.6	✓ 6.6
X 7.08	✓ 7.08
✓ 7.6	✓ 7.6
/ 3.66	✓ 3.66
/ 4.23	✓ 4.23
/ 4.8	✓ 4.8
✓ 5.4	✓ 5.4
✓ 6.05	✓ 6.05

PK in 12" OAK 34' at 43+80 (Destroyed)

T.P	3.00	911.55		908.55
46			3.8	07.77
+50				07.24
47			4.63	06.92
+50				06.80
48			4.70	06.84
+50				07.10
49			4.0	07.55
+50				08.20
50			2.5	09.04

B.T. 19' Rt. 45+00 Sept. 22-1942

4.3	4.3
5.1	5.1
5.2	5.2
4.5	4.5
3.0	3.0

		911.55		
50 +50				09.96
51				6.7 10.89
B.M	6.68	921.23		914.55
+50				942 11.81
52				849 12.74
+50				7.57 13.66
53				6.61 14.59
+50				5.72 15.51
54				4.78 16.45
+50				3.86 17.37

12	12 Sept 22-1942

12" oak 125' Rt. 52 ± 65

9.92	9.92
8.79	8.88
8.07	8.07
6.5	5.46
6.22	6.22
5.28	5.28
4.36	4.36

	Super E.	92123		
55				7.93 18.30
+50				2.01 19.22
56				1.09 20.14
+06.8	0.0 0.0			20.27
+31.8	.09 +09			0.50 20.73
T.P.	939	930.01	0.61	920.62
56+81.8 = 56+82.3				
57+07.3	-38 +38			7.89 22.12
+32.3	-47 +47			7.43 22.58
+57.3	-57 +57			69.4 23.05
58				6.17 23.84
+50				5.24 24.77

3.43	3.43
2.51	2.51
1.59	1.59
0.59	0.41
8.27	7.51
7.90	6.96
7.53	6.39
6.74	5.60
5.81	4.67

		930.01		
59	-57 +57			4.32 25.67
+50				3.51 26.50
60				2.80 27.21
TP	5.47	933.71	177	928.24
+50	-57 +57			5.89 27.82
61				5.99 28.32
+10.8	Est -57 +57			28.43
+60.3	-35 +35			4.92 28.79
62 +10.3	-19 +19			4.64 29.07
+60.3	00 00			4.48 29.23

		4.91	3.77		
		4.08	2.94		
		3.37	2.27		
Sol. in Tel P		25' Rt.	60 + 25		
		6.46	5.32		
		5.96	4.82		
		5.30	4.54		
		4.83	4.45		
		4.98	4.98		

		93371			
63				443 2928	
150				445 2926	
64				457 2914	
B.M	5.99	933.74	5.99	917.72	927.75
150				473 2901	
65				484 2888	
150				499 2875	
66				512 2862	
150				525 2849	
67				538 2836	

		4.93	4.93		
		4.95	4.95		
		5.07	5.07		
SPIL. IN 24" OAK 68' L. 63+10					
		5.23	5.23		
		5.36	5.36		
		5.49	5.48		
		5.62	5.62		
		5.75	5.75		
		5.88	5.88		

		933.74			
67+80				5.31 28.23	
+53.6	00 .00			5.16 28.14	
T.P	455	930.48 2.93	7.81	925.93 2.47	
68+33.6	+11 -11	5.7		28.01	
B.M					922.95
+83.6	+23 -23			2.60 27.88	
69+08.6	+29 -29			2.66 27.82	
69+27.3	+33 -33			2.70 27.78	
+56	+26 -26			2.77 27.71	
+87.8	+17 -17			2.87 27.61	
70	+15 -15			27.58	
+21.6	+13 -13			2.95 27.53	

6.01	6.01
6.10	6.10
2.36	2.58

Weld Top RC Cut @ 6878'

2.37	2.83
2.37	2.95
2.37	3.03
2.51	3.03
2.70	3.04
2.82	3.04

		93048		
70+55.4 PC	+11	-11		3.04 27.44
+80.4	+15	-15		27.37
71+05.0	+25	-25		3.17 27.31
+30.4	+33	-33		27.24
+56	"	"		3.29 27.19
72	"	"		3.42 27.06
+50	"	"		3.55 26.93
+98.7	+33	-33		3.67 26.86
73+03.7	+27	-27		3.69 26.79

2.93	3.13
2.92	3.42
2.96	3.62
3.09	3.75
3.22	3.88
3.29	3.95
3.42	3.96

		93048			
		2295			
~~23+25.7~~	+22 -27	95		26.77	
				3.82	
+53.7	+16 -16			26.66	
B.M			7.55	922.93	922.95
+78.7	+11 -11			26.59	
74+03.7	+05 -05			26.52	

366 ✓ 398 ✓

X- Mark on RR Culvt 65' Rt 68+80

	6.10				
0+00	Rt.		6.10		
0+11			6.20		
0+25			6.2		
0+50			5.4		
0+75			4.5		
1+00			3.3		
1+25			2.1		
1+32					
1+50			1.1		
0+11	Lt.		6.20		
0+25			6.70		
0+50			7.40		
0+75			7.70		
0+98			7.75		
1+25			8.0		

£ Pmt & £ Cleveland

1.95 · 1.85 1.95

8.0 8.0

South Cleveland

0+53 — 5.6, 5.3

1+00 — 3.6, 3.3

North.

0+50 — 7.3, 7.0

0+75 — 7.8, 75

52' E

77' E

52' W

77' W.

✓ NE Rad. 6.3

C1.0 4.6

C0.5 5.1

✓ SE. Rad. 5.6

C0.5 3.1

C0.5 3.1

✓ N.W. Rad. 7.0

✓ S.W. Rad. 6.6

7.3

7.3

7.8

7.8

5.20

5.15

4.8

4.75

7.2

7.2

7.65

7.65

B.M	3.13	927.88		924.75	
80				3.83 24.05	
+50				4.05 23.83	
81				4.28 23.60	
+50				4.51 23.37	
82				4.73 23.15	
+50				4.92 22.96	
83				4.94 22.94	
+50				4.80 23.08	
T.P	5.55	928.79	4.64	92324	
84				5.40 23.39	

Sept. 28. 1942

...k.m P.R 36 Lt. 79+33

4.33	4.33
4.55	4.55
4.78	4.78
5.01	5.01
5.23	5.23
5.42	5.42
5.44	5.44
5.30	5.30
5.90	6.96

		928.79			
84 +5°				4.90 23.89	
85				4.22 24.57	
+5°				3.40 25.39	
86				2.58 26.21	
+5°				1.75 27.04	
87				0.93 27.86	
+5° T.P	5.73	923.83	0.69	0.20 28.59 928.10	
B.M					940.31
88				4.71 29.12	
+5°				4.34 29.47	

5.40	5.40
4.72	4.72
3.90	3.90
3.08	3.08
2.25	2.25
1.43	1.43
0.70	0.70

16" oak 85' at 87+50

5.21	5.21
4.86	4.86

		933.83		
89				4.21 29.62
+50				4.24 29.59
90				4.48 29.35
+50				4.91 28.92
91				5.53 28.30
+50				6.34 27.49
T.P.	1.01	927.98	6.56	926.97
92				1.56 1.50 26.48
+50				2.60 25.38
93				3.70 24.28

4.71	4.71
4.74	4.74
4.98	4.98
5.41	5.41
6.03	6.03
6.84	6.84
2.00	2.00
3.10	3.10
4.20	4.20

		927.98			
93+50				4.80 23.18	
94				5.9 22.08	
+50				7.00 20.98	
B.M.	0.96	922.25	621	921.97	921.79
95				2.97 19.88	
+50				3.39 18.86	
96				4.24 18.01	
+50				4.92 17.33	
97				5.02 16.83	
+50				5.74 16.51	

		5.30	5.30		
		6.4	6.4		
		7.5	7.5		

SPK. in 12" OAK 65' at 94+25 Sept 28 1942

		2.87	2.87		
		3.89	3.89		
		4.74	4.74		
		5.42	5.42		
		5.92	5.92		
		6.24	6.24		

		922.25		
98				5.84 16.36
+50				5.93 16.32
99				5.98 16.27
T.P.	4.49	920.02	6.72	915.53
+50				3.80 16.22
100				3.85 16.17
+50				3.90 16.12
101				3.95 16.07
+50				4.00 16.02
102				4.05 15.97

6.39	6.39
6.43	6.43
6.48	6.48
4.30	4.30
4.35	4.35
4.40	4.40
4.45	4.45
4.50	4.50
4.55	4.55

		920.02			
102 +50				4.10 15.92	
103				4.15 15.87	
+50				4.20 15.82	
T.P.	5.57	920.32	5.27	914.75	
104				4.55 15.77	
+50				4.60 15.72	
105				4.40 15.92	
+50				3.72 16.60	
BM			2.47 445	917.85	917.91

4.60	4.60
4.65	4.65
4.70	4.70
5.05	5.05
5.10	5.10
4.90	4.90
4.22	4.22

SPK in Tel R 31' Rt. 108+19

Truck No.	License	Owner	Tire Size	Make
1 ·	X3474	P. Sorenson	9.75	Wills
2 ·	X26-373	P. Sorenson	9.00	Federal
3 ·	X38-884	Frank McKenna	9.75	Intern'l
4 ·	X27-578	Melvin Lodehl	7.50	Ford
5 ·	X41-531	Nick Blees	9.00	Intern'l
8 ·	X55-239	Clere W. Perkins	8.25	Ford
11 ·	X56-121	Geo. Golembewski	8.25	G.M.C
12 ·	X41-084	Ed. Michofer	7.00	Chev.
13 ·	X2828	Mary A. Wildenover	7.20	Dodge
17 ·	X26-360	Horval John	8.25	Chev.
18 ·	X66-328	Joe Dotty	6.00	Ford
20 ·	X2674	Albert Amsden	7.50	chev.
28 ·	X11-723	Paul Paytal	7.00	Ford.
33 ·	X46-668	Ben. H. Lee	7.50	Dodge
36 ·	X27-575	Irving B. Anderson	7.50	Intern'l
47 ·	X30-170	Bert Warden	7.00	Ford
56 ·	X40-480	Leon Turnbull	8.25	Chev

Length	Width	Heighth	Capacity Cu. yds
8.0'	5.8'	2.33'	4.0 ✓
2.0'	6.0'	2.0'	4.0 ✓
0.5'	5.6'	2.05'	4.0 ✓
3.0'	5.5	1.85'	3.0 ✓
3.0'	6.1	1.95'	4.0 ✓
2.0'	6.0	1.70'	3.0 ✓
2.0'	6.0	1.70'	3.0 ✓
5.6'	5.7'	2.08'	3.3 ✓
7.45'	5.5'	2.00'	3.0 ✓
8.0'	6.0'	2.27	4.0 ✓
7.0'	5.5'	2.10'	3.0 ✓
8.0'	5.5'	1.85'	3.0 ✓
8.05'	5.55'	2.08'	3.0 ✓
8.0'	6.0'	1.70'	3.0 ✓
8.0'	5.5'	1.85	3.0 ✓
7.0	5.55	2.15	3.1 ✓
8.0	6.0	2.25	4.0 ✓

Truck No.	License	owner	Tire Size	Make
1	X53-207	C.F. Soulleys	8.25	Ford
2	X53-209	"	8.25	Ford
3	X53-208	"	8.25	Ford
4	X9514	"	8.25	Ford
5	X58-289	"	8.25	Ford
6	Duplicate X584	"	8.25	G.M.C.
7	X41-372	"	8.25	Chev.
8	Dup. X583	"	8.25	Chev.
9	Dup. X397	"	9.00	Ford
10	X43-484	"	8.25	Ford
13	X69-219	"	8.25	G.M.C

Water Tank # 1
" " # 2

ength	Width	Heighth	Capacity Cu. yds
8.0'	6.05'	2.30'	4.1 ✓
7.95'	6.05'	2.30'	4.1 ✓
8.00'	6.00'	2.30'	4.1 ✓
8.00'	6.00'	2.30'	4.1 ✓
8.00'	5.60'	2.47'	4.1 ✓
8.00'	6.00'	2.33'	4.1 ✓
8.00'	6.10'	2.27'	4.1 ✓
8.00'	6.00'	2.25'	4.0 ✓
8.00'	5.70'	2.43'	4.1 ✓
8.00'	5.55'	2.40'	3.9 ✓
.90	5.5'	2.57'	4.1 ✓
8.00'	5.0'	4.01'	1200 Gals
.9'		3.7' Diameter	635 "

Item 2120.5M S.P 62-511-01

	1200 Gal.		635 Gal.		
Date	Loads	Gallons	Loads	Gallons	
4-28	5	6000			
4-30	1	1200			
5-1	3	3600			
5-3	3	3600			
5-11			2	1270	
				Total	15,670
		Item	2203.5L		
5-11			1	635	
				Total	635

Item 2120.5M S.P. 27-516-01

1200 Gal.

Date.	Loads	Gallons
5-1	1	1200.
	Total	1200

Thur. May 20, 1943

Bit. Matl for Wearing Course
775 Gal. at 150°
Shot 620 Gal. at County Road "C" & Cleveland Ave.
620 Gal. at 150° = 600 Gal

Shot 130 Gal. for tack
130 Gal. at 150° = 126 Gal
Total 726 Gal

Bit. Matl for Prime Coat
Placed 208 Gal. at 108° = 204 Gal

Wed. May 19, 1943

Item No. 2321.5D

Mineanal Aggregate Delivered by Industrial Aggregate Co.

Loads	1	12200 Lbs
"	2	11900 "
"	3	12900 "
"	4	12700 "
"	5	12700 "
"	6	12000 "
"	7	12500 "
"	8	13100. "
		100000 Lbs
		50 Tons.

Item No.

2524.5A1a Trench 0-6'

Sta. to Sta.

75+66 - 77+50 = 184'

Total 184'

Item No.

2524.5A1b Trench 0-10

Sta. to Sta.

77+50 - 79+40 190'

79+40 - 79+62

79+62 - 81+50 188'

Total 378'

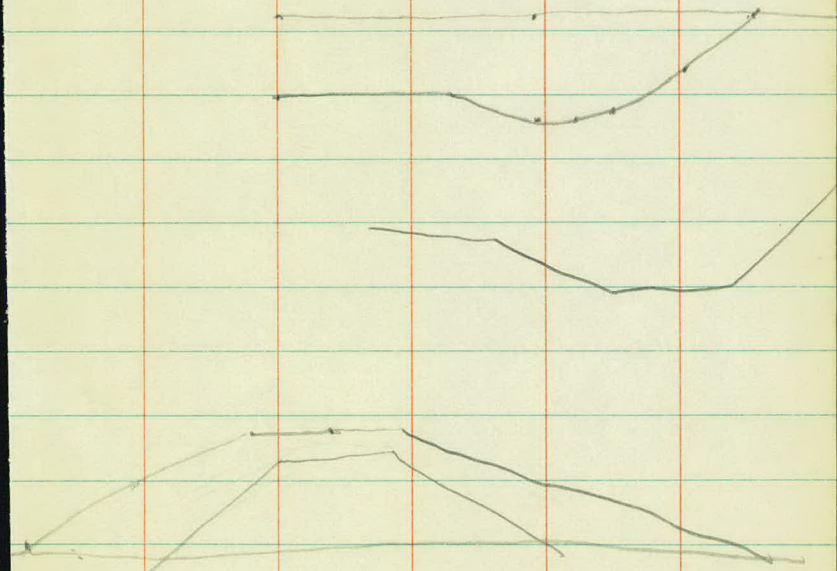
8" x 22' C.M. Pipe Jacked under Slab. New Brighton Rd.

Sta.	Item No. 2391.59. Foundo
25+48.0	1
25+57.0	1
26+31.4	1
26+40.4	1
Total	4

) Headers -

Sta.	Item No. 2391-5I Temporary Cr
53+02	1
Total	1

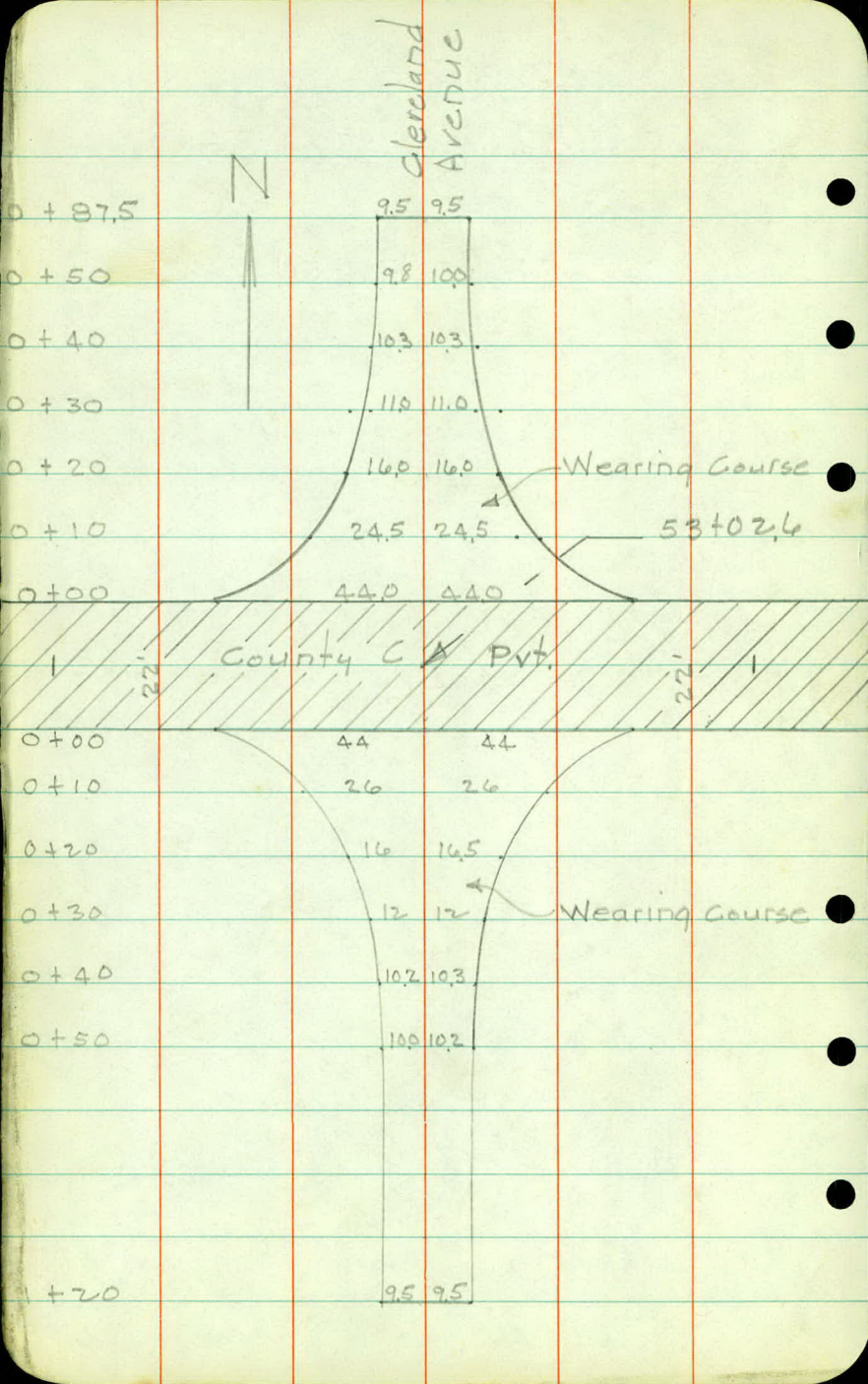
ing



Wearing Course

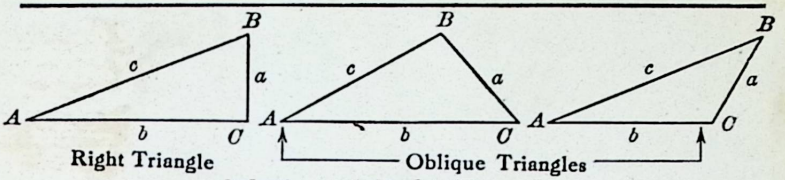
Item No 2321.5F

S.P. 62-511-01


Cleveland Avenue
N
0+87.5
0+50
0+40
0+30
0+20
0+10
0+00
9.5 9.5
9.8 10.0
10.3 10.3
11.0 11.0
16.0 16.0
24.5 24.5
44.0 44.0
Wearing Course
53+02.6
County C
Pvt.
22'
22'
0+00
0+10
0+20
0+30
0+40
0+50
1+20
44 44
26 26
16 14.5
12 12
10.2 10.3
10.0 10.2
9.5 9.5
Wearing Course

Width	Sq Ft.
19.0	
	727.5
19.8	
	202.0
20.6	
	213.0
22.0	
	270.0
32.0	
	405.0
49.0	
	685.0
88.0	
88.0	
	700.0
52.0	
	422.5
32.5	
	282.5
24.0	
	222.5
20.5	
	203.5
20.2	
	1372.0
19.0	
	5705.5 Sq Ft = 633.9 Sq. Yds.

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

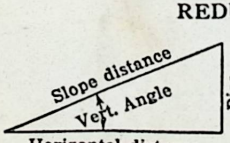
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

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 $= \frac{b c \sin A}{2}$
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.