4 299

Tunnel 4
Final Timber

O.R. to A.D. 2nd Main Tube Line

Tunnel #4 Construction

W299

Reciprocal of 1095 = .091324

Our Leather Bound Engineers Note Books are carried in the following rulings:

No. 380 LEVEL BOOK. Left and Right Hand Page the same as Left Hand Page of this Book.

No. 382 FIELD BOOK. Left Hand Page as in this Book, Right Hand Page 4 x 4 to the inch, Center Line Red.

No. 384 MINING TRANSIT BOOK. Left Hand Page as in this Book, Right Hand Page 8x8 to the inch, Center Line Red.

No. 385 FIELD BOOK. Left Hand Page as in this Book, Right Hand Page 8 vertical and 4 horizontal lines to the inch, Center Line Red.

We also carry the Note Books listed above, bound in extra strong Fabri-Hide (otherwise the same quality of book), which can be furnished at a somewhat lower price.

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THE FREDERICK POST CO.

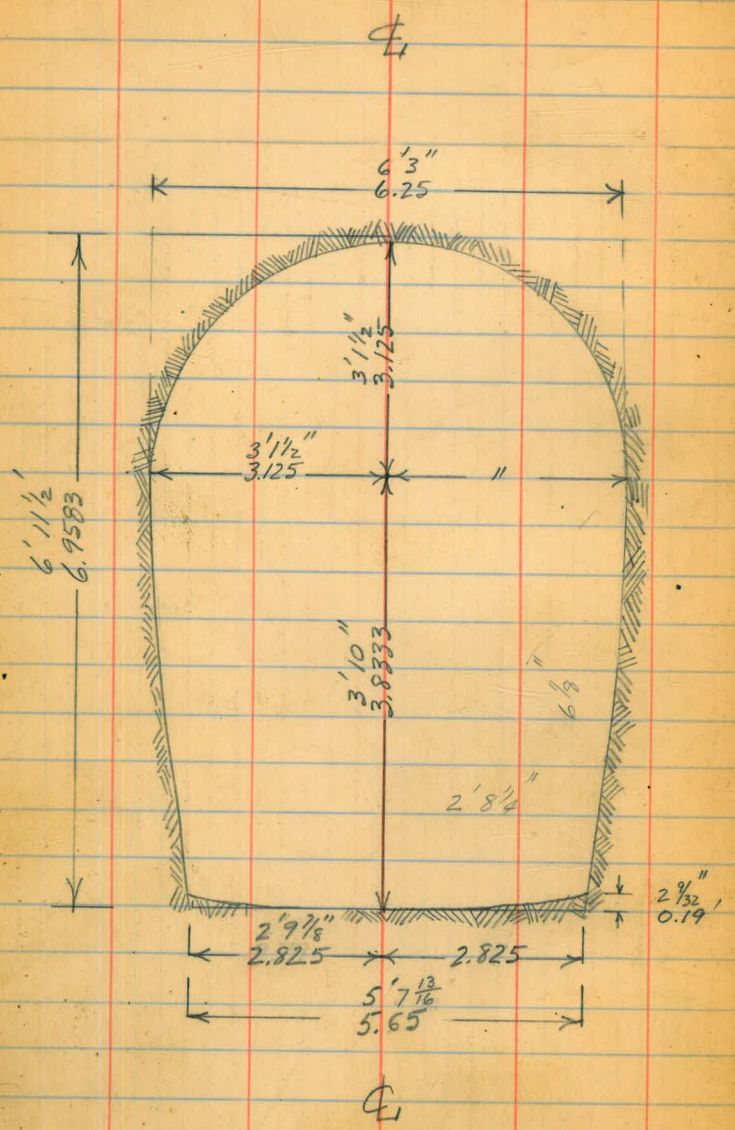
ENGINEERING and DRAFTING SUPPLIES

IRVING PARK STATION

CHICAGO, ILL.

Otay Reservoir to San Diego 2nd Main Pipe Line. Tunnel #4 Construction Book.

Index



Copied from original Tunnel Book
Mar 15 M.D.E

Alignment over Top.

	○	Iron Pin
~~298+32.51~~	4	~~Hub~~ Out
298+03.42	⌊4	Exit Portal
297+39.21	○	Iron pin
294+72.00	○	Iron pin
292+82.64	○	Iron pin
288+53.88	○	Iron pin
287+08.92	4	Entrance Portal
286+13 ±	○	(set Mar 7 1930) Iron pipe
	○	Iron pin

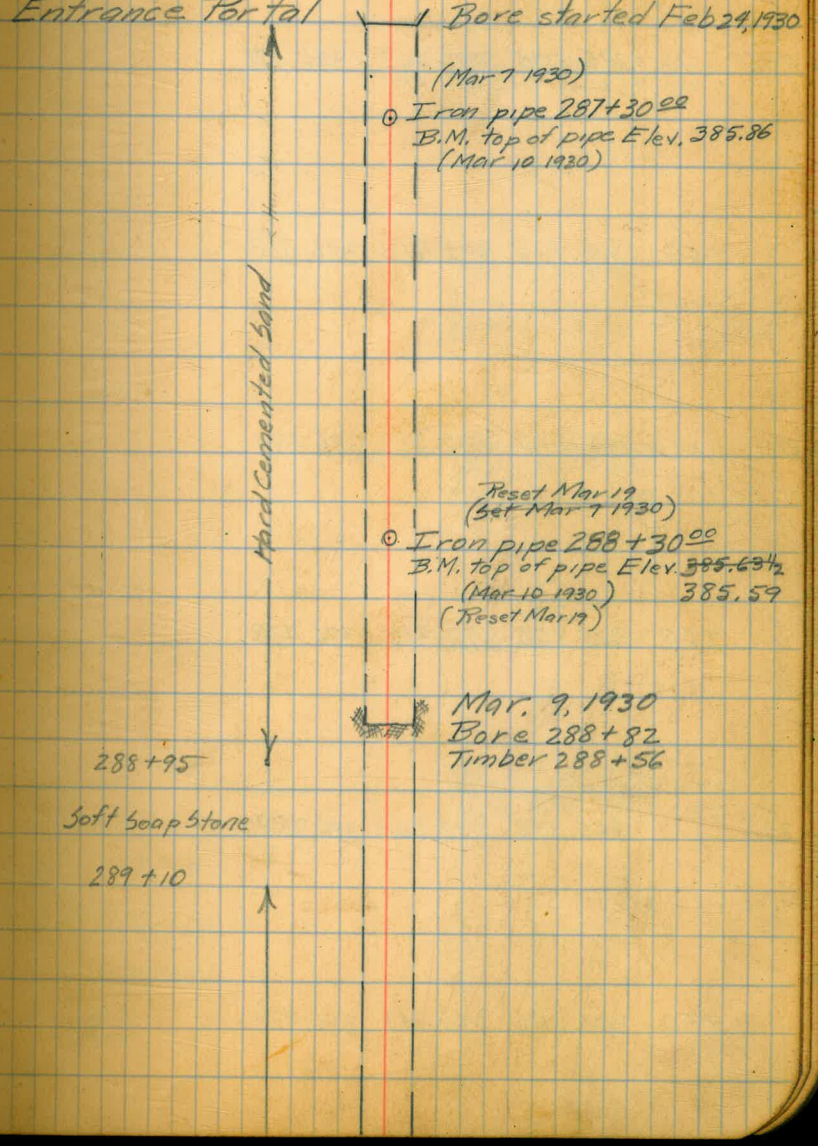
Refer to reference point book

Tunnel #4

	Excavation Bottom	Grade top	Pipe Line Grade
287+08.42	385.797	392.755	386.88
+50	385.755	392.713	386.838
288	385.705	392.663	386.788
+50	385.655	392.613	386.738
289	385.605	392.563	386.688
+50	385.555	392.513	386.638

0.10%

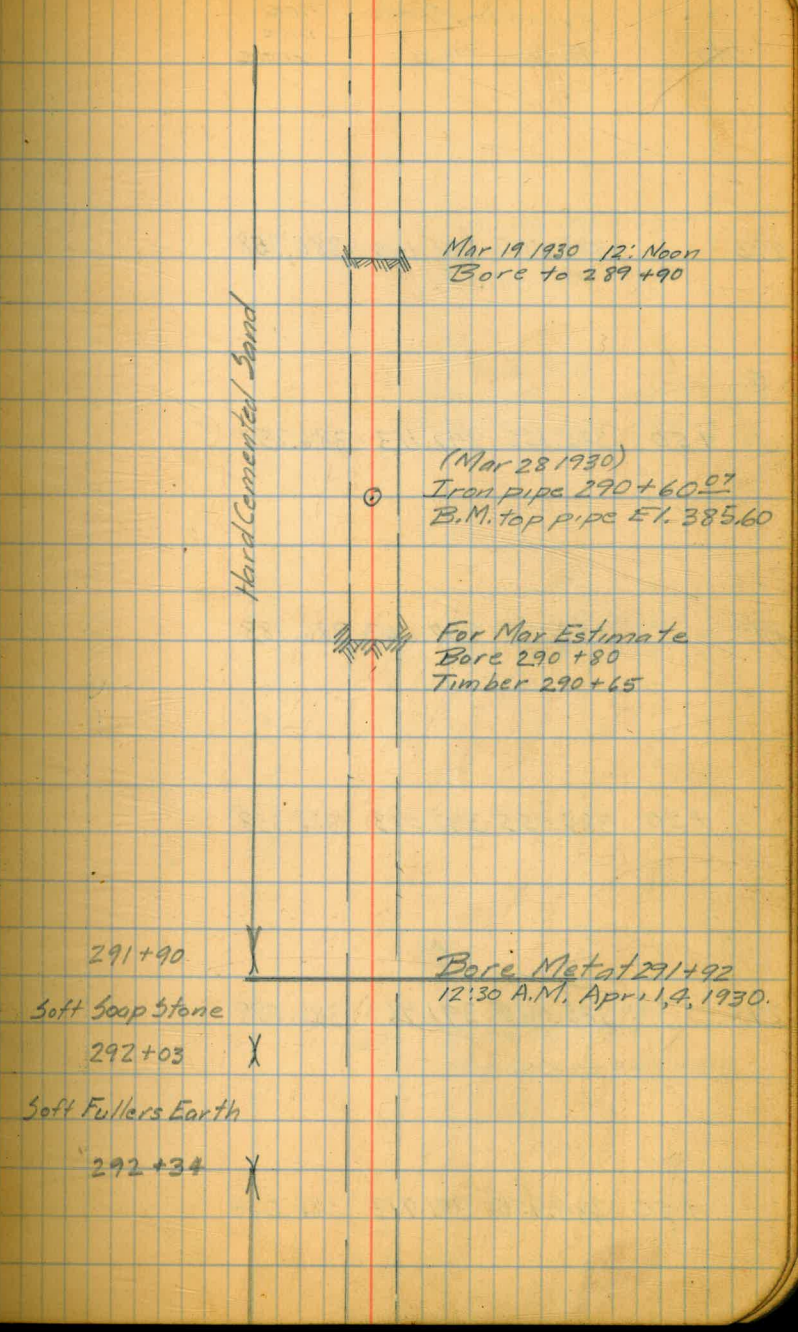
392.755
385.797
6.958



Tunnel #4

Sta	Excavation Grade Bottom	Excavation Grade Top	Pipe Line Grade
290	385.505	392.463	386.588
+50	385.455	392.413	386.538
291	385.405	392.363	386.488
+50	385.355	392.313	386.438
292	385.305	392.263	386.388
+50	385.255	392.213	386.338

0.10%



Tunnel #4

Sta.	Excavation Grade Bottom	Excavation Grade Top	Pipe Line Grade
293	385.205	392.163	386.288
+50	385.155	392.113	386.238
294	385.105	392.063	386.188
+50	385.055	392.013	386.138
295	385.005	391.963	386.088
+50	384.955	391.913	386.038

0.10%

Hard Cemented Sand Strata of Soapstone

For Mar 1930 Estimate
Bore 293+00
Timbers 293+05

(Mar 25, 1930)
Iron pipe 293 +39.27
B.M. top of pipe 385.14

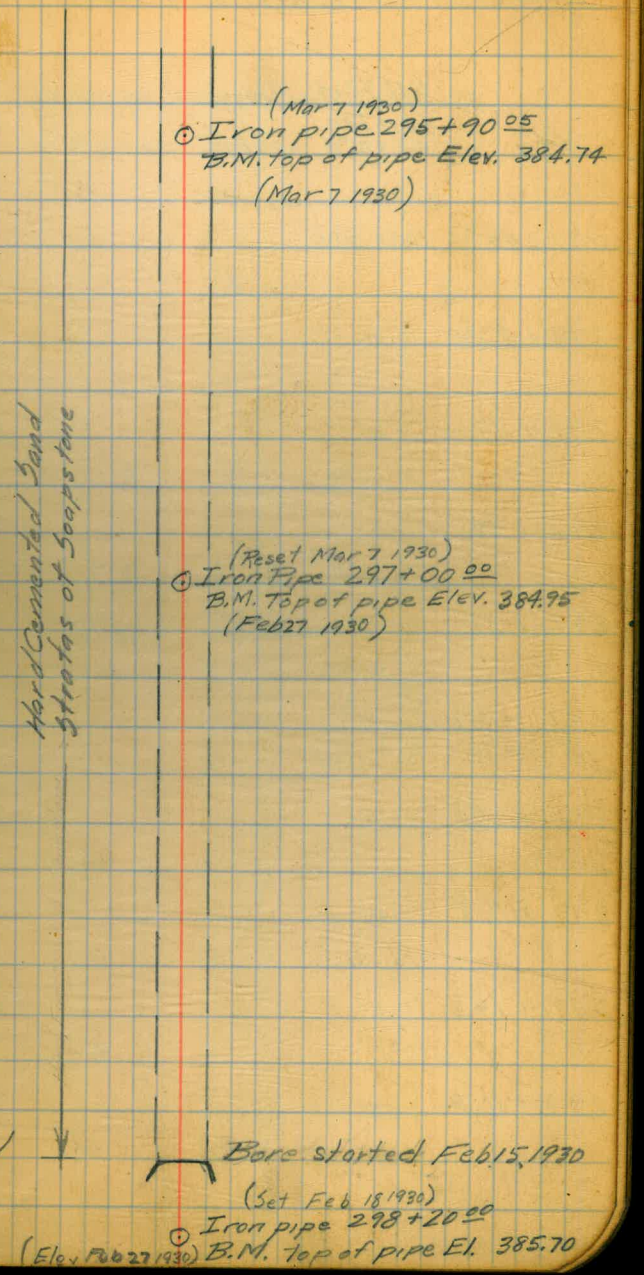
Mar 19 1930 10:A.M.
Bore to 294+00

Mar 9, 1930
Bore to 295+07
Timbers to 295+07

Tunnel #4

Sta	Excavation Bottom	Grade Top	Pipe Line Grade
296	384.905	391.863	385.988
+50	384.855	391.813	385.938
297	384.805	391.763	385.888
+50	384.755	391.713	385.838
298	384.705	391.663	385.788
+03.42	384.702	391.660	385.785

-0.10%



Timbered Section - Tunnel #4

Monthly Estimate to 3 P.M. Feb 26, 1930

Exit Portal

Sta	Sill, Post + Cap Pcs. 4"×6"×	Lagging 2"×10"	Lagging 2"×12"	Board 4"×6"	Board 2"×10"	Measure 2"×12"
297+47 3	One Set			51.08 ✓		
		2	1		13.36 ✓	8.0
297+43 2	"			51.08 ✓		
		1	2		6.68 ✓	16.0
297+39 1	"			51.08		
		1	2		6.68 ✓	16.0
297+35	"			51.08		
		1	2		6.68	16.0
297+31	"			51.08		
		3	6		20.04 ✓	48.0
297+27	"			51.08		
		3	6		20.04	48.0
297+22 8	"			51.08		
		3	6		20.04	48.0
297+18 8	"			51.08		
		3	6		20.04	48.0
297+14 7	"			51.08		
		3	6		20.04	48.0
297+10 6	"			51.08		
		2	4		16.70 ✓	40.0
				510.80 ✓	150.30	336.0
				✓ A.C.L.	✓ A.C.L.	✓ A.C.L.

Converse
H.H.
Elliott
Simpson

Estimate to 3 P.M.
Mar. 26, 1930

9

Lagging 2×10	Lagging 2×12	Board Measure 2×10	Board Measure 2×12
	1		8.0 ✓
1	1	6.67 ✓	8.0 ✓
			16.0
			6.67
			22.67 - Est. #2

- M.P.E.

Continued from page 9

Sta	Sill, Posts, Caps 4"×6"	Lagging 2"×10"	Lagging 2"×12"	Board 4"×6"	Board 2"×10"	Measure 2"×12"
				510.80	150.30	336.0
297 + 05 5	One Set			51.08		
		2	4		16.70	40.0
297 + 00 4	"			51.08		
		3	6		25.05	60.0
296 + 95 6	"			51.08		
5.0		4	5		33.40	50.0
296 + 90 6	"			51.08		
4.5		3	5		22.55	45.0
296 + 85 9	"			51.08		
4.5		3	4		22.55	36.0
296 + 81 4	"			51.08		
		3	6		22.55	54.0
296 + 76 8	"			51.08		
		3	6		22.55	54.0
296 + 72	"			51.08		
		3	6		22.55	54.0
296 + 67 5	"			51.08		
		3	6		22.55	54.0
296 + 63	"			51.08		
		3	6		22.55	54.0
296 + 58 5	"			51.08		
To 3: P.M. Feb 26, 1930 —				1072.68	~~383.30~~ 381.30	837.0
				1072. ✓A.C.L.	382.53 ✓A.C.L.	✓A.C.L.

Estimate to 3 P.M. Mar 26 1930 — 10

2×10. 2×12

144
30
174

30.0 144.0 Total to be added to Mch. 1st Estimate

1	3	7.5	27.0	
2	6	15.0	54.0	
1	7	7.5	63.0	Feb. Estimates

868.36
293.10
621.00
1782.96

1072.68 ✓
~~381.30~~ 383.30 ✓
837.00 ✓
~~2290.98~~
2292.98 ✓A.C.L.

Estimate #1 2291.0

Timbered Sections Tunnel #9.
Monthly Estimate to 3 P.M. 2/26/30

Entrance Portal

Feb Estimate

Sta.	Sill, Posts, Caps. 4"x6"	Lagging 2"x10"	Lagging 2"x12"	Board 4x6	Board 2x10
287+10	One Set			51.08	
		3	6		20.04
+14	"			51.08	
		3	6		20.04
+18	"			51.08	
		3	6		20.04
+22	"			51.08	
		3	6		20.04
+26	"			51.08	
		3	6		20.04
+30	"			51.08	
		3	6		20.04
+34	"			51.08	
To 3 P.M. Feb 26, 1930				357.56	120.24
				V A.C.L.	V A.C.L.

Above stationing taken from inspectors reports. By actual measurement above sets are 4.5 instead of 4.0

Note - difference between measurements below and Feb. Est. to be added to Mch. Est.

Measure 2"x12"	Board Measure 4x6	Board Measure 2x10	Board Measure 2x12
	51		
48.0		22.5	54
	51		
48.0		22.5	54
	51		
48.0		22.5	54
	51		
48.0		22.5	54
	51		
48.0		22.5	54
	51		
288.0 V A.C.L.	357 V A.C.L.	135.0 V A.C.L.	324 V A.C.L.

324
135
357
816
766
50.0

357.56
120.24
288.00
765.80 V A.C.L.

Estimate #1 — 766.0

Timbered Section - Tunnel 4

Monthly Estimate to 3 P.M. Mar 26 1930

Exit Portal

Sta.	Sill. Posts Caps & Braces 4×6	Logging 2×10	Logging 2×12	Board Measure 4×6	Board Measure 2×10	Board Measure 2×12
296+58.5						
		4	7		30.0	63.0
+54	One Set			51.0		
		3	6		22.5	54.0
+49	"			51.0		
		4	9		30.0	81.0
+45	"			51.0		
		3	10		22.5	90.0
+40.4	"			51.0		
		4	10		30.	90
+36.0	"			51.0		
		6	11		45	99
+31.4	"			51.0		
		5	14		37.5	126
+26.6	"			51.0		
		5	14		37.5	126
+22.2	"			51.0		
		4	15		30.	135
+17.8	"			51.0		
		5	14		37.5	126
+13.2	"			51.0		
		5	14		37.5	126
+08.3	"					
				510.0	360.0	1116.0
	11	48	124	m.o.s.	m.o.s.	m.o.s.

Continued from page 12

	Pieces 4"x6"	2x10	2x12	Board Measure 4x6	2x10	2x12
296+08.3		28	129	51		
	"	4	15		30	135
+04.3	One Set			51		
		5	14		37.5	126
+00.2	"			51		
		5	14		37.5	126
295+95.4	"			51		
		5	14		37.5	126
+91.0	"			51		
		4	10		30	90
+86.5	"			51		
		3	6		22.5	54
+81.5	"			51		
		5	7		37.5	63
+77.5	"			51		
		4	13		30.0	117
+73.1	"			51		
		4	14		30.0	126
+68.5	"			51		
		5	14		37.5	126
+63.9	"			51		
		9	10		67.5	90
+59.3	"			51		
		5	14		37.5	126
+54.8	"					
	23	106	269	C12.0	+35.0 Chkd M.R.E.	1305.0

Continued from page 13

	Pieces 4"x6"	2x10	2x12	Board Measure 4x6	2x10	2x12
295+54.8	23	106	269	51		
		5	14		37.5	126
+50.2	One Set			51		
		5	14		37.5	126
+45.5	"			51		
		5	13		37.5	117
+41.2	"			51		
		6	13		45.0	117
+36.7	"			51		
		5	13		37.5	117
+32.2	"			51		
		5	14		37.5	126
+27.7	"			51		
		5	14		37.5	126
+23.2	"			51		
		5	14		37.5	126
+18.6	"			51		
		5	14		37.5	126
+14.1	"			51		
		5	14		37.5	126
+09.6	"			51		
		5	14		37.5	126
+05.2	"			51		
		5	14		37.5	126
295+00.6	"					
	35	167	434	612.0	457.5	1485.0

Chkd

Continued from page 14

	Pieces			Board Measure		
	4×6	2×10	2×12	4×6	2×10	2×12
295+00.6	35	167	439	51		
		5	14		√ 37.5	√ 126
294+96.0	One Set			51		
		5	14		√ 37.5	√ 126
+91.4	"			51		
		5	14		√ 37.5	√ 126
+86.9	"			51		
		5	14		√ 37.5	√ 126
+82.4	"			51		
		4	10		√ 30.0	√ 90
+77.9	"			51		
		4	10		√ 30.0	√ 90
+73.4	"			51		
		4	10		√ 30.0	√ 90
+68.8	"			51		
		4	10		√ 30.0	√ 90
+64.2	"			51		
		5	14		√ 37.5	√ 126
+59.7	"			51		
		5	14		√ 37.5	√ 126
+55.2	"			51		
		5	14		√ 37.5	√ 126
+50.6	"			51		
		5	14		√ 37.5	√ 126
+46.0	"				√	√
	47	223	586	612.0	420.0 chkd	1368.0 M.B.E.

Continued from page 15

	Pieces			Board Measure		
	4x6	2x10	2x12	4x6	2x10	2x12
294+46.0	47	223	586	51		
		5	14		✓ 37.5	✓ 126
+41.4	One Set			51		
		5	14		✓ 37.5	✓ 126
+36.8	"			51		
		5	13		✓ 37.5	✓ 117
+32.4	"			51		
		5	14		✓ 37.5	✓ 126
+27.8	"			51		
		5	14		✓ 37.5	✓ 126
+23.3	"			51		
		4	10		✓ 30.0	✓ 90
+18.7	"			51		
		4	10		✓ 30.0	✓ 90
+14.2	"			51		
		5	14		✓ 37.5	✓ 126
+09.7	"			51		
		3	10		✓ 22.5	✓ 90
+05.2	"			51		
		13	6		✓ 97.5	✓ 54
+00.5	"			51		
		5	14		✓ 37.5	✓ 126
293+96.3	"			51		
		5	14		✓ 37.5	✓ 126
+91.7	"					
	59	287	733	612.0	480.0 ✓ Chkd M.S.C.	1323.0 ✓

Continued from page 16

	Pieces			Board Measure		
	4×6	2×10	2×12	4×6	2×10	2×12
293+91.7	59	287	733	51.		
		5	14		✓ 37.5	✓ 126
+87.3	One Set			51		
		5	14		✓ 37.5	✓ 126
+82.7	"			51		
		5	14		✓ 37.5	✓ 126
+78.1	"			51		
		5	14		✓ 37.5	✓ 126
+73.6	"			51		
		5	14		✓ 37.5	✓ 126
+69.0	"			51		
		5	14		✓ 37.5	✓ 126
+64.4	"			51		
		5	14		✓ 37.5	✓ 126
+60.0	"			51		
		5	14		✓ 37.5	✓ 126
+55.3	"			51		
		5	14		✓ 37.5	✓ 126
+50.7	"			51		
		2	17		✓ 15.0	✓ 153
+46.2	"			51		
		5	14		✓ 37.5	✓ 126
+41.5	"			51.		
		5	14		✓ 37.5	✓ 126
+37.0	"			51	✓	✓
	71	394	904	663	+27.5 Ckd	15-39 MDE

Continued from page 17

	Pieces			Board Measure		
	4×6	2×10	2×12	4×6	2×10	2×12
	71	5	14		37.5	126
293+32⅝	One Set			51		
		5	14		37.5	126
+28°	11			51		
		5	14		37.5	126
+23⅝	11			51		
		5	14		37.5	126
+19°	11			51		
		5	14		37.5	126
+14⅝	11			51		
		5	14		37.5	126
+10°	11			51		
		5	14		37.5	126
+05⅝	11			51	262.5	882
	78	379	1002	3978.0	2842.5	2018.0 CB & HH 3/26/30
				A.C.L.	A.C.L.	A.C.L.

9018.0
2842.5
3978.0
15838.5

Timbered Sections Tunnel #4

Monthly Estimate to 3 P.M. Mar. 26, '30 Hill Elliott notes. Simpson

Entrance Portal

Sta	Sill, Posts Caps. Braces 4"x6"	Lagging 2"x10"	Lagging 2"x12"	Board Measure 4x6	Board Measure 2x10	Board Measure 2x12
287+08	One set			51.0		
		3	6		10.0	24.0
287+10						
287+38 = 287+34	On Feb. Est. (See page 11)					
		3	6		22.5	54
+42	One Set			51		
		3	6		22.5	54
+47	"			51		
		3	6		22.5	54
+51	"			51		
		3	6		22.5	54
+56	"			51		
		3	6		22.5	54
+60	"			51		
		None				
+61	"			51		
		3	6		22.5	54
+65	"			51		
		3	6		22.5	54
+70	"			51		
		3	6		22.5	54
+74	"			51		
		24				

Chtl M.D.E.

Continued from page 19

Sta.	Pieces 4"×6"	2"×10"	2"×12"	Board Measure 4×6	2×10	2×12
		3	6		22.5'	54'
287+79	One Set			51		
		3	6		22.5'	54'
+83	"			51		
		3	6		22.5'	54'
+88	"			51		
		3	6		22.5'	54'
+92	"			51		
		3	6		22.5'	54'
+97	"			51		
		3	6		22.5'	54'
288+01	"			51		
		3	6		22.5'	54'
+06	"			51		
		3	6		22.5'	54'
+10	"			51		
		3	6		22.5'	54'
+15	"			51		
		3	6		22.5'	54'
+20	"			51		
		3	6		22.5'	54'
+24	"			51		
		3	6		22.5'	54'
+29	"			51		
		60			A.C.L.	A.C.L.

Continued from page 20

Sta.		Pieces 4"x6"	2"x10"	2"x12"	Board Measure 4x6	2x10	2x12
			3	6		22.5	54
2	288+33.6	One Set			51		
			3	6		22.5	54
	+38.0	"			51		
			3	6		22.5	54
	+42.5	"			51		
			3	6		22.5	54
	+47.0	"			51		
			3	6		22.5	54
	+51.5	"			51		
			3	6		22.5	54
2	+56.0	"			51		
			3	6		22.5	54
	+60.7	"			51		
			3	6		22.5	54
	+65.4	"			51		
			3	6		22.5	54
	+69.8	"			51		
			3	6		22.5	54
	+74.3	"			51		
			3	6		22.5	54
	+78.1	"			51		
			3	6		22.5	54
	+83.5	"			51		
			96				

Continued from page 21

Sta	Pieces 4"×6"	Pieces 2×10"	Pieces 2"×12"	Board Measure 4×6	Board Measure 2×10	Board Measure 2×12
		3	6		22.5	54
288+88	One Set			51	"	"
		3	6		22.5	54
+92	"			51	"	"
		3	6		22.5	54
+97	"			51	"	"
		3	6		22.5	54
289+01	"			51	"	"
		3	6		22.5	54
+06	"			51	"	"
		3	6		22.5	54
+10	"			51	"	"
		3	6		22.5	54
+15	"			51	"	"
		3	6		22.5	54
+19	"			51	"	"
		3	6		22.5	54
+24	"			51	"	"
		3	6		22.5	54
+28	"			51	"	"
		3	6		22.5	54
+33	"			51	"	"
		3	6		22.5	54
+38	"			51		
		132				

Continued from page 22

Sta	Pieces 4×6	2×10	2×12	Board Measure. 4×6	2×10	2×12
		3	6		22.5	54
289+92	One Set			51		
		3	6		22.5	54
+46	"			51		
		3	6		22.5	54
+51	"			51		
		3	6		22.5	54
+56	"			51		
		3	6		22.5	54
+60	"			51		
		3	6		22.5	54
+65	"			51		
		3	6		22.5	54
+69	"			51		
		3	6		22.5	54
+74	"			51		
		3	6		22.5	54
+78	"			51		
		3	6		22.5	54
+83	"			51		
		3	6		22.5	54
+87	"			51		
		3	10		22.5	90
+92	"			51		
		168	340			

Continued from page 23

Sta		Pieces 4X6	2X10	2X12	Board Measure 4X6	2X10	2X12
			11.8	39.6			
			3	6		22.5	54
289 + 96.9	One Set				51		
			3	6		22.5	54
290 + 01.4	"				51		
			5	9		37.5	81
+ 06.0	"				51		
			4	10		30.0	90
+ 10.2	"				51		
			4	10		30.0	90
+ 15.0	"				51		
			5	14		37.5	126
+ 19.4	"				51		
			5	14		37.5	126
+ 24.1	"				51		
			5	14		37.5	126
+ 28.6	"				51		
			5	14		37.5	126
+ 33.2	"				51		
			4	14		30.0	126
+ 37.6	"				51		
			5	14		37.5	126
+ 42.0	"				51		
			5	14		37.5	126
+ 46.5	"				51		
			22.1	47.9		397.5	125.1

Continued from page 24

Sta	Pieces 4×6	2×10	2×12	Board Measure 4×6	2×10	2×12
		221	479			
		5	14		37.5'	126'
290 + 51	One Set			51'		
		5	14		37.5'	126'
+55	"			51'		
		5	14		37.5'	126'
+60	"			51'		
		5	14		37.5'	126'
+647	"			51'		
Not marked						
	74	221	535	3,774.0'	1817.5	4839.0' ch 4-14 3/26/30
				B.C.L.	B.C.L.	B.C.L.

4839.0'
1817.5'
3774.0'
10430.5' B.C.L.

Monthly Estimate #2. (March.)

Sta. 296+58.5 to 293+05.5	= 15,838.5 ✓
287+08 to 287+10 } 287+34 to 290+64.7 }	10,430.5 ✓
	26,269.0 ✓
Addition on Page 9	22.67 ✓
" " " 10	174.00 ✓
" " " 10	2.00 ✓
	26,467.67
Less correction on 4x6 Timbers 9-11	2.45 ✓
	26,465.22
	50.00 ✓
	26,515.22 ✓

Final Timber Count Tunnel #4

April 18, 1930 (Not including wedges.)

Elliott
Simpson
Bailey
Remmen

Sta	Sill, Posts, Cap 4 X 6	Lagging 2X10	Lagging 2X12	Board 4X6	Board 2X10	Measure 2X12
298+03	One set			51		
		3	16		17.43	112.0
298+00	"			51		
		3	16		15.0	96.0
297+97	"			51		
		3	16		22.5	144.0
+92	"			51		
		3	16		22.5	144.0
+88	"			51		
		3	16		22.5	144.0
+83	"			51		
		3	16		22.5	144.0
+79	"			51		
		3	16		22.5	144.0
+74.5	"			51		
		3	16		22.5	144.0
+70	"			51		
		3	16		22.5	144.0
+65.5	"			51		
		3	16		22.5	144.0
+61	"			51		
		3	16		22.5	144.0
				2349	1504.0	

2X10 x 3.0 x 2 x 10 x 3.5

2X12 x 3.0 2X12 x 3.5

2X10 x 4.5

2X12 x 4.5

Per Set

4 X 6

3 pcs 2' 8 3/4"

2 pcs 5' 2 3/8"

1 pc 6' 11"

Continued from page 27.

Final Timber Count.

Sta	Posts, Sills, Caps 4×6	Lagging 2×10	Lagging 2×12	Board Measure 4×6	2×10	2×12
297 +56.5	One Set			51		
		3	16		20.0	128.0
+52	"			51		
=		9	11		60.0	88.0
+47.3	"			51		
=		9	11		60.0	88.0
+43.2	"			51		
=		4	15		26.67	120.0
+39.1	"			51		
=		4	15		26.67	120.0
+35	"			51		
=		6	12		40.0	96.0
+31	"			51		
=		4	15		26.67	120.0
+27	"			51		
=		5	14		33.33	112.0
+22.8	"			51		
=		4	15		26.67	120.0
+18.8	"			51		
=		4	15		26.67	120.0
+14.7	"			51		
		4	15		26.67	120.0
+10.6	"			51		
		10	10		83.33	100.0
					454.68	1332.0

2×10×4.0

2×12×4.0

2×10×5a

2×12×5a

April 10 1930 — Final Timber Count. — Elliott notes Simpson Count Bailey & Remson

Sta.	Posts Sills Cap 4×6	Lagging 2×10	Lagging 2×12	Board 4×6	Board 2×10	Measure 2×12
297+05.5	One Set			51		
		10	10		83.33	100.0
297+00	"			51		
		9	10		75.00	100.0
296+95.6	"			51		
		6	13		50.00	130.0
+90.6	"			51		
		6	13		45.0	117.0
+85.9	"			51		
		6	13		45.0	117.0
+81.4	"			51		
		4	15		30.0	135.0
+76.8	"			51		
		5	14		37.5	126.0
+72	"			51		
		5	14		37.5	126.0
+67.5	"			51		
		5	14		37.5	126.0
+63	"			51		
		5	14		37.5	126.0
+58.5	"			51		
		5	14		37.5	126.0
+54	"			51		
		5	14		37.5	126.0
					553.33	1455.0

2×10×5.0 — 2×12×5.0 — 2×10×4.5 — 2×12×4.5

Final Timber Count

Sta	Sills, Posts, Caps. 4×6	Lagging 2×10	Lagging 2×12	Board Measure 4×6	Board Measure 2×10	Board Measure 2×12
296+49.5	One Set			51		
		5	14		37.5	126.0
+45	"			51		
		4	15		30.0	135.0
+40.4	"			51		
		4	15		30.0	135.0
+36	"			51		
		6	13		45.0	117.0
+31.4	"			51		
		5	14		37.5	126.0
+26.6	"			51		
		5	14		37.5	126.0
+22.2	"			51		
		4	15		30.0	135.0
+17.8	"			51		
		5	14		37.5	126.0
+13.2	"			51		
		5	14		37.5	126.0
+08.3	"			51		
		4	15		30.0	135.0
+04.3	"			51		
		5	14		37.5	126.0
296+00.2	"			51		
		5	14		37.5	126.0
					427.5	1539.0

2×10 × 4.5

2×12 × 4.5

Final Timber Count

Sta	Posts, Sill, Caps 4×6	Lagging 2×10	Lagging 2×12	Board 4×6	Board 2×10	Measure 2×12
295+95 4	One Set			51	〃	〃
		5	14		37.5	126.0
+91	〃			51	〃	〃
		5	14		37.5	126.0
+86 5	〃			51	〃	〃
		5	14		37.5	126.0
+81 5	〃			51	〃	〃
		6	13		45.0	117.0
+77 5	〃			51	〃	〃
		5	14		37.5	126.0
+73 1	〃			51	〃	〃
		5	14		37.5	126.0
+68 5	〃			51	〃	〃
		5	14		37.5	126.0
+63 9	〃			51	〃	〃
		10	10		75.0	90.0
+59 3	〃			51	〃	〃
		5	14		37.5	126.0
+54 8	〃			51	〃	〃
		5	14		37.5	126.0
+50 2	〃			51	〃	〃
		5	14		37.5	126.0
+45 5	〃			51	〃	〃
		5	14		37.5	126.0
					495.00	1467.0

2×10×4.5

2×12×4.5

Final Timber Count

Sta	Posts, Sill, Caps 4×6	Lagging 2×10	Lagging 2×12	Board 4×6	Board 2×10	Measure 2×12
295+41 2	One Set			51	"	"
		6	13		45.0	117.0
+36 7	"			51	"	"
		5	14		37.5	126.0
+32 2	"			51	"	"
		5	14		37.5	126.0
+27 7	"			51	"	"
		5	14		37.5	126.0
+23 2	"			51	"	"
		5	14		37.5	126.0
+18 6	"			51	"	"
		5	14		37.5	126.0
+14 1	"			51	"	"
		5	14		37.5	126.0
+09 6	"			51	"	"
		5	14		37.5	126.0
+05 2	"			51	"	"
		5	14		37.5	126.0
295 +00 6	"			51	"	"
		5	14		37.5	126.0
294+96	"			51	"	"
		5	14		37.5	126.0
+91 9	"			51	"	"
		5	14		37.5	126.0
					457.50	1503.0

2×10 × 4.5'

2×12 × 4.5'

Final Timber Count

Sta	Posts, Sill, Cap 4×6	Lagging 2×10	Lagging 2×12	Board 4×6	Board 2×10	Measure 2×12
294+86.9	One Set			51		
		5	14		37.5	126.0
+82.2	"			51		
		5	14		37.5	126.0
+77.9	"			51		
		5	14		37.5	126.0
+73.5	"			51		
		5	14		37.5	126.0
+68.8	"			51		
		5	14		37.5	126.0
+64.2	"			51		
		5	14		37.5	126.0
+59.7	"			51		
		5	14		37.5	126.0
+55.2	"			51		
		5	14		37.5	126.0
+50.6	"			51		
		5	14		37.5	126.0
+46.9	"			51		
		5	14		37.5	126.0
+41.9	"			51		
		5	14		37.5	126.0
+36.8	"			51		
		5	14		37.5	126.0
					450.00	1512.0

2×10×4.5'

2×12×4.5'

Final Timber Count

Sta	Posts, Sill, Caps 4×6	Lagging 2×10	Lagging 2×12	Board 4×6	Board 2×10	Measure 2×12
294+32.4	One Set			51		
		5	14		37.5	126.0
+27.8	"			51		
		5	14		37.5	126.0
+23.3	"			51		
		4	15		30.0	135.0
+18.7	"			51		
		5	14		37.5	126.0
+14.2	"			51		
		5	14		37.5	126.0
+09.7	"			51		
		5	14		37.5	126.0
+05.2	"			51		
		6	15		45.0	135.0
294+00.5	"			51		
		5	14		37.5	126.0
293+96.3	"			51		
		5	14		37.5	126.0
+91.7	"			51		
		5	14		37.5	126.0
+87.3	"			51		
		5	14		37.5	126.0
+82.7	"			51		
		5	14		37.5	126.0
					450.0	1530.0

2×10×4.5

2×12×4.5

Final Timber Count

Sta	Posts, Sill, Caps 4×6	Lagging 2×10	Lagging 2×12	Board 4×6	Board 2×10	Measure 2×12
293 +78 1/2	One Set			51	✓	
		5	14		37.5	126.0 ✓
+73 6/12	"			51	✓	
		5	14		37.5	126.0 ✓
+69 0/12	"			51	✓	
		5	14		37.5	126.0 ✓
+64 9/12	"			51	✓	
		5	14		37.5	126.0 ✓
+60 0/12	"			51	✓	
		5	14	100	37.5	126.0 ✓
+55 3/12	"			51	✓	
		5	14		37.5	126.0 ✓
+50 7/12	"			51	✓	
		2	17		15.0	153.0 ✓
+46 2/12	"			51	✓	
		5	14		37.5	126.0 ✓
+41 5/12	"			51	✓	
		5	14		37.5	126.0 ✓
+37 0/12	"			51	✓	
		5	14		37.5	126.0 ✓
+32 5/12	"			51	✓	
		5	14		37.5	126.0 ✓
+28 0/12	"			51	✓	
		5	14		37.5	126.0 ✓
					427.5'	1539.0

2×10 × 4.5'

2×12 × 4.5'

Final Timber Count

Sta	Posts, Sills, Caps 4×6	Lagging 2×10	Lagging 2×12	Board 4×6	Board 2×10	Measure 2×12
293 + 23.5	One Set			51	✓	
		5	14		37.5	126.0 ✓
+ 19.0	"			51	✓	
		5	14		37.5	126.0 ✓
+ 14.5	"			51	✓	
		5	14		37.5	126.0 ✓
+ 10	"			51	✓	
		5	14		37.5	126.0 ✓
+ 05.3	"			51	✓	
		5	14		37.5	126.0 ✓
293 + 00.7	"			51	✓	
		5	14		37.5	126.0 ✓
292 + 96.0	"			51	✓	
=		5	14		37.5	126.0 ✓
+ 91.5	"			51	✓	
=		5	14		37.5	126.0 ✓
+ 87.0	"			51	✓	
=		5	14		37.5	126.0 ✓
+ 82.5	"			51	✓	
		5	14		37.5	126.0 ✓
+ 78.0	"			51	✓	
		5	14 Double?		37.5	126.0 ✓ — ?
+ 73.5	"			51	✓	
		5	14		37.5	126.0 ✓
					450.0	1512.0

2×10×4.5

2×12×4.5

Final Timber Count

Sta	Posts, Sill, Cap 4×6	Lagging 2×10	Lagging 2×12	Board of 4×6	Board of 2×10	Measure 2×12
292+69 ±	One Set			51	✓	
		5	14		37.5	126.0
+64 5/ ±	"			51	✓	
		5	14		37.5	126.0
+60 ±	"			51	✓	
		5	14		37.5	126.0
+55 5/ ±	"			51	✓	
		5	14		37.5	126.0
+51 ±	"			51	✓	
		5	14		37.5	126.0
+46 5/ ±	"			51	✓	
		5	14		37.5	126.0
+42 ±	"			51	✓	
		5	14		37.5	126.0
+37 5/ ±	2 Sets			102	✓	
		5	14		37.5	126.0
+33 ±	2 Sets			102	✓	
5.0		5	14		41.67	140.0
+28 ±	2 Sets			102	✓	
		5	14		37.5	126.0
+23 5/ ±	2 Sets			102	✓	
		5	14		37.5	126.0
+19 ±	One Set			51	✓	
		5	14		37.5	126.0
					454.17	1526.0

2×10×4.5

2×12×4.5

2×10×5.0

2×12×5.0

2×10×4.5

2×12×4.5

Final Timber Count

Sta	Posts, Sill, Caps 4×6	Lagging 2×10	Lagging 2×12	Board Measure 4×6	Board Measure 2×10	Board Measure 2×12
292 + 14.5	One Set			51		
		5	14		37.5	126.0
+ 10	"			51		
		5	14		37.5	126.0
+ 05.5	"	2×10×4.5	2×12×4.5	51		
		5	14		37.5	126.0
292 + 01	"			51		
		5	14		37.5	126.0
291 + 96.5	"			51		
		5	14		33.33	112.0
+ 92.5	"	2×10×4.0	2×12×4.0	51		
		5	14		33.33	112.0
+ 88.5	"			51		
		5	14		37.5	126.0
+ 89	"			51		
		5	14		37.5	126.0
+ 79.5	"			51		
		5	14		37.5	126.0
+ 75	"	2×10×4.5	2×12×4.5	51		
		5	14		37.5	126.0
+ 70.5	"			51		
		5	14		37.5	126.0
+ 66	"			51		
		5	14		37.5	126.0
					441.66	1484.0

Final Timber Count

Sta	Posts, S.M. Caps 4×6	Logging 2×10	Logging 2×12	Board Measure 4×6	Board Measure 2×10	Board Measure 2×12
291 + 61.5	One Set			51		
		5	14		41.67	140.0
+ 56.5	"			51		
		5	14		37.5	126.0
+ 52.0	"			51		
		4	15		30.0	135.0
+ 47.5	"			51		
		4	15		30.0	135.0
+ 43.0	"			51		
		4	15		30.0	135.0
+ 38.5	"			51		
		5	14		37.5	126.0
+ 34.0	"			51		
		5	14		37.5	126.0
+ 29.5	"			51		
		10	10		75.0	90.0
+ 25.0	"			51		
		3	16		22.5	144.0
+ 20.5	"			51		
		4	15		30.0	135.0
+ 16.0	"			51		
		4	15		30.0	135.0
+ 11.5	"			51		
50		3	16		25.0	160.0
				426.67		1587.0

2×10×4.5 — 2×10×5.0

2×12×4.5 — 2×12×5.0

Final Timber Count

Sta	Posts, Sill Caps 4×6	Logging 2×10"	Logging 2"×12"	Board 4×6	Board 2×10	Measure 2×12
291+06.5	One Set			51		
		3	16		22.5	144.0
291+02	"			51		
		15	6		112.5	54.0
290+97.5	"			51		
		9	11		67.5	99.0
+93	"			51		
		4	15		30.0	135.0
+88.3	"			51		
		3	16		22.5	144.0
+83.9	"			51		
		3	16		22.5	144.0
+79.4	"			51		
		3	16		22.5	144.0
+75.0	"			51		
		3	16		22.5	144.0
+70.3	"			51		
		3	16		22.5	144.0
+65.6	"			51		
		5	14		37.5	126.0
+61.1	"			51		
		5	14		37.5	126.0
+56.6	"			51		
		5	14		37.5	126.0
					457.50	1530.0

2×10×4.5

2×12×4.5

Final Timber Count

Sta	Posts, Sill, Caps 4X6	Wagging 2X10	Wagging 2X12	Board 4X6	Board 2X10	Measure 2X12
290+52.0	One Set			51	"	"
a-		5	14		37.5	176.0
+47.3	"			51	"	"
		5	14		37.5	176.0
+42.6	"			51	"	"
		5	14		37.5	176.0
+37.9	"			51	"	"
		5	14		37.5	176.0
+33.2	"			51	"	"
		5	14		37.5	176.0
+28.5	"			51	"	"
		5	14		37.5	176.0
+24.0	"			51	"	"
		5	14		37.5	176.0
+19.5	"			51	"	"
		5	14		37.5	176.0
+15.0	"			51	"	"
		5	14		37.5	176.0
+10.9	"			51	"	"
		5	14		37.5	176.0
+06.0	"			51	"	"
		6	13		45.0	117.0
290+01.9	"			51	"	"
		5	14		37.5	176.0
					4-57.5	1503.0

2X10 x 4.5

2X12 x 4.5

Final Timber Count

Sta.	Pieces: Posts, Sill Caps 4×6	Pieces: Lagging 2×10	Pieces: Lagging 2×12	Board Measure: 4×6	Board Measure: 2×10	Board Measure: 2×12
289+96	One Set			51		
		5	14		37.5	126.0
+92	"			51		
		5	14		37.5	126.0
+87	"			51		
		4	15		30.0	135.0
+83	"			51		
		11	9		82.5	81.0
+78	"			51		
		15	6		112.5	54.0
+74	"			51		
		3	16		22.5	144.0
+69	"			51		
		9	11		67.5	99.0
+65	"			51		
		3	16		22.5	144.0
+60	"			51		
		3	16		22.5	144.0
+56	"			51		
		4	15		30.0	135.0
+51	"			51		
		4	15		30.0	135.0
+46	"			51		
		4	15		30.0	135.0
					525.00	1458.0

2×10 × 4.5

2×12 × 4.5

Final Timber Count

Sta	Pieces 4 x 6	Pieces 2 x 10	Pieces 2 x 12	Board Measure 4 x 6	Board Measure 2 x 10	Board Measure 2 x 12
289 + 42.5	One Set			51	"	"
		9	11		67.5	99.0
+38.0	"			51	"	"
		3	16		22.5	144.0
+33.5	"			51	"	"
		3	16		22.5	144.0
+28.8	"			51	"	"
		3	16		22.5	144.0
+29.4	"			51	"	"
		3	16	200	22.5	144.0
+19.8	"			51	"	"
		3	16		22.5	144.0
+15.2	"			51	"	"
		3	16		22.5	144.0
+10.6	"			51	"	"
		3	16		22.5	144.0
+06.2	"			51	"	"
		3	16		22.5	144.0
289 +01.6	"			51	"	"
		3	16		22.5	144.0
288 + 97.0	"			51	"	"
		3	16		22.5	144.0
+92.6	"			51	"	"
		3	16		22.5	144.0
				315.0		1683.0

2 x 10 x 4.5

2 x 12 x 4.5

Final Timber Count

Sta	Pieces 4X6	Pieces 2X10	Pieces 2X12	Board Measure 4X6	Board Measure 2X10	Board Measure 2X12
288+88	One Set			51		
		3	16		22.5	144.0
+83	"			51		
		3	16		22.5	144.0
+78	"			51		
		3	16		22.5	144.0
+74	"			51		
		4	15		30.0	135.0
+69	"			51		
		4	15		30.0	135.0
+65	"			51		
		3	16		22.5	144.0
+60	"			51		
		6	13		45.0	117.0
+56	"			51		
		5	14		37.5	126.0
+51	"			51		
		4	15		30.0	135.0
+47	"			51		
		4	15		30.0	135.0
+42	"			51		
		4	15		30.0	135.0
+38	"			51		
		3	16		22.5	144.0
				345.0		1638.0

2X10 x 4.5

2X12 x 4.5

Final Timber Count

Sta	Pieces 4×6	Pieces 2×10	Pieces 2×12	Board Measure 4×6	Board Measure 2×10	Board Measure 2×12
288+33.6	One Set			51		
		4	15		30.0	135.0
+29.0	"			51		
		3	16		22.5	144.0
+24.6	"			51		
		4	15		30.0	135.0
+20.0	"			51		
		3	16		22.5	144.0
+15.5	"			51		
		3	16		22.5	144.0
+10.9	"			51		
		3	16		22.5	144.0
+06.5	"			51		
		3	16		22.5	144.0
288+01.9	"			51		
		3	16		22.5	144.0
287+97.4	"			51		
		3	16		22.5	144.0
+92.7	"			51		
		3	16		22.5	144.0
+88.2	"			51		
		3	16		22.5	144.0
+83.8	"			51		
		3	16		22.5	144.0
					285.0	1710.0

2×10 × 4.5

2×12 × 4.5

Final Timber Count

Sta	Pieces 4x6	2x10	2x12	Board Measure 4x6	2x10	2x12
287 + 24	One set			51		
		3	16		22.5	144.0
+ 19	"			51		
		8	12		60.0	108.0
+ 14	"			51		
		3	16		22.5	144.0
+ 10	"			51		
		3	16		10.0	64.0
287 + 08	"			51		
					115.0	460.0
				12,699.0	8,501.44	31,191.0
				✓ A.C.L.	850244	✓ A.C.L

2x10x4.5 ← 2x10x20

2x12x4.5 ← 2x12x8

20

See next page.

12,699.0 ✓
8,501.4 8502.44
31,191.0
52391.4
52,392.44

Final Timber Count

Sta	Pieces 4x6	Pieces 2x10	Pieces 2x12	Board Measure 4x6	Board Measure 2x10	Board Measure 2x12
287 +79	One Set			51		
		3	16		22.5	144.0
+74	"			51		
		3	16		22.5	144.0
+70	"			51		
		3	16		22.5	144.0
+65	"			51		
		3	16		22.5	144.0
+60	2 Sets			102		
		3	16		22.5	144.0
+56	One Set			51		
		3	16		22.5	144.0
+51	"			51		
		4	15		30.0	135.0
+47	"			51		
		3	16		22.5	144.0
+42	"			51		
		3	16		22.5	144.0
+38	"			51		
		3	16		22.5	144.0
+33	"			51		
		3	16		22.5	144.0
+28	"			51		
		3	16		22.5	144.0
					277.5	1719.0

2x10x4.5

2x12x4.5

Final Timber Count

Sta	Pieces 4x6	Pieces 2x10	Pieces 2x12	Board Measure 4x6	Board Measure 2x10	Board Measure 2x12
287+24	One set			51		
		3	16		22.5	144.0
+19	"			51		
		8	12		60.0	108.0
+19	"			51		
		3	16		22.5	144.0
+10	"			51		
		3	16		10.0	64.0
287+08	"			51		
					115.0	460.0
				12,699.0	8,501.44	31,191.0
				% A.C.L.	850.244	% A.C.L.

2x10x22 — 2x10x4.5

2x12x22 — 2x12x4.5

See next page.

12,699.0
8,501.4 8502.44
31,191.0
52391.4
52,392.44

Total Timber Count Tunnel 4.

Total 4x6 Timber Sets = 249.

Total B.M. Timber + Lagging.

52.3924
Blocks + Wedges 4.5738 ✓ Letter 6/14
56.9662
Add. to 4"x6" sets .498
57.4642
2x10 and 2x12 .626 Letter of 10/2/30
used as blocking
58.090

Summary Total.

4"x6" Timber Sets	13.197	M.B.M.
2"x10" and 2"x12" Lagging	39.6934	" " "
Blocking and Wedges.	5.1998	" " "
Total	58.0902	M.B.M.

Correction —
249 – 4"x6" Timber sets at 53' B.M. per set instead of 51' B.M. as allowed
2' B.M. x 249 sets = 498' B.M. additional to be allowed on Sept. Estimate

4x6 Sets = 13.197
Lagging = 39.6934 52.8904
Blocks + Wedges = 4.5738
57.4642

4.5738
.626
5.1998

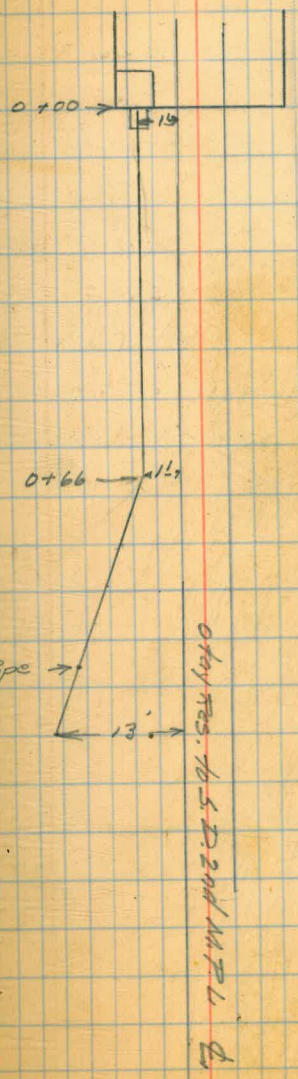
.1

Aug 18, 1930
Elliott
Soper
Bailey

		Grade Rod	Cut Cut to
0+00	Flow Line	5.42	~~0.0~~
0+06		5.43	1.6
0+27		5.47	1.3
0+64		5.60	0.7
0+66		5.61	0.3
0+82		5.62	4.8
1+02	End pipe		0.9
1+14		5.65	0.0

150' of pipe on hand
102' Needed

Exit Well Drain Tile



Converse
Hill
Elliott notes
Simpson

Tunnel 4-Exit Layout Notes

B.M.				380.50	Iron pin about 150' N. of Exit Portal
	+9.08	389.58			
298 +00			−4.87	384.71	Bottom
297 +60			−4.83	384.75	Bottom
297 +50			−4.82	384.76	Bottom Set Red Hd. to line and grade
297 +30			−4.80	384.78	Bottom " " " " " "
B.M.				380.50	Iron Pin about 150' N. of Exit Portal
	8.79	389.29			
298 +00			+2.37	391.66	Top Set Red Hd to line and grade
297 +90			+2.38	391.67	" "
297 +80			+2.39	391.68	" "
297 +70			+2.40	391.69	" "
297 +60			+2.41	391.70	" "
297 +50			+2.42	391.71	" "
T.P. B.M.			8.79	380.50	Iron pin about 150' N. of Exit Portal
	5.07½	385.57½			
B.M.			0.99½	384.58	Iron pin Rt 298 +80

no

Converse
Hill
Elliott
Simpson (off)

Feb 24 1930

Exit Portal

B.M.			380.50		
	9.08	389.58			
296+90			+ 2.19	391.77	Top
297+00			+ 2.18	391.76	Top
297+00			- 4.78	384.80	Bottom
297+10			+ 2.17	391.75	Top
297+20			+ 2.16	391.74	"
297+30			+ 2.15	391.73	"
297+40			+ 2.14	391.72	"

Set Red Hd to line and grade
"
"
"
"

Entrance Portal

Same Day
Same Party

Set line and grade for start.

Converse
Hill
Elliott & Notes
Simpson

Feb 27 1930

Exit Portal

B.M.				394.50	S.E. Cor. Concrete Cap N. Portal Old Tunnel # 4
	0.16½	394.66½			
T.P.			10.69	383.97½	
	5.06	389.03½			
Set B.M.			4.95½	384.58	384.58 (Check against B.M. 150' N. of Portal / See Page 20) Iron pin Rt. of Station 298+80
Set B.M. T.P.			3.33½	385.70	Top of pipe 298+20
	2.65	388.35			
Set B.M. T.P.			3.40	384.95	Top of pipe 297+00
	3.40	388.35			
296+81			+3.43	391.78	Top — Set Red Hd. to line and grade
296+73			+3.44		" "
296+63			+3.45		" "
296+55			+3.46		" "
296+46			+3.47	391.82	" "

Mar. 3, 1930

Converse
Hill
Elliott
Simpson

Exit Portal

B.M.			385.70		Top of pipe 298+20
	3.01	388.71			
296+10			- 3.81	384.90	Bottom	Set Red Hd. to line and grade
296+20			+ 3.13	391.84	Top	"
296+30					"	"
296+40					"	"
296+50					"	"

Same day, Same Party

Entrance Portal

B.M.			393.44		
	0.99	394.43			
T.P.			6.44	387.99	
	1.85	389.84			
287+60			+2.86	392.70	Top	Set Rd Hd to line and grade
288+00			-4.14	385.70	Bottom	" " " "

Hill
Elliott π notes
Simpson

Mar 5 1930

Exit Portal

B.M.				384.95	Top of pipe 297+00
	3.67	388.62			
296+00			+3.24	391.86	Top — Set Rd Hd. to line and grade
296+10			+3.23	391.85	" "
295+82			+3.26	391.88	" "
295+75			-3.69	384.93	Bottom "

Entrance Portal

B.M.				393.44	
	0.93	394.37			
T.P.			6.38	387.99	
	2.98	390.97			
287+38			+1.76	392.73	Top — Set Rd. Hd to line and grade
+47			+1.75	392.72	" "
+60			+1.73	392.70	" "
+65			+1.73	392.70	" "
+75			+1.72	392.69	" "
+84			+1.71	392.68	" "
+93			+1.70	392.67	" "
288+02			+1.69	392.66	" "
+02			-5.27	385.70	Bottom "
+12			-5.28	385.69	" "

Converse
Hill
Elliott & notes
Simpson

Mar. 6, 1930.

Entrance Portal

B.M.			393.44		
	1.39	394.83			
			7.54	387.29	
	2.08	389.37			
288 +12			-3.68	3.85.69	Bottom
+12			+3.28	3.92.65	Top
+20			-3.69	385.68	Bottom
+20			+3.27	392.64	Top
+30			-3.70	385.67	Bottom
288 +30			+3.26	392.63	Top

Set Red Hd to line and grade
"
"
"
"

Same Party, Same Day.

Exit Portal

B.M.			384.95		
	4.40	389.35			
295 +73			391.89	Top	
295 +73			384.93	Bottom	"
295 +64			391.90	Top	"
295 +64			384.94	Bottom	"

Converse
Hill
Elliott
Simpson

Mar 7 1930

Exit Portal

B.M.			385.70		Iron pin 298+20
	3.71	389.41			
B.M.			4.46	384.95	Iron pipe 297+00
	4.46	389.41			
Set B.M.			4.67	384.74	Iron pipe 295+90 95
	4.67	389.41			
295 +42			-4.45	384.96	Bottom Set Rod Hd to grade
			+2.51	391.92	Top "
+50			-4.46	384.95	Bottom "
			+2.50	391.91	Top "
+59			-4.47	384.94	Bottom "
			+2.49	391.90	Top "
+73			-4.48	384.93	Bottom "
295 +73			+2.98	391.89	Top "

Entrance Portal

B.M.	1.60½	395.04½		393.44	
T.P.			7.14½	387.90	
	2.06	389.96			
Set B.M.			4.12	385.84	Top of pin 287+30
Set B.M			4.34	385.62	Top of pipe 288+30
288+29			+2.67	392.63	Top Set Rd. Hd. to line + grade.
288 +38			+2.66	392.62	Top "
288 +38			-4.30	385.66	Bottom "
288 +48			+2.65	392.61	Top "
288+48			-4.31	385.65	Bottom "

Converse
Hill
Elliott & notes
Simpson

Mar 10 1930

Entrance Portal

B.M. #54				395.18	S.W. Cor. Concrete Cap Old Tunnel #4
	2.31½	397.99½			
Set B.M.			4.03½	393.46	Previous 393.44 — This B.M. No Good, Temporary B.M. Set with Transit for checking trench excavation and start of Tunnel
T.P.			4.93	392.56½	
	0.95½	393.02			
T.P.			5.94½	387.07½	
	3.03	390.10½			
Set B.M.			4.29½	385.86	Top of pipe 287+30
Set B.M. T.P.			4.47	385.63½	" " 288+30
	4.41	390.04			
287+20			+2.70	392.74	Red Hd. Set to line and grade.
+29			+2.69	392.73	"
+38			+2.68	392.72	"
+47			+2.67	392.71	"
+56			+2.66	392.70	"
+65			+2.65	392.69	"
+75			+2.64	392.68	"
+84			+2.64	392.68	"
+93			+2.63	392.67	"
288+02			+2.62	392.66	"
+12			+2.61	392.65	"
+20			+2.60	392.64	"
+29			+2.59	392.63	"
+38			+2.58	392.62	"

Continued from page 58

	390.04		
288 + 47		+2.57	392.61
288 + 56		+2.56	392.60
288 + 56		-4.40	385.64
288 + 65		+2.55	392.59
288 + 65		-4.41	385.63
288 + 74		+2.55	392.59
288 + 74		-4.41	385.63
288 + 84		+2.54	392.58
288 + 84		-4.42	385.62

Set Red Hd to line and grade

"

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Converse
Hill
Elliott & notes
Simpson

Mar. 10 1930.

Exit Portal

B.M.				384.95
	4.71	389.66		
295+55			+2.25	391.91
+50			+2.25	391.91
+50			-4.71	384.95
+90			+2.26	391.92
+90			-4.70	384.96
+31			+2.27	391.93
+31			-4.69	384.97
+23			+2.28	391.94
+23			-4.68	384.98
+14			+2.29	391.95
+14			-4.67	384.99
+05			+2.30	391.96
+05			-4.66	385.00
295 +00			+2.30	391.96
295 +00			-4.66	385.00

Top of pipe 297+00

Set Red Hds to line and grade

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Converse
Hill
Elliott
Simpson

Exit Portal

Mar. 14, 1930

B.M.				389.74		
	5.22	389.96				
295+05			+2.00	391.96	391.96	Check on point set Mar 10 page 60.
294+96			+2.01	391.97	Top	Red Hd set to line and grade
294+87			+2.02	391.98	"	"
294+78			+2.02	391.98	"	"
294+69			+2.03	391.99	"	"
294+60			+2.04	392.00	"	"
294+51			+2.05	392.01	"	"
294+42			+2.06	392.02	"	"
294+42			−4.90	385.06	Bottom	"

Converse
Hill
Elliott
Simpson

Entrance Portal

Mar 19, 1930

B.M.			385.64		Top of pipe 288+30.00
	5.20	390.84			
288+84			+1.74	392.58	Top	Check on point set Mar 10 page 59
288+93			+1.73	392.57	"	Set Rd. Hd. to line and grade
289+02			+1.72	392.56	"	"
289+11			+1.71	392.55	"	"
289+20			+1.70	392.54	"	"
289+29			+1.69	392.53	"	"
289+38			+1.68½	392.52½	"	"
289+47			+1.67½	392.51½	Top	"
289+47			-5.28½	385.55½	Bottom	Set Hub to grade

Mar 19 1930

Hill
Elliott π notes
Simpson

Exit Portal

B.M.			384.74		Iron pin 295+90 05
	5.40	390.14			
294+41 5		+1.88	392.02	Top	Check on work of Mar 19 1930
294+32		+1.89	392.03	Top	Set Rd. Hd. to line and grade
294+23		+1.90	392.04	"	"
294+14		+1.91	392.05	"	"
294+05		+1.92	392.06	"	"
		-5.04		Bottom	

Bore at 294+00 10: A.M.

Hill
Elliott & notes
Simpson

Mar 19, 1930

Entrance Portal

B.M.	5.07	390.93		385.86
Set B.M. T.P.			5.34	385.59
	5.11	390.70		
289+38			+1.82½	392.52½
+47			+1.81	392.51
+56			+1.81	392.51
+65			+1.80	392.50
+74.5			+1.79	392.49
+84			-5.18	385.52 Bottom

Bore about 289+90 at 12: Noon

Iron pipe 288+30 ℄
" " 289+30 ℄

Check on work of Mar 14 1930.

Set Red Hd to line and grade.

"

"

"

"

Converse
Hill
Elliott Notes
Simpson

Mar 22 1930

Exit Portal

B.M			384.74		Top of pipe 295+90.95
	4.85	389.59			
294+05			+2.47	392.06	Top	Check on work of Mar 19.
293+96			+2.48	392.07	"	Set. Rd. Hd. to line + grade
293+87			+2.49	392.08	"	"
293+78			+2.50	392.09	"	"
293+69			+2.50	392.09	"	"
293+59.5			6.96 +2.51	392.10	"	"
			-4.45	385.14	Bottom	"

Converse
Hill
Elliott notes
Simpson

Mar 22 1930

Entrance Portal

B.M.			385.59	
	4.79	390.38		
289+74.5			+2.11	392.49
289+83.5			+2.10	392.48
289+93			+2.09	392.47
290+02			+2.08	392.46
290+11			+2.07	392.45
290+20			+2.06 (6.96)	392.44
			-4.90	385.48 Bottom

Iron pipe 288+30.0

Check on work of Mar 19.

Set Rel. Hel. to line and grade.

"

"

"

"

"

Converse
Hill
Elliott
Simpson

Mar 25 1930

		Entrance Portal			
B.M.			385.59		Pipe 288+30.00
	4.72	390.31			
290+11			+2.14	392.45	Top
+20			+2.13	392.44	"
+29			+2.12	392.43	"
+37			+2.12	392.43	"
+46			+2.11	392.42	"
+55			+2.10	392.41	"
+60			+2.09 (6.96)	392.40	"
+60			-4.87	385.44	Bottom

Check on work of Mar. 22, 1930.
Red Hd. set to line and grade.
"
"
"
"
"
"

Same Party		Exit Portal		Same day.	
B.M.			384.74		Iron pipe 395+90.05
	5.10	389.84			
293+69			+2.25	392.09	
293+65			+2.26	392.10	
+56			+2.27	392.11	
+47			+2.28	392.12	
+37			+2.28	392.12	
+28			+2.29	392.13	
+19			+2.30	392.14	
+15			+2.31 (6.96)	392.15	
+15			-4.65	385.19	

Check on work of Mar 22 1930
Set Rd Hd. to line + grade.

Converse
H. II
Elliott
Simpson

Mar. 25, 1930

Exit Portal

B.M.			389.74	
	4.60	389.34		
Set B.M.			4.20	385.14
293+15			4.15	385.19

Same Party Entrance Portal Same day

B.M.			385.86	
	5.06	390.92		
287+20			+1.82	392.74
+30			+1.81	392.73
+39			+1.80	392.72
+48			+1.80	392.72
+56			+1.79	392.71
+75			+1.77	392.69
+84			+1.76	392.68
+93			+1.75	
288+12			+1.73	392.65

Iron pipe 295+90 os

Iron pipe 293+39.92
Check on sill just set

Top pipe 288+30 o

392.66
390.92
1.74

Mar 28 1930

Hill
Elliott
Soper

Exit Portal

B.M.			385.14	
	5.23	390.37		
293+19		+1.77	392.14	Top
+09.5		+1.78	392.15	"
293+00		+1.79	392.16	"
292+91.5		+1.80	392.17	"
292+82.0		+1.81 (6.96)	392.18	"
"		-5.15	385.22	Bottom

Same day Entrance Portal

Converse
Hill
Elliott notes
Soper

B.M.			385.59	
	5.18	390.77		
Set B.M. T.P.		5.17	385.60	
	5.07	390.67		
290+60		+1.73	392.40	Top
+65.4		+1.73	392.40	"
+74.6		+1.72	392.39	"
+83.6		+1.71	392.38	"
+92.7		+1.70	392.37	"
+97.2		+1.70 (6.96)	392.37	"
290+97.2		-5.26	385.41	Bottom

Top of pipe 293+39.27

Check on work of Mar 25
Set Red Hd to line + grade
"
"
"
"

Pipe 288+30.0

Pipe 290+60.07

Check on work of Mar 25 1930

March-31-30

Simpson
Jacobson
Bailey

Exit Portal

B.M.			385.14	
	4.75	389.89		
292+91.5			+2.28	392.17 Top
292+82			+2.29	392.18 "
292+73			+2.30	392.19 "
292+64			+2.30	392.19 "
292+55			+2.31	392.20 "
292+46			+2.32	392.21 "
292+37				385.26 Bottom

Same day
Same Crew

Entrance Portal

B.M.			385.60	
	5.10	390.70		
290+92.7			+1.67	392.37 Top
291+01.7			+1.66	392.36 "
+10.7			+1.65	392.35 "
+20.0			+1.65	392.35 "
+29.0			+1.64	392.34 "
+38.0			-5.33	385.37 Bottom

Part cloudy and cool

Top of Iron Pipe sta. 293+39.97

Check on work of Mar. 28

On Pipe sta 290+60.07

Check on work of March 28

Simpson
Jacobson
Bailey

April -1, 1930

Part cloudy and cool

Entrance Portal

Check up on all Bents

B.M.	5.28	390.87		385.59	
287+10			+1.88	392.75	Top
+20			+1.87	392.74	"
+29			+1.86	392.73	"
+38			+1.85	392.72	"
+47			+1.84	392.71	"
+56			+1.83	392.70	"
+65			+1.82	392.69	"
+75			+1.81	392.68	"
+84			+1.81	392.68	"
+93			+1.80	392.67	"
288+02			+1.79	392.66	"
+12			+1.78	392.65	"
+20			+1.77	392.64	"
+29			+1.76	392.63	"
B.M.			-5.28	385.59	
	5.18	390.77			
288+38			+1.85	392.62	"
+47			+1.84	392.61	"
+56			+1.83	392.60	"
+65			+1.82	392.59	"
+74			+1.82	392.59	"
+84			+1.81	392.58	"
+93			+1.80	392.57	"

Top of Iron Pipe Sta. 288+30

392.75
390.87
1.88

Top of Iron Pipe Sta. 288+30

392.62
390.77
1.85

continued from Page 71

		390.77		
289+02			+1.79	392.56 Top
+11			+1.78	392.55 "
+20			+1.77	392.54 "
+29			+1.76	392.53 "
+38			+1.75	392.52 "
+47			+1.74	392.51 "
+56			+1.74	392.51 "
+65			+1.73	392.50 "
+74.5			+1.72	392.49 "
+83.5			+1.71	392.48 "
+93.0			+1.70	392.47 "
290+02			+1.69	392.46 "
+11			+1.68	392.45 "
+20			+1.67	392.44 "
+29			+1.66	392.43 "
+37			+1.66	392.43 "
+46			+1.65	392.42 "
+55			+1.64	392.41 "
B.M.			-5.17	385.60
	4.89	390.49		
290+65.6			+1.91	392.40 Top
+74.6			+1.90	392.39 "
+83.6			+1.89	392.38 "
+92.7			+1.88	392.37 "
291+01.7			+1.87	392.36 "

392.56
390.77
1.79

check on B.M. Sta. 290+60.07

392.40
390.49
1.91

Continued from Page 72

390.49

291+10	+1.86	392.35	Top
+20	+1.86	392.35	Top
+29	+1.85	392.34	Top
+38	+1.84	392.33	Bottom
+47			

392.32
6 96
385 36

390.49
385.36
5.13

389.73
51
24

Continued from page 81

April 9, 1930

Floor Grades

389.55 H.I.

296+50	4.18	385.37	
+64	4.20	385.35	
+77	4.21		
+91	4.23	385.32	
297+05	4.24	385.31	
B.M. T.P.	4.61	384.94	384.95
4.34 389.29			
+19	3.99	385.30	
+31	4.01	385.28	
+43	4.02		
+60	4.03		
+74	4.05	385.24	
+88	4.06		
298+03	4.08	385.21	
B.M.	3.59	385.70	Check 385.70

Converse Hill
Elliott notes
Soper

April 3 1930

Entrance

B.M.				385.60	
	3.96	389.56			
291+38			+2.77	392.33	Check on Mar 31
291+79			6.96 +2.72	392.28	Top — Set Rd Hd Line & grade
			−4.24		Bottom

Same Party Exit Same day

B.M.				385.14	
	4.87	390.01			
292+55			+2.20	392.21	Top — For check
292+00			+2.25	392.26	Top
			−4.71	385.30	Bottom
+05			+225	392.26	

Converse
Hill
Elliott notes
Soper

April 4 1930

Tunnel #4

B.M.			385.14		Iron pipe 293+39.97
	5.38	390.52			
B.M.			From Exit	From Entrance	
			4.90	385.62	385.60 Iron pipe 290+60.27
	4.90	390.52			
292+46			+1.70	392.22	Top Set Rd. Hd. to line + grade
+35			+1.71	392.23	" "
+28			+1.72	392.24	" "
+18.5			+1.72	392.24	" "
+05			+1.73	392.25	" "
292+00.5			+1.74	392.26	" "
291+91			+1.75	392.27	" "
+83.5			+1.76	392.28	" "
+74.5			+1.77	392.29	" "
+65			+1.78	392.30	" "
+55			+1.79	392.31	" "
+46.5			+1.80	392.32	" "
+37.5			+1.81	392.33	" "

Hill
Elliott notes
Soper

April 14 1930

Near Exit Tunnel

B.M.				385.70
	5.03	390.73		
298+03.42			+0.93	391.66
298+00			+0.93	391.66
297+90			+0.94	391.67
+80			+0.95	391.68
+70			+0.96	391.69
+63			+0.97	391.70
+50			+0.98	391.71
+47			+0.98½	391.71½

Iron pipe 298+20

Set Rd. Hd. to Line & Grade

"

"

"

"

"

"

April 8, 1930

Elliott notes
Simpson T
Bailey, Light
Remmen Rod

Exit Portal

B.M.			385.70		Top of pipe 298+20.00
	403	389.73			
298+03.4			+1.93	391.66	Top Set Rd. Hd. to Line & grade
297+97.2			+1.94	391.67	" "
+88.2			+1.95	391.68	" "
+79.9			+1.96	391.69	" "
+70.0			+1.97	391.70	" "
+61			+1.97	391.70	" "
+52			+1.98	391.71	" "
+43.5			+1.99	391.72	" "
+35			+2.00	391.73	" "
+27			+2.01	391.74	" "
+19			+2.01	391.74	" "
+11			+2.02	391.75	" "
B.M.			9.78	384.95	Check 384.95 Top of pipe 297+00

Elliott Notes Apr. 18 1930
Simpson ↑
Bailey
Remmen

B.M.				385.89	Iron Pipe
		4.95	390.54		
	287+65			+2.16	392.70	Set Red Hd to line + grade
	287+75			+2.15	392.69	"
	+84			+2.14	392.68	"
	+93			+2.13	392.67	"
	288+02			+2.12	392.66	"
	+12			+2.11	392.65	"
	+20			+2.10	392.64	"
	+29			+2.09	392.63	"
	289+20			+2.00	392.54	"
	289+29			+1.99	392.53	"

Apr. 18, 1930

Floor Grades

Elliott Notes
Simpson T
Bailey
Rimmer

B.M.	4.82	390.41		385.59	
287+08 92			4.10	386.31	
+20			4.11		
+33			4.13		
+47			4.15		
+60			4.16		
+75			4.17		
+90			4.18		
288 +02			4.19		
288 +20			4.21		
+33			4.22		
+47			4.24		
+60			4.25		
+74			4.27		
+87			4.28		
289 +02			4.30	386.11	
T.P.	4.30	390.39	4.32	386.09	
B.M.			4.79	385.60	Check 385.60
289+15			4.29	386.10	
+29			4.30		
+43			4.32	386.07	
B.M.	4.47	390.07		385.60	
+56			4.01	386.06	
+70			4.03	386.04	
+84				386.03	

385.80
.51
386.31

Pipe 290+60 07

Apr 1/91930
Elliott Notes
Simpson
Bailey
Remmen

Tunnel #4 Floor Grades

	390.07		
289+97		4.05	386.02
290+10		4.07	386.00
290+24		4.08	
290+37		4.09	
+51		4.10	385.97
+65		4.12	
+79		4.13	
+93		4.14	
291+06		4.16	385.91
+20		4.17	
+34		4.18	
+47		4.20	385.87
+60		4.21	
+74		4.22	
+87		4.24	385.83
292+00		4.25	
292+14		4.27	385.80
+28		4.28	
+39		4.29	385.78
+50		4.30	
+64		4.32	385.75
+78		4.33	
+92		4.34	
293+05		4.36	385.71
+19		4.37	
+33		4.38	

385.51
51

46
51

April 9 1930

Tunnel #4 Floor Grades

B.M.	4.92	389.56		385.14	
293 +47			3.89	385.67	
+60			3.90		
+74			3.91		
+87			3.93	385.63	
294 +01			3.94		
+15			3.96	385.60	
+29			3.97	385.59	
+42			3.98	385.58	
+55			3.99		
+69			4.01	385.55	
B.M. T.P.			4.83	384.73	384.74
	4.81	389.55			
294 +82			4.02	385.53	
294 +96			4.03		
295 +10			4.04		
+24			4.06	385.49	
+37			4.07		
+50			4.08½		
+64			4.10	385.45	
+77			4.11		
+91			4.12		
296 +04			4.14	385.41	
+18			4.15		
+31			4.17	385.38	

Continued on Page 73

IMPROVED TABLES AND INFORMATION

Table II—Continued
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

Given a, b, C; to find c, B, A.

Use Law of Tangents.

Given A. B. c; to find a, b, C.

Use Law of Sines.

Given a, b, c; to find A, B, C.

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

$$\cos \tfrac{1}{2} A = \sqrt{\frac{s(s-a)}{bc}}$$

$$\tan \tfrac{1}{2} A = \frac{r}{s-a}$$

$$\tan \tfrac{1}{2} B = \frac{r}{s-b}$$

$$\tan \tfrac{1}{2} C = \frac{r}{s-c}$$

Area of a triangle:

Area $= \tfrac{1}{2}$ ab Sin C

Area $= \sqrt{s\,(s-a)\,(s-b)\,(s-c)}$

PRISMOIDAL FORMULA.

$$\text{Vol.} = \frac{h}{6}(B+b+4M)$$

h = altitude: b. B = bases; M = midsection

Table III
INCHES AND FRACTIONS OF AN INCH IN DECIMALS OF A FOOT

	0	1	2	3	4	5	6	7	8	9	10	11	
1/16	.0052	.0885	.1719	.2552	.3385	.4219	.5052	5885	.6719	.7552	.8385	.9219	1/16
1/8	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271	1/8
3/16	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	3/16
1/4	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	1/4
5/16	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	5/16
3/8	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479	3/8
7/16	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	7/16
1/2	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	1/2
9/16	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635	9/16
5/8	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	9688	5/8
11/16	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	11/16
3/4	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	3/4
13/16	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	13/16
7/8	.0729	.1563	.2396	.3229	4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896	7/8
15/16	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	15/16
1	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	1.000	1
	0	1	2	3	4	5	6	7	8	9	10	11	

Table IV
USEFUL RELATIONS

Lineal feet	×.00019	= miles
Lineal yards	×.0006	= miles
Square inches	×.007	= square feet
Square feet	×.111	= square yards
Square yards	×.0002067	= acres
Acres	×4840	= square yards
Cubic inches	×.00058	= cubic feet
Cubic feet	×.03704	= cubic yards
Links	×.22	= yards
Links	×.66	= feet
Feet	×1.5	= links

$360° = 21600' = 1296000''$

Radius = arc of 57.2957790°

Arc of 1° (radius = 1) = .017453292

Arc of 1′ (radius = 1) = .000290888

Arc of 1″ (radius = 1) = .000004848

$\pi = 3.141592654$ $\qquad \sqrt{\frac{1}{4}} = 0.564190$

$\frac{\pi}{4} = 0.785398163$ $\qquad \sqrt[3]{\frac{6}{\pi}} = 1.240700982$

$\frac{\pi}{6} = 0.523598776$ $\qquad \pi^2 = 9.869604401$

$\sqrt{\frac{4}{\pi}} = 1.128379167$ $\qquad \frac{1}{\pi^2} = 0.101321184$

$\frac{\pi}{6} = 0.523598776$ $\qquad \sqrt{\pi} = 1.772453851$

$\frac{4.\pi}{3} = 4.188790205$ $\qquad \frac{1}{\pi} = 0.3183099$

Curvature of Earth's surface = about 0.7 feet in 1 mile

Curvature in feet = 0.667 (Dist. in miles)²

Difference between arc and chord length, 0.05 feet in 11½ miles

Probable error of a single observation $= 0.6754\sqrt{\frac{\Sigma v^2}{n-1}}$

Error in chaining of 0.01 feet in 100 feet:

Due to—

1. Length of tape error of 0.01 feet
2. Alignment. One end 1.4 feet out of line
3. Sag of tape at centre of 0.61 feet.
4. Temperature difference of 15°
5. Difference of pull of 15 lbs.

STADIA REDUCTION FORMULÆ.

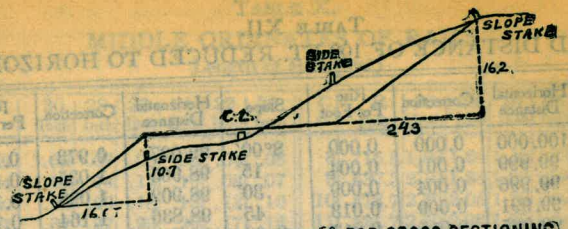
Horizontal Distance $= R - R \sin^2 a + C \cos a$

Vertical Distance $= R\ \tfrac{1}{2} \sin 2a + C \sin a$

$R = \text{Reading} \times \frac{\text{distance from Object glass to cross hairs}}{\text{distance between cross hairs}}$

C = distance from Object glass to cross hairs + distance from Object glass to center of instrument.

a = angle of elevation for mid Reading



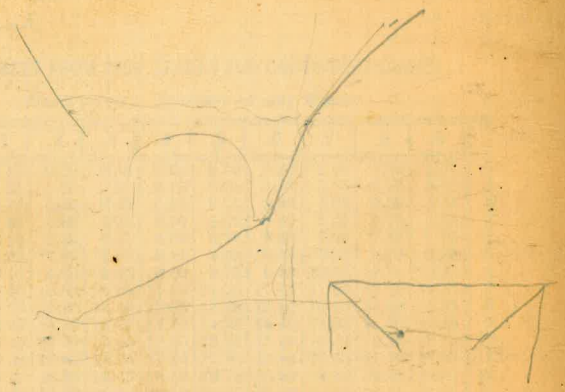
DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE 1½ TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0 00	0 15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.50	1 65	1 80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	1
2	3.00	3.15	3.30	3 45	3.60	3 75	3.90	4.05	4.20	4 35	2
3	4.50	4 65	4.80	4.95	5 10	5 25	5 40	5.55	5.70	5.85	3
4	6.00	6 15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	4
5	7 50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	5
6	9 00	9 15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	6
7	10.50	10 65	10.80	10.95	11.10	11.25	11.40	11.55	11 70	11.85	7
8	12.00	12 15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	8
9	13 50	13 65	13 80	13 95	14.10	14.25	14.40	14 55	14.70	14.85	9
10	15.00	15 15	15 30	15 45	15.60	15.75	15.90	16.05	16.20	16 35	10
11	16 50	16 65	16 80	16.95	17 10	17.25	17.40	17.55	17.70	17.85	11
12	18 00	18 15	18.30	18 45	18.60	18 75	18.90	19.05	19.20	19 35	12
13	19 50	19 65	19.80	19.95	20.10	20.25	20 40	20.55	20.70	20.85	13
14	21.00	21 15	21.30	21.45	21 60	21.75	21.90	22 05	22 20	22 35	14
15	22 50	22 65	22 80	22 95	23.10	23.25	23.40	23.55	23.70	23.85	15
16	24.00	24 15	24 30	24 45	24.60	24.75	24 90	25 05	25.20	25.35	16
17	25.50	25 65	25.80	25 95	26.10	26 25	26 40	26.55	26.70	26.85	17
18	27.00	27 15	27.30	27 45	27.60	27.75	27.90	28.05	28 20	28.35	18
19	28 50	28 65	28 80	28.95	29.10	29.25	29 40	29.55	29.70	29.85	19
20	30 00	30 15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	20
21	31 50	31 65	31.80	31.95	32 10	32 25	32.40	32.55	32 70	32 85	21
22	33 00	33 15	33 30	33 45	33.60	33 75	33.90	34.05	34.20	34.35	22
23	34 50	34 65	34.80	34.95	35.10	35 25	35 40	35.55	35.70	35 85	23
24	36.00	36 15	36.30	36 45	36.60	36.75	36.90	37.05	37 20	37.35	24
25	37.50	37 65	37 80	37.95	38.10	38.25	38.40	38.55	38.70	38.85	25
26	39 00	39 15	39 30	39 45	39 60	39.75	39.90	40.05	40.20	40.35	26
27	40 50	40 65	40 80	40.95	41.10	41.25	41 40	41.55	41.70	41.85	27
28	42 00	42 15	42.30	42.45	42.60	42 75	42.90	43.05	43.20	43.35	28
29	43 50	43 65	43.80	43 95	44.10	44 25	44 40	44.55	44.70	44 85	29
30	45 00	45 15	45.30	45 45	45.60	45.75	45 90	46.05	46 20	46.35	30
31	46.50	46.65	46.80	46 95	47.10	47.25	47.40	47.55	47.70	47.85	31
32	48 00	48.15	48.30	48 45	48.60	48 75	48.90	49.05	49 20	49.35	32
33	49.50	49 65	49.80	49.95	50.10	50.25	50.40	50.55	50 70	50.85	33
34	51 00	51.15	51.30	51.45	51.60	51.75	51 90	52.05	52.20	52.35	34
35	52 50	52.65	52.80	52.95	53.10	53.25	53.40	53.55	53.70	53.85	35
36	54 00	54 15	54 30	54 45	54.60	54.75	54.90	55.05	55.20	55.35	36
37	55 50	55 65	55.80	55 95	56.10	56.25	56.40	56.55	56.70	56.85	37
38	57.00	57.15	57 30	57 45	57.60	57 75	57.90	58.05	58.20	58 35	38
39	58 50	58.65	58 80	58 95	59.10	59 25	59.40	59 55	59.70	59.85	39
40	60 00	60 15	60 30	60 45	60 60	60.75	60 90	61 05	61 20	61.35	40
41	61.50	61 65	61 80	61 95	62 10	62 25	62.40	62 55	62 70	62.85	41
42	63 00	63.15	63 30	63 45	63 60	63 75	63 90	64 05	64 20	64.35	42
43	64.50	64 65	64 80	64.95	65.10	65 25	65 40	65.55	65.70	65.85	43
44	66 00	66 15	66 30	66.45	66.60	66 75	66.90	67.05	67.20	67.35	44
45	67 50	67 65	67 80	67.95	68.10	68.25	68.40	68.55	68.70	68.85	45
46	69 00	69 15	69 30	69.45	69.60	69.75	69.90	70.05	70.20	70.35	46
47	70 50	70 65	70 80	70 95	71.10	71.25	71 40	71.55	71.70	71.85	47
48	72.00	72 15	72.30	72.45	72.60	72.75	72.90	73 05	73.20	73 35	48
49	73 50	73 65	73.80	73.95	74.10	74.25	74.40	74.55	74.70	74.85	49
50	75.00	75 15	75.30	75.45	75.60	75.75	75.90	76.05	76.20	76.35	50

Computed by L. Leland Locke.

Entrance = 4 12' Wide 2' above Tunnel
Exit = 4 12' " "



293 + 90 386.901
290 + 60 385.843
8

392.713

294 + 60
294 + 78
295 + 05
295 + 15

386.838
385.755
1.083

Checked 295 + 42

392.755
388.797
6.958

135 | 10950 | 81
1080
150

289 + 29
+ 20
288 + 29
+ 20
+ 12
+ 02
287 + 93
+ 84
+ 75
+ 65

2.69
2.21
.48