

296

Final Estimate
Tunnels 1-2-3-4.

to San Diego 2nd Main Tunnel

Final Estimate Tunnels 1 and 2

W 296

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JAN 11 1965

Otay Res. to San Diego 2nd Main Pipe Line
Final timber Count.

Tunnel #1 timber pages 1-10

Tunnel #2 timber pages 13-24

Tunnel Final Estimate

Tunnels 1-2-3 and 4.

Tunnel 1. Page 26 to 31

" 2 " 34 " 38

" 3 " 40 " 45

" 4 " 47 " 49

MICROFILMED

JAN 1 1982

Station	Pill, Posts, Caps		Lagging		Board		Measure
	4x6	2x10	2x12	4x6	2x10	2x12	
145+96 ²	One Set (Entr. Portal)				51		
146+01 ⁴	"	2x10x5.5	3	2x12x5.5	16		22.5
							144
			3		16		27.5
+05 ²	"				51		176
			3		16		27.5
+11 ²	"	2x10x5.5		2x12x5.5	6		51
			3		6		27.5
+17 ⁰	"				51		27.5
			3		6		66
+22 ⁶	"				51		27.5
			3		6		66
146+28 ²	"	↓		↓	51		27.5
					357		66
					160		694
149+73 ⁵	"	↑		↑	51		
			3		6		27.5
+79 ³	"				51		66
			3		6		27.5
+84 ⁶	"	2x10x5.5		2x12x5.5	6		51
			3		6		27.5
149+90	"				51		27.5
			3		6		66

↓ No timber →

694
160
357
1011
114

$149+95^S$ One set	3	6	51	27.5	66
$150+00^9$ "	3	6	51	27.5	66
$+06^9$ "	2x10x5.5	3	6	27.5	66
$+12^0$ "	2x12x5.5	3	11	27.5	121
$150+17^E$ "	3	6	51	27.5	66
$150+66^3$ "	3	6	51	27.5	66
$+71^8$ "	3	6	51	27.5	66
$+77^3$ "	3	6	51	27.5	66
$+82^8$ "	2x10x5.5	3	6	27.5	66
$+88^4$ "	2x12x5.5	3	6	27.5	66
	3	6	51	27.5	66

No number

51
459
220
583

459
220
583
1262
18
1.280

150+93 ² One set	2x10x5.5	3	11	51	27.5	121
150+99 ³ "	2x10x5.5	3	11	51	27.5	121
163+35 ⁵ "	2x10x5.5	3	6	51	27.5	66
+41 ³	2x10x5.5	3	6	51	27.5	66
+46 ⁷	2x10x5.5	3	6	51	27.5	66
+52 ³	2x10x5.5	3	11	51	27.5	121
+57 ⁸	2x10x5.5	3	11	51	27.5	121
+63 ⁴	2x10x5.5	3	11	51	27.5	121
+68 ²	2x10x5.5	3	11	51	27.5	121
163+74 ⁴	2x10x5.5	3	11	51	27.5	121

220.0 ✓ 803 ✓

357 ✓
 165 ✓
 451 ✓

 973 ✓
 14 ✓

 987 ✓

163 + 80	One set			51		
		3	//		27.5	121
+85 ⁵	"			51		
		3	//		27.5	121
+91 ²	"			51		
		3	//		27.5	121
163 + 96 ⁵	"			51		
		3	//		27.5	121
164 + 02	"			51		
		3	//		27.5	121
+07 ²	"	2x10x5.5	//	51		
		3	//		27.5	121
+13 ²	"	2x12x5.5	//	51		
		3	//		27.5	121
+18 ²	"			51		
		3	//		27.5	121
+24 ²	"			51		
		3	//		27.5	121
+29 ²	"			51		
		3	//		27.5	121
+35 ²	"			51		
		3	//		27.5	121
164 + 40 ²	"			51		

302.5 1331

	3	11	51	27.5	121
164+46 ³ One set	3	11	51	27.5	121
+51 ⁸ "	3	11	51	27.5	121
+57 ⁹ "	3	11	51	27.5	121
+62 ⁹ "	3	11	51	27.5	121
+68 ⁹ "	3	11	51	27.5	121
+74 ⁰ "	3	11	51	27.5	121
+79 ⁵ "	3	6	51	27.5	66
+85 "	3	11	51	27.5	121
+90 ⁵ "	3	16	51	27.5	176
164+96 "	3	16	51	27.5	176
165+01 ² "	3	16	51	27.5	176
	2	6		27.5	66

330.0

1507

165+07	One set	3	6	51	22.5	54
+115	"	3	6	51	22.5	54
+161	"	3	6	51	22.5	54
+202	"	3	6	51	22.5	54
+252	"	3	6	51	22.5	54
+292	"	3	6	51	22.5	54
+392	"	3	6	51	22.5	54
+388	"	3	11	51	22.5	99
+435	"	5	9	51	37.5	81
+48	"	3	11	51	22.5	99
+525	"	3	6	51	22.5	54
165+570	"	3	6	51	22.5	54
					262.5	711

165 + 61 ⁵ One set	4	8	51	30	72
+66 "	3	9	51	22.5	81
+70 ⁶ "	3	6	51	22.5	54
+75 ² "	3	6	51	22.5	54
+79 ⁶ "	4	10	51	30	90
+84 ² "	5 4 x 4	4 10	51	30	90
+88 ² "	3 x 0	3 9	51	22.5	81
+93 ³ "	2 x 3	2 x 9	51	22.5	81
165 + 97 ⁸ "	3	6	51	22.5	54
166 + 02 ³ "	3	6	51	22.5	54
+06 ⁸ "	3	6	51	22.5	54
+11 ⁴ "	3	6	51	22.5	54
				29 2.5	81 9

166+152	One set	3	6	51	22.5	54		
16	+205	"	3	6	51	22.5	54	
	+25	"	3	6	51	22.5	54	
	+296	"	3	6	51	22.5	54	
	+341	"	3	6	51	22.5	54	
	+388	"	3	6	51	22.5	54	
	+432	"	2x10x4.5	3	6	51	22.5	54
	+472	"	2x12x4.5	3	6	51	22.5	54
	+522	"	3	6	51	22.5	54	
	+562	"	3	6	51	22.5	54	
	+613	"	3	6	51	22.5	54	
166	+658	"	3	6	51	22.5	54	

270.0

648

		3	6		22.5	54
166+70 ³	One set			51		
		3	6		22.5	54
+74 ⁹	"			51		
		3	6		22.5	54
+79 ⁹	"			51		
		3	6		22.5	54
+83 ⁹	"			51		
		3	6		22.5	54
+88 ⁵	"			51		
		3	6		22.5	54
+93	"	2x10x4.5	2x12x4.5			
		3	6		22.5	54
		3	6		22.5	54
166+97 ⁵	"			51		
		3	6		22.5	54
167+02 ¹	"			51		
		3	6		22.5	54
+06 ⁶	"			51		
		3	6		22.5	54
+11 ¹	"			51		
		3	6		22.5	54
+15 ⁶	"			51		
		3	6		22.5	54
167+20 ¹	"			51		

270.0

648

Final timber count Tunnel #1

Aug 20, 1930

10

Elliott
Soper
Bailey

167+247	Oneset	3	6	51	22.5	54
+292	"	3	6	51	22.5	54
+338	"	3	6	51	22.5	54
+383	"	3	6	51	22.5	54
+428	"	3	6	51	22.5	54
+473	"	2	11	51	22.5	99
+517	"	4	15	51	30	135
+563	"	3	16	51	22.5	144
167+611	(Exit Portal)	4	15	51	30	135
					217.5	783
				4488	2165	7250

4488 ✓
2165 ✓
7250 ✓
13903 ✓
176 ✓
14079

Final Timber Count - Tunnel 1.

Total 4x6 Timber Sets = 111.

Total B.M. 145+97 to 146+28.2 = 1211.
 149+73.5 to 150+17.5 = 1262
 150+66.3 to 150+99.3 = 973
 163+35.5 to 167+61 = 13903
17349

Total - 17,349 M.B.M.

Blocks + Wedges - 3,1153 Letter of 6/14
 " " " .5412 " of 7/21
21,0055 Est. #7.
 Add to 4x6 sets - .222

21,2275
 21,2275
 Blocks + Wedges 1,4287 Letter of 10/2/30
22,6562
 2x10 and 2x12 .626 Letter of 10/2/30
 Used as blocking 23,2822

Total Summary.

4"x6" Timber Sets 5,8830 M.B.M.
 2"x10" and 2"x12" Logging 11,6880 " " "
 Blocking and wedges 5,7112 " " "
Total 23,2822 M.B.M.

Correction.

111 - 4"x6" Timber Sets at 53 B.M. per set
 instead of 51 B.M. as allowed
 2' B.M. x 111 sets = 222 B.M. additional
 to be added to Sept. Estimate.

4x6 Sets = 5,883
 Logging = 11,688
 Blocks + Wedges = 3,6565 3,6565
 21,227 1,4287
 1,4287 .626
22,6562 5,7112
 .626
23,2822

Final timber count Tunnel #2

Aug 21, 1930
 Elliot Notes, count
 Soper tape, count
 Bailey tape, reel

Station	Sill, Posts, Caps		Logging				
	4x6	2x10	2x12				
172+097	One set (Entrance Portal)				51		
		5	14			37.5	126
+14	"	2x10x4.5	2x12x4.5		51	15	
		7	12			52.5	108
+187	"	2x10x4.5	2x12x4.5		51		
					153		
						90.0	234
178+137	"				51		
		3	11			27.5	121
+184	"				51		
		3	11			27.5	121
+24	"				51		
		3	11			27.5	121
+295	"	2x10x5.5	2x12x5.5		51		
		3	11			27.5	121
+35	"	2x10x5.5	2x12x5.5		51		
		3	16			27.5	176
178+406	"				51		

153 ✓
 90 ✓
 234 ✓
 477 ✓

137.5 ✓
 660 ✓

↑ Timber ↓

179+04 ²	One set			51	36.7	165
+10 ³	"	4	15	51	45.8	154
+15 ⁸	"	5	14	51	64.2	132
+21 ³	"	7	12	51	73.3	121
+26 ⁸	"	8	11	51	45.8	154
+32 ³	"	5	14	51	45.8	154
+37 ²	"	5	14	51	110.0	77
+43 ³	"	12	7	51	91.7	88
+48 ²	"	10	8	51	55.0	110
+54 ¹	"	6	10	51	64.2	99
+59 ⁸	"	7	9	51	64.2	99
179+65 ³	"	7	9	51		

2x10x5.5-

2x12x5.5-

696.7 1353.0

179+70 ³ Onset	3	9	51	27.5	99
+76 ⁴ "	6	12	51	55.0	132
+82 "	3	10	51	27.5	110
+87 ⁵ "	7	7	51	64.2	77
+93 ¹ "	3	14	51	27.5	154
179 +98 ² "	2	16	51	18.3	176
180 +04 "	4	14	51	36.7	154
+09 ⁵ "	11	8	51	100.8	88
+15 "	5	14	51	45.8	154
+20 ⁶ "	5	14	51	45.8	154
+26 ¹ "	5	14	51	45.8	154
180 +318 "	4	10	51	36.7	110
∪				↓	↓
				531.6	1562.0

2x10x5.5

2x12x5.5

$180 + 37^3$ One set	3	16	51	27.5	176
$+42^8$ "	2x10x5.5	4	15	51	36.7
$+48^3$ "	2x12x5.5	3	16	51	165
$+53^9$ "	2x10x7	6	13	51	27.5
$+60^8$ "	2x12x9	7	12	51	55.0
$+66^4$ "	2x10x7	8	10	51	81.7
$+71^2$ "	2x12x9	7	12	51	168
$+77^4$ "	2x10x5.5	5	14	51	73.3
$+83$ "	2x12x5.5	4	15	51	110
$+88^5$ "	2x10x5.5	7	13	51	64.2
$180 + 93^7$ "	2x12x5.5	7	13	51	132
		8	12	51	64.2

650.1

1807

180+99 ³	One set			51	36.7	165
181+05	"	4	15	51	36.7	165
		15	6	51	137.5	66
+10 ⁶	"			51	45.8	154
		5	14	51	45.8	154
+16 ¹	"			51	55.0	143
		6	13	51	55.0	143
+21 ⁶	"			51	55.0	143
		6	13	51	55.0	143
+27 ²	"	2x10x5.5	2x12x5.5	51	91.7	110
		10	10	51	91.7	110
+32 ⁷	"			51	64.2	132
		7	12	51	64.2	132
+38 ⁹	"			51	45.8	154
		5	14	51	45.8	154
+43 ⁸	"			51	45.8	154
		5	14	51	45.8	154
+49 ⁹	"			51	45.8	143
		5	13	51	45.8	143
+55	"			51	45.8	154
		5	14	51	45.8	154
181+60 ⁵	"			51		

↓ ✓
669.1

↓ ✓
1518.0

	5	14		45.8	154
181+66 ¹ Onset			51		
+712	9	11		82.5	121
			51		
+77 ²	10	10		91.7	110
			51		
+82 ³	5	14		45.8	154
			51		
+87 ²	7	12		64.2	132
			51		
+93 ²	5	14		45.8	154
			51		
181+98 ⁸	4	15		36.7	165
			51		
182+04 ⁴	5	14		45.8	154
			51		
+10	5	14		45.8	154
			51		
+15 ⁵	5	14		45.9	154
			51		
182+21	5	14		45.8	154
			51		
	5	14		45.8	154
				641.6	1760

2x10x515

2x12x515

182+26 ⁵	One set			51		
		5	14		45.9	154
+31 ⁸	"			51		
		5	14		45.8	154
+37 ⁵	"			51		
		5	14		45.8	154
+43	"			51		
		6	13		55.0	143
+48 ⁶	"			51		
		5	14		45.9	154
+53 ⁹	"			51		
		5	14		45.8	154
+59 ⁴	"			51		
		5	14		45.8	154
+65	"			51		
		5	14		45.9	154
+70 ⁹	"			51		
		5	14		45.8	154
+75 ⁹	"			51		
		5	14		45.8	154
+81 ⁴	"			51		
		5	14		45.9	154
182+86 ²	"			51		

↓ ✓ ↓ ✓
513.4 1643

Aug 21, 1930

21

	5	14	51	45.8	154
182 + 92 ³ Onset			51		
	4	15	51	36.7	165
182 + 97 ⁸ "			51		
	6	13	51	55.0	143
183 + 03 ² "			51		
	5	14	51	45.8	154
+ 08 ⁸ "			51		
	4	15	51	36.7	165
+ 14 ² "			51		
	4	15	51	36.7	165
+ 19 ⁸ "	2x10x5.5	2x12x5.5	51		
	5	14	51	45.8	154
+ 25 ³ "			51		
	6	13	51	55.0	143
+ 30 ⁸ "			51		
	7	12	51	64.2	132
+ 36 ³ "			51		
	7	12	51	64.2	132
+ 41 ⁸ "			51		
	7	12	51	64.1	132
+ 47 ⁵ "			51		
	7	12	51	64.2	132
183 + 52 ⁷ "			51		
				↓	↓
				614.2	177.1

183 + 58 ²	One set	7	12	51	64.2	132	
+63 ²	"	5	14	51	45.8	154	
+69 ²	"	5	14	51	45.8	154	
+74 ²	"	4	15	51	36.7	165	
+80 ²	"	5	14	51	45.8	154	
+86	"	4	15	51	36.7	165	5457 ✓
+91 ²	"	3	16	51	27.5	176	5213.4 ✓
183 + 96 ²	"	5	14	51	45.8	154	15203.0 ✓
				51	368.3 ✓	1254 ✓	25873.4 ✓
				5457	5213.4	15203	

No timber

2x10x5.5

2x12x5.5

Aug 21, 1930

23

No Timber

191 + 99 = One set

51

3

6

22.5

54

192 + 03 =

"

2x10x4.5

8

2x12x4.5

12

51

60.0

108

+ 08 =

"

6

13

51

45.0

117

+ 12 =

"

3

16

51

22.5

144

192 + 17 =

"

(Exit Portal)

51

255

150.0

↓ 273

255

150

423

828

115 Timber Sets

Total Timber Count - Tunnel 2

Total 4x6 Timber Sets = 115

Total B.M. $172 + 09.5 - 172 + 18.5 = 477.0$
 $178 + 13 - 183 + 97 = 25873.4$
 $191 + 99 - 192 + 17.5 = 828.0$
27,178.4

Total - 27,178.4 M.B.M.

Blocks + Wedges - 1,007.4 ✓ Letter of 7/31
 28,185.8 Est. #7

Add to 4"x6" sets 230.

~~28,385.8~~

28,415.8 ✓

Blocks + Wedges 3,365 ✓ Letter of 10/2/30

31,780.8 ✓

2"x10 and 2"x12 626 ✓ Letter of 10/2/30

used as blocking 32,406.8

Summary.

4"x6" Timber Sets 6,0950 M.B.M.

2"x10" and 2"x12" Lagging 21,3134 " " "

Blocking and Wedges. 4,9984 " " "

Total 32,406.8 M.B.M.

Correction -

115 - 4"x6" timber sets at 53' B.M. per set instead of 51' B.M. as allowed
 2' B.M. x 115 sets = 230' B.M. additional to be allowed on Sept. Estimate.

4x6 Sets = 6,095

Lagging = 21,3134

Blocks + Wedges = 1,0074

1,0074

28,4158

.626

.673

3,3650

3,365

4,9984

32,41538

Tunnel 1. Final Estimate

Oct. 1, 1930.

Item	Sta. to Sta.	Quantity	Unit Price	Total
1.	145+97 ⁰⁶ - 167+61 ⁰⁶	2164	5 ⁹⁵ Lin. ft.	12,875.80
2. (a)	145+83 ⁰⁶ - 145+97 ⁰⁶	9.3 cu. yds.	1 ⁴⁰ cu. yd.	
(b)	167+61 ⁰⁶ - 167+75 ⁰⁶	8.9 "	" " "	
Total		18.2 "	" " "	25.48
3. (a)	146+28 ¹ - 149+73 ¹	345	Lin. ft. 1 ⁶⁰ Lin. ft.	
(b)	150+17 ¹ - 150+66 ¹	49	" " " " "	
(c)	150+99 ¹ - 163+35 ¹	1236 ⁵	" " " " "	
Total		1630 ⁵	" " " " "	2608.80
4. (a)	145+97 ¹ - 146+28 ¹	31	Lin. ft. 3 ⁷⁵ Lin. ft.	
(b)	149+73 ¹ - 150+17 ¹	44	" " " " "	
(c)	150+66 ¹ - 150+99 ¹	33	" " " " "	
(d)	163+35 ¹ - 167+61 ¹	425 ⁵	" " " " "	
Total		533 ⁵	" " " " "	2000.63
5. (a)	145+83 ⁰⁶ - 145+97 ⁰⁶	8.61 cu. yds.	6 ⁷⁵ Cu. yd.	
(b)	167+61 ⁰⁶ - 167+75 ⁰⁶	8.41 "	" " " " "	
Total		17.02 "	" " " " "	114.88

This is total quantity in wells. Not complete on 10/1/30
 Quantity of concrete in Entrance Wells
 calculated by Harvey Watts.

A.C.L.
 10/3/30

Tunnel-1 Final Estimate (Contd.)

Item	Sta. to Sta.	Quantity	Unit Price	Total
6 (a)	145+97 - 146+28			
(b)	149+73 - 150+17			
(c)	150+66 - 150+99			
(d)	163+35 ⁵ - 167+61			
Total	533 ⁵	$\times 2.51 \div 27 = 49^6$ cu. yds.	6^75 cu. yd.	\$ 334.80

End Area of concrete floor in timber sections
 = 2.51 sq. ft. Calculated by Paul Beermans.
 533^5 Lin. ft. $\times 2.51$ sq. ft. end area $\div 27 =$ cu. yds.

7 (a)	146+28 - 149+73			
(b)	150+17 - 150+66			
(c)	150+99 - 163+35 ⁵			
Total	1630 ⁵	$\times 2.0 \div 27 = 120.8$ cu. yds.	5^75 cu. yd.	694.60

End Area of concrete floor in untimbered sections
 = 2.0 sq. ft. Calculated by Harvey Watts.
 1630^5 Lin. ft. $\times 2.0$ sq. ft. end area $\div 27 =$ cu. yds.

8 (a)	Cement in floor	258 bbls.	2 ²⁰ bbl.	567.60
(b)	" " gunitite	619 ²⁵	" "	1362.35
(c)	" " Ent. Wells	121 ⁷⁵	" "	28.05
Total		890 bbl.	" "	\$ 1958 ⁰⁰

Cement in floor includes cement in entrance well floors.
 Cement in gunitite includes cement in 5⁵ ft. tunnel sloped
 portion of entrance wells which were gunitited.
 Concrete portion of entrance wells not complete 10/1/30.

Note - The quantity of cement noted in concrete and
 gunitite is from reports of Concrete and Gunitite
 Inspectors to Division Engineer G.W. Converse
 10/28/30. Ent. Wells complete - G.W.C.

A.L.L.
 10/3/30

Tunnel 1. Final Estimate (contd.)

Item	Sta. to Sta.	Quantity	Unit Price	Total
9.	145+83 ⁰⁶ - 167+75 ⁰⁶	14770 Lbs.	.06 Lb.	868.20
		<u>270</u>		
Total		14740	.06	\$884.40

Note - The quantity of reinforcing steel noted is from reports of Concrete and Guniting Inspectors to Division Engineer G.W. Converse.

Pcs.	Size	Length	Lin. Feet	Unit Weight	Total Pounds
585	1/2"	17'6"	10237.5	✓	
685	1/2"	6'8"	4566.9	✓	
980	1/2"	5'2"	5063.7	✓	
Total	1/2"		19868.1	✓	13311.6

Note - To total as of Oct. 1, 1930 must be added additional reinforcing steel on completion of concrete entrance wells at entrance and exit portals.

10/28/30. Above amt. of steel = 270.0 lbs.
G.W.C.

60	3/8"	40'0"	2400.0	✓	
8	3/8"	16'0"	128.0	✓	
7	3/8"	12'0"	84.0	✓	
6	3/8"	30'0"	180.0	✓	
34	3/8"	6'9"	229.5	✓	
26	3/8"	1'0"	26.0	✓	
Total	3/8"		3047.5	✓	1158.1
Total	as of 10/1/30.				14469.7
20	3/8	10'	200.0		
36	3/8	9'8"	348.0		
20	3/8	6'6"	130.0		
6	3/8	5'4"	32.0		
Total	3/8		710	x .38	270.0

270.0 ✓
14740 ✓
ALL
10/3/30

Tunnel 1

Final Estimate (contd)

Item	Sta. to Sta.	Quantity	Unit Price	Total
10.	145+97 ⁰⁶ - 167+61 ⁰⁶	4669 Lbs.	\$.09 Lb.	420.21

Note - The quantity of No. 6 gauge 6"x6" mesh noted is from reports of Gunite Inspector to Division Engineer G.W. Converse.

Item 10

Pcs.	Width	Length	Sq. feet	Unit Weight	Total Pounds
84 ✓	7'	17'	996 ✓		
1 ✓	4'	17'	68 ✓		
Additional reinforcing in					1052.4
sloughing sections of untimbered					
Tunnel.					
Total					1116.4 ✓
					.42 ✓
					4669 ✓

11.	145+97 ⁰⁶ - 167+61 ⁰⁶	6756 Lbs.	\$.12 Lb.	810.72
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Item 11

Note - The quantity of No. 16 gauge 2" mesh noted is from reports of Gunite Inspector to Division Engineer G.W. Converse. Weights of rolls from invoices to Contractor.

Rolls	Width	Length	Weight Per Roll	Total Pounds
22 ✓	3'	150'	80.5	1771.0 ✓
60 ✓	3'	150'	80.4	4824.0 ✓
2 ✓	3'	150'	80.7	161.4 ✓
Total -				6756.4 ✓

V.A.C.L.
10/3/30

Tunnel 1.

Final Estimate (contd)

Item	Sta. to Sta.	Quantity	Unit Price	Total
12.	145+97 ⁰⁶ - 167+61 ⁰⁶	23.28	80 ⁰⁰ M.	\$ 1862.56

Note - The number of 4"x6" timber sets and 2"x10" and 2"x12" lagging are from actual count of City Engineering Crew. The quantity of blocks and wedges and 2"x10" and 2"x12" pieces used as blocking are from Lumber Company invoices to Contractor.

The Engineers timber count is on Page 1 to 11 inclusive - this book.

Work Order

1.	145+97 ⁰⁶ - 167+61 ⁰⁶	5652 lbs	# 13.26	\$ 73.46
		+ 15%		11.02
		Total =		\$ 84.48

111 - 4"x6" Timber Sets.
 2" mesh to cover same and allow for lap 16" x 19"
 111 Sets x 28.5 sq. ft. to set = 3163.5 sq. ft.
 3163.5 sq. ft. + 450 sq. ft. to roll = 7.03 rolls.
 7.03 rolls at 80.4 pounds per roll = 565.2 pounds

A.L.L.
 10/3/30

Tunnel 1. Final Estimate (Contd)

Work Order	Quantity	Material	Price	Total
2. (a)	26	Bundles Lath	\$.90 bundle	20.80 ✓
(b)	25	Rolls Felt Paper	2 ³⁵ roll	58.75 ✓
(c)	48	Hrs. Lights	.08 per hr.	3.84 ✓
(d)	16	Hrs. Lights	.10 per hr.	1.60 ✓
(e)	1/4	Keq Nails	5 ⁸⁰ Keq	1.45 ✓
(f)		Labor		112.38 ✓
		Total		\$198.82 ✓

Compensation Insurance 14.89 ✓
 Liability Insurance .15 ✓
 Bond 3.21 ✓

\$219.07 ✓
 +15% 32.56 ✓
 Total \$249.63 ✓

Note - The quantity of materials and labor involved is from report of Gunitite Inspector to Division Engineer G. W. Converse. The unit prices of materials are from Material Company invoices to Contractor.

✓ A.C.L.
 10/3/32

Wor

Tunnel 2.

Final Estimate.

Oct. 1, 1930

Item	Sta. to	Sta.	Quantity	Unit Price	Total
1.	172+09 ⁵	192+17 ⁵	2008 Feet	5 ⁹⁵ Lin. Ft.	11947.60
2.	(a)	171+95.5 - 172+09 ⁵	8.9 cu. yd	140	cu. yd
	(b)	192+17 ⁵ - 192+31 ⁵	9.3 cu. yd.	"	"
Total			18.2	"	25.48
3.	(a)	172+18 ⁵ - 178+13	594 ⁵ Lin. Ft.	160	Lin. Ft.
	(b)	183+97 - 191+99	802 ⁵ " " "	"	"
Total			1396 ⁵	"	2234.40
4.	(a)	172+09 ⁵ - 172+18 ⁵	9 Lin. Ft.	375	Lin. Ft.
	(b)	178+13 - 183+97	584 ⁵ " " "	"	"
	(c)	191+99 - 192+17 ⁵	18 ⁵ " " "	"	"
Total			61 ⁵	"	2293.13
5	(a)	171+95.5 - 172+09 ⁵	8.41 cu. yd	6 ⁷⁵	cu. yd
	(b)	192+17.5 - 192+31 ⁵	8.61 " " "	"	"
Total			17.02	"	114.88

This is total quantity in wells. Not complete on 10/1/30
 Calculated by Harvey Watts.

✓ A.L.L.
 10/3/30

Tunnel 2. Final Estimate (Contd)

Item Sta. to Sta. Quantity Unit Price Total

6. (a) $172+09\frac{5}{8} - 172+18\frac{5}{8}$
 (b) $178+13 - 183+97$
 (c) $191+99 - 192+17\frac{5}{8}$
 Total $611\frac{5}{8} \times 2.51 \div 27 = 56\frac{85}{8} \text{ cu. yds } 67\frac{5}{8} \text{ cu. yd } 383.74$

7. (a) $172+18\frac{5}{8} - 178+13$
 (b) $183+97 - 191+99$
 Total $1396\frac{5}{8} \times 2.0 \div 27 = 103\frac{44}{27} \text{ cu. yd } 57\frac{5}{8} \text{ cu. yd } 594.78$

8. (a) Cement in floor $236\frac{5}{8} \text{ Bbl. } 220 \text{ Bbl. } 520.30$
 (b) Cement in granite $543\frac{25}{8} \text{ " " } 1195.15$
 (c) Cement in Ent. Wells $13\frac{50}{8} \text{ " " } 29.70$
 Total $793.25 \text{ " " } 1745.15$

See Page 27 - this book for notations - Items 6-7-8

Concrete portion of entrance wells not complete 10/1/30

Ent. Wells complete 10/28/30. G.W.B.

A.L.L.
10/3/30

Tunnel 2. Final Estimate (Contd)

Item	Sta. to Sta.	Quantity	Unit Price	Total
9.	171+95 ⁵ - 192+31 ⁵	15283.3 lb.	#.06 lb.	\$959.00
		16153 lb.	.06 lb.	\$969.18

Note - To total as of Oct. 1, 1930 must be added additional reinforcing steel on completion of concrete entrance wells at entrance and exit portals.

10/28/30. Steel in above = 270 pounds.

R.W.C.

See Page 28 - this book for notation on quantity.

Pcs.	Size	Length	Lin. Feet	Unit Weight	Total Pounds.
677 ✓	1/2"	17'6"	11847.5		
611 ✓	1/2"	6'8"	4073.5		
1138 ✓	1/2"	5'2"	5880.1		
4 ✓	1/2"	4'0"	16		
Total	1/2"		21817.1	.67 ✓	14617.5 ✓
62 ✓	3/8"	40'	2480		
4 ✓	3/8"	26'	104		
21 ✓	3/8"	20'	420		
15 ✓	3/8"	15'	225		
7 ✓	3/8"	8'	56		
46 ✓	3/8"	1'	46		
Total	3/8"		3331	.38 ✓	1265.8 ✓
Total as of 10/1/30 =					15883.3 ✓
20	3/8"	10'	200		
36	3/8"	9'8"	348		
20	3/8"	6'6"	130		
6	3/8"	5'4"	32		
Total	3/8"		710	.38 ✓	270.0 ✓

16153.3 ✓
A.L.L.
10/2/30

Tunnel 2. Final Estimate (Contd)

Item	Sta. to Sta.	Quantity	Unit Price	Total
10	172+09 ⁵ - 192+17 ⁵	5197 Lbs.	#.09 Lb.	467.73

Pos.	Width	Length	Sq. feet	Unit Weight	Total Pounds.
9L	7'	17'	1186	✓	
2	4'	17'	136	✓	

Additional reinforcing in 1052.4 ✓

sloughing sections of untimbered

Tunnel Total 12374.4 .42 5197 ✓

11.	172+09 ⁵ - 192+17 ⁵	6511 Lbs.	#.12 Lb.	781.32
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Rolls	Width	Length	Weight per roll	Weight
60'	3'	150'	80.65	4839 ✓
20'	"	"	80.45	1609 ✓
5'	"	"	81.6	408 ✓
2'	"	"	80.0	160 ✓
1'	"	"	81.0	81 ✓

7097 ✓

Less Work Order #1 - See Page 38. 586 ✓

6511 ✓

12.	172+09 ⁵ - 192+17 ⁵	324068M	#80 ⁰⁰ M.	2592.54
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The Engineers timber count is on Page 13-24 inclusive - this book.

A.C.L.
10/3/30

Tunnel 2. Final Estimate (Contd.)

Work Order	Quantity	Material	Price	Total
1.	586 lbs.	2" mesh	13 Lb.	\$ 76.18
		+15%		11.43
		Total =		\$ 87.61

115-4"x6" Timber Sets ✓
 115 x 28.5 sq. ft. per set = 3277.5 sq. ft.
 3277.5 ÷ 450 sq. ft. to roll = 7.28 rolls.
 7.28 rolls at 80.5 pounds per roll = 586 pounds.

3	(a)	18	Bundles Lath	80 bundle	\$ 14.40
	(b)	47	Rolls Felt Paper	123 roll	83.81
	(c)	72	Mrs. Lights	10 per hr.	7.20
	(d)	32	" "	.08 " "	2.56
	(e)	1/4	Keq Nails	580 Keq	1.45
	(f)		Labor		161.38
			Total		\$ 270.80

	Compensation Insurance	21.38
	Liability	.21
	Bond	4.39
		296.78
	+15%	44.52
	Total	\$ 341.30

✓ A.L.L.
 10/3/30

Tunnel 3. Final Estimate

Item Sta. to Sta. Quantity Unit Price Total

1. $205+24^{66} - 224+16^{66}$ 1892 Lin. ft. $\frac{1}{5}$ Lin. ft. \$ 11257.40

2. (a) $205+10^{66} - 205+24^{66}$ 9.3 cu. yds. 1.40 cu. yd

(b) $224+16^{66} - 224+30^{66}$ 8.9 " " " " "

Total 18.2 " " " " " 25.48

3. (a) $205+34 - 208+20$ 286 Lin. ft. $\frac{1}{60}$ Lin. ft.

(b) $208+47^{\frac{1}{2}} - 212+53$ 405 $\frac{1}{2}$ " " " " "

(c) $213+91 - 214+71$ 80 " " " " "

(d) $217+28 - 217+49$ 21 " " " " "

(e) $217+77 - 218+31$ 54 " " " " "

(f) $219+85^{\frac{1}{2}} - 219+96$ 105 $\frac{1}{2}$ " " " " "

(g) $220+58^{\frac{1}{2}} - 220+78$ 195 $\frac{1}{2}$ " " " " "

(h) $220+95 - 221+29$ 34 " " " " "

(i) $221+68 - 221+97$ 29 " " " " "

Total 939 $\frac{3}{2}$ " " " " " 1503.20

A.L.L.
10/3/30

Tunnel 3. Final Estimate (Contd)

Item Sta. to Sta. Quantity Unit Price Total

4	(a)	205+24 ⁶⁶ - 205+30 [✓]	9 [✓]	Lin. ft	3 ⁷⁵	Lin. ft.	
	(b)	208+20 [✓] - 208+47 [✓]	27 [✓]	" "	" "	" "	
	(c)	212+53 [✓] - 213+91 [✓]	138 [✓]	" "	" "	" "	
	(d)	214+71 [✓] - 217+28 [✓]	257 [✓]	" "	" "	" "	
	(e)	217+49 [✓] - 217+77 [✓]	28 [✓]	" "	" "	" "	
	(f)	218+31 [✓] - 219+85 [✓]	154 [✓]	" "	" "	" "	
	(g)	219+96 [✓] - 220+58 [✓]	62 [✓]	" "	" "	" "	
	(h)	220+78 [✓] - 220+95 [✓]	17 [✓]	" "	" "	" "	
	(i)	221+29 [✓] - 221+68 [✓]	39 [✓]	" "	" "	" "	
	(j)	221+97 [✓] - 224+16 ⁶⁶	219 ²	" "	" "	" "	
	Total		952 [✓]	" "	" "	" "	3571.88

5.	(a)	205+10 ⁶⁶ - 205+24 ⁶⁶	8 ⁶¹	cu. yd.	6 ⁷⁵	cu. yd.	
	(b)	224+16 ⁶⁶ - 224+30 ⁶⁶	8 ⁴¹	cu. yd.	" "	" "	
	Total		17 ⁰²	cu. yd.	" "	" "	114.88

6.	Same as Item 4		6 ⁷⁵	cu. yd.			
	Total	952 [✓] x 2.51 ÷ 27	88 [✓]	cu. yd.	" "	" "	597.37

7.	Same as Item 3						
	Total	939 [✓] x 2.0 ÷ 27	69 ⁶	cu. yd.	5 ⁷⁵	cu. yd.	400.20

A.L.
10/10/30.

Tunnel 3. Final Estimate (Contd)

Item	Sta. to Sta	Quantity	Unit	Price	Total
8 (a)	Cement in Floor	270 ²⁵	Bbl. 2 ²⁰	Bbl.	
(b)	" " Gunite	691	"	"	
(c)	" " Ent. Walls	12 ⁵	"	"	
Total		973 ²⁵	"	2 ²⁰ Bbl.	\$ 2142.25

9. 205+10⁶⁶-224+30⁶⁶=2499 316.06 Lb. \$ 1499.58

Item 9.

Pcs.	Size	Length	Lin. Feet	Unit Weight	Total Pounds.
1064	1/2"	17'6"	18620.00	✓	
1033	1/2"	6'8"	6890.11	✓	
1726	1/2"	5'2"	8918.24	✓	
7	1/2"	16	112.00	✓	
7	1/2"	14	98.00	✓	
Total	1/2"		34638.35	.67	23207.7

1	3/8"	4	4	
72	3/8"	40	2880	✓
7	3/8"	30	210	✓
22	3/8"	7	154	✓
1	3/8"	18	18	✓
8	3/8"	22	176	✓
4	3/8"	26	104	✓
13	3/8"	36	468	✓
5	3/8"	24	120	✓
29	3/8"	9'9"	282.75	✓
19	3/8"	9'6"	180.5	✓
10	3/8"	10	100	✓
Total			4697 ²⁵	.38

Ent. Wells complete Total Steel = 24992.7

✓ A.L.
10/3/30

Tunnel 3 Final Estimate (Contd.)

Item	Sta. to	Sta.	Quantity	Unit Price	Total
10	205+24 ⁶⁶	224+16 ⁶⁶	7596 [✓] Lb.	#09 Lb.	\$683.64

11	205+24 ⁶⁶	224+16 ⁶⁶	6159 [✓] Lb.	#12 Lb.	739.08
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12	205+24 ⁶⁶	224+16 ⁶⁶	30.8505 [✓] M	80 ⁰⁰ M.	\$2468.04
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43

Item 10.

Pcs.	Width	Length	Sq. ft.	Unit Height	Total Pounds
138 [✓]	7'	17'	16422 [✓]		
4 [✓]	4'	17'	272 [✓]		
6 [✓]	3'	17'	306 [✓]		
1 [✓]	2'	17'	34 [✓]		

Additional reinforcing in 1052.4

sloughing sections of

untimbered Tunnel Total 180864[✓].42 7596[✓]

Item 11.

19 rolls	2" mesh	at 82 pounds per roll	1558 [✓]	
57.22 "	"	"	80.4 " " "	4600.5 [✓]
Total			6159 [✓]	

Note - The Engineers count is in Tunnel 3
Timber Book - Page 31-58

✓ A.L.L.
12/3/30

Tunnel 3.

Final Estimate (Contd)

Work Order	Quantity	Material	Price	Total
1.	947.11 Lbs.	2" mesh	#13 Lb.	\$123.12
		+ 15%		18.47
		Total		\$141.59

2.	25	Bundles Lath	\$80 Bundle	20.00
	1	Roll Felt Paper	2 ³⁵ roll	2.35
	10	" " "	2 ⁰⁰ "	20.00
	10	" " "	1 ⁸⁵ "	18.50
	12	" " "	2 ⁰⁰ "	24.24
	128	Hrs. Lights	.08 Hr.	10.24
	1/2	Keq Nails	5 ⁸⁰ Keq	2.90
	4	Hrs. Trucking	1 ⁵⁰ Hr.	6.00
		Labor		109.75
				\$213.98

Liability Insurance	.14
Compensation	14.54
Bond	3.43
Total	232.09

(over)

186 - 4" x 6" Timber Sets ✓
 186 x 28.5 sq. ft. to set = 5301 sq. ft. ✓
 5301 ÷ 450 sq. ft. to roll = 11.78 rolls ✓
 11.78 rolls at 80.4 pounds to roll = 947.11 Lbs

 ✓ A.L.L.
 10/3/30

Tunnel 3. Final Estimate (Contd)

Work Order	Quantity	Material	Price	Total
2.	1	Bundle Lath #80 Bundle	.80	.80
	18	Rolls Felt Paper 235 Roll	42.30	761.40
	105	Hrs. Lights .08 Hr	8.40	8.40
	56	" " .10 "	5.60	5.60
		Labor		141.19
		Total		\$198.29

+
 Compensation Insurance 18.71
 Liability " .18
 Bond 3.26
 \$220.44

2. Total Tunnel 3 = \$220.44
 232.09
 \$452.50
 +15% 67.88
 Total \$520.41

V.A.L.L.
 10/13/30

Tunnel 4. Final Estimate

Item	Sta. to	Sta.	Quantity	Unit Price	Total
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1.	287+08 ⁴²	298+03 ⁴²	1095 Lin. ft.	\$5.25	6515.25
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2.	(a) 286+94 ⁴²	287+08 ⁴²	8.2 cu. yd.	\$140	
	(b) 298+03 ⁴²	298+17 ⁴²	9.3 cu. yds.	" "	
Total			18.2 " "	" "	2548

3. None.

4	287+08 ⁴²	298+03 ⁴²	1095 Lin. ft.	\$3.75	4106.25
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5	(a) 286+94 ⁴²	287+08 ⁴²	8.41 cu. yd.	\$67.5	
	(b) 298+03 ⁴²	298+17 ⁴²	8.61 " "	" "	
Total			17.02 " "	" "	114.88

6.	287+08 ⁴²	298+03 ⁴²	67.5 cu. yd.		
Total	1095	$\times 2.51 \div 27$	101.8 cu. yd.	" "	687.15

7. None

8.	(a) Cement in floor	163.5 Bbl.	2.20 Bbl.		
	(b) " " Gunite	747.5 Bbl.	" "		
	(c) " " Ent. Wells	12 Bbl.	" "		
Total		918	" "	" "	2019.60

A.L.L.
10/3/30

Tunnel 4 Final Estimate (Contd)

Item	Sta. to Sta.	Quantity	Unit	Price	Total
9.	286+94 ⁴² - 298+17 ⁴² = 2798 ¹²		Lb.	\$.06	\$1678.92

Item 9.

Pos.	Size	Length	Lin. Feet	Unit Weight	Total Pounds
1196	1/2"	17'6"	20930.0	✓	
1125	1/2"	6'8"	7500.38	✓	
1939	1/2"	5'2"	10018.81	✓	
6	1/2"	2'2"	13.0	✓	
4	1/2"	1'8"	6.67	✓	
Total	1/2"		38468.86	.67	25774.1
21	3/8"	9'9"	204.75	✓	
20	"	6'9"	135.00	✓	
12	"	8'4"	100.00	✓	
72	"	40	2880.00	✓	
96	"	20	1920.00	✓	
12	"	17'6"	210.00	✓	
20	"	5'2"	103.33	✓	
16	"	16	256.00	✓	
Total	3/8"		5809.08	.38	2207.4
Ent. Wells complete - Total Steel.					27981.5

✓ A.C.L.
10/3/50

Tunnel 4 Final Estimate (Contd)

Item	Sta. to Sta.	Quantity	Unit Price	Total
10	287+08 ⁴² - 298+03 ⁴²	8297 Lb.	\$.09 Lb.	746.73
11.	287+08 ⁴² - 298+03 ⁴²	3362 Lb.	\$.12 Lb.	403.44
12.	287+08 ⁴² - 298+03 ⁴²	58,090 M	\$.0080 M	4647.22

Work Order

1.	287+08 ⁴² - 298+03 ⁴²	1230 Lb.	\$.13 Lb.	\$159.90
		+ 15%		23.99
		Total		\$183.89

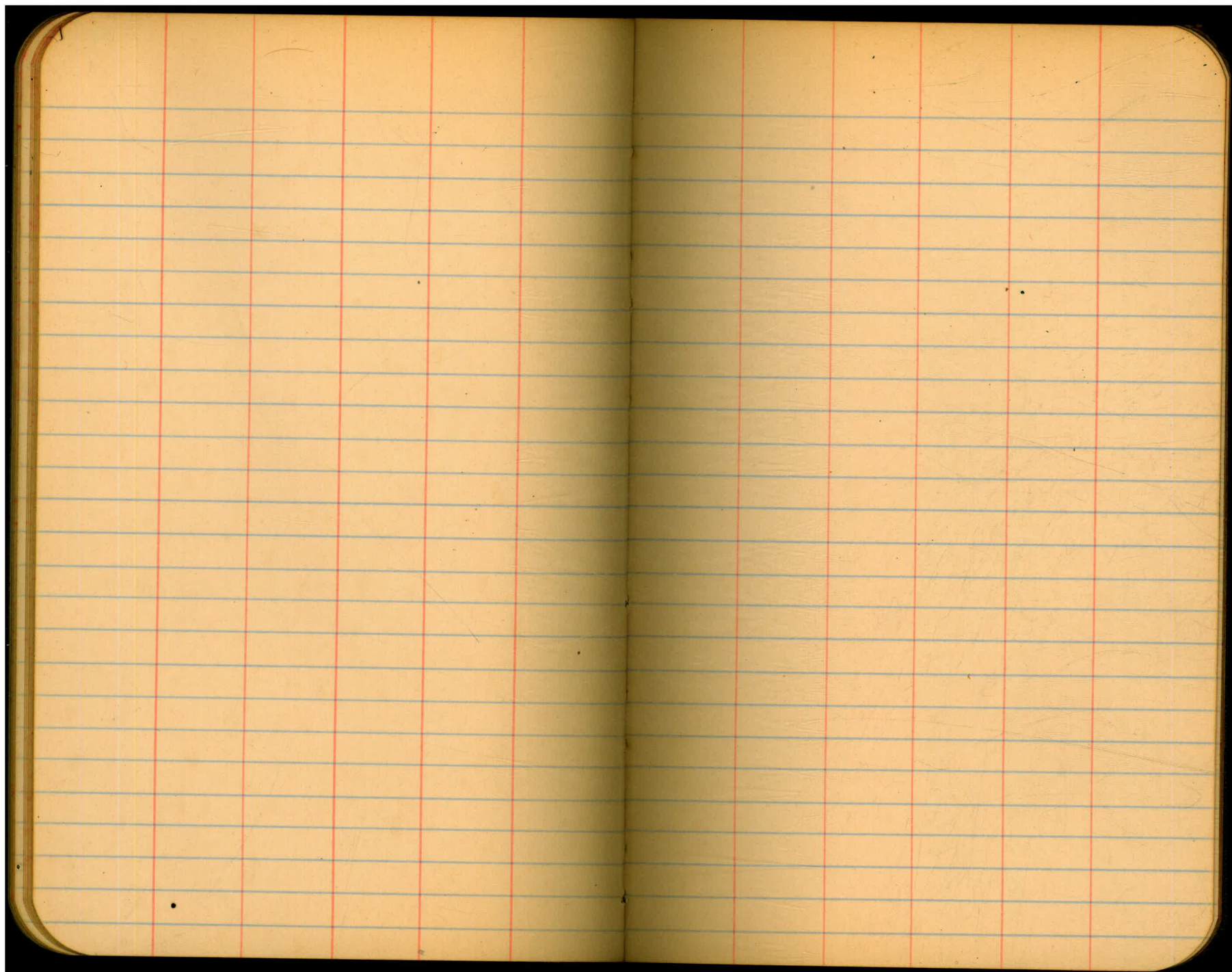
Item 10. ✓
 166 pcs. 7' x 17' = 19754 sq. ft. x 42 = ^{Alt.} 8297 pounds

41 rolls 2" mesh at 82 pounds per roll = 3362 "

Note - The Engineers count is in Tunnel 4
 Timber Book, Page 27-48

15 rolls 2" mesh at 82 pounds per roll = 1230 pounds.

✓ A.L.L.
 10/3/30



Concrete Pavement Patching.

	width	length	Area	
54 th St.	5'10"	34'0"	6 x 34	204
	6'2"			
	6'0"			

Broadway.	14'0"	37'3"	15 x 37.25	558.75
	14'3"			
	16'			
	16'3"			
	15'6"			

Bach. More or less covered with earth. 533.

Ridgeway	50'9"	20'0"	49.87 x 20	997.4
	49'0"			
	Triangular break $\frac{1}{2}(26" \times 14')$			17.5
	Total			1014.9

Bonita.	10.5	20.5	10.5 x 20.5	215.0
	Triangular break $\frac{1}{2}(3.5 \times 7)$			12
	Total			227.

Imperial				
Ave. Sidewalk	4'	65.5	4 x 65.5	262.0
	Triangular break			1.0
	Total			263.0

Asphalt Pavement Patching.

65 th St.	6.67	31.5	=	210
	1.0	10.0		10
				<u>220</u>

Imperial 261.

DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder
stake for any width roadway, slope 1 1/2 to 1.
If ground is nearly level, the cut or fill at side
stake is located by the double entry method in
left column and top row. The number in bold

IMPROVED TABLES

AND

INFORMATION

TABLE No. 2.

To find Tangent and External for curve of
any other degree, divide by degree of curve and
add correction found in column of corrections.

Degree of curve with a given T may be found
by dividing tangent (or external), opposite T by
given tangent (or external).

The distance from a point on the tangent to
the curve is very nearly the square of the tangent
length divided by twice the radius.

