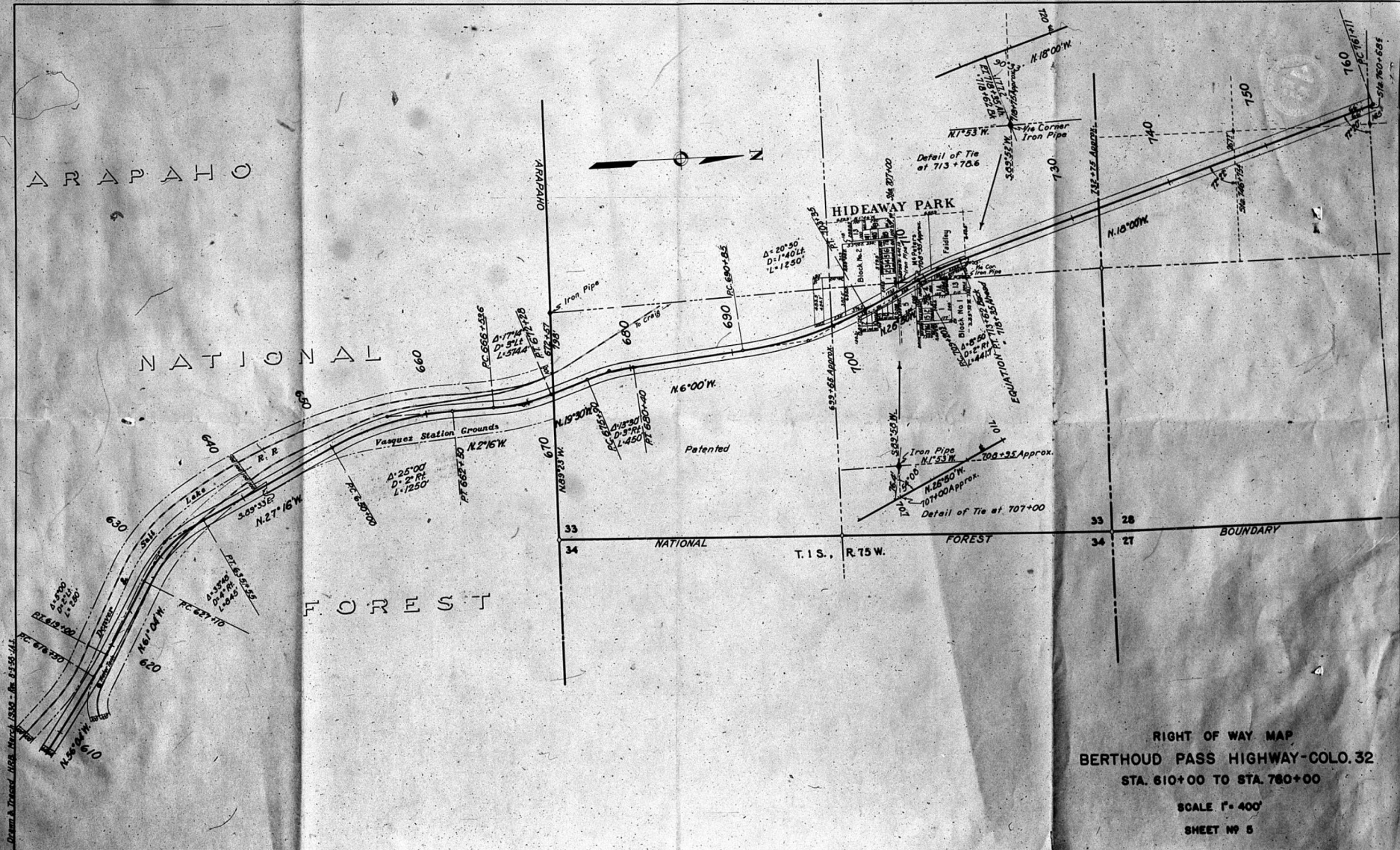


ARAPAHO

NATIONAL

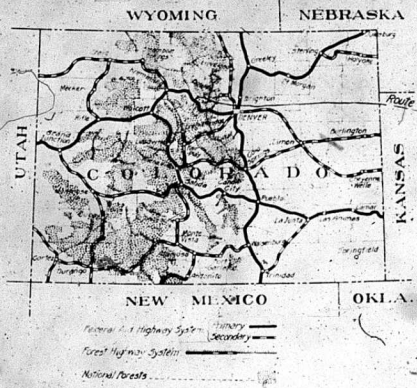
FOREST



RIGHT OF WAY MAP  
BERTHOUD PASS HIGHWAY-COLO.32  
STA. 610+00 TO STA. 760+00  
SCALE 1" = 400'  
SHEET NO 5

Drawn & Traced, 1938, from 8158-A.



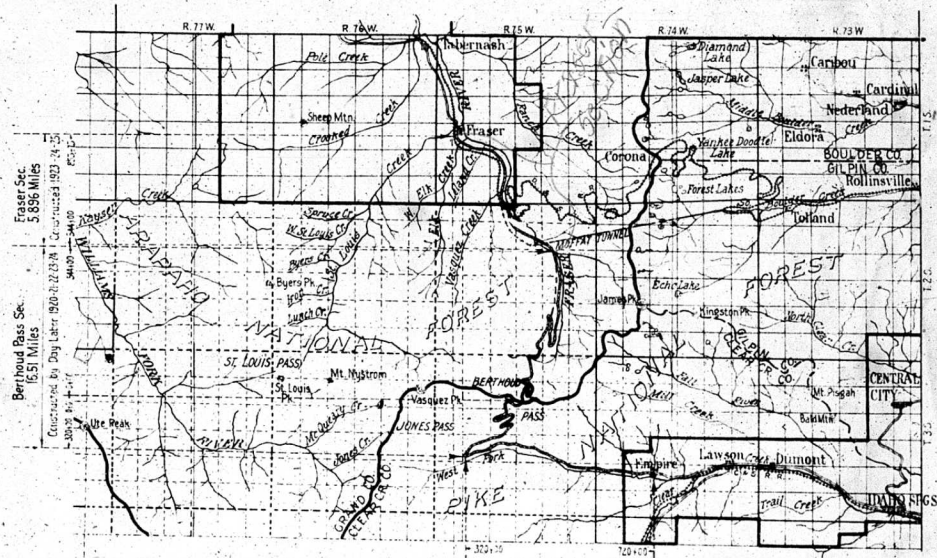


UNITED STATES DEPARTMENT OF AGRICULTURE  
 BUREAU OF PUBLIC ROADS

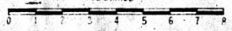
PLANS FOR PROPOSED  
 FRASER SECTION  
 BERTHOUD PASS HIGHWAY  
 ROUTE 32 EMPIRE TO FRASER  
 30 MILES CLASS 2.  
 COLORADO FOREST HIGHWAY SYSTEM  
 ARAPAHO NATIONAL FOREST  
 GRAND COUNTY,  
 COLORADO

SHEET NO.	STATE	PANEL NO.	SECTION	SHEET NO.	TOTAL SHEETS
7	COLO.				

INDEX TO SHEETS		
SHEET NO.	DESCRIPTION	STATION TO STATION
2	TYPICAL SECTIONS	



INDEX MAP  
 Scale Miles



Approximate Route  
 Surveyed Route  
 Existing Roads  
 Grading and Drain  
 Paving  
 See or Marked

Berthoud Pass  
 Fraser Section

Constructed by Day later 1910-1923 N. Constructed 1923-1925  
 Empire - Jones Pass Section  
 7,523 Miles  
 Surveyed 1919



APPROVED: [Signature] DATE [Date] 192[ ]

DISTRICT ENGINEER,  
 U. S. BUREAU OF PUBLIC ROADS

APPROVED: [Signature] DATE [Date] 192[ ]

DISTRICT FORESTER,  
 U. S. FOREST SERVICE

APPROVED: [Signature] DATE [Date] 192[ ]

STATE HIGHWAY ENGINEER,  
 STATE OF COLORADO

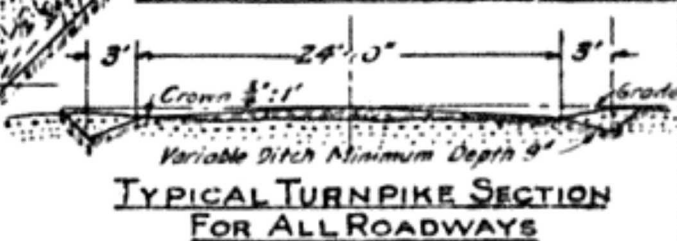
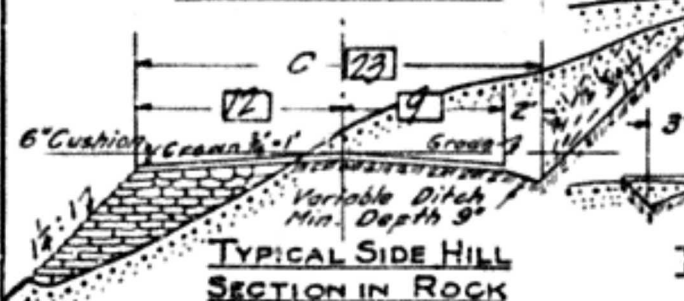
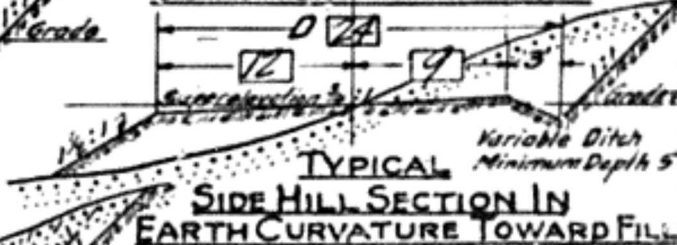
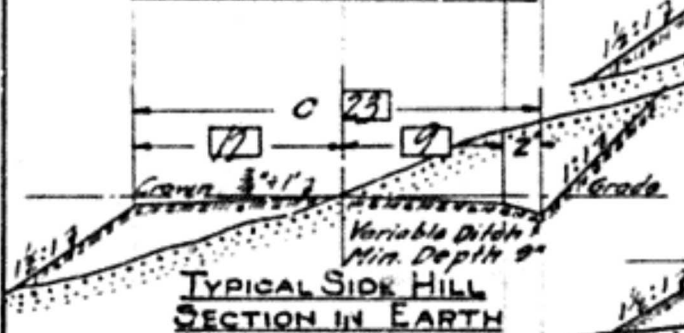
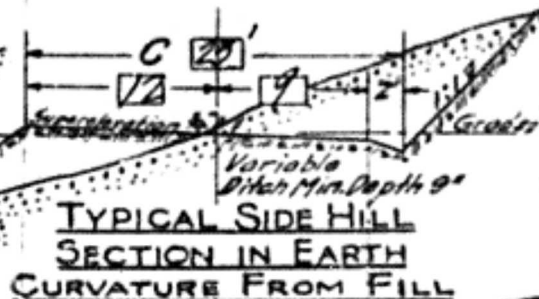
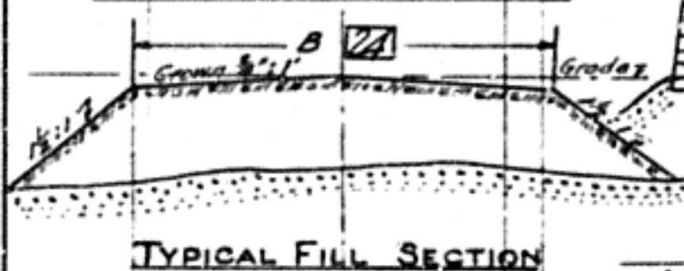
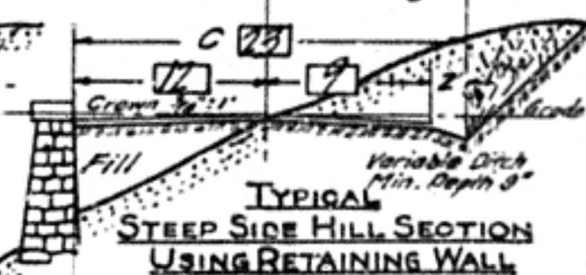
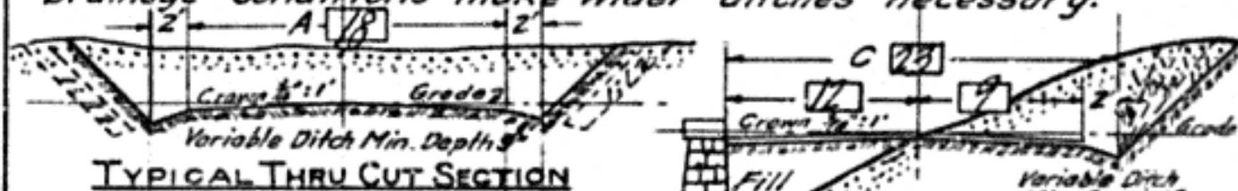
U.S. BUREAU OF PUBLIC ROADS  
**STANDARD CROSS SECTIONS**  
 FOREST HIGHWAYS  
 REVISED JAN. 1 1923

30

DISTRICT No. 9. STANDARD ROADWAY. 18 Ft.  
 ROAD *Berthoud Pass - Fraser Sect.*  
 NATIONAL FOREST *Grapah*  
 COUNTY *Grand*  
 STATE *Colorado*

ROADWAY	A	B	C	D
12'	12	18	17	18
14'	14	20	19	20
16'	16	22	21	22
✓ 18'	18	24	23	24

Sections to be widened on curves as per instructions  
 Excavation Sections to be widened in shallow cuts or where  
 Drainage conditions make wider ditches necessary.

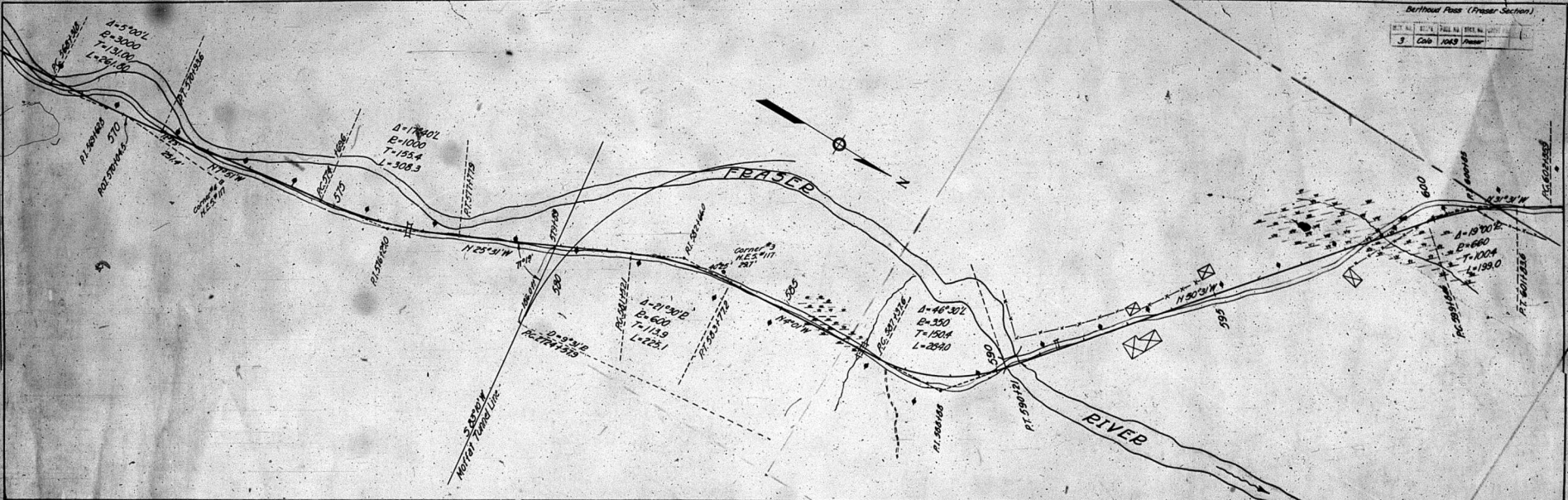


Hand Placed Embankment

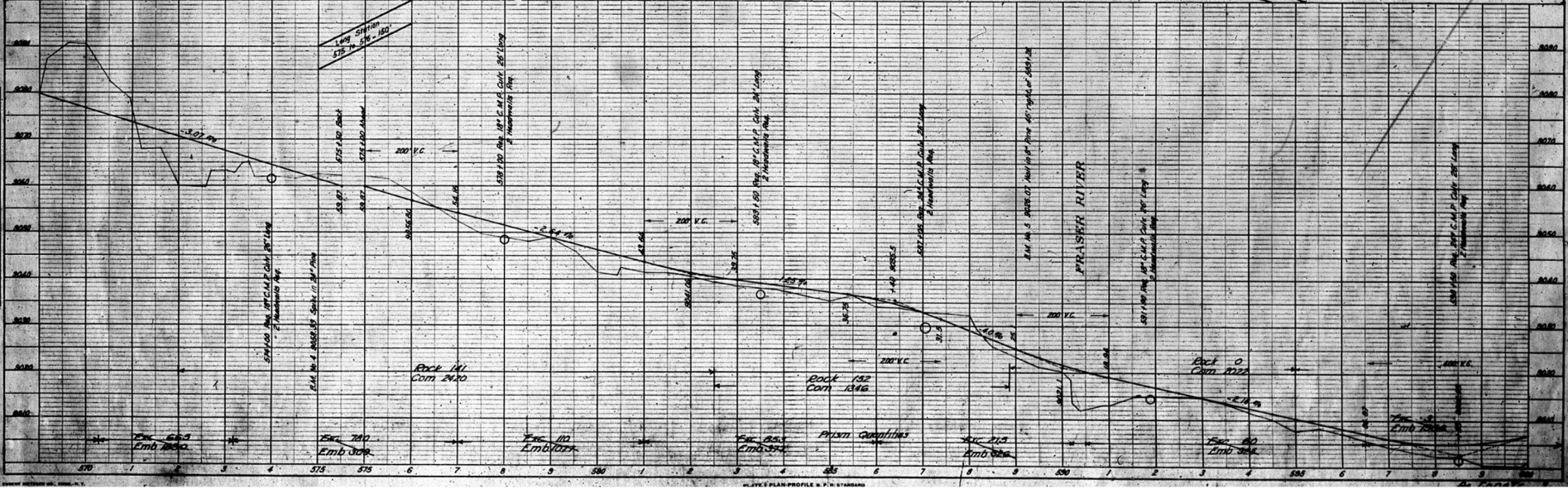
APPROVED *L. J. HEWEL* Date *1/3/23*  
 Deputy Chief Engineer



PLAN	INSTRUMENTED	DATE
NOTE BOOK	BY	
NO.		



PROFILE	INSTRUMENTED	DATE
NOTE BOOK	BY	
NO.		





PLAN	SCALE	1" = 100'
VERT.	SCALE	1" = 10'
ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED ARE IN FEET AND DECIMALS THEREOF.		

PLAN	SCALE	1" = 100'
VERT.	SCALE	1" = 10'
ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED ARE IN FEET AND DECIMALS THEREOF.		

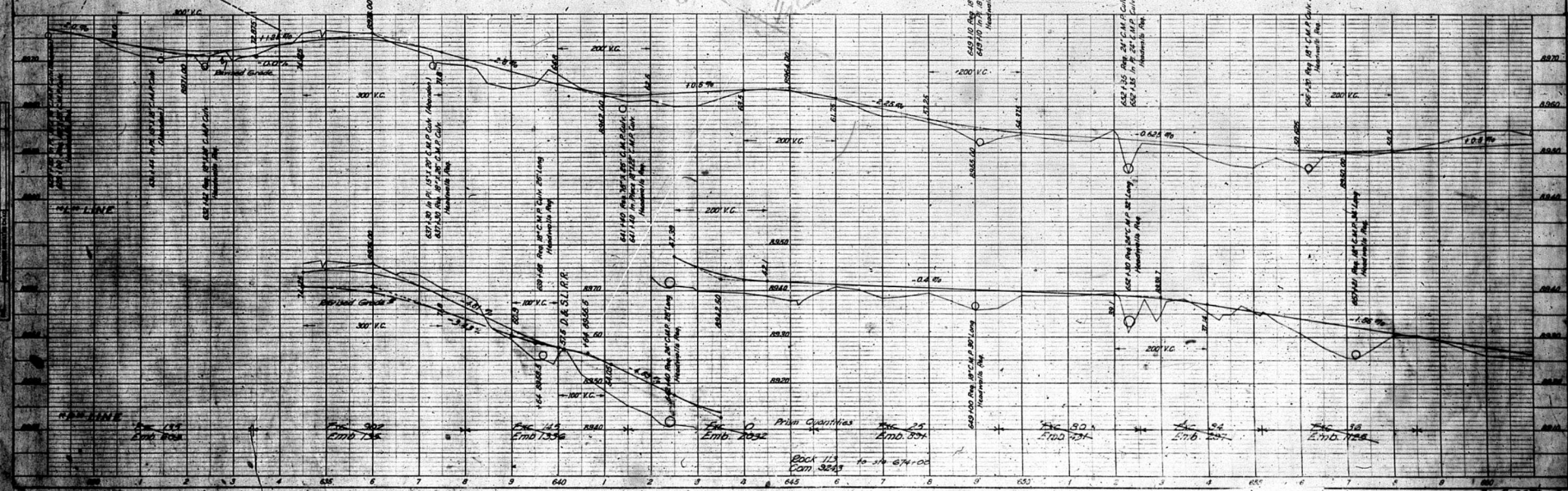
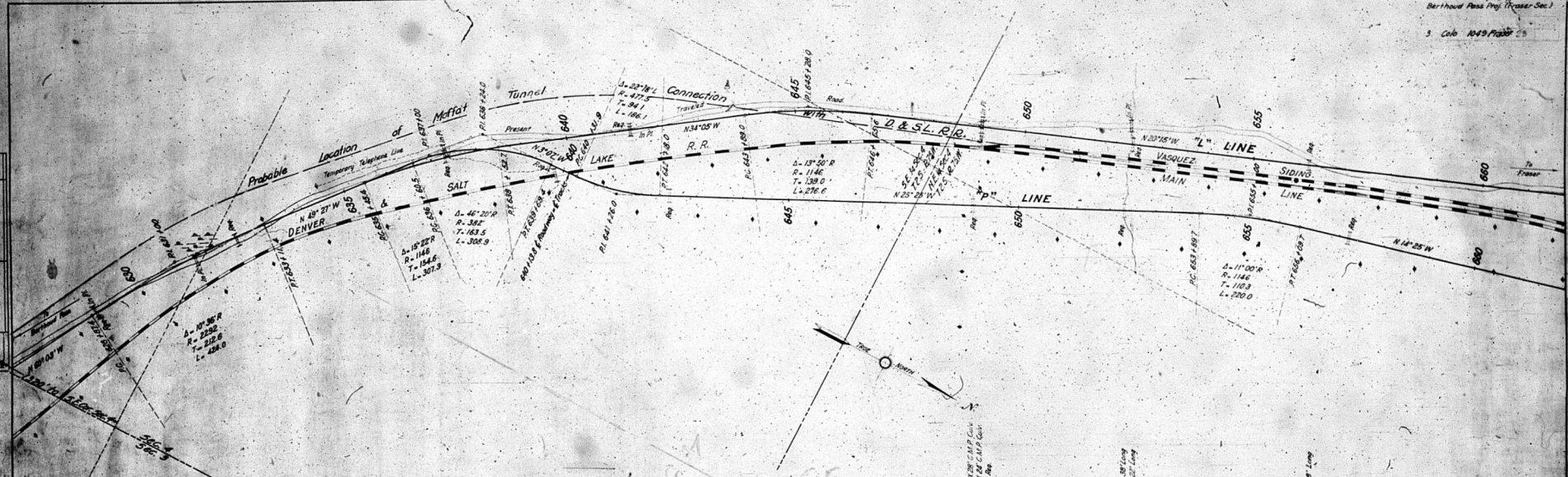
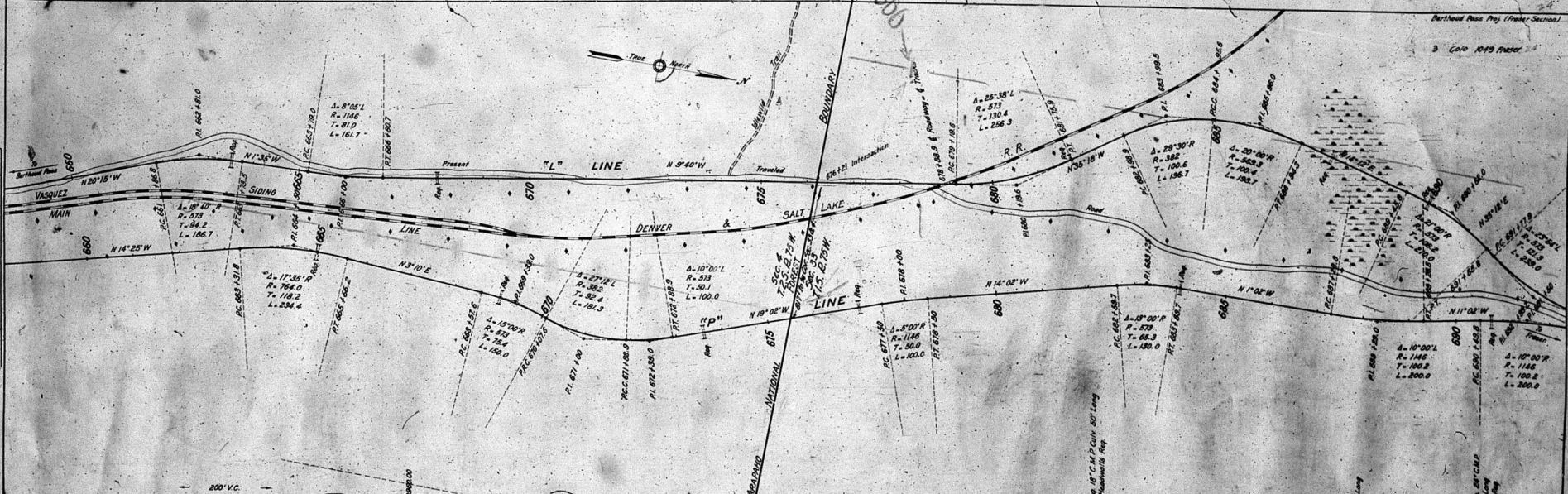
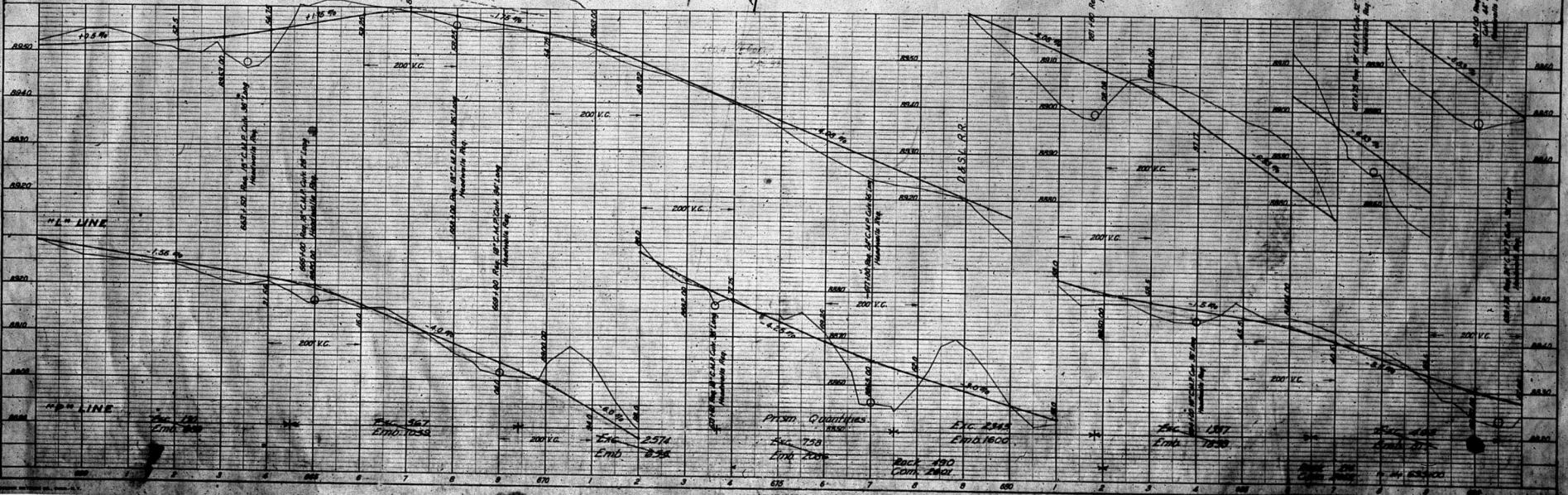


PLATE PLAN/PROFILE - P. 25 - STANDARD

PLAN	DATE	BY
REVISED		
DATE		
BY		
REVISIONS		
NO.		

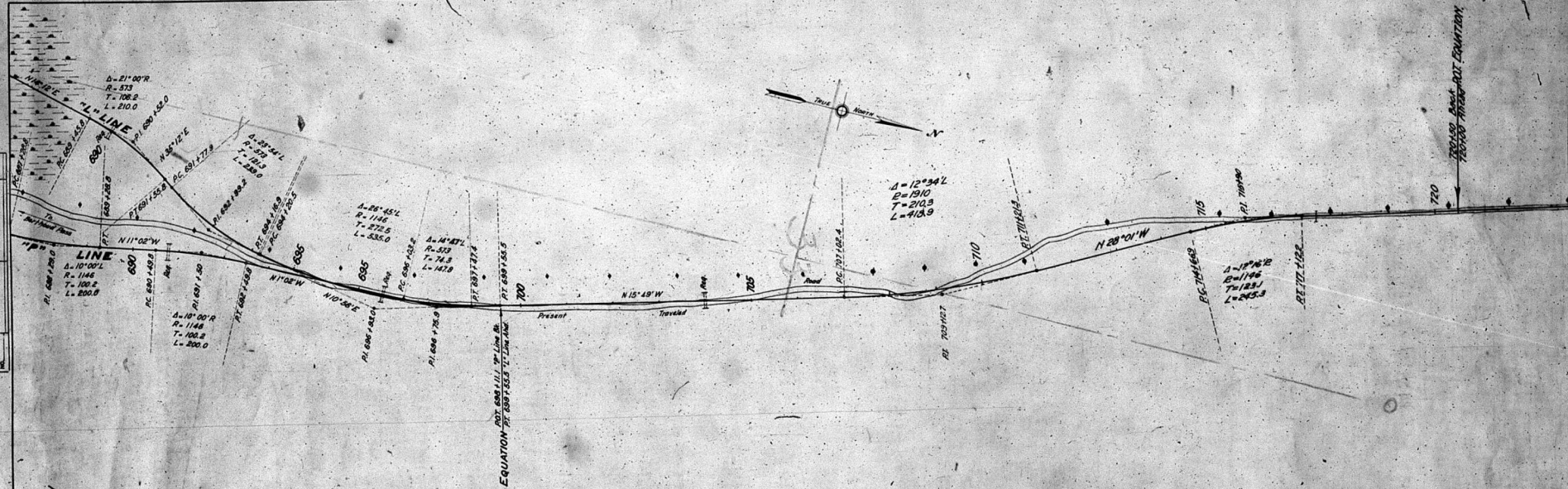


PROFILE	DATE	BY
REVISED		
DATE		
BY		
REVISIONS		
NO.		



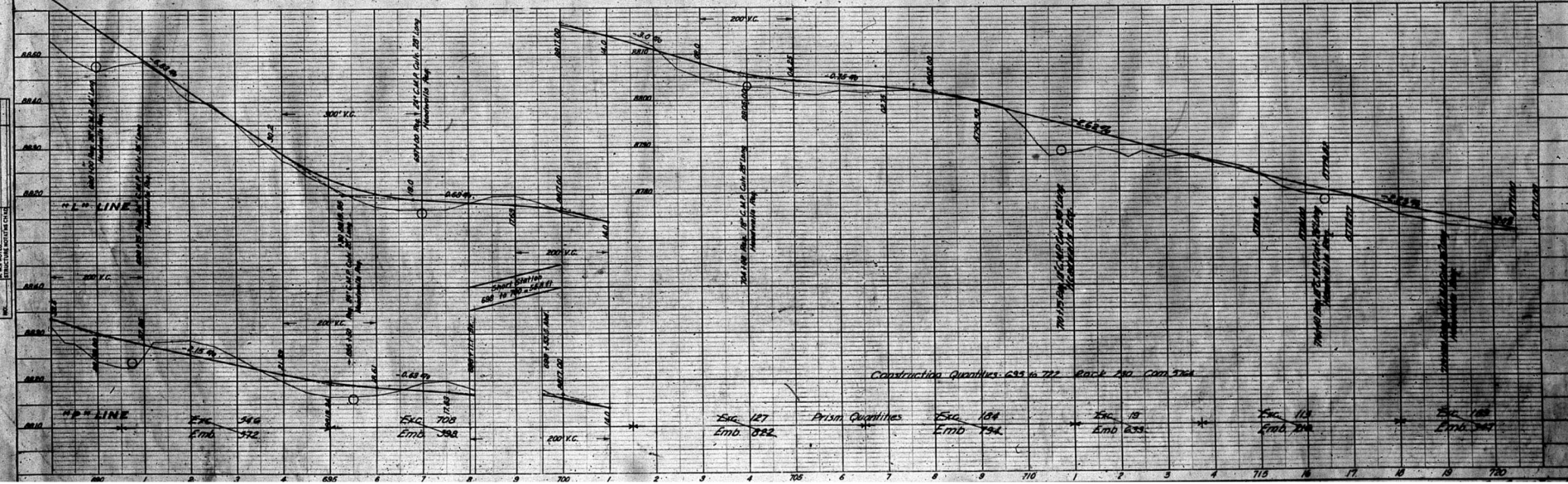
PLAN

DATE	BY
REVISED	BY
APPROVED	BY
SCALE	
PROJECT	
NO.	



PROFILE

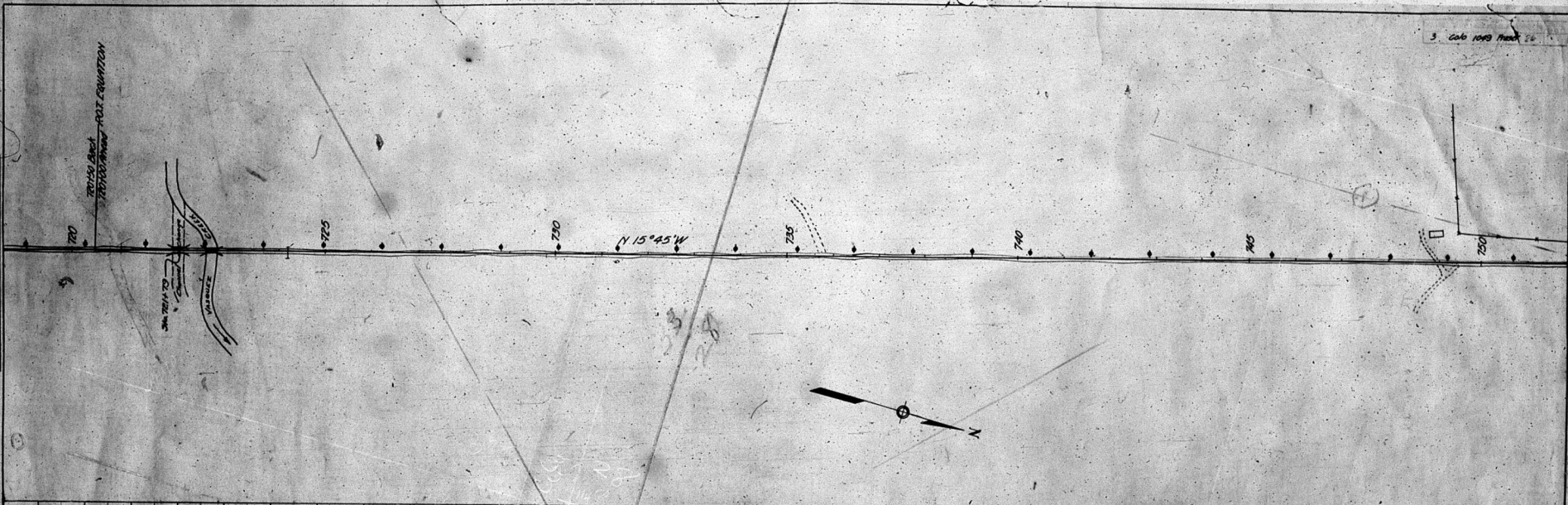
DATE	BY
REVISED	BY
APPROVED	BY
SCALE	
PROJECT	
NO.	



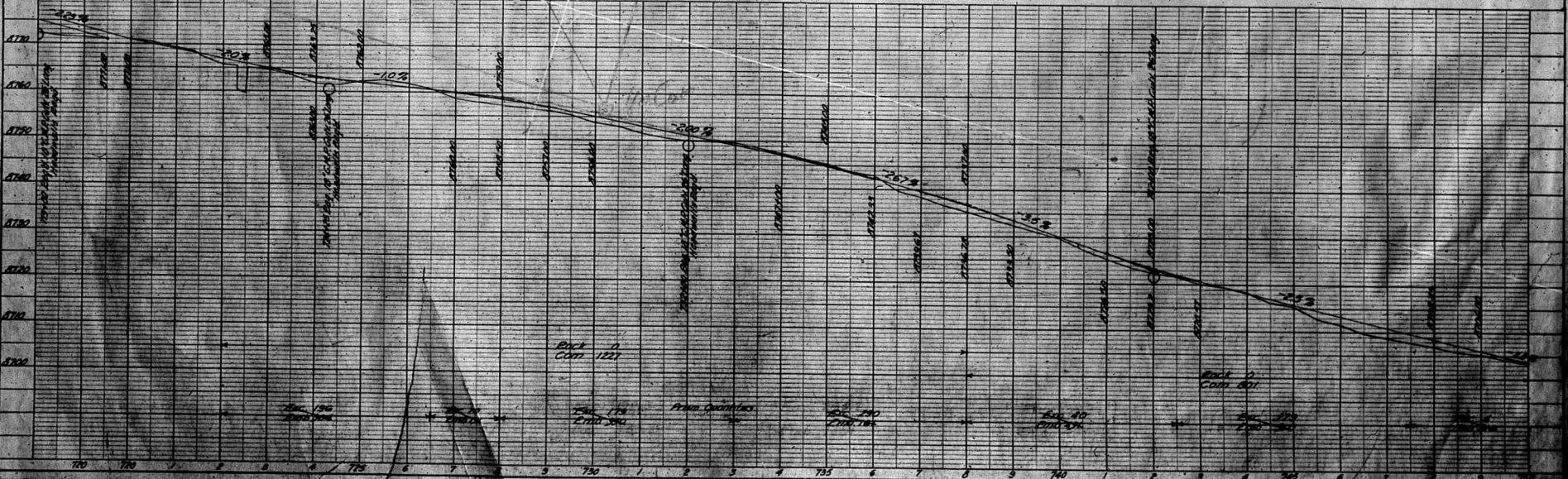
Construction Quantities: 635 to 722 Back 700 Com 574

Prison Quantities: Elev 127 E.M.D. 582, Elev 128 E.M.D. 584, Elev 13 E.M.D. 635, Elev 113 E.M.D. 584, Elev 118 E.M.D. 587

PLAN	DATE
PROJECT	
DATE	
BY	
NO.	



PROFILE	DATE
PROJECT	
DATE	
BY	
NO.	



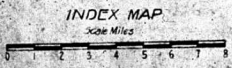
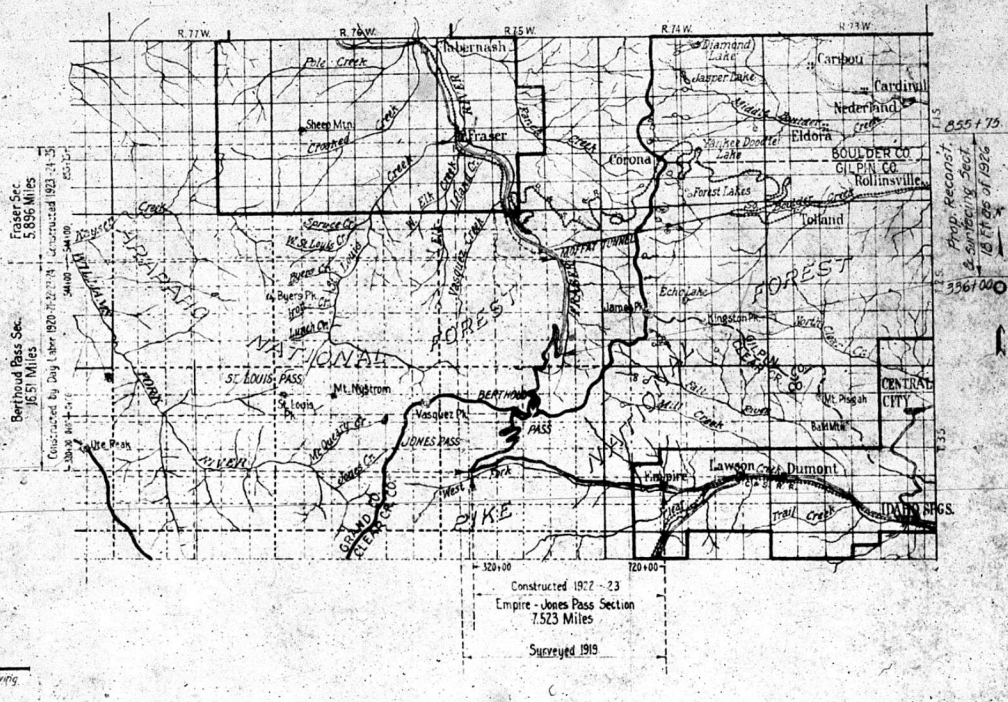
UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF PUBLIC ROADS

PLANS FOR PROPOSED  
SURFACING SECTION  
BERTHOUD PASS HIGHWAY  
ROUTE 32 EMPIRE TO FRASER  
30 MILES CLASS 2.

COLORADO FOREST HIGHWAY SYSTEM  
ARAPAHOE & PIKE NAT'L. FORESTS  
GRAND & CLEAR CREEK CO'S.  
COLORADO

INDEX TO SHEETS

SECTION	DESCRIPTION	SECTION NUMBER



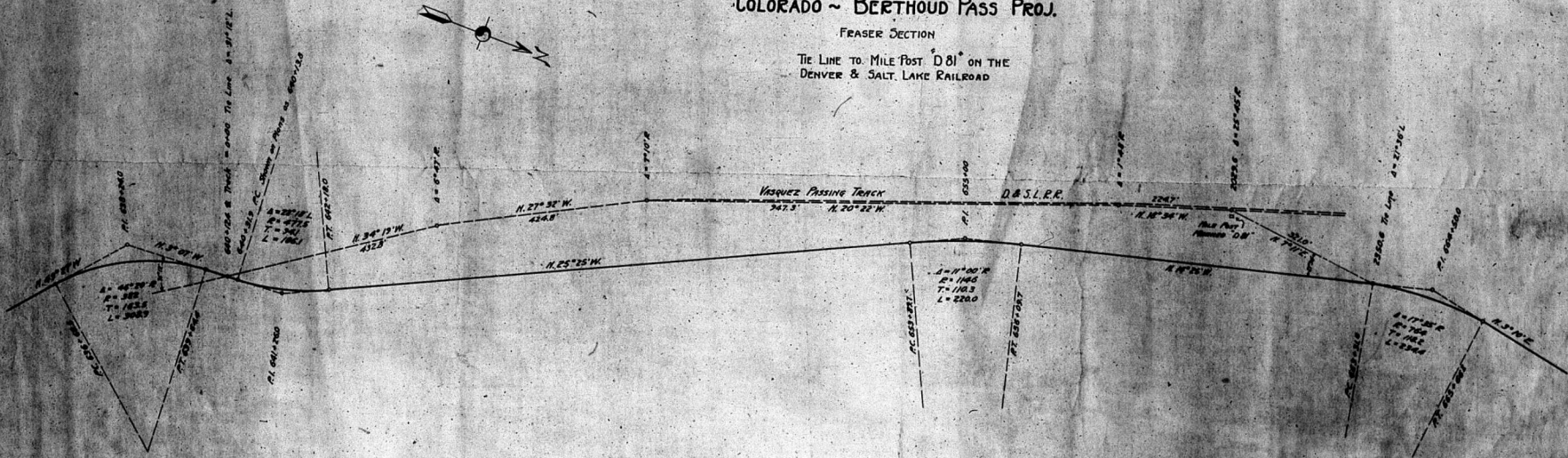
Approximate Route    Surveyed Route    Existing Roads    Grading Work, Grades, Slope or Elevation    Paving



# COLORADO ~ BERTHOUD PASS PROJ.

FRASER SECTION

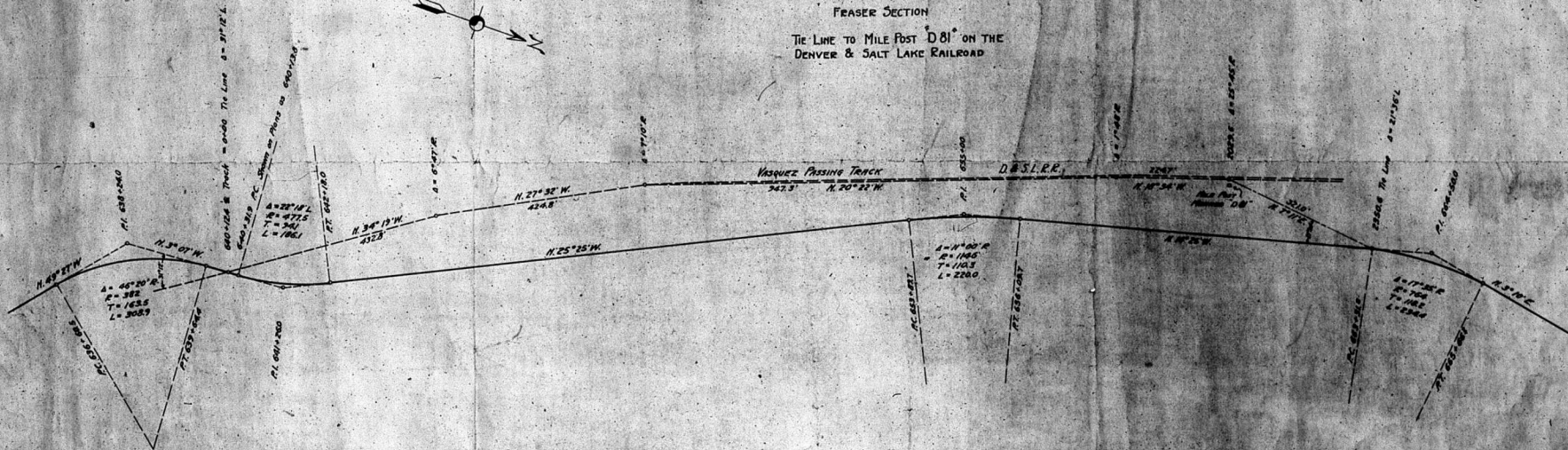
TIE LINE TO MILE POST D81 ON THE  
DENVER & SALT LAKE RAILROAD



# COLORADO ~ BERTHOUD PASS PROJ.

FRASER SECTION

TIE LINE TO MILE POST 181 ON THE  
DENVER & SALT LAKE RAILROAD



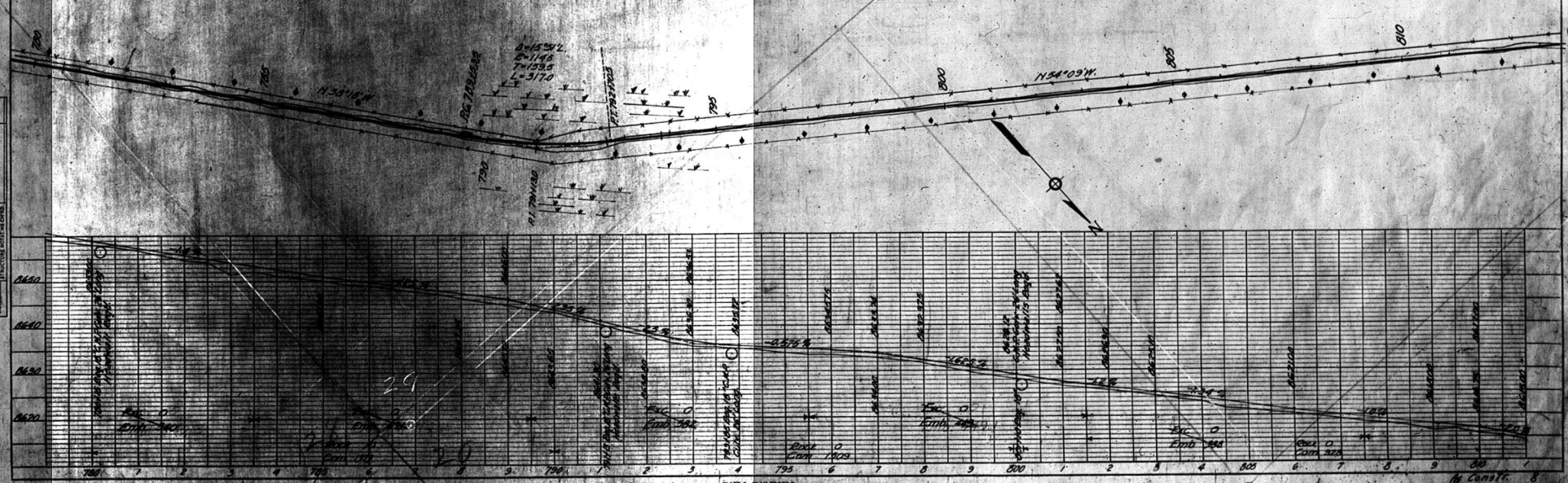
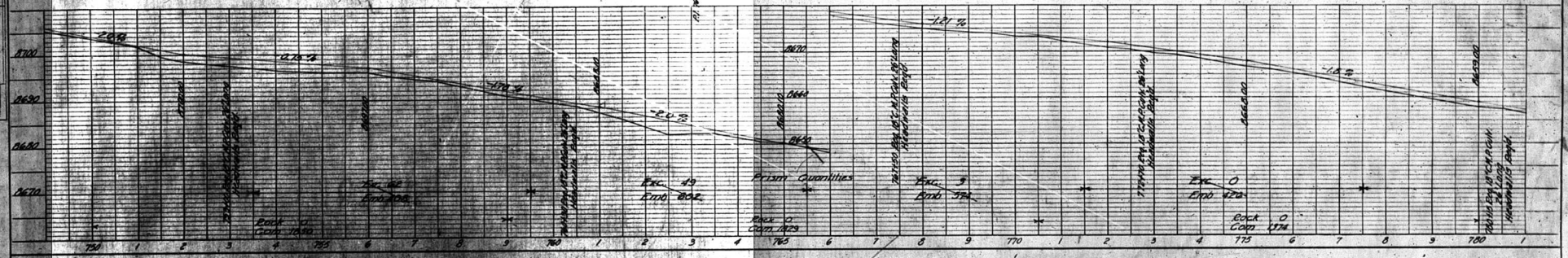
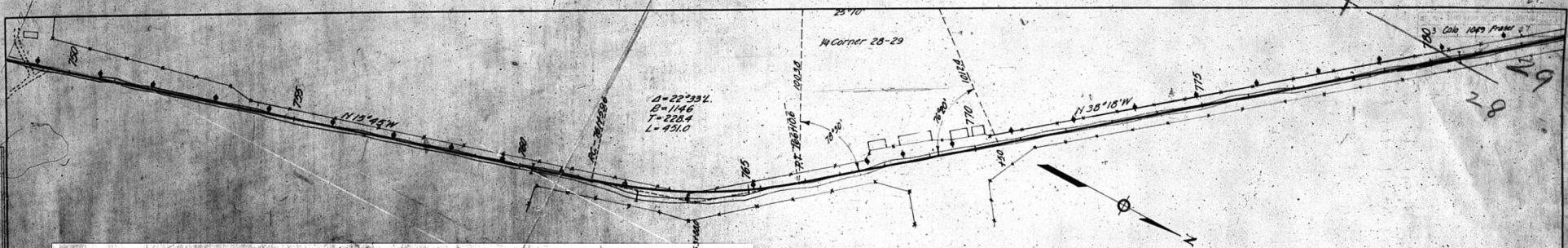


PLATE 2 - PLAN PROFILE & ELEVATION

PLAN  
 DATE: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 NO. OF SHEETS: \_\_\_\_\_

PROFILE  
 DATE: \_\_\_\_\_  
 DRAWN BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 NO. OF SHEETS: \_\_\_\_\_

PLAN  
 SHEET NO. 1  
 PROJECT NO. 1000  
 DATE 10/15/1910

PROFILE  
 SHEET NO. 1  
 PROJECT NO. 1000  
 DATE 10/15/1910

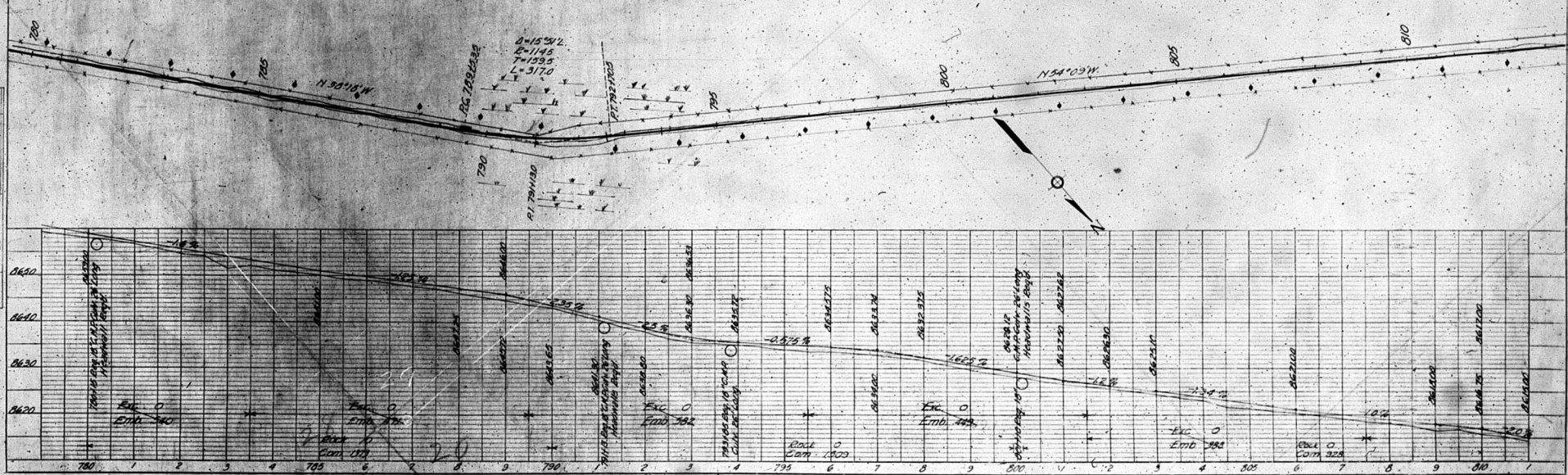
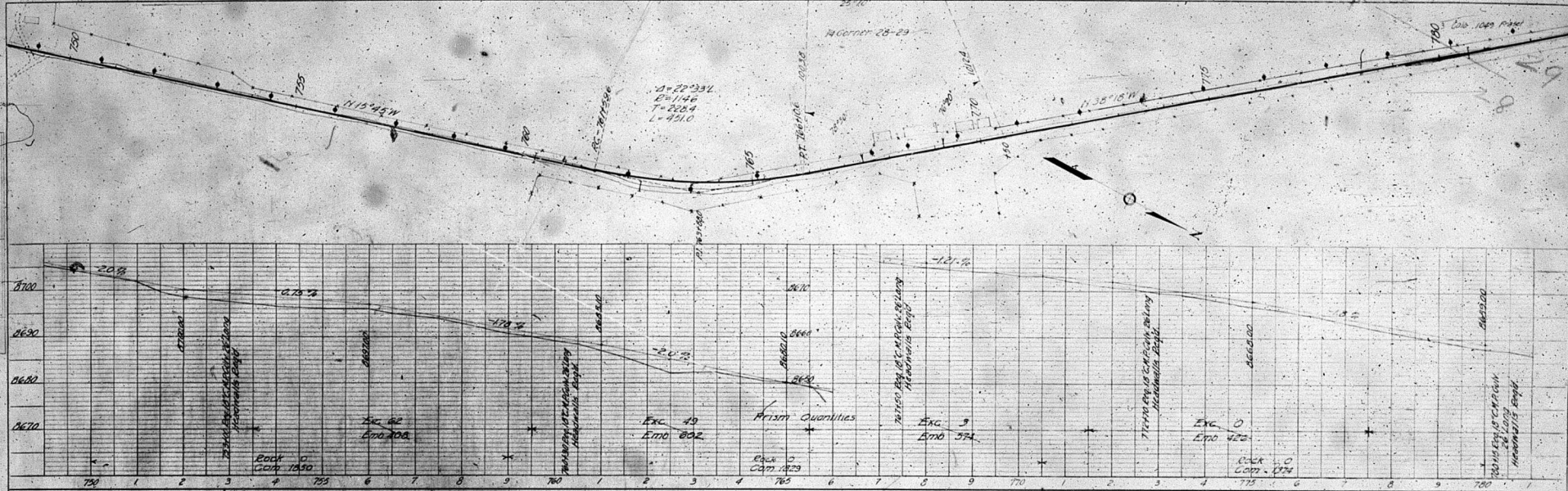


PLATE 2 - PLAN PROFILE

PLAN
DATE
SCALE
PROJECT
NO.

PROFILE
DATE
SCALE
PROJECT
NO.

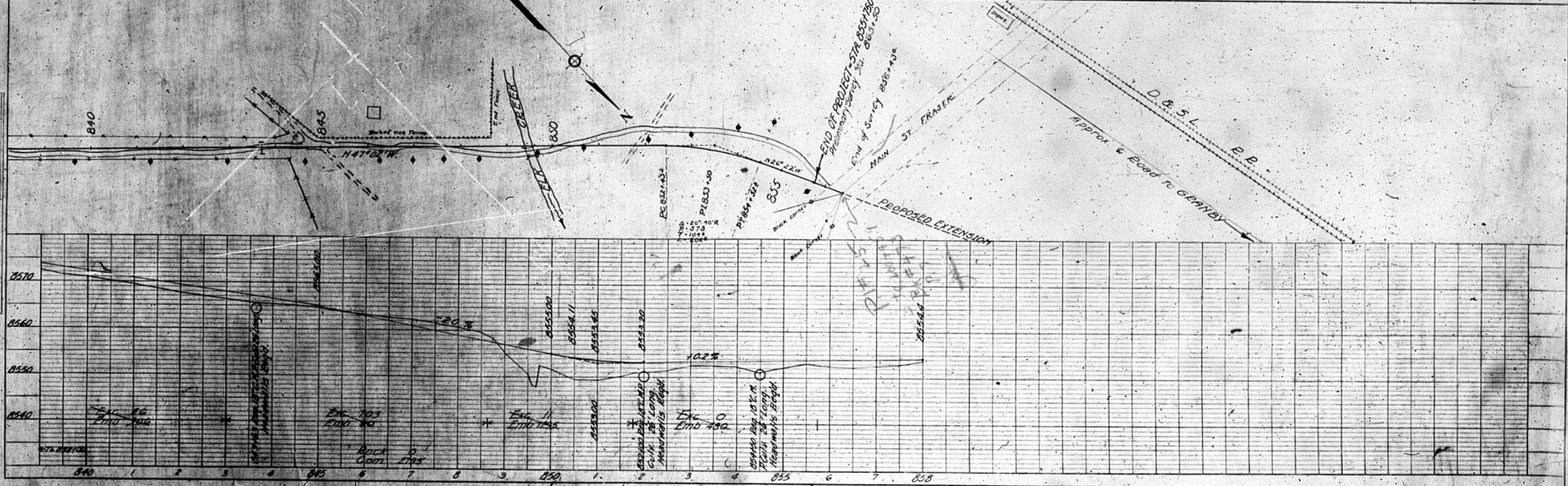
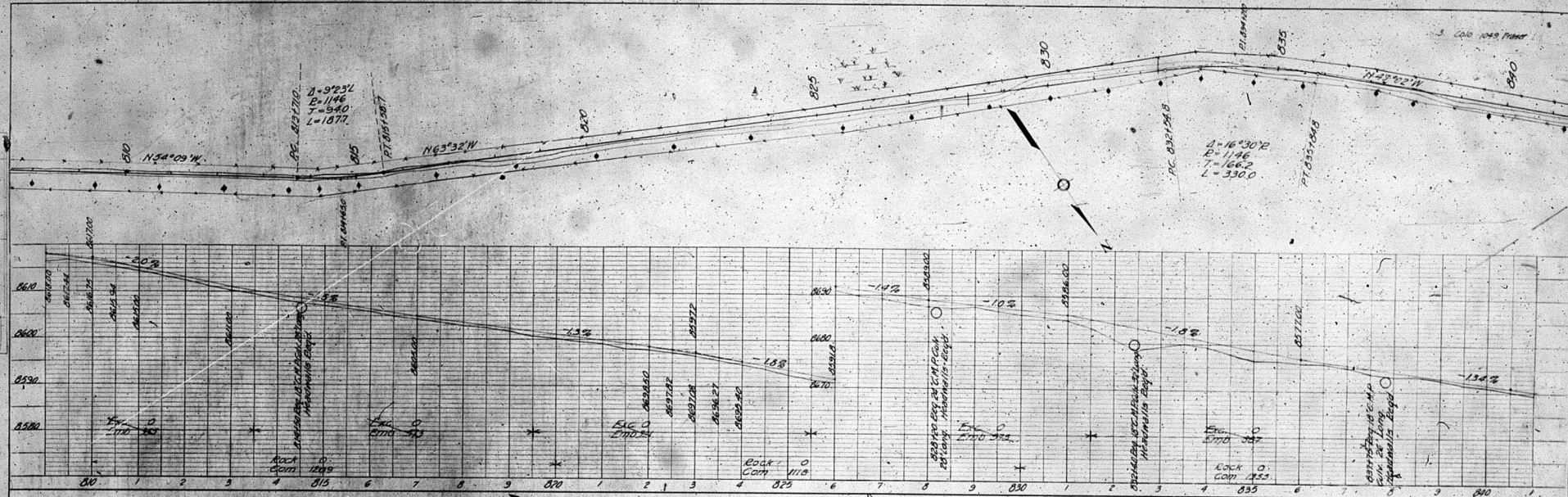
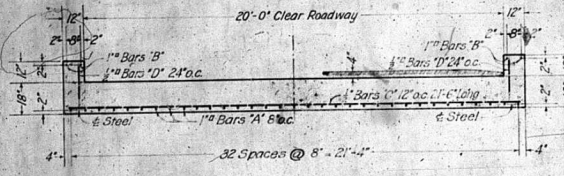


PLATE 2 - PLAN PROFILE & P & E STUDY  
 PREPARED BY THE ENGINEERING DEPARTMENT  
 OF THE UNIVERSITY OF TORONTO





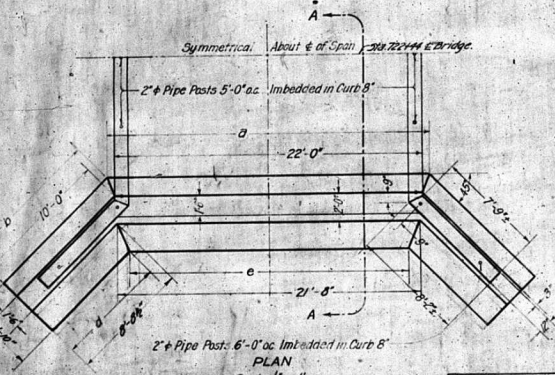
CROSS-SECTION OF SLAB  
Scale 3/8"=1"

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE

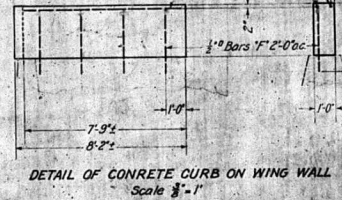
Bars	No.	Size	Length	
A	33	1"	22'-6"	2525*
B	4	1 1/2"	20'-0"	272*
C	23	1 1/2"	21'-6"	420*
D	24	1 1/2"	11'-6"	31*
Total Reinforcing Steel				3248*
Concrete 1: 2: 4 Mix				30 cu yds.
2" W.I. Pipe 1'-10" Long Galv.				10 pcs.
2" W.I. Pipe 1'-1" Long "				10 pcs.
2" W.I. Pipe 4'-9" Long "				16 pcs.
2" Mal. Iron Rolling Ells				4
2" Mal. Iron Rolling Tees				10
2" Mal. Iron Rolling Crosses				6

DIMENSIONS & ESTIMATED QUANTITIES FOR SUBSTRUCTURE

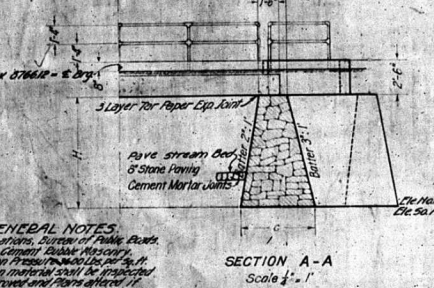
(2 ABUTMENTS)	727+20 Vasquez Creek
H	6'-0"
a	23'-1"
b	10'-6 1/2"
c	5'-4"
d	7'-11"
e	20'-0"
Cement Rubble Masonry	
	82 cu yds.
Stone Paving Cement Mortar Joints	
	70 sq yds.
Concrete Curb 1: 2: 4 Mix	
	9 cu yds.
Steel B. Bars "E" 1" x 3' 7 1/2"	
	204*
Steel 1/2 Bars "F" 1 1/2" x 2'-3"	
	37*
2" W.I. Pipe 1'-10" Long Galv.	
	8 pcs.
2" W.I. Pipe 1'-1" Long "	
	8 pcs.
2" W.I. Pipe 5'-9" Long "	
	8 pcs.
2" Mal. Iron Rolling Ells	
	6
2" Mal. Iron Rolling Tees	
	6



PLAN  
Scale 1/2"=1"



DETAIL OF CONCRETE CURB ON WING WALL  
Scale 3/8"=1"

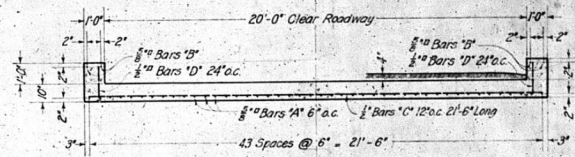


SECTION A-A  
Scale 1/2"=1"

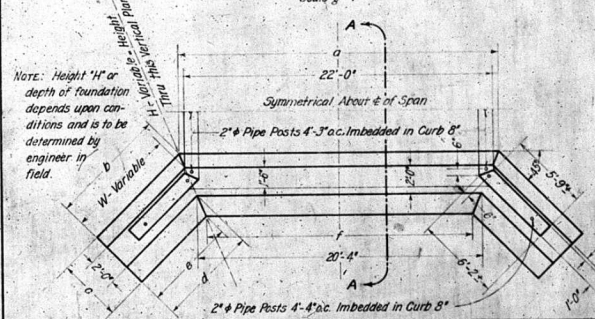
GENERAL NOTES  
Specifications, Bureau of Public Roads, Material, Cement Rubble Masonry, Foundation, Concrete, etc. All exposed ends of curbs shall have a 1" chamfer. Top of curbs shall be finished smooth. Use load 2-1/2 Ton Trucks. Impact 30 Tons.

BUREAU OF PUBLIC ROADS  
**CONCRETE SLAB BRIDGES**  
CEMENT RUBBLE ABUTMENTS  
CLEAR SPAN 20'-0" ROADWAY 20'-0"  
STATION 727+20  
BERTHOUD PASS ROAD  
GRAND COUNTY,  
COLORADO  
VASQUEZ CREEK.

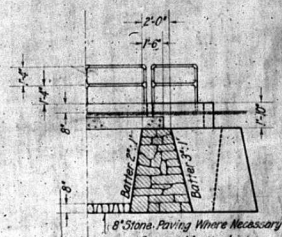
Drawn by R. J. ... 1923. Approved by ...  
R. J. ...  
Senior Bridge Engineer. District Engineer.



CROSS-SECTION OF SLAB  
Scale 3/8"=1"



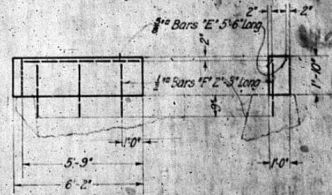
PLAN  
Scale 1/2"=1"



SECTION A-A  
Scale 1/2"=1"

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE (SLAB IDENTICAL FOR FOUR BRIDGES)

Bars	No.	Size	Length	
A	44	1"	10'-6"	613*
B	4	1 1/2"	8'-0"	43*
C	11	1 1/2"	21'-6"	205*
D	12	1 1/2"	11'-6"	15*
Total Reinforcing Steel				876*
Concrete 1: 2: 4 Mix				8 cu yds.
2" W.I. Pipe 1'-11" Long				6 pcs.
2" W.I. Pipe 1'-2" Long "				6 pcs.
2" W.I. Pipe 4'-1" Long "				8 pcs.
2" Mal. Iron Rolling Ells				4
2" Mal. Iron Rolling Tees				6
2" Mal. Iron Rolling Crosses				2



DETAIL OF CONCRETE CURB ON WING WALL  
Scale 3/8"=1"

DIMENSIONS & ESTIMATED QUANTITIES FOR SUBSTRUCTURE

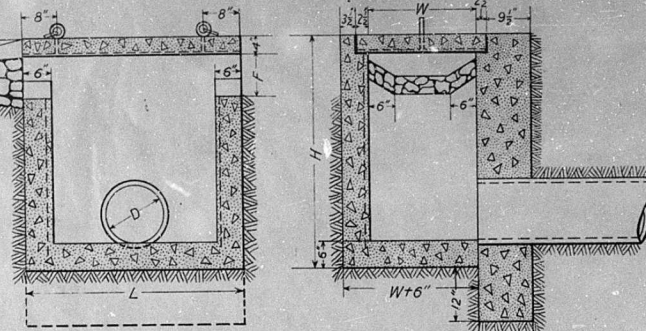
(2 Abutments)	416+00 Hoop Creek	507+30 Blue Creek	673+00 Mad Creek	7174+63 Linn Creek
H	6'-0"	4'-0"	3'-0"	6'-0"
a	6'-0"	6'-0"	4'-0"	6'-0"
b	6'-0"	6'-0"	6'-0"	6'-0"
c	2'-6"	3'-0"	3'-0"	3'-0"
d	5'-5"	5'-2 1/2"	5'-2 1/2"	5'-2 1/2"
e	4'-8 1/2"	4'-9"	4'-10 1/2"	4'-11"
f	18'-10 1/2"	19'-3 1/2"	18'-7 1/2"	18'-10 1/2"
Cement Rubble Masonry		64 cu yds.	42 cu yds.	26 cu yds.
Stone Paving Cement Mortar Joints		25 sq yds.	25 sq yds.	25 sq yds.
Concrete Curb 1: 2: 4 Mix		2 cu yds.	2 cu yds.	2 cu yds.
Steel B. Bars "E" 1" x 3' 7 1/2"		60*	60*	60*
Steel 1/2 Bars "F" 1 1/2" x 2'-3"		28*	28*	28*
2" W.I. Pipe 1'-11" Long		8 pcs.	8 pcs.	8 pcs.
2" W.I. Pipe 1'-2" Long "		8 pcs.	8 pcs.	8 pcs.
2" W.I. Pipe 4'-2" Long "		8 pcs.	8 pcs.	8 pcs.
2" Mal. Iron Rolling Ells		6	6	6
2" Mal. Iron Rolling Tees		6	6	6

BUREAU OF PUBLIC ROADS  
**CONCRETE SLAB BRIDGES**  
CEMENT RUBBLE ABUTMENTS  
CLEAR SPAN 8'-0" ROADWAY 20'-0"  
STATIONS 416+00 - 507+30 - 673+00 - 7174+63  
BERTHOUD PASS ROAD  
CLEAR CREEK COUNTY  
COLORADO  
Dry No D3-104

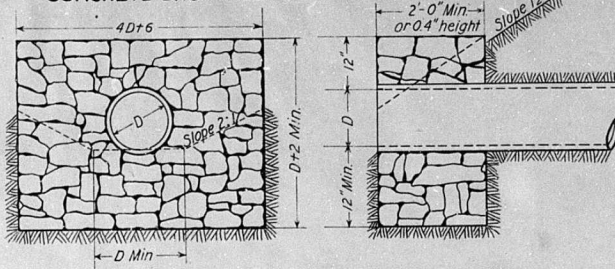
Drawn by R. J. ... 1923. Approved by ...  
R. J. ...  
Senior Bridge Engineer. District Engineer.



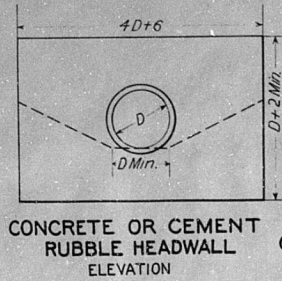
Note:  
Dimensions of inlet vary to special conditions with following minimums: L=4'-0", W=2'-0", F=9", H=D+1'-3". Concrete Cover may be replaced by iron grating where necessary. Reinforcing may be omitted in walls less than 2' in height.



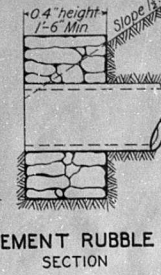
CONCRETE DROP INLET FOR PIPE CULVERT



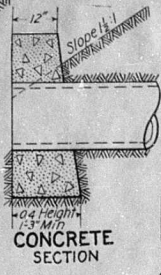
DRY RUBBLE HEADWALL



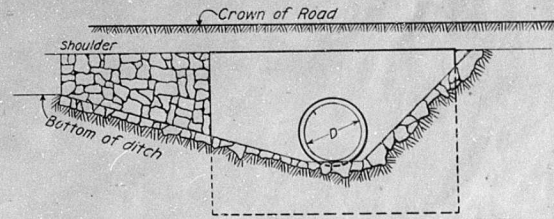
CONCRETE OR CEMENT RUBBLE HEADWALL ELEVATION



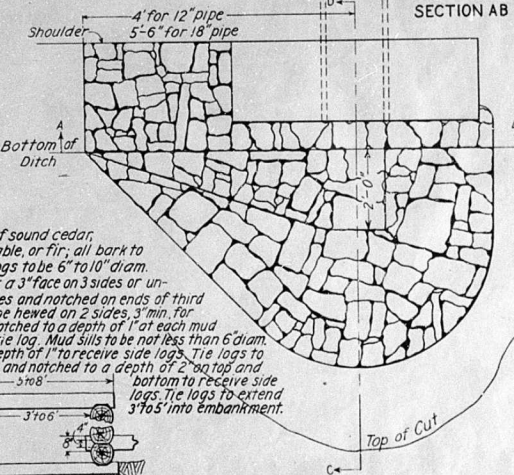
CEMENT RUBBLE SECTION



CONCRETE SECTION



PAVED INLET SECTION AB

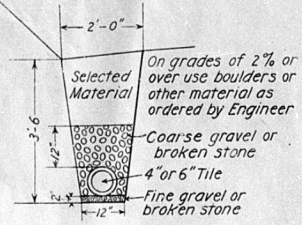


SECTION CD

Note:  
Where preferable headwall may be omitted at outlet and culvert extended beyond toe of slope

U.S. BUREAU OF PUBLIC ROADS

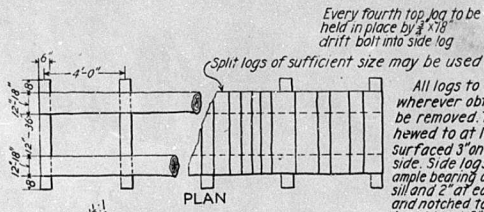
STANDARD PIPE AND LOG CULVERTS



TILE UNDERDRAIN

On grades of 2% or over use boulders or other material as ordered by Engineer

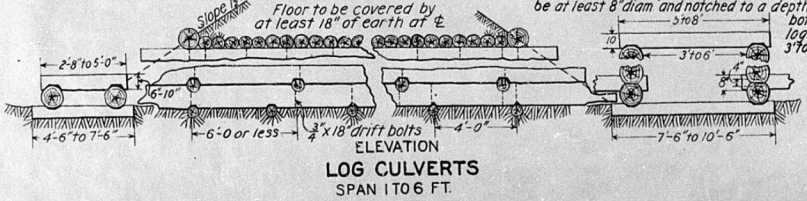
Coarse gravel or broken stone  
4" or 6" Tile  
Fine gravel or broken stone



PLAN

Every fourth top log to be held in place by 3/4" x 1/8" drift bolt into side log  
Split logs of sufficient size may be used

All logs to be of sound cedar, wherever obtainable, or fir; all bark to be removed. Top logs to be 6" to 10" diam. hewed to at least a 3" face on 3 sides or unsurfaced 3" on 2 sides and notched on ends of third side. Side logs to be hewed on 2 sides, 3" min. for ample bearing and notched to a depth of 1" at each mud sill and 2" at each tie log. Mud sills to be not less than 6" diam. and notched to a depth of 1" to receive side logs. Tie logs to be at least 8" diam and notched to a depth of 2" at top and bottom to receive side logs. Tie logs to extend 3' to 5' into embankment.



ELEVATION  
LOG CULVERTS  
SPAN 1 TO 6 FT.

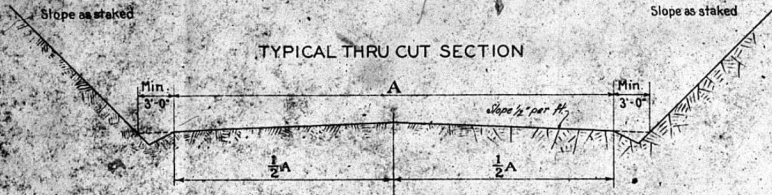


Barstow Pass, Colorado, 32-8  
 National Forest, Pike  
 Project 32-8-1

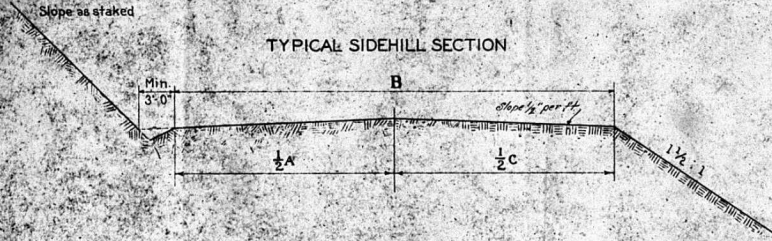
TYPICAL GRADED SECTIONS

SURFACING SECTIONS  
 CRUSHED ROCK CRUSHED GRAVEL  
 OR OTHER SURFACE COURSE

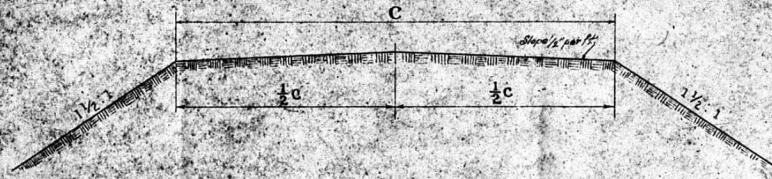
TYPICAL THRU CUT SECTION



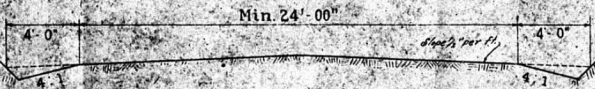
TYPICAL SIDEHILL SECTION



TYPICAL THRU FILL SECTION



TYPICAL TURN PIKE SECTION



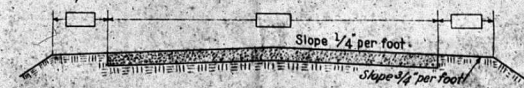
TWO (2) COURSE SECTION

Feathered Edge Top Course.....Inches  
 Trenched Bottom "....."



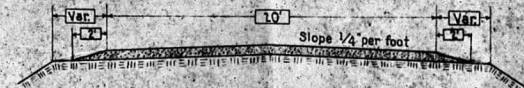
TWO (2) COURSE SECTION

Trenched Top Course.....Inches  
 " Bottom "....."



ONE (1) COURSE SECTION

Trenched.....Inches



ONE (1) COURSE SECTION

Feathered Edged .5.....Inches Loose..

CRUSHED ROCK  
 OR  
 CRUSHED GRAVEL  
 (OR OTHER SURFACE COURSE)  
 (As per specifications)  
 One Course.....5 Inches Loose  
 Top Course.....Inches  
 Bottom Course.....Inches

GENERAL NOTES

- All curves are to be widened and superelevated as per instructions.
- Where drainage conditions require, larger and deeper side ditches shall be constructed.
- Increase or decrease thickness of surfacing as local conditions may require.
- Finished grade at center line will be profile grade.

U.S. DEPARTMENT OF AGRICULTURE  
 BUREAU OF PUBLIC ROADS  
 DISTRICT NO. 3 DENVER, COLO.

STANDARD CROSS SECTION  
 FOREST HIGHWAYS

DISTRICT NO. 3 STANDARD ROADWAY 18 ft.  
 PROJECT Barstow Pass, Road 32-8-1 Surfacing  
 NATIONAL FOREST, PIKE  
 COUNTY Clear Creek  
 STATE Colorado

ROADWAY	DIMENSIONS			
	A	B	C	A+C
12	16	12	16	32
14	18	14	20	38
16	20	16	24	44
18	22	18	28	50

STANDARD ROADWAYS are as designated in the table and imply the corresponding dimensions shown in the table.

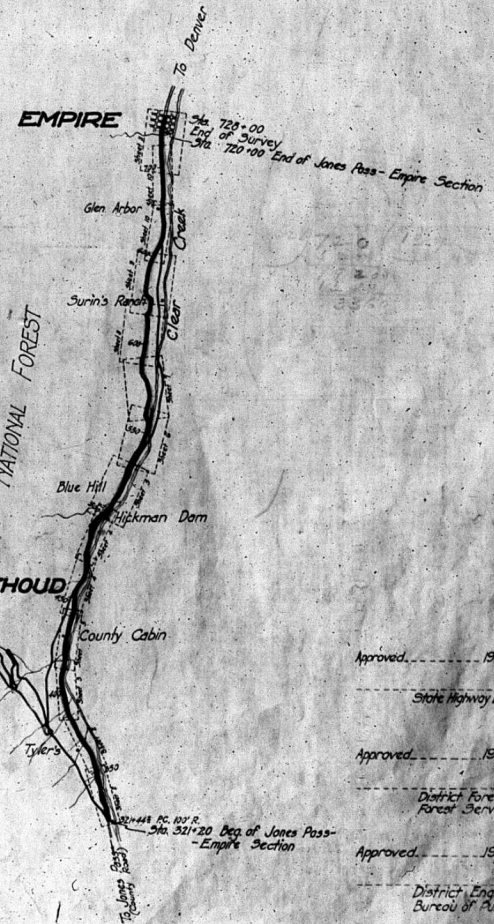
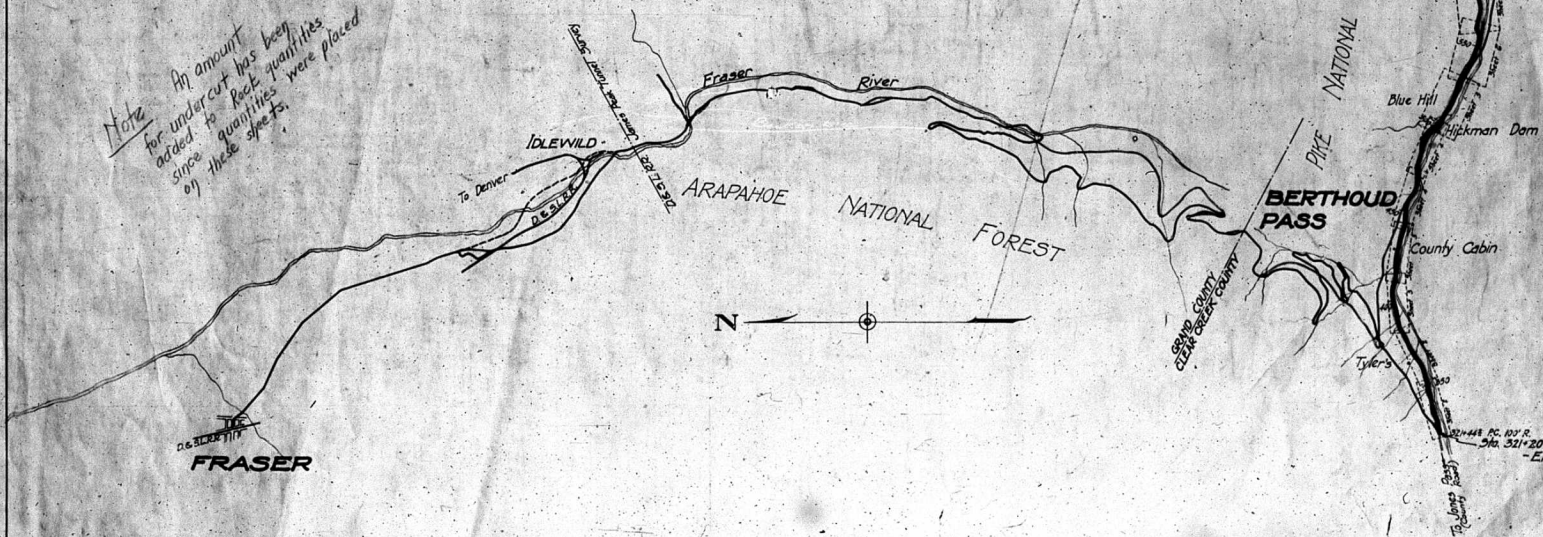


U.S. DEPARTMENT OF AGRICULTURE  
 BUREAU OF PUBLIC ROADS  
 LOCATION  
 PLANS & PROFILE  
 OF THE  
**BERTHOUD PASS PROJECT**  
**JONES PASS-EMPIRE SECTION**  
 PIKE NATIONAL FOREST  
 CLEAR CREEK COUNTY  
 COLORADO  
 1922

INDEX		
	SHEETS	TOTAL
Title Sheet	1	1
Plan and Profile	2 to 11	10
Structures	12 to 14	3
Cross-sections	15 to 74	60
		74

SECTIONS	FROM	TO	LENGTH
Section	321+20	491+32	5.34
Clear Cuts	491+32	534+88	1.82
Empire	534+88	720+00	2.57
		Total	7.53

*Note: An amount for undercut has been added to Rock quantities since quantities were placed on these sheets.*



Approved \_\_\_\_\_ 1922  
 State Highway Engineer

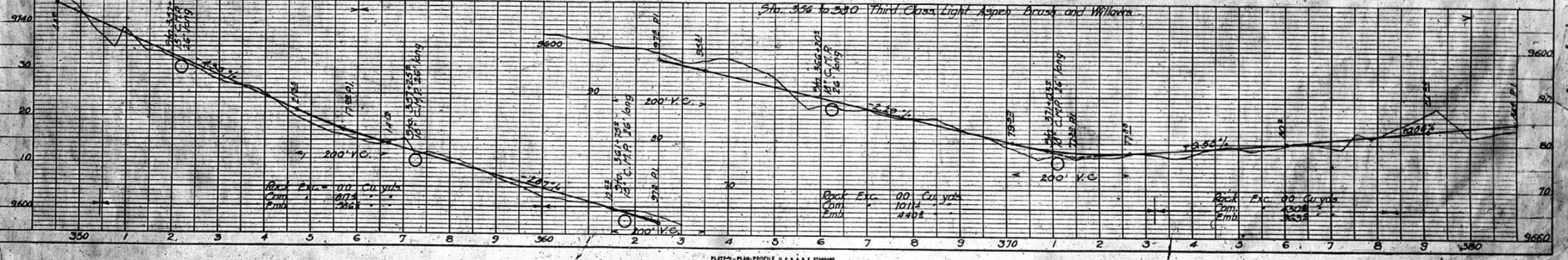
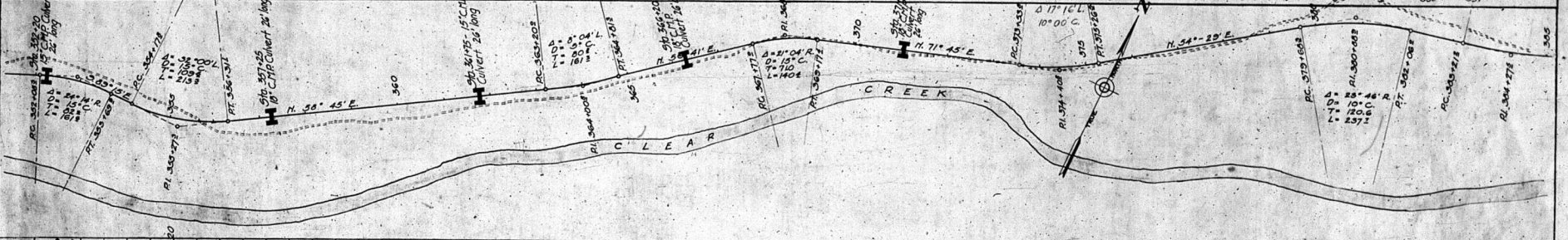
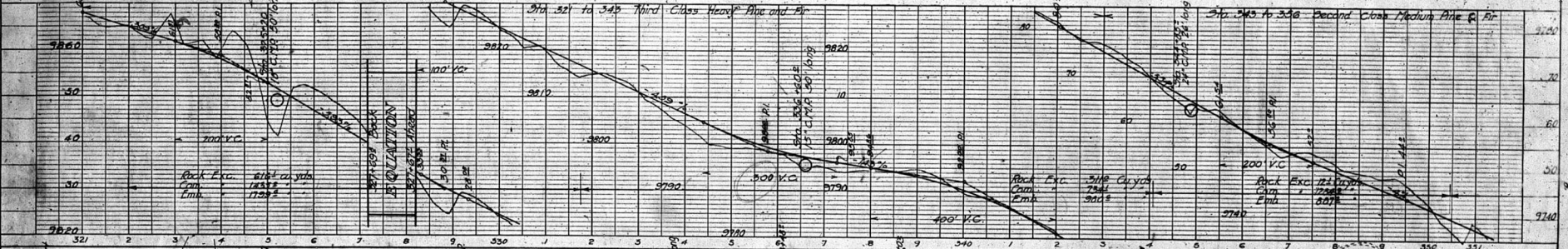
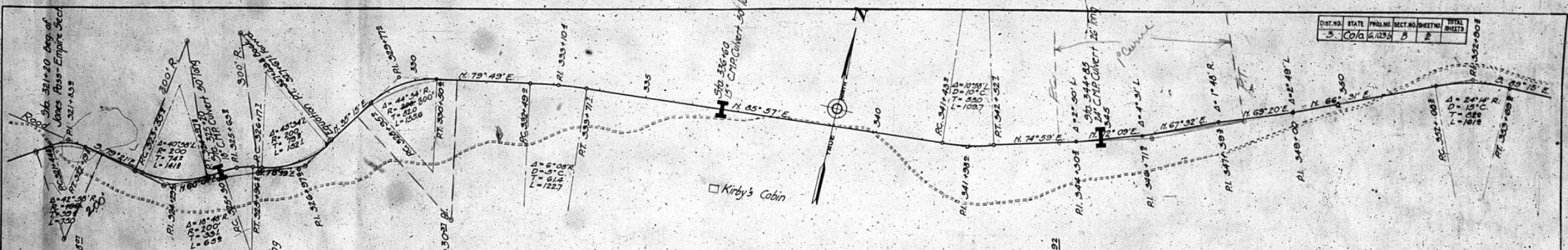
Approved \_\_\_\_\_ 1922  
 District Forester  
 Forest Service

Approved \_\_\_\_\_ 1922  
 District Engineer  
 Bureau of Public Roads

PLAN	DATE
REVISED	
REVISIONS	
BY	
CHECKED	
DATE	

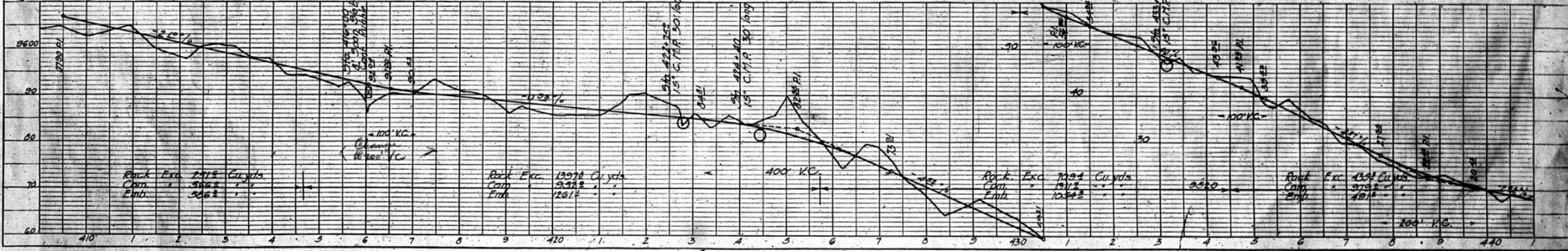
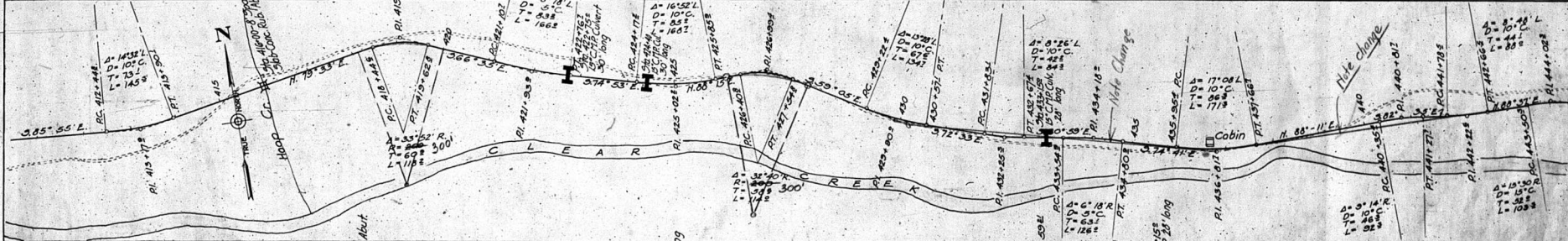
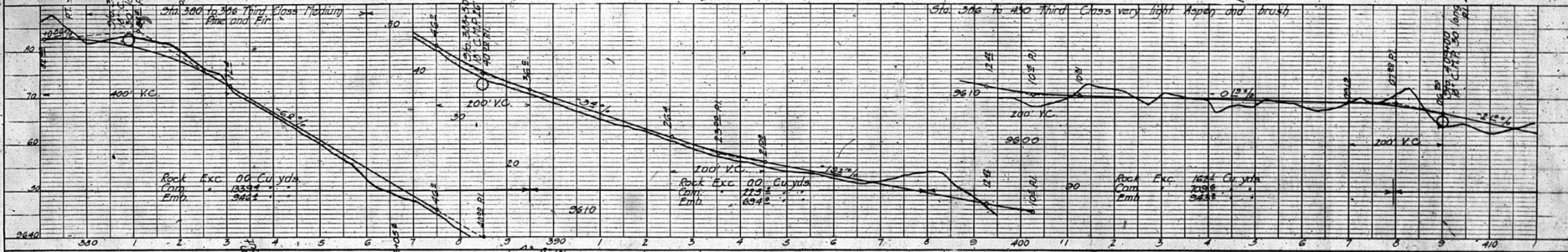
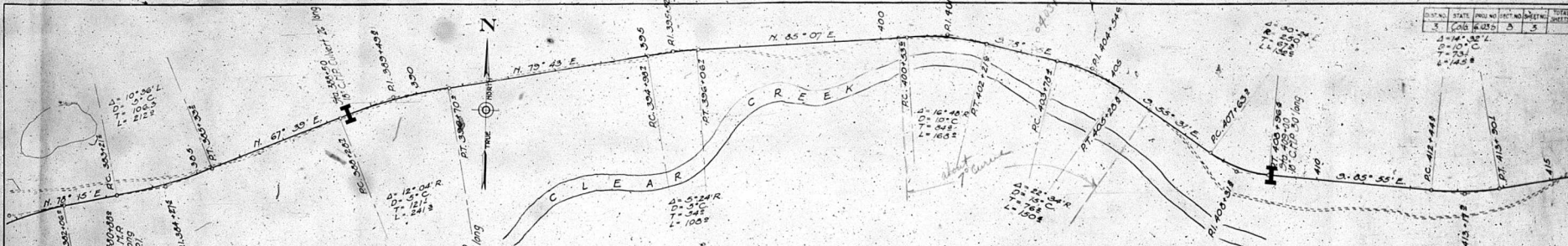
PROFILE	DATE
REVISED	
REVISIONS	
BY	
CHECKED	
DATE	

DIST. NO.	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
3	COA	1234	B	E



PLAN	DATE
PROJECT	
OWNER	
DESIGNED BY	
CHECKED BY	
DATE	

PROFILE	DATE
PROJECT	
OWNER	
DESIGNED BY	
CHECKED BY	
DATE	



POST NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	MD	1225	3	5

PLAN	DATE	SCALE
PLANNING		
DESIGN		
CONSTRUCTION		

PROFILE	DATE	SCALE
PLANNING		
DESIGN		
CONSTRUCTION		

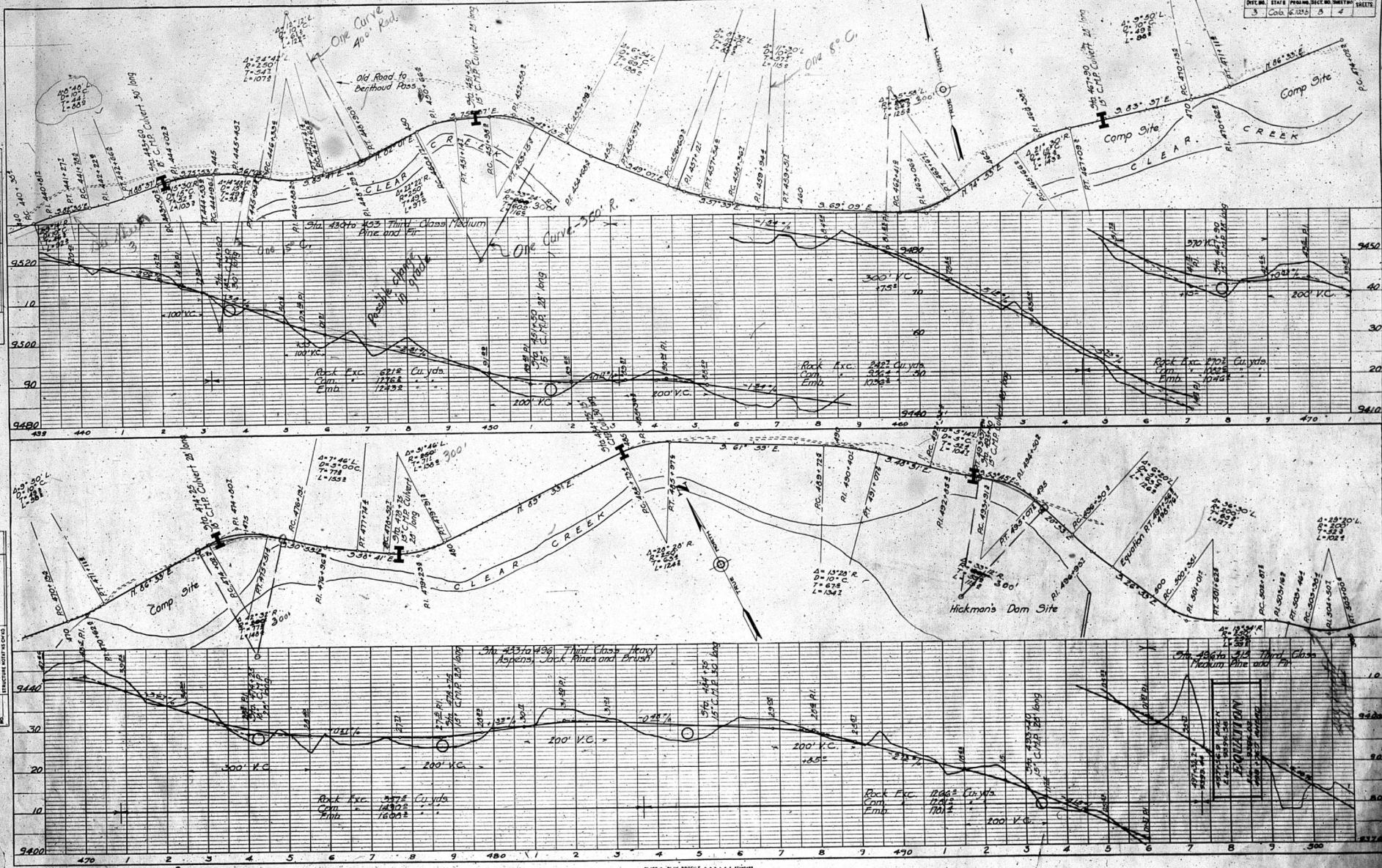
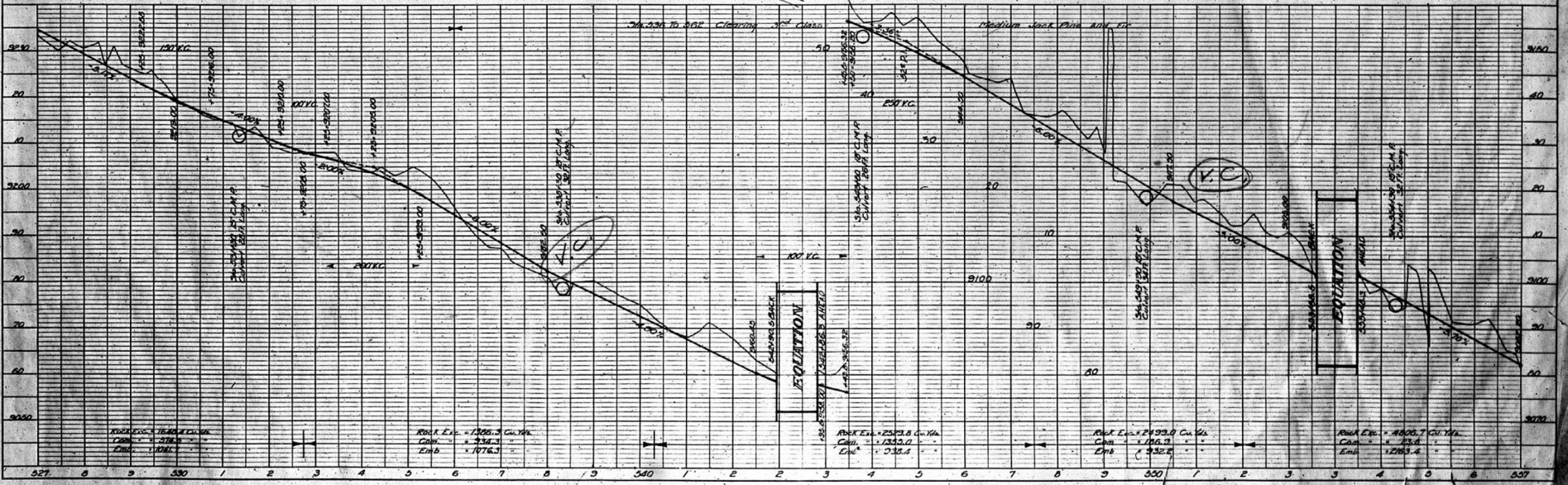
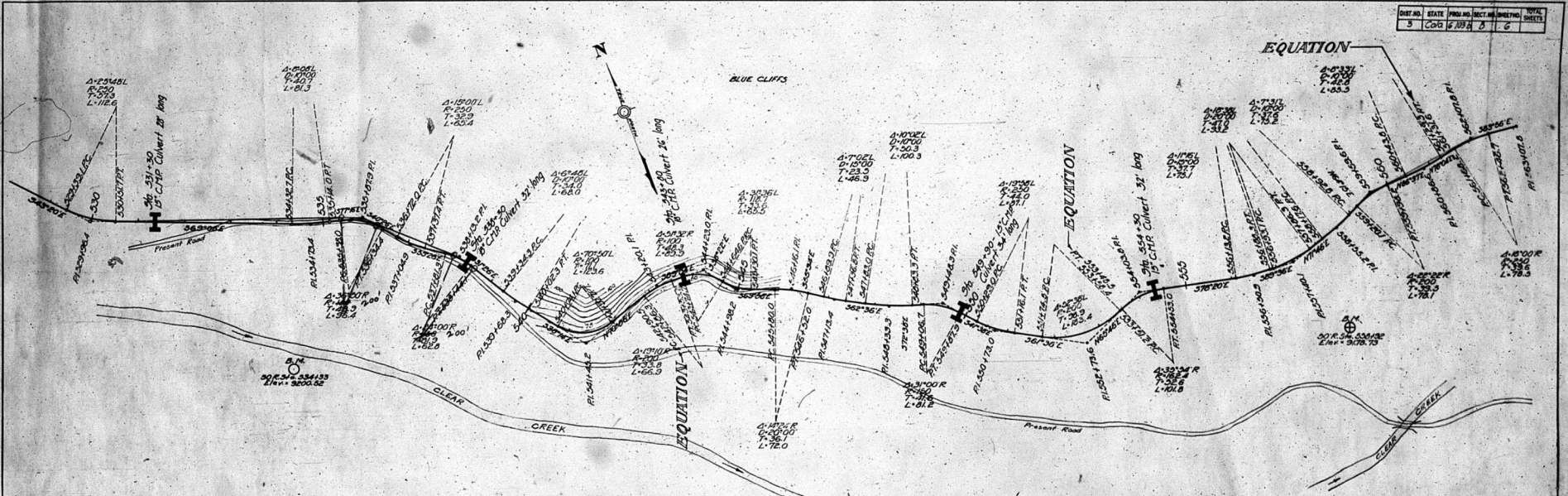


PLATE 2 - PLAN - PROFILE 177 & 178 E. DIVISION



PLAN	DATE	BY	CHECKED

PROFILE	DATE	BY	CHECKED



ROAD ELEV. = 7806.8 Cu Yd  
 C&G = 1.218.8  
 EMB = 1.000

ROAD ELEV. = 7865.3 Cu Yd  
 C&G = 1.334.3  
 EMB = 1.076.3

ROAD ELEV. = 2433.8 Cu Yd  
 C&G = 1.033.0  
 EMB = 0.38.4

ROAD ELEV. = 2433.0 Cu Yd  
 C&G = 1.06.2  
 EMB = 0.32.5

ROAD ELEV. = 2400.7 Cu Yd  
 C&G = 1.14.4  
 EMB = 1.283.4

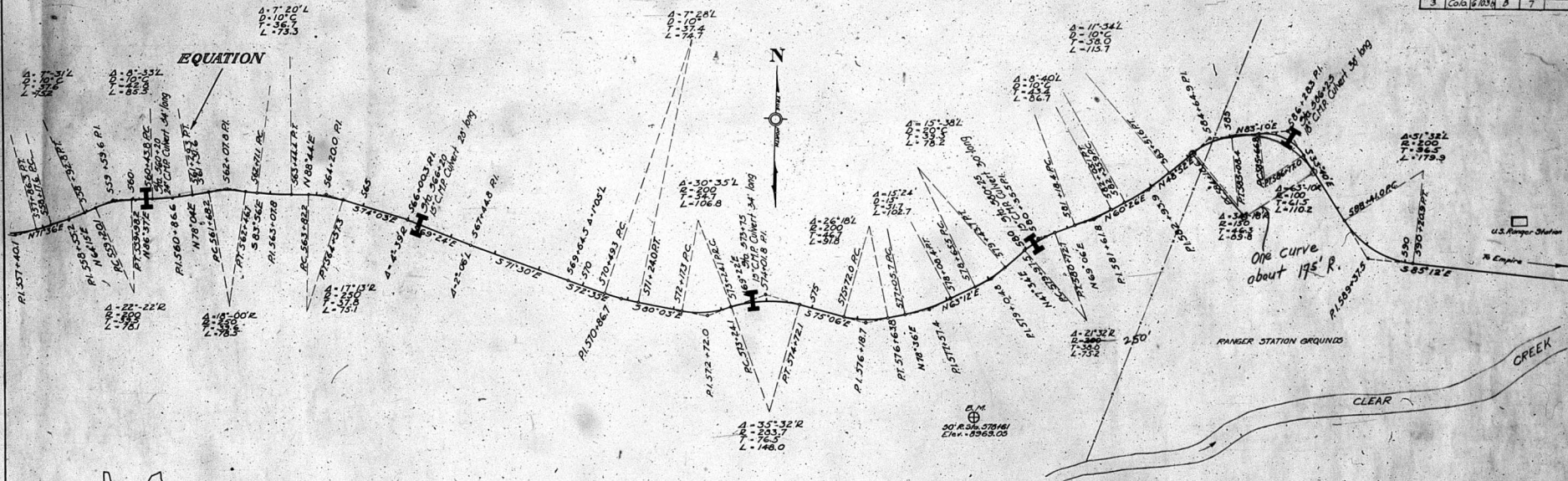
A = 7° 20' L  
 D = 10° C  
 L = 73.3

A = 7° 20' L  
 D = 10° C  
 L = 74.7

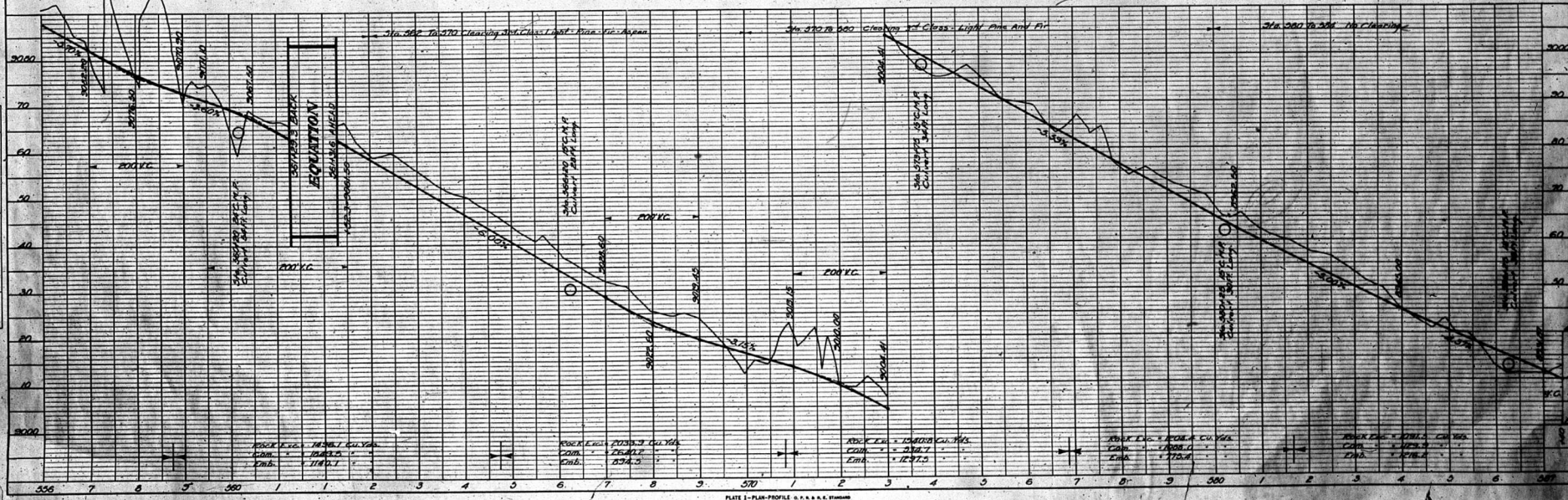
A = 11° 34' L  
 D = 10° C  
 L = 115.7

A = 5° 32' L  
 D = 10° C  
 L = 178.9

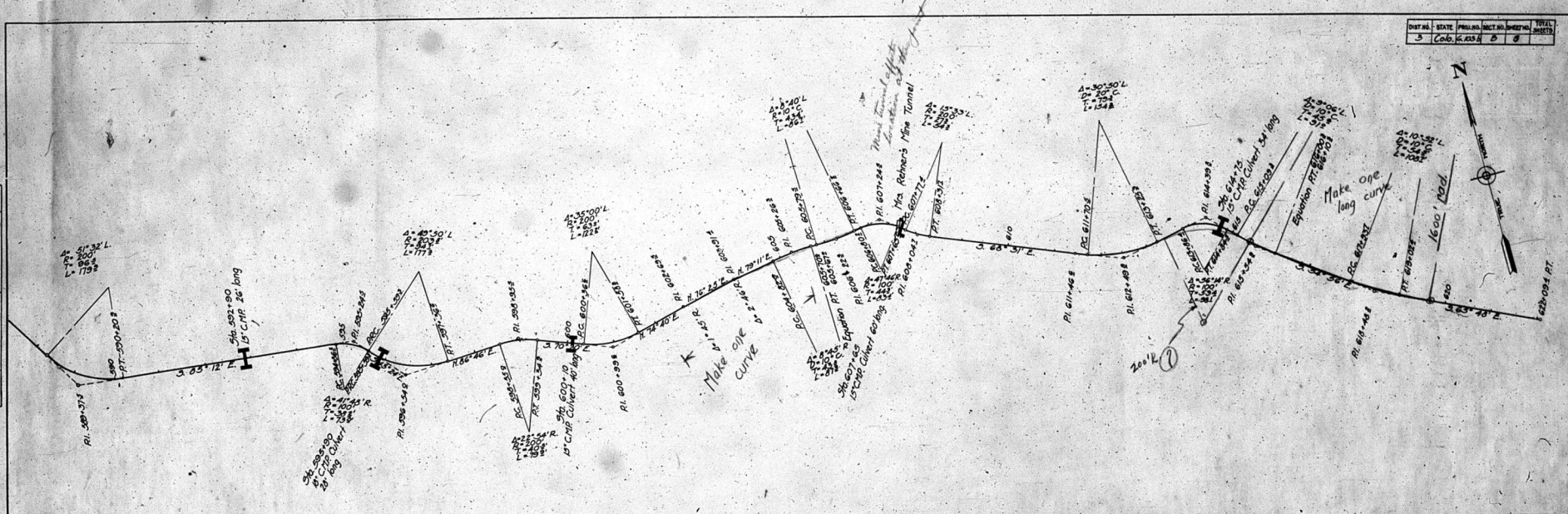
PLAN	DATE	BY	CHKD.
REVISION			
1			
2			
3			



PROFILE	DATE	BY	CHKD.
REVISION			
1			
2			
3			



PLAN	DATE	BY	CHKD.
APPROVED			
REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	AS NOTED		



PLAN	DATE
REVISIONS	
1. PLANNING	
2. SURVEYING	
3. DESIGN	
4. CONSTRUCTION	
5. AS-BUILT	

PROFILE	DATE
REVISIONS	
1. PLANNING	
2. SURVEYING	
3. DESIGN	
4. CONSTRUCTION	
5. AS-BUILT	

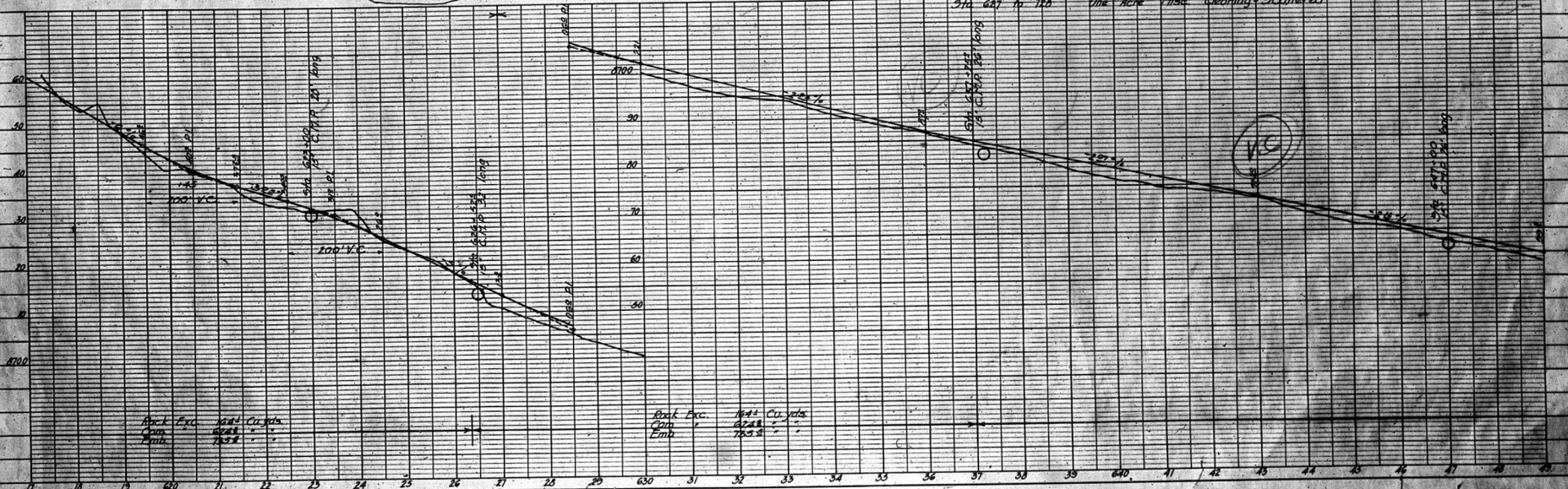
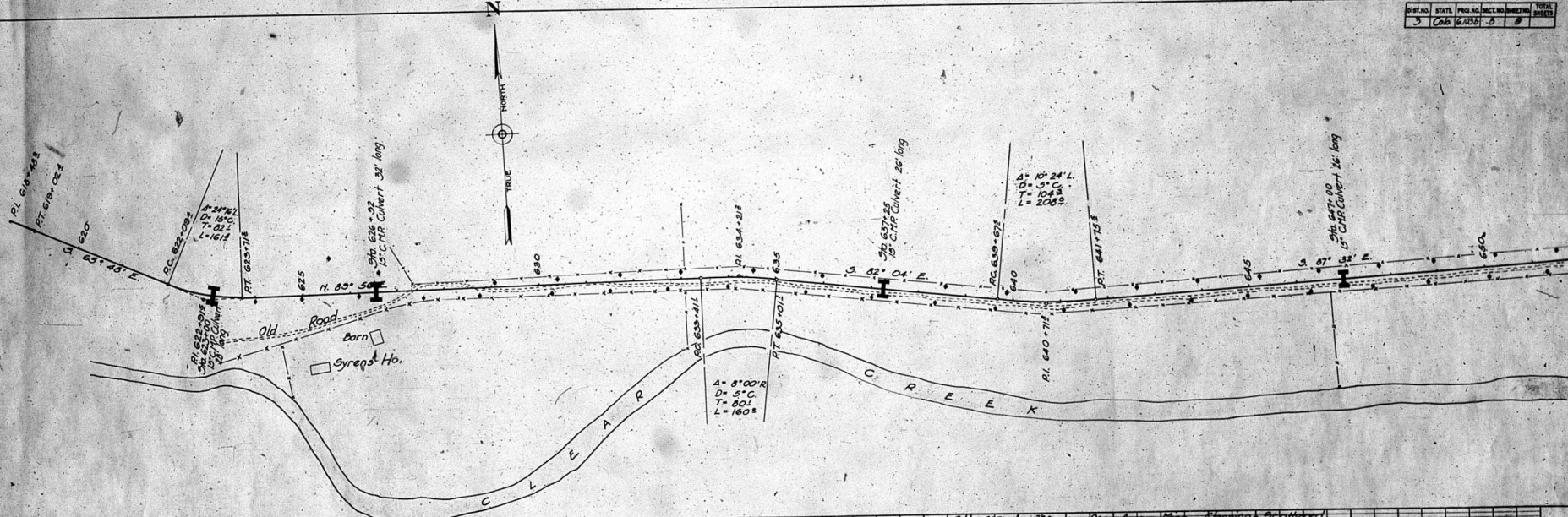
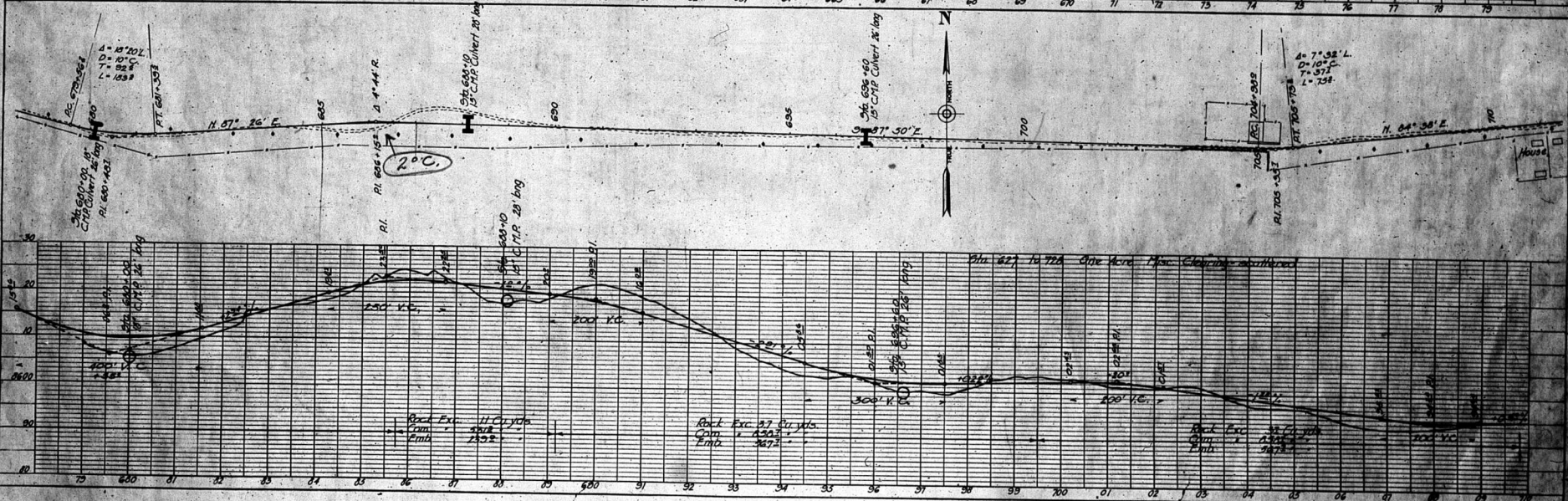
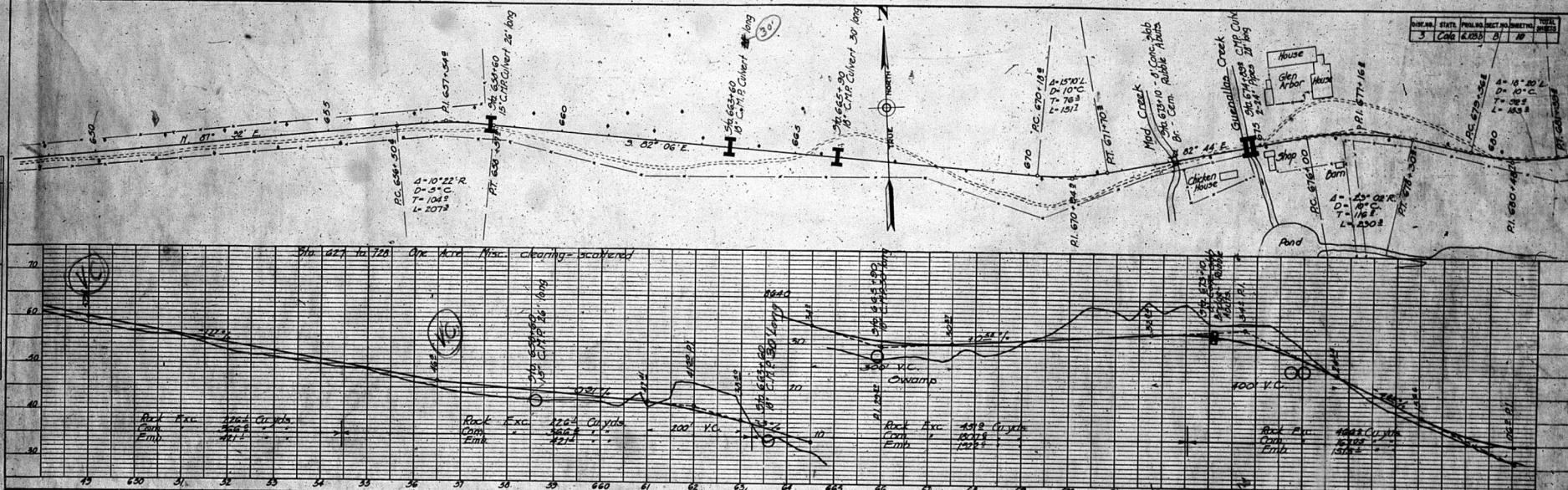


PLATE 1 - PLAN - PROFILE - C. P. & S. L. STUBBS  
 NEWFIELD & SONS CO., NEW YORK.

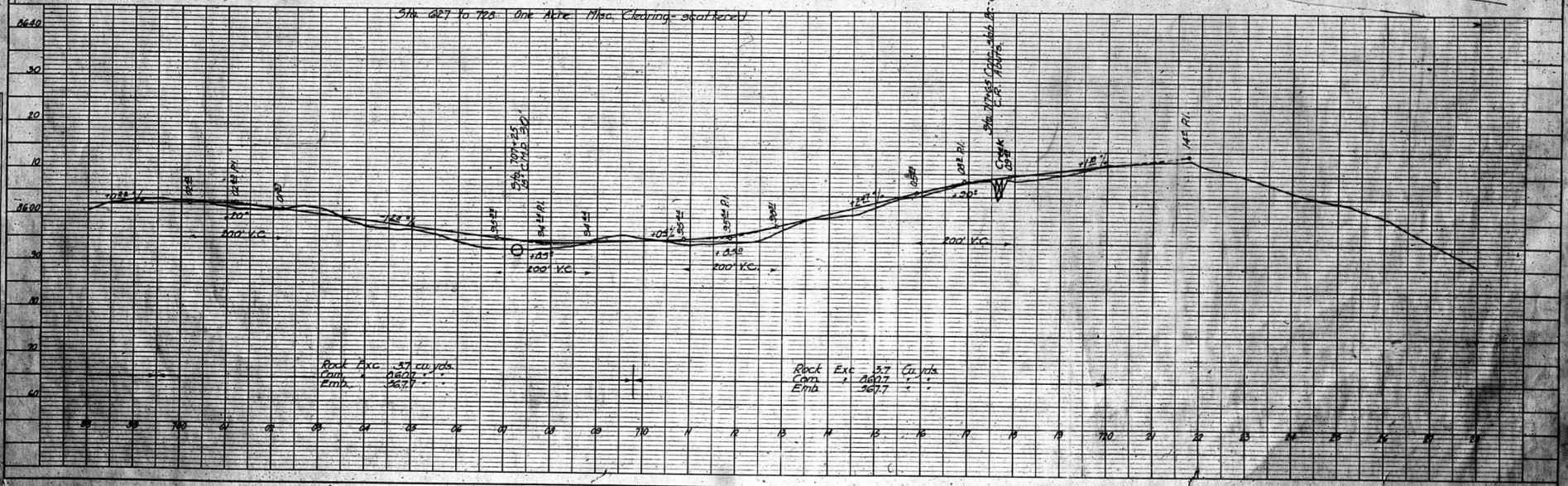
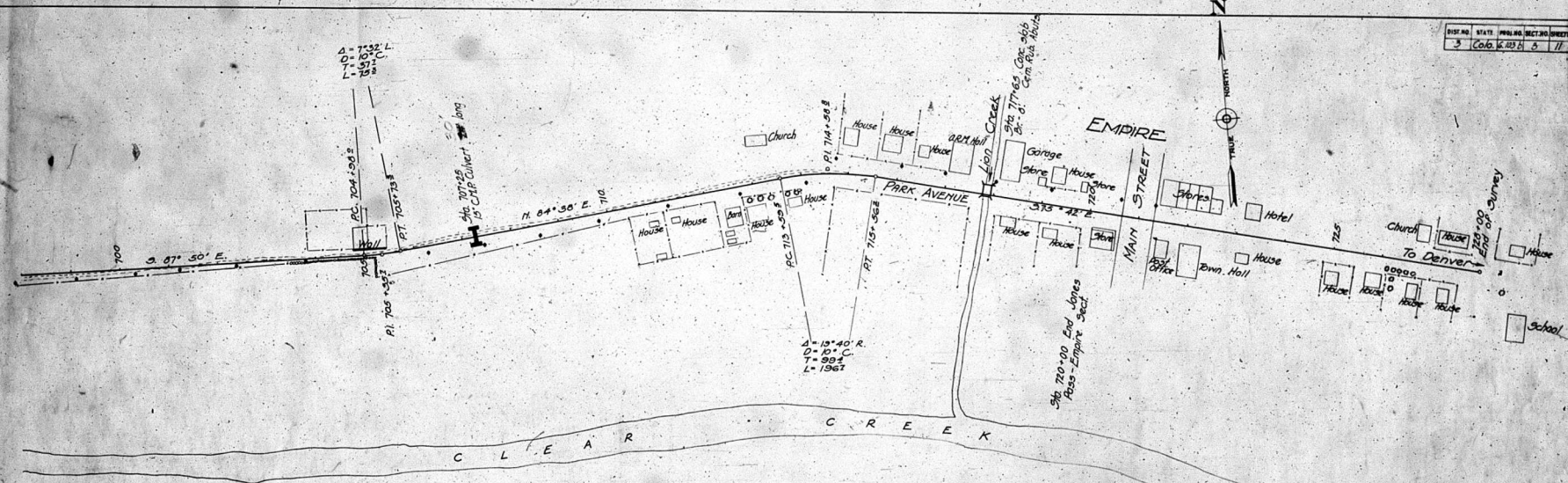
PLAN
DATE: _____
SCALE: _____
PROJECT: _____
BY: _____
CHECKED: _____
APPROVED: _____

PROFILE
DATE: _____
SCALE: _____
PROJECT: _____
BY: _____
CHECKED: _____
APPROVED: _____



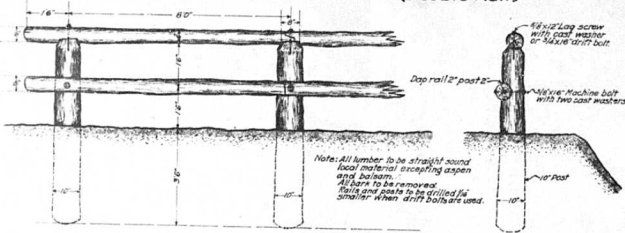
PLAN  
 DRAWN BY  
 CHECKED BY  
 DATE

PROFILE  
 DRAWN BY  
 CHECKED BY  
 DATE

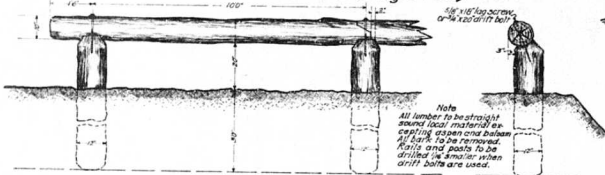


RECEIVED  
AUG 24 1922

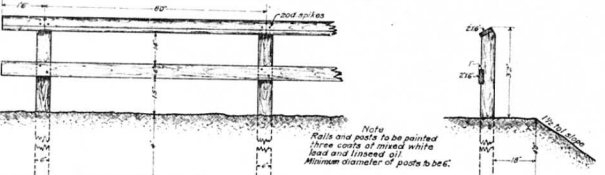
**RUSTIC GUARD RAIL (Double Rail)**



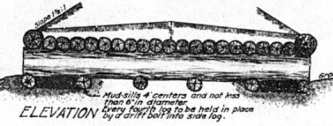
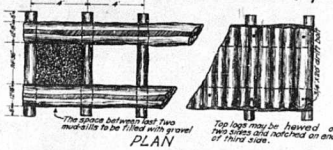
**RUSTIC GUARD RAIL (Single Rail)**



**WOODEN GUARD FENCE**

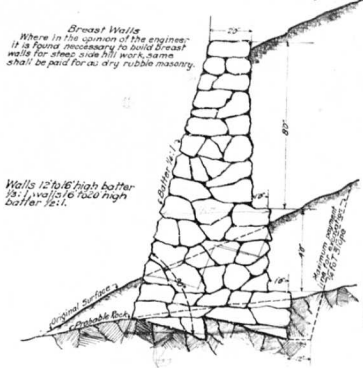


**LOG CULVERT (Span 2 to 3 ft.)**

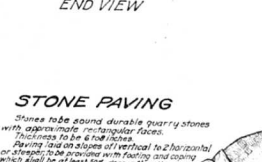
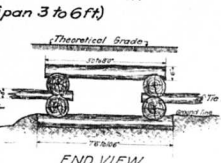
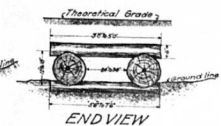
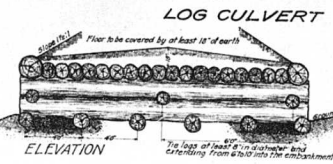


All logs to be sound local material, excepting balsam and aspen. All bark to be removed. The logs to be dressed to a diameter of 12 inches at the ends. The logs to be notched at the ends to a depth of 2 inches on top and bottom to receive side logs.

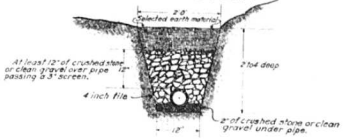
**RETAINING WALL (Dry or Cement Rubble)**



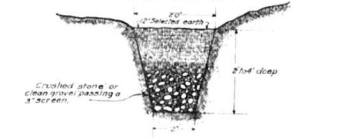
Height in ft.	Volume per sq. ft. of height in cu. ft.
4	0.87
6	0.61
8	0.83
10	1.28
12	1.70
14	2.34
16	2.91
18	3.50
20	4.22



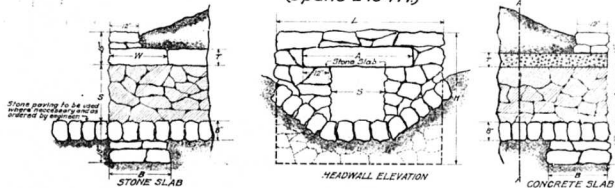
**TILE UNDERDRAIN**



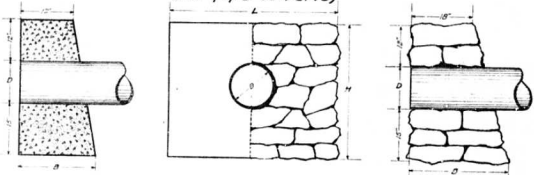
**BLIND DRAIN**



**DRY OR CEMENT RUBBLE CULVERTS (Spans 2 to 4 ft.)**



**RUBBLE AND CONCRETE HEADWALLS (for pipe culverts)**



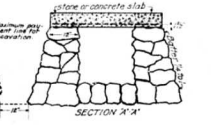
D	L	H	B	Cu. Yds. per Headwall
4	3'	1'0"	0	0.62
6	3'	1'0"	0	0.67
8	3'	1'0"	0	1.16
10	4'	1'0"	0	1.24
12	4'	1'0"	0	1.85
14	4'	1'0"	0	2.14
16	4'	1'0"	0	2.66
18	4'	1'0"	0	2.60

**Headwalls**

Concrete to be 1-2 1/2" - 8 (Class B). Mortar to be 1 part cement to 3 parts sand. Rubble headwalls to be dry or cement as ordered by end.

D	L	H	B	Cu. Yds. per Headwall
12	4'0"	3'3"	2'4"	0.86
15	4'0"	3'3"	2'4"	0.91
18	6'0"	3'3"	2'4"	1.54
24	6'0"	3'3"	2'4"	1.68
30	6'0"	3'3"	2'4"	2.56
36	6'0"	3'3"	2'4"	2.60

Dimensions for Spans 2' to 4'						Quantity per 100 sq. ft. of culvert	Cu. Yds. per 100 sq. ft. of culvert	Cu. Yds. per 100 sq. ft. of culvert	Cu. Yds. per 100 sq. ft. of culvert		
S	B	L	H	A	W						
2' x 2'	2'0"	6'0"	4'0"	4'0"	16"	3"	6"	16.62	1.48	0.6	0.47
3' x 3'	3'0"	10'0"	5'0"	5'0"	24"	12"	6"	18.76	1.85	0.6	0.73
4' x 4'	4'0"	12'0"	6'0"	6'0"	30"	15"	8"	26.96	2.96	1.2	1.05

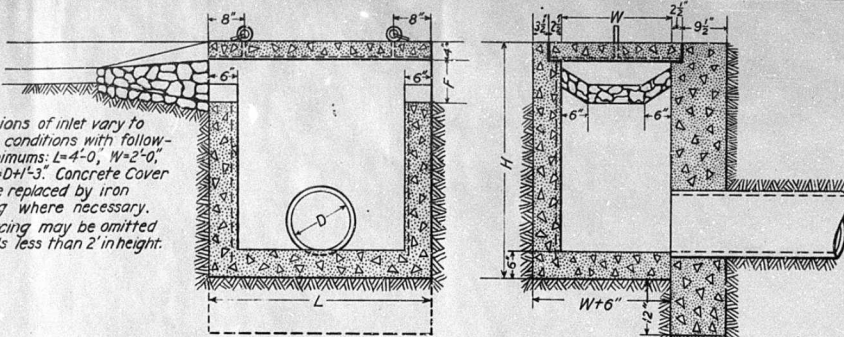


**COBBLE GUTTER**

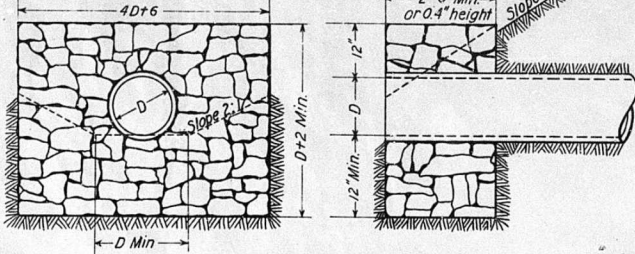


U.S. BUREAU OF PUBLIC ROADS  
District #23 Denver, Colo.  
Standard Structures Details  
Approved: District Engineer

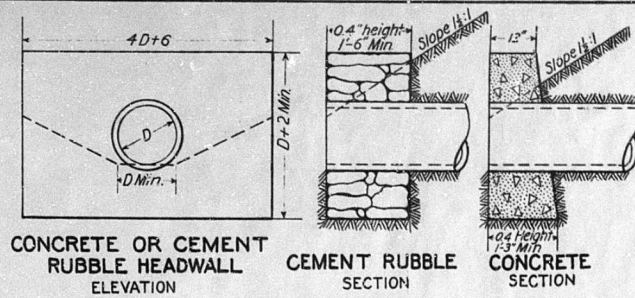
Note: Dimensions of inlet vary to special conditions with following minimums:  $L=4'-0"$ ,  $W=2'-0"$ ,  $F=9"$ ,  $H=D+1'-3"$ . Concrete cover may be replaced by iron grating where necessary. Reinforcing may be omitted in walls less than 2' in height.



CONCRETE DROP INLET FOR PIPE CULVERT



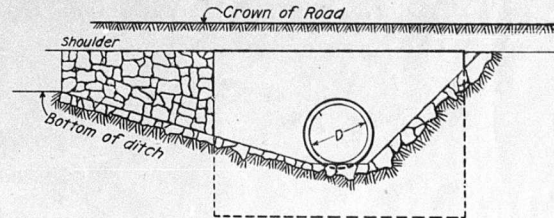
DRY RUBBLE HEADWALL



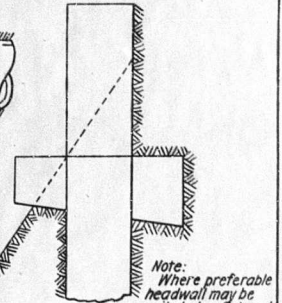
CONCRETE OR CEMENT RUBBLE HEADWALL ELEVATION

CEMENT RUBBLE SECTION

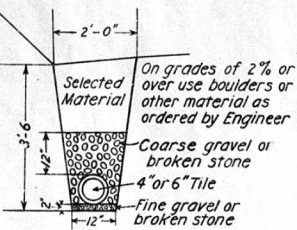
CONCRETE SECTION



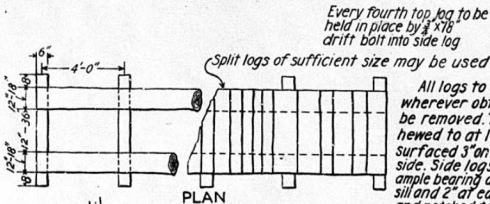
PAVED INLET SECTION AB



Note: Where preferable headwall may be omitted at outlet and culvert extended beyond toe of slope

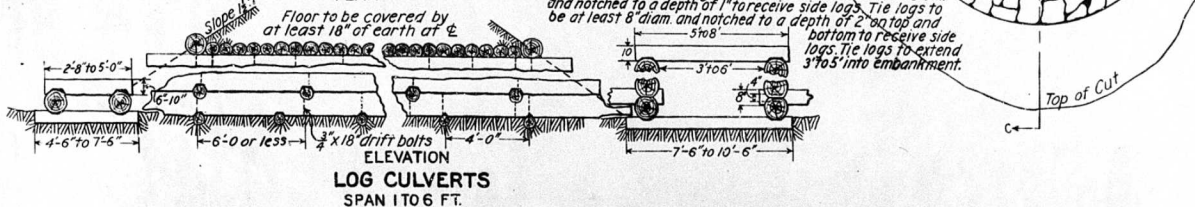


TILE UNDERDRAIN

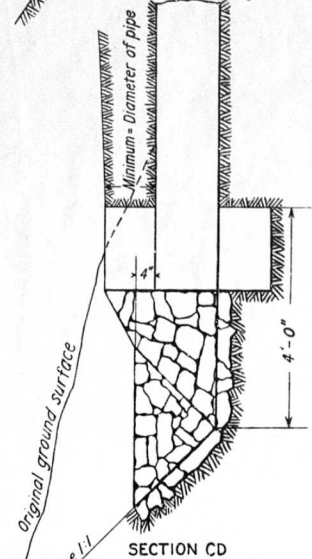


PLAN

All logs to be of sound cedar, wherever obtainable, or fir; all bark to be removed. Top logs to be 6" to 10" diam. hewed to at least a 3" face on 3 sides or un-surfaced 3" on 2 sides and notched on ends of third side. Side logs to be hewed on 2 sides, 3" min. for ample bearing and notched to a depth of 1" at each mud sill and 2" at each tie log. Mud sills to be not less than 6" diam. and notched to a depth of 1" to receive side logs. Tie logs to be at least 8" diam. and notched to a depth of 2" on top and bottom to receive side logs. Tie logs to extend 3" to 5" into embankment.



LOG CULVERTS SPAN 10 TO 6 FT.

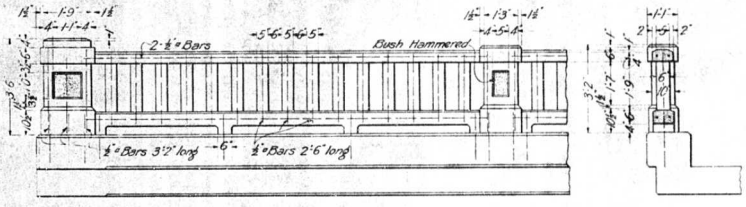
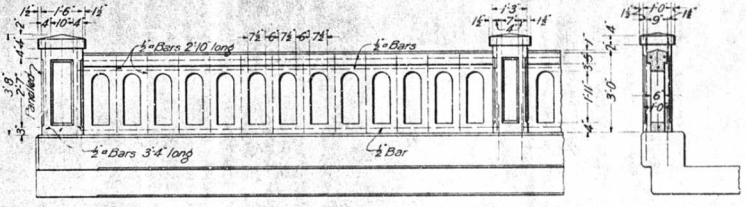
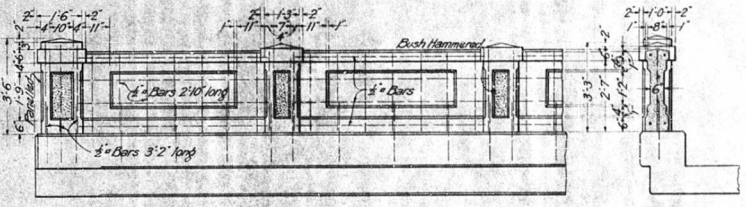
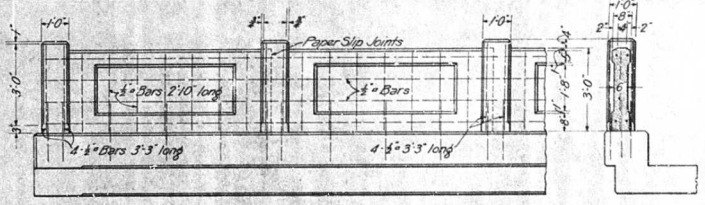
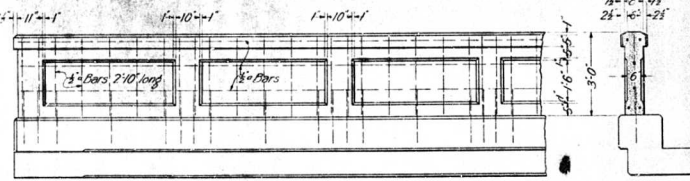
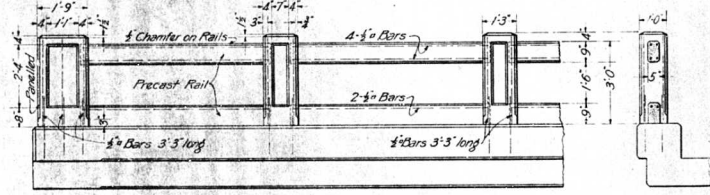
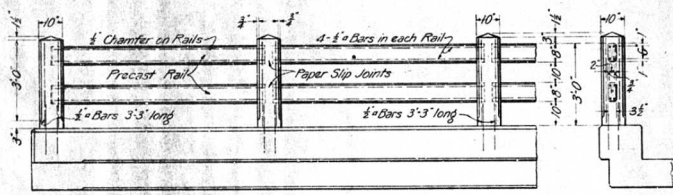
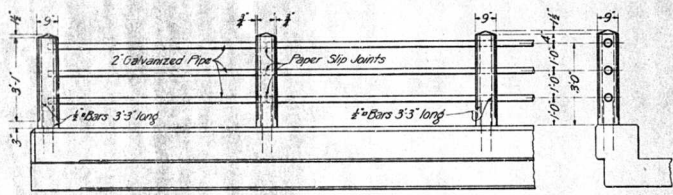
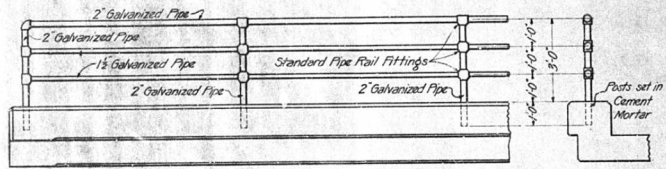


SECTION CD

U.S. BUREAU OF PUBLIC ROADS

STANDARD PIPE AND LOG CULVERTS

Each  
Railway Section  
Shown is 10' Long  
M.L. 24 1/2"  
REINFORCED



DESIGNED BY  
DRAWN BY  
CHECKED BY

DATE  
DATE  
DATE

US OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING  
WASHINGTON, D.C.

TYPICAL BRIDGE AND CULVERT RAILINGS

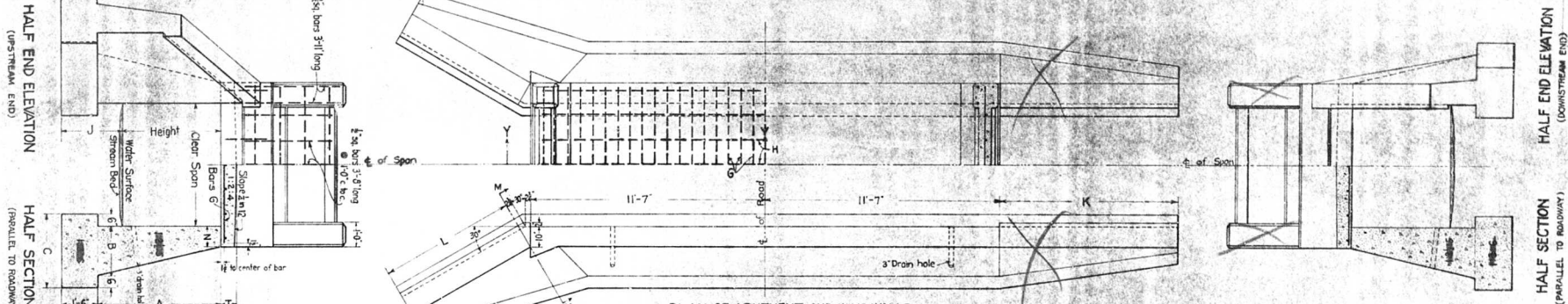
SCALE: 1/2" = 1' FOOT  
DECEMBER, 1917

CORRECT

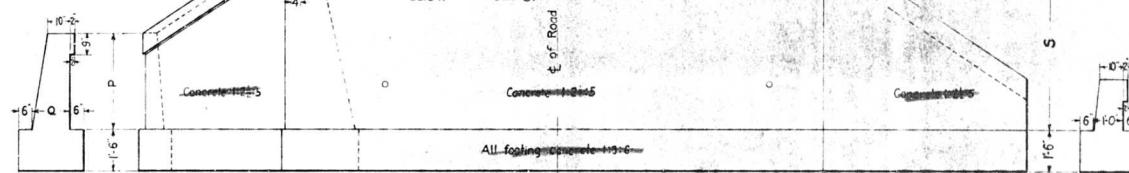
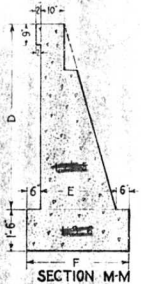
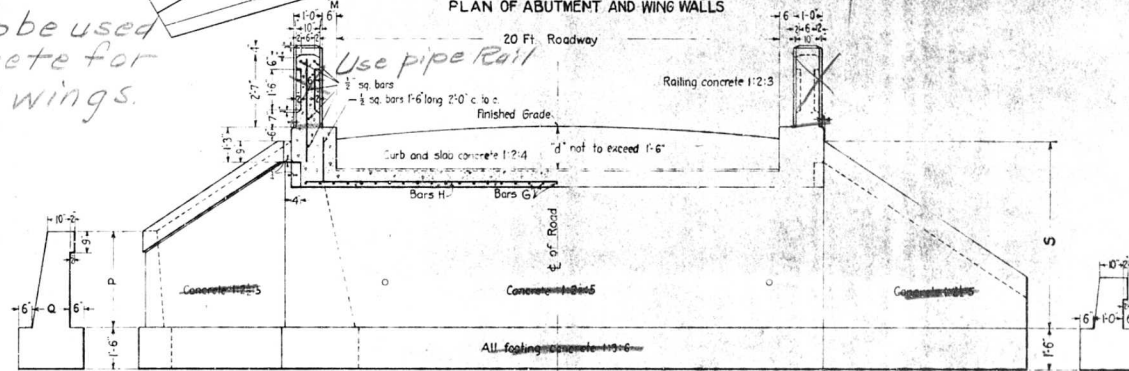
BRIDGE ENGINEER

APPROVED

CITY ENGINEER



*cement rubble to be used in place of concrete for abutments and wings.*



Exposed edges, except on railing, to be chamfered 1/2 in. All reinforcing steel shall be deformed bars (Square twisted bars not to be considered as deformed). The table is based on net area of bars as follows: 1/2" = 1.56 sq in., 3/4" = 2.50 sq in., etc. Footings to be carried down to firm bearing or modified as directed by the engineer, and quantity of concrete in footings adjusted accordingly. Bottom of culvert to be paved where necessary to prevent erosion. Paving may be 1:3:6 concrete 6 in. or more in thickness, or selected stones laid in cement mortar or grout. Concrete curtain walls to be used at the end of the paving. Complete permanent records should be made of each structure as built, showing footing depths, general dimensions and all modifications of this design.

DESIGN DATA  
 Concentrated load, 15 ton typical truck  
 Impact allowance, 30%  
 Paving or ballast not to exceed 180 lbs per sq. ft.  
 Steel in tension, 16,000 lbs per sq. in.  
 Concrete in compression, 6,000 lbs per sq. in.

CONCRETE SLAB CURVERTS, 20 FT. ROADWAY DIMENSIONS AND ESTIMATED QUANTITIES SPANS 5 FT. TO 10 FT.

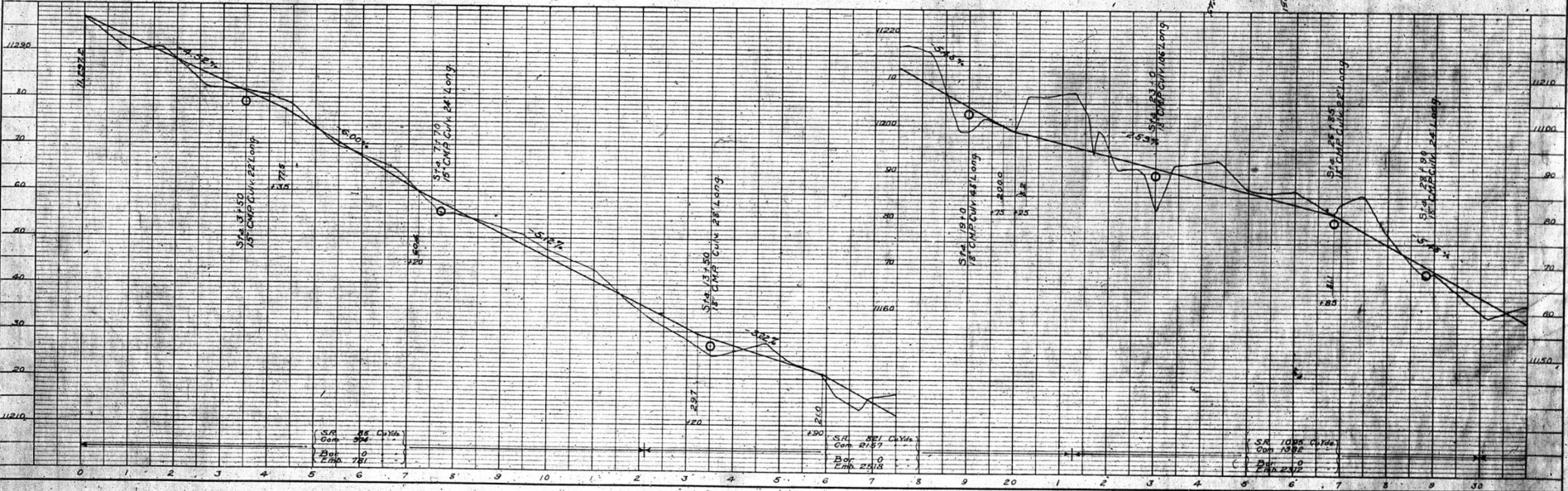
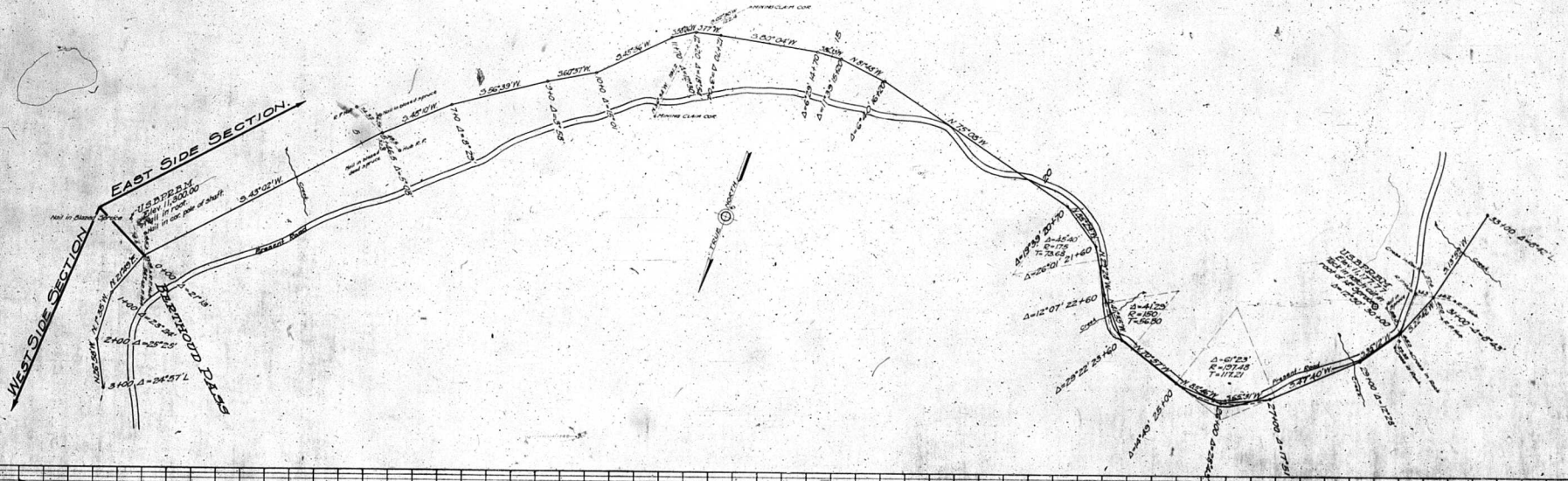
DIMENSIONS	SLAB	TWO ABUTMENTS												TWO 30' WING WALLS												TWO STRAIGHT WING WALLS				TOTAL OF ALL CONCRETE CU YDS.	TOTAL OF ALL STEEL LBS.					
		TWO RAILS						TWO CURBS						CONCRETE 1:2:4						CONCRETE 1:3:6						CONCRETE 1:2:5		CONCRETE 1:3:6								
		N	A	B	C	PER LIN. FT. CU YDS.	TOTAL CU YDS.	D	E	F	G	PER LIN. FT. CU YDS.	TOTAL CU YDS.	D	E	F	G	PER LIN. FT. CU YDS.	TOTAL CU YDS.	S	V	K	PER LIN. FT. CU YDS.	TOTAL CU YDS.	PER LIN. FT. CU YDS.	TOTAL CU YDS.										
5'	2'-6"	1.74	3.91	16.3	3.79	1.5	3.3	1.0	1.30	1.2	1.9	10'	3-6	1-5	2-5	2.9	6.9	2.7	6.3	5-2	2-1	3-1	2-10	1-2	2-2	4-0	1.5	1.2	5-2	1-10	5-11	1.5	1.2	2.4	340	578
6'	3'-0"	2.06	4.63	21.2	4.76	2.0	4.5	1.2	1.40	1.4	2.1	12'	4-6	1-10	2-10	4.7	11.1	3.2	7.3	6-3	2-11	3-11	4-1	1-8	2-8	5-6	3.7	2.0	6-3	2-3	5-11	2.2	1.6	3.2	624	637
8'	4'-0"	3.07	6.91	30.7	6.91	2.9	6.5	1.4	1.65	1.7	2.7	12'	5-6	2-3	3-3	.66	1.55	3.6	8.3	7-4	2-7	3-11	4-2	1-8	2-8	5-6	3.8	2.0	7-4	2-3	7-7	3.6	2.2	4.5	883	978
10'	5'-0"	4.42	9.94	42.8	9.94	4.0	9.0	1.6	1.90	2.1	3.0	12'	7-6	3-0	4-0	1.11	2.56	4.5	10.2	9-4	3-7	4-11	4-1	1-10	2-10	6-6	5.5	2.6	9-4	2-3	10-7	7.0	3.5	6.7	1214	1208

DESIGNED BY: L. W. Fitchback DATE: 1-20-17  
 CHECKED BY: A. M. Schell DATE: 2-2-17

U.S. OFFICE OF PUBLIC WORKS AND RURAL ENGINEERING, WASHINGTON, D.C.  
**CONCRETE CULVERTS**  
 SLAB TOP TYPE  
 SPANS 5 TO 10 FT. CLEAR BASED ON 20 FT. CLEAR ROADWAY  
 HAVING PLAIN CONCRETE SIDE AND WING WALLS  
 MARCH 29, 1917  
 APPROVED: [Signature]

DATE	SCALE	PROJECT	SECTION	SHEET
3	1" = 100'	NEW YORK	EAST	100

PLAN	DATE	SCALE	PROJECT	SECTION	SHEET
1	3	1" = 100'	NEW YORK	EAST	100



PROFILE	DATE	SCALE	PROJECT	SECTION	SHEET
1	3	1" = 100'	NEW YORK	EAST	100

PLATE 1 - PLAN-PROFILE OF R.R. & R. STATIONS  
 DRAWN BY JAMES W. BROWN

PLAN	DATE	BY	CHKD
ROUTE BOOK	11/11/50	W. J. ...	...
PROJECT	...	...	...
...	...	...	...

PROFILE	DATE	BY	CHKD
ROUTE BOOK	11/11/50	W. J. ...	...
PROJECT	...	...	...
...	...	...	...

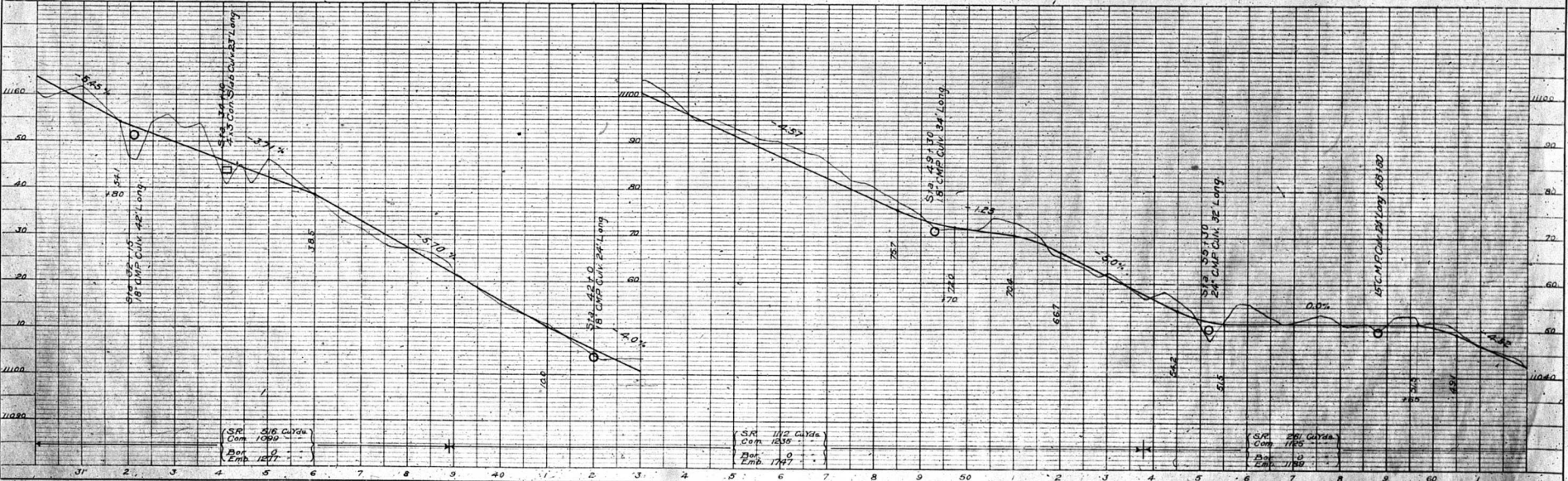
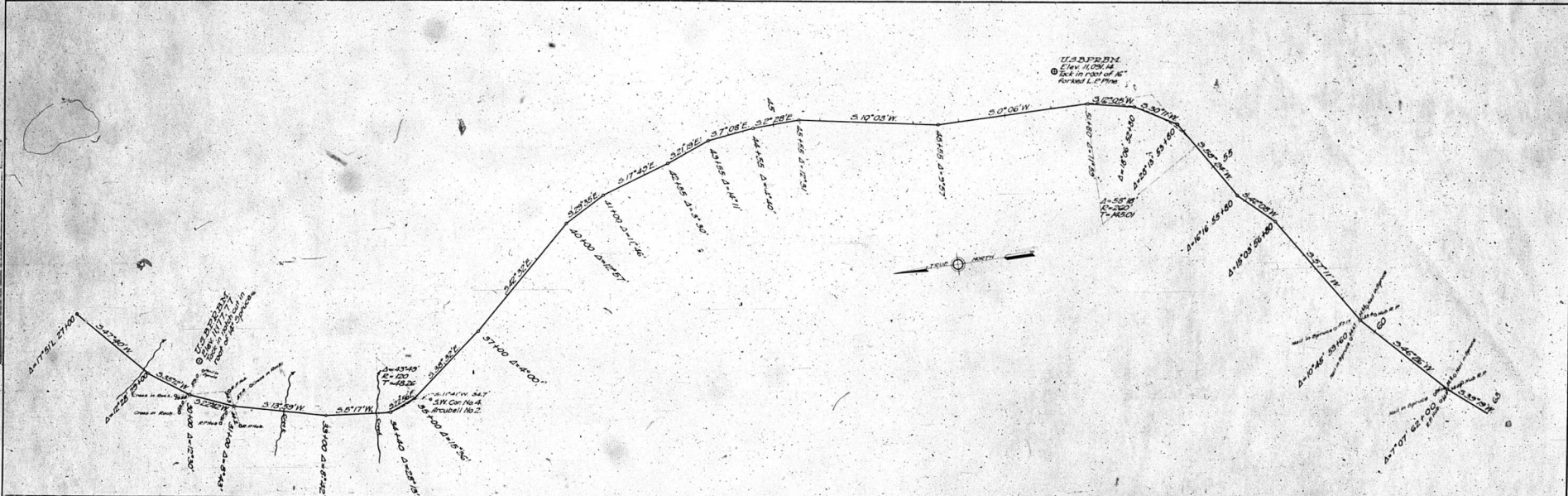
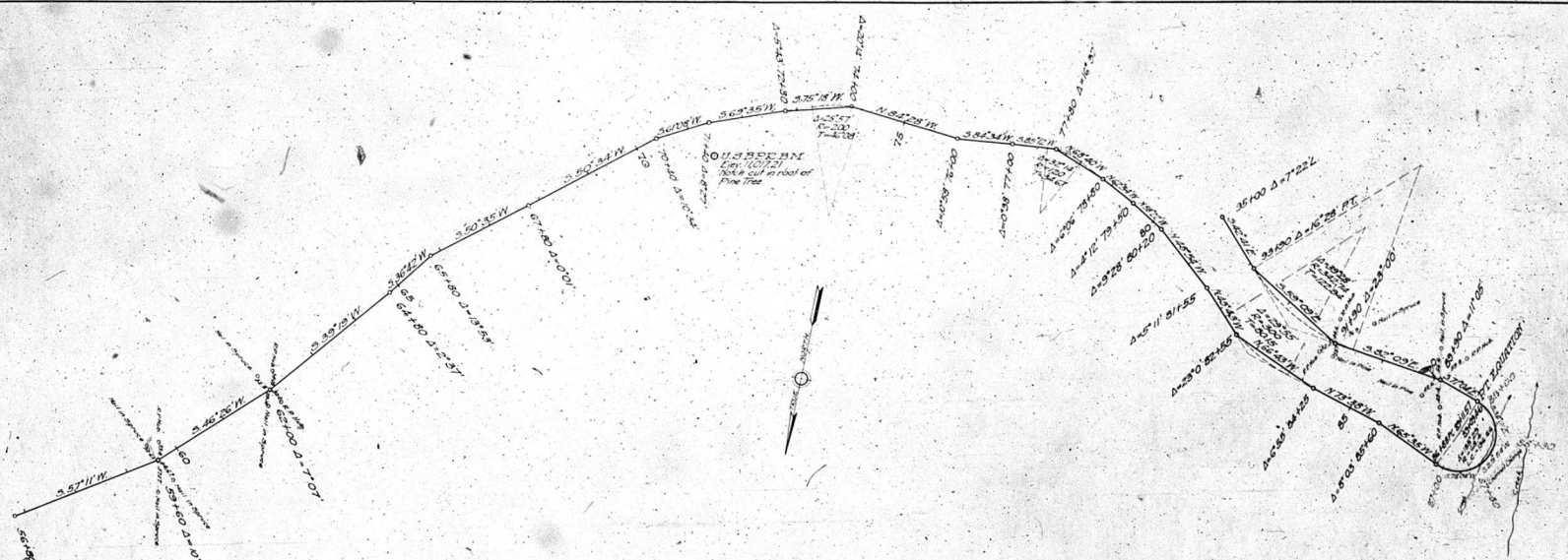


PLATE 1 - PLAN PROFILE - S. & N. R. STANBARD  
 SERIAL 4 1950 CO. NEW YORK

PLAN	FOOTED	SCALE
NITE BOON	IN POWER CHART	1" = 20'
NO.		17-52



PROFILE	FOOTED	SCALE
NITE BOON	IN POWER CHART	1" = 20'
NO.		17-52

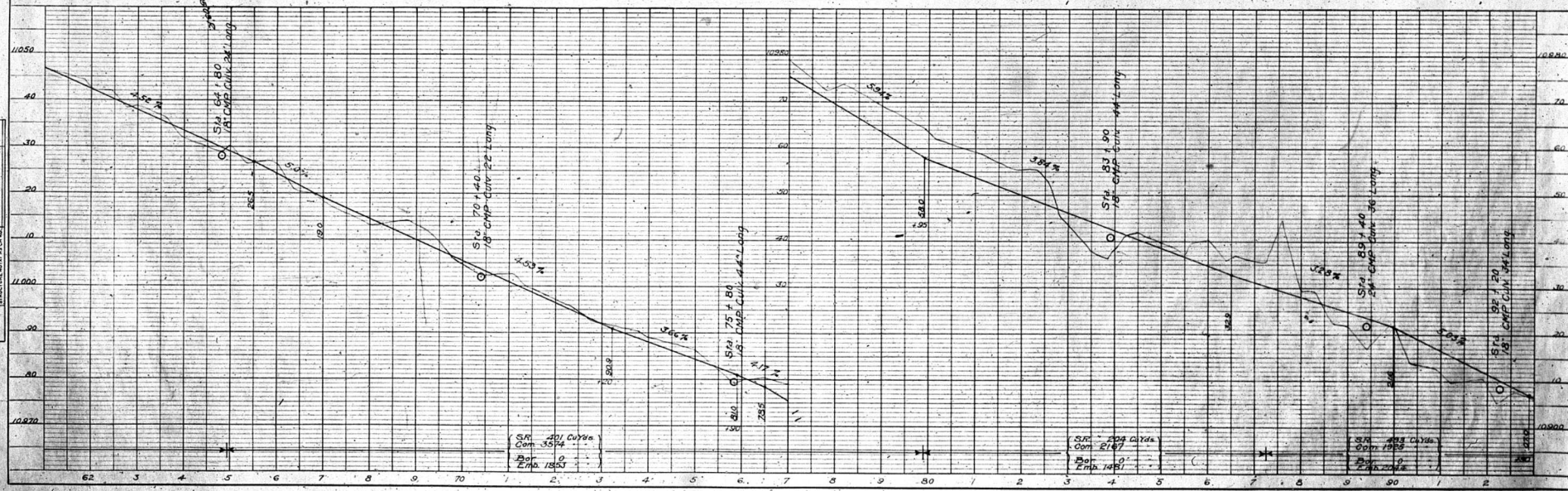


PLATE 1 - PLAN-PROFILE OF P.A.S.S. STATIONS





PLAN	DATE	BY
REVISED	10/22/54	W. B. WATSON
DATE BOOK	10/22/54	W. B. WATSON
BY	10/22/54	W. B. WATSON
NO.	10/22/54	W. B. WATSON

PROFILE	DATE	BY
REVISED	10/22/54	W. B. WATSON
DATE BOOK	10/22/54	W. B. WATSON
BY	10/22/54	W. B. WATSON
NO.	10/22/54	W. B. WATSON

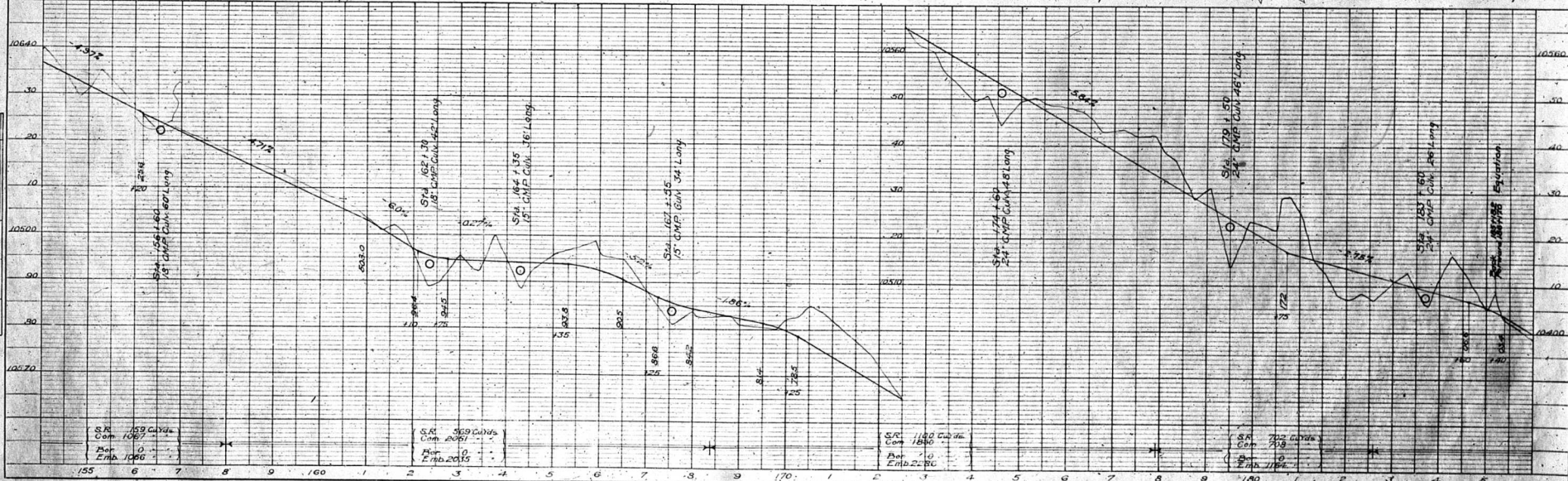
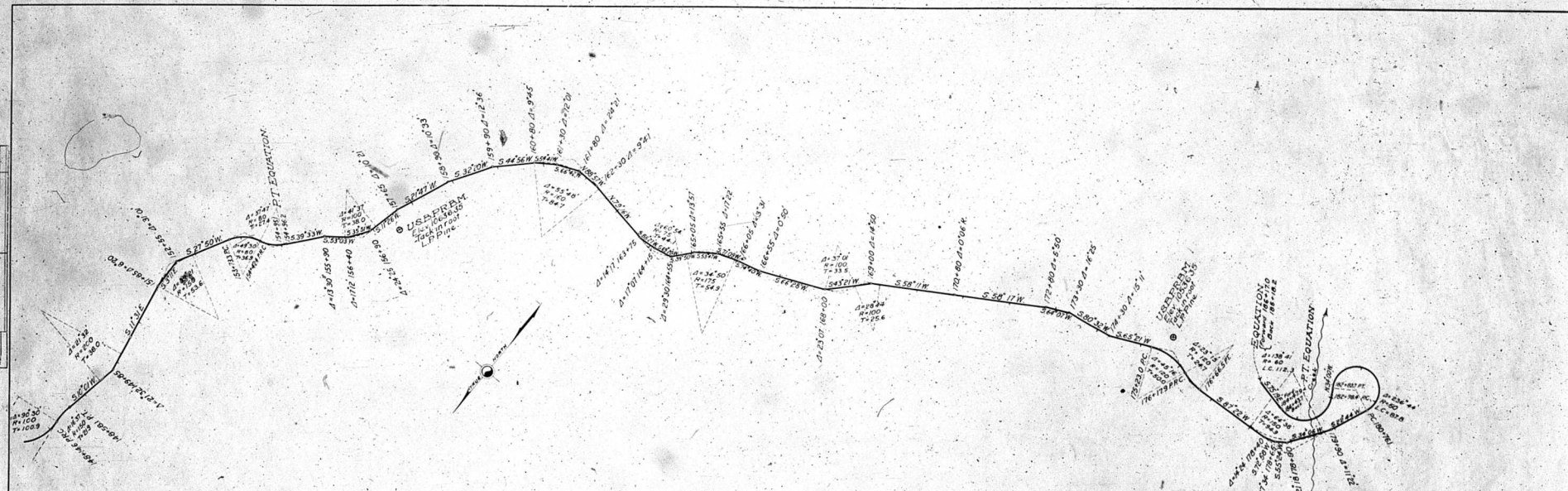
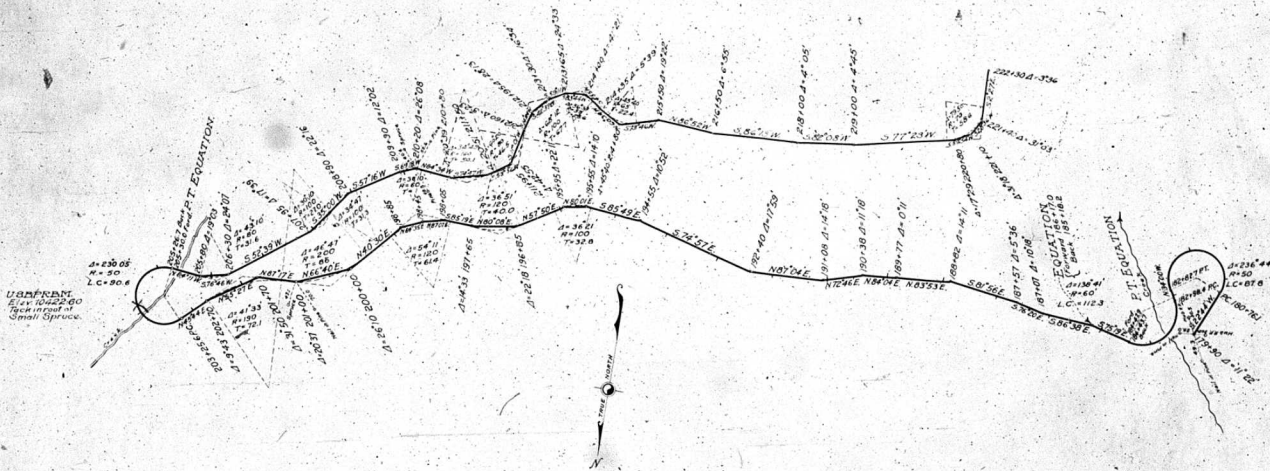
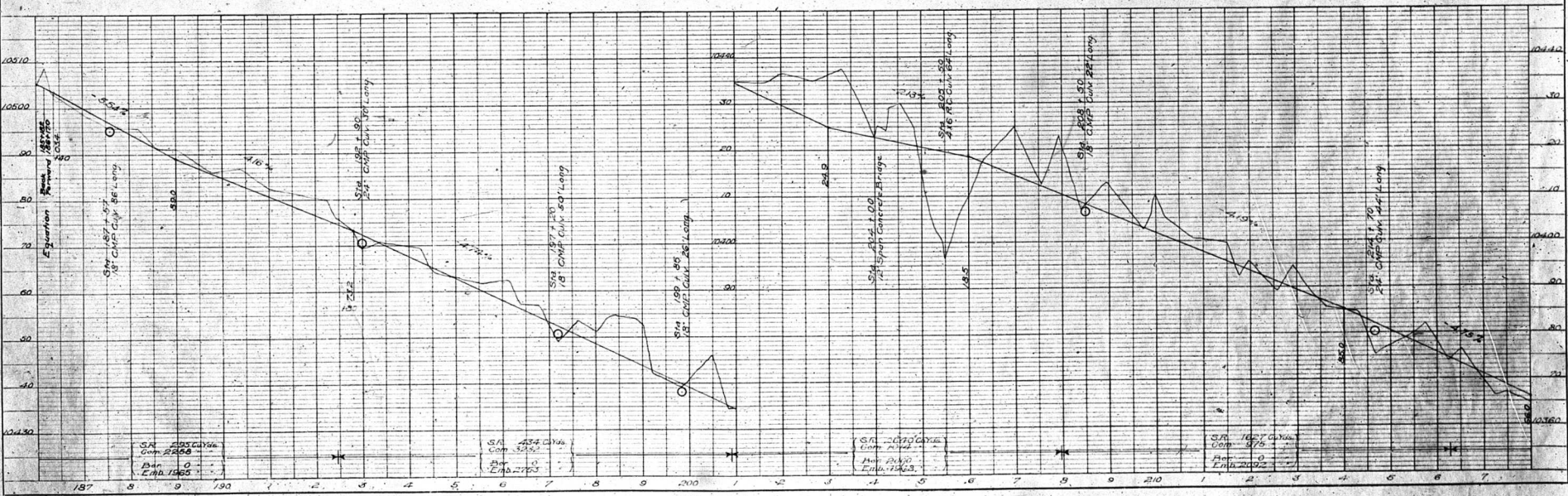


PLATE 1 - PLAN PROFILE S. P. K. & S. STANBARD  
DESIGNED & DRAWN BY W. B. WATSON

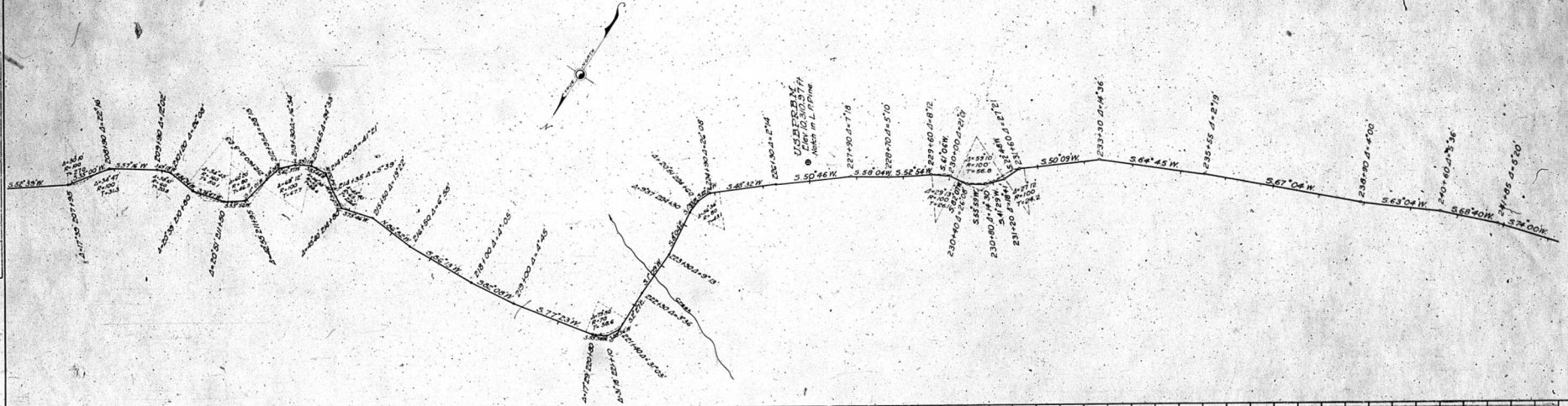
PLAN  
 DATE: 10-25-57  
 DRAWN BY: [Signature]  
 CHECKED BY: [Signature]  
 SCALE: AS SHOWN  
 SHEET NO. 10 OF 10 SHEETS



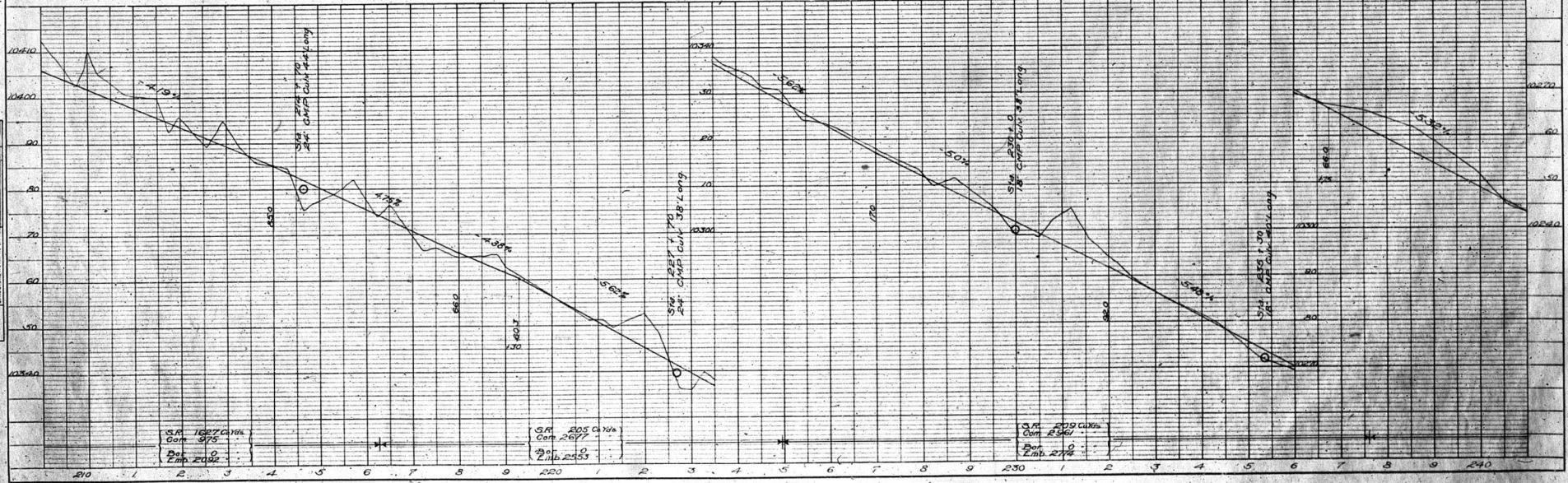
PROFILE  
 DATE: 10-25-57  
 DRAWN BY: [Signature]  
 CHECKED BY: [Signature]  
 SCALE: AS SHOWN  
 SHEET NO. 10 OF 10 SHEETS



PLAN	DATE	10/15/20
	BY	W. J. WILSON
PROJECT	NO. 100	100
	NAME	W. J. WILSON
SCALE	1" = 100'	1" = 100'
	DATE	10/15/20



PROFILE	DATE	10/15/20
	BY	W. J. WILSON
PROJECT	NO. 100	100
	NAME	W. J. WILSON
SCALE	1" = 100'	1" = 100'
	DATE	10/15/20

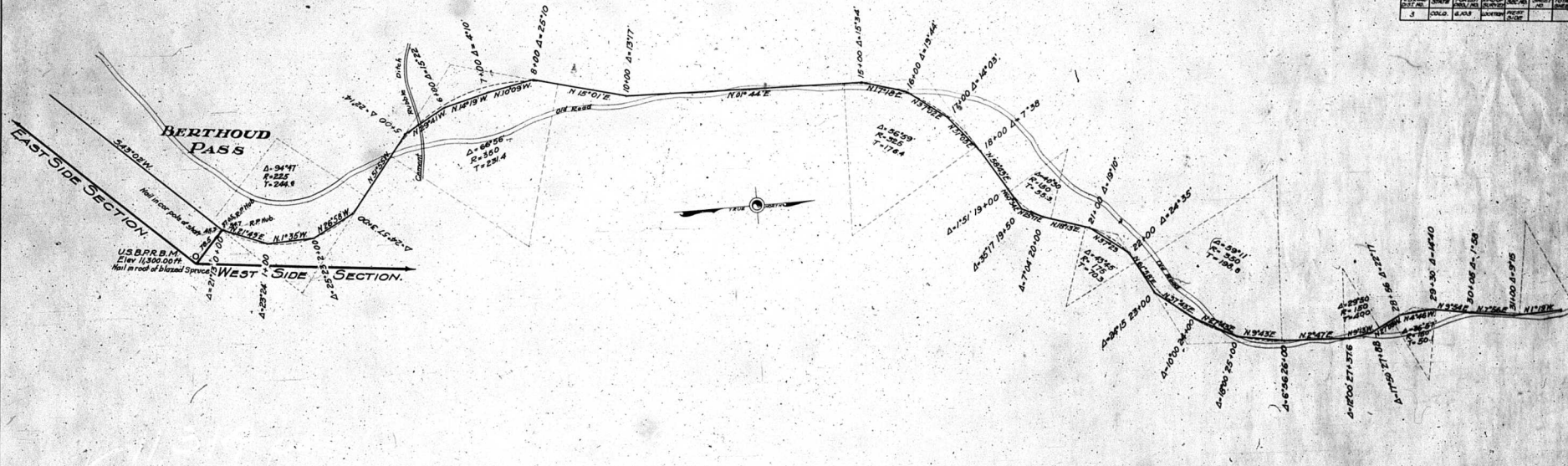






NO.	DATE	BY	FOR	STATUS	SCALE	TOTAL
3						

PLAN	DATE	BY	FOR	STATUS	SCALE	TOTAL



PROFILE	DATE	BY	FOR	STATUS	SCALE	TOTAL

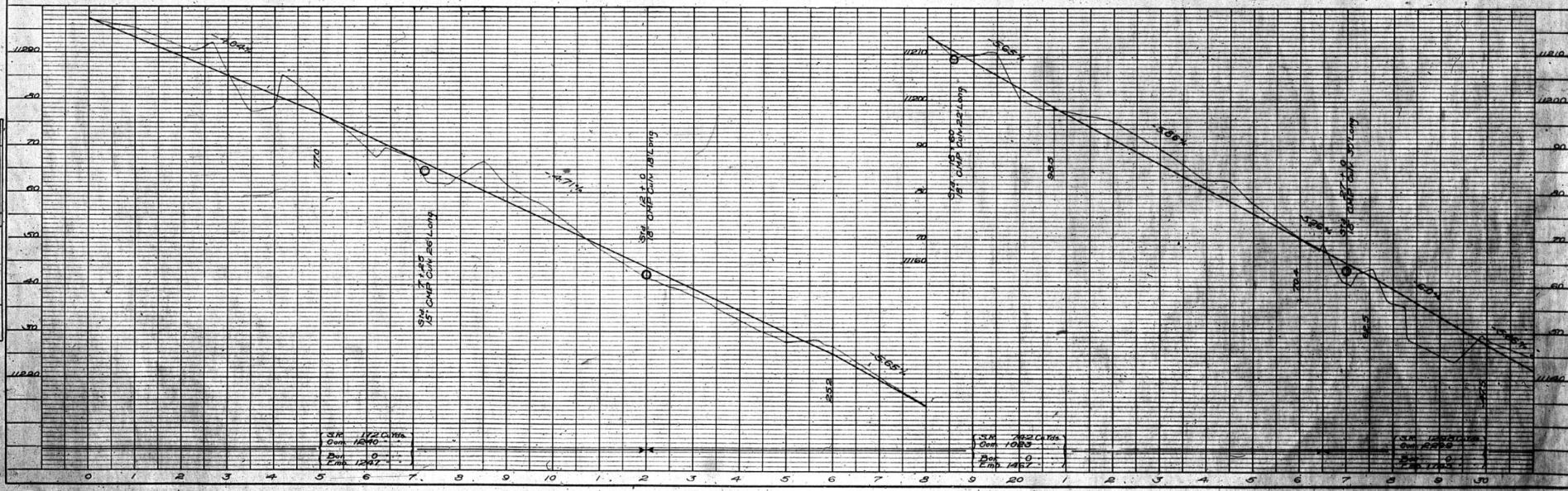


PLATE 1 - PLAN-PROFILE of P. & E. STATIONS  
 1:2000 & 1:5000



DESIGNED BY	DATE	PROJECT	NO. OF SHEETS	SHEET NO.
3	6.53	STANBROOK	1	1

PLAN	DATE	BY	CHECKED
PLANNING	6.53	W. J. H. S.	W. J. H. S.
ADJUSTED			
APPROVED			

PROFILE	DATE	BY	CHECKED
PLANNING	6.53	W. J. H. S.	W. J. H. S.
ADJUSTED			
APPROVED			

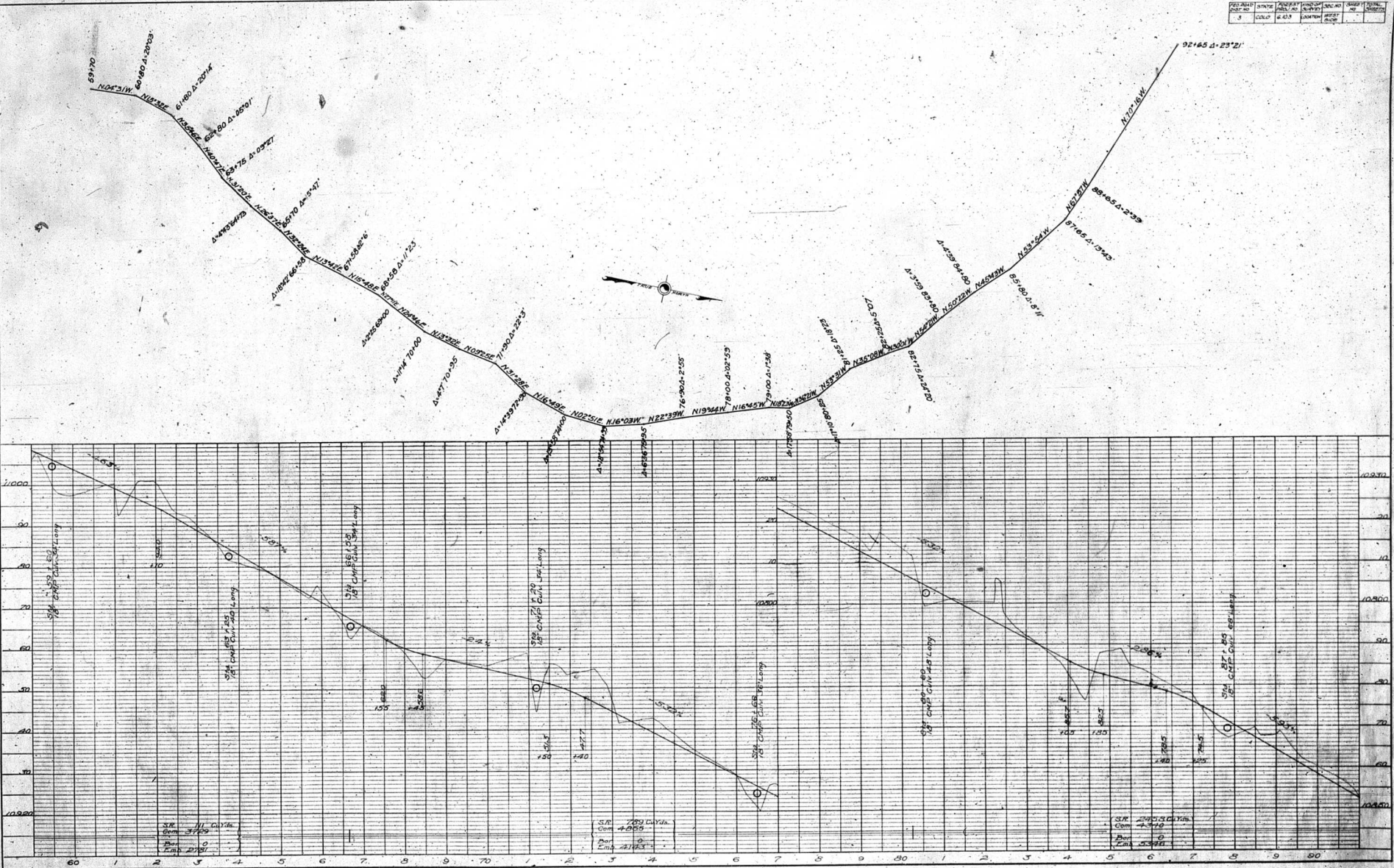
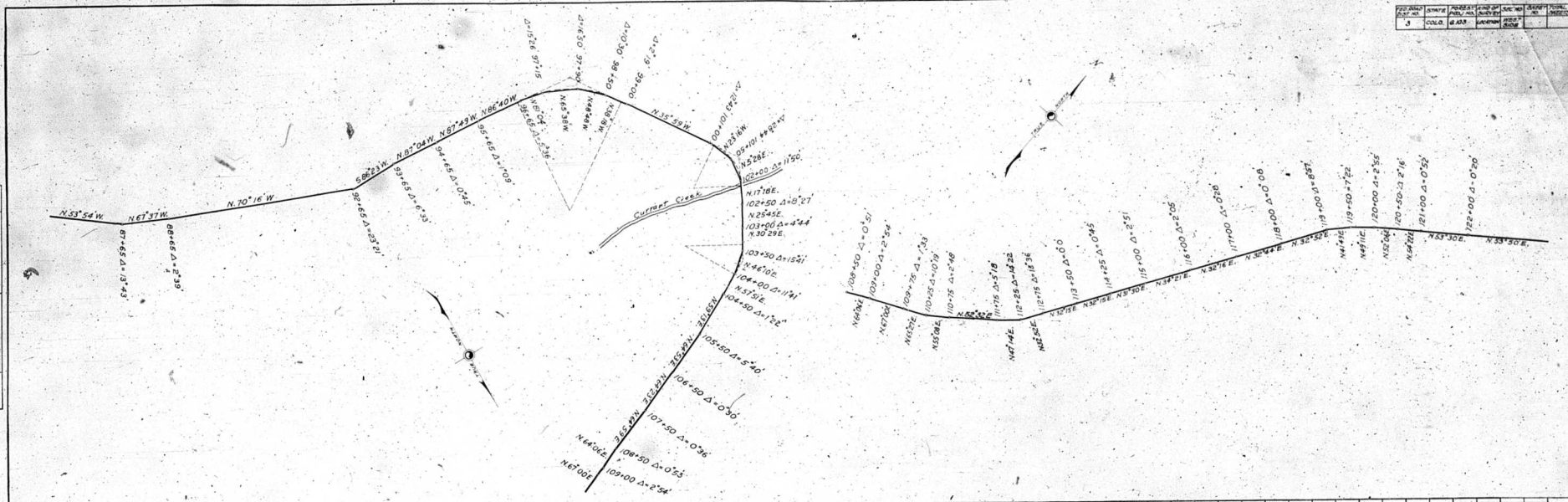


PLATE 1 - PLAN - PROFILE P. H. S. STANBROOK

PLAN	DATE	BY	CHECKED
1	1958	J. H. ...	J. H. ...

PLAN	DATE	BY	CHECKED
1	1958	J. H. ...	J. H. ...



PROFILE	DATE	BY	CHECKED
1	1958	J. H. ...	J. H. ...

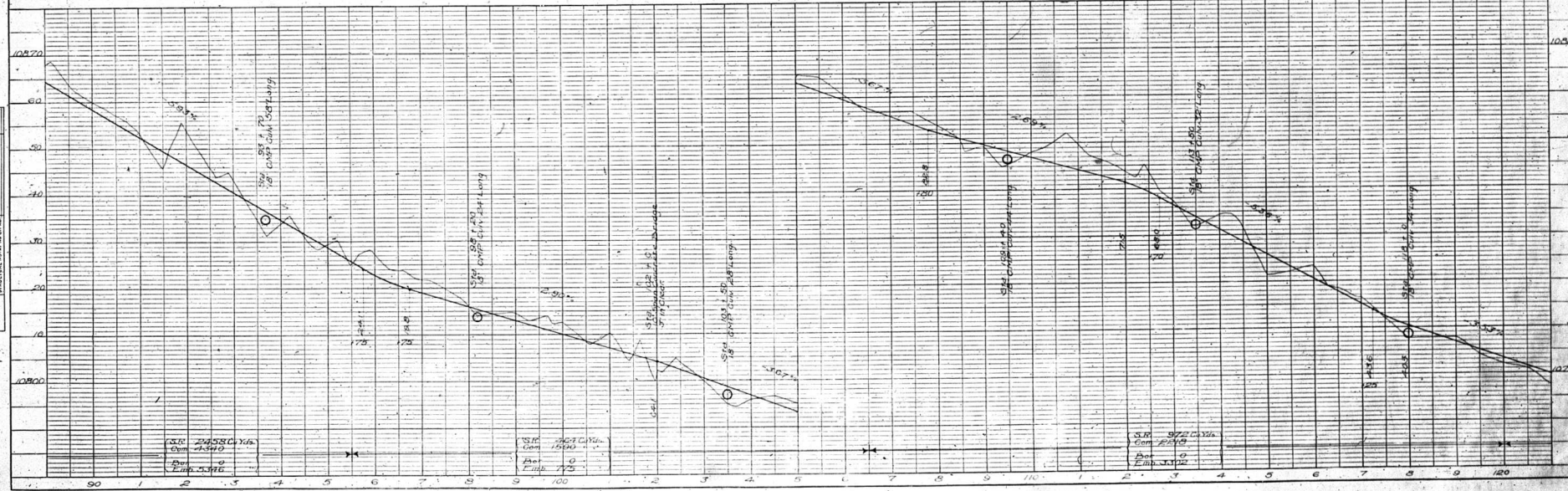


PLATE 1 - PLAN - PROFILE OF ...

PLAN	DATE	BY
REVISED		
PLOTTED		
CHECKED		
SCALE		
DATE		

PROFILE	DATE	BY
REVISED		
PLOTTED		
CHECKED		
SCALE		
DATE		

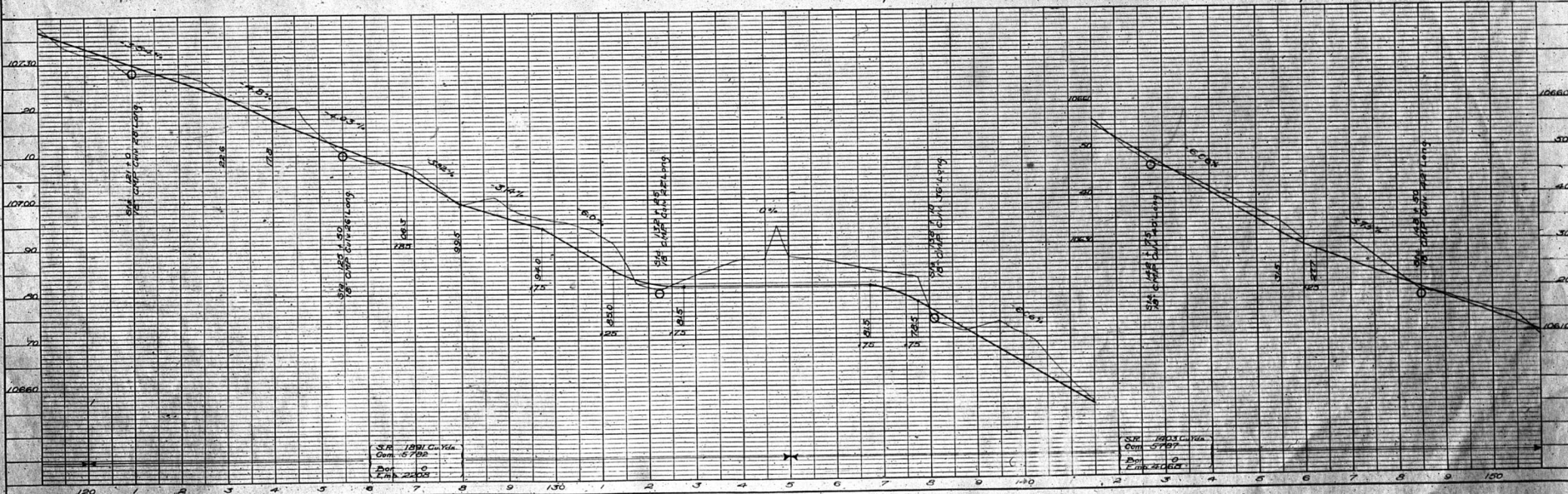
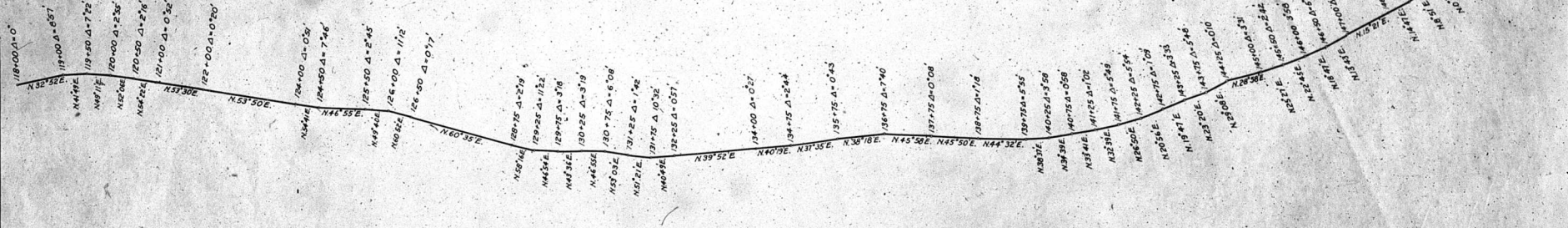
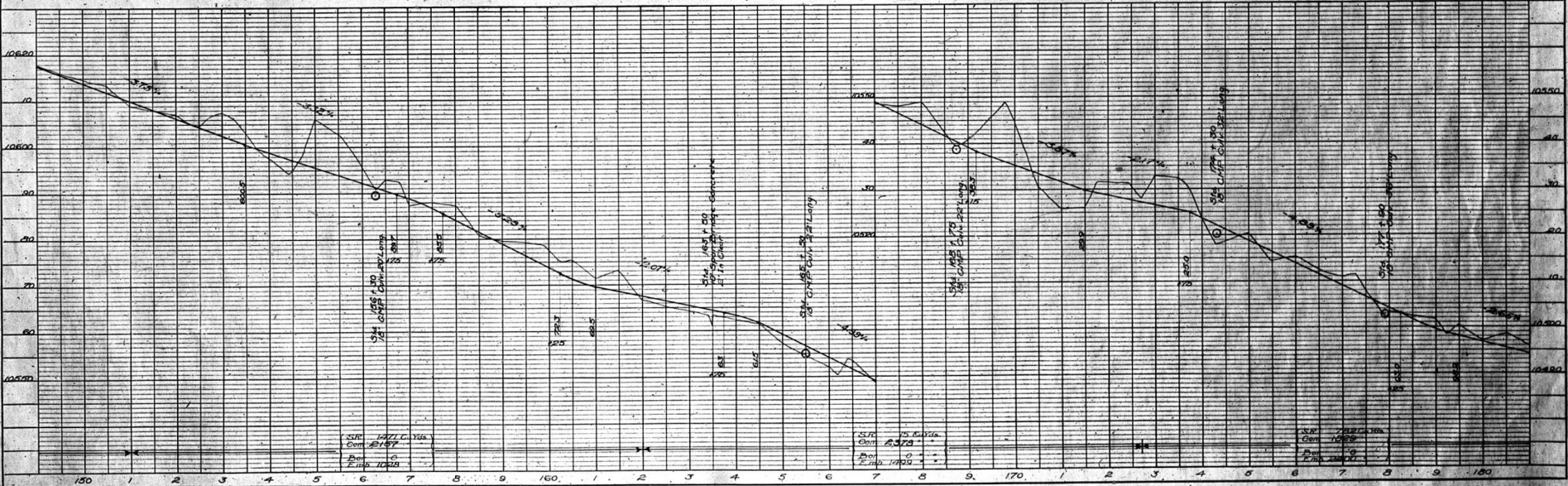
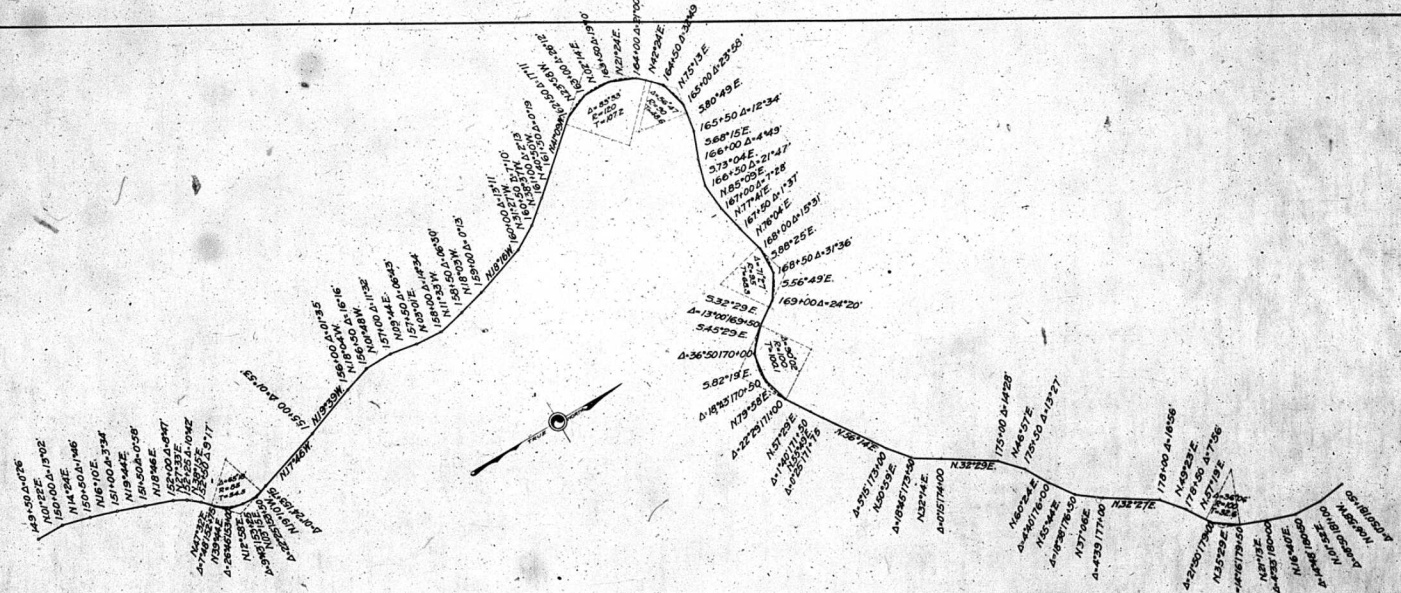


PLATE 1 - PLAN - PROFILE

PLAN	DATE	BY	CHKD.
PLANNING	1/10/54	J. J. DUNN	J. J. DUNN
DESIGN	1/10/54	J. J. DUNN	J. J. DUNN
CONSTRUCTION	1/10/54	J. J. DUNN	J. J. DUNN
AS BUILT	1/10/54	J. J. DUNN	J. J. DUNN

PROFILE	DATE	BY	CHKD.
PLANNING	1/10/54	J. J. DUNN	J. J. DUNN
DESIGN	1/10/54	J. J. DUNN	J. J. DUNN
CONSTRUCTION	1/10/54	J. J. DUNN	J. J. DUNN
AS BUILT	1/10/54	J. J. DUNN	J. J. DUNN

NO.	DATE	BY	CHKD.	REVISION
1	1/10/54	J. J. DUNN	J. J. DUNN	AS BUILT



DATE	SCALE	PROJECT	NO. OF SHEETS	SHEET NO.
3/27/21	1" = 100'	WATER	10	10

PLAN	DATE	BY	SCALE
WATER	3/27/21	J. H. ...	1" = 100'
NO. OF SHEETS	NO. OF SHEETS	NO. OF SHEETS	NO. OF SHEETS
10	10	10	10

PROFILE	DATE	BY	SCALE
WATER	3/27/21	J. H. ...	1" = 100'
NO. OF SHEETS	NO. OF SHEETS	NO. OF SHEETS	NO. OF SHEETS
10	10	10	10

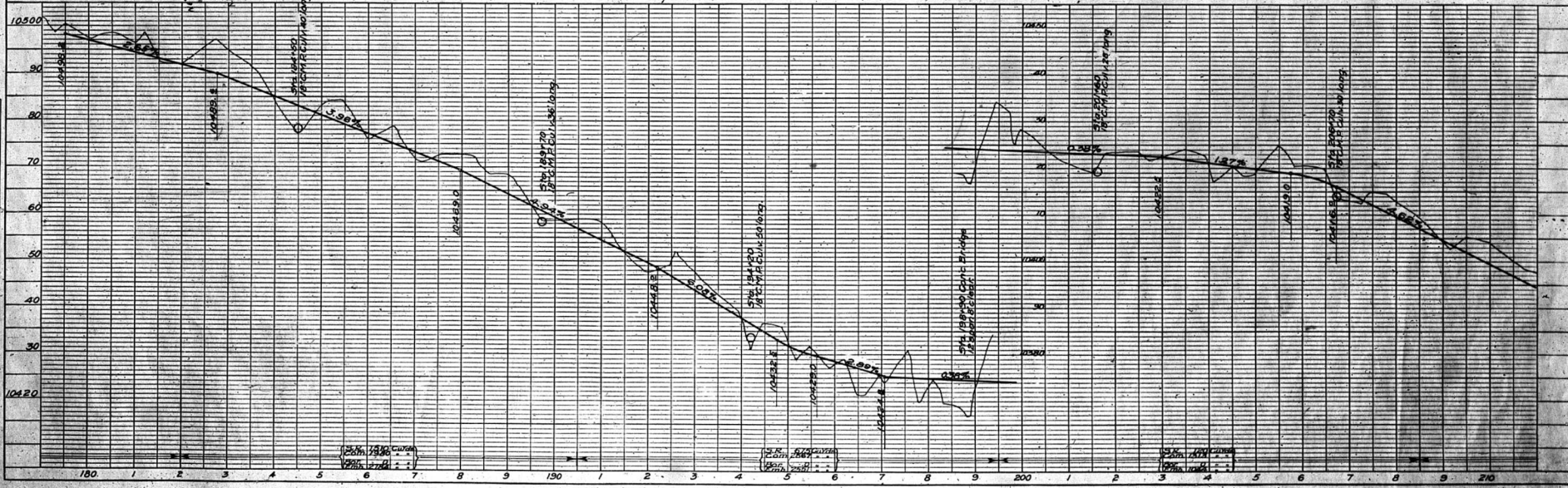
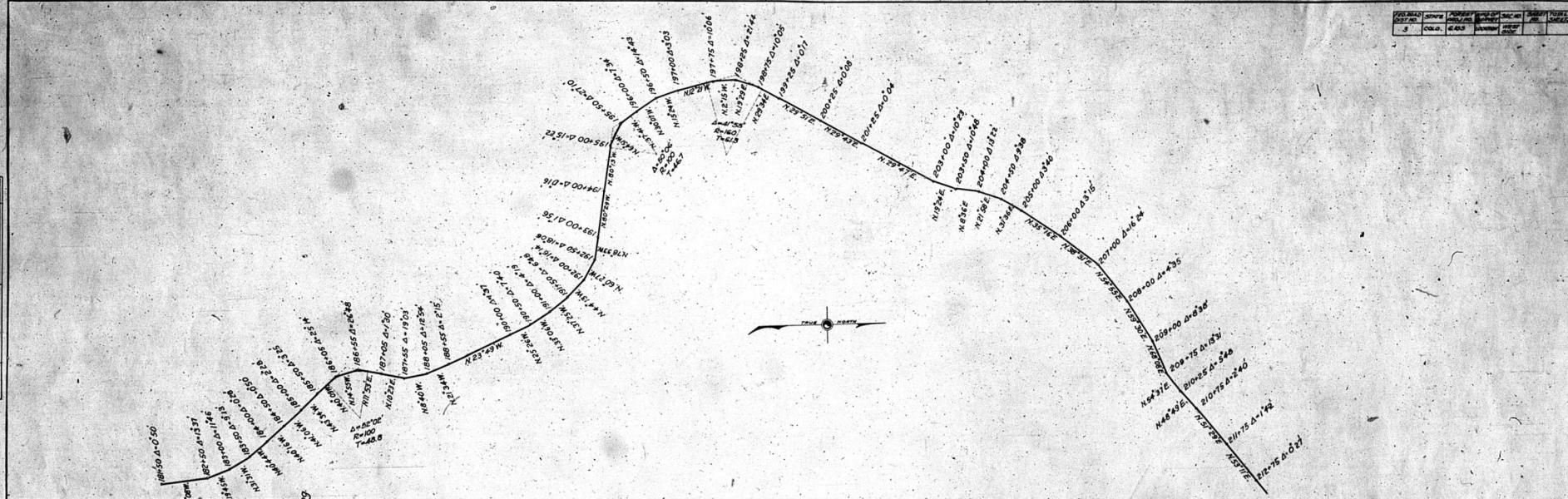
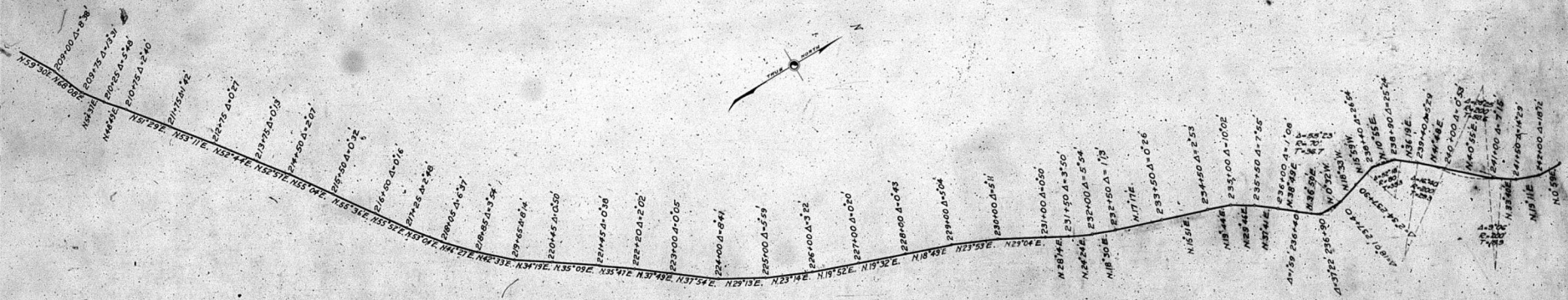


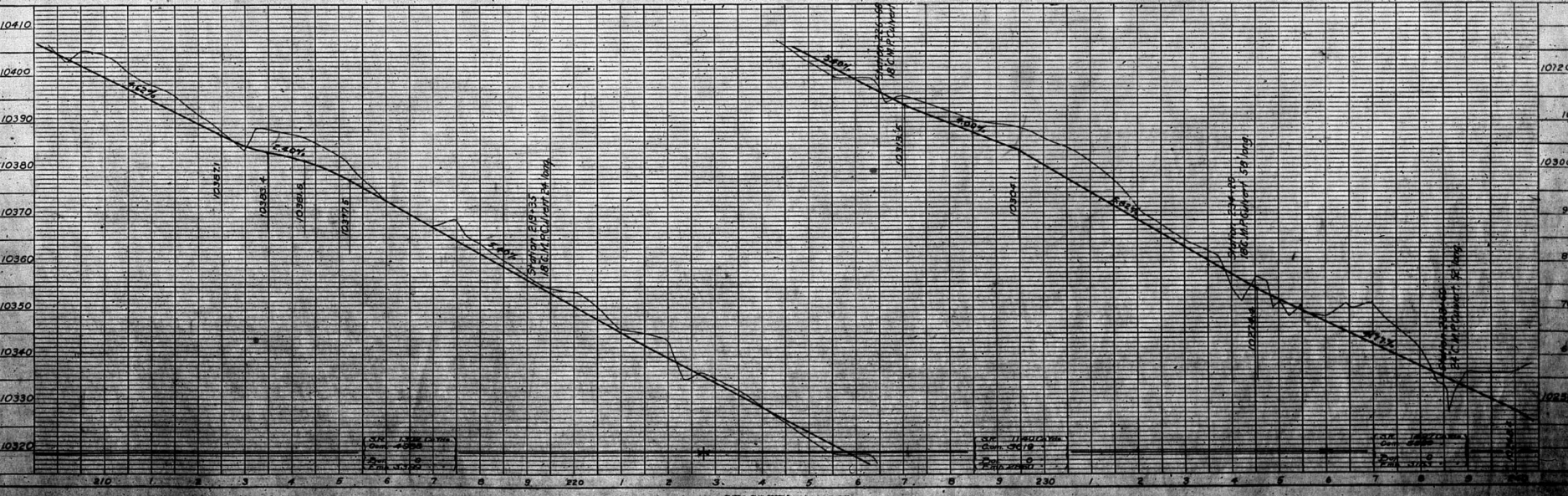
PLATE 1 - PLAN PROFILE & P&E & STATIONS

PLAN	DATE	BY	CHK'D	SCALE	SHEET NO.	TOTAL SHEETS
3	COLOR	A 423				

PLAN	DATE	BY	CHK'D	SCALE	SHEET NO.	TOTAL SHEETS
3	COLOR	A 423				



PROFILE	DATE	BY	CHK'D	SCALE	SHEET NO.	TOTAL SHEETS
3	COLOR	A 423				



PLAN - PROFILE



PLAN	DATE	BY
PROPOSED	11-25-50	W. J. ...
REVISION		
NO. OF SHEETS	1	OF 1
PROJECT	... ..	

PROFILE	DATE	BY
PROPOSED	11-25-50	W. J. ...
REVISION		
NO. OF SHEETS	1	OF 1
PROJECT	... ..	

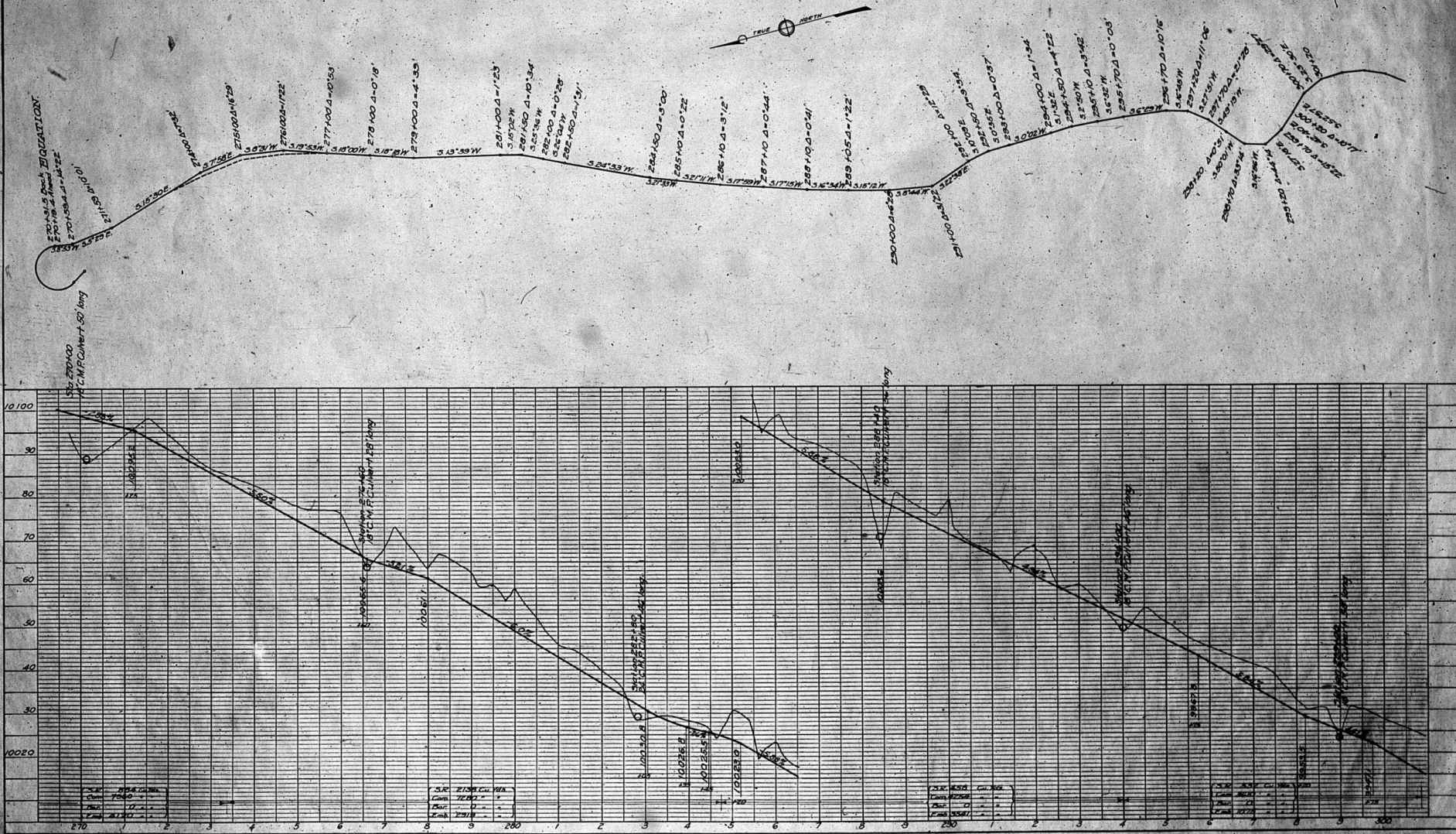
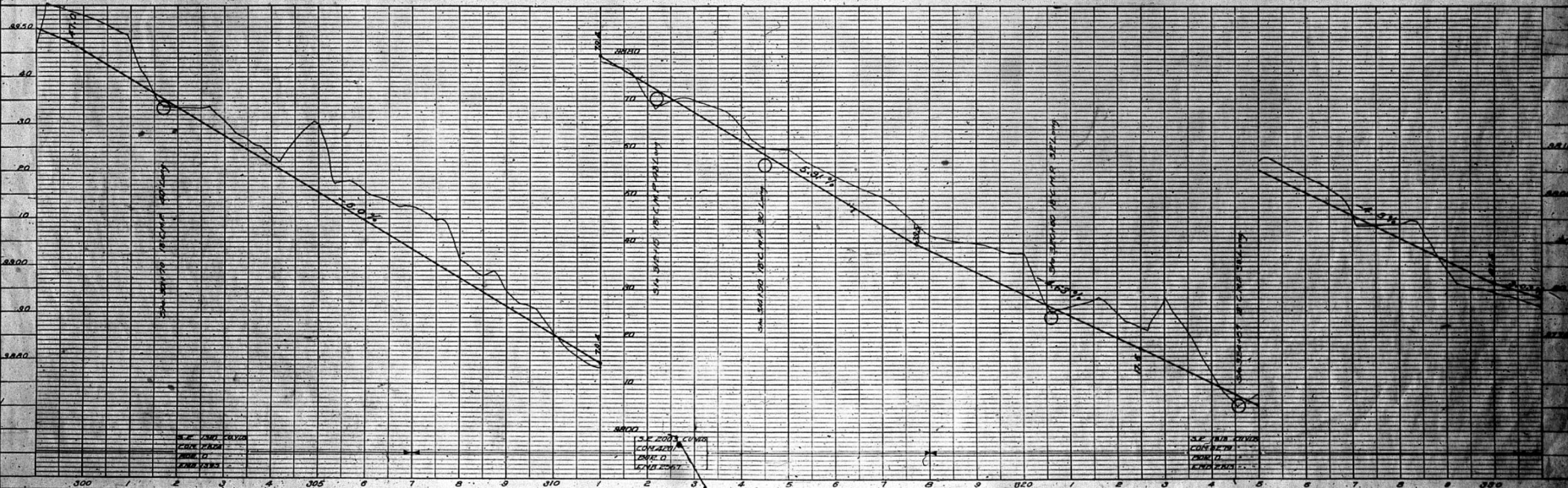
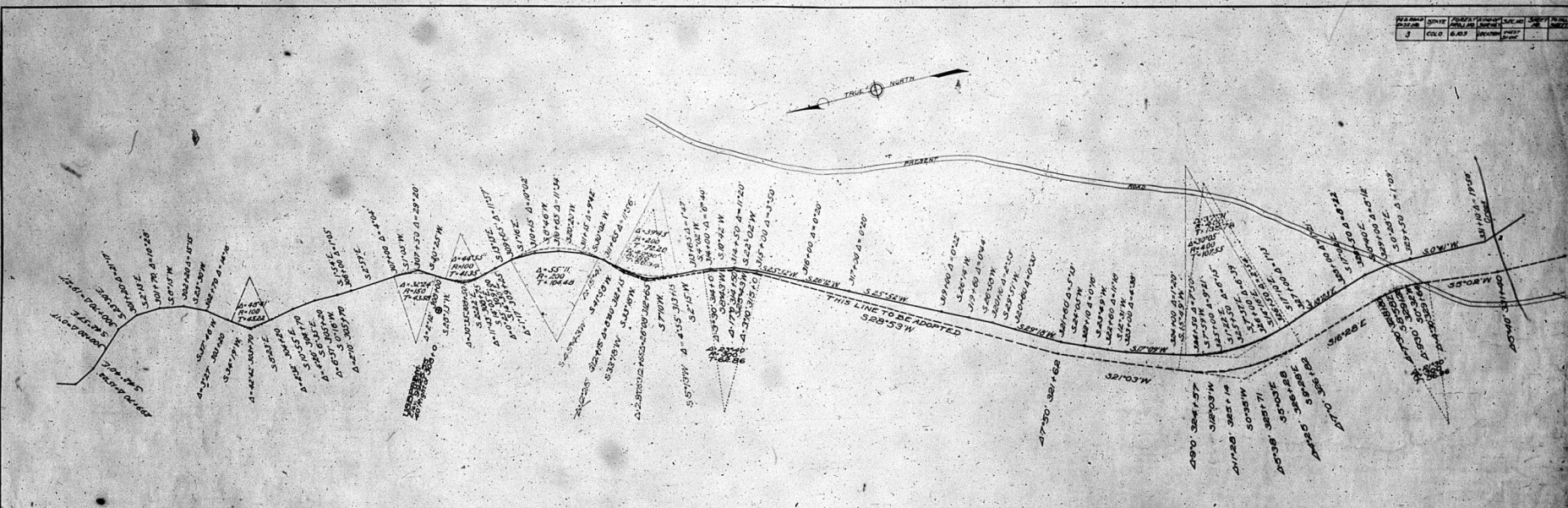


PLATE 1 - PLAN-PROFILE OF ... ..

DATE	SCALE	PROJECT	SECTION	NO.
1922	1" = 100'	WATER	100	1

DATE	SCALE	PROJECT	SECTION	NO.
1922	1" = 100'	WATER	100	1

DATE	SCALE	PROJECT	SECTION	NO.
1922	1" = 100'	WATER	100	1

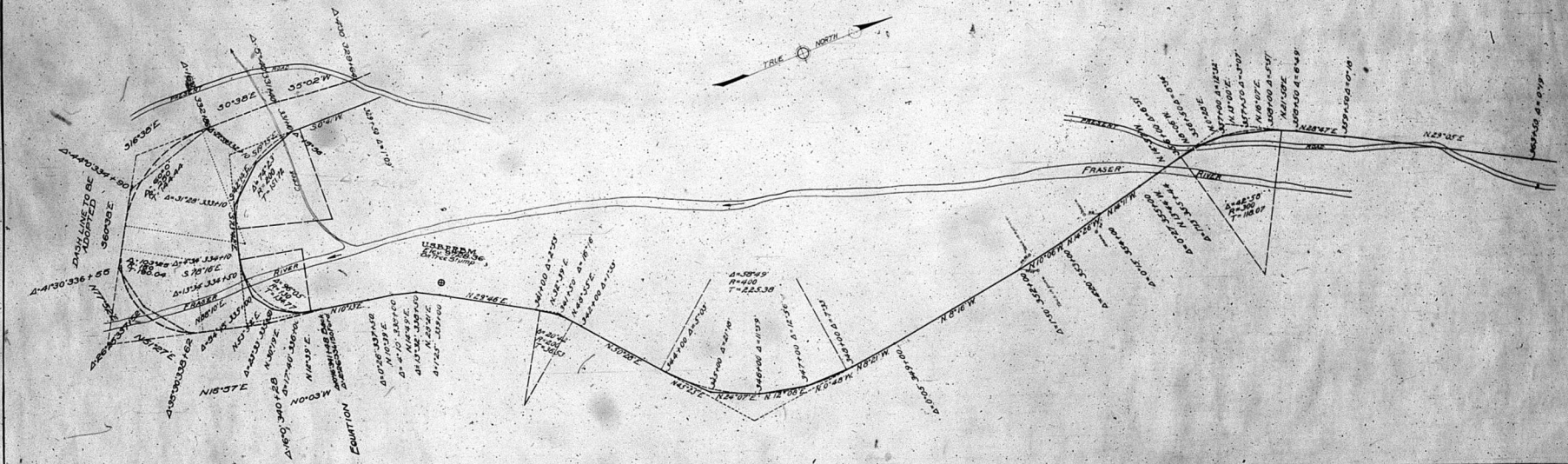


SCALE 1" = 100'

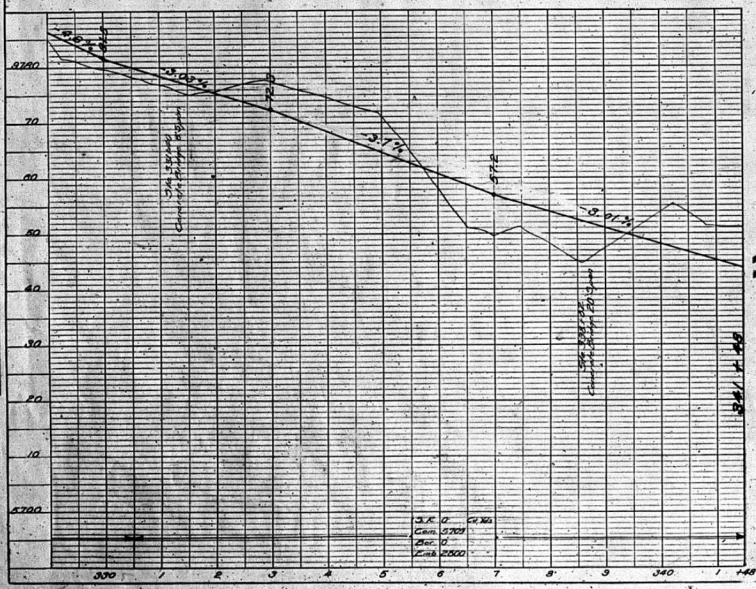
SCALE 1" = 100'

SCALE 1" = 100'

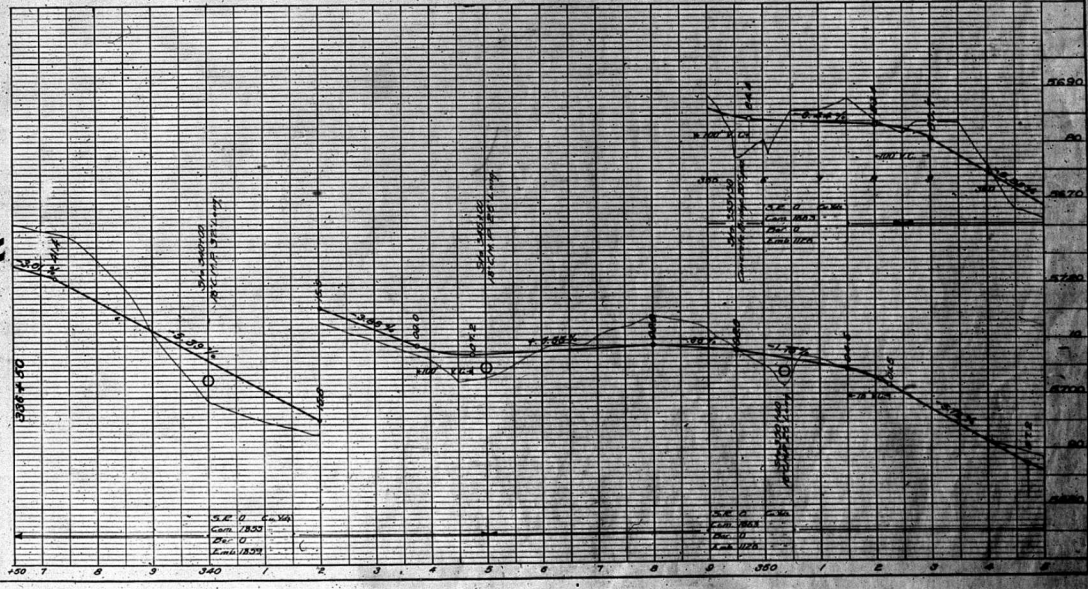
PLAN  
 DRAWN BY  
 CHECKED BY  
 DATE



PROFILE  
 DRAWN BY  
 CHECKED BY  
 DATE



EQUATION



DATE	BY	CHKD	APP'D	SCALE	SHEET NO.	TOTAL SHEETS
3	020	0-03			1007	1007

PLAN	DATE	BY	CHKD	APP'D

PROFILE	DATE	BY	CHKD	APP'D

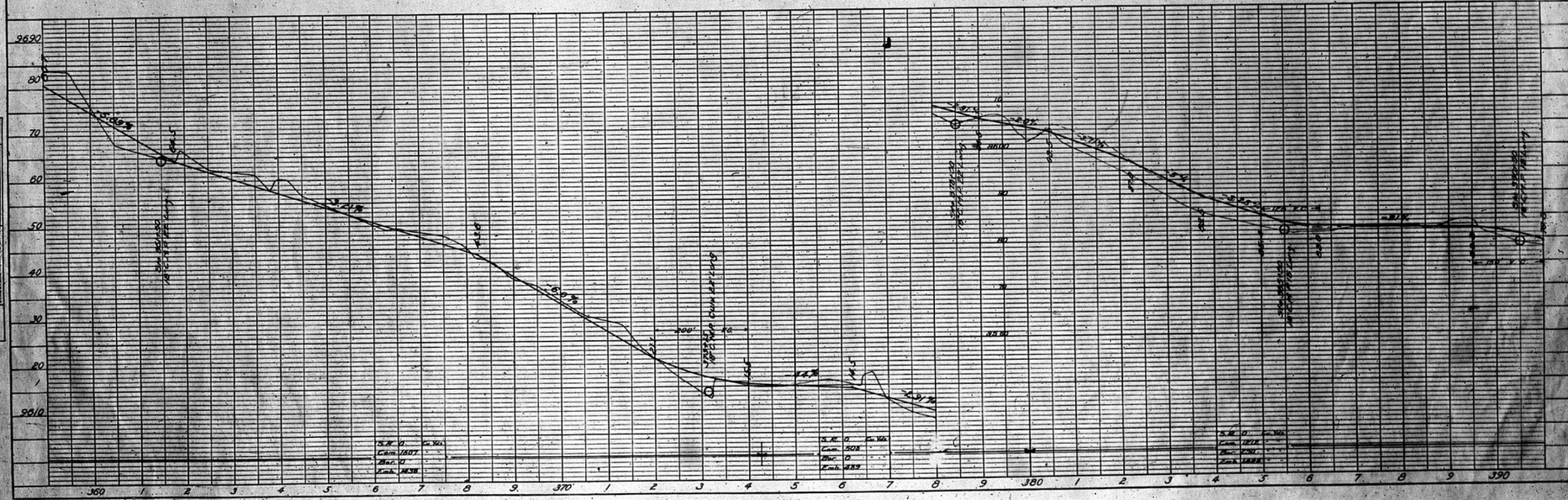
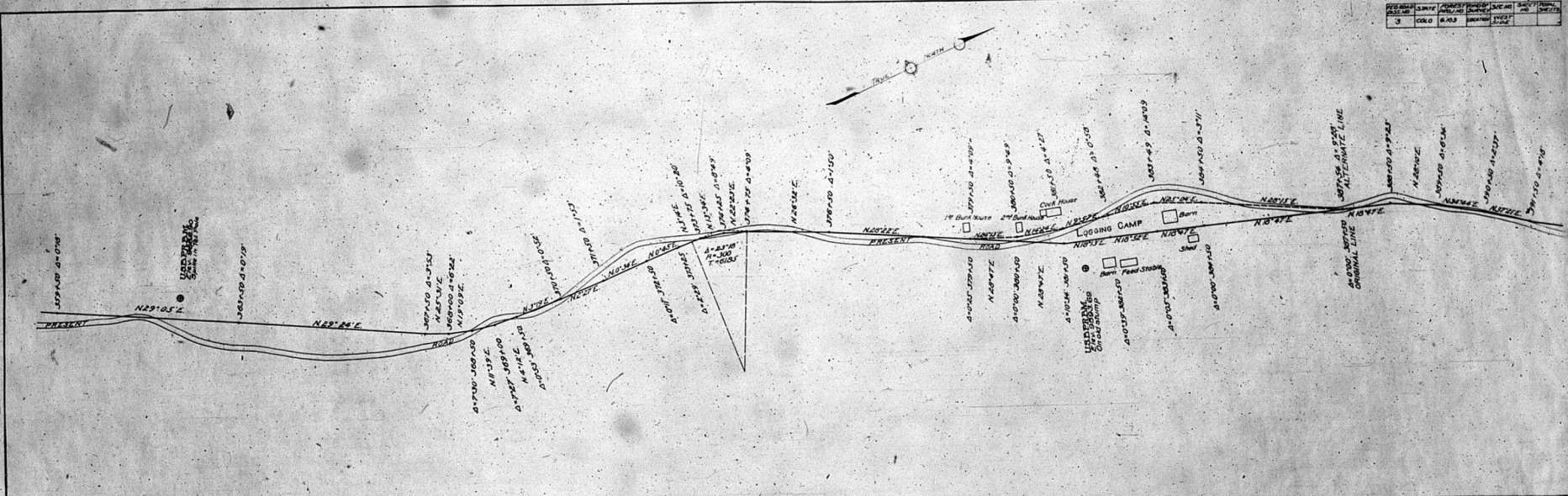


PLATE 1 - PLAN PROFILE OF P.A.S.S.E. STADIUM  
 DRAWN BY: [Name]

**PLAN**

DATE	
BY	
CHECKED BY	
APPROVED BY	
SCALE	AS SHOWN

**PROFILE**

DATE	
BY	
CHECKED BY	
APPROVED BY	
SCALE	AS SHOWN

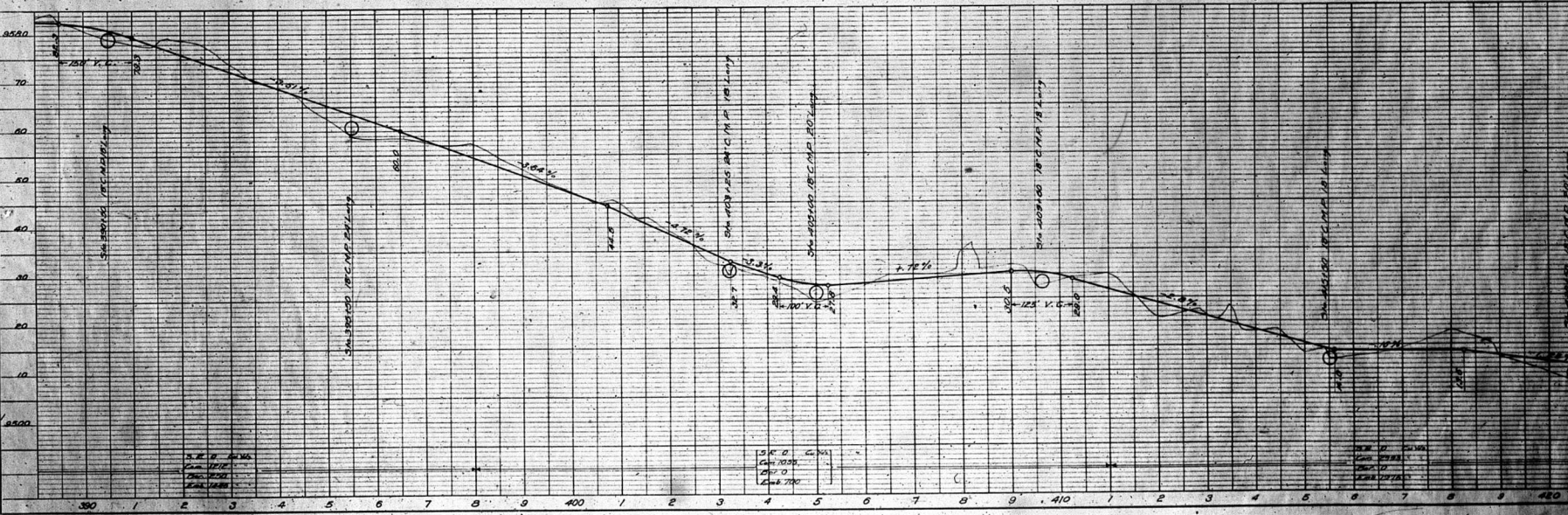
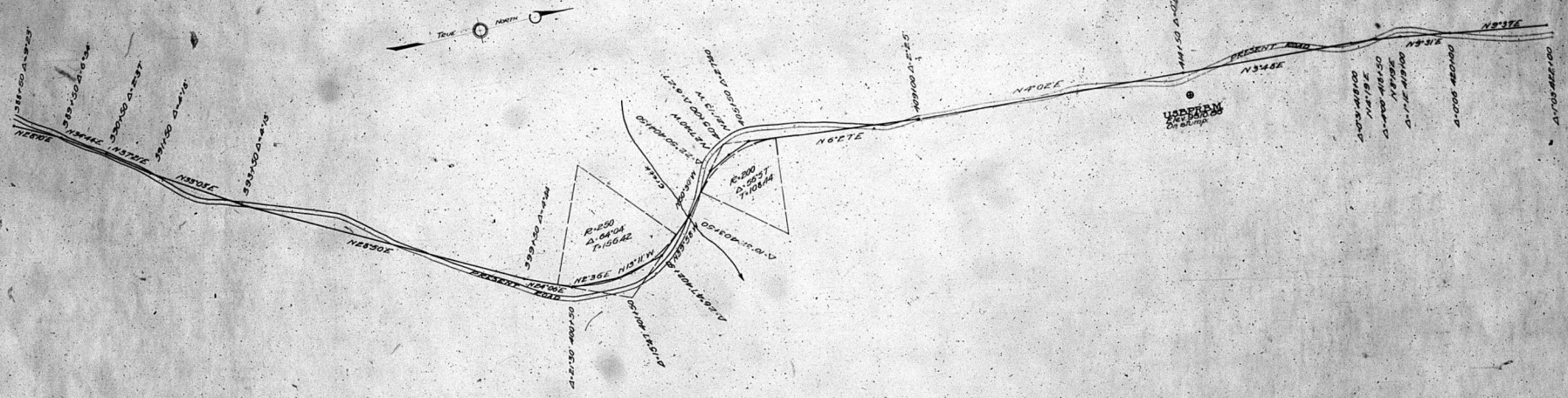


PLATE 1 - PLAN-PROFILE OF STATE HIGHWAY IMPROVEMENT PROJECT  
 DRAWN BY: [Name]



PLAN	DATE	BY
REVISION		
APPROVED		
DATE		
BY		
REVISION		
APPROVED		
DATE		
BY		

PROFILE	DATE	BY
REVISION		
APPROVED		
DATE		
BY		
REVISION		
APPROVED		
DATE		
BY		

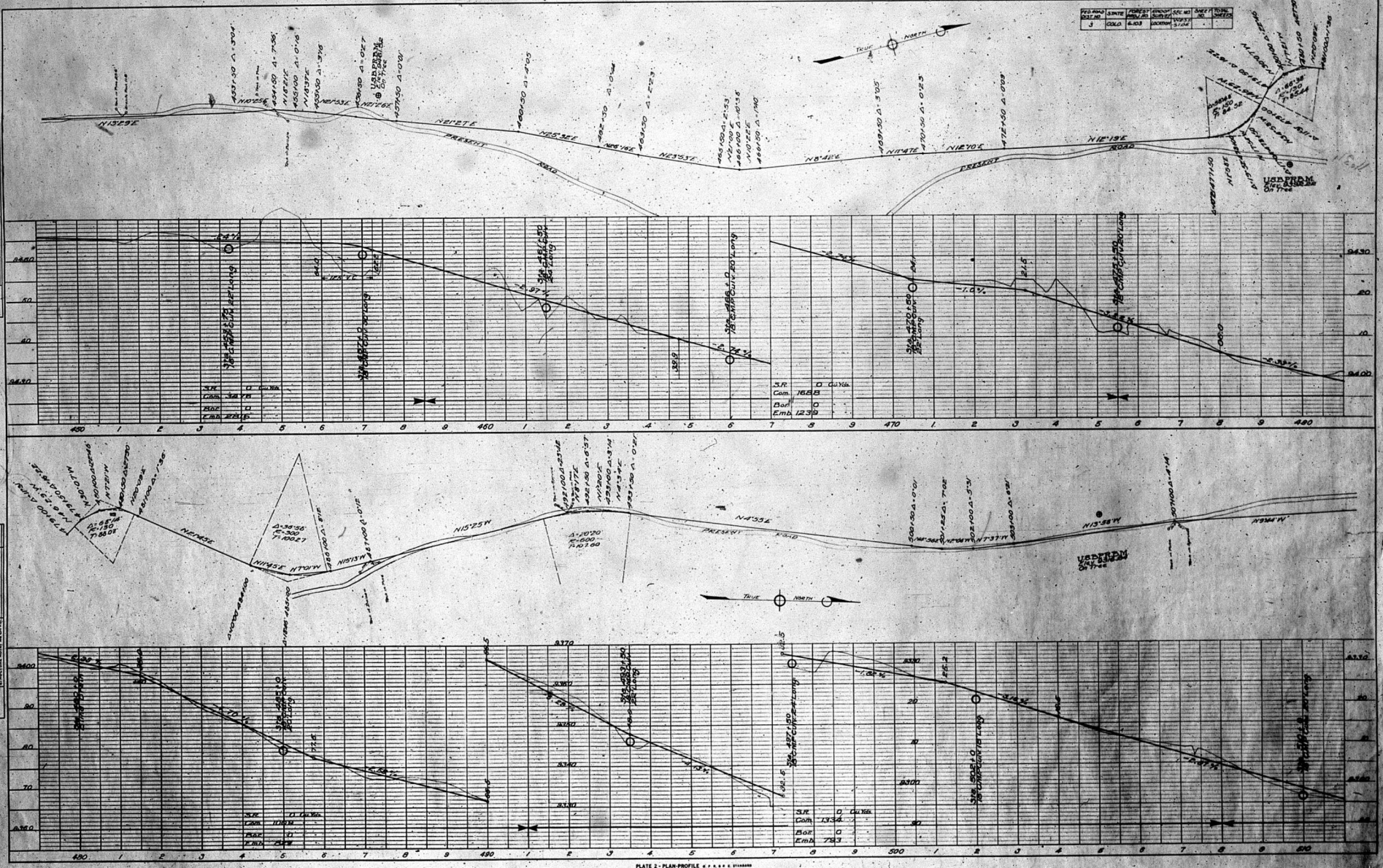


PLATE 2 - PLAN PROFILE

DATE	BY	CHECKED	SCALE	SHEET
1922	G. G. J.	J. H. J.	1" = 100'	12

PLAN	DATE	BY	CHECKED
1922	G. G. J.	J. H. J.	J. H. J.

PROFILE	DATE	BY	CHECKED
1922	G. G. J.	J. H. J.	J. H. J.

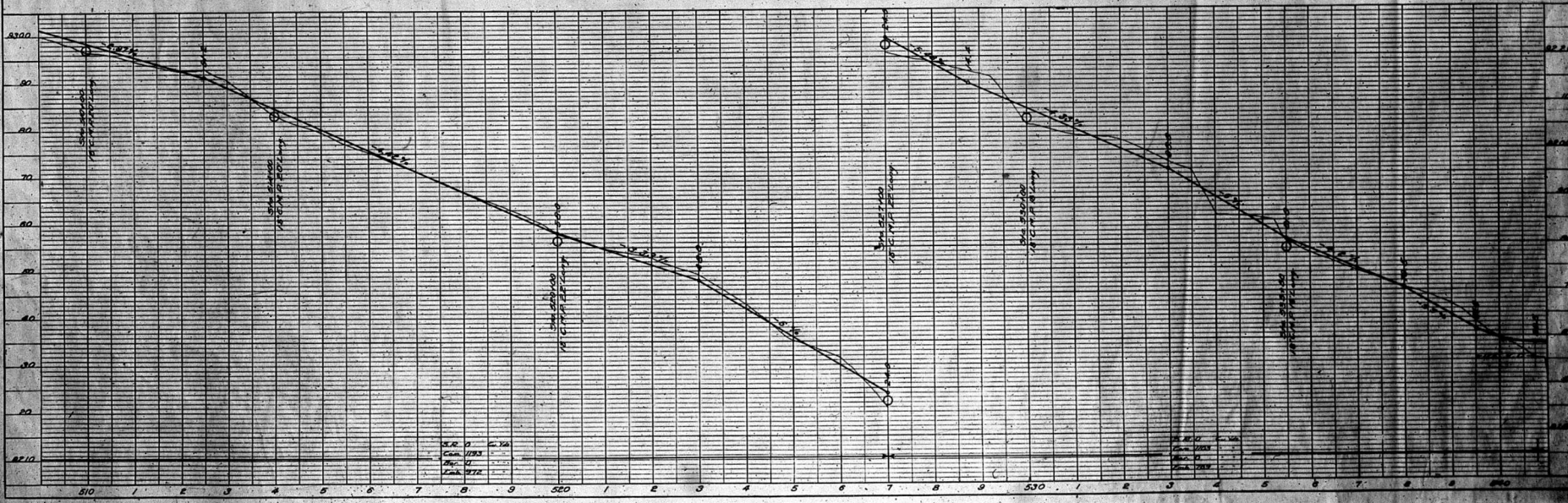
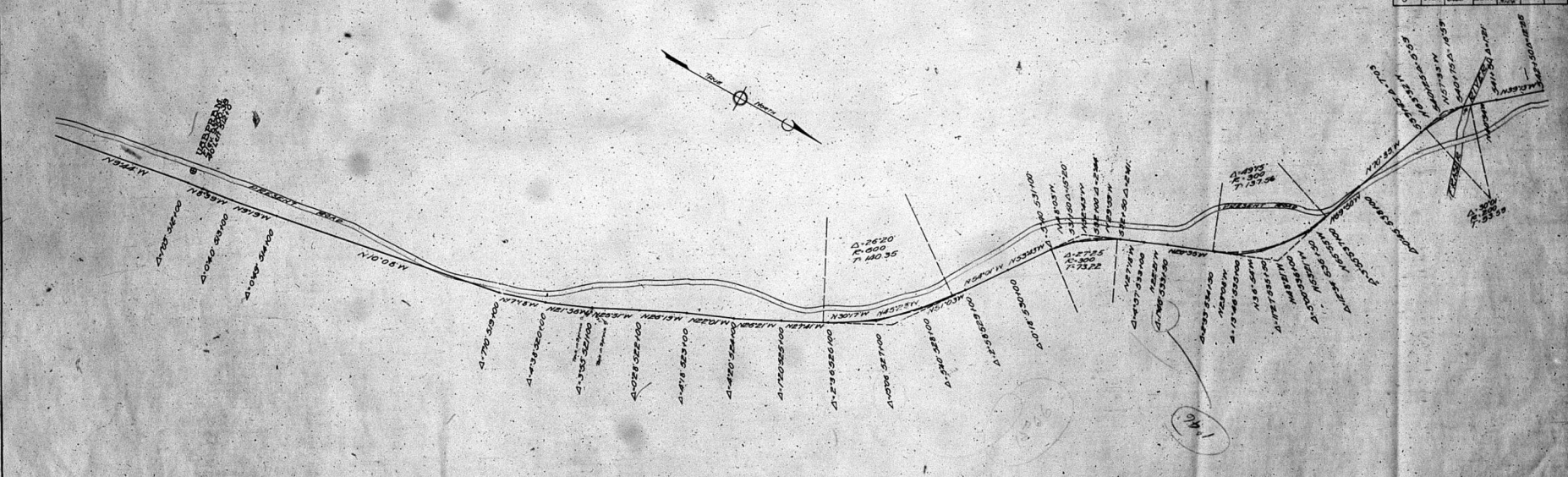
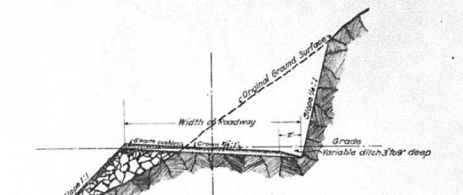


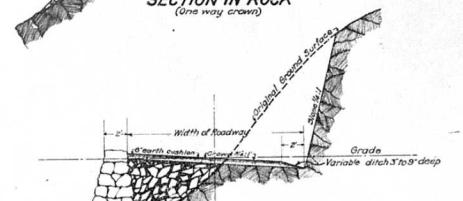
PLATE 11 - PLAN - PROFILE OF P. & A. & E. STATION  
 HARTFORD & HARTFORD CO. NEW YORK



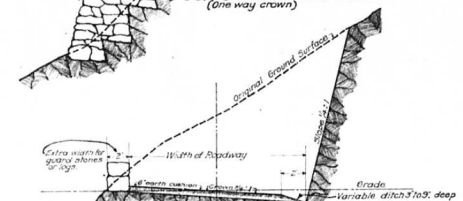
US BUREAU OF PUBLIC ROADS  
 District NB3, Denver, Colo.  
 Standard Structures Details  
 Approved \_\_\_\_\_ District Engineer  
 Made by Clyde E. Hoarst  
 Traced by W. A. Schuchman, April 1914  
 Checked by John R. C. Clelland



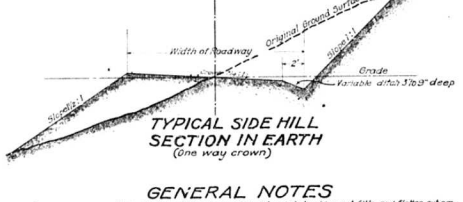
**TYPICAL SIDE HILL SECTION IN EARTH**  
(one way crown)



**TYPICAL SIDE HILL SECTION IN ROCK USING RETAINING WALL**  
(one way crown)



**TYPICAL STEEP SIDE HILL SECTION IN ROCK**  
(one way crown)



**TYPICAL SIDE HILL SECTION IN EARTH**  
(one way crown)

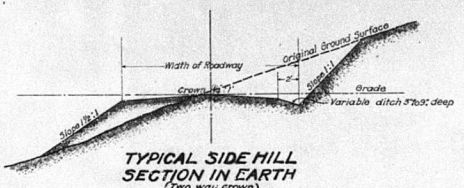
**GENERAL NOTES**

Any excess excavation shall be filled as ordered by engineer to widen cut fills and flatten out embankment slopes. All rock cuts and fills to have crown of earth or other suitable material at least wide in thickness as maximum rock fill, all reasonable precautions should be taken to limit the amount of voids by placing in place suitable material to form a solid embankment.

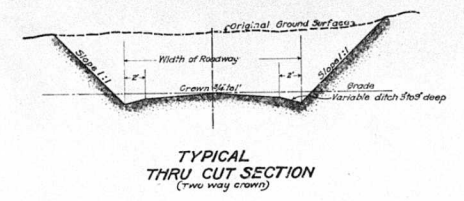
**CURVES:** Curves of 100 ft or less radii within the section 2' on the inside of the curves. Super-elevate grades on curves except of 100 ft or sharper radii. To approximate for branches, give 1/4" feet in rock and ten (10) feet wide in earth, on inside of curves. The bottom elevation of benches to be three feet and six inches (3' 6") below crown of roadway.

**STRUCTURES:** Foundations of all structures shall be carried to such a depth as to secure good foundation and water content occur where utilized by engineer. The footing courses may be omitted if the foundation is deep to fit the ground surface.

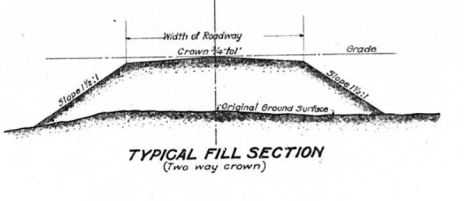
See US Bureau of Public Roads Structures where the following structures are to be used:  
 Plain Concrete Arch Culverts, Spans 2 to 7 - 0-248  
 Plain Concrete Arch Culverts, Spans 10 to 20 - 0-252  
 4 to 12 - 0-249  
 Concrete Culverts, 2 to 20 - 0-257  
 2 to 20 - 0-262  
 12 to 20 - 0-263  
 Concrete Overflow Trucking - 0-264



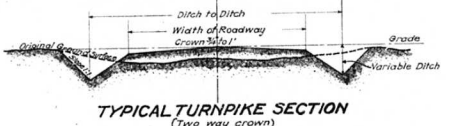
**TYPICAL SIDE HILL SECTION IN EARTH**  
(Two way crown)



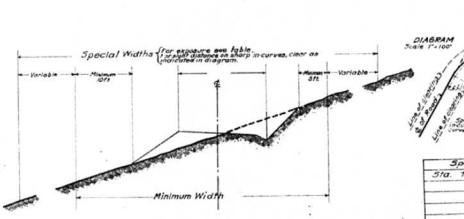
**TYPICAL THRU CUT SECTION**  
(Two way crown)



**TYPICAL FILL SECTION**  
(Two way crown)



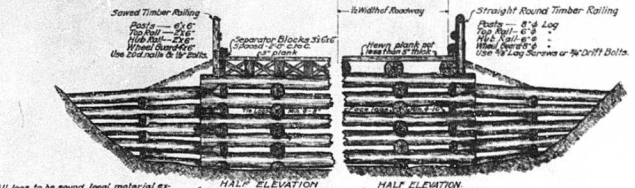
**TYPICAL TURNPIKE SECTION**  
(Two way crown)



**CLEARING DIAGRAM**

**TABLE Special Widths**

Spa. to Spa.	Width FT.



**END ELEVATION TYPICAL LOG ABUTMENT**

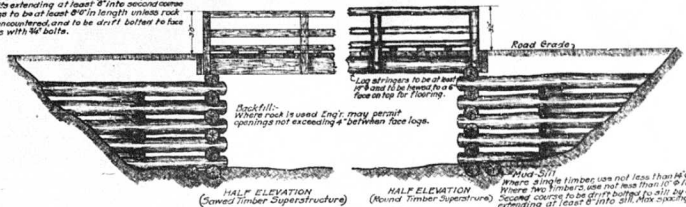
All logs to be sound local material excepting bottom and except all logs to be reserved. Face logs to be notched 2" on top and bottom to receive the logs. The logs to be notched 2" on top and bottom to fit into face logs. Top courses to be drilled bolted to second course. Maximum spacing 8" using 3/4" or 1" bolts extending at least 8" into second course. Logs to be at least 8" in length unless rock is encountered and to be drilled bolted to face logs with 3/4" bolts.

Log abutments to be at least 7' 6" and 10' long and 4' to 6' high on top for flooring.

Rock fill: Where rock is used engineer may permit spacings not exceeding 4" between face logs.

1/2" Roadway - Live load 10 ton truck (no impact) allowable fiber stress - 1000 lbs. per sq. in.

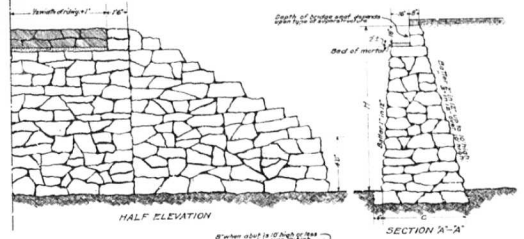
No. 1		No. 2	
Span	3-Logs # c/c	Span	7-Logs # c/c
8 to 9'	14" φ	8 to 12'	14" φ
10 to 13'	16" φ	13 to 16'	16" φ
14 to 18'	18" φ	17 to 20'	18" φ
17 to 20'	20" φ		



**SIDE ELEVATION TYPICAL LOG ABUTMENT**

1/2" Roadway - Live load 10 ton truck (no impact) allowable fiber stress - 1000 lbs. per sq. in.

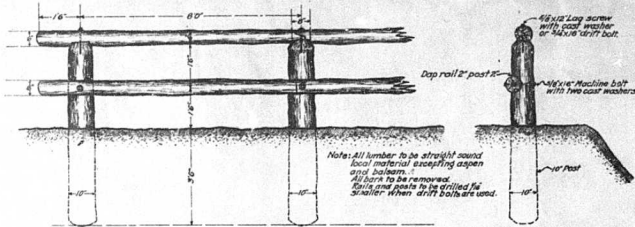
No. 3		No. 4	
Span	Joists 3-lines	Span	Joists 10-lines
8 to 10'	4" x 14"	4" x 12"	
11 to 14'	4" x 16"	4" x 14"	
15 to 17'	6" x 14"	4" x 16"	
18 to 20'	6" x 16"	6" x 14"	



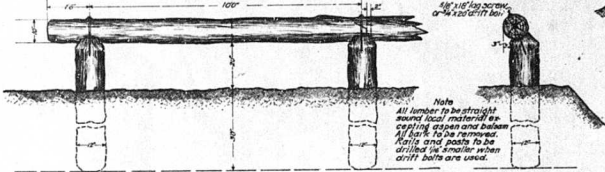
**DRY OR CEMENT RUBBLE ABUTMENTS.**

Height	Increase in depth	Increase in width	Width	Length	Quantity	Quantity	Quantity
ft.	ft.	ft.	ft.	ft.	cu. yds.	cu. yds.	cu. yds.
4' 0"	4'	8'	5' 0"	7-4	3.3	7.4	0.37
6' 0"	6'	10'	3' 6"	5' 0"	14.0	7.0	16.3
8' 0"	8'	14'	4' 0"	9' 0"	24.6	11.5	27.6
10' 0"	10'	18'	4' 6"	12' 0"	37.7	16' 0"	42.4
12' 0"	10'	3' 0"	6' 0"	14' 0"	59.7	20' 3"	68' 1"
14' 0"	12'	3' 6"	6' 6"	19' 6"	82.3	24' 6"	93.5
16' 0"	14'	4' 0"	7' 4"	23' 0"	109.3	28' 9"	123.2

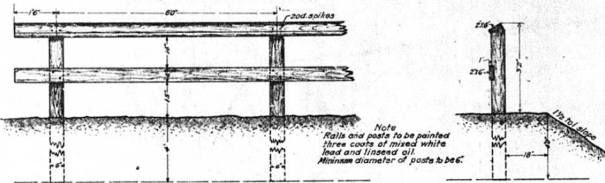
### RUSTIC GUARD RAIL (Double Rail)



### RUSTIC GUARD RAIL (Single Rail)

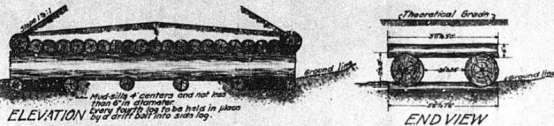
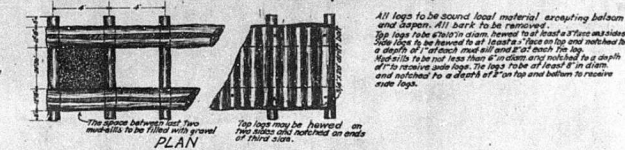


### WOODEN GUARD FENCE

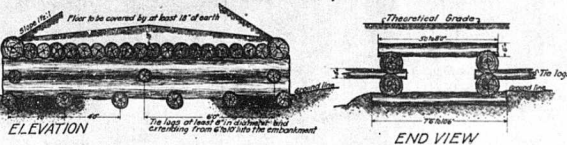


All posts to be either charred or coated with an approved bituminous paint for a distance of 6' above ground surface.

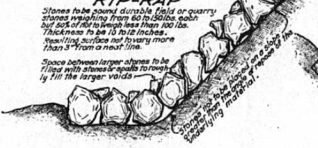
### LOG CULVERT (Span 2 to 3 ft)



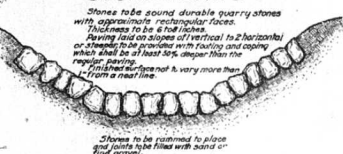
### LOG CULVERT (Span 3 to 6 ft)



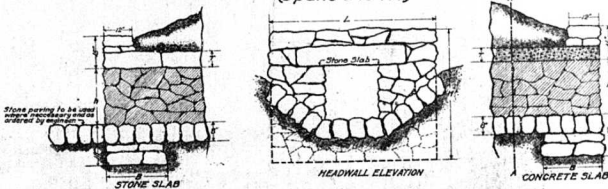
### RIP-RAP



### STONE PAVING

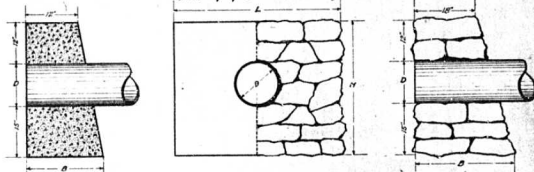


### DRY OR CEMENT RUBBLE CULVERTS (Spans 2 to 4 ft)



Dimensions for spans 2' to 4'				Span	B	L	H	T	Quantity		Cost per cu. yd.	Cost per sq. ft.
Span	B	L	H						Volume	Area		
2' x 2'	2'0"	6'	4'3"	6"	8"	1037	1.40	0.6	0.66			
3' x 3'	3'3"	10'	5'3"	6"	8"	17.04	1.85	0.6	0.66			
4' x 4'	3'6"	12'	6'3"	8"	10"	25.09	2.96	1.2	0.91			

### RUBBLE AND CONCRETE HEADWALLS (for pipe culverts)

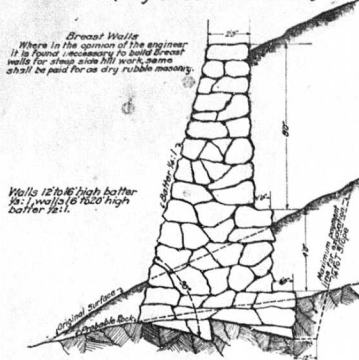


D	L	H	B	Q. No. per footwall
12"	4'	3'	1'0"	0.64
15"	4'	3'	1'0"	0.67
18"	6'	3'3"	2'0"	1.16
24"	6'	4'3"	2'0"	1.24
30"	8'-0"	4'-9"	2'-6"	1.95
36"	8'-0"	5'-3"	2'-4"	2.14

Headwalls  
Concrete to be 1-2 1/2 - 5 (Class B)  
Rubble headwalls to be dry or cement or covered with any.

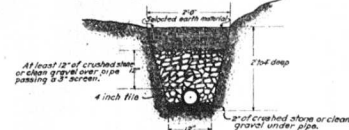
D	L	H	B	Q. No. per footwall
12"	4'-0"	3'-3"	2'-6"	0.86
15"	4'-0"	3'-6"	2'-6"	0.91
18"	6'-0"	3'-9"	2'-6"	1.54
24"	6'-0"	4'-3"	2'-6"	1.66
30"	8'-0"	4'-9"	2'-6"	2.56
36"	8'-0"	5'-3"	2'-10"	2.82

### RETAINING WALL (Dry or Cement Rubble)

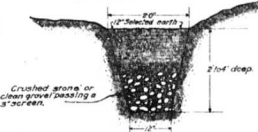


Height (ft. or in.)	Volume (cu. yd. or cu. ft.)
4'	0.37
6'	0.61
8'	0.83
10'	1.29
12'	1.70
14'	2.24
16'	2.91
18'	3.50
20'	4.22

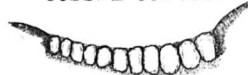
### TILE UNDERDRAIN



### BLIND DRAIN



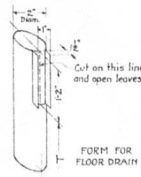
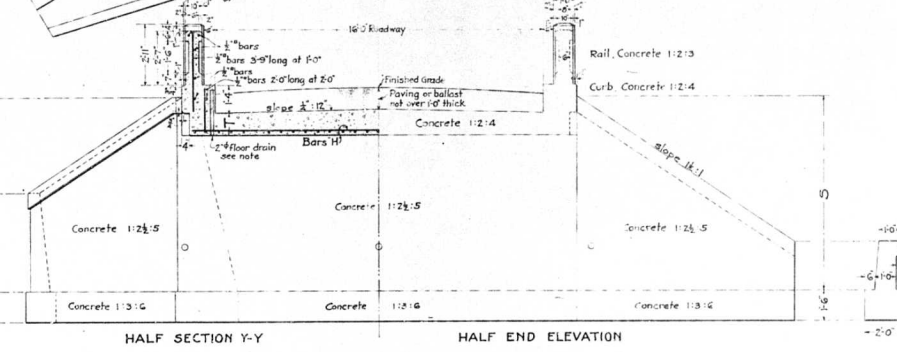
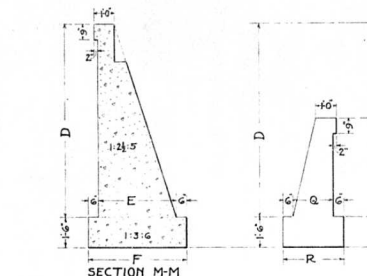
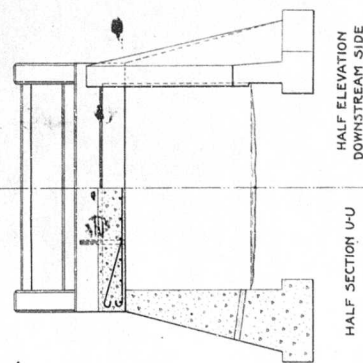
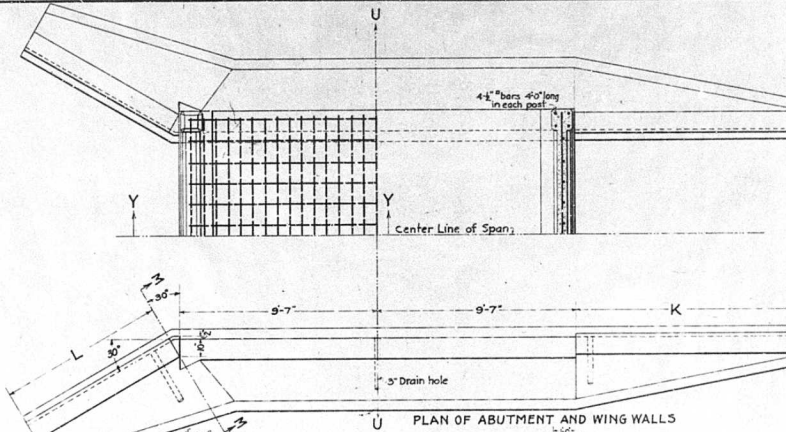
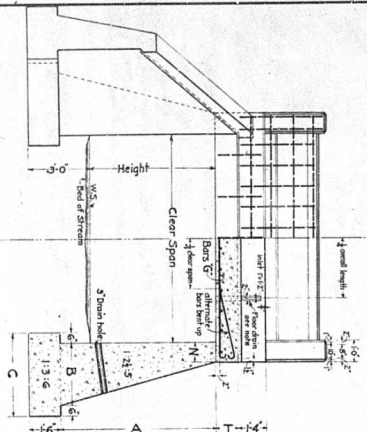
### COBBLE GUTTER



Size of stone 5" to 3". Largest stones to be placed on the inner edge and the smaller stones to be placed on the outer edge. Mortar joints to be used on heavy drains and where they are subject to heavy wash. Surface to be filled with 1-3 cement mortar.

HALF ELEVATION  
UPSTREAM SIDE

HALF SECTION U-U



Floor Drains:  
Roadway is to be drained by four 2 1/4" drains placed in curb as shown in Section U-U.  
Form for drain to consist of tin or other sheet metal slotted and bent as shown. Center of opening to be not less than 2 1/2" from reinforcing bars. Top to have tin or cement cover.

DESIGN DATA

Concentrated load, 15 ton typical truck.  
Impact allowance, 30%  
Paving or ballast not to exceed 120 lbs per sq ft.  
Steel in tension, 16,000 lbs per sq in.  
Concrete in compression, 600 lbs per sq in.

Notes:

Exposed edges, except on railing to be chamfered 3/4".  
All reinforcing steel shall be deformed bars. (Square twisted bars not to be considered as deformed.)  
The table is based on net area of bars, as follows:  
1/2" = 0.15 sq in., 3/4" = 0.25 sq in., etc.  
Footings to be carried down to firm bearing or modified as directed by the engineer, and quantity of concrete in footings adjusted accordingly.  
Extra riprap or paving for channel protection shall be provided where necessary, especially near outlets.

U.S. OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING  
WASHINGTON, D.C.  
(ROADS)

CONCRETE CULVERTS

SLAB TOP TYPE

SPANS 12 TO 20 FT IN CLEAR. BASED ON 16 FT CLEAR ROADWAY  
HAVING PLAIN CONCRETE ABUTMENTS AND WING WALLS

APRIL 2, 1917

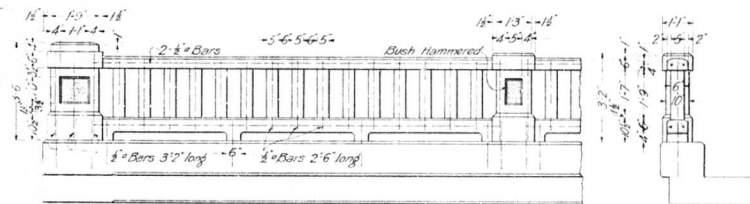
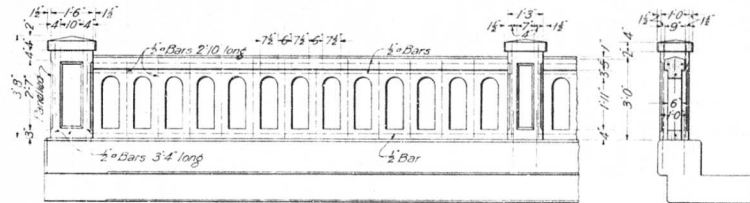
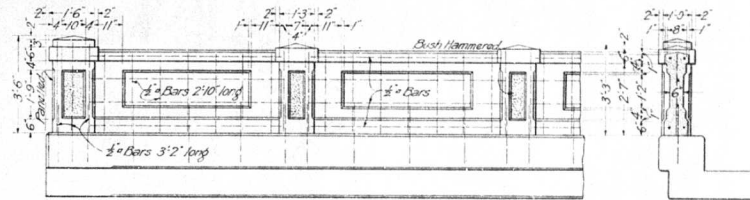
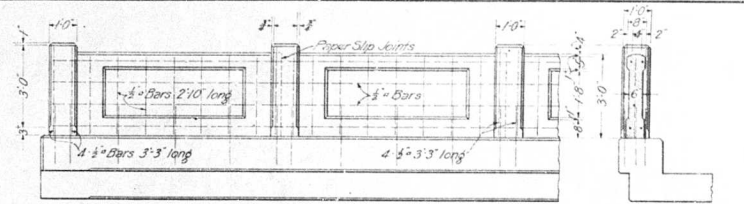
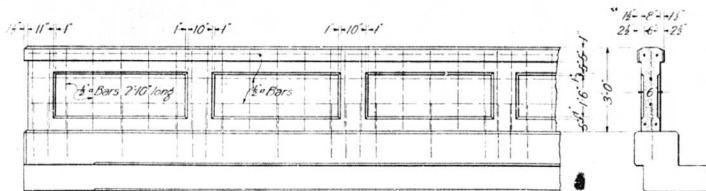
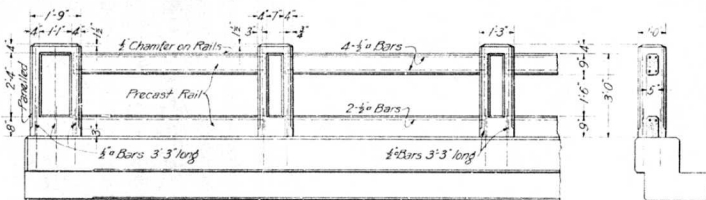
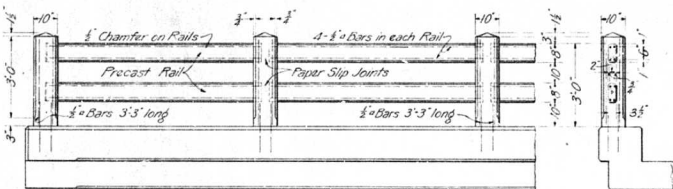
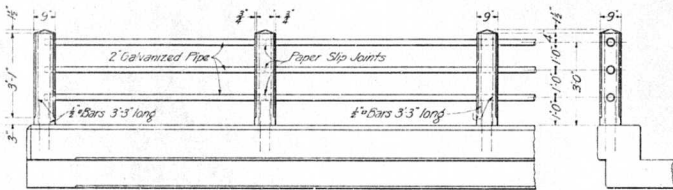
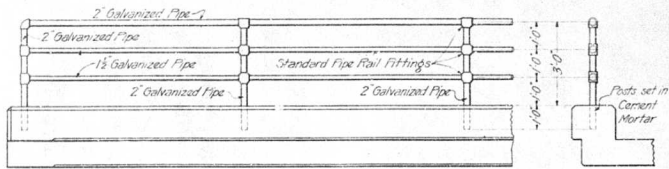
DESIGNED BY  
ENGINEER

APPROVED  
SUPERVISOR

CONCRETE SLAB CULVERTS DIMENSIONS AND ESTIMATED QUANTITIES 16 FT. ROADWAY SPANS 12 FT. TO 20 FT.

WATERWAY CLAS. SPAN HT. FT.	SLAB		2 RAILINGS		2 CURBS		TWO ABUTMENTS (exclusive of wing walls)				TWO 30" WING WALLS				2 STRAIGHT WING WALLS		TOTAL OF ALL CONCRETE CU. YDS.	TOTAL OF ALL STEEL LBS.													
	T	SIZE AND SPACING OF BARS	CONCRETE 1:2:4	STEEL	CONCRETE 1:2:4	STEEL	DIMENSIONS				DIMENSIONS				CONCRETE 1:2:4	STEEL															
							N	A	B	C	D	E	F	Q					R	L	S	K									
12	12'	12'	57.0	1054	1.3	225	2.2	71	12'	3'-6"	2'-3"	3'-3"	3'-6"	6.9	66	12.8	7-4	2-11	3-11	4-0"	1-7"	2-7"	5-9"	2.1	3.8	7-4	7-6	2.2	3.4	439	1350
6	72	12'	57.0	1054	1.3	225	2.2	71	12'	3'-6"	2'-3"	3'-3"	3'-6"	6.9	66	12.8	7-4	2-11	3-11	4-0"	1-7"	2-7"	5-9"	2.1	3.8	7-4	7-6	2.2	3.4	439	1350
6	96	12'	56.9	1052	1.3	225	2.2	71	12'	3'-6"	2'-3"	3'-3"	3'-6"	6.9	66	12.8	7-4	2-11	3-11	4-0"	1-7"	2-7"	5-9"	2.1	3.8	7-4	7-6	2.2	3.4	439	1350
10	120	12'	57.2	1058	1.3	225	2.2	71	12'	3'-6"	2'-3"	3'-3"	3'-6"	6.9	66	12.8	7-4	2-11	3-11	4-0"	1-7"	2-7"	5-9"	2.1	3.8	7-4	7-6	2.2	3.4	439	1350
4	66	12'	75.3	1402	1.3	225	2.2	71	12'	5'-6"	2'-3"	3'-3"	3'-6"	6.9	71	13.5	7-5	3-0	4-0"	4-11	1-7"	2-7"	5-10"	2.1	4.0	7-5	7-8	2.2	3.6	513	1743
6	84	14'	74.9	1385	1.3	225	2.2	71	12'	7'-6"	3'-0"	4'-0"	4-5"	8.4	118	14.8	9-5	3-5	4-9"	4-9"	1-11"	2-11"	6-1"	3.4	8.0	9-5	10-8	3.6	7.0	716	2371
8	112	14'	75.4	1358	1.3	225	2.2	71	12'	9'-6"	3'-0"	4'-0"	4-5"	10.0	179	17.9	11-5	4-5	5-7"	5-4"	2-3"	3-3"	10-3"	5.0	14.1	11-5	13-8	5.2	12.4	99.0	3165
10	140	14'	71.4	1310	1.3	225	2.2	71	12'	11'-6"	4-7"	5-7"	6-2"	11.4	248	24.8	13-5	5-4	6-5"	2-6"	3-6"	12-4"	6.8	27.4	13-5	16-8	7.0	19.6	137.1	4647	
6	96	16'	89.3	1663	1.3	225	2.2	71	12'	7'-6"	3'-0"	4'-0"	4-5"	8.4	118	14.8	9-7	3-10	4-10"	4-11"	2-11"	2-11"	8-3	3.6	8.4	9-7	10-11	3.6	7.3	76.9	2646
6	120	16'	91.3	1690	1.3	225	2.2	71	12'	9'-6"	3'-0"	4'-0"	4-5"	10.0	179	17.9	11-5	5-8	5-7"	2-3"	3-3"	10-5"	5.2	14.7	11-7	13-11	5.3	12.8	104.6	3473	
8	144	16'	95.3	1726	1.3	225	2.2	71	12'	11'-6"	4-7"	5-7"	6-2"	11.4	248	24.8	13-5	6-3	6-4"	2-6"	3-6"	12-8"	7.0	23.2	13-7	16-11	7.1	20.2	138.1	4509	
10	160	16'	89.9	1660	1.3	225	2.2	71	12'	13'-6"	5-5"	6-5"	7.1	12.9	333	33.3	15-5	6-3	7-0"	2-10"	3-10"	14-10"	9.1	34.6	15-7	19-11	9.3	30.3	180.4	5943	
12	192	16'	117.7	2178	1.3	225	2.2	71	12'	9'-6"	3'-0"	4'-0"	4-5"	10.0	179	17.9	11-5	5-7	4-11	2-0"	3-0"	8-5"	3.7	8.9	9-9	11-2	3.7	7.6	84.0	2803	
6	144	18'	112.3	2090	1.3	225	2.2	71	12'	9'-6"	3'-0"	4'-0"	4-5"	10.0	188	18.8	11-9	4-9	5-9	5-8"	2-3"	3-3"	10-3"	5.3	15.3	11-9	14-2	5.4	19.2	112.3	3615
8	180	18'	112.0	2072	1.3	225	2.2	71	12'	11'-6"	4-7"	5-7"	6.2	12.4	259	25.9	13-5	6-6	6-5"	2-7"	3-7"	12-5"	7.2	24.0	13-9	17-2	7.2	20.7	146.5	4897	
10	216	18'	111.4	2062	1.3	225	2.2	71	12'	13'-6"	5-5"	6-5"	7.1	12.9	346	34.6	15-9	6-4	7-4"	2-11"	3-11"	18-0"	9.4	36.1	15-9	20-2	9.4	30.9	190.1	6247	
12	252	18'	111.4	2062	1.3	225	2.2	71	12'	15'-6"	6-3"	7-3"	8.1	14.3	445	44.5	17-1	6-1	7-11"	3-2"	4-2"	17-3"	11.8	50.9	17-9	23-2	11.9	44.7	241.6	7811	
6	120	19'	138.1	2555	1.3	225	2.2	71	12'	7'-6"	3'-0"	4'-0"	4-5"	8.4	125	12.5	9-1	4-11	5-0"	2-0"	3-0"	8-5"	3.8	9.4	9-11	11-5	3.8	7.8	90.3	3016	
8	160	19'	141.1	2610	1.3	225	2.2	71	12'	9'-6"	3'-0"	4'-0"	4-5"	10.0	186	18.6	11-1	4-9	5-9"	2-0"	3-4"	10-9"	5.4	15.9	11-11	14-5	5.5	13.6	118.9	3871	
10	200	19'	135.7	2315	1.3	225	2.2	71	12'	11'-6"	4-7"	5-7"	6.2	14.4	239	23.9	13-5	6-7	6-6"	2-7"	3-7"	15-0"	7.3	25.0	13-11	17-5	7.3	21.2	153.6	5096	
12	240	19'	135.6	2305	1.3	225	2.2	71	12'	13'-6"	5-5"	6-5"	7.1	15.9	346	34.6	15-9	6-4	7-4"	2-11"	3-11"	18-0"	9.4	36.1	15-9	20-2	9.6	31.7	197.3	6396	
14	280	19'	137.2	2540	1.3	225	2.2	71	12'	15'-6"	6-3"	7-3"	8.1	17.4	445	44.5	17-1	7-2	8-2"	2-11"	3-2"	17-3"	11.9	52.2	17-11	23-5	12.1	45.1	249.6	8001	
16	320	19'	137.2	2540	1.3	225	2.2	71	12'	17'-6"	7-0"	8-0"	8.9	19.6	551	55.1	19-1	8-0	9-0"	3-6"	4-6"	19-7"	14.9	71.4	19-11	26-5	14.7	61.2	303.8	9828	

DESIGNED BY  
DRAWN BY  
CHECKED BY  
DATE  
DATE  
DATE



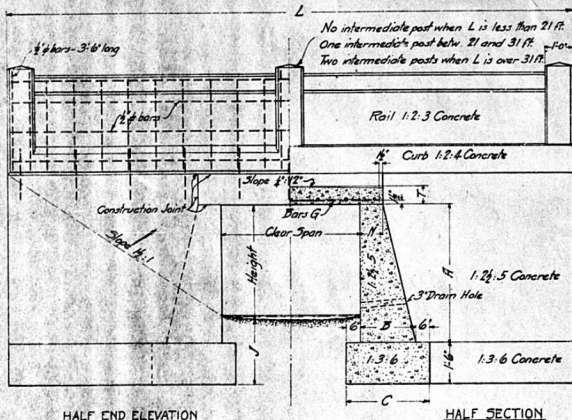
DESIGNED BY: J. M. Bowman  
DRAWN BY: J. M. Bowman  
CHECKED BY: J. M. Bowman  
DATE: Dec. 2, 1917

U.S. OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING  
WASHINGTON, D.C.

# TYPICAL BRIDGE AND CULVERT RAILINGS

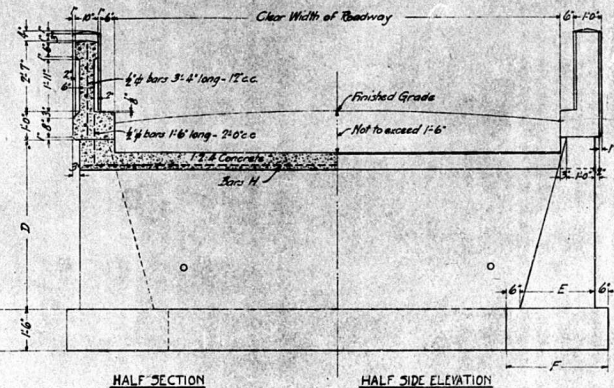
SCALE: 1/2" = 1 FOOT  
DECEMBER, 1917

CURBET  
BRIDGE ENGINEER  
APPROVED  
HEAD ENGINEER



HALF END ELEVATION

HALF SECTION

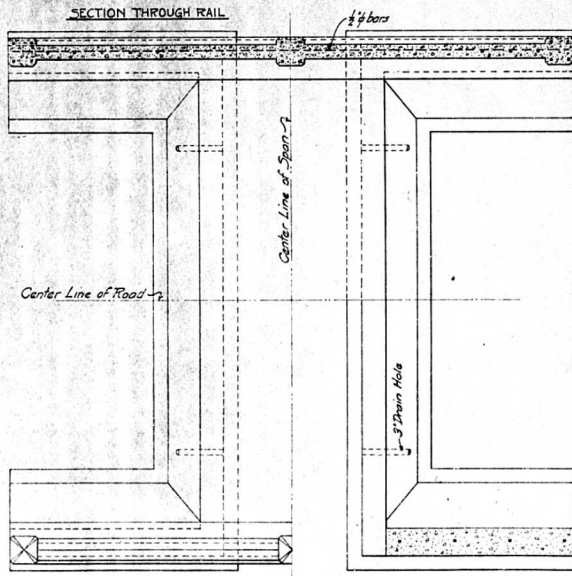


HALF SECTION

HALF SIDE ELEVATION

DESIGN DATA AND GENERAL NOTES

Concentrated Load, 15 tons typical truck.  
 Impact Allowance, 30%  
 Steel in tension, 16000 lbs. per sq. in.  
 Concrete in compression, 600 lbs. per sq. in.  
 Weight of paving or ballast not over 180 lbs. per sq. ft.  
 All reinforcing steel to be deformed bars. Sizes differing from those shown may be used, provided that they are spaced so as to give the same net sectional area of steel per foot width of slab. The design and table are based upon the following net areas of bars:  $\frac{1}{2}$ " - 0.25 sq. in.,  $\frac{3}{4}$ " - 0.3906 sq. in.,  $\frac{1}{2}$ " - 0.5625 sq. in.  
 Exposed edges, except on railing, to be chamfered  $\frac{1}{4}$ ".  
 Extra rip-rap or paving for channel protection shall be provided where necessary, especially near outlets.  
 The footings shown are intended for use on firm foundation material. Where soft or unstable material is found, the footings should be deepened, widened or otherwise modified to obtain stable foundations. If other materials are used, or the dimensions of footings changed, the quantities and cost should be adjusted accordingly.  
 Complete permanent records should be made of each structure as built, showing footing depths, general dimensions and all modifications of this design.



SECTION THROUGH RAIL

PLAN

SECTION UNDER CURB

Slab removed

DIMENSIONS AND ESTIMATED QUANTITIES

BASED ON 20 FT CLEAR ROADWAY

Clear Span FT	Height FT	J Span Sp. FT	T Span Sp. FT	Slab		2 Curbs		2 Rails		2 Abutments				2 End Walls				Total of All Concrete Lbs.	Total of All Steel Lbs.									
				1:2:4 Concrete		Reinforcing Steel		1:2:4 Concrete		1:2:3 Concrete		Dimensions				Dimensions												
				Sp. Wdth Cu Yds	Total Cu Yds	Size and Spacing of Bars	Rein. Wdth Lbs	Total Lbs	Sp. Wdth Cu Yds	Total Lbs	Sp. Wdth Cu Yds	Total Lbs	N	A	B	C	1:3:6 Conc Wdth Cu Yds			Total Cu Yds	1:2:3 Conc Wdth Cu Yds	Total Cu Yds	D	E	F	L		
2	2'-0"	4.0	6'	0.3	1.6	$\frac{1}{2}$ "-8 c.c.	7.6	170	1.4	39	1.6	194	0	2'-6"	1'-0"	2'-0"	22	5.2	1.6	3.6	3'-6"	1'-8"	2'-8"	12'-6"	2.1	3.0	18.6	40.5
3	2'-0"	6.0	6'	0.8	2.0	$\frac{1}{2}$ "-7 c.c.	10.5	235	1.8	43	1.7	206	0	2'-6"	1'-0"	2'-0"	22	5.2	1.6	3.6	3'-6"	1'-8"	2'-8"	13'-6"	2.2	3.0	19.2	43.6
4	2'-0"	8.0	6 1/2'	1.1	2.7	$\frac{1}{2}$ "-6 c.c.	14.3	322	1.6	38	1.8	218	0	3'-0"	1'-5"	2'-5"	21	6.3	2.8	4.0	3'-11"	1'-11"	3'-11"	16'-0"	3.3	3.9	27.6	57.9
5	2'-6"	10.0	7 1/2'	1.5	3.7	$\frac{1}{2}$ "-6 c.c.	16.9	379	1.0	23	2.3	278	0	3'-0"	1'-5"	2'-5"	21	6.3	2.8	4.0	3'-11"	1'-11"	3'-11"	16'-2"	2.8	3.8	28.8	66.6
6	3'-0"	12.0	8 1/2'	2.0	4.9	$\frac{1}{2}$ "-7 c.c.	23.3	523	1.0	23	2.3	278	0	3'-0"	1'-5"	2'-5"	21	6.3	2.8	4.0	3'-11"	1'-11"	3'-11"	17'-8"	3.6	4.4	34.0	76.9
8	4'-0"	18.0	10'	2.9	7.0	$\frac{1}{2}$ "-7 c.c.	30.7	691	1.0	23	2.3	278	0	3'-0"	1'-5"	2'-5"	21	6.3	2.8	4.0	3'-11"	1'-11"	3'-11"	20'-0"	4.7	5.8	46.7	107.8
10	5'-0"	24.0	10'	3.9	9.6	$\frac{1}{2}$ "-8 c.c.	43.9	958	1.0	23	2.3	278	0	3'-0"	1'-5"	2'-5"	21	6.3	2.8	4.0	3'-11"	1'-11"	3'-11"	22'-0"	5.8	7.1	57.1	133.9

U.S. OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING

WASHINGTON, D.C.

(ROADS)

CONCRETE CULVERTS

SPANS 2 TO 10 FT. IN CLEAR SLAB TOP TYPE BASED ON 20 FT. CLEAR ROADWAY

HAVING PLAIN CONCRETE SIDE AND END WALLS

APRIL 21 1917

DESIGNED BY C. L. Green

CONSTRUCTION ENGINEER

APPROVED BY [Signature]

CHIEF ENGINEER

DESIGNED BY A. J. [Signature] DATE 1-17-16  
 DRAWN BY [Signature] DATE 1-17-16  
 CHECKED BY O. W. [Signature] DATE 1-17-16

DATE	BY	REVISION	DESCRIPTION
1950	...	...	...

PLAN	DATE	BY	REVISION	DESCRIPTION
...	...	...	...	...

PROFILE	DATE	BY	REVISION	DESCRIPTION
...	...	...	...	...

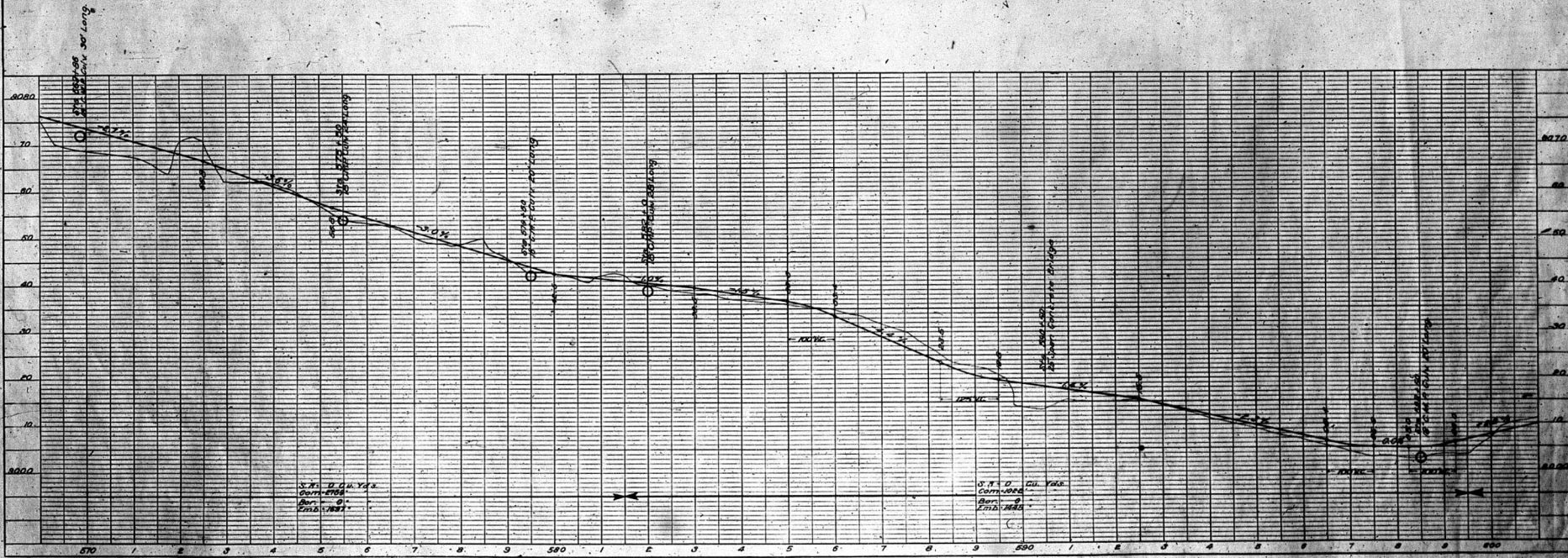
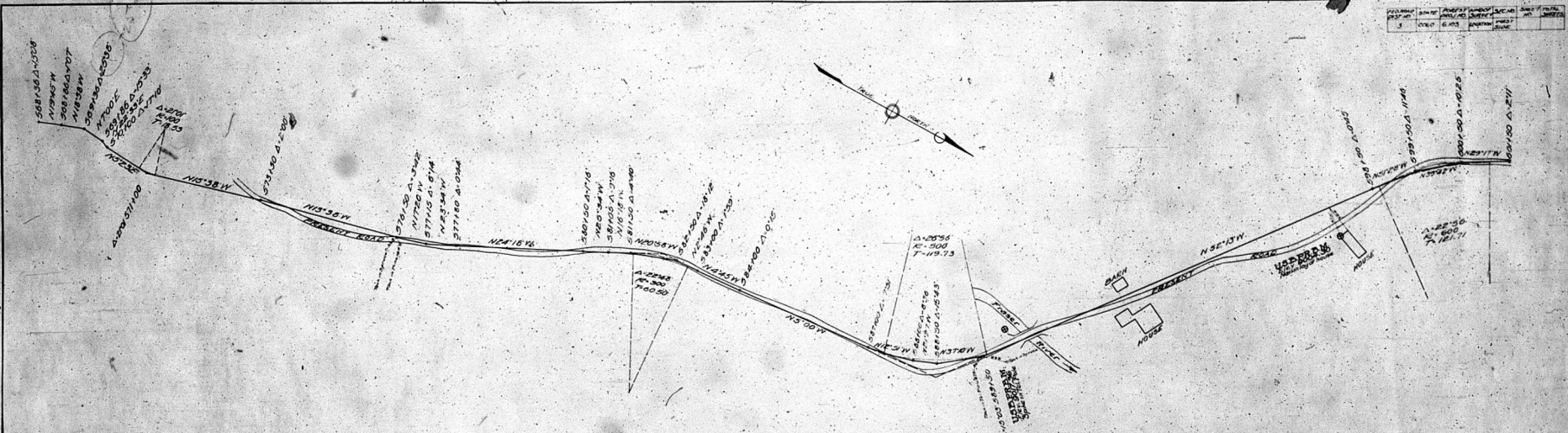


PLATE 1 - PLAN - PROFILE OF P. R. & E. STADIUM  
 DRAWN BY: ...  
 CHECKED BY: ...

PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PLAN	DATE	SCALE	BY	CHECKED	NO.

PROFILE	DATE	SCALE	BY	CHECKED	NO.

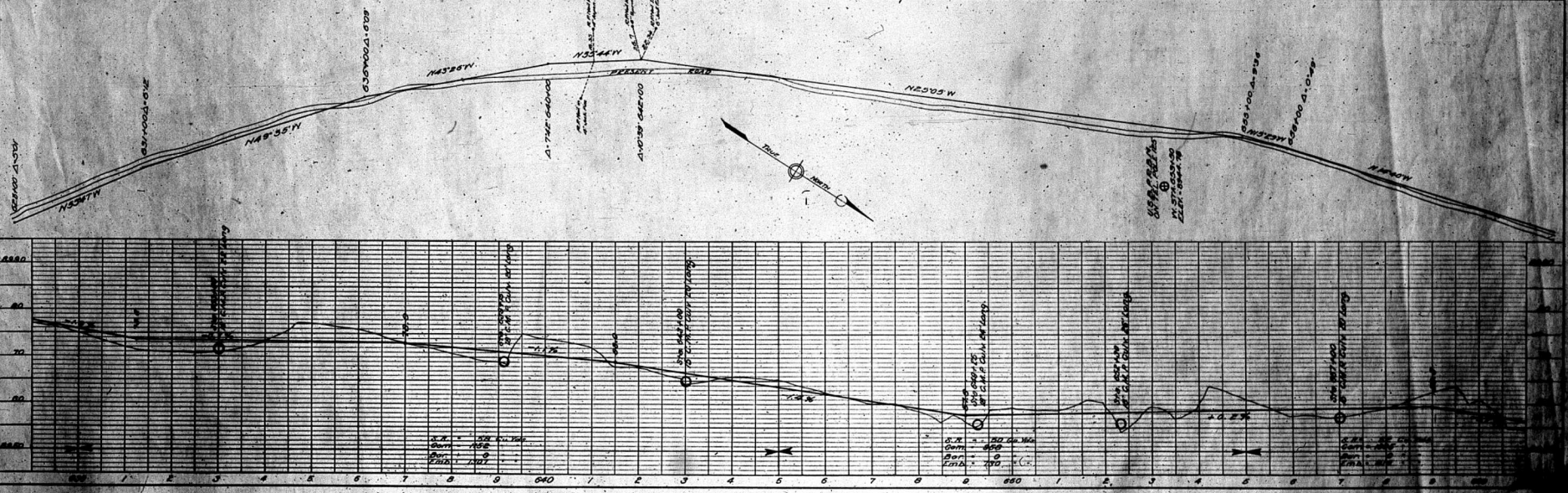
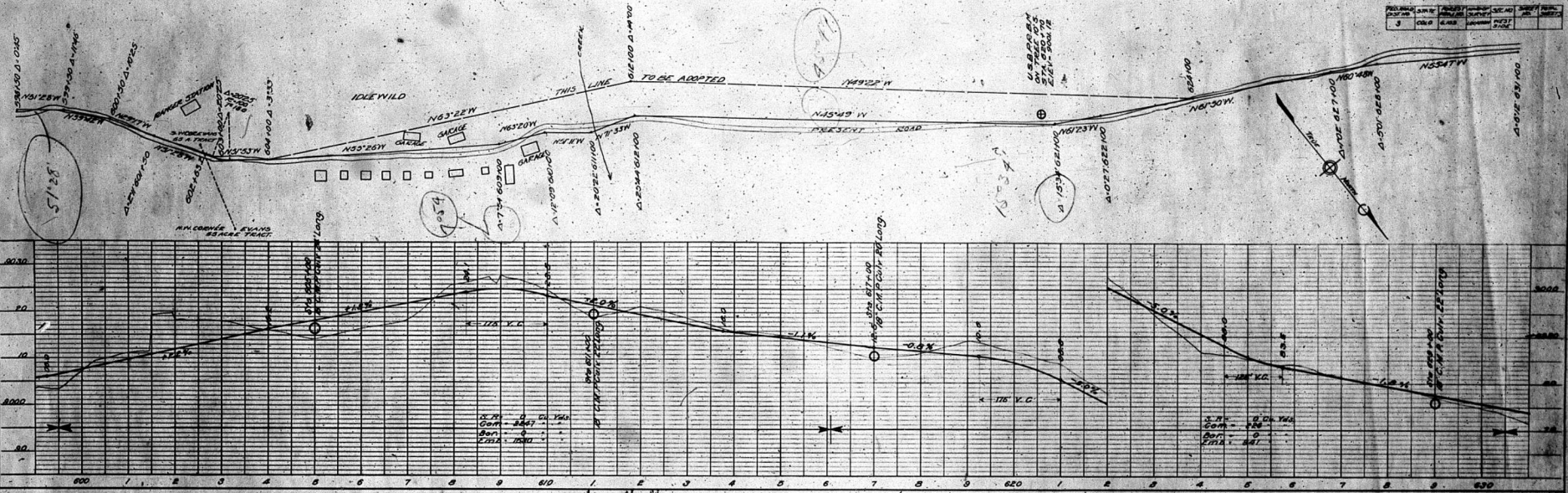
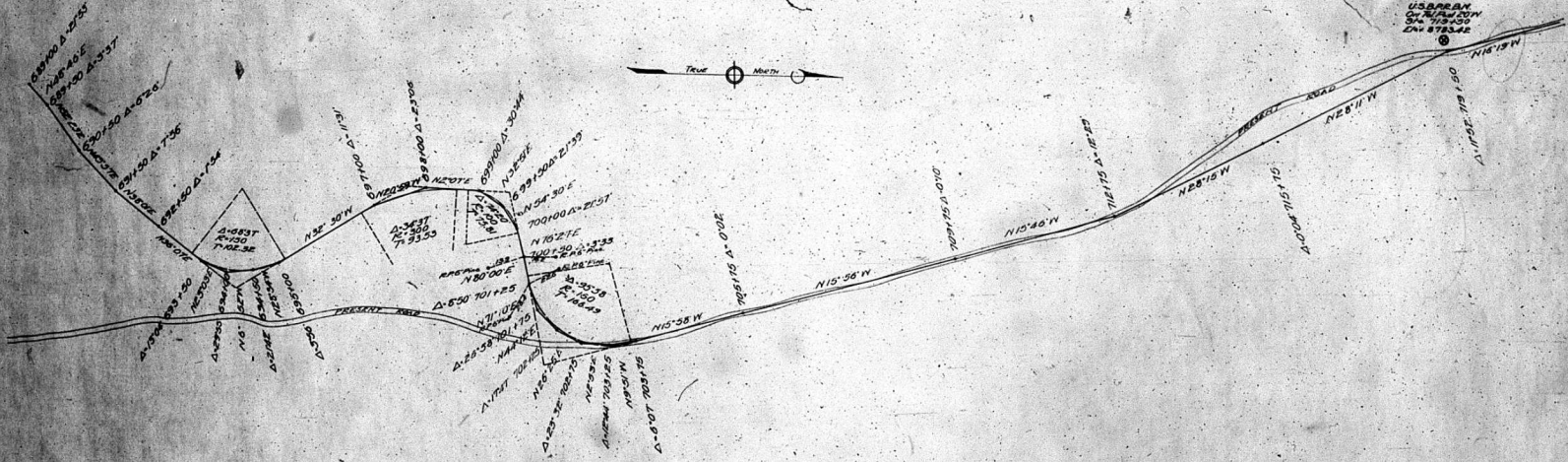


PLATE 2 - PLAN-PROFILE



PLAN	DATE	BY	CHKD
04/07	WJG	WJG	WJG



PLAN	DATE	BY	CHKD
04/07	WJG	WJG	WJG

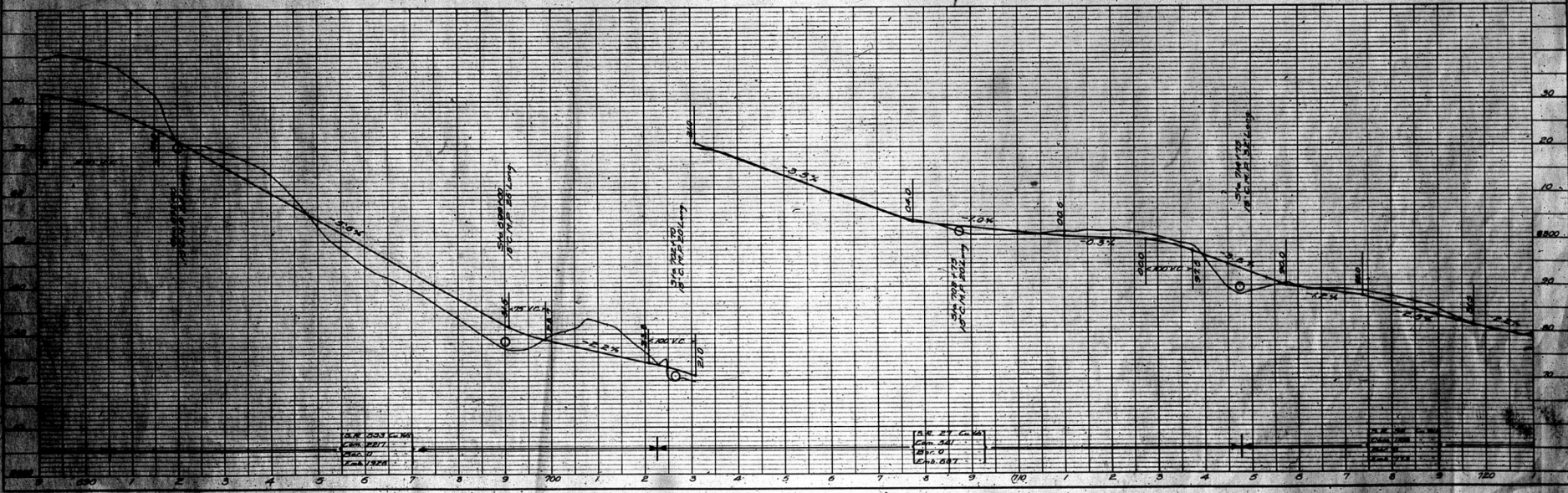
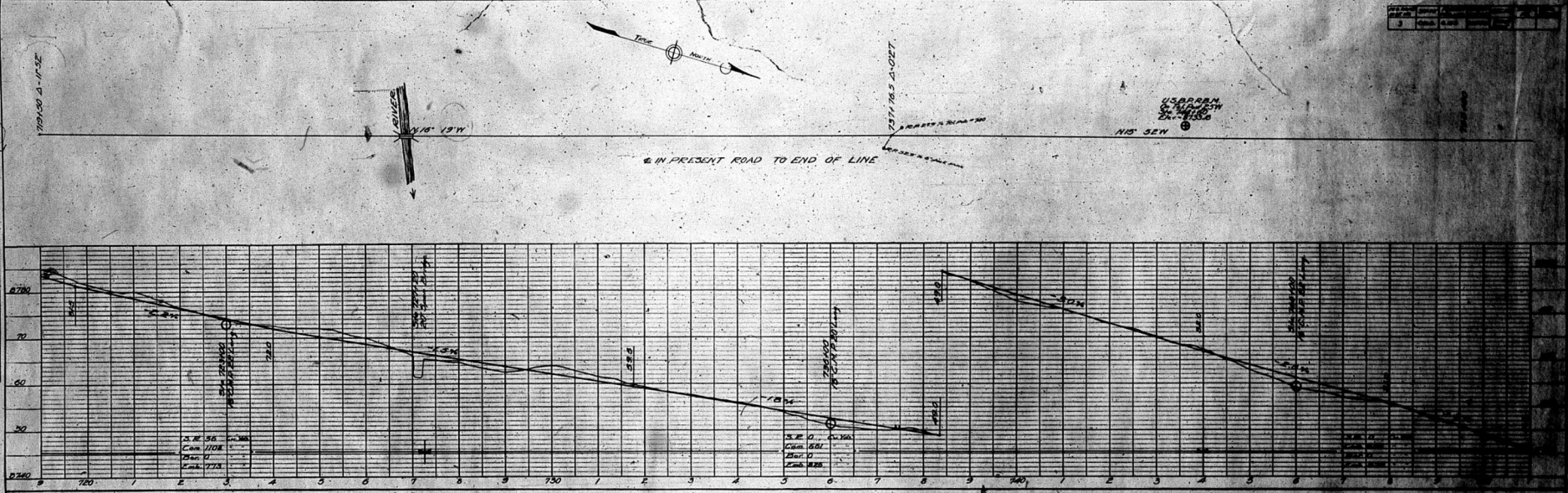
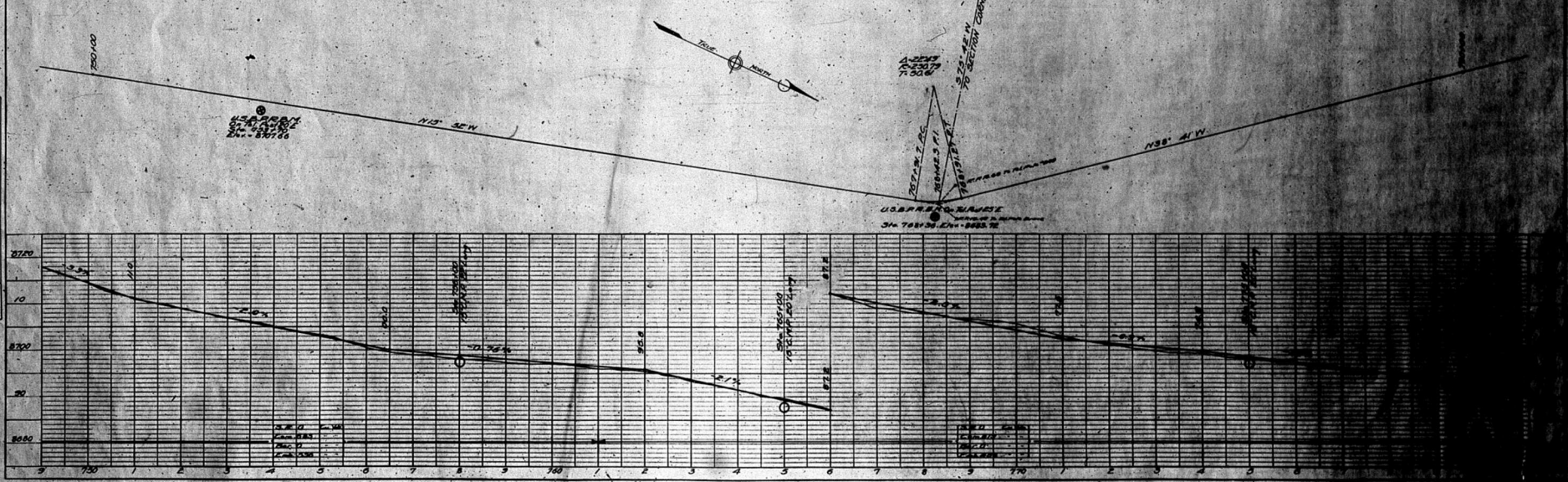


PLATE 1 - PLAN PROFILE OF R.S. & L.L. HIGHWAY  
 DRAWN BY WJG, 04/07

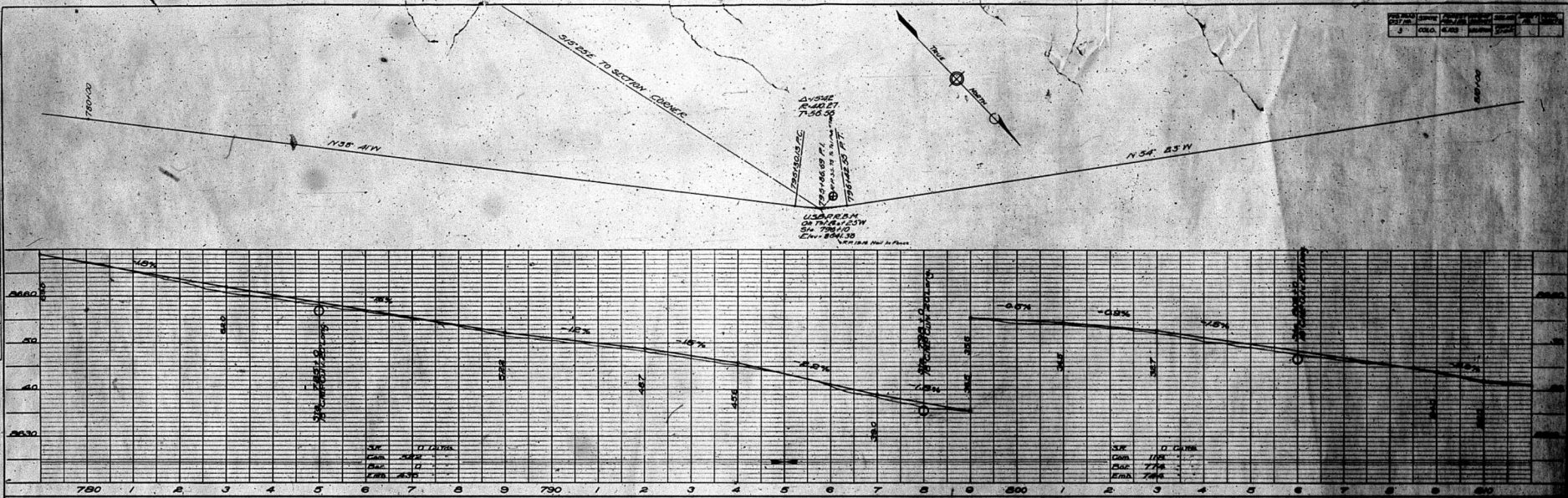
PLAN  
 DATE: 11/15/52  
 DRAWN BY: J. J. [unclear]  
 CHECKED BY: [unclear]  
 APPROVED BY: [unclear]



PROFILE  
 DATE: 11/15/52  
 DRAWN BY: J. J. [unclear]  
 CHECKED BY: [unclear]  
 APPROVED BY: [unclear]



PLAN	PROFILE
DATE	DATE
SCALE	SCALE
PROJECT	PROJECT
NO.	NO.



PLAN	PROFILE
DATE	DATE
SCALE	SCALE
PROJECT	PROJECT
NO.	NO.

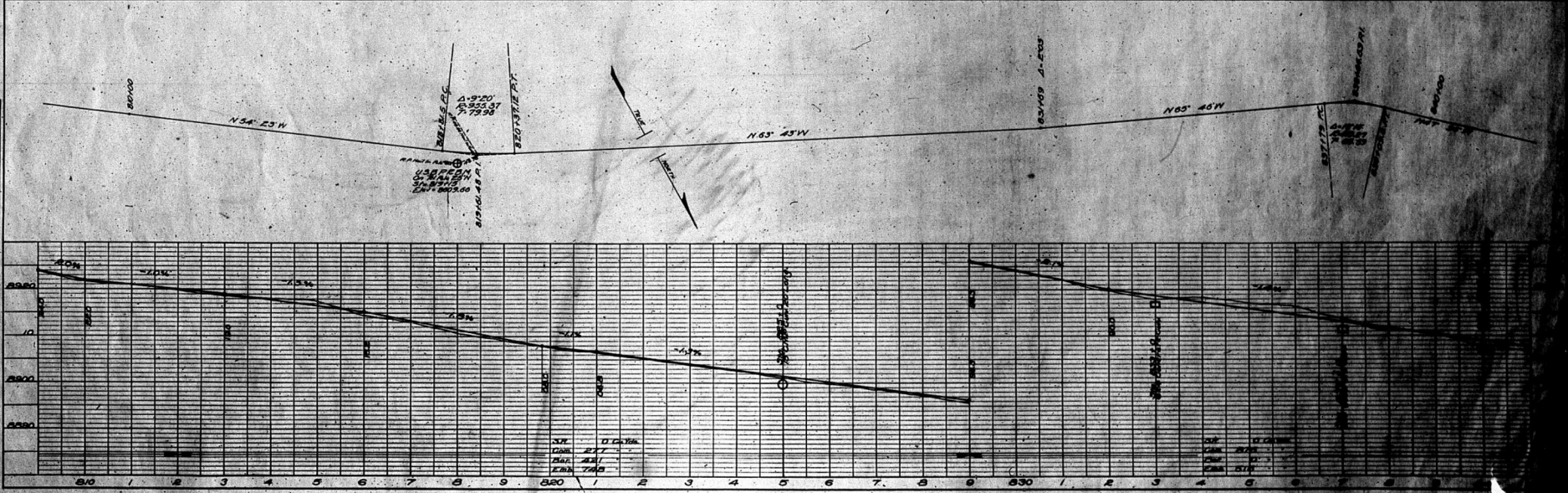
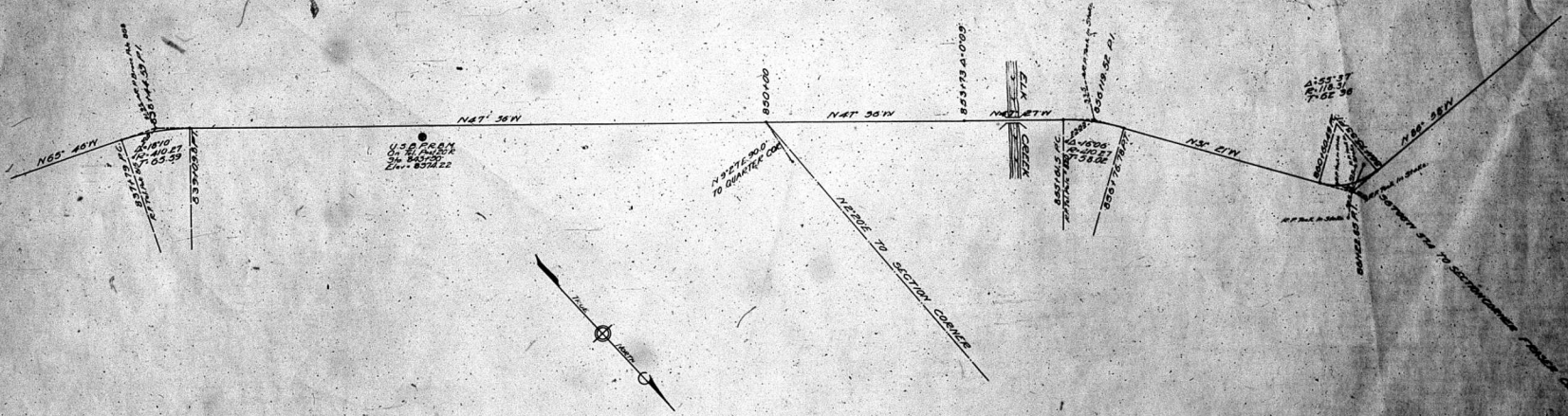
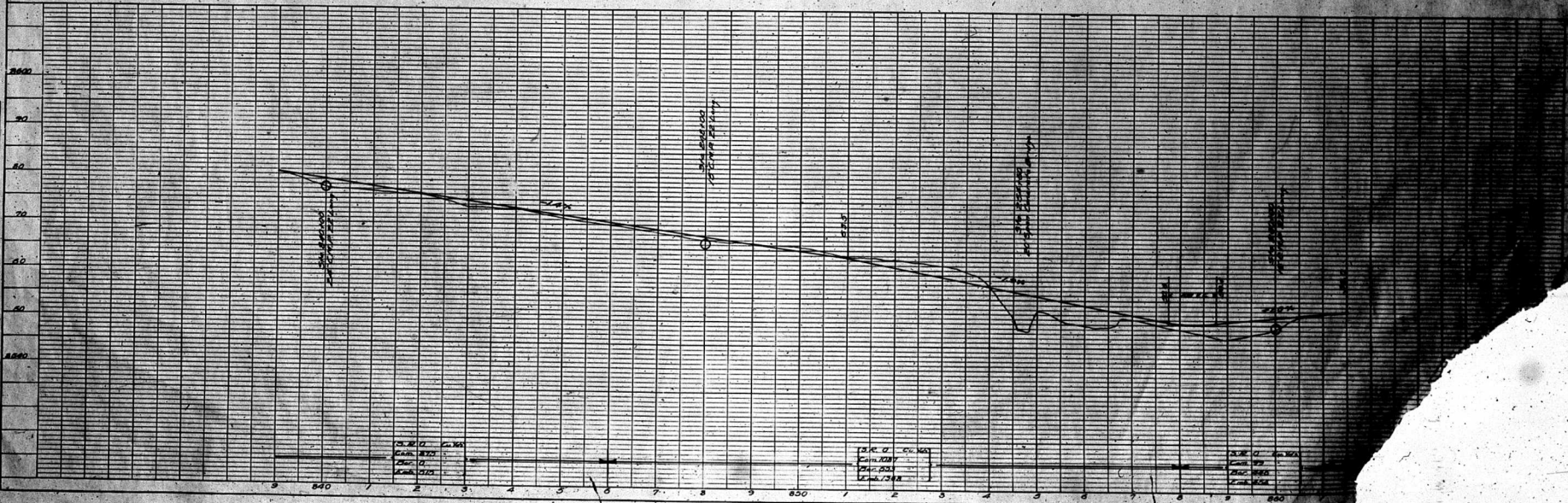


PLATE 2 - PLAN-PROFILE 2.1 x 1.5, C. STATION

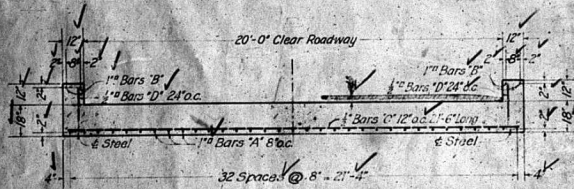
PLAN  
 DRAWN BY  
 CHECKED BY  
 DATE



PROFILE  
 DRAWN BY  
 CHECKED BY  
 DATE



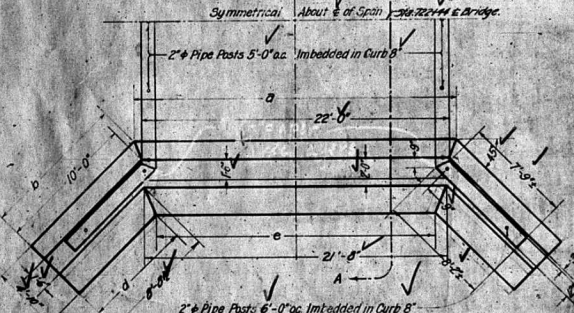




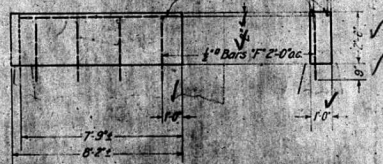
CROSS-SECTION OF SLAB  
Scale 3/4" = 1'

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE				
Bars	No.	Size	Length	
A	33	1"	22'-6"	2525 #
B	4	1"	20'-0"	272
C	23	1/2"	21'-6"	420
D	24	1/2"	4'-6"	31
Total Reinforcing Steel				
Concrete 1:2:4 Mix				
30 cu. yds.				
2" W.I. Pipe 1'-10" Long Galv.				
10 pcs.				
2" W.I. Pipe 1'-1" Long "				
10 pcs.				
2" W.I. Pipe 4'-9" Long "				
16 pcs.				
2" Mal. Iron Rolling Ells "				
4 "				
2" Mal. Iron Rolling Tees "				
10 "				
2" Mal. Iron Rolling Crosses "				
6 "				

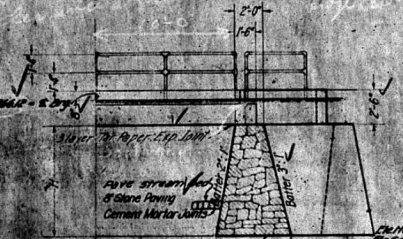
DIMENSIONS & ESTIMATED QUANTITIES FOR SUBSTRUCTURE	
(2 ABUTMENTS)	
7271-20	Vasquez Creek
H	8'-0"
a	23'-1"
b	10'-6"
c	5'-4"
d	1'-4"
e	20'-0"
Cement Rubble Masonry	
22 cu. yds.	
Stone Paving Cement Mortar Joints	
70 sq. yds.	
Concrete Curb 1:2:4 Mix	
3 cu. yds.	
Steel 8 Bars "E" 1/2" x 7'6"	
204'	
Steel 16 Bars "F" 1/2" x 2'-9"	
37'	
2" W.I. Pipe 1'-10" Long Galv.	
8 pcs.	
2" W.I. Pipe 1'-4" Long "	
8 pcs.	
2" W.I. Pipe 5'-9" Long "	
8 pcs.	
2" Mal. Iron Rolling Ells "	
5 "	
2" Mal. Iron Rolling Tees "	
8 "	



PLAN  
Scale 3/4" = 1'



DETAIL OF CONCRETE CURB ON WING WALL  
Scale 3/4" = 1'

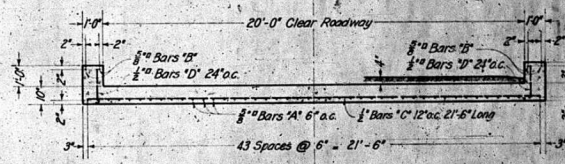


SECTION A-A  
Scale 3/4" = 1'

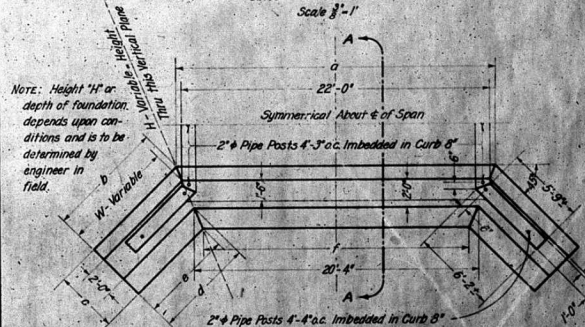
**GENERAL NOTES**  
 1. Reinforcing steel shall be furnished by contractor.  
 2. All steel shall be galvanized.  
 3. All concrete shall be 1:2:4 mix.  
 4. All masonry shall be cement rubble masonry.  
 5. All stone paving shall be 8" stone paving.  
 6. All cement mortar joints shall be 1:2:4 mix.  
 7. All steel shall be welded to concrete.  
 8. All steel shall be protected from rust.  
 9. All steel shall be painted.  
 10. All steel shall be galvanized.

BUREAU OF PUBLIC ROADS  
**CONCRETE SLAB BRIDGES**  
 CEMENT RUBBLE ABUTMENTS  
 CLEAR SPAN 20'-0" ROADWAY 20'-0"  
 STATION 722+44  
**BERTHOUD PASS ROAD**  
 GRAND COUNTY  
 COLORADO  
**VASQUEZ CREEK**

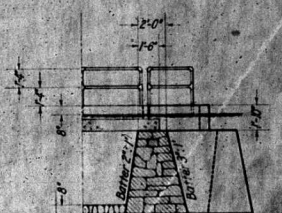
Contract No. 1442-23 Approved 1/22/23  
 R. C. Caldwell District Engineer



CROSS-SECTION OF SLAB  
Scale 3/4" = 1'



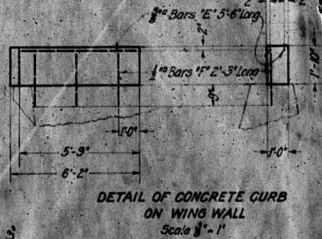
PLAN  
Scale 3/4" = 1'



SECTION A-A  
Scale 3/4" = 1'

NOTE: Height "H" or depth of foundation depends upon conditions and is to be determined by engineer in field.

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE (SLAB IDENTICAL FOR FOUR BRIDGES)				
Bars	No.	Size	Length	
A	44	1"	10'-6"	613#
B	4	1"	8'-0"	43#
C	11	1/2"	21'-6"	204#
D	12	1/2"	1'-6"	15#
Total Reinforcing Steel				
872#				
Concrete 1:2:4 Mix				
8 cu. yds.				
2" W.I. Pipe 1'-11" Long				
6 pcs.				
2" W.I. Pipe 1'-2" Long "				
6 pcs.				
2" W.I. Pipe 4'-2" Long "				
8 pcs.				
2" Mal. Iron Rolling Ells "				
4 "				
2" Mal. Iron Rolling Tees "				
6 "				
2" Mal. Iron Rolling Crosses "				
2 "				



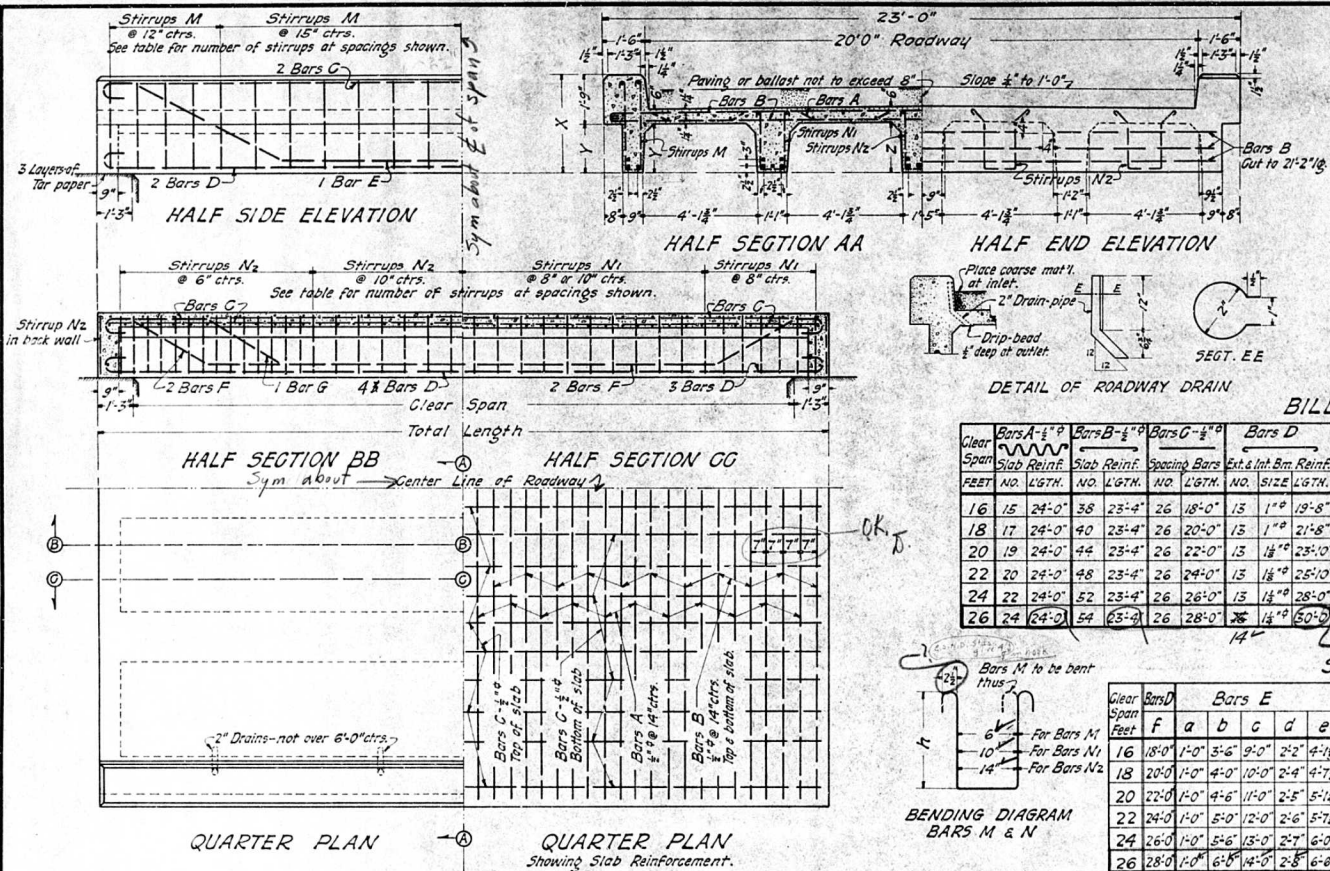
DETAIL OF CONCRETE CURB ON WING WALL  
Scale 3/4" = 1'

DIMENSIONS & ESTIMATED QUANTITIES FOR SUBSTRUCTURE											
(2 Abutments)		416+00 Harp Creek		507+30 Blue Creek		673+00 Mad Creek		717+65 Lion Creek			
Dimension	Quantity	Dimension	Quantity	Dimension	Quantity	Dimension	Quantity	Dimension	Quantity		
H	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"	8'-0"		
a	23'-1"	23'-1"	23'-1"	23'-1"	23'-1"	23'-1"	23'-1"	23'-1"	23'-1"		
b	10'-6"	10'-6"	10'-6"	10'-6"	10'-6"	10'-6"	10'-6"	10'-6"	10'-6"		
c	5'-4"	5'-4"	5'-4"	5'-4"	5'-4"	5'-4"	5'-4"	5'-4"	5'-4"		
d	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"	1'-4"		
e	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"	20'-0"		
Cement Rubble Masonry	22 cu. yds.	22 cu. yds.	22 cu. yds.	22 cu. yds.	22 cu. yds.	22 cu. yds.	22 cu. yds.	22 cu. yds.	22 cu. yds.		
Stone Paving Cement Mortar Joints	70 sq. yds.	70 sq. yds.	70 sq. yds.	70 sq. yds.	70 sq. yds.	70 sq. yds.	70 sq. yds.	70 sq. yds.	70 sq. yds.		
Concrete Curb 1:2:4 Mix	3 cu. yds.	3 cu. yds.	3 cu. yds.	3 cu. yds.	3 cu. yds.	3 cu. yds.	3 cu. yds.	3 cu. yds.	3 cu. yds.		
Steel 8 Bars "E" 1/2" x 7'6"	204'	204'	204'	204'	204'	204'	204'	204'	204'		
Steel 16 Bars "F" 1/2" x 2'-9"	37'	37'	37'	37'	37'	37'	37'	37'	37'		
2" W.I. Pipe 1'-10" Long Galv.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.		
2" W.I. Pipe 1'-4" Long "	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.		
2" W.I. Pipe 5'-9" Long "	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.	8 pcs.		
2" Mal. Iron Rolling Ells "	5 "	5 "	5 "	5 "	5 "	5 "	5 "	5 "	5 "		
2" Mal. Iron Rolling Tees "	8 "	8 "	8 "	8 "	8 "	8 "	8 "	8 "	8 "		

BUREAU OF PUBLIC ROADS  
**CONCRETE SLAB BRIDGES**  
 CEMENT RUBBLE ABUTMENTS  
 CLEAR SPAN 20'-0" ROADWAY 20'-0"  
 STATION 722+44  
**BERTHOUD PASS ROAD**  
 GRAND COUNTY  
 COLORADO  
**VASQUEZ CREEK**

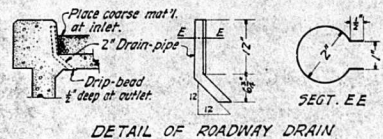
RECEIVED

Contract No. 1442-23 Approved 1/22/23  
 R. C. Caldwell District Engineer



**DIMENSIONS & QUANTITIES**

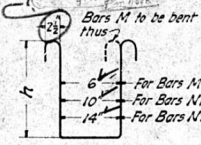
Clear Span Feet	Total Span Feet	Dimensions			Stirrup Spacing			Quantities	
		X	Y	Z	Exterior Beam Stirrups M	Interior Beam Stirrups N1	Interior Beam Stirrups N2	Concrete Cu yds	Steel Lbs
16	18'-6"	2'-11"	1'-2"	1'-4"	10 Spcs @ 12" 3	10 Spcs @ 15" 7	26 Spcs @ 8" 10	16.5	3510
18	20'-6"	3'-4"	1'-4"	1'-6"	10 Spcs @ 12" 9	10 Spcs @ 15" 7	26 Spcs @ 8" 10	19.0	3880
20	22'-6"	3'-2"	1'-5"	1'-7"	10 Spcs @ 12" 10	10 Spcs @ 15" 8	26 Spcs @ 8" 10	21.1	4760
22	24'-6"	3'-5"	1'-6"	1'-8"	10 Spcs @ 12" 11	10 Spcs @ 15" 9	26 Spcs @ 8" 10	23.3	5140
24	26'-6"	3'-4"	1'-7"	1'-9"	10 Spcs @ 12" 12	10 Spcs @ 15" 10	26 Spcs @ 8" 10	25.7	6230
26	28'-6"	3'-5"	1'-8"	1'-10"	10 Spcs @ 12" 13	10 Spcs @ 15" 11	26 Spcs @ 8" 10	28.0	6970



**BILL OF STEEL**

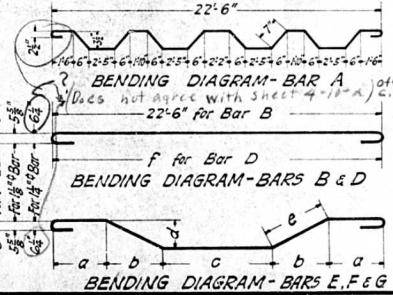
Clear Span Feet	Bars A-1/2"		Bars B-1/2"		Bars C-1/2"		Bars D		Bars E		Bars F		Bars G		Bars M-1/2"		Bars N-1/2"		
	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	NO.	LGTH.	
16	15	24'-0"	38	23'-4"	26	18'-0"	15	1'-0"	19'-8"	2	1'-0"	21'-0"	6	1'-0"	20'-4"	32	6'-6"	40	3'-8"
18	17	24'-0"	40	23'-4"	26	20'-0"	15	1'-0"	21'-8"	2	1'-0"	23'-0"	6	1'-0"	22'-4"	36	6'-10"	40	3'-8"
20	19	24'-0"	44	23'-4"	26	22'-0"	15	1'-0"	23'-10"	2	1'-0"	25'-0"	6	1'-0"	24'-8"	38	7'-0"	40	3'-8"
22	20	24'-0"	48	23'-4"	26	24'-0"	15	1'-0"	25'-10"	2	1'-0"	27'-0"	6	1'-0"	26'-8"	42	7'-2"	40	3'-8"
24	22	24'-0"	52	23'-4"	26	26'-0"	15	1'-0"	28'-0"	2	1'-0"	29'-5"	6	1'-0"	28'-10"	46	7'-4"	40	3'-8"
26	24	24'-0"	54	23'-4"	26	28'-0"	15	1'-0"	30'-0"	2	1'-0"	31'-3"	6	1'-0"	30'-10"	48	7'-6"	40	3'-8"

**STEEL BENDING TABLE**



Clear Span Feet	Bars E					Bars F					Bars G					Bars M			Bars N		
	f	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	h	h	h		
16	18'-0"	1'-0"	3'-6"	9'-0"	2'-2"	4'-11"	1'-0"	1'-9"	12'-6"	1'-1"	2'-0"	2'-9"	1'-9"	9'-0"	1'-1"	2'-8"	2'-7"	1'-6"	1'-7"		
18	20'-0"	1'-0"	4'-0"	10'-0"	2'-4"	4'-7"	1'-0"	2'-0"	14'-0"	1'-5"	2'-4"	3'-0"	2'-0"	10'-0"	1'-5"	2'-9"	2'-9"	1'-8"	1'-9"		
20	22'-0"	1'-0"	4'-6"	11'-0"	2'-5"	5'-11"	1'-0"	2'-5"	15'-6"	1'-4"	2'-7"	3'-5"	2'-5"	11'-0"	1'-4"	2'-8"	2'-9"	1'-8"	1'-10"		
22	24'-0"	1'-0"	5'-0"	12'-0"	2'-6"	5'-7"	1'-0"	2'-6"	17'-0"	1'-5"	2'-10"	3'-6"	2'-6"	12'-0"	1'-5"	2'-10"	2'-11"	1'-10"	1'-11"		
24	26'-0"	1'-0"	5'-6"	13'-0"	2'-7"	6'-0"	1'-0"	2'-9"	18'-6"	1'-6"	3'-1"	3'-9"	2'-9"	13'-0"	1'-6"	3'-1"	3'-0"	1'-11"	2'-0"		
26	28'-0"	1'-0"	6'-0"	14'-0"	2'-8"	6'-6"	1'-0"	3'-0"	20'-0"	1'-7"	3'-4"	4'-0"	3'-0"	14'-0"	1'-7"	3'-4"	3'-0"	2'-0"	2'-11"		

BENDING DIAGRAM BARS M & N




E-13-A  
**BERTHOUD PASS ROAD**  
 FEARLESS SECTION  
 BRIDGE OVER FRASER RIVER, STA 590+33.00  
 26'-0" CLEAR SPAN.  
 FOR SUBSTRUCTURE SEE DET. NO. D3-103.  
 U.S. BUREAU OF PUBLIC ROADS  
 WASHINGTON, D.C.  
**CONCRETE DECK GIRDER SPANS**  
 SPANS 16'-0" TO 26'-0" ROADWAY 20'-0"  
 MARCH 1919  
 CORRECT  
 APPROVED  
 BRIDGE ENGINEER  
 CHIEF ENGINEER  
 G-265  
 This drawing supercedes Dr. G-255.

**GENERAL NOTES & DESIGN DATA.**

Specifications — B.P.R. 1918.  
 Concentrated load — 2 Typical 15 ton trucks.  
 Impact allowance — 30 per cent.  
 Paving or ballast — Not to exceed 80 lbs per sq. ft.  
 Steel in tension — 16000 " " sq. in.  
 Concrete in compression — 650 " " sq. in.  
 Reinforced concrete in shear — 110 " " "

The table is based on the net area of bars as follows:  
 1/2" = 0.25 sq. in. 1" = 1.00 sq. in. 1 1/2" = 1.25 sq. in.  
 1 3/4" = 1.5625 sq. in.

Concrete to be a 1:2:4 mixture.  
 Maximum size of aggregate — 1 1/2".  
 All reinforcing steel shall be deformed bars.  
 (Square twisted bars not to be considered as deformed).  
 All dimensions relating to reinforcement are to centers of bars.  
 Where splicing of reinforcement is necessary, bars are to be lapped 40 diameters.  
 All exposed corners (except as indicated) to be chamfered thus:   
 Railings designed to suit local conditions to be placed on curbs where necessary, and provision made therefore when pouring curbs. For types of railing, see Drawing M2 G-211.  
 Curbs, slab and beam-stems must be poured at same time, allowing no time for initial set to take place between them.

DESIGNED BY: [Signature] DATE: Feb. 1919.  
 DRAWN BY: [Signature] MAR. 1919.  
 TRACED BY: [Signature] MAR. 1919.  
 CHECKED BY: [Signature] MAR. 1919.



RECEIVED  
24 MAR 1924

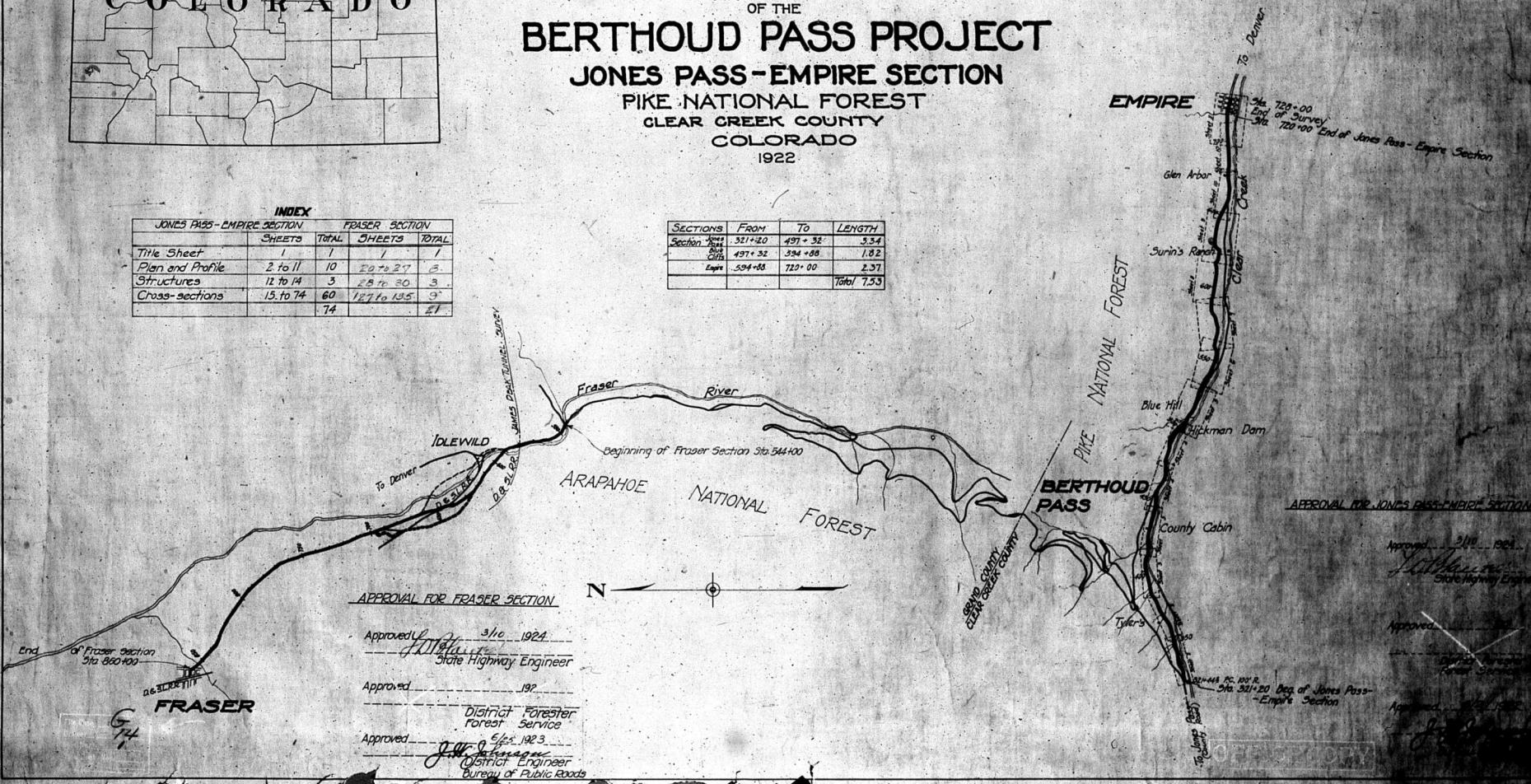


U.S. DEPARTMENT OF AGRICULTURE  
BUREAU OF PUBLIC ROADS  
LOCATION  
PLANS & PROFILE  
OF THE  
**BERTHOUD PASS PROJECT**  
JONES PASS - EMPIRE SECTION  
PIKE NATIONAL FOREST  
CLEAR CREEK COUNTY  
COLORADO  
1922

**INDEX**

	JONES PASS - EMPIRE SECTION		FRASER SECTION	
	SHEETS	TOTAL	SHEETS	TOTAL
Title Sheet	1	1	1	1
Plan and Profile	2 to 11	10	20 to 27	8
Structures	12 to 14	3	28 to 30	3
Cross-sections	15 to 74	60	127 to 135	9
		74		21

SECTIONS	FROM	TO	LENGTH
Section 1	321+20	497+32	3.54
Section 2	497+32	594+88	1.82
Empire	594+88	720+00	2.37
			Total 7.53



APPROVAL FOR FRASER SECTION

Approved *[Signature]* 3/10 1924  
State Highway Engineer

Approved \_\_\_\_\_ 192  
District Forester  
Forest Service

Approved *[Signature]* 3/23 1923  
District Engineer  
Bureau of Public Roads

APPROVAL FOR JONES PASS - EMPIRE SECTION

Approved \_\_\_\_\_ 3/10 1924  
State Highway Engineer

Approved \_\_\_\_\_  
District Forester  
Forest Service

Approved \_\_\_\_\_  
District Engineer  
Bureau of Public Roads

Prelim. plans

4-3-24

RECEIVED

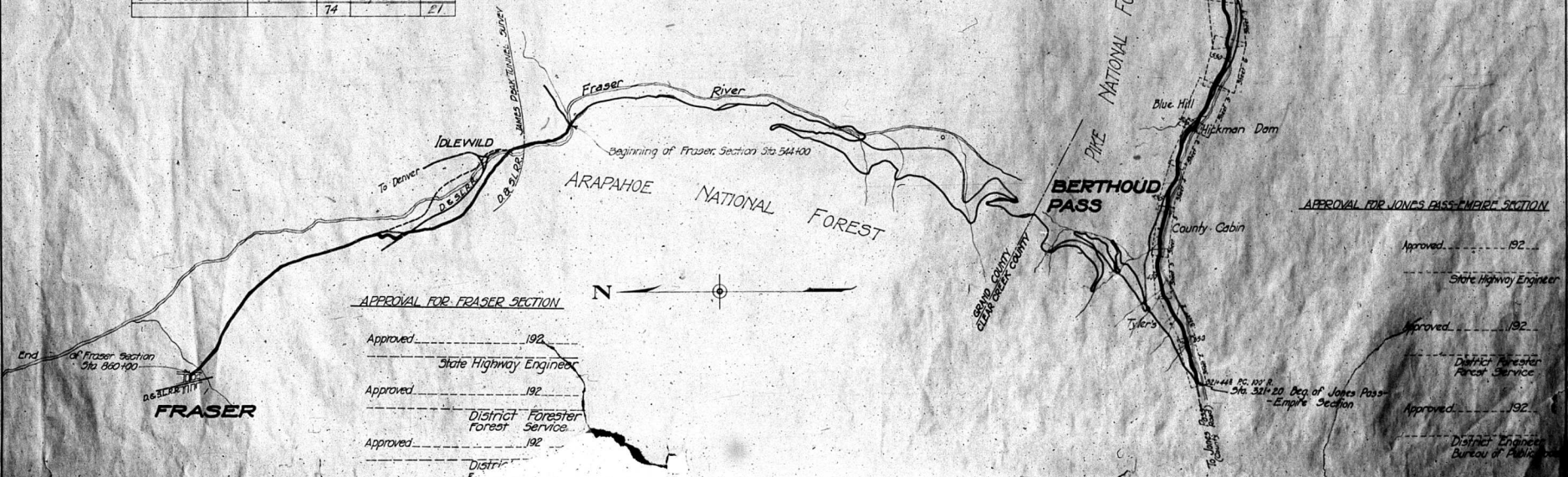


U.S. DEPARTMENT OF AGRICULTURE  
 BUREAU OF PUBLIC ROADS  
**LOCATION  
 PLANS & PROFILE  
 OF THE  
 BERTHOUD PASS PROJECT**  
**JONES PASS-EMPIRE SECTION**  
 PIKE NATIONAL FOREST  
 CLEAR CREEK COUNTY  
 COLORADO  
 1922

**INDEX**

	JONES PASS-EMPIRE SECTION		FRASER SECTION	
	SHEETS	TOTAL	SHEETS	TOTAL
Title Sheet	1	1	1	1
Plan and Profile	2 to 11	10	20 to 27	8
Structures	12 to 14	3	28 to 30	3
Cross-sections	15 to 74	60	121 to 135	15
		74		27

SECTIONS	FROM	TO	LENGTH
Section 1	521+20	497+32	3.54
Section 2	497+32	534+88	1.62
Empire	534+88	720+00	2.37
			Total 7.53



**EMPIRE**

To Denver

720+00 End of Survey  
720+00 End of Jones Pass-Empire Section

Glen Arbor

Surin's Ranch

Blue Hill

Hickman Dam

County Cabin

Tyler's

To Jones Pass

To Denver

720+00

546+30+20 End of Jones Pass-Empire Section

APPROVAL FOR JONES PASS-EMPIRE SECTION

Approved.....192

State Highway Engineer

Approved.....192

District Forester  
Forest Service

Approved.....192

District Engineer  
Bureau of Public Roads

APPROVAL FOR FRASER SECTION

Approved.....192

State Highway Engineer

Approved.....192

District Forester  
Forest Service

Approved.....192

District Engineer

End of Fraser Section Sta 860+00

D. & B. 1111

**FRASER**

To Denver

Idlewild

JAMES PARK TUNNEL, SLOPE

D. & B. 9142

Beginning of Fraser Section Sta 544+00

ARAPAHOE NATIONAL FOREST

PIKE NATIONAL FOREST

BERTHOUD PASS

Clear Creek County



DATE	SCALE	BY	CHECKED	APPROVED
3	1" = 100'			

PLAN	DATE	BY	CHECKED	APPROVED

PROFILE	DATE	BY	CHECKED	APPROVED

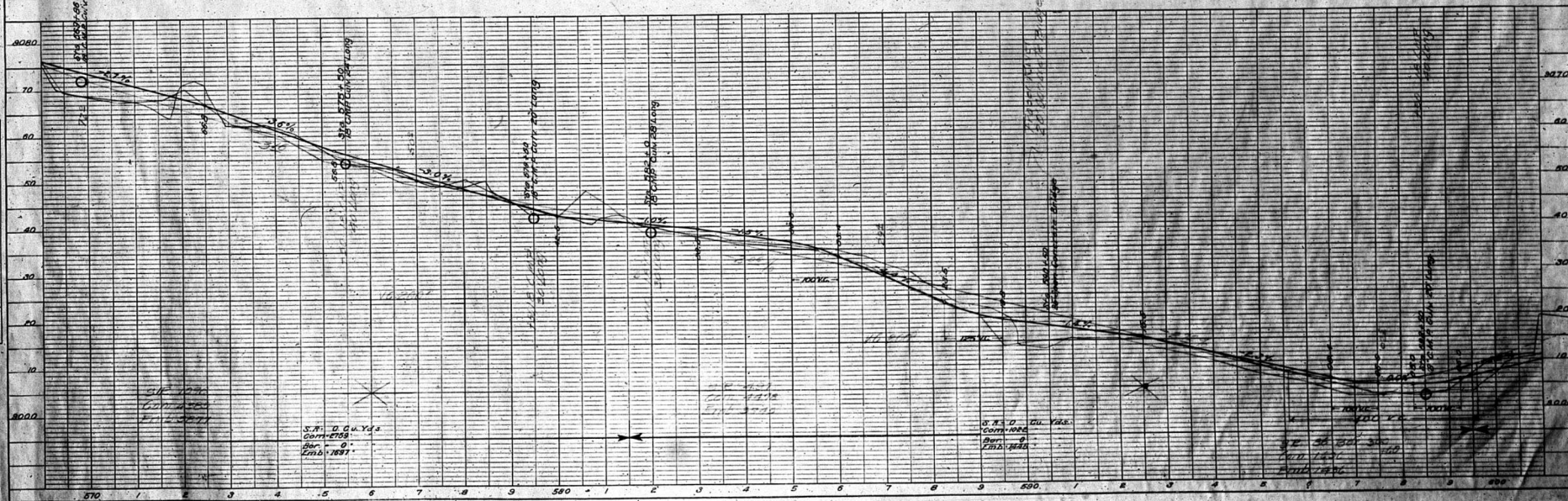
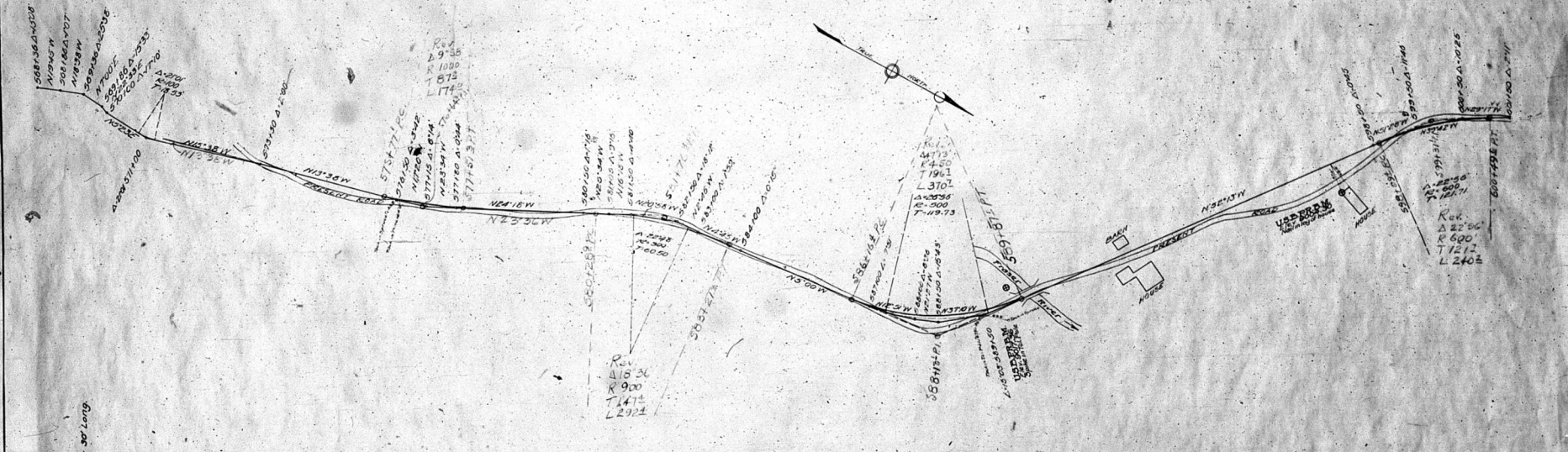


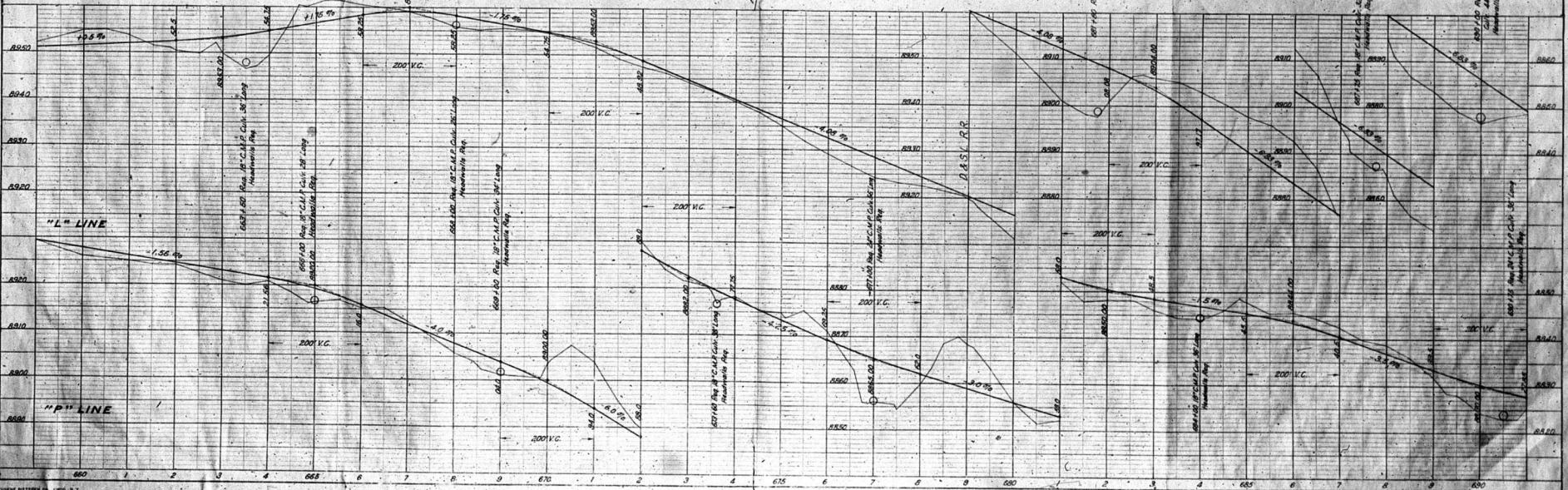
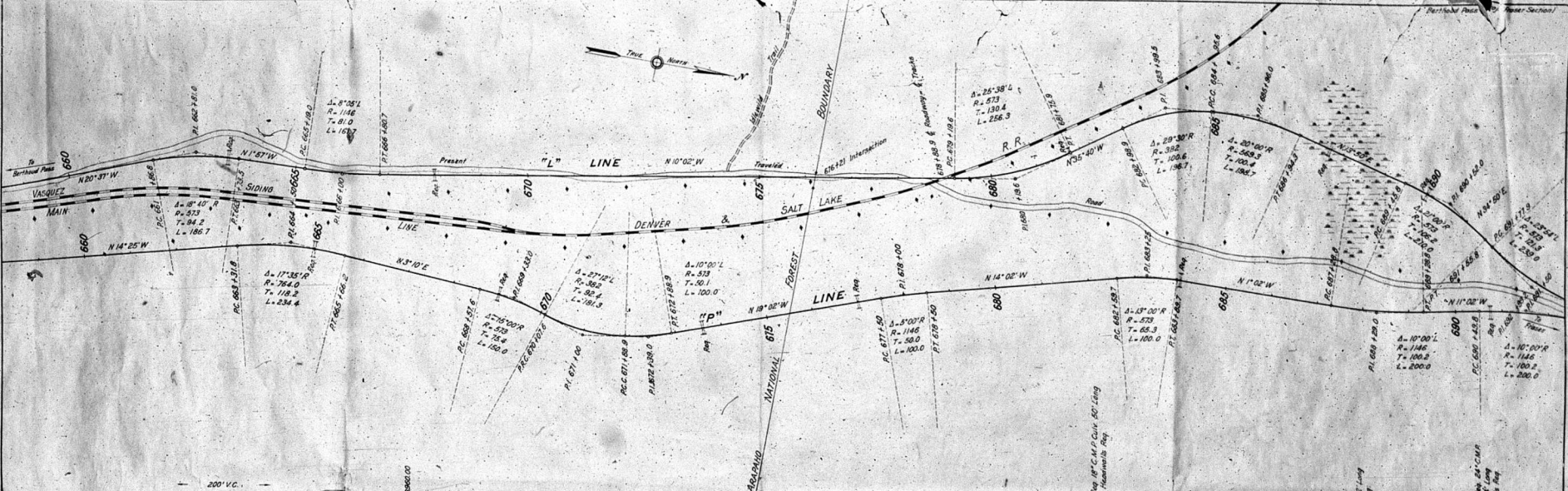
PLATE 1 - PLAN - PROFILE OF R.O.W. & E. SHOWN  
 DRAWN & CHECKED BY: [Name]



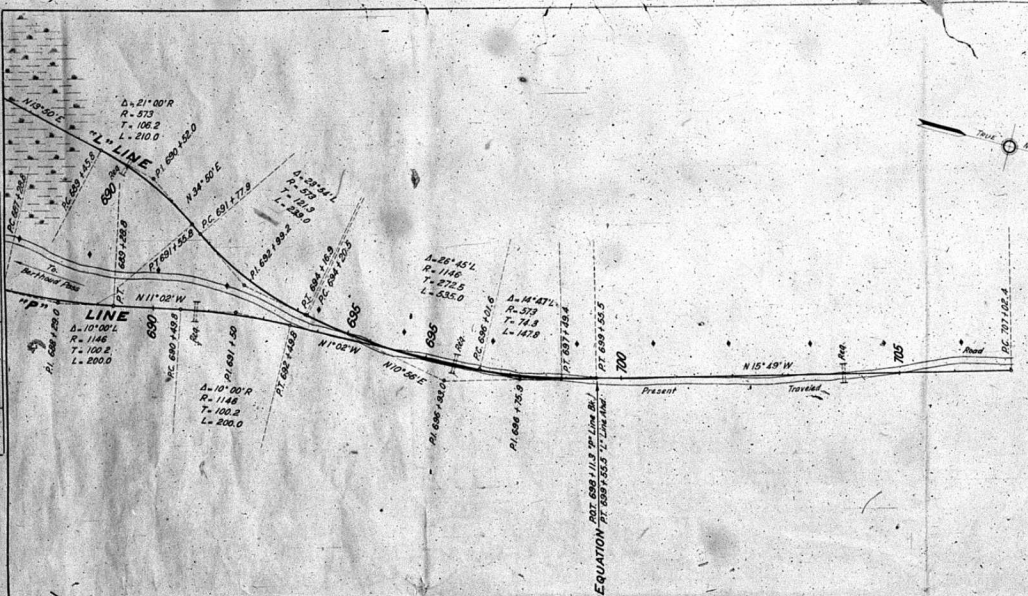


PLAN	DATE	BY
REVISED	11/21/50	J.P. Sweeney
NOTED		
NO. OF SHEETS		
NO. OF THIS SHEET		

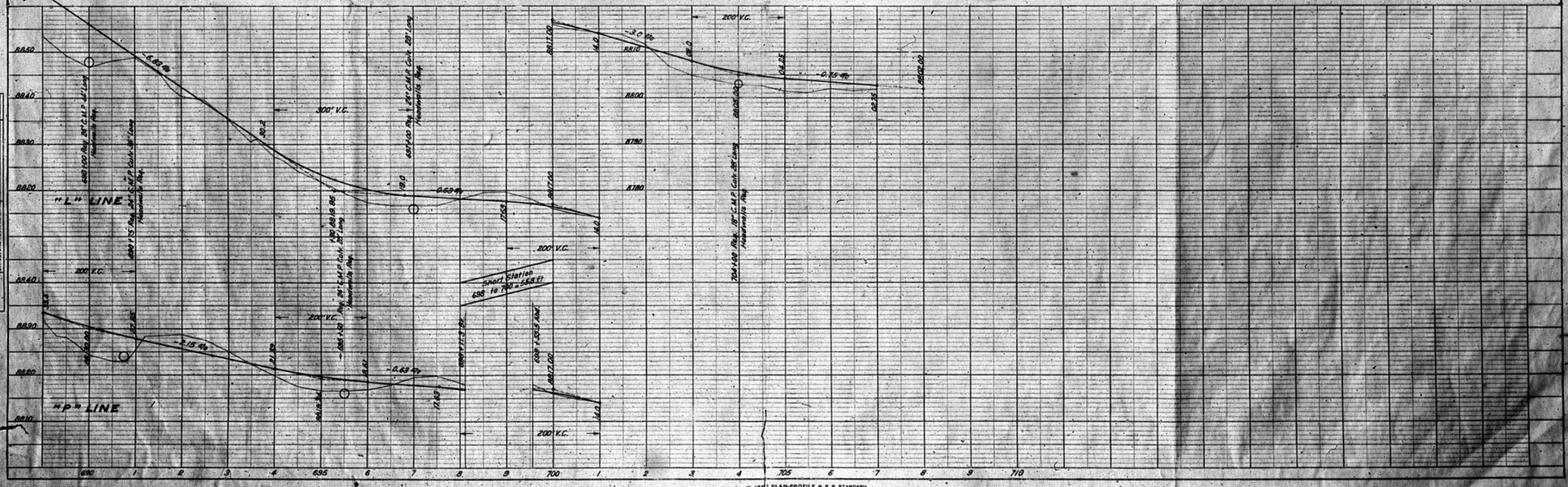
PROFILE	DATE	BY
REVISED	11/21/50	J.P. Sweeney
NOTED		
NO. OF SHEETS		
NO. OF THIS SHEET		



PLAN	DATE	BY
APPROVED	1950	P. G. STANLEY
REVISIONS		
NO.	DESCRIPTION	DATE
1	AS SHOWN	

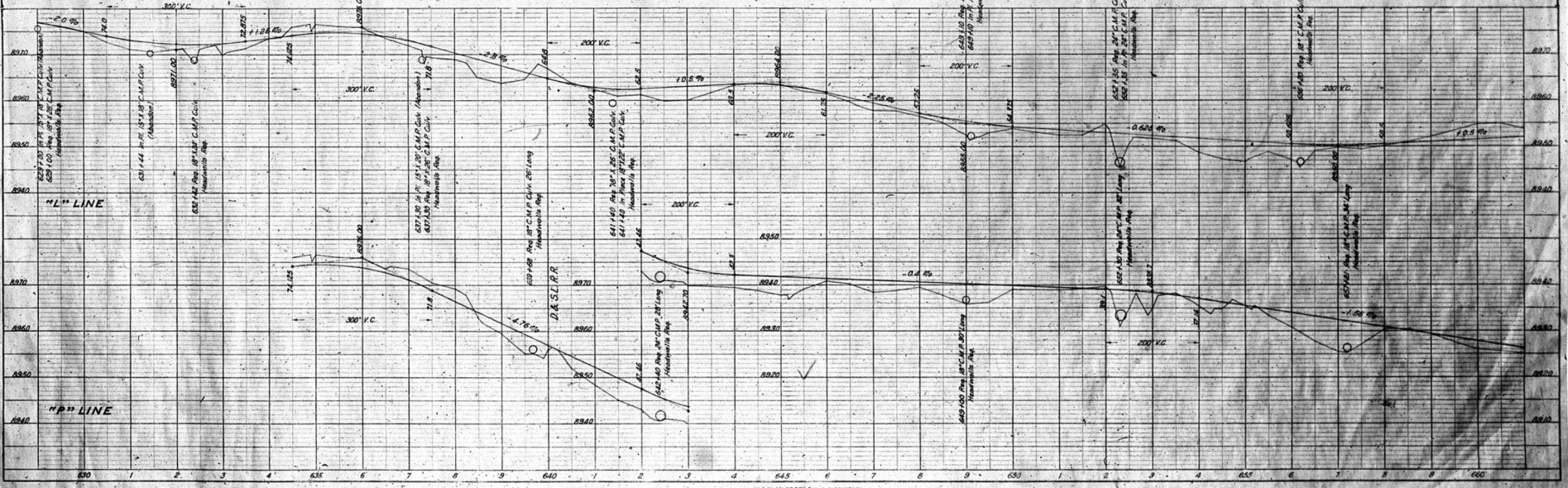
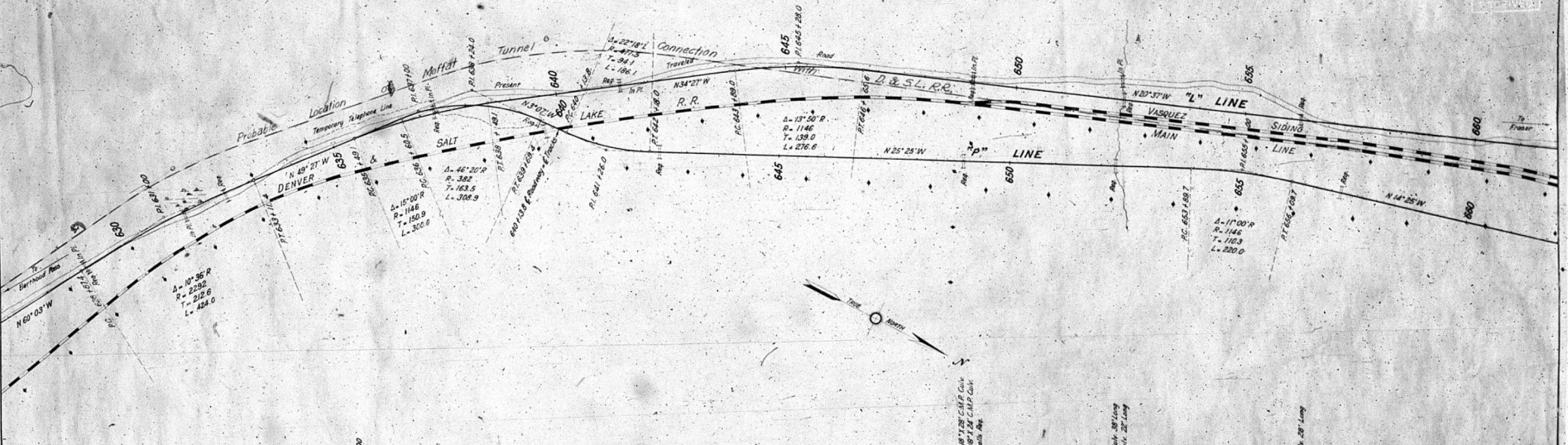


PROFILE	DATE	BY
APPROVED	1950	P. G. STANLEY
REVISIONS		
NO.	DESCRIPTION	DATE
1	AS SHOWN	



PLAN  
 PROJECTED  
 LOCATED  
 BY  
 DATE  
 SHEET NO. OF SHEETS  
 SHEET NO. OF PLAN SHEETS

PROFILE  
 PROJECTED  
 LOCATED  
 BY  
 DATE  
 SHEET NO. OF SHEETS  
 SHEET NO. OF PROFILE SHEETS

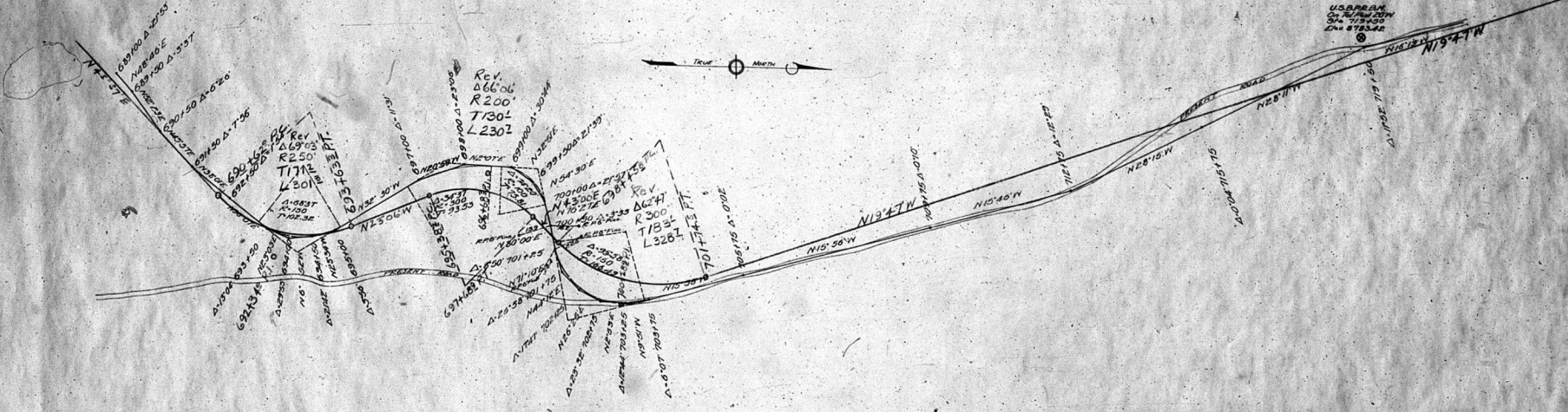




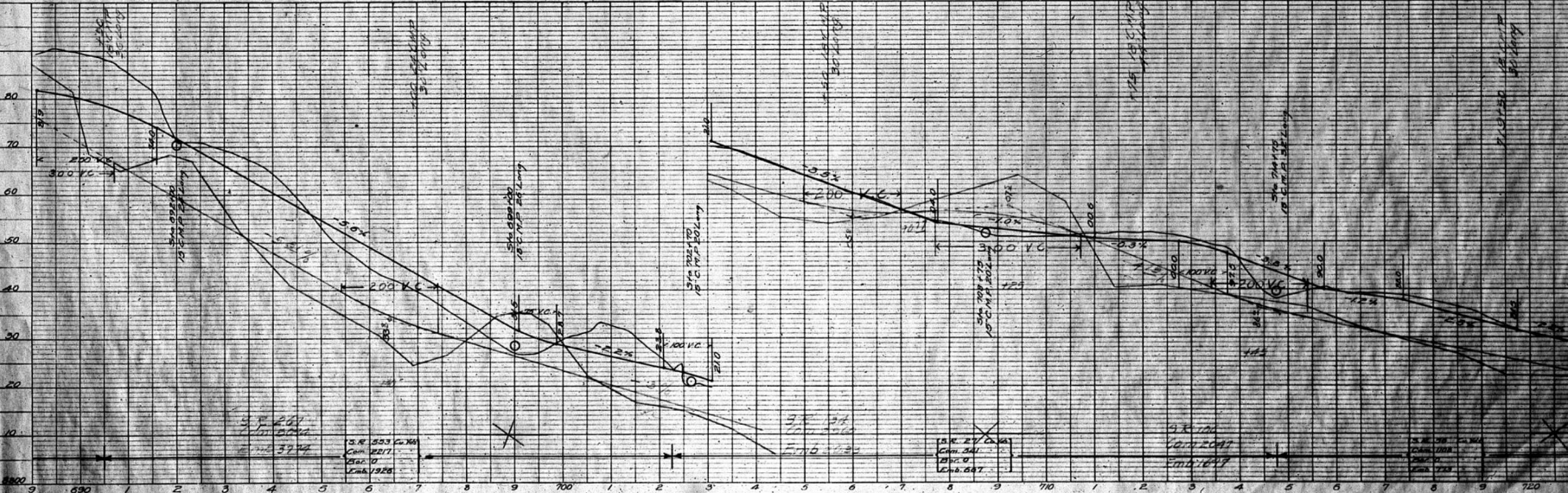




PLAN  
 NOTED  
 REVISIONS  
 DATE



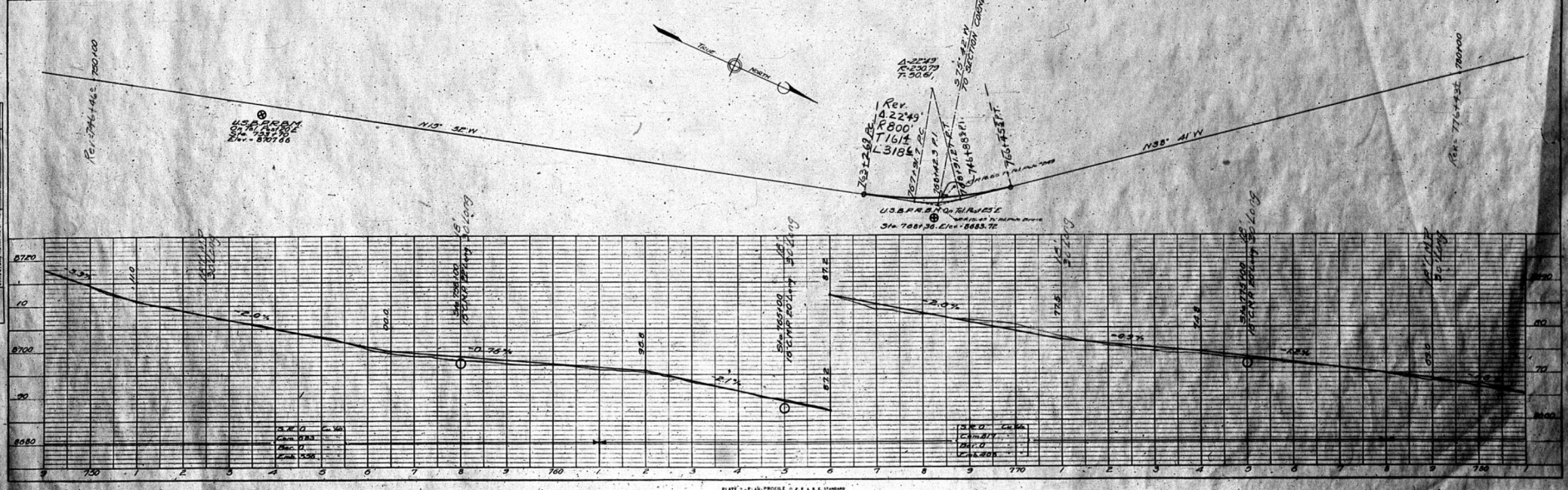
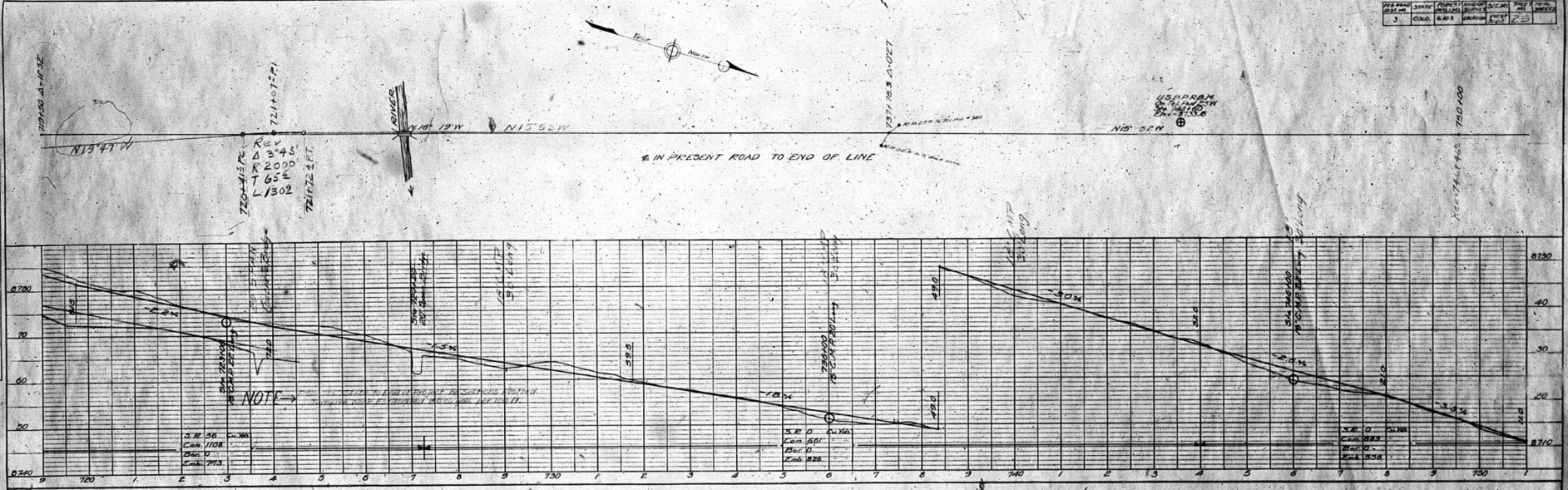
PROFILE  
 NOTED  
 REVISIONS  
 DATE



DATE	BY	CHKD.	APP'D.	REVISION	SCALE	PLAT.	SHEET
3	DOUG.	BLAIR	BRADY				

PLAN	DATE	BY	CHKD.	APP'D.	REVISION	SCALE	PLAT.	SHEET
3	DOUG.	BLAIR	BRADY					

PROFILE	DATE	BY	CHKD.	APP'D.	REVISION	SCALE	PLAT.	SHEET
3	DOUG.	BLAIR	BRADY					



NO. PROJ.	DATE	NO. OF SHEETS	SHEET NO.	TOTAL SHEETS
1077	1952	1	1	1
NO. PROJ.	DATE	NO. OF SHEETS	SHEET NO.	TOTAL SHEETS
1077	1952	1	1	1

PLAN	DATE	NO. OF SHEETS	SHEET NO.	TOTAL SHEETS
1077	1952	1	1	1

PROFILE	DATE	NO. OF SHEETS	SHEET NO.	TOTAL SHEETS
1077	1952	1	1	1

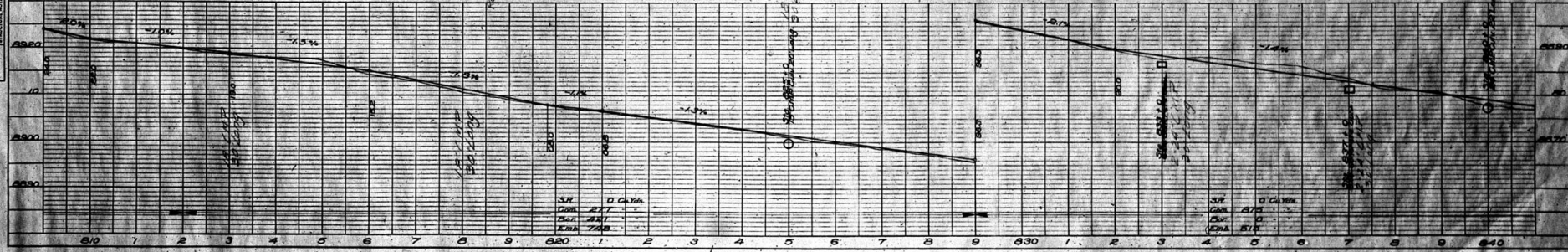
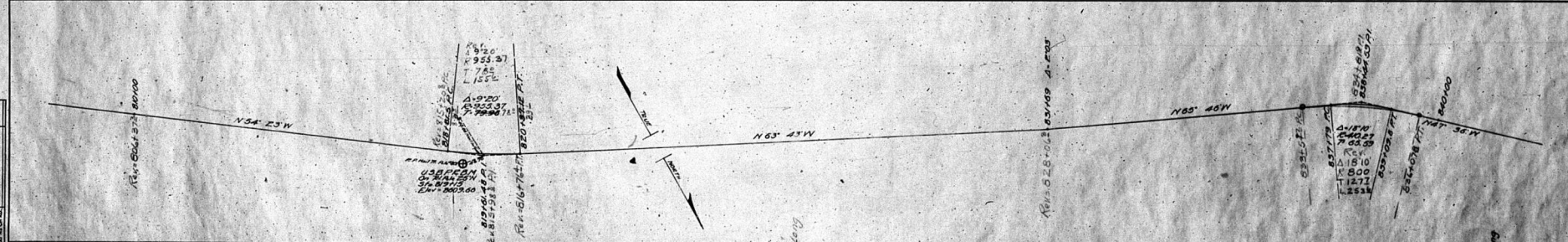
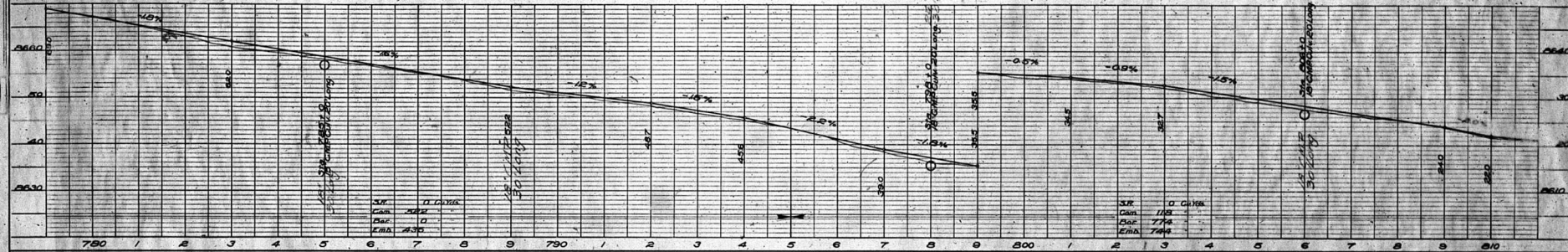
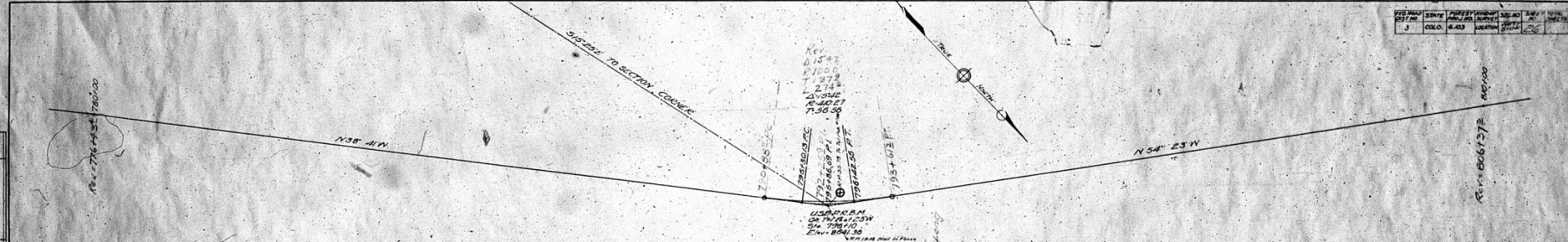
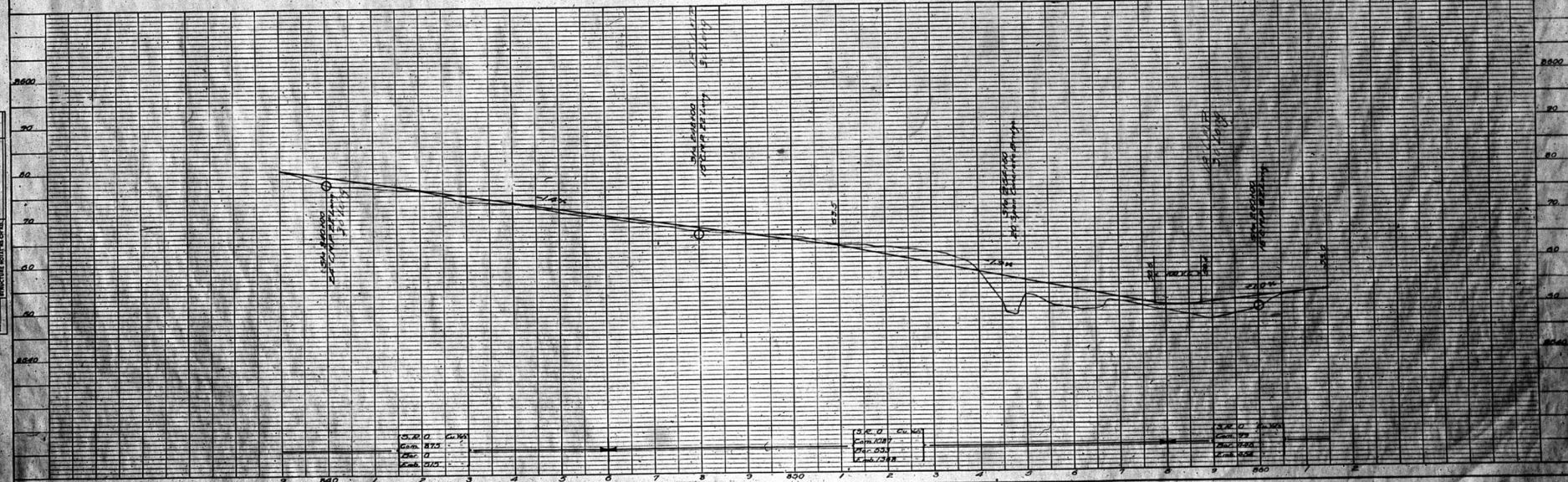
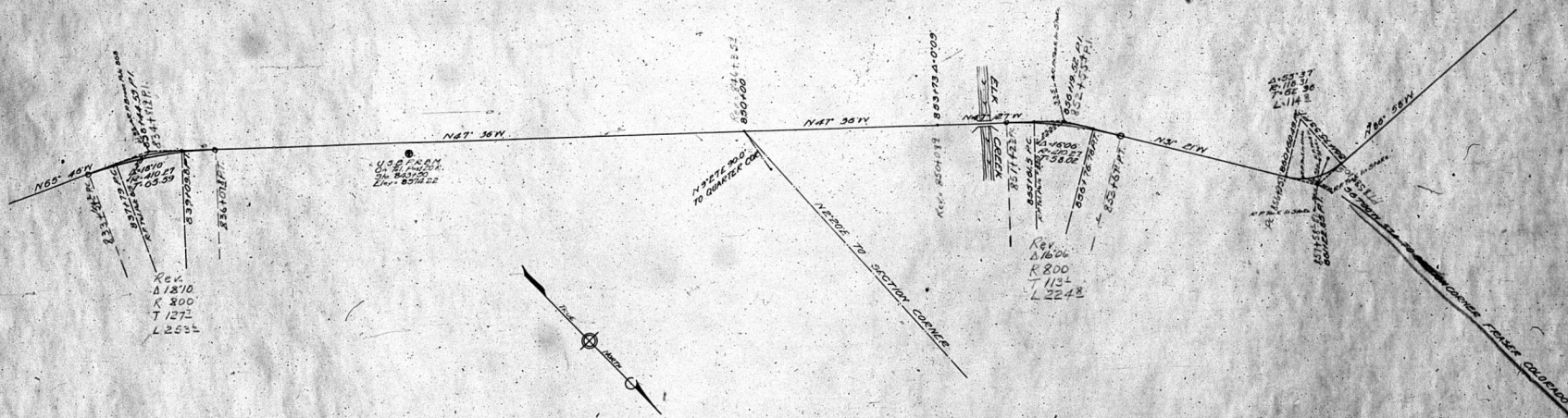


PLATE 2 - PLAN-PROFILE

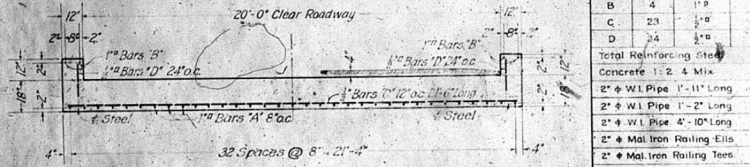
PLAN	DATE	BY	SCALE
3	08-07	6-03	1"=100'

PROFILE	DATE	BY	SCALE
3	08-07	6-03	1"=100'



STATION	ELEVATION	STATION	ELEVATION	STATION	ELEVATION
0+00	8573	4+00	8573	8+00	8573
1+00	8573	5+00	8573	7+00	8573
2+00	8573	6+00	8573	8+00	8573

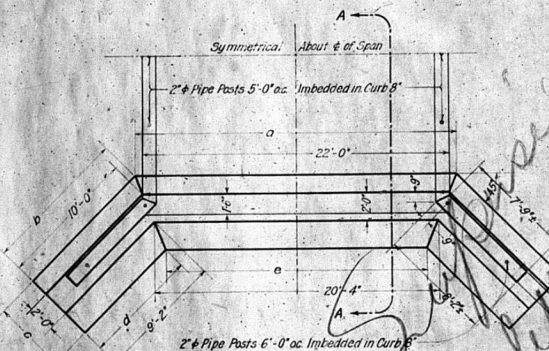
PLATE 1 - PLAN-PROFILE OF R.R. & R.E. STATION  
 DESIGNED BY CLARENCE W. HARRIS



CROSS-SECTION OF SLAB  
Scale 3/8" = 1"

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE  
(SLAB IDENTICAL FOR THREE BRIDGES)

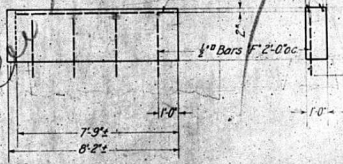
Bars	No.	Size	Length	
A	33	1#	22'-6"	2525*
B	4	1#	20'-0"	272*
C	23	1#	21'-6"	420*
D	24	1#	1'-6"	31*
Total Reinforcing Steel				3048*
Concrete 1:2:4 Mix				30 cu yds
2" # W.I. Pipe 1'-11" Long				10 pcs
2" # W.I. Pipe 1'-2" Long				10 pcs
2" # W.I. Pipe 4'-10" Long				16 pcs
2" # Mal. Iron Railing Ells				4
2" # Mal. Iron Railing Tees				10
2" # Mal. Iron Railing Crosses				6



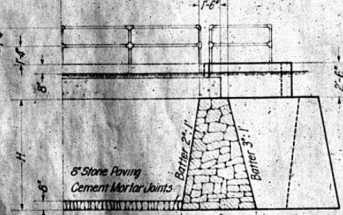
PLAN  
Scale 1/2" = 1"

DIMENSIONS & ESTIMATED QUANTITIES FOR SUBSTRUCTURE  
(2 ABUTMENTS)

	590150	727120	854400
	Fraser River	Wagoner Creek	Elk Creek
H	8'-0"	8'-0"	10'-0"
a	23'-1"	23'-1"	23'-1"
b	10'-0"	10'-6"	10'-6"
c	5'-4"	5'-4"	6'-2"
d	5'-4"	5'-4"	8'-1"
e	15'-8"	15'-5"	15'-3"
Cement Rubble Masonry			
100 cu yds	100 cu yds	140 cu yds	
Stone Paving Cement Mortar Joints			
70 sq yds	70 sq yds	70 sq yds	
Concrete Curb 1:2:4 Mix			
3 cu yds	3 cu yds	3 cu yds	
Steel 8 Bars 1" x 7'6"			
204*	204*	204*	
Shallot Bars 7" x 2'-0"			
374*	374*	374*	
2" # W.I. Pipe 1'-11" Long			
8 pcs	8 pcs	8 pcs	
2" # W.I. Pipe 1'-2" Long			
8 pcs	8 pcs	8 pcs	
2" # W.I. Pipe 5'-10" Long			
8 pcs	8 pcs	8 pcs	
2" # Mal. Iron Railing Ells			
8	8	8	
2" # Mal. Iron Railing Tees			
8	8	8	



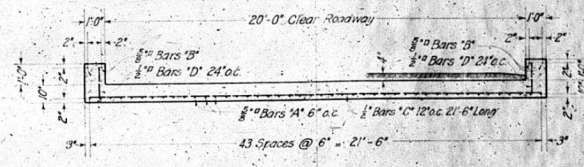
DETAIL OF CONCRETE CURB ON WING WALL  
Scale 3/8" = 1"



SECTION A-A  
Scale 1/2" = 1"

BUREAU OF PUBLIC ROADS  
**CONCRETE SLAB BRIDGES**  
CEMENT RUBBLE ABUTMENTS  
CLEAR SPAN 20'-0" ROADWAY 20'-0"  
STATIONS - 590+50 - 727+20 - 854+00  
**BERTHOUD PASS ROAD**  
GRAND COUNTY  
COLORADO

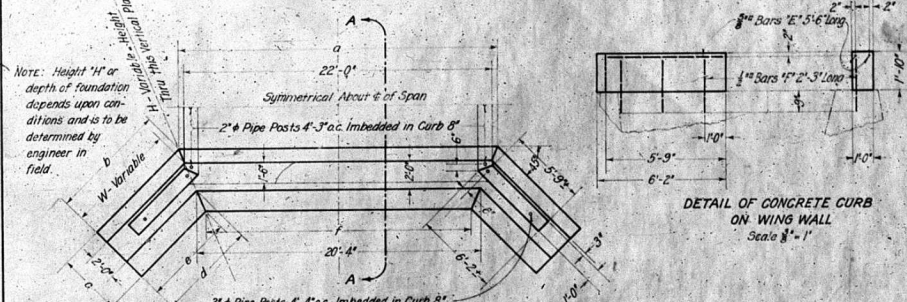
CONR. 23 April 23 1923. APPROVED. 192  
R. E. Campbell  
Senior Bridge Engineer. DISTRICT ENGINEER.



CROSS-SECTION OF SLAB  
Scale 3/8" = 1"

ESTIMATED QUANTITIES FOR SUPERSTRUCTURE  
(SLAB IDENTICAL FOR FOUR BRIDGES)

Bars	No.	Size	Length	
A	44	5#	10'-6"	613*
B	4	5#	6'-0"	23*
C	11	1#	21'-6"	201*
D	12	1#	1'-6"	15*
Total Reinforcing Steel				872*
Concrete 1:2:4 Mix				9 cu yds
2" # W.I. Pipe 1'-11" Long				6 pcs
2" # W.I. Pipe 1'-2" Long				6 pcs
2" # W.I. Pipe 4'-10" Long				8 pcs
2" # Mal. Iron Railing Ells				4
2" # Mal. Iron Railing Tees				6
2" # Mal. Iron Railing Crosses				2



PLAN  
Scale 1/2" = 1"

DIMENSIONS & ESTIMATED QUANTITIES FOR SUBSTRUCTURE  
(2 Abutments)

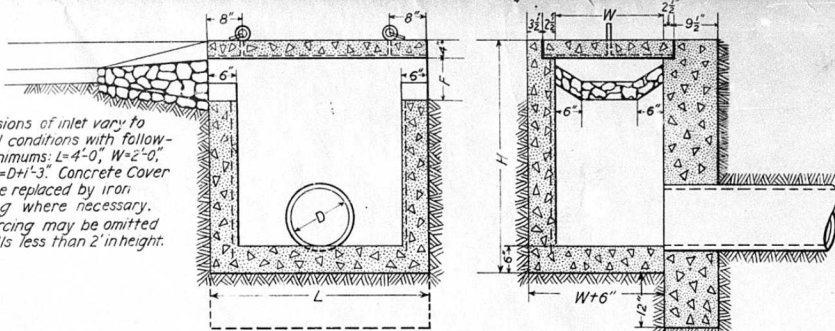
	416+00	507+30	673+00	717+65
	Hoop Creek	Blue Creek	Mad Creek	Lion Creek
Upstream Downstream Upstream Downstream Upstream Downstream Upstream Downstream				
H	9'-0" ± 8'-0"	4'-0" ± 6'-0"	3'-0" ± 4'-0"	6'-0" ± 8'-0"
W	6'-0" ± 8'-0"	6'-0" ± 8'-0"	6'-0" ± 8'-0"	6'-0" ± 8'-0"
b	6'-5" ± 6'-1"	6'-3" ± 8'-5"	6'-2" ± 6'-3"	6'-5" ± 8'-6"
c	4'-6" ± 5'-4"	5'-8" ± 4'-6"	3'-3" ± 3'-8"	4'-6" ± 5'-4"
d	5'-2" ± 7'-2"	5'-2" ± 7'-2"	6'-2" ± 7'-2"	5'-2" ± 7'-2"
e	4'-6" ± 6'-4"	4'-8" ± 6'-1"	4'-0" ± 4'-0"	4'-6" ± 6'-4"
f	23'-11" ± 23'-5"	23'-5" ± 22'-6"	19'-7" ± 18'-10"	22'-11" ± 22'-11"
Cement Rubble Masonry				
64 cu yds	42 cu yds	26 cu yds	64 cu yds	
Stone Paving Cement Mortar Joints				
25 sq yds	25 sq yds	25 sq yds	25 sq yds	
Concrete Curb 1:2:4 Mix				
2 cu yds	2 cu yds	2 cu yds	2 cu yds	
Steel 8 Bars 1" x 5'-6"				
60*	60*	60*	60*	
Steel 12 Bars 1" x 2'-3"				
25*	25*	25*	25*	
2" # W.I. Pipe 1'-11" Long				
8 pcs	8 pcs	8 pcs	8 pcs	
2" # W.I. Pipe 1'-2" Long				
8 pcs	8 pcs	8 pcs	8 pcs	
2" # W.I. Pipe 4'-2" Long				
8 pcs	8 pcs	8 pcs	8 pcs	
2" # Mal. Iron Railing Ells				
8	8	8	8	
2" # Mal. Iron Railing Tees				
8	8	8	8	

SECTION A-A  
Scale 1/2" = 1"

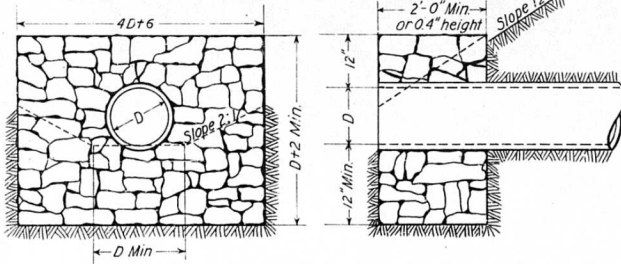
BUREAU OF PUBLIC ROADS  
**CONCRETE SLAB BRIDGES**  
CEMENT RUBBLE ABUTMENTS  
CLEAR SPAN 20'-0" ROADWAY 20'-0"  
STATIONS - 416+00 - 507+30 - 673+00 - 717+65  
**BERTHOUD PASS ROAD**  
CLEAR CREEK COUNTY  
COLORADO

CONR. 23 April 23 1923. APPROVED. 192  
R. E. Campbell  
Senior Bridge Engineer. DISTRICT ENGINEER.

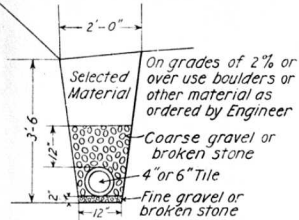
Note: Dimensions of inlet vary to special conditions with following minimums:  $L=4'-0"$ ,  $W=2'-0"$ ,  $F=9"$ ,  $H=D+1'-3"$ . Concrete Cover may be replaced by iron grating where necessary. Reinforcing may be omitted in walls less than 2' in height.



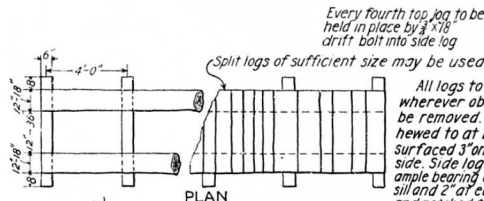
CONCRETE DROP INLET FOR PIPE CULVERT



DRY RUBBLE HEADWALL

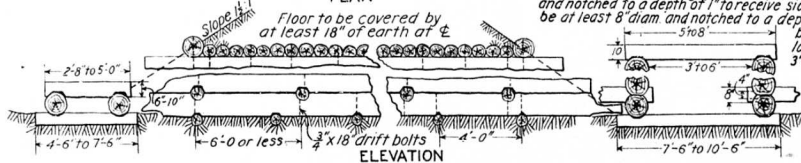


TILE UNDERDRAIN

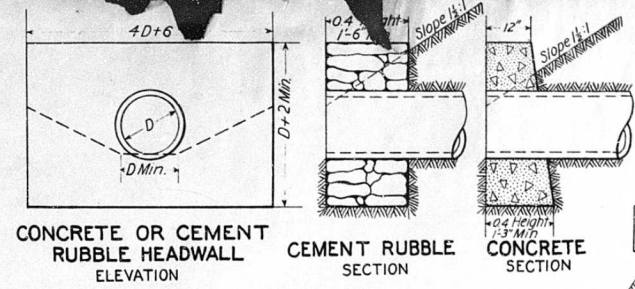


PLAN

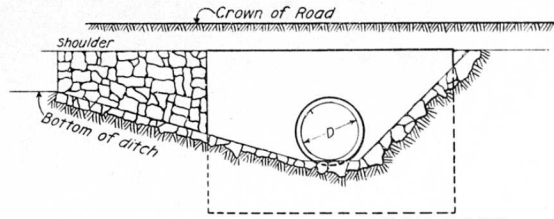
All logs to be of sound cedar, wherever obtainable, or fir; all bark to be removed. Top logs to be 6" to 10" diam. Hewed to at least a 3" face on 3 sides or unsurfaced 3" on 2 sides and notched on ends of third side. Side logs to be hewed on 2 sides, 3" min. for ample bearing and notched to a depth of 1" at each mud sill and 2" at each tie log. Mud sills to be not less than 6" diam and notched to a depth of 1" to receive side logs. Tie logs to be at least 8" diam and notched to a depth of 2" on top and bottom to receive side logs. Tie logs to extend 3' to 5' into embankment.



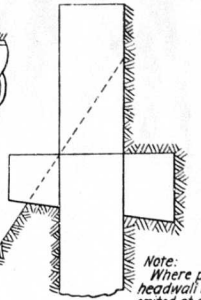
ELEVATION  
LOG CULVERTS  
SPAN 10 TO 6 FT.



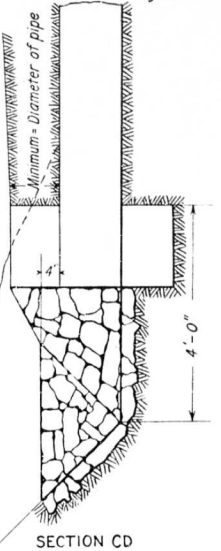
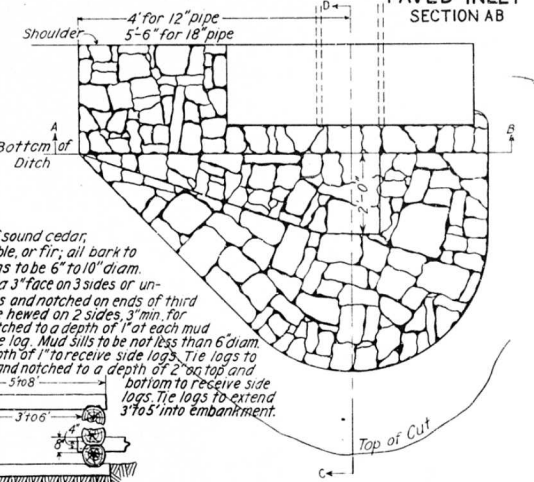
CONCRETE OR CEMENT RUBBLE HEADWALL ELEVATION  
CEMENT RUBBLE SECTION  
CONCRETE SECTION



PAVED INLET SECTION AB



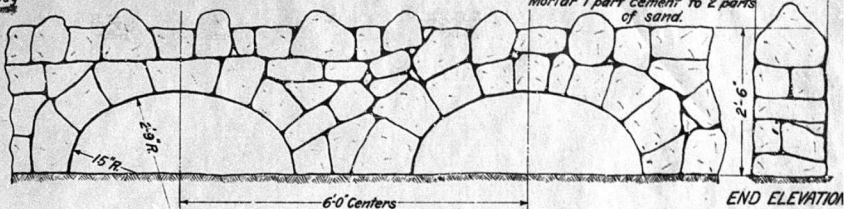
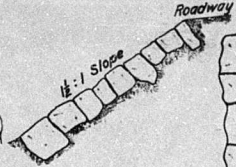
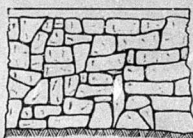
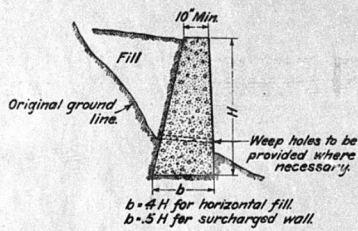
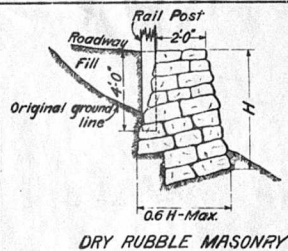
Note: Where preferable headwall may be omitted at outlet and culvert extended beyond toe of slope



SECTION CD

U.S. BUREAU OF PUBLIC ROADS

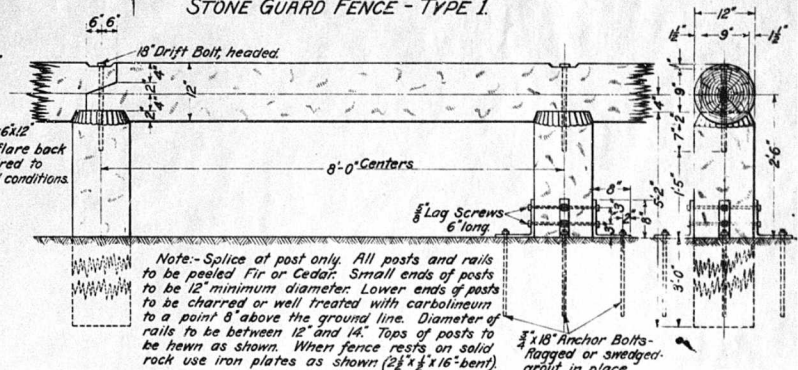
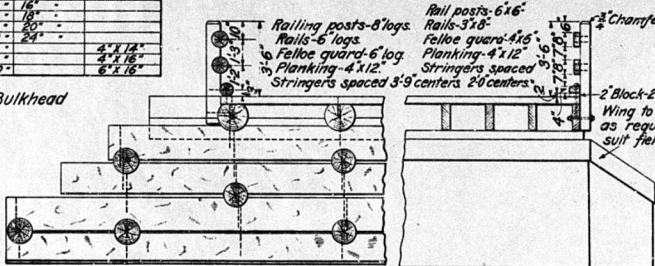
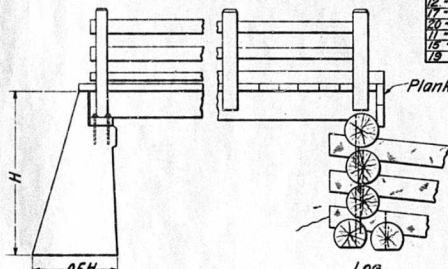
STANDARD PIPE AND LOG CULVERTS



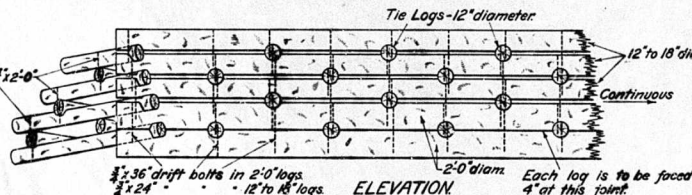
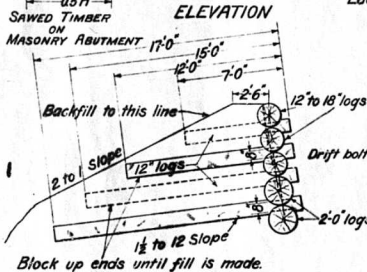
RETAINING WALLS

STRINGERS

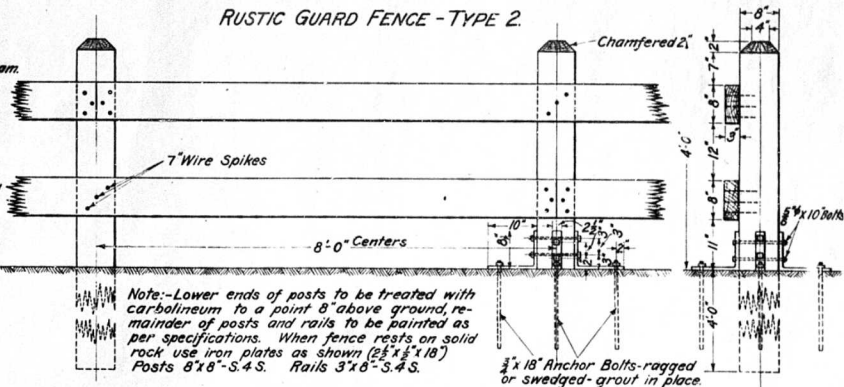
SPAN	LOGS	SAWED TIMBER
6'-10"	12" diam.	4" x 12"
8'-0"	12" diam.	4" x 12"
10'-0"	12" diam.	4" x 12"
12'-0"	12" diam.	4" x 12"
14'-0"	12" diam.	4" x 12"
16'-0"	12" diam.	4" x 12"
18'-0"	12" diam.	6" x 16"



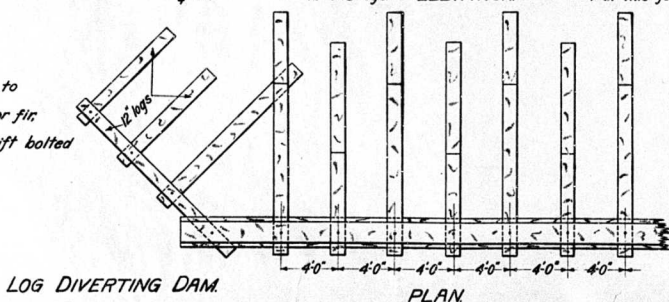
SMALL BRIDGES.



RUSTIC GUARD FENCE - TYPE 2.



WOODEN GUARD FENCE - TYPE 3.



NOTES:-  
 Ends to flare back as required to suit field conditions.  
 All logs are to be sound cedar or fir, with all bark removed.  
 The wall is to be thoroughly drift bolted as shown. All drift bolts 3/4".  
 Fill to be rock.