

CONVENTIONAL SIGNS

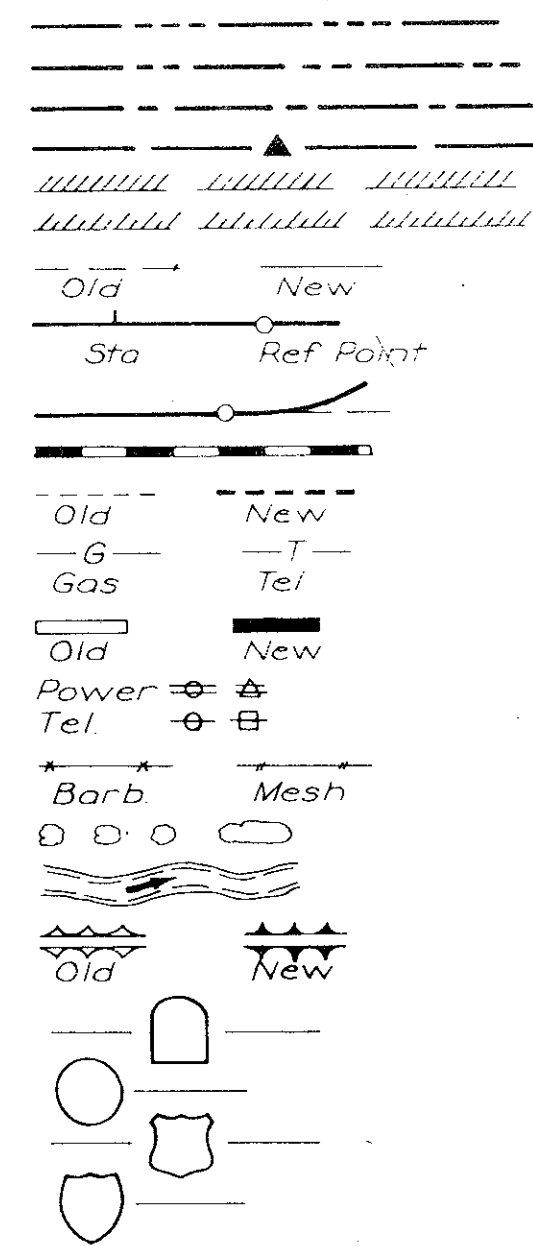
State Line
Co. Line
Twp. Line
Sec. Line
Corp. Line
Urban Bdry.
R.O.W. Lines
Survey Line

Profile Grade
Railroad
Field Tile
Underground Lines

Culverts
Utility Poles

Fences
Trees Or Brush
Stream
Dike

County Road No.
Primary Road No.
U. S. Road No.
Interstate Road No.



STATE OF IOWA
STATE HIGHWAY COMMISSION

PLAN & PROFILE OF PROPOSED IMPROVEMENT
ON THE

INTERSTATE ROAD SYSTEM

P.C.C. PAVING PROJECT NO. 1 - 80 - 5(31) 188

ON INTERSTATE 80 FROM ONE MILE EAST IOWA #146, EAST APPROXIMATELY 3 MILES

POWESHIEK COUNTY

PLAN 1 INCH=100 FT.
PROFILE HOR. 1 INCH=100 FT., VERT. 1 INCH=10 FT.

THE IOWA STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS
FOR CONSTRUCTION WORK, SERIES OF 1960, SHALL
APPLY TO WORK ON THIS PROJECT

MILEAGE SUMMARY			
105-1			
DIV.	LOCATION	LIN. FT.	MILES
	RURAL: STA. 160+33.00 TO STA. 319+37.00 OMIT BRIDGE AT STA. 213+41.30 NET LENGTH OF PROJECT	15,904.00 114.50 15,789.50	2.990

INDEX OF SHEETS	
105-3	
NO.	DESCRIPTION
1	TITLE PAGE
2	TYPICAL CROSS SECTION AND ESTIMATE OF QUANTITIES
3 THRU 8	PLAN AND PROFILE SHEETS
9	DESIGN STANDARD RH-10, REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT
10	DESIGN STANDARD RH-11, STABILIZED SHOULDER (INTERSTATE)
11	DESIGN STANDARD RK-4, BRIDGE APPROACH PAVEMENT
12	DESIGN STANDARD RE-1, FORMED STEEL BEAM GUARD RAIL
13A	DESIGN STANDARD RE-2, BEAM RAIL AT BRIDGE APPROACH
14	DESIGN STANDARD RH-9, SUPERELEVATION DUAL ROADWAY
15A-E	DESIGN STANDARD RC-1 & RC-2 EROSION CONTROL DETAILS & PLANTINGS
16A-B	DESIGN STANDARD RF-5 & RF-7 METAL ELBOW & CORR. METAL DIAPHRAGM
17	DESIGN STANDARD RD-1, PROJECT SIGN (INTERSTATE)
13B	DETAIL FOR PLACING FORMED STEEL BEAM GUARD RAIL
15F	DETAILS FOR CONSTRUCTION OF WOVEN WIRE FENCING AND CHANNEL CROSSING
15G	DETAILS FOR WOVEN WIRE FENCING AND GATE CORNERS

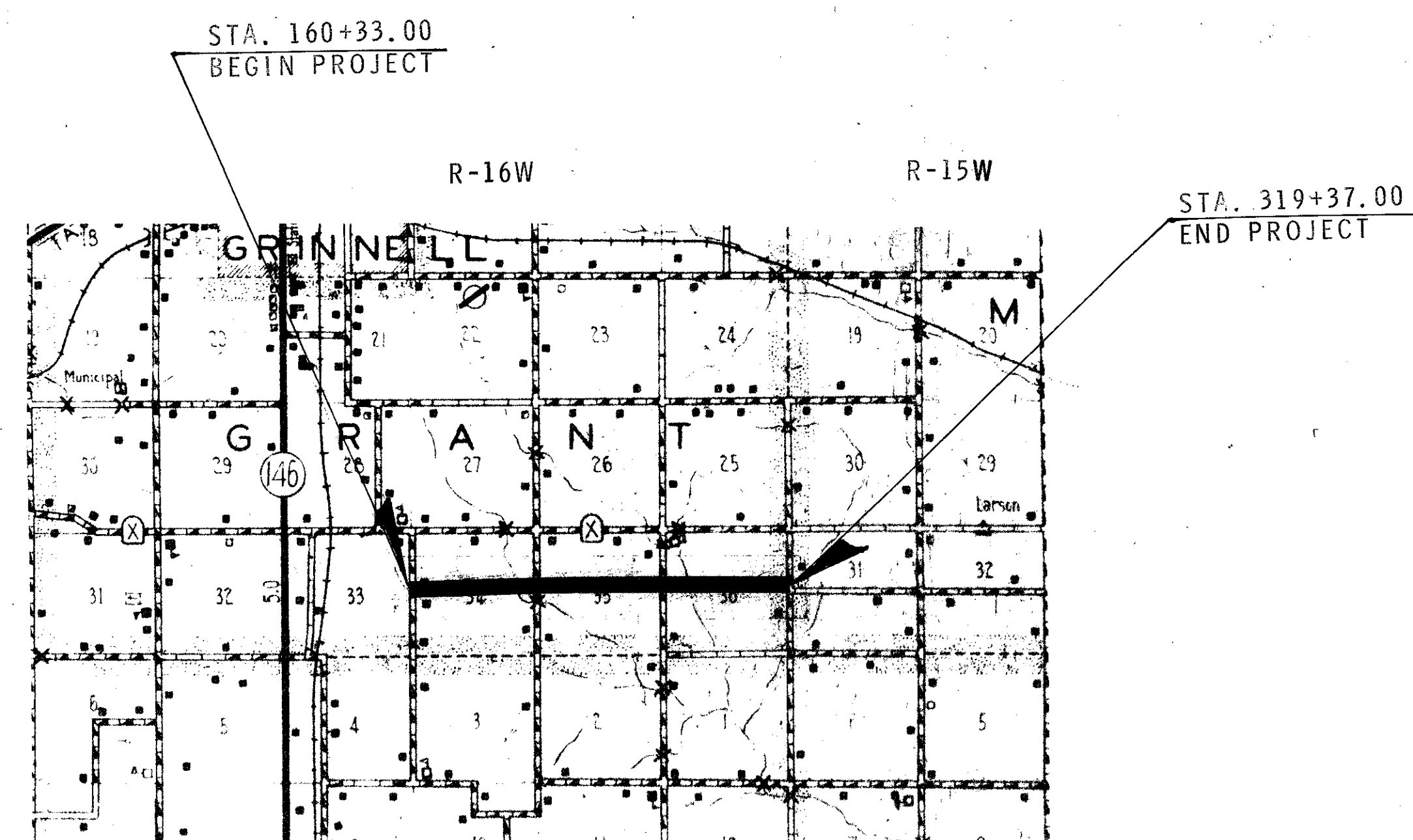
CONSTRUCTION PLANS SHOWING PROJECT

AS BUILT - TWO COPIES PREPARED.

PREPARED BY *John T. Lawrence*
(RESIDENT ENGINEER)

DATE _____
THIS COPY APPROVED AND FORWARDED
TO AMES - DATE _____
OTHER COPY DELIVERED TO DIVISION
MAINTENANCE ENGINEER (DIV. MAINT. ENGR.)

DATE _____
SIGNED _____



DESIGN DESIGNATION
INTERSTATE
HIGHWAY

1963 AADT 11,130 V.P.D.
1975 AADT 20,420 V.P.D.
1975 DHV 2,748 V.P.H.
DIRECTIONAL 60 %
TRUCKS 13 %
DESIGN V 70 M.P.H.

FULL CONTROL OF ACCESS
SHALL BE EXERCISED ON
THIS PROJECT.

REVISED JUNE 25, 1964 SHEETS NO. 1,
2, 15F & 15G

REVISED JUNE 5, 1964 SHEETS NO. 1, 2,
4, 15A THRU 15E & 16A-B

REVISED AUG. 20, 1963 SHEET NO. 2

APPROVED
John T. Lawrence
DEPUTY CHIEF ENGINEER
IOWA HIGHWAY COMMISSION

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
APPROVED
John T. Lawrence
CHIEF ENGINEER

Aug 11, 1964 Fencing

POWESHIEK

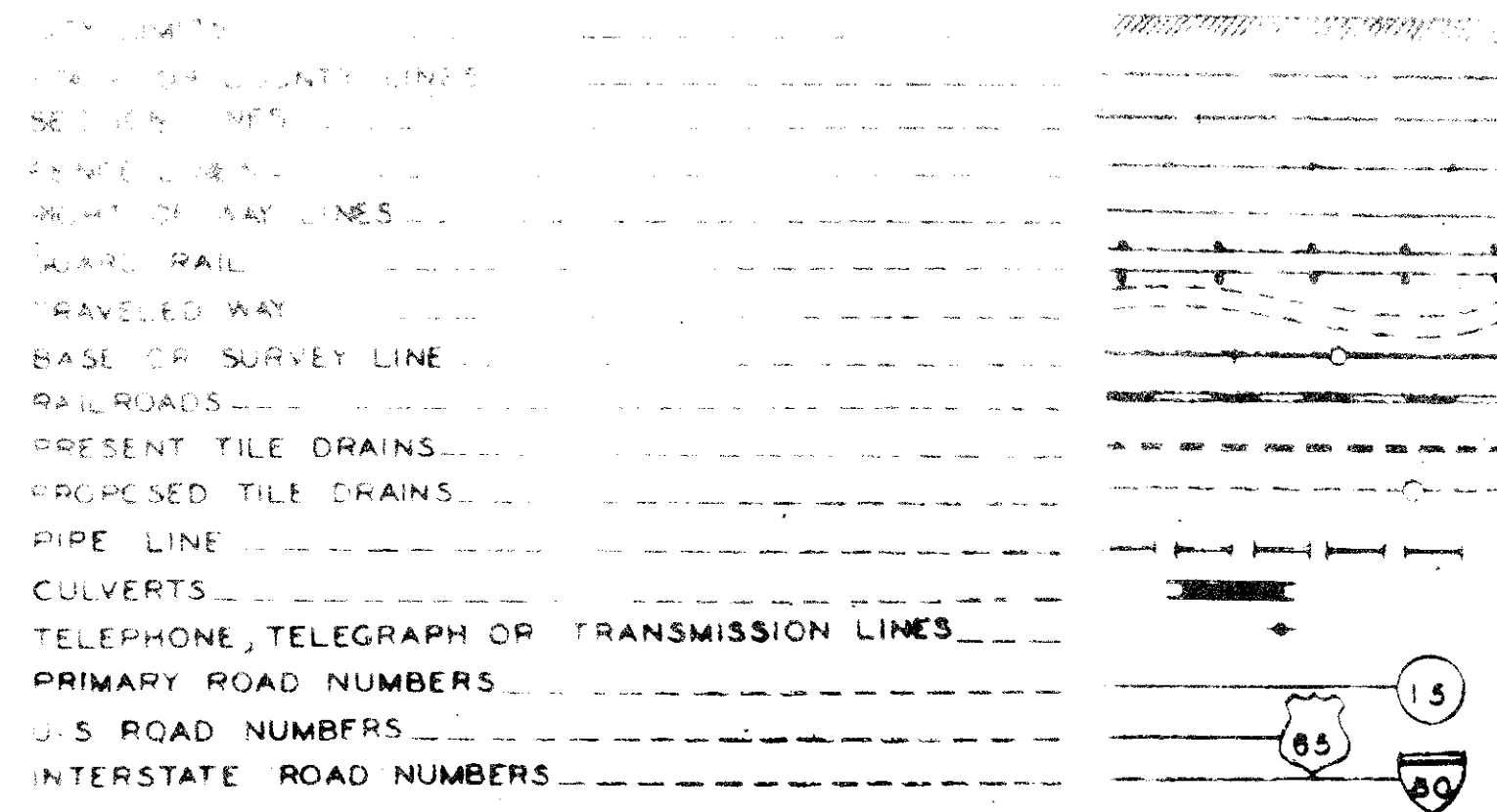
COUNTY

PROJECT NO. 80-5(31) 188

SHEET NO. 1

I-80-5(31)188 906.11.1964

CONVENTIONAL SIGNS



STATE OF IOWA
STATE HIGHWAY COMMISSION

PLAN & PROFILE OF PROPOSED IMPROVEMENT
ON THE

INTERSTATE ROAD SYSTEM
GRADING PROJECT NO. 1 - 80-5(29)188

ON INTERSTATE 80 FROM ONE MILE EAST IA. #146, EAST APPROX. 3 MILES

POWESHIEK COUNTY

SCALE: PLAN 1 INCH=100 FT.
PROFILE HOR. 1 INCH=100 FT. VERT. 1 INCH=10 FT.

THE IOWA STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS
FOR CONSTRUCTION WORK, SERIES OF 1960, SHALL
APPLY TO WORK ON THIS PROJECT

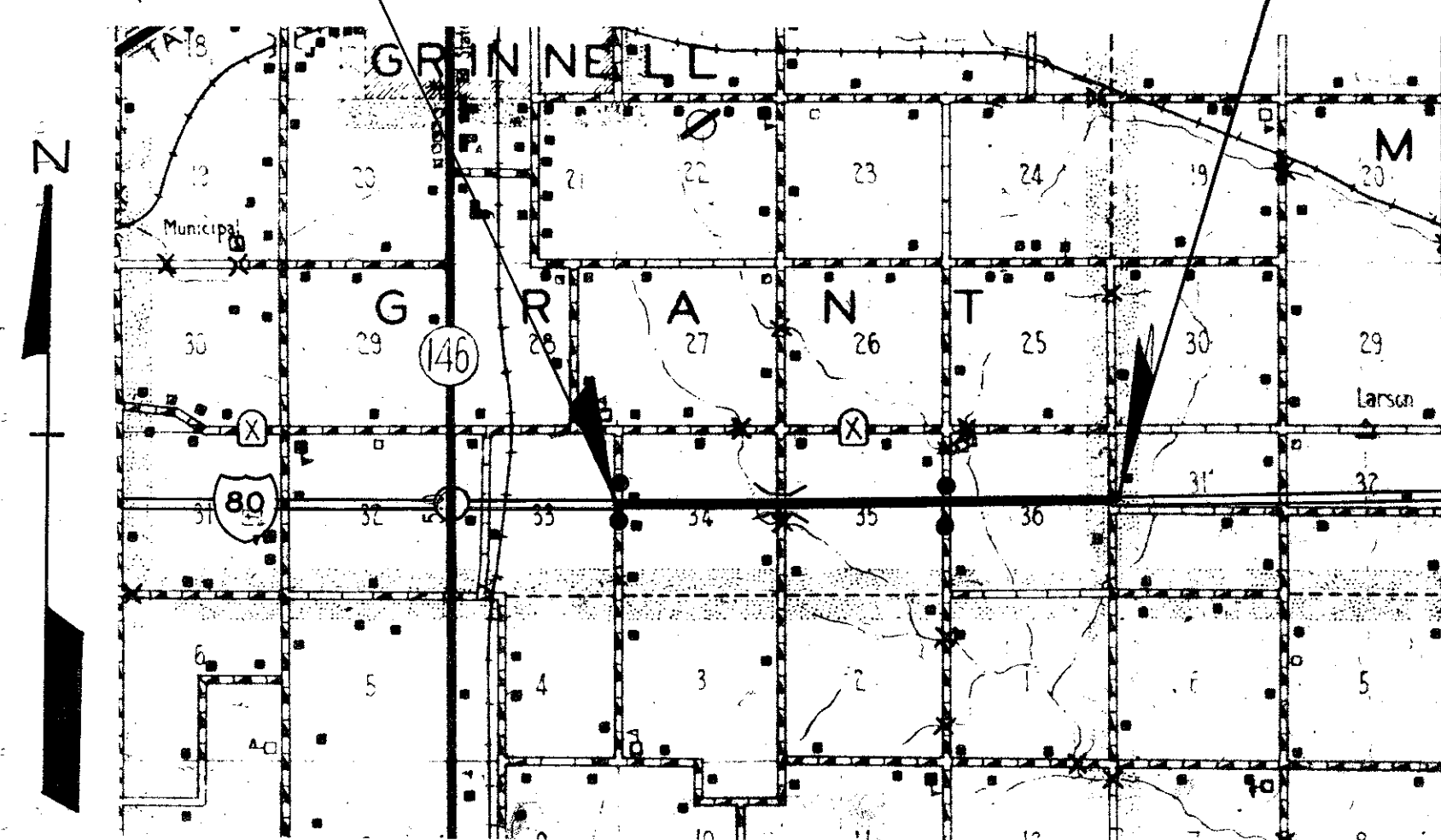
MILEAGE SUMMARY			
105-1			
DIV.	LOCATION	LIN. FT.	MILES
	RURAL:		
	STA. 160+33.00 TO STA. 319+37.00	15,904.00	
	BRIDGE STA. 209+00.00	35.20	
	BRIDGE STA. 213+41.30	114.50	
	BRIDGE STA. 276+00.00	27.20	
	NET LENGTH OF ROADWAY IN PROJECT	15,727.10	2.979
	NET LENGTH OF BRIDGES IN PROJECT	176.90	0.033
	TOTAL LENGTH OF PROJECT	15,904.00	3.012

INDEX OF SHEETS	
105-3	
NO.	DESCRIPTION
1	TITLE SHEET
2	TYPICAL CROSS SECTIONS
3	ESTIMATE OF QUANTITIES
4	TABULATION OF DRAINAGE STRUCTURES
5	DETAILS OF DRAINAGE STRUCTURES
6	PLAN AND PROFILE STA. 160+33.00 TO STA. 185+00
7	PLAN AND PROFILE STA. 185+00 TO STA. 215+00
8	PLAN AND PROFILE STA. 215+00 TO STA. 245+00
9	PLAN AND PROFILE STA. 245+00 TO STA. 275+00
10	PLAN AND PROFILE STA. 275+00 TO STA. 305+00
11	PLAN AND PROFILE STA. 305+00 TO STA. 335+00
12	SIDE ROAD PLAN AND PROFILE AT STA. 213+40.7
13	DETAIL OF CHANNEL CHANGE STA. 209+00
14 & 15	TABULATION OF EARTHWORK QUANTITIES
16	TABULATION OF MOISTURE AND DENSITY CONTROL AND SUBGRADE TREATMENTS
17A-17E	SOIL SURVEY
18	DESIGN STANDARD RF-1 CONCRETE CULVERT PIPE
19	DESIGN STANDARD RF-2 CONCRETE PIPE ADAPTORS
20	DESIGN STANDARD RF-3 CONCRETE PIPE APRONS
21	DESIGN STANDARD RF-4 CONCRETE PIPE CULVERT DETAILS
22A	DESIGN STANDARD RF-5 METAL PIPE APRONS AND BEVELED ENDS
23	DESIGN STANDARD RF-7 CORRUGATED METAL TYPE "A" DIAPHRAGM
24	DESIGN STANDARD RL-1 DETAILS OF EMBANKMENTS
25	DESIGN STANDARD RL-2 TYPICAL CONSTRUCTION OF EMBANKMENTS WITH MOISTURE AND DENSITY CONTROL
26	DESIGN STANDARD RC-4 DITCH BLOCKS AND DIKES
27A	DESIGN STANDARD RC-1 EROSION CONTROL DETAILS
27B	DESIGN STANDARD RD-1 PROJECT SIGNS
27C	DESIGN STANDARD RH-9 SUPERELEVATION FOUR LANE DIVIDED PORTLAND CEMENT CONCRETE PAVEMENT
27D	DESIGN STANDARD RE-3 ROAD CLOSURE BARRICADE
27E	DESIGN STANDARD RE-1 FORMED STEEL BEAM GUARD RAIL
22B	DESIGN STANDARD RF-12 CONCENTRIC METAL PIPE REDUCER
28-104	CROSS SECTIONS
98	OMITTED SHEET

ABOVE SHEETS ARE BEHIND PAVING SECTION

I-80-5(29)188

160+33.00 BEGIN PROJECT 319+37.00 END PROJECT



SCALE
1-INCH=1 MILE

DESIGN DESIGNATION
INTERSTATE
HIGHWAY

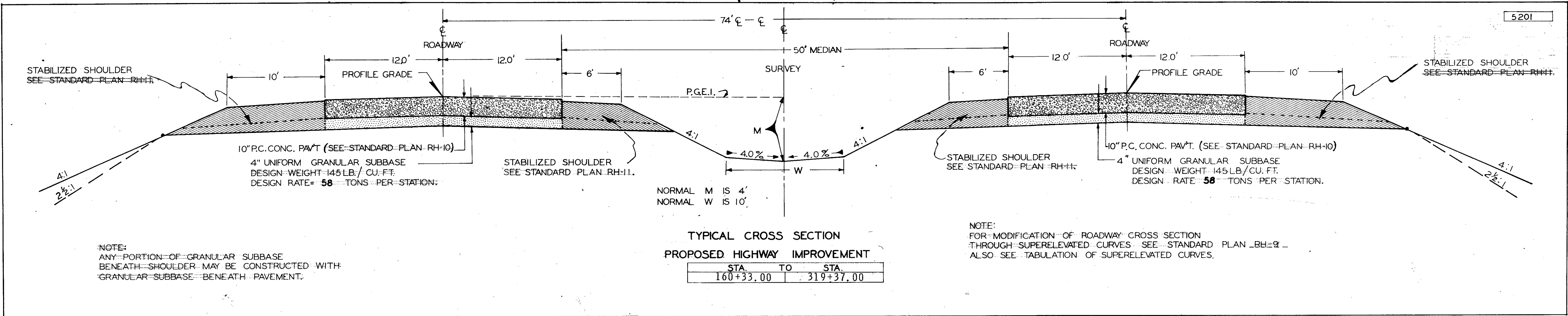
1963 AADT	11,130	V.P.D.
1975 AADT	20,420	V.P.D.
1975 DHV	2,748	V.P.H.
DIRECTIONAL	60	%
TRUCKS	13	%
DESIGN V	70	M.P.H.

FULL CONTROL OF ACCESS
SHALL BE EXERCISED ON
THIS PROJECT.

REVISED NOV. 18, 1963 SHEETS NO. 3 & 4
REVISED APRIL 17, 1963 SHEETS NO. 4, 6 AND 33
REVISED MARCH 8, 1963 SHEETS NO. 3, 171, 51, 52 & 53
REVISED FEB. 5, 1963 SHEETS NO. 3 & 4
REVISED JAN. 30, 1963 SHEETS NO. 3, 4 & 6
REVISED JAN. 28, 1963 SHEETS NO. 1, 3, 10, 11, 14, 15 AND 98
REVISED JAN. 9, 1963 SHEETS 3, 8, 14, 17D, 67, 68, 69 & 70

APPROVED
R.M. Taylor
DEPUTY CHIEF ENGINEER DATE
IOWA HIGHWAY COMMISSION

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
APPROVED
DIVISION ENGINEER DATE



SUPERELEVATION DATA (SEE STANDARD PLAN FOR DETAILS)						
P.I. STATION	D	V	e	S	Δ	REMARKS
160+45.8	0° 45' 00"	70	0.021	108	6° 51'	
196+81.6	0° 12' 10"	70	N. C.	0	1° 13'	
266+31.9	0° 03' 25"	70	N. C.	0	0° 20 1/2'	
319+37.0	0° 08' 20"	70	N. C.	0	0° 50'	

TABULATION OF EXPANSION JOINTS
STA. 210+00
STA. 217+00

ESTIMATED PROJECT QUANTITIES				
NO.	ITEM	UNIT	TOTAL	
1	Standard 10" Reinforced Portland Cement Conc. Pav't.	Sq. Yds.	84,211	
2	Granular Subbase	Tons	33,980	
3	Asphalt Treated Base Class 1	Tons	29,509	
4	Primer and/or Tack Coat Bitumen	Gallons	37,193	
5	Binder Bitumen	Gallons	21,553	
6	Cover Aggregate	Tons	701	
7	Formed Steel Beam Rail	Lin. Ft.	175	
8	Posts	No.	24	
9	Project Signs	No.	2	

ESTIMATED FENCING QUANTITIES FOR AUG. 1964 LETTING			
NO.	ITEM	UNIT	TOTAL
1	Right of Way Fence	Sta.	21.95

ESTIMATED PLANTING QUANTITIES (FUTURE)			
TREEST	NO.	95	
SHRUBS	NO.	-	
PEAT	CU. YDS.	9.0	
FERTILIZER	LBS.	95.0	

EROSION CONTROL WORK WILL BE DONE ON THIS PROJECT. THE DETAILS WILL BE DETERMINED FOLLOWING COMPLETION OF THE PAVING.

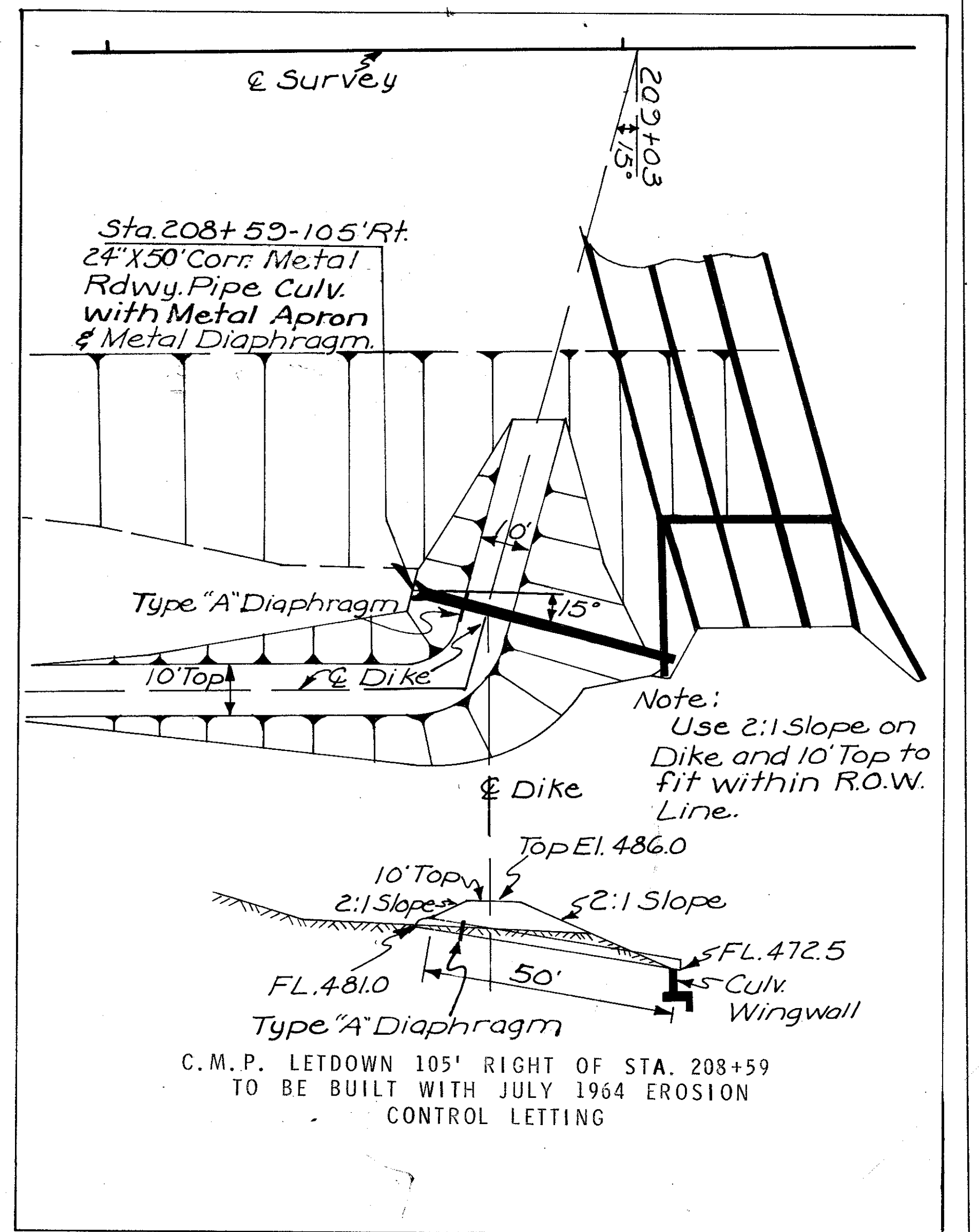
ESTIMATE REFERENCE INFORMATION	
ITEM NO.	DESCRIPTION
2.	Includes an additional 10% for irregularities in subgrade. There are approximately 5.93 miles of subgrade to be corrected.
7.	Includes 20 curved metal end sections.
5.	Includes 4561 gal. for fog coat.

ESTIMATED EROSION CONTROL QUANTITIES FOR JULY 1964 LETTING				
NO.	ITEM	UNIT	DIVISION	TOTAL
101	SEEDING	ACRES		85.0
102	SODDING	SQUARES		511.0
103	MULCHING	ACRES		50.0
104	FERTILIZING	ACRES		85.0
105	Erosion Net Over Sod (Special Ditch Control)	SQUARES		-
106	JUTE MESH (SPECIAL DITCH CONTROL)	SQUARES		2838.0
106A	Jute Mesh Over Sod (Special Ditch Control)	SQUARES		302.0

LETDOWN STRUCTURE WITH EROSION CONTROL FOR JULY 1964 LETTING			
ESTIMATED PROJECT QUANTITIES			
NO.	ITEM	UNIT	TOTAL
1	Class 10 Excavation	Cu. Yds.	200
2	Class 20 Excavation	Cu. Yds.	22
3	24" Corr. Metal Roadway Pipe Culv.	Lin. Ft.	50
4	24" Metal Apron	No.	1
5	24" Corr. Metal Diaphragm	No.	1

FOR JULY 1964 LETTING	
ITEM NO.	DESCRIPTION
1.	Class 10 Exc. for dike to be obtained at the direction of the Engineer in charge of construction. Maximum haul to be two miles. No payment for overhaul will be allowed.

TABULATION OF FENCE LOCATIONS FOR AUG. 1964 LETTINGS		
LOCATION	SIDE	UNIT IN STA'S.
STA. 167+90	LT.	2.20
	RT.	2.50
STA. 175+60	LT.	1.15
	RT.	2.00
STA. 134+55	LT.	1.05
	RT.	1.20
STA. 207+10	RT.	.90
STA. 212+50	LT.	1.00
	RT.	.80
STA. 214+25	LT.	.85
	RT.	.85
STA. 235+55	RT.	1.10
STA. 263+70	LT.	1.50
	RT.	2.35
STA. 276+00	LT.	1.00
	RT.	1.50



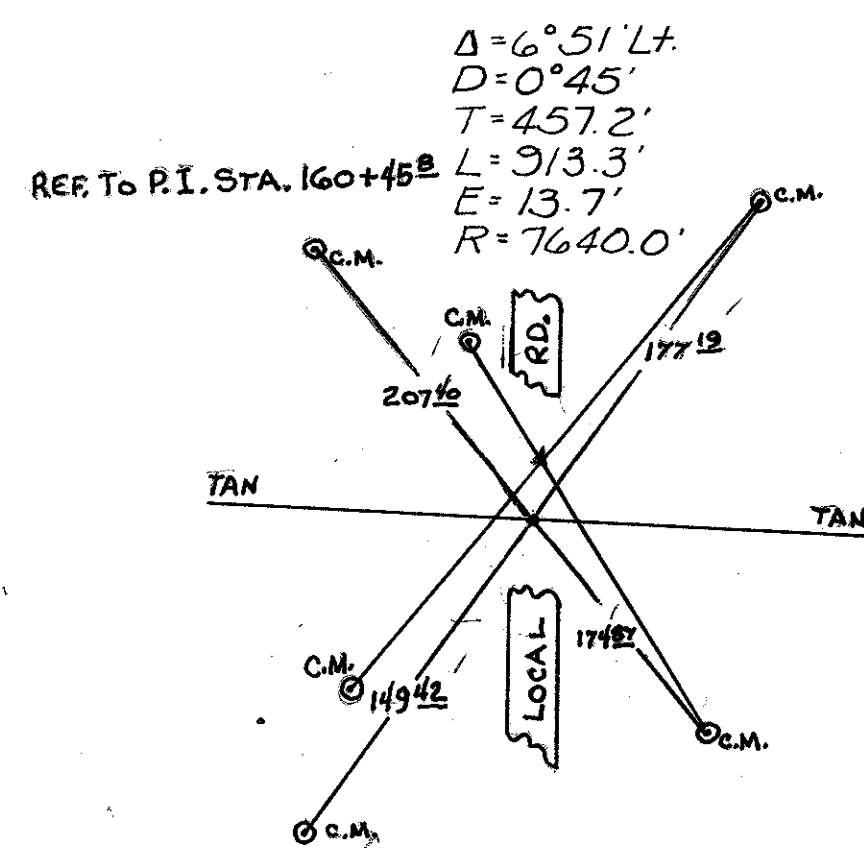
Revised June 25, 1964
Revised Aug. 20, 1963

Property Owners:
A-Ralph Fleener
B-George A Hyde

GRANT TWP
T80N R16W

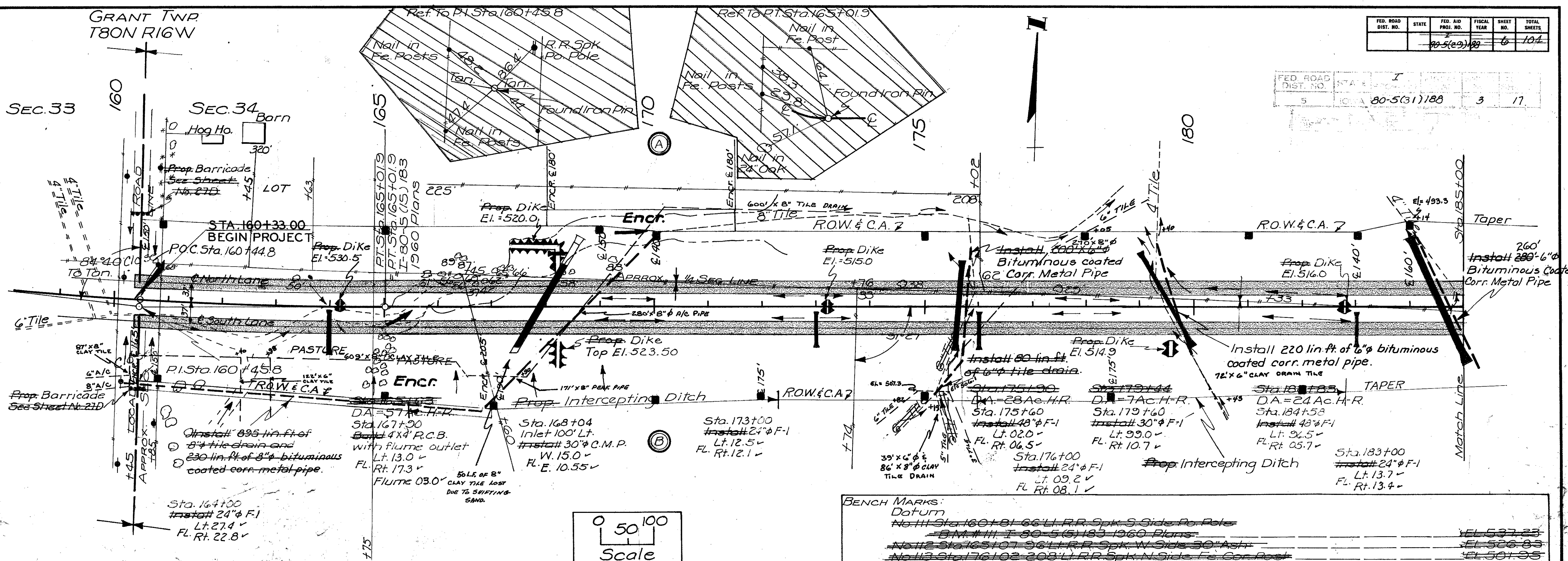
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
80-5(29)188	IL			6	104

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
80-5(31)188	IL			3	17



NAME: RALPH FLEENER
ACQUIRED: JANUARY 1, 1963
CONSIDERATION: \$ 6,005.00
TITLE BY: CONDEMNATION
BOOK 253 PAGE 166
COUNTY POWESHIEK, RECORDER.

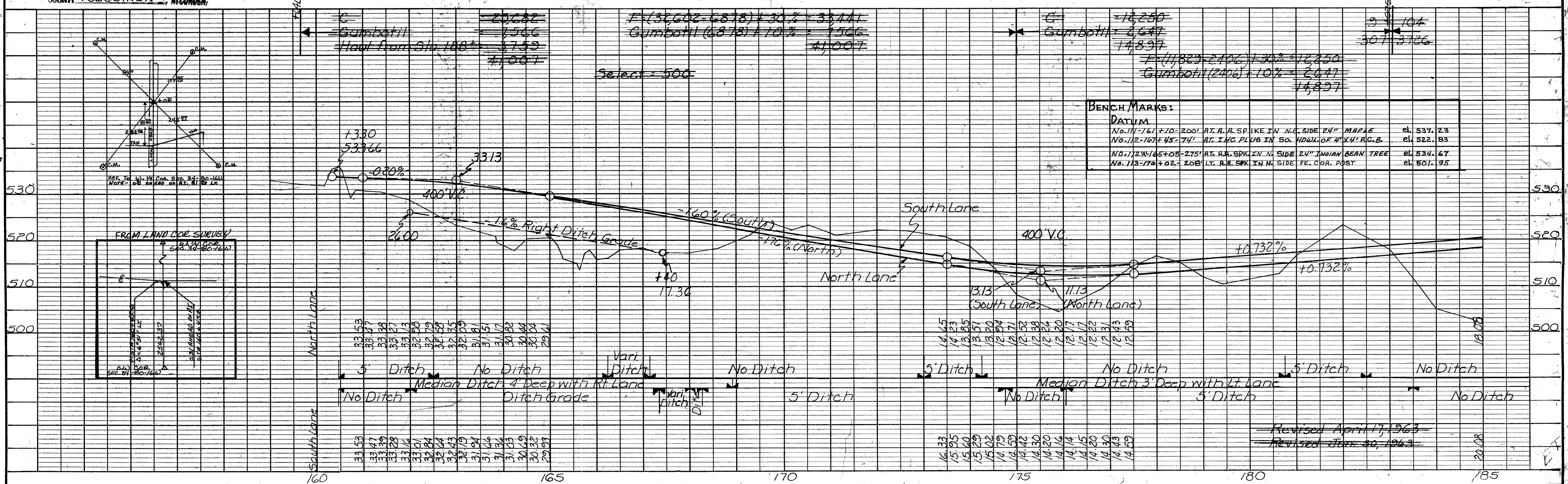
NAME: GEORGE A. HYDE
ACQUIRED: MAY 24, 1962
CONSIDERATION: \$ 8,400.00
TITLE BY: WARRANTY DEED
BOOK 252 PAGE 407
COUNTY POWESHIEK, RECORDER.



BENCH MARKS:

Datum
No. 111 Sta. 160+01 66" L.R. Spk. S. Side Fe. Post
No. 112 Sta. 163+01 36" L.R. Spk. N. Side 30" Ash
No. 113 Sta. 176+02 208" L.R. Spk. N. Side Fe. Cor. Post

EL 537.23
EL 526.83
EL 501.95

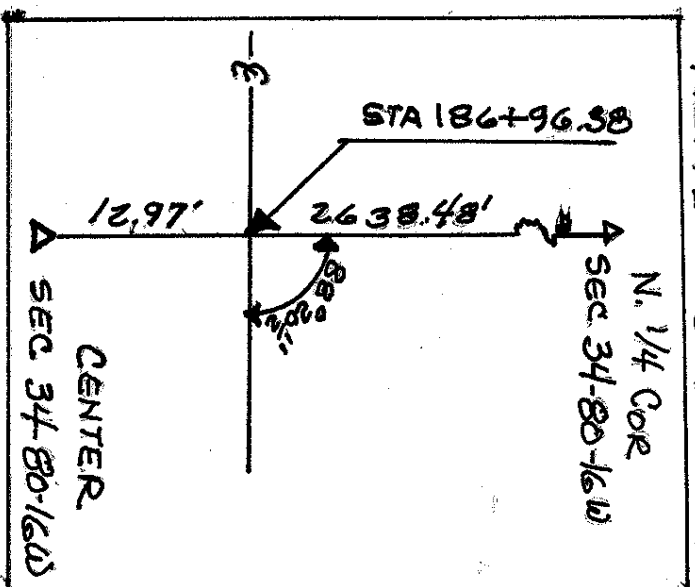


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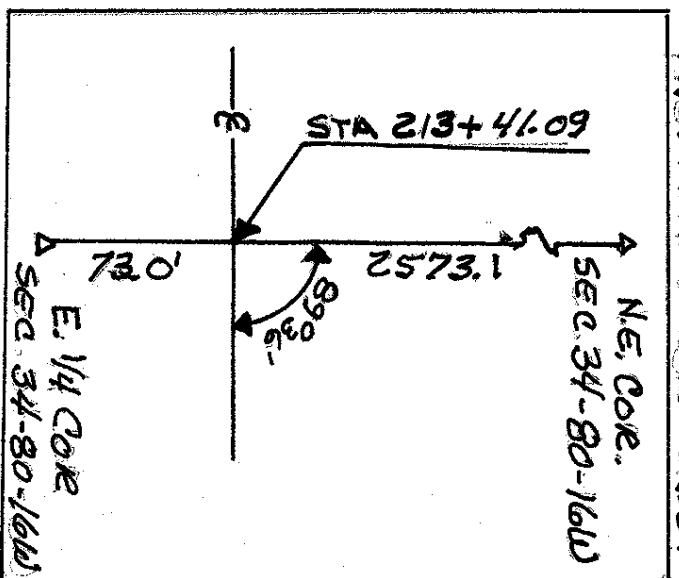
DATUM
No. 111-161+10-200' AT R.A. SPIKE IN N.E. SIDE 24" MAPLE
No. 112-167+45-74' AT ING. PLUG IN SO. SIDE OF 4'x4' R.C.B.
No. 113-176+05-275' AT R.A. SPIKE IN N. SIDE 24" INDIAN BURN TREE
No. 113-176+02-208' L.R. SPK. IN N. SIDE FE. COR. POST

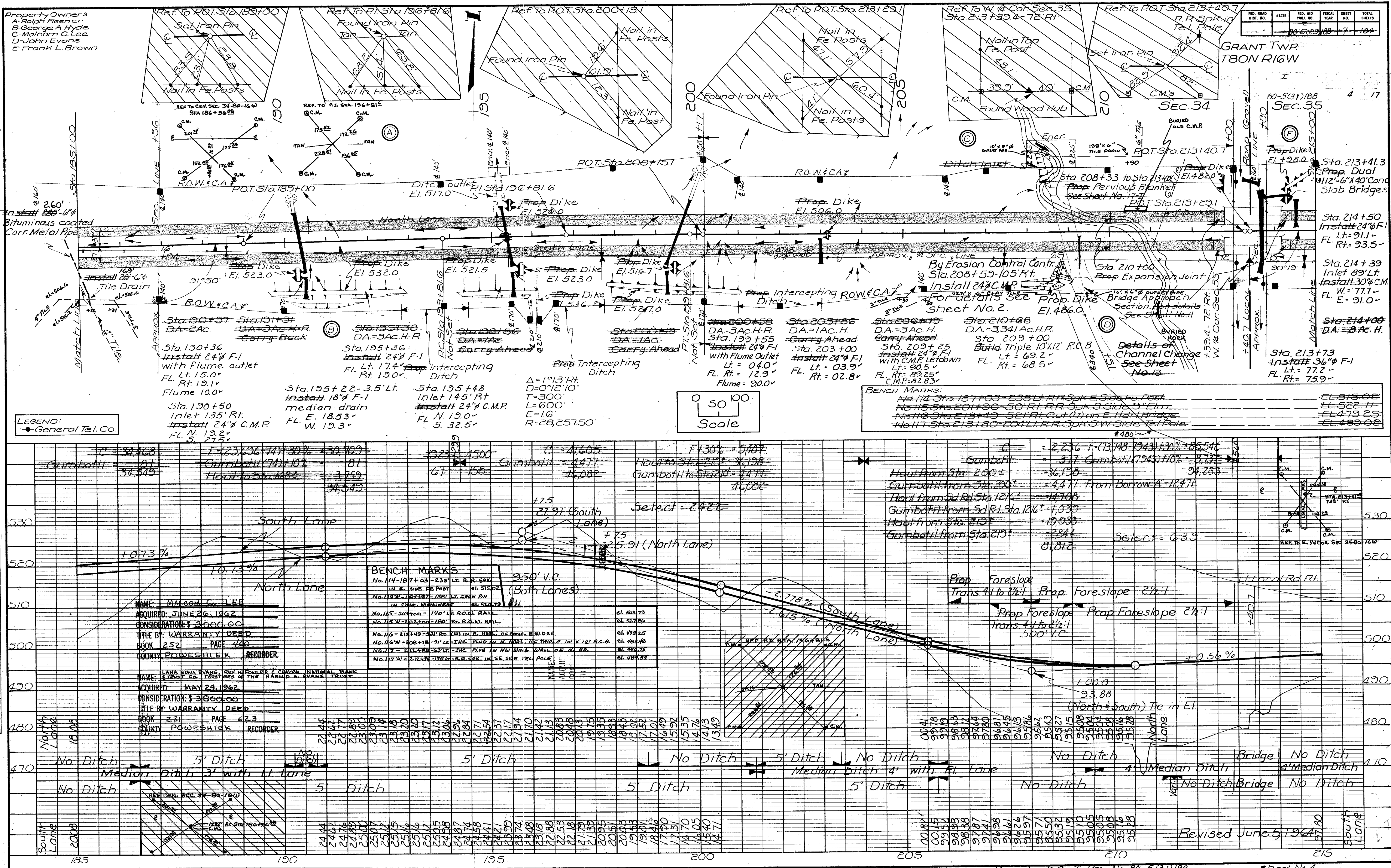
EL 537.23
EL 522.83
EL 534.67
EL 501.95

FROM LAND COR SURVEY



FROM LAND COR SURVEY





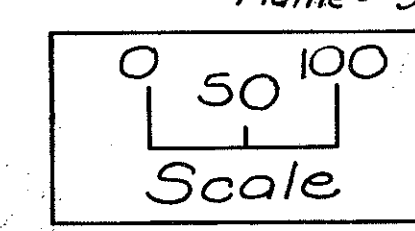
Property Owners
A. Ralph Pienaar
B. George A. Hyde
C. Malcolm C. Lee
D. John Evans
E. Frank L. Brown

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
80-5(31)188	7	104			

PLAN	DATE	BY
SURVEYED		
NOTED		
ALIGNED		
CHECKED		
BY		

PROFILE	DATE	BY
SURVEYED		
NOTED		
ALIGNED		
CHECKED		
BY		

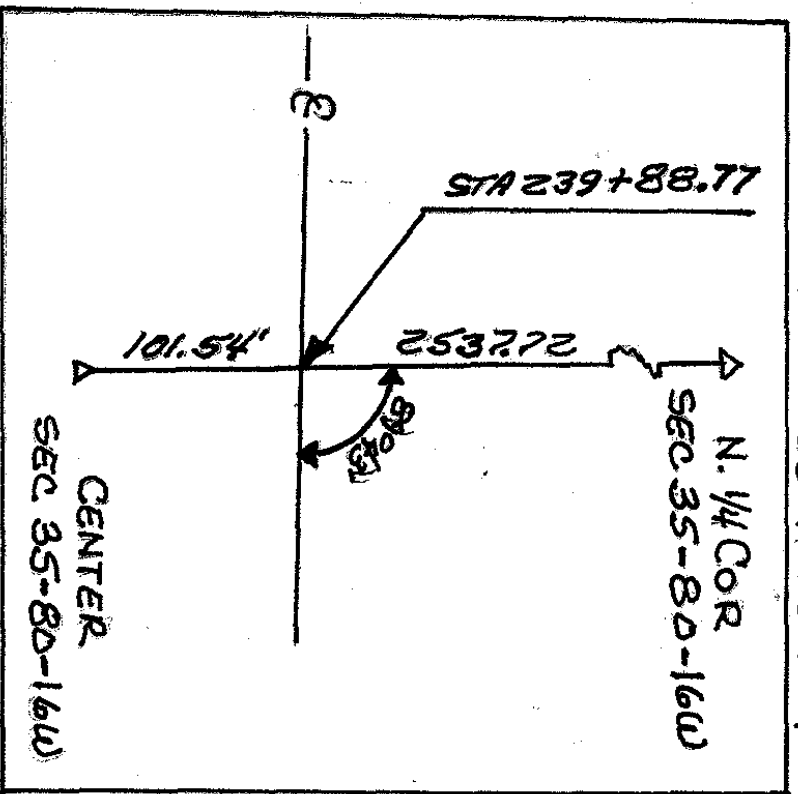
LEGEND:
General Tel. Co.



BENCH MARKS:
No. 114 Sta. 187+03 - 235' L.R. Spk. S. Side Fe. Post
No. 115 Sta. 201+90 - 50' R.R. Spk. S. Side 3' Elm.
No. 116 Sta. 213+49 - 52' R.R. Spk. S. Side 3' Elm.
No. 117 Sta. 213+80 - 204' L.R. Spk. S. Side Tel. Pole

Revised June 5, 1967

FROM LAND COR. SURVEY



Property Owners
D. John Evans
E. Frank L. Brown
F. Sherman Mackin
G. Iver Iverson
H. Lavern & Margaret Morrison

FRANK L. BROWN &
NAME: MAX EUGENE BROWN
ACQUIRED: MAY 23, 1962
CONSIDERATION: \$ 4,800.00
TITLE BY: WARRANTY DEED
BOOK 252 PAGE 406
COUNTY POWESHIEK, RECORDER.

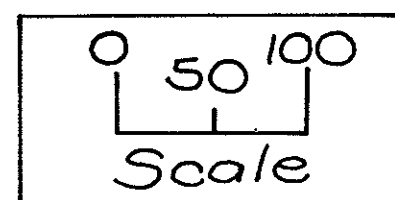
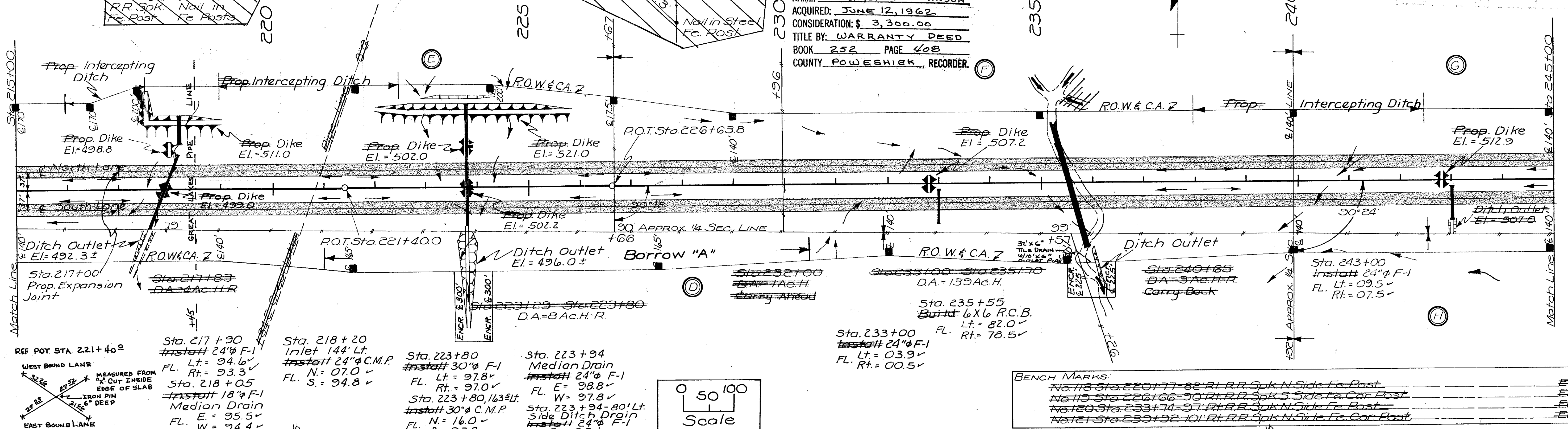
GRANT TWP
T8ON R16W
SEC.35

MARGARET W. MORRISON
NAME: LAVERN J. MORRISON
ACQUIRED: JANUARY 1, 1963
CONSIDERATION: \$ 802.50
TITLE BY: CONDEMNATION
BOOK 253 PAGE 166
COUNTY POWESHIEK, RECORDER.

NAME: SHERMAN E. MACKIN
ACQUIRED: NOVEMBER 1, 1962
CONSIDERATION: \$ 2,800.00
TITLE BY: WARRANTY DEED
BOOK 252 PAGE 402
COUNTY POWESHIEK, RECORDER.

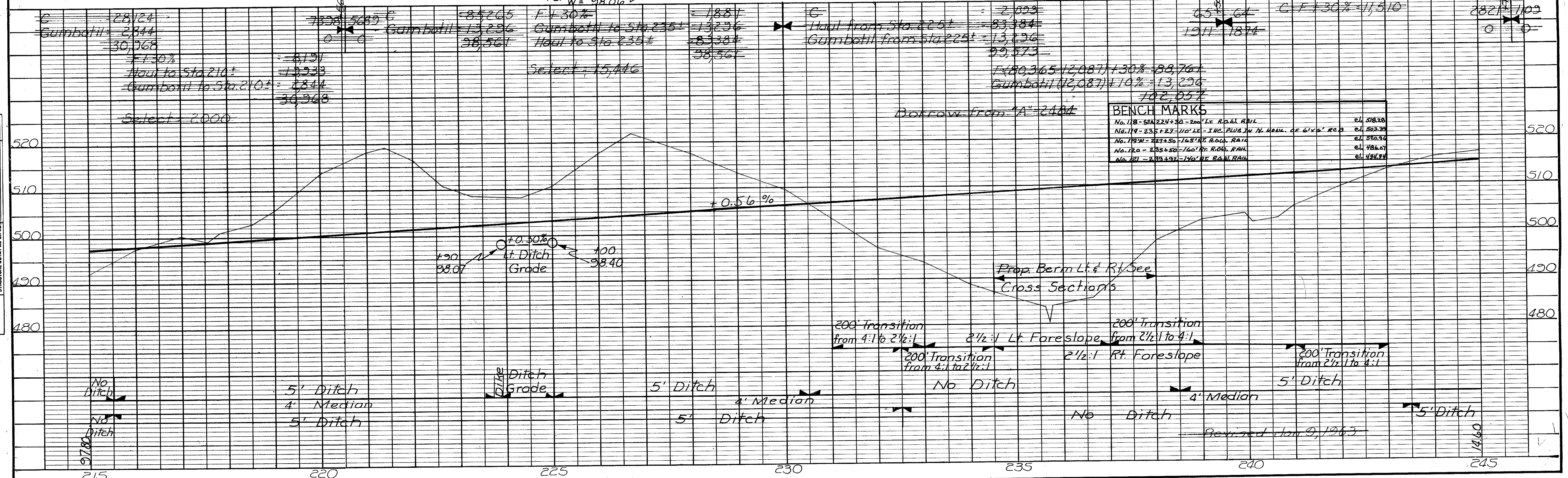
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IL	80-5(29)188		5	17

PLAN	DATE	BY
SURVEYED		
NOTE BOOK		
ALIGNED CHECKED		
RT. OF WAY CHECKED		



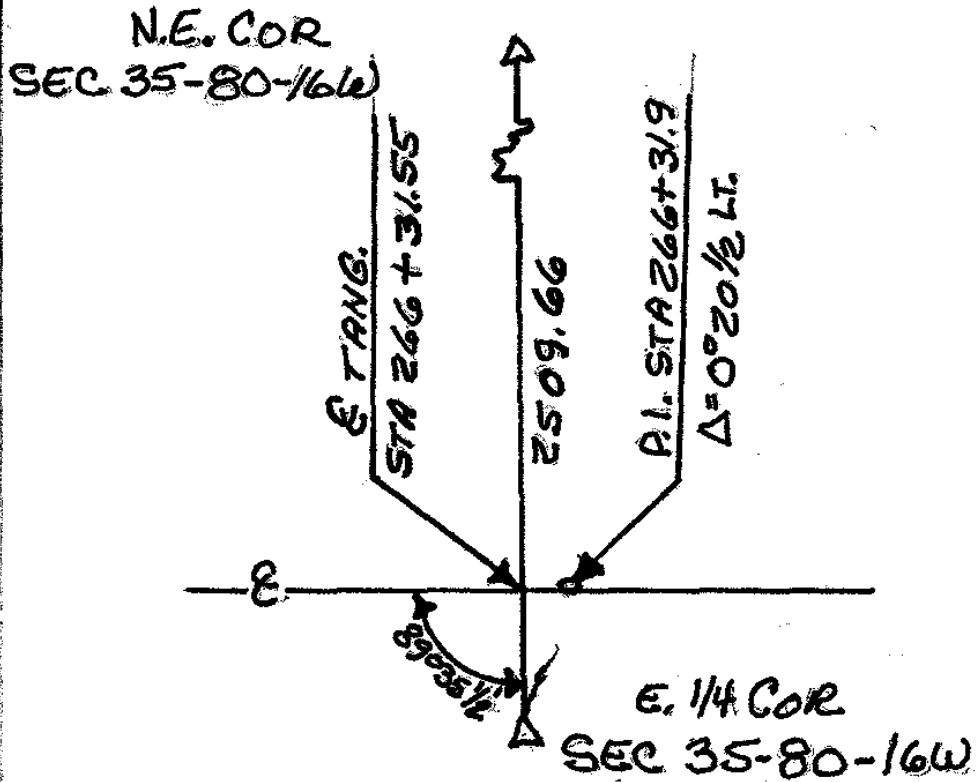
BENCH MARKS	
No. 118 Sta. 220+77-82 R.R. Spk N Side Fe Post	EL 516.83
No. 119 Sta. 226+66-70 R.R. Spk S Side Fe Cor Post	EL 521.65
No. 120 Sta. 233+74-97 R.R. Spk N Side Fe Post	EL 497.41
No. 121 Sta. 239+92-101 R.R. Spk N Side Fe Cor Post	EL 498.31

PROFILE	DATE	BY
SURVEYED		
NOTE BOOK		
GRADES CHECKED		
STRUCTURE NOTATIONS OK'D		

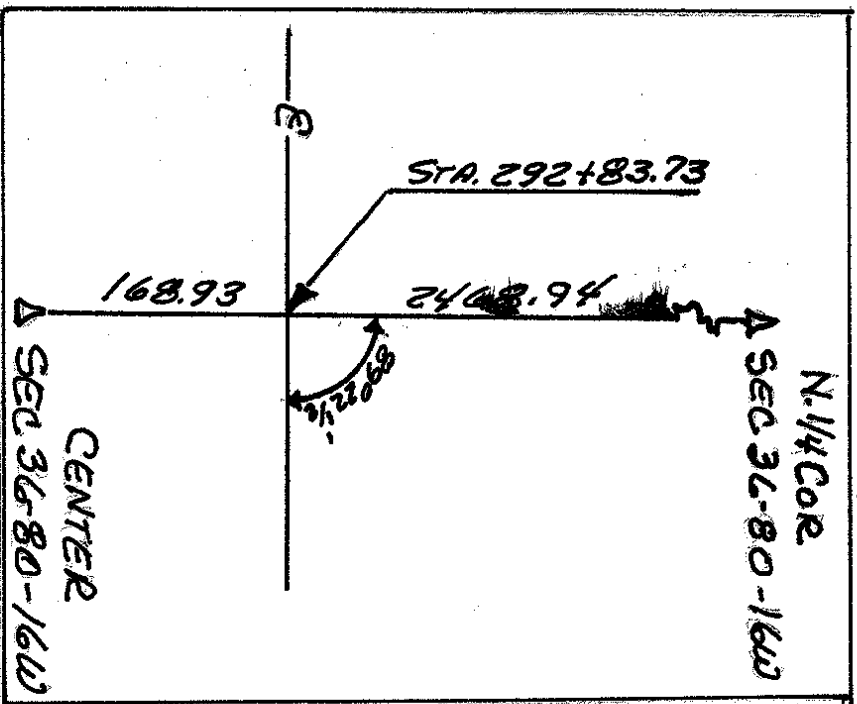


BENCH MARKS	
No. 118 Sta. 224+30-220' Lt. R.O.W. RAIL	EL 508.10
No. 119 Sta. 235+27-110' Lt. - INC. PLUS IN N. HAND. OF 6' X 6' R.O. 2	EL 503.20
No. 120 Sta. 231+50-165' Lt. R.O.W. RAIL	EL 506.34
No. 121 Sta. 235+50-160' Lt. R.O.W. RAIL	EL 506.07
No. 122 Sta. 239+92-140' Lt. R.O.W. RAIL	EL 494.94

FROM LAND COR. SURVEY



FROM LAND COR. SURVEY



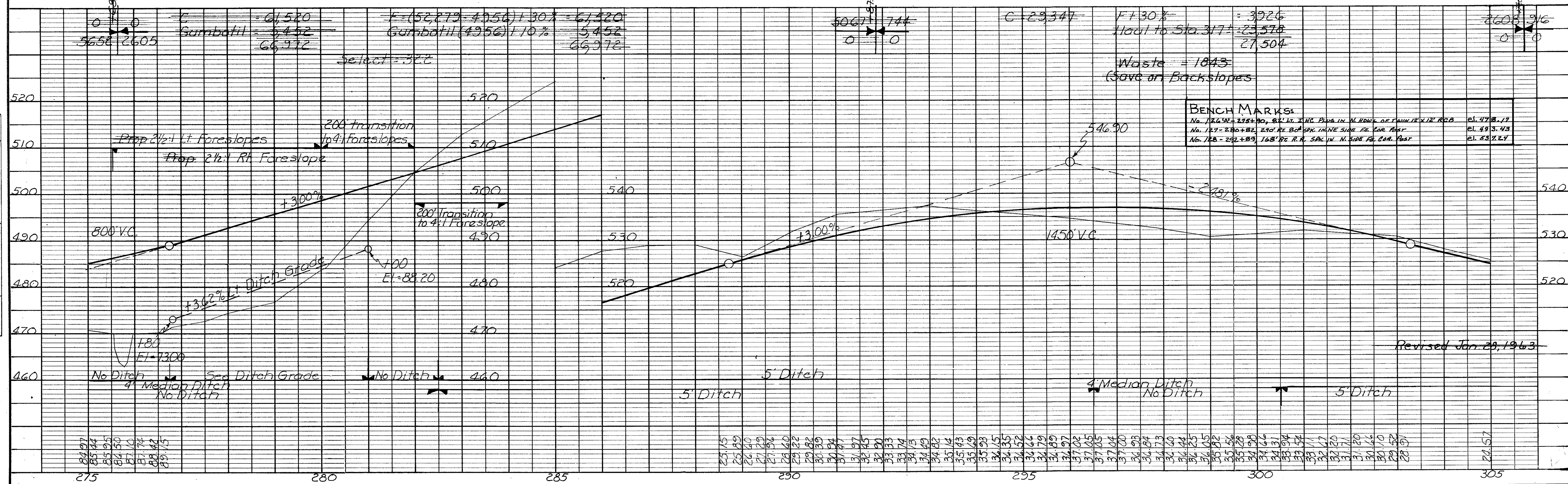
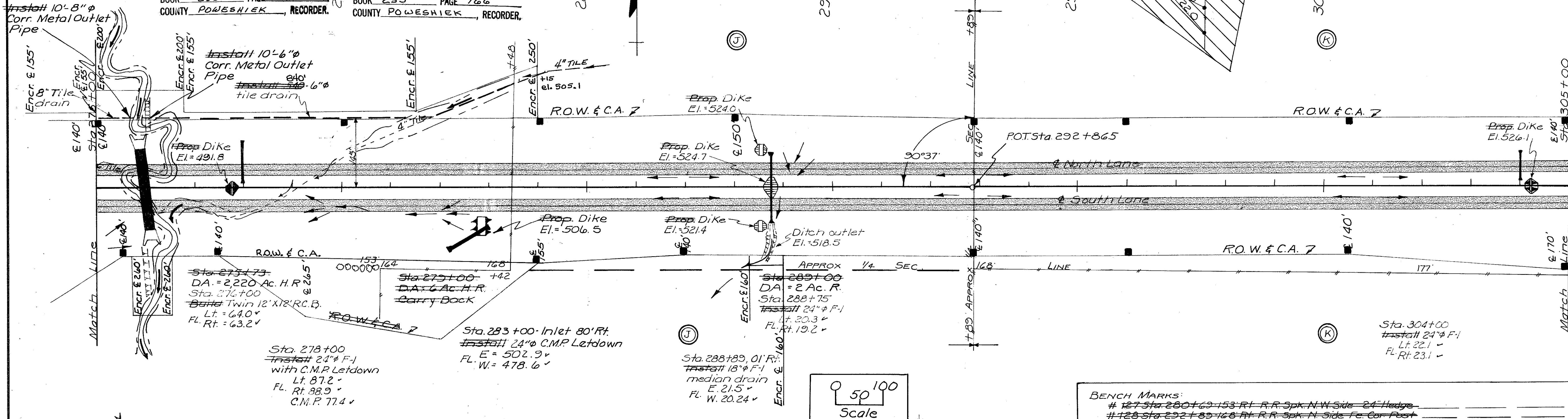
Property Owners
J-Marie Hull 1/2 Int.
Marie A. Hull Life Est 1/2 Int.
K-Louis F & Josephine Sietk NAME: MARIE A. HULL
ACQUIRED: JANUARY 1, 1963
CONSIDERATION: \$16,727.50
TITLE BY: CONDEMNATION
BOOK 253 PAGE 166
COUNTY POWESHIEK, RECORDER.

LOUIS F SIECK &
JOSEPHINE SIECK
ACQUIRED: JANUARY 1, 1963
CONSIDERATION: \$17,540.00
TITLE BY: CONDEMNATION
BOOK 253 PAGE 166
COUNTY POWESHIEK, RECORDER.

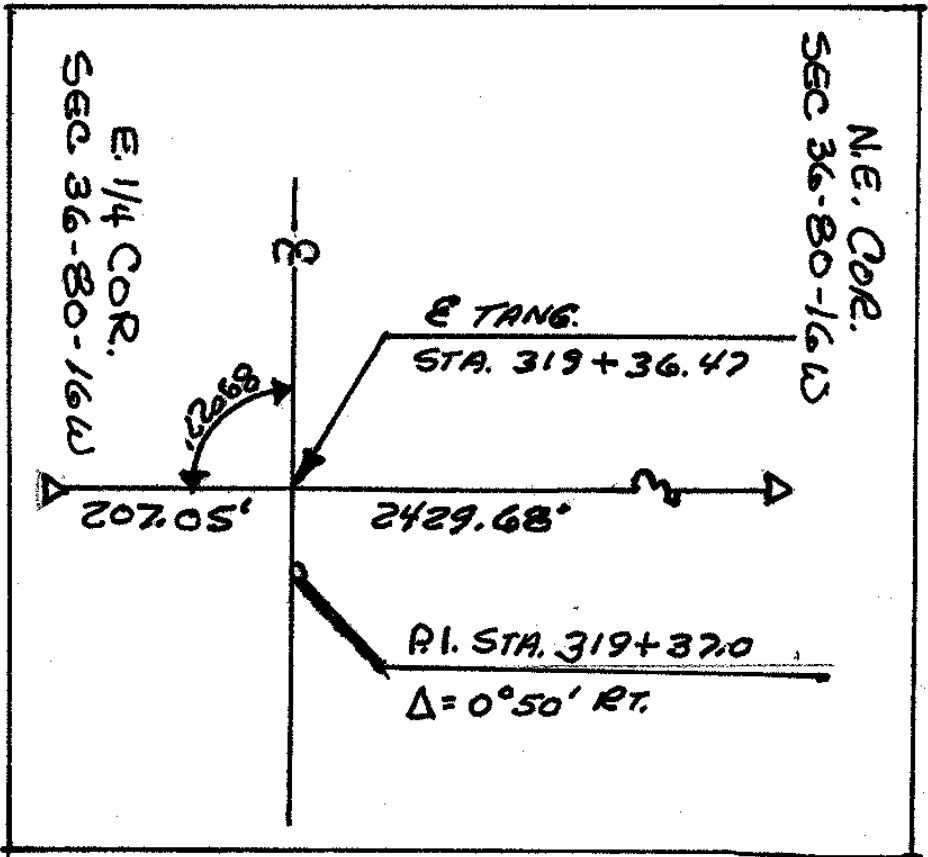
GRANT TWP
T80N R16W
SEC. 36

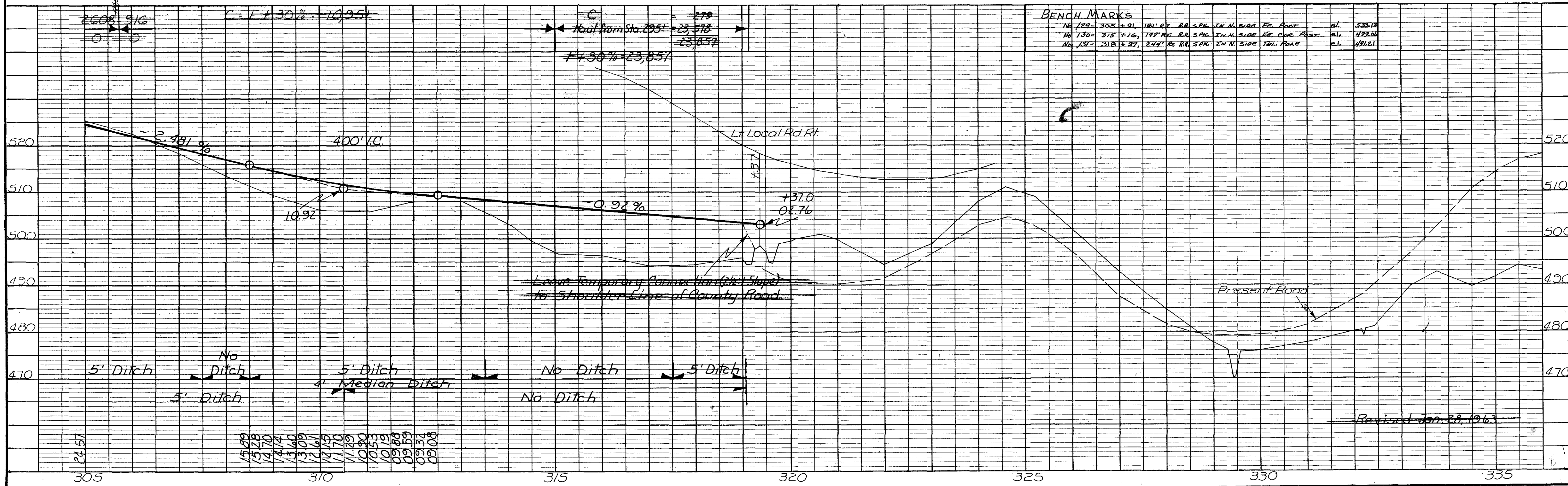
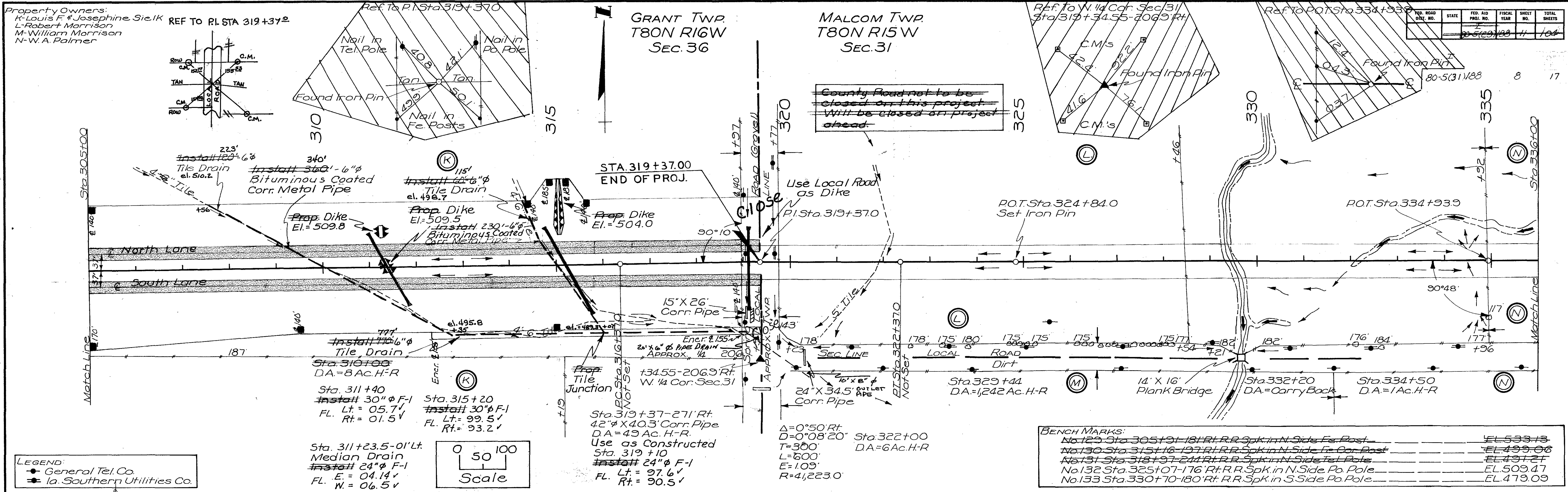
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IA	80-5(29)188	1963	10	104

80-5(31)188 7 17

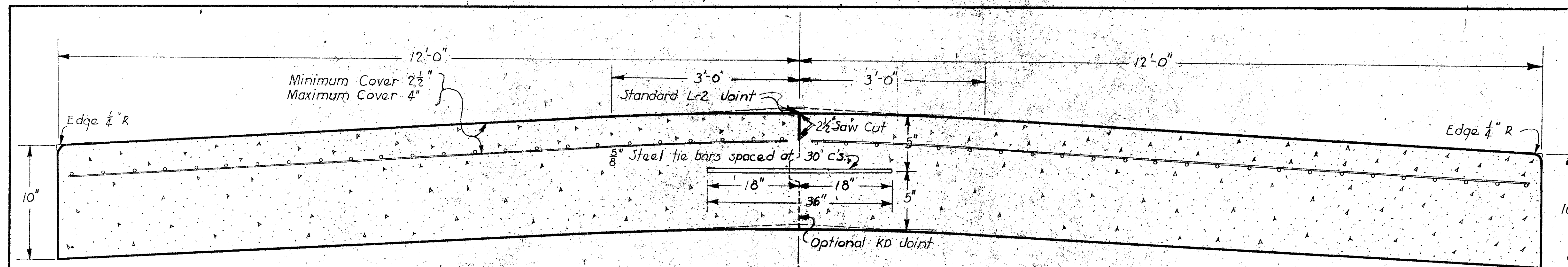


FROM LAND COR. SURVEY

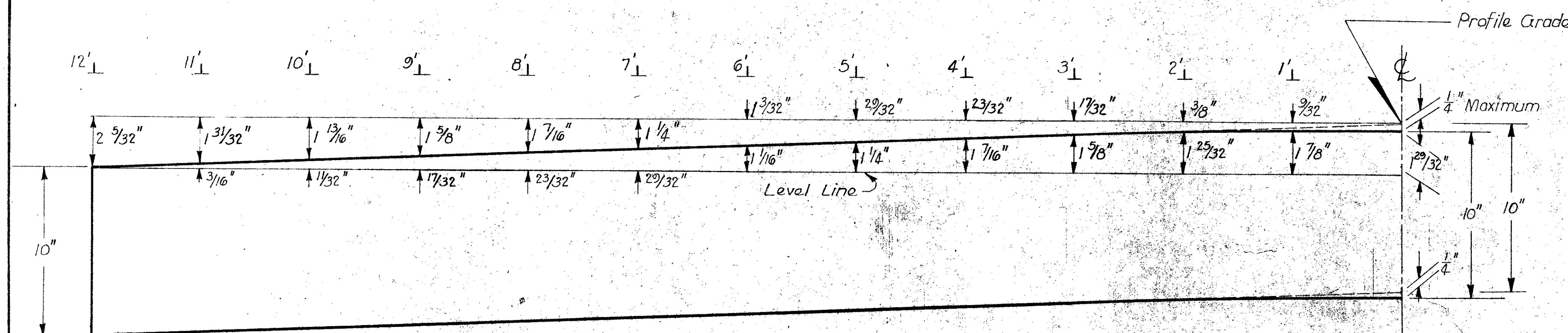




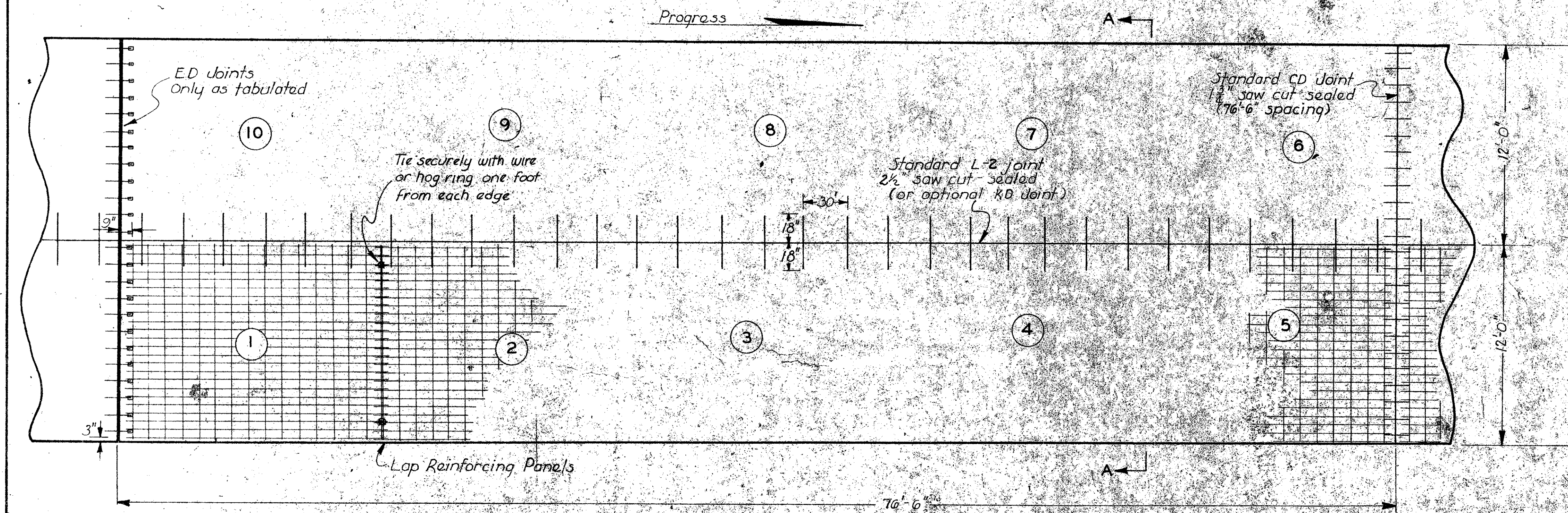
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5	IOWA	80-5(31)	88	9	17



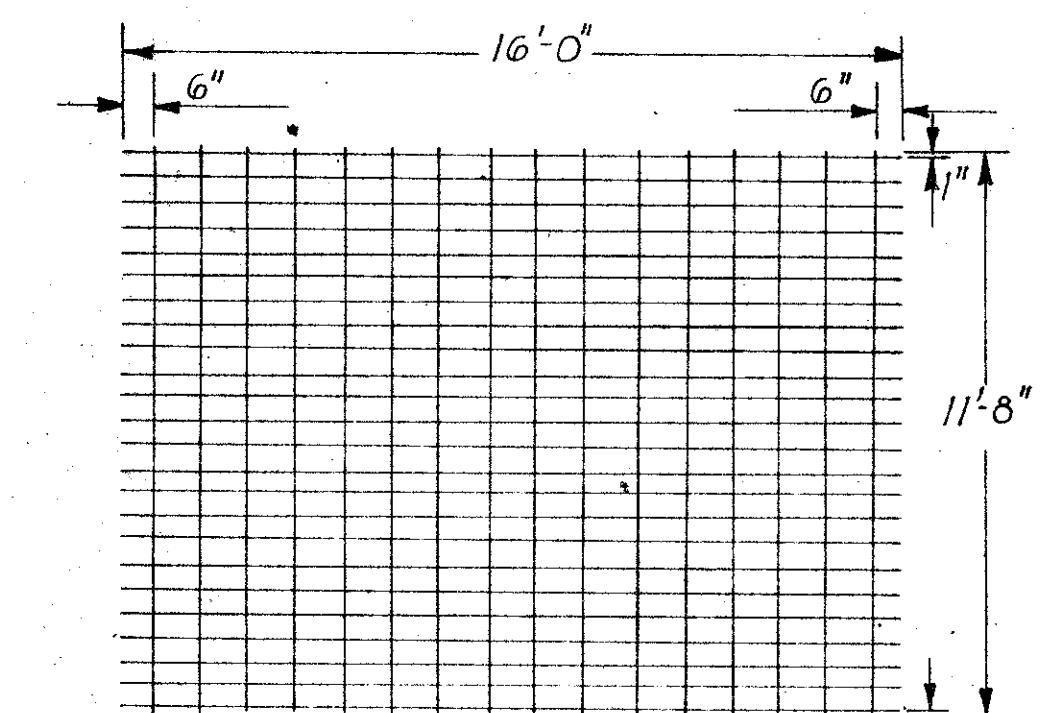
SECTION A-A
Area = 20.000 Sq. Ft.
Volume = 74.07407 Cu. Yds. per Sta.



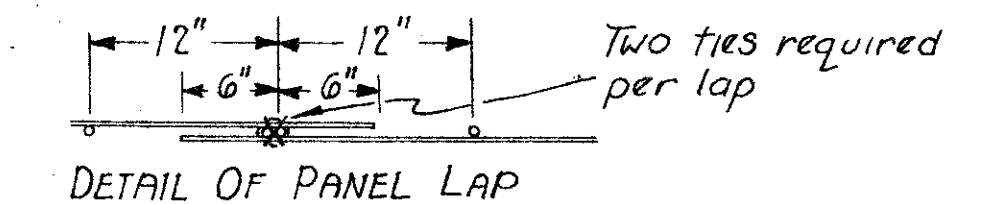
HALF SECTION
Standard pavement slope 0.015 ft. per ft.
3'-0" either side of ϵ may be shaped to a parabolic crown with a maximum of 4" variation from actual profile grade.



REINFORCING PLAN
Standard CD joint spacing is 7'-6" with ED joints constructed only as tabulated on the detail plans or as directed by engineer.



DETAIL OF REINFORCING
PANEL (1) THRU (10)



Wire mesh reinforcing shall be #12-00/4. Transverse wires shall be No. 4 gage and spaced at 12" centers. Longitudinal wires shall be No. 10 gage and spaced at 6" centers. Wires shall be welded at each intersection of each crosswire.

Wire mesh reinforcing shall weigh approximately 79 lbs. per 100 sq. ft.

10 panels (11'-8" x 16'-0") are required for each section of 24' pavement constructed at normal joint spacing (7'-6").

**UNIFORM 10" THICK - 24'-0" WIDE
PORTLAND CEMENT CONCRETE PAVEMENT
STEEL MESH REINFORCED**

Specifications reference 2301

The price bid for p.c. concrete paving shall include the furnishing and installing of all reinforcing steel as well as any and all other material necessary for the construction of the pavement and all required pavement joints.

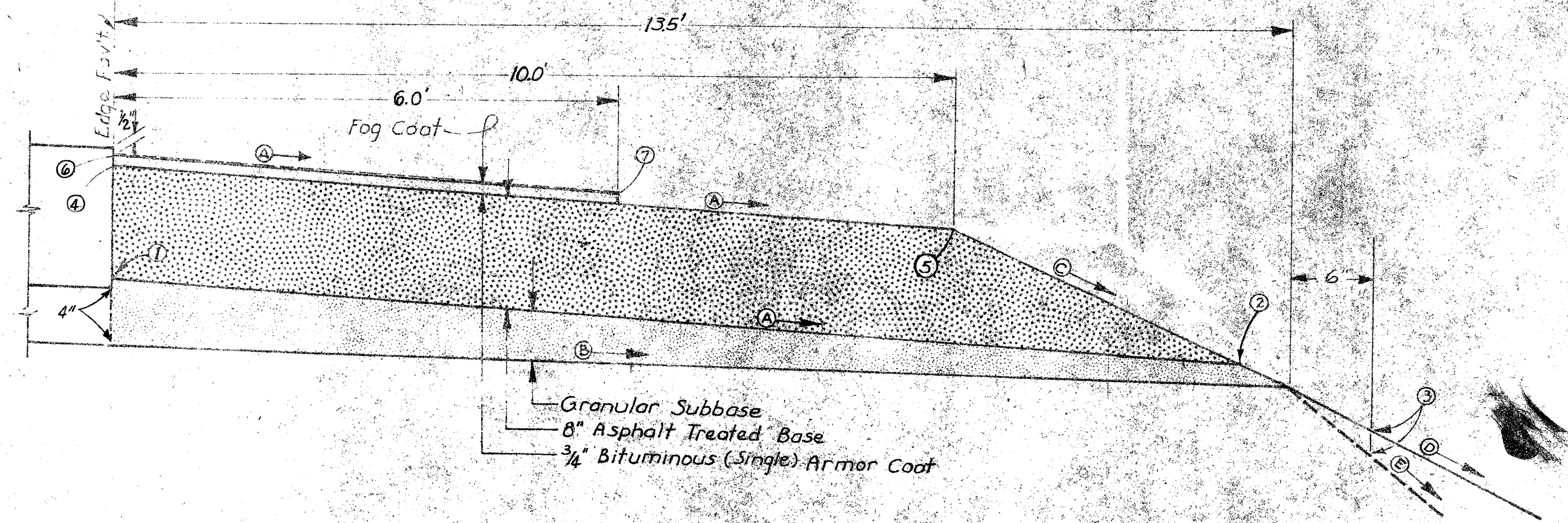
The contractor, at his option, may construct this pavement slab as a single unit 24 ft. wide with a parabolic crown in the center 6 ft., or as two units c' 12' wide at a flat slope joined at the ϵ with a standard KD joint.

The welded wire mesh reinforcing shall be installed on a full bed of concrete a minimum of 2" or a maximum of 4" below pavement surface. The supporting bed of concrete shall be provided by the use of a steel shod template shaped to the pavement crown and used as a "strike off" at the required distance below tops of forms.

The use of mesh supporting sleds or other devices which require the placing of concrete through the mesh will not be permitted.

DATE	REVISION	APPROVED	IOWA HIGHWAY COMMISSION	
			STANDARD ROAD PLAN RH-10	
			RECOMMENDED	<i>K.P. McQuinn</i> 4-28-61 ROAD ENGINEER DATE
			APPROVED	<i>D.D. McQuinn</i> 11-23-61 DESIGN COMMITTEE DATE
12-1-61	Standard CD joint spacing is 7'-6" with ED joints constructed only as tabulated on the detail plans or as directed by engineer.	<i>K.P. McQuinn</i> 12-1-61 CHIEF ENGINEER DATE	10"-24" MESH REINFORCED P.C. CONCRETE PAVEMENT	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IOWA	80-5(31)188	1988	10	17



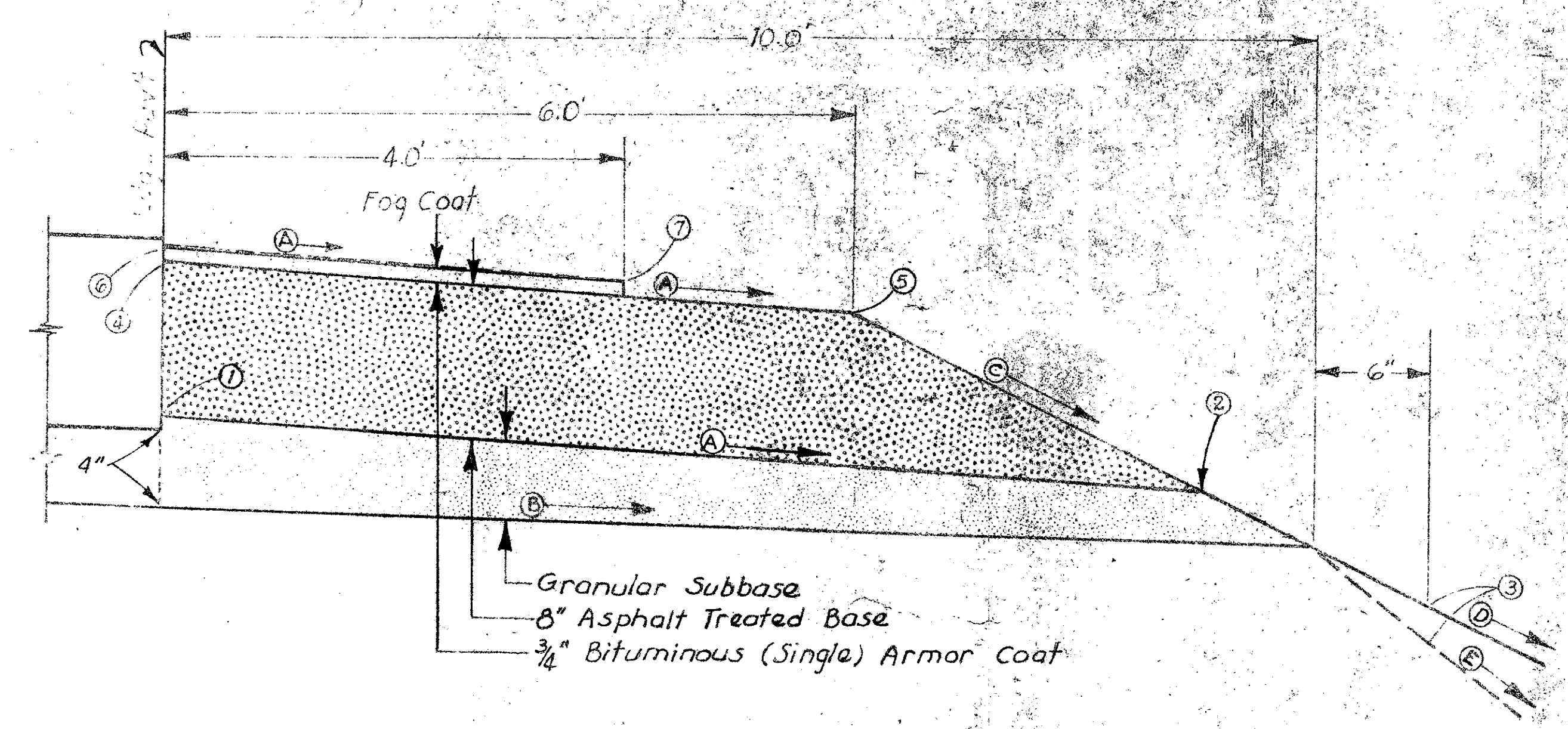
OUTSIDE SHOULDER

SLOPE TABLE		
A	0.040 PER FOOT	(-4.00 %)
B	0.015 FT. PER FT.	(-1.50 %)
C	MIN 4.0 ON 1.0	(-25.0 %)
D	4.0 ON 1.0	(-25.0 %)
E	2.5 ON 1.0	(-40.0 %)

RATES FOR STABILIZED SHOULDERS ON INTERSTATE P.C. CONC. PAVEMENTS			
UNIT PER STATION	ITEM	QUANTITY PER SHOULDER PER STATION*	
		6 foot shoulder	10 foot shoulder
Tons	GRANULAR SUBBASE	18.7239	21.0961
Tons	ASPHALT TREATED BASE	37.0910	56.3543
Gal.	PRIME AND TACK COAT	49.8730	67.9059
Gal.	BINDER BITUMEN	20.8889	31.3333
Tons	COVER AGGREGATE	0.8889	1.3333
Gal.	Fog COAT	5.7778	8.6667

* Quantities indicated are absolute volumes.

ITEM	DESIGN NET WEIGHT	DESIGN RATE OF APPLICATION	APPLY AT	NOTE
PRIME (MC-O)		0.20 gal. / sq. yd.	1-2-3	On surface of granular subbase and adjacent 1/2 foot of slope.
ASPHALT TREATED BASE	145 lb./cu. ft.		1-2	
TACK COAT (MC-O)		0.05 gal. / sq. yd.		(Two) Optional between lifts, as directed by engineer.
FINAL PRIME (RC-O)		0.15 gal. / sq. yd.	4-5-2-3	Rate may be adjusted by engineer.
SINGLE ARMOR COAT (Binder Bitumen)		0.47 gal. / sq. yd.	4-5	
(3/4" Cover Aggregate)		40 lbs. / sq. yd.	4-5	
Fog COAT (Binder)		0.13 gal. / sq. yd.	6-7	Only on surface of armor coat.

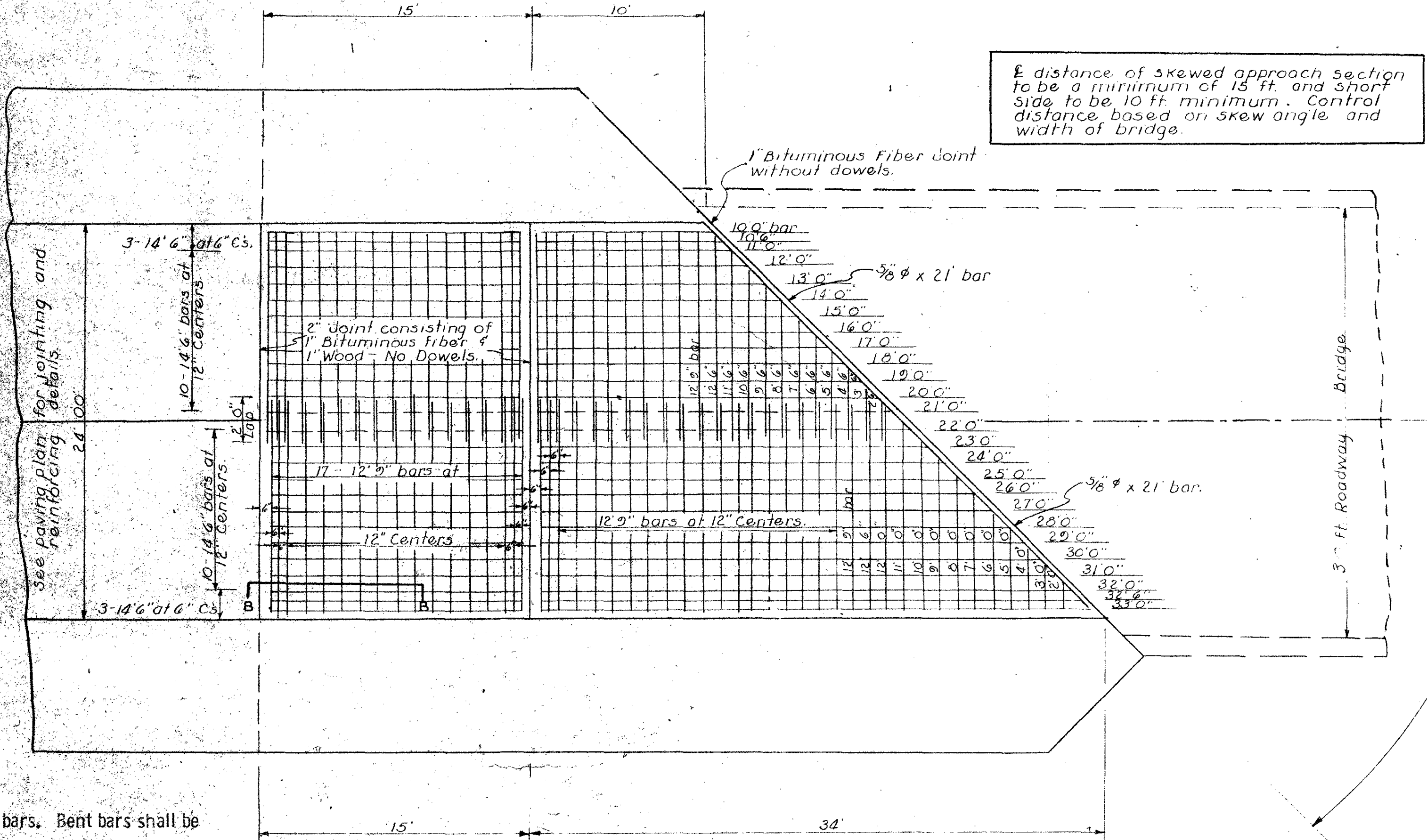
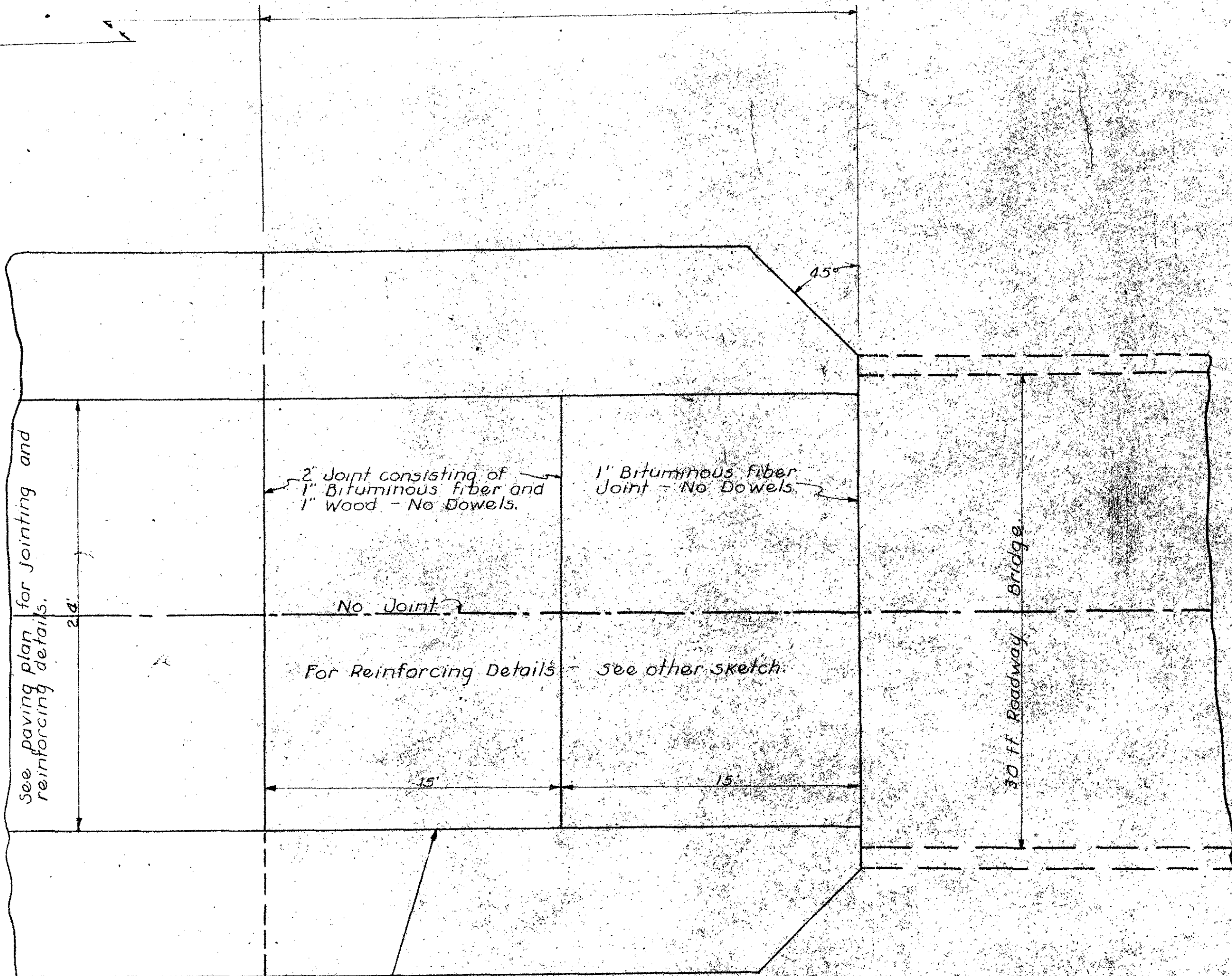


INSIDE SHOULDER

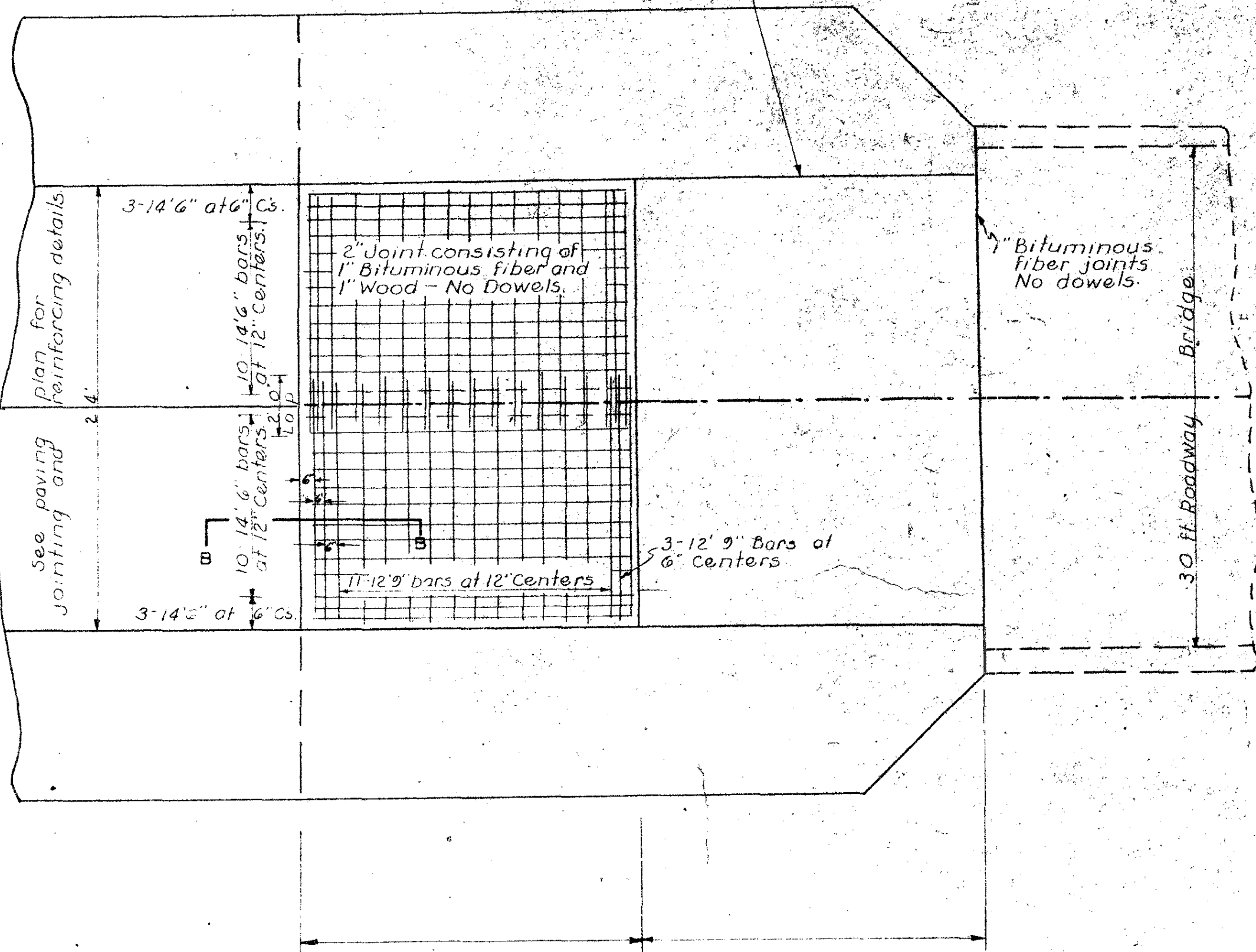
NOTE:
QUANTITIES AND DIMENSIONS INDICATED HEREON ARE FOR THE PURPOSE OF DESIGN. BASES OF PAYMENT SHALL BE THE ACTUAL VOLUME OF MATERIAL INSTALLED AS INDICATED HEREON.

IOWA HIGHWAY COMMISSION			
STANDARD ROAD PLAN RH-II			
RECOMMENDED: <i>E.P. McLaughlin</i> 7/1/61 ROAD ENGINEER DATE			
DESIGN COMMITTEE DATE			
APPROVED: CHIEF ENGINEER DATE			
STABILIZED SHOULDER FOR P.C. CONCRETE PAVEMENT			

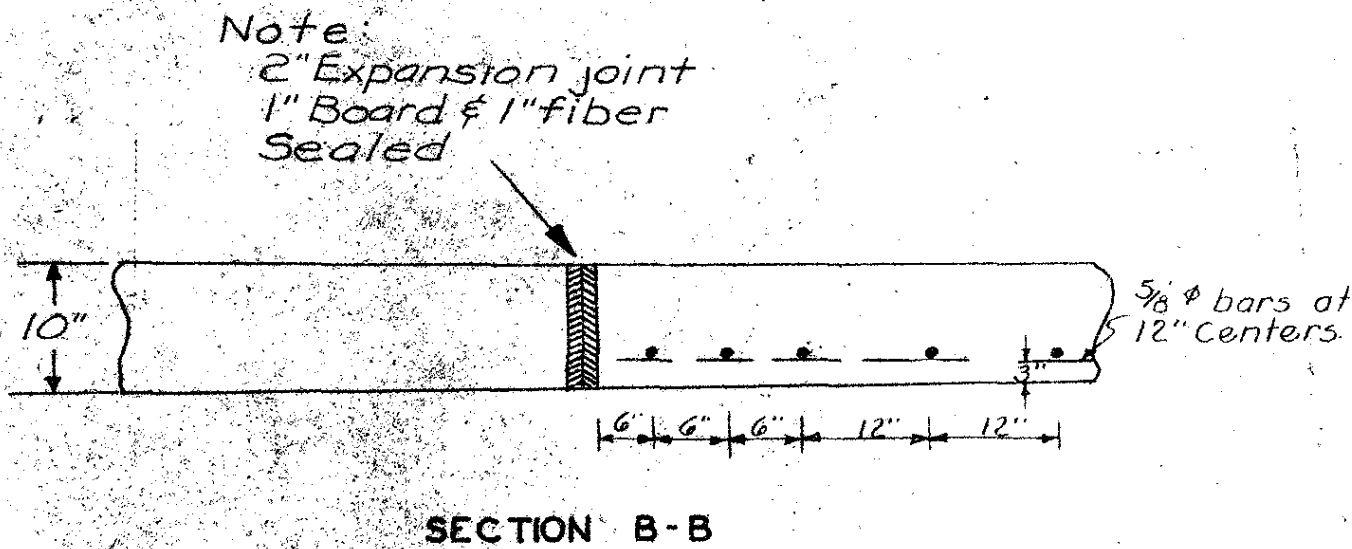
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IOWA	80-5(31)	188	11	17



Run paving machines thru on steel forms set to normal width of paving. Approx. 5 ft. of wood form to be used where wing post interferes with form removal and reinforcing.



- (1) All reinforcing shall be 5/8" ϕ bars. Bent bars shall be structural grade steel.
- (2) Bar mats are to be wire tied at intersection of bars. Pour 2 1/2 inches of concrete uniformly on grade and place assembled bar mats on this concrete. Place the remainder 7 1/2 inches of concrete and finish. Approach section paving shall conform with paving specifications used on remainder of paving project.
- (3) Place one standard (E0) doweled expansion joint in pavement approximately 300 feet from each end of bridge.
- (4) Area of bridge approach section is included in estimate of quantities for concrete paving. Price bid for paving shall include constructing necessary bridge approach sections as detailed hereon.

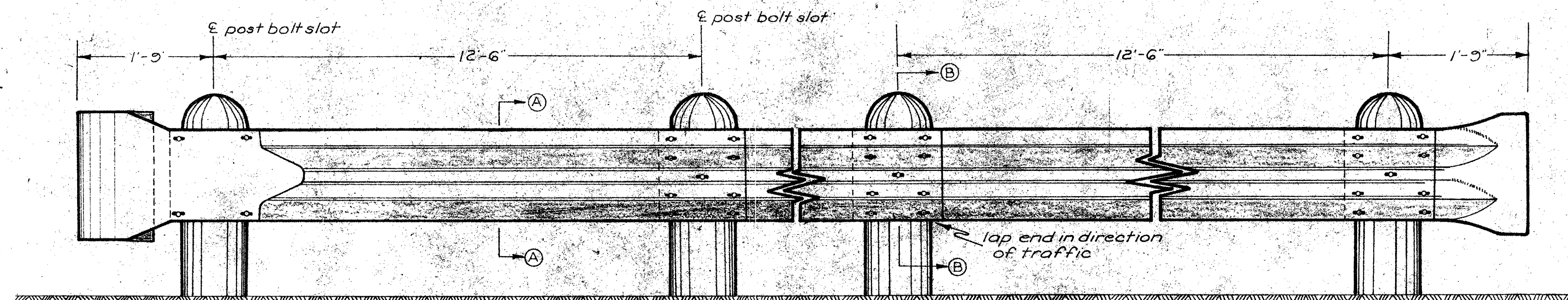


NOTE:
Details indicated hereon are shown for a 30 ft. roadway bridge and 24 ft. pavement. Construction methods shall be similar (with necessary modification as directed by the Engineer) where used with pavement or bridge width other than as shown.

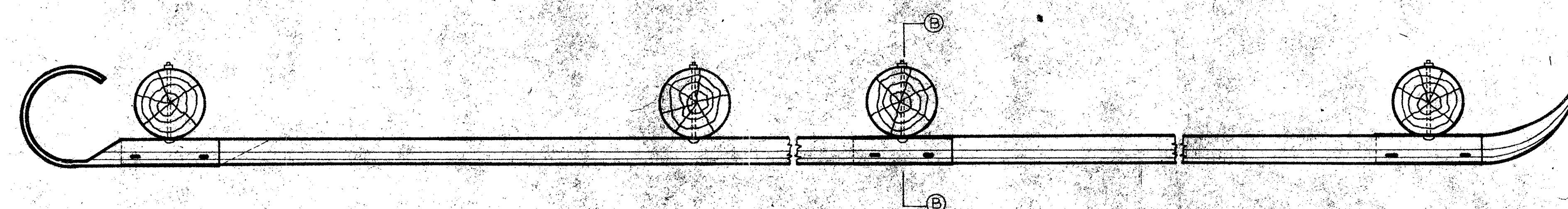
Details on this sheet shall be used for all Interstate 2 lane roadway bridges regardless of width or length.

IOWA HIGHWAY COMMISSION		STANDARD ROAD PLAN		RK-4	
RECOMMENDED	DATE	DESIGN COMMITTEE	DATE	CHIEF ENGINEER	DATE
APPROVED	DATE	CHIEF ENGINEER	DATE	CHIEF ENGINEER	DATE
INTERSTATE BRIDGE APPROACH					

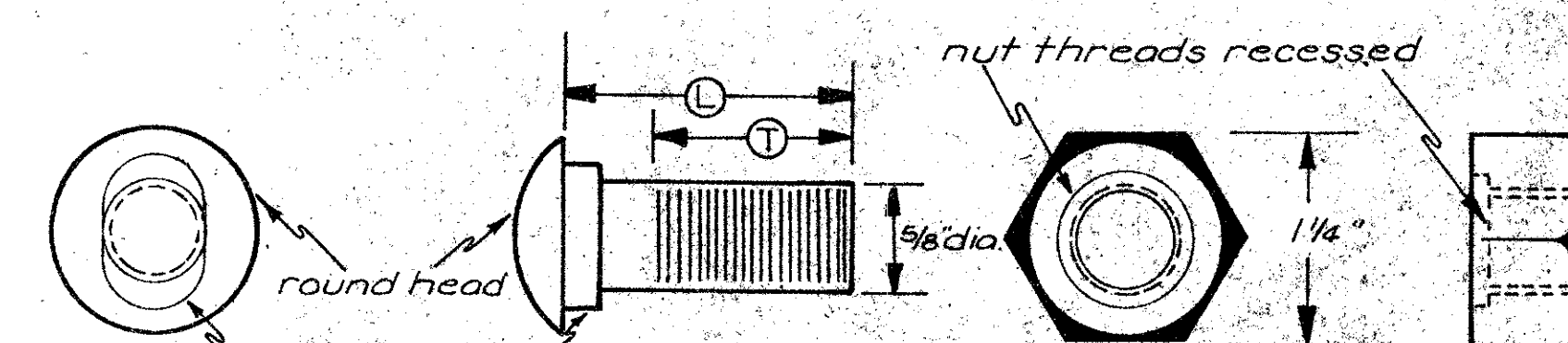
INSTALLATION DETAILS



ELEVATION



PLAN

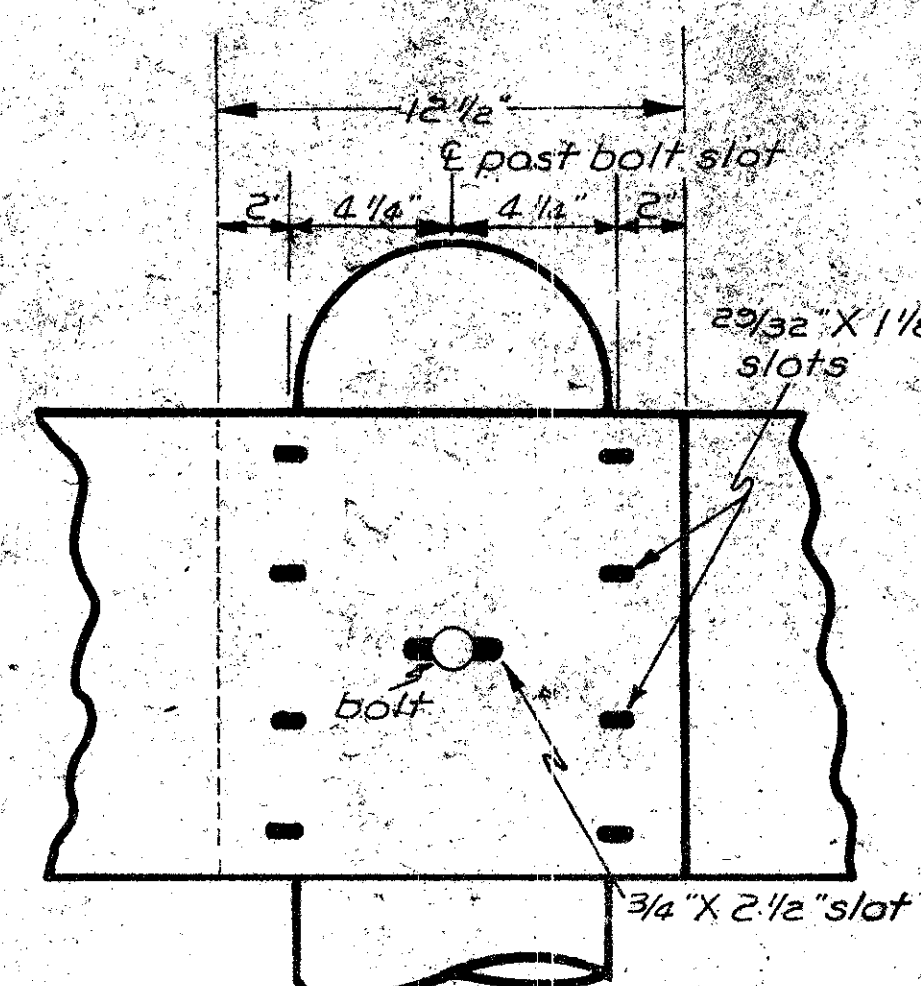


BOLT

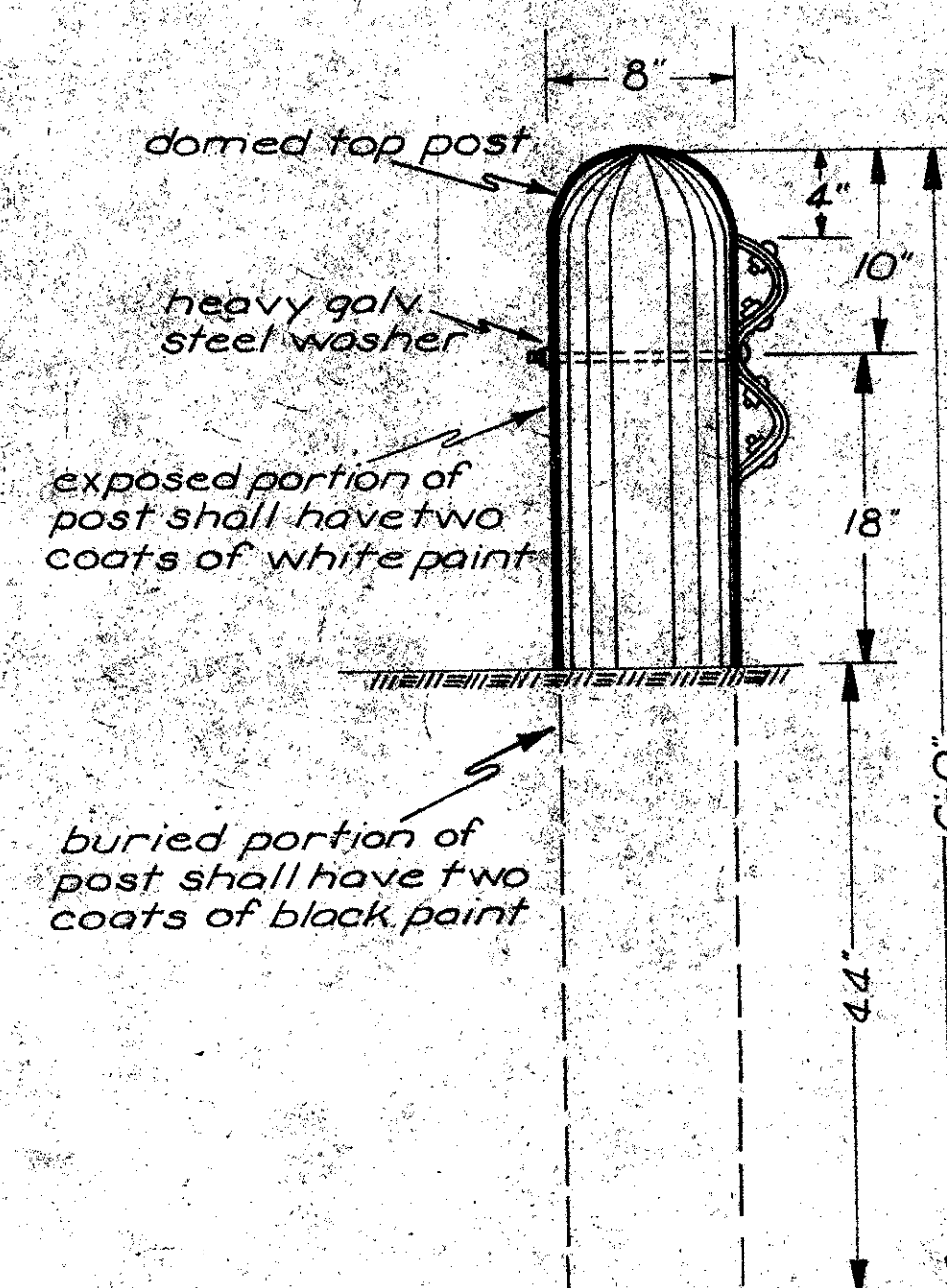
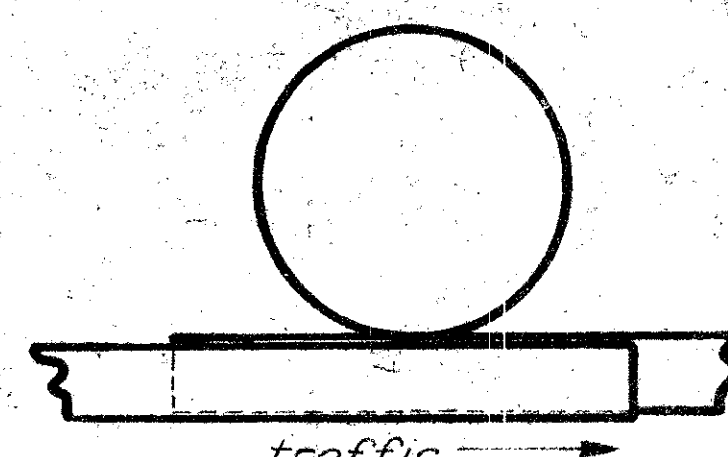
HEX NUT

splice T = 1" L = 1 1/4"
wood post T = 2" L = 10 1/2"

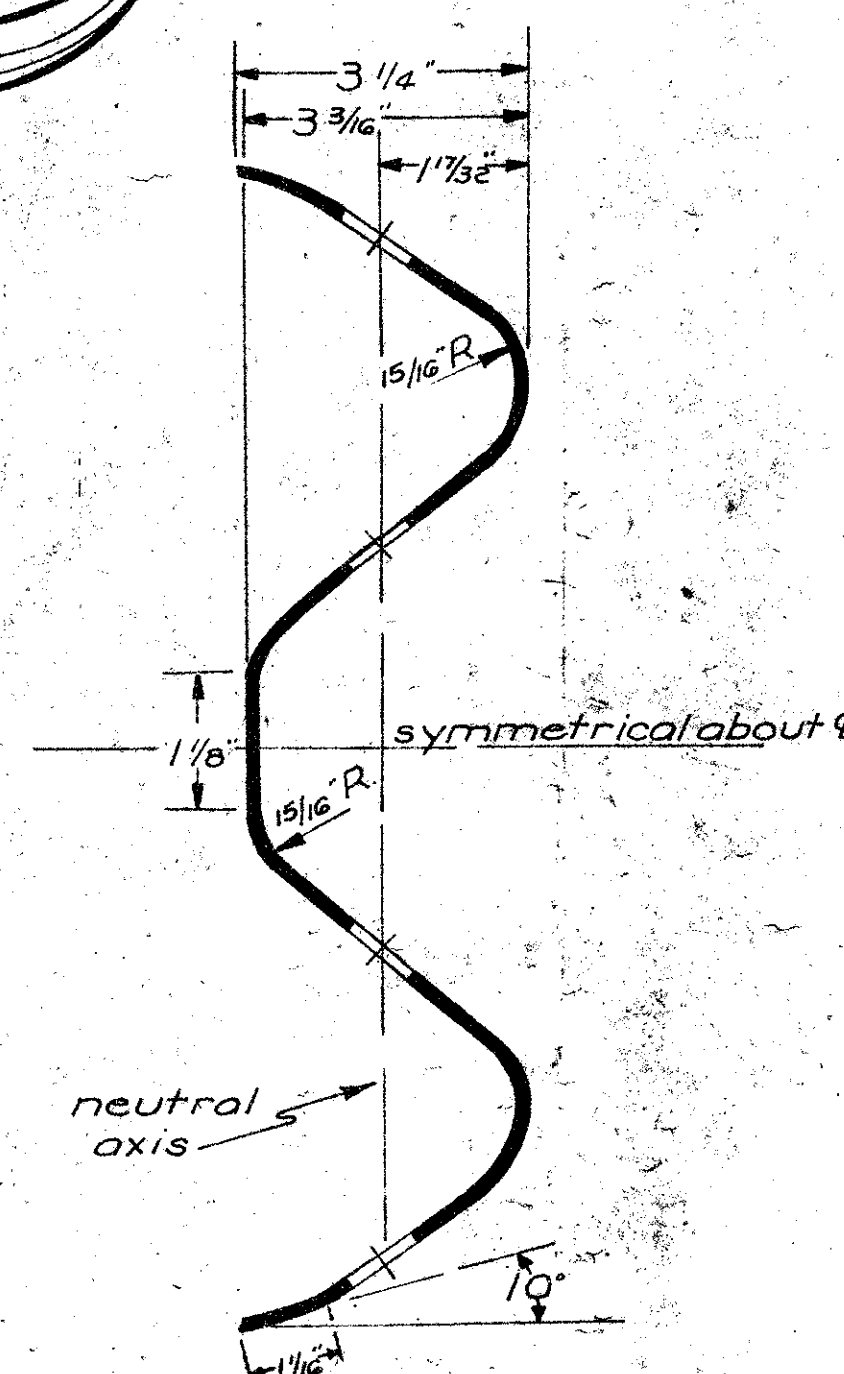
BEAM RAIL BOLT



RAIL SPLICE "B"

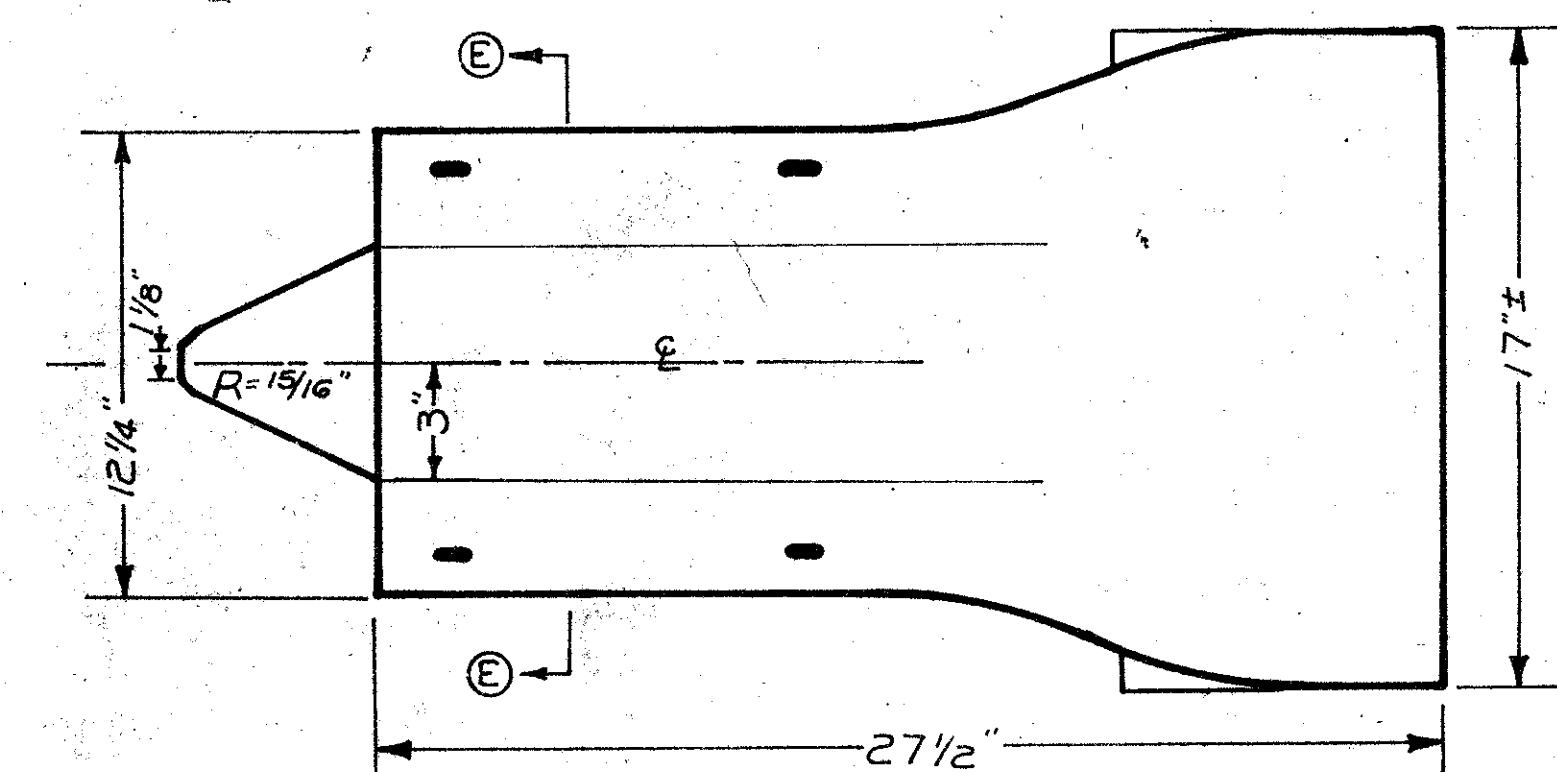


SEC. "B-B"
SPLICE ARRANGEMENT AT POST



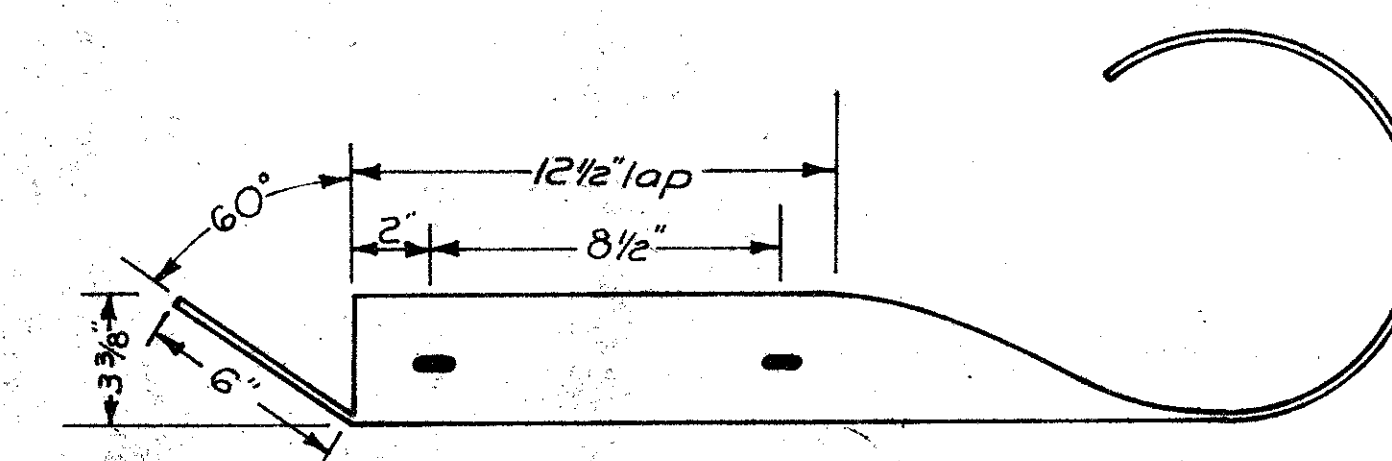
SECTION THRU RAIL "A"

TERMINAL SECTIONS



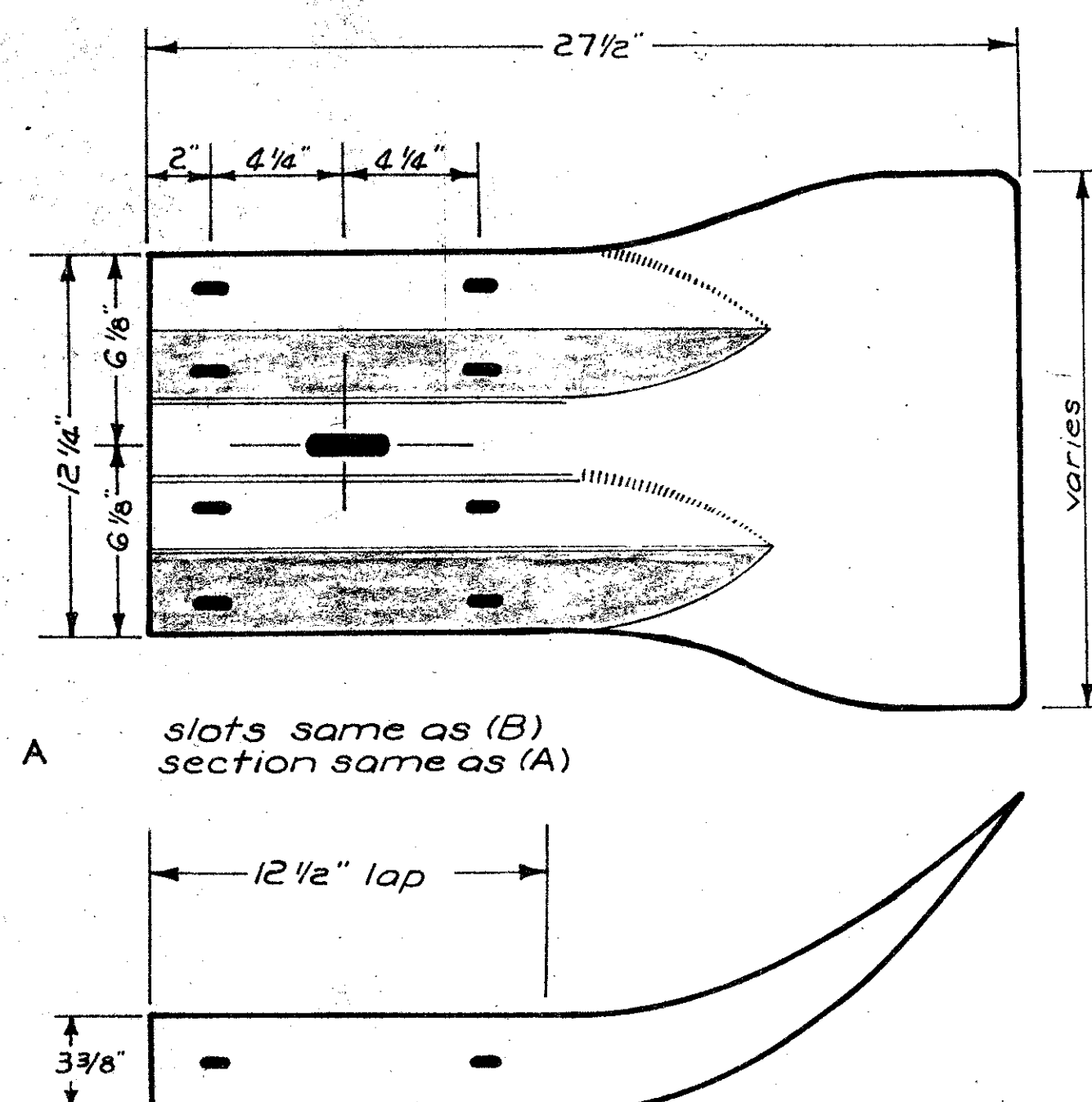
TYPE B

SEC. "E-E"



TYPE A

slots same as (B)
section same as (A)



NOTES:

Specifications reference, Section 2505.

The cost of necessary terminal sections shall be included in the unit price per lineal foot of beam rail. When a particular type is not specified in the detail plans, either type of terminal section may be used, but no variation through a project will be allowed.

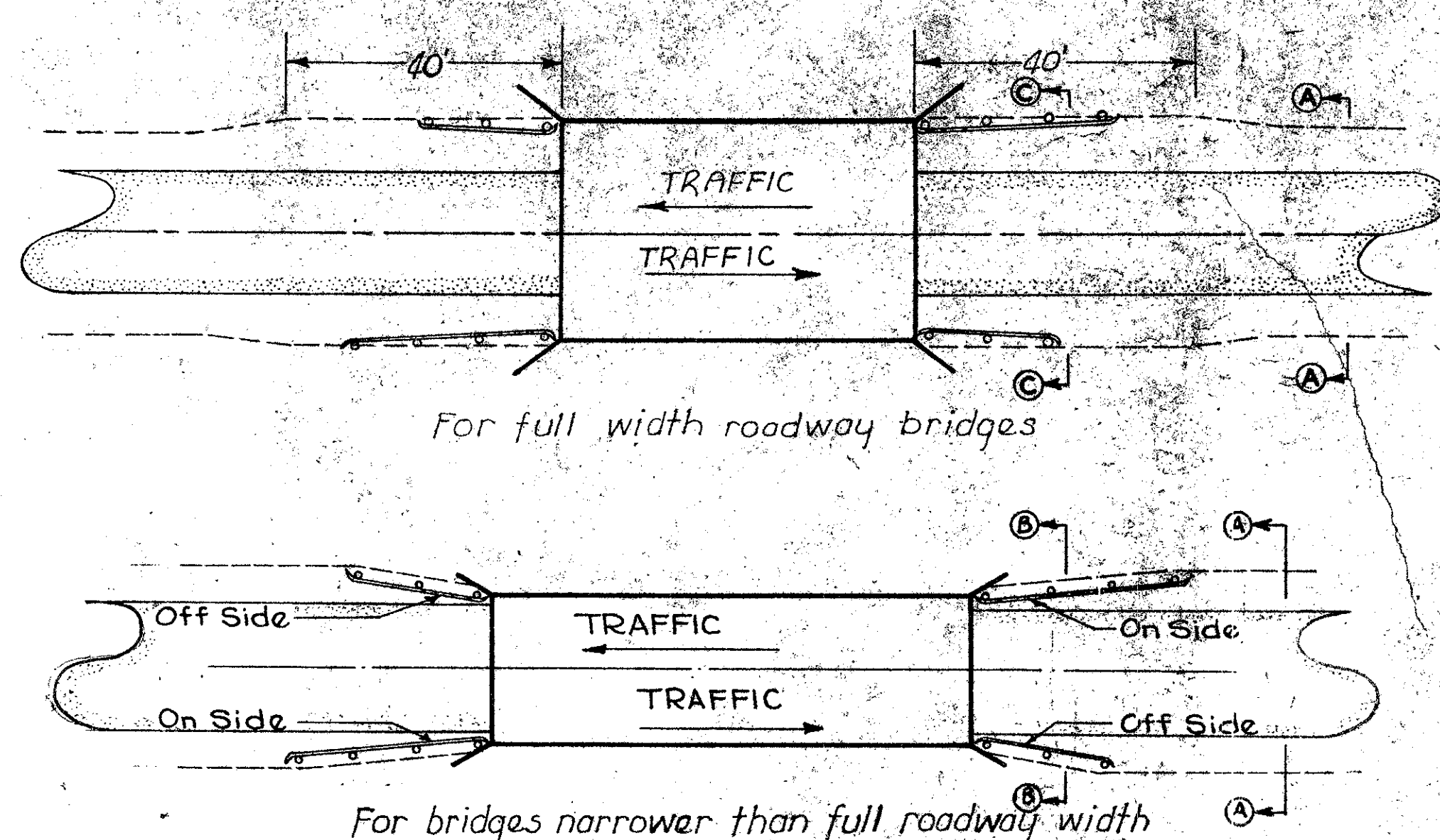
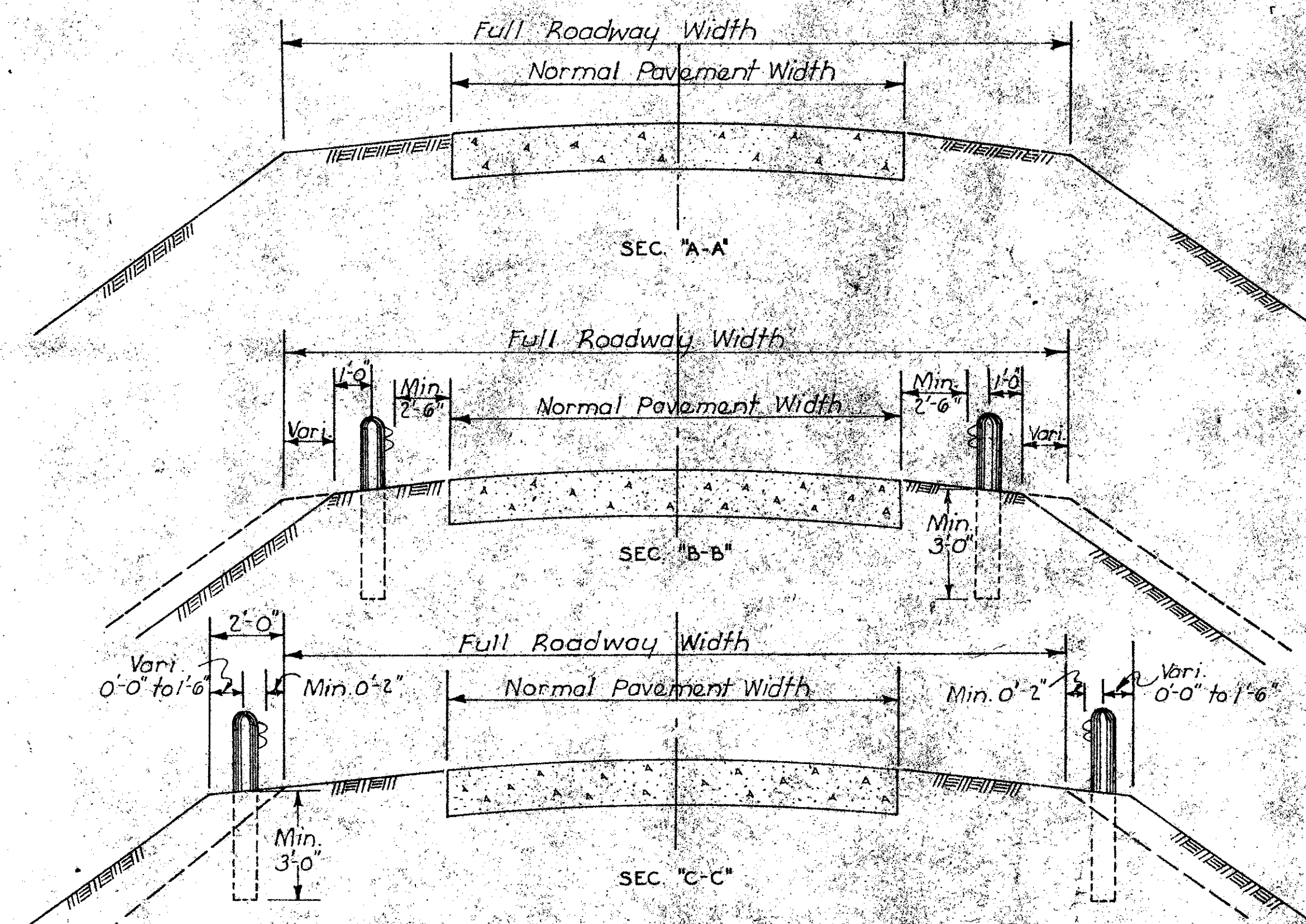
Beam rail installed on curvilinear alignment with radii less than 150 ft. shall be shop curved by the fabricator to the proper radius.

Splices shall be made only at posts.

Posts shall be pressure treated with pentachlorophenol (4160.03) as per Section 4161 and painted as per Art. 2505.07, 1960 Standard Specifications.

When post spacing other than that indicated hereon is required, the preparation of the beam rail as well as any other work required because of additional posts shall be considered incidental to the price bid for "beam rail" and "posts".

IOWA HIGHWAY COMMISSION	
STANDARD ROAD PLAN	RE-1
RECOMMENDED	<div> <div>R.P. McLaughlin</div> <div>ROAD ENGINEER</div> <div>11/14/60</div> <div>DATE</div> </div>
DESIGN COMMITTEE	DATE
APPROVED	<div> <div>CHIEF ENGINEER</div> <div>DATE</div> </div>
FORMED STEEL BEAM GUARD RAIL	

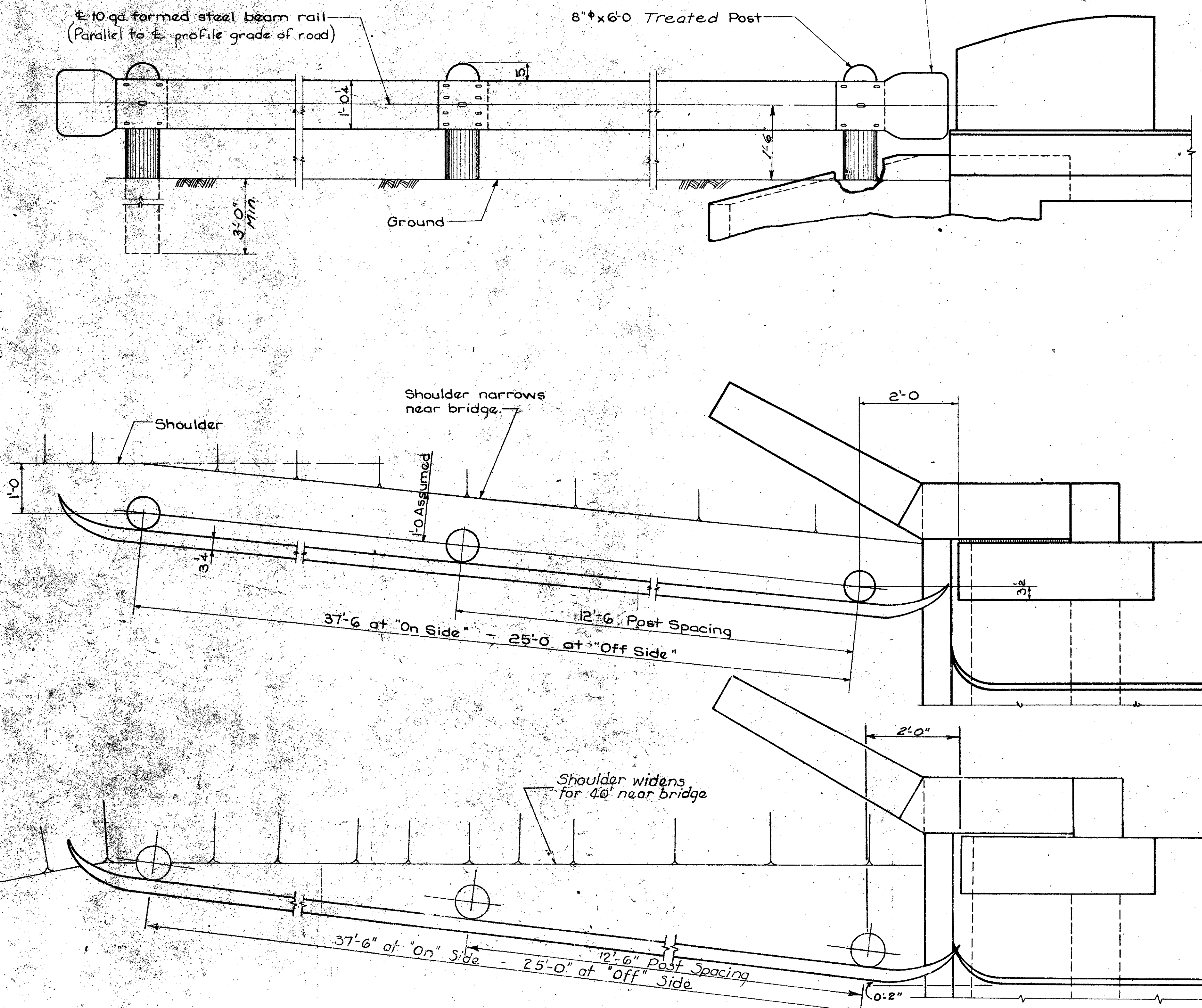


TYPICAL PLACEMENT OF GUARD RAIL

Note

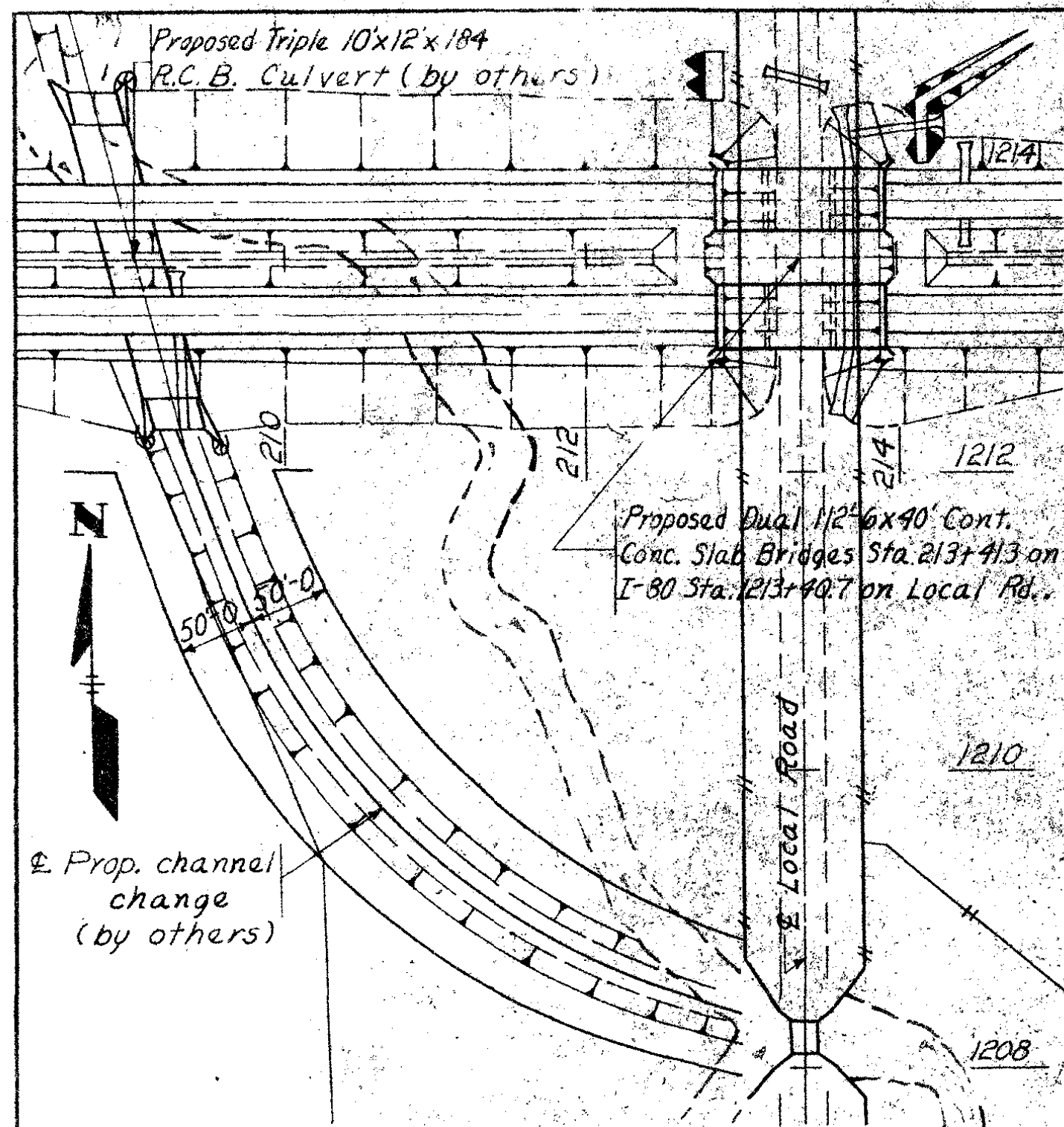
On "full width roadway" bridges, the roadway, for a distance of 40ft. both directions from the bridge, shall be widened a minimum of 2'-0" to provide adequate placement area for the approach section beam rail. Quantities for such grading are included in the contract estimate.

On dual roadway bridges, where beam rail is placed across the median, extra care shall be taken in the placement to ensure the profile line of the beam rail shall be a line parallel to the \pm profile grade of the roadway.



IOWA HIGHWAY COMMISSION			
STANDARD ROAD PLAN		RE-2	
RECOMMENDED	<i>A. P. McLaughlin</i>	ENGINEER	11/16/60
	<i>R. P. McLaughlin</i>	DESIGN COMMITTEE	1-4-61
APPROVED	<i>L. M. Clouston</i>	CHIEF ENGINEER	1-10-61
BRIDGE APPROACH BEAM GUARD RAIL			

7-1-61	NEW ISSUE	
DATE	REVISIONS	APP



GENERAL PLAN
Scale 1"=100'-0"

GENERAL NOTES:

These bridges are designed for H20-S16-44 loading and alternate loading designated in B.P.R.'s R.P.M. 20-4, section 4c, plus an allowance of 19 lbs. per sq. ft. of roadway for future wearing surface.

Bridge Contractor is to shape berms as shown on the "Situation Plan."

Preformed joint material is to be included in price bid for concrete.

The approach fills as shown are not a part of this estimate but are to be placed and compacted before abutment piles are driven. Abutment piles are to be driven in oversize holes drilled through the fill to Elevation 477.0 West Abutments; Elev. 484.0 East Abutments.

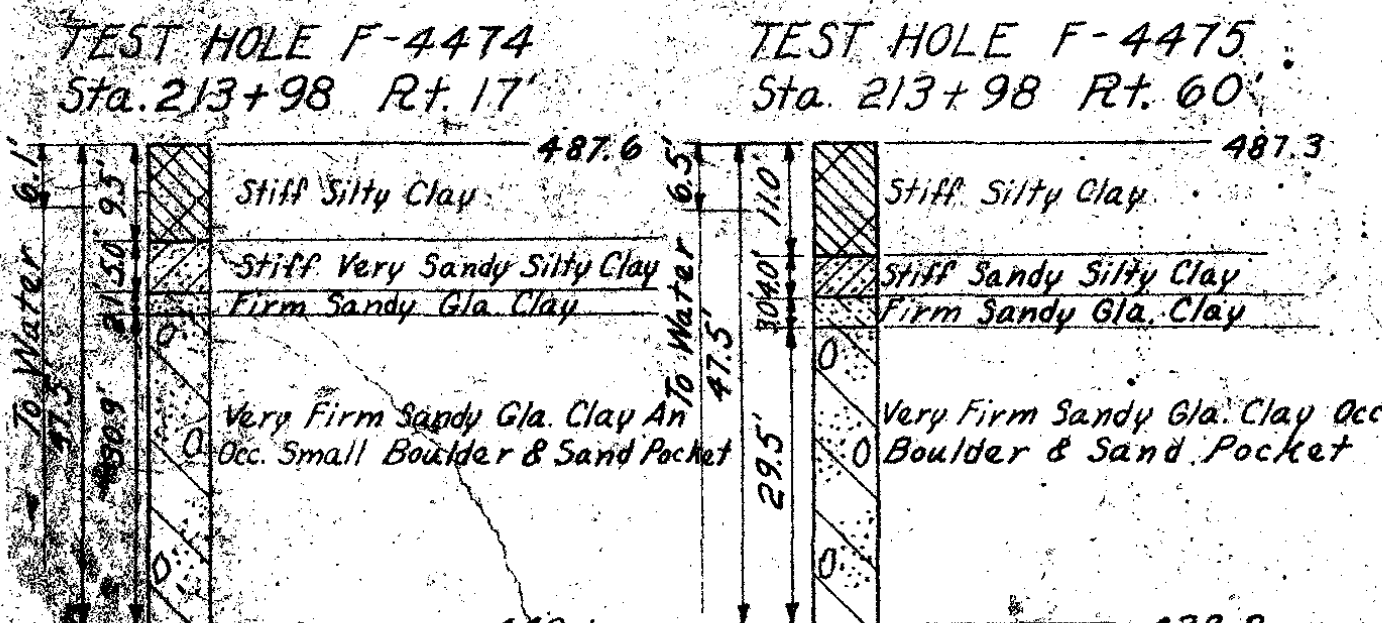
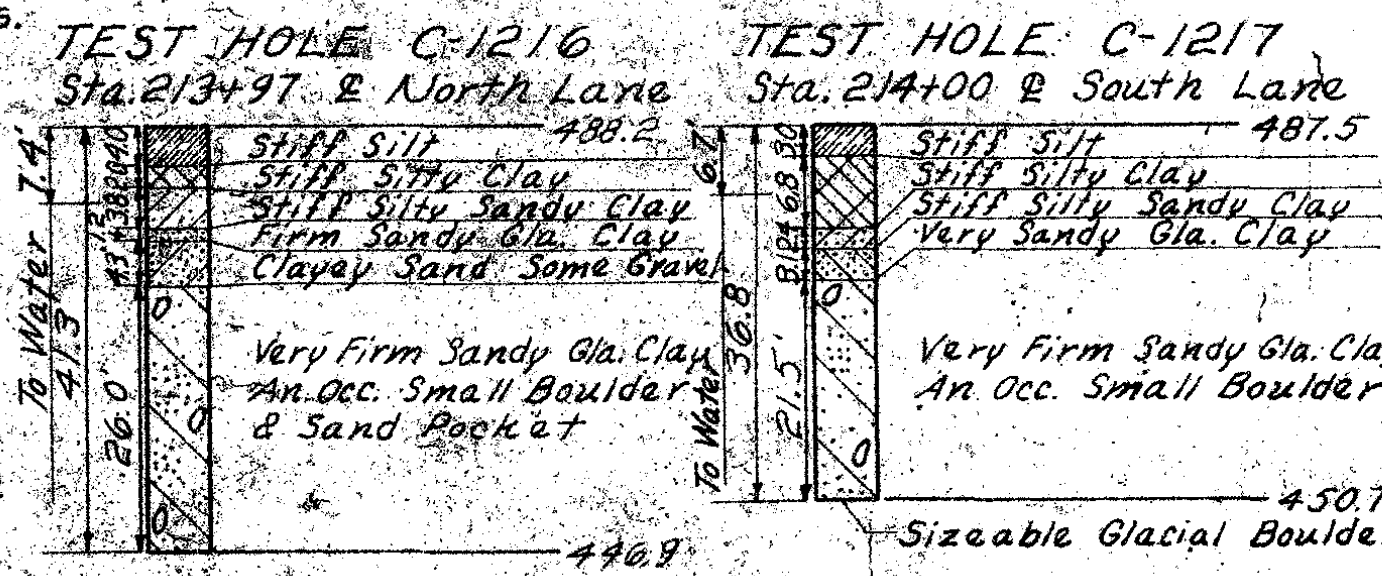
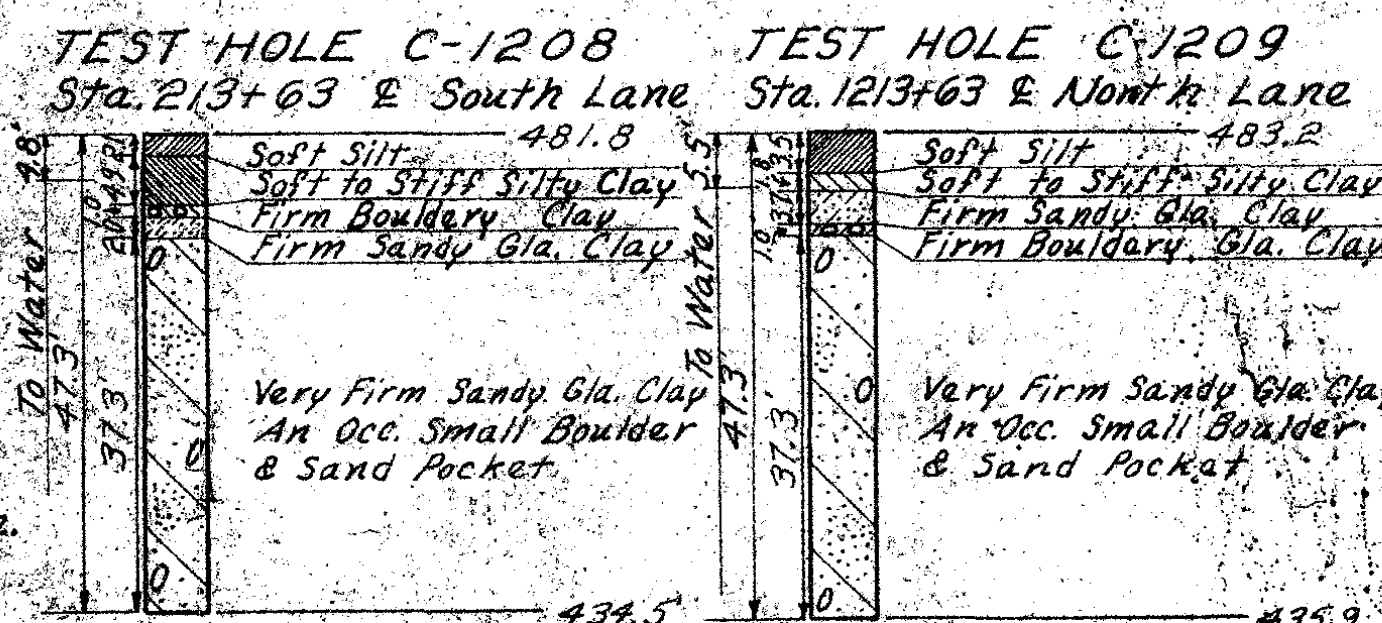
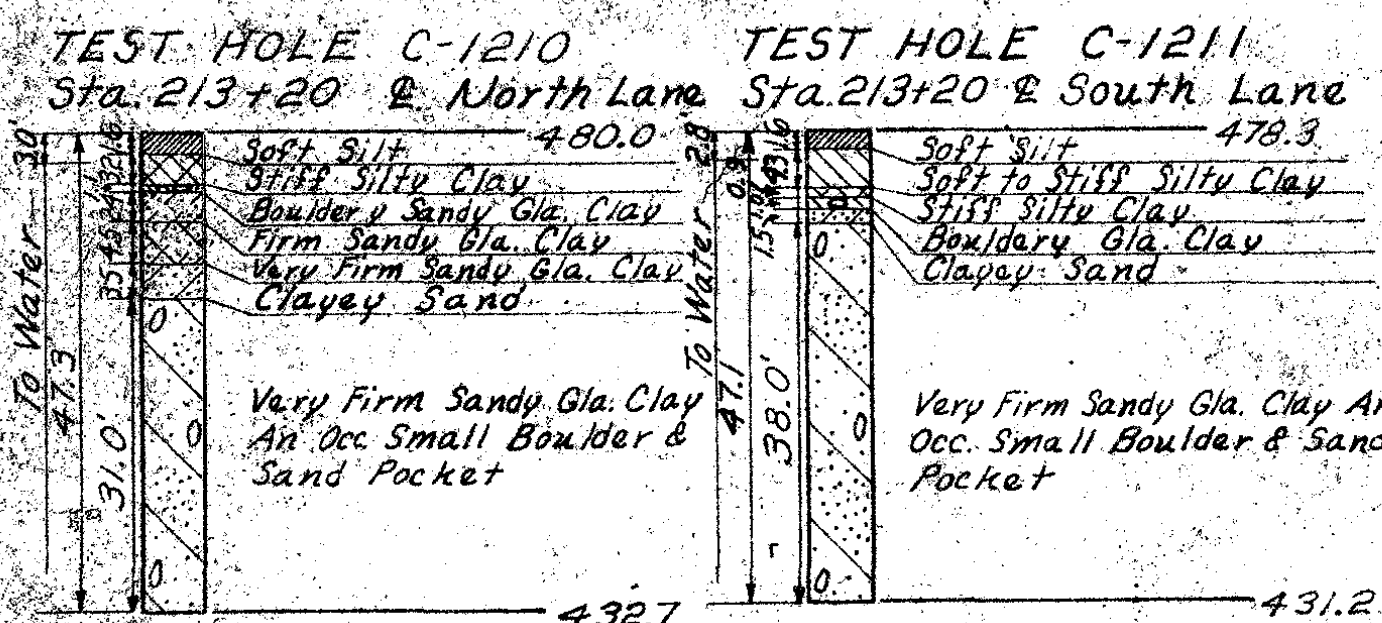
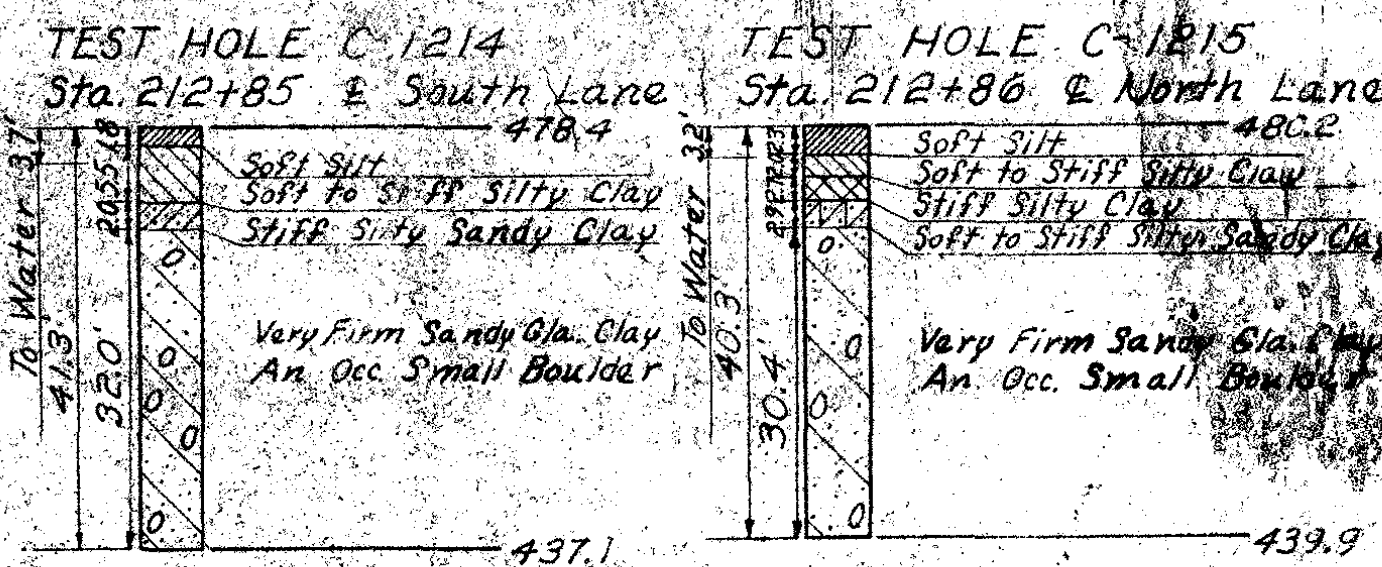
The minimum diameter of the drilled holes is to be 4 inches greater than the diameter of the pile 3 feet from the butt. Voids around piles are to be filled with dry sand. No separate payment will be made for drilling holes or filling voids since it is considered incidental to driving piles.

Abutment concrete is not to be placed until one month before anticipated date of construction of superstructure.

Excavation quantities are based on the assumption that local road grading will be completed before bridge construction is begun.

The Bridge Contractor is to install the tile drain behind each abutment as detailed. The price bid for 4" Tile Drain is to include excavation necessary for installation.

The formed steel beam guardrail and creosoted wood posts are to be furnished and placed by others and are not a part of this estimate.



SOUNDING DATA
Scale 1"=20'-0"
Test Holes C-1208 - 4217 Dated November 1, 1961
Test Holes F-4474 - 4475 Dated December 19, 1961

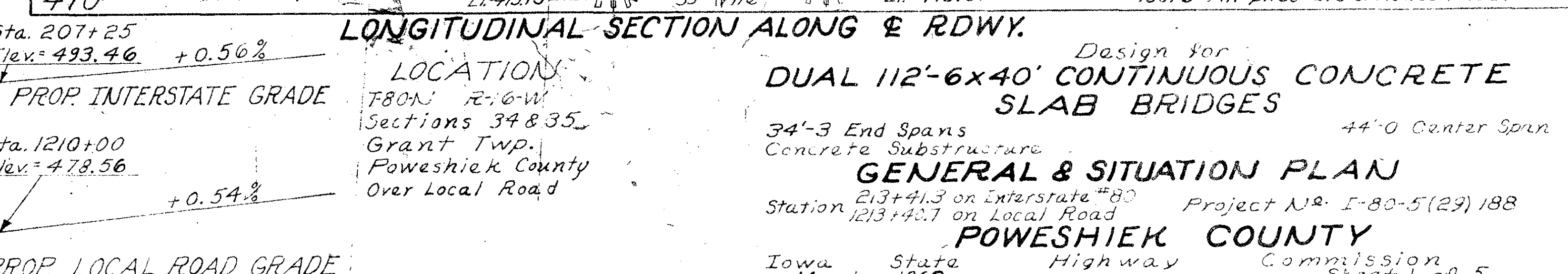
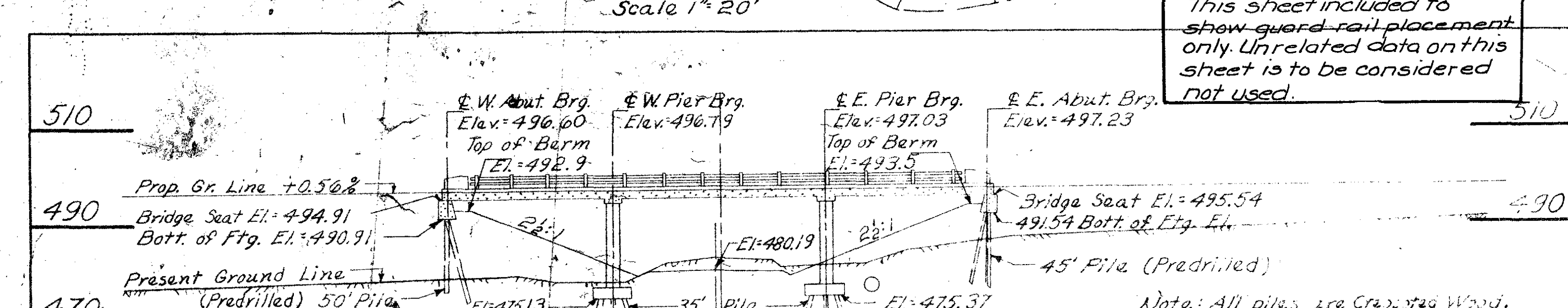
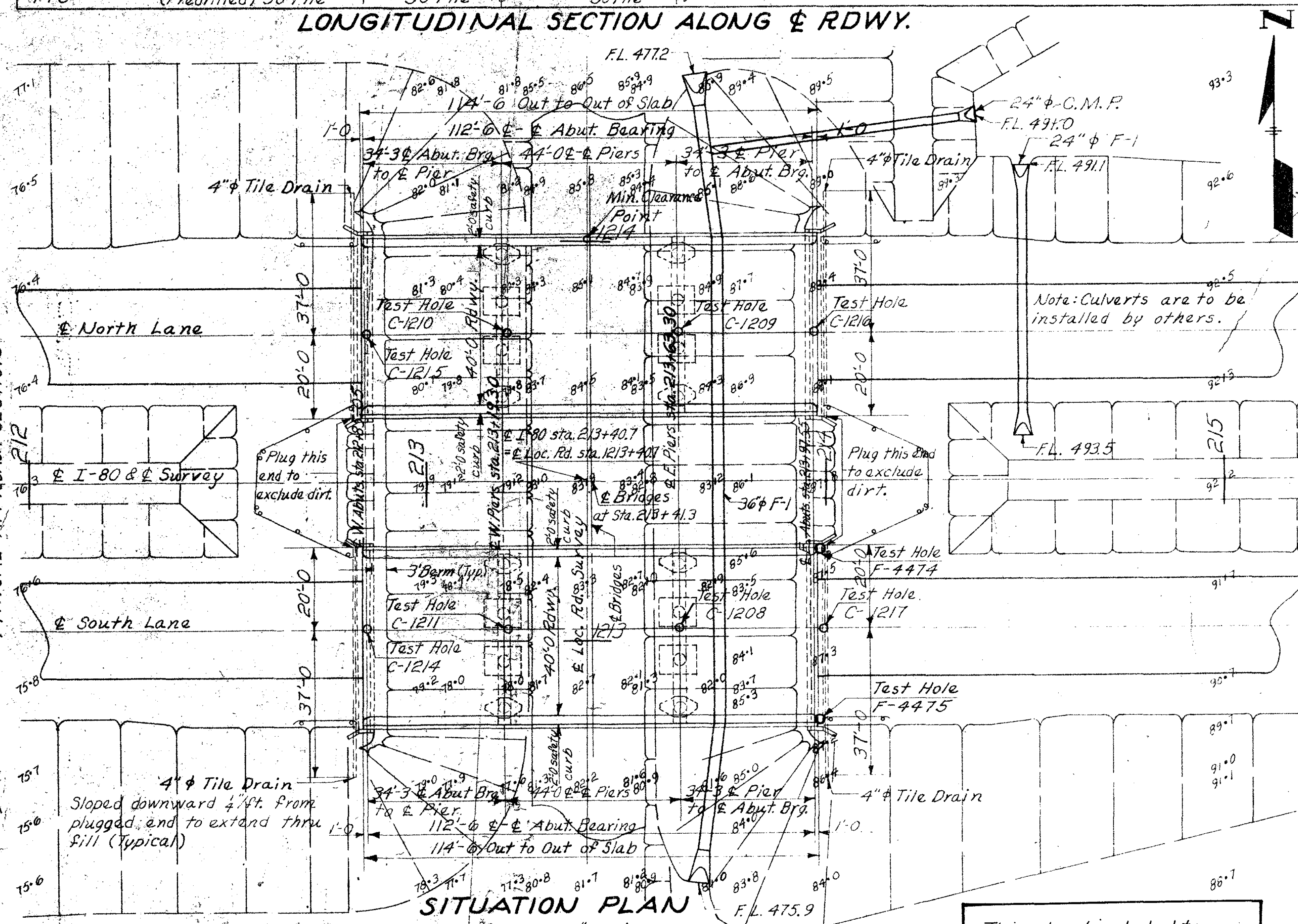
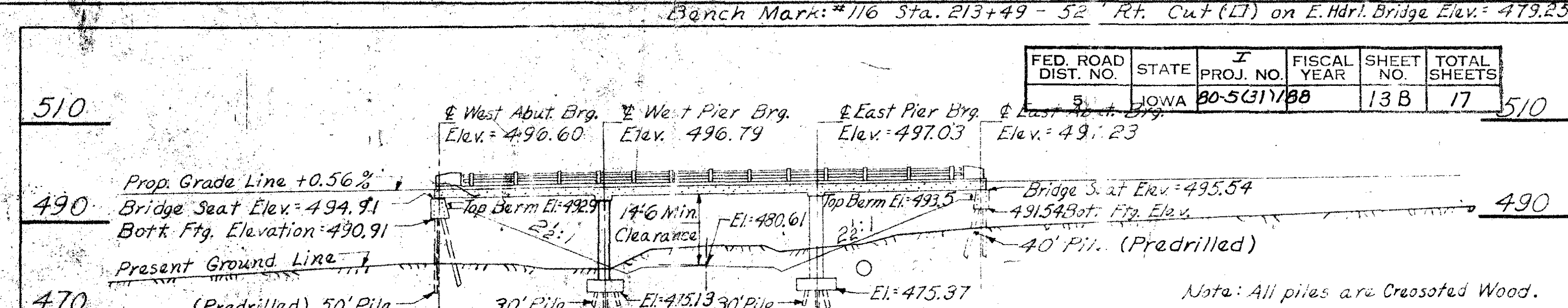
SPECIFICATIONS:

Design: A.A.S.H.O., Series of 1961
Construction: Standard Specifications of the Iowa State Highway Commission, Series of 1960, plus current special provisions and Supplemental Specifications.

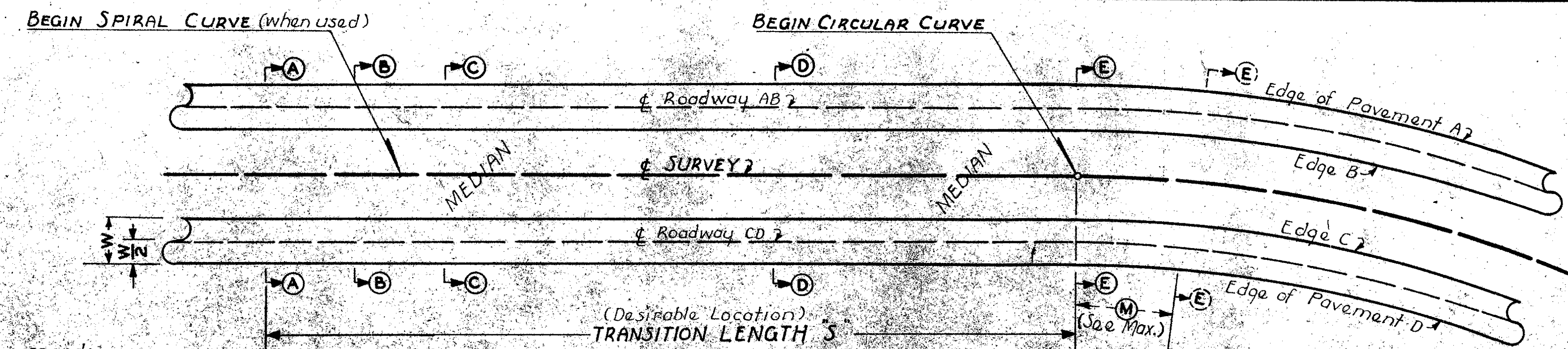
DESIGN STRESSES:

Design stresses for the following material are in accordance with A.A.S.H.O. Standard Specifications for Highway Bridges, Series of 1961.
Reinforcing steel in accordance with Section 1.4.12
"Reinforcement for Intermediate, Hard, or Rail Steel Grade."
Concrete in accordance with Section 1.4.11 $f'_c = 3500$ psi.

TOTAL ESTIMATED QUANTITIES				
Item	4 Abuts.	4 Piers	2 Super.	Total
Concrete	110.0	145.6	586.4	842.0 c.y.
Reinforcing Steel	9816	30,500	129,844	170,160 lbs.
Creosoted Piling	13 @ 40'	56 @ 30'		6045 L.F.
Class 20 Excavation	269	388		657 c.y.
4" Tile Drain				228 L.F.
Granular Backfill	173			173 Tons
Aluminum Handrail (E-E end posts)				416.0 L.F.
Steel Handrail (E-E end posts)				416.0 L.F.



FED. ROAD DIST. NO.	STAT.	PRC. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
80-5	CAA	80-5(31)	1988	14	17



To establish superelevation design speed:

In Rural areas,
When minimum vertical alignment design speed is 50 mph or 60 mph use **60 MPH**.
When vertical alignment design speed is 70 use **70 MPH**.

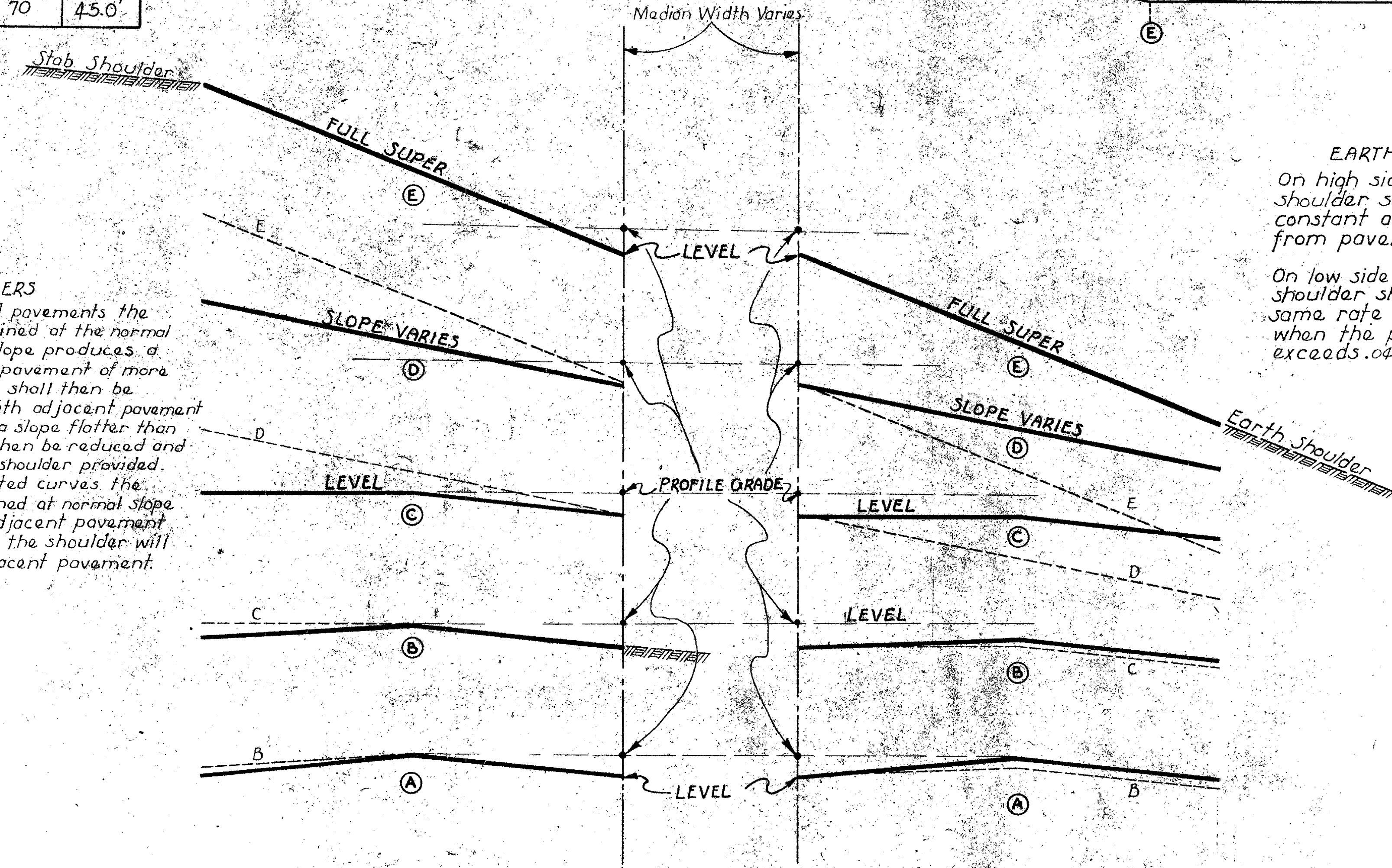
In Suburban areas,
Where speed limits of 45-55 mph would usually be posted use **50 MPH**.

In Urban areas,
Where speed limits of less than 45 mph would be posted use **30 OR 40 MPH** as the situation requires.

Formula for S

$$S = X + \left(\frac{W}{2}\right)(e)(\text{SLOPE})$$

V	X
30	27.0
40	31.5
50	36.0
60	40.0
70	45.0



STABILIZED SHOULDERS

On high side of superelevated pavements the shoulder slope shall be maintained at the normal slope of .04 per ft. unless this slope produces a grade break with the adjacent pavement of more than 7.0%. The shoulder slope shall then be determined by a 7.0% break with adjacent pavement unless this super would create a slope flatter than 1.0%. The grade break should then be reduced and a slope of at least 1.0% on the shoulder provided. On the low side of superelevated curves the shoulder slope shall be maintained at normal slope of .040 ft. per ft. unless the adjacent pavement slope is steeper, in which case the shoulder will slope at the same slope as adjacent pavement.

EARTH SHOULDERS

On high side of roadway the shoulder slope shall remain constant at .04 per ft. away from pavement.

On low side of roadway the shoulder shall slope at the same rate as the pavement when the pavement slope exceeds .04 per ft.

SUPERELEVATION DATA FOR DIVIDED HIGHWAY PROJECTS

- Degree of curve of ϵ of individual roadway pavements will be taken as the same as that of ϵ Survey for this purpose.
- Paved roadways separated by a median shall ordinarily be superelevated about the median edges of pavement as detailed hereon.
- In some cases, paved roadways separated by a narrow median (more than 10 ft.) may be superelevated by rotating about the ϵ of median similar to the method detailed on design RH-8.
- In some cases, paved roadways separated by a wide median (more than 30') may be superelevated by rotating about the ϵ of each roadway similar to the method detailed on design RH-7.

MAXIMUM (M)	DESIGN SPEED
30% S_1	50 MPH
20% S_1	60 MPH
10% S_1	70 MPH

$S_1 = S$ dimension in feet.

- NOTE:
- Edge slope ratio is between edge of lane and ϵ of roadway profile (not profile grade).
 - e is the rate of superelevation in ft. per ft. of pavement width.
 - S is length of transition section from normal crown to full superelevation.
 - Spiral curves are normally to be used on curves listed below the heavy line. Total length of transition (including spiral and "X" transition) shall be at least equal to that indicated. Even increment spirals are to be used.

D	SLOPE 1:200		SLOPE 1:225		SLOPE 1:250	
	50 MPH	60 MPH	70 MPH			
	ϵ	S	ϵ	S	ϵ	S
0° 15'	NC	0	NC	0	.015	90.0 FT.
0° 30'	.015	72.0 FT.	.015	81.0 FT.	.018	99.0
0° 45'	.017	76.8	.018	89.1	.021	108.0
1° 00'	.020	84.0	.022	99.9	.028	129.0
1° 30'	.027	100.8	.035	135.0	.042	171.0
2° 00'	.035	120.0	.047	167.4	.056	213.0
2° 30'	.043	139.2	.057	194.4	.069	252.0
3° 00'	.050	156.0	.066	218.7	.077	276.0
3° 30'	.056	170.4	.072	234.9	.080	285.0
4° 00'	.062	184.8	.076	245.7		
5° 00'	.070	204.0	.080	256.5		
6° 00'	.076	218.4				
7° 00'	.079	225.6				
8° 00'	.080	228.0				

IOWA HIGHWAY COMMISSION

STANDARD ROAD PLAN **RH-9**

RECOMMENDED: *R.P. McLaughlin* 11/16/60
ROAD ENGINEER DATE

DESIGN COMMITTEE: *D.M. Lutz* 1-4-61
DATE

APPROVED: *L.M. Clauson* 1-10-61
CHIEF ENGINEER DATE

10-9-62	Modify Spiral Data	R.D.
11-2-61	change shldr slope & break	R.D.S.
7-1-61	NEW ISSUE	
DATE	REVISIONS	APP.

SUPERELEVATION DIVIDED FOUR LANE DIVIDED P.C. CONC. PAV'T.

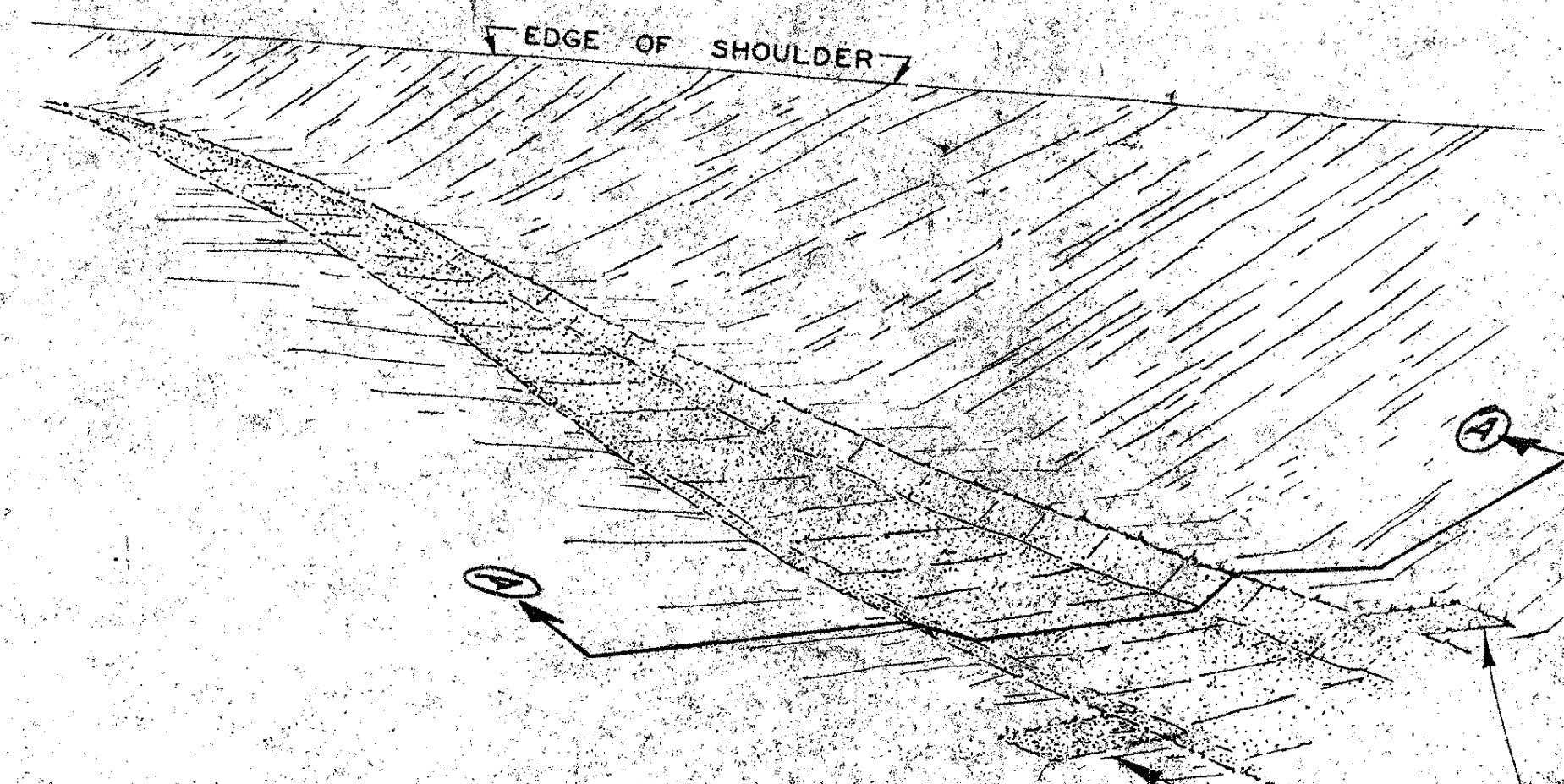


FIG. 1 ROAD DITCH

WINGS ONE OR BOTH SIDES AS DESIGNATED BY THE ENGINEER

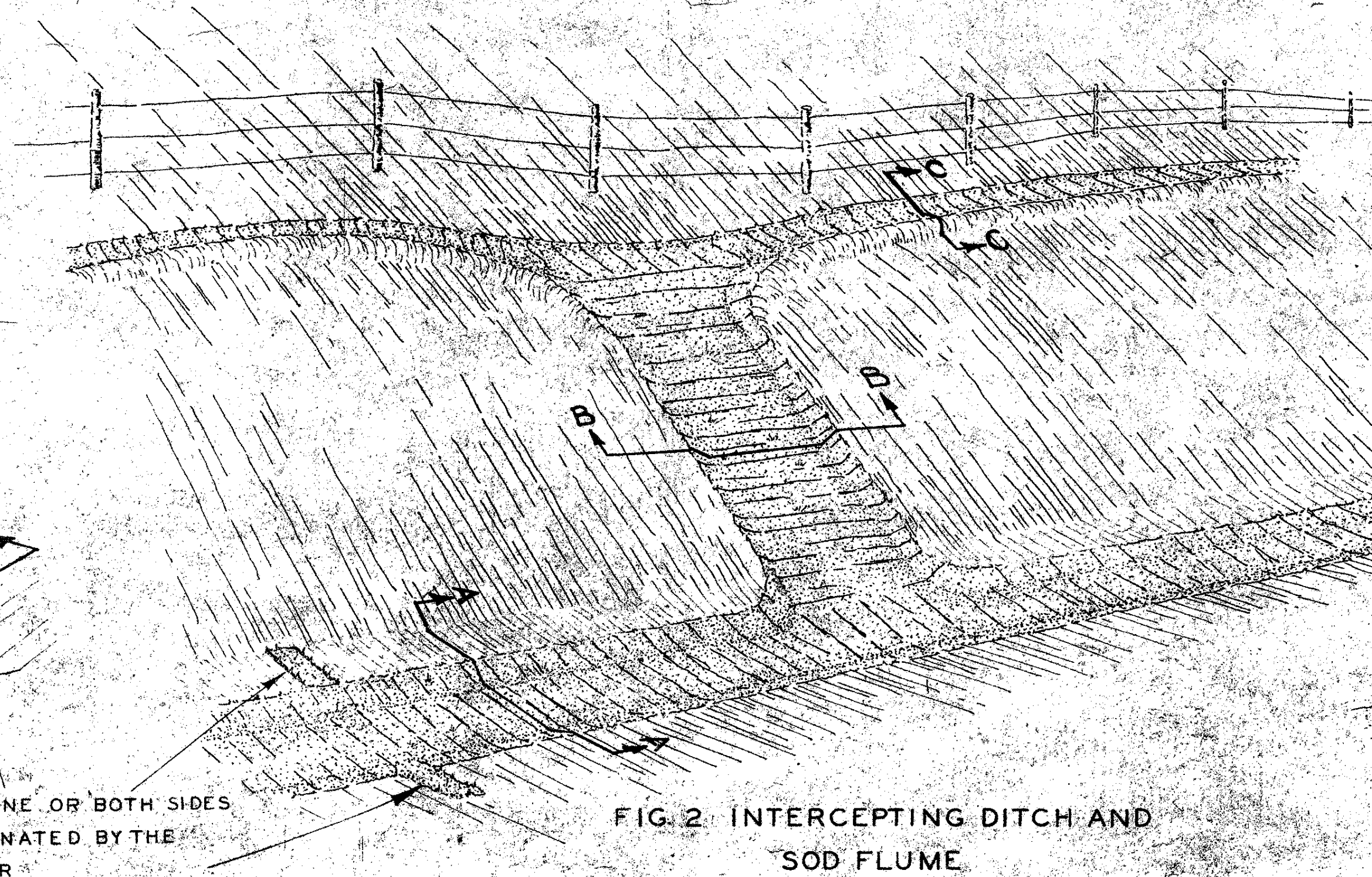


FIG. 2 INTERCEPTING DITCH AND SOD FLUME

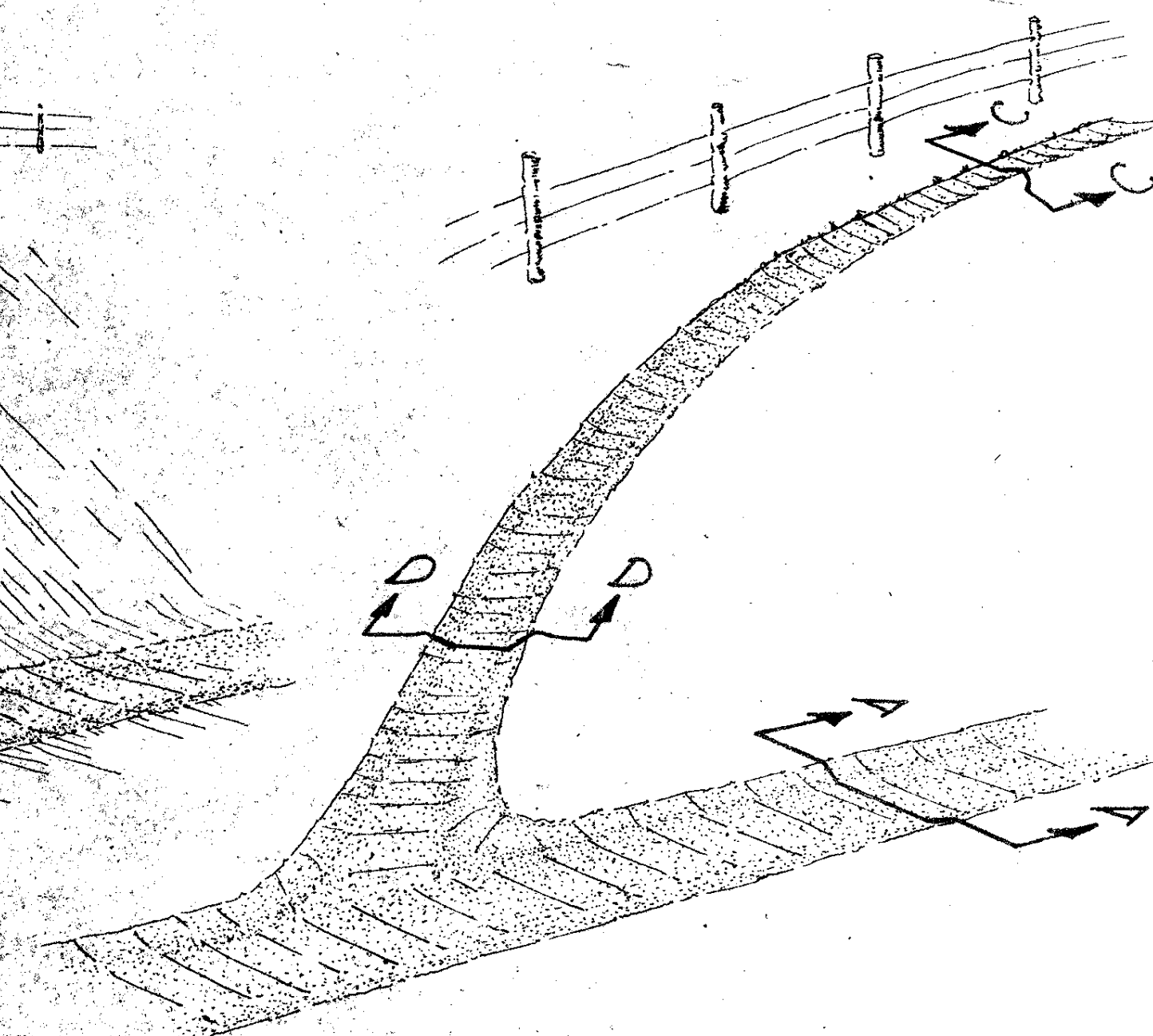
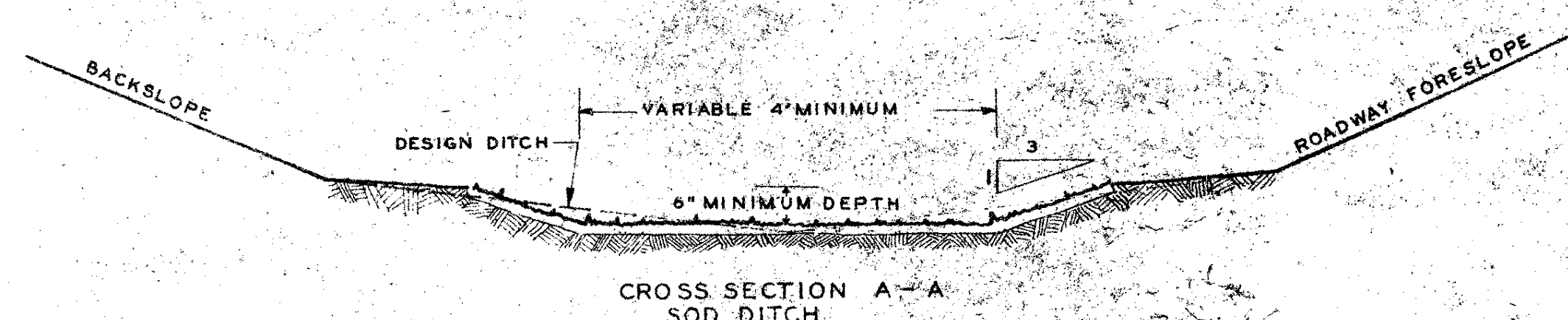
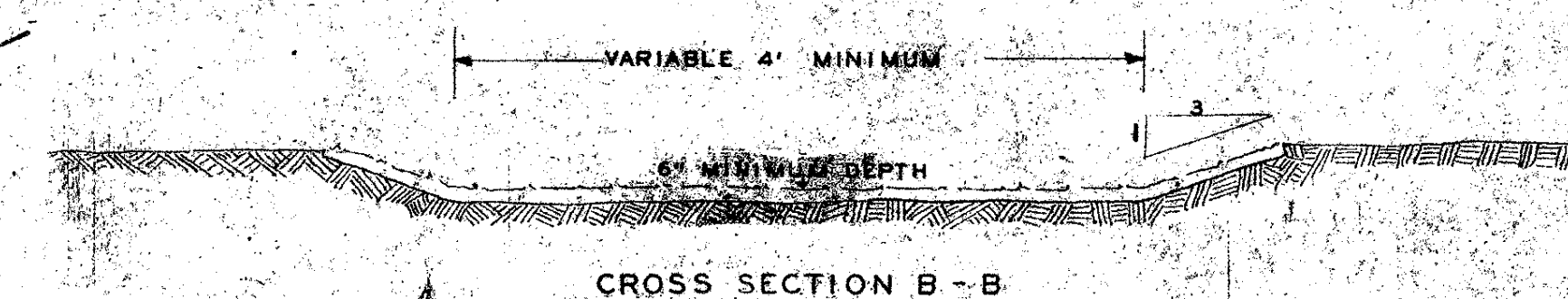


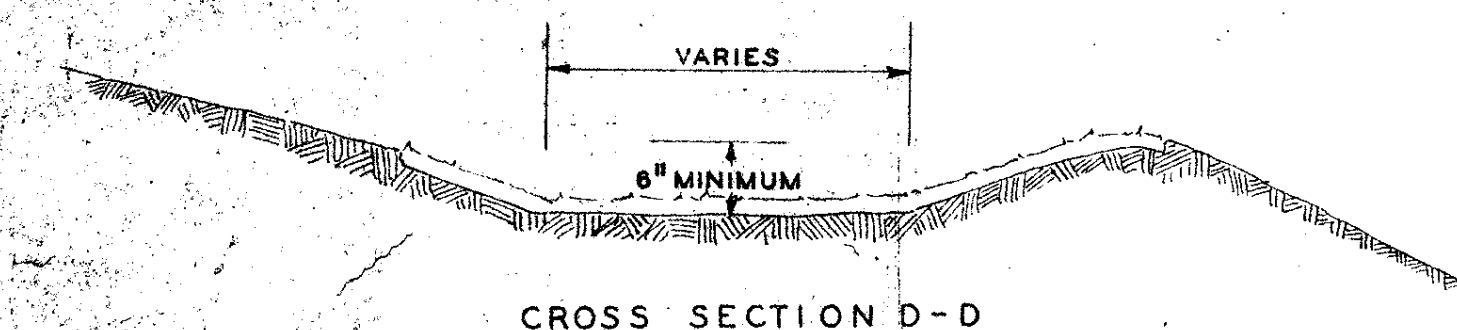
FIG. 3 INTERCEPTING DITCH AND FLUME AT END OF SLOPE



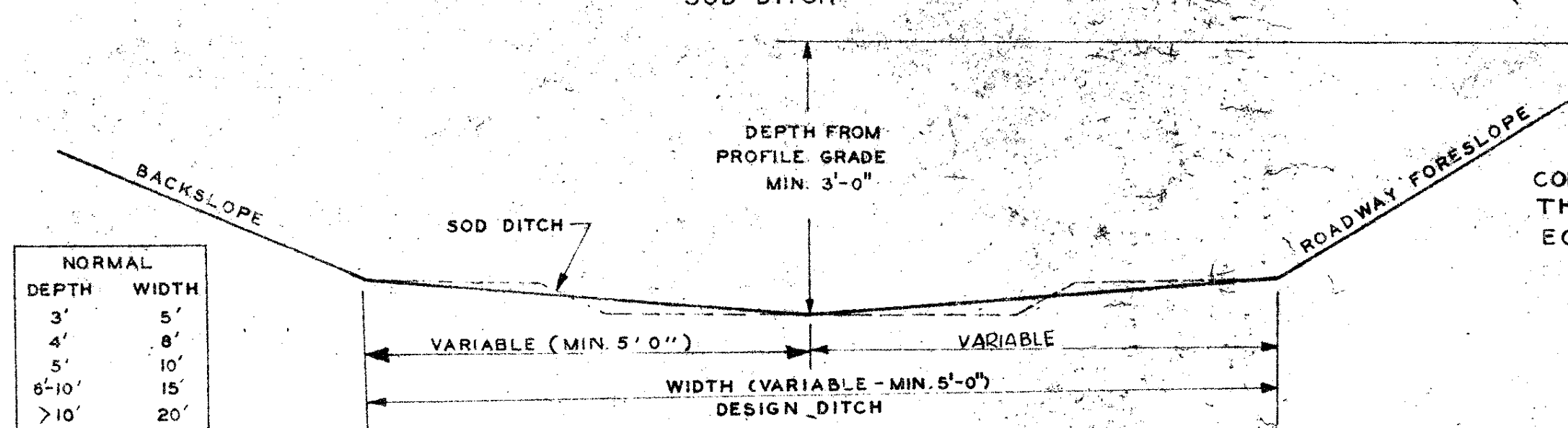
CROSS SECTION A-A SOD DITCH



CROSS SECTION B-B



CROSS SECTION D-D



CROSS SECTION C-C PROPOSED INTERCEPTING DITCH (ONLY WHERE INDICATED ON DETAIL PLANS)

NORMAL DEPTH	WIDTH
3'	5'
4'	8'
5'	10'
6'-10'	15'
>10'	20'

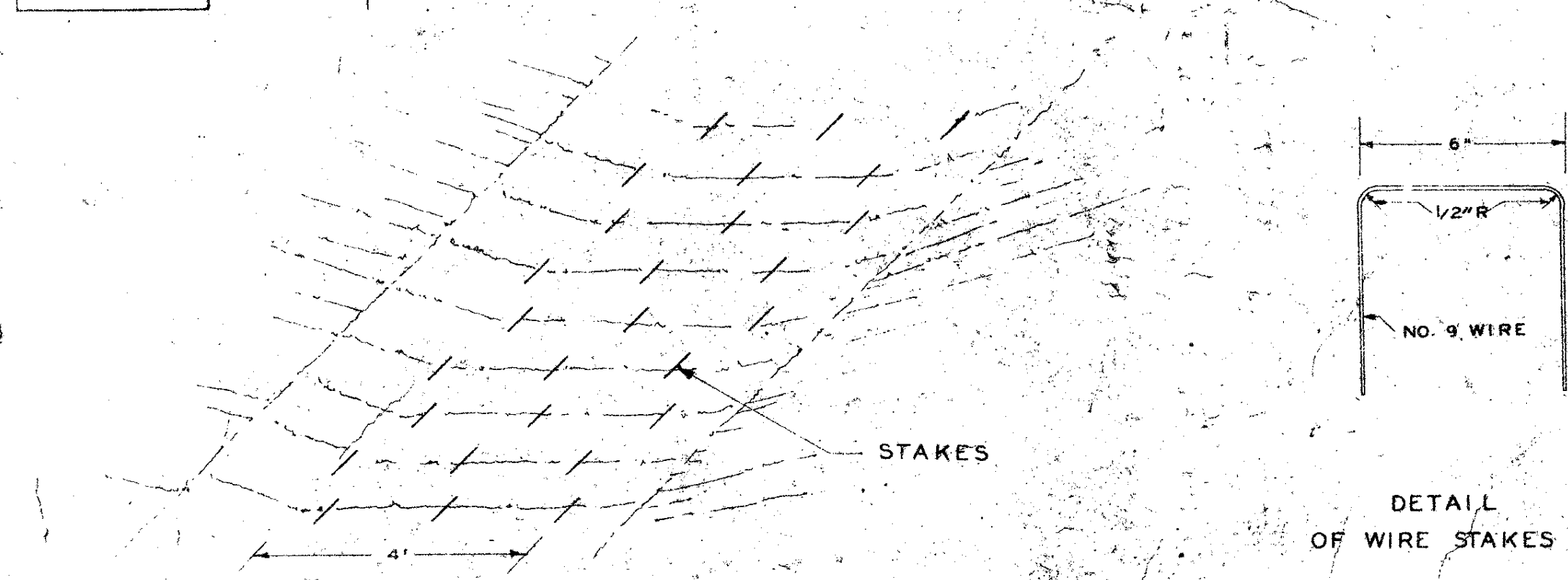


FIG. 4 WIRE STAKES

NOTES:

- FIG. 1 THROUGH DITCHES OR BORROW AREAS SOD CHANNELS SHOULD BE CONSTRUCTED AT THE LOW POINT. ALL EXCAVATED MATERIAL SHOULD BE WASTED TO FILL LOW AREAS AND OTHERWISE FACILITATE THE FREE FLOW OF SURFACE WATER INTO THE CHANNEL. ALINEMENT SHOULD BE SMOOTH AND ABRUPT CHANGES SHOULD BE AVOIDED. SOD WINGS SHALL BE NOT LESS THAN 30" LONG AND SHALL NOT BE EXTRA PIECES OF SOD MERELY ADDED TO THE REGULAR CHANNEL.
- FIG. 3 SOD FLUMES AT THE END OF A SLOPE SHALL GRADUALLY CHANGE FROM A FLAT BOTTOM TO ROUNDED BOTTOM AS THEY PROGRESS UP THE SLOPE.
- FIG. 4 WIRE STAKES SHALL BE STAGGERED AS SHOWN. MINIMUM 33 STAKES PER SQUARE.
- WOODEN STAKES SHALL BE USED IN SOD FLUMES WHEN DESIGNATED BY ENGINEER.

Revised June 5, 1964

3-13-62	Modify intercepting ditch	RDJ
7-1-61	NEW ISSUE	
DATE	REVISIONS	APP.

IOWA HIGHWAY COMMISSION		
STANDARD ROAD PLAN		RC-1
RECOMMENDED	<i>K. P. McLaughlin</i> ENGINEER	11/16/60 DATE
	<i>D. P. McLaughlin</i> DESIGN COMMITTEE	1-4-61 DATE
APPROVED	<i>L. M. Chaugon</i> CHIEF ENGINEER	1-10-61 DATE
EROSION CONTROL DETAILS DITCHES		

W=Width of single panel of net or mesh
8" Min.

INTERCEPTING DITCH
NO SCALE

Normal Backslope

ANCHOR SLOT

STAPLES

JUNCTION SLOT

STAPLES

TAMP SOIL FIRMLY

CHECK SLOT

STAPLES

TAMP SOIL FIRMLY

TERMINAL FOLD

12" STAPLE

CENTER
LAP JOINT

3" Staple

NOTE -
STAGGER SPLICE POINTS.
APPROXIMATELY 800 STAPLES
REQUIRED PER 3'-9" X 750' ROLL
OF EROSION NET (25.5g).
APPROXIMATELY 250 STAPLES REQUIRED
PER 4' X 225' ROLL OF JUTE MESH (9.05g).

PLAN VIEW - STAPLING DIAGRAM NO SCALE
(TWO STRIPS SHOWN-THREE MAY BE USED)

APPROX. 7'-10" (2 STRIPS) } JUTE MESH (48")
APPROX. 11'-8" (3 STRIPS)
APPROX. 7'-3" (2 STRIPS) } EROSION NET (45")
APPROX. 10'-9" (3 STRIPS)

TYPICAL DITCH CROSS SECTION NO SCALE

4 1/2" MINIMUM

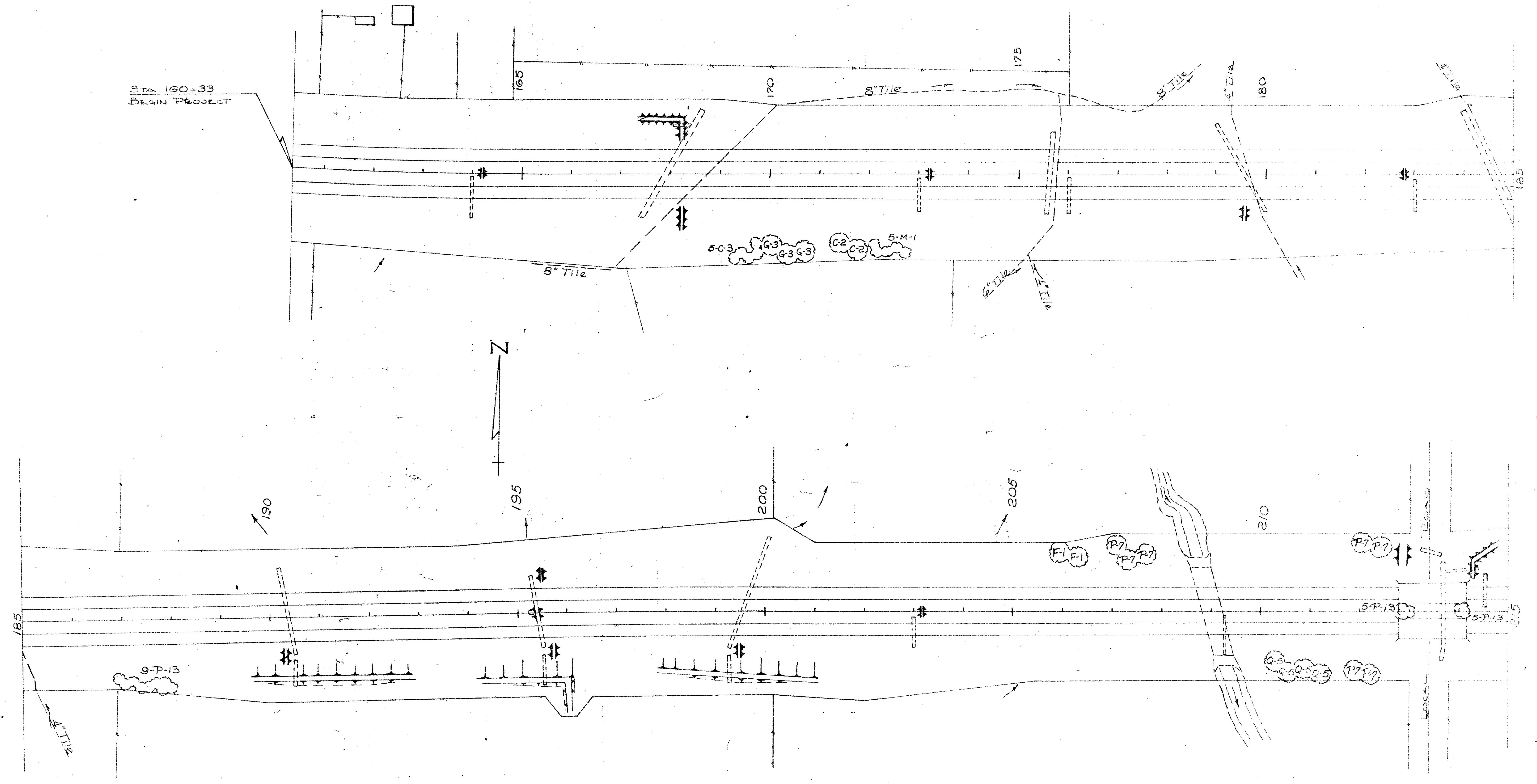
SPECIAL DITCH CONTROL
DETAILS FOR INSTALLATION OF EROSION NET
OR JUTE MESH

Revised June 5, 1964

10-2-62	CHANGE STAPLING	RD
11-16-61	ADDED DETAILS FOR JUTE	RD
7-1-61	NEW ISSUE	
DATE	REVISIONS	APP.

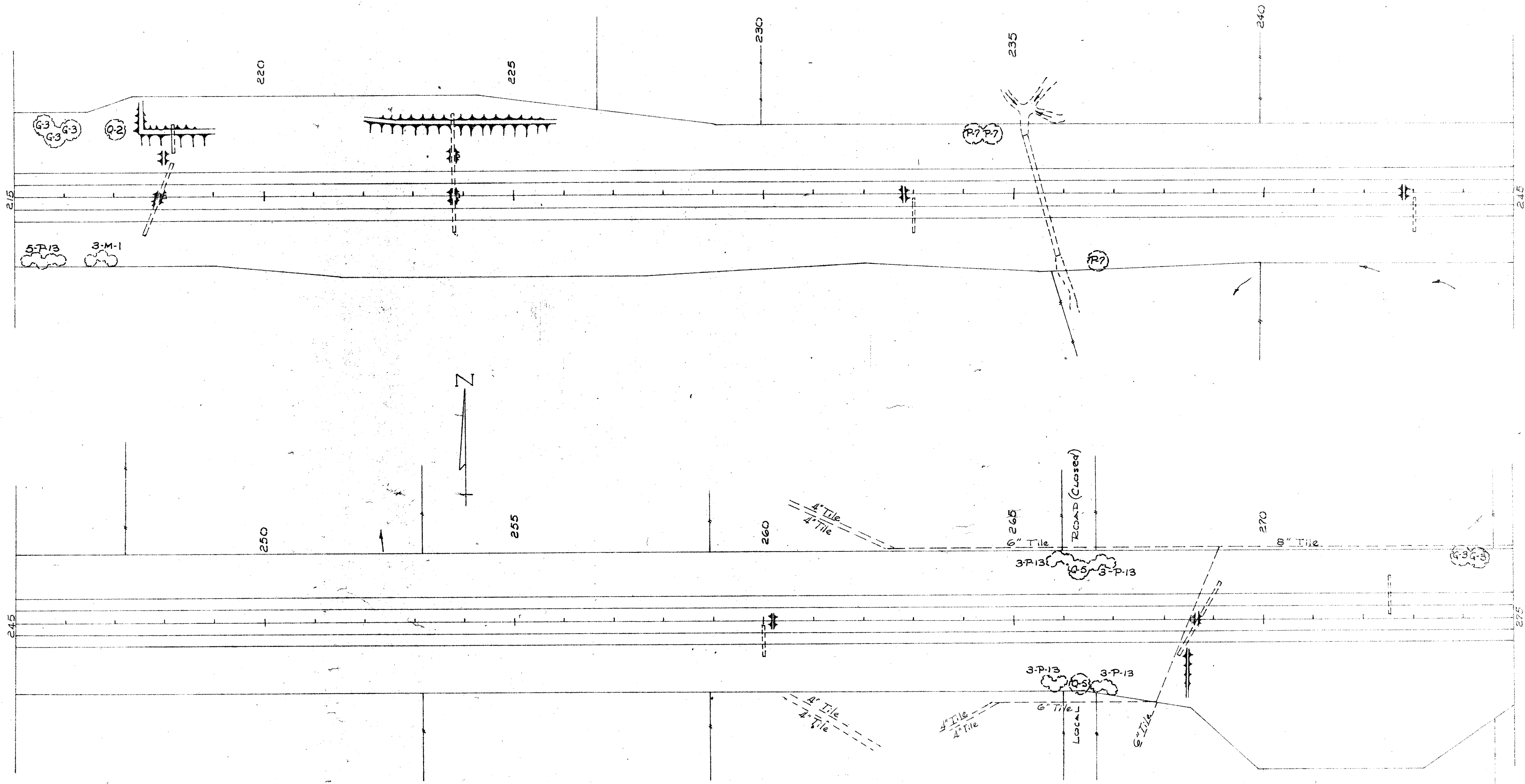
IOWA HIGHWAY COMMISSION	
STANDARD ROAD PLAN	RC-2
RECOMMENDED	<i>Dr. P. McLaughlin</i> 11/16/60 ENGINEER DATE <i>RD 2, 1-4-61</i> DESIGN COMMITTEE DATE
APPROVED	<i>J. M. Bowman</i> 2-9-61 CHIEF ENGINEER DATE
DETAILS OF SPECIAL DITCH CONTROL - JUTE MESH OR EROSION NET	

Sta. 160+33
BEGIN PROJECT



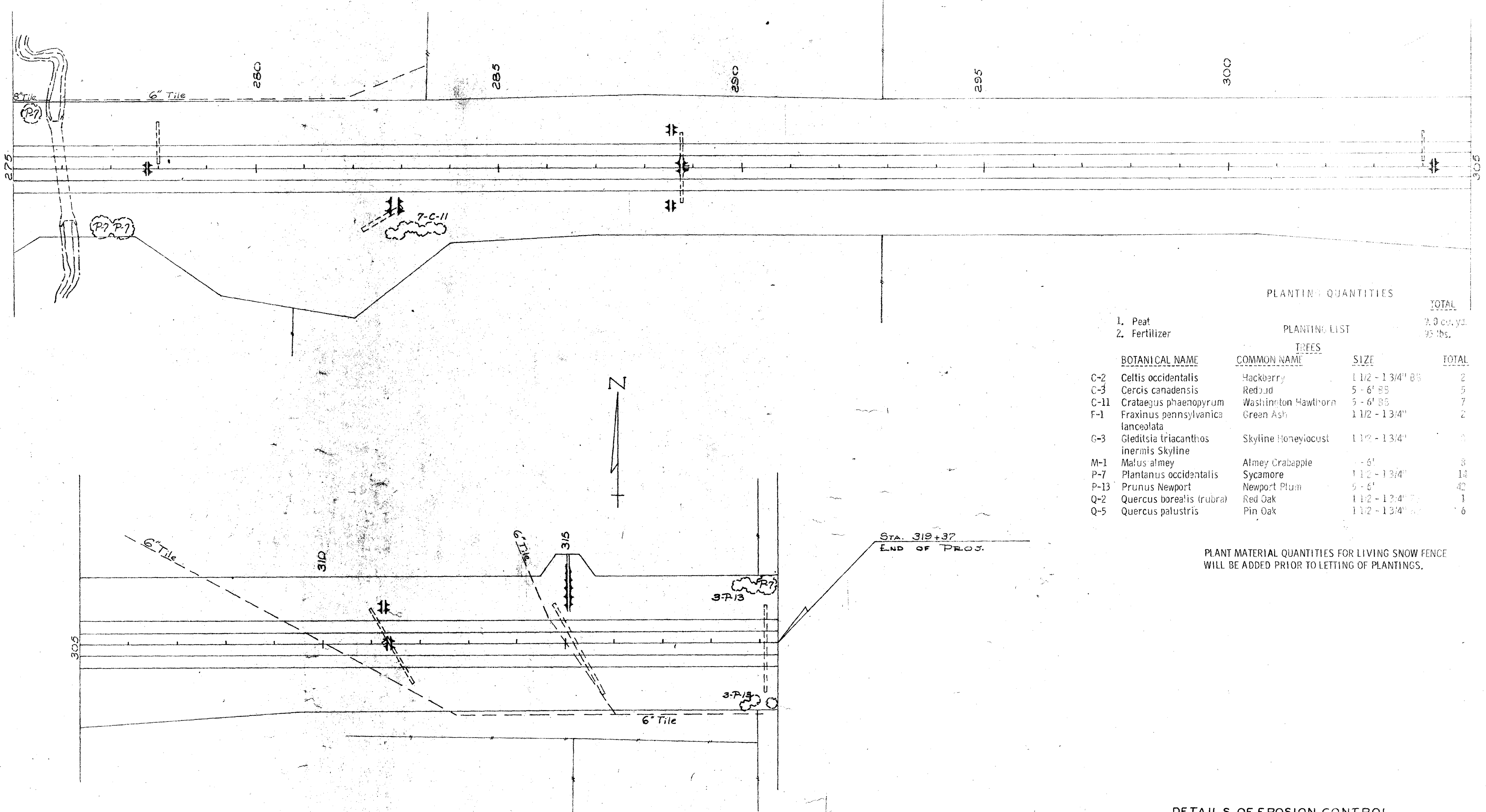
DETAILS OF EROSION CONTROL
PLANTINGS

Revised June 5, 1964



DETAILS OF EROSION CONTROL
PLANTINGS

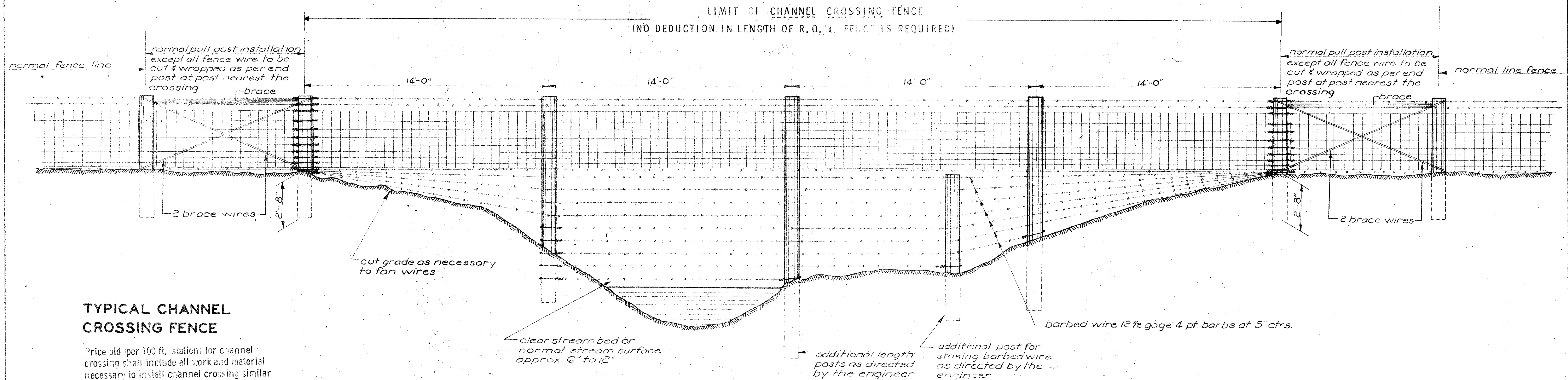
Revised June 5, 1964



DETAILS OF EROSION CONTROL PLANTINGS

Revised June 5, 1964

ET-1



TYPICAL CHANNEL CROSSING FENCE

Price bid (per 100 ft. station) for channel crossing shall include all work and material necessary to install channel crossing similar to method described hereon.

Preparation of site including any necessary minor earth shaping, brush removal, etc. shall be included and considered incidental to the price bid for fencing.

Preparation of site including any necessary minor earth shaping, brush removal etc. shall be included and considered incidental to the price bid for fencing.

GENERAL NOTES

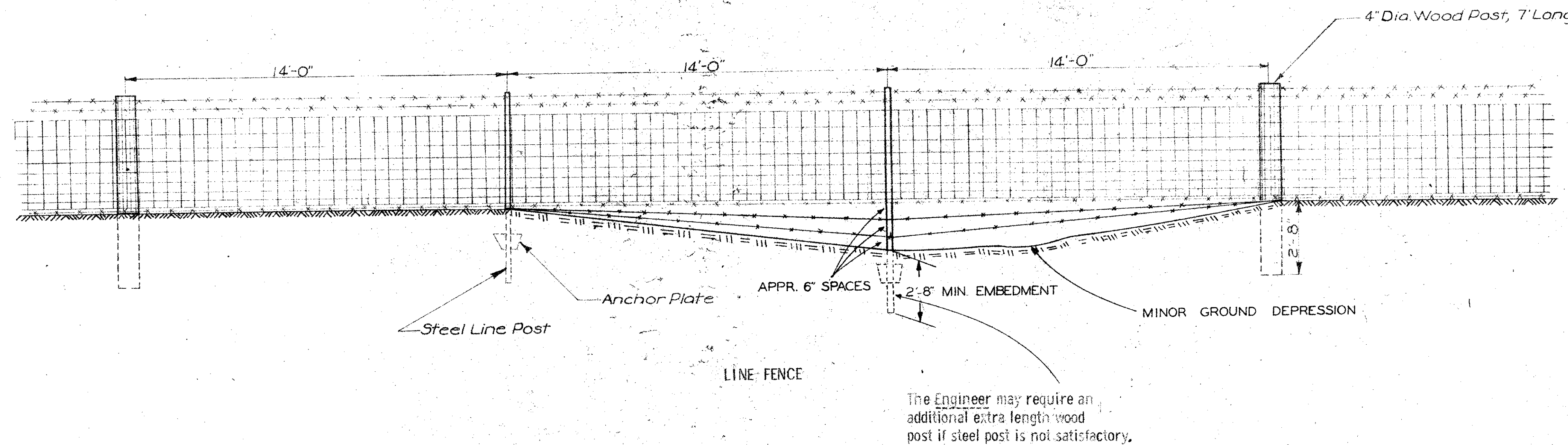
Right of way fence shall be constructed one foot from the right of way line on State property unless otherwise shown on the plans.

Channel crossing details shown shall be considered typical. Channel crossings shall be constructed to fit their individual sites as directed by the Engineer in charge of construction.

All expense for furnishing necessary material and construction of channel crossing as indicated hereon shall be included in the price bid for channel crossing fence.

Fencing materials and methods for construction shall be in accordance with current Standard Specifications as supplemented by this drawing as well as applicable Special Provisions.

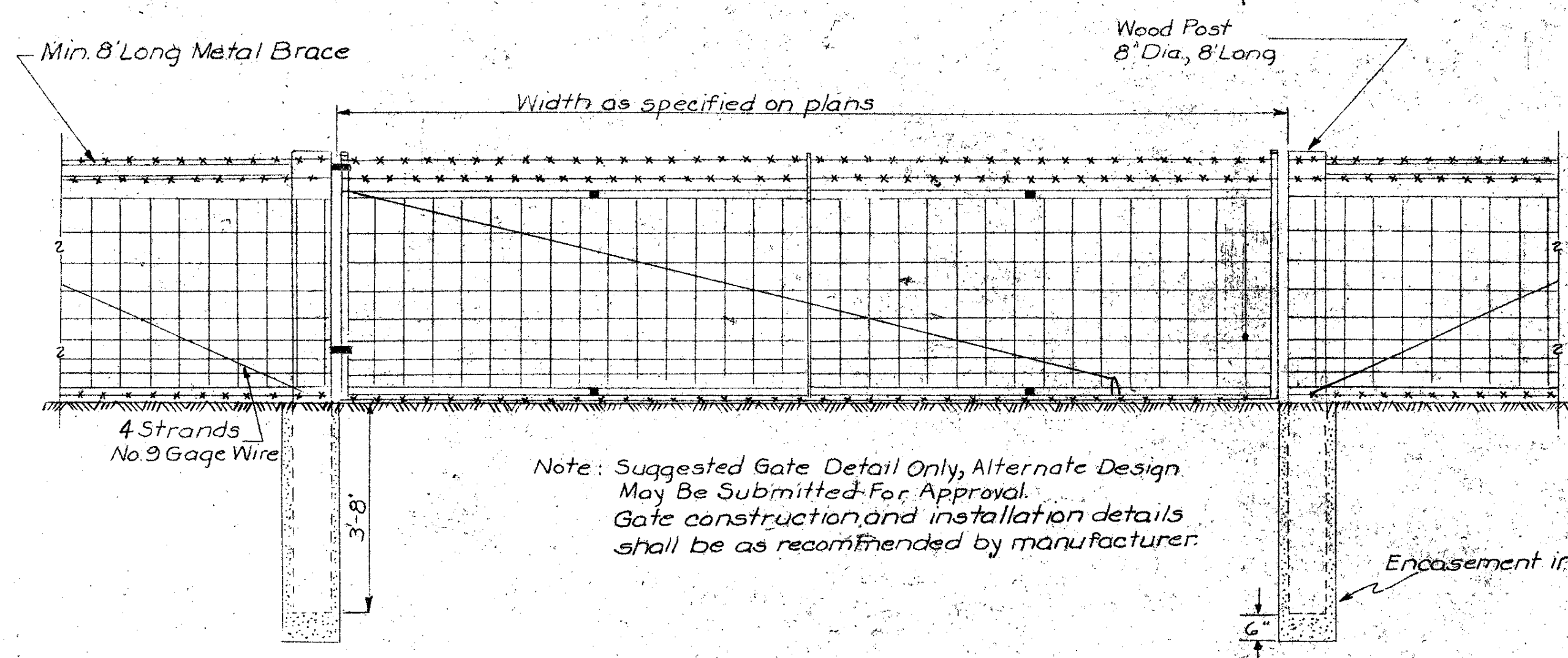
All extra length posts (more than 8' long) require a minimum embedment of 4'-0".



Price bid (per 100 ft. station) for R.O.W. fence shall include all work and material necessary to construct fence as described hereon (Also see Std. Plan RD-9). At locations where depressions in the ground surface may not warrant construction of channel crossing fence, the Engineer may require the installation of not more than two additional barb wires as indicated hereon. This work shall be considered incidental to the construction of R.O.W. Fence. Work not specifically described hereon, or in Special Provisions or Specifications, which may be required by the Engineer in the construction of fencing, shall be paid for as Extra Work as provided for in current Standard Specifications.

Revised June 25, 1964

Mod Line Fence, Provide Pay for Channel Cross	5-1-64	IOWA HIGHWAY COMMISSION	
	DATE	STANDARD ROAD PLAN RD-8	
	LAST REVISION	RECOMMENDED	J.P. McLaughlin 10/23/62 ROAD ENGINEER DATE
		DESIGN COMMITTEE	DATE
		APPROVED	CHIEF ENGINEER DATE
DETAILS FOR CONSTRUCTION OF WOVEN WIRE FENCING AND CHANNEL CROSSING			

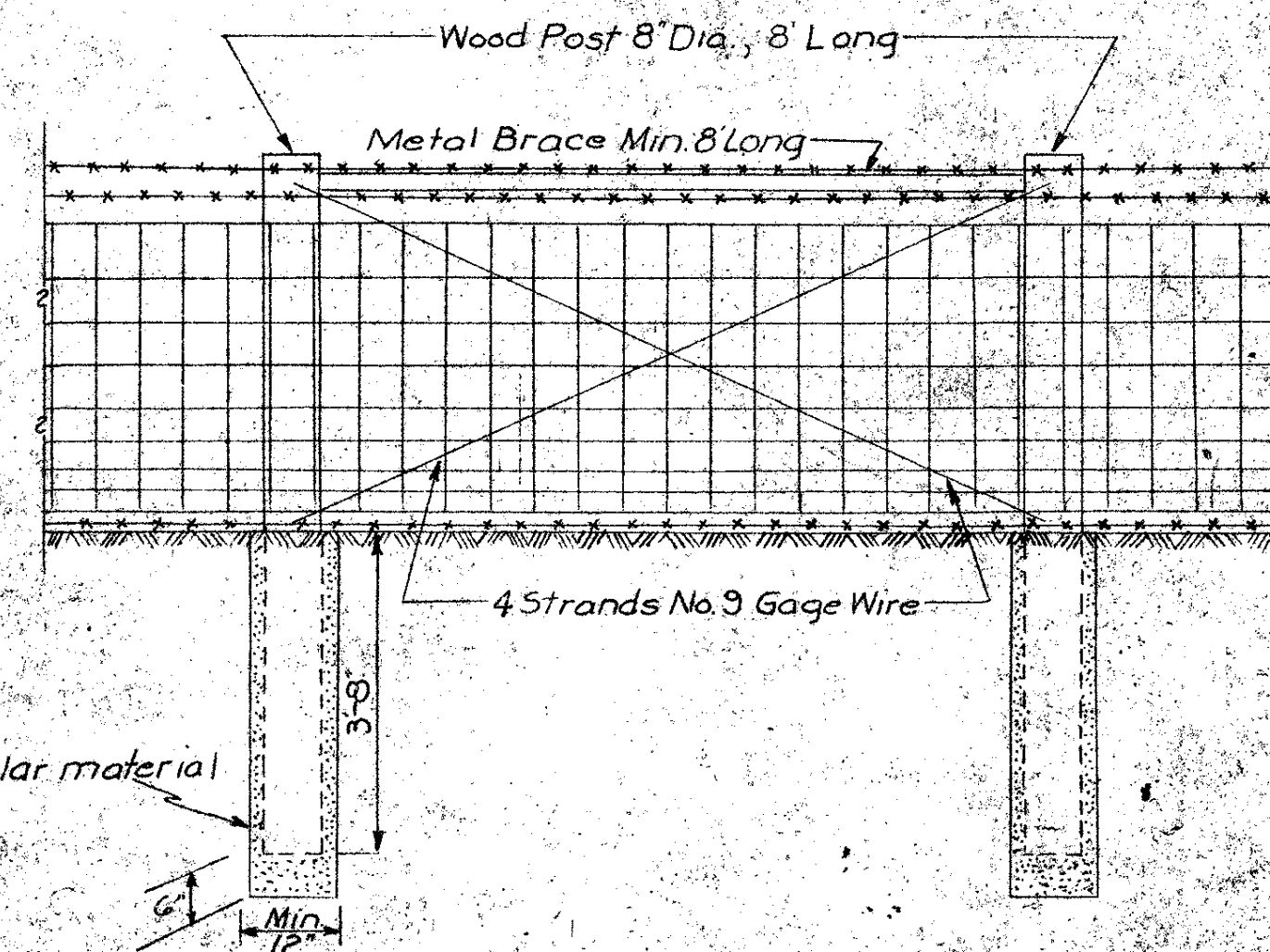


GATE ASSEMBLY

General Notes:
Construction of woven wire ROW fencing shall be as specified in the current Standard Specifications as well as applicable special provisions.

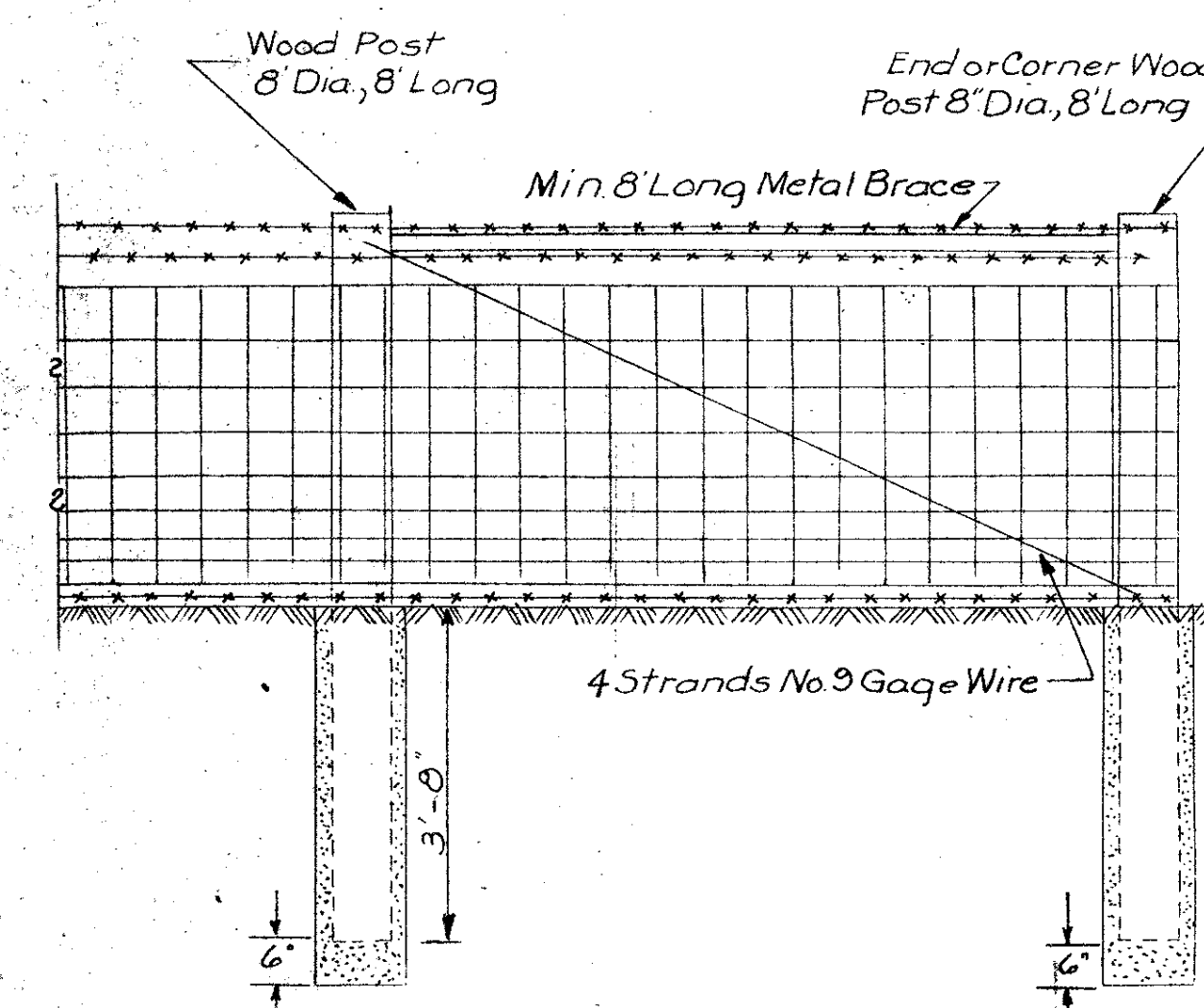
Construction of necessary corners, pull post, fence breaks, as well as all other incidental construction shall not be measured or paid for as such, but shall be considered incidental to the construction of fencing.

Price bid for gates shall include all work & material necessary to install gates as indicated hereon and in current standard specifications.



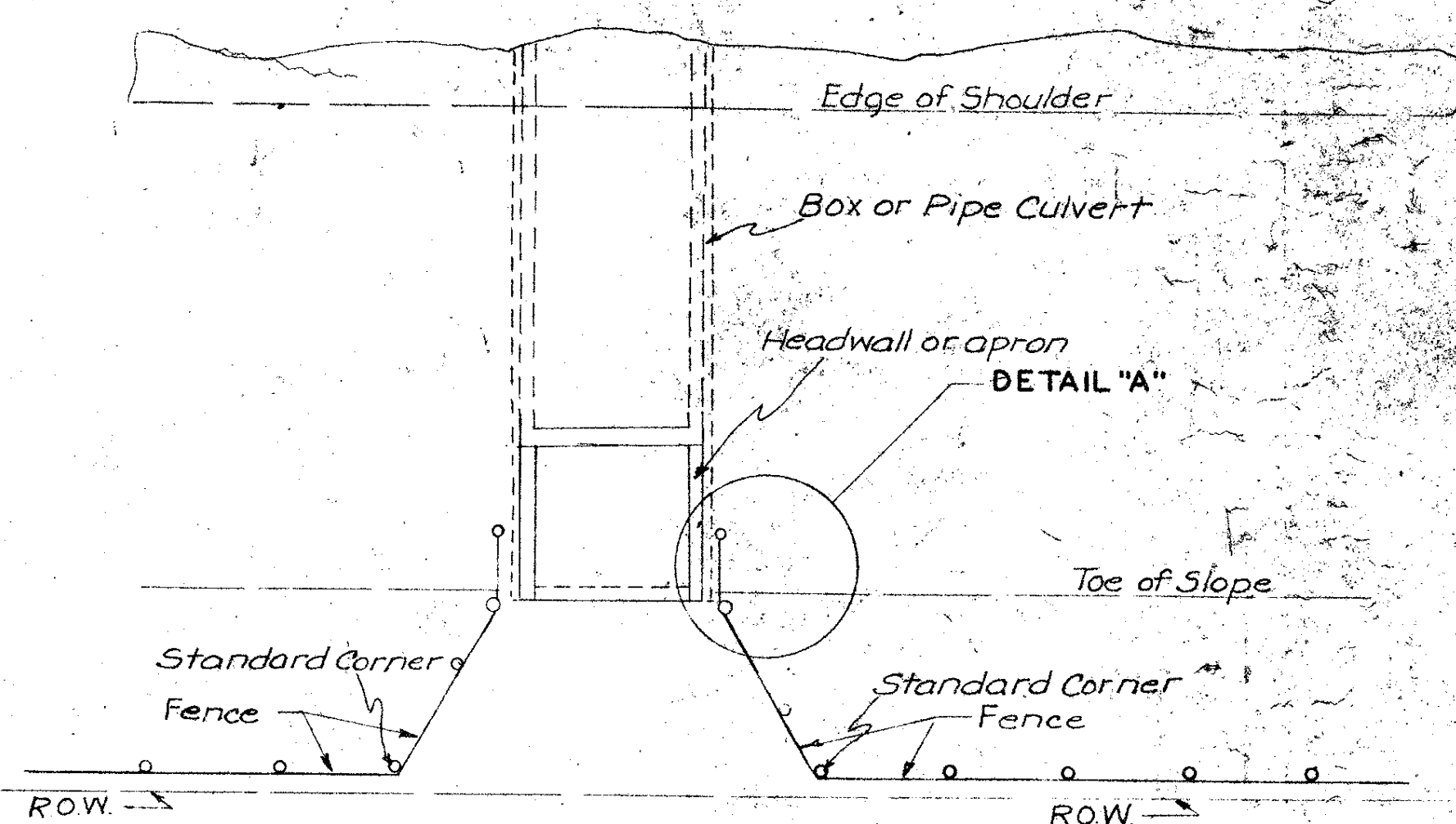
PULL POST ASSEMBLY

Note: Suggested bracing detail only, alternate design may be submitted for approval.



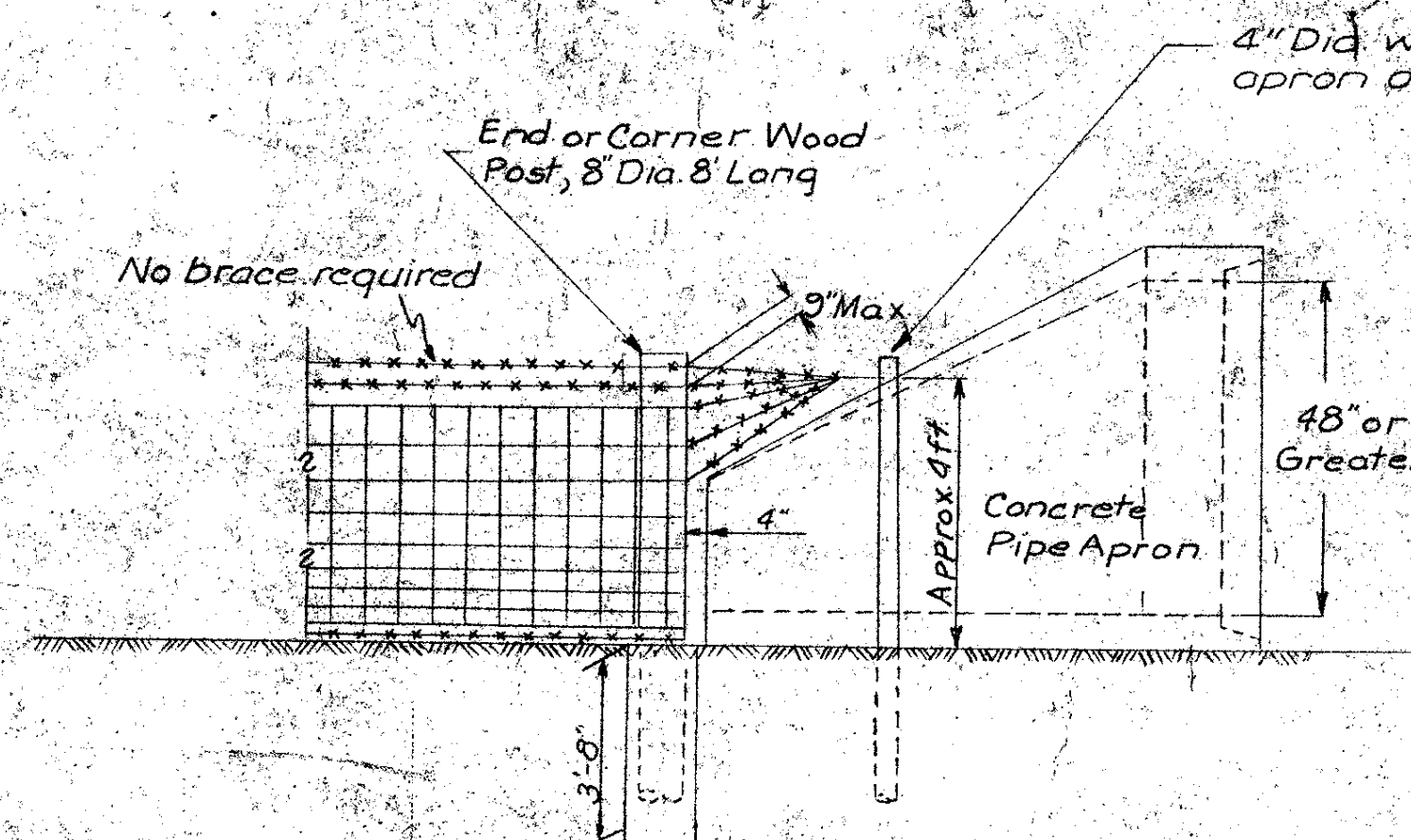
END OR CORNER POST ASSEMBLY

(Details are similar for opposite half of corner or angle installation)
Note: Suggested bracing detail only, alternate design may be submitted for approval.

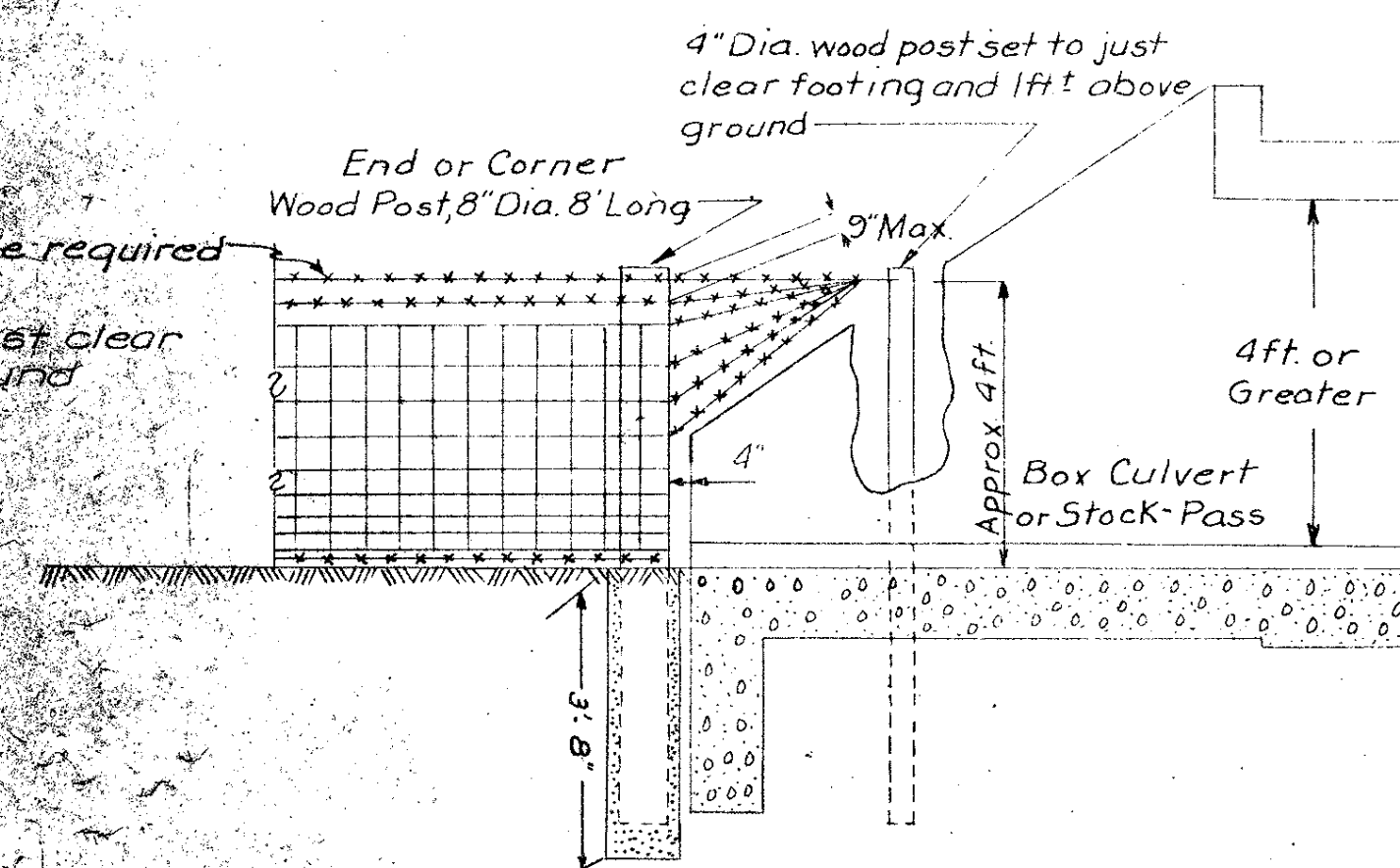


PLAN OF FENCE BREAK

FOR ALL BOX CULVERTS 4'x 4' OR LARGER
AND ALL ϕ PIPES 48" OR LARGER
(DO NOT BREAK FOR SMALLER CULVERTS)



**DETAILS OF FENCE ADJACENT TO CONCRETE PIPE CULVERTS
DETAIL "A"**

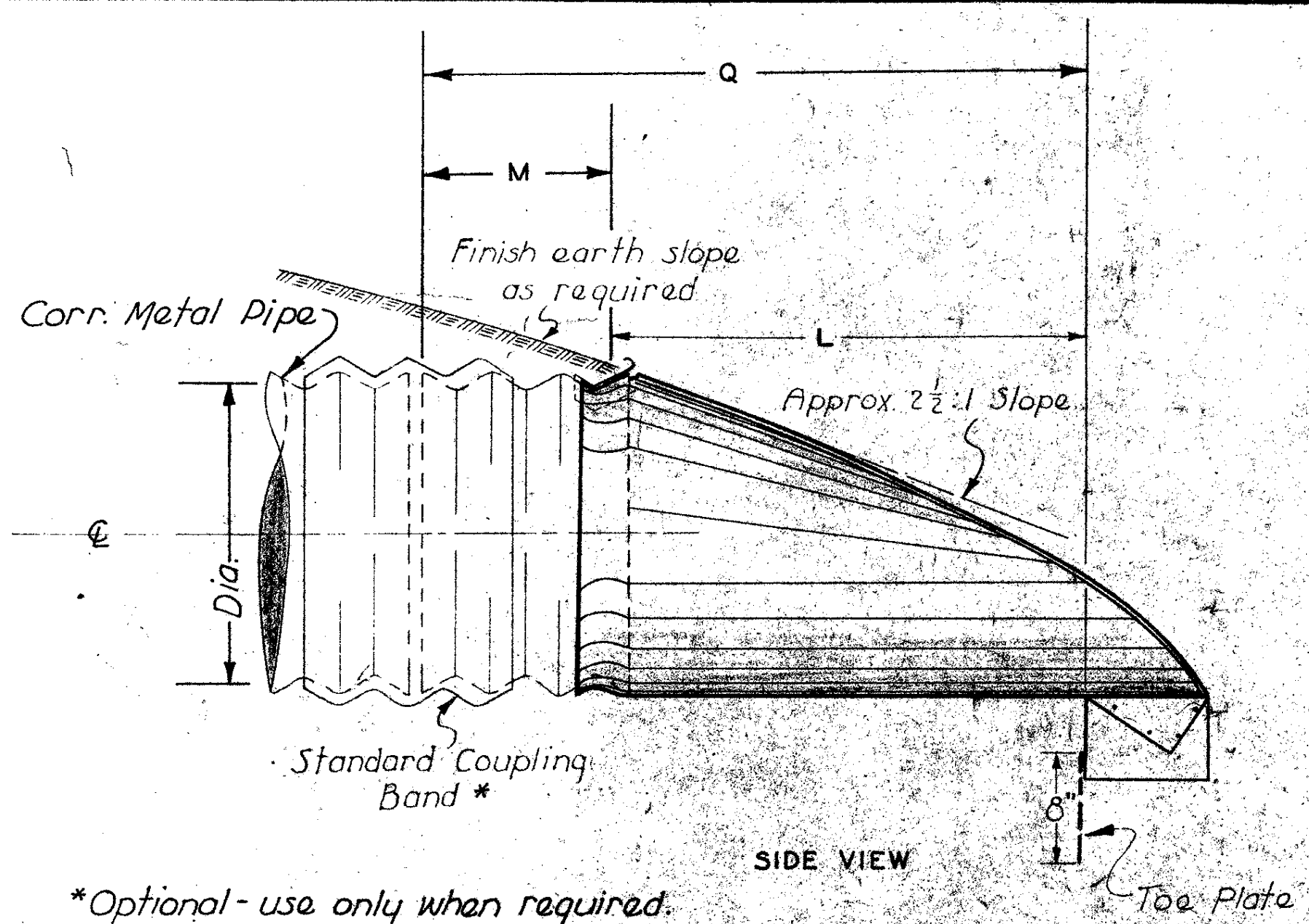


**DETAILS OF FENCING TO BOX CULVERTS OR STOCKPASS 4' OR LARGER
DETAIL "A"**

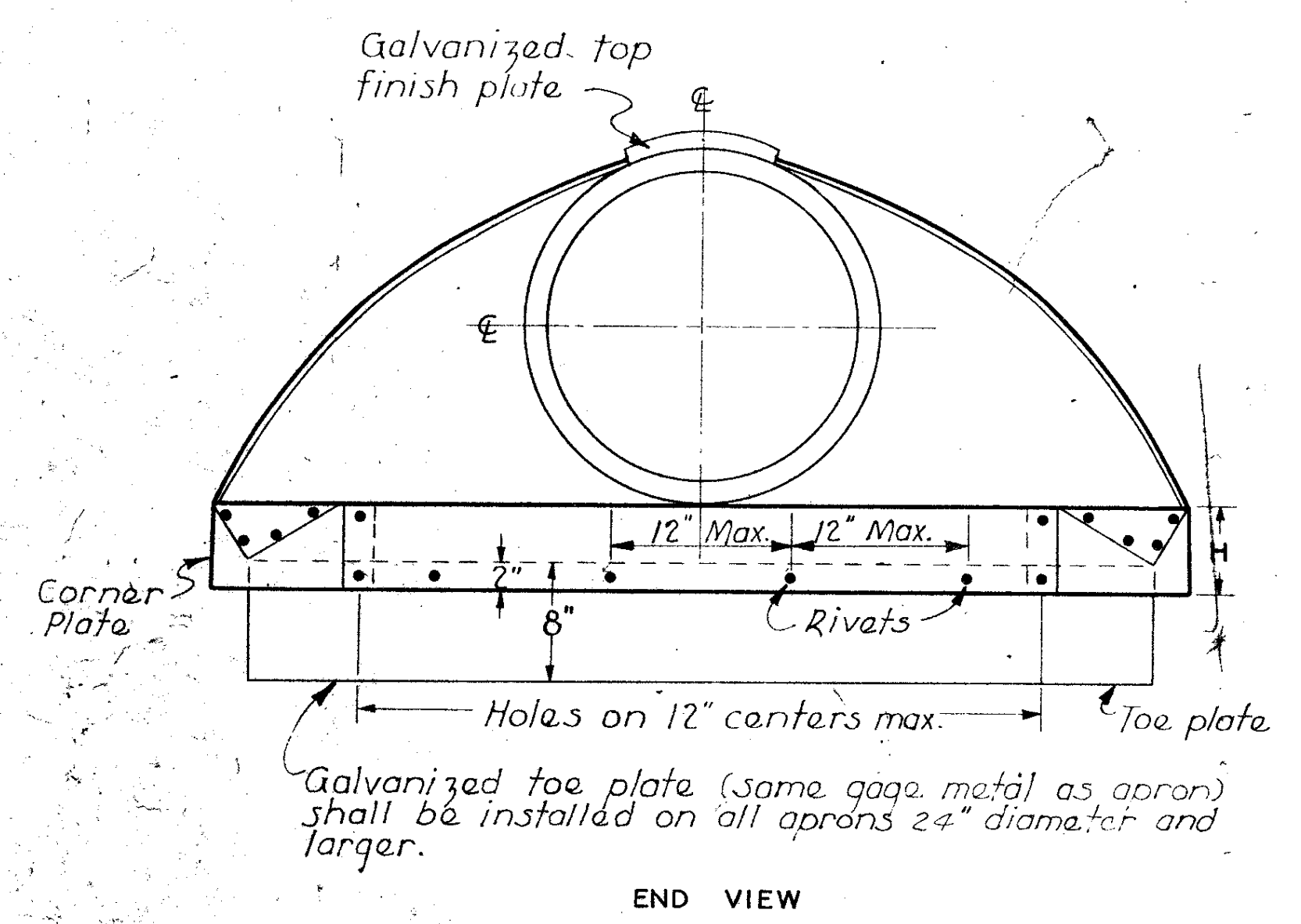
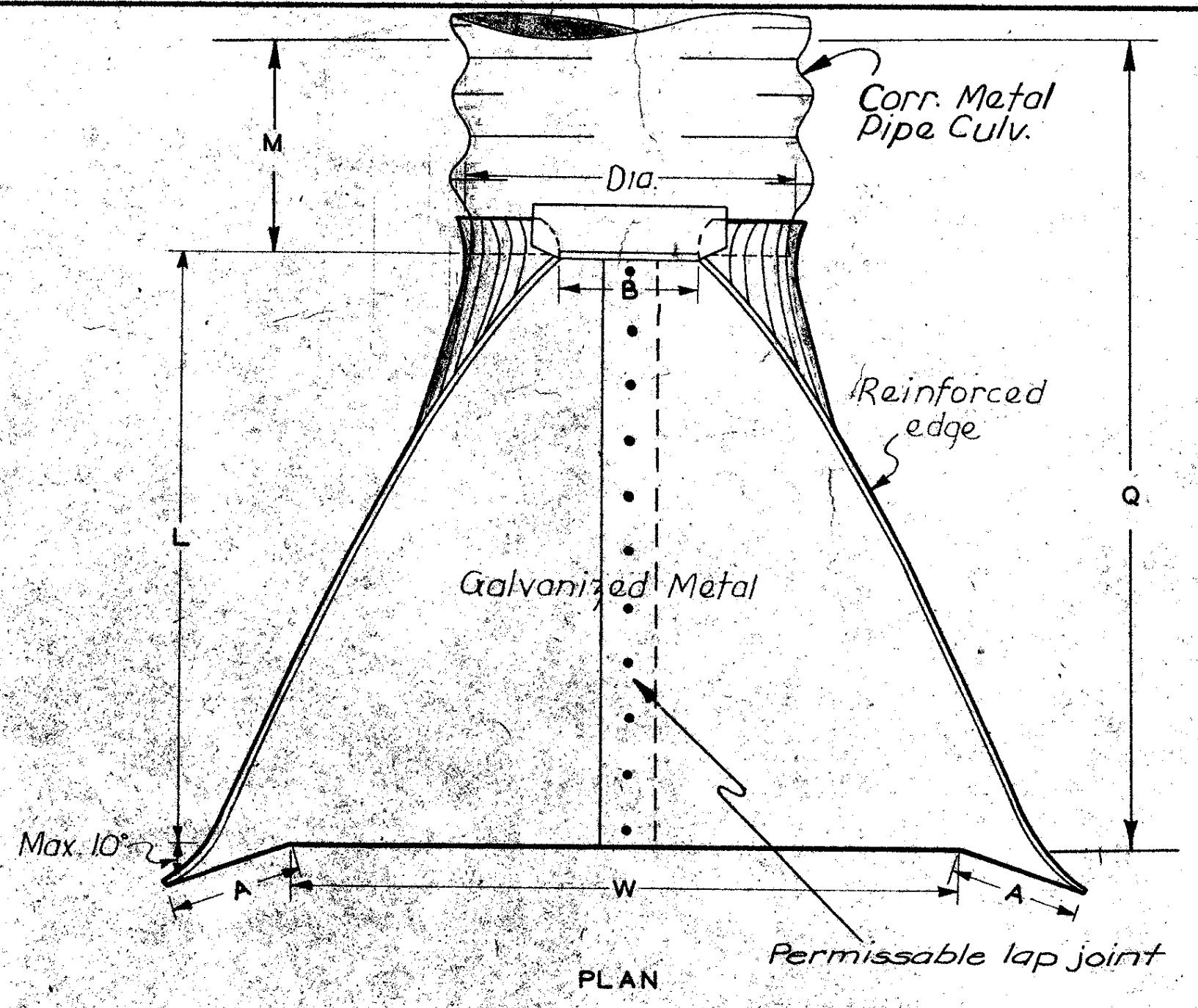
IOWA HIGHWAY COMMISSION			
STANDARD ROAD PLAN RD-9			
RECOMMENDED	R. L. McLaughlin	11-22-61	DATE
	ENGINEER		
APPROVED	DESIGN COMMITTEE		DATE
	CHIEF ENGINEER		DATE
WOVEN WIRE FENCING GATES CORNERS & OTHER DETAILS			

Revised June 25, 1964

4-4-63	ADD GATE NOTE	R.D.J.
DATE	REVISIONS	APP.



*Optional - use only when required.

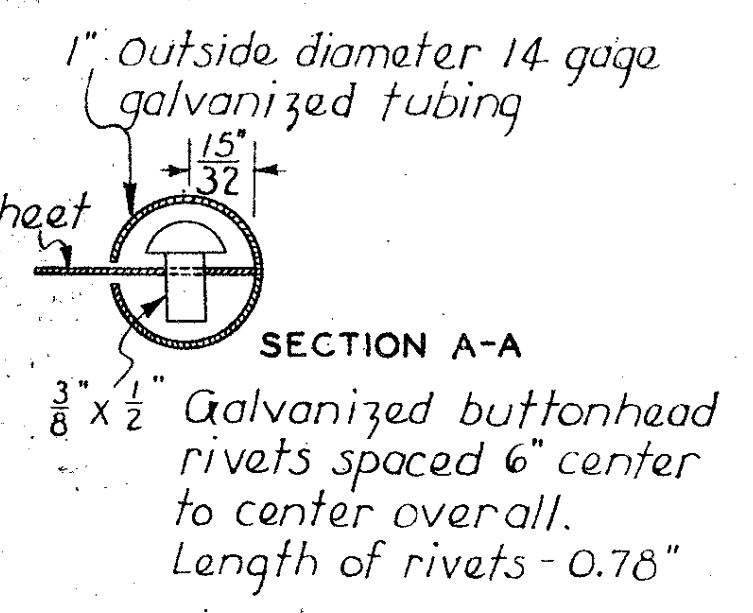
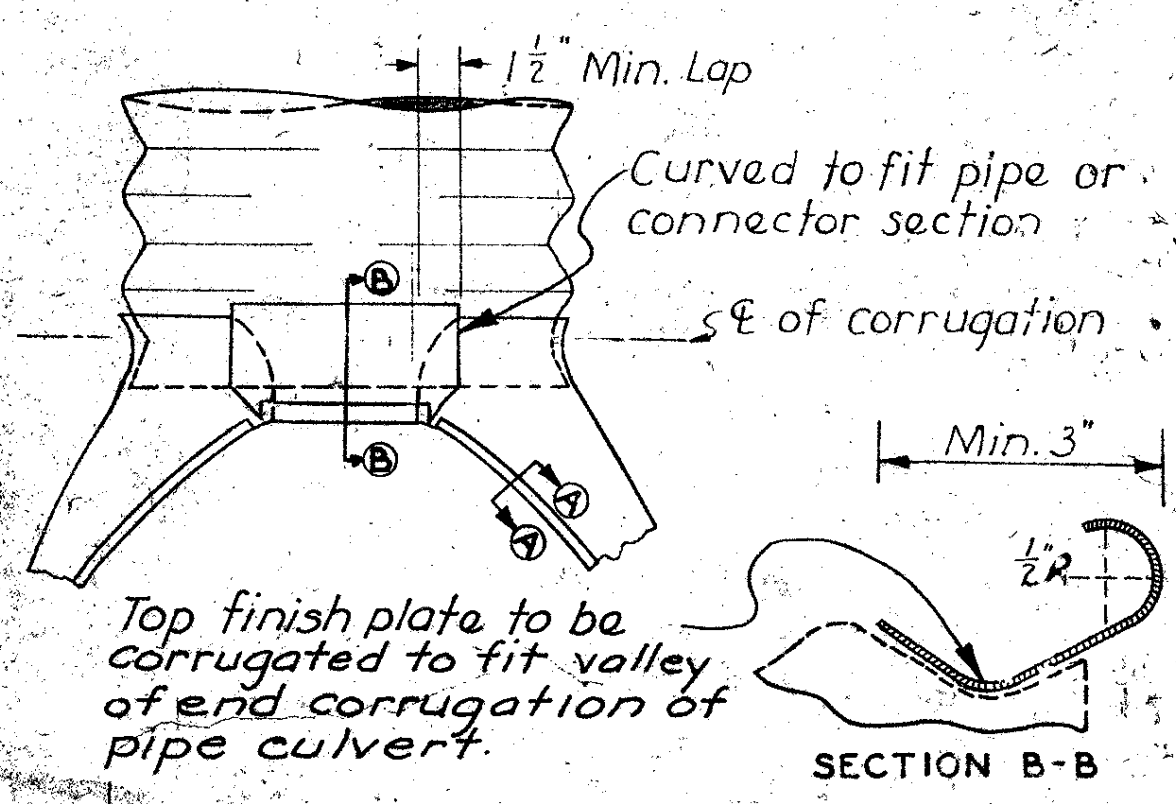


NOTE:

Corrugated metal pipe culvert of length "W". (See Table of Dimensions) shall be furnished and installed in addition to specified length of corrugated metal pipe culvert. This length "M" shall be considered an integral part of the "Apron" and shall not be measured or paid for as culvert pipe but shall be considered incidental to the item of "Aprons". Dimension "Q" shall be considered the "LENGTH" of the apron.

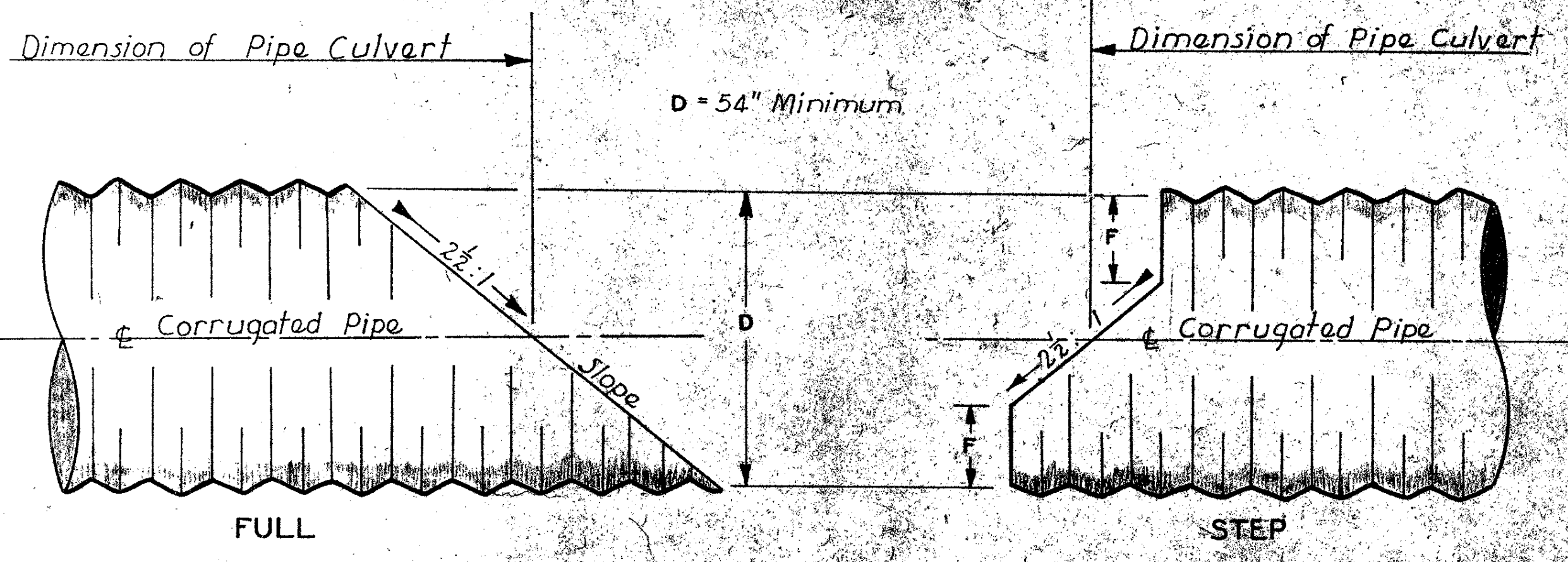
PIPE DIAM.	DIMENSIONS						
	A 1"	B MAX.	H 1 1/2"	L 1 1/2"	W 2 1/2"	M *	Q *
12"	4 3/4"	6"	6"	21"	24"	48"	69"
15"	6"	8"	"	26"	30"	63"	74"
18"	7"	9"	"	31"	36"	78"	79"
21"	8 1/4"	11"	"	36"	42"	93"	84"
24"	9 1/2"	12"	"	42"	48"	108"	89"
30"	12"	15"	7 1/2"	52"	60"	135"	96"
36"	14"	18"	9"	63"	72"	162"	111"
42"	16"	21"	10 1/2"	73 1/2"	84"	189"	126"
48"	18"	27"	12"	84"	96"	216"	140"

Dimensions indicated for M & Q are minimum. Actual dimension of pipe provided may not be less than that indicated.



GENERAL NOTES:

- (1) Aprons shall be attached to the circular pipe culvert section by any appropriate method of bolts, clamps, or other, securely connecting the two; subject to the approval of the Engineer. Aprons for pipe culverts 30" diameter and larger may be made in two pieces securely joined together with a tight lap joint with at least 3/8" rivets or bolts at minimum 6" spacing at or near the C of apron as indicated.
- (2) "Toe plates" and "corner plates" as specified may be attached to the apron by any appropriate method which will securely connect the plates to the apron; subject to the approval of the Engineer.
- (3) The "top finish plate" shall be attached to the apron and culvert pipe by any appropriate clamp arrangement securely connecting the parts; subject to the approval of the Engineer. All miscellaneous metal culvert parts shall be at least the same weight or gage as culvert pipe.
- (4) All metal culvert parts and hardware shall be galvanized as per current ISHC Specifications. Any damage to spelter coat resulting from installation of culvert shall be repaired as required in current ISHC Specifications or as directed by the Engineer.

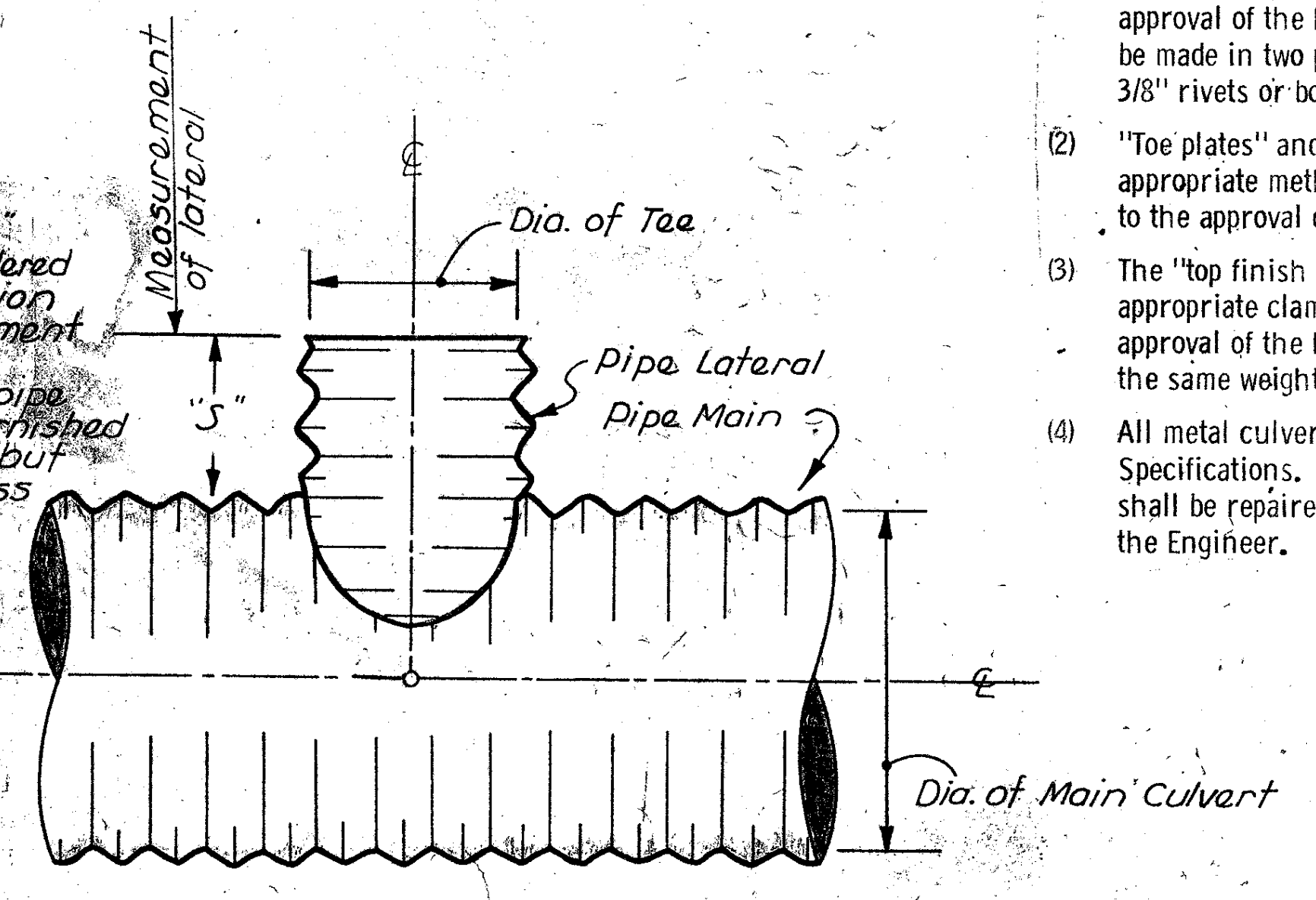


BEVELED ENDS FOR CORRUGATED METAL PIPE

Beveled ends may be used on corrugated pipes longer than 48" in diameter. Either step or full bevel may be used unless one type is specified.

D	F
54"	3"
60"	6"
66"	9"
72"	12"
78"	15"
84"	18"

Note: Dimension "F" shall be considered 6" for installation and measurement of tee. Actual dimension of pipe culvert tee furnished may exceed 6" but may not be less than 6"

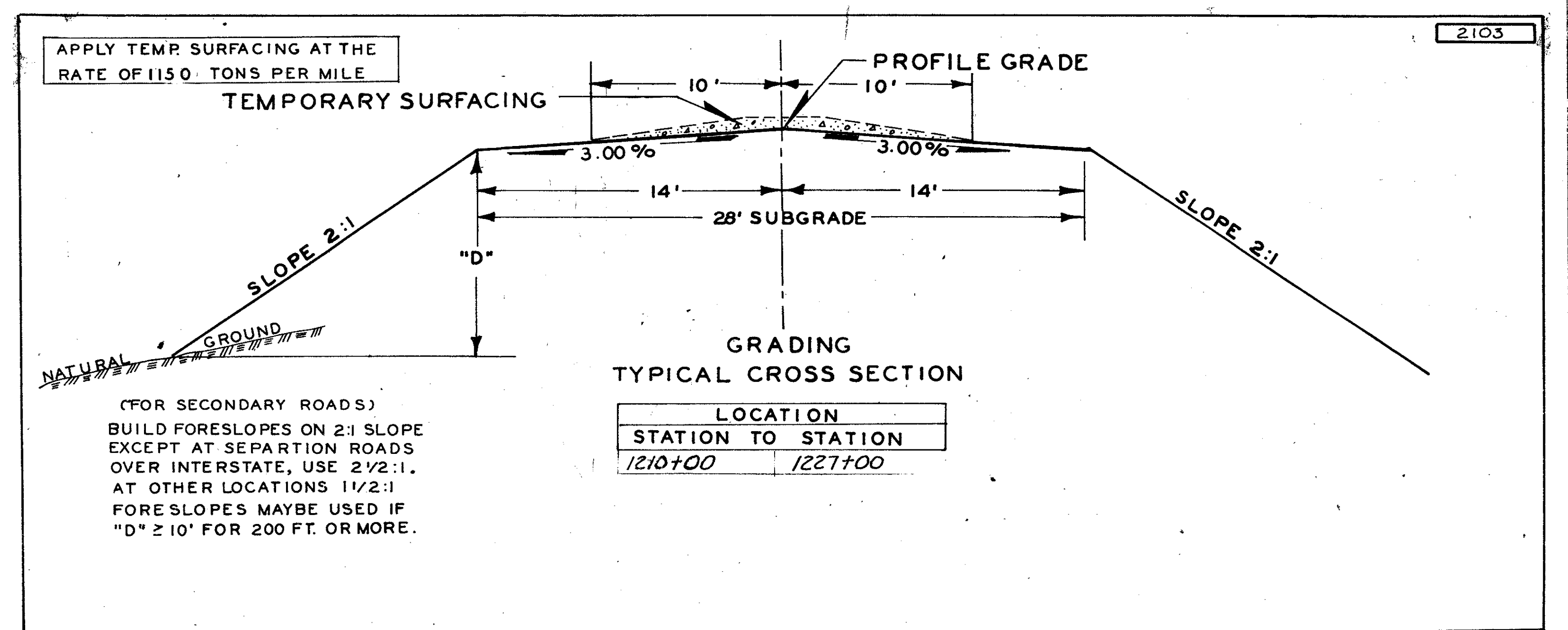
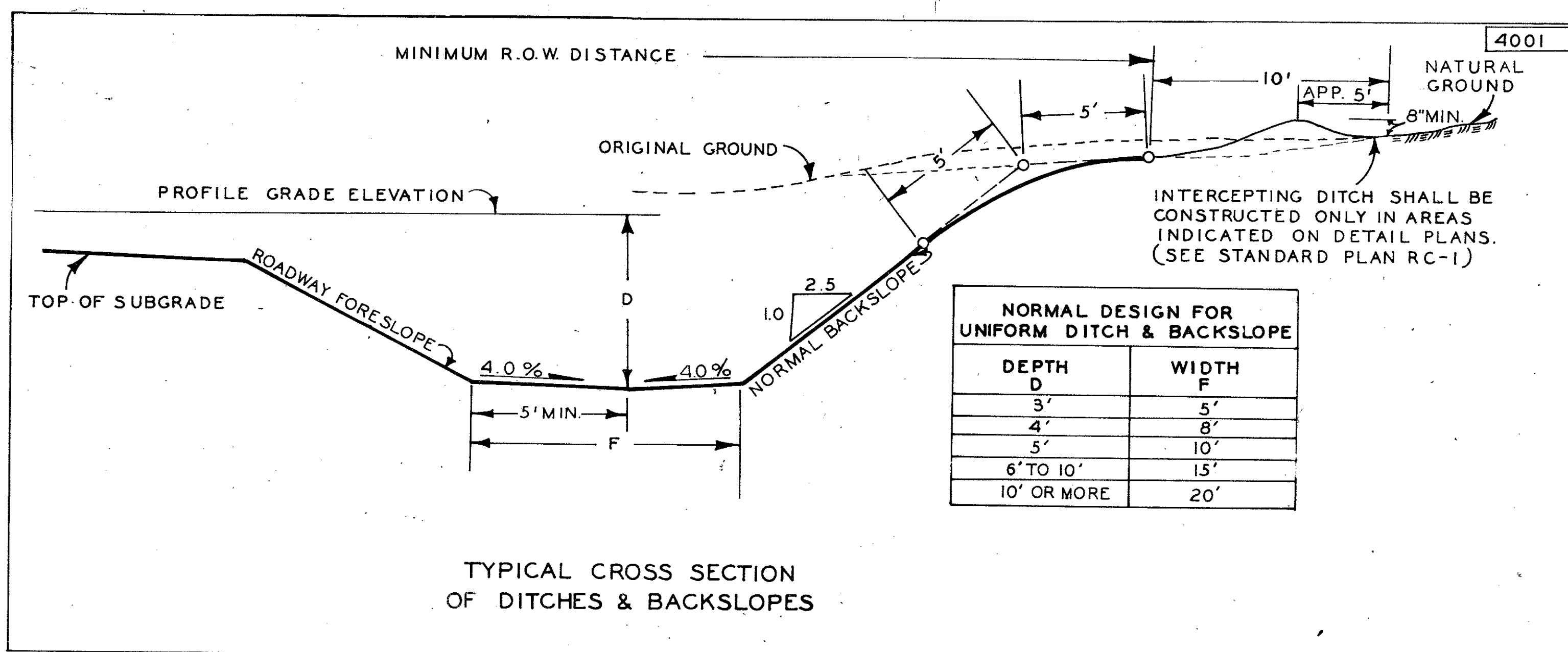
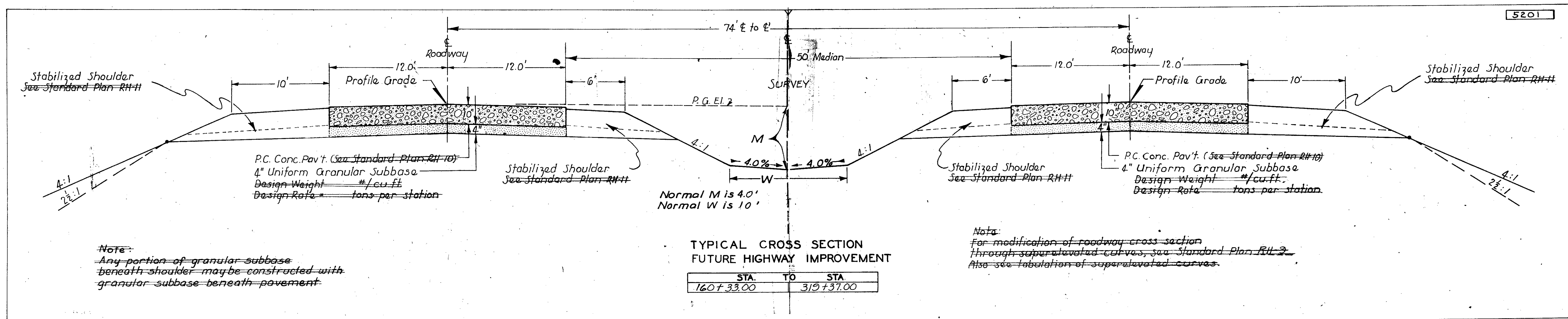
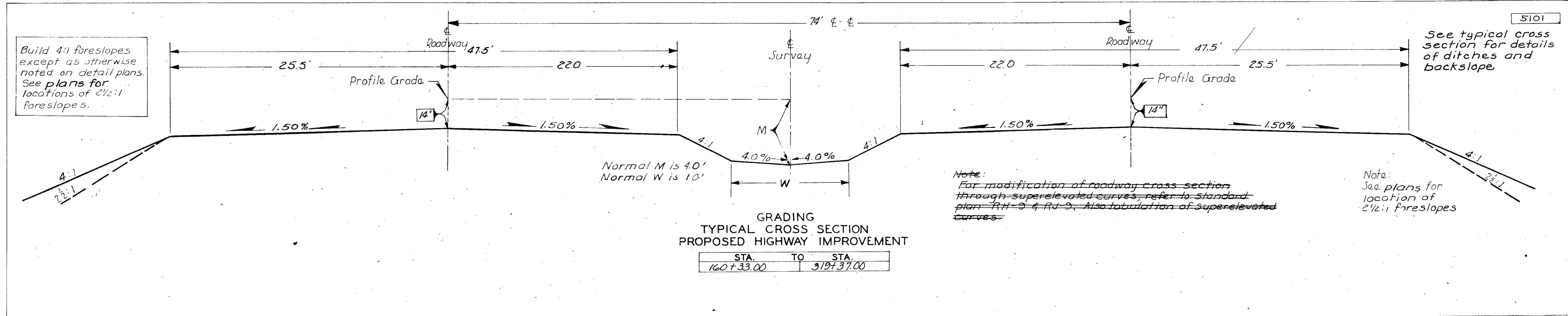


NOTE:

Corrugated metal pipe tee shall be fabricated in accordance with current ISHC Specifications for culvert material. Tees may be required in all sizes from 12" to 48" (in 6" increments) on main pipe culverts equal to or greater in diameter than the diameter of the tee. Price bid for "Tee" shall be for the fabrication & installation of the tee.

Revised June 5, 1964

IOWA HIGHWAY COMMISSION	
DATE	STANDARD ROAD PLAN RF-5
RECOMMENDED	<p>DESIGN COMMITTEE 11-3-61</p> <p>ROAD ENGINEER 11/16/60</p>
APPROVED	<p>CHIEF ENGINEER 12-18-61</p>
METAL PIPE APRONS, TEES & BEVELED ENDS	



ESTIMATED PROJECT QUANTITIES 100-0			
NO.	ITEM	UNIT	TOTAL
1	Class 10 Excavation (Roadway and Borrow)	Cu. Yds.	462,404
2	Class 10 Excavation (Channel)	Cu. Yds.	4,860
3	Class 20 Excavation	Cu. Yds.	1,882
4	Selected Soil Backfill	Cu. Yds.	84,853
5	Compacting Backfill Adjacent to Culverts	Cu. Yds.	933
6	Compacting Embankment with Moisture & Density Control	Cu. Yds.	27,682
7	Intercepting Ditch	Lin. Ft.	2,835
8	18" ϕ Concrete Roadway Pipe Culvert	Lin. Ft.	18
9	24" ϕ Concrete Roadway Pipe Culvert	Lin. Ft.	1,408
10	30" ϕ Concrete Roadway Pipe Culvert	Lin. Ft.	702
11	36" ϕ Concrete Roadway Pipe Culvert	Lin. Ft.	188
12	42" ϕ Concrete Roadway Pipe Culvert	Lin. Ft.	154
13	48" ϕ Concrete Roadway Pipe Culvert	Lin. Ft.	388
14	18" ϕ Special Concrete Aprons	No.	3
15	24" ϕ Concrete Aprons	No.	39
16	30" ϕ Concrete Aprons	No.	7
17	36" ϕ Concrete Aprons	No.	2
18	42" ϕ Concrete Aprons	No.	2
19	48" ϕ Concrete Aprons	No.	4
20	24" ϕ Corrugated Metal Roadway Pipe Culvert	Lin. Ft.	350
21	30" ϕ Corrugated Metal Roadway Pipe Culvert	Lin. Ft.	176
22	24" ϕ Metal Aprons	No.	11
23	30" ϕ Metal Aprons	No.	3
24	24" ϕ Corrugated Metal Elbows (20°)	No.	14
25	30" ϕ Corrugated Metal Elbows (15°)	No.	2
26	30" ϕ Corrugated Metal Elbows (20°)	No.	2
27	6" ϕ Tile Drain	Lin. Ft.	2,788
28	8" ϕ Tile Drain	Lin. Ft.	1,560
29	6" ϕ Bituminous Coated Corrugated Metal Pipe Drain	Lin. Ft.	1,490
30	18" ϕ X 24" ϕ Concrete Tee Section	No.	3
31	24" ϕ X 30" ϕ Concrete Tee Section	No.	3
32	24" ϕ X 42" ϕ Concrete Tee Section	No.	1
33	30" ϕ X 36" ϕ Concrete Tee Section	No.	1
34A	Temporary Surfacing Alternates (Class "A" Crushed Stone)	Tons	135
34B	Temporary Surfacing Alternate (Class "C" Gravel)	Cu. Yds.	135
35	Reclaiming Stockpiling and Spreading Present Surfacing	Cu. Yds.	300
36	Porous Backfill	Cu. Yds.	205
37	Granular Backfill	Tons	9,840
38	6" ϕ Corrugated Metal Pipe Drain	Lin. Ft.	10
39	8" ϕ Corrugated Metal Pipe Drain	Lin. Ft.	10
40	6" ϕ Perforated Corrugated Metal Pipe Drain	Lin. Ft.	1,300
41	12" ϕ Metal Apron	No.	1
42	12" ϕ X 6" ϕ RF-12 Reducer	No.	1
43	Stabilizing Crop Seeding	Acres	85
44	Fertilizing	Acres	38
45	24" ϕ Corrugated Metal Type "A" Diaphragm	No.	5
46	30" ϕ Corrugated Metal Type "A" Diaphragm	No.	2
47	Formed Steel Beam Guard Rail	Lin. Ft.	100
48	Posts	No.	20
49	Overhaul	Sta. Yds.	968,087
50	Project Signs	No.	1
51	24" ϕ Special Concrete Aprons	No.	4
52	8" ϕ Bituminous Coated Corrugated Metal Pipe Drain	Lin. Ft.	230

ESTIMATE REFERENCE INFORMATION 100-4	
ITEM NO.	DESCRIPTION
1.	Template quantities include 38,267 cu. yds. of Gumbotil.
49	Includes 924,541 sta. yds. calculated from a mass diagram and 43,546 sta. yds. calculated by assuming a center of mass of borrow areas.
47	Includes 8 curved end sections. For details see sheet No. 27E.
11.	Includes 2-Type "D" Sections.
20.	Includes 2-Type C-3 Adaptors.
34.	To be used as temporary surfacing on side road at Sta. 213+40.7.
35.	To be used as temporary surfacing on side road at Sta. 213+40.7.
42.	For details, see sheet No. 22B.
21	Includes 2-Type C-4 Adaptor.

MATERIAL LISTED WITHIN THESE PLANS AS "UNSUITABLE" IS INCLUDED IN THE TEMPLATE QUANTITIES FOR CLASS 10 EXCAVATION AND IS INDICATED ONLY TO ILLUSTRATE THE DISTRIBUTION.

109-4

ALL UTILITY COMPANIES WHOSE FACILITIES ARE WITHIN CONSTRUCTION LIMITS SHALL BE NOTIFIED, BY THE CONTRACTOR, OF THE CONSTRUCTION STARTING DATE

ROAD CONTRACTOR IS TO USE DUE CAUTION IN WORKING OVER AND AROUND ALL TILE LINES. BREAKS IN THE TILE LINE DUE TO THE CONTRACTORS CARELESSNESS OR HEAVY EQUIPMENT ARE TO BE REPLACED AT HIS EXPENSE WITHOUT COST TO THE STATE OF IOWA. ANY TILE LINES BROKEN OR DISTURBED BY OUR CUT LINES WILL BE REPLACED OR DISCARDED AS DIRECTED BY THE ENGINEER IN CHARGE OF CONSTRUCTION AND AT THE STATE OF IOWA'S EXPENSE.

SOUNDING AND TEST BORING DATA SHOWN ON PLANS WERE ACCUMULATED FOR DESIGN AND ESTIMATING PURPOSES. THEIR APPEARANCE ON THE PLAN DOES NOT CONSTITUTE A GUARANTEE THAT CONDITIONS OTHER THAN THOSE INDICATED WILL NOT BE ENCOUNTERED.

BLADING AND SHAPING AS WELL AS ANY OTHER INCIDENTAL WORK IN PREPARATION FOR AND MAINTENANCE OF TEMPORARY CROSSINGS OR DETOURS SHALL BE CONSIDERED INCIDENTAL TO OTHER WORK ON THE PROJECT. ADDITIONAL SURFACING NEEDED FOR TEMPORARY CROSSINGS OR DETOURS DURING CONSTRUCTION SHALL BE FURNISHED AND SPREAD AT CONTRACT PRICE. ARTICLE 1109.03 OF THE 1960 STANDARD SPECIFICATIONS SHALL NOT APPLY TO THE ITEM OF TEMPORARY SURFACING.

EROSION CONTROL WORK WILL BE DONE ON THIS PROJECT. THE DETAILS WILL BE DETERMINED FOLLOWING COMPLETION OF THE GRADING.

SUPERELEVATION DATA (SEE STANDARD PLAN FOR DETAILS)						101-1
P.I. STATION	D	V	e	S	Δ	REMARKS
160+45.8	0° 45' 00"	70	0.021	108'	6° 51'	
196+81.6	0° 12' 10"	70	N. C.	0	1° 13'	
266+31.9	0° 03' 25"	70	N. C.	0	0° 20 1/2'	
319+37.0	0° 08' 20"	70	N. C.	0	0° 50'	

Revised Nov. 18, 1963
Revised March 8, 1963
Revised Feb. 5, 1963
Revised Jan. 30, 1963
Revised Jan. 28, 1963
Revised Jan. 9, 1963

DRAINAGE STRUCTURES BY ROAD CONTRACTOR

104-3

TYPE	LOCATION	D SIZE	LENGTH L.F.	KIND	SKEW AHEAD LT. RT.	APR. NO.	DIMENSIONS LT. RT.	FLOW LINE ELEV. LT. RT. OTHER	CL. 20 EXCAV. CU. YDS.	DIKE LOCATION	TOP EL.	REMARKS
--	165± (RT & LT.)	8"φ	895	TILE	-- --							Bituminous Coated
--	168±75 (RT & LT.)	8"φ	230	C.M.P.	-- --							
1101	164+00	24"φ	68	F-1	-- --	2	29 51	527.4 522.8	20	5 M. 164+20	530.5	
1101	168+04 -- 100' LT.	30"φ	32	C.M.P.	-- --	1	-- --	W515.0 E510.5	2	10 LT. 167+30 168+20	520.0	Connect to 30"φ C.M.P. in Flume Wall. One Conn. Band.
1101	173+00	24"φ	54	F-1	-- --	2	31 35	512.5 512.1	54	5 M. 173+20	515.0	
1101	175+60	48"φ	150	F-1	5° --	2	88 78	502.0 506.5	16			
1101	176+00	24"φ	58	F-1	-- --	2	31 39	509.2 508.1	0			
--	175+80±	6"φ	200	C.M.P.	-- --							Bituminous Coated
--	175+80±	6"φ	80	TILE	-- --							
1101	179+60	30"φ	188	F-1	-- 30°	2	120 80	499.0 510.7	71	10 RT. 179+55	514.9	
--	180+00±	6"φ	223	C.M.P.	-- --							Bituminous Coated
1101	183+00	24"φ	54	F-1	-- --	2	31 35	513.7 513.4	51	5 M. 182+80	516.0	
1101	184+58	48"φ	238	F-1	-- 25°	2	141 113	496.5 505.7	75			
--	184+80±	6"φ	280	C.M.P.	-- --							Bituminous Coated
--	185+50± (RT)	6"φ	28	TILE	-- --							
1403	190+50 -- 135' RT.	24"φ	42	C.M.P.	-- --	2	-- --	S527.5 N519.2 526.9 519.5	39	10 RT. 189+60	532.0	Two 20° Elbows A=7, B=20, C=15 1 Type "A" Diaphragm
1102	195+36	24"φ	132	F-1	-- 10°	2	72 72	517.4 519.0	109	10 LT. 195+45 195+70	520.0 523.0	G=68, Ditch Outlet 140' Elev. 517.0 Inc. 1-18" X 24" Tee Sec.
1502	195+22 -- 03.5' LT.	18"φ	6	F-1	-- --	Sp1	-- --	W519.3 E518.5	3	5 M. 195+36	521.5	
1403	195+48 -- 145' RT.	24"φ	54	C.M.P.	-- --	2	-- --	S532.5 N519.0 531.99 519.37	33			Two 20° Elbows A=7, B=34, C=13 1 Type "A" Diaphragm
1403	199+25 -- 143' RT.	24"φ	46	C.M.P.	-- --	2	-- --	N513.0 S522.83 522.25 513.34	27	10 RT. 197+75 201+00	527.0 506.0	Two 20° Elbows A=7, B=24, C=15 1 Type "A" Diaphragm.
1101	203+00	24"φ	50	F-1	-- --	2	27 35	503.9 502.8	45	5 M. 203+20	506.0	
1501	209+25	24"φ	44	F-1	-- --	1	27.5 22.5	490.5 489.25	0			Two 20° Elbows A=15, B=17, C=1 1 Type C-3 Adaptor
1501	209+25	24"φ	32	C.M.P.	-- --	--	--	91 482.83 483.31	0			G=184' One "D" Section 44' from Outlet & One "D" Section 164' from Outlet for Horizontal Change in Direction. Inc. 1-30" X 36" Tee Sec.
1102	213+73	36"φ	188	F-1	-- --	2	100 104	477.2 475.9	339			
1403	214+39 -- 89' LT.	30"φ	64	C.M.P.	-- --	1	-- --	E491.0 W477.1 490.8 477.8	35	10 LT. 214.23	495.0	Two 15° Elbows A=1, B=52, C=11 1 Type "A" Diaphragm, 1 Type C-4 Adaptor
1101	214+50	24"φ	56	F-1	-- --	2	40 28	491.1 493.5	0			
1102	217+90	24"φ	146	F-1	20° --	2	77 81	494.6 493.3	128	10 LT. 218+00	498.8	G=86 Ditch Outlet 170' Elev. 492.3
1502	218+05	18"φ	6	F-1	-- --	Sp1	-- --	E495.5 W494.44	2	5 M. 217+90	499.0	Inc. 1-18" X 24" Tee Sec.
1403	218+20 -- 144' LT.	24"φ	52	C.M.P.	-- --	2	-- --	N507.0 S494.8	36	10 LT. 217+60 219+25	511.0	Two 20° Elbows A=7, B=30, C=15 1 Type "A" Diaphragm
1102	223+80	30"φ	144	F-1	-- --	1	82 74	497.8 497.0	126			G=74, G=154 Ditch Outlet 275' Elev. 496.0 Inc. 2-24" X 30" Tee Sec.
1502	223+94	24"φ	6	F-1	-- --	Sp1	-- --	E498.8 W497.8	2	5 M. 223+80	502.2	
1502	223+94 -- 80' LT.	24"φ	6	F-1	-- --	Sp1	-- --	E498.1 W498.0	2	10 LT. 223+80	502.0	
1403	223+80 -- 163' LT.	30"φ	80	C.M.P.	-- --	1	-- --	N516.0 S497.8 515.3 498.2	64	10 LT. 222+00	521.0	Two 20° Elbows A=17, B=46, C=17 1 Type "A" Diaphragm, 1 Type C-4 Adaptor
1101	233+00	24"φ	58	F-1	-- --	2	28 42	503.9 500.5	0	5 M. 232+80	507.2	Ditch Outlet 200' Elev. 507.0
1101	243+00	24"φ	54	F-1	-- --	2	28 38	509.5 507.5	29	5 M. 242+80	512.9	Ditch Outlet 110' Elev. 507.0
1101	260+00	24"φ	50	F-1	-- --	2	27 35	506.3 504.3	43	5 M. 260+20	509.2	
--	263± to 269± (LT)	6"φ	740	TILE	-- --							Bituminous Coated
--	268+50	6"φ	200	C.M.P.	-- --							
--	265± to 268± (RT)	6"φ	450	TILE	-- --							
1102	268+67	42"φ	154	F-1	-- 30°	2	88 82	480.0 483.5	2	10 RT. 268+45	487.9	G=96 Inc. 1-24" X 42" Tee Sec.
1502	268+50 -- 01' RT.	24"φ	6	F-1	-- --	Sp1	-- --	E482.94 W484.2	0	5 M. 268+67	487.3	
--	269± to 276± (LT)	8"φ	665	TILE	-- --							
--	276± (LT)	8"φ	10	C.M.P.	-- --							
1201	272+50	24"φ	66	F-1	-- --	2	49 29	473.7 478.7 474.4	7			F=48
1501	278+00	24"φ	44	F-1	-- --	1	23 27	487.2 488.9	0	5 M. 277+80	491.8	
1501	278+00	24"φ	34	C.M.P.	-- --	1	97	477.4 477.6	3			Two 20° Elbows A=7, B=26, C=1 1 Type C-3 Adaptor
--	276± (LT)	6"φ	10	C.M.P.	-- --							
--	276± to 282± (LT)	6"φ	540	TILE	-- --							
1102	288+75	24"φ	134	F-1	-- --	2	71 75	520.3 519.2	98	10 LT. 288+55	524.0	Ditch Outlet 160' Elev. 518.5
1502	288+89 -- 01' RT.	18"φ	6	F-1	-- --	Sp1	-- --	E521.5 W520.24		5 M. 288+75	524.7	G=74' Inc. 1-18" X 24" Tee Sec.
1403	283+00 -- 80' RT.	24"φ	90	C.M.P.	30° W	2	-- --	502.9 478.6 502.0 479.1	113	15 RT. 282+80	506.5	A=9, B=62, C=19 Two 20° Elbows 1 Type "A" Diaphragm
1101	304+00	24"φ	50	F-1	-- --	2	35 27	522.1 523.1	45	5 M. 304+20	526.1	
1102	311+40	30"φ	168	F-1	-- 30°	2	83 97	505.7 501.5	99	10 LT. 311+20	509.8	G=106' Inc. 1-24" X 30" Tee Sec.
1502	311+23.5 -- 01' LT.	24"φ	6	F-1	-- --	Sp1	-- --	504.14 W506.5	4	5 M. 311+40	509.5	
--	308± (LT)	6"φ	120	TILE	-- --							Bituminous Coated
--	310+00±	6"φ	360	C.M.P.	-- --							
--	314+50 (LT)	6"φ	60	TILE	-- --							Bituminous Coated
--	31±	6"φ	230	C.M.P.	-- --							
--	312± to 319± (RT)	6"φ	770	TILE	-- --							
1101	315+20	30"φ	202	F-1	-- 30	2	95 119	499.5 493.2	54	10 LT. 315+08	504.0	

DRAINAGE STRUCTURES BY ROAD CONTRACTOR

104-3

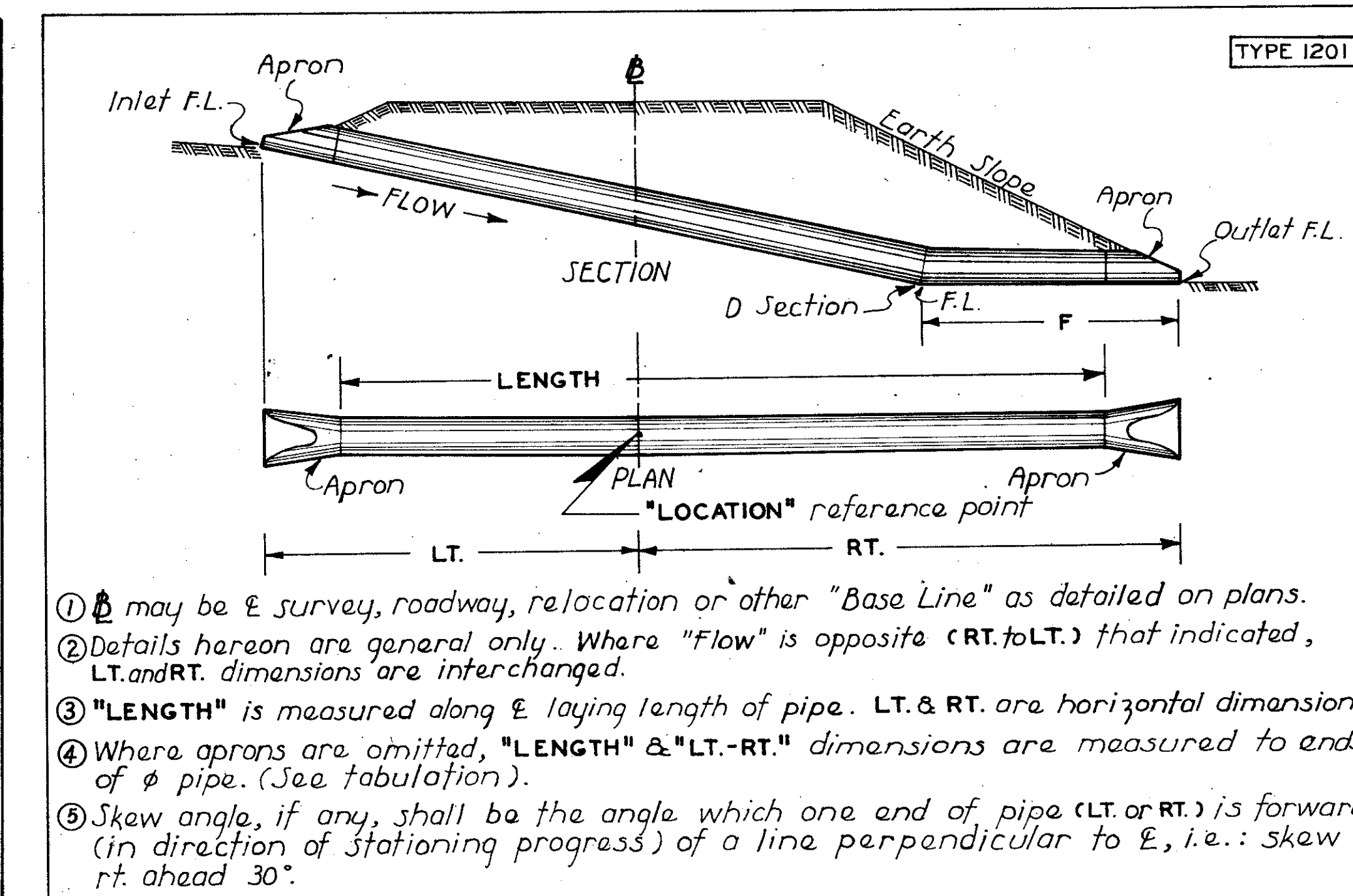
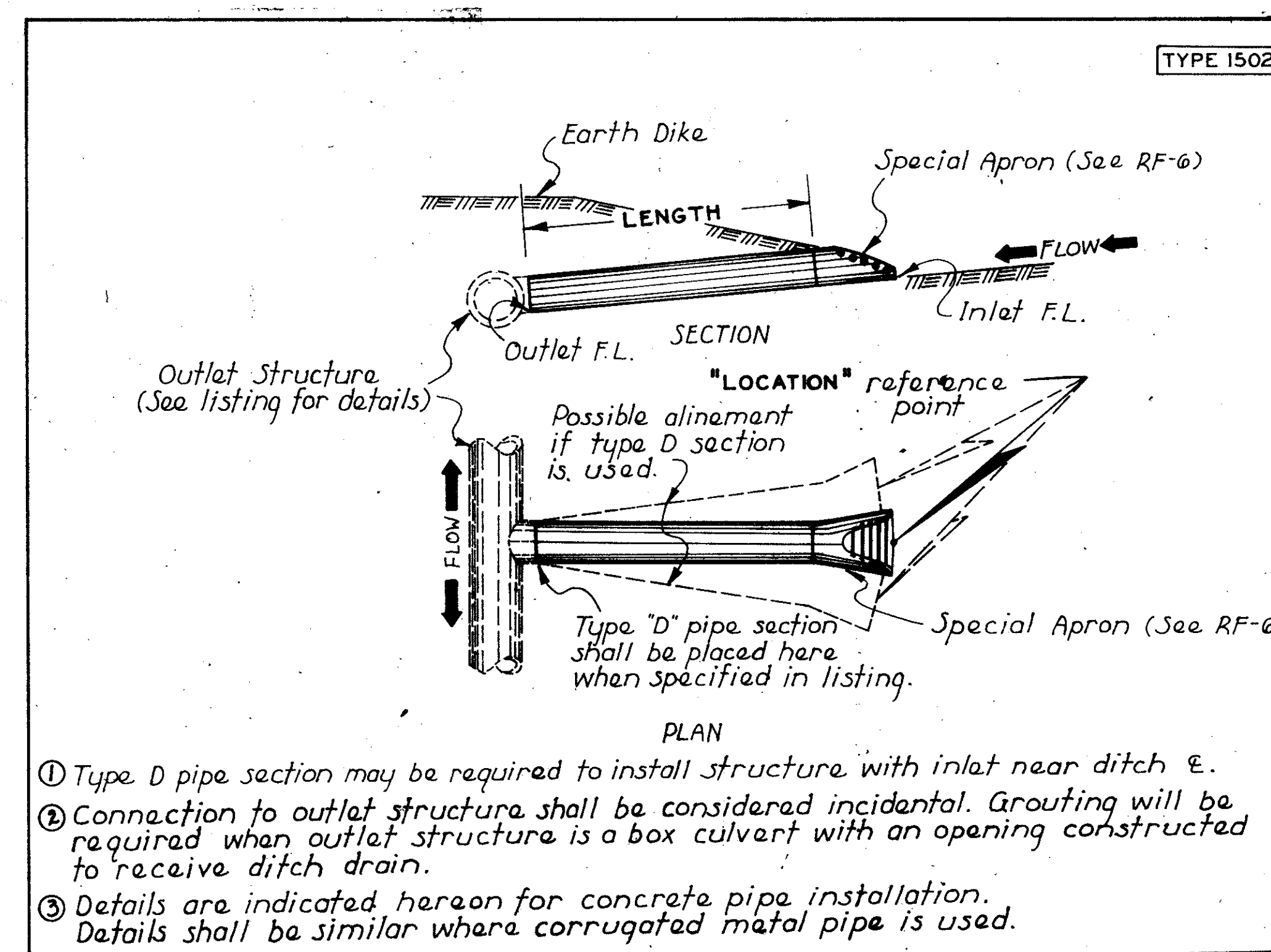
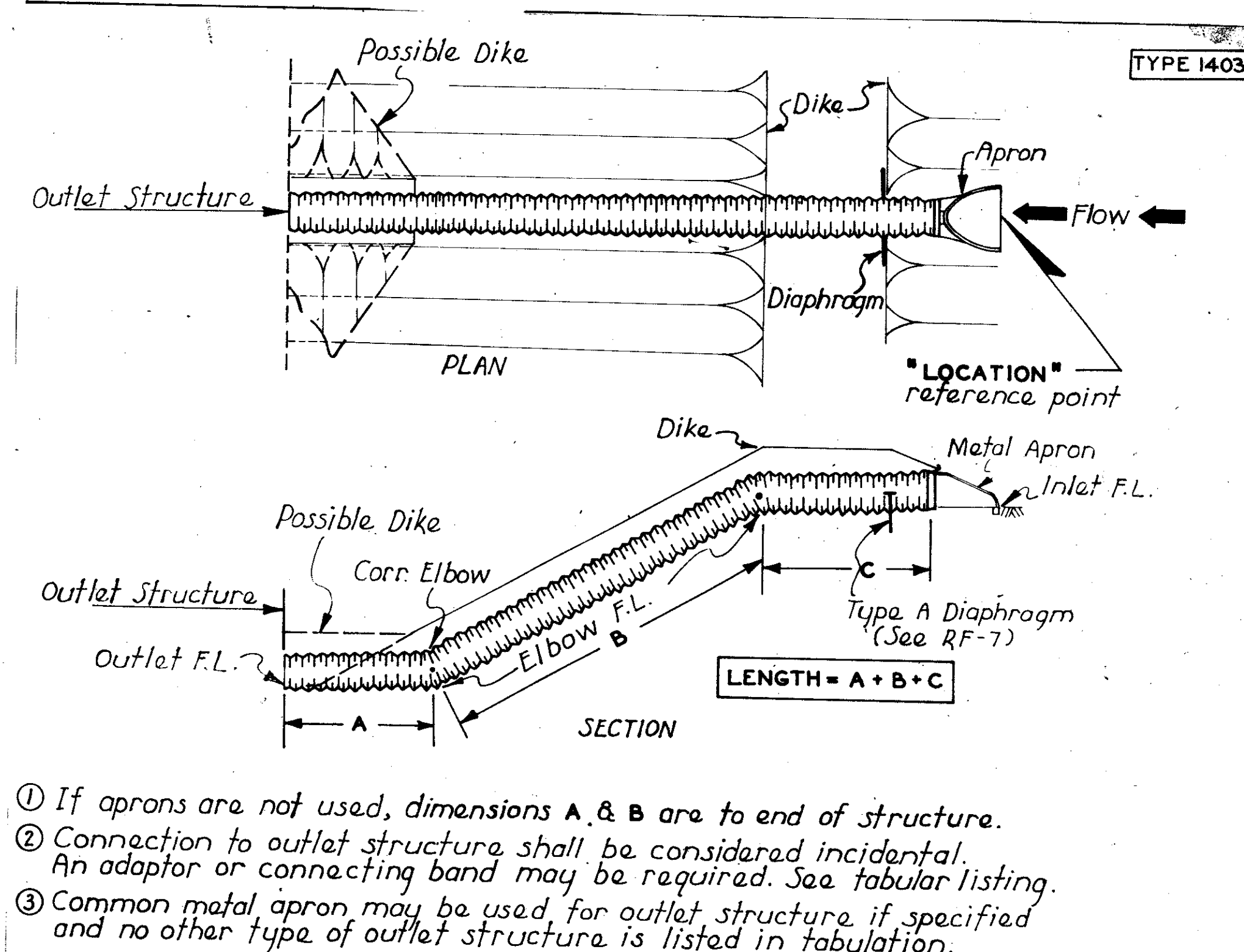
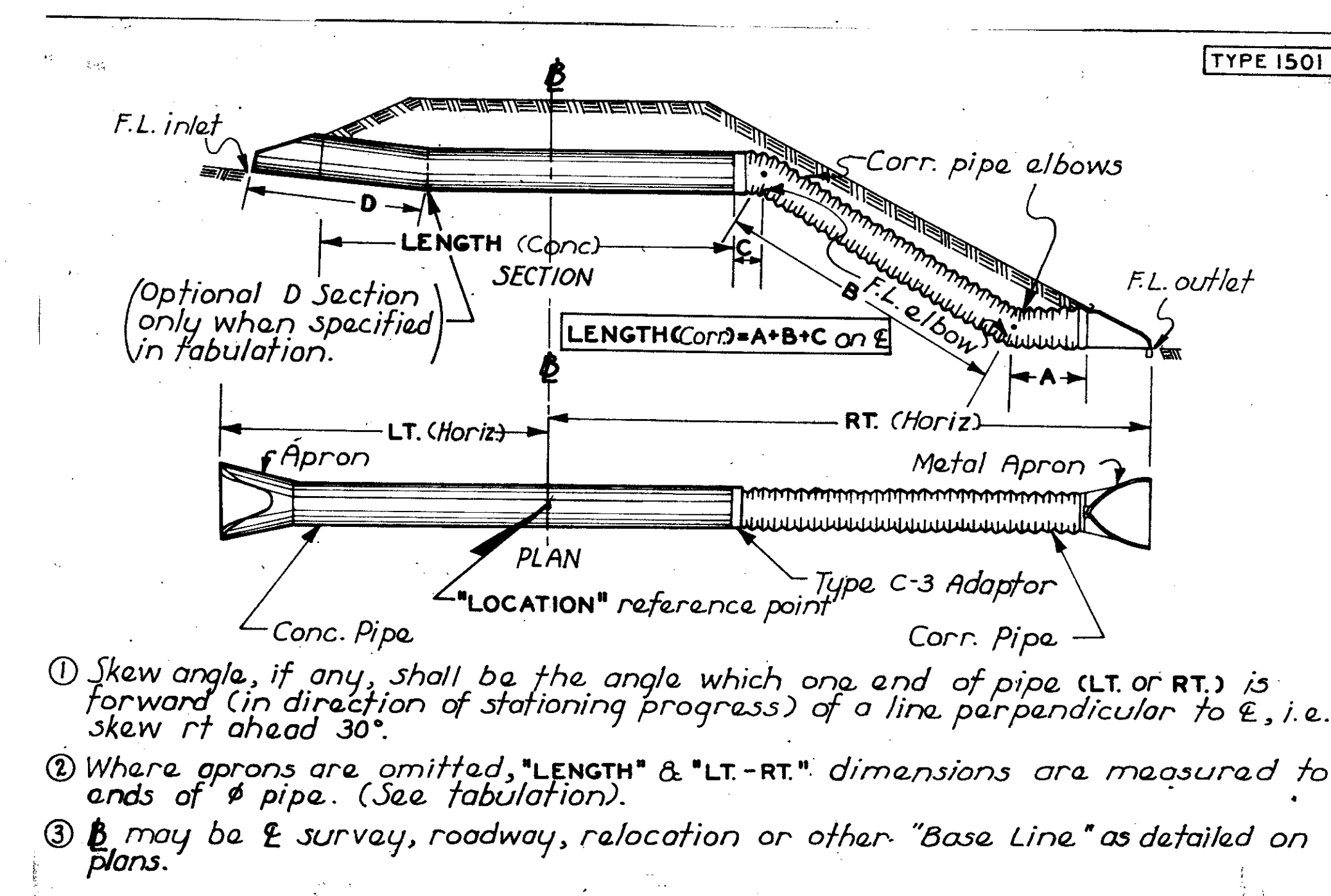
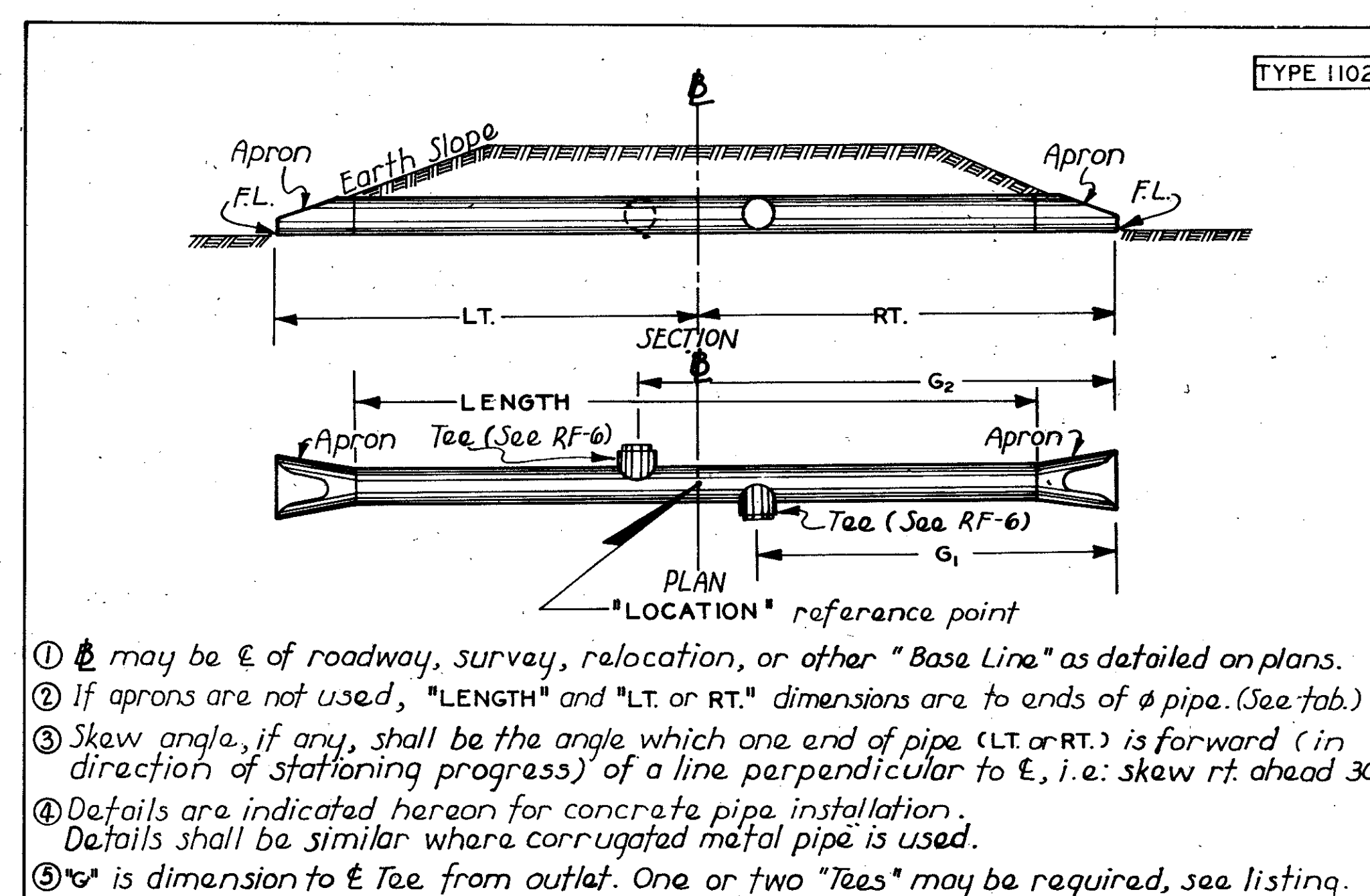
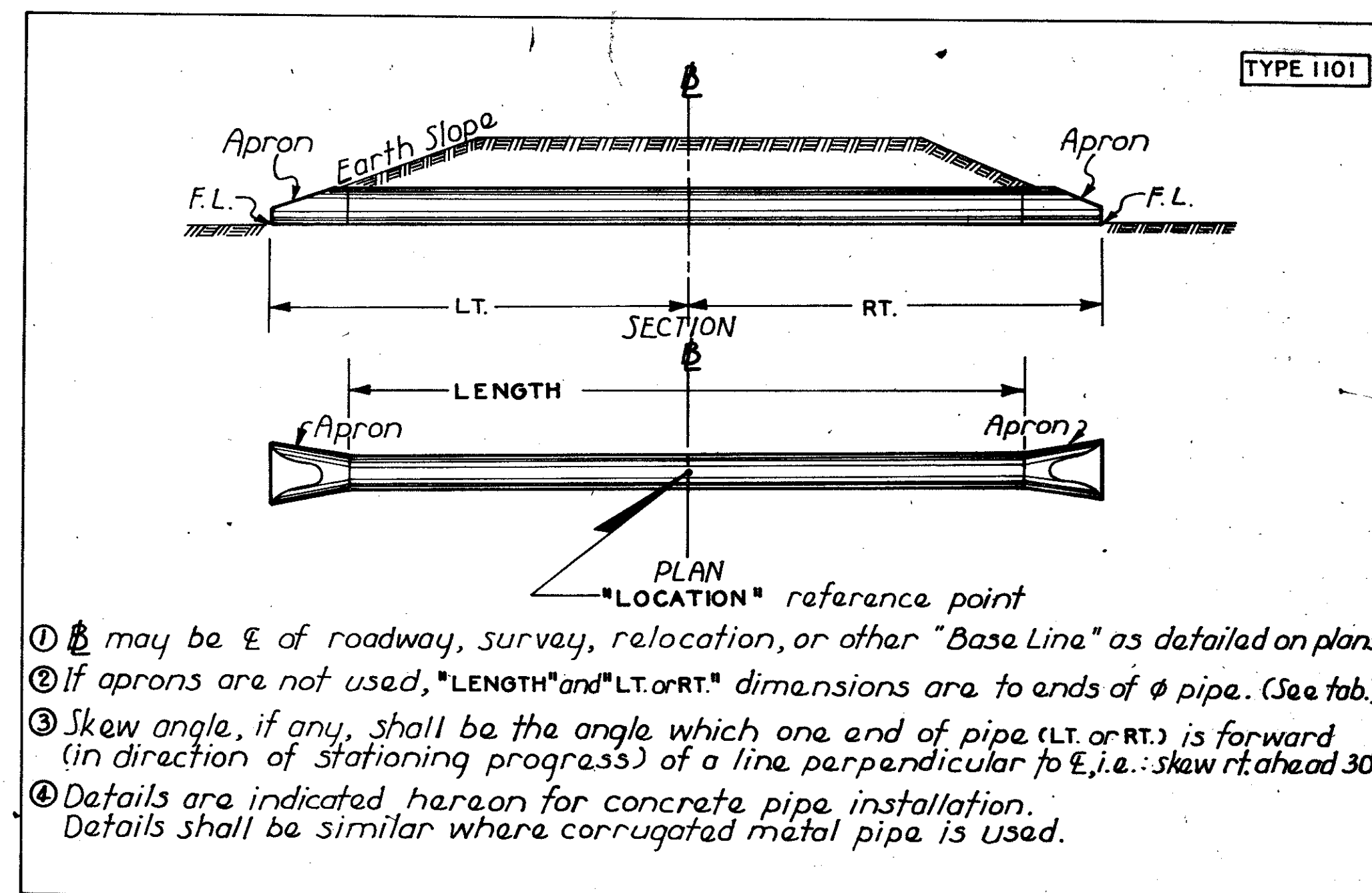
TYPE	LOCATION	D SIZE	LENGTH L.F.	KIND	SKEW AHEAD LT. RT.	APR. NO.	DIMENSIONS LT. RT.	FLOW LINE ELEV. LT. RT. OTHER	CL. 20 EXCAV. CU. YDS.	DIKE LOCATION	TOP EL.	REMARKS
1101	319+10	24"φ	164	F-1	-- --	2	74 102	497.5 490.5	19			USE LOCAL ROAD LEFT Ditch Outlet
1101	1214+60	24"φ	32	F-1	15° --	2	22 22	477.7 477.4	27			
1101	1221+75	24"φ	34	F-1	-- --	2	25 21	506.3 508.3	28	10 RT. 1221+60	511.5	Remove Pipe Sta. 1221+96.6
1101	1226+72	24"φ	36	F-1	-- --	2	-- --		32	10 RT. 1226+50	516.5	FL'S to be determined on construction. Remove Pipe Sta. 1226+72.6

DRAINAGE STRUCTURES BY CULVERT CONTRACTOR

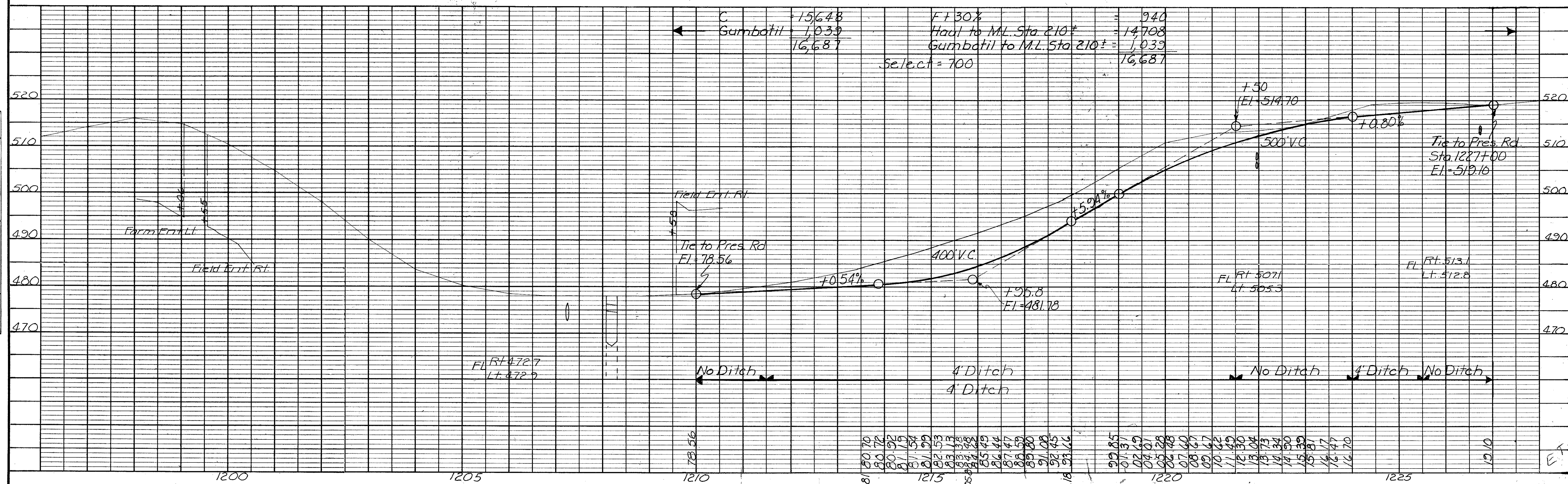
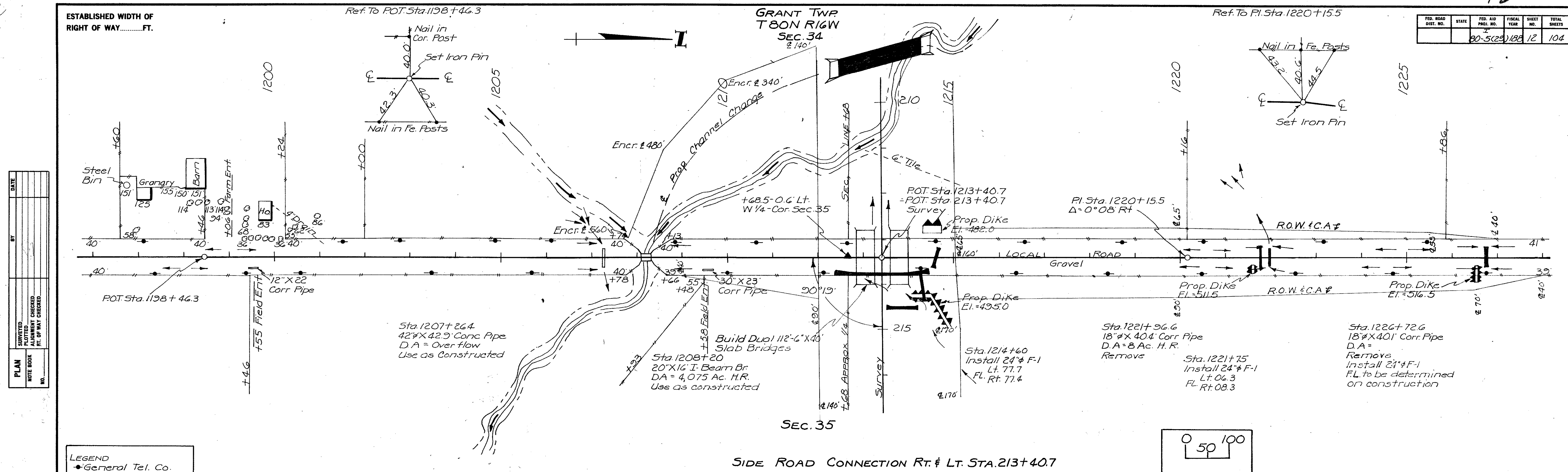
104-4

DESIGN NO.	LOCATION	SIZE	LENGTH L.F.	KIND	SKEW AHEAD LT. RT.	APR. NO.	DIMENSION LT. RT.	FLOW LINE ELEV. LT. RT. OTHER	BY ROAD CONTRACTOR COMP. OF B.F.	DIKE LOCATION	TOP ELEV.	REMARKS
7161	167+90	4 X 4	176	R.C.B.	30° --	--	91 85	513.0 517.3 503.0	103	20 RT. 168+30	523.5	
7261	190+36	24"φ	142	F-1	-- 10°	1	73.5 74.5	515.0 519.1 510.0	--	10 RT. 190+30	523.0	One "D" Section. 138' from Outlet
7361	199+55	24"φ	166	F-1	20° --	1	95 77	504.0 512.9 490.0	--	10 RT. 199+45	516.7	
5761	209+00	Triple 10X12	184	R.C.B.	-- 15°	--	91.5 92.5	469.2 468.2	325	20 LT. 212+80	482.0	Ditch Inlet & Outlet. See channel change.
7461	235+55	6 X 6	232	R.C.B.	-- --	--	111 121	482.0 478.5	206			
5961	276+00	Twin 12 X 12	168	R.C.B.	-- 7°	--	82 86	464.0 463.2	299			Ditch Inlet & Outlet

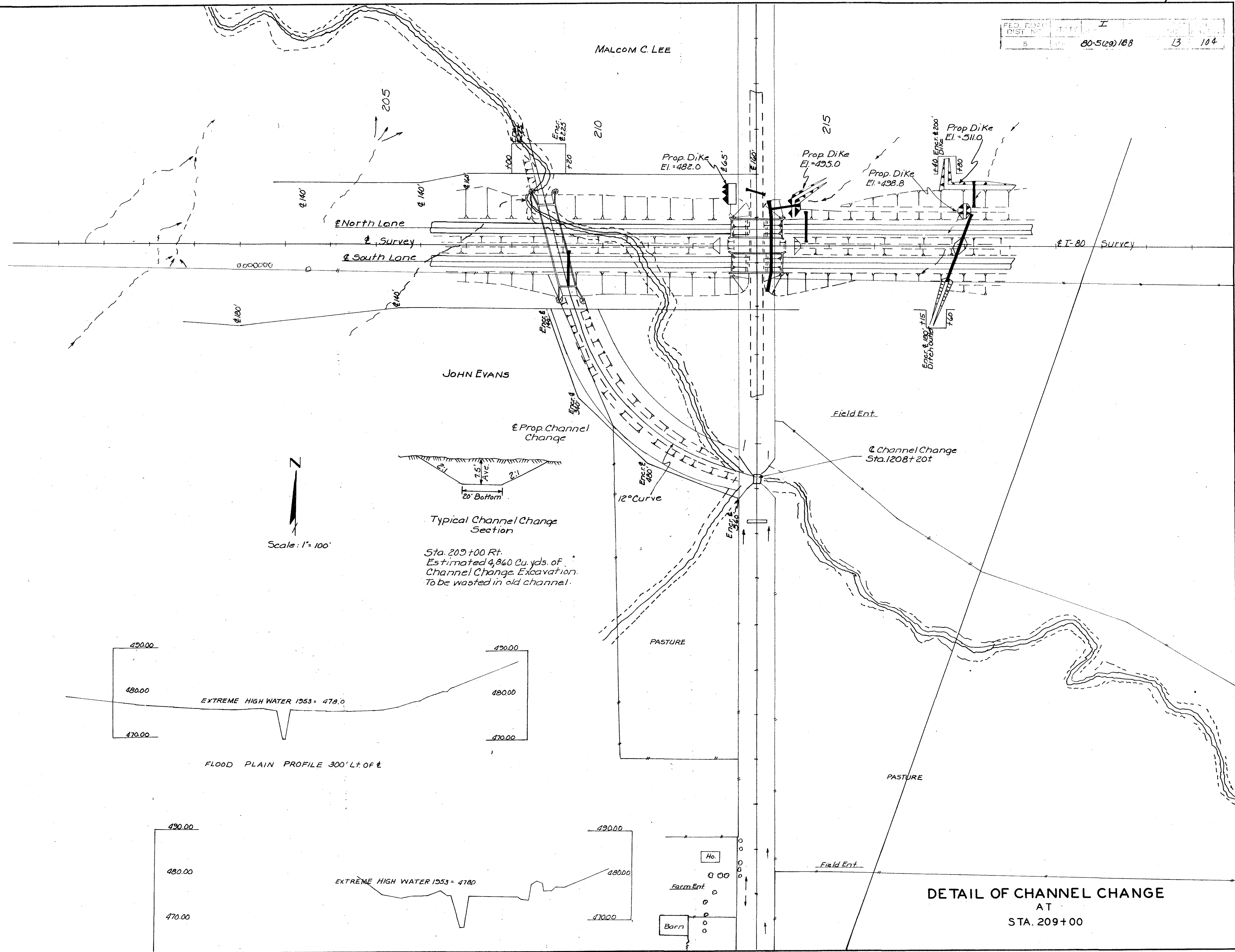
Revised April 17, 1963
Revised Feb. 5, 1963
Revised Jan. 30 1963 Revised Nov. 18, 1963



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
		2 80-5(29)	1988	12	104



FED. ROAD DIST. NO.	STATE	PROJECT	SHEET NO.
5	MD	80-5(29)188	13



TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

STATION	TEMPLATE		M & D CONTROL		SUBGRADE TREATMENT		APPROACH GRADING		SELECT. SOIL CUT -C	ADJUSTED TOTALS			UNSATURABLE MATERIAL		MASS D'GRM. UNCL. CLASS IO	BALANCE & OVERHAUL
	CUT	FILL	+C	+F	+C	-F	+C	+F		CUT	FILL	F+30%	C	F		
159+64.0																
160+00	816	1492	0	0	0	0				816	1492	1940				
161+00	139	201	0	0	0	0				139	201	261				
162+00	1111	1982	0	0	0	0				1111	1982	2577				
163+00	70	3089	0	0	0	0				70	3089	4016				
164+00	408	4227	0	0	0	0				408	4227	5495				
165+00	552	4600	0	0	0	0		DIKE F=5		552	4675	6078				
166+00	520	4231	0	0	0	0				520	4231	5500				
167+00	1801	3927	0	0	0	0				1801	3927	5105				
168+00	1998	4125	0	0	0	0		DIKE F=75		1998	4900	6370				
169+00	1345	2898	0	0	165	146				1510	2752	3578	196			
170+00	5051	636	75	0	451	97				5577	539	701	570			
171+00	2918	166	176	0	497	157				3591	9	12	437			
172+00	4928	155	217	0	508	105			100	5553	50	65	767			
173+00	8402	79	268	0	531	31			200	9001	48	62	1907			
174+00	2362	0	299	0	531	0		DIKE F=34	100	3092	34	44	2926			
175+00	1197	760	160	0	252	314			100	1509	446	580	763			
176+00	2	3960	0	0	0	0				2	3960	5148	0			
177+00	283	1520	0	0	114	93				397	1427	1855	170			
178+00	3517	1406	0	0	415	0				3992	1406	1828	1193			
179+00	2802	1200	0	0	397	18				3199	1182	1537	970			
180+00	349	2271	0	0	54	50		DIKE F=60		403	2301	2991	59			
181+00	331	1118	0	0	0	0				331	1118	1453	26			
182+00	3522	4	0	0	0	0				3522	4	5	96			
183+00	3102	124	0	0	0	0				3102	124	161	133			
184+00	113	4011	0	0	0	0		DIKE F=2		113	4033	5243	44			
185+00	0	9384	0	0	0	0				0	9384	12,199				
186+00	0	7811	0	0	0	0				0	7811	10,154				
187+00	106	2302	0	0	103	208				209	2094	2722				
188+00	3044	0	0	0	830	0				3874	0	0				
189+00	7743	0	0	0	830	0				8573	0	0				
190+00	1784	2	0	0	828	2		DIKE F=40		2612	60	78				
191+00	1722	230	0	0	609	221		DIKE F=180		2331	189	246				
192+00	1457	127	0	0	708	122		DIKE F=180		2165	185	240				
193+00	3948	0	0	0	830	0		DIKE F=180		4778	180	234				
194+00	7150	0	0	0	830	0				7980	0	0	37			
195+00	5593	0	0	0	830	0		DIKE F=225		6423	225	292	37			
196+00	3786	0	0	0	830	0		DIKE F=225		4616	225	292	52			
197+00	5911	0	0	0	830	0		DIKE F=50		6741	50	65	133			
198+00	7959	0	0	0	830	0		DIKE F=9		8789	9	12	111			
199+00	2017	237	0	0	653	177		DIKE F=26		2670	326	424	15			
200+00	917	1191	0	0	365	465		DIKE F=42		1282	1200	1560	7			
201+00	1782	2113	0	0	346	484		DIKE F=23	70	2058	1842	2395	185			
202+00	5431	359	0	0	621	122		DIKE F=30	593	5459	267	347	1474			
203+00	6837	0	0	0	714	0			963	6588	0	0	1711			
204+00	3519	65	0	0	656	58		DIKE F=75	796	3379	82	107	752			
205+00	1972	317	0	0	498	245			560	1910	72	94	320			
206+00	610	1296	0	0	170	556			79	701	740	962	57			
207+00	0	3669	0	0	0	0			0	0	3669	4770				
208+00	0	10,052	0	0	0	0			0	0	10,052	13,068				
209+00	0	11,295	0	0	0	0			0	0	11,295	14,684				
210+00	0	11,715	0	0	0	0			0	0	11,715	15,230				
211+00	0	12,089	0	0	0	0			0	0	12,089	15,716				
212+00	2	12,422	0	0	0	0			2	12,422	16,149					
212+83.2	0	9694	0	0	0	0			0	0	9694	12,602				
BRIDGE	C & W	2000	0	0	0	0			0	0	2000	2600				
213+98.2	C & W	725	0	0	0	0			0	0	725	942				
215+00	0	3635	0	0	0	0		DIKE F=585		0	4220	5486				
216+00	374	1052	58	58	207	208				639	902	1173				
217+00	2322	182	0	0	668	162				2990	20	26				
218+00	3063	4	0	0	826	4		DIKE F=434		3889	434	564				
219+00	5367	0	0	0	801	0				6168	0	0	152			
220+00	9926	0	0	0	627	0			669	9884	0	0	1444			
221+00	15,081	0	0	0	598	0			2592	13,087	0	0	2496			
222+00	17,466	0	0	0	598	0			2741	15,323	0	0	2430			
223+00	13,625	0	0	0	656	0	14	318	1556	12,739	318	413	1333			
224+00	7447	0	0	0	830	0	61	266		8338	266	346	370			
225+00	4861	0	0	0	830	0	20	606	444	5267	606	788	830			
226+00	10,819	0	0	0	655	0	0	257	2222	9252	257	334	1926			
227+00	15,847	0	0	0	598	0			3222	13,223	0	0	2281			
228+00	14,322	0	0	0	598	0			2889	12,031	0	0	1815			
229+00	10,170	0	0	0	714	0			1111	9773	0	0	956			
230+00	6096	0	0	0	830	0				6926	0	0	107			
231+00	1917	180	0	0	670	160				2587	20	26				
232+00	193	2763	32	32	0	0				225	2795	3634				
233+00	9	5574	0	0	0	0	0	56		9	5630	7319				
234+00	0	8504	0	0	0	0				0	8504	11,055				

C=29,882
Gumbotti = 7,566
Haul from Sta. 188± = 3,759
F=32,602-6878+30±=33,441
Gumbotti 16878+10±= 7,566
Select = 500

C=12,250
Gumbotti = 2,647
F=11,925-206± = 11,719
30±=12,250
Gumbotti 210± = 2,647
10± = 4,897

C=34,468
Gumbotti = 81
F=29,667-40±=29,707
Gumbotti 74+10± = 81
Haul to Sta. 168± = 3,759
1923, 67
4500, 158
+29,900

C=41,605
Gumbotti = 4,477
F=307±=407
to Sta 210±=36,998
Gumbotti " " 407
" " 46,062

C=2236
Gumbotti = 37
F=1099
to Sta 210±=4,477
Gumbotti " " 1099
" " 2,444
" " 81,812
F=103,740-194,002-88,556
Gumbotti 103,740-194,002-88,556
=244,402

C=28,124
Gumbotti = 2,844
F=307±=311
to Sta 210±=19,933
Gumbotti " " 311
" " 30,968
F=103,740-194,002-88,556
Gumbotti 103,740-194,002-88,556
=244,402

C=85,265
Gumbotti = 13,296
F=307±=311
to Sta 210±=4,477
Gumbotti " " 1099
" " 2,444
" " 81,812
F=103,740-194,002-88,556
Gumbotti 103,740-194,002-88,556
=244,402

C=2,883
Gumbotti = 2,883
F=307±=311
to Sta 210±=19,933
Gumbotti " " 311
" " 30,968
F=103,740-194,002-88,556
Gumbotti 103,740-194,002-88,556
=244,402

TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

STATION	TEMPLATE		M & D CONTROL		SUBGRADE TREATMENT		APPROACH GRADING		SELECT SOIL CUT	ADJUSTED TOTALS			UNSUITABLE MATERIAL		MASS D'GRM. ORDNATE		BALANCE & OVERHAUL
	CUT	FILL	+C	+F	+C	-F	+C	+F		CUT	FILL	F+30%	C	F	UNS. MAT.	CLASS IO	
234+00	0	12,416			0	0				0	12,355	16,062					
235+00	0	12,141			0	0				2	12,141	15,783					
236+00	0	20,355			0	0				24	18,992	24,690					
237+00	0	10,737			0	0				0	10,322	13,419					
238+00	7	5,856			0	0				7	5804	7545					
239+00	129	3785			0	0				129	3785	4921					65 1911 +50.5
240+00	187	4202			0	0				187	4202	5463					64 1874
241+00	511	2141			147	164				658	1977	2570					
242+00	1159	837			413	106	0	56		1572	787	1023					
243+00	1926	170			674	156				2600	14	18					
244+00	2778	0			830	0				3608	0	0					
245+00	3100	0			830	0				3930	0	0					
246+00	2737	0			830	0				3567	0	0	215				2821 0 +71.8
247+00	2370	0			830	0				3200	0	0	215				
248+00	2104	0			830	0				2934	0	0					
249+00	1607	4			826	4				2433	0	0					
250+00	1052	98			732	98				1784	0	0					
251+00	726	259			571	259				1297	0	0					
252+00	600	363			467	363				1067	0	0	29				
253+00	776	172			658	172				1434	0	0	29				
254+00	1541	6			824	6				2365	0	0					
255+00	2378	0			830	0				3208	0	0					
256+00	2578	0			830	0				3403	0	0					
257+00	2200	0			830	0				3030	0	0					
258+00	1815	7			823	7				2638	0	0					
259+00	1830	7			823	7				2653	0	0					
260+00	1963	0			830	0	0	56		2793	56	73					
261+00	1970	118			712	118				2682	0	0					
262+00	1600	452			526	304				2126	148	192					
263+00	585	1104			224	191				809	913	1187					
264+00	61	1859			0	0				61	1859	2417					
265+00	74	1585			0	0				74	1585	2061					
266+00	413	1591			0	0				413	1591	2068					
267+00	52	3052			0	0				52	3052	3968					
268+00	15	2880			0	0		DIKE F=79		15	3059	3977					
269+00	452	2222			25	50			444	33	2172	2824					
270+00	2400	1585			217	82			2450	167	1503	1954					
271+00	3830	1230			299	0			3852	277	1230	1599					
272+00																	
273+00	2320	2149			299	0			2550	69	2149	2794					
274+00	569	3724			37	37			569	37	5687	4793					
275+00	0	6593			0	0				0	6593	8571					
276+00	0	8257			0	0				0	8257	10,734					
277+00	0	10,430			0	0				0	10,430	13,559					
278+00	25	12,376			0	0		DIKE F=2		25	12,398	16,117					
279+00	104	10,148			0	0				104	10,148	13,192					
280+00	60	9163			0	0				60	9163	11,912					
281+00	20	5362			0	0				20	5362	7621					
282+00	537	1744			131	234				718	1510	1963	183				
283+00	2975	106			726	104			200	3504	2	3	1048				
284+00	5913	0			830	0			122	6621	0	0	1385				
285+00	8229	0			830	0				9059	0	0	1700				
286+00	9215	0			830	0				10,045	0	0	734				
287+00	8565	0			830	0				9395	0	0	389				
288+00	6899	0			830	0				7729	0	0	13				
289+00	4473	20			810	20		DIKE F=161		5283	161	209					
290+00	3346	39			781	39				4127	0	0					
291+00	4385	0			830	0				5215	0	0					
292+00	4981	0			830	0				5811	0	0					
293+00	4370	0			830	0				5200	0	0					
294+00	3163	0			830	0				3993	0	0					
295+00	1815	0			830	0				2645	0	0					
296+00	811	115			741	89				1552	26	34					
297+00	293	763			234	596				527	167	217					
298+00	122	1407			6	824				128	583	758					
299+00	89	1904			0	830				89	1074	1396					
300+00	70	1682			0	830				70	852	1108					
301+00	396	770			322	508				718	262	341					
302+00	1074	282			548	282				1622	0	0					
303+00	1856	200			630	200				2486	0	0					
304+00	2574	104			726	104				3300	0	0					
305+00	2852	17			813	17		DIKE F=55		3665	55	72					
306+00	2726	32			798	32				3524	0	0					
307+00	2063	215			615	215				2678	0	0					
308+00	970	546			422	408				1392	138	179					
309+00	411	1159			215	615				626	544	707					
310+00	437	1556			60	770				497	786	1022					

C=32,683
Gumbotill = 488
33,171

C=32,683
To Sta. 270±
Gumbotill to Sta. 270± = 33,171

F+30% =
+71.8

2335 | 0
303 | 0 +88.5

C=98
Gumbotill = 488
From Sta. 270± to Sta. 270± = 33,171

F+30% =
+68.2

5067 | 0
744 | 0 +87.2

C=61,520
Gumbotill = 5,452
66,972

F+30% = 3,926
To Sta. 317± = 27,504

C=29,347
Waste = 1943
(Save on Backslope)

2608 | 0
916 | 0 +74.0

F+30% =
+951

Revised Jan. 9, 1963
Revised Jan. 28, 1963

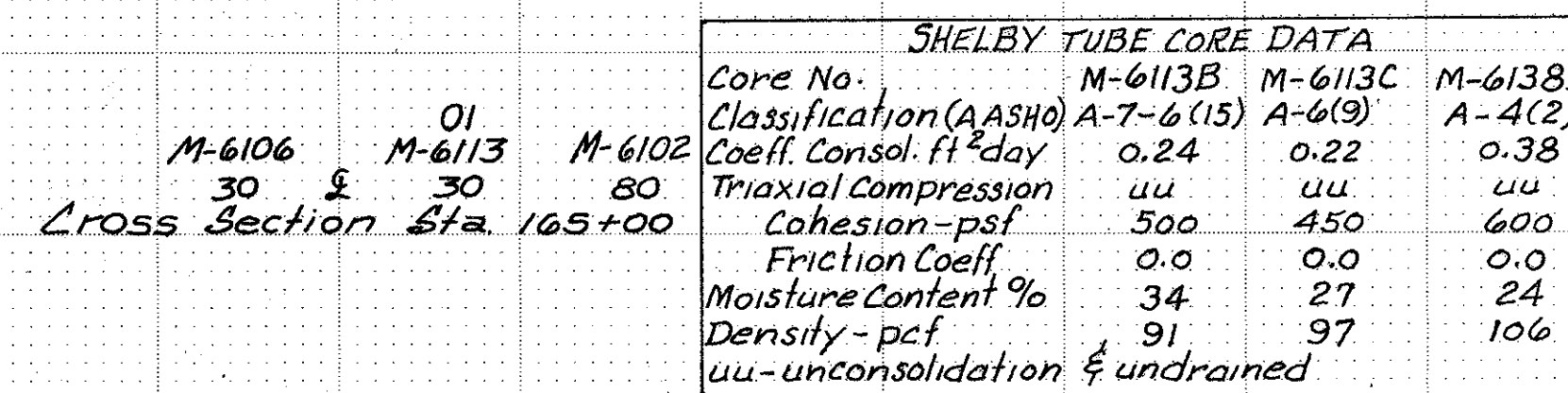
TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS																		107-4	6
SIDE ROAD STATION	TEMPLATE		M & D CONTROL		SUBGRADE TREATMENT		APPROACH GRADING		RECLAIMED SURFACING		SELECT SOIL CUT -C	ADJUSTED TOTALS			UNSUITABLE MATERIAL		MASS D'GRM. ORDINATE		BALANCE & OVERHAUL
	CUT	FILL	+C	+F	+C	-F	+C	+F	-C	+F		CUT	FILL	F+30%	C	F	UNS. MAT.	CLASS 10	
1209+50																			C = 15,648 Gumbotil = 1,039 16,687 F+30% = 940 To M.L. Sta. 210± = 14,708 Gumbotil to M.L. Sta. 210± = 1,039 Select = 700
1211+00	99	82								7	13		92	95	124				
1212+00	259	59								16	4		243	63	82				
1213+00	652	15								20	0		632	15	20				
1214+00	1252	0								20	0		1232	0	0				
1215+00	1793	0						DIKE F=6		20	0		1773	45	59				
1216+00	2052	0								20	0		2032	0	0				
1217+00	2007	0								20	0		1987	0	0	130			
1218+00	1778	0								20	0	13	1745	0	0	233			
1219+00	1948	0								20	0	224	1704	0	0	104			
1220+00	2215	0								20	0	407	1788	0	0	257			
1221+00	1622	0								20	0	56	1546	0	0	296			
1222+00	483	29						DIKE F=6		20	0		463	74	96	19			
1222+80	25	154								8	8		17	162	211				
1223+50	18	101								5	9		13	110	143				
1224+50	441	41								18	2		423	43	56				
1225+50	681	0								10	0		671	0	0				
1226+50	307	22											307	22	29				
1227+50	19	22						DIKE F=70					19	92	120				

TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS																	107-4	5	6
STATION	TEMPLATE		M & D CONTROL		SUBGRADE TREATMENT		APPROACH GRADING		SELECT SOIL CUT _C	ADJUSTED TOTALS			UNSUITABLE MATERIAL		MASS D'GRM. ORDINATE		BALANCE & OVERHAUL		
	CUT	FILL	+C	+F	+C	-F	+C	+F		CUT	FILL	F+30%	C	F	UNS. MAT.	CLASS 10			
310+00																	<div>C = 279</div> <div>From Sta. 295± = 23,573</div> <div>23,657</div> <div>F+30% = 23,657</div>		
311+00	682	1559			204	211				886	1348	1752							
312+00	1230	1107			352	63		DIKE F=10		1582	1154	1500							
313+00	1411	548			415	0				1826	548	712							
314+00	343	689			205	210				548	479	623							
315+00	0	3428			0	0				0	3428	4456							
316+00	0	4202			0	0		DIKE F=63		0	4365	5675							
317+00	0	4963			0	0				0	4963	6452							
318+00	28	4889			0	0				28	4889	6356							
319+00	223	3614			0	0				223	3614	4698							
319+12	28	520			0	0				28	520	676							

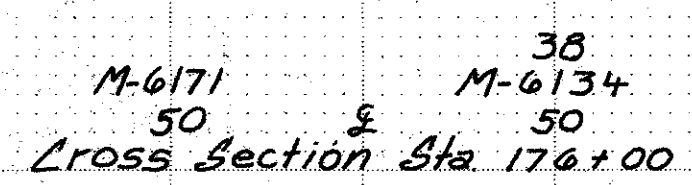
Revised Jan. 28, 1963

Revised Jan 28, 1963

34	29	27	20	19
-	-	92	98	106
2714	25	2114	21	2215

[illegible]

				30	25	2423	23	32				24	25	19
				91	94	9234	90	—				92	87	107
21/9				2213	2718/6	23	19	26	12		24241319	19	252319	2616



		M-6109	01 13	10	12	23	24	25	26	27	28	35	36	38	39	40	41	42	46
		All RT30				All RT37						All RT50	RT37	RT37	RT37	RT37	RT37	RT37	RT50
160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179

POWESHIEK State Proj. No. I-80-5(29) 188 Sheet No. 17A of 104 Sheets

FED. ROAD DIST. NO.	STATE	FEDERAL PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
50-5(29)188	IA		1962	17B	104

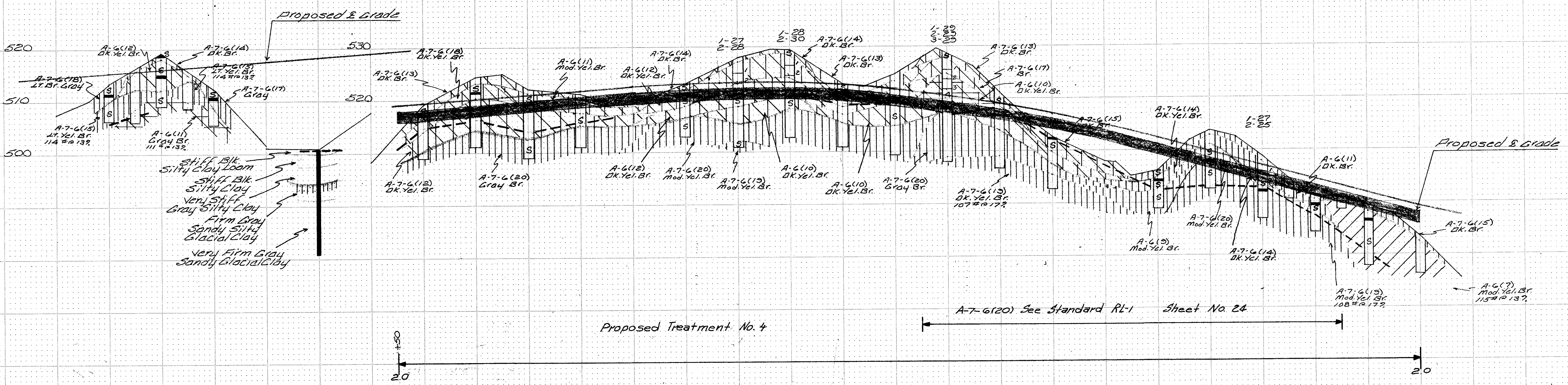
CUT MOISTURE	24	27	27	21
CUT DENS. LBS./FT. ³	93	86	93	104
PLASTIC LIMIT	17/6	28	20/6	15

23	26	24
73	-	35
25	25	20/21
20		

24	30
89	92
23	20/22
18/13	23/17

32	26	28
75	93	95
23	21	24/13
25	22	25

34	22	20	17	23	14
78	91	100	110	-	107
28	27	23/15	21/17	18	20
					16



VOLUME CHANGE
CUT TO PROCTOR

SENDER'S NO.	M-6173	75	74	77	76	78	81	82	83	84	85	86	87	88	89	90	91	92	M-6203	10	11	13	12	15	14	16
DIST. FROM C-LINE	A-11	LT 37				LT 50	A-11	LT 37																		
STATION NO.	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206

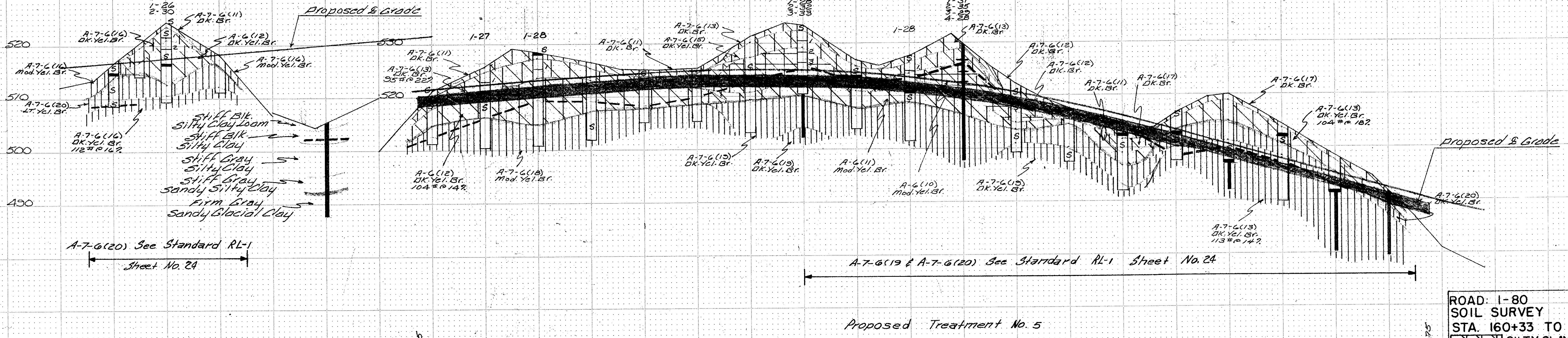
CUT MOISTURE	24	31
CUT DENS. LBS./FT. ³	94	87
PLASTIC LIMIT	21/21/5	23/23/13

27	30	36
82	87	-
24/25	19	22
13	13	24

26	26	27	30
96	98	86	93
20	26	24	23/21

30	31	39	28
81	77	79	92
23/24/23	18	23/13	28/21

21	23	18
106	89	112
15	20	



VOLUME CHANGE
CUT TO PROCTOR

SENDER'S NO.	M-6147	49	48	50	50	65	66	67	68	69	70	93	94	95	96	97	98	99	M-6200	04	05	06	07	08		
DIST. FROM C-LINE	A-11	RT 37			RT 50	A-11	RT 37																			
STATION NO.	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206

ROAD: I-80	DATE: JAN - FEB 1962
STA. 160+33 TO STA. 319+37	
SOIL SURVEY	
SYMBOL	DESCRIPTION
[Symbol]	GRAV. SANDY LOAM
[Symbol]	GRAVELLY SAND
[Symbol]	GRAVELLY LOAM
[Symbol]	SANDY LOAM
[Symbol]	LOAMY SAND
[Symbol]	LOAM
[Symbol]	SAND
[Symbol]	SILT
[Symbol]	WATER

FUNCTIONAL CROSS SECTION - OPEN DOTTED
H. A. ROGERS CO. - MINNEAPOLIS - ST. PAUL - DULUTH

FED. ROAD DIST. NO.	STATE	FEDERAL PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
80-5(29)188	IA		1962	17C	104

CUT MOISTURE
CUT DENS. LBS./FT.³
PLASTIC LIMIT

31	28	22	20	24	13	28	30	24	29	21	32	27	31
2313/4	17	102	102	98	103	94	-	94	84	106	-	80	68
			2221/5			2017/8			15			2620	2713

From Sta. 215+00 to Sta. 228+00 place 1300 linear ft. of 6" perforated drain pipe to be installed in 4' backslope as excavation proceeds to trench-top elev. Place 205 cu. yds. of porous backfill material (Art. 413.92) 0.5 ft. below and 2.0 ft. above drain. Outlet to be at station 215+00.

Proposed ± Grade

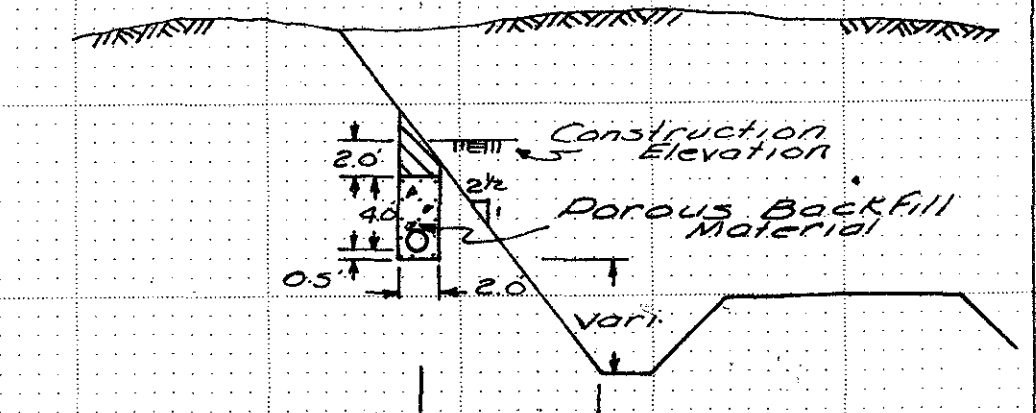
BRIDGE

PLAN VIEW

2.2% SLOPE

0.5% SLOPE

Proposed ± Grade



At Outlet of 6" drain pipe use:
1-12" Metal Apron
1-12" x 6" Concentric reducer
1-12" Band
1-6" Band

A-7-G(19) & A-7-G(20) See Standard RL-1 Sheet No. 24

Proposed Treatment No. 6

VOLUME CHANGE
CUT TO PROCTOR
SENDER'S NO.
DIST. FROM C-LINE
STATION NO.

17-6223	17-6345	46	47	48	17-6351	53	52	55	54	56	58	57	59	60	61	62	63	65	64	90	91	93	92	34
111 LT 50					111 LT 37																			
207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231

CUT MOISTURE
CUT DENS. LBS./FT.³
PLASTIC LIMIT

28	24	30	23	22	34	26	20	21	24	27	28	28
93	97	82	104	102	88	81	107	120	117	73	92	82
22		24	13	13			16		-13	20	23	

Proposed ± Grade

BRIDGE

SHELBY CORE DATA		
Core No.	C-1213 B	C-1213 C
Classification (AASHTO)	A-7-G(13)	A-6(11)
Coeff. Consol. ft ² /day	0.43	0.86
Triaxial Compression	44	44
Cohesion - psf	425	450
Friction Coeff.	0.0	0.0
Moisture Content %	36	34
Density - pcf	90	92
uu-unconsolidated & undrained		

Proposed ± Grade

A-7-G(19) & A-7-G(20) See Standard RL-1 Sheet No. 24

Proposed Treatment No. 7

Note:
From Sta. 208+33± to Sta. 211+30 place a pervious blanket of granular back fill.
For details see Sheet No. 17I.

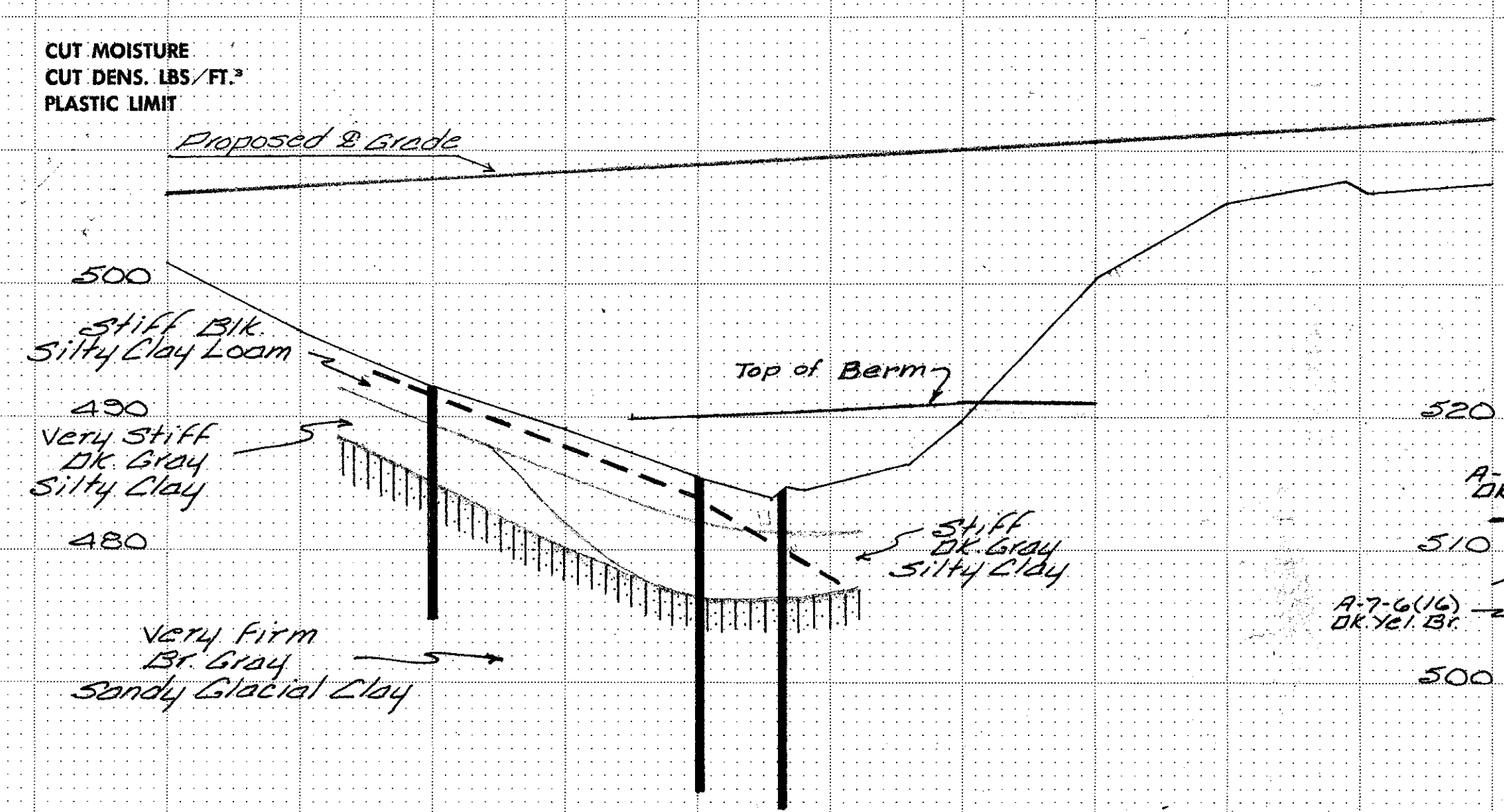
VOLUME CHANGE
CUT TO PROCTOR
SENDER'S NO.
DIST. FROM C-LINE
STATION NO.

17-6224	25	27	17-6349	50	52	17-6378	70	80	81	82	83	84	85	95	96	98	97	99
111 LT 50						111 LT 37												
207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225

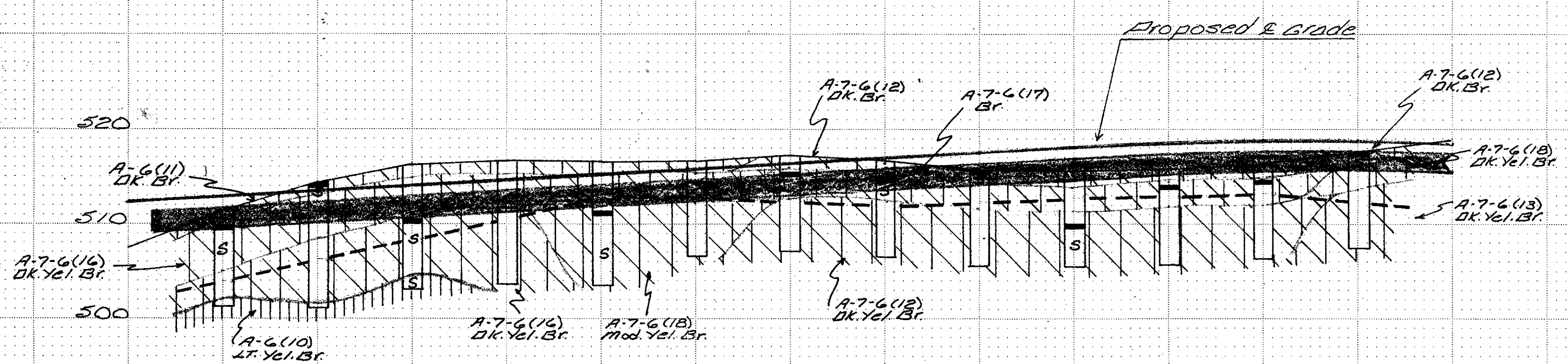
ROAD: I-80		DATE: APRIL 1962	
SOIL SURVEY STA. 160+33 TO STA. 319+37			
	SILTY CLAY LOAM		GRAVELLY SAND
	SILTY CLAY		GRAVELLY LOAM
	SILTY LOAM		SANDY LOAM
	CLAY LOAM		LOAMY SAND
	CLAY		LOAM
	SILT		SAND
	WATER		

DATE
BY
SURVEYED
PLOTTER
NOTE BOOK
NO.
FINAL SURVEY

DATE
BY
SURVEYED
PLOTTER
NOTE BOOK
NO.
ORIGINAL SURVEY

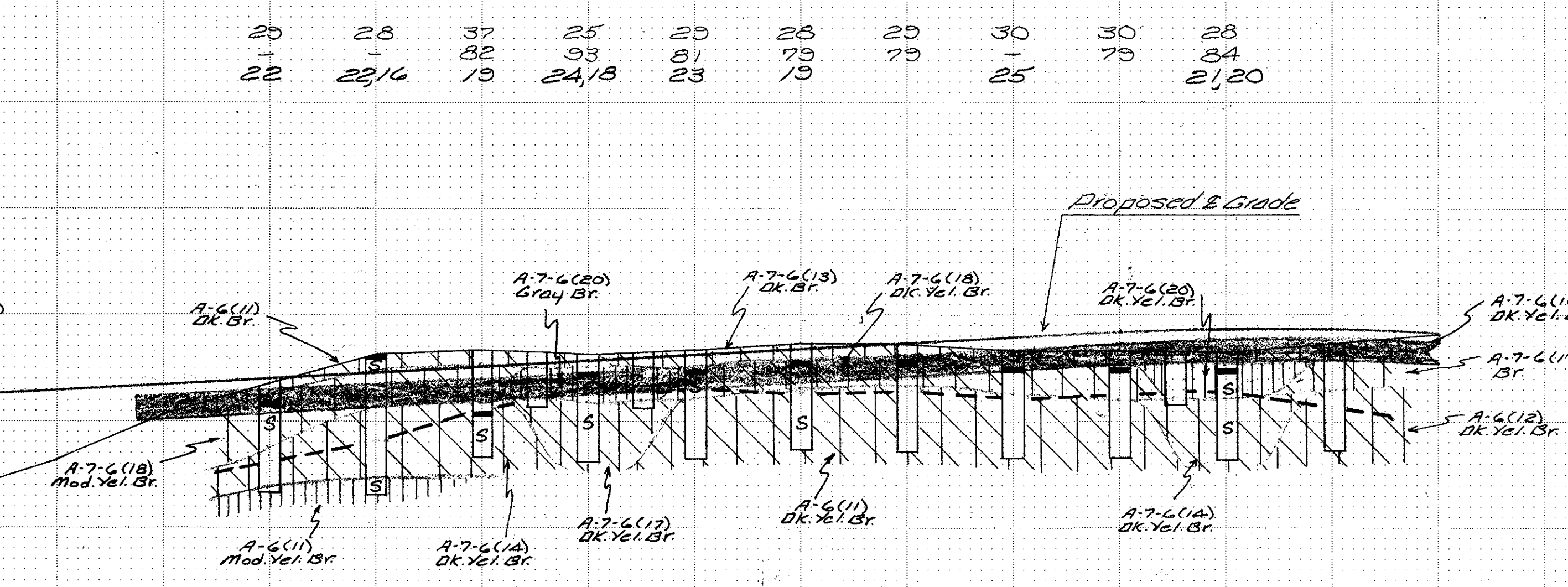
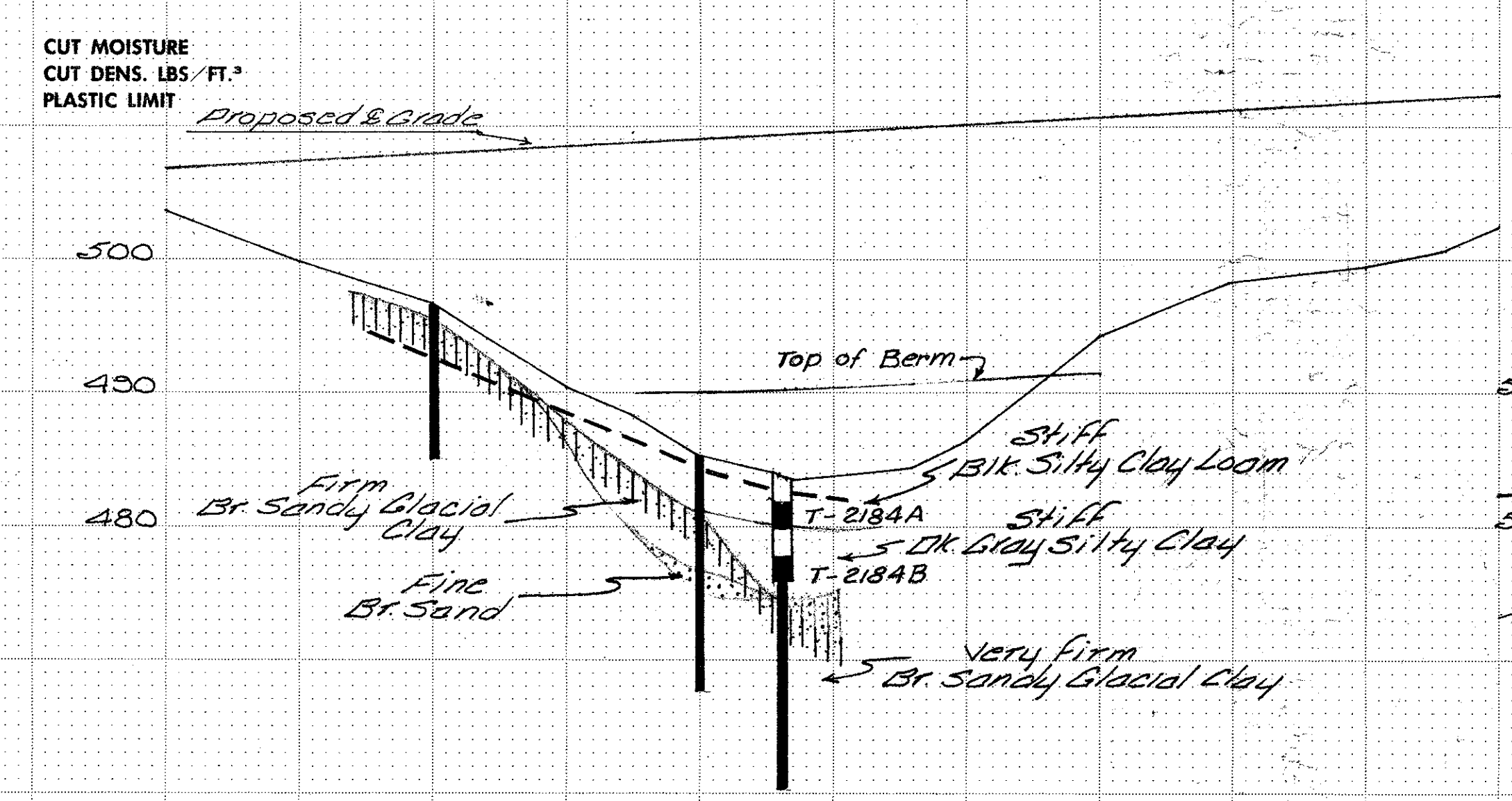


27	29	31		29	28	29	28	29	31	25
83	82	86		89	80	76	91	82	82	86
21	22	17/13		21	26	23	20			24



Proposed Treatment No. 8

VOLUME CHANGE CUT TO PROCTOR	SENDER'S NO. DIST. FROM C-LINE	STATION NO.	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254
	M-6421 1750					22	23						32	33	34	35	36	37	51	52	53	54	55	56	57
						1750	1750						111137												



SHELBY TUBE CORE DATA

Core No.	T-2184A	T-2184B
Classification (AASHTO)	A-7-6(15)	A-7-6(18)
Coeff. Consol. H ² clay	-	0.21
Triaxial Compression	uu	uu
Cohesion - p _{sf}	300	350
Friction Coeff.	0.0	0.0
Moisture %	33	33
Density - p _{cf}	92	88
uu - unconsolidated & undrained		

Note:
From Sta. 234+50 to Sta. 238+00 construct berms
on both sides of embankment as shown on cross
sections.
Berms to be ditched for inlet and outlet of culvert.

VOLUME CHANGE CUT TO PROCTOR	SENDER'S NO. DIST. FROM C-LINE	STATION NO.	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254
	M-6418 1750																								

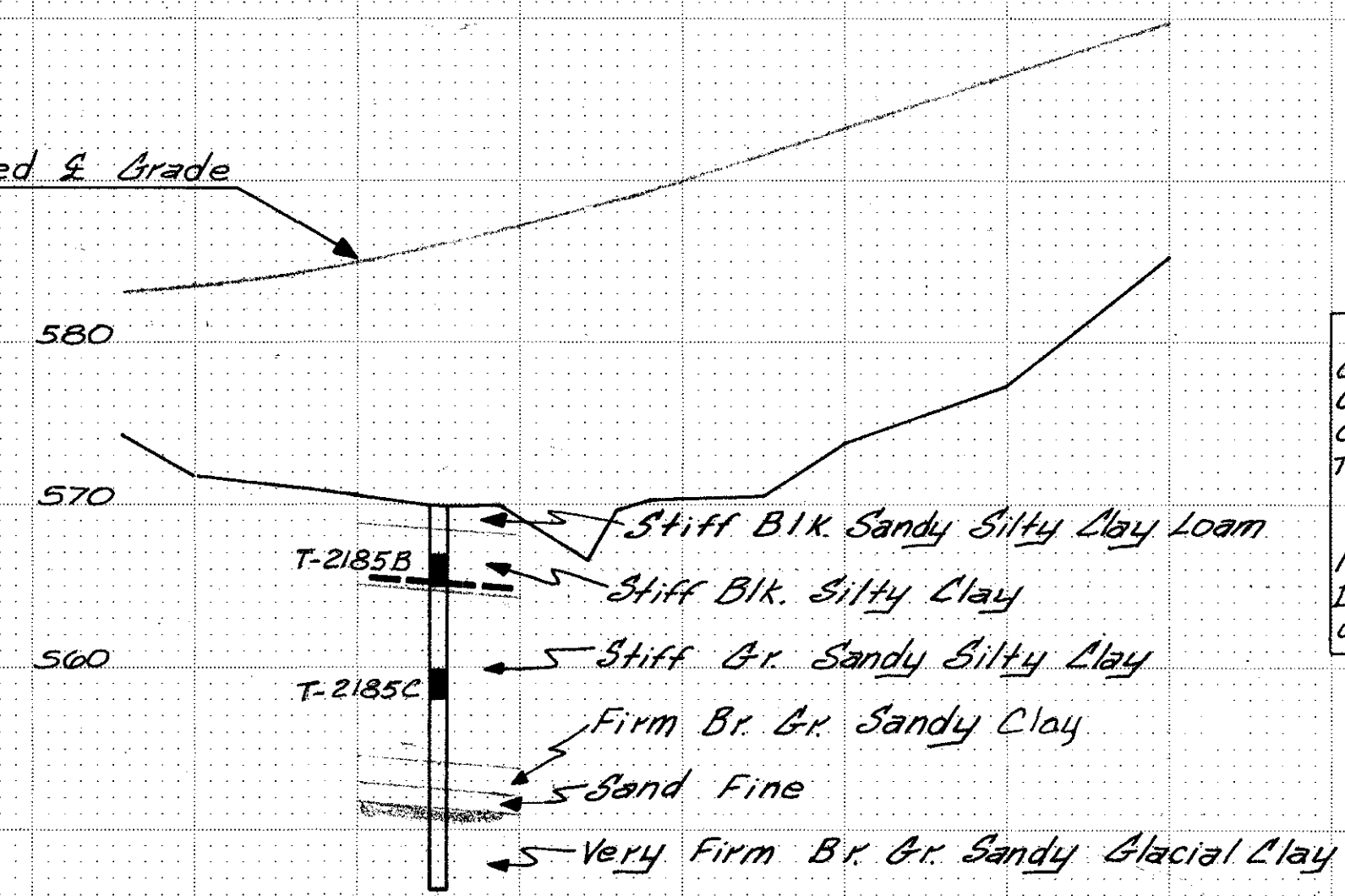
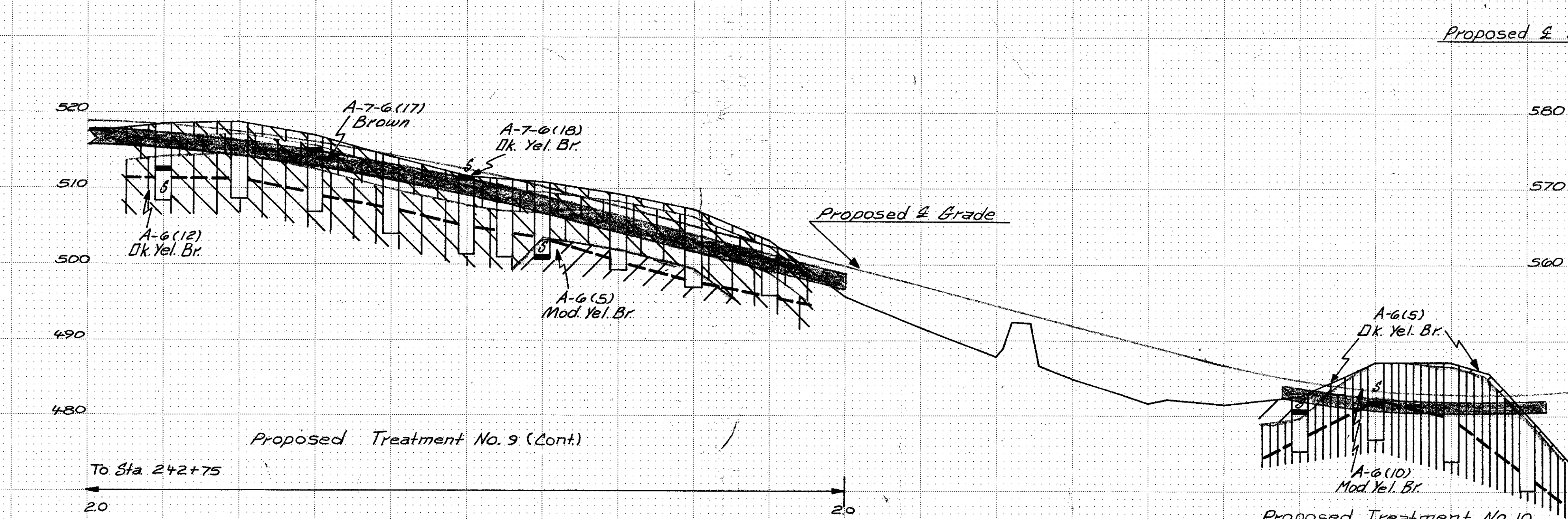
ROAD: I-80
SOIL SURVEY
STA. 160+33 TO STA. 319+37

DATE: MAY 62

[Symbol]	SILTY CLAY LOAM	[Symbol]	GRAV. SANDY LOAM
[Symbol]	SILTY LOAM	[Symbol]	GRAVELLY LOAM
[Symbol]	CLAY LOAM	[Symbol]	SANDY LOAM
[Symbol]	CLAY	[Symbol]	LOAMY SAND
[Symbol]	SILT	[Symbol]	LOAM
[Symbol]	WATER	[Symbol]	SAND




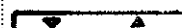



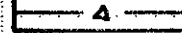

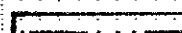



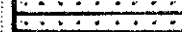
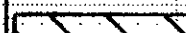
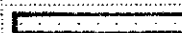
Revised Jan. 9, 1963

VOLUME CHANGE CUT TO PROCTOR																									
SENDER'S NO.	M-6458	59	60	61	62	64	63	65	66													M-6499			
DIST. FROM C-LINE	ALL LT.37																					LT.60			
STATION NO.	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279
CUT MOISTURE	34		25		23	17										17	15								
CUT DENS. LBS / FT. ³	84		76		77	91										91	111								
PLASTIC LIMIT	19		22		25	12										18	15								



SHELBY TUBE		CORE DATA	
Core No.	T-2185B	T-2185B	T-2185C
Classification (AASHTO)	A-7-T-6(20)	A-7-T-6(20)	A-6(17)
Coeff. Consol. ft./day	0.064	0.064	0.56
Triaxial Compression	uu	uu	uu
Cohesion- psi	500	600	600
Friction Coeff.	0.0	0.0	0.0
Moisture Content %	31	26	26
Density - pcf	87	102	102
uu- unconsolidated & undrained			

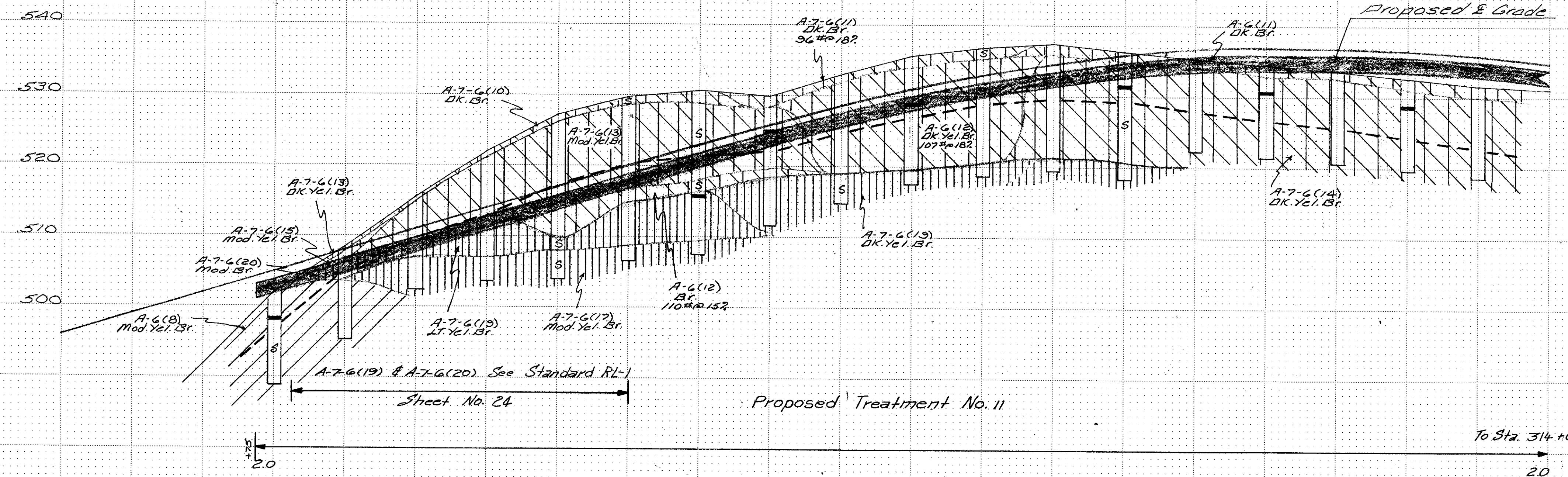
VOLUME CHANGE CUT TO PROCTOR																									
SENDER'S NO.	M-6468	69	70	71	72	73	74	75	76	77															
DIST. FROM C-LINE	111 ET 37																								
STATION NO.	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	

ROAD: I-80		DATE: MAY 1962	
SOIL SURVEY			
STA. 160+33		TO STA. 319+37	
	SILTY CLAY LOAM		GRAV. SANDY LOAM
	SILTY CLAY		GRAVELLY SAND
	SILTY LOAM		GRAVELLY LOAM
	CLAY LOAM		SANDY LOAM
	CLAY		LOAMY SAND
	SILT		LOAM
	WATER		SAND
			

FINAL SURVEY
DATE
BY
SURVEYED
PLOTTER
NOTE BOOK
NO.
AREAS CHECKED

CUT MOISTURE
CUT DENS. LBS./FT.³
PLASTIC LIMIT

14	25	33	32	30	31	29
115	91	22	85	87	88	87
13	18, 16	25	25, 21	14	21	

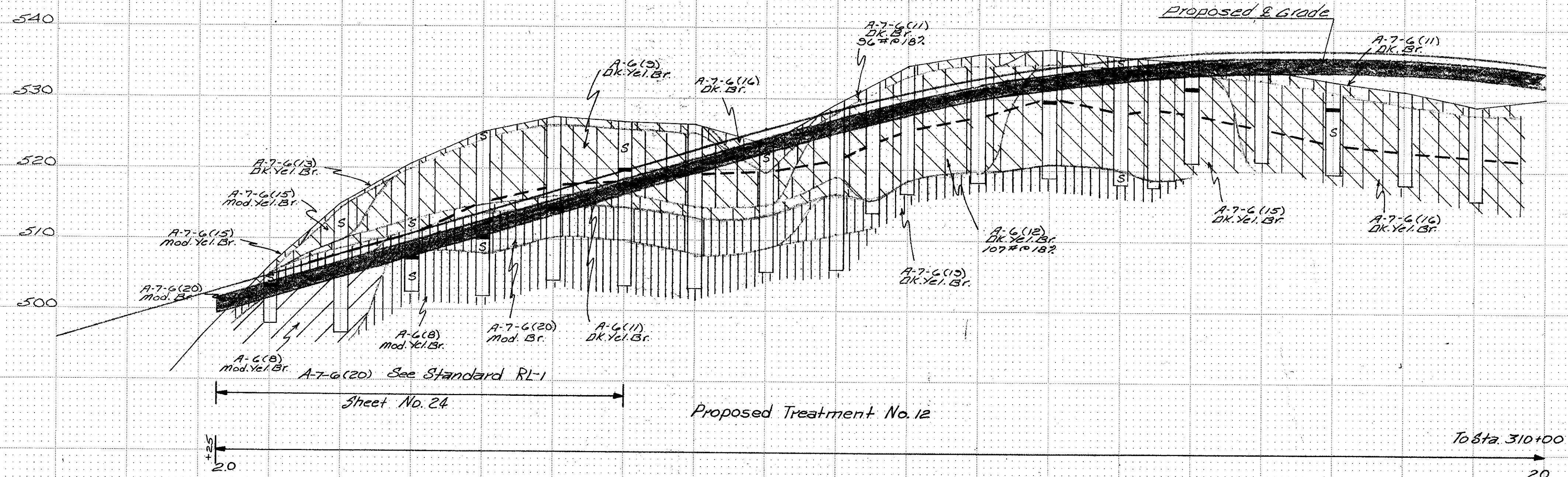


VOLUME CHANGE
CUT TO PROCTOR
SENDER'S NO.
DIST. FROM C-LINE
STATION NO.

										Silty Clay 26									
K-8350		51	84	83	82	81	80	79	78	77	76	K-8411	12	13	14	15	16	17	
280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299

CUT MOISTURE
CUT DENS. LBS./FT.³
PLASTIC LIMIT

23	20	23	20	27		30	23	29
34	106	101	107	97		87	88	83
21	20	13, 14	26, 33	19	20	21	26, 17	19



VOLUME CHANGE
CUT TO PROCTOR
SENDER'S NO.
DIST. FROM C-LINE
STATION NO.

K-8348	49	66	67	68	69	70	71	72	74	73	75	90	91	93	92	94	95	96	97
280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299

ORIGINAL SURVEY
DATE
BY
SURVEYED
PLOTTER
NOTE BOOK
NO.
AREAS CHECKED

ROAD: I-80
SOIL SURVEY
STA. 160+33 TO STA. 319+37

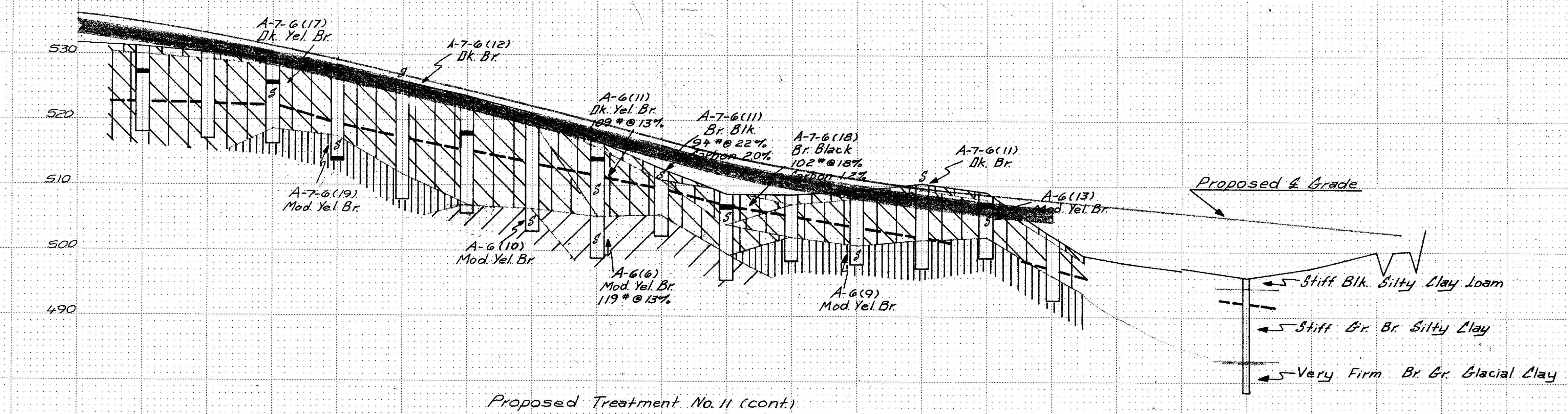
DATE: MAY 1962

[Symbol]	SILTY CLAY LOAM	[Symbol]	GRAV. SANDY LOAM
[Symbol]	SILTY CLAY	[Symbol]	GRAVELLY SAND
[Symbol]	SILTY LOAM	[Symbol]	GRAVELLY LOAM
[Symbol]	CLAY LOAM	[Symbol]	SANDY LOAM
[Symbol]	CLAY	[Symbol]	LOAMY SAND
[Symbol]	SILT	[Symbol]	LOAM
[Symbol]	WATER	[Symbol]	SAND

FED. ROAD DIST. NO.	STATE	FEDERAL PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
80-5(29)	IA		1962	176	104

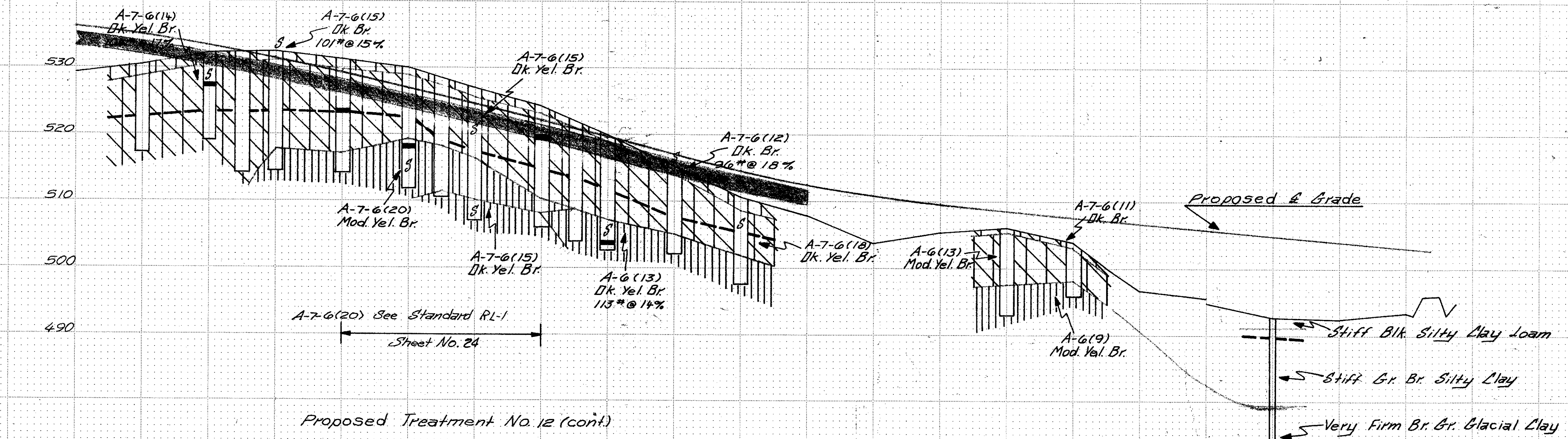
DATE	
BY	
REVIEWED	
NOTED	
NO.	

CUT MOISTURE	29	29	21	28	31	27	29
CUT DENS. LBS./FT. ³	85	87	101	91	86	92	94
PLASTIC LIMIT		22	17	23	14	13/13	10



VOLUME CHANGE CUT TO PROCTOR																					
SENDER'S NO.	K-8418	19	20	21	22	23	24	25	26	27	28	29	30	31	32		M-6501				
DIST. FROM C-LINE	111/1737																RT50				
STATION NO.	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320

CUT MOISTURE	30	27	25	29	19
CUT DENS. LBS./FT. ³	87	89	96	88	107
PLASTIC LIMIT	19	25	23	21/15	16



VOLUME CHANGE CUT TO PROCTOR																					
SENDER'S NO.	K-8338	99	01	K-8400	02	03	05	04	06	08	07	09	10	34	33	M-6500					
DIST. FROM C-LINE	111/1737															RT50					
STATION NO.	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320

DATE	May 56
BY	W. J. Smith
REVIEWED	W. J. Smith
NOTED	W. J. Smith
NO.	11/1737

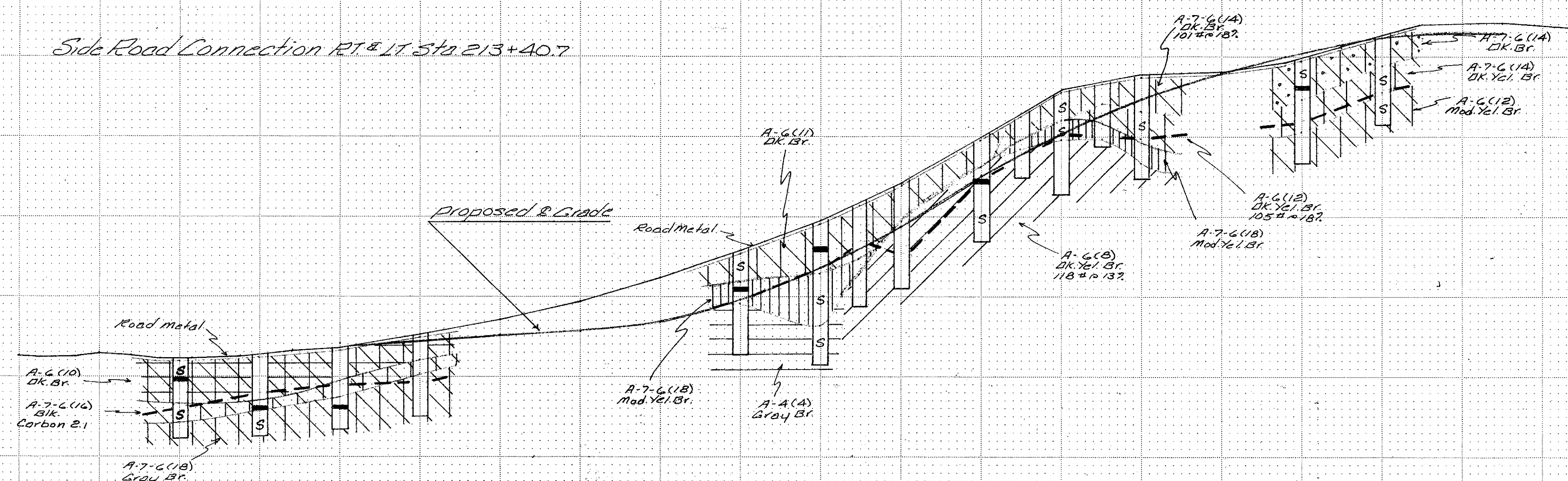
ROAD: I-80
SOIL SURVEY
STA. 160+33 TO STA. 319+37

DATE: MAY 1962

	SILTY CLAY LOAM		GRAVELLY SAND
	SILTY CLAY		GRAVELLY LOAM
	SILTY LOAM		SANDY LOAM
	CLAY LOAM		LOAMY SAND
	CLAY		SILT
	WATER		LOAM
	SAND		SAND

CUT MOISTURE	18	29	33	22	31	15	26
CUT DENS. LBS./FT. ³	102	93	83	102	—	114	94
PLASTIC LIMIT	13.24	19	83	18	17.13	14	23

Side Road Connection RT# 17 Sta 213+40.7



RECLAIM APPROXIMATELY 300 CUBIC YARDS OF ROAD METAL FROM STA 1210+00 TO STA 1225+00

VOLUME CHANGE CUT TO PROCTOR

SENDER'S NO. DIST. FROM C-LINE STATION NO.

K-BA-65	65	66	67	K-BA-53	54	56	55	57	59	58	61	60	62	63
1208	1203	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222

CUT MOISTURE CUT DENS. LBS./FT.³ PLASTIC LIMIT

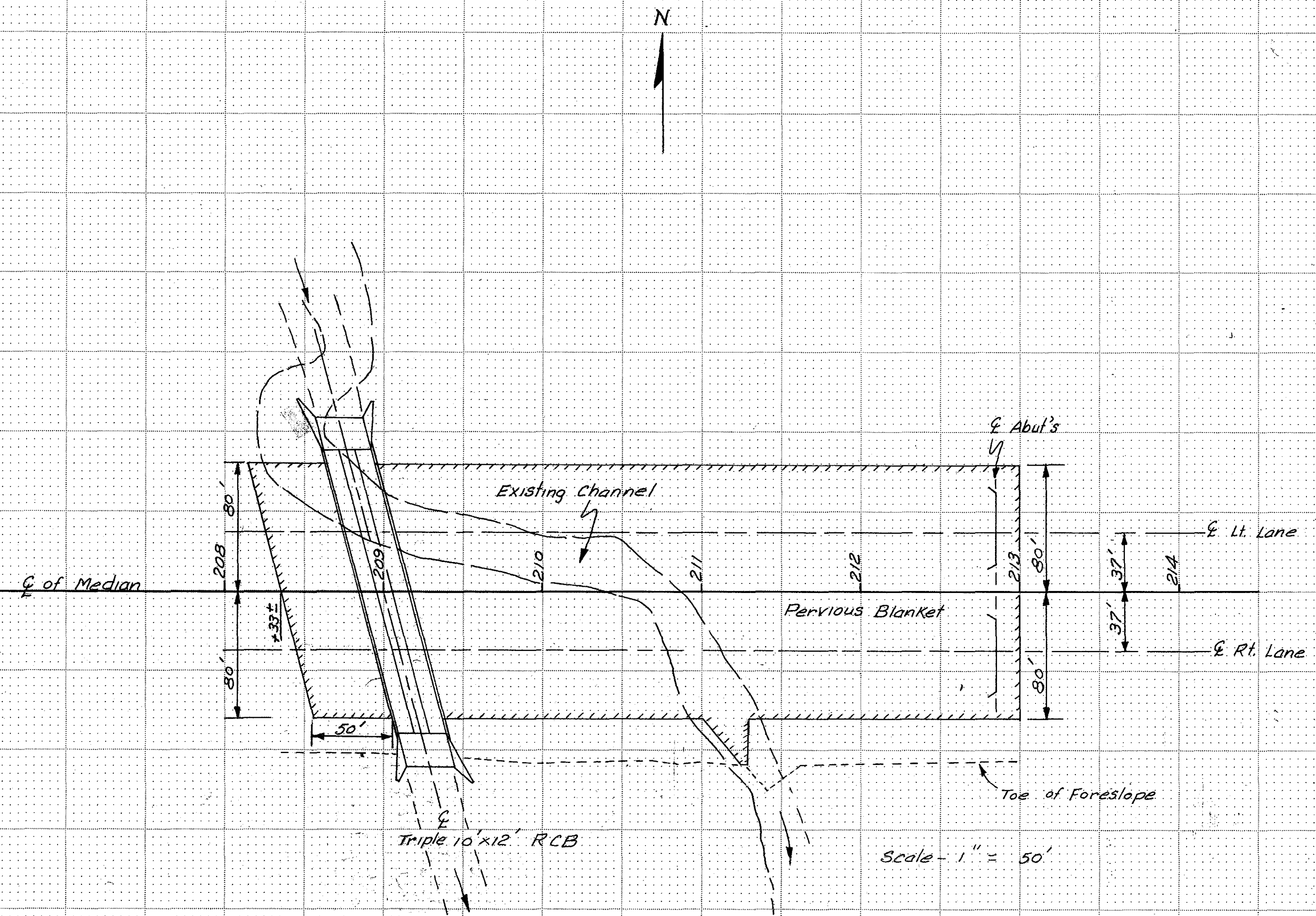
VOLUME CHANGE CUT TO PROCTOR

SENDER'S NO. DIST. FROM C-LINE STATION NO.

ROAD: 1-80		DATE: MAY 1962	
SOIL SURVEY		STA. 160+33 TO STA. 319+37	
	SILTY CLAY LOAM		GRAVELLY SAND
	SILTY CLAY		GRAVELLY LOAM
	SILTY LOAM		SANDY LOAM
	CLAY LOAM		LOAMY SAND
	CLAY		LOAM
	SILT		SAND
	WATER		

FINAL SURVEY
NOTE BOOK
NO. _____
DATE _____
BY _____
SURVEYED _____
TEMPLATE _____
AREAS CHECKED _____

ORIGINAL SURVEY
NOTE BOOK
NO. _____
DATE _____
BY _____
SURVEYED _____
TEMPLATE _____
AREAS CHECKED _____



PLAN VIEW OF PERVIOUS BLANKET AREA

From Sta. 208+33± to Sta. 213+00 place a pervious blanket on existing ground and in existing channel as shown on this sheet and on cross sections approximately 9840 tons of uncompacted granular backfill, Art. 4133.

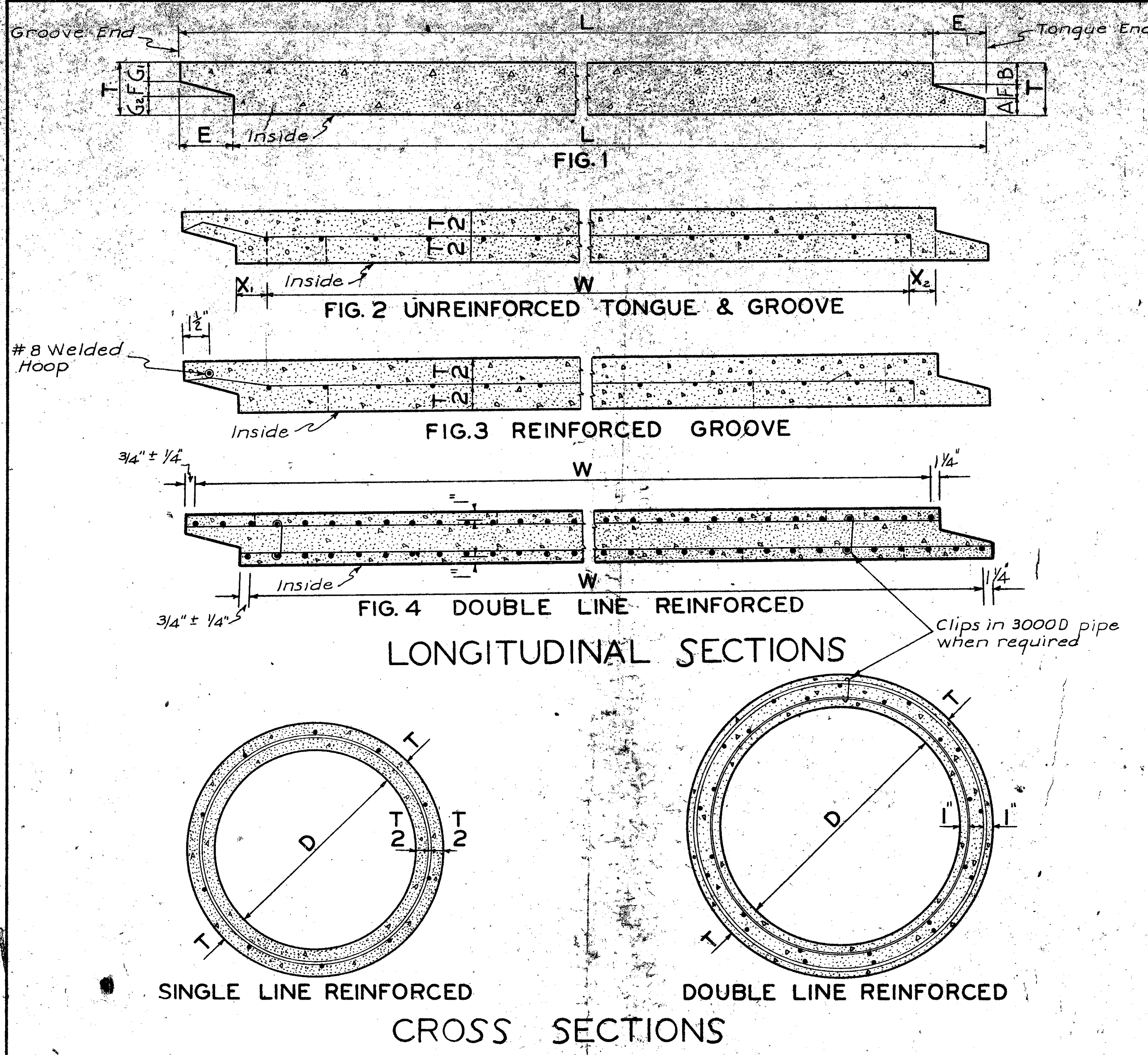
From pervious blanket with 90 ft. of 6 inch perforated corrugated metal pipe and with 30 ft. of 6 inch non-perforated corrugated metal pipe. Place drain pipe at approximate location and to flowline elevations as shown on above plan view.

Also weepholes are to be placed in the outside walls of the culvert as shown on culvert plans and road contractor to place blanket in direct contact with weepholes.

At outlet of 6" drain pipe use:-
 1- 12" Metal Apron
 1- 12" to 6" concentric reducer
 1- 12" Band
 1- 6" Band

POWESHIEK COUNTY
I-80-5(29)188

Revised March 8, 1963



GENERAL DIMENSIONS																				
D	AREA OF OPENING	2000 AND 3000 D										1500 D								
		APPROX. WT./FT.	T	*A	*B	*G ₁	*G ₂	C	*E	F	APPR. WT./FT.	T	A	B	G ₁	G ₂	C	E	F	D
12	.78	92	2	5/8	3/4	5/8	3/4	1/8	2	3/8										12
15	1.23	127	2 1/4	3/4	1	7/8	7/8	1/8	2	1/2	111	2	3/4	7/8	3/4	7/8	1/8	2	3/8	15
18	1.77	168	2 1/2	7/8	1 1/8	1	1	1/8	2 1/2	1/2	149	2 1/4	7/8	1	7/8	1	1/8	2	3/8	18
21	2.41	210	2 3/4	1	1 3/8	1 1/4	1 1/8	1/8	2 1/2	3/8	192	2 1/2	1	1 1/8	1	1 1/8	1/8	2 1/2	3/8	21
24	3.15	265	3	1 5/16	1 5/16	1 1/8	1 1/8	3/16	3	3/4	229	2 5/8	1	1 3/16	1	1 3/16	3/16	2 1/2	7/16	24
27	3.98	327	3 1/4	1 1/16	1 7/16	1 1/4	1 1/4	3/16	3 1/4	3/4										27
30	4.91	384	3 1/2	1 3/16	1 9/16	1 3/8	1 3/8	3/16	3 1/2	3/4	324	3	1 1/8	1 5/16	1 1/8	1 5/16	3/16	3	9/16	30
36	7.07	524	4	1 3/8	1 7/8	1 5/8	1 5/8	1/4	4	3/4	435	3 3/8	1 3/16	1 7/16	1 3/16	1 7/16	1/4	3 1/2	3/4	36
42	9.62	685	4 1/2	1 5/8	2 1/8	1 7/8	1 7/8	1/4	4	3/4	562	3 3/4	1 3/8	1 3/8	1 3/8	1 3/8	1/4	3 1/2	3/4	42
48	12.57	867	5	1 5/8	2 5/8	2 3/8	1 7/8	1/4	4	3/4	727	4 1/4	1 5/8	1 7/8	1 5/8	1 7/8	1/4	4	3/4	48
54	15.90	1071	5 1/2	1 3/16	2 15/16	2 1/16	2 1/16	1/4	4 1/2	3/4	888	4 5/8	1 3/16	2 1/16	1 3/16	2 1/16	1/4	4 1/2	3/4	54
60	19.64	1296	6	2	3 1/4	3	2 1/4	1/4	5	3/4	1064	5	2	2 1/4	2	2 1/4	1/4	5	3/4	60
66	23.76	1542	6 1/2	2 1/4	3 1/2	3 1/4	2 1/2	1/4	5	3/4										66
72	28.27	1810	7	2 1/2	3 3/4	3 1/2	2 3/4	1/4	5	3/4	1532	6	2 1/2	2 3/4	2 1/2	2 3/4	1/4	5	3/4	72
84	38.48	2409	8	2 7/8	4 3/8	4	3 1/4	3/8	5	3/4	2085	7	3	3 1/4	3	3 1/4	1/4	5 1/2	3/4	84

* Permissible variations from dimensions given for old molds (sizes 48" to 84") shall be $\pm 1/4$ ".
+ Permissible variations from dimensions given for old molds (sizes 48" to 84") shall be $\pm 1/2$ ".

REINFORCEMENT—WELDED STEEL WIRE FABRIC														
D	MINIMUM CIRCUMFERENTIAL SQ. INCH PER FT. OF PIPE						MINIMUM CAGE WIDTH (W) = L—(INCHES SHOWN BELOW)			SUGGESTED OVERHANG				
	1500 D		2000 D		3000 D					GROOVE END		TONGUE END		
	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE	1500 D	2000 D	3000 D	STD. WALL 2000 D 3000 D	THIN WALL 1500 D	STD. WALL 2000 D 3000 D	WALL 1500 D	THIN WALL 1500 D
12	.062		.062		.062		5	5	5					
15	.062		.062		.087		5	5	5	3 ½	3 ½	1 ⅜	1 ⅜	1 ¼
18	.062		.078		.116		5	5	5	3 ¾	3 ½	1 ½	1 ½	1 ⅜
21	.074		.116		.148		5	5	5	3 ¾	3 ¾	1 ⅝	1 ⅝	1 ½
24	.087		.148		.187		6	6	6	5 ⅝	4 ¼	1 ¾	1 ¾	1 ⅝
27			.159		.216			6	6	5 ¾		2		
30	.116		.187		.174	6	6	3	5 ⅞	5 ⅝	2	2		1 ¾
36	.140			.174	.187	6	3	3	¾	5 ⅞	1 ⅜	2 ¼		2
42		.174		.187	.239	3	3	2	¾	¾	1 ½	1 ⅜		1 ⅜
48		.187		.239	.280	3	2	2	¾	¾	1 ½	1 ½		1 ½
54		.239		.280	.325	2	2	2	¾	¾	1 ½	1 ⅜		1 ⅜
60		.280		.325	.377	2	2	2	¾	¾	1 ½	1 ½		1 ½
66				.377	.443		2	2	¾	¾	1 ½			
72		.325		.443	.443	2	2	2	¾	¾	1 ⅝	1 ½		1 ½
84		.377		.516	.516	2	2	2	¾	¾	1 ⅝	1 ½		1 ½

General Notes:
The wall thickness and reinforcement shown are minimum requirements. If the wall thickness is increased, only dimensions indicated by T, B, & G₁ shall be changed.
1500 D pipe, in 12", 15", 18" & 21" diameters, when made with wall thickness for 2000 D pipe need not be reinforced if strength requirement can be met. All other 2000 D pipe shall have the minimum reinforcement specified.
No circumferential reinforcement shall be required in tongues or grooves of 12", 15", 18" & 21" pipe of all classes or 24" pipe of 1500 D class. See Fig. 2.
All other pipe with single line reinforcement shall have the grooves reinforced by one welded hoop of not less than 8 gage wire. This hoop shall be secured to the cage by welding or by twisting the transverse wire around the hoop a minimum of 300° as in figure 3.
Pipe having two lines of reinforcement shall have circumferential wires extending into tongues and grooves as shown in figure 4.
The difference between X₁ & X₂ shall not be more than 1/2".
The spacing of transverse wires shall not exceed 8" and the size shall be that specified by the U.S. Department of Commerce Simplified Practice Recommendation No. 234-48 effective August 1, 1948. The spacing of circumferential rings shall not exceed 4".
The overhangs specified are approximate and may need to be changed due to the tightness of bends, wire diameter, cage width, and the exact location of cage within the tolerances permitted. The bend as shown in Fig. 2 requires approximately 1/8" extra overhang for all sizes except the 30" pipe which will require about 1/4".
When the groove end hoop is welded to the transverse wires, approximately 1/8" less overhang will be required. Tongue end overhang is required only when it is used for placement of reinforcement.
All material and construction to conform to the Iowa State Highway Commission Specifications and welded wire fabric shall conform to A.S.T.M. A 185.

7-1-61	NEW ISSUE	
DATE	REVISIONS	APR

IOWA HIGHWAY COMMISSION

STANDARD ROAD PLAN RF-1

RECOMMENDED

R.P. McLaughlin

ROAD ENGINEER

12-7-60

DATE

APPROVED

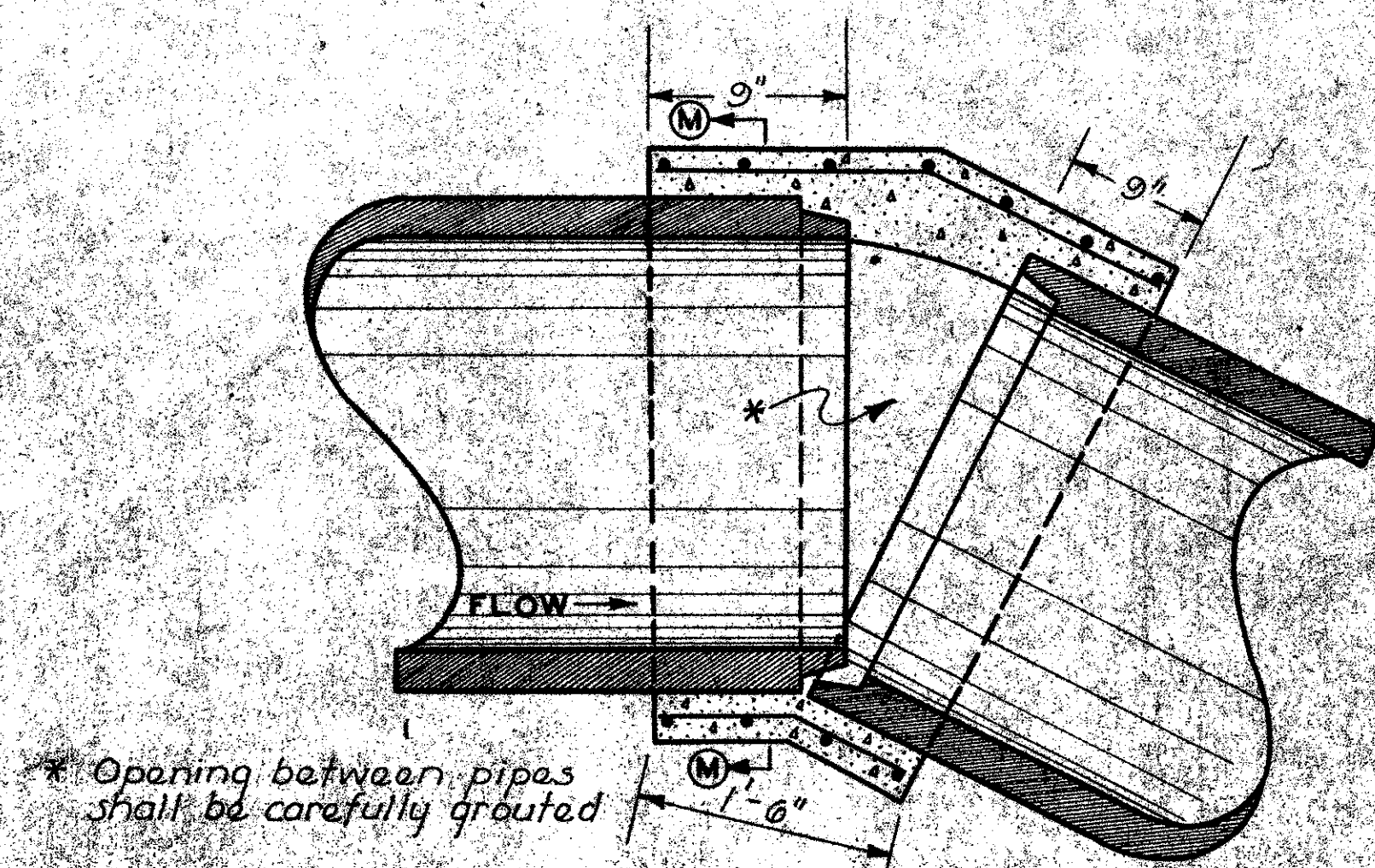
R.M. Tilton

CHIEF ENGINEER

December 7, 1960

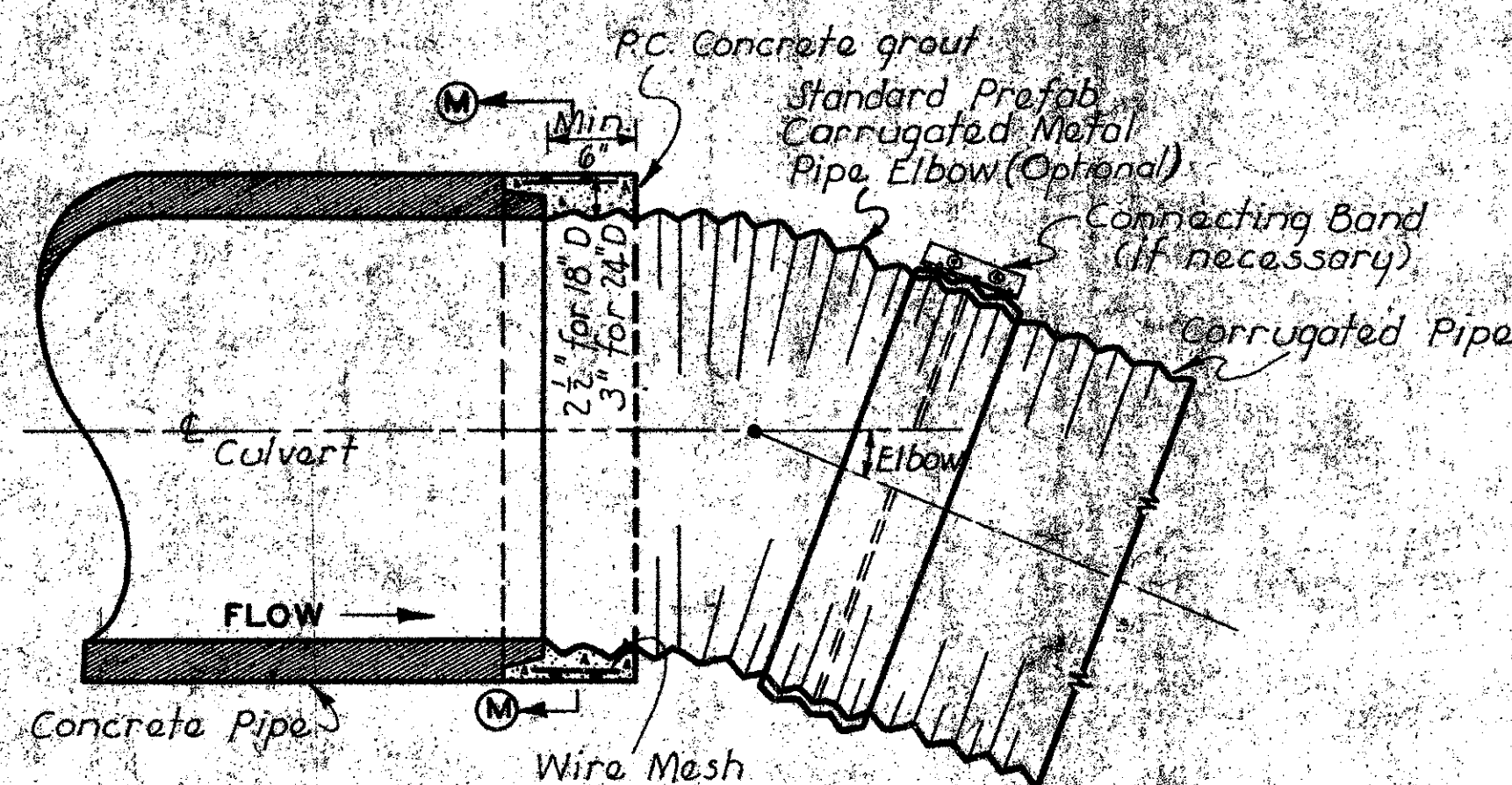
DATE

CONCRETE CULVERT PIPE



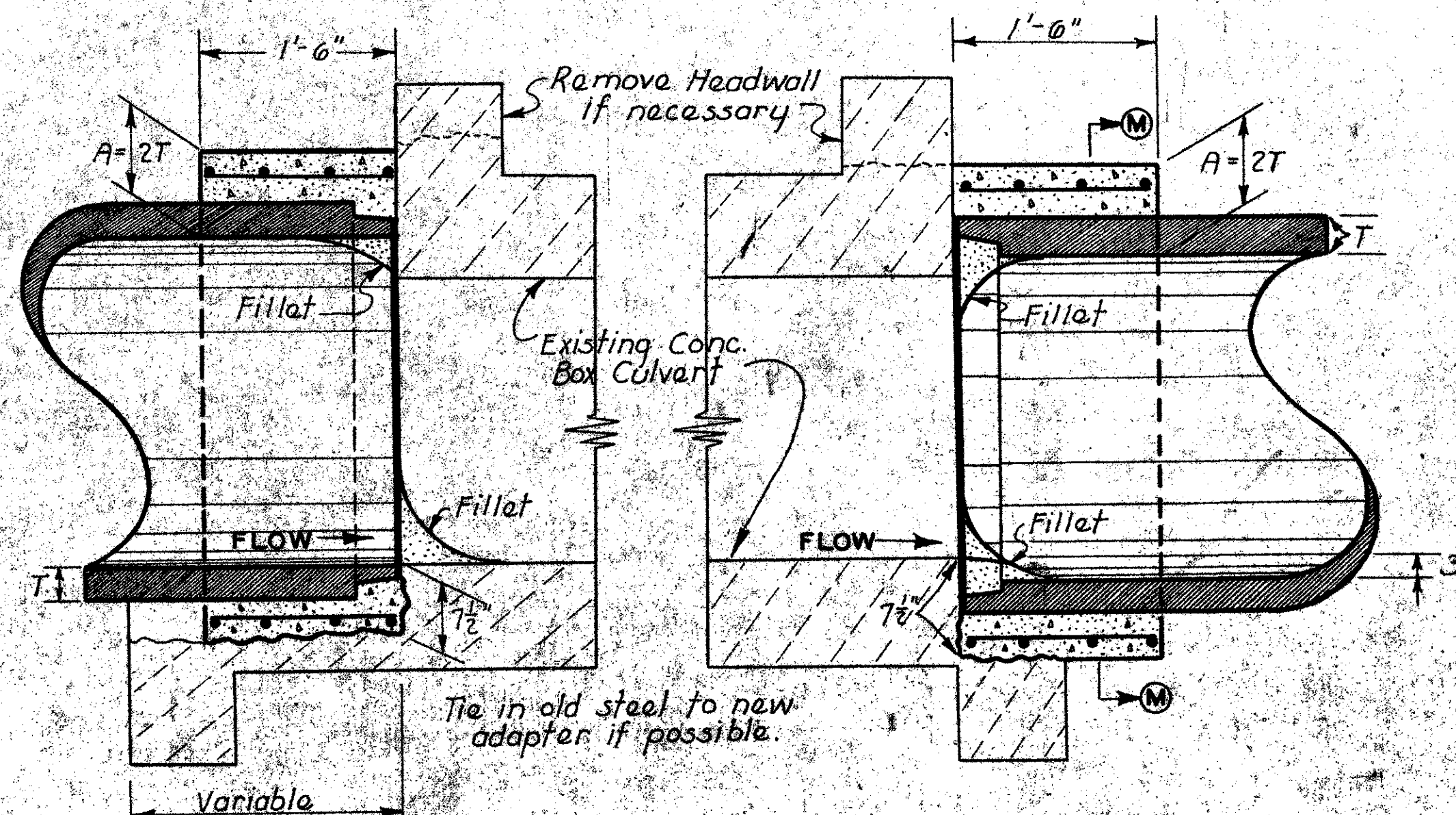
(Conc. pipe to conc. pipe)
TYPE C-1

Note:
Type C-1 and C-2 adaptors are to be formed and constructed on the actual job site by methods approved by the engineer.

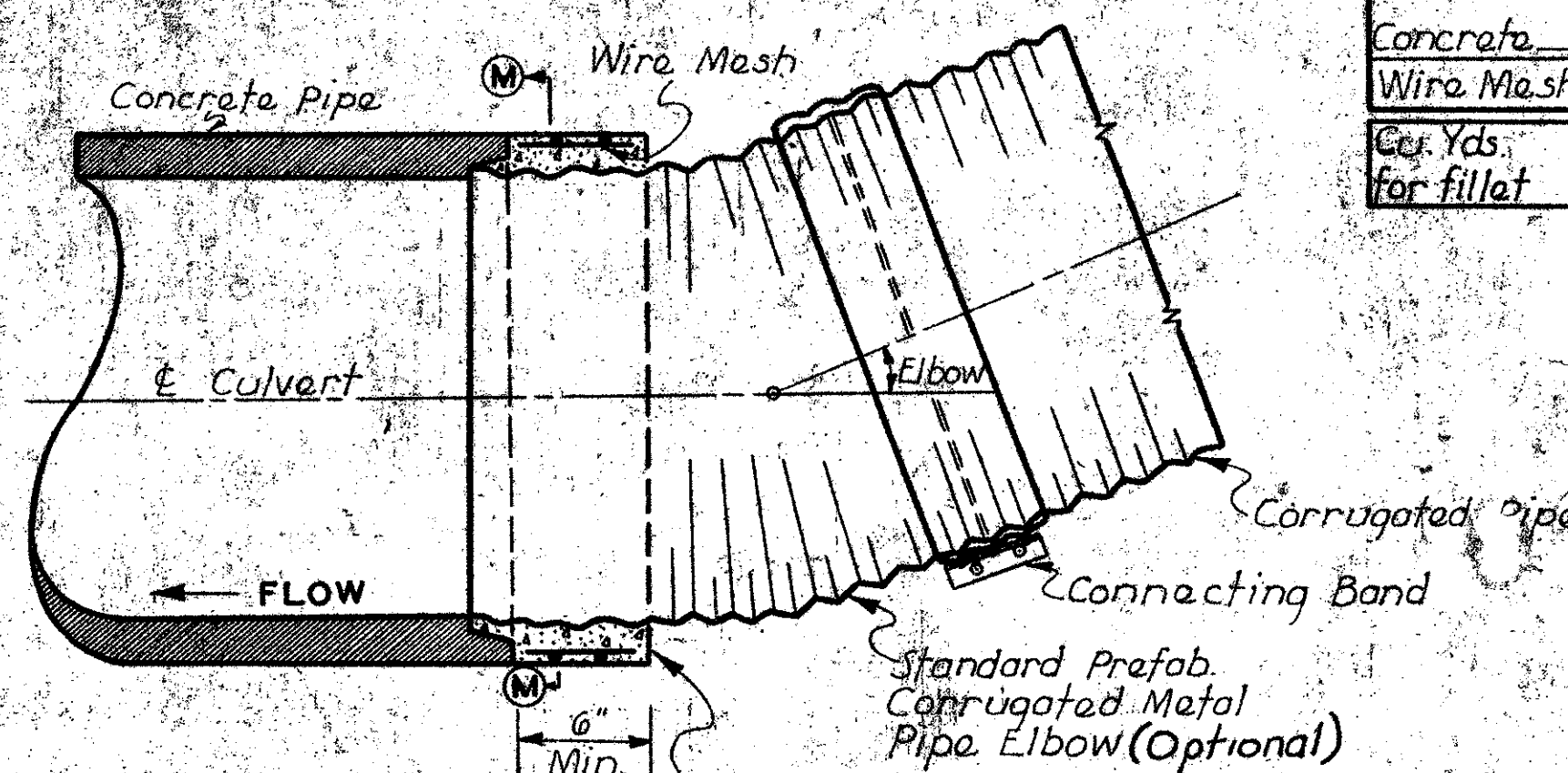


(Conc. pipe to corr. pipe)
TYPE C-3

Note:
Type C-3 and C-4 adaptors may be shop fabricated by a method approved by the engineer for attaching a concrete collar (either tongue or groove end) to a standard section of corrugated metal pipe.

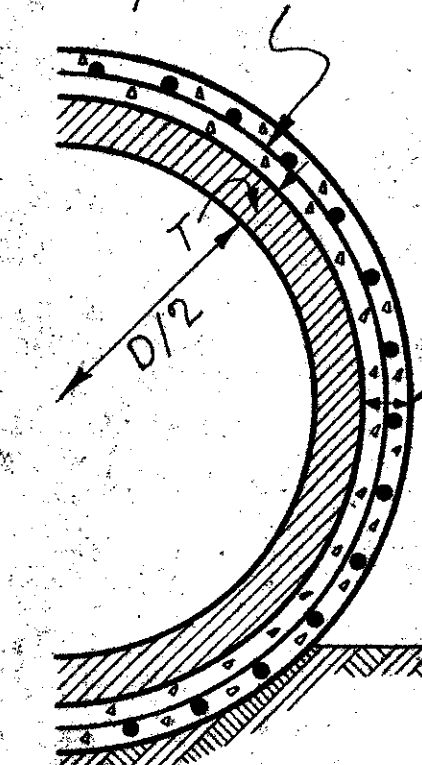


TYPE C-2
(Conc. pipe to conc. box culv.)



(Corr. pipe to conc. pipe)
TYPE C-4

6"x6" Steel Wire Mesh
#8 Wire - 30 lbs. per 100 sq. ft.
Lap ends 6"



TYPE C-1,2,3,4
HALF SECTION "M-M"

ENCASEMENT QUANTITIES PER LINEAR FOOT FOR C-1 & C-2 ADAPTORS
2000 D & 3000 D PIPE

	Diameter (D)											
	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	72"	84"
Concrete cu. yds.	.076	.087	.099	.110	.132	.155	.200	.254	.318	.378	.525	.697
Wire Mesh lbs.	2.00	2.27	2.55	2.82	3.36	3.93	4.50	5.10	5.70	6.20	7.47	8.64
Cu. Yds. Conc. for fillet (C-2)					.052	.068	.050	.069	.073			

TYPE C ADAPTORS

When the use of suitable Adaptors for making connections in various drainage structures are required, the details shall be similar to those indicated hereon for the respective types. No payment will be made for individual adaptors. The cost of furnishing all materials and constructing adaptor as indicated will be considered incidental to the pipe culvert. The cost of removing and disposing as directed, of any necessary headwall or other concrete, shall be considered incidental to the pipe culvert.

IOWA HIGHWAY COMMISSION

STANDARD ROAD PLAN **RF-2**

RECOMMENDED *A.P. McLaughlin* 11/10/60
ENGINEER DATE

D.P. McLaughlin 1-4-61
DESIGN COMMITTEE DATE

APPROVED *L.M. Clauson* 1-10-61
CHIEF ENGINEER DATE

CONCRETE PIPE ADAPTORS

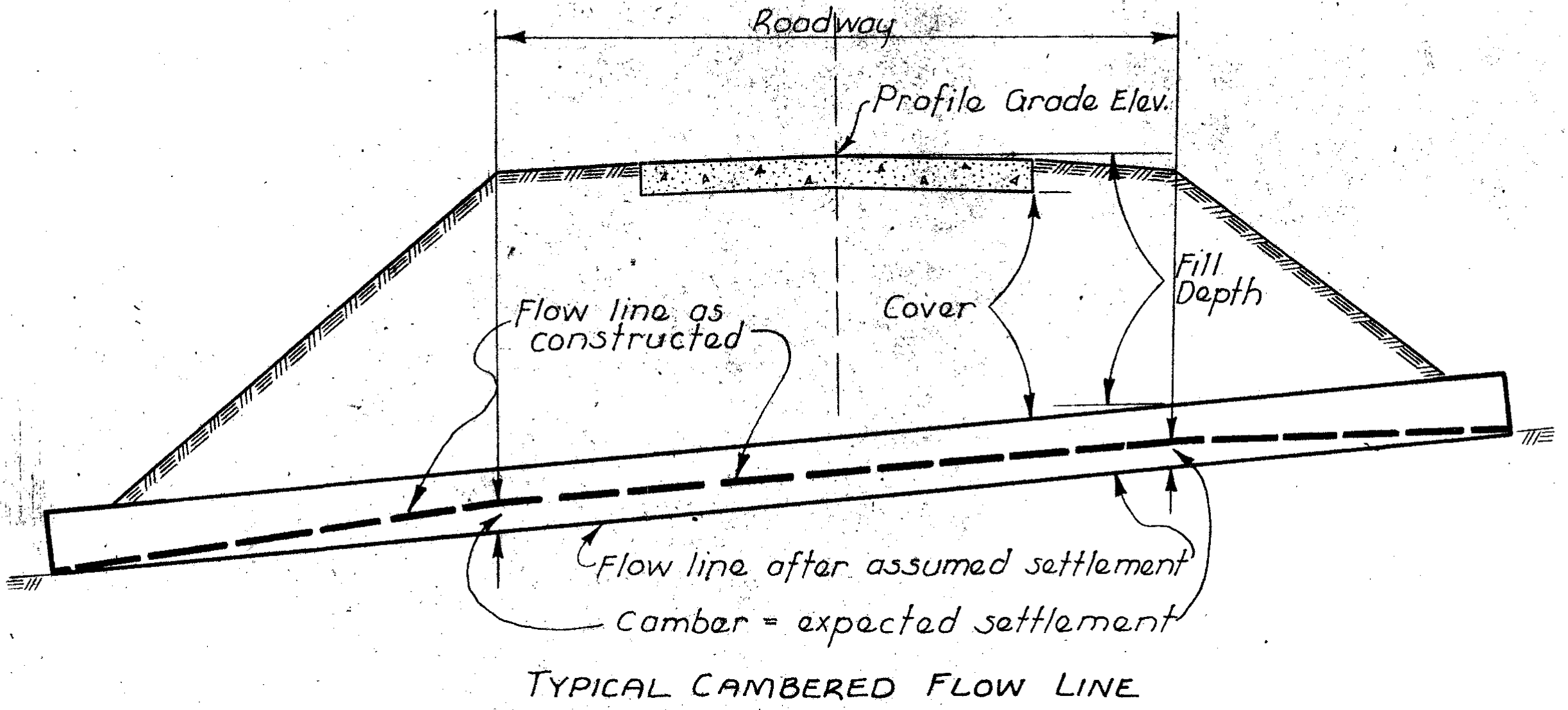
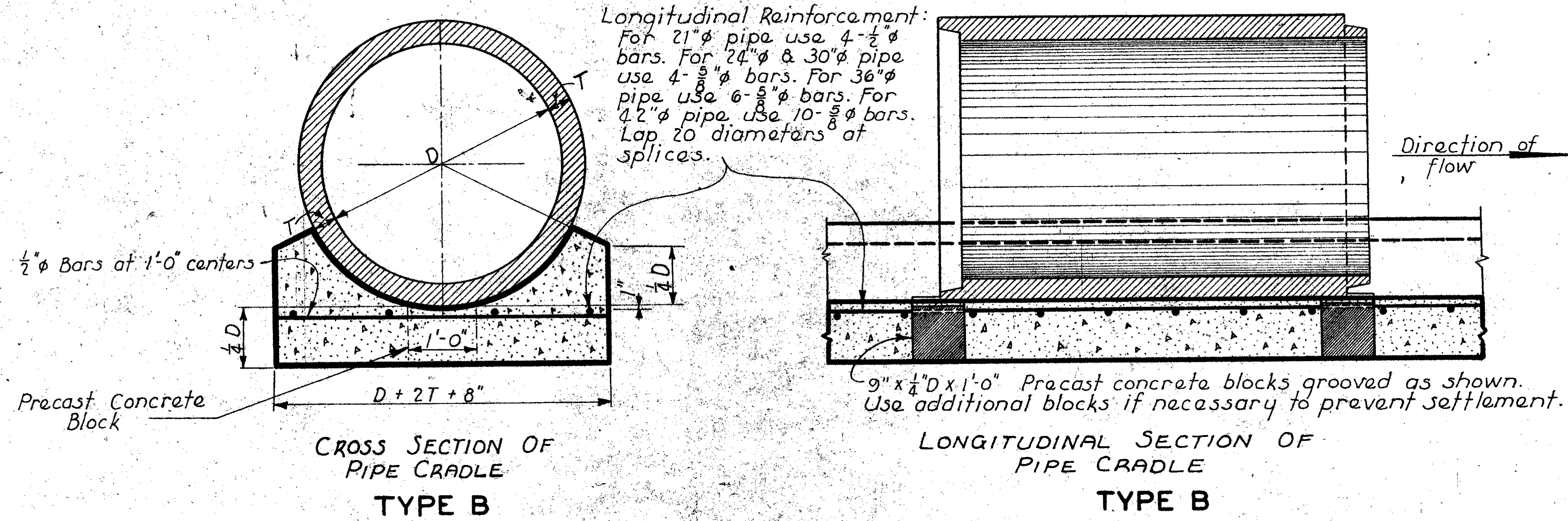
7-1-61 NEW ISSUE
DATE REVISIONS APP.

[THIS DESIGN SUPERSEDES STANDARD F-2 DATED JAN. 1938]

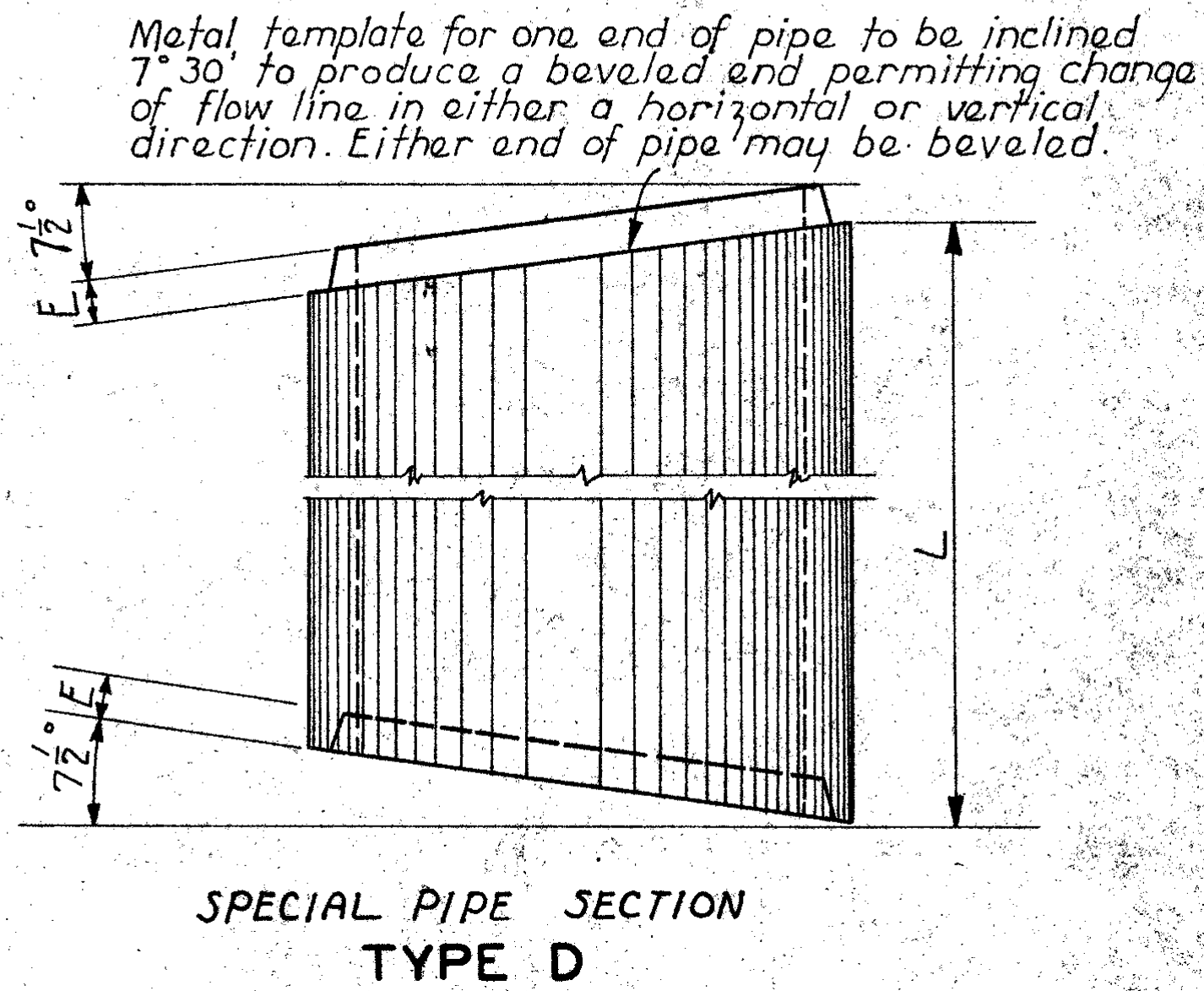
Poweshiek Co. I Proj. No. 80-5(29)108

Sheet No. 19

FED. ROAD DIST. NO.	STATE	PROJ. NO.	YEAR	SHEET NO.	TOTAL SHEETS
5	IOWA	80-5(29)	1988	21	104



Note: On yielding soil, pipe should be placed on a cambered flow line. Values for camber are average and should be varied with soil conditions.



CLASS PIPE	DEPTH TABLE			
	NORMAL		IMPERFECT TRENCH	
	MAX. FILL	MIN. COVER	MAX. FILL	MIN. COVER
1500 D	15'	6"	20'	6"
2000 D	20'	1'	28'	1'
3000 D	30'	2'	42'	2'

FILL	CAMBER
5'	.08'
10'	.17'
15'	.25'
20'	.33'
25'	.42'
30'	.50'
35'	.58'

GENERAL NOTES:

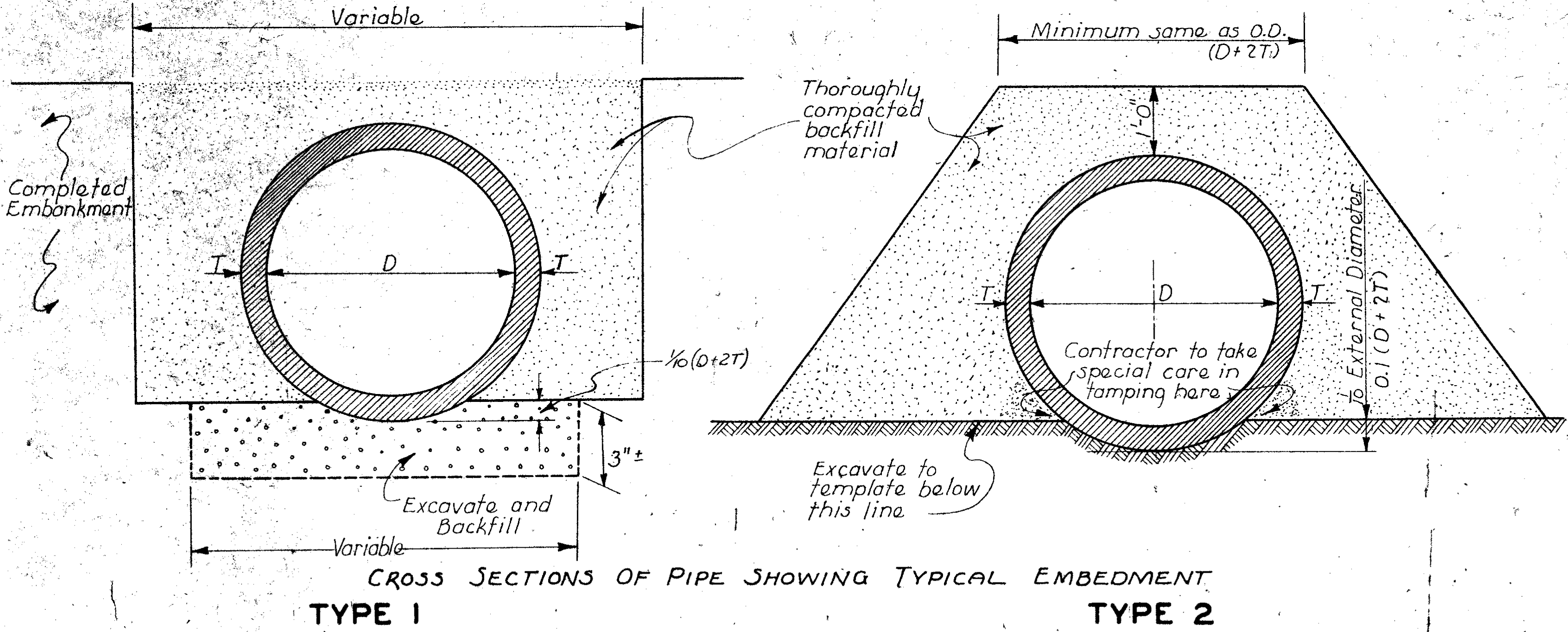
Pipe of the 1500 D Class may be used for entrance culverts only. Pipe of the 2000 D and 3000 D Class may be used for roadway culverts, or for farm entrance culverts, where the fill conditions require pipe of this class. See Standard RF-1 for details of pipe.

In general, pipe laying is to proceed upstream, starting at outlet and with tongue (top) end always downstream.

Where available, boulders or old concrete may be used to pave outlet and lay up rubble headwalls.

All material and construction to conform to the current Standard Specifications of the Iowa State Highway Commission.

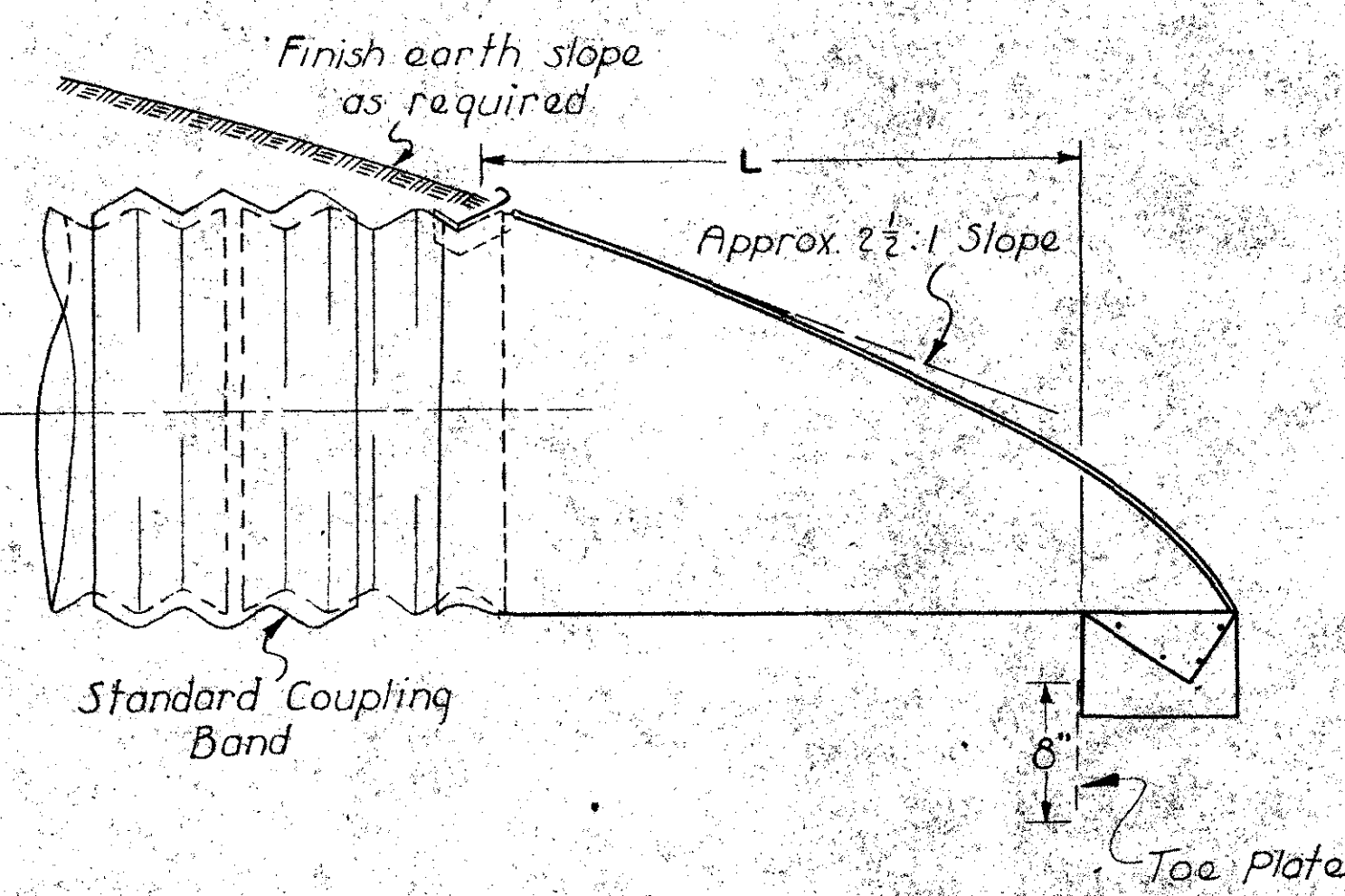
Maximum depth of fills may be made 75% greater than given in maximum depth table by using pipe cradles. For type B the pipe is to be supported in correct alignment on precast concrete blocks before concrete is placed. The concrete is to be carefully worked under the pipe to secure complete embedment and prevent formation of air pockets.



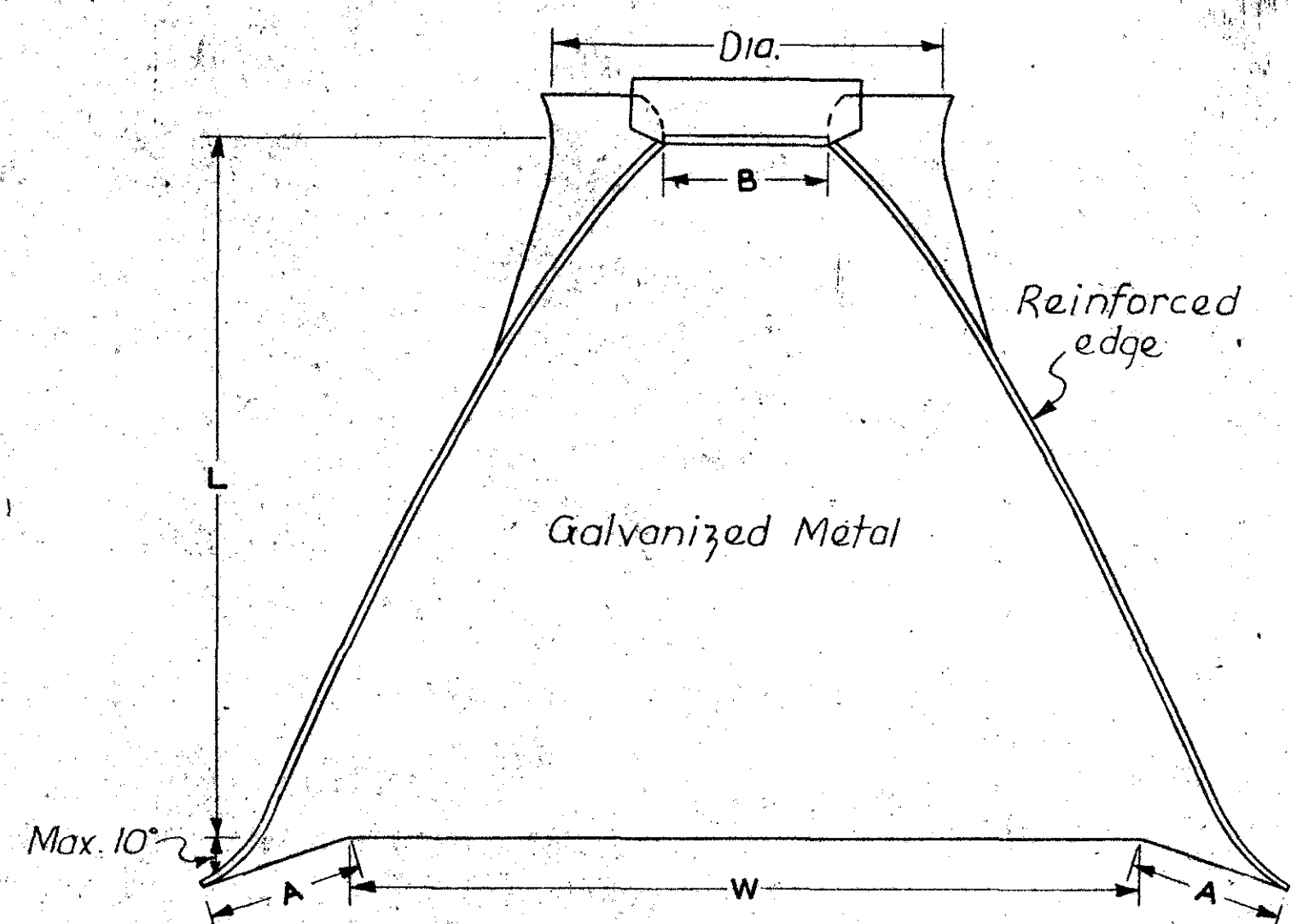
7-1-61	NEW ISSUE	
DATE	REVISIONS	APP.

IOWA HIGHWAY COMMISSION	
STANDARD ROAD PLAN RF-4	
RECOMMENDED	<i>R. P. McLaughlin</i> 11/16/60 ENGINEER DATE
	<i>D. E. McLaughlin</i> 1-4-61 DESIGN COMMITTEE DATE
APPROVED	<i>L. M. Clauson</i> 2-9-61 CHIEF ENGINEER DATE
CONCRETE PIPE CULVERT DETAILS	

FILE NO.	DATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	10/1/61	80-5(29)	1960	22A	104

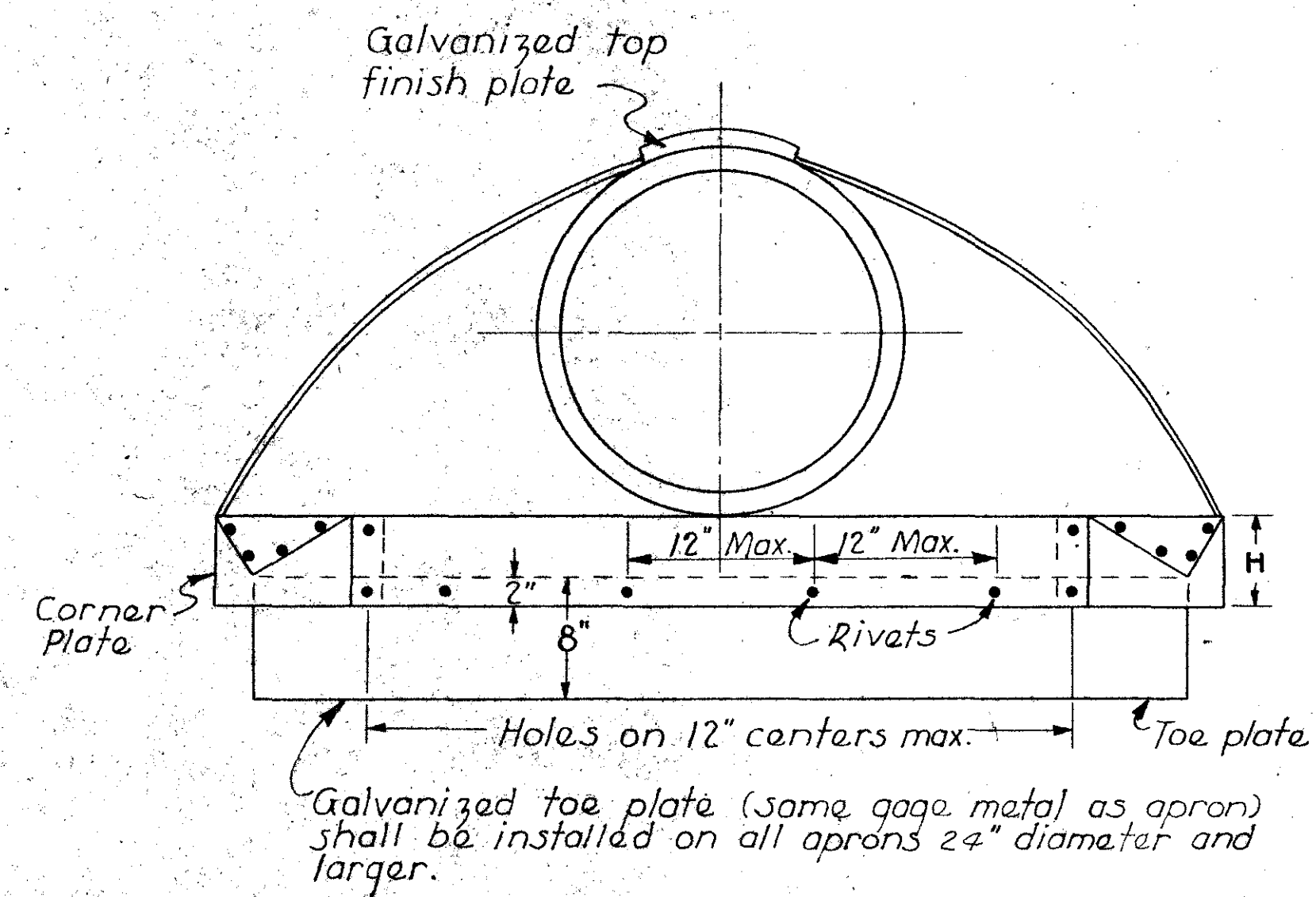


NOTE:
The apron shall be attached to the pipe section by any approved method of bolts or clamps which will securely connect the two.
All parts shall be galvanized and any damage shall be treated as in Section 414.1 of current Standard Specifications.

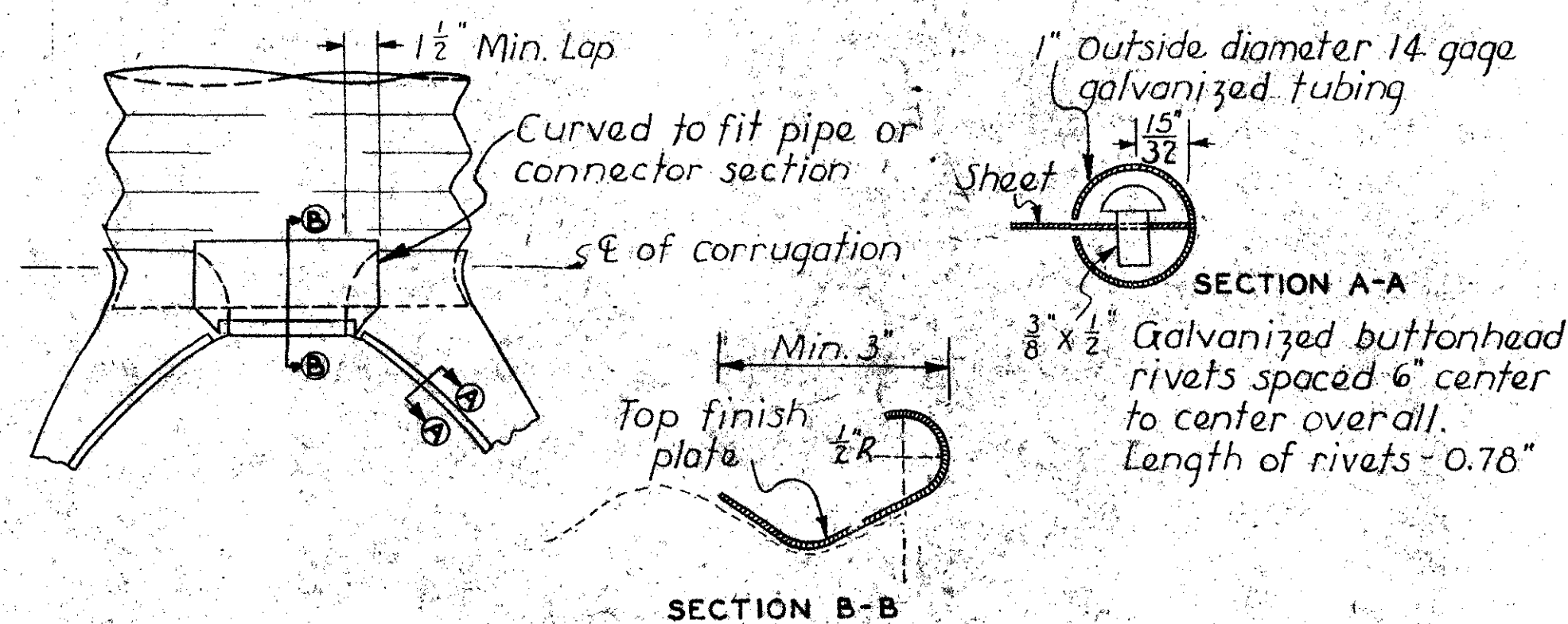


NOTE:
Approval of pipe culvert installations requiring aprons shall be limited to locations other than private or commercial entrances.

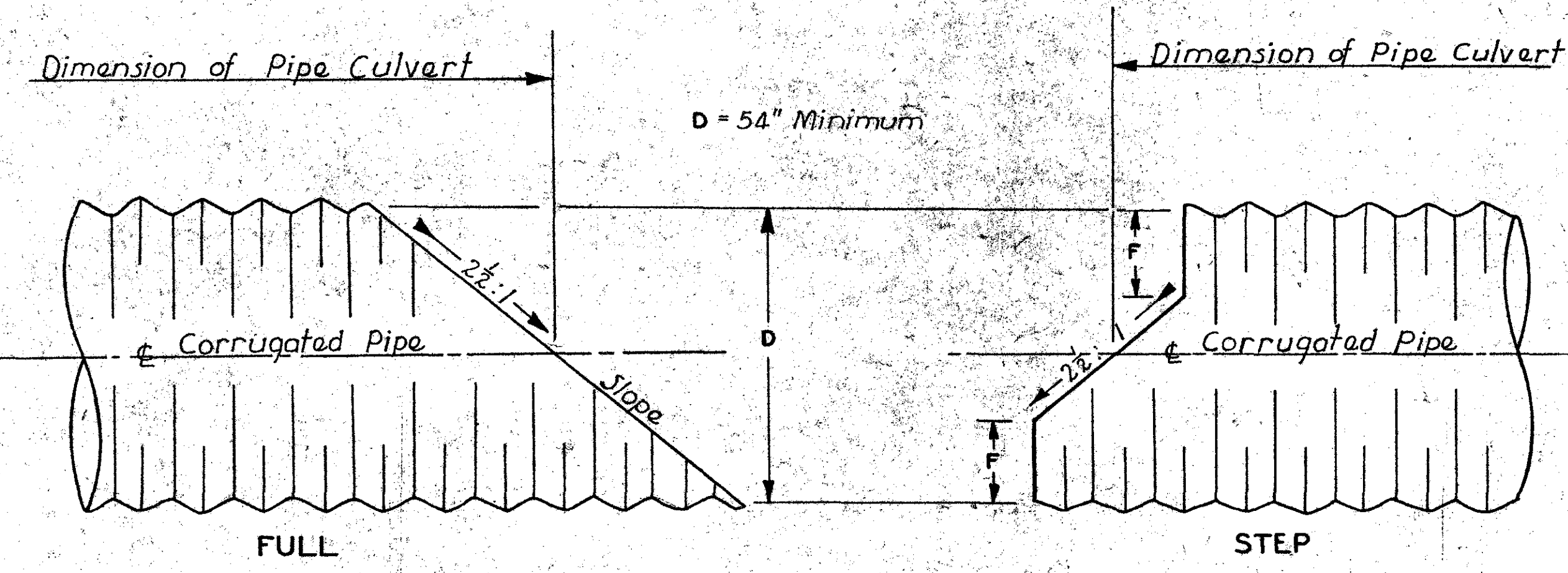
PIPE DIAM.	GAGE	DIMENSIONS				
		A 1 1/2"	B MAX.	H 1 1/2"	L 1 1/2"	W 2 1/2"
12"	16	4 3/4"	6"	6"	21"	24"
15"	"	6"	8"	"	26"	30"
18"	"	7"	9"	"	31"	36"
21"	"	8 1/4"	11"	"	36"	42"
24"	14	9 1/2"	12"	"	42"	48"
30"	"	12"	15"	7 1/2"	52 1/2"	60"
36"	12	14"	18"	9"	63"	72"
42"	"	16"	21"	10 1/2"	73 1/2"	84"
48"	"	18"	21"	12"	84"	90"



NOTE: Corner plates and toe plates may be attached by riveting or welding. Welds shall be treated as in Section 414.05 of the current specifications.



NOTE: The "top finish plate" shall be corrugated to fit into the valley of the end corrugation of the pipe. The plate shall be held firm to the apron and pipe end by suitable clamp or bolt arrangement. The plate shall be 16 gage minimum.

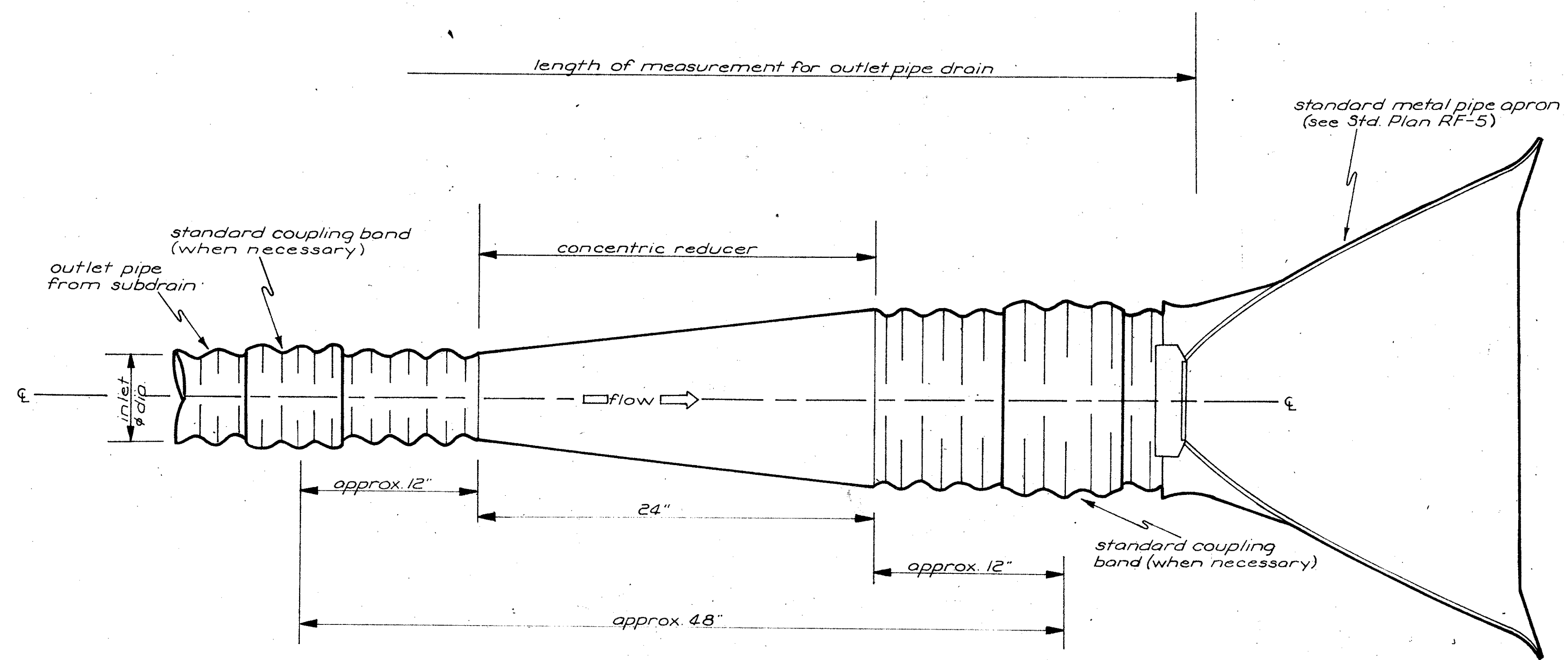


D	F
54"	3"
60"	6"
66"	9"
72"	12"
78"	15"
84"	18"

BEVELED ENDS FOR CORRUGATED METAL PIPE
Beveled ends may be used on corrugated pipes larger than 48" in diameter. Either step or full bevel may be used unless one type is specified.

IOWA HIGHWAY COMMISSION		
STANDARD ROAD PLAN RF-5		
RECOMMENDED	<i>R.D. M. Lee</i>	11-3-61
	DESIGN COMMITTEE	DATE
	<i>R.P. McLaughlin</i>	11/16/60
	ROAD ENGINEER	DATE
APPROVED	<i>L.M. Chasman</i>	12-18-61
	CHIEF ENGINEER	DATE
METAL PIPE APRONS & BEVELED ENDS		

DATE	REVISIONS	APP.
6-1-61	Beveled Ends added	R.D.
5-8-61	24" toe plate	J.P.M.



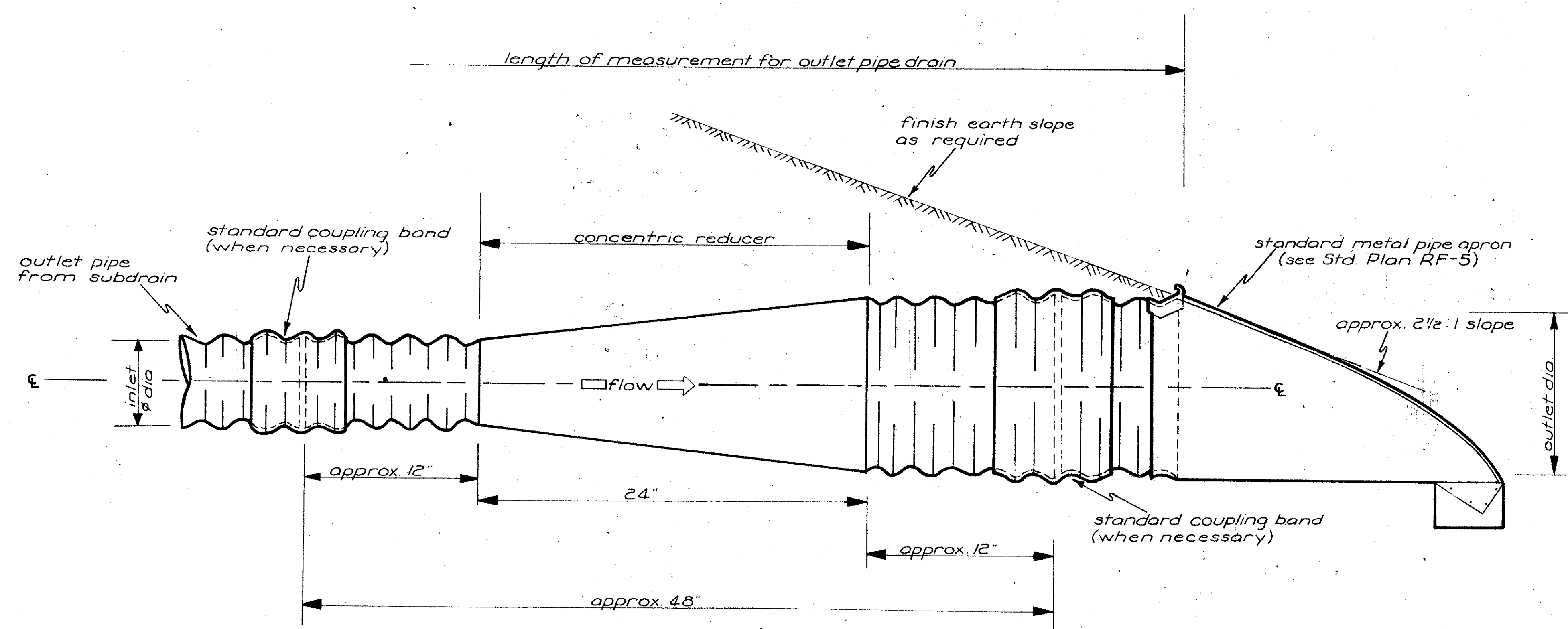
NOTE:

The reducer shall be attached to the appropriate pipe sections by any approved method of bolts, clamps, or welding, which will securely connect the two.

All parts shall be galvanized according to current specifications for corrugated metal culvert pipe and any damage shall be treated as in Section 4141 of current Standard Specifications.

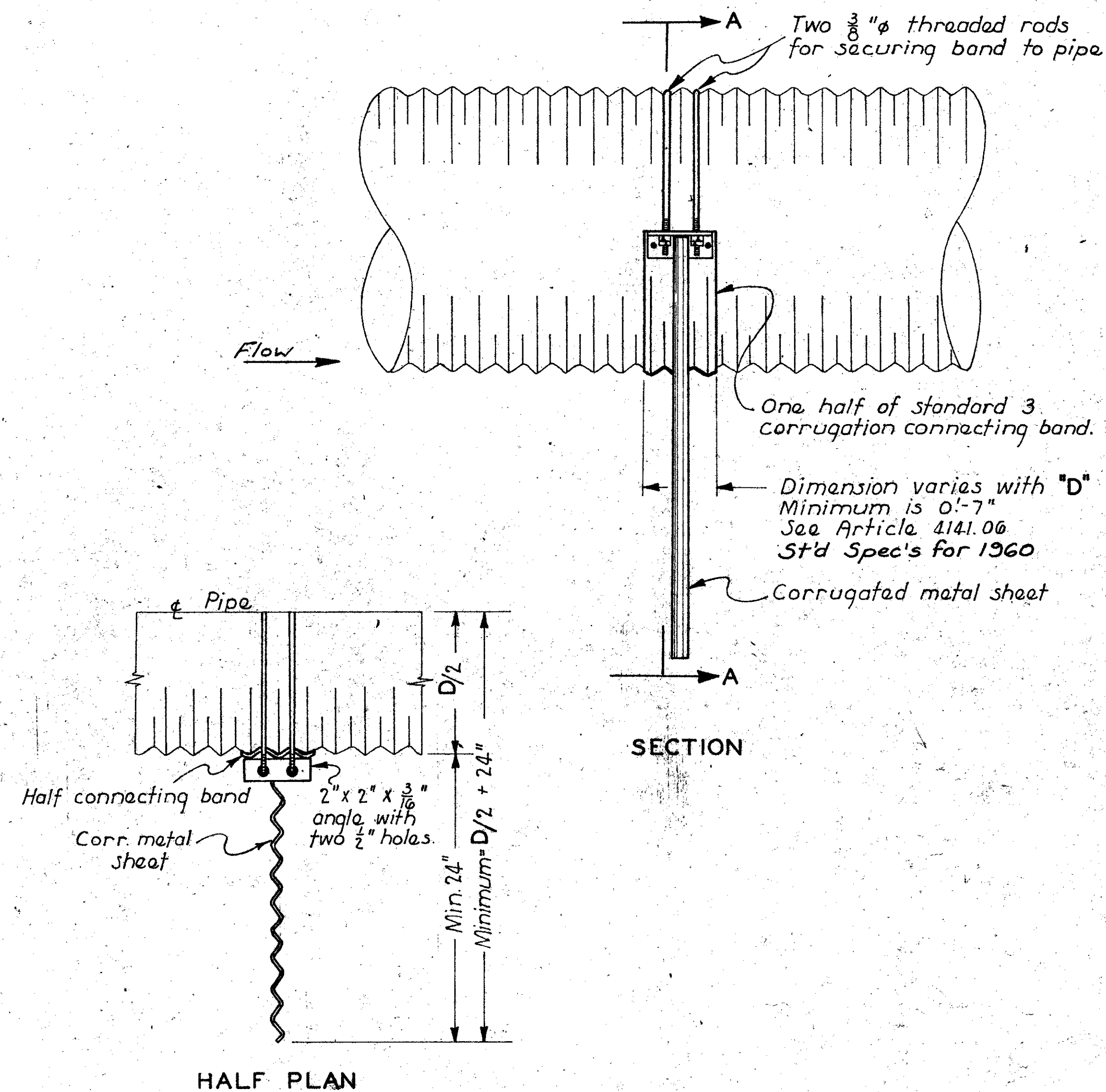
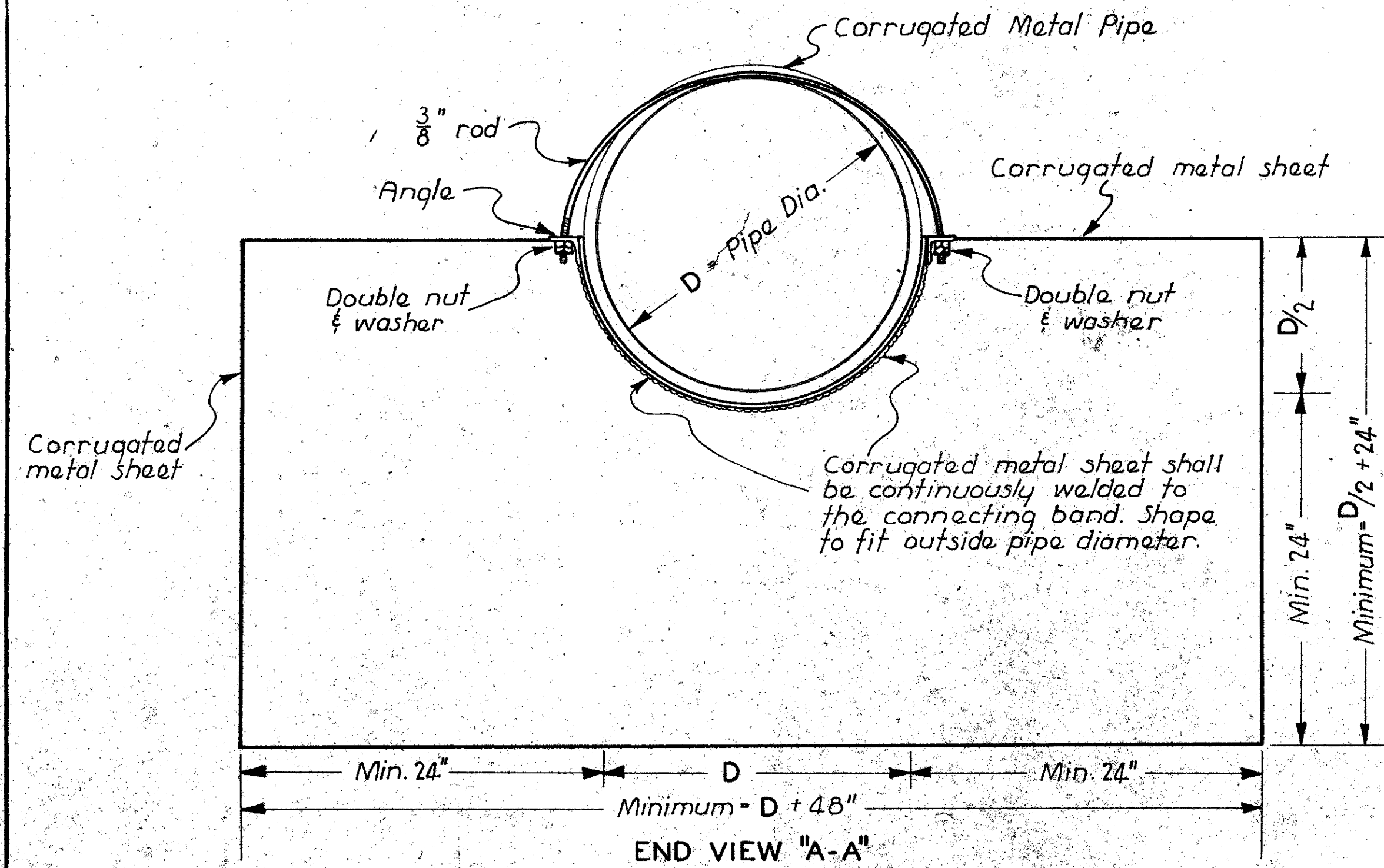
Price bid for reducer shall be full compensation for furnishing all necessary material and installing as indicated hereon. Length of reducer shall not be deducted from length of line of outlet pipe.

Unless otherwise indicated within detail plans, subdrain outlet pipe will be 6"Ø, reducer shall be 6"-12" size and apron for outlet will be 12" size.



IOWA HIGHWAY COMMISSION		
STANDARD ROAD PLAN		RF-12
RECOMMENDED	ROAD ENGINEER	DATE
	DESIGN COMMITTEE	DATE
APPROVED	CHIEF ENGINEER	DATE
CONCENTRIC METAL PIPE REDUCER		

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IOWA	80-5(29)188		23	104



Type A Diaphragm is an anti-seep device for use on let-down structures and shall be installed directly below the upstream shoulder of the dike.

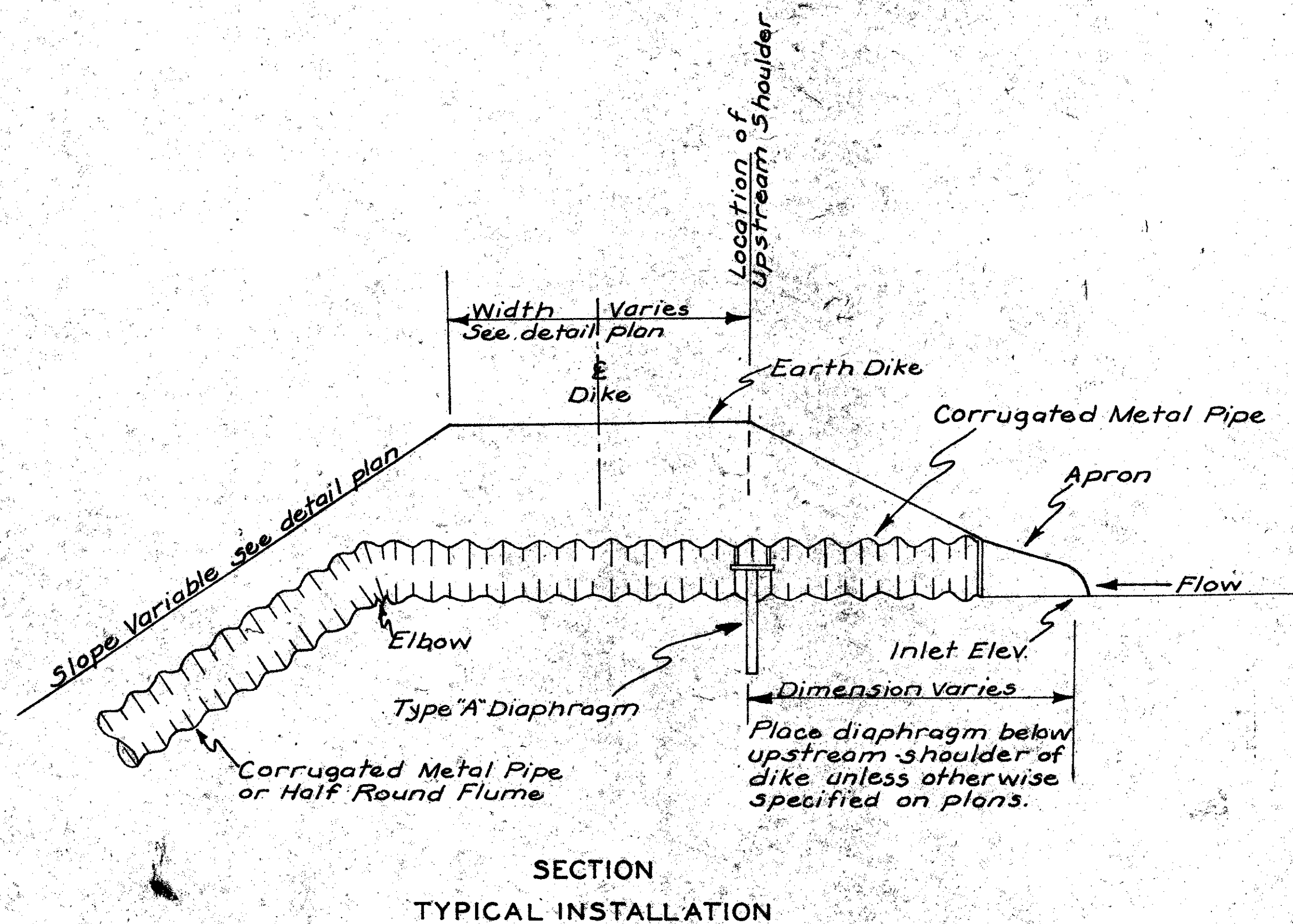
Type A Diaphragm shall consist of a sheet of corrugated metal of the dimensions indicated hereon and of the following weights:

18" to 48" incl. - 14 gage
54" to 72" incl. - 10 gage

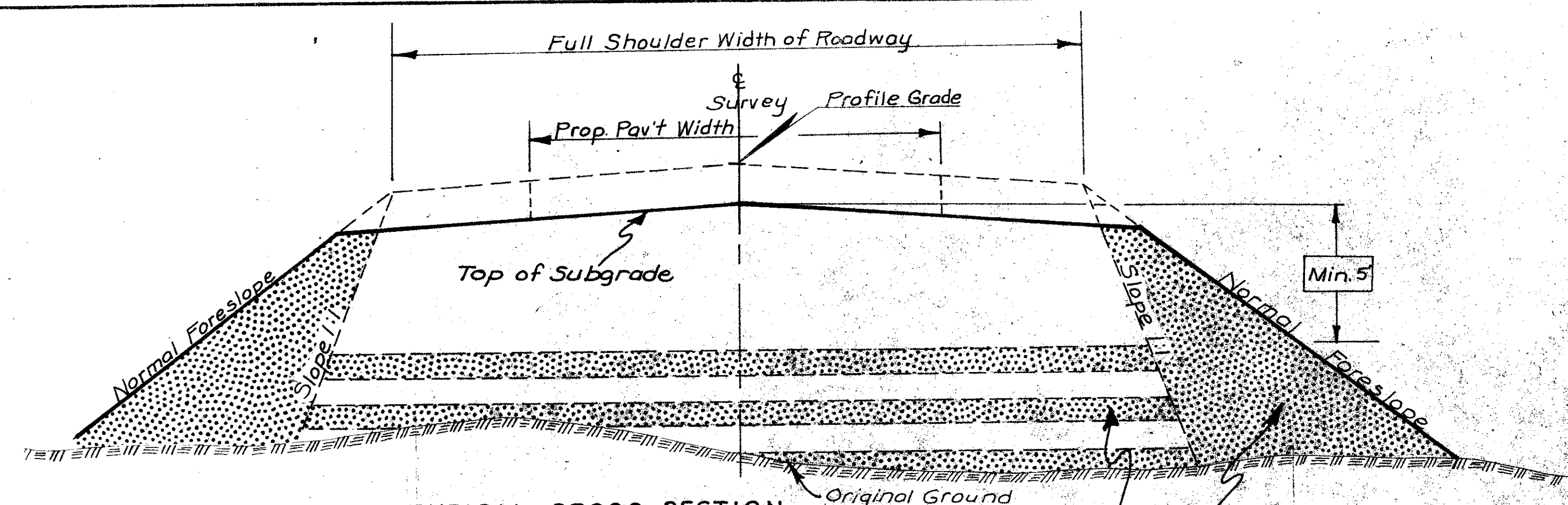
This sheet may be fabricated from one or more sheets of corrugated metal. If two or more sheets are used, they shall be lapped a minimum of two corrugations and welded or riveted at 3" centers along the seam. The sheet shall be welded on both sides to a standard half connecting band of the dimensions indicated hereon. This assembly shall then be securely attached to the pipe by means of two 3/8" rods of appropriate length placed in two adjacent valleys of the corrugated pipe and threaded with double nut and washer.

Bid price for "Type A Diaphragm" shall include furnishing all material and labor necessary as well as any excavation, backfilling, or other work required to complete the installation as indicated hereon.

Section 4141 of the 1960 Standard Specifications shall apply to construction of the "Type A Diaphragm".



IOWA HIGHWAY COMMISSION		
STANDARD ROAD PLAN RF-7		
RECOMMENDED	<i>J. P. McLaughlin</i> ROAD ENGINEER	DATE
	<i>D. M. Ryan</i> DESIGN COMMITTEE	11-3-61 DATE
APPROVED	<i>L. M. Johnson</i> CHIEF ENGINEER	12-28-61 DATE
CORRUGATED METAL TYPE "A" DIAPHRAGM		



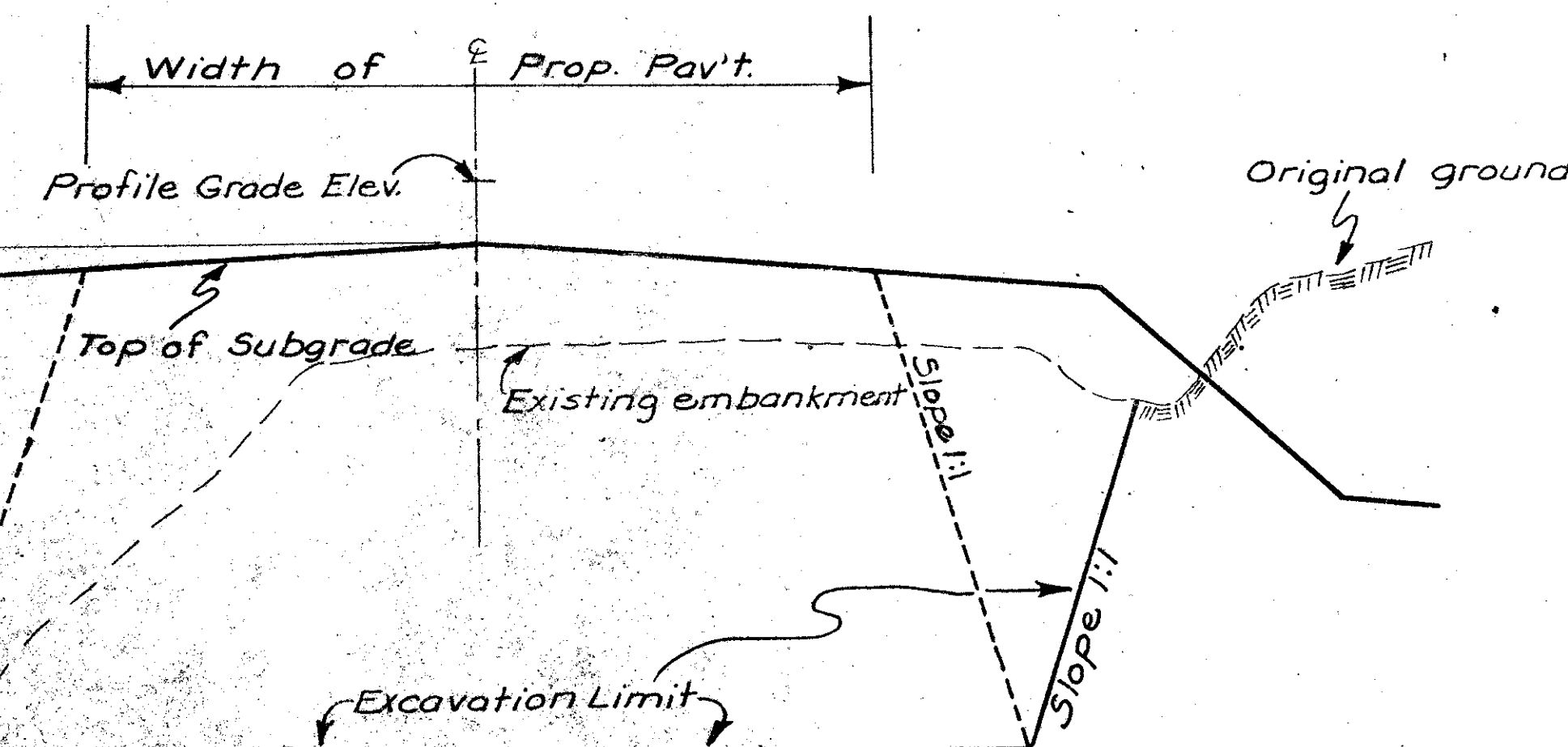
TYPICAL CROSS SECTION FOR DISPOSAL OF SHALE OR MATERIAL DESIGNATED A-7-5 OR A-5 IN THE AASHO SOILS CLASSIFICATION.

Disposal Area (as per Art. 210.703)

Typical method for constructing toe fill
10' per ft.
Note: Care should be exercised in setting toe fills so that proper drainage in side ditches is maintained.

N = MAXIMUM 5'-0"

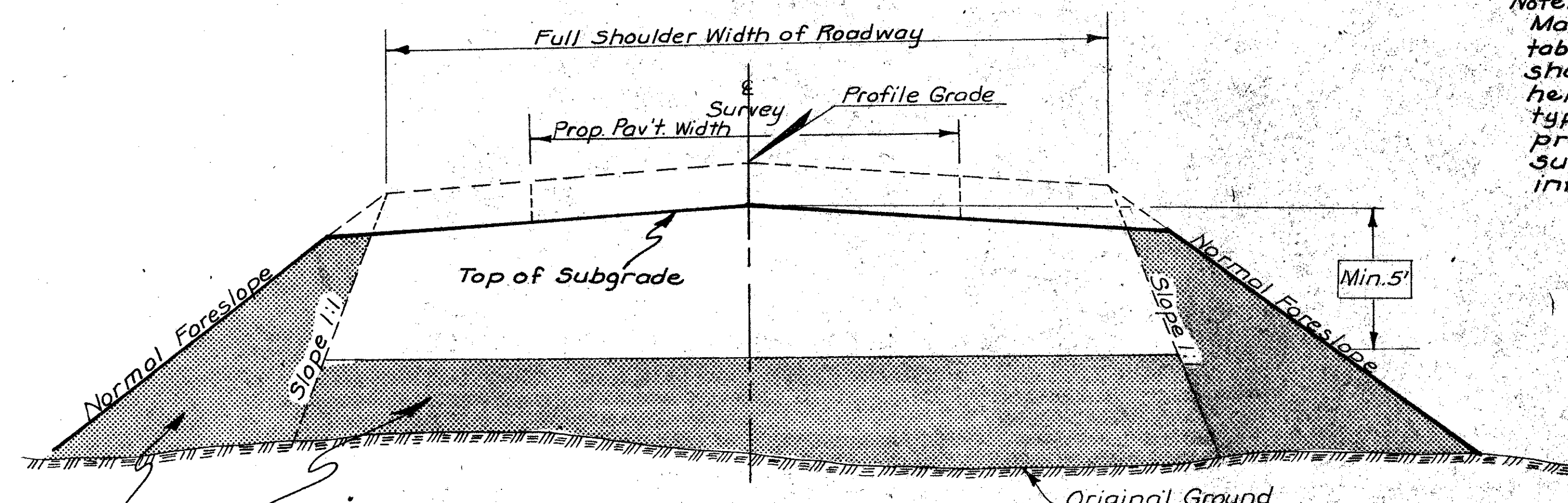
Note: Material listed as "unsuitable" in the tabulation of earthwork quantities shall be disposed of as detailed hereon for the particular soil types identified. Refer also to the project cross sections & plan soil survey sheets for additional information.



TYPICAL CROSS SECTION REBUILDING EMBANKMENTS (PLOWING & SHAPING)

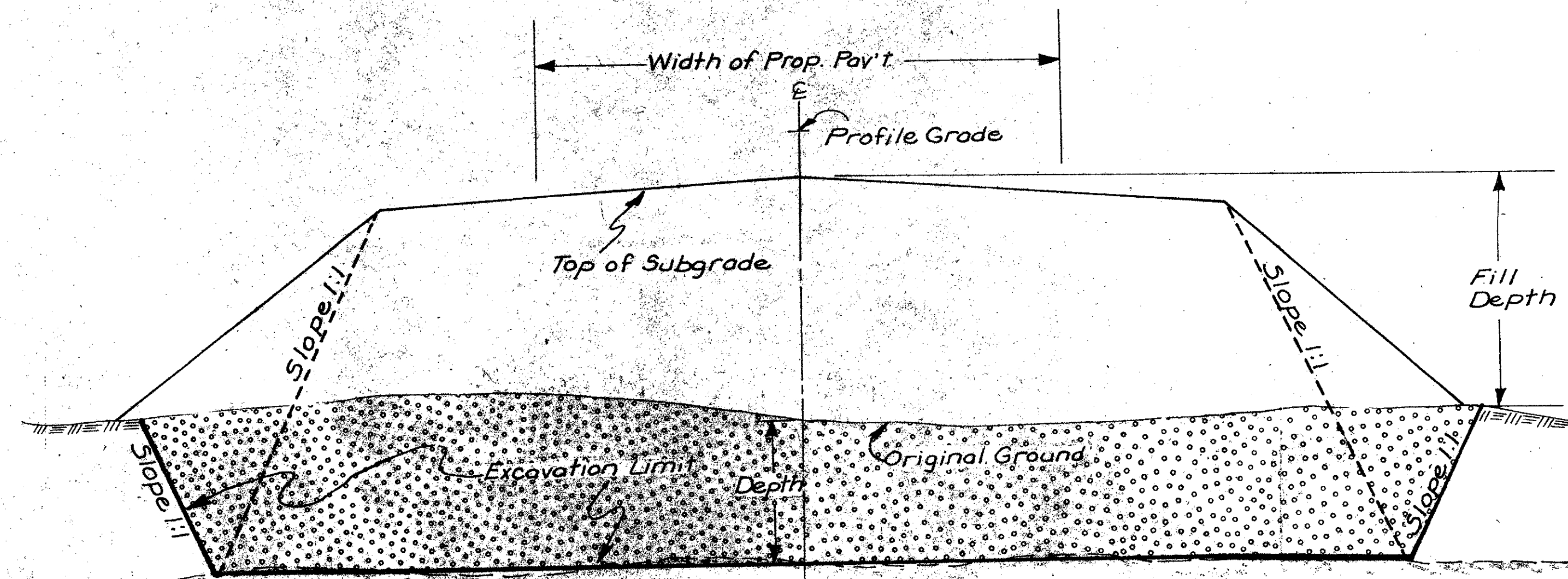
Note: Material excavated in rebuilding embankments may be redeposited in the same area or any adjacent embankment approved by the engineer. No payment for overhaul will be allowed on material excavated in "Rebuilding Embankments".

Excavate from grade down on 1:1 slope to natural ground or to five feet below grade which ever is less. This will insure that new pavement will rest completely on uniformly stable bearing soil. Rebuild embankments only when new roadbed overlaps an existing roadbed. Do not use this type section on relocations or where new roadbed is placed on natural ground.



TYPICAL CROSS SECTION FOR DISPOSAL OF GUMBOTIL OR MATERIAL DESIGNATED A-7-6 (19 TO 20) IN THE AASHO SOILS CLASSIFICATION.

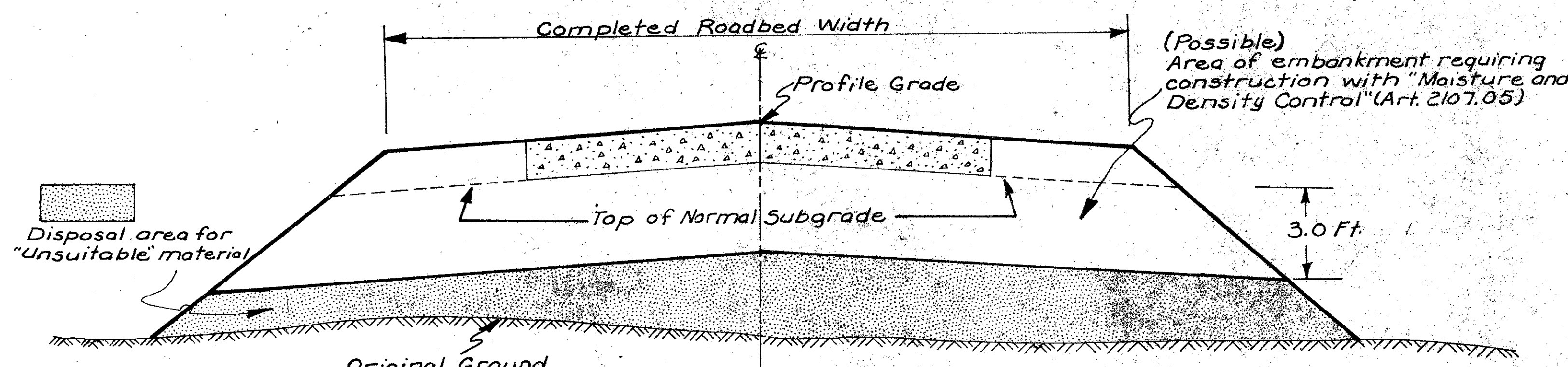
Disposal Area



TYPICAL CROSS SECTION EXCAVATION OF WASTE MATERIAL

REFER TO DETAIL CROSS SECTIONS FOR DEPTHS AND LIMITS OF EXCAVATION AND TO QUANTITY LISTINGS & BALANCES FOR DISTRIBUTION OF MATERIAL.

PEAT & MUCK OR OTHER MATERIAL WHICH MUST BE WASTED AND IN NO CASE USED IN CONSTRUCTION OF EMBANKMENT.

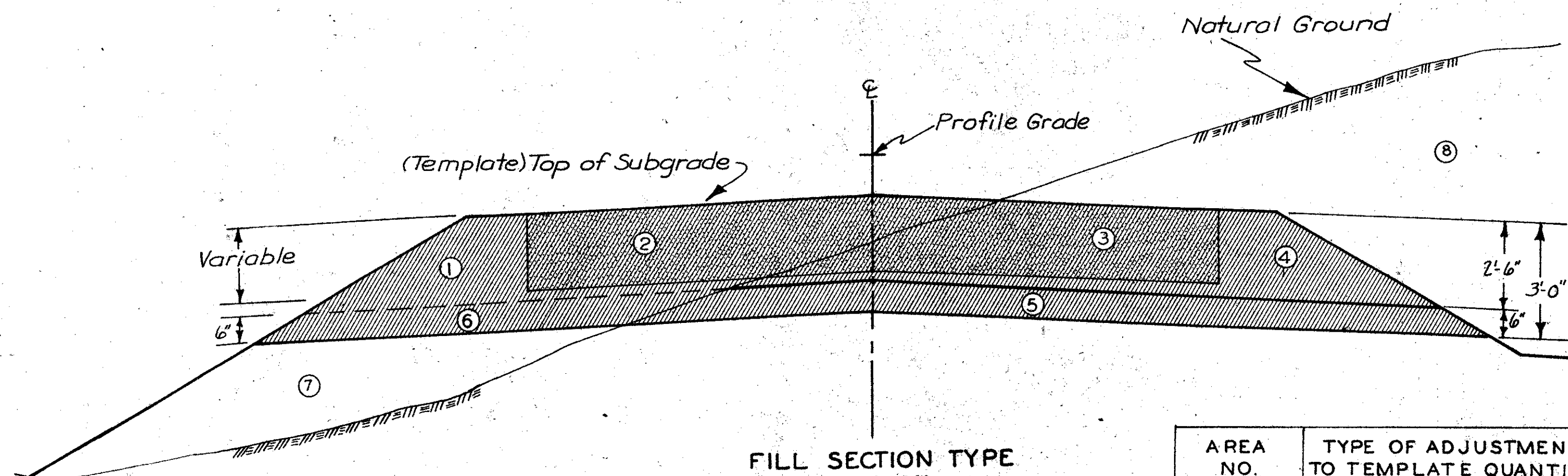


TYPICAL CROSS SECTION FOR DISPOSAL OF SOILS, CLASSIFIED BY COLOR AS BLACK OR BROWNISH BLACK IN THE AASHO SOIL CLASSIFICATION A-4, A-6, OR A-7-6; UNSUITABLE FOR USE IN CONSTRUCTION OF THE UPPER 3 FT. OF ANY EMBANKMENTS.

REFER TO QUANTITY LISTING AND BALANCES FOR DETAILS OF DISTRIBUTION OF "UNSUITABLE" MATERIAL

DISPOSAL OF SOILS, CLASSIFIED BY COLOR AS BLACK OR BROWNISH BLACK IN THE AASHO SOIL CLASSIFICATION A-4, A-6, OR A-7-6; UNSUITABLE FOR USE IN CONSTRUCTION OF THE UPPER 3 FT. OF ANY EMBANKMENTS.

IOWA HIGHWAY COMMISSION	
STANDARD ROAD PLAN RL-1	
RECOMMENDED	R.P. McLaughlin 11-16-61 ROAD ENGINEER DATE
DESIGN COMMITTEE	DATE
APPROVED	CHIEF ENGINEER DATE
DETAILS OF EMBANKMENTS (DISPOSAL OF UNSUITABLE MATERIAL)	

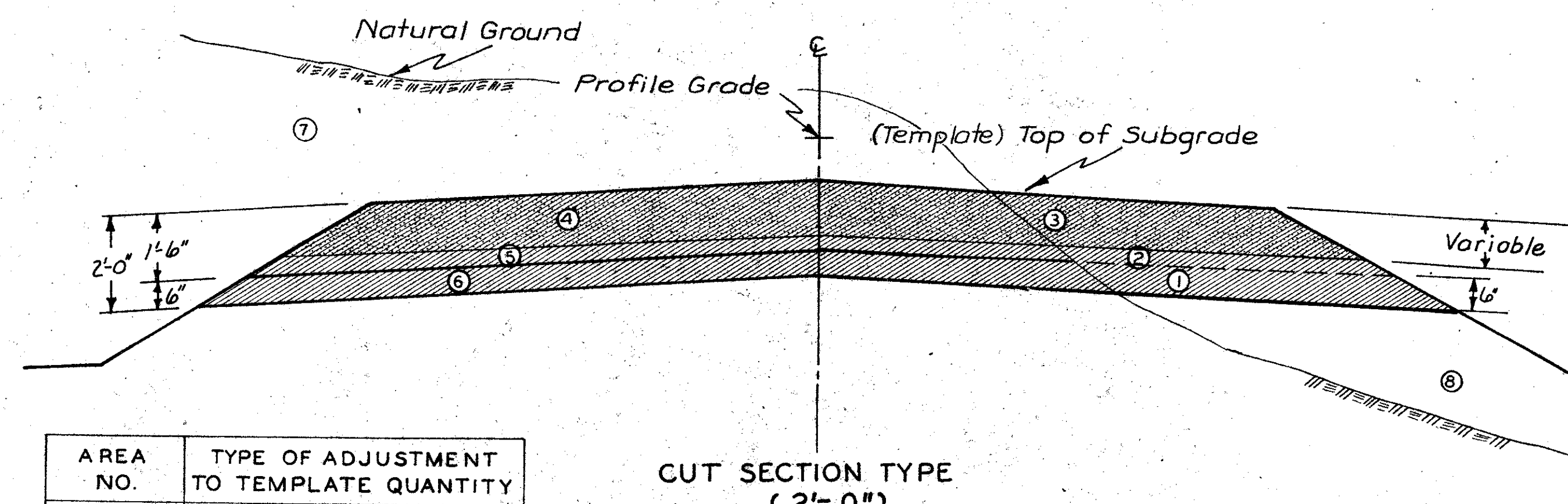


FILL SECTION TYPE
(3'-0")

WITH TRENCH TREATMENT
TREATMENT LESS THAN THICKNESS
OF MOISTURE & DENSITY CONTROL

TYPE WORK	AREA NO.
EXCAVATION	8,4,3
EMBANKMENT	7
M&D EMBANKMENT (90%)	6
SCARIFY WITH M&D EMB. (90%)	5
M&D EMBANKMENT (95%)	1,2,3,4
SUBGRADE TREATMENT	2,3
PAY AREA M&D EMBANKMENT	1,2,3,4,5,6

AREA NO.	TYPE OF ADJUSTMENT TO TEMPLATE QUANTITY
1	NONE
2	- FILL
3	+ CUT
4	+ CUT, + FILL & SHRINK
5	+ F (SHRINKAGE ONLY)
6	NONE



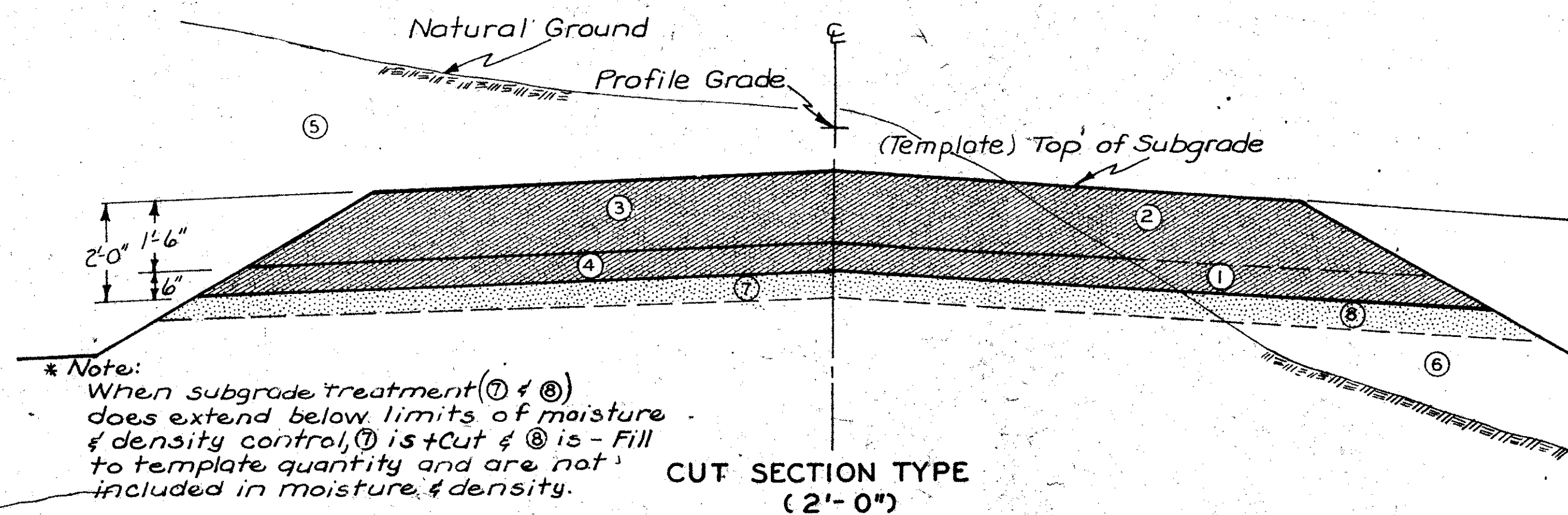
CUT SECTION TYPE
(2'-0")

WITH FULL WIDTH TREATMENT
TREATMENT LESS THAN THICKNESS
OF MOISTURE & DENSITY CONTROL

AREA NO.	TYPE OF ADJUSTMENT TO TEMPLATE QUANTITY
1	NONE
2	NONE
3	- FILL
4	+ CUT
5	+ CUT, + FILL & SHRINK
6	+ F (SHRINKAGE ONLY)

TYPE WORK	AREA NO.
EXCAVATION	7,4,5
EMBANKMENT	8
M&D EMBANKMENT (90%)	1
SCARIFY WITH M&D EMB. (90%)	6
M&D EMBANKMENT (95%)	2,3,4,5
SUBGRADE TREATMENT	3,4
PAY AREA M&D EMBANKMENT	1,2,3,4,5,6

General Information regarding "Construction of Embankment with Moisture and Density Control" (Art 210705).
1. Fill Section type 3'0" in depth shall normally be used when profile grade is above existing ground at roadway.
2. Cut Section type 2'0" in depth shall normally be used when profile grade is below existing ground at roadway.
3. Moisture and Density Control shall be at a uniform depth for the complete width of a roadway.
4. Minimum length for use of either type shall be 50ft.



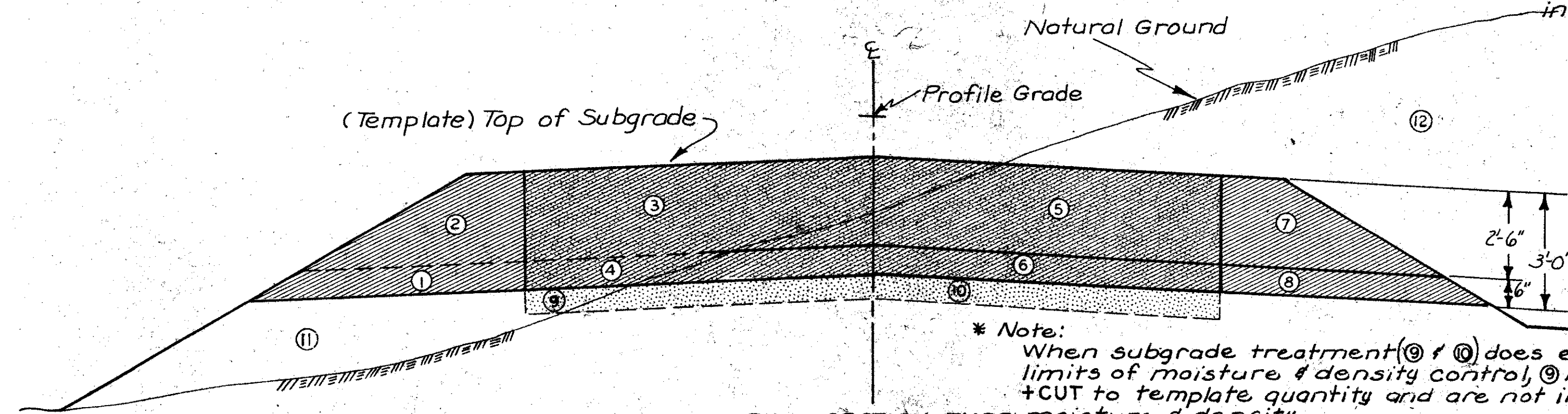
* Note: When subgrade treatment (1 & 8) does extend below limits of moisture & density control, 1 is + CUT & 8 is - FILL to template quantity and are not included in moisture & density.

CUT SECTION TYPE
(2'-0")

WITH FULL WIDTH TREATMENT
TREATMENT SAME THICKNESS
OR MORE THAN THICKNESS OF
MOISTURE & DENSITY CONTROL

AREA NO.	TYPE OF ADJUSTMENT TO TEMPLATE QUANTITY
1	- FILL
2	- FILL
3	+ CUT
4	+ CUT

TYPE WORK	AREA NO.
EXCAVATION	3,4,5
EMBANKMENT	6
M&D EMBANKMENT (90%)	1,4
M&D EMBANKMENT (95%)	2,3
SUBGRADE TREATMENT *	1,2,3,4
PAY AREA M&D EMBANKMENT	1,2,3,4



* Note: When subgrade treatment (1 & 8) does extend below limits of moisture & density control, 1 is - FILL & 8 is + CUT to template quantity and are not included in moisture & density.

FILL SECTION TYPE
(3'-0")

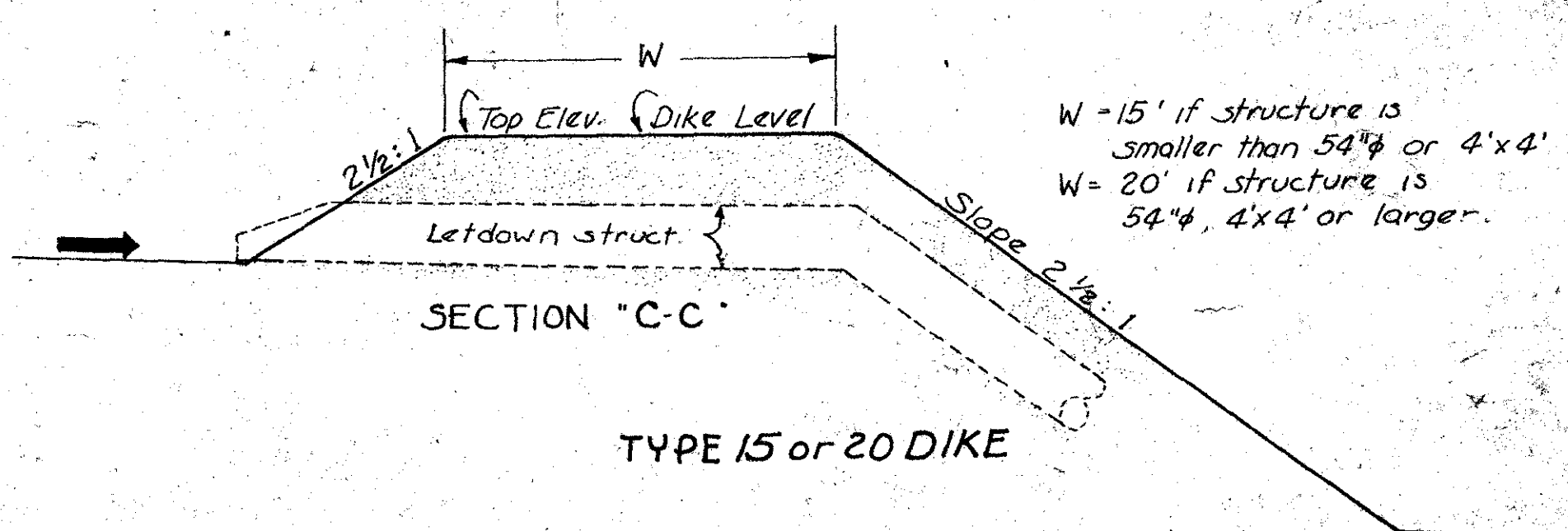
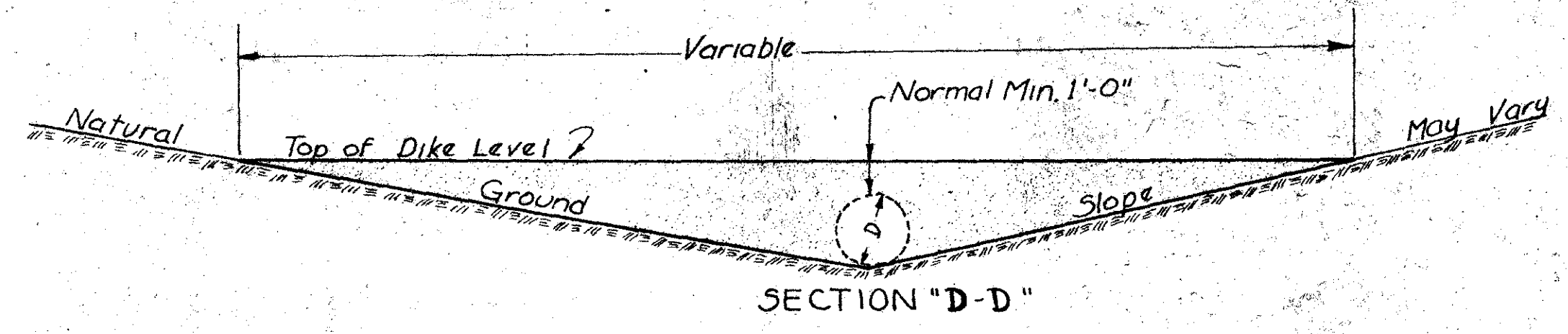
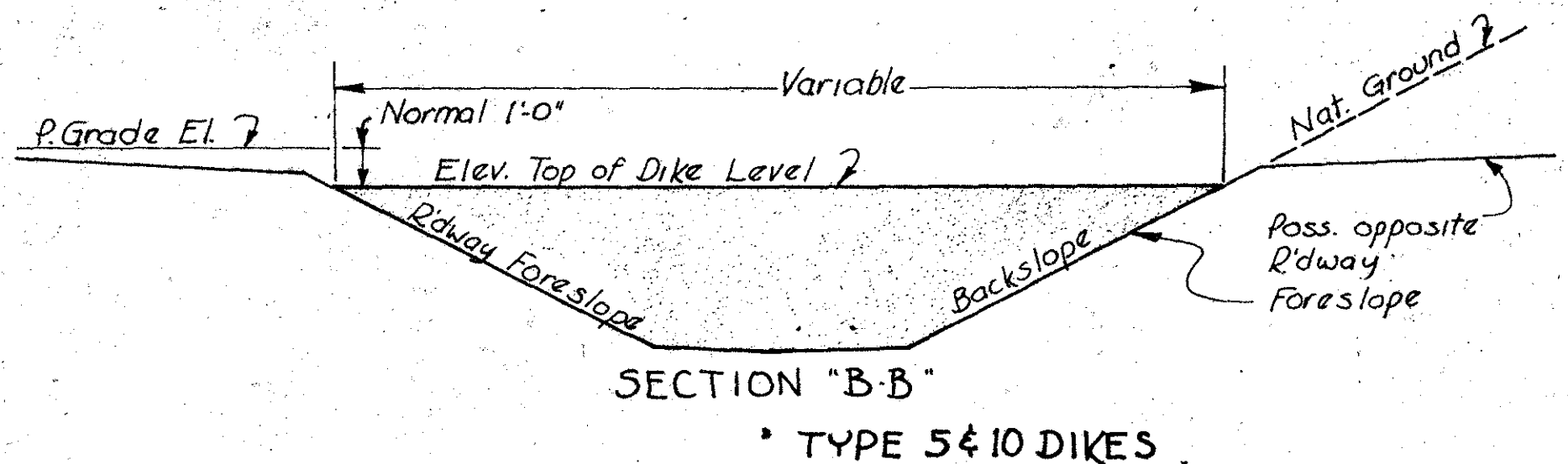
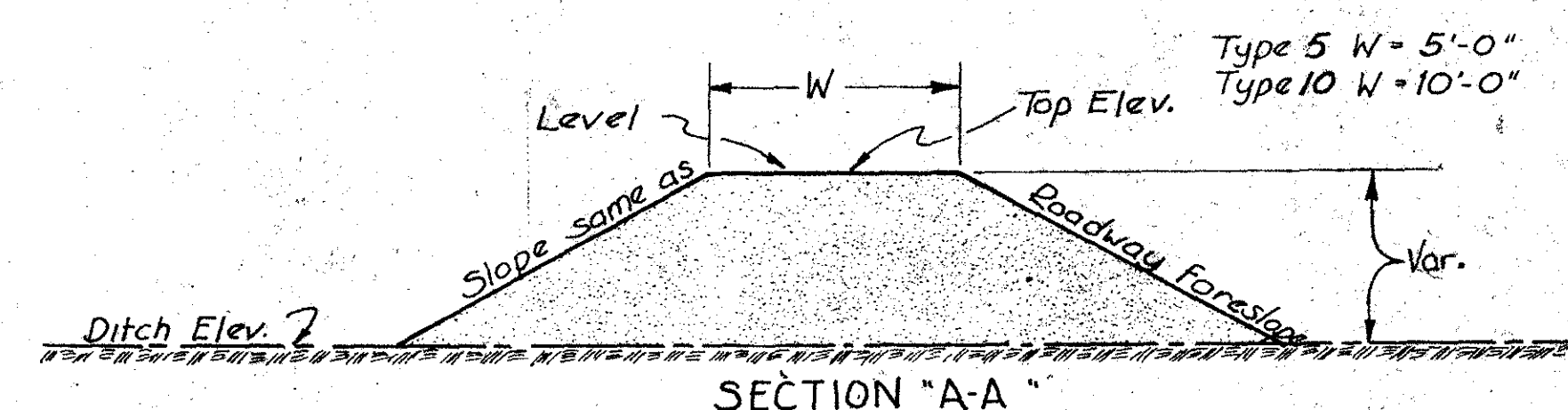
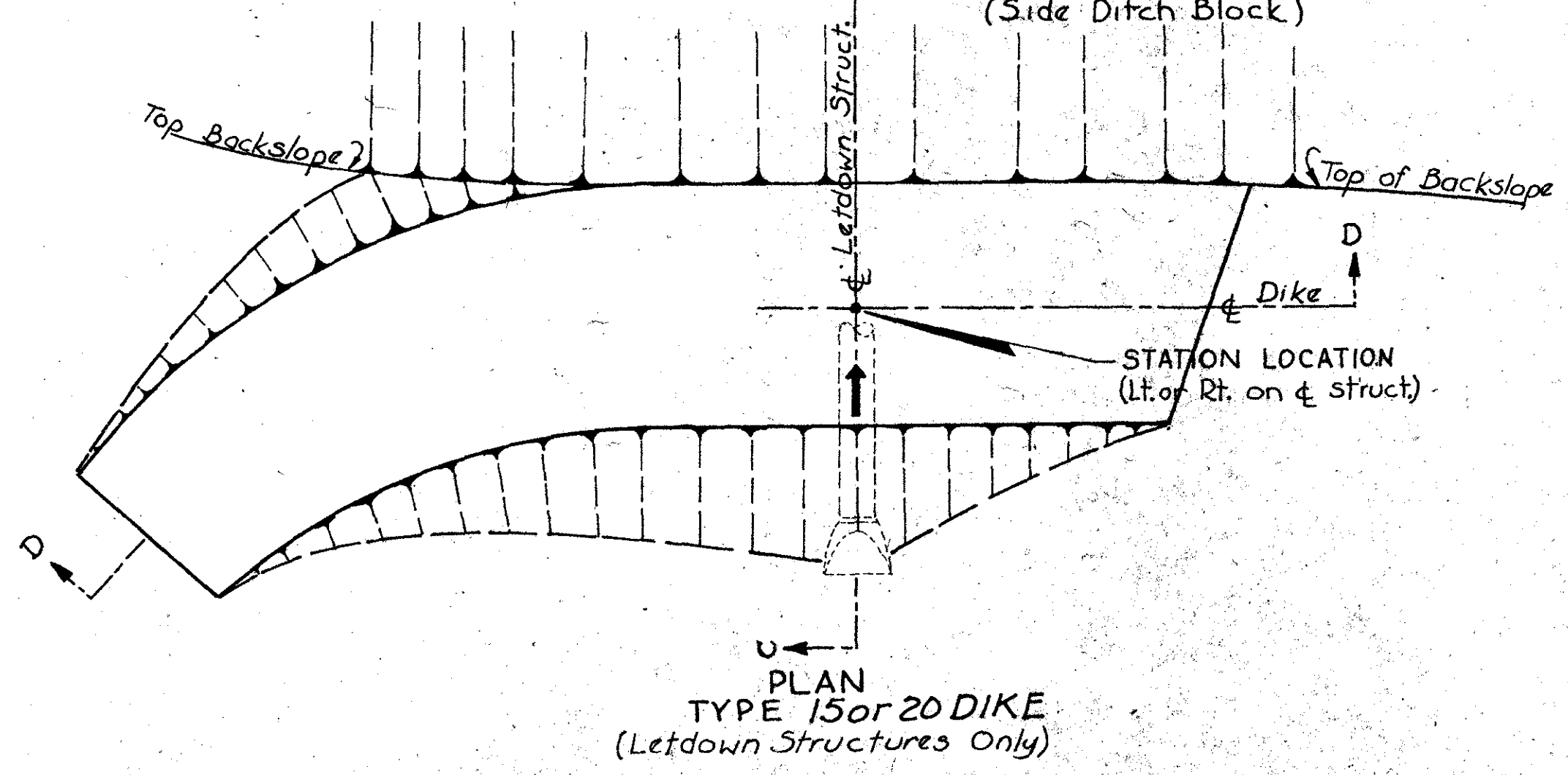
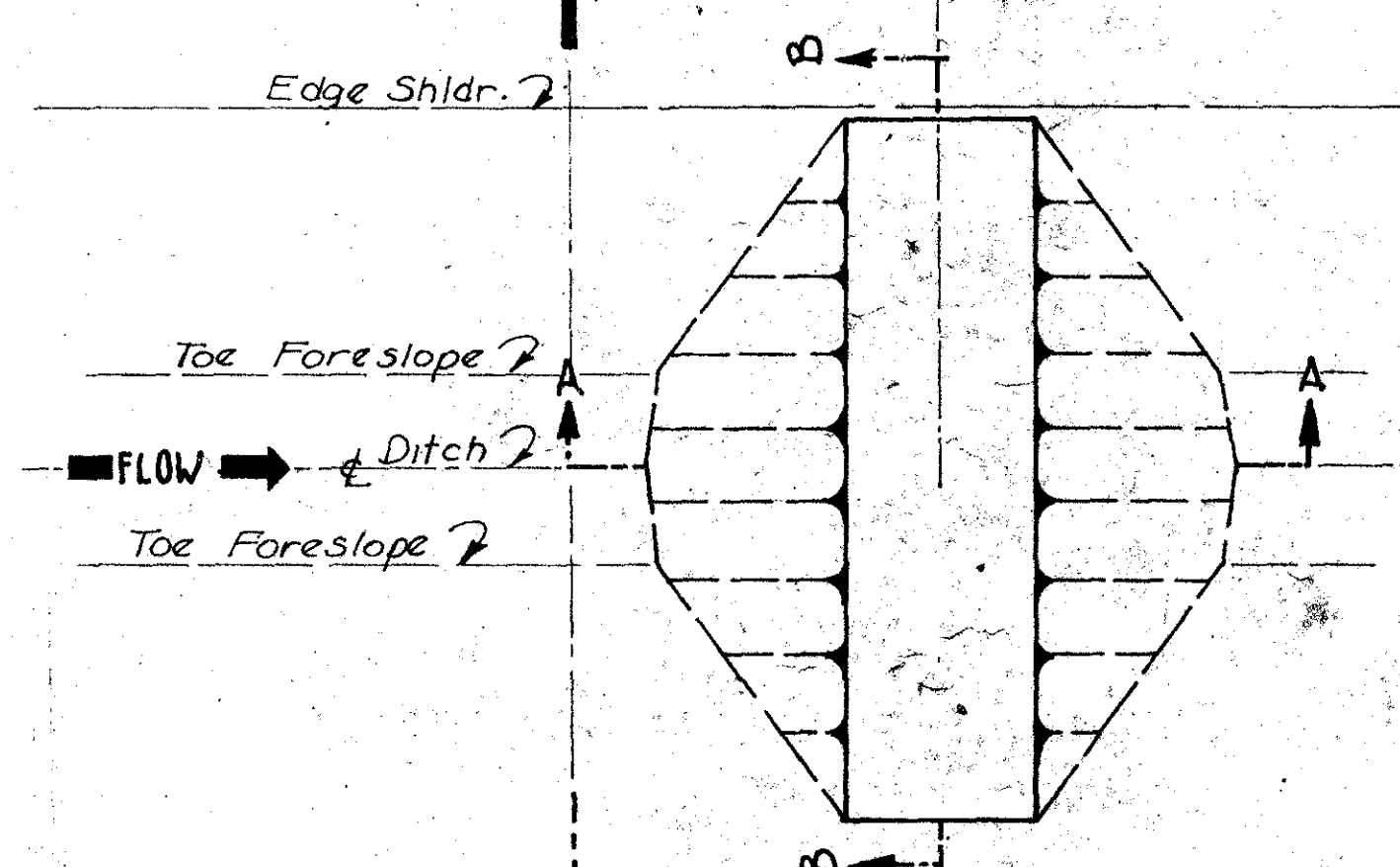
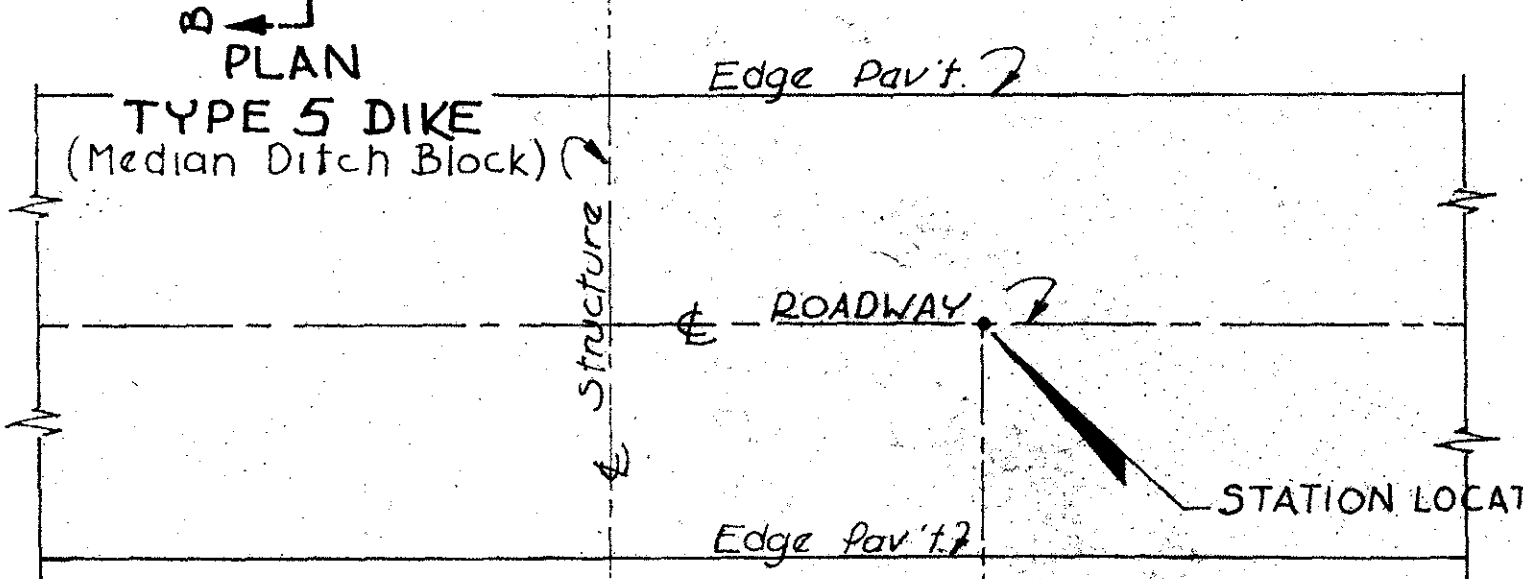
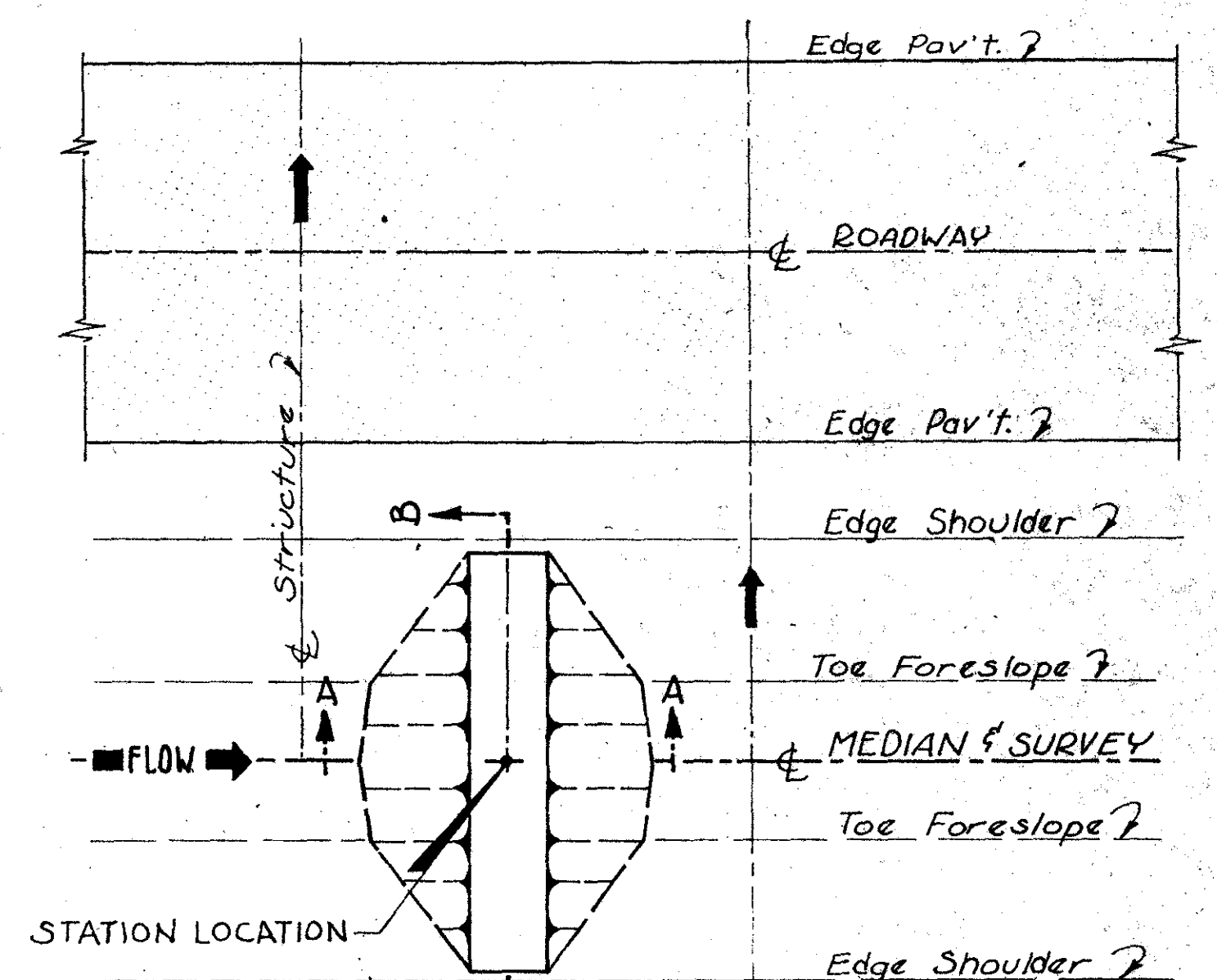
WITH TRENCH TREATMENT
TREATMENT SAME THICKNESS
OR MORE THAN THICKNESS OF
MOISTURE & DENSITY CONTROL

AREA NO.	TYPE OF ADJUSTMENT TO TEMPLATE QUANTITY
1	NONE
2	NONE
3	- FILL
4	- FILL
5	+ CUT
6	+ CUT
7	+ CUT, + FILL & SHRINK
8	+ F (SHRINKAGE ONLY)

TYPE WORK	AREA NO.
EXCAVATION	10,7,5,6,12
EMBANKMENT	11
M&D EMBANKMENT (90%)	1,4,6
SCARIFY WITH M&D EMB. (90%)	8
M&D EMBANKMENT (95%)	2,3,5,7
SUBGRADE TREATMENT *	3,4,5,6
PAY AREA M&D EMBANKMENT	1,2,3,4,5,6,7,8

IOWA HIGHWAY COMMISSION	
STANDARD ROAD PLAN RL-2	
RECOMMENDED	<i>A.P. Smith</i> 11-16-61 ROAD ENGINEER DATE
DESIGN COMMITTEE	DATE
APPROVED	CHIEF ENGINEER DATE
TYPICAL CONSTRUCTION OF EMBANKMENT WITH MOISTURE & DENSITY CONTROL	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IOWA	80-5(25)188	88	26	104



GENERAL NOTES FOR DIKES

Dikes of the types indicated hereon shall be constructed essentially as shown. Some variation will be allowed to adapt to local conditions when necessary.

When practical, top elevation of "Type 5" and "Type 10" dikes shall be 1'-0" below profile grade elevation at the dike location. Side slopes of "Type 1 and 2" dikes shall normally be the same as foreslopes or the adjacent roadway.

Type 5 dike for letdown structures may vary in length and plan in different locations. Ends of dike shall ordinarily tie into natural ground at the elevation of top of dike.

Necessary material for construction of dikes is included in "Estimate of Quantities" for excavation. Price bid for excavation shall be full compensation for construction of dikes as indicated hereon and in accordance with current Standard Specifications for roadway embankment.

Refer to detail road plans and tabulations of drainage structures for exact information on location, top elevation, shape, or any variation from this standard for dikes.

IOWA HIGHWAY COMMISSION		
STANDARD ROAD PLAN RL-4		
RECOMMENDED	ROAD ENGINEER	DATE
	DESIGN COMMITTEE	DATE
APPROVED	CHIEF ENGINEER	DATE
DITCH BLOCKS & DIKES		

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IOWA	80-5(29)188		27A	106

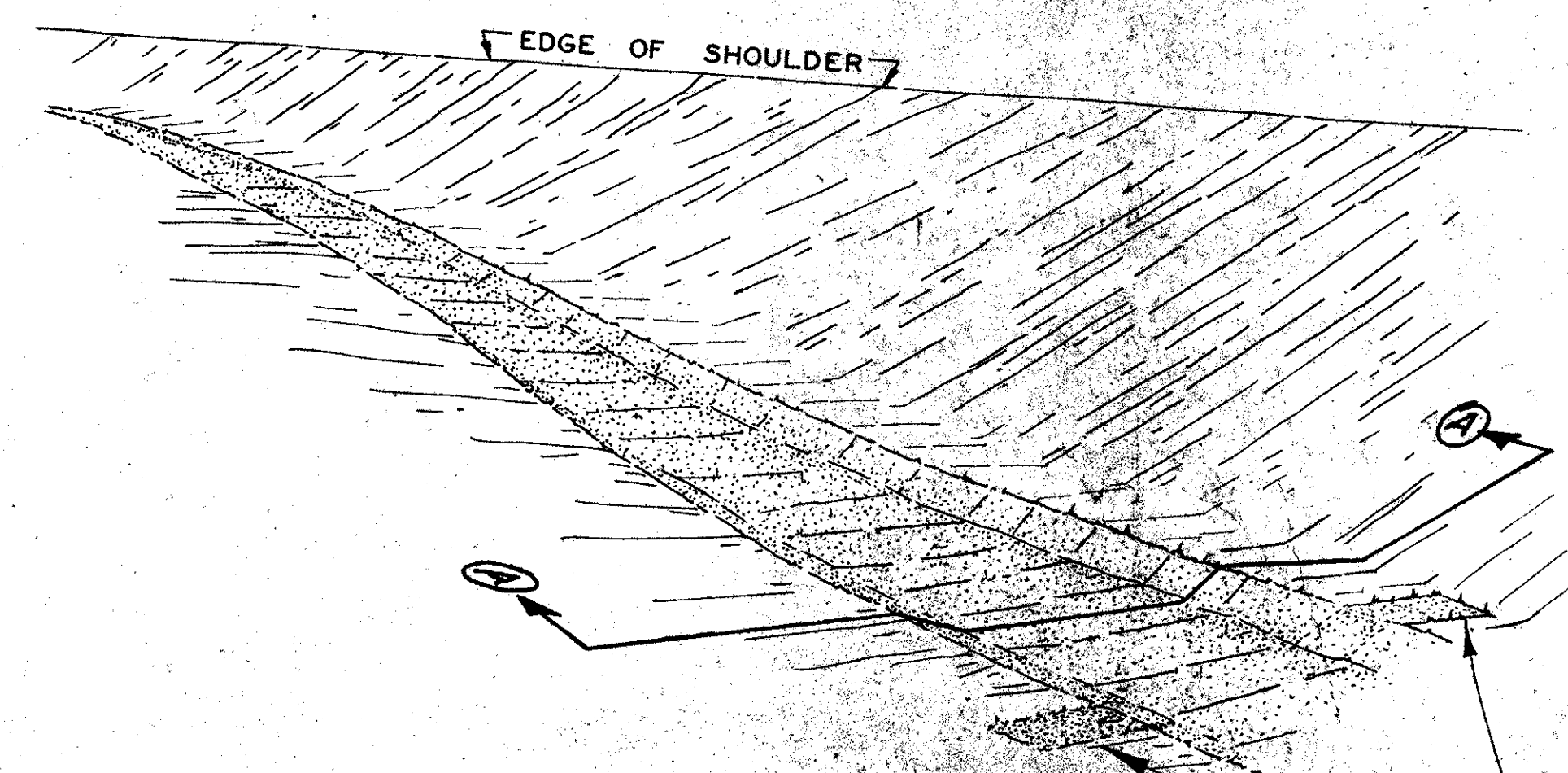


FIG. 1 ROAD DITCH

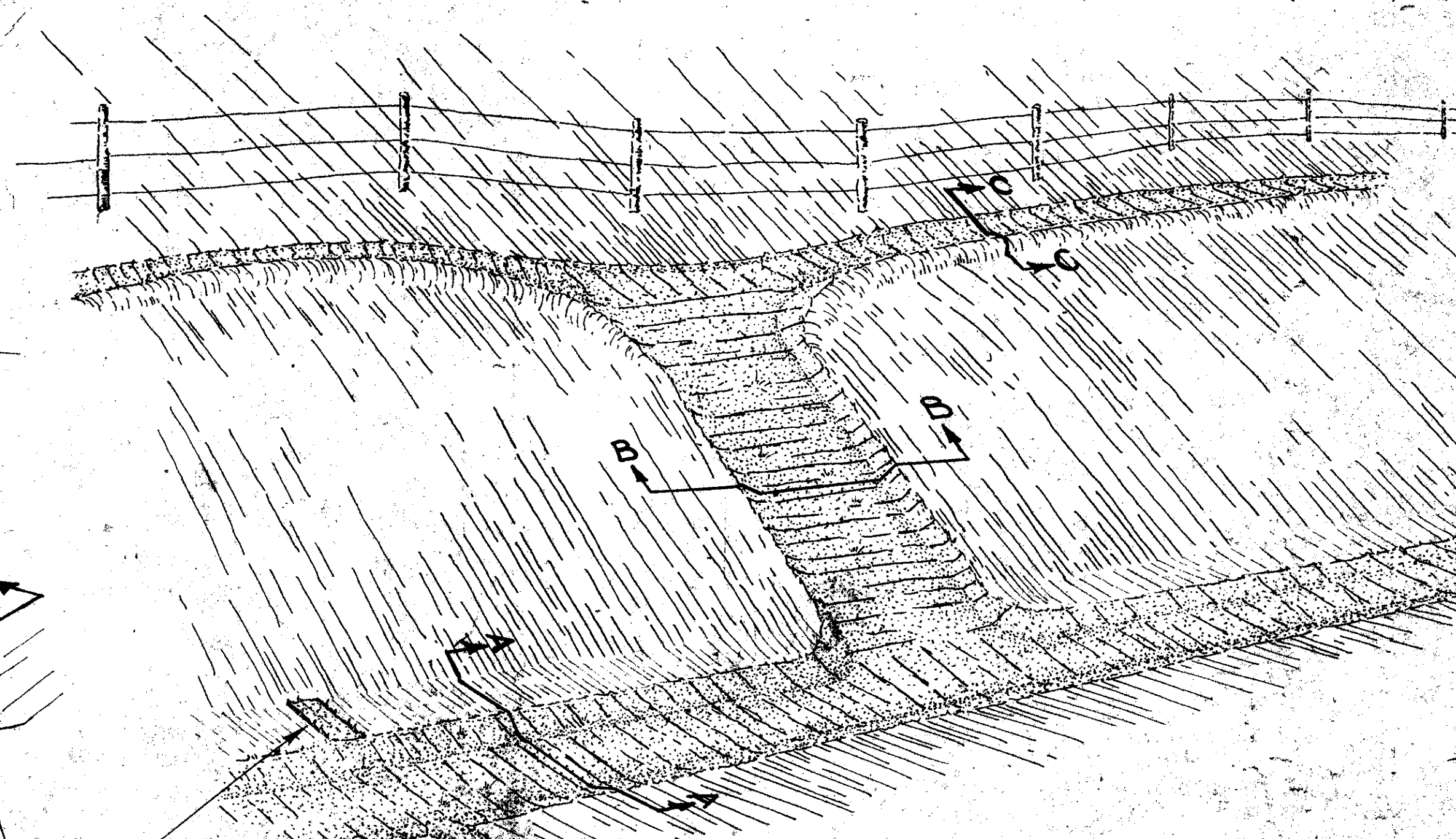


FIG. 2 INTERCEPTING DITCH AND SOD FLUME

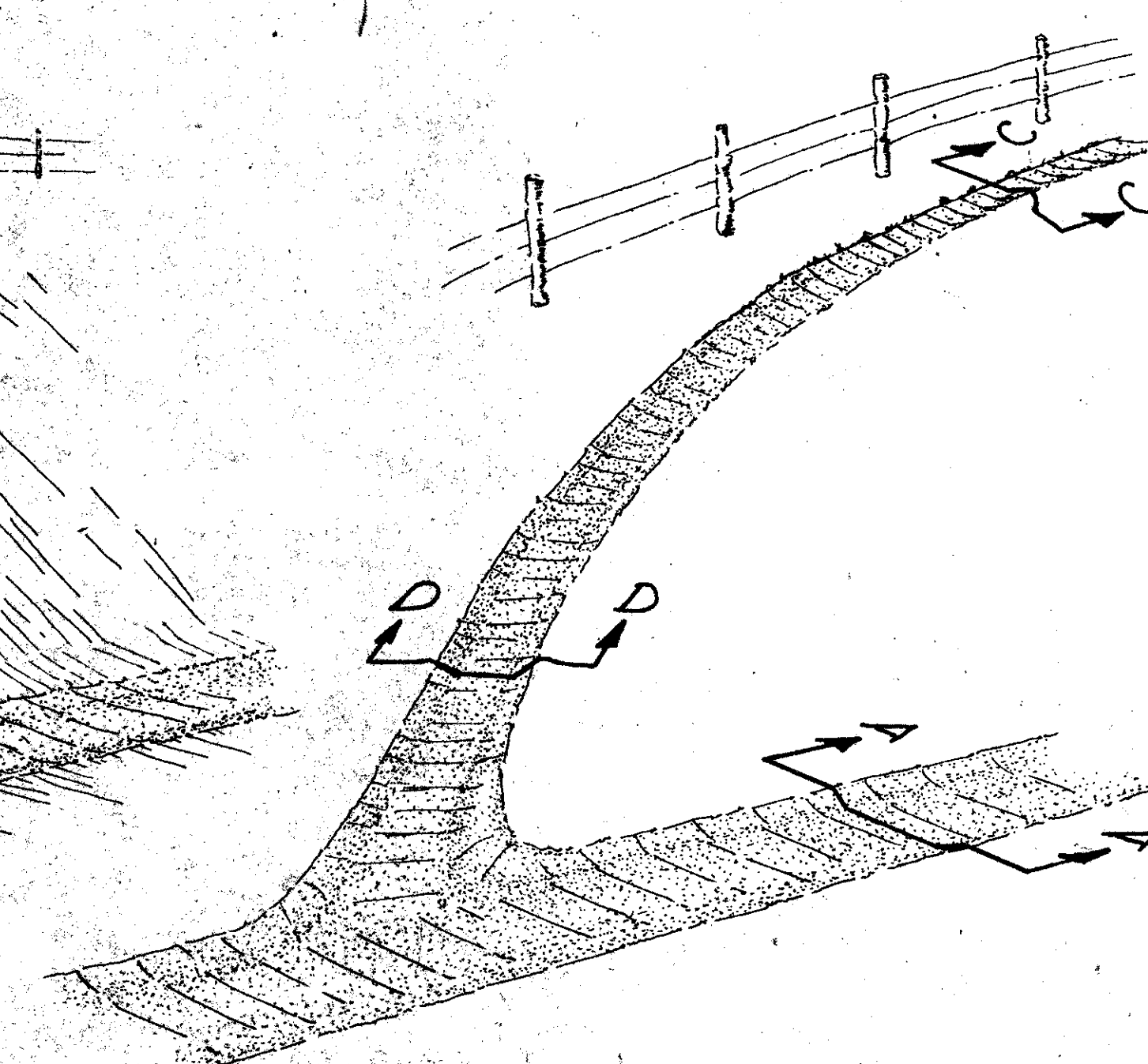
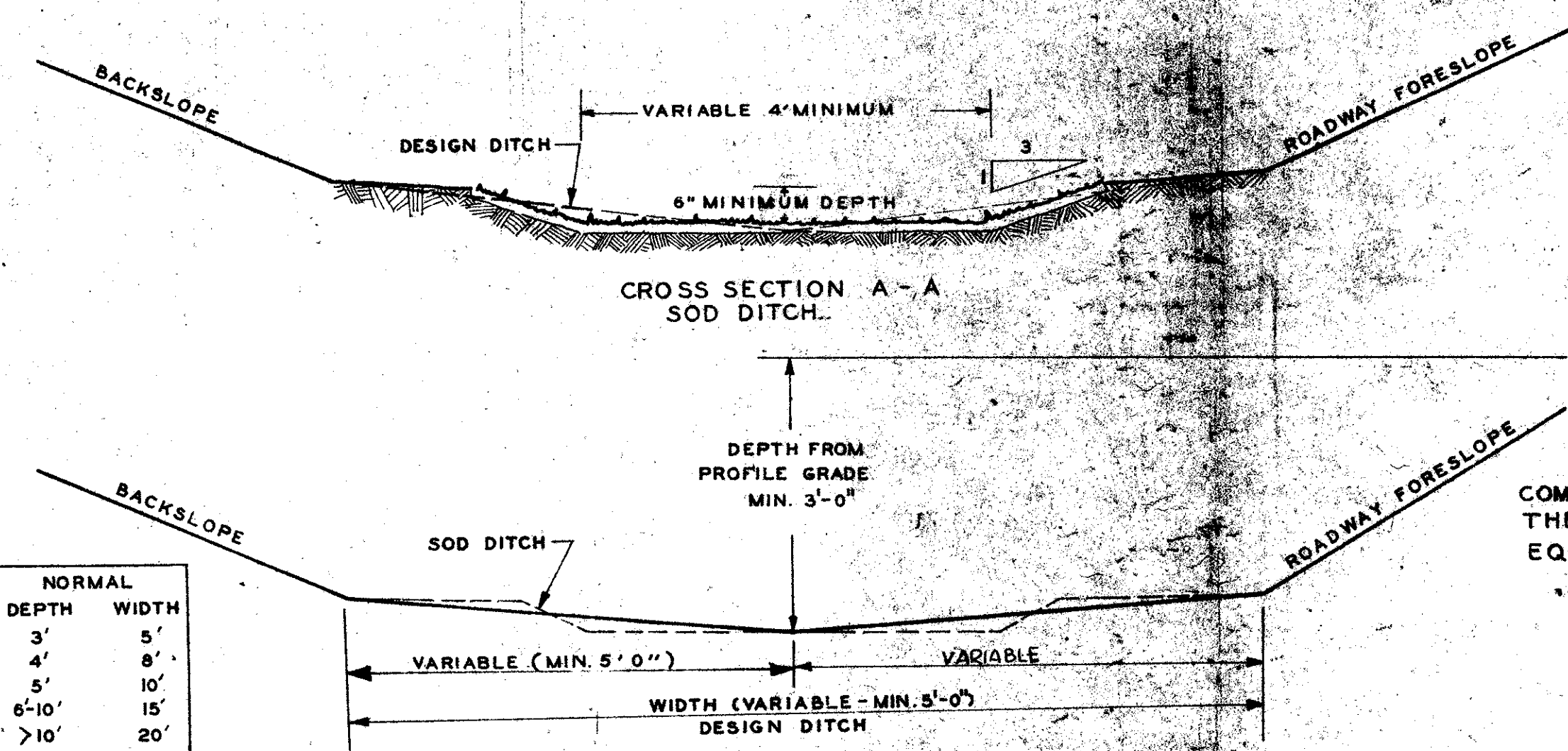
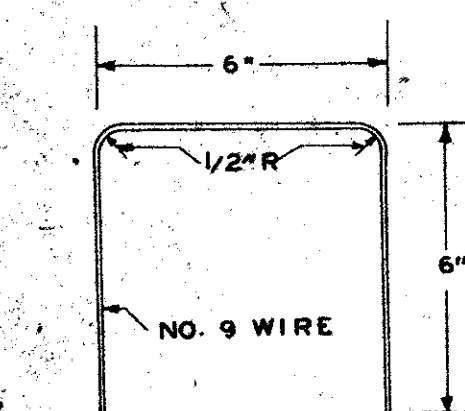


FIG. 3 INTERCEPTING DITCH AND FLUME AT END OF SLOPE

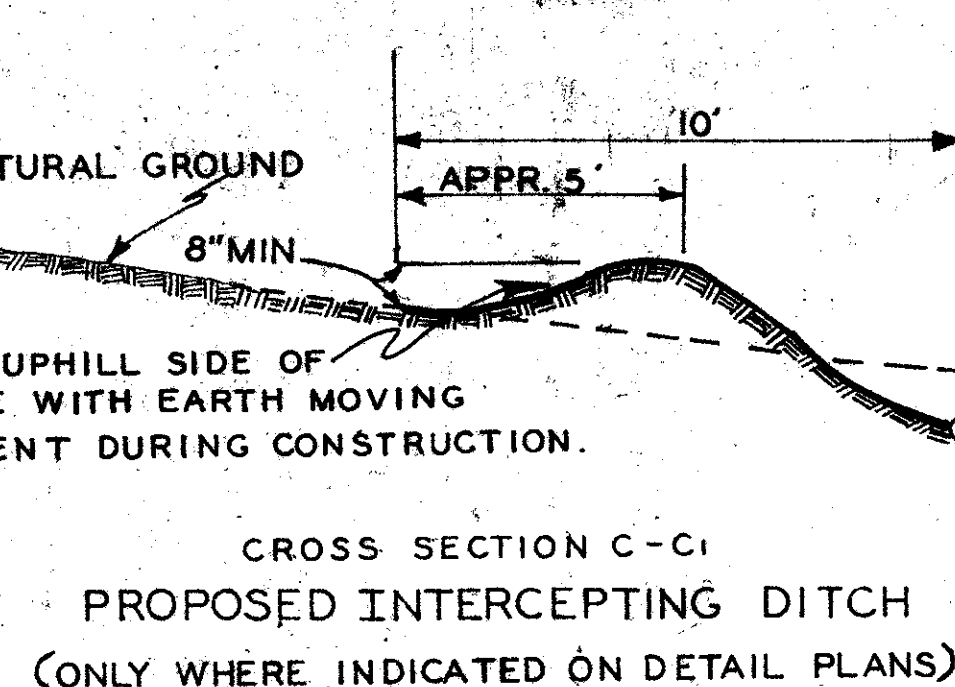
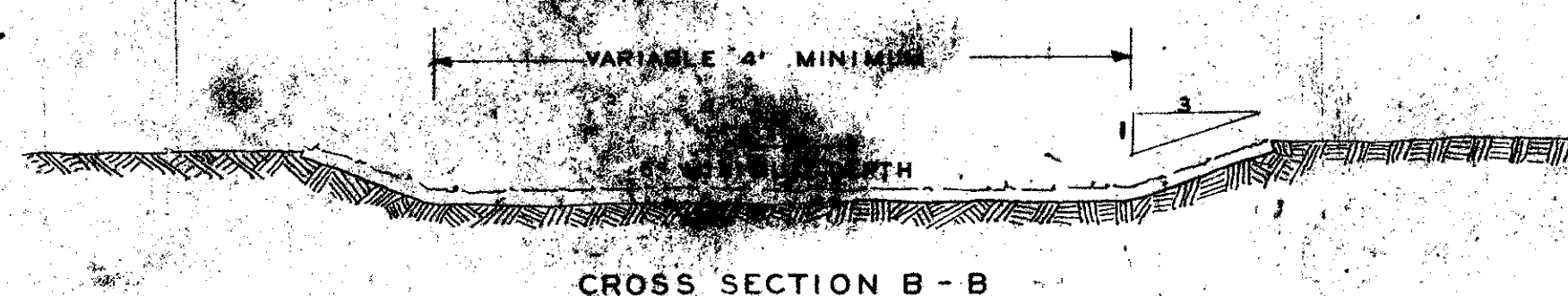


METHOD OF USE

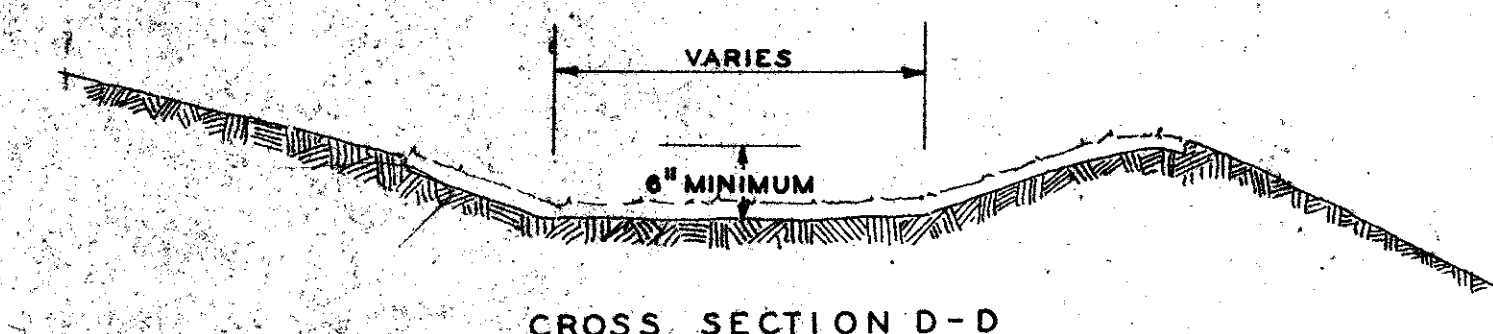
FIG. 4 WIRE STAKES



DETAIL OF WIRE STAKES



CROSS SECTION C-C
PROPOSED INTERCEPTING DITCH
(ONLY WHERE INDICATED ON DETAIL PLANS)



CROSS SECTION D-D

NOTES:

FIG. 1 THROUGH DITCHES OR BORROW AREAS SOD CHANNELS SHOULD BE CONSTRUCTED AT THE LOW POINT. ALL EXCAVATED MATERIAL SHOULD BE WASTED TO FILL LOW AREAS AND OTHERWISE FACILITATE THE FREE FLOW OF SURFACE WATER INTO THE CHANNEL. ALINEMENT SHOULD BE SMOOTH AND ABRUPT CHANGES SHOULD BE AVOIDED. SOD WINGS SHALL BE NOT LESS THAN 30" LONG AND SHALL NOT BE EXTRA PIECES OF SOD MERELY ADDED TO THE REGULAR CHANNEL.

FIG. 3 SOD FLUMES AT THE END OF A SLOPE SHALL GRADUALLY CHANGE FROM A FLAT BOTTOM TO ROUNDED BOTTOM AS THEY PROGRESS UP THE SLOPE.

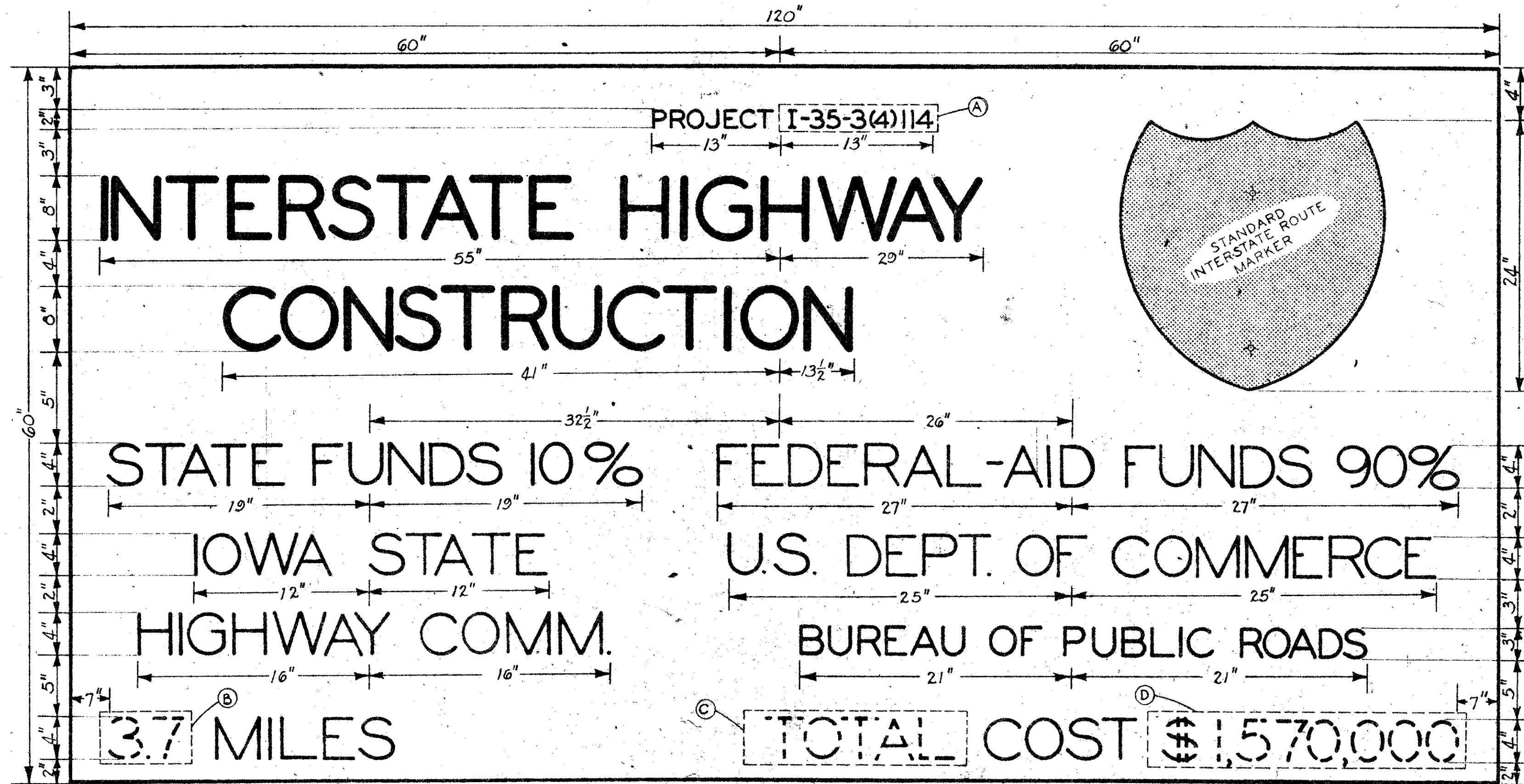
FIG. 4 WIRE STAKES SHALL BE STAGGERED AS SHOWN. MINIMUM 33 STAKES PER SQUARE.

WOODEN STAKES SHALL BE USED IN SOD FLUMES WHEN DESIGNATED BY ENGINEER.

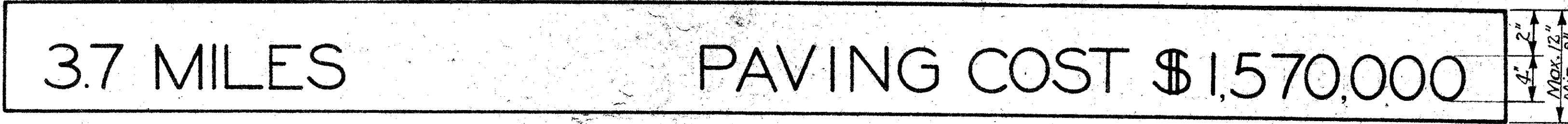
IOWA HIGHWAY COMMISSION			
STANDARD ROAD PLAN		RC-1	
RECOMMENDED	<i>K. P. Slaughter</i> ENGINEER	11/16/60	DATE
	<i>D. M. P.</i> DESIGN COMMITTEE	1-4-61	DATE
APPROVED	<i>L. M. Claugen</i> CHIEF ENGINEER	1-10-61	DATE
EROSION CONTROL DETAILS DITCHES			

3-13-62	Modify intercepting ditch	RDJ
7-1-61	NEW ISSUE	
DATE	REVISIONS	APP.

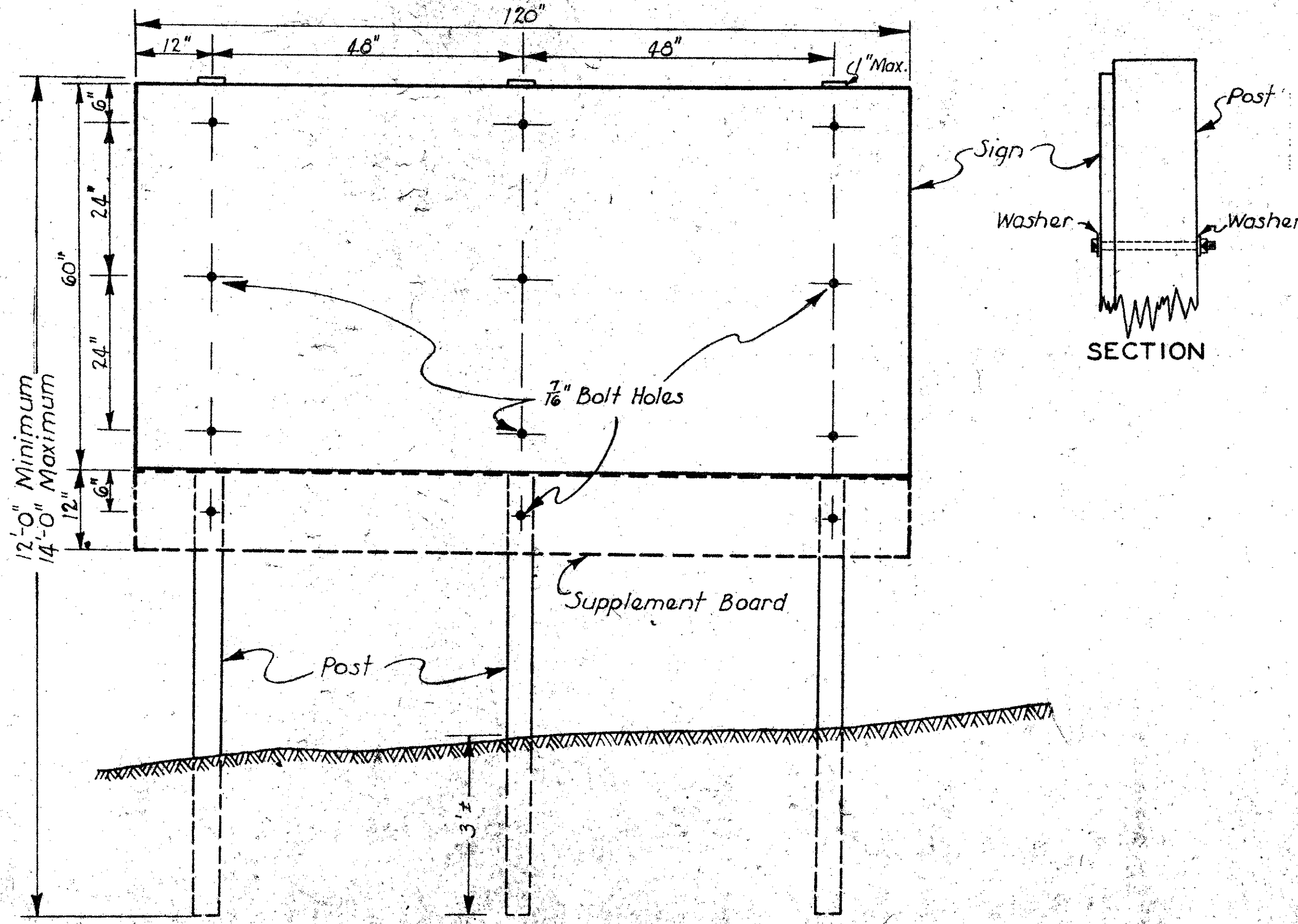
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IOWA	80-5(29)	1988	27B	104



- TYPE I SIGN -



- SUPPLEMENT BOARD -



GENERAL REQUIREMENTS

1. SIGNS SHALL BE ERECTED IN ADVANCE OF THE START OF ANY ACTUAL CONSTRUCTION OPERATIONS.
2. THE CONTRACTOR SHALL BE NOTIFIED BY THE RESIDENT ENGINEER AS TO THE EXACT MESSAGE TO BE USED ON THE SIGN AND THE EXACT LOCATION FOR PLACEMENT OF THE SIGN PROPER.
3. THE STANDARD INTERSTATE SHIELD ROUTE MARKER SHALL BE FURNISHED BY THE STATE ALONG WITH SUITABLE METHOD FOR ATTACHING TO SIGN.
4. THE CONDITION OF THE SIGN BEFORE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SIGN IN ACCEPTABLE CONDITION THROUGH THE TERM OF HIS PARTICULAR PROJECT.
5. AFTER COMPLETION OF THE PROJECT AND WHEN RELEASED BY THE ENGINEER, THE CONTRACTOR MAY AT HIS OPTION, REMOVE THE SIGN ASSEMBLY TO RETAIN IN HIS POSSESSION FOR USE ON OTHER PROJECTS (AS SUBJECT TO THE PROVISIONS OF THIS STANDARD PLAN).
6. THE TYPE "PROJECT SIGN" SHALL CONSIST OF PROVIDED SIGN AS DETAILED HEREON AND MAY REQUIRE ONE OF THE FOLLOWING:
 1. A COMPLETE SIGN ASSEMBLY.
 2. "PORTABLE SIGN" IN THE CONTRACTOR'S POSSESSION.

SPECIFICATIONS

1. POSTS - THREE 4" x 4" WOOD POSTS ARE REQUIRED FOR EACH SIGN AND THE POSTS SHALL BE SUBJECT TO THE REQUIREMENTS OF SECTION 4231 OF THE 1960 STANDARD SPECIFICATIONS (EXCEPT 4231.04 AND LAST PARAGRAPH OF 4231.01).
2. LAMBER - THE SIGN AND SUPPLEMENT BOARD MAY BE CONSTRUCTED OF EITHER OF THE FOLLOWING ALTERNATIVES MEETING THE REQUIREMENTS OF SECTION 4273 OF THE 1960 STANDARD SPECIFICATIONS.
 - a. 3/4" THICK "KROG" OR "SUGAR" PLYWOOD.
 - b. 3/4" THICK "REDWOOD" OR "DOUGLASS" PLYWOOD.

SIGNS MAY BE CONSTRUCTED FROM MORE THAN ONE PLATE OF LAMBER IF APPROVED BY THE ENGINEER. SUBSTITUTION OF ADDITIONAL BOLTING SHALL BE REQUIRED IF MORE THAN ONE BOARD IS USED FOR THE SIGN FACE.

PRESSED OR DRY LAMBER 1/2" THICK AND OF APPROPRIATE DIMENSIONS MAY BE USED FOR MODIFYING PANELS A, B, C, AND D OF THE SIGN MESSAGE WHEN NECESSARY. THESE PANELS SHALL HAVE A SMOOTH FINISH ON ONE SIDE, BE PAINTED AS SPECIFIED AND SHALL BE FIRMLY BOLTED OR OTHERWISE ATTACHED TO THE SIGN PROPER.
3. BOLTS - A MINIMUM OF 5/8" BOLTS (INCLUDING ONE NUT AND 2 FIBER WASHERS PER BOLT) ARE REQUIRED PER SIGN. BOLTS SHALL BE OF APPROVED DIMENSION AND BE OF A "HEAVY DUTY" TYPE.
4. PAINT - SIGN MESSAGE AND BLACK ENAMEL SHALL COMPLY WITH SECTION 4280 OF THE STANDARD SPECIFICATIONS FOR 1960. COMPLETE SIGN (EXCLUDING POSTS) SHALL BE GIVEN TWO COATS OF WHITE. LETTERS SHALL BE APPLIED WITH ONE COAT OF SOLID BLACK.

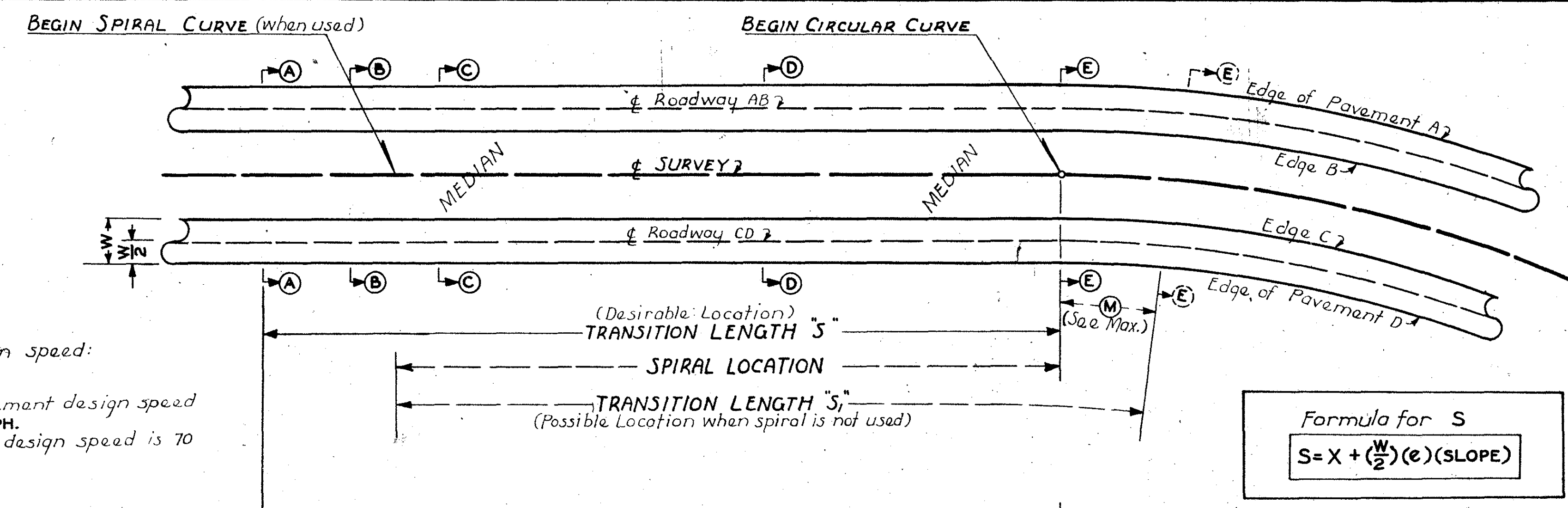
INSTRUCTIONS

1. ALL SIGN LETTERING SHALL BE DONE IN SERIES "C" AS DESCRIBED IN THE AASHTO MANUAL OF STANDARD ALPHABETS FOR HIGHWAY SIGNS.
2. PANEL A SHALL BE INSCRIBED WITH THE CORRECT PROJECT NUMBER FOR EACH PROJECT ON WHICH THE SIGN IS USED.
3. PANEL B SHALL BE INSCRIBED WITH THE LENGTH TO ONE DECIMAL OF THE TOTAL LENGTH OF PROJECT INVOLVED, NOT INCLUDING RAMP, INTERSECTING ROAD, ETC.
4. PANEL C SHALL BE INSCRIBED WITH THE NOMENCLATURE OF THE TYPE OF WORK INVOLVED, SUCH AS GRADING, BRIDGE, GRADE AND PAVEMENT, ETC.
5. PANEL D SHALL BE INSCRIBED WITH THE TOTAL DOLLAR VALUE OF THE CONTRACT INVOLVED ROUNDED TO THE NEAREST \$10,000.
6. SUPPLEMENT BOARD SHALL BE INSCRIBED SIMILAR TO THE BOTTOM LINE OF THE ORIGINAL SIGN, SHOWING THE BILLAGE, TYPE OF WORK AND VALUE OF CONTRACT.

IOWA HIGHWAY COMMISSION			
STANDARD ROAD PLAN		RD-1	
RECOMMENDED	<i>K.P. McLaughlin</i>	ROAD ENGINEER	9/2/61
	<i>D.P. Ray</i>	DESIGN COMMITTEE	11-3-61
APPROVED	<i>L.M. Olson</i>	CHIEF ENGINEER	12-18-61
PROJECT SIGN - 1			

DATE	REVISIONS	APP
7-1-61	NEW ISSUE	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IOWA	80-5(29)188		27C	104



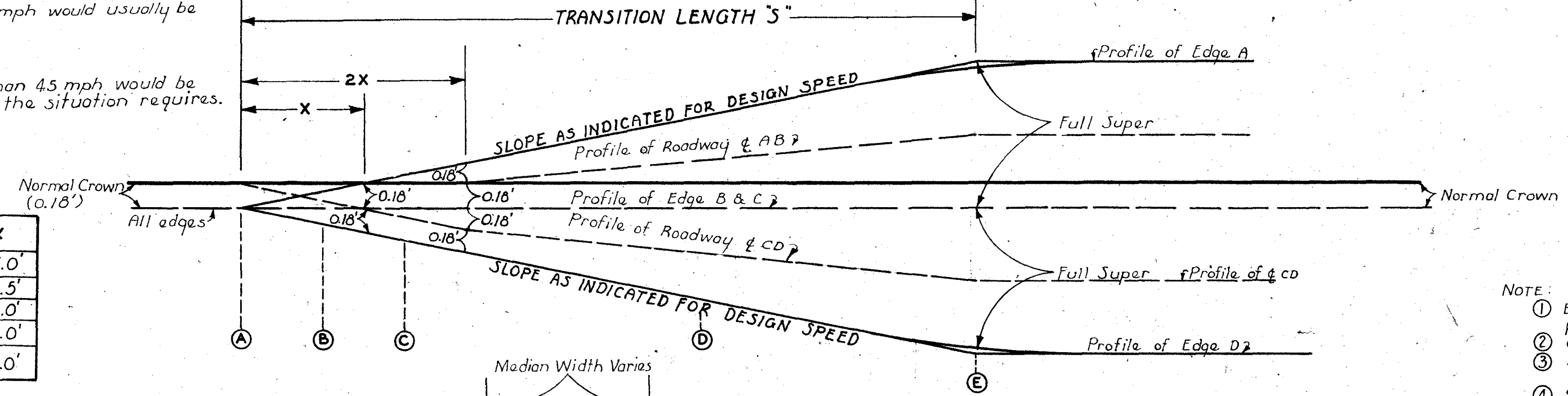
To establish superelevation design speed:

In Rural areas,
When minimum vertical alignment design speed is 50 mph or 60 mph use **60 MPH**.
When vertical alignment design speed is 70 use **70 MPH**.

In Suburban areas,
Where speed limits of 45-55 mph would usually be posted use **50 MPH**.

In Urban areas,
Where speed limits of less than 45 mph would be posted use **30 OR 40 MPH** as the situation requires.

V	X
30	27.0'
40	31.5'
50	36.0'
60	40.0'
70	45.0'



SUPERELEVATION DATA FOR DIVIDED HIGHWAY PROJECTS

- Degree of curve of E of individual roadway pavements will be taken as the same as that of E Survey for this purpose.
- Paved roadways separated by a median shall ordinarily be superelevated about the median edges of pavement as detailed hereon.
- In some cases, paved roadways separated by a narrow median (less than 10 ft.) may be superelevated by rotating about the E of median similar to the method detailed on design RH-8.
- In some cases, paved roadways separated by a wide median (more than 30') may be superelevated by rotating about the E of each roadway similar to the method detailed on design RH-7.

MAXIMUM (M)	DESIGN SPEED
30% S ₁	50 MPH
20% S ₁	60 MPH
10% S ₁	70 MPH

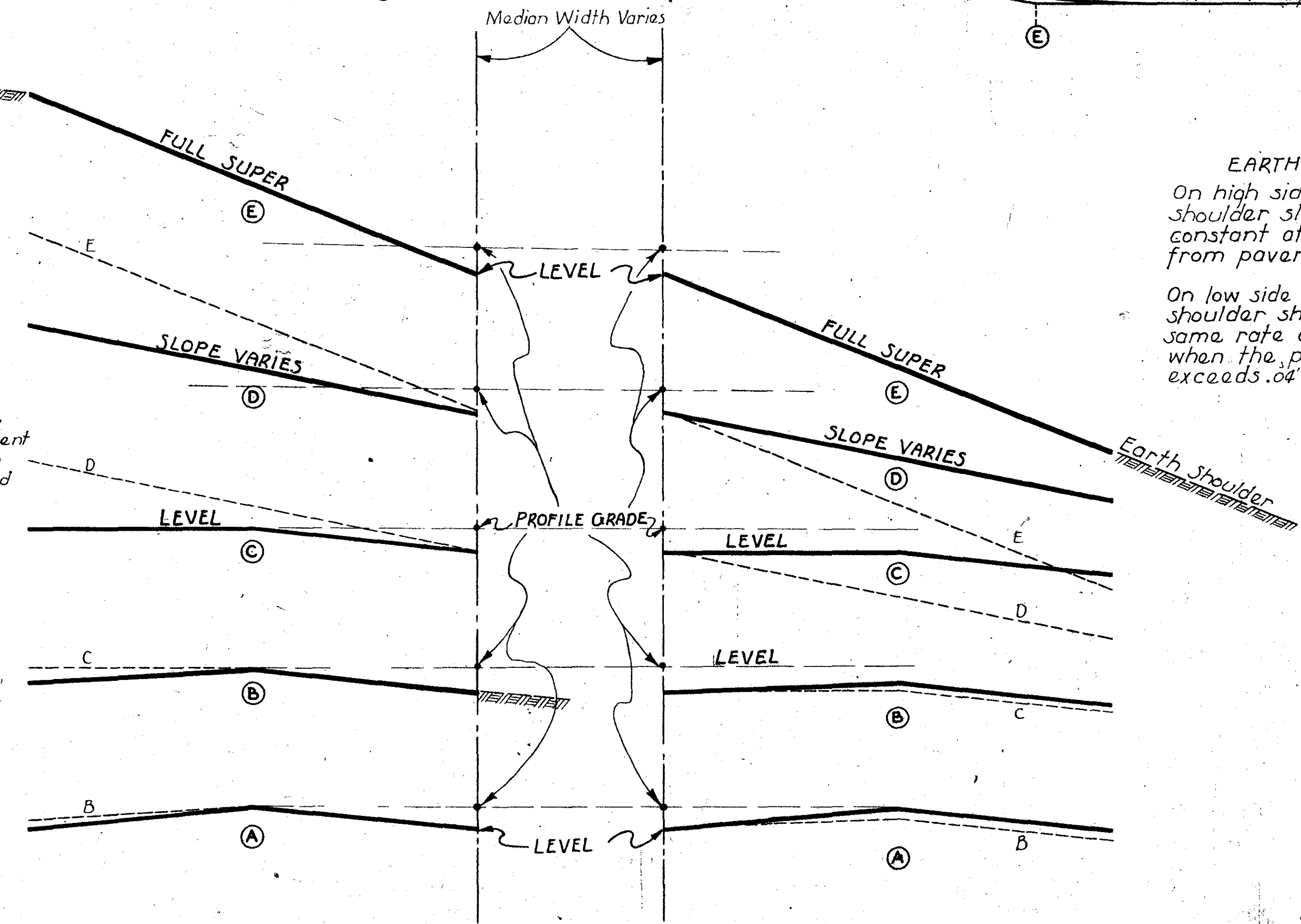
S₁ = S dimension in feet.

- NOTE:
- Edge slope ratio is between edge of lane and E of roadway profile (not profile grade).
 - e is the rate of superelevation in ft. per ft. of pavement width.
 - S is length of transition section from normal crown to full superelevation.
 - Spiral curves are normally to be used on curves listed below the heavy line. Total length of transition (including spiral and "X" transition) shall be at least equal to that indicated. Even increment spirals are to be used.

D	SLOPE 1:200		SLOPE 1:225		SLOPE 1:250	
	e	S	e	S	e	S
0° 15'	NC	0	NC	0	.015	90.0 FT.
0° 30'	.015	72.0 FT.	.015	81.0 FT.	.018	99.0
0° 45'	.017	76.8	.018	89.1	.021	108.0
1° 00'	.020	84.0	.022	99.9	.028	129.0
1° 30'	.027	100.8	.035	135.0	.042	171.0
2° 00'	.035	120.0	.047	167.4	.056	213.0
2° 30'	.043	139.2	.057	194.4	.069	252.0
3° 00'	.050	156.0	.066	218.7	.077	276.0
3° 30'	.056	170.4	.072	234.9	.080	285.0
4° 00'	.062	184.8	.076	245.7		
5° 00'	.070	204.0	.080	256.5		
6° 00'	.076	218.4				
7° 00'	.079	225.6				
8° 00'	.080	228.0				

STABILIZED SHOULDERS
On high side of superelevated pavements the shoulder slope shall be maintained at the normal slope of .04' per ft. unless this slope produces a grade break with the adjacent pavement of more than 7.0%. The shoulder slope shall then be determined by a 7.0% break with adjacent pavement unless this super would create a slope flatter than 1.0%. The grade break should then be reduced and a slope of at least 1.0% on the shoulder provided. On the low side of superelevated curves the shoulder slope shall be maintained at normal slope of .040 ft per ft. unless the adjacent pavement slope is steeper, in which case the shoulder will slope at the same slope as adjacent pavement.

EARTH SHOULDERS
On high side of roadway the shoulder slope shall remain constant at .04' per ft. away from pavement.
On low side of roadway the shoulder shall slope at the same rate as the pavement when the pavement slope exceeds .04' per ft.

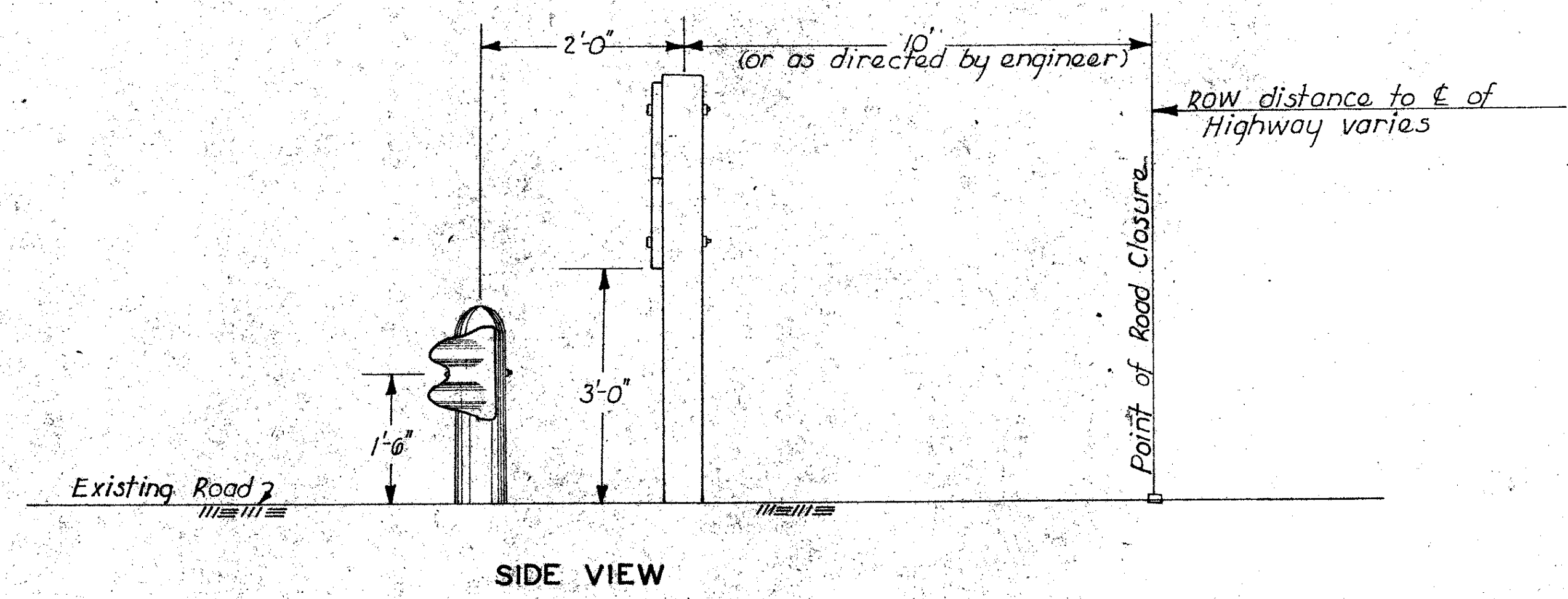
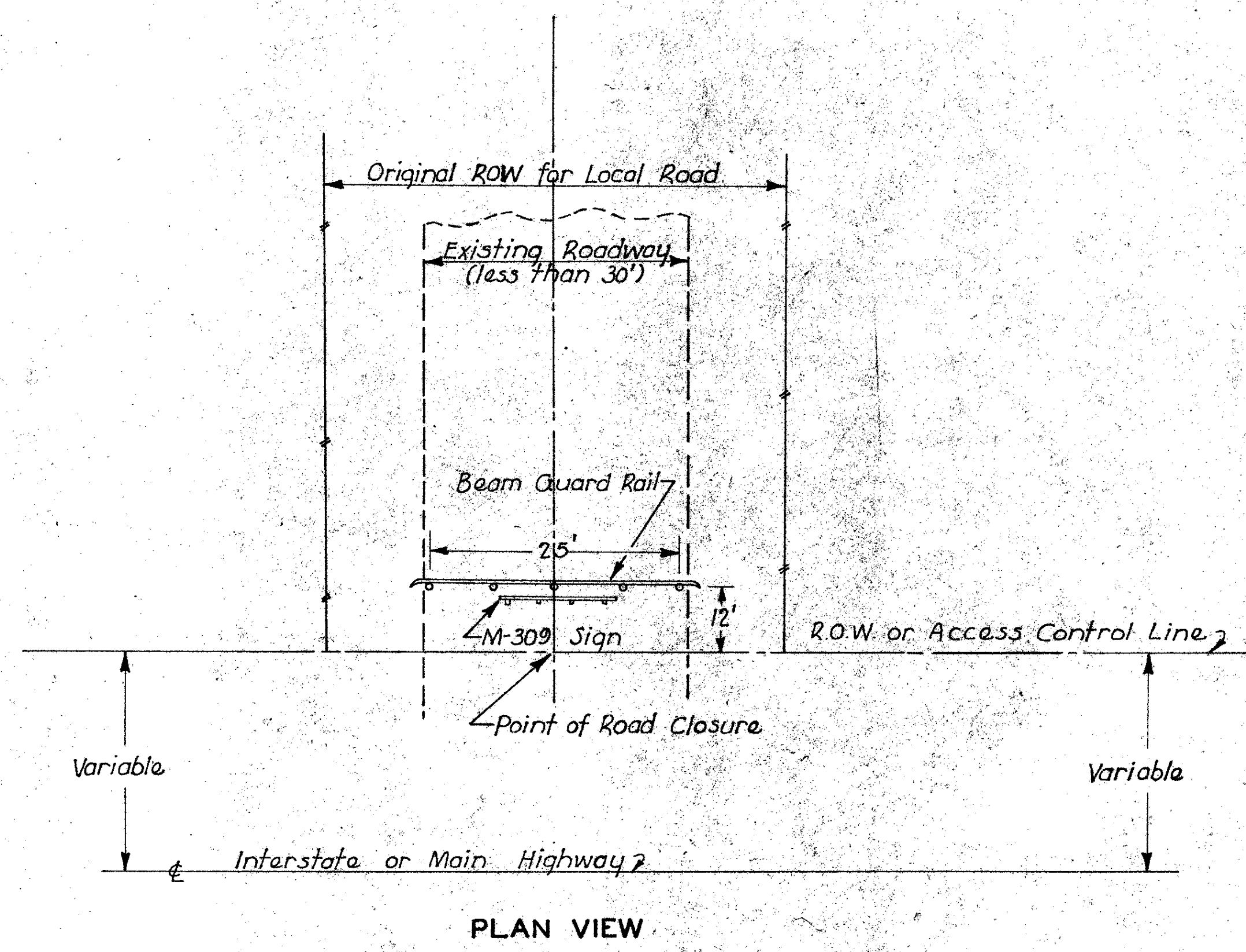


AXIS OF ROTATION ABOUT ADJACENT EDGES NORMAL DISTANCE BELOW PROFILE GRADE
P.C. CONC. PAV'T. - 12" CROWN IN 20 FT.

DATE	REVISIONS	APP.
10-9-62	Modify Spiral Data	
11-2-61	change shldr slope & break	RDS
7-1-61	NEW ISSUE	

IOWA HIGHWAY COMMISSION	
STANDARD ROAD PLAN RH-9	
RECOMMENDED	<i>K.P. McLaughlin</i> 11/16/60 ROAD ENGINEER DATE
	<i>D.D. McLaughlin</i> 1-4-61 DESIGN COMMITTEE DATE
APPROVED	<i>J.M. Clauson</i> 1-10-61 CHIEF ENGINEER DATE
SUPERELEVATION FOUR LANE DIVIDED P.C. CONC. PAV'T.	

FED. ROAD DIST. NO.	STATE	FISCAL YEAR	SHEET TOTAL
5	IOWA	80-5(29)188	270 104



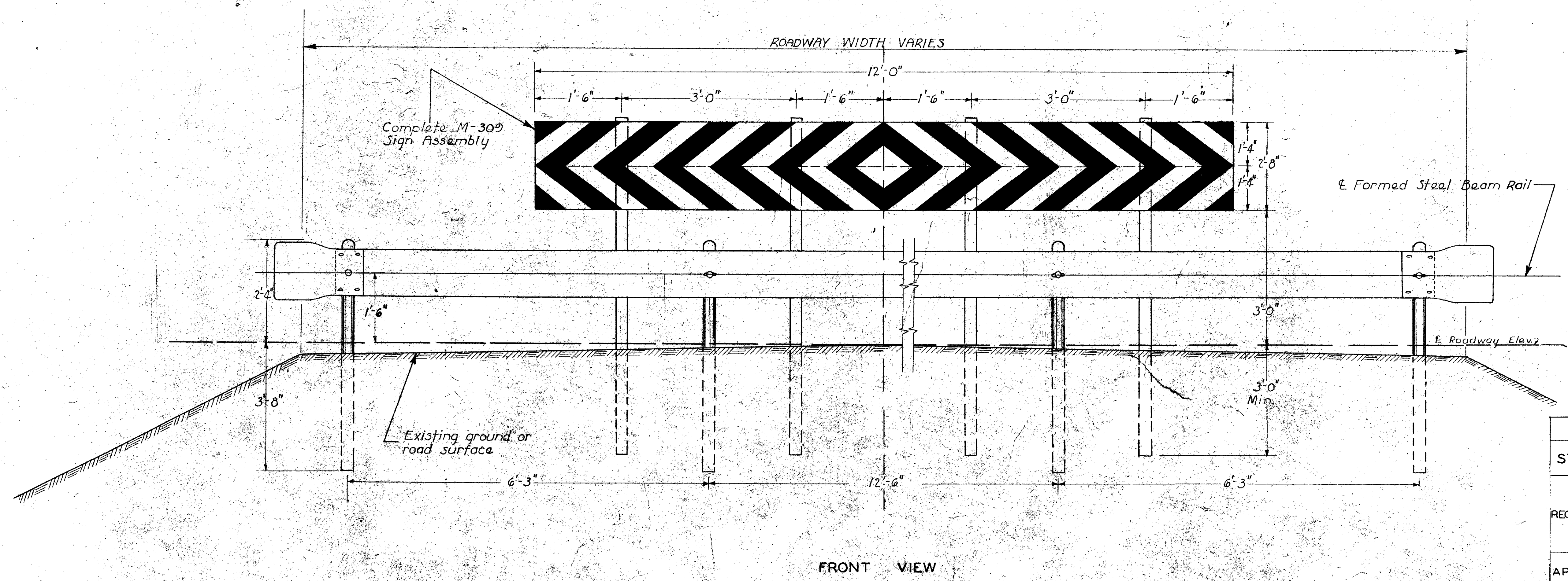
NOTE:
M-309 sign assembly shall be furnished by the State at the State Maintenance Garage nearest the project site. The sign assembly shall consist of two "M-301 Right Striped Object Markers" & two "M-306 Left Striped Object Markers" along with necessary posts and hardware. The cost of transportation of the sign assembly to the job site and the complete installation shall be included and considered incidental to other work on the project.

Formed steel beam rail shall be installed at road closure locations as detailed hereon. Specifications and construction details of Formed Steel Beam Rail shall be as shown on standard design E-1, with the exception that post spacing shall be 6'-3" on centers. The beam rail shall be provided with additional bolt holes to provide for construction. Specification reference is Section 2414.

The complete installation, including the M-309 sign assembly and formed steel beam guard rail shall be considered a "Road Closure Barricade".

For roadway widths less than 30 ft., 8 posts and 25 lineal feet of beam rail (plus end sections) shall be provided.

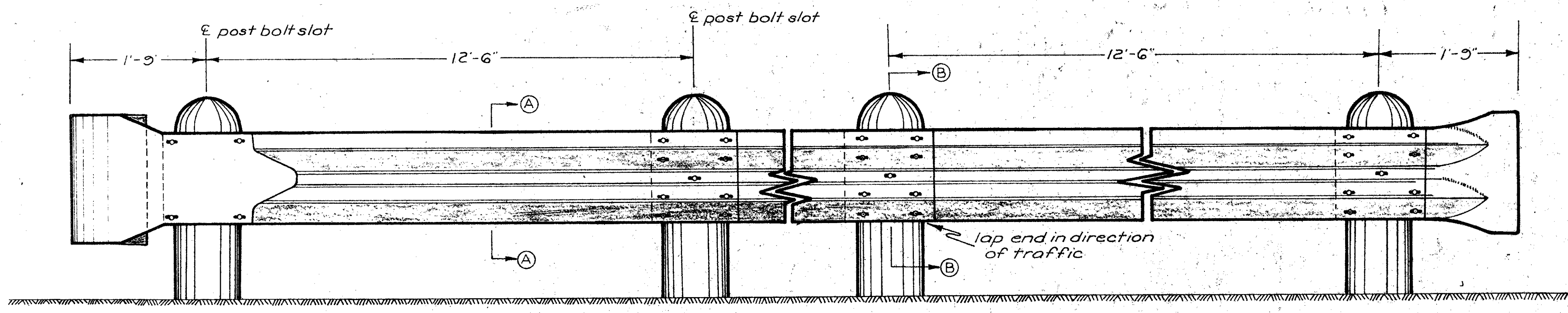
TABULATION OF ROAD CLOSURE BARRICADES			
LOCATION STATION	BEAM RAIL LIN. FT.	POSTS NO.	M-309 NO.
160 + 45 Lt.	25	5	1
160 + 45 Rt.	25	5	1
266 + 31.9 Lt.	25	5	1
266 + 31.9 Rt.	25	5	1



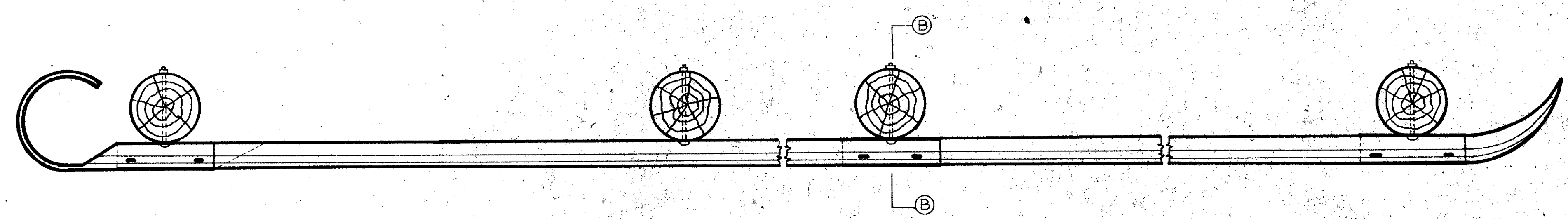
IOWA HIGHWAY COMMISSION		
STANDARD ROAD PLAN RE-3		
RECOMMENDED	<i>H.P. McLaughlin</i> Road ENGINEER	11/16/60 DATE
	<i>R.D. McLaughlin</i> DESIGN COMMITTEE	1-4-61 DATE
APPROVED	<i>L.M. Clauson</i> CHIEF ENGINEER	1-10-61 DATE
ROAD CLOSURE BARRICADE		

7-1-61	NEW ISSUE	
DATE	REVISIONS	APP

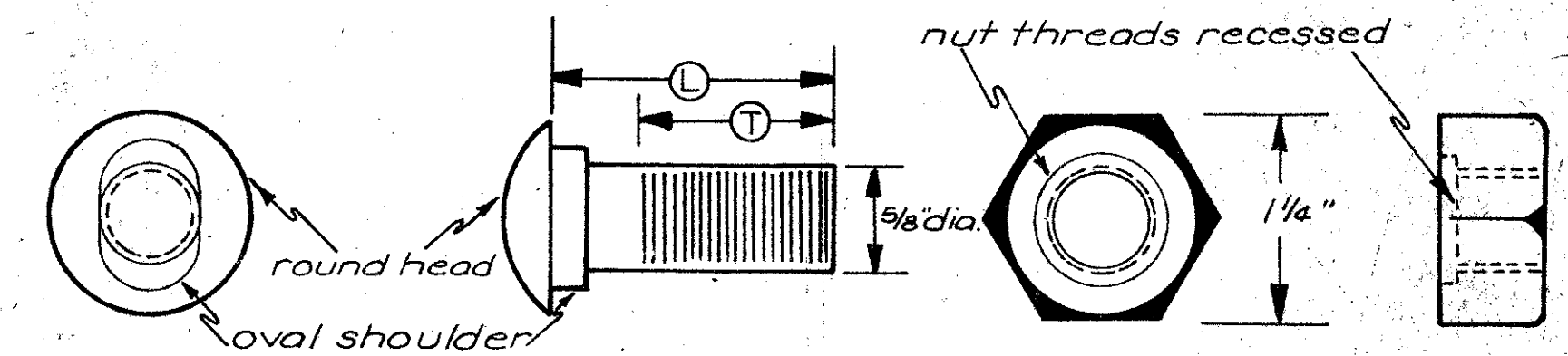
INSTALLATION DETAILS



ELEVATION



PLAN

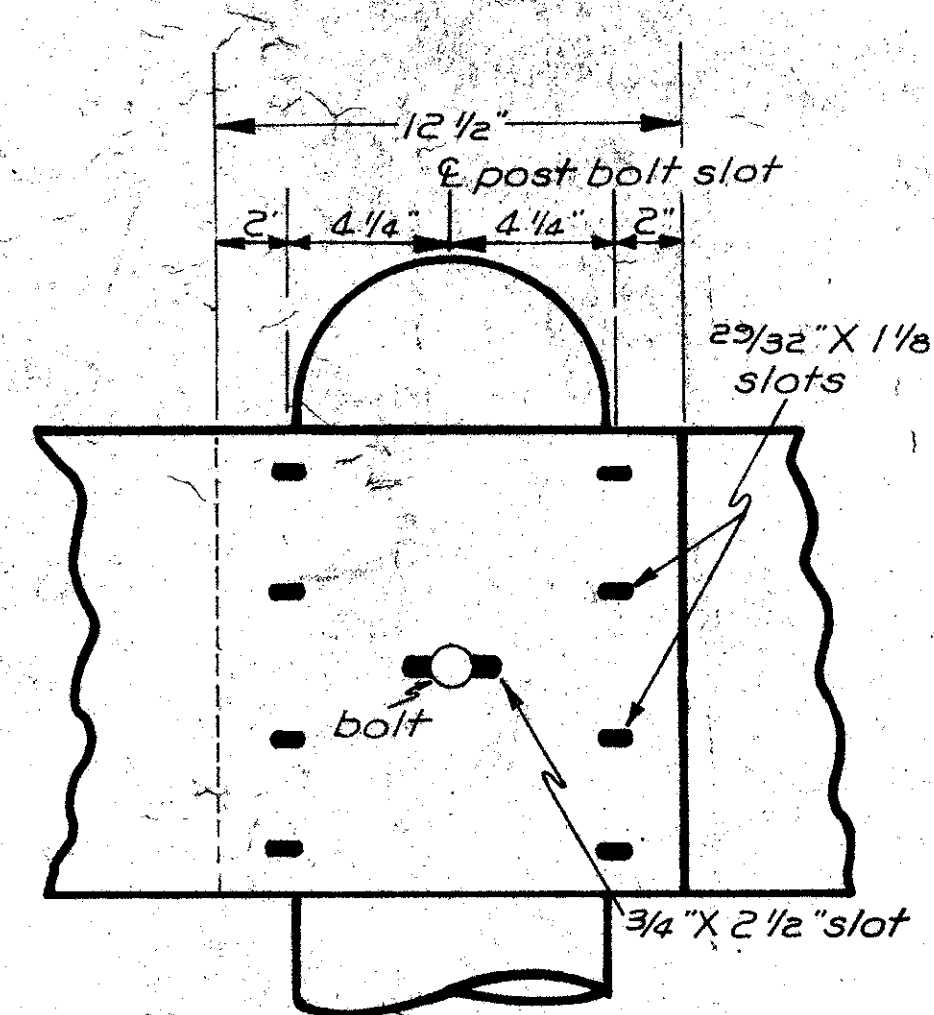


BOLT

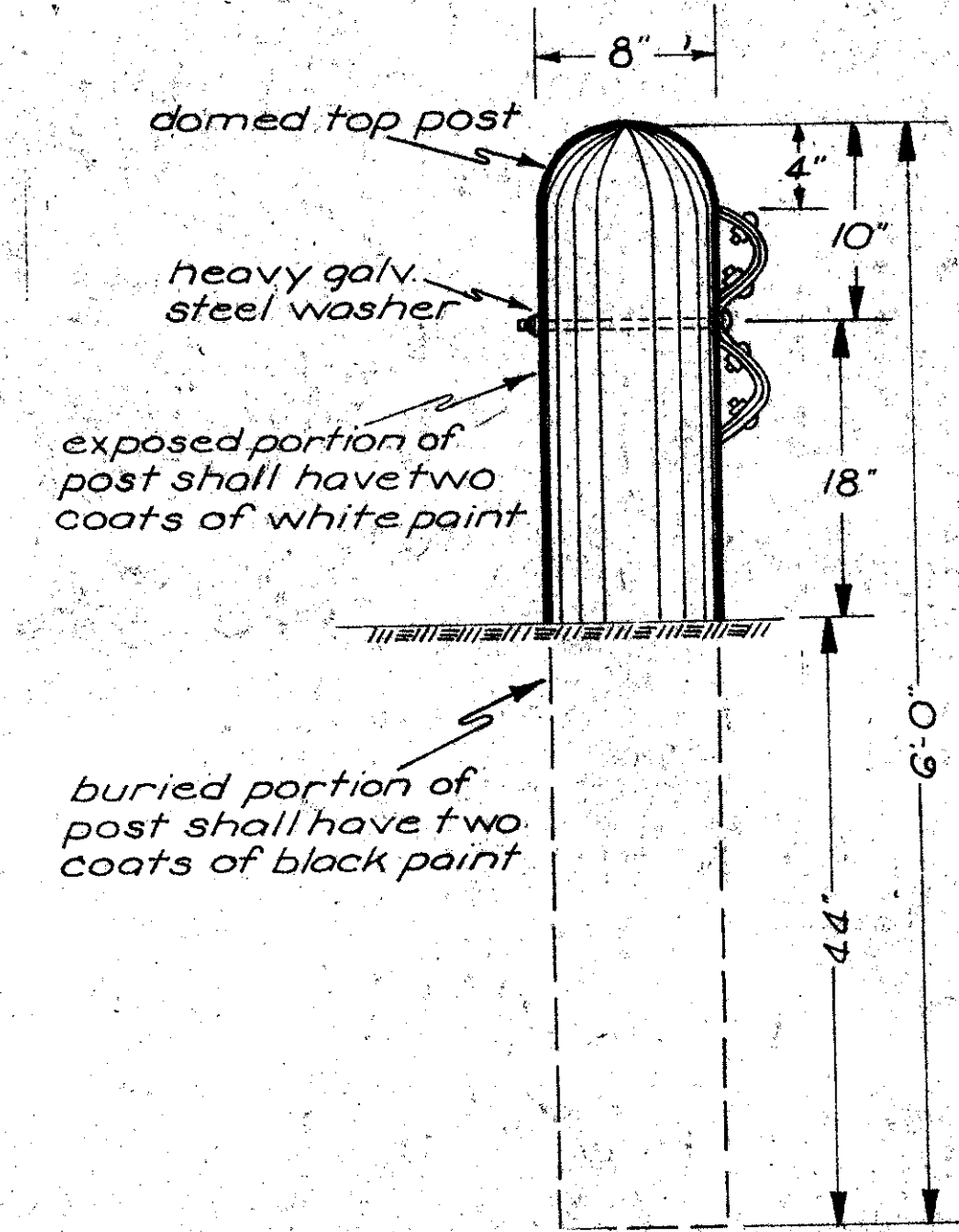
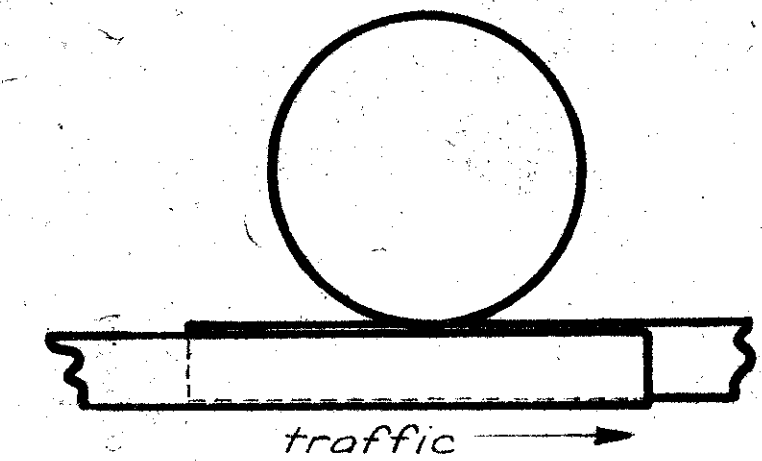
HEX NUT

splice T = 1" L = 1 1/4"
wood post T = 2" L = 10 1/2"

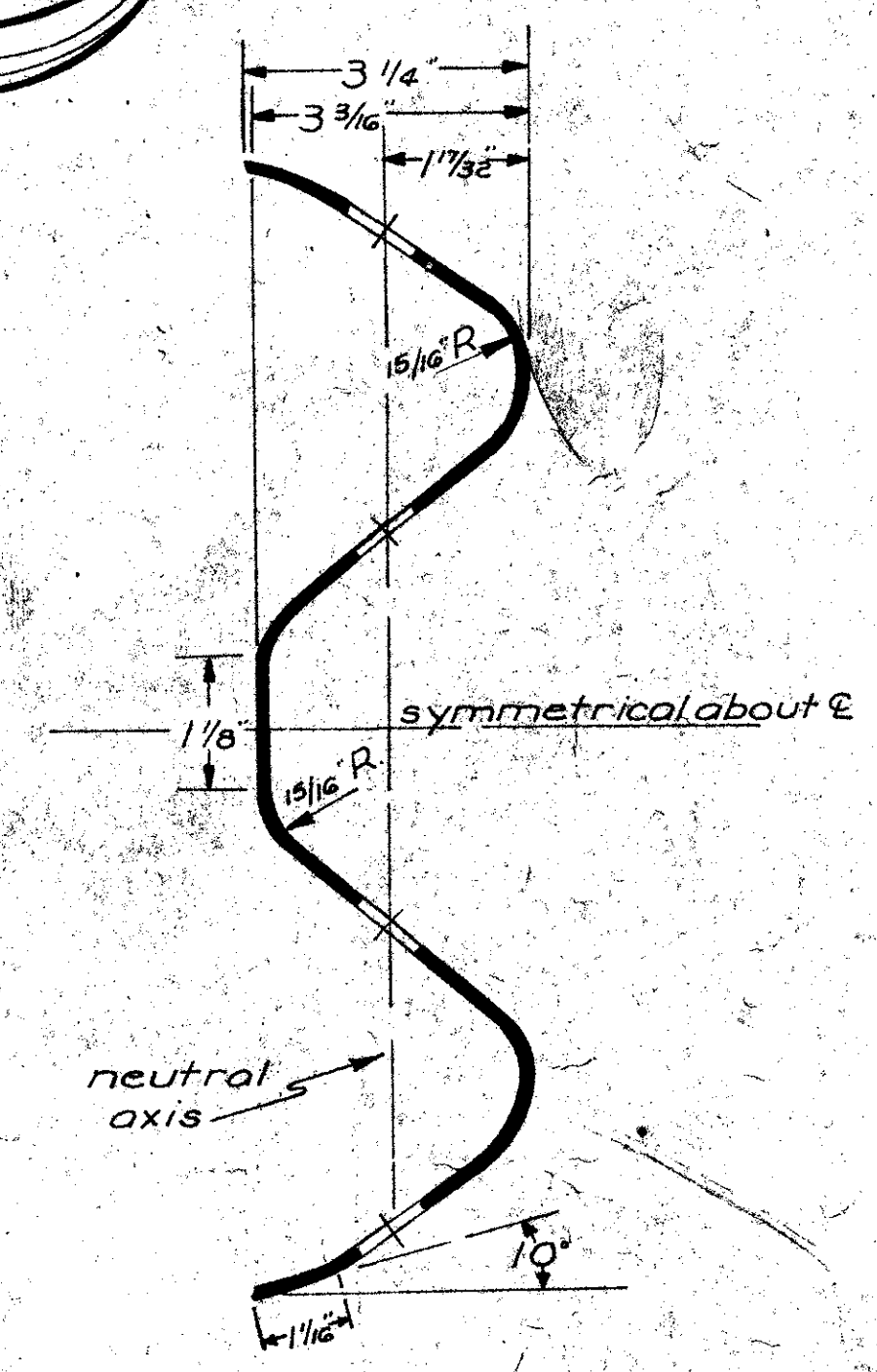
BEAM RAIL BOLT



RAIL SPLICE "B"

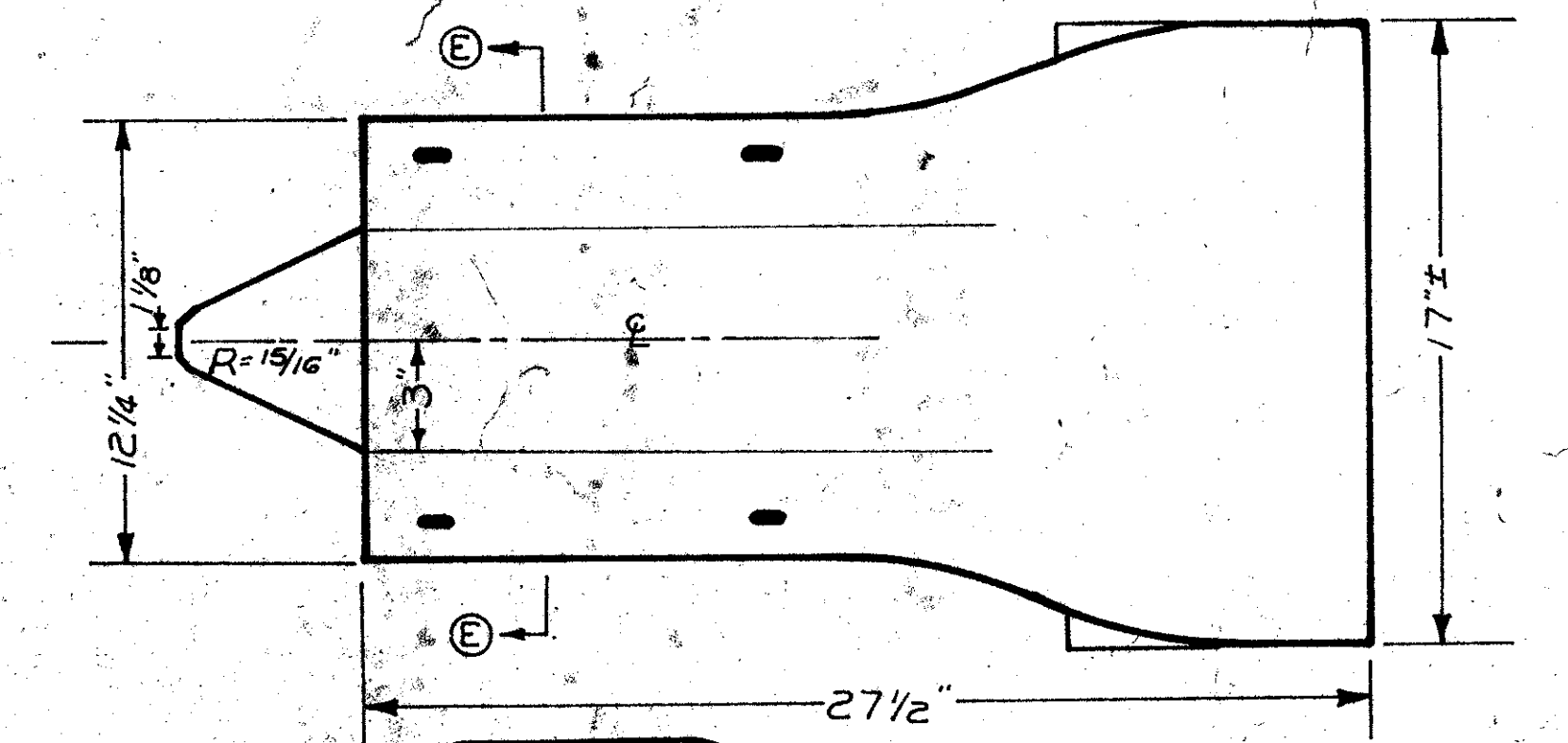


SEC. "B-B"
SPLICE ARRANGEMENT AT POST

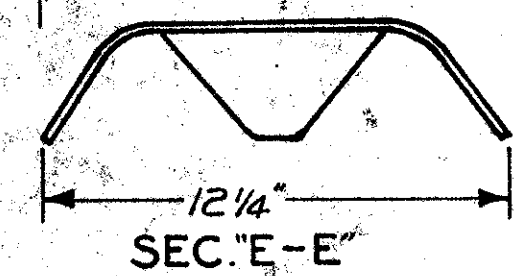


SECTION THRU RAIL "A"

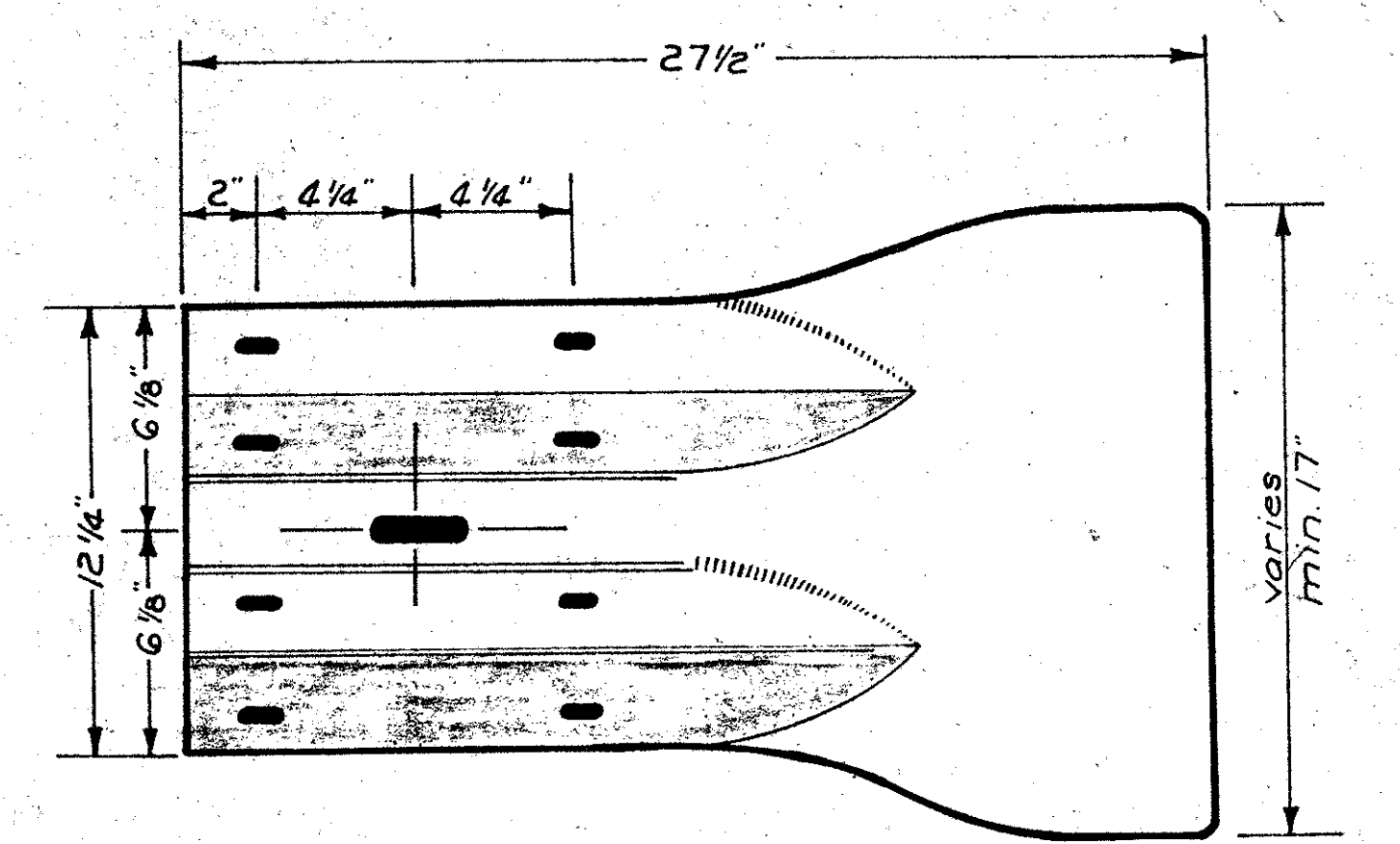
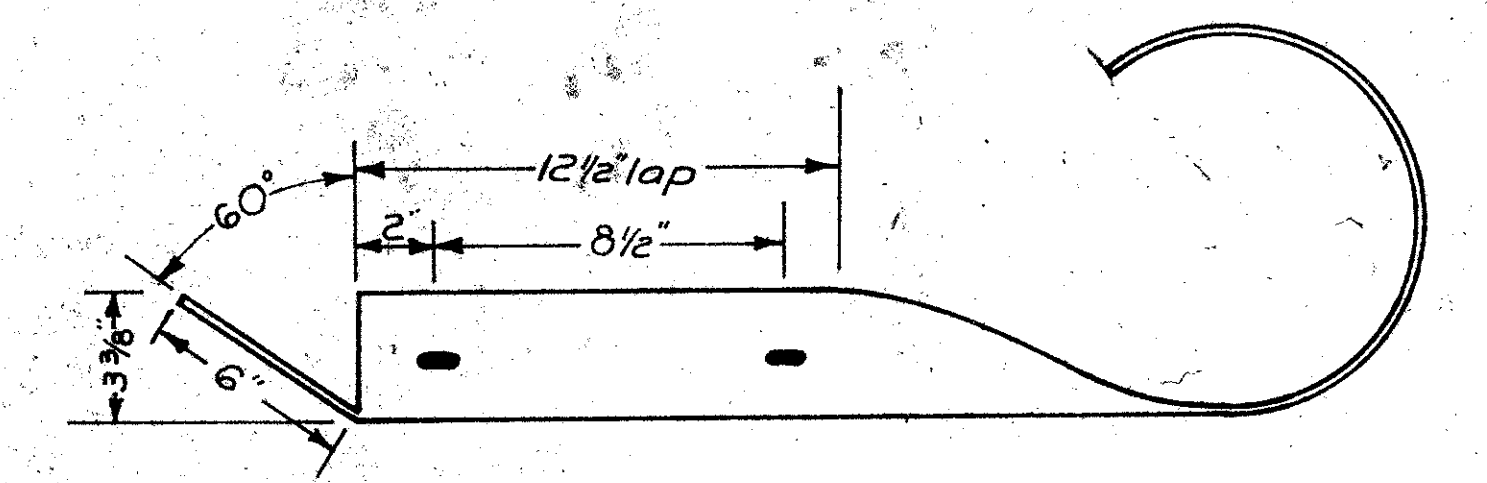
TERMINAL SECTIONS



TYPE B

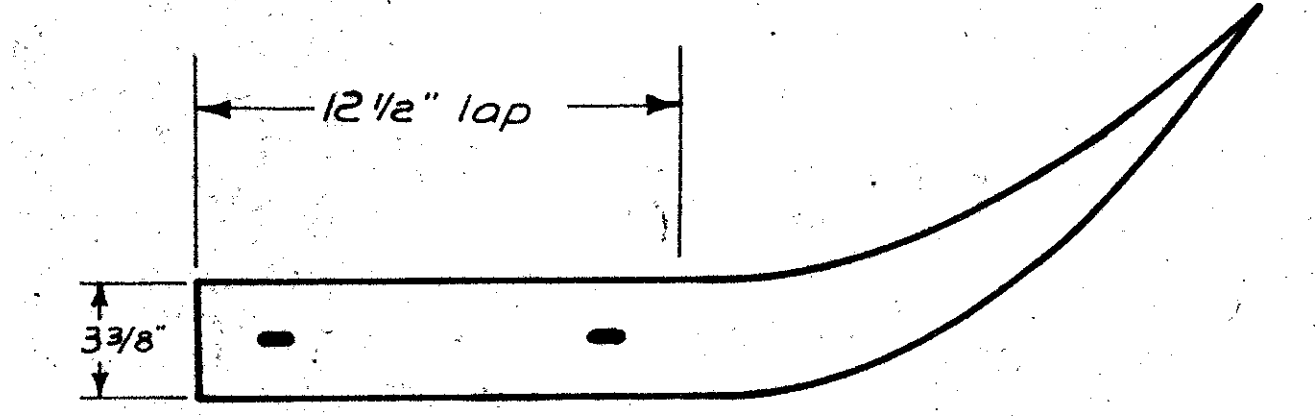


SEC. "E-E"



TYPE A

slots same as (B)
section same as (A)



NOTES:

Specifications reference, Section 2505.

The cost of necessary terminal sections shall be included in the unit price per lineal foot of beam rail. When a particular type is not specified in the detail plans, either type of terminal section may be used, but no variation through a project will be allowed.

Beam rail installed on curvilinear alinement with radii less than 150 ft. shall be shop curved by the fabricator to the proper radius.

Splices shall be made only at posts.

Posts shall be pressure treated with pentachlorophenol (4160.03) as per Section 4161 and painted as per Art. 2505.07, 1960 Standard Specifications.

When post spacing other than that indicated hereon is required, the preparation of the beam rail as well as any other work required because of additional posts shall be considered incidental to the price bid for "beam rail" and "posts".

IOWA HIGHWAY COMMISSION			
STANDARD ROAD PLAN		RE-1	
RECOMMENDED	<i>R.P. McLaughlin</i>	ROAD ENGINEER	11/14/60
DESIGN COMMITTEE		DATE	
APPROVED		CHIEF ENGINEER	DATE
FORMED STEEL BEAM GUARD RAIL			