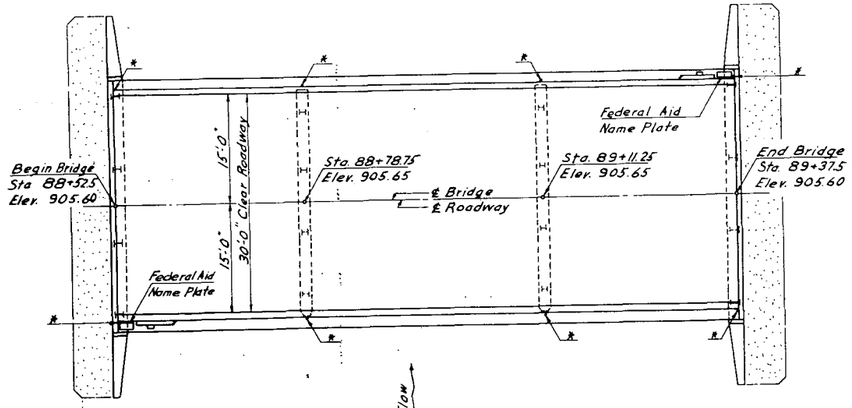
BRIDGE CODE	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X-020	5	N. D.	I-029-1(4)		104	



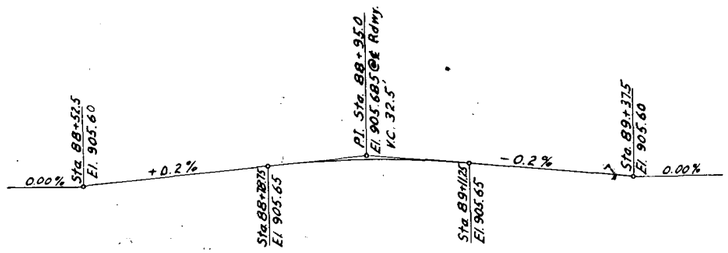
* Elevation check points only see Std. D-900-1. (Cost to be included in unit price bid for Class AE-1 Concrete Superstructure)

PLAN

	Begin Br.																	End Br.
Dead Load Deflection	0.0	0.0	.008	.013	.013	.008	0.0	0.0	.023	.036	.036	.023	0.0	0.0	.008	.013	.013	.008	0.0	0.0
Screed Elev. Including D.L. Def.	905.600	905.600	905.618	905.633	905.643	905.648	905.650	905.650	905.683	905.706	905.706	905.683	905.650	905.650	905.648	905.643	905.633	905.618	905.600	905.600
			5 Eq. Spaces = 24'-2"						5 Eq. Spaces = 31'-0"						5 Eq. Spaces = 24'-2"					
			1'-4"			1'-6"									1'-6"				1'-4"	

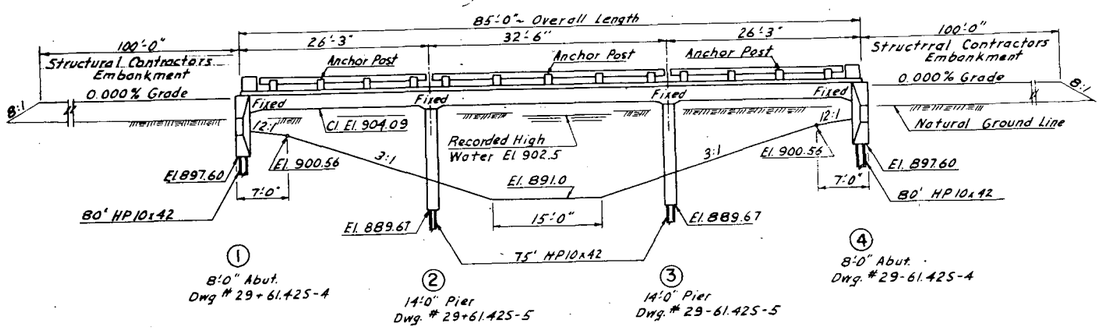
SCREED ELEVATIONS

Elevations are to top of finished Rdwy. @ ℄

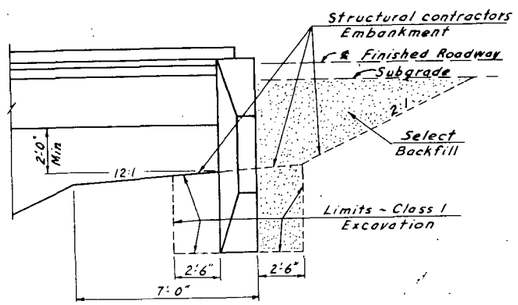


VERTICAL CURVE DATA

Elevations are to top of finished Rdwy @ ℄ for structural drainage only.



ELEVATION



DETAIL AT ABUTMENTS

Not to scale

1971
FEDERAL AID
PROJECT
I-029-1(4)
NORTH DAKOTA
29-61.42S

12-27-71

FEDERAL AID NAME PLATE
2 Required

BENCH MARKS

	DESCRIPTION	LOCATION	ELEV.
10	R.R. Spike in P.P.	80+20 - 277' Rt.	904.99
10	Paint Spot on Br.	88+63 - 251' Rt.	906.26
11	R.R. Spike in P.P.	97+25 - 282' Rt.	904.38

PILE LOADING

LOCATION	DEAD LOAD	LIVE LOAD	EARTH O. T. M.	WIND 50 LB.	WIND 15 LB.	WIND 100 LB. L.L.	LONG. FORCE	DESIGN LOAD	MAXIMUM REQUIRED BEARING
Abutment	23.3 T	8.7						32.0	55
Piers	40.5 T	12.4						52.9	55

ESTIMATE OF QUANTITIES

SPEC. NO.	CODE NO.	BID ITEM	
208	0100	CLASS 1 EXCAVATION	96 CU. YD.
208	0110	CLASS 2 "	71 CU. YD.
228	0100	SELECT BACKFILL	116 CU. YD.
610	1116	CLASS AE-1 CONCRETE (SLAB SUPERSTRUCTURE)	135.5 CU. YD.
610	1112	CLASS AE-1 CONCRETE (SUBSTRUCTURE)	92.6 CU. YD.
610	0138	CLASS AAE-3 " (RAILING & POSTS)	6.0 CU. YD.
612	0110	REINFORCING STEEL (GRADE. 40)	42,088 LB.
622	0020	STEEL PILING HP10x42	1,240 L.F.T.
750	0100	LINSEED OIL TREATMENT	14 GAL.

STRUCTURAL DRAWINGS

GENERAL DRAWING 29-61.42S, 29-61.42S-1, 2, 3.
SUBSTRUCTURE 29-61.42S-4 & 5.
SUPERSTRUCTURE 29-61.42S-6, H-0158, H-0501, H-0401, D-900-1 & D-900-6

DESIGN LOADING	SCALE
H 20	1 INCH = 10 FEET

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
ROSE COULEE
SERVICE ROAD (LEGAL DRAIN No. 27)
BRIDGE LAYOUT

PROJECT I-029-1(4) STA. 88+95.0

CASS COUNTY

APPROVED

12-27-71
DATE

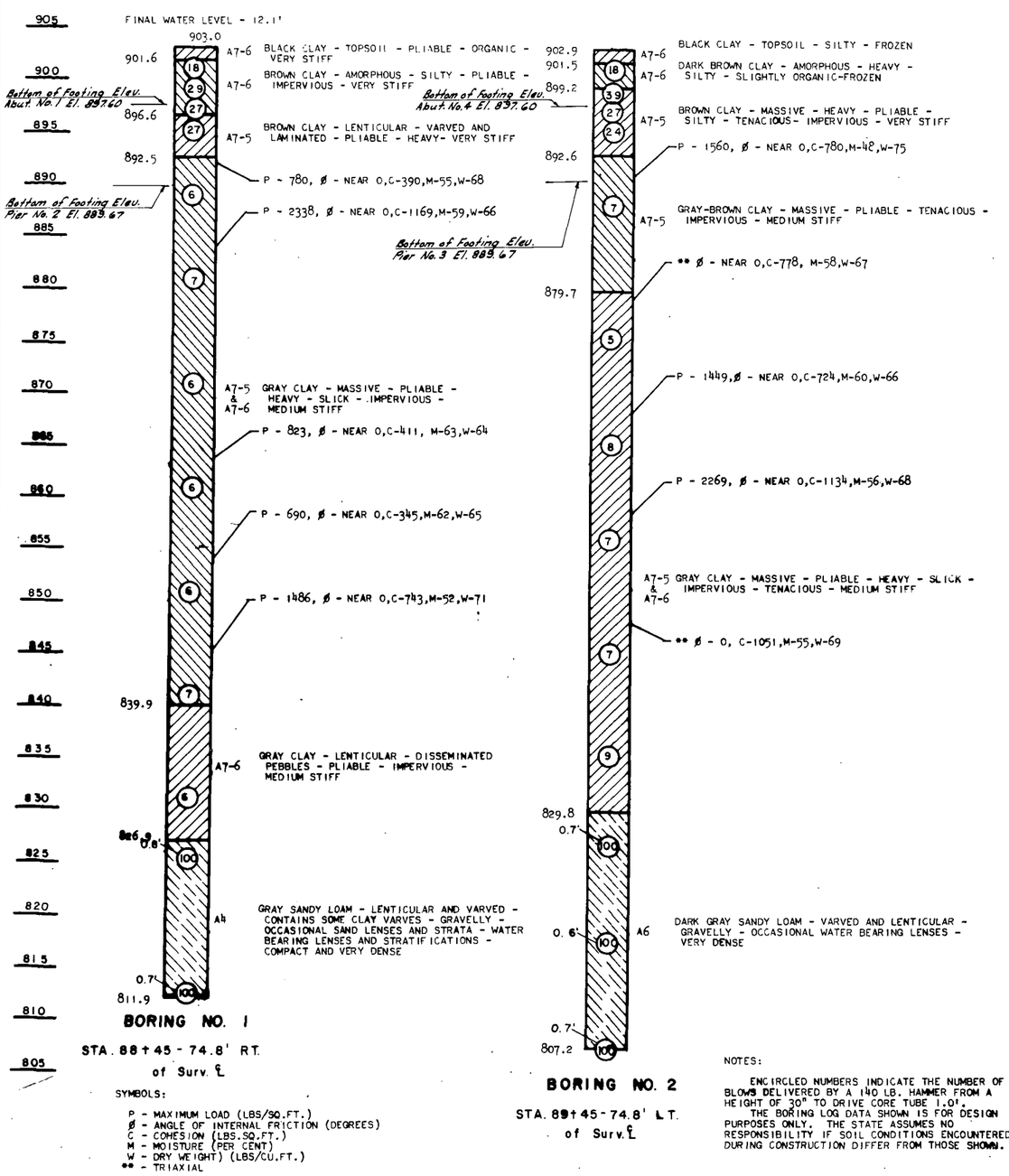
BRIDGE ENGINEER

29-61.42S 29-89S 29-89S 29-61.42S

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-029-1(4)	105		

REVISIONS

DETAILS MADE BY / CHECKED BY
TRACING MADE BY / CHECKED BY
QUANTITIES MADE BY / CHECKED BY



SYMBOLS:

P - MAXIMUM LOAD (LBS/SQ.FT.)
ø - ANGLE OF INTERNAL FRICTION (DEGREES)
C - COHESION (LBS.SQ.FT.)
M - MOISTURE (PER CENT)
W - DRY WEIGHT) (LBS/CU.FT.)
** - TRIAXIAL

NOTES:

ENCIRCLED NUMBERS INDICATE THE NUMBER OF BLOWS DELIVERED BY A 140 LB. HAMMER FROM A HEIGHT OF 30" TO DRIVE CORE TUBE 1.0'.

THE BORING LOG DATA SHOWN IS FOR DESIGN PURPOSES ONLY. THE STATE ASSUMES NO RESPONSIBILITY IF SOIL CONDITIONS ENCOUNTERED DURING CONSTRUCTION DIFFER FROM THOSE SHOWN.

QUANTITIES

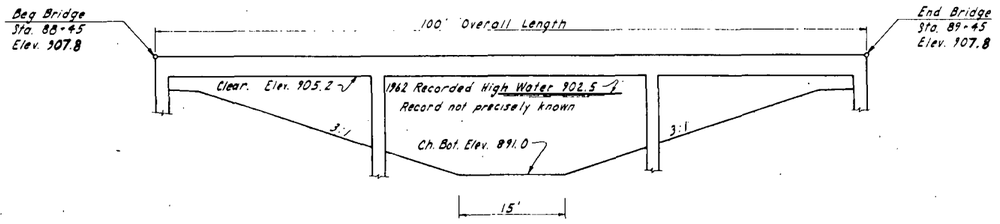
NEW BRIDGE NO. 29-61.42
OLD BRIDGE NO. 29-89

BORING LOG

ROSE COULEE

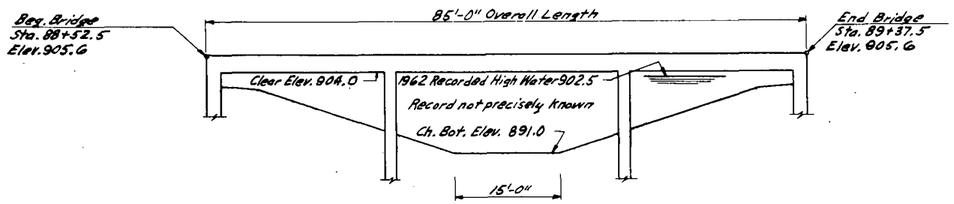
CASS COUNTY

FED. ROAD DIST. NO.	STATE	PROJ. NO	SHEET NO.	TOTAL SHEETS
5	N.D.	I-029-1(4)	106	



ELEVATION OF PROPOSED BRIDGE (ML)

SCALE: 1" = 10'



ELEVATION OF PROPOSED BRIDGE (SERVICE ROAD)

SCALE: 1" = 10'

HYDRAULIC DESIGN DATA

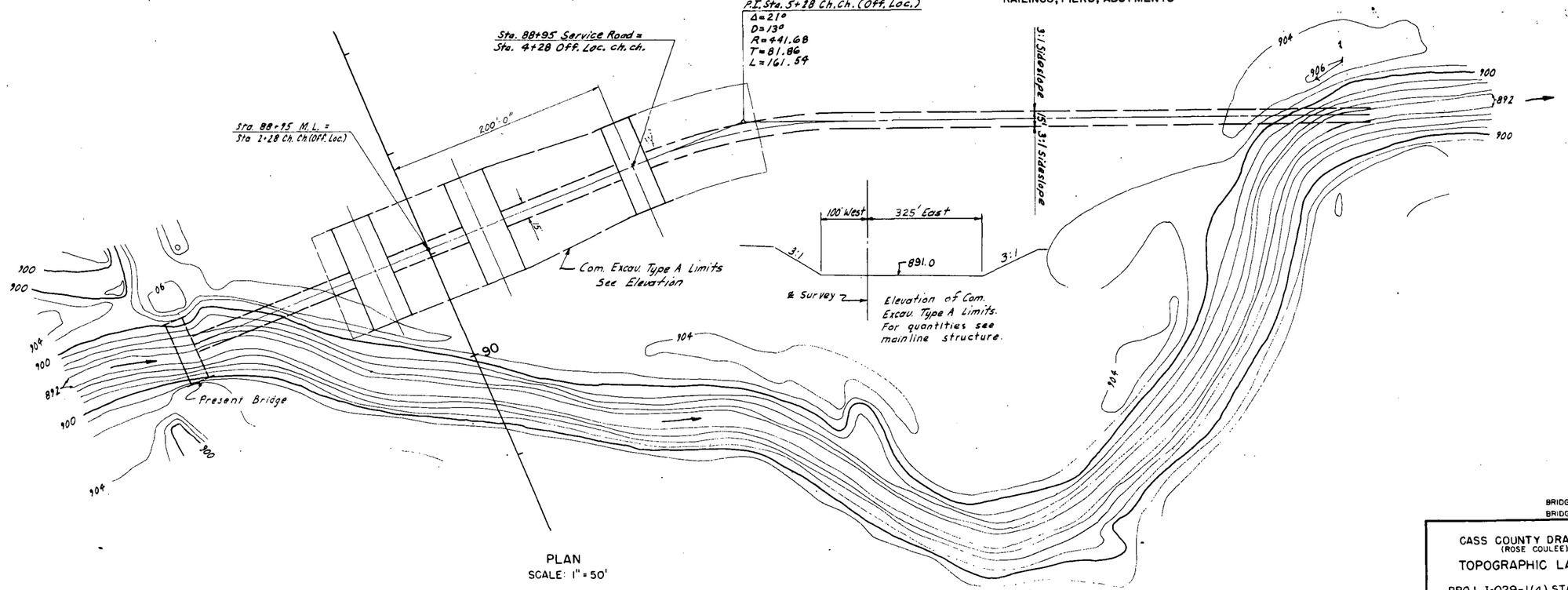
DRAINAGE AREA	20 SQ. MI.
DESIGN FREQUENCY	50 YEARS
DESIGN DISCHARGE, Q50 (NOT CONTROLLING)	450 CFS + OVERFLOW FROM SHEYENNE RIVER
NATURAL STREAM GRADIENT	0.000265 FT./FT.
WATERWAY PROVIDED BELOW RECORDED HIGHWATER	540 SQ. FT.
WATERWAY PROVIDED BELOW CLEARANCE	713 SQ. FT.
AVERAGE VELOCITY OF FLOW IN NATURAL CHANNEL	APPROX. 1 FPS
DEPTH OF FLOW, RECORDED HIGHWATER	11.5 FT.
VELOCITY OF FLOW UNDER BRIDGE	APPROX. 1 FPS
FREEBOARD PROVIDED	2.0 FT.
MAXIMUM RECORDED STAGE (1962)	902.5
ESTIMATED MAXIMUM RECORDED DISCHARGE	UNKNOWN
FREQUENCY OF MAXIMUM FLOOD	UNKNOWN
MINIMUM WATER ELEVATION	891.0

BRIDGE DESIGN CRITERIA (ML)

TYPE	3-SPAN PRESTRESSED BOX GIRDER
DESIGN LIVE LOAD	HS-20
ROADWAY WIDTH	40'-0" CLEAR
RAILINGS	STANDARD R.C.
PIERS	SOLID WALL TYPE
ABUTMENTS	MONOLITHIC WALL TYPE

BRIDGE DESIGN CRITERIA (SERVICE ROAD)

TYPE	THREE SPAN SLAB
DESIGN LIVE LOAD	H-20
ROADWAY WIDTH	30'-0" CLEAR
RAILINGS, PIERS, ABUTMENTS	SAME AS MAINLINE



PLAN

SCALE: 1" = 50'

BRIDGE NO. 29-61.42S
BRIDGE NO 29-89S

CASS COUNTY DRAIN # 27
(ROSE COULEE)

TOPOGRAPHIC LAYOUT

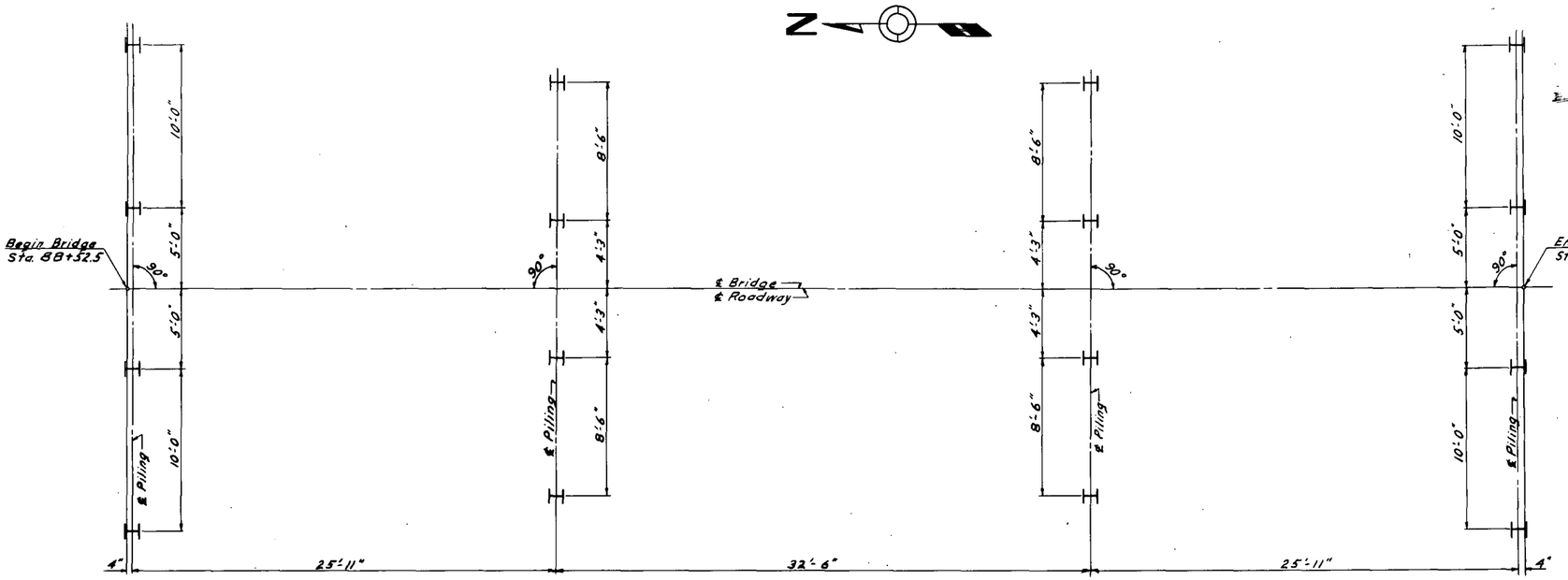
PROJ. I-029-1(4) STA. 88 + 95

CASS COUNTY

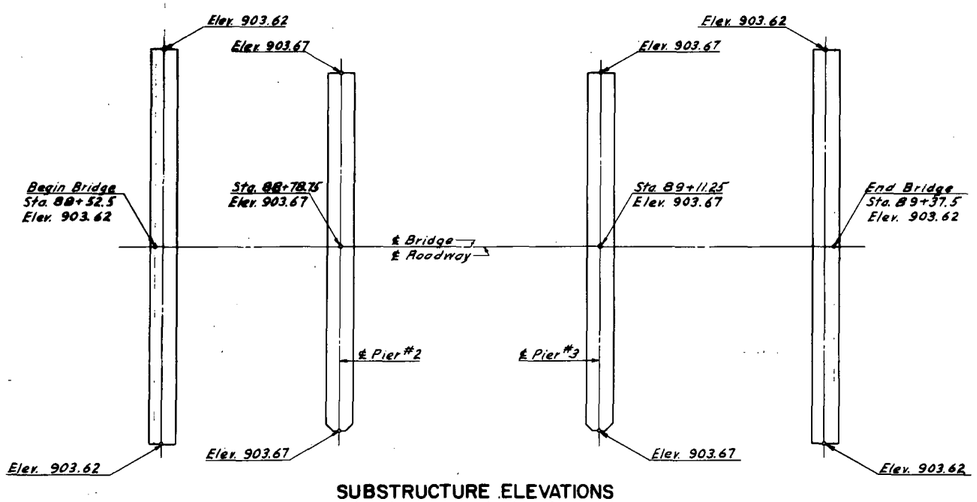
29-61.42S-2 29-89S 29-89S 29-61.42S-2

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-029-1(4)		107	

	MADE BY	DATE
REVISIONS		
DETAILS	CHECKED BY D.R.E.	
TRACING	MADE BY J.A.E.	
	CHECKED BY	
QUANTITIES	MADE BY W.K.B.	
	CHECKED BY	



PILING STAKING LAYOUT



SUBSTRUCTURE ELEVATIONS

Elevations are to top of concrete

GENERAL:

WORK SHALL CONFORM TO ALL APPLICABLE PARAGRAPHS OF THE NORTH DAKOTA STATE HIGHWAY DEPARTMENT SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

THE COST OF FURNISHING AND PLACING ASPHALT CURB SEAL, NAME PLATES, PREMOLDED JOINT FILLER, BAR SPACERS, BAR SUPPORTS, SCREED CHAIRS, THREADED INSERTS AND OTHER MISCELLANEOUS ITEMS SHALL BE INCLUDED IN THE PRICE BID FOR CLASS AE-1 AND AAE-3 CONCRETE.

THE COST OF SLAB DRAINS SHALL BE INCLUDED IN THE PRICE BID FOR CLASS AE-1 CONCRETE.

CONCRETE:

THE "RUBBED SURFACE FINISH" WILL BE REQUIRED FOR THE ROADWAY AND OUTSIDE OF CURBS, EDGES OF SLAB, EXPOSED FACES OF PIER DIAPHRAGMS, ALL FACES OF RAILING AND END POSTS, AND TO ALL EXPOSED FACES OF ABUTMENTS AND PIERS. ALL OTHER SURFACES SHALL HAVE THE "ORDINARY SURFACE FINISH". ALL ORDINARY SURFACE FINISH SHALL BE COMPLETED WITHIN 24 HOURS AFTER REMOVAL OF FORMS. THE CONTRACTOR HAS THE OPTION OF USING THE "SPECIAL SURFACE FINISH" AS PROVIDED IN SEC. 602-3.10.5 IN LIEU OF THE "RUBBED SURFACE FINISH" (502-3.10.3) CALLED FOR ABOVE.

AIR-ENTRAINED PORTLAND CEMENT SHALL BE USED IN THE ENTIRE BRIDGE.

ALL EXPOSED EDGES OF CONCRETE SHALL BE BEVELED WITH 3/4" TRIANGULAR MOLDING UNLESS OTHERWISE NOTED.

ALL CONCRETE ABOVE THE CURB SHALL BE CLASS AAE-3. THE REMAINING PORTIONS OF THE SUPERSTRUCTURE SHALL BE AE-1. CONCRETE IN SUBSTRUCTURES SHALL BE CLASS AE-1.

EXCAVATION:

ALL EXCAVATION AT THE PIERS SHALL BE CLASS 2 WITHIN SPECIFIED LIMITS. (208-4.1 AND 208-4.1.2). ALL EXCAVATION AT THE ABUTMENTS SHALL BE CLASS 1 WITHIN SPECIFIED LIMITS (208-4.1.1).

COMMON EXCAVATION TYPE A IS INCLUDED IN THE QUANTITY OF MAINLINE STRUCTURE.

BACKFILL:

BACKFILLING SHALL BE DONE IN ACCORDANCE WITH SECTION 228 EXCEPT THAT THE EMBANKMENT SHALL BE COMPACTED TO NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHO DESIGNATION T-99. THE MOISTURE CONTENT IN THE SOIL AT THE TIME OF COMPACTION SHALL NOT BE LESS THAN 4 PERCENTAGE POINTS BELOW OPTIMUM NOR MORE THAN THAT WHICH WILL PERMIT COMPACTION TO THE REQUIRED DENSITY. SELECT BACKFILL SHALL NOT BE PLACED ABOVE THE BERM ELEVATION UNTIL THE ENTIRE SUPERSTRUCTURE SLAB HAS CURED.

REINFORCING:

DIMENSIONS FOR REINFORCING STEEL BENT BARS ARE GIVEN OUT TO OUT UNLESS OTHERWISE NOTED.

THE BAR FABRICATOR SHALL ADD A PREFIX TO ALL BAR DESIGNATIONS TO DIFFERENTIATE BETWEEN THE SEVERAL PARTS OF THE STRUCTURE OR STRUCTURES.

PILING:

THE PILING FOR THIS STRUCTURE SHALL BE DRIVEN BY A STEAM, AIR OR DIESEL HAMMER HAVING A RATED ENERGY AND RAM WEIGHT NOT LESS THAN 29,856 FOOT POUND TONS AS COMPUTED BY THE FORMULA $W(E-8820) + 9.68E$ WHERE W IS THE WEIGHT OF THE RAM IN TONS AND E IS THE RATED HAMMER ENERGY AS ALLOWED IN THE SEC. 622-4.1.19.1. IN NO CASE SHALL THE RAM WEIGHT BE LESS THAN 4800 POUNDS.

THE TEST PILES FOR THIS STRUCTURE SHALL BE DRIVEN TO A BEARING OF NOT LESS THAN 125% DESIGN LOAD AS DETERMINED BY THE DYNAMIC FORMULA.

PILING LENGTHS WILL NOT BE DETERMINED UNTIL THE TEST PILE FOR THE MAIN LINE STRUCTURES HAVE BEEN DRIVEN.

DESIGN STRESSES:

1700 PSI CLASS AAE-3 CONCRETE
1200 PSI CLASS AE-1 CONCRETE
20000 PSI GRADE 40 REINFORCING STEEL.

CONCRETE:

IF THE EXPOSED FACES OF THE ABUTMENTS AND PIERS HAVE A SURFACE FINISH ACCEPTABLE TO THE ENGINEER WITHOUT RUBBING, THE REQUIREMENT FOR "RUBBED SURFACE FINISH" MAY BE WAIVED AT THE OPTION OF THE ENGINEER, AND THE "ORDINARY SURFACE FINISH" WILL APPLY.

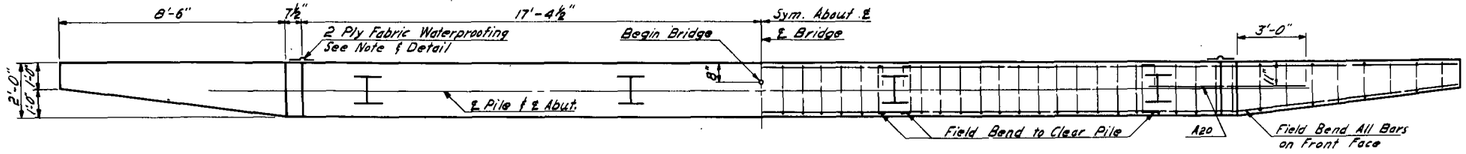
LINSEED OIL TREATMENT:

LINSEED OIL TREATMENT SHALL NOT BE DONE UNTIL ALL CONCRETE WORK IS COMPLETED AND ASPHALT CURB SEAL HAS BEEN INSTALLED.

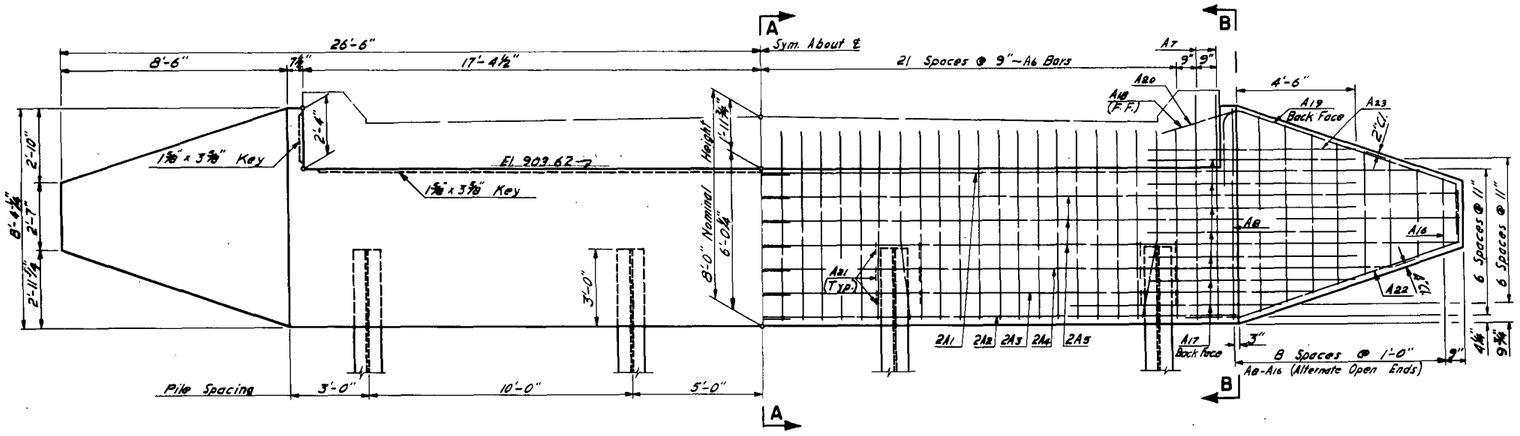
QUANTITIES

PILE STAKING LAYOUT
NOTES
SUBSTRUCTURE ELEVATIONS

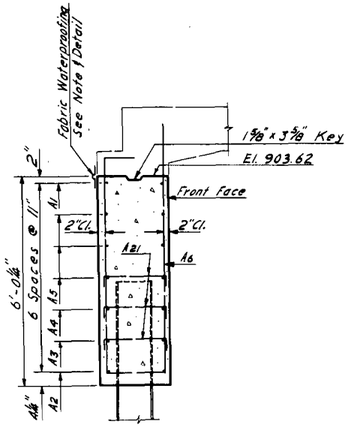
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
5	N. D.	I-029-1(41)	108	



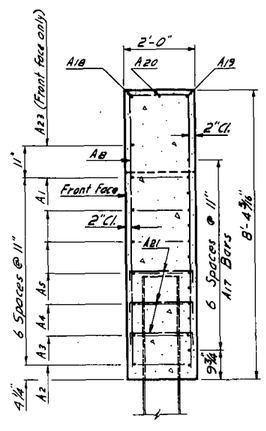
Showing Dimensions **PLAN** Showing Reinforcing



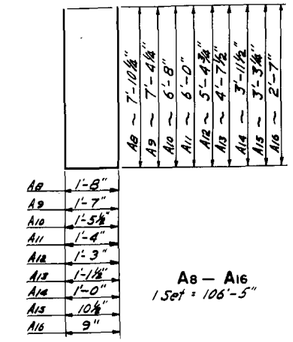
Showing Dimensions **ELEVATION** Showing Reinforcing



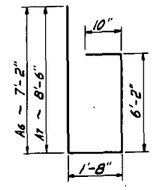
A-A



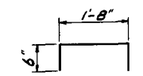
B-B



A8 — A16
1 Set = 106'-5"



A6 – A7



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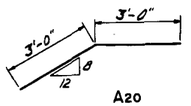
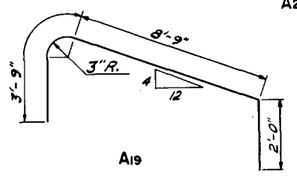


A20



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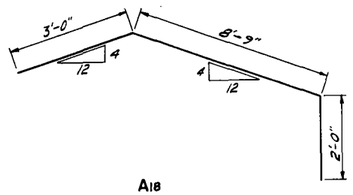

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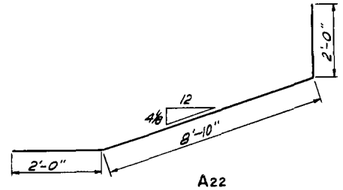
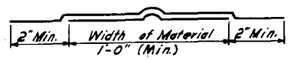


A22

BENT BAR DETAILS
Dimensions are shown out to out



FABRIC WATERPROOFING DETAIL

BAR LIST (ONE ABUT.)

MARK	NO	SIZE	LENGTH	SHAPE	UNIT WT.
A1	4	6	25'-9"	Str.	38.68
A2	4	6	19'-0"	"	28.54
A3	4	5	21'-9"	"	22.69
A4	4	5	24'-9"	"	25.82
A5	12	5	27'-3"	"	28.42
A6	43	6	15'-10"	Bent	23.78
A7	4	6	17'-2"	"	25.79
A8-A16	1 Set	6	106'-5"	"	159.84
A17	14	8	8'-0"	Str.	21.36
A18	2	6	13'-9"	Bent	20.65
A19	2	6	14'-6"	"	21.78
A20	2	6	6'-0"	"	9.01
A21	28	4	2'-8"	"	1.78
A22	4	6	12'-10"	"	19.28
A23	2	5	8'-0"	Str.	8.34
				Total =	2,788

NOTE:
Two Ply Fabric Waterproofing shall consist of furnishing materials and placing dampproofing and fabric waterproofing at areas designated on this sheet in accordance with Sec. 736 of the Standard Specifications for Two Ply Fabric Waterproofing. All materials and work shall be considered incidental to the pay item for Class AE-1 Concrete.

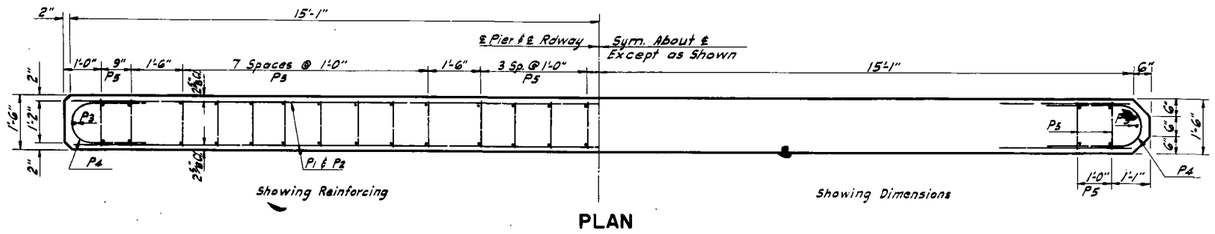
QUANTITIES (ONE ABUT.)

Class AE-1 Concrete	22.4 C.Y.
Reinforcing Steel	2,788 Lbs.
Piling (See Layout)	
Excavation (See Layout)	

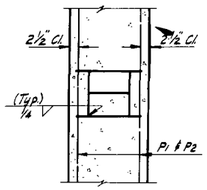
ROSE COULEE
SERVICE ROAD
(LEGAL DRAIN NO. 27)
8' ABUTMENT
30' CL. RDWY. H20 LOADING

QUANTITIES CHECKED BY A.R.E.
MADE BY U.A.E.

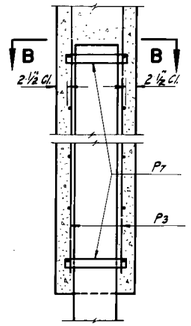
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-029-1(4)		109	



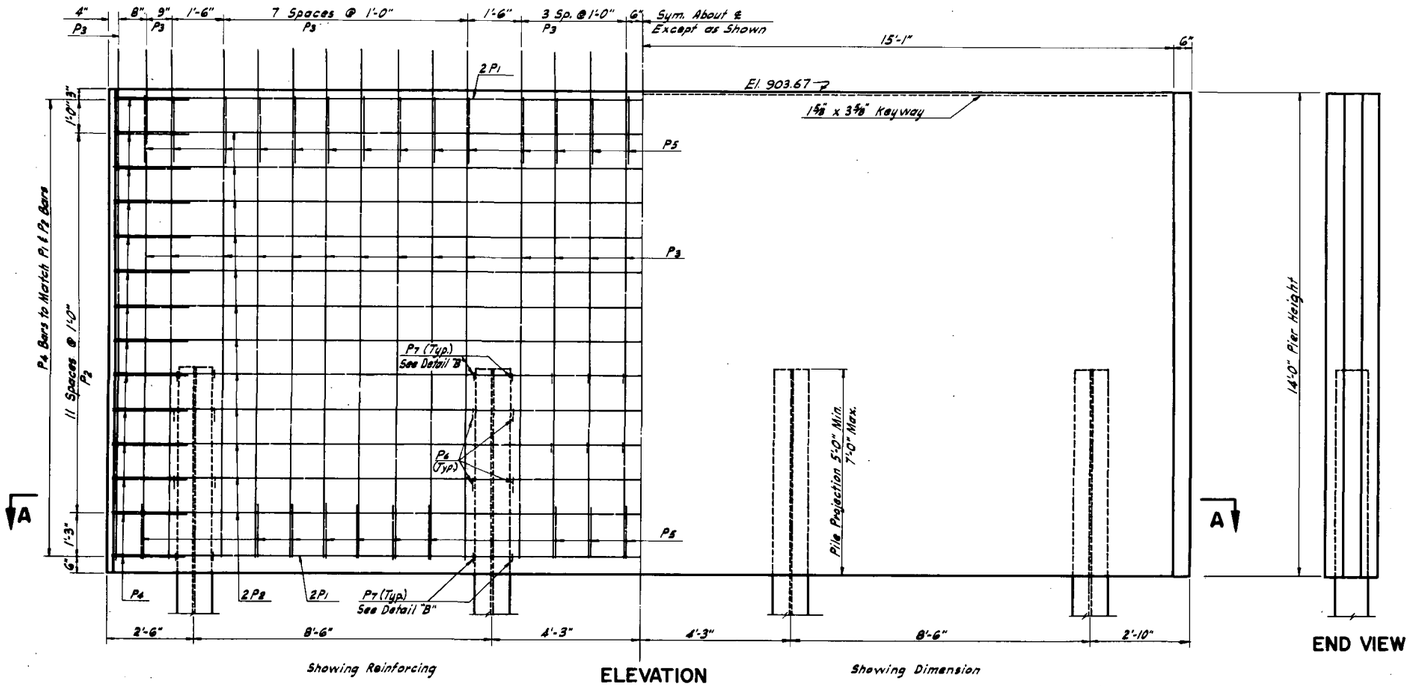
PLAN



B-B



DETAIL "B"

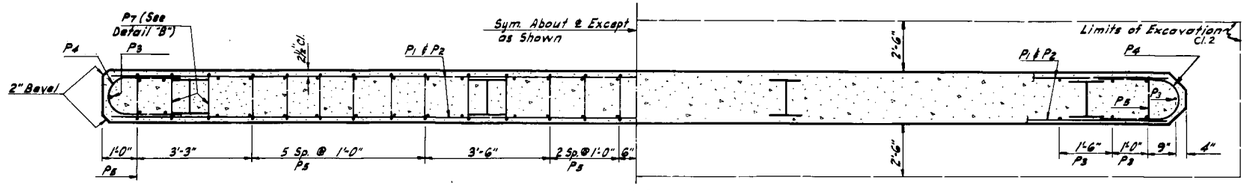


Showing Reinforcing

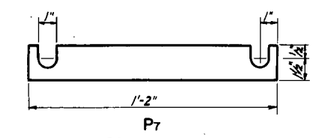
ELEVATION

Showing Dimension

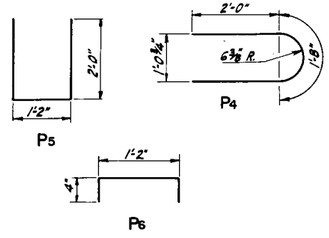
END VIEW



A-A



2" x 3/8 flat bar to be paid for as reinforcing steel.



BENT BAR DETAILS

Dimensions Are Out To Out

BAR LIST (ONE PIER)

MARK	NUMBER	SIZE	LENGTH	UNIT WEIGHT	SHAPE
P1	4	6	30'-0"	45.06	Str.
P2	24	5	30'-0"	31.29	Str.
P3	58	5	14'-9"	15.39	Str.
P4	28	5	5'-8"	5.91	Bent
P5	48	5	5'-2"	5.39	"
P6	16	4	1'-10"	1.22	"
P7	16	2"x3/8"	1'-2"	2.98	Flat Bar
				Total =	2,315
*SR4	1	4	3'-6"		Str.
*SR5	1	5	4'-0"		"
*SR6	1	6	4'-6"		"

NOTE:
* Sample replacement bars to be spliced to bar from which 2'-0" sample has been cut. Furnish only one of each for entire bridge. The replacement bars will not be paid for directly. Their cost shall be included in the unit price bid for reinforcing steel.

QUANTITIES

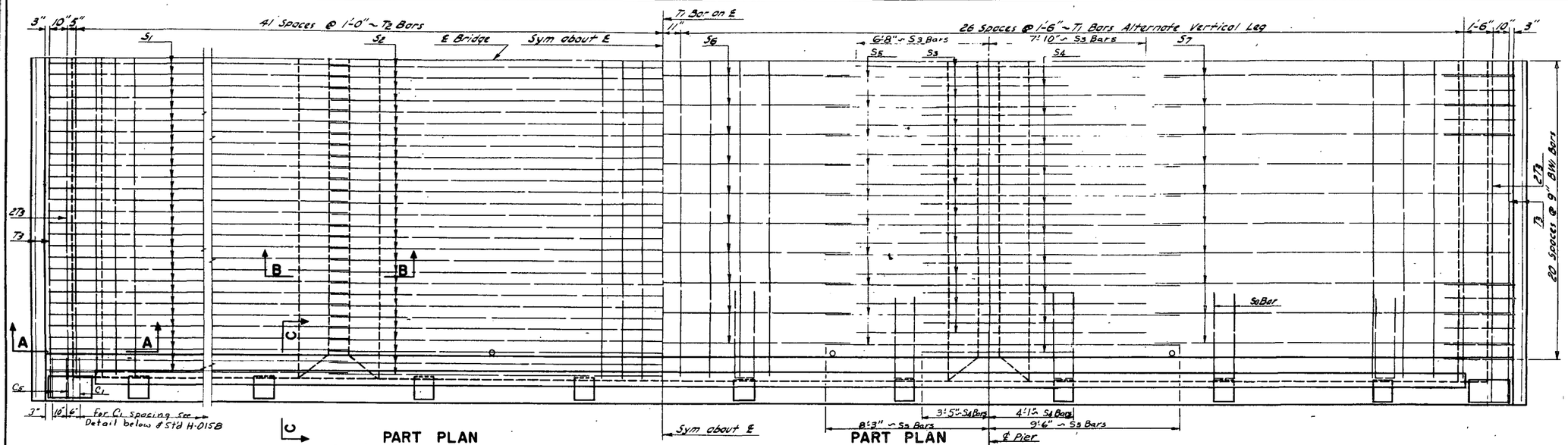
Class AE-1 Concrete	23.9 Cu. Yd.
Reinforcing Steel (Grade 40)	2,315 Lbs.
Piling (See Layout)	
Excavation (See Layout)	

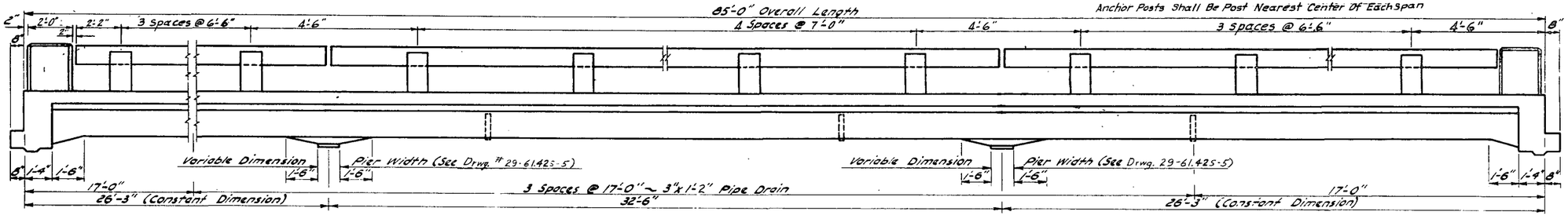
ROSE COULEE
SERVICE ROAD
(LEGAL DRAIN NO. 27)
14' PIER

30' CL. RDWY. H20 LOADING

DETAILS: CHECKED BY APE; MADE BY JAE
QUANTITIES: CHECKED BY DRE; MADE BY LFF
DRAWING: CHECKED BY DRE; MADE BY DRE
QUANTITIES: CHECKED BY J.A.E.; MADE BY J.A.E.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
5	N.D.	I-029-1(14)	110	

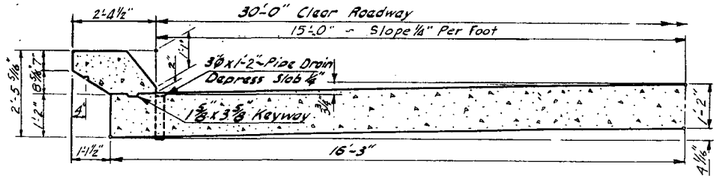


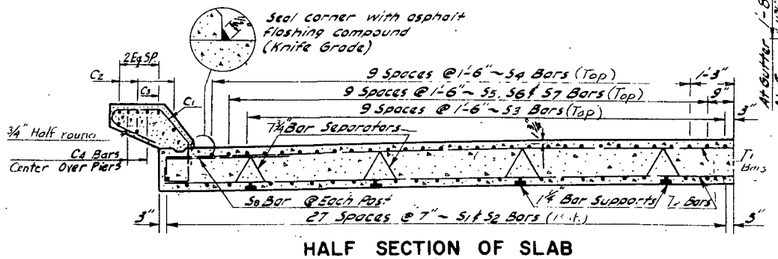


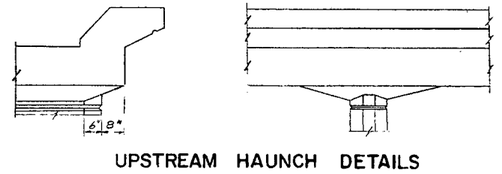
BAR LIST

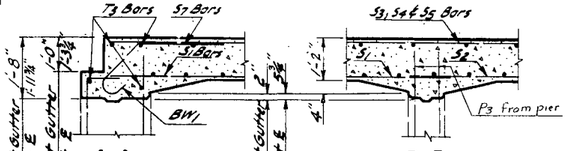
MARK	NO	SIZE	LENGTH	SHAPE
S1	112	9	27'-6"	Str.
S2	56	9	35'-3"	"
S3	40	8	14'-6"	"
S4	40	7	7'-6"	"
S5	40	8	17'-9"	"
S6	20	4	18'-6"	"
S7	40	4	16'-9"	"
S8	26	6	8'-0"	Bent
T1	55	4	32'-9"	Bent
T2	83	5	32'-2"	Str.
T3	8	6	34'-3"	"
BW1	82	6	4'-9"	Bent
BW2	12	5	4'-6"	"
C1	220	5	6'-3"	Bent
C2	20	5	43'-0"	Str.
C3	4	6	43'-3"	"
C4	8	5	15'-0"	"
C5	8	5	5'-4"	Bent
*P1	24	6	25'-5"	Str.
*P2	12	6	32'-0"	"
*PC	176	3	3'-3"	Bent
*P4	60	6	4'-4"	Bent
*P5	18	6	5'-1"	"
*P6	52	5	4'-9"	"
*P7	52	3	4'-2"	"
*P8	40	3	3'-2"	"
*P9	12	3	4'-8"	"

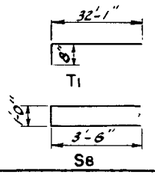
* See Drawing H-0158

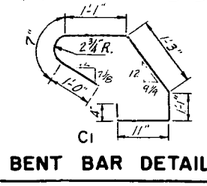


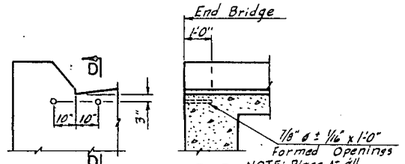


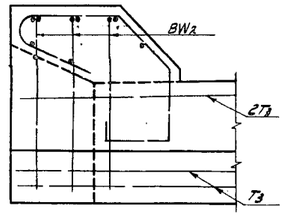


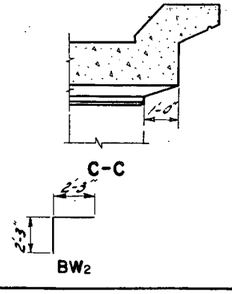


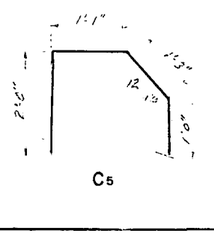












This slab has been dimensioned for a 1'-0" pier width. If the pier width varies, adjust clear span opening accordingly.

NOTE: This drawing not to scale.

Designed for 25 lb/sq. ft. F.W.S.

QUANTITIES

Concrete Class AE-1	135.5 C.Y.
Concrete Class AAE-3	6.0 C.Y.
Reinforcing Steel	32,782 Lbs.
Linseed Oil Treatment	14 Gal.

SLAB BRIDGE DETAILS

THREE SPAN CONTINUOUS
OVERALL LENGTH 85'-0"
30'-0" CLEAR ROADWAY
H 20 LOADING