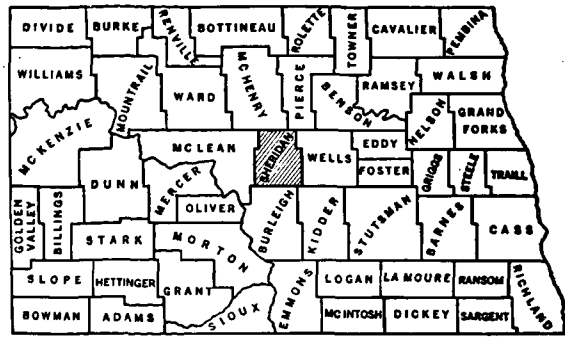
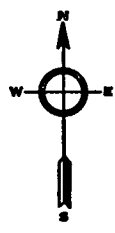


14-061.107

FED. ROAD DIV. NO.	STATE	STATE AID PROJ. NO.	SHEET NO.
8	N.D.	BRC-4-014(01)059	1



SKETCH-MAP OF NORTH DAKOTA SHOWING COUNTIES



SCALES  
 LAYOUT SHEET: 1 IN. = 3000 FT.  
 PLAN AND PROFILE DRAWINGS (VERT.): 1 IN. = 10 FT.  
 STRUCTURAL DRAWINGS: AS SHOWN  
 CROSS SECTION SHEETS: 1 IN. = 10 FT., 1 IN. = 20 FT.

# NORTH DAKOTA STATE HIGHWAY DEPARTMENT

## PLANS

FOR THE PROPOSED IMPROVEMENT OF A

## STATE HIGHWAY

IN SHERIDAN COUNTY

STATE AID PROJECT NO. BRC-4-014(01)059  
 STRUCTURAL, RIPRAP, GRADING, & BIT. SURFACING

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
BRC-4-014(01)059	2.888	2.888
TOTALS	2.888	2.888

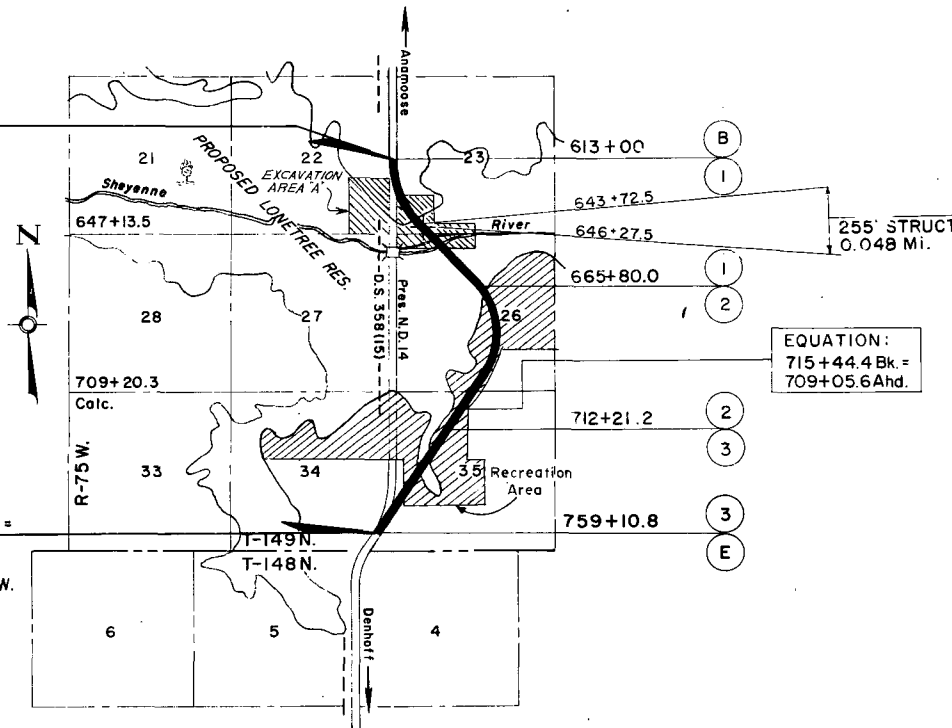
GOVERNING SPECIFICATIONS:  
 Standard Specifications adopted by the North Dakota State Highway Department July 1, 1971 and approved as standard by the Federal Highway Administration Sept. 29, 1971 Required Contract Provision (Form PR-1273) dated April 1974 and others submitted herewith.

### DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. 30TH MAX. HR.
CURRENT TRAFFIC (1975)	210 PASS. 40 TRUCKS 250 TOTAL	45
TRAFFIC FORECAST (1995)	340 PASS. 60 TRUCKS 400 TOTAL	80
DESIGN SPEED	60 MPH	
TRAFFIC CLASSIFICATION	"M"	
MINIMUM SIGHT DISTANCE (STOPPING)	650'	
MINIMUM SIGHT DISTANCE (SAFE PASSING)	2300'	
MINIMUM PASSING SIGHT DISTANCE FOR MARKING	1000'	
BRIDGES		

BEG. BRC-4-014(01)059 STA. 613+00 =  
 Sta. 603+55.2 on DS-358(15)  
 A point 2216.7' South of the N.W. Cor. of  
 Sec. 23, Twp. 149 N., Rge. 75 W.

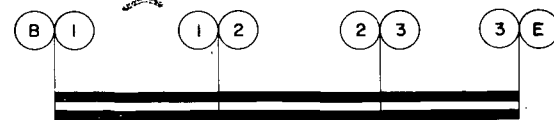
END BRC-4-014(01)059 STA. 759+10.8 =  
 Sta. 744+47.9 on DS-358(15)  
 A point 491.1' West and 587.1' North of  
 the S.W. Cor. of Sec. 35 Twp. 149 N., Rge. 75 W.



EQUATION:  
 $715 + 44.4 Bk. = 709 + 05.6 Ahd.$

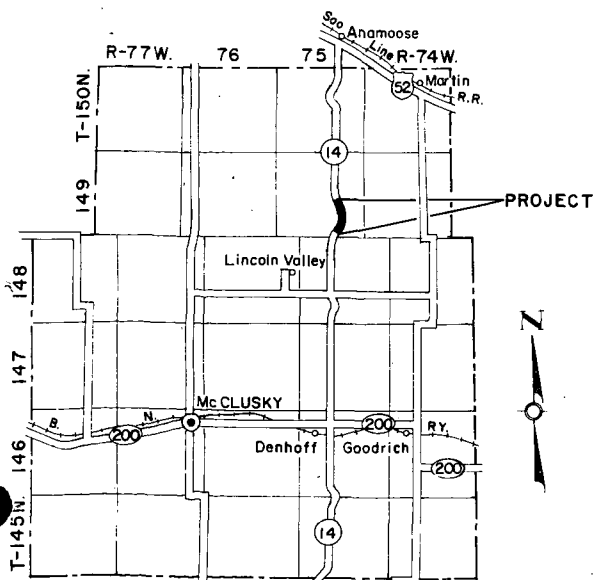
\* MAY 23, 1975 - GRADING & INCIDENTAL  
 Δ JULY 30, 1976 - RIPRAP & STRUCTURAL

LAYOUT MAP  
 3000 0 3000  
 SCALE IN FEET



BARRIER STRIPING DIAGRAM  
 LEGEND

Passing Zones  
 Non-Passing Zones (Barrier Stripes)  
 He=3.75 Ft., Ho=4.5 Ft.



SKETCH MAP OF SHERIDAN COUNTY

APPROVED DATE 6-1-76  
*[Signature]*  
 CHIEF ENGINEER  
 NORTH DAKOTA  
 STATE HIGHWAY DEPARTMENT



U.S. DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION  
 APPROVED  
 DIVISION ADMINISTRATOR DATE

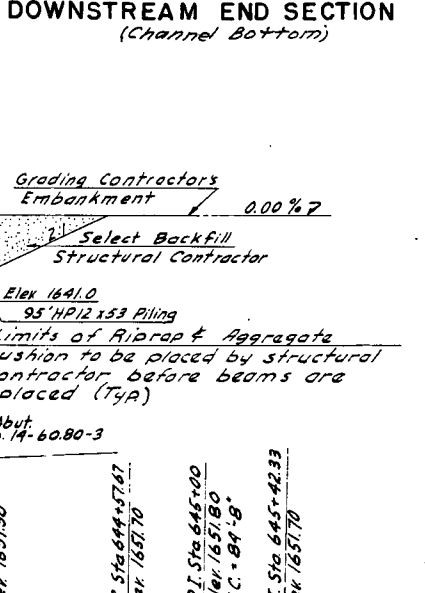
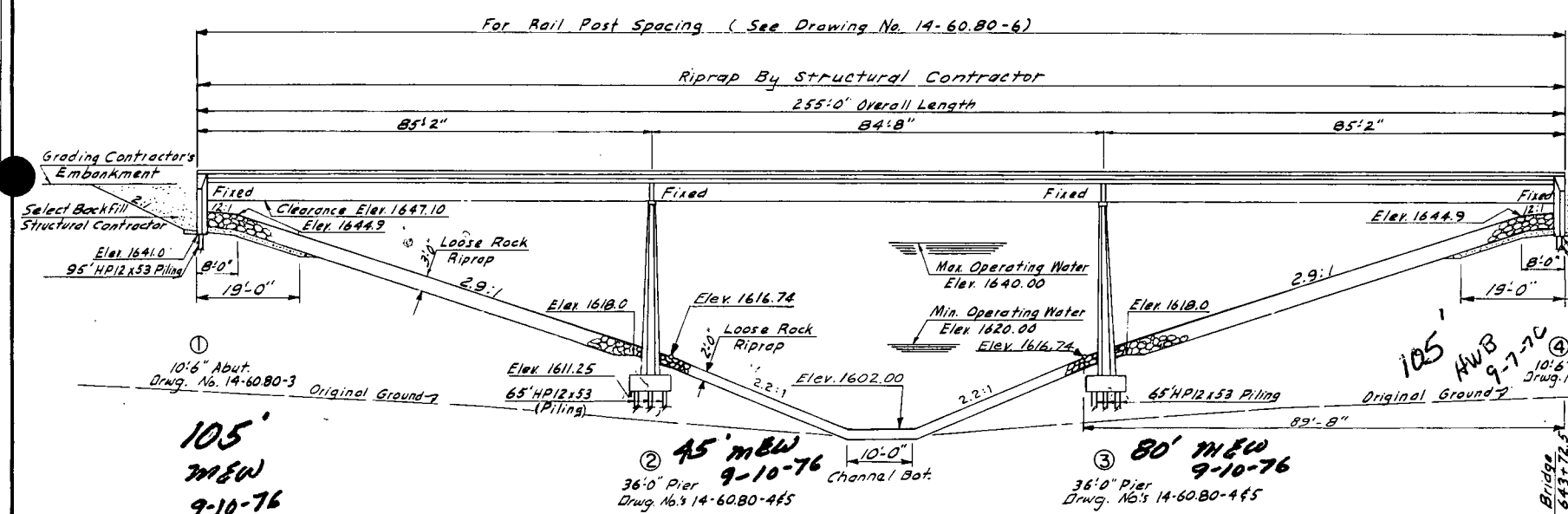
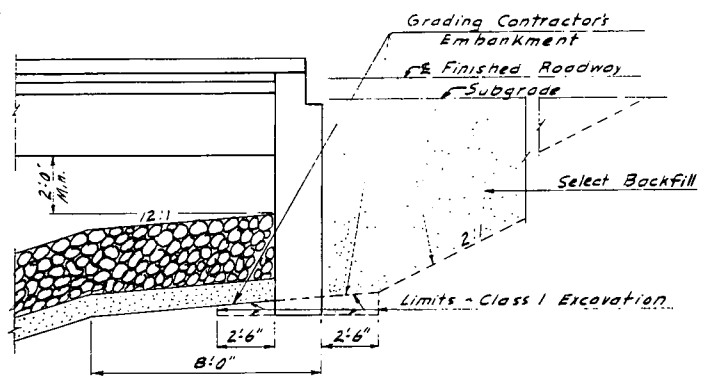
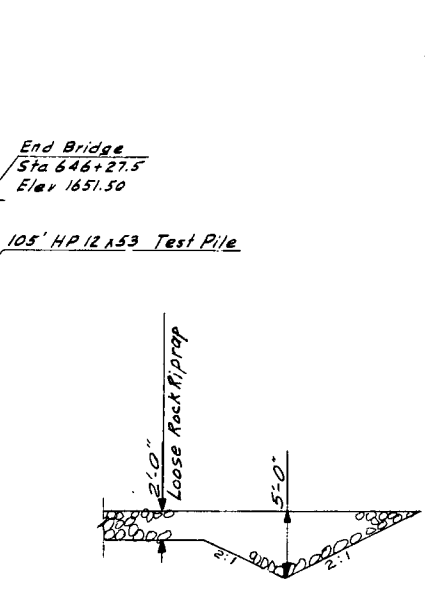
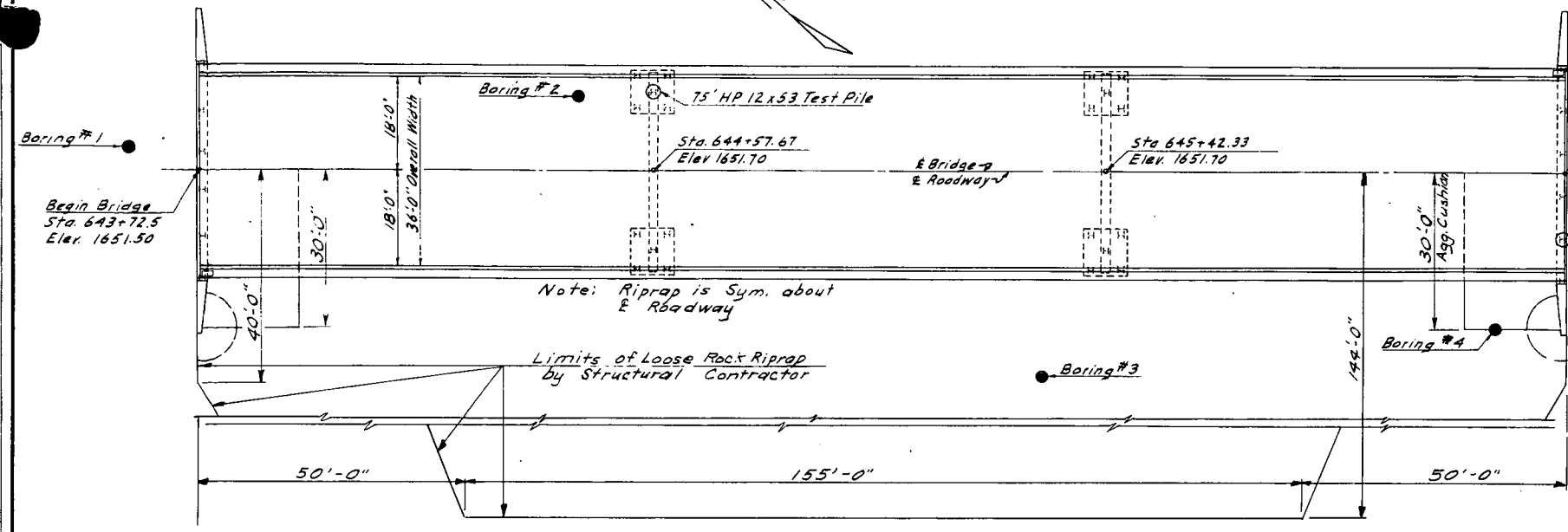
## SYMBOLS

STATE & NATIONAL LINES		BUILDINGS	
COUNTY LINE		TELEGRAPH LINES	
TOWNSHIP & RANGE LINES		TELEPHONE LINES	
SECTION LINE		POWER LINES	
QUARTER SECTION LINE		CULVERTS (In Place)	
SECTION CORNER		CULVERTS (Install)	
QUARTER SECTION CORNER		CONCRETE BOX CULVERTS (Install)	
OLD RIGHT OF WAY LINE		BRIDGES (Install)	
NEW RIGHT OF WAY LINE		CONCRETE CURB	
GRADE LINE		CONCRETE CURB AND GUTTER	
CENTERLINE OF CONSTRUCTION		CONCRETE WALK	
RAILROAD RIGHT OF WAY LINE		CATCH BASIN (Existing)	
CITY OR VILLAGE CORPORATE LIMITS		CATCH BASIN (New)	
PROPERTY LINE		MANHOLE (Existing)	
EASEMENT LINE		MANHOLE (New)	
FENCES		CURB INLET (Existing)	
SNOW FENCE		CURB INLET (New)	
DRAINAGE		GROUND MOUNTED SIGNS	
WATERS EDGE		OVERHEAD SIGNS	
MARSH OR SWAMP		HYDRANT	
RIPRAP		LIGHT STANDARDS	
DRAINAGE DITCH		TRAFFIC SIGNALS (Plan & Profile Sheets)	
APPROACH		HIGH MAST LIGHTING ASSEMBLY	
TRAVELED WAY		GROUND ELEVATION	
RAILROADS		GRADE	
GUARD RAIL		CENTERLINE	
GUIDE POSTS		SECTION LINE	
DELINEATORS		DEFLECTION ANGLE (Delta)	
HEDGES AND TREES		SOD OR JUTE MESH	
INTERCHANGE		POLES TO BE MOVED	
HIGHWAY GRADE SEPARATION-NO CONNECTION		POLES TO BE LOWERED	
OTHER BRIDGE		CONCRETE FOUNDATION	
SERVICE ROAD		CONDUIT	
TERMINATED CROSS-ROAD		CONDUCTOR	
		CONCRETE PULL BOX	
		FEED POINT	
		250 WATT LIGHT STANDARDS	
		400 WATT LIGHT STANDARDS	
		700 WATT LIGHT STANDARDS	
		1000 WATT LIGHT STANDARDS	
		FLASHING BEACON	
		TRAFFIC SIGNAL - MAST ARM MOUNTED	
		TRAFFIC SIGNAL - POST MOUNTED	
		SIGNAL HEAD	
		PEDESTRIAN PUSHBUTTON POST	
		TRAFFIC SIGNAL CONTROLLER	
		FEED POINT - PAD MOUNTED	

## ABBREVIATIONS

Aggr.	Aggregate	M. L.	Main Line
Ahd.	Ahead	N. R.	North Roadway
Alt.	Alternate	Off. Loc.	Office Location
Approx.	Approximate or Approximately	O. to O.	Out to Out
Appr.	Approach	P. & P.	Plan and Profile
Asph. Cem. or A.C.	Asphalt Cement	P.C.	Point of Curvature
Asph. Conc.	Asphaltic Concrete	P.C.C.	Point of Compound Curve
Bit.	Bituminous or Bitumen	P.C.C. Pvm't	Portland Cement Concrete Pavement
Bk.	Back	P.D.	Private Drive
B.M.	Bench Mark	Pen.	Penetration
Bldg.	Building	Perf.	Perforated
Br.	Bridge	P.I.	Point of Intersection
C.A.E.S.	Corrugated Aluminum End Section	P.O.C.	Point on Curve
C.A.P.	Corrugated Aluminum Pipe	P.O.T.	Point on Tangent
C.B.	Catch Basin	P.P.	Power Pole
C. & G.	Curb and Gutter	P.R.C.	Point of Reverse Curvature
Ch. Blk.	Channel Block	Pref.	Preformed
Ch. Ch.	Channel Change	P.S.D.	Passing Sight Distance
C.I.	Curb Inlet	P.T.	Point of Tangency
C.I.P.	Cast Iron Pipe	P.V.C.	Polyvinyl Chloride Sewer Pipe
Cl.	Class	Quant.	Quantity or Quantities
C.S. E.S.	Corrugated Steel End Section	R	Radius
C.S.P.	Corrugated Steel Pipe	R or Rge.	Range
C.M.S.	Cationic Medium Setting	RC	Rapid Curing
Comp.	Compression	R.C.E.S.	Reinforced Concrete End Section
Const.	Construction	R.C.P.	Reinforced Concrete Pipe
Conc.	Concrete	R.C.P.S.	Reinforced Concrete Pipe Sewer
Cont. Reinf. Conc.	Continuously Reinforced Concrete	Rd.	Road
Pvm't	Pavement	Rdbd.	Roadbed
Contn.	Contraction	Rdwy.	Roadway
Crn.	Crown	Refi.	Refactorized
CRS	Cationic Rapid Setting	R. R.	Railroad
Crse.	Course	Rt.	Right
C.S.	Curve to Spiral	R/W	Right of Way
C. to C.	Center to Center	Salv.	Salvage
C.Y.	Cubic Yard	San.	Sanitary
D	Degree of Curvature	S.C.	Spiral to Curve
D-Load	Dead Load	SC	Slow Curing
D.B.	Ditch Block	Sc	Spiral Deflection Angle
Def.	Deformed	S.D.	Sight Distance
Del.	Deliver	S.E.	Superelevation
D.G.	Ditch Grade	Sec.	Section
El. or Elev.	Elevation	Sec. Line Appr.	Section Line Approach
Ellipt.	Elliptical	Sep.	Separation
Emb.	Embankment	Serv.	Service
Emul.	Emulsified	Sgr. Prep.	Subgrade Preparation
Engr.	Engineer	Shldr.	Shoulder
Eq.	Equation	SP	Special Provision
E. R.	East Roadway	S.P.P.	Structural Plate Pipe
E. S.	End Section	S.P.P.A.	Structural Plate Pipe Arch
Esmt.	Easement	S.R.	South Roadway
Exc.	Excavation	SS	Slow Setting or Supplement Specification
Exp.	Expansion	S.S.D.	Stopping Sight Distance
F. D.	Field Drive	S.T.	Spiral to Tangent
Found.	Foundation	Sta.	Station
F.P.	Fence Post	Std.	Standard
Furn.	Furnish	Std. Specs.	Standard Specifications
Ga.	Gage or Gauge	Struct.	Structure
Gr.	Gravel	Surf.	Surface or Surfacing
Grd.	Graded	Surv.	Survey
G.V.	Gate Valve	S.W.	Sidewalk
Hel.	Helical	S.Y.	Square Yard
Hyd.	Hydrant	T	Tangent Length (circular curve)
Ident.	Identification	T or Twp.	Township
Inchg.	Interchange	Tel.	Telephone
I.M.	Iron Monument	Temp.	Temporary
Inst.	Install	T.P.	Telephone Pole
Inter.	Intersection	Tr.	Traffic
Inv.	Invert	Trans.	Transverse or Transition
Jt.	Joint	Trtd.	Treated
L	Length of Curve	Ts	Tangent Length (curve with spirals)
Lc	Length of Spiral	T.S.	Tangent to Spiral
Levg.	Leveling	U.S.C. & G.S.	United States Coast and Geodetic Survey
L.F.	Linear or Lineal Foot	V.C.	Vertical Curve
Liq.	Liquid	V.C.P.	Vitrified Clay Pipe
Long	Longitudinal	W.M.	Water Main
L.P.	Light Pole	W.M.V.	Water Main Valve
Lt.	Left	W.R.	West Roadway
"M"	One Thousand	Wrng.	Wearing
Matl.	Material	W.S.V.	Water Service Valve
Max.	Maximum	X-Sec.	Cross Section
MC	Medium Curing	Xc	Spiral Coordinate
M.H.	Manhole	Yc	Spiral Coordinate
Min.	Minimum		

PROJECT NO.	DATE	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
X-081	B	N. D.	BRC-4-014 1059	86	



**HYDRAULIC DESIGN DATA \***

DRAINAGE AREA (UNCONTROLLED)	665 SQ. MI.
DESIGN FREQUENCY	*
DESIGN DISCHARGE	1600 c.f.s. to 7000 cfs
DESIGN STAGE	(AT 1600 cfs) 1620 MSL
	(AT 7000 cfs) 1640 MSL
DEPTH OF FLOW	(AT 1620 MSL) 15 FT.
	(AT 1640 MSL) 35 FT.
WATERWAY PROVIDED BELOW DESIGN STAGE	(1620 MSL) 795 SQ. FT.
	(1640 MSL) 3865 SQ. FT.
VELOCITY OF FLOW UNDER BRIDGE	(AT 1620 MSL) 2.01 f.p.s.
	(AT 1640 MSL) 1.81 f.p.s.
FREEBOARD PROVIDED	(AT 1640 MSL) 7.1 FT.
100 YEAR FREQUENCY STAGE	1640.7 MSL
MAX. RECORDED STAGE	UNKNOWN
MAX. RECORDED DISCHARGE	UNKNOWN
MIN. WATER ELEV. (CONTROLLED)	1620 MSL

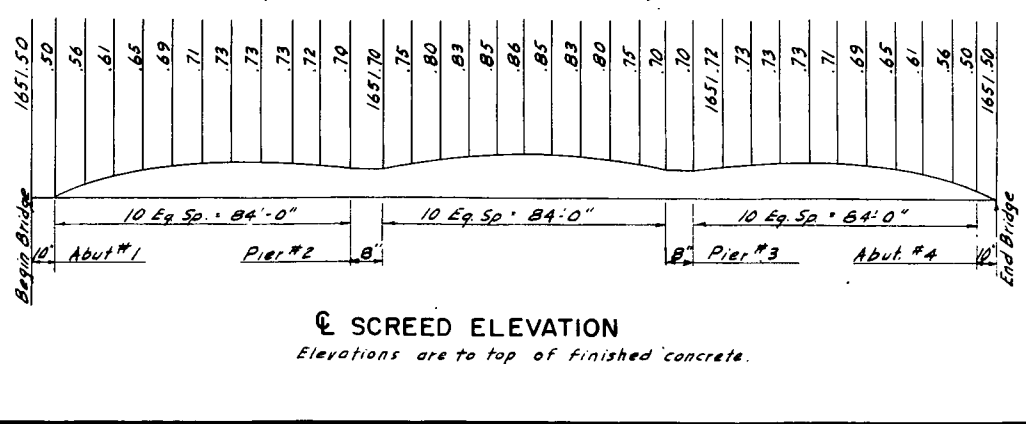
The reservoir stages and inflows will be influenced by inflows from the McClusky Canal and releases from the Lone Tree Dam. The design discharges and stages were provided by the U.S. Bureau of Reclamation.

**BENCH MARKS**

NO.	DESCRIPTION	LOCATION	ELEV.
1	In. Man. 2x2 Gd. by Fa Line	Sta. 640+70-208' Rf.	1639.26
2	"	Sta. 647+60-175' Lf.	1621.51
3	"	Sta. 652+68-91' Rf.	1603.69

**PILE LOADING**

DRAW DOWN	DESIGN LOAD	MAX. RECD. LOAD	MINIMUM PENETRATION	WIND		
				50 LB.	100 LB.	150 LB.
6.7 T	70.0 T	70.0 T				
67.6 T	70.0 T	70.0 T				



**SPECIAL PROVISIONS**

SP	CHEMICAL ADMIXTURES FOR CONCRETE
----	----------------------------------

**ESTIMATE OF QUANTITIES**

SPEC NO.	CODE NO.	BID	QUANTITY
208	0100	CLASS 1 EXCAVATION	102 CU. YD.
228	0100	SELECT BACKFILL	400 CU. YD.
604	9640	PRESTRESSED BOX BEAM-42" (150# B4)	1260 LIN. FT.
602	110	CLASS AE-1 CONCRETE	235.6 CU. YD.
602	1130	CLASS AAE-3 CONCRETE	302.05 CU. YD.
612	0115	REINFORCING STEEL GRADE-60	112,199 LB.
622	0040	STEEL PILING-HP12x53	2280 LIN. FT.
622	1200	STEEL TEST PILING-HP12x53	180 LIN. FT.
705	0100	MOBILIZATION	L. SUM
702	0130	LOOSE ROCK RIPRAP	6,500 CU. YD.
750	0100	LINSEED OIL TREATMENT	18 GAL.
758	0100	FIELD LAB TYPE A	1 EA.
900	3000	BRIDGE BENCH MARKS	1 SET

**STRUCTURAL DRAWINGS**

GENERAL DRAWING (THIS SHEET) 14-60.80-1 & 2, D-754-71-1, D-754-71-5

SUBSTRUCTURE 14-60.80-3, 4 & 5 H-0401, H-0402

SUPERSTRUCTURE 14-60.80-6 & 7, H-7006, H-0158, D-900-1, D-900-4 & H-0501

DESIGN LOADING: HS 20-44

SCALE: 1 INCH = 15 FEET

NORTH DAKOTA STATE HIGHWAY DEPARTMENT

**LONE TREE RESERVOIR BRIDGE LAYOUT**

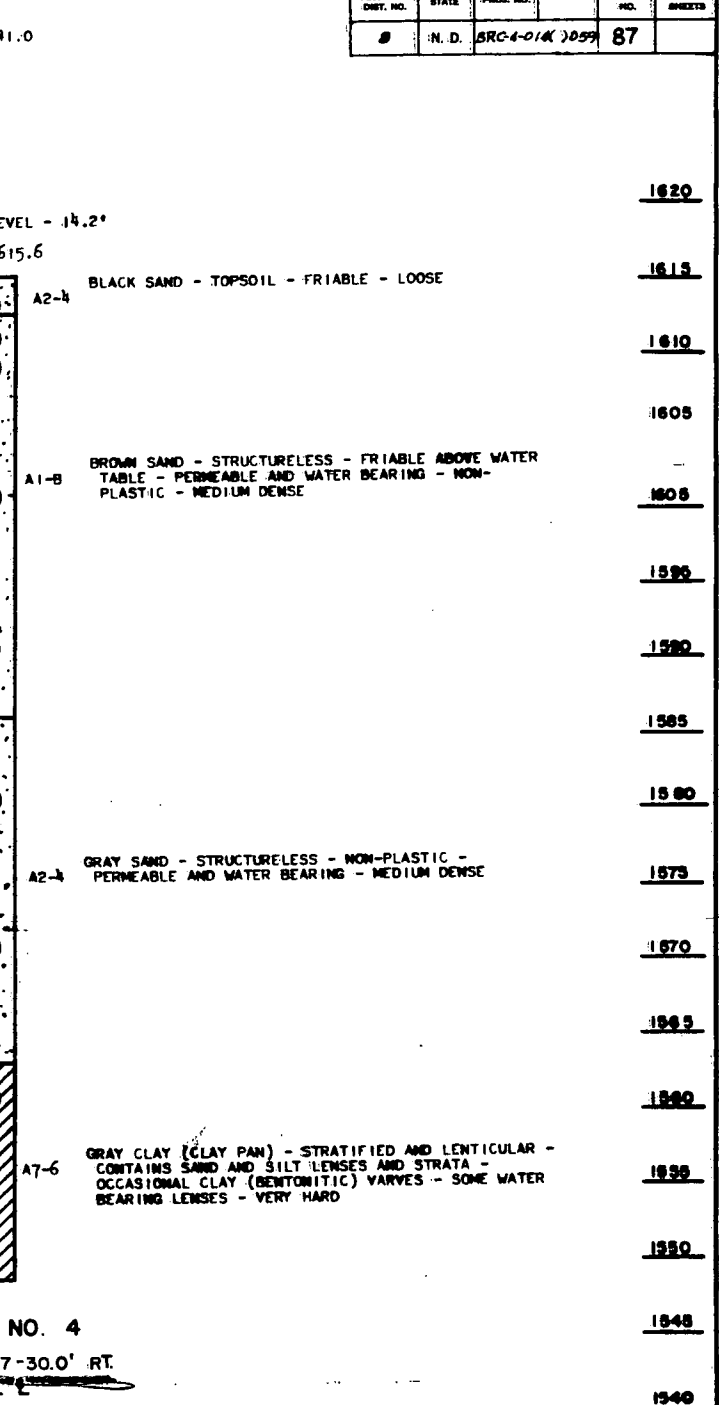
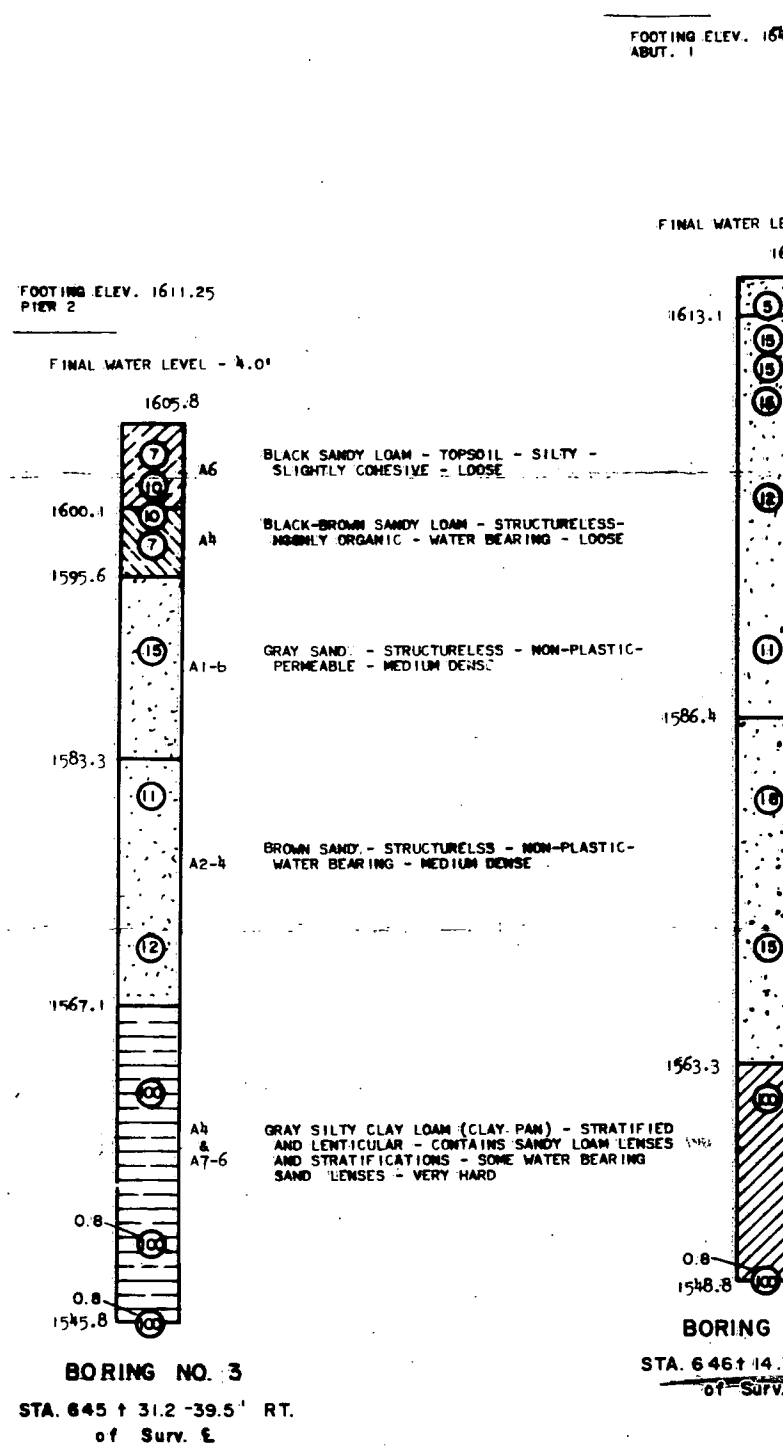
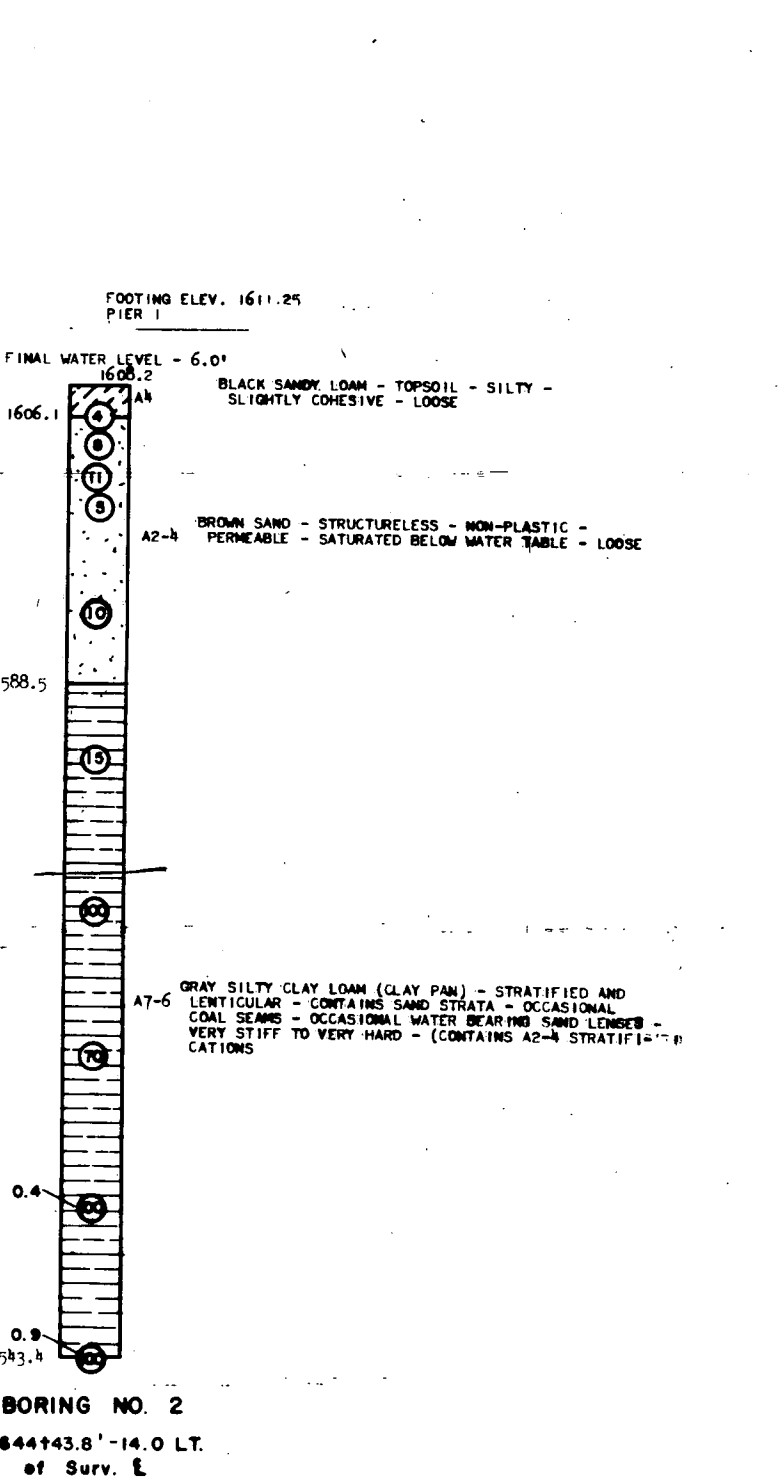
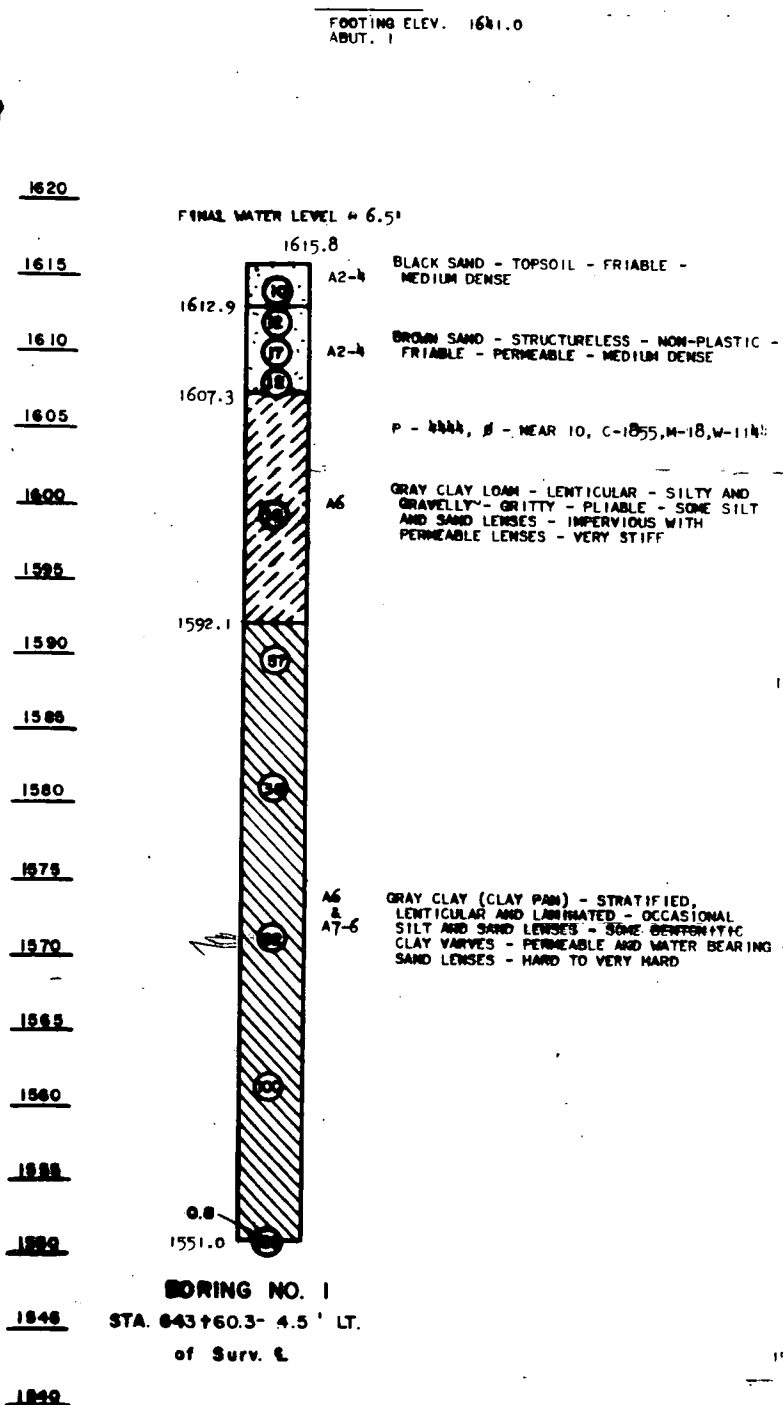
PROJECT BRC-4-014(01)059 STA. 645+00

SHERIDAN COUNTY

APPROVED: \_\_\_\_\_

DATE: \_\_\_\_\_

BRIDGE ENGINEER



**SYMBOLS:**

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

**NOTES:**

ENCIRCLED NUMBERS INDICATE THE NUMBER OF BLOWS DELIVERED BY A 100 LB. HAMMER FROM A HEIGHT OF 30" TO DRIVE CORE TUBE 1.0'.

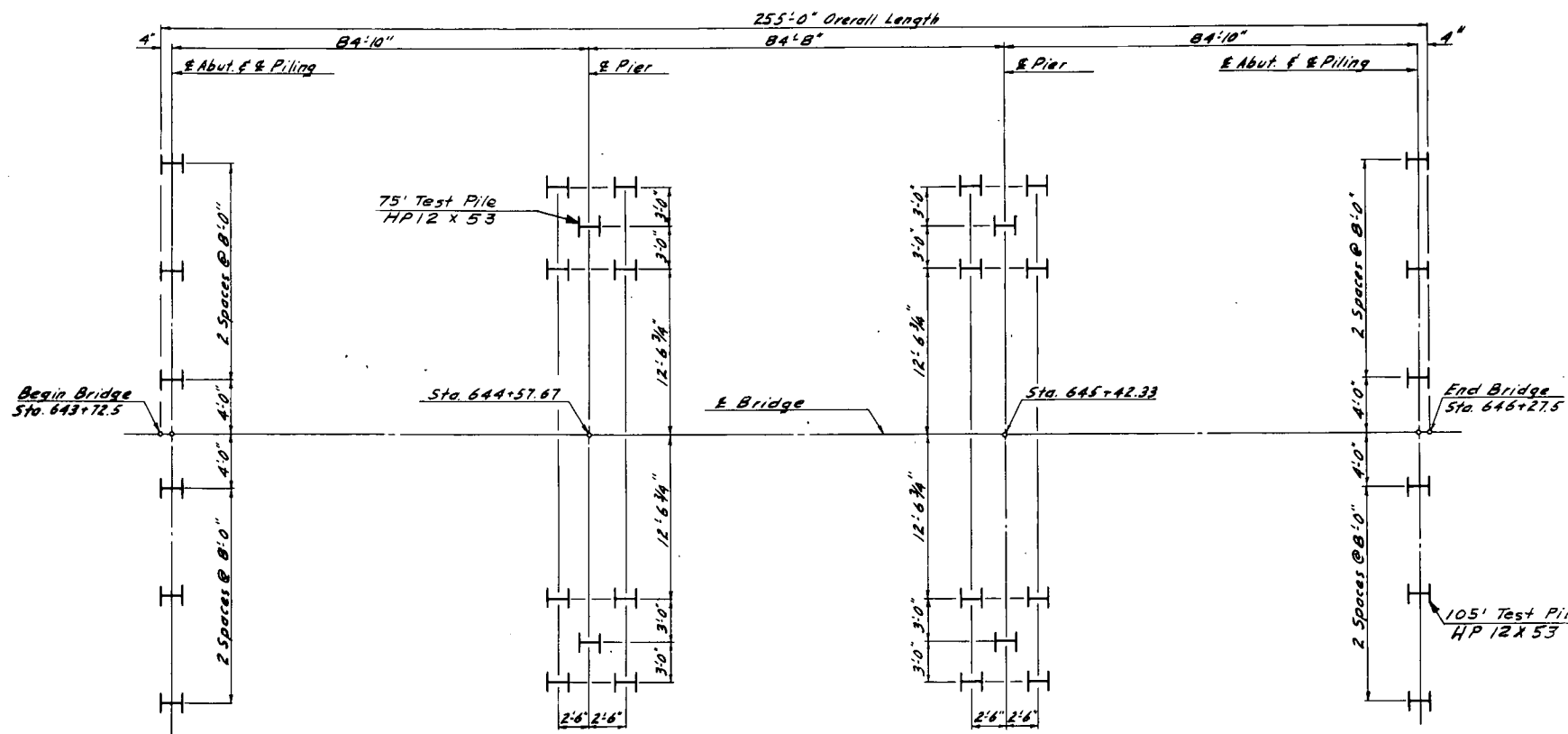
THE BORING LOG DATA SHOWN IS FOR DESIGN PURPOSES ONLY. THE STATE ASSUMES NO RESPONSIBILITY IF SOIL CONDITIONS ENCOUNTERED DURING CONSTRUCTION DIFFER FROM THOSE SHOWN.

OLD BRIDGE NO. 14-85  
 NEW BRIDGE NO. 14-80796

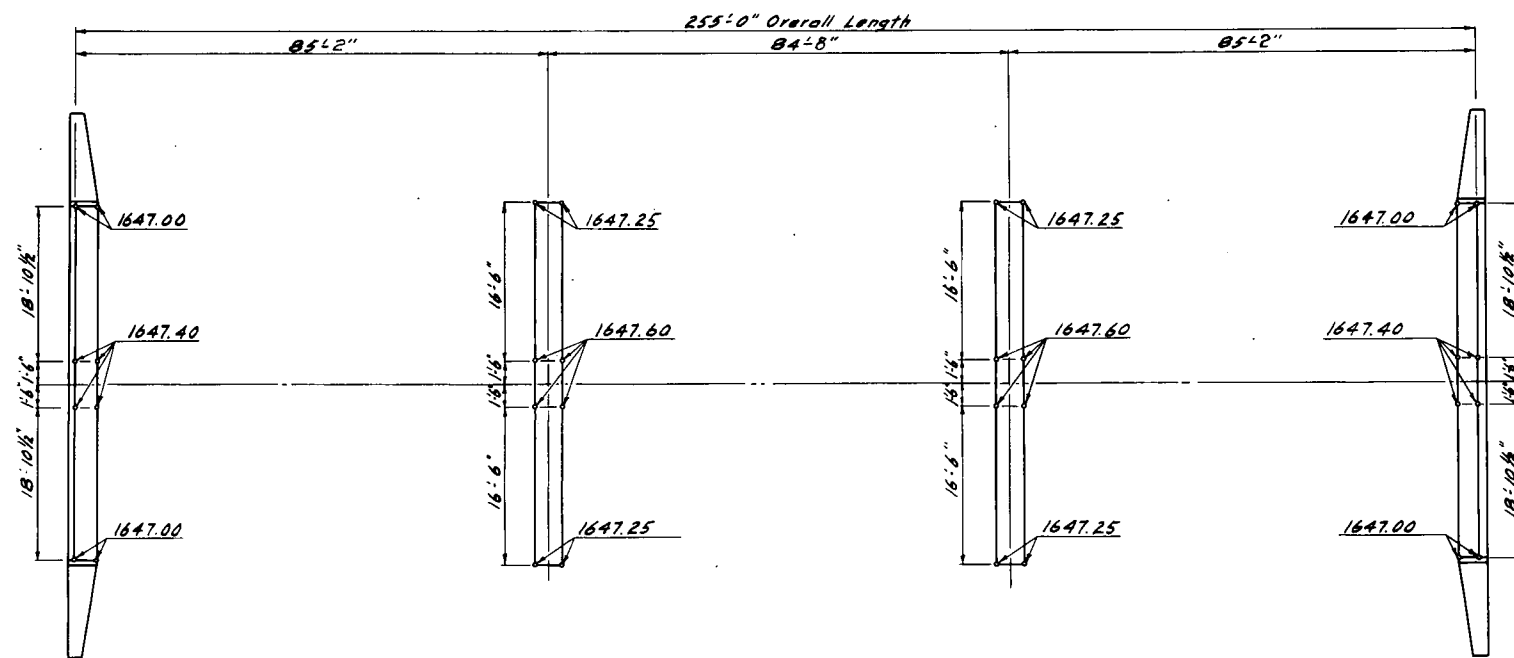
**BORING LOG**

LONE TREE RESERVOIR BRIDGE

SHERIDAN COUNTY



**PILING LAYOUT**  
(Not to Scale)



**ABUTMENT AND PIER CAP ELEVATION**  
Elevations are to top of finished concrete  
(Not to Scale)

**NOTES:**

**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, PRE-MOLDED 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. DEAD LOAD DEFLECTIONS HAVE BEEN ACCOUNTED FOR IN THE SCREED ELEVATIONS.

**CONCRETE:**

THE "RUBBED SURFACE FINISH" WILL BE REQUIRED FOR THE ROADWAY AND OUTSIDE FACES OF CURBS, EDGES OF SLABS, ALL FACES OF RAILINGS POSTS AND END POSTS AND ALL EXPOSED FACES OF ABUTMENT WINGS. ALL OTHER SURFACES SHALL HAVE THE "ORDINARY SURFACE FINISH". ALL ORDINARY SURFACE FINISH SHALL BE COMPLETED WITHIN 24 HOURS AFTER THE REMOVAL OF FORMS. THE CONTRACTOR HAS THE OPTION OF USING THE "SPECIAL SURFACE FINISH" AS PROVIDED IN SECTION 602-3.10.5 OF THE STANDARD SPECIFICATIONS, IN LIEU OF THE "RUBBED SURFACE FINISH" (602-3.10.3) CALLED FOR ABOVE. IF THE CONTRACTOR USES THE "SPECIAL SURFACE FINISH" ON THE OUTSIDE FACE OF SLAB, CURB, AND RAIL, THE OUTSIDE FACE OF THE PRESTRESSED FACIA GIRDER SHALL BE GIVEN THE SAME TREATMENT. COST SHALL BE INCIDENTAL TO CLASS AAE-3 CONCRETE. IF THE EXPOSED FACES OF THE ABUTMENT WINGS HAVE A SURFACE FINISH ACCEPTABLE TO THE ENGINEER WITHOUT RUBBING, THE REQUIREMENTS FOR RUBBED SURFACE FINISH MAY BE WAIVED AT THE OPTION OF THE ENGINEER AND THE ORDINARY SURFACE FINISH WILL APPLY.

AIR-ENTRAINED PORTLAND CEMENT SHALL BE USED IN THE ENTIRE BRIDGE EXCEPT IN THE PRESTRESSED GIRDERS. TYPE 1, 1S, 1I OR 1S-MH-MS PORTLAND CEMENT SHALL BE USED IN THE PRESTRESSED GIRDERS.

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

SUBSTRUCTURE CONCRETE SHALL BE CLASS AE-1. SUPERSTRUCTURE CONCRETE SHALL BE CLASS AAE-3.

**CURING OF DECK SLAB CONCRETE:**

THE WATER SOLUBLE LIQUID MEMBRANE CURE (SECTIONS 550-4.13.2.1 AND 550-5 OF THE STANDARD SPECIFICATIONS) SHALL BE USED FOR CURING THE DECK SLAB CONCRETE. A PROTECTIVE COVERING SHALL BE USED SO THAT LINSOED OIL IS NOT APPLIED TO AN AREA WITHIN THREE INCHES OF THE OUTER LINE UNTIL AFTER THE ASPHALT CURB SEAL IS IN PLACE.

**LINSOED OIL TREATMENT:**

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

ONLY ONE UNIFORM APPLICATION OF .015 GALLONS PER SQUARE YARD SHALL BE APPLIED TO THE DECK AND CURBS.

**EXCAVATION:**

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

**BACKFILL:**

BACKFILLING SHALL BE DONE IN ACCORDANCE WITH SECTION 228 AND 203-2.3.2 OF THE STANDARD SPECIFICATIONS. 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.

THE TOP LAYER OF TRANSVERSE DECK SLAB REINFORCEMENT SHALL BE TIED DOWN WITH WIRE TIES TO THE PROTRUDING SHEAR REINFORCEMENT OF THE PRESTRESS BEAMS.

THE TIES SHALL BE INTERVALS OF 5 TO 6 FEET ALONG THE FULL LENGTH OF ALL BEAMS TO PREVENT THE SLAB REINFORCEMENT FROM RISING WHEN THE CONCRETE IS PLACED.

**PILING: (OPTIONAL)**

THE CONTRACTOR HAS THE OPTION TO USE PRESTRESSED CONCRETE PILES ON A ONE FOR ONE BASIS FOR THE STEEL H-PILES SHOWN ON THE PLANS. IF THE OPTION FOR PRESTRESSED CONCRETE PILES IS USED, THE PILE LENGTHS AND PILE HAMMER REQUIREMENTS MAY CHANGE.

**PILE HAMMER: (STEEL H PILE)**

A STEAM, AIR OR DIESEL HAMMER FOR DRIVING PILING FOR THIS STRUCTURE SHALL HAVE A RATED ENERGY AND RAM WEIGHT NOT LESS THAN 41,702 FOOT-POUND-TONS AS COMPUTED BY THE FORMULA  $W(E-11,025) + .76E$ , WHERE W IS THE WEIGHT OF THE RAM IN TONS AND E IS THE RATED HAMMER ENERGY AS ALLOWED IN SECTION 622-4.1.19.1. IN NO CASE SHALL THE RAM WEIGHT BE LESS THAN 4800 POUNDS.

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

THE ACTUAL ABUTMENT AND BENT PILING LENGTHS WILL BE DETERMINED BY THE ENGINEER AFTER THE RESULTS OF THE TEST PILES HAVE BEEN REVIEWED.

F' C - 4000 PSI	FC - 1600 PSI	CLASS AAE-3 CONCRETE
F' C - 3000 PSI	FC - 1200 PSI	CLASS AE-1 CONCRETE
FY - 60000 PSI	FS - 24000 PSI	GRADE 60 REINFORCING STEEL
F' C - 5000 PSI	FC - 2000 PSI	PRESTRESSED GIRDER CONCRETE

**EMBANKMENT:**

THE EMBANKMENT AT THE ABUTMENTS SHALL BE IN PLACE A MINIMUM OF 60 DAYS BEFORE PILING ARE DRIVEN. THE CONTRACTOR WILL BE REQUIRED TO DRILL PILOT HOLES THROUGH THE FILL AT THE ABUTMENTS BEFORE DRIVING PILING.

IN LIEU OF THE ABOVE 60 DAY WAITING PERIOD, THE CONTRACTOR MAY BEGIN PILE DRIVING OPERATIONS AS SOON AS THE EMBANKMENT IS IN PLACE, BUT ALL PILOT HOLES SHALL BE EXTENDED TO A DEPTH OF 15 FEET INTO THE ORIGINAL GROUND.

ALL PILOT HOLES, NOT COMPLETELY FILLED BY THE PILES SHALL BE BACKFILLED WITH SAND OR FINE GRAVEL BEFORE THE SUBSTRUCTURE IS PLACED.

**LOOSE ROCK RIPRAP:**

THE PAY ITEM "LOOSE ROCK RIPRAP" SHALL INCLUDE THE COST OF HAULING AND PLACEMENT OF THE RIPRAP AND AGGREGATE CUSHION FROM A STOCKPILE NEAR THE BRIDGE SITE.

AGGREGATE CUSHION AT THE ABUTMENT SHALL BE PLACED BY THE STRUCTURAL CONTRACTOR TO THE LIMITS SHOWN ON THE PLANS.

THE RIPRAP AND AGGREGATE CUSHION AT THE ABUTMENTS SHALL BE PLACED BEFORE THE BEAMS ARE ERECTED. SEE LIMITS ON LAYOUT SHEET.

THE RIPRAP AND AGGREGATE CUSHION TO BE HAULED AND PLACED BY STRUCTURAL CONTRACTOR WILL BE STOCKPILED NEAR THE SITE BY ANOTHER CONTRACTOR.

**BARRICADE SIGNS:**

THE STRUCTURAL CONTRACTOR SHALL ERECT BARRICADE SIGNS ON EACH END OF BRIDGE DURING CONSTRUCTION. A TYPE 111 BARRICADE SHALL BE USED WITH A CR-88-48 AND A CM-102 MOUNTED TO BARRICADE.

COST OF BARRICADE SIGNS SHALL BE INCIDENTAL TO CLASS AE-3 CONCRETE. BARRICADE SIGNS SHALL REMAIN PROPERTY OF CONTRACTOR.

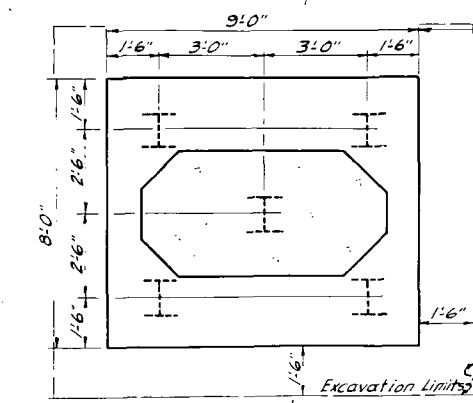
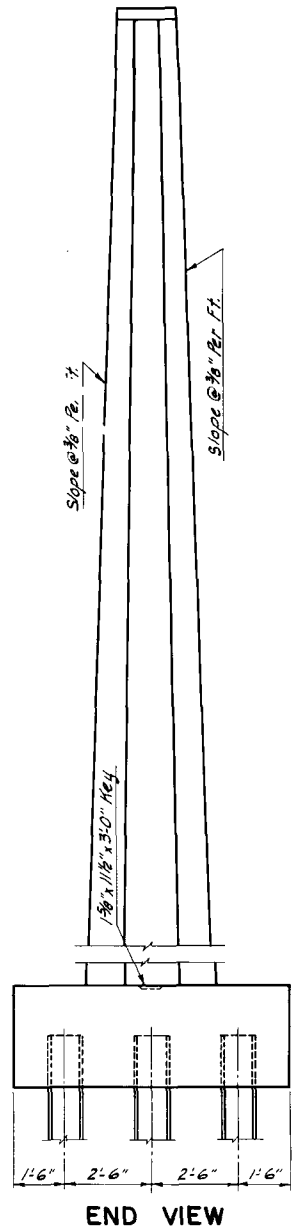
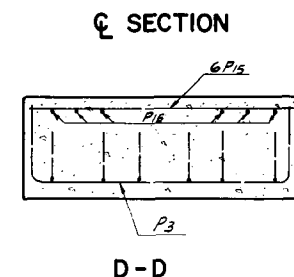
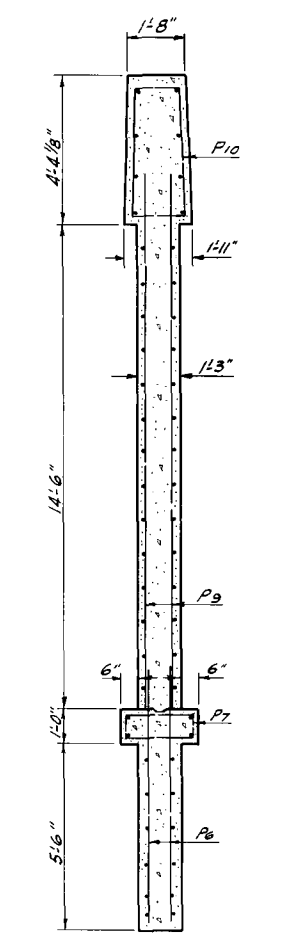
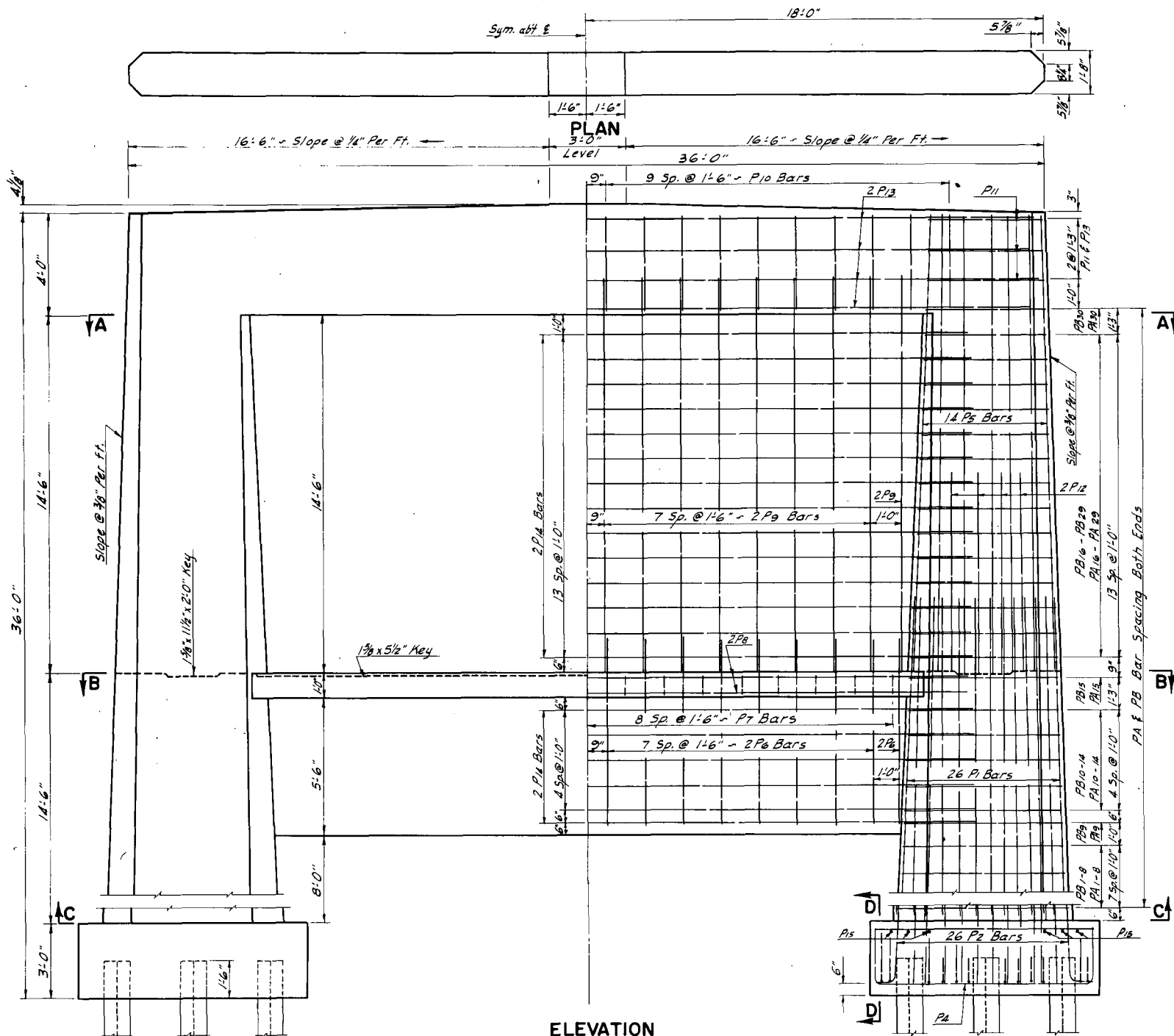
**TEMPORARY CROSSING:**

THE STRUCTURAL CONTRACTOR MAY CONSTRUCT A TEMPORARY CROSSING WITH THE TWO-36" C.M.P. STOCKPILED NEAR THE BRIDGE SITE. THE CONTRACTOR SHALL REMOVE THE TEMPORARY CROSSING WHEN CONSTRUCTION IS COMPLETED. THE OPTION OF CONSTRUCTION AND REMOVAL OF CROSSING IS FOR THE CONTRACTORS CONVENIENCE ONLY AND WILL NOT BE A BID ITEM. THE TWO-36" C.M.P. SHALL REMAIN THE PROPERTY OF THE STATE.

**QUANTITIES**

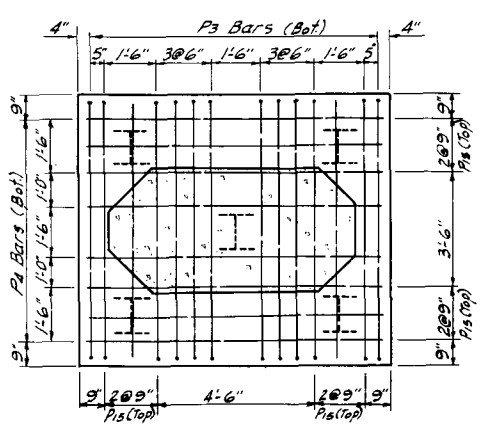

LONE TREE RESERVOIR  
PILING LAYOUT,  
ABUT. & PIER CAP ELEV.  
& NOTES





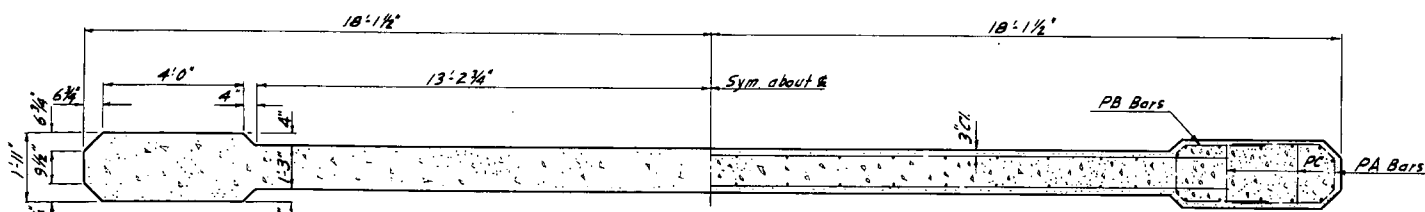
ELEVATION

FOOTING PLAN

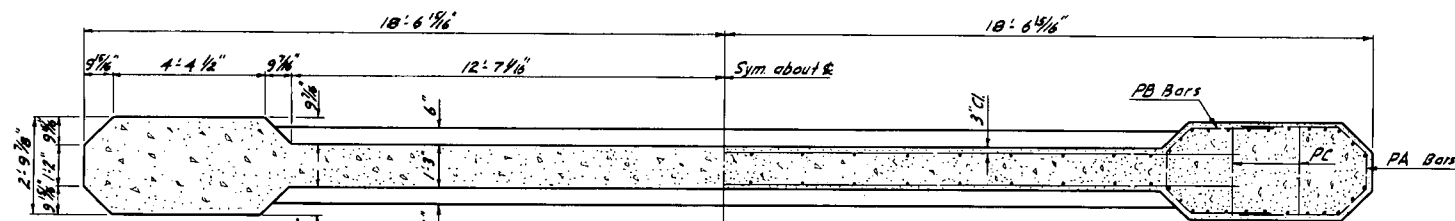


QUANTITIES	
See Dwg. # 14-60.80-5	

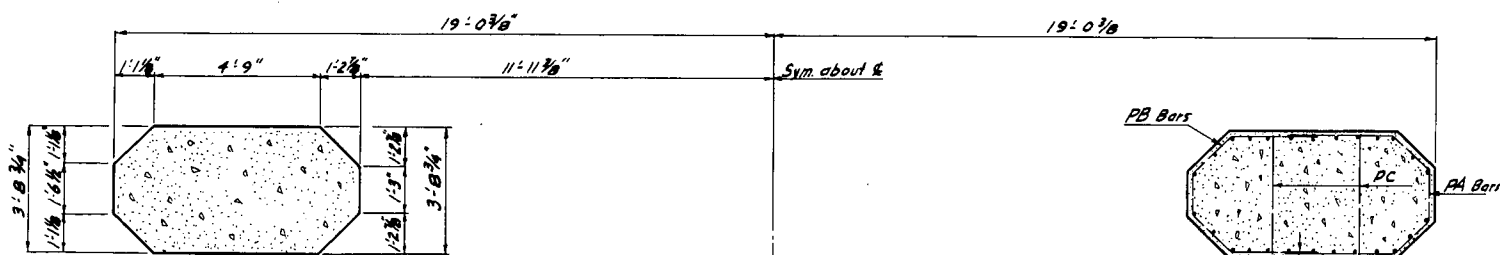
LONE TREE RESERVOIR  
 36'-0"  
 PIER DETAIL  
 36'-0" ROADWAY  
 HS-20 LOADING



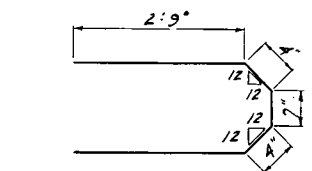
A-A



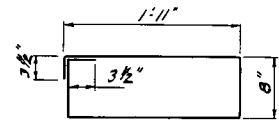
B-B



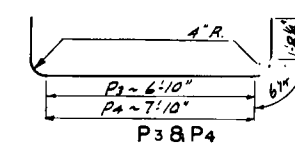
C-C



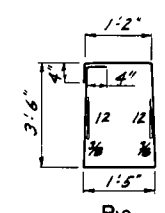
P11



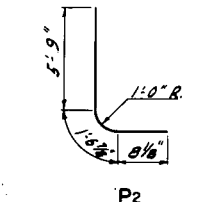
P7



P3 & P4



P10



P2

BENT BAR DETAILS  
Dimensions Shown are Out to Out.

BAR LIST (ONE PIER)					
MARK	NO.	SIZE	LENGTH	UNIT WT.	SHAPE
P1	52	10	17'-9"	76.38	Str.
P2	52	10	8'-0"	34.48	Bent
P3	24	7	11'-3"	23.00	"
P4	12	7	12'-3"	25.05	"
P5	28	9	18'-3"	62.05	Str.
P6	36	5	8'-0"	8.34	"
P7	17	5	5'-9"	6.00	Bent
P8	4	6	29'-0"	42.56	Str.
P9	36	5	16'-3"	16.95	"
P10	20	4	10'-1"	6.73	Bent
P11	6	6	6'-9"	10.14	"
P12	16	9	8'-0"	27.80	Str.
P13	8	8	35'-0"	92.46	"
P14	40	5	29'-0"	30.25	"
P15	24	4	7'-6"	5.01	"
PA-30 2 Sets	5		267'-8"	279.03	Bent
PB-30 2 Sets	5		266'-9"	278.25	"
PC-30 4 Sets	4		105'-7"	70.49	"

PA		PB		PC	
MARK	LENGTH	MARK	LENGTH	MARK	LENGTH
PA1	3'-0"	PB1	1'-6 1/2"	PC1	3'-4 3/4"
PA2	1'-4"	PB2	1'-6"	PC2	3'-4"
PA3	1'-8 3/8"	PB3	1'-5 1/2"	PC3	3'-3 1/2"
PA4	1'-3 3/8"	PB4	1'-5"	PC4	3'-2 1/2"
PA5	1'-2 3/8"	PB5	1'-4 1/2"	PC5	3'-1 1/2"
PA6	1'-2 1/2"	PB6	1'-3 3/8"	PC6	3'-1"
PA7	1'-2 1/8"	PB7	1'-3 3/8"	PC7	3'-0 1/2"
PA8	1'-1 7/8"	PB8	1'-2 7/8"	PC8	2'-11 1/2"
PA9	1'-1 3/8"	PB9	1'-2 3/4"	PC9	2'-10 3/4"
PA10	1'-1 1/4"	PB10	1'-1 3/4"	PC10	2'-10"
PA11	1'-0 7/8"	PB11	1'-1 1/4"	PC11	2'-9 1/4"
PA12	1'-0 3/8"	PB12	1'-0 3/4"	PC12	2'-8 3/4"
PA13	1'-0 1/4"	PB13	1'-0 1/4"	PC13	2'-7 3/4"
PA14	1'-0"	PB14	1'-0"	PC14	2'-7"
PA15	11 1/8"	PB15	11 1/8"	PC15	2'-6 1/4"
PA16	11 3/8"	PB16	10 7/8"	PC16	2'-5 1/2"
PA17	11 1/2"	PB17	10 1/2"	PC17	2'-4 1/2"
PA18	10 3/4"	PB18	9 3/4"	PC18	2'-4"
PA19	10 1/8"	PB19	9 1/8"	PC19	2'-3 1/4"
PA20	10 1/8"	PB20	8 7/8"	PC20	2'-2 1/2"
PA21	9 1/2"	PB21	8 1/2"	PC21	2'-1 3/4"
PA22	9 1/2"	PB22	7 1/2"	PC22	2'-1"
PA23	9 1/4"	PB23	7"	PC23	2'-0 1/4"
PA24	8 7/8"	PB24	6 1/2"	PC24	1'-11 1/2"
PA25	8 3/8"	PB25	5 7/8"	PC25	1'-10 1/2"
PA26	8 1/4"	PB26	5 3/8"	PC26	1'-10"
PA27	8"	PB27	4 3/4"	PC27	1'-9 1/4"
PA28	7 3/4"	PB28	4 1/4"	PC28	1'-8 1/2"
PA29	7 1/2"	PB29	3 3/4"	PC29	1'-7 3/4"
PA30	7"	PB30	3 1/2"	PC30	1'-7"

Sheet 2 of 2

QUANTITIES (ONE PIER)	
Class AE-1 Concrete	84.0 Cu Yds.
Reinforcing Steel	13,644 Lbs.

LONE TREE RESERVOIR  
36'-0"  
PIER DETAIL  
36'-0" ROADWAY  
HS 20 LOADING

CHECKED BY: DRE  
 MADE BY: MAB  
 QUANTITIES CHECKED BY: JAE, EDH

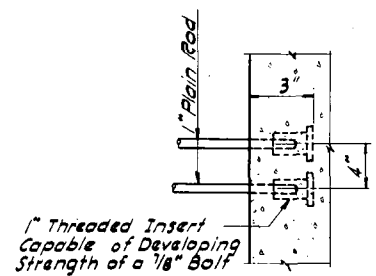




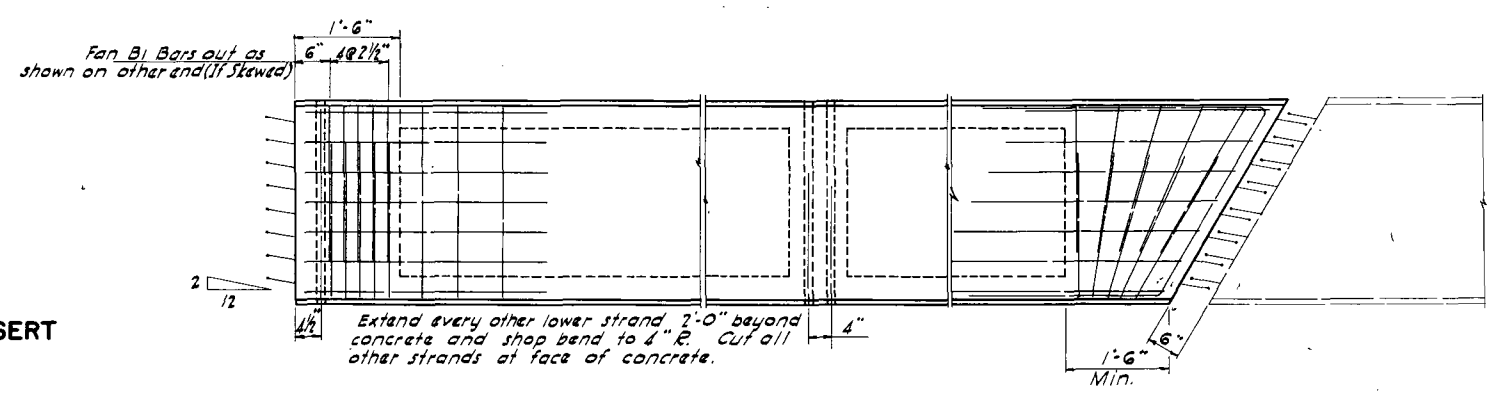


Wt. of Girder in Tons = (0.3378) Length in ft. + (0.3702) No. of Diaph. + 1.3328 (1 + Tangent of Skew Angle)

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	BAC-7-01460		94	

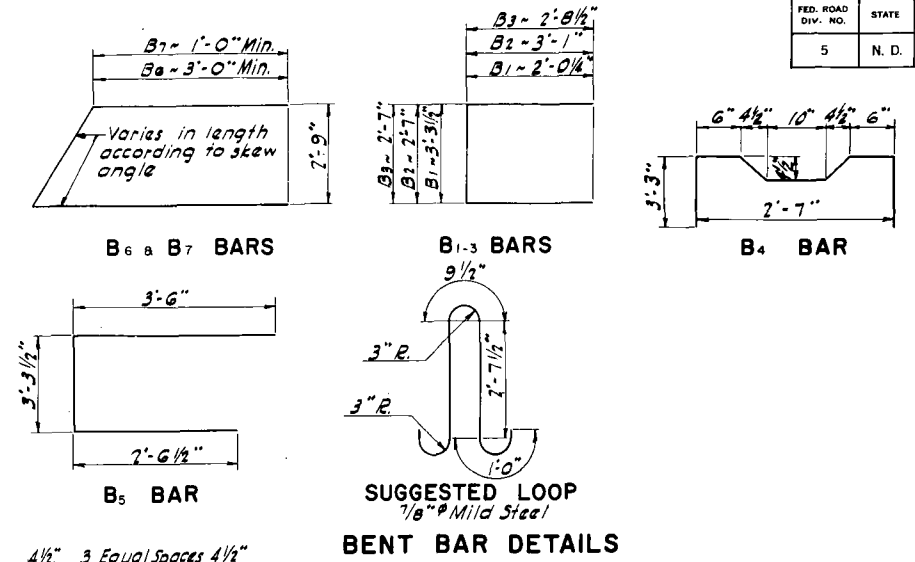


**DIAPHRAGM BAR INSERT**  
Outer Girders Only

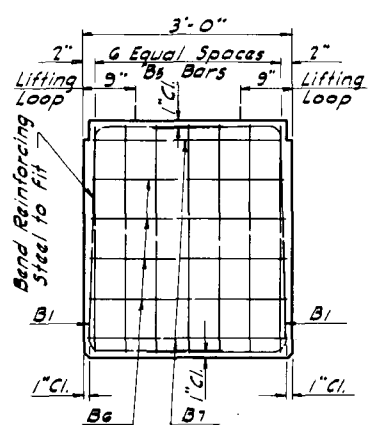


**PARTIAL PLAN**  
Showing Square End

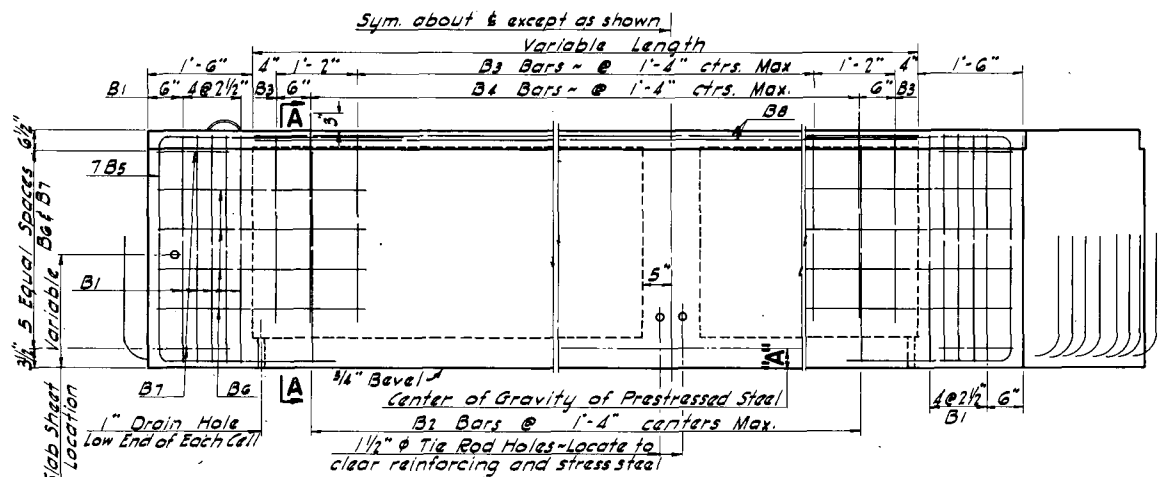
**PARTIAL PLAN**  
Showing Skewed End



**BENT BAR DETAILS**

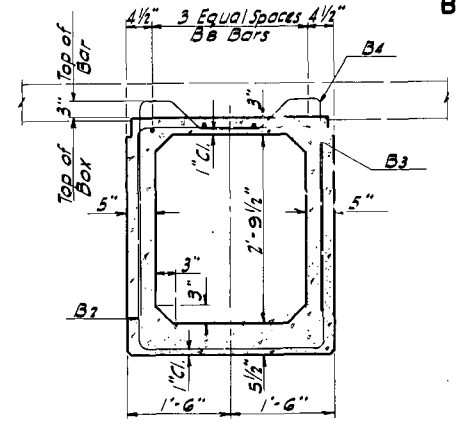


**END BLOCK**

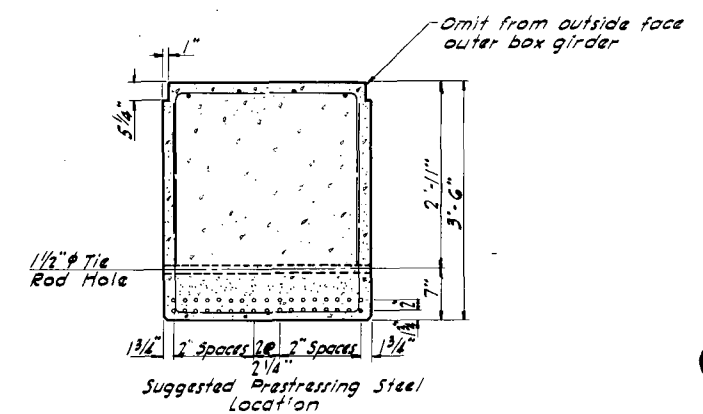


**PARTIAL ELEVATION**  
Showing Square End

**PARTIAL ELEVATION**  
Showing Skewed End



**A-A**



**SECTION OF DIAPHRAGM**

**GIRDER DATA**

LENGTH BETWEEN BEAMS	SPACE BETWEEN BEAMS	THICKNESS OF SLAB OF SLABON	THICKNESS BETW. RMS. TOP BEAMS	LIVE LOAD	FINAL STRESSING FORCE AT MIDSPAN	WEIGHT TONS
					A = 2" A = 2.5" A = 3"	

**NOTES:**  
Design Specification: A.A.S.H.O.  
Design and Shop Drawing: At least 14 days prior to the forming and pouring of any girders, the Contractor shall submit checked design figures and shop drawings for the approval of the Bridge Engineer of the State Highway Department. The design figures shall show the total initial prestress force required as the sum of the final prestress force taken from the contract drawings and the losses in prestress due to friction, elastic shortening of concrete, shrinkage of concrete, creep of concrete and relaxation of steel stress as determined by the Contractor for his method of stressing. If the Contractor wishes, the loss of steel stress not including friction losses may be assumed as 35,000 p.s.i. for pretensioning and 25,000 p.s.i. for post-tensioning.  
Shop drawing shall show wire, strand or bar layout; end anchor plate details; pull down locations; tensioning forces, elongation and order of tensioning and any proposed changes in reinforcing steel.  
\* The final prestress force (remaining after all losses have been accounted for) and its corresponding dimension 'A' shall be selected from those on a curve determined by the three values shown on this drawing.  
The girders shall be poured in all-steel forms.  
All reinforcing steel shall be intermediate grade.  
Minor changes to the shape of the girder and to the reinforcing steel may be made to accommodate the forms of various contractors and their construction methods with the approval of the Bridge Engineer.

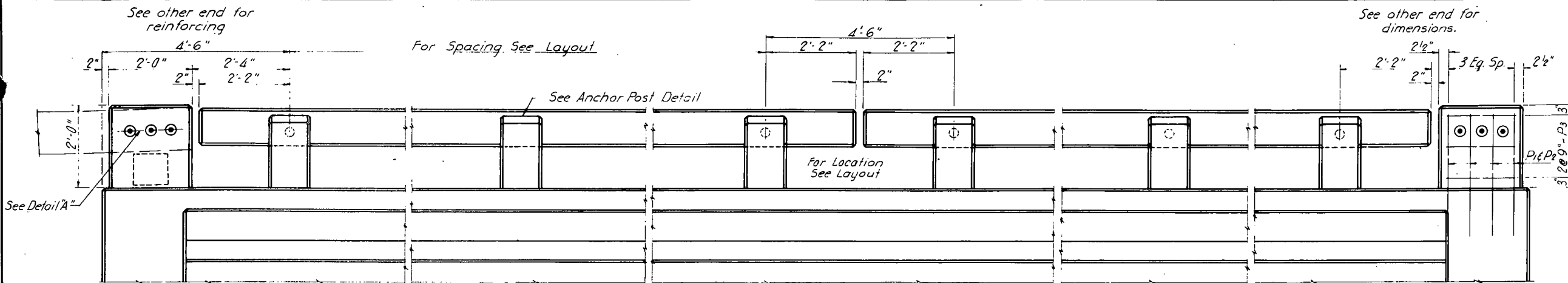
All tension in the top of the beam shall be taken care of by draping prestress steel, by adding mild steel in the top or by a combination of the two.  
The dead load provisions in the design include composite concrete slab, 25 p.s.f. future wearing surface and curb weight uniformly distributed over all units.  
The center of gravity of the tensioning units at all points along the girder shall lie on or below the curve of a draped chalk line that sags freely with dimension 'A' as shown and with the end 14" above the bottom of the girder.  
Concrete test cylinder strength at time of stress transfer shall be at least 4000 p.s.i.  
Stressing forces for lengths not shown shall be interpolated from values in table.

C.G. = 19.06" from bottom  
Area = 648.50 sq. in.  
Moment of Inertia = 137,934 in<sup>4</sup>

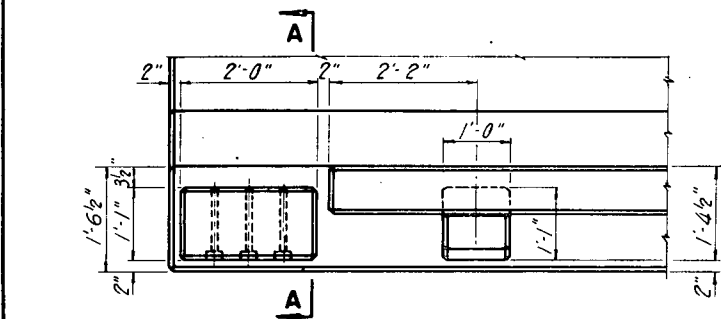
\* If not shown on this drawing, see plans on Specific Project.

MARK	SIZE	LENGTH	SHAPE
B1	4	7'-4"	Bent
B2	4	8'-9"	"
B3	4	8'-0"	"
B4	4	9'-4"	"
B5	4	9'-4"	"
B6	4	Variable	"
B7	4	"	"
B8	4	"	Str.

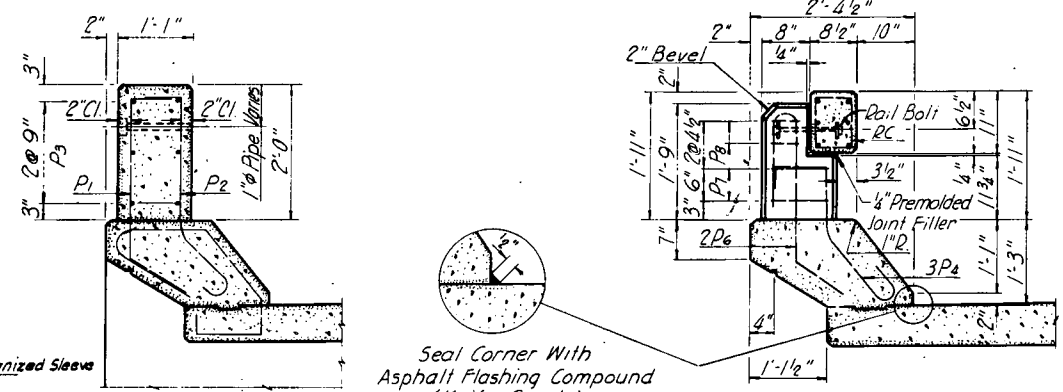
**42" x 36"**  
(5 1/2" Box Floor)  
**SPREAD**  
**PRESTRESSED BOX**  
**GIRDER**  
COMPOSITE SLAB



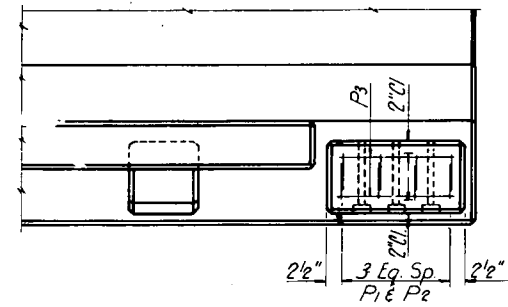
**PART ELEVATION**



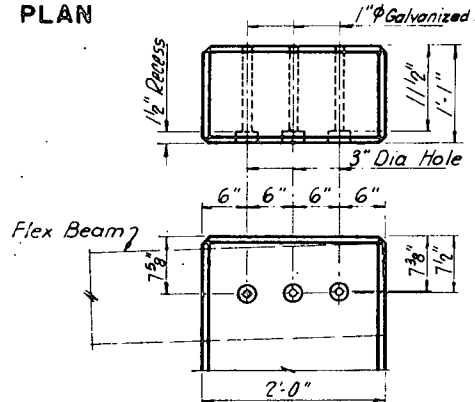
**PART PLAN**



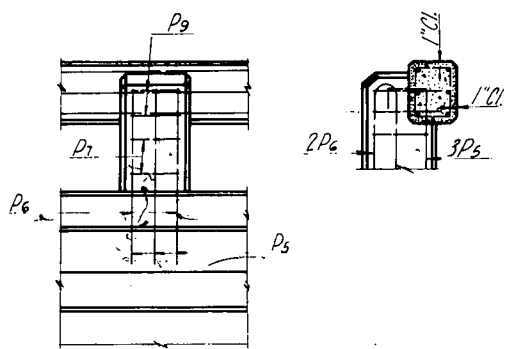
**TYPICAL SECTION**



**PART PLAN**

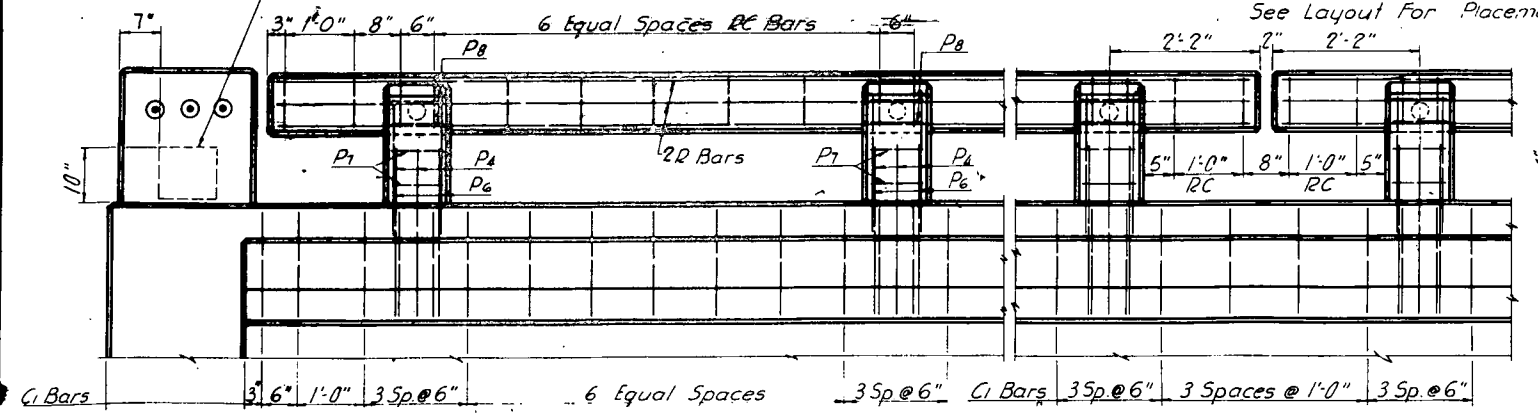


**DETAIL "A"**

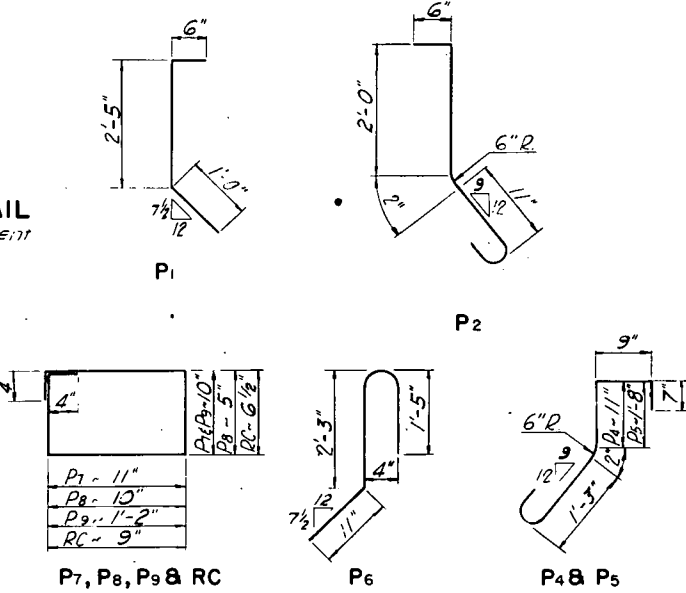


**ANCHOR POST DETAIL**  
See Layout For Placement

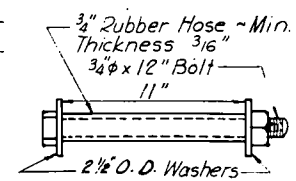
Federal Aid Name Plate  
Roadway Face of Post  
(See Bridge Layout)



**RAIL DETAILS**



**BENT BAR DETAILS**  
Dimensions shown are out to out



**RAIL BOLT**  
(Galvanized)  
To be included in the unit price bid for Class AAE-3 Concrete.

**NOTES:**

All concrete above top of curb shall be Class AAE-3.  
"Rubbed Surface Finish" will be required for the roadway faces of curbs, the outside vertical faces of curb and slab, and all faces of rails, intermediate and end posts.  
Designed in accordance with 1965 A.A.S.H.O. Specifications.

\* Number of bars shown on superstructure sheet.  
\*\* Number, length & splicing information of R bars shown on superstructure sheet.

BAR LIST (BARS FOR FOUR END POSTS)				
MARK	NO.	SIZE	LENGTH	SHAPE
P1	16	5	3'-11"	Bent
P2	16	5	4'-2"	"
P3	24	4	1'-8"	Str.

BAR LIST (BARS FOR RAILING AND POSTS)				
MARK	NO.	SIZE	LENGTH	SHAPE
P4	8	6	4'-4"	Bent
P5	8	6	5'-7"	"
P6	8	5	4'-9"	"
P7	8	3	4'-2"	"
P8	3	3	3'-2"	"
P9	3	3	4'-0"	"
RC	3	3	3'-3"	Bar
R0	6	0	0	Str.

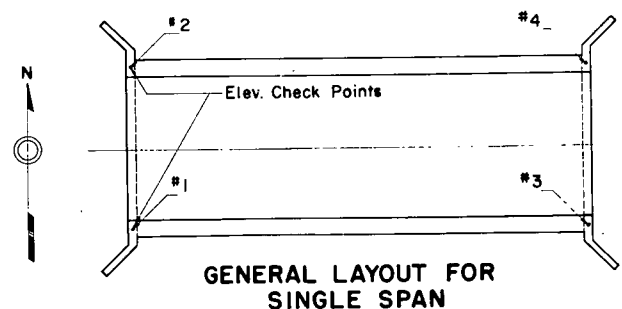
QUANTITIES 4 END POSTS			
Class AAE-3 Concrete	0.64	Cy	
Reinforcing Steel	162	Lbs.	

\* Railing and end post quantities are included in slab quantities on superstructure sheet.

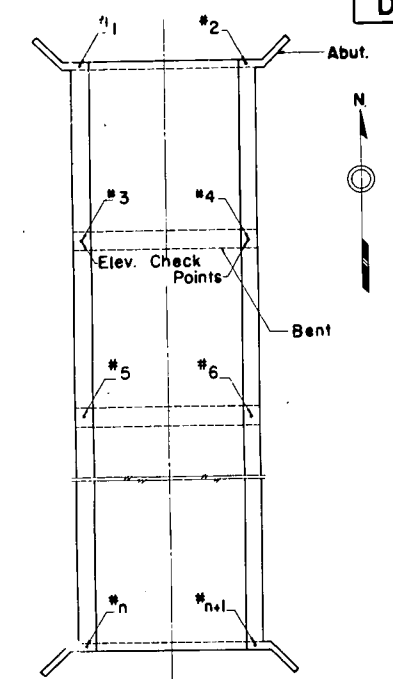
**STANDARD RAILING DETAILS**

BRIDGE BENCH MARKS

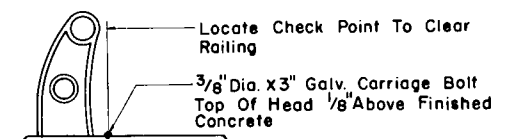
8 N.D. BRC-4-014(01) 96  
D-900-1



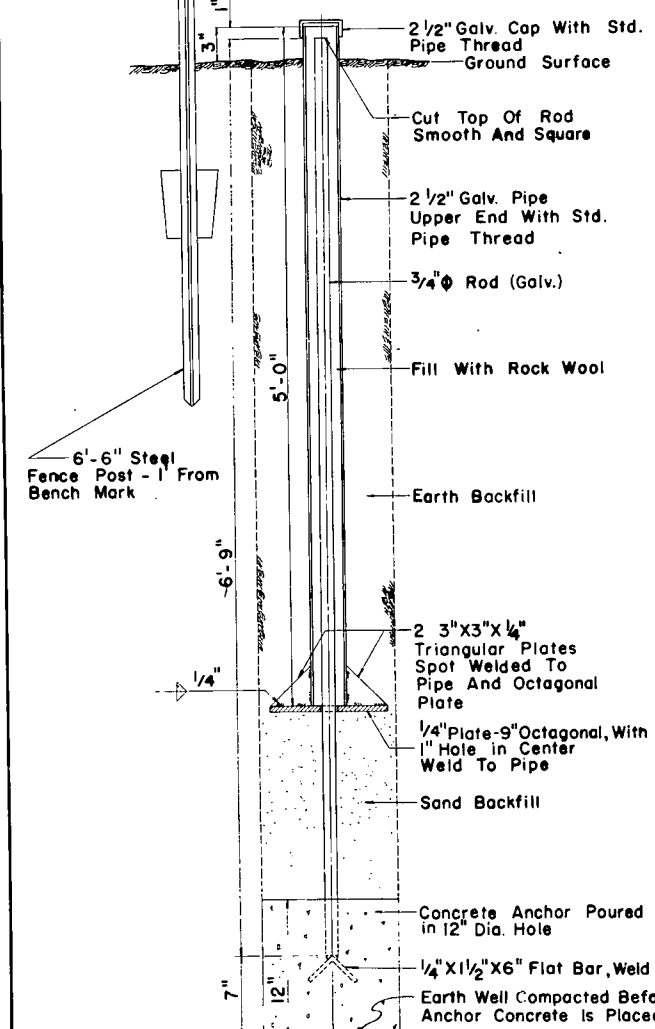
GENERAL LAYOUT FOR SINGLE SPAN



GENERAL LAYOUT FOR MULTIPLE SPAN



CHECK POINT LOCATION SKETCH



BENCH MARK DETAIL

NOTES:

Elevation check points shall consist of 3/8"x 3" galvanized carriage bolts (or equal) set in the concrete curb at the points indicated on the General Layout Sketches. The top of bolt head shall project above the finished concrete 1/8". Elevation check points shall be placed on each curb over each unit of the sub-structure for each bridge at a structural location.

Two bench marks as detailed hereon shall be set at diagonal opposite positions away from the structure location and at least 300 feet from the nearest point on the bridge or bridges (if more than one at a location). These bench marks shall be constructed as detailed on this sheet and located near the Highway Right-of-way lines. The steel fence post shall extend 4'-0" above ground and be painted with two coats of white paint suitable for steel surfaces.

The Project Engineer shall run a set of levels determining the elevation of each check point on the structure and the two bench marks immediately after the completion of the bridge. This information shall be submitted to the Bridge Engineer with adequate information locating each check point and bench mark.

Except for fence posts, all metal parts to be hot dip galvanized after punching, shearing, welding, and fabrication. Threads of cap and pipe are not to be galvanized. At time of installation these threads are to be coated with grease and cap screwed to snug fit.

METHOD OF MEASUREMENT:

Each set of Bridge Bench Marks consisting of two bench marks and the required number of elevation check points shall be considered as one unit for bidding purposes and the quantity to be paid for shall be the number of sets of bridge bench marks which have been installed complete in place and accepted by the Engineer.

BASIS OF PAYMENT:

Bridge Bench Marks shall be paid for at the contract price bid for each set of Bridge Bench Marks, which price shall be full compensation for all excavation, backfill and clean-up, and for furnishing, hauling and placing all elevation check points, fence posts, galvanized pipe, caps, rods, sand backfill, concrete, rock equipment, tools and incidentals, including galvanizing, necessary to complete this item.

GALVANIZING:

After fabrication the complete assembly shall be Hot Dip Galvanized.

NORTH DAKOTA  
STATE HIGHWAY DEPARTMENT  
Submitted: *Joseph R. Kirby*  
Bridge Engineer  
Recommended: *[Signature]*  
Director, State Division  
Approved: *[Signature]*  
Chief Engineer  
Date: 3-3-58

A B C D E F G H I J K L M N O

P Q R S T U V W X Y Z

1 2 3 4 5 6 7 8 9 0

1 2 3 4 5 6 7 8 9 0 <sup>5/8"</sup>

Note: All dimensions for 3/4 inch letters and numbers shall be in direct proportion to those shown above for the 1 inch high letters and numbers

LETTERS FOR BRIDGE NAME PLATES

NOTES

Federal Aid Project name plates shall be installed in the locations designated on the Structure layout sheet.

The Federal Aid Project number, Bridge number, and date to be shown on the name plate shall be as indicated on the structure layout sheet.

Name plates shall be cast of bronze composed of the following materials:

- Copper - 84-86%
- Tin - 4-6%
- Lead - 4-6%
- Zinc - 4-6%

Lettering shall be approximately 3/32" above the surface of the plate and shall conform to the type and spacing shown. "Name Plate Condensed" pattern letters as manufactured by Wellman Co. or approved equal may be used if desired. Vertical and horizontal spacing shall be kept in proportion to the spacing shown.

The top surface of the letters and frame shall be burnished. The background of the plate shall have a deep brown oxidized finish.

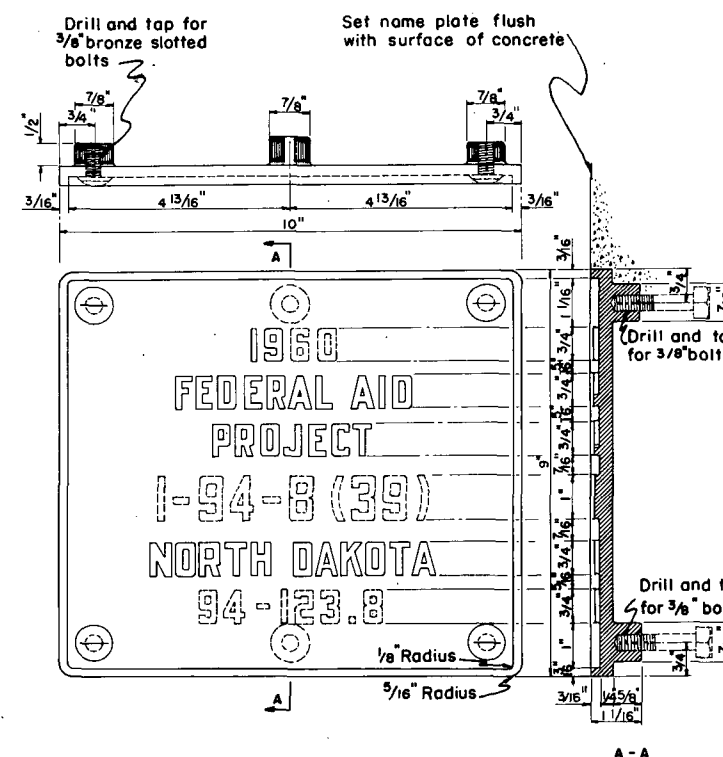
The draft on the letters shall be not more than 3° in 12°.

Letters and numbers shall conform to those shown. Furnish two steel bolts 3/8" x 3" long and four bronze bolts 3/8" x 3/4" long with each plate. The bronze bolts shall have slotted heads. The four corner bolt holes are to be used to fasten the plate to the forms during construction. After the forms have been removed the four bronze bolts shall be used to fill the four bolt holes.

A rubbed proof of the patterns shall be submitted to the North Dakota State Highway Department for approval before the name plates are cast.

Unless otherwise noted on the structure layout sheet two (2) Federal Aid Name Plates will be required at each structure location.

The cost of furnishing and installing name plates, steel and bronze bolts, as described on this sheet, shall be included in the unit price bid for the several pay items.

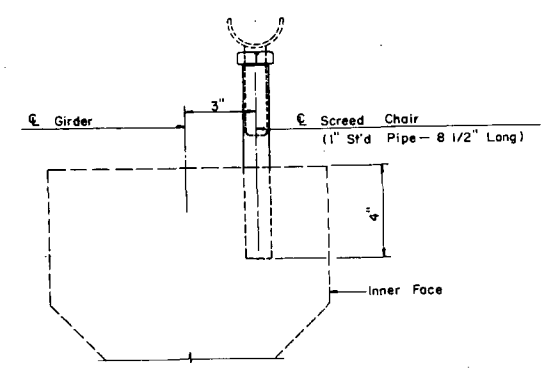


FEDERAL AID NAME PLATE

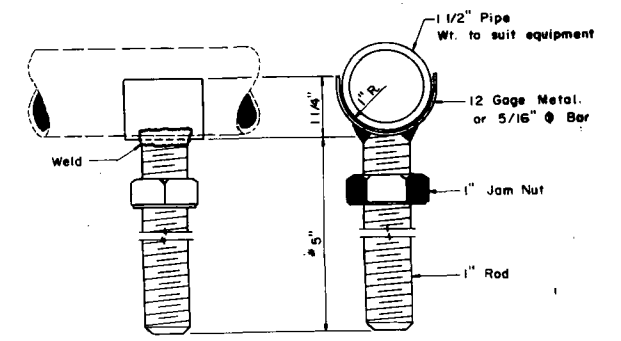
NORTH DAKOTA  
STATE HIGHWAY DEPARTMENT  
Submitted: *Joseph C. Kirby*  
Bridge Engineer  
Recommended: *W. A. Wise*  
Director Staff Division  
Approved: *W. A. Wise*  
Acting Chief Engineer  
Date: 3-24-58

Revised 7-19-62  
Revised 7-10-59  
Revised 4-30-59  
Revised 4-7-58

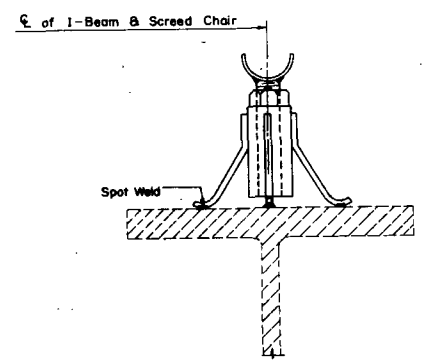
DESIGN	MADE BY	REVISIONS	MADE BY	CHK'D BY	DATE
DETAILS	CHECKED BY				
TRACING	CHECKED BY				
QUANTITIES	CHECKED BY				



**SCREED CHAIR IN PRESTRESSED GIRDER**  
(Outside Girders Only)



**ADJUSTABLE SCREED HOLDER**  
\* Useable with slab thickness of 7" or less. For greater slab thickness adjust length accordingly.

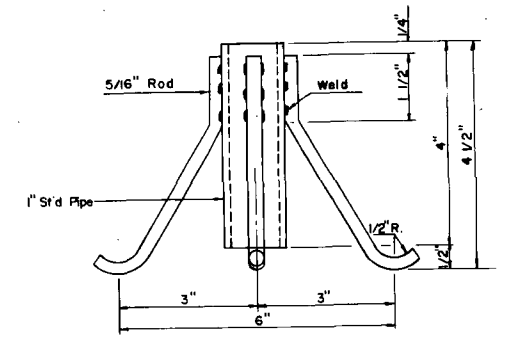


**I-BEAM WITH SCREED CHAIR**

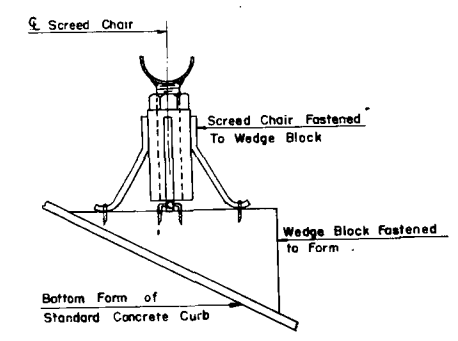
**NOTE:**  
THE SPACING OF SCREED CHAIRS SHALL BE SUCH THAT NO NOTICEABLE DEFLECTION OCCURS IN THE SCREED WHEN THE VIBRATION STRIKE-OFF IS IN OPERATION. CHAIRS SHALL BE SIMILARLY PLACED FOR ALL SCREEDS ON THE SAME BRIDGE SPAN WITH A MAXIMUM SPACING OF THREE FEET WHEN USING 1 1/2" EXTRA STRONG PIPE FOR A SCREED. SCREEDS SHALL BE SET ON OUTER BEAMS AND ALSO ON INTERMEDIATE BEAMS IF NECESSARY TO MAINTAIN THE REQUIRED TEMPLATE.

THE COST OF THE SCREED CHAIRS AND HOLDERS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE VARIOUS PAY ITEMS. UPON COMPLETION OF THE PROJECT THE SCREED AND SCREED HOLDERS SHALL REMAIN THE PROPERTY OF THE CONTRACTOR.

THE DESIGN SHOWN FOR THE SCREED CHAIRS AND SEAT MAY BE VARIED SLIGHTLY TO SUIT MANUFACTURERS PRODUCTS IF APPROVED BY THE ENGINEER.



**SCREED CHAIR**

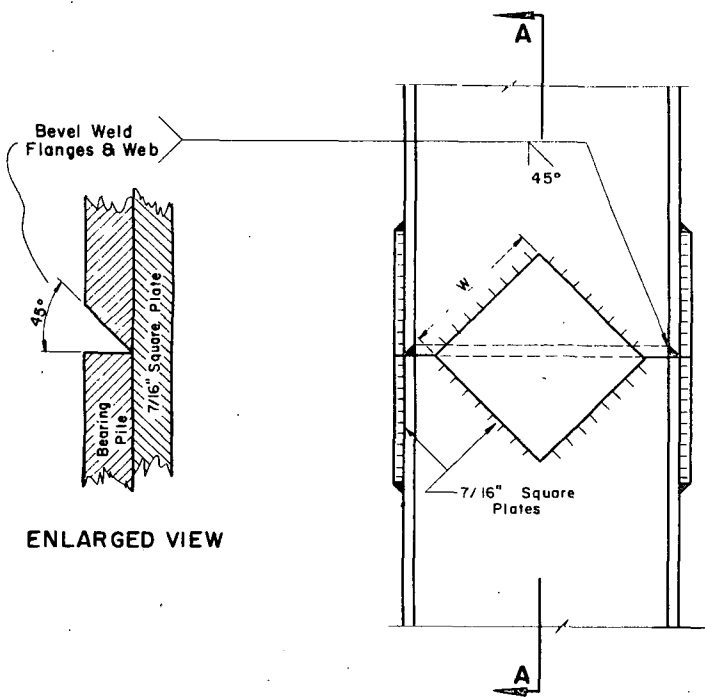


**BOTTOM CURB FORM WITH SCREED CHAIR**

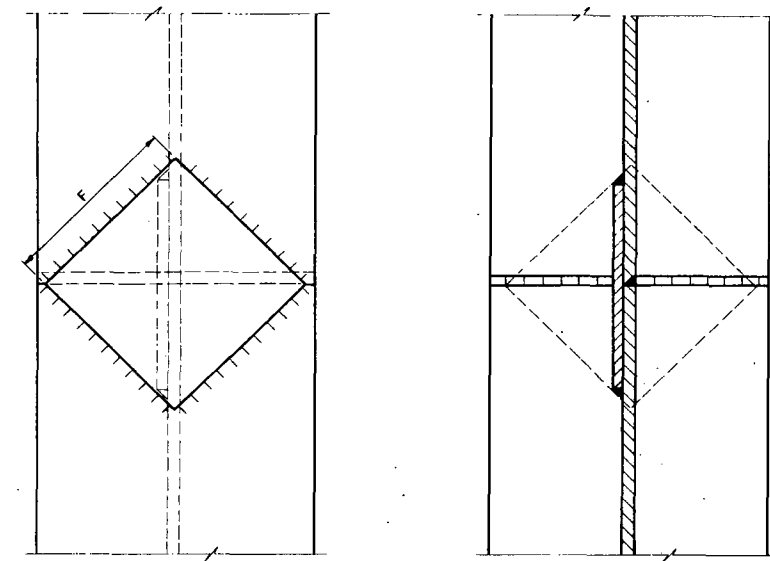
NORTH DAKOTA  
STATE HIGHWAY DEPARTMENT

**SCREED CHAIR & ADJUSTABLE SCREED HOLDER**

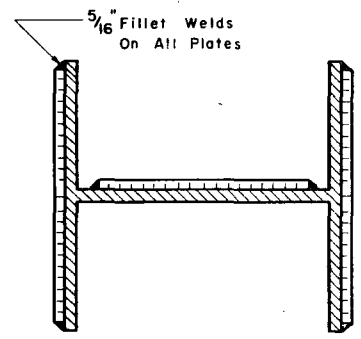
APPROVED: *Allen Anderson*  
DATE: 3-20-73  
BRIDGE ENGINEER



ENLARGED VIEW

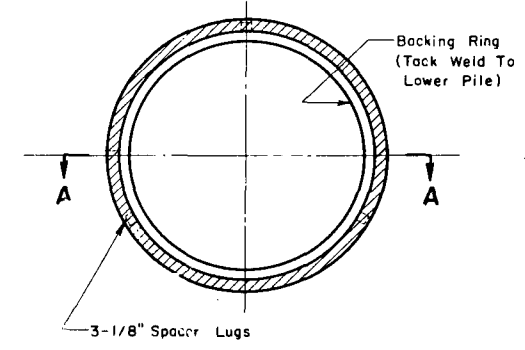


Flare Scarf Inside Of Both Flanges And One Side Of Web Of Upper Section

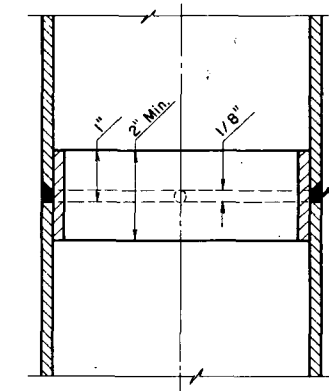


H-PILE SPLICE DETAIL

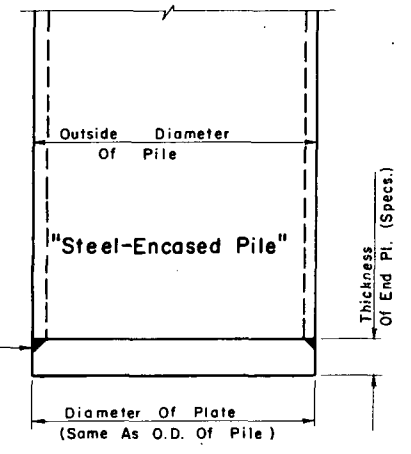
PILE	8"	10"	12"	14"
F FLANGE	5"	6 1/2"	8"	10"
W WEB	4"	5 1/2"	6 1/2"	8"



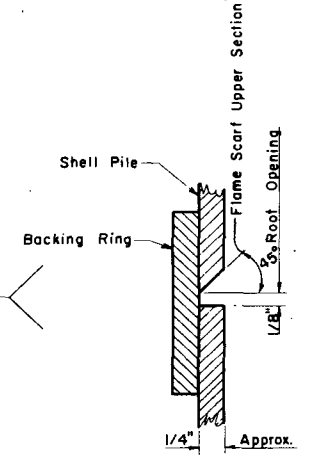
Backing may be made from pile cut-offs or other material of a like quality.



SHELL PILE SPLICE DETAIL



END PLATE DETAIL



ENLARGED VIEW

All welding shall conform to the current specification for "Welded Highway and Railway Bridges of the American Welding Society."

PILE SPLICE DETAILS

CHECKED BY  
MADE BY  
QUANTITIES  
CHECKED BY

H-0401



PILE PROPERTIES

Table with 7 columns: PILE SIZE, AREA Ac, APPROX WEIGHT PER 1/2" (1), MINIMUM PRESTRESS FORCE (2), STRANDS PER PILE DIAMETER 7/16" (3) 1/2", SECTION MODULUS, PERIMETER, DESIGN BEARING CAPACITY CONCRETE STRENGTH 5000 PSI (4). Rows for 10" and 12" pile sizes.

Table with 5 columns: PILE ROAD DIST. NO., STATE, PROJ. NO., SHEET NO., TOTAL SHEETS. Values: #, N. D., BRC-A-01401, 100, 100.

NOTES:

- ALTERNATE PILE HEADS: REINFORCEMENT MAY BE SPECIFIED TO PROJECT FROM THE PILE INTO THE CAP OR FOOTING. IF SO REQUIRED, ATTACHMENT OF THE PILE TO THE CAP OR FOOTING MAY BE MADE BY ANY ONE OF THE FOLLOWING METHODS UNLESS OTHERWISE SPECIFIED. 1. ALLOW ALL STRANDS TO PROJECT A MINIMUM OF 28" (SPECIAL DRIVING HEAD REQ.) 2. CAST MILD REINFORCING STEEL IN PILE HEAD WITH BARS PROJECTING FOR ANCHORAGE. (SPECIAL DRIVING HEAD REQUIRED.) 3. PROVIDE CORED HOLES IN PILE HEAD FOR SUBSEQUENT USE OF GROUTED DOWEL BARS. 4. DRILL HOLES IN PILE HEAD FOR INSTALLATION OF GROUTED DOWEL BARS. SPECIAL CARE SHALL BE TAKEN TO PREVENT DAMAGE TO THE PILE HEAD.

GENERAL: WHEN PILES ARE ORDERED IN ACCORDANCE WITH THIS STANDARD PLAN, THE STANDARD PILE DETAILS SHALL BE USED. ALTERNATE PILE HEADS, PILE TIPS, SPLICES, BUILD-UPS OR OTHER ALTERNATES SHALL BE USED ONLY IF SPECIFIED OR AUTHORIZED BY THE ENGINEER. WHERE SPECIFIC METHODS ARE INDICATED FOR ACHIEVING A RESULT, OTHER METHODS WHICH WILL INSURE EQUAL RESULTS MAY BE CONSIDERED FOR APPROVAL BY THE ENGINEER.

SMALL AREAS OF HONEYCOMB WHICH ARE PURELY SURFACE IN NATURE EXTENDING TO A DEPTH OF NO MORE THAN ONE INCH MAY BE REPAIRED IN A MANNER SATISFACTORY TO THE ENGINEER. HONEYCOMB EXTENDING TO THE PLANE OF REINFORCING WILL BE CAUSE FOR REJECTION.

IF MILD REINFORCING STEEL IS USED FOR PROJECTION INTO CAP OR FOOTING THE MINIMUM AREA OF STEEL REQUIRED SHALL BE TWICE THE AREA OF THE PRESTRESSING STRANDS WITH NOT LESS THAN FOUR BARS BEING USED. ARRANGEMENT OF BARS SHALL BE IN A SYMMETRICAL PATTERN WITH BARS AS CLOSE AS PRACTICAL TO THE SIDES OF THE PILE. ANCHORAGE OF BARS SHALL BE SUFFICIENT TO DEVELOP STRENGTH OF BAR BUT NOT LESS THAN 20 BAR DIAMETERS.

CONCRETE: CONCRETE IN THE PRECAST PRESTRESSED PILES SHALL HAVE A MINIMUM COMPRESSIVE CYLINDER STRENGTH (F'c) OF 5000 PSI AT 28 DAYS. COMPRESSIVE CYLINDER STRENGTH OF TRANSFER OF PRESTRESSING FORCE SHALL BE NOT LESS THAN 4000 PSI.

HIGHER CONCRETE STRENGTHS MAY BE USED AND ADVANTAGE MAY BE TAKEN OF SUCH GREATER STRENGTH FOR HANDLING AND DRIVING STRESSES AND COLUMN LOADING, SUBJECT TO APPROVAL OF ENGINEER.

AIR-ENTRAINED CONCRETE IS REQUIRED FOR PILES WHICH WILL BE SUBJECTED TO CYCLES OF FREEZING AND THAWING AND WETTING AND DRYING.

PRESTRESSING REINFORCEMENT: SEVEN WIRE STRESS RELIEVED STRAND SHALL CONFORM TO THE GENERAL REQUIREMENTS OF ASTM DESIGNATION A416, AND MAY BE EITHER REGULAR OR HIGH STRENGTH, IN ACCORDANCE WITH STRAND MANUFACTURER'S PUBLISHED TABLES. SUBJECT TO THE APPROVAL OF THE ENGINEER, PRESTRESSING MAY BE INCREASED AS REQUIRED FOR HANDLING OR DRIVING BY INCREASING THE NUMBER OR SIZE OF STRANDS. IN GENERAL THE UNIT PRESTRESS AFTER LOSSES SHOULD NOT EXCEED 0.2 F'c, UNLESS SPECIAL CONDITIONS WARRANT AND APPROPRIATE ADJUSTMENT IS MADE IN ALLOWABLE PILE CAPACITY. BROKEN WIRES WITHIN INDIVIDUAL STRANDS WILL BE PERMITTED UP TO 2% OF THE TOTAL NUMBER OF WIRES IN EACH PILE, PROVIDING THAT THERE IS NOT MORE THAN ONE BROKEN WIRE PER STRAND. TWO OR MORE BROKEN WIRES PER STRAND WILL BE CAUSE FOR REPLACEMENT OF THE STRAND, EVEN THOUGH THE TWO BROKEN WIRES ARE WITHIN THE 2% LIMITATION.

SPLICES: TWO PRESTRESSED PILE SECTIONS MAY BE SPLICED BY THE USE OF DOWELS EXTENDING FROM THE TIP OF THE UPPER PRESTRESSED SECTION INTO CORED OR DRILLED HOLES IN THE LOWER PRESTRESSED SECTION. THE DOWELS SHALL HAVE AN AREA EQUAL TO 1-1/4% OF THE GROSS CROSS-SECTION OF PILE AND SHALL BE ADEQUATELY BONDED INTO BOTH SECTIONS. THE DOWEL HOLES AND SPACE BETWEEN SPLICED SECTIONS SHALL BE ADEQUATELY BONDED INTO BOTH SECTIONS. THE DOWEL HOLES AND SPACE BETWEEN SPLICED SECTIONS SHALL BE FILLED WITH A MATERIAL HAVING PROPERTIES FULLY EQUAL TO THAT OF THE CONCRETE AND ADHESIVE STRENGTH EQUAL TO THE SHEAR AND TENSILE STRENGTH OF THE CONCRETE. SUCH PROPERTIES SHALL BE OBTAINED WITHIN A TIME LIMIT CONSISTENT WITH THE DRIVING REQUIREMENTS OF THE PILE.

ANY ALTERNATE METHOD OF SPLICING PROVIDING EQUAL RESULTS MAY BE CONSIDERED FOR APPROVAL.

CHAMFERS AND CORNERS: ALL CORNERS OF SQUARE PILES SHALL BE CHAMFERED TO AT LEAST 3/4" OR ROUNDED TO APPROXIMATELY 1" RADIUS.

FORMS: FOR FORMING THE EXTERIOR OF PILES, THE USE OF STEEL FORMS ON CONCRETE FOUNDED CASTING BEDS IS REQUIRED, UNLESS OTHERWISE APPROVED BY THE ENGINEER. SIDE FORMS MAY HAVE A MAXIMUM DRAFT ON EACH SIDE NOT EXCEEDING 1/4" PER FOOT.

PICK-UP AND HANDLING: MAXIMUM LENGTH FOR PICK-UP ARE DETERMINED USING THE FOLLOWING STRESS ASSUMPTIONS.

LOADING: 1-1/2 TIMES FULL DEAD LOAD. ALLOWABLE TENSILE STRESS EQUALS 6.0 sqrt(F'c). THESE STRESS AND LOADING CRITERIA ARE BASED ON NORMAL CARE IN HANDLING THE PILE. IF HANDLING IS SUCH THAT DAMAGE TO THE PILE BECOMES EVIDENT, THE ENGINEER MAY REQUIRE A HIGHER LOAD FACTOR OR LOWER ALLOWABLE STRESS AS NECESSARY TO INSURE NO DAMAGE TO PILES.

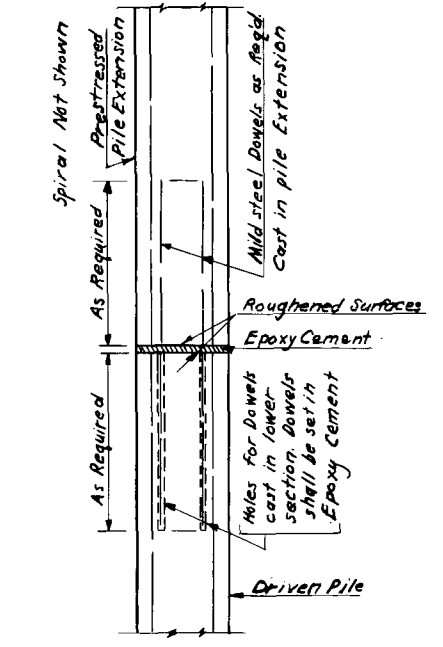
DRIVING: PILE HEADS SHALL BE PROTECTED FROM DIRECT IMPACT OF THE HAMMER BY CUSHION BLOCKS CONSISTING OF SEVERAL PLIES OF SOFT COMPRESSIBLE WOOD OR OTHER APPROVED MATERIAL.

JETTING WILL BE PERMITTED AND/OR REQUIRED WHEN NECESSARY TO OBTAIN THE REQUIRED PENETRATION. INTERNAL JETS MAY BE INSTALLED PROVIDED THEY ARE SECURELY ANCHORED TO THE PILE AND ARE IMBEDDED IN THE CONCRETE.

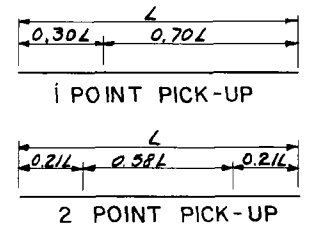
THE DRIVING HEAD (HELMET) SHALL BE SUFFICIENTLY LARGE AND SHALLOW SO AS NOT TO BIND THE HEAD OF THE PILE IF IT TWISTS SLIGHTLY DURING DRIVING.

TOLERANCES: PILE ENDS SHALL BE PLANE SURFACES AND PERPENDICULAR TO AXIS OF PILE WITH A MAXIMUM TOLERANCE OF 1/8" PER FOOT TRANSVERSELY.

THE MAXIMUM SWEEP (DEVIATION FROM STRAIGHTNESS MEASURED ALONG TWO PERPENDICULAR FACES OF THE PILE, WHILE NOT SUBJECT TO BENDING FORCES) SHALL NOT EXCEED 1/8" IN ANY 10' OF ITS LENGTH.



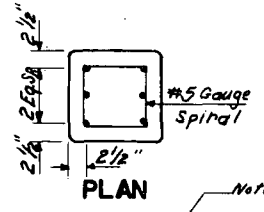
DOWELED SPLICE



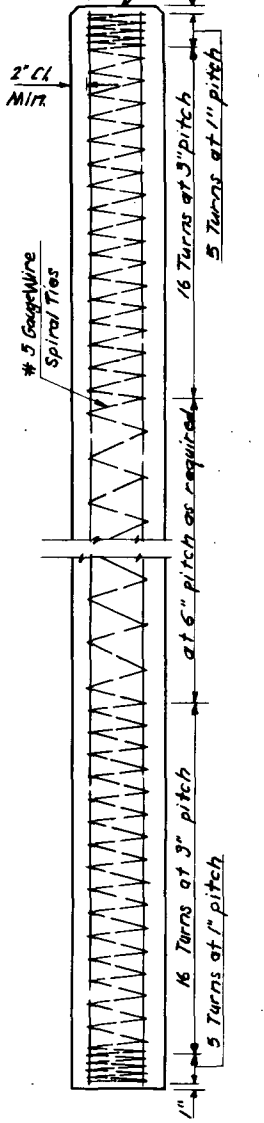
PICKING POINTS: UNLESS SPECIAL LIFTING DEVICES ARE ATTACHED FOR PICK-UP POINTS SHALL BE PLAINLY MARKED ON ALL PILES AFTER REMOVAL OF THE FORMS AND ALL LIFTING SHALL BE DONE AT THESE POINTS.

THE USE OF SPECIAL EMBEDDED OR ATTACHED LIFTING DEVICES, THE EMPLOYMENT OF OTHER PICK-UP POINTS OR ANY OTHER METHOD OF PICK-UP SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.

ALTERNATE PILE TIPS: WHEN DRIVING INTO ROCK OR HARD STRATA ALTERNATE TIPS MAY BE USED IN LIEU OF THE STANDARD FLAT TIP. SIZE AND LENGTH OF STEEL SECTION USED SHALL BE AS DETERMINED BY THE ENGINEER FOR ADEQUATE PENETRATION.

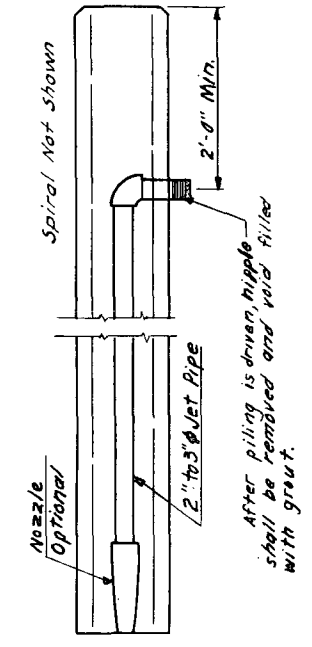


PLAN Note: For Method of Attachment of pile head to footing or Cap, See Notes on Alternate pile heads. Typical all pile heads.

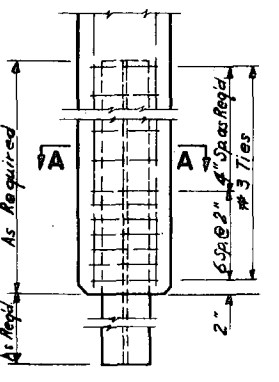


ELEVATION

- 1. WEIGHTS BASED ON 150 LB. PER CUBIC FOOT OF REGULAR CONCRETE.
2. MINIMUM PRESTRESS FORCE BASED ON UNIT PRESTRESS OF 700 PSI AFTER LOSSES.
3. BASED ON 7/16" AND 1/2" HIGH STRENGTH STRAND WITH AN ULTIMATE STRENGTH OF 31,000 LBS. AND 41,300 LBS., RESPECTIVELY. IF REGULAR STRENGTH STRAND IS USED, THE NUMBER OF STRANDS PER PILE SHOULD BE INCREASED ACCORDINGLY IN CONFORMANCE WITH STRAND MANUFACTURER'S TABLES.
4. DESIGN BEARING CAPACITY BASED ON 5000 PSI CONCRETE AND AN ALLOWABLE UNIT STRESS ON THE TIP OF THE PILE OF .2 F'c. THESE BEARING CAPACITY VALUES MAY BE INCREASED IF HIGHER STRENGTH CONCRETE IS USED.



JET PIPE DETAILS



A-A ALTERNATE PILE TIP

Table with 2 main sections: QUANTITIES and STANDARD PRESTRESSED CONCRETE PILE.