

29-074.991

DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current 2006	Pass: 5220	Trucks: 1560	Total: 6,780	
Forecast 2026	Pass: 8665	Trucks: 2590	Total: 11,255	
Clear Zone Dist. 34 ft		Design Speed: 75 mph		
Minimum Sight Dist for Stopping: 820'		Bridges: Cass Co. Drain 13 and Argusville		
Full Control of Access				
No Point of Access Other Than at Interchange Ramps				
Pavement Design Life 30 (years)				

JOB# 61

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	IM-8-029(122)075	18035	1	1

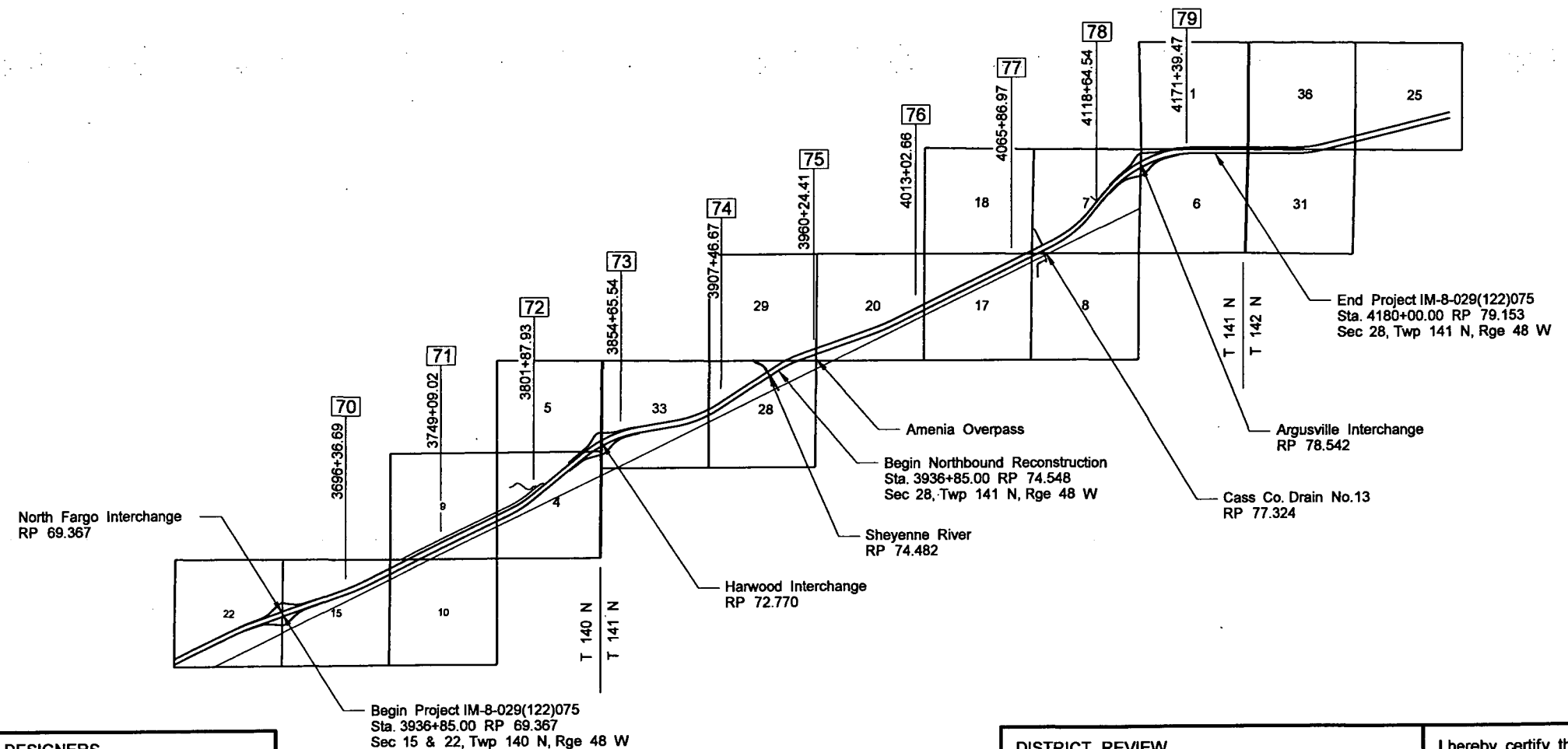
## NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

IM-8-029(122)075

GOVERNING SPECIFICATIONS:  
Standard Specifications adopted by the North Dakota Department of Transportation October 2008; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

CASS COUNTY  
SHEYENNE RIVER NORTH TO ARGUSVILLE  
NORTHBOUND PCC RECONSTRUCTION, RAMP HBP OVERLAY AND RECONSTRUCTION  
BRIDGE DECK OVERLAY, CASS CO. DRAIN 13 BOX CULVERT

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
IM-8-029(122)075 Reconstruction	4.605	9.786



DESIGNERS
Jeffrey T. Lansink, PE
Adam R. Walker, PE
Brian T. Pattengale
Luke J. Beckerman

Begin Project IM-8-029(122)075  
Sta. 3936+85.00 RP 69.367  
Sec 15 & 22, Twp 140 N, Rge 48 W

DISTRICT REVIEW
Robert Walton Jr. /s/
FARGO DISTRICT
APPROVED DATE 08/25/2010
Roger Weigel /s/ for
OFFICE OF PROJECT DEVELOPMENT ND DEPARTMENT OF TRANSPORTATION

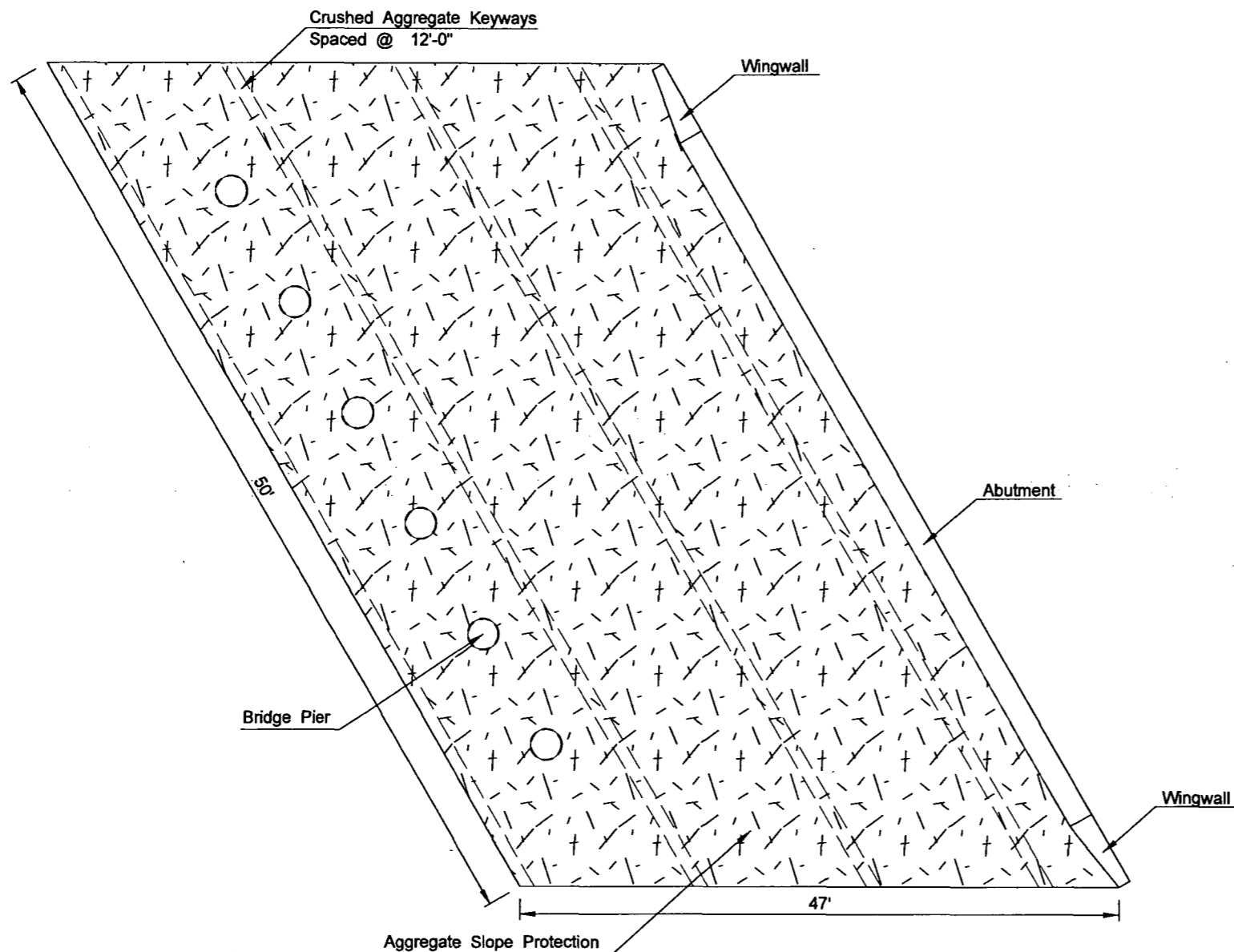
I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 08/23/2010

Jeremy L. McLaughlin /s/  
HOUSTON ENGINEERING, INC., FARGO, ND

This document was originally issued and sealed by Jeremy L. McLaughlin Registration Number PE-4883, on 08/23/2010 and the original document is stored at the North Dakota Department of Transportation

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	IM-8-029(122)075	170	1



PLAN

Note: Aggregate slope protection shall be placed on the embankment slope at Amenia Overpass - Northbound. The subgrade for placing aggregate slope protection shall be free of rubbish and vegetation. All loose material shall be thoroughly compacted. The contractor shall excavate or backfill as required to obtain the Plan cross-section as shown in the plans or lines and grades established in the field. This slope protection shall consist of a 6 inch layer of coarse crushed aggregate as used in Portland concrete.

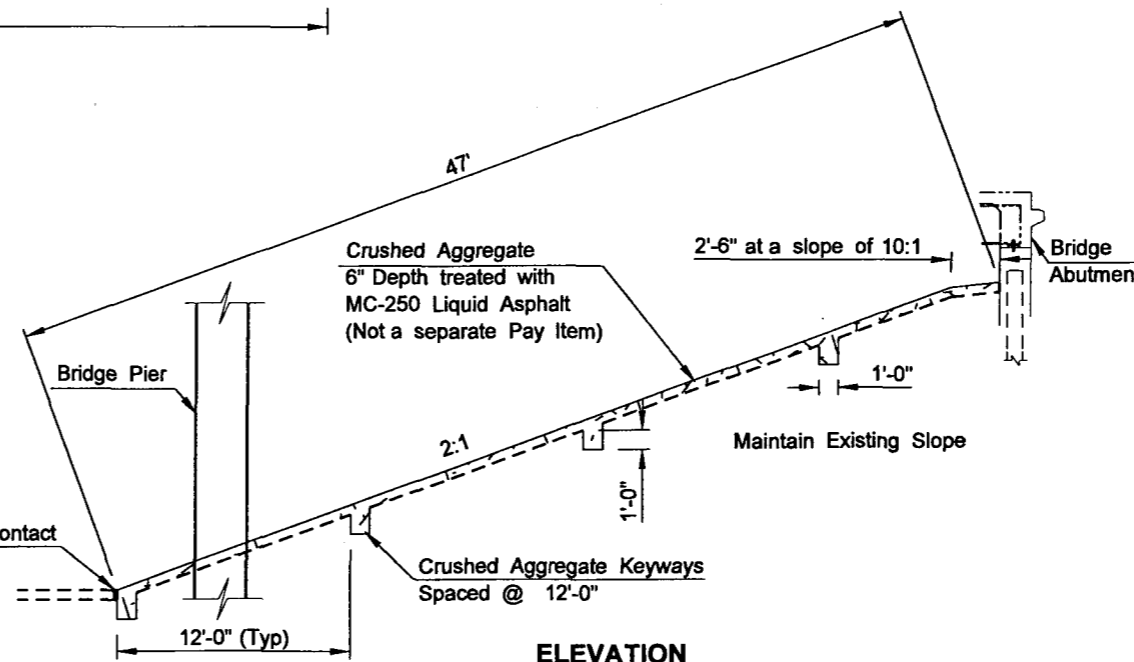
The gradation shall be as follows:

Sieve Size	% Passing
2"	100%
3/4"	5-35%
#4	0-5%

The minimum fractured face requirement of the aggregate shall be 50% by weight on the portion of the aggregate retained on the No. 4 sieve. To be considered fractured, the rock shall have at least one fractured face.

The aggregate shall be deposited, spread, consolidated, and shaped by mechanical or hand methods that will provide uniform depth and density and produce a uniform surface appearance. MC-250 Liquid asphalt shall be applied at an approximate rate of 1.8 gal/SY. The bituminous materials shall penetrate to a depth of not less than one-half the required thickness of aggregate. Adjacent structure surfaces shall be protected against bituminous splatter. All costs for labor, materials, and equipment to complete this work shall be included in the unit price bid for "Aggregate Slope Protection".

This document was originally issued and sealed by Jeremy L McLaughlin, Registration Number PE 4883, on 08/23/2010 and the original document is stored at the North Dakota Department of Transportation



ELEVATION

AGGREGATE SLOPE PROTECTION

Location	Area	
	(SQ FT)	(SQ YD)
Amenia Overpass - NB	2,350	261

NORTH DAKOTA  
 DEPARTMENT OF TRANSPORTATION  
**Amenia Overpass**  
**AGGREGATE SLOPE PROTECTION**

PROJECT: IM-8-029(122)075  
 STATION: 3959+74.13  
 CASS COUNTY

09/01/2010 Terrence R. Udland  
 DATE BRIDGE ENGINEER

NOTE: See Design Data Sheet for Design Data at each location.

JOB# 13

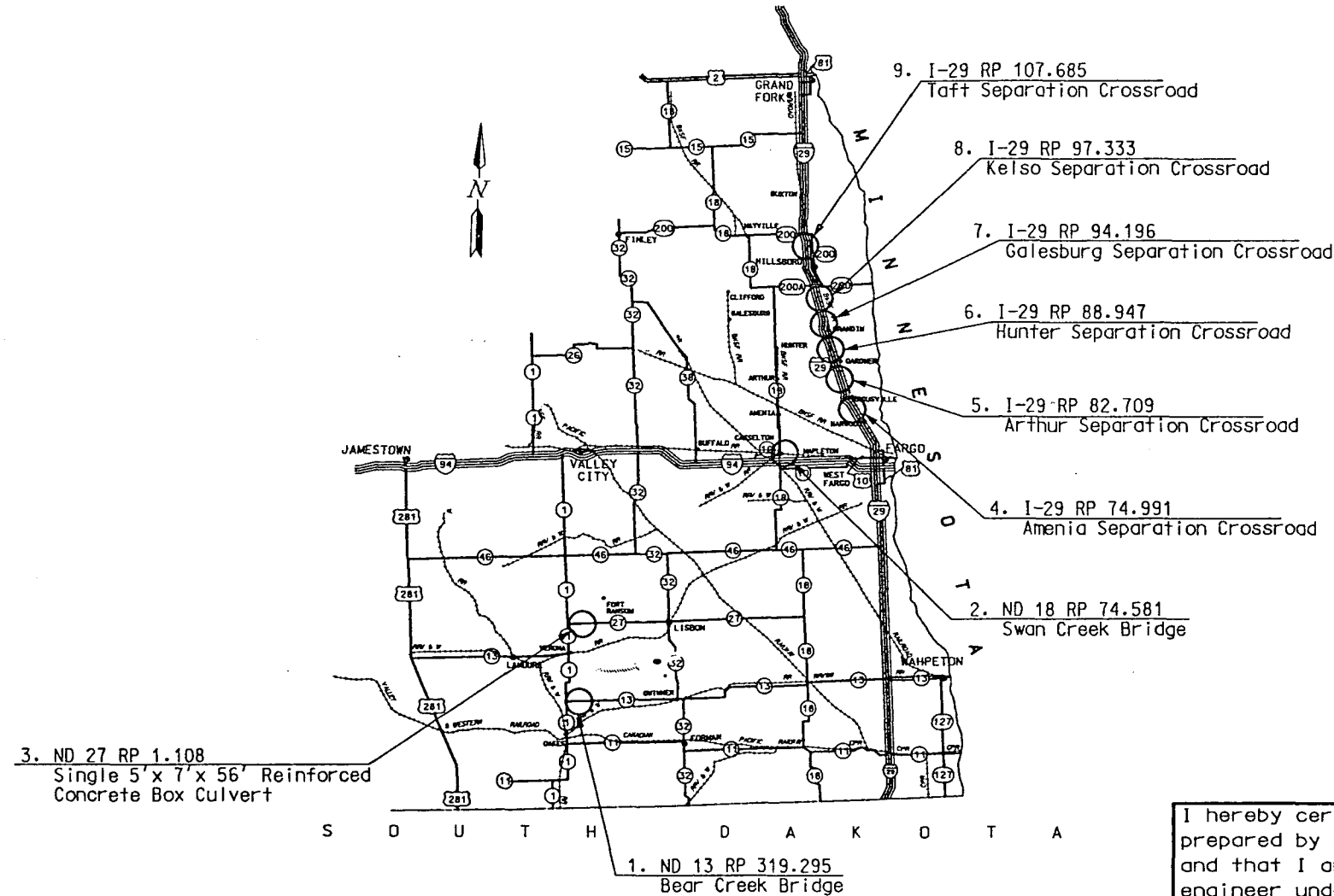
STATE	PROJECT NO.	PCN	SHEET NO.
ND	HSP-8-999(014)	15528	1

# NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

Federal Aid Project HSP-8-999(014)  
Bridge Rail Retrofit, Guardrail, RCB Extension and Incidentals  
at Various Locations in Cass, Dickey, LaMoure and Traill Counties

GOVERNING SPECIFICATIONS:

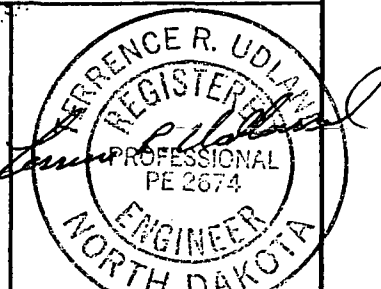
Standard Specifications adopted by the North Dakota Department of Transportation October 2002; Standard Drawings currently in effect; and other Contract Provisions submitted herein.



I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 3-30-04

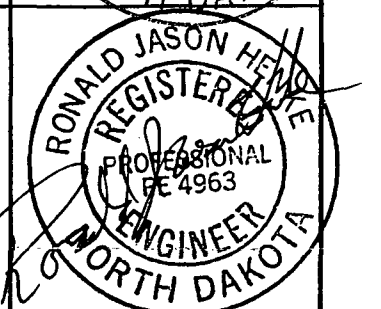
*Lawrence R. Ullmann*  
BRIDGE ENGINEER  
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION



I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 3/31/04

*Ronald Jason Helms*  
DESIGN DIVISION  
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION



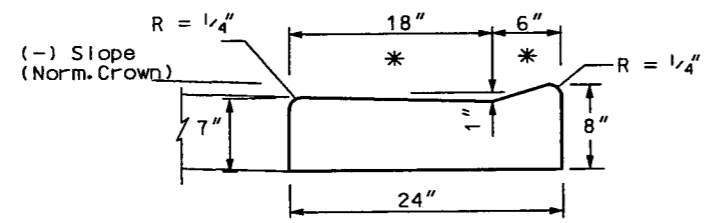
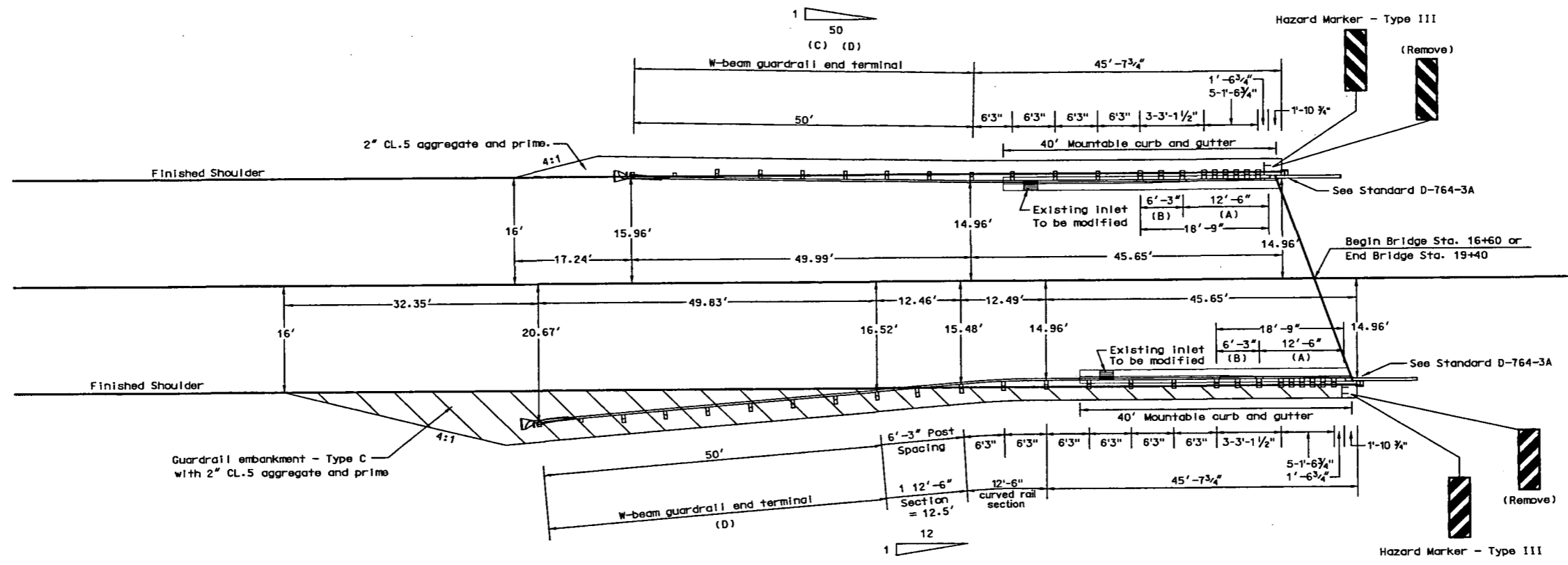
DESIGNER	<i>Guoye St. Frullo</i>
DESIGNER	_____
DESIGNER	_____
DESIGNER	_____
DESIGNER	_____
Retain Paper Original:	<input checked="" type="checkbox"/> Yes ___ No

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

APPROVED DATE <u>3/31/04</u>
<i>Francis A. Engler</i> DIRECTOR, OFFICE OF PROJECT DEVELOPMENT ND DEPARTMENT OF TRANSPORTATION

23 USC § 409 Documents  
 NDDOT Reserves All Objections

STATE	PROJECT NO.	SHEET NO.
ND	HSP-8-999(014)	13



Mountable Curb & Gutter  
 Type I At Bridge End

\* Transition flow line in  
 20 feet to standard  
 mountable curb section.

- (A) Thrie beam rail (double thickness)
- (B) W-thrie beam transition section (double thickness)
- (c) If the ET-2000 end terminal is to be installed, a 50:1 taper shall be used for this end terminal. If the FLEAT is to be installed, the flare shown on Standard D-764-2C shall be used.
- (D) The Slotted Rail Terminal (SRT) may not be used at this location.

Thrie/W-Beam Guardrail Layout  
 at both ends of bridge

Amenia Separation Crossroad

R.P. 74.991  
 I-29

23 USC §409 Documents  
NDDOT Reserves All Objections

STATE	PROJECT NO.	SHEET NO.
N.D.	HSP-8-999(014)	14

W-BEAM SUMMARY SHEET																
THRIE/W-BEAM GUARDRAIL AT BRIDGE ENDS																
LOCATION	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(B)
	5/8" @ x 18" LONG GUARD- RAIL BOLT	6" x 8" x 6'-0" TIMBER POST	6" x 8" x 14" TIMBER BLOCK	5/8" @ x 1 1/4" LONG GUARD- RAIL BOLT	12'-6" CURVED W-BEAM RAIL SECTION	REFL- ECTOR- IZED PLATES	8"x8" x 6" WOOD POST	8"x8" x 22" WOOD OFF- SET BLOCK	8"x8" x 18" WOOD OFF- SET BLOCK	8"x8" x 14" WOOD OFF- SET BLOCK	6'-3" DOUBLE W-THRIE BEAM TRANS- ITION SECTION	12'-6" DOUBLE THRIE BEAM SECTION	2'-6" THRIE BEAM TERM- INAL CON- NECTOR	7/8" @ x VAR- IABLE LONG. BOLT	3/4" @ x 2-1/2" LONG POST BOLT	EMBANK- MENT TYPE C
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 16+08.89 to 16+21.38 rt	3	3	3	8	1	2										20
Sta 16+46.38 to 16+67.03 rt	17			32		4	9	7	1	1	1	1	1	5	2	
Sta 16+34.25 to 16+54.90 lt	17			32		5	9	7	1	1	1	1	1	5	2	
Sta 19+45.10 to 19+65.75 rt	17			32		5	9	7	1	1	1	1	1	5	2	
Sta 19+32.97 to 19+53.62 lt	17			32		4	9	7	1	1	1	1	1	5	2	
Sta 19+78.62 to 19+91.11 lt	3	3	3	8	1	2										20
<b>TOTAL</b>	<b>74</b>	<b>6</b>	<b>6</b>	<b>144</b>	<b>2</b>	<b>22</b>	<b>36</b>	<b>28</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>20</b>	<b>8</b>	<b>40</b>

**W-BEAM GUARDRAIL**

Sta 16+08.89 to 16+21.38 rt	12.5 LF
Sta 16+46.38 to 16+67.03 rt	20.65 LF
Sta 16+34.25 to 16+54.90 lt	20.65 LF
Sta 19+45.10 to 19+65.75 rt	20.65 LF
Sta 19+32.97 to 19+53.62 lt	20.65 LF
Sta 19+78.62 to 19+91.11 lt	12.5 LF
<b>Total</b>	<b>107.6 LF</b>

**W-BEAM GUARDRAIL END TERMINAL**

Sta 15+46.60 to 15+96.43 rt	1 ea
Sta 15+59.26 to 16+09.25 lt	1 ea
Sta 19+90.75 to 20+40.74 rt	1 ea
Sta 20+03.57 to 20+53.40 lt	1 ea
<b>Total</b>	<b>4 ea</b>

**REMOVAL OF CURB & GUTTER**

Sta 16+25.5 to 16+65.5 rt	40 LF
Sta 16+14.5 to 16+54.5 lt	40 LF
Sta 19+45.5 to 19+85.5 rt	40 LF
Sta 19+34.5 to 19+74.5 lt	40 LF
<b>Total</b>	<b>160 LF</b>

**GUARDRAIL EMBANKMENT - TYPE C**

Sta 15+14.25 to 16+67.03 rt	1 ea
Sta 19+32.97 to 20+85.75 lt	1 ea
<b>Total</b>	<b>2 ea</b>

**HAZARD MARKERS - TYPE III**

Sta 16+63.5 rt	1 ea
Sta 16+52.5 lt	1 ea
Sta 19+47.5 rt	1 ea
Sta 19+36.5 lt	1 ea
<b>Total</b>	<b>4 ea</b>

**RESET W-BEAM GUARDRAIL**

Sta 15+96.43 to 16+08.89 rt	12.5 LF
Sta 16+21.38 to 16+46.38 rt	25 LF
Sta 16+09.25 to 16+34.25 lt	25 LF
Sta 19+65.75 to 19+90.75 rt	25 LF
Sta 19+53.62 to 19+78.62 lt	25 LF
Sta 19+91.11 to 20+03.57 lt	12.5 LF
<b>Total</b>	<b>125 LF</b>

**CASTING MOUNTABLE CURB - TYPE A**

Sta 16+29.5 rt	1 ea
Sta 16+19.5 lt	1 ea
Sta 19+81.5 rt	1 ea
Sta 19+69.5 lt	1 ea
<b>Total</b>	<b>4 ea</b>

**REMOVE W-BEAM GUARDRAIL & POSTS**

Sta 15+67.5 to 16+67.5 rt	100 LF
Sta 16+05.8 to 16+55.8 lt	50 LF
Sta 19+43.2 to 19+93.2 rt	50 LF
Sta 19+32.5 to 20+32.5 lt	100 LF
<b>Total</b>	<b>300 LF</b>

**MOUNTABLE CURB & GUTTER - TYPE 1 SEC A**

Sta 16+25.5 to 16+65.5 rt	40 LF
Sta 16+14.5 to 16+54.5 lt	40 LF
Sta 19+45.5 to 19+85.5 rt	40 LF
Sta 19+34.5 to 19+74.5 lt	40 LF
<b>Total</b>	<b>160 LF</b>

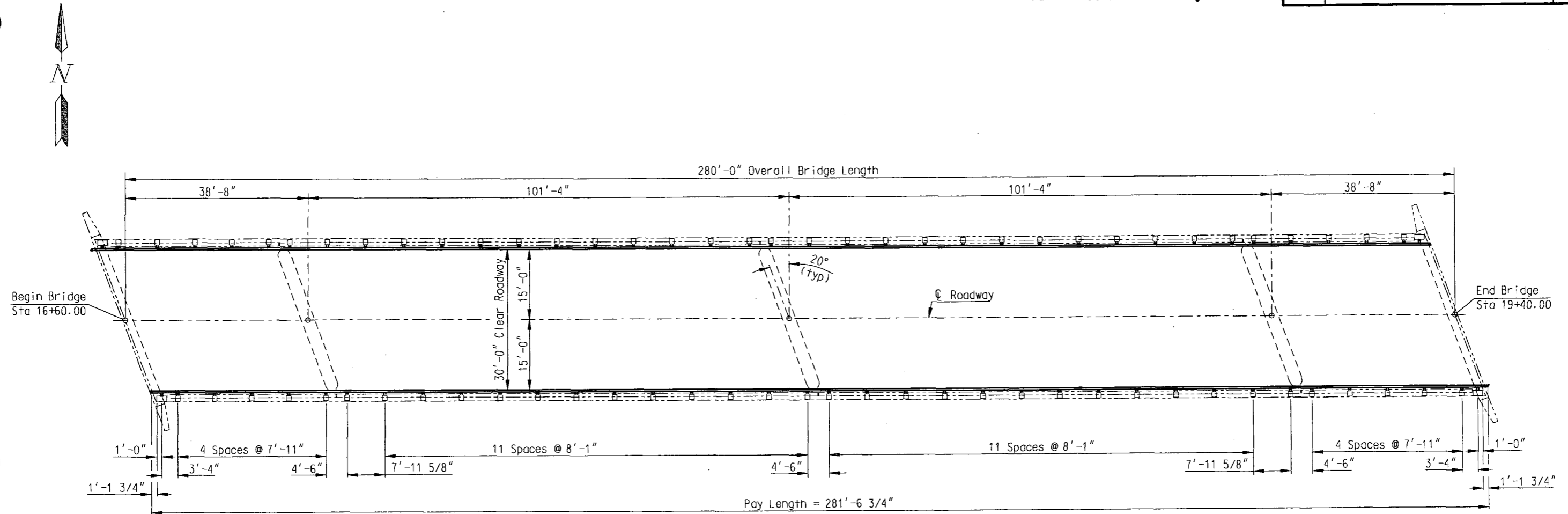
(A) These items are not to be bid separately but shall be included in the price bid for the item "W-Beam Guardrail".

(B) The amount of Embankment - type C (cubic yards), is for informational purposes only.

Thrie/W-Beam Guardrail Quantities

Amenia Separation Crossroad

RP 74.991  
I-29



PLAN

NOTES

The work at this site consists of placing a double box beam E-Rail retrofit.

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	563.1

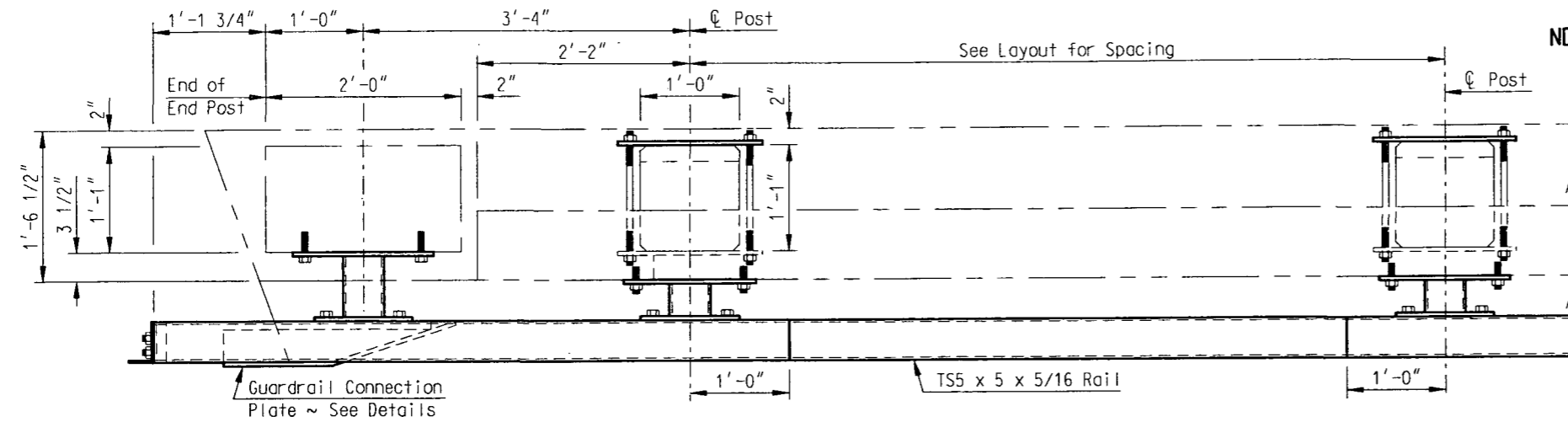
NORTH DAKOTA  
 DEPARTMENT OF TRANSPORTATION

AMENIA SEPARATION

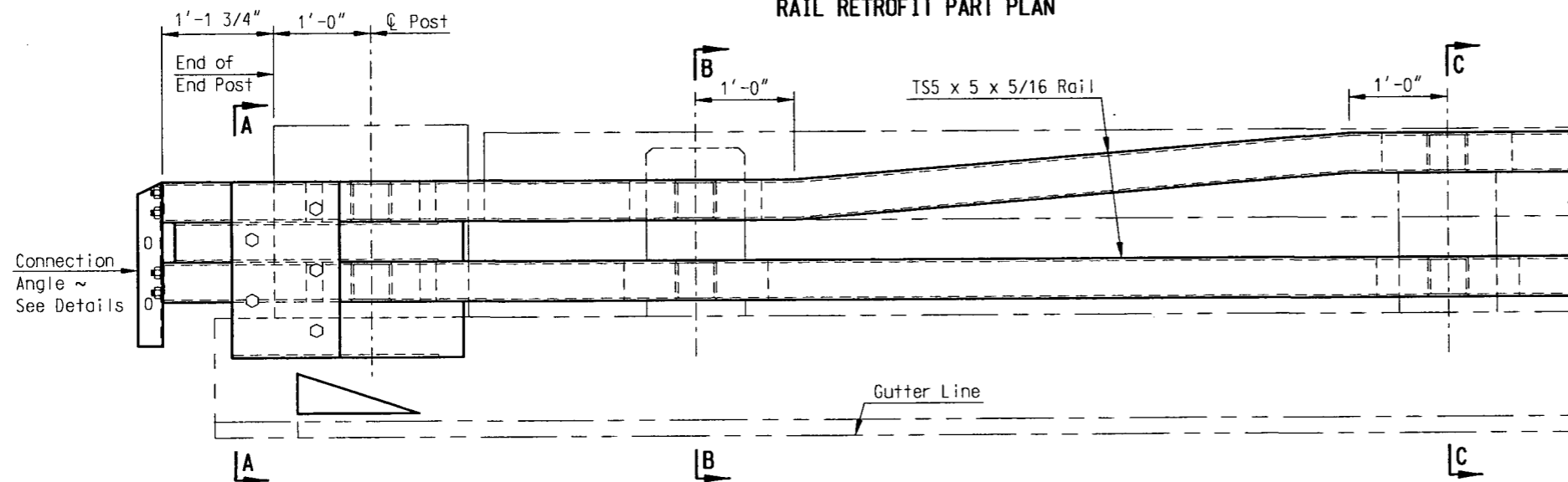
BRIDGE LAYOUT

PROJECT: HSP-8-999(014)  
 STATION 1394+96.9

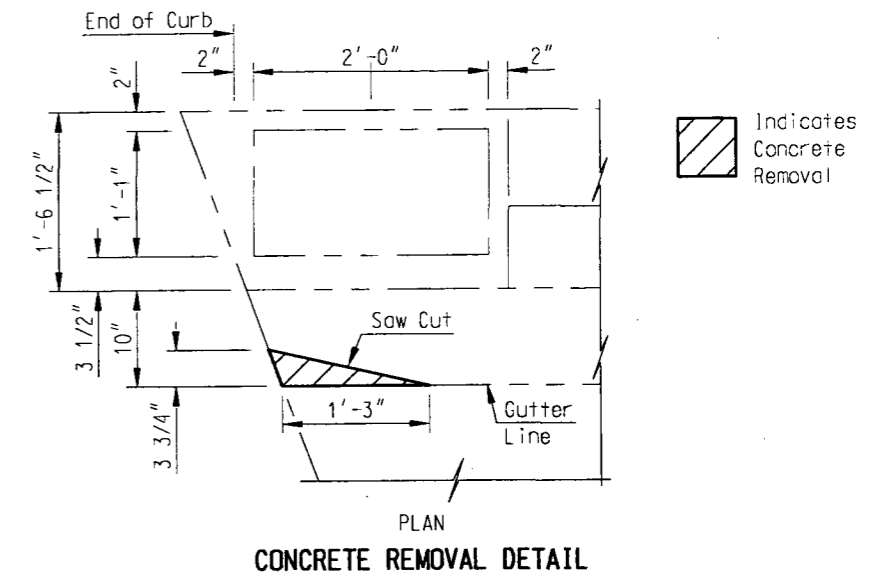
CASS COUNTY



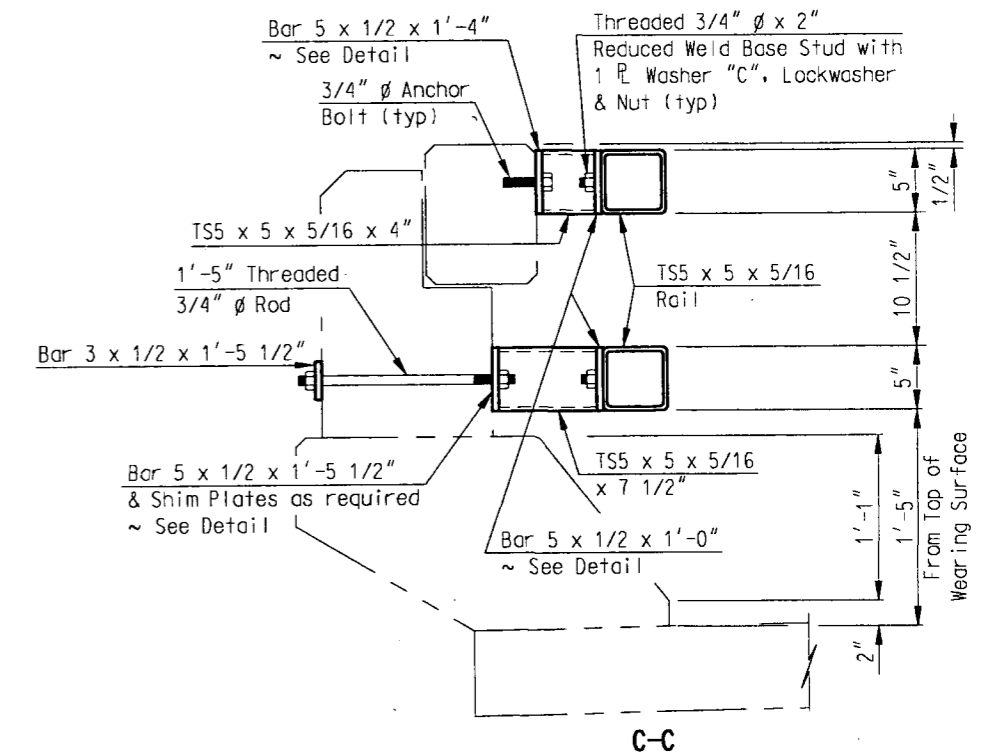
RAIL RETROFIT PART PLAN



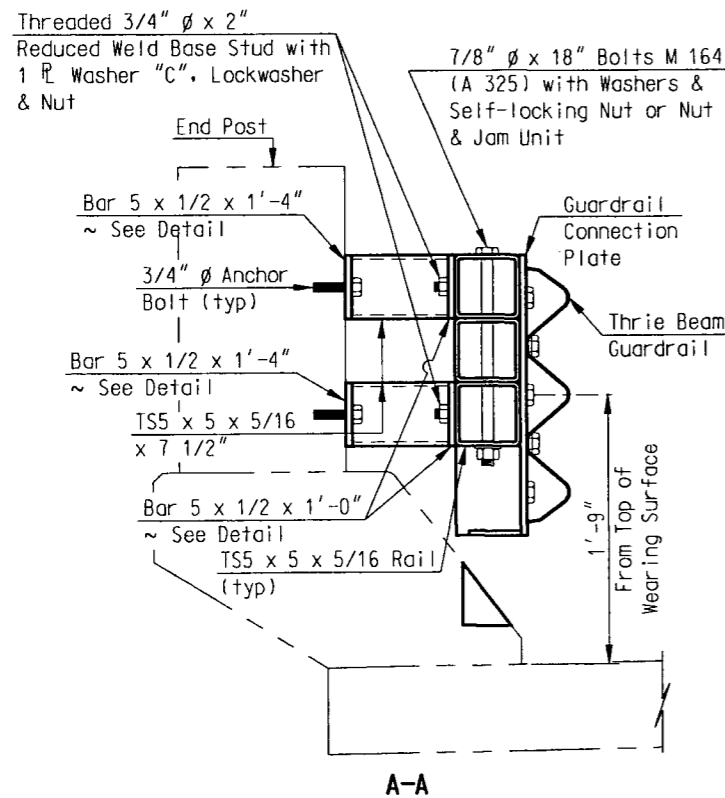
RAIL RETROFIT PART ELEVATION



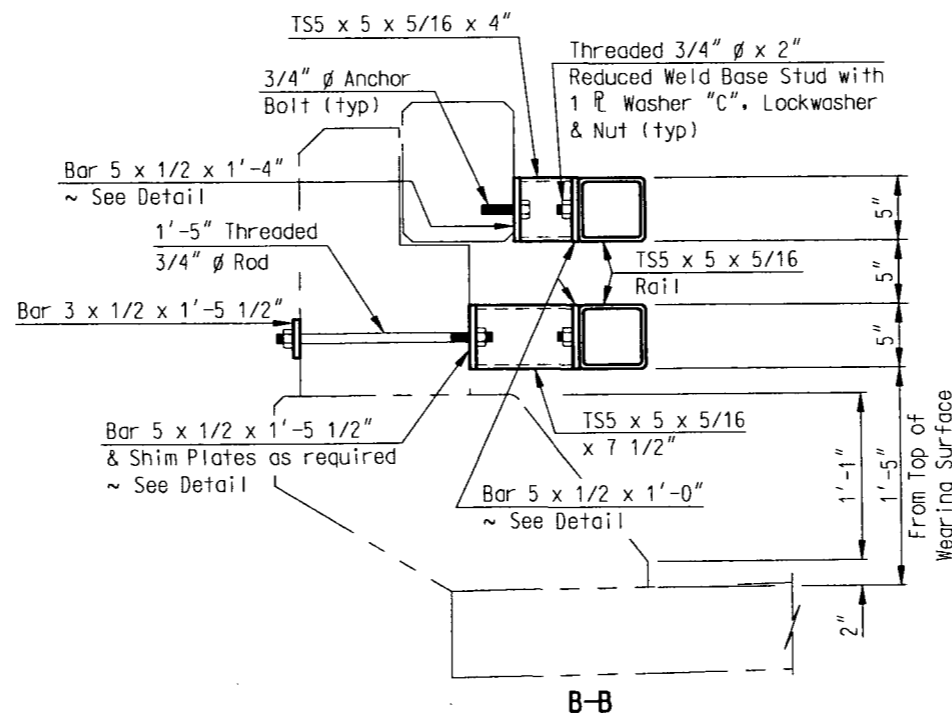
CONCRETE REMOVAL DETAIL



C-C



A-A



B-B

NOTE:

See Dwg 29-074.991-2 for notes and details not shown on this drawing.

QUANTITIES

SEE DWG 29-074.991-2

AMENIA SEPARATION  
 DOUBLE BOX BEAM  
 E-RAIL RETROFIT DETAILS

STATE	PROJECT NUMBER	SHEET NO.
ND	HSP-8-999(014)	34

NOTES:

The bid item shall be "Double Box Beam Rail Retrofit - E-Rail." The pay length shall be end to end and in linear feet.

Rail elements shall be square structural tubing in accordance with ASTM Specification A 500 Grade B.

Steel plates and angles shall conform to AASHTO Specification M 270 Grade 36, unless otherwise noted.

Railing shall be fabricated to the horizontal and vertical alignment of the structure.

Payment for the railing shall include compensation for furnishing and installing the guardrail connection plates and for sawing and removing portions of the curb.

All structural steel shall be hot-dip galvanized after fabrication according to AASHTO M 111.

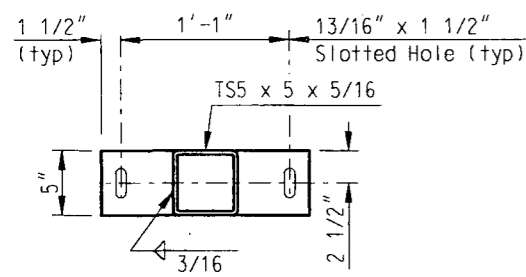
Rails shall be fabricated so that each rail segment between splices is attached to a minimum of two posts.

The threaded rods shall be M 270 Grade 36 Steel and galvanize according to M 232. The threaded rods shall be tightened to provide a minimum tensile force of 2,500 lbs. and a maximum tensile force of 2,700 lbs.

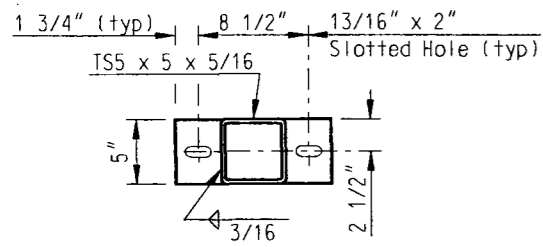
The anchor bolts shall be embedded into the concrete with a chemical adhesive system that can develop a tensile strength of at least 17,500 lbs.

All anchor and splice bolts shall be AASHTO M 164 (A 325) and shall be galvanized according to M 232.

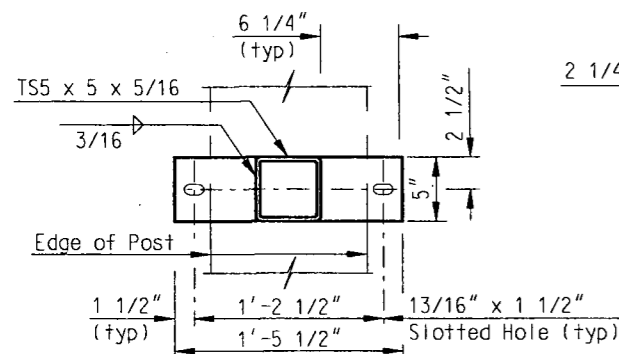
The Contractor shall field verify all dimensions and incorporate them into the shop drawings. The double box beam rail retrofit shop drawings shall be submitted for approval to the Construction Office before fabrication.



(CONCRETE RAIL CONNECTION)  
**BAR 5 X 1/2 X 1'-4" DETAIL**



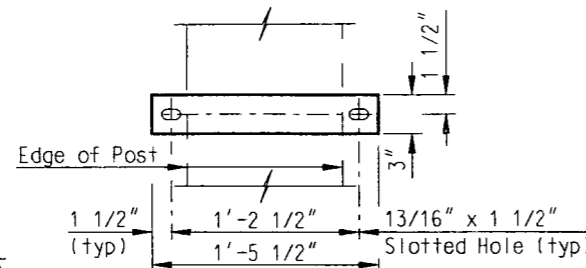
(RAIL CONNECTION)  
**BAR 5 X 1/2 X 1'-0" DETAIL**



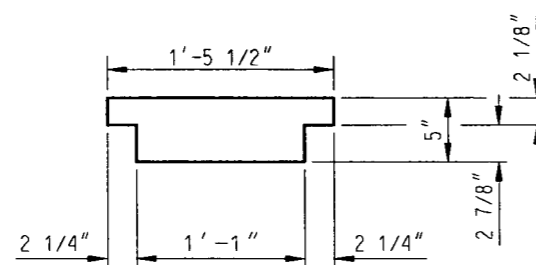
(CONCRETE POST CONNECTION)  
**BAR 5 X 1/2 X 1'-5 1/2" DETAIL**

The filled circles indicate drilled and tapped holes for 7/8" ø bolts M 164 (A 325). See Detail "B."

The open circle indicates a drilled hole through the 1/2" plate for a 7/8" ø bolt M 164 (A 325).

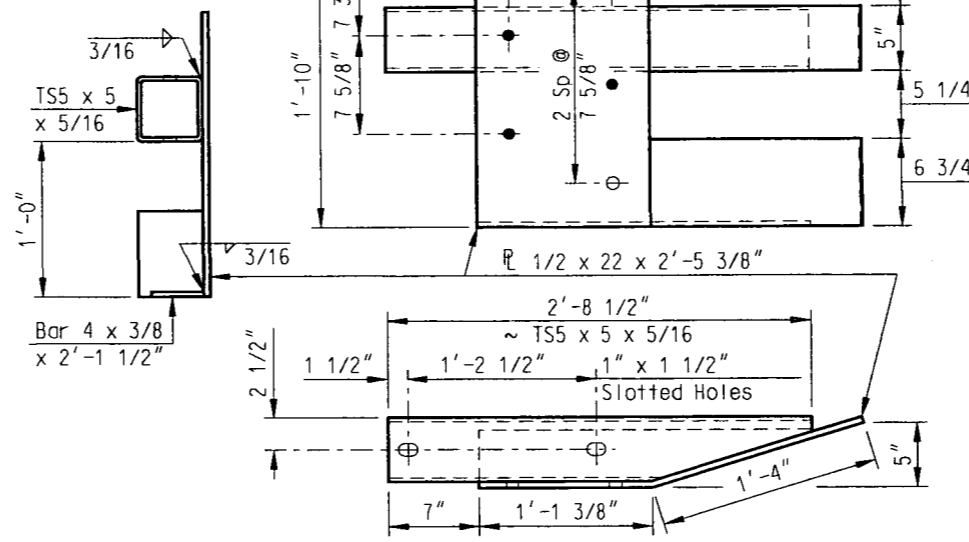


(CONCRETE POST CONNECTION)  
**BAR 3 X 1/2 X 1'-5 1/2" DETAIL**

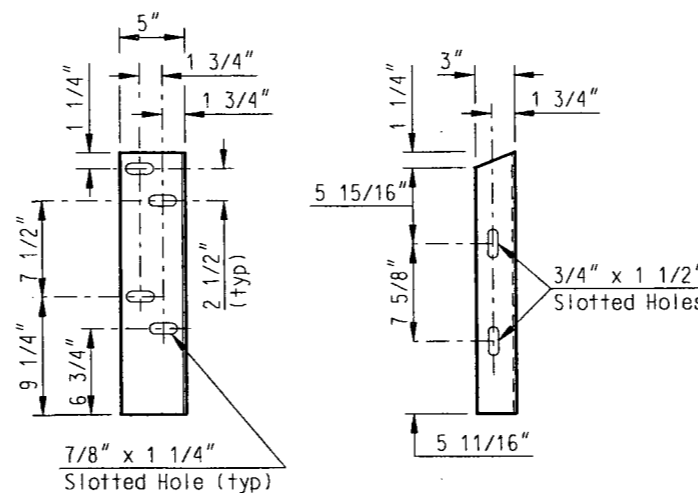


1/4" & 1/8" Thickness  
Quantities determined in field

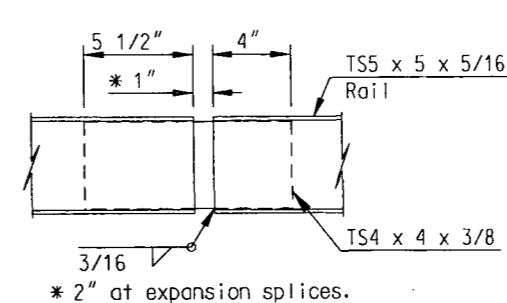
**SHIM PLATE DETAIL**



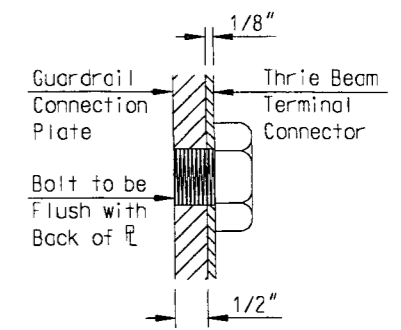
(4 REQUIRED)  
**GUARDRAIL CONNECTION PLATE DETAILS**



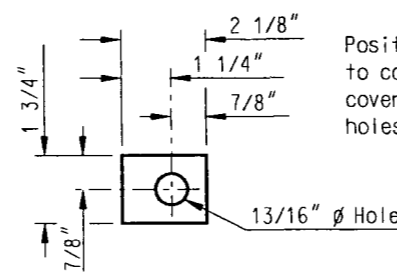
(L5 X 3 X 1/4 X 1'-8 1/2")  
(4 REQUIRED)  
**CONNECTION ANGLE DETAILS**



**RAIL SPLICE DETAIL**

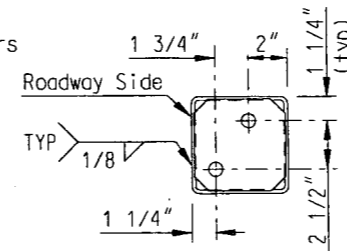


**DETAIL "B"**



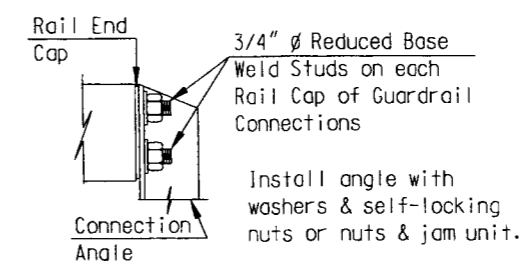
(1/4" R AASHTO M 270 GRADE 36)  
**WASHER "C"**

Position washers to completely cover slotted holes.



Rail cap shall be a Bar 4 3/4 x 3/16 x 4 3/4".  
Cope corners 1" to provide zinc drains.

**RAIL CAP DETAILS**



Install angle with washers & self-locking nuts or nuts & jam unit.

QUANTITIES	
E-RAIL RETROFIT	563.1 LF
AMENIA SEPARATION	
<b>DOUBLE BOX BEAM E-RAIL RETROFIT DETAILS</b>	



JOB# 19

STATE	PROJECT NO.	PCN	SHEET NO.
ND	SIM-9-999(143)	14279	1

# NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

## RICHLAND, CASS, TRAILL & GRAND FORKS COUNTIES

SIM-9-999(143)

CLEANING AND PAINTING  
STRUCTURAL STEEL SURFACES ON  
TWELVE BRIDGES ALONG INTERSTATE 29

**GOVERNING SPECIFICATIONS:**  
Standard Specifications adopted by the North Dakota Department of Transportation October 1997; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

**INDEX OF DRAWINGS**

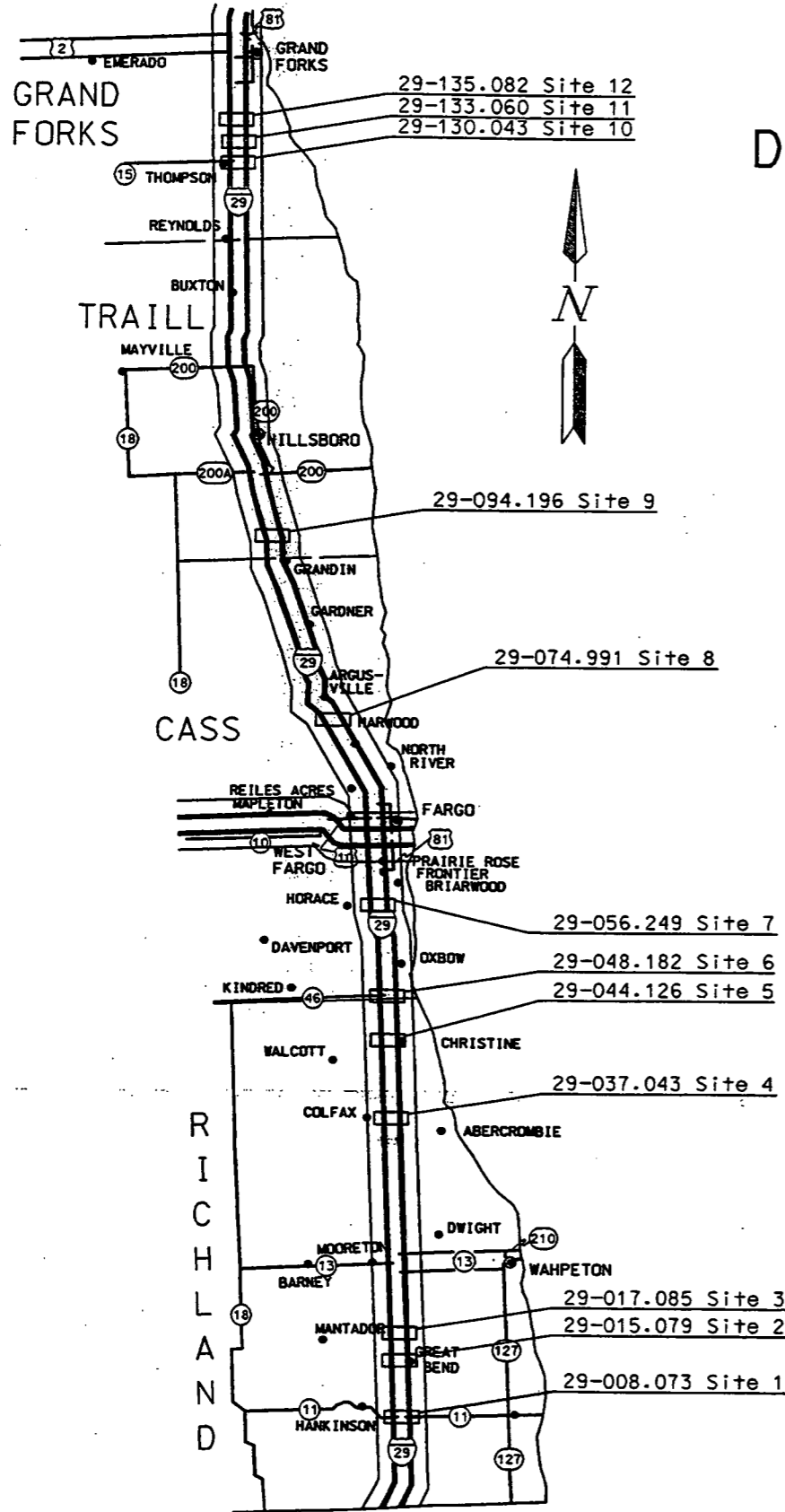
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE OF QUANTITIES
3	BASIS OF ESTIMATE AND NOTES
4-5	STRUCTURAL STEEL PAINTING DETAILS

**SPECIAL PROVISIONS**

SP 357(97) BRIDGE PAINTING

**LIST OF STANDARD DRAWINGS**

D-704-8	BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS
D-704-9, 10, 11, 12	CONSTRUCTION SIGN DETAILS
D-704-13	BARRICADE DETAILS
D-704-14	CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS
D-704-35	SIGN LAYOUT FOR ONE LANE CLOSURE INTERSTATE SYSTEM



SITE LOCATIONS

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE March 23, 2001

*Terrence R. Udland*

BRIDGE ENGINEER  
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 3/23/2001

*Francis J. Ziegler*

OFFICE OF INFRASTRUCTURE SUPPORT  
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION



# ESTIMATE OF QUANTITIES

STATE	FED. AID PROJ. NO.	SHEET NO.
N.D.	SIM-9-999((143))	2

SPEC CODE	ITEM DESCRIPTION	UNIT	I29 BRIDGES	TOTAL
103	0100 CONTRACT BOND	L SUM	1	1
630	0120 CLEANING & PAINTING	L SUM	1	1
702	0100 MOBILIZATION	L SUM	1	1
704	0100 FLAGGING	MER	65	65
704	1100 TRAFFIC CONTROL	L SUM	1	1

**STRUCTURAL STEEL PAINTING ~ BASIS OF ESTIMATE**

SITE	BRIDGE NO.	DISTRICT	LOCATION	AREAS TO BE PAINTED	SPANS	GIRDER LENGTH	FINISH COLOR	COLOR NO.	AREA (SF)	SPOT COAT (SF)	TOTAL (SF)
1	29-008.073	Fargo	Hankinson Interchange	Fascia Girders & Spot Paint	2	233'-8"	Blue-Gray	25184	3230	300	3530
2	29-015.079	Fargo	Great Bend Interchange	Fascia Girders & Spot Paint	2	233'-8"	Blue-Gray	25184	3145	300	3445
3	29-017.085	Fargo	Mantador Separation	Fascia Girders & Spot Paint	2	233'-8"	Maroon	10076	3105	100	3205
4	29-037.043	Fargo	Colfax Interchange	Fascia Girders & Spot Paint	2	233'-8"	Maroon	10076	2995	300	3295
5	29-044.126	Fargo	Christine Interchange	Fascia Girders & Spot Paint	2	233'-8"	Maroon	10076	3145	300	3445
6	29-048.182	Fargo	Kindred Interchange	Fascia Girders & Spot Paint	2	233'-8"	Green-Gray	24300	3230	300	3530
7	29-056.249	Fargo	Horace Interchange	Fascia Girders & Spot Paint	2	233'-8"	Green-Gray	24300	2995	300	3295
8	29-074.991	Fargo	Amenia Separation	Fascia Girders & Spot Paint	4	279'-7 1/4"	Green-Gray	24300	2955	200	3155
9	29-094.196	Fargo	Galesburg Separation	Fascia Girders & Spot Paint	4	264'-8"	Green-Gray	24300	2780	100	2880
10	29-130.043	Grand Forks	Thompson Interchange	Fascia Girders & Spot Paint	4	264'-8"	Green-Gray	24300	2770	400	3170
11	29-133.060	Grand Forks	Walle Separation	All Exposed Structural Steel	4	263'-8"	Blue-Gray	25184	8730	---	8730
12	29-135.082	Grand Forks	Merrifield Separation	Fascia Girders & Spot Paint	4	298'-4 1/4"	Maroon	10076	3205	200	3405
<b>TOTAL</b>									<b>42,285</b>	<b>2,800</b>	<b>45,085</b>

**NOTES:**

100 SCOPE OF WORK: This project consists of cleaning and painting the fascia surfaces of exterior girders and miscellaneous spot coating of deteriorated areas on all remaining painted surfaces for Sites 1-10 and 12. All exposed structural steel shall be cleaned and painted for Site 11.

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
630	0120	CLEANING & PAINTING	L SUM	1

630 CLEANING AND PAINTING: All structural steel surfaces that are to be painted shall be cleaned and painted according to Special Provision 357(97). The finish coats at each site shall be the color shown in the above table and shall meet Federal Standard No. 595B colors.

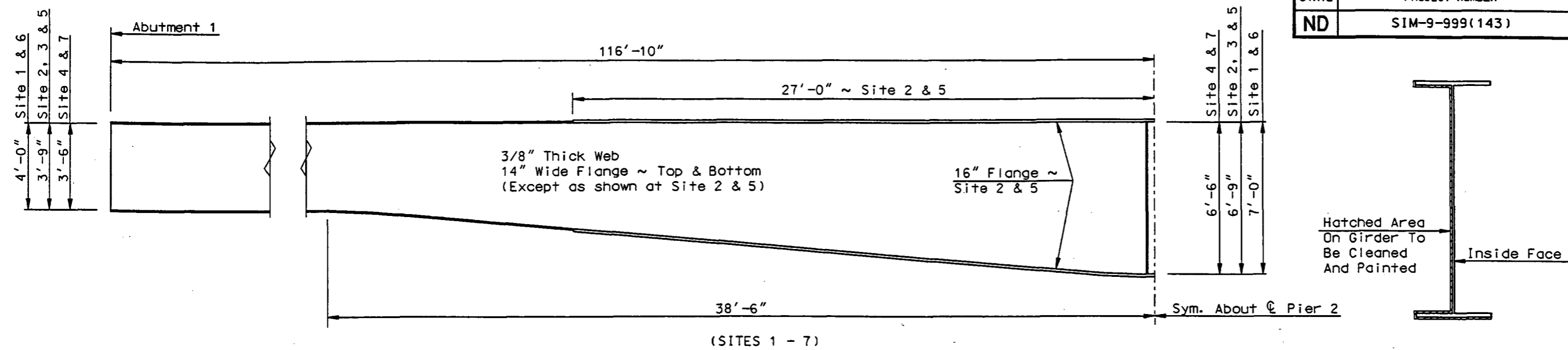
The contractor shall shroud the work area to protect the motor-ing public. Shrouding shall be capable of preventing dust and paint overspray from reaching passing traffic and causing vehicle damage or impairing motorist visibility. The cost for protecting traffic at each site shall be included in the lump sum bid item "Cleaning & Painting."

Plan Sheets 29-008.073-2 and 29-008.073-3 show the approximate surface area of structural steel to be painted at each site. A complete set of plans for each structure can be viewed at the NDDOT Bridge Division.

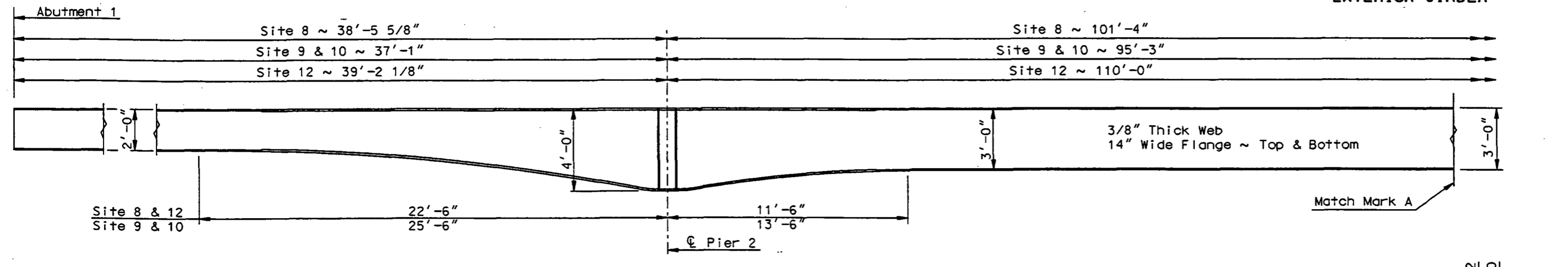
704 TRAFFIC CONTROL: The traffic control shall be according to Standard Drawing D-704-35 for all sites. The traffic control shall be set up only while work is going on at the sites during daylight hours. The traffic control shall be removed and normal traffic operations restored at the end of each workday. All traffic control devices, labor and equipment required for traffic control at all twelve sites shall not be bid separately but shall be included in the lump sum bid item "Traffic Control."

SPECIAL PROVISIONS	
SP 357(97)	BRIDGE PAINTING
BRIDGES ALONG I-29 (TWELVE SITES)	
<b>STRUCTURAL STEEL PAINTING BASIS OF ESTIMATE &amp; NOTES</b>	

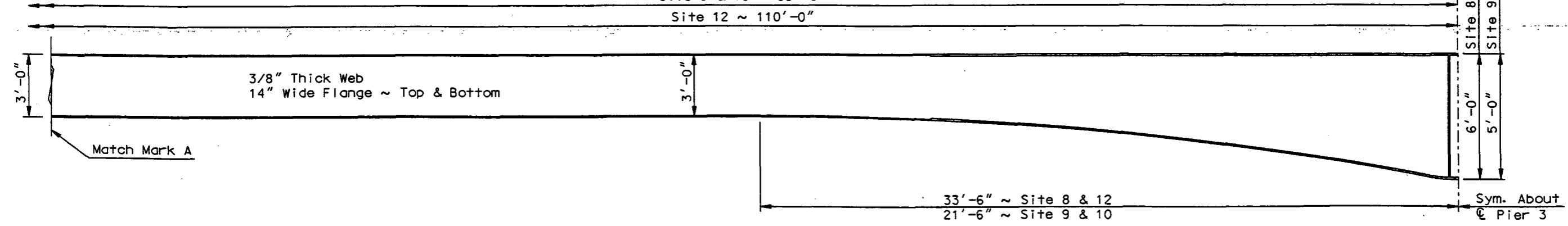
STATE	PROJECT NUMBER	SHEET NO.
ND	SIM-9-999(143)	4



(SITES 1 - 7)  
PARTIAL GIRDER ELEVATION



(SITES 8 - 10 & 12)  
PARTIAL GIRDER ELEVATION



(SITES 8 - 10 & 12)  
PARTIAL GIRDER ELEVATION

SITES 1 - 10 & 12  
STRUCTURAL STEEL  
PAINTING DETAILS

# NORTH DAKOTA STATE HIGHWAY DEPARTMENT

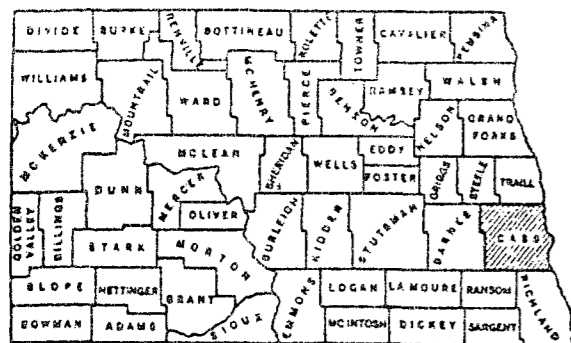
## PLANS

FOR THE PROPOSED IMPROVEMENT OF A  
**STATE HIGHWAY**  
IN CASS COUNTY  
FEDERAL AID PROJECT NO. 1-29-2(21) 73  
STRUCTURAL

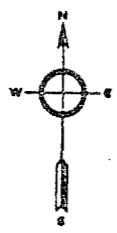
INDEX OF DRAWINGS	
SHEET NO. 1	TITLE PAGE & SUMMARY OF QUANTITIES
SHEET NO. 2, 3	TYPICAL SECTIONS & SIGNING
SHEET NO. 4	TO 38 INCL. PLAN AND PROFILE DRAWINGS
SHEET NO. 5	TO 32 INCL. STRUCTURAL DRAWINGS
SHEET NO. 33	TO 43 INCL. CROSS SECTIONS

PROJ. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
1-29-2(21)	N. D.	73	1	43

**COVERING SPECIFICATIONS**  
Standard Specifications adopted by the North Dakota State Highway Department Jan. 1963 and approved as standard by the Bureau of Public Roads June 23, 1965. Required Contract Provisions (Form - PR-1273) dated October 1968 and others submitted herewith.



SKETCH-MAP OF NORTH DAKOTA  
SHOWING COUNTIES



**SCALES**  
LAYOUT SHEET: 1 IN. = 5000 FT.  
PLAN AND PROFILE DRAWINGS: 1 IN. = 100 FT.  
STRUCTURAL DRAWINGS: AS SHOWN  
CROSS SECTION SHEETS: 1 IN. = 10 FT.

STA.	CLEAR ROWY. WIDTH	DESIGN LOADING
1394+96.9	30'	M <sub>20</sub> (1944)
1511+79.6	40'	HS <sub>20</sub> (1944)

**DESIGN DATA**

**TRAFFIC** AVERAGE DAILY EST. MTH MAX. HR.  
CURRENT TRAFFIC (1969) 2380 PASS. 420 TRUCKS 2800 TOTAL 420  
TRAFFIC FORECAST 1989 5235 PASS 925 TRUCKS 6160 TOTAL 925  
DESIGN SPEED 70 MPH  
TRAFFIC CLASSIFICATION M  
MINIMUM SIGHT DISTANCE (INDY. PASSING) 500  
FULL CONTROL OF ACCESS.  
NO POINT OF ACCESS OTHER THAN BY RAMP AT INTERCHANGES.

LENGTH OF PROJECT	
PROJECT MILES-GROSS	MILES-NET
1-29-2(21) 2.212	0.000
<b>TOTALS</b>	<b>2.212 0.000</b>

SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS	
NAME	NO.
Piling	18
Conc. Slope Protection	19
Backfill	20
Conc. Structures	
Reinforcement	
Struct. Steel	
Painting	
Quick Setting Anchor Grout	
Bidding Requirement & Conditions	
Legal Relations & Resp. to the Public	SS-10,15
General Statement	
Prosecution & Progress	
Mobilization	
Value Engineer Incentive	
Maintenance Protection of Traffic	
Scope of Work	
Field Laboratory	

LIST OF STRUCT. ST'D'S.	SHEET NO.
H-0401	18
H-0153	19
H-0501	20

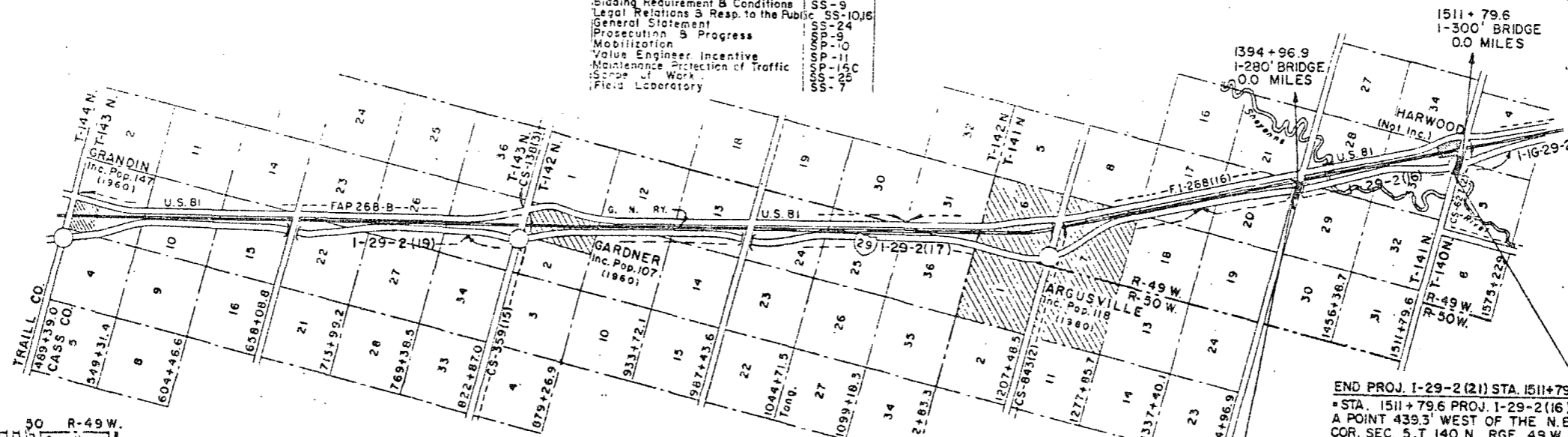
LIST OF STANDARDS	ST'D. NO.
Slope Protection	7.5A
Federal Aid Name Plate	14.9B
Bridge Bench Marks	7.6
Const. Ident. Sign	14.25
Standard Signs	14.1A-1 thru 14.1A-10

**KEY TO CONVENTIONAL SIGNS**

STATE & NATIONAL LINES	—
COUNTY LINE	—
TOWNSHIP & RANGE LINES	—
GRADE LINE	—
CENTERLINE OF CONSTRUCTION	—
OLD RIGHT OF WAY LINE	—
NEW RIGHT OF WAY LINE	—
ABANDONED RIGHT OF WAY LINE	—
PROPERTY LINE	—
STONE WALL	—
OTHER FENCES	—
POLE LINES	—
POWER LINES	—
BRIDGE	—
GROUND ELEVATION	—
TRAVELED WAY	—
RAILROADS	—
HEDGES AND TREES	—
TRAILS	—
CITY OR VILLAGE CORPORATE LIMITS	—
SECTION CORNER	—
QUARTER SECTION CORNER	—
BUILDINGS	—
OLD CULVERTS	—
NEW CULVERTS	—
DRAINAGE	—
BENCH MARKS	—
WATERS EDGE	—
MARSH	—
WIRE ROPE GUARD RAIL	—
SNOW FENCE	—
RIPRAP	—
GUARD POSTS	—
COBBLE GUTTERS	—
CONCRETE GUTTERS	—

**LEGEND**

- INTERCHANGE
- HIGHWAY GRADE SEPARATION-NO CONNECTION.
- OTHER BRIDGE
- SERVICE ROAD
- TERMINATED CROSS-ROAD



**LAYOUT MAP**

SCALE IN FEET  
5000 0 5000

The grading & structural contractors shall conduct their individual operations to the mutual benefit of each other. See Sec. 105-7 of the S'd Spec.

If the structural contractor damages the bituminous surfacing in place he shall repair the bituminous surfacing at his own expense. Bit Surfing & Temp. Curbing have been provided on the grading contract for the Amenia and Harwood crossroads. In the event that structural work has not progressed sufficiently to allow the grading contractor to install these items at the structure ends, the structural contractor shall install these items in accordance with the plan. The grading contractor will furnish the materials at the site for these items. The cost of this work shall be incidental to other items.

The grading contractor shall be responsible for maintenance and protection of traffic while the grading contract is active. The structural contractor shall be responsible for maintenance and protection of traffic on the detours as soon as he begins work if the grading contract is complete, or suspended while the structural contract is active. The detours will be removed on the future surfacing contract. The cost of maintenance of detours and protection of traffic shall be paid for as maintenance and protection of traffic (Two X-Road Detours).

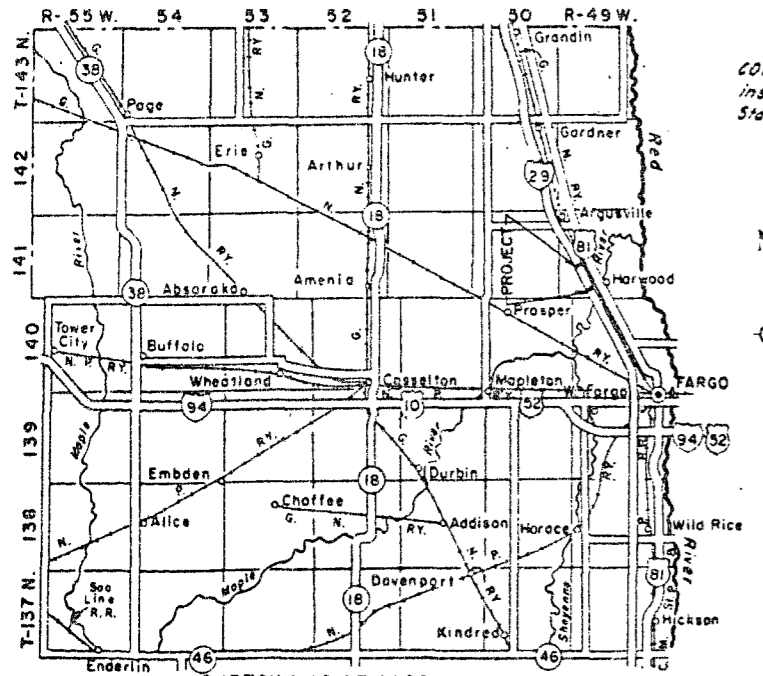
**QUANTITIES**

SPEC. NO.	208	228	610	610	610	612	616	615	622	622	622	750	754	756	746		
CODE NO.	0100	0100	1112	1134	0138	0110	0362	4412	0020	0040		1390	0100	0100	0100		
LOCATION	CLASS 1 EXCAVATION	SELECT BACKFILL	CLASS AE-1 CONCRETE (SUBSTRUCT)	CLASS AE-3 CONCRETE (I-BEAM SUPERSTRUCT)	CLASS AAE-3 CONCRETE (RAILING)	REINFORCING STEEL	GRADE 40 STRUCTURAL STEEL (A-36)	STRUCTURAL STEEL (A-44) (WELDED BEAM)	STEEL PILING (10BP42)	STEEL PILING (12BP53)	STEEL TEST PILES (12BP53) 100FT	LINSEED OIL TREATMENT	CONC. SLOPE PROTECTION	BRIDGE BENCH MARKS	FIELD LABORATORY MOBILIZATION	MAINTENANCE & PROTECTION OF TRAFFIC 2-CROSS ROAD DETOURS	FLAGGING
	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	LB.	LB.	LB.	Lin. Ft.	Lin. Ft.	EA.	Gal.	S.Y.	Set	EA.	Lump Sum	Man Hr's.
1394 + 96.9	185	180	129.1	274.8	18.07	105,249	30,000	153,500	2,630	670	1	45	490	1			
1511 + 79.6	275	205	179.7	377.5	19.23	145,587	45,000	241,000	1,320	2,125	1	62	680	1			
<b>TOTAL</b>	<b>460</b>	<b>385</b>	<b>309</b>	<b>652</b>	<b>37</b>	<b>251,536</b>	<b>75,000</b>	<b>394,500</b>	<b>3,950</b>	<b>2,795</b>	<b>2</b>	<b>107</b>	<b>1,170</b>	<b>2</b>			

APPROVED DATE: 1-23-69  
*[Signature]*  
CHIEF ENGINEER  
NORTH DAKOTA STATE  
HIGHWAY DEPARTMENT

Quantity Totals have been rounded off to the nearest whole unit for bidding purposes.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION  
BUREAU OF PUBLIC ROADS  
APPROVED  
DIVISION ENGINEER DATE



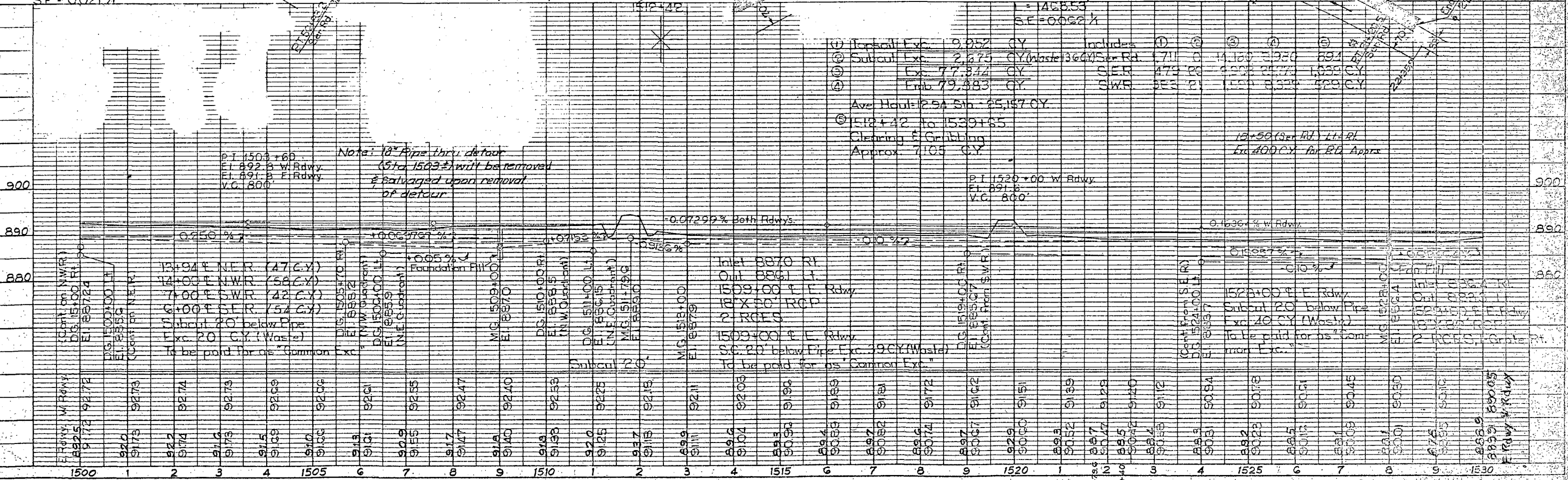
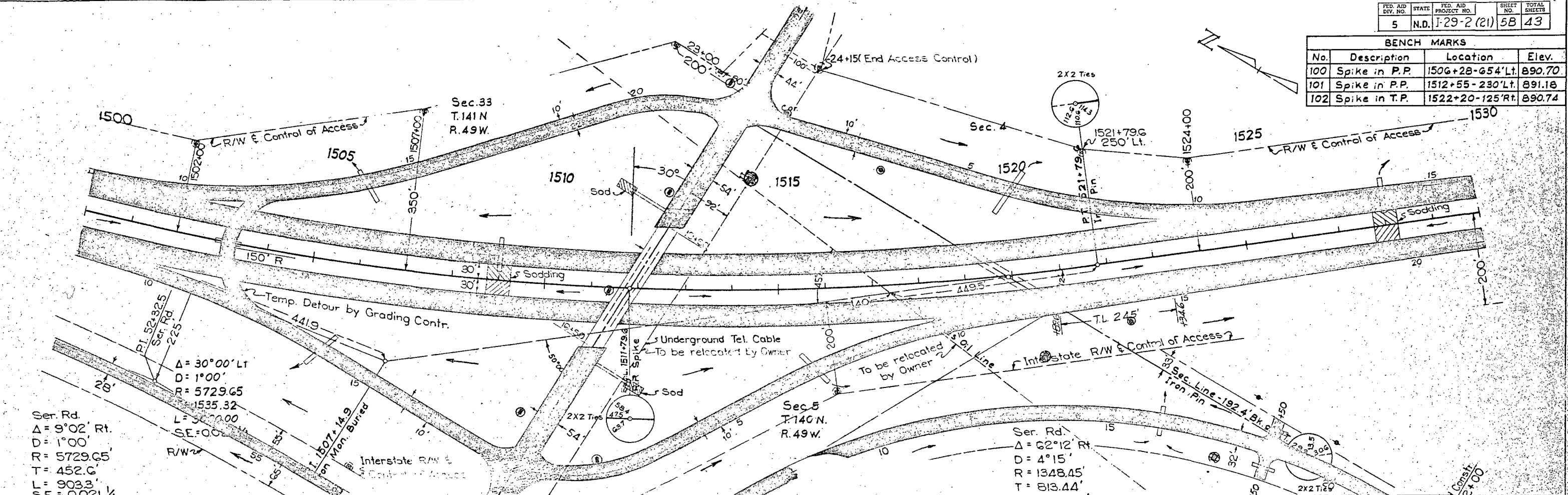
SKETCH MAP OF CASS COUNTY

FED. AID DIV. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
5	N.D.	I-29-2 (21)	5B	43

No.	Description	Location	Elev.
100	Spike in P.P.	1506+28-654'Lt.	890.70
101	Spike in P.P.	1512+55-230'Lt.	891.18
102	Spike in T.P.	1522+20-125' Rt.	890.74

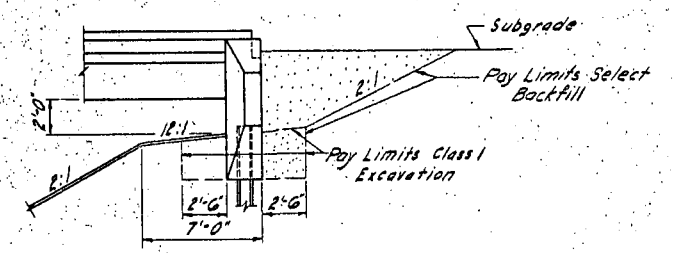
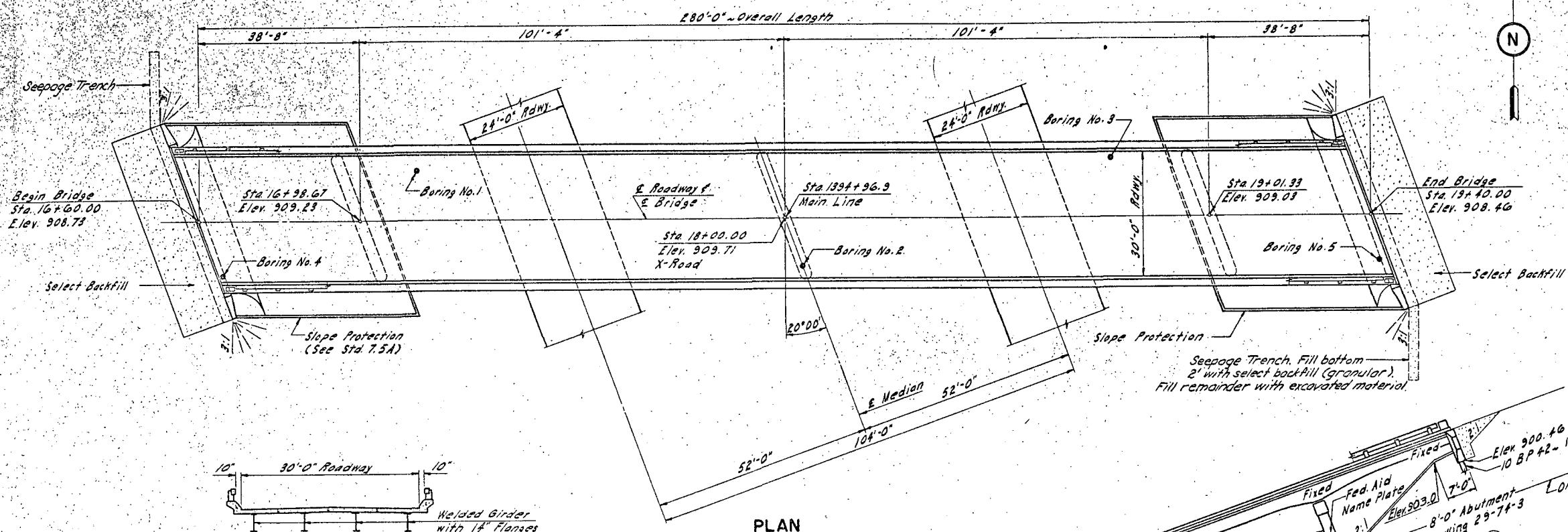
PLAN  
SURVEYED  
PLATTED  
NOTED  
NO. 1

PROFILE  
SURVEYED  
PLATTED  
NOTED  
NO. 1



Raise Br. 2.4'  
NO QUANTITY CHANGES

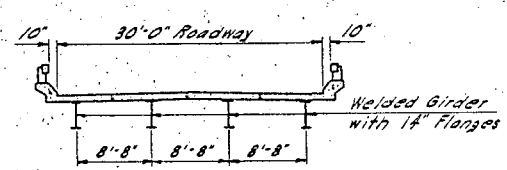
BRIDGE CODE	FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
X-771	5	N. D.	I-29-2(21)		6	43



DETAIL AT ABUTMENTS

- See SP-29 for Optional Concrete Surface Finish.
- See SP-35 for Structural Steel.
- See SP-33 for Painting.
- See SS-21 for Piling.
- See SS-22 for Concrete Slope Protection.
- See SP-32 for Reinforcement.
- See SP-27 for Backfill.
- See SP-34 for Quick-Setting Anchor Grout.

The General Notes for this project are shown on Drawing 29-74-1.

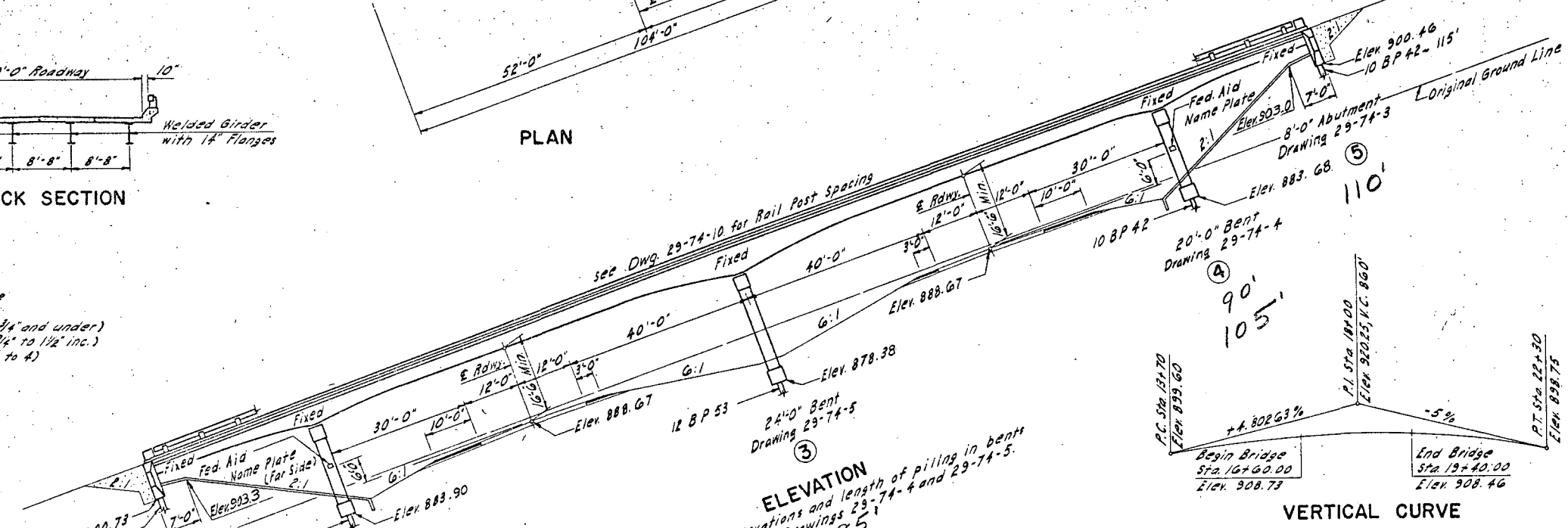


DECK SECTION

DESIGN STRESSES:

- $f_s = 20,000$  psi ~ Reinforcing Steel
- $f_c = 1,200$  psi ~ Class AE-1 & AE-3 Concrete
- $f_c = 1,700$  psi ~ Class AAE-3 Concrete
- $f_s = 27,000$  psi ~ Structural Steel A-441 ( $3/4$ " and under)
- $f_s = 25,000$  psi ~ Structural Steel A-441 ( $3/4$ " to  $1 1/2$ " inc.)
- $f_s = 23,000$  psi ~ Structural Steel A-441 ( $1 1/2$ " to 4")
- $f_s = 20,000$  psi ~ Structural Steel A-36

ESTIMATE OF QUANTITIES				
SPEC. NO.	CODE NO.	BID ITEM	QUANTITY	UNIT
203	0100	COMMON EXCAVATION		CU. YD.
208	0100	CLASS I EXCAVATION	185	CU. YD.
228	0100	SELECT BACKFILL	180	CU. YD.
216	0100	WATER		"M" GAL.
610	1112	CLASS AE-1 CONCRETE (SUBSTRUCTURE)	129.1	CU. YD.
610	1134	CLASS AE-3 CONCRETE (SUPERSTRUCTURE)	274.8	CU. YD.
610	0138	CLASS AAE-3 CONCRETE (RAILING)	18.07	CU. YD.
612	0110	REINFORCING STEEL (GRADE 40)	105,949	LB.
616	4412	STRUCTURAL STEEL (A-441) (WELDED BEAM)	153,500	LB.
610	0152	STRUCTURAL STEEL (A-36) (WELDED BEAM)	30,000	LB.
622	0040	STEEL PILING (12" x 53")	670	LINEAL FT.
622	0020	STEEL PILING (10" x 42")	2630	LINEAL FT.
622	1390	STEEL TEST PILE (12" x 53")	1 @ 100 FT	EACH
750	0100	LINSEED OIL TREATMENT	45	GAL.
704	0100	CONCRETE SLOPE PROTECTION	430	SQ. YD.
3000		BRIDGE BENCH MARKS		1 SET



ELEVATION

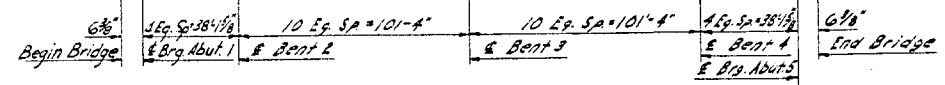
For cut-off elevations and length of piling in bents see Bent Detail Drawings 29-74-4 and 29-74-5.

VERTICAL CURVE

ROADWAY	RIGHT GIRDER	LEFT GIRDER
908.73	908.57	908.39
908.87	908.66	908.53
909.10	908.77	908.65
909.27	908.89	908.77
909.47	909.00	908.90
909.62	909.14	909.05
909.71	909.27	909.19
909.76	909.38	909.32
909.77	909.51	909.41
909.76	909.57	909.46
909.74	909.52	909.48
909.72	909.50	909.45
909.71	909.46	909.41
909.71	909.44	909.44
909.71	909.41	909.45
909.70	909.41	909.45
909.66	909.39	909.45
909.63	909.35	909.42
909.59	909.28	909.35
909.48	909.17	909.25
909.31	909.02	909.12
909.19	908.86	908.97
909.09	908.70	908.81
908.98	908.55	908.68
908.75	908.40	908.54
908.61	908.26	908.41
908.47	908.11	908.27
908.46	908.10	908.27

SCREED ELEVATION

Elevations are to top of finished concrete



1969  
FEDERAL AID  
PROJECT  
I-29-2(21)  
NORTH DAKOTA  
29-74

FEDERAL AID NAME PLATE  
2 REQUIRED

BENCH MARKS			PILE LOADING								
NO.	DESCRIPTION	LOCATION	ELEV.	LOCATION	DEAD LOAD	LIVE LOAD	EARTH. LOAD	WIND	EMBARMENT SETTLEMENT	DESIGN LOAD	MAXIMUM REQUIRED BEARING
97	Spike in Tel. Pole	1332+43 ~ 240' RT.	888.08	Abutments	13.7 T.	8.1 T.		50 LB.	15 LB.	32.6 T.	55.0 T.
97A	Iron Man on In-slope	4+30 ~ 16' RT.	889.76	Bents 2 & 4	37.0 T.	17.0 T.	1.0 T.			55.0 T.	55.0 T.
97B	Spike in Tel. Pole	24+87 ~ 43' Lt.	888.66	Bent 3	47.0 T.	18.7 T.	1.2 T.			66.6 T.	70.0 T.

STRUCTURAL DRAWINGS

GENERAL DRAWING 29-74 (THIS SHEET), 29-74-1, 29-74-2, STD. 7.5A  
SUBSTRUCTURE 29-74-3, 29-74-4, 29-74-5, M-0401, STD. 14.9B  
SUPERSTRUCTURE 29-74-6 THRU 29-74-11, M-0153, STD. 7.6, M-0501

DESIGN LOADING: H20 (1944) SCALE: 1 INCH = 15 FEET

NORTH DAKOTA  
STATE HIGHWAY DEPARTMENT  
AMENIA SEPARATION  
BRIDGE LAYOUT  
PROJECT I-29-2(21) STA. 1394+96.9  
CASS COUNTY

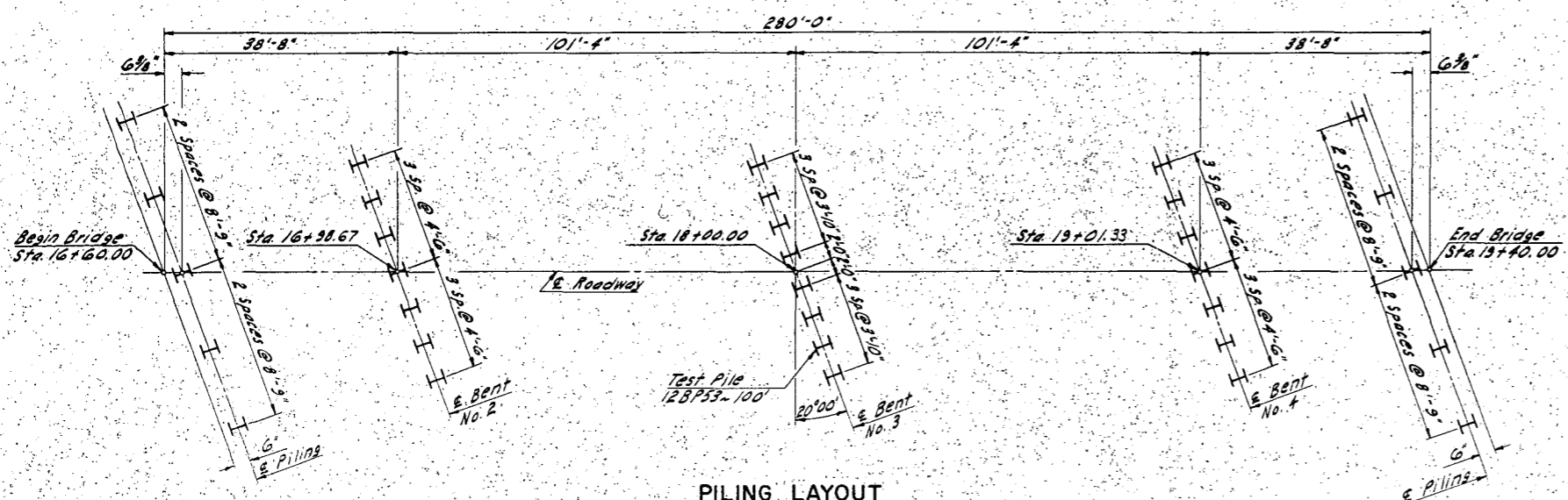
APPROVED: Joseph P. Kelly, BRIDGE ENGINEER  
DATE: 10-10-68

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	2-29-220		7	43

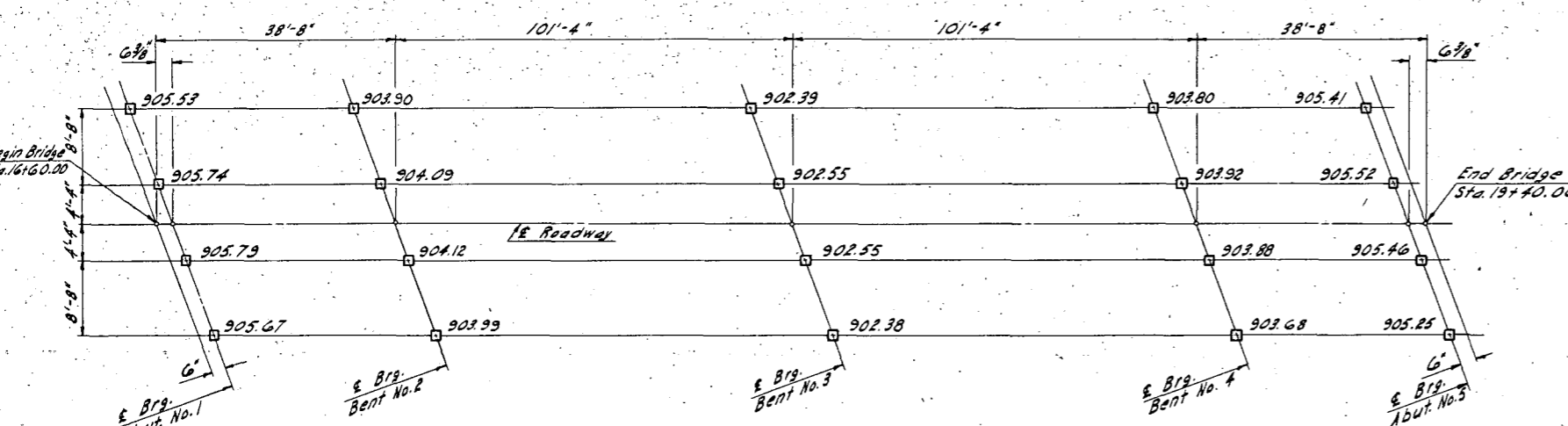
REVISIONS	DATE	CHK'D BY

DESIGN	QUANTITIES
CHECKED BY: L.F.B.	CHECKED BY: D.L.R.
MADE BY: L.F.B.	CHECKED BY: D.L.R.
CHECKED BY: L.F.B.	CHECKED BY: D.L.R.
MADE BY: L.F.B.	CHECKED BY: D.L.R.
CHECKED BY: L.F.B.	CHECKED BY: D.L.R.



**PILING LAYOUT**  
(Not to Scale)



**BEARING PLATE LAYOUT**  
Elevations are to top of finished concrete  
(Not to Scale)

**NOTES:**

**GENERAL:**

THE COST OF FURNISHING AND PLACING JOINT FILLER, ASPHALT CURB SEAL, NAME PLATES, AND OTHER MISCELLANEOUS ITEMS SHALL BE INCLUDED IN THE PRICE BID FOR CONCRETE.

WELDING WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR STRUCTURAL STEEL.

DEAD LOAD DEFLECTIONS AND VERTICAL CURVE CORRECTIONS HAVE BEEN ACCOUNTED FOR IN THE SHOP CAMBER OF THE GIRDERS.

BEARING AREAS SHALL BE FINISHED TRUE TO PLAN AND ELEVATION BY GRINDING, IF NECESSARY, BEFORE BEARING PLATES ARE SET.

ALL RIVETS OR HIGH STRENGTH BOLTS ARE TO BE 7/8" OPEN HOLES ARE TO BE 15/16" EXCEPT AS NOTED. SHOP CONNECTIONS SHALL BE MADE AS SHOWN. FIELD CONNECTIONS SHALL BE MADE WITH HIGH TENSILE STRENGTH BOLTS OR SHALL BE RIVETED.

IF HIGH STRENGTH BOLTS ARE USED IN THE WEB AND FLANGE SPLICES, THE BOLTS SHALL BE PLACED WITH THE NUTS ON THE INTERIOR SIDE OF THE WEB AND ON THE UPPER SIDE OF THE FLANGE.

**EMBANKMENT:**

THE EMBANKMENT AT THE ABUTMENTS SHALL BE IN PLACE BEFORE PILING ARE DRIVEN.

THE CONTRACTOR WILL BE REQUIRED TO PREDRILL THROUGH THE FILL AT THE ABUTMENTS BEFORE DRIVING PILING. ALL PILOT HOLES, NOT COMPLETELY FILLED BY THE PILES, SHALL BE BACKFILLED WITH SAND OR FINE GRAVEL BEFORE THE SUBSTRUCTURE IS PLACED.

**EXCAVATION:**

EXCAVATION CLASS 1 AT THE ABUTMENTS SHALL EXTEND FROM THE BOTTOM OF THE FOOTING TO THE UPPER LIMITS AS SHOWN ON THE BRIDGE LAYOUT DRAWING. EXCAVATION CLASS 1 AT THE BENTS SHALL EXTEND FROM THE BOTTOM OF THE FOOTING TO THE FINISHED ELEVATION OF THE INTERSTATE MEDIAN AT BENT 3, AND TO THE FINISHED PROFILE OF THE EMBANKMENT BACKSLOPES AT BENTS 2 AND 4.

**BACKFILL:**

ALL BACKFILL SHALL BE COMPACTED ACCORDING TO SECTION 203-2.3 OF THE STANDARD SPECIFICATIONS, EXCEPT THAT THE COMPACTED DENSITY SHALL BE AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHO DESIGNATION T-99. SELECT BACKFILL SHALL NOT BE PLACED ABOVE THE ELEVATION OF THE BERM UNTIL THE SUPERSTRUCTURE HAS BEEN PLACED.

**REINFORCING STEEL:**

DIMENSIONS FOR BENT BARS ARE GIVEN CENTER TO CENTER AND TO TANGENT INTERSECTIONS UNLESS OTHERWISE NOTED. BENT BARS SHALL BE BENT AROUND CRS1 STANDARD SIZE PINS. THE BAR FABRICATOR SHALL ADD A PREFIX TO ALL BAR DESIGNATIONS TO DIFFERENTIATE BETWEEN THE SEVERAL PARTS OF THE STRUCTURE OR STRUCTURES.

**CONCRETE:**

ALL EXPOSED EDGES OF CONCRETE SHALL BE BEVELED WITH 3/4" TRIANGULAR MOLDING UNLESS OTHERWISE NOTED. THE DECK SLAB CONCRETE SHALL BE STRUCK OFF AND COMPACTED BY AN APPROVED DECK FINISHING MACHINE. ALL CONCRETE ABOVE THE TOP OF THE CURBS SHALL BE CLASS AAE-3. SLAB, CURBS, AND END WALLS SHALL BE CLASS AE-3. ABUTMENTS AND BENTS SHALL BE CLASS AE-1.

ALL CONCRETE SHALL BE COMPACTED BY VIBRATION. THE "RUBBED SURFACE FINISH" WILL BE REQUIRED FOR THE ROADWAY AND OUTSIDE FACES OF CURBS, EDGES OF SLAB, ALL FACES OF THE RAILS, RAIL POSTS AND END POSTS. ALL EXPOSED FACES OF BENTS, AND ALL EXPOSED FACES OF ABUTMENT WINGS. ALL OTHER SURFACES SHALL BE GIVEN THE "ORDINARY SURFACE FINISH" (SEE OPTION BELOW).

IF THE EXPOSED FACES OF THE ABUTMENTS AND BENTS 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.

ALL "ORDINARY SURFACE FINISH" SHALL BE COMPLETED WITHIN 24 HOURS AFTER REMOVAL OF FORMS.

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

THE CONTRACTOR HAS THE OPTION OF USING THE SPECIAL FINISH AS PROVIDED IN SPECIAL PROVISION NO. 29, CONCRETE STRUCTURES, IN LIEU OF THE RUBBED SURFACE FINISH (602-3.10.3) CALLED FOR ABOVE.

**LINSEED OIL TREATMENT:**

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

**STRUCTURAL STEEL:**

THE NORTH DAKOTA STANDARD SPECIFICATIONS 616-3.3.12.2. FLAME CUTTING, SHALL GOVERN THE FLAME CUTTING. PREPARATION OF A36 AND A441 STEELS. IN ADDITION PREHEATING OF THE A36 AND A441 STEEL SHALL BE REQUIRED. JUST PRIOR TO FLAME CUTTING, THE STEEL SHALL BE PREHEATED TO A TEMPERATURE CONFORMING TO TABLE 2, PAGE 3 OF SPECIAL PROVISION SP 35 GOVERNING THE PREHEATING OF STEEL THICKNESSES. WHEN LOW HYDROGEN ELECTRODES ARE USED IN WELDING.

THE BEND TEST, UNDER 616-3.3.12.2, SHALL BE REQUIRED FOR THE THICKEST A36 AND A441 STEEL USED IN THE PROJECT. AS STATED IN PARAGRAPHS 616-3.3.12.3, "IN LIEU OF PREHEATING, THE FLAME CUT EDGES SHALL BE REMOVED TO A DEPTH OF AT LEAST 1/8" BY MILLING OR GRINDING OR IN THE CASE OF MACHINE FLAME CUTTINGS, THE EDGES MAY BE FLAME SOFTENED AFTER CUTTING."

IN ACCORDANCE WITH SP 35, PARAGRAPH 406(G) THE TEST PLATE SIZE SHALL BE 5/8" x 14".

THE GIRDERS SHALL BE CAMBERED IN THE SHOP AS DETAILED ON DRAWING 29-74-8. SUFFICIENT PARTS OF THE STRUCTURE SHALL BE SHOP ASSEMBLED AND ADJUSTED TO LINE, GRADE AND CAMBER OR OTHER PROPER FIT UP, IN ORDER TO ESTABLISH THE ACCURACY OF THE WORKMANSHIP AND SHOP DRAWINGS. AFTER SUBPUNCHING OR SUBDRILLING, EACH FULL LENGTH GIRDER LINE WITH ITS FIELD SPLICE PLATES IN PLACE SHALL BE SHOP ASSEMBLED TO THE CORRECT LINE AND GRADE BEFORE REAMING. TEMPLATES SHALL NOT BE USED IN LIEU OF COMPLETE ASSEMBLY.

ALTERNATE SHEAR DEVICES WILL BE PAID FOR AS CHANNEL SHEAR DEVICES.

ALTERNATE STUD SHEAR DEVICES SHALL BE MANUFACTURED OF C-1015 OR C-1020 COLD ROLLED STEEL WHICH CONFORMS TO ASTM A 108-61T SPECIFICATIONS, AND SHALL CONFORM TO THE DIAMETER AND OTHER DIMENSIONS AS SHOWN. THE CONTRACTOR IS REQUIRED TO OBTAIN A PRODUCT CERTIFICATION OF THE STUD SHEAR DEVICES USED ON THIS BRIDGE IN ACCORDANCE WITH SECTION 802 OF THE 1995 NORTH DAKOTA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. AASHO REQUIREMENTS FOR WELDABILITY OF STUD CONNECTORS SHALL BE MET AND CERTIFIED.

**PILE HAMMERS:**

THE PILES FOR THIS STRUCTURE SHALL BE DRIVEN BY A STEAM (OR AIR) OR DIESEL HAMMER HAVING A RATED ENERGY AND RAM WEIGHT NOT LESS THAN 38,300 FOOT-POUND-TONS AS COMPUTED BY THE FORMULA  $W(E-10,500)+0.73E$  WHERE W IS THE WEIGHT OF THE RAM IN TONS AND E IS THE RATED HAMMER ENERGY AS ALLOWED IN THE SPECIAL PROVISIONS. IN NO CASE SHALL THE RAM WEIGHT BE LESS THAN 4,800 POUNDS.

**TEST PILES:**

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

**MATERIALS: (STRUCTURAL STEEL)**

GIRDER FLANGES, WEBS, FLANGE AND WEB SPLICE PLATES: A 441 STIFFENERS, DIAPHRAGMS, SHEAR DEVICES, BEARING PLATES, AND ANCHOR BOLTS: A 36, EXCEPT ALTERNATE STUD SHEAR DEVICES.

**PAINT:**

PAINT AND PAINTING SHALL CONFORM TO THE NORTH DAKOTA STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, SECTIONS 718 AND 870-1.2, AND THE SPECIAL PROVISION ON PAINTING.

ALL EXPOSED STEEL SURFACES SHALL BE GIVEN ONE SHOP COAT OF RED LEAD PAINT (INCLUDING TOP OF UPPER GIRDER FLANGES BUT NOT SHEAR DEVICES). ONE SPOT COAT OF RED LEAD PAINT AFTER ERECTION AND CONCRETE WORK IS COMPLETED, AND TWO FIELD COATS OF ENAMEL. THE FIRST FIELD COAT SHALL CONFORM TO GREY-GREEN COLOR NO. 24260. AND THE SECOND COAT SHALL CONFORM TO GREY-GREEN COLOR NO. 24300. BOTH COATS SHALL MEET THE FEDERAL STANDARD NO. 595 FOR COLOR. COLOR CHIPS ARE ON FILE IN THE BRIDGE DIVISION OF THE NORTH DAKOTA STATE HIGHWAY DEPARTMENT, BISMARCK.

**BLAST CLEANING:**

COMMERCIAL BLAST CLEANING OF ALL EXPOSED MAIN AND SECONDARY STEEL MEMBERS WILL BE REQUIRED PRIOR TO PAINTING. SEE S.P. 33. (INCLUDE IN UNIT BID PRICE FOR STRUCTURAL STEEL.)

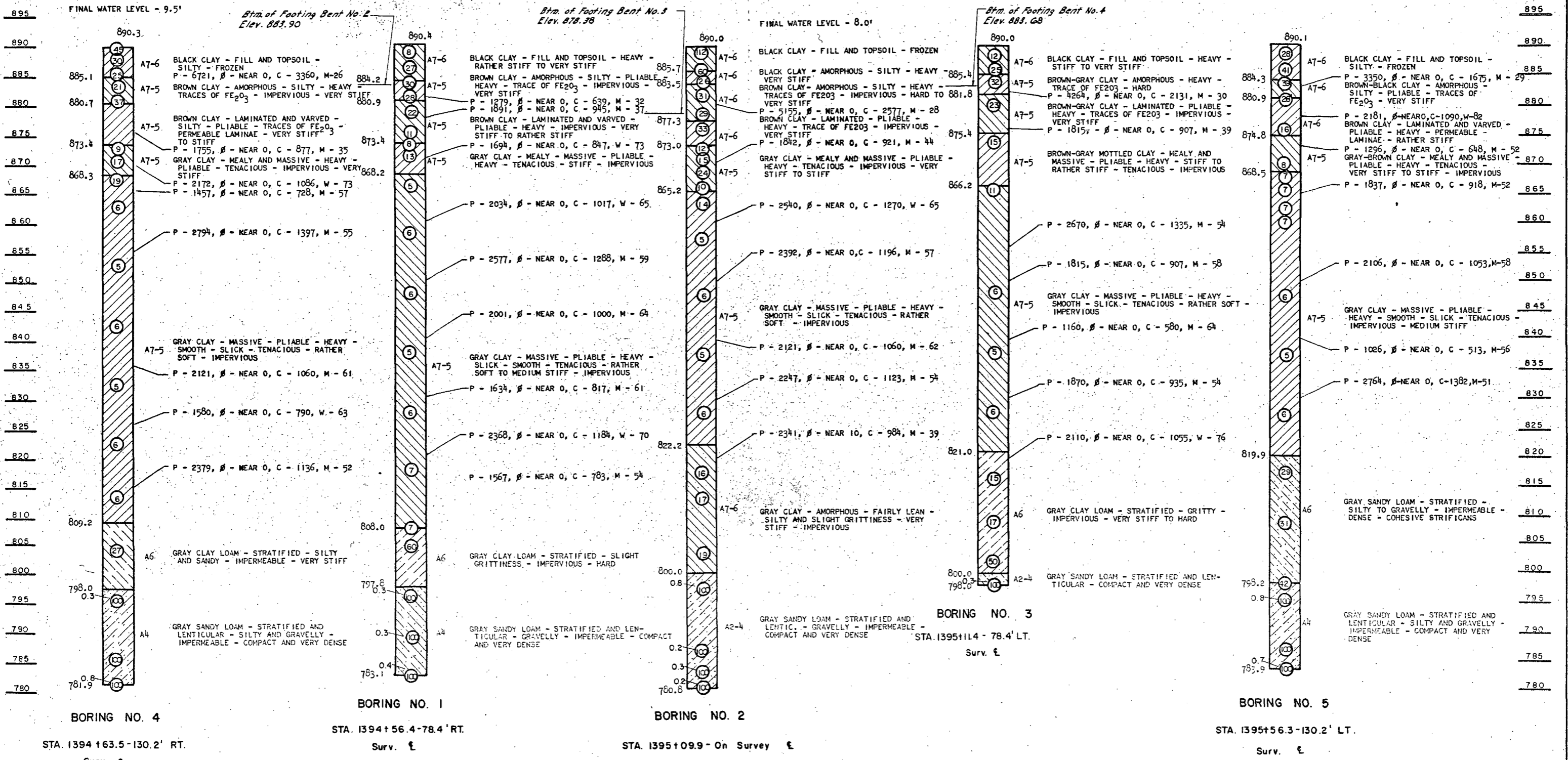
**AMENIA SEPARATION**  
**BEARING PLATE LAYOUT**  
**PILING LAYOUT**  
**GENERAL NOTES**



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	T-29-221		8	43

Btm. of Footing Abut. No. 1  
Elev. 900.73

Btm. of Footing Abut. No. 5  
Elev. 900.46



SYMBOLS:

- P - MAXIMUM LOAD (LBS./SQ.FT.)
- β - SHEAR ANGLE (DEGREES)
- C - COHESION (LBS./SQ.FT.)
- M - MOISTURE (PER CENT)
- W - DRY WEIGHT (LBS./CU.FT.)

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.

BRIDGE NO. 29-74

BORING LOG

I-29-2(21)

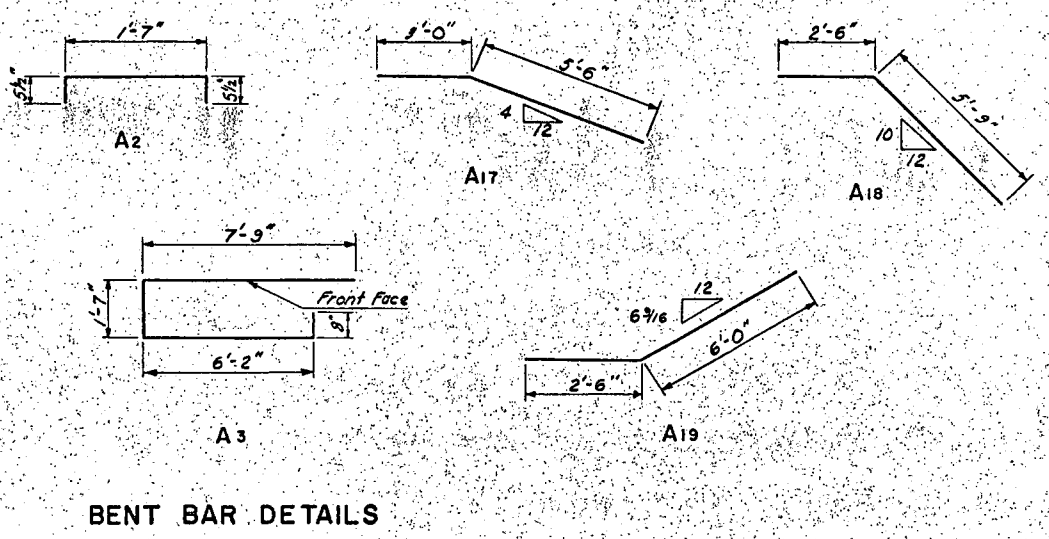
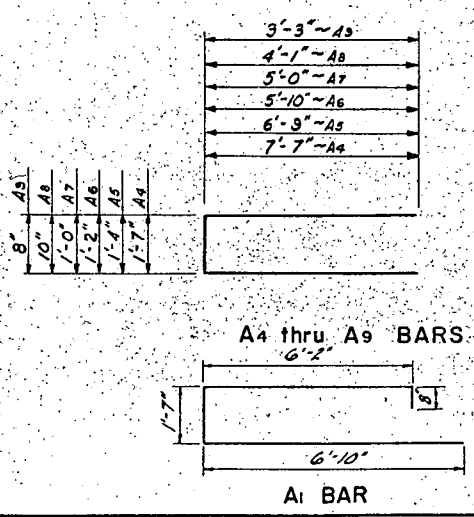
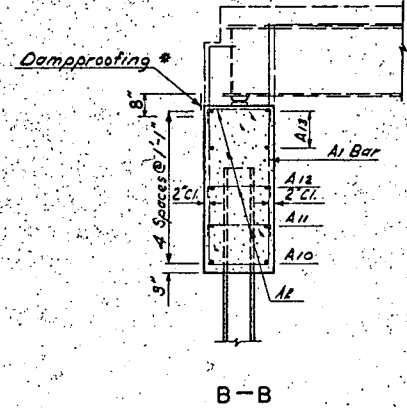
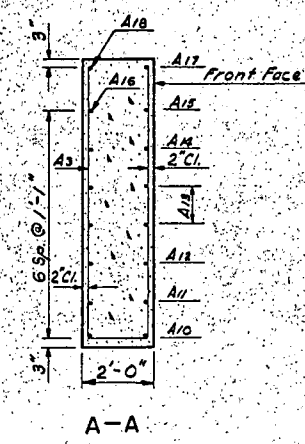
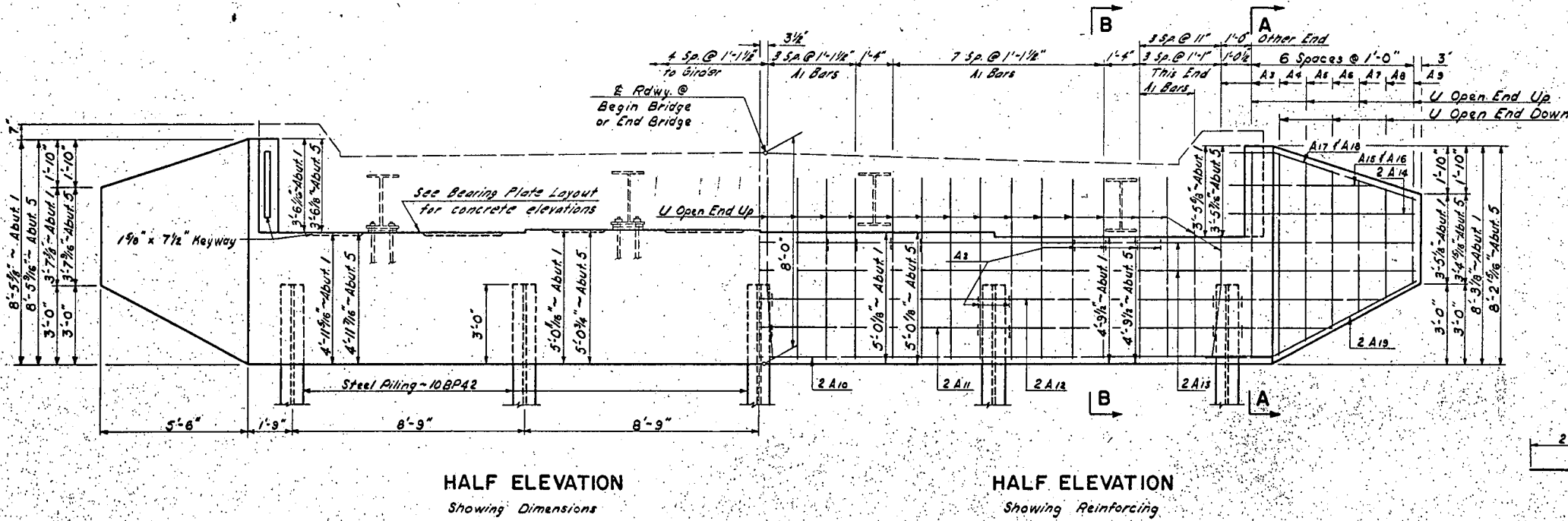
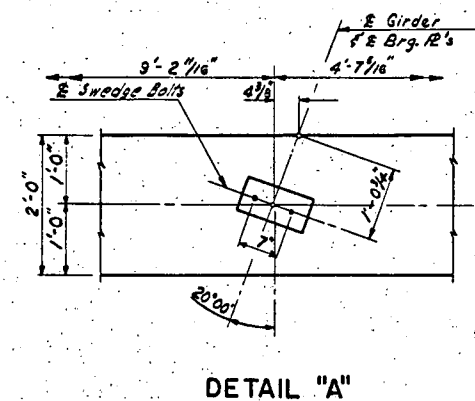
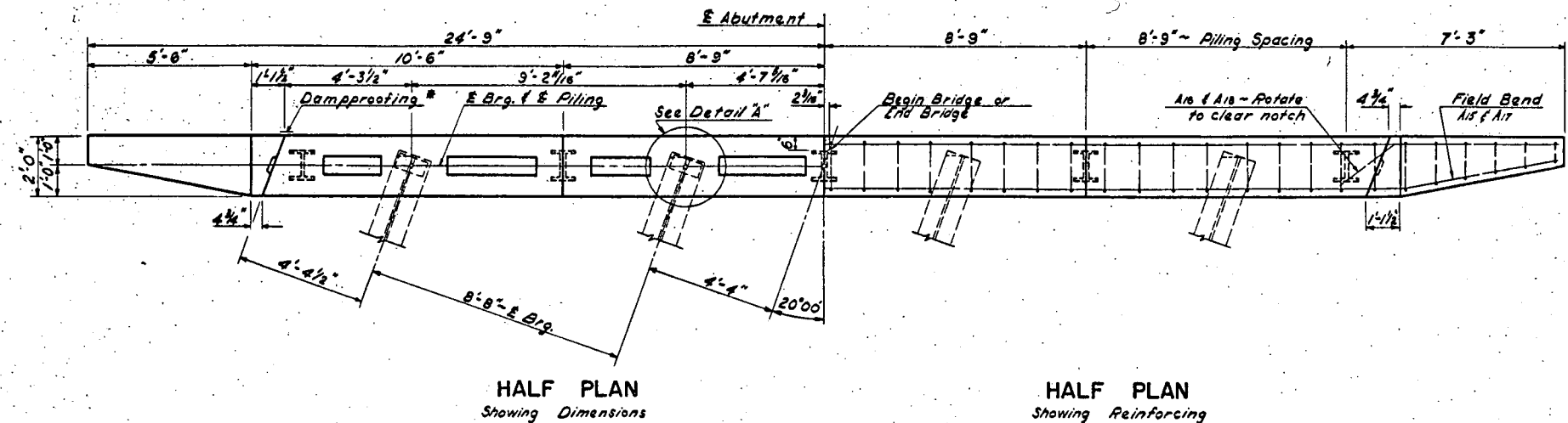
CASS COUNTY

Plotted by J.L.S. - Page 2 - 1165

29-74-2

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-2(2)		9	43

DESIGN	MADE BY	CHKD BY	DATE
D.O.A.	L.R.K.		
DETAILS	D.L.R.		
TRACING	J.S.G.		
QUANTITIES	D.L.R.		
	L.F.G.		



BAR LIST (ONE ABUT.)					
MARK	NUMBER	SIZE	LENGTH	SHAPE	
					WALL
A1	30	6	15'-3"	Bent	
A2	35	7	2'-5"		
A3	4	6	16'-2"	Bent	
A4	2	6	16'-9"		
A5	2	5	14'-10"		
A6	2	5	12'-10"		
A7	2	5	11'-0"		
A8	2	5	9'-0"		
A9	2	5	7'-2"		
A10	2	6	33'-6"	Str.	
A11	4	5	22'-3"		
A12	4	5	24'-3"		
A13	8	5	25'-4"		
A14	4	5	8'-0"		
A15	2	5	6'-6"		
A16	2	5	6'-6"	Bent	
A17	2	6	9'-6"		
A18	2	6	8'-3"		
A19	4	6	8'-6"		

**NOTES:**

\*Two coats of damproofing shall be applied over the construction joint on the back face as shown on the detail. "Damproofing Two Coats" shall be applied in accordance with Section 736 of the Standard Specifications. Damproofing will not be paid for directly, but shall be included in the unit price bid for Class AE-1 Concrete.

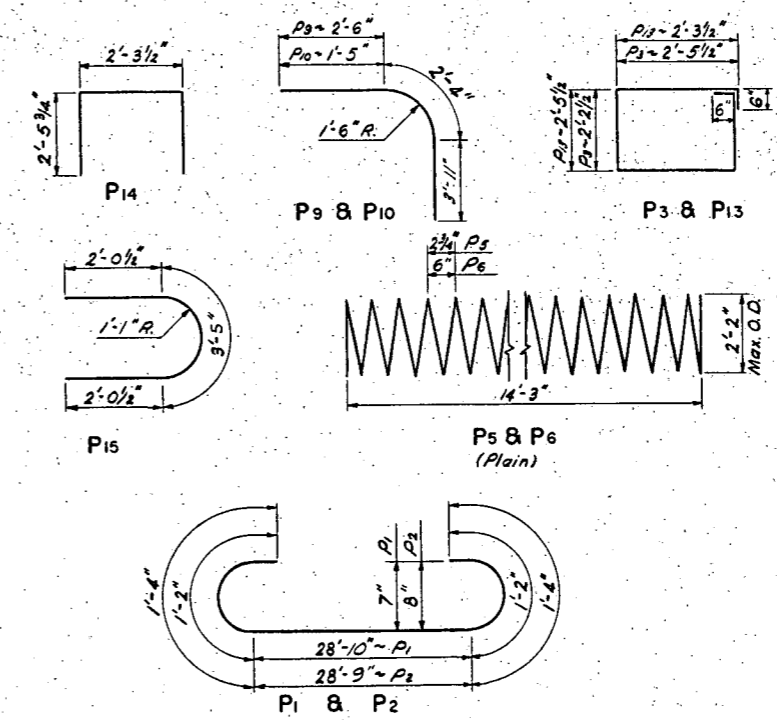
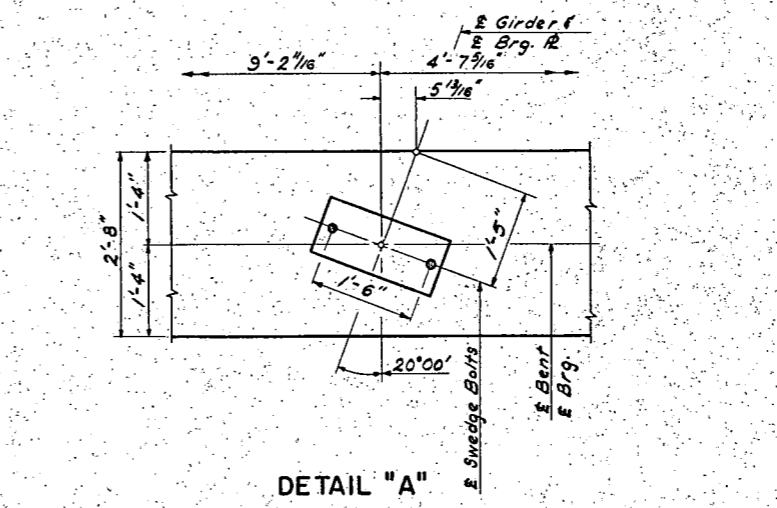
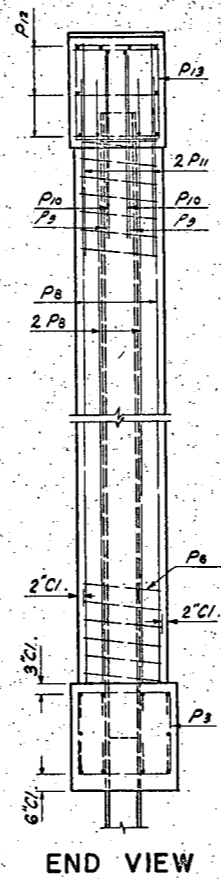
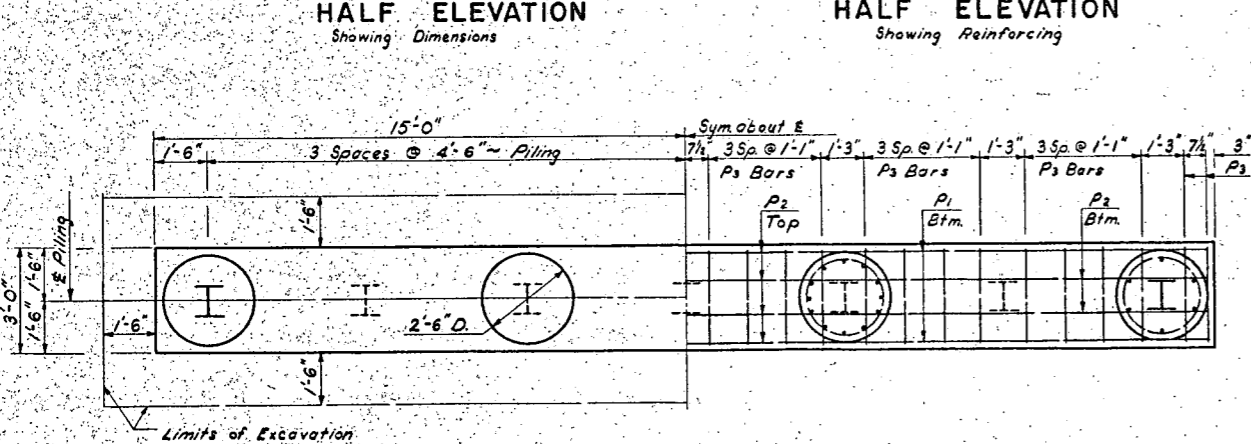
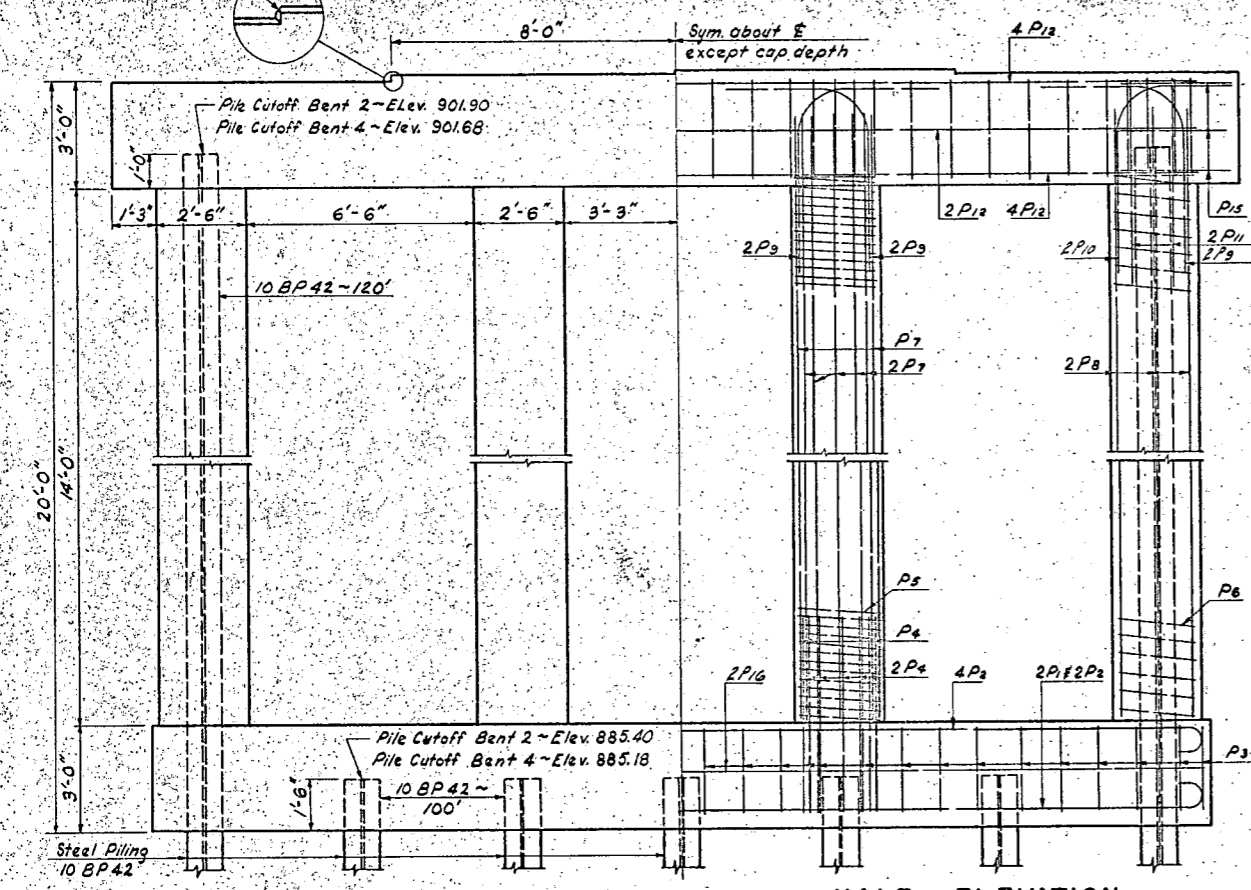
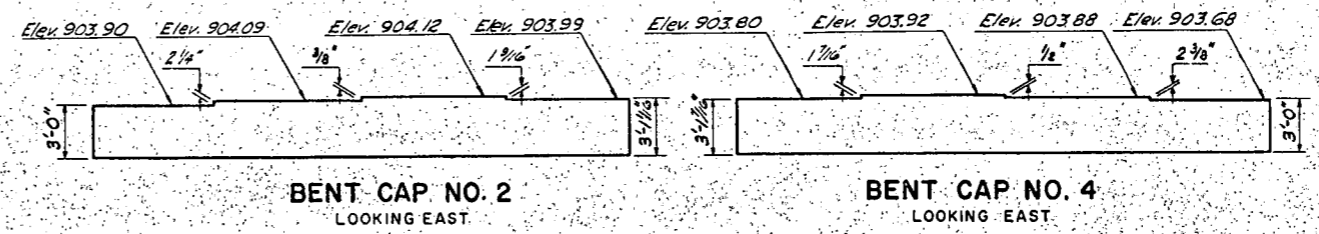
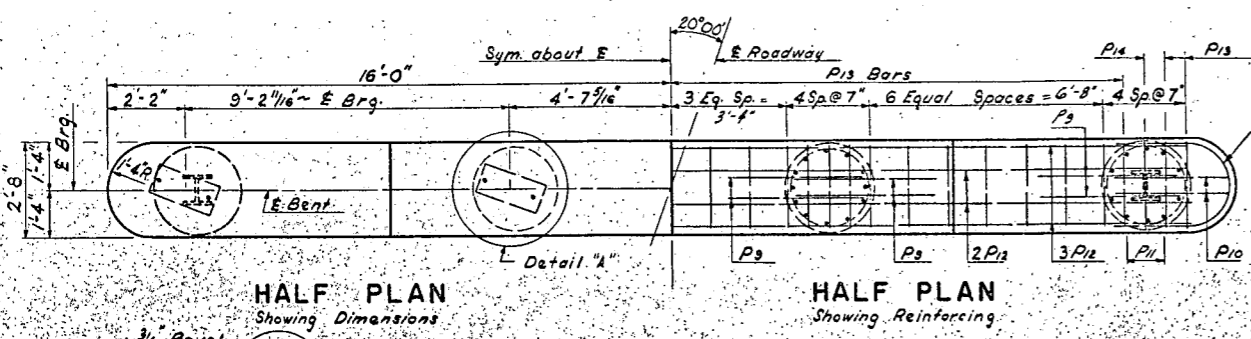
QUANTITIES (ONE ABUT.)	
Class AE-1 Concrete	18.3 CY.
Reinforcing Steel	1692 Lbs.
Excavation (See Layout)	
Piling (See Layout)	

AMENIA SEPARATION  
8'-0" ABUTMENT  
30'-0" ROADWAY  
H20 LOADING

29-74-3

29-74-3

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-221		10	43



BAR LIST (ONE BENT)					
MARK	NUMBER	SIZE	LENGTH	SHAPE	
P1	2	7	31'-2"	Bent	
P2	6	8	31'-5"	"	
P3	28	5	10'-4"	"	
P4	24	7	5'-6"	Str.	
P5	2	4	435'-0"	Spiral	
P6	2	3	21'-0"	"	
P7	24	7	16'-0"	Str.	
P8	12	5	16'-0"	"	
P9	12	8	8'-3"	Bent	
P10	4	8	7'-3"	"	
P11	8	6	5'-6"	Str.	
P12	10	7	29'-6"	"	
P13	33	5	10'-6"	Bent	
P14	2	5	7'-3"	"	
P15	6	5	7'-6"	"	
P16	2	5	29'-6"	Str.	

**NOTE:**  
 The concrete in the column shall be allowed to set at least two (2) hours before the bent cap reinforcing is placed and concrete poured.  
 All exposed edges to be beveled with 3/4" triangular molding.

QUANTITIES (ONE BENT)	
Concrete Class AE-1	29.9 C.Y.
Reinforcing Steel	4443 Lbs.
Steel Piling (See Layout)	
Excavation (See Layout)	

AMENIA SEPARATION  
 20'-0" BENT  
 30'-0" ROADWAY  
 H2O LOADING

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	1-29-221		11	43

**BAR LIST (ONE BENT)**

MARK	NUMBER	SIZE	LENGTH	SHAPE
P1	2	10	31'-10"	Bent
P2	2	11	32'-1"	"
P3	2	8	31'-5"	"
P4	2	9	31'-8"	"
P5	32	5	10'-4"	"
P6	24	7	5'-6"	Str.
P7	2	4	552'-0"	Spiral
P8	1	3	265'-0"	"
P9	24	7	20'-0"	Str.
P10	12	5	20'-0"	"
P11	12	8	8'-3"	Bent
P12	4	8	7'-8"	"
P13	8	6	5'-6"	Str.
P14	10	7	29'-6"	"
P15	33	5	10'-6"	Bent
P16	2	5	7'-3"	"
P17	6	5	7'-6"	"
P18	2	5	29'-6"	Str.
*SR4	1	4	3'-8"	Str.
*SR5	1	5	4'-0"	"
*SR6	1	6	4'-6"	"
*SR7	1	7	5'-0"	"
*SR8	1	8	5'-4"	"

PROJECT 1-29-221  
DRAWING 29-74-5

**NOTE:**

The concrete in the columns shall be allowed to set at least two (2) hours before the bent cap reinforcing is placed and concrete poured. All exposed edges to be beveled with 1/4" triangular mounding.

\* Sample replacement bar to be spliced to bar from which 2'-0" sample has been cut. Furnish only one set for the entire bridge. This is not a pay item and shall be included in the unit price bid for reinforcing steel.

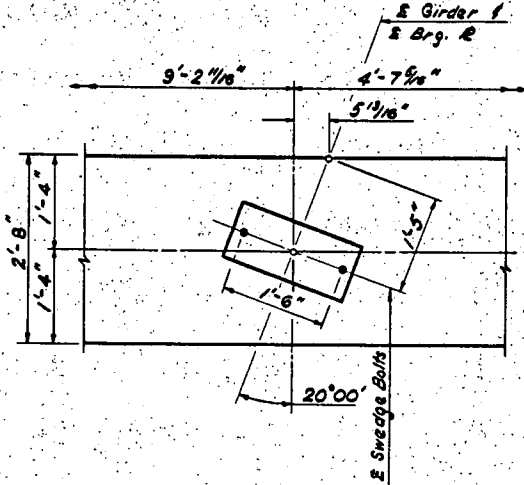
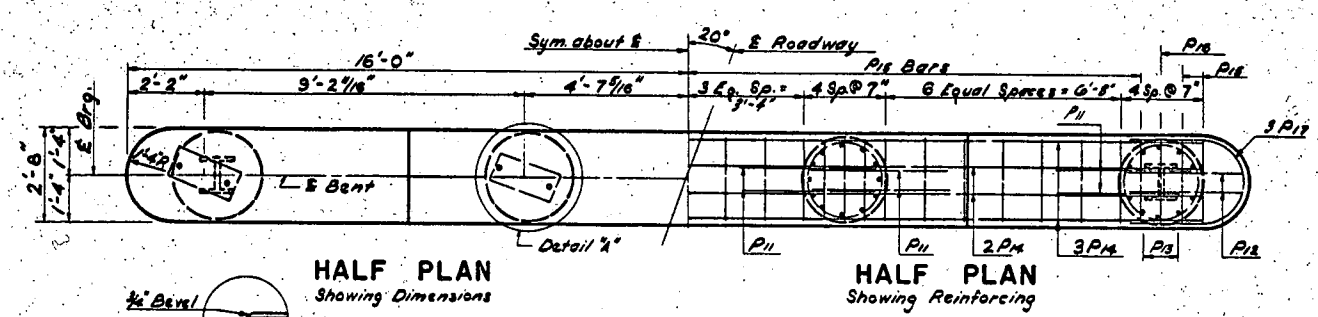
**QUANTITIES (ONE BENT)**

Concrete Class AE-1	32.7 C.Y.
Reinforcing Steel	3297 Lbs.
Steel Piling (See Layout)	
Excavation (See Layout)	

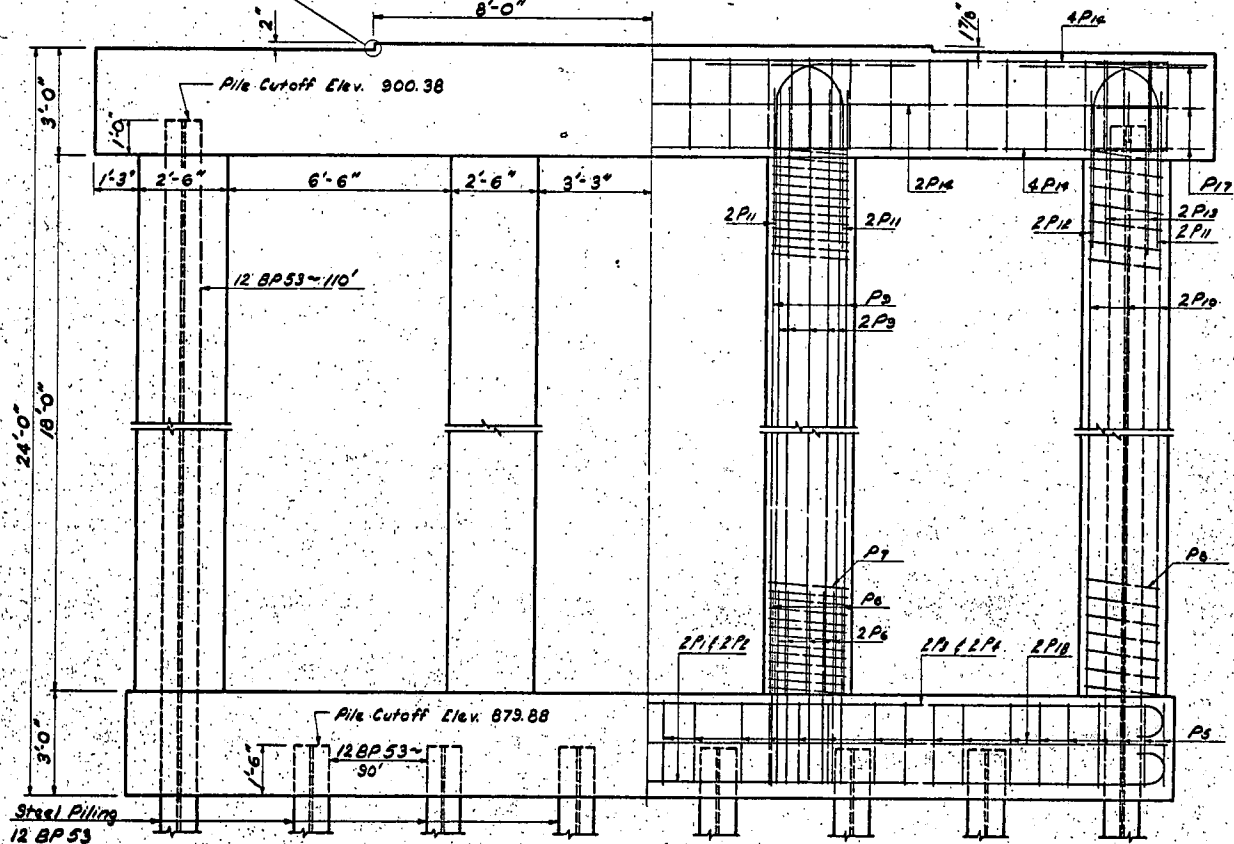
**AMENIA SEPARATION**

**24'-0" BENT**

30'-0" ROADWAY  
H20 LOADING



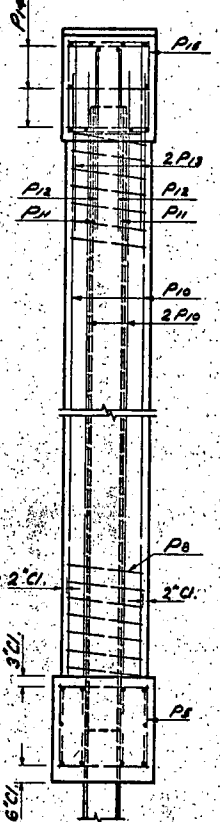
**DETAIL "A"**



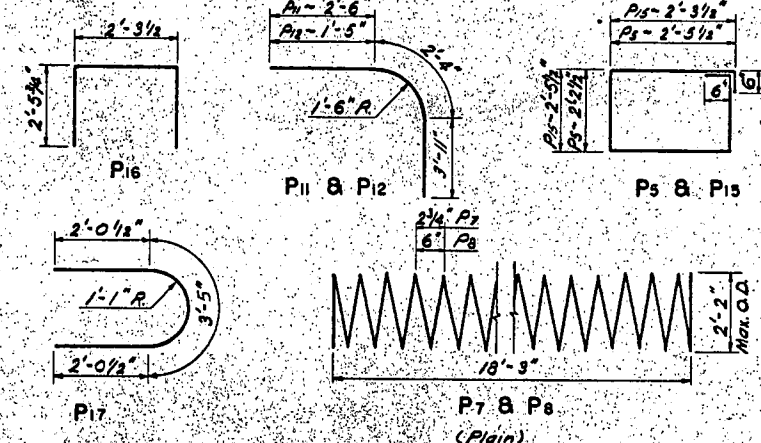
**HALF ELEVATION**  
Showing Dimensions

**HALF ELEVATION**  
Showing Reinforcing

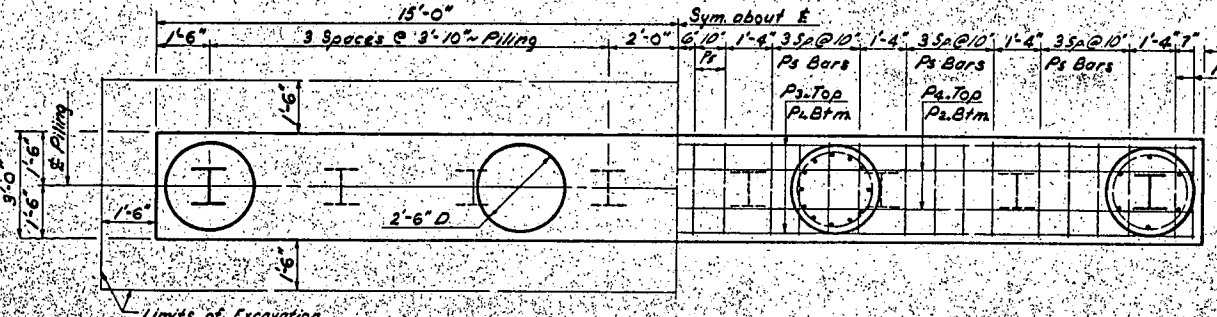
Bent 3 - Looking West



**END VIEW**

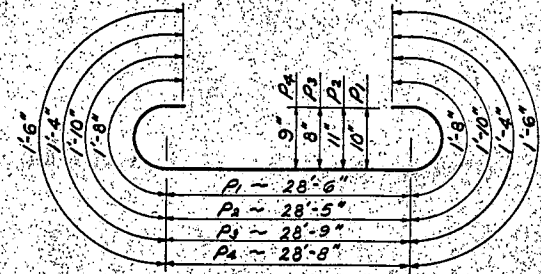


**BENT BAR DETAILS**



**HALF FOOTING PLAN**  
Showing Dimensions

**HALF FOOTING PLAN**  
Showing Reinforcing



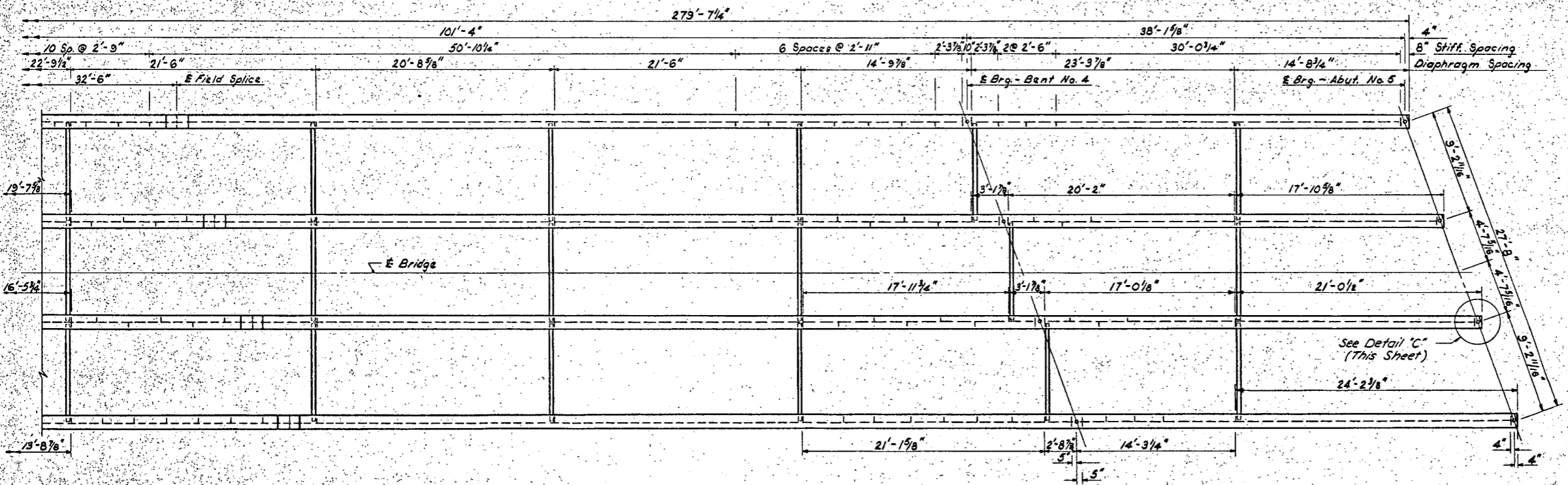
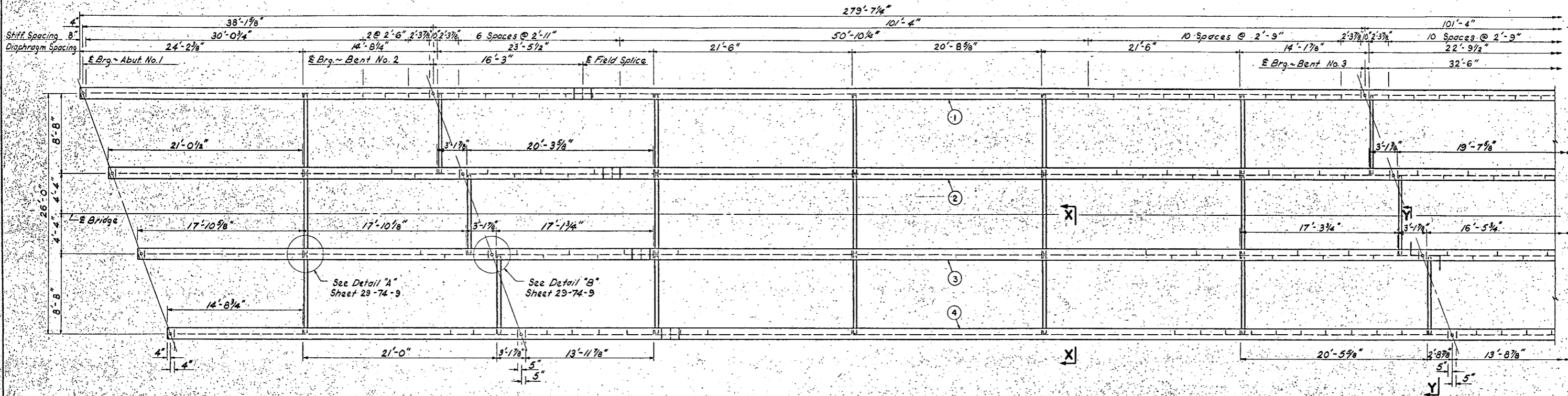
**P1 thru P4**

**BENT BAR DETAILS**

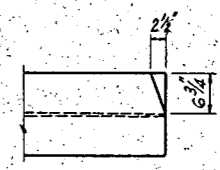
DESIGN	MADE BY D.O.A.
CHECKED BY L.P.H.	
DETAILS	MADE BY G.A.L.
CHECKED BY O.L.P.	
TRACING	MADE BY H.L.S.
CHECKED BY O.L.P.	
QUANTITIES	MADE BY L.E.G.
CHECKED BY L.E.G.	

29-74-5

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-2(2)		12	43



See Drawing 29-74-8 for X-X and Y-Y



DETAIL "C"  
Clip Top Flanges Only

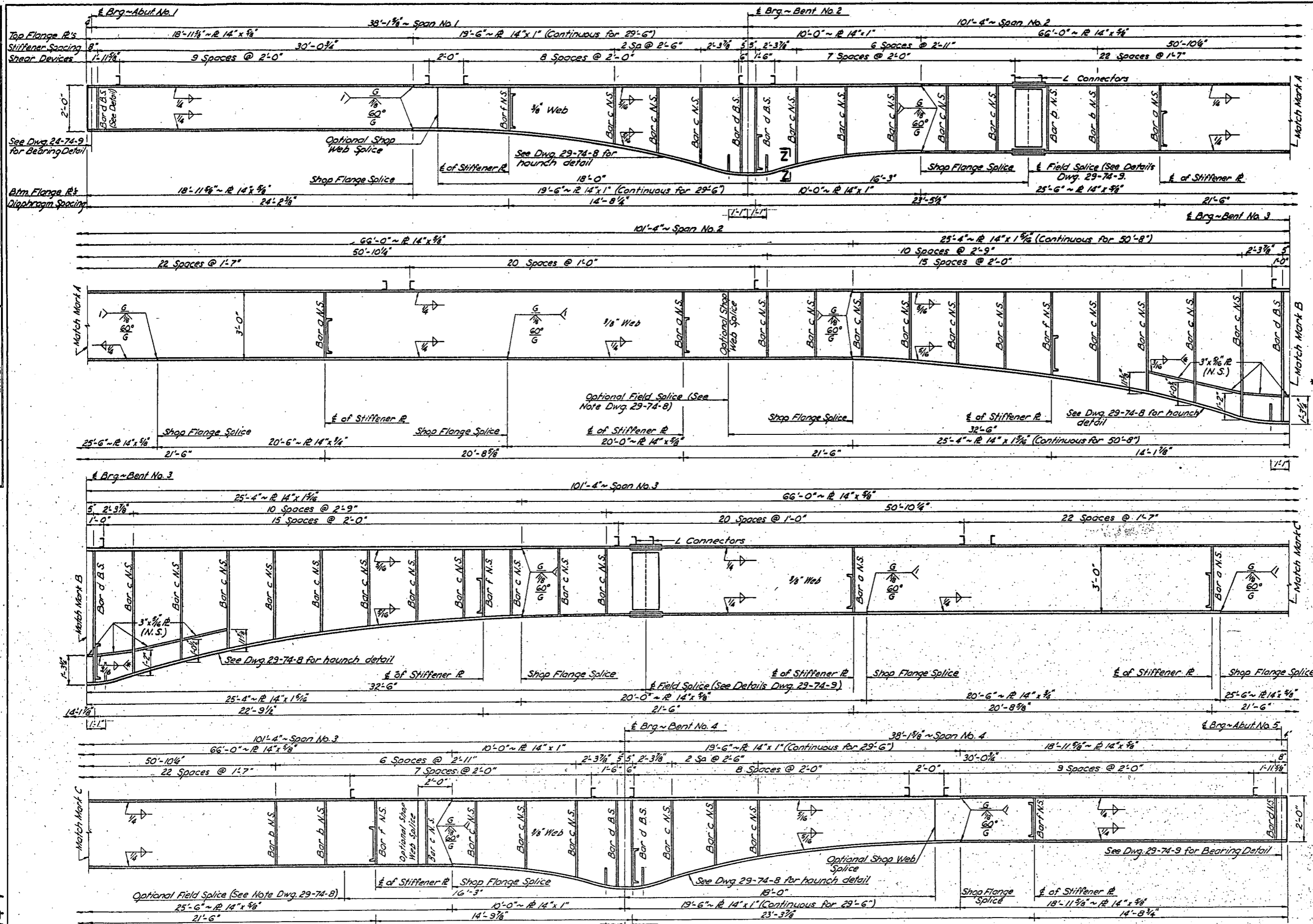
STEEL LAYOUT

QUANTITIES	
See Drawing 29-74-9	
AMENIA SEPARATION SUPERSTRUCTURE DETAILS 30'-0" ROADWAY H20 LOADING	

QUANTITIES MADE BY: D.L.A. CHECKED BY: Z.L.G.

29-74-6

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	1-29-221		13	43



Nomenclature:  
 B.S. = Both Sides  
 N.S. = Near Side

See drawing 29-74-8 for Z-Z  
 See drawing 29-74-8 for notes

Designed for 25' I.S.F. F.W.S.

QUANTITIES  
 See Drawing 29-74-9

AMENIA SEPARATION  
 WELDED GIRDER DETAIL

30'-0" ROADWAY  
 H<sub>2</sub>O LOADING

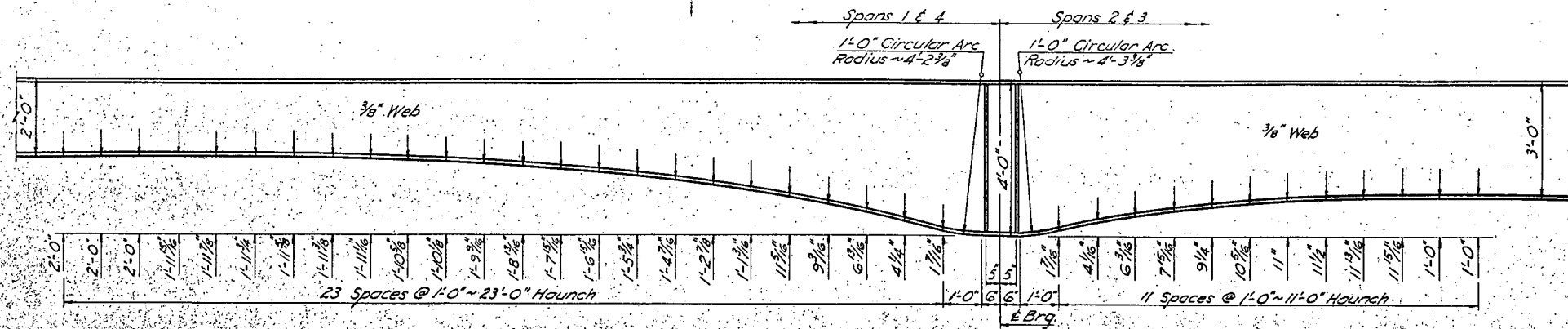
ELEVATION

29-74-7

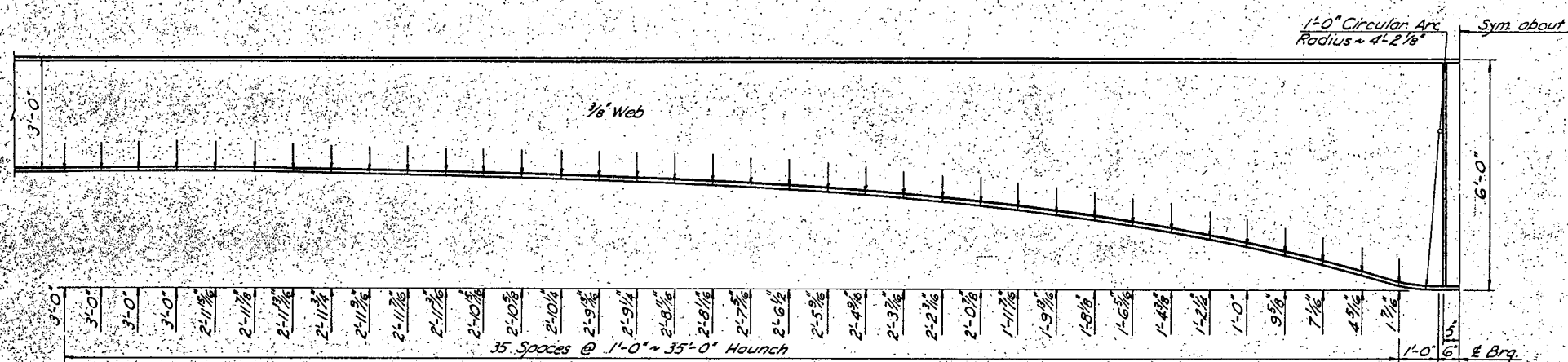
29-74-7

REVISIONS	MADE BY	CHECKED BY	DATE
DESIGN	D.O.A.	L.P.H.	
TRACING	J.L.S.	D.L.R.	
QUANTITIES	J.F.B.		

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-220		14	43

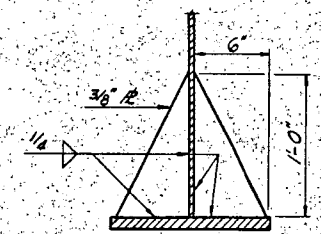


BENT 2 & 4

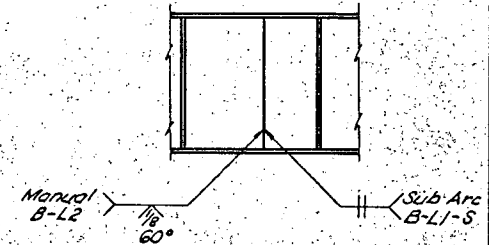


BENT NO. 3

GIRDER HAUNCH DETAILS

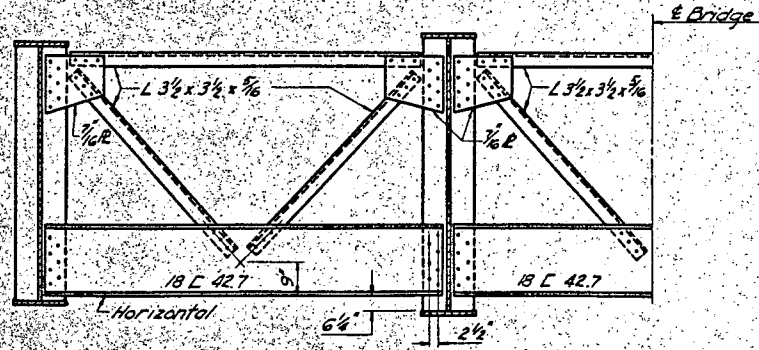


Z-Z  
Typical for bents 2, 3 & 4

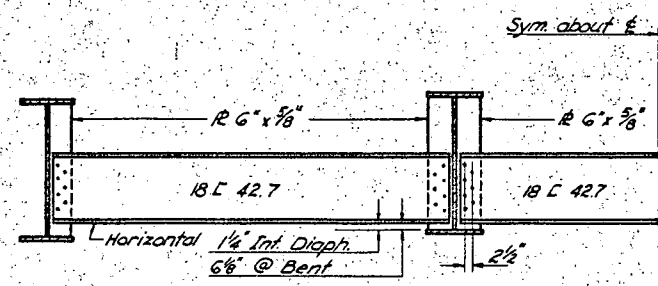


OPTIONAL SHOP WEB SPLICE

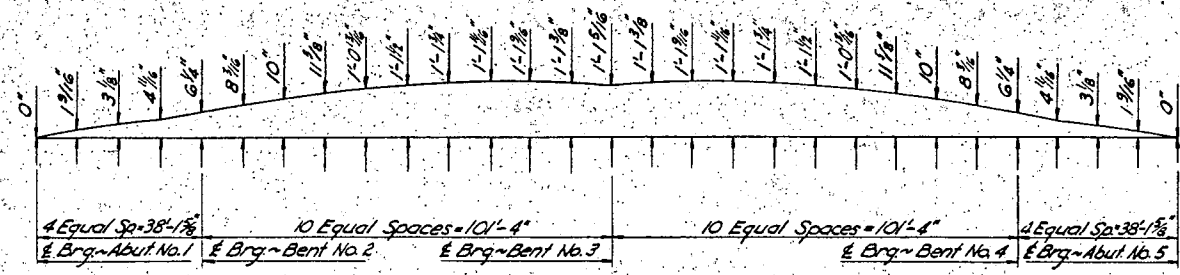
If optional field splices are used in spans 2 and 3, shop web splices will not be used in those spans.



Y-Y  
AT BENT NO. 3 ONLY



X-X  
Typical for diaphragms at Bents 2 and 4 and for most intermediate diaphragms. For intermediate diaphragms in the haunch region the 1/4" dimension shall be measured from the girder with the higher bottom flange.



SHOP CAMBER DIAGRAM

The shop camber diagram above represents the rise in inches, above a chord between the centerline of abutment bearings, that shall be cut into the web plate of the girders to compensate for the dead load deflection of the superstructure, plus the vertical curve of the roadway. The camber shown shall be in addition to the rise required for the girder haunch. The depth of the web plate will also vary according to the thickness of the flange plates.

FIELD SPLICE:

TWO FIELD SPLICES ARE PROVIDED ON DRAWING 29-74-7. FALSEWORK WITH PROVISIONS FOR JACKING MUST BE PROVIDED DURING ERECTION TO HOLD THE GIRDERS IN ALIGNMENT WHILE SPLICES ARE BEING MADE.

OPTIONAL FIELD SPLICES:

IN ADDITION TO THE TWO FIELD SPLICES ON DRAWING 29-74-7, TWO OPTIONAL FIELD SPLICES ARE SHOWN. THESE TWO ADDITIONAL FIELD SPLICES MAY BE USED BY THE CONTRACTOR UNDER THE FOLLOWING CONDITIONS:

1. THEY ARE MADE AT NO EXPENSE TO THE STATE.
2. FLANGE AND WEB SPLICE PLATES AND BOLTS WILL BE AS SHOWN IN DETAILS ON SHEET 29-74-9.
3. FALSEWORK AT THESE SPLICE POINTS WITH PROVISIONS FOR JACKING MUST BE PROVIDED DURING ERECTION TO HOLD THE GIRDERS IN ALIGNMENT WHILE SPLICES ARE BEING MADE.

THE SHOP FABRICATION AND ERECTION DRAWING MUST INDICATE FOUR PICK-UP POINTS FOR EACH MEMBER OVER 100 FEET LONG TO BE USED DURING SHIPPING AND ERECTION.

THE DETAILS SHOWN ON DRAWING 29-74-7 REPRESENT GIRDER NO. 1 IN A FOUR (4) GIRDER BRIDGE. GIRDER NO. 2, NO. 3 AND NO. 4 ARE SIMILAR TO GIRDER NO. 1 AND SHALL BE FABRICATED IN ACCORDANCE WITH THESE DETAILS AND DRAWINGS 29-74-6 THRU 29-74-9.

ALL SHOP BUTT WELDS IN THE FLANGE PLATES SHALL BE MADE BEFORE FINAL FITTING AND WELDING INTO THE GIRDER.

OPTIONAL WEB SPLICES:

THE PAY QUANTITY FOR STRUCTURAL STEEL WILL BE BASED ON THE USE OF THE OPTIONAL SHOP WEB SPLICES.

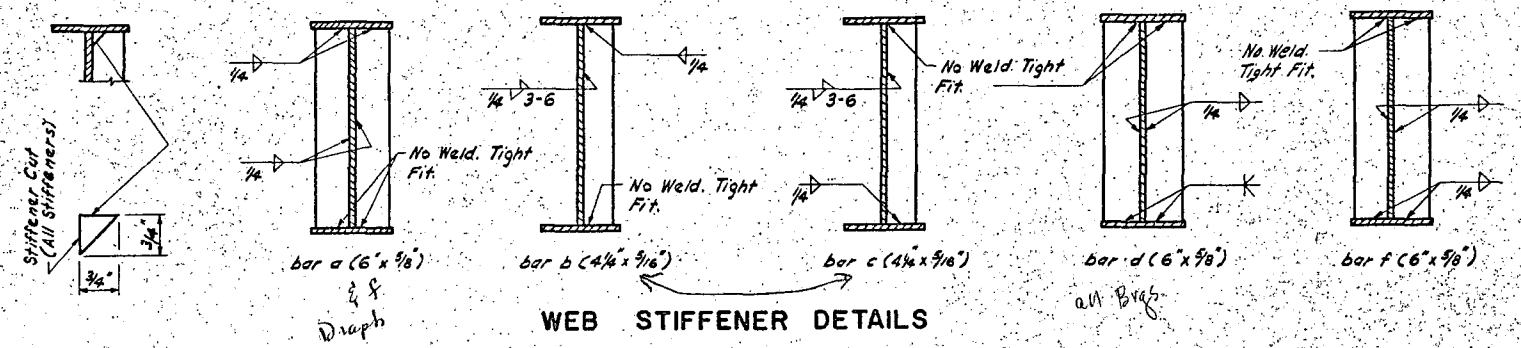
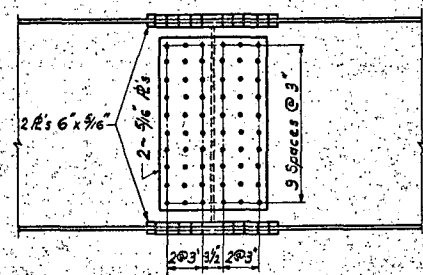
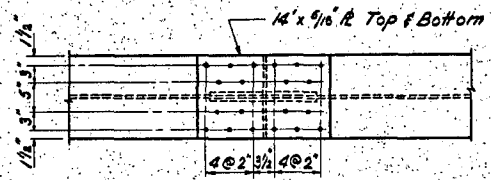
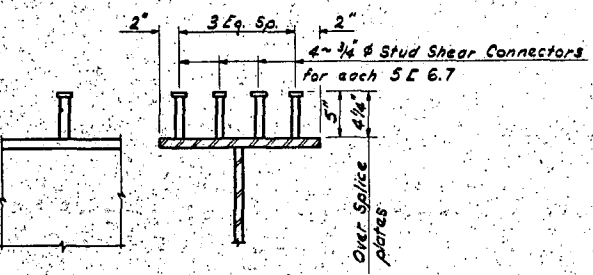
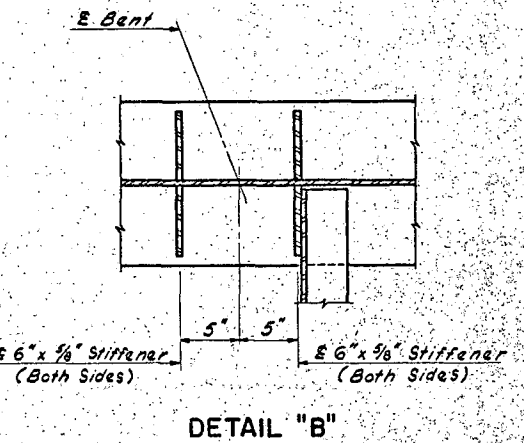
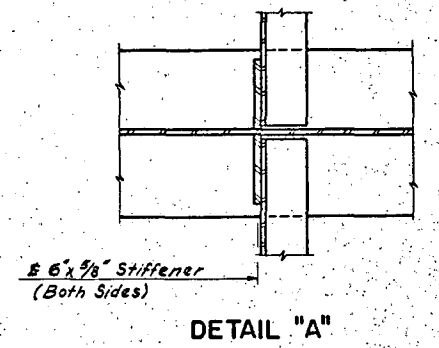
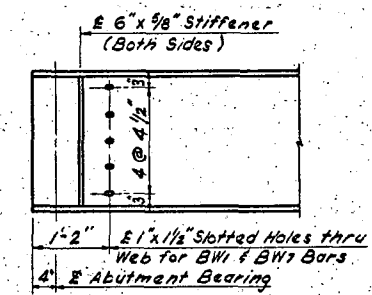
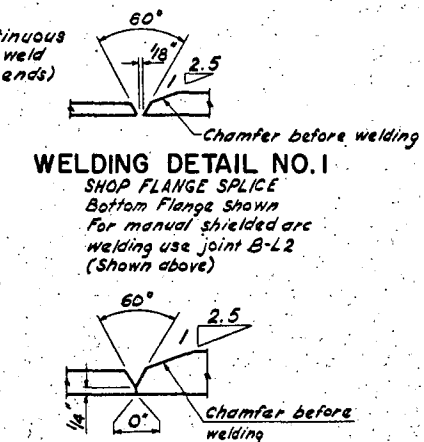
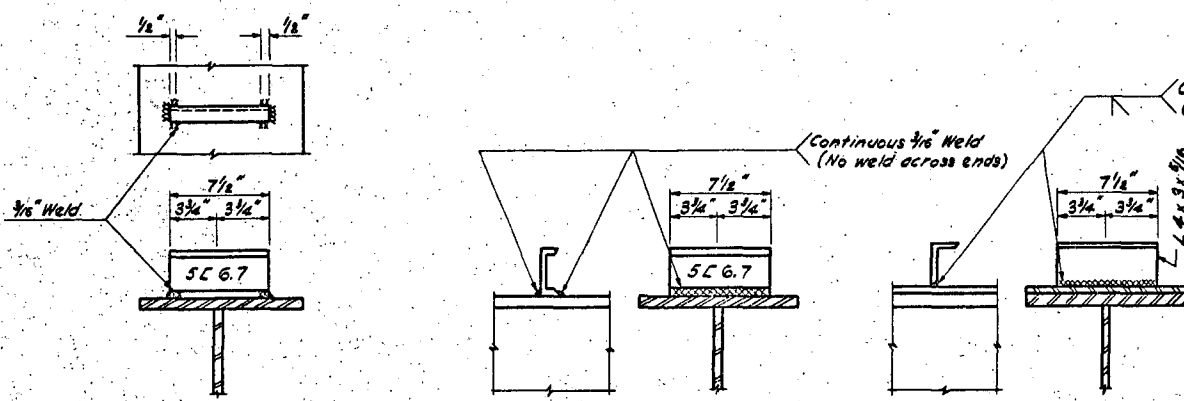
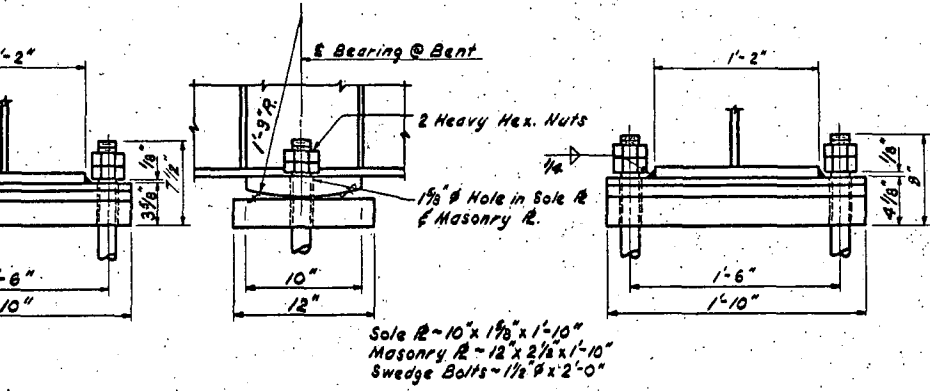
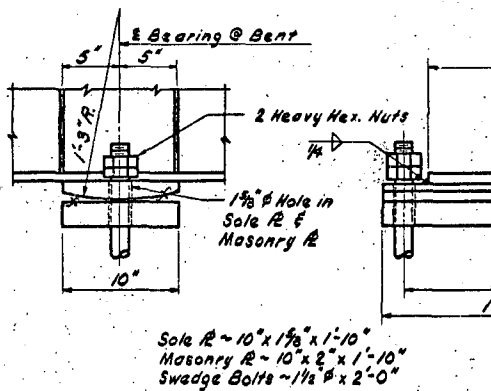
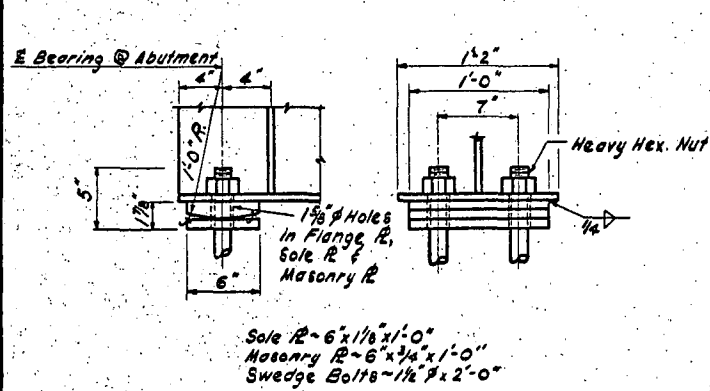
Designed for 25' S.F. F.W.S.

QUANTITIES	
See Drawing 29-74-9	

AMENIA SEPARATION  
SUPERSTRUCTURE DETAILS  
30'-0" ROADWAY  
H2o LOADING

MADE BY DLR  
QUANTITIES CHECKED BY LEG

29-74-8



Designed for 25' S.F. F.W.S.

QUANTITIES	
Structural Steel (A-441)	153,500 Lbs.
Structural Steel (A-36)	30,000 Lbs.

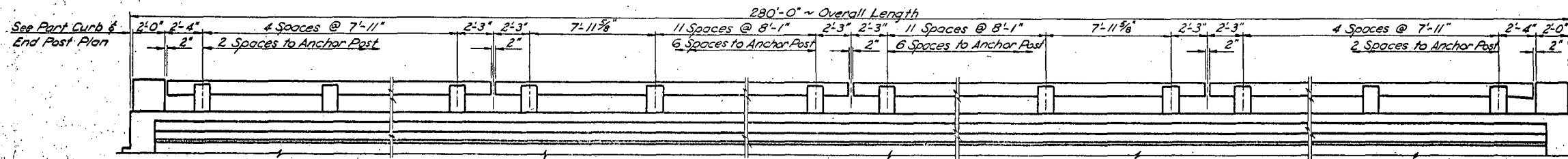
**AMENIA SEPARATION SUPERSTRUCTURE DETAILS**

30'-0" ROADWAY

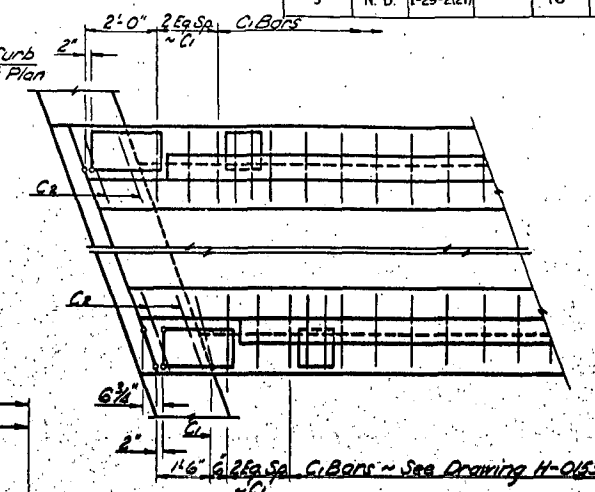
H<sub>2</sub>O LOADING

MADE BY	DATE
DESIGNED BY	
CHECKED BY	
TRACING	
QUANTITIES	

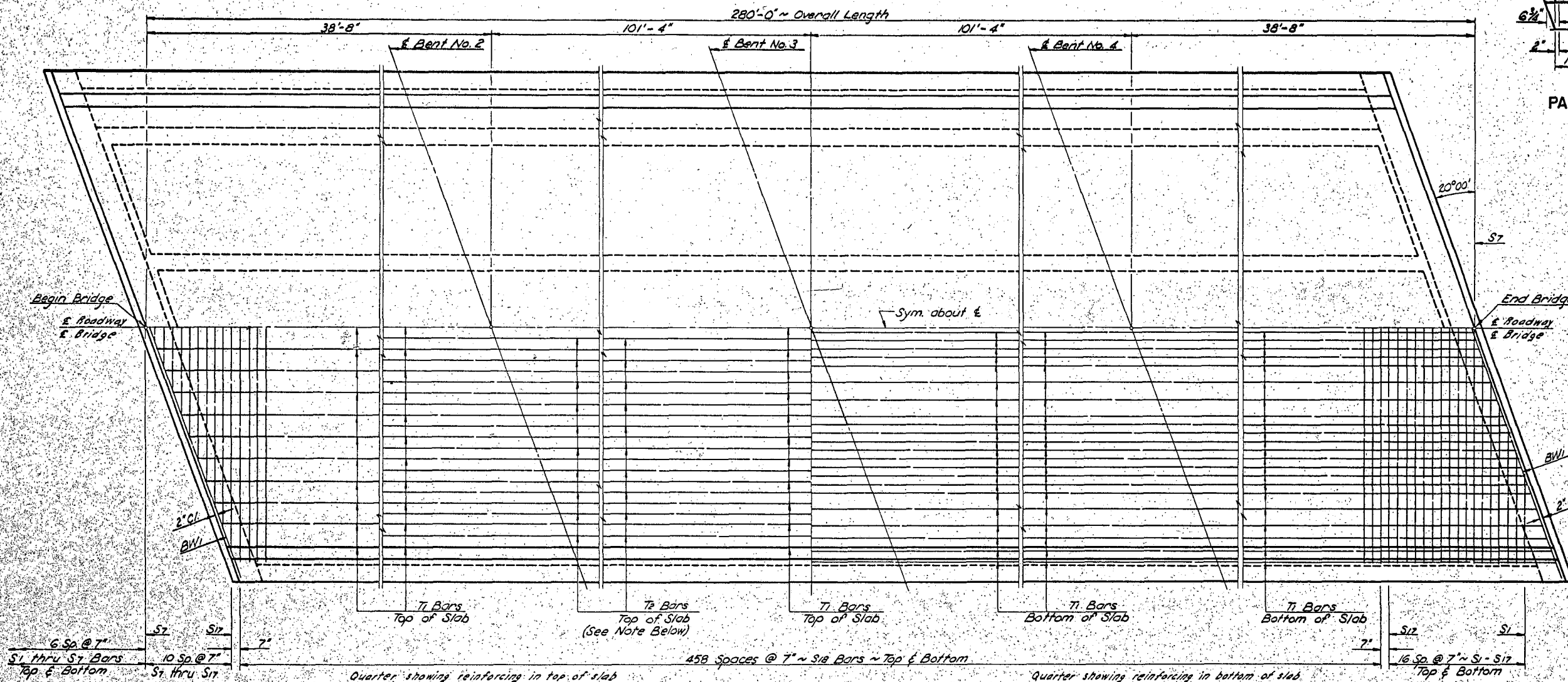




**PART ELEVATION**  
See H-0153 for Railing Details



**PART CURB AND END POST PLAN**



**PART PLAN**

Half Showing Slab Reinforcement  
Typical Both Sides ~ by Rotation

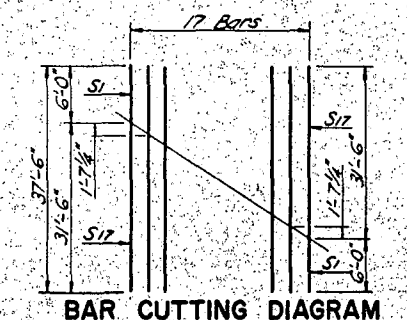
**NOTE :**

- T<sub>1</sub> Bar Placement (Slab & Curbs):
- At Bent No. 2 ~ 15 feet in Span No. 1, 25 feet in Span No. 2.
- At Bent No. 3 ~ Center over Bent.
- At Bent No. 4 ~ 25 feet in Span No. 3, 15 feet in Span No. 4



**R BAR SPLICING DETAIL**

Spans No. 2 & No. 3  
Use R<sub>1</sub> Bars in Spans No. 1 & No. 4



**BAR CUTTING DIAGRAM**

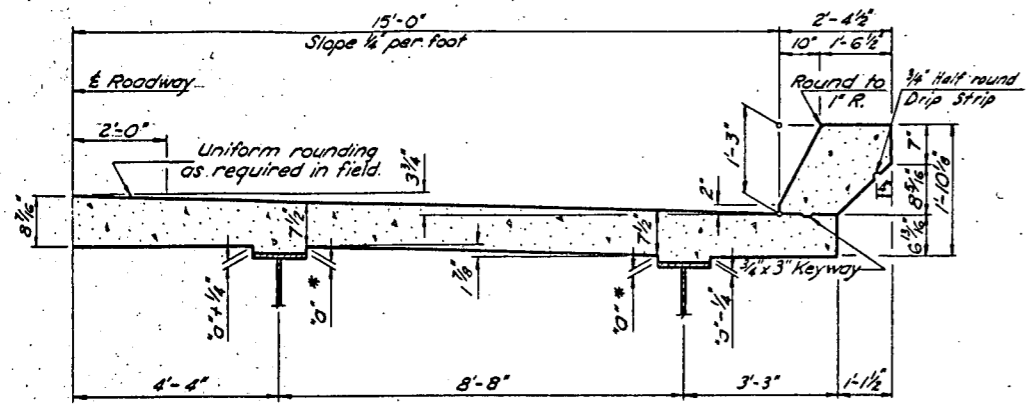
S<sub>1</sub>-S<sub>17</sub> Bars ~ Two Sets ~ 637'-6"

Designed for 25<sup>#</sup>/S.F. F.W.S.

**QUANTITIES**

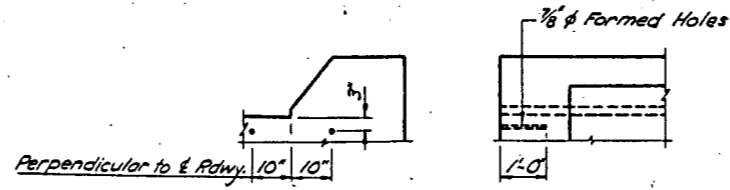
See Drawing 29-74-11


**AMENIA SEPARATION  
SLAB & RAILING DETAILS**  
30'-0" ROADWAY  
H<sub>20</sub> LOADING



HALF SECTION OF SLAB  
 Showing Dimensions

\* "a" equals 1/8" @ E bearings of bents and abutments. At intermediate points "a" equals screed elevation at E Roadway minus top of girder elevation minus (884 outside girders) (.727 inside girders).

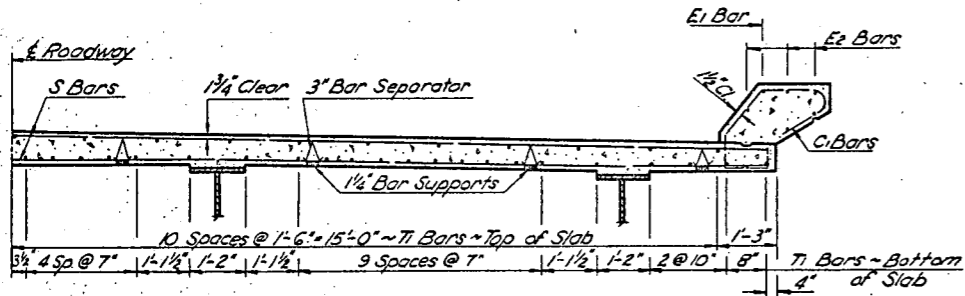


CURB SLEEVE DETAILS

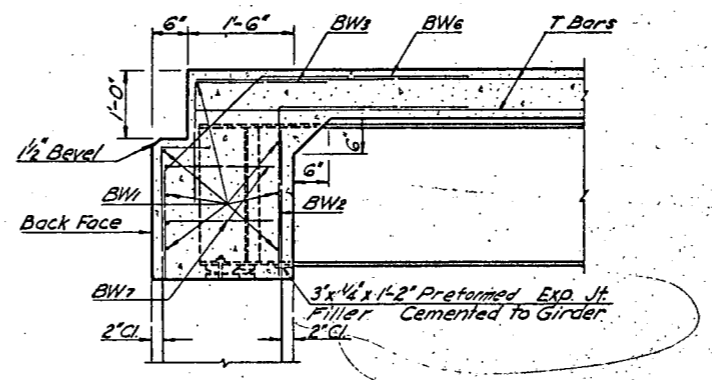
SUPERSTRUCTURE

MARK	NUMBER	SIZE	LENGTH	SHAPE
BW1	14	6	36'-8"	Str.
BW2	56	6	5'-0"	Bent
BW3	56	6	3'-6"	"
BW4	8	6	7'-9"	"
BW5	4	6	7'-3"	"
BW6	56	6	6'-0"	"
BW7	16	5	5'-0"	"
C1	630	5	5'-3"	"
C2	8	5	7'-1"	"
E1	16	6	36'-8"	Str.
E2	80	5	36'-4"	"
P1	192	6	3'-8"	Bent
P2	24	6	4'-5"	"
P3	144	5	4'-11"	"
P4	128	3	3'-10"	"
P5	16	3	4'-4"	"
RC	496	3	2'-11"	Bent
R1	24	6	35'-8"	Str.
R2	16	6	37'-2"	"
R3	40	6	34'-11"	"
R4	16	6	32'-8"	"
S1-S17	480	6	318'-9"	Str.
S18	918	6	32'-2"	"
T1	520	5	36'-4"	Str.
T2	60	12	40'-0"	"
R7	40	6	34'-11"	"

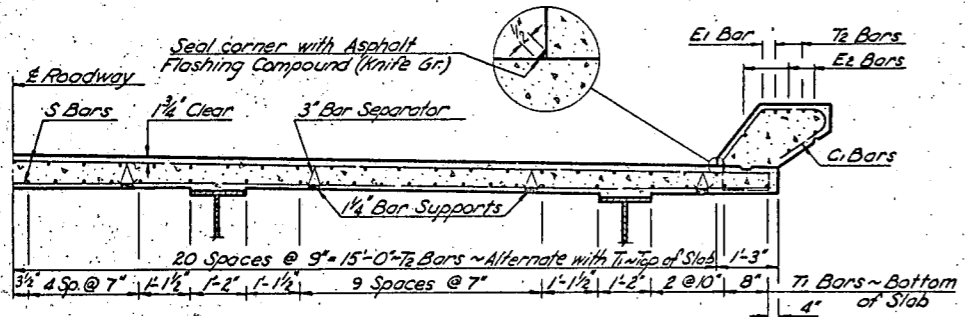
PROJECT 1-29-221  
 DRAWING 29-74-11



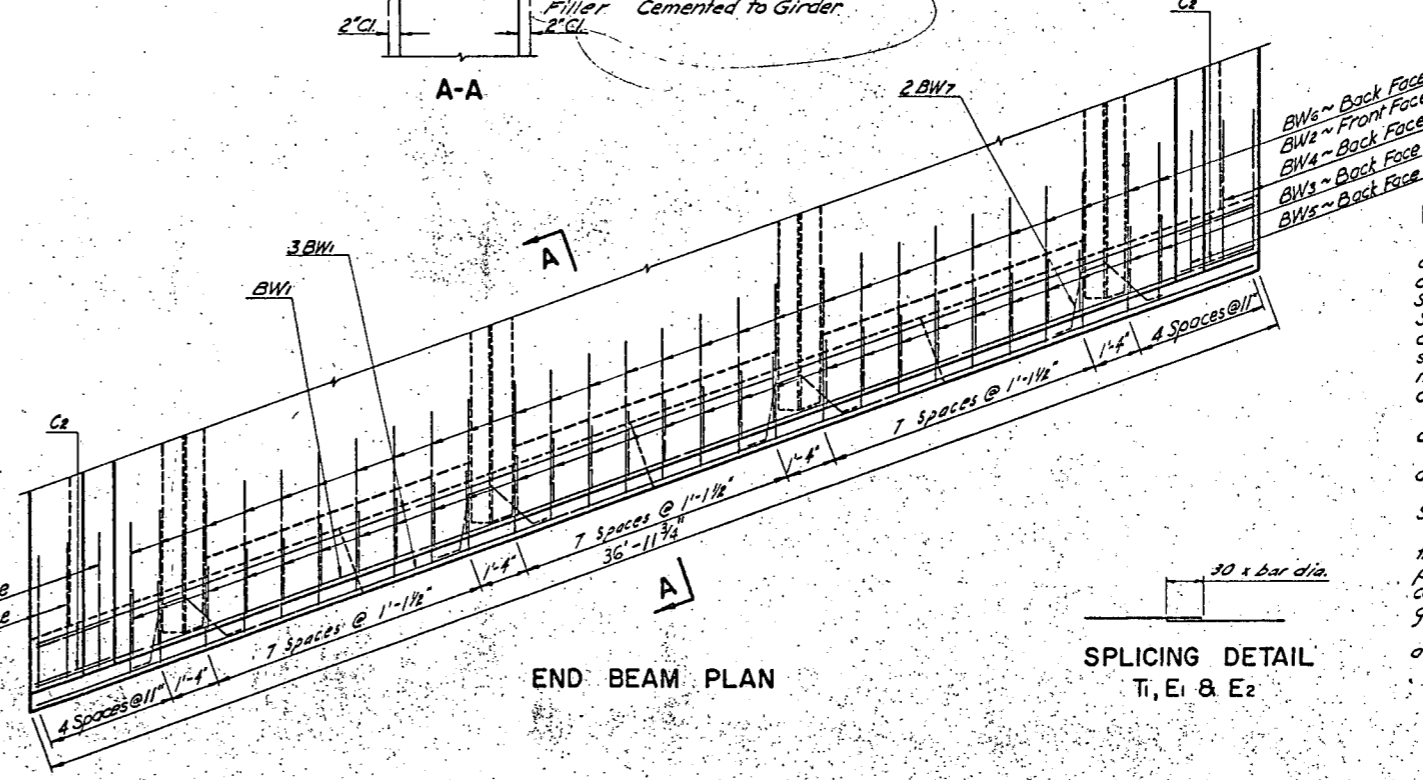
HALF SECTION OF SLAB  
 Showing Reinforcing between Bents & Abutments



A-A



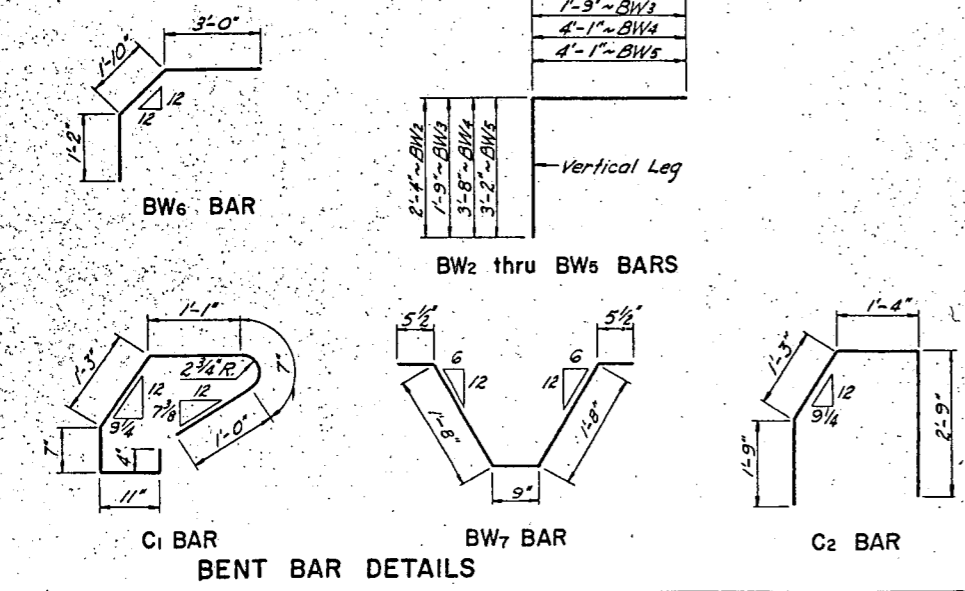
HALF SECTION OF SLAB  
 Showing Reinforcing over Bents



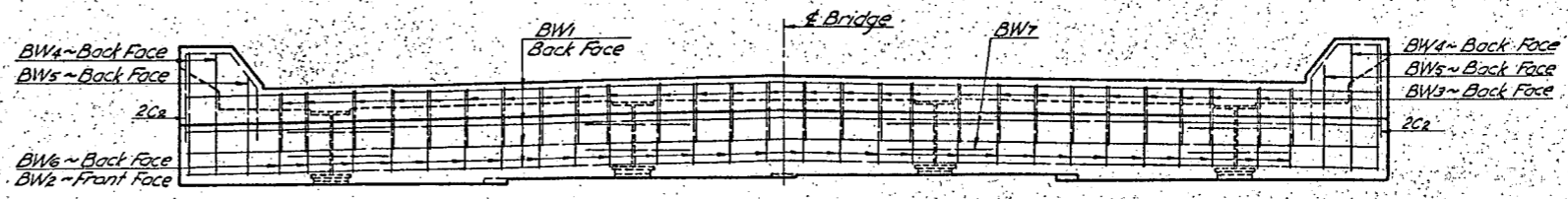
END BEAM PLAN

SPlicing DETAIL  
 T1, E1 & E2

NOTES:  
 It is assumed that the Contractor can place the slab concrete in one continuous operation in accordance with Sections 602-3.6.1 thru 602-3.6.2.1.4 of the Standard Specifications. If the Contractor cannot pour at the specified rate, he shall submit drawings to the Bridge Engineer, for approval, showing proposed construction joints and pouring sequence.  
 Each curb shall be poured in one continuous operation.  
 See Std. Drawing H-0153 for railing details.  
 See Dwg. 29-74-6 thru 29-74-9 for Structural Steel details.  
 The end beams shall be poured at the same time that the deck slab is poured. Special care shall be taken to completely fill the space under the girders in the end beams with concrete.  
 \* See Dwg. 29-74-10 for bar cutting diagram.



BENT BAR DETAILS



END BEAM ELEVATION

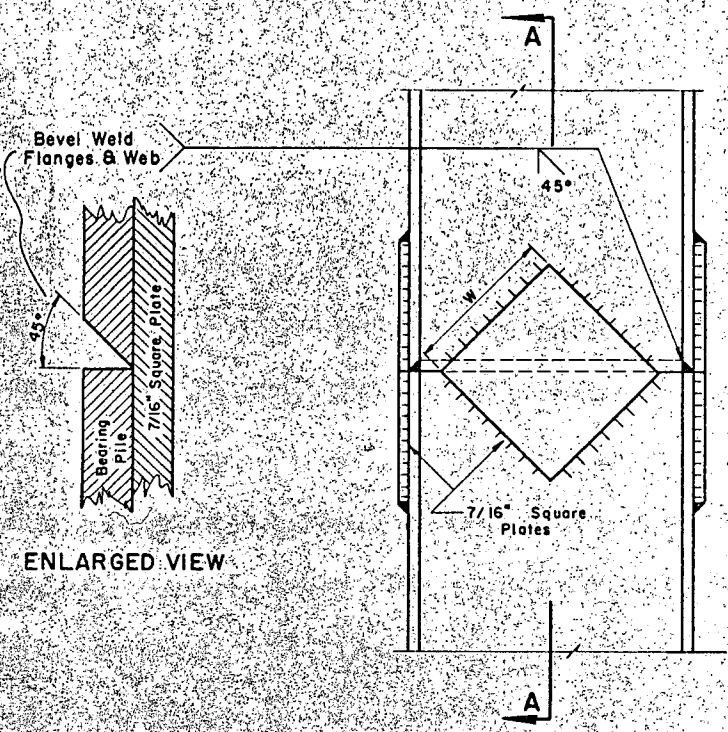
Designed for 25' S.F. F.W.S.

QUANTITIES	
Class AE-3 Concrete	272.8 C.Y.
Class AAE-3 Concrete	18.07 C.Y.
Reinforcing Steel	88,382 Lbs.

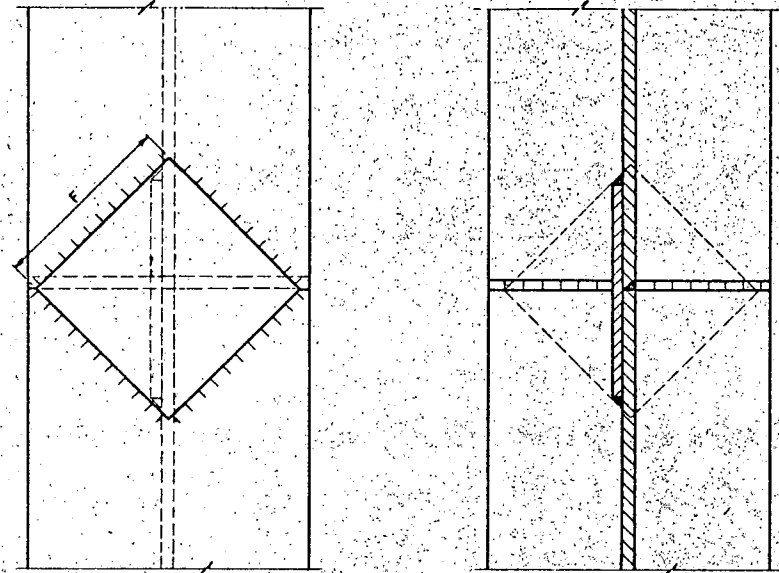
Railing and end post quantities included.

AMENIA SEPARATION  
 SLAB, END BEAM &  
 MISC. DETAILS  
 30'-0" ROADWAY  
 H20 LOADING

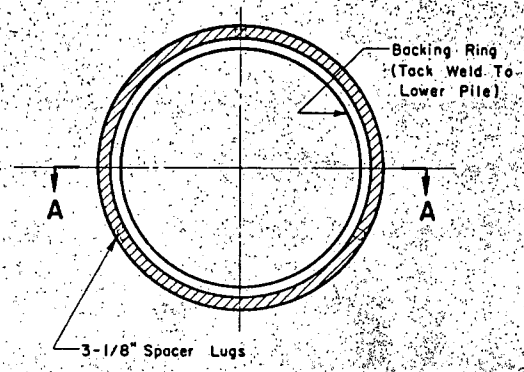
REVISIONS	DATE	MADE BY	CHKD BY
DESIGN			
CHECKED BY			
TAILS			
TRACING			
QUANTITIES			



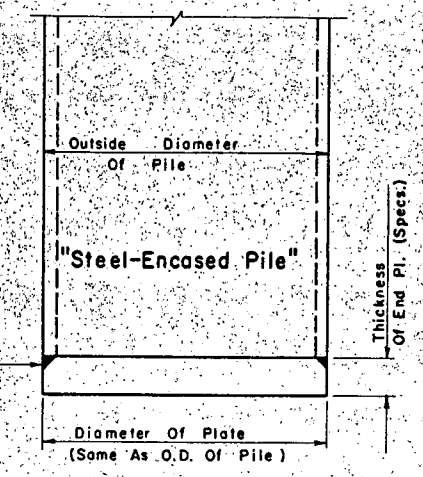
ENLARGED VIEW



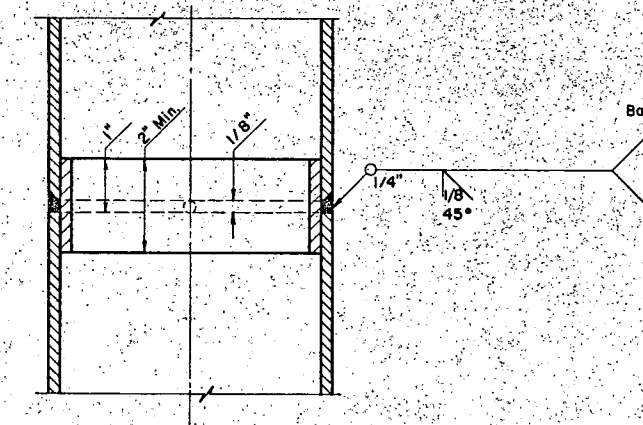
Flame Scarf Inside Of Both Flanges And One Side Of Web Of Upper Section



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

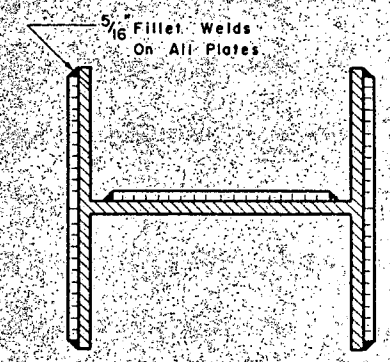


END PLATE DETAIL



SHELL PILE SPLICE DETAIL

ENLARGED VIEW



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"

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

PILE SPLICE DETAILS