STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	8	1977	1	5

PROJECT NUMBER
RS -3210(1)--61-24

R.O.W. PROJECT NUMBER

IOWA
DEPARTMENT OF TRANSPORTATION
Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

FARM TO MARKET SYSTEM
CRAWFORD COUNTY

PROJECT NO. RS -3210(1)--61-24

87'-6"X30' CONTINUOUS CONCRETE SLAB BRIDGE

SCALES AS NOTED

IOWA STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS SERIES 1972 PLUS CURRENT SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION--HIGHWAY DIVISION SHALL APPLY TO WORK ON THIS PROJECT.

INDEX OF SHEETS

MILEAGE SUMMARY

STA. 311+22.0 ℄ = 90.5 FT. = 0.0171 MI.

REMOVALS

REMOVALS INCLUDE DISPOSITION OF:
39'X20' I-BEAM BRIDGE

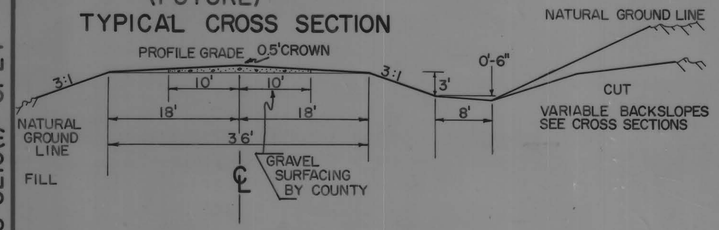
IOWA STATE HIGHWAY COMMISSION STANDARDS REQUIRED (MAY BE OBTAINED AT BRIDGE DESIGN SERVICES)

STANDARD	ISSUED	REVISED
J16-75	DECEMBER 1975	
J16-2-70	JUNE 1969	6-8-72
J16-6-70	JUNE 1969	12-7-76
J16-7-70	JUNE 1969	6-8-72
J16-9-70	JUNE 1969	7-28-72
J16-15-70	JUNE 1969	12-7-76
P10A	JUNE 1959	1-24-77

CONVENTIONAL SIGNS

State Line
Co. Line
Twp. Line
Sec. Line
Corp. Line
Urban Bdry.
R.O.W. Lines
Survey Line — Old / New — Sta / Ref Point
Sec. Corner
Profile Grade
Railroad
Field Tile — Old / New
Underground Lines — G Gas / T Tel
Culverts — Old / New
Utility Poles — Power / Tel
Fences — Barb / Mesh
Trees Or Brush
Stream
Dike — Old / New
County Road No
Primary Road No.
U. S. Road No
Interstate Road No

(FUTURE) TYPICAL CROSS SECTION



DESIGN NO. 1777 — FARM TO MARKET ROAD — STA. 311+22.0
CRAWFORD COUNTY — OVER TRINKLE CREEK
SECTIONS 17-18 — T-85N R-37W — JACKSON TWP.

DESIGN FOR 87'-6"X30' CONTINUOUS CONCRETE SLAB BRIDGE

ESTIMATED QUANTITIES

IN LETTING OF MAY 24, 1977

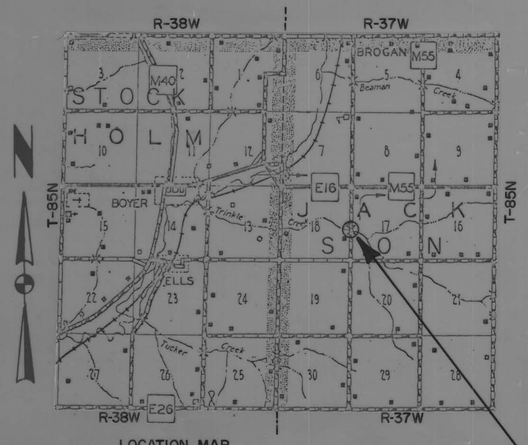
ITEM NO.	ITEM			UNIT	TOTAL
1	CONCRETE, STRUCTURAL			CU. YDS.	190.5
2	STEEL, REINFORCING			LBS.	42,948
3	HANDRAIL, ALUMINUM			LIN. FT.	170.7
4	CREOSOTED PILES 12@35'			LIN. FT.	420
5	STEEL BEARING PILING HP 10X42	FURNISH	14@60	LIN. FT.	840
		DRIVE	14@60	LIN. FT.	840
		ENCASE	14@18	LIN. FT.	252
6	REVETMENT, CLASS D-RIP RAP			TONS	74
7	CULVERT, CORRUGATED METAL		24" DIA.	LIN. FT.	47
8	CULVERT, CORRUGATED METAL		48" DIA.	LIN. FT.	45
9	APRON, METAL RF-5		24" DIA.	NO.	1
10	APRON, METAL RF-5		48" DIA.	NO.	1
11	EXCAVATION, CLASS 10 CHANNEL			CU. YDS.	665
12	EXCAVATION, CLASS 20			CU. YDS.	75
13	EXCAVATION, CLASS 20 FOR ROADWAY PIPE CULVERT			CU. YDS.	21
14	REMOVAL OF EXISTING STRUCTURES			L.S.	LUMP SUM

-100-

ITEM NO. 1 THE FLOOR, CURBS, AND WING POSTS (158.3 CU.YDS.) ARE TO BE CLASS "D" CONCRETE, THE REMAINDER (32.2 CU.YDS.) ARE TO BE CLASS "C" CONCRETE.

ITEM NO. 11 THE CONSTRUCTION OF WING DIKES (1,263 CU.YDS.) AND TEMPORARY FILLETS (452 CU.YDS.) ARE TO BE CONSIDERED INCIDENTAL TO CLASS 10 CHANNEL EXCAVATION. 665 CU.YDS. OF CLASS 10 CHANNEL EXCAVATION SHALL BE USED IN WING DIKE CONSTRUCTION. CONTRACTOR TO FURNISH 1,050 CU.YDS. OF BORROW. NO OVERHAUL ALLOWED. BORROW AREA TO BE APPROVED BY COUNTY ENGINEER.

12 TOTAL INCLUDES 21 CU.YDS. OF CLASS 20 EXCAVATION FOR CORR. METAL LET DOWN PIPE CULVERT.



LOCATION MAP

LOCATION MAP SCALE
0 1 2 3
miles

STA 311+22.0 ℄ 87'-6" X30' CONTINUOUS CONCRETE SLAB BRIDGE DESIGN NO. 1777

APPROVED

Wm H Jensen
LeRoy A. Hansohn
Louis J. Mahlbauer
Martin Spiegel
Charles L. Smith
BOARD OF SUPERVISORS

IOWA DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
APPROVED
DISTRICT LOCAL SYSTEMS ENGINEER — DATE

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY SUPERVISION AND THAT ENGINEERING DECISIONS WITH REGARD TO THE DESIGN WERE MADE BY ME OR BY OTHER DULY REGISTERED PROFESSIONAL ENGINEERS UNDER THE LAWS OF THE STATE OF IOWA.
H. Dale Wright 1-14-77
IOWA REGISTRATION NUMBER 5798 DATE

DEPARTMENT OF TRANSPORTATION IOWA — Highway Division
APPROVED D.E. McKay 4/22/77
DEPUTY CHIEF ENGINEER — DATE

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

MASTERS PRINTED

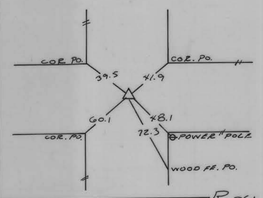
1971 TRAFFIC COUNT (75 V.P.D.)

BRIDGE — CRAWFORD COUNTY — PROJECT NO. RS-3210(1)--61-24

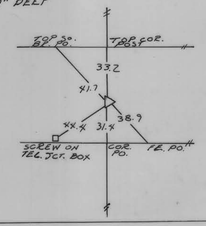
LETTING DATE: MAY 24, 1977 — DESIGN NO. 1777 — FILE NO. 50622 — CRAWFORD COUNTY — PROJECT NO. RS -3210(1)--61-24 — SHEET NO. 1 of 5

JACKSON TOWNSHIP
T-85N R-37W
SEC. 18

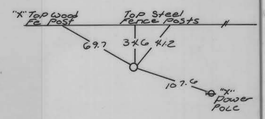
STA. 290+00.86 REF. TO SEC. COR.
C.M. 24" DEEP



STA. 316+35.15 REF. to SEC. COR.
17" DEEP



Sta. 330+91.03 Ref to P.O.T.
Iron Pin.



Roy M. Koenck

Raymond D. Rickers

House 132'

Farm Yard

Grain Shed 110'

Sewer Cmc

Cultivated

Cultivated

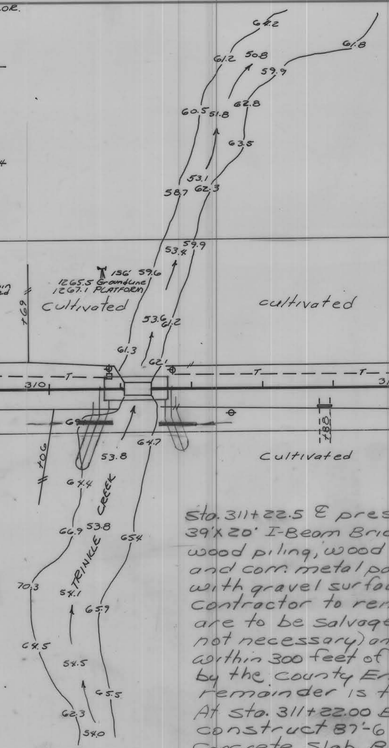
Cultivated

Edward O. Wieland

Dennis Dozark 1/2 int.
Duone Dozark 1/2 int.

Sta. 310+69, ET. 48 ft., D.A.=1 Ac.
Bridge Contractor to furnish & Place 24"X47' C.m.p. on one RF-5 metal Apron.
Class 20 = 6 cu. yds.

Sta. 311+76, ET. 50 ft., D.A.=76 Ac.
Bridge Contractor to furnish & Place 48"X 45' C.m.p. on one RF-5 metal Apron.
Class 20 = 15 cu. yds.



Sta. 311+22.5 ℄ present 39'X20' I-Beam Bridge, wood piling, wood backwalls, and corr. metal pan floor with gravel surface. Bridge Contractor to remove. The I-Beams are to be salvaged (match marking not necessary) and stockpiled within 300 feet of site as directed by the County Engineer. The remainder is to be wasted. At Sta. 311+22.00 Bridge Contr. to construct 87'-6 x 30'-0 Continuous Concrete Slab Bridge.

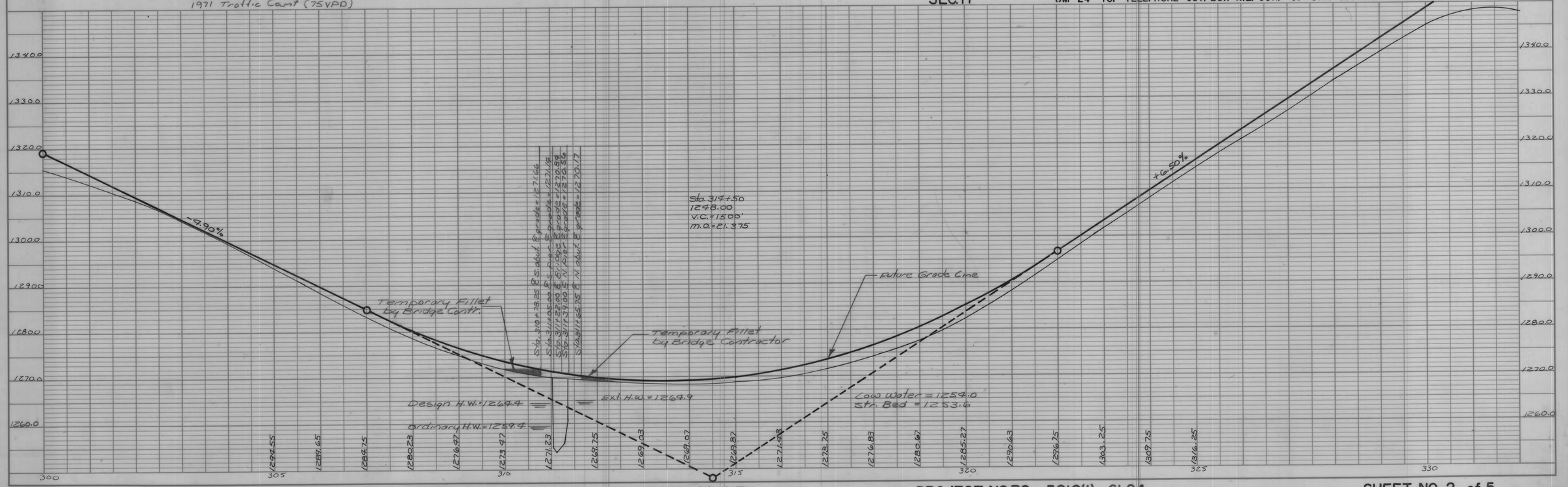
It shall be the contractors responsibility to provide waste areas or disposal sites for excess material which is not desirable to be incorporated in the work involved on this project. No payment for overhaul will be allowed for material hauled to these sites.

Contractor shall cooperate with utilities in regards to their respective lines.

SEC. 17

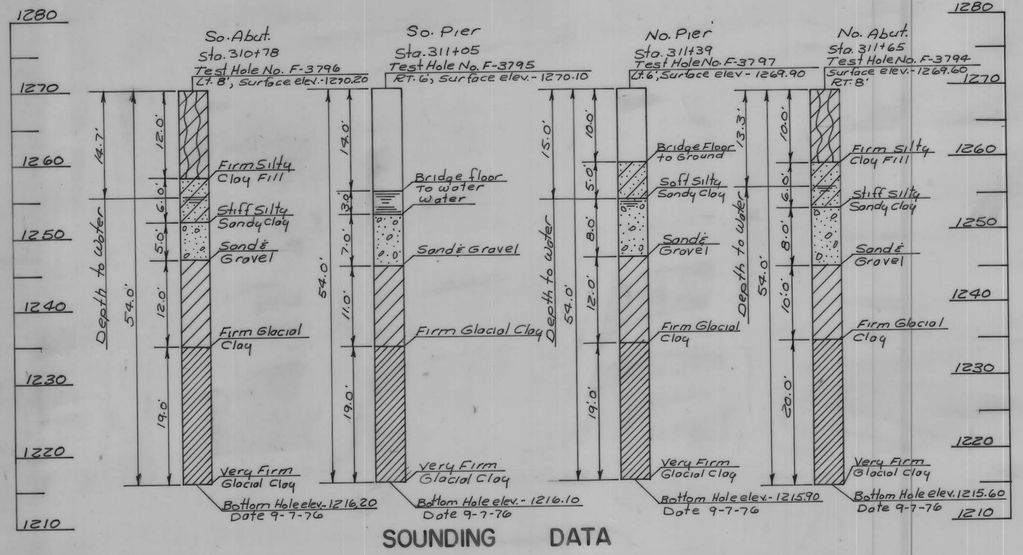
1971 Traffic Count (75 VPD)

BM = 24 TOP TELEPHONE JCT. BOX N.E. COR. 31' STA. 305+90 ELEV. = 1292.87



DESIGN NO. 1777 FILE NO. 50622 CRAWFORD COUNTY PROJECT NO. RS - 3210(1)--61-24 SHEET NO. 2 of 5

BENCH MARK #24 -- TOP TELEPHONE JCT. BOX, N.E. COR. 31' STA. 305+90 = ELEV. 1292.87

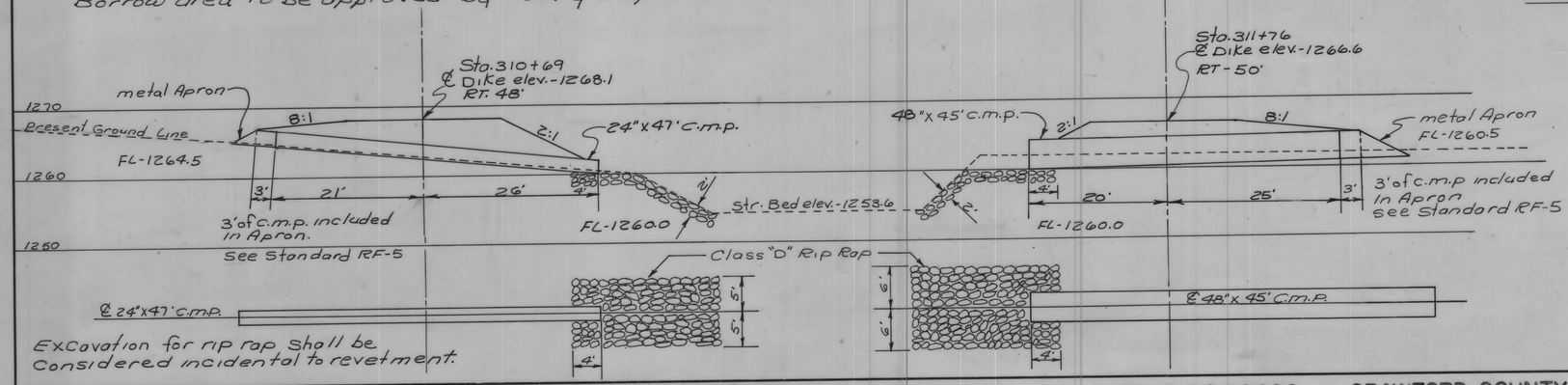


SOUNDING DATA

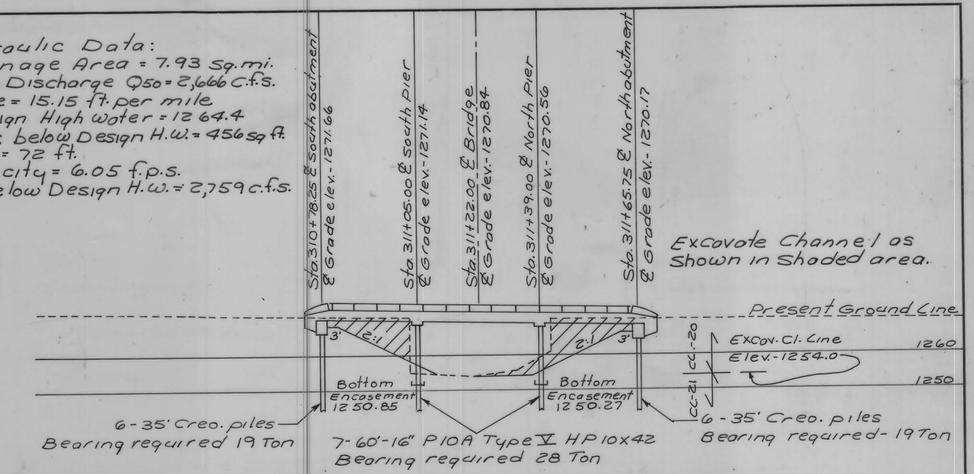
Estimate of Quantities 87'-6 x 30'-0 Continuous Concrete Slab Bridge.					
Item		unit	Abutments	Superstructure	Totals
*Concrete, Structural		cu.yds.	32.2	158.3	190.5
Steel, Reinforcing		Lbs.	4,216	38,732	42,948
Handrail Aluminum		Lin. FT.		170.7	170.7
Creosoted Piles 12@35'		Lin. FT.	420	———	420
Steel H Piling HP 10x42	Furnish 14@60'	Lin. FT.	———	840	840
	Drive 14@60'	Lin. FT.	———	840	840
	Encase 14@18	Lin. FT.	———	252	252
⊗ Class 10 Channel Excavation		Cu. yds.	———	———	665
Excavation Class 20		cu. yds.	75	———	75
Excav Class 20 Roadway Pipe culvert		Cu. yds.	———	———	21
Revetment Class D-Rip Rap		Tons	———	———	74
Removal of Existing Structure		Lump Sum	———	———	Lump Sum

* The floor, curbs & wing posts 158.3 cu. yds. are to be Class "D" Concrete, the remainder 32.2 cu. yds. are to be Class "C" concrete.

⊗ The construction of wing Dikes (263 cu. yds) and Temporary fillets (452 cu. yds.) are to be considered incidental to Class 10 Channel excavation. 665 cu. yds. of Class 10 Channel excav. shall be used in wing Dike Construction. Contractor to furnish 1,050 cu. yds. of Borrow. No overhaul allowed. Borrow area to be approved by County Engineer.



Hydraulic Data:
Drainage Area = 7.93 Sq. mi.
Des. Discharge Q50 = 2,666 c.f.s.
Slope = 15.15 ft. per mile
Design High Water = 1264.4
Area below Design H.W. = 456 sq ft.
W.P. = 72 ft.
Velocity = 6.05 f.p.s.
Q below Design H.W. = 2,759 c.f.s.



Pier caps are to be monolithic. Str. bed elev.-1253.6

Sta. 310+78.25 ℄ S. abut.
Top abut. elev = 1270.09
Bottom abut. elev.=1266.09
Piling cutoff elev.=1268.09
Berm elev.=1268.1

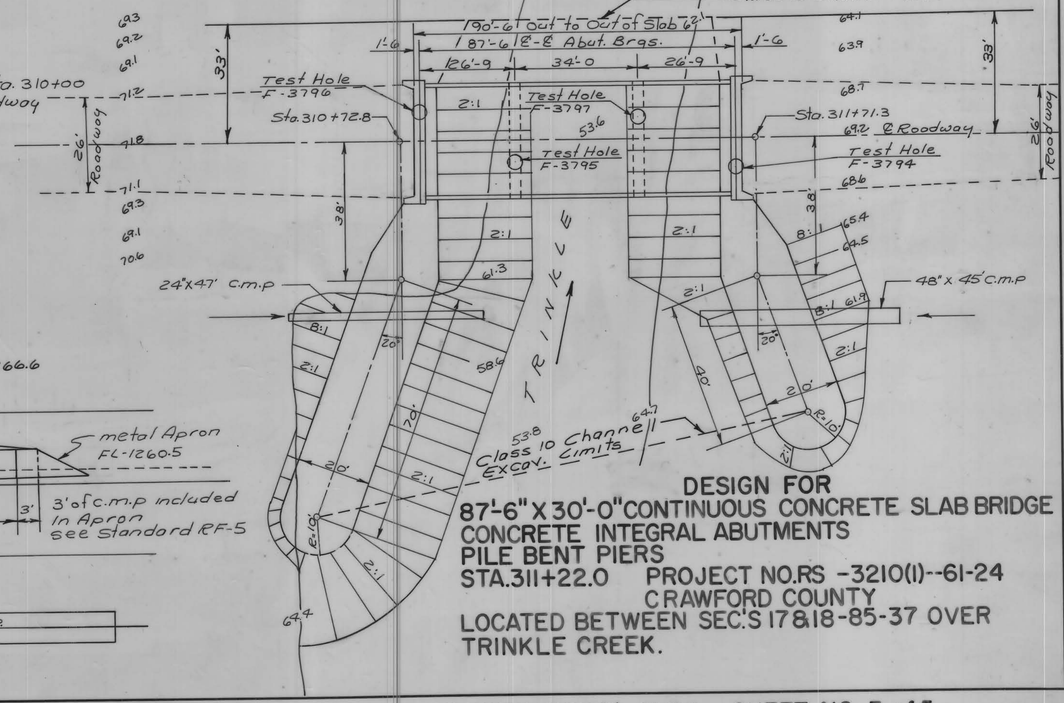
Sta. 311+05.00 ℄ S. pier
Bottom cap @ ℄ = 1268.85
Bottom Cap @ ext. pile = 1268.67

Sta. 311+39.00 ℄ N. Pier
Bottom Cap @ ℄ = 1268.27
Bottom Cap @ ext. pile = 1268.09

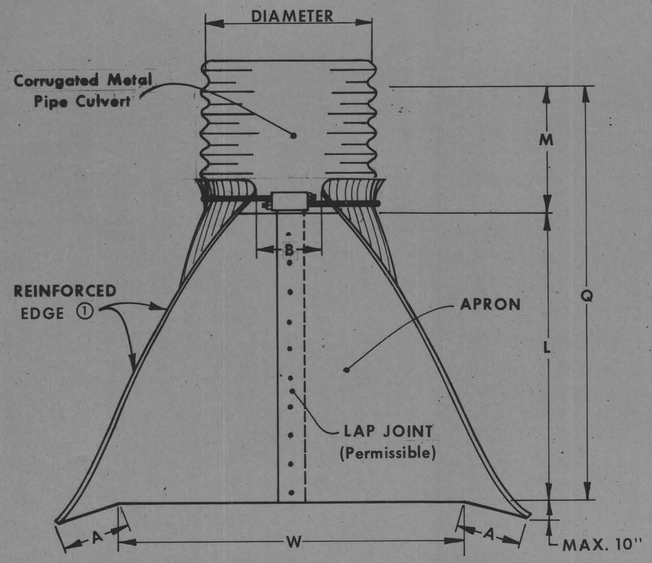
Sta. 311+65.75 ℄ N. abut.
Top abut. elev.=1268.60
Bottom abut. elev.=1264.60
Piling cutoff elev.=1266.60
Berm elev.=1266.6

Note: The county will supply the Contractor with the necessary bridge floor elevations.

H = 15'-3
H20-44 Loading



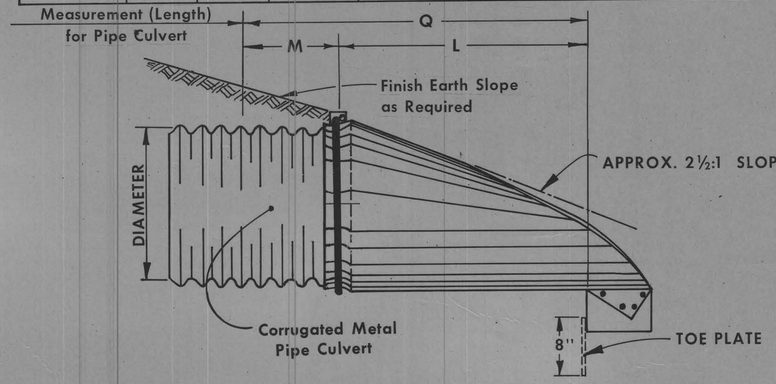
DESIGN FOR
87'-6" X 30'-0" CONTINUOUS CONCRETE SLAB BRIDGE
CONCRETE INTEGRAL ABUTMENTS
PILE BENT PIERS
STA. 311+22.0 PROJECT NO. RS-3210(1)--61-24
CRAWFORD COUNTY
LOCATED BETWEEN SEC'S 17 & 18-85-37 OVER TRINKLE CREEK.



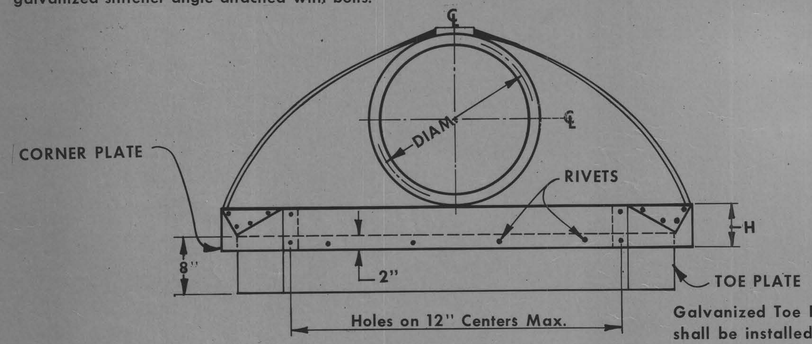
PLAN

① On sizes 60" and larger the reinforced edge should be supplemented with a galvanized stiffener angle attached with bolts.

PIPE DIAM.	DIMENSIONS						
	A 1" ±	B MAX.*	H 1" ±	L 1½" ±	W 2" ±	M*	Q
12"	4¾"	6"	6"	21"	24"	48"	69"
15"	6"	8"	6"	26"	30"	48"	74"
18"	7"	9"	6"	31"	36"	48"	79"
21"	8¼"	11"	6"	36"	42"	48"	84"
24"	9½"	12"	6"	42"	48"	36"	78"
30"	12"	15"	7½"	52½"	60"	24"	76½"
36"	14"	18"	9"	63"	72"	48"	111"
42"	16"	21"	10½"	73½"	84"	48"	121½"
48"	18"	27"	12"	84"	90"	36"	120"
54"	18"	30"	12"	84"	102"	36"	120"
60"	18"	33"	12"	87"	114"	36"	123"
66"	18"	36"	12"	87"	120"	36"	123"
72"	18"	39"	12"	87"	126"	36"	123"
78"	18"	42"	12"	87"	132"	36"	123"
84"	18"	45"	12"	87"	138"	36"	123"



SIDE VIEW



END VIEW

Galvanized Toe Plate (Same gage metal as apron) shall be installed on all aprons 24" diameter and larger.

GENERAL NOTES:
Metal pipe aprons and hardware shall be constructed of galvanized steel in conformance with the requirements of current standard specifications for Corrugated Metal Culverts and essentially as indicated hereon. Refer to appropriate other standard road plans as well as project plans for additional details of individual culvert installations. Alternate design details may be submitted to the engineer for approval.

Apron may be attached to culvert pipe as follows:

A. If normal culvert is of circumferential corrugation type:
   1. Use an approved bolt or clamp to fasten apron directly to culvert.
   2. If apron is fabricated with "M" dimension of annular corrugated pipe as an integral part of apron, use a standard connecting band to fasten the two pieces together.

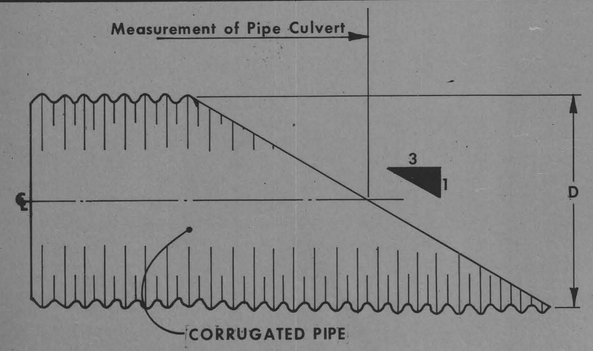
B. If normal culvert is of helical corrugation type:
   1. Use an approved sizing ring securely fastened to inside diameter of apron to connect to the culvert pipe using special dimple band connector.
   2. If the apron is fabricated with "M" dimension of annular pipe as an integral part of apron, connect the two with a dimple band.
   3. "Dimple" bands shall be approved by the engineer.

Any damage to Spelter Coat resulting from installation of culvert shall be repaired as directed by the engineer.

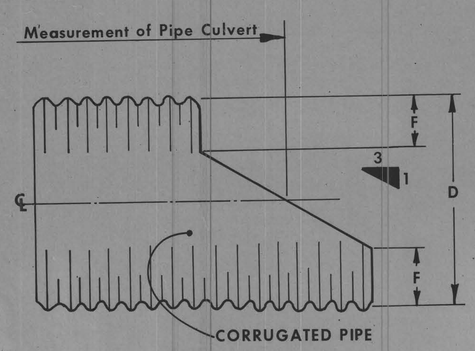
Price bid for "Metal Aprons" shall be considered full compensation for fabrication and installation of metal aprons as indicated hereon.

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

Where the corrugated metal apron is to be used with bituminous coated corrugated metal pipe culverts, the pipe portion (Dimension "M") of this apron shall be bituminous coated, same as the culvert.



FULL



STEP

BEVELED ENDS FOR CORRUGATED METAL PIPE

BEVEL 3:1	
D	F
54"	3"
60"	6"
66"	9"
72"	12"
78"	15"
84"	18"

NOTE:
When specifically required as part of detail project plans, ends of pipe culverts may be provided with beveled ends as shown. Either Full Bevel or Step Bevel may be used unless one type is specified. Unless specified otherwise the slope of the bevel shall be 3:1.

Beveled ends will not be paid for separately but when required shall be considered incidental to the price bid for the culvert.

ADD PIPE DIAMETERS 66" THRU 84"
LAST REVISION | NO. 3 | DATE 1-9-76

DEPARTMENT OF TRANSPORTATION — IOWA

Highway Division

STANDARD ROAD PLAN **RF-5**

RECOMMENDED — ASS'T. ROAD DESIGN ENGINEER — DATE 12-30-75
RECOMMENDED — ROAD DESIGN ENGINEER — DATE 12-30-75
APPROVED — DEPUTY CHIEF ENGINEER — DATE 12-30-75

METAL PIPE APRONS AND BEVELED ENDS

DESIGN NO. 1777 | FILE NO. 50622 | CRAWFORD COUNTY

PROJECT NUMBER	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
RS-3210(I)--61-24	IOWA	5	1977	4	5

ALUMINUM ROUND PIPE

① 2 2/3" × 1/2" CORRUGATIONS

DIAM. OF PIPE D (INCHES)	MIN. COVER ABOVE PIPE (INCHES)	(H) MAXIMUM ALLOWABLE COVER-FEET									
		(0.060")		(0.075)		(0.105")		(0.135")		(0.164")	
		Round	Elong	Round	Elong	Round	Elong	Round	Elong	Round	Elong
12	12	38	—	38	—	—	—	—	—	—	—
15	12	29	—	30	—	—	—	—	—	—	—
18	12	21	—	23	—	—	—	—	—	—	—
24	12	14	—	16	—	—	—	—	—	—	—
30	12	—	—	13	26	14	28	—	—	—	—
36	12	—	—	12	23	12	24	—	—	—	—
42	18	—	—	—	—	11	22	12	23	—	—
48	18	—	—	—	—	11	22	11	22	—	—
54	18	—	—	—	—	11	21	11	21	—	—
60	18	—	—	—	—	—	—	11	21	11	21
66	18	—	—	—	—	—	—	—	—	10	20
72	18	—	—	—	—	—	—	—	—	10	20

STEEL ROUND PIPE

② 3" × 1" CORRUGATIONS

DIAM OF PIPE D (INCHES)	MIN. COVER ABOVE PIPE (INCHES)	(H) MAXIMUM ALLOWABLE COVER-FEET									
		16 GA. (0.064")		14 GA. (0.079")		12 GA. (0.109")		10 GA. (0.138")		8 GA. (0.168")	
		Round	Elong	Round	Elong	Round	Elong	Round	Elong	Round	Elong
36	12	27	40	31	50	40	74	—	—	—	—
42	12	21	34	23	42	29	58	—	—	—	—
48	12	17	30	19	37	23	46	—	—	—	—
54	12	15	27	16	32	19	38	—	—	—	—
60	12	13	24	15	29	16	33	—	—	—	—
66	12	13	22	13	27	15	30	—	—	—	—
72	12	12	20	12	25	14	27	—	—	—	—
78	12	12	18	12	23	13	26	—	—	—	—
84	12	—	—	12	21	12	24	13	26	—	—
90	12	—	—	—	—	12	24	12	35	13	26
96	12	—	—	—	—	11	23	12	24	12	25
102	24	—	—	—	—	—	—	12	23	12	24
108	24	—	—	—	—	—	—	—	—	12	23
114	24	—	—	—	—	—	—	—	—	11	23
120	24	—	—	—	—	—	—	—	—	11	20

STEEL ROUND PIPE

③ 2 2/3" × 1/2" CORRUGATIONS

DIAM. OF PIPE D (INCHES)	MIN. COVER ABOVE PIPE (INCHES)	(H) MAXIMUM ALLOWABLE COVER-FEET									
		16 GA. (0.064")		14 GA. (0.079")		12 GA. (0.109")		10 GA. (0.138")		8 GA. (0.168")	
		Round	Elong	Round	Elong	Round	Elong	Round	Elong	Round	Elong
12	12	70	—	76	—	—	—	—	—	—	—
15	12	56	—	61	—	—	—	—	—	—	—
18	12	40	—	48	—	64	—	—	—	—	—
24	12	23	—	26	—	33	—	—	—	—	—
30	12	—	—	18	30	22	43	25	51	—	—
36	12	—	—	15	25	17	33	19	38	—	—
42	12	—	—	—	—	14	28	16	31	17	34
48	12	—	—	—	—	13	25	14	27	15	29
54	12	—	—	—	—	12	24	13	25	13	26
60	12	—	—	—	—	—	—	12	23	12	25
66	12	—	—	—	—	—	—	11	22	12	23
72	12	—	—	—	—	—	—	11	17	11	21
78	12	—	—	—	—	—	—	—	—	11	17
84	12	—	—	—	—	—	—	—	—	11	13

GENERAL NOTES:
The maximum allowable cover values indicated hereon for the various kind of pipe culvert installations, are design values based on current ISHC construction specifications(Class "C" Bedding) and other normal conditions.

ntractor may furnish the type of corrugated culvert he chooses so long as the selection conforms to the limits shown only on charts ② or ③. The use of Aluminum Pipe (Chart①) will be allowed only when spcified in contract documents.

Refer to tabulation of culvert installations and other detail project plans as well as appropriate other Standard Road Plans for additional inform ation regarding individual culvert installations.

For culverts shown in Elongated Column, the installation shall be made in accordance with current I.S.H.C. Specifications. Min. Allowable Cover for Roadway Culverts H=2.0.'

DESIGN CRITERIA:
These height of cover tables have been prepared from data in the "AASHO Standard Specifications for Highway Bridges". Section 8 with exceptions only as stated
W=unit weight of Soil= 120 lbs. per cu. ft.

CIRCULAR CORRUGATED METAL PIPE
(A) Seam Strength
(B) Handling and Installation Strength
(C) Failure of conduit wall (buckling)
(D) Deflection or Flattening
K= Soil Stiffness Factor= 0.55
E'= Modulus of passive earth pressure= 400 psi per inch.

SPECIAL NOTE
Special installations may be designed to exceed indicated maximum allow able cover by specific modification of on one or more of the following conditions:
1. Bedding Class
2. Pipe Strength (including special design pipe)
3. Type of backfill or cover material
4. Compaction requirements for backfill or cover material
5. Controlled trench width

Where site conditions favor such modifications significant economy may result from special design installations and these should be considered. Special designs shall specify particular modifications of construction requirements or design criteria as applicable. Necessary modifications of normal requirements will not ordinarily be paid for separately but will be included in the price bid for that culvert pipe.

Change General Notes
LAST REVISION NO. 1 DATE 6-8-73

DEPARTMENT OF TRANSPORTATION IOWA

Highway Division

STANDARD ROAD PLAN **RF-32**

John C. Hocker 12-1-71
ASS'T ROAD DESIGN ENGINEER DATE

RECOMMENDED
H. P. McLaughlin 12-1-71
ROAD DESIGN ENGINEER DATE

APPROVED
R. H. Auer 12-2-71
DEPUTY CHIEF ENGINEER DATE

DEPTH OF COVER TABLES FOR CORRUGATED METAL PIPE

DESIGN NO. 1777 FILE NO. 50622 CRAWFORD COUNTY

PROJECT NUMBER	STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
RS-3210(I)--61-24	IOWA	5	1977	5	5