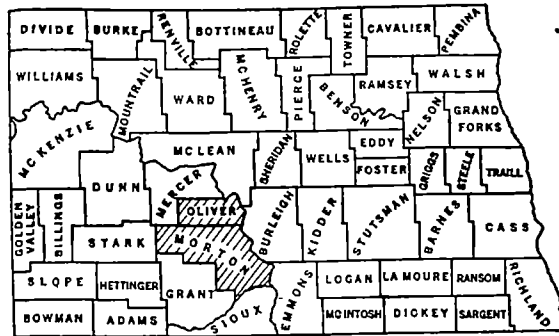
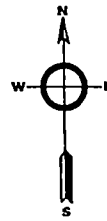




SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES



SCALES { LAYOUT SHEET: 1" = 5280 FT.
PLAN AND PROFILE DRAWINGS: 1" = 100 FT.
STRUCTURAL DRAWINGS: AS SHOWN
CROSS SECTION SHEETS: 1" = 10 FT.

NORTH DAKOTA STATE HIGHWAY DEPARTMENT

31-089.531

PLANS FOR THE PROPOSED IMPROVEMENT OF A STATE HIGHWAY IN OLIVER & MORTON COUNTIES FEDERAL AID PROJECT NO. ROS-1-031(02)086 STRUCTURAL & INCIDENTALS

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
ROS-1-031(02)086	8.283	.029
TOTALS	8.283	.029

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

DESIGN DATA

TRAFFIC AVERAGE DAILY EST. 30TH MAX. HR.

CURRENT TRAFFIC (1971) 450 PASS. 100 TRUCKS 550 TOTAL 75
TRAFFIC FORECAST (1991) 770 PASS. 180 TRUCKS 950 TOTAL 130

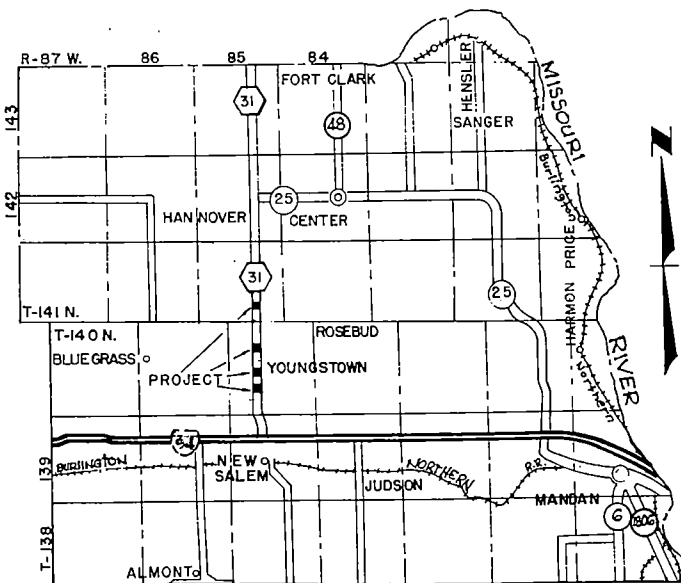
DESIGN SPEED 60 MPH

TRAFFIC CLASSIFICATION M

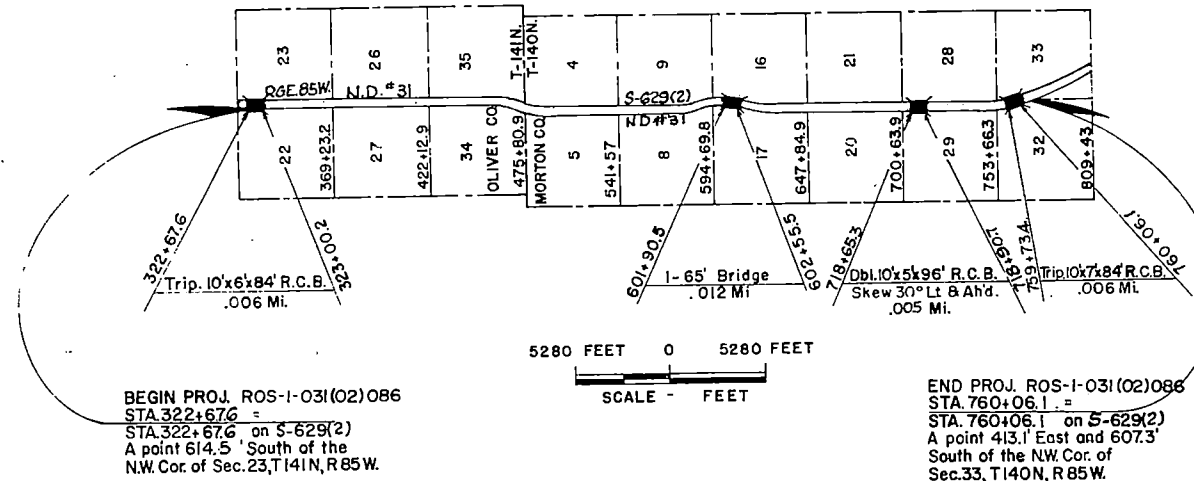
MINIMUM SIGHT DISTANCE (STOPPING) 475
MINIMUM SIGHT DISTANCE (SAFE PASSING) 2300
MINIMUM PASSING SIGHT DISTANCE FOR MARKING 1000

STA. DESIGN LOADING

322+83.9 TRPL 10' X 6' RCB HS 20
602+23.0 BRIDGE 36' CLEAR RDWY. HS 20
718+78.0 DBL 10' X 5' RCB HS 20
759+89.7 TRPL 10' X 7' RCB HS 20 SIG



SKETCH MAP OF OLIVER AND MORTON COUNTIES



P.S. & E. Changes made
November 17, 1971

APPROVED DATE 3/1/76

CHIEF ENGINEER
NORTH DAKOTA STATE
HIGHWAY DEPARTMENT

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ENGINEER

DATE

ROS-1-031(02)086

INSTALL R.C.B. CULVERT

Sta. 322+83.9 ±
 Triple 10'x6'x8' R.C.B. (42' Lt. 42' Rt.)
 Excavation Class I 788 C.Y.
 Foundation Fill 448 C.Y.
 Concrete Class AE-3 252.4 C.Y.
 Reinforcing Steel (Grade 40) 35,181 Lbs.
 Dampproofing 2 Coats 29.0 Sq. Yds.
 Dwg. Nos. 330106-1, 330106-2

REMOVE EXISTING STRUCTURE

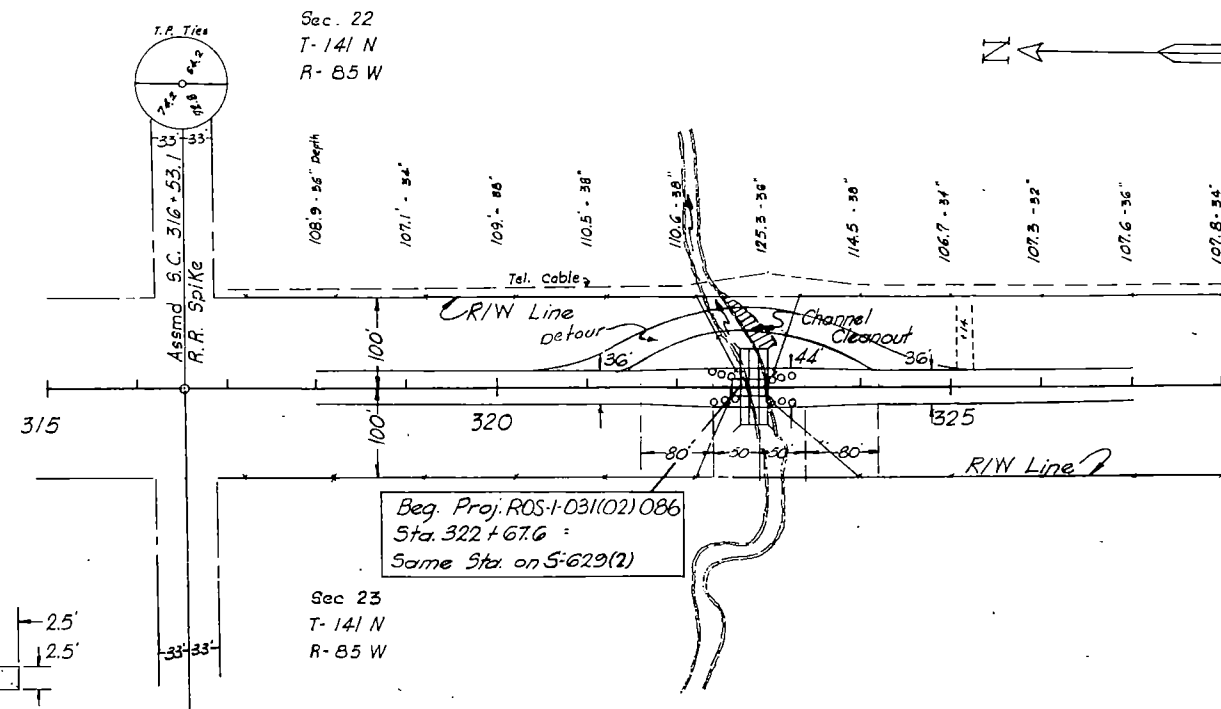
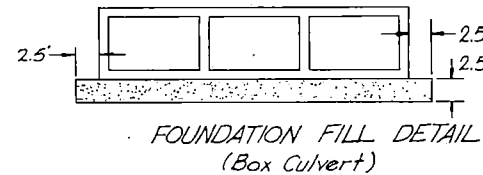
322+84 ± Lump Sum

ROS-1-031(02)086 S

BENCH MARKS			
NO.	DESCRIPTION	LOCATION	ELEV.
A	Inbed Rock	319+50-155' Rt.	100.0'
A-1	Point Spot	N.E. Bolt on Bridge	104.17'

HYDRAULIC DATA

Drainage Area 15.0 Sq. Miles
 Design Runoff 1760 C.F.S.
 Design Stage 99.9
 Design Frequency 50 Yrs.
 Outlet Velocity 103 FPS.
 Max. Recorded Stage 100.6
 Date of Max Stage 1966
 100-Yr Frequency Dischge. 2218 cfs
 100-Yr Frequency Stage 102.0



INSTALL TEMP BYPASS
 322+83.9 Lt. Lump Sum

322+84 ±
 34.5' Timber Bridge
 22' Clear Roadway
 (Remove & Salvage)

322+66.7 Beg. Bridge
 323+01.2 End Bridge

Note: See Note No. 15, & 11

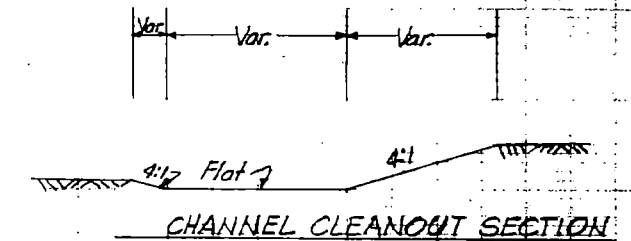
318+00

Cl. 1 Exc. 788 C.Y. (Waste)
 Exc. 325 C.Y. (Ch.) (Use)
 Borrow 4914 C.Y.
 Emb. 5239 C.Y.

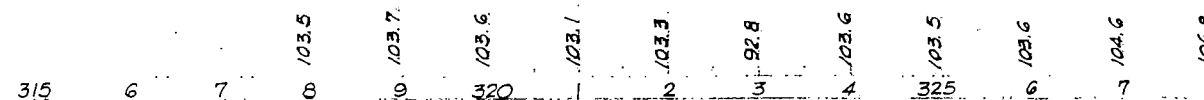
326+00

Clearing & Grubbing
 Sta. 318+00 to 326+00
 Approx. 967 Cu. Yds.

322+83.9 Lt.
 Exc. 325 C.Y. for
 Channel Cleanout.



Found. Fill (2.5')
 In 92.1 Rt.
 Out 91.9 Lt.
 322+83.9 ±
 Triple 10'x6'x8' R.C.B.



CONCRETE FORMULAS	
Entire Floor	$L \times 1.107 + 20.15$
2 Side Walls & 4 Wings	$L \times 0.272 + 7.21$
2 Inner Walls	$L \times 0.272 + 1.37$
Entire Roof	$L \times 0.985 + 2.21$
Total	$L \times 2.636 + 30.94$
DAMPPROOFING FORMULAS	
For	$1.296 + 4.0 = 5.296$

* Same replacement bar to be spaced to bar from which 2'-0" sample has been cut. (Not Pay Item)

BAR LIST (CONSTANT)

MARK	SIZE	NO.	LENGTH	SHAPE
A1	6	4	36'-0"	Str.
A2	4	4	11'-6"	Bent
A3	4	12	17'-0"	Str.
C1-C11	4	4 Sets	94'-3"	Bent
C12	4	4	9'-6"	"
C13	4	4	9'-8"	"
C14	4	4	9'-10"	"
C15	4	4	10'-0"	"
F5	4	8	34'-0"	Str.
F6	5	16	11'-9"	"
F7	4	8	34'-0"	"
F8	6	16	6'-0"	"
H1	7	16	13'-9"	Str.
H2	4	8	5'-6"	"
H3	4	8	10'-0"	"
H4	4	16	13'-0"	"
H5	4	96	6'-0"	Bent
H6	4	8	6'-0"	Str.
O1	4	4	3'-3"	Str.
O2	4	8	3'-9"	"
O3	4	8	4'-9"	"
O4	4	8	6'-0"	"
O5	4	8	7'-0"	"
P1	4	66	4'-0"	Bent
P2	4	8	19'-9"	"
P3	4	42	7'-3"	"
P4	4	8	5'-6"	"
P5	4	8	7'-0"	Str.
T2	4	54	5'-6"	Str.
T3	4	8	4'-6"	"
T4	4	8	3'-6"	"
V5	4	8	4'-8"	Str.
V6	4	8	3'-3"	"
V7	4	8	2'-0"	"
W1	4	12	4'-8"	Bent
W2	4	12	5'-9"	"
W3	4	12	6'-10"	"
W4	4	8	7'-11"	"
W5	4	8	8'-6"	"
W6	4	4	9'-0"	"

W6 8'-4"
W5 7'-10"
W4 7'-3"
W3 6'-2"
W2 5'-11"
W1 4'-0"

W1 TO W6 BARS

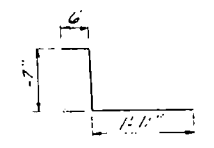
C1 TO C11 BARS

C12 TO C15 BARS

V1 TO V3 BARS

3766*

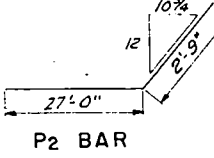
BENT BAR DETAILS



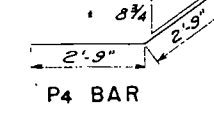
P1 BAR



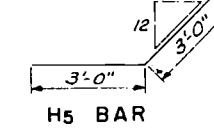
P3 BAR



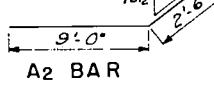
P2 BAR



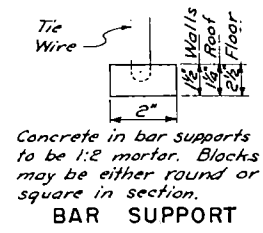
P4 BAR



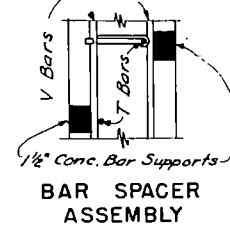
H5 BAR



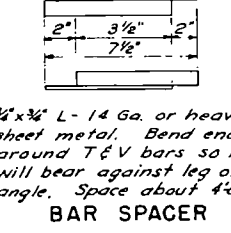
A2 BAR



BAR SUPPORT

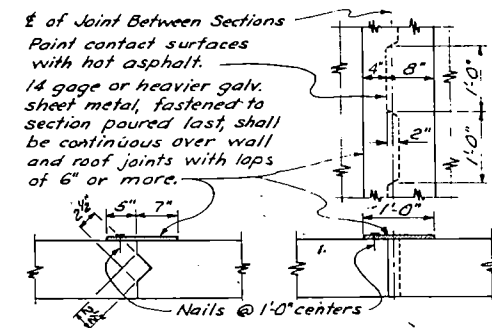


BAR SPACER ASSEMBLY

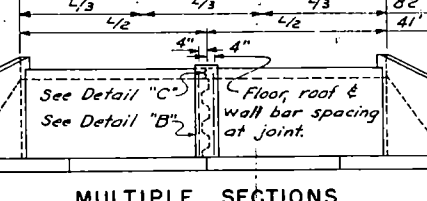


BAR SPACER

BAR SUPPORT DETAILS



DETAIL 'C'

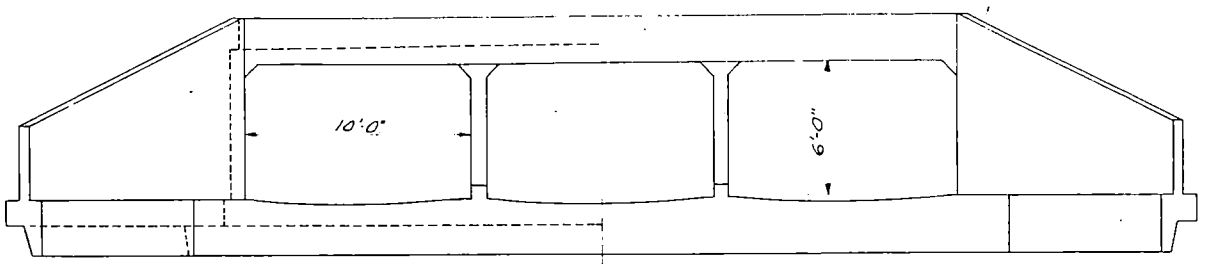


DETAIL 'B'

MULTIPLE SECTIONS

Use only when 'L' exceeds 40 feet

CONTRACTION OR DEFLECTION JOINT



END VIEW

DAMPPROOFING:
Two coats of dampproofing shall be applied over the entire length of the construction joints at the top and bottom of walls (outside surfaces only) as shown on the details.
Dampproofing Two Coats will be applied, measured and paid for in accordance with Section 736 of the Standard Specifications.

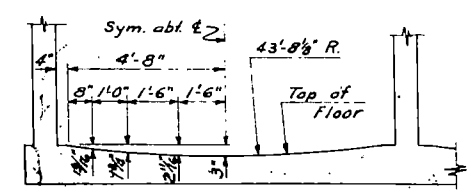
CONSTRUCTION NOTES

REINFORCEMENT:
The transverse and vertical bars shall always be placed nearest the surface. The longitudinal temperature or tie bars shall be placed immediately inside of the vertical and transverse bars and the intersections wired.
When the distance between end bars is not evenly divisible by the bar spacing, the odd distance shall be adjusted by a few irregular spaces near the center, not at the ends of the culvert or section of culvert.
The clear distance from the nearest bar to the surface of the concrete shall be as follows:
Bottom of floor slab 2 1/2" Clear
Bottom of wing footing 2 1/2" Clear
Top of floor slab 2" Clear
Top of wing footing 2 1/2" Clear
All walls 1 1/2" Clear
Bottom of roof slab 1 1/2" Clear
Top of roof slab 1 1/2" Clear

CONCRETE:
All concrete shall be Class AE-3 and shall be compacted by vibration.
The following elements of each section shall be poured in one continuous run:
Floor slab and wing footings.
Each intermediate wall up to bottom of fillets.
Each side wall up to bottom of fillets with its adjacent wings complete to top.
Roof slab and parapets.
All exposed edges of concrete shall be beveled with 3/4" triangular molding.
The concrete in the walls shall be allowed to set at least two (2) hours before the roof slab is poured.
Unsuitable foundation material shall be removed and replaced with suitable backfill. This backfill will be paid for at the contract price bid for 'Foundation Fill'.

DESIGN LOADING HS20-44 SERIES OF 1951

QUANTITIES FOR ONE CULVERT	
LENGTH CONCRETE REINFORCING STEEL	LENGTH CONCRETE REINFORCING STEEL
FEET CU. YD. LBS.	FEET CU. YD. LBS.
44	146.9
56	178.6
57	181.2
58	183.8



OFF-SETS FOR CURVED FLOOR

BAR LIST (VARIABLE)	
MARK	SIZE
F1	4
F2	5
F3	6
F4	6
S1	6
S2	5
S3	5
V1	4
V2	5
V3	4
V4	4
T1	4

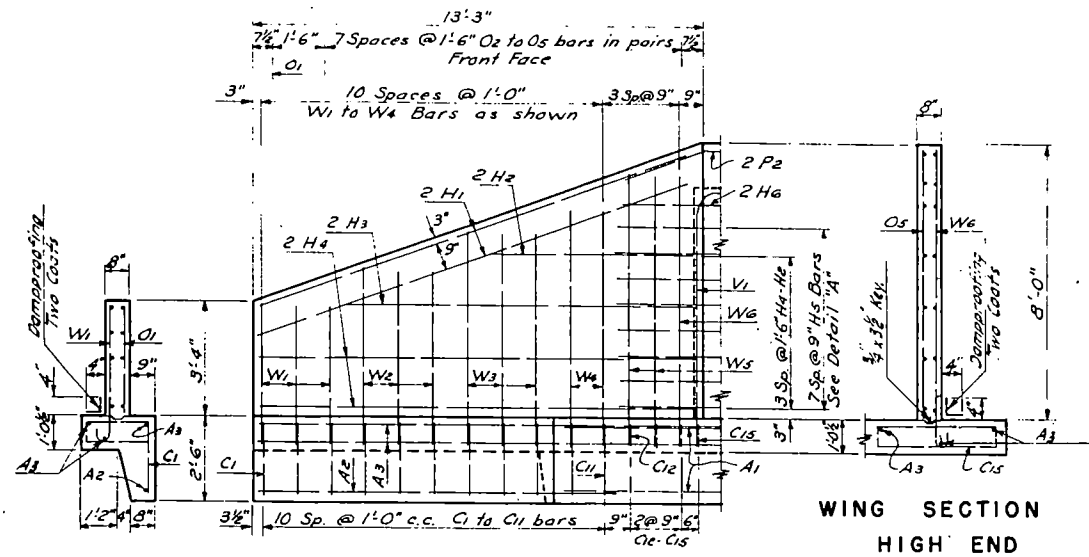
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
STANDARD
REINFORCED CONCRETE
TRIPLE BOX CULVERT
CLEAR SPAN 3x10' CLEAR HEIGHT 6'
MAXIMUM FILL 5'

APPROVED Dec. 9, 1954
APPROVED Dec. 9, 1954

33010

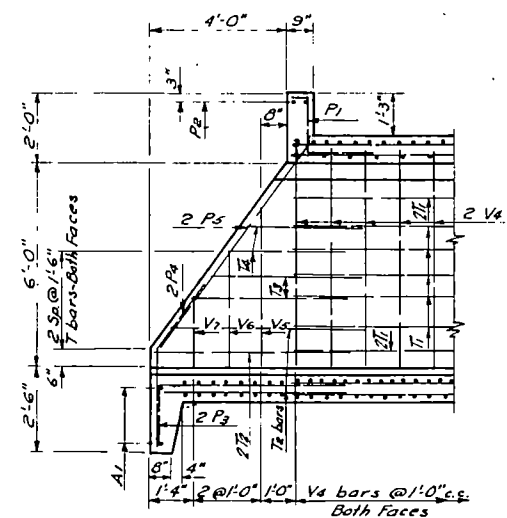
330106

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	RDS-1-031(02)006	10		



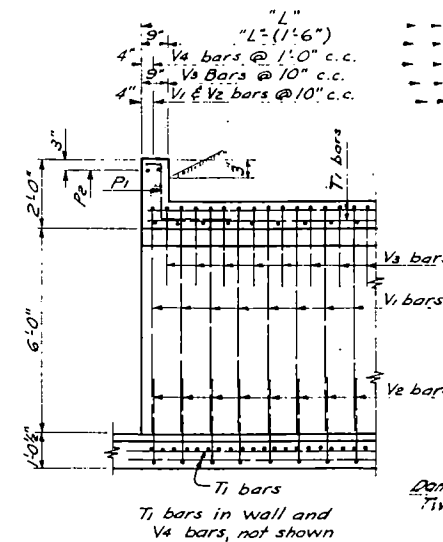
WING ELEVATION

WING SECTION
HIGH END

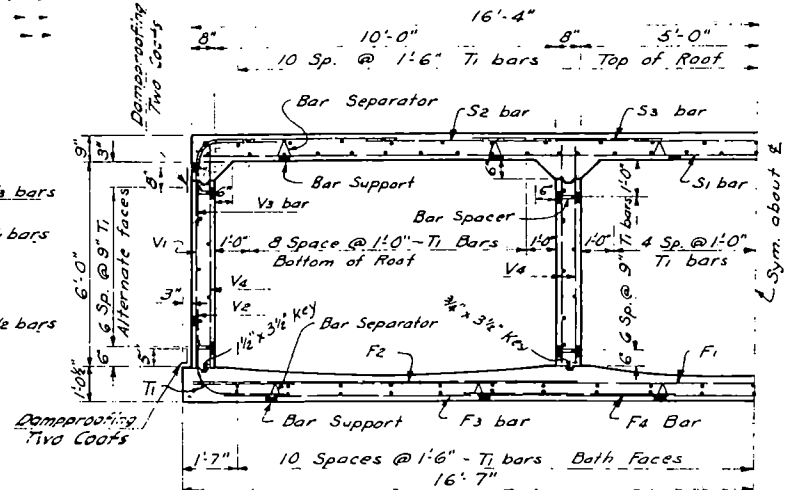


INNER WALL

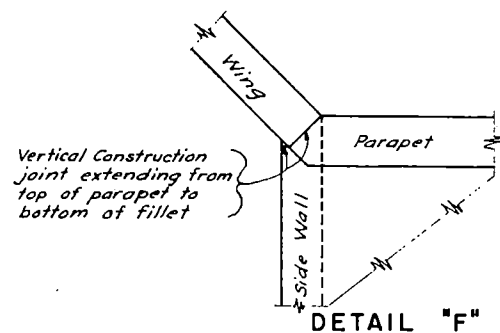
LONGITUDINAL BARREL SECTIONS



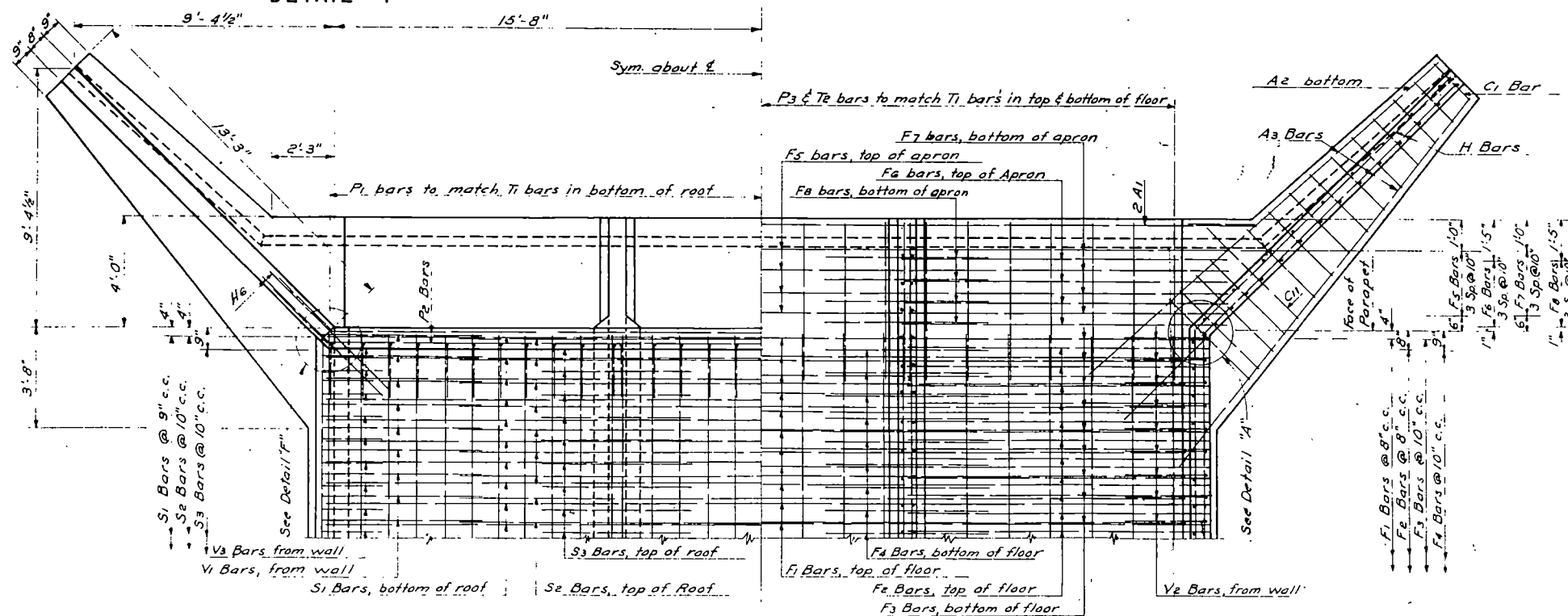
OUTER WALL



SECTION OF BARREL
130 T1 Bars Per Section

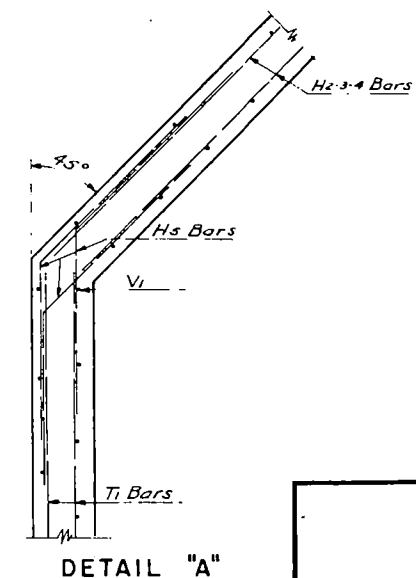


DETAIL "F"



PART PLAN OF ROOF

PART PLAN OF FLOOR



DETAIL "A"

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT
STANDARD
REINFORCED CONCRETE
TRIPLE BOX CULVERT
CLEAR SPAN 3X10' CLEAR HEIGHT 6'
MAXIMUM FILL 5'

APPROVED Dec. 9, 1954
APPROVED Dec. 9, 1954