MINNESOTA DEPARTMENT OF TRANSPORTATION

THE COUNTY OF OLMSTED

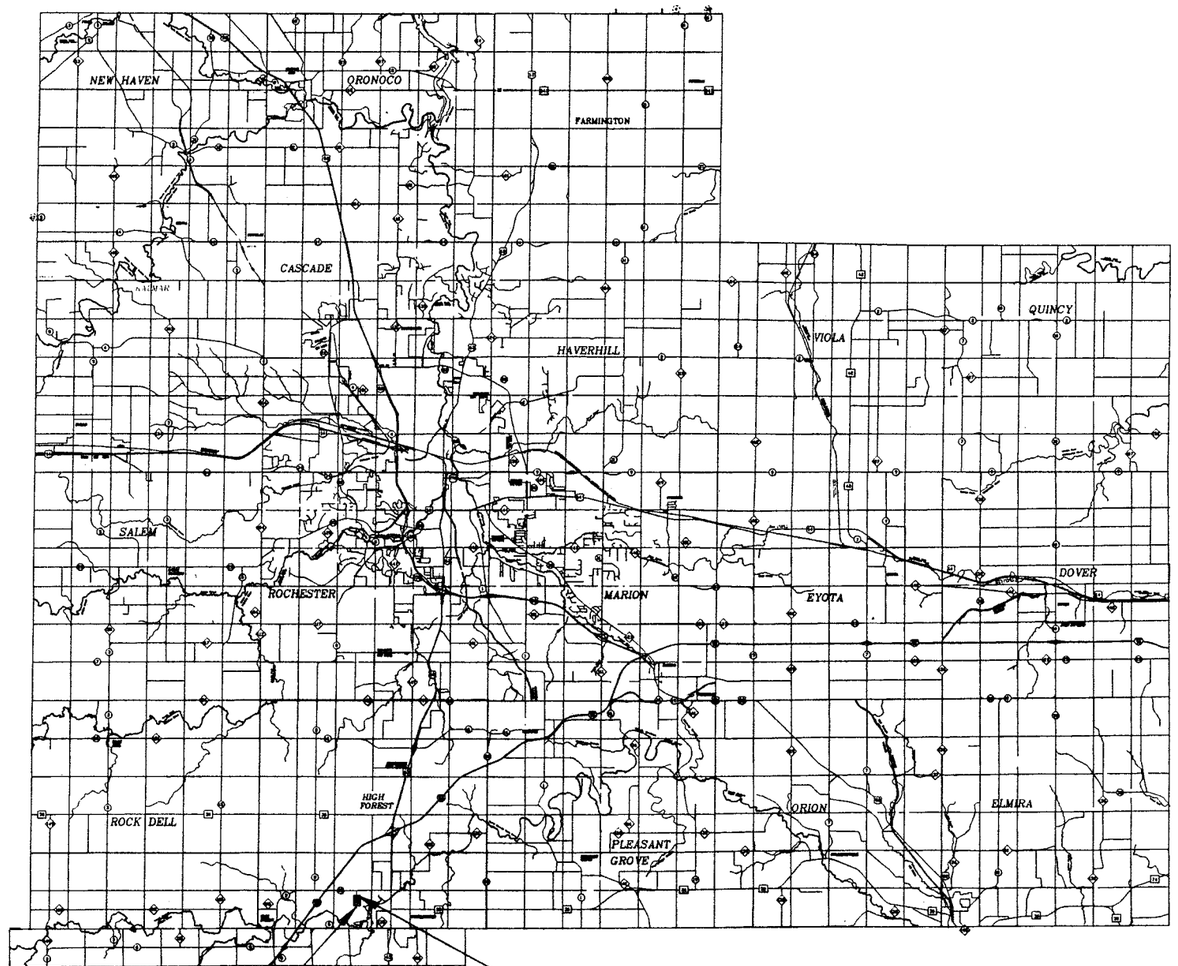
CONSTRUCTION PLAN FOR GRADING & CONCRETE BOX CULVERT (NO.55J10)

LOCATED ON HIGH FOREST TWP. RD., 11TH AVE. N.W. BETWEEN C.S.A.H. 35 AND 1/3 MILE SOUTH (DEAD END ROAD) (GEOGRAPHIC DESCRIPTION)

FROM 347.93 FT. E. & 1608.38 FT. S. OF N.W. COR. SEC. 33, T105N, R14W TO 347.93 FT. E. & 608.38 FT. S. OF N.W. COR. SEC. 33, T105N, R14W (LEGAL DESCRIPTION)

55-599-65

S.A.P. NO.					S.A.P. NO.		
GROSS LENGTH	1000	FEET	0.19	MILES	GROSS LENGTH	FEET	MILES
BRIDGE-LENGTH	0	FEET	0	MILES	BRIDGE-LENGTH	FEET	MILES
EXCEPTIONS-LENGTH	0	FEET	0	MILES	EXCEPTIONS-LENGTH	FEET	MILES
NET LENGTH	1000	FEET	0.19	MILES	NET LENGTH	FEET	MILES



BEGIN: 55-599-65 STA. 3+00

END: 55-599-65 STA. 13+00

PLAN SYMBOLS

STATE LINE
COUNTY LINE
TOWNSHIP OR RANGE LINE
SECTION LINE
QUARTER LINE
SIXTEENTH LINE
RIGHT-OF-WAY LINE
PRESENT RIGHT-OF-WAY LINE
CONTROL OF ACCESS LINE
PROPERTY LINE (Except Land Lines)
VACATED PLATTED PROPERTY
CORPORATE OR CITY LIMITS
TRUNK HIGHWAY CENTER LINE
RETAINING WALL
RAILROAD
RAILROAD RIGHT-OF-WAY
RIVER OR CREEK
DRY RUN
DRAINAGE DITCH
DRAIN TILE
CULVERT
DROP INLET
GUARD RAIL
BARBED WIRE FENCE
WOVEN WIRE FENCE
CHAIN LINK FENCE
RAILROAD SNOW FENCE
STONE WALL OR FENCE
HEDGE
RAILROAD CROSSING SIGN
RAILROAD CROSSING BELL
ELECTRIC WARNING SIGN
CROSSING GATE
MEANDER CORNER
SPRINGS
MARSH
TIMBER, ORCHARD, BRUSH, NURSERY
CATCH BASIN
FIRE HYDRANT
CATTLE GUARD
OVERPASS (HIGHWAY OVER)
UNDERPASS (HIGHWAY UNDER)
BRIDGE
BUILDING (ONE STORY FRAME)
F - FRAME C - CONCRETE
S - STONE T - TILE
B - BRICK ST - STUCCO
IRON PIPE OR ROD
MONUMENT (STONE, CONCRETE, OR METAL)
WOODEN HUB
GRAVEL PIT
SAND PIT
BORROW PIT
ROCK QUARRY
SLOPE EASEMENT

UTILITIES SYMBOLS

POWER POLE LINE
TELEPHONE OR TELEGRAPH POLE LINE
JOINT TELEPHONE AND POWER ON POWER POLE
ON TELEPHONE POLES
ANCHOR
STEEL TOWER
STREET LIGHT
PEDESTAL (TELEPHONE CABLE TERMINAL)
GAS MAIN
WATER MAIN
CONDUIT
TELEPHONE CABLE IN CONDUIT
ELECTRICAL CABLE IN CONDUIT
TELEPHONE MANHOLE
ELECTRICAL MANHOLE
BURIED TELEPHONE CABLE
BURIED ELECTRICAL CABLE
AERIAL TELEPHONE CABLE
SEWER (SANITARY OR SEWER)
SEWER MANHOLE

EROSION CONTROL SYMBOLS

TEMPORARY SILT FENCE
RIP RAP DITCH CHECKS

SCALES

PLAN 0 50'
PROFILE 0 50' HORIZ. 0 10' VERT.
INDEX MAP 0 10560'
CROSS SECTIONS 0 10'

MINN. PROJ. NO.

GOVERNING SPECIFICATIONS

THE 1988 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION 'STANDARD SPECIFICATIONS FOR CONSTRUCTION' AS AMENDED BY THE MAY 2, 1994, SUPPLEMENTAL SPECIFICATION SHALL GOVERN.

INDEX

SHEET NO. 1	TITLE SHEET
SHEET NO. 2	ESTIMATE OF QUANTITIES & TYP. SECTION
SHEET NO. 3	PLAN & PROFILE
SHEET NO. 4 & 5	CROSS SECTIONS
SHEET NO. 6	BRIDGE SHEET
SHEET NO. 7 - 10	DETAIL DRAWING FOR BOX CULV.
SHEET NO. 11	TRAFFIC CONTROL

THIS PLAN CONTAINS 11 SHEETS.

Approved 10/1/96 1996 TWP. CHAIRPERSON

DESIGN DESIGNATION

R ΣN18 (20)
ADT (Current Year) = <50 (1996) Design Speed 35 MPH
ADT (Future Year) = <50 (2016) Based on STOPPING Sight Distance
DHV (Design Hr. Vol.) = Height of eye 3.5 Height of object 0.5
D (Directional Distr.) = Design Speed not achieved at:
T (Heavy Commercial) = STA. TO STA. MPH
SUBGRADE = STA. TO STA. MPH
SHOULDER WIDTH = 1 FT.

SOIL FACTOR = 130%

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

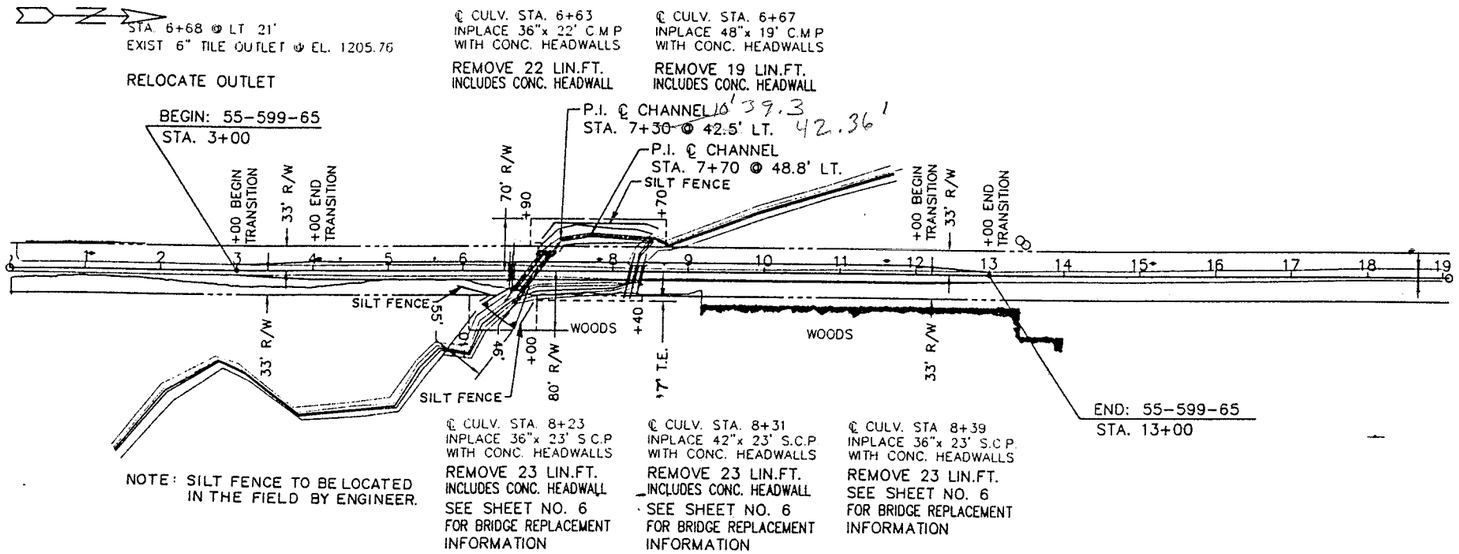
DATE 9/30/96 REG. NO. 19917 ENGR Kayer M Beemsterboer
COUNTY OLMSTED

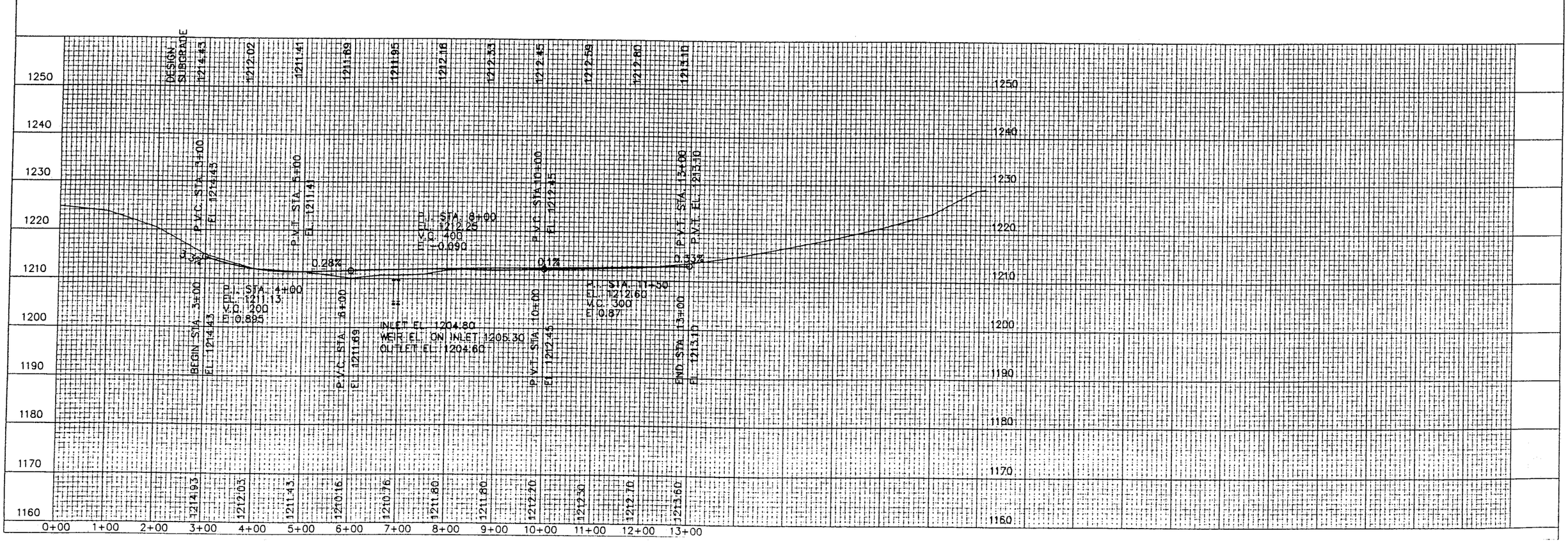
Approved 9/30 1996 Michael J Sheehan OLMSTED COUNTY ENGINEER

Recommended for Approval M G Pinnt 10/2/96 DISTRICT STATE AID ENGINEER

Approved 11/18 1996 Julie Stallman for STATE AID ENGINEER

55J10


STA 6+68 @ LT 21'
EXIST 6" TILE OUTLET @ EL. 1205.76
RELOCATE OUTLET
BEGIN: 55-599-65
STA. 3+00
+00 BEGIN TRANSITION
33' R/W
+00 END TRANSITION
℄ CULV. STA. 6+63
INPLACE 36"x 22' C.M.P
WITH CONC. HEADWALLS
REMOVE 22 LIN.FT.
INCLUDES CONC. HEADWALL
℄ CULV. STA. 6+67
INPLACE 48"x 19' C.M.P
WITH CONC. HEADWALLS
REMOVE 19 LIN.FT.
INCLUDES CONC. HEADWALL
P.I. ℄ CHANNEL
STA. 7+30 @ 42.5' LT.
P.I. ℄ CHANNEL
STA. 7+70 @ 48.8' LT.
70' R/W
+90
+70
SILT FENCE
+00 BEGIN TRANSITION
33' R/W
+00 END TRANSITION
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
SILT FENCE
55'
10'
45'
WOODS
+40
WOODS
33' R/W
33' R/W
+00
80' R/W
17' T.E.
SILT FENCE
END: 55-599-65
STA. 13+00
NOTE: SILT FENCE TO BE LOCATED
IN THE FIELD BY ENGINEER.
℄ CULV. STA. 8+23
INPLACE 36"x 23' S.C.P
WITH CONC. HEADWALLS
REMOVE 23 LIN.FT.
INCLUDES CONC. HEADWALL
SEE SHEET NO. 6
FOR BRIDGE REPLACEMENT
INFORMATION
℄ CULV. STA. 8+31
INPLACE 42"x 23' S.C.P
WITH CONC. HEADWALLS
REMOVE 23 LIN.FT.
INCLUDES CONC. HEADWALL
SEE SHEET NO. 6
FOR BRIDGE REPLACEMENT
INFORMATION
℄ CULV. STA 8+39
INPLACE 36"x 23' S.C.P.
WITH CONC. HEADWALLS
REMOVE 23 LIN.FT.
SEE SHEET NO. 6
FOR BRIDGE REPLACEMENT
INFORMATION


DESIGN SUBGRADE
1214.43
1212.02
1211.41
1211.69
1211.95
1212.16
1212.33
1212.45
1212.58
1212.80
1213.10
P.V.C. STA. 3+00
EL. 1214.43
P.V.T. STA. 5+00
EL. 1211.41
P.V.C. STA. 8+00
EL. 1211.69
P.V.C. STA. 10+00
EL. 1212.45
P.V.T. STA. 13+00
EL. 1213.10
BEGIN STA. 3+00
EL. 1214.43
END STA. 13+00
EL. 1213.10
WEIR EL. ON INLET 1205.30
OUTLET EL. 1204.60
1214.93
1212.03
1211.43
1210.16
1210.76
1211.80
1211.80
1212.20
1212.30
1212.70
1213.60
0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00
1250 1240 1230 1220 1210 1200 1190 1180 1170 1160

ESTIMATED QUANTITIES

	SPECIFICATION NO.	ITEM	UNIT	NON PARTICIPATING	PARTICIPATING	TOTAL ESTIMATED QUANTITIES
	2101.511	CLEAR AND GRUBBING	LUMP SUM	1		1
①	2104.501	REMOVE PIPE CULVERT	LIN. FT.	110		110
②	2105.515	UNCLASSIFIED EXCAVATION	CU. YD.	367		367(P)
	2105.523	COMMON BORROW (CV)	CU. YD.	1351		1351(P)
	2412.511	12'x 5' PRECAST CONC. BOX CULV. CL. II	LIN. FT.		80	80
③	2412.512	12'x 5' PRECAST CONC. BOX CULVERT END SECTION	EACH		4	4
	2451.507	GRANULAR BEDDING (CV)	CU. YD.		61	61(P)
④	2502.521	6" TP PIPE DRAIN	LIN. FT.	10		10
⑤	2511.501	RANDOM RIPRAP CL. III	CU. YD.		139	139
⑥	2573.502	SILT FENCE TYPE HEAVY DUTY MAINTAINED	LIN. FT	280		280

QUANTITY NOTES:

① INCLUDES REMOVAL OF CONCRETE HEADWALLS.

② INCLUDES 237 CU. YDS. FOR CHANNEL CHANGE ON INLET END.

③ WEIR CONSTRUCTION WILL BE CONSIDERED INCIDENTAL AND WILL BE INCLUDED FOR PAYMENT UNDER UNIT PRICE 2412.512 FOR 12'x 5' PRECAST CONC. END SECTION.

④ PAYMENT FOR 6" TP PIPE DRAIN SHALL BE FULL COMPENSATION FOR RELOCATION OF EXISTING TILE OUTLET AND ALL OTHER ASSOCIATED WORK.

⑤ PLACE RIPRAP ON 9" GRANULAR FILTER OR GEOTEXTILE MATERIAL WHICH SHALL BE CONSIDERED INCIDENTAL AND NO DIRECT COMPENSATION WILL BE MADE THEREFOR.

⑥ TO BE LOCATED IN THE FIELD BY THE ENGINEER.

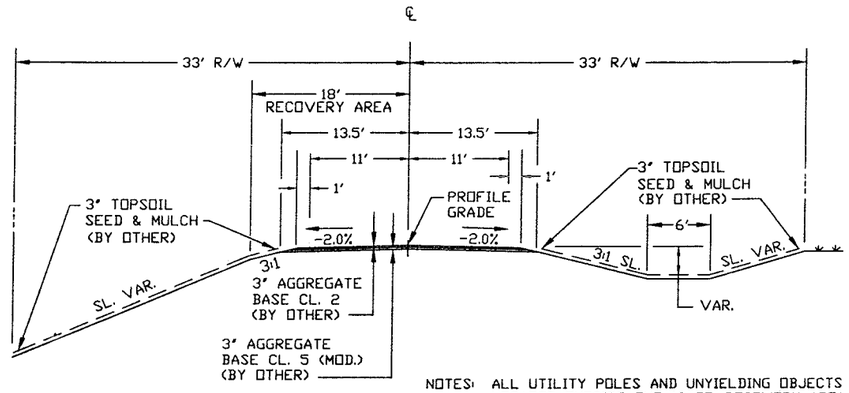
STANDARD PLATES

THE FOLLOWING STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION SHALL APPLY ON THIS PROJECT.

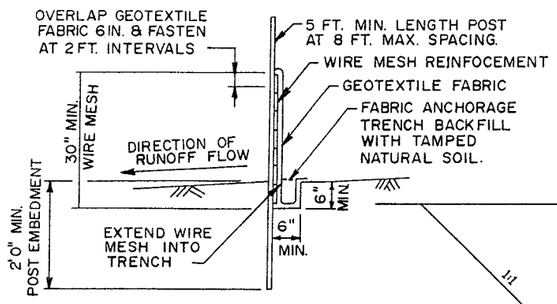
PLATE NO.	DESCRIPTION
	NUMERICAL INDEX OF STANDARD PLATES
3007 B	SHEAR REINFORCEMENT FOR PRECAST DRAINAGE STRUCTURES
3145 E	CONCRETE PIPE TIES
3221 C	CORRUGATED STEEL PIPE COUPLING BAND
8000 I	STANDARD BARRICADES

TYPICAL SECTION

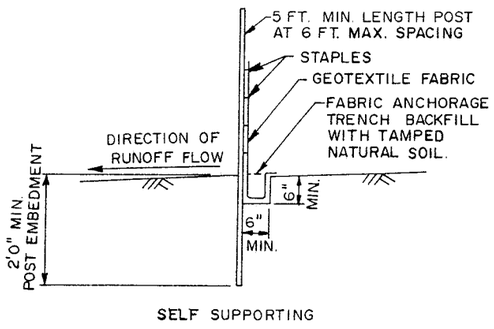
STA. 3+00 TO STA. 13+00



NOTES: ALL UTILITY POLES AND UNYIELDING OBJECTS WILL BE LOCATED OUTSIDE THE 18 FT. RECOVERY AREA BY OTHERS.



HEAVY DUTY

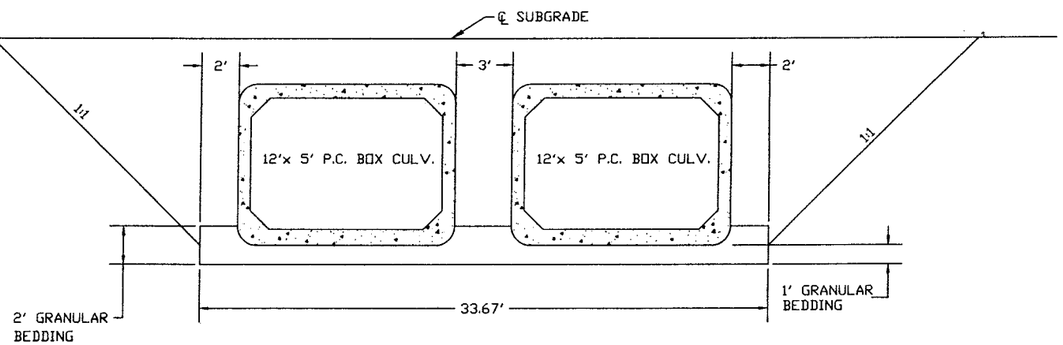


SELF SUPPORTING

SILT FENCE DETAILS

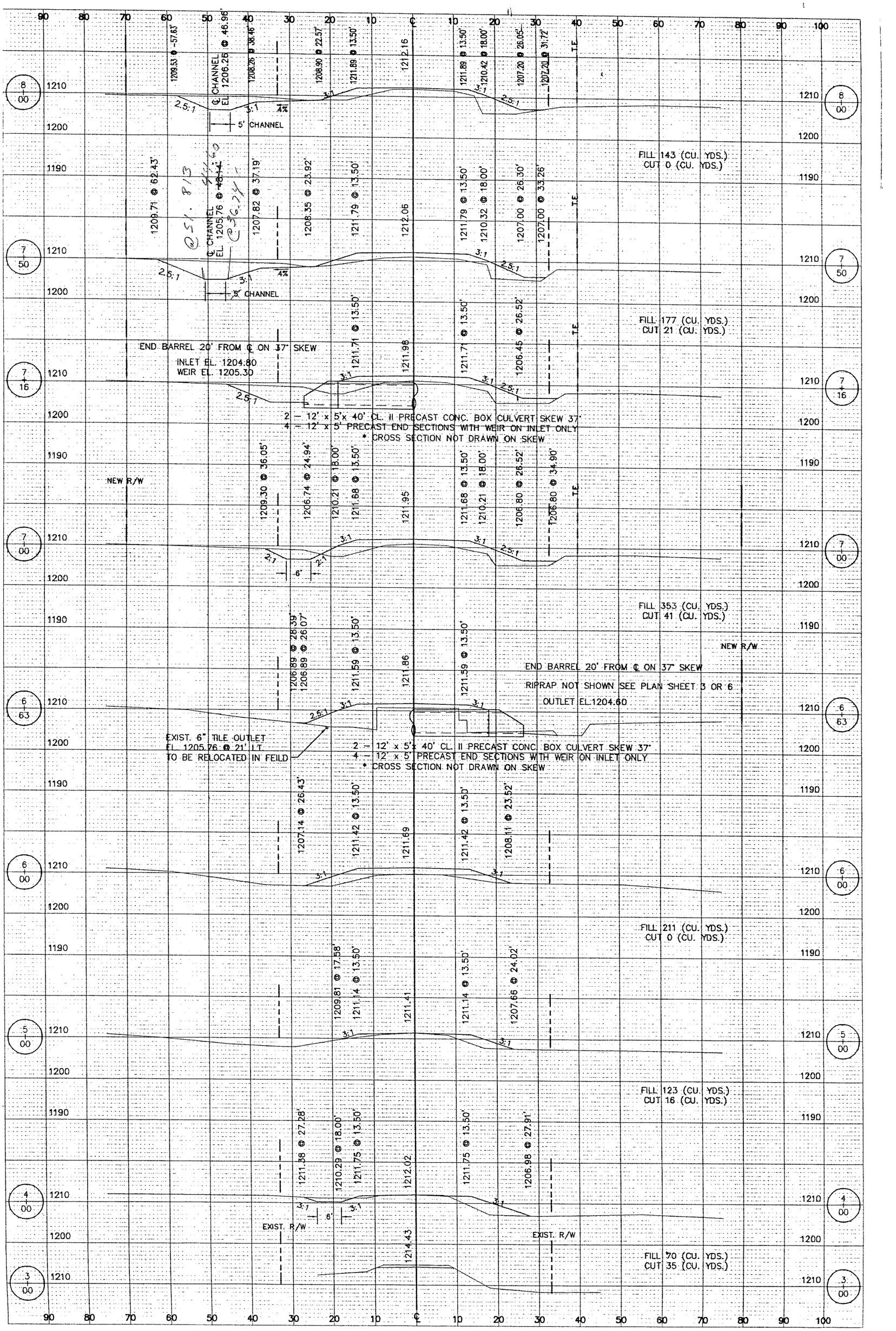
TO PROTECT AREA FROM SHEET FLOW (SEE SPEC 3886)

BEDDING DETAIL



NOTES:

1. CULVERT EXCAVATION WILL BE CONSIDERED INCIDENTAL AND WILL BE INCLUDED FOR PAYMENT UNDER UNIT PRICE FOR ITEM NO. 2412.511 AND ITEM NO. 2412.512.
2. CULVERT TO BE BACKFILLED WITH EXCAVATION MATERIAL AND WILL BE CONSIDERED INCIDENTAL TO UNCLASSIFIED EXCAVATION AND NO DIRECT COMPENSATION WILL BE MADE.
3. ALL DIMENSIONS AND SLOPES SHOWN ON TYPICAL SECTION ARE APPROXIMATE.
4. GRANULAR BEDDING TO BE PLACED UNDER BARREL SECTIONS ONLY.


8+00
1209.53 @ -57.63'
1208.26 @ 38.46'
1208.90 @ 22.57'
1211.89 @ 13.50'
1212.16
1211.89 @ 13.50'
1210.42 @ 18.00'
1207.20 @ 26.05'
1207.20 @ 31.72'
T.E.
℄ CHANNEL EL. 1206.26 @ 46.96'
2.5:1
3:1
4%
5' CHANNEL
FILL 143 (CU. YDS.)
CUT 0 (CU. YDS.)
7+50
1209.71 @ 62.43'
1207.82 @ 37.19'
1208.35 @ 23.92'
1211.79 @ 13.50'
1212.06
1211.79 @ 13.50'
1210.32 @ 18.00'
1207.00 @ 26.30'
1207.00 @ 33.26'
℄ CHANNEL EL. 1205.76 @ 46.13'
FILL 177 (CU. YDS.)
CUT 21 (CU. YDS.)
END BARREL 20' FROM ℄ ON 37° SKEW
INLET EL. 1204.80
WEIR EL. 1205.30
7+16
1211.71 @ 13.50'
1211.98
1206.45 @ 26.52'
2 — 12' x 5' x 40' CL. II PRECAST CONC. BOX CULVERT SKEW 37°
4 — 12' x 5' PRECAST END SECTIONS WITH WEIR ON INLET ONLY
* CROSS SECTION NOT DRAWN ON SKEW
NEW R/W
1209.30 @ 36.05'
1206.74 @ 24.94'
1210.21 @ 18.00'
1211.68 @ 13.50'
1211.95
1211.68 @ 13.50'
1210.21 @ 18.00'
1206.80 @ 26.52'
1206.80 @ 34.90'
7+00
6'
FILL 353 (CU. YDS.)
CUT 41 (CU. YDS.)
NEW R/W
1206.89 @ 28.39'
1206.89 @ 26.07'
1211.59 @ 13.50'
1211.86
1211.59 @ 13.50'
END BARREL 20' FROM ℄ ON 37° SKEW
RIPRAP NOT SHOWN SEE PLAN SHEET 3 OR 6
OUTLET EL.1204.60
6+63
EXIST. 6" TILE OUTLET
EL. 1205.76 @ 21' LT.
TO BE RELOCATED IN FEILD
2 — 12' x 5' x 40' CL. II PRECAST CONC. BOX CULVERT SKEW 37°
4 — 12' x 5' PRECAST END SECTIONS WITH WEIR ON INLET ONLY
* CROSS SECTION NOT DRAWN ON SKEW
1207.14 @ 26.43'
1211.42 @ 13.50'
1211.89
1211.42 @ 13.50'
1208.11 @ 23.52'
6+00
FILL 211 (CU. YDS.)
CUT 0 (CU. YDS.)
1209.81 @ 17.58'
1211.14 @ 13.50'
1211.41
1211.14 @ 13.50'
1207.66 @ 24.02'
5+00
FILL 123 (CU. YDS.)
CUT 16 (CU. YDS.)
1211.38 @ 27.28'
1210.29 @ 18.00'
1211.75 @ 13.50'
1212.02
1211.75 @ 13.50'
1206.98 @ 27.91'
4+00
EXIST. R/W
EXIST. R/W
1214.43
FILL 70 (CU. YDS.)
CUT 35 (CU. YDS.)
3+00
1210
1200
1190
90 80 70 60 50 40 30 20 10 ℄ 10 20 30 40 50 60 70 80 90 100

UNCLASSIFIED EXC. 367 (CU. YDS.)
EMBANKMENT 1586 (CU. YDS.)

FILL 26 (CU. YDS.)
CUT 17 (CU. YDS.)

FILL 65 (CU. YDS.)
CUT 0 (CU. YDS.)

FILL 95 (CU. YDS.)
CUT 0 (CU. YDS.)

FILL 126 (CU. YDS.)
CUT 0 (CU. YDS.)

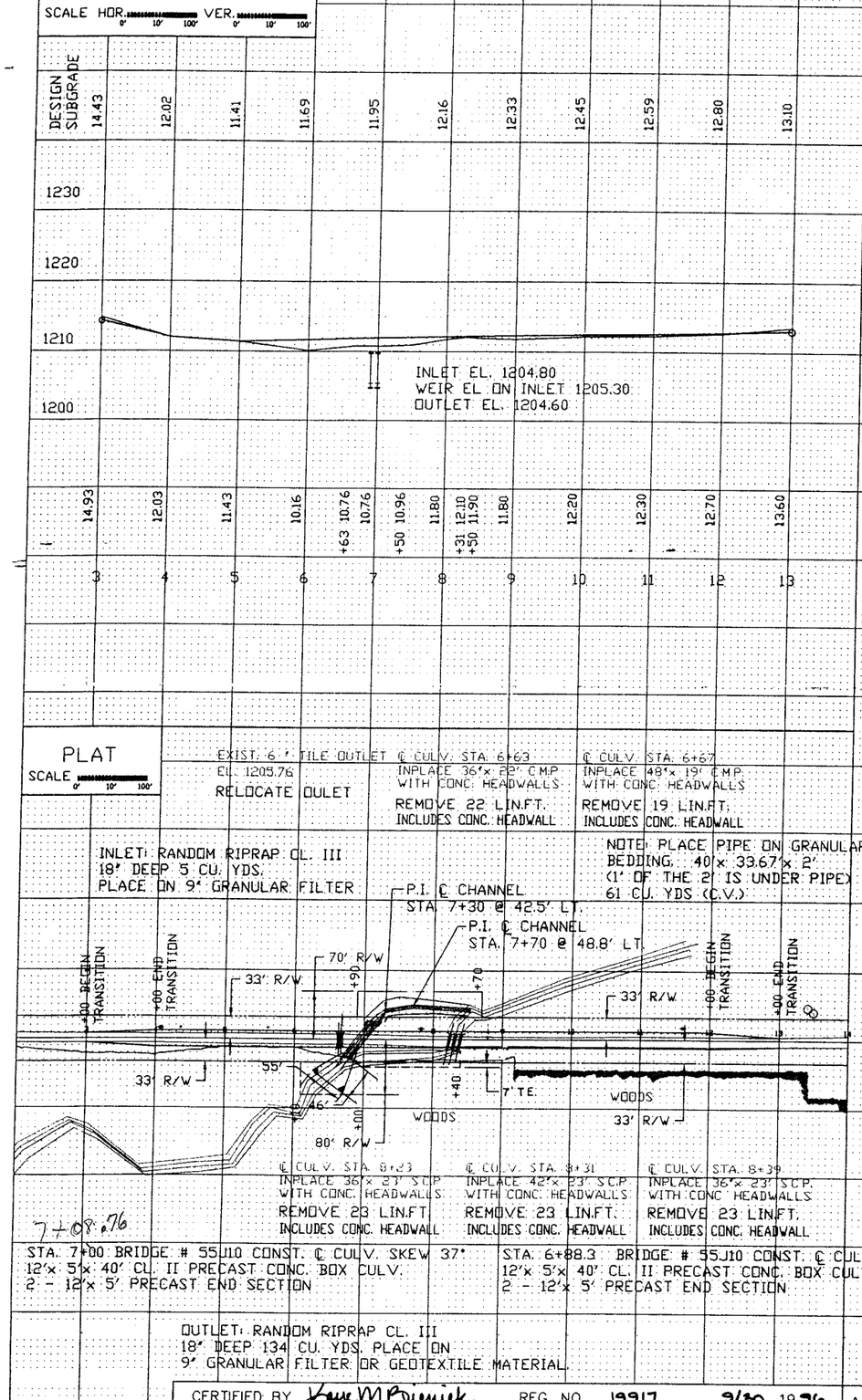
FILL 197 (CU. YDS.)
CUT 78 (CU. YDS.)

1211.94 @ 13.50'
1207.45 @ 27.08'
1207.45 @ 57.59'
EXIST. R/W
TF
6'
3:1
2.5:1
1211.98 @ 13.50'
1210.51 @ 18.00'
1208.60 @ 33.27'
1212.06 @ 13.50'
1209.04 @ 22.65'
1212.18 @ 13.50'
1210.44 @ 18.83'
1212.32 @ 13.50'
1211.48 @ 16.12'
1212.53 @ 13.50'
1211.66 @ 16.23'
1213.10
1212.80
1212.59
1212.45
1212.33
1212.25
1212.22
1211.94 @ 13.50'
1211.98 @ 13.50'
1212.06 @ 13.50'
1212.18 @ 13.50'
1212.32 @ 13.50'
1212.53 @ 13.50'
1208.81 @ 23.00
1207.90 @ 25.84
1208.84 @ 23.24
1208.77 @ 23.83
1209.10 @ 23.24
1210.24 @ 20.49
1208.18 @ 38.63
EXIST. R/W
4%
3:1
5' CHANNEL
4:1
℄ NEW CHANNEL
EL. 1206.58 @ 46'
1209.82 @ 56.60
NEW R/W

Fed. Proj. No.

CONTRACTED PROFILE

SCALE HOR. 0' 10' 100' VER. 0' 10' 100'

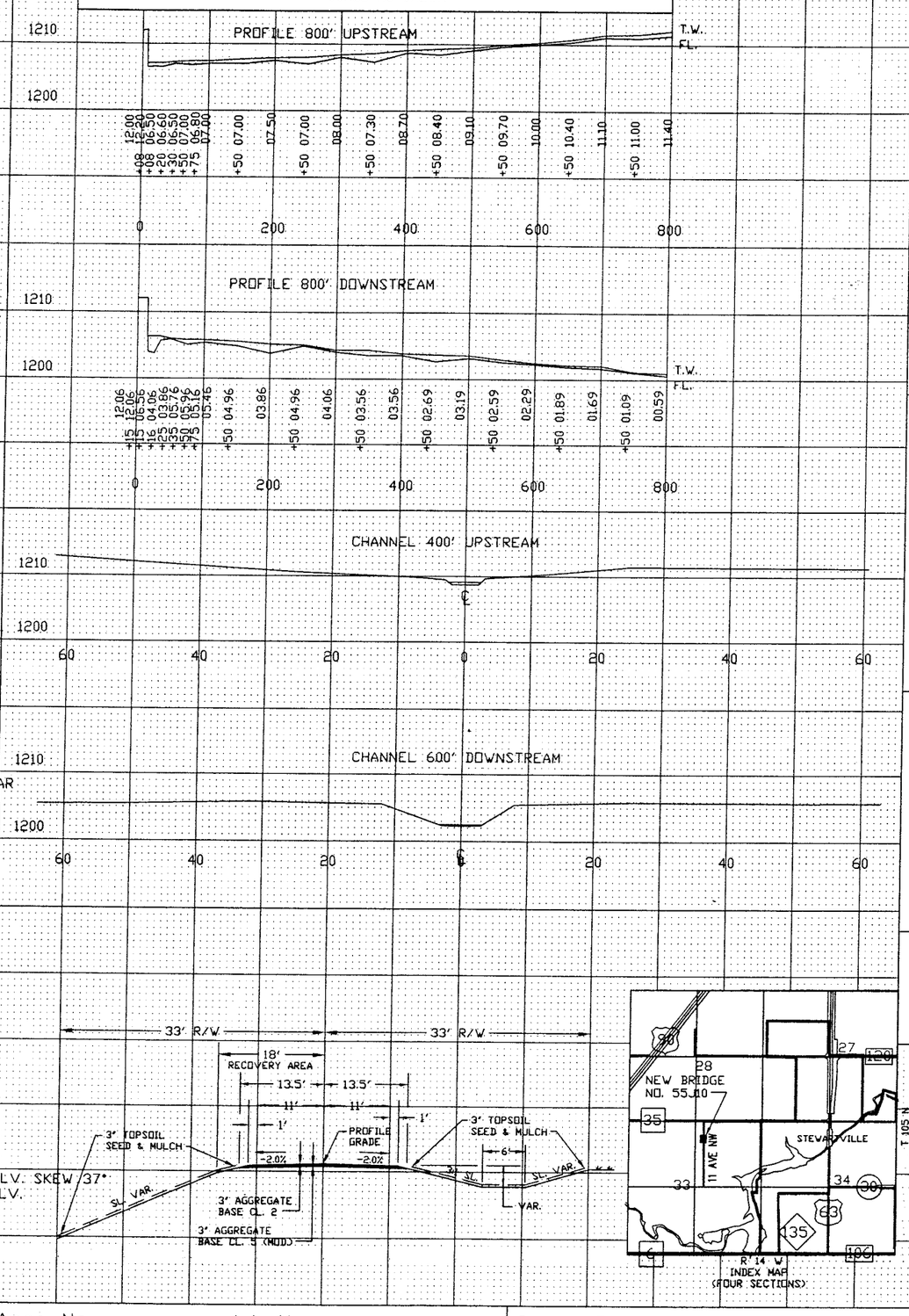


PLAT

SCALE 0' 10' 100'

TYPICAL SECTIONS & PERTINENT DATA

SCALE AS SHOWN



1. Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating.

2. Other bridges or culverts over the same stream (particularly structures which carry high water without overflow of roadway) Given location, type, length, height above high water, cross-sectional area etc.

3. Apparent highwater elevation Obtained from

4. Other data: Approx. velocity of water at time of survey

HYDRAULIC ENGINEERS RECOMMENDATION
DATE 4-15-96

Stream or ditch designation
Drainage area 2.2 SQ. MILES
Max. flood on record UNKNOWN Design Flood (25 yr. freq.) 605 C.F.S.
Max. observed highwater elevation UNKNOWN Design highwater elevation 1210.80
Design mean velocity through structure 5.2 F.P.S. OUTLET
Low superstructure at or above elevation 1209.89
Flowline 1204.80 - 1204.64 Skew angle 37°
Waterway area req'd. below elevation = Sq. Ft. at Rt. angles to channel

In the interest of flood plain zoning the regional flood (100 yr. freq.) is 920 C.F.S. at stage 1211.5 and mean velocity of 4.4 F.P.S. with 0.7 Ft. swellhead. The above recommendation will provide a structure of adequate waterway to pass the regional flood within criteria established by the Dept. of National Resources.

FOUNDATION ENGINEERS RECOMMENDATION
DATE.

Bridge survey sheets made from:

Bench mark elevation 1212.10 (M.S.L. 1929 Adj.)
Location: TOP OF EAST HEADWALL SOUTH CULVERT.

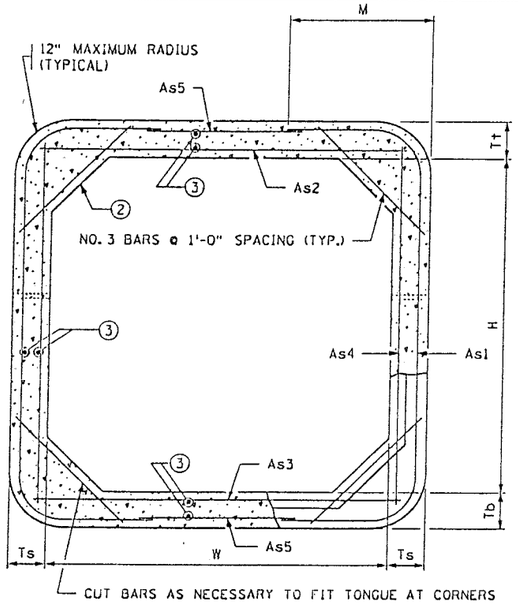
MINNESOTA
DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY

AT MILE POINT ON 11TH AVE. N.W. (T.H., C.S.A.H., C.R. etc.)
PROPOSED BRIDGE LOCATED 0.5 MILES N.W. OF
STEWARTVILLE
SEC. 33 TWP. 105 R 14
TOWNSHIP HIGH FOREST COUNTY OLMSTED
BRIDGE NO. # 55J10

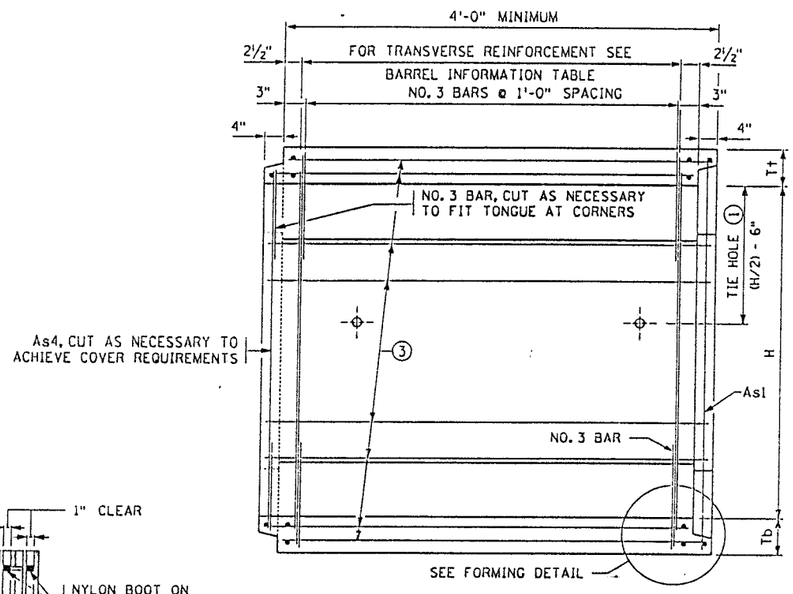
CERTIFIED BY Gene M Bruniek PROFESSIONAL ENGINEER REG. NO. 19917 9/30 1996

Area No. Job No. ~~State Proj. No.~~ S.A.P. 55-599-65 Sheet No. 6 of 11 Sheets



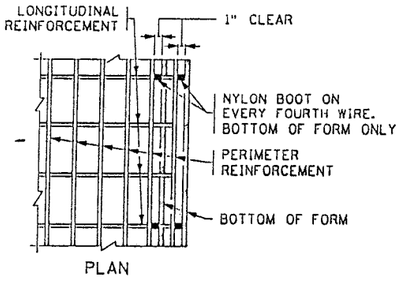
TRANSVERSE BARREL SECTION

(BAR REINFORCEMENT OPTION SHOWN)

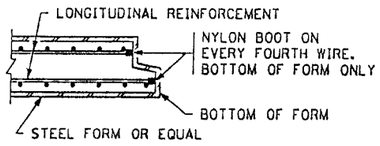


LONGITUDINAL BARREL SECTION

(BAR REINFORCEMENT OPTION SHOWN)

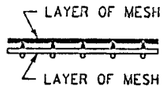


PLAN



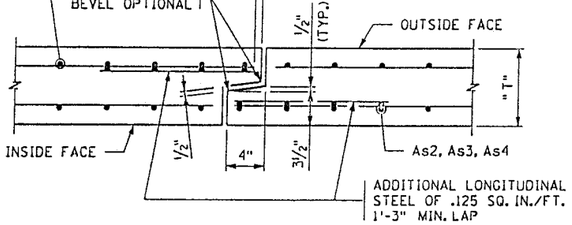
SECTION

FORMING DETAIL



FABRIC LAYER DETAIL

WHEN MORE THAN ONE LAYER OF STEEL FABRIC IS USED TO OBTAIN THE REQUIRED REINFORCEMENT AREAS, THE WIRES OF THE STEEL FABRIC SHALL BE PLACED AS SHOWN



TONGUE AND GROOVE JOINT DETAIL

CONSTRUCTION NOTES:

CULVERTS TO BE CONSTRUCTED AS PER SPEC. 2412 EXCEPT AS NOTED.

THE STEEL FABRIC, SHEAR REINFORCEMENT AND REINFORCEMENT BARS SHALL CONFORM TO APPLICABLE REQUIREMENTS OF AASHTO M259.

1½" MIN. AND 2" MAX. CONCRETE COVER ON ALL REINFORCEMENT, INCLUDING SHEAR REINFORCEMENT, EXCEPT FOR TONGUE AND GROOVE DETAIL.

ANY OF THE FOLLOWING COMBINATIONS OF STEEL REINFORCEMENT MAY BE USED:
- (a) 1 OR 2 LAYERS OF MESH OR
- (b) 1 LAYER OF MESH AND 1 LAYER OF REINFORCEMENT BARS OR
- (c) 1 LAYER OF REINFORCEMENT BARS.

THE REINFORCEMENT SHALL BE DEVELOPED IN ACCORDANCE WITH AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES". IF BAR REINFORCEMENT IS SUBSTITUTED FOR WIRE MESH, THE AREAS OF REINFORCEMENT SHALL BE INCREASED BY 8%.

THE MAXIMUM SIZE OF REINFORCEMENT BARS SHALL BE NO. 6. THE MAXIMUM MESH SIZE SHALL BE ½" DIA. PER LAYER (MAXIMUM OF 2 LAYERS).

THE SPACING CENTER TO CENTER OF THE TRANSVERSE WIRES SHALL NOT BE LESS THAN 2 INCHES NOR MORE THAN 4 INCHES. THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 8 INCHES.

WELDING WILL NOT BE ALLOWED ON REINFORCEMENT BARS OR STEEL FABRIC, EXCEPT THAT THE ORIGINAL WELDING REQUIRED TO MANUFACTURE WIRE FABRIC IS ACCEPTABLE.

WHEN REINFORCEMENT IS CUT, ADDITIONAL REINFORCEMENT SHALL BE ADDED ON BOTH SIDES OF THE CUT MEMBER TO REPLACE OR EXCEED THE CUT STEEL.

BARREL SECTIONS WHICH ARE CAST WITH A DRAFT IN THE FORMS SHALL BE LAID WITH THE NARROWEST PART OF THE SECTION DOWNSTREAM.

CONCRETE SHALL BE MIX NO. 3W36 WITH NO CALCIUM CHLORIDE ALLOWED.

① CULVERT TIES ARE TO BE 1" DIAMETER RODS. SEE STANDARD PLATE NO. 3145 FOR CONNECTION DETAILS.

② HAUNCH SIZE AS FOLLOWS:
- 6 AND 8 FT. WIDTHS - 6 TO 12 INCHES
- 10 FT WIDTH - 10 TO 12 INCHES
- 12 FT WIDTH - 12 INCHES

③ MINIMUM LONGITUDINAL STEEL SHALL BE 0.06 SQ. IN. /FT.

BARREL INFORMATION

LOCATION	SIZE	CLASS	f'c (P.S.I.)	FILL HEIGHT RANGE (FT.)	DIMENSIONS W (FT.)	H (FT.)	Tt (IN.)	Tb (IN.)	Ts (IN.)	WEIGHT (LBS./FT.)	STEEL FABRIC REINFORCEMENT As1 AREA (IN.²/FT.)	As1 LENGTH (FT.)	As1 M (FT.)	As2 AREA (IN.²/FT.)	As2 LENGTH (FT.)	As3 AREA (IN.²/FT.)	As3 LENGTH (FT.)	As4 AREA (IN.²/FT.)	As4 LENGTH (FT.)	As5 AREA (IN.²/FT.)	As5 LENGTH (FT.)
6+88.3	12 x 5	11	5000	2 - 8	12	5	9	10	8	4330	0.74	11'-11"	3'-4"	0.93	12'-8"	0.93	12'-8"	0.20	5'-8"	0.20	8'-7"
7+00	12 x 5	11	5000	2 - 8	12	5	9	10	8	4330	0.74	11'-11"	3'-4"	0.93	12'-8"	0 93	12'-8"	0.20	5'-8"	0.20	8'-7"

CERTIFIED BY Kyle M Biesiek PROFESSIONAL ENGINEER
REG. NO. 19917 9/30 19 96

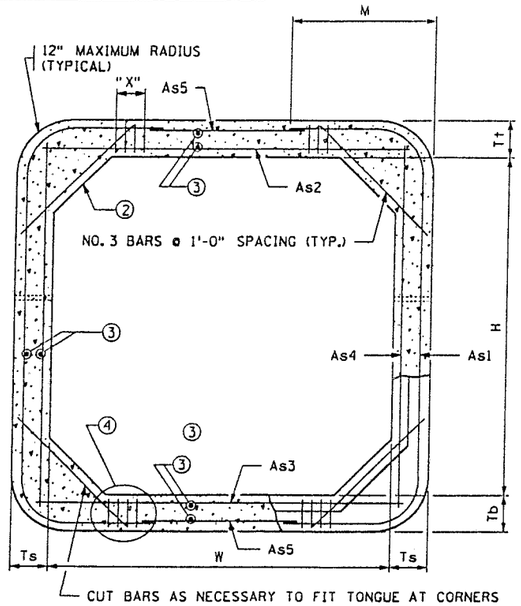
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CHK: ____ CHK: ____

STANDARD SHEET NO. 5-297.420 (1 OF 2)
STATE BRIDGE ENGINEER APPROVAL: AUGUST 10, 1995

TITLE: BARREL DETAILS

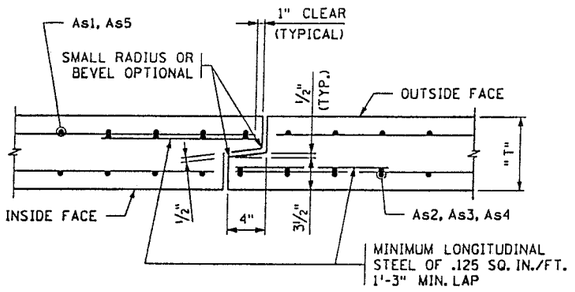
STATE PROJ. NO. 55-599-65 SHEET NO. 7 OF 11 SHEETS

SERVER CA64S11/USR/STANDARDS FILE NAME S4201H95.SPN

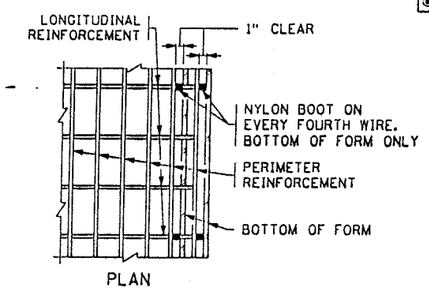


TRANSVERSE BARREL SECTION

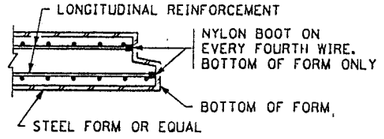
(BAR REINFORCEMENT OPTION SHOWN)



TONGUE AND GROOVE JOINT DETAIL

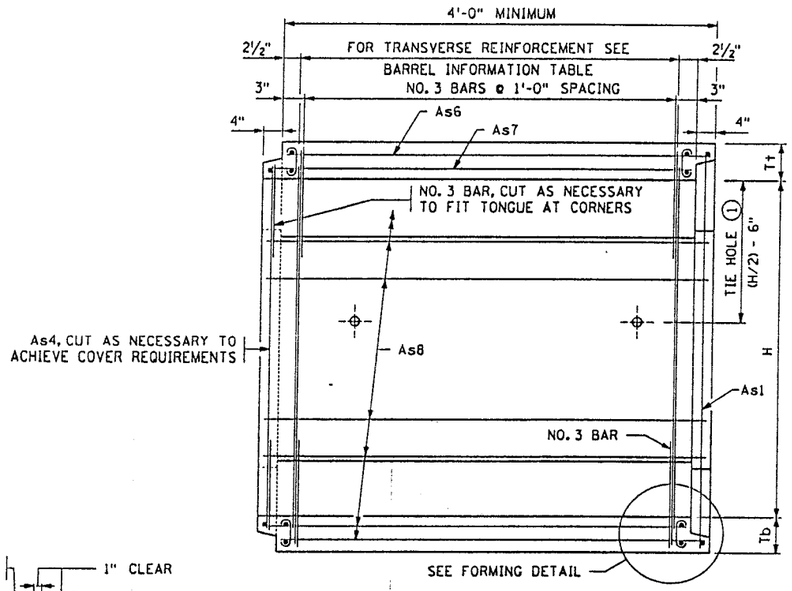


PLAN



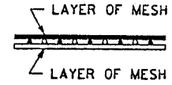
SECTION

FORMING DETAIL



LONGITUDINAL BARREL SECTION

(BAR REINFORCEMENT OPTION SHOWN)



FABRIC LAYER DETAIL

WHEN MORE THAN ONE LAYER OF STEEL FABRIC IS USED TO OBTAIN THE REQUIRED REINFORCEMENT AREAS, THE WIRES OF THE STEEL FABRIC SHALL BE PLACED AS SHOWN

CONSTRUCTION NOTES:

CULVERTS TO BE CONSTRUCTED AS PER SPEC. 2412 EXCEPT AS NOTED.

THE STEEL FABRIC, SHEAR REINFORCEMENT AND REINFORCEMENT BARS SHALL CONFORM TO APPLICABLE REQUIREMENTS OF AASHTO M259.

1½" MIN. AND 2" MAX. CONCRETE COVER ON ALL REINFORCEMENT, INCLUDING SHEAR REINFORCEMENT, EXCEPT FOR TONGUE AND GROOVE DETAIL.

ANY OF THE FOLLOWING COMBINATIONS OF STEEL REINFORCEMENT MAY BE USED:
- (a) 1 OR 2 LAYERS OF MESH OR
- (b) 1 LAYER OF MESH AND 1 LAYER OF REINFORCEMENT BARS OR
- (c) 1 LAYER OF REINFORCEMENT BARS.

THE REINFORCEMENT SHALL BE DEVELOPED IN ACCORDANCE WITH AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES". IF BAR REINFORCEMENT IS SUBSTITUTED FOR WIRE MESH, THE AREA OF REINFORCEMENT SHALL BE INCREASED BY 8%.

THE MAXIMUM SIZE OF REINFORCEMENT BARS SHALL BE NO. 6. THE MAXIMUM MESH SIZE SHALL BE ½" DIA. PER LAYER (MAXIMUM OF 2 LAYERS).

THE SPACING CENTER TO CENTER OF THE TRANSVERSE WIRES SHALL NOT BE LESS THAN 2 INCHES NOR MORE THAN 4 INCHES. THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 8 INCHES.

WELDING WILL NOT BE ALLOWED ON REINFORCEMENT BARS OR STEEL FABRIC, EXCEPT THAT THE ORIGINAL WELDING REQUIRED TO MANUFACTURE WIRE FABRIC IS ACCEPTABLE.

WHEN REINFORCEMENT IS CUT, ADDITIONAL REINFORCEMENT SHALL BE ADDED ON BOTH SIDES OF THE CUT MEMBER TO REPLACE OR EXCEED THE CUT STEEL.

BARREL SECTIONS WHICH ARE CAST WITH A DRAFT IN THE FORMS SHALL BE LAID WITH THE NARROWEST PART OF THE SECTION DOWNSTREAM.

CONCRETE SHALL BE MIX NO. 3W36 WITH NO CALCIUM CHLORIDE ALLOWED.

(1) CULVERT TIES ARE TO BE 1" DIAMETER RODS. SEE STANDARD PLATE NO. 3145 FOR CONNECTION DETAILS.

(2) HAUNCH SIZE AS FOLLOWS:
- 6 AND 8 FT. WIDTHS - 6 TO 12 INCHES
- 10 FT. WIDTH - 10 TO 12 INCHES
- 12 FT. WIDTH - 12 INCHES

(3) MINIMUM LONGITUDINAL STEEL SHALL BE 0.06 SQ. IN./FT.

(4) SEE STANDARD PLATE 3007 FOR SHEAR REINFORCEMENT OPTIONS. THE MAXIMUM SHEAR REINFORCEMENT SPACING IN THE LONGITUDINAL DIRECTION SHALL BE 6 INCHES.

BARREL INFORMATION

LOCATION	SIZE	f'c (P.S.I.)	OVERFILL LIMITS (FT.)	DIMENSIONS					WEIGHT (LBS./FT.)	STEEL FABRIC REINFORCEMENT														(4) SHEAR REINFORCEMENT TOP AND BOTTOM OF BARREL		
										As1			As2		As3		As4		As5		As6	As7	As8			
				W (FT.)	H (FT.)	Tt (IN.)	Tb (IN.)	Ts (IN.)		AREA (IN.²/FT.)	LENGTH (FT.)	M (FT.)	AREA (IN.²/FT.)	LENGTH - (FT.)	AREA (IN.²/FT.)	LENGTH (FT.)	AREA (IN.²/FT.)	LENGTH (FT.)	AREA (IN.²/FT.)	LENGTH (FT.)	AREA (IN.²/FT.)	AREA (IN.²/FT.)	AREA (IN.²/FT.)	AREA (IN.²/FT.)	MAX. SPC. (IN.)	X (IN.)

SERVER CA645i/USR/STANDARDS FILE NAME S420H95.SPN

CERTIFIED BY _____ PROFESSIONAL ENGINEER

REG. NO. _____ 19__

DES: _____ DR: _____ APPROVED:

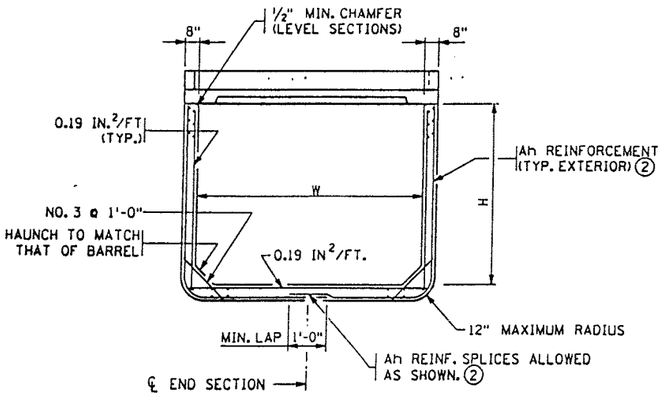
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STANDARD SHEET NO. 5-297.420 (2 OF 2)

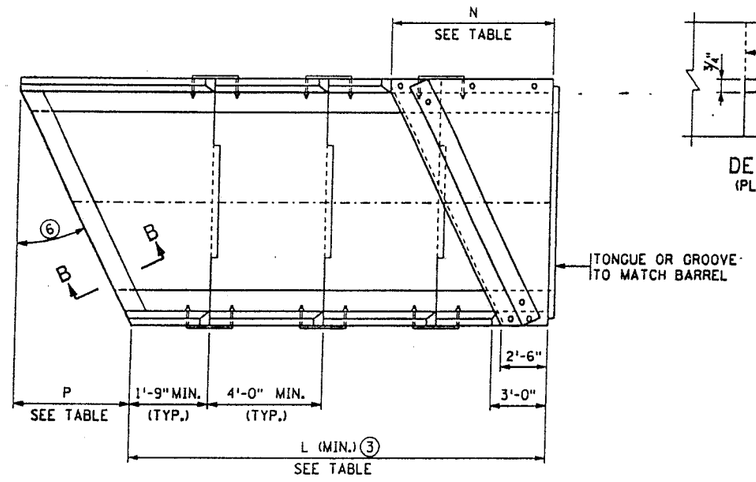
STATE BRIDGE ENGINEER APPROVAL: AUGUST 10, 1995

TITLE: BARREL DETAILS (SPECIAL DESIGNS)

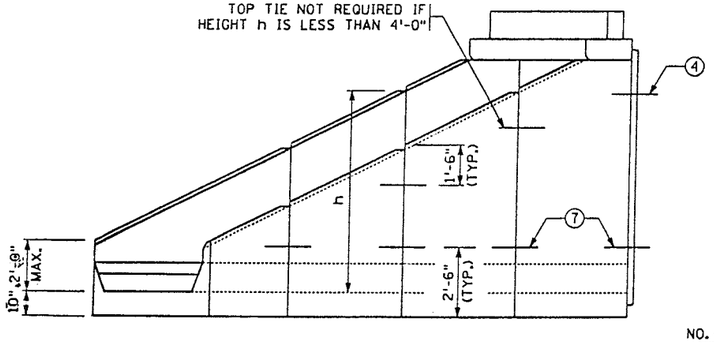
STATE PROJ. NO. _____55-599-65_____ SHEET NO. _8_ OF _11_ SHEETS



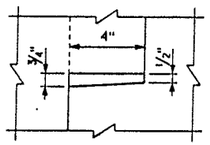
END VIEW



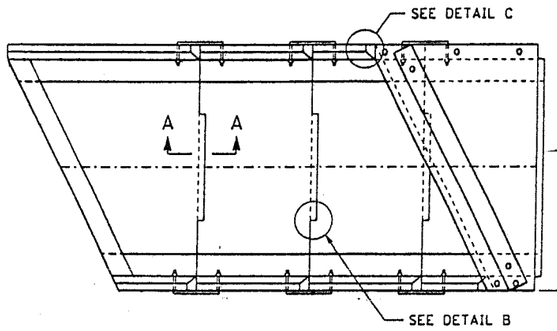
PLAN VIEW
SINGLE BARREL OPTION



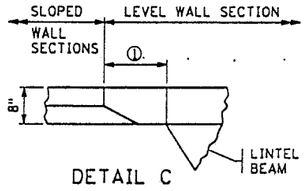
ELEVATION



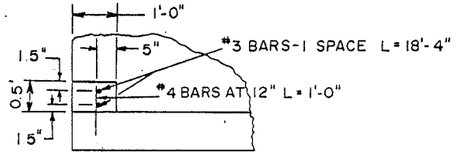
DETAIL B
(PLAN VIEW)



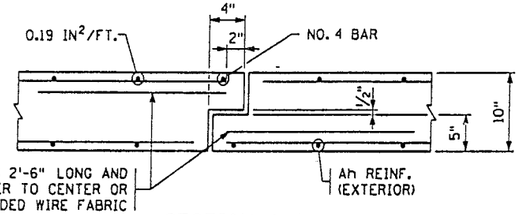
PLAN VIEW
MULTI-BARREL OPTION



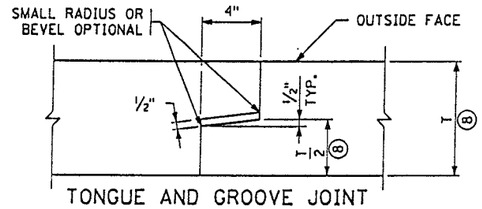
DETAIL C



SECTION B-B
(WEIR DETAIL)

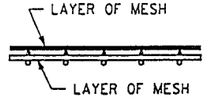


SECTION A-A



TONGUE AND GROOVE JOINT

MAKE DIMENSION OF TONGUE OR GROOVE ON ADJACENT PRECAST BARREL SECTIONS SO INSIDE WALLS ARE FLUSH.



FABRIC LAYER DETAIL

WHEN MORE THAN ONE LAYER OF STEEL FABRIC IS USED TO OBTAIN THE REQUIRED REINFORCEMENT AREAS, THE WIRES OF THE STEEL FABRIC SHALL BE PLACED AS SHOWN

NOTES:

SEE 5-297.420, FOR DIMENSIONS AND CONSTRUCTION NOTES, EXCEPT AS NOTED.

FINISH ALL VERTICAL EDGES OF CONCRETE WITH ½" CHAMFER OR RADIUS UNLESS OTHERWISE NOTED.

PRECAST CONCRETE SHALL BE MIX 3W36 WITH NO CALCIUM CHLORIDE ALLOWED.

DROPWALL CONCRETE SHALL BE MIX 1A43 OR 3Y43. LIMITS FOR DROPWALL EXCAVATION TO BE APPROXIMATELY THE SAME AS DROPWALL DIMENSIONS. FURNISHING AND INSTALLATION OF DROPWALL TO BE INCLUDED IN PRICE BID FOR END SECTIONS.

LONGITUDINAL REINFORCEMENT SHALL BE A MINIMUM OF 0.06 SQ. IN. PER FT. ON BOTH FACES.

NO TONGUE OR GROOVE REQUIRED IN WALLS BETWEEN END SECTIONS.

SEE 5-297.425 FOR EMBANKMENT PROTECTION.

GROUT SHALL CONSIST OF 1 PART CEMENT AND 2 PARTS SAND. USE TYPE 1A AIR ENTRAINED PORTLAND CEMENT. GROUT MIX SHALL HAVE A MAXIMUM SLUMP OF 4".

① 8⅛" @ 15°; 10⅝" @ 30°; 1'-2" @ 45°

② SEE 5-297.420 (2 OF 2) FOR REINFORCEMENT TABLES.

③ NUMBER OF SECTIONS VARIES WITH "H" DIMENSION.

④ EXCEPT AS NOTED, CULVERT TIES ARE TO BE 1" DIA RODS. SEE STANDARD PLATE NO. 3145 FOR DETAILS.

⑤ 3'-6" TONGUE AND 3'-7" GROOVE FOR 6'-0" WIDE CULVERTS. 5'-0" TONGUE AND 5'-1" GROOVE FOR CULVERTS OVER 6'-0" WIDE. CENTER TONGUE & GROOVE ON ℄ OF EACH APRON JOINT.

⑥ FOR SKEW ANGLES OVER 7½° UP TO 22½°, USE A 15° SKEW END SECTION. FOR SKEW ANGLES OVER 22½° UP TO 37½°, USE A 30° SKEW END SECTION. FOR SKEW ANGLES OVER 37½° UP TO 45°, USE A 45° SKEW END SECTION.

⑦ PROVIDE EXTRA STRONG TIE @ BOTTOM CONNECTION BETWEEN BARREL & 1st APRON SEGMENT, AND 1st & 2nd APRON SEGMENTS; ONLY REQUIRED ON HIGH FILL SIDE FOR 45° SKEW END SECTIONS OVER 6'-0" HIGH. SEE 5-297.423 (2 OF 2) FOR DETAILS.

⑧ DIMENSION T IS EQUAL TO Tt, Tb OR Ts.

⑨ PROVIDE 2'-0" MIN. BETWEEN SEGMENTS.

LENGTH L			
HEIGHT H (FT.)	15° SKEW	30° SKEW	45°SKEW
4	7'-6"	8'-6"	9'-0"
5	10'-0"	11'-0"	12'-0"
6	12'-0"	13'-6"	14'-6"
7	14'-0"	16'-0"	17'-6"
8	16'-0"	18'-0"	20'-6"
9	18'-6"	20'-6"	23'-6"
10	20'-6"	23'-0"	26'-0"
11	22'-6"	25'-6"	29'-0"
12	25'-0"	28'-0"	31'-6"

LENGTH P			
WIDTH W (FT.)	15° SKEW	30° SKEW	45° SKEW
6	1'-9⅜"	3'-10¼"	6'-8"
8	2'-3⅞"	5'-0"	8'-8"
10	2'-10¼"	6'-1⅞"	10'-8"
12	3'-4¾"	7'-3¾"	12'-8"

CERTIFIED BY _____ PROFESSIONAL ENGINEER
REG. NO. _____ 19

DES: DR: APPROVED:

STANDARD SHEET NO. 5-297.423 (1 OF 2)
STATE BRIDGE ENGINEER APPROVAL: AUGUST 10, 1995

TITLE: PRECAST CONC. END SECTION TYPE III- SINGLE OR MULTI-BARREL
FOR SKEWS 7½° TO 45°

STATE PROJ. NO. 55 509 65 SHEET NO. 9 OF 11 SHEETS

FILE NAME S4231H95.SPN
RVER CA64S1:/USR/STANDARDS

Ah REINFORCEMENT TABLE		
HEIGHT h (FT.)	Ah (IN^2/FT.)	
	15° & 30° SKEW	45° SKEW
7 OR LESS	0.192	0.192
8	0.20	0.24
9	0.29	0.36
10	0.42	0.53
11	0.60	0.75
12	0.78	0.98

NOTE: h IS THE LARGEST VERTICAL DIMENSION OF THE SEGMENT.

LINTEL BEAM REINFORCEMENT TABLE		
WIDTH W	BOTTOM REINFORCEMENT	
	A1	A2
6'	NO. 4 @ 1'-6"	NO. 4 @ 1'-4"
8'	NO. 4 @ 1'-1"	NO. 4 @ 9"
10'	NO. 4 @ 9"	NO. 4 @ 6"
12'	NO. 5 @ 9"	NO. 5 @ 6"

LENGTH N			
WIDTH W (FT.)	15° SKEW	30° SKEW	45° SKEW
6	4'-3⅜"	6'-4¼"	9'-2"
8	4'-9⅞"	7'-6"	11'-2"
10	5'-4¼"	8'-7⅞"	13'-2"
12	5'-10¾"	9'-9¾"	15'-2"

NOTES:

GROUT SHALL CONSIST OF 1 PART CEMENT AND 2 PARTS SAND. USE TYPE 1A AIR ENTRAINED PORTLAND CEMENT. GROUT MIX SHALL HAVE A MAXIMUM SLUMP OF 4".

STRUCTURAL STEEL PER SPEC. 3306.

WELDING PER SPEC. 2471.

GALVANIZE STRUCTURAL STEEL PER SPEC. 3394.

GALVANIZE BOLTS, NUTS AND WASHERS PER SPEC. 3392.

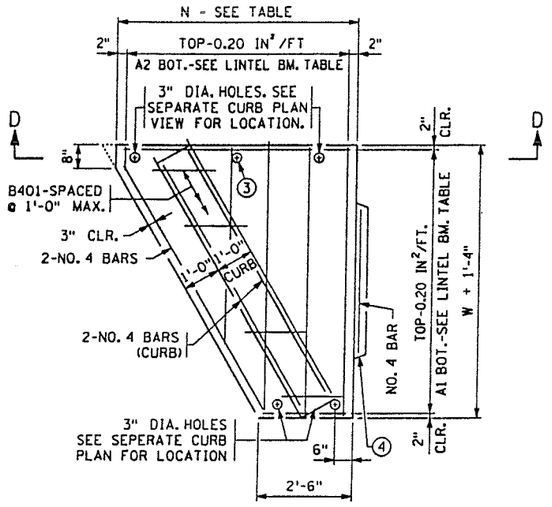
(1) NO. 8 DOWEL, 1'-0" LONG, 2" DIA. HOLE IN THE TOP OF THE WALL SECTION AND 3" DIA. HOLE IN THE LINTEL BEAM. FILL HOLE WITH GROUT.

(2) NO. 8 DOWEL, 1'-0" LONG, 2" DIA. HOLE IN THE TOP OF THE LINTEL BEAM AND 3" DIA. HOLE IN THE CURB. FILL HOLE WITH GROUT.

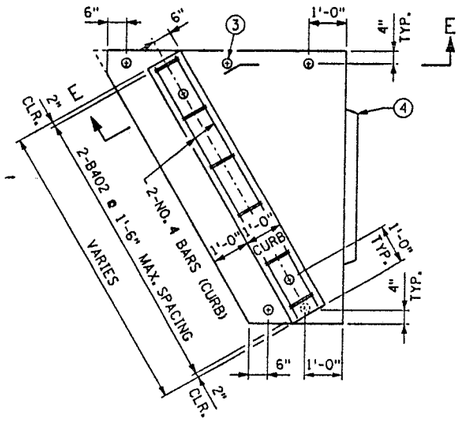
(3) CAST AN ADDITIONAL 3" HOLE AT MIDPOINT OF BEAM WHEN SIDE OF LINTEL BEAM IS OVER 6 FT.

(4) CHECK THE LOCATION TO DETERMINE WHETHER A TONGUE OR A GROOVE IS USED. TONGUE AND GROOVE TO TERMINATE AT CULVERT RADIUS.

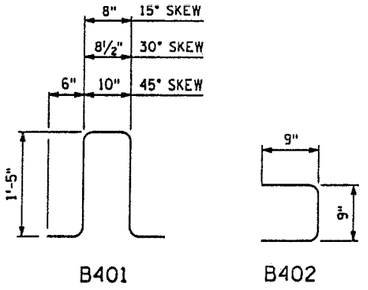
(5) FOR SKEW LENGTH UNDER 10' USE NO. 8 BARS. FOR SKEW LENGTH OF 10' TO 14' USE NO. 9 BARS. FOR SKEW LENGTH OVER 14' TO 18' USE NO. 10 BARS. FOR SKEW LENGTH OVER 18' TO 20' USE NO. 11 BARS, OR EQUAL. SKEW LENGTH IS DISTANCE ALONG LINTEL BEAM.



PLAN VIEW
(LINTEL BEAM WITH INTEGRAL CURB)

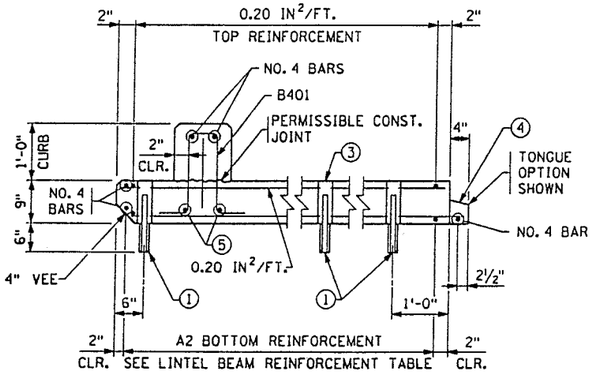


PLAN VIEW
(LINTEL BEAM WITH SEPARATE CURB)
SOME REINFORCEMENT NOT SHOWN

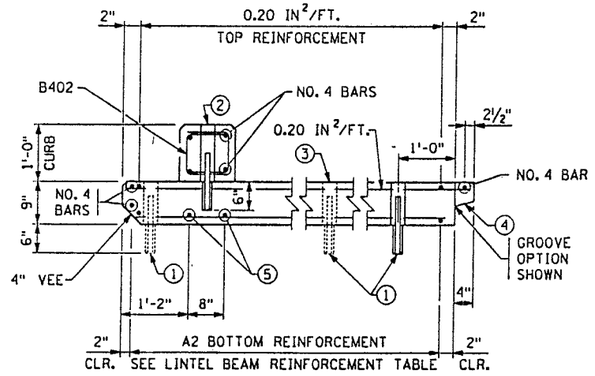


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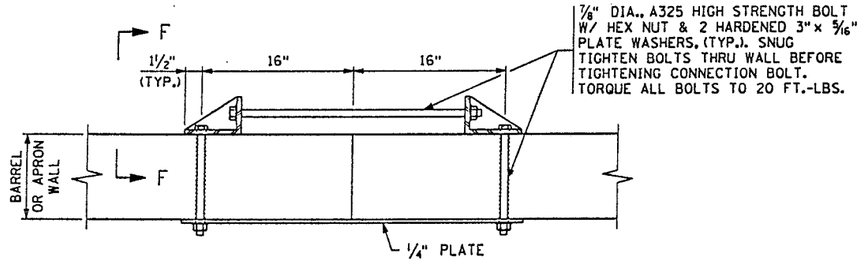
B402



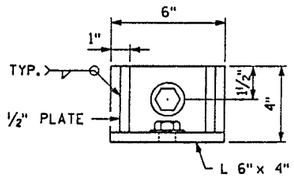
SECTION D-D



SECTION E-E



PLAN VIEW



SECTION F-F

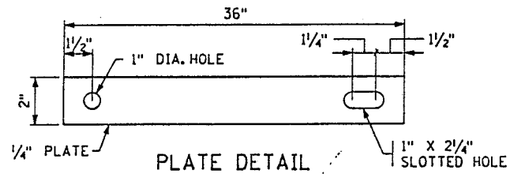


PLATE DETAIL

EXTRA STRONG CONNECTION DETAILS

CERTIFIED BY _____ PROFESSIONAL ENGINEER
REG. NO. _____ 19__

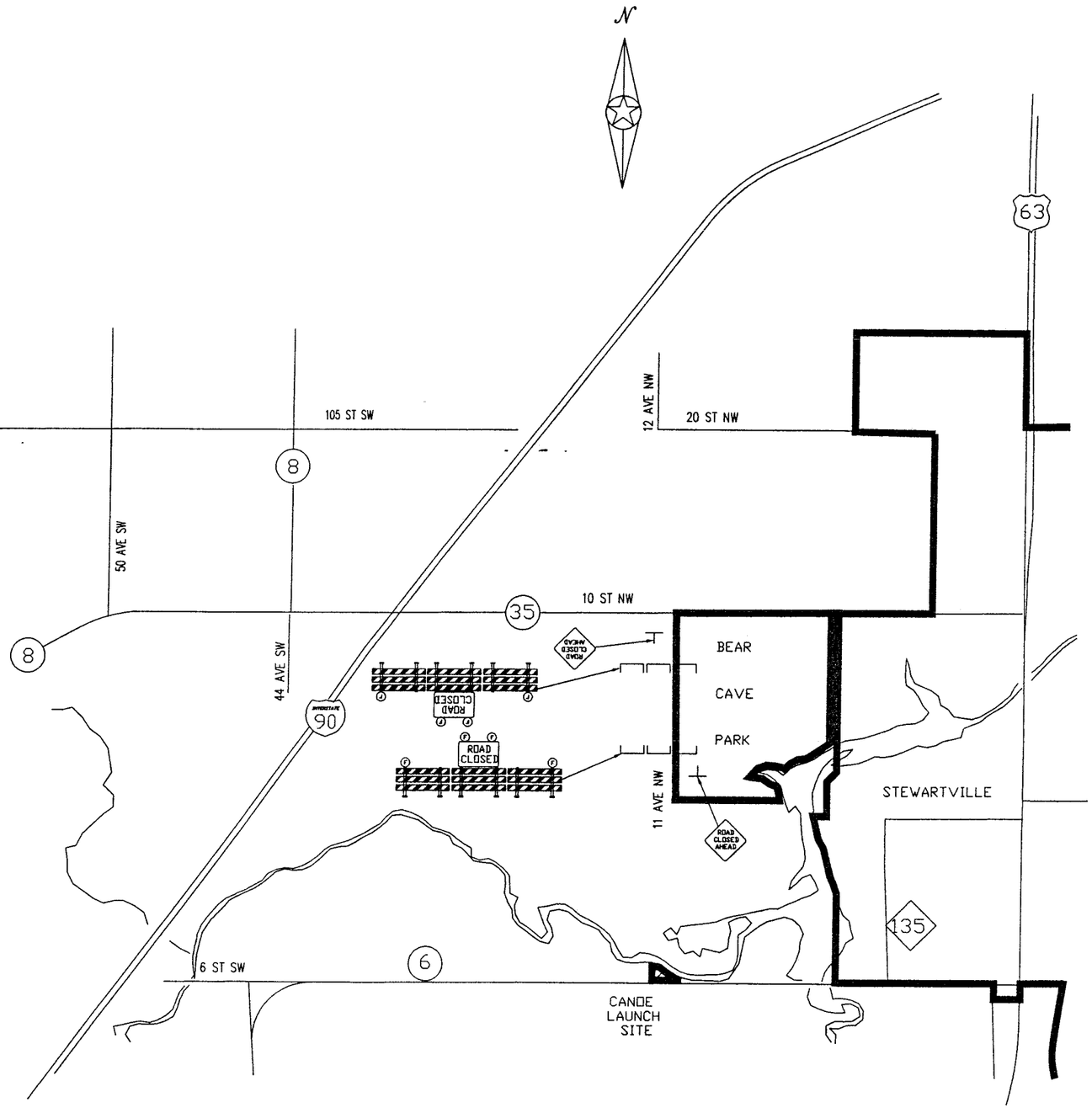
DES: _____ DR: _____ APPROVED:
CHK: _____ CHK: _____

STANDARD SHEET NO. 5-297.423 (2 OF 2)
STATE BRIDGE ENGINEER APPROVAL: AUGUST 10, 1995

TITLE: PRECAST CONC. END SECTION TYPE III- SINGLE OR MULTI-BARREL
FOR SKEWS 7½° TO 45°

STATE PROJ. NO. 55-599-65 SHEET NO. 10 OF 11 SHEETS

SERVER CA6451:/USR/STANDARDS FILE NAME S4232H95.SPN



ESTIMATE OF TRAFFIC CONTROL DEVICES

DEVICE	NUMBER	SIZE	COLOR	QUANTITY	DEVICE	NUMBER	SIZE	COLOR	QUANTITY
ROAD CLOSED AHEAD	W20-3	48 x 48	BLK/OR	2		TYPE III	MIN. 6'	OR & BLK	6
ROAD CLOSED	W11-2	48 x 30	BLK/WH	2	(F)	TYPE A	FLASHING LAMP	AMBER	8

TRAFFIC CONTROL LEGEND

- ⊥ POST OR STAND MOUNTED SIGN
- ⌊⌋ TYPE III BARRICADE
- (F) TYPE "A" AMBER FLASHING LAMP

TRAFFIC CONTROL NOTES

1. THE LOCATION OF SIGNS AND DEVICES WILL BE STAKED BY THE ENGINEER IN THE FIELD.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL ON THIS PROJECT.
3. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES INCLUDING THE TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS FIELD MANUAL DATED APRIL 1995.
4. CONSTRUCTION ZONE SIGNING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND WILL INCLUDE, BUT NOT BE LIMITED TO SIGNS FOR LANE CLOSURE, MACHINARY AHEAD, BUMP, DIP, LOOSE GRAVEL, ETC. THE NUMBER AND LOCATION WILL BE DETERMINED BY THE CONTRACTORS OPERATION.
5. ALL BARRICADES ON THIS PROJECT SHALL BE REFLECTORIZED ON BOTH SIDES.

CERTIFIED BY Kaye M Bierwirth PROFESSIONAL ENGINEER REG. NO. 19917 9/30 19 96

S.A.P. NO. 55-599-65

SHEET 11 OF 11 SHEETS