MINNESOTA DEPARTMENT OF TRANSPORTATION

THE COUNTY OF OLMSTED

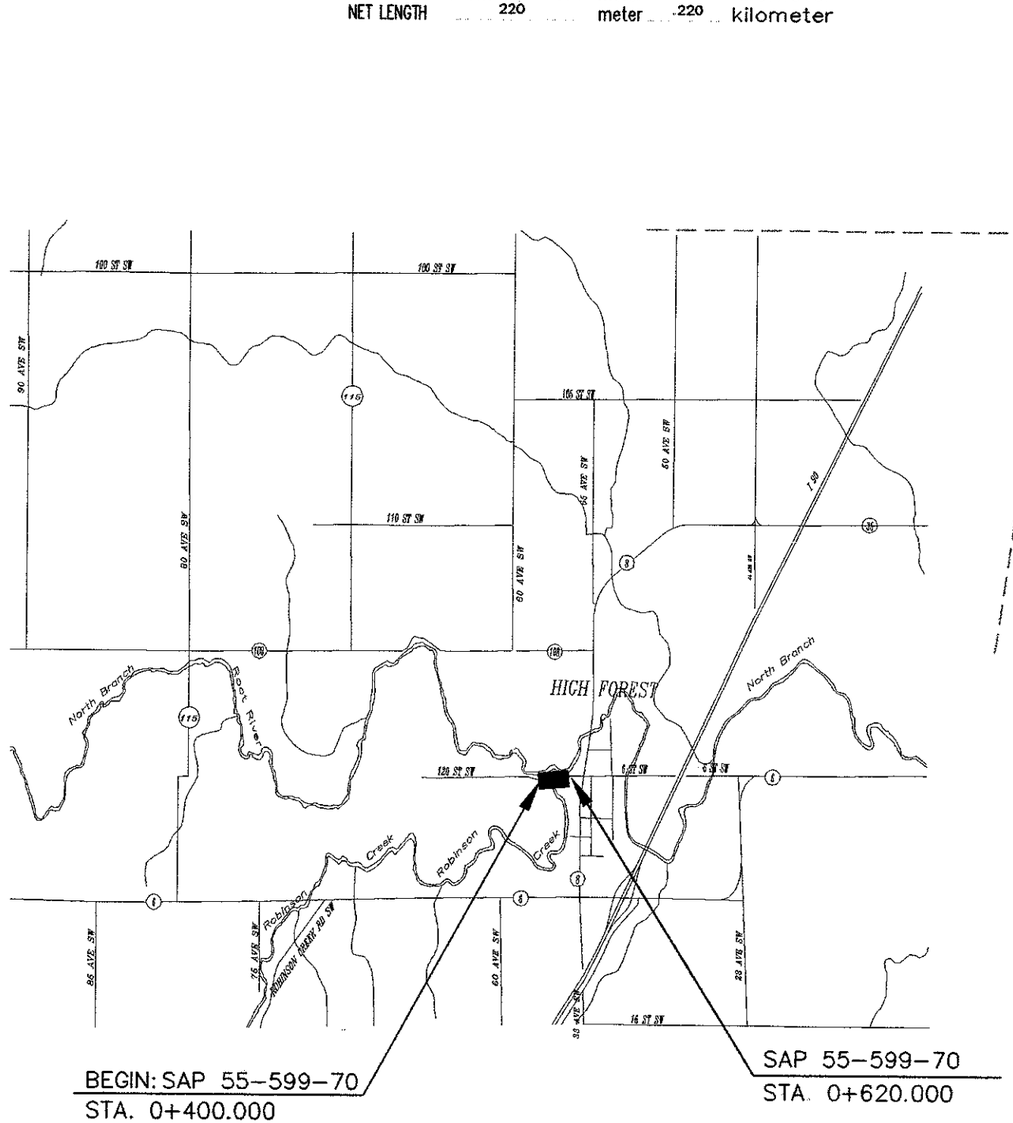
CONSTRUCTION PLAN FOR GRADING & PRECAST CONC. BOX (BRIDGE NO. 55J22)

LOCATED ON 120 ST. S.W. BETWEEN C.S.A.H. 8 AND 1 MILE W. C.S.A.H. 8 (GEOGRAPHIC DESCRIPTION)

FROM APPROX. 0.371 km WEST of N. SEC. COR. 5 & 6 T 104 N – R 14 W TO APPOX. 0.151 km WEST of N. SEC. COR. 5 & 6 T 104 N – R 14 W (LEGAL DESCRIPTION)

S.A.P. NO. 55-599-70

GROSS LENGTH	220	meter	.220	kilometer
BRIDGE-LENGTH		meter		kilometer
EXCEPTIONS-LENGTH		meter		kilometer
NET LENGTH	220	meter	.220	kilometer



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 PUB
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

MINN. PROJ. NO.

GOVERNING SPECIFICATIONS

THE 1995 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION".

ATTENTION: THIS IS A METRIC PLAN

INDEX

SHEET NO. 1	TITLE SHEET
SHEET NO. 2	TYPICAL SECTION & ESTIMATE OF QUANTITIES
SHEET NO. 3 – 4	BRIDGE SHEETS
SHEET NO. 5 – 7	CROSS SECTIONS
SHEET NO. 8	TRAFFIC CONTROL
SHEET NO. 9 – 10	BARREL DETAILS
SHEET NO. 11 – 12	PRECAST CONC. END SECTION DETAILS

THIS PLAN CONTAINS 12 SHEETS.

DESIGN DESIGNATION: S.A.P. 55-599-70

R IN18(20)
ADT (Current Year) = <50 (1999) Design Speed 90 km/h
ADT (Future Year) = <50 (2019) Based on STOPPING Sight Distance
DHV (Design Hr. Vol.) = Height of eye 1070 mm Height of object 150 mm
D (Directional Distr.) = Design Speed not achieved at:
T (Heavy Commercial) = STA. TO STA. mph
SUBGRADE = STA. TO STA. mph
LANE WIDTH 3.3 m
SHOULDER WIDTH 0.3 m
SOIL FACTOR = 1.30%

TOWNSHIP APPROVAL:
Ruth Bamler 11-10-99
APPROVED: TOWNSHIP CHAIRPERSON DATE

DESIGN ENGINEER: 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 11/8/99 REGISTRATION NUMBER 19917
Kaye M Brienes
APPROVED: COUNTY DESIGN ENGINEER

DESIGN SQUAD: Cummings/Holmes

DATE 11/15/99 REGISTRATION NUMBER 20397
Michael Sheehan
APPROVED: OLMSTED COUNTY ENGINEER

STATE AID APPROVALS:
DISTRICT STATE AID ENGINEER: REVIEWED FOR COMPLIANCE WITH STATE AID RULES/POLICY DATE: 11-29-99
APPROVED FOR STATE AID FUNDING DATE: 2/9/00
STATE AID ENGINEER

minnesota metric

S.A.P. NO. 55-599-70 HIGH FOREST TWP. SHEET NO. 1 OF 12 SHEETS

ESTIMATED QUANTITIES

	SPECIFICATION NO.	ITEM	UNIT	NON PARTICIPATING	PARTICIPATING	TOTAL ESTIMATED QUANTITIES
①	2101.511	CLEARING & GRUBBING	LUMP SUM	1		1
	2104.501	REMOVE FENCE	m	80		80
③	2105.511	COMMON CHANNEL EXCAVATION	m^3	220		(P) 220
②③	2105.515	UNCLASSIFIED EXCAVATION	m^3	434		(P) 434
	2105.523	COMMON BORROW (CV)	m^3	1206		(P) 1206
	2412.511	3660 mm x 2440 mm PRECAST CONCRETE BOX CULVERT	m		44.70	44.70
④	2412.512	3660 mm x 2440 mm PRECAST CONC. BOX CULVERT END SECTION	EACH		6	6
⑤	2442.501	REMOVE OLD BRIDGE	LUMP SUM	1		1
	2451.507	GRANULAR BEDDING (CV)	m^3		70	(P) 70
⑥	2511.501	RANDOM RIPRAP CL. III	m^3		160	160
⑦	2573.502	SILT FENCE, TYPE HEAVY DUTY	m	40		40

QUANTITY NOTES:

① INCLUDES APPROXIMATELY 0.05 HECTARES OF TREES.

② UNCLASSIFIED EXCAVATION INCLUDES SUBGRADE TREATMENT AS SHOWN IN TYPICAL SECTIONS AND CROSS SECTIONS.

③ 220 m3 OF EXCAVATION IS TO BE USED AS SALVAGED TOPSOIL.

④ DROP WALLS ARE TO BE INSTALLED AS SHOWN ON THE END SECTION DETAILS SHEET.

⑤ CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRAFFIC DURING REPLACEMENT. ALL COSTS ASSOCIATED WITH MAINTAINING TRAFFIC SHALL BE INCIDENTAL TO ITEM 2442.501

⑥ PLACE RIPRAP ON 230 mm GRANULAR FILTER OR GEOTEXTILE MATERIAL WHICH SHALL BE CONSIDERED INCIDENTAL AND NO DIRECT COMPENSATION WILL BE MADE THEREFOR.(SEE SHEET 4)

⑦ SILT FENCE TO BE INSTALLED AT LOCATIONS AS DIRECTED BY THE ENGINEER STANDARD SPECIFICATION 1903 DOES NOT APPLY TO THIS ITEM.

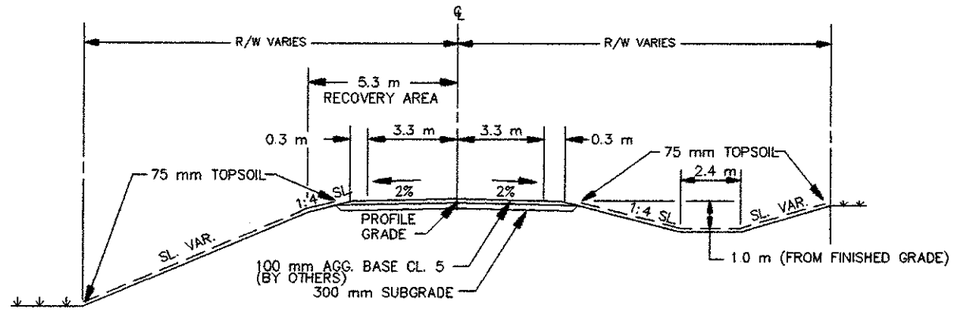
STANDARD PLATES

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

PLATE NO.	DESCRIPTION
	NUMERICAL INDEX OF METRIC STANDARD PLATES
M3007 B	SHEAR REINFORCEMENT FOR PRECAST DRAINAGE STRUCTURES
M3145 E	CONCRETE PIPE TIES
M8000 I	STANDARD BARRICADES
M9000 C	APPROACHES AND ENTRANCES

TYPICAL SECTION

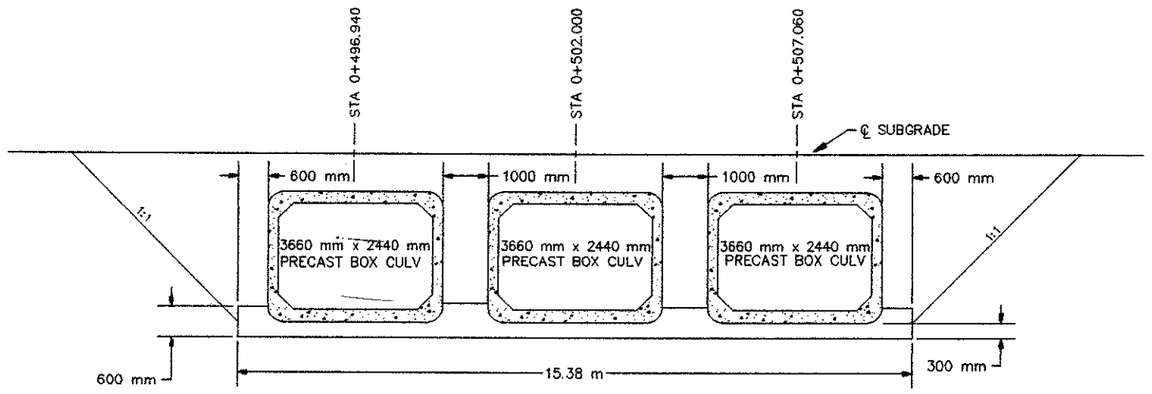
STA. 0+400 TO STA. 0+620



NOTES: ALL UTILITY POLES AND UNYIELDING OBJECTS WILL BE RELOCATED OUTSIDE THE 5.3 m RECOVERY AREA (BY OTHERS).

TURF ESTABLISHMENT BY OTHERS

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.

minnesota metric

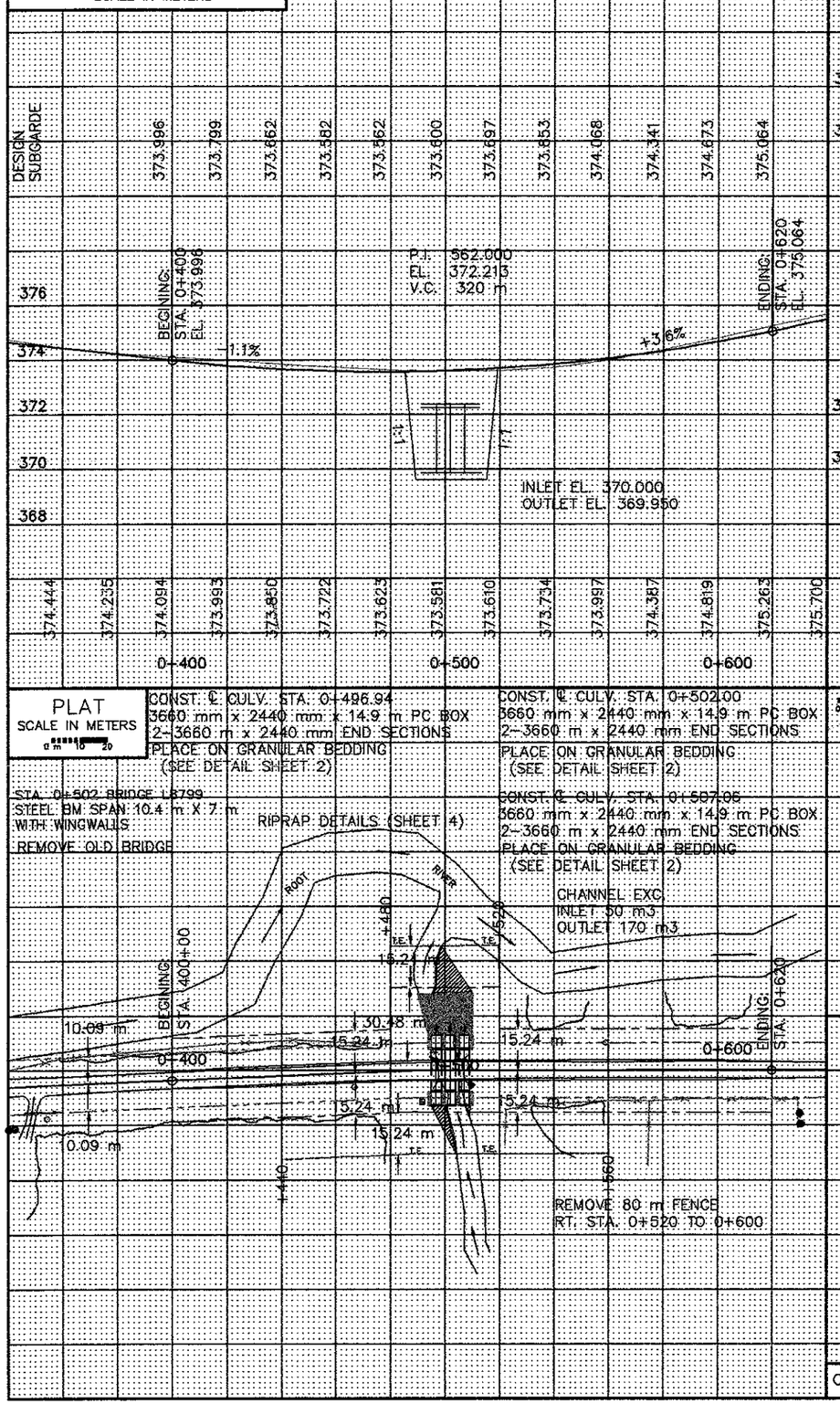
CERTIFIED BY Kayo M Brenner PROFESSIONAL ENGINEER REG NO. 19917 11/24 1999

S.A.P. 55-599-70 HIGH FOREST TWP.

CONTRACTED PROFILE

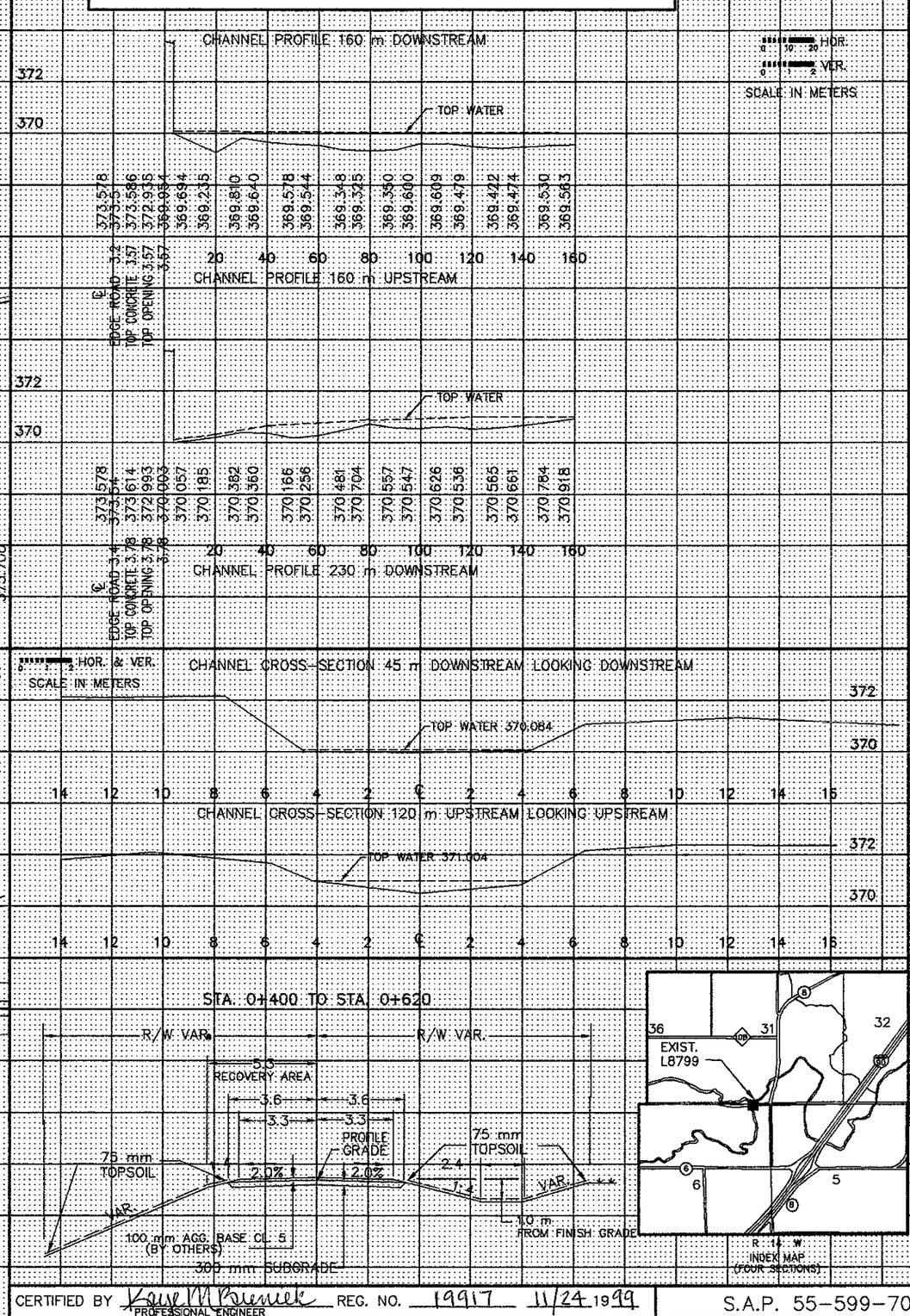
HOR. 0 m 10 20 VER. 0 m 1 2

SCALE IN METERS



TYPICAL SECTIONS & PERTINENT DATA

SCALE AS SHOWN



HOR. & VER. 0 1 2

SCALE IN METERS

PLAT

SCALE IN METERS 0 m 10 20

CONST. ℄ CULV. STA. 0+496.94
3660 mm x 2440 mm x 14.9 m PC BOX
2-3660 m x 2440 mm END SECTIONS
PLACE ON GRANULAR BEDDING
(SEE DETAIL SHEET 2)

STA. 0+502 BRIDGE L8799
STEEL BM SPAN 10.4 m X 7 m
WITH WINGWALLS
REMOVE OLD BRIDGE

CONST. ℄ CULV. STA. 0+502.00
3660 mm x 2440 mm x 14.9 m PC BOX
2-3660 m x 2440 mm END SECTIONS
PLACE ON GRANULAR BEDDING
(SEE DETAIL SHEET 2)

CONST. ℄ CULV. STA. 0+587.05
3660 mm x 2440 mm x 14.9 m PC BOX
2-3660 m x 2440 mm END SECTIONS
PLACE ON GRANULAR BEDDING
(SEE DETAIL SHEET 2)

CHANNEL EXC.
INLET 50 m3
OUTLET 170 m3

REMOVE 80 m FENCE
RT. STA. 0+520 TO 0+600

RIPRAP DETAILS (SHEET 4)

STA. 0+400 TO STA. 0+620

INDEX MAP (FOUR SECTIONS)

minnesota metric

ALL DIMENSIONS ARE meter UNLESS OTHERWISE NOTED.

Fed. Proj. No.

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 8/30/99

Stream or ditch designation ROBINSON CREEK
Drainage area 45.3 km2
Max. flood on record ..... Design flood (100 yr. freq.) 82.5 m^3/s
Max. observed highwater elevation 374.80 Design highwater elevation .....
Design mean velocity through structure 3.15 m/s
Low superstructure at or above elevation .....
Flowline 370.00 Skew angle .....
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 83 m^3/s at stage 373.71 and mean velocity of 3.17 m/s with 0.77 m 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: SURVEY CONDUCTED BY OLMSTED COUNTY

Bench mark elevation 373.453 (M.S.L. 1929 Adj.)
Location: PK NAIL SE COR. WINGWALL BR. 8799

MINNESOTA
DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY

AT kilometer POINT ..... ON TWP. RD. 13 (T.H., C.S.A.H., C.R. etc.)
PROPOSED BRIDGE LOCATED 0.15 km W. OF JCT. C.S.A.H. 8
SEC. 6 TWP. 104 R 14
TOWNSHIP HIGH FOREST COUNTY OLMSTED
BRIDGE NO. 55J22

CERTIFIED BY Kaye M Brenner PROFESSIONAL ENGINEER REG. NO. 19917 11/24 1999

S.A.P. 55-599-70

Sheet No. 3 of 12 Sheets

RIPRAP @ OUTLET 142m3

RIPRAP @ INLET 18m3

minnesota metric

P.I. 0+489.50
RT. 2° 17' 43"

0+480

0+520

R/W 15.24m

R/W 30.48m

15.24m

9.5m

4
1

1m

0+496.94

0+500

0+502

0+507.06

© SUBGRADE ELEVATIONS

373.56

373.60

373.70

373.85

1:1

INLET EL. 370.000
OUTLET EL. 369.950

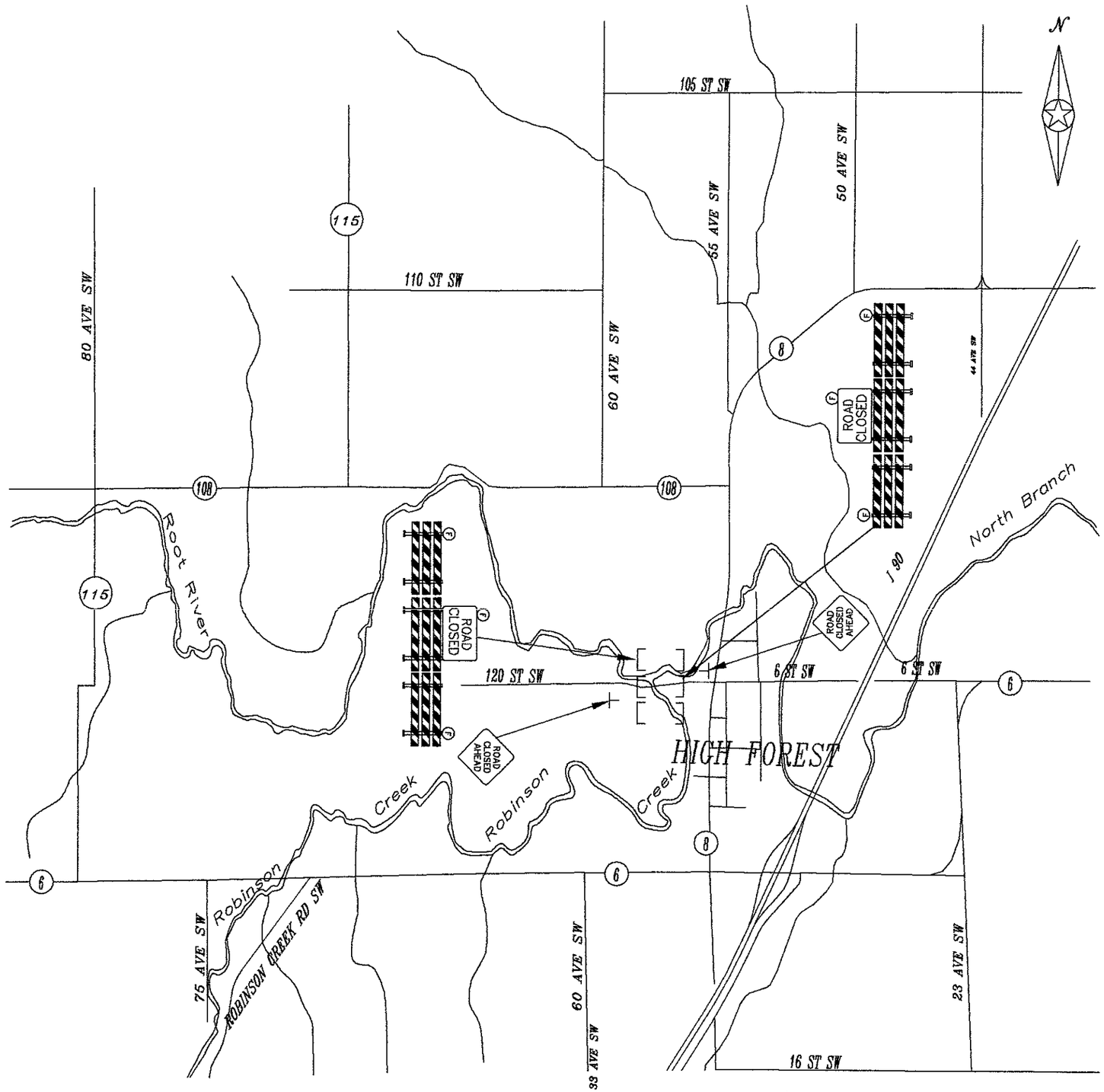
376
374
372
370
368

0+460
0+480
0+500
0+520
0+540

CERTIFIED BY Kaye M Bienick PROFESSIONAL ENGINEER REG. NO. 19917 11/8 1999

SAP 55-599-70

SHEET 4 OF 12 SHEETS



ESTIMATE OF TRAFFIC CONTROL DEVICES									
DEVICE	NUMBER	SIZE	COLOR	QUANTITY	DEVICE	NUMBER	SIZE	COLOR	QUANTITY
ROAD CLOSED	R11-2	48 x 30	BLK/WH	2		TYPE III	MIN. 6'	OR & WHT	6
ROAD CLOSED AHEAD	W20-3	48 x 48	BLK/OR	2	(F)	TYPE A	FLASHING LAMP	AMBER	6

TRAFFIC CONTROL LEGEND

⊥ POST OR STAND MOUNTED SIGN

└┘ TYPE III BARRICADE

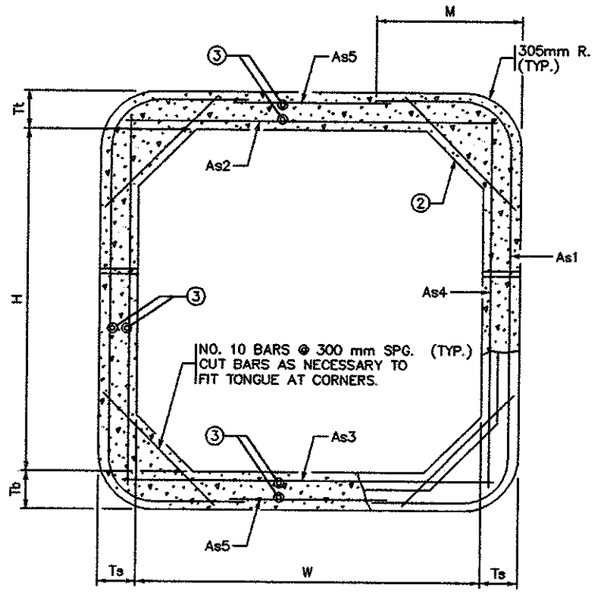
(F) TYPE "A" AMBER FLASHING LAMP

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 JANUARY 1998.
4. CONSTRUCTION ZONE SIGNING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND WILL INCLUDE, BUT NOT BE LIMITED TO SIGNS FOR LANE CLOSURE, MACHINERY 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.

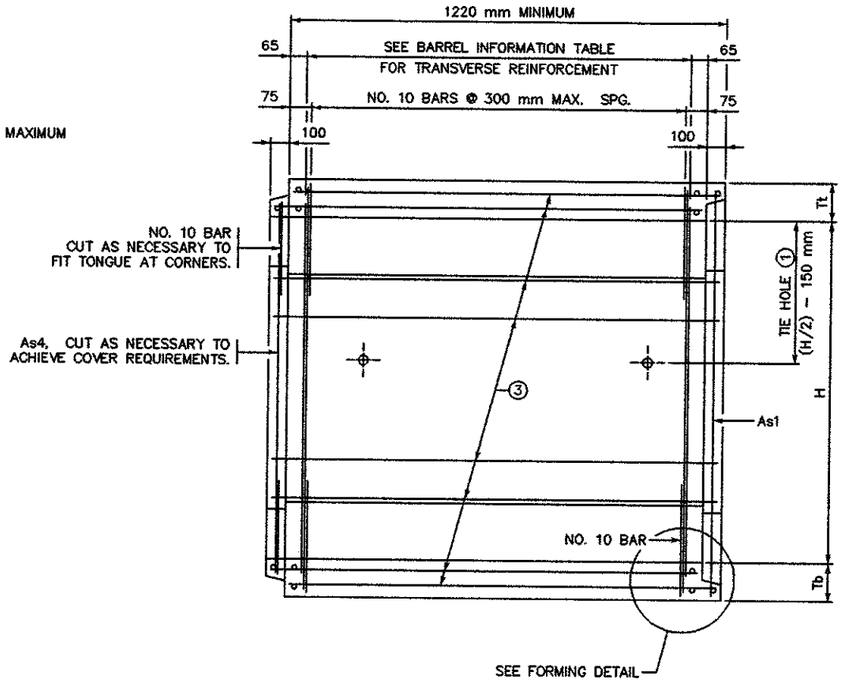
CERTIFIED BY Bruce M Brenneke REG. NO. 19917 11/24 1999
PROFESSIONAL ENGINEER

S.A.P. 55-599-70 HIGH FOREST TWP.



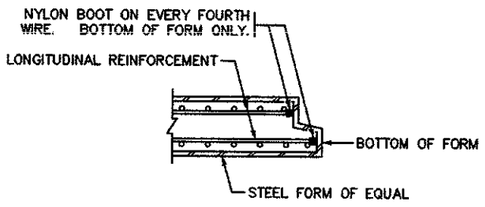
TRANSVERSE BARREL SECTION

BAR REINFORCEMENT OPTION SHOWN.

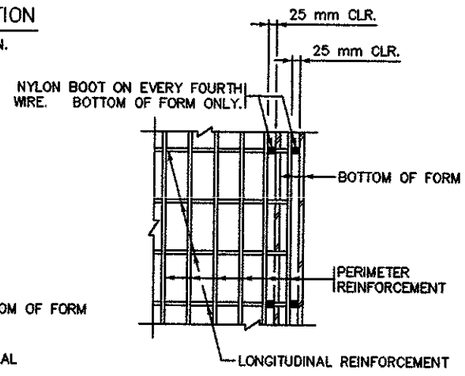


LONGITUDINAL BARREL SECTION

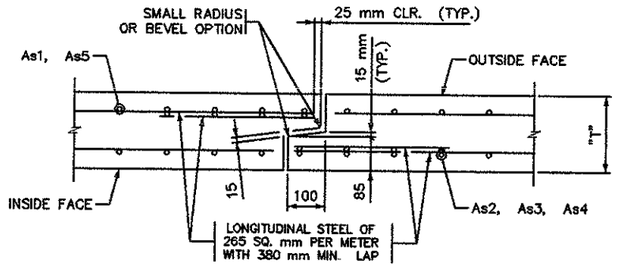
BAR REINFORCEMENT OPTION SHOWN.



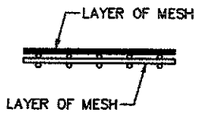
FORMING DETAIL SECTION



FORMING DETAIL PLAN



TONGUE AND GROOVE JOINT 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.

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.

40 MILLIMETERS MINIMUM AND 50 MILLIMETERS MAXIMUM 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. 19. THE MAXIMUM MESH SIZE SHALL BE 15 MILLIMETERS DIAMETER PER LAYER (MAXIMUM OF 2 LAYERS).

THE SPACING CENTER TO CENTER OF THE TRANSVERSE WIRES SHALL NOT BE LESS THAN 50 MILLIMETERS NOR MORE THAN 100 MILLIMETERS. THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 200 MILLIMETERS.

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.

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

(1) CULVERT TIES ARE TO BE 25 MILLIMETER DIAMETER RODS. SEE STANDARD PLATE NO. M3145 FOR CONNECTION DETAILS.

(2) HAUNCH SIZE AS FOLLOWS:
1830 AND 2440 MILLIMETER WIDTHS – 150 TO 305 MILLIMETERS
3050 MILLIMETER WIDTH – 250 TO 305 MILLIMETERS
3660 MILLIMETER WIDTH – 305 MILLIMETERS

(3) MINIMUM LONGITUDINAL STEEL SHALL BE 130 SQ. MILLIMETERS/METER.

SHOP DRAWING APPROVAL PER SPEC. 3238.2A IS NOT REQUIRED UNLESS OPENINGS OR ATTACHMENTS ARE PLACED ON A BARREL SEGMENT.

BARREL INFORMATION

LOCATION	SIZE	CLASS	f'c	FILL HEIGHT RANGE	DIMENSIONS					MASS	STEEL FABRIC REINFORCEMENT									
					W	H	Tt	Tb	Ts		As1			As2		As3		As4		As5	
			(MPa)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg/m)	AREA (mm²/m)	LENGTH (mm)	M (mm)	AREA (mm²/m)	LENGTH (mm)	AREA (mm²/m)	LENGTH (mm)	AREA (mm²/m)	LENGTH (mm)	AREA (mm²/m)	LENGTH (mm)
0+496.940	3660x2440	2	35	600-2400	3660	2440	225	250	200	7230	1570	4450	975	2350	3875	2240	3875	420	2650	130	2750
0+502.000	3660x2440	2	35	600-2400	3660	2440	225	250	200	7230	1570	4450	975	2350	3875	2240	3875	420	2650	130	2750
0+507.060	3660x2440	2	35	600-2400	3660	2440	225	250	200	7230	1570	4450	975	2350	3875	2240	3875	420	2650	130	2750

APPROVED: SEPTEMBER 19, 1996
Donald J. Flemming
STATE BRIDGE ENGINEER

minnesota metric

S.A.P. 55-599-70 CL. STA. 0+496.94, 0+502, AND 0+507.06

FIG. 5-395.101M (1 of 2)

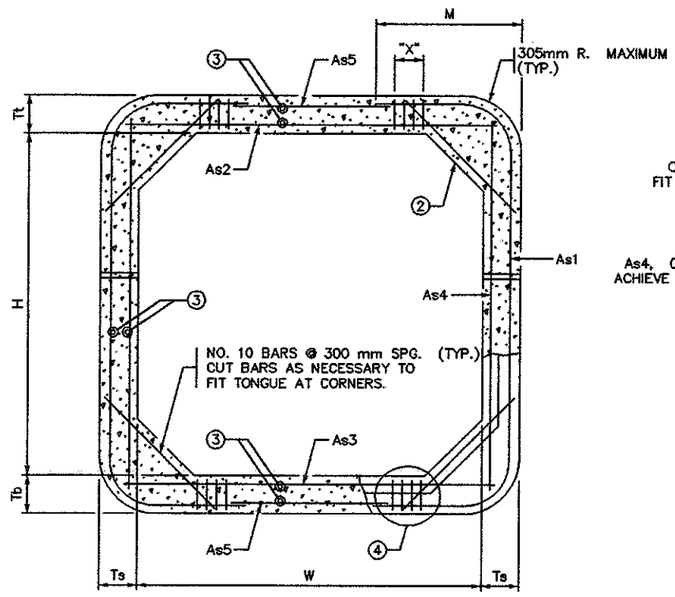
CERTIFIED BY: Kaye M Brenick PROFESSIONAL ENGINEER
REG. NO. 19917 11/8 19 99

TITLE: BARREL DETAILS

DES: DR: APPROVED:
CHK: CHK:

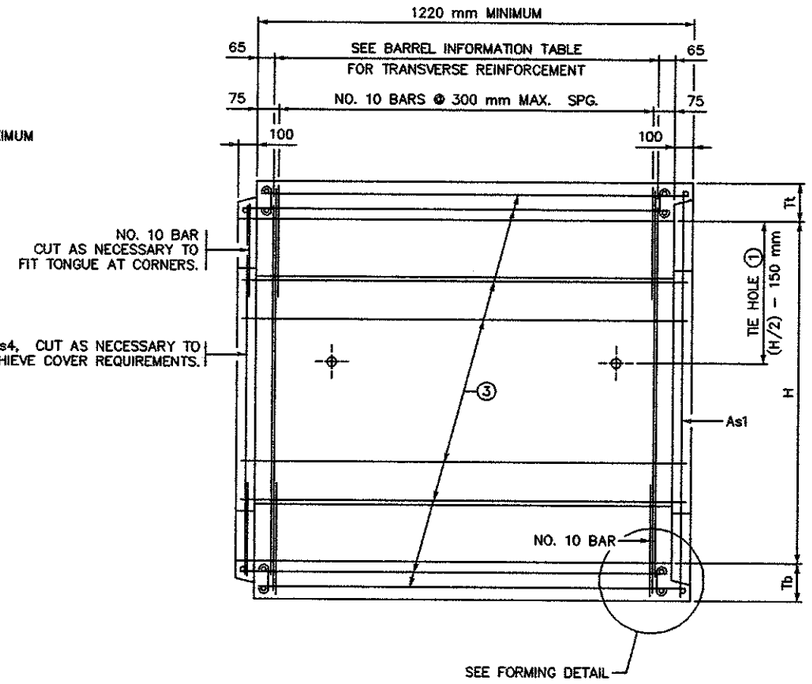
SHEET NO. 9 OF 12 SHEETS

BRIDGE NO. 55J22



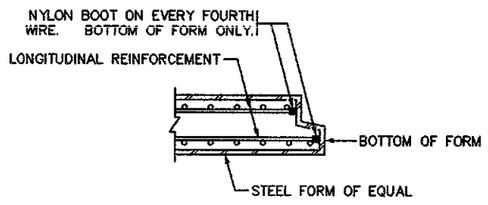
TRANSVERSE BARREL SECTION

(BAR REINFORCEMENT OPTION SHOWN)

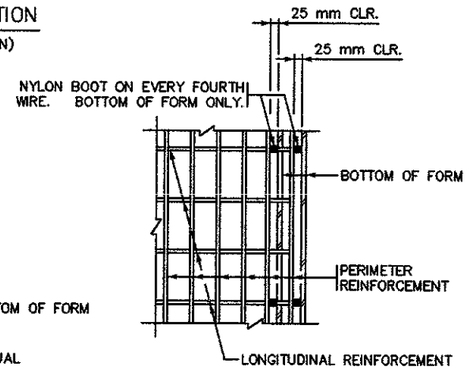


LONGITUDINAL BARREL SECTION

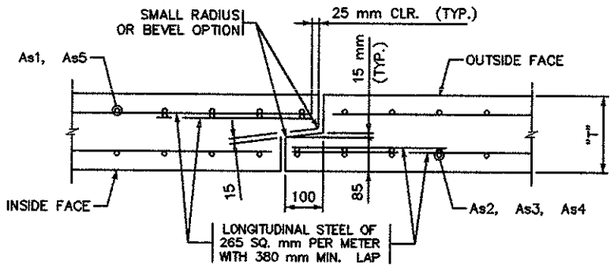
(BAR REINFORCEMENT OPTION SHOWN.)



FORMING DETAIL SECTION



FORMING DETAIL PLAN



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.

40 MILLIMETERS MINIMUM AND 50 MILLIMETERS MAXIMUM 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. 19. THE MAXIMUM MESH SIZE SHALL BE 15 MILLIMETERS DIAMETER PER LAYER (MAXIMUM OF 2 LAYERS).

THE SPACING CENTER TO CENTER OF THE TRANSVERSE WIRES SHALL NOT BE LESS THAN 50 MILLIMETERS NOR MORE THAN 100 MILLIMETERS. THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 200 MILLIMETERS.

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.

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

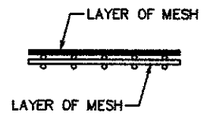
① CULVERT TIES ARE TO BE 25 MILLIMETER DIAMETER RODS. SEE STANDARD PLATE NO. M3145 FOR CONNECTION DETAILS.

② HAUNCH SIZE AS FOLLOWS:
1830 AND 2440 MILLIMETER WIDTHS – 150 TO 305 MILLIMETERS
3050 MILLIMETER WIDTH – 250 TO 305 MILLIMETERS
3660 MILLIMETER WIDTH – 305 MILLIMETERS

③ MINIMUM LONGITUDINAL STEEL SHALL BE 130 SQ. MILLIMETERS/METER.

④ SEE STANDARD PLATE NO. M3007 FOR SHEAR REINFORCEMENT OPTIONS. THE MAXIMUM SHEAR REINFORCEMENT SPACING IN THE LONGITUDINAL DIRECTION SHALL BE 150 MILLIMETERS.

SHOP DRAWING APPROVAL PER SPEC. 3238.2A IS REQUIRED.

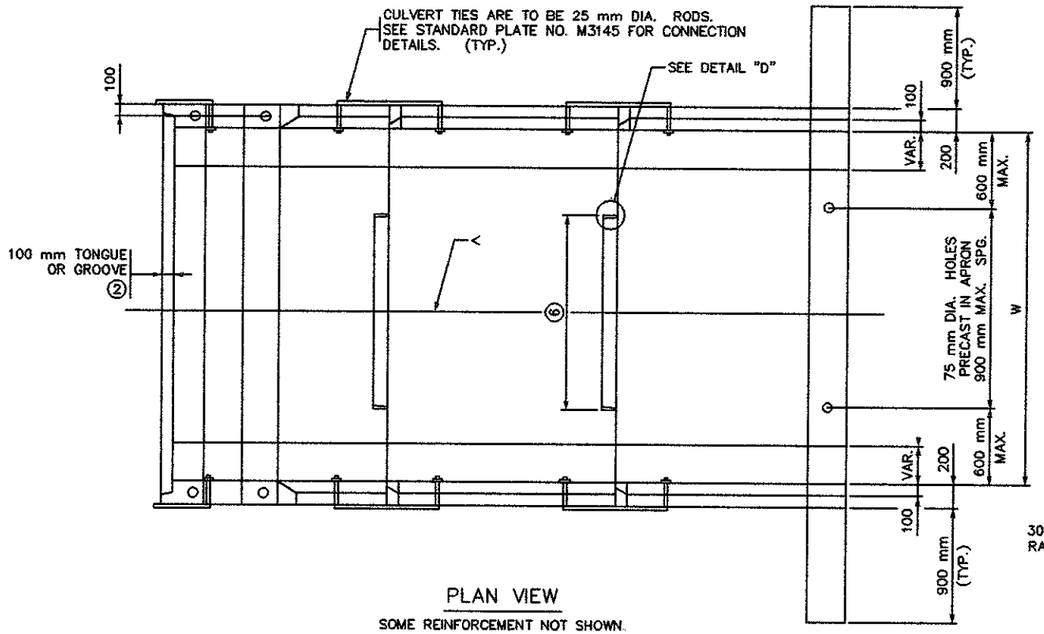


FABRIC LAYER DETAIL

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.

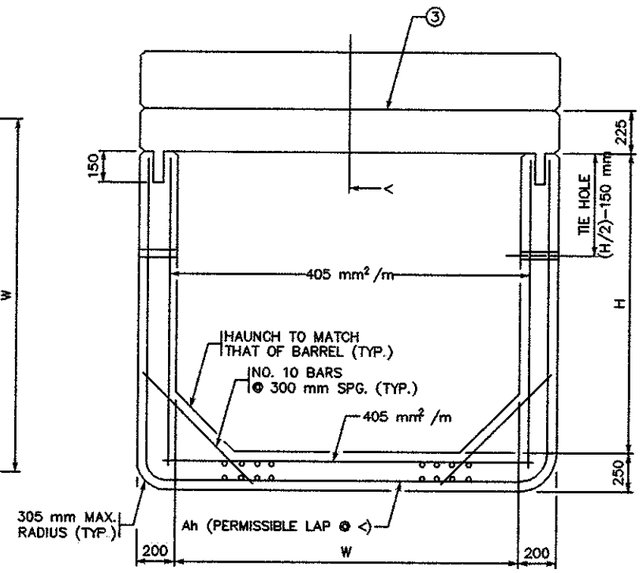
BARREL INFORMATION

LOCATION	SIZE	f'c (MPa)	OVER-FILL LIMITS (mm)	DIMENSIONS W (mm)	H (mm)	Tt (mm)	Tb (mm)	Ts (mm)	MASS (kg/m)	STEEL FABRIC REINFORCEMENT As1 AREA (mm²/m)	As1 LENGTH (mm)	As1 M (mm)	As2 AREA (mm²/m)	As2 LENGTH (mm)	As3 AREA (mm²/m)	As3 LENGTH (mm)	As4 AREA (mm²/m)	As4 LENGTH (mm)	As5 AREA (mm²/m)	As5 LENGTH (mm)	SHEAR REINFORCEMENT TOP AND BOTTOM OF BARREL ④ AREA (mm²/m)	MAX. SPG. (mm)	X (mm)

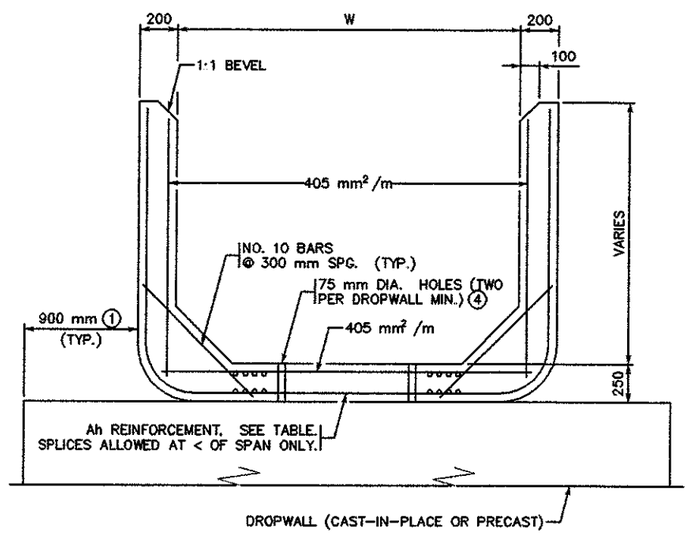


PLAN VIEW

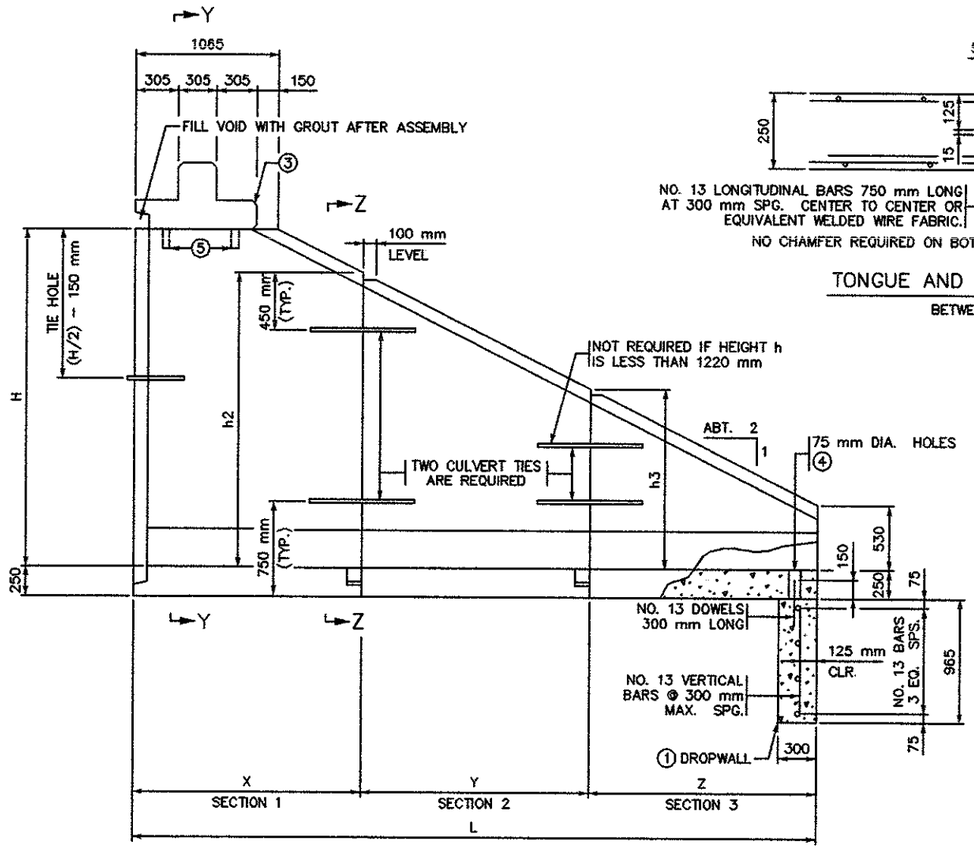
SOME REINFORCEMENT NOT SHOWN.



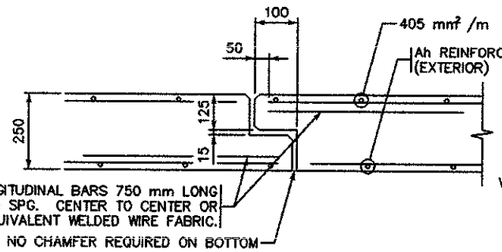
SECTION Y–Y



SECTION Z–Z

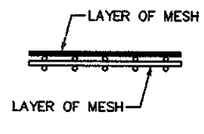


SIDE ELEVATION



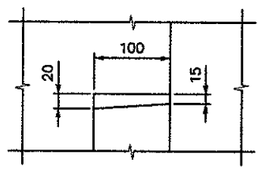
TONGUE AND GROOVE JOINT DETAIL

BETWEEN END SECTIONS.



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.



DETAIL "D"

NOTES:

SEE FIG. 5–395.101M FOR DIMENSIONS AND CONSTRUCTION NOTES, EXCEPT AS NOTED.

LONGITUDINAL REINFORCEMENT PARALLEL TO THE AXIS OF THE CULVERT SHALL HAVE A MINIMUM OF 130 SQ. MILLIMETERS PER PERIPHERAL METER ON ALL FACES OF THE BARREL, EXCEPT IN THE TONGUE AND GROOVE AREA.

SEE FIG. 5–395.115M FOR EMBANKMENT PROTECTION.

FINISH ALL EXPOSED EDGES OF CONCRETE WITH 15 MILLIMETER OR 20 MILLIMETER CHAMFER OR RADIUS UNLESS OTHERWISE NOTED.

① WITH MULTIPLE BOXES LOCATE DROPWALL JOINTS BETWEEN END SECTIONS. SEE FIG. 5–395.111M FOR ALTERNATE DROPWALLS. LIMITS OF EXCAVATION FOR DROPWALL TO BE APPROXIMATELY THE SAME AS DROPWALL DIMENSIONS. DROPWALL TO BE CONCRETE MIX NO. 1A43 OR 3Y43. FURNISHING AND INSTALLATION OF DROPWALL TO BE INCLUDED IN PRICE BID FOR END SECTIONS. DROPWALL NOT REQUIRED FOR NON–WATERWAY USE.

② CHECK LOCATION TO DETERMINE WHETHER A TONGUE OR A GROOVE IS USED.

③ SEE FIG. 5–395.104M (SHEET 2 OF 2) FOR LINTEL BEAM DETAILS.

④ FILL HOLE WITH GROUT. 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 100 MILLIMETERS.

⑤ 50 MILLIMETER DIA. HOLE, 150 MILLIMETERS DEEP IN TOP OF THE SECTION WALL.

⑥ 1065 MILLIMETER TONGUE AND 1090 MILLIMETER GROOVE FOR 1830 MILLIMETER WIDE CULVERTS.
1525 MILLIMETER TONGUE AND 1550 MILLIMETER GROOVE FOR CULVERTS OVER 1830 MILLIMETERS WIDE.
CENTER TONGUE AND GROOVE ON < OF EACH APRON JOINT.

APRON DIMENSIONS & Ah REINFORCEMENT

H (mm)	L (mm)	SECTION 1 X (mm)	SECTION 1 Ah	h2 (mm)	SECTION 2 Y (mm)	SECTION 2 Ah	h3 (mm)	SECTION 3 Z (mm)	SECTION 3 Ah	h4 (mm)	SECTION 4 ZZ (mm)	SECTION 4 Ah	h5 (mm)
1220	2440	2440	410	530									
1520	3050	1830	410	1150	1220	410	530						
1830	3660	1830	410	1450	1830	410	530						
2130	4270	1830	410	1750	2440	410	530						
2440	4880	1830	420	2060	1830	410	1150	1220	410	530			
2740	5490	1830	610	2375	1830	420	1450	1830	410	530			
3050	6100	1830	890	2675	1830	610	1750	2440	410	530			
3350	6710	1830	1270	2975	1830	890	2050	1830	410	1150	1220	410	530
3660	7320	1830	1650	3275	1830	1270	2360	1830	420	1450	1830	410	530

NOTE: Ah IS AREA OF REINFORCEMENT PER METER OF LENGTH (mm^2/m).

APPROVED: SEPTEMBER 19, 1996
STATE BRIDGE ENGINEER

minnesota metric

S.A.P. 55–599–70

FIG. 5–395.104M (1 OF 2)

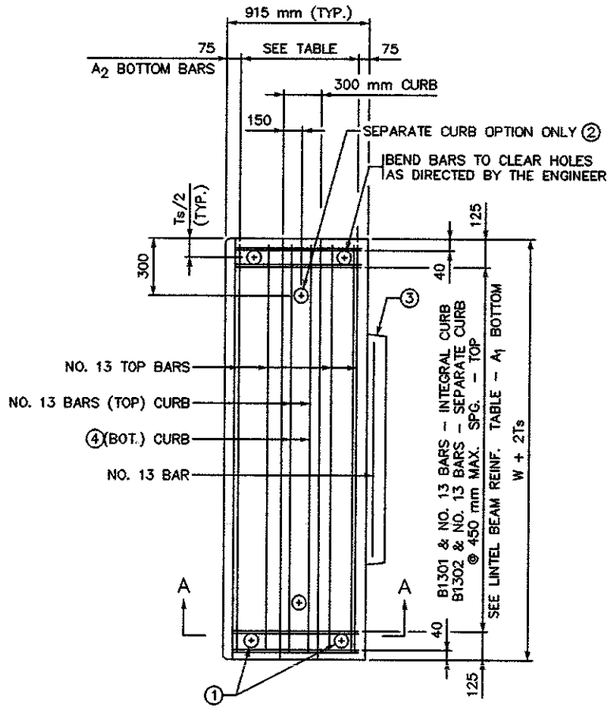
CERTIFIED BY: Kaye M Brenneke
PROFESSIONAL ENGINEER
REG. NO. 19917 11/8 19 99

TITLE: PRECAST CONCRETE END SECTION TYPE III–SINGLE OR MULTI–BARREL FOR SKEWS UP TO 7 1/2°

DES: | DR: | APPROVED:
CHK: | CHK:

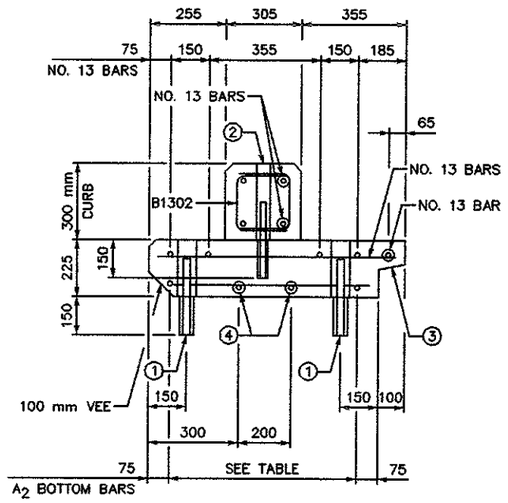
SHEET NO. 11 OF 12 SHEETS

BRIDGE NO. 55J22



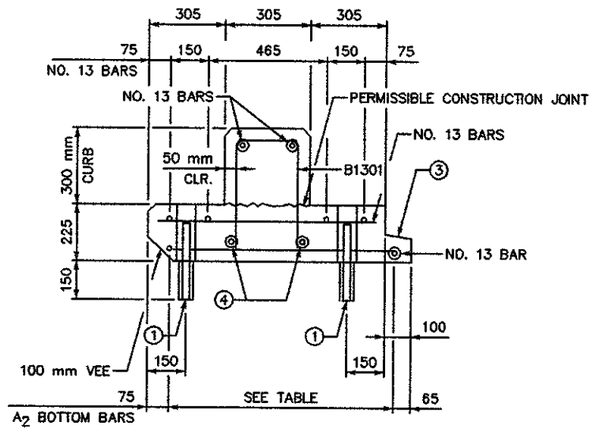
PLAN OF SQUARE LINTEL BEAM

TONGUE OPTION SHOWN.



SECTION A-A

SEPARATE CURB OPTION WITH GROOVE
(ADDITIONAL REINFORCEMENT IN GROOVE NOT SHOWN).



SECTION A-A

INTEGRAL CURB OPTION WITH TONGUE
(ADDITIONAL REINFORCEMENT IN TONGUE NOT SHOWN).

NOTES:

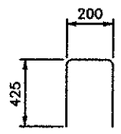
GROUT SHALL CONSIST OF 1 PART CEMENT AND 2 PARTS SAND. USE TYPE 1A AIR ENTRAINED PORTLAND CEMENT. GROUT MIX SHALL HAVE A MAXIMUM SLUMP OF 100 MILLIMETERS.

(1) 75 MILLIMETER DIAMETER HOLE THROUGH LINTEL BEAM AND 50 MILLIMETERS DIAMETER HOLE IN TOP OF WALL SECTION. PLACE NO. 25 DOWEL, 300 MILLIMETERS LONG, IN HOLE AND FILL HOLE WITH GROUT.

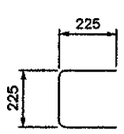
(2) 75 MILLIMETER DIAMETER HOLE THROUGH CURB AND 50 MILLIMETER DIAMETER HOLE IN LINTEL BEAM. PLACE NO. 25 DOWEL, 300 MILLIMETERS LONG, IN HOLE AND FILL HOLE WITH GROUT.

(3) CHECK THE LOCATION TO DETERMINE WHETHER A TONGUE OR A GROOVE IS USED. TONGUE AND GROOVE TO TERMINATE AT HAUNCH.

(4) FOR SPANS UNDER 3050 MILLIMETERS USE NO. 25 BARS. FOR SPANS OF 3050 MILLIMETERS TO 3660 MILLIMETERS USE NO. 29 BARS.



B1301



B1302

LINTEL BEAM REINFORCEMENT TABLE				
WIDTH W (mm)	1200 mm DESIGN FILL HEIGHT		600 mm DESIGN FILL HEIGHT	
	BOTTOM REINFORCEMENT		BOTTOM REINFORCEMENT	
	A_1	A_2	A_1	A_2
1830	NO. 13 @ 350 mm	NO. 13 @ 240 mm	NO. 13 @ 450 mm	NO. 13 @ 400 mm
2440	NO. 13 @ 200 mm	NO. 16 @ 200 mm	NO. 13 @ 325 mm	NO. 13 @ 225 mm
3050	NO. 16 @ 200 mm	NO. 19 @ 190 mm	NO. 13 @ 225 mm	NO. 13 @ 150 mm
3660	NO. 16 @ 150 mm	NO. 19 @ 150 mm	NO. 16 @ 225 mm	NO. 16 @ 150 mm

NOTE: MAXIMUM BAR SPACING GIVEN; REDUCE AS NECESSARY.

APPROVED: SEPTEMBER 19, 1996
Donald J. Flemming
STATE BRIDGE ENGINEER

minnesota metric

S.A.P. 55-599-70

FIG. 5-395.104M (2 OF 2)

CERTIFIED BY: Kaye M Bucnick
PROFESSIONAL ENGINEER
REG. NO. 19917 11/8 1999

TITLE: PRECAST CONCRETE END SECTION TYPE III-SINGLE OR MULTI-BARREL FOR SKEWS UP TO 7 1/2°

DES: | DR: | APPROVED:
CHK: | CHK:

SHEET NO. 12 OF 12 SHEETS

BRIDGE NO. 55J22