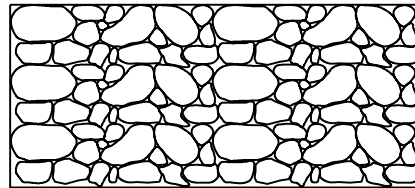
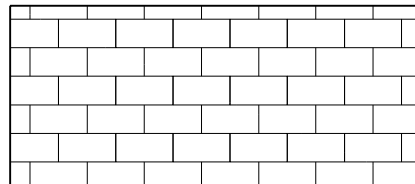


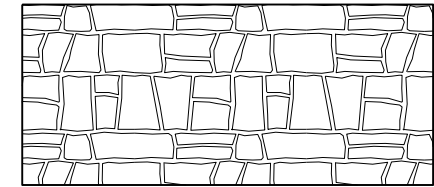
**BROKEN RIB**  
 FORMLINER THICKNESS =  $3" \pm 1/2"$   
 WIDTH =  $2" \pm 1/2"$   
 MAX. RELIEF =  $2" \pm 1/2"$



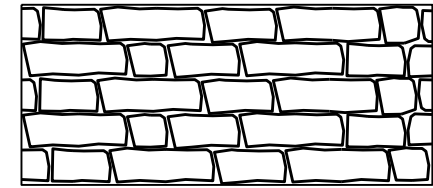
**FIELD STONE - RANDOM**  
 FORMLINER THICKNESS =  $3/2"$   
 SIZES BETWEEN 6" & 24"  
 MAX. RELIEF =  $2/2"$



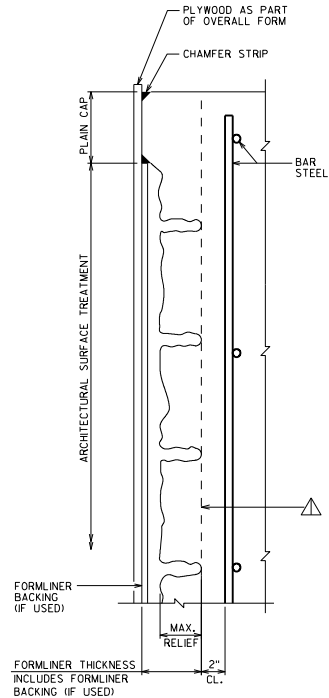
**RECTANGULAR BRICK**  
 FORMLINER THICKNESS = 2"  
 SIZE = VARIES  
 MAX. RELIEF = 1"



**RUSTIC ASHLAR**  
 FORMLINER THICKNESS = 3"  
 SIZE = 8" TO 32"  
 MAX. RELIEF = 2"



**RECTANGULAR CUT STONE**  
 FORMLINER THICKNESS = 4" TO 5/2"  
 COURSE HEIGHT =  $\pm 2"$   
 MAX. RELIEF = 3" TO 4/2"



**SECTION THRU FORMLINER**

△ STRUCTURAL CONCRETE CAN ONLY BE ASSUMED TO TO THIS LINE. PROVIDE ADDITIONAL STRUCTURE SIZE AS NECESSARY TO MAINTAIN MINIMUM FULL STRUCTURAL CONCRETE DIMENSIONS AS INDICATED ON THE STANDARDS.

**RETAINING WALL NOTES**

FORMLINER COURSING ON RETAINING WALLS SHALL BE LEVEL

**ABUTMENT NOTES**

FORMLINER COURSING ON ABUTMENTS AND WINGS SHALL BE LEVEL.

THE FORMLINER COURSING ON THE WINGS SHALL BE VERTICALLY ALIGNED WITH THE FORMLINER COURSING ON THE FRONT OF THE ABUTMENT.

THE FORMLINER PATTERN SHALL BE CONTINUOUS ACROSS CONSTRUCTION JOINTS.

WRAPAROUND/MATCH FORMLINER PATTERN AT CORNERS.

**PIER NOTES**

FORMLINER COURSING ON PIERS SHALL BE LEVEL.

THE FORMLINER COURSING ON ALL FACES OF EACH COLUMN SHALL BE VERTICALLY ALIGNED.

SPACE ADJACENT PORTIONS OF FORMLINER ON SLOPED FACE SO THAT COURSING IS ALIGNED VERTICALLY WITH COURSING ON VERTICAL FACE.

THE FORMLINER PATTERN SHALL BE CONTINUOUS ACROSS CONSTRUCTION JOINTS.

WRAPAROUND/MATCH FORMLINER PATTERN AT CORNERS.

**PARAPET NOTES**

FORMLINER COURSING ON PARAPETS SHALL BE PARALLEL TO TOP OF PARAPET.

**FORMLINER DETAILS**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

DATE:  
 7-13





### DESIGNER NOTES

LAP LENGTHS FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.

PILING SPACING IN ABUTMENT BODY SHALL BE 8'-0" MAX. FOR ALL TYPES OF PILING. THE MAX. PILE SPACING FROM THE END OF THE ABUT. BODY TO THE FIRST PILE SHALL BE THE MINIMUM OF ONE-HALF PILE SPACE OR 2'-6".

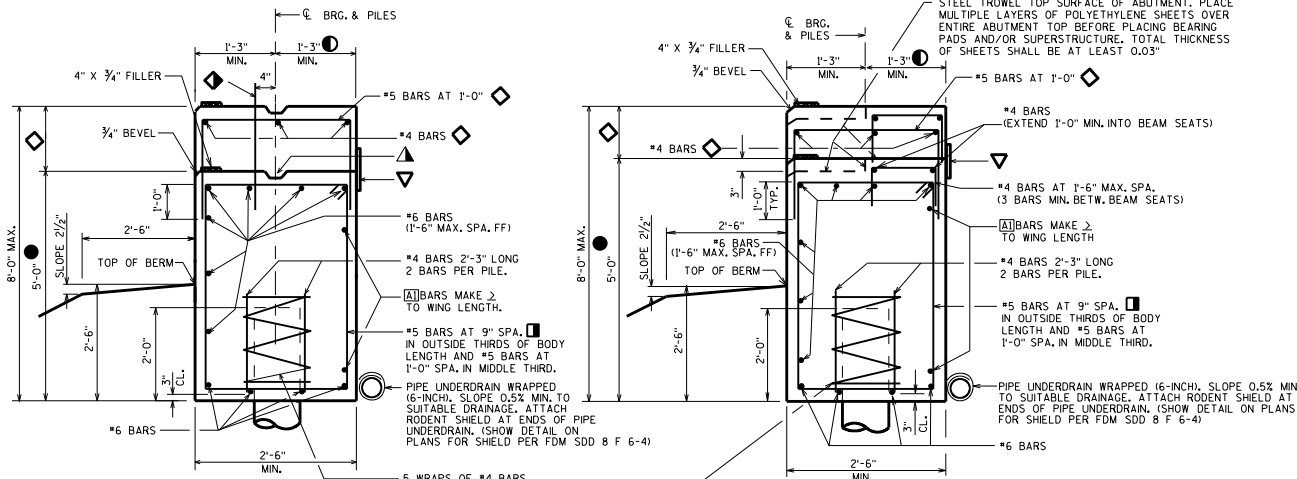
CONCRETE POURED UNDER WATER WILL BE ALLOWED AND SHALL BE DONE IN ACCORDANCE WITH SECTION 502.3.5.3 STANDARD SPECIFICATIONS.

THE SEMI-EXPANSION SEAT SHALL BE USED WHEN REQUIRED AS STATED IN CHAPTER 12, FIGURE 12.7-1 OF THE BRIDGE MANUAL OR WHENEVER A WING PILE IS REQUIRED.

THE FIXED SEAT CANNOT BE USED WHEN A WING PILE IS REQUIRED (SEE STD 12.02 FOR CRITERIA)

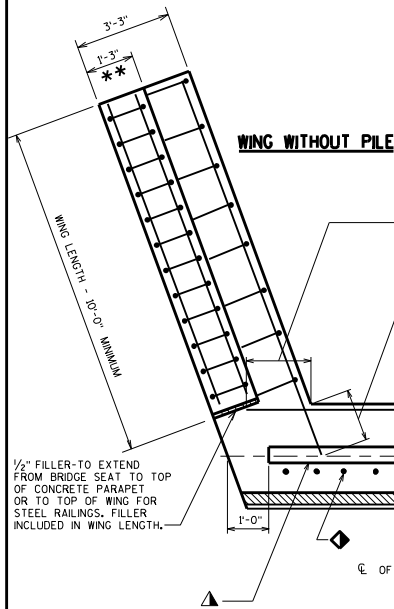
### LEGEND

- ◆ #5 BARS (COATED) AT 1'-0" (2'-0" LONG). THESE BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE.
- ◇ WHEN THIS DIMENSION  $\geq$  4" THIS ADDITIONAL REINFORCEMENT SHALL BE ADDED. MAX. SPA. OF HORIZ. #4 BARS = 1'-0".
- USE 1'-3" FOR SLAB SPANS AND FOR GIRDER SPANS WITH NO PAVING NOTCH. USE 1'-6" FOR GIRDER SPANS WITH NO PAVING NOTCH, BUT WHERE 36", 45", 54", 54", 70", 72" OR 82" GIRDERS ARE USED, AND SKEW  $>$  25°. USE 1'-3" FOR SLAB SPANS WITH A PAVING NOTCH, BUT NO STRUCTURAL APPROACH SLAB.
- ▲ USE 1'-11" FOR GIRDER SPANS WITH A PAVING NOTCH, BUT NO STRUCTURAL APPROACH SLAB.
- USE 1'-7" FOR SLAB SPANS WITH A STRUCTURAL APPROACH SLAB. (STD. 12.10) USE 2'-3" FOR GIRDER SPANS WITH A STRUCTURAL APPROACH SLAB. (STD. 12.10)
- DIMENSION IS FROM BOTTOM OF ABUTMENT TO LOW BEAM SEAT OR LOW SIDE OF SLAB TYPE SUPERSTRUCTURE.
- ▽ 18" RUBBERIZED MEMBRANE WATERPROOFING. SEAL ALL HORIZONTAL AND VERTICAL JOINTS ON BACKFACE.
- ▲ KEYED CONST. JOINT FORMED BY BEVELED 2" x 6".
- \*\* WINGWALL WIDTH SHALL BE 1'-6" WHEN TYPE "M" RAILING, VERTICAL FACE PARAPET "TX", OR SINGLE SLOPE PARAPET "56SS" IS USED.
- USE #5 BARS AT 6" SPA. IN OUTSIDE THIRDS OF BODY LENGTH WHEN THE WING LENGTH  $>$  20'-0" AND WING HEIGHT  $>$  10'-0".
- ★ WHEN BODY SECTION IS  $>$  50'-0"± LONG PROVIDE VERTICAL CONSTRUCTION JOINT. RUN BAR STEEL THRU JOINT AND SEAL JOINT WITH 18" RUBBERIZED MEMBRANE WATERPROOFING. SEE STD. 12.09 FOR ALTERNATE CONSTRUCTION JOINT.



**TYPE A1 WITH FIXED SEAT**

**TYPE A1 WITH SEMI-EXPANSION SEAT**

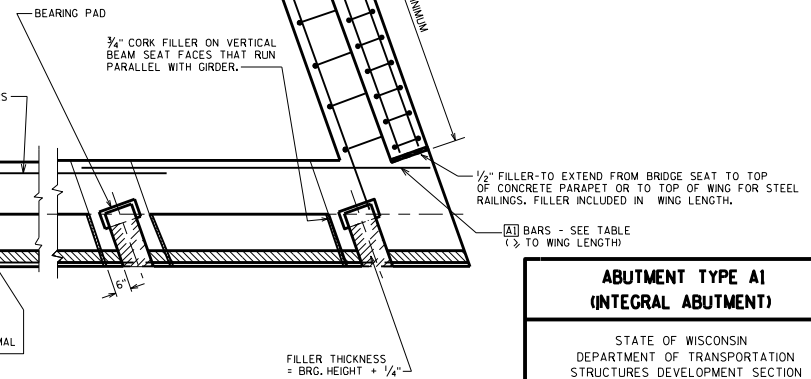


**WING WITHOUT PILE**

DISTANCE (OR EQUIVALENT STD. HOOK)	BAR SIZE
1'-9"	5
2'-1"	6
2'-9"	7
3'-8"	8
4'-7"	9
5'-10"	10

▲ BARS - SEE TABLE ( $\geq$  TO WING LENGTH)

**WING WITH PILE**



**SLAB SPAN WITH FIXED SEAT**

**GIRDER SPAN WITH FIXED SEAT**

**SLAB SPAN WITH SEMIEXPANSION SEAT**

**GIRDER SPAN WITH SEMIEXPANSION SEAT**

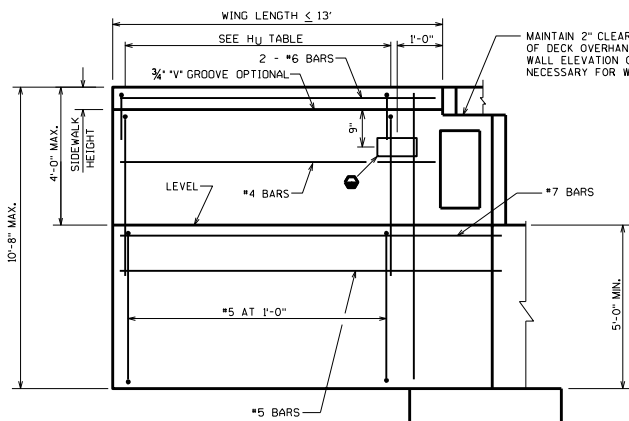
### ABUTMENT TYPE A1 (INTEGRAL ABUTMENT)

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

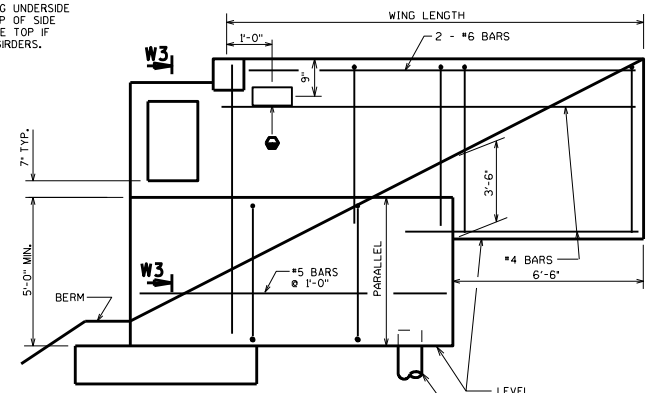
APPROVED: *Bill Oliva*

DATE:  
7-13

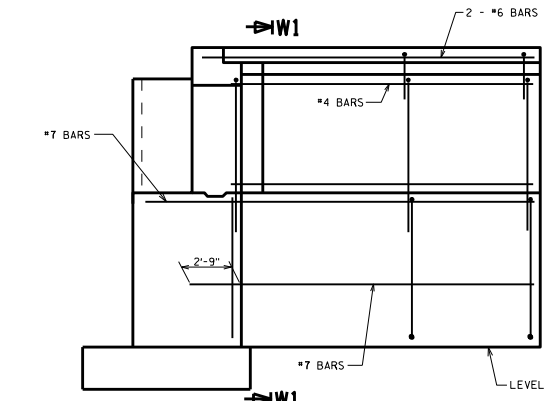




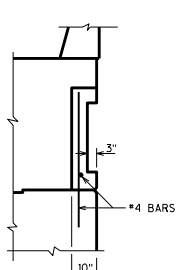
**WING WITHOUT PILE ELEVATION**  
(FRONT FACE)



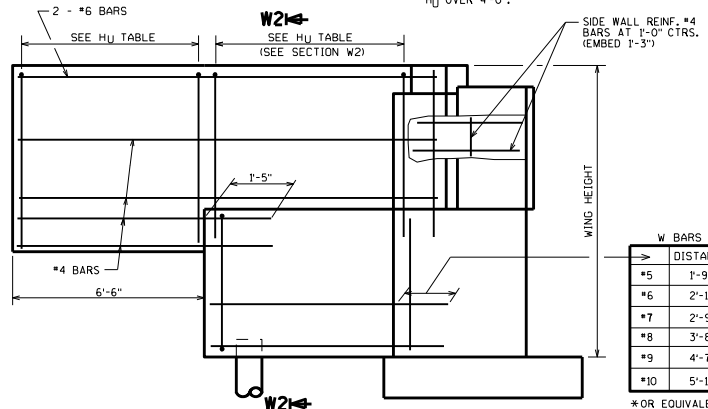
**WING WITH PILE ELEVATION**  
(FRONT FACE)



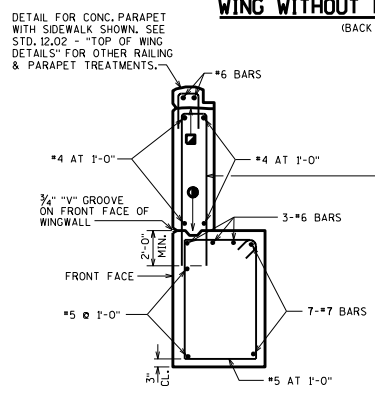
**WING WITHOUT PILE ELEVATION**  
(BACK FACE)



**SECTION W3**

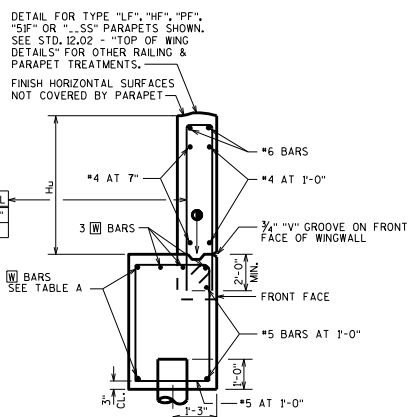


**WING WITH PILE ELEVATION**  
(BACK FACE)



**SECTION W1**  
WING WITHOUT PILE

H <sub>u</sub>	STEEL RAIL	CONC. RAIL
< 7'-0"	#6 @ 9"	#5 @ 1'-0"
7'-0"-9'-6"	#6 @ 9"	#5 @ 6"



**SECTION W2**  
WING WITH PILE

**DESIGNER NOTES**

- LENGTH OF A3 BARS SHALL BE ≥ TO WING LENGTH.
- WING WITH PILE & WING WITHOUT PILE CAN BE USED FOR EITHER SIDEWALK OR SLOPED FACE PARAPETS. THE TYPE OF WING TO USE IS BASED ONLY ON THE WING HEIGHT AND WING LENGTH LIMITATIONS SHOWN.
- LAP LENGTH FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.
- BARS IN WINGS, ABUTMENT BACKWALL AND PAVING BLOCK SHALL BE EPOXY COATED.
- NAME PLATE (ONLY FOR TYPE "F", "W" AND "M" OR TIMBER RAIL AS SHOWN ON STANDARD 30,24), LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.
- FRONT ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WGT. OF SOIL OF 40 P.C.F. WITH δ<sub>PEH</sub> = 1.50, AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WGT. OF SOIL OF 40 P.C.F. WITH δ<sub>PEH</sub> MIN. = 0.90, AND "P".
- FOR MODULAR EXPANSION JOINTS W/CONC. DIAPH. RUNNING TO EDGE OF DECK: IF SIDEWALK IS USED, FORM SIDEWALK 2" BELOW CONC. DIAPH.
- CONSTRUCTION JOINT, LEAVE ROUGH. REQUIRED FOR PRESTRESSED CONCRETE SUPERSTRUCTURES. OPTIONAL FOR OTHERS. POUR CONCRETE ABOVE THIS JOINT AFTER DECK IS IN PLACE.
- OPTIONAL CONST. JOINT FORMED BY BEVELED 2' x 6" KEYWAY WITH MEMBRANE ON BACKFACE.

**LRFD DESIGN LOADS**

LIVE LOAD = 2'-0" SURCHARGE  
LOAD FACTORS:  
 γ<sub>DC</sub> = 1.25  
 γ<sub>SW</sub> = 1.50  
 γ<sub>SEN</sub> = 1.50  
 γ<sub>PEH</sub> MIN. = 0.90  
 γ<sub>PEV</sub> = 1.35  
 γ<sub>LL</sub> = 1.75  
 EXPOSURE CLASS 2, γ<sub>E</sub> = 0.75  
 f<sub>y</sub> = 60,000 P.S.I.  
 f'<sub>c</sub> = 3,500 P.S.I.  
 HORIZ. EARTH LOAD BASED ON: 35 P.C.F. EQUIV. FLUID UNIT WEIGHT OF SOIL

**TABLE A**

WING 2 LENGTH	WING 2 HEIGHT				BARS
	10'-0"	11'-6"	13'-0"	14'-6"	
12'-0"	6-#6's	7-#5's	8-#7's	8-#7's	A3
16'-0"	8-#6's	7-#7's	8-#7's	7-#7's	A3
20'-0"	8-#7's	9-#7's	9-#8's	10-#8's	A3
24'-0"	9-#8's	10-#8's	10-#9's	8-#10's + W	A3
26'-0"	9-#8's	9-#9's	9-#10's	10-#10's + W	A3
	7-#10's	9-#10's	9-#10's	10-#10's + W	A3

W BARS	DISTANCE*
#5	1'-9"
#6	2'-1"
#7	2'-9"
#8	3'-8"
#9	4'-7"
#10	5'-10"

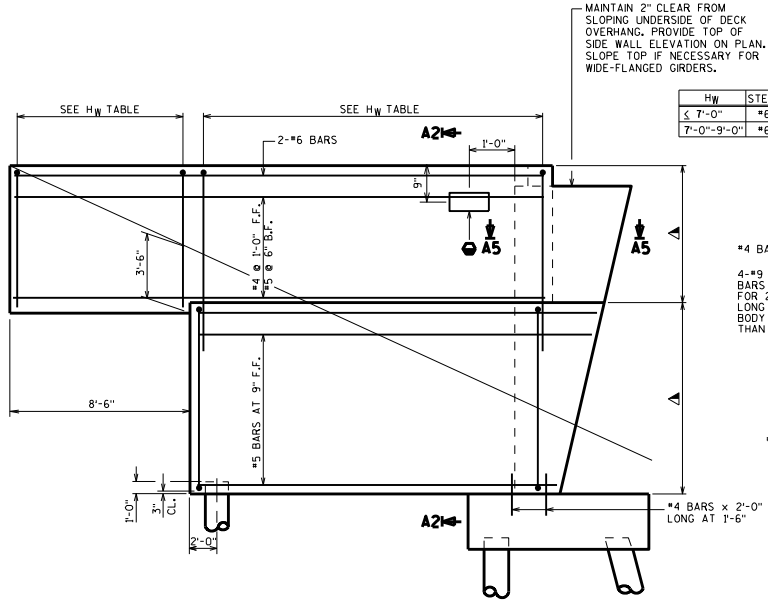
\*OR EQUIVALENT STANDARD HOOK

- \*\* USE 4'-6" FOR LOWER WING POUR WIDTH
- \*\* USE 3'-3" MIN. FOR BEARING SEAT WIDTH

**ABUTMENT TYPE A3**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva* DATE: 7-13



**WING ELEVATION**  
WING LENGTH TO 26'-6"

MAINTAIN 2" CLEAR FROM SLOPING UNDERSIDE OF DECK OVERHANG, PROVIDE TOP OF SIDE WALL ELEVATION ON PLAN. SLOPE TOP IF NECESSARY FOR WIDE-FLANGED GIRDERS.

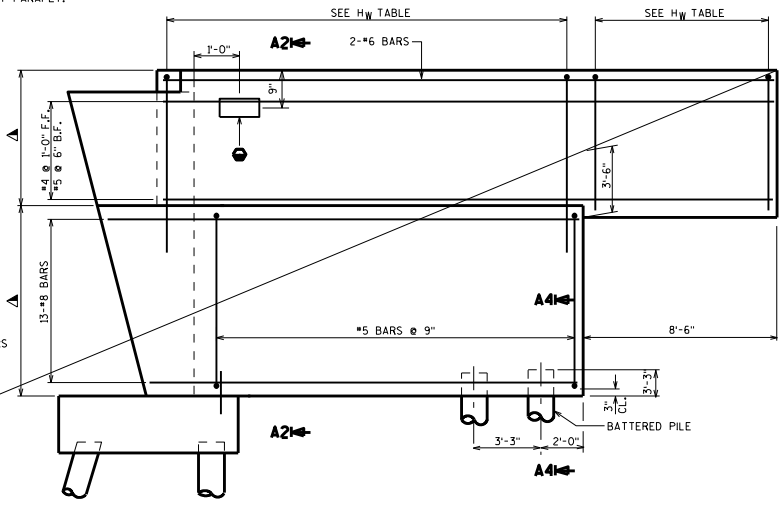
Hw	STEEL RAIL	CONC. RAIL
≤ 7'-0"	*6 @ 9"	*5 @ 1'-0"
7'-0"-9'-0"	*6 @ 9"	*5 @ 6"

4-#9 BARS, USE 2-#9 BARS AND 2-#10 BARS FOR 26'-6" TO 29'-6" LONG WING WITH ABUT. BODY HEIGHT LESS THAN 6'-0"

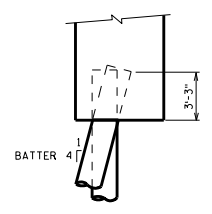
**SECTION A2**  
ALL WING LENGTHS

DETAIL FOR TYPE "LF", "HF", "PF", "SJF" OR "SS" PARAPETS SHOWN, SEE STD. 12.02 - "TOP OF WING DETAILS" FOR OTHER RAILING & PARAPET TREATMENTS.

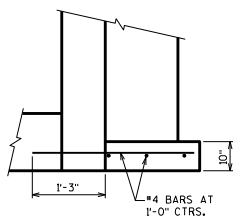
FINISH HORIZONTAL SURFACES NOT COVERED BY PARAPET.



**WING ELEVATION**  
WING LENGTH OVER 26'-6" TO 29'-6"



**SECTION A4**



**SECTION A5**

**DESIGNER NOTES**

BODY DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WGT. OF SOIL OF 35 P.C.F. AND A 2'-0" SURCHARGE. A 5 KIP LATERAL RESISTANCE IS USED FOR EACH WING PILE.  
FRONT ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WGT. OF SOIL OF 40 P.C.F. WITH  $\delta_{PEH} = 1.50$ , AND SUPERSTRUCTURE REACTIONS "P". BACK ROW PILE DESIGN IS BASED ON AN EQUIVALENT FLUID UNIT WEIGHT OF SOIL OF 20 P.C.F. WITH  $\delta_{PEH_{MIN}} = 0.90$ , AND "P".  
UNIT WEIGHT OF SOIL IS ASSUMED AS 120 P.C.F.

BRIDGE SEATS BETWEEN BEARINGS SHALL SLOPE 1" FROM FRONT FACE OF BACKWALL.  
PAY LIMITS FOR EXCAVATION FOR STRUCTURES & GRANULAR BACKFILL IS SHOWN IN CHAPTER 12 OF THE BRIDGE MANUAL.  
BARS IN WINGS, ABUTMENT BACKWALL AND PAVING BLOCK SHALL BE EPOXY COATED.

NAME PLATE (ONLY FOR TYPE "F", "W" AND "M" OR TIMBER RAIL AS SHOWN ON STANDARD 30.24), LOCATE NAME PLATE ON FIRST RIGHT WING TRAVELING UP STATION.  
FOR MODULAR EXPANSION JOINTS W/CONC. DIAPH, RUNNING TO EDGE OF DECK; IF SIDEWALL IS USED, FORM SIDEWALL 2" BELOW CONC. DIAPH.

\*4 DOWELS (COATED), 2'-0" L.G. AT 1'-0" CTRS. FROM WING TIP TO PAVING NOTCH, PLACE IN WING ADJACENT TO SURFACE DRAIN APRON ONLY.

DIMENSIONS TO BE CONSTANT.

**LRFD DESIGN LOADS**

LIVE LOAD  
BODY = 1'-6" SURCHARGE  
WINGS = 2'-0" SURCHARGE  
HORIZ. EARTH LOAD BASED ON:  
BODY = 40 P.C.F. EQUIV. FLUID UNIT WGT. OF SOIL  
WINGS = 35 P.C.F. EQUIV. FLUID UNIT WGT. OF SOIL  
LOAD FACTORS:  
 $\gamma_{DC} = 1.25$   
 $\gamma_{DW} = 1.50$   
 $\gamma_{EH} = 1.50$   
 $\gamma_{EM} = 0.90$   
 $\gamma_{EV} = 1.35$   
 $\gamma_{LL} = 1.75$   
EXPOSURE CLASS 2,  $\gamma_{E} = 0.75$   
 $f_y = 60,000$  P.S.I.  
 $f_c = 3,500$  P.S.I.

<b>ABUTMENT A4 PILE FOOTING</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13

### DESIGNER NOTES

THIS TYPE OF WING SHOULD BE USED WHEN POSSIBLE IN LIEU OF WINGS PARALLEL TO THE ROADWAY. DO NOT USE FOR STREAM CROSSINGS WHERE HIGH WATER MAY BE A PROBLEM.

\*USE 2 1/2:1 FOR THE UNSTABLE CLAYS WHICH ARE SOMETIMES ENCOUNTERED IN NORTHWEST WISC. (SUPERIOR AREA)

① WHEN TIMBER RAILING IS USED AS PER STANDARD 30.24, AND THE SKEW IS > 0°, THIS CONSTRUCTION JOINT SHALL BE MANDATORY. THE WING CONCRETE SHALL BE PLACED ABOVE CONSTR. JT. AFTER THE TIMBER END POSTS ARE IN PLACE.

ALL WING BARS SHALL BE EPOXY COATED.

### LRFD DESIGN LOADS (WINGS)

LIVE LOAD = 1'-0" SURCHARGE

LOAD FACTORS:

$\gamma_{DC} = 1.25$

$\gamma_{EH} = 1.50$

$\gamma_{LS} = 1.75$

EXPOSURE CLASS 2,  $\gamma_{Ft} = 0.75$

HORIZ. EARTH LOAD BASED ON: 35 P.C.F. EQUIV. FLUID UNIT

WEIGHT OF SOIL

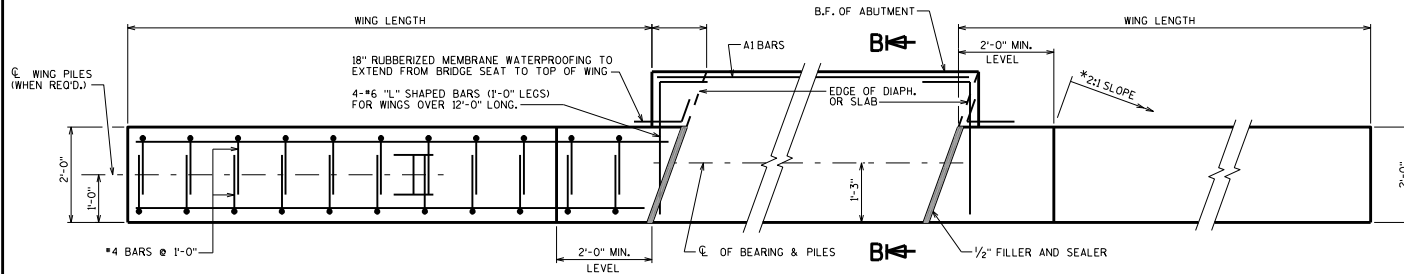
$F_y = 60,000$  P.S.I.

$F_c = 3,500$  P.S.I.

### TABLE A

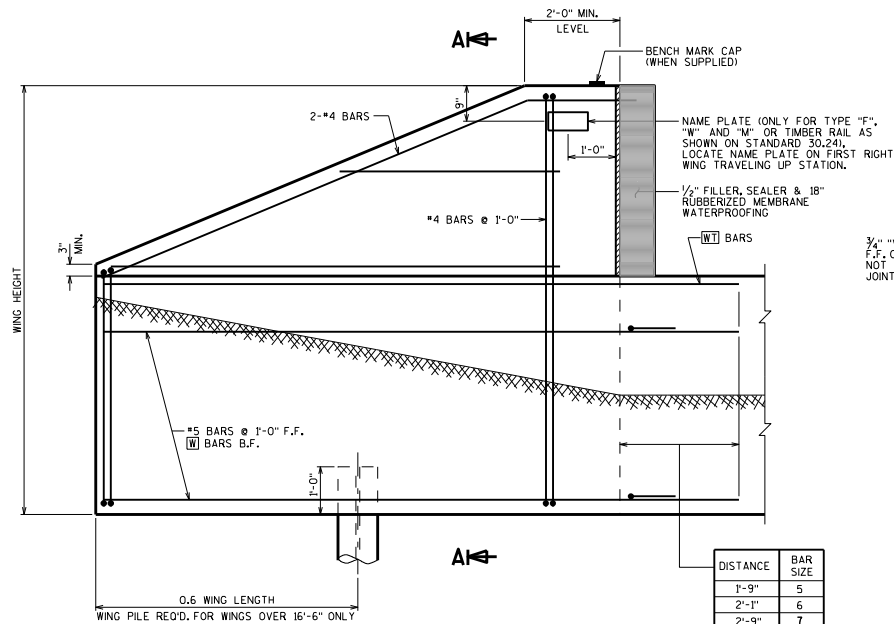
WING LENGTH	WING HEIGHT				BARS
	8'-6"	10'-0"	11'-6"	13'-0"	
5'-0"	5-#9's	5-#5's	6-#5's		W
	2-#5's	2-#5's	2-#5's		WT
10'-0"	4-#6's	4-#6's	5-#6's		A1
		5-#6's	5-#7's		W
12'-0"		2-#7's	2-#7's	2-#8's	WT
		5-#6's	6-#6's	6-#7's	A1
15'-0"		5-#8's	6-#8's	5-#9's	W
		2-#8's	2-#8's	2-#9's	WT
20'-0"		5-#8's	6-#8's	7-#8's	A1
			8-#8's	8-#9's	W
		2-#8's	2-#9's		WT
		7-#9's	8-#9's		A1

▲ WING PILE REQUIRED



### PLAN FOR TYPE A1 ABUTMENT

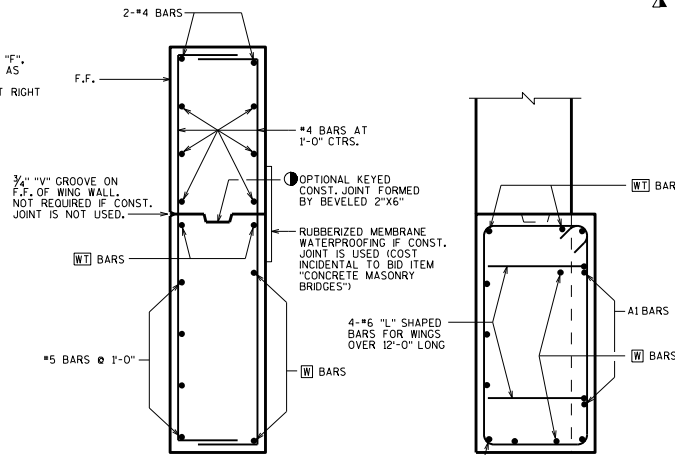
(SEE STD. 12.01 FOR ABUTMENT BODY DETAILS)



### WING ELEVATION

(A1 ABUTMENT)

DISTANCE	BAR SIZE
1'-9"	5
2'-1"	6
2'-9"	7
3'-8"	8
4'-7"	9



### SECTION A-A

### SECTION B-B

SEE STD. 12.01 & 12.02 FOR NOTES & DETAILS

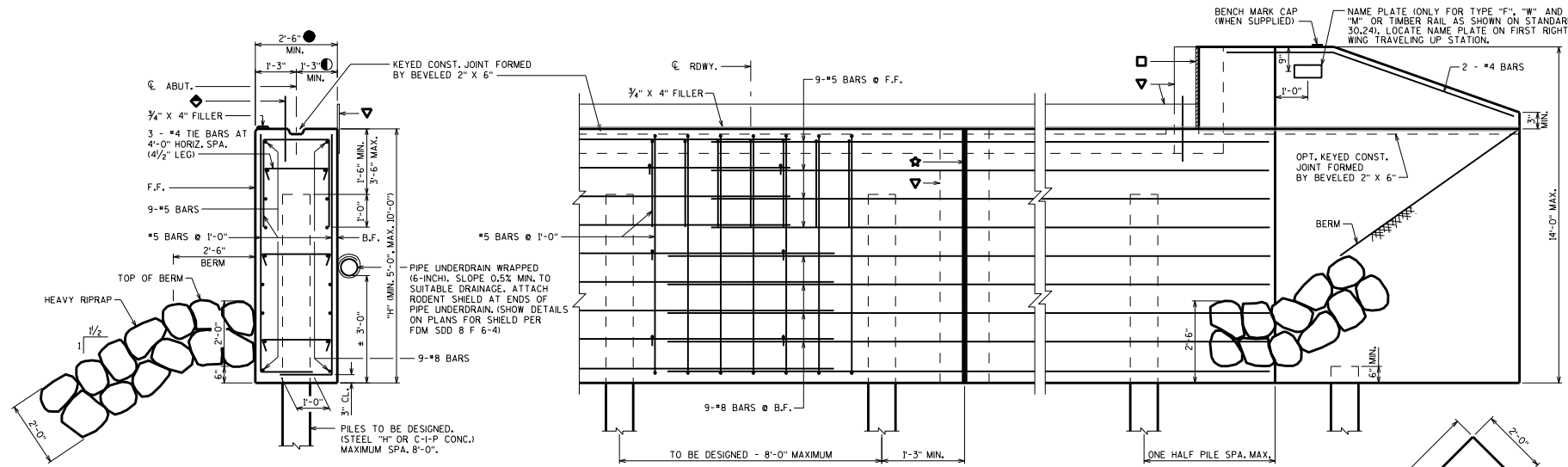
### DETAILS FOR WINGS PARALLEL TO A1 ABUTMENT CENTERLINE

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

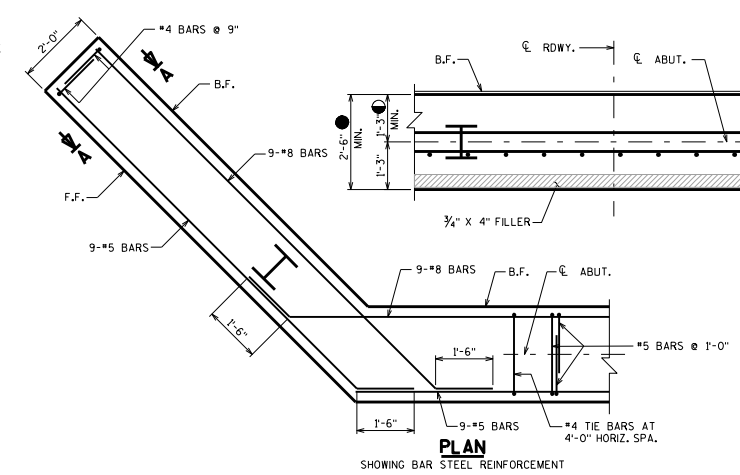
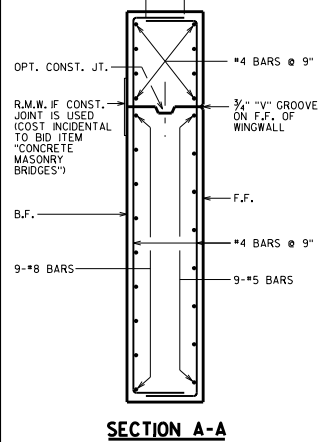
APPROVED: Bill Oliva

DATE:  
7-13



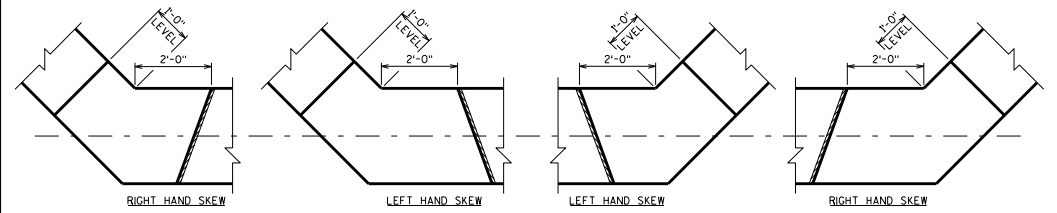


**TYP. SECTION THRU ABUTMENT BODY**



**ELEVATION**

**PLAN**

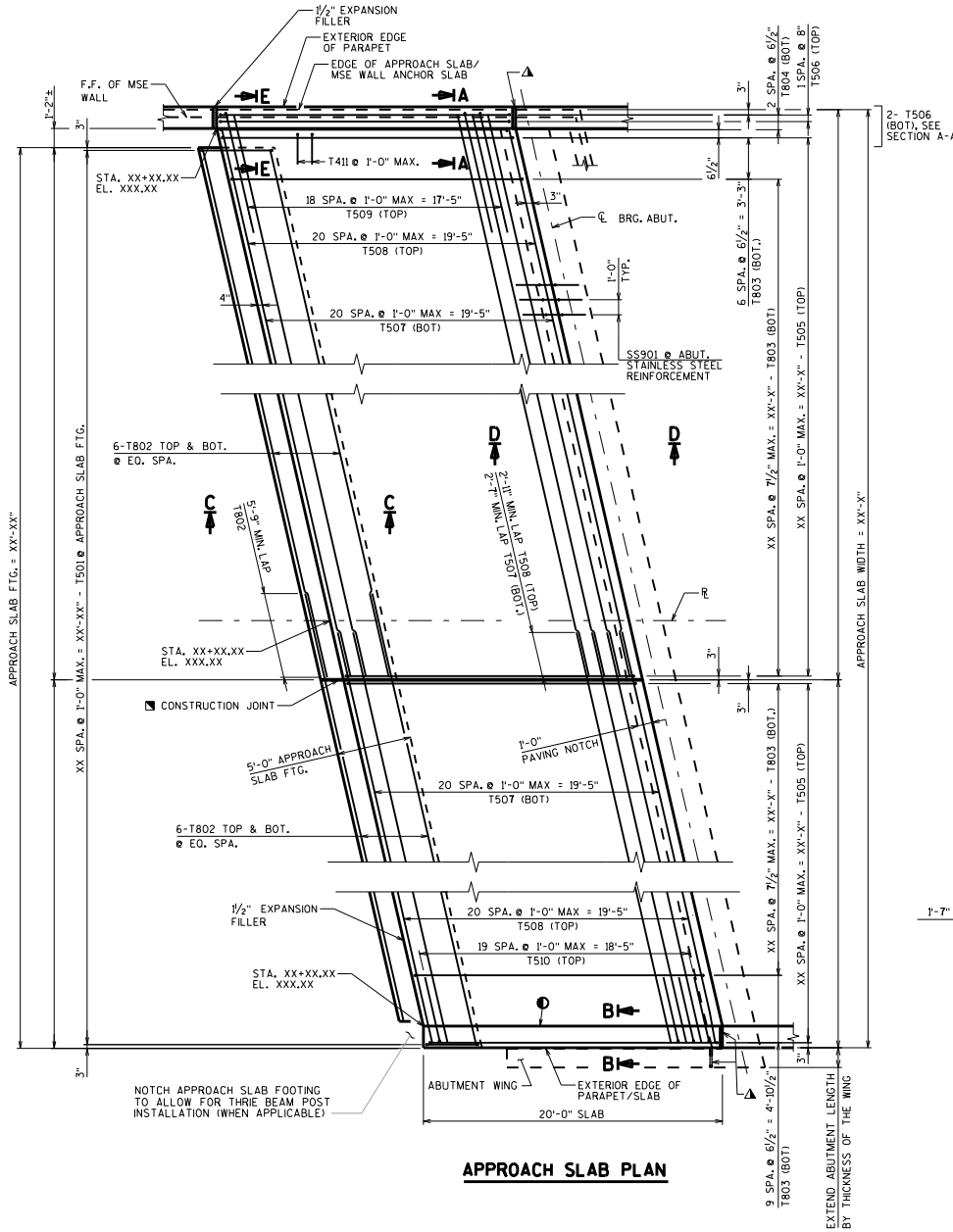


**WING DETAIL FOR SKEWED STRUCTURES**

**DESIGNER NOTES**

- SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF 1/2" FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER, (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONG.)
- DO NOT PLACE FILL ABOVE 3'-0" FROM BOTTOM OF ABUTMENT UNTIL SUPERSTRUCTURE IS IN PLACE.
- ▽ 18" RUBBERIZED MEMBRANE WATERPROOFING.
- WHEN ABUTMENT WIDTH > 2'-10" FIXED POINT OF WING ROTATION SHALL BE ON F.F. OF ABUTMENT (40° SKEW ONLY).
- ◆ THESE BARS MAY BE PLACED AFTER CONCRETE IS POURED, BUT BEFORE INITIAL SET HAS TAKEN PLACE. SEE STD. 12.01 & 27.05.
- ★ WHEN BODY SECTION IS > ± 50'-0" LONG, PROVIDE VERT. CONST. JOINT. RUN BAR STEEL THRU JOINT. BEVEL EXPOSED EDGES 3/4" AND SEAL JOINT. SEE STD. 12.09 FOR ALTERNATE CONSTRUCTION JOINT.
- USE 1'-3" FOR SLAB SPANS AND FOR GIRDER SPANS WITH NO PAVING NOTCH. USE 1'-6" FOR GIRDER SPANS WITH NO PAVING NOTCH, BUT WHERE 36", 45", 54", 54", 70", 72" OR 82" GIRDERS ARE USED, AND SKEW > 25°. USE 1'-3" FOR SLAB SPANS WITH A PAVING NOTCH, BUT NO STRUCTURAL APPROACH SLAB. USE 1'-11" FOR GIRDER SPANS WITH A PAVING NOTCH, BUT NO STRUCTURAL APPROACH SLAB. USE 1'-7" FOR SLAB SPANS WITH A STRUCTURAL APPROACH SLAB. (STD. 12.10) USE 2'-3" FOR GIRDER SPANS WITH A STRUCTURAL APPROACH SLAB. (STD. 12.10) LAP LENGTH FOR HORIZONTAL BARS SHALL BE BASED ON A "CLASS C" TOP TENSION LAP SPLICE.

<b>ABUTMENT A5 (INTEGRAL, PILE ENCASED ABUTMENT)</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



**APPROACH SLAB PLAN**

**DESIGNER NOTES**

STRUCTURAL APPROACH SLABS AND PARAPETS SHALL BE USED ON ALL LH, BRIDGES AND U.S.H. BRIDGES. OTHER LOCATIONS CAN BE CONSIDERED WITH THE APPROVAL OF THE CHIEF STRUCTURAL DESIGN ENGINEER.

STRUCTURAL APPROACH SLABS TO BE PART OF THE BRIDGE PLAN. BID ITEMS ARE CONCRETE MASONRY BRIDGES, BAR STEEL REINFORCEMENT HS COATED BRIDGES, ETC. POLYETHYLENE SHEETS SHALL BE INCIDENTAL TO CONCRETE MASONRY BRIDGES.

QUANTITIES FOR APPROACH SLABS SHALL BE SHOWN IN A SEPARATE COLUMN WITHIN THE TOTAL ESTIMATED QUANTITIES TABLE IN THE FINAL PLANS.

CONSTRUCTION JOINT REQUIRED WHEN WIDTH OF SUPERSTRUCTURE EXCEEDS 90'. RUN REINFORCEMENT THROUGH THE JOINT.

LONGITUDINAL APPROACH SLAB REINFORCEMENT SHALL BE PLACED PARALLEL TO THE APPROACH (I.E., NOT NORMAL TO THE ABUTMENT WITH SKEWED STRUCTURES).

STRUCTURE APPROACH SLABS TO BE DETAILED TO MATCH THE BRIDGE DECK (I.E., PROTECTIVE SURFACE TREATMENT, STAINLESS STEEL REINFORCEMENT, LONGITUDINAL GROOVING, ETC.).

THE BID ITEM FOR SS901 BARS SHALL BE SPECIAL PROVISION "BAR STEEL REINFORCEMENT HS STAINLESS BRIDGES".

DESIGNER TO COORDINATE LOCATION OF SURFACE DRAINS, INLETS, AND/OR FLUMES WITH ROADWAY DESIGNER AND FDM SDD 802 OR 803.

**LEGEND**

SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF 1/2" FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONCRETE). EXTEND SEALER 3" BELOW GUTTER LINE AT INSIDE FACE.

SEE PARAPET STANDARD DETAILS FOR LOCATION OF NAME PLATE AND BENCH MARK WITH RESPECT TO THE END OF PARAPET.

**DESIGN DATA**

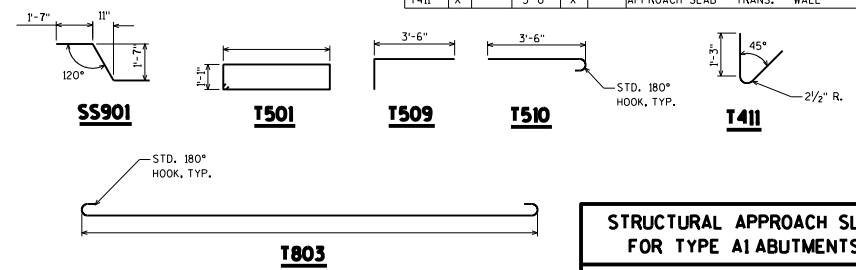
CONCRETE STRENGTH, f'c: 4,000 P.S.I.  
 BAR STEEL REINFORCEMENT, GRADE 60, fy: 60,000 P.S.I.  
 ALLOWABLE SOIL BEARING PRESSURE: 2,000 P.S.F.

NOTE: FOR NEW STRUCTURES ON NEW ALIGNMENTS, BASE AGGREGATE DENSE 1-1/4 INCH AS PER FDM 14-5 AND BRIDGE MANUAL FIGURE 12.6-2 SHALL BE UTILIZED. FOR REPLACEMENT STRUCTURES ON EXISTING ALIGNMENTS, THE EXISTING SOIL MAY REMAIN IN PLACE IF THE REGION SOIL'S ENGINEER DETERMINES THAT THE EXISTING SOIL BEARING PRESSURE MEETS THE REQUIREMENT ABOVE.

**BILL OF BARS**

NOTE: THE FIRST OR FIRST TWO DIGITS OF THE BAR MARK SIGNIFIES THE BAR SIZE.

BAR MARK	COAT	NO. REQ'D.	LENGTH	BENT	BAR SERIES	LOCATION
SS901			5'-0"	X		CONC. ABUT. DIAPH. TO APPROACH SLAB
T501	X			X		APPROACH SLAB FTG. - STIRRUP
T802	X					APPROACH SLAB FTG. - TRANS.
T803	X			X		APPROACH SLAB - LONG. - BOT.
T804	X					APPROACH SLAB - LONG. - BOT. - WALL
T505	X		19'-6"			APPROACH SLAB - LONG. - TOP.
T506	X					APPROACH SLAB - LONG. - WALL
T507	X					APPROACH SLAB - TRANS. - BOT.
T508	X					APPROACH SLAB - TRANS. - TOP.
T509	X		4'-3"	X		APPROACH SLAB - TRANS. - TOP - WALL
T510	X		4'-1"	X		APPROACH SLAB - TRANS. - TOP - WING
T411	X		3'-0"	X		APPROACH SLAB - TRANS. - WALL



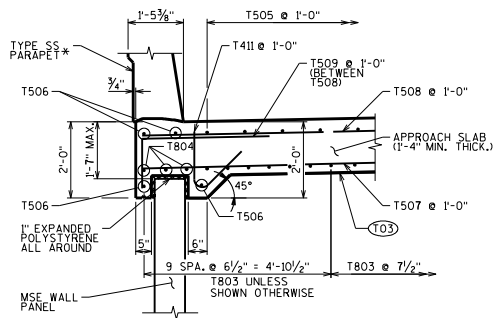
**STRUCTURAL APPROACH SLAB FOR TYPE A1 ABUTMENTS**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

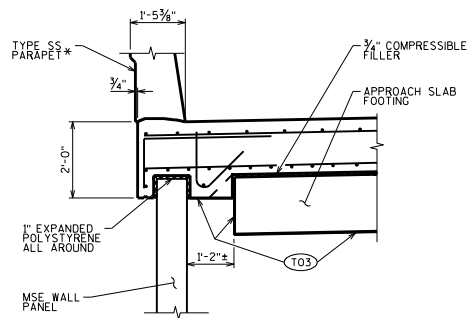
APPROVED: Bill Oliva

DATE: 7-13

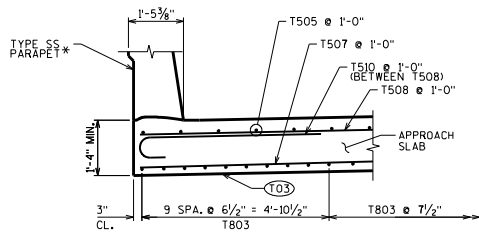
SECTIONS A-A THRU E-E ARE SHOWN ON STANDARD 12.11



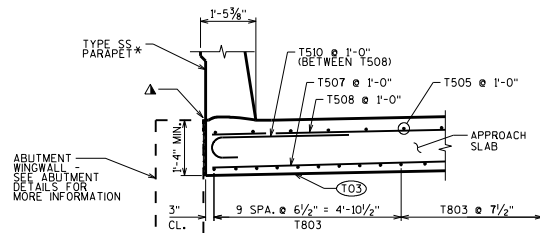
**SECTION A-A**  
(AT MSE WINGWALLS)



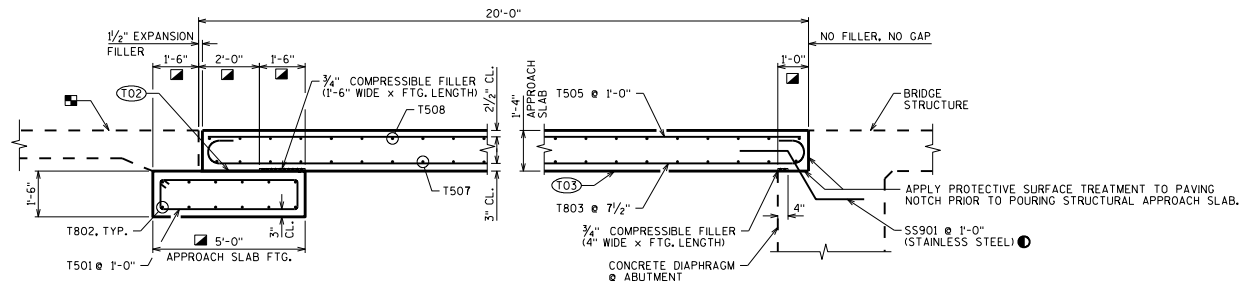
**SECTION E-E**  
(AT MSE WINGWALLS)



**SECTION B-B**  
(AT WINGWALLS PERP. TO BRIDGE)



**SECTION B-B**  
(AT WINGWALLS PARALLEL TO BRIDGE)



**SECTION C-C**

**SECTION D-D**

**SECTION THRU APPROACH SLAB**

MEASURED NORMAL TO ABUTMENT

**LEGEND**

- (T02) STEEL TROWEL TOP SURFACE OF FOOTING AND PLACE MULTIPLE LAYERS (0.03" MIN. TOTAL THK.) OF POLYETHYLENE SHEETS OVER THE ENTIRE TOP OF FOOTING.
- (T03) PLACE MULTIPLE LAYERS (0.03" MIN. TOTAL THK.) OF POLYETHYLENE SHEETS OVER THE ENTIRE TOP OF SUBGRADE.
- ▲ SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF 1/2" FILLER WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/2" BELOW SURFACE OF CONCRETE). EXTEND SEALER 3" BELOW GUTTER LINE AT INSIDE FACE.

**DESIGNER NOTES**

- STRUCTURAL APPROACH SLABS AND PARAPETS SHALL BE USED ON ALL I.H. BRIDGES AND U.S.H. BRIDGES. OTHER LOCATIONS CAN BE CONSIDERED WITH THE APPROVAL OF THE CHIEF STRUCTURAL DESIGN ENGINEER.
- STRUCTURAL APPROACH SLABS TO BE PART OF THE BRIDGE PLAN. BID ITEMS ARE CONCRETE MASONRY BRIDGES, BAR STEEL REINFORCEMENT HS COATED BRIDGES, ETC. POLYETHYLENE SHEETS SHALL BE INCIDENTAL TO CONCRETE MASONRY BRIDGES.
- QUANTITIES FOR APPROACH SLABS SHALL BE SHOWN IN A SEPARATE COLUMN WITHIN THE TOTAL ESTIMATED QUANTITIES TABLE IN THE FINAL PLANS.
- LONGITUDINAL APPROACH SLAB REINFORCEMENT SHALL BE PLACED PARALLEL TO THE APPROACH (I.E., NOT NORMAL TO THE CL ABUTMENT WITH SKEWED STRUCTURES).
- STRUCTURE APPROACH SLABS TO BE DETAILED TO MATCH THE BRIDGE DECK (I.E., PROTECTIVE SURFACE TREATMENT, STAINLESS STEEL REINFORCEMENT, LONGITUDINAL GROOVING, ETC.).
- THE BID ITEM FOR SS901 BARS SHALL BE SPECIAL PROVISION "BAR STEEL REINFORCEMENT HS STAINLESS BRIDGES".
- DESIGNER TO COORDINATE LOCATION OF SURFACE DRAINS, INLETS, AND/OR FLUMES WITH ROADWAY DESIGNER AND FDM SDD 802 OR 803.
- SEE PARAPET STANDARD DETAILS FOR REINFORCEMENT, LOCATION OF NAME PLATE AND BENCH MARK WITH RESPECT TO THE END OF PARAPET, ETC.
- BELOW THE APPROACH SLAB FOOTING AND STRUCTURAL APPROACH SLAB, SHOW BASE AGGREGATE DENSE 1-1/4 INCH AS PER FDM 14-5 AND BRIDGE MANUAL FIGURE 12.6-2.
- FOLLOW FDM 14-10-15 REQUIREMENTS FOR ROADWAY APPROACH PAVEMENT.

**STRUCTURAL APPROACH SLAB  
DETAILS FOR TYPE A1 ABUTMENTS**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

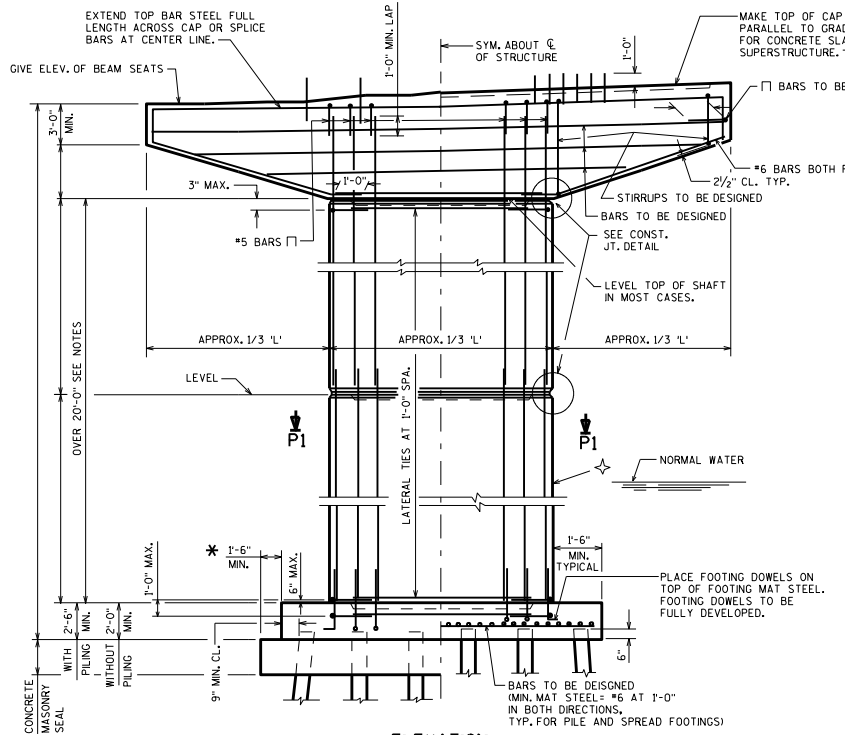
APPROVED: *Bill Oliva*

DATE:  
7-13

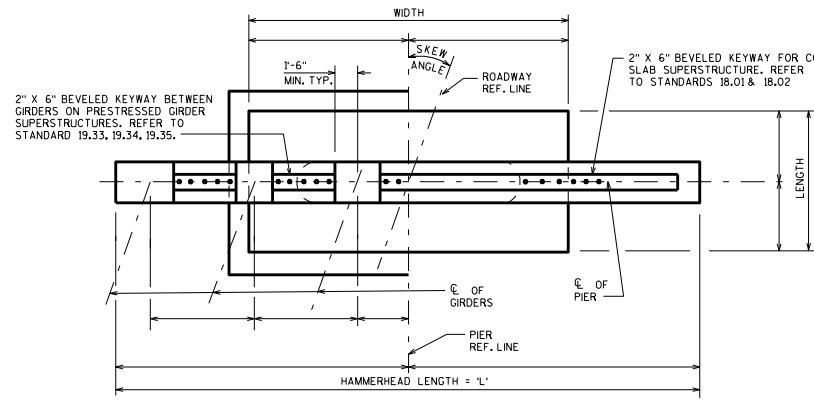
SECTIONS SHOWN HERE ARE FROM STANDARD 12.10

**GIRDER STRUCTURES**

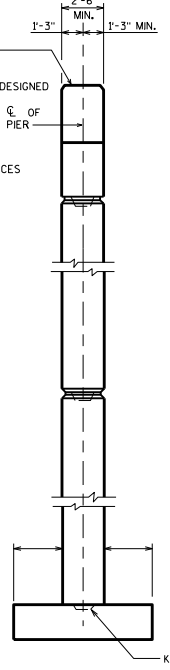
**CONCRETE SLAB STRUCTURES**



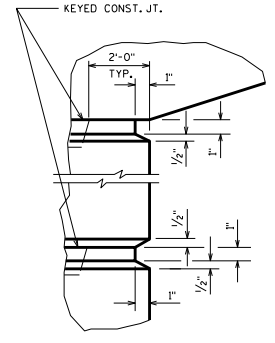
**ELEVATION**  
LOOKING UP STATION



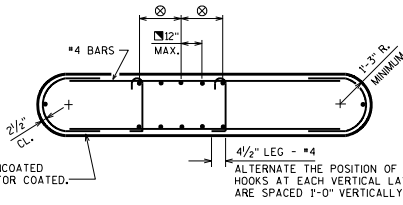
**PLAN**



**END VIEW**



**CONST. JT. DETAIL**



**ALTERNATE SECTION P1**

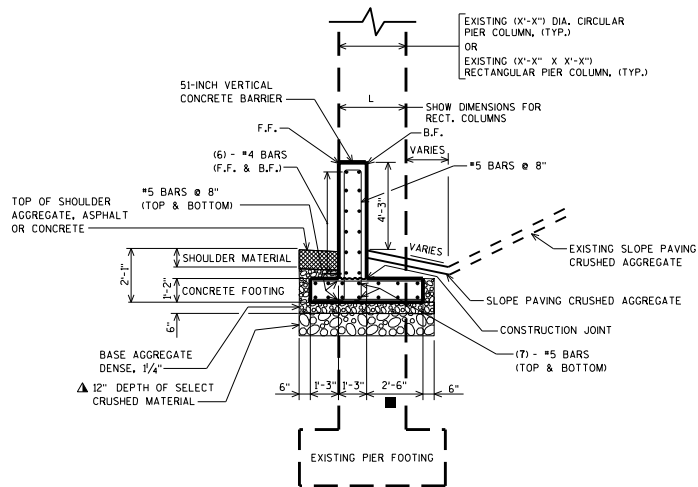
**DESIGNER NOTES**

- ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE UNLESS OTHERWISE SHOWN.
- OPTIONAL KEYED CONSTRUCTION JOINTS IN SHAFT, IF PROVIDED, SHALL BE PLACED APPROXIMATELY 2'-0" ABOVE NORMAL WATER ELEVATION. OPTIONAL KEYED CONSTRUCTION JOINT IN SHAFT SHALL BE PROVIDED SO THAT MAXIMUM HEIGHT OF POUR NEED NOT EXCEED 20 FEET. RUSTICATIONS SHOWN IN "CONST. JT. DETAIL" MAY BE OMITTED AT THE OPTION OF THE DESIGNER.
- KEYED CONSTRUCTION JOINTS SHALL BE FORMED BY BEVELED KEYWAY 4" DEEP X 1/3 THICKNESS OF SHAFT X 4'-0" LESS THAN LENGTH OF SHAFT.
- ▲ A STANDARD SHAFT TAPER OF 10% MAY BE USED AT THE OPTION OF THE DESIGNER. (LATERAL DIRECTION ONLY)
- SHAFT MAY BE TAPERED IN ONE OR TWO DIRECTIONS WHEN REQUIRED FOR STRUCTURAL REASONS.
- A NON-STANDARD SHAFT CROSS-SECTION, SHAPE, OR TAPER, NOT REQUIRED FOR STRUCTURAL REASONS, MAY BE USED ONLY WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.
- BEARING SEAT AREAS SHALL BE LEVEL EXCEPT FOR THE TWO CASES LISTED BELOW:
  1. FOR GIRDERS WITH 1/2" ELASTOMERIC BEARING PADS WHEN THE BOTTOM OF THE GIRDERS SLOPE MORE THAN 1%. SEE STANDARD 13.01.
  2. FOR CONCRETE SLAB SUPERSTRUCTURES MAKE THE TOP OF CAP PARALLEL TO GRADE. SEE STANDARD 18.01.
- BEAM SEATS MAY BE ANGLED TO MATCH SKEW AT THE DESIGN ENGINEER'S DISCRETION.
- SEE STANDARD 12.01 FOR ADDITIONAL REINFORCING STEEL IN BEARING AREA FOR BEAM SEATS OF NON-SLOPED CAPS THAT ARE 4 INCHES OR MORE ABOVE THE LOWEST BEAM SEAT.
- ⊠ THIS MAXIMUM VERT. BAR SPACING APPLIES ONLY WHEN THE VERTICAL REINFORCEMENT IS 1% OR MORE OF THE GROSS CONCRETE AREA.
- SEE STANDARD 13.01 FOR MINIMUM OFFSETS FROM BEARINGS TO SIDES OF CAP AND TO ADJACENT BEARING SEAT STEPS.
- EPOXY COAT BAR STEEL DOWN TO TOP OF FOOTINGS IN ALL PIERS UNDER EXPANSION JOINTS AND ON ALL PIERS AT GRADE SEPARATIONS.
- \* INCREASE THIS DIMENSION IF NECESSARY TO PREVENT BATTERED PILES FROM DRIVING INTO SHEET PILING. ALSO INCREASE DIMENSION TO FACILITATE OVERHEAD SHEETING CLEARANCE IF THE TOP OF PIER IS BEYOND NORMAL SEAL SIZE AND NO CONSTRUCTION JOINT IS PROVIDED IN THE SHAFT/CAP REGION (E.G. TAPERED WALL PIERS OR SHORTER HAMMERHEADS WITH RADIUS TRANSITION FROM SHAFT TO CAP).
- ⊞ MAXIMUM SPACING BETWEEN UNRESTRAINED VERTICAL BAR AND RESTRAINED (TIED ACROSS MEMBER) VERTICAL BAR IS 24 INCHES.

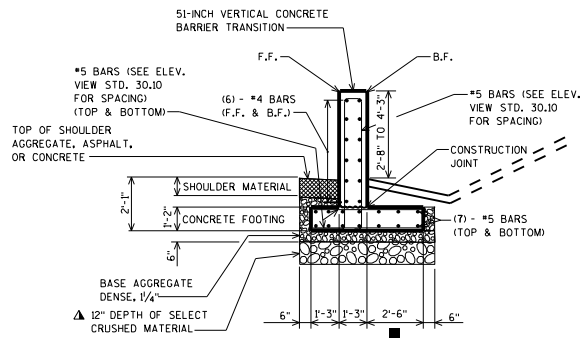
<b>HAMMERHEAD PIER</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13







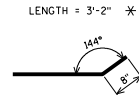
**SECTION A-A**  
BETWEEN COLUMNS



**SECTION B-B**  
TRANSITION REGION

▲ 12" SELECT CRUSHED MATERIAL MAY BE ELIMINATED IF IT IS DETERMINED BY THE ENGINEER THAT THE EXISTING MATERIAL IS COMPACTED, GRANULAR MATERIAL.

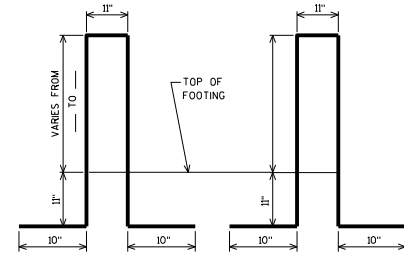
■ FOR COLUMNS WITH "DIA." OR "L." GREATER THAN 3'-0", INCREASE THIS VALUE SO THAT B.F. OF FOOTING EXTENDS 9" BEYOND B.F. OF COLUMN.



**#6 BAR**

USED WITH CIRCULAR COLUMNS  
(MASONRY ANCHOR)

\* FOR RECTANGULAR COLUMN USE STRAIGHT BARS OF THIS LENGTH



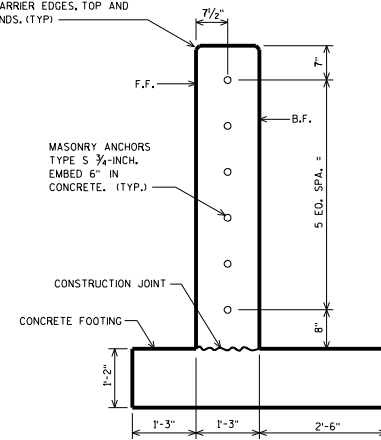
**#5 BAR**  
BARRIER REINF. IN  
TRANSITION REGION

**#5 BAR**  
BARRIER REINF.  
BETWEEN COLUMNS

**BAR BENDING DIAGRAMS**

BAR DIMENSIONS ARE OUT TO OUT OF BAR

PROVIDE 3/4-INCH BEVEL OR 1-INCH RADIUS ON CONCRETE BARRIER EDGES, TOP AND ENDS. (TYP.)



**MASONRY ANCHOR, TYPE S LAYOUT**

**DESIGNER NOTES**

THE DETAILS SHOWN ON STANDARDS 13.10 AND 13.11 ARE FOR VEHICLE PROTECTION AND ARE USED WITH EXISTING STRUCTURES.

CONSIDER PROVIDING AN ADDITIONAL TRANSITION SECTION ADJACENT TO THE OTHER EXTERIOR PIER COLUMN FOR THE FOLLOWING CONDITIONS:

- TWO-LANE ROAD IS ADJACENT TO BARRIER AND THERE IS A CONCERN FOR TRAFFIC TO CROSS-OVER.
- FUTURE TRAFFIC CONTROL NEEDS MAY CAUSE THE DIRECTION OF TRAFFIC ADJACENT TO BARRIER TO BE REVERSED.
- HAZARDS MAY EXIST IN THIS REGION THAT REQUIRE SHIELDING.

CONTACT THE REGIONAL OFFICE FOR VERIFICATION OF ANY OF THESE CONDITIONS.

THESE DETAILS MEET CRITERIA FOR TEST LEVELS TL-3/TL-4.

FOR VEHICLE PROTECTION, SEE FDM 11-35-1 TO DETERMINE WHEN BEAM GUARD OR CONCRETE BARRIER SHOULD BE PLACED BETWEEN THE TRAFFIC AND THE PIER, OR WHEN AN INTEGRAL BARRIER SHOULD BE USED.

F.F. = FRONT FACE  
B.F. = BACK FACE

**51-INCH VERTICAL CONCRETE BARRIER AND TRANSITION**

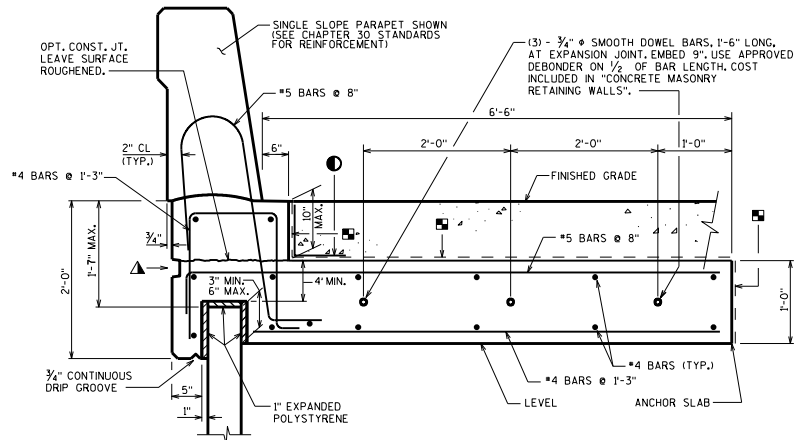
SEE STANDARD 13.10 FOR ADDITIONAL DETAILS

**INTEGRAL BARRIER  
DETAILS**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

DATE:  
7-13



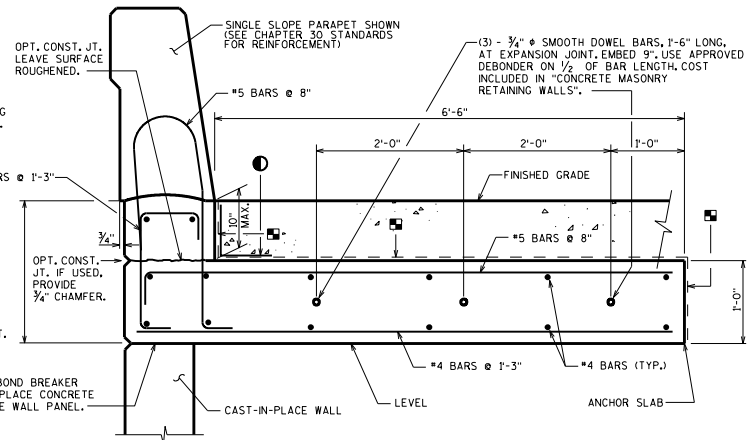
18" RUBBERIZED MEMBRANE WATERPROOFING TO BE PLACED ON THESE SURFACES AT EACH JOINT.

IF THE OPT. CONST. JOINT IS USED, PLACE 18" MEMBRANE WATERPROOFING ALONG THE ENTIRE LONGITUDINAL JOINT. THE MEMBRANE WATERPROOFING SEALING THE OPTIONAL CONST. JOINT IS INCIDENTAL TO THE CONCRETE MASONRY BID ITEM.

**RUSTICATION DETAIL**

PROVIDE RUSTICATION IF OPT. CONST. JOINT IS USED.

LIQUID OR OTHER BOND BREAKER BETWEEN CAST-IN-PLACE CONCRETE AND CAST-IN-PLACE WALL PANEL.



**CAST-IN-PLACE CONCRETE TRAFFIC BARRIER DETAIL FOR CAST-IN-PLACE WALL PANELS**

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPET AND ANCHOR SLAB BETWEEN EXPANSION JOINTS MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT. SEE STANDARDS 30.07, 30.12, 30.13 & 30.30-30.32 FOR MINIMUM LAP LENGTHS IN PARAPET BARS. DEFINE CONSTRUCTION JOINT WITH A 3/4" V-GROOVE.

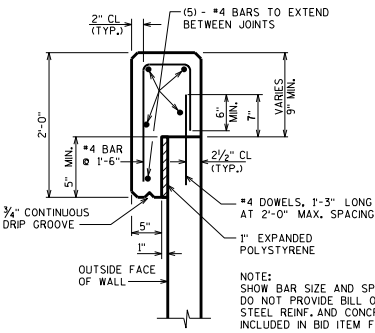
LAP LONGITUDINAL #4 BARS A MINIMUM OF 1'-0".  
ALL BAR STEEL SHALL BE EPOXY COATED.

**CAST-IN-PLACE CONCRETE TRAFFIC BARRIER DETAIL FOR PRECAST WALL PANELS**

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPET AND ANCHOR SLAB BETWEEN EXPANSION JOINTS MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT. SEE STANDARDS 30.07, 30.12, 30.13 & 30.30-30.32 FOR MINIMUM LAP LENGTHS IN PARAPET BARS. DEFINE CONSTRUCTION JOINT WITH A 3/4" V-GROOVE.

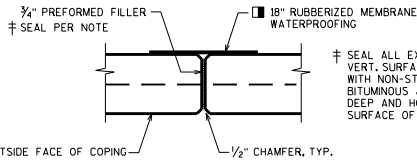
LAP LONGITUDINAL #4 BARS A MINIMUM OF 1'-0".  
ALL BAR STEEL SHALL BE EPOXY COATED.

CONCRETE QUALITY BASED ON 3" PANEL EMBEDMENT.



**CAST-IN-PLACE CONCRETE COPING DETAIL**

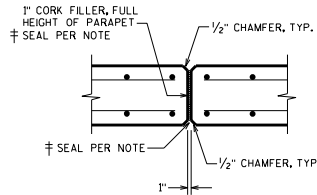
NOTE: CONCRETE COPING REINFORCING STEEL SHALL BE DESIGNED AT LOCATIONS WHERE RAILING, FENCING, OR ANY OTHER ATTACHMENTS ARE MADE.



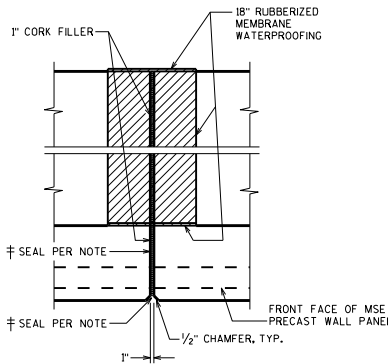
**COPING EXPANSION JOINT**

DO NOT RUN BAR STEEL THRU JOINT. MAX. SPACING OF JOINT = 50"

MEMBRANE WATERPROOFING TO EXTEND FROM TOP OF COPING TO 6" BELOW TOP OF PANELS.

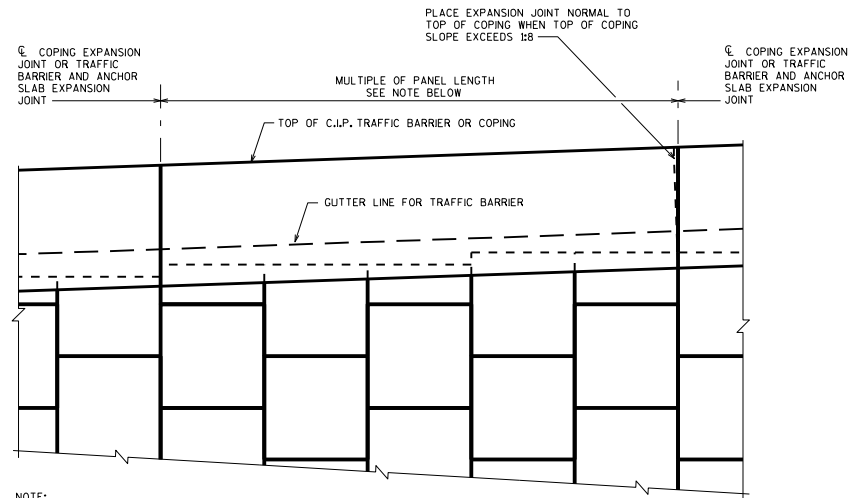


**TRAFFIC BARRIER EXPANSION JOINT DETAIL**



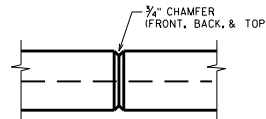
**ANCHOR SLAB EXPANSION JOINT DETAIL**

EXPANSION JOINTS TO BE SPACED AT A MINIMUM OF 20' AND A MAXIMUM OF 30'. LOCATE EXPANSION JOINTS OVER WALL JOINTS. DO NOT RUN BAR STEEL THRU JOINT, EXCEPT FOR DOWEL BARS. JOINT TO EXTEND FULL DEPTH OF PARAPET AND ANCHOR SLAB. PROVIDE THE NUMBER OF BARS AND OVERALL LENGTH FOR QUANTITY PURPOSES, ONLY. DO NOT DETAIL SPECIFIC BAR LENGTHS BETWEEN EXPANSION JOINTS AS THESE LENGTHS ARE BASED ON UNKNOWN MSE PANEL LENGTH AND CONFIGURATION.



**C.I.P. TRAFFIC BARRIER OR COPING PARTIAL ELEVATION**

NOTE: ALL JOINTS SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS AND MUST COINCIDE WITH PANEL JOINT ON FRONT FACE.



**COPING CONTRACTION JOINT**

DO NOT RUN BAR STEEL THRU JOINT. MAX. SPACING OF JOINT = 12'

**MSE RETAINING WALL DETAILS**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva*

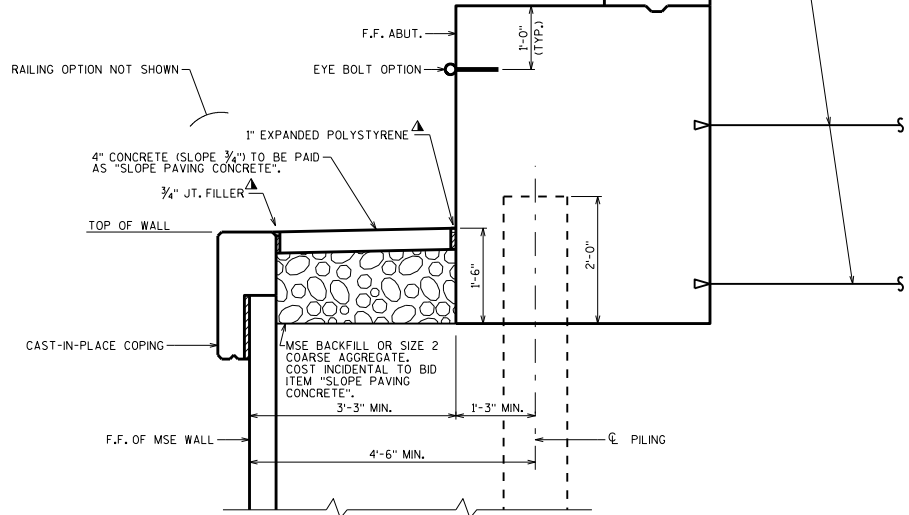
DATE:  
7-13





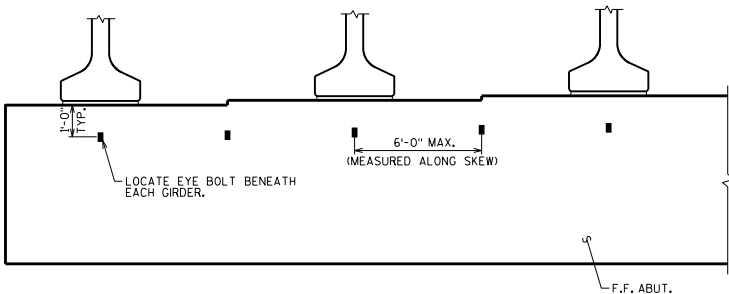
**EYE BOLT DETAIL**

COST INCIDENTAL TO BID ITEM "CONCRETE MASONRY BRIDGES". MINIMUM STRENGTH OF 3500 LB.



**CROSS SECTION THRU ABUTMENT AT MSE WALL**

EXPANSION ABUT. SHOWN. SEE STANDARDS 12.01 & 12.02 FOR APPLICABLE BODY REINFORCEMENT AND STANDARDS 12.03 & 12.04 FOR BACKWALL AND WING REINFORCEMENT.



**PARTIAL ELEVATION OF F.F. ABUTMENT SHOWING EYE BOLT FALL PROTECTION OPTION**

RETAINING WALL NOT SHOWN

ABUTMENT ANCHORAGE TO BE DETERMINED BY THE MSE WALL DESIGNER. (SOIL REINFORCEMENT STRIPS SHOWN.)

**DESIGNER NOTES**

DUE TO MAINTENANCE CONCERNS, MSE WALLS SHALL NOT BE USED FOR THE SINGULAR PURPOSE OF REDUCING SPAN LENGTH. IF THE GRADE LINE CANNOT BE RAISED, THEN MSE WALLS MAY BE USED TO MAINTAIN THE SUPERSTRUCTURE DEPTH. OTHER CIRCUMSTANCES MAY ALSO JUSTIFY THE USE OF MSE WALLS AT ABUTMENTS.

FALL PROTECTION SHALL BE PROVIDED. THE OPTION PROVIDED SHOULD BE BASED ON THE PREFERENCE OF THE BRIDGE MAINTENANCE AND REGION PROJECT STAFF.

IF PIPE RAILING IS USED, SEE STD. 30.26 FOR APPLICABLE NOTES. (NOTE: STD. 30.26 IS STILL UNDER DEVELOPMENT)

"SLOPE PAVING CONCRETE" ITEMS TO BE SHOWN AS PART OF BRIDGE PLAN.

**NOTES**

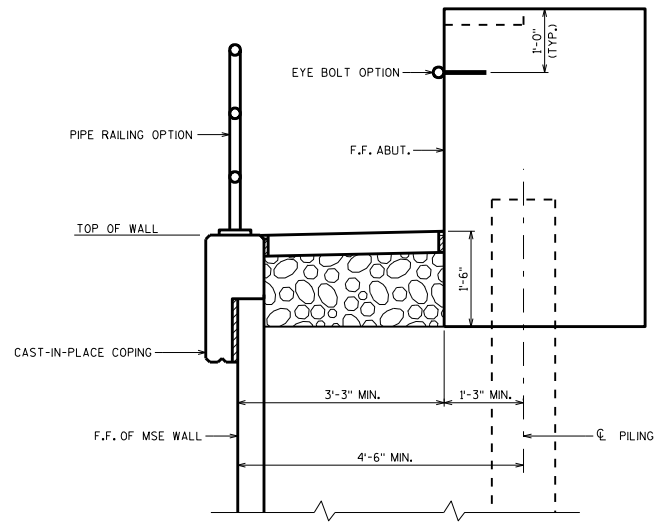
UNFACTORED SUPERSTRUCTURE LATERAL LINE LOAD TRANSFERRED TO THE ABUTMENT IS TAKEN TO BE  $\frac{1}{2}$  K/LF OF ABUTMENT LENGTH. THIS VALUE IS TO BE USED FOR THE DESIGN OF THE ABUTMENT ANCHORAGE (MSE SYSTEM, DEAD MAN ANCHOR, OTHER). THE LINE LOAD IS A SUMMATION OF AASHTO LOADS BR, WS, WL AND TU.

FOR SEMI-EXPANSION OR FIXED TYPE ABUTMENTS:

THE DESIGN OF THE WALL IN FRONT OF THE ABUTMENT SHALL INCLUDE THE HORIZONTAL EARTH LOADS AND 240 PSF LIVE LOAD SURCHARGE ACTING ON THE BACK OF THE ABUTMENT BELOW THE BEAM SEATS.

SEAL ALL EXPOSED HORIZONTAL AND VERTICAL SURFACES OF FILLER AND EXPANDED POLYSTYRENE WITH NON-STAINING, GRAY NON-BITUMINOUS JOINT SEALER. (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONCRETE).

EXPANSION ABUTMENTS TO BE BACKFILLED TO A MINIMUM OF THE BEAM SEAT ELEVATION PRIOR TO PLACING GIRDERS.

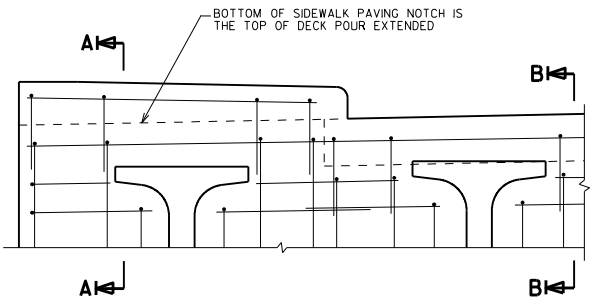


**CROSS SECTION THRU ABUTMENT AT MSE WALL SHOWING BOTH EYE BOLT AND RAILING FALL PROTECTION OPTIONS**

TYPE A1 SEMI-EXPANSION ABUTMENT SHOWN

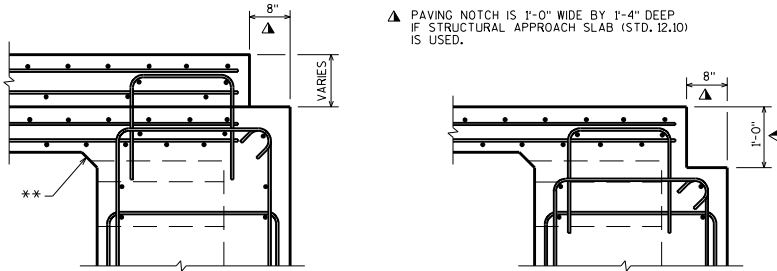
<b>MSE WALL AT ABUTMENT</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13





**PART TRANSVERSE SECTION AT ABUTMENT  
TYPE A1 DIAPHRAGM WITH A RAISED SIDEWALK**

(HORIZ. BARS SHOWN ARE THE FF BARS.  
DECK REINFORCEMENT NOT SHOWN FOR CLARITY.)

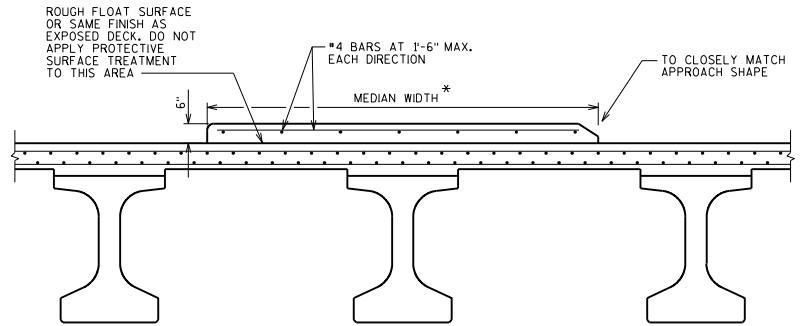


**SECTION A-A**

\*\* 3" X 3" BEVEL ENDS AT EDGE OF BRIDGE DECK

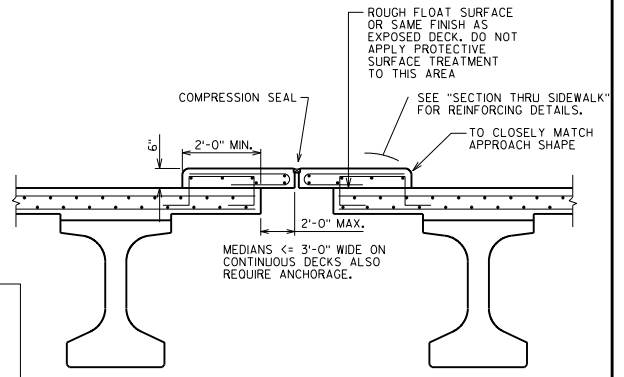
**SECTION B-B**

- SEE STANDARDS 19.33, 19.34, 19.35 FOR REINFORCEMENT DETAILS  
- DETAILS SHOWN ARE FOR GIRDER STRUCTURES. SIMILAR REINFORCEMENT FOR SLAB STRUCTURES SHALL BE USED WITH A REMINDER THAT THE TRANSVERSE AND LONGITUDINAL REINFORCEMENT LAYERS ARE REVERSED.



**CROSS SECTION THRU UNANCHORED MEDIAN**

\* (ANCHORAGE TO DECK NOT REQUIRED FOR WIDTHS > 3'-0", EXCEPT ALL MEDIAN SECTIONS ON TOP OF PAVING BLOCK MUST BE ANCHORED)  
CLEAN ALL LOOSE MATERIAL ON THE DECK AT THE MEDIAN LOCATION PRIOR TO MEDIAN PLACEMENT USING HIGH PRESSURE WATER OR AIR, ENSURING ALL FREE-STANDING WATER IS REMOVED PRIOR TO MEDIAN PLACEMENT. NEAT CEMENT IS REQUIRED AS PER 509.3.9.2 OF THE STANDARD SPECIFICATIONS UNLESS THE MEDIAN IS POURED WITHIN 45 DAYS OF COMPLETING THE DECK POUR.



**CROSS SECTION THRU ANCHORED MEDIAN**

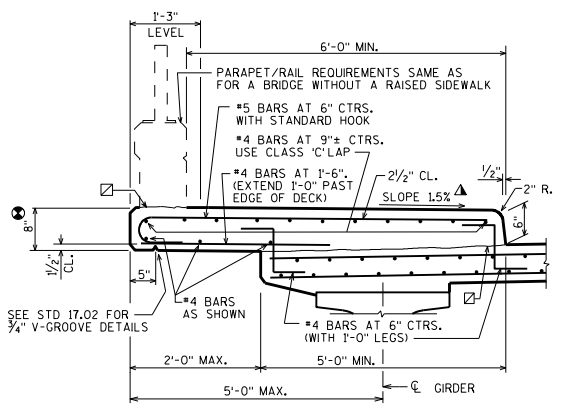
**NOTES**

WHEN PARAPETS ARE POURED CONTINUOUSLY FROM END TO END, THEY SHALL BE SEPARATED AT THE DEFLECTION JOINTS BY A PIECE OF 1/8" ZINC OR PLASTIC PLATE CUT AS SHOWN IN THE "DEFLECTION JOINT DETAIL". IF CONSTRUCTION JOINTS IN PARAPETS ARE USED AT THE DEFLECTION JOINTS, ONE SIDE OF JOINT SHALL BE COATED WITH AN APPROVED LIQUID BOND BREAKER AND PLATE SEPARATORS MAY BE OMITTED.

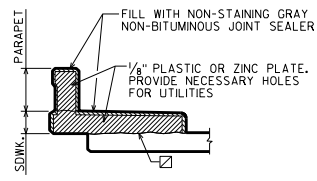
- ☑ CONST. JOINT-STRIKE OFF AS SHOWN AND LEAVE ROUGH FOR DECK POUR, MATCH BRIDGE X-SLOPE.
- ⊙ 8" MIN. SIDEWALK THICKNESS ALSO REQ'D AT EDGE OF DECK/SLAB.
- ⚠ ±0.5% CONSTRUCTION TOLERANCE IN SIDEWALK CROSS SLOPE. THE SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

**DESIGNER NOTES**

FOR EXTREME SIDEWALK WIDTHS AND/OR SUPERELEVATIONS THE DECK MAY BE LEVEL BENEATH THE SIDEWALK (MAINTAIN CONSTANT DECK THICKNESS) TO REDUCE EXCESSIVE SIDEWALK THICKNESS.  
THE DESIGN ENGINEER SHALL DESIGN THE SUPERSTRUCTURE TO ACCOUNT FOR THE MAXIMUM 2% SIDEWALK CROSS SLOPE.



**SECTION THRU SIDEWALK**



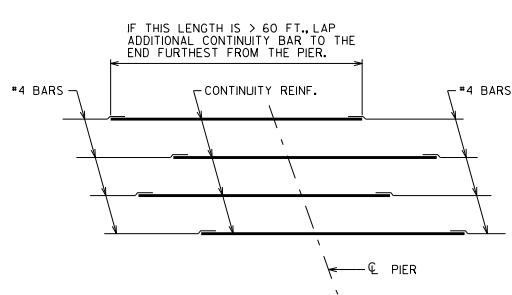
**DEFLECTION JOINT DETAIL**

SHOWING DEFLECTION JOINT IN PARAPET OR SIDEWALK USING THE FOLLOWING CRITERIA:

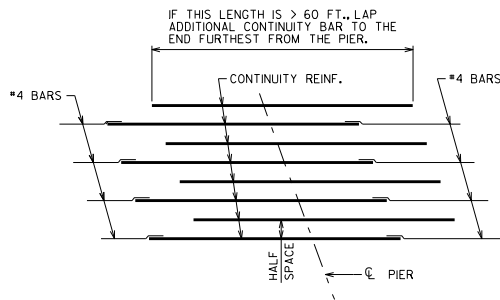
1. GIRDER STRUCTURES AND SLAB STRUCTURES WITH A SIDEWALK SHOULD HAVE A DEFLECTION JOINT IN THE SIDEWALK AND PARAPET OVER THE PIER.
2. GIRDER STRUCTURES AND SLAB STRUCTURES WITHOUT SIDEWALKS SHOULD HAVE NO DEFLECTION JOINTS IN THE PARAPETS.

SEE STD. 24.11 FOR DECK JOINT DETAIL FOR LONGITUDINAL AND TRANSVERSE JOINTS.

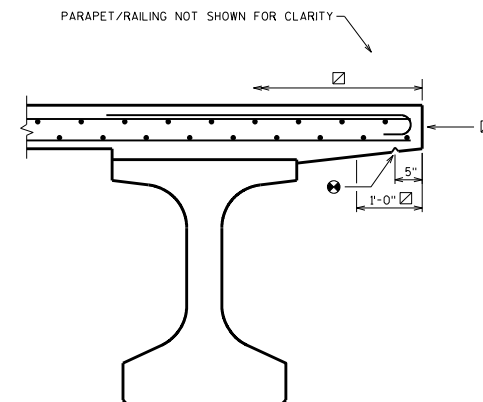
MEDIAN AND RAISED SIDEWALK DETAILS	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



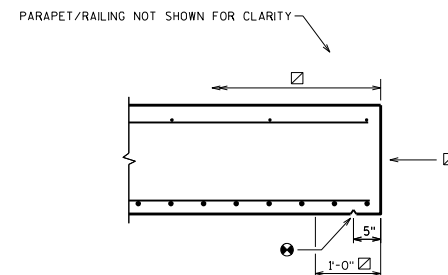
**PLAN VIEW OF DECK CONTINUITY REINFORCEMENT FOR PRESTRESSED GIRDER BRIDGES**  
(SHOWING TYPICAL BAR SPACING FROM CHAPTER 17 TABLES)



**PLAN VIEW OF DECK CONTINUITY REINFORCEMENT FOR PRESTRESSED GIRDER BRIDGES SHOWING HALF-SPACES**  
(SHOWING TYPICAL BAR SPACING FROM CHAPTER 17 TABLES + HALF-SPACE)

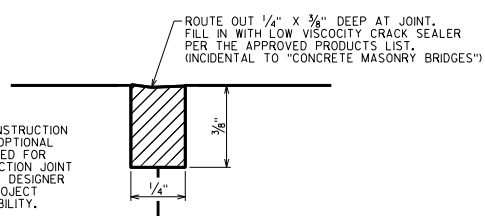


**CROSS SECTION THRU EDGE OF DECK**  
(SHOWING DRIP GROOVE FOR ALL PARAPET AND RAILINGS, AND PROTECTIVE SURFACE TREATMENT FOR OPEN RAILINGS)

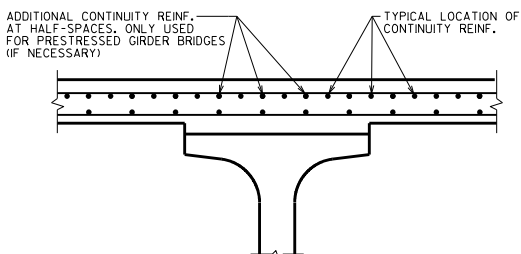


**CROSS SECTION THRU EDGE OF SLAB**  
(SHOWING DRIP GROOVE FOR ALL PARAPET AND RAILINGS, AND PROTECTIVE SURFACE TREATMENT FOR OPEN RAILINGS)

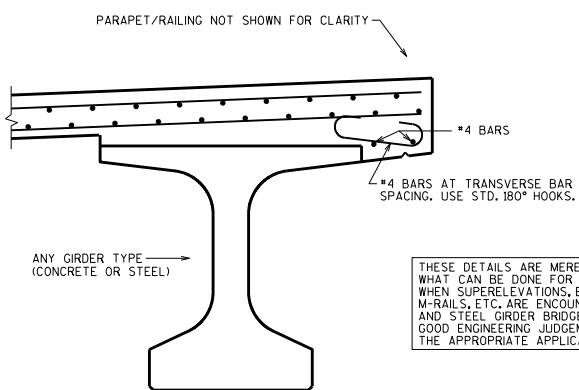
NOTE:  
LONGITUDINAL CONSTRUCTION JOINT DETAIL IS OPTIONAL AND IS TO BE USED FOR STAGED CONSTRUCTION JOINT LOCATIONS ONLY. DESIGNER TO DETERMINE PROJECT SPECIFIC APPLICABILITY.



**LONGITUDINAL CONSTRUCTION JOINT DETAIL**

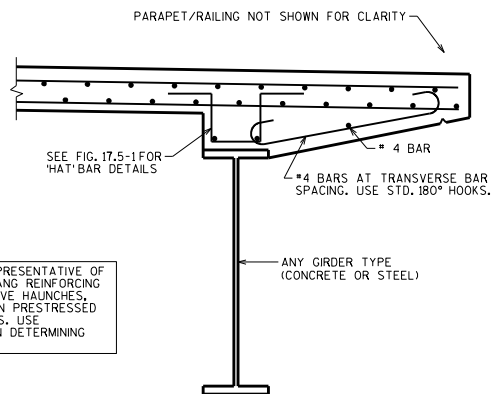


**CROSS SECTION THRU DECK**  
(SHOWING TOP LONGIT. REINF. LOCATION RELATIVE TO BOTTOM LONGIT. REINF.)



**CROSS SECTION THRU EDGE OF DECK**  
(SHOWING ADDITIONAL OVERHANG REINFORCEMENT)

THESE DETAILS ARE MERELY REPRESENTATIVE OF WHAT CAN BE DONE FOR OVERHANG REINFORCING WHEN SUPERELEVATIONS, EXCESSIVE HAUNCHES, M-RAILS, ETC. ARE ENCOUNTERED ON PRESTRESSED AND STEEL GIRDER BRIDGE DECKS. USE GOOD ENGINEERING JUDGEMENT IN DETERMINING THE APPROPRIATE APPLICATION.



**CROSS SECTION THRU EDGE OF DECK**  
(SHOWING ADDITIONAL OVERHANG REINFORCEMENT)

**DESIGNER NOTES**

- ⊗ 3/4" V-GROOVE, TERMINATE 2'-0" FROM FRONT FACE OF EXPANSION ABUTMENTS, OR FIXED ABUTMENTS ON STEEL BEARINGS.
- 3/4" V-GROOVE, EXTEND V-GROOVE TO 3" FROM FRONT FACE OF ABUTMENT DIAPHRAGM FOR TYPE A1 FIXED AND SEMI-EXPANSION ABUTMENTS.
- V-GROOVES ARE REQUIRED.

- ☑ FOR OPEN RAILINGS, COAT WITH "PROTECTIVE SURFACE TREATMENT" AS PER THE STANDARD SPECIFICATIONS.

**NOTES**

- ⊗ 3/4" V-GROOVE, TERMINATE 2'-0" FROM FRONT FACE OF ABUTMENTS.
- 3/4" V-GROOVE, EXTEND V-GROOVE TO 3" FROM FRONT FACE OF ABUTMENT DIAPHRAGM.
- V-GROOVES ARE REQUIRED.

- ☑ COAT WITH "PROTECTIVE SURFACE TREATMENT" AS PER THE STANDARD SPECIFICATIONS.

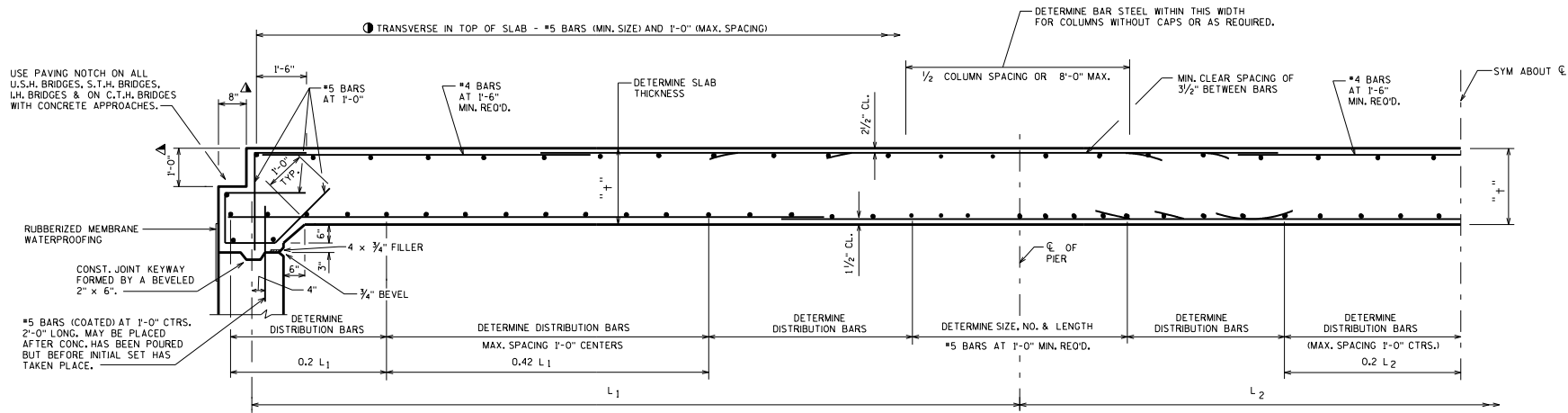
**DECK AND SLAB DETAILS**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

DATE:  
7-13





**HALF LONGITUDINAL SECTION**

**NOTES**

TOP TRANSVERSE BARS IN SLAB SHALL BE SUPPORTED BY INDIVIDUAL BAR CHAIRS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BAR CHAIRS AT APPROXIMATELY 4'-0" CENTERS.

ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM. ANY TOLERANCES NECESSARY TO CORRECT CONSTRUCTION DISCREPANCIES ARE TO BE PLUS (+).

PARAPETS, SIDEWALKS AND MEDIANS PLACED ON TOP OF THE SLAB SHALL BE POURED AFTER FALSEWORK HAS BEEN RELEASED, EXCEPT FOR STAGED CONSTRUCTION.

CAMBER SPANS AS SHOWN TO PROVIDE FOR DEAD LOAD DEFLECTION AND FUTURE CREEP. CAMBER DOES NOT INCLUDE ALLOWANCE FOR FORM SETTLEMENT.

PRIOR TO RELEASING SLAB FALSEWORK, TAKE TOP OF SLAB ELEVATIONS AT THE  $\epsilon$  OF ABUTMENTS, THE  $\epsilon$  OF PIERS AND AT 5/10 PTS. TO VERIFY CAMBER. TAKE ELEVATIONS ALONG GUTTER LINES AND CROWN  $\epsilon$ .

**DESIGNER NOTES**

THE MAXIMUM ALLOWABLE SKEW ANGLE OF STRUCTURE SHALL BE 30°.

ALL BAR SPLICES TO BE BASED ON "CLASS C" TENSION LAP SPLICE.

USE OPTIONAL LONGITUDINAL JOINTS WHEN OVERALL SLAB WIDTH IS OVER 52'-0".

FOR BRIDGES LOCATED IN REMOTE AREAS USE OPTIONAL TRANSVERSE JOINT WHEN POUR EXCEEDS 400 C.Y. PLACE KEYED JOINT NEAR POINT OF DEAD LOAD INFLECTION.

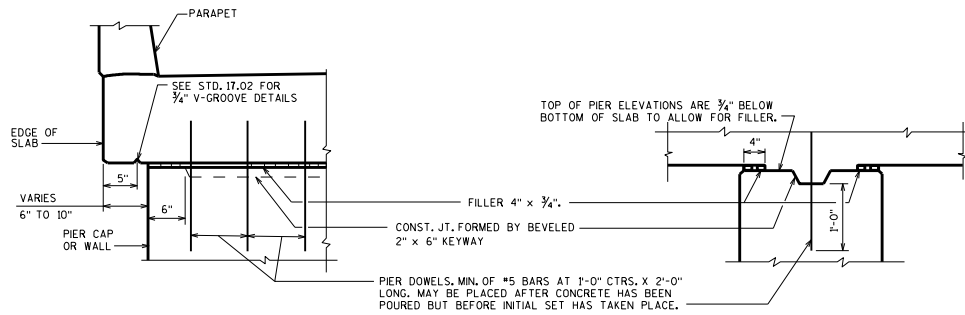
ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.

FLOOR DRAINS ARE TO BE OMITTED FROM SLAB STRUCTURES WHERE POSSIBLE. IF FLOOR DRAINS ARE REQUIRED, PLACE ONLY AT THE 2/10 AND 8/10 PTS. BEND MAIN REBARS PAST DRAINS - DO NOT CUT.

PIER CAP OR WALL TYPE PIERS SHALL BE USED ON MOST STRUCTURES. "COLUMN WITHOUT CAP" TYPE PIERS (SEE STD. 18.01) MAY BE USED WITH THE APPROVAL OF THE STRUCTURES DESIGN SECTION.

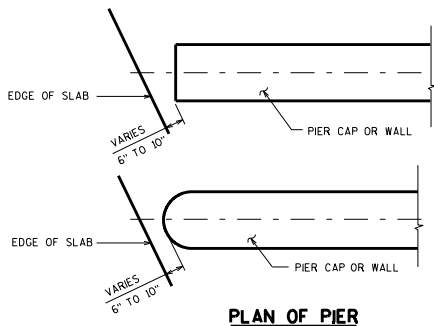
ON THE PLANS, PROVIDE CAMBER VALUES AT THE TENTH POINTS OF ALL SPANS. ALSO PROVIDE TOP OF SLAB ELEVATIONS AT THE CENTERLINE (AND/OR CROWN) AND OUTSIDE EDGES OF SLAB AT TENTH POINTS.

▲ PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.

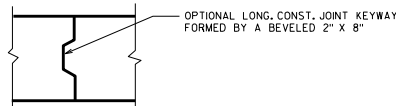


**PIER CAP OR WALL TYPE PIER**

SEE STD. 18.01 FOR COLUMN W/O CAP PIER DETAIL.



**PLAN OF PIER**



**OPTIONAL LONGITUDINAL CONSTRUCTION JOINT**

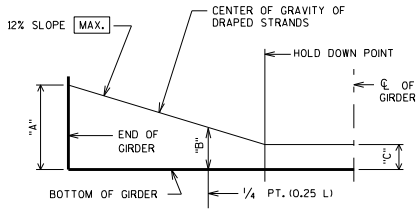
TOP TRANSVERSE REINF. FOR RAILINGS/PARAPETS		
SINGLE SLOPE OR SLOPED FACE PARAPETS	MAIN BARS RUN FROM EDGE TO EDGE OF SLAB	SHORT BARS PLACED BETWEEN MAIN BARS AT EDGE OF SLAB
SLAB THICK. $\geq$ 15"	(*5 @ 1'-0")	(*5 @ 1'-0") 5'-0" LONG NO HOOK REQ'D. AT END
13" $\leq$ SLAB THICK. < 15"	(*5 @ 10")	(*5 @ 10") 5'-0" LONG STD. HOOK REQ'D. AT END
STEEL RAILINGS TYPE "M"/"W"	● TOP TRANSVERSE REINF. SPECIFIED IN "LONGIT. SECTION" IS ADEQUATE	

**CONTINUOUS FLAT SLAB**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva*

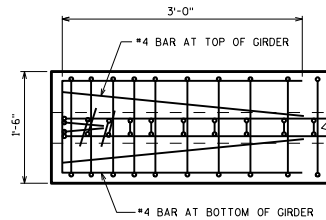
DATE:  
7-13



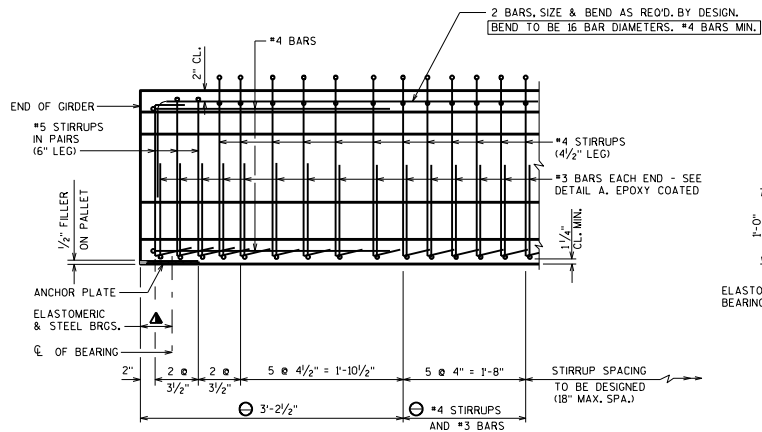
"A" TO BE GIVEN TO THE NEAREST 1"  
 "B" =  $1/4("A" + 3 "C")$  [MIN.]  
 "B" =  $1/4("A" + 3 "C") + 3$  [MAX.]

RECORD DIMENSIONS  
 "A", "B" & "C"  
 ON FINAL PLANS.

**LOCATION OF DRAPED STRANDS**



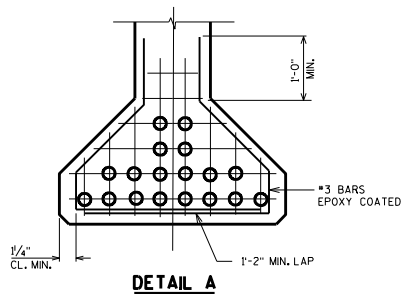
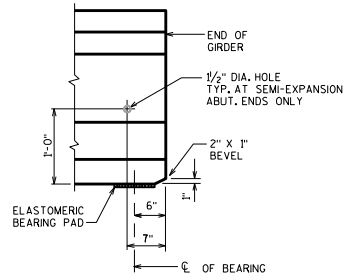
**PLAN VIEW**



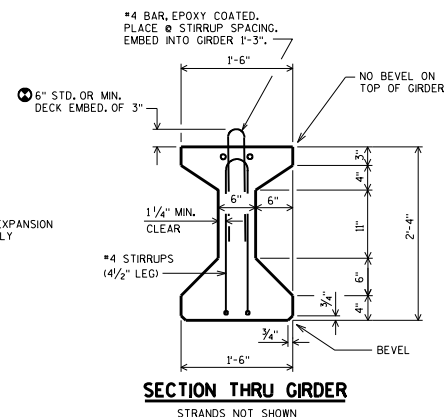
**SUPPORT WITH STEEL OR ELASTOMERIC BRGS.**

**SIDE VIEW OF GIRDER**

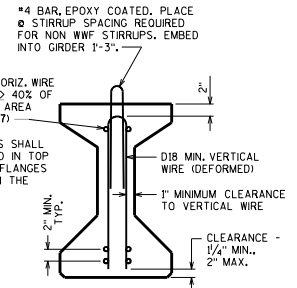
**SUPPORT WITH 1/2" ELASTOMERIC BRG. PAD**



**DETAIL A**



**SECTION THRU GIRDER**



**SECTION THRU GIRDER**

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS  
 ASTM A497 (FY = TO KSI)

**NOTES**

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 9 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT. AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

PRESTRESSING STRANDS SHALL BE (1) DIAJ-7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

**DESIGNER NOTES**

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 28-INCH".

SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE ONLY 0.5" DIA. STRAND FOR THE DRAPED PATTERN. THE MAX. NUMBER OF DRAPED 0.5" DIA. STRANDS IS 8. USE 0.8" DIA. FOR THE STRAIGHT PATTERN, UNLESS ONLY 0.5" DIA. WORK FOR KEEPING STRESSES AT ACCEPTABLE LEVELS.

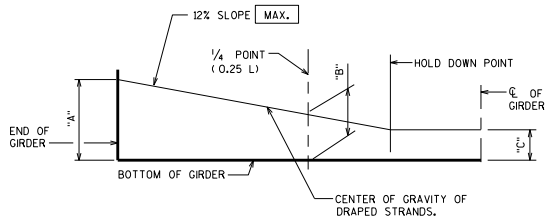
REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.02 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

⊙ DETAIL TYPICAL AT EACH END

⊙ THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ±3/4" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

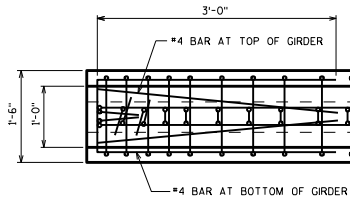
<b>28" PRESTRESSED GIRDER DETAILS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



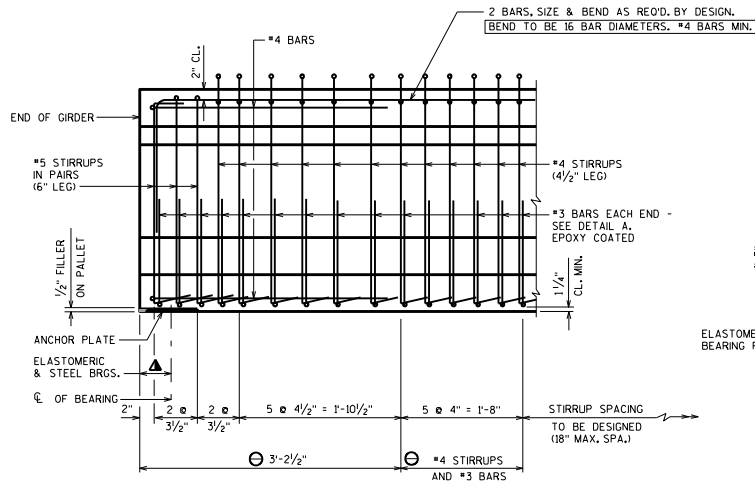
"A" TO BE GIVEN TO THE NEAREST 1"  
 "B" =  $\frac{1}{4}("A" + 3 "C")$  [MIN.]  
 "B" =  $\frac{1}{4}("A" + 3 "C") + 3$  [MAX.]

RECORD DIMENSIONS  
 "A", "B" & "C"  
 ON FINAL PLANS.

**LOCATION OF DRAPED STRANDS**

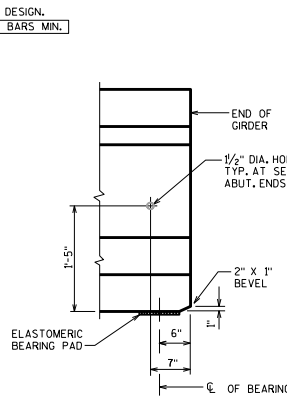


**PLAN VIEW**

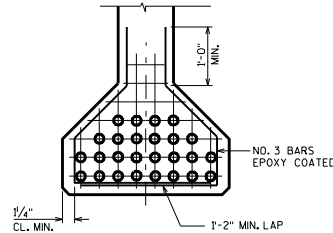


**SUPPORT WITH STEEL OR ELASTOMERIC BRGS.**

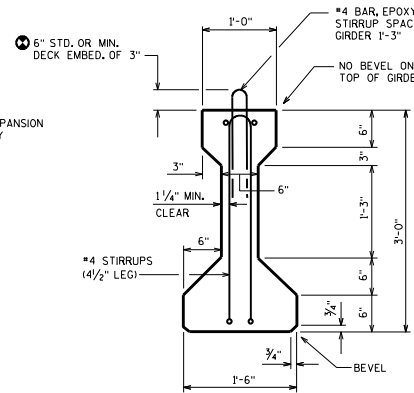
**SIDE VIEW OF GIRDER**



**SUPPORT WITH 1/2" ELASTOMERIC BRG. PAD**



**DETAIL A**



**SECTION THRU GIRDER**

STRANDS NOT SHOWN

**NOTES**

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

PRESTRESSING STRANDS SHALL BE 1/2" DIA. J-7 WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

**DESIGNER NOTES**

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 36-INCH".

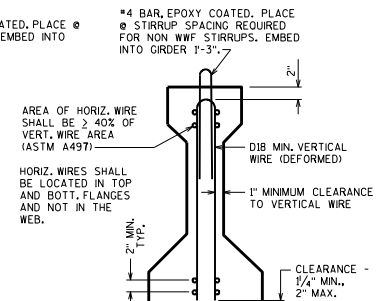
SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI, MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE ONLY 0.5" DIA. STRAND FOR THE DRAPED PATTERN, THE MAX. NUMBER OF DRAPED 0.5" DIA. STRANDS IS 8. USE 0.6" DIA. FOR THE STRAIGHT PATTERN, UNLESS ONLY 0.5" DIA. WORK FOR KEEPING STRESSES AT ACCEPTABLE LEVELS.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.04 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

⊙ DETAIL TYPICAL AT EACH END

⊙ THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ± 3/4" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.



**SECTION THRU GIRDER**

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS ASTM A497 (FY = 70 KSI)

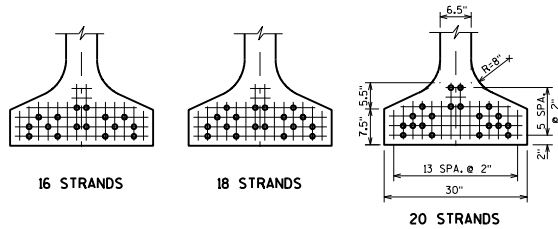
**36" PRESTRESSED GIRDER DETAILS**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

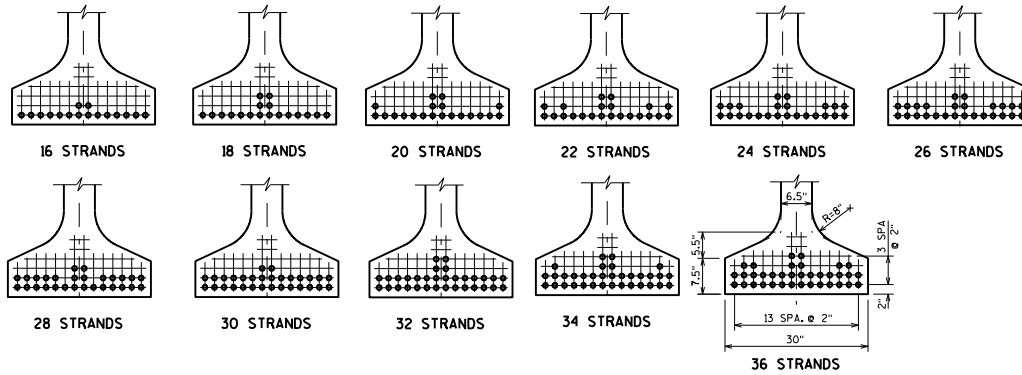
APPROVED: *Bill Oliva* DATE: 7-13







**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY  
TO AVOID DRAPING OF 0.6"Ø STRANDS**



**ARRANGEMENT AT  $\frac{1}{4}$  SPAN - FOR GIRDERS WITH DRAPED 0.6"Ø STRANDS**

**36W" GIRDER**

A = 632 SQ. IN.  
 $r^2 = 158.20 \text{ IN.}^2$   
 $y_T = 19.37 \text{ IN.}$   
 $y_B = -16.63 \text{ IN.}$   
 $I = 99,980 \text{ IN.}^4$   
 $S_T = 5,162 \text{ IN.}^3$   
 $S_B = -6,012 \text{ IN.}^3$   
 WT. = 658 #/FT.

**PRE-TENSION**

$f'_s = 270,000 \text{ P.S.I.}$   
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$   
 for low relaxation strands

Pi PER 0.6" Ø STRAND =  $0.217 \times 202,500 = 43,94 \text{ KIPS}$

$$\frac{y_B}{r^2} = \frac{-16.63}{158.20} = -0.10512 \text{ in/in}^2$$

$$f_B (\text{ini.}) = \frac{A_s f_s (1 + e_s y_B)}{A r^2}$$

NO. STRANDS	$e_s$ (Inches)	P(ini.) = $A_s f_s$ (KIPS)	(COMPRESSION IS POSITIVE)
			$f_B$ (ini.) (K/sq.in.)
<b>STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS</b>			
16	-12.13	703	2.531
18	-11.74	791	2.796
20	-11.03	879	3.003
<b>STANDARD STRAND PATTERNS FOR DRAPED STRANDS</b>			
16	-14.38	703	2.794
18	-13.96	791	3.088
20	-13.83	879	3.413
22	-13.72	967	3.737
24	-13.63	1055	4.061
26	-13.55	1143	4.385
28	-13.49	1230	4.706
30	-13.43	1318	5.030
32	-13.13	1406	5.295
34	-12.98	1494	5.589
36	-12.85	1582	5.885

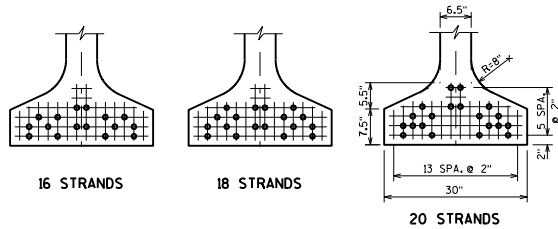
**36W" PRESTRESSED GIRDER  
DESIGN DATA**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

DATE:  
7-13





**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY  
TO AVOID DRAPING OF 0.6"Ø STRANDS**

**45W" GIRDER**

A = 692 SQ. IN.  
 $r^2 = 258.70 \text{ IN.}^2$   
 $y_T = 24.26 \text{ IN.}$   
 $y_B = -20.74 \text{ IN.}$   
 $I = 178,971 \text{ IN.}^4$   
 $S_T = 7,377 \text{ IN.}^3$   
 $S_B = -8,629 \text{ IN.}^3$   
 WT. = 721 #/FT.

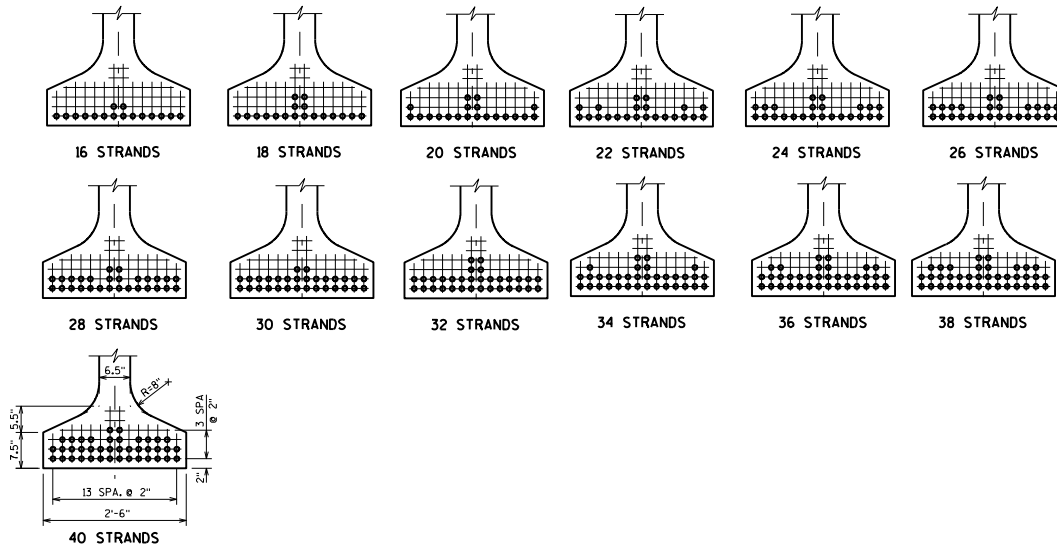
**PRE-TENSION**

$f'_s = 270,000 \text{ P.S.I.}$   
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$   
 for low relaxation strands

Pi PER 0.6" Ø STRAND =  $0.217 \times 202,500 = 43.94 \text{ KIPS}$

$$\frac{y_B}{r^2} = \frac{-20.74}{258.70} = -0.08017 \text{ in/in}^2$$

$$f_B (\text{ini.}) = \frac{A_s f_s}{A} (1 + \frac{e_s y_B}{r^2})$$



**ARRANGEMENT AT C SPAN - FOR GIRDERS WITH DRAPED 0.6"Ø STRANDS**

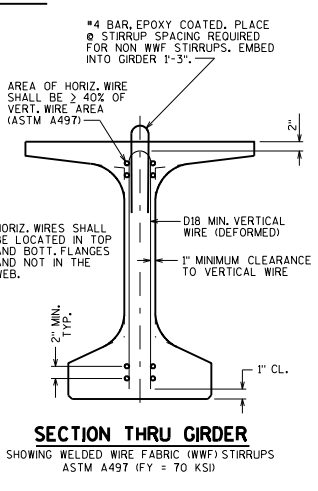
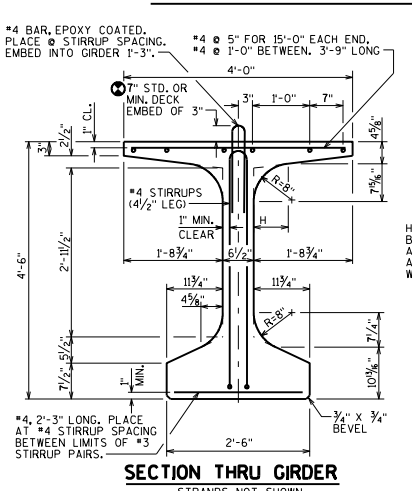
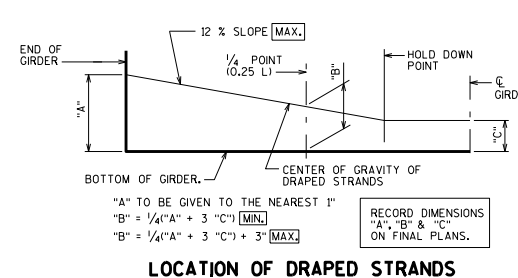
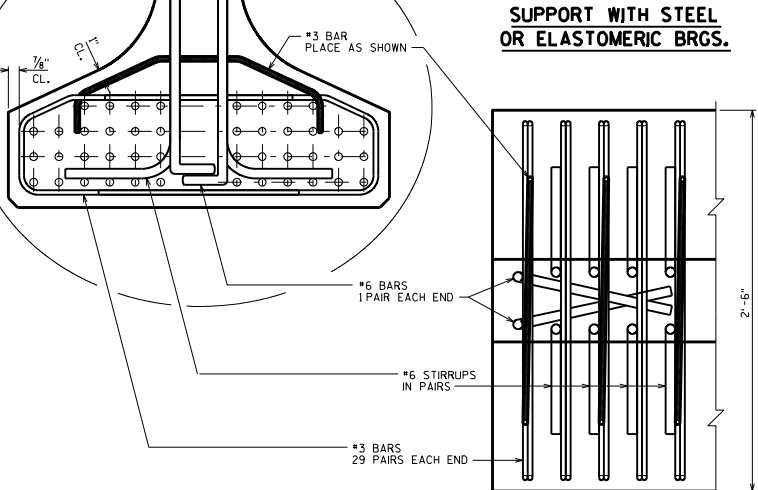
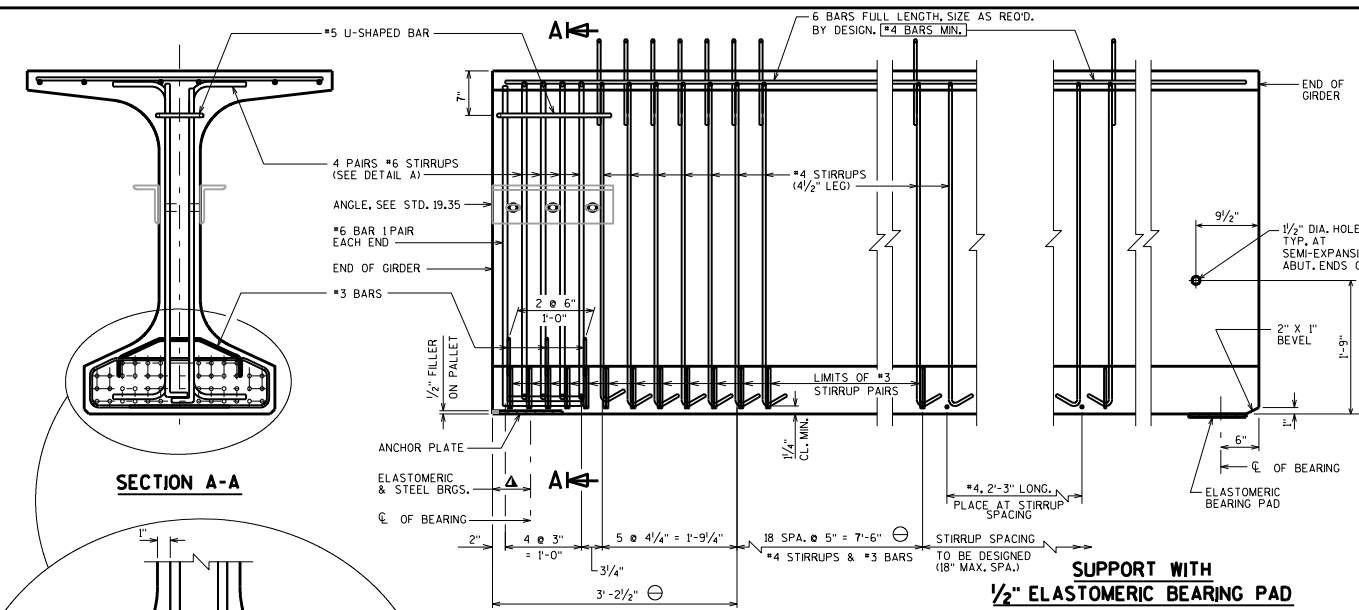
NO. STRANDS	$e_s$ (Inches)	P(ini.) = $A_s f_s$ (KIPS)	(COMPRESSION IS POSITIVE)
			$f_B$ (ini.) (K/sq.in.)
<b>STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS</b>			
16	-16.24	703	2.339
18	-15.85	791	2.596
20	-15.14	879	2.812
<b>STANDARD STRAND PATTERNS FOR DRAPED STRANDS</b>			
16	-18.49	703	2.521
18	-18.07	791	2.799
20	-17.94	879	3.097
22	-17.83	967	3.394
24	-17.74	1055	3.693
26	-17.66	1143	3.991
28	-17.60	1230	4.285
30	-17.54	1318	4.583
32	-17.24	1406	4.840
34	-17.09	1494	5.117
36	-16.96	1582	5.395
38	-16.85	1670	5.674
40	-16.74	1758	5.950

**45W" PRESTRESSED GIRDER  
DESIGN DATA**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

DATE:  
7-13



**NOTES**

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 15\"/>

DO NOT APPLY CONCRETE SEALER TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-225 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

PRESTRESSING STRANDS SHALL BE 1/2\"/>

**DESIGNER NOTES**

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 54W-INCH".

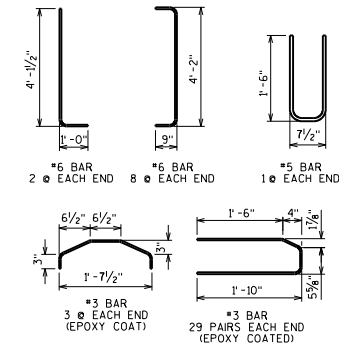
SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE 0.6\"/>

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.16 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-2. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

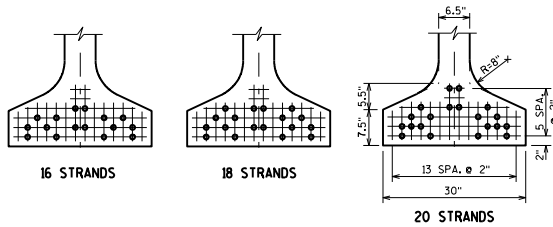
▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

⊖ DETAIL TYPICAL AT EACH END

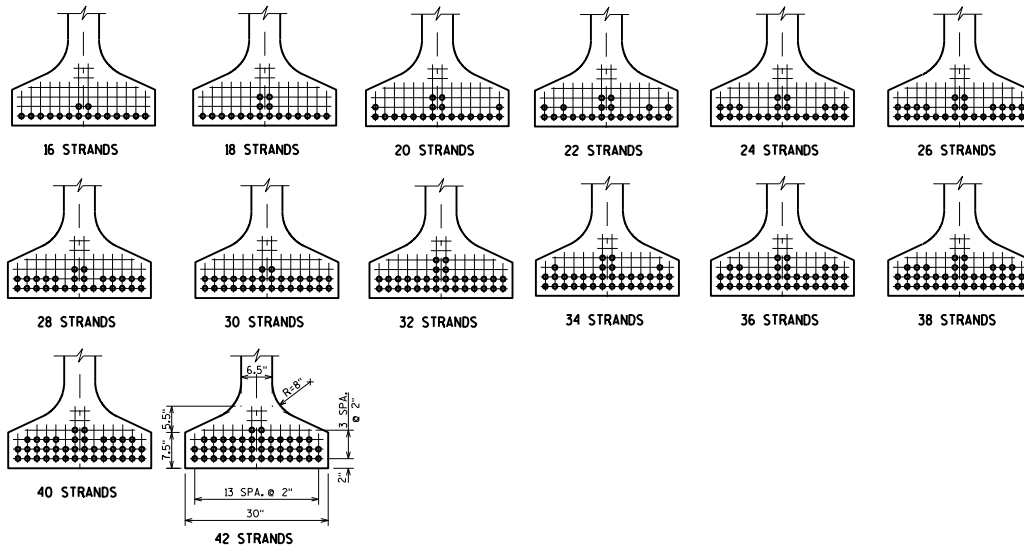
⊙ THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2\"/>



<b>54W\"/&gt; </b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY  
TO AVOID DRAPING OF 0.6"Ø STRANDS**



**ARRANGEMENT AT  $\frac{1}{4}$  SPAN - FOR GIRDERS WITH DRAPED 0.6"Ø STRANDS**

**54W GIRDER**

A = 798 SQ. IN.  
 $r^2 = 402.41 \text{ IN.}^2$   
 $y_T = 27.70 \text{ IN.}$   
 $y_B = -26.30 \text{ IN.}$   
 $I = 321,049 \text{ IN.}^4$   
 $S_T = 11,592 \text{ IN.}^3$   
 $S_B = -12,205 \text{ IN.}^3$   
 WT. = 831 #/FT.

**PRE-TENSION**

$f'_s = 270,000 \text{ P.S.I.}$   
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$   
 for low relaxation strands

Pi PER 0.6" Ø STRAND =  $0.217 \times 202,500 = 43.94 \text{ KIPS}$

$$\frac{y_B}{r^2} = \frac{-26.30}{402.41} = -0.06536 \text{ in/in}^2$$

$$f_B (\text{init.}) = \frac{A_s f_s}{A} (1 + \frac{e_s y_B}{r^2})$$

(COMPRESSION IS POSITIVE)

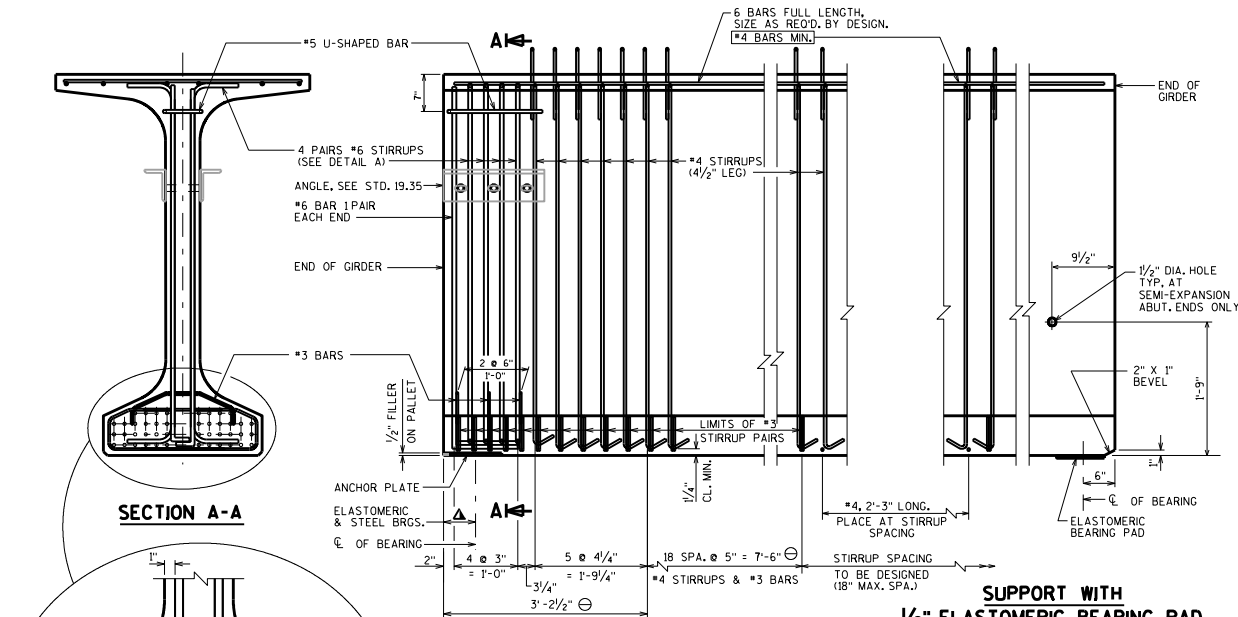
NO. STRANDS	$e_s$ (inches)	P (init.) = $A_s f_s$ (KIPS)	$f_B$ (init.) (K/sq.in.)
<b>STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS</b>			
16	-21.80	703	2.136
18	-21.41	791	2.378
20	-20.70	879	2.592
<b>STANDARD STRAND PATTERNS FOR DRAPED STRANDS</b>			
16	-24.05	703	2.266
18	-23.63	791	2.522
20	-23.50	879	2.793
22	-23.39	967	3.065
24	-23.30	1055	3.336
26	-23.22	1143	3.607
28	-23.16	1230	3.875
30	-23.10	1318	4.146
32	-22.80	1406	4.387
34	-22.65	1494	4.643
36	-22.52	1582	4.901
38	-22.41	1670	5.159
40	-22.30	1758	5.413
42	-22.20	1846	5.670

**54W PRESTRESSED GIRDER  
DESIGN DATA**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

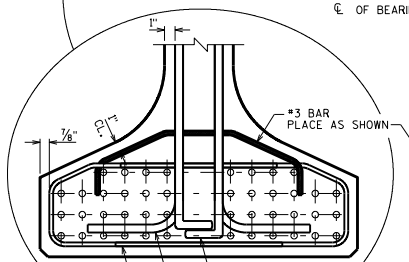
DATE:  
7-13



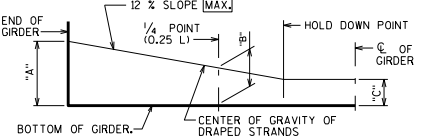
**SECTION A-A**

**SUPPORT WITH STEEL OR ELASTOMERIC BRGS.**

**SUPPORT WITH 1/2" ELASTOMERIC BEARING PAD**



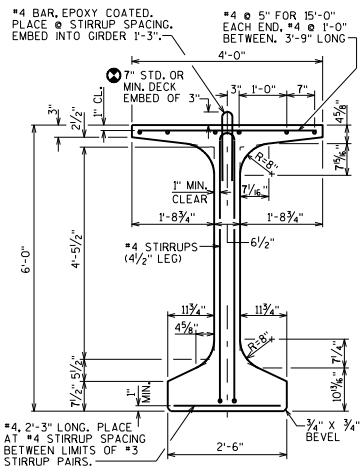
**DETAIL A  
BOTTOM FLANGE**



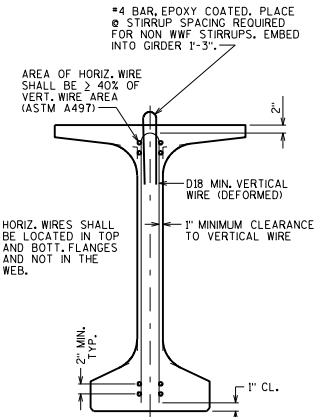
"A" TO BE GIVEN TO THE NEAREST 1"  
 "B" = 1/4("A" + 3 "C") [MIN.]  
 "B" = 1/4("A" + 3 "C") + 3" [MAX.]

RECORD DIMENSIONS  
 "A", "B" & "C"  
 ON FINAL PLANS.

**LOCATION OF DRAPED STRANDS**



**SECTION THRU GIRDER  
STRANDS NOT SHOWN**



**SECTION THRU GIRDER**

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS  
 ASTM A497 (FY = 70 KSI)

**NOTES**

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 15" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 15" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURE'S DEVELOPMENT SECTION.

PRESTRESSING STRANDS SHALL BE ( ) DIA. 7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

THIS NOTE APPLIES TO LONG SPANS AS DEFINED IN THE NOTES FOR THE 72" GIRDER, TABLE 19.3-2 OF THE BRIDGE MANUAL. FOR STORAGE, HANDLING AND TRANSPORTING, THIS GIRDER IS REINFORCED TO ALLOW A MAXIMUM OVERHANG FROM THE LIFTING LOCATION OR POINT OF SUPPORT OF UP TO 1/10 THE GIRDER LENGTH. THE CONTRACTOR IS RESPONSIBLE FOR LATERAL STABILITY OF THE GIRDER UNTIL THE DECK IS CURED.

**DESIGNER NOTES**

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 72W-INCH".

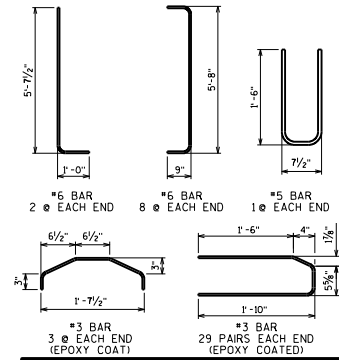
SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE 0.6" DIA. STRAND FOR ALL PATTERNS. THE MAX. NUMBER OF DRAPED 0.6" DIA. STRANDS IS 8.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19.18 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-2. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRE PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

⊙ DETAIL TYPICAL AT EACH END

⊙ THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE, AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR 1/4" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

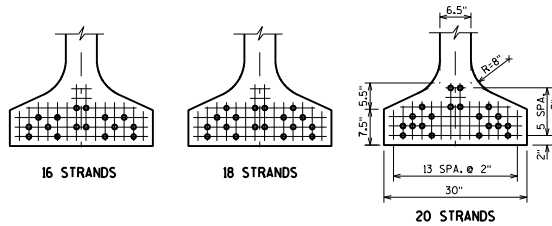


**72" PRESTRESSED GIRDER DETAILS**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva*

DATE: 7-13



**72W GIRDER**

A = 915 SQ. IN.  
 $r^2 = 717.5 \text{ IN.}^2$   
 $y_T = 37.13 \text{ IN.}$   
 $y_B = -34.87 \text{ IN.}$   
 $I = 656,426 \text{ IN.}^4$   
 $S_T = 17,680 \text{ IN.}^3$   
 $S_B = -18,825 \text{ IN.}^3$   
 WT. = 953 #/FT.

**PRE-TENSION**

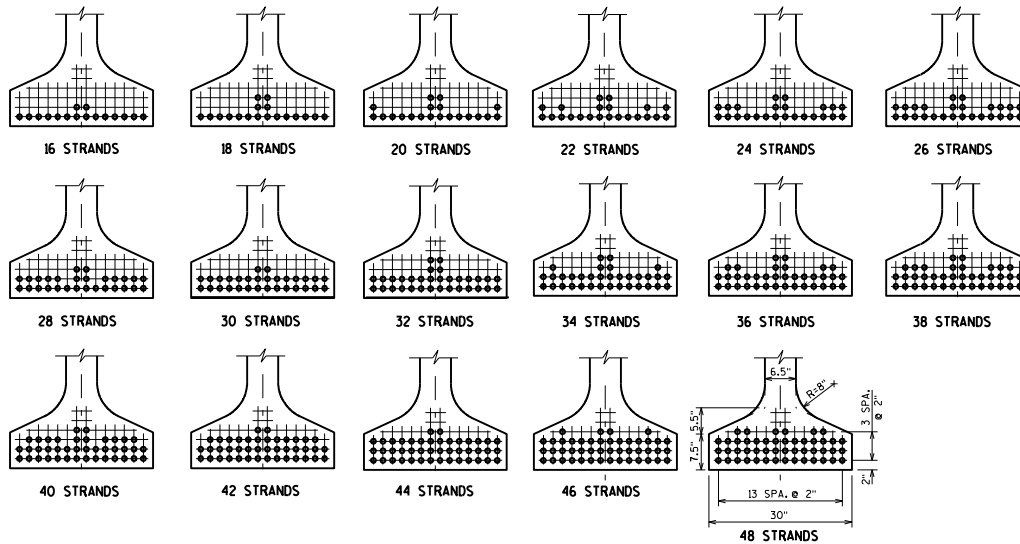
$f'_s = 270,000 \text{ P.S.I.}$   
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$   
 for low relaxation strands

Pi PER 0.6"  $\phi$  STRAND =  $0.217 \times 202,500 = 43.94 \text{ KIPS}$

$\frac{y_B}{r^2} = \frac{-34.87}{717.50} = -0.0486 \text{ in/in}^2$

$f_B (\text{init.}) = \frac{A_s f_s}{A} (1 + e_s y_B)$

**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY TO AVOID DRAPING OF 0.6"  $\phi$  STRANDS**



**ARRANGEMENT AT  $\frac{1}{4}$  SPAN - FOR GIRDERS WITH DRAPED 0.6"  $\phi$  STRANDS**

(COMPRESSION IS POSITIVE)

NO. STRANDS	$e_s$ (inches)	P(init.) = $A_s f_s$ (KIPS)	$f_B$ (init.) (K/sq.in.)
<b>STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS</b>			
16	-30.37	703	1,902
18	-29.98	791	2,124
20	-29.27	879	2,328
<b>STANDARD STRAND PATTERNS FOR DRAPED STRANDS</b>			
16	-32.62	703	1,986
18	-32.20	791	2,217
20	-32.07	879	2,458
22	-31.96	967	2,698
24	-31.87	1055	2,939
26	-31.79	1143	3,179
28	-31.73	1230	3,417
30	-31.67	1318	3,657
32	-31.37	1406	3,880
34	-31.22	1494	4,110
36	-31.09	1582	4,341
38	-30.98	1670	4,574
40	-30.87	1758	4,803
42	-30.77	1846	5,034
44	-30.69	1933	5,265
46	-30.52	2021	5,484
48	-30.37	2109	5,707

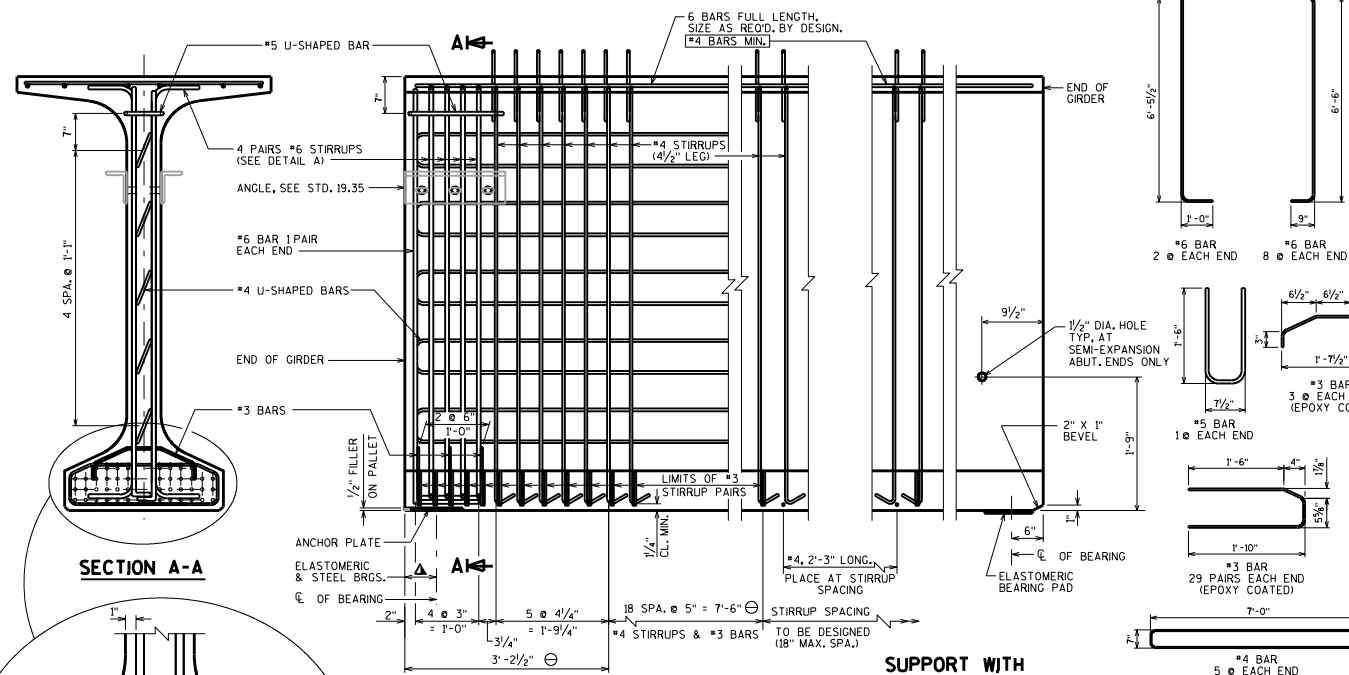
**72W PRESTRESSED GIRDER DESIGN DATA**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

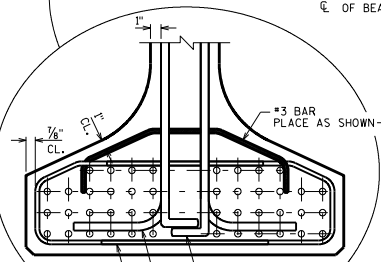
APPROVED: Bill Oliva

DATE:  
7-13



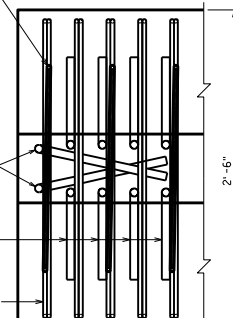


**SECTION A-A**

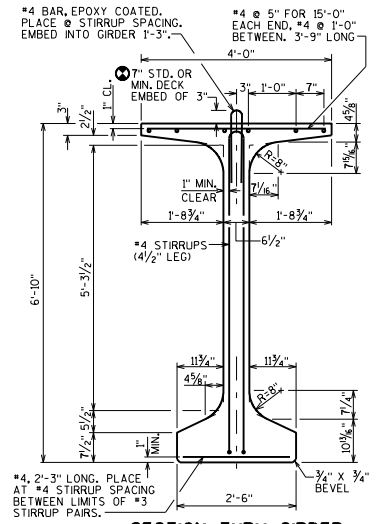


**DETAIL A**  
BOTTOM FLANGE

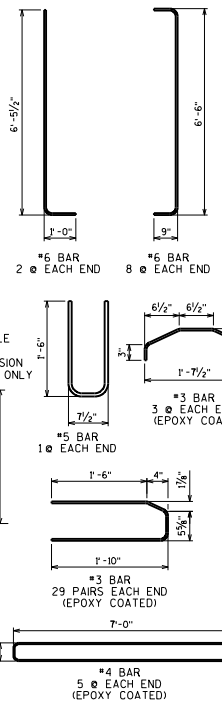
**SUPPORT WITH STEEL OR ELASTOMERIC BRGS.**



**SUPPORT WITH 1/2" ELASTOMERIC BEARING PAD**



**SECTION THRU GIRDER**  
STRANDS NOT SHOWN



**NOTES**

TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 15" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 15" OF THE TOP FLANGE.

DO NOT APPLY CONCRETE SEALER TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.

THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.

STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.

ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.

SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.

AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.

PRESTRESSING STRANDS SHALL BE ( DIA. ) 7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

**DESIGNER NOTES**

BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE 182W-INCH".

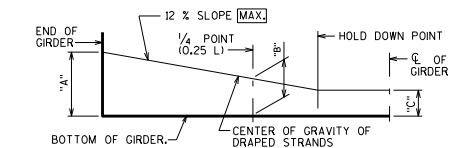
SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE 0.6" DIA. STRAND FOR ALL PATTERNS. THE MAX. NUMBER OF DRAPED 0.6" DIA. STRANDS IS 8.

REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 19-20 AND THE SPAN LENGTHS SHOWN IN TABLE 19.3-2 USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.

VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)

DETAIL TYPICAL AT EACH END

THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR #3/4" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.



**LOCATION OF DRAPED STRANDS**

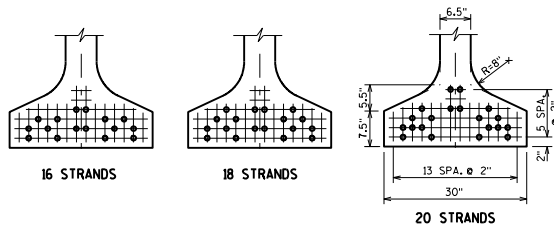
THERE IS CURRENTLY A MORATORIUM ON THE USE OF 82W" PRESTRESSED GIRDERS.

**82W" PRESTRESSED GIRDER DETAILS**

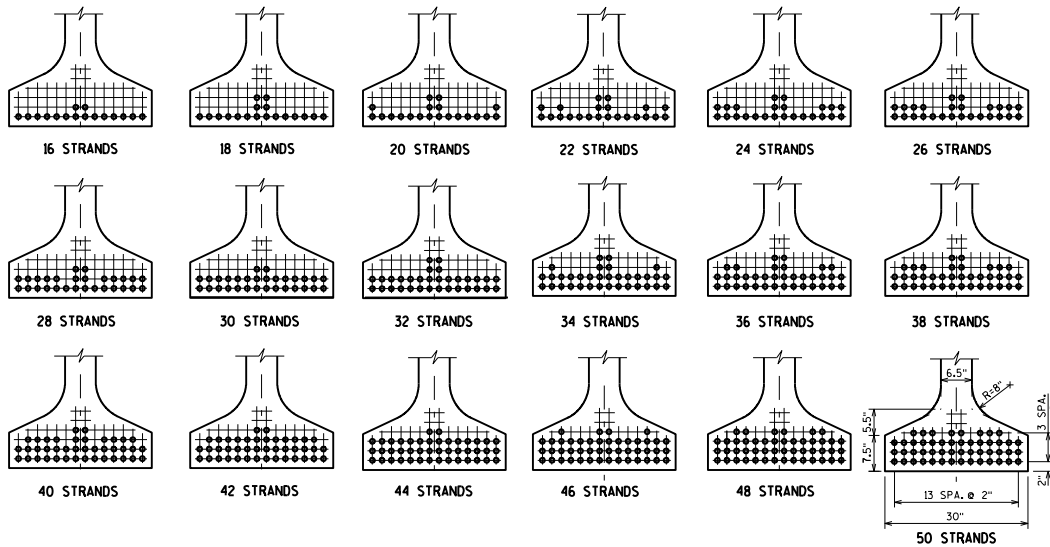
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva*

DATE:  
7-13



**STANDARD ARRANGEMENTS TO RAISE CENTER OF GRAVITY  
TO AVOID DRAPING OF 0.6"Ø STRANDS**



**ARRANGEMENT AT 1/4 SPAN - FOR GIRDERS WITH DRAPED 0.6"Ø STRANDS**

**82W GIRDER**

A = 980 SQ. IN.  
 $r^2 = 924.1 \text{ IN.}^2$   
 $y_T = 42.32 \text{ IN.}$   
 $y_B = -39.68 \text{ IN.}$   
 $I = 905,453 \text{ IN.}^4$   
 $S_T = 21,396 \text{ IN.}^3$   
 $S_B = -22,819 \text{ IN.}^3$   
 WT. = 1021 #/FT.

**PRE-TENSION**

$f'_s = 270,000 \text{ P.S.I.}$   
 $f_s = 0.75 \times 270,000 = 202,500 \text{ P.S.I.}$   
 for low relaxation strands

Pi PER 0.6" Ø STRAND =  $0.217 \times 202,500 = 43.94 \text{ KIPS}$

$$\frac{y_B}{r^2} = \frac{-39.68}{924.10} = -0.04294 \text{ in/in}^2$$

$$f_b (\text{ini.t.}) = \frac{A_s f_s}{A} (1 + e_s \frac{y_B}{r^2})$$

(COMPRESSION IS POSITIVE)

NO. STRANDS	$e_s$ (inches)	P(ini.t.) = $A_s f_s$ (KIPS)	$f_b$ (ini.t.) (K/sq.in.)
<b>STANDARD STRAND PATTERNS FOR UNDRAPED STRANDS</b>			
16	-35.18	703	1.801
18	-34.79	791	2.013
20	-34.08	879	2.209
<b>STANDARD STRAND PATTERNS FOR DRAPED STRANDS</b>			
16	-37.43	703	1.870
18	-37.01	791	2.090
20	-36.88	879	2.318
22	-36.77	967	2.545
24	-36.68	1055	2.772
26	-36.60	1143	3.000
28	-36.54	1230	3.224
30	-36.48	1318	3.451
32	-36.18	1406	3.664
34	-36.03	1494	3.883
36	-35.90	1582	4.104
38	-35.79	1670	4.323
40	-35.68	1758	4.542
42	-35.58	1846	4.762
44	-35.50	1933	4.978
46	-35.33	2021	5.191
48	-35.18	2109	5.404
50	-35.04	2197	5.616

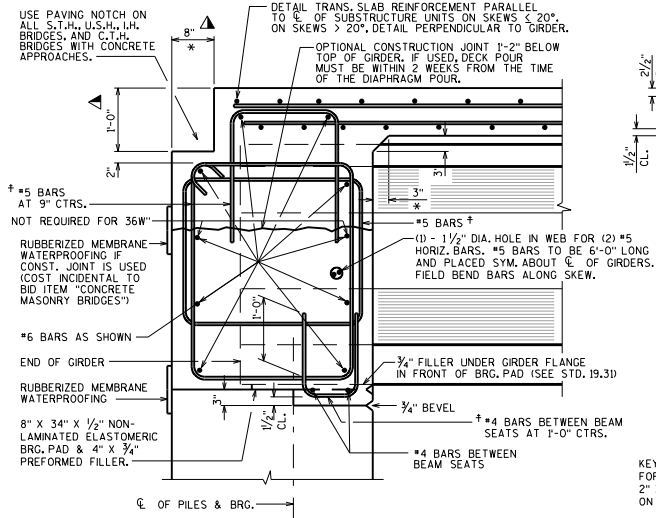
THERE IS CURRENTLY A MORATORIUM ON THE USE OF 82W" PRESTRESSED GIRDERS.

**82W" PRESTRESSED GIRDER  
DESIGN DATA**

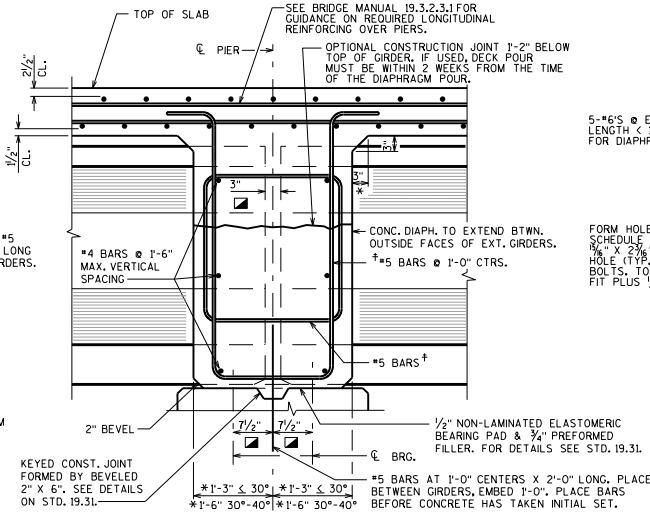
STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

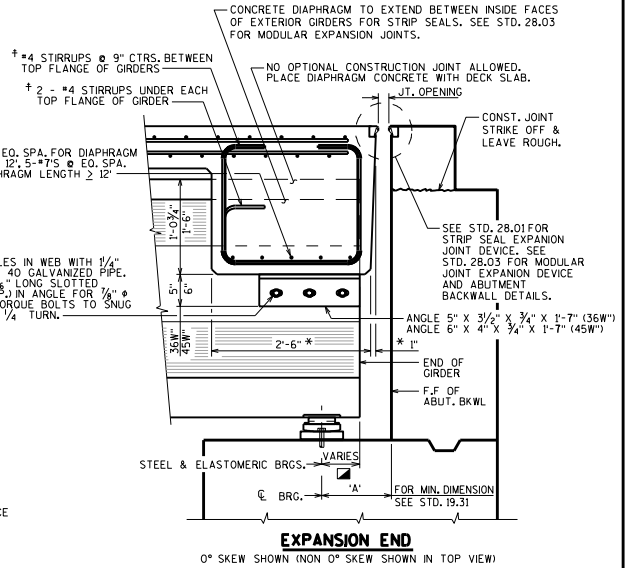
DATE:  
7-13



**PRESTRESSED GIRDER WITH SEMI-EXPANSION SEAT**



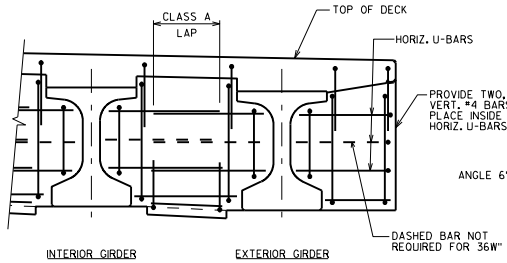
**DIAPHRAGM AT 1/2" ELASTOMERIC BEARING**



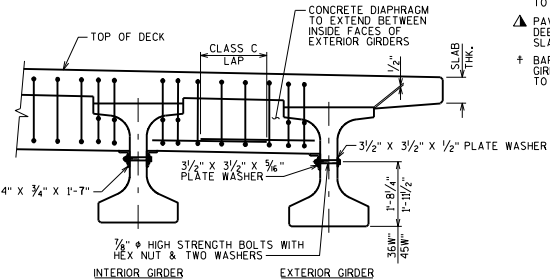
**EXPANSION END**

**LEGEND**

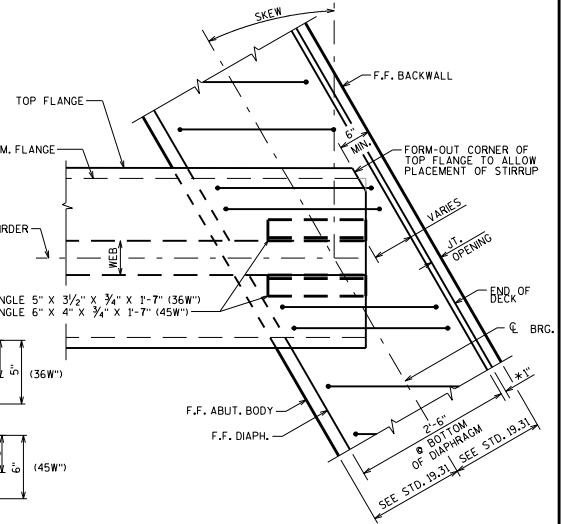
- ☑ DIMENSION IS TAKEN PARALLEL TO CL GIRDER.
- \* DIMENSION IS TAKEN NORMAL TO CL SUBSTRUCTURE UNITS.
- ▲ PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.
- † BARS PLACED PARALLEL TO GIRDERS, SPACING PERPENDICULAR TO CL GIRDERS.



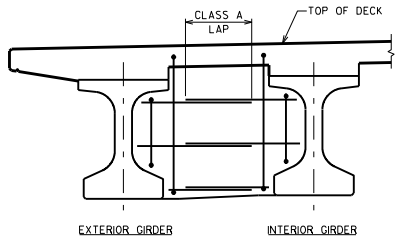
**PART TRANSVERSE SECTION AT DIAPHRAGM SEMIEXPANSION END**



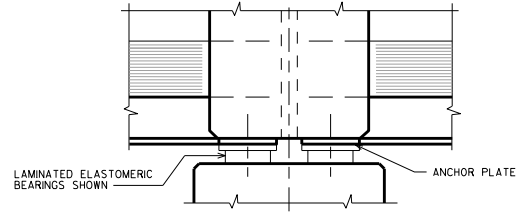
**PART TRANSVERSE SECTION AT DIAPHRAGM EXPANSION END**



**TOP VIEW OF DIAPHRAGM (EXPANSION END)**



**PART TRANSVERSE SECTION AT DIAPHRAGM PIER**



**DIAPHRAGM AT STEEL OR ELASTOMERIC BEARINGS SECTION THRU DIAPHRAGM AT PIER**

FOR STEEL BEARINGS, FORM DIAPHRAGM APPROXIMATELY 1/2" ABOVE BEARING KEEPER BARS

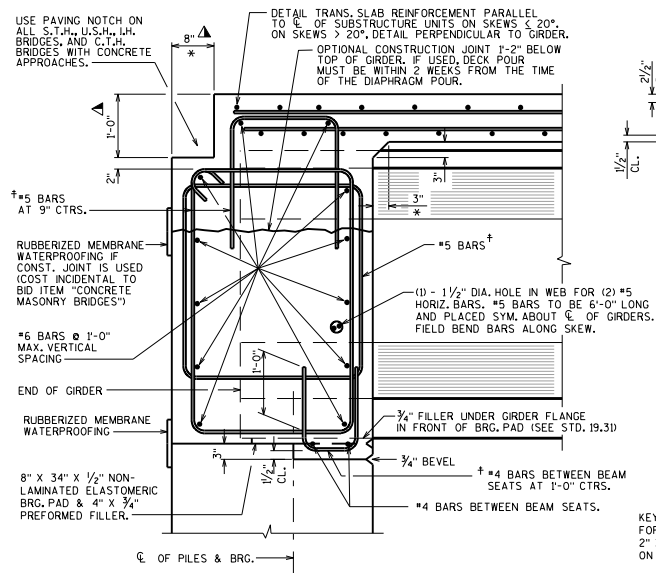
**NOTES**

DIAPHRAGM SUPPORT ANGLES SHALL BE ASTM A709 GRADE 36. ALL BOLTS, NUTS AND WASHERS SHALL BE ASTM A325 TYPE I. ALL SUPPORT ANGLES SHALL BE HOT-DIPPED GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIPPED GALVANIZED. IN ACCORDANCE WITH ASTM A153 CLASS C. GALVANIZED NUTS SHALL BE TAPPED OVERSIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A563 AND SHALL MEET THE REQUIREMENTS OF SUPPLEMENTARY REQUIREMENT S1 OF ASTM A563. LUBRICANT AND TEST FOR COATED NUTS. ALL DIAPHRAGM SUPPORT HARDWARE SHALL BE INCIDENTAL TO CONCRETE MASONRY BRIDGES.

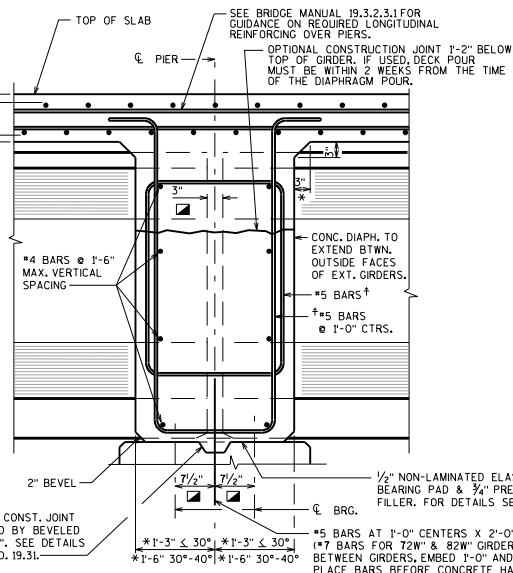
**DESIGNER NOTES**

LAP LENGTHS FOR DIAPHRAGM REINFORCEMENT SHALL BE BASED ON A CLASS "C" TENSION LAP SPLICE, UNLESS OTHERWISE NOTED.

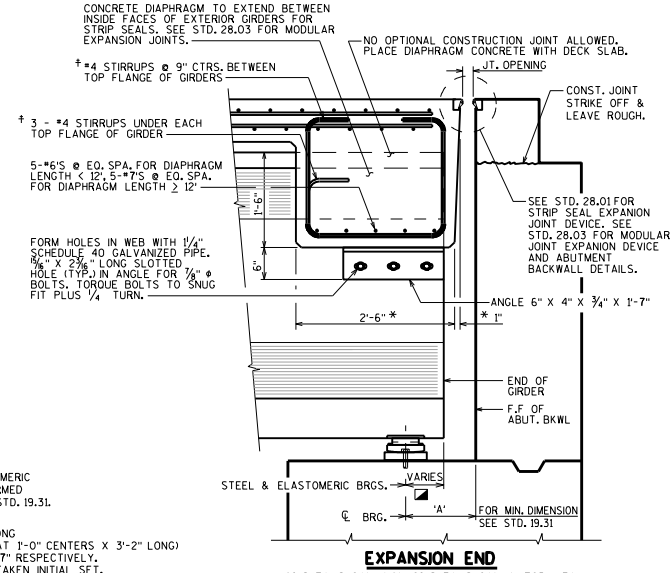
<b>PRESTRESSED 36W" &amp; 45W" GIRDER SLAB &amp; SUPERSTRUCTURE DETAILS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



**PRESTRESSED GIRDER WITH SEMI-EXPANSION SEAT**

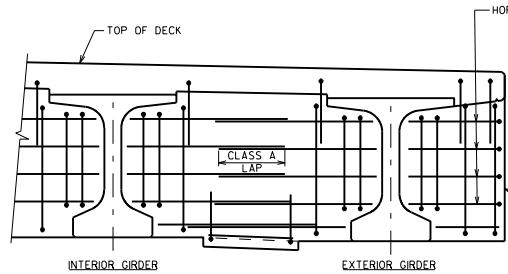


**DIAPHRAGM AT 1/2" ELASTOMERIC BEARING**

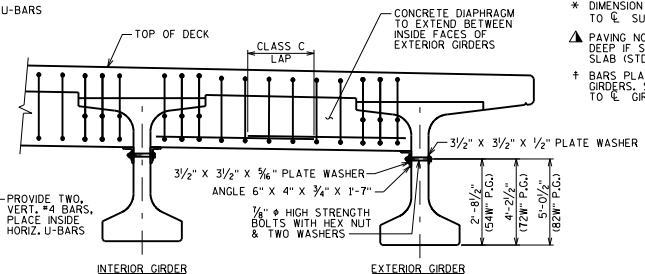


**EXPANSION END**

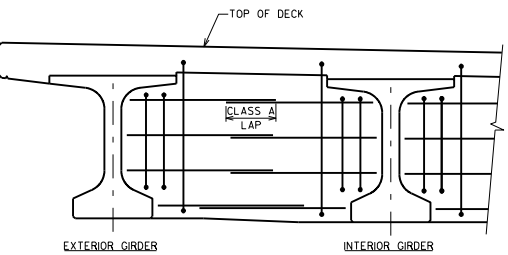
0° SKEW SHOWN IN 0° SKEW SHOWN IN TOP VIEW



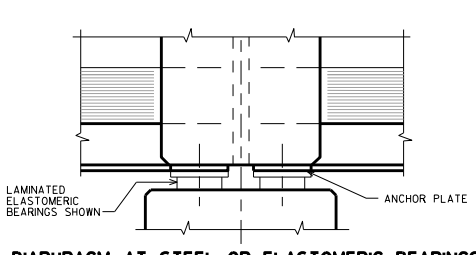
**PART TRANSVERSE SECTION AT DIAPHRAGM SEMI-EXPANSION END**



**PART TRANSVERSE SECTION AT DIAPHRAGM EXPANSION END**



**PART TRANSVERSE SECTION AT DIAPHRAGM PIER**

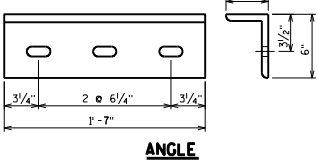


**DIAPHRAGM AT STEEL OR ELASTOMERIC BEARINGS SECTION THRU DIAPHRAGM AT PIER**

FOR STEEL BEARINGS, FORM DIAPHRAGM APPROXIMATELY 1/2" ABOVE BEARING KEEPER BARS

**LEGEND**

- ▣ DIMENSION IS TAKEN PARALLEL TO G GIRDER.
- \* DIMENSION IS TAKEN NORMAL TO G SUBSTRUCTURE UNITS.
- ▲ PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.
- † BARS PLACED PARALLEL TO GIRDERS, SPACING PERPENDICULAR TO G GIRDERS.



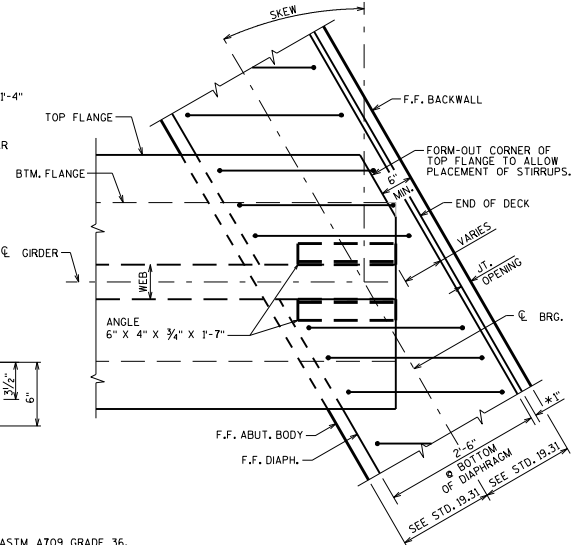
**ANGLE**

**NOTES**

DIAPHRAGM SUPPORT ANGLES SHALL BE ASTM A709 GRADE 36. ALL BOLTS, NUTS AND WASHERS SHALL BE ASTM A325 TYPE L. ALL SUPPORT ANGLES SHALL BE HOT-DIPPED GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C. GALVANIZED NUTS SHALL BE TAPPED OVERSIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A563 AND SHALL MEET THE REQUIREMENTS OF SUPPLEMENTARY REQUIREMENT S1 OF ASTM A563. LUBRICANT AND TEST FOR COATED NUTS. ALL DIAPHRAGM SUPPORT HARDWARE SHALL BE INCIDENTAL TO "CONCRETE MASONRY BRIDGES".

**DESIGNER NOTES**

LAP LENGTHS FOR DIAPHRAGM REINFORCEMENT SHALL BE BASED ON A CLASS "CC" TENSION LAP SPLICE, UNLESS OTHERWISE NOTED.



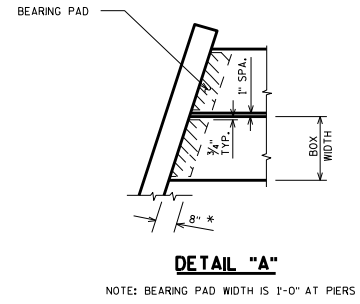
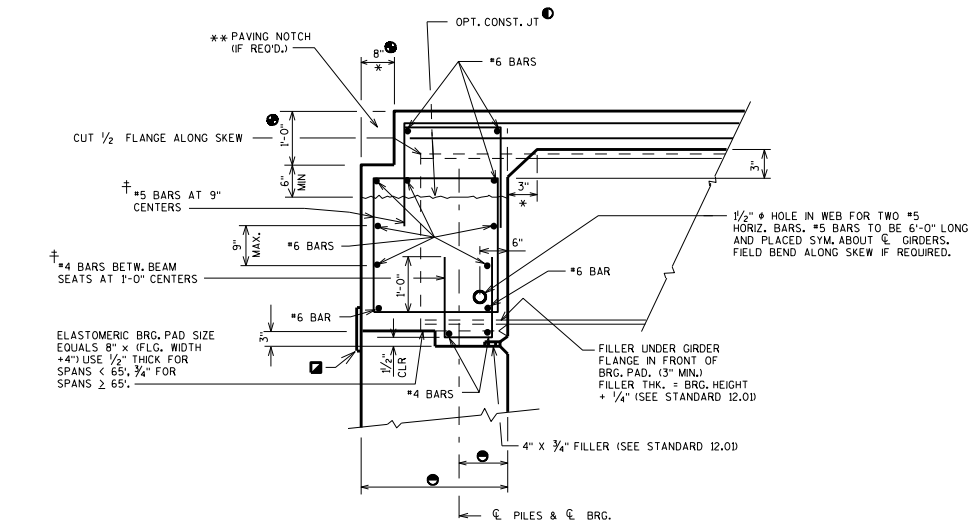
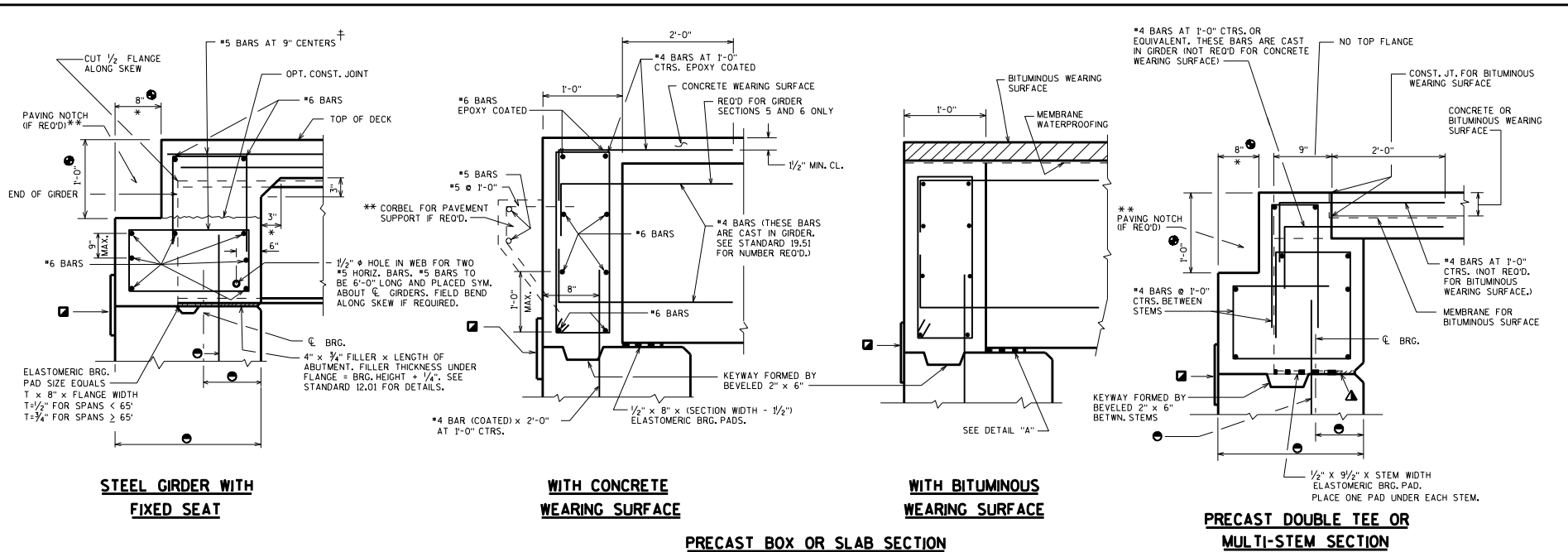
**TOP VIEW OF DIAPHRAGM (EXPANSION END)**

**PRESTRESSED 54W", 72W" & 82W" GIRDER SLAB & SUPERSTRUCTURE DETAILS**

STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION

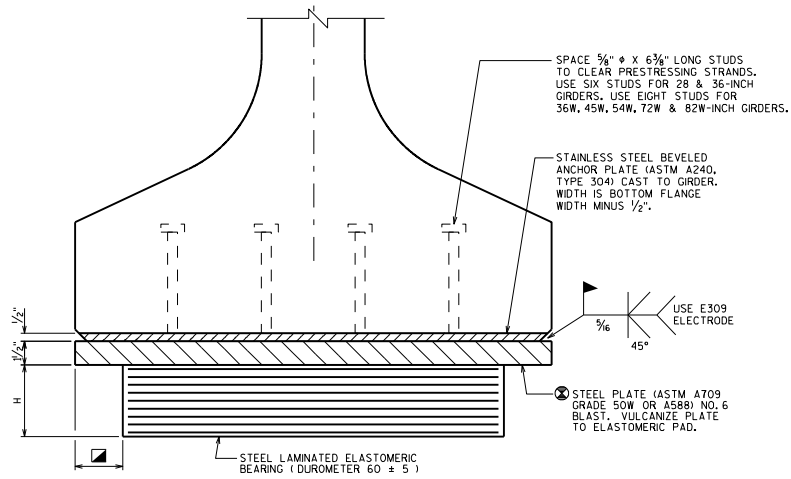
APPROVED: *Bill Oliva*

DATE: 7-13

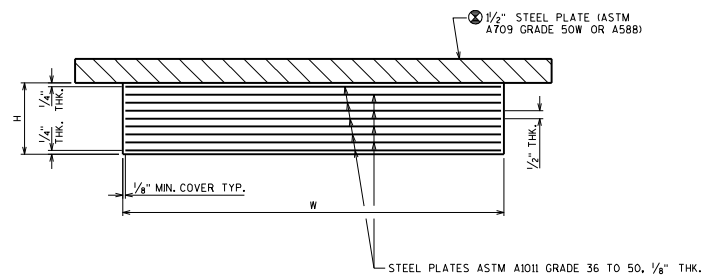


- NOTES**
- FOR SKEWED STRUCTURES CAST END OF PRECAST BOX, SLAB, OR TEE ALONG SKEW.
  - ▲ ¾" x 4" FILLER x LENGTH OF ABUT. PLACE ADDITIONAL FILLER BETWEEN BRG. PAD AND ¾" x 4" FILLER.
  - \* DIMENSION IS TAKEN NORMAL TO CL SUBSTRUCTURE UNITS.
  - 1'-6" RUBBERIZED MEMBRANE WATERPROOFING
  - † BARS PLACED PARALLEL TO GIRDERS. SPACING PERPENDICULAR TO CL GIRDERS.
- DESIGNER NOTES**
- THE USE OF THIS OPT. CONST. JOINT IS NOT RECOMMENDED FOR SKEWS OVER 15° WHEN LARGE DEADLOAD END ROTATION IS ANTICIPATED.
  - \*\* USE PAVING NOTCH ON ALL U.S.H. BRIDGES, S.T.H. BRIDGES, I.H. BRIDGES & ON C.T.H. BRIDGES WITH CONCRETE APPROACHES.
  - ⊙ PAVING NOTCH IS 1'-0" WIDE BY 1'-4" DEEP IF STRUCTURAL APPROACH SLAB (STD. 12.10) IS USED.
  - ⦿ SEE STD. 12.01

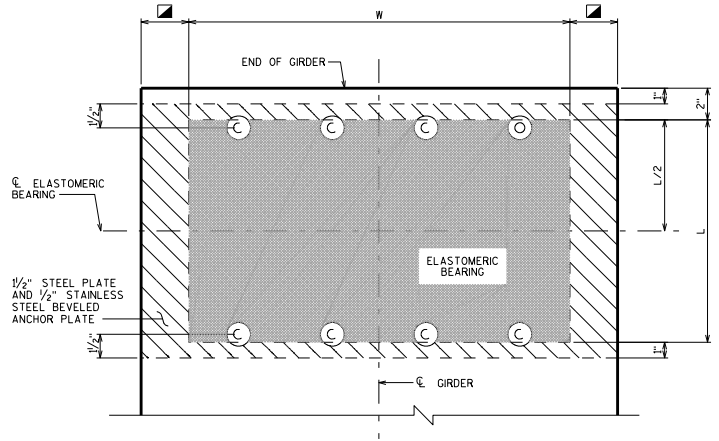
<b>BRG. DETAILS FOR STEEL GDERS. AND PRECAST UNITS ON A1 ABUTMENTS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



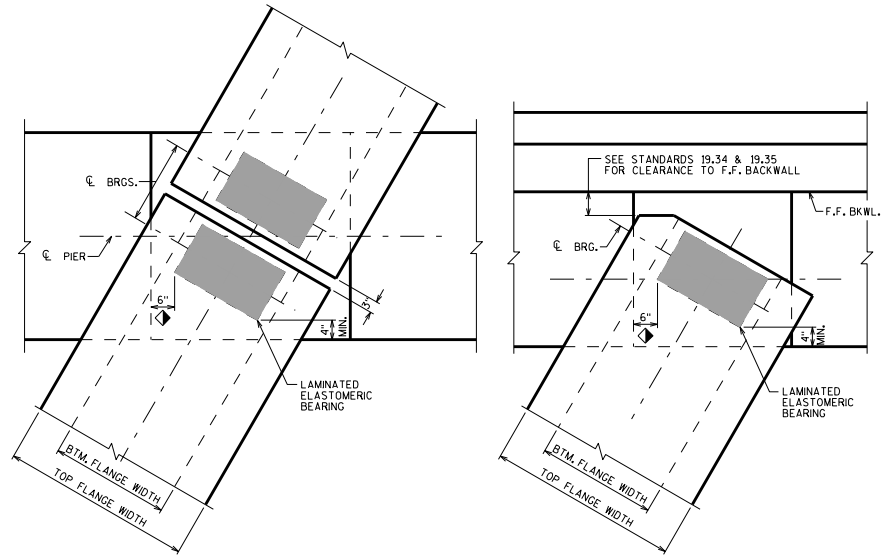
**END VIEW**



**SECTION THRU ELASTOMERIC BEARING**



**PLAN VIEW**



**AT SKEWED PIER**

**AT SKEWED ABUTMENTS**

DETAIL SHOWN IS FOR A CONTINUOUS DECK AT AN EXPANSION PIER. IF PIER CAP WIDTH BECOMES EXCESSIVE, CONSIDER USING STEEL BEARINGS.

**CLEARANCE DIAGRAM**

**DESIGNER NOTES**

FOR ALL NEW BRIDGES, THE STEEL TOP PLATE SHALL HAVE A MINIMUM THICKNESS OF 1/2".

FOR BEARINGS USED IN BEARING REPLACEMENT PROJECTS, THE STEEL TOP PLATE THICKNESS MAY BE REDUCED TO A MINIMUM OF 3/4" TO MATCH THE OVERALL EXISTING BEARING HEIGHT. WHEN THE THICKNESS IS REDUCED, THE FOLLOWING NOTE SHALL BE LOCATED ON THE PLANS:

"WELDING PROCEDURES SHALL BE ESTABLISHED BY THE CONTRACTOR TO RESTRICT THE MAXIMUM TEMPERATURE REACHED BY SURFACES IN CONTACT WITH ELASTOMER TO 200°F (93°C). TEMPERATURES SHALL BE CONTROLLED BY TEMPERATURE INDICATING WAX PENCILS OR OTHER SUITABLE MEANS APPROVED BY THE ENGINEER."

**NOTES**

ALL MATERIAL USED FOR BEARINGS SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING PADS ELASTOMERIC LAMINATED", EACH.

ON BEARING REPLACEMENTS, COMPRESSION LOAD AND ADHESION TESTS WILL BE WAIVED WHERE BEARINGS ARE DETAILED TO MEET HEIGHT REQUIREMENTS.

ALL STRUCTURAL STEEL PLATES SHALL BE FLAT ROLLED WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT, AND VERTICAL.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FINISH.

SEE CHAPTER 40 STANDARDS FOR USE OF ELASTOMERIC BEARINGS ON NEW AND REHABILITATED STEEL GIRDER BRIDGES.

- ⊗ CHECK 27.2.1 ELASTOMERIC BEARINGS IN THE BRIDGE MANUAL FOR REQUIREMENTS TO SEE IF THIS PLATE SHOULD BE TAPERED.
- ▣ 3" FOR 36W", 45W", 54W", 72W" & 82W" 1" FOR 28" & 36"
- ◊ MIN. DISTANCE FROM EDGE OF PIER/ABUT. STEP TO LAMINATED ELASTOMERIC BEARING

**ELASTOMERIC BEARINGS FOR PRESTRESSED CONCRETE GIRDERS**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva DATE: 7-13

**BEARING NOTES**

ALL BEARINGS ARE SYMMETRICAL ABOUT  $\epsilon$  OF GIRDER AND  $\epsilon$  OF BEARING.

FINISH THESE SURFACES TO ANS1250 IF 'Y' DIMENSION IS GREATER THAN 2".

ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153, CLASS C.

ROCKER PLATE "C" AND MASONRY PLATE "D" SHALL BE GALVANIZED. TOP PLATE "A" AND STEEL PLATE "B" SHALL BE SHOP PAINTED. USE A WELDABLE PRIMER ON TOP PLATE "A". DO NOT PAINT STAINLESS STEEL OR TEFLON SURFACES.

ALL MATERIAL IN BEARINGS, INCLUDING SHIM PLATES, BUT EXCLUDING STAINLESS STEEL SHEET, TEFLON SURFACE, PINTLES, ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 50W.

IN LIEU OF USING SHIM PLATES, FABRICATOR MAY INCREASE THICKNESS OF TOP PLATE "A" OR MASONRY PLATE "D" BY THE SHIM PLATE THICKNESS.

DIMENSION IS 2" WHEN  $1/4"$  ANCHOR BOLTS ARE USED AND  $2/4"$  WHEN  $1/2"$  ANCHOR BOLTS ARE USED.

ALL MATERIAL IN TYPE "A-T" BEARINGS, INCLUDING SHIM PLATES AND BEARING PADS, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "BEARING ASSEMBLIES EXPANSION B-...-...", EACH.

CHAMFER ANCHOR BOLTS PRIOR TO THREADING.

ALL FINISHED SURFACES SHALL BE MACHINE FINISHED BY AN AUTOMATIC PROCESS.

ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

ALL STRUCTURAL STEEL BEARING PLATES SHALL BE FLAT ROLLED STEEL PLATES WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL.

PROVIDE  $1/8"$  THICK BEARING PAD THE SAME SIZE AS MASONRY PLATE "D" FOR EACH BEARING.

ANCHOR BOLTS SHALL BE THREADED 3". PROVIDE ONE STANDARD WROUGHT WASHER AND ONE HEX NUT PER BOLT. PROJECT ANCHOR BOLTS, MASONRY PLATE "D" THICKNESS +  $2/4"$  ABOVE TOP OF CONCRETE.

CHAMFER TOP OF PINTLES  $1/8"$ . DRILL HOLES FOR ALL PINTLES IN MASONRY PLATE "D" FOR A DRIVING FIT.

STEEL PINTLES SHALL CONFORM TO ASTM A449 OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A709 GRADE 36, OR MATERIAL OF EQUIVALENT YIELD STRENGTH AND ELONGATION.

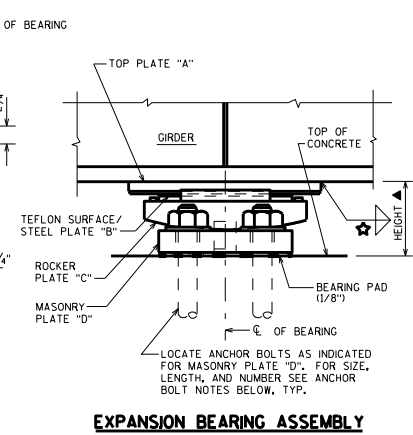
PLACE SHIM PLATES BETWEEN BEARING PAD AND MASONRY PLATE "D". PLATES SHALL HAVE 'X' AND 'Z' DIMENSIONS THAT MATCH MASONRY PLATE "D".

PROVIDE A METHOD FOR HANDLING ROCKER PLATE "C" DURING GALVANIZING.

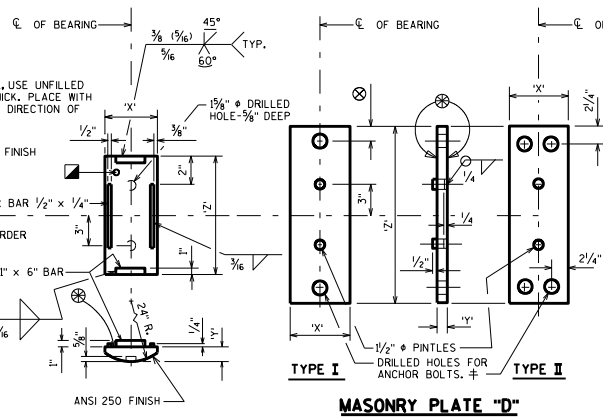
BOND STEEL PLATE "B" AND TEFLON WITH ADHESIVE MATERIAL MEETING FEDERAL SPECIFICATION MMM-A-134, FEP FILM OR EQUAL.

DRILLED HOLES FOR ANCHOR BOLTS IN MASONRY PLATE "D" SHALL HAVE A DIAMETER  $3/8"$  LARGER THAN ANCHOR BOLT.

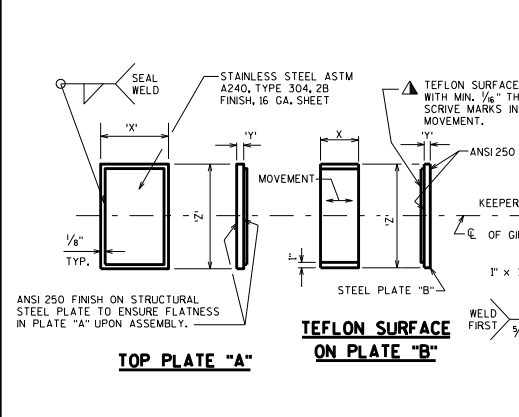
AT INSTALLATION, ENSURE STAINLESS STEEL SLIDING FACE OF THE UPPER ELEMENT AND THE TFE SLIDING FACE OF THE LOWER ELEMENT HAVE THE SURFACE FINISH SPECIFIED AND ARE CLEAN AND FREE OF ALL DUST, MOISTURE, OR ANY OTHER FOREIGN MATTER.



**EXPANSION BEARING ASSEMBLY**



**MASONRY PLATE "D"**



**TOP PLATE "A"**

**ROCKER PLATE "C"**

**EXPANSION BEARING**

**10" BEARING**

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
100	9"	3/8"	10"	5"	1/2"	10"	7"	1 1/8"	1'-0 1/4"	8"	1 1/2"	1'-8"	0.360
180	1'-1"	3/8"	10"	9"	1/2"	10"	11"	2 3/8"	1'-0 1/4"	8"	1 1/2"	1'-8"	0.438
260	1'-5"	3/8"	10"	1'-1"	1/2"	10"	1'-3"	3 3/8"	1'-0 1/4"	11"	2"	1'-8"	0.604

**12" BEARING**

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
125	9"	3/8"	1'-0"	5"	1/2"	1'-0"	7"	1 1/8"	1'-2 1/4"	8"	1 1/2"	1'-10"	0.360
175	11"	3/8"	1'-0"	7"	1/2"	1'-0"	9"	1 1/8"	1'-2 1/4"	8"	1 1/2"	1'-10"	0.401
275	1'-3"	3/8"	1'-0"	11"	1/2"	1'-0"	1'-1"	2 3/8"	1'-2 1/4"	11"	2"	1'-10"	0.521

**14" BEARING**

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
210	11"	3/8"	1'-2"	7"	1/2"	1'-2"	9"	1 1/8"	1'-4 1/4"	8"	1 1/2"	2'-0"	0.401
375	1'-5"	3/8"	1'-2"	1'-1"	1/2"	1'-2"	1'-3"	3 3/8"	1'-4 1/4"	1'-2"	2 3/8"	2'-0"	0.677
500	1'-9"	3/8"	1'-2"	1'-5"	1/2"	1'-2"	1'-7"	4 3/8"	1'-4 1/4"	1'-5"	3 3/8"	2'-1"	0.802

**16" BEARING**

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
245	11"	3/8"	1'-4"	7"	1/2"	1'-4"	9"	1 1/8"	1'-6 1/4"	8"	1 1/2"	2'-2"	0.401
370	1'-3"	3/8"	1'-4"	11"	1/2"	1'-4"	1'-1"	2 3/8"	1'-6 1/4"	1'-0"	2 3/8"	2'-3"	0.552
525	1'-7"	3/8"	1'-4"	1'-3"	1/2"	1'-4"	1'-5"	3 3/8"	1'-6 1/4"	1'-4"	3 3/8"	2'-3"	0.719
575	1'-9"	3/8"	1'-4"	1'-5"	1/2"	1'-4"	1'-7"	4 3/8"	1'-6 1/4"	1'-6"	3 3/8"	2'-3"	0.844

**18" BEARING**

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
280	11"	3/8"	1'-6"	7"	1/2"	1'-6"	9"	1 1/8"	1'-8 1/4"	9"	2"	2'-4"	0.443
360	1'-1"	3/8"	1'-6"	9"	1/2"	1'-6"	11"	2 3/8"	1'-8 1/4"	11"	2"	2'-4"	0.479
600	1'-7"	3/8"	1'-6"	1'-3"	1/2"	1'-6"	1'-5"	3 3/8"	1'-8 1/4"	1'-5"	3 3/8"	2'-5"	0.719
650	1'-11"	3/8"	1'-6"	1'-7"	1/2"	1'-6"	1'-9"	4 3/8"	1'-8 1/4"	1'-10"	3 3/8"	2'-5"	0.844

**20" BEARING**

TOTAL LOAD (KIPS)	PLATE A			PLATE B			PLATE C			PLATE D			HEIGHT FEET
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	
225	9"	3/8"	1'-8"	5"	1/2"	1'-8"	7"	1 1/8"	1'-10 1/4"	8"	1 1/2"	2'-6"	0.360
315	11"	3/8"	1'-8"	7"	1/2"	1'-8"	9"	1 1/8"	1'-10 1/4"	9"	2"	2'-6"	0.443
495	1'-3"	3/8"	1'-8"	11"	1/2"	1'-8"	1'-1"	2 3/8"	1'-10 1/4"	1'-1"	2 3/8"	2'-7"	0.594
675	1'-7"	3/8"	1'-8"	1'-3"	1/2"	1'-8"	1'-5"	3 3/8"	1'-10 1/4"	1'-6"	3 3/8"	2'-7"	0.760
705	1'-11"	3/8"	1'-8"	1'-7"	1/2"	1'-8"	1'-9"	4 3/8"	1'-10 1/4"	1'-11"	3 3/8"	2'-7"	0.844

**DESIGNER NOTES**

HEIGHT OF BEARINGS GIVEN IN TABLES INCLUDES  $1/8"$  BEARING PAD, 16 GAGE STAINLESS STEEL SHEET AND  $1/16"$  TEFLON SURFACE.

DETAIL SHIM PLATES AS DESCRIBED IN NOTES ON STANDARD 24.02.

SEE STANDARD 27.02 FOR THE USE OF BEVELED ROCKER PLATE "C" ON GRADES GREATER THAN 3% AND ALSO CLEARANCE REQUIREMENTS.

AT ABUTMENTS, WHEN THE 'X' DIMENSION OF PLATE "A" EXCEEDS 11", INCREASE STANDARD DISTANCE FROM  $\epsilon$  OF BEARING TO END OF GIRDER.

- FOR WELD SIZE, REFER TO STANDARD 24.02.
- ADJUST HEIGHT IF BEVELED ROCKER PLATE "C" IS USED.

CALCULATE THE REACTIONS AT THE BEARINGS DUE TO "TOTAL LOADS" AND ALSO "DEAD LOADS" ONLY. USE THE AASHTO LRFD SERVICE I LOAD COMBINATION, CONSIDER ONLY DEAD LOAD (DC + DW) AND HL-93 LIVE LOADS (LL), INCLUDING A 33% DYNAMIC LOAD ALLOWANCE (IM).

THE VALUES IN THE TABLES ARE THE BEARING CAPACITIES FOR "TOTAL LOAD" (DC + DW + ILL + IM). TAKE 60% OF THE VALUES IN THE TABLES TO DETERMINE THE BEARING CAPACITIES FOR "DEAD LOAD" ONLY (DC + DW).

SELECT A BEARING THAT HAS A "TOTAL LOAD" CAPACITY GREATER THAN OR EQUAL TO THE CALCULATED "TOTAL LOAD" REACTION AND ALSO A "DEAD LOAD" CAPACITY GREATER THAN OR EQUAL TO THE CALCULATED "DEAD LOAD" REACTION.

**ANCHOR BOLT NOTES**

FOR SPAN LENGTHS UP TO 100'-0": USE A TYPE I MASONRY PLATE "D" WITH (2) -  $1/4"$   $\phi$  X 1'-5" LONG ANCHOR BOLTS.

FOR SPAN LENGTHS FROM 100'-0" UP TO 150'-0": USE A TYPE I MASONRY PLATE "D" WITH (2) -  $1/2"$   $\phi$  X 1'-10" LONG ANCHOR BOLTS.

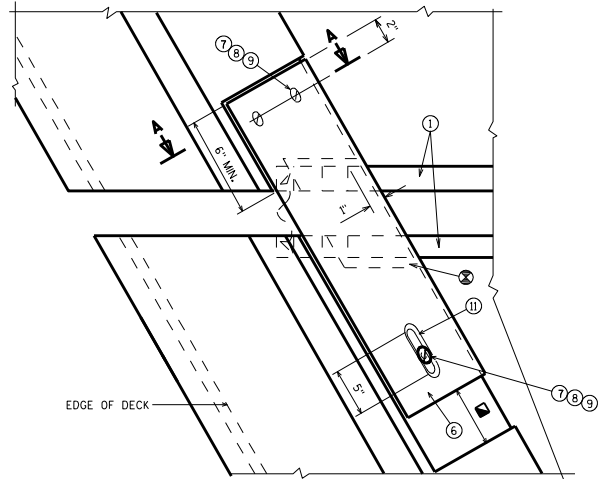
FOR SPAN LENGTHS GREATER THAN 150'-0": USE A TYPE II MASONRY PLATE "D" WITH (4) -  $1/2"$   $\phi$  X 1'-10" LONG ANCHOR BOLTS.

CHECK THAT ANCHOR BOLTS PROVIDE ADEQUATE HORIZONTAL CAPACITY.

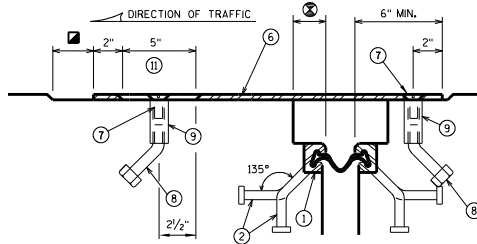
**STAINLESS STEEL - TFE EXPANSION BEARING DETAILS TYPE "A-T"**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

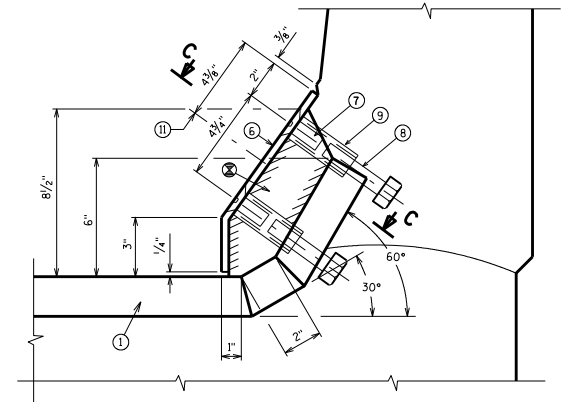
APPROVED: *Bill Oliva* DATE: 7-13



**PLAN AT PARAPET**  
SLOPED FACE PARAPET

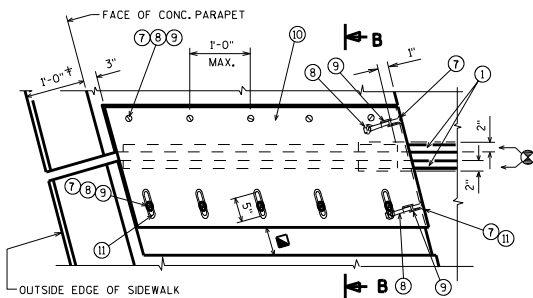


**SECTION C-C**



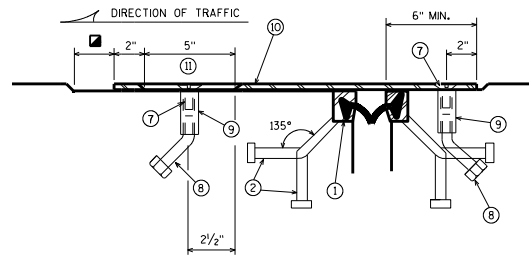
**SECTION A-A**  
SLOPED FACE PARAPET

⑥ GALVANIZED PLATE  $\frac{3}{8}$ " x  $10\frac{1}{2}$ " x (2'-2" LONG FOR SKEWS TO 45° AND 3'-0" LONG FOR SKEWS  $\geq$  45°) WITH HOLES FOR NO. 7, BEND AS SHOWN.

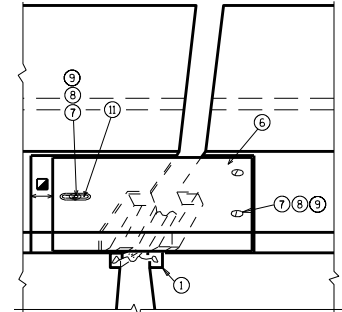


**PLAN AT SIDEWALK**

± 1'-2" WHEN "VERTICAL FACE PARAPET TYPE 'TX' IS USED

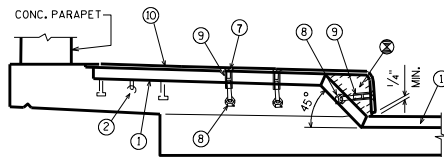


**SECTION B-B**

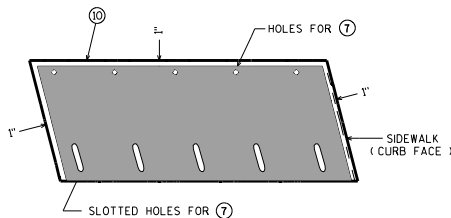


**VIEW OF PARAPET PLATES**  
**FROM ROADWAY**  
SLOPED FACE PARAPET

- ⊗ BLOCK OUT CONCRETE 2" EACH SIDE OF JOINT OPENING
- ⊠ JOINT OPENING DIM. ALONG SKEW PLUS  $\frac{1}{2}$ "



**SECTION AT SIDEWALK**



**PLAN OF SIDEWALK COVER PLATE**  
**WITH SLIP-RESISTANT SURFACE**

PLACE SLIP-RESISTANT SURFACE ON TOP WALKING SURFACE IN SHADED AREA ONLY (NOT ON CURB FACE).

APPROVED SLIP-RESISTANT APPLIED SURFACES FOR STEEL PLATES		
PRODUCT	MANUFACTURER	CONTACT AT
SLIPNOT GRADE 2, STEEL	W. S. MOLNAR COMPANY	1-800-SLIPNOT
ALGRIP, STEEL	ROSS TECHNOLOGY CORP.	1-800-345-8170

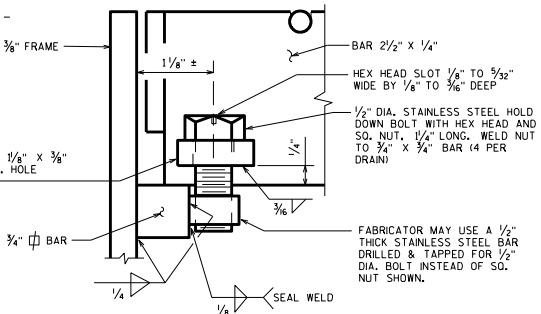
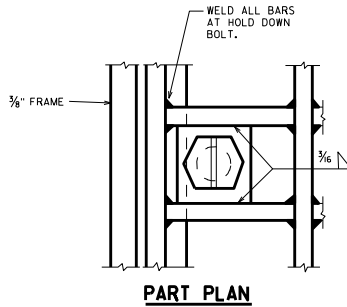
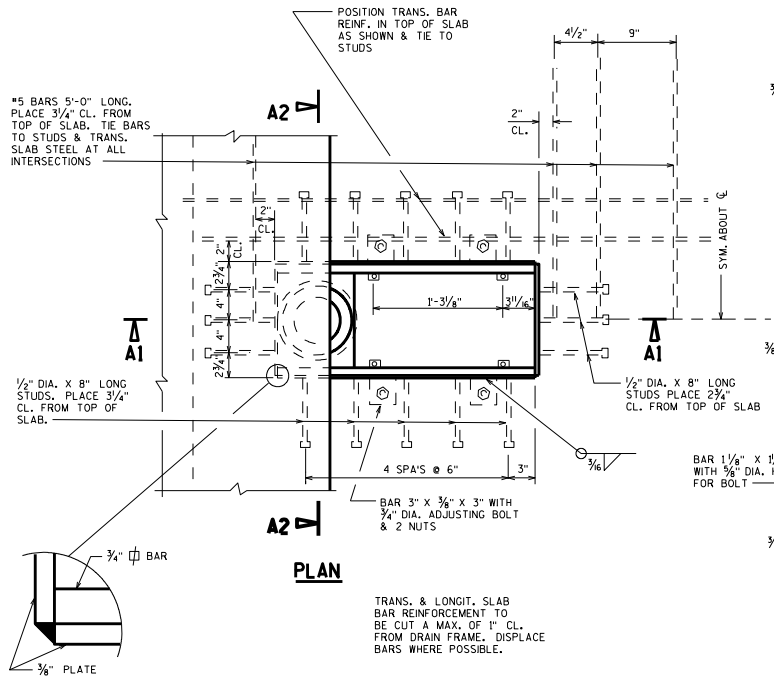
**STRIP SEAL COVER PLATES**  
**SLOPED FACE PARA./SDWK.**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva* DATE: 7-13







**SECTION AT HOLD DOWN BOLT**

**GENERAL NOTES**

ALL DRAIN MATERIAL INCLUDING GRATE, EXCLUDING PIPE & GRATE HOLD DOWN BOLTS, SHALL BE ASTM A36 STEEL.

MATERIAL FOR BRACKETS SHALL CONFORM TO ASTM A36.

THE CONTRACTOR MAY PROPOSE AN ALTERNATE TYPE OF BRACKET. THE PROPOSED ALTERNATE DETAILS SHALL BE SUBMITTED AND SUBJECT TO THE APPROVAL OF THE ENGINEER.

ALL STEEL SHALL BE GALVANIZED. WELDS SHALL BE MADE WITH LOW HYDROGEN ELECTRODES.

SEAL WELD INSIDE OF DRAIN.

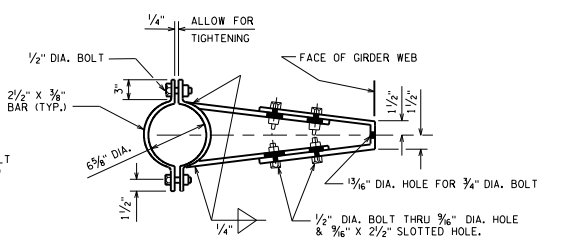
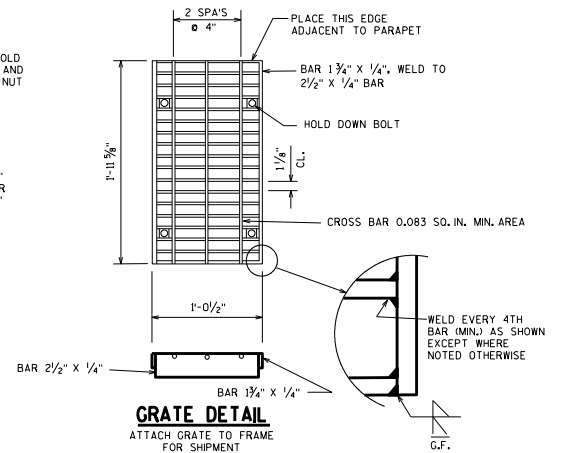
PRIOR TO GALVANIZING A NO. 6 BLAST CLEANING IS REQUIRED.

FLANGED 6" DIA. FIBERGLASS PIPE CONFORMING TO ASTM D2996, GRADE 1, CLASS A, MAY BE USED AS AN ALTERNATE TO GALVANIZED STANDARD PIPE CONFORMING TO ASTM A53.

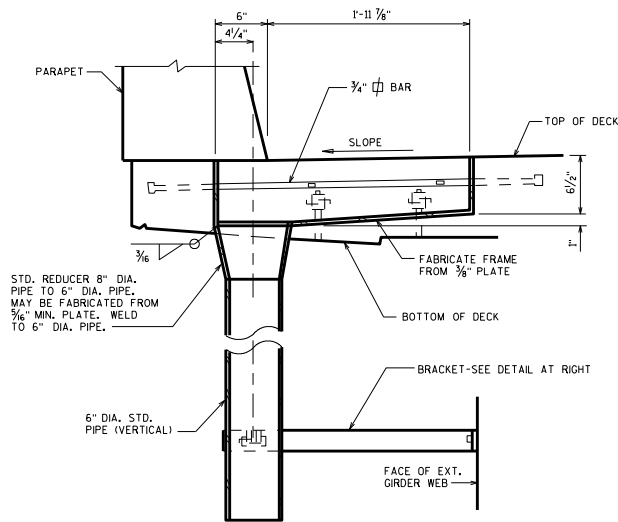
**DESIGNER NOTES**

ALL MATERIAL FOR FLOOR DRAINS AS SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE BID ITEM "FLOOR DRAINS TYPE 'H'".

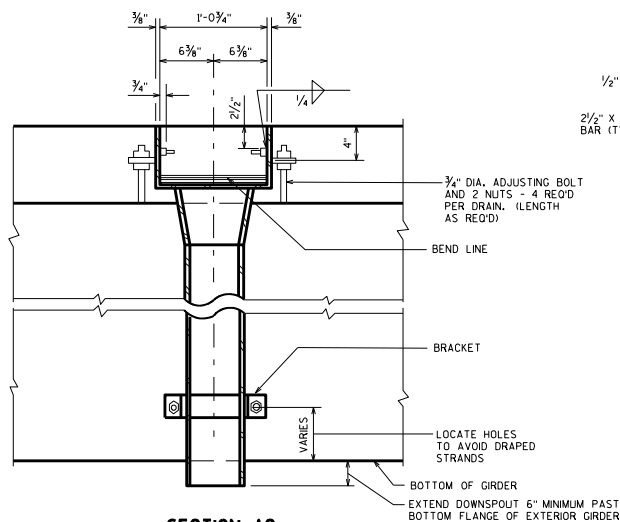
ALL MATERIAL FOR DOWNSPOUTS AND BRACKETS AS SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE BID ITEM "DOWNSPOUT 6'-INCH".



**BRACKET DETAIL**

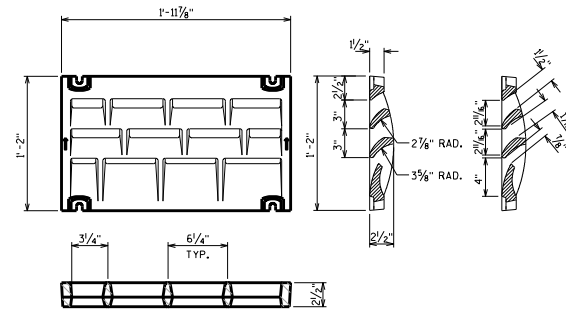
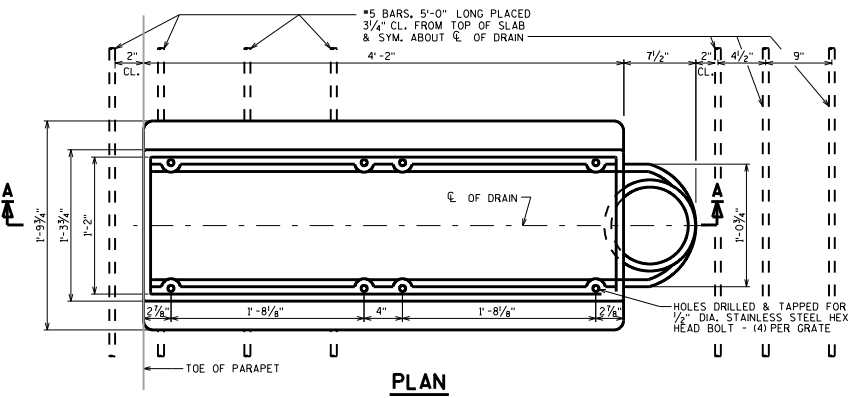


**SECTION A1**



**SECTION A2**

<b>FLOOR DRAIN TYPE 'H'</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



**GENERAL NOTES**

ALL MATERIAL FOR TYPE "WF" CASTING AND 8" DIA. CONNECTION PIPE, EXCLUDING GRATE HOLD DOWN SCREWS, SHALL BE GRAY IRON CONFORMING TO ASTM A48, CLASS 30.

MATERIAL FOR BRACKETS SHALL CONFORM TO ASTM A36.

THE CONTRACTOR MAY PROPOSE AN ALTERNATE TYPE OF BRACKET. THE PROPOSED ALTERNATE DETAILS SHALL BE SUBMITTED AND SUBJECT TO THE APPROVAL OF THE ENGINEER.

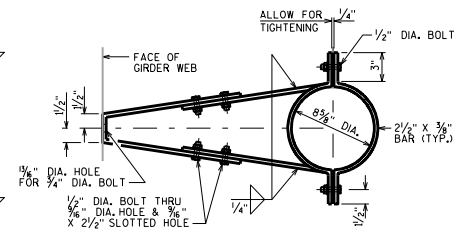
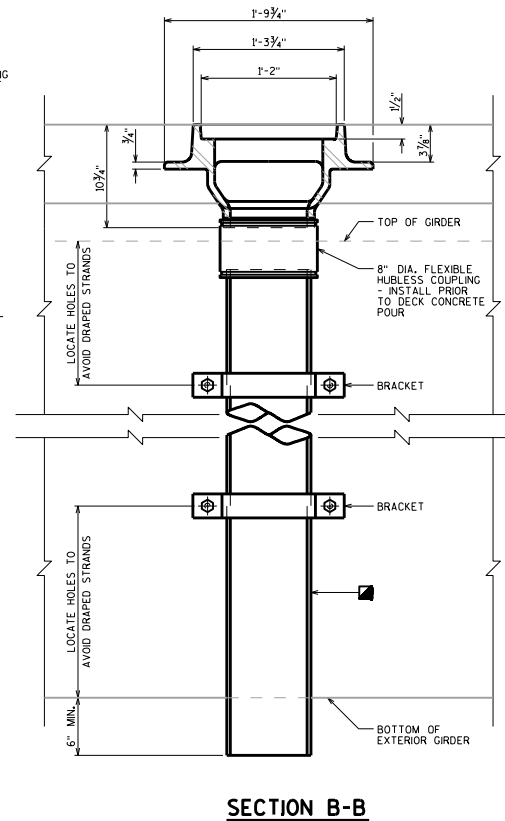
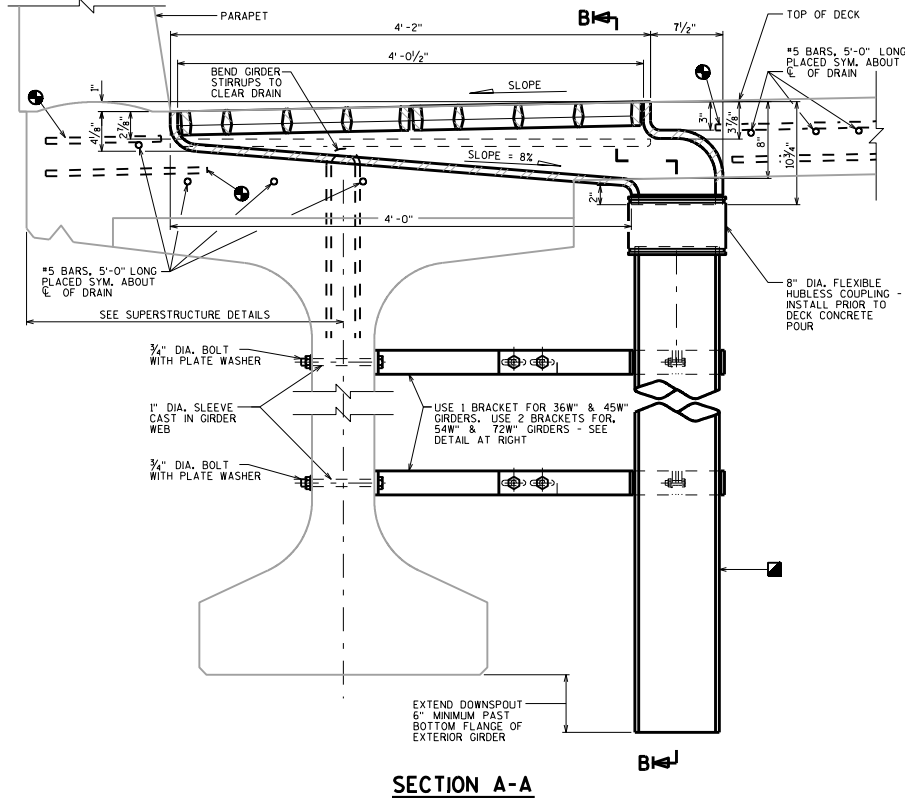
8" DIA. DOWNSPOUTS SHALL BE REINFORCED THERMOSETTING RESIN PIPE CONFORMING TO SECTION 514 OF THE STANDARD SPECIFICATIONS.

TRANSVERSE & LONGITUDINAL SLAB BAR REINFORCEMENT TO BE CUT A MAXIMUM OF 1" CLEAR FROM DRAIN FRAME. DISPLACE BARS WHERE POSSIBLE.

**DESIGNER NOTES**

ALL MATERIAL FOR FLOOR DRAINS AS SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE BID ITEM "FLOOR DRAINS TYPE 'WF'".

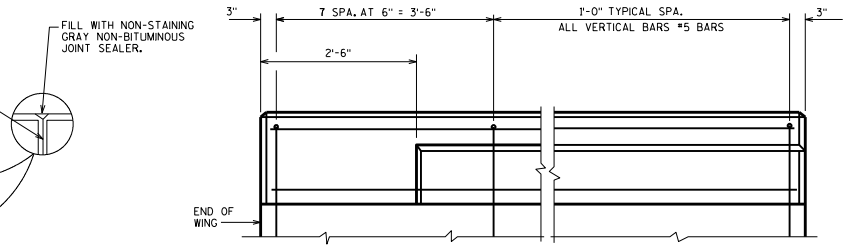
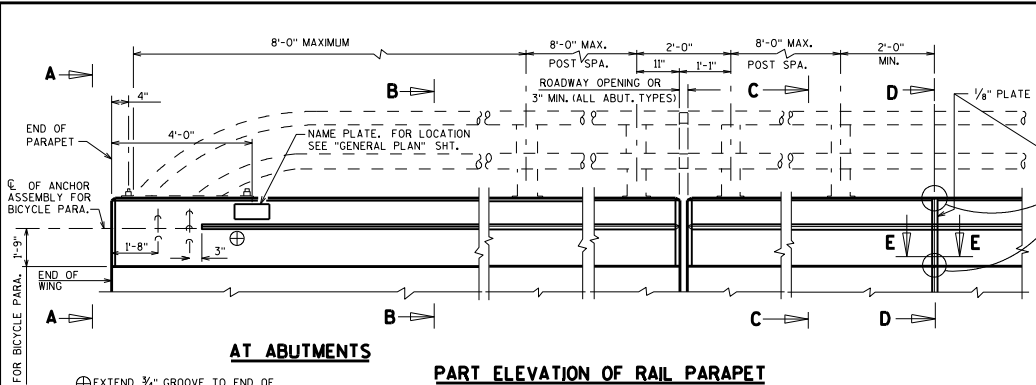
ALL MATERIAL FOR DOWNSPOUTS, CONNECTORS, AND BRACKETS AS SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE BID ITEM "DOWNSPOUT 8-INCH".



**FLOOR DRAIN TYPE 'WF'**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

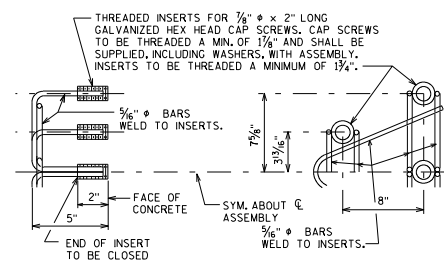
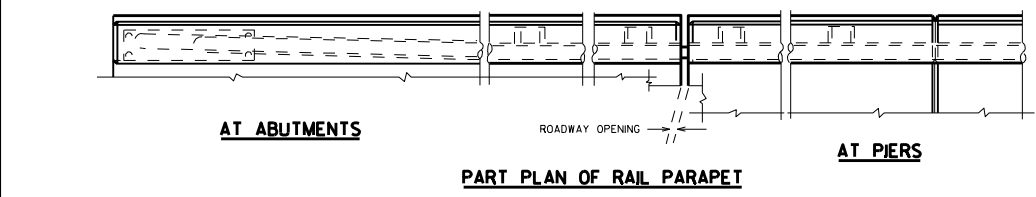
APPROVED: *Bill Oliva* DATE: 7-13



**VIEW SHOWING OUTSIDE FACE OF PARAPET & REINF.**

**BILL OF BARS**

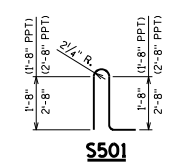
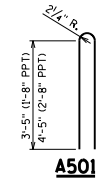
BAR MARK	COAT.	NO. REQ'D.	LENGTH		BEVY	BAR SERIES	LOCATION
			1'-8" PPT HT	2'-8" PPT HT			
S501	X		4-8	6-8	X		PARAPET VERT.
A501	X		7-5	9-5	X		PARAPET VERT.



**DETAIL OF ANCHOR ASSEMBLY**

NOTE: HEX. HEAD CAP SCREWS & WASHERS TO BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 CLASS C.

ASSEMBLY BID ITEM SHALL BE "ANCHOR ASSEMBLIES FOR STEEL PLATE BEAM GUARD", EACH.

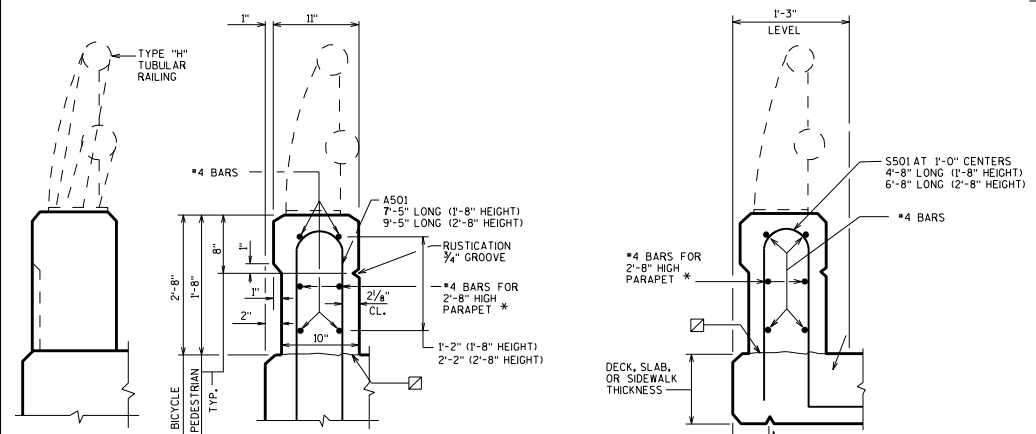


**NOTES**

WHEN PARAPETS ARE POURED CONTINUOUSLY FROM END TO END, THEY SHALL BE SEPARATED AT THE DEFLECTION JOINTS BY A PIECE OF 1/8" ZINC OR PLASTIC PLATE CUT AS SHOWN IN SECTION "D" BY SHADED AREA. IF CONSTRUCTION JOINTS IN PARAPETS ARE USED AT THE DEFLECTION JOINTS, ONE SIDE OF JOINT SHALL BE COATED WITH AN APPROVED LIQUID BOND BREAKER AND PLATE SEPARATORS MAY BE OMITTED.

HORIZ. CONST. JOINT-STRIKE OFF AS SHOWN AND LEAVE ROUGH.

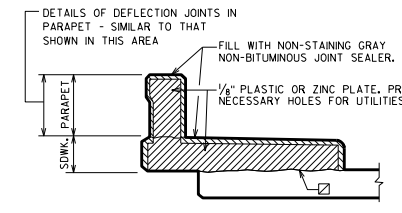
A A501 BAR MAY BE USED IN LIEU OF A S501 BAR ADJACENT TO THE PAVING NOTCH ON TYPE AT ABUTMENTS.



\* OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT, LAP LONGIT. BARS A MIN. OF 1'-5". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - 'V' GROOVE.

**AT SIDEWALK OR DECK**

**SECTION C**



**SECTION D**

SHOWING DEFLECTION JOINT IN PARAPET OR SIDEWALK USING THE FOLLOWING CRITERIA:

- GIRDER STRUCTURES AND SLAB STRUCTURES WITH A SIDEWALK SHOULD HAVE A DEFLECTION JOINT IN THE SIDEWALK AND PARAPET OVER THE PIER.
- IF THERE IS A LIGHT STANDARD AT THE PIER, PLACE A DEFLECTION JOINT APPROX. 4'-0" EACH SIDE OF PIER, WITH NONE DIRECTLY OVER THE PIER.
- GIRDER STRUCTURES AND SLAB STRUCTURES WITHOUT SIDEWALKS SHOULD HAVE NO DEFLECTION JOINTS IN THE PARAPETS.

**SECTION E**

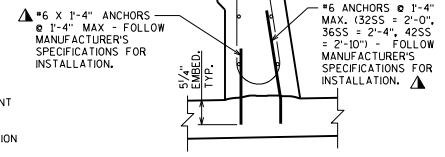
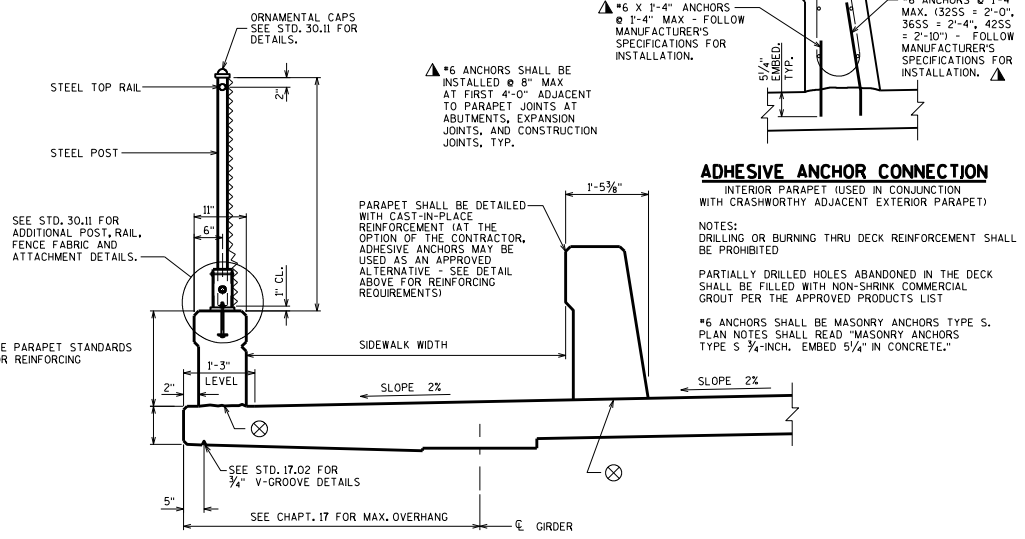
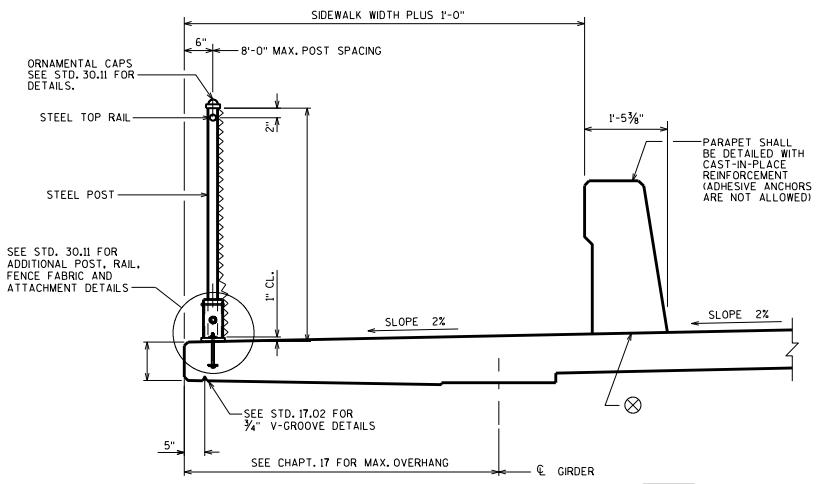
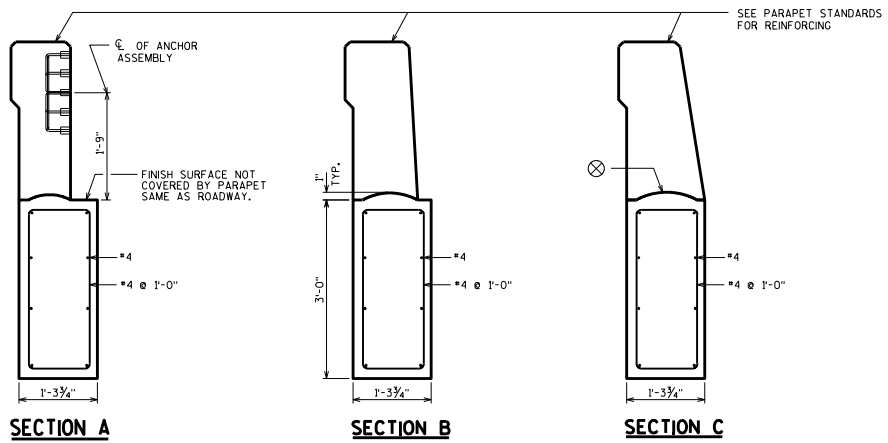
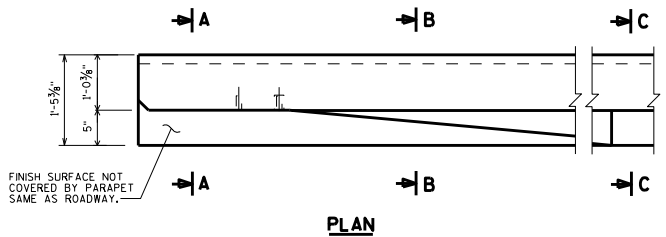
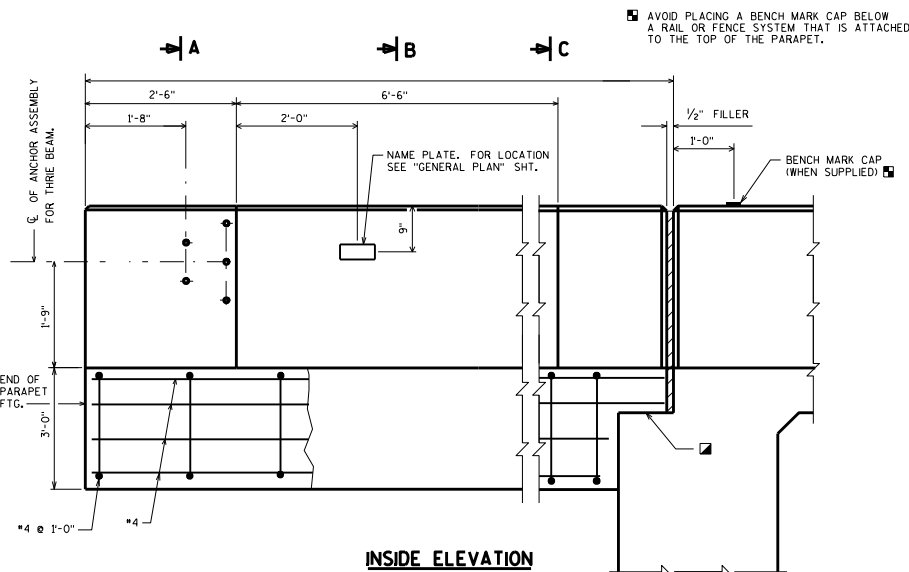
	1'-8" PARAPET	2'-8" PARAPET
AREA	1.44 SF	2.27 SF
WEIGHT	216 LB/FT	340 LB/FT

**VERTICAL FACE PARAPET 'A'**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

DATE:  
7-13



**ADHESIVE ANCHOR CONNECTION**

INTERIOR PARAPET (USED IN CONJUNCTION WITH CRASHWORTHY ADJACENT EXTERIOR PARAPET)

NOTES:  
 DRILLING OR BURNING THRU DECK REINFORCEMENT SHALL BE PROHIBITED  
 PARTIALLY DRILLED HOLES ABANDONED IN THE DECK SHALL BE FILLED WITH NON-SHRINK COMMERCIAL GROUT PER THE APPROVED PRODUCTS LIST  
 \*6 ANCHORS SHALL BE MASONRY ANCHORS TYPE S. PLAN NOTES SHALL READ "MASONRY ANCHORS TYPE S 3/4-INCH. EMBED 5/4" IN CONCRETE."

⊗ CONST. JT. - STRIKE OFF AS SHOWN & LEAVE ROUGH

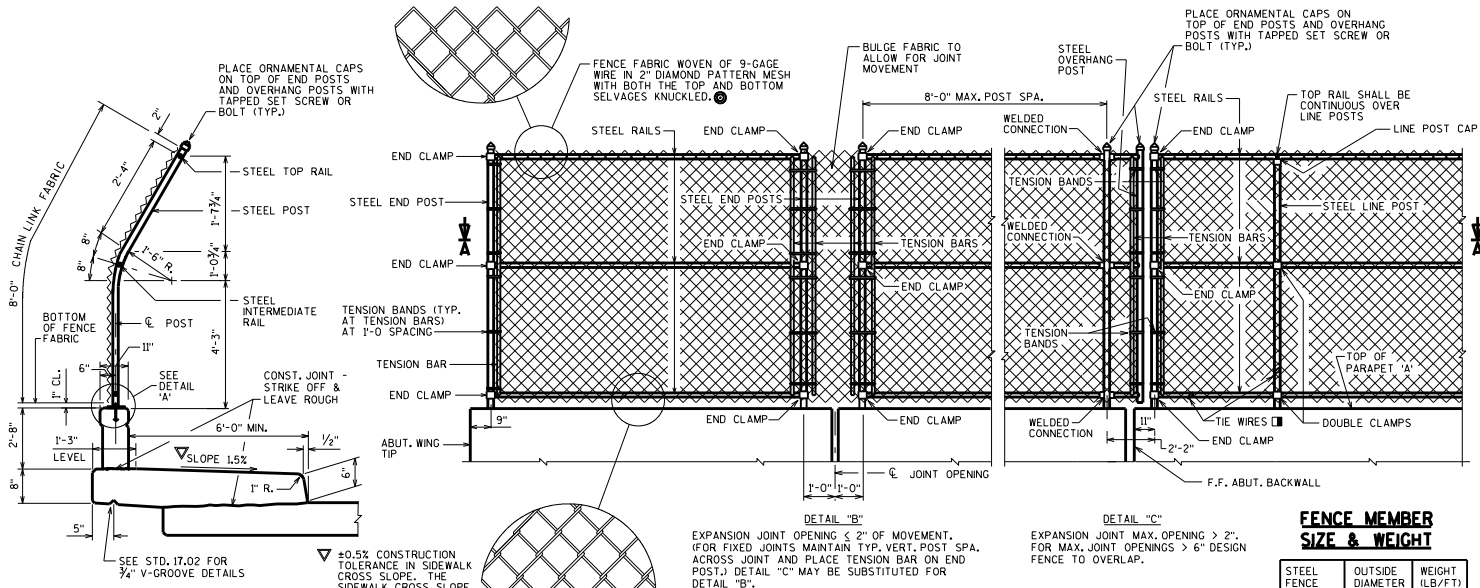
STEEL TROWEL HORIZONTAL SURFACE OF PAVING NOTCH. PLACE MULTIPLE LAYERS OF POLYETHYLENE SHEETS BETWEEN PARAPET FOOTING AND HORIZONTAL SURFACE OF PAVING NOTCH. TOTAL THICKNESS OF SHEETS SHALL BE AT LEAST 0.03".

**DESIGNER NOTES**

\*32SS PARAPET SHOWN IN THIS STANDARD. FOR DETAILS, INCLUDING REINFORCING, SEE STANDARD 30.30. SEE STANDARDS 30.31, 30.32, AND 30.33 FOR SIMILAR DETAILS USED WITH OTHER PARAPET TYPES.

ALL PARAPET FOOTING BARS SHALL BE EPOXY COATED.

<b>PARAPET FOOTING</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



**NOTES**

POSTS ARE TO BE SET VERTICAL.

**METALLIC-COATED FENCE SYSTEM:**  
ALL FENCE COMPONENTS SHALL BE GALVANIZED STEEL, EXCEPT THE FENCE FABRIC WHICH MAY BE ALUMINUM-COATED STEEL OR GALVANIZED STEEL.

FABRIC SHALL CONFORM TO ASTM A491 OR A392, CLASS 2. STEEL RAILS, POSTS AND POST SLEEVES SHALL CONFORM TO ASTM F1083 STANDARD WEIGHT PIPE (SCHEDULE 40). FITTINGS SHALL CONFORM TO ASTM F626.

THE BID ITEM SHALL BE "FENCE CHAIN LINK - FT., LF."

**POLYMER-COATED FENCE SYSTEM:**  
ALL FENCE COMPONENTS SHALL BE GALVANIZED STEEL WITH A COLORED POLYMER-COATING ON THE OUTSIDE.

FABRIC SHALL CONFORM TO ASTM F668, CLASS 2B. STEEL RAILS, POSTS AND POST SLEEVES SHALL CONFORM TO ASTM F1083. STANDARD WEIGHT PIPE (SCHEDULE 40). FITTINGS SHALL CONFORM TO ASTM F626. SEE THE "BRIDGE SPECIAL PROVISIONS" FOR ADDITIONAL DETAILS.

THE COLOR OF POLYMER-COATING FOR THIS STRUCTURE SHALL BE (SPECIFY: DARK GREEN, BROWN OR BLACK) IN ACCORDANCE WITH ASTM F934.

THE BID ITEM SHALL BE "FENCE CHAIN LINK POLYMER-COATED - FT., LF."

COMPLETE ANY REQUIRED WELDING OF COMPONENTS BEFORE GALVANIZING.

POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.

BASE PLATES, ANCHOR PLATES AND SHIMS SHALL BE ASTM A709, GRADE 36.

ALL POST SPACINGS ARE MEASURED HORIZONTALLY ALONG THE C/L OF THE POST.

CAULK AROUND PERIMETER OF BASE PLATE AND FILL PORTION OF SLOTTED HOLE AROUND ANCHOR BOLT IN SHIM WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

ALTERNATE TO DOUBLE CLAMP: USE LINE RAIL CLAMP (BOULEVARD) OR 180° BRACE BAND, WHICH MAY BE USED WHEN THE POSTS ARE EITHER BOLTED TO THE POST SLEEVES OR DIRECTLY WELDED TO THE BASE PLATE.

1/2" DIA. X 6 3/8" LONG GALVANIZED HEX BOLT WITH NUT & WASHER, TYPE "S", 1/2" DIA. CONCRETE MASONRY ANCHORS MAY BE SUBSTITUTED FOR 1/2" DIA. BOLTS. ANCHOR PLATE NOT REQUIRED WHEN TYPE "S" ANCHORS ARE USED. SEE \*

MASONRY ANCHOR TYPE S 1/2"-INCH. EMBED 6" IN CONCRETE. ANCHOR, WASHER, AND NUT SHALL BE GALVANIZED.

ATTACH FABRIC TO RAILS AND TO POSTS WITHOUT TENSION BANDS, WITH THE WIRES (ROUND, 9-GAGE) SPACED AT 1'-0".

BOLT RAIL TO RAIL END TO SECURE OVERHANG SECTION. ALTERNATE IS TO WELD RAIL DIRECTLY TO END POST.

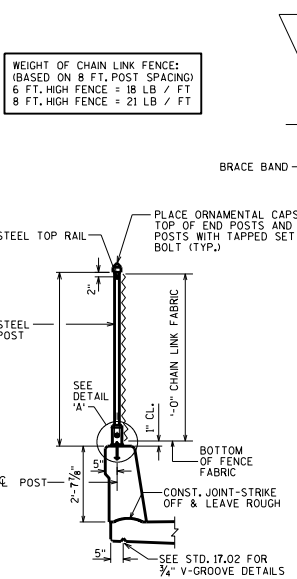
MINIMUM LENGTH OF TOP RAIL BETWEEN SPLICES SHALL BE 20'-0". LOCATE SPLICES NEAR 1/4 POINT OF POST SPACING.

**FENCE MEMBER SIZE & WEIGHT**

FENCE MEMBER	OUTSIDE DIAMETER (INCHES)	WEIGHT (LB/FT)
RAILS	1.660	2.27
END POST	2.875	5.80
OVERHANG POST	2.875	5.80
LINE POST	2.375	3.65
POST SLEEVE	4.000	9.12

**SECTION THRU FENCE ON SINGLE SLOPE PARAPET**

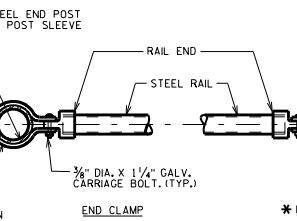
FOR TRAFFIC BARRIER APPLICATION, USE VERTICAL POST (NO BEND)



WEIGHT OF CHAIN LINK FENCE: (BASED ON 8 FT. POST SPACING)  
6 FT. HIGH FENCE = 18 LB / FT  
8 FT. HIGH FENCE = 21 LB / FT

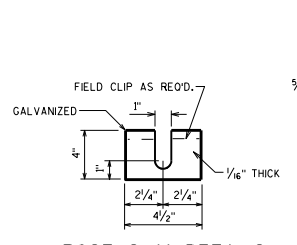
**SECTION A-A**

NOTE: PLACE ALL BOLT HEADS ON SIDE OF FENCE ADJACENT TO PEDESTRIANS



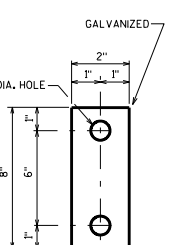
**POST SHIM DETAILS**

SHIMS REQUIRED ONLY WHEN END POSTS AND LINE POSTS ARE WELDED TO BASE PLATES. PROVIDE 4 SHIMS PER POST, USE WHERE REQUIRED FOR ALIGNMENT.



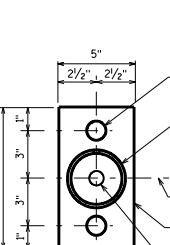
**ANCHOR PLATE**

1/4" x 2" x 8"



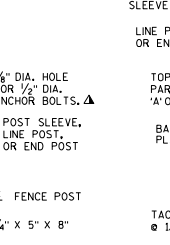
**BASE PLATE**

5/8" DIA. HOLE FOR 1/2" DIA. ANCHOR BOLTS.



**DETAIL 'A'**

UNIT SHALL BE GALVANIZED AFTER FABRICATION



NOTE: IN LIEU OF USING THE POST SLEEVE, THE FENCE POST MAY BE WELDED TO THE BASE PLATE.

**DESIGNER NOTES**

THE CHAIN LINK FENCE SYSTEM SELECTED FOR THE STRUCTURE SHALL BE A "METALLIC-COATED FENCE SYSTEM" OR A "POLYMER-COATED FENCE SYSTEM".

A 1" MESH MAY BE USED ON PROTECTIVE SCREENING IN HIGHLY VULNERABLE AREAS, OR AS STATED IN FDM PROCEDURE II-35-1 FOR PROTECTIVE SCREENING.

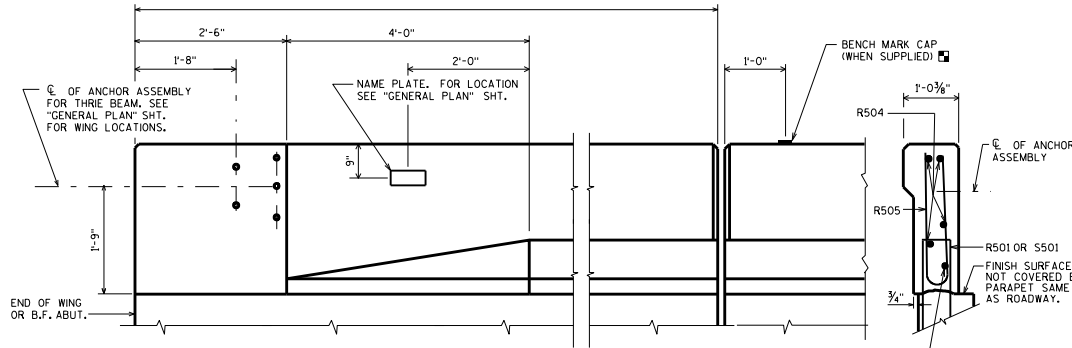
PEDESTRIAN RAILING MAY BE USED ON WINGWALL PARAPETS IF CHAIN LINK FENCE DOES NOT CONTINUE BEYOND BRIDGE.

HANDRAILS SHALL BE USED ALONG BRIDGE SIDEWALKS WHERE THE SLOPE OF THE SIDEWALK IS GREATER THAN 5%. TOP OF HANDRAIL GRIPPING SURFACES SHALL BE MOUNTED BETWEEN 30" & 34" ABOVE SIDEWALK SURFACE. USE 30" NEAR SCHOOL ZONES, IF FEASIBLE. HANDRAILS SHALL BE PROVIDED ALONG BOTH SIDES OF SIDEWALK. FOR HANDRAIL DETAILS SEE STANDARD 37.02.

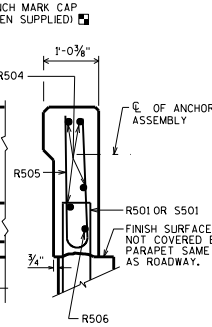
THE DESIGN ENGINEER SHALL DESIGN THE SUPERSTRUCTURE TO ACCOUNT FOR THE MAXIMUM 2% SIDEWALK CROSS SLOPE.

<b>CHAIN LINK FENCE DETAILS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13

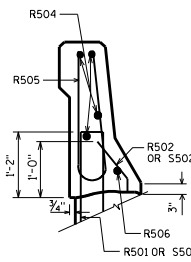
AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



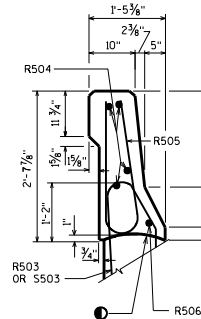
**INSIDE ELEVATION**



**SECTION A**



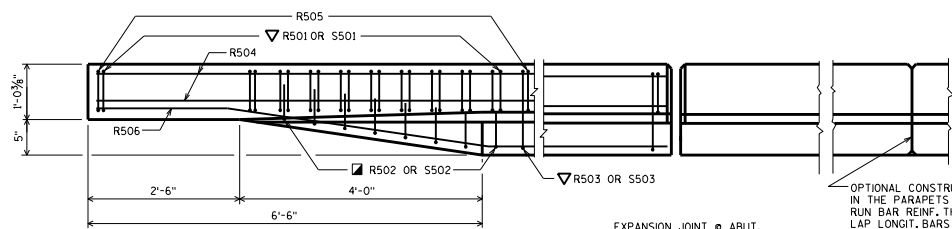
**SECTION B**



**SECTION C**

**BILL OF BARS**  
FOR ABUTMENT PARAPETS

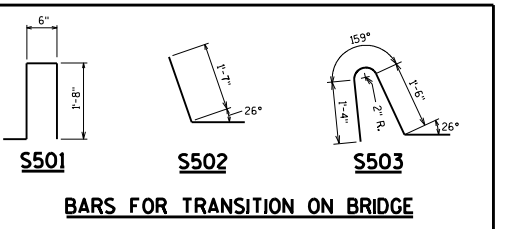
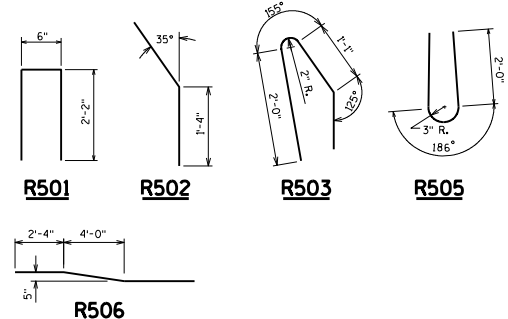
BAR MARK	QTY	ABUT.	ABUT.	LENGTH	BENT	LOCATION
R501	X			4'-7"	X	PARAPET VERT.
R502	X			2'-4"	X	PARAPET VERT.
R503	X			4'-7"	X	PARAPET VERT.
R504	X					PARAPET HORIZ.
R505	X			4'-10"	X	PARAPET VERT.
R506	X				X	PARAPET HORIZ.
S501	X			4'-5"	X	PARAPET VERT.
S502	X			2'-4"	X	PARAPET VERT.
S503	X			4'-2"	X	PARAPET VERT.



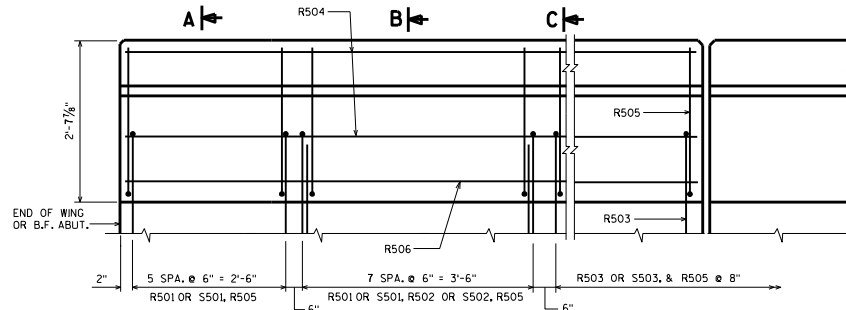
**PLAN**

EXPANSION JOINT @ ABUT.  
0° SKEW SHOWN, MATCH EXP. JT. OPENING.  
FOR TYPE A1 ABUT., USE 1/2" FILLER TO TOP OF PARAPET. SEE STD. 12.01.

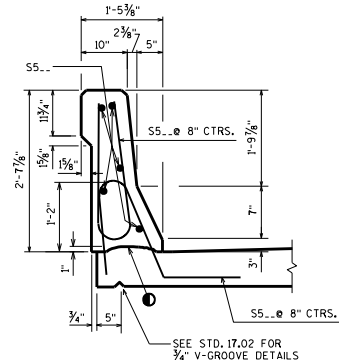
OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" V-GROOVE.



**BARS FOR TRANSITION ON BRIDGE**



**OUTSIDE ELEVATION**



**SECTION THRU PARAPET ON BRIDGE**

AREA = 2.58 SF  
WEIGHT = 387 LB/FT

CONST. JOINT - STRIKE OFF AS SHOWN.

R502 BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE. USE CARE TO PLACE R502 OR S502 BARS CORRECTLY ALONG TRANSITION OF PARAPET.

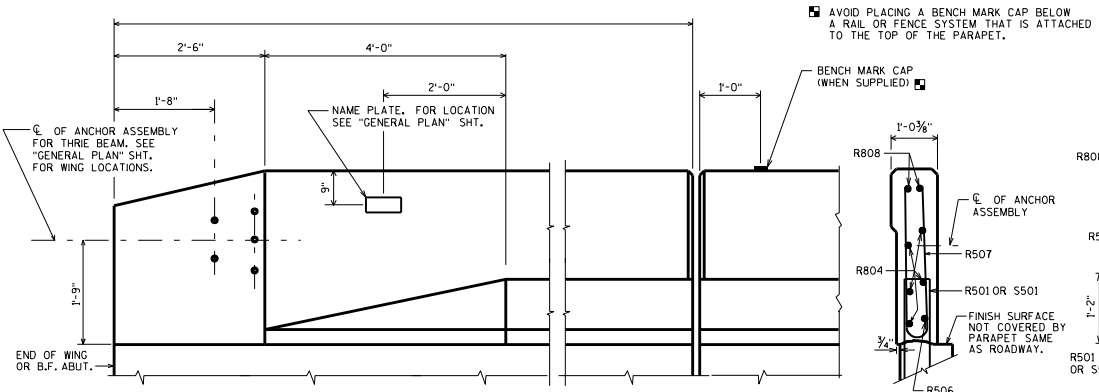
R501 AND R503 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED.

A R503 BAR MAY BE USED IN LIEU OF A S503 BAR ADJACENT TO THE PAVING NOTCH ON TYPE A1 ABUTMENTS.

**SLOPED FACE PARAPET 'LF'**

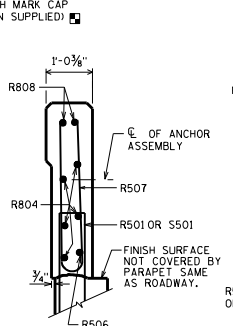
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva* DATE: 7-13

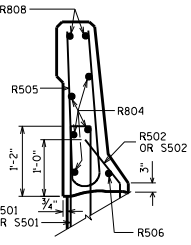


**INSIDE ELEVATION**

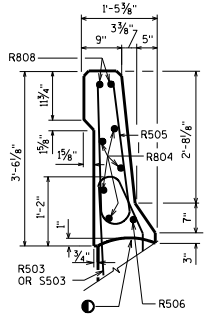
AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



**SECTION A**



**SECTION B**



**SECTION C**

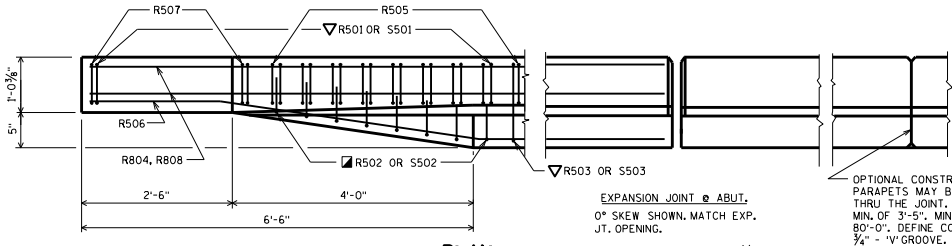
LENGTH SHOWN FOR BAR IS AN AVERAGE LENGTH AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS.

**BILL OF BARS** FOR ABUTMENT PARAPETS

BAR MARK	CON'T.	ABUT.	ABUT.	LENGTH	BAR SERIES	LOCATION
R501	X			4'-7"	X	PARAPET VERT.
R502	X			2'-4"	X	PARAPET VERT.
R503	X			4'-7"	X	PARAPET VERT.
R804	X					PARAPET HORIZ.
R505	X			6'-6"	X	PARAPET VERT.
R506	X				X	PARAPET HORIZ.
R507	X			5'-8"	X	PARAPET VERT.
R808	X				X	PARAPET HORIZ.
S501	X			4'-5"	X	PARAPET VERT.
S502	X			2'-4"	X	PARAPET VERT.
S503	X			4'-2"	X	PARAPET VERT.

**BAR SERIES TABLE**

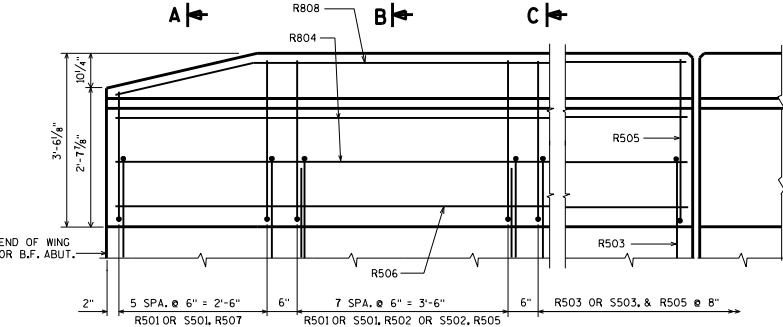
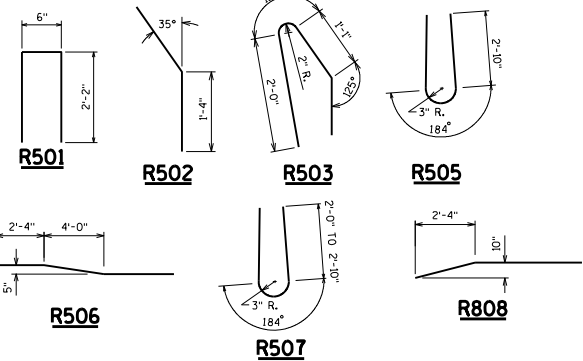
MARK	NO. REOD.	LENGTH
R507	4 SERIES OF 6	4'-10" TO 6'-6"



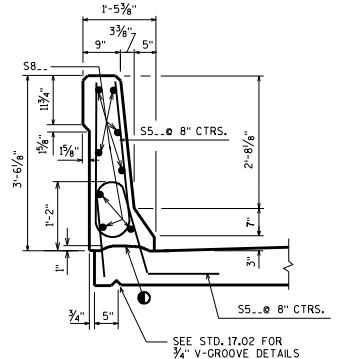
**PLAN**

EXPANSION JOINT @ ABUT. 0° SKEW SHOWN, MATCH EXP. JT. OPENING. FOR TYPE A1 ABUT., USE 1/2" FILLER TO TOP OF PARAPET. SEE STD. 12.01.

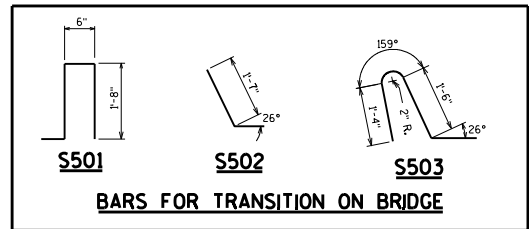
OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED, RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 3'-5". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" V-GROOVE.



**OUTSIDE ELEVATION**



**SECTION THRU PARAPET ON BRIDGE**



**BARS FOR TRANSITION ON BRIDGE**

AREA = 3.16 SF  
WEIGHT = 474 LB/FT

CONST. JOINT - STRIKE OFF AS SHOWN.

R502 BARS MAY BE PLACED AFTER CONCRETE IS POURED BUT BEFORE INITIAL SET HAS TAKEN PLACE. USE CARE TO PLACE R502 OR S502 BARS CORRECTLY ALONG TRANSITION OF PARAPET.

R501 AND R503 BARS TO BE TIED TO WING STEEL BEFORE WING IS POURED.

A R503 BAR MAY BE USED IN LIEU OF A S503 BAR ADJACENT TO THE PAVING NOTCH ON TYPE A1 ABUTMENTS.

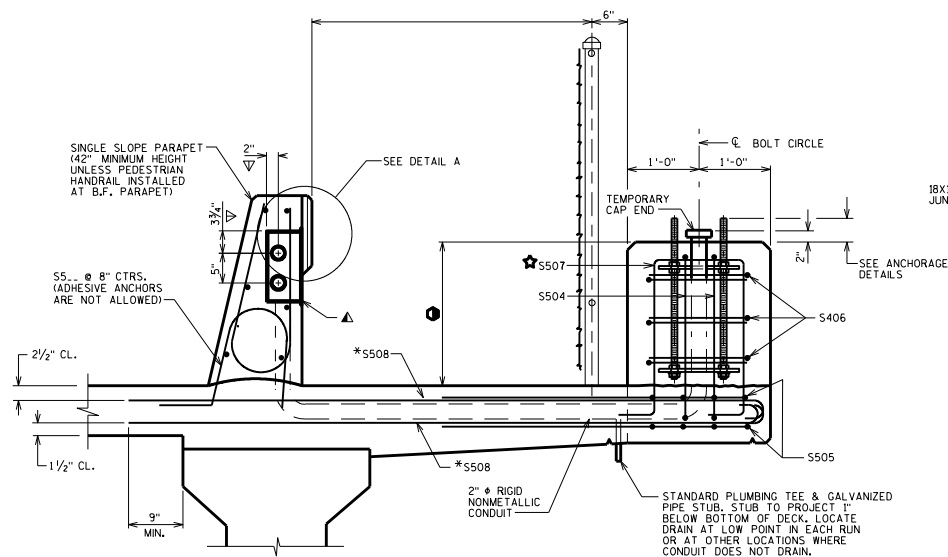
**SLOPED FACE PARAPET 'HF'**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

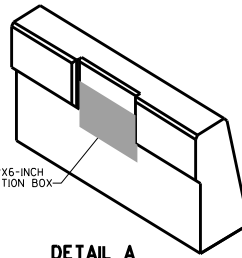
APPROVED: *Bill Oliva*

DATE: 7-13





**SECTION A-A**



**DETAIL A**  
SHOWING B.F. OF PARAPET WITH  
BLOCK OUT FOR JUNCTION BOX.

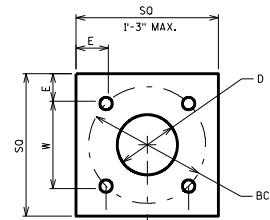
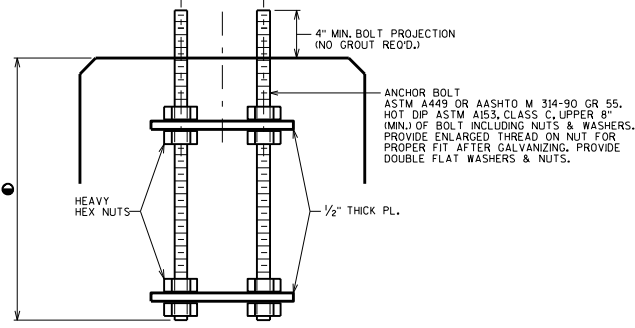


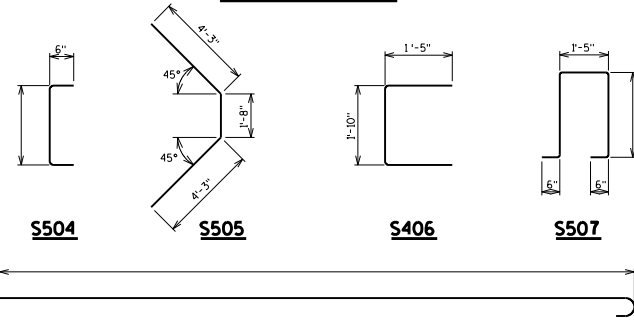
TABLE FOR "TYPE 5 LIGHT POLE"  
FROM FACILITIES DEV. MANUAL  
WITH 1" ANCHOR BOLTS.  
(ANY OTHER LIGHT POLE TYPE  
MUST BE DESIGNED FOR.)

SO	1'-1/2"
E	2 11/16"
W	8 1/8"
BC	11 1/2"
D	9 1/2"

W = 0.707 x BC  
SO = BC + 2d  
d = ANCHOR BOLT DIA.  
E = (SO-W)/2  
D<sub>MAX</sub> = BC - 2d  
D<sub>MIN</sub> = 2 x CONDUIT DIA. + 1"



**ANCHORAGE DETAIL**

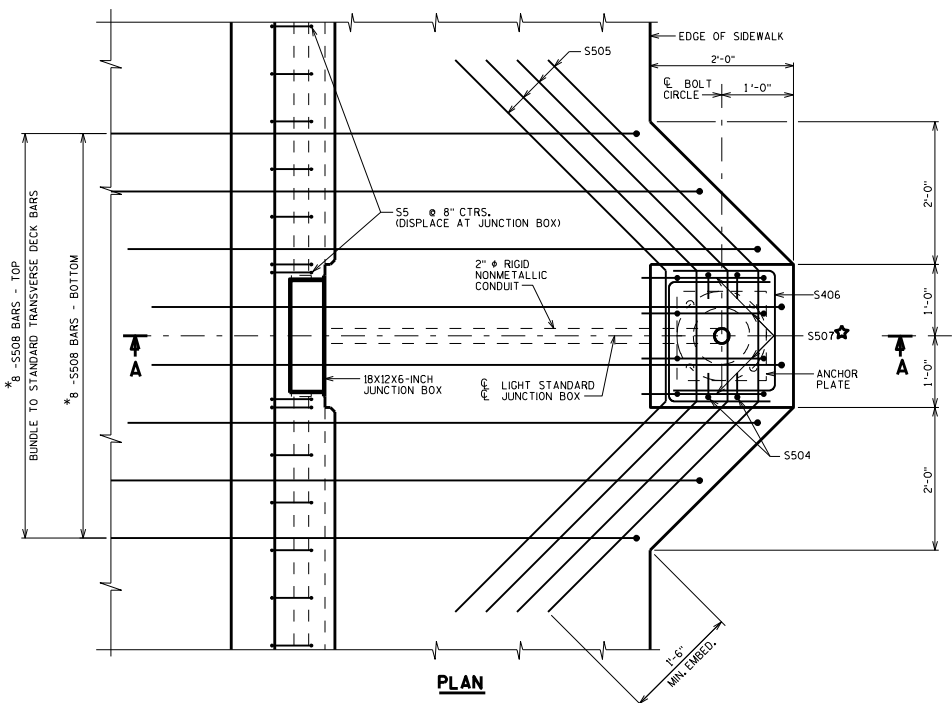


**S504**

**S505**

**S406**

**S507**



**PLAN**

- S508**
- STAND-ALONE PEDESTAL  
- 1" DIA. ANCHOR BOLTS = 2'-0"  
- < 1" DIA. ANCHOR BOLTS = 1'-3"
  - STAND-ALONE PEDESTAL  
- 1" DIA. ANCHOR BOLTS = 1'-11"  
- < 1" DIA. ANCHOR BOLTS = 1'-2"

- ▲ PARAPET BLISTER  
- SEE STANDARD 30.21
- ▽ LOCATION OF CONDUIT IS MEASURED FROM OUTSIDE EDGE OF JUNCTION BOX.
- ★ TIE IN PLACE AFTER ANCHOR BOLT ASSEMBLY LOCATED.
- \* THESE BARS ARE IN ADDITION TO STANDARD TRANSVERSE BARS IN DECK.

**NOTES**  
BID ITEM SHALL BE "ANCHOR ASSEMBLIES LIGHT POLES" EA.  
SEE STD. 30.11 FOR FENCE DETAILS.  
SEE STD. 30.21 FOR  
- ADDITIONAL NOTES  
- END OF BRIDGE DETAILS

THIS STANDARD ACCOMMODATES A MAXIMUM 15" BOLT HOLE CIRCLE AND A MAXIMUM 15" X 15" SQUARE ANCHOR PLATE WITH (4) - 1" ANCHOR BOLTS. THIS STANDARD IS BASED ON A 8" MIN. DECK THICKNESS.

**BILL OF BARS**

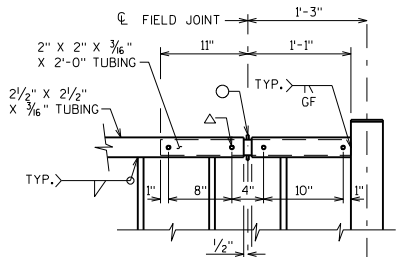
BAR MARK	COV.	NO. REQ'D.	LENGTH	BENT	LOCATION
S504	X			X	LIGHT STD., VERT.
S505	X	10-2		X	LIGHT STD., HORIZ. IN DECK
S406	X	4-6		X	LIGHT STD., HORIZ.
S507	X			X	LIGHT STD., VERT.
S508	X			X	LIGHT STD., TRANSV. IN DECK

**LIGHTING DETAIL**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

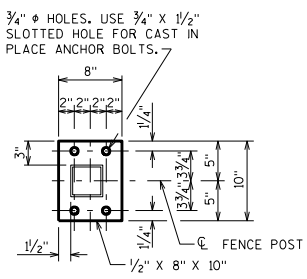
APPROVED: Bill Oliva

DATE:  
7-13

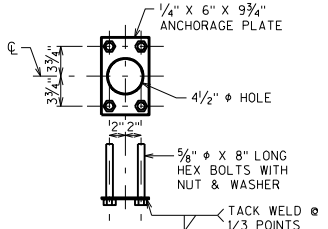


**LEGEND**  
 ○ 3/16" x 3/8" WELDED STUDS  
 △ WELD BEAD ON EACH SIDE OF TUBE, GRIND BEADS SO THAT SLEEVE FITS FREELY INSIDE THE 2 1/2" X 2 1/2" TUBE.

**RAILING EXPANSION JOINT DETAIL**

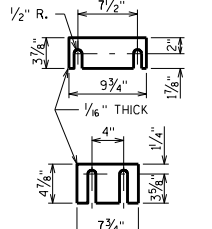


**BASE PLATE**



**ANCHORAGE DETAIL**

5/8" CAST-IN-PLACE ANCHOR BOLTS. MASONRY ANCHORS MAY BE SUBSTITUTED FOR C.I.P. ANCHOR BOLTS. ANCHORAGE PLATE NOT REQUIRED WHEN TYPE S ANCHORS ARE USED.  
 MASONRY ANCHOR TYPE S 5/8-INCH. EMBED 7" IN CONCRETE.

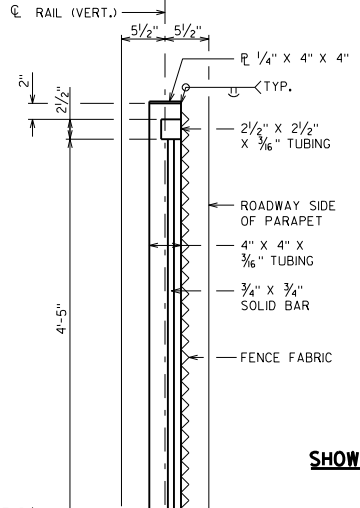


**SHIM PLATE DETAILS**

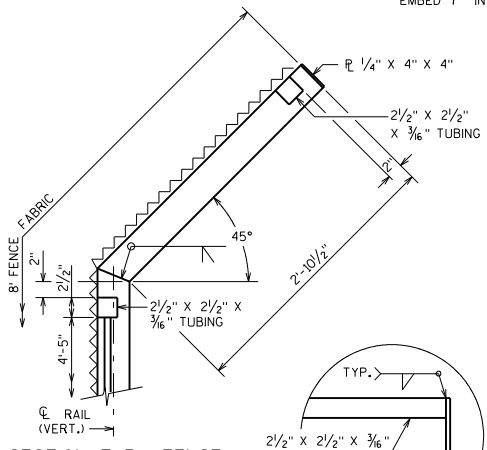
TWO SHIMS OF EACH SIZE REQUIRED PER POST

**NOTES**

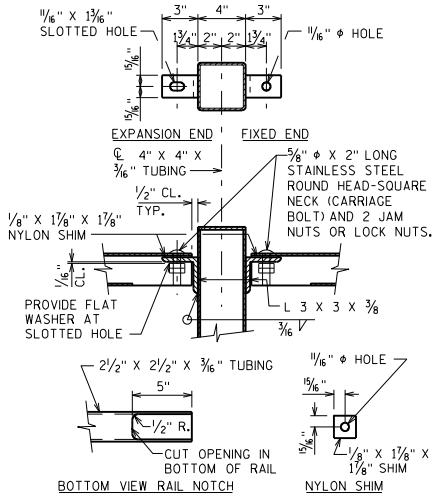
POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.  
 RAILS AND POSTS TO BE ASTM A500, GRADE B. BASE PLATES AND SHIMS TO BE ASTM A709, GRADE 36. ALL GALVANIZED AFTER FABRICATION.  
 ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING. SET POSTS NORMAL TO GRADE.  
 ALL POST SPA. ARE TAKEN HORIZ. ALONG CENTER LINE OF RAILING AT BASE OF POST.  
 SHIMS SHALL BE USED UNDER BASE PLATES WHERE REQUIRED FOR ALIGNMENT.  
 CAULK AROUND PERIMETER OF BASE PLATES AND FILL PORTION OF SLOTTED HOLES AROUND ANCHOR BOLTS WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.  
 CUT BOTTOM OF POST TO MAKE VERTICAL IN TRANSVERSE DIRECTION.  
 ANCHOR BOLTS, NUTS AND WASHERS SHALL BE EITHER STAINLESS STEEL OR ASTM 307. IF 307 IS USED, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED.  
 RAILING TO BE PAINTED AND FENCE FABRIC AND TIES TO BE VINYL COATED. FEDERAL COLOR NO. ....  
 THE BID ITEM SHALL BE "RAILING TUBULAR SCREENING B-..." WHICH SHALL INCLUDE ALL ITEMS SHOWN.  
 RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE NOT MORE THAN 3 POSTS.  
 VENT HOLES SHALL BE DRILLED IN MEMBERS AS REQUIRED TO FACILITATE GALVANIZING.  
 ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION. PRIOR TO GALVANIZING ALL STEEL RAILING POSTS AND STEEL TUBING SHALL BE GIVEN A #6 BLAST CLEANING BY SSPC SPECIFICATIONS. PAINT OVER GALVANIZING WITH APPROVED TIE COAT AND TOPCOAT.  
 THE END OF THE FABRIC SHALL BE ATTACHED TO THE POST BY MEANS OF A TENSION BAR THREADED THROUGH THE END LOOPS OF THE FABRIC AND SECURED TO THE POST WITH CLAMPS & BOLT. THE FABRIC SHALL BE STRETCHED TO REMOVE ALL SLACK.



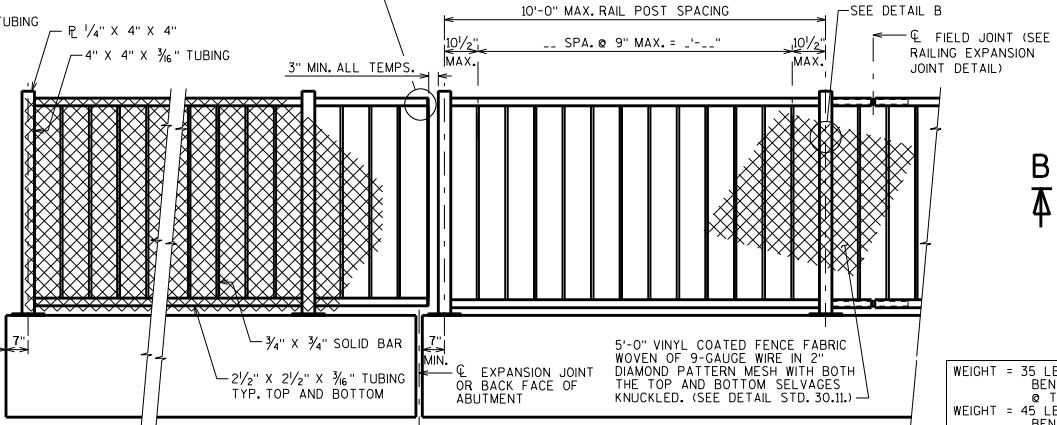
**SECTION THRU RAILING**



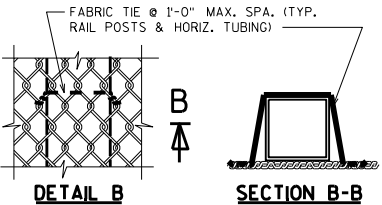
**SECTION THRU FENCE SHOWING DETAILS FOR BENT TOP**



**TOP RAIL CONNECTION FOR FENCE W/ BENT TOP**



**INSIDE ELEVATION OF RAILING**



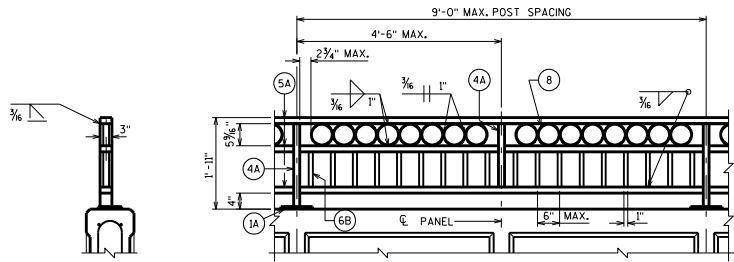
**DETAIL B**

**SECTION B-B**

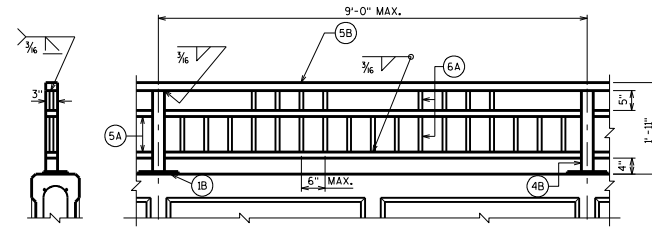
**ORNAMENTAL PROTECTIVE SCREENING**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION  
 APPROVED: *Bill Oliva* DATE: 7-13

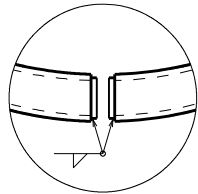
WEIGHT = 35 LB/FT (W/O BENT SECTION @ TOP)  
 WEIGHT = 45 LB/FT (W/ BENT SECTION @ TOP)



**TYPE C1**

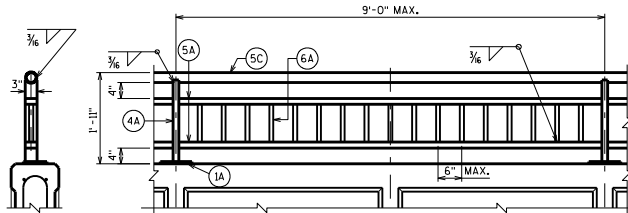


**TYPE C4**

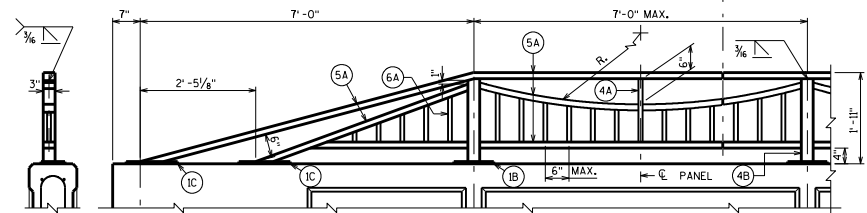


**DETAIL A**

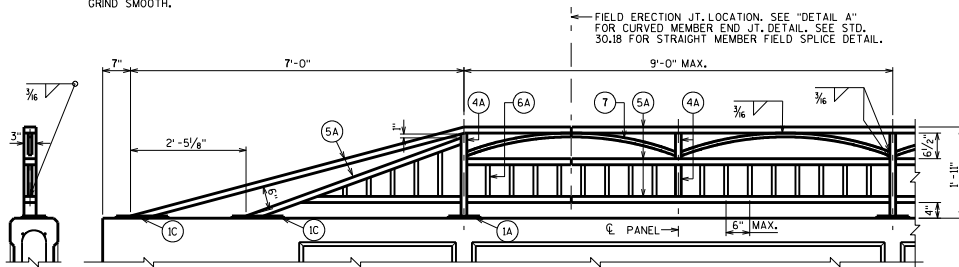
SEAL ENDS ON CURVED STRUCTURAL TUBING WITH 1/4" PLATE, WELD AND GRIND SMOOTH.



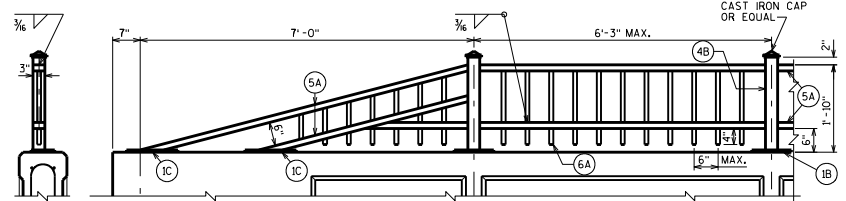
**TYPE C2**



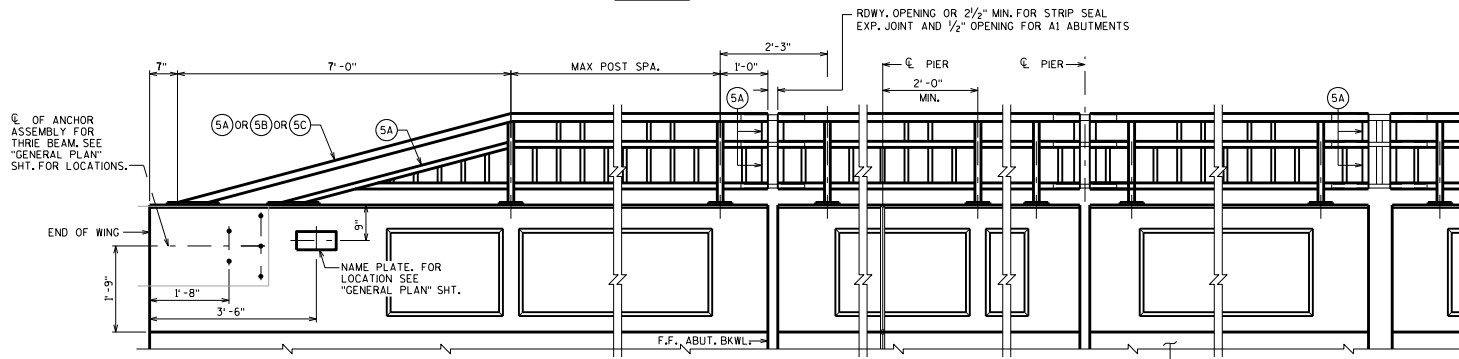
**TYPE C5**



**TYPE C3**



**TYPE C6**



**INSIDE ELEVATION**

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-5". MIN. JOINT SPACING OF 80'-0". DEFINE CONSTR. JT. WITH A 3/4" V-GROOVE.

RAILING WEIGHT = 22 LB/FT

**DESIGNER NOTES**

COMBINATION RAILINGS TYPE C1-C6 MAY ALSO BE USED AS A PEDESTRIAN RAIL MOUNTED DIRECTLY TO A BRIDGE SIDEWALK OR RETAINING WALL BY INCREASING THE RAILING HEIGHT TO A MINIMUM OF 3'-6" AND A MAXIMUM OF 4'-6" AND USING A MINIMUM POST SIZE OF 3"x3"x3/8". WHEN USED ON A BRIDGE, A TRAFFIC BARRIER IS REQUIRED BETWEEN THE ROADWAY AND THE SIDEWALK. FOR THIS PEDESTRIAN RAILING, BID ITEM SHALL BE "RAILING STEEL TYPE C1-C6 GALVANIZED PEDESTRIAN BARRIER". THE CLEAR SPACE BETWEEN THE TOP TWO RAILS MAY BE INCREASED TO A 6" MAXIMUM EXCEPT FOR "TYPE C1" RAILING.

A MINIMUM 12'-0" WING LENGTH IS RECOMMENDED TO ACCOMMODATE THE RAIL END TRANSITION AND PROVIDE A POST SPACING ON THE WING THAT WILL MAINTAIN THE RAIL AESTHETICS.

SEE STANDARD 30.18 FOR ADDITIONAL RAILING DETAILS.

SEE STANDARD 30.07 FOR:

- DEFLECTION JOINT DETAILS AND NOTES
- BEAM GUARD ANCHOR ASSEMBLY DETAILS
- SIDEWALK REINFORCEMENT AND DETAILS

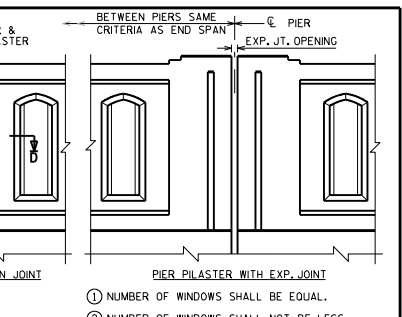
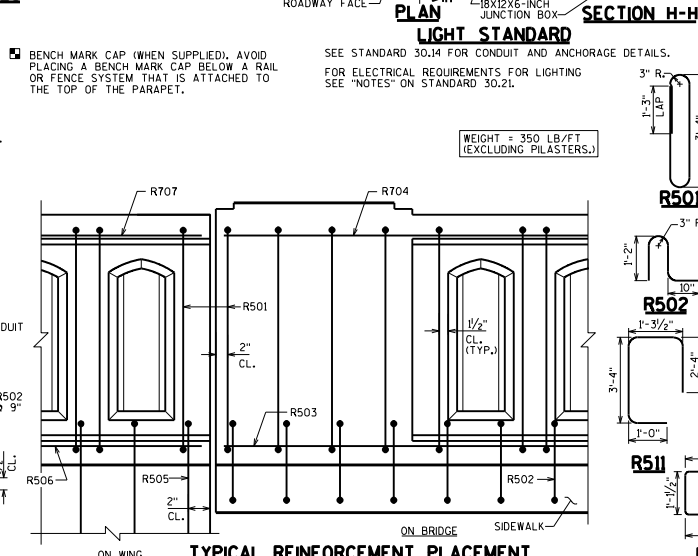
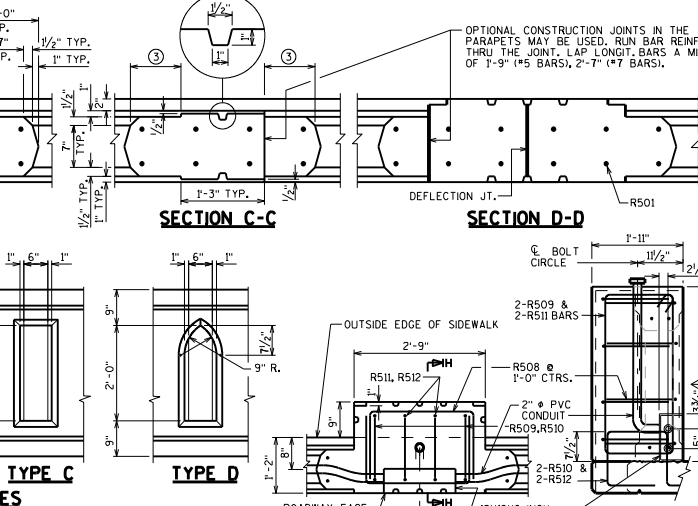
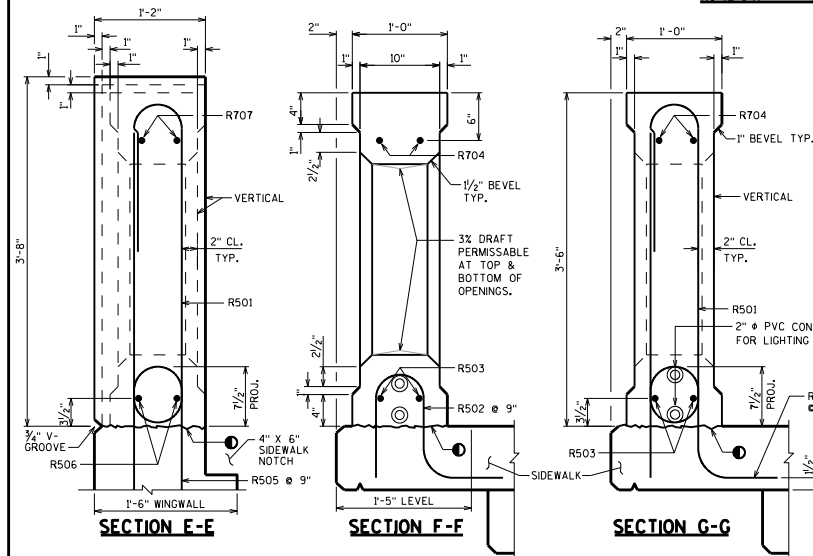
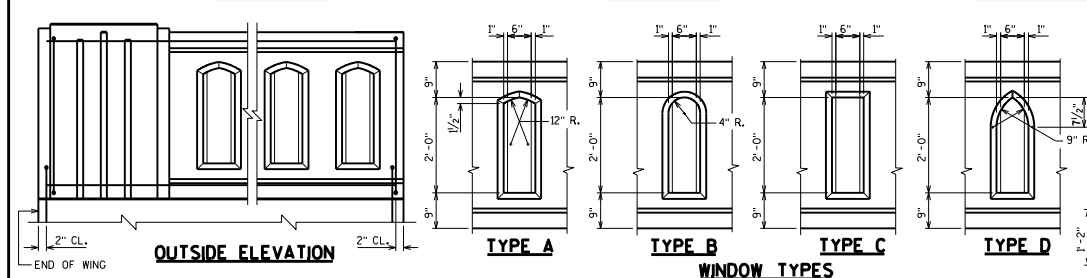
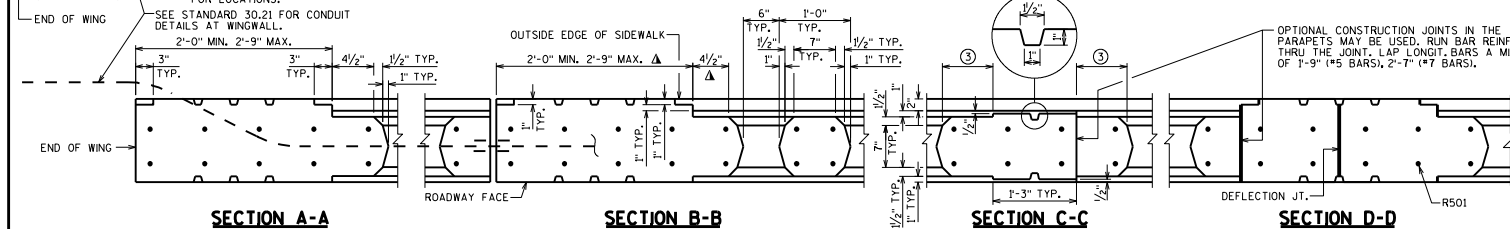
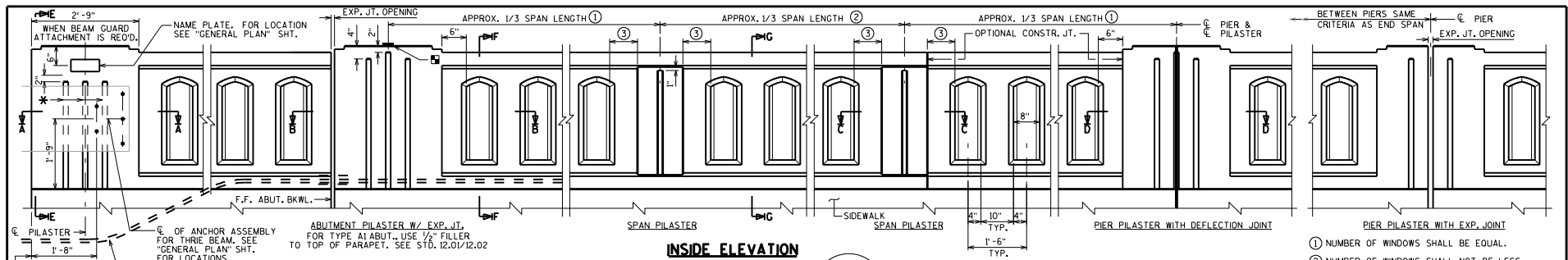
**COMBINATION RAILING  
TYPES 'C1 - C6'**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva*

DATE:  
7-13





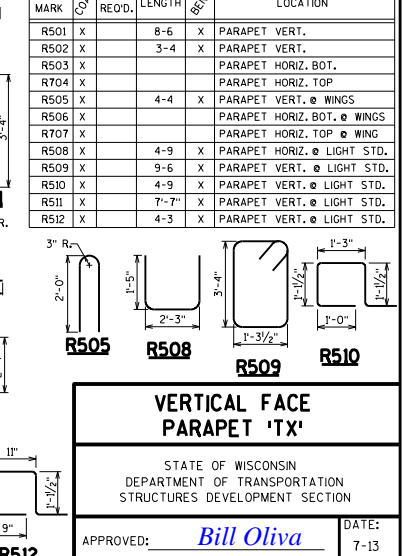
**NOTES**

- NUMBER OF WINDOWS SHALL BE EQUAL.
- NUMBER OF WINDOWS SHALL NOT BE LESS THAN THE AMOUNT IN (D). SPAN PILASTERS MAY BE SPACED AT 1/5 POINTS IN LONG SPANS.
- DIMENSION SHALL BE THE SAME FOR ALL POSTS ADJACENT TO SPAN PILASTERS IN A SPAN. DIMENSION MAY VARY FROM SPAN TO SPAN. MIN. = 3', MAX. = 7 1/2'

**SECTION H-H**

**BILL OF BARS**

BAR MARK	NO. REQ'D.	LENGTH	BENT?	LOCATION
R501	X	8-6	X	PARAPET VERT.
R502	X	3-4	X	PARAPET VERT.
R503	X			PARAPET HORIZ. BOT.
R704	X			PARAPET HORIZ. TOP
R505	X	4-4	X	PARAPET VERT. @ WINGS
R506	X			PARAPET HORIZ. BOT. @ WINGS
R707	X			PARAPET HORIZ. TOP @ WING
R508	X	4-9	X	PARAPET HORIZ. @ LIGHT STD.
R509	X	9-6	X	PARAPET VERT. @ LIGHT STD.
R510	X	4-9	X	PARAPET VERT. @ LIGHT STD.
R511	X	7'-7"	X	PARAPET VERT. @ LIGHT STD.
R512	X	4-3	X	PARAPET VERT. @ LIGHT STD.

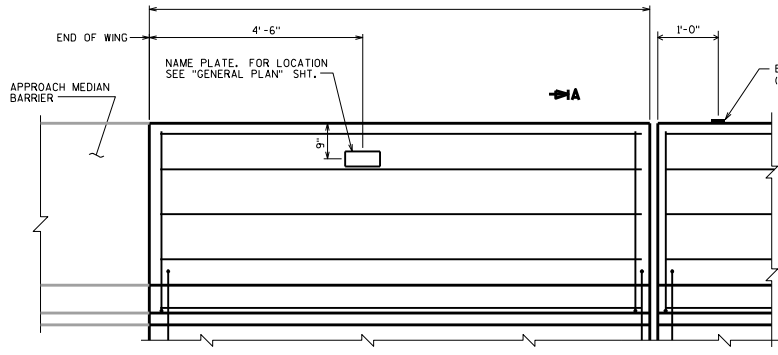


**VERTICAL FACE PARAPET 'TX'**

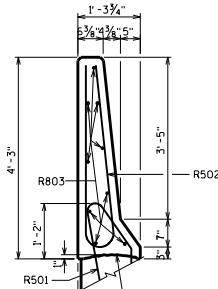
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva DATE: 7-13

AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



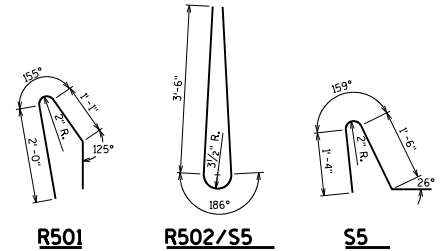
**INSIDE ELEVATION**



**SECTION A**

**BILL OF BARS** FOR ABUTMENT PARAPETS

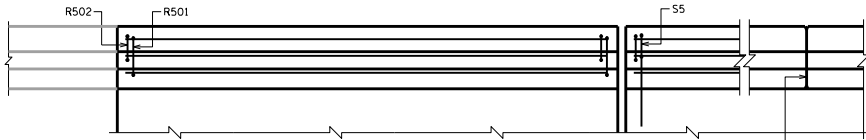
BAR MARK	CONT.	ABUT.	ABUT.	LENGTH	REIN.	LOCATION
R501	X			4'-6"	X	PARAPET VERT.
R502	X			7'-11"	X	PARAPET VERT.
R803	X					PARAPET HORIZ.
S5	X			4'-2"	X	PARAPET VERT.
S5	X			7'-11"	X	PARAPET VERT.
S8	X					PARAPET HORIZ.



**R501**

**R502/S5**

**S5**

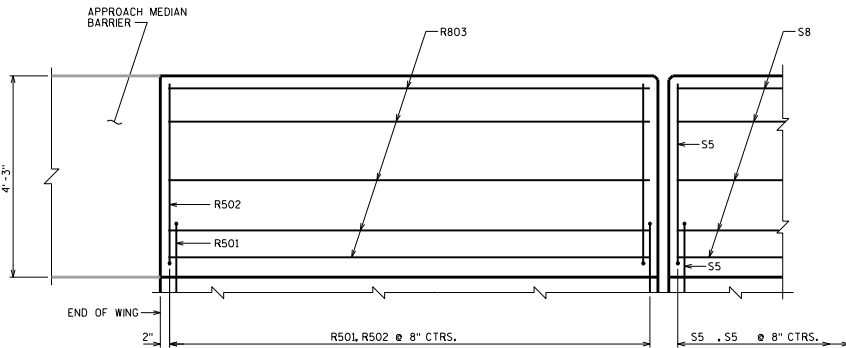


**PLAN**

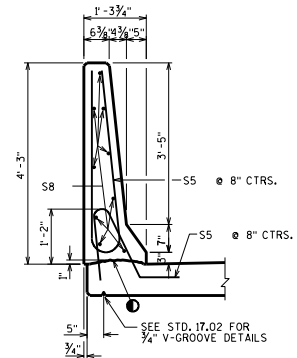
EXPANSION JOINT @ ABUT. 0° SKEW SHOWN MATCH EXP. JT. OPENING.

FOR TYPE A1 ABUT., USE 1/2" FILLER TO TOP OF PARAPET. SEE STD. 12.01.

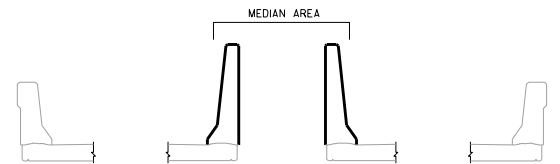
OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT; LAP LONGIT. BARS A MIN. OF 3'-5". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - 1" GROOVE.



**OUTSIDE ELEVATION**



**SECTION THRU PARAPET ON BRIDGE**



SLOPED FACE PARAPET "51F" MAY BE USED IN MEDIAN AREA OF ADJACENT STRUCTURES WHEN HIGHWAY MEDIAN APPROACH CONCRETE BARRIER IS 51" HIGH

CONST. JOINT - STRIKE OFF AS SHOWN.

A R501 BAR MAY BE USED IN LIEU OF A TYPICAL S5... BAR ADJACENT TO THE PAVING NOTCH ON TYPE A1 ABUTMENTS.

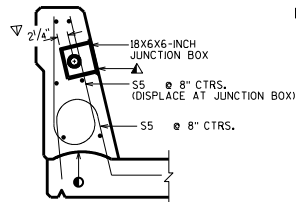
AREA = 3.41 FT.<sup>2</sup>  
WEIGHT = 512 LBS./FT.

**SLOPED FACE PARAPET '51F'**

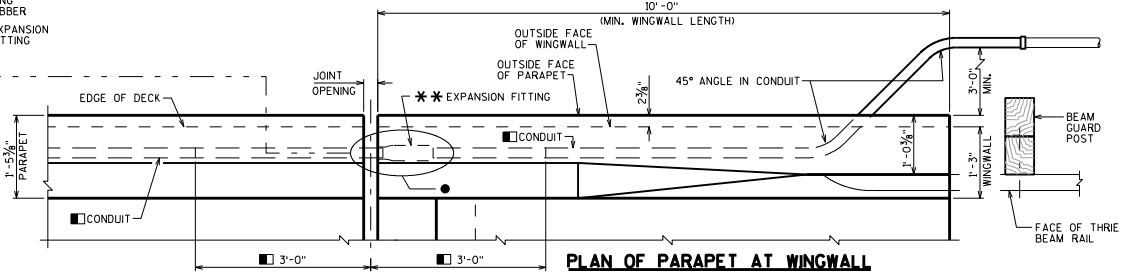
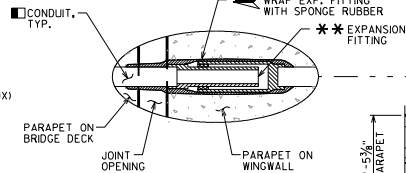
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva*

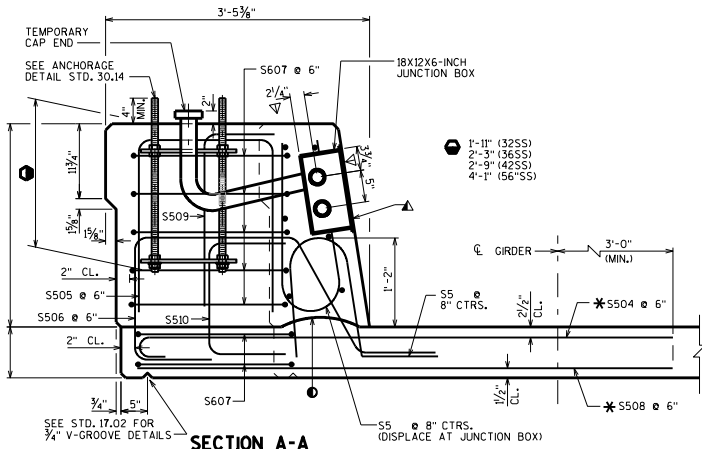
DATE:  
7-13



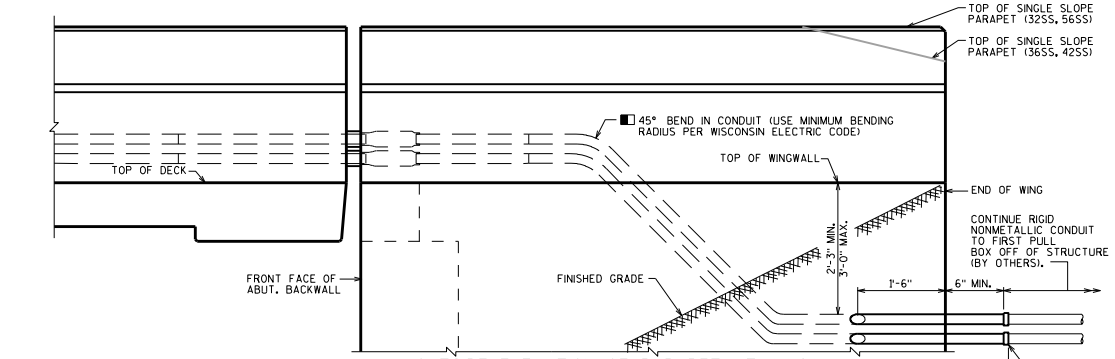
**SECTION THRU PARAPET**  
SHOWING 18X6X6-INCH JUNCTION BOX  
(SINGLE CONDUIT APPLICATION ONLY)



**PLAN OF PARAPET AT WINGWALL**



**SECTION A-A**



**OUTSIDE ELEVATION OF PARAPET AT WINGWALL**  
SHOWING (2) - CONDUIT SYSTEM

SPONGE RUBBER WRAP TO BE AASHTO M153, TYPE 1 OR EQUIVALENT - 1/4" MINIMUM THICKNESS. SPONGE RUBBER WRAP INCIDENTAL TO CONDUIT RIGID METALLIC 2-INCH".

POSITION MOVABLE END OF CONDUIT INSIDE EXPANSION FITTING, SUCH THAT IT WILL HAVE THE SAME ALLOWANCE FOR MOVEMENT (EXPANSION/CONTRACTION) AS THE EXPANSION FITTING. SET IN PLACE IN THE DECK BELOW IT. TAKE CARE TO INSTALL EXPANSION FITTING AND CONDUIT EXACTLY PARALLEL TO BRIDGE MOVEMENT.

CONSTRUCTION JOINT, STRIKE OFF AS SHOWN.

USE 2" DIA. RIGID NONMETALLIC CONDUIT EXCEPT AT EXPANSION FITTING. AT EXPANSION FITTING USE RIGID METALLIC CONDUIT 3'-0" INTO PARAPET ON DECK AND WING SIDES OF THE JOINT OPENING.

CUT OUT \* 1" OF GASKET AT BOTTOM OF JUNCTION BOX COVER TO ALLOW FOR DRAINAGE.

THESE BARS ARE IN ADDITION TO STANDARD TRANSVERSE BARS IN DECK. FOR CONG. SLAB STRUCTURES, REPLACE S504 & S508 BARS W/ S404 BARS @ 6" SPA. (W/O HOOK @ ENDS, 5'-6" LONG).

LOCATION OF CONDUIT IS MEASURED FROM OUTSIDE EDGE OF JUNCTION BOX.

**NOTES**

BID ITEMS SHALL BE:  
"JUNCTION BOXES 18X12X6-INCH", EACH  
"CONDUIT RIGID NONMETALLIC SCHEDULE 40 2-INCH"  
"CONDUIT RIGID METALLIC 2-INCH"  
"ANCHOR ASSEMBLIES LIGHT POLES ON STRUCTURE"

EXPANSION FITTINGS, ANGLES AND ADAPTER FITTINGS TO BE INCIDENTAL TO "CONDUIT RIGID METALLIC 2-INCH".

WHEN CONNECTING NONMETALLIC CONDUIT TO METALLIC CONDUIT, ONLY ADAPTER FITTINGS U.L. OR NRTL LISTED FOR ELECTRICAL USE SHALL BE USED.

APPROVED MANUFACTURERS - JUNCTION BOXES:  
SEE APPROVED MATERIAL LIST.

APPROVED MANUFACTURER OR EQUIVALENT - EXPANSION FITTING (SPECIFY SIZE ON PLANS):  
0-2/GEDNEY TYPE AX-200 AND BONDING JUMPER (4" TOTAL CONDUIT MOVEMENT),  
0-2/GEDNEY TYPE AX-8-200 AND BONDING JUMPER (8" TOTAL CONDUIT MOVEMENT),  
0-2/GEDNEY TYPE EX-200 WITH PBS-200-125 AND BONDING JUMPER (10" TOTAL CONDUIT MOVEMENT).

THIS STANDARD ACCOMMODATES A MAXIMUM 15" DIA. BOLT HOLE CIRCLE AND A MAXIMUM 15" X 15" SQUARE ANCHOR PLATE WITH (4) - 1" DIA. ANCHOR BOLTS. THIS STANDARD IS BASED ON A 8" MIN. DECK THICKNESS AND A MAXIMUM OVERHANG OF 3'-7" FROM GIRDER TO EDGE OF DECK.

**JUNCTION BOX REQUIREMENTS**

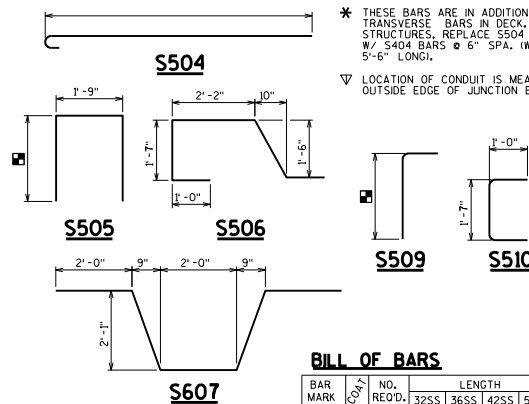
PLACE A 18" X 12" X 6" JUNCTION BOX AT EACH LIGHT STANDARD (CENTERED ON LIGHT G.).  
USE A JUNCTION BOX TO KEEP A CONTINUOUS RUN OF CONDUIT (PULL LENGTH) TO A MAXIMUM OF 190 FT. CONTACT THE BUREAU OF HIGHWAY OPERATIONS, ELECTRICAL SECTION WHEN PULL LENGTH IS > 190' BUT < 200'.

**CONDUIT REQUIREMENTS**

USE (1) - 2" DIA. CONDUIT TO PROVIDE ELECTRICAL SERVICE TO LIGHTS MOUNTED ON TOP OF THE PARAPET.  
USE (2) - 2" DIA. CONDUITS IF AN ADDITIONAL ELECTRICAL SERVICE IS REQUIRED.  
USE A 18" X 6" X 6" JUNCTION BOX WHEN (1) - 2" DIA. CONDUIT IS PRESENT.  
USE A 18" X 12" X 6" JUNCTION BOX WHEN (2) - 2" DIA. CONDUITS ARE PRESENT.

**EXPANSION FITTING REQUIREMENTS**

USE AN APPROVED EXPANSION FITTING AT EACH SEMI EXPANSION OR EXPANSION JOINT.  
RUN CONDUIT STRAIGHT THROUGH (WITHOUT A FITTING) AT EACH FIXED JOINT.



2'-3" (32SS)  
2'-7" (36SS)  
3'-1" (42SS)  
4'-5" (56SS)

**BILL OF BARS**

BAR MARK	QTY	NO. REQ'D.	32SS	36SS	42SS	56SS	BENT	LOCATION
S504	X						X	DECK TRANSV. @ LIGHT STD.
S505	X	6-0	6-8	7-8	10-0		X	PARAPET VERT. @ LIGHT STD.
S506	X	7-0	7-0	7-0	7-0		X	PARAPET VERT. @ LIGHT STD.
S607	X	10-0	10-0	10-0	10-0		X	PARAPET HORIZ. @ LIGHT STD.
S508	X							DECK TRANSV. @ LIGHT STD.
S509	X	3-2	3-6	4-0	5-4		X	PARAPET VERT. @ LIGHT STD.
S510	X	3-4	3-4	3-4	3-4		X	PARAPET VERT. @ LIGHT STD.

**LIGHT STD., JUNCTION BOX, & EXP. FITTING FOR 'SS' PARAPETS**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva*

DATE:  
7-13

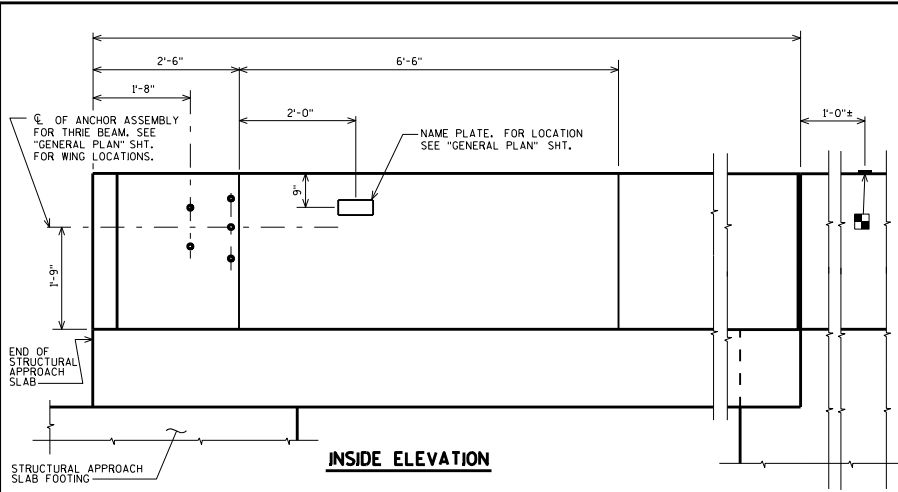




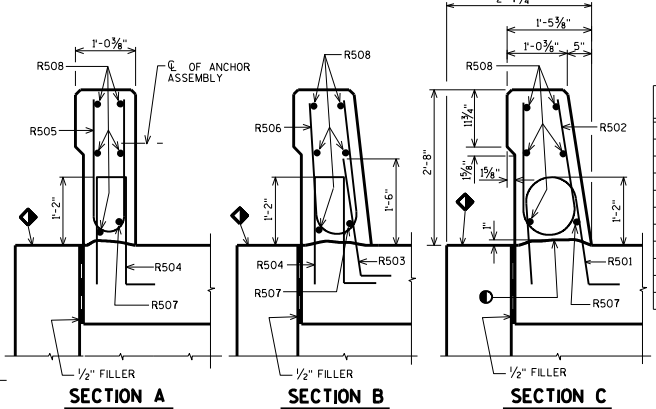








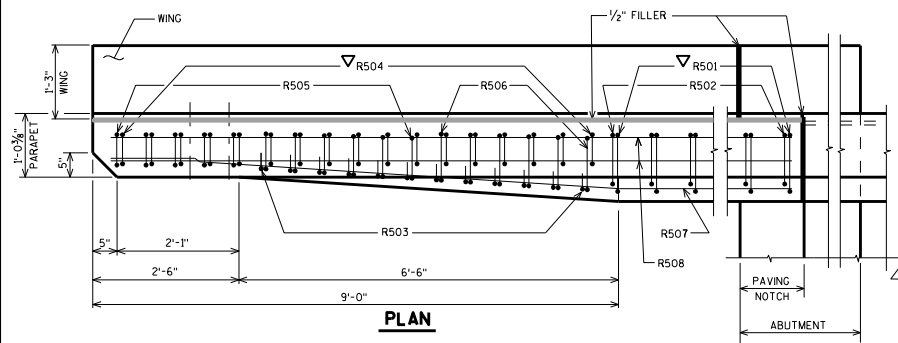
■ BENCH MARK CAP (WHEN SUPPLIED), AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



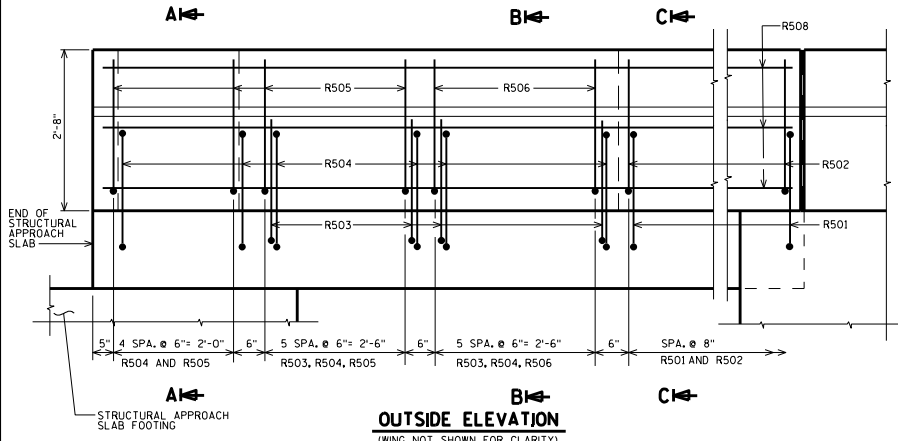
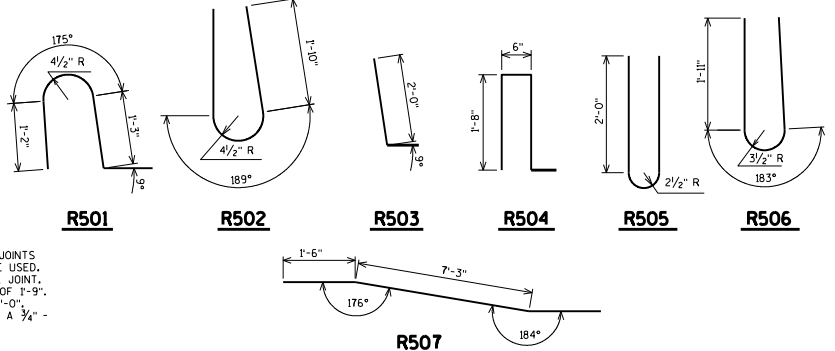
**BILL OF BARS**

FOR STRUCTURAL APPROACH SLAB PARAPETS

BAR MARK	QTY	ABUT.	ABUT.	LENGTH	BEY	LOCATION
R501	X			4-5	X	PARAPET-VERT.
R502	X			5-0	X	PARAPET-VERT.
R503	X			2-9	X	PARAPET-VERT.
R504	X			4-4	X	PARAPET-VERT.
R505	X			4-9	X	PARAPET-VERT.
R506	X			4-10	X	PARAPET-VERT.
R507	X				X	PARAPET-HORIZ.
R508	X				X	PARAPET-HORIZ.



OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - 'V' GROOVE.



**DESIGNER NOTES**

SEE STRUCTURAL APPROACH SLAB STANDARDS 12.10 AND 12.11 FOR APPROACH SLAB INFORMATION.  
SEE STANDARD 30.30 FOR DETAILS OF 32SS PARAPET ON BRIDGE.

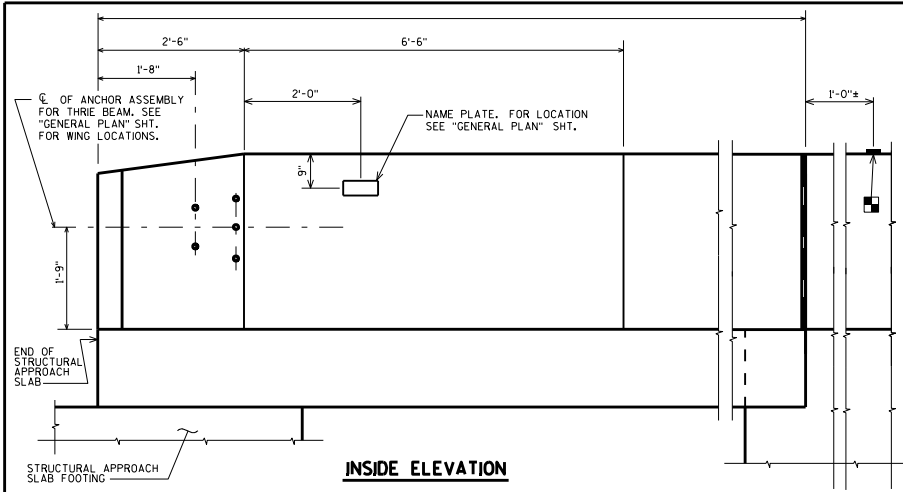
AREA = 3.09 SF  
WEIGHT = 464 LB/FT

- ① CONST. JOINT - STRIKE OFF AS SHOWN.
- ◊ SLOPE FOR DRAINAGE
- ▽ R501 AND R504 BARS TO BE TIED TO STRUCTURAL APPROACH SLAB STEEL BEFORE STRUCTURAL APPROACH SLAB IS POURED.

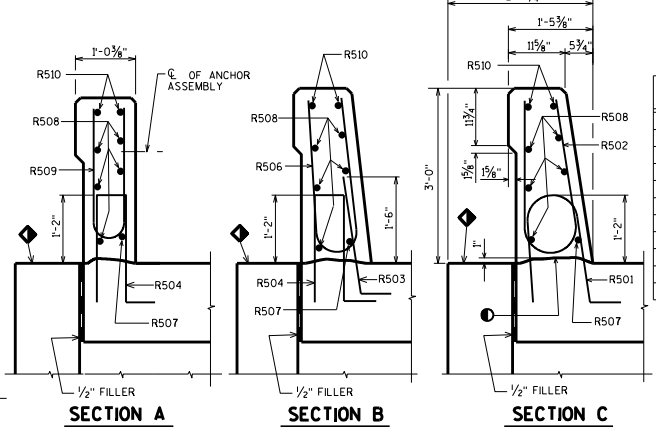
**SINGLE SLOPE PARAPET 32SS WITH STRUCTURAL APPROACH SLAB**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva DATE: 7-13



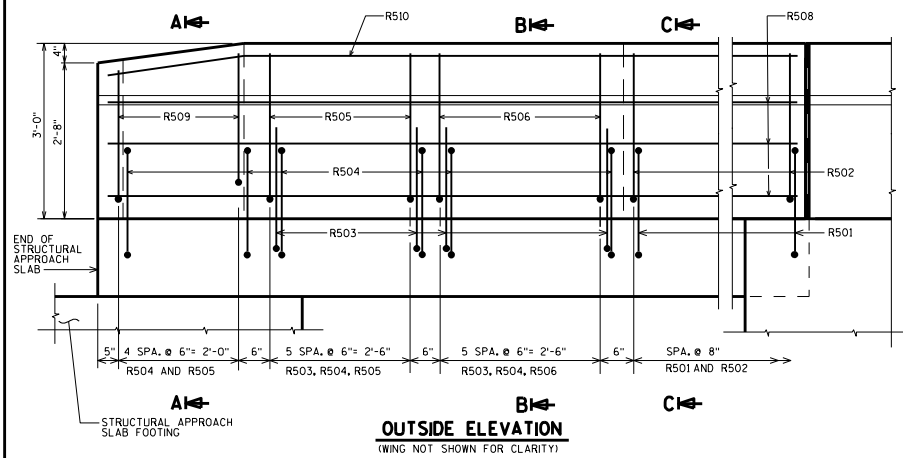
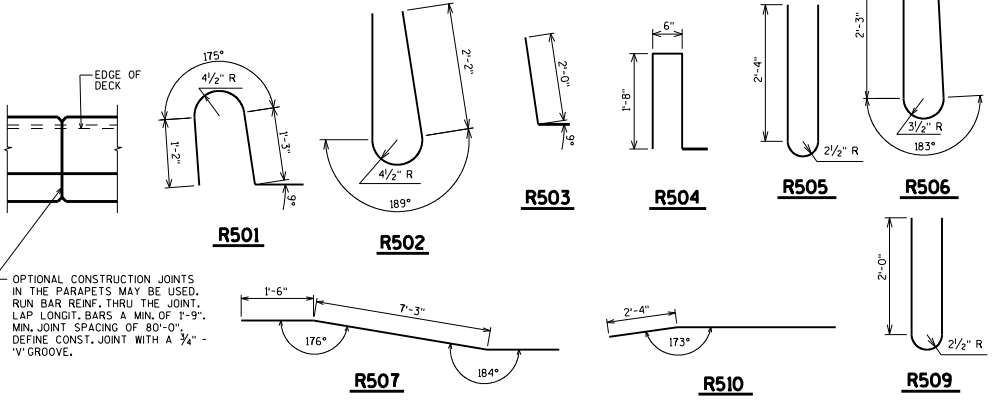
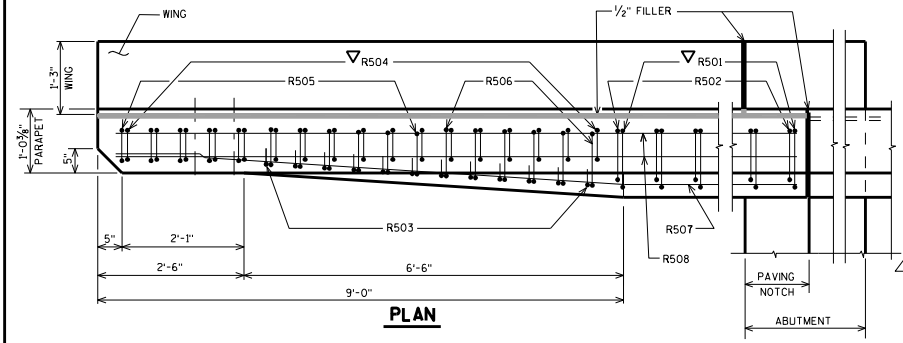
■ BENCH MARK CAP (WHEN SUPPLIED), AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



**BILL OF BARS**

FOR STRUCTURAL APPROACH SLAB PARAPETS

BAR MARK	COUPLER	ABUT.	ABUT.	LENGTH	BEND	LOCATION
R501	X			4-5	X	PARAPET-VERT.
R502	X			5-8	X	PARAPET-VERT.
R503	X			2-9	X	PARAPET-VERT.
R504	X			4-4	X	PARAPET-VERT.
R505	X			5-5	X	PARAPET-VERT.
R506	X			5-6	X	PARAPET-VERT.
R507	X				X	PARAPET-HORIZ.
R508	X				X	PARAPET-HORIZ.
R509	X			4-9	X	PARAPET-VERT.
R510	X				X	PARAPET-HORIZ.



OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" V-GROOVE.

**DESIGNER NOTES**

SEE STRUCTURAL APPROACH SLAB STANDARDS 12.10 AND 12.11 FOR APPROACH SLAB INFORMATION.  
SEE STANDARD 30.31 FOR DETAILS OF 365S PARAPET ON BRIDGE.

AREA = 3.36 SF  
WEIGHT = 504 LB/FT

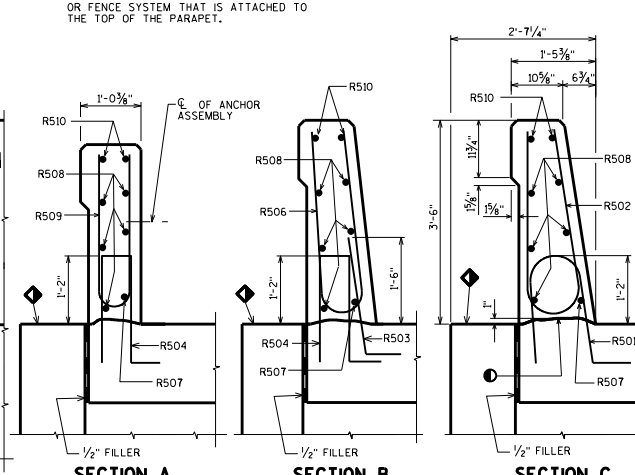
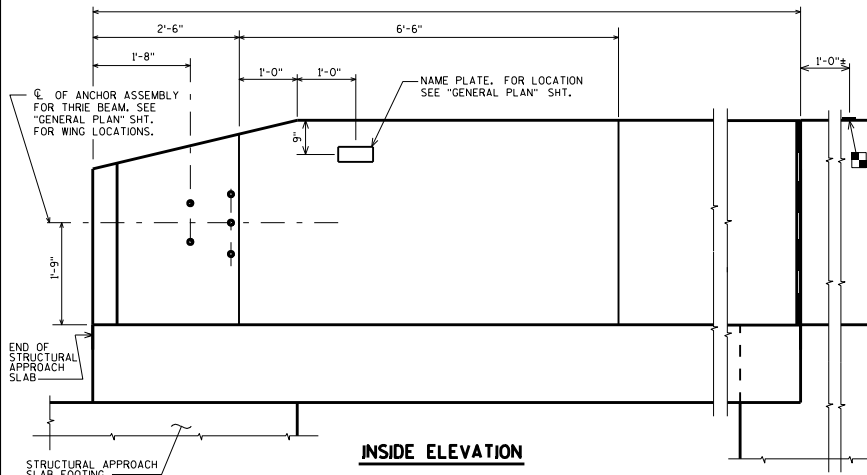
- ① CONST. JOINT - STRIKE OFF AS SHOWN.
- ◊ SLOPE FOR DRAINAGE
- ▽ R501 AND R504 BARS TO BE TIED TO STRUCTURAL APPROACH SLAB STEEL BEFORE STRUCTURAL APPROACH SLAB IS POURED.

**SINGLE SLOPE PARAPET 365S WITH STRUCTURAL APPROACH SLAB**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva* DATE: 7-13

☐ BENCH MARK CAP (WHEN SUPPLIED), AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.



**BILL OF BARS**

FOR STRUCTURAL APPROACH SLAB PARAPETS

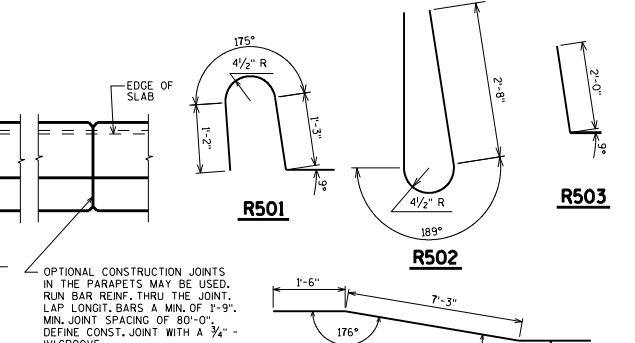
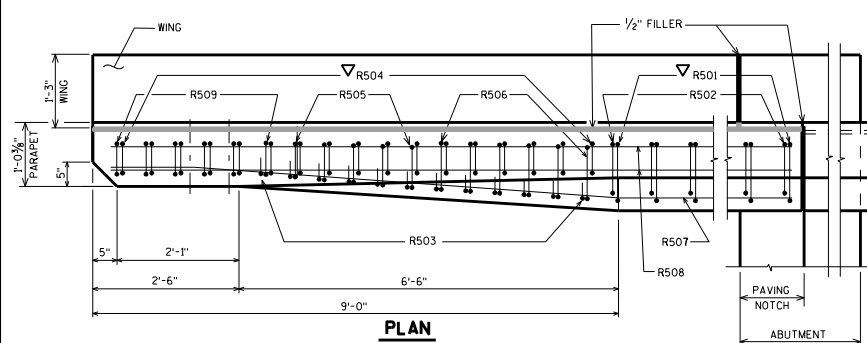
BAR MARK	COUPLER	ABUT.	ABUT.	LENGTH	REINFT.	BAR SERIES	LOCATION
R501	X			4-5	X		PARAPET-VERT.
R502	X			6-8	X		PARAPET-VERT.
R503	X			2-9	X		PARAPET-VERT.
R504	X			4-4	X		PARAPET-VERT.
R505	X			6-5	X		PARAPET-VERT.
R506	X			6-6	X		PARAPET-VERT.
R507	X				X		PARAPET-HORIZ.
R508	X				X		PARAPET-HORIZ.
R509	X			5-5	X	▲	PARAPET-VERT.
R510	X				X		PARAPET-HORIZ.

▲ LENGTH SHOWN FOR BAR IS AN AVERAGE LENGTH AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS.

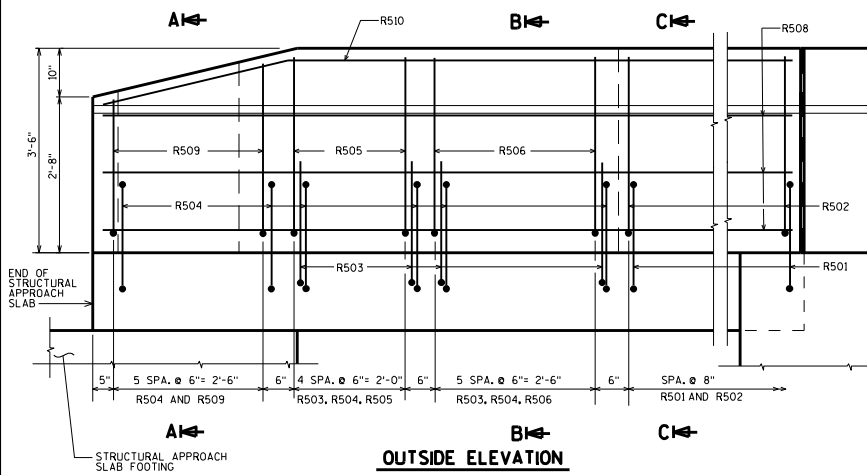
**BAR SERIES TABLE**

MARK	NO. REOD.	LENGTH
R509	4 SERIES OF 6	4'-9" TO 6'-1"

BUNDLE AND TAG EACH SERIES SEPARATELY.



OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - "V" GROOVE.



AREA = 3.75 SF  
WEIGHT = 563 LB/FT

● CONST. JOINT - STRIKE OFF AS SHOWN.

◆ SLOPE FOR DRAINAGE

▽ R501 AND R504 BARS TO BE TIED TO STRUCTURAL APPROACH SLAB STEEL BEFORE STRUCTURAL APPROACH SLAB IS POURED.

**DESIGNER NOTES**

SEE STRUCTURAL APPROACH SLAB STANDARDS 12.10 AND 12.11 FOR APPROACH SLAB INFORMATION.

SEE STANDARD 30.32 FOR DETAILS OF 42SS PARAPET ON BRIDGE.

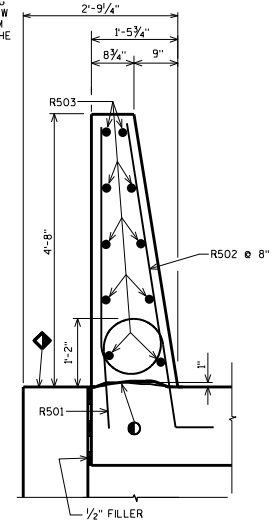
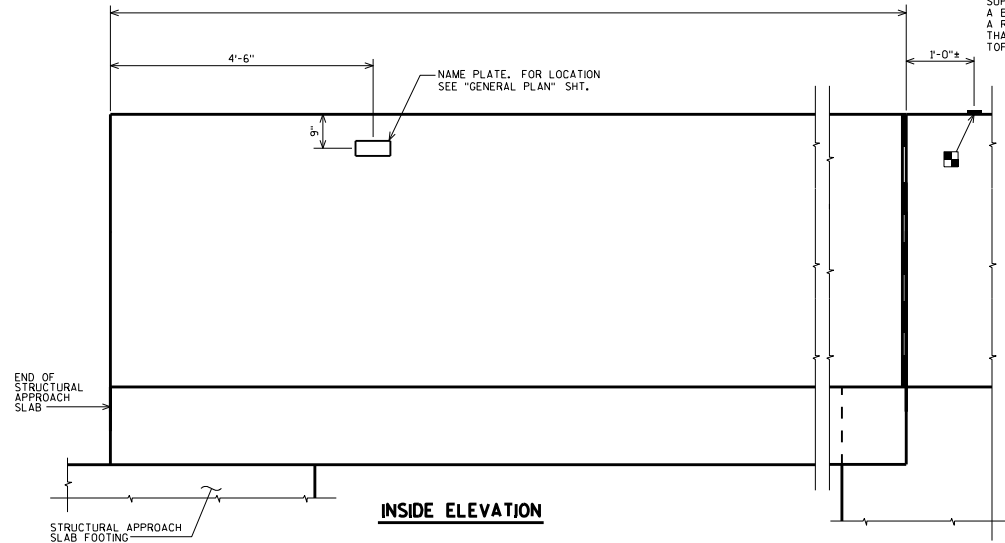
**SINGLE SLOPE PARAPET 42SS WITH STRUCTURAL APPROACH SLAB**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva*

DATE: 7-13

■ BENCH MARK CAP (WHEN SUPPLIED), AVOID PLACING A BENCH MARK CAP BELOW A RAIL OR FENCE SYSTEM THAT IS ATTACHED TO THE TOP OF THE PARAPET.

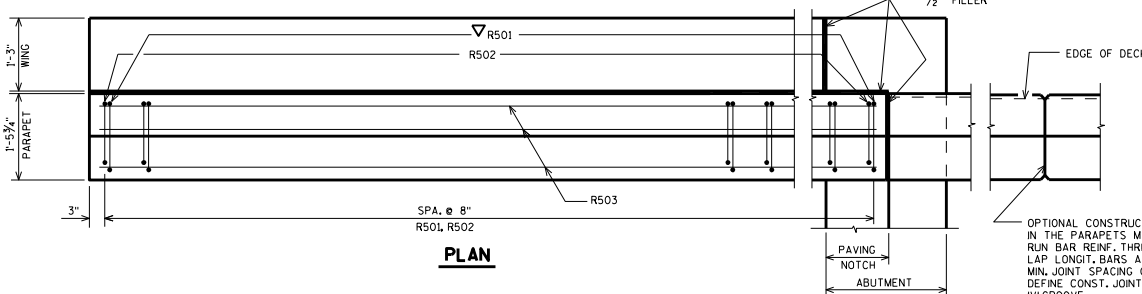


**BILL OF BARS**

FOR STRUCTURAL APPROACH SLAB PARAPETS

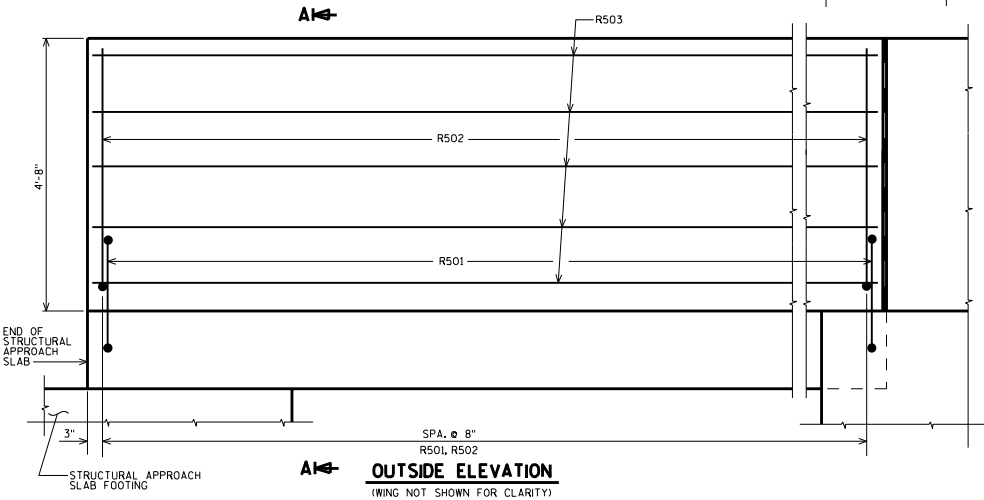
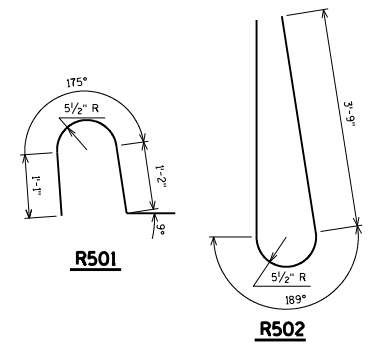
BAR MARK	QTY	ABUT.	ABUT.	LENGTH	BENT	LOCATION
R501	X			4-6	X	PARAPET-VERT.
R502	X			9-1	X	PARAPET-VERT.
R503	X					PARAPET HORIZ.

**SECTION A**



**PLAN**

OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINF. THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 1'-9". MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 3/4" - V GROOVE.



**OUTSIDE ELEVATION**  
(WING NOT SHOWN FOR CLARITY)

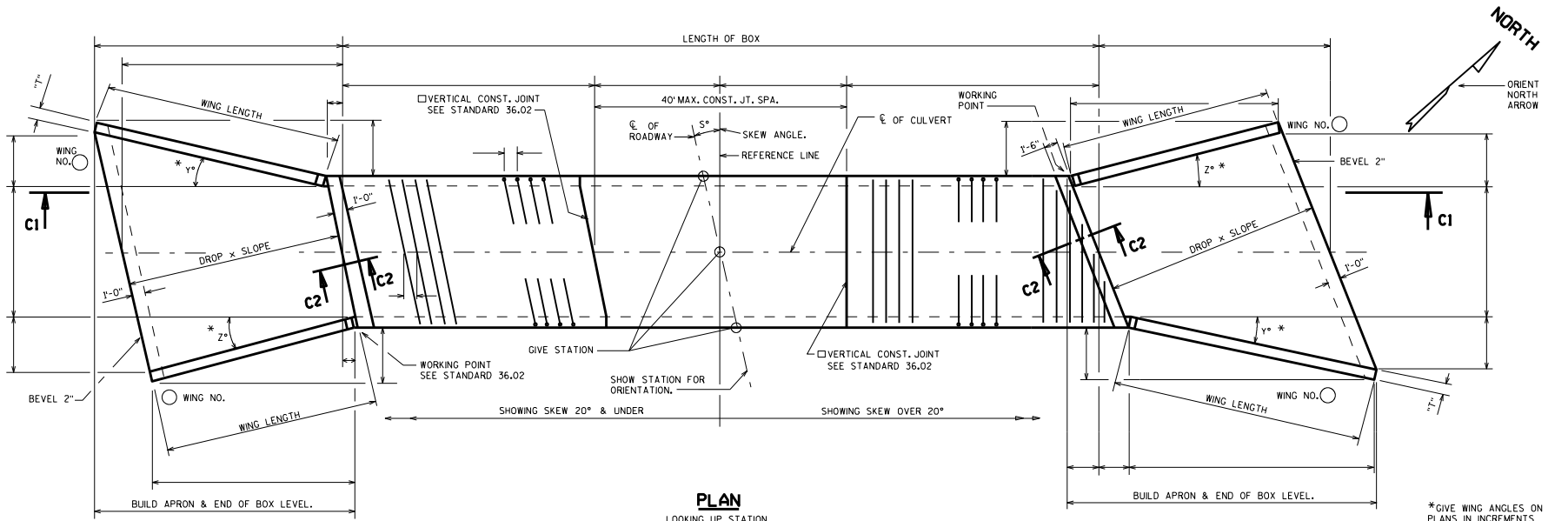
**DESIGNER NOTES**

THE '56SS' PARAPET IS ONLY TO BE USED IF A 'TYPE S56' SINGLE SLOPE CONCRETE ROADWAY BARRIER ADJOINS THE END OF THE '56SS' PARAPET.  
SEE STRUCTURAL APPROACH SLAB STANDARDS 12.10 AND 12.11 FOR APPROACH SLAB INFORMATION.  
SEE STANDARD 30.33 FOR DETAILS OF 56SS PARAPET ON BRIDGE.

AREA = 5.16 SF  
WEIGHT = 774 LB/FT

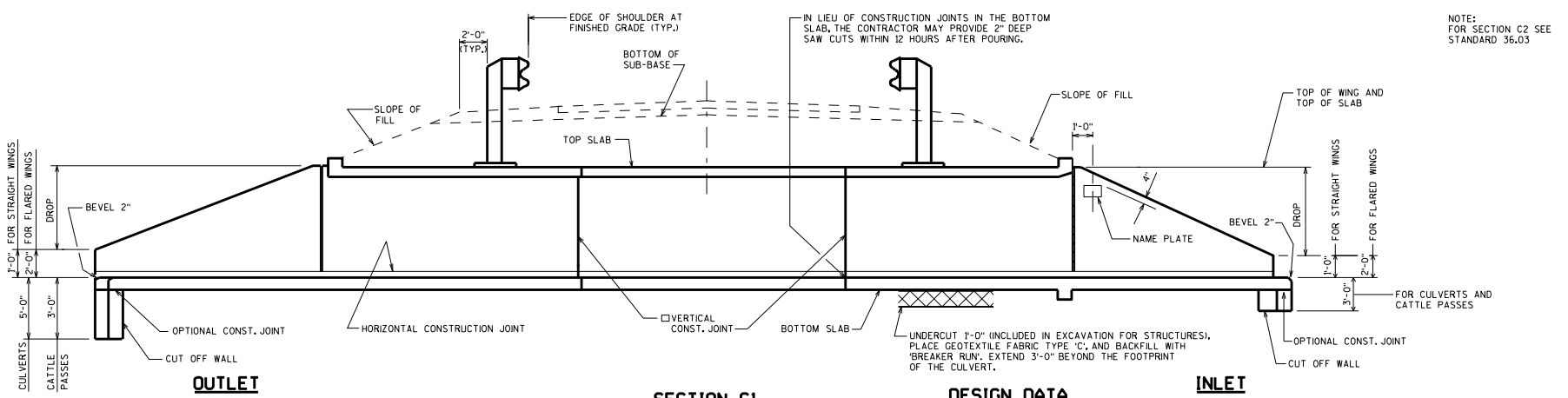
- CONST. JOINT - STRIKE OFF AS SHOWN.
- ▽ R501 BARS TO BE TIED TO STRUCTURAL APPROACH SLAB STEEL BEFORE STRUCTURAL APPROACH SLAB IS POURED.
- ◆ SLOPE FOR DRAINAGE

<b>SINGLE SLOPE PARAPET 56SS WITH STRUCTURAL APPROACH SLAB</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <u>Bill Oliva</u>	DATE: 7-13



**PLAN**  
LOOKING UP STATION

\*GIVE WING ANGLES ON PLANS IN INCREMENTS OF 5°. SEE BRIDGE MANUAL.



**SECTION C1**

**DESIGN DATA**

**INLET**

**OUTLET**

□ 18" MIN. WIDTH RUBBERIZED MEMBRANE WATERPROOFING UP WALLS & ACROSS TOP SLAB

\*\*SEE SECTION 36.5 FOR DESIGN RANGE OF FILL HEIGHTS. HEIGHT TO BE TO THE NEAREST 0.5 FEET ON FILLS UNDER 4 FEET AND TO THE NEAREST FOOT ON FILLS OVER 4 FEET.

**LIVE LOAD:**  
 DESIGN LOADING: HL-93  
 INVENTORY RATING FACTOR: RF=1.05  
 OPERATING RATING FACTOR: RF=1.35  
 WISCONSIN STANDARD PERMIT VEHICLE (WIS.-SPV): 255 (KIPS)

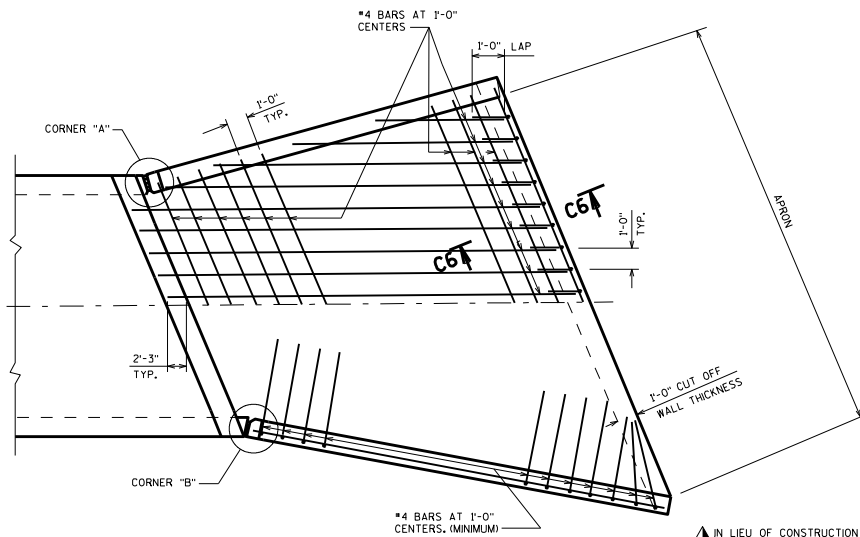
\*\* EARTH LOAD: DESIGNED FOR FILL HEIGHT RANGE OF \_\_\_ TO \_\_\_ FEET

**ULTIMATE DESIGN STRESSES:**  
 CONCRETE MASONRY —————  $f'_c = 3.5$  K.S.J.  
 BAR STEEL REINFORCEMENT —————  $f_y = 60.0$  K.S.J.

NOTE:  
FOR SECTION C2 SEE STANDARD 36.03

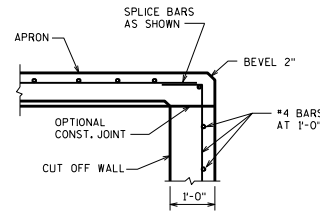
<b>BOX CULVERT LAYOUT</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <u>Bill Oliva</u>	DATE: 7-13





**APRON DETAIL**

▲ IN LIEU OF CONSTRUCTION JOINTS IN THE BOTTOM SLAB, THE CONTRACTOR MAY USE 2" DEEP SAW CUTS WITHIN 12 HOURS AFTER POURING.



**SECTION C6**

"H" (FT.)	"L" (FT.)
≤ 5'-0"	3'-8"
> 5'-0" - 7'-0"	5'-2"
> 7'-0" - 8'-0"	6'-1"
> 8'-0" - 9'-0"	6'-9"
> 9'-0" - 10'-0"	7'-4"
> 10'-0" - 11'-0"	7'-8"
> 11'-0" - 12'-0"	8'-0"
> 12'-0" - 13'-0"	8'-4"
> 13'-0" - 14'-0"	8'-6"

"H" IS MAX. WING WALL HEIGHT

THE AREA OF REINFORCING STEEL NOT IDENTIFIED IN SECTIONS SHALL CONFORM TO THE FOLLOWING TEMPERATURE AND SHRINKAGE REQUIREMENTS:

THICKNESS	T&S REINF.
≤ 12"	#4 @ 18"
> 12" - 18"	#4 @ 12"

**NOTES**

BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CLEAR UNLESS OTHERWISE SHOWN OR NOTED.

THE UPPER LIMITS OF EXCAVATION FOR STRUCTURES CULVERTS C-1-1 SHALL BE THE EXISTING GROUND LINE.

STRUCTURE BACKFILL IS REQUIRED BEHIND ALL WINGWALLS.

WHEN STRUCTURE BACKFILL IS REQUIRED; ALL SPACES EXCAVATED AND NOT OCCUPIED BY THE NEW STRUCTURE SHALL BE BACKFILLED WITH STRUCTURE BACKFILL TO THE ELEVATION AND SECTION EXISTING PRIOR TO EXCAVATION WITHIN THE LENGTH OF THE BOX.

THE CONCRETE IN THE CUT OFF WALL MAY BE PLACED UNDERWATER IF THE EXCAVATION CANNOT BE DEWATERED.

THE ALTERNATE CUT OFF WALL MAY BE USED IN LIEU OF THE CAST-IN-PLACE CONCRETE CUT OFF WALLS. PAYMENT SHALL BE BASED ON CONCRETE CUT OFF WALLS.

LOCATE NAME PLATE ON NEAREST RIGHT WING TRAVELING UP STATION, FACE NAME PLATE UP STATION.

HARDWARE FOR POST ANCHORS SHALL BE PAID FOR AS "STRUCTURAL STEEL CARBON".

THE CONTRACTOR MAY FURNISH A PRECAST CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE BOX CULVERT WITH THE ACCEPTANCE OF THE SHOP DRAWINGS BY THE STRUCTURES DESIGN SECTION. THE PRECAST CONCRETE BOX CULVERT SHALL CONFORM TO PRECAST DETAILS IN CHAPTER 36 STANDARDS OF THE CURRENT WISCONSIN DOT BRIDGE MANUAL. PAYMENT FOR THE PRECAST CULVERT SHALL BE BASED ON THE QUANTITIES AND PRICES BID FOR THE ITEMS LISTED IN THE "TOTAL ESTIMATED QUANTITIES".

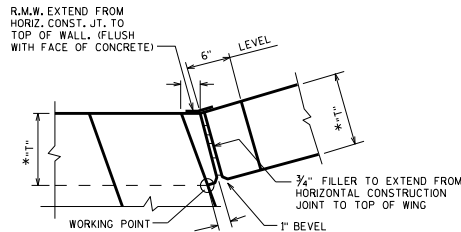
IN LIEU OF USING BREAKER RUN FOR THE BOX CONSTRUCTION PLATFORM, THE CONTRACTOR MAY ELECT TO SUBSTITUTE #1 OR #2 CONCRETE COARSE AGGREGATE. SELECT CRUSHED MATERIAL OR OTHER GRANULAR MATERIAL AS APPROVED BY THE ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR BASE STABILITY WITH ANY SUBSTITUTED MATERIAL. THE REGION GEOTECHNICAL ENGINEER MAY BE CONTACTED TO DETERMINE IF "OTHER GRANULAR MATERIAL" IS ACCEPTABLE.

**DESIGNER NOTES**

THE ABOVE NOTE REGARDING POTENTIAL SUBSTITUTION OF BREAKER RUN SHOULD ONLY BE INCLUDED ON THE PLANS IF ALLOWED BY THE REGION GEOTECHNICAL ENGINEER.

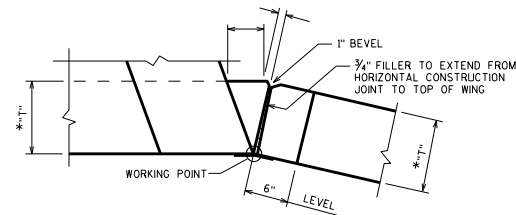
ALL BAR STEEL FOR CAST-IN-PLACE CONCRETE BOX CULVERTS SHALL BE UNCOATED, EXCEPT WHEN THERE IS NO FILL OVER THE CULVERT. EPOXY COATED BARS SHALL BE USED FOR THE TOP AND BOTTOM BARS IN THE TOP SLAB.

FOR "B" DESIGNATED CONCRETE BOX CULVERTS HAVING THEIR TOP SURFACE AT GRADE, HAND HELD FINISHING MACHINES MAY BE USED. NOTE THIS ON PLANS WHEN APPLICABLE.

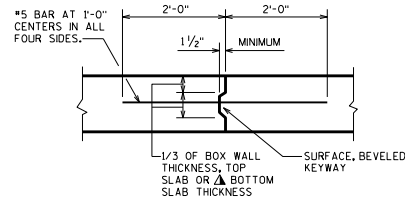


**CORNER "A"**

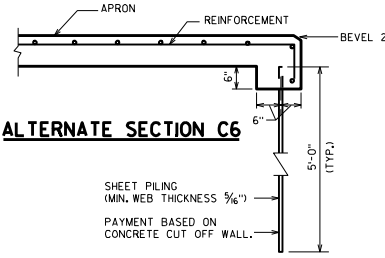
\* DIMENSION "T" TO BE DETERMINED FROM BARREL DESIGN



**CORNER "B"**



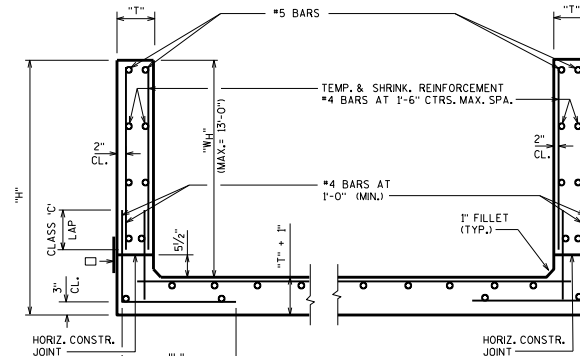
**VERTICAL CONSTRUCTION JOINT**



**ALTERNATE SECTION C6**

SHEET PILING (MIN. WEB THICKNESS 5/16")  
PAYMENT BASED ON CONCRETE CUT OFF WALL.

**ALTERNATE CUTOFF WALL**



**SECTION THRU WINGWALLS**

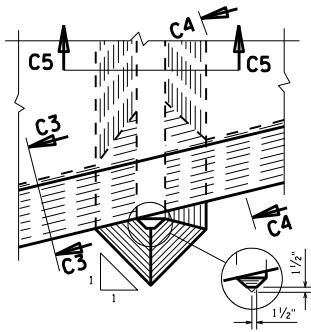
□ 18" MIN. WIDTH RUBBERIZED MEMBRANE WATERPROOFING ALONG HORIZ. CONSTR. JT. IN WING.

**BOX CULVERT APRON DETAILS**

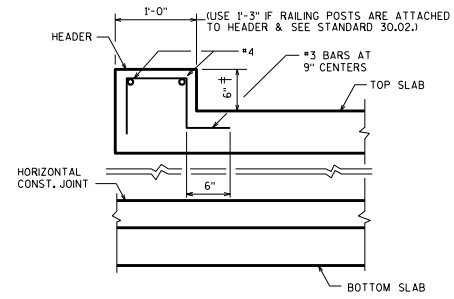
STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: *Bill Oliva*

DATE:  
7-13

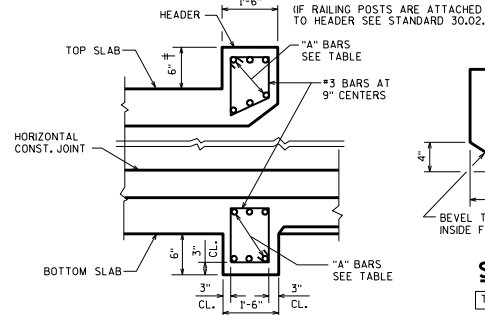


**PLAN**



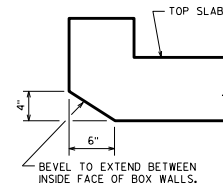
**SECTION C2 FOR SKEW OF 20° AND UNDER**

OUTLET HEADERS SHOWN



**SECTION C2 FOR SKEW OVER 20°**

† IF RAILING POSTS ARE ATTACHED TO HEADER THIS DIMENSION MAY BE INCREASED IF NECESSARY TO KEEP RAILING PARALLEL TO ROADWAY. INCREASE WING HEIGHT IF NECESSARY.

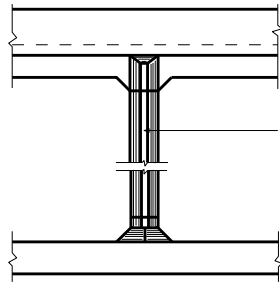


**SECTION C3**

TYPICAL ALL INLETS

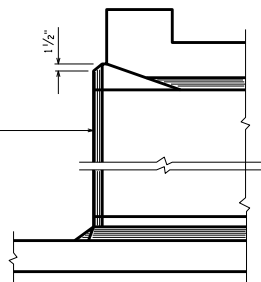
* HEADER LENGTH	"A" BARS
TO 11'-0"	6 - #7
OVER 11'-0" - 14'-0"	6 - #8
OVER 14'-0" - 17'-0"	6 - #9
OVER 17'-0" - 20'-0"	6 - #10

\* HEADER LENGTH EQUALS THE DISTANCE BETWEEN C. OF WALLS IN ONE CELL MEASURED ALONG THE SKEW.

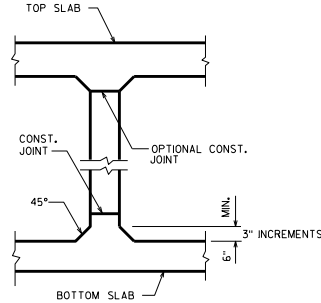


**ELEVATION**

**INLET NOSE CENTERWALL DETAILS**

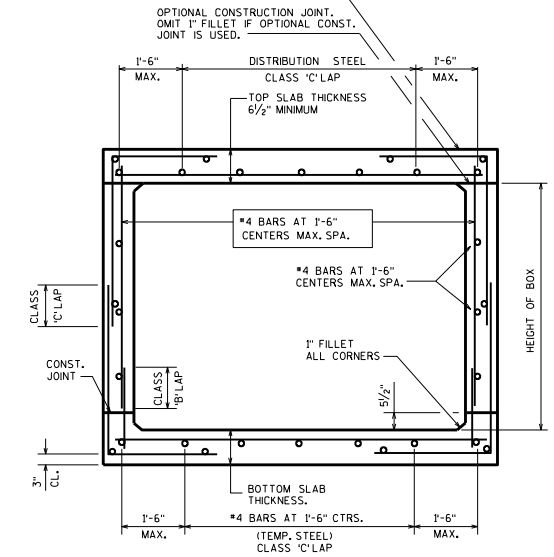


**SECTION C4**



**SECTION C5**

NOTE:  
FOR MULTI-CELL CULVERTS, IN THE TOP OF THE TOP SLAB USE A MINIMUM OF #4 BARS AT 1'-0" IN THE LONGITUDINAL DIRECTION AND A MIN. OF #4 BARS AT 1'-0" IN THE TRANSVERSE DIRECTION WHEN THE TOP SLAB HAS NO FILL PLACED ON IT.



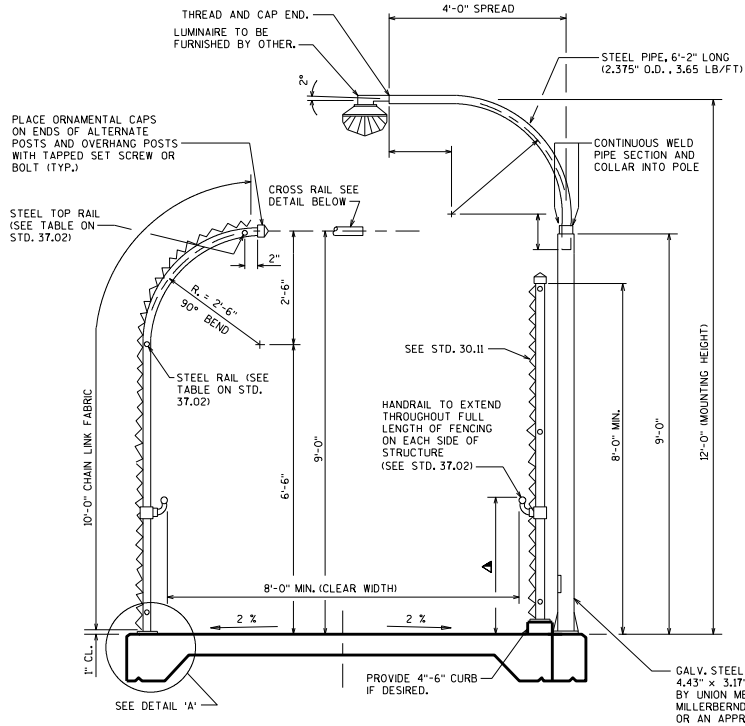
**SECTION THRU BOX**

CONTACT BUREAU OF PROJECT DEVELOPMENT OR THE BUREAU OF STRUCTURES FOR DETAILS OF THE CRASH TESTED GUARD RAIL POST ANCHORAGE SYSTEM.

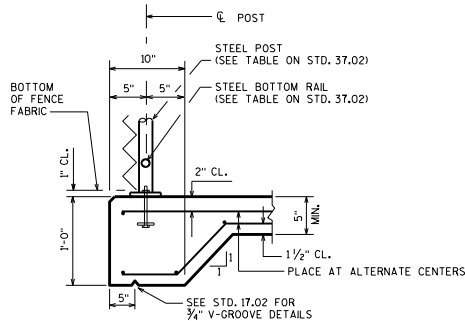
**GUARD RAIL POST ANCHORAGE SYSTEM**

USE FOR POSTS EMBEDDED LESS THAN 4'-0".  
NOT RECD FOR POSTS EMBEDDED 4'-0" OR MORE.

<b>BOX CULVERT DETAILS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13

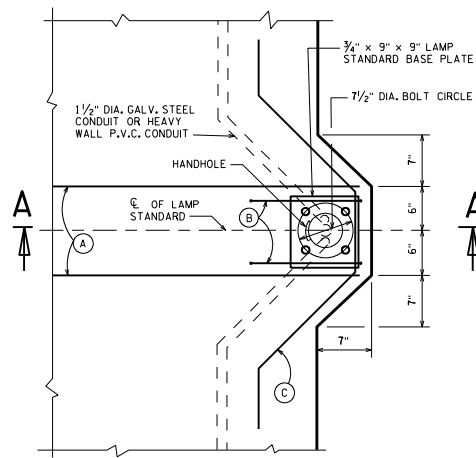


**SECTION THRU PEDESTRIAN STRUCTURE**



**DETAIL 'A'**

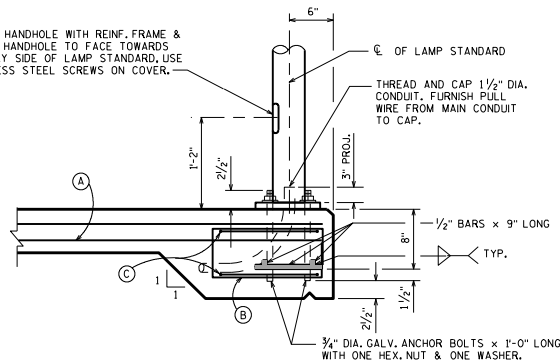
SEE STANDARD 30.11 FOR BASE PLATE, ANCHOR PLATE, SHIM, POST SLEEVE AND ANCHORAGE DETAILS. SEE THIS STANDARD ALSO FOR FENCE FABRIC REQUIREMENTS.



**PLAN AT LAMP STANDARD**

- BAR STEEL REINFORCEMENT AT EACH LAMP STANDARD.
- (A) 4 - #5 BARS 4'-6" LONG
  - (B) 2 - #4 BARS 4'-3" LONG
  - (C) 2 - #4 BARS 5'-9" LONG

2" x 4" HANDHOLE WITH REINF. FRAME & COVER. HANDHOLE TO FACE TOWARDS WALKWAY SIDE OF LAMP STANDARD, USE STAINLESS STEEL SCREWS ON COVER.



**SECTION A-A**

**NOTES**

STEEL RAILS, POSTS, HANDRAILS AND SLEEVES SHALL CONFORM TO ASTM F1083, STANDARD WEIGHT PIPE (SCHEDULE 40).

ALL POSTS, INCLUDING LIGHT POLES, SHALL BE SET VERTICAL. SPACE ALL POSTS OF 9'-0" HIGH FENCE OPPOSITE EACH OTHER TO PERMIT SQUARE PLACEMENT OF CROSS RAILS.

MAXIMUM SPACING FOR CROSS RAILS SHALL BE AT ALTERNATE POSTS. ALL END POSTS SHALL HAVE CROSS RAILS.

HANDRAILS SHALL BE CONTINUOUS EXCEPT AT EXPANSION JOINTS WHERE ENDS SHALL BE CAPPED.

WASHERS, HEX NUTS AND ANCHOR BOLTS FOR LIGHT POLES SHALL BE GALVANIZED AND SHALL BE PAID FOR AT THE UNIT PRICE BID FOR "STRUCTURAL STEEL CARBON".

GALVANIZED STEEL SHIMS OF 1/8" THICKNESS SHALL BE USED UNDER LAMP STANDARD BASE PLATE WHERE REQUIRED FOR ALIGNMENT. CALCUL. AROUND PERIMETER OF THIS PLATE AND FILL PORTION OF SLOTTED HOLE AROUND ANCHOR BOLT IN SHM WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

FOR GALVANIZED CONDUIT PROVIDE GROUNDING LUG IN HANDHOLE. GROUND WIRE FROM LUG TO CONDUIT SHALL BE NUMBER 6 AWG BARE OR WEATHER-PROOF COPPER, SINGLE CONDUCTOR.

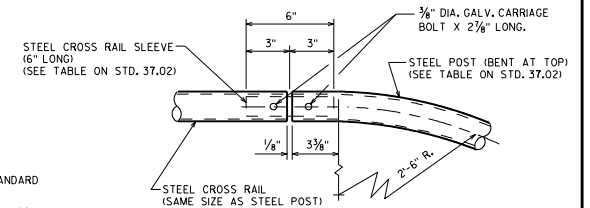
SEE STANDARD 30.11 FOR ADDITIONAL "NOTES".

**DESIGNER NOTES**

▲ TOP OF HANDRAIL GRIPPING SURFACES SHALL BE MOUNTED BETWEEN 30" AND 34" ABOVE WALKING SURFACE. USE 30" NEAR SCHOOL ZONES.

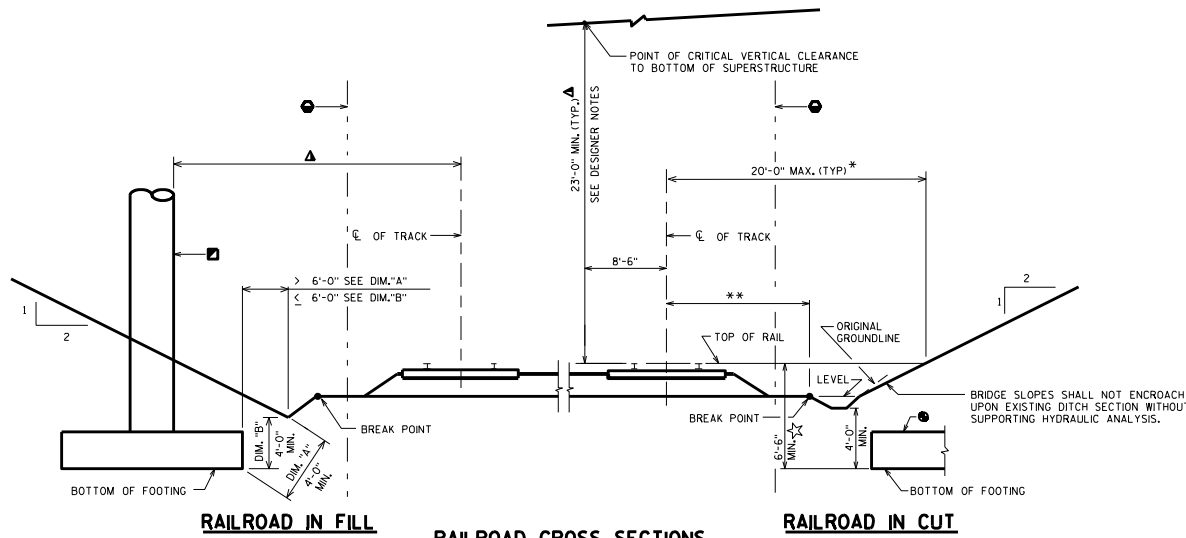
FENCE HEIGHT, CURVED OR STRAIGHT, MESH SIZE, COATING AND COLOR SHOULD BE COORDINATED WITH THE REGION AND ALL OTHER APPLICABLE AGENCIES. SEE BRIDGE MANUAL SECTION 30.3 FOR ADDITIONAL GUIDANCE.

SEE STANDARD 30.11 FOR ADDITIONAL "DESIGNER NOTES".



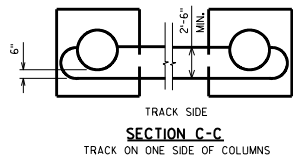
**DETAIL OF CROSS RAIL AT TOP**

<b>PEDESTRIAN OVERPASS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <u>Bill Oliva</u>	DATE: 7-13



**DESIGNER NOTES**

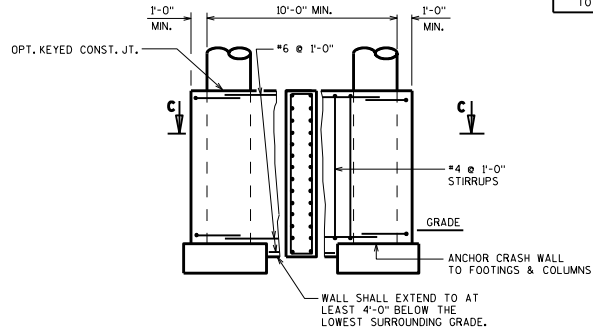
- DIMENSIONS SHOWN APPLY TO CUT OR FILL SITUATIONS.
- DECK DRAINS OR DOWN SPOUTS SHALL NOT DISCHARGE ONTO RAILROAD TRACK BED.
- SINGLE SLOPE PARAPET SHALL BE USED. PEDESTRIAN RAILING WILL ONLY BE PROVIDED IF THERE IS A SIDEWALK. SEE CHAPTER 38 OF THE BRIDGE MANUAL.
- VERTICAL CLEARANCE LESS THAN 23'-0" MAY BE PROVIDED IN SOME SITUATIONS WITH APPROVAL OF THE OFFICE OF THE COMMISSIONER OF RAILROADS. CONSULT WITH CENTRAL OFFICE RAILROAD UNIT. MAXIMUM ALLOWABLE VERTICAL CLEARANCE OF 23'-3/2" IS ALLOWED BY FHWA.
- \*\* VARIABLE DISTANCE WHICH IS FOUND FROM FIELD SURVEY.
- \* SITE SPECIFIC JUSTIFICATION REQUIRED FOR GREATER DISTANCES. LATERAL CLEARANCES SHALL BE ESTABLISHED BASED ON SITE SPECIFIC CONDITIONS AND ECONOMICAL STRUCTURE DESIGN; CONSULT WITH CENTRAL OFFICE RAILROAD UNIT. SEE 23 CODE OF FEDERAL REGULATIONS PT 646, SUBPT. B APPENDIX.
- ▲ FOR OFFSETS UP TO, AND INCLUDING 25'-0", A CRASH WALL OR HAMMERHEAD PIER (30 SQ. FT. MIN. X-SECT) IS REQUIRED. FOR OFFSETS BETWEEN 25'-0" AND 35'-0", A CRASH WALL, HAMMERHEAD PIER OR A SPECIALLY DESIGNED PIER FOR COLLISION (SEE 13.4.10) IS REQUIRED. FOR OFFSETS GREATER THAN 35'-0", THE PIER IS SUFFICIENTLY PROTECTED BY THE EMBANKMENT AND A CRASH WALL IS NOT REQUIRED. IF SLOPE PAVING IS NOT PRESENT, A CRASH WALL, HAMMERHEAD PIER OR SPECIALLY DESIGNED PIER FOR COLLISION (SEE 13.4.10) IS REQUIRED FOR OFFSETS BETWEEN 35'-0" AND 50'-0".
- ▲ ACCOMODATION FOR ADDITIONAL TRACKS REQUIRES DEPARTMENT APPROVAL. CONFER WITH RAILROAD PROJECT COORDINATION ENGINEER IN CENTRAL OFFICE RAILROADS AND HARBORS SECTION AT (608) 266-0233.
- ▲ HORIZONTAL CLEARANCES LESS THAN 18'-0" AND VERTICAL CLEARANCES LESS THAN 23'-0" SHOULD BE REVIEWED WITH THE RAILROAD PROJECT COORDINATION ENGINEER IN THE CENTRAL OFFICE RAILROADS AND HARBORS SECTION.
- TEMPORARY CONSTRUCTION CLEARANCES ARE 21'-0" VERTICAL (21'-6" FOR BNSF AND UP RAILROADS) AND 12'-0" HORIZONTAL FROM CENTERLINE OF TRACK TO FALSEWORK.
- DESIGNER SHALL SHOW HORIZONTAL LOCATION OF SHORING NEEDED IN PLAN VIEW. DESIGNER SHALL ALSO DETERMINE IF THE SHORING IS TO BE DESIGNED FOR ZONE A, B OR C.
- ☆ 6'-6" MIN. NOT REQ'D IF BEDROCK IS PRESENT.
- THIS STANDARD IS TO MEET WISDOT REQUIREMENTS ONLY. THE DESIGN ENGINEER SHALL CONTACT THE RAILROAD FOR THEIR REQUIREMENTS.
- 1 BNSF AND UP RAILROADS HAVE GREATER REQUIREMENTS THAN SHOWN. CONFER WITH RAILROAD PROJECT COORDINATION ENGINEER IN CENTRAL OFFICE RAILROADS AND HARBORS SECTION.
- 2 BNSF AND UP RAILROAD REQUIRE A DEPTH OF FOOTING 6'-0" MIN. FROM BASE OF RAIL TO TOP OF FOOTING, IN LOCATIONS WHERE BEDROCK IS PRESENT. COORDINATE FOOTING DEPTHS WITH RAILROAD PROJECT COORDINATION ENGINEER.
- 3 LIMITS OF RAILROAD RIGHT-OF-WAY. LOCATIONS SHOWN ARE FOR REFERENCE ONLY AND NEED NOT BE DIMENSIONED.
- 4 AESTHETICS SHALL NOT BE EMPLOYED ALONG RAILROAD TRACKS.



**SECTION C-C**  
TRACK ON ONE SIDE OF COLUMNS

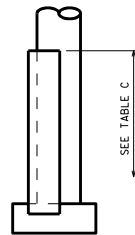
**TABLE C**

PIER LOCATION	HEIGHT OF CRASH WALL ABOVE TOP OF RAIL
PIERS ≤ 12'-0" FROM CL TRACK	12'-0"
PIERS 12'-0" TO 50'-0"	6'-0"

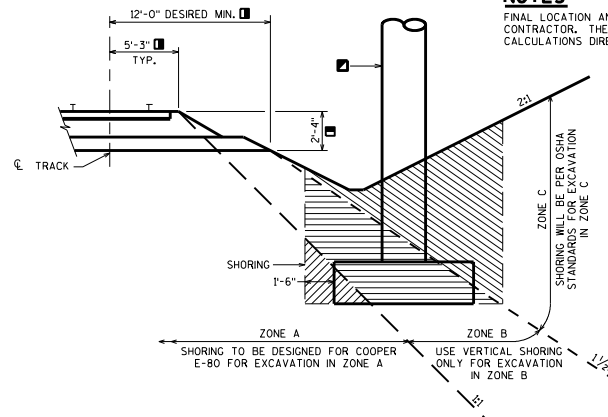


**ELEVATION**

**CRASH WALL DETAILS**



**END VIEW**



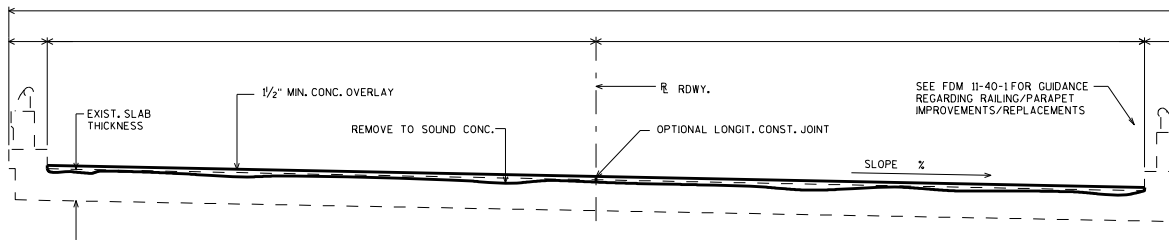
**LIMITS BEFORE SHORING REQUIRED**

**NOTES**

FINAL LOCATION AND TYPE OF SHORING SYSTEM TO BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL SUBMIT ALL DESIGN DRAWINGS AND CALCULATIONS DIRECTLY TO THE RAILROAD.

- ZONE A SHORING
- ZONE B SHORING
- ZONE C SHORING

<b>HIGHWAY OVER RAILROAD DESIGN REQUIREMENTS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <u>Bill Oliva</u>	DATE: 7-13



**GENERAL NOTES**

DRAWINGS SHALL NOT BE SCALED.  
DIMENSIONS SHOWN ARE BASED ON THE ORIGINAL STRUCTURE PLANS.

UNDER THE BID ITEM "MASONRY ANCHORS TYPE S  $\frac{1}{2}$ -INCH", ANCHORED REINFORCING STEEL SHALL BE PAID FOR SEPARATELY AS PROVIDED IN SECTION 505 OF THE STANDARD SPECIFICATIONS FOR BAR STEEL REINFORCEMENT.

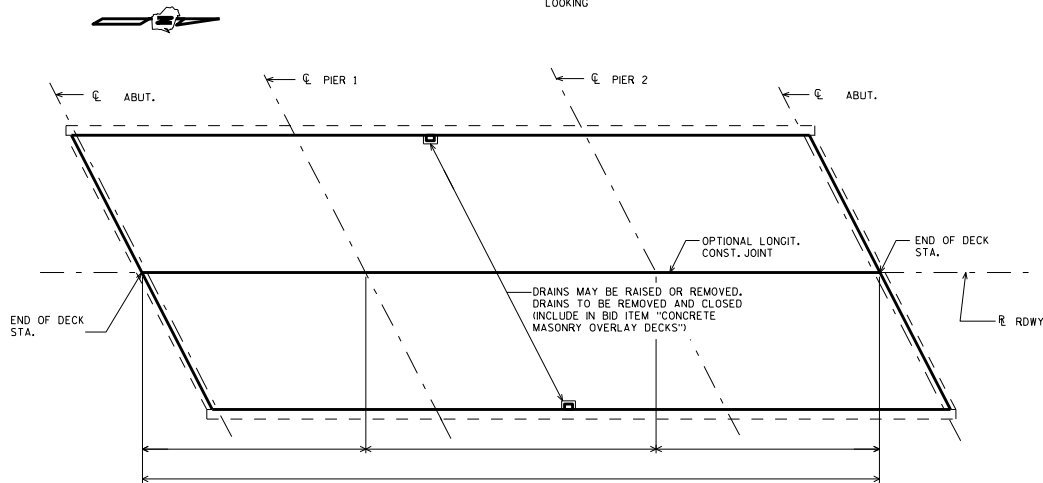
**DESIGN DATA**

LIVE LOAD: \_\_\_\_\_  
INVENTORY RATING; HS- \_\_\_\_\_  
OPERATIONAL RATING; HS- \_\_\_\_\_  
MAXIMUM STANDARD PERMIT VEHICLE LOAD = ... Kips

ULTIMATE DESIGN STRESSES: \_\_\_\_\_  
CONCRETE MASONRY OVERLAY DECKS  $f'c = 4,000$  P.S.I.

**CROSS SECT. THRU RDWY.**

LOOKING



**PLAN**

**NOTE:**

PROFILE GRADE LINE SHALL BE DETERMINED BASED ON A MINIMUM OVERLAY THICKNESS OF  $\frac{1}{2}$ " PLACED ABOVE THE DECK SURFACE AFTER CLEANING. EXPECTED AVERAGE OVERLAY THICKNESS IS 2" (OR AS GIVEN BY THE DESIGN ENGINEER). IF EXPECTED AVERAGE OVERLAY THICKNESS IS EXCEEDED BY MORE THAN  $\frac{1}{2}$ ", CONTACT THE STRUCTURES DESIGN SECTION.

A MIN. OF 1 INCH OF CONCRETE SHALL BE REMOVED FROM THE ENTIRE BRIDGE DECK UNDER THE BID ITEM "CLEANING DECKS".

TOP OF EXISTING DECK ELEVATIONS SHALL BE DETERMINED FROM A FIELD SURVEY AT LOCATIONS DEEMED NECESSARY FOR ESTABLISHING OVERLAY THICKNESS FOR ACCURATE RATINGS AND POINT OF MINIMUM THICKNESS.

FOR CROSS SECTIONS NOT IN SUPERELEVATION TRANSITIONS THE PREFERRED MINIMUM SLOPE IS 2%.

ANY EXCAVATION REQ'D. TO COMPLETE THE OVERLAY OR THE PAVING BLOCK AT ABUTTS. IS INCIDENTAL TO THE BID ITEM, "CONCRETE MASONRY OVERLAY DECKS".

**TOTAL ESTIMATED QUANTITIES**

BID ITEM NUMBER	BID ITEMS	UNIT	TOTAL
509.0301	PREPARATION DECKS TYPE 1	SY	
509.0302	PREPARATION DECKS TYPE 2	SY	
509.0500	CLEANING DECKS	SY	
509.1000	JOINT REPAIR	SY	
509.1200	CURB REPAIR	LF	
509.1500	CONCRETE SURFACE REPAIR	SF	
509.2000	FULL-DEPTH DECK REPAIR	SY	
509.2500	CONCRETE MASONRY OVERLAY DECKS	CY	
POSSIBLE ADDITIONAL BID ITEMS			
502.3100	EXPANSION DEVICE B-1	LS	
502.50	MASONRY ANCHORS TYPE L NO. 1 BARS	EACH	
502.61	MASONRY ANCHORS TYPE S $\frac{1}{2}$ -INCH	EACH	
505.0605	BAR STEEL REINFORCEMENT HS COATED BRIDGES	LB	
509.9005.S	REMOVING CONCRETE MASONRY DECK OVERLAY	SY	
509.9020.S	EPOXY CRACK SEALING	LF	
514.0900	ADJUSTING FLOOR DRAINS	EACH	
SPV.0090	SAWING PAVEMENT DECK PREPARATION AREAS	LF	
SPV.0180	DECK GRINDING	SY	

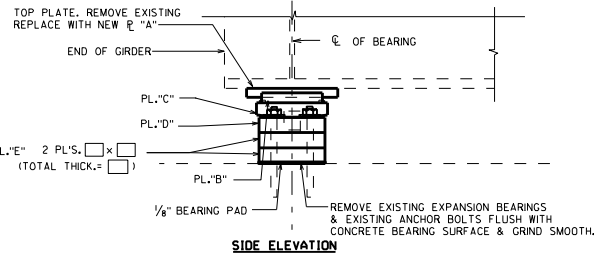
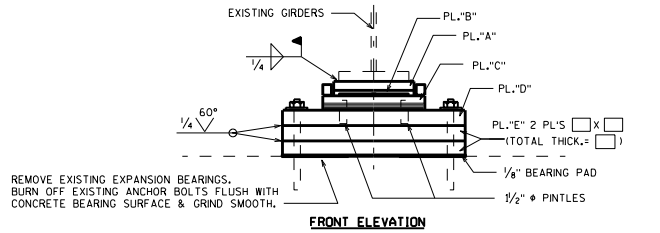
THIS IS A PARTIAL LIST OF POSSIBLE BID ITEMS. BID ITEMS MAY NEED TO BE ADDED OR REMOVED TO FIT EACH INDIVIDUAL CASE.

**CONCRETE OVERLAY**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

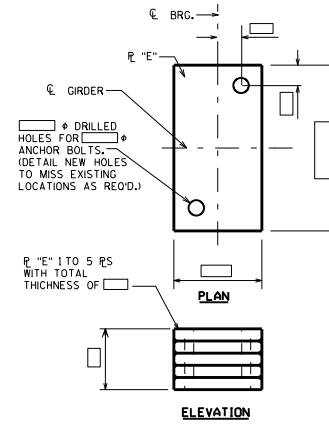
APPROVED: Bill Oliva

DATE:  
7-13



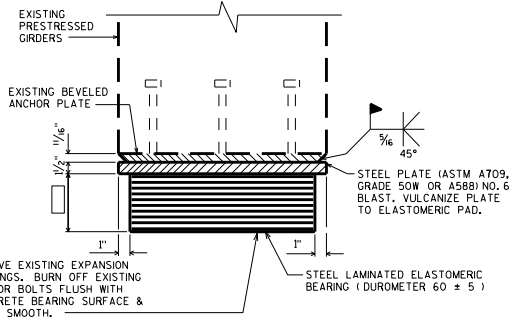
**EXPANSION BEARING REPLACEMENT - STEEL GIRDERS**  
**STEEL BEARINGS**

SEE STANDARD 27.08 FOR BEARING DETAILS

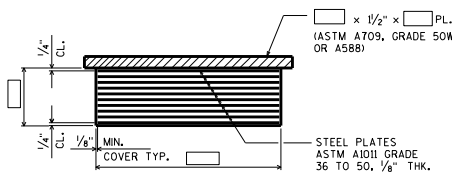


**PLATE 'E' DETAILS**

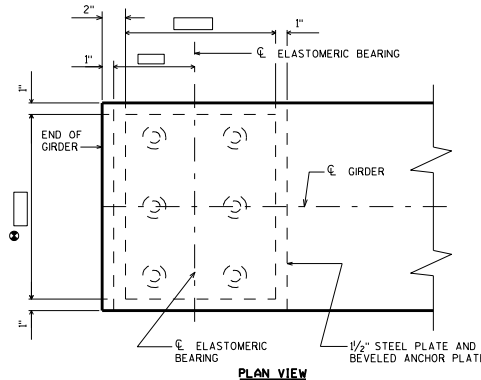
(SEE STD. 40.10 FOR CONCRETE BLOCK ALTERNATE)



**FRONT ELEVATION**



**SECTION THRU ELASTOMERIC BEARING**

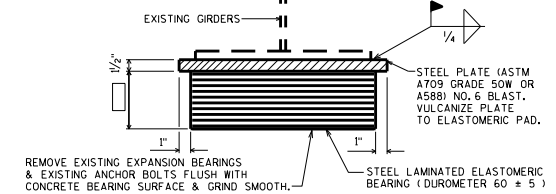


**PLAN VIEW**

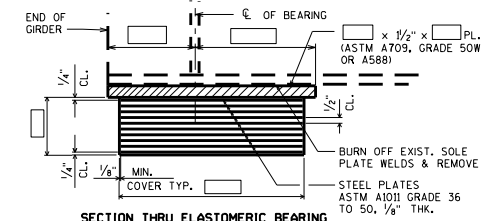
**NOTE:**  
 SEE STANDARD 27.07 FOR ADDITIONAL INFORMATION.  
 DUE TO HEIGHT RESTRICTIONS, STEEL PLATE MAY BE OMITTED AND ELASTOMER EPOXIED TO GIRDER. EPOXY TO BE SUPPLIED BY BEARING MANUFACTURER.  
 ALL MATERIAL USED FOR BEARINGS SHALL BE PAID AT THE UNIT PRICE BID FOR "BEARING PADS ELASTOMERIC LAMINATED."  
 GRIND EXIST. WELD THAT ATTACHED EXIST. TOP PLATE TO EXIST. BOT. FLANGE. GRIND AFFECTED AREAS SMOOTH.

**DESIGNER NOTES**  
 THE STEEL TOP PLATE THICKNESS MAY BE REDUCED TO MATCH THE OVERALL EXISTING BEARING HEIGHT. WHEN THE THICKNESS IS REDUCED, THE FOLLOWING NOTE SHALL BE LOCATED ON THE PLANS:  
 "WELDING PROCEDURES SHALL BE ESTABLISHED BY THE CONTRACTOR TO RESTRICT THE MAXIMUM TEMPERATURE REACHED BY SURFACES IN CONTACT WITH ELASTOMER TO 200°F (93°C). TEMPERATURES SHALL BE CONTROLLED BY TEMPERATURE INDICATING WAX PENCILS OR OTHER SUITABLE MEANS APPROVED BY THE ENGINEER."

**EXPANSION BEARING REPLACEMENT - PRESTRESSED GIRDERS**  
**ELASTOMERIC BEARINGS**



**FRONT ELEVATION**



**SECTION THRU ELASTOMERIC BEARING**

**EXPANSION BEARING REPLACEMENT - STEEL GIRDERS**  
**ELASTOMERIC BEARINGS**

**NOTE:**  
 SEE STANDARD 27.07 FOR ADDITIONAL INFORMATION.

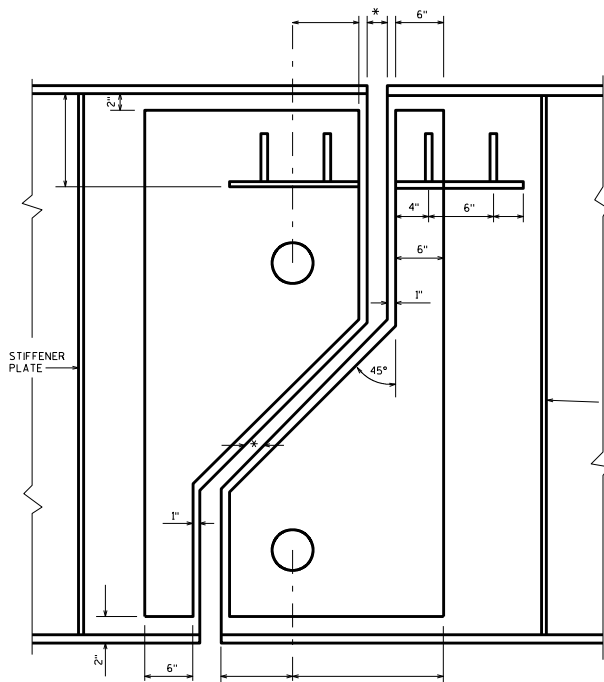
**DESIGNER NOTES**  
 THE STEEL TOP PLATE THICKNESS MAY BE REDUCED TO MATCH THE OVERALL EXISTING BEARING HEIGHT. WHEN THE THICKNESS IS REDUCED, THE FOLLOWING NOTE SHALL BE LOCATED ON THE PLANS:  
 "WELDING PROCEDURES SHALL BE ESTABLISHED BY THE CONTRACTOR TO RESTRICT THE MAXIMUM TEMPERATURE REACHED BY SURFACES IN CONTACT WITH ELASTOMER TO 200°F (93°C). TEMPERATURES SHALL BE CONTROLLED BY TEMPERATURE INDICATING WAX PENCILS OR OTHER SUITABLE MEANS APPROVED BY THE ENGINEER."

**EXPANSION BEARING REPLACEMENT DETAILS**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

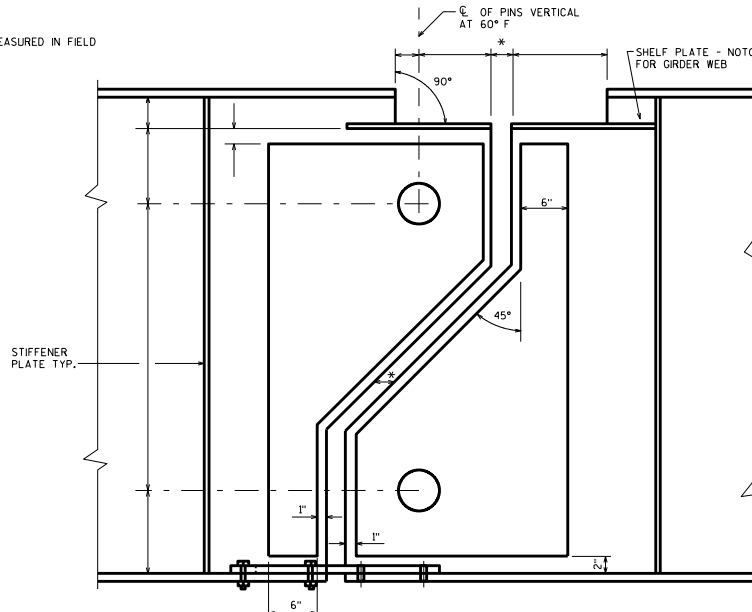
DATE:  
 7-13



**TYPICAL HINGE DETAIL FOR WATERTIGHT EXPANSION DEVICE**

NOTE:  
DETAILS NOT SHOWN ARE IDENTICAL TO DETAILS SHOWN  
FOR "FINGER TYPE EXPANSION DEVICE".

\* OPENING TO BE MEASURED IN FIELD



**TYPICAL HINGE DETAIL FOR FINGER TYPE EXPANSION DEVICE**

(HANGER PLATES NOT SHOWN)

**NOTES**

INSIDE HOLES OF HANGER PLATES SHALL BE COATED WITH "BLOXIDE" OR AN APPROVED EQUAL AFTER FINISHING. THE BUSHINGS SHALL HAVE A PRESS FIT INTO HANGER PLATES. THE INSIDE DIAMETER OF THE BUSHING SHALL PROVIDE A CLEARANCE OF 0.005" MINIMUM AND 0.010" MAXIMUM OVER THE FINISHED DIAMETER OF THE PIN. NOTE THAT THE HOLE DIAMETER SHALL BE SMALLER THAN THE BUSHING O.D. BY AT LEAST 0.001" FINISH ANSI 125.

REMOVE EXISTING HANGER PLATES, PINS, AND WIND TRANSFER PLATES AND REPLACE WITH NEW MATERIALS.

BID ITEM SHALL BE "HINGE REPLACEMENT", EACH. ALL MATERIAL AND WORK INVOLVED SHALL BE PAID FOR UNDER "HINGE REPLACEMENT".

NEW PINS SHALL MATCH THE DIAMETER OF THE EXISTING PINS. CONTRACTOR TO CONTACT ENGINEER IF CORROSION AT EXISTING PIN IS PRESENT.

BLAST CLEAN GIRDER WEB AND FLANGES WITHIN 2'-0" OF C OF HINGE IN ACCORDANCE WITH THE STEEL STRUCTURES PAINTING COUNCIL'S SPECIFICATION SSPC-SP6. PAINT AREA CLEANED WITH ORGANIC ZINC RICH PAINT SYSTEM.

HANGER PLATES AND WIND TRANSFER PLATES SHALL BE SHOP PAINTED.

BUSHINGS SHALL BE THE SAME LENGTH AS THE HANGER PLATE THICKNESS.

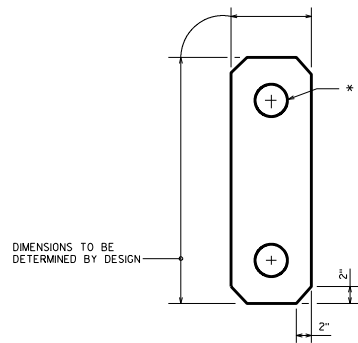
NON-METALLIC WASHERS SHALL HAVE AN INSIDE DIAMETER OF BETWEEN 0.005" AND 0.010" LARGER THAN THE PIN DIAMETER.

STEEL FOR PINS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 6.4.2 AND ASTM A276. PINS TO BE FINISHED ANSI 63.

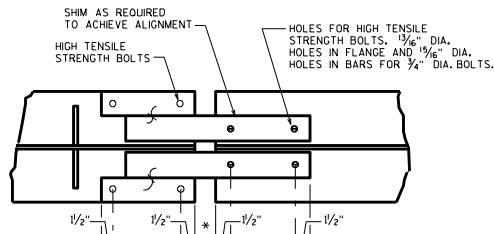
☑ BUSHINGS SHALL BE GAR-MAX AS MANUFACTURED BY GARLOCK BEARINGS, INC. OR DURALON JOURNAL BEARINGS AS MANUFACTURED BY REYNOLD BEARING DIVISION, OR APPROVED EQUAL. BUSHINGS SHALL HAVE A NOMINAL WALL THICKNESS OF 1/4".

⚠ NON-METALLIC WASHERS REQUIRED FOR USE AS SPACERS BETWEEN THE PIN PLATES AND THE HANGER PLATES AND THE HANGER PLATES AND NUTS SHALL BE MADE FROM ONE OF THE FOLLOWING MATERIALS:

1. PHENOLIC, CANVAS REINFORCED, MIL-P-15035
2. POLYETHYLENE, HIGH DENSITY, BLACK ASTM D 1248, TYPE III, CLASS B
3. ACETAL, FEDERAL SPECIFICATION L-P-392
4. TEFLON TFE, MIL-P-22241A

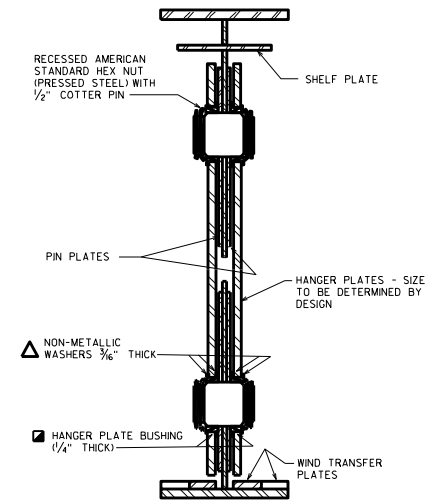


**HANGER PLATE DETAIL**



**TYPICAL WIND TRANSFER PLATES DETAIL**

CONTACT AREA OF WIND TRANSFER PLATES TO BE FINISHED ANSI 125.



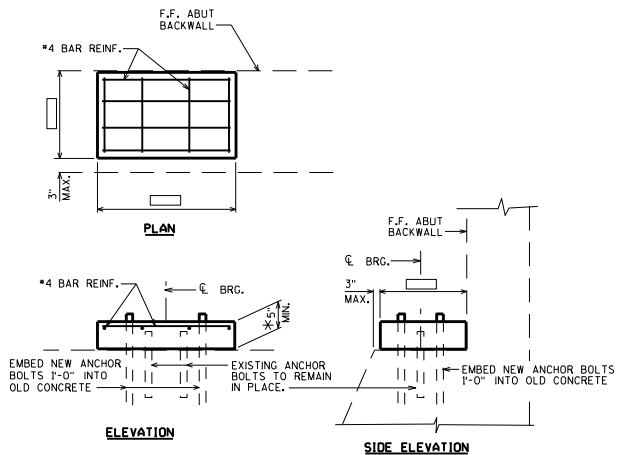
**SECTION THRU HINGE**

**HINGED JOINT REHABILITATION**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

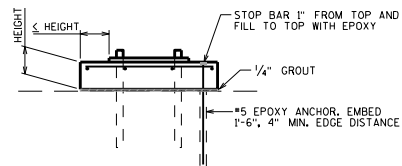
APPROVED: *Bill Oliva*

DATE:  
7-13



### CONCRETE BEARING BLOCK DETAILS

(MAY BE USED IN LIEU OF PLATE 'E' AS SHOWN ON STD. 40.08)



### PRECAST CONCRETE BLOCK DETAIL

DEPTH = MIN. 5", MAX. 1'-0" \*

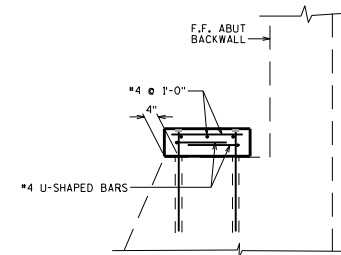
ANCHOR IN AT LEAST 4 LOCATIONS (ANCHORS INCLUDE EPOXY ANCHORS, ANCHOR BOLTS OR COMBINATION).

GROUT 1/4" BENEATH PRECAST ELEMENT - ELIMINATE STRESS CONCENTRATION AND REDUCE CRACKING.

PRECAST BLOCK (OR ANY CONCRETE BLOCK) MUST EXTEND BEYOND BEARING A DISTANCE EQUAL TO, OR GREATER THAN, THE HEIGHT OF THE CONCRETE BLOCK \*. THIS IS TO ACCOUNT FOR 45-DEGREE DOWNWARD AND OUTWARD STRESS DISTRIBUTION. THIS PROVISION CAN BE DISREGARDED IF A FULL-DEPTH CONCRETE DIAPHRAGM IS USED IN CONJUNCTION WITH A 1/2" THICK ELASTOMERIC PAD (FIXED SEAT).

REINFORCEMENT SHOULD BE IN BOTH DIRECTIONS UTILIZING #4 @ 1'-0" MAXIMUM SPACING.

BURN EXISTING ANCHOR BOLTS OFF FLUSH WITH BEAM SEAT.



### \* ALTERNATE DETAIL

TO BE USED FOR CASES WHERE HEIGHT EXCEEDS 1'-0" OR INSUFFICIENT EDGE DISTANCE (PRECAST OPTION SHOWN)

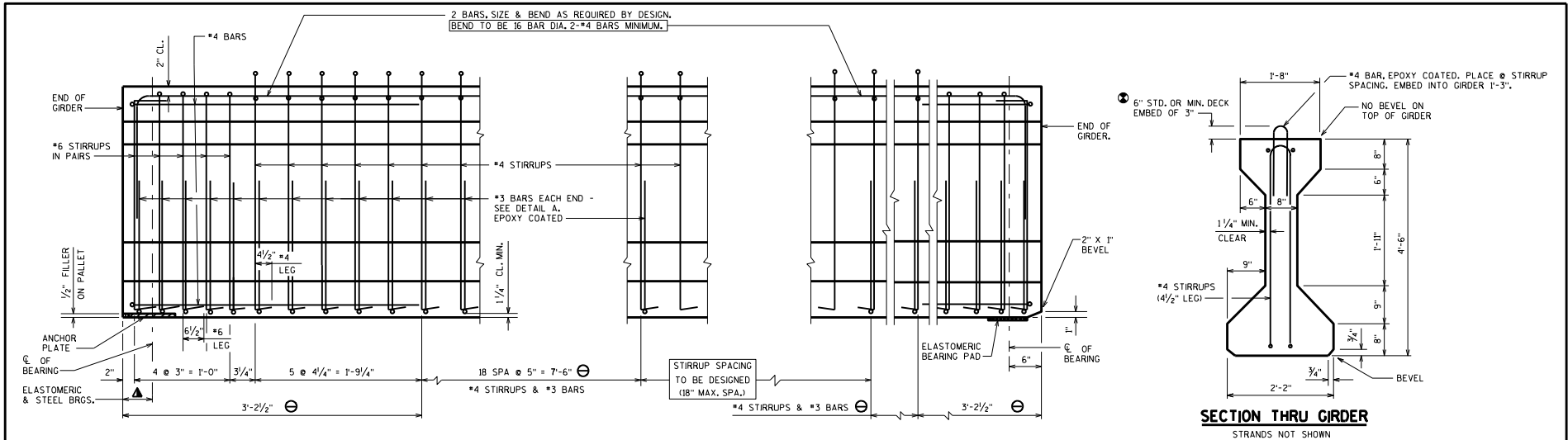
### CONCRETE BEARING BLOCK DETAILS

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

DATE:  
7-13



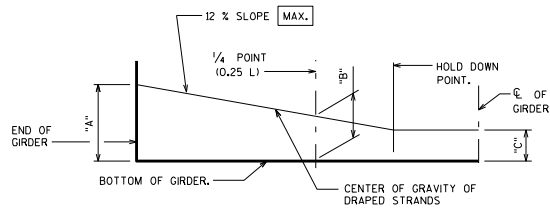


**SUPPORT WITH STEEL OR ELASTOMERIC BRGS.**

**SIDE VIEW OF GIRDER**

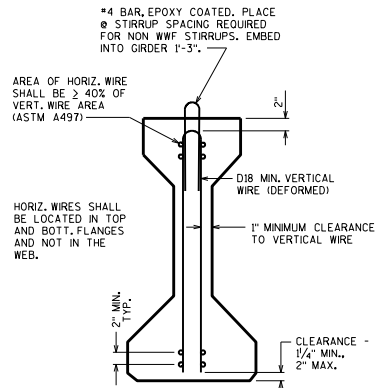
**SUPPORT WITH 1/2\"/>**

**SECTION THRU GIRDER**  
STRANDS NOT SHOWN



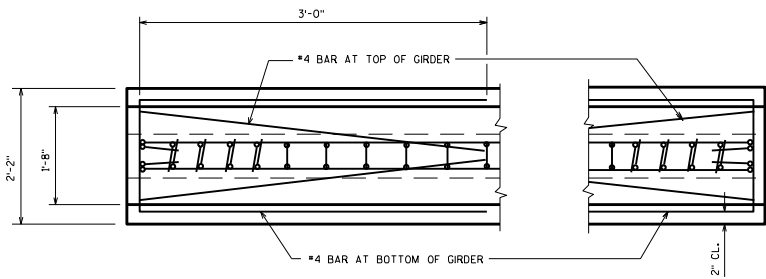
"A" TO BE GIVEN TO THE NEAREST 1"  
 "B" = 1/4("A" + 3 "C") MIN.  
 "B" = 1/4("A" + 3 "C") + 3" MAX.  
 RECORD DIMENSIONS "A", "B" & "C" ON FINAL PLANS.

**LOCATION OF DRAPED STRANDS**

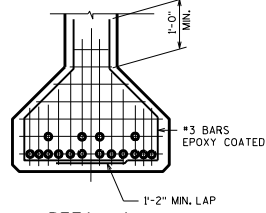


**SECTION THRU GIRDER**

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS  
 ASTM A497 (F<sub>y</sub> = 70 KSI)



**PLAN VIEW**



**DETAIL A**

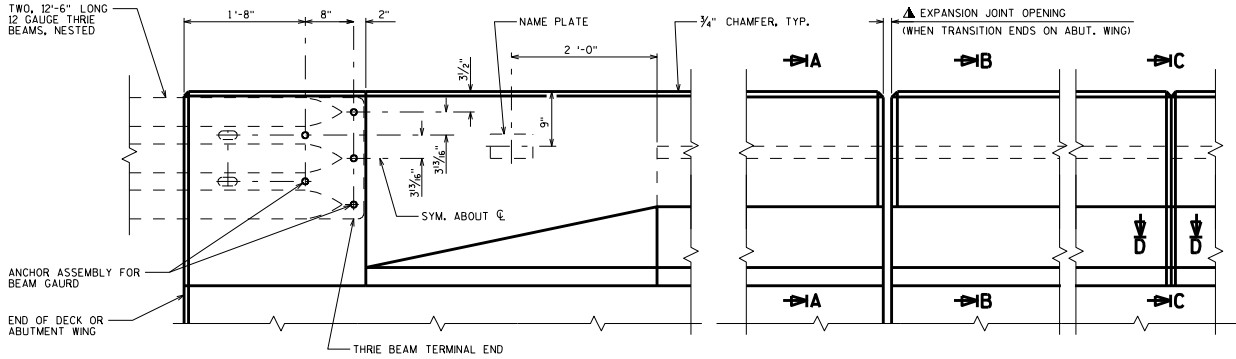
**DESIGNER NOTES**

- ▲ BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 54-INCH.
- SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE 0.5" DIA. OR 0.6" DIA. STRANDS FOR ALL PATTERNS AS REQUIRED. THE MAX. NUMBER OF DRAPED 0.5" DIA. STRANDS IS 12 AND THE MAX. NUMBER FOR 0.6" DIA. STRANDS IS 10.
- REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 40.14 AND THE SPAN LENGTHS SHOWN IN TABLE 40.7-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.
- ▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)
- DETAIL TYPICAL AT EACH END
- THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR ± 3/4" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

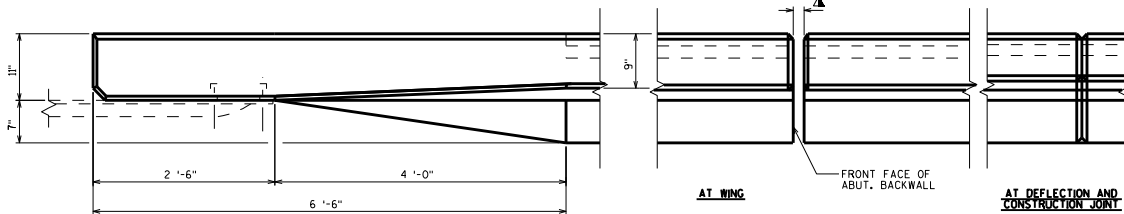
**NOTES**

- TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.
- DO NOT APPLY CONCRETE SEALER TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.
- THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.
- STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.
- ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.
- SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.
- AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.
- PRESTRESSING STRANDS SHALL BE ( ) DIA., 7-WIRE LOW RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

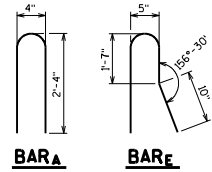
<b>54" PRESTRESSED GIRDER DETAILS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



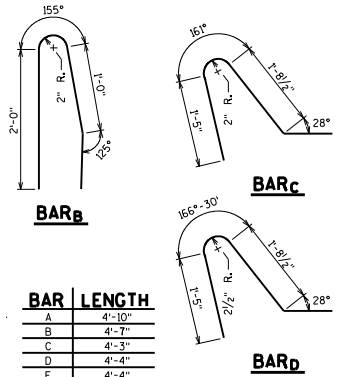
**ELEVATION OF PARAPET**



**PART PLAN ON PARAPET**

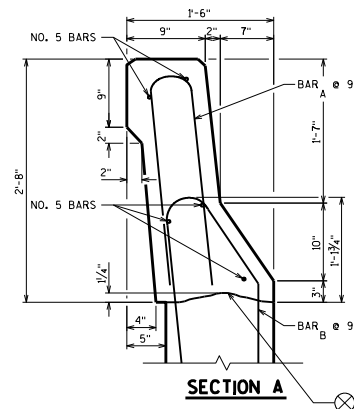


**BAR A**      **BAR F**

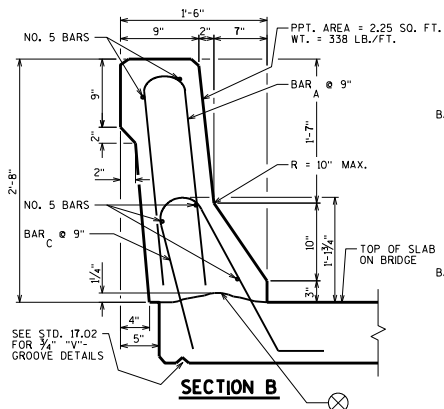


BAR	LENGTH
A	4'-10"
B	4'-7"
C	4'-3"
D	4'-4"
E	4'-4"

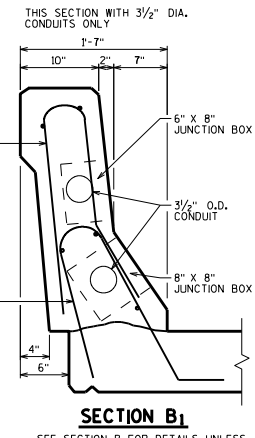
**BAR D**



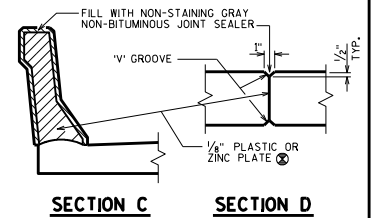
**SECTION A**



**SECTION B**



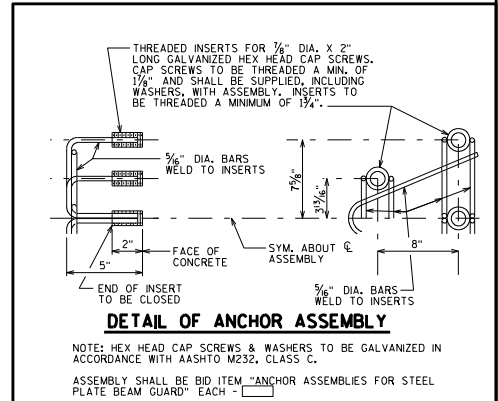
**SECTION B1**



**SECTION C**

**SECTION D**

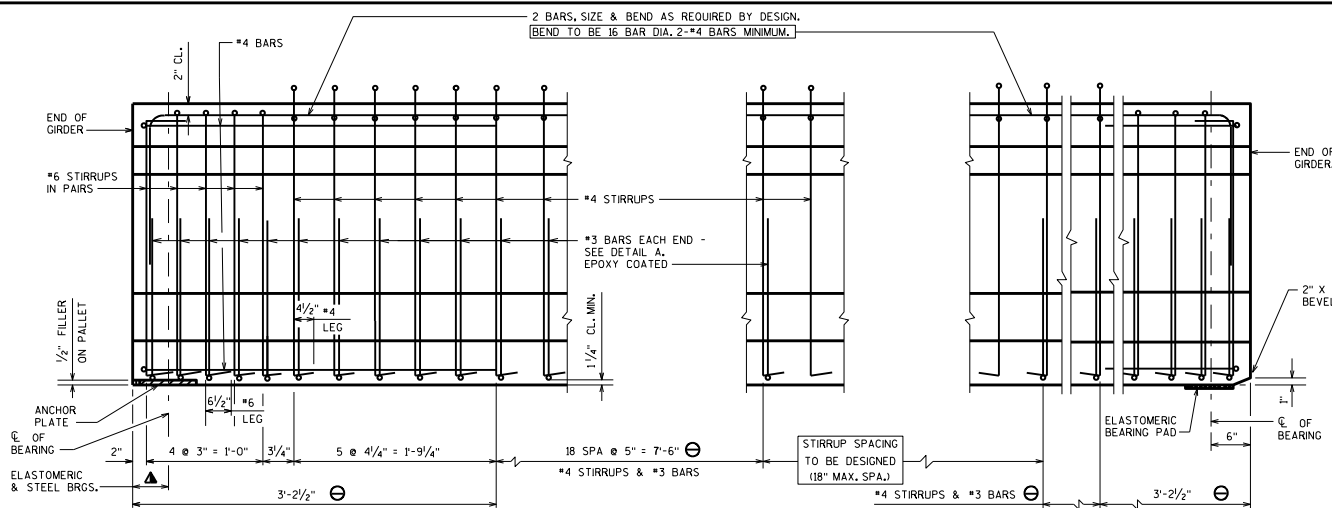
- NOTES**
- ALL SLOPED FACE PARAPET "B" REINFORCEMENT ARE NO. 4 BARS UNLESS OTHERWISE SHOWN.
  - PLATE REQUIRED WHEN DEFLECTION JOINTS ARE REQUIRED. IF CONSTRUCTION JOINTS IN PARAPETS ARE USED, PLATE SEPARATORS SHALL BE OMITTED. DEFLECTION JOINTS ARE REQUIRED ON SLAB SPAN STRUCTURES ONLY.
  - OPTIONAL CONSTRUCTION JOINTS IN THE PARAPETS MAY BE USED. RUN BAR REINFORCEMENT THRU THE JOINT. LAP LONGIT. BARS A MIN. OF 2'-11" MIN. JOINT SPACING OF 80'-0". DEFINE CONST. JOINT WITH A 1" V' GROOVE.
  - CONST. JOINT - STRIKE OFF AS SHOWN & FINISH WITH A WOODEN TROWEL.



**DETAIL OF ANCHOR ASSEMBLY**

NOTE: HEX HEAD CAP SCREWS & WASHERS TO BE GALVANIZED IN ACCORDANCE WITH AASHTO M232, CLASS C.  
ASSEMBLY SHALL BE BID ITEM "ANCHOR ASSEMBLIES FOR STEEL PLATE BEAM GUARD" EACH -

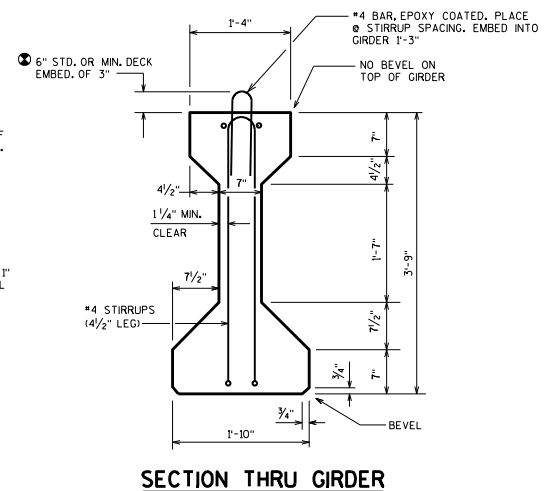
<b>SLOPED FACE PARAPET 'B'</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13



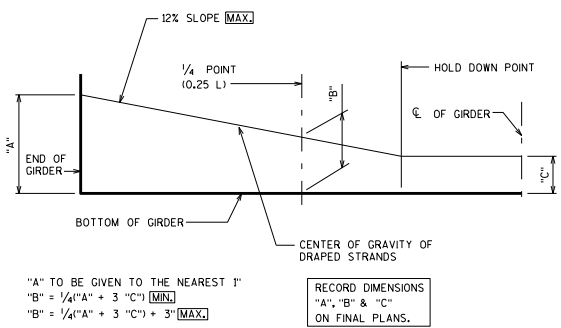
**SUPPORT WITH STEEL OR ELASTOMERIC BRGS.**

**SIDE VIEW OF GIRDER**

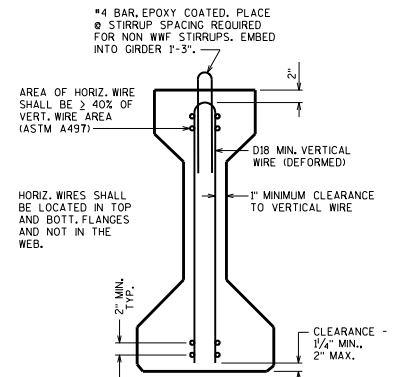
**SUPPORT WITH 1/2" ELASTOMERIC BRG. PAD**



**SECTION THRU GIRDER**

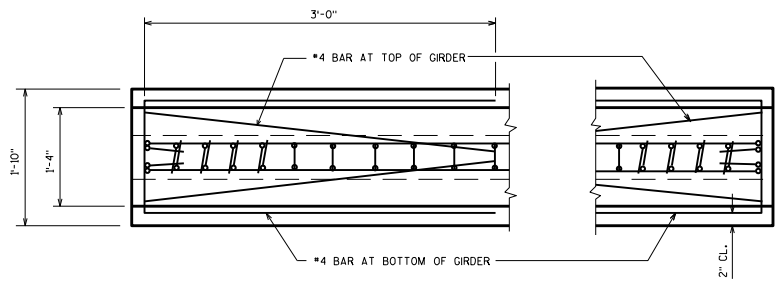


**LOCATION OF DRAPED STRANDS**

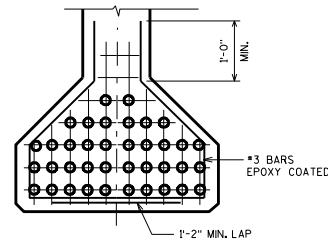


**SECTION THRU GIRDER**

SHOWING WELDED WIRE FABRIC (WWF) STIRRUPS ASTM A497 (FY = 70 KSI)



**PLAN VIEW**



**DETAIL A**

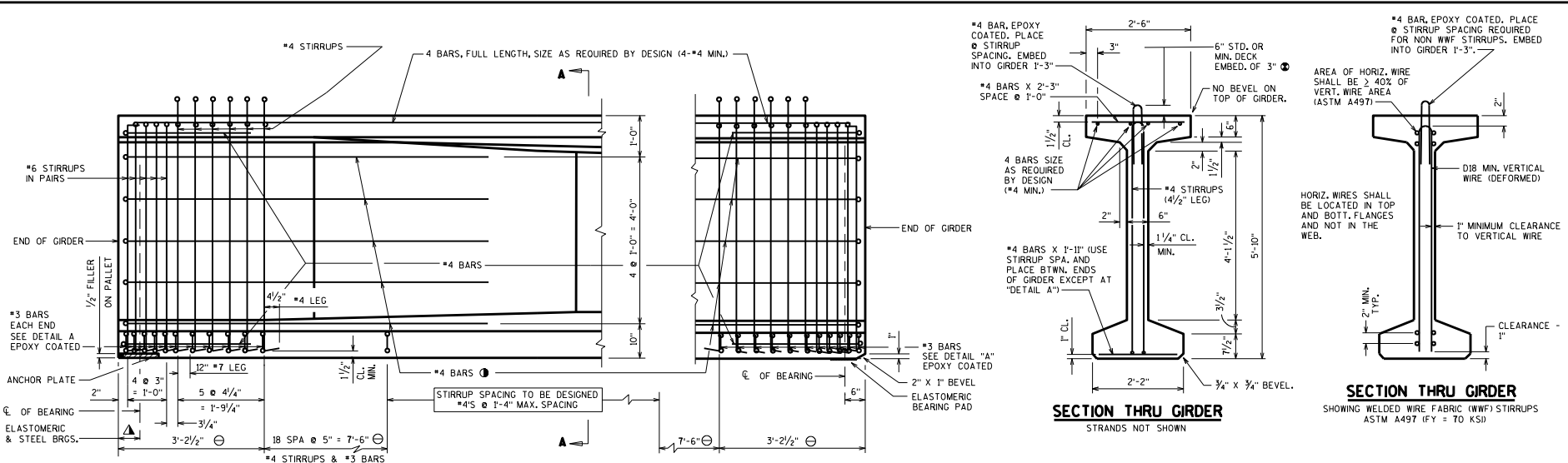
**DESIGNER NOTES**

- BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 45-INCH.
- SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE 0.5" OR 0.6" DIA. STRANDS FOR THE DRAPED PATTERN AS REQUIRED. THE MAX. NUMBER OF DRAPED 0.5" DIA. STRANDS IS 10 AND THE MAX. NUMBER FOR 0.6" DIA. STRANDS IS 8. FOR THE STRAIGHT PATTERN USE ONLY 0.6" DIA. STRANDS.
- REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 40.18 AND THE SPAN LENGTHS SHOWN IN TABLE 40.7-L. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.
- VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)
- DETAIL TYPICAL AT EACH END
- THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2 1/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR 3/4" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

**NOTES**

- TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.
- DO NOT APPLY CONCRETE SEALER TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.
- THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.
- STRANDS SHALL BE FLUSH WITH END OF GIRDER, FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.
- ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.
- SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.
- AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.
- PRESTRESSING STRANDS SHALL BE ( DIA.)-7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

<b>45" PRESTRESSED GIRDER DETAILS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <u>Bill Oliva</u>	DATE: 7-13



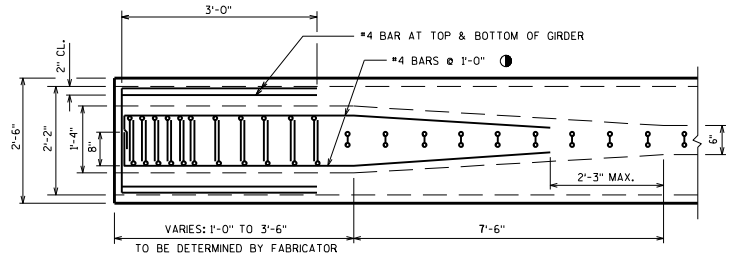
**SUPPORT WITH STEEL OR ELASTOMERIC BRGS.**

**SUPPORT WITH 1/2" ELASTOMERIC BEARING PAD**

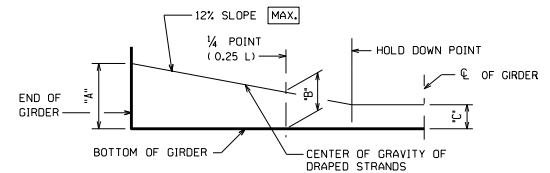
**SECTION THRU GIRDER**

**SECTION THRU GIRDER**

**SIDE VIEW OF GIRDER**



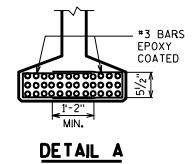
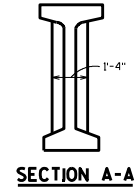
**PLAN VIEW**



"A" TO BE GIVEN TO THE NEAREST 1"  
 "B" = 1/4("A" + 3 "C") [MIN.]  
 "B" = 1/4("A" + 3 "C") + 3" [MAX.]

RECORD DIMENSIONS "A", "B" & "C" ON FINAL PLANS.

**LOCATION OF DRAPED STRANDS**



**DESIGNER NOTES**

- ▲ BID ITEM SHALL BE "PRESTRESSED GIRDER TYPE I 70-INCH. SHOW ONLY ONE STRAND SIZE ON THE PLANS.
- GIRDER LENGTHS IN EXCESS OF 140 FEET MAY BE CONTROLLED BY TRANSPORTATION LIMITATIONS AND REQUIRE APPROVAL BY THE PRESTRESS GIRDER MANUFACTURERS AND CONCURRENCE BY THE STRUCTURES DEVELOPMENT SECTION.
- SPECIFY CONCRETE STRENGTH AS REQUIRED BY DESIGN FROM A MINIMUM OF 6,000 PSI TO A MAX. OF 8,000 PSI. MAXIMUM RELEASE STRENGTH IS 6800 PSI. USE 0.5" OR 0.6" DIA. STRANDS FOR ALL PATTERNS AS REQUIRED. USE ONLY ONE STRAND SIZE IN EACH PATTERN. THE MAX. NUMBER OF DRAPED 0.6" DIA. STRANDS IS 8.
- REINFORCEMENT IN STANDARD END SECTION OF THE GIRDER IS BASED ON THE STANDARD STRAND PATTERNS LISTED ON STANDARD 40.20 AND THE SPAN LENGTHS SHOWN IN TABLE 40.7-1. USING DIFFERENT STRAND PATTERNS OR LONGER SPANS WILL REQUIRE A COMPLETE DESIGN OF THIS REINFORCEMENT, WHICH REQUIRES PRIOR APPROVAL FROM THE BUREAU OF STRUCTURES.
- ▲ VARIES FOR ELASTOMERIC BRGS. (STD. 27.07) AND STEEL BRGS. (STD. 27.09)
- DETAIL TYPICAL AT EACH END
- INCREASE THE SIZE OF THESE BARS IF REQUIRED BY AASHTO LRFD 5.8.3.5
- THE DESIGN ENGINEER DETERMINES THIS VALUE BASED ON 2" MIN. HAUNCH AT EDGE OF GIRDER, X-SLOPE, PROFILE GRADE LINE AND CALCULATED RESIDUAL GIRDER CAMBER, INCLUDING THE CAMBER MULTIPLIER OF 1.4. THIS VALUE CAN VARY AND SHOULD BE GIVEN FOR EACH 1/3 OF THE GIRDER LENGTH. PROVIDE VALUES THAT MAINTAIN 3" MIN. DECK EMBEDMENT AND 2/2" CLEAR FROM TOP OF DECK WHILE ACCOUNTING FOR #3/4" VARIANCE IN ACTUAL CAMBER VERSUS THE CALCULATED RESIDUAL CAMBER.

**NOTES**

- TOP OF GIRDER TO BE ROUGH FLOATED AND BROOMED TRANSVERSELY, EXCEPT THE OUTSIDE 2" OF GIRDER, WHICH SHALL RECEIVE A SMOOTH FINISH. AN APPROVED CONCRETE SEALER SHALL BE APPLIED TO ALL SMOOTH SURFACES INCLUDING THE OUTSIDE 2" OF THE TOP FLANGE.
- DO NOT APPLY CONCRETE SEALER TO SURFACES RECEIVING APPLICATION OF CONCRETE STAINING.
- THE GIRDERS SHALL BE PROVIDED WITH A SUITABLE LIFTING DEVICE FOR HANDLING AND ERECTING THE GIRDERS.
- STRANDS SHALL BE FLUSH WITH END OF GIRDER. FOR GIRDER ENDS EMBEDDED COMPLETELY IN CONCRETE, END OF STRANDS SHALL BE COATED WITH NON-BITUMINOUS JOINT SEALER. FOR GIRDER ENDS THAT ARE FINALLY EXPOSED, COAT THE GIRDER ENDS, EXPOSED STRAND ENDS AND ALL NON-BONDING SURFACES WITHIN 2 FEET OF THE GIRDER ENDS WITH A NON-PIGMENTED EPOXY CONFORMING TO AASHTO M-235 TYPE III, GRADE 2, CLASS B OR C. THE EPOXY SHALL BE APPLIED AT LEAST 3 DAYS AFTER MOIST CURING HAS CEASED AND PRIOR TO THE APPLICATION OF THE SEALER.
- ALL GIRDERS SHALL BE CAST FULL LENGTH AS SHOWN.
- SPACING SHOWN FOR #4 STIRRUPS IS FOR GRADE 60 REINFORCEMENT.
- AN ALTERNATE EQUIVALENT OF WELDED WIRE FABRIC (WWF) ASTM A497 MAY BE SUBSTITUTED FOR THE STIRRUP REINFORCEMENT SHOWN, UPON APPROVAL OF THE STRUCTURES DEVELOPMENT SECTION.
- PRESTRESSING STRANDS SHALL BE ( DIA.)-7-WIRE LOW-RELAXATION STRANDS WITH AN ULTIMATE STRENGTH OF 270,000 PSI.

<b>70" PRESTRESSED GIRDER DETAILS</b>	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DEVELOPMENT SECTION	
APPROVED: <i>Bill Oliva</i>	DATE: 7-13

**▲ FOR CULVERT WINGS:**

WITH WING WALL THICKNESS  $\geq 8"$  USE:  
 $\frac{3}{4}"$  DIA. CONCRETE MASONRY ANCHOR, TYPE S  
 5" EMBEDMENT DEPTH  
 SEE DETAIL "A"

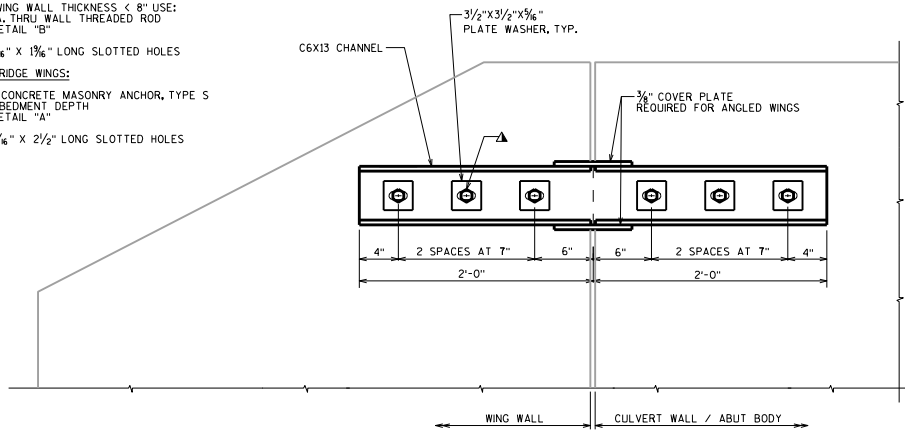
WITH WING WALL THICKNESS  $< 8"$  USE:  
 $\frac{3}{4}"$  DIA. THRU WALL THREADED ROD  
 SEE DETAIL "B"

USE  $\frac{1}{6}" \times 1\frac{1}{4}"$  LONG SLOTTED HOLES

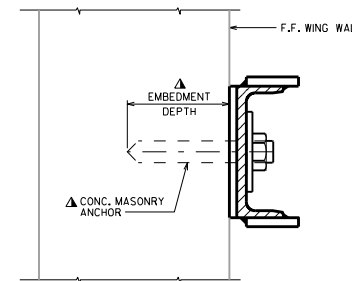
FOR BRIDGE WINGS:

1" DIA. CONCRETE MASONRY ANCHOR, TYPE S  
 10" EMBEDMENT DEPTH  
 SEE DETAIL "A"

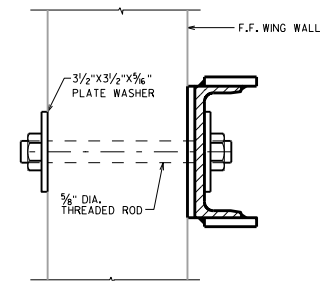
USE  $\frac{1}{4}" \times 2\frac{1}{2}"$  LONG SLOTTED HOLES



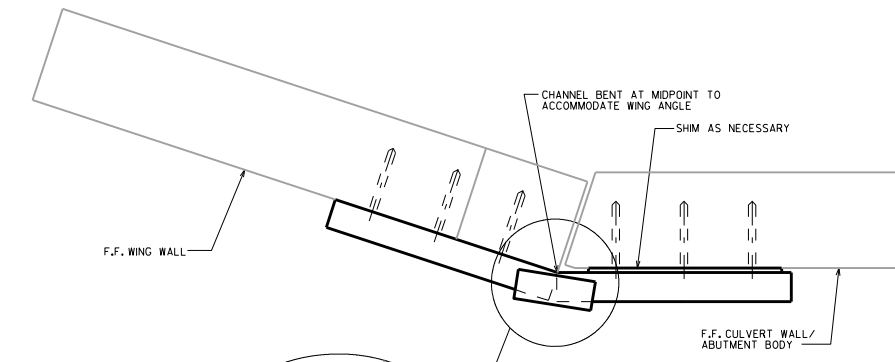
**WING ELEVATION**



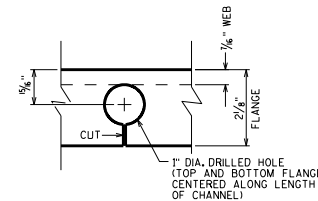
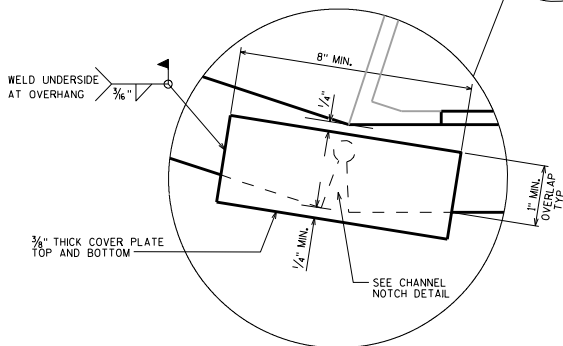
**DETAIL "A"**  
SECTION THRU CHANNEL



**DETAIL "B"**  
SECTION THRU CHANNEL



**PLAN**



**CHANNEL NOTCH DETAIL**  
FOR USE WITH ANGLED WINGS ONLY

**GENERAL NOTES**

WING STRAPPING DETAIL FOR THE PURPOSE OF MITIGATING INWARD WING TIPPING, AS AN ALTERNATIVE TO THE PREFERRED METHOD OF WING REPLACEMENT.

BID ITEM SHALL BE "STRAPPING B-XX-XXX" WHICH INCLUDES ALL ITEMS SHOWN.

WISDOT REGIONAL BRIDGE MAINTENANCE ENGINEER TO APPROVE USE OF DETAIL PRIOR TO INSTALLATION.

ALL PROVIDED STEEL MATERIAL SHALL CONFORM TO ASTM A36.

ALL STRUCTURAL STEEL SHOWN SHALL BE GALVANIZED. THREADED RODS, MASONRY ANCHORS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C.

CUTTING AND DRILLING OF CHANNEL SHALL BE DONE IN FABRICATION SHOP, PRIOR TO GALVANIZING.

IF WELDING COVER PLATE IN FIELD, PRIOR TO WELDING, REMOVE GALVANIZING FROM AREA TO BE WELDED, TOUCH UP WITH PAINT ALL AREAS LACKING GALVANIZING WHEN COMPLETE.

CAULK AROUND PERIMETER OF CHANNEL AND FILL PORTION OF HOLE AROUND ANCHOR BOLT AND SHIM WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

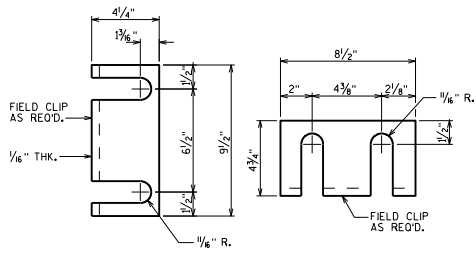
**WING STRAPPING**

STATE OF WISCONSIN  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES DEVELOPMENT SECTION

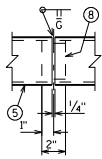
APPROVED: *Bill Oliva*

DATE:  
7-13

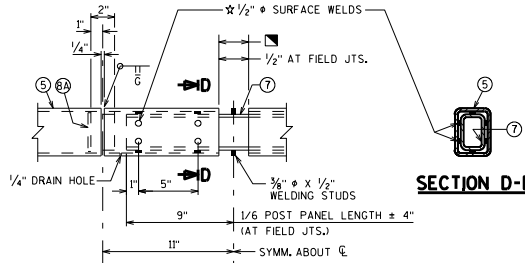




**POST SHIM DETAILS**

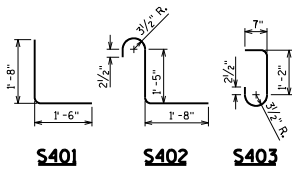


**SHOP RAIL SPICE DETAIL**  
(LOCATION MUST BE SHOWN ON SHOP DRAWINGS)



**FIELD ERECTION JOINT DETAIL**

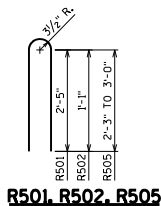
\* MIN. 3/8\"/>



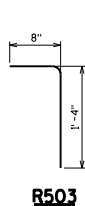
**S401**

**S402**

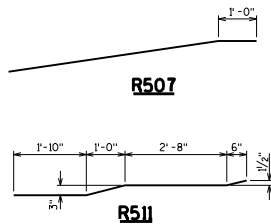
**S403**



**R501, R502, R505**

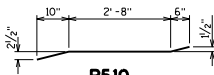


**R503**



**R507**

**R511**



**R510**

**BAR SERIES TABLE**

MARK	NO. REOD.	LENGTH
R505	OF SERIES	5'-5\"/>

BUNDLE AND TAG EACH SERIES SEPARATELY.

**BILL OF BARS**

NOTE: THE FIRST OR FIRST TWO DIGITS OF THE BAR MARK SIGNIFIES THE BAR SIZE.

BAR MARK	NO. REOD.	LENGTH	REV.	BAR SERIES	LOCATION
S401	X	3'-0"	X		PARAPET VERT.
S402	X	4'-1"	X		PARAPET VERT.
S403	X	2'-9"	X		PARAPET VERT.
S404	X				PARAPET HORIZ.
R501	X	5'-9"	X		PARAPET VERT.
R502	X	3'-1"	X		PARAPET VERT.
R503	X	1'-11"	X		PARAPET VERT.
R504	X	3'-4"			PARAPET VERT.
R505	X	6'-2"	X	▲	PARAPET VERT.
R506	X				PARAPET HORIZ.
R507	X		X		PARAPET HORIZ.
R508	X	4'-0"			PARAPET HORIZ.
R509	X	5'-8"			PARAPET HORIZ.
R510	X	4'-0"	X		PARAPET HORIZ.
R511	X	6'-0"	X		PARAPET HORIZ.
R512	X				PARAPET HORIZ.
R513	X				PARAPET HORIZ.

▲ LENGTH SHOWN FOR BAR IS AN AVERAGE LENGTH AND SHOULD ONLY BE USED FOR BAR HEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS.

**GENERAL NOTES**

BID ITEM SHALL BE "RAILING TUBULAR TYPE PF B-...", WHICH SHALL INCLUDE ALL STEEL ITEMS SHOWN, AND PAINTING.  
POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUTS.

NO. 2, NO. 7 AND NO. 8 SHALL CONFORM TO ASTM A709 GRADE 36. STRUCTURAL TUBING, NO. 1 AND NO. 5, SHALL CONFORM TO ASTM A500 GRADE B.

ANCHORAGES SHALL BE ACCURATELY PLACED TO PROVIDE CORRECT ALIGNMENT OF RAILING, SET POSTS NORMAL TO GRADE.  
CUT BOTTOM OF POST TO MAKE POST VERTICAL IN TRANSVERSE DIRECTION.  
STEEL SHIMS SHALL BE PROVIDED & USED UNDER BASE PLATES WHERE REQUIRED FOR ALIGNMENT.

FILL BOLT SLOT OPENINGS IN SHIMS AND PLATE NO. 2 AND CAULK AROUND PERIMETER OF PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER.

ALL JOINTS IN CONCRETE PARAPET ARE TO BE VERTICAL.

AFTER FABRICATION, ALL MATERIAL, EXCEPT ANCHORAGE NO. 3 & 4 & SHIMS SHALL BE PAINTED WITH A THREE COAT ZINC-RICH EPOXY SYSTEM PER WISDOT STANDARD SPECIFICATION SECTION 517, EPOXY SYSTEM. SHIMS SHALL BE GIVEN ONE COAT OF ZINC RICH PRIMER PAINT. THE FINISH COLOR SHALL BE FEDERAL COLOR NO. 1.

1/4" VENT HOLES TO BE LOCATED AT LOW END OF RAILS.

RAILING SHALL BE FABRICATED IN LENGTHS THAT INCLUDE 3 OR 4 POSTS.

TOUCH-UP PAINTING TO BE DONE AT COMPLETION OF STEEL RAILING INSTALLATION TO THE SATISFACTION OF THE ENGINEER AT NO EXTRA COST.

SEE STD. 30.07 FOR BEAM GUARD ANCHOR ASSEMBLY DETAILS.

THIS RAILING MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TEST LEVEL 2 (TL-2).

RDWY. OPENING OR 2/2" MIN. FOR STRIP SEAL EXP. JOINT & 1/2" OPENING FOR AT ABUTMENT.

**LEGEND**

- ① TS 4 x 4 x 0.25 x 1'-9 1/4" STRUCTURAL TUBING WITH 3/8" HOLES FOR BOLT NO. 6. PLACE POSTS VERTICAL IN TRANSVERSE DIRECTION. WELD TO NO. 2. PLACE POSTS NORMAL TO GRADE LINE
- ② PLATE 3/4" x 8 1/2" x 9 1/2" WITH 3/8" X 1/4" SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN. SLOTS PARALLEL TO SHORT SIDE OF PLATE.
- ③ 3/8" DIA. X 1'-1" LONG ASTM A325 HEX BOLTS (GALVANIZED) WITH A325 NUT AND WASHER. 4 REOD. PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. EMBED A MIN. OF 10". CHAMFER TOP OF BOLTS BEFORE THREADING.
- ④ BAR 3/4" SQ. X 7" LONG. WELD TO ANCHOR BOLTS NO. 3 (GALVANIZED).
- ⑤ TS 4 x 3 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH BOLTS NO. 6. PROVIDE 3/8" DIA. HOLE FOR NO. 6.
- ⑥ 3/4" DIA. X 9" LONG ROUND HEAD BOLTS, ASTM A307, WITH HEX. NUT AND WASHERS AND LOCK WASHER. (1 REOD.) AT EACH RAIL TO POST LOCATION.)
- ⑦ RECTANGULAR SLEEVE FABRICATED FROM 1/4" PLATES. 1'-6" LONG.
- ⑧ RECTANGULAR SLEEVE FABRICATED FROM 1/4" PLATES. PROVIDE "SLIDING FIT" WITH MIN. OUT TO OUT DIMENSION OF 3 9/8" X 2 5/8".
- ⑨ RECTANGULAR SLEEVE FABRICATED FROM 1/4" PLATES. PROVIDE "SLIDING FIT" WITH MIN. OUT TO OUT DIMENSION OF 3 9/8" X 2 5/8" WITH 3/8" PLATE AT ONE END WELDED ALL AROUND TO BLOCK WATER.
- ⑩ 3/4" DIA. X 1'-1" LONG ROUND HEAD BOLTS, ASTM A307, WITH HEX NUT AND WASHERS

**RAILING TUBULAR TYPE 'PF' DETAILS**

STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION  
STRUCTURES DEVELOPMENT SECTION

APPROVED: Bill Oliva

DATE:  
7-13