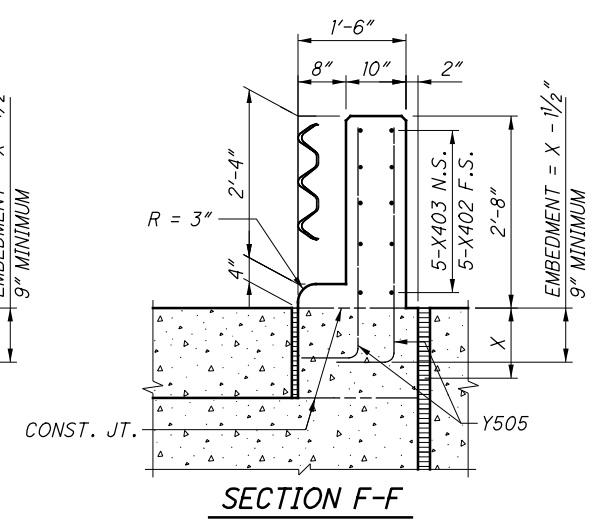
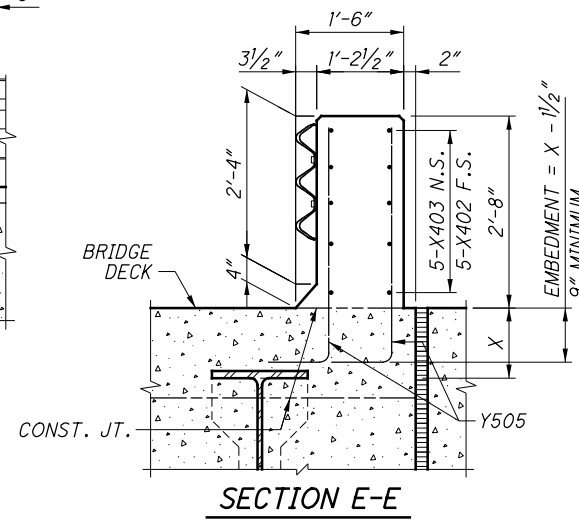
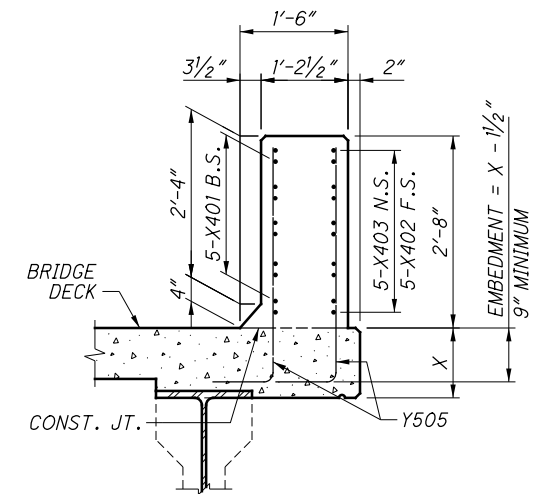
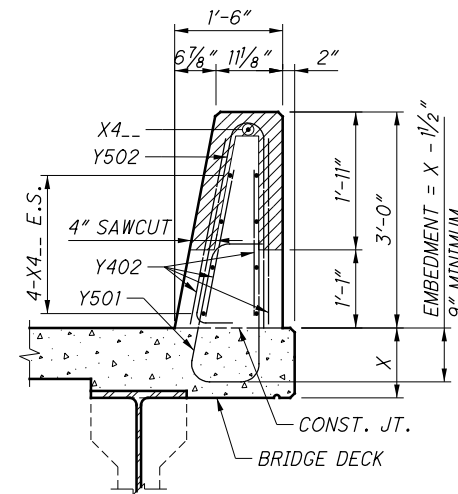


LEGEND:
E.S. = EACH SIDE
F.S. = FAR SIDE
N.S. = NEAR SIDE



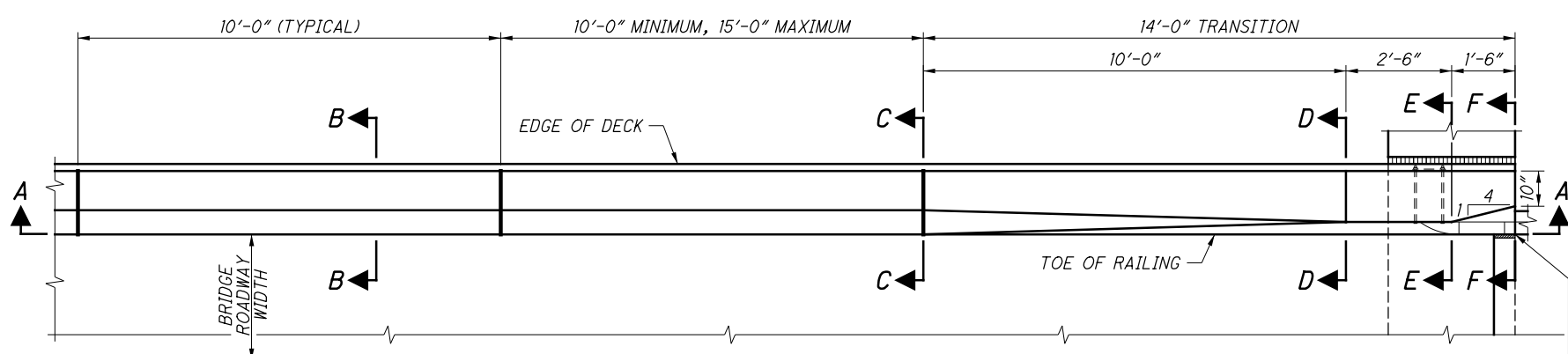
REINFORCEMENT FOR 36" SBR-1 TRANSITION MOUNTED ON BRIDGE OR APPROACH SLAB

MARK	LENGTH	TYPE	MATERIAL	INCR.	BENDING DIAGRAMS
X401	10'-0"	STR	GFRP		
X402	6'-4"	BENT	GFRP		
X403	5'-1"	STR	GFRP		
X4...	⊕	STR	GFRP		
Y401	10'-0"	STR	GFRP		
Y402	⊕	STR	GFRP		
Y501	4'-7"+2.25A	BENT	STEEL		
Y502	6'-2"	BENT	STEEL		
Y503	A + 3'-6"	BENT	STEEL		
Y504	A + 3'-5"	BENT	STEEL		
Y505	A + 3'-4"	BENT	STEEL		

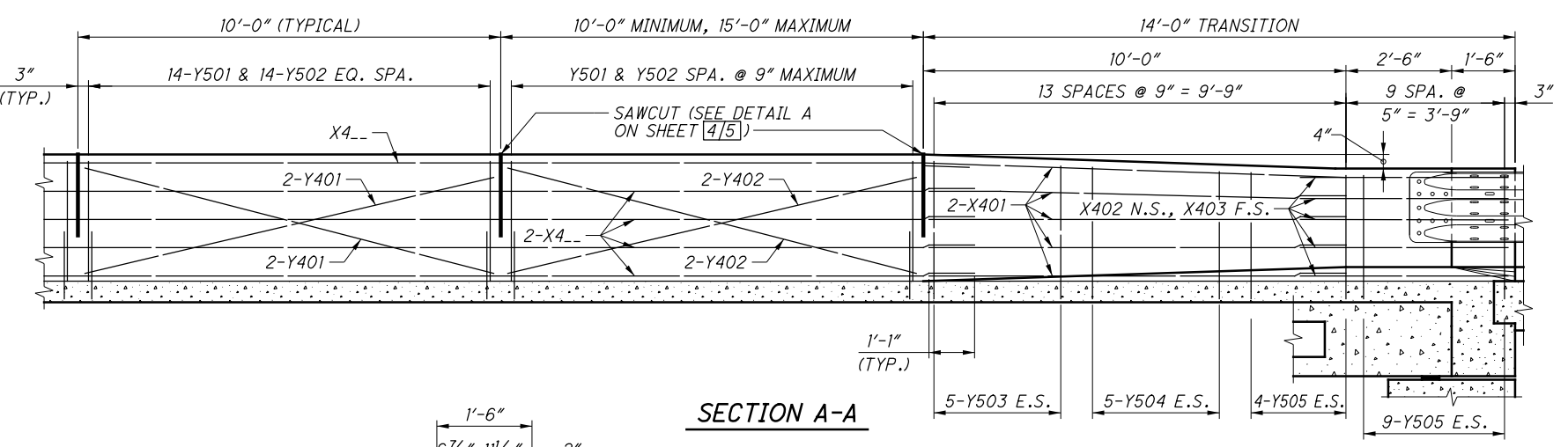
NOTES:

- FOR ALL SINGLE SLOPE CONCRETE BRIDGE RAILINGS INCLUDING THE 14'-0" TRANSITIONS, PROJECT PLANS SHALL INCLUDE PLAN VIEW, ELEVATION VIEW, SECTIONS, REINFORCING MARKS, REINFORCING BENDING DIAGRAMS, AND REINFORCING QUANTITIES.
- SEE APPROPRIATE STANDARD BRIDGE DRAWING FOR ABUTMENT DETAILS.
- FOR BRIDGE TERMINAL ASSEMBLY, SEE STD. CONSTR. DWGS. MGS-3.1 AND MGS-3.2.
- FOR SAWCUT PERIMETER LENGTH, SEE DETAIL A ON SHEET [4/5].
- FOR DEFLECTION JOINT DETAILS AND ADDITIONAL NOTES, SEE SHEET [5/5].
- USE GLASS FIBER REINFORCED POLYMER (GFRP) FOR ALL HORIZONTAL X4... BARS AND STIFFENING BARS (Y401 & Y402 BARS).
- TIE Y401 & Y402 STIFFENING BARS LOCATED INSIDE THE VERTICAL REINFORCEMENT AT EACH HORIZONTAL BAR. TIE Y401 & Y402 STIFFENING BARS LOCATED OUTSIDE OF THE VERTICAL REINFORCEMENT AT EACH VERTICAL BAR.
- PLACE STIFFENING BARS IN ALL SAWCUT PANELS 10'-0" AND GREATER. DO NOT ADD STIFFENING BARS TO 14'-0" TRANSITIONS. DO NOT SLIPFORM UNSTIFFENED SAWCUT PANELS. DO NOT OMIT STIFFENING BARS FOR CONVENTIONALLY FORMED CONSTRUCTION.
- X402 BAR MAY BE PROVIDED AS EPOXY COATED STEEL REINFORCEMENT IF A GFRP FABRICATED SHAPE IS NOT AVAILABLE.

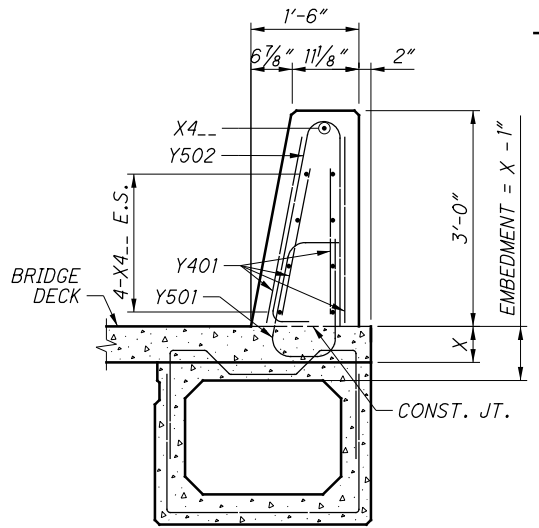
⊕ SEE PROJECT PLANS



PLAN VIEW
36" SBR-3 TRANSITION MOUNTED ON BRIDGE SHOWN WITH INTEGRAL ABUTMENT AND ADJACENT BOX BEAM SUPERSTRUCTURE



SECTION A-A



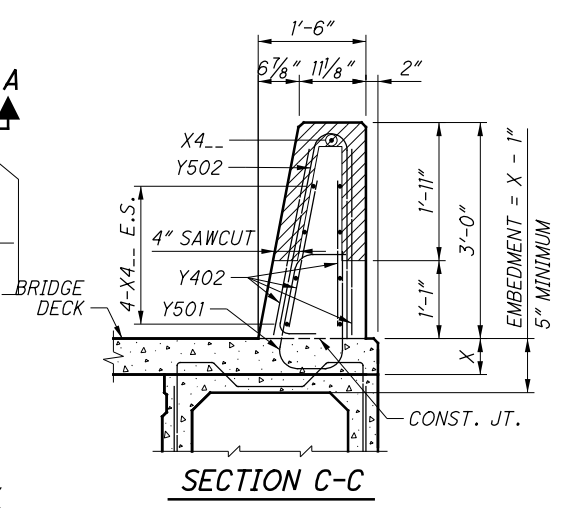
SECTION B-B

COMPOSITE PRESTRESSED CONCRETE BOX BEAMS (SAWCUT NOT SHOWN)

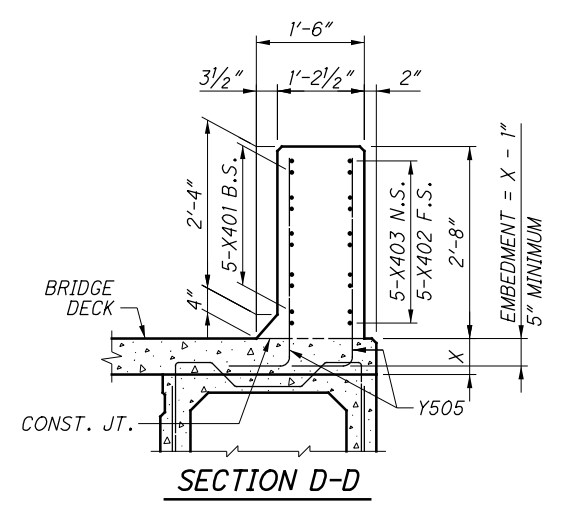
LEGEND:
E.S. = EACH SIDE
F.S. = FAR SIDE
N.S. = NEAR SIDE

NOTES:

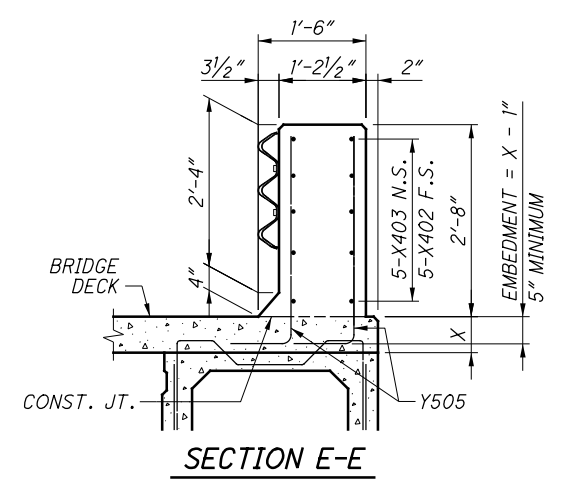
- FOR ALL SINGLE SLOPE CONCRETE BRIDGE RAILINGS INCLUDING THE 14'-0" TRANSITIONS, PROJECT PLANS SHALL INCLUDE PLAN VIEW, ELEVATION VIEW, SECTIONS, REINFORCING MARKS, REINFORCING BENDING DIAGRAMS, AND REINFORCING QUANTITIES.
- SEE APPROPRIATE STANDARD BRIDGE DRAWING FOR ABUTMENT DETAILS.
- FOR BRIDGE TERMINAL ASSEMBLY, SEE STD. CONSTR. DWGS. MGS-3.1 AND MGS-3.2.
- FOR SAWCUT PERIMETER LENGTH, SEE DETAIL A ON SHEET 4/5.
- FOR DEFLECTION JOINT DETAILS AND ADDITIONAL NOTES, SEE SHEET 5/5.
- THE HORIZONTAL LEGS OF THE Y615 BARS ARE INTENDED TO LAP WITH THE BOTTOM TRANSVERSE STEEL IN THE DECK. THE SPACING MAY BE ADJUSTED THE MINIMUM DISTANCE NECESSARY TO AVOID INTERFERENCE WITH THE TRANSVERSE DECK REINFORCEMENT.
- USE GLASS FIBER REINFORCED POLYMER (GFRP) FOR ALL HORIZONTAL X4... BARS AND STIFFENING BARS (Y401 & Y402 BARS).
- TIE Y401 & Y402 STIFFENING BARS LOCATED INSIDE THE VERTICAL REINFORCEMENT AT EACH HORIZONTAL BAR. TIE Y401 & Y402 STIFFENING BARS LOCATED OUTSIDE OF THE VERTICAL REINFORCEMENT AT EACH VERTICAL BAR.
- PLACE STIFFENING BARS IN ALL SAWCUT PANELS 10'-0" AND GREATER. DO NOT ADD STIFFENING BARS TO 14'-0" TRANSITIONS. DO NOT SLIPFORM UNSTIFFENED SAWCUT PANELS. DO NOT OMIT STIFFENING BARS FOR CONVENTIONALLY FORMED CONSTRUCTION.
- X402 BAR MAY BE PROVIDED AS EPOXY COATED STEEL REINFORCEMENT IF A GFRP FABRICATED SHAPE IS NOT AVAILABLE.



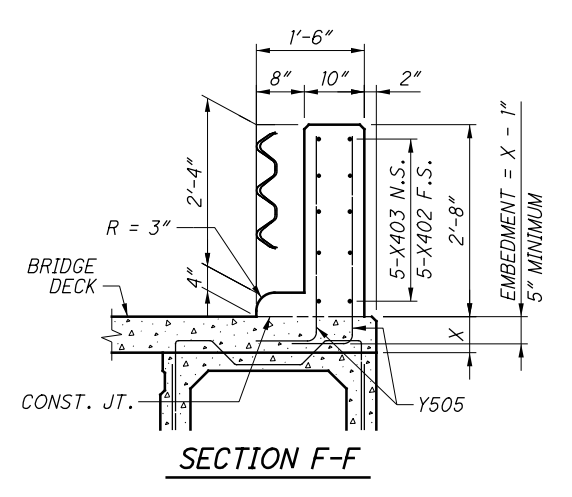
SECTION C-C



SECTION D-D



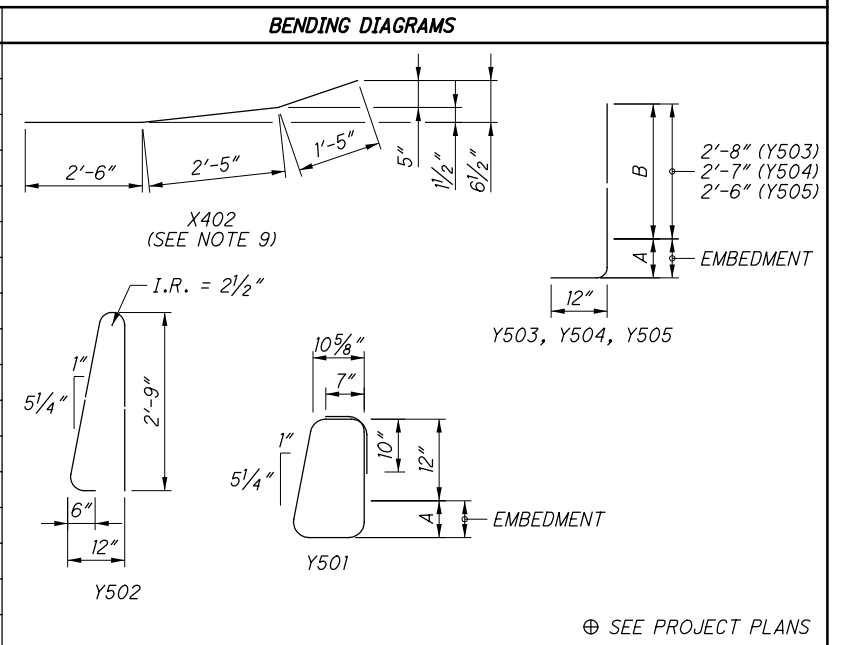
SECTION E-E



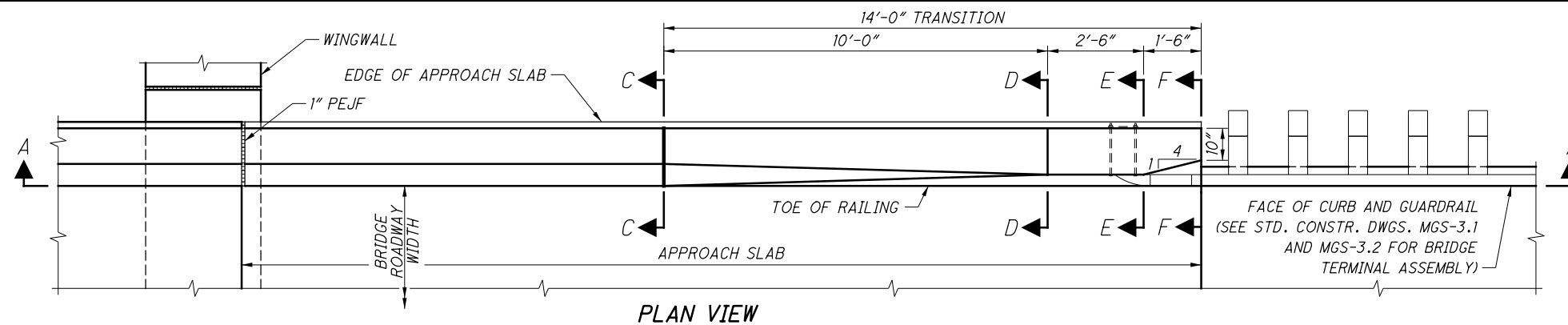
SECTION F-F

REINFORCEMENT FOR 36" SBR-1 TRANSITION MOUNTED ON COMPOSITE BOX BEAM BRIDGE

MARK	LENGTH	TYPE	MATERIAL	INCR.
X401	10'-0"	STR	GFRP	
X402	6'-4"	BENT	GFRP	
X403	5'-1"	STR	GFRP	
X4...	⊕	STR	GFRP	
Y401	10'-0"	STR	GFRP	
Y402	⊕	STR	GFRP	
Y501	4'-7"+2.25A	BENT	STEEL	
Y502	6'-2"	BENT	STEEL	
Y503	A + 3'-6"	BENT	STEEL	
Y504	A + 3'-5"	BENT	STEEL	
Y505	A + 3'-4"	BENT	STEEL	

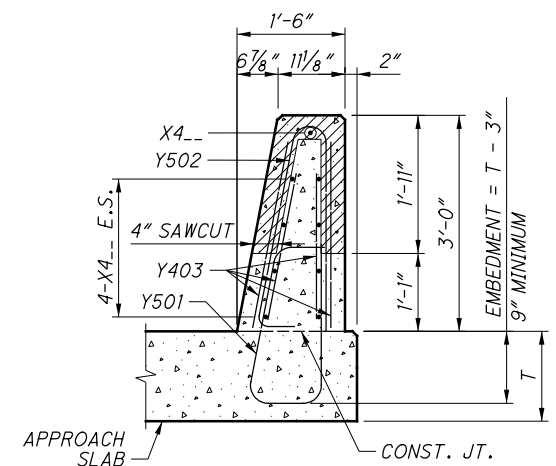


⊕ SEE PROJECT PLANS

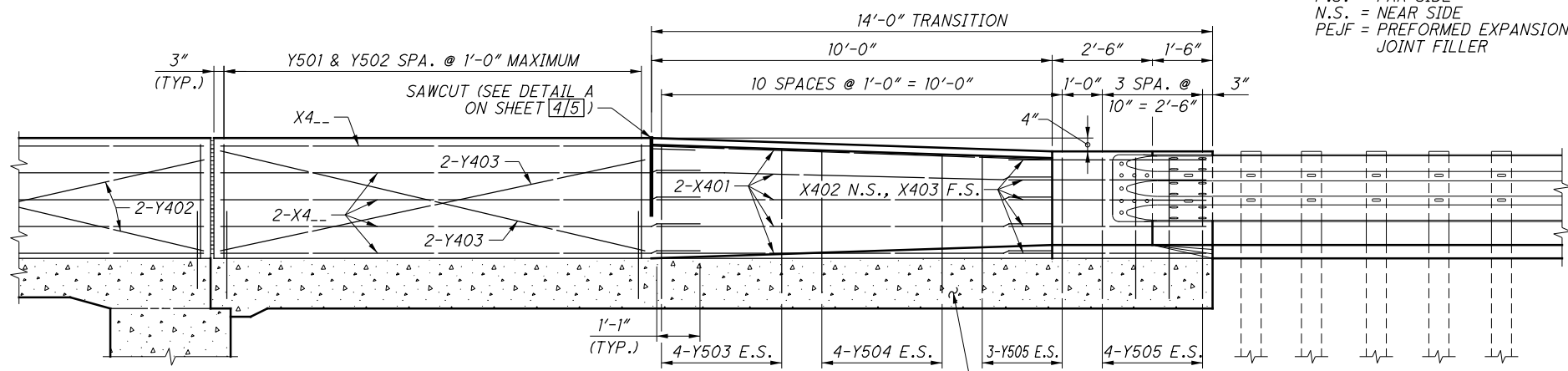


PLAN VIEW
36" SBR-3 TRANSITION MOUNTED ON APPROACH SLAB WITH SEMI-INTEGRAL ABUTMENT SHOWN (INTEGRAL ABUTMENT AND CAPPED PILE ABUTMENT SIMILAR)

LEGEND:
E.S. = EACH SIDE
F.S. = FAR SIDE
N.S. = NEAR SIDE
PEJF = PREFORMED EXPANSION JOINT FILLER

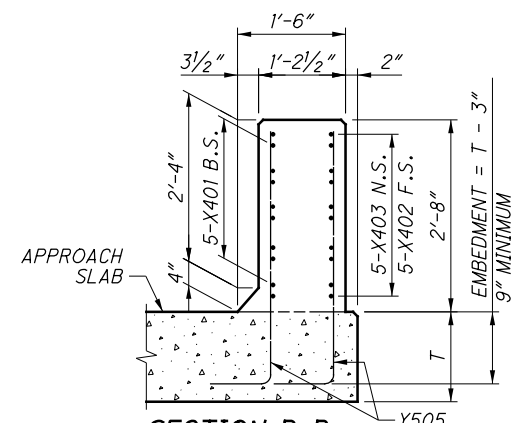


SECTION C-C

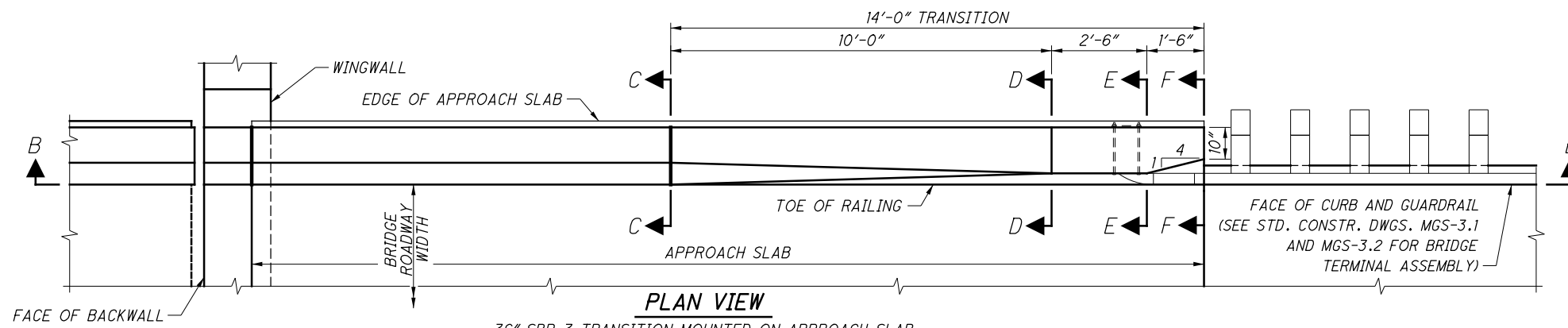


SECTION A-A

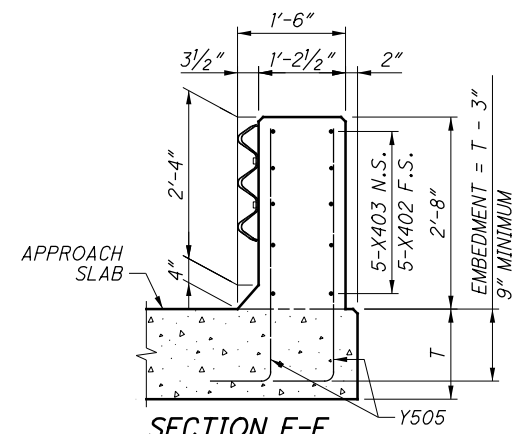
APPROACH SLAB (SEE STD. BRIDGE DWG. FOR DETAILS)



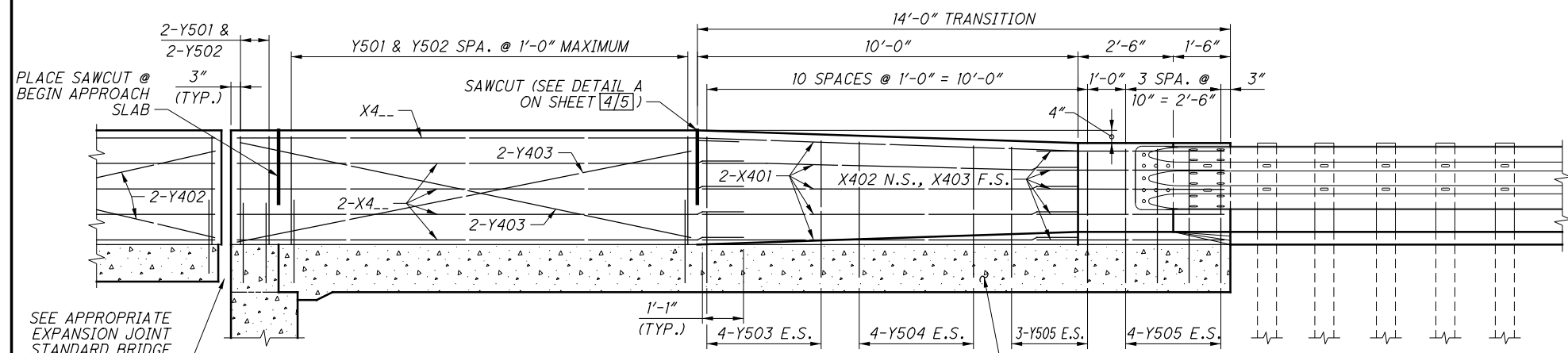
SECTION D-D



PLAN VIEW
36" SBR-3 TRANSITION MOUNTED ON APPROACH SLAB WITH TYPICAL ABUTMENT SHOWN

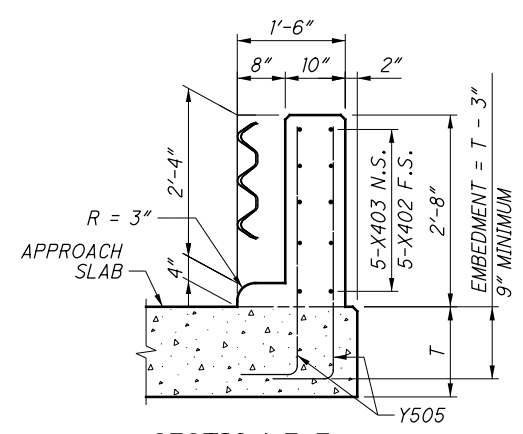


SECTION E-E

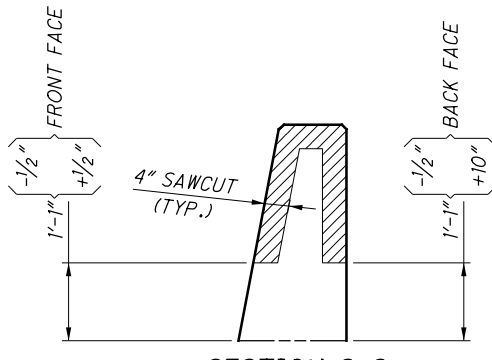
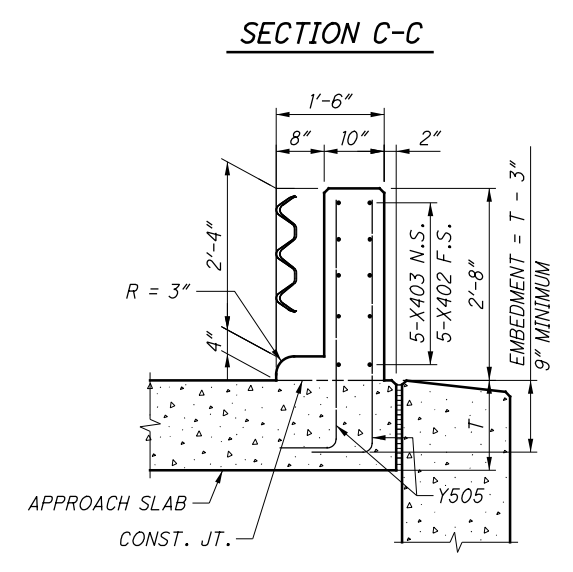
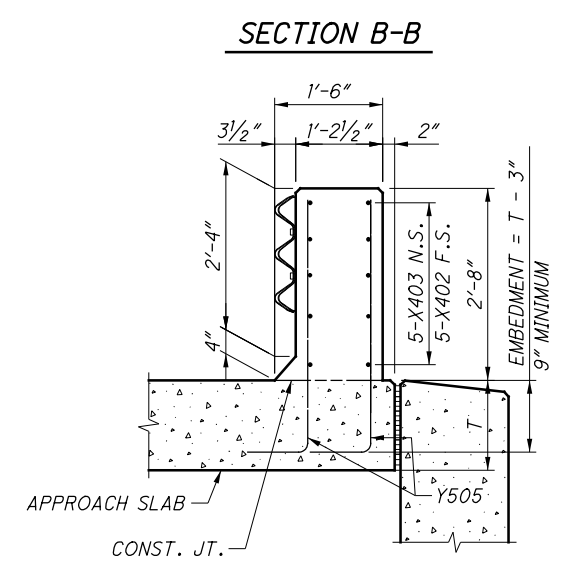
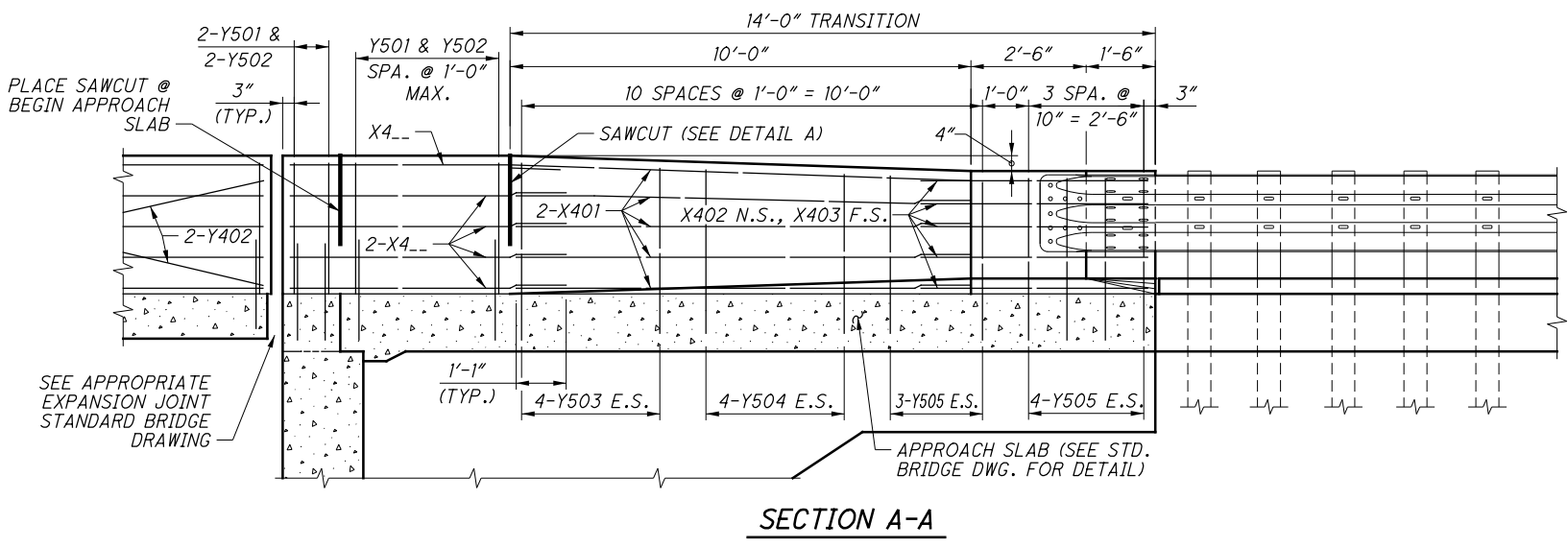
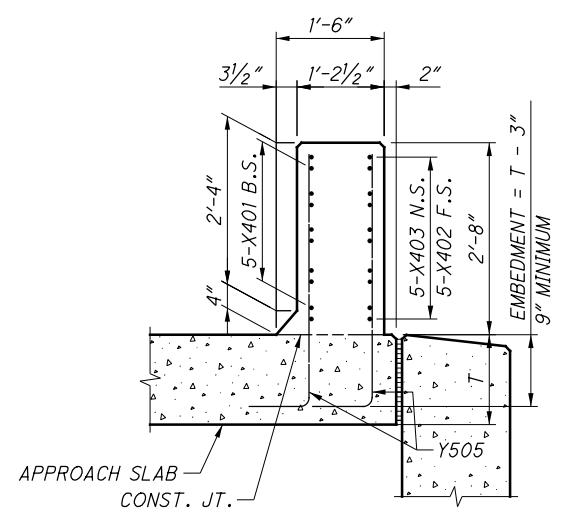
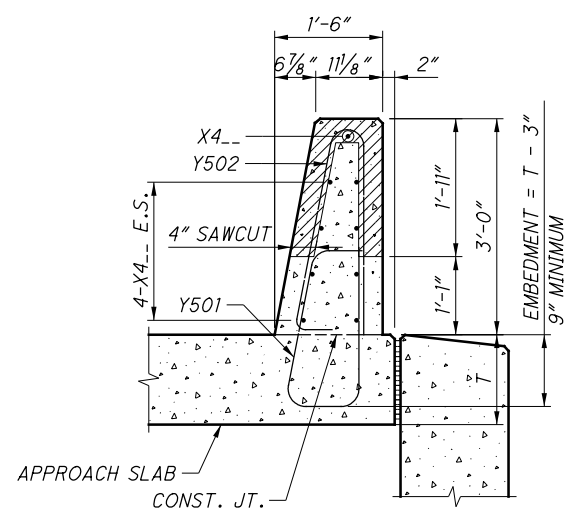
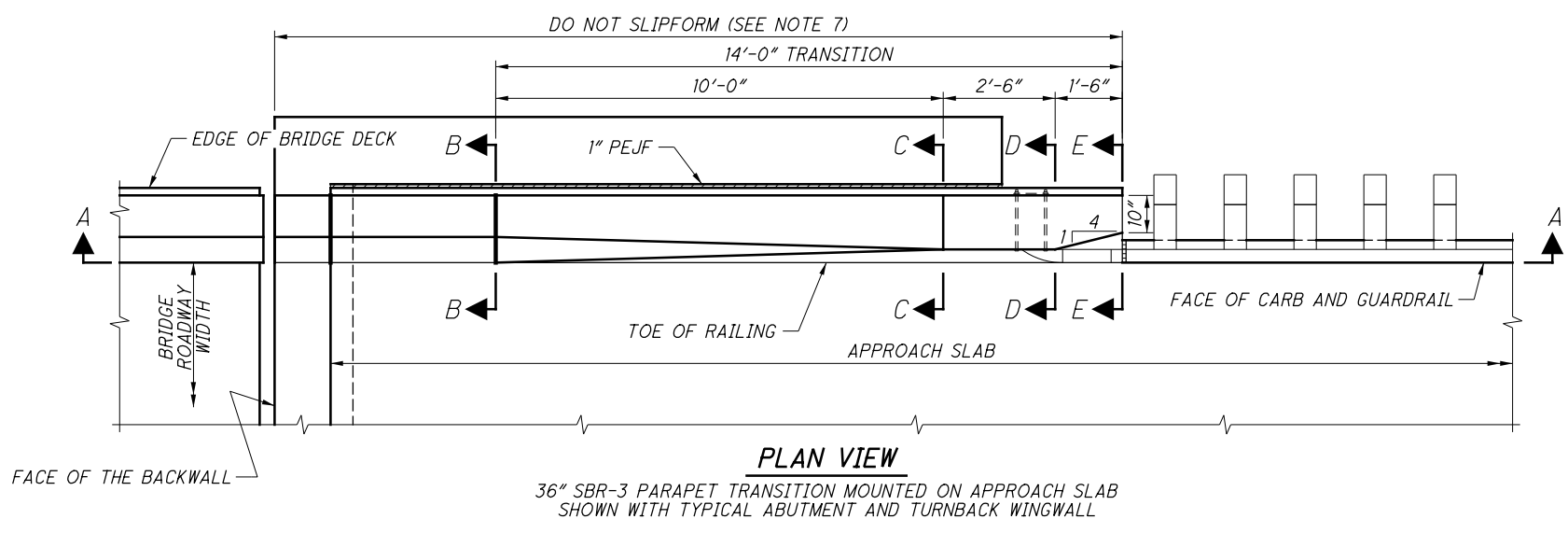


SECTION B-B

APPROACH SLAB (SEE STD. BRIDGE DWG. FOR DETAILS)



SECTION F-F



LEGEND:
E.S. = EACH SIDE
F.S. = FAR SIDE
N.S. = NEAR SIDE
PEJF = PREFORMED EXPANSION JOINT FILLER

- NOTES:**
- FOR ALL SINGLE SLOPE CONCRETE BRIDGE RAILINGS INCLUDING THE 14'-0" TRANSITIONS, PROJECT PLANS SHALL INCLUDE PLAN VIEW, ELEVATION VIEW, SECTIONS, REINFORCING MARKS, REINFORCING BENDING DIAGRAMS, AND REINFORCING QUANTITIES.
 - SEE APPROPRIATE STANDARD BRIDGE DRAWING FOR ABUTMENT DETAILS.
 - FOR BRIDGE TERMINAL ASSEMBLY, SEE STD. CONSTR. DWGS. MGS-3.1 AND MGS-3.2.
 - FOR SAWCUT PERIMETER LENGTH, SEE DETAIL A ON SHEET 4/5.
 - FOR DEFLECTION JOINT DETAILS AND ADDITIONAL NOTES, SEE SHEET 5/5.
 - USE GLASS FIBER REINFORCED POLYMER (GFRP) FOR ALL HORIZONTAL X4... BARS AND STIFFENING BARS (Y401 & Y402 BARS).
 - TIE Y401 & Y402 STIFFENING BARS LOCATED INSIDE THE VERTICAL REINFORCEMENT AT EACH HORIZONTAL BAR. TIE Y401 & Y402 STIFFENING BARS LOCATED OUTSIDE OF THE VERTICAL REINFORCEMENT AT EACH VERTICAL BAR.
 - PLACE STIFFENING BARS IN ALL SAWCUT PANELS 10'-0" AND GREATER. DO NOT ADD STIFFENING BARS TO 14'-0" TRANSITIONS. DO NOT SLIPFORM UNSTIFFENED SAWCUT PANELS. DO NOT OMIT STIFFENING BARS FOR CONVENTIONALLY FORMED CONSTRUCTION.
 - X402 BAR MAY BE PROVIDED AS EPOXY COATED STEEL REINFORCEMENT IF A GFRP FABRICATED SHAPE IS NOT AVAILABLE.

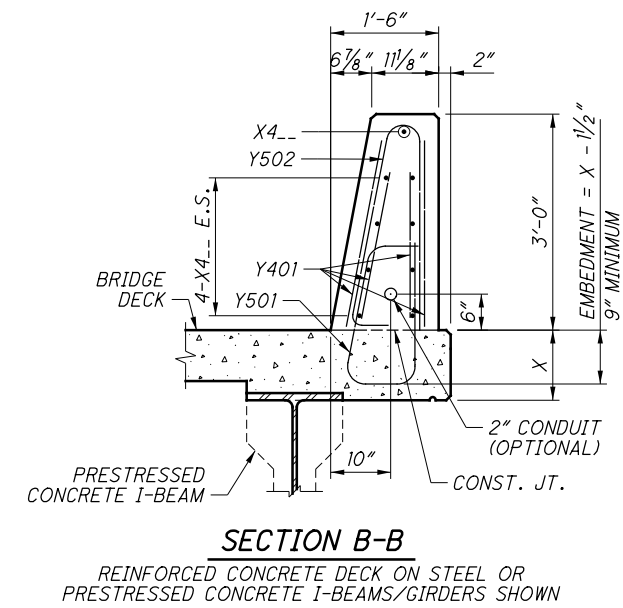
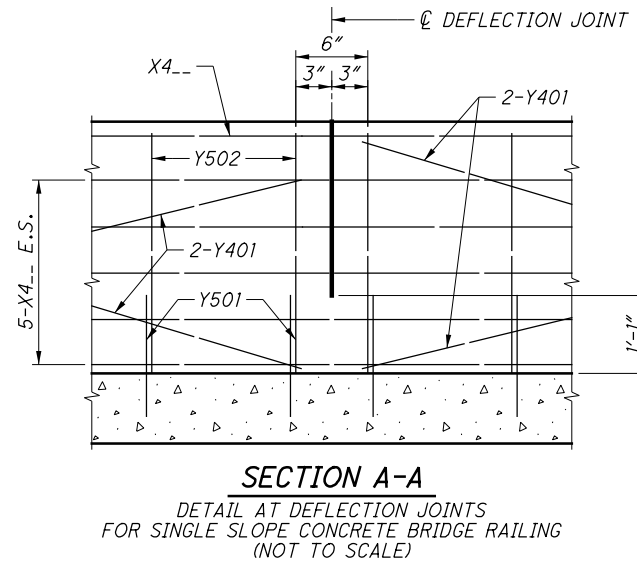
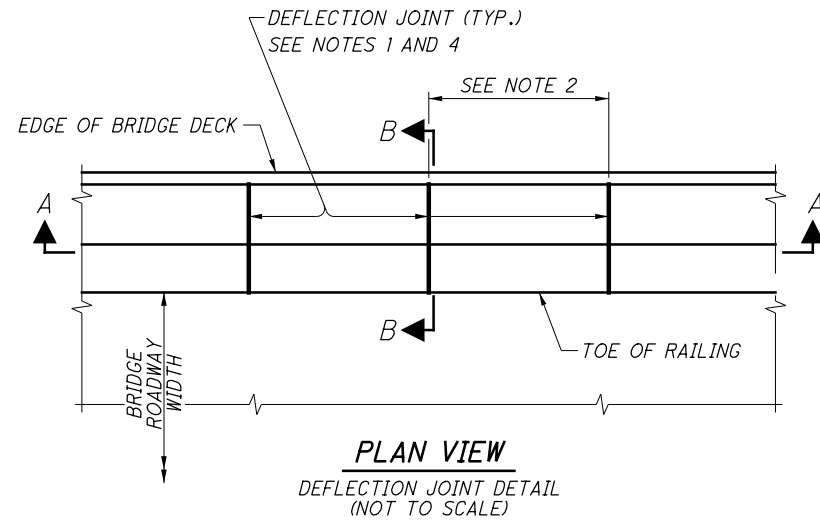
REINFORCEMENT FOR 36" SBR-3 TRANSITION MOUNTED ON APPROACH SLAB				
MARK	LENGTH	TYPE	MATERIAL	INCRE.
X401	10'-0"	STR	GFRP	
X402	6'-4"	BENT	GFRP	
X403	5'-1"	STR	GFRP	
X4...	⊕	STR	GFRP	
Y401	10'-0"	STR	GFRP	
Y402	⊕	STR	GFRP	
Y501	4'-7"+2.25A	BENT	STEEL	
Y502	6'-2"	BENT	STEEL	
Y503	A + 3'-6"	BENT	STEEL	
Y504	A + 3'-5"	BENT	STEEL	
Y505	A + 3'-4"	BENT	STEEL	

X402 (SEE NOTE 9)

Y501

Y503, Y504, Y505

⊕ SEE PROJECT PLANS



NOTES:

1. FOR THE ENTIRE LENGTH OF SINGLE SLOPE CONCRETE BRIDGE RAILINGS, PROJECT PLANS SHALL SHOW THE LOCATIONS OF DEFLECTION JOINTS.
2. DEFLECTION JOINT SPACING SHALL BE 10'-0" EXCEPT FOR THE LAST JOINT SPACING ADJACENT TO EITHER A 14'-0" TRANSITION OR AN OPEN JOINT. EXCEPTION PANELS MAY VARY IN LENGTH BETWEEN 10'-0" AND 15'-0".
3. PAYMENT FOR GLASS FIBER REINFORCED POLYMER (GFRP) STIFFENING REINFORCEMENT SHALL BE INCLUDED WITH CONTRACT PRICE FOR ITEM 509 - NO... GFRP DEFORMED BARS.
4. LIMITS OF SAWCUT IS SHOWN IN DETAIL A, SHEET [4/5]. THE 4" SAWCUT DEPTH SHOWN IN DETAIL A IS THE MINIMUM REQUIRED. HOWEVER, THE CONTRACTOR HAS AN OPTION TO PERFORM FULL DEPTH SAWCUT.

DESIGN CRITERIA:

36" SINGLE SLOPE CONCRETE BRIDGE RAILINGS MEET THE REQUIREMENTS OF NCHRP 350 & MASH TEST LEVEL 4 AND "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION".

DESIGN DATA:

CONCRETE - COMPRESSIVE STRENGTH = 4.5 KSI
 REINFORCING STEEL - MINIMUM YIELD STRENGTH = 60 KSI
 GFRP - C&MS 705.28 (MODULUS = 8700 KSI)
 AREA OF STANDARD 36" SBR-3 CROSS SECTION = 524.0 SQ. IN.
 VOLUME OF 36" SBR-3 14'-0" TRANSITION SECTION = 1.74 CU. YD.

DEFLECTION JOINTS FOR CONCRETE RAILINGS:

FOR SLIPFORMED CONSTRUCTION:
 AS SOON AS CUTTING OPERATIONS CAN BEGIN WITHOUT DAMAGING THE CONCRETE, SAWCUT 1/4 INCH DEEP DEFLECTION CONTROL JOINTS ALONG THE PERIMETER OF THE RAILING.

AFTER THE CURING PERIOD AND BEFORE APPLYING LOAD TO THE RAILING, PERFORM 4 INCH SAWCUT AS SHOWN IN DETAIL A, SHEET [4/5]. APPLIED PARAPET LOAD INCLUDES: CONSTRUCTION LOADS ON THE DECK (EXCLUDING PERSONNEL; HAND OPERATED EQUIPMENT AND MANUALLY POWERED VEHICLES); AND VEHICLE TRAFFIC IN THE LANE IMMEDIATELY ADJACENT TO THE RAILING AFTER REMOVAL OF TRAFFIC CONTROL DEVICES.

FOR CONVENTIONALLY FORMED CONSTRUCTION:

REMOVE THE FORMS BEFORE APPLYING LOAD TO THE RAILING. AS SOON AS THE FORMS ARE REMOVED, PERFORM 4-INCH SAWCUT AS SHOWN IN DETAIL A, SHEET [4/5]. THE 1/4 INCH SAWCUTS ARE NOT REQUIRED.

THE CONTRACTOR HAS AN OPTION TO PERFORM FULL DEPTH SAWCUT. HOWEVER, THE SAWCUT SHALL NOT BE LESS THAN 1'-0 1/2" FROM THE TOP OF THE CONCRETE DECK SLAB.

USE AN EDGE GUIDE, FENCE, OR JIG TO ENSURE THAT THE CUT JOINT IS STRAIGHT, TRUE, AND ALIGNED ON ALL FACES OF THE RAILING. THE JOINT WIDTH SHALL BE THE WIDTH OF THE SAW BLADE, A NOMINAL WIDTH OF 1/4 INCH.

SEAL THE PERIMETER OF THE DEFLECTION JOINTS TO A MINIMUM DEPTH OF ONE INCH WITH A POLYURETHANE OR POLYMERIC MATERIAL CONFORMING TO ASTM C920, TYPE S. LEAVE THE BOTTOM 1/2 INCH OF BOTH THE INSIDE AND OUTSIDE FACES OF THE RAILING UNSEALED TO ALLOW ANY WATER WHICH MAY ENTER THE JOINT TO ESCAPE.

FOR TRANSITION SECTION, PLACE A DEFLECTION JOINT AT THE BEGINNING OF THE 14'-0" TRANSITION. DEFLECTION JOINTS ARE NOT REQUIRED WITHIN THE 14'-0" TRANSITION SECTION.

MAXIMUM SPACING OF VERTICAL REINFORCING BARS FOR STANDARD 36" SBR-3 CONCRETE RAILING:

THE MAXIMUM SPACING OF VERTICAL REINFORCING BARS FOR THE STANDARD 36" SBR-3 CONCRETE RAILING SHALL BE 12", UNLESS NOTED OTHERWISE.

MAXIMUM SPACING OF VERTICAL REINFORCING BARS FOR 36" SBR-3 TRANSITIONS:

THE MAXIMUM SPACING OF VERTICAL REINFORCING BARS FOR THE 36" SBR-3 TRANSITION SECTION SHALL BE AS SHOWN ON SHEETS [1/5], [2/5], [3/5], OR [4/5].

MINIMUM EMBEDMENT OF VERTICAL REINFORCING BARS:

THE MINIMUM EMBEDMENT SHOWN ASSUMES A MINIMUM DECK OVERHANG DEPTH OF 10 1/2" AND A MINIMUM APPROACH SLAB THICKNESS OF 12". IF THE MINIMUM EMBEDMENT FOR THE VERTICAL REINFORCING BARS INTO THE BRIDGE DECK OR APPROACH SLAB IS NOT MET, THEN THE DESIGNER SHALL CALCULATE THE REQUIRED REINFORCEMENT ACCORDING TO SECTION 13 OF THE "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS.