

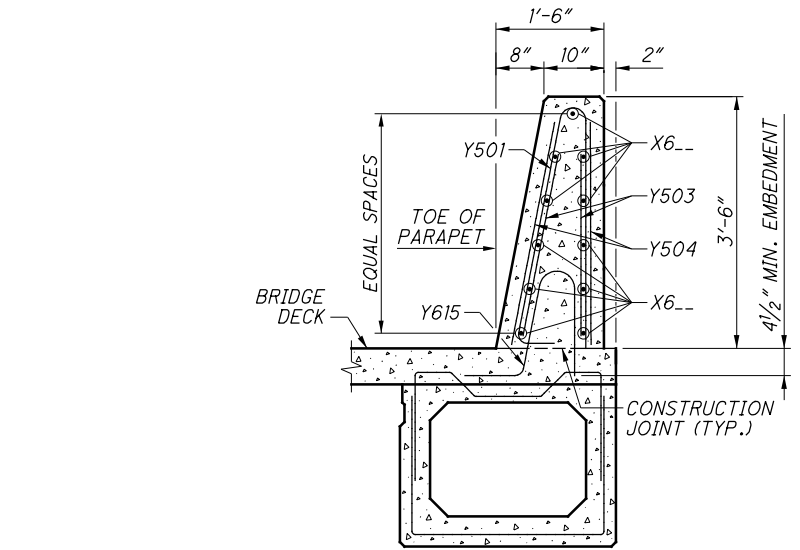
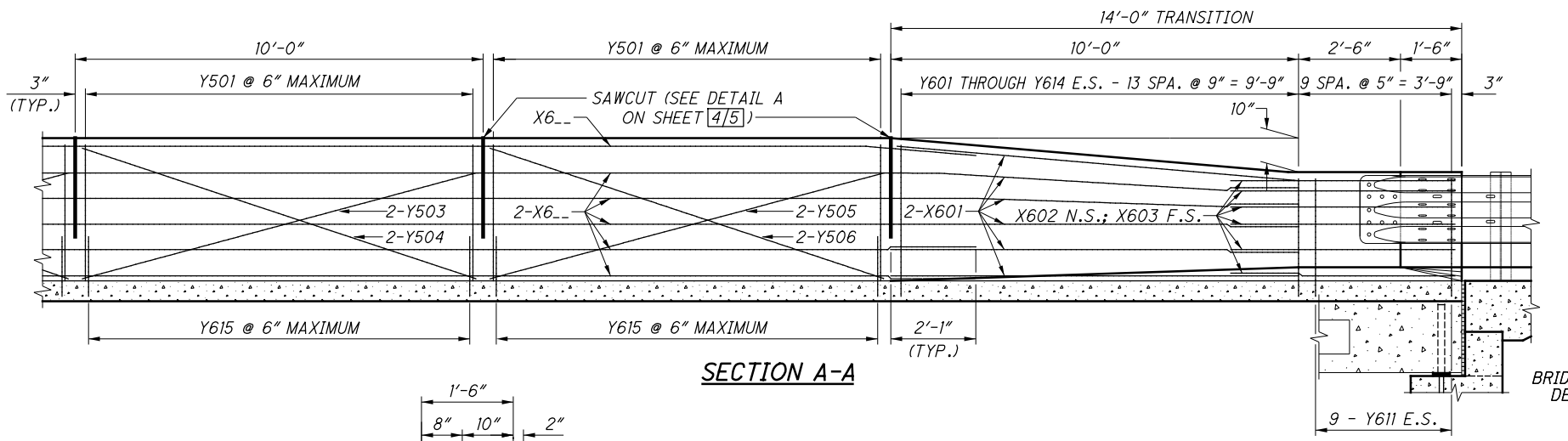
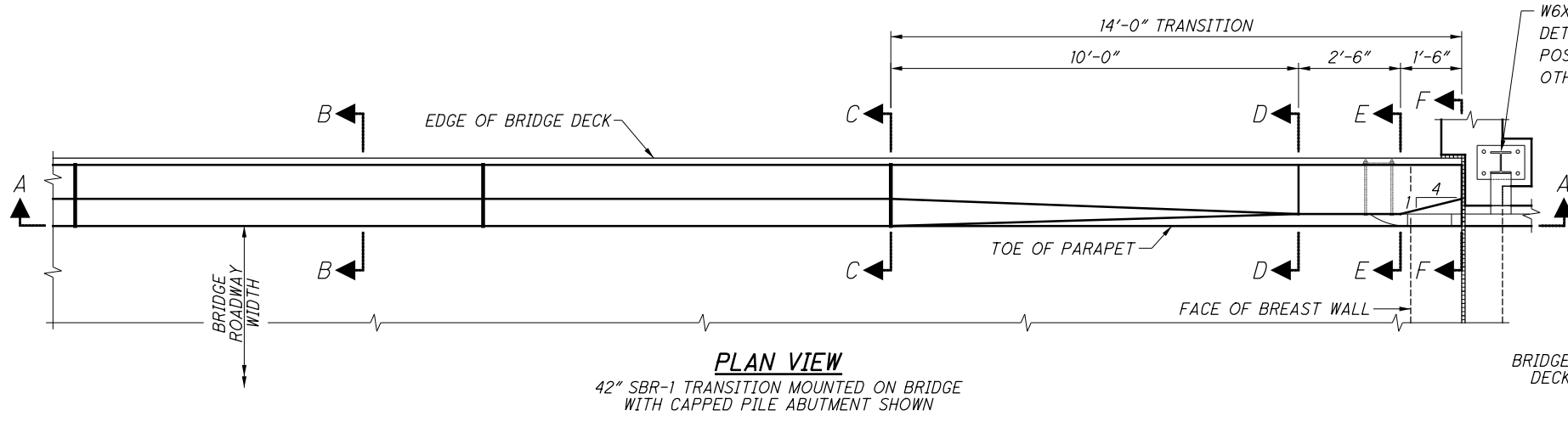
LEGEND:
E.S. = EACH SIDE
F.S. = FAR SIDE
N.S. = NEAR SIDE

REINFORCEMENT FOR 42" SBR-1 TRANSITION MOUNTED ON BRIDGE OR APPROACH SLAB			
MARK	LENGTH	TYPE	MATERIAL
X601	10'-0"	STR	GFRP
X602	5'-8"	BENT	GFRP
X603	5'-8"	STR	GFRP
X6...	⊕	STR	GFRP
Y501	7'-1 1/2"	BENT	STEEL
Y502	2A + 3'-2"	BENT	STEEL
Y503	10'-0"	STR	GFRP
Y504	10'-2"	STR	GFRP
Y505	⊕	STR	GFRP
Y506	⊕	STR	GFRP
Y601 THROUGH Y612	A + B + 10"	BENT	STEEL

BENDING DIAGRAMS	
<p>X602 (SEE NOTE 9)</p>	<p>Y501</p>
<p>Y502</p>	<p>Y601 THROUGH Y612</p>

- 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 WEIGHTS.
 - 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 Y502 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 X6... BARS AND STIFFENING BARS (Y503, Y504, Y505 & Y506 BARS).
 - TIE Y503 & Y505 STIFFENING BARS AT EACH HORIZONTAL BAR. TIE Y504 & Y506 STIFFENING BARS 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.
 - X602 BAR MAY BE PROVIDED AS EPOXY COATED STEEL REINFORCEMENT IF A GFRP FABRICATED SHAPE IS NOT AVAILABLE.

⊕ SEE PROJECT PLANS.

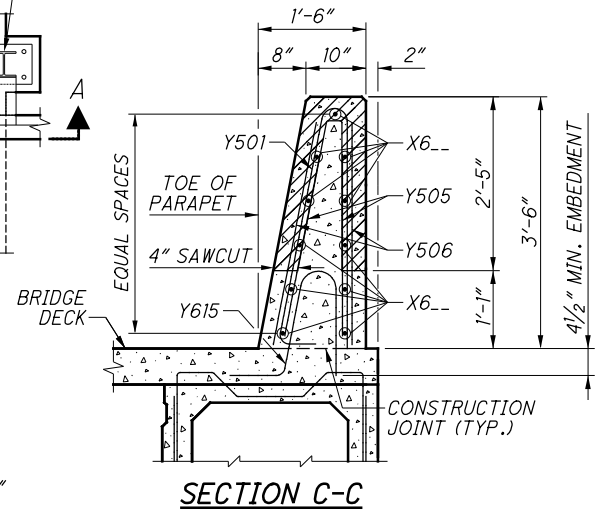


SECTION B-B
COMPOSITE PRESTRESSED
CONCRETE BOX BEAMS

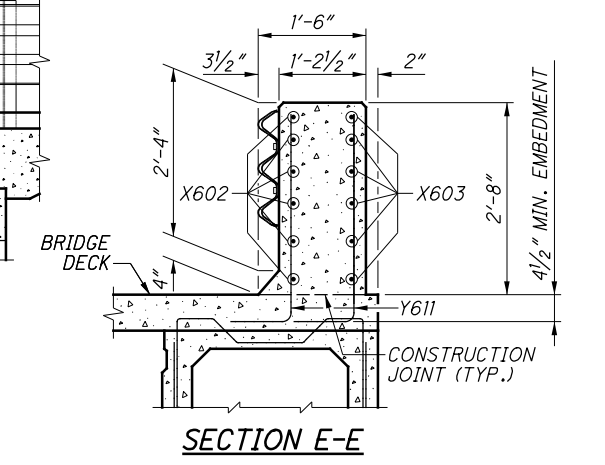
- NOTES:**
- FOR ALL SINGLE SLOPE CONCRETE BRIDGE RAILINGS INCLUDING THE 14'-0" TRANSITIONS, PROJECT PLANS SHALL INCLUDE PLAN VIEW, ELEVATION VIEW, SECTIONS, REINFORCING MARKS, REINFORCING BENDING DIAGRAMS, AND REINFORCING WEIGHTS.
 - SEE APPROPRIATE STANDARD BRIDGE DRAWING FOR ABUTMENT DETAILS.
 - FOR 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 X6... BARS AND STIFFENING BARS (Y503, Y504, Y505 & Y506 BARS).
 - TIE Y503 & Y505 STIFFENING BARS AT EACH HORIZONTAL BAR. TIE Y504 & Y506 STIFFENING BARS 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.
 - X602 BAR MAY BE PROVIDED AS EPOXY COATED STEEL REINFORCEMENT IF A GFRP FABRICATED SHAPE IS NOT AVAILABLE.

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

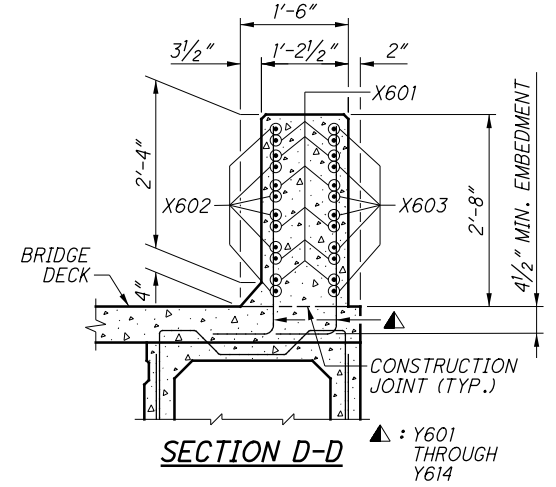
W6X25 TOP MOUNTED STEEL GUARDRAIL POST. REFER TO STD. BRIDGE DWG. TST-1-99 FOR ADDITIONAL DETAILS. MODIFY WINGWALL THICKNESS TO ACCOMMODATE INSTALLATION OF BASE PLATE AND GUARDRAIL POST. PAYMENT FOR STEEL POSTS, BASE PLATES, SPACER PLATES, ANCHOR BOLTS, NUTS, WASHERS, AND OTHER HARDWARE SHALL BE INCLUDED WITH ITEM 606 - MGS BRIDGE TERMINAL ASSEMBLY.



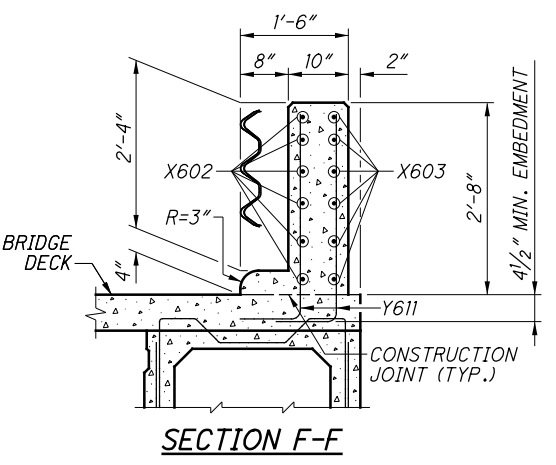
SECTION C-C



SECTION E-E



SECTION D-D ▲ : Y601 THROUGH Y614

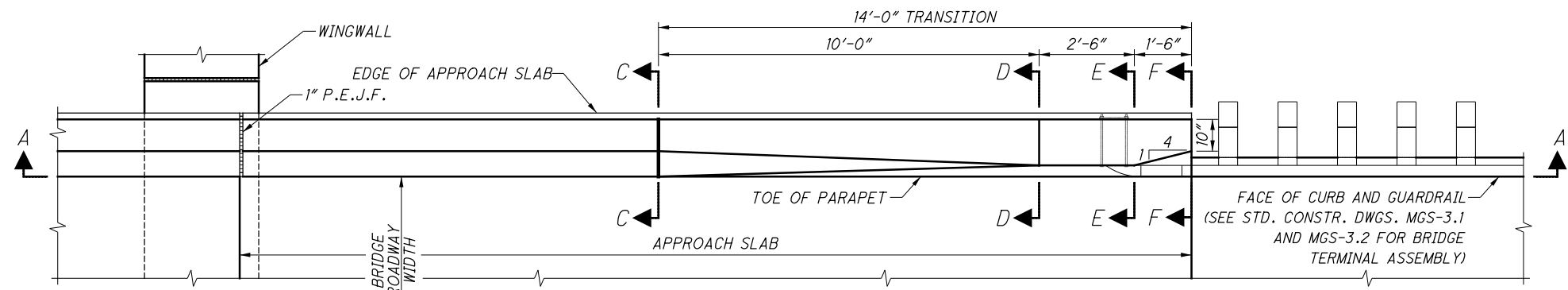


SECTION F-F

REINFORCEMENT FOR 42" SBR-1 TRANSITION MOUNTED ON BRIDGE

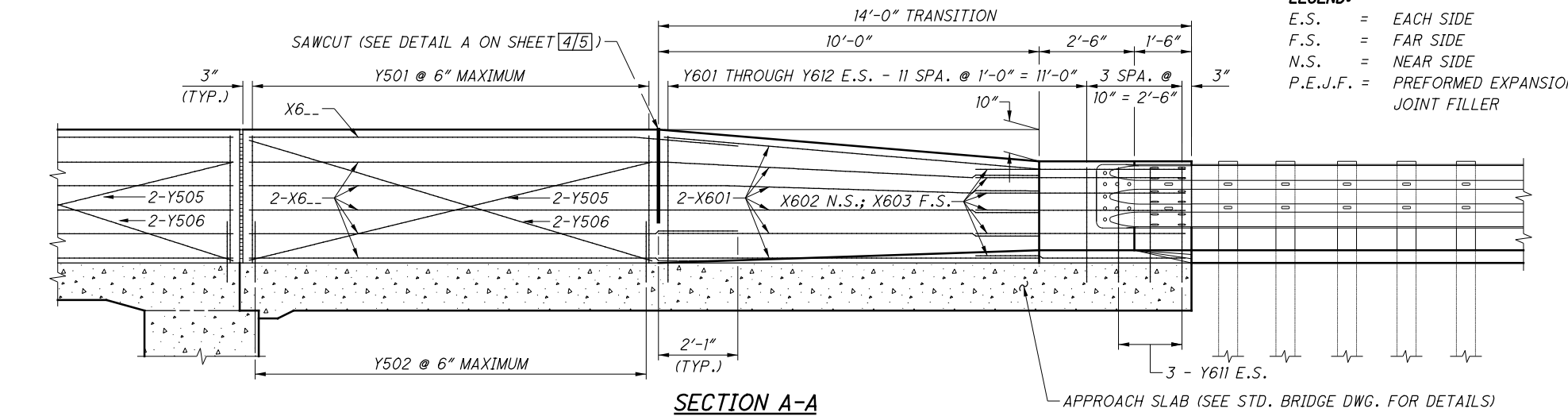
MARK	LENGTH	TYPE	MATERIAL	BENDING DIAGRAMS	
X601	10'-0"	STR	GFRP		
X602	5'-8"	BENT	GFRP		
X603	5'-8"	STR	GFRP		
X6...	⊕	STR	GFRP		
Y501	7'-1 1/2"	BENT	STEEL		
Y615	2A + 3'-3"	BENT	STEEL		
Y503	10'-0"	STR	GFRP		
Y504	10'-2"	STR	GFRP		
Y505	⊕	STR	GFRP		
Y506	⊕	STR	GFRP		
Y601 THROUGH Y614	A + B + 10"	BENT	STEEL		
				<p>⊕ SEE PROJECT PLANS.</p>	

Y601 THROUGH Y614

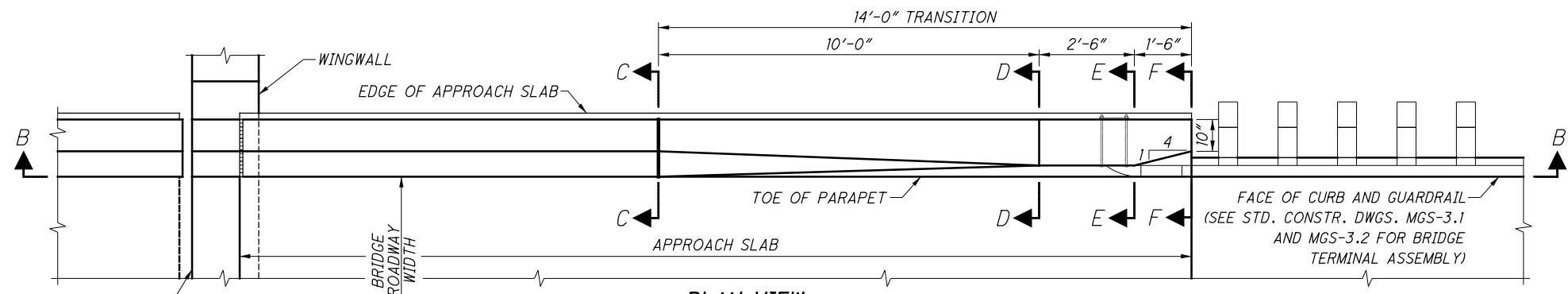


PLAN VIEW
42" SBR-1 TRANSITION MOUNTED ON APPROACH SLAB
WITH SEMI-INTEGRAL ABUTMENT SHOWN
(INTEGRAL ABUTMENT AND CAPPED PILE ABUTMENT SIMILAR)

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

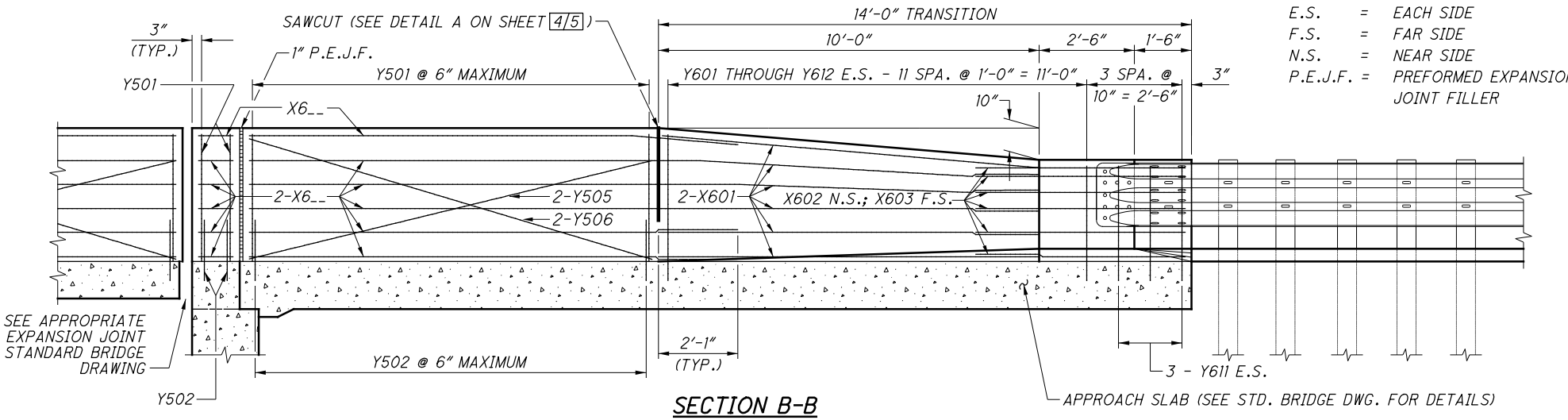


SECTION A-A

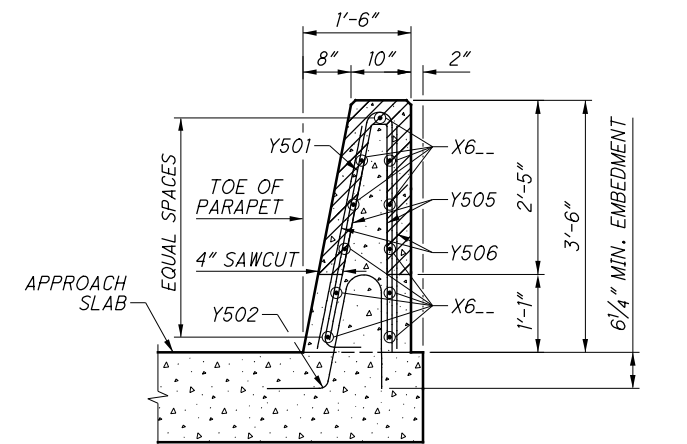


PLAN VIEW
42" SBR-1 TRANSITION MOUNTED ON APPROACH SLAB
WITH TYPICAL ABUTMENT SHOWN

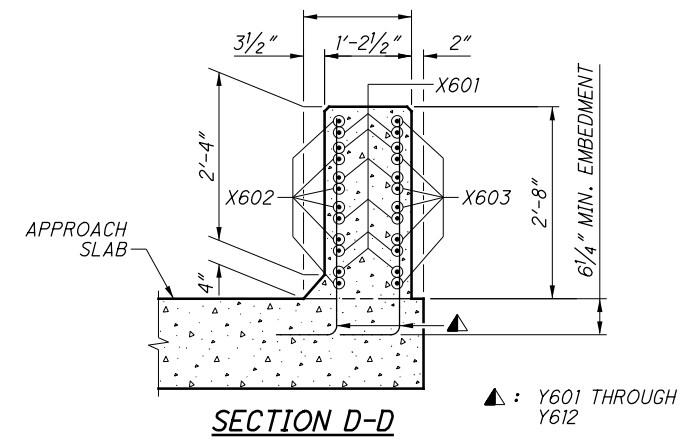
LEGEND:
E.S. = EACH SIDE
F.S. = FAR SIDE
N.S. = NEAR SIDE
P.E.J.F. = PREFORMED EXPANSION
JOINT FILLER



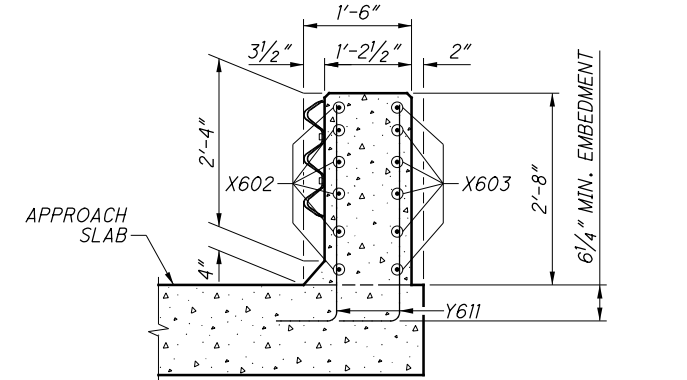
SECTION B-B



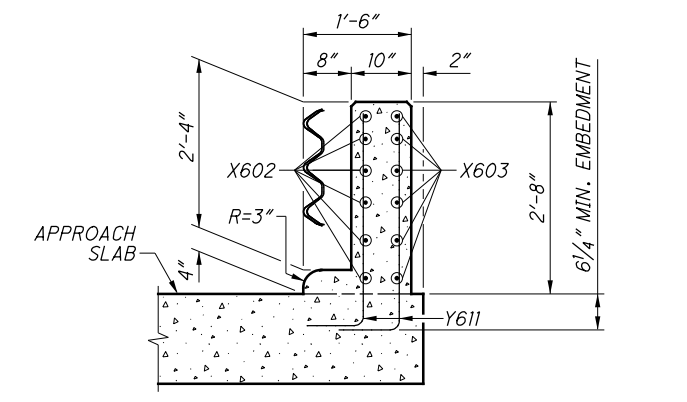
SECTION C-C



SECTION D-D

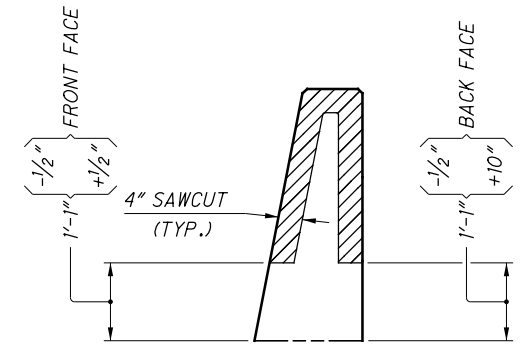
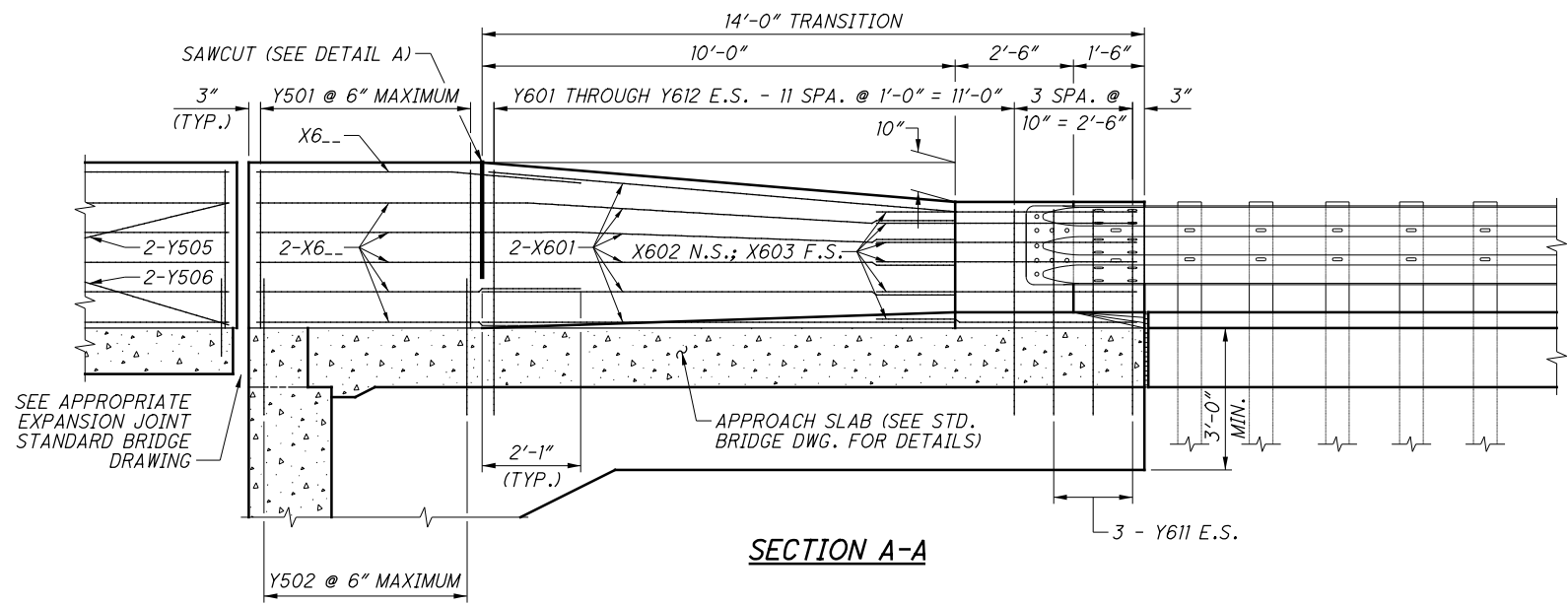
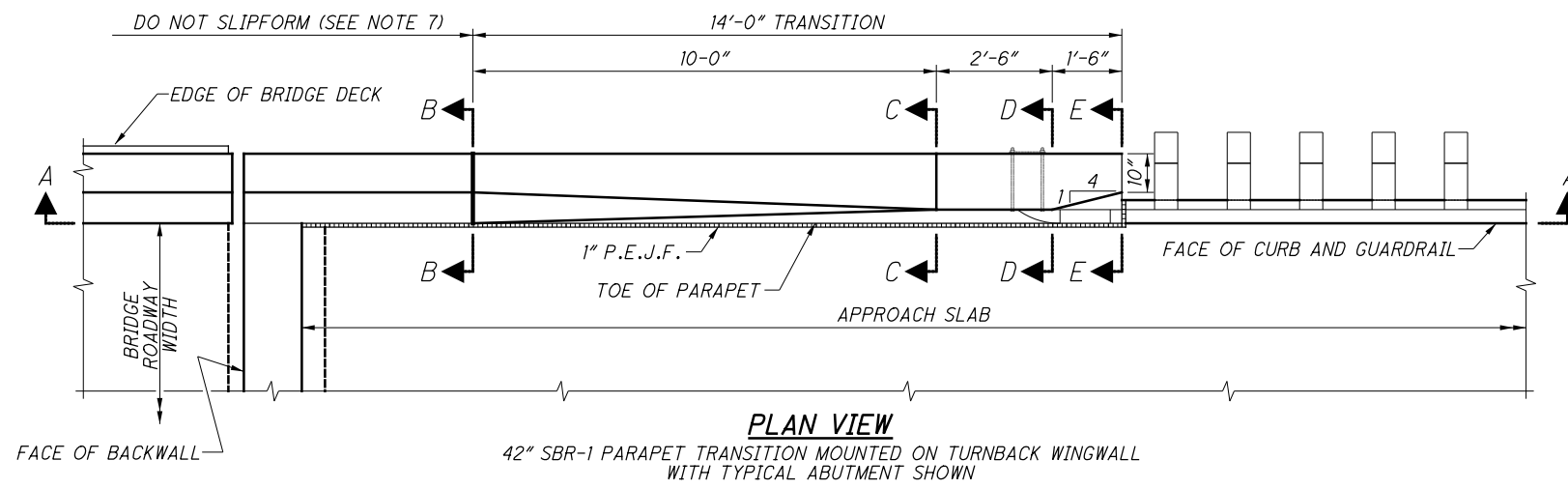


SECTION E-E



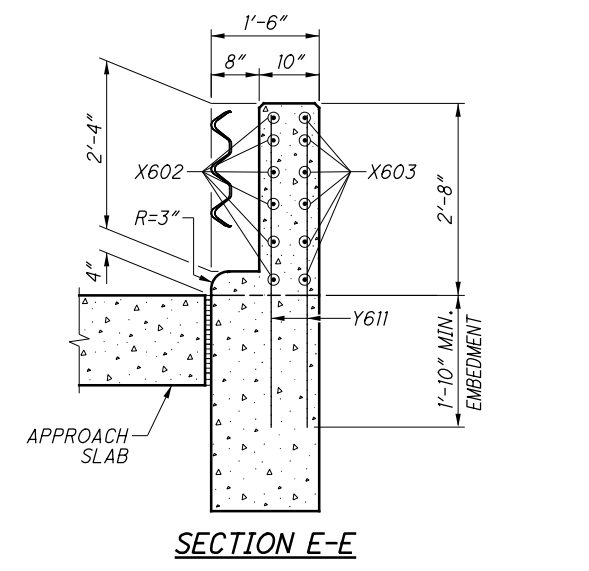
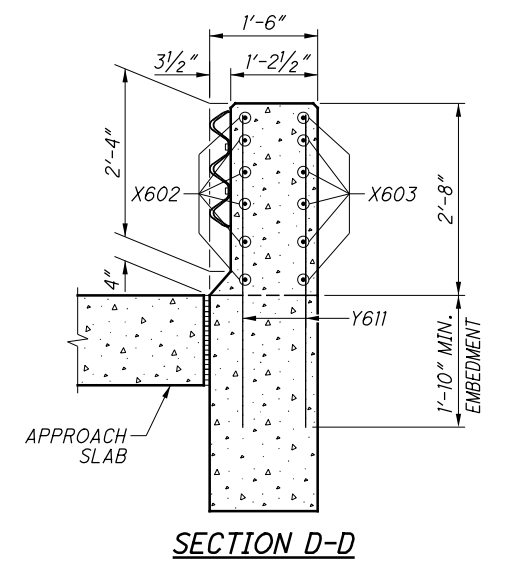
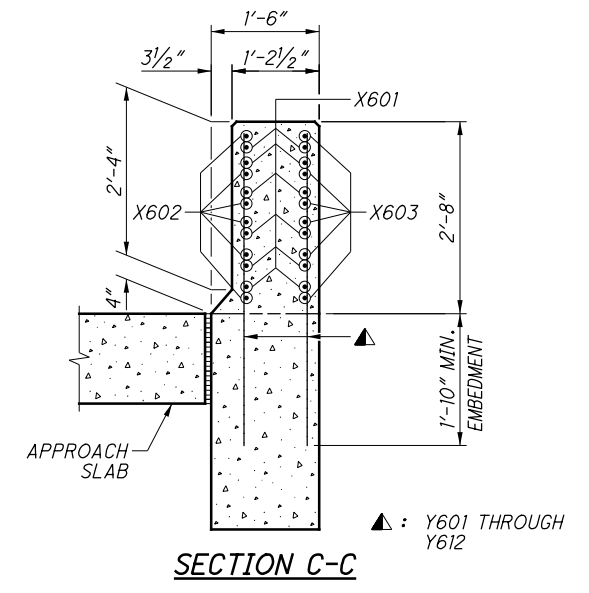
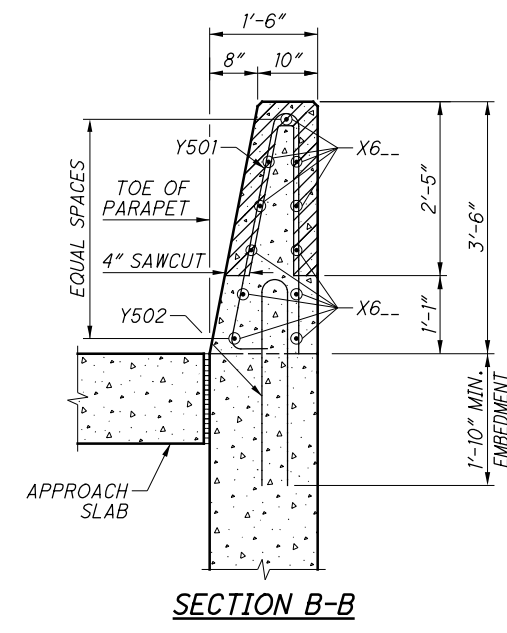
SECTION F-F

NOTES:
1. FOR REINFORCEMENT LIST, SEE SHEET [1/5].
2. FOR ADDITIONAL DETAILS AND NOTES, SEE SHEETS [1/5] AND [5/5].



LEGEND:
E.S. = EACH SIDE
F.S. = FAR SIDE
N.S. = NEAR SIDE
P.E.J.F. = 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 WEIGHTS.
 - SEE APPROPRIATE STANDARD BRIDGE DRAWING FOR ABUTMENT DETAILS.
 - FOR BRIDGE TERMINAL ASSEMBLY, SEE STD. CONSTR. DWGS. MGS-3.1 AND MGS-3.2.
 - FOR DEFLECTION JOINT DETAILS AND ADDITIONAL NOTES, SEE SHEET 5/5.
 - GLASS FIBER REINFORCED POLYMER (GFRP) SHALL BE USED FOR ALL HORIZONTAL X6... BARS AND STIFFENING BARS (Y503 & Y504 BARS).
 - USE GLASS FIBER REINFORCED POLYMER (GFRP) FOR ALL HORIZONTAL X6... BARS AND STIFFENING BARS (Y503, Y504, Y505 & Y506 BARS).
 - TIE Y503 & Y505 STIFFENING BARS AT EACH HORIZONTAL BAR. TIE Y504 & Y506 STIFFENING BARS 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.
 - X602 BAR MAY BE PROVIDED AS EPOXY COATED STEEL REINFORCEMENT IF A GFRP FABRICATED SHAPE IS NOT AVAILABLE.

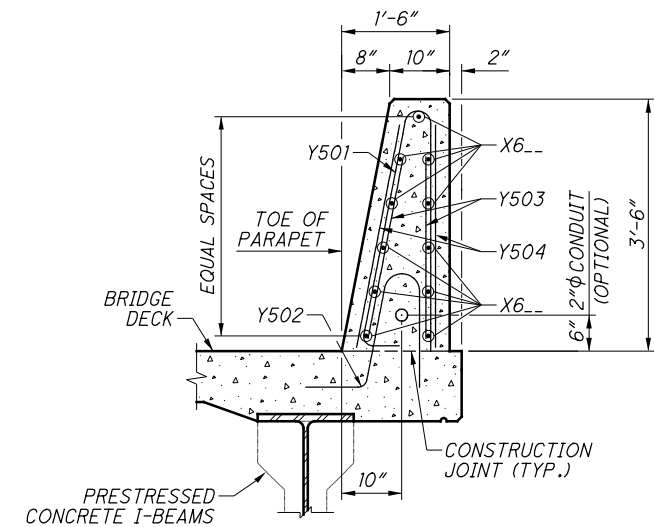
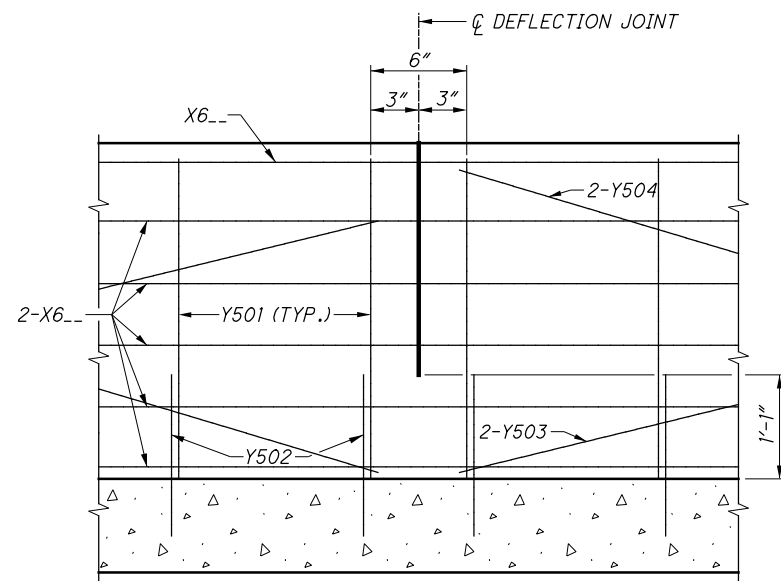
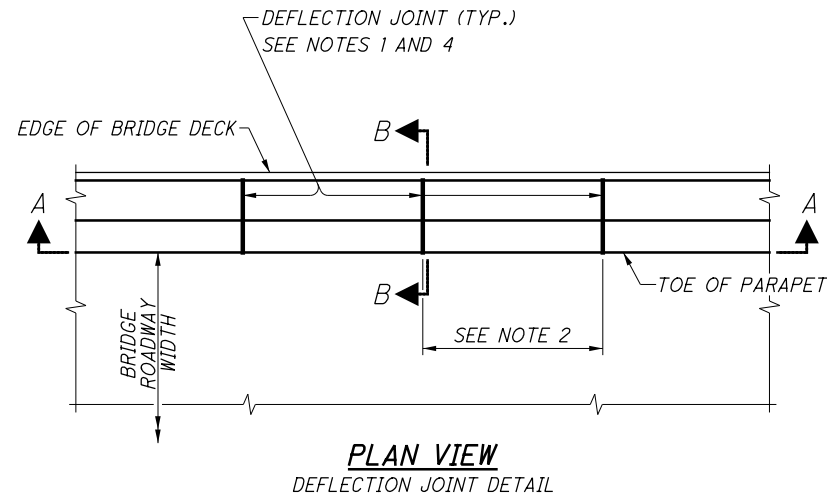


REINFORCEMENT FOR 42" SBR-1 TRANSITION MOUNTED ON WINGWALL			
MARK	LENGTH	TYPE	MATERIAL
X601	10'-0"	STR	GFRP
X602	5'-8"	BENT	GFRP
X603	5'-8"	STR	GFRP
X6...	⊕	STR	GFRP
Y501	7'-1 1/2"	BENT	STEEL
Y502	2A + 2'-4"	BENT	STEEL
Y503	10'-0"	STR	GFRP
Y504	10'-2"	STR	GFRP
Y505	⊕	STR	GFRP
Y506	⊕	STR	GFRP
Y601 THROUGH Y612	A + B + 10"	STR	STEEL

BENDING DIAGRAMS	
<p>X602 (SEE NOTE 8)</p>	<p>EMBEDMENT</p>

MARK	LENGTH
Y601	3'-4"
Y602	3'-3"
Y603	3'-2"
Y604	3'-1"
Y605	3'-0"
Y606	2'-11"
Y607	2'-10"
Y608	2'-9"
Y609	2'-8"
Y610	2'-7"
Y611	2'-6"
Y612	2'-5"

⊕ SEE PROJECT PLANS.



SECTION A-A
DETAIL AT DEFLECTION JOINTS
FOR SINGLE SLOPE CONCRETE BRIDGE RAILING

SECTION B-B
REINFORCED CONCRETE DECK ON STEEL OR
PRESTRESSED CONCRETE I-BEAMS/GIRDERS SHOWN

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:

42" SINGLE SLOPE CONCRETE BRIDGE RAILINGS MEET THE REQUIREMENTS OF NCHRP 350 TEST LEVEL 5 AND "AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS", 2017.

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 42" SBR-1 CROSS SECTION = 588.0 SQ. IN.
 VOLUME OF 42" SBR-1 14'-0" TRANSITION SECTION = 1.82 CU. YD.

DEFLECTION JOINTS FOR CONCRETE PARAPETS:

FOR SLIPFORMED CONSTRUCTION:

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

AFTER THE CURING PERIOD AND BEFORE APPLYING LOAD TO THE PARAPET, 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 PARAPET AFTER REMOVAL OF TRAFFIC CONTROL DEVICES.

FOR CONVENTIONALLY FORMED CONSTRUCTION:

REMOVE THE FORMS BEFORE APPLYING LOAD TO THE PARAPET. AS SOON AS THE FORMS ARE REMOVED, PERFORM 4-INCH SAWCUT AS SHOWN IN DETAIL A, SHEET [4/5]. THE 1 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 PARAPET. 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 PARAPET 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 42" SBR-1 CONCRETE PARAPETS:

THE MAXIMUM SPACING OF VERTICAL REINFORCING BARS FOR THE STANDARD 42" SBR-1 CONCRETE PARAPET SHALL BE 6", UNLESS NOTED OTHERWISE.

MAXIMUM SPACING OF VERTICAL REINFORCING BARS FOR 42" SBR-1 TRANSITIONS:

THE MAXIMUM SPACING OF VERTICAL REINFORCING BARS FOR THE 42" SBR-1 TRANSITION SECTION SHALL BE AS SHOWN ON SHEETS [1/5], [2/5], [3/5], OR [4/5].

MINIMUM EMBEDMENT OF VERTICAL REINFORCING BARS:

IF THE MINIMUM EMBEDMENT SHOWN FOR THE VERTICAL REINFORCING BARS INTO THE BRIDGE DECK, APPROACH SLAB, OR WINGWALL 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.