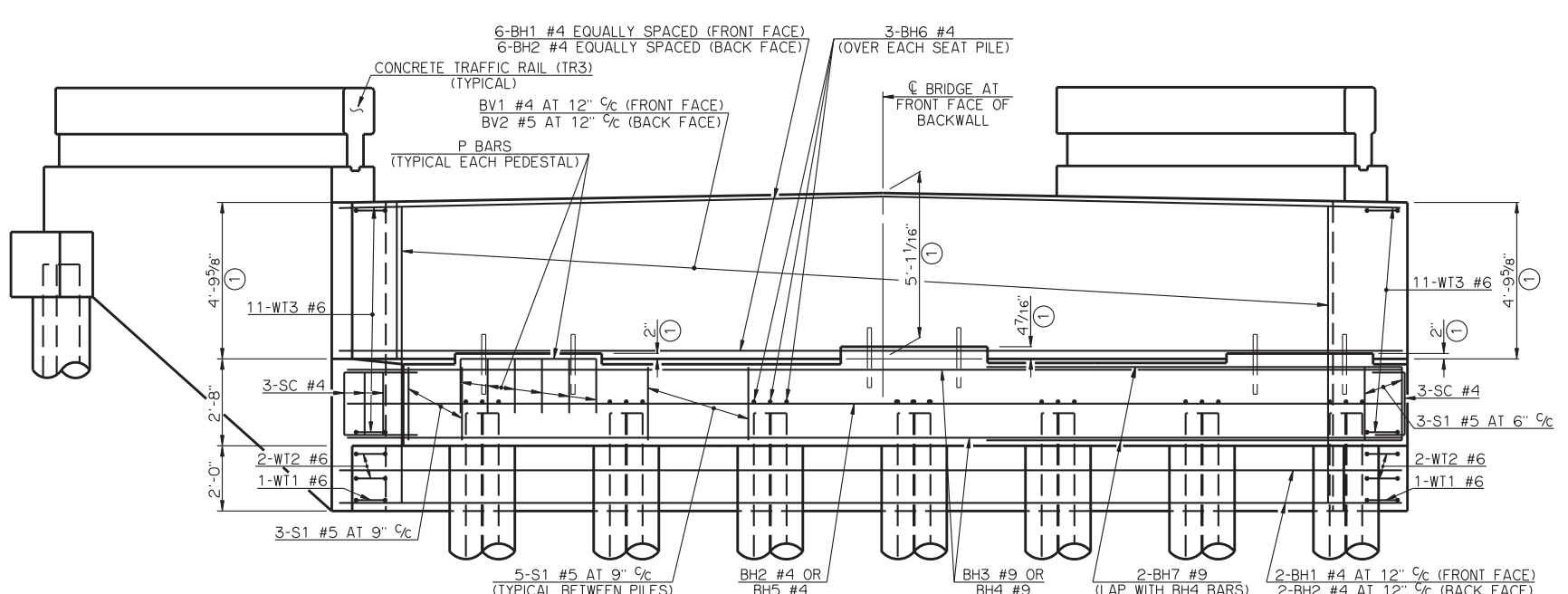


PLAN
LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND

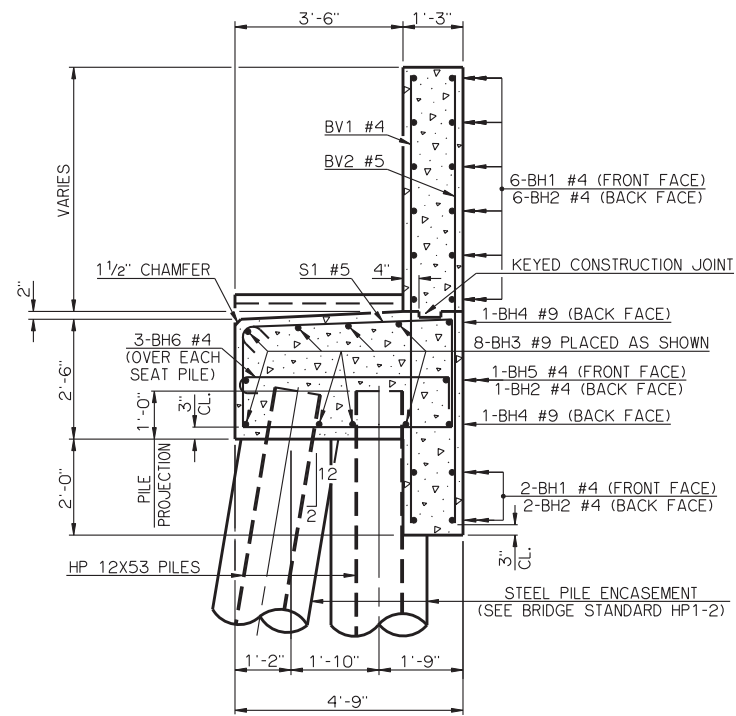


SUMMARY OF QUANTITIES - ONE ABUTMENT ③		
ITEM	UNIT	TOTAL
SUBSTRUCTURE EXCAVATION, COMMON	CY	70.00
GRANULAR BACKFILL	CY	51.00
CLASS A CONCRETE	CY	25.90
REINFORCING STEEL	LB	3,370.00
PILES, FURNISHED (HP 12X53)	LF	-
PILES, DRIVEN (HP 12X53)	LF	-
6" PERFORATED PIPE UNDERDRAIN	LF	30.00
6" NON-PERFORATED PIPE UNDERDRAIN	LF	-

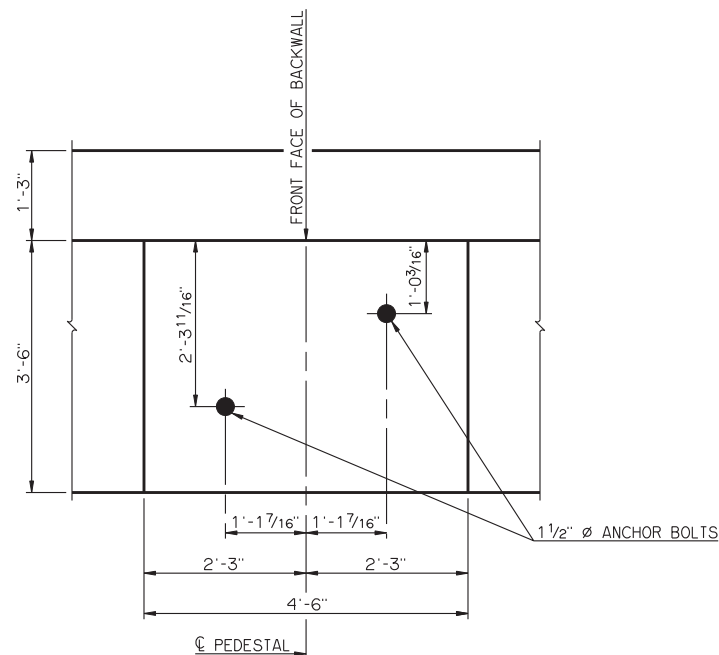
③ EXCLUDES WINGS

- ① DIMENSIONS ARE FROM TOP OF BRIDGE SEAT AT FRONT FACE OF BACKWALL.
- ② ALL WT WING REINFORCING STEEL TIED TO THE ABUTMENT BRIDGE SEAT, BACKWALL AND CURTAIN WALL REINFORCING STEEL MUST BE IN PLACE PRIOR TO POURING ABUTMENT CONCRETE. FOR ADDITIONAL INFORMATION SEE WING DETAILS.

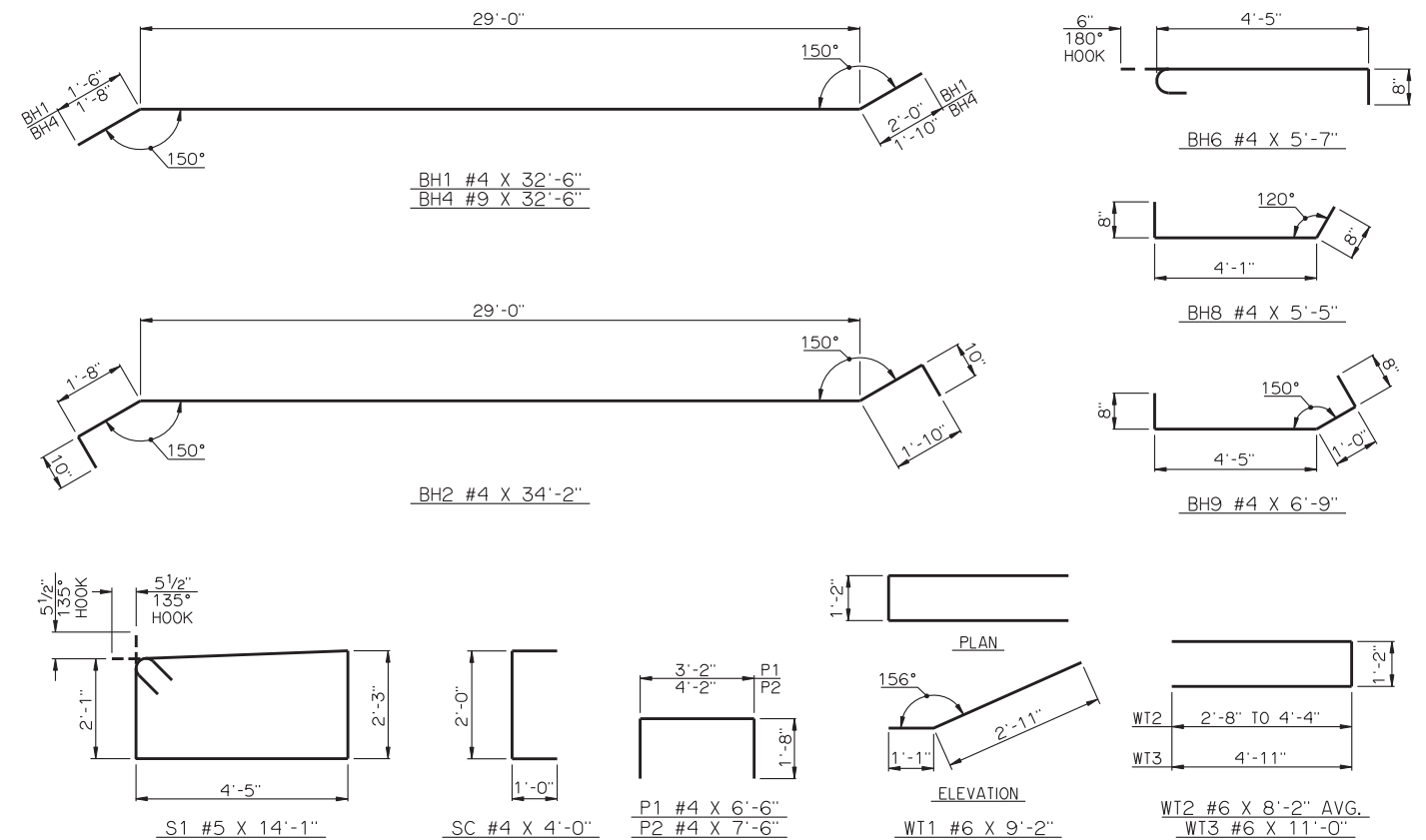
APPROVED BY BRIDGE ENGINEER *Robert J. Duch* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
ABUTMENT DETAILS
TYPE IV P.C. BEAMS
 (SHEET NO. 1 OF 2)
 26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°
 2009 SPECIFICATIONS CB26-C-SK30-ABUT-PC4-1 Q1E
 CB-199E



TYPICAL SECTION THRU ABUTMENT



DETAIL OF PEDESTAL WITH LAYOUT OF ANCHOR BOLTS

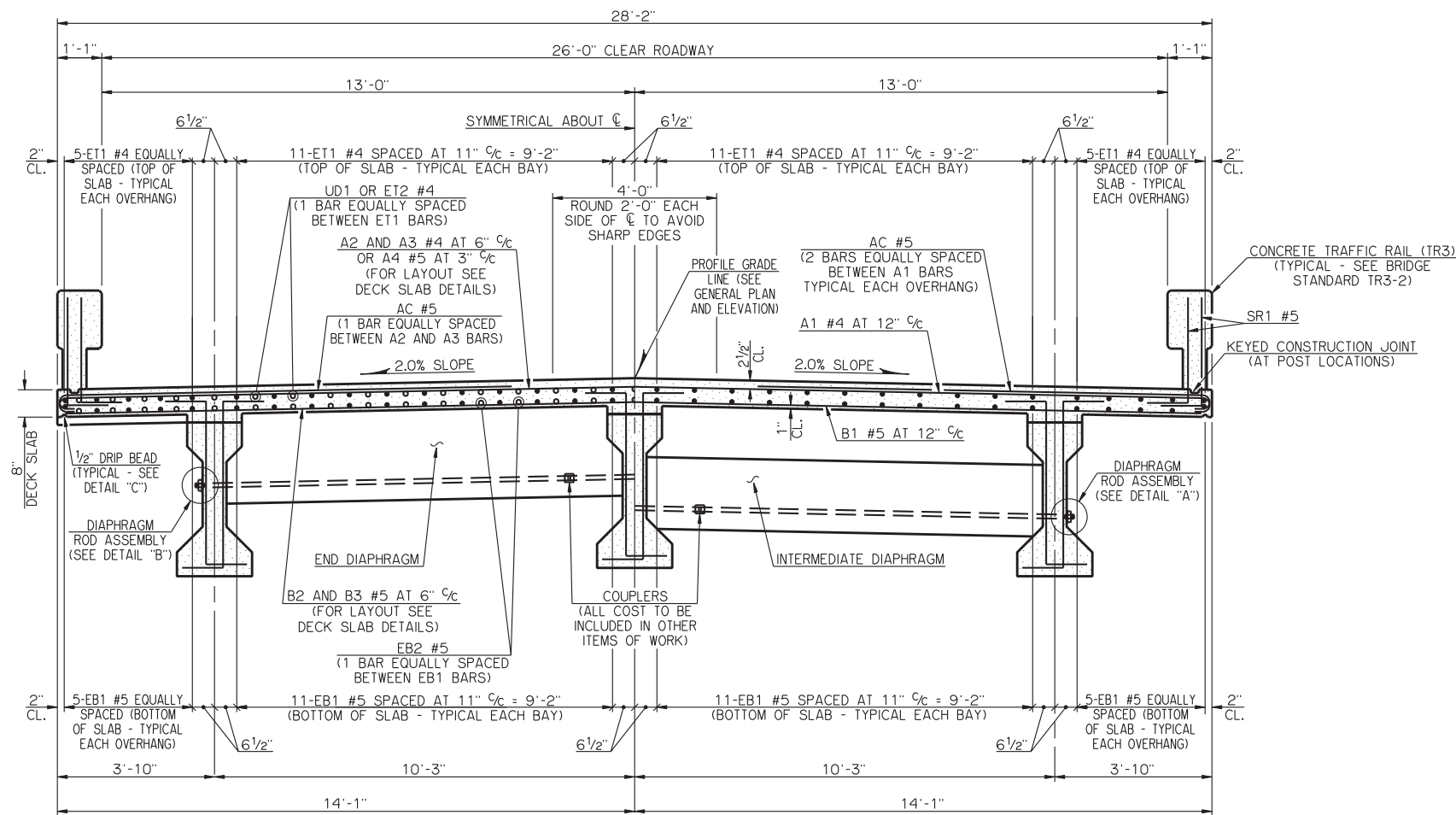


DETAILS OF BENT REINFORCING STEEL

BAR LIST - ONE ABUTMENT					
MARK	NO.	SIZE	FORM	LENGTH	LENGTH VARIATION
BH1	8	#4	BNT.	32'-6"	-
BH2	9	#4	BNT.	34'-2"	-
① BH3	8	#9	STR.	31'-6" AVG.	30'-7" TO 32'-5"
BH4	2	#9	BNT.	32'-6"	-
BH5	1	#4	STR.	30'-7"	-
BH6	21	#4	BNT.	5'-7"	-
BH7	2	#9	STR.	12'-9"	-
BH8	3	#4	BNT.	5'-5"	-
BH9	3	#4	BNT.	6'-9"	-
② BV1	30	#4	STR.	9'-2" AVG.	9'-0" TO 9'-4"
② BV2	30	#5	STR.	9'-2" AVG.	9'-0" TO 9'-4"
BV3	8	#6	STR.	9'-0"	-
P1	18	#4	BNT.	6'-6"	-
P2	12	#4	BNT.	7'-6"	-
S1	36	#5	BNT.	14'-1"	-
SC	6	#4	BNT.	4'-0"	-
WT1	2	#6	BNT.	9'-2"	-
③ WT2	4	#6	BNT.	8'-2" AVG.	6'-6" TO 9'-10"
WT3	22	#6	BNT.	11'-0"	-

- ① NO. INCLUDES TWO SETS OF 4 BARS
- ② NO. INCLUDES TWO SETS OF 15 BARS
- ③ NO. INCLUDES TWO SETS OF 2 BARS

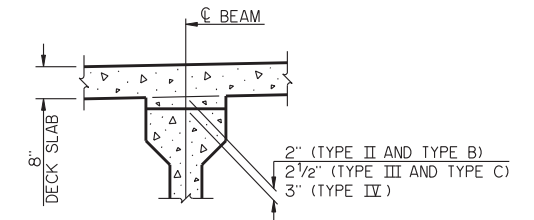
APPROVED BY BRIDGE ENGINEER *Robert J. Dush* DATE 10-31-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
ABUTMENT DETAILS
TYPE IV P.C. BEAMS
 (SHEET NO. 2 OF 2)
 26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°
 2009 SPECIFICATIONS CB26-C-SK30-ABUT-PC4-2 02E CB-200E



HALF SECTION OF END ZONE REINFORCING AT END DIAPHRAGM

HALF SECTION OF TYPICAL REINFORCING AT INTERMEDIATE DIAPHRAGM

TYPICAL CROSS SECTION



DETAIL OF HAUNCH

PLAN QUANTITIES FOR "CLASS AA CONCRETE" INCLUDE HAUNCHES OVER BEAMS. HAUNCH HEIGHT SHOWN IS AT CENTERLINE BEARING ONLY, MEASURED FROM BOTTOM OF DECK SLAB TO TOP OF BEAM, AND VARIES ACROSS THE SPAN. HAUNCH HEIGHT TO BE DETERMINED AFTER ERECTION OF BEAMS TO PROVIDE FOR DEAD LOAD DEFLECTION AND GRADE ADJUSTMENT, BUT THE PAY QUANTITY WILL BE AS SHOWN IN THE PLANS.

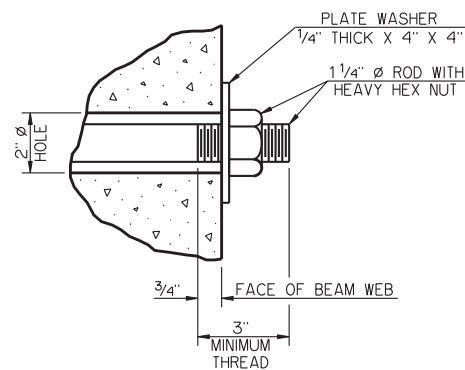
NOTES

- ROTATE HOOKS ON A4 AND AC BARS TO MAINTAIN MINIMUM CLEARANCE.
- DO NOT PLACE THE CONCRETE FOR THE DECK SLAB OR APPLY OTHER MASSIVE LOADS TO THE BEAMS, INTERMEDIATE DIAPHRAGMS OR END DIAPHRAGMS UNTIL THE CONCRETE IN THE INTERMEDIATE AND END DIAPHRAGMS HAS BEEN IN PLACE A MINIMUM OF 10 DAYS OR AT THE DISCRETION OF THE ENGINEER. THIS TIME MAY BE SHORTENED IF THE CONCRETE HAS ATTAINED 80% OF THE SPECIFIED COMPRESSIVE STRENGTH.
- STAY-IN-PLACE STEEL DECK FORMS MAY BE USED IF THE MINIMUM DECK SLAB THICKNESS OF 8" IS OBTAINED BY MEASURING FROM THE TOP OF THE DECK SLAB TO THE TOP PORTION OF THE STEEL CORRUGATION. NO ADDITIONAL CONCRETE WEIGHT OF THE DECK SLAB IS PERMITTED. ADDITIONAL STEEL WEIGHT OF THE DECK FORMS SHALL NOT EXCEED 5 PSF. STAY-IN-PLACE PRESTRESSED CONCRETE DECK FORMS MAY BE USED IF THE FOLLOWING CONDITIONS ARE MET:
 - 1) SHOP DRAWINGS AND STRUCTURAL CALCULATIONS FOR THE FORMS ARE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL.
 - 2) A NEW STRUCTURAL DESIGN, STRUCTURAL CALCULATIONS, AND A NEW REINFORCING SCHEDULE FOR THE DECK SLAB ARE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL.
 - 3) SHOP DRAWINGS, NEW DECK SLAB REINFORCING SCHEDULE AND STRUCTURAL DESIGNS AND CALCULATIONS SHALL BE PREPARED BY AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF OKLAHOMA.
- ALL COSTS ASSOCIATED WITH THE USE OF STAY-IN-PLACE FORMS, INCLUDING ALL PROFESSIONAL SERVICES, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS, SHALL BE AT THE CONTRACTOR'S EXPENSE. FOR ADDITIONAL INFORMATION CONCERNING THE USE OF STAY-IN-PLACE FORMS, SEE SECTION 502 OF THE STANDARD SPECIFICATIONS.

THE DECK SLAB SHALL BE POURED ONE SPAN AT A TIME. A SPAN ADJACENT TO A FIXED PIER SHALL NOT BE POURED UNTIL AT LEAST 48 HOURS AFTER THE POUR OF ANY ADJACENT SPAN HAS BEEN COMPLETED.

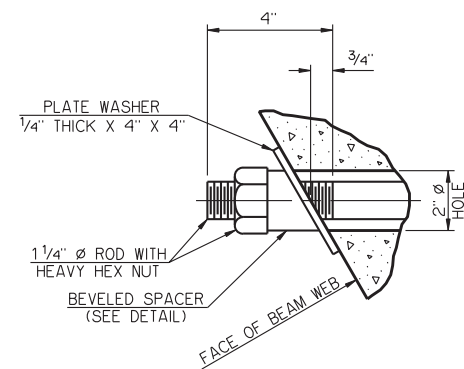
CONSTRUCTION JOINTS AT THE FIXED PIERS SHALL NOT BE KEYED. IN THE EVENT OF AN EMERGENCY, POURING OF THE DECK SLAB MAY BE HALTED WITH A CONSTRUCTION JOINT MADE PERPENDICULAR TO THE DIRECTION OF TRAFFIC AS DIRECTED BY THE ENGINEER. ALL LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS. NO HEAVY EQUIPMENT WILL BE PERMITTED ON THE FINISHED DECK SLAB WITHIN 5'-0" OF ANY CONSTRUCTION JOINT UNTIL THE DECK SLAB IS IN PLACE ON BOTH SIDES OF THE RESPECTIVE JOINT.

DO NOT SAW-CUT GROOVE THE DECK SLAB WITHIN 6" OF ANY CONSTRUCTION JOINT. FOR BAR LIST AND DETAILS OF BENT REINFORCING STEEL, SEE DECK SLAB BAR LIST.



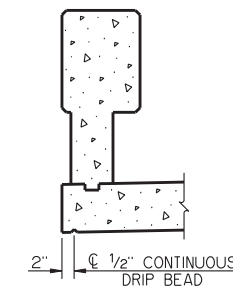
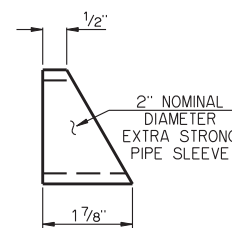
DETAIL "A"

STRUCTURAL STEEL FOR DIAPHRAGM RODS AND PLATE WASHERS SHALL CONFORM TO AASHTO M 270 (ASTM A 709), GRADE 50W, WEATHERING STEEL (CHARPY V-NOTCH TESTING NOT REQUIRED). A #10 REINFORCING STEEL BAR CONFORMING TO AASHTO M 31, GRADE 60 AND THREADED AT BOTH ENDS AS SHOWN MAY BE SUBSTITUTED FOR THE DIAPHRAGM ROD. HEX NUTS SHALL CONFORM TO AASHTO M 291 (ASTM A 563), PROPERTY CLASS 8S3 OR 10S3. STRUCTURAL STEEL FOR BEVELED SPACER SHALL CONFORM TO ASTM A 53, GRADE B. PAINT EXPOSED PARTS OF DIAPHRAGM RODS, PLATE WASHERS, HEX NUTS AND BEVELED SPACERS WITH TWO (2) COATS OF ZINC-RICH PAINT (6 MIL MINIMUM THICKNESS) AFTER ASSEMBLY. ALL COST OF DIAPHRAGM RODS, PLATE WASHERS, HEX NUTS AND BEVELED SPACERS SHALL BE INCLUDED IN UNIT PRICE BID PER POUND OF "STRUCTURAL STEEL."



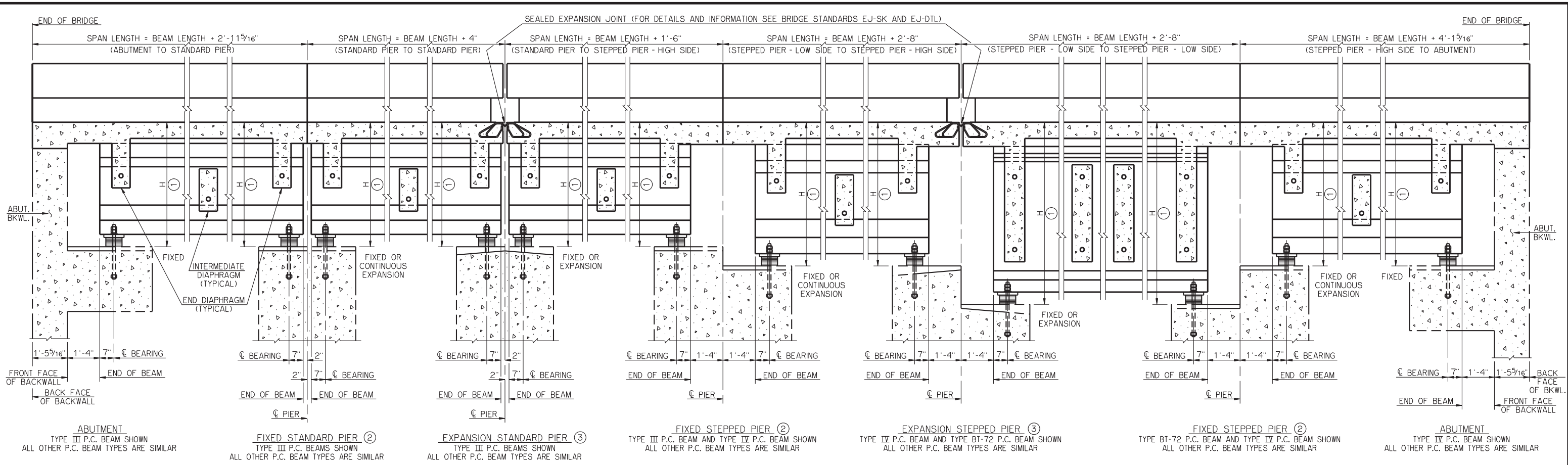
DETAIL "B"

DETAIL OF BEVELED SPACER

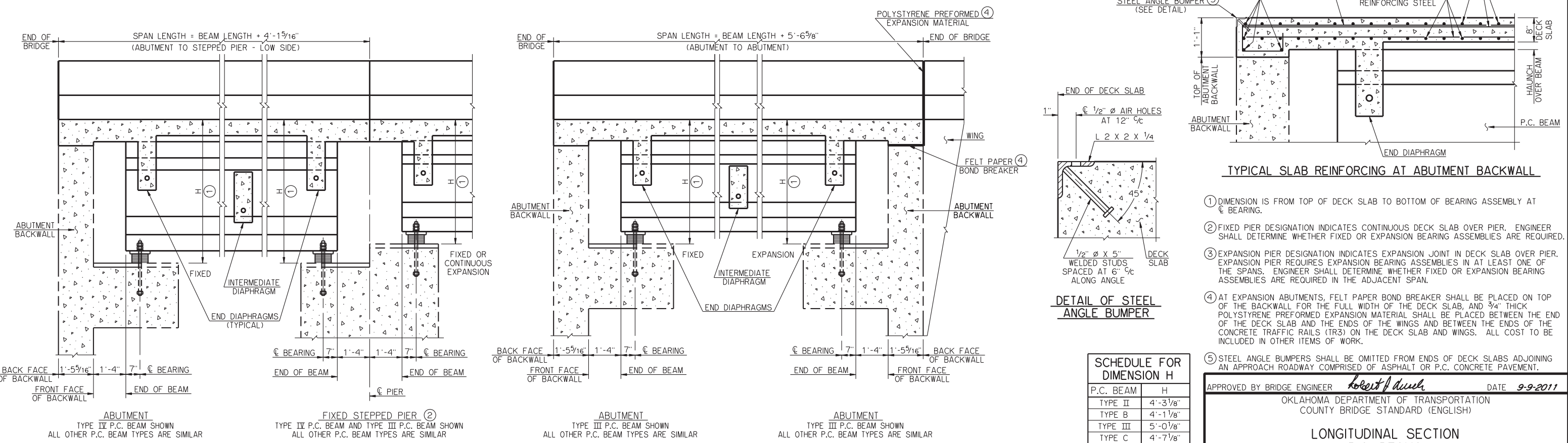


DETAIL "C"

APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
TYPICAL CROSS SECTION
TYPE II, B, III, C AND IV P.C. BEAMS
 26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°
 2009 SPECIFICATIONS CB26-C-SK30-XSECT-PC234 01E
 CB-223E



LONGITUDINAL SECTION



LONGITUDINAL SECTION

LONGITUDINAL SECTION

SCHEDULE FOR DIMENSION H	
P.C. BEAM	H
TYPE II	4'-3 ¹ / ₈ "
TYPE B	4'-1 ¹ / ₈ "
TYPE III	5'-0 ¹ / ₈ "
TYPE C	4'-7 ¹ / ₈ "
TYPE IV	5'-9 ¹ / ₈ "
TYPE BT-72	7'-4 ⁵ / ₈ "
TYPE J	7'-5 ¹ / ₈ "

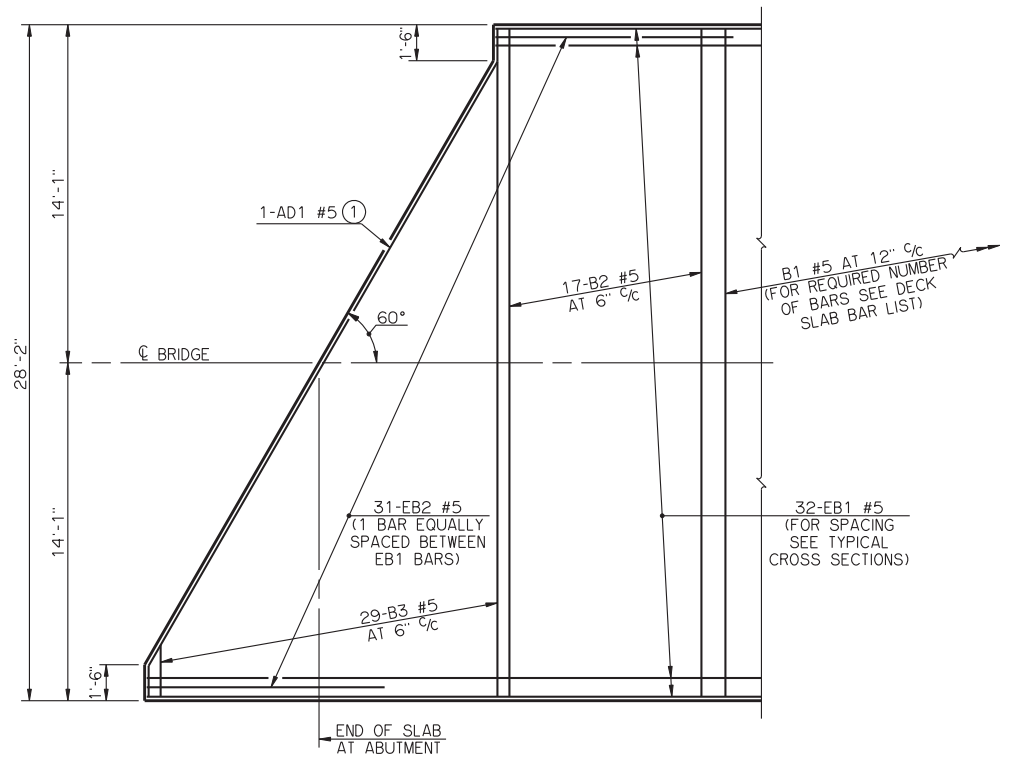
APPROVED BY BRIDGE ENGINEER *Robert Deuch* DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

**LONGITUDINAL SECTION
P.C. BEAMS**

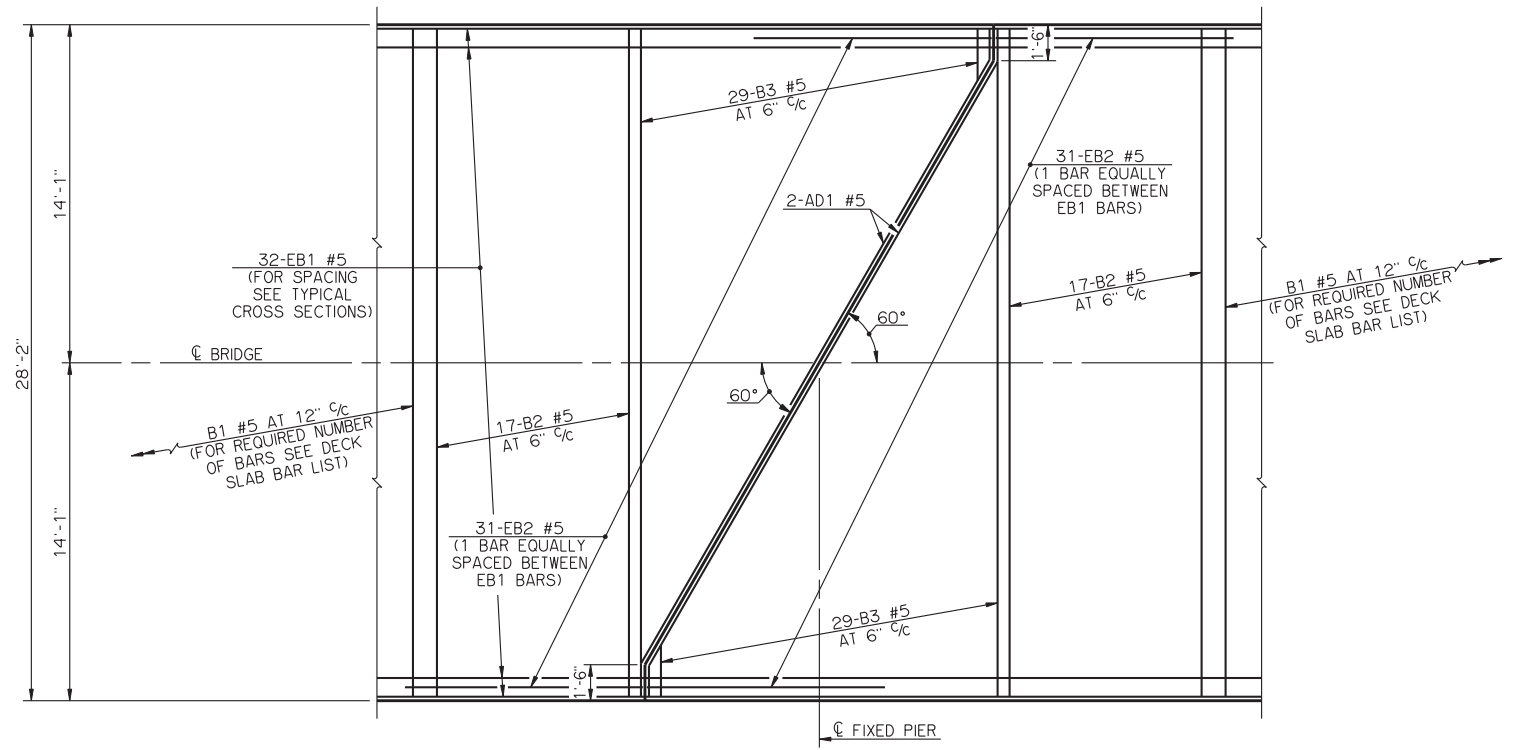
26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

2009 SPECIFICATIONS CB26-C-SK30-LSECT-PCB 01E CB-228E

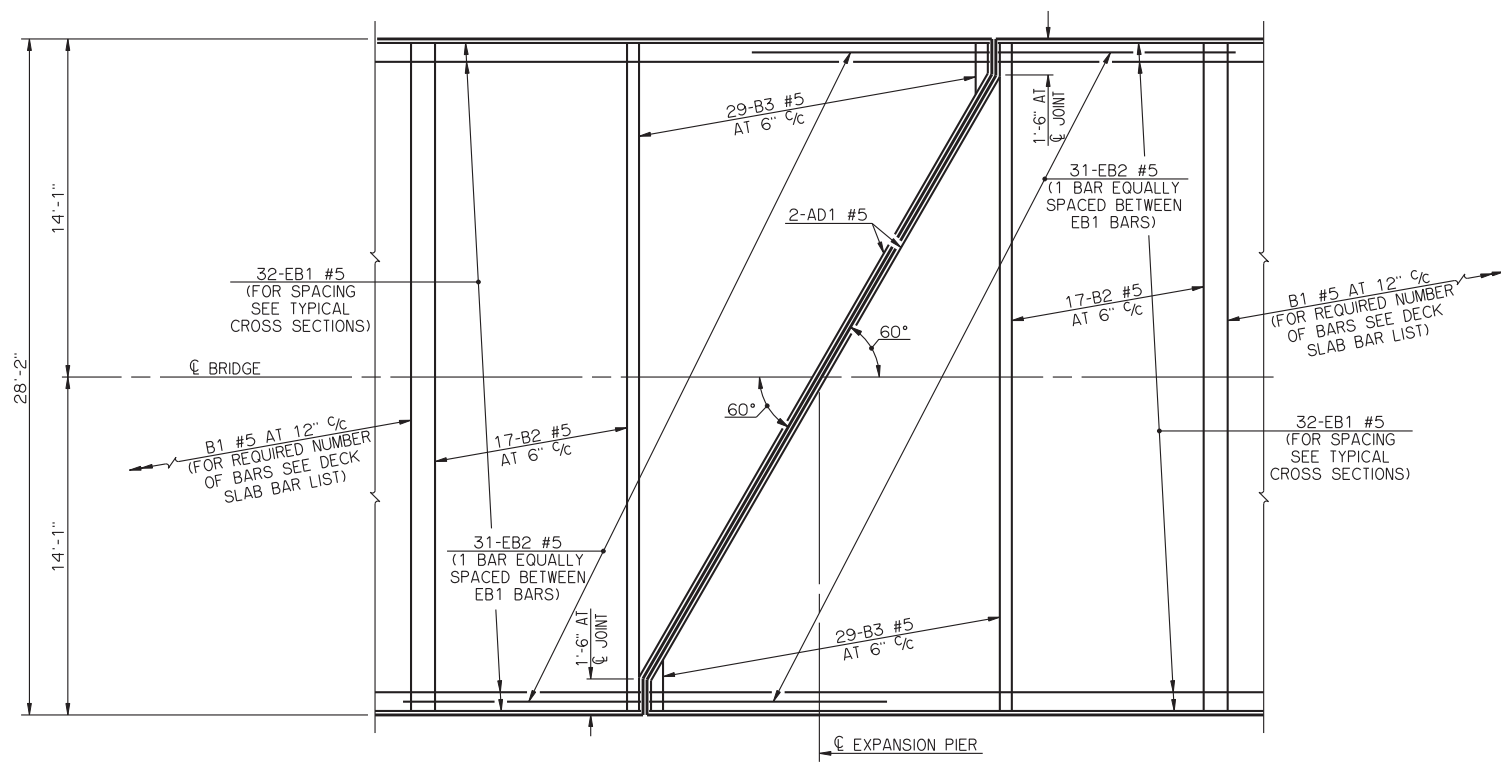


PLAN OF DECK SLAB WITH TYPICAL BOTTOM LAYER OF END ZONE REINFORCING STEEL AT ABUTMENT

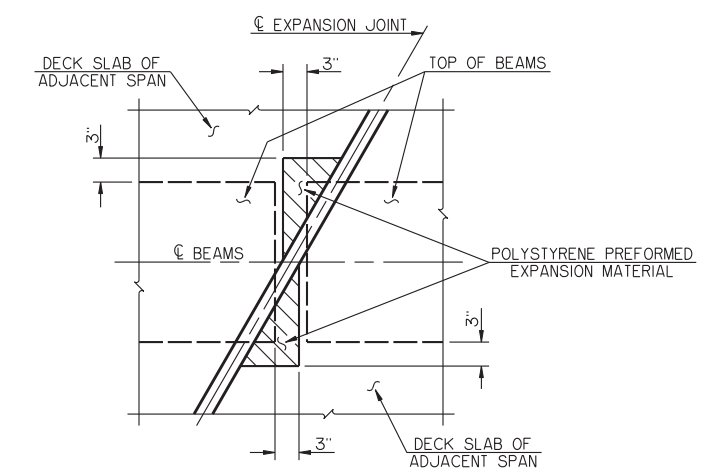
① SEE DETAIL "TYPICAL SLAB REINFORCING AT ABUTMENT BACKWALL" ON LONGITUDINAL SECTION SHEET FOR LAYOUT OF AD1 BARS.



PLAN OF DECK SLAB WITH TYPICAL BOTTOM LAYER OF END ZONE REINFORCING STEEL AT FIXED PIER



PLAN OF DECK SLAB WITH TYPICAL BOTTOM LAYER OF END ZONE REINFORCING STEEL AT EXPANSION PIER



PLAN OF BEAM CORNERS AT SKEWED EXPANSION JOINT

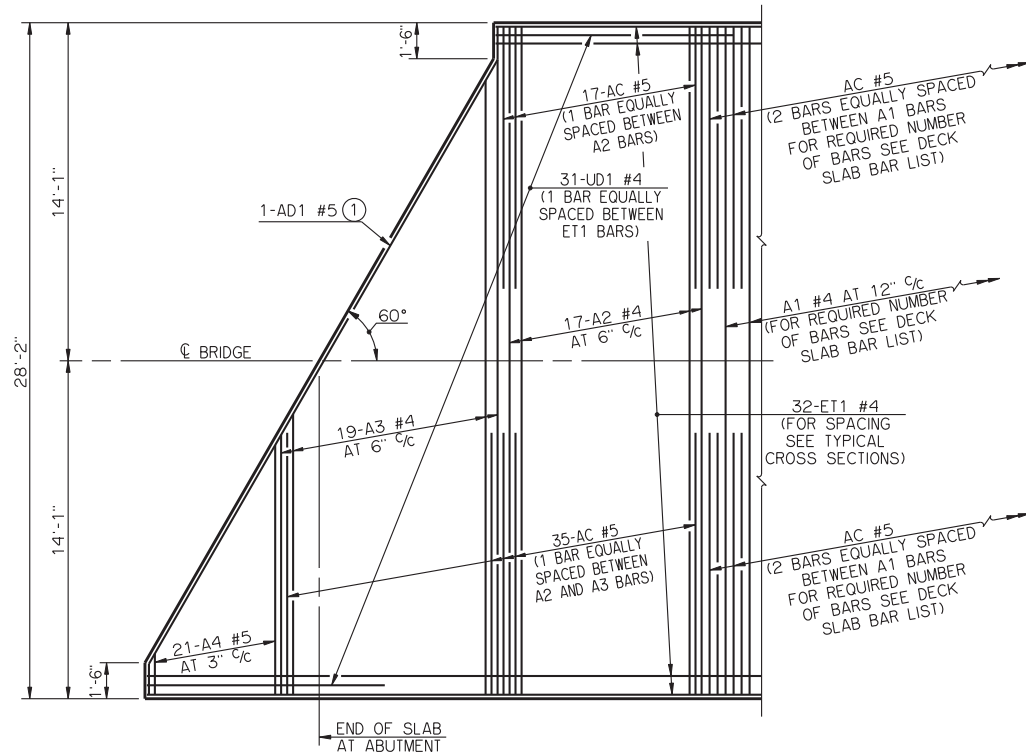
WHERE THE TOP CORNER OF A BEAM PROJECTS UNDER THE DECK SLAB OF THE ADJACENT SPAN, 1/2" POLYSTYRENE PREFORMED EXPANSION MATERIAL SHALL BE PLACED BETWEEN THE TOP OF THE BEAM AND THE BOTTOM OF THE DECK SLAB IN THE HATCHED AREAS SHOWN ABOVE. ALL COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

NOTES

PLAN VIEWS SHOWN WITH LEFT FORWARD SKEW, RIGHT FORWARD SKEW WILL BE OPPOSITE HAND.

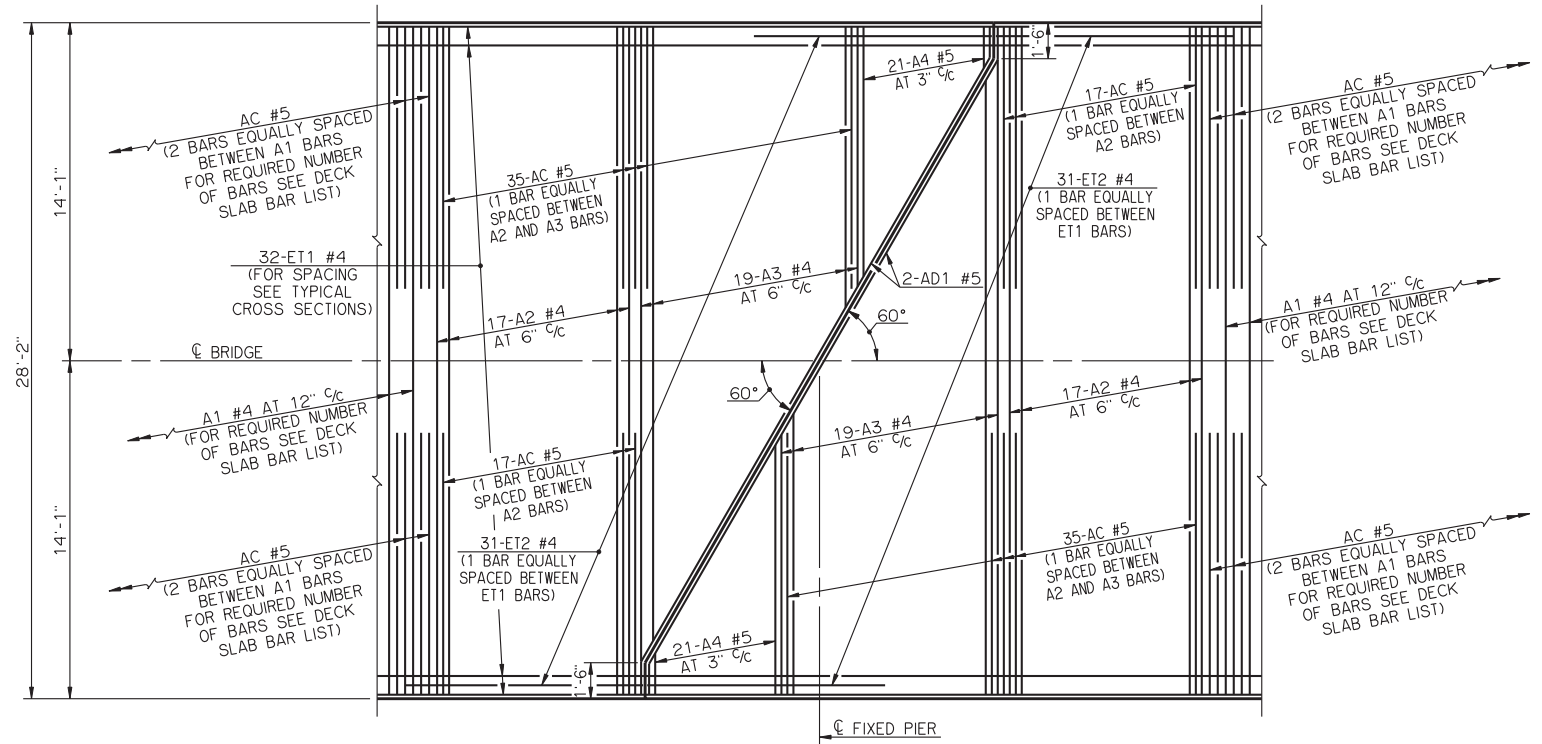
THE B1 AND B2 BARS ARE SHOWN FOR SPAN LENGTHS OF 33'-0" OR GREATER. FOR SPAN LENGTHS OF LESS THAN 33'-0", THE B1 BARS WILL BE OMITTED, AND THE TOTAL NUMBER OF B2 BARS SPACED AT 6" c/c WITHIN THE END ZONES OF THE DECK SLAB WILL BE THE AMOUNT GIVEN IN THE DECK SLAB BAR LIST.

APPROVED BY BRIDGE ENGINEER <i>Robert J. Duch</i>	DATE 9-9-2011
OKLAHOMA DEPARTMENT OF TRANSPORTATION COUNTY BRIDGE STANDARD (ENGLISH)	
DECK SLAB DETAILS (SHEET NO. 1 OF 2)	
26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°	
2009 SPECIFICATIONS	CB26-C-SK30-DKSLB-1 01E
	CB-232E

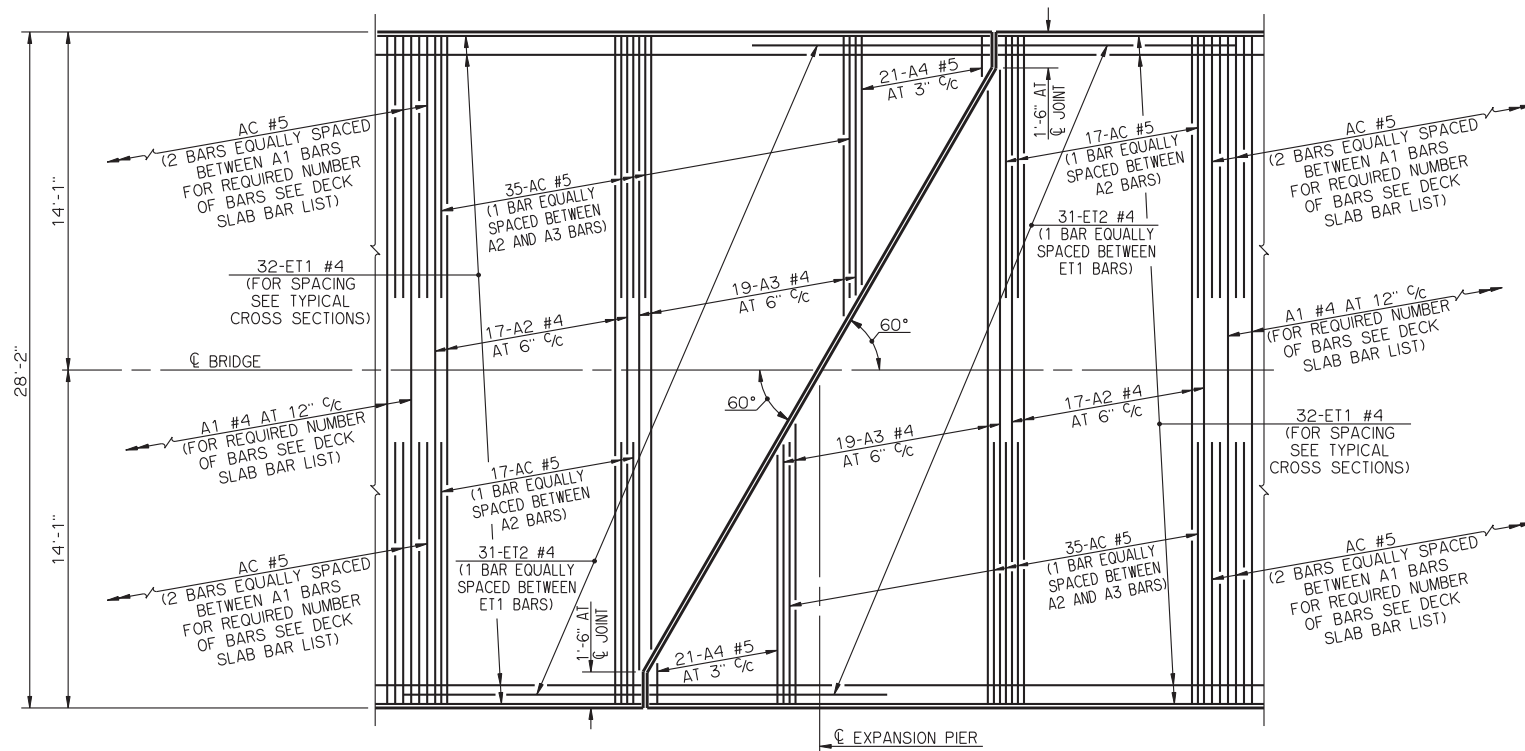


PLAN OF DECK SLAB WITH TYPICAL TOP LAYER OF END ZONE REINFORCING STEEL AT ABUTMENT

① SEE DETAIL "TYPICAL SLAB REINFORCING AT ABUTMENT BACKWALL" ON LONGITUDINAL SECTION SHEET FOR LAYOUT OF AD1 BARS.



PLAN OF DECK SLAB WITH TYPICAL TOP LAYER OF END ZONE REINFORCING STEEL AT FIXED PIER



PLAN OF DECK SLAB WITH TYPICAL TOP LAYER OF END ZONE REINFORCING STEEL AT EXPANSION PIER

NOTES

PLAN VIEWS SHOWN WITH LEFT FORWARD SKEW, RIGHT FORWARD SKEW WILL BE OPPOSITE HAND.

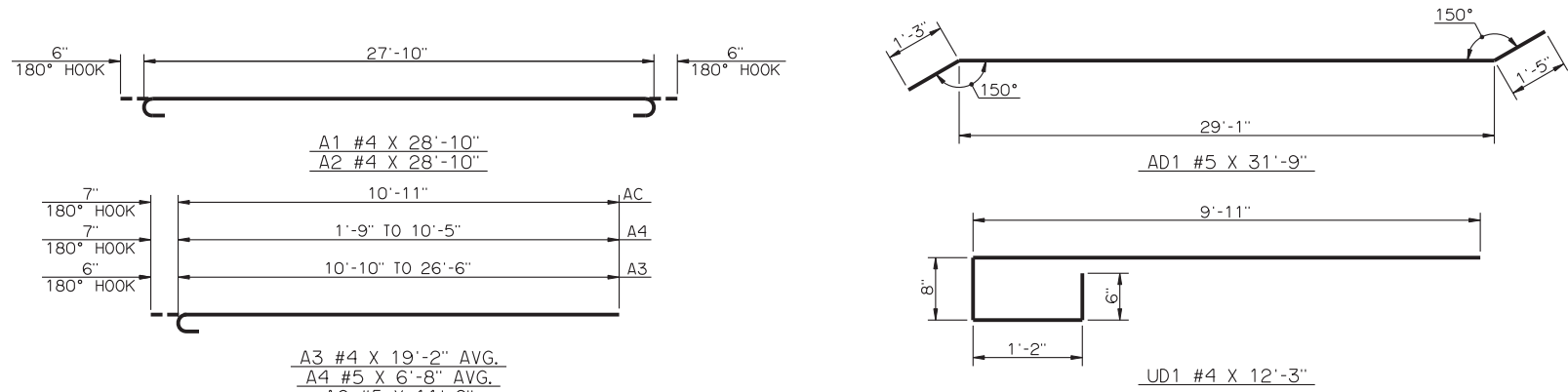
THE A1, A2 AND AC BARS ARE SHOWN FOR SPAN LENGTHS OF 33'-0" OR GREATER. FOR SPAN LENGTHS OF LESS THAN 33'-0", THE A1 BARS WILL BE OMITTED, AND THE TOTAL NUMBER OF A2 BARS SPACED AT 6" C/C WITHIN THE END ZONES OF THE DECK SLAB WILL BE THE AMOUNT GIVEN IN THE DECK SLAB BAR LIST. ADDITIONALLY, THE TOTAL NUMBER OF AC BARS EQUALLY SPACED BETWEEN THE A2 AND A3 BARS WITHIN THE END ZONES OF THE DECK SLAB WILL BE THE AMOUNT GIVEN IN THE DECK SLAB BAR LIST.

APPROVED BY BRIDGE ENGINEER <i>Robert J. Dush</i>	DATE 9-9-2011
OKLAHOMA DEPARTMENT OF TRANSPORTATION COUNTY BRIDGE STANDARD (ENGLISH)	
DECK SLAB DETAILS (SHEET NO. 2 OF 2)	
26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°	
2009 SPECIFICATIONS	CB26-C-SK30-DKSLB-2 01E
	CB-233E

BAR LIST - DECK SLAB											
			SPAN TYPE								
			ABUTMENT TO ABUTMENT			ABUTMENT TO FIXED PIER			ABUTMENT TO EXPANSION PIER		
MARK	SIZE	FORM	NUMBER	LENGTH	VARIANCE	NUMBER	LENGTH	VARIANCE	NUMBER	LENGTH	VARIANCE
A1	#4	BNT.	FOR SL < 32: 0	28'-10"	-	FOR SL < 32: 0	28'-10"	-	FOR SL < 32: 0	28'-10"	-
			FOR SL ≥ 32: SL - 32			FOR SL ≥ 32: SL - 32			FOR SL ≥ 32: SL - 32		
A2	#4	BNT.	FOR SL < 32: (2 x SL) - 29	28'-10"	-	FOR SL < 32: (2 x SL) - 29	28'-10"	-	FOR SL < 32: (2 x SL) - 29	28'-10"	-
			FOR SL ≥ 32: 34			FOR SL ≥ 32: 34			FOR SL ≥ 32: 34		
A3	#4	BNT.	38	19'-2" AVG.	11'-4" TO 27'-0"	38	19'-2" AVG.	11'-4" TO 27'-0"	38	19'-2" AVG.	11'-4" TO 27'-0"
A4	#5	BNT.	42	6'-8" AVG.	2'-4" TO 11'-0"	42	6'-8" AVG.	2'-4" TO 11'-0"	42	6'-8" AVG.	2'-4" TO 11'-0"
AC	#5	BNT.	(4 x SL) - 20	11'-6"	-	(4 x SL) - 20	11'-6"	-	(4 x SL) - 20	11'-6"	-
AD1	#5	BNT.	8	31'-9"	-	6	31'-9"	-	5	31'-9"	-
B1	#5	STR.	FOR SL < 32: 0	27'-10"	-	FOR SL < 32: 0	27'-10"	-	FOR SL < 32: 0	27'-10"	-
			FOR SL ≥ 32: SL - 32			FOR SL ≥ 32: SL - 32			FOR SL ≥ 32: SL - 32		
B2	#5	STR.	FOR SL < 32: (2 x SL) - 29	27'-10"	-	FOR SL < 32: (2 x SL) - 29	27'-10"	-	FOR SL < 32: (2 x SL) - 29	27'-10"	-
			FOR SL ≥ 32: 34			FOR SL ≥ 32: 34			FOR SL ≥ 32: 34		
B3	#5	STR.	58	14'-4" AVG.	2'-2" TO 26'-6"	58	14'-4" AVG.	2'-2" TO 26'-6"	58	14'-4" AVG.	2'-2" TO 26'-6"
EB1	#5	STR.	32	SPAN LENGTH - 2"	-	32	SPAN LENGTH - 1"	-	32	SPAN LENGTH - 3"	-
EB2	#5	STR.	62	9'-11"	-	62	9'-11"	-	62	9'-11"	-
ET1	#4	STR.	32	SPAN LENGTH - 2"	-	32	SPAN LENGTH - 1"	-	32	SPAN LENGTH - 3"	-
ET2	#4	STR.	-	-	-	31	9'-11"	-	31	9'-11"	-
SR1	#5	BNT.	36 x IP + 7.5 x EP	3'-10"	-	36 x IP + 7.5 x EP	3'-10"	-	36 x IP + 7.5 x EP	3'-10"	-
UD1	#4	BNT.	62	12'-3"	-	31	12'-3"	-	31	12'-3"	-

- ① SL = NUMBER OF FEET IN SPAN LENGTH. EXAMPLE: FOR SPAN LENGTH = 31'-8", SL = 31.
 - ② THE LENGTHS SHOWN DO NOT INCLUDE LAP SPLICES. THE LENGTH OF ALL REQUIRED LAP SPLICES SHALL BE ADDED TO THE LENGTHS SHOWN. THE MINIMUM LAP SPLICE LENGTH FOR #5 REINFORCING STEEL BARS SHALL BE 2'-6", AND THE MINIMUM LAP SPLICE LENGTH FOR #4 REINFORCING STEEL BARS SHALL BE 1'-8". THE LAP SPLICES SHALL BE STAGGERED.
 - ③ THE LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU ALL CONSTRUCTION JOINTS AT FIXED PIERS. TO DETERMINE THE ACTUAL REINFORCING STEEL BAR LENGTH, COMBINE THE LENGTHS SHOWN FOR ALL SPAN TYPES OCCURRING BETWEEN AN ABUTMENT AND EXPANSION PIER OR BETWEEN TWO EXPANSION PIERS CONTAINED WITHIN THE BRIDGE INCLUDING ALL REQUIRED LAP SPLICE LENGTHS. NO LAP SPLICE SHALL BE PLACED WITHIN 10'-0" OF THE CENTERLINE OF FIXED PIERS.
 - ④ NUMBER INCLUDES TWO SETS OF 19 BARS.
 - ⑤ NUMBER INCLUDES TWO SETS OF 21 BARS.
 - ⑥ NUMBER INCLUDES TWO SETS OF 29 BARS.
 - ⑦ CALCULATION IN TABLE SHALL BE ROUNDED UP TO THE NEAREST NUMBER OF BARS.
- IP = NUMBER OF INTERIOR POSTS IN CONCRETE TRAFFIC RAIL (TR3) CALCULATED AS FOLLOWS:
- FOR ABUTMENT TO EXPANSION PIER OR FIXED PIER TO EXPANSION PIER:
IP = INTEGER AMOUNT OF (SPAN LENGTH - 15.375)/10
- FOR EXPANSION PIER TO EXPANSION PIER:
IP = INTEGER AMOUNT OF (SPAN LENGTH - 15.75)/10
- FOR ALL OTHER CASES:
IP = INTEGER AMOUNT OF (SPAN LENGTH - 15)/10
- EP = TOTAL LENGTH OF END POSTS IN CONCRETE TRAFFIC RAIL (TR3) CALCULATED AS FOLLOWS:
- FOR ABUTMENT TO EXPANSION PIER OR FIXED PIER TO EXPANSION PIER:
EP = SPAN LENGTH - 5.375 - (10 x IP)
- FOR EXPANSION PIER TO EXPANSION PIER:
EP = SPAN LENGTH - 5.75 - (10 x IP)
- FOR ALL OTHER CASES:
EP = SPAN LENGTH - 5 - (10 x IP)
- EXAMPLE: FOR FIXED PIER TO EXPANSION PIER WITH SPAN LENGTH = 80'-4"
IP = (80.34 - 15.375)/10 = 6
EP = 80.34 - 5.375 - (10 x 6) = 14.97
- FOR ADDITIONAL DETAILS AND INFORMATION, SEE BRIDGE STANDARD TR3-2. SR1 BARS SHALL NOT BE EPOXY COATED AS INDICATED ON THE BRIDGE STANDARD.

BAR LIST - DECK SLAB											
			SPAN TYPE								
			FIXED PIER TO FIXED PIER			FIXED PIER TO EXPANSION PIER			EXPANSION PIER TO EXPANSION PIER		
MARK	SIZE	FORM	NUMBER	LENGTH	VARIANCE	NUMBER	LENGTH	VARIANCE	NUMBER	LENGTH	VARIANCE
A1	#4	BNT.	FOR SL < 32: 0	28'-10"	-	FOR SL < 32: 0	28'-10"	-	FOR SL < 32: 0	28'-10"	-
			FOR SL ≥ 32: SL - 32			FOR SL ≥ 32: SL - 32			FOR SL ≥ 32: SL - 32		
A2	#4	BNT.	FOR SL < 32: (2 x SL) - 29	28'-10"	-	FOR SL < 32: (2 x SL) - 29	28'-10"	-	FOR SL < 32: (2 x SL) - 29	28'-10"	-
			FOR SL ≥ 32: 34			FOR SL ≥ 32: 34			FOR SL ≥ 32: 34		
A3	#4	BNT.	38	19'-2" AVG.	11'-4" TO 27'-0"	38	19'-2" AVG.	11'-4" TO 27'-0"	38	19'-2" AVG.	11'-4" TO 27'-0"
A4	#5	BNT.	42	6'-8" AVG.	2'-4" TO 11'-0"	42	6'-8" AVG.	2'-4" TO 11'-0"	42	6'-8" AVG.	2'-4" TO 11'-0"
AC	#5	BNT.	(4 x SL) - 20	11'-6"	-	(4 x SL) - 20	11'-6"	-	(4 x SL) - 20	11'-6"	-
AD1	#5	BNT.	4	31'-9"	-	3	31'-9"	-	2	31'-9"	-
B1	#5	STR.	FOR SL < 32: 0	27'-10"	-	FOR SL < 32: 0	27'-10"	-	FOR SL < 32: 0	27'-10"	-
			FOR SL ≥ 32: SL - 32			FOR SL ≥ 32: SL - 32			FOR SL ≥ 32: SL - 32		
B2	#5	STR.	FOR SL < 32: (2 x SL) - 29	27'-10"	-	FOR SL < 32: (2 x SL) - 29	27'-10"	-	FOR SL < 32: (2 x SL) - 29	27'-10"	-
			FOR SL ≥ 32: 34			FOR SL ≥ 32: 34			FOR SL ≥ 32: 34		
B3	#5	STR.	58	14'-4" AVG.	2'-2" TO 26'-6"	58	14'-4" AVG.	2'-2" TO 26'-6"	58	14'-4" AVG.	2'-2" TO 26'-6"
EB1	#5	STR.	32	SPAN LENGTH	-	32	SPAN LENGTH - 2"	-	32	SPAN LENGTH - 4"	-
EB2	#5	STR.	62	9'-11"	-	62	9'-11"	-	62	9'-11"	-
ET1	#4	STR.	32	SPAN LENGTH	-	32	SPAN LENGTH - 2"	-	32	SPAN LENGTH - 4"	-
ET2	#4	STR.	62	9'-11"	-	62	9'-11"	-	62	9'-11"	-
SR1	#5	BNT.	36 x IP + 7.5 x EP	3'-10"	-	36 x IP + 7.5 x EP	3'-10"	-	36 x IP + 7.5 x EP	3'-10"	-
UD1	#4	BNT.	-	-	-	-	-	-	-	-	-



DETAILS OF BENT REINFORCING STEEL

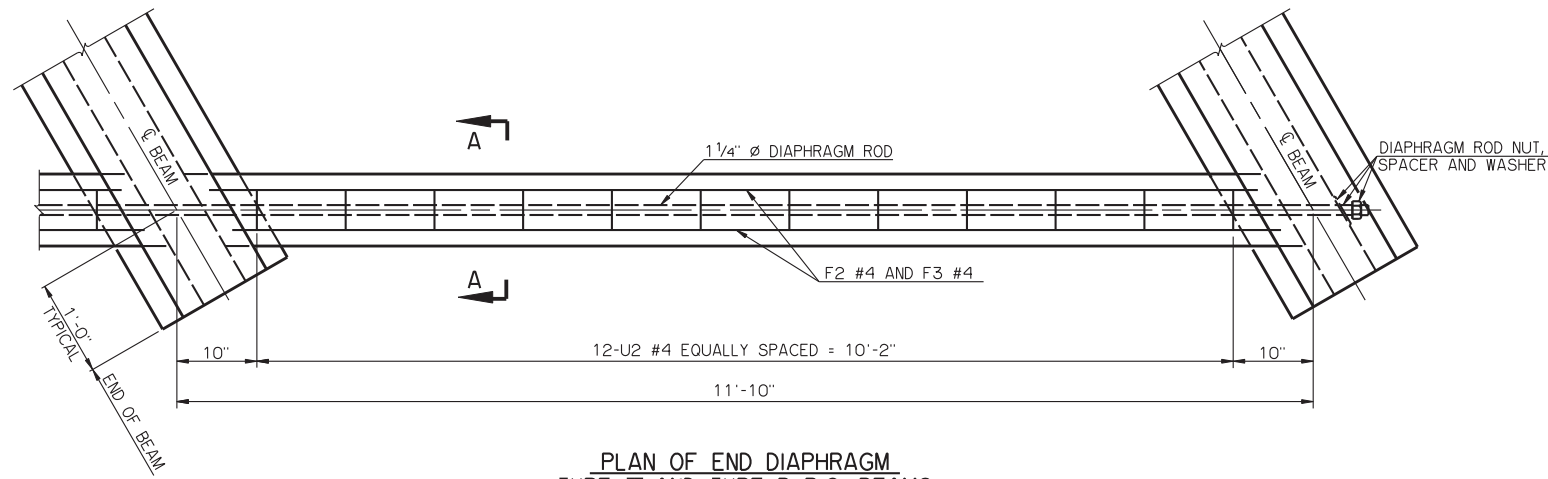
APPROVED BY BRIDGE ENGINEER *Robert J. Duch* DATE **9-9-2011**

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

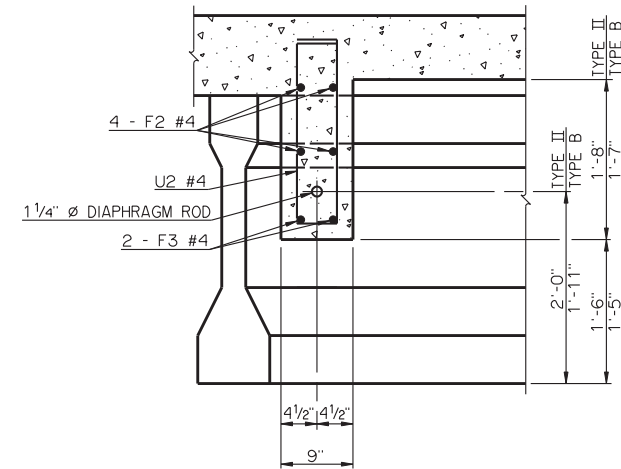
DECK SLAB BAR LIST

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

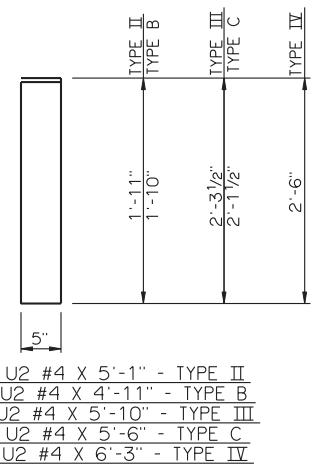
2009 SPECIFICATIONS CB26-C-SK30-DKSLB-BLST 01E
CB-236E



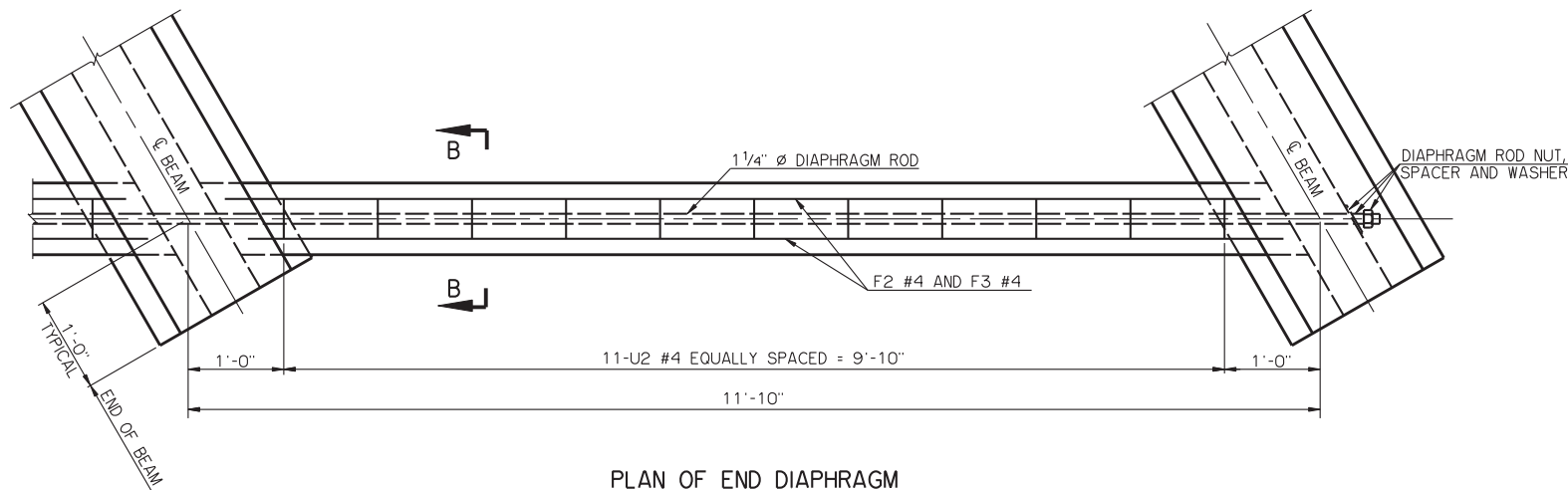
PLAN OF END DIAPHRAGM
TYPE II AND TYPE B P.C. BEAMS
LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND



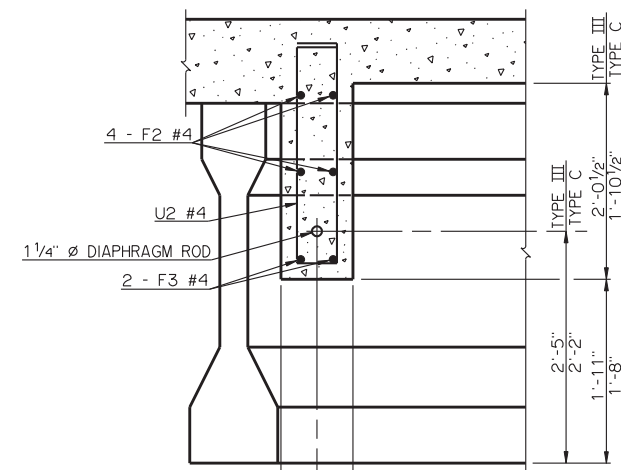
SECTION A-A



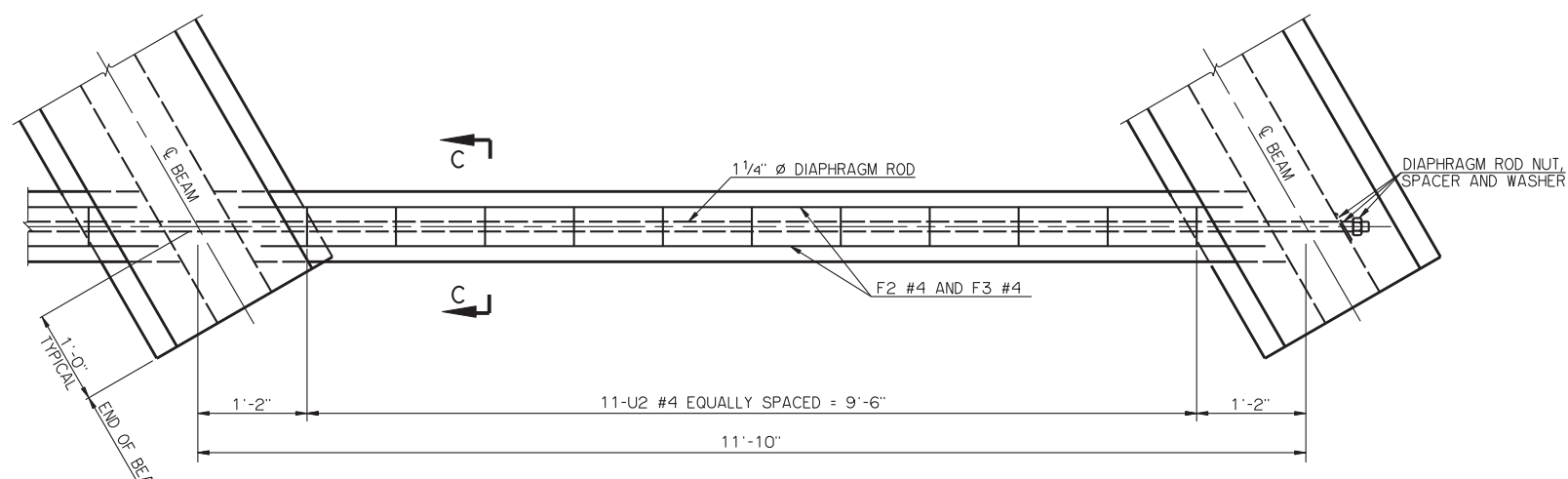
DETAILS OF BENT REINFORCING STEEL



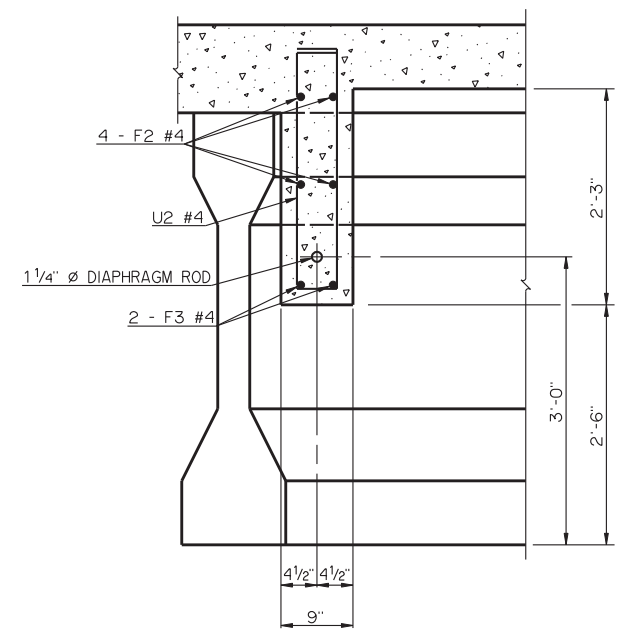
PLAN OF END DIAPHRAGM
TYPE III AND TYPE C P.C. BEAMS
LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND



SECTION B-B



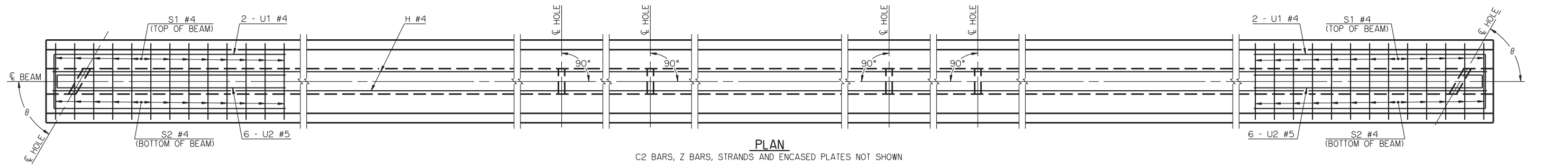
PLAN OF END DIAPHRAGM
TYPE IV P.C. BEAM
LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND



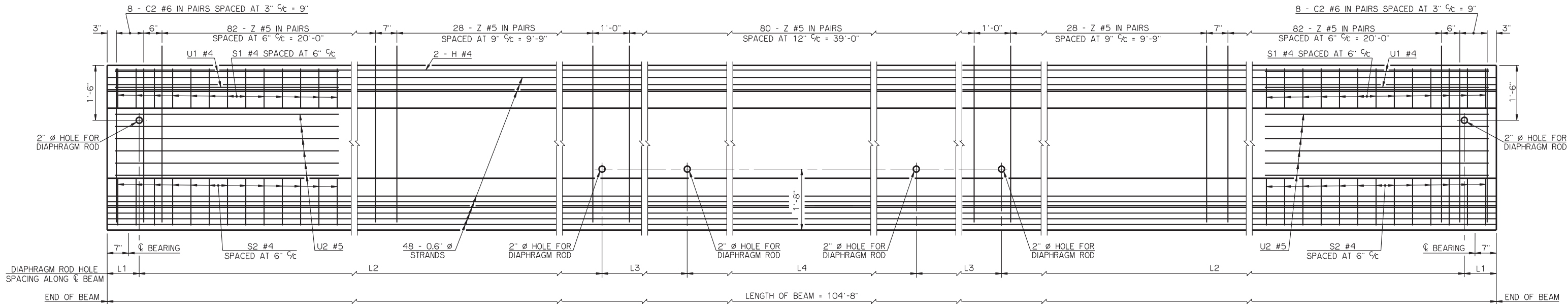
SECTION C-C

BAR LIST - ONE END DIAPHRAGM					
P.C. BEAM	MARK	NO.	SIZE	FORM	LENGTH
TYPE II	U2	12	#4	BNT.	5'-1"
	F2	4	#4	STR.	10'-4"
	F3	2	#4	STR.	10'-11"
TYPE B	U2	12	#4	BNT.	4'-11"
	F2	4	#4	STR.	10'-4"
	F3	2	#4	STR.	10'-11"
TYPE III	U2	11	#4	BNT.	5'-10"
	F2	4	#4	STR.	10'-0"
	F3	2	#4	STR.	10'-10"
TYPE C	U2	11	#4	BNT.	5'-6"
	F2	4	#4	STR.	10'-2"
	F3	2	#4	STR.	10'-10"
TYPE IV	U2	11	#4	BNT.	6'-3"
	F2	4	#4	STR.	9'-7"
	F3	2	#4	STR.	10'-9"

APPROVED BY BRIDGE ENGINEER *Robert J. Duch* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
END DIAPHRAGM DETAILS
 TYPE II, B, III, C AND IV P.C. BEAMS
 26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°
 2009 SPECIFICATIONS CB26-C-SK30-DIA-END-PC234 01E
 CB-240E

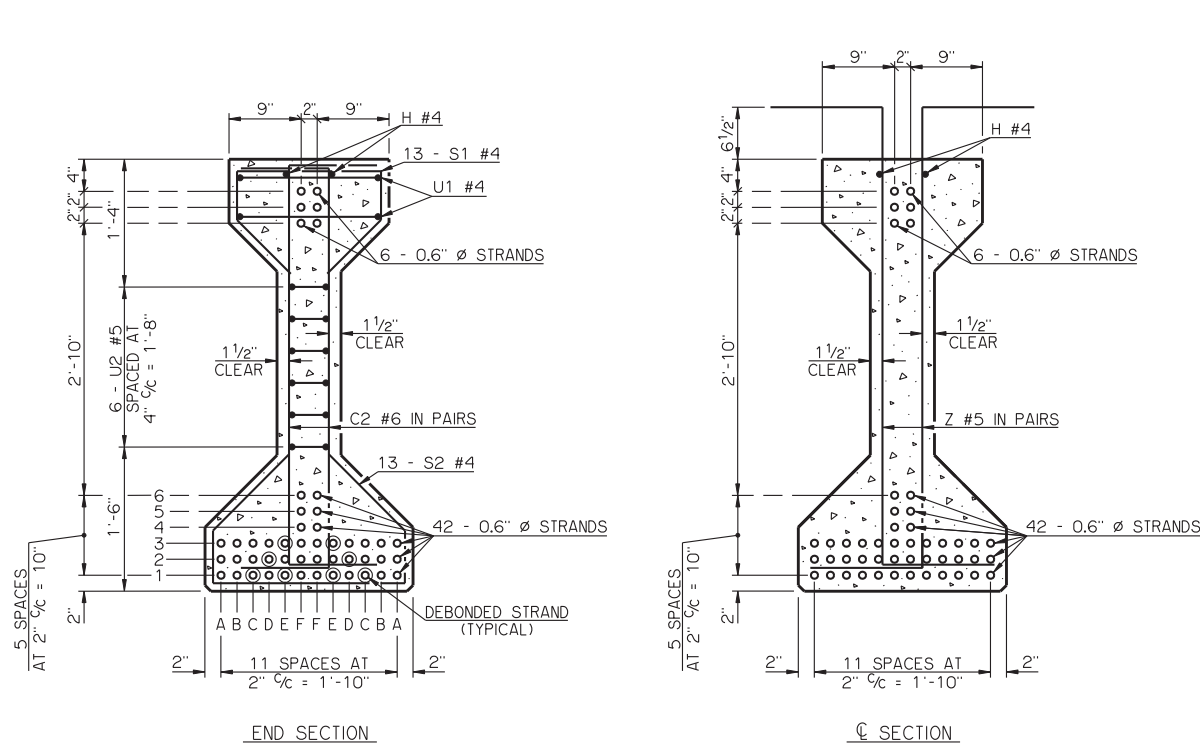
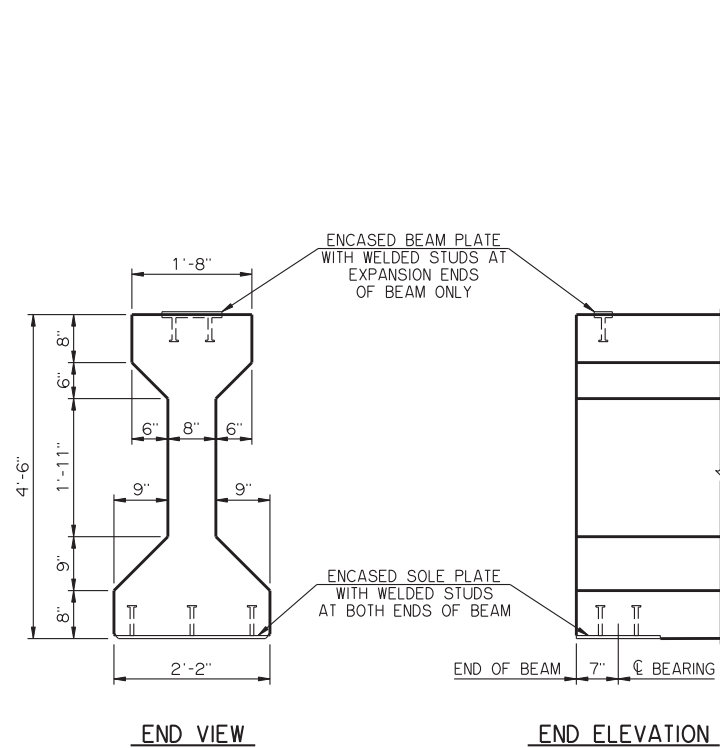


PLAN
C2 BARS, Z BARS, STRANDS AND ENCASED PLATES NOT SHOWN

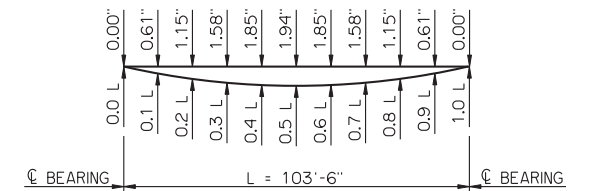


ELEVATION
ENCASED PLATES NOT SHOWN

DIAPHRAGM ROD HOLE SCHEDULE					
BRIDGE SKEW	θ	L1	L2	L3	L4
0°	90°	10'-1/2"	34'-2"	0'-0"	34'-7"
30° LEFT FORWARD	60°	1'-0"	31'-1"	5'-11"	28'-8"
30° RIGHT FORWARD	120°	1'-0"	31'-1"	5'-11"	28'-8"



BEAM SECTIONS
(48 - 0.6" STRANDS)



DEAD LOAD DEFLECTIONS

THE DEAD LOAD DEFLECTIONS SHOWN ABOVE AT THE TENTH POINTS ARE THE INITIAL THEORETICAL BEAM DEFLECTIONS DUE TO THE DIAPHRAGMS, A 5 PSF STEEL SIP FORMS ALLOWANCE, DECK SLAB, HAUNCH AND CONCRETE TRAFFIC RAIL (TR3). THE DEAD LOAD DEFLECTIONS SHALL BE ACCOUNTED FOR IN THE HAUNCH DEPTH CALCULATIONS.

MATERIAL PROPERTIES

THE COMPRESSIVE STRENGTH OF THE CONCRETE IN THE P.C. BEAM SHALL BE NO LESS THAN 7,000 PSI AT THE TIME OF TRANSFER OF THE PRESTRESSING FORCE AND NO LESS THAN 10,000 PSI AT 28 DAYS AFTER THE POURING OF THE CONCRETE.

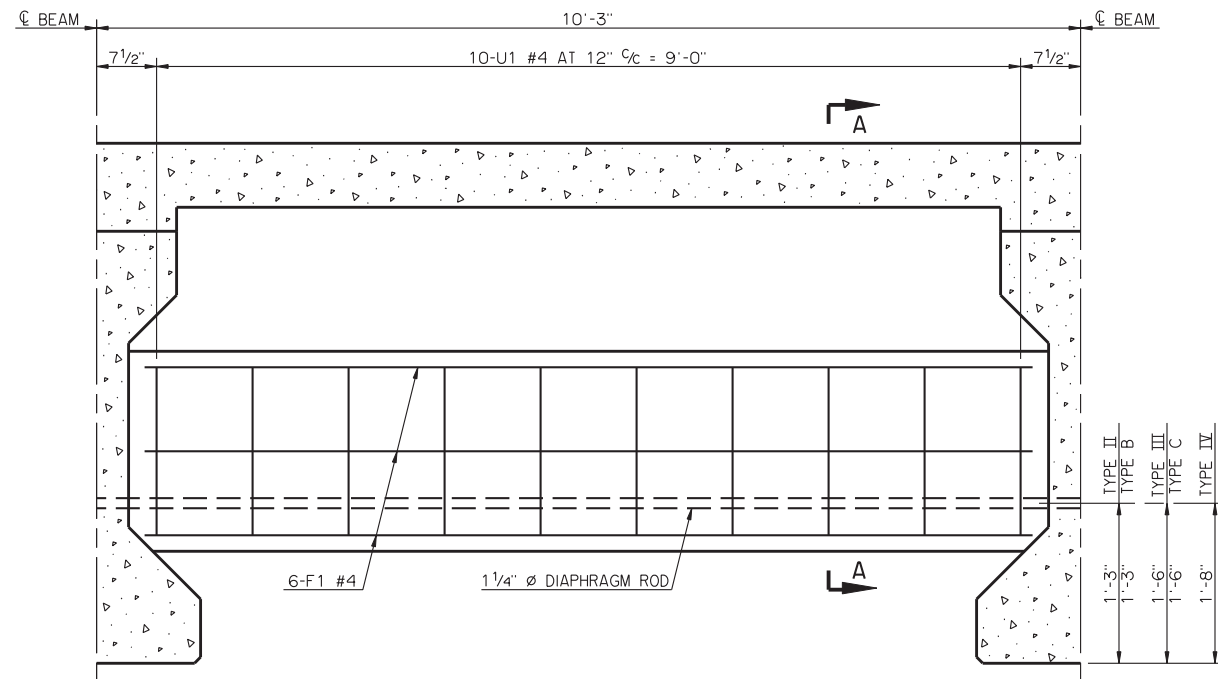
THE TYPE OF PRESTRESSING STRANDS REQUIRED IN THE P.C. BEAM SHALL BE LOW RELAXATION 7-WIRE STRAND WITH A NOMINAL DIAMETER OF 0.6 INCHES AND AN ULTIMATE TENSILE STRENGTH OF 270 KSI.

LFD OPERATING RATING - HS 55.0

THE LFD OPERATING RATING SHOWN ABOVE IS FOR THE P.C. BEAM ONLY AND APPLIES ONLY TO THE P.C. BEAMS OF A BRIDGE CONSTRUCTED IN STRICT CONFORMANCE TO ALL RELEVANT DETAILS CONTAINED IN THE COMPLETE SET OF COUNTY BRIDGE STANDARDS AND TO THE ODOT STANDARD SPECIFICATIONS.

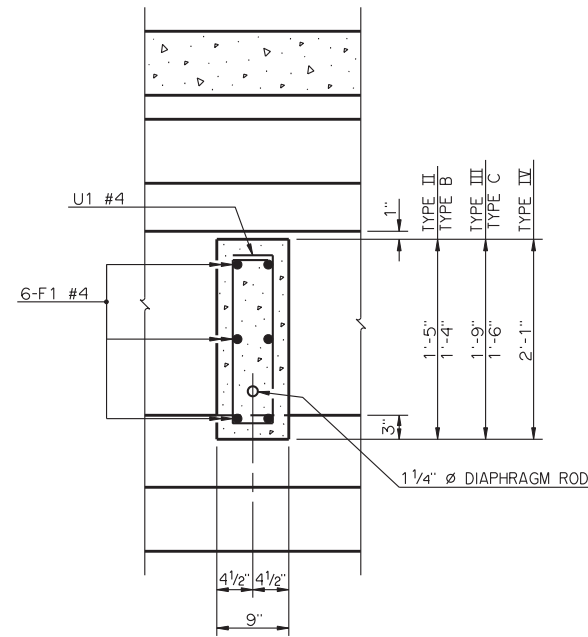
DEBOND SCHEDULE	
DEBOND PAIR	DEBOND LENGTH FROM END OF BEAM
C1	5'-0"
E1	5'-0"
D2	12'-0"
E3	20'-0"

APPROVED BY BRIDGE ENGINEER *Scott J. Dush* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
P.C. BEAM DETAILS
TYPE IV - 105' SPAN
 26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 0° AND 30°
 2009 SPECIFICATIONS CB26-C-SKO.30-PCB-IV-105 Q1E
 CB-294E

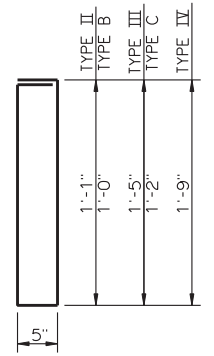


**ELEVATION OF INTERMEDIATE DIAPHRAGM
TYPE II, B, III, C AND IV P.C. BEAMS**

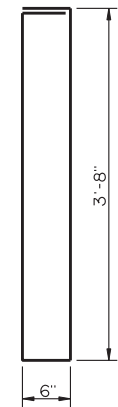
FOR SPANS OF 100' OR LESS IN LENGTH - INCLUDE ONE LINE OF INTERMEDIATE DIAPHRAGMS PER SPAN.
FOR SPANS OVER 100' IN LENGTH - INCLUDE TWO LINES OF INTERMEDIATE DIAPHRAGMS PER SPAN.



SECTION A-A

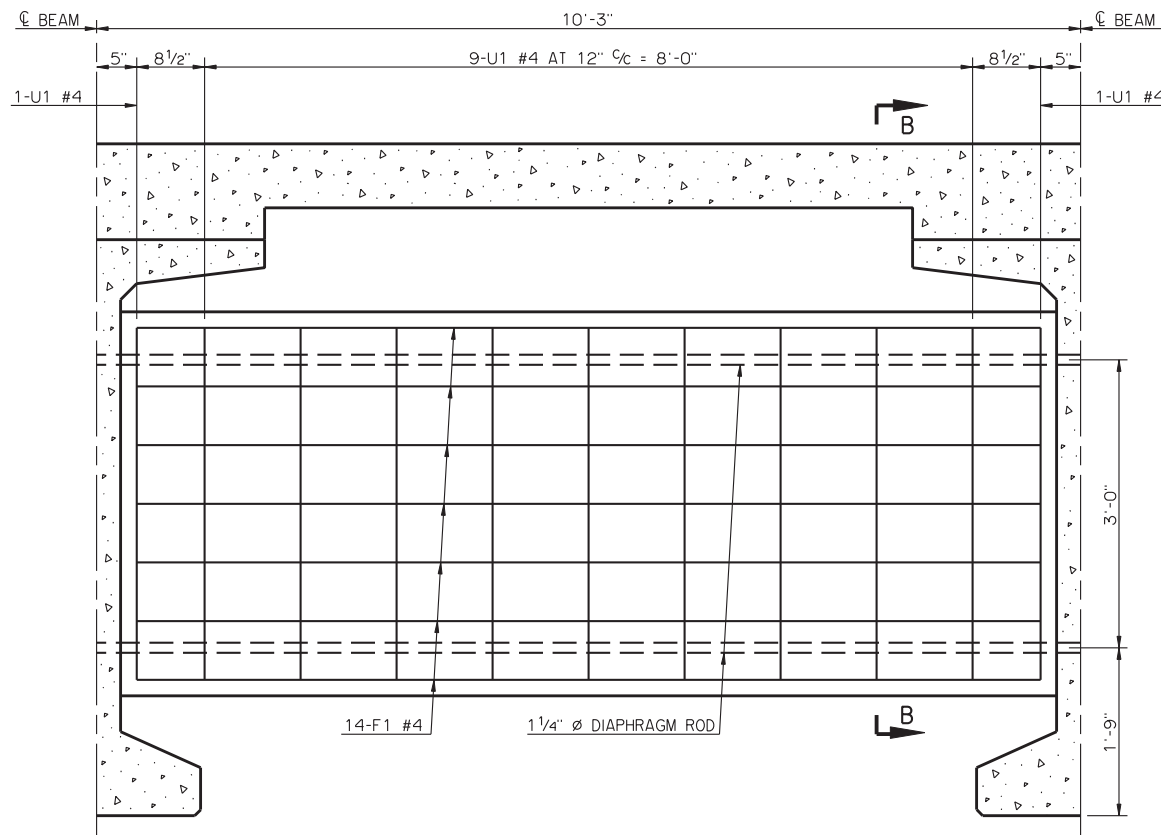


- U1 #4 X 3'-5" - TYPE II
- U1 #4 X 3'-3" - TYPE B
- U1 #4 X 4'-1" - TYPE III
- U1 #4 X 3'-7" - TYPE C
- U1 #4 X 4'-9" - TYPE IV



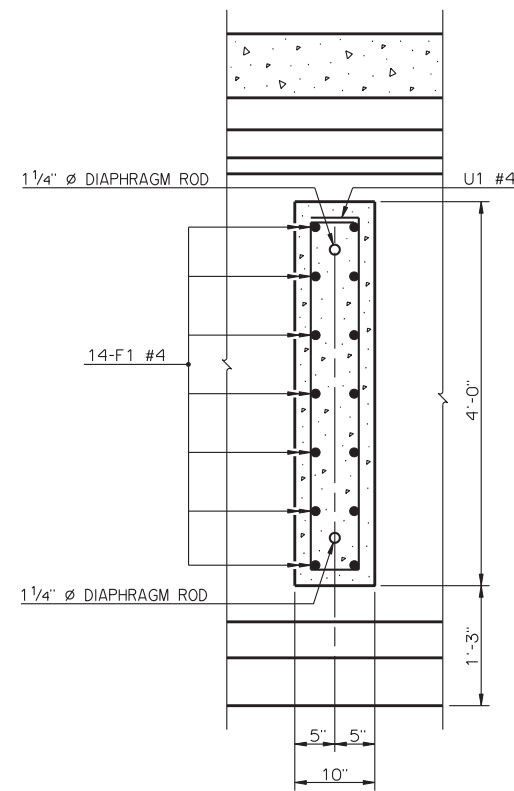
- U1 #4 X 8'-10" - TYPE BT-72 AND TYPE J

DETAILS OF BENT REINFORCING STEEL



**ELEVATION OF INTERMEDIATE DIAPHRAGM
TYPE BT-72 AND TYPE J P.C. BEAMS**

FOR ALL SPAN LENGTHS - INCLUDE TWO LINES OF INTERMEDIATE DIAPHRAGMS PER SPAN.



SECTION B-B

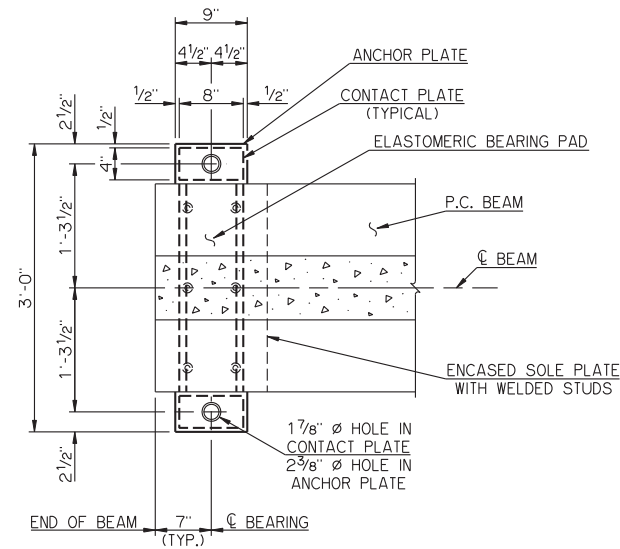
BAR LIST - ONE INTERMEDIATE DIAPHRAGM					
P.C. BEAM	MARK	NO.	SIZE	FORM	LENGTH
TYPE II	U1	10	#4	BNT.	3'-5"
	F1	6	#4	STR.	9'-5"
TYPE B	U1	10	#4	BNT.	3'-3"
	F1	6	#4	STR.	9'-4"
TYPE III	U1	10	#4	BNT.	4'-1"
	F1	6	#4	STR.	9'-4"
TYPE C	U1	10	#4	BNT.	3'-7"
	F1	6	#4	STR.	9'-4"
TYPE IV	U1	10	#4	BNT.	4'-9"
	F1	6	#4	STR.	9'-3"
TYPE BT-72	U1	11	#4	BNT.	8'-10"
	F1	14	#4	STR.	9'-5"
TYPE J	U1	11	#4	BNT.	8'-10"
	F1	14	#4	STR.	9'-5"

APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE 9-9-2011

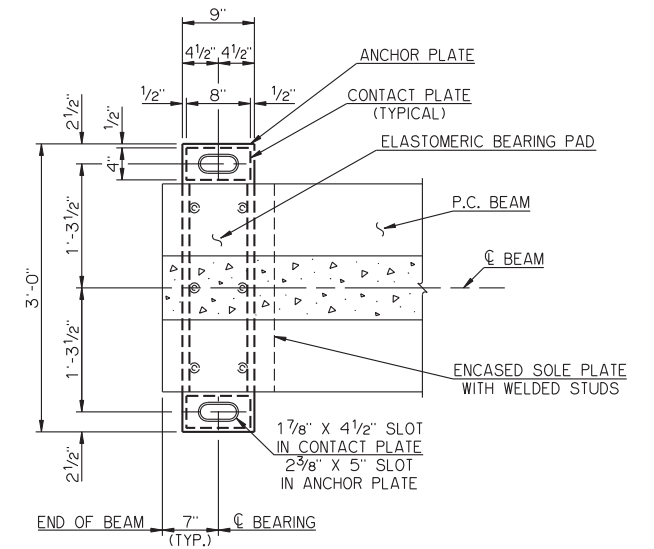
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

**INTERMEDIATE DIAPHRAGM DETAILS
P.C. BEAMS**

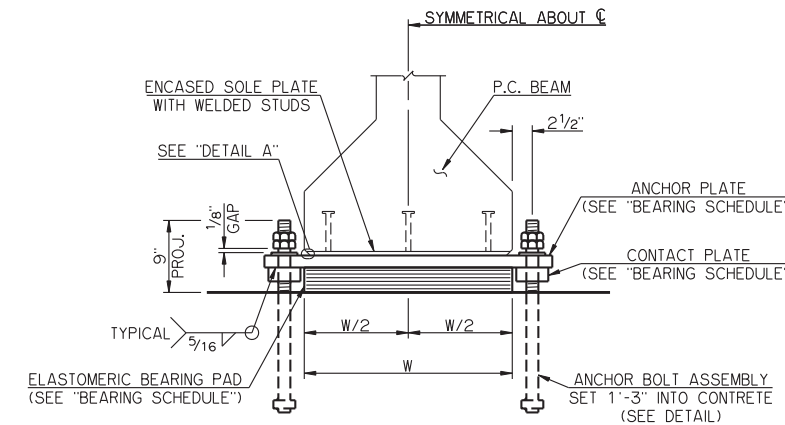
26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 0° AND 30°



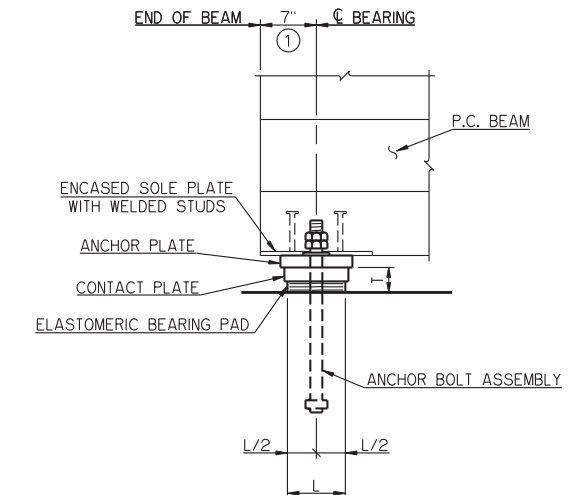
FIXED BEARING PLAN
ANCHOR BOLT ASSEMBLIES NOT SHOWN



EXPANSION BEARING PLAN
ANCHOR BOLT ASSEMBLIES NOT SHOWN

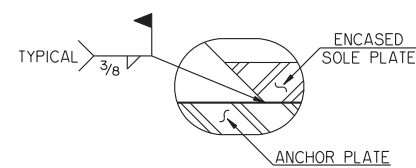


END VIEW

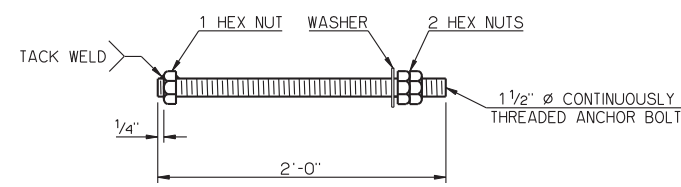


SIDE VIEW

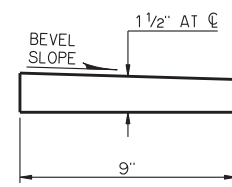
BEARING DETAILS



DETAIL A



ANCHOR BOLT ASSEMBLY DETAIL



BEVELED ANCHOR PLATE DETAIL

BEVELED ANCHOR PLATE IS REQUIRED WHEN ANGLE BETWEEN UNDERSIDE OF BEAM AND HORIZONTAL EXCEEDS 1.0%. BEVEL SLOPE TO MATCH ANGLE BETWEEN BEAM AND HORIZONTAL. PAINT THICKER EDGE RED.

SPAN	ANCHOR PLATE	CONTACT PLATE	60 DUROMETER ELASTOMERIC BEARING PAD			MAXIMUM EXPANSION LENGTH WITHOUT BONDING	
			SIZE (T X L X W)	COVER LAYER	INNER LAYER		
80'	1 1/2" X 9" X 3'-0"	3/4" X 4" X 8"	3 1/8" X 6 1/2" X 2'-2"	2-1/4"	5-3/8"	6-1/8"	260'
85'	1 1/2" X 9" X 3'-0"	1" X 4" X 8"	3 1/8" X 6 1/2" X 2'-2"	2-1/4"	5-3/8"	6-1/8"	260'
90'	1 1/2" X 9" X 3'-0"	1" X 4" X 8"	3 1/8" X 6 3/4" X 2'-2"	2-1/4"	5-3/8"	6-1/8"	260'
95'	1 1/2" X 9" X 3'-0"	1 1/4" X 4" X 8"	3 1/8" X 6 3/4" X 2'-2"	2-1/4"	5-3/8"	6-1/8"	260'
100'	1 1/2" X 9" X 3'-0"	1 1/4" X 4" X 8"	3 1/8" X 6 3/4" X 2'-2"	2-1/4"	5-3/8"	6-1/8"	260'
105'	1 1/2" X 9" X 3'-0"	1 1/2" X 4" X 8"	3 1/8" X 7" X 2'-2"	2-1/4"	5-3/8"	6-1/8"	260'
110'	1 1/2" X 9" X 3'-0"	1 1/2" X 4" X 8"	3 1/8" X 7" X 2'-2"	2-1/4"	5-3/8"	6-1/8"	260'
115'	1 1/2" X 9" X 3'-0"	1 3/4" X 4" X 8"	3 1/8" X 7" X 2'-2"	2-1/4"	5-3/8"	6-1/8"	260'
120'	1 1/2" X 9" X 3'-0"	1 3/4" X 4" X 8"	3 1/8" X 7 1/4" X 2'-2"	2-1/4"	5-3/8"	6-1/8"	260'

NOTES

STRUCTURAL STEEL FOR ANCHOR PLATES, CONTACT PLATES AND CONTINUOUSLY THREADED ANCHOR BOLTS SHALL CONFORM TO AASHTO M 270 (ASTM A 709), GRADE 50W. WEATHERING STEEL (CHARPY V-NOTCH TESTING NOT REQUIRED). HEX NUTS SHALL CONFORM TO AASHTO M 291 (ASTM A 563). WASHERS SHALL CONFORM TO AASHTO M 293 (ASTM F 436), TYPE 3. ANCHOR BOLT ASSEMBLIES SHALL BE GALVANIZED, AND ALL OTHER STEEL PARTS COMPRISING THE BEARING ASSEMBLIES SHALL BE PAINTED WITH THE IZ-E-U PAINT SYSTEM.

① ANCHOR BOLTS SHALL BE CENTERED IN SLOTS DURING SETTING OF BEAMS. DIMENSION MAY VARY AT EXPANSION BEARING DEPENDING ON TEMPERATURE AT THE TIME OF BEAM SETTING.

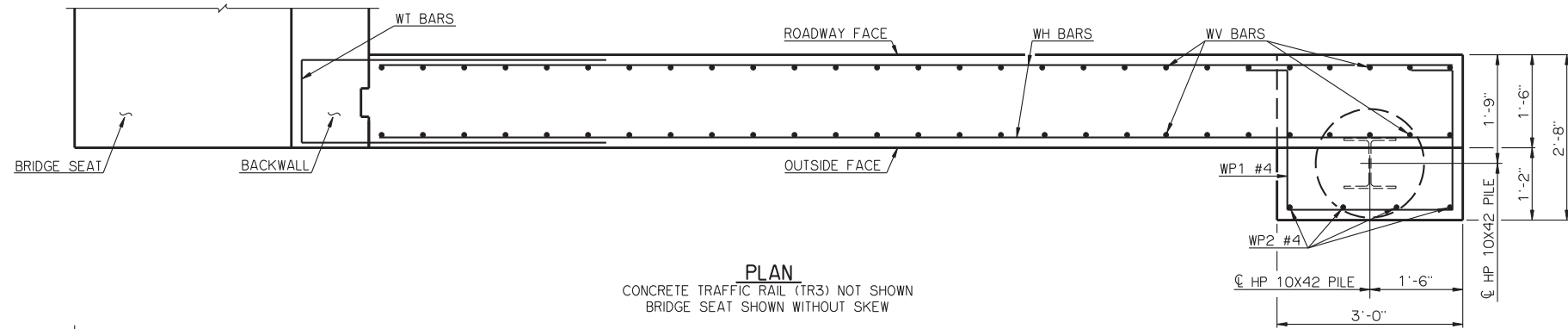
APPROVED BY BRIDGE ENGINEER *Robert J. Duch* DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

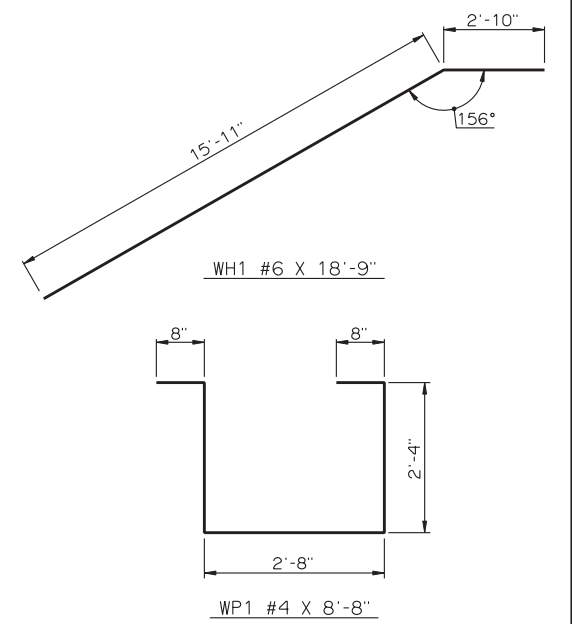
BEARING DETAILS
TYPE IV AND TYPE BT-72 P.C. BEAMS

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 0° AND 30°

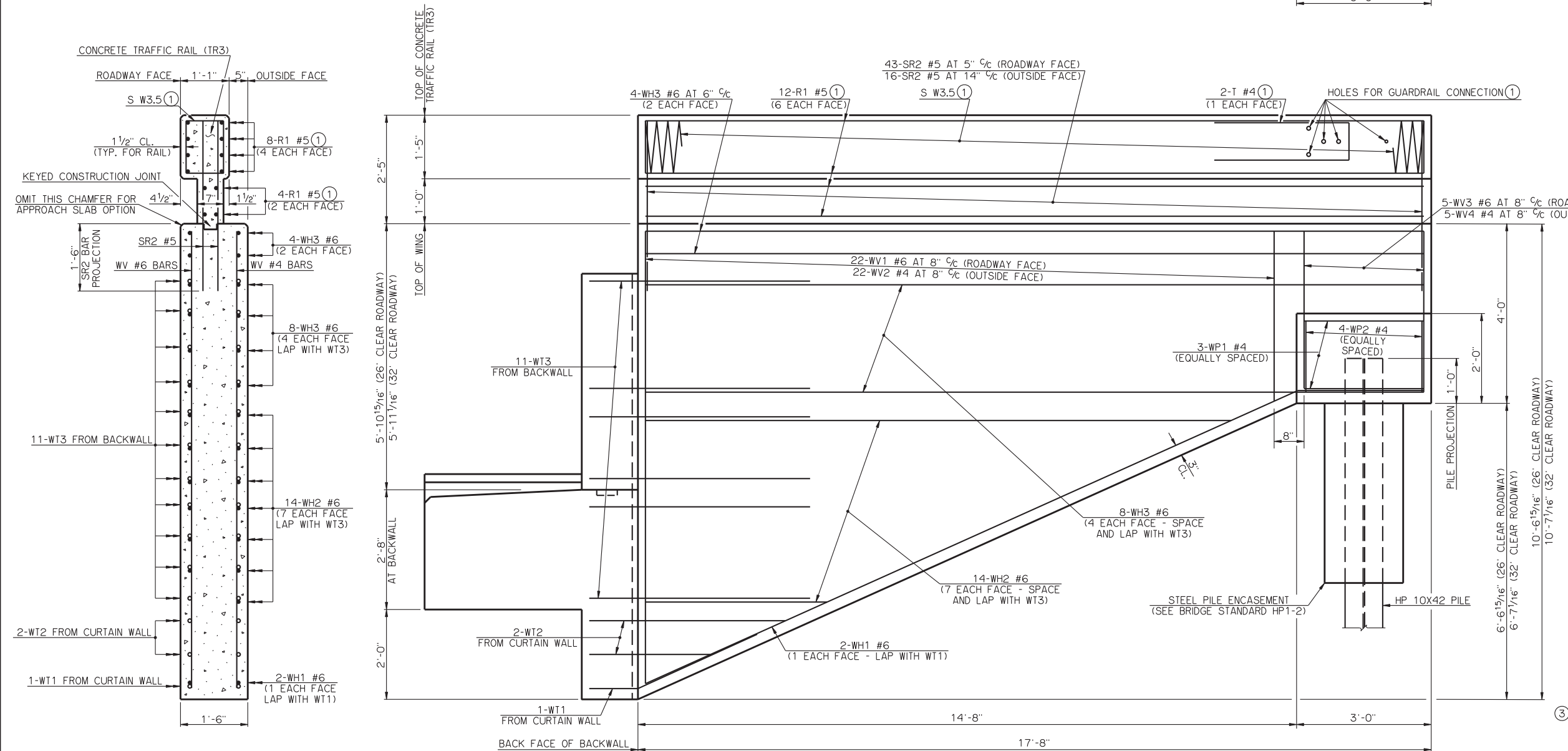
2009 SPECIFICATIONS CB26-C-SKO..30-BRG-PC4 01E CB-361E



PLAN
CONCRETE TRAFFIC RAIL (TR3) NOT SHOWN
BRIDGE SEAT SHOWN WITHOUT SKEW



DETAILS OF BENT REINFORCING STEEL



SECTION THRU WING AT BACK FACE OF BACKWALL

ELEVATION

BAR LIST - ONE WING					
MARK	NO.	SIZE	FORM	LENGTH	LENGTH VARIATION
SR2	59	#5	STR.	3'-9"	-
WH1	2	#6	BNT.	18'-9"	-
WH2	14	#6	STR.	8'-9" AVG.	4'-3" TO 13'-3"
WH3	12	#6	STR.	17'-4"	-
WV1	22	#6	STR.	6'-11" AVG.	3'-9" TO 10'-1"
WV2	22	#4	STR.	6'-11" AVG.	3'-9" TO 10'-1"
WV3	5	#6	STR.	3'-7"	-
WV4	5	#4	STR.	3'-7"	-
WP1	3	#4	BNT.	8'-8"	-
WP2	4	#4	STR.	1'-7"	-

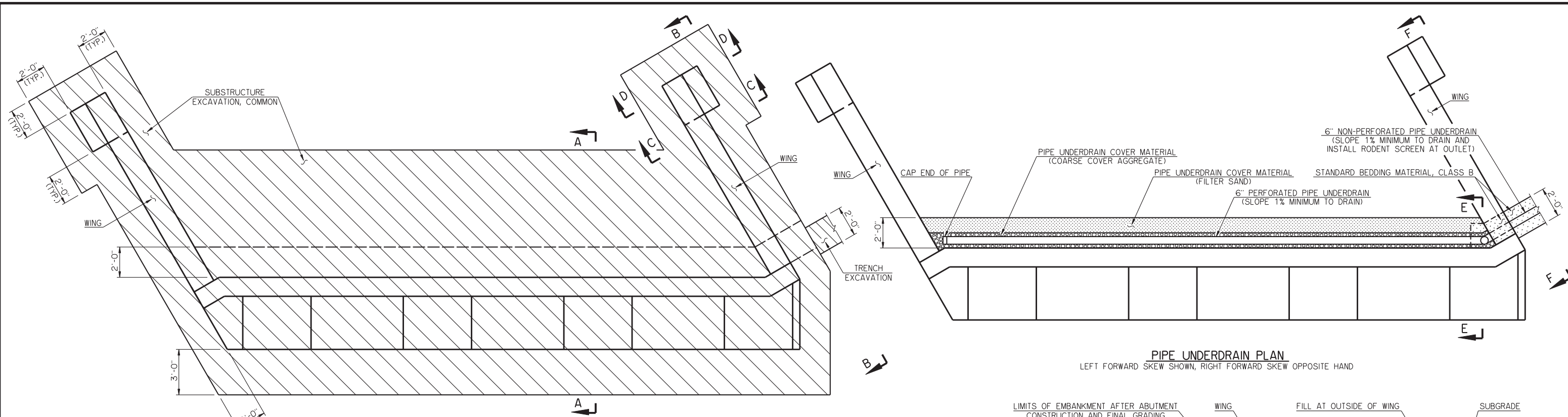
(2) NO. INCLUDES TWO SETS OF 7 BARS

SUMMARY OF QUANTITIES - ONE WING		
ITEM	UNIT	TOTAL
SUBSTRUCTURE EXCAVATION, COMMON	CY	20.00
CONCRETE RAIL (TR3)	LF	17.70
CLASS A CONCRETE	CY	6.90
REINFORCING STEEL	LB	1,180.00
PILES, FURNISHED (HP 10X42)	LF	-
PILES, DRIVEN (HP 10X42)	LF	-

(3) QUANTITY INCLUDES ALL COST OF CONCRETE TRAFFIC RAIL (TR3) INCLUDING R1, S AND T REINFORCING STEEL BARS AND CONCRETE.

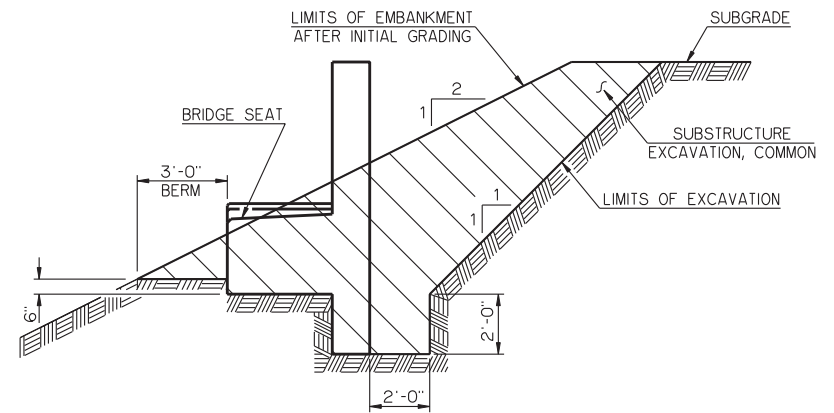
APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE **9-9-2011**
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
WING DETAILS
TYPE IV P.C. BEAMS
26' AND 32' CLEAR ROADWAYS - CONVENTIONAL - SKEWED 30°
 2009 SPECIFICATIONS CB26.32-C-SK30-WING-PC4 Q1E
 CB-926E

(1) SEE BRIDGE STANDARD TR3-2 FOR DETAILS NOT SHOWN

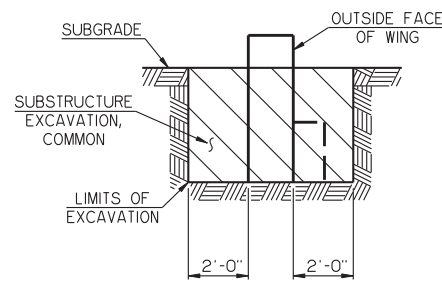


EXCAVATION PLAN
LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND

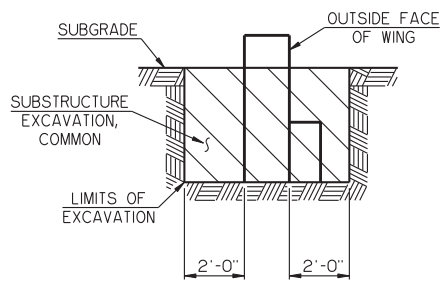
PIPE UNDERDRAIN PLAN
LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND



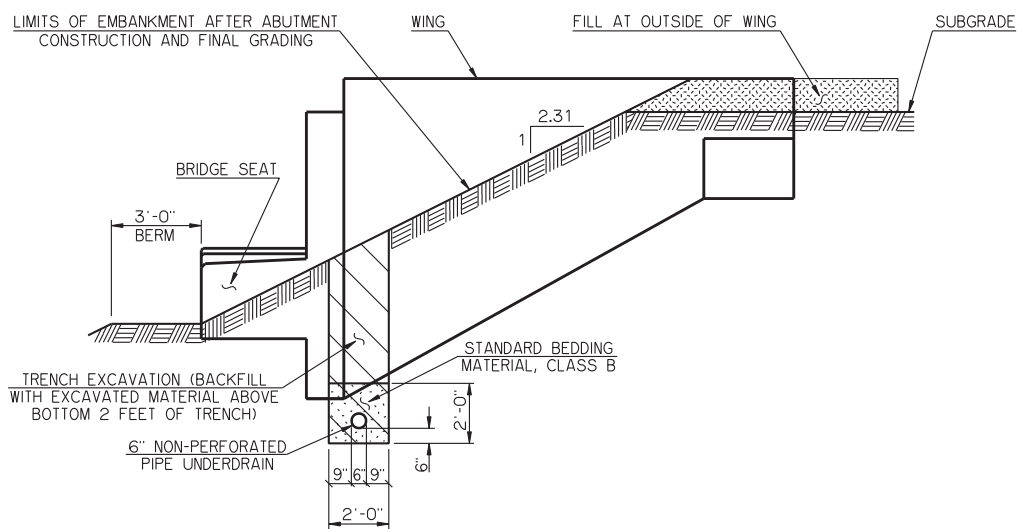
SECTION A-A



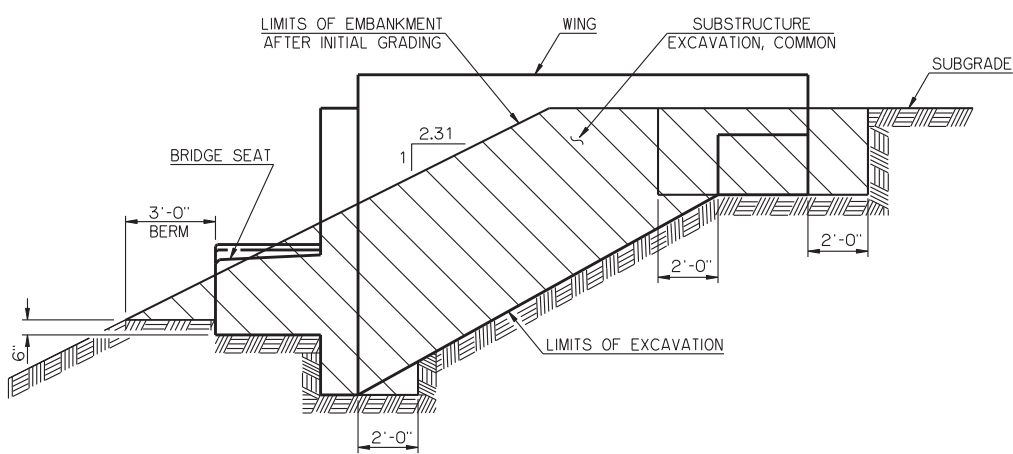
SECTION C-C



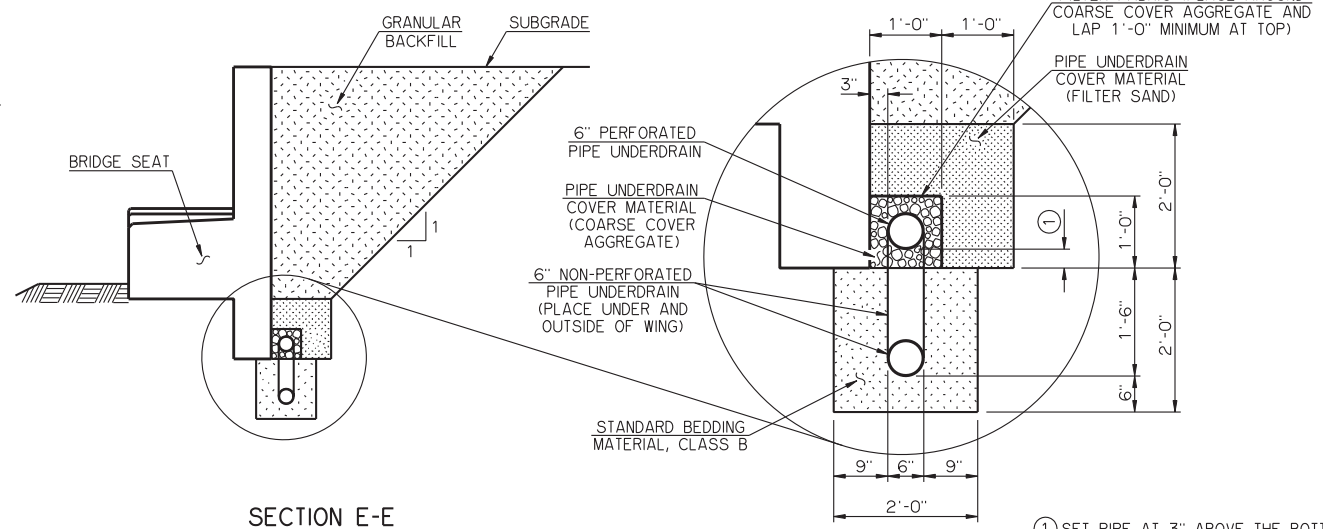
SECTION D-D



SECTION F-F



SECTION B-B



SECTION E-E

NOTES

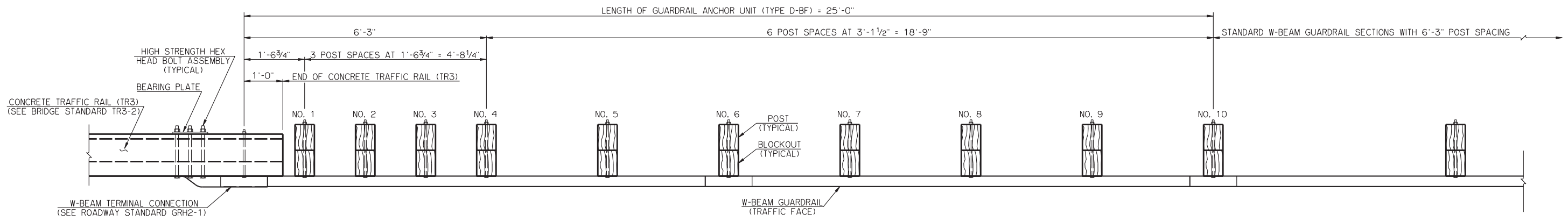
CONCRETE MAY BE PLACED AGAINST THE LIMITS OF EXCAVATION IF THE MATERIAL IS EXCAVATED TO THE NEAT LINES OF THE ABUTMENT AND APPROVED BY THE ENGINEER. IF NECESSARY, FORMS SHALL BE USED ON THE BACK VERTICAL FACE OF THE ABUTMENT AND REMOVED AFTER THE CONCRETE HAS SET. THE MEASUREMENT AND PAYMENT FOR "SUBSTRUCTURE EXCAVATION COMMON" AT THE ABUTMENTS SHALL BE IN ACCORDANCE WITH THE DETAILS SHOWN IN THE PLANS.

GRANULAR BACKFILL SHALL NOT BE PLACED UNTIL THE CONCRETE IN THE ABUTMENT WINGS HAS ATTAINED A STRENGTH OF 3,000 PSI.

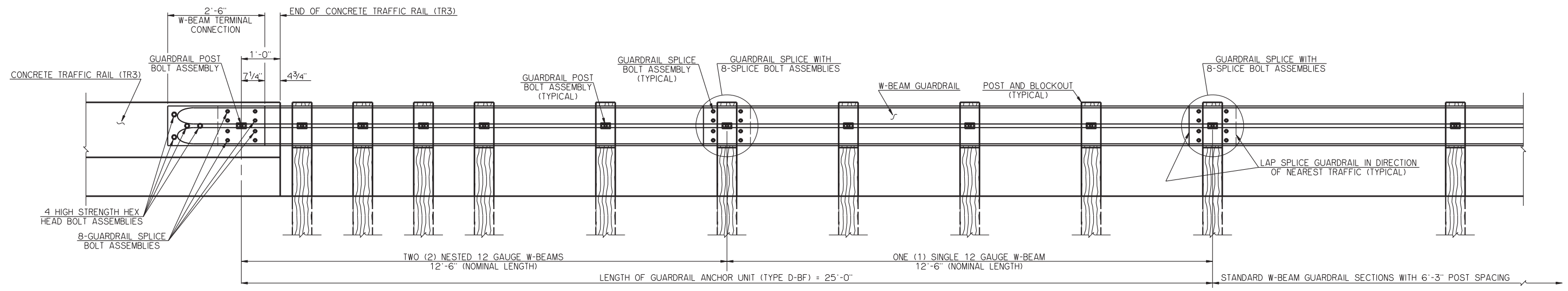
INSTALLATION OF THE PIPE UNDERDRAIN SHALL BE AS SHOWN IN THE PLANS AND ON ROADWAY STANDARD DRAWING PUD-3. THE EXTENT, LOCATION AND DEPTH OF THE 6" NON-PERFORATED PIPE UNDERDRAIN MAY BE ADJUSTED BY THE ENGINEER DURING CONSTRUCTION. ALL COST OF THE PERFORATED AND NON-PERFORATED PIPE, PIPE UNDERDRAIN COVER MATERIAL, FILTER FABRIC, TRENCH EXCAVATION, STANDARD BEDDING MATERIAL, PIPE CAPS, RODENT SCREENS, BACKFILLING OF TRENCH EXCAVATION, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS SHALL BE INCLUDED IN THE UNIT PRICE BID PER LINEAR FOOT OF "6" PERFORATED PIPE UNDERDRAIN" AND "6" NON-PERFORATED PIPE UNDERDRAIN."

APPROVED BY BRIDGE ENGINEER *Robert J. Duch* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
SUBSTRUCTURE EXCAVATION AND PIPE UNDERDRAIN ASSEMBLY DETAILS
 26' AND 32' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°
 2009 SPECIFICATIONS CB26.32-C-SK30-ABUT-MISC 01E
 CB-938E

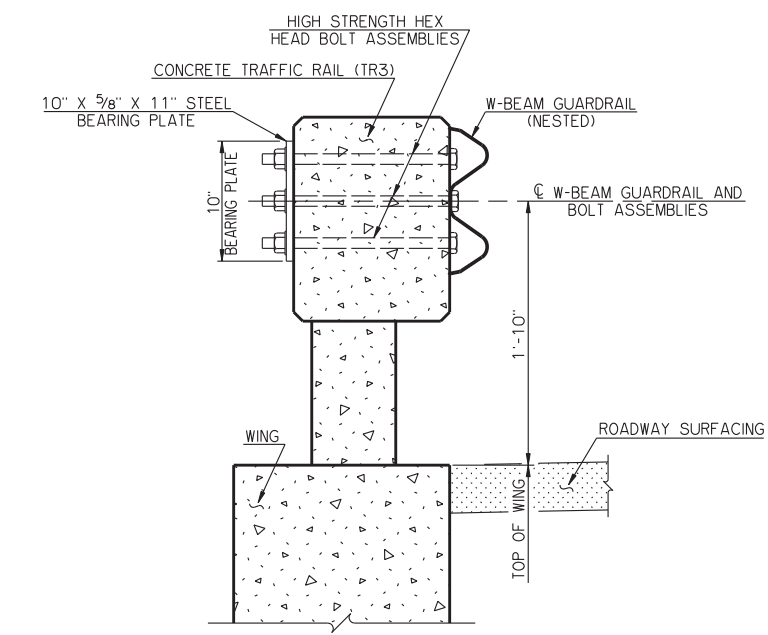
① SET PIPE AT 3" ABOVE THE BOTTOM OF THE ABUTMENT AT THE LOW END.



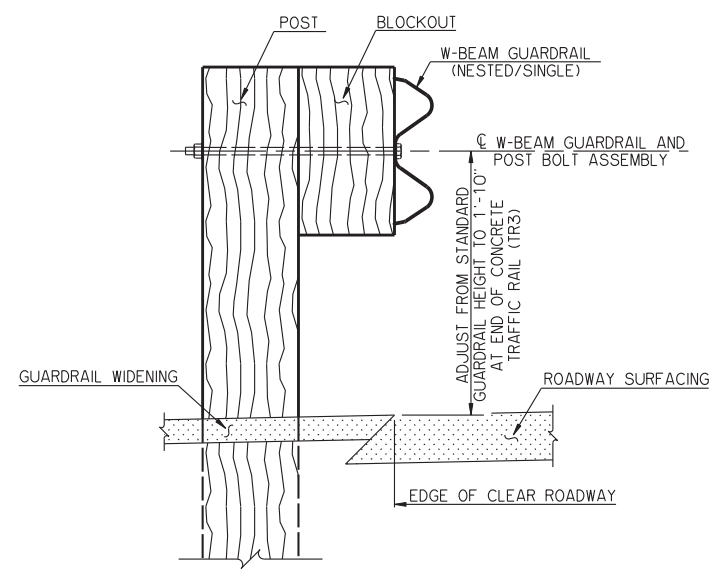
PLAN



ELEVATION



SECTION THRU GUARDRAIL BRIDGE CONNECTION AT CONCRETE TRAFFIC RAIL (TR3)



SECTION THRU GUARDRAIL BRIDGE CONNECTION AT GUARDRAIL POST AND BLOCKOUT

NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE ODOT 2009 STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
2. SEE ROADWAY STANDARDS GRH1-1 AND GRH2-1 FOR DETAILS OF GUARDRAIL, W-BEAM TERMINAL CONNECTION, POSTS, BLOCKOUTS, BOLT ASSEMBLIES AND HARDWARE NOT SHOWN. SEE "STATE" BRIDGE STANDARD TR3-2 FOR DETAILS OF CONCRETE TRAFFIC RAIL (TR3) NOT SHOWN.
3. ALL GUARDRAIL, METAL POSTS, BEARING PLATES, BOLTS, WASHERS AND NUTS SHALL BE GALVANIZED AFTER FABRICATION.
4. ANY FIELD CUTS OR HOLES MADE IN GALVANIZED MATERIALS SHALL BE COATED WITH A ZINC OXIDE PAINT SATISFYING SECTION 730.02 OF THE STANDARD SPECIFICATIONS.
5. ALL SPLICE BOLT ASSEMBLIES SHALL BE 5/8" DIAMETER BUTTON HEAD BOLTS WITH RECESSED NUTS AS SHOWN ON ROADWAY STANDARDS GRH1-1 OR GRH2-1. ALL POST BOLT ASSEMBLIES SHALL BE 5/8" DIAMETER BUTTON HEAD BOLTS WITH 1 3/4" OUTSIDE DIAMETER WASHERS AND RECESSED NUTS AS SHOWN ON ROADWAY STANDARDS GRH1-1 OR GRH2-1.
6. ALL HIGH STRENGTH HEX HEAD BOLT ASSEMBLIES SHALL BE 7/8" DIAMETER X 1'-4" LONG BOLTS WITH TWO WASHERS AND ONE NUT. ALL NUTS SHALL BE TIGHTENED WITH THE TURN-OF-THE-NUT METHOD TO BETWEEN 1/12 TURN AND 1/4 TURN IN EXCESS OF SNUG TIGHT.
7. THE PAY ITEM "GUARDRAIL ANCHOR UNIT (TYPE D-BF)" INCLUDES ALL COST OF MATERIAL AND INSTALLATION OF THE GUARDRAIL ANCHOR UNIT - BRIDGE CONNECTION INCLUDING THE COST OF POST AND BLOCKOUT NOS. 1 THRU 10, SINGLE AND NESTED W-BEAM GUARDRAIL, W-BEAM TERMINAL CONNECTION, SPLICE BOLT ASSEMBLIES, POST BOLT ASSEMBLIES, HIGH STRENGTH HEX HEAD BOLT ASSEMBLIES, BEARING PLATE, GALVANIZING, PAINTING, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS.

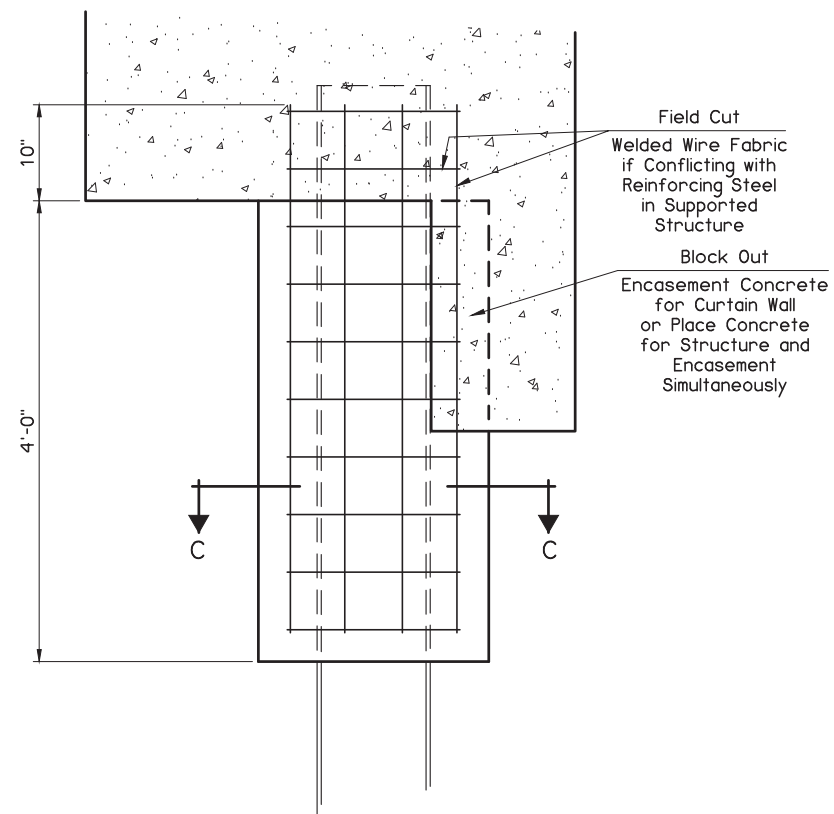
APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

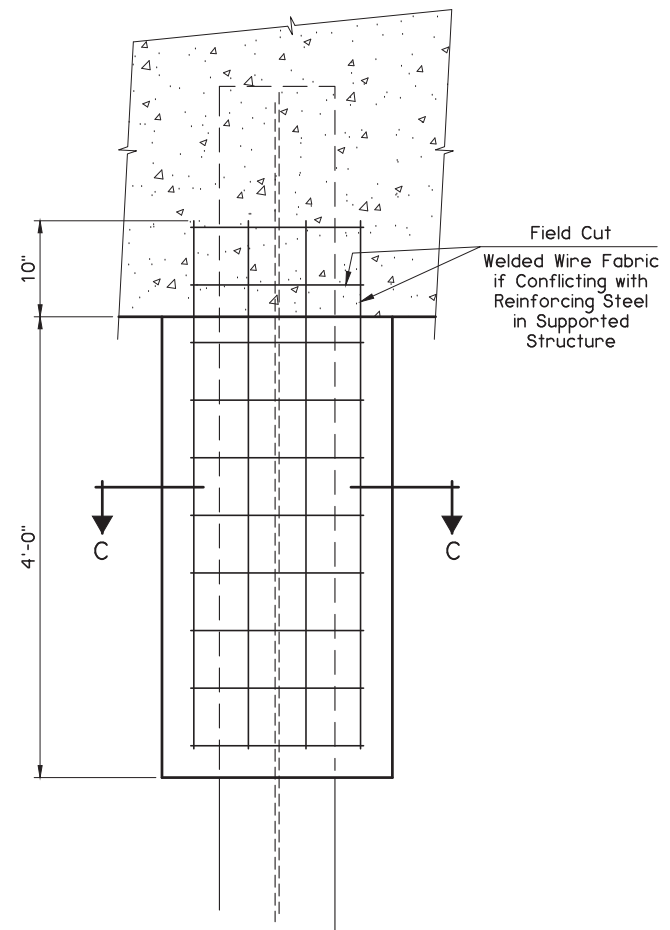
GUARDRAIL ANCHOR UNIT - BRIDGE CONNECTION

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623(F)	GUARDRAIL ANCHOR UNIT (TYPE D-BF)	EA

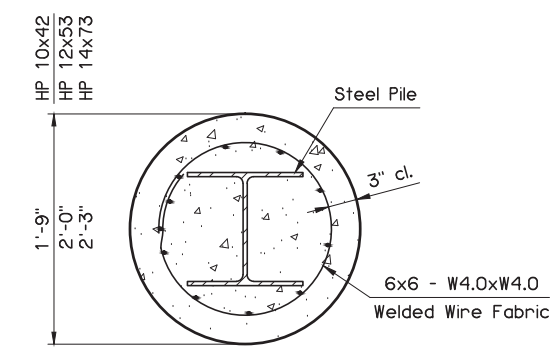
26' AND 32' CLEAR ROADWAYS - CONVENTIONAL AND INTEGRAL - SKEWED 0° AND 30°
2009 SPECIFICATIONS CB26.32-C.I-SKO.30-GRAU-BC OOE
CB-969E



ELEVATION AT CURTAIN WALL



TYPICAL ELEVATION

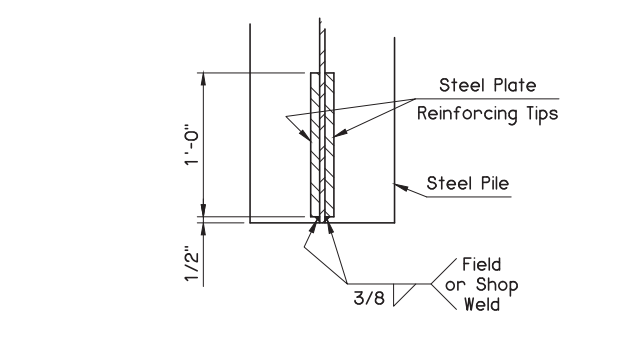


SECTION C-C

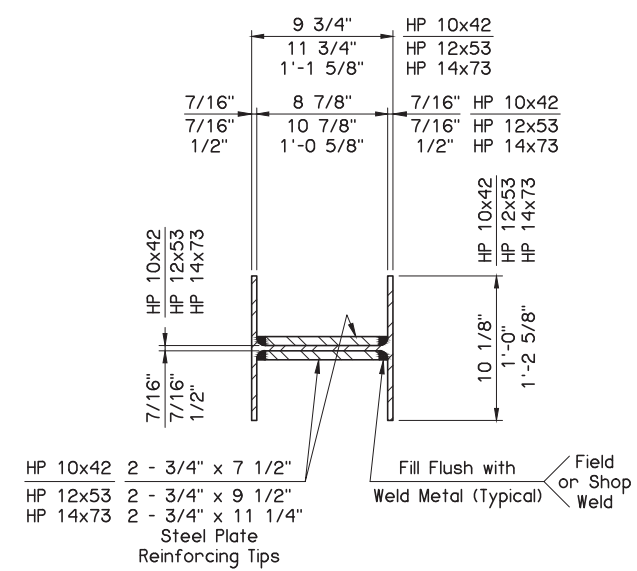
DETAIL OF STEEL PILE ENCASEMENT

NOTE:
Forms for Encasements may be omitted when soil conditions permit. Use only when specified in the plans. The Department considers the cost of Excavation, Forms, Class A Concrete and Welded Wire Fabric Reinforcing Steel for Steel Pile Encasements to be included in the contract unit price of PILES, DRIVEN.

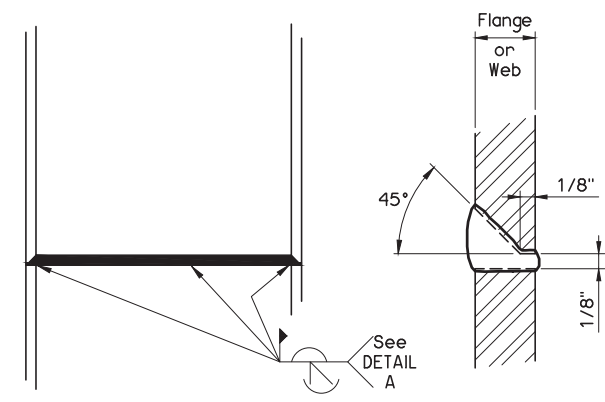
PILE ENCASEMENT QUANTITIES PER PILE				
ITEM	UNIT	HP 10x42	HP 12x53	HP 14x73
CLASS A CONCRETE	C.Y.	0.34	0.45	0.57
REINFORCING STEEL	LB.	16.2	18.3	20.3



SECTION A-A

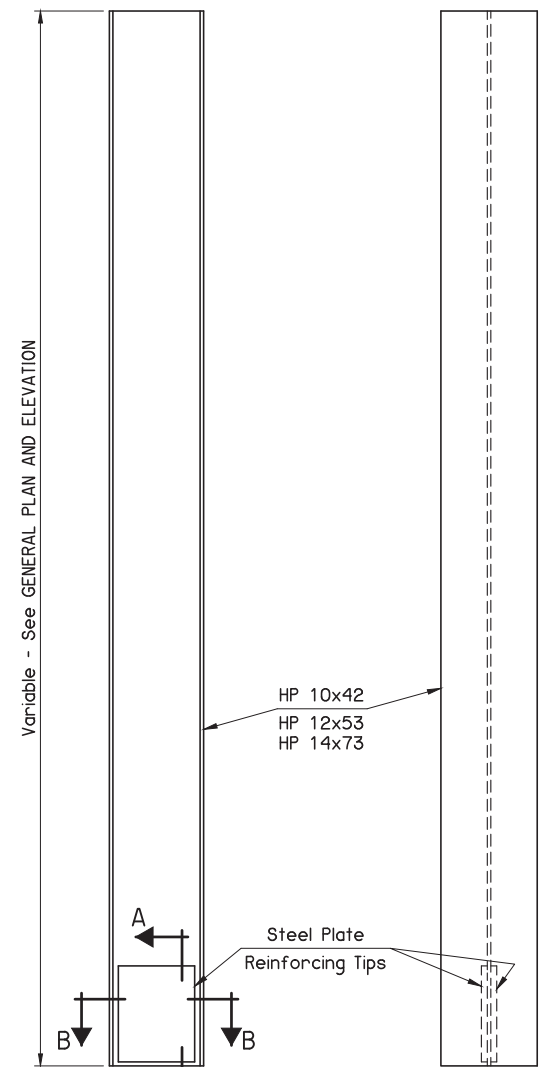


SECTION B-B



DETAIL OF WELDED SPLICE

NOTE:
The Contractor may use an ODOT approved Manufactured Pile Splice as an alternative to the Welded Splice shown.



ELEVATION OF WEB

ELEVATION OF FLANGE

DETAIL OF PILING

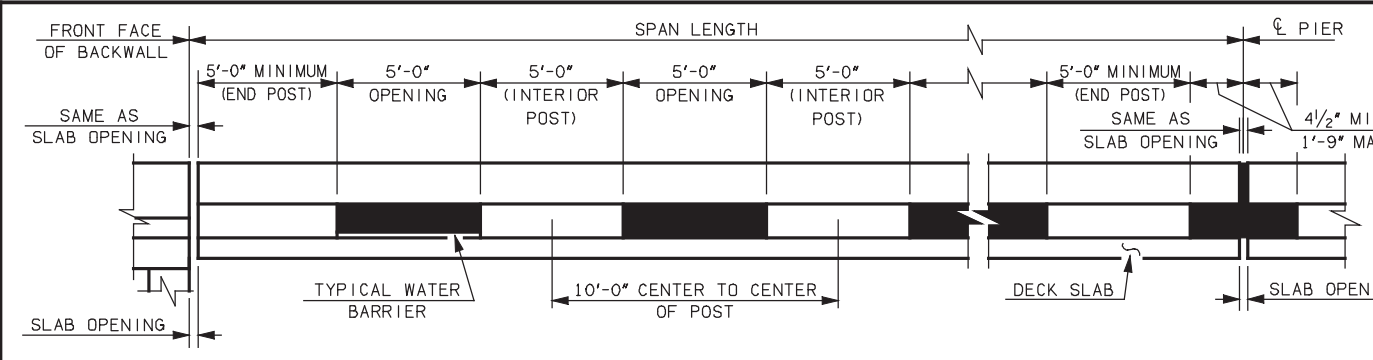
NOTE:
Provide structural steel for Piling and Steel Plate Reinforcing Tips in accordance with AASHTO M270 (ASTM A572), Grade 50. Provide Steel Plate Reinforcing Tips for all Piling unless specifically deleted by notes in the Project Plans and Specifications. The Contractor may use Manufactured Driving Tips as an alternative to the Steel Plate Reinforcing Tips shown with approval by the Bridge Engineer. The Department considers the cost of Steel Plate Reinforcing Tips or Manufactured Driving Tips to be included in the contract unit price of PILES, FURNISHED.

APPROVED BY BRIDGE ENGINEER *St. J.* DATE 12-20-16

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

STEEL PILING

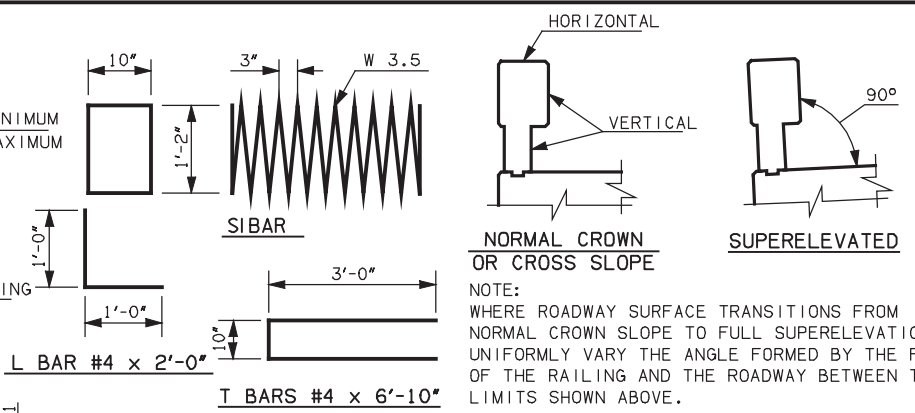
DESCRIPTION	REVISIONS	DATE



AT EXPANSION ABUTMENTS

AT EXPANSION PIERS

ELEVATION OF RAIL WITH EXPANSION JOINTS



NORMAL CROWN OR CROSS SLOPE

SUPERELEVATED

NOTE: WHERE ROADWAY SURFACE TRANSITIONS FROM NORMAL CROWN SLOPE TO FULL SUPERELEVATION, UNIFORMLY VARY THE ANGLE FORMED BY THE FACE OF THE RAILING AND THE ROADWAY BETWEEN THE LIMITS SHOWN ABOVE.

CONCRETE RAIL (TR3) NOTES

CONSTRUCT THE CONCRETE RAIL (TR3) TO MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (ENGLISH) AS WELL AS THE FOLLOWING REQUIREMENTS:

S-BARS (SPIRAL BARS):
WHEN TWO OR MORE S-BARS ARE USED IN A CONTINUOUS RAIL SECTION, BUTT THEIR ENDS TOGETHER WITHIN THE CENTER 3'-0" OF A RAIL POST. S-BARS ARE NOT TO BE EPOXY COATED.

CLASS AA CONCRETE:
CLASS AA CONCRETE SHALL BE USED IN THE CONCRETE RAIL (TR3). ALL COSTS OF CONCRETE TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF "CONCRETE RAIL (TR3)".

SR-BARS (VERTICAL POST BARS):
PLACE AND TIE ALL SRIBARS BEFORE CONCRETE IS PLACED IN THE DECK SLAB, APPROACH SLABS, OR WINGWALLS AS APPLICABLE. ROTATE HORIZONTAL LEGS OF THE SRIBARS TO MAINTAIN CONCRETE COVER IN WINGWALL APPLICATIONS. ALL REINFORCING STEEL SHALL BE EPOXY COATED REINFORCING STEEL AND SHALL BE PAID FOR IN THE PRICE BID PER LB OF "EPOXY COATED REINFORCING STEEL".

WATER BARRIER:
WATER BARRIERS, AS DETAILED, SHALL BE PROVIDED AT RAIL OPENINGS THAT DRAIN ONTO UNDERCROSSING ROADWAYS AND SIDEWALKS AS SHOWN IN THE PLANS AND AT OTHER LOCATIONS AS DIRECTED BY THE ENGINEER. PLACE THE CONCRETE FOR THE WATER BARRIER CONCURRENTLY WITH THE PLACEMENT OF THE CONCRETE IN THE POSTS. INCLUDE THE COST OF WATER BARRIERS IN THE PRICE BID FOR "CONCRETE RAIL (TR3)".

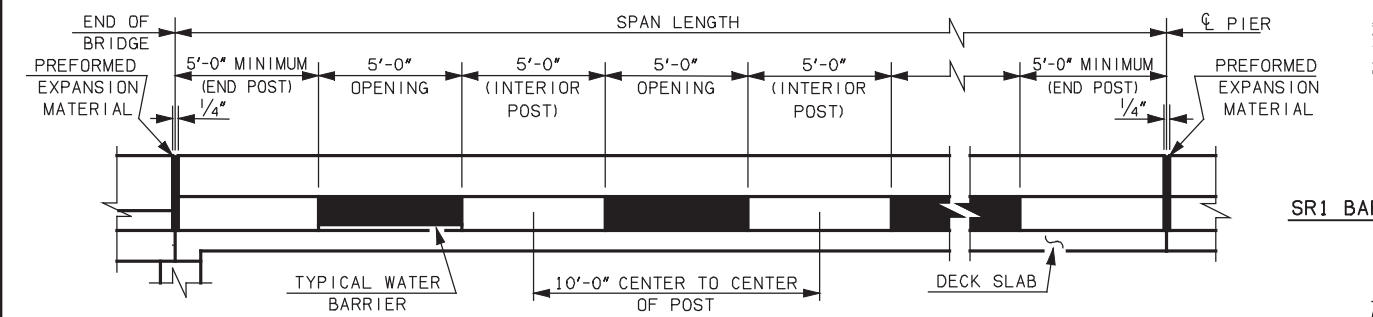
CONCRETE RAIL CONSTRUCTION:
CONSTRUCT RAILING WITHIN THE GUIDELINES AS SHOWN IN THE PLACEMENT DETAILS. LAYOUT THE POSTS AS SHOWN IN THE DETAILS ON THIS SHEET UNLESS OTHERWISE SHOWN IN THE PLANS. CONSTRUCT THE OPENINGS SUCH THAT THE END FACE OF THE POST IS PERPENDICULAR TO THE ROADWAY PROFILE GRADE. FOR RAILS ON A HORIZONTAL CURVE, CONSTRUCT THE RAIL TO THE REQUIRED RADIUS.

CONSTRUCTION JOINTS:
PLACE A CONSTRUCTION JOINT AT EACH FIXED ABUTMENT AND FIXED PIER, AND AT OTHER LOCATIONS AS SHOWN IN THE PLANS. PLACE 1/4" THICK PREFORMED EXPANSION MATERIAL IN THE CONSTRUCTION JOINT, SUCH THAT IT COVERS THE ENTIRE AREA OF THE RAIL AND POST IN ACCORDANCE WITH THE DETAILS SHOWN.

EXPANSION JOINTS:
AT EXPANSION JOINTS IN THE DECKSLAB OR APPROACH SLAB, MATCH THE WIDTH OF THE OPENING BETWEEN THE ENDS OF THE RAILING WITH THE OPENING OF THE EXPANSION JOINT. CONSTRUCT THE OPENING BETWEEN THE END POST AND THE EXPANSION JOINT AS SHOWN ON THE PLANS WITHIN THE MAXIMUM AND MINIMUM DIMENSIONS AS SHOWN ON THIS SHEET.

CONTROL CRACK JOINTS:
WHEN PLANS CALL FOR A CONTROL CRACK JOINT PROVIDE DOUBLE 3/4" CHAMFERS OR 3/4" DEEP SAWCUT IN ACCORDANCE WITH THE DETAILS SHOWN. ALL BARS SHALL BE CONTINUOUS THROUGH THE CONTROL CRACK JOINTS.

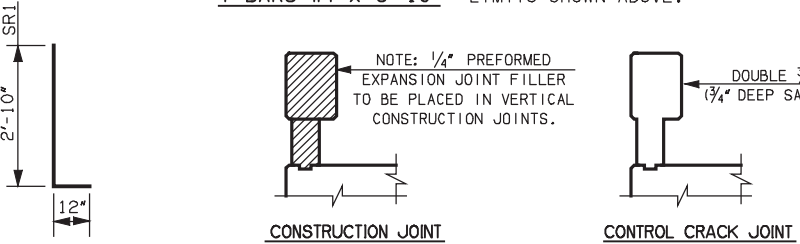
GUARDRAIL CONNECTION:
FORM OR DRILL HOLES, AS SHOWN, FOR THE CONNECTION OF GUARDRAIL BRIDGE CONNECTION AT THE LOCATIONS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. IT IS THE RESPONSIBILITY OF THE BRIDGE CONTRACTOR TO PROVIDE THE HOLES. THE CONTRACTOR THAT INSTALLS THE GUARDRAIL WILL BE RESPONSIBLE FOR INSTALLING THE GUARDRAIL BRIDGE CONNECTIONS. INCLUDE THE COST OF "T" BARS IN THE PRICE BID FOR "CONCRETE RAIL (TR3)".



AT FIXED ABUTMENTS

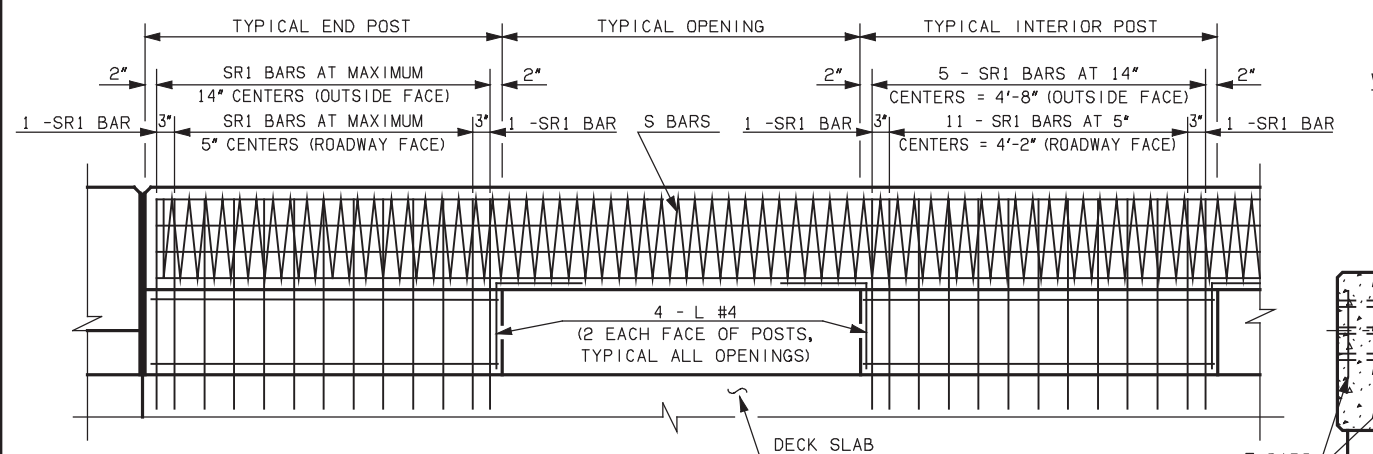
AT FIXED PIERS

ELEVATION OF RAIL WITH FIXED JOINTS

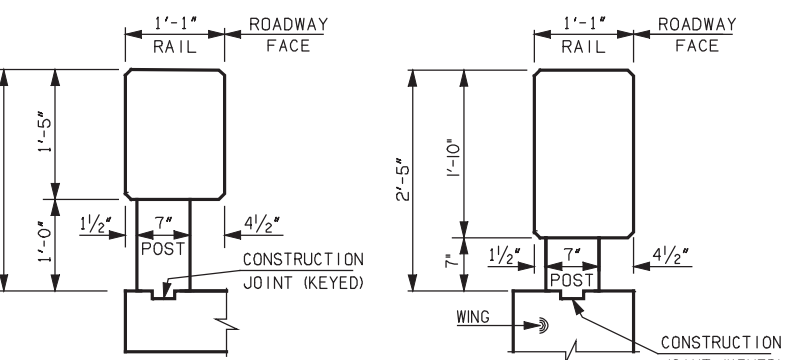


CONSTRUCTION JOINT

CONTROL CRACK JOINT

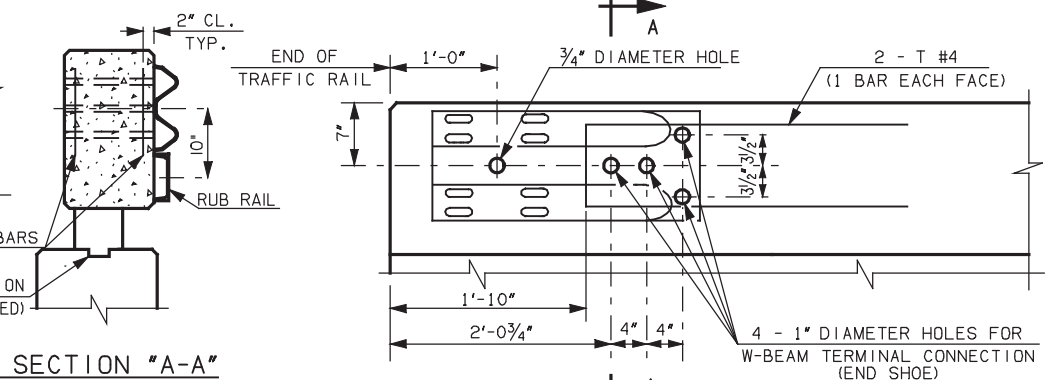


TRAFFIC RAIL REINFORCING



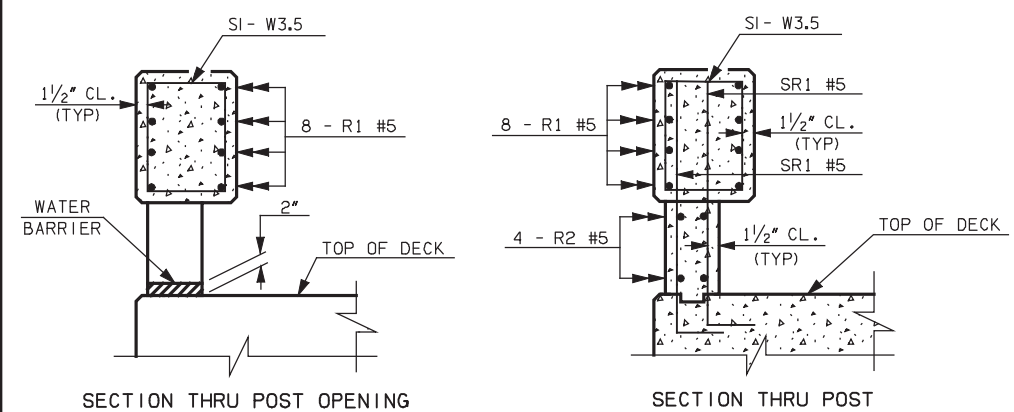
TRAFFIC RAIL DETAIL

TRAFFIC RAIL DETAIL AT WING



SECTION "A-A"

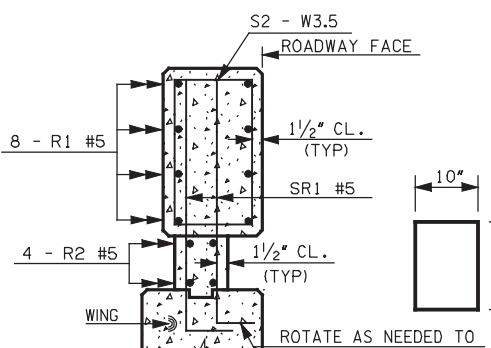
DETAIL "A"



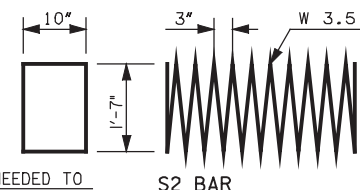
SECTION THRU POST OPENING

SECTION THRU POST

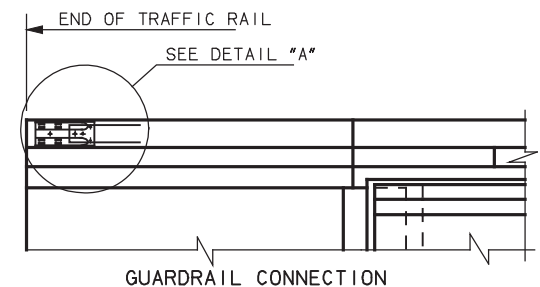
SECTION THRU RAIL AT BRIDGE DECK OR APPROACH SLAB



TRAFFIC RAIL SECTION AT WING



S2 BAR



GUARDRAIL CONNECTION

BASIS OF PAYMENT	
DESCRIPTION	UNIT
CONCRETE RAIL (TR3)	L.F.

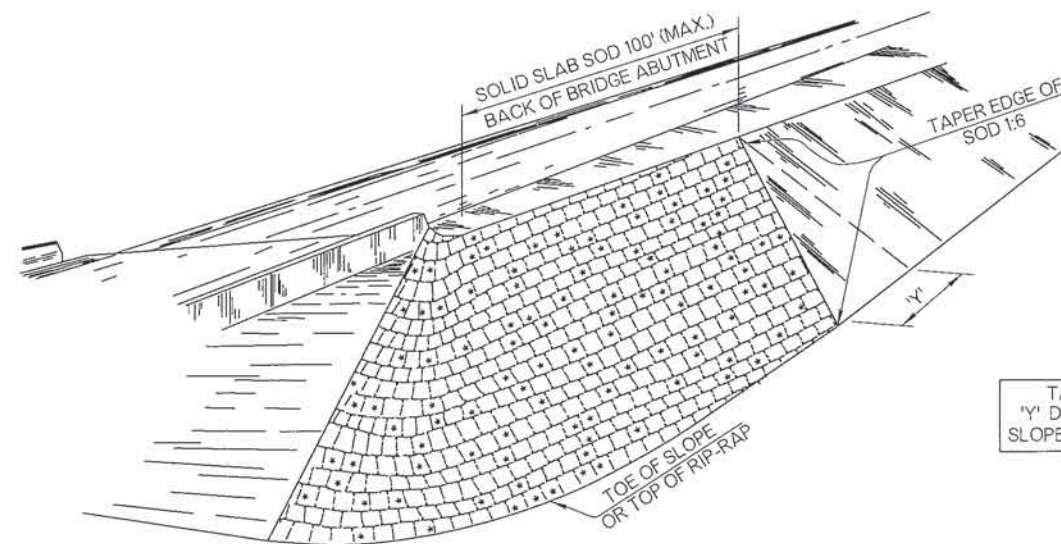
APPROVED BY BRIDGE ENGINEER: *[Signature]* DATE: 1/17/13

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

CONCRETE RAIL (TR3)

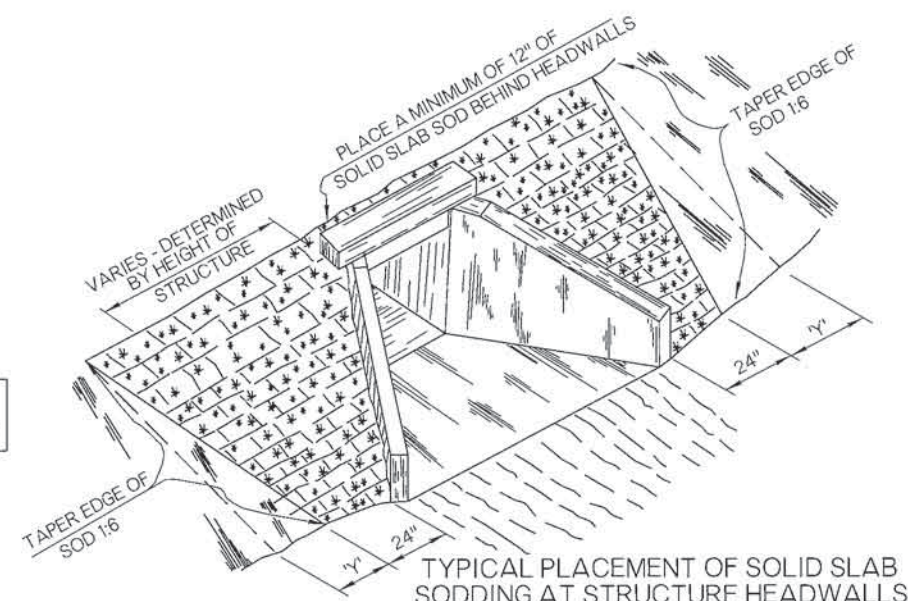
2009 SPECIFICATIONS

TR3-2	OIE
	B-01E



TYPICAL PLACEMENT OF SOLID SLAB SODDING ON FILL SLOPES, APPROACHES TO OVERPASSES AND BRIDGES.

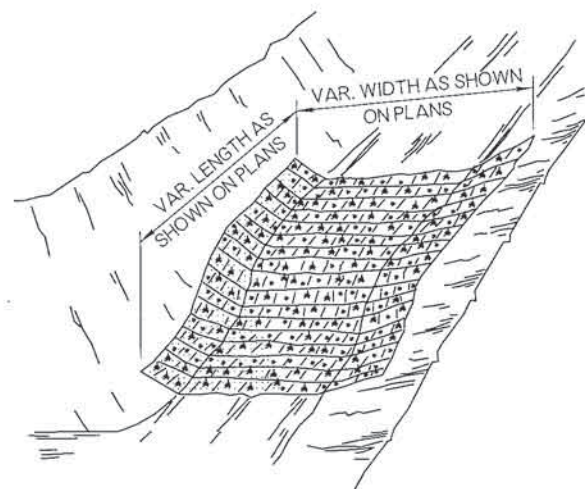
TAPER NOTE
 'Y' DIMENSION =
 SLOPE LENGTH x 0.17



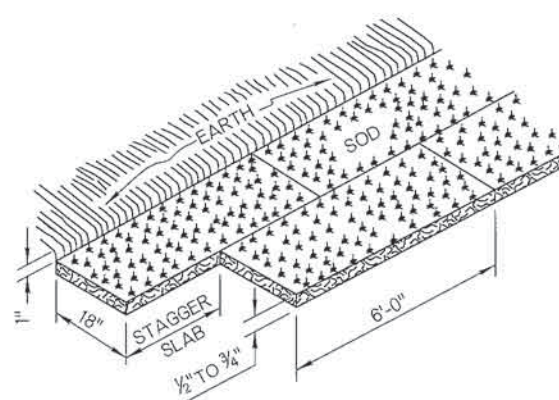
TYPICAL PLACEMENT OF SOLID SLAB SODDING AT STRUCTURE HEADWALLS

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. SOLID SLAB SOD SHALL BE PLACED IN HORIZONTAL ROWS WITH THE LONGEST SIDE OF EACH SLAB RUNNING PARALLEL TO THE ROADWAY, AND THE SLABS IN ALTERNATE ROWS STAGGERED HALF THE LENGTH OF EACH INDIVIDUAL SLAB. ENSURE THE ROWS RUN PARALLEL TO THE ROADWAY.
3. SLABS SHALL BE CUT AND HARVESTED WITH A COMMERCIAL SOD CUTTER TO THE DIMENSIONS SHOWN, THEN LOADED, TRANSPORTED AND HANDLED ON PALLETS.
4. AFTER PLACEMENT OF SOLID SLAB SOD, EARTH AT THE OUTER EDGES OF THE PLACEMENT SHALL BE BACKFILLED AND LOOSELY COMPACTED TO AT LEAST 1" ABOVE THE TOP OF THE SOLID SLAB SODDING.
5. STAKE SOD ON ALL SLOPES 1:2 OR STEEPER, AND ON ANY AREAS THAT ARE IN SUCH CONDITION THAT THERE IS DANGER OF SOD SLIPPING. PERFORM STAKING CONCURRENTLY WITH SOD PLACEMENT AND PRIOR TO TAMPING WITH SOUND WOODEN STAKES APPROXIMATELY 1 INCH SQUARE OR 1 INCH IN DIAMETER AND NOT LESS THAN 12 INCHES IN LENGTH, OR USE METAL STAPLES IN PLACE OF WOODEN STAKES. PLACE, STAKE AND STAPLE THE SOD WHERE NECESSARY, AND AS DETERMINED BY THE ENGINEER.



TYPICAL PLACEMENT OF SOLID SLAB SODDING IN DITCHES



SOLID SLAB SODDING
 (MARCH 1 THRU AUGUST 31)

THE PLACEMENT OF SOLID SLAB SOD SHALL BE RESTRICTED TO THE PERIOD FROM MARCH 1 THRU AUGUST 31, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

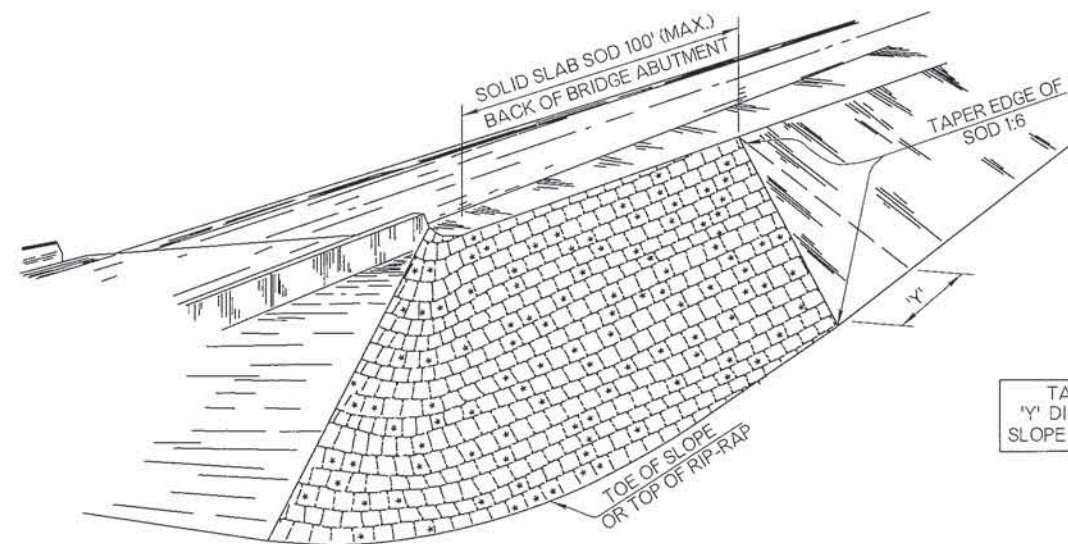
BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
230(A)	SOLID SLAB SODDING	SY



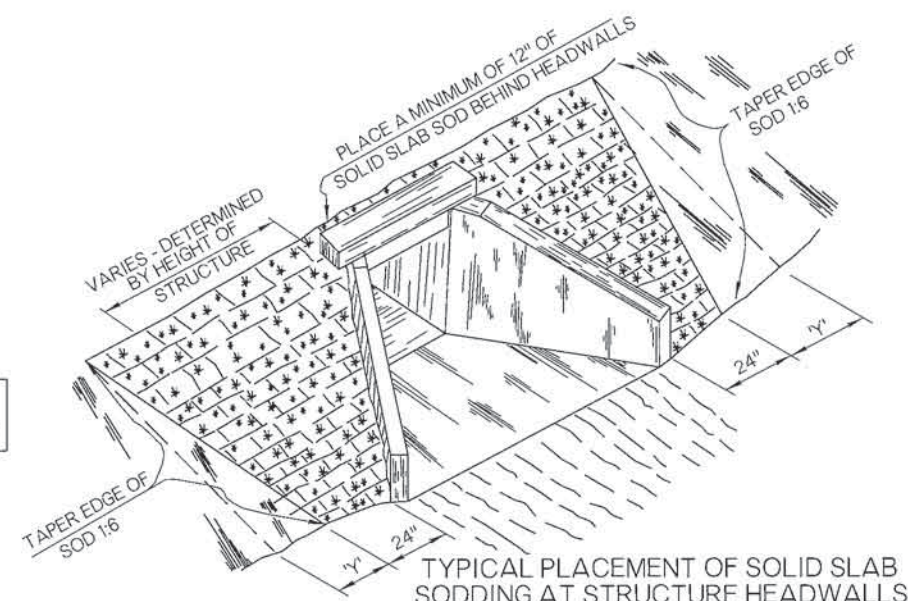
APPROVED BY ROADWAY ENGINEER: *Calvin F. A.* DATE: *01/14/15*
 ROADWAY DESIGN DIVISION STANDARD

SOLID SLAB SODDING



TYPICAL PLACEMENT OF SOLID SLAB SODDING ON FILL SLOPES, APPROACHES TO OVERPASSES AND BRIDGES.

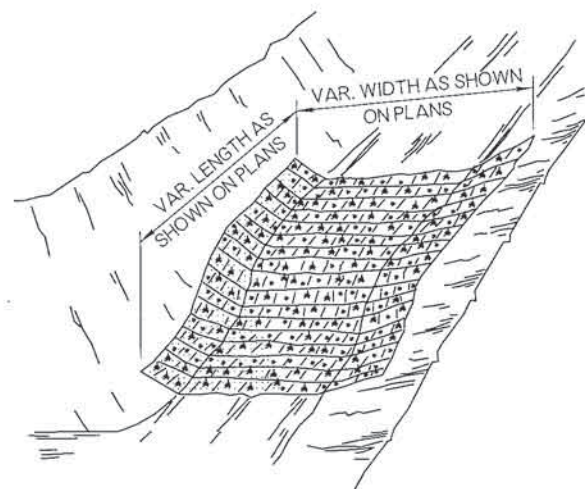
TAPER NOTE
 'Y' DIMENSION =
 SLOPE LENGTH x 0.17



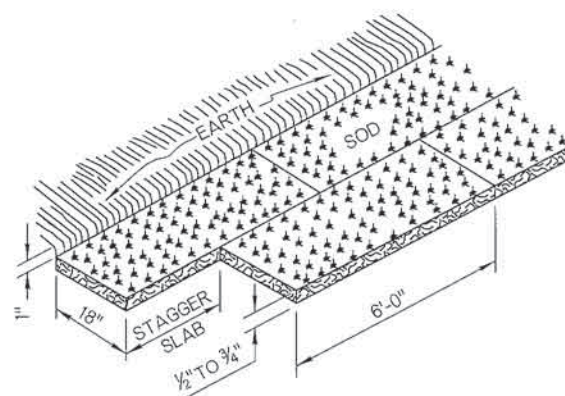
TYPICAL PLACEMENT OF SOLID SLAB SODDING AT STRUCTURE HEADWALLS

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. SOLID SLAB SOD SHALL BE PLACED IN HORIZONTAL ROWS WITH THE LONGEST SIDE OF EACH SLAB RUNNING PARALLEL TO THE ROADWAY, AND THE SLABS IN ALTERNATE ROWS STAGGERED HALF THE LENGTH OF EACH INDIVIDUAL SLAB. ENSURE THE ROWS RUN PARALLEL TO THE ROADWAY.
3. SLABS SHALL BE CUT AND HARVESTED WITH A COMMERCIAL SOD CUTTER TO THE DIMENSIONS SHOWN, THEN LOADED, TRANSPORTED AND HANDLED ON PALLETS.
4. AFTER PLACEMENT OF SOLID SLAB SOD, EARTH AT THE OUTER EDGES OF THE PLACEMENT SHALL BE BACKFILLED AND LOOSELY COMPACTED TO AT LEAST 1" ABOVE THE TOP OF THE SOLID SLAB SODDING.
5. STAKE SOD ON ALL SLOPES 1:2 OR STEEPER, AND ON ANY AREAS THAT ARE IN SUCH CONDITION THAT THERE IS DANGER OF SOD SLIPPING. PERFORM STAKING CONCURRENTLY WITH SOD PLACEMENT AND PRIOR TO TAMPING WITH SOUND WOODEN STAKES APPROXIMATELY 1 INCH SQUARE OR 1 INCH IN DIAMETER AND NOT LESS THAN 12 INCHES IN LENGTH, OR USE METAL STAPLES IN PLACE OF WOODEN STAKES. PLACE, STAKE AND STAPLE THE SOD WHERE NECESSARY, AND AS DETERMINED BY THE ENGINEER.



TYPICAL PLACEMENT OF SOLID SLAB SODDING IN DITCHES



SOLID SLAB SODDING
 (MARCH 1 THRU AUGUST 31)

THE PLACEMENT OF SOLID SLAB SOD SHALL BE RESTRICTED TO THE PERIOD FROM MARCH 1 THRU AUGUST 31, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

BASIS OF PAYMENT

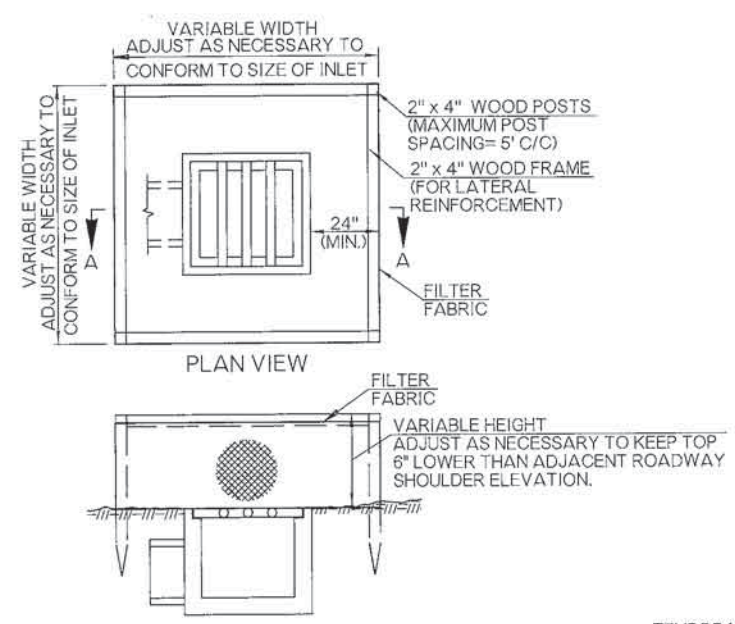
ITEM NO.	ITEM	UNIT
230(A)	SOLID SLAB SODDING	SY



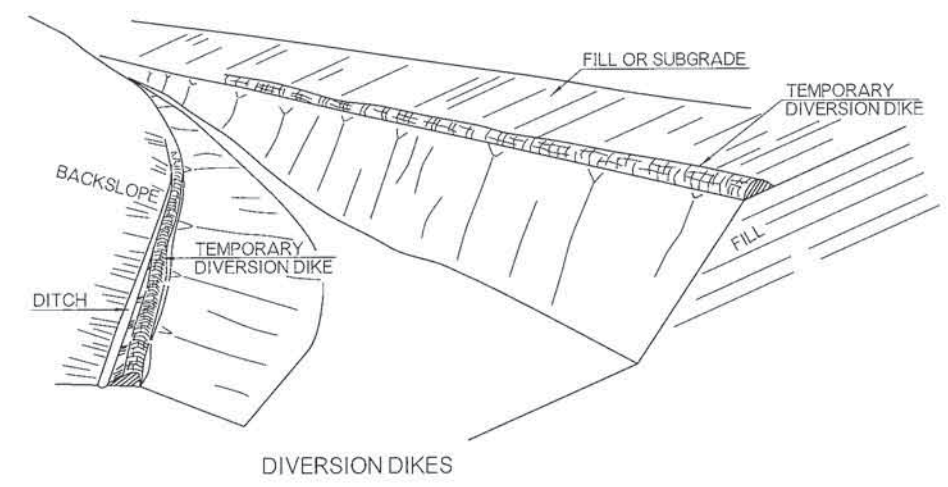
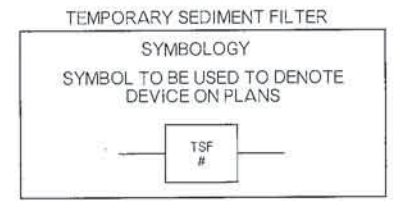
APPROVED BY ROADWAY ENGINEER: *Calvin F. A.* DATE: *01/14/15*
 ROADWAY DESIGN DIVISION STANDARD

SOLID SLAB SODDING

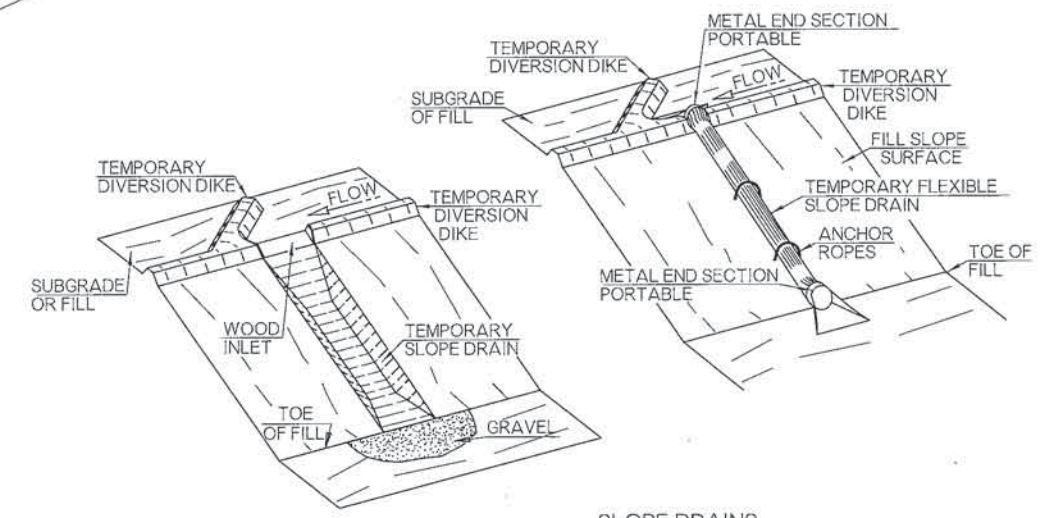
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



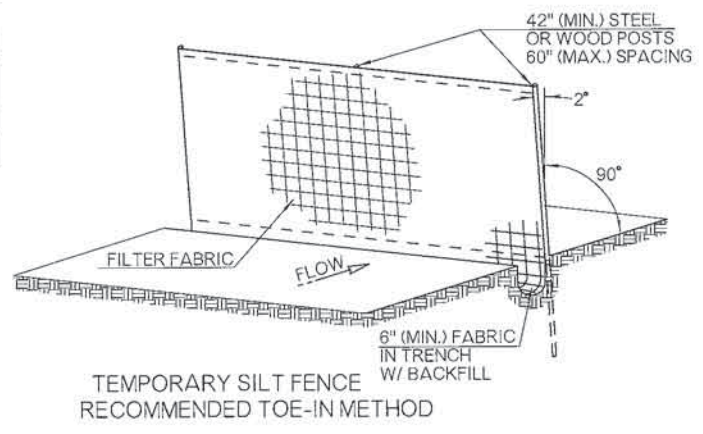
SECTION A - A
SEDIMENT FILTER



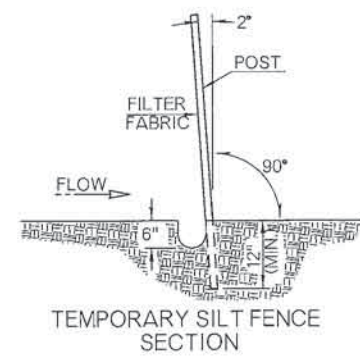
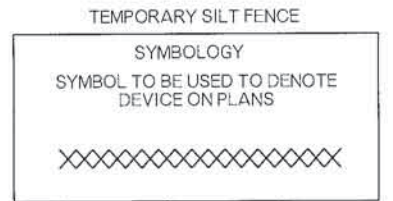
DIVERSION DIKES



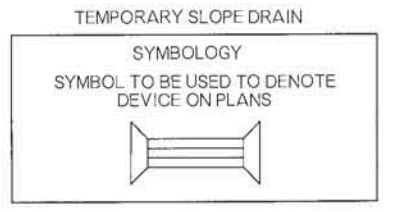
SLOPE DRAINS



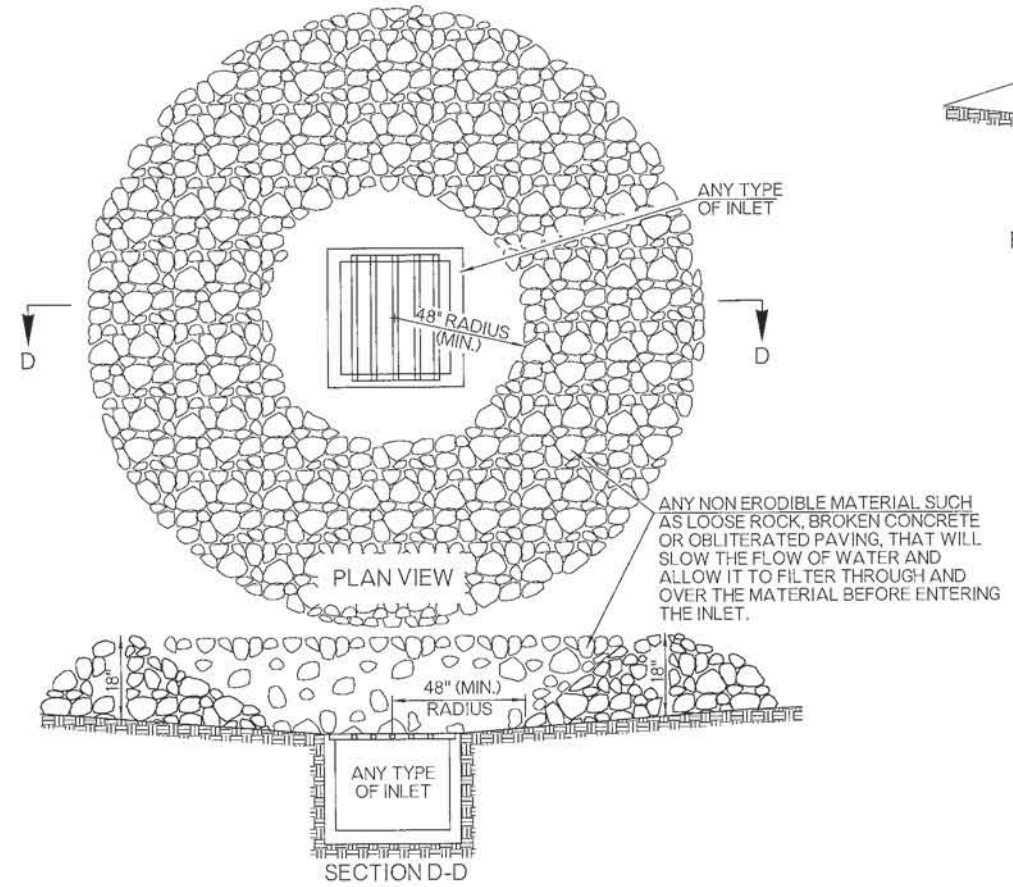
TEMPORARY SILT FENCE
RECOMMENDED TOE-IN METHOD



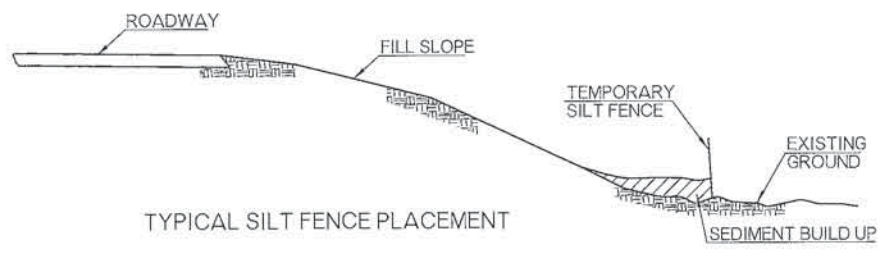
TEMPORARY SILT FENCE
SECTION



TEMPORARY SLOPE DRAIN



SECTION D-D
SEDIMENT FILTER
(TYPE II)



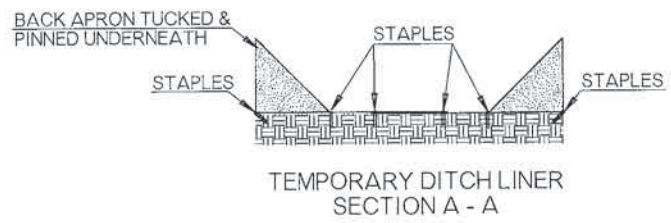
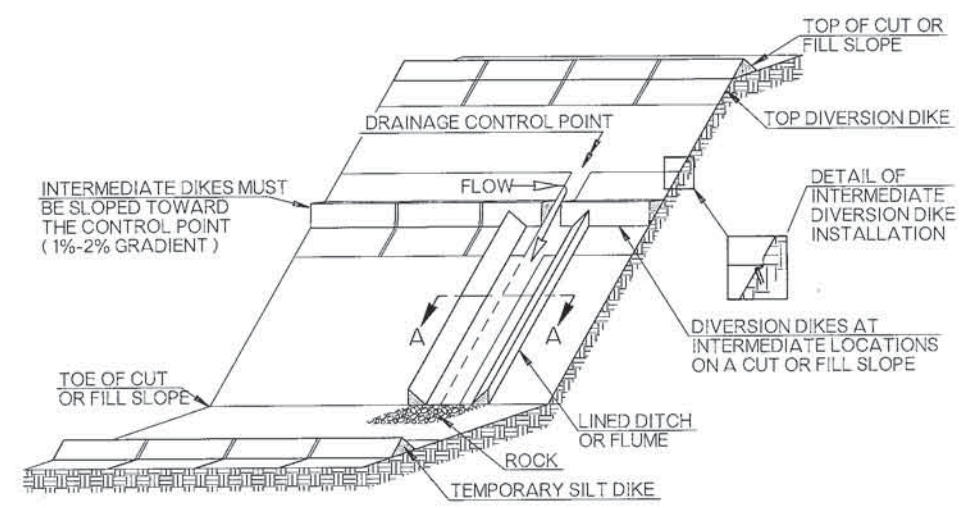
TYPICAL SILT FENCE PLACEMENT

- GENERAL NOTES
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 2. COST OF TEMPORARY DIVERSION DIKES TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS OF WORK.

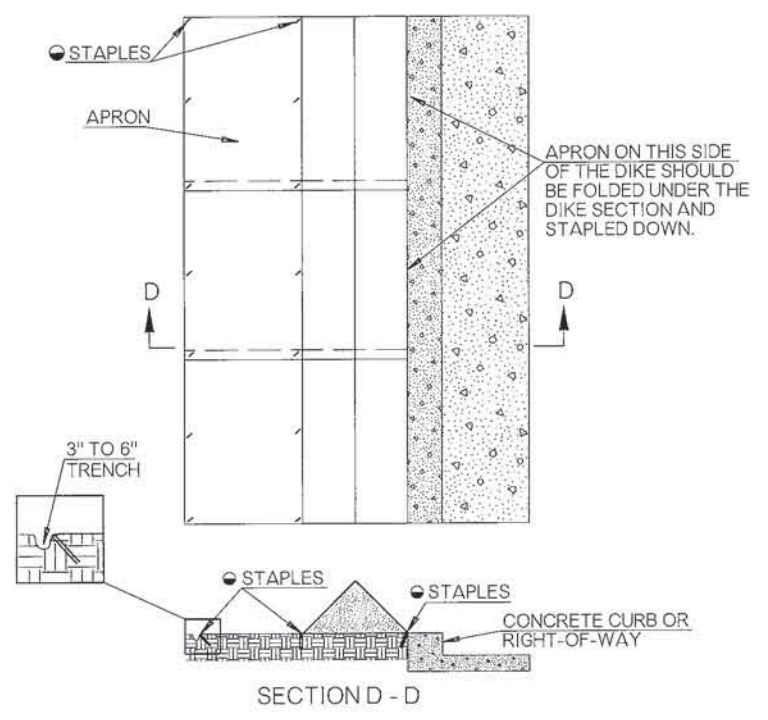
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
221 (A)	TEMPORARY SLOPE DRAINS	LF
221 (C)	TEMPORARY SILT FENCE	LF
221 (D)	TEMPORARY SEDIMENT FILTER	EA

APPROVED BY ROADWAY ENGINEER: *Calvin F. A.* DATE: *04/16/15*
 ROADWAY DESIGN DIVISION STANDARD
ODOT
 TEMPORARY SEDIMENT CONTROLS

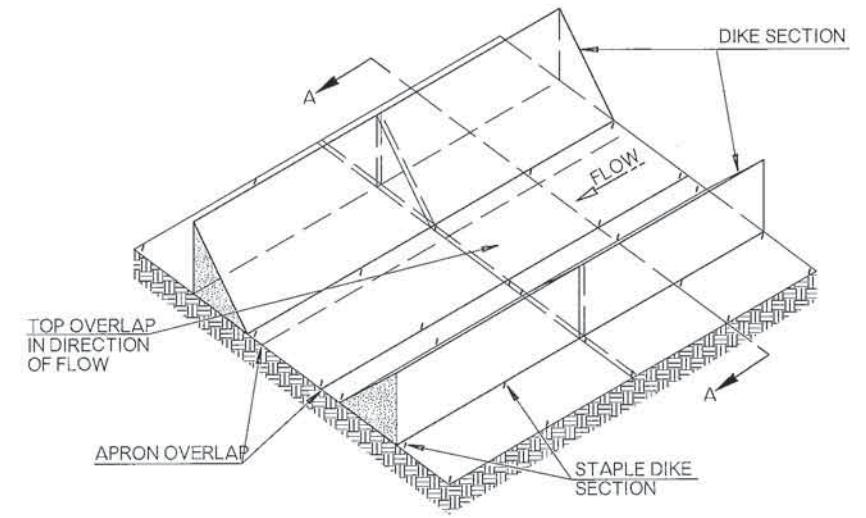
OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	



TEMPORARY SILT DIKE INSTALLATION FOR DIVERSION DIKES AND / OR DITCH LINER

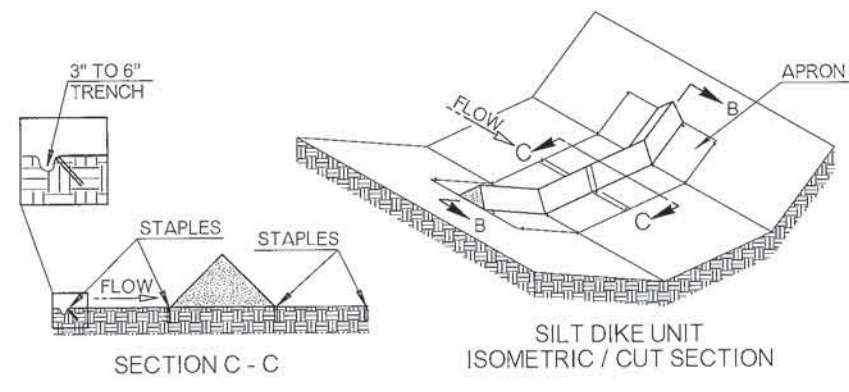


TEMPORARY SILT DIKE INSTALLATION FOR CONTINUOUS BARRIER

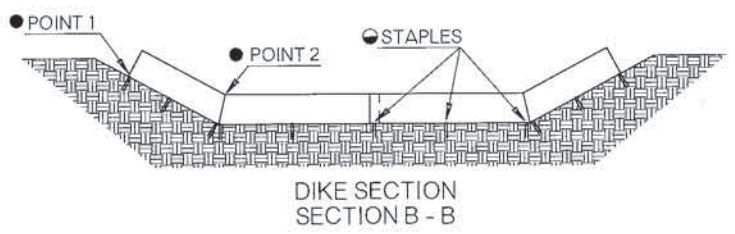


TEMPORARY SILT DIKE INSTALLATION FOR TEMPORARY DITCH LINER

- GENERAL NOTES
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - THIS WORK SHALL CONSIST OF FURNISHING, INSTALLING, AND MAINTAINING THE TEMPORARY SILT DIKE. THE DIKES SHALL BE USED AS A CONTINUOUS LINE BARRIER AT THE TOE OF SLOPE OR ACROSS THE ROADWAY DITCH TO CONTAIN SEDIMENT AND MINIMIZE EROSION, OR AS DIRECTED BY THE ENGINEER. THESE DIKES SHALL BE INSTALLED AND LOCATED AS SOON AS CONSTRUCTION WILL ALLOW OR AS DIRECTED BY THE ENGINEER.
 - TEMPORARY SILT DIKE SHALL BE TRIANGULAR SHAPED HAVING A HEIGHT OF AT LEAST 8" TO 10" IN THE CENTER WITH EQUAL SIDES AND A 16" TO 20" BASE. THE TRIANGULAR SHAPED INNER MATERIAL SHALL BE URETHANE FOAM MEETING THE REQUIREMENTS FOR ASTM D3574. THE OUTER COVER SHALL BE A WOVEN GEOTEXTILE FABRIC PLACED AROUND THE INNER MATERIAL & ALLOWED TO EXTEND BEYOND BOTH SIDES OF THE TRIANGLE 24" TO 36". THIS FABRIC SHOULD BE MILDEW RESISTANT, ROT-PROOF AND RESISTANT TO HEAT AND ULTRAVIOLET RADIATION MEETING REQUIREMENTS FOR SEDIMENT CONTROL IN AASHTO M 288. THE DIKES SHALL BE ATTACHED TO THE GROUND WITH WIRE STAPLES. THE STAPLES SHALL BE NO. 11 GAUGE WIRE AND BE AT LEAST 6" TO 8" LONG. STAPLES SHALL BE PLACED AS SHOWN ON THESE DETAILS.
 - ACCEPTED TEMPORARY SILT DIKE, MEASURED AS PROVIDED ABOVE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE BID FOR TEMPORARY SILT DIKE. PRICE BID WILL INCLUDE THE COST OF FURNISHING THE DIKES, INSTALLING, MAINTAINING AND REMOVAL WHEN DIRECTED BY THE ENGINEER.

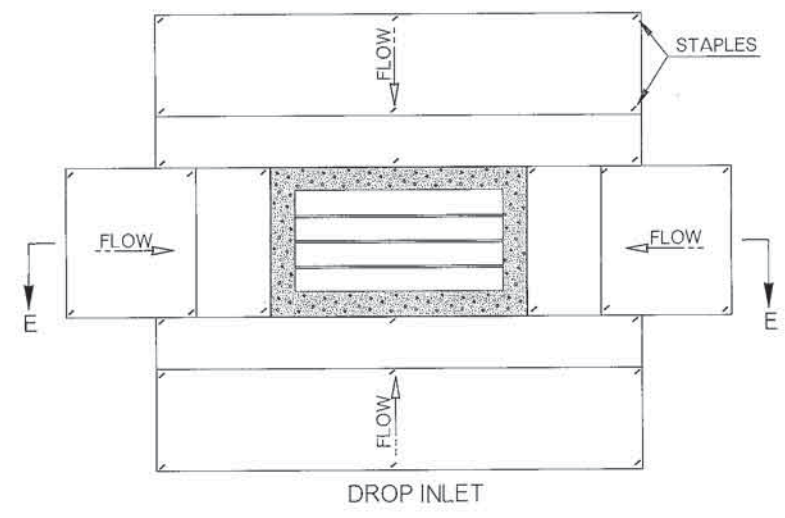


SILT DIKE UNIT ISOMETRIC / CUT SECTION

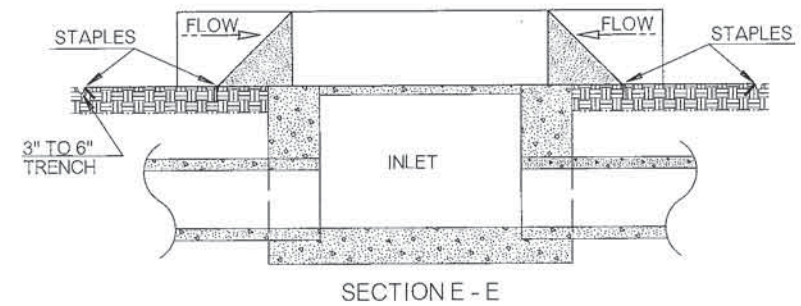


TEMPORARY SILT DIKE INSTALLATION FOR ROADWAY DITCH OR DRAINAGE DITCH

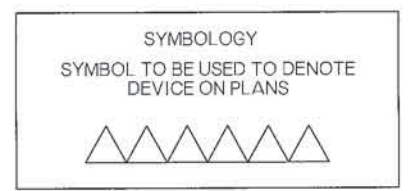
- POINT "1" MUST BE HIGHER THAN POINT "2" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- STAPLES SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF THE UNIT AS SHOWN ON THE DIAGRAM.



DROP INLET



TEMPORARY SILT DIKE INSTALLATION FOR DROP INLETS



NOTE: SILT DIKE SHOULD ONLY BE USED FOR DROP INLETS IN SUMP LOCATIONS. FOR DROP INLETS ON GRADE, USE SEDIMENT TRAPS OR OTHER CONTROLS.

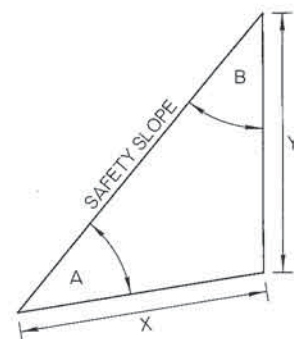
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
221 (F)	TEMPORARY SILT DIKE	LF

NOTE: SILT DIKES ARE ONLY FURNISHED IN 7' INCREMENTS.

APPROVED BY ROADWAY ENGINEER: *Caleb F. A.* DATE: *04/16/15*
 ROADWAY DESIGN DIVISION STANDARD

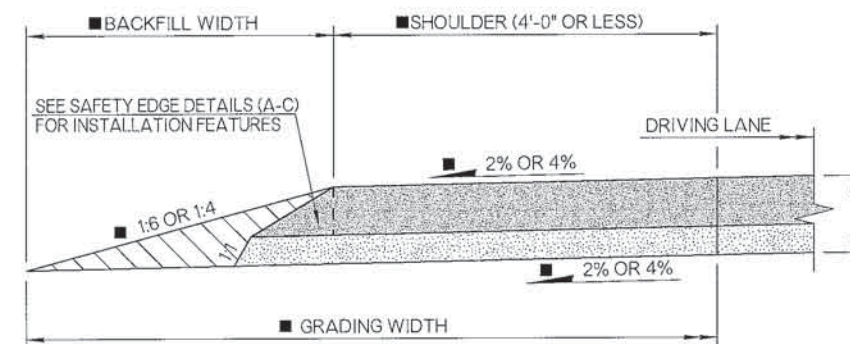
TEMPORARY SILT DIKE

X - ASPHALT PAVEMENT SAFETY EDGE WIDTH				
Y	X (2% SLOPE)		X (-4% SLOPE)	
	2%	-2%	IN	IN
0.50	0.86	0.88	0.89	
0.75	1.28	1.31	1.33	
1.00	1.71	1.75	1.77	
1.50	2.57	2.63	2.66	
2.00	3.42	3.50	3.54	
2.50	4.28	4.38	4.43	
3.00	5.14	5.26	5.31	
3.50	5.99	6.13	6.20	
4.00	6.85	7.01	7.08	
4.50	7.70	7.88	7.97	
5.00	8.56	8.76	8.85	



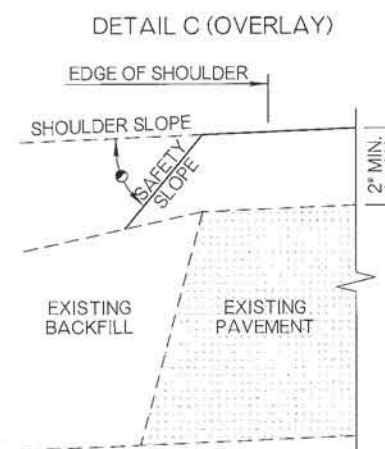
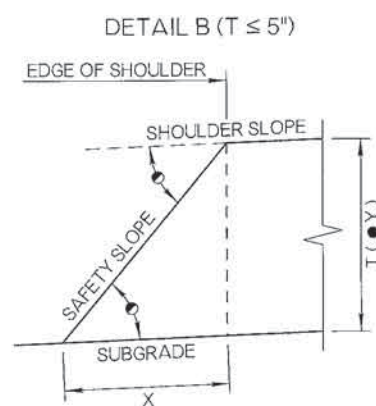
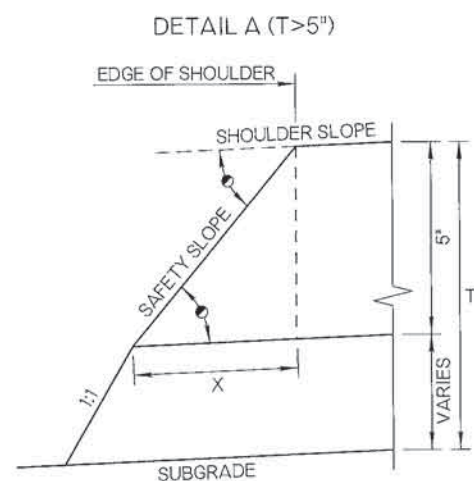
$$X = \frac{Y \cdot \sin(B)}{\sin(A)}$$

CALCULATE X USING 30° FOR ANGLE A.



TYPICAL SECTION VIEW OF AN ASPHALT PAVEMENT SAFETY EDGE

NOTE: SAFETY EDGE SHALL BE INSTALLED ON SHOULDERS OF WIDTH 4'-0" OR LESS.
 ■ SEE TYPICAL SECTION FOR DIMENSIONS AND SLOPES.



SAFETY EDGE DETAILS (A-C)

- VARIES BETWEEN 2" AND 5" WITH A 5" MAXIMUM HEIGHT.
- 30°±5° (ANGLE IS MEASURED FROM SLOPED EDGE OF SHOULDER.)

GENERAL NOTES

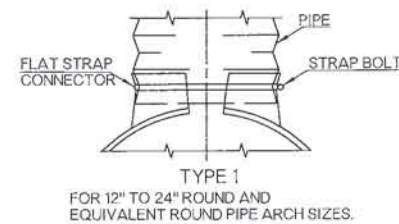
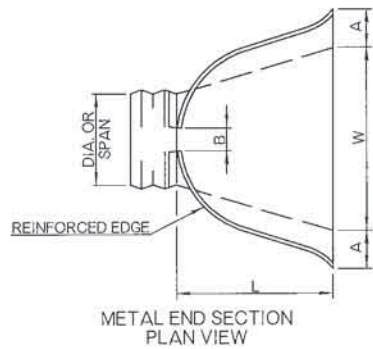
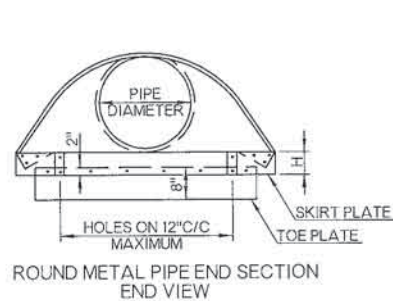
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. SAFETY EDGE SHALL BE CONSTRUCTED IN UNION WITH THE ASPHALT CONCRETE PAVEMENT.
3. THE SAFETY EDGE, AS SHOWN, CAN BE APPLIED TO NEW CONSTRUCTION AND TO OVERLAYS OF AT LEAST 2".
4. INSTALLATION OF SAFETY EDGE IS NOT REQUIRED IN CURB AND GUTTER AREAS.
5. ALL SAFETY EDGES MUST MEET THE APPROVAL OF THE ENGINEER. THE ENGINEER MAY REQUIRE PROOF THAT THE SYSTEM HAS BEEN USED ON PREVIOUS PROJECTS WITH ACCEPTABLE RESULTS OR MAY REQUIRE THAT A TEST SECTION BE CONSTRUCTED PRIOR TO THE BEGINNING OF WORK TO DEMONSTRATE THAT THE EDGE SHAPE AND COMPACTION IS TO THE SATISFACTION OF THE ENGINEER.
6. PRIOR TO PAVING SAFETY EDGE, GRADE AN AREA 10" WIDE BEGINNING AT EDGE OF PAVED SHOULDER TO PROVIDE A LEVEL SURFACE FREE OF VEGETATION.

APPROVED BY ROADWAY ENGINEER: *Caleb F. A.* DATE: 04/14/15
 ROADWAY DESIGN DIVISION STANDARD

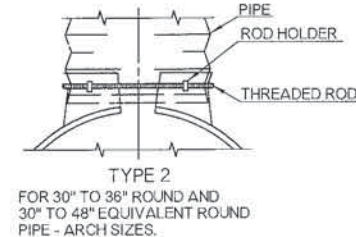
DOT PAVEMENT SAFETY EDGE

DIMENSIONS OF END SECTIONS FOR ROUND METAL PIPE

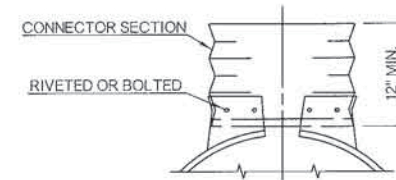
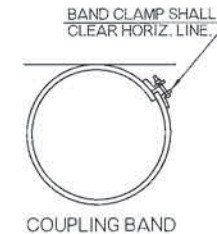
PIPE DIA.	GA.	A	B	H	L	W	APPROX. SLOPE	BODY TYPE
12"	16	6"	6"	6"	21"	24"	1:2 1/2	1 PC.
15"	16	7"	8"	6"	26"	30"	1:2 1/2	1 PC.
18"	16	8"	10"	6"	31"	36"	1:2 1/2	1 PC.
21"	16	9"	12"	6"	36"	42"	1:2 1/2	1 PC.
24"	16	10"	13"	6"	41"	48"	1:2 1/2	1 PC.
30"	14	12"	16"	8"	51"	60"	1:2 1/2	1 PC.
36"	14	14"	19"	9"	60"	72"	1:2 1/2	2 PC.
42"	12	16"	22"	11"	69"	84"	1:2 1/2	2 PC.
48"	12	18"	27"	12"	78"	90"	1:2 1/4	2 PC.
54"	12	18"	30"	12"	84"	102"	1:2	2 PC.
60"	12	18"	33"	12"	87"	114"	1:1 3/4	3 PC.
66"	12	18"	36"	12"	87"	120"	1:1 1/2	3 PC.
72"	12	18"	39"	12"	87"	126"	1:1 1/3	3 PC.
78"	12	16"	42"	12"	87"	132"	1:1 1/4	3 PC.
84"	12	18"	45"	12"	87"	138"	1:1 1/6	3 PC.



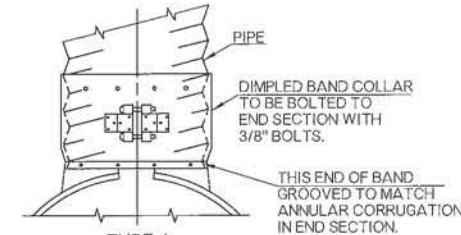
TYPE 1
FOR 12" TO 24" ROUND AND EQUIVALENT ROUND PIPE ARCH SIZES.



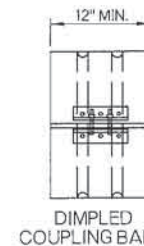
TYPE 2
FOR 30" TO 36" ROUND AND 30" TO 48" EQUIVALENT ROUND PIPE - ARCH SIZES.



TYPE 3
FOR 42" TO 84" ROUND AND 54" TO 72" EQUIVALENT ROUND PIPE - ARCH SIZES.

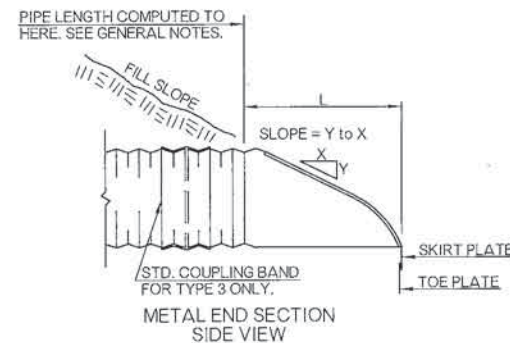
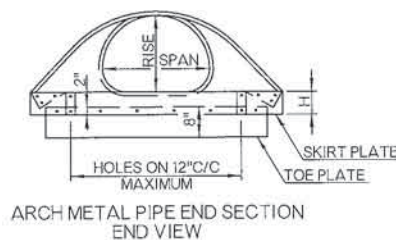


TYPE 4
FOR USE WITH ALL ROUND AND PIPE ARCH SIZES.



DIMENSIONS OF END SECTIONS FOR METAL PIPE - ARCH

SPAN x RISE	EQUIV. ROUND	GA.	A	B	H	L	W	APPROX. SLOPE	BODY TYPE
17" x 13"	15"	16	7"	9"	6"	19"	30"	1:2 1/2	1 PC.
21" x 15"	18"	16	7"	10"	6"	23"	36"	1:2 1/2	1 PC.
24" x 18"	21"	16	8"	12"	6"	28"	42"	1:2 1/2	1 PC.
28" x 20"	24"	#16	9"	14"	6"	32"	48"	1:2 1/2	1 PC.
35" x 24"	30"	14	10"	16"	6"	39"	60"	1:2 1/2	1 PC.
42" x 29"	36"	#14	12"	18"	8"	46"	75"	1:2 1/2	1 PC.
49" x 33"	42"	12	13"	21"	9"	53"	85"	1:2 1/2	2 PC.
57" x 38"	48"	12	18"	26"	12"	63"	90"	1:2 1/2	2 PC.
64" x 43"	54"	12	18"	30"	12"	70"	102"	1:2 1/4	2 PC.
71" x 47"	60"	12	18"	33"	12"	77"	114"	1:2 1/4	3 PC.
77" x 52"	66"	12	18"	36"	12"	77"	126"	1:2	3 PC.
83" x 57"	72"	12	18"	39"	12"	77"	138"	1:2	3 PC.

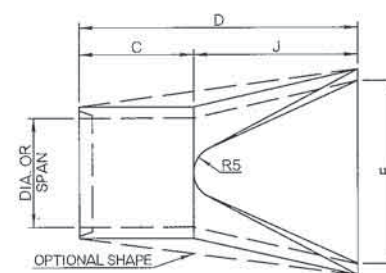
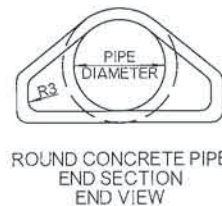


TYPICAL METAL END SECTION CONNECTIONS

FOR ALUMINUM END SECTIONS THE 28" x 20" SHALL BE 14 GAGE AND THE 42" x 29" SHALL BE 12 GAGE.

DIMENSIONS OF PRECAST END SECTIONS FOR ROUND PIPE

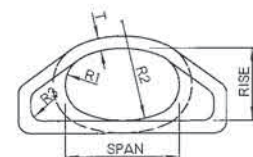
DIAMETER	R3	R4	R5	T	K	J	C	D	E	SLOPE
18"	3"	3"	6"	2 1/2"	9"	2.25'	3.83'	6.08'	3.00'	1:3
24"	3"	3"	7"	3"	9 1/2"	3.63'	2.50'	6.12'	4.00'	1:3
30"	3"	3"	8"	3 1/2"	12"	4.50'	1.65'	6.16'	5.00'	1:3
36"	3"	3"	10 1/2"	4"	15"	5.25'	2.90'	8.15'	6.00'	1:3
42"	3"	3"	10 1/2"	4 1/2"	21"	5.25'	2.92'	8.17'	6.50'	1:3
48"	6"	6"	14"	5"	24"	6.00'	2.17'	8.17'	7.00'	1:3
54"	6"	6"	-	5 1/2"	27"	5.42'	2.92'	8.33'	7.50'	1:2 1/2
60"	6"	6"	-	6"	30"	5.00'	3.25'	8.25'	8.00'	1:2
66"	6"	6"	-	6 1/2"	24"	6.50'	1.75'	8.25'	8.50'	1:2
72"	6"	6"	-	7"	24"	6.50'	1.75'	8.25'	9.00'	1:2



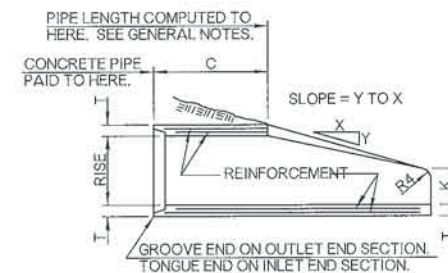
CONCRETE END SECTION PLAN VIEW

DIMENSIONS OF PRECAST END SECTIONS FOR ELLIPTICAL PIPE

APPROX. EQUIV. DIAMETER	RISE	SPAN	R1	R2	R3/R4	R5	T	K	J	C	D	E	SLOPE	
18"	14"	23"	6"	20"	3"	6"	2 3/4"	8"	2.25'	3.75'	6.00'	3.00'	1:3	
24"	19"	30"	8 1/4"	26 1/4"	3"	3"	3 1/4"	8 1/2"	3.25'	2.75'	6.00'	4.00'	1:3	
30"	24"	38"	10 1/4"	32 3/4"	3"	3"	3 3/4"	9 1/2"	4.50'	1.50'	6.00'	5.00'	1:3	
36"	29"	45"	12 1/4"	39 1/4"	3"	3"	4 1/2"	11 1/4"	5.00'	3.00'	8.00'	6.00'	1:3	
42"	34"	53"	14 1/2"	46"	6"	6"	5"	15 3/4"	5.00'	3.00'	8.00'	6.50'	1:3	
48"	38"	60"	16 1/2"	51 1/2"	6"	6"	5 1/2"	21"	5.00'	3.00'	8.00'	7.00'	1:3	
54"	43"	68"	18 3/4"	58 1/2"	6"	6"	6"	25 1/2"	5.00'	3.00'	8.00'	7.50'	1:3	
60"	48"	76"	20 3/4"	65"	6"	6"	36 11/16"	6 1/2"	30"	5.00'	3.25'	8.25'	8.00'	1:2
66"	53"	83"	22 3/4"	71 1/2"	6"	6"	36 1/8"	7 1/2"	24"	6.50'	1.75'	8.25'	8.50'	1:2
72"	58"	91"	24 3/4"	78"	6"	6"	36"	7 1/2"	24"	6.50'	1.75'	8.25'	9.00'	1:2



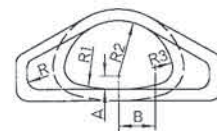
ELLIPTICAL CONCRETE PIPE END SECTION END VIEW



CONCRETE END SECTION SIDE VIEW

DIMENSIONS OF PRECAST END SECTIONS FOR ARCH PIPE

APPROX. EQUIV. DIAMETER	SPAN	RISE	A	B	R	R1	R2	R3	R4	R5	T	K	J	C	D	E	SLOPE
18"	22"	13"	- 1/4"	5 3/4"	2"	27 1/2"	13 3/4"	5 1/4"	3"	13"	2 1/2"	7"	2.25'	3.75'	6.08'	3.00'	1:3
24"	28"	18"	3 7/16"	9 7/32"	3"	40 1/16"	14 9/16"	4 13/32"	3"	16 13/16"	3"	9 1/2"	3.58'	2.50'	6.08'	4.00'	1:3
30"	36"	22"	3 3/4"	12 3/32"	3"	51"	18 3/4"	6 1/32"	3"	18 1/2"	3 1/2"	12"	4.50'	1.58'	6.08'	5.00'	1:3
36"	43"	26"	4 1/8"	15 1/2"	6"	62"	22 1/2"	6 3/8"	3"	24 5/16"	4"	15"	5.25'	2.90'	8.15'	6.00'	1:3
42"	51"	31"	5 1/16"	18"	6"	73"	26 1/4"	7 9/16"	3"	27 1/2"	4 1/2"	21"	5.25'	2.92'	8.17'	6.50'	1:3
48"	58"	36"	6"	20 1/2"	6"	84"	30"	8 3/4"	3"	28 1/2"	5"	24"	6.00'	2.17'	8.17'	7.00'	1:3
54"	65"	40"	6 5/8"	22 11/16"	6"	92 1/2"	33 3/8"	9 3/16"	6"	33 1/8"	5 1/2"	27"	5.42'	2.92'	8.34'	7.50'	1:2.4
60"	73"	45"	7 1/2"	25 9/32"	6"	105"	37 1/2"	11 1/32"	6"	33 1/16"	6"	30"	5.00'	3.25'	8.25'	8.00'	1:2
72"	88"	54"	9"	31 7/16"	6"	126"	45"	12 9/16"	6"	38 15/16"	7"	24"	6.50'	1.75'	8.25'	9.00'	1:2



ARCH CONCRETE PIPE END SECTION END VIEW

- GENERAL NOTES**
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - CULVERT END SECTIONS SHALL BE OF THE SAME MATERIAL AND SHAPE (ROUND, ARCH, OR ELLIPTICAL) AS THE PIPE ON WHICH THEY ARE INSTALLED.
 - DIMENSIONS SHOWN FOR END SECTIONS ARE SUBJECT TO MANUFACTURER TOLERANCES.
 - TOE PLATE WILL BE REQUIRED ON ALL METAL END SECTIONS UNLESS SOLID ROCK IS ENCOUNTERED. HOLES IN TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT PLATE. 3/8" BOLTS TO BE FURNISHED. LENGTH OF TOE PLATES FOR ROUND PIPE END SECTIONS SHALL BE W=10" FOR 12" TO 30" DIAMETER PIPE, W=20" FOR 36" TO 84" DIAMETER PIPE. LENGTH OF TOE PLATES FOR ARCH PIPE END SECTIONS SHALL BE W=10" FOR A RISE OF 13" TO 29" AND W=20" FOR A RISE OF 33" TO 57".
 - CONNECTOR SECTION, SKIRT PLATE, AND TOE PLATE ON METAL END SECTIONS SHALL BE THE SAME GAGE AND MATERIAL AS THE SKIRT AND SHALL BE INCLUDED IN PRICE BID FOR END SECTION.
 - IF TYPE 3 METAL END SECTION IS USED AS OPTIONAL PIPE, THE LENGTH OF PIPE TO BE REDUCED BY 12" FOR EACH END SECTION. IF CONCRETE PIPE OPTION IS USED, THE LENGTH OF PIPE TO BE REDUCED BY THE C DIMENSION FOR EACH END SECTION.

BASIS OF PAYMENT

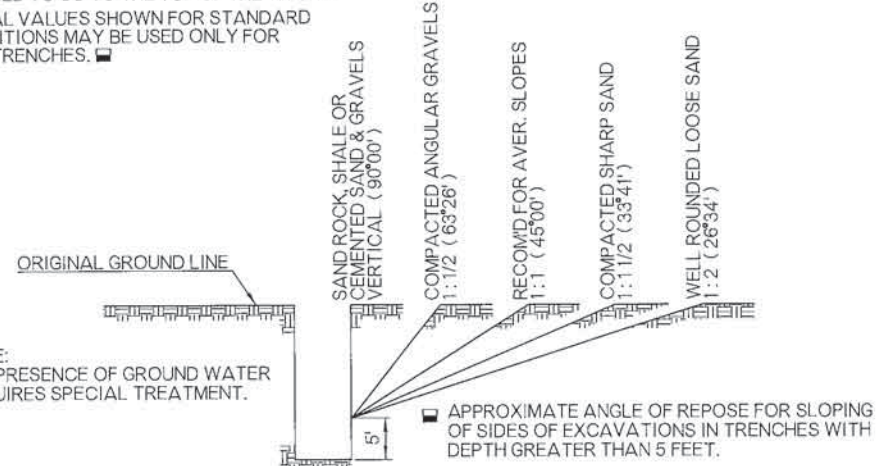
ITEM NO.	ITEM	UNIT
613 (L)	▼ PREFAB. CULVERT END SECTION, ROUND	EA
613 (L)	▼ PREFAB. CULVERT END SECTION, ARCH	EA
613 (L)	▼ PREFAB. CULVERT END SECTION, ELLIPTICAL	EA

▼ END SECTION DIMENSION(S) SHALL BE SPECIFIED.

TRENCHING DIMENSIONS AND STANDARD BEDDING MATERIAL QUANTITIES

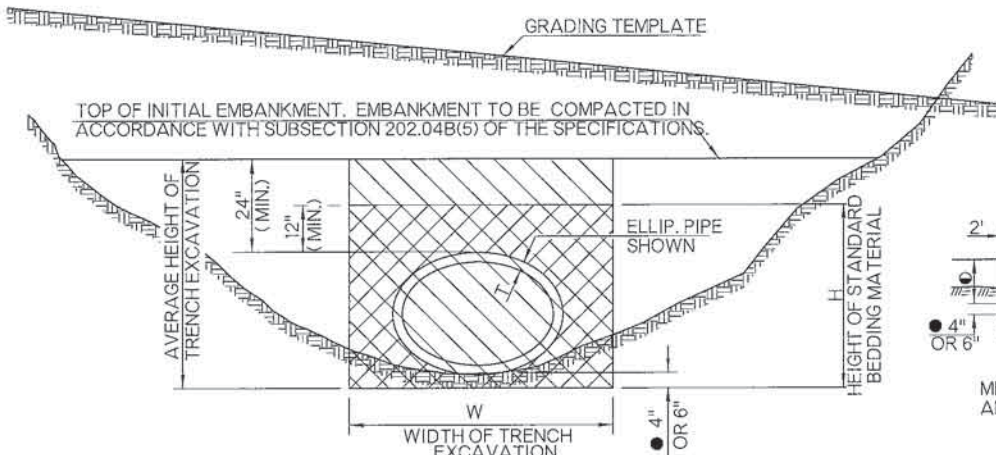
PIPE DIA. OR DESIGN EQUIV.	H	T	SINGLE PIPE STANDARD TRENCHING		DOUBLE PIPE STANDARD TRENCHING		TRIPLE PIPE STANDARD TRENCHING		SPECIAL TRENCHING SINGLE, DOUBLE & TRIPLE PIPE OPTIONS W+12"
			W	STANDARD BEDDING MATERIAL CY/LF	W	STANDARD BEDDING MATERIAL CY/LF	W	STANDARD BEDDING MATERIAL CY/LF	ADD'L STANDARD BEDDING MATERIAL CY/LF
18	3.25	0.208	3.17	0.274	5.67	0.468	8.17	0.663	0.120
24	3.83	0.25	4.00	0.386	7.00	0.629	10.00	0.873	0.142
30	4.42	0.292	4.58	0.474	8.33	0.811	12.08	1.146	0.163
36	5.00	0.333	6.17	0.751	10.67	1.193	15.17	1.636	0.185
42	5.58	0.375	6.75	0.870	12.00	1.429	17.25	1.989	0.207
48	6.17	0.417	7.33	0.996	13.33	1.688	19.33	2.379	0.228
54	6.75	0.458	7.92	1.126	14.67	1.960	21.42	2.794	0.250
60	7.33	0.5	9.50	1.532	17.00	2.521	24.50	3.510	0.271
66	8.08	0.542	10.08	1.757	18.33	2.965	26.58	4.173	0.299
72	8.67	0.583	10.67	1.931	19.67	3.327	28.67	4.724	0.321
78	9.25	0.625	11.25	2.107	20.75	3.615	30.25	5.122	0.343
84	9.83	0.667	11.83	2.288	21.83	3.908	31.83	5.529	0.364
90	10.42	0.708	12.42	2.479	22.92	4.219	33.42	5.959	0.386
96	11	0.75	13.00	2.671	24.00	4.527	35.00	6.383	0.407

NOTE: QUANTITIES FOR 66" & 78" EQUIV. DIA. ARCH PIPE BASED ON METAL PIPE & ESTIMATED WALL THICKNESS.
 ■ FOR PIPES UNDER PAVEMENT, THE H DIMENSION AND THE STANDARD BEDDING MATERIAL QUANTITY, SHALL BE INCREASED TO GO TO THE TOP OF THE TRENCH.
 ■ BEDDING MATERIAL VALUES SHOWN FOR STANDARD TRENCHING CONDITIONS MAY BE USED ONLY FOR VERTICAL WALL TRENCHES. ■



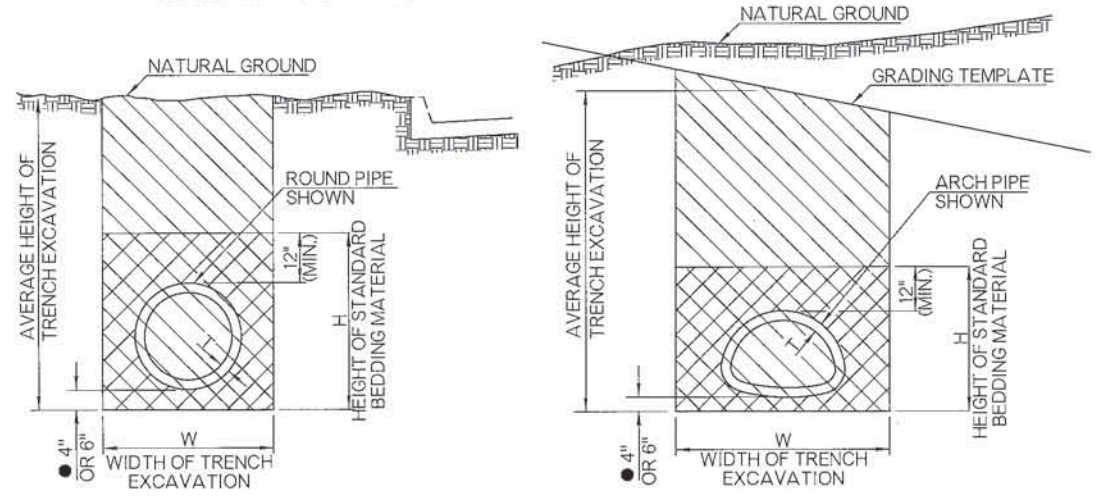
NOTE: THE PRESENCE OF GROUND WATER REQUIRES SPECIAL TREATMENT.

■ OPTIONAL TRENCHES WITH DEPTH GREATER THAN 5.0 FEET EXCAVATION AND BEDDING MATERIAL WILL BE MEASURED AND PAID FOR AS IF SHEETING & SHORING WAS USED. (SPECIAL TRENCHING=STD. WIDTH TRENCH+12")



METHOD NO. 1
TRENCH EXCAVATION IN EMBANKMENT SECTIONS

LIMITS OF STANDARD BEDDING MATERIAL
 QUANTITIES FOR BEDDING MATERIAL DO NOT INCLUDE THE SPACE WITHIN AND BOUNDED BY THE OUTER SURFACE OF THE PIPE CONDUIT.

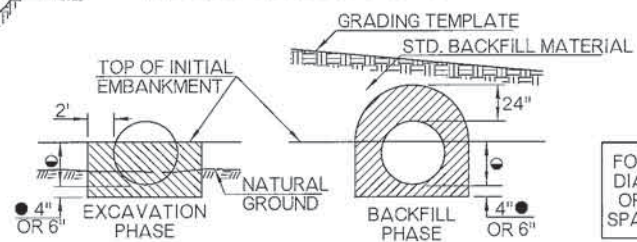


TRENCH EXCAVATION IN CUT SECTIONS

EQUIV. DIA.	REINF. CONC. ARCH PIPE	STEEL ARCH PIPE	ALUMINUM ARCH PIPE	REINF. CONC. ELLIPTICAL PIPE
18"	22" x 13"	21" x 15"	21" x 15"	14" x 23"
21"		24" x 18"	24" x 18"	
24"	28" x 18"	28" x 20"	28" x 20"	19" x 30"
27"				22" x 34"
30"	36" x 22"	35" x 24"	35" x 24"	24" x 38"
36"	43" x 26"	42" x 29"	42" x 29"	29" x 45"
42"	51" x 31"	49" x 33"	49" x 33"	34" x 53"
48"	58" x 36"	57" x 38"	57" x 38"	38" x 60"
54"	65" x 40"	64" x 43"	64" x 43"	43" x 68"
60"	73" x 45"	71" x 47"	71" x 47"	48" x 76"
66"		77" x 52"	77" x 52"	53" x 83"
72"	88" x 54"	83" x 57"	83" x 57"	58" x 91"
78"		87" x 63"	92" x 65"	63" x 98"
84"	102" x 62"	95" x 67"	95" x 67"	68" x 106"
90"	115" x 72"	103" x 71"	103" x 71"	72" x 113"
96"	122" x 77"	112" x 75"	112" x 75"	77" x 121"

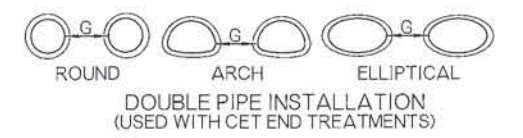
▲ STRUCTURAL PLATE ARCH.

● EMBANKMENT HEIGHT PRIOR TO EXCAVATION
 PIPE SIZES FROM 18" TO 42" = 30"
 PIPE SIZES FROM 48" TO 84" = 2/3 DIAM.
 PIPE SIZES LARGER THAN 84" = 60"



METHOD NO. 2
 (OPTIONAL INSTALLATION FOR R. C. PIPE)

FOR DIA. OR SPAN	CONDUIT SHAPE			DIST.
	ROUND	ARCH	ELLIPTICAL	
UP TO 24"	UP TO 36"	UP TO 36"	12"	
25" TO 72"			D/2"	
37" TO 108"	37" TO 108"	37" TO 108"	D/3"	
OVER 73"	OVER 108"	OVER 108"	36"	

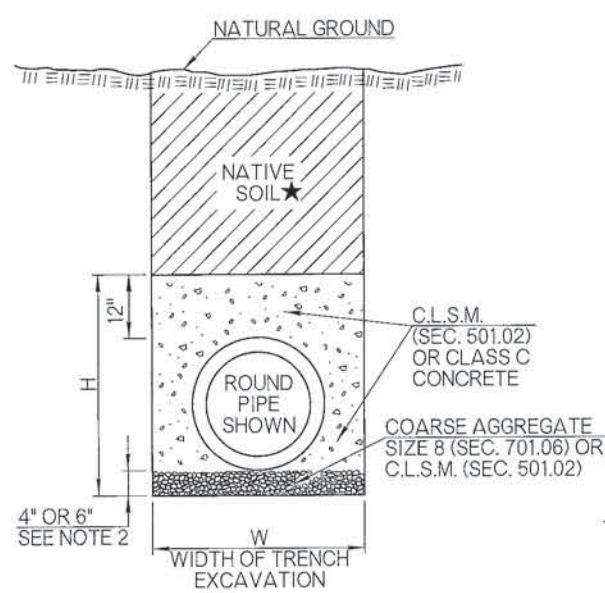


GENERAL NOTES

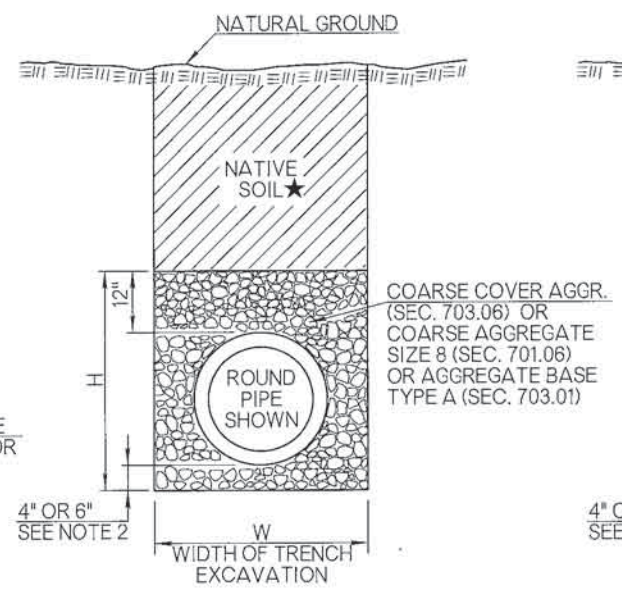
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- TRENCH EXCAVATION AND BEDDING MATERIAL WILL NOT BE REQUIRED FOR PIPE INSTALLATIONS OF SIDE DRAINS UNLESS OTHERWISE NOTED ON THE PLANS.
- FOR PIPE UNDERDRAIN INSTALLATIONS, SEE ROADWAY STANDARD PUD-3.
- SPECIAL TRENCHING CONDITIONS ARE THOSE AS DEFINED BY O.S.H.A. REGULATIONS, TITLE 29 CFR CHAPTER XVII, PART 1926.650, 1926.651 & 1926.652, SO DEFINED WILL APPLY UNTIL THEY ARE IN CONFLICT WITH CURRENT SPECIFICATIONS. FOR TRENCH DEPTHS OVER FIVE FEET, WHERE O.S.H.A. REGULATIONS FOR SPECIAL TRENCHING ARE APPLIED, QUANTITIES AND DIMENSIONS FOR SPECIAL TRENCHING WILL BE USED FOR COMPUTING QUANTITIES. SEE TABLE OF TRENCHING DIMENSIONS AND STANDARD BEDDING MATERIAL QUANTITIES.
- NORMAL BACKFILLING OPERATIONS SHALL FOLLOW BEDDING AND PIPE INSTALLATION AS CLOSELY AS PRACTICAL. IN NO CASE SHALL A PIPE INSTALLATION SUBJECT TO SUDDEN FLOW DEVELOPMENT BE LEFT WITHOUT SUFFICIENT BACKFILL TO RESTRAIN THE CONDUIT AND PREVENT JOINT SEPARATION AND/OR PIPING SCOUR. PHYSICALLY RESTRAINING THE CONDUIT MAY BE USED TO AUGMENT OR REPLACE THIS IMMEDIATE BACKFILL REQUIREMENT.
- ANY EXCESS EXCAVATION NOT USED FOR BACKFILL WILL BECOME THE PROPERTY OF THE CONTRACTOR AND DISPOSED OF, BY HIM, IN A MANNER APPROVED BY THE ENGINEER.
- STANDARD BEDDING QUANTITIES FOR ROUND PIPE ARE BASED ON AASHTO DESIGNATED CLASS III (WALL B) REINFORCED CONCRETE PIPE.
- WHEN REQUIRED, THE SIDES OF THE TRENCHES SHALL BE SHEETED AND SHORED OR OTHERWISE SUPPORTED WHEN THE TRENCH IS MORE THAN 5.0 FEET IN DEPTH. IN LIEU OF SHEETING, THE SIDES OF THE TRENCH ABOVE THE 5.0 FOOT LEVEL MAY BE SLOPED TO PRECLUDE COLLAPSE, SEE OPTIONAL TRENCHES DETAIL THIS SHEET.
- PROPER COMPACTION OF BACKFILL REQUIRES A VERTICAL WALLED TRENCH TO 24 INCHES ABOVE TOP OF PIPE, REGARDLESS OF EXCAVATION ABOVE THAT ELEVATION.
- EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES OF BEDDING MATERIAL BELOW PIPE CONDUIT.
- ELLIPTICAL PIPE DIMENSIONS CONFORM TO AASHTO M 207, AS DESIGNATED RISE BY SPAN.
- FOR COMPUTING TRENCH EXCAVATION & STANDARD BEDDING QUANTITIES, THE LENGTH OF THE CULVERT SHALL INCLUDE END SECTION AND END TREATMENT LENGTHS.
- MULTIPLE PIPE INSTALLATIONS WILL REQUIRE A MINIMUM OF 12" BETWEEN PIPES FOR PROPER COMPACTION.

ITEM NO.	ITEM	UNIT
613 (R)	STANDARD BEDDING MATERIAL, CLASS A	CY
613 (S)	STANDARD BEDDING MATERIAL, CLASS B	CY
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY
613 (V)	TRENCH EXCAVATION	CY

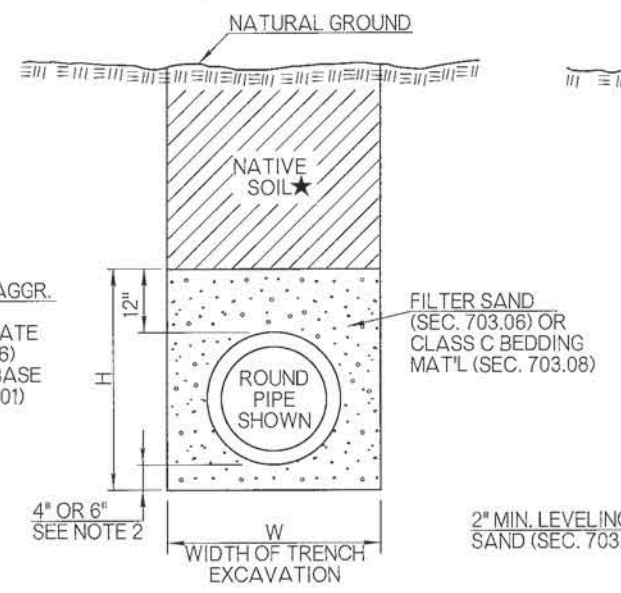
APPROVED BY ROADWAY ENGINEER: *Calvin F. A.* DATE: 04/11/15
 ROADWAY DESIGN DIVISION STANDARD
 STANDARD PIPE INSTALLATION



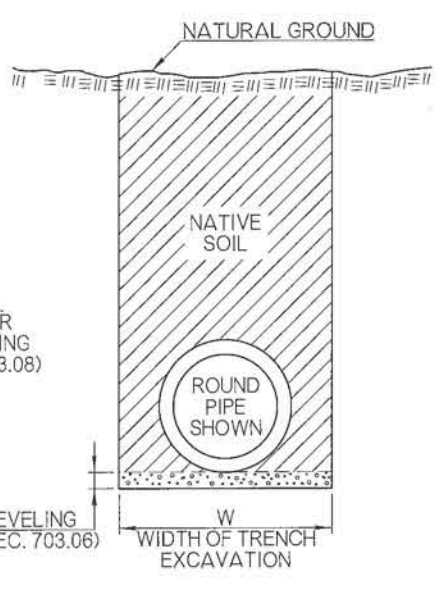
CLASS A BEDDING



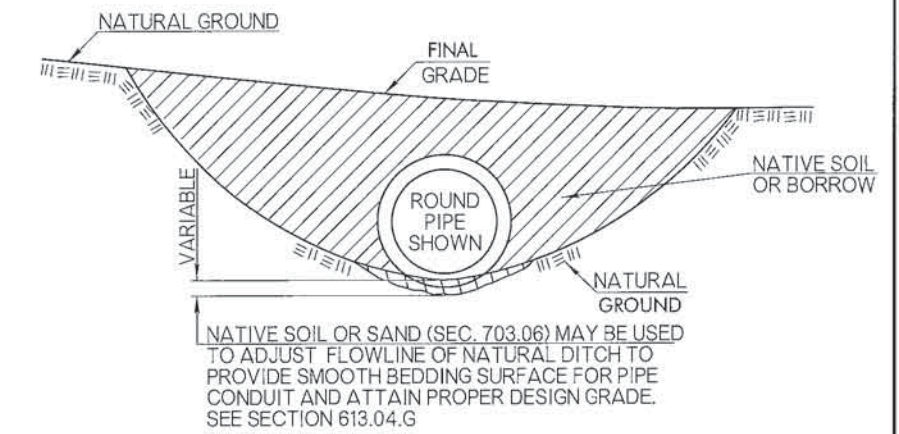
CLASS B BEDDING



CLASS C BEDDING



CLASS D BEDDING ALTERNATE 1



CLASS D BEDDING ALTERNATE 2

GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES OF BEDDING MATERIAL BELOW PIPE CONDUIT.
- NATIVE SOIL FOR BACKFILL, TO BE COMPACTED IN ACCORDANCE WITH SECTION 202.04 OF THE STANDARD SPECIFICATIONS.
- A BETTER CLASS OF BEDDING MAY BE SUBSTITUTED FOR THE NEXT LOWER CLASS. EXAMPLE: CLASS A STANDARD BEDDING CAN BE USED IN LIEU OF CLASS B STANDARD BEDDING.
- FOR TRENCH WIDTH (W), BEDDING HEIGHT (H), PIPE DATA, MULTIPLE PIPE SPACING & BEDDING DATA, SEE ROADWAY STANDARDS SPI-4 & FPI-3.
- DATA TABLE WILL DISPLAY 'NA' WHEN PIPE MATERIALS ARE NOT ALLOWED.
- STANDARD BEDDING CLASS D MATERIAL (S) (ALTERNATE 1) WILL BE CONSIDERED AS INCIDENTAL AND NOT BE PAID FOR SEPARATELY. COST FOR BORROW OR FILL MATERIAL, NEEDED FOR ALTERNATE 2, WILL BE INCLUDED IN THE PRICE OF THE PIPE.
- PIPE MATERIAL (S) / PRODUCT (S) NOT SHOWN IN THE PIPE BEDDING TABLE WILL BE EVALUATED AND APPROVED ON A CASE BY CASE BASIS.
- ALL TEMPORARY PIPES SHALL HAVE CLASS D BEDDING UNLESS OTHERWISE SHOWN IN THE PLANS.
- BEDDING MATERIAL TYPE B, C, AND D, SHALL BE PLACED IN 6" LAYERS AND COMPACTED TO THE SPECIFIED DENSITY USING HAND OPERATED EQUIPMENT ONLY.
- ★ WHEN PIPE INSTALLATION IS UNDER PAVING, IN LIEU OF BACKFILLING WITH NATIVE SOIL, PLACE BEDDING MATERIAL ALL THE WAY TO TOP OF TRENCH.
- THE USE OF AN ALTERNATE PIPE AND ITS CORRESPONDING BEDDING MATERIAL WILL BE ACCEPTABLE PROVIDED THE CRITERIA IN THE DESIGN TABLE IS MET
- POLYPROPYLENE PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.

PIPE BEDDING CLASS/DESIGN TABLE

TYPE OF PIPE	■ UNDER PAVING				OUTSIDE PAVING		
	CROSS DRAIN (NHS OR ADT > 6000 VPD)	CROSS DRAIN (OTHER)	STORM SEWER (NHS OR ADT > 6000 VPD)	STORM SEWER (OTHER)	CROSS DRAIN	SIDE DRAIN	STORM SEWER
REINFORCED CONCRETE PIPE	B	C	B	C	C	D	C
CORRUGATED GALV. STEEL PIPE (CGSP)	NA	B	NA	B	C	D	C
MILL PRECOATED CGSP	NA	B	NA	B	C	D	C
CORRUGATED GALV. STRUCT. PLATE	NA	B	NA	B	C	D	C
ALUMINIZED TYPE II CSP	NA	B	NA	B	C	D	C
CORRUGATED POLYETHYLENE / PVC	NA	A	NA	A	B	B	B
POLYVINYL CHLORIDE (SC 40/80 PVC)	NA	NA	NA	NA	NA	NA	NA
POLYPROPYLENE PIPE (PP) ▲	NA	B	NA	B	C	D	C

- WHEN THERE IS ANY POSSIBILITY OF THE PAVEMENT BEING WIDENED DURING THE LIFE OF THE DRAINAGE STRUCTURE, THE BEDDING SHALL MEET THE 'UNDER PAVING SECTION' CRITERIA FOR THE FULL EXTENT OF ANY ANTICIPATED EXPANSION TO THE FACILITY.
- ▲ BACKFILL WITH A MINIMUM OF TWO (2) FEET OF APPROVED BACKFILL MATERIAL.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
613 (R)	STANDARD BEDDING MATERIAL, CLASS A	CY
613 (S)	STANDARD BEDDING MATERIAL, CLASS B	CY
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY

APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 04/14/15
 ROADWAY DESIGN DIVISION STANDARD
STANDARD PIPE BEDDING

FULL CIRCLE STEEL PIPE CULVERT											
PIPE DIAMETER FOR CORRUGATION PATTERN				MIN. COVER TOP OF PIPE TO TOP OF SUBGRADE	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE						
2 2/3" x 1/2"	3" x 1"	5" x 1"	6" x 2"		EQUIV. STANDARD GAGE						
					16	14	12	10	8	7	5
18"				12"	61'	67'	86'	90'	94'		
21"				12"	53'	57'	74'	77'	81'		
24"				12"	46'	50'	65'	68'	71'		
27"				12"	41'	44'	57'	60'	63'		
30"				12"	37'	40'	52'	54'	56'		
36"				12"	30'	33'	43'	45'	47'		
	36"			12"	53'	66'	77'	89'	100'		
42"				12"	34'	44'	46'	47'	49'		
	42"			12"	45'	56'	64'	71'	78'		
48"				12"	41'	44'	45'	46'			
	48"			12"	39'	49'	56'	61'	66'		
		48"		12"	49'	52'	56'	61'	66'		
54"				12"		36'	43'	44'	45'		
	54"			12"	35'	44'	51'	55'	58'		
		54"		12"	47'	48'	52'	55'	58'		
60"				12"			42'	43'	43'		
	60"			12"	31'	39'	49'	51'	53'		
		60"		12"	43'	46'	49'	51'	53'		
			60"	12"			46'	68'	90'	96'	106'
66"				12"				42'	43'		
	66"			12"	29'	36'	47'	48'	50'		
		66"		12"	39'	45'	47'	48'	50'		
			66"	12"			42'	62'	78'	82'	90'
72"				12"				42'	42'		
	72"			12"	26'	33'	45'	47'	48'		
		72"		12"	36'	44'	45'	47'	48'	73'	78'
			72"	12"			38'	57'	69'		
78"				12"				42'			
	78"			12"	24'	30'	44'	45'	46'		
		78"		12"	33'	42'	44'	45'	46'		
			78"	12"			35'	53'	63'	66'	70'
84"				12"				42'			
	84"			12"	22'	28'	42'	44'	45'		
		84"		12"	31'	39'	43'	44'	45'		
			84"	12"			33'	49'	59'	61'	64'
			90"	12"		26'	39'	44'	44'		
		90"		12"	29'	36'	43'	44'	44'		
			90"	12"			31'	45'	55'	57'	60'
		96"		12"		24'	36'	43'	44'		
			96"	12"			34'	43'	43'	44'	
				12"			29'	43'	53'	54'	57'
		102"		24"			34'	41'	43'		
			102"	24"		32'	42'	43'	43'		
			108"	24"			32'	39'	43'		
				24"			42'	42'	43'		
			108"	24"			25'	38'	49'	50'	52'
				24"			31'	37'	41'		
			114"	24"			40'	42'	42'		
				24"			29'	35'	39'		
			120"	24"			38'	42'	42'		
				24"			23'	34'	45'	48'	49'

FULL CIRCLE ALUMINUM PIPE CULVERT									
PIPE DIAMETER FOR CORRUGATION PATTERN			MIN. COVER TOP OF PIPE TO TOP OF SUBGRADE	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE					
2 2/3" x 1/2"	3" x 1"	6" x 1"		EQUIV. STANDARD GAGE					
				16	14	12	10'	8	
18"			12"	36'	36'	63'			
24"			12"	27'	27'	47'	50'		
27"			12"	24'	24'	42'	44'		
30"			12"	22'	21'	37'	39'		
	30"		12"	40'	50'	68'			
36"			12"		18'	32'	33'		
	36"		12"	33'	41'	57'	85'		
		36"	12"	20'					
42"			12"			54'	57'		
	42"		12"	27'	35'	48'	73'		
48"			12"			47'	49'	51'	
	48"		12"	24'	30'	42'	63'	82'	
54"			12"			41'	44'	45'	
	54"		12"	21'	27'	37'	56'	73'	
		54"	12"	29'	42'	67'	66'		
60"			12"			39'	41'		
	60"		12"	19'	24'	33'	24'	66'	
		60"	12"		25'	37'	59'	58'	
66"			12"			36'	37'		
	66"		12"	14'	18'	26'	40'	51'	
		66"	12"		23'	33'	53'	52'	
			72"	12"	28'	27'	41'	54'	
			72"	15"	19'	27'	36'	43'	
			78"	15"	18'	25'	38'	50'	
			78"	15"	17'	25'	32'	40'	
			84"	18"	17'	23'	35'	47'	
			84"	18"		23'	30'	37'	
			90"	18"		21'	33'	43'	
			90"	18"		21'	28'	34'	
			96"	18"		20'	31'	40'	
			96"	18"		19'	26'	32'	
			102"	21"		18'	28'	37'	
			102"	21"		18'	25'	29'	
			108"	21"			27'	35'	
			108"	21"		17'	23'	28'	
			114"	24"			25'	34'	
			114"	24"		16'	21'	26'	
			120"	24"			24'	32'	
			120"	24"			20'	25'	

METAL PIPE ARCH - FILLS TO 10 FT. MAX.					
APPROX. EQUIV. ROUND PIPE	SIZE SPAN x RISE	2 2/3" x 1/2" CORRUGATION PATTERN			
		STEEL		ALUMINUM	
		MIN. GAGE	MIN. COVER	MIN. GAGE	MIN. COVER
15"	17" x 13"	16	12"	16	12"
18"	21" x 15"	16	12"	16	12"
21"	24" x 18"	16	12"	16	12"
24"	28" x 20"	16	12"	14	12"
30"	35" x 24"	14	12"	14	12"
36"	42" x 29"	14	12"	12	15"
42"	49" x 33"	14	12"	12	15"
48"	57" x 38"	12	12"	10	15"
54"	64" x 43"	12	12"	10	18"
60"	71" x 47"	10	12"	8	18"
66"	77" x 52"	8	12"	8	18"
72"	83" x 57"	8	12"	8	18"
3" x 1" & 5" x 1" CORRUGATION PATTERN					
36"	40" x 31"	14	12"		
42"	46" x 36"	14	12"		
48"	53" x 41"	14	12"		
54"	60" x 46"	14	12"	14	15"
60"	66" x 51"	14	12"	14	18"
66"	73" x 55"	14	12"	14	18"
72"	81" x 59"	14	12"	12	21"
78"	87" x 63"	14	12"	12	21"
84"	95" x 67"	12	12"	12	24"
90"	103" x 71"	12	18"	10	24"
96"	112" x 75"	12	18"	10	27"
102"	117" x 79"	12	18"		
108"	128" x 83"	10	24"		
114"	137" x 87"	10	24"		
120"	142" x 91"	10	24"		

WHEN INSTALLED UNDER PAVEMENT INCLUDING ALL P.C. OR A.C. SURFACING UNDER MAINLINE TRAFFIC AND MAJOR STREET RETURNS. A MINIMUM PIPE GAGE OF 16 MAY BE USED FOR INSTALLATION REQUIRING 30 INCH EQUIVALENT ROUND CONDUITS (MAX.) AND LIMITED TO LOW VOLUME COUNTY OR OFF-SYSTEM ROADS, MINOR STREET RETURNS, DRIVEWAYS OR TEMPORARY DETOURS, AS APPROVED BY THE ENGINEER.

GENERAL NOTES

- METAL PIPE FILL HEIGHT DESIGNS ARE BASED ON A CLASS B BEDDING, NEGATIVE PROJECTION, HS-20 LIVE LOADING AND 120 LBS/C.F. SOIL WEIGHT. POLYPROPYLENE PIPE FILL HEIGHTS ARE BASED ON AASHTO M330 FOR POLYPROPYLENE, TYPE S, PIPE WITH OUTER CORRUGATED WALL AND SMOOTH INNER WALL.
- IN THE EVENT LOADS IN EXCESS OF HS-20 ARE TO BE OPERATED OVER OR ADJACENT TO THE PIPE INSTALLATION DURING THE CONSTRUCTION PHASE, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A MINIMUM OF FOUR FEET OF COVER OVER THE PIPE AT WHEEL OR TRACK PATHS.
- PROPER INSTALLATION PRACTICES MUST BE ADHERED TO AS SHOWN ON ROADWAY STANDARDS SPI-4, FPI-3 AND SPB-1. POLYPROPYLENE PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
- ANY PIPE DEFORMED PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED BY THE CONTRACTOR AT HIS EXPENSE. SURFACE DISTRESS MUST BE REPAIRED TO THE SATISFACTION OF THE ENGINEER OR REPLACED AT THE CONTRACTOR'S EXPENSE.
- MAXIMUM FILL HEIGHTS ARE MEASURED TO TOP OF SUBGRADE (OR BOTTOM OF ASPHALT OR PC PAVEMENT) FOR METAL AND POLYPROPYLENE PIPES.


POLY-PROPYLENE PIPE DIAMETER	MAXIMUM FILL HEIGHT OVER CULVERT (FT.)			
	UNDER PAVEMENT		OUTSIDE PAVEMENT	
	95% COMPACT	90% COMPACT	Class C - 85% COMPACT	Class D - 85% COMPACT
18	25	18	16	13
24	22	16	14	12
30	23	17	13	12
36	22	16	11	11
42	22	15	11	11
48	21	15	11	10
60	23	16	11	10

REFER TO ROADWAY DESIGN STANDARD SPB-1 FOR MINIMUM FILL HEIGHT AND OTHER POLYPROPYLENE INSTALLATION DETAILS.

GAGE NUMBER	EQUIVALENT METAL THICKNESS AND GAGE	
	METAL THICKNESS (INCHES)	
	■ STEEL	◆ ALUMINUM
16	0.064	0.060
14	0.079	0.075
12	0.109	0.105
10	0.138	0.135
8	0.168	0.164
7	0.188	----
5	0.218	----

THE THICKNESS OF THE SHEET INCLUDES BOTH THE BASE STEEL AND THE COATING.
 THE THICKNESS SHOWN REFERS TO THE CLAD SHEET.

APPROVED BY ROADWAY ENGINEER: *Calvin F. A.* DATE: 04/14/15
 ROADWAY DESIGN DIVISION STANDARD

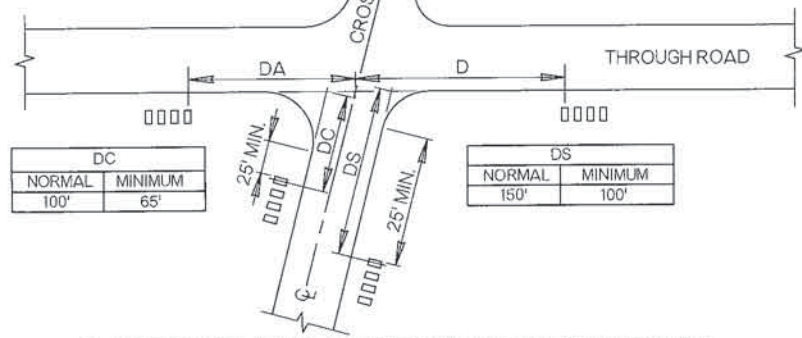
 **FILL HEIGHT TABLES (METAL & POLYPROPYLENE PIPES)**

OKLAHOMA DEPARTMENT OF TRANSPORTATION
 2009 SPECIFICATIONS

FHTMPP-1 0
 R-50

● SPEED FACTOR MAY BE DESIGN SPEED, OBSERVED SPEED OR ASSIGNED SPEED BASED UPON PREDICTABLE GROWTH FACTORS OR PENDING IMPROVEMENTS.

THRU ROAD SPEED MPH	DA		THRU ROAD SPEED MPH	D	
	MINIMUM	DESIRABLE		MINIMUM	DESIRABLE
≤ 35	65'	200'	≤ 35	65'	100'
36-49	70'	233'	36-49	100'	133'
50-54	70'	267'	50-54	125'	167'
≥ 55	65'	295'	≥ 55	150'	200'

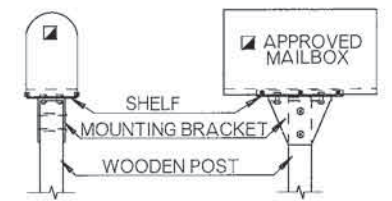


SUGGESTED MINIMUM CLEARANCE DISTANCES TO NEAREST MAILBOX IN MAIL STOPS AT INTERSECTIONS

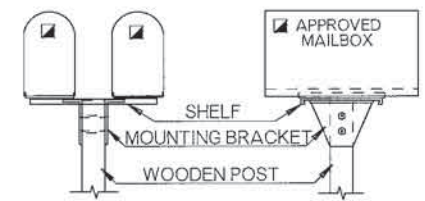
HIGHWAY TYPE AND TRAFFIC CONDITIONS	OFFSET TABLE			
	WIDTH OF ALL-WEATHER SURFACE OF TURNOUT OR AVAILABLE SHOULDER AT MAILBOX		DISTANCE ROADSIDE FACE OF MAILBOX IS TO BE OFFSET BEHIND EDGE OF TURNOUT OR USABLE SHOULDER	
	PREFERRED	MINIMUM	PREFERRED	MINIMUM
RURAL HIGHWAY ADT OVER 10,000 VPD	12'	8'	8" TO 12"	0
RURAL HIGHWAY ADT 1,500 TO 10,000 VPD	12'	8'	8" TO 12"	0
RURAL HIGHWAY ADT 400 TO 1,500 VPD	10'	8'	8" TO 12"	0
RURAL ROAD ADT UNDER 400 VPD	8'	6'	8" TO 12"	10"
RURAL ROAD ADT UNDER 50 VPD SPEED 40 MPH OR LESS	6'	2'	8" TO 12"	0
RESIDENTIAL STREET WITHOUT CURB OR ALL-WEATHER SHOULDER	6'	0	8" TO 12"	10" ●
CURBED STREET	NOT APPLICABLE		8" TO 12" BEHIND FACE OF CURB	6" BEHIND FACE OF CURB

ADT-AVERAGE DAILY TRAFFIC, THROUGH ROAD ONLY
VPD-VEHICLES PER DAY
● IF TURNOUT IS PROVIDED, THIS MAY BE REDUCED TO ZERO.

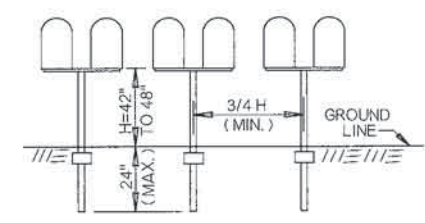
MAILBOX DESIGN TYPE	DIMENSIONS (NOM.)		
	LENGTH	WIDTH	HEIGHT
1	19"	6 1/2"	8 1/2"
1-A	21"	8"	10 1/2"
2	23 1/2"	11 1/2"	13 1/2"



MAILBOX INSTALLATION - SINGLE WOODEN POST SUPPORT & BRACKET ASSEMBLY DETAILS

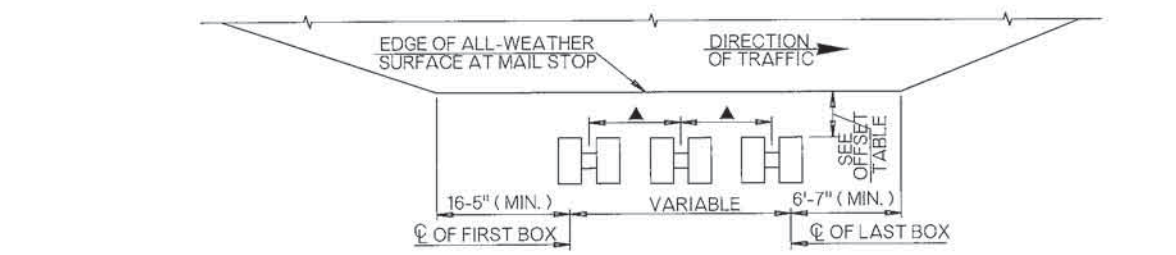


MAILBOX INSTALLATION - MULTIPLE (DOUBLE OR TWIN BOX)

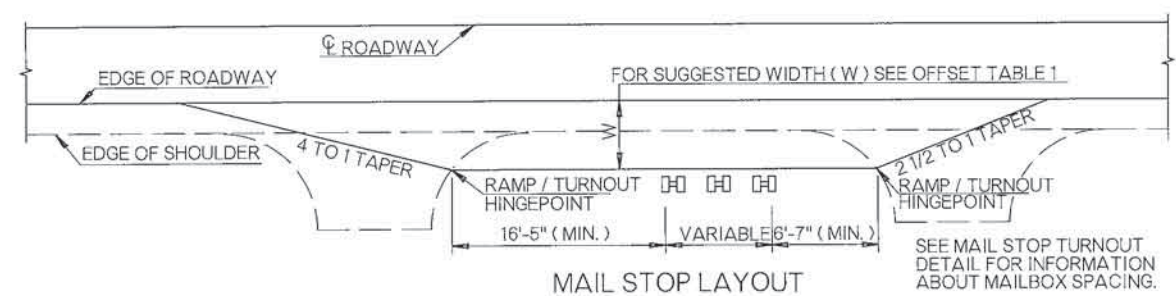


POST SPACING DETAIL MULTIPLE BOX INSTALLATION SINGLE POST SERIES

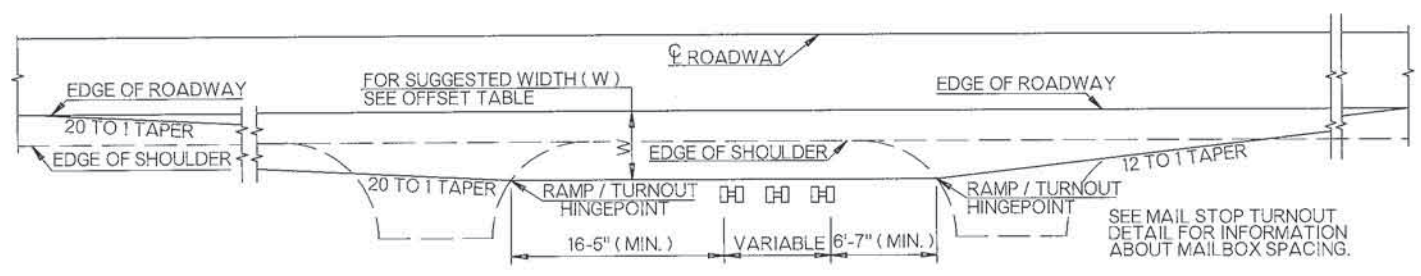
- GENERAL NOTES**
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - MAILBOX INSTALLATION, SINGLE OR MULTIPLE TYPE, SHALL BE OF A DESIGN AND MATERIAL THAT HAS BEEN CRASH TESTED AND APPROVED. OTHER DESIGNS OR MAILBOX TYPES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
 - IF MAILBOX IS INSTALLED IN AN AREA WITH GUARDRAIL, MAILBOX AND/OR POST ASSEMBLY SHOULD BE BEHIND OR FLUSH WITH FACE OF RAIL.
 - PRODUCER AND CONTRACTOR SHALL AVOID PATENT INFRINGEMENT OF THE MAILBOX SUPPORT ASSEMBLY AND SHALL SAVE THE STATE HARMLESS IN THE USE OF ANY MAILBOX SUPPORT ASSEMBLY.
 - ALTERNATE WOODEN POST SUPPORT INSTALLATIONS MAY BE USED IN LIEU OF METAL PIPE SUPPORT UNITS IF WOODEN COMPONENTS CONFORM TO CURRENT SPECIFICATIONS.
 - PRICE OF EACH MAILBOX INSTALLATION, SINGLE OR MULTIPLE, INCLUDES PAYMENT FOR INSTALLATION OF THE POST SYSTEM, SUPPORT POST, ALL ATTACHMENT HARDWARE AND MOUNTING OF THE MAILBOX. PAYMENT FOR THE MAILBOX WILL BE PAID FOR BY THE EACH AND SEPARATELY FROM THE SUPPORT SYSTEM.
 - IF MAILBOX IS INSTALLED BEHIND CURB, ANY SIDEWALKS WILL REQUIRE A MINIMUM 3'-0" OF USABLE SPACE BEHIND THE MAILBOX.



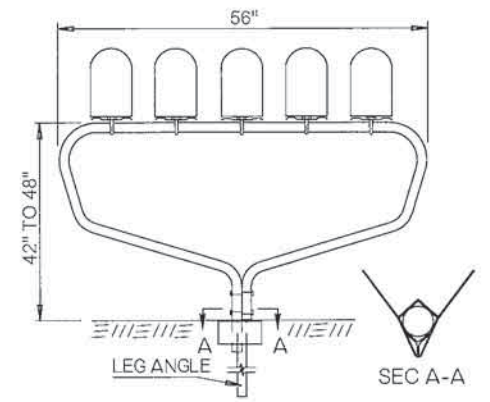
MAIL STOP TURNOUT DETAIL
▲ RECOMMENDED MINIMUM SPACING IS 3/4 OF THE DIMENSION FROM THE GROUND LINE TO THE BOTTOM OF THE MAILBOX



MAIL STOP LAYOUT FOR ROADS CARRYING TRAFFIC AT 40 MPH OR LESS OR FOR LOCAL AND COLLECTOR ROADS



MAIL STOP LAYOUT ROADS CARRYING TRAFFIC AT SPEED OVER 40 MPH

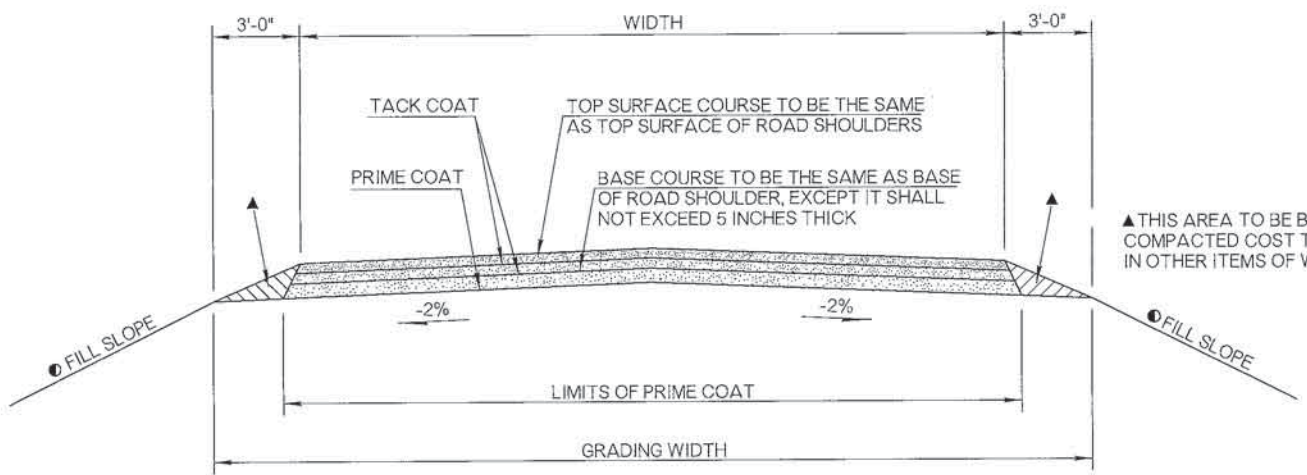


MAILBOX INSTALLATION - MULTIPLE (MULTIPLE BOX SUPPORT DETAILS) MAXIMUM NUMBER OF MAILBOXES = 5

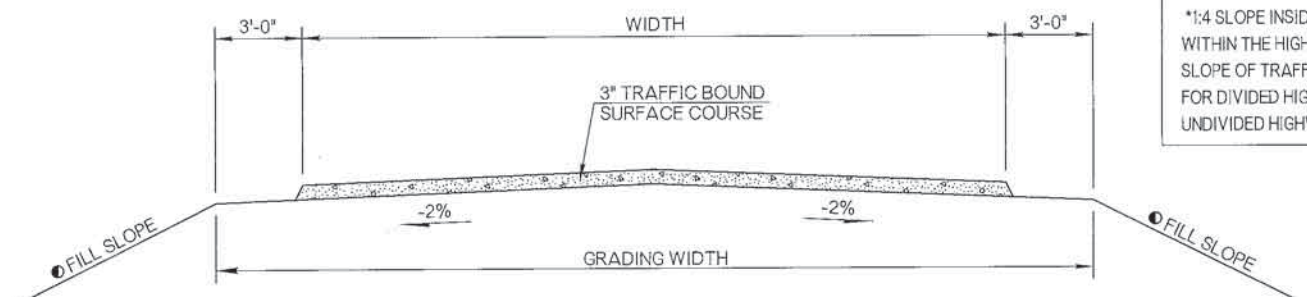
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
629 (A)	MAILBOX INSTALLATION - SINGLE	EA
629 (B)	MAILBOX INSTALLATION - MULTIPLE	EA
629 (C)	MAILBOX	EA
629 (D)	REMOVAL OF MAILBOX INSTALLATION	EA
629 (E)	REMOVE AND RESET MAILBOX	EA

MAILBOX DESIGN TYPE(S) AND LOCATION(S) SHALL BE SPECIFIED IN THE PLANS.

APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 04/16/15
ROADWAY DESIGN DIVISION STANDARD
DOT MAILBOX INSTALLATION

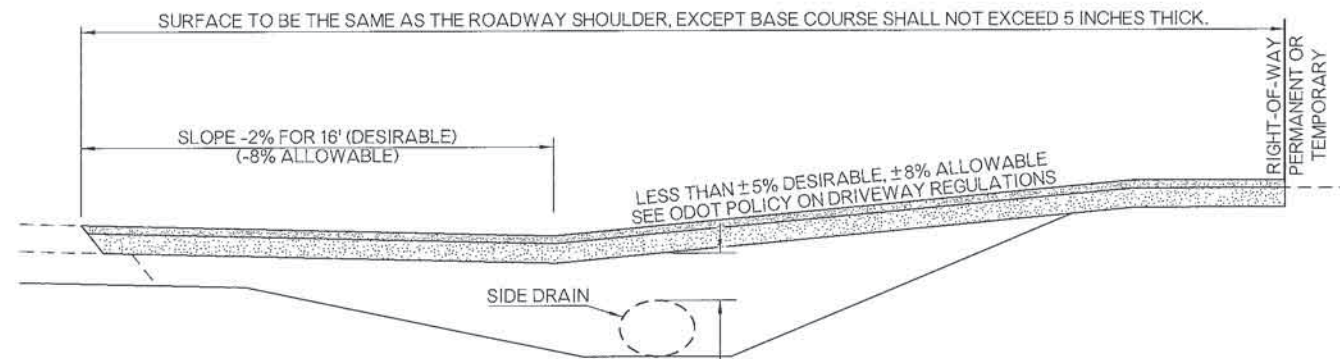


TYPICAL SECTION OF ASPHALT RETURN/DRIVE

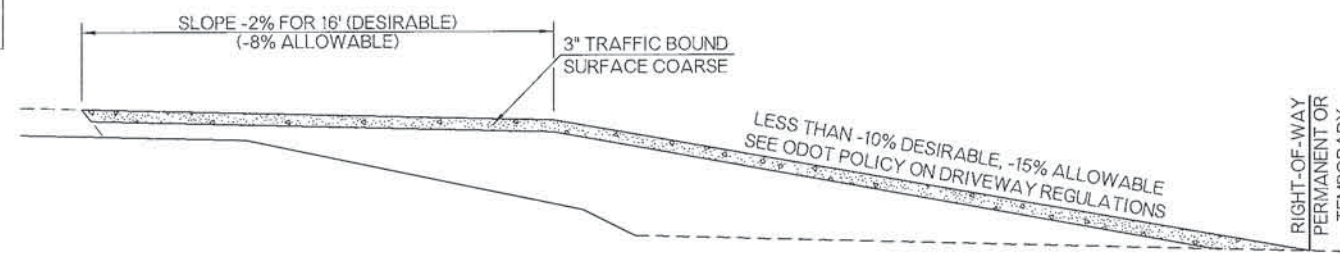


TYPICAL SECTION OF T.B.S.C. RETURN/DRIVE

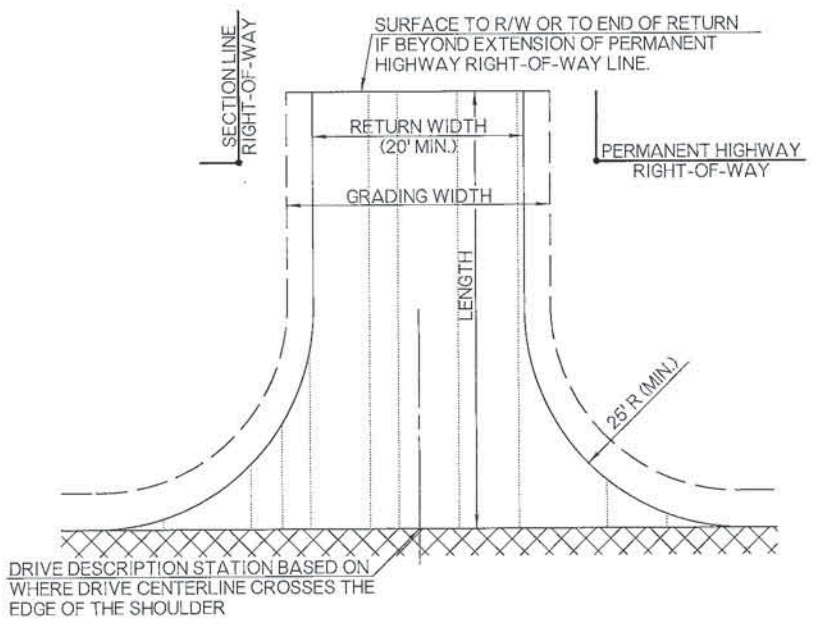
FILL SLOPE NOTES:
FILL SLOPE AS SHOWN IN TYPICAL SECTIONS SHALL NOT EXCEED:
*1:3 SLOPE OUTSIDE HIGHWAY CLEARZONE
*1:4 SLOPE INSIDE HIGHWAY CLEARZONE
WITHIN THE HIGHWAY CLEARZONE, ADJUST SLOPE OF TRAFFIC APPROACH END TO 1:10 FOR DIVIDED HIGHWAYS AND 1:5 FOR UNDIVIDED HIGHWAYS.



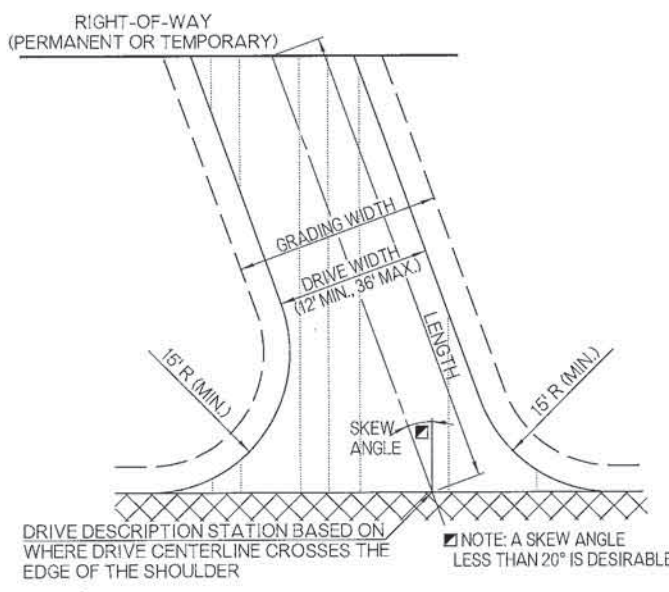
PROFILE OF TYPICAL ASPHALT RETURN/DRIVE ON ROADWAY CUT SECTION



PROFILE OF TYPICAL T.B.S.C. RETURN/DRIVE ON ROADWAY FILL SECTION

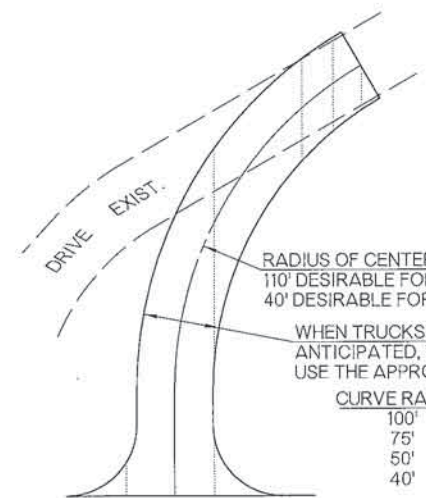


PLAN TYPICAL SECTION LINE RETURN



PLAN TYPICAL DRIVE ON SKEW

NOTE: A SKEW ANGLE LESS THAN 20° IS DESIRABLE.



SECTION LINE OR DRIVE WITH CURVED ALIGNMENT

WHEN TRUCKS OR FARM EQUIPMENT ARE ANTICIPATED, FOR THE FOLLOWING RADIUS, USE THE APPROPRIATE MIN. WIDTH OF DRIVE:

CURVE RADIUS	MIN. WIDTH
100'	14'
75'	16'
50'	18'
40'	20'

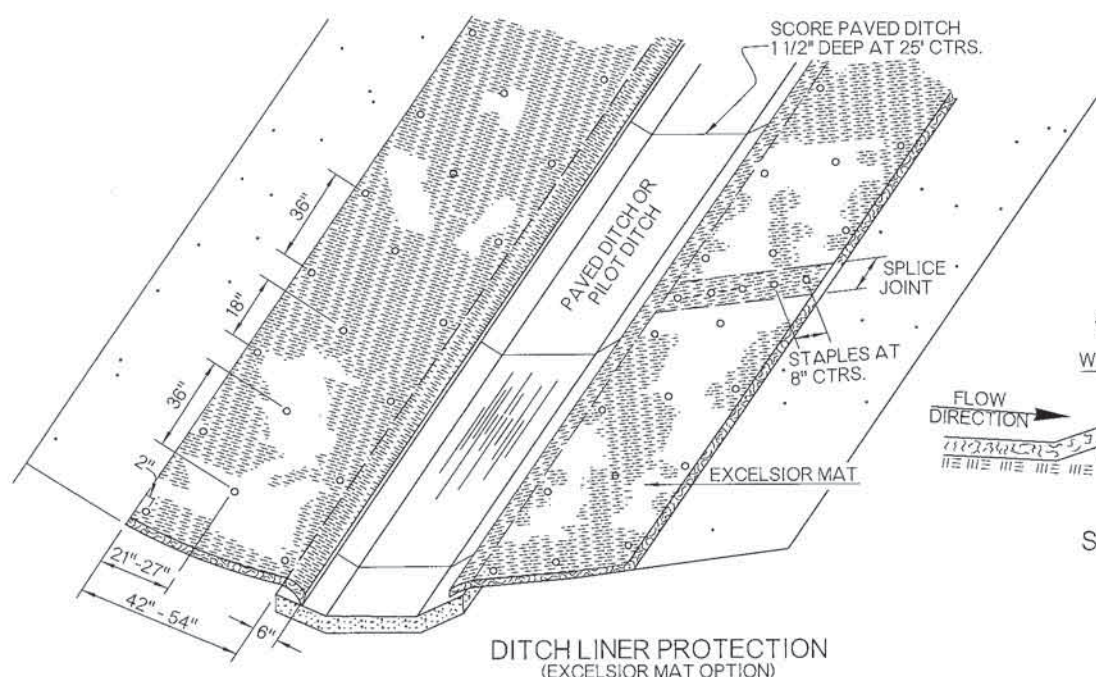
PROPOSED DRIVES AND RETURNS SHALL MATCH EXISTING EXCEPT WHEN SKEW ANGLE EXCEEDS 20 DEGREES; IT IS THEN DESIRED TO SHIFT THE LOCATION AND CONSTRUCT USING CURVED ALIGNMENT

USEFUL ABBREVIATIONS FOR PLAN SHEETS:

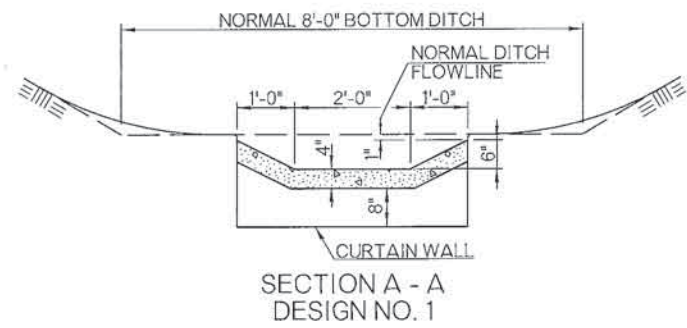
ASPH.	ASPHALT
T.B.S.C.	TRAFFIC BOUND SURFACE COARSE
CONC.	CONCRETE
SEC. RET.	SECTION LINE RETURN
FIELD ENT.	FIELD ENTRANCE
PVT. DRIVE	PRIVATE DRIVE
COMM. DRIVE	COMMERCIAL DRIVE
W/S.D.	WITH SIDE DRAIN
AS DIKE	AS DIKE ACROSS DITCH

APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: *04/16/15*
ROADWAY DESIGN DIVISION STANDARD
DOT RURAL DRIVEWAY INSTALLATION

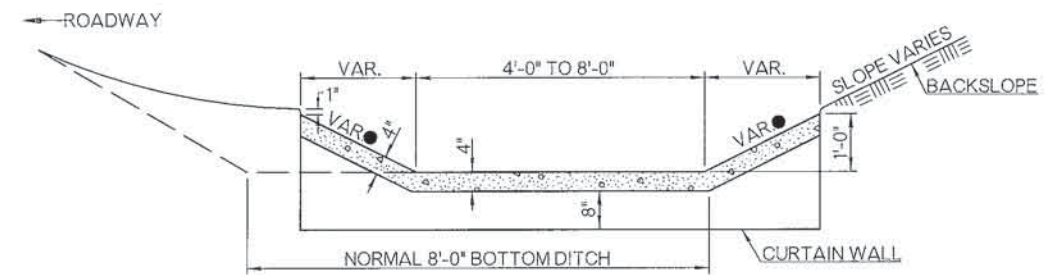
STANDARD REVISIONS	
DESCRIPTION	DATE



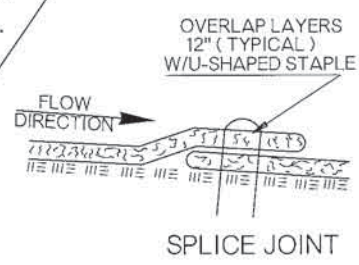
DITCH LINER PROTECTION
(EXCELSIOR MAT OPTION)



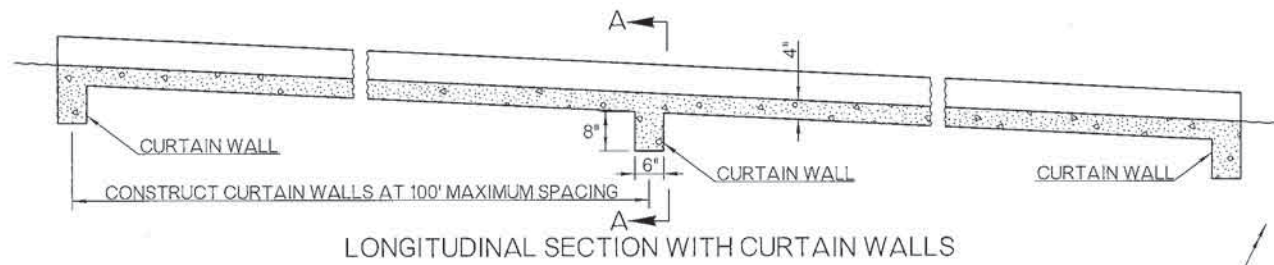
SECTION A - A
DESIGN NO. 1



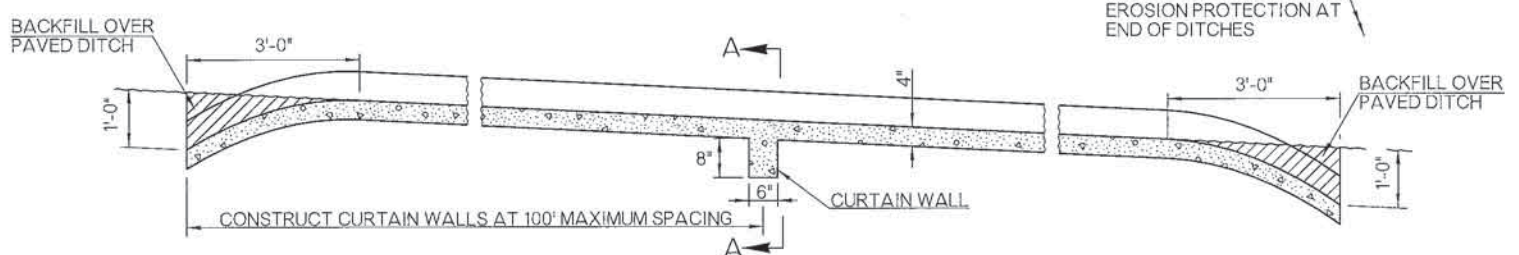
SECTION A - A
DESIGN NO. 2



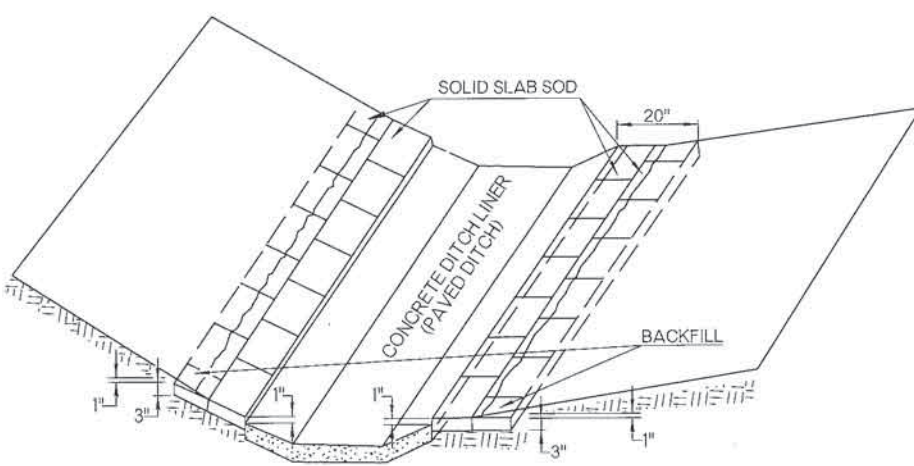
SPLICE JOINT



LONGITUDINAL SECTION WITH CURTAIN WALLS



OPTIONAL LONGITUDINAL SECTION WITH BURIED ENDS
(BURIED ENDS SHALL NOT BE USED ADJACENT TO DRAINAGE STRUCTURES)



DITCH LINER PROTECTION
(SOLID SLAB SOD OPTION)

DESIGN NO. 1 - A PAVED PILOT DITCH TO BE PLACED 6" BELOW THE NORMAL FLOWLINE AND IN THE CENTER OF A STANDARD DITCH

DESIGN NO. 2 - A DITCH THAT IS PAVED AND HAVING THE SAME FLOWLINE AS A STANDARD UNPAVED DITCH

- GENERAL NOTES**
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 2. ALL COST OF ADDITIONAL BORROW OR EXCAVATION, REQUIRED FOR INSTALLING PAVED DITCH, SHALL BE INCLUDED IN PRICE BID FOR CLASS C CONCRETE.
 3. THE DITCH SHALL BE WATERED, AND COMPACTED, BEFORE PLACING CLASS C CONCRETE.
 4. DITCH LINER PROTECTION MAY BE EITHER EXCELSIOR MAT, OR SOLID SLAB SOD, AND SHALL BE MEASURED BY THE LINEAR FOOT OF DITCH (PAVED DITCH), IN PLACE.

QUANTITIES OF CLASS C CONCRETE PER LF OF PAVED DITCH										
QUANTITIES IN CUBIC YARDS										
BOTTOM WIDTH	DESIGN NO. 1					DESIGN NO. 2				
	2'-0"	3'-0"	4'-0"	5'-0"	6'-0"	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"
K 1	.0522	.0645	.0769	.0892	.1016	.1274	.1397	.1521	.1644	.1768
K 2	.0586	.0709	.0832	.0955	.1078	.1790	.1913	.2036	.2159	.2282
● VARIABLE AS SHOWN ON PLANS						K 1	.1045	.1168	.1292	.1415
DESIGN 2A = 1:3 SLOPES						K 2	.1357	.1480	.1603	.1726
DESIGN 2B = 1:2 SLOPES						K 1	.0923	.1048	.1172	.1295
DESIGN 2C = 1:1 SLOPES						K 2	.1105	.1228	.1352	.1476
TOTAL CLASS C CONC. = (LENGTH OF PAVED DITCH) (K1) + (NO. OF CURT. WALLS) (K2)										
K1=CU. YDS. OF CONCRETE PER LINEAR FOOT										
K2=CU. YDS. OF CONCRETE PER CURTAIN WALL										

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
509 (D)	CLASS C CONCRETE	CY
229	DITCH LINER PROTECTION	LF

APPROVED BY ROADWAY ENGINEER: *Calderon* DATE: 04/14/15

ROADWAY DESIGN DIVISION STANDARD

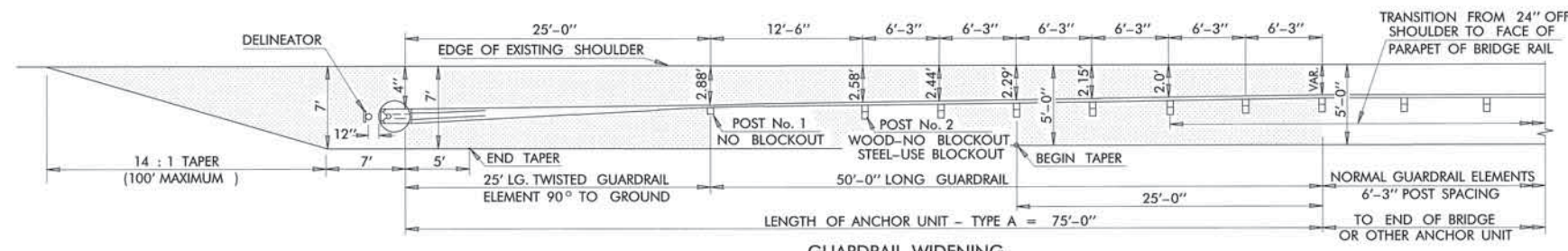
DOT PAVED DITCHES AND FLUMES

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

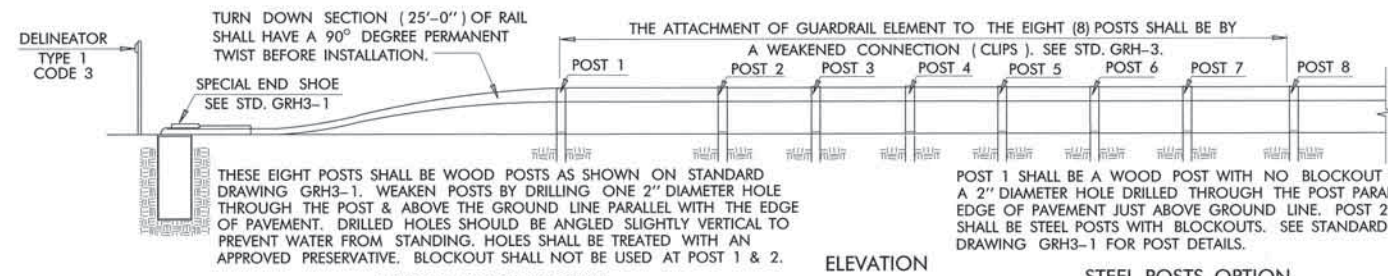
DC-3	2
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R-64

DESCRIPTION	REVISIONS	DATE



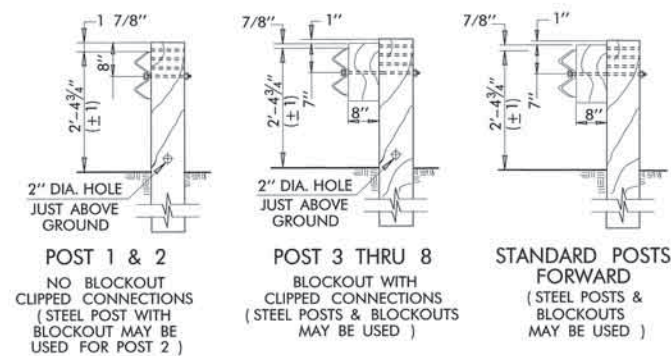
GUARDRAIL WIDENING



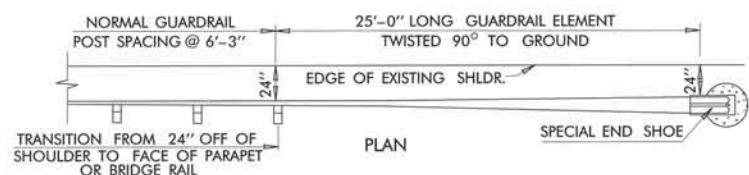
WOOD POSTS OPTION

ANCHOR UNIT - TYPE A

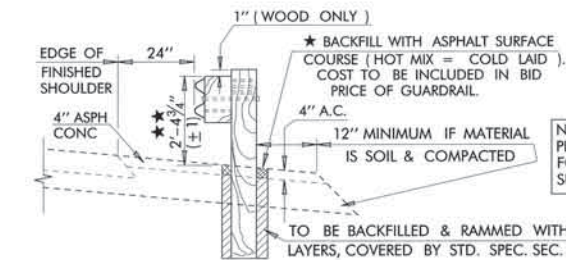
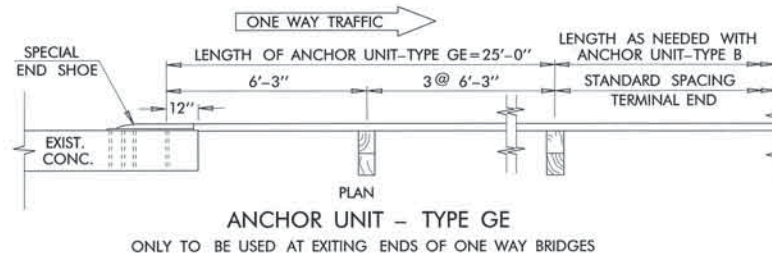
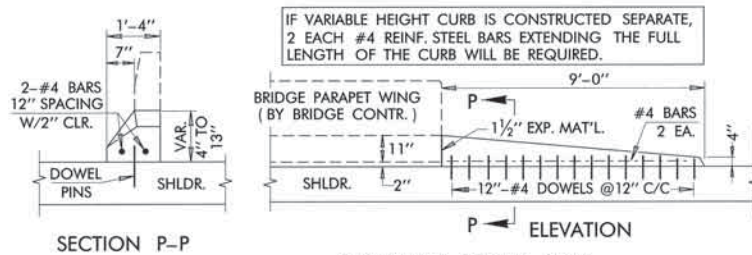
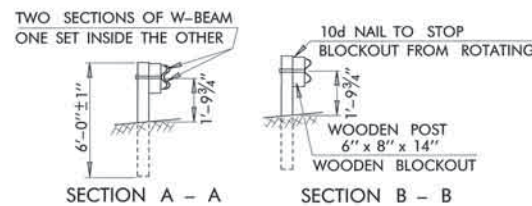
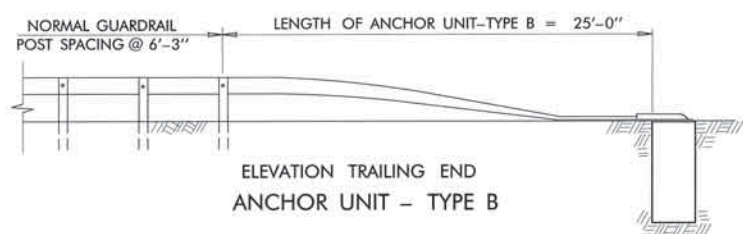
STEEL POSTS OPTION



ANCHOR UNIT - TYPE A - APPROACH END



ANCHOR UNIT - TYPE B



DETAIL OF GUARDRAIL POST IN SHOULDER BASE WIDENING

- ★ SEE 2009 STD. SPECIFICATIONS-SEC. 411, ASPH SURFACE COURSE (HOT MIX-COLD LAID)
- ★ MEASURE DIRECTLY BELOW RAIL, GUARDRAIL TO BE INSTALLED THIS DIMENSION. WHEN INSTALLING GUARDRAIL IN AN AREA WITH NO SHOULDER WIDENING THE RAIL HEIGHT SHALL BE MEASURED AS FOLLOWS: FOR NEGATIVE GRADE SHOULDERS, MEASURE TO A LINE FROM THE SHOULDER ON THE SAME SLOPE AS THE SHOULDER. FOR POSITIVE GRADE & LEVEL SHLDRS, MEASURE FROM A LINE LEVEL WITH THE EDGE OF SHOULDER.

GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ENGLISH STANDARD SPECIFICATIONS.
- THE BRIDGE CONTRACTOR SHALL PROVIDE HOLES FOR THE CONNECTION OF W-BEAM TERMINAL CONNECTOR (SPECIAL END SHOE) TO BRIDGE RAIL AND SLOPED FACE PARAPET. RETROFIT CONNECTIONS FOR GUARDRAIL (SPECIAL END SHOE) SHALL BE FIELD DRILLED BY THE SURFACING CONTRACTOR.
- GUARDRAIL COMPONENTS SHALL MEET NCHRP-350, THE APPLICABLE STANDARDS OF "A GUIDE TO STANDARDIZED HIGHWAY BARRIER RAIL HARDWARE" PREPARED AND APPROVED BY THE AASHTO-ARTBA-AGC JOINT COMMITTEE, TECHNICAL BULLETIN NO. 268 B.
- POST SPACING AND FACE OF RAIL ALIGNMENT REMAINS THE SAME.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623.06(F)	GUARDRAIL ANCHOR UNIT (TYPE ▲)	EA.

▲ TYPE OF GUARDRAIL ANCHOR UNIT TO BE SPECIFIED.



APPROVED BY TRAFFIC ENGINEER: *David Smith* DATE: 4/9/12

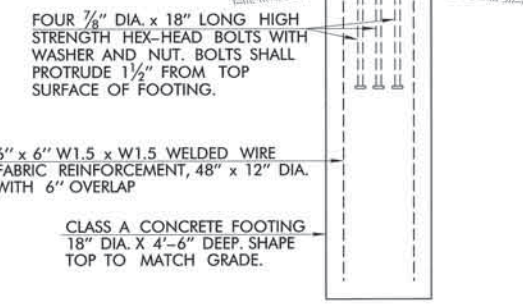
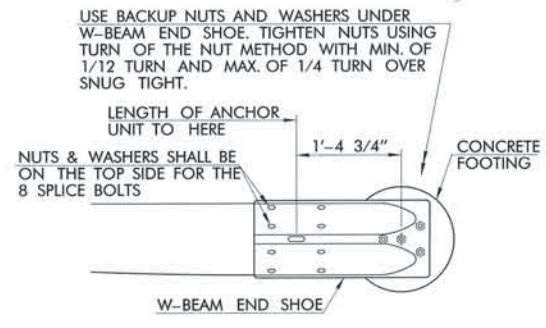
TRAFFIC MAINTENANCE STANDARD
GUARDRAIL ANCHOR UNITS
(1 OF 2)
(27 3/4" SYSTEM)

2009 SPECIFICATIONS

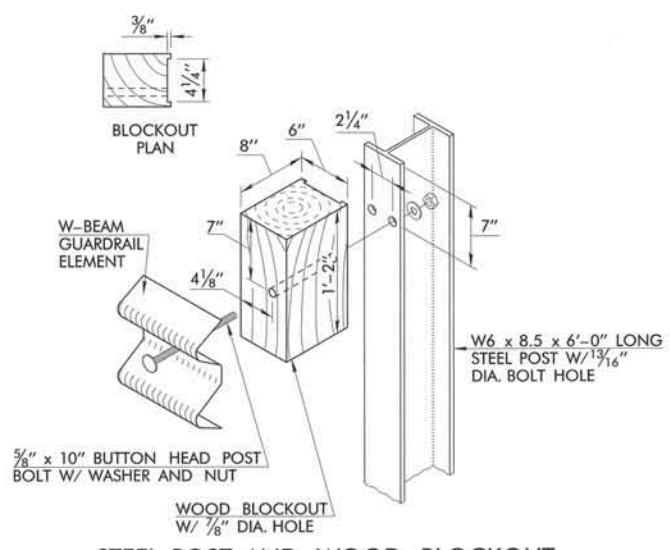
GRAU1-1 00

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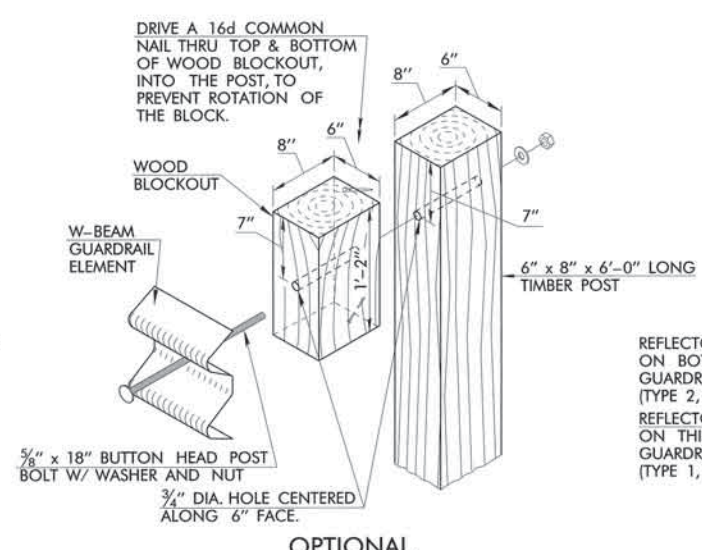
DESCRIPTION	REVISIONS	DATE



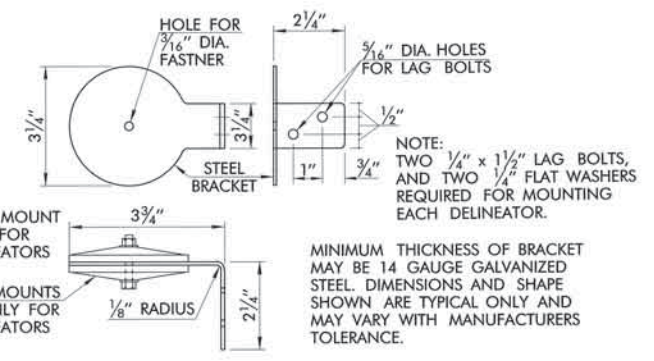
GROUND ANCHOR FOOTING DETAIL



STEEL POST AND WOOD BLOCKOUT



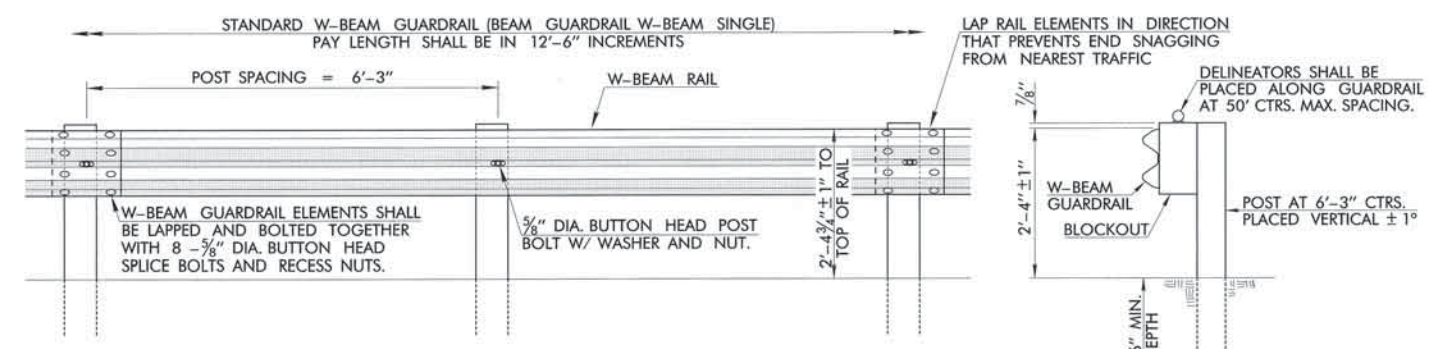
OPTIONAL WOOD POST AND WOOD BLOCKOUT



TYPICAL BRACKET FOR MOUNTING 3 1/4\"/>

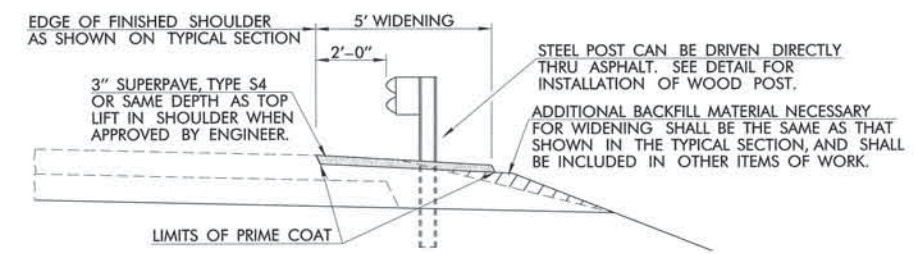
OPTIONAL TYPE POSTS OR BLOCKOUTS FOR STANDARD GUARDRAIL

THE CONTRACTOR MAY, AT HIS OPTION, SELECT AND USE ONE OF THE TYPE POSTS AND BLOCKOUTS SHOWN ABOVE, OR AN APPROVED ALTERNATE. THIS POST & BLOCKOUT CHOICE MUST BE USED ON THE ENTIRE PROJECT. ALTERNATE POST (INCLUDING SPECIAL SHAPES) MAY BE USED UPON THE APPROVAL OF THE ENGINEER. ALTERNATE BLOCKOUTS (SUCH AS RECYCLED MATERIAL, RUBBER, PLASTIC AND COMPOSITE PRODUCTS) MAY BE USED IF PRODUCT HAS BEEN EVALUATED AND APPROVED BY ODOT.

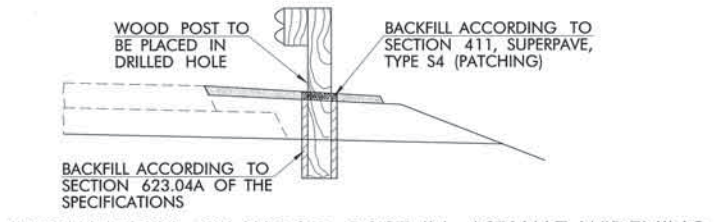


STANDARD W-BEAM GUARDRAIL ELEVATION

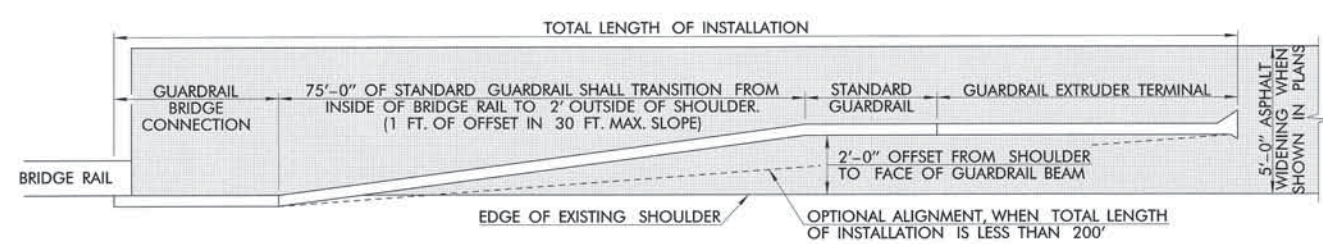
STANDARD W-BEAM GUARDRAIL SECTION



DETAIL OF SHOULDER WIDENING FOR STANDARD GUARDRAIL



INSTALLATION OF WOOD POST IN ASPHALT WIDENING



TYPICAL GUARDRAIL INSTALLATION AT BRIDGE

- GENERAL NOTES**
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - STANDARD GUARDRAIL WITH 6'-3\"/>
 - WOOD POSTS AND BLOCKOUTS SHALL BE STRESS GRADE 1200F.
 - ALL STANDARD GUARDRAIL AND GUARDRAIL EXTRUDER TERMINALS SHALL BE OFFSET SO THAT RAIL FACE IS TWO FEET OUTSIDE THE SHOULDER. FOR TRANSITION FROM BRIDGE RAIL TO TWO FOOT OFFSET, BEGINNING AT THE GUARDRAIL BRIDGE CONNECTION, TRANSITION THE STANDARD GUARDRAIL, AT A 30:1 TAPER, UNTIL THE RAIL REACHES THE OFFSET DISTANCE.
 - ALL GUARDRAIL, METAL POSTS, PLATES AND HARDWARE SHALL BE GALVANIZED AFTER FABRICATION.
 - ANY FIELD CUTS OR HOLES DRILLED IN GALVANIZED MATERIALS SHALL BE COATED WITH A ZINC OXIDE PAINT. SEE SECTION 730 OF THE SPECIFICATIONS.
 - GUARDRAIL DELINEATORS (TYPE 2, CODE 1) WILL BE REQUIRED FOR ALL TWO-LANE ROADWAYS. ALL OTHER ROADWAYS WILL REQUIRE GUARDRAIL DELINEATORS (TYPE 1, CODE 1).

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623 (A)	BEAM GUARDRAIL W-BEAM SINGLE	L.F.
853	GUARDRAIL DELINEATORS (TYPE 1, CODE 1)	EA.
853	GUARDRAIL DELINEATORS (TYPE 2, CODE 1)	EA.

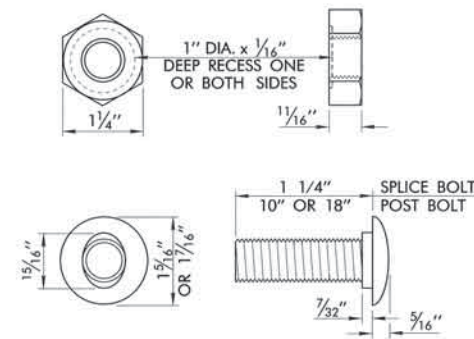
NOTE: PAYITEM GUARDRAIL ANCHOR UNIT TYPE B INCLUDES ALL LABOR AND MATERIALS TO INSTALL 25'-0\"/>



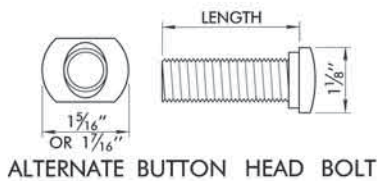
APPROVED BY: *Dwight Smalley* DATE: 4/9/12
TRAFFIC MAINTENANCE STANDARD

GUARDRAIL AND HARDWARE
(1 OF 3)
(27 3/4\"/>

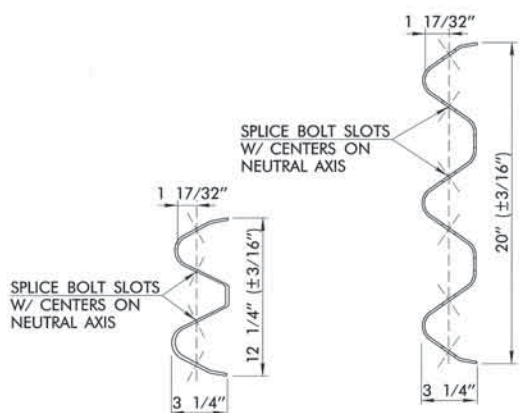
DESCRIPTION	REVISIONS	DATE



5/8" DIA. BUTTON HEAD BOLT & RECESS NUT

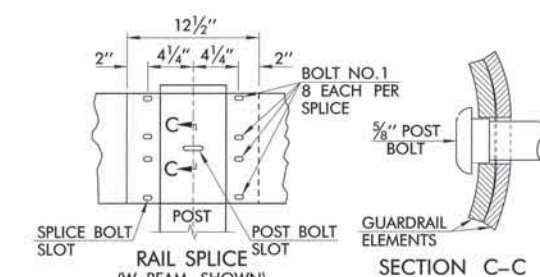


ALTERNATE BUTTON HEAD BOLT



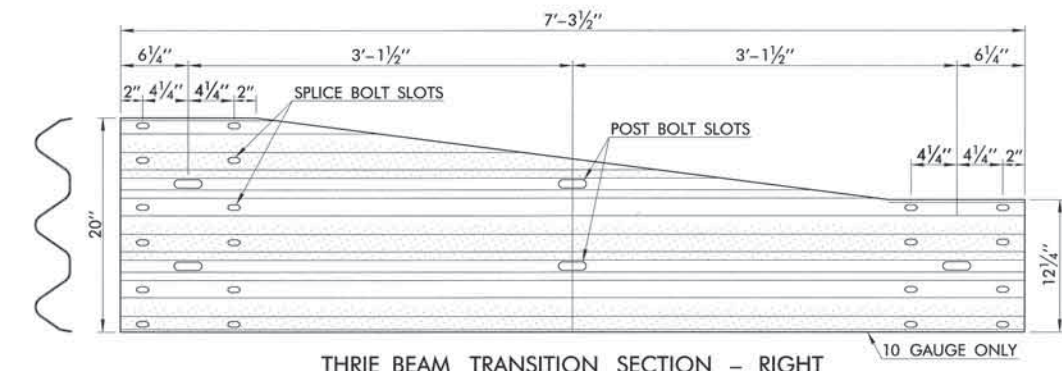
W-BEAM GUARDRAIL SECTION

THRIE BEAM GUARDRAIL SECTION

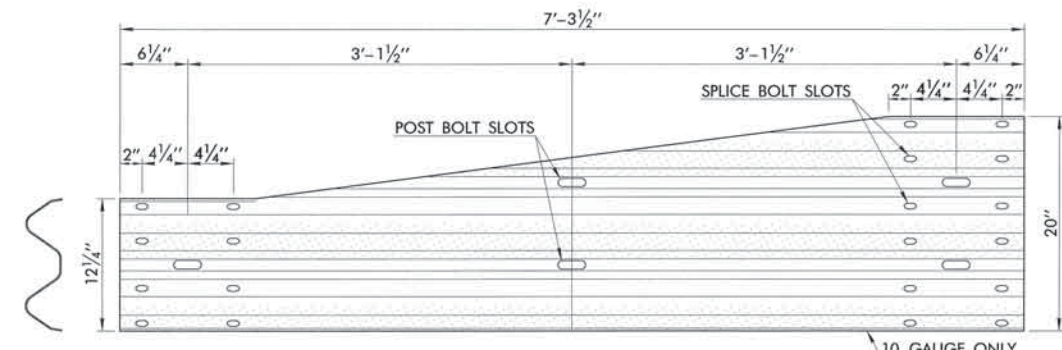


RAIL SPLICE (W-BEAM SHOWN)
 GUARDRAIL SHALL BE LAPPED IN THE DIRECTION OF NEAREST TRAFFIC AT ALL LOCATIONS WHERE SPLICES OCCUR (EXCEPT AT NARROW OR ONE LANE BRIDGE APPROACHES, WHERE LAPS SHALL BE TOWARD THE BRIDGE ON BOTH SIDES OF THE APPROACH ROADWAY).

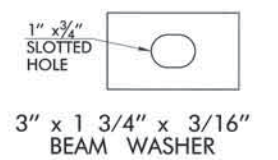
RAIL SPLICE



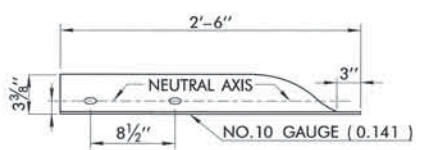
THRIE BEAM TRANSITION SECTION - RIGHT
 (THRIE BEAM TO W-BEAM CONNECTION)



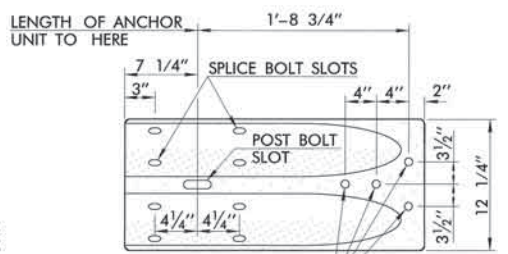
THRIE BEAM TRANSITION SECTION - LEFT
 (THRIE BEAM TO W-BEAM CONNECTION)



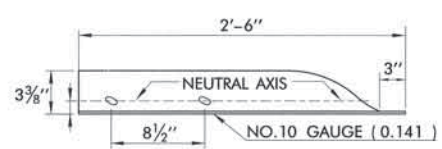
3" x 1 3/4" x 3/16" BEAM WASHER



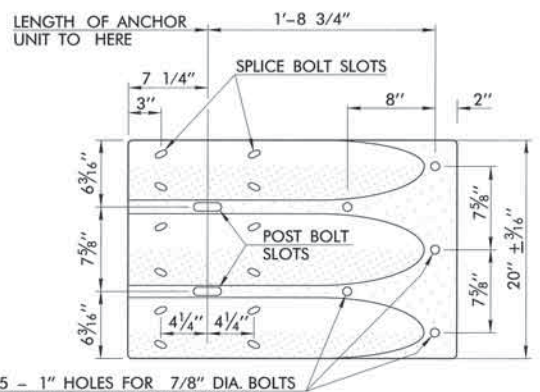
NO. 10 GAUGE (0.141)



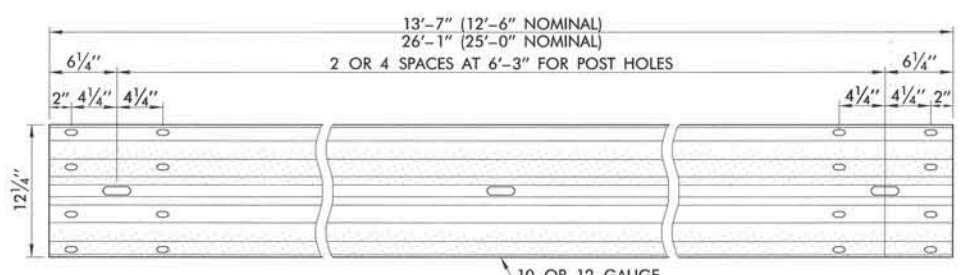
W-BEAM TERMINAL CONNECTION (END SHOE)



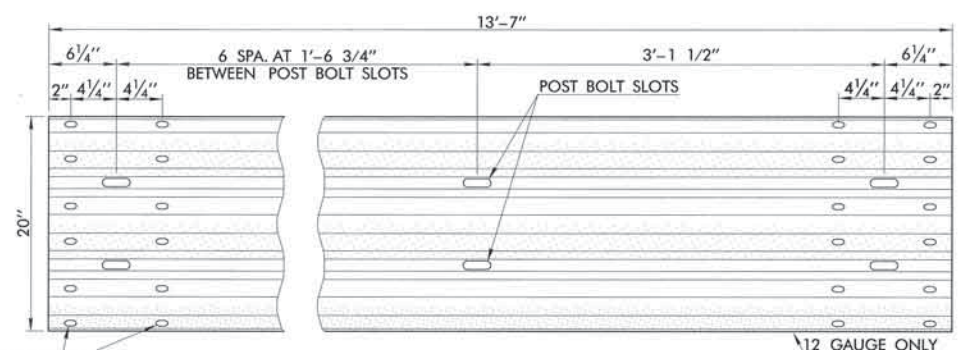
NO. 10 GAUGE (0.141)



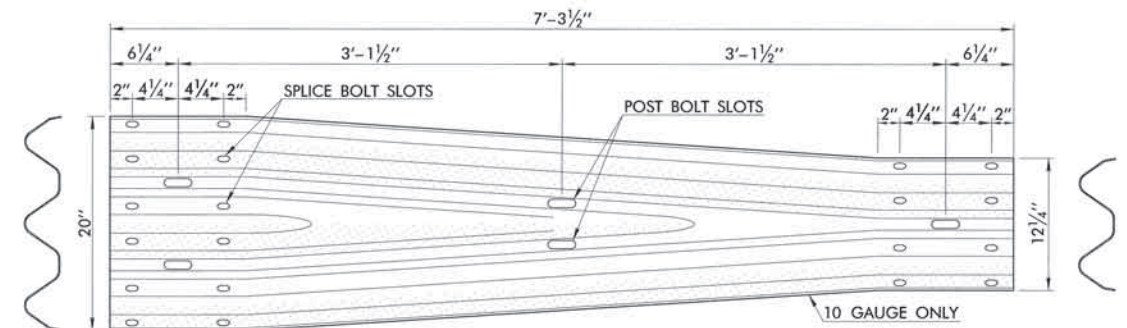
THRIE BEAM TERMINAL CONNECTION 10 GAUGE ONLY (END SHOE)



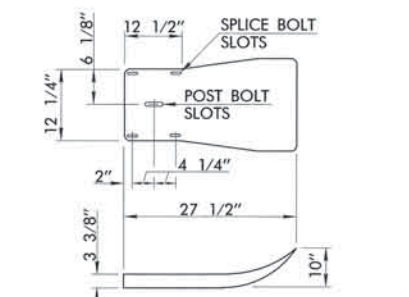
STANDARD W-BEAM GUARDRAIL ELEMENT (12'-6" OR 25'-0" NOMINAL LENGTH)



THRIE BEAM GUARDRAIL ELEMENT FOR BRIDGE CONNECTION



THRIE BEAM TRANSITION SECTION (6'-3" NOMINAL LENGTH)
 (THRIE BEAM TO W-BEAM CONNECTION)



W-BEAM END SECTION (FLARED)

- GENERAL NOTES**
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 2. ALL GUARDRAIL BEAMS, END SHOES, AND END SECTIONS ON THIS STANDARD DRAWING SHALL BE IN ACCORDANCE WITH AASHTO M 180.
 3. ALL SPLICE BOLT SLOTS SHALL BE 29/32" WIDE x 1 1/8" LONG.
 4. ALL POST BOLT SLOTS SHALL BE 3/4" WIDE x 2 1/2" LONG.



APPROVED BY TRAFFIC ENGINEER: *David Under* DATE: 4/9/12

TRAFFIC MAINTENANCE STANDARD

GUARDRAIL AND HARDWARE
 (2 OF 3)
 (27 3/4" SYSTEM)

ALL GENERAL NOTES SHOWN BELOW SHALL APPLY TO ALL OF THE STANDARD DRAWINGS IN TCS SERIES

DESCRIPTION	REVISIONS	DATE
MODIFIED NOTES		3/15/2011

CONTRACTOR

ON CONSTRUCTION PROJECTS IT WILL BE THE CONTRACTORS RESPONSIBILITY TO INSTALL THE NECESSARY TRAFFIC CONTROL BEFORE CONSTRUCTION BEGINS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL DEVICES TO ASSURE A HIGH DEGREE OF BOTH DAY AND NIGHT VISIBILITY, WHICH WILL INCLUDE ANY WASHING, REPLACEMENT AND/OR REPOSITIONING WHERE DEEMED NECESSARY BY THE ENGINEER.

THE CONTRACTOR SHALL REPAIR OR REPLACE ANY NEW OR EXISTING PERMANENT STATE OWNED SIGNS WHICH ARE DAMAGED DUE TO HIS NEGLIGENCE OR CARELESS HANDLING DURING THE CONSTRUCTION OF THIS PROJECT. THIS SHALL BE DONE AT THE CONTRACTORS EXPENSE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TEMPORARY TRAFFIC CONTROL WORK ZONE AND EXISTING PAVEMENT MARKINGS ON ALL ROADWAYS OPEN TO TRAFFIC WITHIN THE PROJECT. SUFFICIENT QUANTITIES HAVE BEEN PROVIDED FOR MAINTAINING PAVEMENT MARKINGS FOR PRESCRIBED DETOUR ROUTES WHEN DEEMED NECESSARY BY THE ENGINEER.

SIGN MATERIALS

ALL SIGN BLANK MATERIALS SHALL BE THE OPTION OF THE CONTRACTOR BUT SHALL BE OF SUCH MATERIAL THAT WILL RETAIN A SATISFACTORY APPEARANCE THROUGHOUT THE LIFE OF THE PROJECT.

ALL SIGNS, LIGHTS, FLAGS, ETC. SHALL CONFORM IN SIZE, SHAPE, COLOR, LEGENDS AND APPLICATIONS TO THE STANDARDS SET FORTH IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND/OR OKLAHOMA STATE STANDARD DRAWINGS FOR SIGNS. STANDARD DRAWINGS ARE AVAILABLE FROM THE DEPARTMENT OF TRANSPORTATION. INTERPRETATIONS THAT MAY BE NECESSARY SHALL BE REFERRED TO THE ENGINEER.

SIGN SHEETING

REFLECTORIZATION OF TRAFFIC CONTROL DEVICES SHALL BE BY MEANS OF WIDE ANGLE, FLAT TOP REFLECTIVE SHEETING MEETING THE REQUIREMENTS OF 2009, OKLAHOMA STANDARD SPECIFICATIONS.

SIGN INSTALLATION

ALL SIGNS SHALL BE SECURELY PLACED OR WEIGHTED TO PREVENT BLOWING OVER. ROCKS, BROKEN CONCRETE OR OTHER SUCH OBJECTS SHALL NOT BE CONSIDERED AN ACCEPTABLE SUBSTITUTE FOR SAND BAGS WHEN USED TO OBTAIN ADDED STABILITY FOR MOVABLE SIGNS AND BARRICADES.

SPACING OF SIGNING, ON THE PLANS OR TCS STANDARDS, SHOULD BE NO LESS THAN THE DISTANCES SHOWN. THE DISTANCE BETWEEN SIGNS SHOULD BE INCREASED ON HIGH SPEED OR MORE HEAVILY TRAVELED HIGHWAYS, OR WHERE SIGHT DISTANCE IS RESTRICTED.

IN ALL CONSTRUCTION ZONES, THE 48 INCH X 48 INCH WARNING SIGNS SHALL HAVE ATTACHED THERETO FLORESCENT FLAGS AND TYPE "A" WARNING LIGHTS. THIS SHALL ALSO APPLY WHEN SIGNS ARE USED ON BOTH SIDES OF THE ROADWAY. ADDITIONAL FLASHING LIGHTS MAY BE REQUIRED WHEN SO DESIRED BY THE ENGINEER.

ALL DIAMOND SHAPED CONSTRUCTION WARNING SIGNS ON EXPRESSWAYS OR FREEWAYS SHALL BE 48 INCH X 48 INCH, WITH THE APPROPRIATE ADVISORY SIGN WHERE REQUIRED UNLESS OTHERWISE NOTED IN THE PLANS.

DUE TO THE TEMPORARY NATURE OF CONSTRUCTION, SIGNS WHICH ARE 33 S.F. AND OVER WILL HAVE NO REINFORCING STEEL IN THEIR FOOTINGS.

ALL SIGNS AND SIGN ASSEMBLIES WITH A TOTAL SURFACE AREA OF 10 S.F. OR MORE SHALL BE INSTALLED ON TWO (2) POSTS. THE EXCEPTION BEING SINGLE ROUTE MARKER ASSEMBLIES.

SIGNS MOUNTED ON BARRICADES SHALL BE MOUNTED AS HIGH AS NECESSARY TO BE VISIBLE.

BARRICADES

ONE (1) WING BARRICADE SHALL BE SET ON EACH SIDE OF THE ROADWAY IN ADVANCE OF THE FIRST ADVANCE WARNING SIGN, THE EXCEPTIONS ARE MINOR CROSS STREETS AND SECTION LINE ROADS WHICH INTERSECT THE WORK AREA.

WING BARRICADES SHALL BE INSTALLED ON TWO (2) BREAKAWAY POSTS.

WORK DURATION

THE FIVE CATEGORIES OF WORK DURATION AND THEIR TIME AT A LOCATION SHALL BE:

- A) LONG-TERM STATIONARY IS WORK THAT OCCUPIES A LOCATION MORE THAN 3 DAYS.
- B) INTERMEDIATE-TERM STATIONARY IS WORK THAT OCCUPIES A LOCATION MORE THAN ONE DAYLIGHT PERIOD UP TO 3 DAYS, OR NIGHTTIME WORKLASTING MORE THAN 1 HOUR.
- C) SHORT-TERM STATIONARY IS DAYTIME WORK THAT OCCUPIES A LOCATION FOR MORE THAN 1 HOUR WITHIN A SINGLE DAYLIGHT PERIOD.
- D) SHORT DURATION IS WORK THAT OCCUPIES A LOCATION UP TO 1 HOUR.
- E) MOBILE IS WORK THAT MOVES INTERMITTENTLY OR CONTINUOUSLY.

LIGHTING

TYPE "A" WARNING LIGHTS SHALL BE USED ON BARRICADES (AS REQUIRED) AND WARNING SIGNS.

TYPE "C" WARNING LIGHTS MAY BE USED ON VERTICAL PANELS (OPTIONAL).

CONSTRUCTION NOTES

SHOULD THE REQUIRED WORK ON ANY PROJECT, INCLUDING ANY TRAFFIC CONTROL, OVERLAP OR OTHERWISE INTERFERE WITH THE ON-GOING WORK OR TRAFFIC CONTROL OF ANOTHER PROJECT, IT SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE CONTRACTORS TO COORDINATE THEIR WORK ACTIVITIES TO FACILITATE THE SAFE MOVEMENT OF TRAFFIC THROUGHOUT OR AROUND THEIR COLLECTIVE WORK AREAS. ANY SUCH RECOMMENDED CHANGES SHALL BE SUBMITTED IN WRITING TO EACH PROJECT RESIDENT ENGINEER FOR REVIEW AND APPROVAL.

ALL TRAFFIC CONTROL DEVICES NOT REQUIRED FOR THE SAFE CONDUCT OF TRAFFIC THROUGH THE TEMPORARY TRAFFIC CONTROL ZONE SHALL BE PROMPTLY REMOVED, COMPLETELY COVERED, TURNED AWAY FROM TRAFFIC OR OTHERWISE TAKEN OUT OF SERVICE. DEVICES SHALL NOT BE STORED ALONG THE ROADWAY WITHIN 15 FEET (15') OF AN OPEN DRIVING LANE, EITHER BEFORE OR AFTER THEY ARE TO BE USED UNLESS PROTECTED BY GUARDRAIL, BRIDGE RAIL, AND/OR BARRIERS INSTALLED FOR OTHER PURPOSES. THESE DEVICES SHALL BE REMOVED FROM THE TEMPORARY TRAFFIC CONTROL ZONE WHEN THE ENGINEER DETERMINES THEY ARE NO LONGER NEEDED. WHERE THERE IS INSUFFICIENT RIGHT-OF-WAY TO PROVIDE FOR THIS 15 FEET (15') SETBACK, THE CONTRACTOR SHALL DETERMINE ALTERNATE LOCATIONS AND REQUEST THE ENGINEERS APPROVAL TO USE THEM.

TRAFFIC CONTROL DEVICES, WARNING DEVICES, AND BARRIERS SHALL BE KEPT IN CORRECT POSITION, PROPERLY DIRECTED, CLEARLY VISIBLE AND CLEAN AT ALL TIMES. DAMAGED, DEFACED OR DIRTY DEVICES OR BARRICADES SHALL IMMEDIATELY BE REPAIRED, REPLACED OR CLEANED BY THE CONTRACTOR AND APPROVED FOR USE BY THE ENGINEER.

NO EQUIPMENT OR VEHICLES BELONGING TO THE CONTRACTOR, HIS SUB-CONTRACTORS OR EMPLOYEES SHALL BE PARKED OR STOPPED WITHIN 30 FEET (30') OF A LANE CARRYING TRAFFIC, AT ANY TIME, UNLESS REQUIRED BY ONGOING WORK OPERATIONS.

ALL DETOURS AND DIVERSIONS SHOULD BE IN PLACE, WITH SIGNING, STRIPING AND CHANNELIZING DEVICES, AS SHOWN IN THE PLANS OR STANDARD DRAWINGS, BEFORE THEY ARE OPENED TO TRAFFIC.

WHEN IT BECOMES NECESSARY TO CLOSE THE ROAD TO THROUGH TRAFFIC, NO LESS THAN SEVEN DAYS PRIOR TO THE CLOSURE, THE CONTRACTOR SHALL NOTIFY THE FOLLOWING INDIVIDUALS OR AGENCIES DESCRIBING THE AFFECTED ROAD AND THE APPROXIMATE DURATION OF THE CLOSURE. THOSE TO BE NOTIFIED INCLUDE BUT ARE NOT LIMITED TO 1) LOCAL LAW ENFORCEMENT OFFICIALS, 2) LOCAL FIRE OFFICIALS, 3) AMBULANCE SERVICES, 4) LOCAL SCHOOL SUPERINTENDENT, 5) UNITED STATES POSTAL SERVICE, AND 6) CITY OR COUNTY ROAD SUPERINTENDENT.

ALL TEMPORARY TRAFFIC CONTROL DEVICES, AND THEIR CONDITIONS THROUGHOUT THE LIFE OF THE CONSTRUCTION PROJECT, SHALL MEET O.D.O.T.'S LATEST "QUALITY STANDARDS FOR TEMPORARY TRAFFIC CONTROL DEVICES". THE O.D.O.T. RESIDENT ENGINEER WILL MAKE FINAL DECISION OF ALL TEMPORARY TRAFFIC CONTROL DEVICES BASED ON THE O.D.O.T. GUIDELINES.

NO GENDER BIAS SIGNS ARE ALLOWED.

ARROW DISPLAY

USE OF AN ARROW DISPLAY, IN THE ARROW OR CHEVRON MODE, SHALL BE LIMITED TO STATIONARY OR MOVING LANE CLOSURES.

AN ARROW DISPLAY, IN THE CAUTION MODE, SHALL BE USED ONLY FOR SHOULDER WORK, BLOCKING THE SHOULDER, ROADSIDE WORK NEAR THE SHOULDER, OR FOR MOBILE OPERATIONS (I.E. STRIPING).

AN ARROW DISPLAY IN THE ARROW OR CHEVRON MODE, SHALL NOT BE USED ON A TWO-LANE, TWO-WAY ROADWAY FOR TEMPORARY ONE-LANE OPERATION.

AN ARROW DISPLAY SHALL NOT BE USED ON A MULTI-LANE ROADWAY TO LATERALLY SHIFT TRAFFIC.

CHANNELIZING DEVICES

IN THOSE AREAS WHERE DRIVERS ARE ASKED TO MAKE A DECISION OR MUST BE GUIDED THROUGH A PRECISE MOVEMENT, BY USE OF CHANNELIZING DEVICES, IT IS ESPECIALLY IMPORTANT TO PROVIDE A CLEARLY DEFINED PATH. EXAMPLES OF THIS COULD BE IN DELINEATING A TEMPORARY GORE OR TURNING RADIUS. IN SUCH AREAS THE SPACING OF CHANNELIZING DEVICES MAY BE REDUCED TO 10 FEET FOR SPEEDS OF 40 M.P.H. OR LESS, AND 20 FEET FOR SPEEDS GREATER THAN 40 M.P.H.

WHEN CHANNELIZING DEVICES ARE USED TO DIRECT TRAFFIC ACROSS EXISTING LANE LINES OR EDGE LINES, THE SPACING BETWEEN CHANNELIZING DEVICES SHALL BE REDUCED 50%. SPACING SHOULD ALSO BE REDUCED WHEN CHANNELIZING DEVICES ARE PLACED ON CURVES, HILLS, OR NEXT TO POTENTIAL HAZARDS.

ALL TRAFFIC CONTROL CHANNELIZING DEVICES SHALL MEET MUTCD COLOR REQUIREMENTS.

FLAGGERS

FLAGGERS MUST BE CLEARLY VISIBLE TO APPROACHING TRAFFIC FOR A DISTANCE SUFFICIENT TO PERMIT PROPER RESPONSE BY MOTORISTS TO THE FLAGGING INSTRUCTIONS, AND TO PERMIT TRAFFIC TO REDUCE SPEED OR STOP BEFORE ENTERING THE TEMPORARY TRAFFIC CONTROL ZONE. FLAGGERS SHALL BE POSITIONED TO MAINTAIN MAXIMUM COLOR CONTRAST BETWEEN THE FLAGGER'S REFLECTIVE CLOTHING AND EQUIPMENT AND THE WORK AREA BACKGROUND.

DURING HOURS OF DARKNESS, FLAGGER STATIONS SHALL BE ILLUMINATED SUCH THAT THE FLAGGER WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC. LIGHTS TO BE USED FOR ILLUMINATING THE STATION SHALL BE APPROVED BY THE ENGINEER. REFLECTORIZED PADDLES AND REFLECTORIZED VESTS, SHIRTS OR JACKETS SHALL BE USED FOR NIGHTTIME FLAGGING.

UNLESS OTHERWISE SPECIFIED IN THE PLANS, THE COST OF FLAGGING OPERATIONS SHALL BE INCLUDED IN OTHER ITEMS OF WORK.

MINIMUM STANDARDS FOR TRAFFIC CONTROL DEVICES

- (1) WARNING LIGHTS (TYPE A FLASHERS AND TYPE C STEADY BURN)
 - (A) NOT LESS THAN NINETY (90) PERCENT OF THE TOTAL NUMBER OF LIGHTS BEING USED AT ANY ONE TIME SHALL BE FULLY OPERATIONAL.
 - (B) NOT MORE THAN THREE (3) LIGHTS ADJACENT TO ONE ANOTHER SHALL BE FAILING.
- (2) ARROW DISPLAY
 - (A) WHEN IN ARROW MODE, NO MORE THAN TWO (2) LAMPS IN THE STEM AND ZERO (0) LAMPS IN THE HEAD SHALL BE FAILING. THE DIMMING FUNCTION SHALL BE OPERATING PROPERLY.
 - (B) WHEN IN CAUTION MODE (CORNERS), A MINIMUM OF FOUR (4) LAMPS SHALL BE OPERATIONAL. THE DIMMING FUNCTION SHALL BE OPERATING PROPERLY.
 - (C) ANY LAMP WHICH IS LIGHTED BUT IMPROPERLY ALIGNED SHALL NOT BE CONSIDERED OPERATIONAL.
- (3) CHANGEABLE MESSAGE SIGNS
 - (A) NOT LESS THAN NINETY (90) PERCENT OF THE PIXELS SHALL BE FUNCTIONAL IN EACH CHARACTER MODULE.
 - (B) NO SANDBAG BALLASTING OVER 3 FEET IN HEIGHT.
- (4) PAVEMENT MARKING TAPE
 - (A) NOT MORE THAN TEN (10) PERCENT OF ALL TAPE, PAINT, MESSAGE OR SYMBOL SHALL BE MISSING.
 - (B) NOT MORE THAN TWO (2) CONSECUTIVE DASHED LINES SHALL BE MISSING.
 - (C) NOT MORE THAN FIFTY (50) CONTINUOUS FEET OF A SOLID LINE SHALL BE MISSING.
- (5) CONSTRUCTION ZONE PAVEMENT MARKERS
 - (A) NOT MORE THAN TEN (10) PERCENT OF THE TOTAL NUMBER OF MARKERS SHALL BE MISSING.
 - (B) NOT MORE THAN THREE (3) CONSECUTIVE MARKERS SHALL BE MISSING.

STRIPING

WHENEVER THE WORK CAUSES THE OBLITERATION OF PAVEMENT MARKINGS, EITHER TEMPORARY OR PERMANENT MARKINGS SHALL BE IN PLACE PRIOR TO OPENING THE ROADWAY TO TRAFFIC. CENTERLINE PAVEMENT MARKINGS SHALL BE PROVIDED AT ALL TIMES FOR ROADWAYS OPEN TO TRAFFIC.

THE APPLICATION SURFACES FOR PAVEMENT MARKINGS SHALL BE FREE OF DUST, DIRT, MOISTURE OR OTHER FOREIGN MATTER WHICH WOULD INTERFERE WITH ADHESION. INSTALLATION OF ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

ALL TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED IMMEDIATELY AHEAD OF THE PERMANENT STRIPING OPERATIONS OR RE-STRIPING FOR FOLLOWING CONSTRUCTION PHASES.

WHEN REMOVABLE PAVEMENT MARKINGS TAPE IS TO BE INSTALLED ON NEW CONCRETE PAVEMENT, THE CURING COMPOUND SHALL BE REMOVED PRIOR TO INSTALLATION.

IF REMOVABLE PAVEMENT MARKING TAPE IS INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AND FAILS DURING THE FIRST SIX MONTHS OF SERVICE, IT SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. REPLACEMENT SHALL BE ACCOMPLISHED IN A TIMELY MANNER UPON BEING NOTIFIED, BY THE ENGINEER, OF SUCH FAILURE.

PILOT CAR

WHEN LANE CLOSURES ARE REQUIRED ON TWO-LANE /TWO-WAY ROADWAYS, THE CONTRACTOR MAY, AT HIS OPTION, UTILIZE A PILOT CAR. IF THE CONTRACTOR ELECTS TO USE A PILOT CAR, CHANNELIZING DEVICES ALONG THE CENTERLINE WILL NOT BE REQUIRED. THE PILOT CAR OPERATOR SHALL BE IN RADIO CONTACT WITH PERSONNEL IN THE TEMPORARY TRAFFIC CONTROL ZONE. MAXIMUM SPEED OF THE PILOT CAR THROUGH THE WORK AREA SHALL BE 25 M.P.H. FULL COMPENSATION FOR FURNISHING AND OPERATING THE PILOT CAR, (INCLUDING DRIVER, RADIOS, AND ANY OTHER EQUIPMENT OR LABOR REQUIRED) SHALL BE CONSIDERED AS INCLUDED IN THE COST OF OTHER ITEMS OF WORK.

MISCELLANEOUS

TRAFFIC CONDITIONS MAY NECESSITATE CHANGES IN THE USE AND/OR QUANTITIES OF THE TRAFFIC CONTROL DEVICES AS SHOWN IN THE PLANS OR IN THE STANDARDS. ANY SUCH CHANGES ARE SUBJECT TO APPROVAL BY THE ENGINEER.

ALL CHANNELIZING DEVICES PROVIDED ON THIS PROJECT SHALL BE IN GOOD CONDITION AND SHALL BE APPROVED FOR USE ON THIS PROJECT BY THE ENGINEER.

THE REGULATORY SPEED LIMITS THROUGH THE WORK ZONE MAY BE ADJUSTED AT THE DISCRETION OF THE ENGINEER WITH THE DOCUMENTED APPROVAL OF THE DIVISION ENGINEER IN ACCORDANCE WITH TITLE 47 OF THE OKLAHOMA MOTOR VEHICLE LAWS.

THE TERMINATION AREA EXTENDS FROM THE DOWNSTREAM END OF THE WORK AREA TO THE TEMPORARY TRAFFIC CONTROL DEVICE SUCH AS "END ROAD WORK" SIGNS, IF POSTED, A SPEED SIGN, OR OTHER SIGNS MAY BE USED TO INFORM ROAD USERS THAT THEY CAN RESUME NORMAL OPERATIONS.

THE CONSTRUCTION SIGNING AND BARRICADE CONTRACTOR SHOULD AFFIX THEIR COMPANY NAME AND/OR LOGO INCONSPICUOUSLY ON EACH TRAFFIC CONTROL DEVICE.



APPROVED BY TRAFFIC ENGINEER: *Shelby Gray* DATE: 3/21/11

TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL CONSTRUCTION NOTES

2009 SPECIFICATIONS

TCS1-1	01
T-501	

\$\$\$date\$\$\$

DESCRIPTION	REVISIONS	DATE
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TAPER LENGTH CRITERIA FOR WORK ZONES

SPEED LIMIT M.P.H.	*L* FORMULA	*L* TAPER LENGTH (MINIMUM) (FT)			NUMBER OF CHANNELIZING DEVICES REQUIRED (MINIMUM)			SPACING CHANNELIZING DEVICES (MAXIMUM)		MAXIMUM HORIZONTAL ALIGNMENT THRU DETOUR (S=0)	SPEED LIMIT M.P.H.
		10' OFFSET	11' OFFSET	12' OFFSET	10' OFFSET	11' OFFSET	12' OFFSET	① THRU TAPER SECTION (FT.)	② THRU TANGENT SECTION (FT.)		
20	$L = \frac{W \times S^2}{60}$	70	75	80	5	5	5	20	40	—	20
25		105	115	125	6	6	6	25	50	—	25
30		150	165	180	6	7	7	30	60	15	30
35		205	225	245	7	8	8	35	70	11	35
40		265	295	320	8	9	9	40	80	8	40
45	L = W x S	450	495	540	11	12	13	45	90	6	45
50		500	550	600	11	12	13	50	100	5	50
55		550	605	660	12	14	15	50	100	4	55
60		600	660	720	13	15	16	50	100	3	60
65		650	715	780	14	16	17	50	100	2.5	65
70		700	770	840	15	17	18	50	100	2	70
75		750	825	900	16	18	19	50	100	1.8	75

NOTES:

① RECOMMENDED SIGNING TO BE USED THRU LANE TAPER IS (1) CW1-8 ON EVERY OTHER DRUM.

② RECOMMENDED SIGNING TO BE USED THRU TANGENT LANES IS (1) R4-7A(R) OR (1) R4-7A(L) (AS APPLIES) ON EVERY OTHER DRUM.

L = TAPER LENGTH IN FEET
W = WIDTH OF OFFSET IN FEET
S = POSTED SPEED OR OFF-PEAK 85 PERCENTILE SPEED IN MPH

TYPE OF TAPER
UPSTREAM TAPERS
MERGING TAPER
SHIFTING TAPER
SHOULDER TAPER
TWO-WAY TRAFFIC TAPER

TAPER LENGTH
L MINIMUM
1/2 L MINIMUM
1/3 L MINIMUM
100 FEET MAXIMUM

DOWNSTREAM TAPERS
(USE IS OPTIONAL)
100 FEET PER LANE

FLARE RATES FOR CONCRETE MEDIAN BARRIER IN TEMPORARY TRAFFIC CONTROL ZONES

SPEED *	FLARE RATE (MINIMUM)
40 M.P.H.	9 TO 1
45 M.P.H.	10 TO 1
50 M.P.H.	11 TO 1
55 M.P.H.	12 TO 1
60 M.P.H.	13 TO 1
65 M.P.H.	14 TO 1
70 M.P.H.	15 TO 1
75 M.P.H.	16 TO 1

* POSTED SPEED LIMIT PRIOR TO CONSTRUCTION

PAVEMENT MARKINGS THROUGH TEMPORARY TRAFFIC CONTROL ZONE

	DRIVING SURFACE	FLEX TAB MARKERS	TAPE (REMOVABLE)	TAPE (NON-REMOVABLE)	PAINT	CONSTRUCTION ZONE PAVEMENT MARKERS
ASPHALT	EXISTING PAVEMENT TO BE REMOVED OR OVERLAYED IN THE NEXT PHASE	X	X	X	X	X
	EXISTING PAVEMENT TO BE LEFT IN PLACE THRU THE NEXT PHASE	X	X			X
	INTERMEDIATE LIFT	X	X	X	X	X
	MILLED SURFACE	X	X	X	X	X
CONCRETE	EXISTING PAVEMENT TO BE REMOVED OR OVERLAYED IN THE NEXT PHASE	X	X	X	X	X
	EXISTING PAVEMENT TO BE LEFT IN PLACE THRU THE NEXT PHASE	X	X			X
	FINAL SURFACE	X	X		X	X

NOTE: USE OF NON-REMOVABLE TAPE (FOILBACK) SHALL BE LIMITED TO THOSE CONDITIONS SHOWN IN THE TABLE.

RECOMMENDED CLEAR ZONE DISTANCE (FT) (CONSTRUCTION WORK ZONES)

DESIGN SPEED	DESIGN ADT	FILL SLOPES			CUT SLOPES		
		6:1 OR FLATTER	5:1 OR 4:1	3:1	3:1	4:1 OR 5:1	6:1 OR FLATTER
40 MPH OR LESS	UNDER 750	4	4	SEE NOTE 3	4	4	4
	750-1500	5	6		5	5	5
	1500-6000	6	7		6	6	6
	OVER 6000	7	8		7	7	7
45-50 MPH	UNDER 750	5	6		4	4	5
	750-1500	7	8		5	6	7
	1500-6000	8	10		6	7	8
	OVER 6000	10	12		7	9	10
55 MPH	UNDER 750	6	7		4	5	5
	750-1500	8	10		5	7	8
	1500-6000	10	12		7	8	10
	OVER 6000	11	13		8	10	11
60 MPH	UNDER 750	8	10	5	6	7	
	750-1500	10	13	6	8	10	
	1500-6000	13	16 *	7	9	12	
	OVER 6000	15	18 *	10	12	13	
65-70 MPH	UNDER 750	9	10	5	7	7	
	750-1500	12	14	6	9	10	
	1500-6000	14	17 *	8	11	13	
	OVER 6000	15	19 *	11	13	14	

NOTES:

* THE CLEAR ZONE MAY BE LIMITED TO 15 FEET FOR PRACTICALITY AND TO PROVIDE A CONSISTENT ROADWAY TEMPLATE.

(1) ALL DISTANCES ARE MEASURED FROM EDGE OF THE TRAVEL LANE.

(2) FOR CLEAR ZONES, THE "DESIGN ADT" WILL BE THE TOTAL ADT ON TWO-WAY ROADWAYS AND DIRECTIONAL ADT ON ONE-WAY ROADWAYS (E.G., RAMPS AND ONE ROADWAY OF A DIVIDED HIGHWAY).

(3) FILL SLOPES WHICH ARE 3:1 OR STEEPER ARE CRITICAL AND MAY REQUIRE A BARRIER. THEREFORE THERE IS NOT A CLEAR ZONE APPLICATION.

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED * (MPH)	LENGTH (FEET)
20 M.P.H.	115
25 M.P.H.	155
30 M.P.H.	200
35 M.P.H.	250
40 M.P.H.	305
45 M.P.H.	360
50 M.P.H.	425
55 M.P.H.	495
60 M.P.H.	570
65 M.P.H.	645
70 M.P.H.	730
75 M.P.H.	820

* POSTED SPEED, OFF-PEAK 85th PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED.

RECOMMENDED DISTANCE BETWEEN SIGNS (MIN.)


ROAD TYPE	A (FT)	B (FT)	C (FT)
URBAN (LOW SPEED)	100	100	100
URBAN (HIGH SPEED)	350	350	350
RURAL	500	500	500
EXPRESSWAY / FREEWAY	1,000	1,500	2,640

CROSSOVER CRITERIA FOR WORK ZONES

WIDTH OF MEDIAN (W) (FT)	LATERAL SHIFT - (P) (FT)	LENGTH OF CROSSOVER - LC * (FT)											
		V.	30 M.P.H.	35 M.P.H.	40 M.P.H.	45 M.P.H.	50 M.P.H.	55 M.P.H.	60 M.P.H.	65 M.P.H.	70 M.P.H.	75 M.P.H.	
		D.	15°	11°	8°	6°	5°	4°	3°	2.5°	2°	1.8°	
20	32	R.	382	521	716	955	1146	1433	1910	2292	2865	3183	
30	42		219	256	301	348	382	427	493	541	605	637	
40	52		250	293	344	398	437	489	565	619	692	730	
50	62		277	325	382	443	485	543	628	688	770	812	
60	72		301	354	417	483	529	593	685	751	841	886	
70	82		324	381	448	519	570	638	738	809	905	955	
80	92		344	405	478	554	608	681	787	863	966	1,018	
90	102		363	428	505	586	643	720	833	914	1,023	1,078	
100	112		381	450	531	616	676	758	877	962	1,076	1,135	
110	122		398	470	555	644	708	793	918	1,007	1,127	1,189	
120	132		414	489	578	672	738	827	958	1,050	1,176	1,240	
			429	508	601	698	767	860	995	1,092	1,223	1,290	

* CROSSOVER = REVERSE CURVE CONNECTION TYING TWO (2) PARALLEL ROADWAYS.

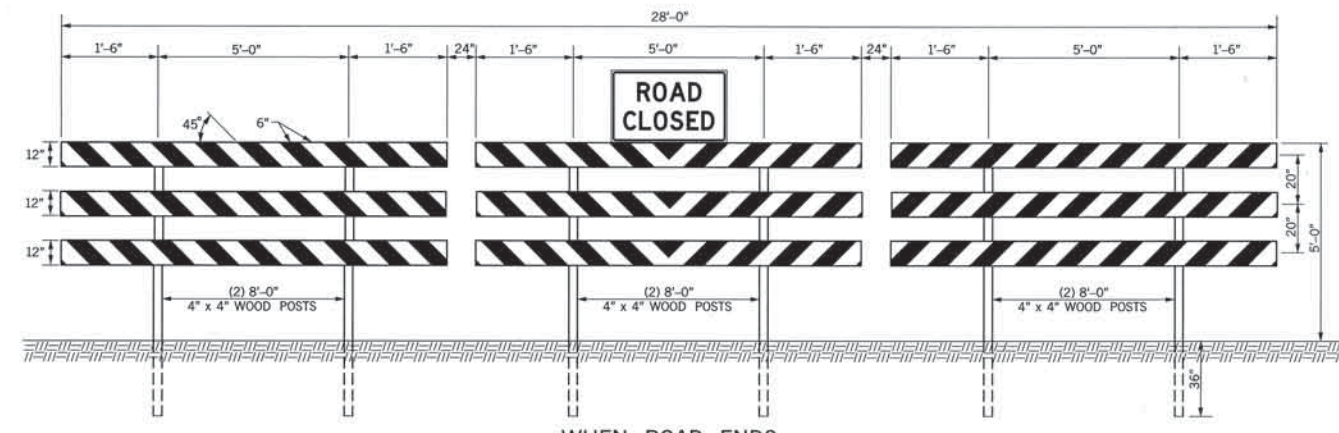
TRFPC36 M:\2009_Standards_TC\1502.dgn 6/23/2010 8:22:34 AM R:\TRAF_PLOT\lroy.pen R:\TRAF_PLOT\bw.cb


 APPROVED BY
 TRAFFIC ENGINEER: *David Smith* DATE: 6/23/10
TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL TABLES AND CHARTS

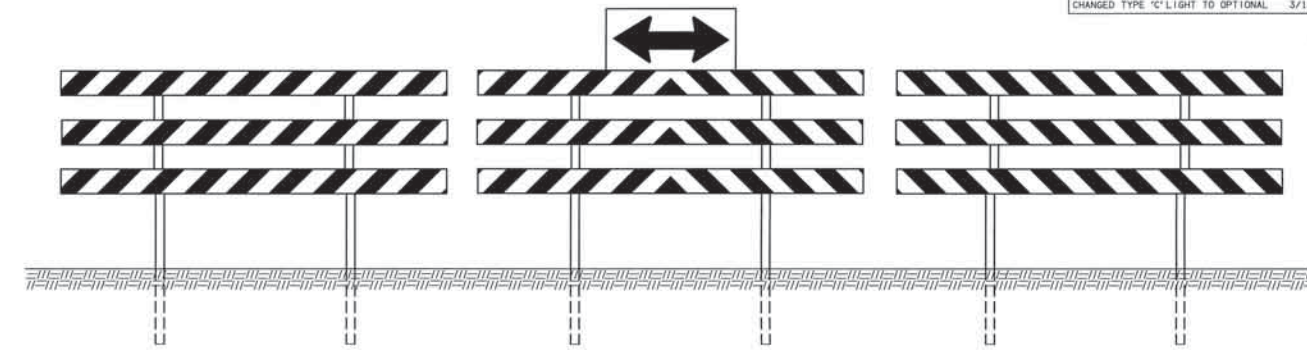
2009 SPECIFICATIONS

TCS2-1	00
T-502	

DESCRIPTION	REVISIONS	DATE
CHANGED TYPE 'C' LIGHT TO OPTIONAL		3/15/2011



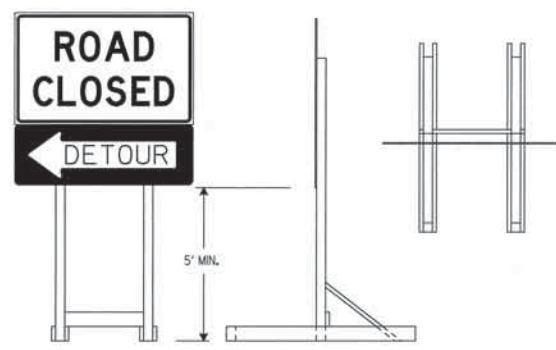
WHEN ROAD ENDS
PERMANENT TYPE III(A/B) BARRICADE
(DIMENSIONS ARE TYPICAL FOR BOTH BARRICADES)



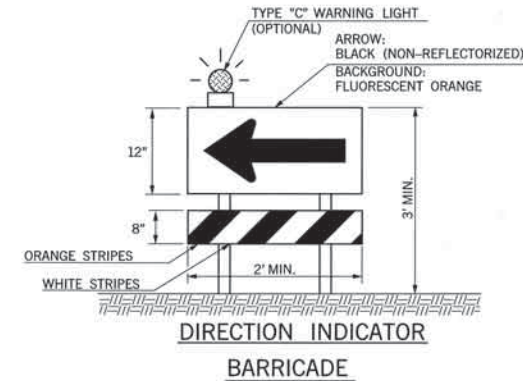
FOR T-INTERSECTIONS

NOTES: A PERMANENT BARRICADE TYPE III(A) SHALL CONSIST OF NINE (9) PANELS AND SIX (6) POSTS.
TYPICAL INSTALLATION AS SHOWN IS FOR AN ABSOLUTE CLOSURE.
BARRICADES SHOULD NOT BE PLACED PARALLEL TO TRAFFIC IF NOT OUTSIDE OF CLEAR ZONE.

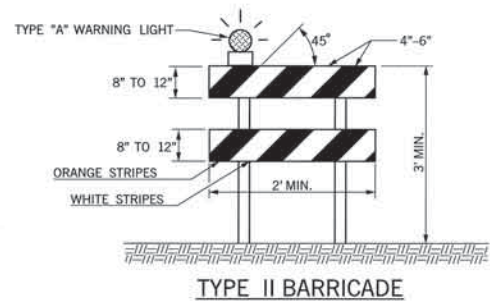
PERMANENT BARRICADE TYPE III(B) WILL BE IDENTICAL TO TYPE III(A) WITH NINE (9) ADDITIONAL REFLECTORIZED 3/4"x12" LUMBER PANELS ATTACHED TO THE BACK SIDE OF THE BARRICADE.
COLOR: BACKGROUND - WHITE (REFLECTORIZED)
DIAGONAL STRIPES - RED (REFLECTORIZED)



LONG INTERMEDIATE TERM STATIONARY PORTABLE SIGN SUPPORTS
5 Foot Mounting Height
(SKID MOUNTED)
(SHALL BE PLACED BEHIND TYPE III BARRICADE)



DIRECTION INDICATOR BARRICADE



TYPE II BARRICADE

NOTES: FOR WOODEN BARRICADES NOMINAL LUMBER DIMENSIONS WILL BE SATISFACTORY.
FOR RAILS LESS THAN 3 FEET LONG, 4 INCH WIDE STRIPES SHALL BE USED.
TYPE III BARRICADES SHALL BE CONSTRUCTED USING A MINIMUM OF TWO (2) POSTS.
FOR WOODEN BARRICADES, PANEL THICKNESS SHALL NOT EXCEED ONE-HALF INCH (1/2").
BARRICADES SHOULD NOT BE PLACED PARALLEL TO TRAFFIC IF NOT OUTSIDE OF CLEAR ZONE.

PROJECTS WITH WORK LIMITS OF 2.0 MILES OR MORE IN LENGTH WILL REQUIRE THE G20-1A SIGN. THE SIGN (G20-1A) WILL BE REQUIRED ON ONE SIDE OF A 2-LANE ROADWAY AND BOTH SIDES OF A DIVIDED HIGHWAY.

ALL BARRICADE STRIPES SHALL BE RETROREFLECTIVE.
COLOR: BACKGROUND - WHITE (REFLECTORIZED)
DIAGONAL STRIPES - FLUORESCENT ORANGE (REFLECTORIZED)

IF BARRICADES ARE USED TO CHANNELIZE PEDESTRIANS, THERE SHALL BE CONTINUOUS DETECTABLE BOTTOM AND TOP RAILS WITH NO GAPS BETWEEN INDIVIDUAL BARRICADES TO BE DETECTABLE TO USERS OF LONG CANES. THE BOTTOM OF THE BOTTOM RAIL SHALL BE NO HIGHER THAN 6 INCHES ABOVE THE GROUND SURFACE. THE TOP OF THE TOP RAIL SHALL BE NO LOWER THAN 36 INCHES ABOVE THE GROUND SURFACE.

SIGNS MOUNTED ON TYPE III BARRICADES SHOULD NOT COVER MORE THAN 50 PERCENT OF THE TOP TWO RAILS OR 33 PERCENT OF THE TOTAL AREA OF THE THREE RAILS
SIGNS MOUNTED ON BARRICADES, OR OTHER PORTABLE SUPPORTS, SHALL BE NO LESS THAN 1' ABOVE THE TRAVELED WAY.

SANDBAGS MAY BE PLACED ON LOWER PARTS OF THE FRAME OR THE STAYS OF BARRICADES TO PROVIDE THE REQUIRED BALLAST.

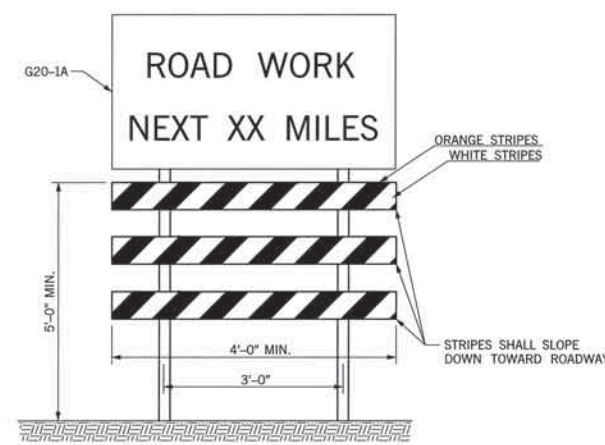
BALLAST SHALL NOT BE PLACED ON TOP OF ANY STRIPED RAIL. BARRICADES SHALL NOT BE BALLASTED BY NONDEFORMABLE OBJECTS SUCH AS ROCKS OR CHUNKS OF CONCRETE. BALLAST SHALL NOT EXTEND INTO THE ACCESSIBLE PASSAGE WIDTH OF 60".

DIRECTION INDICATOR BARRICADE SHALL CONSIST OF A ONE-DIRECTION LARGE ARROW (W1-6) SIGN MOUNTED ABOVE A DIAGONAL STRIPED, HORIZONTALLY ALIGNED, RETROREFLECTIVE RAIL.

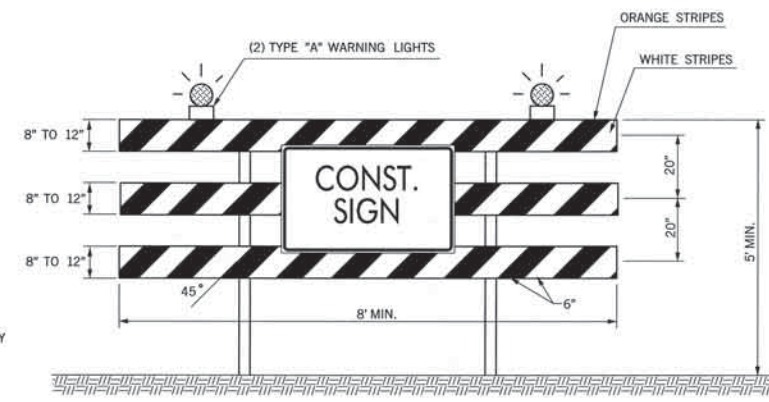
WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, THE STRIPES SHOULD SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN.

WHERE BOTH RIGHT AND LEFT TURNS ARE PROVIDED, THE BARRICADE STRIPES SHOULD SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE OR BARRICADES.

WHERE NO TURNS ARE INTENDED, THE STRIPES SHOULD BE POSITIONED TO SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.

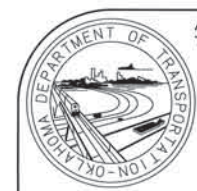


WING BARRICADE



TYPE III BARRICADE

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD
880(C)	CONSTRUCTION BARRICADES	SD
880(E)	WARNING LIGHTS	SD



APPROVED BY
TRAFFIC ENGINEER: *[Signature]* DATE: 3/21/11

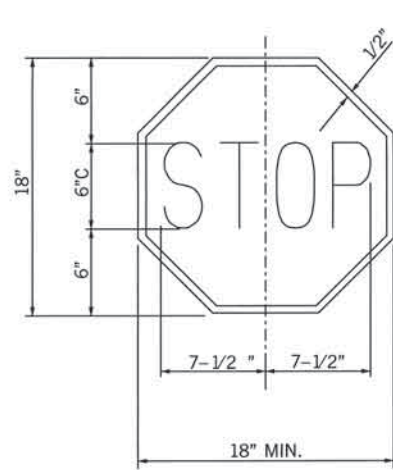
TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL DEVICES

2009 SPECIFICATIONS

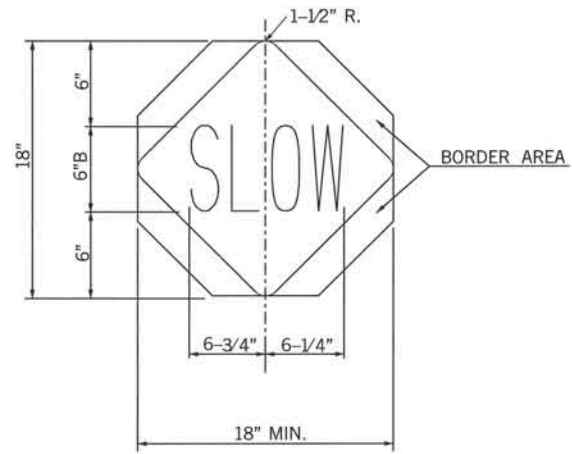
TCS4-1	01
	T-504

\$\$\$date\$\$\$

DESCRIPTION	REVISIONS	DATE

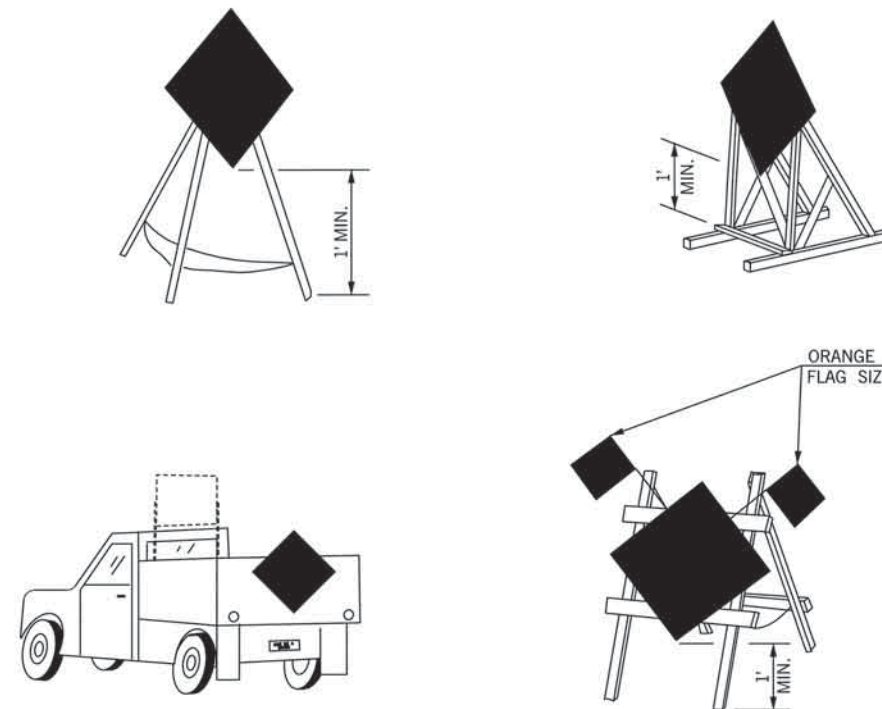


STOP:
 LEGEND AND BORDER: WHITE (REFLECTORIZED)
 BACKGROUND: RED (REFLECTORIZED)



SLOW:
 LEGEND AND BORDER AREA: BLACK (NON-REFLECTORIZED)
 BACKGROUND: ORANGE (REFLECTORIZED)

STOP-SLOW PADDLE

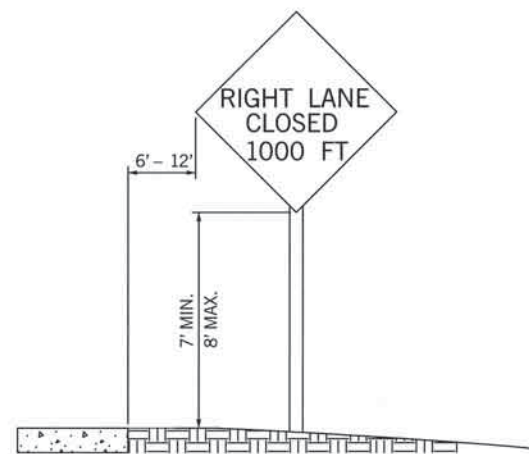


NOTE:
 THE BOTTOM OF SIGNS MOUNTED
 ON BARRICADES OR TEMPORARY
 SUPPORTS SHALL NOT BE LESS THAN
 1 FOOT ABOVE THE TRAVELED WAY.

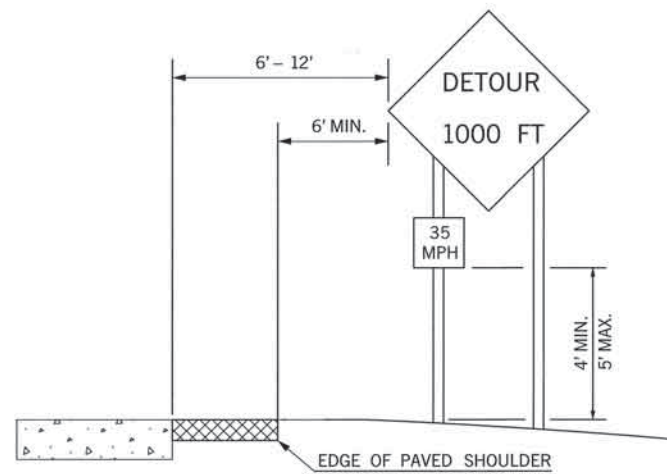
**PORTABLE AND TEMPORARY MOUNTINGS
 METHODS OF MOUNTING SIGNS OTHER THAN ON POSTS**



**URBAN DISTRICT
 (WITH CURB)**



**URBAN DISTRICT
 (WITHOUT CURB)**



**RURAL DISTRICT WITH
 ADVISORY SPEED PLATE**



RURAL DISTRICT

HEIGHT AND LATERAL LOCATIONS OF SIGNS – TYPICAL INSTALLATIONS



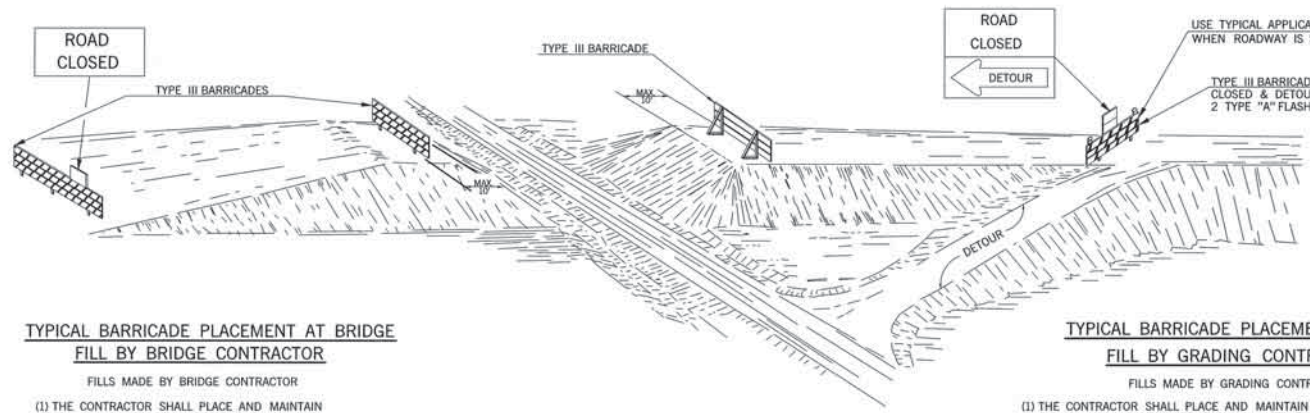
APPROVED BY
 TRAFFIC ENGINEER: *David G. Smith* DATE: 6/23/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
 TYPICAL SIGN INSTALLATION

2009 SPECIFICATIONS

TCSS-1	00
T-505	

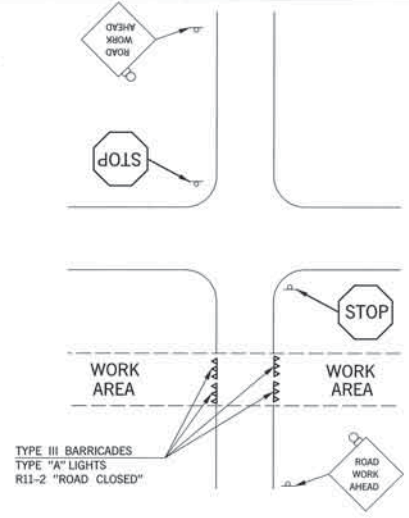


**TYPICAL BARRICADE PLACEMENT AT BRIDGE
FILL BY BRIDGE CONTRACTOR**

- FILLS MADE BY BRIDGE CONTRACTOR
- (1) THE CONTRACTOR SHALL PLACE AND MAINTAIN THE BARRICADES AS SHOWN UNTIL THEY ARE NO LONGER NEEDED.
 - (2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO REMOVAL OF THE BARRICADES.
 - (3) THE ENGINEER SHALL NOTIFY THE GRADING CONTRACTOR TO FURNISH AND ERECT HIS BARRICADES "IMMEDIATELY" AFTER THE BRIDGE CONTRACTOR REMOVES HIS BARRICADES. THE GRADING CONTRACTOR SHALL MAINTAIN HIS BARRICADES UNTIL FINAL INSPECTION OR UNTIL THEY ARE NO LONGER NEEDED.
 - (4) BARRICADES AT BRIDGE FILL SHALL BE IN PLACE AND MAINTAINED AT ALL TIMES UNTIL OPENED TO TRAFFIC. HOWEVER, BARRICADES MAY BE REMOVED OR ADJUSTED, AS NEEDED, TO ALLOW ACCESS TO THE WORK AREA.

**TYPICAL BARRICADE PLACEMENT AT BRIDGE
FILL BY GRADING CONTRACTOR**

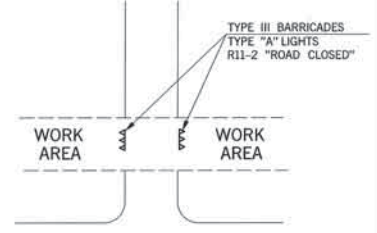
- FILLS MADE BY GRADING CONTRACTOR
- (1) THE CONTRACTOR SHALL PLACE AND MAINTAIN THE BARRICADES AS SHOWN UNTIL FINAL INSPECTION OR UNTIL THEY ARE NO LONGER NEEDED.
 - (2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO REMOVAL OF THE BARRICADES.
 - (3) IF THE BRIDGE WORK ORDER IS ISSUED PRIOR TO COMPLETION OF THE GRADING CONTRACT, THE BRIDGE CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE GRADING CONTRACTOR TO ASSUME RESPONSIBILITY FOR PROTECTION OF THE BRIDGE WORK AREA. THIS WILL INCLUDE FURNISHING, INSTALLING, AND MAINTAINING ALL BARRICADES AND SIGNS NECESSARY TO PROVIDE THAT PROTECTION UNTIL THE BRIDGE IS COMPLETED AND THE FINAL INSPECTION IS COMPLETED.
 - (4) IF THE BRIDGE WORK ORDER HAS NOT BEEN ISSUED PRIOR TO THE FINAL INSPECTION OF THE GRADING, THEN THE GRADING CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE OKLAHOMA DEPARTMENT OF TRANSPORTATION FOR STATE FORCES TO SUPPLY, INSTALL AND MAINTAIN ANY NECESSARY TRAFFIC CONTROL DEVICES NEEDED TO PROTECT THE WORK AREA. THESE STATE OWNED DEVICES SHALL REMAIN IN PLACE UNTIL SUCH TIME THAT THE BRIDGE WORK ORDER IS ISSUED. AT THAT TIME THE BRIDGE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR TRAFFIC CONTROL AND REPLACE THE STATE OWNED DEVICES WITH HIS OWN.
 - (5) SUFFICIENT NUMBER OF TYPE II BARRICADES WITH SIGNS SHALL BE USED TO COMPLETELY CLOSE THE WORK AREA TO THROUGH TRAFFIC.
 - (6) BARRICADES AT BRIDGE FILL SHALL BE IN PLACE AND MAINTAINED AT ALL TIMES UNTIL OPENED TO TRAFFIC. HOWEVER, BARRICADES MAY BE REMOVED OR ADJUSTED, AS NEEDED, TO ALLOW ACCESS TO THE WORK AREA.



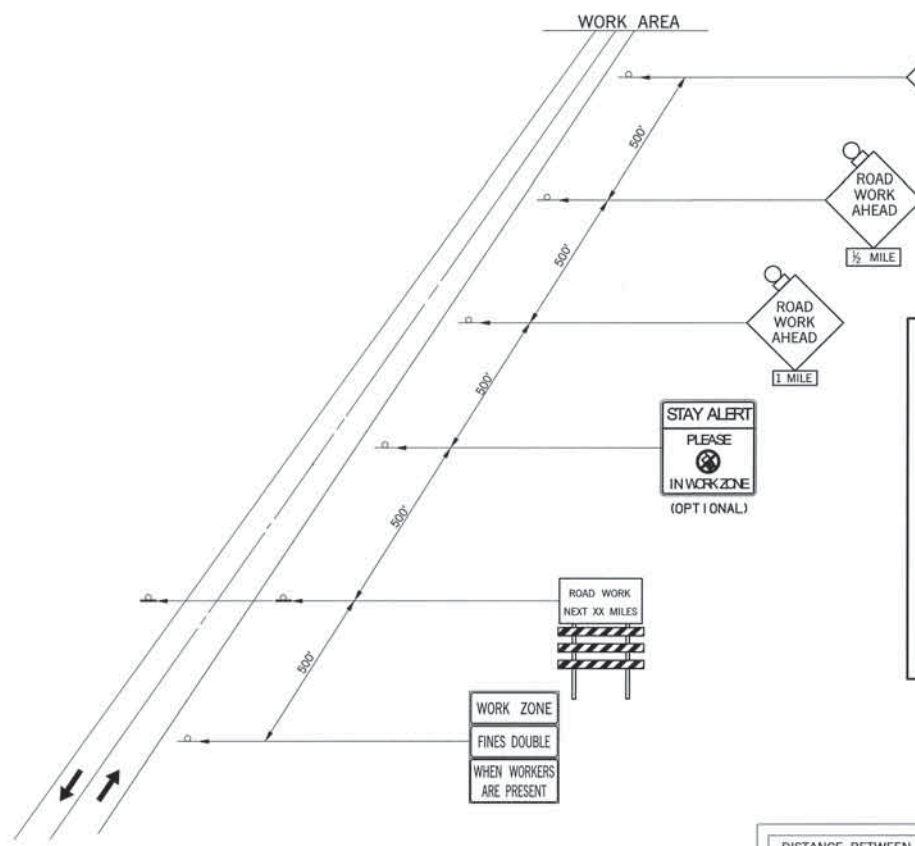
**TYPICAL SIGN PLACEMENT FOR
INTERSECTING ROADS AND STREETS**

DESCRIPTION	REVISIONS	DATE
MODIFIED NOTE		3/16/2011
ADD "NO CELL PHONE" USAGE IN WORK ZONE DISTANCE SIGN TO WARNING SIGNS		4/2/2013

- NOTES:
- (1) SIGNS SHOWN FOR ONE DIRECTION OF TRAVEL ONLY.
 - (2) FLASHING WARNING LIGHTS SHALL BE USED TO CALL ATTENTION TO THE EARLY WARNING SIGNS.
 - (3) WARNING LIGHTS SHOULD BE USED TO MARK CHANNELIZING DEVICES AT NIGHT AS NEEDED.
 - (4) PLACEMENT OF TYPE III BARRICADES SHALL BE APPROVED BY THE ENGINEER.
 - (5) TYPE II BARRICADES, DRUMS AND/OR VERTICAL PANELS MAY BE SUBSTITUTED FOR TYPE III BARRICADES TO AVOID OBSTRUCTING THE MOTORIST'S VIEW.
 - (6) IF TWO OR MORE DRIVEWAYS ARE IN CLOSE PROXIMITY, THE BARRICADES BETWEEN THE DRIVEWAYS MAY BE OMITTED AT THE DISCRETION OF THE ENGINEER.
 - (7) THE "ROAD WORK AHEAD" SIGN, WHICH SERVES AS A GENERAL WARNING OF OBSTRUCTIONS OR RESTRICTIONS, SHALL BE LOCATED ON ALL INTERSECTING ROADS AND STREETS.



**TYPICAL SIGN PLACEMENT FOR
PRIVATE DRIVE OR RESIDENCE**



**TYPICAL APPLICATION
ADVANCE WARNING SIGNS ON 2-LANE HIGHWAY**

TYPICAL CONSTRUCTION WARNING SIGNS WITH MESSAGES OTHER THAN DETAILED ON STANDARD DRAWINGS SHALL BE CONSTRUCTED USING THE LARGEST POSSIBLE LETTER SIZE. SIGN SIZE AND COLOR SHALL BE THE SAME AS OTHER CONSTRUCTION WARNING SIGNS USED FOR SIMILAR CONDITIONS.

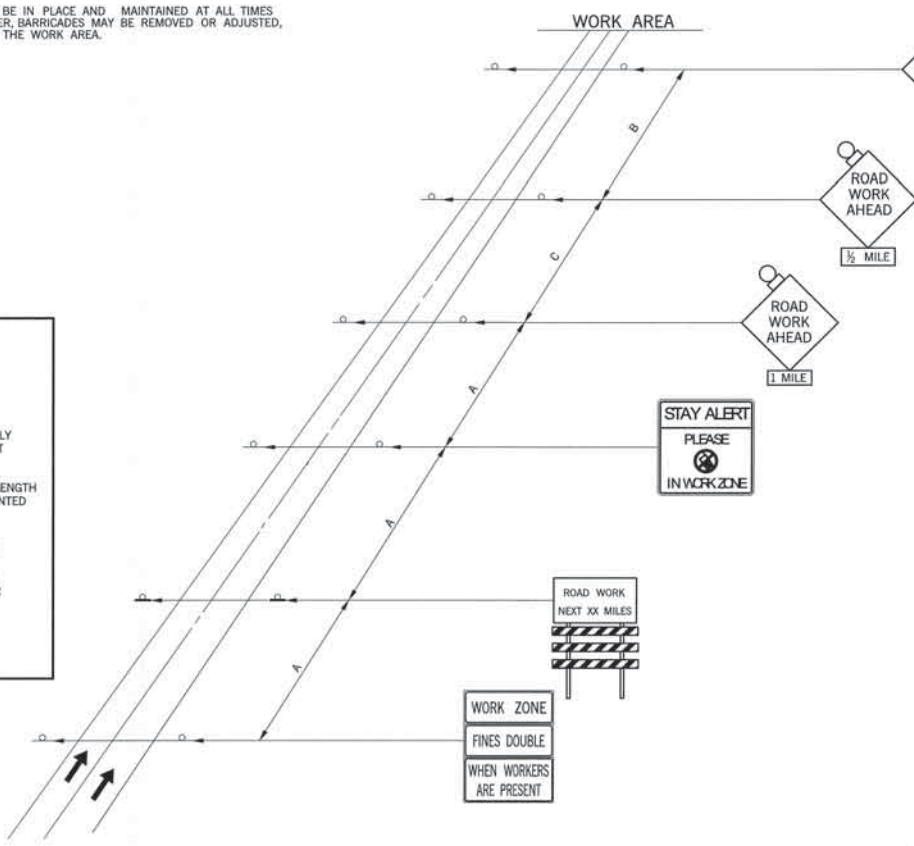
FINES DOUBLE IN WORK ZONE SIGNS ARE TO BE USED ONLY ON STATE OR FEDERAL HIGHWAYS WHERE THE SPEED LIMIT IS REDUCED OR AS DIRECTED BY THE ENGINEER.

PROJECTS WITH WORK LIMITS OF 1.0 MILES OR MORE IN LENGTH WILL REQUIRE THE Q20-1A SIGN. THE SIGN SHALL BE MOUNTED AS SHOWN ON TCS4-1 (LATEST REVISION).

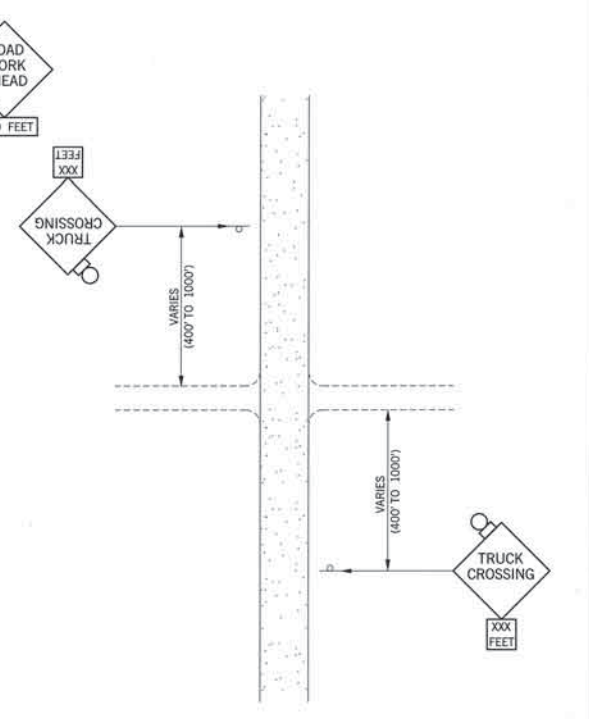
WARNING SIGNS SHOWN ARE "ADVANCE" WARNING SIGNS AND ARE REQUIRED ON ALL STATE HIGHWAYS. ADDITIONAL WARNING SIGNS MAY BE REQUIRED WITHIN THE PROJECT LIMITS TO WARN DRIVERS OF SPECIFIC HAZARDS. ADVANCE "WARNING SIGNS" MAY CHANGE AS CONDITIONS CHANGE OR AS DIRECTED BY THE ENGINEER.

PROJECT WORK OF 1.0 MILE OR MORE IN LENGTH WILL REQUIRE SIGNS CS-14 AND R2-1 TO BE PLACED EVERY 1/2 MILE THROUGH WORK ZONE.

ROAD TYPE	DISTANCE BETWEEN SIGNS SHALL BE A (MIN.)		
	A (FT)	B (FT)	C (FT)
URBAN (LOW SPEED)	100	100	100
URBAN (HIGH SPEED)	350	350	350
RURAL	500	500	500
EXPRESSWAY /FREEWAY	1,000	1,500	2,640



**TYPICAL APPLICATION
ADVANCE WARNING SIGNS ON A DIVIDED HIGHWAY**



**TYPICAL APPLICATION
ADVANCE SIGNING WHERE TRUCKS ARE CROSSING**



APPROVED BY
TRAFFIC ENGINEER: *David S. ...* DATE: 4/18/2013

**TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
PLACEMENT OF ADVANCE
WARNING SIGNS**

2009 SPECIFICATIONS

TCS7-1	02
	T-507

\$\$\$date\$\$\$



ROAD CLOSED

R11-2 48 x 30 10.00 SF

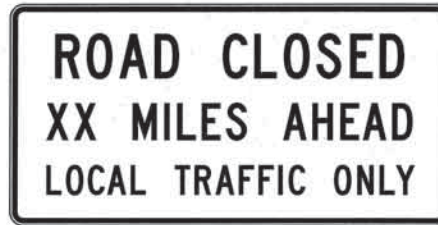
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



LANE CLOSED

R11-2(LANE) 48 x 30 10.00 SF

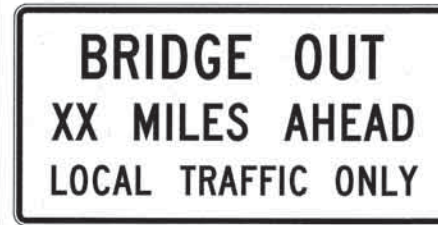
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



ROAD CLOSED XX MILES AHEAD

R11-3a 60 x 30 12.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



BRIDGE OUT XX MILES AHEAD

R11-3b 60 x 30 12.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



ROAD CLOSED TO THRU TRAFFIC

R11-4 60 x 30 12.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



DETOUR SIGN

M4-8 24 x 12 2.00 SF
M4-8E 30 x 15 3.13 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-9(R) 30 x 24 5.00 SF
M4-9(R)E 48 x 36 12.00 SF
M4-9(R)F 60 x 48 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-9(L) 30 x 24 5.00 SF
M4-9(L)E 48 x 36 12.00 SF
M4-9(L)F 60 x 48 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-9(V) 30 x 24 5.00 SF
M4-9(V)E 48 x 36 12.00 SF
M4-9(V)F 60 x 48 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-10(R) 48 x 18 6.00 SF

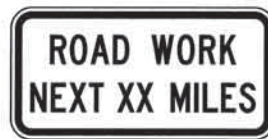
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-10(L) 48 x 18 6.00 SF

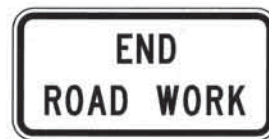
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



ROAD WORK NEXT XX MILES SIGN

G20-1A 36 x 18 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



END ROAD WORK SIGN

G20-2A 36 x 18 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



PILOT CAR FOLLOW ME SIGN

G20-4 36 x 18 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

NOTES:
WORD SIGNS MAY BE USED IF SYMBOL SIGNS ARE NOT AVAILABLE EITHER IN "STANDARD HIGHWAY SIGNS MANUAL" OR IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) (CURRENT EDITION).

ALL DIAMOND SHAPE CONSTRUCTION WARNING SIGNS SHALL BE 48 INCHES X 48 INCHES UNLESS OTHERWISE NOTED IN THE PLANS.

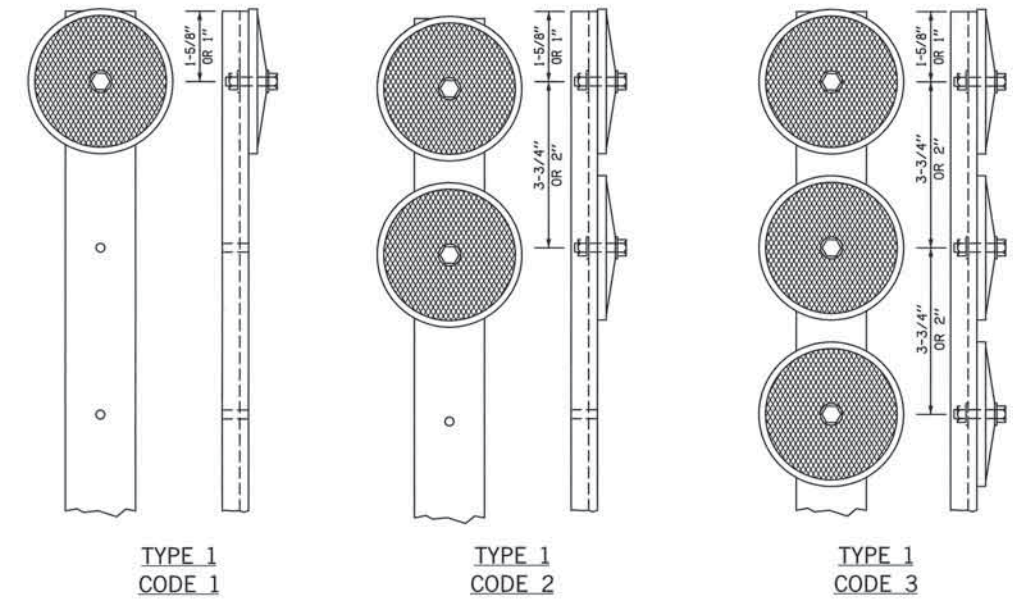
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD



APPROVED BY
TRAFFIC ENGINEER: *David Gandy* DATE: 3/21/11

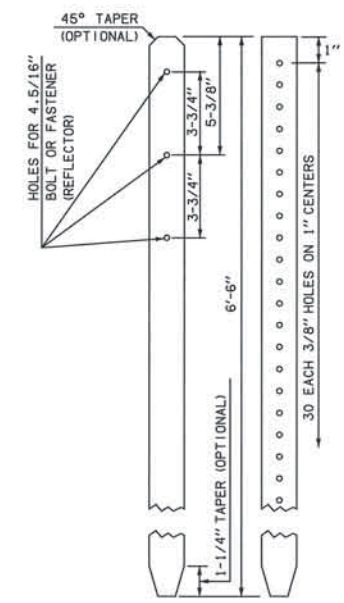
TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

DESCRIPTION	REVISIONS	DATE



TYPE 1 CODE 1 **TYPE 1 CODE 2** **TYPE 1 CODE 3**

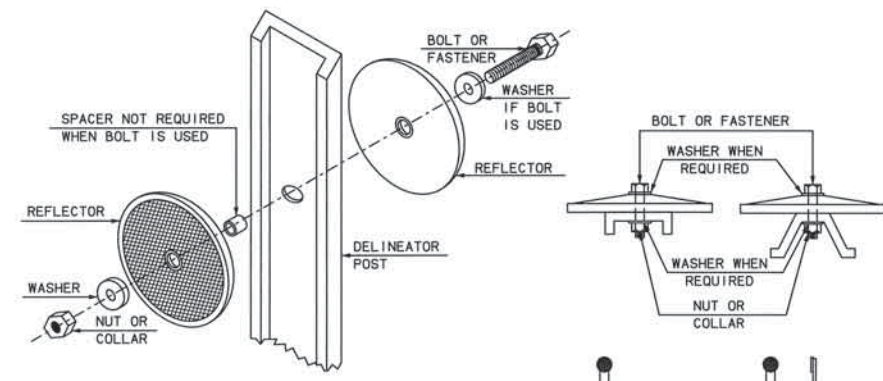
TYPE 2 DELINEATORS SHALL BE THE SAME AS SHOWN ABOVE EXCEPT THAT REFLECTORS ARE MOUNTED ON BOTH SIDES OF THE POST. COLOR OF THE REFLECTORS SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST REVISION.



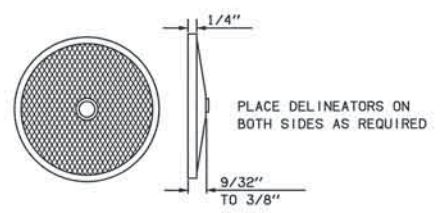
MATERIALS SPECIFICATIONS

THE WEIGHT OF EACH POST BEFORE GALVANIZING & PUNCHING SHALL BE 1.12 lbs/ft. THE WEIGHT TOLERANCE SHALL BE ±3-1/2%.

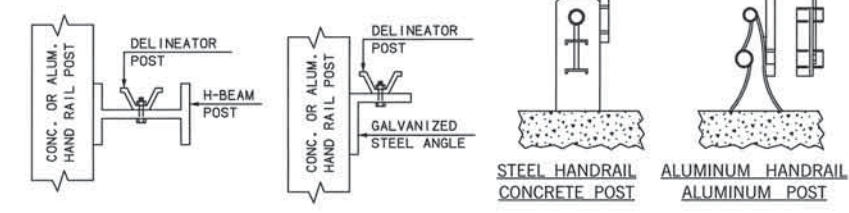
NOTE 1:
FASTENING DEVICES MAY BE ALUMINUM BOLTS, NUTS, AND WASHERS OR ALUMINUM OR STEEL FASTENERS UTILIZING A SWEDGED COLLAR OR ALUMINUM OR STEEL BLIND OR PULL RIVETS OF THE SELF PLUGGING TYPE (PULL PIN, CLIPPED FLUSH, REMAINS IN RIVET WHEN FINISHED). ALL NUTS SHALL BE SELF LOCKING.



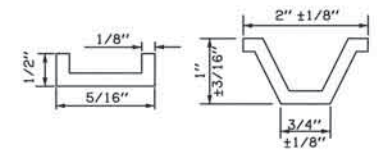
NOTE 3:
WHEN BOLTS AND NUTS ARE USED FOR DELINEATOR ASSEMBLIES, THE BOLT ENDS ARE TO BE SUFFICIENTLY DEFORMED TO RESIST VANDALISM. SEE NOTE 1 FOR FASTENING DEVICES.



CENTER MOUNT REFLECTOR



NOTE 2:
FOR ATTACHING DELINEATOR POSTS TO GALVANIZED STEEL ANGLES, USE 5/16" X 3/4" GALVANIZED STEEL BOLTS. FOR ATTACHING DELINEATOR POST OR GALVANIZED STEEL ANGLES TO ALUMINUM OR "H" BEAM HANDRAIL POST, USE 5/16" X 1" GALVANIZED STEEL BOLTS. FOR ATTACHING GALVANIZED STEEL ANGLES TO CONCRETE POSTS, USE TWO 5/16" X 2" GALVANIZED STEEL EXPANSION SLEEVES AND WASHERS FOR EACH BOLT.



ALTERNATE POST SECTIONS

THE CONTRACTOR MAY USE EITHER TYPE OF POST, BUT ONLY ONE TYPE SHALL BE USED THROUGHOUT THE PROJECT. THE CONTRACTOR SHALL FURNISH THE CORRECT SIZE FASTENING DEVICES AND NECESSARY SPACERS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
853	DELINEATORS	EA



APPROVED BY
TRAFFIC ENGINEER: *[Signature]* DATE: 8/3/2010

TRAFFIC STANDARD
STANDARD DELINEATOR UNITS

2009 SPECIFICATIONS

DU2-1	00
T-110	