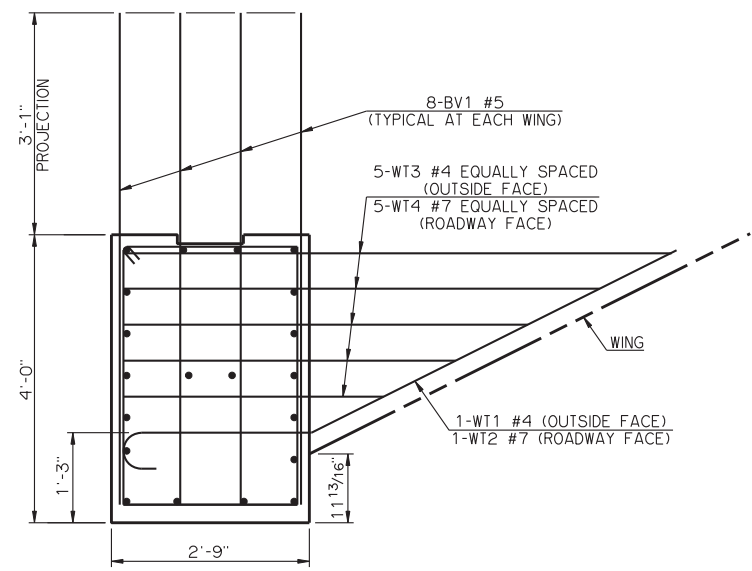


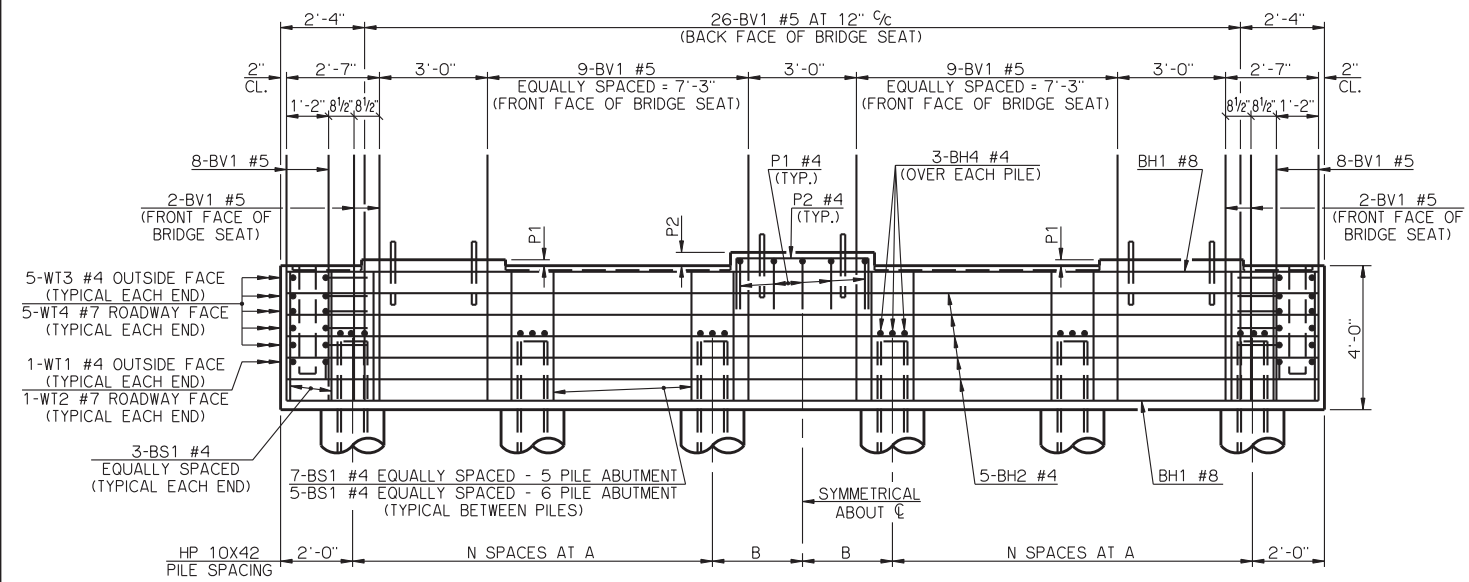
PLAN



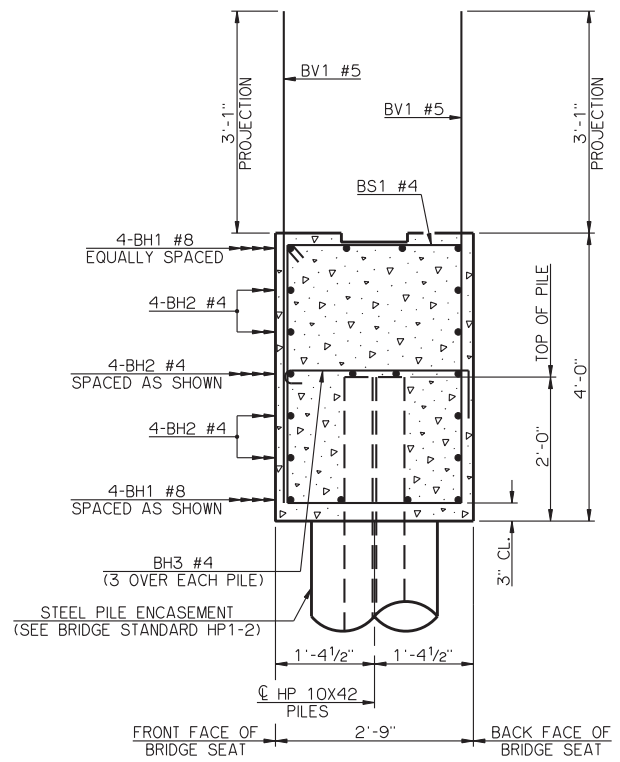
VIEW A-A

PEDESTAL DIMENSIONS		
BEAM TYPE	P1	P2
TYPE III	2"	4 7/16"
TYPE C	7"	9 7/16"

PILE SCHEDULE					
SPAN	TOTAL NUMBER OF PILES	N SPACES	A	B	MAXIMUM FACTORED PILE LOAD
60'	5	2	6'-3"	0'-0"	74.5 TON
65'	5	2	6'-3"	0'-0"	78.0 TON
70'	6	2	5'-0"	2'-6"	67.2 TON
75'	6	2	5'-0"	2'-6"	69.3 TON
80'	6	2	5'-0"	2'-6"	71.4 TON
85'	6	2	5'-0"	2'-6"	73.5 TON



ELEVATION



TYPICAL SECTION THRU BRIDGE SEAT

BAR LIST - ONE ABUTMENT					
MARK	NO.	SIZE	FORM	LENGTH	LENGTH VARIATION
BH1	8	#8	STR.	28'-8"	-
BH2	12	#4	STR.	28'-8"	-
BV1	64	#5	STR.	6'-10"	-
P1	15	#4	BNT.	5'-9"	-
P2	12	#4	BNT.	7'-0"	-
WT1	2	#4	BNT.	5'-2"	-
WT2	2	#7	BNT.	9'-1"	-
WT3	10	#4	STR.	5'-5" AVG.	3'-6" TO 7'-4"
WT4	10	#7	BNT.	6'-7" AVG.	4'-8" TO 8'-6"
ADDITIONAL BARS TO BE USED WITH 5 PILE ABUTMENTS					
BH3	15	#4	BNT.	3'-7"	-
BS1	34	#4	BNT.	12'-9"	-
ADDITIONAL BARS TO BE USED WITH 6 PILE ABUTMENTS					
BH3	18	#4	BNT.	3'-7"	-
BS1	31	#4	BNT.	12'-9"	-

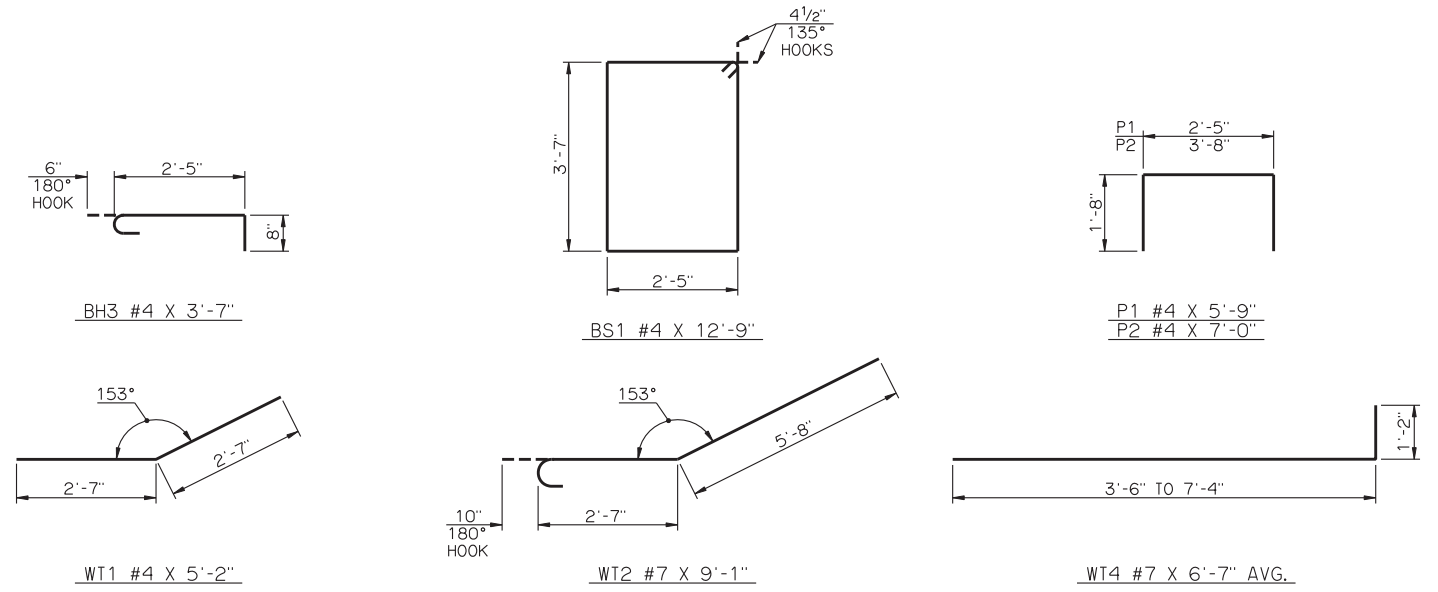
① NO. INCLUDES TWO SETS OF 5 BARS

SUMMARY OF QUANTITIES - ONE ABUTMENT ②			
ITEM	UNIT	TOTAL	
SUBSTRUCTURE EXCAVATION, COMMON	CY	30.00	
GRANULAR BACKFILL	CY	28.00	
CLASS A CONCRETE	CY	12.60	
REINFORCING STEEL	LB	1,960.00	
PILES, FURNISHED (HP 10X42)	LF	-	
PILES, DRIVEN (HP 10X42)	LF	-	
6" PERFORATED PIPE UNDERDRAIN	LF	26.00	
6" NON-PERFORATED PIPE UNDERDRAIN	LF	-	

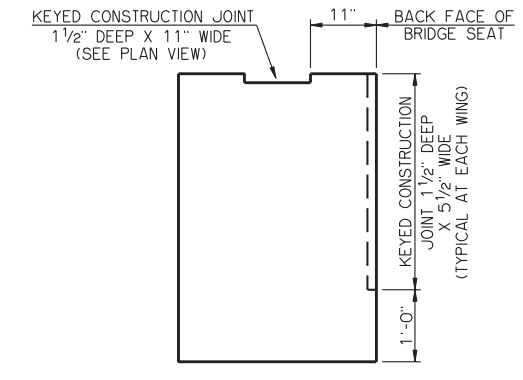
② EXCLUDES WINGS

NOTES

ABUTMENT WING CONCRETE SHALL NOT BE POURED UNTIL THE ABUTMENT DIAPHRAGMS OF THE SUPERSTRUCTURE AND THE DECK SLAB CONCRETE HAVE ATTAINED A STRENGTH OF 3,000 PSI.
 ALL WT WING REINFORCING STEEL TIED TO BRIDGE SEAT REINFORCING STEEL MUST BE IN PLACE PRIOR TO POURING THE BRIDGE SEAT CONCRETE.

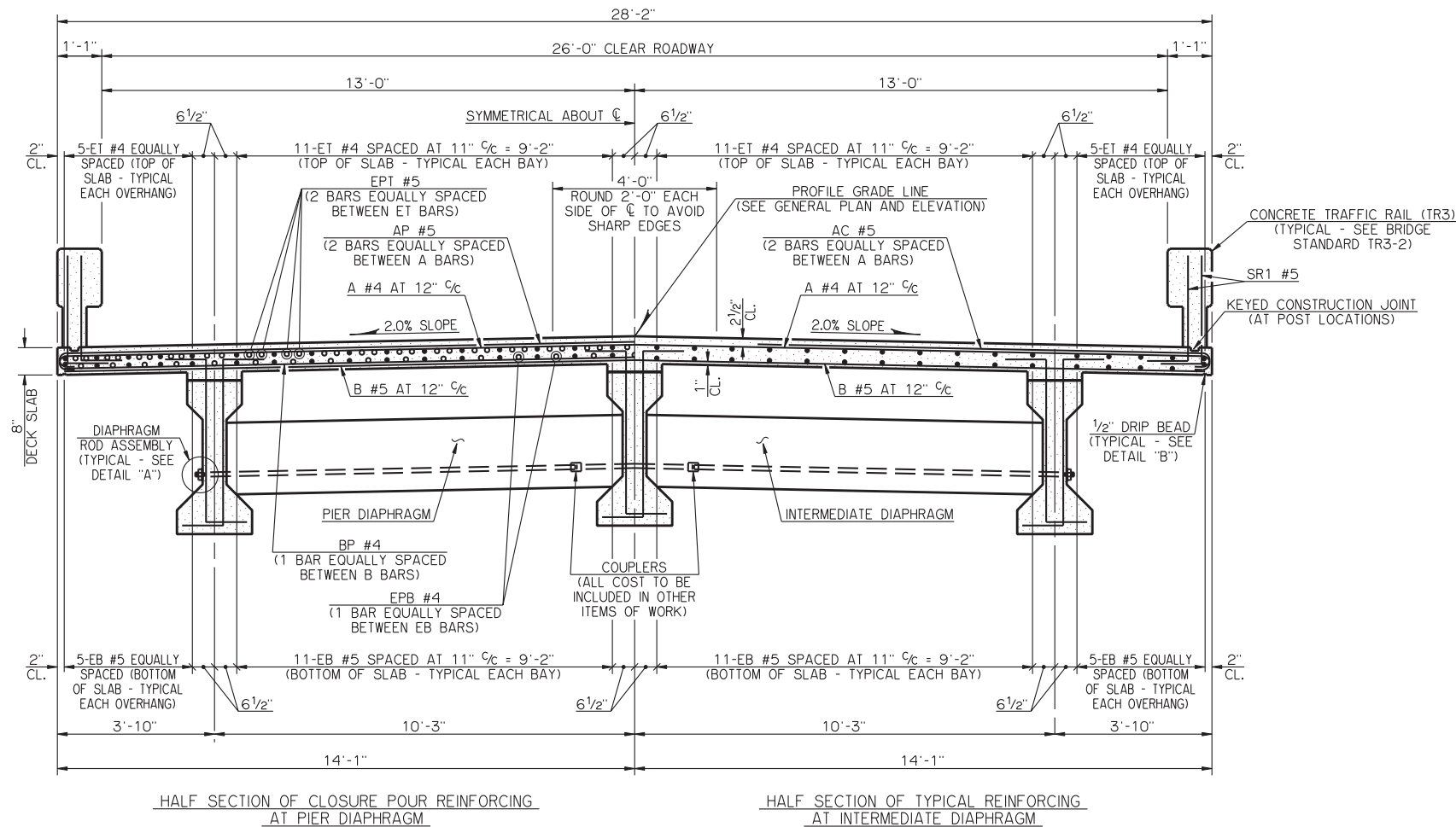


DETAILS OF BENT REINFORCING STEEL



DETAIL OF CONSTRUCTION JOINTS

APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
ABUTMENT DETAILS
TYPE III AND TYPE C P.C. BEAMS
 26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°
 2009 SPECIFICATIONS CB26-I-SKO-ABUT-PC3 01E CB-370E



HALF SECTION OF CLOSURE POUR REINFORCING AT PIER DIAPHRAGM

HALF SECTION OF TYPICAL REINFORCING AT INTERMEDIATE DIAPHRAGM

TYPICAL CROSS SECTION

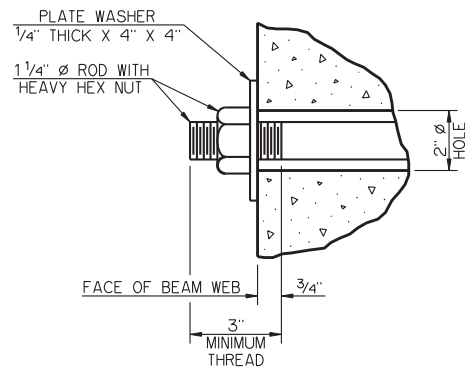
NOTES

- ROTATE HOOKS ON AC AND AP 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:
 - SHOP DRAWINGS AND STRUCTURAL CALCULATIONS FOR THE FORMS ARE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL.
 - A NEW STRUCTURAL DESIGN, STRUCTURAL CALCULATIONS, AND A NEW REINFORCING SCHEDULE FOR THE DECK SLAB ARE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL.
 - 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.

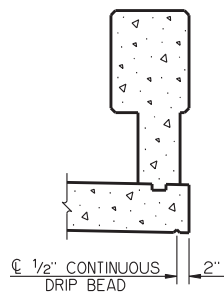
THE DECK SLAB SHALL BE POURED ONE SPAN AT A TIME. A SPAN ADJACENT TO A FIXED PIER SHALL NOT BE POURED UNTIL AT LEAST 48 HOURS AFTER THE POUR OF ANY ADJACENT SPAN HAS BEEN COMPLETED.

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.

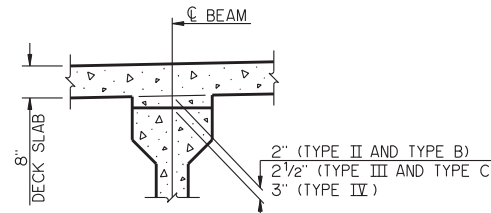
DO NOT SAW-CUT GROOVE THE DECK SLAB WITHIN 6" OF ANY CONSTRUCTION JOINT. FOR BAR LIST AND DETAILS OF BENT REINFORCING STEEL, SEE DECK SLAB BAR LIST.



DETAIL "A"



DETAIL "B"



DETAIL OF HAUNCH

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 BS3 OR 10S3. PAINT EXPOSED PARTS OF DIAPHRAGM RODS, PLATE WASHERS AND HEX NUTS WITH TWO (2) COATS OF ZINC-RICH PAINT (6 MIL MINIMUM THICKNESS) AFTER ASSEMBLY. ALL COST OF DIAPHRAGM RODS, PLATE WASHERS AND HEX NUTS SHALL BE INCLUDED IN UNIT PRICE BID PER POUND OF "STRUCTURAL STEEL."

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.

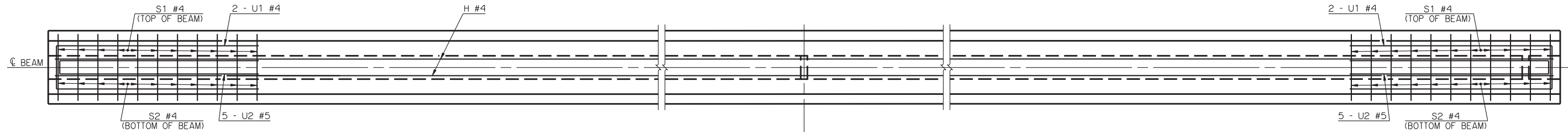
APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

TYPICAL CROSS SECTION
TYPE II, B, III, C AND IV P.C. BEAMS

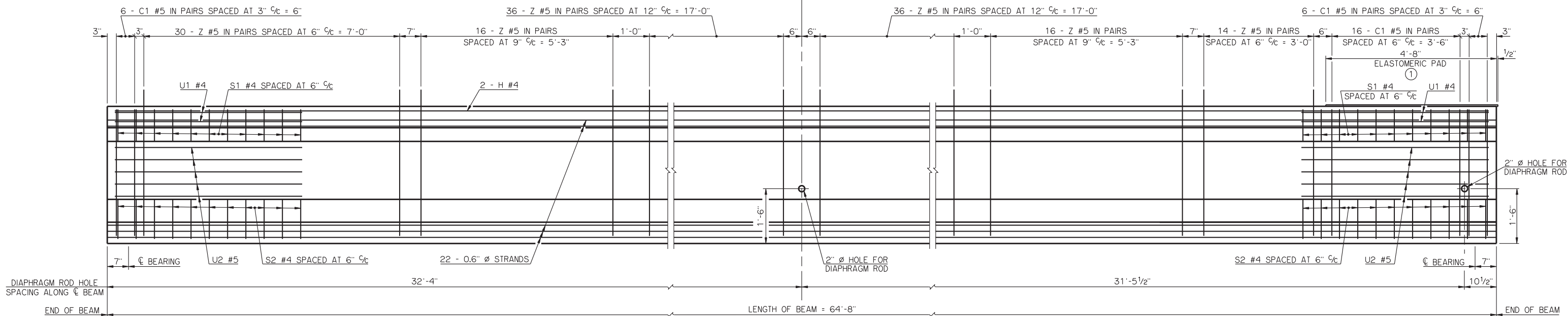
26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°

2009 SPECIFICATIONS CB26-I-SKO-XSECT-PC234 01E CB-383E



HALF PLAN AT ABUTMENT
C1 BARS, Z BARS, STRANDS AND ENCASED PLATES NOT SHOWN

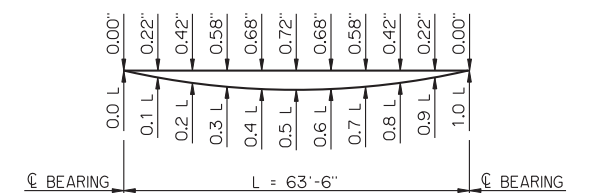
HALF PLAN AT PIER
C1 BARS, Z BARS, STRANDS, ELASTOMERIC PAD AND ENCASED PLATES NOT SHOWN



HALF ELEVATION AT ABUTMENT
ENCASED PLATES NOT SHOWN

HALF ELEVATION AT PIER
ENCASED PLATES NOT SHOWN

① ELASTOMERIC PAD SHALL HAVE A 50 DUROMETER HARDNESS AND CONSIST OF A SINGLE LAYER 1/2" THICK X 1'-4" WIDE X 4'-8 1/2" LONG. THE PAD SHALL EXTEND 1/2" BEYOND THE END OF THE BEAM AS SHOWN. THE TOP SURFACE OF THE BEAM BELOW THE ELASTOMERIC PAD SHALL HAVE A SMOOTH FINISH.



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.

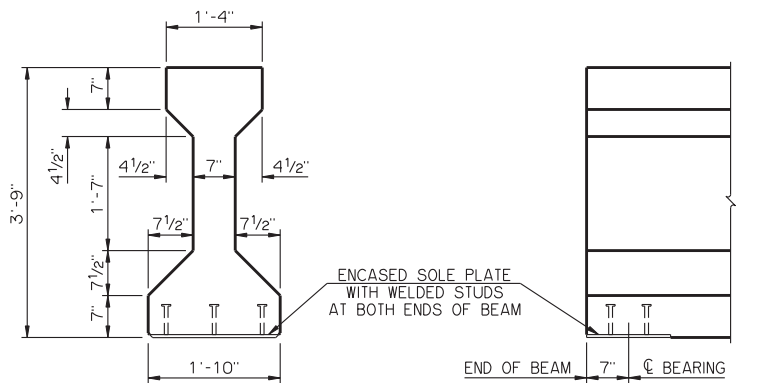
MATERIAL PROPERTIES

THE COMPRESSIVE STRENGTH OF THE CONCRETE IN THE P.C. BEAM SHALL BE NO LESS THAN 4,500 PSI AT THE TIME OF TRANSFER OF THE PRESTRESSING FORCE AND NO LESS THAN 6,000 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.

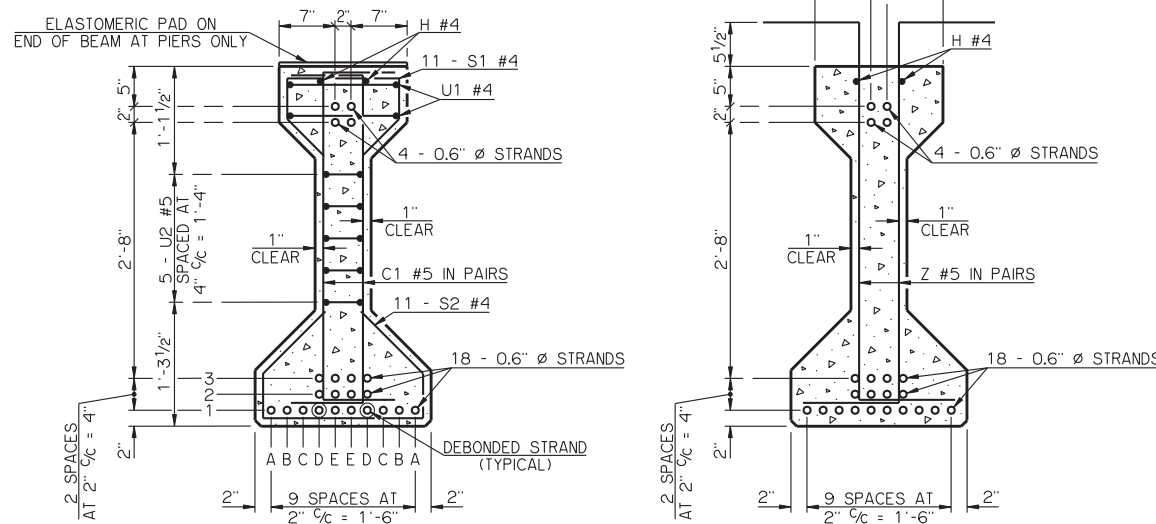
LFD OPERATING RATING - HS 38.2

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.



END VIEW
ELASTOMERIC PAD NOT SHOWN

END ELEVATION
ELASTOMERIC PAD NOT SHOWN



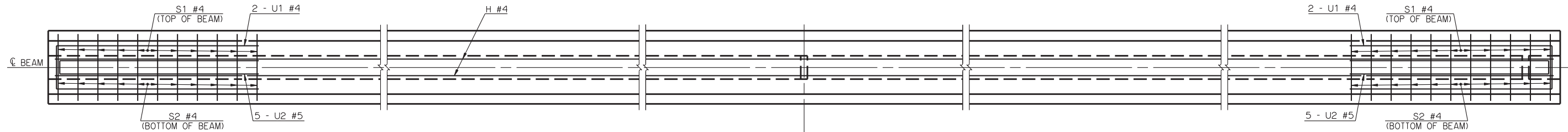
END SECTION

CL SECTION

BEAM SECTIONS
(22 - 0.6" Ø STRANDS)

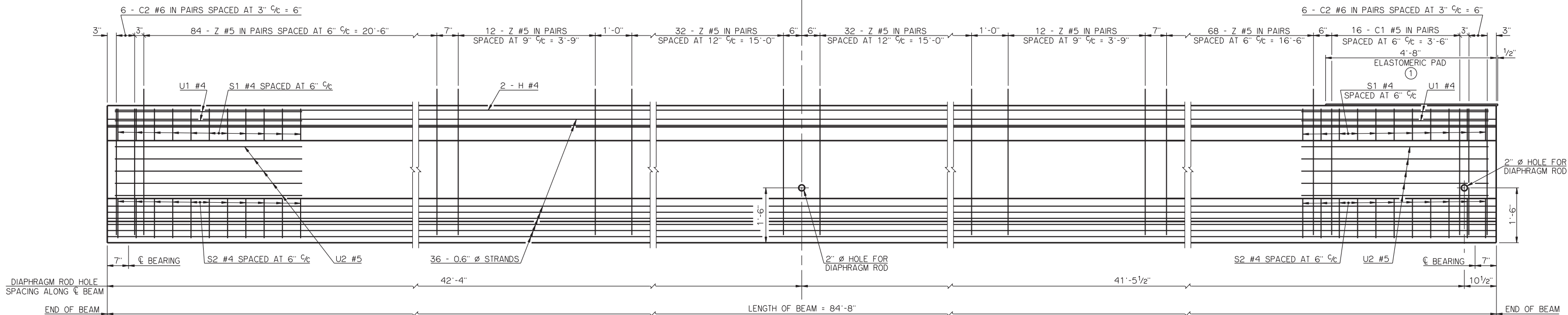
DEBOND SCHEDULE	
DEBOND PAIR	DEBOND LENGTH FROM END OF BEAM
D1	11'-0"

APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
P.C. BEAM DETAILS
TYPE III - 65' SPAN
26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°
 2009 SPECIFICATIONS CB26-I-SKO-PCB-III-65 01E
 CB-414E



HALF PLAN AT ABUTMENT
C2 BARS, Z BARS, STRANDS AND ENCASED PLATES NOT SHOWN

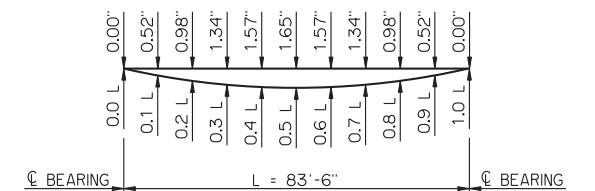
HALF PLAN AT PIER
C1 BARS, C2 BARS, Z BARS, STRANDS, ELASTOMERIC PAD AND ENCASED PLATES NOT SHOWN



HALF ELEVATION AT ABUTMENT
ENCASED PLATES NOT SHOWN

HALF ELEVATION AT PIER
ENCASED PLATES NOT SHOWN

① ELASTOMERIC PAD SHALL HAVE A 50 DUROMETER HARDNESS AND CONSIST OF A SINGLE LAYER 1/2" THICK X 1'-4" WIDE X 4'-8 1/2" LONG. THE PAD SHALL EXTEND 1/2" BEYOND THE END OF THE BEAM AS SHOWN. THE TOP SURFACE OF THE BEAM BELOW THE ELASTOMERIC PAD SHALL HAVE A SMOOTH FINISH.



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.

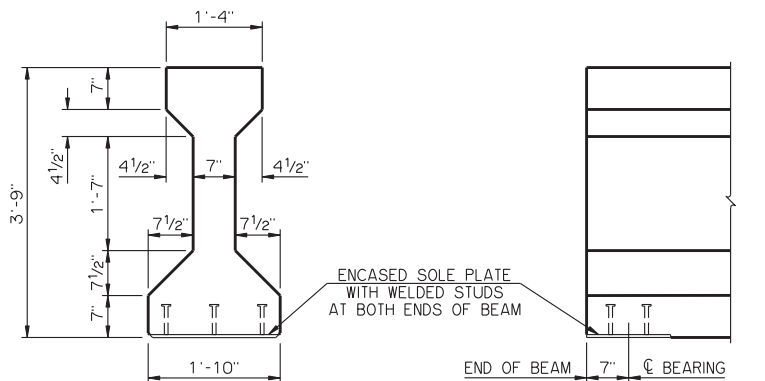
MATERIAL PROPERTIES

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.

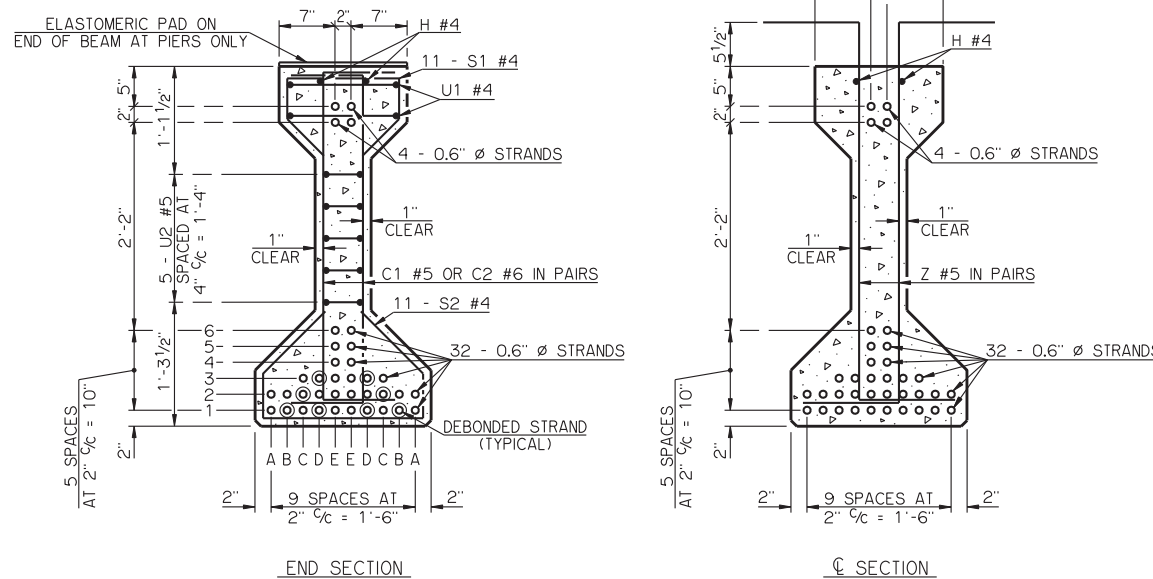
LFD OPERATING RATING - HS 43.0

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.



END VIEW
ELASTOMERIC PAD NOT SHOWN

END ELEVATION
ELASTOMERIC PAD NOT SHOWN



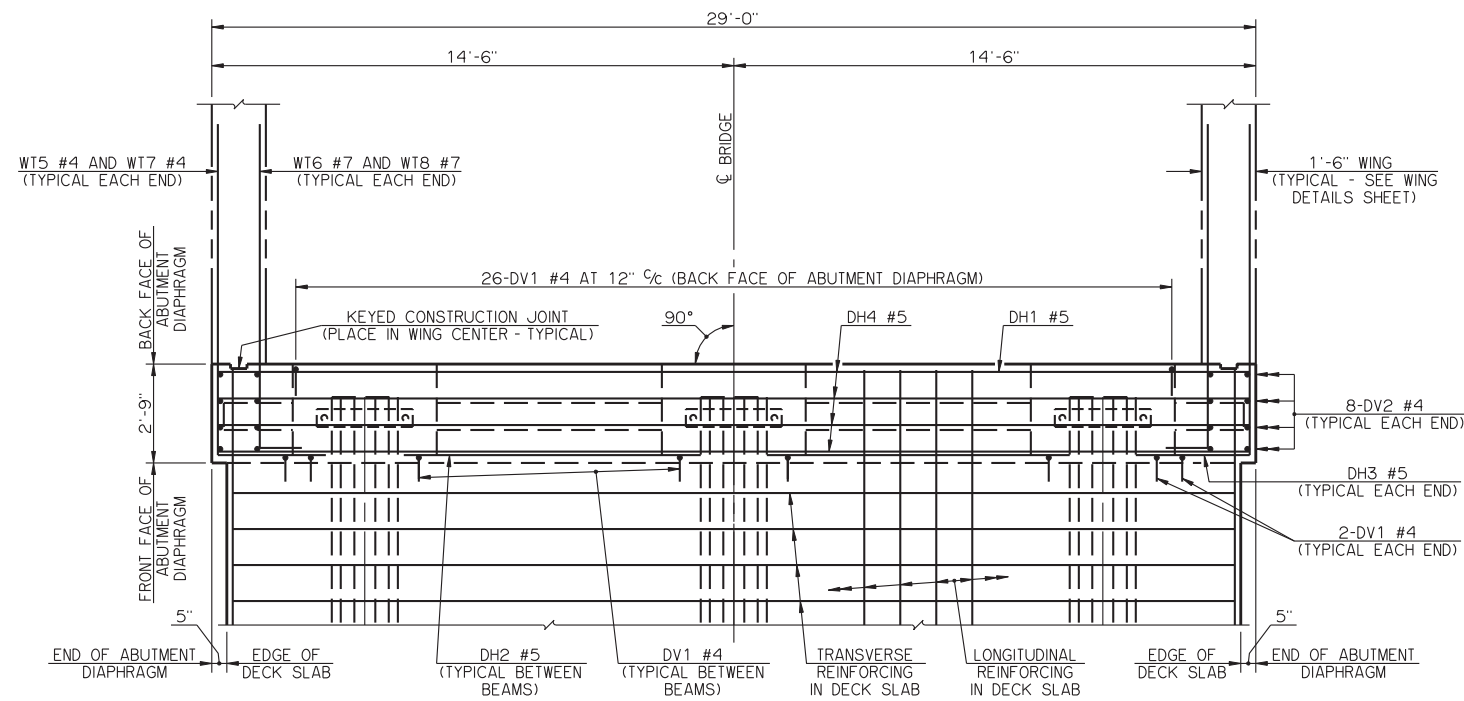
END SECTION

SECTION

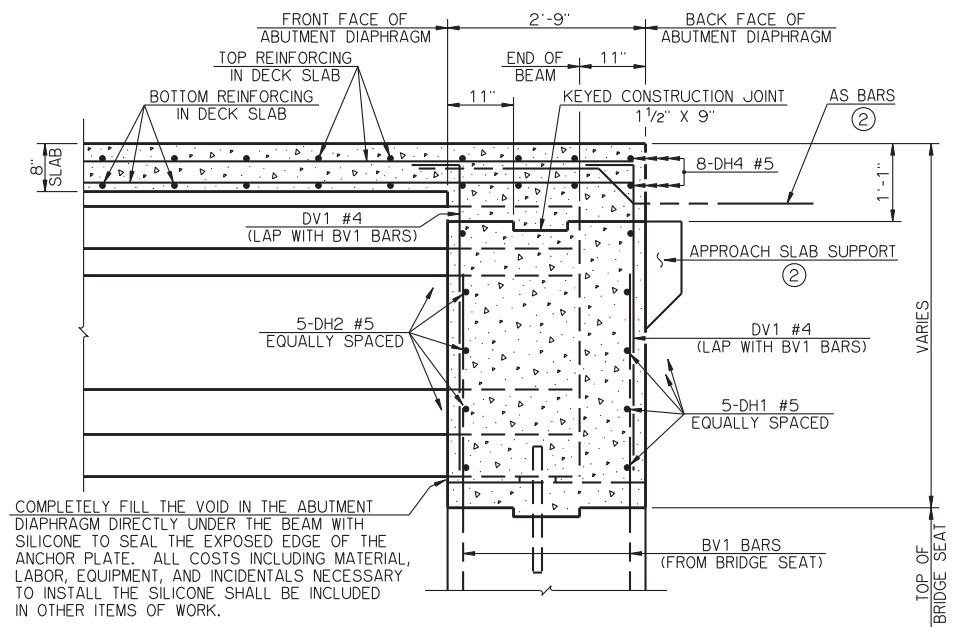
BEAM SECTIONS
(36 - 0.6" Ø STRANDS)

DEBOND SCHEDULE	
DEBOND PAIR	DEBOND LENGTH FROM END OF BEAM
B1	5'-0"
D1	5'-0"
C2	15'-0"
D3	32'-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 III - 85' SPAN
26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°
 2009 SPECIFICATIONS CB26-I-SKO-PCB-III-85 01E
 CB-418E

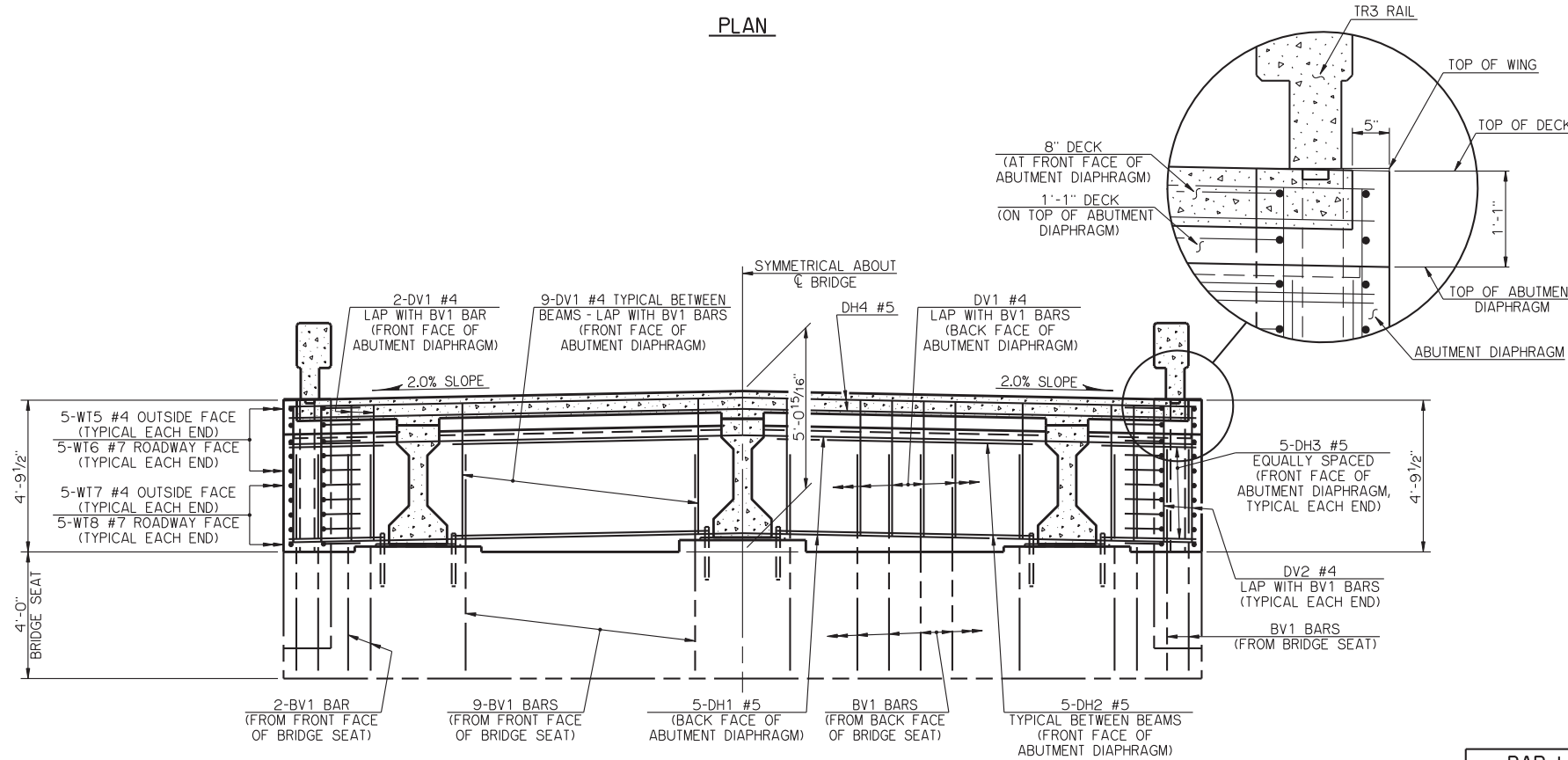


PLAN

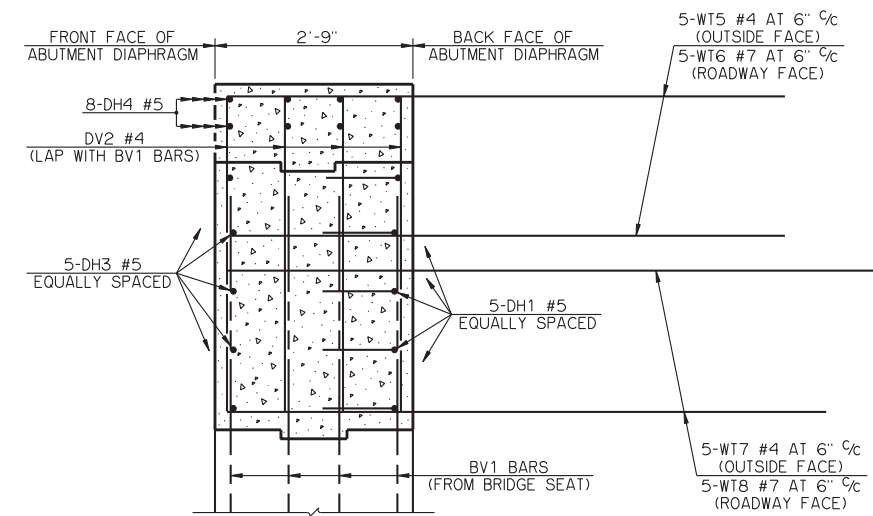


TYPICAL SECTION THRU ABUTMENT DIAPHRAGM

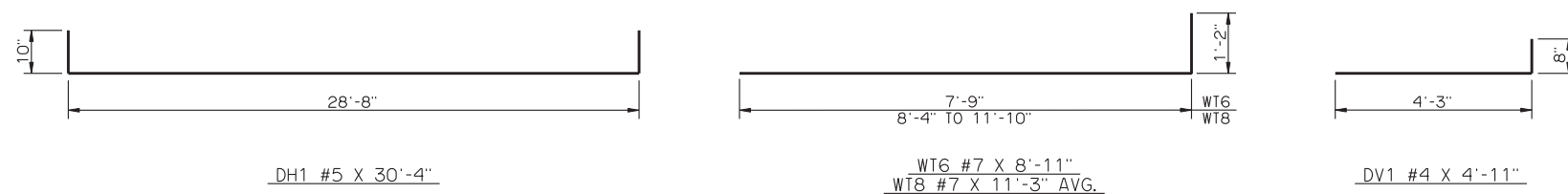
② THE AS BARS AND THE APPROACH SLAB SUPPORT ARE TO BE CONSTRUCTED ONLY IF THE BRIDGE CONTAINS THE OPTIONAL APPROACH SLABS. THE AS BARS IN THE DECK SLAB AND THE BV1 AND SV1 BARS IN THE APPROACH SLAB SUPPORT SHALL BE INSTALLED BEFORE PLACING THE ABUTMENT DIAPHRAGM AND DECK SLAB CONCRETE. FOR ADDITIONAL DETAILS AND INFORMATION SEE APPROACH SLAB DETAILS.



ELEVATION



TYPICAL SECTION THRU ABUTMENT DIAPHRAGM AT WING



DETAILS OF BENT REINFORCING STEEL

BAR LIST - ONE ABUTMENT DIAPHRAGM					
MARK	NO.	SIZE	FORM	LENGTH	LENGTH VARIATION
DH1	5	#5	BNT.	30'-4"	-
DH2	10	#5	STR.	8'-1"	-
DH3	10	#5	STR.	3'-0"	-
DH4	8	#5	STR.	28'-8"	-
DV1	48	#4	BNT.	4'-11"	-
DV2	16	#4	STR.	4'-3"	-
WT5	10	#4	STR.	7'-9"	-
WT6	10	#7	BNT.	8'-11"	-
WT7	10	#4	STR.	10'-1" AVG.	8'-4" TO 11'-10"
WT8	10	#7	BNT.	11'-3" AVG.	9'-6" TO 13'-0"

① NO. INCLUDES TWO SETS OF 5 BARS

NOTES

DECK SLAB CONCRETE SHALL NOT BE POURED UNTIL THE ABUTMENT DIAPHRAGMS HAVE ATTAINED A STRENGTH OF 3,000 PSI.

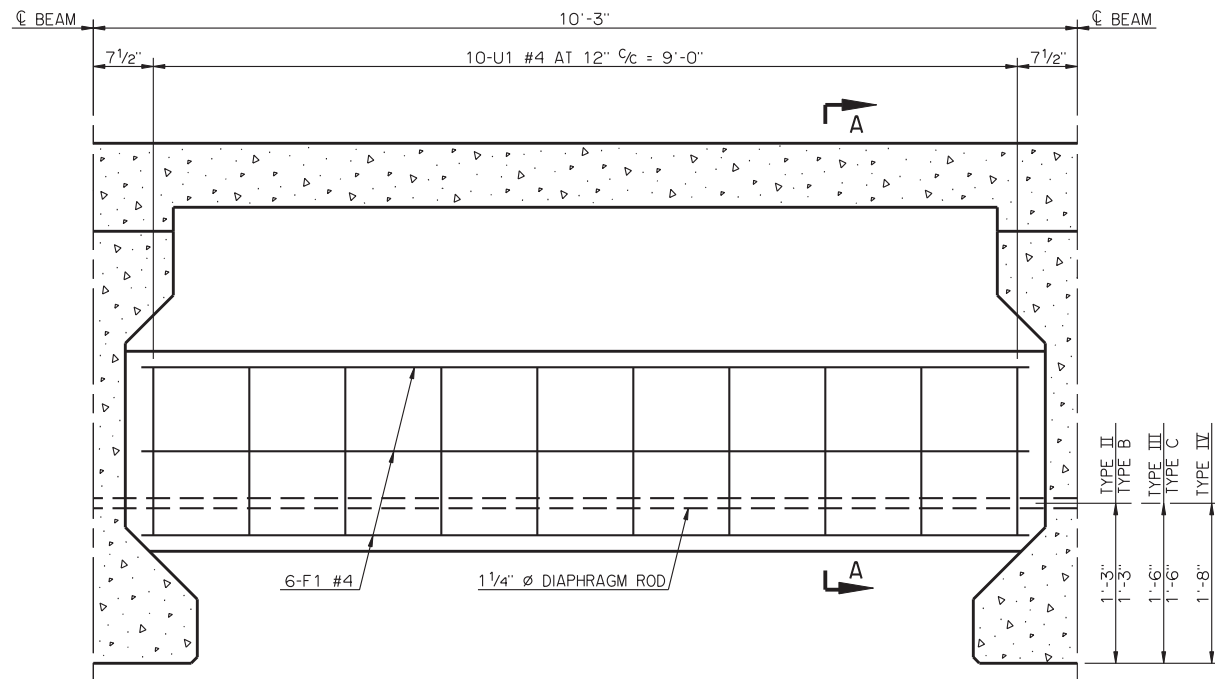
ALL WT WING REINFORCING STEEL TIED TO ABUTMENT DIAPHRAGM REINFORCING STEEL MUST BE IN PLACE PRIOR TO POURING THE ABUTMENT DIAPHRAGM CONCRETE.

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

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

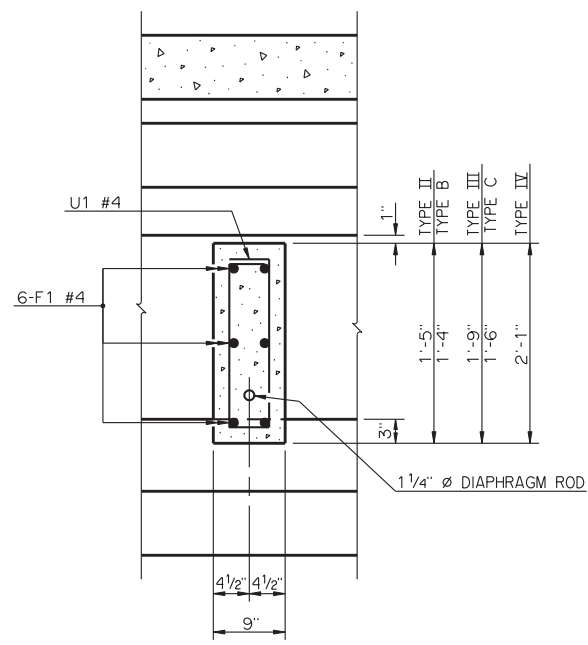
ABUTMENT DIAPHRAGM DETAILS
TYPE III AND TYPE C P.C. BEAMS

26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°

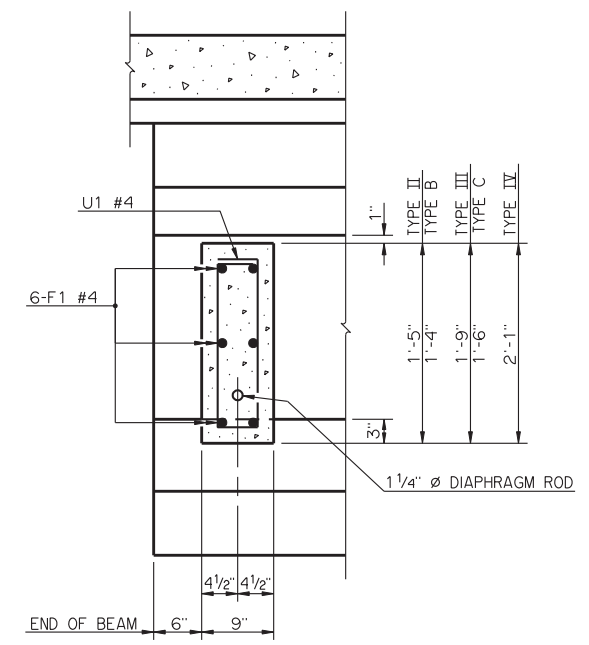


ELEVATION OF INTERMEDIATE AND PIER DIAPHRAGMS
TYPE II, B, III, C AND IV P.C. BEAMS

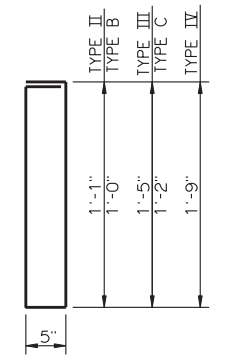
FOR SPANS OF 100' OR LESS IN LENGTH -
 INCLUDE ONE LINE OF INTERMEDIATE DIAPHRAGMS PER SPAN AND ONE LINE OF PIER DIAPHRAGMS AT EACH PIER PER SPAN.
 FOR SPANS OVER 100' IN LENGTH -
 INCLUDE TWO LINES OF INTERMEDIATE DIAPHRAGMS PER SPAN AND ONE LINE OF PIER DIAPHRAGMS AT EACH PIER PER SPAN.



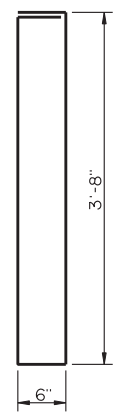
SECTION A-A
AT INTERMEDIATE DIAPHRAGM



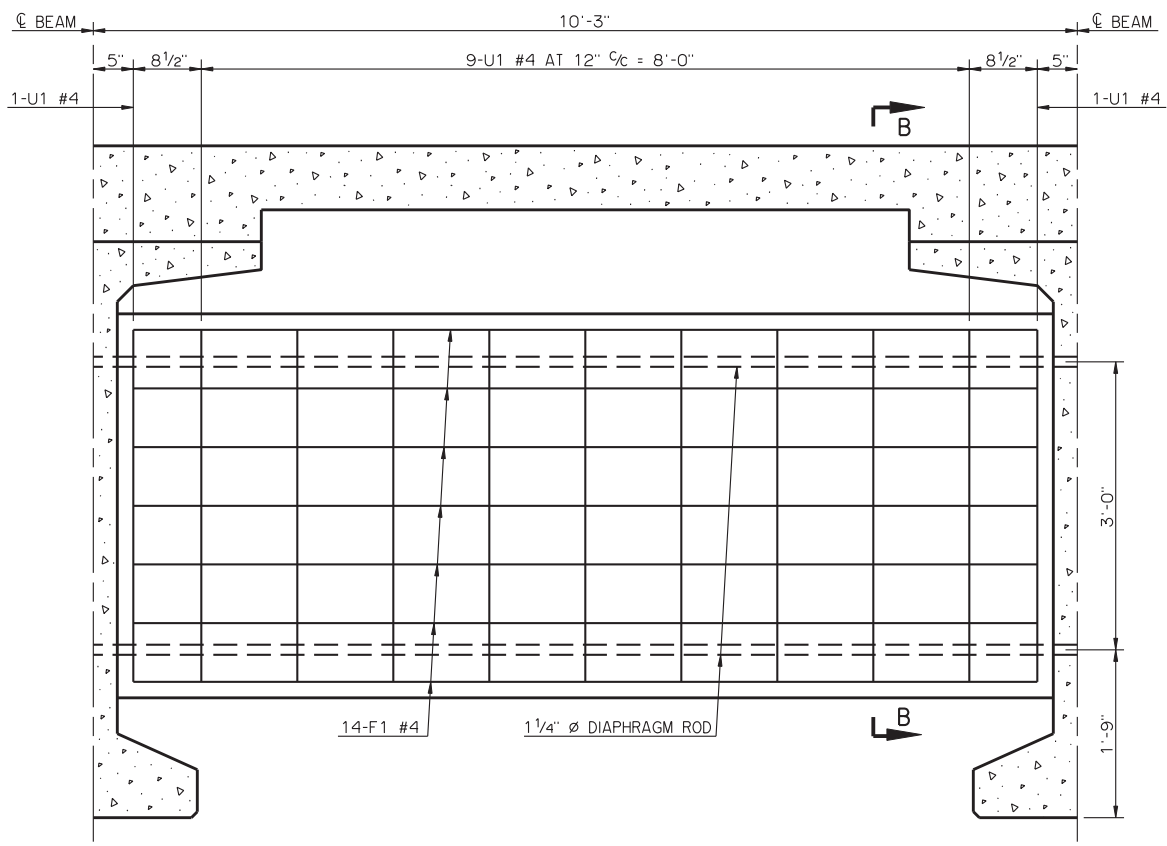
SECTION A-A
AT PIER DIAPHRAGM



- 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

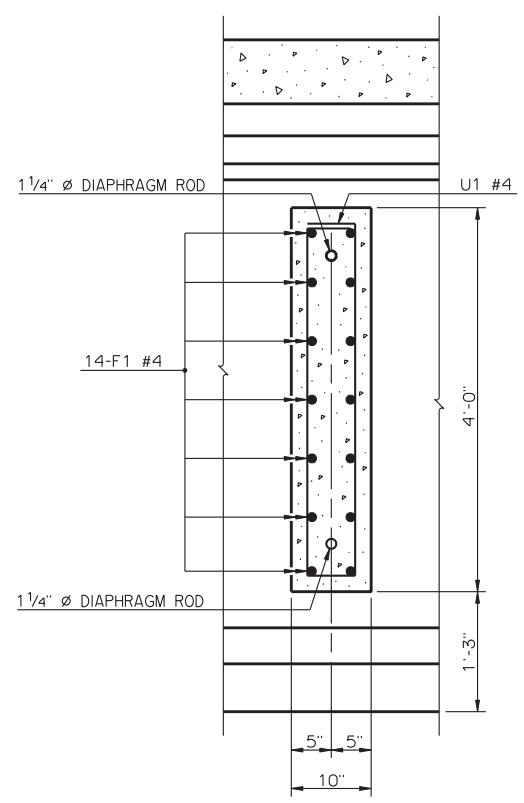


U1 #4 X 8'-10" - TYPE BT-72 AND TYPE J
DETAILS OF BENT REINFORCING STEEL

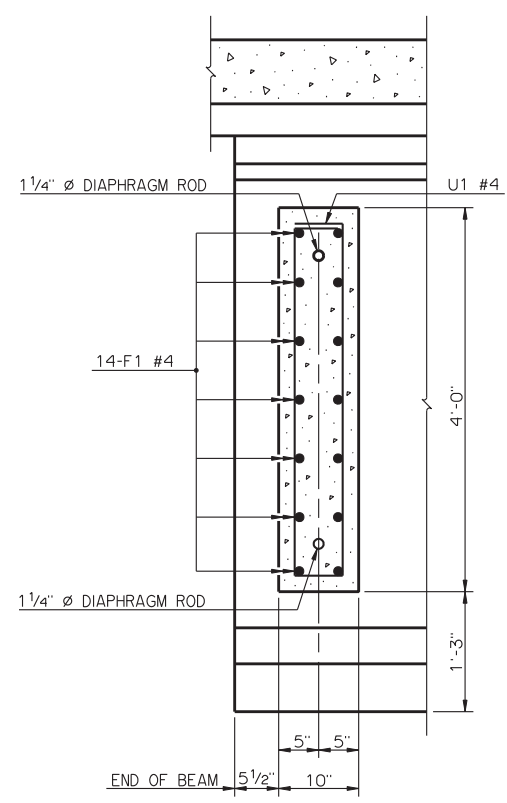


ELEVATION OF INTERMEDIATE AND PIER DIAPHRAGMS
TYPE BT-72 AND TYPE J P.C. BEAMS

FOR ALL SPAN LENGTHS -
 INCLUDE TWO LINES OF INTERMEDIATE DIAPHRAGMS PER SPAN AND ONE LINE OF PIER DIAPHRAGMS AT EACH PIER PER SPAN.



SECTION B-B
AT INTERMEDIATE DIAPHRAGM



SECTION B-B
AT PIER DIAPHRAGM

BAR LIST -
ONE INTERMEDIATE OR PIER DIAPHRAGM

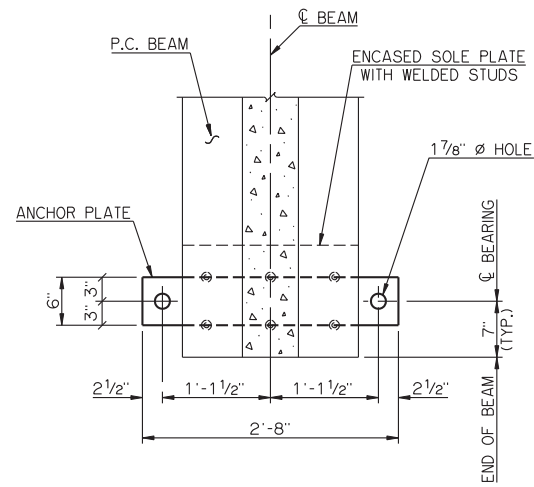
P.C. BEAM	MARK	NO.	SIZE	FORM	LENGTH
TYPE II	U1	10	#4	BNT.	3'-5"
	F1	6	#4	STR.	9'-5"
TYPE B	U1	10	#4	BNT.	3'-3"
	F1	6	#4	STR.	9'-4"
TYPE III	U1	10	#4	BNT.	4'-1"
	F1	6	#4	STR.	9'-4"
TYPE C	U1	10	#4	BNT.	3'-7"
	F1	6	#4	STR.	9'-4"
TYPE IV	U1	10	#4	BNT.	4'-9"
	F1	6	#4	STR.	9'-3"
TYPE BT-72	U1	11	#4	BNT.	8'-10"
	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 D. Smith* DATE 9-9-2011

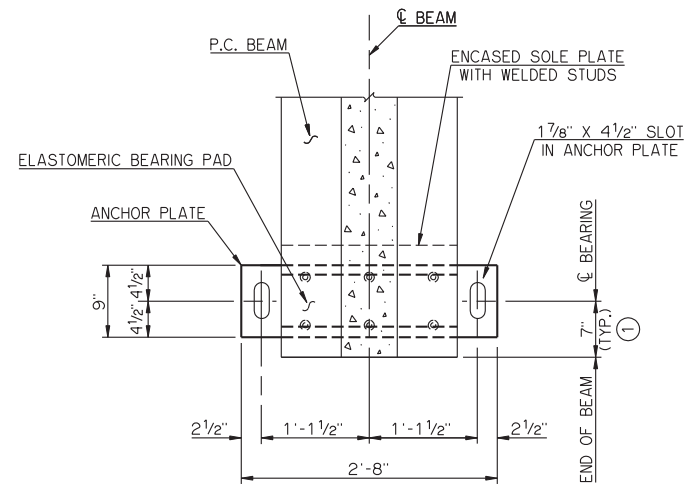
OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)

INTERMEDIATE AND PIER DIAPHRAGM DETAILS
P.C. BEAMS

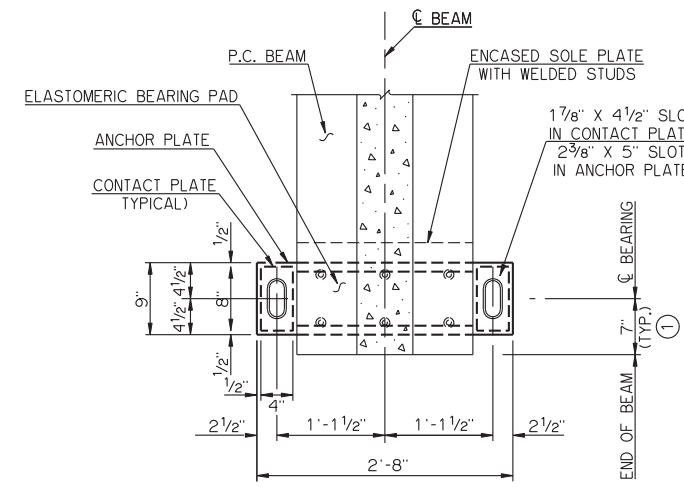
26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°



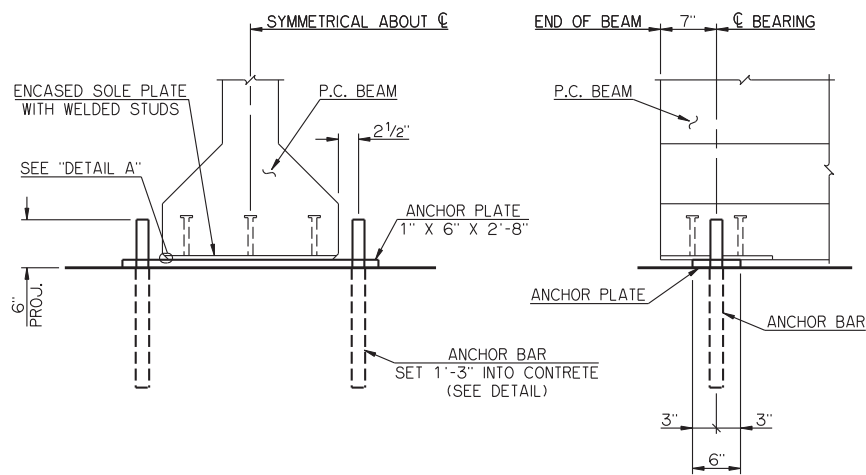
PLAN
ANCHOR BARS NOT SHOWN



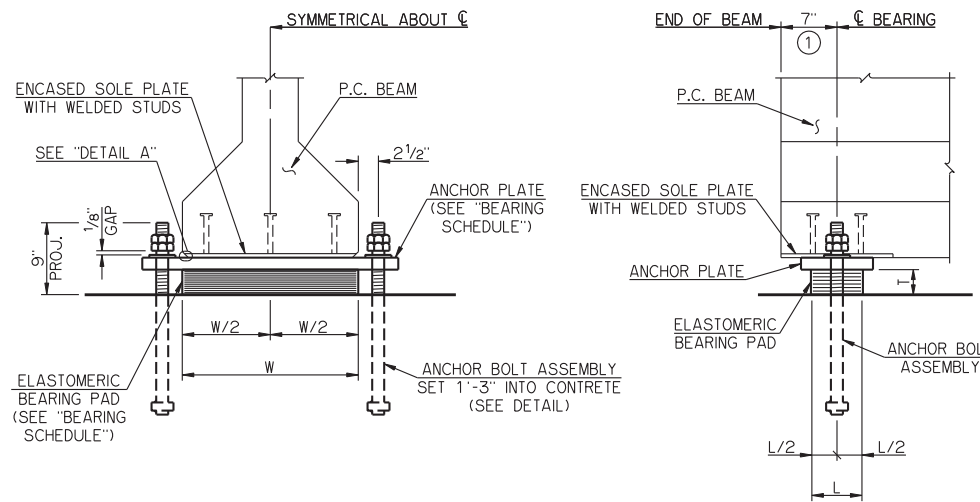
PLAN
ANCHOR BOLT ASSEMBLIES NOT SHOWN



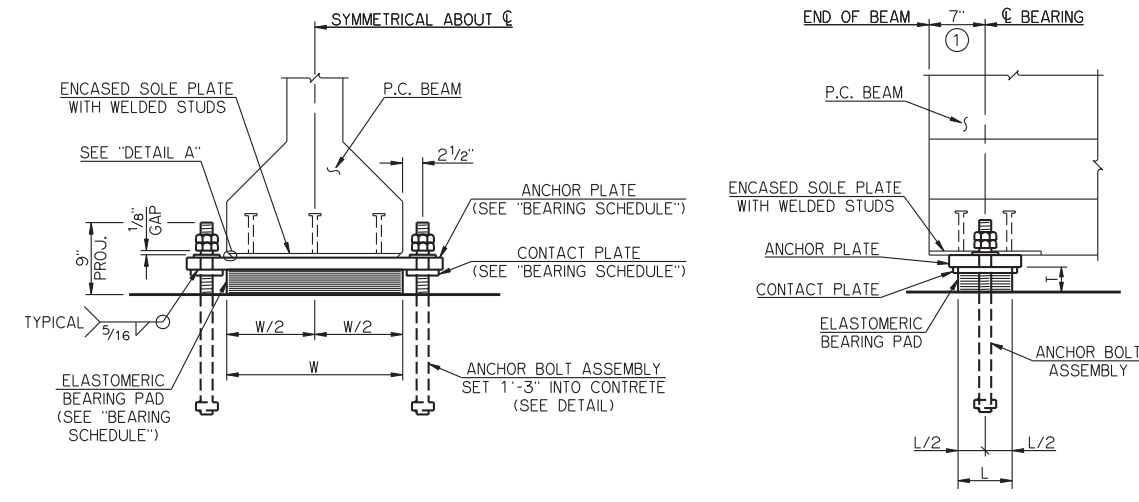
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ANCHOR BOLT ASSEMBLIES NOT SHOWN



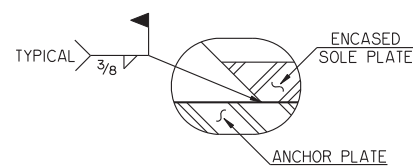
END VIEW
SIDE VIEW
ABUTMENT BEARING DETAILS



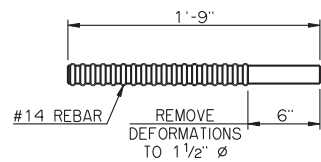
END VIEW
SIDE VIEW
PIER BEARING DETAILS
60' AND 65' SPANS



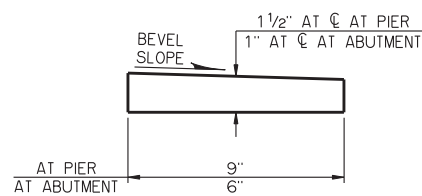
END VIEW
SIDE VIEW
PIER BEARING DETAILS
70' THRU 85' SPANS



DETAIL A

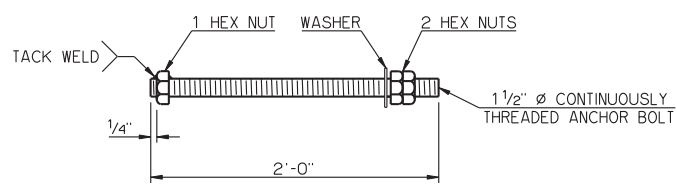


ANCHOR BAR DETAIL



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.



ANCHOR BOLT ASSEMBLY DETAIL

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		
60'	1 1/2" X 9" X 2'-8"	---	3 1/8" X 6 1/2" X 1'-10"	2-1/4"	5-3/8"	6-1/8"	235'
65'	1 1/2" X 9" X 2'-8"	---	3 1/8" X 6 1/2" X 1'-10"	2-1/4"	5-3/8"	6-1/8"	255'
70'	1 1/2" X 9" X 2'-8"	1/2" X 4" X 8"	3 1/8" X 6 1/2" X 1'-10"	2-1/4"	5-3/8"	6-1/8"	260'
75'	1 1/2" X 9" X 2'-8"	1/2" X 4" X 8"	3 1/8" X 6 3/4" X 1'-10"	2-1/4"	5-3/8"	6-1/8"	260'
80'	1 1/2" X 9" X 2'-8"	1/2" X 4" X 8"	3 1/8" X 6 3/4" X 1'-10"	2-1/4"	5-3/8"	6-1/8"	260'
85'	1 1/2" X 9" X 2'-8"	3/4" X 4" X 8"	3 1/8" X 6 3/4" X 1'-10"	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 BARS SHALL BE FABRICATED FROM REINFORCING STEEL CONFORMING TO AASHTO M 31, GRADE 60. ANCHOR BOLT ASSEMBLIES AND ANCHOR BARS 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 Dusch* DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

BEARING DETAILS
TYPE III AND TYPE C P.C. BEAMS

26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°

SUMMARY OF QUANTITIES - SUPERSTRUCTURE (PER SPAN)

SPAN	PRESTRESSED CONCRETE BEAM TYPE	ABUTMENT TO ABUTMENT							ABUTMENT TO STANDARD PIER							ABUTMENT TO STEPPED PIER										
		PRESTRESSED CONCRETE BEAMS (TYPE ①)	SAW-CUT GROOVING (SY)	CONCRETE RAIL (TR3) (LF)	STRUCTURAL STEEL ② (LB)	WEATHERING STEEL FIXED BEARING ASSEMBLY ③ (EA)	CLASS AA CONCRETE (CY)	REINFORCING STEEL ⑥ (LB)	PRESTRESSED CONCRETE BEAMS (TYPE ①) (LF)	SAW-CUT GROOVING (SY)	CONCRETE RAIL (TR3) (LF)	STRUCTURAL STEEL ② (LB)	WEATHERING STEEL FIXED BEARING ASSEMBLY ③ (EA)	WEATHERING STEEL EXPANSION BEARING ASSEMBLY ④ (EA)	ELASTOMERIC BEARING PADS ⑤ (EA)	CLASS AA CONCRETE (CY)	REINFORCING STEEL ⑦ (LB)	PRESTRESSED CONCRETE BEAMS (TYPE ①) (LF)	SAW-CUT GROOVING (SY)	CONCRETE RAIL (TR3) (LF)	STRUCTURAL STEEL ② (LB)	WEATHERING STEEL FIXED BEARING ASSEMBLY ③ (EA)	WEATHERING STEEL EXPANSION BEARING ASSEMBLY ④ (EA)	ELASTOMERIC BEARING PADS ⑤ (EA)	CLASS AA CONCRETE (CY)	REINFORCING STEEL ⑦ (LB)
30'	II	89.00	74.6	63.0	320	6	42.0	6,070	89.00	71.5	61.5	300	3	3	3	32.7	7,290	89.00	72.4	62.2	300	3	3	3	33.0	7,310
	B	89.00	74.6	63.0	320	6	41.8	6,070	89.00	71.5	61.5	300	3	3	3	32.6	7,280	89.00	72.4	62.2	300	3	3	3	32.8	7,310
35'	II	104.00	86.8	73.0	320	6	45.5	6,820	104.00	83.8	71.5	300	3	3	3	36.3	8,040	104.00	84.6	72.2	300	3	3	3	36.5	8,070
	B	104.00	86.8	73.0	320	6	45.4	6,820	104.00	83.8	71.5	300	3	3	3	36.1	8,030	104.00	84.6	72.2	300	3	3	3	36.3	8,060
40'	II	119.00	99.0	83.0	320	6	49.0	7,730	119.00	96.0	81.5	300	3	3	3	39.8	8,940	119.00	96.8	82.2	300	3	3	3	40.0	8,970
	B	119.00	99.0	83.0	320	6	48.9	7,720	119.00	96.0	81.5	300	3	3	3	39.6	8,940	119.00	96.8	82.2	300	3	3	3	39.9	8,960
45'	II	134.00	111.3	93.0	320	6	52.6	8,480	134.00	108.2	91.5	300	3	3	3	43.3	9,690	134.00	109.0	92.2	300	3	3	3	43.5	9,720
	B	134.00	111.3	93.0	320	6	52.4	8,480	134.00	108.2	91.5	300	3	3	3	43.2	9,680	134.00	109.0	92.2	300	3	3	3	43.4	9,710
50'	II	149.00	123.5	103.0	320	6	56.1	9,380	149.00	120.4	101.5	300	3	3	3	46.8	10,660	149.00	121.3	102.2	300	3	3	3	47.1	10,680
	B	149.00	123.5	103.0	320	6	55.9	9,380	149.00	120.4	101.5	300	3	3	3	46.7	10,650	149.00	121.3	102.2	300	3	3	3	46.9	10,680
55'	II	164.00	135.7	113.0	320	6	59.6	10,130	164.00	132.7	111.5	300	3	3	3	50.4	11,400	164.00	133.5	112.2	300	3	3	3	50.6	11,430
	B	164.00	135.7	113.0	320	6	59.5	10,130	164.00	132.7	111.5	300	3	3	3	50.2	11,400	164.00	133.5	112.2	300	3	3	3	50.4	11,430
60'	II	179.00	147.9	123.0	320	6	63.1	11,150	179.00	144.9	121.5	300	3	3	3	53.9	12,310	179.00	145.7	122.2	300	3	3	3	54.1	12,340
	C	179.00	147.9	123.0	320	6	67.4	11,360	179.00	144.9	121.5	300	3	3	3	56.2	12,520	179.00	145.7	122.2	300	3	3	3	56.4	12,550
65'	III	194.00	160.2	133.0	320	6	71.3	12,120	194.00	157.1	131.5	300	3	3	3	60.2	13,280	194.00	157.9	132.2	300	3	3	3	60.4	13,310
	C	194.00	160.2	133.0	320	6	70.9	12,110	194.00	157.1	131.5	300	3	3	3	59.7	13,270	194.00	157.9	132.2	300	3	3	3	60.0	13,300
70'	III	209.00	172.4	143.0	320	6	74.9	13,020	209.00	169.3	141.5	300	3	3	3	63.7	14,250	209.00	170.1	142.2	300	3	3	3	64.0	14,270
	C	209.00	172.4	143.0	320	6	74.5	13,020	209.00	169.3	141.5	300	3	3	3	63.3	14,230	209.00	170.1	142.2	300	3	3	3	63.5	14,260
75'	III	224.00	184.6	153.0	320	6	78.4	13,770	224.00	181.5	151.5	300	3	3	3	67.3	14,990	224.00	182.4	152.2	300	3	3	3	67.5	15,020
	C	224.00	184.6	153.0	320	6	78.0	13,770	224.00	181.5	151.5	300	3	3	3	66.8	14,980	224.00	182.4	152.2	300	3	3	3	67.1	15,010
80'	III	239.00	196.8	163.0	320	6	82.0	14,680	239.00	193.8	161.5	300	3	3	3	70.9	15,900	239.00	194.6	162.2	300	3	3	3	71.1	15,930
	IV	239.00	196.8	163.0	320	6	86.7	15,150	239.00	193.8	161.5	300	3	3	3	73.8	16,380	239.00	194.6	162.2	300	3	3	3	74.0	16,410
85'	III	254.00	209.0	173.0	320	6	85.5	15,430	254.00	206.0	171.5	300	3	3	3	74.4	16,650	254.00	206.8	172.2	300	3	3	3	74.6	16,680
	IV	254.00	209.0	173.0	320	6	90.2	15,900	254.00	206.0	171.5	300	3	3	3	77.3	17,130	254.00	206.8	172.2	300	3	3	3	77.6	17,160
90'	IV	269.00	221.3	183.0	320	6	93.8	16,810	269.00	218.2	181.5	300	3	3	3	80.9	18,040	269.00	219.0	182.2	300	3	3	3	81.2	18,060
95'	IV	284.00	233.5	193.0	320	6	97.4	17,560	284.00	230.4	191.5	300	3	3	3	84.5	18,780	284.00	231.3	192.2	300	3	3	3	84.8	18,810
100'	IV	299.00	245.7	203.0	320	6	101.0	18,460	299.00	242.7	201.5	300	3	3	3	88.1	19,690	299.00	243.5	202.2	300	3	3	3	88.4	19,720
105'	IV	314.00	257.9	213.0	410	6	105.7	19,350	314.00	254.9	211.5	400	3	3	3	92.8	20,580	314.00	255.7	212.2	400	3	3	3	93.1	20,610
110'	BT-72	329.00	270.2	223.0	600	6	125.5	21,040	329.00	267.1	221.5	670	3	3	3	109.4	22,500	329.00	267.9	222.2	670	3	3	3	109.6	22,530
	J	329.00	270.2	223.0	600	6	125.2	21,040	329.00	267.1	221.5	670	3	3	3	109.3	22,500	329.00	267.9	222.2	670	3	3	3	109.5	22,530
115'	BT-72	344.00	282.4	233.0	600	6	129.3	21,790	344.00	279.3	231.5	670	3	3	3	113.2	23,250	344.00	280.1	232.2	670	3	3	3	113.4	23,280
	J	344.00	282.4	233.0	600	6	129.0	21,790	344.00	279.3	231.5	670	3	3	3	113.1	23,250	344.00	280.1	232.2	670	3	3	3	113.3	23,280
120'	BT-72	359.00	294.6	243.0	600	6	133.1	22,810	359.00	291.5	241.5	670	3	3	3	117.0	24,150	359.00	292.4	242.2	670	3	3	3	117.2	24,180
	J	359.00	294.6	243.0	600	6	132.8	22,810	359.00	291.5	241.5	670	3	3	3	116.9	24,150	359.00	292.4	242.2	670	3	3	3	117.1	24,180
125'	J	374.00	306.8	253.0	600	6	136.6	23,570	374.00	303.8	251.5	670	3	3	3	120.7	24,900	374.00	304.6	252.2	670	3	3	3	120.9	24,930
130'	J	389.00	319.0	263.0	600	6	140.4	24,470	389.00	316.0	261.5	670	3	3	3	124.5	25,810	389.00	316.8	262.2	670	3	3	3	124.7	25,830
135'	J	404.00	331.3	273.0	600	6	144.2	25,220	404.00	328.2	271.5	670	3	3	3	128.3	26,560	404.00	329.0	272.2	670	3	3	3	128.5	26,590

- ① PRESTRESSED CONCRETE BEAM TYPE SHALL BE TYPE II, TYPE B, TYPE III, TYPE C, TYPE IV, TYPE 72 BT OR TYPE J BT AS APPLICABLE.
- ② QUANTITIES SHOWN INCLUDE WEIGHT OF STEEL ANGLE BUMPERS AT ABUTMENT ENDS OF DECK SLAB. FOR EACH STEEL ANGLE BUMPER OMITTED FROM END OF DECK SLAB, DEDUCT 110 POUNDS FROM THE QUANTITIES SHOWN.
- ③ AT THE ABUTMENTS, PROVIDE AND INSTALL FIXED BEARING ASSEMBLIES OF THE SIZE, SHAPE AND LOCATION AS DETAILED IN THE PLANS. SEE SUMMARY FOR THE ESTIMATED TOTAL AMOUNT OF STRUCTURAL STEEL PER EACH FIXED BEARING ASSEMBLY. ALL COST OF PROVIDING AND INSTALLING THE FIXED BEARING ASSEMBLIES INCLUDING THE COST OF ANCHOR PLATES, ANCHOR BARS, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS SHALL BE INCLUDED IN THE UNIT PRICE BID PER EACH OF "WEATHERING STEEL FIXED BEARING ASSEMBLY."
- ④ AT THE PIERS, PROVIDE AND INSTALL EXPANSION BEARING ASSEMBLIES OF THE SIZE, SHAPE AND LOCATION AS DETAILED IN THE PLANS. SEE SUMMARY FOR THE ESTIMATED TOTAL AMOUNT OF STRUCTURAL STEEL PER EACH EXPANSION BEARING ASSEMBLY. ALL COST OF PROVIDING AND INSTALLING THE EXPANSION BEARING ASSEMBLIES INCLUDING THE COST OF STEEL REINFORCED ELASTOMERIC BEARING PADS, ANCHOR PLATES, CONTACT PLATES, CONTACT ANGLES, ANCHOR BOLTS, NUTS, WASHERS, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS SHALL BE INCLUDED IN THE UNIT PRICE BID PER EACH OF "WEATHERING STEEL EXPANSION BEARING ASSEMBLY."

- ⑤ PROVIDE AND INSTALL ELASTOMERIC BEARING PADS BETWEEN THE TOP SURFACE OF THE P.C. BEAMS AND THE BOTTOM SURFACE OF THE DECK SLAB. THE ELASTOMERIC BEARING PADS ARE TO BE OF THE SIZE AND SHAPE AS DETAILED IN THE PLANS AND LOCATED AT EACH BEAM END ABOVE THE PIERS. ALL COST OF PROVIDING AND INSTALLING THE ELASTOMERIC BEARING PADS INCLUDING THE COST OF ELASTOMERIC BEARING PADS, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS SHALL BE INCLUDED IN THE UNIT PRICE BID PER EACH OF "ELASTOMERIC BEARING PADS."
- ⑥ QUANTITY INCLUDES PROVISION FOR LAP SPLICES REQUIRED IN THE LONGITUDINAL REINFORCING STEEL AS FOLLOWS:
30' THRU 55' SPANS - NO LAP SPLICES
60' THRU 115' SPANS - 1 LAP SPLICE
120' THRU 135' SPANS - 2 LAP SPLICES
- ⑦ QUANTITY INCLUDES PROVISION FOR LAP SPLICES REQUIRED IN THE LONGITUDINAL REINFORCING STEEL AS FOLLOWS:
30' THRU 45' SPANS - 1/2 LAP SPLICE
50' THRU 65' SPANS - 1 LAP SPLICE
70' THRU 105' SPANS - 1 1/2 LAP SPLICES
110' THRU 135' SPANS - 2 LAP SPLICES
LAP SPLICES ACCOUNT FOR ADJACENT SPAN COMBINATIONS AND ARE APPROXIMATE. PAYMENT FOR "REINFORCING STEEL" WILL BE BASED ON PLAN QUANTITY.

PRESTRESSED CONCRETE BEAM TYPE	SPAN	WEATHERING STEEL FIXED BEARING ASSEMBLY (LB)	WEATHERING STEEL EXPANSION BEARING ASSEMBLY (LB)
II AND B	30' THRU 60'	80	150
III AND C	60' AND 65'	90	160
	70' THRU 85'	90	170
IV AND BT-72	80' THRU 90'	90	190
	95' THRU 110'	90	200
	115' AND 120'	90	210
J	110' THRU 135'	100	220

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

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

SUPERSTRUCTURE QUANTITIES
P.C. BEAMS
(SHEET NO. 1 OF 2)
26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°

2009 SPECIFICATIONS CB26-I-SKO-SPR-QUAN-PCB-1 01E CB-515E

SUMMARY OF QUANTITIES - SUPERSTRUCTURE (PER SPAN)

SPAN	PRESTRESSED CONCRETE BEAM TYPE	STANDARD PIER TO STANDARD PIER							STANDARD PIER TO STEPPED PIER							STEPPED PIER TO STEPPED PIER									
		PRESTRESSED CONCRETE BEAMS (TYPE ①)	SAW-CUT GROOVING	CONCRETE RAIL (TR3)	STRUCTURAL STEEL	WEATHERING STEEL EXPANSION BEARING ASSEMBLY ②	ELASTOMERIC BEARING PADS ③	CLASS AA CONCRETE	REINFORCING STEEL ④	PRESTRESSED CONCRETE BEAMS (TYPE ①)	SAW-CUT GROOVING	CONCRETE RAIL (TR3)	STRUCTURAL STEEL	WEATHERING STEEL EXPANSION BEARING ASSEMBLY ②	ELASTOMERIC BEARING PADS ③	CLASS AA CONCRETE	REINFORCING STEEL ④	PRESTRESSED CONCRETE BEAMS (TYPE ①)	SAW-CUT GROOVING	CONCRETE RAIL (TR3)	STRUCTURAL STEEL	WEATHERING STEEL EXPANSION BEARING ASSEMBLY ②	ELASTOMERIC BEARING PADS ③	CLASS AA CONCRETE	REINFORCING STEEL ④
		(LF)	(SY)	(LF)	(LB)	(EA)	(EA)	(CY)	(LB)	(LF)	(SY)	(LF)	(LB)	(EA)	(EA)	(CY)	(LB)	(LF)	(SY)	(LF)	(LB)	(EA)	(EA)	(CY)	(LB)
30'	II	89.00	68.5	60.0	280	6	6	23.5	8,440	89.00	69.3	60.7	280	6	6	23.7	8,470	89.00	70.1	61.4	280	6	6	23.9	8,500
	B	89.00	68.5	60.0	290	6	6	23.3	8,430	89.00	69.3	60.7	290	6	6	23.6	8,460	89.00	70.1	61.4	290	6	6	23.8	8,490
35'	II	104.00	80.7	70.0	280	6	6	27.0	9,190	104.00	81.5	70.7	280	6	6	27.2	9,220	104.00	82.3	71.4	280	6	6	27.5	9,240
	B	104.00	80.7	70.0	290	6	6	26.9	9,180	104.00	81.5	70.7	290	6	6	27.1	9,210	104.00	82.3	71.4	290	6	6	27.3	9,230
40'	II	119.00	92.9	80.0	280	6	6	30.5	10,090	119.00	93.8	80.7	280	6	6	30.8	10,120	119.00	94.6	81.4	280	6	6	31.0	10,150
	B	119.00	92.9	80.0	290	6	6	30.4	10,080	119.00	93.8	80.7	290	6	6	30.6	10,110	119.00	94.6	81.4	290	6	6	30.8	10,140
45'	II	134.00	105.2	90.0	280	6	6	34.1	10,840	134.00	106.0	90.7	280	6	6	34.3	10,870	134.00	106.8	91.4	280	6	6	34.5	10,900
	B	134.00	105.2	90.0	290	6	6	33.9	10,830	134.00	106.0	90.7	290	6	6	34.1	10,860	134.00	106.8	91.4	290	6	6	34.4	10,890
50'	II	149.00	117.4	100.0	280	6	6	37.6	11,810	149.00	118.2	100.7	280	6	6	37.8	11,830	149.00	119.0	101.4	280	6	6	38.0	11,860
	B	149.00	117.4	100.0	290	6	6	37.4	11,800	149.00	118.2	100.7	290	6	6	37.7	11,820	149.00	119.0	101.4	290	6	6	37.9	11,850
55'	II	164.00	129.6	110.0	280	6	6	41.1	12,550	164.00	130.4	110.7	280	6	6	41.3	12,580	164.00	131.2	111.4	280	6	6	41.6	12,610
	B	164.00	129.6	110.0	290	6	6	41.0	12,550	164.00	130.4	110.7	290	6	6	41.2	12,580	164.00	131.2	111.4	290	6	6	41.4	12,600
60'	II	179.00	141.8	120.0	280	6	6	44.6	13,460	179.00	142.6	120.7	280	6	6	44.9	13,490	179.00	143.5	121.4	280	6	6	45.1	13,520
	C	179.00	141.8	120.0	290	6	6	45.0	13,670	179.00	142.6	120.7	290	6	6	45.2	13,700	179.00	143.5	121.4	290	6	6	45.5	13,730
65'	III	194.00	154.0	130.0	290	6	6	49.1	14,440	194.00	154.9	130.7	290	6	6	49.3	14,470	194.00	155.7	131.4	290	6	6	49.5	14,500
	C	194.00	154.0	130.0	290	6	6	48.5	14,420	194.00	154.9	130.7	290	6	6	48.8	14,450	194.00	155.7	131.4	290	6	6	49.0	14,480
70'	III	209.00	166.3	140.0	290	6	6	52.6	15,410	209.00	167.1	140.7	290	6	6	52.8	15,430	209.00	167.9	141.4	290	6	6	53.1	15,460
	C	209.00	166.3	140.0	290	6	6	52.1	15,390	209.00	167.1	140.7	290	6	6	52.3	15,410	209.00	167.9	141.4	290	6	6	52.5	15,440
75'	III	224.00	178.5	150.0	290	6	6	56.2	16,150	224.00	179.3	150.7	290	6	6	56.4	16,180	224.00	180.1	151.4	290	6	6	56.6	16,210
	C	224.00	178.5	150.0	290	6	6	55.6	16,130	224.00	179.3	150.7	290	6	6	55.9	16,160	224.00	180.1	151.4	290	6	6	56.1	16,190
80'	III	239.00	190.7	160.0	290	6	6	59.7	17,060	239.00	191.5	160.7	290	6	6	60.0	17,090	239.00	192.3	161.4	290	6	6	60.2	17,120
	IV	239.00	190.7	160.0	290	6	6	60.8	17,550	239.00	191.5	160.7	290	6	6	61.1	17,580	239.00	192.3	161.4	290	6	6	61.3	17,610
85'	III	254.00	202.9	170.0	290	6	6	63.3	17,810	254.00	203.8	170.7	290	6	6	63.5	17,840	254.00	204.6	171.4	290	6	6	63.7	17,860
	IV	254.00	202.9	170.0	290	6	6	64.4	18,300	254.00	203.8	170.7	290	6	6	64.7	18,330	254.00	204.6	171.4	290	6	6	64.9	18,350
90'	IV	269.00	215.2	180.0	290	6	6	68.0	19,200	269.00	216.0	180.7	290	6	6	68.3	19,230	269.00	216.8	181.4	290	6	6	68.5	19,260
95'	IV	284.00	227.4	190.0	290	6	6	71.6	19,950	284.00	228.2	190.7	290	6	6	71.9	19,980	284.00	229.0	191.4	290	6	6	72.1	20,010
100'	IV	299.00	239.6	200.0	290	6	6	75.2	20,860	299.00	240.4	200.7	290	6	6	75.5	20,890	299.00	241.2	201.4	290	6	6	75.7	20,920
105'	IV	314.00	251.8	210.0	380	6	6	79.9	21,740	314.00	252.6	210.7	380	6	6	80.2	21,770	314.00	253.5	211.4	380	6	6	80.4	21,800
110'	BT-72	329.00	264.0	220.0	750	6	6	93.3	23,840	329.00	264.9	220.7	750	6	6	93.5	23,860	329.00	265.7	221.4	750	6	6	93.8	23,890
	J	329.00	264.0	220.0	750	6	6	93.3	23,840	329.00	264.9	220.7	750	6	6	93.5	23,860	329.00	265.7	221.4	750	6	6	93.8	23,890
115'	BT-72	344.00	276.3	230.0	750	6	6	97.1	24,580	344.00	277.1	230.7	750	6	6	97.3	24,610	344.00	277.9	231.4	750	6	6	97.6	24,640
	J	344.00	276.3	230.0	750	6	6	97.1	24,580	344.00	277.1	230.7	750	6	6	97.3	24,610	344.00	277.9	231.4	750	6	6	97.6	24,640
120'	BT-72	359.00	288.5	240.0	750	6	6	100.9	25,490	359.00	289.3	240.7	750	6	6	101.1	25,520	359.00	290.1	241.4	750	6	6	101.4	25,550
	J	359.00	288.5	240.0	750	6	6	100.9	25,490	359.00	289.3	240.7	750	6	6	101.1	25,520	359.00	290.1	241.4	750	6	6	101.4	25,550
125'	J	374.00	300.7	250.0	750	6	6	104.7	26,240	374.00	301.5	250.7	750	6	6	104.9	26,270	374.00	302.3	251.4	750	6	6	105.2	26,290
130'	J	389.00	312.9	260.0	750	6	6	108.5	27,140	389.00	313.8	260.7	750	6	6	108.7	27,170	389.00	314.6	261.4	750	6	6	109.0	27,200
135'	J	404.00	325.2	270.0	750	6	6	112.3	27,890	404.00	326.0	270.7	750	6	6	112.5	27,920	404.00	326.8	271.4	750	6	6	112.8	27,950

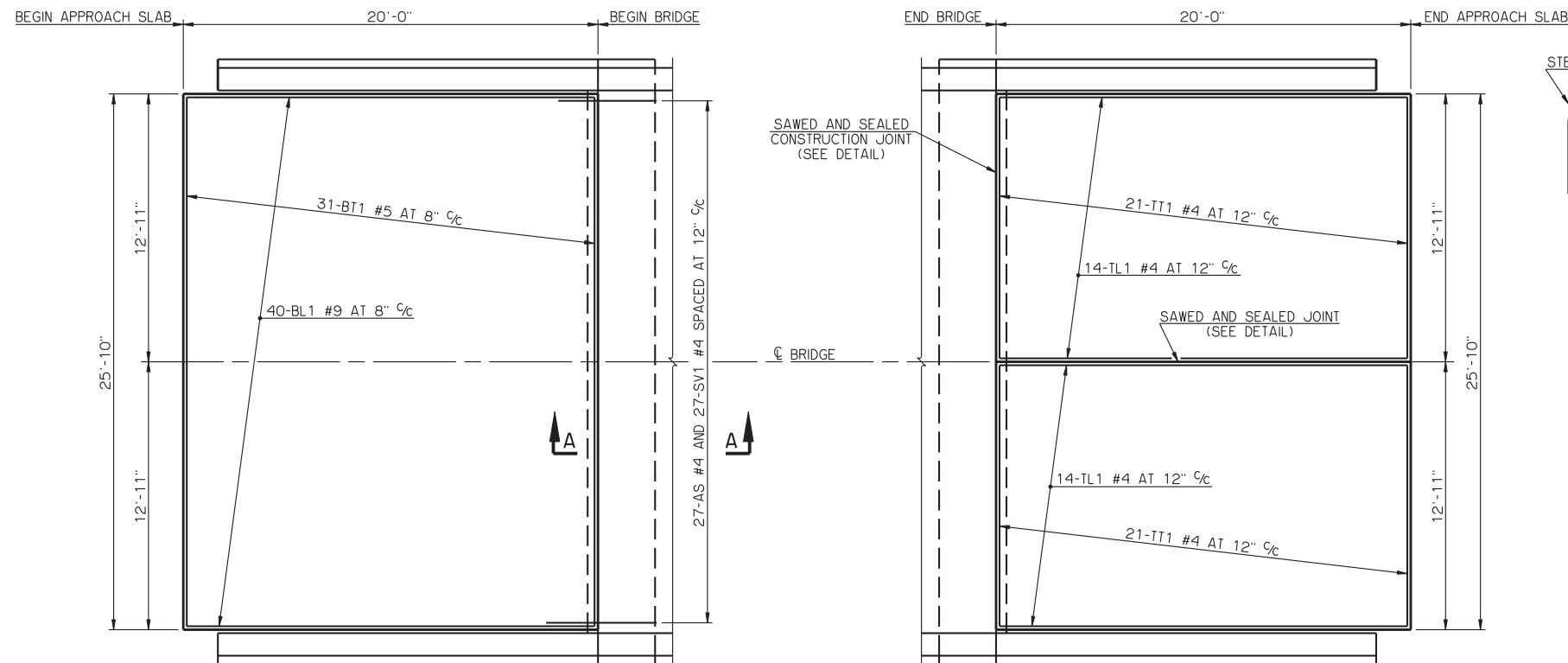
① PRESTRESSED CONCRETE BEAM TYPE SHALL BE TYPE II, TYPE B, TYPE III, TYPE C, TYPE IV, TYPE 72 BT OR TYPE J BT AS APPLICABLE.

② AT THE PIERS, PROVIDE AND INSTALL EXPANSION BEARING ASSEMBLIES OF THE SIZE, SHAPE AND LOCATION AS DETAILED IN THE PLANS. SEE SUMMARY FOR THE ESTIMATED TOTAL AMOUNT OF STRUCTURAL STEEL PER EACH EXPANSION BEARING ASSEMBLY. ALL COST OF PROVIDING AND INSTALLING THE EXPANSION BEARING ASSEMBLIES INCLUDING THE COST OF STEEL REINFORCED ELASTOMERIC BEARING PADS, ANCHOR PLATES, CONTACT PLATES, CONTACT ANGLES, ANCHOR BOLTS, NUTS, WASHERS, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS SHALL BE INCLUDED IN THE UNIT PRICE BID PER EACH OF "WEATHERING STEEL EXPANSION BEARING ASSEMBLY."

③ PROVIDE AND INSTALL ELASTOMERIC BEARING PADS BETWEEN THE TOP SURFACE OF THE P.C. BEAMS AND THE BOTTOM SURFACE OF THE DECK SLAB. THE ELASTOMERIC BEARING PADS ARE TO BE OF THE SIZE AND SHAPE AS DETAILED IN THE PLANS AND LOCATED AT EACH BEAM END ABOVE THE PIERS. ALL COST OF PROVIDING AND INSTALLING THE ELASTOMERIC BEARING PADS INCLUDING THE COST OF ELASTOMERIC BEARING PADS, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS SHALL BE INCLUDED IN THE UNIT PRICE BID PER EACH OF "ELASTOMERIC BEARING PADS."

④ QUANTITY INCLUDES PROVISION FOR LAP SPLICES REQUIRED IN THE LONGITUDINAL REINFORCING STEEL AS FOLLOWS:
 30' THRU 45' SPANS - 1/2 LAP SPLICE
 50' THRU 65' SPANS - 1 LAP SPLICE
 70' THRU 105' SPANS - 1 1/2 LAP SPLICES
 110' THRU 135' SPANS - 2 LAP SPLICES
 LAP SPLICES ACCOUNT FOR ADJACENT SPAN COMBINATIONS AND ARE APPROXIMATE. PAYMENT FOR "REINFORCING STEEL" WILL BE BASED ON PLAN QUANTITY.

APPROVED BY BRIDGE ENGINEER	<i>Robert J. Dusch</i>	DATE	9-9-2011
OKLAHOMA DEPARTMENT OF TRANSPORTATION COUNTY BRIDGE STANDARD (ENGLISH)			
SUPERSTRUCTURE QUANTITIES P.C. BEAMS (SHEET NO. 2 OF 2)			
26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°			
2009 SPECIFICATIONS	CB26-I-SKO-SPR-QUAN-PCB-2	01E	CB-516E

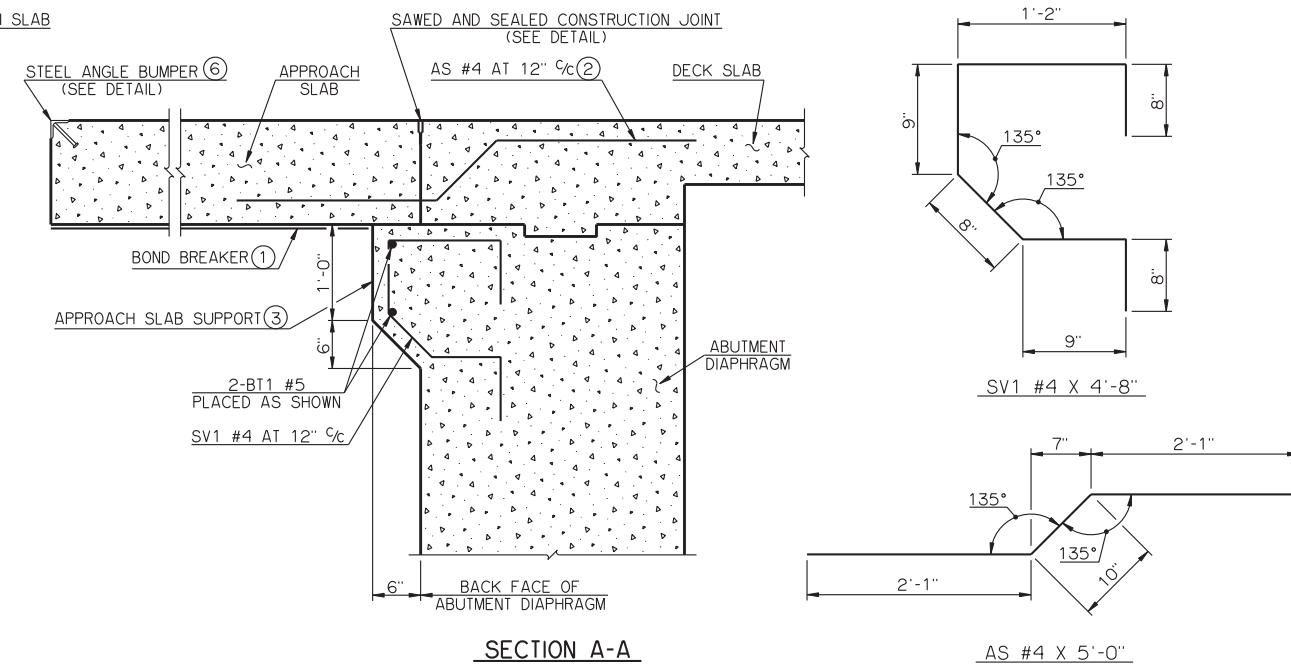


PLAN OF APPROACH SLAB AT BEGIN BRIDGE

BOTTOM LAYER OF REINFORCING STEEL SHOWN. TYPICAL FOR EACH APPROACH SLAB.

PLAN OF APPROACH SLAB AT END BRIDGE

TOP LAYER OF REINFORCING STEEL SHOWN. TYPICAL FOR EACH APPROACH SLAB. DO NOT SAW-CUT GROOVE THE APPROACH SLAB WITHIN 6" OF CONSTRUCTION JOINTS OR SAWED AND SEALED JOINTS.



SECTION A-A

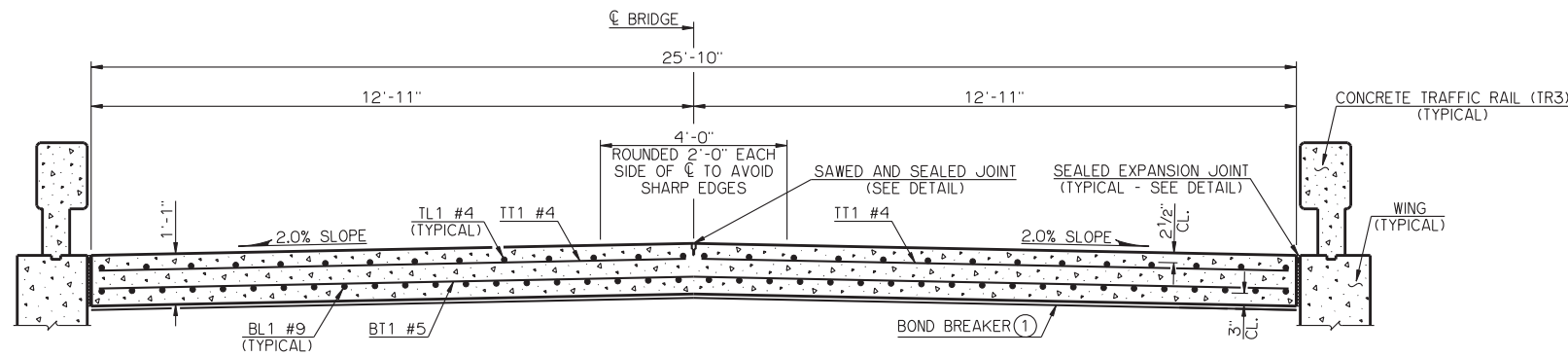
DETAILS OF BENT REINFORCING STEEL

BAR LIST ONE APPROACH SLAB

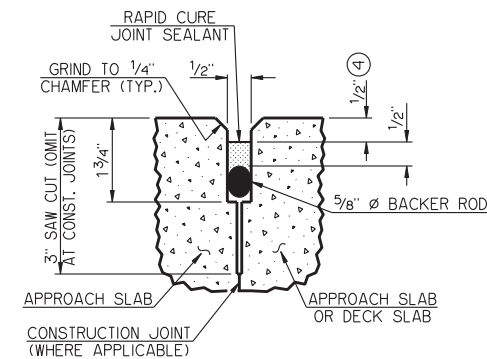
MARK	NO.	SIZE	FORM	LENGTH
AS	27	#4	BNT.	5'-0"
BL1	40	#9	STR.	19'-8"
BT1	33	#5	STR.	25'-6"
SV1	27	#4	BNT.	4'-8"
TL1	28	#4	STR.	19'-8"
TT1	42	#4	STR.	12'-7"

SUMMARY OF QUANTITIES - ONE APPROACH SLAB

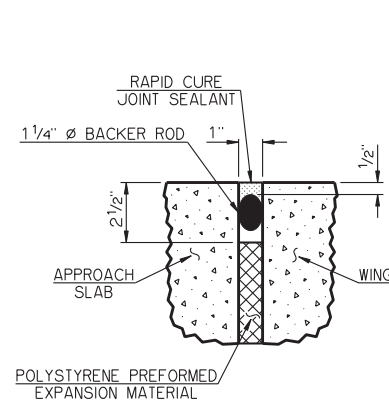
ITEM	UNIT	TOTAL
⑤ APPROACH SLAB	SY	57.50
SAW-CUT GROOVING	SY	44.40
⑥ STRUCTURAL STEEL	LB	110.00



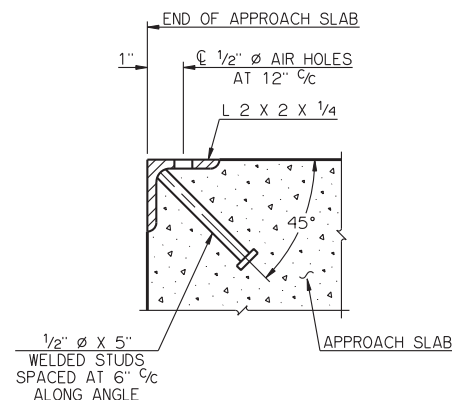
TYPICAL SECTION THRU APPROACH SLAB



DETAIL OF SAWED AND SEALED JOINT



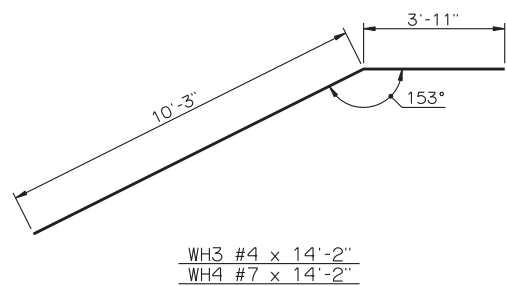
DETAIL OF SEALED EXPANSION JOINT



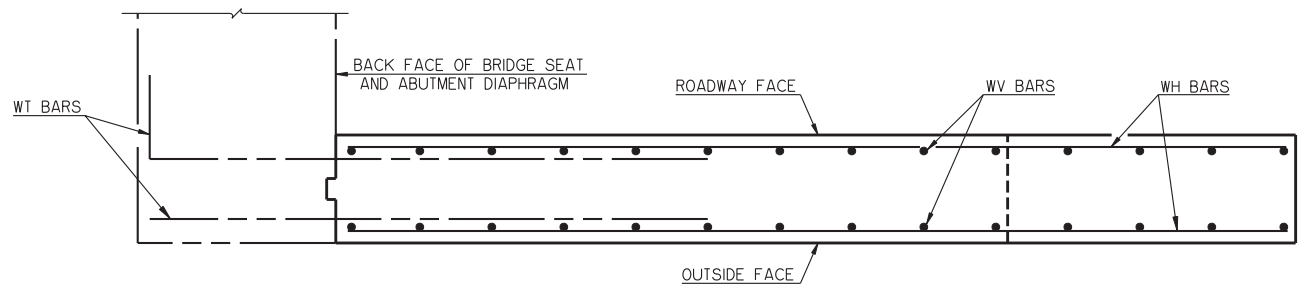
DETAIL OF STEEL ANGLE BUMPER

- THE BOND BREAKER SHALL BE ONE 6 MIL OR TWO 4 MIL POLYETHYLENE SHEETS. THE BOND BREAKER SHALL EXTEND THE FULL WIDTH AND LENGTH OF THE APPROACH SLAB BUT SHALL NOT BE PLACED IN THE NOTCH ABOVE THE APPROACH SLAB SUPPORT AT THE BACK FACE OF THE ABUTMENT DIAPHRAGM.
- AS BARS SHALL BE TIED TO THE TOP LAYER OF REINFORCING STEEL IN THE DECK SLAB AND TO THE BOTTOM LAYER OF REINFORCING STEEL IN THE APPROACH SLAB. AS BARS SHALL BE INSTALLED BEFORE PLACING DECK SLAB CONCRETE.
- THE APPROACH SLAB SUPPORT AT THE BACK FACE OF THE ABUTMENT DIAPHRAGM SHALL BE CONSTRUCTED WITH THE ABUTMENT DIAPHRAGM. SV1 AND BT1 BARS SHALL BE INSTALLED BEFORE PLACING THE ABUTMENT DIAPHRAGM CONCRETE.
- AT TRANSVERSE JOINTS ONLY, THIS DIMENSION SHALL TAPER FROM 1/2" AT THE EDGE OF DRIVING LANES TO 1/8" AT FACE OF TRAFFIC RAILS
- THE UNIT PRICE BID PER SQUARE YARD OF "APPROACH SLAB" SHALL INCLUDE ALL COST TO CONSTRUCT THE APPROACH SLAB AND THE APPROACH SLAB SUPPORT AT THE BACK FACE OF THE ABUTMENT DIAPHRAGM INCLUDING THE COST OF ALL CONCRETE, ALL REINFORCING STEEL INCLUDING AS, BT1 AND SV1 BARS, BACKER ROD, RAPID CURE JOINT SEALANT, POLYSTYRENE PREFORMED EXPANSION MATERIAL, POLYETHYLENE SHEETING, SAWING, GRINDING, EXCAVATION, BACKFILL, MATERIALS, LABOR, EQUIPMENT AND INCIDENTALS.
- STEEL ANGLE BUMPERS SHALL BE OMITTED FROM ENDS OF APPROACH SLABS ADJOINING AN APPROACH ROADWAY COMPRISED OF ASPHALT OR P.C. CONCRETE PAVEMENT. STRUCTURAL STEEL QUANTITY SHOWN IS FOR ONE STEEL ANGLE BUMPER.

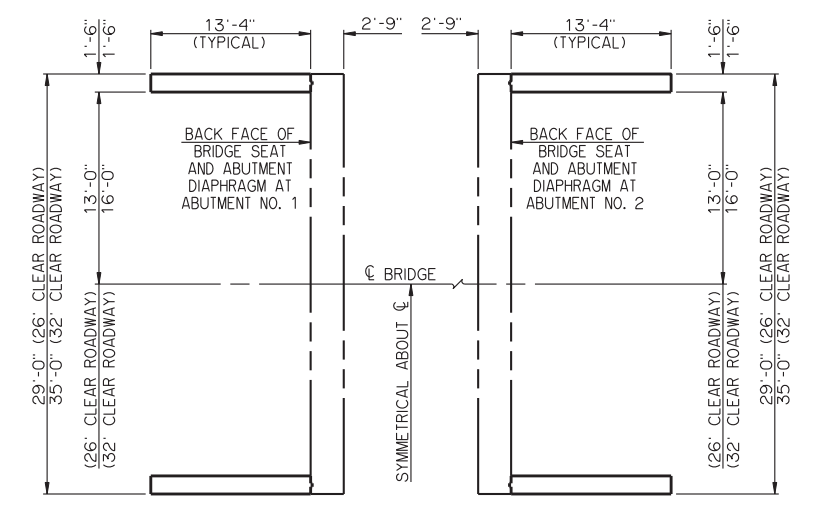
APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
APPROACH SLAB DETAILS
 26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°
 2009 SPECIFICATIONS CB26-I-SKO-AS 01E
 CB-521E



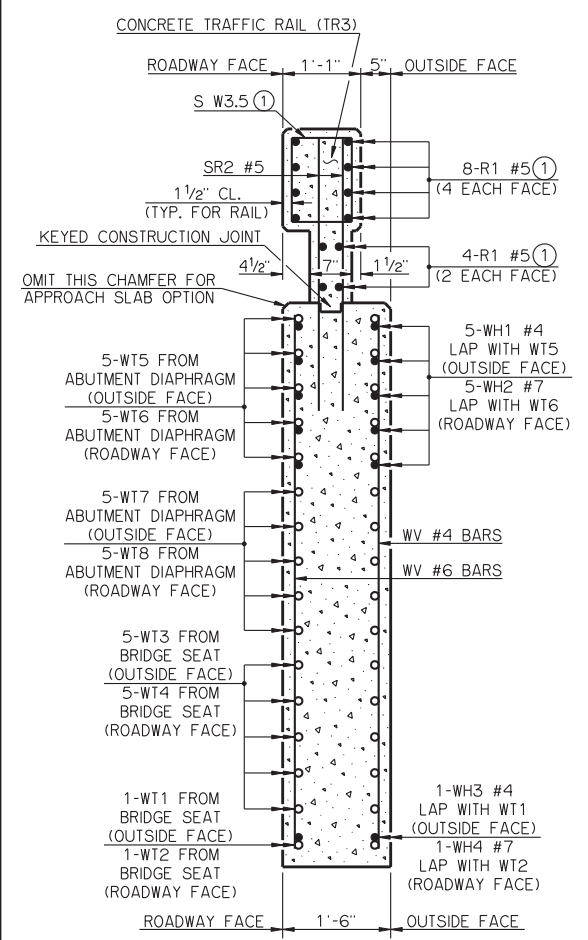
DETAILS OF BENT REINFORCING STEEL



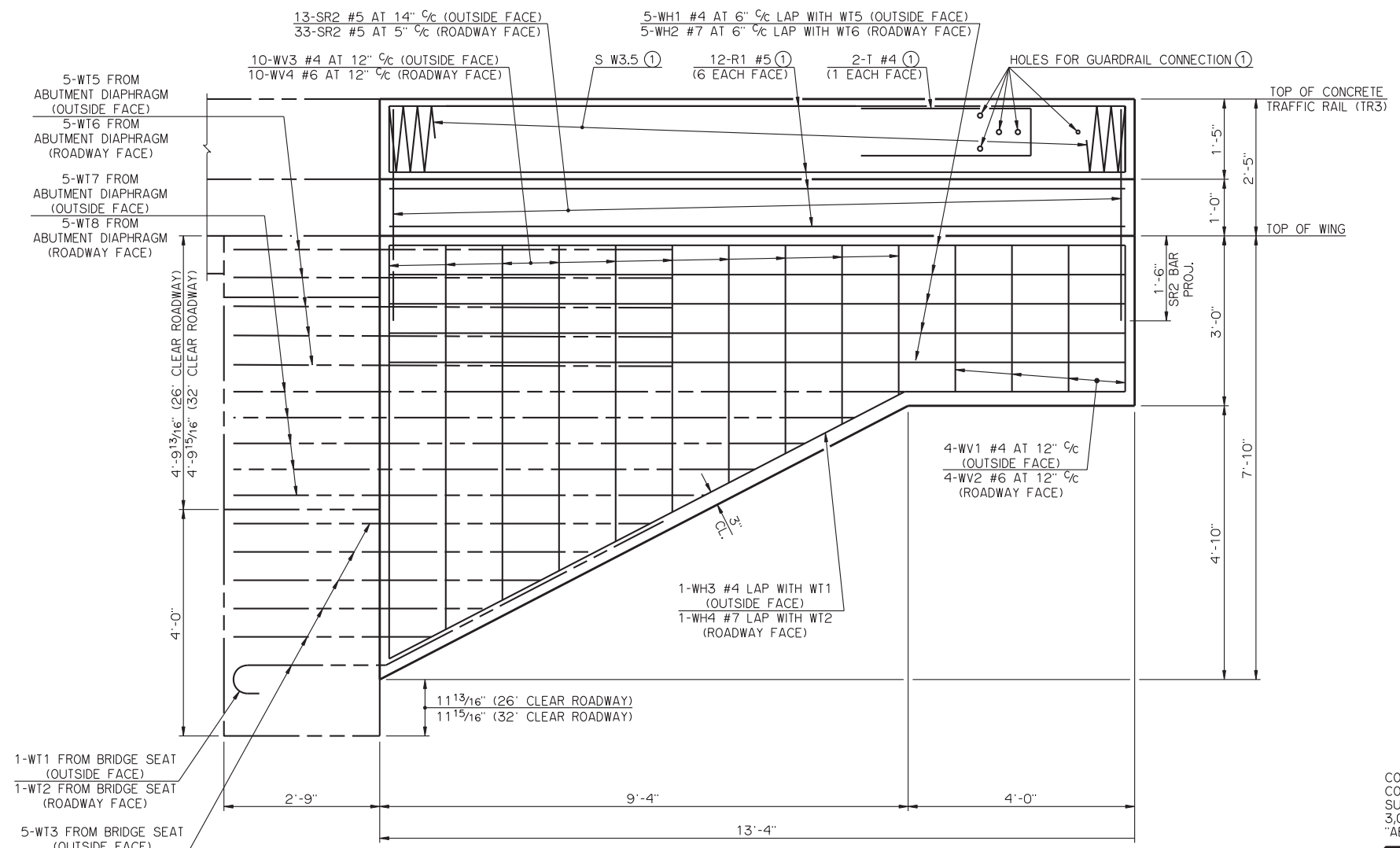
PLAN
CONCRETE TRAFFIC RAIL (TR3) NOT SHOWN



LAYOUT OF WINGS



SECTION THRU WING AT
BACK FACE OF BRIDGE SEAT



ELEVATION

BAR LIST - ONE WING					
MARK	NO.	SIZE	FORM	LENGTH	LENGTH VARIATION
SR2	46	#5	STR.	3'-9"	-
WH1	5	#4	STR.	13'-0"	-
WH2	5	#7	STR.	13'-0"	-
WH3	1	#4	BNT.	14'-2"	-
WH4	1	#7	BNT.	14'-2"	-
WV1	4	#4	STR.	2'-7"	-
WV2	4	#6	STR.	2'-7"	-
WV3	10	#4	STR.	4'-11" AVG.	2'-7" TO 7'-3"
WV4	10	#6	STR.	4'-11" AVG.	2'-7" TO 7'-3"

SUMMARY OF QUANTITIES - ONE WING			
ITEM	UNIT	TOTAL	
SUBSTRUCTURE EXCAVATION, COMMON	CY	10.00	
CONCRETE RAIL (TR3)	LF	13.40	
CLASS A CONCRETE	CY	3.50	
REINFORCING STEEL	LB	530.00	

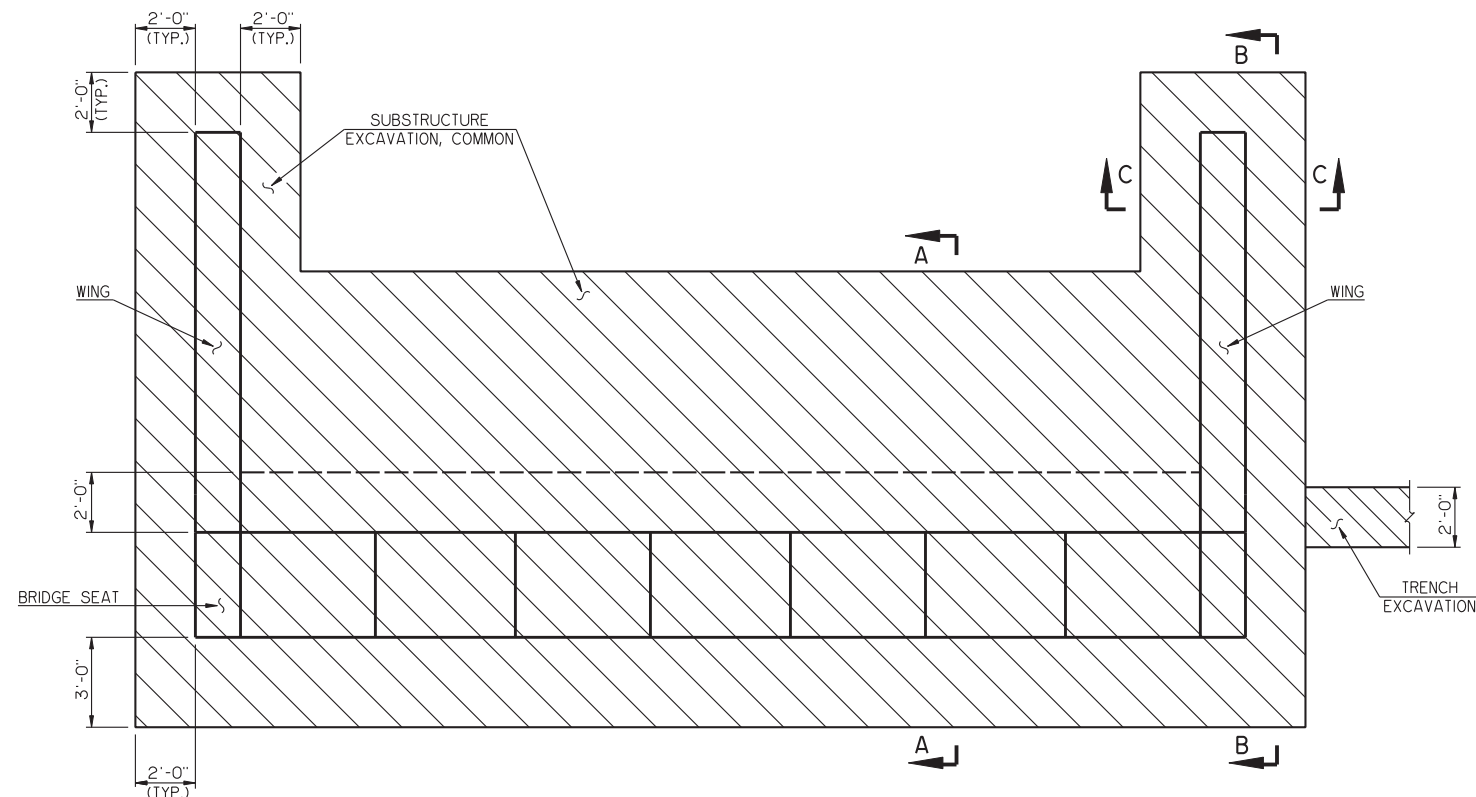
(2) QUANTITY INCLUDES ALL COST OF CONCRETE TRAFFIC RAIL (TR3) INCLUDING R1, S AND T REINFORCING STEEL BARS AND CONCRETE.

NOTES

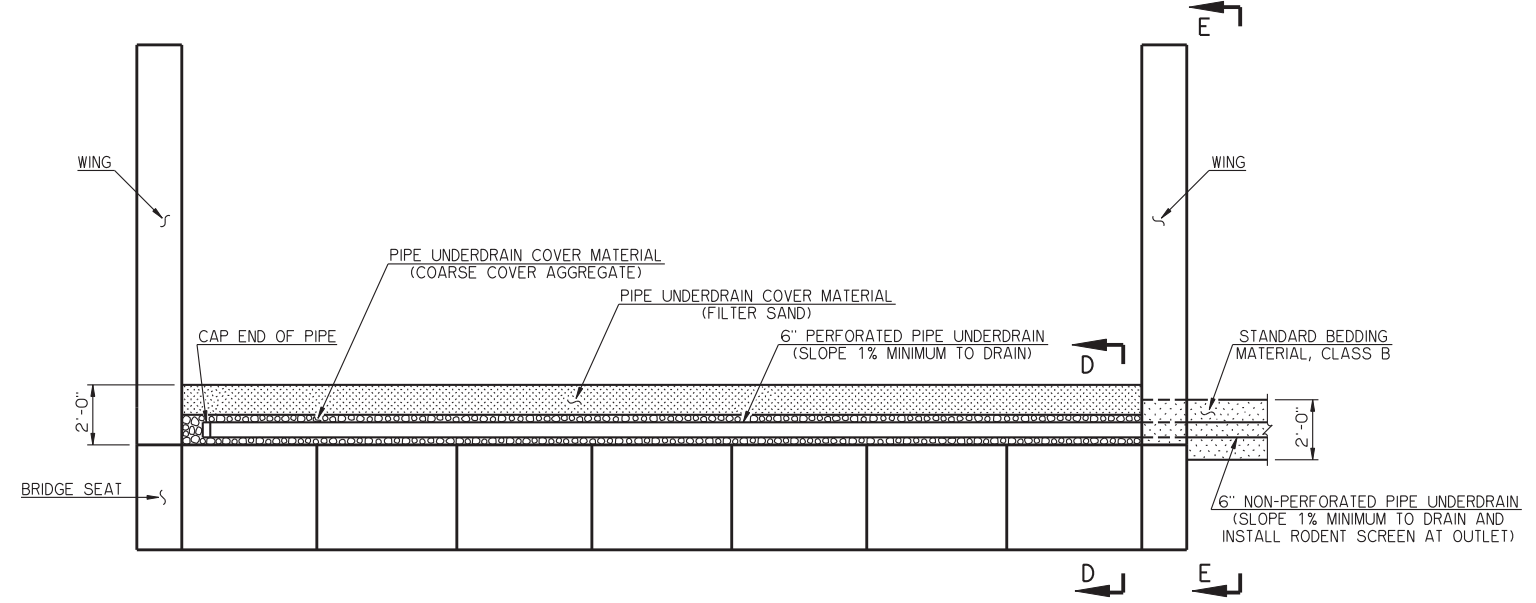
CONSTRUCT THE TOP OF THE ABUTMENT WING LEVEL AS SHOWN. ABUTMENT WING CONCRETE SHALL NOT BE POURED UNTIL THE ABUTMENT DIAPHRAGMS OF THE SUPERSTRUCTURE AND THE DECK SLAB CONCRETE HAVE ATTAINED A STRENGTH OF 3,000 PSI. FOR ADDITIONAL DETAILS AND INFORMATION, SEE "ABUTMENT DETAILS" AND "ABUTMENT DIAPHRAGM DETAILS."

APPROVED BY BRIDGE ENGINEER *Robert J. Dusch* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
WING DETAILS
TYPE III AND TYPE C P.C. BEAMS
26' AND 32' CLEAR ROADWAY - INTEGRAL - SKEWED 0°
 2009 SPECIFICATIONS CB26.32-I-SKO-WING-PC3 01E CB-942E

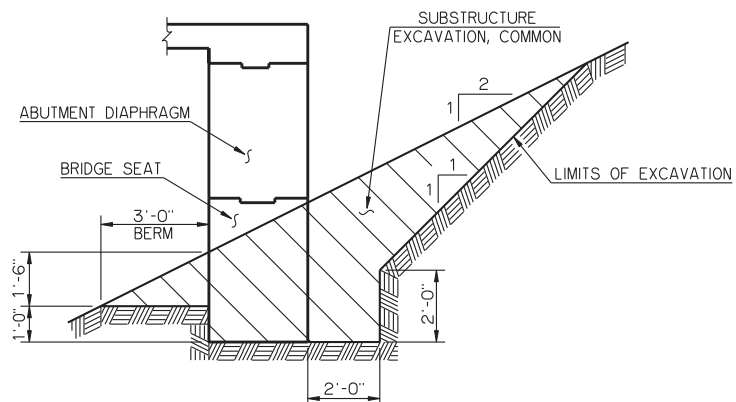
(1) SEE BRIDGE STANDARD TR3-2 FOR DETAILS NOT SHOWN



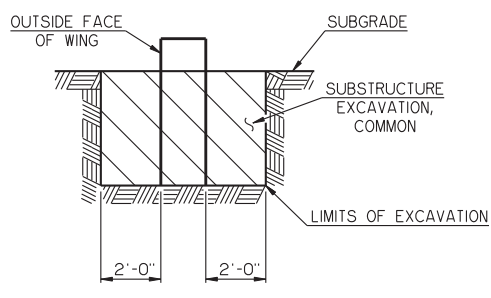
EXCAVATION PLAN



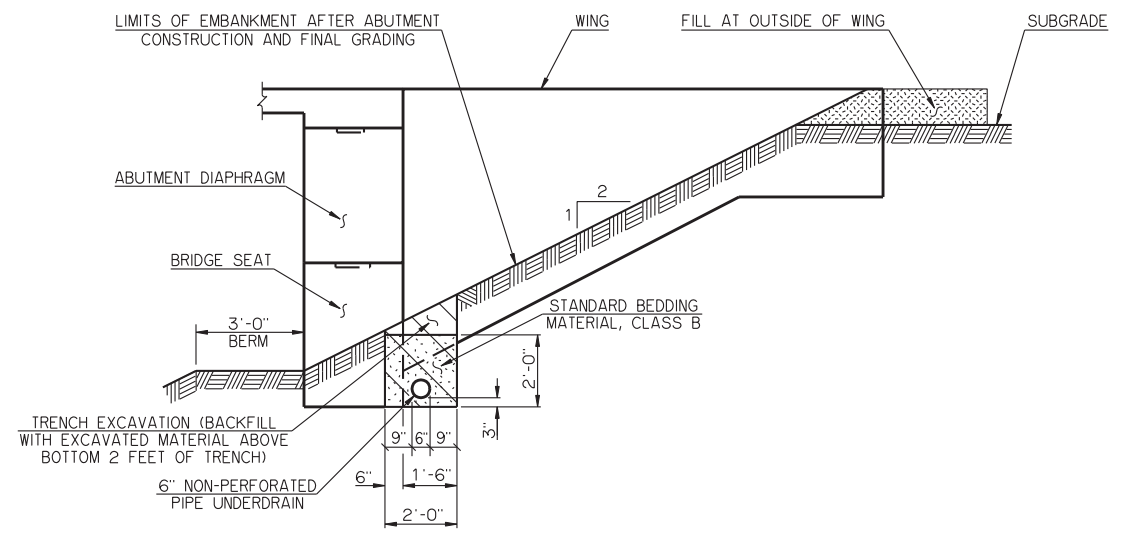
PIPE UNDERDRAIN PLAN



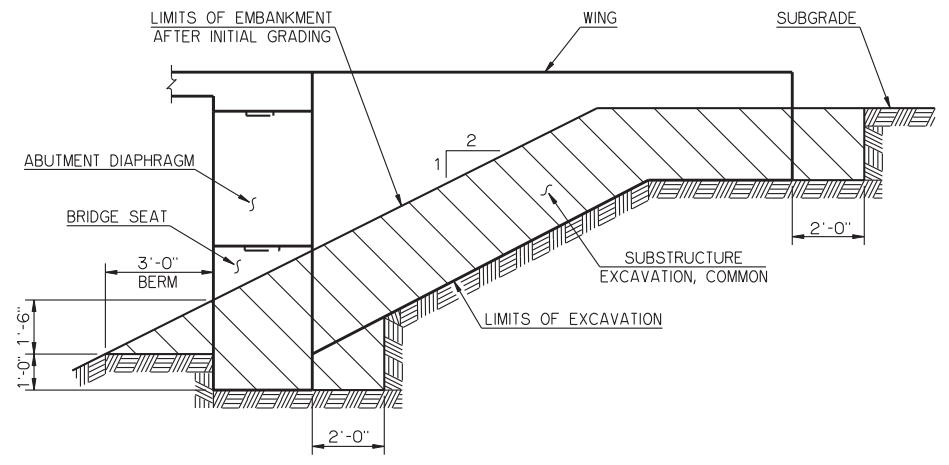
SECTION A-A



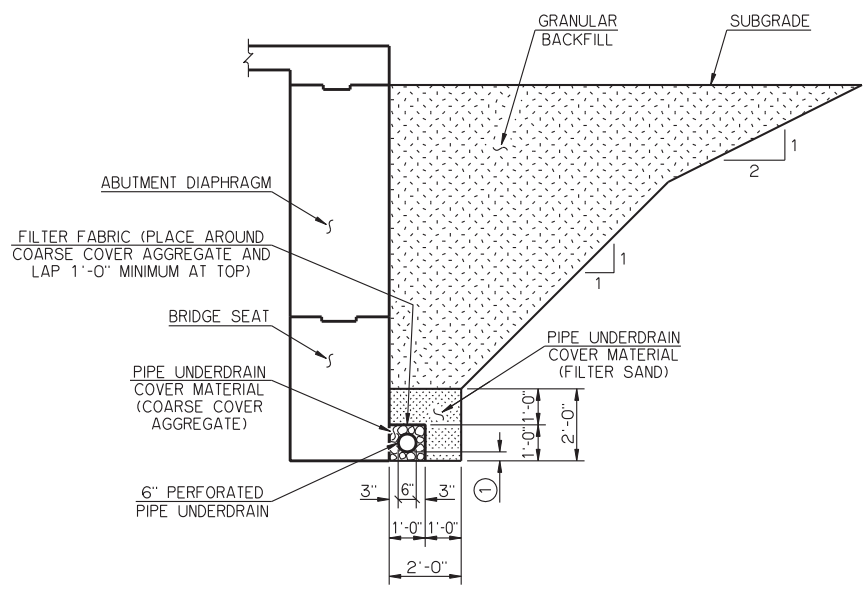
SECTION C-C



SECTION E-E



SECTION B-B



SECTION D-D

NOTES

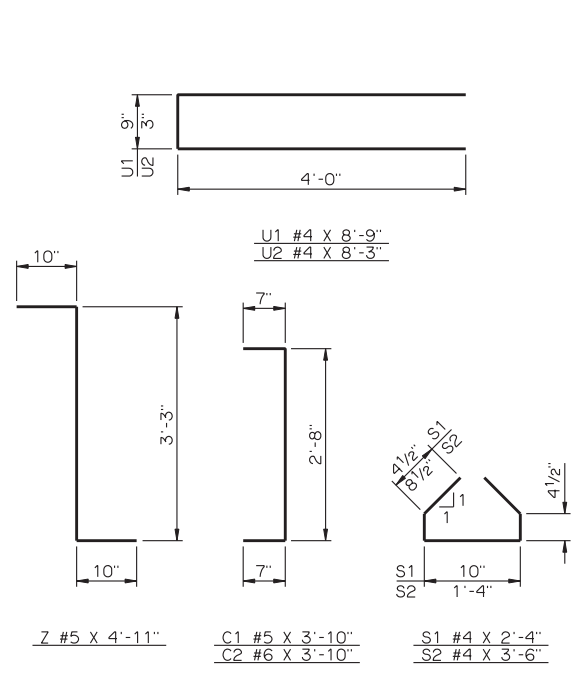
CONCRETE MAY BE PLACED AGAINST THE LIMITS OF EXCAVATION IF THE MATERIAL IS EXCAVATED TO THE NEAT LINES OF THE ABUTMENT AND APPROVED BY THE ENGINEER. IF NECESSARY, FORMS SHALL BE USED ON THE BACK VERTICAL FACE OF THE ABUTMENT AND REMOVED AFTER THE CONCRETE HAS SET. THE MEASUREMENT AND PAYMENT FOR "SUBSTRUCTURE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

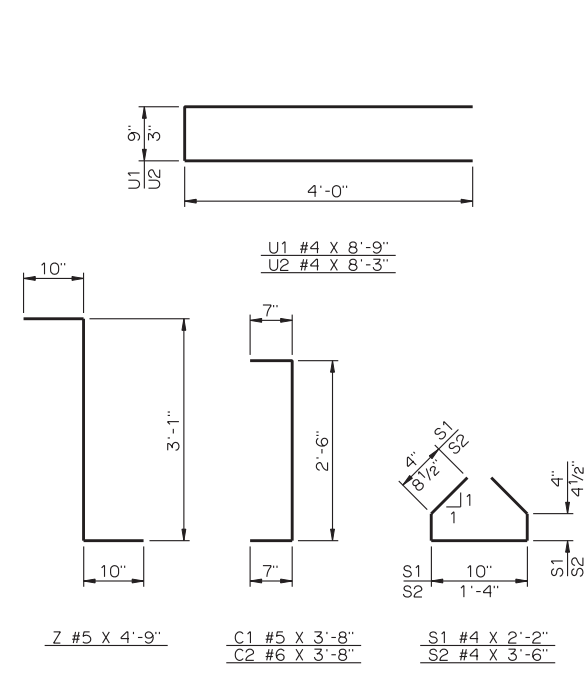
INSTALLATION OF THE PIPE UNDERDRAIN SHALL BE AS SHOWN IN THE PLANS AND ON ROADWAY STANDARD DRAWING PUD-3. THE EXTENT, LOCATION AND DEPTH OF THE 6" NON-PERFORATED PIPE UNDERDRAIN MAY BE ADJUSTED BY THE ENGINEER DURING CONSTRUCTION. ALL COST OF THE PERFORATED AND NON-PERFORATED PIPE, PIPE UNDERDRAIN COVER 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 - INTEGRAL - SKEWED 0°
 2009 SPECIFICATIONS CB26.32-I-SKO-ABUT-MISC 01E
 CB-955E

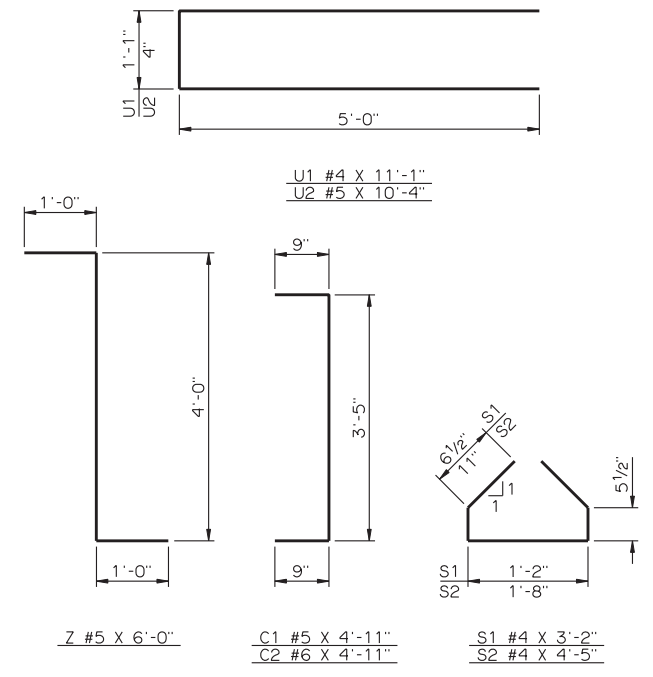
① SET PIPE AT 3" ABOVE THE BOTTOM OF THE ABUTMENT AT THE LOW END.



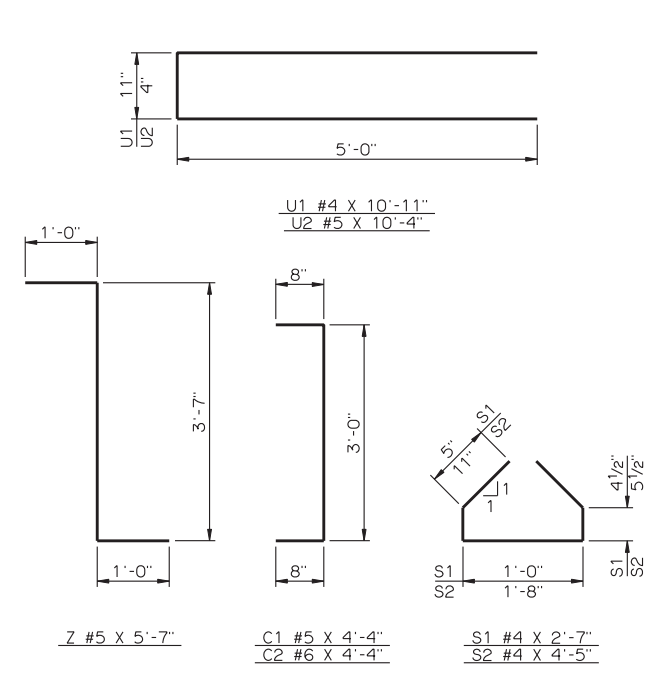
TYPE II P.C. BEAMS



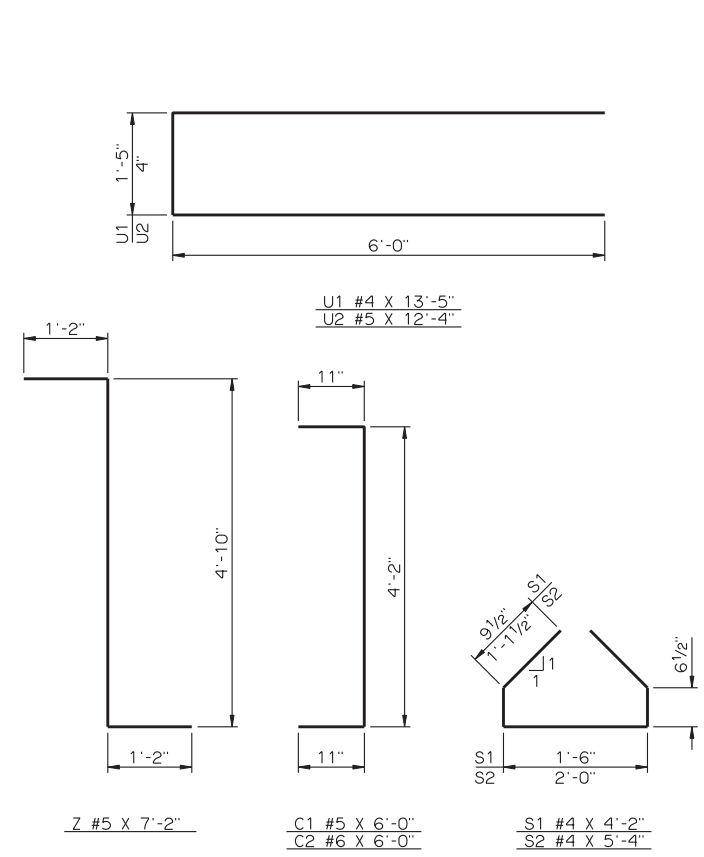
TYPE B P.C. BEAMS



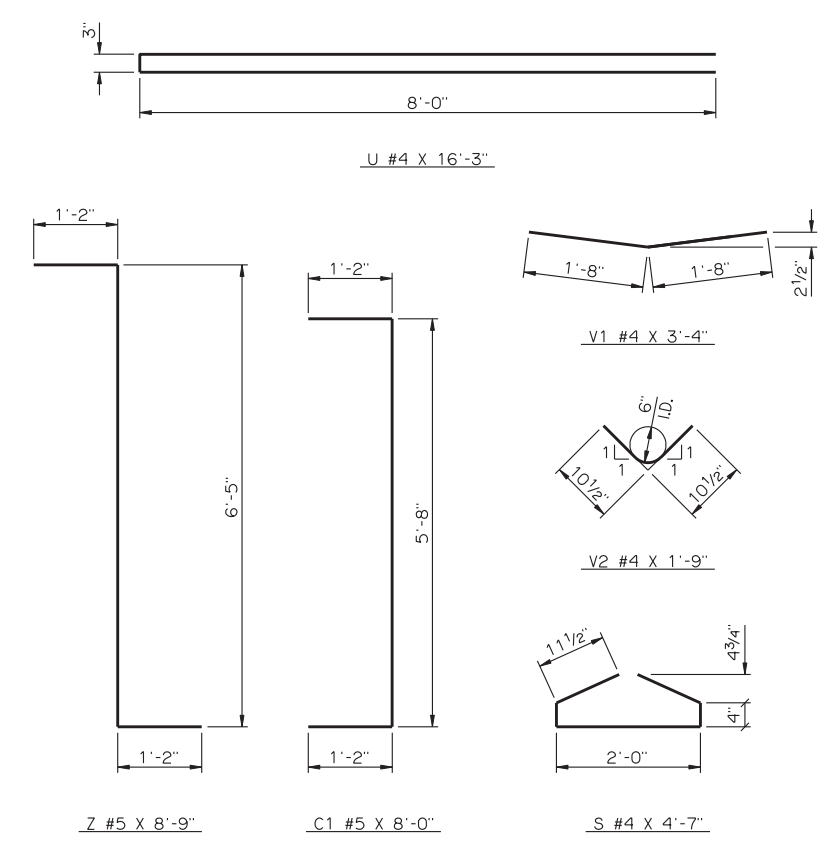
TYPE III P.C. BEAMS



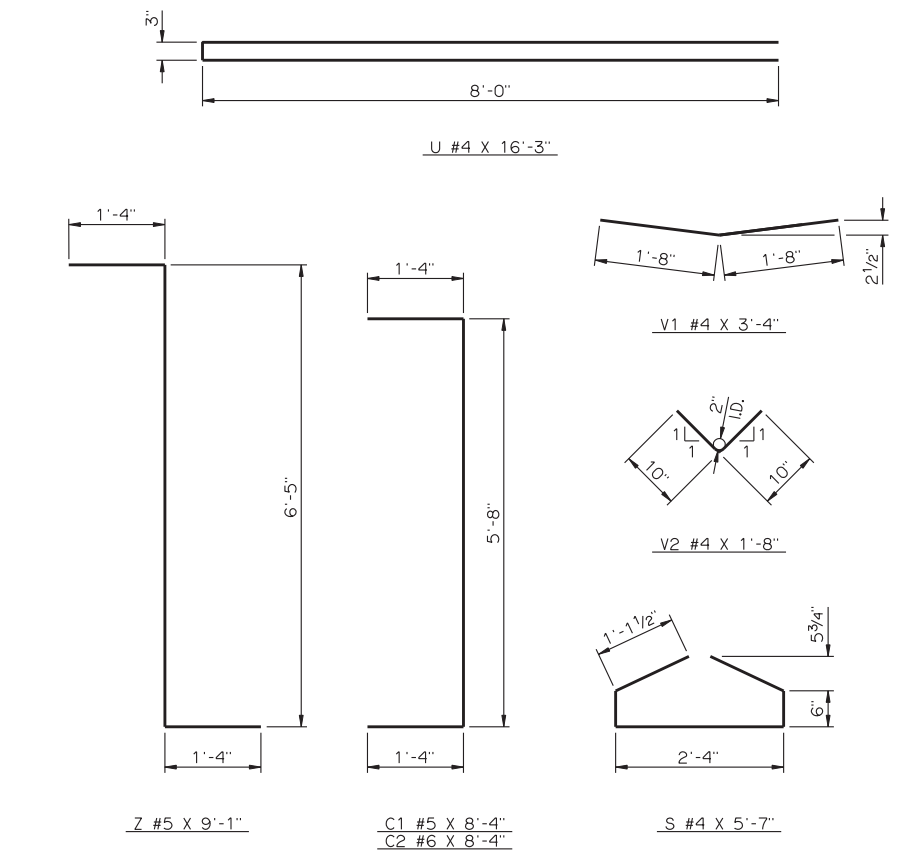
TYPE C P.C. BEAMS



TYPE IV P.C. BEAMS



TYPE BT-72 P.C. BEAMS



TYPE J P.C. BEAMS

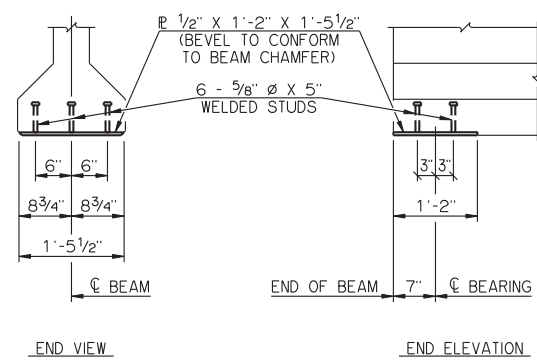
DETAILS OF BENT REINFORCING STEEL

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

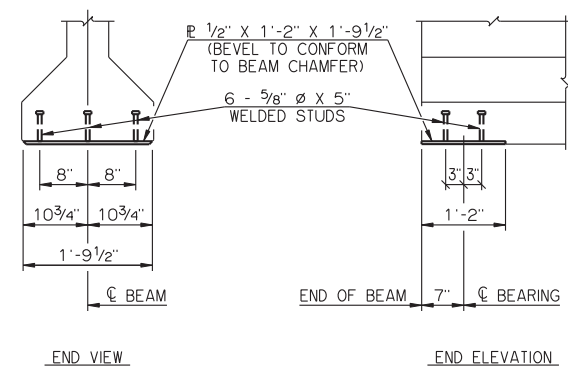
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

P.C. BEAM DETAILS
TYPE II, B, III, C, IV, BT-72 AND J P.C. BEAMS
(SHEET NO. 1 OF 2)

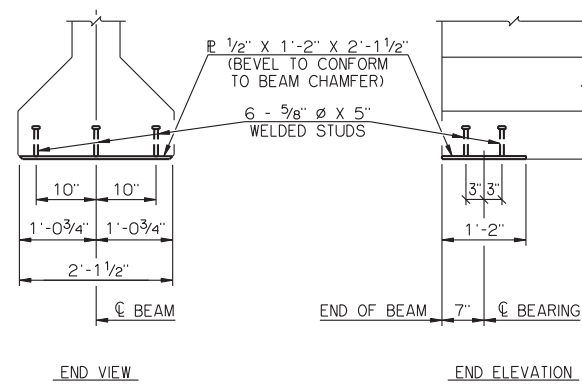
26' AND 32' CLEAR ROADWAYS - CONVENTIONAL AND INTEGRAL - SKEWED 0° AND 30°
2009 SPECIFICATIONS CB26.32-C.I.-SKO.30-PCB-DTL-1 01E
CB-958E



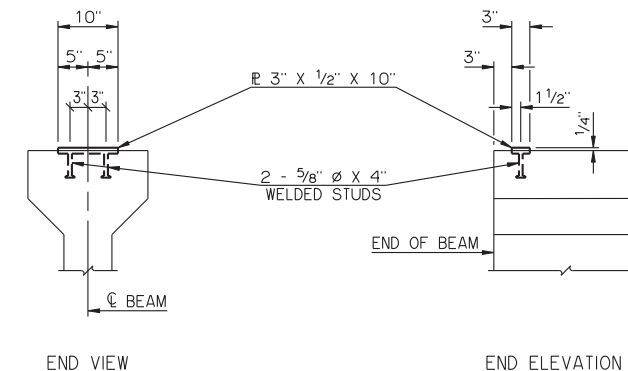
TYPE II AND TYPE B P.C. BEAMS



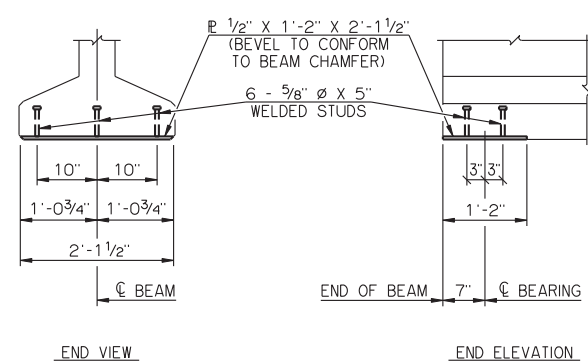
TYPE III AND TYPE C P.C. BEAMS



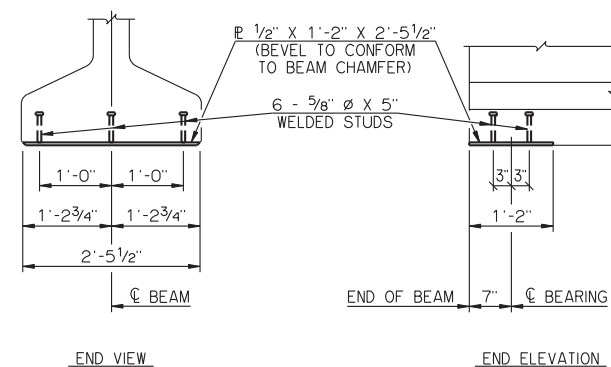
TYPE IV P.C. BEAMS



ENCASED BEAM PLATE DETAILS

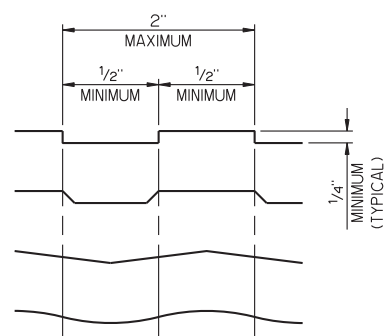


TYPE BT-72 P.C. BEAMS



TYPE J P.C. BEAMS

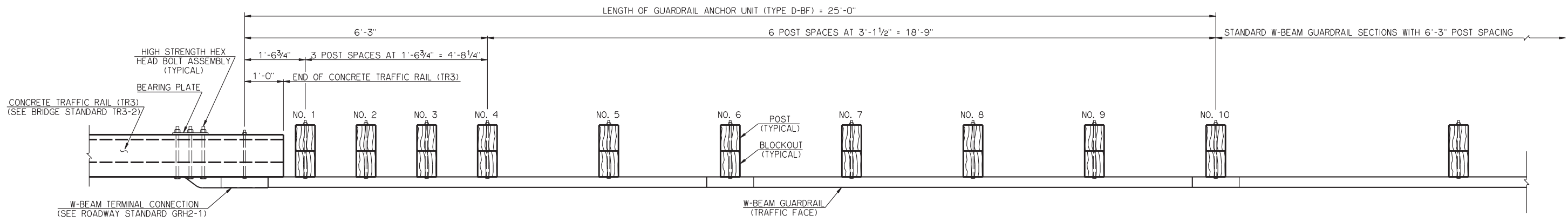
ENCASED SOLE PLATE DETAILS



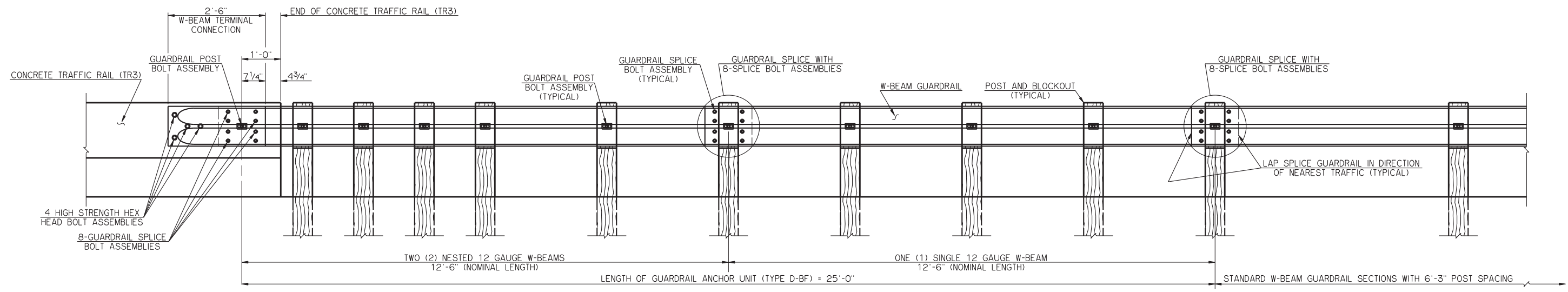
INTENTIONALLY ROUGHENED SURFACE EXAMPLES

TOP SURFACE OF P.C. BEAMS SHALL BE INTENTIONALLY ROUGHENED TO A MINIMUM HEIGHT OF 1/4" OVER A MAXIMUM PITCH OF 2" MEASURED LONGITUDINALLY ALONG THE LENGTH OF THE BEAM. THE CREST AND TROUGH ASSOCIATED WITH THE HEIGHT SHALL NOT BE LESS THAN 1/2" AND SHALL EXTEND THE FULL WIDTH OF THE TOP FLANGE. ROUGHENED SURFACE MAY BE OBTAINED BY A SPECIAL TROWEL AS SHOWN IN THE EXAMPLES, BY CLEANING THE CONCRETE SURFACE WITH A STIFF WIRE BRUSH OR BLASTING TO THE EXTENT THAT AGGREGATE IS EXPOSED TO A HEIGHT OF 1/4", OR BY ANOTHER METHOD APPROVED BY THE ENGINEER.

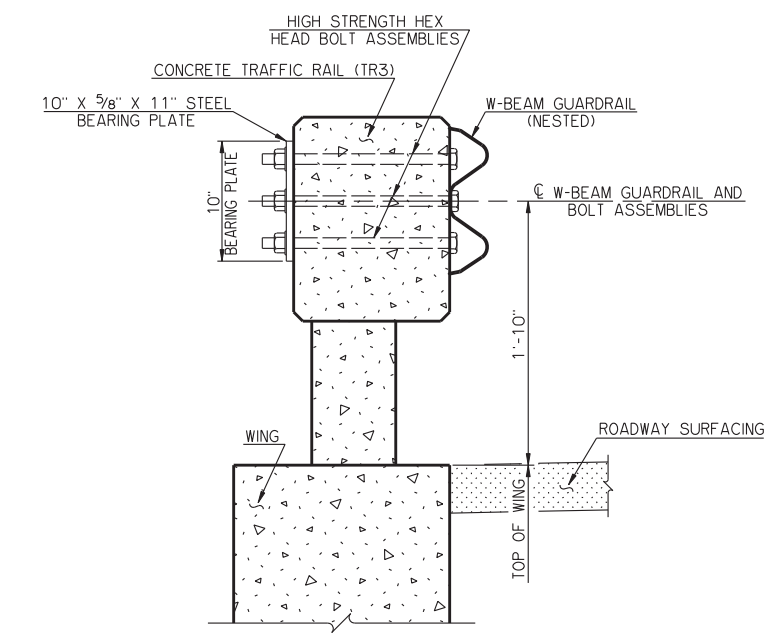
APPROVED BY BRIDGE ENGINEER *Robert D. Smith* DATE 9-9-2011
 OKLAHOMA DEPARTMENT OF TRANSPORTATION
 COUNTY BRIDGE STANDARD (ENGLISH)
P.C. BEAM DETAILS
 TYPE II, B, III, C, IV, BT-72 AND J P.C. BEAMS
 (SHEET NO. 2 OF 2)
 26' AND 32' CLEAR ROADWAYS - CONVENTIONAL AND INTEGRAL - SKEWED 0° AND 30°
 2009 SPECIFICATIONS CB26.32-C.I.-SKO.30-PCB-DTL-2 01E
 CB-959E



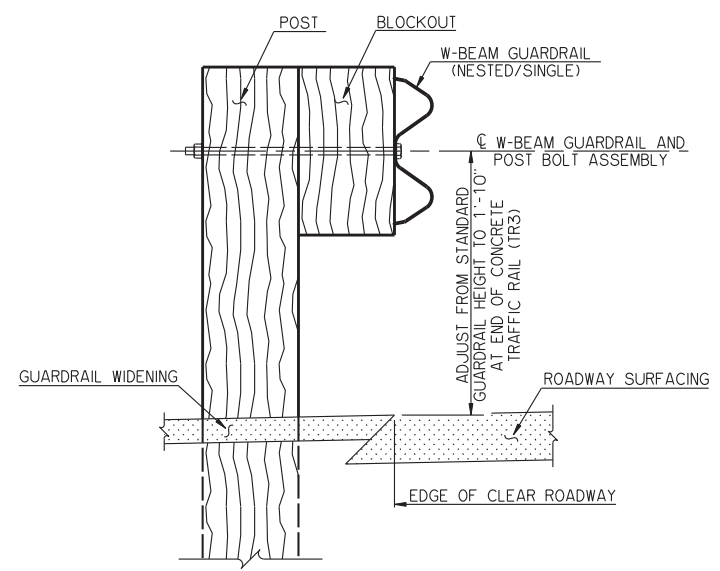
PLAN



ELEVATION



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



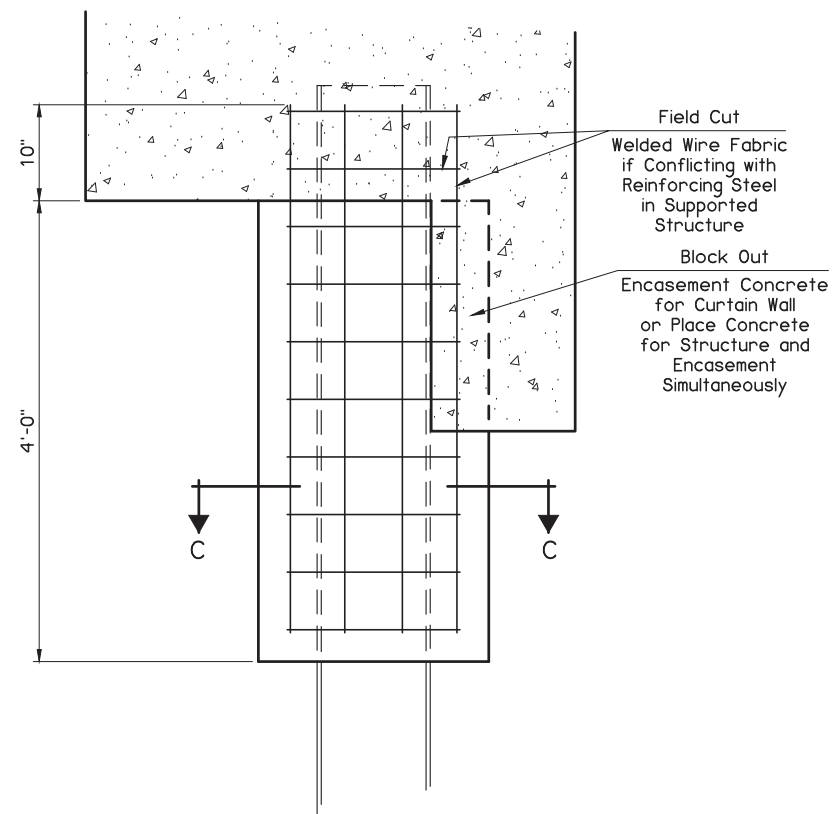
SECTION THRU GUARDRAIL BRIDGE CONNECTION AT GUARDRAIL POST AND BLOCKOUT

NOTES

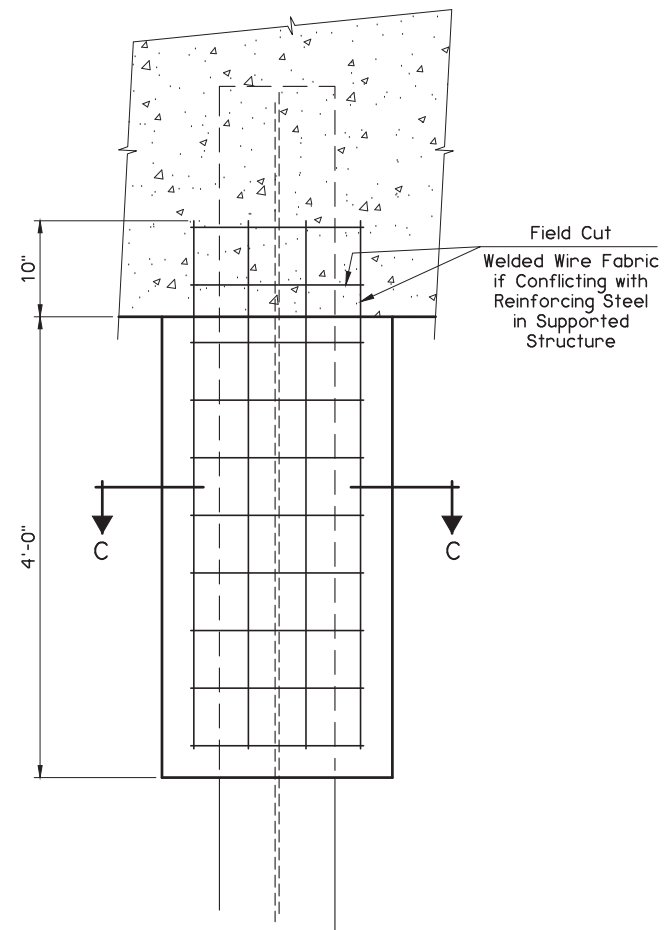
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE ODOT 2009 STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
2. SEE ROADWAY STANDARDS GRH1-1 AND GRH2-1 FOR DETAILS OF GUARDRAIL, W-BEAM TERMINAL CONNECTION, POSTS, BLOCKOUTS, BOLT ASSEMBLIES AND HARDWARE NOT SHOWN. SEE "STATE" 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
 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

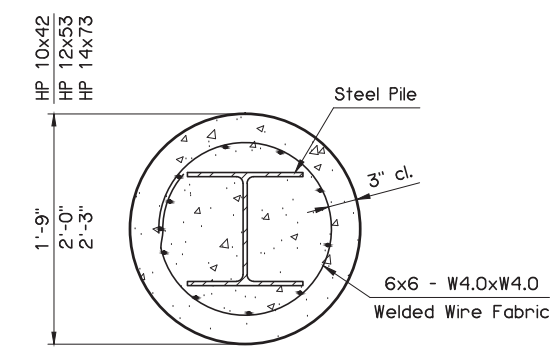
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623(F)	GUARDRAIL ANCHOR UNIT (TYPE D-BF)	EA



ELEVATION AT CURTAIN WALL



TYPICAL ELEVATION

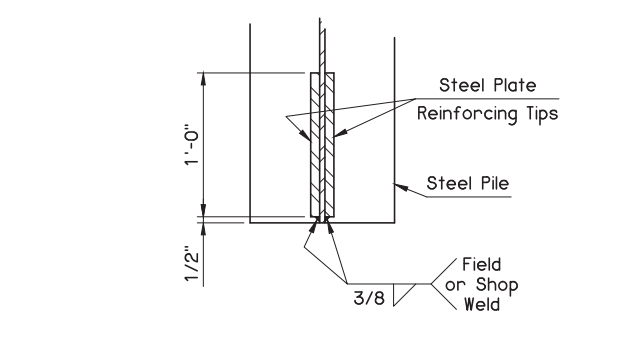


SECTION C-C

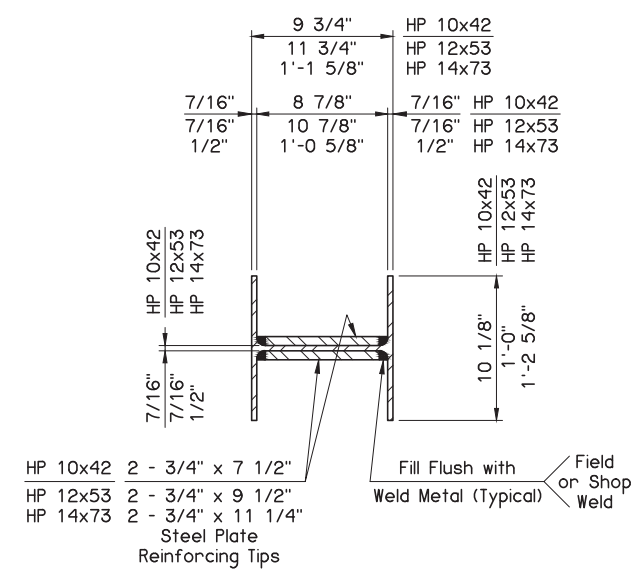
DETAIL OF STEEL PILE ENCASEMENT

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.

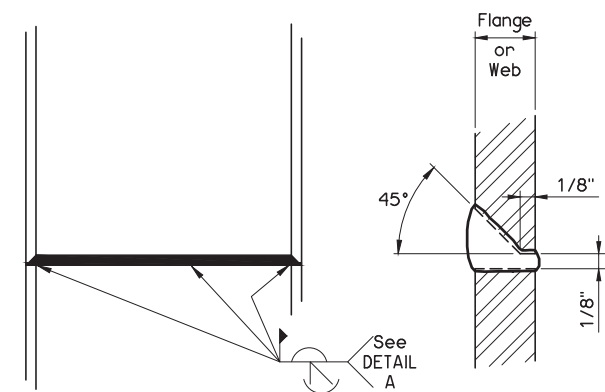
PILE ENCASEMENT QUANTITIES PER PILE				
ITEM	UNIT	HP 10x42	HP 12x53	HP 14x73
CLASS A CONCRETE	C.Y.	0.34	0.45	0.57
REINFORCING STEEL	LB.	16.2	18.3	20.3



SECTION A-A

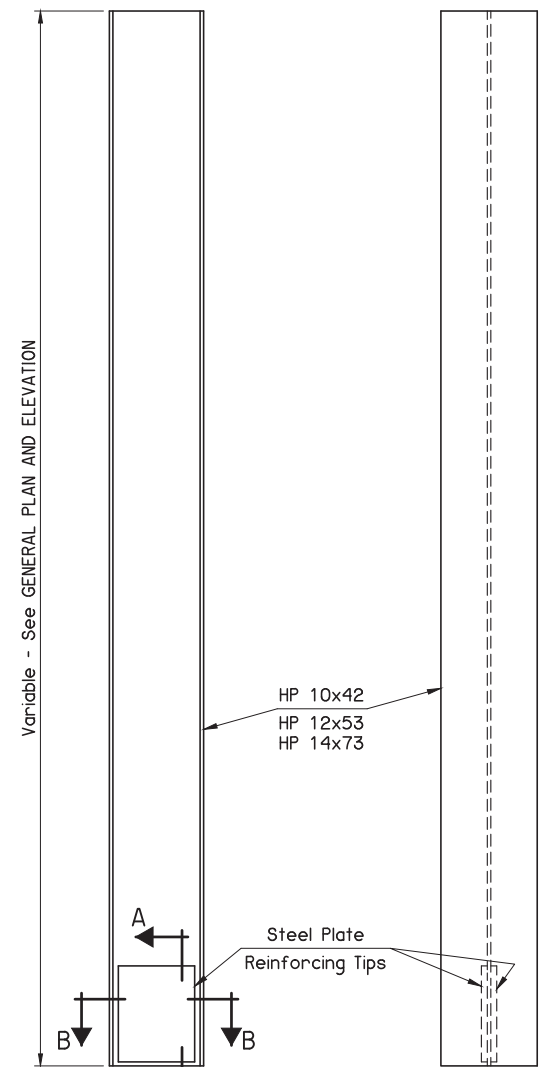


SECTION B-B



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

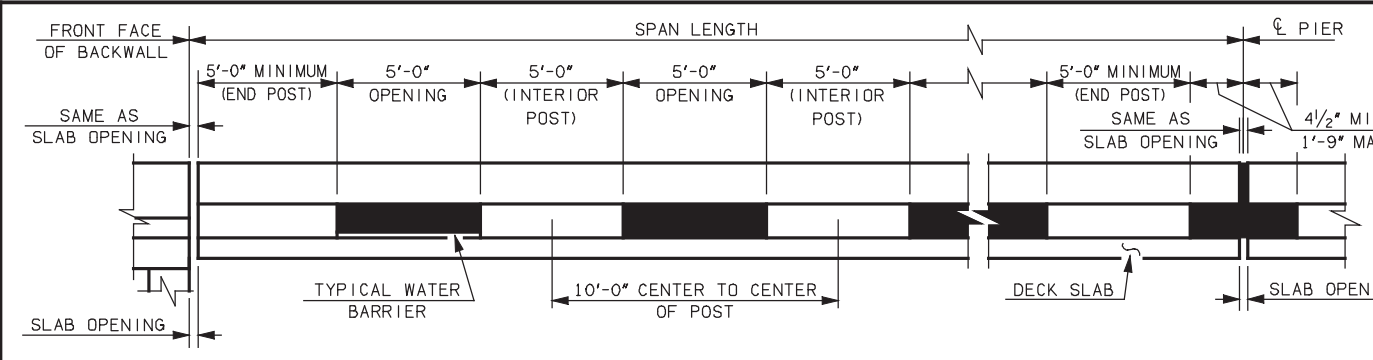
NOTE:
Provide structural steel for Piling and Steel Plate Reinforcing Tips in accordance with AASHTO M270 (ASTM A572), Grade 50. Provide Steel Plate Reinforcing Tips for all Piling unless specifically deleted by notes in the Project Plans and Specifications. The Contractor may use Manufactured Driving 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

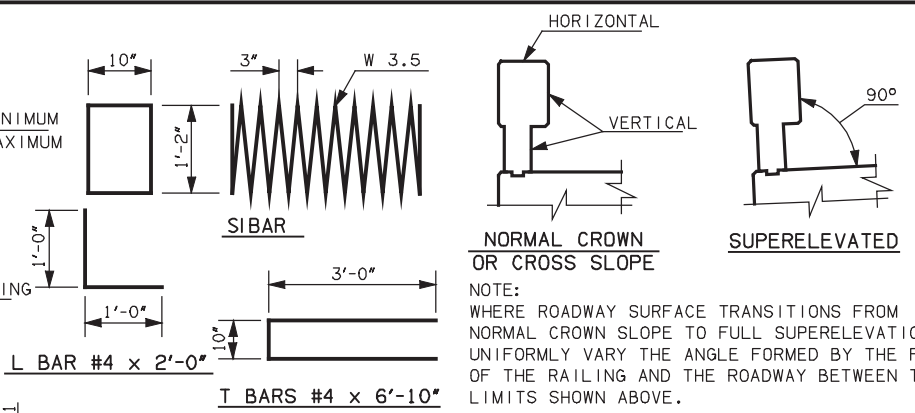
DESCRIPTION	REVISIONS	DATE



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)".

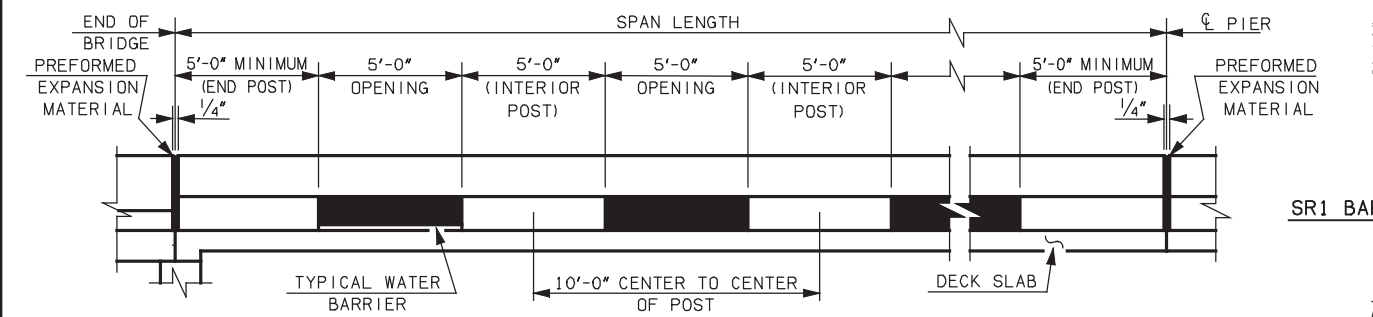
CONCRETE RAIL CONSTRUCTION:
CONSTRUCT RAILING WITHIN THE GUIDELINES AS SHOWN IN THE PLACEMENT DETAILS. LAYOUT THE POSTS AS SHOWN IN THE DETAILS ON THIS SHEET UNLESS OTHERWISE SHOWN IN THE PLANS. CONSTRUCT THE OPENINGS SUCH THAT THE END FACE OF THE POST IS PERPENDICULAR TO THE ROADWAY PROFILE GRADE. FOR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

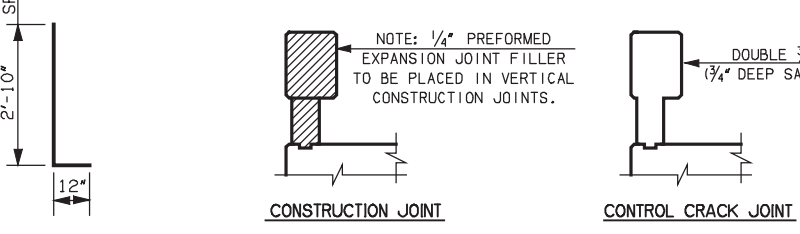
GUARDRAIL CONNECTION:
FORM OR DRILL HOLES, AS SHOWN, FOR THE CONNECTION OF GUARDRAIL BRIDGE CONNECTION AT THE LOCATIONS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. IT IS THE RESPONSIBILITY OF THE BRIDGE CONTRACTOR TO PROVIDE THE HOLES. THE CONTRACTOR THAT INSTALLS THE GUARDRAIL WILL BE RESPONSIBLE 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

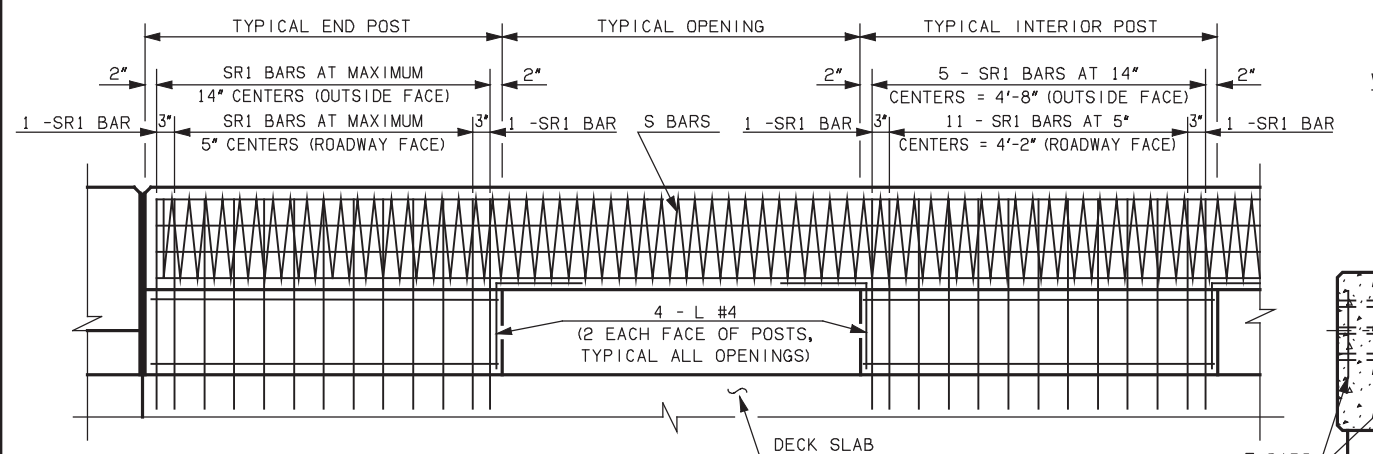
ELEVATION OF RAIL WITH FIXED JOINTS



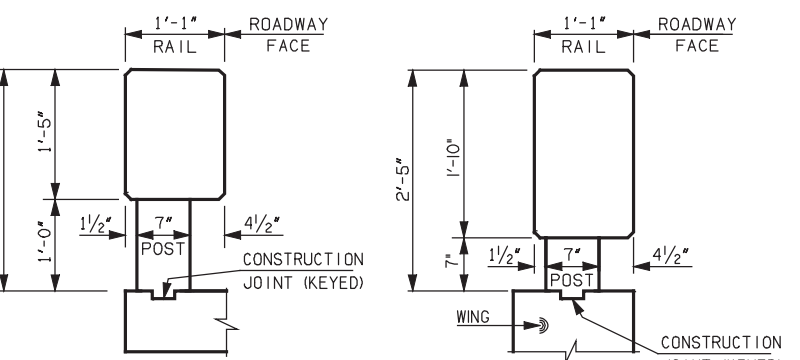
SR1 BARS #5 x 3'-10"

CONSTRUCTION JOINT

CONTROL CRACK JOINT

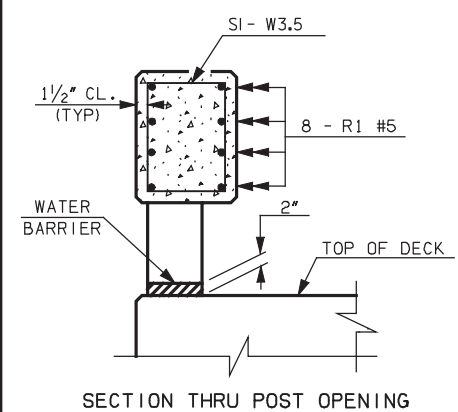


TRAFFIC RAIL REINFORCING

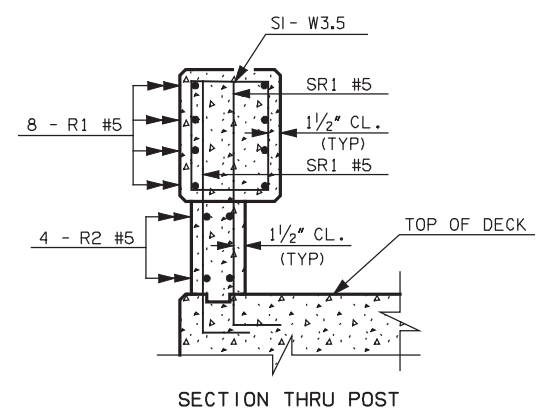


TRAFFIC RAIL DETAIL

TRAFFIC RAIL DETAIL AT WING

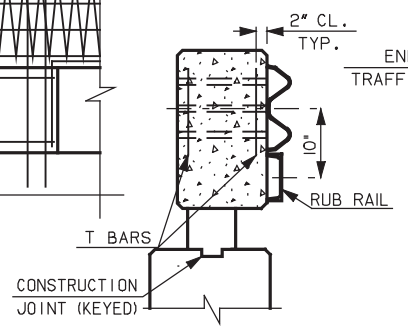


SECTION THRU POST OPENING

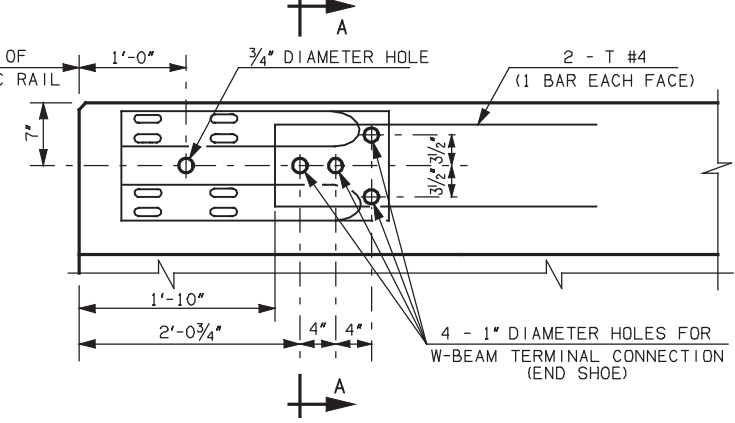


SECTION THRU POST

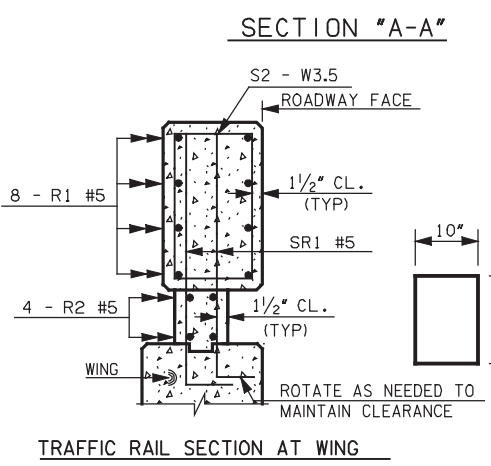
SECTION THRU RAIL AT BRIDGE DECK OR APPROACH SLAB



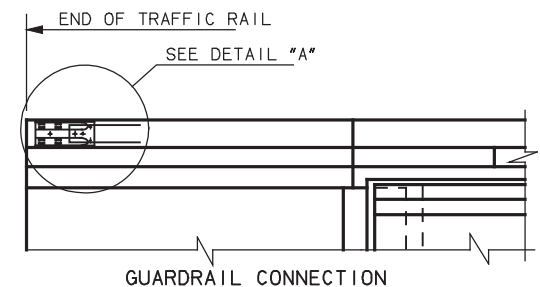
SECTION "A-A"



DETAIL "A"



TRAFFIC RAIL SECTION AT WING



GUARDRAIL CONNECTION

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

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

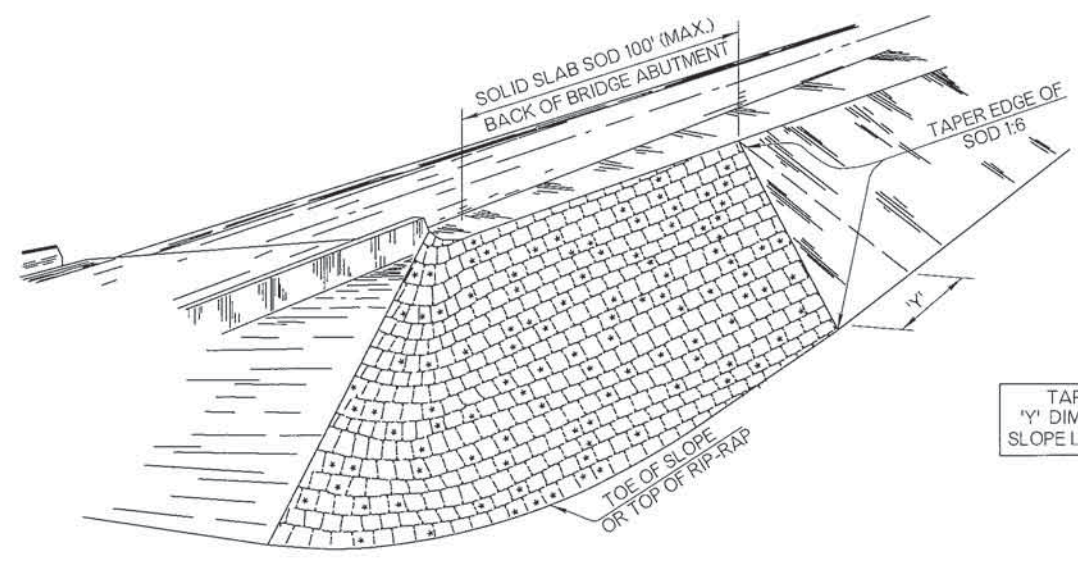
OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

CONCRETE RAIL (TR3)

2009 SPECIFICATIONS

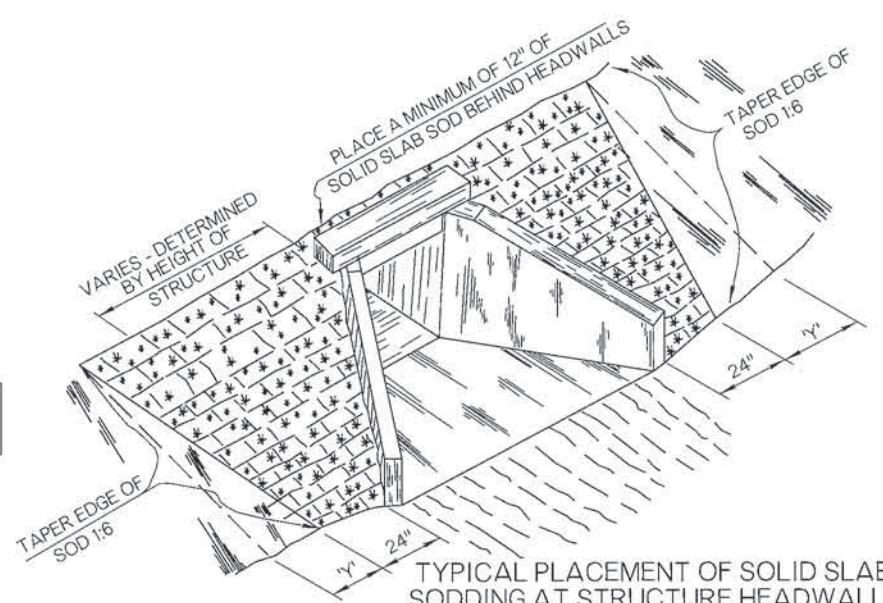
TR3-2	OIE
B-01E	

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



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

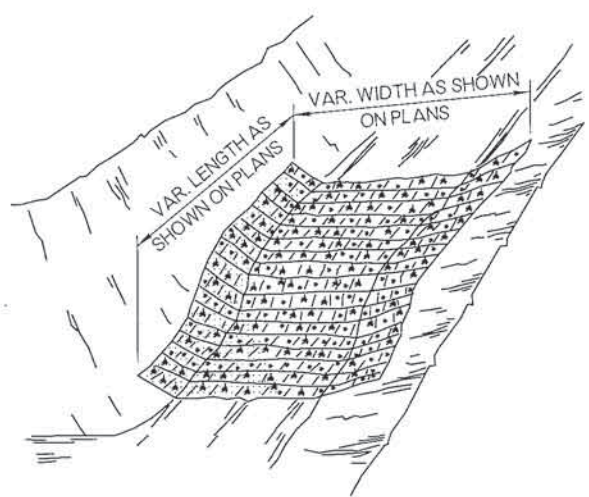
TAPER NOTE
 'Y' DIMENSION =
 SLOPE LENGTH x 0.17



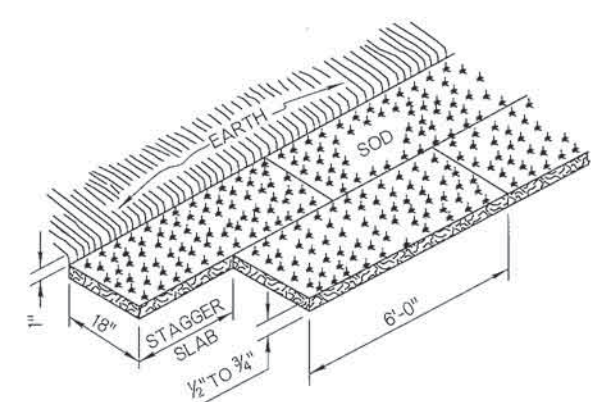
TYPICAL PLACEMENT OF SOLID SLAB SODDING AT STRUCTURE HEADWALLS

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



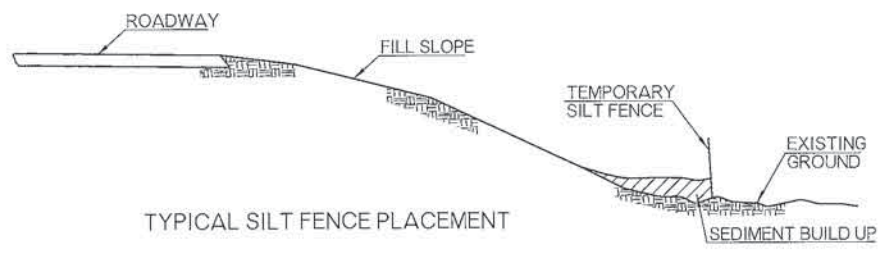
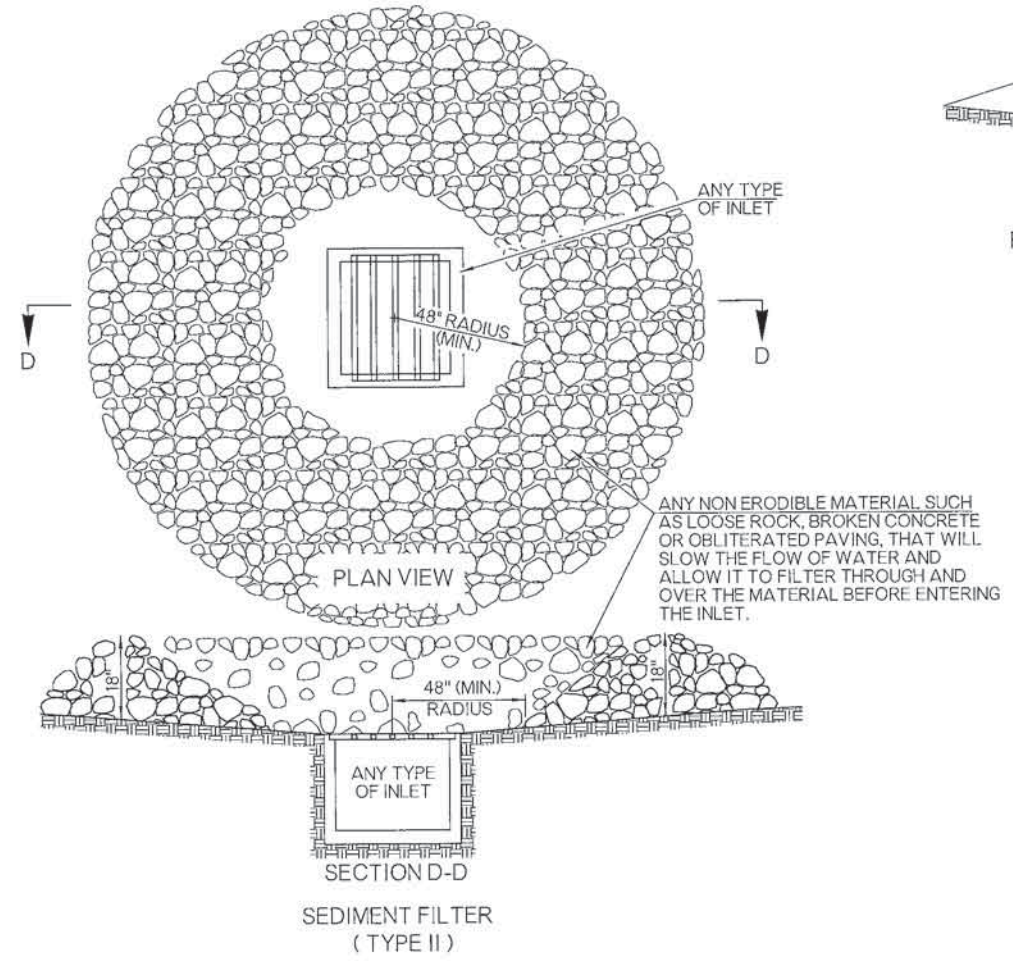
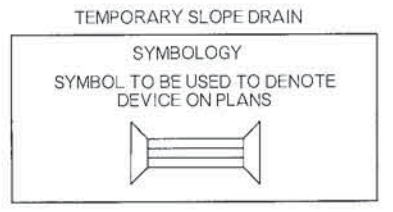
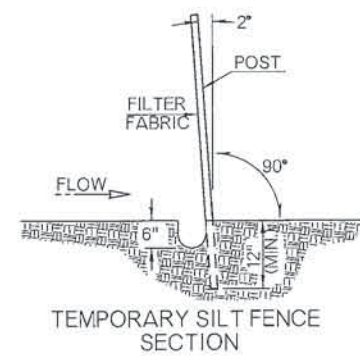
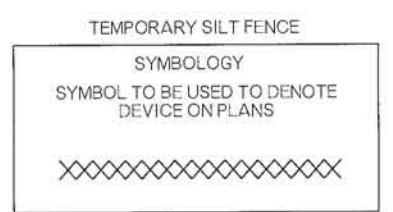
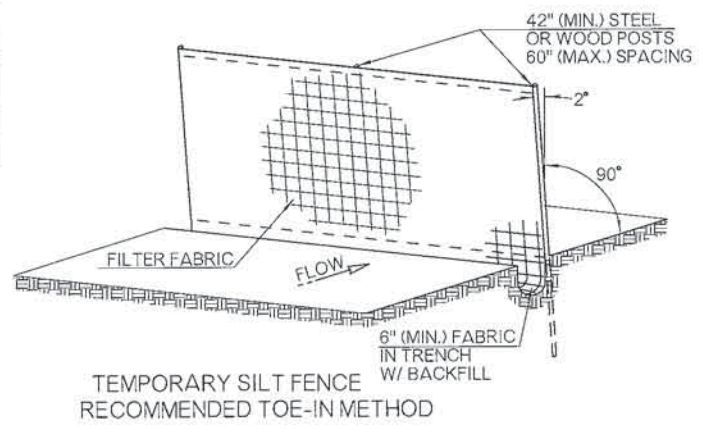
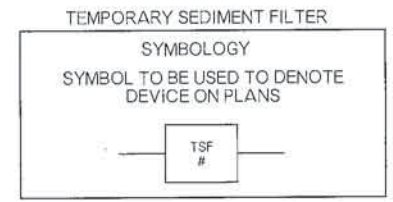
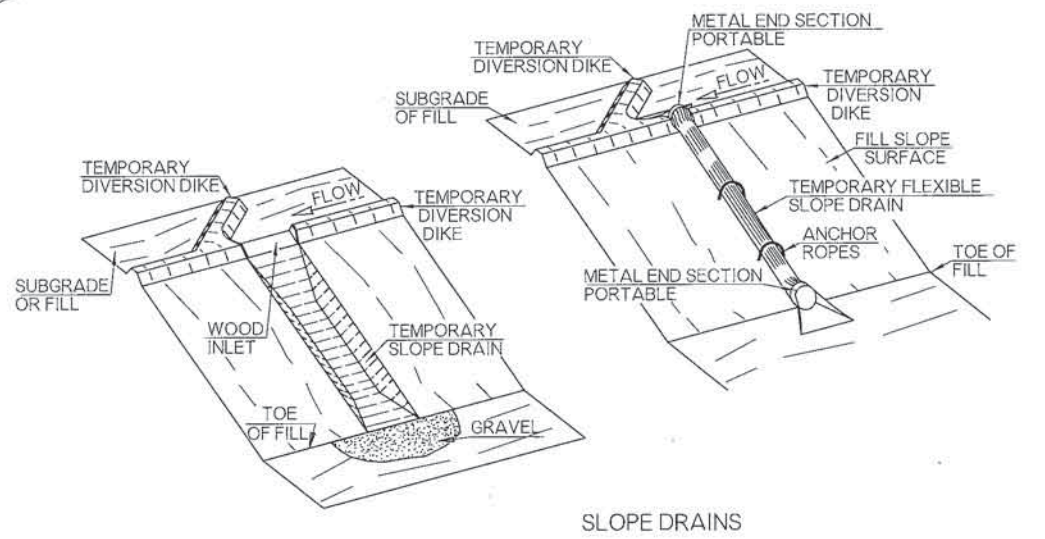
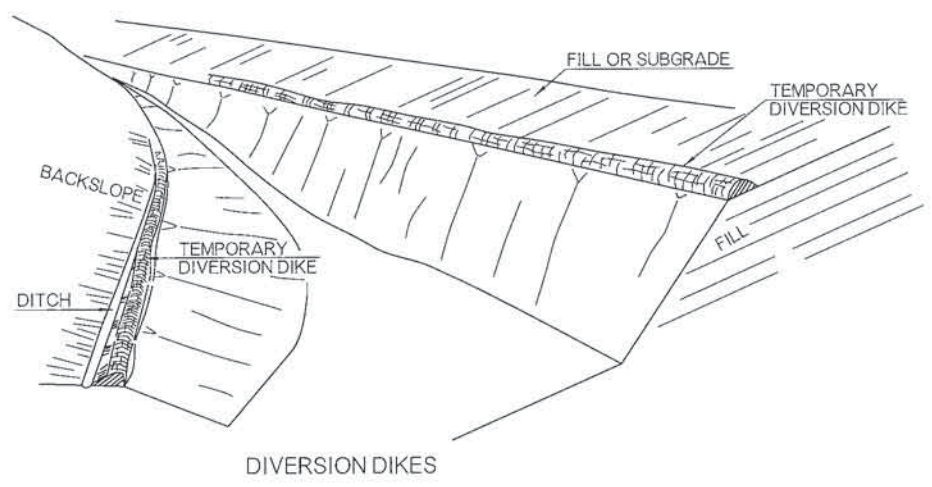
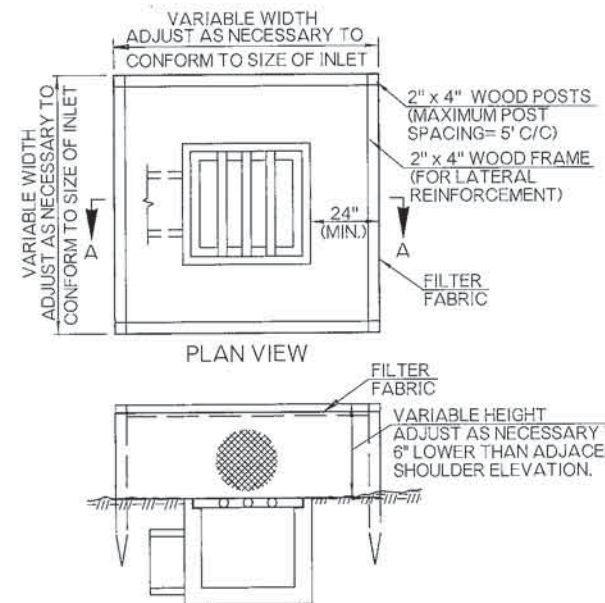
SOLID SLAB SODDING
 (MARCH 1 THRU AUGUST 31)

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: *07/14/13*
 ROADWAY DESIGN DIVISION STANDARD
 SOLID SLAB SODDING

OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	



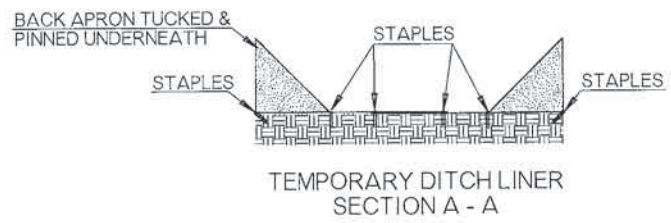
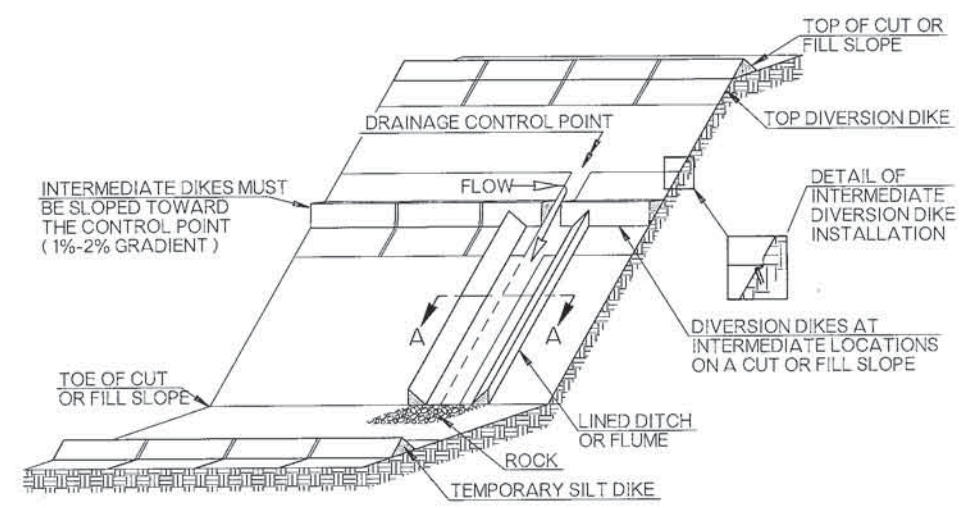
- GENERAL NOTES
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 2. COST OF TEMPORARY DIVERSION DIKES TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS OF WORK.

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

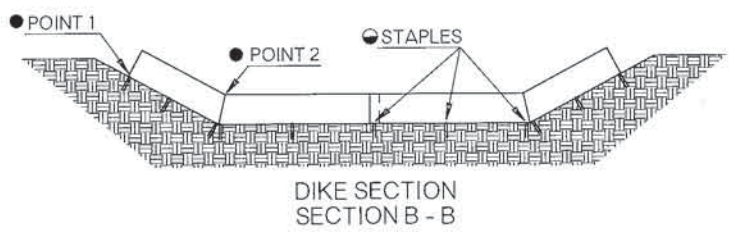
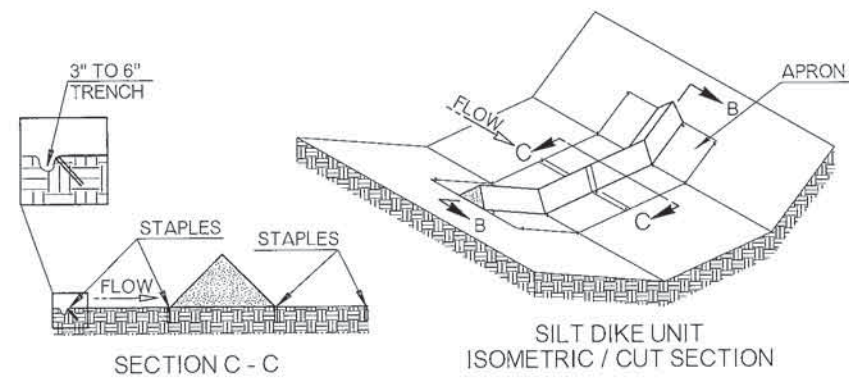
APPROVED BY ROADWAY ENGINEER: *Calvin F. A.* DATE: *01/16/15*

ROADWAY DESIGN DIVISION STANDARD

TEMPORARY SEDIMENT CONTROLS

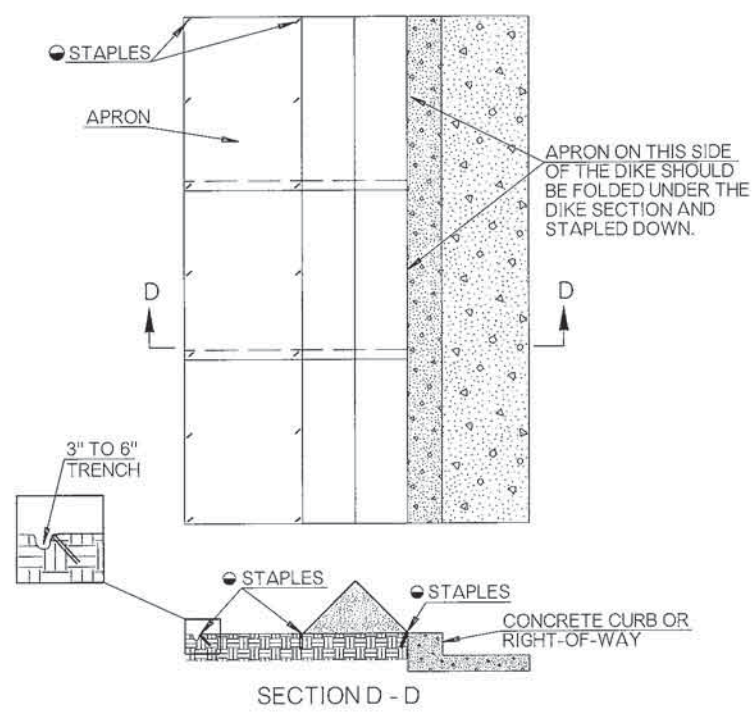


TEMPORARY SILT DIKE INSTALLATION FOR DIVERSION DIKES AND / OR DITCH LINER

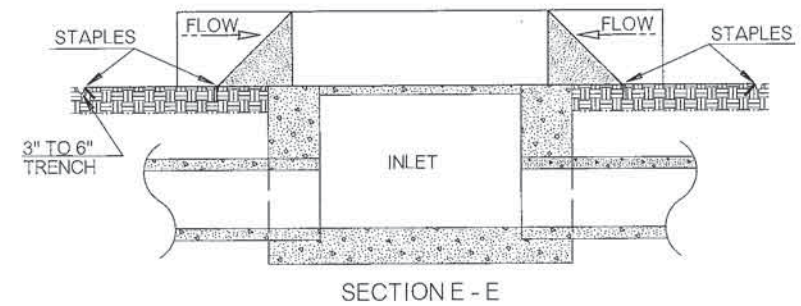
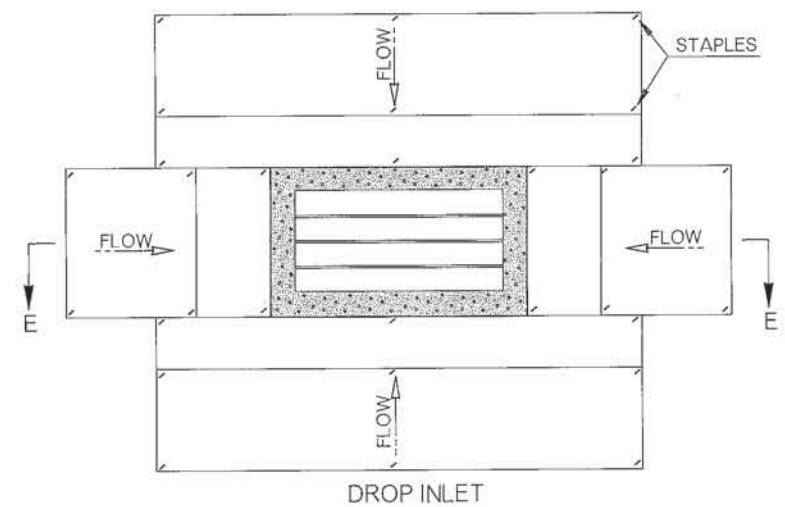


TEMPORARY SILT DIKE INSTALLATION FOR ROADWAY DITCH OR DRAINAGE DITCH

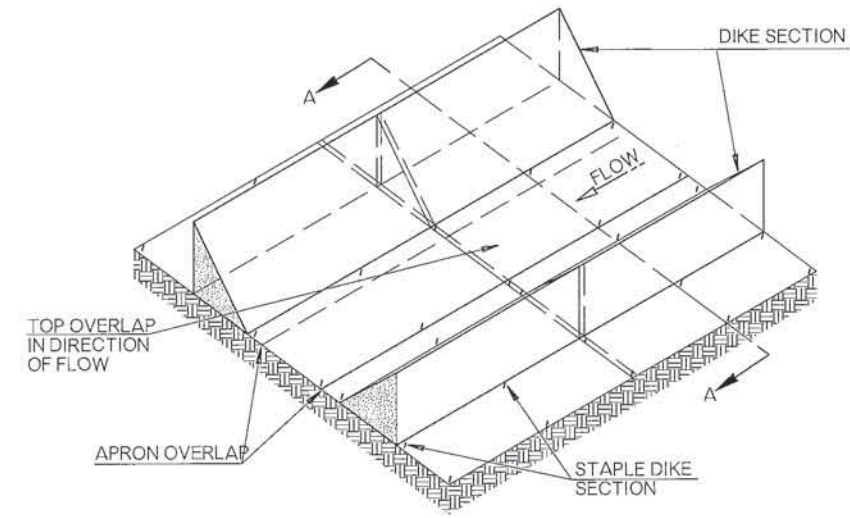
- POINT "1" MUST BE HIGHER THAN POINT "2" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- STAPLES SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF THE UNIT AS SHOWN ON THE DIAGRAM.



TEMPORARY SILT DIKE INSTALLATION FOR CONTINUOUS BARRIER



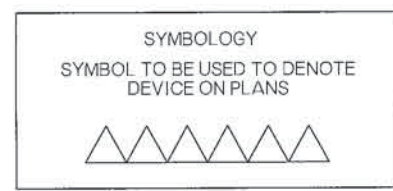
TEMPORARY SILT DIKE INSTALLATION FOR DROP INLETS



TEMPORARY SILT DIKE INSTALLATION FOR TEMPORARY DITCH LINER

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. 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.
3. 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.
4. 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.



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

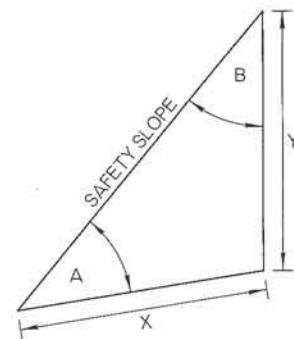
NOTE: SILT DIKES ARE ONLY FURNISHED IN 7' INCREMENTS.

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

TEMPORARY SILT DIKE

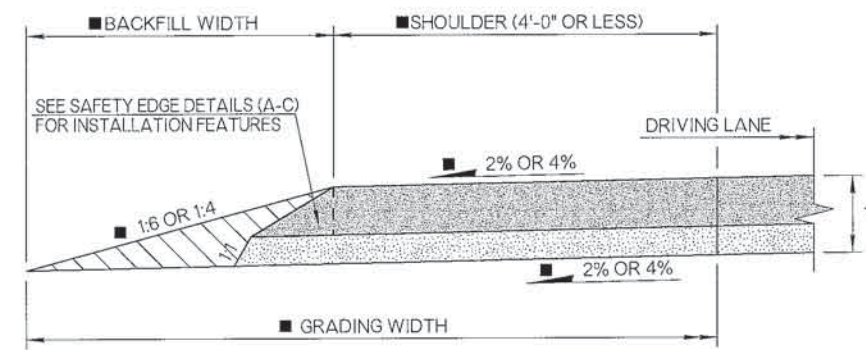
X - ASPHALT PAVEMENT SAFETY EDGE WIDTH

Y	X (2% SLOPE)		X (-4% SLOPE)
	2%	-2%	
IN	IN	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

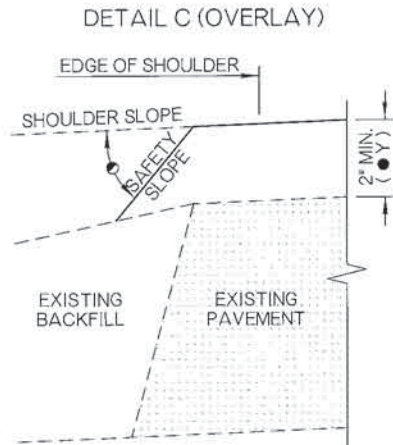
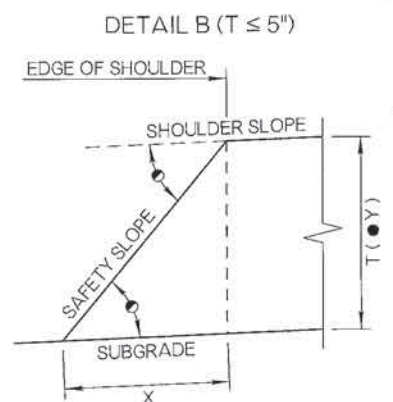
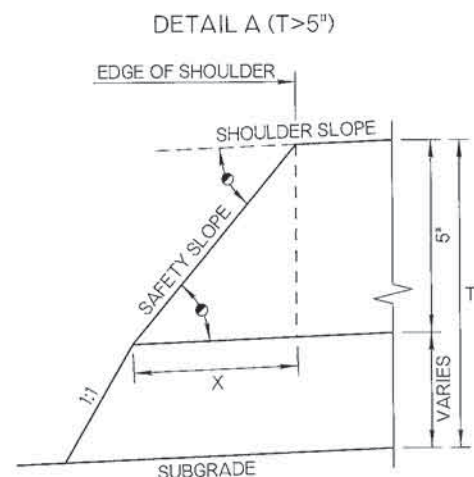


$$X = \frac{Y \cdot \sin(B)}{\sin(A)}$$

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.)

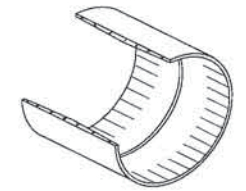
- GENERAL NOTES**
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 2. SAFETY EDGE SHALL BE CONSTRUCTED IN UNION WITH THE ASPHALT CONCRETE PAVEMENT.
 3. THE SAFETY EDGE, AS SHOWN, CAN BE APPLIED TO NEW CONSTRUCTION AND TO OVERLAYS OF AT 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

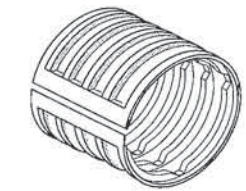
DOT

PAVEMENT SAFETY EDGE

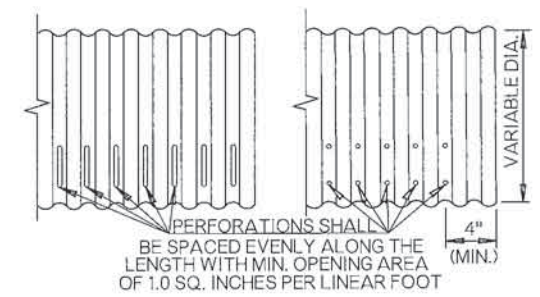
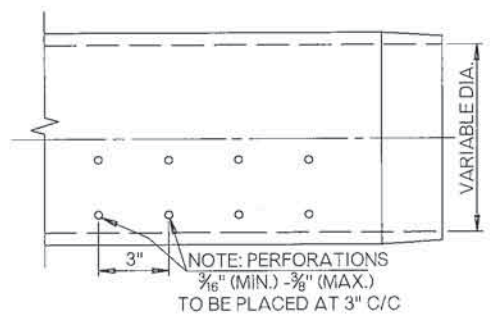
OKLAHOMA DEPARTMENT OF TRANSPORTATION		
STANDARD REVISIONS		
DESCRIPTION	DATE	



TYPICAL COUPLING FOR PVC PIPE UNDERDRAIN
1/4 SECTION REMOVED



TYPICAL CORRUGATED COUPLING
OR AN APPROVED EQUAL



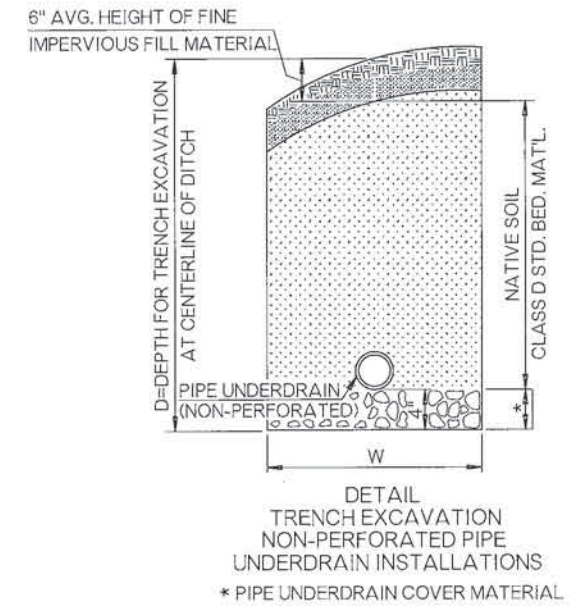
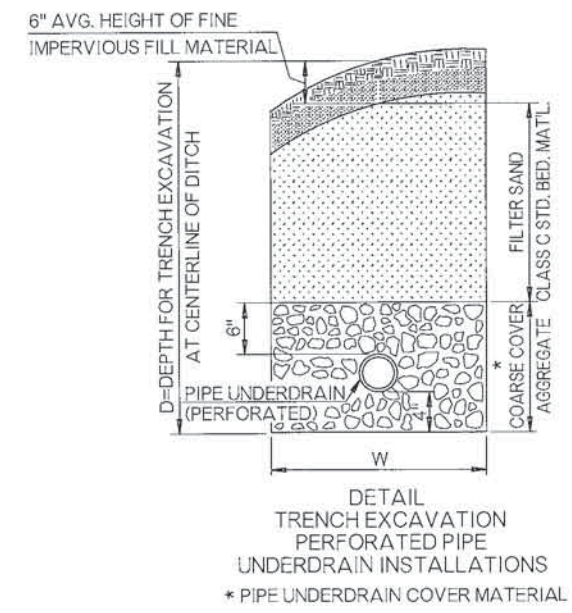
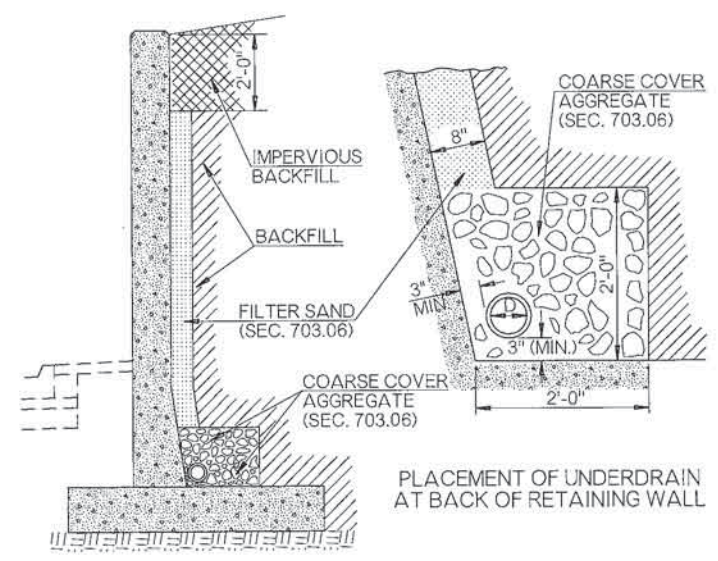
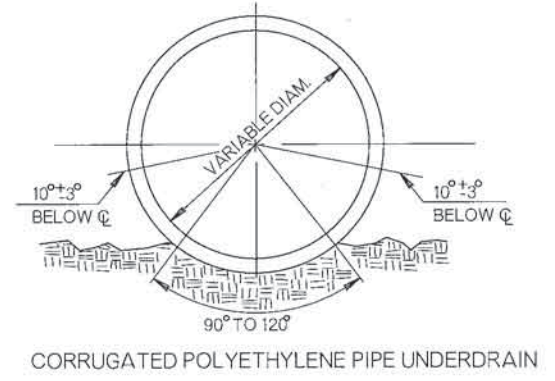
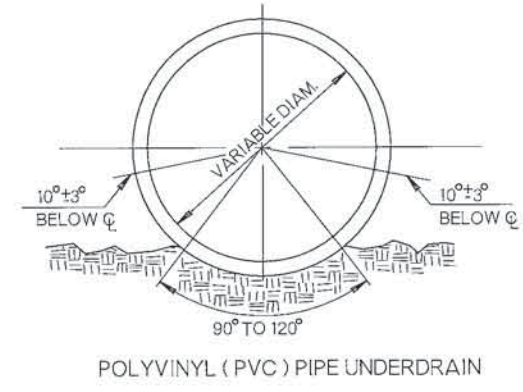
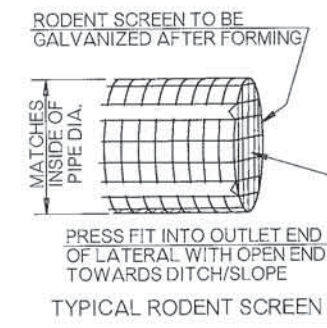
INSTALLATION TECHNIQUE: (12" DIAMETER OR SMALLER)

PERFORATED PIPE UNDERDRAIN, WHEN INSTALLED IN A TRENCH, SHALL BE BEDDED ON 4" OF COARSE COVER AGGREGATE. THE INSTALLED PIPE SHALL THEN BE CAREFULLY BACKFILLED WITH THE REMAINING COARSE COVER AGGREGATE TO 6" ABOVE THE TOP OF THE PIPE. FILTER SAND SHALL BE INSTALLED TO APPROXIMATELY 6" BELOW THE ORIGINAL NATURAL GROUND AS APPROVED BY THE ENGINEER. THE LAYER OF COARSE COVER AGGREGATE SHALL BE PAID FOR AS PIPE UNDERDRAIN COVER MATERIAL AND SHALL CONFORM TO SEC. 703.06. FILTER SAND SHALL BE PAID FOR AS CLASS C STANDARD BEDDING MATERIAL AND SHALL CONFORM TO SEC. 703.06.

NON-PERFORATED PIPE UNDERDRAIN, WHEN INSTALLED IN A TRENCH, SHALL BE BEDDED IN A 4" LAYER CONSISTING OF COARSE AGGREGATE COVER MATERIAL OR A 50-50 MIX OF COARSE AGGREGATE COVER MATERIAL AND FILTER SAND. THIS LAYER OF COVER MATERIAL SHALL CONFORM TO SEC. 703.06, AND SHALL BE PAID FOR AS PIPE UNDERDRAIN COVER MATERIAL. THE REMAINING BACKFILL MAY BE NATIVE SOIL REMOVED IN THE TRENCHING OPERATION, FILTER SAND OR BACKFILLED ACCORDING TO THE ENGINEER. COST TO BE INCLUDED IN OTHER ITEMS OF WORK. SEE GENERAL NOTE NUMBERS 5 & 6.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. THE EXTENT, LOCATION AND DEPTH OF DRAINS MAY BE ADJUSTED BY THE ENGINEER TO SUIT CONDITIONS FOUND DURING CONSTRUCTION.
3. COST OF ALL FITTINGS TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF PIPE UNDERDRAIN.
4. FOR PIPE UNDERDRAIN OF UP TO 12" IN DIAMETER, W = 24" WITHOUT SHEETING AND SHORING. W = 36" WHEN SHEETING AND SHORING IS USED. SEE ROADWAY STANDARD SPI-4 FOR SHEETING & SHORING NOTES.
5. FOR PIPE UNDERDRAIN LARGER THAN 12" IN DIAMETER, SEE ROADWAY STANDARD SPI-4 FOR ADDITIONAL TRENCH EXCAVATION DETAILS.
6. NON-PERFORATED UNDERDRAIN PIPES, LARGER THAN 12", SHALL BE TREATED AS PIPE CONDUITS: I.E., PAY ITEMS SHALL CONSIST OF TRENCH EXCAVATION AND BEDDING MATERIAL. SEE STANDARD SPB-1.
7. MATERIALS SHOWN HERE ARE TYPICAL ONLY AND ARE NOT THE ONLY CHOICE FOR SUBSURFACE DRAINAGE PURPOSES.
8. OUTLET OPENING SHALL HAVE INSTALLED A REMOVABLE RODENT SCREEN HAVING A WIRE MESH DESIGN & 0.23" TO 0.50" (NOM.) SQUARE OPENINGS. SCREEN MATERIAL MAY BE STAINLESS STEEL OR GALVANIZED WITH WIRE THICKNESS OF BETWEEN 0.023" & 0.039". AFTER SHAPING AND FABRICATION, RODENT SCREEN DESIGN SHALL BE APPROVED BY THE ENGINEER.
9. THE FINAL SECTION OF THE OUTLET LATERAL CONDUIT SHALL BE NON-PERFORATED, SCHEDULE 40 OR TYPE S HIGH DENSITY POLYETHYLENE AND A MINIMUM 20'-0" IN LENGTH, INCLUDING COUPLINGS.
10. FOR DETAILS OF OUTLET LATERAL HEADWALL, SEE ROADWAY STANDARD PED-3.



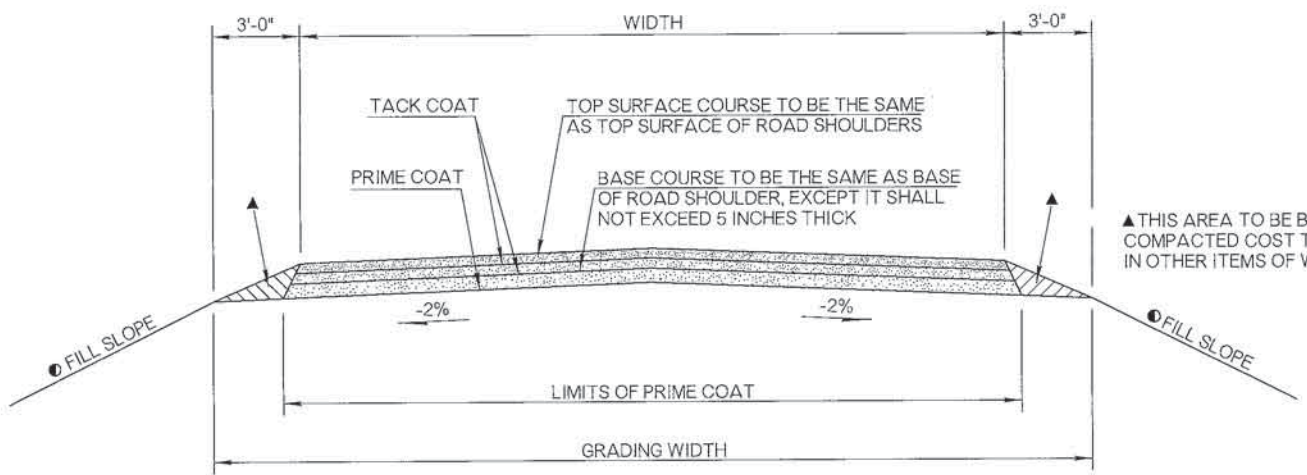
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
613 (H)	■ PERFORATED PIPE UNDERDRAIN ROUND	LF
613 (I)	■ NON-PERFORATED PIPE UNDERDRAIN RND.	LF
613 (Q)	■ OUTLET LATERAL HEADWALL	EA
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY
613 (U)	PIPE UNDERDRAIN COVER MATERIAL	CY
613 (V)	TRENCH EXCAVATION	CY

■ DIMENSION TO BE SPECIFIED IN INCHES

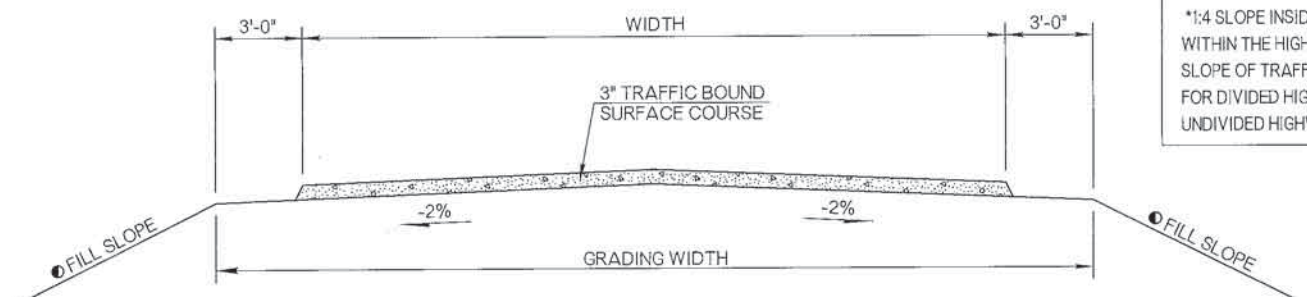
APPROVED BY ROADWAY ENGINEER: *Calvin A.* DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

DOT PIPE UNDERDRAIN INSTALLATION

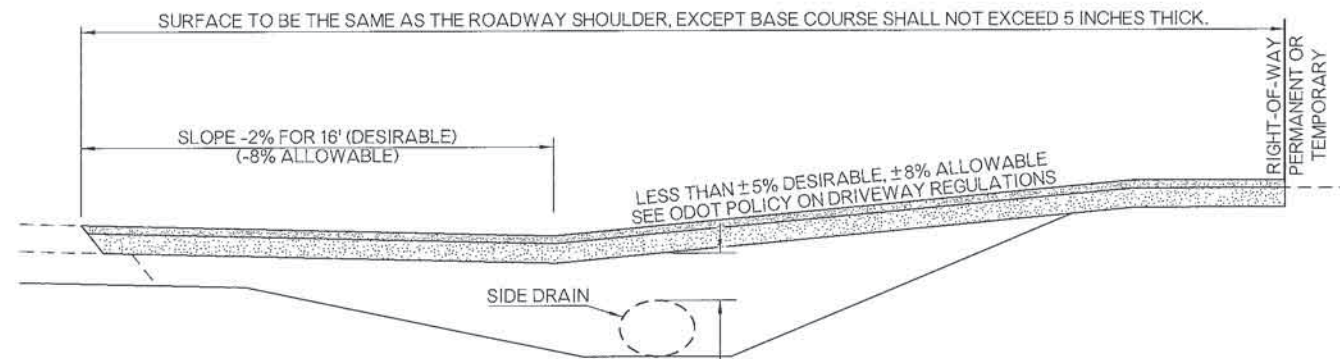


TYPICAL SECTION OF ASPHALT RETURN/DRIVE

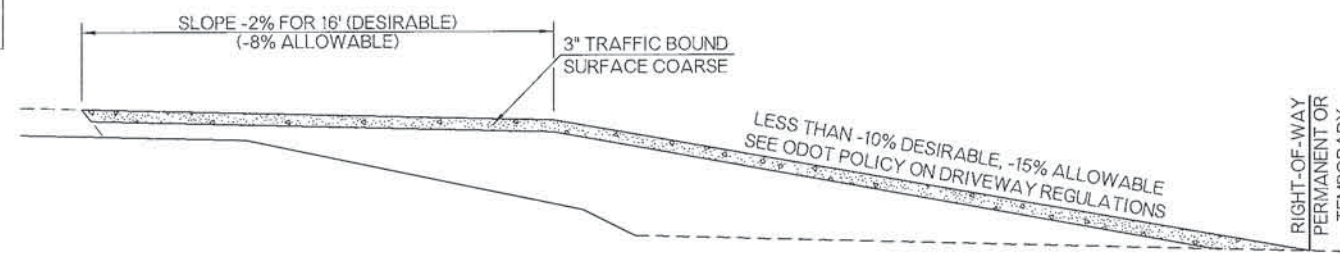


TYPICAL SECTION OF T.B.S.C. RETURN/DRIVE

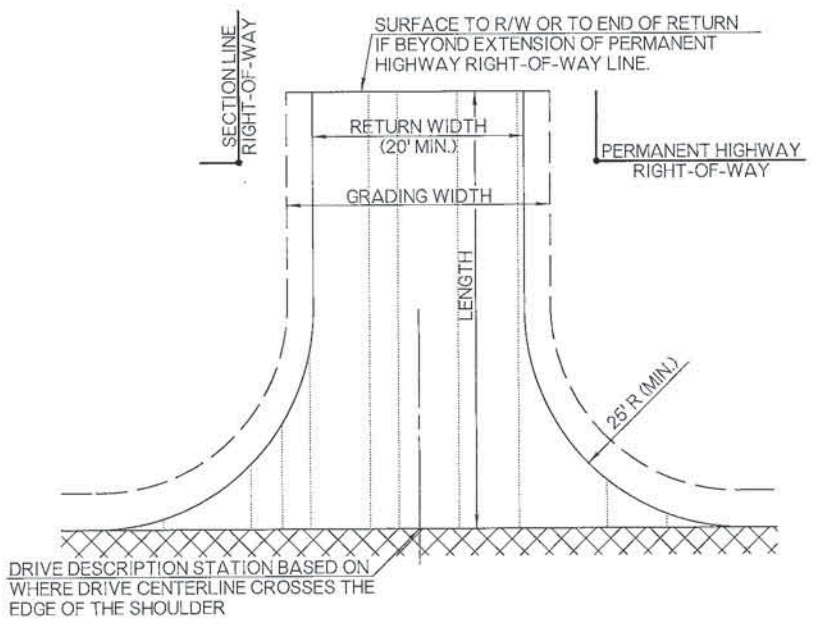
FILL SLOPE NOTES:
FILL SLOPE AS SHOWN IN TYPICAL SECTIONS SHALL NOT EXCEED:
*1:3 SLOPE OUTSIDE HIGHWAY CLEARZONE
*1:4 SLOPE INSIDE HIGHWAY CLEARZONE
WITHIN THE HIGHWAY CLEARZONE, ADJUST SLOPE OF TRAFFIC APPROACH END TO 1:10 FOR DIVIDED HIGHWAYS AND 1:5 FOR UNDIVIDED HIGHWAYS.



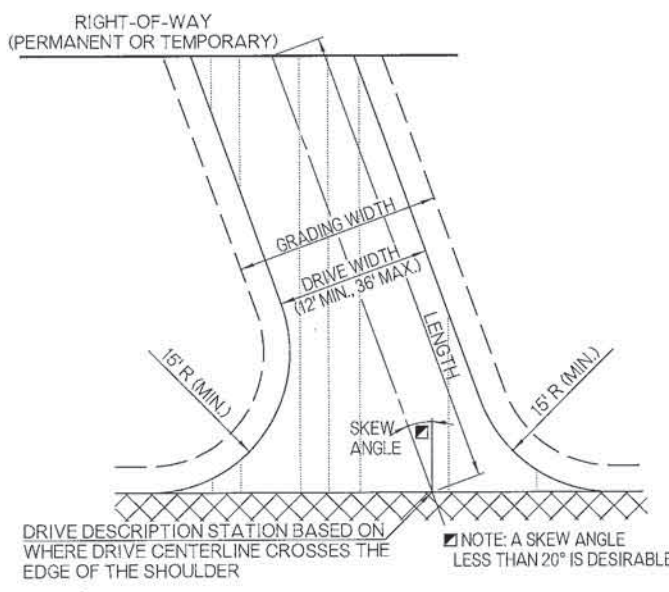
PROFILE OF TYPICAL ASPHALT RETURN/DRIVE ON ROADWAY CUT SECTION



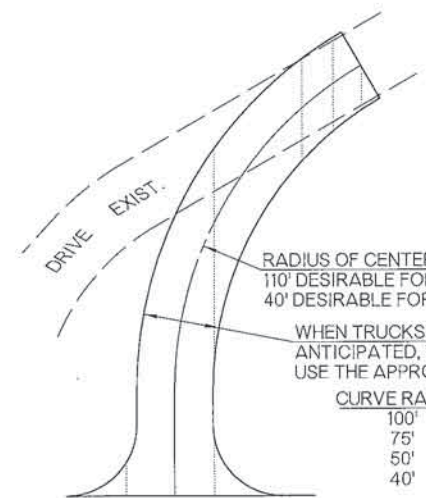
PROFILE OF TYPICAL T.B.S.C. RETURN/DRIVE ON ROADWAY FILL SECTION



PLAN TYPICAL SECTION LINE RETURN



PLAN TYPICAL DRIVE ON SKEW



SECTION LINE OR DRIVE WITH CURVED ALIGNMENT

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

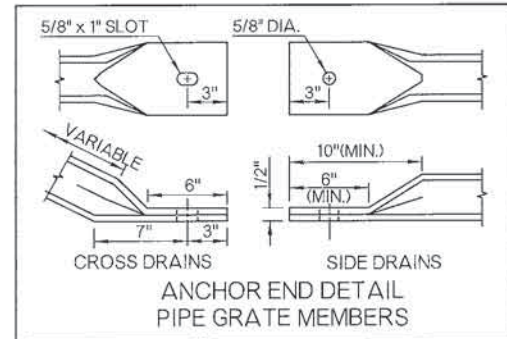
TABLE A - SCHEDULE OF PIPE SAFETY GRATES

C. E. T. TYPE	CULVERT TYPE				SIDE DRAIN		CROSS DRAIN	
	REINF. CONC. STEEL OR ALUMINUM ROUND PIPE	REINF. CONC. ARCH PIPE	REINF. CONC. ELLIPTICAL PIPE (RISE x SPAN)	STEEL OR ALUMINUM ARCH PIPE	NO. OF GRATES	GRATE LENGTH L (SD)	NO. OF GRATES	GRATE LENGTH L (CD)
A4	18"			21" x 15"	2	36"	NONE	
		22" x 13"	14" x 23"	24" x 18"	2	42"	NONE	
	24"				2	45"	NONE	
B4		28" x 18"	19" x 30"	28" x 20"	2	48"	1	10'-9"
		36" x 22"	22" x 34"	35" x 24"	3	54"	1	12'-0"
			24" x 38"		3	57"	1	12'-6"
					5	50"	NONE	
		43" x 26"		42" x 29"	3	64"	1	13'-6"
C4			29" x 45"		3	64"	1	14'-3"
		51" x 31"		49" x 33"	4	70"	1	15'-3"
			34" x 53"		4	72"	1	15'-9"
				64" x 43"	5	84"	2	19'-0"
D4	36"	58" x 36"	38" x 60"	57" x 38"	5	78"	1	17'-3"
	42"				5	84"	2	18'-0"
		65" x 40"			5	84"	2	19'-0"
E4	48"		43" x 68"	71" x 47"	5	88"	2	19'-0"
		73" x 45"			6	92"	2	20'-6"
			48" x 76"		6	96"	2	20'-9"

TABLE B - SCHEDULE OF DIMENSIONS

CET TYPE	LENGTH A	WIDTH B	WIDTH B	LENGTH C	HEIGHT H	HEIGHT K	CONC. CY	CONC. CY	REINF. BAR LENGTH		
									H-BARS	H-BARS	S-BARS
A4	10'-4"	5'-6"	6'-2"	5'-8"	21"	9"	1.70	2.00	5'-2"	5'-10"	12'-4"
B4	12'-4"	6'-0"	7'-2"	6'-0"	22"	14"	2.00	2.60	5'-8"	6'-10"	15'-4"
C4	15'-9"	6'-6"	8'-5"	7'-4"	26"	20"	2.85	3.95	6'-2"	8'-1"	19'-6"
D4	19'-3"	7'-6"	9'-6"	8'-0"	28"	27"	3.50	5.05	7'-2"	9'-2"	21'-6"
E4	20'-8"	8'-0"	10'-4"	8'-8"	30"	30"	4.05	5.75	7'-8"	10'-0"	23'-4"

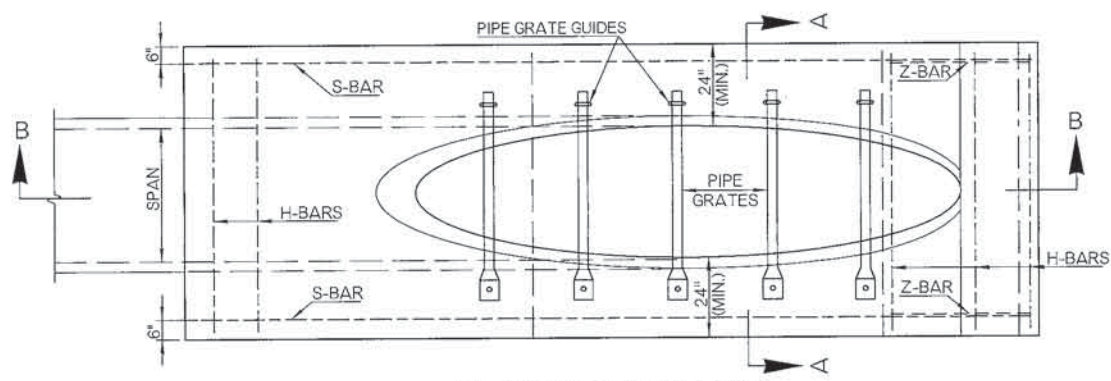
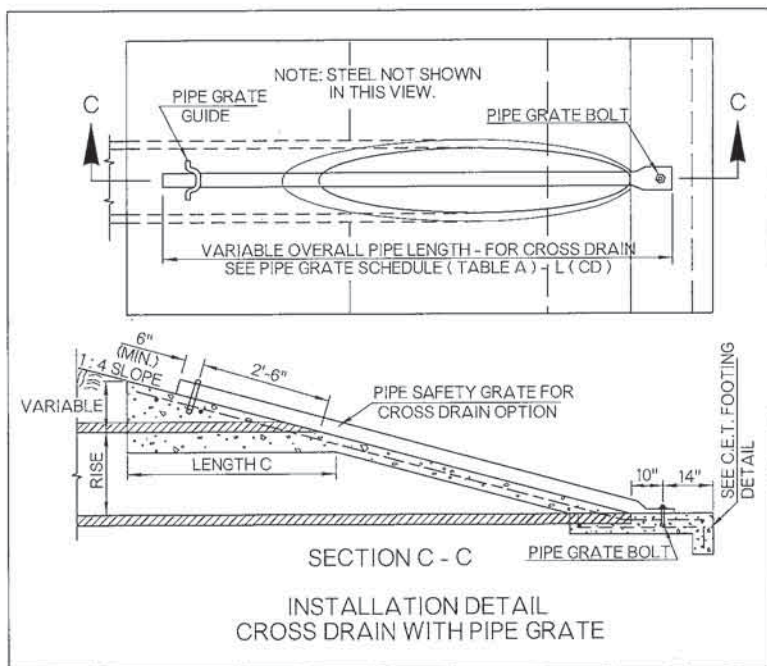
(R) ROUND SHAPE CULVERT OPTIONS
(A) ARCH SHAPE CULVERT OPTIONS
(E) HORIZONTAL ELLIPSE SHAPE CULVERT OPTIONS



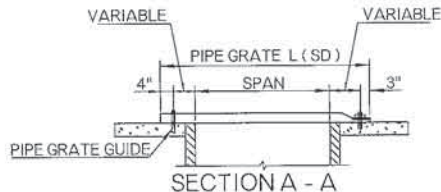
GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- QUANTITIES SHOWN IN TABLE B ARE FOR ONE END ONLY. CLASS A CONCRETE SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF SECTION 509 OF THE SPECIFICATIONS.
- TYPES A4 THROUGH E4 END SECTIONS, AS SHOWN IN TABLE B, MAY BE USED WITH ANY AASHTO DESIGNATED METAL, ALUMINUM & CONCRETE PIPE SIZES, AS SHOWN IN TABLE A. END SECTION QUANTITIES ARE BASED ON METAL PIPE DIMENSIONS, NO PIPE WALL THICKNESS AND SMALLEST LISTED CULVERT ROUND OR ARCH PIPE WITHIN TYPE.
- SLOPED END OF CULVERT PIPE SHALL BE SHOP CUT. TWO COATS OF COLD GALVANIZATION WILL BE APPLIED TO CUT EDGES OF STEEL CULVERT PIPE. COST OF CUTTING AND GALVANIZING IS INCLUDED IN THE PRICE BID FOR PIPE CULVERT.
- ALL SIZES OF CULVERT PIPE WILL BE CUT ON 1 TO 4 SLOPE.
- PIPE FOR SAFETY GRATES SHALL BE 3" x 7.58 LBS./FT. STANDARD WEIGHT STEEL PIPE, SCHEDULE 40. IT SHALL BE FURNISHED GALVANIZED, PLAIN END AND SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM A53 (HYDROSTATIC TESTS MAY BE WAIVED) OR ASTM F1083. COST OF GRATES TO BE INCLUDED IN PRICE BID FOR THE C.E.T.
- ANY GALVANIZED AREA(S) OF METAL PIPE DISTRESSED DURING THE POST FABRICATION AND/OR HANDLING PROCESS SHALL BE COATED WITH AN APPROVED ZINC RICH PAINT.
- REINFORCING STEEL AND PIPE GRATE GUIDES SHALL BE NO. 4 DEFORMED BARS. COST OF STEEL SHALL BE INCLUDED IN PRICE BID FOR THE CULV. END TREATMENT.
- CRITERIA FOR USE OF PIPE SAFETY GRATE MEMBERS:
(A) ALL SIDE DRAIN AND MULTIPLE PIPE INSTALLATIONS WITHIN THE CLEAR ZONE.
(B) ALL CROSS DRAIN INSTALLATIONS WITH A CULVERT SPAN OF 30" OR LARGER WITHIN THE CLEARZONE.
(C) ALL INSTALLATIONS OUTSIDE THE CLEAR ZONE WHERE HAZARD POTENTIAL IS HIGH BASED ON TRAFFIC DIRECTION, SPEED, VOLUME AND SIZE OF CULVERT.
NOTE: ANALYZE HYDRAULIC PERFORMANCE AT VARYING DEGREES OF CLOGGING AND APPLY RISK ASSESSMENT BEFORE USING GRATES.
- ANCHOR END OF PIPE GRATE MEMBERS SHALL BE HELD IN PLACE WITH A 1/2" x 5 1/2" GALVANIZED BOLT, NUT AND WASHER, THREADS, 1 3/4" (NOM.) SHALL REMAIN EXPOSED FOR INSTALLING GRATE, WASHER AND NUT. ALL BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A307 WITH COST TO BE INCLUDED IN THE PRICE BID FOR THE CULVERT END TREATMENT.
- FOR TOTAL QUANTITY OF EXTRA DEPTH TOE WALL, MULTIPLY WIDTH B TIMES 0.0185 FOR EACH FOOT OF DEPTH OF TOE WALL REQUIRED. PAYMENT TO BE INCLUDED IN PRICE BID FOR THE CULVERT END TREATMENT.

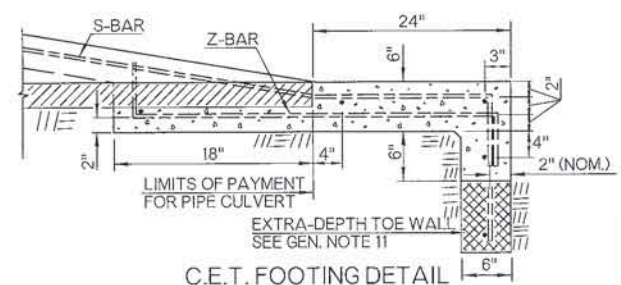
PRECAST CULVERT END TREATMENTS OR OTHER ALTERNATIVE DESIGNS MAY BE USED IF APPROPRIATE DRAWINGS ARE SUBMITTED TO AND APPROVED BY THE ENGINEER.



PLAN (SIDE DRAIN SHOWN)



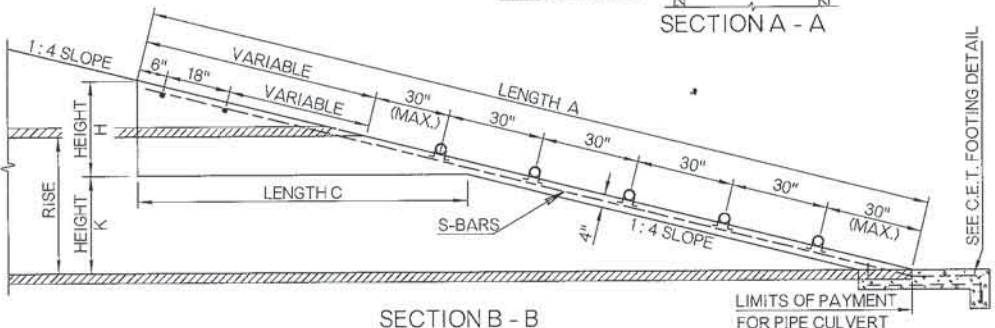
SECTION A - A



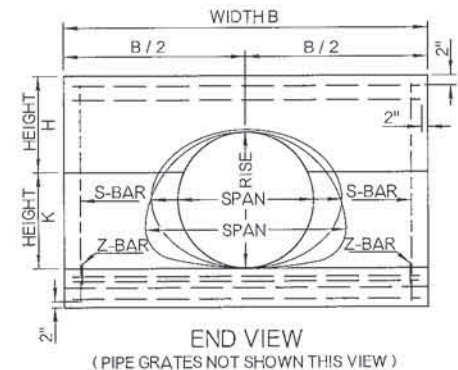
C.E.T. FOOTING DETAIL

TYPICAL ABBREVIATIONS

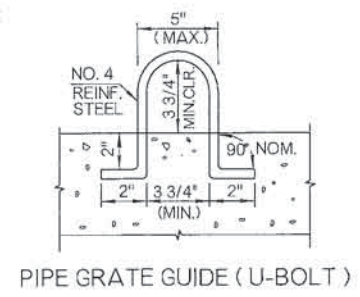
RS - ROUND SIDE DRAIN
RC - ROUND CROSS DRAIN
AS - ARCH SIDE DRAIN
AC - ARCH CROSS DRAIN
GR - GRATED
NG - NON-GRATED



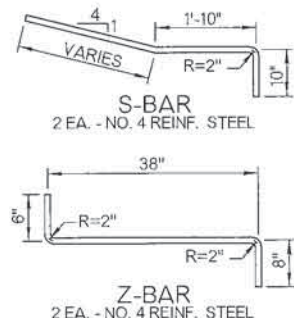
SECTION B - B



END VIEW (PIPE GRATES NOT SHOWN THIS VIEW)



PIPE GRATE GUIDE (U-BOLT)



S-BAR
2 EA. - NO. 4 REINF. STEEL

Z-BAR
2 EA. - NO. 4 REINF. STEEL

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
613 (M)	CULVERT END TREATMENT	EA

- SPECIFY TYPE OF END TREATMENT (EXAMPLE: TYPE B4 CULVERT END TREATMENT)
- CET ORIENTATION AND SAFETY GRATE REQUIREMENTS SHALL BE SPECIFIED ON THE SUMMARY OF DRAINAGE STRUCTURES. (SEE TYPICAL ABBREVIATIONS)

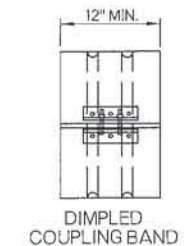
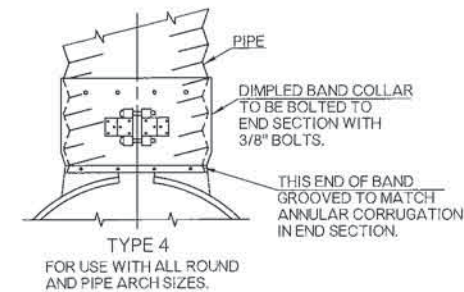
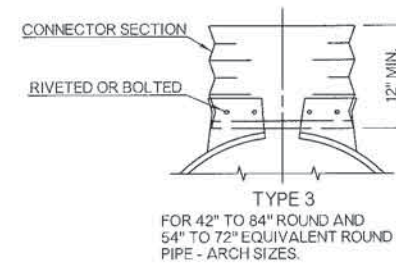
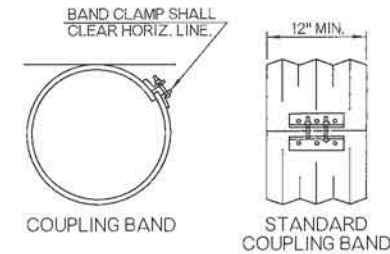
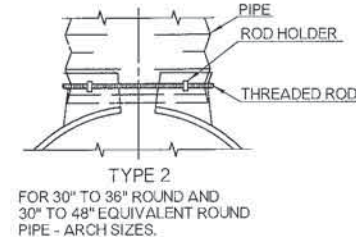
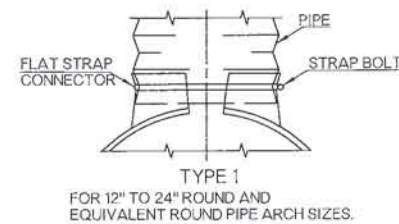
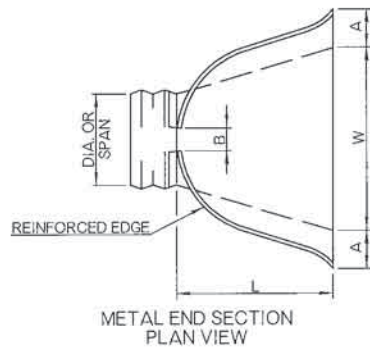
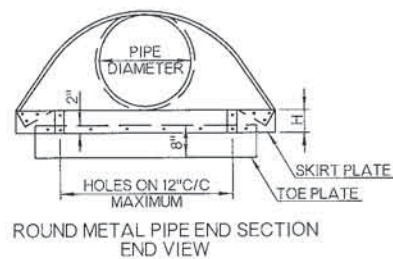
APPROVED BY ROADWAY ENGINEER: *Calvin A* DATE: *04/11/15*
ROADWAY DESIGN DIVISION STANDARD

DOT OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

CULVERT END TREATMENT
SINGLE PIPE INSTALLATION
1 TO 4 SAFETY SLOPE

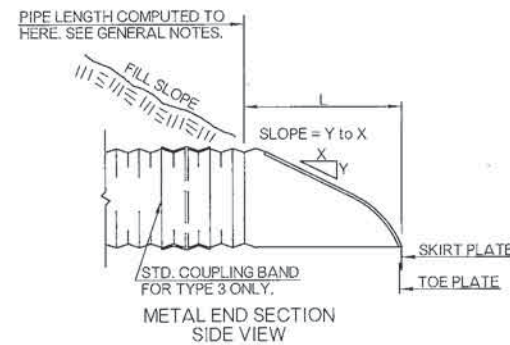
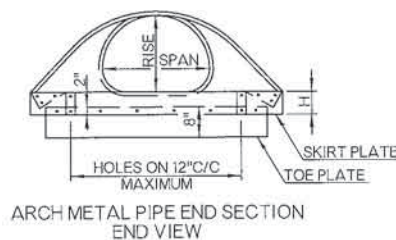
DIMENSIONS OF END SECTIONS FOR ROUND METAL PIPE

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.



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.

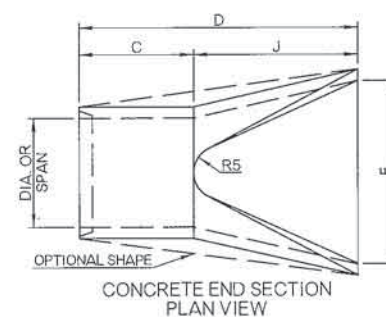
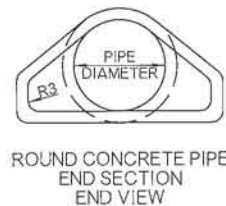


TYPICAL METAL END SECTION CONNECTIONS

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

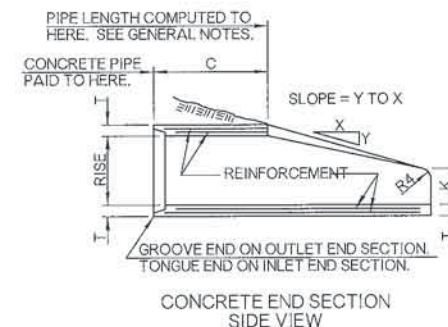
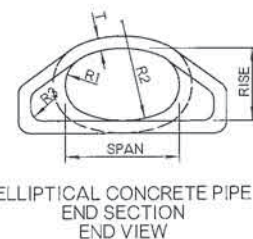
DIMENSIONS OF PRECAST END SECTIONS FOR ROUND PIPE

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



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"	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"	6 3/8"	36"	6.50'	1.75'	8.25'	8.50'	1:2
72"	58"	91"	24 3/4"	78"	6"	6"	7 1/2"	24"	6.50'	1.75'	8.25'	9.00'	1:2



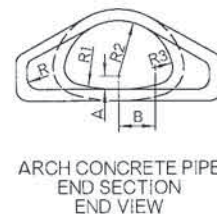
BASIS OF PAYMENT

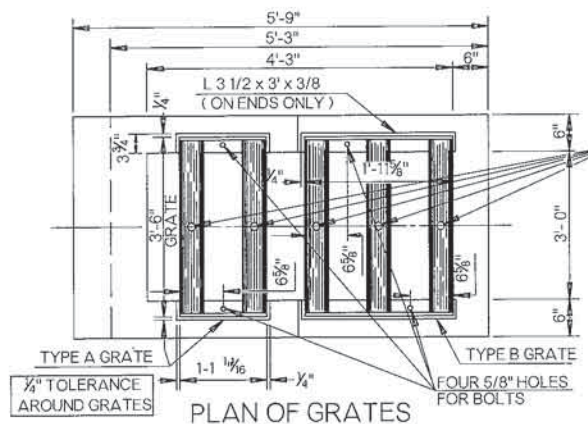
ITEM NO.	ITEM	UNIT
613 (L)	▼ PREFAB. CULVERT END SECTION, ROUND	EA
613 (L)	▼ PREFAB. CULVERT END SECTION, ARCH	EA
613 (L)	▼ PREFAB. CULVERT END SECTION, ELLIPTICAL	EA

▼ END SECTION DIMENSION(S) SHALL BE SPECIFIED.

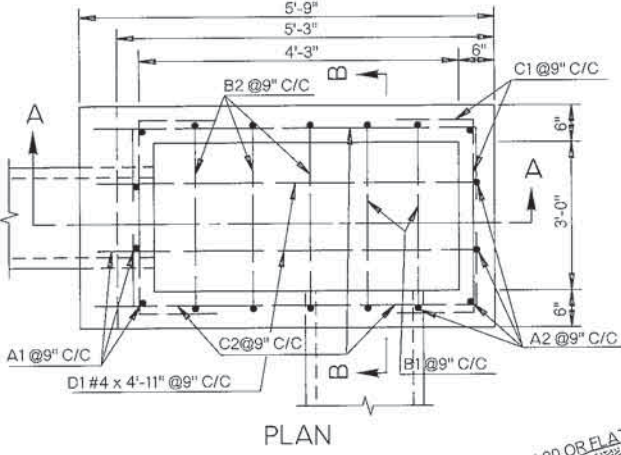
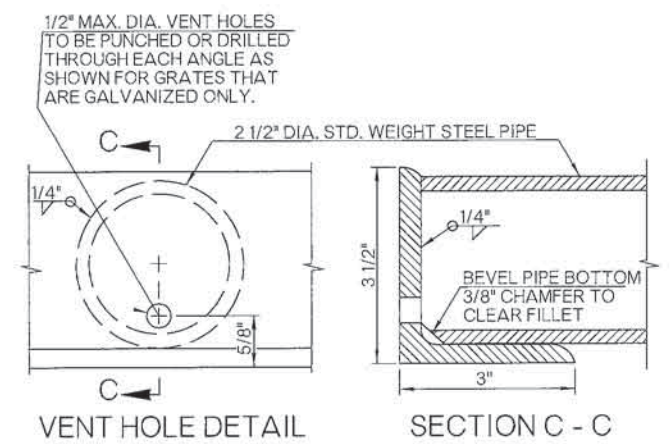
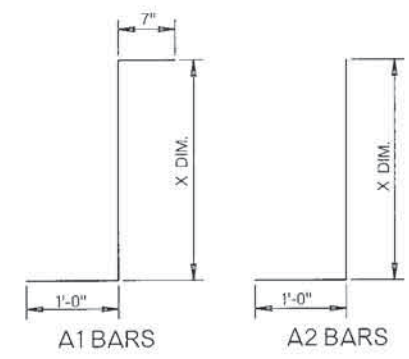
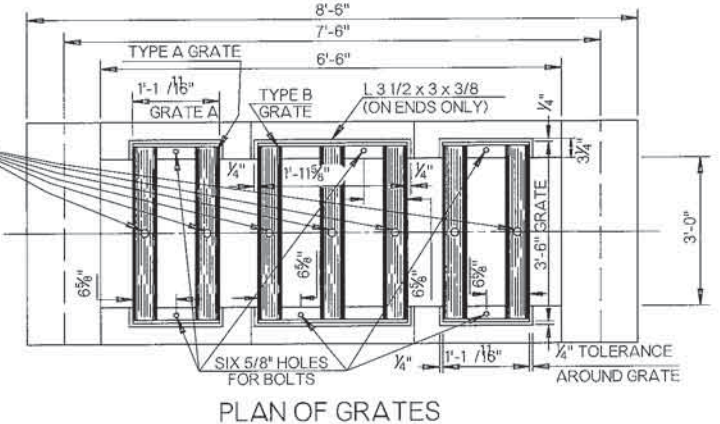
DIMENSIONS OF PRECAST END SECTIONS FOR ARCH PIPE

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 7/8"	9 7/32"	3"	40 1/16"	14 9/16"	4 19/32"	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 1/8"	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

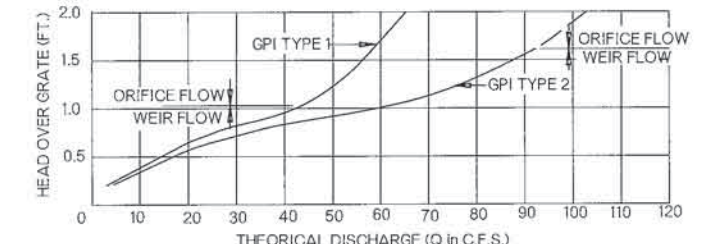
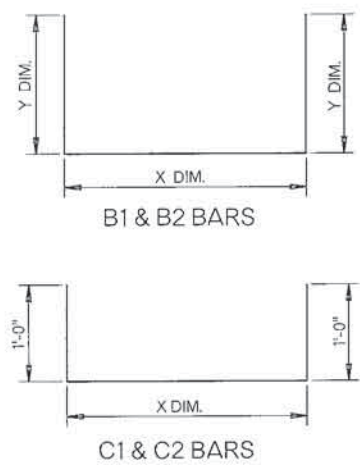
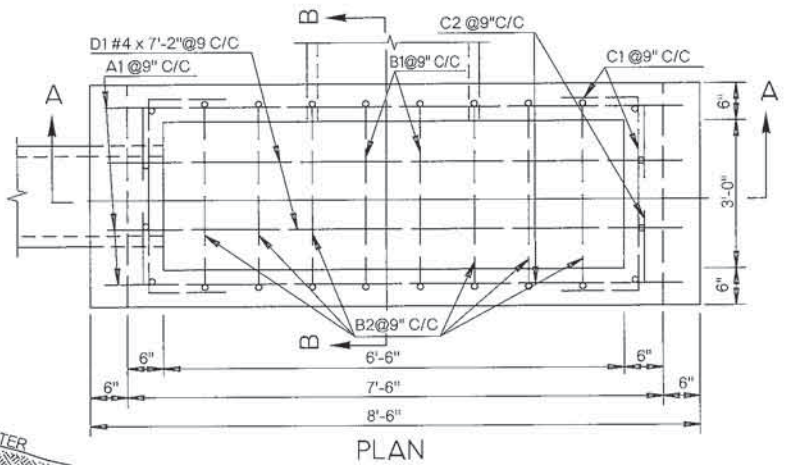




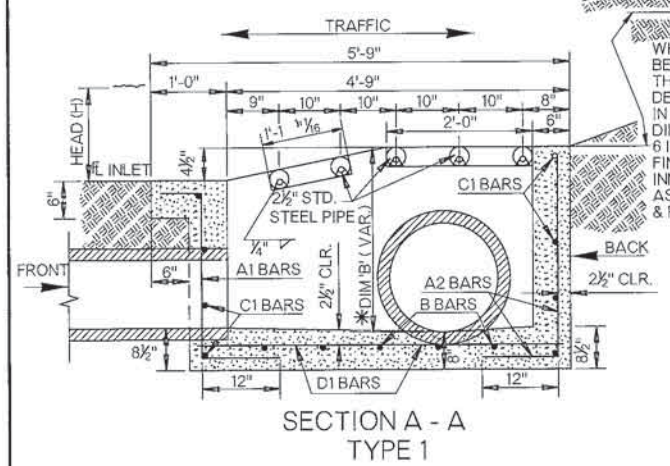
1/4" DIA. (MAX.) DRAIN HOLES TO BE PUNCHED OR DRILLED THROUGH BOTTOM SIDE OF STEEL PIPE AT THE MID POINT, AS SHOWN FOR GRATES THAT ARE HOT-DIPPED GALVANIZED ONLY.



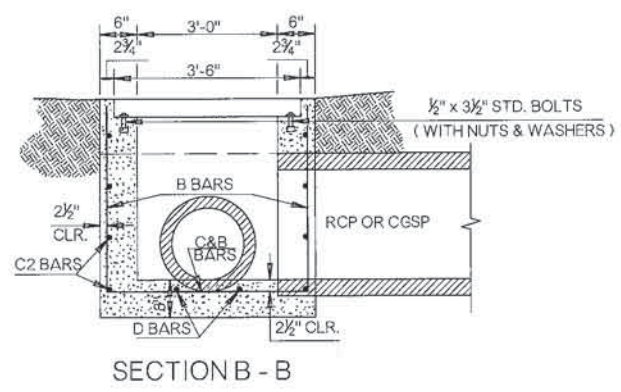
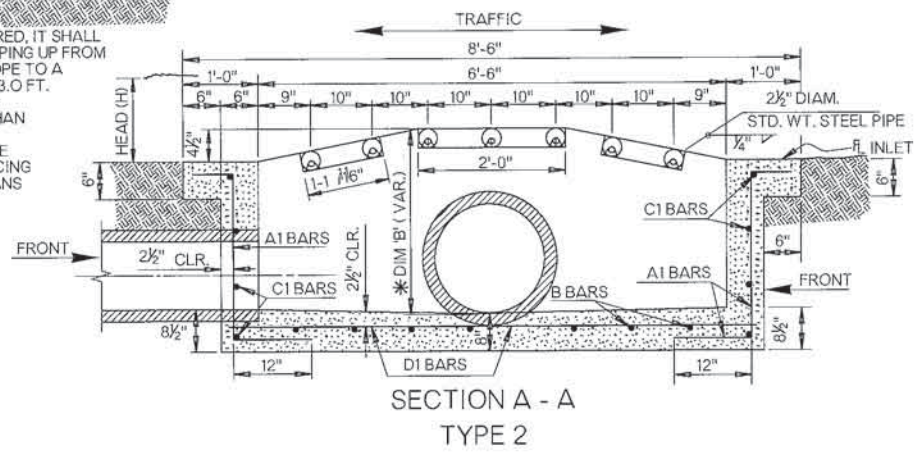
NOTE: REINF. STEEL TO BE CUT AND/OR BENT TO CLEAR PIPE IN FIELD.



HYDRAULIC PERFORMANCE CHART
TO ALLOW FOR CLOGGING 60% THEORETICAL DISCHARGE IS THE RECOMMENDED FACTOR TO USE IN AREAS SUBJECT TO DEBRIS.



DIKE SECTION
WHEN A DIKE IS REQUIRED, IT SHALL BE CONSTRUCTED SLOPING UP FROM THE INLET IN A 1:20 SLOPE TO A DESIRABLE HEIGHT OF 3.0 FT. IN NO CASE SHALL THE DIKE TOP BE HIGHER THAN 6 INCHES BELOW THE FINISHED GRADE OF THE INNER EDGE OF SURFACING AS SHOWN ON THE PLANS & PROFILE SHEET.



GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- VENT HOLES AND DRAIN HOLES FOR HOT-DIP GALVANIZATION SHALL BE DRILLED OR PUNCHED IN THE GRATE AS SHOWN.
- WHEN INLET DEPTH B (*) EXCEEDS VALUE LISTED IN TABLE SUMMARY SHOWN IN LOWER LEFT CORNER OF SHEET, THE ADDITIONAL DEPTH SHALL BE PAID FOR AS 'ADDITIONAL DEPTH IN INLET'. SPECIFIC ADDITIONAL DEPTH DATA FOR EACH STRUCTURE SHALL BE SHOWN ON THE PLANS.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
611 (G)	INLET GPI ■	EA
611 (H)	ADDITIONAL DEPTH IN INLET ●	VF

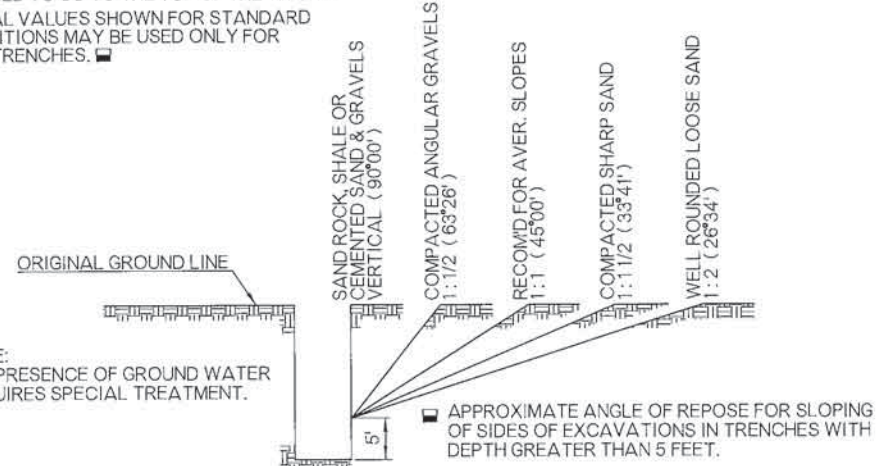
- SPECIFY TYPE AND DESIGN, EXAMPLE: INLET GPI TYPE 1 (DESIGN 2)
 - SPECIFY TYPE, EXAMPLE: ADDITIONAL DEPTH IN INLET GPI TYPE 1
- NOTE: COST OF INLET PIPE GRATES (TYPES A & B) SHALL BE INCLUDED IN THE PRICE BID FOR THE INLET.

DESIGN NO.	PIPE SIZE	* MIN. DIM. "B"	CLASS A CONC.	REINF. STEEL	CONC. PER ADD'L FT. DEPTH	REINF. STEEL PER ADD'L FT. DEPTH	"A1" BARS BENT #4 AT 9" C/C		"A2" BARS BENT #4 AT 9" C/C		"B1" BARS BENT #4 AT 9" C/C			"B2" BARS BENT #4 AT 9" C/C			"C1" BARS BENT #4 AT 9" C/C		"C2" BARS BENT #4 AT 9" C/C		"D1" BARS STR'T. #4 AT 9" C/C									
							NO	LGTH	X DIM.	NO	LGTH	X DIM.	NO	LGTH	X DIM.	Y DIM.	NO	LGTH	X DIM.	Y DIM.	NO	LGTH	X DIM.	NO	LGTH	X DIM.	NO	LGTH		
TYPE 1	PIPE AT SIDES OR BACK	1	24"	3'-1 1/4"	1.40	162.	.31	36.5	6	4'-5"	2'-10"	2	10'-1"	3'-7"	3'-3"	3	9'-7" Avg.	3'-7"	2'-10" to 3'-2"	10	5'-6"	3'-6"	10	6'-9"	4'-9"	4	4'-11"			
		2	30"	3'-7 3/4"	1.52	174.	.31	36.5	6	5'-0"	3'-5"	6	4'-9"	3'-9"	2	11'-1"	3'-7"	3'-9"	3	10'-7" Avg.	3'-7"	3'-4" to 3'-8"	11	5'-6"	3'-6"	10	6'-9"	4'-9"	4	4'-11"
		3	36"	4'-2 1/4"	1.63	198.	.31	36.5	6	5'-6"	3'-11"	6	5'-4"	4'-4"	2	12'-3"	3'-7"	4'-4"	3	11'-9" Avg.	3'-7"	3'-11" to 4'-3"	13	5'-6"	3'-6"	12	6'-9"	4'-9"	4	4'-11"
		4	42"	4'-8 3/4"	1.73	219.	.31	36.5	6	6'-1"	4'-6"	6	5'-10"	4'-10"	2	13'-3"	3'-7"	4'-10"	3	12'-9" Avg.	3'-7"	4'-5" to 4'-9"	14	5'-6"	3'-6"	14	6'-9"	4'-9"	4	4'-11"
		5	18" or 24"	3'-7 3/4"	1.57	174.	.31	36.5	6	5'-0"	3'-5"	6	4'-9"	3'-9"	2	11'-1"	3'-7"	3'-9"	3	10'-7" Avg.	3'-7"	3'-4" to 3'-8"	11	5'-6"	3'-6"	10	6'-9"	4'-9"	4	4'-11"
		6	30"	4'-2 1/4"	1.69	198.	.31	36.5	6	5'-6"	3'-11"	6	5'-4"	4'-4"	2	12'-3"	3'-7"	4'-4"	3	11'-9" Avg.	3'-7"	3'-11" to 4'-3"	13	5'-6"	3'-6"	12	6'-9"	4'-9"	4	4'-11"
		7	36"	4'-8 3/4"	1.79	219.	.31	36.5	6	6'-1"	4'-6"	6	5'-10"	4'-10"	2	13'-3"	3'-7"	4'-10"	3	12'-9" Avg.	3'-7"	4'-5" to 4'-9"	14	5'-6"	3'-6"	14	6'-9"	4'-9"	4	4'-11"
TYPE 2	PIPE AT SIDES	8	24"	3'-1 1/4"	1.89	204.	.39	44.5	12	4'-5"	2'-10"	2	10'-1"	3'-7"	3'-3"	6	9'-7" Avg.	3'-7"	2'-10" to 3'-2"	10	5'-6"	3'-6"	10	9'-0"	7'-0"	4	7'-2"			
		9	30"	3'-7 3/4"	2.05	213.	.39	44.5	12	5'-0"	3'-5"	6	11'-1"	3'-7"	3'-9"	6	10'-7" Avg.	3'-7"	3'-4" to 3'-8"	10	5'-6"	3'-6"	10	9'-0"	7'-0"	4	7'-2"			
		10	36"	4'-2 1/4"	2.21	243.	.39	44.5	12	5'-6"	3'-11"	2	12'-3"	3'-7"	4'-4"	6	11'-9" Avg.	3'-7"	3'-11" to 4'-3"	12	5'-6"	3'-6"	12	9'-0"	7'-0"	4	7'-2"			
		11	42"	4'-8 3/4"	2.35	272.	.39	44.5	12	6'-1"	4'-6"	2	13'-3"	3'-7"	4'-10"	6	12'-9" Avg.	3'-7"	4'-5" to 4'-9"	14	5'-6"	3'-6"	14	9'-0"	7'-0"	4	7'-2"			
		11A	48"	5'-3 1/4"	2.51	302.	.39	44.5	12	6'-7"	5'-0"	2	14'-3"	3'-7"	5'-4"	6	13'-9" Avg.	3'-7"	5'-0" to 5'-4"	16	5'-6"	3'-6"	16	9'-0"	7'-0"	4	7'-2"			
		12	18" or 24"	3'-7 3/4"	2.10	213.	.39	44.5	12	5'-0"	3'-5"	2	11'-1"	3'-7"	3'-9"	6	10'-7" Avg.	3'-7"	3'-4" to 3'-8"	10	5'-6"	3'-6"	10	9'-0"	7'-0"	4	7'-2"			
		13	30"	4'-2 1/4"	2.26	243.	.39	44.5	12	5'-6"	3'-11"	2	12'-3"	3'-7"	4'-4"	6	11'-9" Avg.	3'-7"	3'-11" to 4'-3"	12	5'-6"	3'-6"	12	9'-0"	7'-0"	4	7'-2"			
14	36"	4'-8 3/4"	2.42	272.	.39	44.5	12	6'-1"	4'-6"	2	13'-3"	3'-7"	4'-10"	6	12'-9" Avg.	3'-7"	4'-5" to 4'-9"	14	5'-6"	3'-6"	14	9'-0"	7'-0"	4	7'-2"					

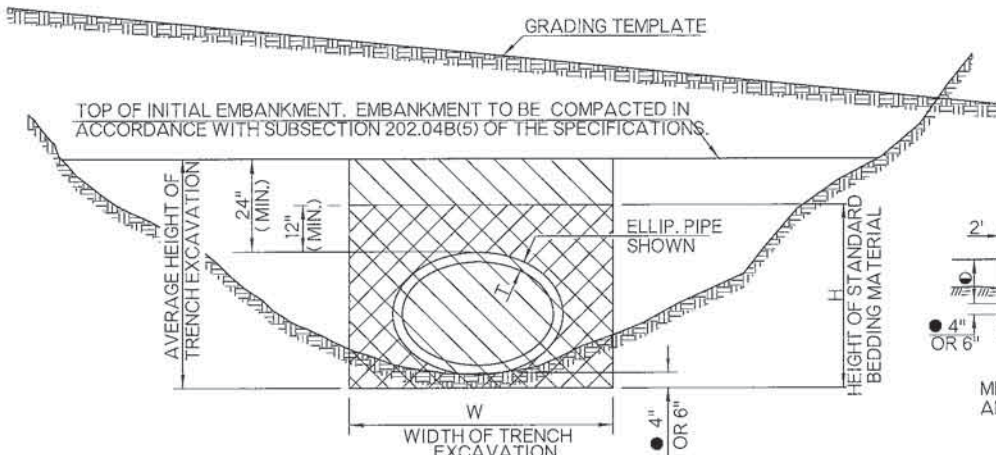
TRENCHING DIMENSIONS AND STANDARD BEDDING MATERIAL QUANTITIES

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. ■

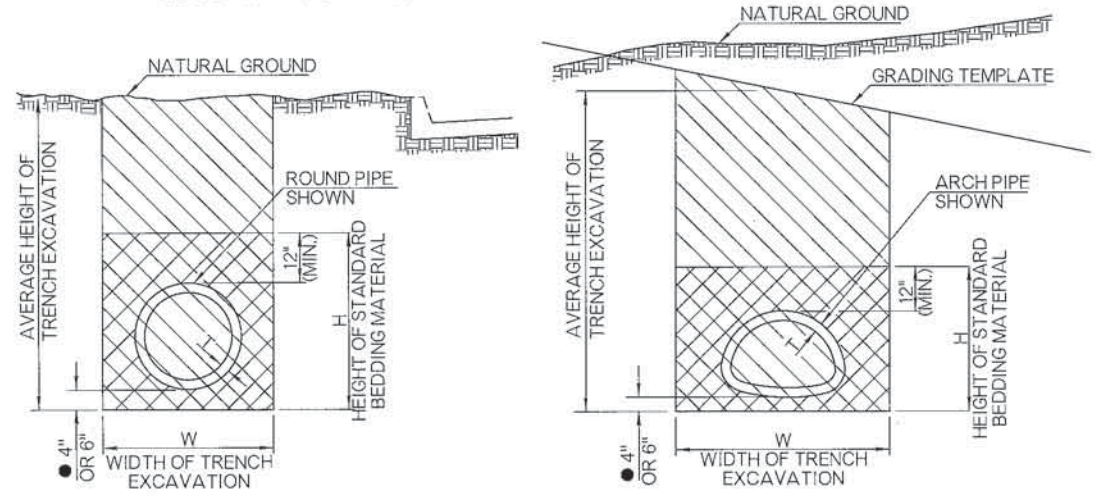


■ OPTIONAL TRENCHES WITH DEPTH GREATER THAN 5.0 FEET EXCAVATION AND BEDDING MATERIAL WILL BE MEASURED AND PAID FOR AS IF SHEETING & SHORING WAS USED. (SPECIAL TRENCHING=STD. WIDTH TRENCH+12")



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.

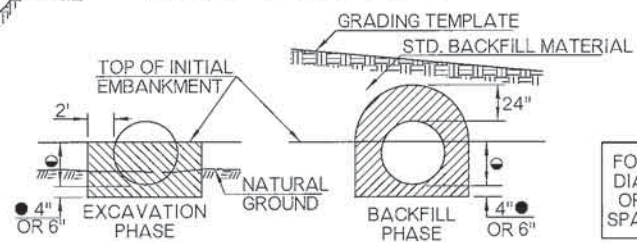


TRENCH EXCAVATION IN CUT SECTIONS

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"

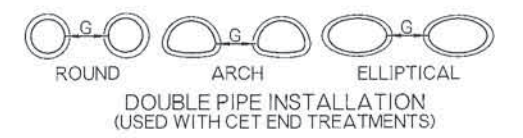
▲ STRUCTURAL PLATE ARCH.

● 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"	

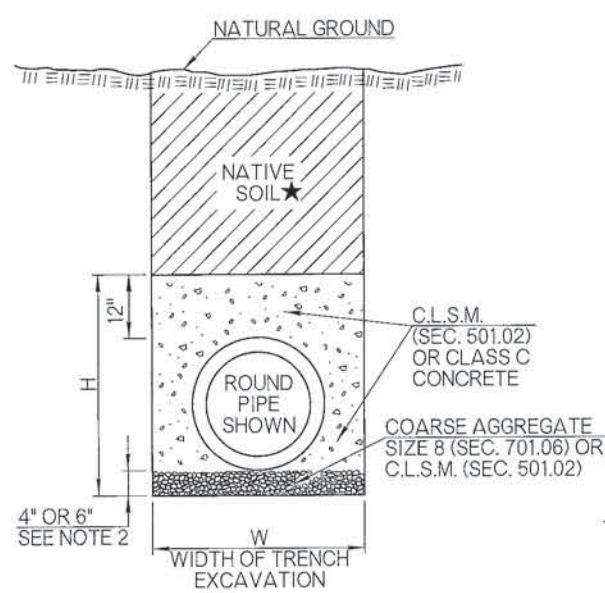


GENERAL NOTES

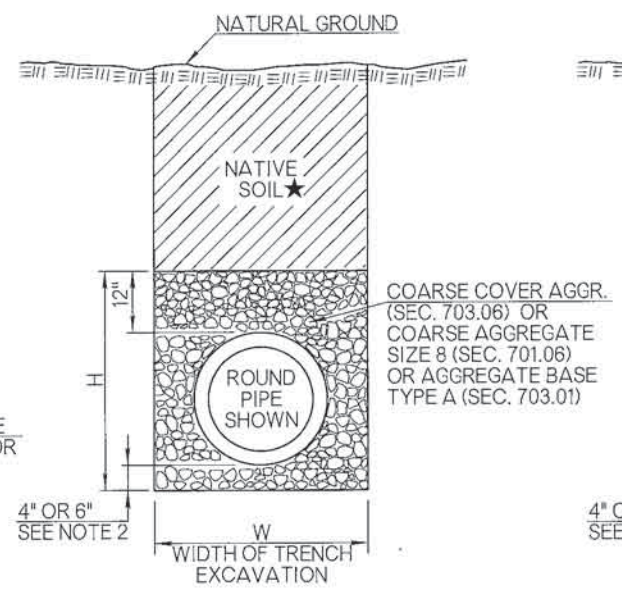
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- TRENCH EXCAVATION AND BEDDING MATERIAL WILL NOT BE REQUIRED FOR PIPE INSTALLATIONS OF SIDE DRAINS UNLESS OTHERWISE NOTED ON THE PLANS.
- FOR PIPE UNDERDRAIN INSTALLATIONS, SEE ROADWAY STANDARD 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

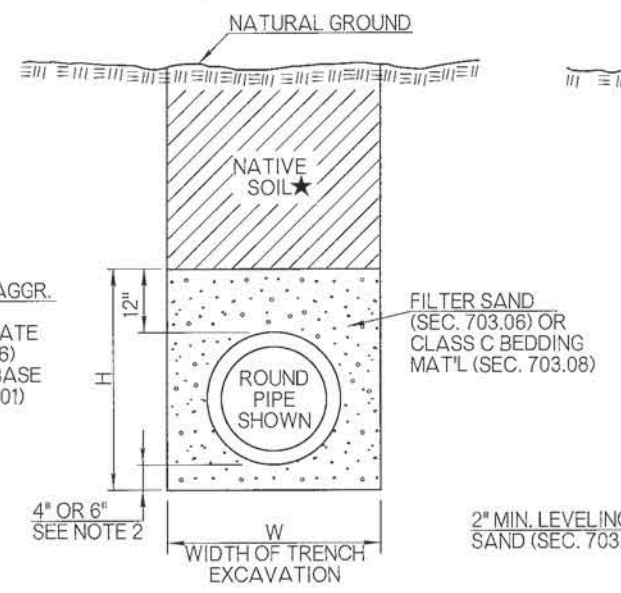
APPROVED BY ROADWAY ENGINEER: *Calvin F. A.* DATE: 04/11/15
 ROADWAY DESIGN DIVISION STANDARD
DOT STANDARD PIPE INSTALLATION



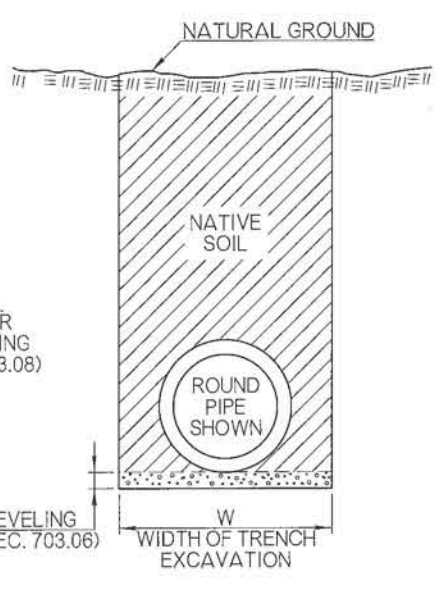
CLASS A BEDDING



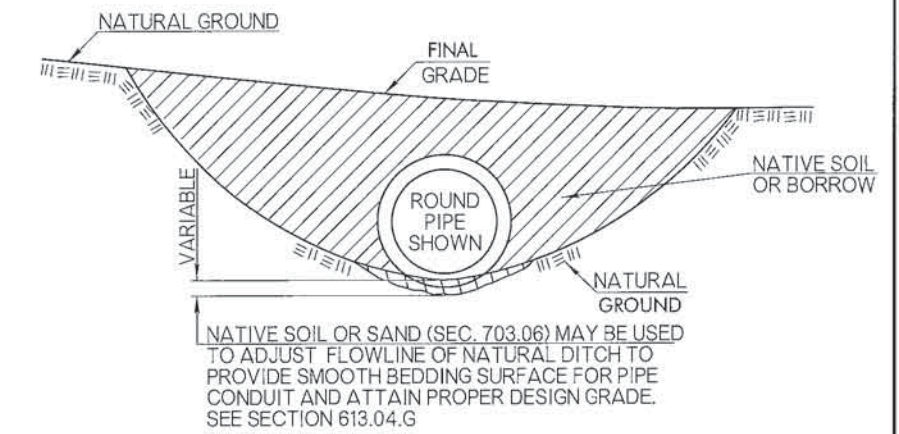
CLASS B BEDDING



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.
- ★ 11. 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.

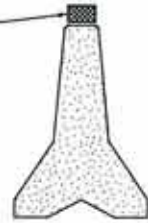
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
613 (R)	STANDARD BEDDING MATERIAL, CLASS A	CY
613 (S)	STANDARD BEDDING MATERIAL, CLASS B	CY
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY

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

STANDARD PIPE BEDDING

BARRIER DELINEATOR SHALL BE PLACED AT 50' o/c (MAX). DELINEATOR SHALL HAVE 8" (MIN.) REFLECTIVE AREA. SEE THE 2009 STANDARD SPECIFICATIONS FOR DETAILS. DELINEATOR TO BE INSTALLED AS RECOMMENDED BY THE MANUFACTURER. ALL DELINEATION WILL BE EITHER JD-2/JD-1 MANUFACTURED BY VEGA CORPORATION OR ASTRO OPTICS OR APPROVED EQUAL.

BARRIER DELINEATORS
@ 50' o/c



BARRIER DELINEATORS FOR PERMANENTLY INSTALLED CONCRETE MEDIAN BARRIER

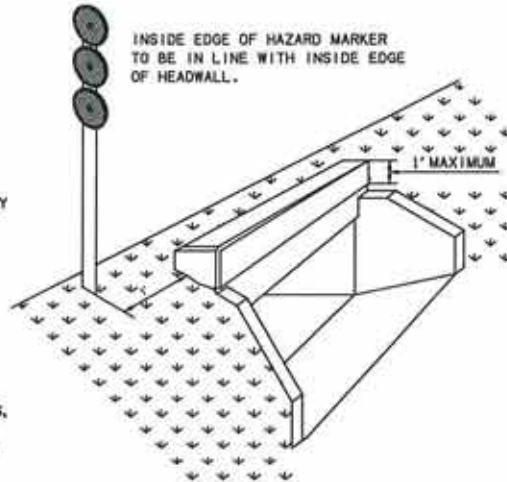
- TYPE 1 (CRYSTAL)
- TYPE 1 (AMBER)
- TYPE 2 (CRYSTAL/CRYSTAL)
- TYPE 2 (AMBER/AMBER)

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.

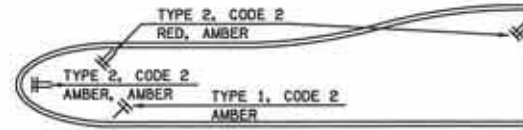
NOTE 3:
WHEN BOLTS AND NUTS ARE USED FOR DELINEATOR ASSEMBLIES, THE BOLT ENDS ARE TO BE SUFFICIENTLY DEFORMED TO RESIST VANDALISM. SEE NOTE 1 FOR FASTENING DEVICES.

WHEN HEADWALL IS 2'-3" OR LESS FROM EDGE OF SHOULDER, USE MONODIRECTIONAL CODE 3 AMBER HAZARD MARKER FOR ONE-WAY ROADWAY (NON-EXPRESSWAY) AND FOR TWO-WAY ROADWAY, USE BI-DIRECTIONAL CODE 3 AMBER HAZARD MARKERS PLACED AT APPROACH END OF HEADWALL.

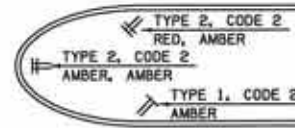
INSIDE EDGE OF HAZARD MARKER TO BE IN LINE WITH INSIDE EDGE OF HEADWALL.



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.

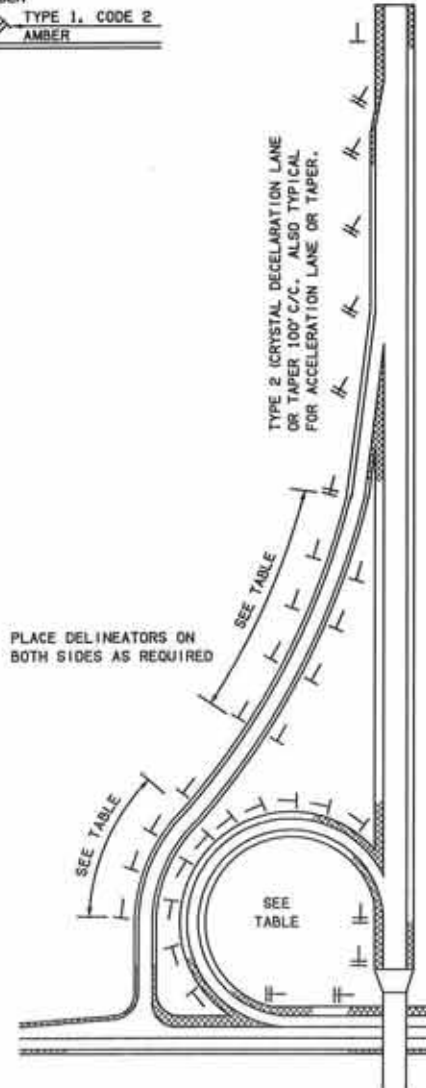


TYPICAL DELINEATOR PLACEMENT AT MEDIAN OPENINGS



TYPE 2 (CRYSTAL) DECELERATION LANE OR TAPER 100' C/C. ALSO TYPICAL FOR ACCELERATION LANE OR TAPER.

PLACE DELINEATORS ON BOTH SIDES AS REQUIRED



TYPICAL DELINEATOR SPACING FOR INTERCHANGE RAMP

DELINEATORS SHALL NORMALLY BE PLACED ON THE RIGHT SIDE OF RAMPS EXCEPT WHEN REQUIRED OUTSIDE OF CURVE.

WHEN RADIUS ON RAMP CURVES IS LESS THAN 2500', DELINEATORS SHALL BE PLACED ON OUTSIDE OF CURVE AND SPACED AS SHOWN ON TABLE FOR "SPACING ON CURVES", OR OMIT DELINEATORS WHEN W1-B CHEVRON SIGNS ARE SPECIFIED.

MAXIMUM SPACING OF DELINEATORS ON RAMPS SHALL BE 100'.

RADIUS IN FEET UP TO AND INCLUDING	SPACING ON CURVE	SPACING IN ADVANCE AND BEYOND CURVES		
		FIRST	SECOND	THIRD
2500'	100'	200'	200'	200'
1000'	90'	150'	200'	200'
900'	85'	150'	200'	200'
800'	80'	150'	200'	200'
700'	75'	100'	200'	200'
600'	70'	100'	150'	200'
500'	65'	75'	125'	200'
400'	55'	50'	100'	200'
300'	50'	50'	100'	175'
250'	40'	50'	100'	150'
200'	35'	30'	50'	125'
150'	30'	20'	50'	90'
50'	20'	20'	50'	90'

DESCRIPTION	REVISIONS	DATE
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ELIMINATE NORMAL DELINEATOR WHEN CODE 3 IS WITHIN 1/4 SPACING DISTANCE

ON ONE-WAY ROADWAY (NON-FREEWAYS), CONSTRUCT MONO-DIRECTIONAL TYPE 1, CODE 1 DELINEATORS ON OUTSIDE OF CURVES HAVING A RADIUS OF 2500' OR LESS.

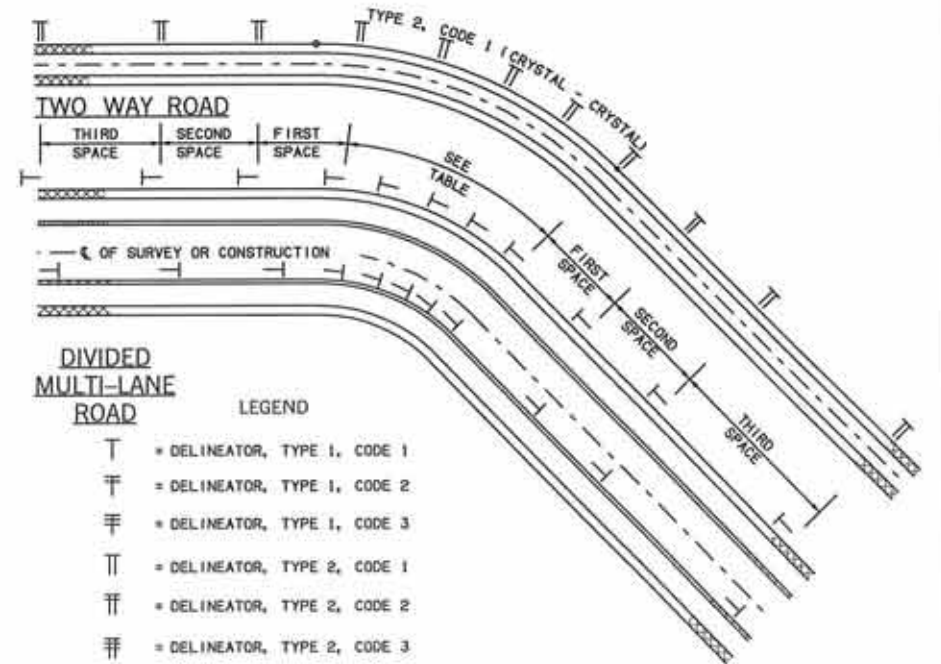
ON TWO-WAY ROADWAYS, CONSTRUCT BI-DIRECTIONAL TYPE 2, CODE 1 DELINEATORS ON OUTSIDE OF CURVES HAVING A RADIUS OF 2500' OR LESS.

ON FREEWAYS, CONSTRUCT MONO-DIRECTIONAL TYPE 1, CODE 1 DELINEATORS ON RIGHT SIDE OF ROADWAYS AT 528' SPACING ON THROUGH LANE.

EXCEPT ON FREEWAYS, DELINEATOR SPACING ON THRU LANE CURVES SHALL BE BASED ON CENTERLINE OF SURVEY OR CONSTRUCTION BASE LINE. PLACEMENT SHALL BE EVENLY SPACED AS REQUIRED IN TABLE.

MATERIALS SPECIFICATIONS

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



DIVIDED MULTI-LANE ROAD

LEGEND

- T = DELINEATOR, TYPE 1, CODE 1
- ⊥ = DELINEATOR, TYPE 1, CODE 2
- ≡ = DELINEATOR, TYPE 1, CODE 3
- ⊥⊥ = DELINEATOR, TYPE 2, CODE 1
- ≡≡ = DELINEATOR, TYPE 2, CODE 2
- ≡≡≡ = DELINEATOR, TYPE 2, CODE 3

LENGTH OF CURVE ÷ REQUIRED SPACING + 7 = TOTAL POSTS REQUIRED FOR CURVE AND RUNOUT SPACINGS

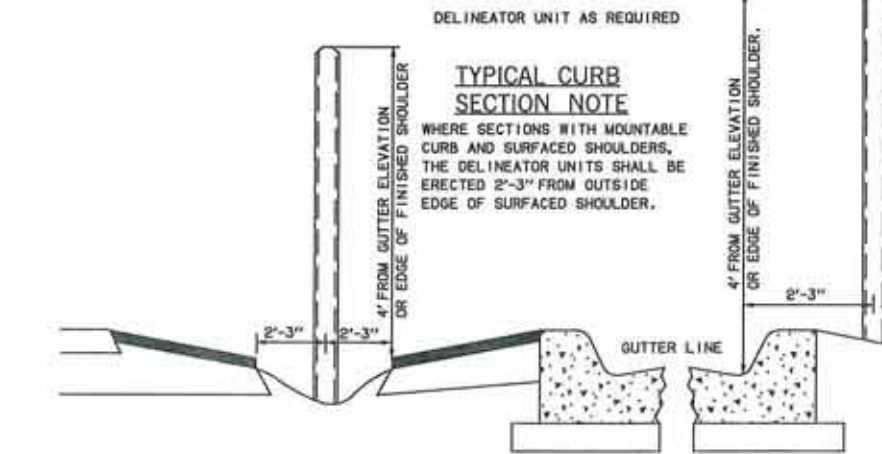
BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
853	DELINEATORS	EA



APPROVED BY TRAFFIC ENGINEER: *David Smith* DATE: 8/1/10

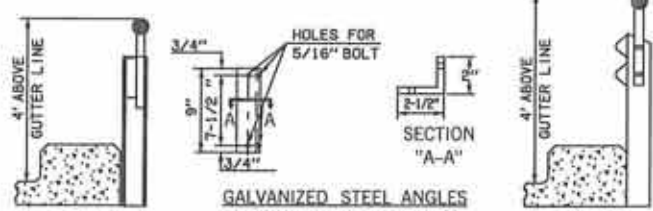
TRAFFIC STANDARD
STANDARD DELINEATOR UNITS



DELINEATOR UNIT AS REQUIRED

TYPICAL CURB SECTION NOTE

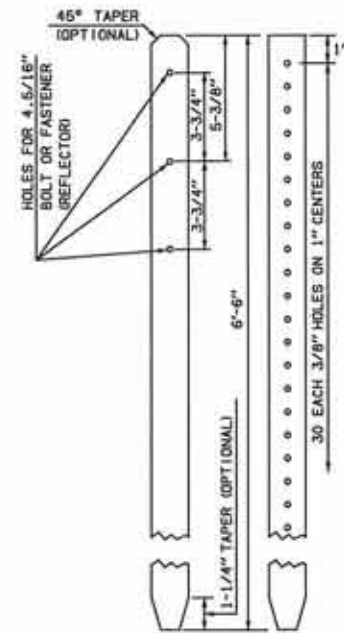
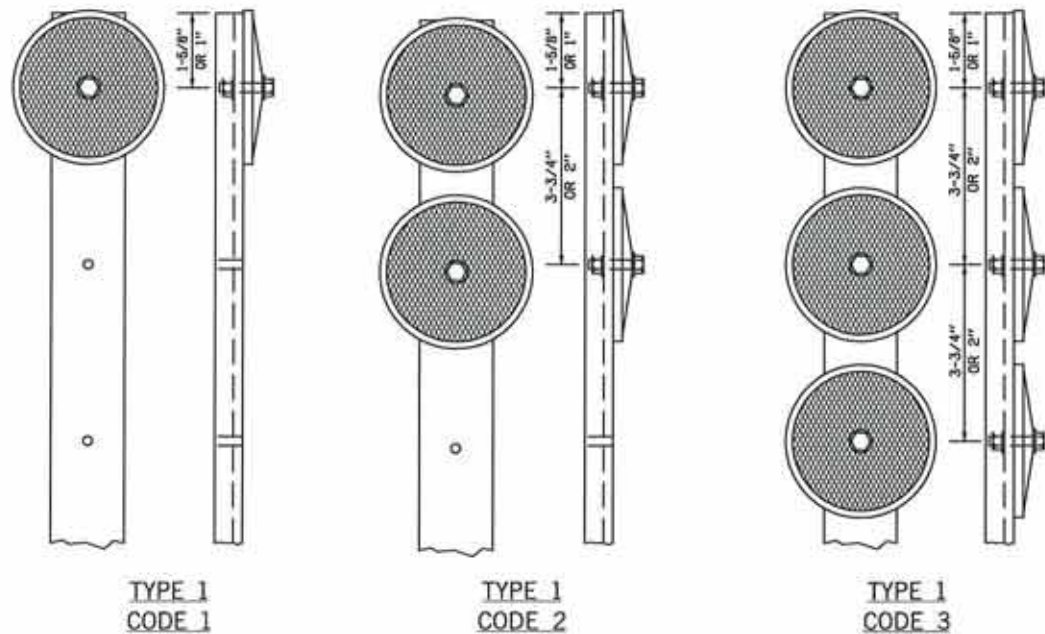
WHERE SECTIONS WITH MOUNTABLE CURB AND SURFACED SHOULDERS, THE DELINEATOR UNITS SHALL BE ERECTED 2'-3" FROM OUTSIDE EDGE OF SURFACED SHOULDER.



CHANNEL BEAM HANDRAIL "H" BEAM POST
GALVANIZED STEEL ANGLES 5/16" MINIMUM THICKNESS WEIGHT PER M² 2.75 lbs/ft.
CHANNEL BEAM GUARD RAIL "H" BEAM POST

NOTE 2:
FOR ATTACHING DELINEATOR POSTS TO GALVANIZED STEEL ANGLES, USE 5/16" X 3/4" GALVANIZED STEEL BOLTS. FOR ATTACHING DELINEATORS 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.

DESCRIPTION	REVISIONS	DATE

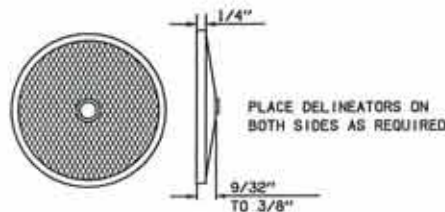
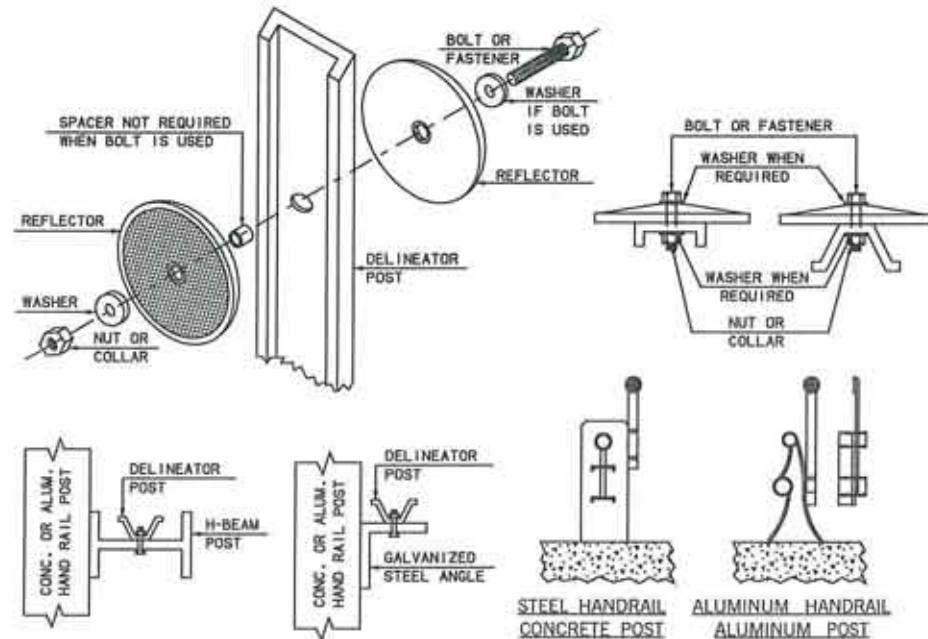


TYPE 2 DELINEATORS SHALL BE THE SAME AS SHOWN ABOVE EXCEPT THAT REFLECTORS ARE MOUNTED ON BOTH SIDES OF THE POST. COLOR OF THE REFLECTORS SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST REVISION.

MATERIALS SPECIFICATIONS

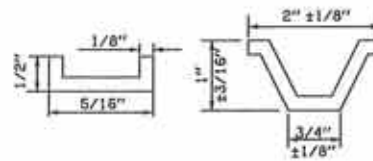
THE WEIGHT OF EACH POST BEFORE GALVANIZING & PUNCHING SHALL BE 1.12 lbs/ft. THE WEIGHT TOLERANCE SHALL BE $\pm 3-1/2\%$.

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 (FULL PIN, CLIPPED FLUSH, REMAINS IN RIVET WHEN FINISHED). ALL NUTS SHALL BE SELF LOCKING.



CENTER MOUNT REFLECTOR

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.



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.

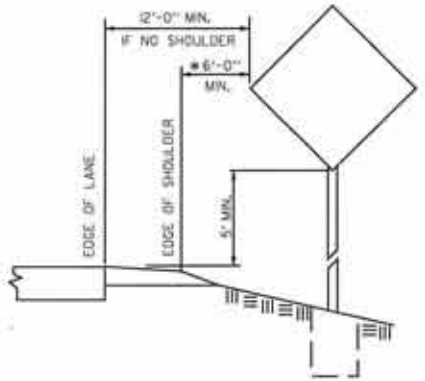
NOTE 2:
FOR ATTACHING DELINEATOR POSTS TO GALVANIZED STEEL ANGLES, USE 5/16" X 3/4" GALVANIZED STEEL BOLTS. FOR ATTACHING DELINEATOR POST OR GALVANIZED STEEL ANGLES TO ALUMINUM OR "H" BEAM HANDRAIL POST, USE 5/16" X 1" GALVANIZED STEEL BOLTS. FOR ATTACHING GALVANIZED STEEL ANGLES TO CONCRETE POSTS, USE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

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
853	DELINEATORS	EA

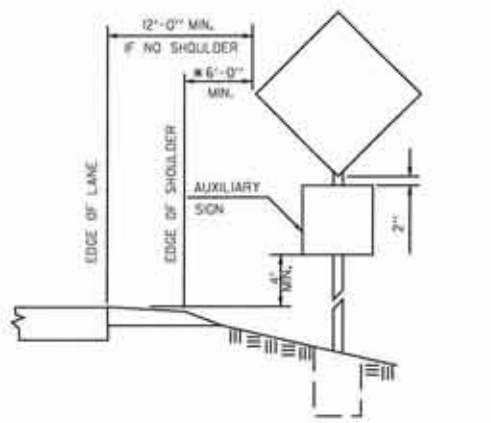


APPROVED BY
TRAFFIC ENGINEER: *Chad G. Smith* DATE: *1/11/10*

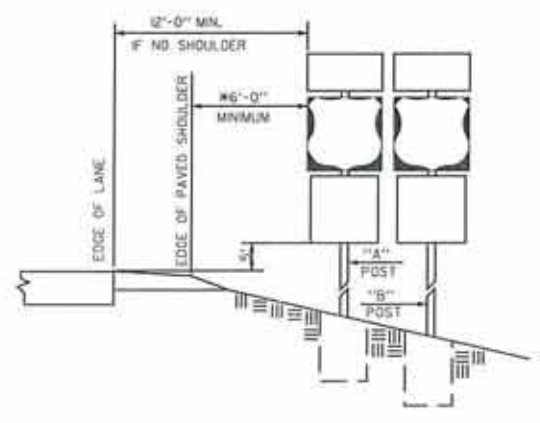
TRAFFIC STANDARD
STANDARD DELINEATOR UNITS



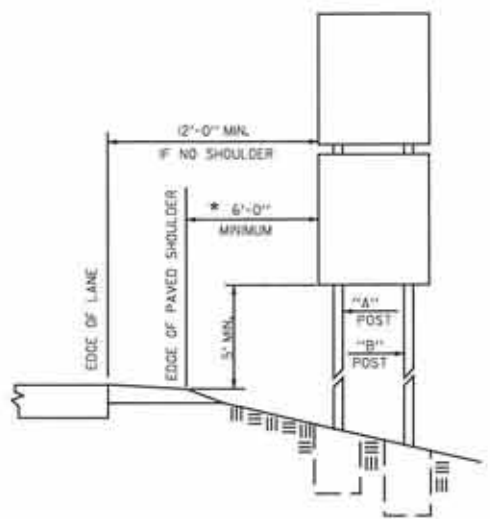
SINGLE POST (RURAL)



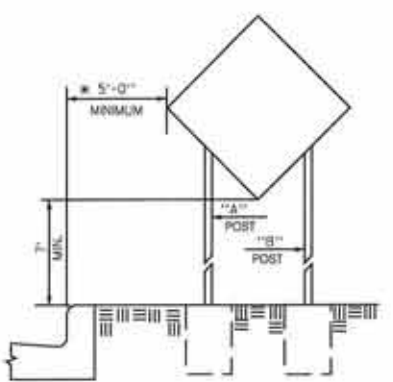
SINGLE POST WITH AUXILIARY SIGN (RURAL)



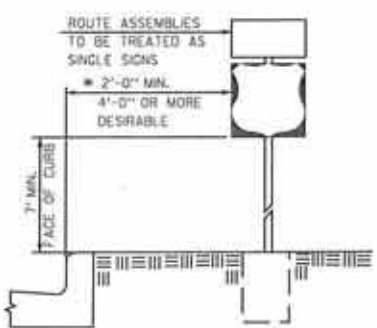
ROADSIDE ASSEMBLY (RURAL)



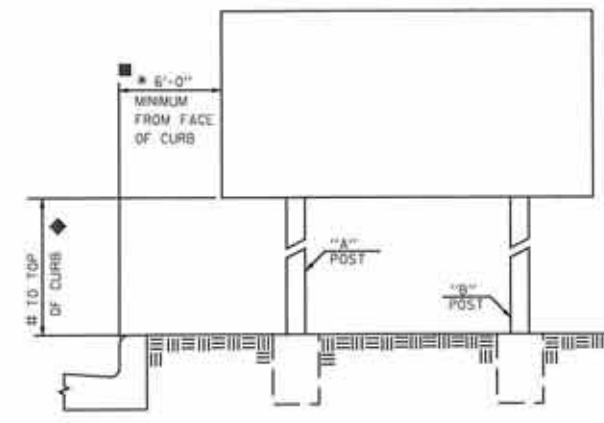
DOUBLE POST MAXIMUM & MINIMUM SPEED LIMIT SIGNS (RURAL)



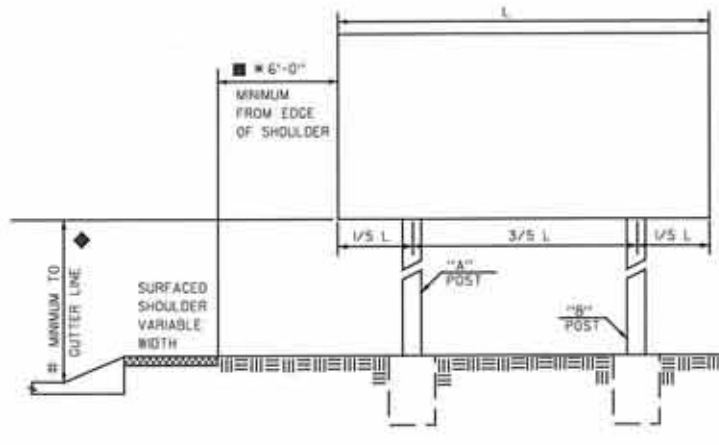
BUSINESS, COMMERCIAL OR RESIDENTIAL AREA



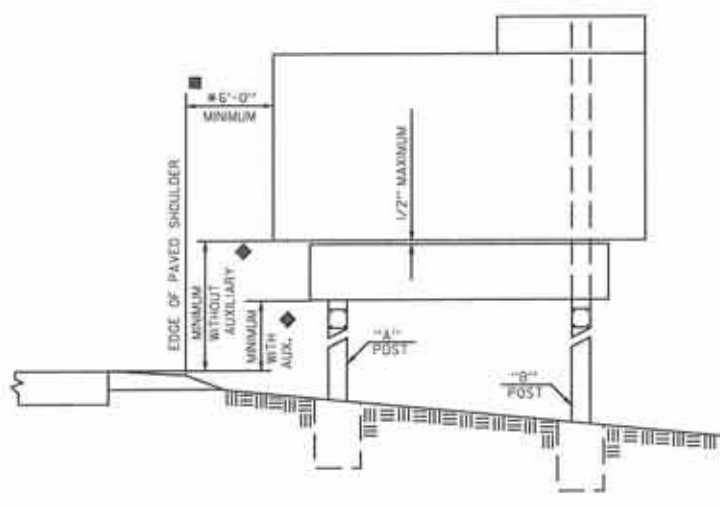
BUSINESS, COMMERCIAL OR RESIDENTIAL AREA



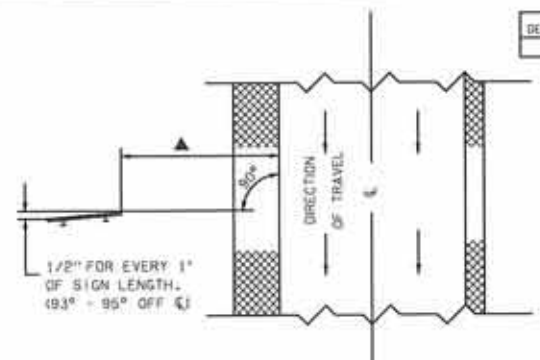
INFORMATION SIGN WITH NON-MOUNTABLE CURB



INFORMATION SIGN WITH MOUNTABLE CURB



FREEWAY OR EXPRESSWAY SIGN (WITH OR WITHOUT AUXILIARY SIGN)



SIGN POSITIONING DETAIL

*1 SIGNS SHALL BE SO POSITIONED TO ELIMINATE OR MINIMIZE SPECULAR REFLECTION, DUE TO THE NUMEROUS VARIATIONS IN ROAD CURVES AND GRADES, THIS GENERAL RULE MAY NOT ALWAYS BE APPLICABLE, AND SIGNS SHALL BE POSITIONED AS DETERMINED BY THE ENGINEER.

*2 IF FURTHER CLARIFICATION OF VERTICAL AND LATERAL CLEARANCES IS REQUIRED, SEE THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES LATEST REVISION.

◆ WHEN LATERAL CLEARANCE OF STANDARD OR SPECIAL INFORMATION GUIDE SIGNS IS 30' OR GREATER (AS REQUIRED BY CLEAR ZONE) FROM THE EDGE LINE, THE MINIMUM VERTICAL CLEARANCE IS 7'. IF AN AUXILIARY SIGN IS MOUNTED BELOW A STANDARD OR SPECIAL INFORMATION GUIDE SIGN, THE RECOMMENDED VERTICAL CLEARANCE FOR THE STANDARD OR SPECIAL INFORMATION GUIDE SIGN IS MINIMUM 8' AND THE AUXILIARY SIGN IS MINIMUM 5'.

◆ THE MINIMUM LATERAL CLEARANCE OF THE SIGN FROM THE EDGE OF SHOULDER OR FACE OF CURB SHALL BE AS SHOWN ON THIS STANDARD DRAWING UNLESS OTHERWISE SHOWN OR NOTED ON PLANS. WHEN SIGNS ARE NOTED TO BE PLACED 5' TO 9' FROM SHOULDER, THE TOLERANCE SHALL BE THE DISTANCE SHOWN +2'.

IN INSTANCES WHERE THE LATERAL CLEARANCE SHOWN CAUSES THE FOOTING TO BE LOCATED UNDESIRABLY, SUCH AS THE BOTTOM OF DITCHES, ETC., THE LOCATION MAY BE ADJUSTED OUTWARD FROM THE ROADWAY IF NECESSARY AT THE DISCRETION OF THE ENGINEER.

IN RURAL AREAS THERE SHALL BE A 12' MINIMUM FROM TRAVELWAY (EDGE LINE) TO THE EDGE OF THE SIGN IF NO SHOULDER EXISTS.

◆ NORMALLY, ON FREEWAY AND EXPRESSWAY MAINLINE, STANDARD OR SPECIAL INFORMATION SIGNS SHALL BE LOCATED WITH A LATERAL CLEARANCE OF 10' FROM THE FACE OF NON-MOUNTABLE CURBS OR GUARD RAILS, 20' FROM EDGE OF SHOULDER, IN ALL CASES EXCEPT WHEN SIGN SUPPORTS ARE PROTECTED BY BARRIERS, SIGNS SHALL HAVE A LATERAL CLEARANCE OF 30' OR GREATER (AS REQUIRED BY CLEAR ZONE) FROM EDGE OF DRIVING LANE.

ALONG INTERCHANGE RAMP THE LATERAL CLEARANCE SHALL NORMALLY BE 10' OR GREATER (AS REQUIRED BY CLEAR ZONE).

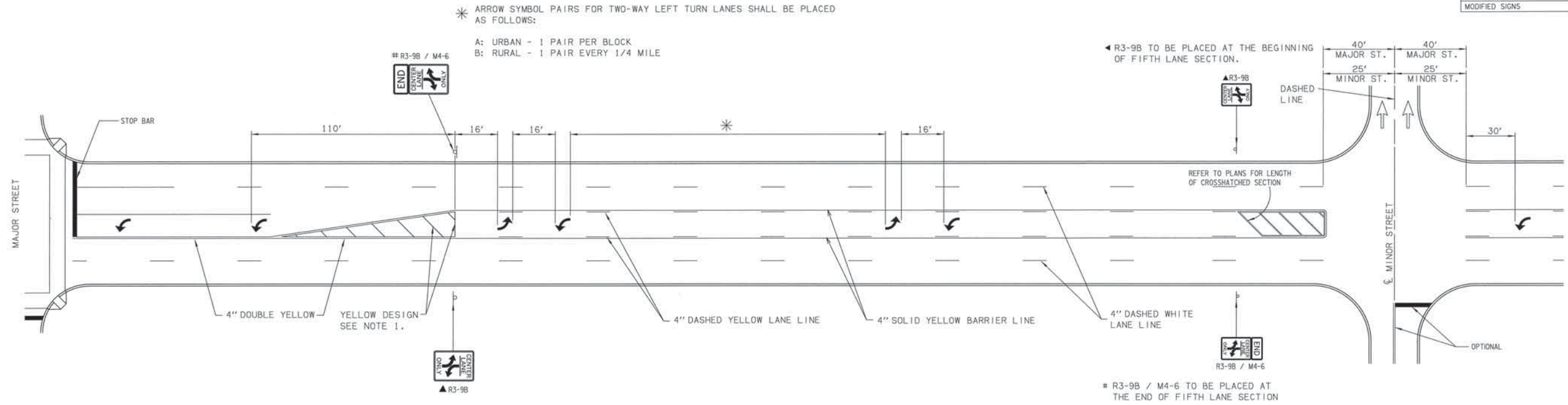
▲ WHEN LATERAL CLEARANCE IS 30'-0" OR GREATER FROM EDGE OF PAVEMENT, THE SIGN IS TO BE APPROXIMATELY PERPENDICULAR TO ROADWAY.



APPROVED BY TRAFFIC ENGINEER *David Smalley* DATE 8/5/10
TRAFFIC STANDARD

TYPICAL INSTALLATIONS OF GROUND MOUNTED SIGNS

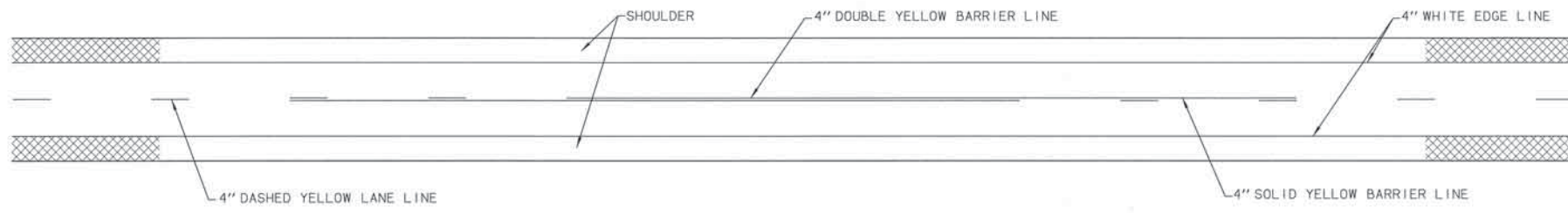
DESCRIPTION	REVISIONS	DATE
ADDED GENERAL NOTE L		7/08/2011
MODIFIED SIGNS		4/10/2012



FIFTH LANE PAVEMENT MARKING DETAIL (URBAN)

GENERAL NOTE

- 1. WIDTH OF DIAGONALS ARE AS FOLLOWS:
 ≥ 45 MPH - 12" WIDE
 < 45 MPH - 8" WIDE



TWO LANE RURAL ROADWAY PAVEMENT MARKINGS

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
854(A)	TRAFFIC STRIPE (PAINT) (4" WIDE)	LF
854(B)	TRAFFIC STRIPE (PAINT) (ARROW, WORDS, OR SYMBOLS)	EA
855(A)	TRAFFIC STRIPE (PLASTIC) (4" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (6" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (8" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (24" WIDE)	LF
855(B)	TRAFFIC STRIPE (PLASTIC) (ARROW)	EA
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (4" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (6" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (8" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (24" WIDE)	LF
856(B)	TRAFFIC STRIPE (MULTI-POLYMER) (SYMBOLS, WORDS, ETC)	EA



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

TRAFFIC STANDARD
 PAVEMENT MARKING
 (FIFTH LANE AND TWO LANE RURAL)



STOP

R1-1 30 x 30 5.18 SF
 R1-1E 36 x 36 7.46 SF
 R1-1F 48 x 48 13.26 SF

COLOR:
 LEGEND AND BORDER:
 WHITE (REFLECTORIZED)
 BACKGROUND:
 RED (TRANSPARENT REFLECTORIZED)



YIELD

R1-2 36 x 36 x 36 3.90 SF
 R1-2E 48 x 48 x 48 6.93 SF
 R1-2F 60 x 60 x 60 10.83 SF

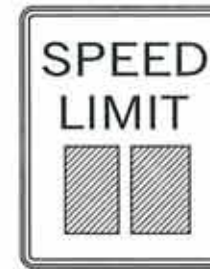
COLOR:
 LEGEND AND BORDER:
 RED (TRANSPARENT REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



ALL-WAY

R1-3P 18 x 6 0.75 SF
 R1-3PE 30 x 12 2.50 SF

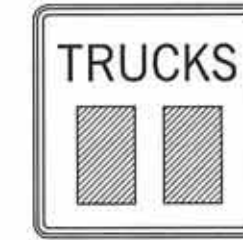
COLOR:
 LEGEND AND BORDER:
 WHITE (REFLECTORIZED)
 BACKGROUND:
 RED (TRANSPARENT REFLECTORIZED)



SPEED LIMIT

R2-1()^{SPEED} 24 x 30 5.00 SF
 R2-1E() 36 x 48 12.00 SF
 R2-1F() 48 x 60 20.00 SF

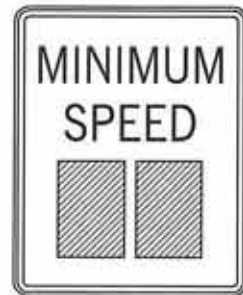
COLOR:
 LEGEND AND BORDER:
 BLACK (NON-REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



TRUCK SPEED LIMIT

R2-2P()^{SPEED} 24 x 24 4.00 SF
 R2-2PE() 36 x 36 9.00 SF
 R2-2PF() 48 x 48 16.00 SF

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



MINIMUM SPEED LIMIT

R2-4P()^{SPEED} 24 x 30 5.00 SF
 R2-4PE() 36 x 48 12.00 SF
 R2-4PF() 48 x 60 20.00 SF

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



NO RIGHT TURN

R3-1 24 x 24 4.00 SF
 R3-1E 36 x 36 9.00 SF
 R3-1F 48 x 48 16.00 SF

COLOR:
 ARROW AND BORDER:
 BLACK (NON-REFLECTORIZED)
 CIRCLE AND DIAGONAL:
 RED (TRANSPARENT REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



NO LEFT TURN

R3-2 24 x 24 4.00 SF
 R3-2E 36 x 36 9.00 SF
 R3-2F 48 x 48 16.00 SF

COLOR:
 ARROW AND BORDER:
 BLACK (NON-REFLECTORIZED)
 CIRCLE AND DIAGONAL:
 RED (TRANSPARENT REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



NO TURN

R3-3 24 x 24 4.00 SF
 R3-3E 36 x 36 9.00 SF
 R3-3F 48 x 48 16.00 SF

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



NO U TURN

R3-4 24 x 24 4.00 SF
 R3-4E 36 x 36 9.00 SF
 R3-4F 48 x 48 16.00 SF

COLOR:
 ARROW AND BORDER:
 BLACK (NON-REFLECTORIZED)
 CIRCLE AND DIAGONAL:
 RED (TRANSPARENT REFLECTORIZED)
 BACKGROUND:
 WHITE (REFLECTORIZED)



LEFT TURN ONLY

R3-5(L) 30 x 36 7.50 SF

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



RIGHT TURN ONLY

R3-5(R) 30 x 36 7.50 SF

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



LANE-LEFT

R3-6(L) 30 x 36 7.50 SF

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



LANE-RIGHT

R3-6(R) 30 x 36 7.50 SF

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

BASIS OF PAYMENT

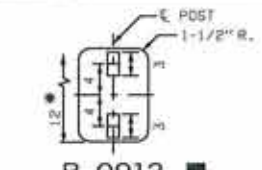
ITEM NO.	ITEM	UNIT
850(A)	SHEET ALUMINUM SIGNS	SF



APPROVED BY TRAFFIC ENGINEER: *Clayton Smith* DATE: 8/15/10

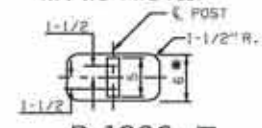
TRAFFIC STANDARD
 REGULATORY SIGN DETAILS
 (R-SERIES)

DESCRIPTION	REVISIONS	DATE
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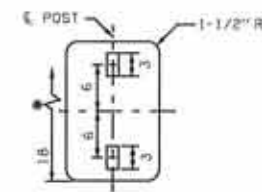


B-0912

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST

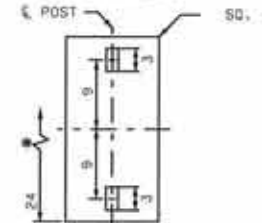


B-1206



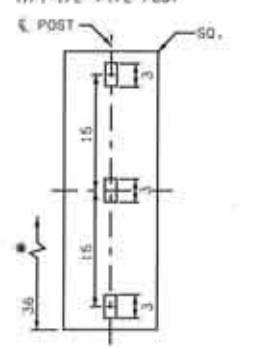
B-1218

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



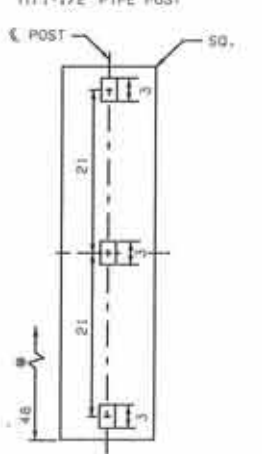
B-1224

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



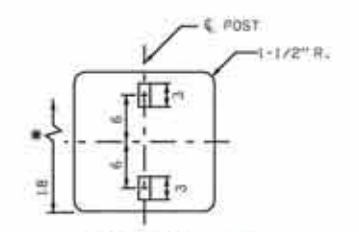
B-1236

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



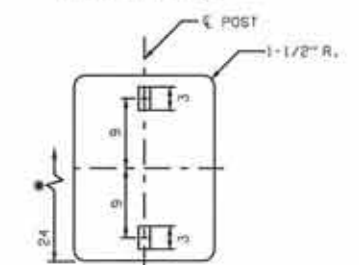
B-1248

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



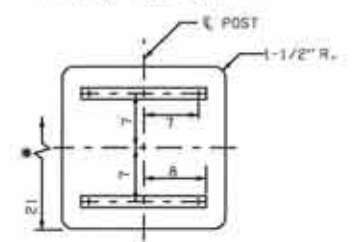
B-18(S)

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



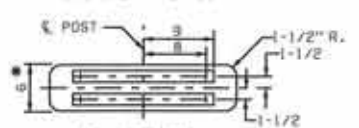
B-1824

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



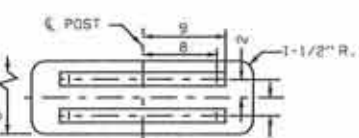
B-21(S)

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



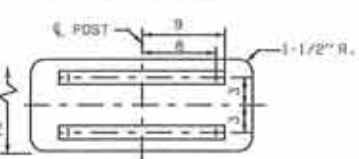
B-2406

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



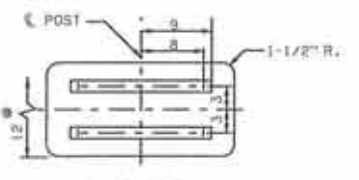
B-2408

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



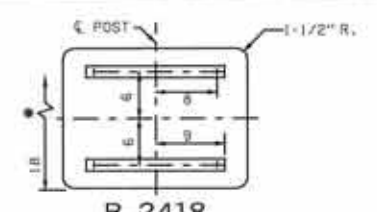
B-2410

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



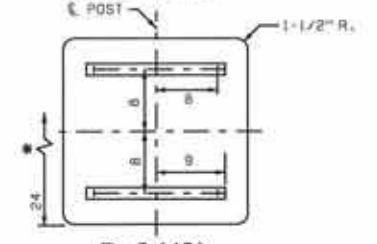
B-2412

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



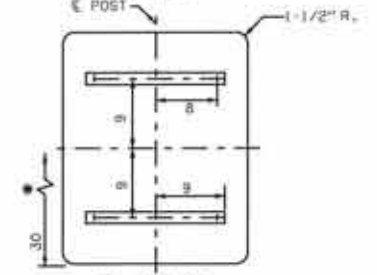
B-2418

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



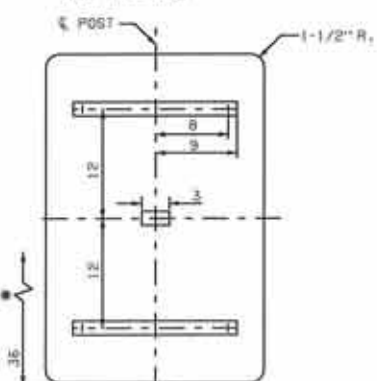
B-24(S)

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



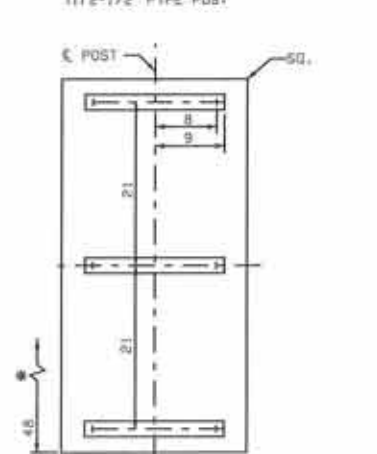
B-2430

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



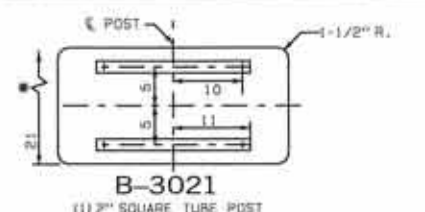
B-2436

(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST



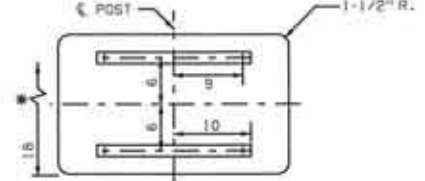
B-2448

(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST



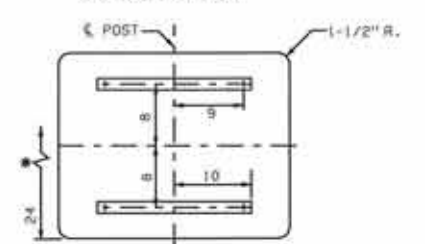
B-3021

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



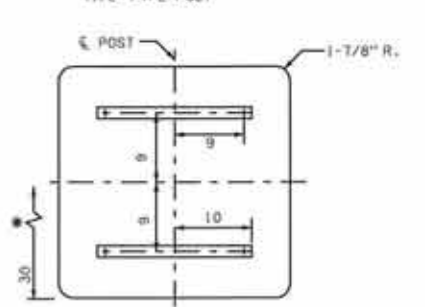
B-3018

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



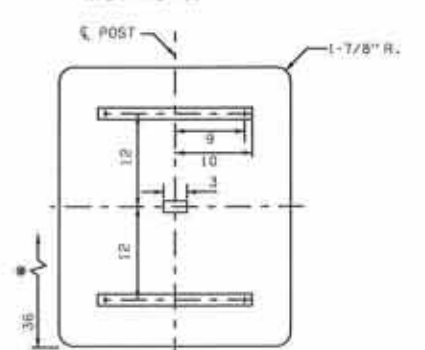
B-3024

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



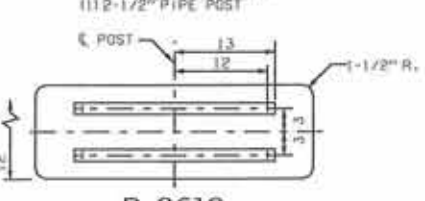
B-30(S)

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



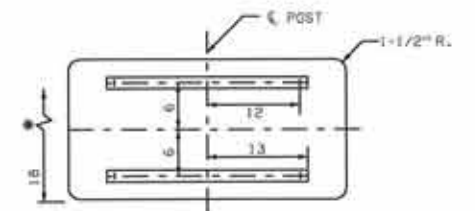
B-3036

(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST



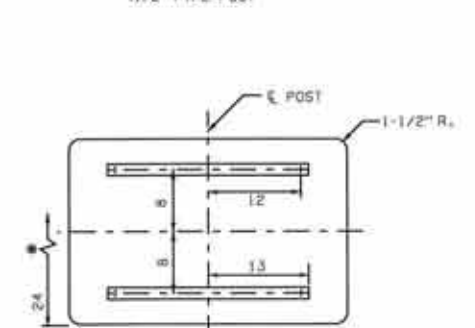
B-3612

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



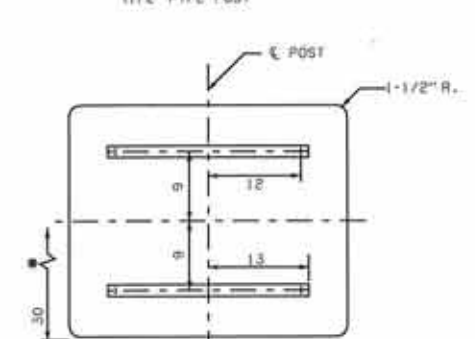
B-3618

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(1) 2" PIPE POST



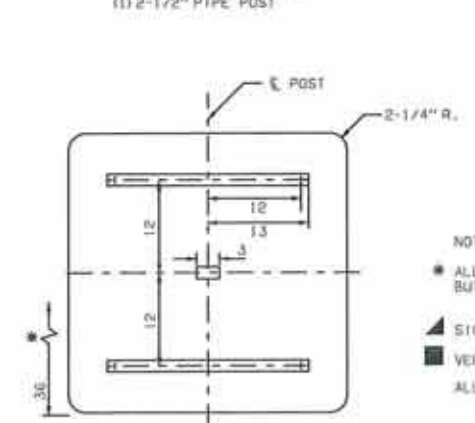
B-3624

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



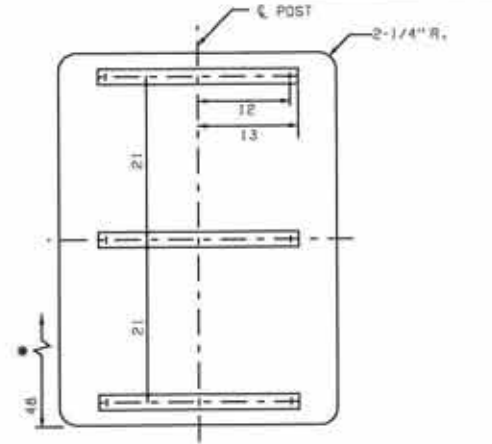
B-3630

(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST



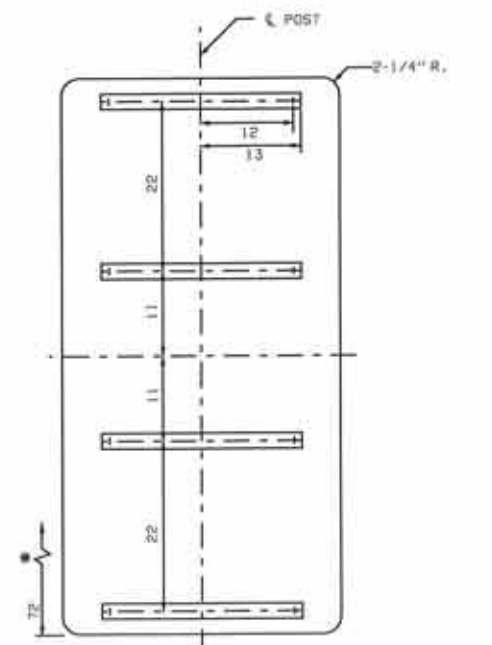
B-36(S)

(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST



B-3648

(2) 2" SQUARE TUBE POSTS
(1) 3" PIPE POST



B-3672

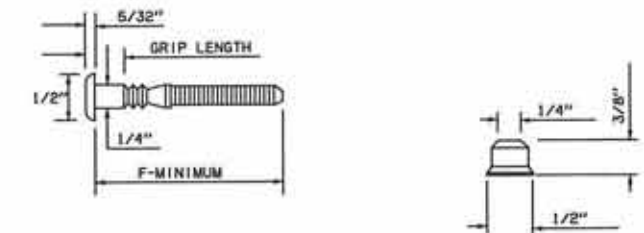
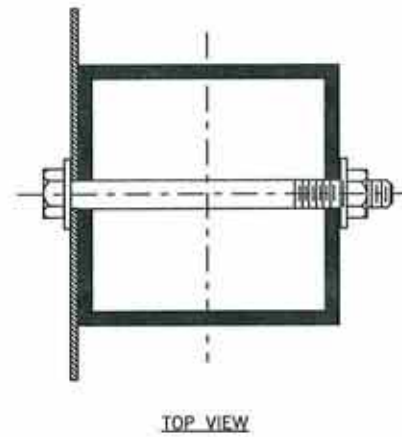
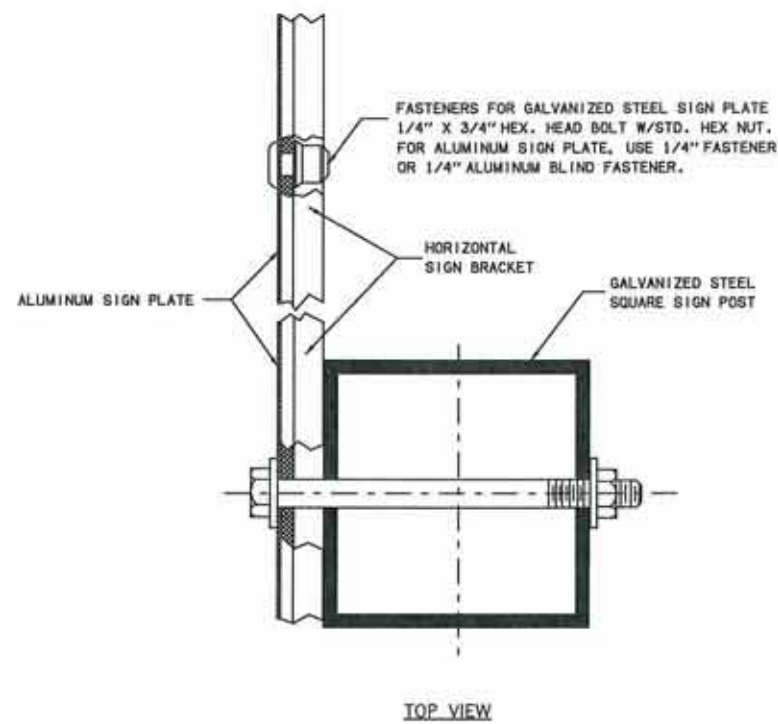
(1) 3-1/2" PIPE POST

- NOTES:
- ALL POSTS SHALL EXTEND 2" ABOVE THE TOP SIGN BRACKET, BUT NOT ABOVE THE TOP OF THE SIGN.
 - SIGN BLANK THICKNESS SHALL BE .060" ALUMINUM OR 18 GAUGE STEEL.
 - VERTICAL SIGN BRACKET ONLY.
 - ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.



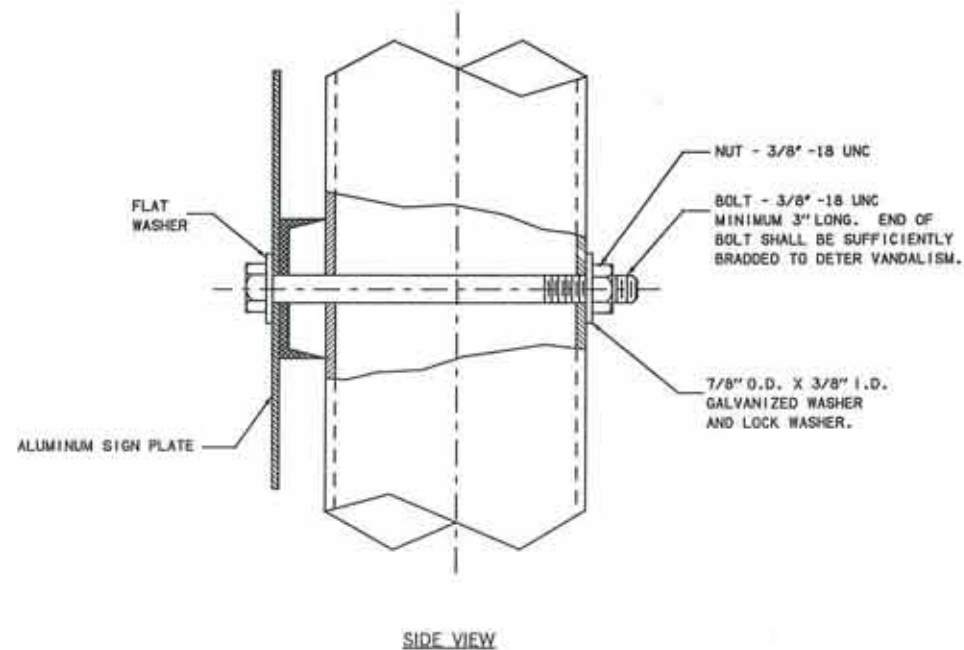
APPROVED BY
TRAFFIC ENGINEER: *Harold Smith* DATE: *8/10*
TRAFFIC STANDARD

SIGN BLANK AND BRACKET DETAILS

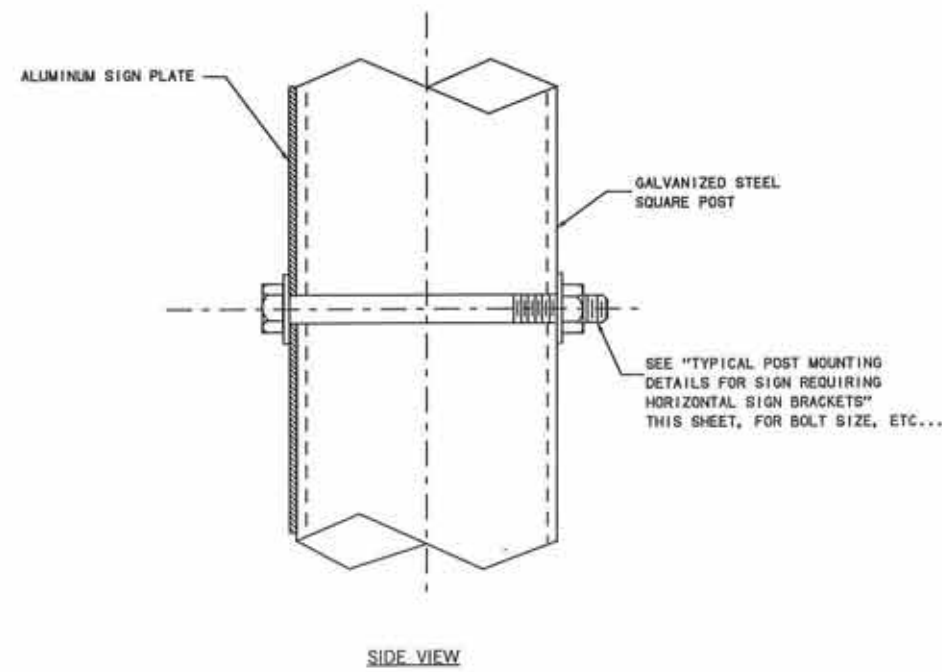


1/4" FASTENER AND 1/4" COLLAR
(TYPICAL)

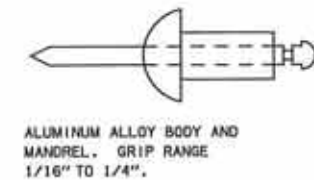
GRIP NO.	GRIP LENGTH (INCHES)	F-MIN. (INCHES)
2	0.094 - 0.156	1-7/16"
3	0.157 - 0.218	1-1/2"
4	0.219 - 0.281	1-9/16"
5	0.282 - 0.343	1-5/8"
6	0.344 - 0.406	1-11/16"
17	0.407 - 1.093	2-3/8"



TYPICAL POST MOUNTING DETAILS
FOR SIGN REQUIRING HORIZONTAL
SIGN BRACKETS



TYPICAL POST MOUNTING DETAILS
FOR SIGN 18" WIDE AND UNDER



1/4" BLIND
FASTENERS

NOTE: ALL NUTS SHALL
BE SELF-LOCKING.



APPROVED BY
TRAFFIC ENGINEER: *David Smith* DATE: 8/15/10

TRAFFIC STANDARD

SHEET SIGN ASSEMBLY DETAILS
(SQUARE TUBE)

DESCRIPTION	REVISIONS	DATE
MODIFIED GENERAL NOTE 4.		7/08/2011
REISSUED		4/10/2012

WINDLOAD COORDINATES FOR SQUARE POST AT 90 MPH

SIGN CENTROID	ALLOWABLE SIGN AREA (FT ²) PER SINGLE POST *							
	FHWA APPROVED FOR: 2 POST PER SIGN				FHWA APPROVED FOR: 1 POST PER SIGN			
	1 1/2"x12ga perf.	1 3/4"x14ga perf.	1 3/4"x12ga perf.	2"x14ga perf.	2"x12ga perf.	2 1/4"x14ga perf.	2 1/4"x12ga perf.	2 1/2"x12ga perf.
16.5'	3.46	3.90	4.85	5.19	6.48	6.67	8.34	10.44
16'	3.57	4.02	5.00	5.36	6.68	6.88	8.60	10.76
15.5'	3.68	4.15	5.17	5.53	6.90	7.11	8.88	11.11
15'	3.81	4.29	5.34	5.71	7.13	7.34	9.17	11.48
14.5'	3.94	4.44	5.52	5.91	7.37	7.60	9.49	11.87
14'	4.08	4.59	5.72	6.12	7.64	7.87	9.83	12.30
13.5'	4.23	4.76	5.93	6.35	7.92	8.16	10.19	12.75
13'	4.39	4.95	6.16	6.59	8.22	8.47	10.59	13.24
12.5'	4.57	5.15	6.41	6.86	8.55	8.81	11.01	13.77
12'	4.76	5.36	6.67	7.14	8.91	9.18	11.47	14.35
11.5'	4.96	5.59	6.96	7.45	9.30	9.58	11.97	14.97
11'	5.19	5.85	7.28	7.79	9.72	10.01	12.51	15.65
10.5'	5.44	6.13	7.63	8.16	10.18	10.49	13.11	16.40
10'	5.71	6.43	8.01	8.57	10.69	11.01	13.76	17.22
9.5'	6.01	6.77	8.43	9.02	11.25	11.59	14.49	18.12
9'	6.34	7.15	8.90	9.52	11.88	12.24	15.29	19.13
8.5'	6.72	7.57	9.42	10.08	12.58	12.96	16.19	20.26
8'	7.14	8.04	10.01	10.71	13.36	13.77	17.20	21.52

* USE A MULTIPLIER OF 2 OR 3 FOR 2 & 3 POST INSTALLATIONS.

GENERAL NOTES

- POST TUBE SHALL MEET ASTM A1011 GRADE 50. POST TUBE GALVANIZED AS PER ASTM A653 GRADE 90.
- HEAVY DUTY ANCHOR TUBE SHALL MEET ASTM A500 GRADE B STRUCTURAL TUBE AND STEEL SHALL BE HOT DIP GALVANIZED PER ASTM A123.
- THE UPPER SIGN POST SHALL TELESCOPE INSIDE THE ANCHOR TUBE A MINIMUM OF 12". ANCHOR TUBE SHALL BE MINIMUM OF 30" WITH 3" MAXIMUM AS SHOWN IN DETAILS.
- THE CONCRETE FOOTING SHALL BE CLASS "C" CONCRETE OR AS DIRECTED BY THE ENGINEER. CONCRETE INCLUDED IN THE COST OF SQUARE TUBE POST.
- THE NON-REINFORCED CIRCULAR CONCRETE FOOTING, ANCHOR TUBE AND HARDWARE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE SQUARE TUBE POST.
- SEE STANDARD DRAWINGS SSA1-1, MSD5-1, MSD6-1, SBS1-1, SBS2-1, AND SBS3-1 (LATEST REVISION) FOR PROPER BRACKET PLACEMENT ON THE SIGN AND POST SPACING FOR TWO POST INSTALLATION.
- FOR VERTICAL AND LATERAL CLEARANCE, SEE STANDARD DRAWING GMS1-1, AND GMS2-1-(LATEST REVISION).
- SIGNS SHALL BE ATTACHED TO THE POSTS WITH BOLTS AS SHOWN ON STANDARD DRAWING SSA1-1-(LATEST REVISION).

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
851(C)	SQUARE TUBE POST	LF

APPROVED BY TRAFFIC ENGINEER: *Theresa Gray* DATE: 4/17/12

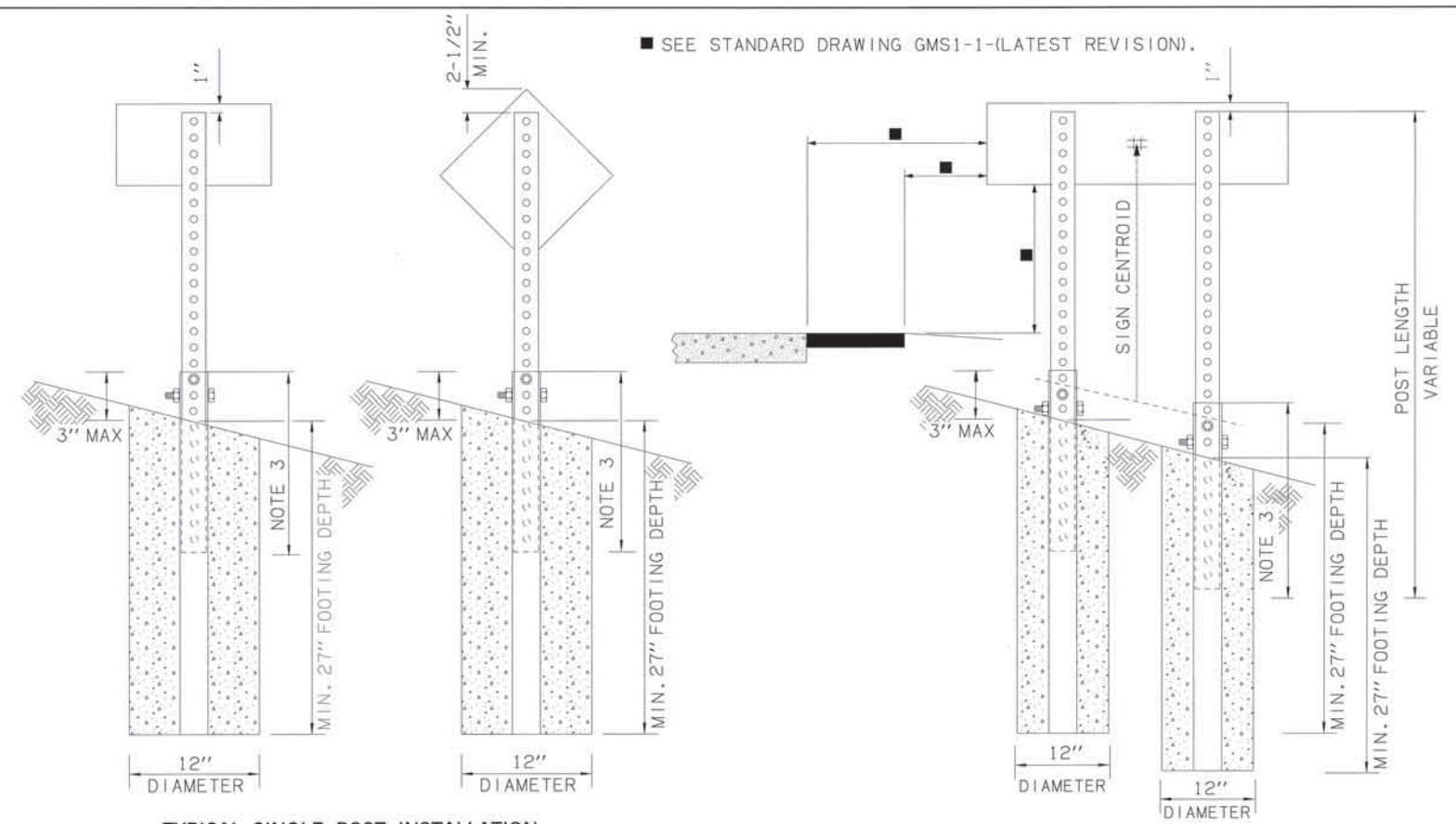


TRAFFIC STANDARD
SQUARE TUBE POST DETAILS

2009 SPECIFICATIONS

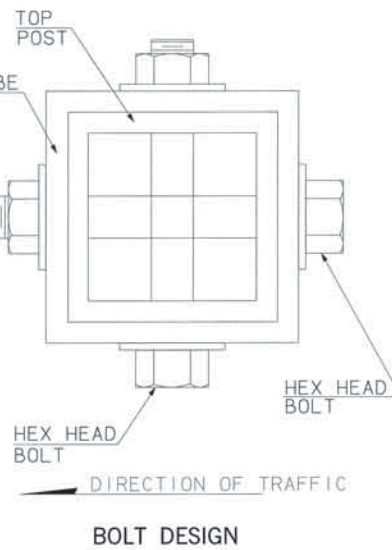
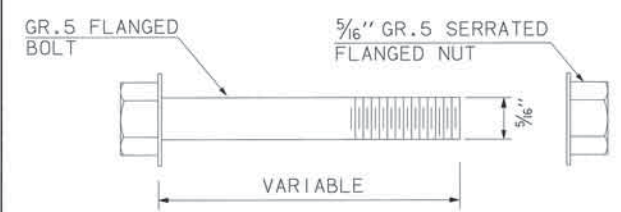
SSP1-1	02
T-138	

SEE STANDARD DRAWING GMS1-1-(LATEST REVISION).

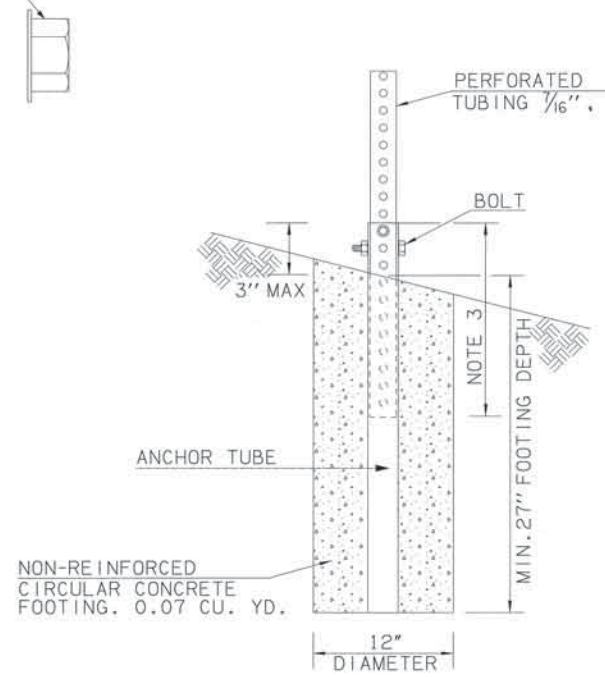


TYPICAL SINGLE POST INSTALLATION

TYPICAL DOUBLE POST INSTALLATION

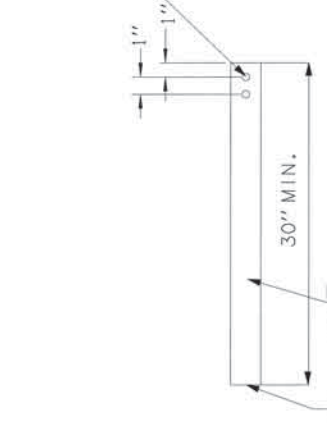


BOLT DESIGN



ANCHOR TUBE DETAILS WITH CONCRETE FOOTING

NON-PERFORATED ANCHOR TUBE SHALL HAVE TWO (2) 1/16" DIAMETER HOLES SPACED 1" ON CENTER ALONG THE CENTERLINE OF EACH OF THE FOUR SIDES.



HEAVY DUTY ANCHOR TUBE

- DRAWING NOT TO SCALE -

NON-PERFORATED HEAVY DUTY ANCHOR TUBE
2 1/2" X 2 1/2" X 3/16" ANCHOR FOR 1 3/4" & 2" UPRIGHT POST.
3" X 3" X 3/16" ANCHOR FOR 2 1/4" & 2 1/2" UPRIGHT POST.

APPLY DUCT TAPE TO PREVENT CONCRETE ENTERING ANCHOR TUBE.

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\$\$\$

TAPER LENGTH CRITERIA FOR WORK ZONES

SPEED LIMIT M.P.H.	W* FORMULA	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	$L = W \times S^2 / 60$	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	$L = W \times S$	265	295	320	8	9	9	40	80	8	40
45		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

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.

ROAD TYPE	RECOMMENDED DISTANCE BETWEEN SIGNS (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

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
	FINAL LIFT	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.

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	2855	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	

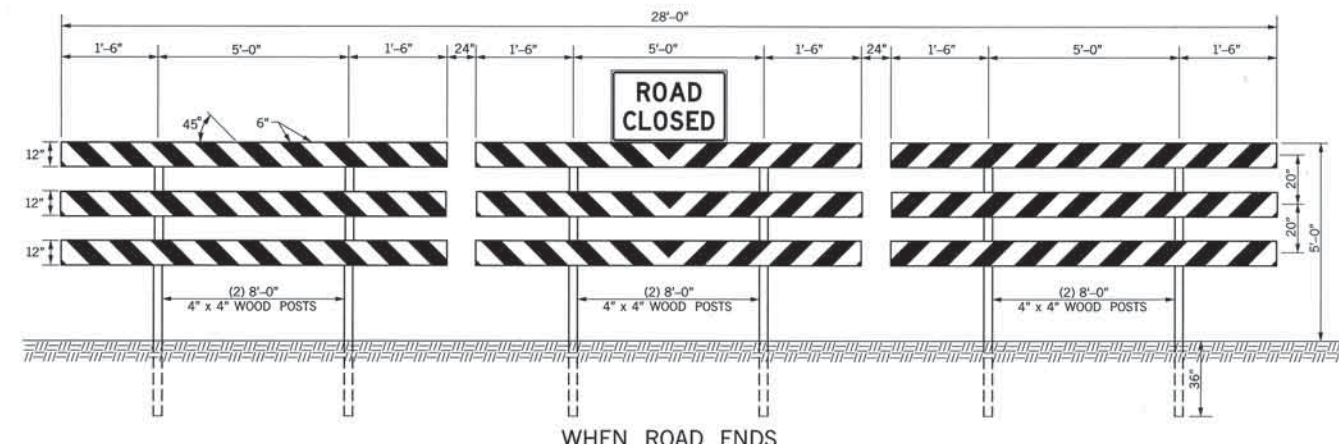
* CROSSOVER = REVERSE CURVE CONNECTION TYING TWO (2) PARALLEL ROADWAYS.



APPROVED BY
TRAFFIC ENGINEER *David Smart* DATE 6/23/10

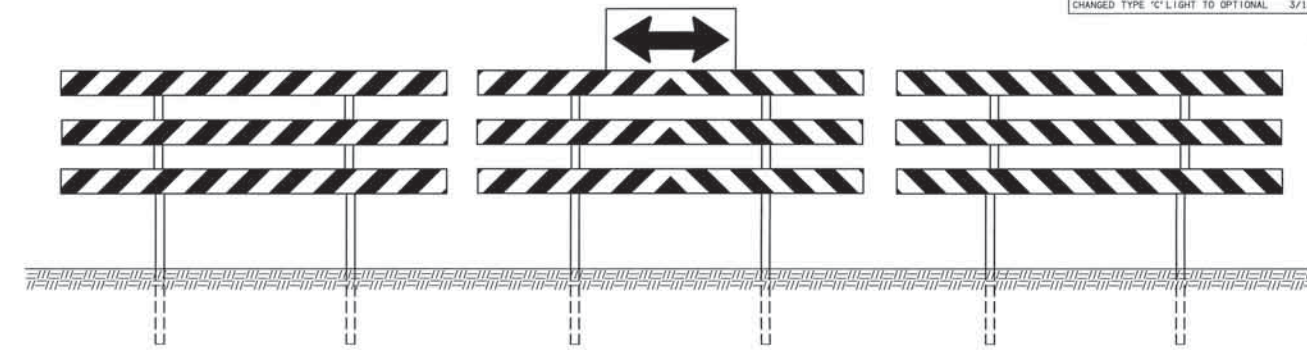
TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL TABLES AND CHARTS

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



WHEN ROAD ENDS

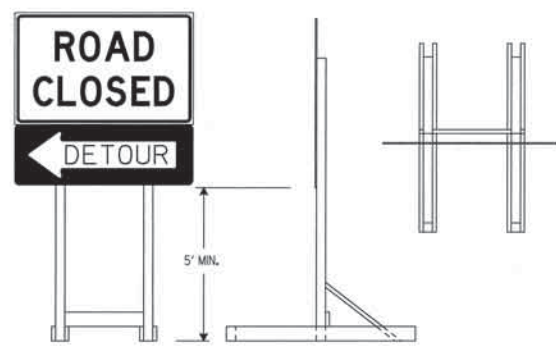
PERMANENT TYPE III(A/B) BARRICADE
(DIMENSIONS ARE TYPICAL FOR BOTH BARRICADES)



FOR T-INTERSECTIONS

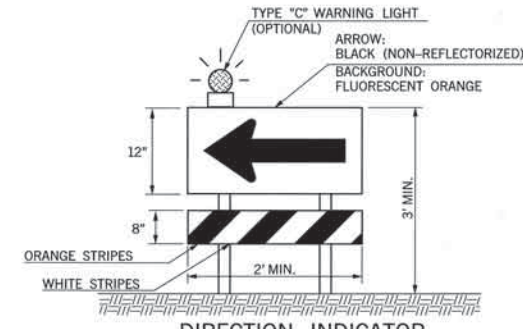
NOTES: A PERMANENT BARRICADE TYPE III(A) SHALL CONSIST OF NINE (9) PANELS AND SIX (6) POSTS.
TYPICAL INSTALLATION AS SHOWN IS FOR AN ABSOLUTE CLOSURE.
BARRICADES SHOULD NOT BE PLACED PARALLEL TO TRAFFIC IF NOT OUTSIDE OF CLEAR ZONE.

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)

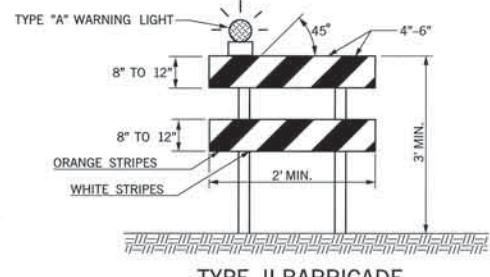


Skid-Mounted Sign Support with plywood sign

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.

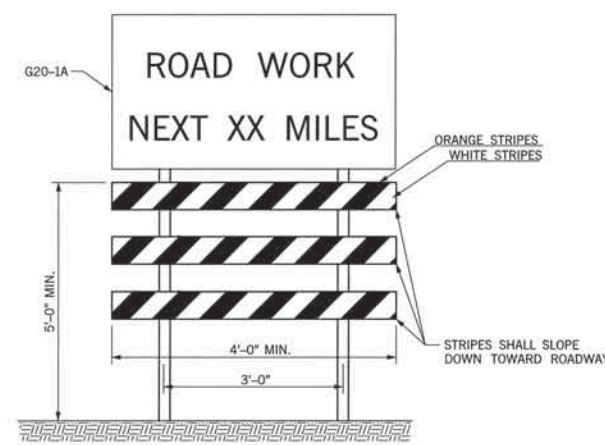
BALLAST SHALL NOT BE PLACED ON TOP OF ANY STRIPED RAIL. BARRICADES SHALL NOT BE BALLASTED BY NONDEFORMABLE OBJECTS SUCH AS ROCKS OR CHUNKS OF CONCRETE. BALLAST SHALL NOT EXTEND INTO THE ACCESSIBLE PASSAGE WIDTH OF 60".

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

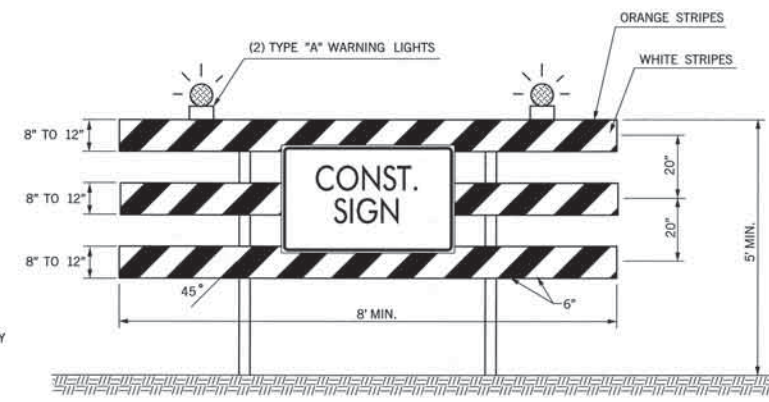
WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, THE STRIPES SHOULD SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN.

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.

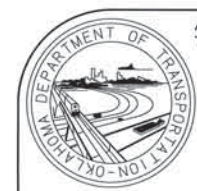


WING BARRICADE



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

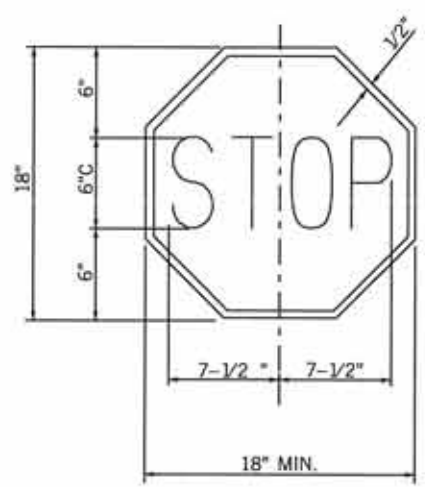
TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL DEVICES

2009 SPECIFICATIONS

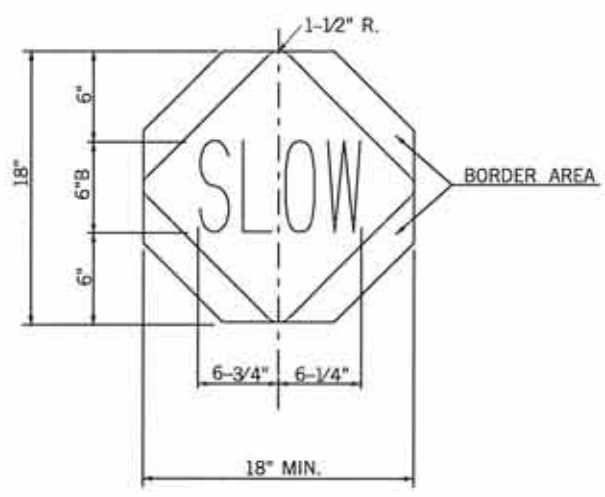
TCS4-1	01
T-504	

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

DESCRIPTION	REVISIONS	DATE

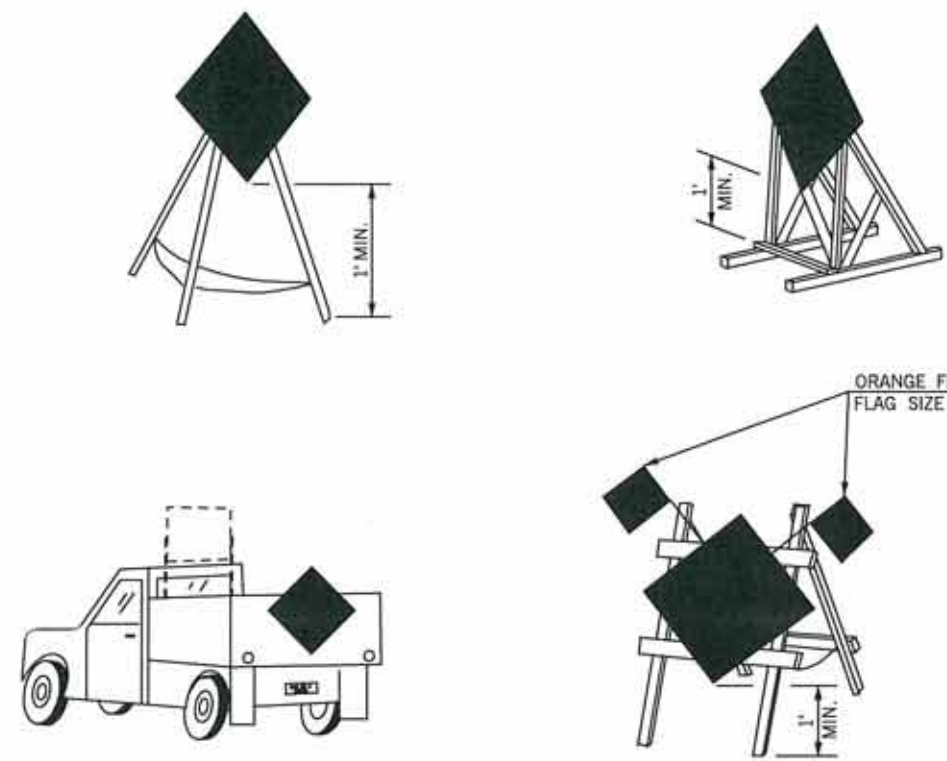


STOP:
LEGEND AND BORDER: WHITE (REFLECTORIZED)
BACKGROUND: RED (REFLECTORIZED)



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

STOP-SLOW PADDLE

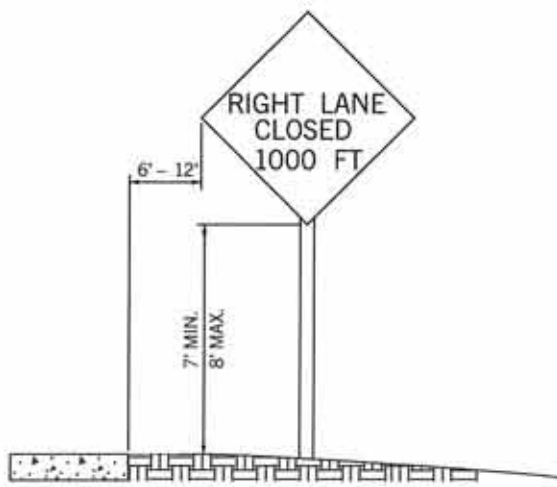


NOTE:
THE BOTTOM OF SIGNS MOUNTED ON BARRICADES OR TEMPORARY SUPPORTS SHALL NOT BE LESS THAN 1 FOOT ABOVE THE TRAVELED WAY.

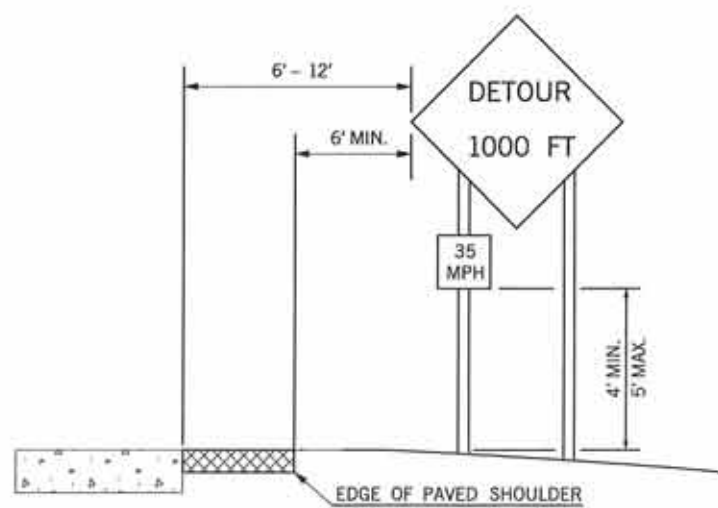
PORTABLE AND TEMPORARY MOUNTINGS
METHODS OF MOUNTING SIGNS OTHER THAN ON POSTS



URBAN DISTRICT
(WITH CURB)



URBAN DISTRICT
(WITHOUT CURB)



RURAL DISTRICT WITH
ADVISORY SPEED PLATE



RURAL DISTRICT

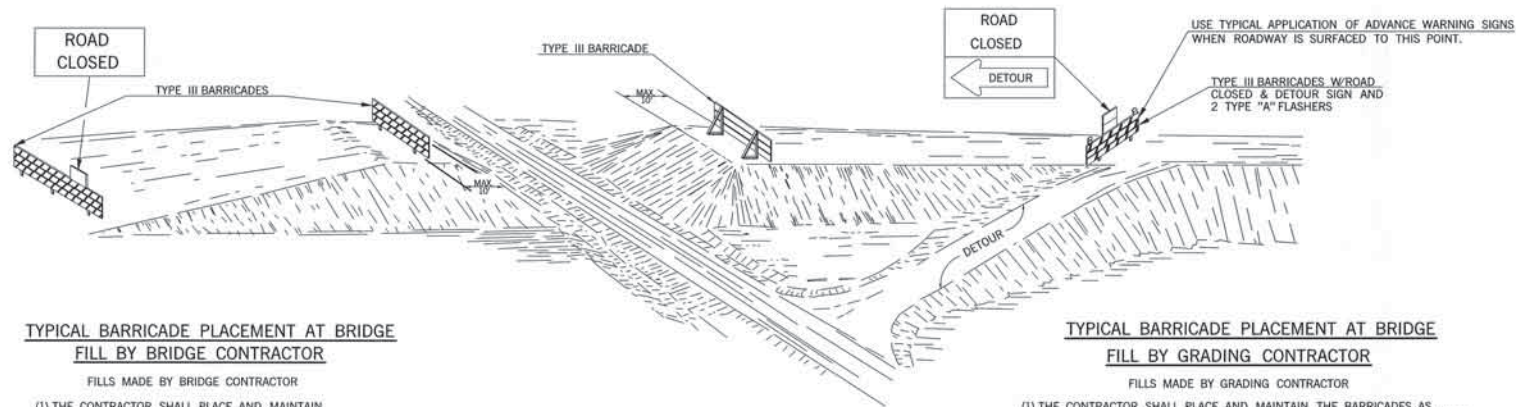
HEIGHT AND LATERAL LOCATIONS OF SIGNS - TYPICAL INSTALLATIONS



APPROVED BY TRAFFIC ENGINEER *Cheryl Smith* DATE 6/23/10
TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
TYPICAL SIGN INSTALLATION

TRFPC36 M:\2009_Standards_TC\505.dgn 8:16:51 AM 6/2/2010 d:\usr2\lib\lerryh.psn R:\TRAF_FLOT\bw.tbl

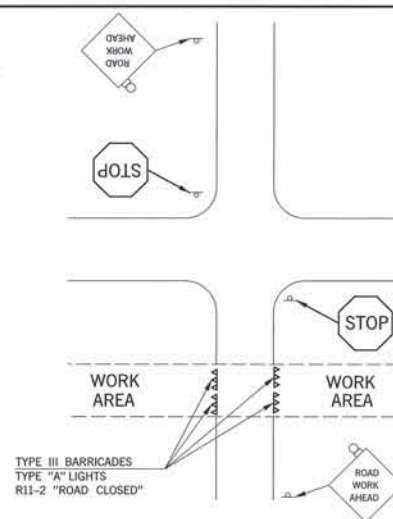


TYPICAL BARRICADE PLACEMENT AT BRIDGE FILL BY BRIDGE CONTRACTOR

- 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

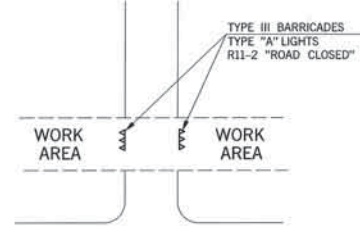
- FILLS MADE BY GRADING CONTRACTOR
- (1) THE CONTRACTOR SHALL PLACE AND MAINTAIN THE BARRICADES AS SHOWN UNTIL FINAL INSPECTION OR UNTIL THEY ARE NO LONGER NEEDED.
 - (2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO REMOVAL OF THE BARRICADES.
 - (3) IF THE BRIDGE WORK ORDER IS ISSUED PRIOR TO COMPLETION 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.



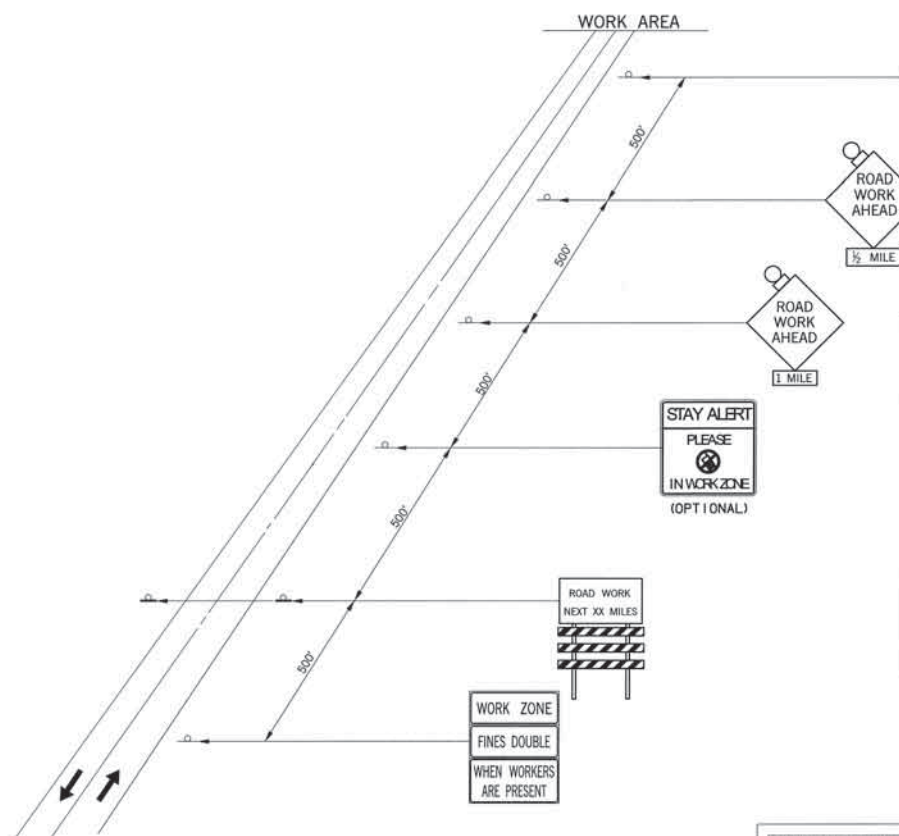
TYPICAL SIGN PLACEMENT FOR INTERSECTING ROADS AND STREETS

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.

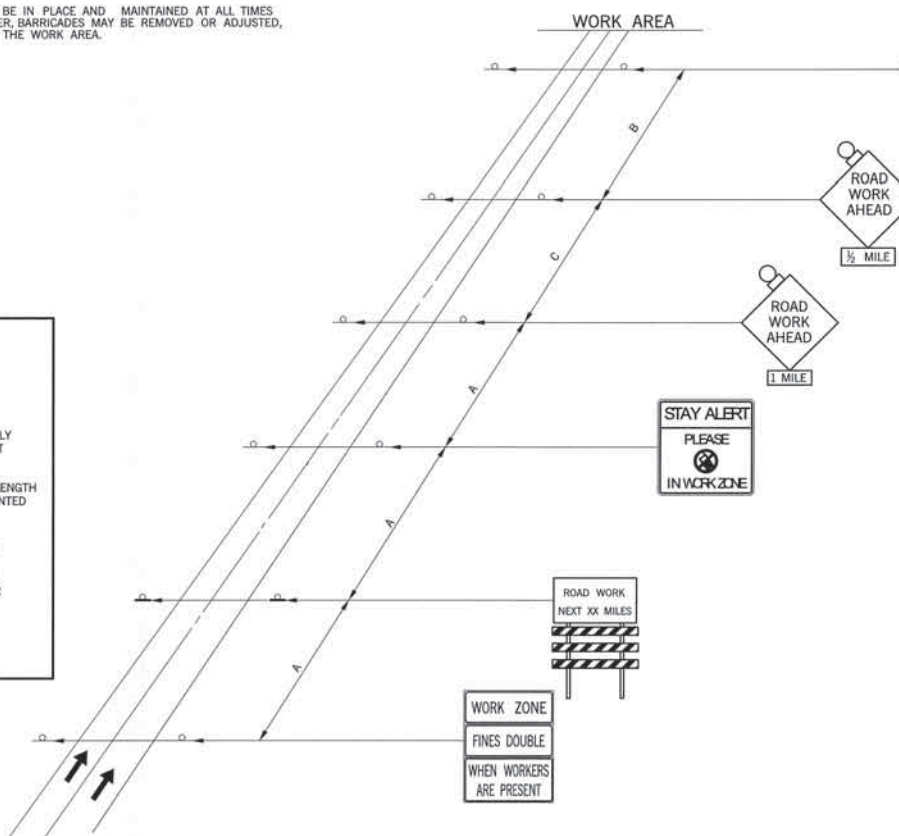
FINES DOUBLE IN WORK ZONE SIGNS ARE TO BE USED ONLY ON STATE OR FEDERAL HIGHWAYS WHERE THE SPEED LIMIT IS REDUCED OR AS DIRECTED BY THE ENGINEER.

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).

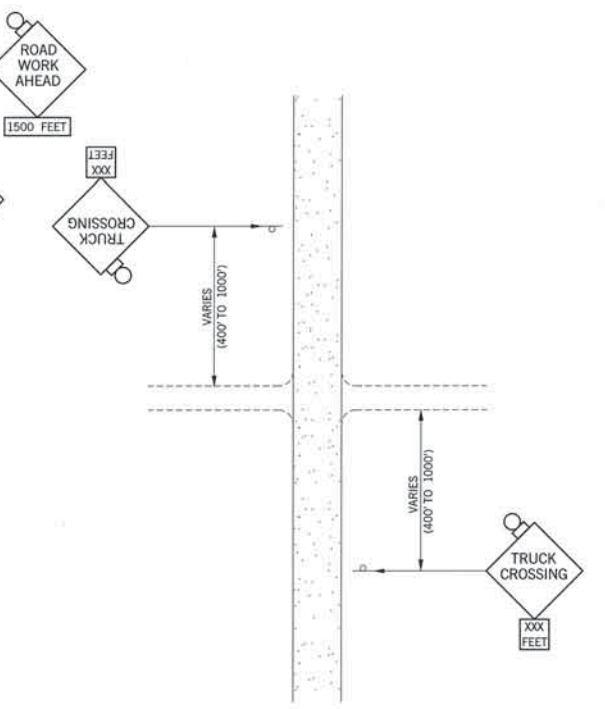
WARNING SIGNS SHOWN ARE "ADVANCE" WARNING SIGNS AND ARE REQUIRED ON ALL STATE HIGHWAYS. ADDITIONAL WARNING SIGNS MAY BE REQUIRED WITHIN THE PROJECT LIMITS TO WARN DRIVERS OF SPECIFIC HAZARDS. ADVANCE "WARNING SIGNS" MAY CHANGE AS CONDITIONS CHANGE OR AS DIRECTED BY THE ENGINEER.

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

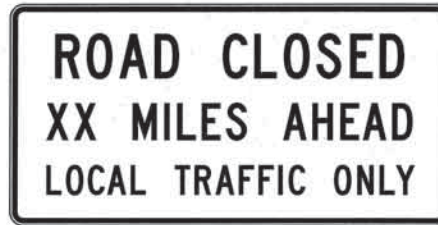
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



LANE CLOSED

R11-2(LANE) 48 x 30 10.00 SF

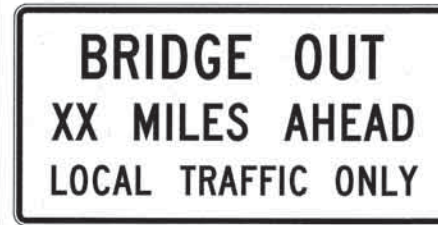
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



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

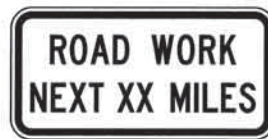
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



DETOUR SIGN

M4-10(L) 48 x 18 6.00 SF

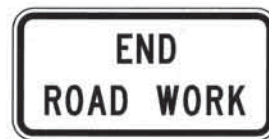
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)



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



SHOULDER WORK SIGN

W21-5 48 x 48 16.00 SF

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



SURVEY CREW SIGN

W21-6 48 x 48 16.00 SF

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



UTILITY WORK AHEAD SIGN

W21-7 48 x 48 16.00 SF

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



MOWING AHEAD SIGN

W21-8 48 x 48 16.00 SF

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



BRIDGE REPAIR SIGN

W21-9 48 x 48 16.00 SF

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



MATERIAL ON SHOULDER SIGN

W21-10 48 x 48 16.00 SF

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



MATERIAL ON ROADWAY SIGN

W21-11 48 x 48 16.00 SF

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



BLASTING ZONE AHEAD SIGN

W22-1 48 x 48 16.00 SF

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



CELL TELEPHONES SIGN

W22-2 36 x 30 7.50 SF
W22-2E 42 x 36 10.50 SF

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



END BLASTING ZONE SIGN

W22-3 36 x 30 7.50 SF
W22-3E 42 x 36 10.50 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.

* SUPPLEMENTAL SIGNS SHALL ONLY BE USED IN CONJUNCTION WITH DIAMOND SHAPE CONSTRUCTION WARNING SIGNS. THE SIZE OF SUPPLEMENTAL SIGNS SHALL BE APPROPRIATE FOR USE WITH A 48 INCH X 48 INCH WARNING SIGN UNLESS OTHERWISE NOTED IN THE PLANS.

TRFPC36 (M)\2009 Standards TC1515.dgn 8:20:40 AM 6/2/2010 d:\usr2\lib\erofy\pen R:\TRAF PLOT\bw.tbl

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



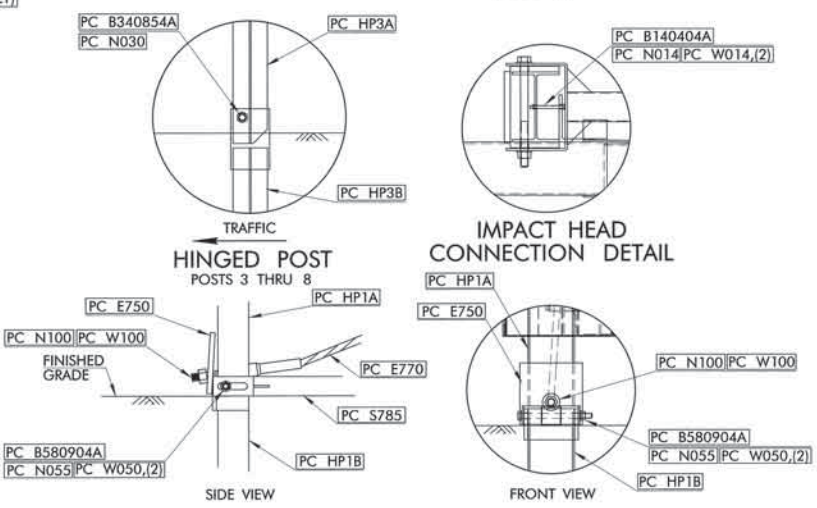
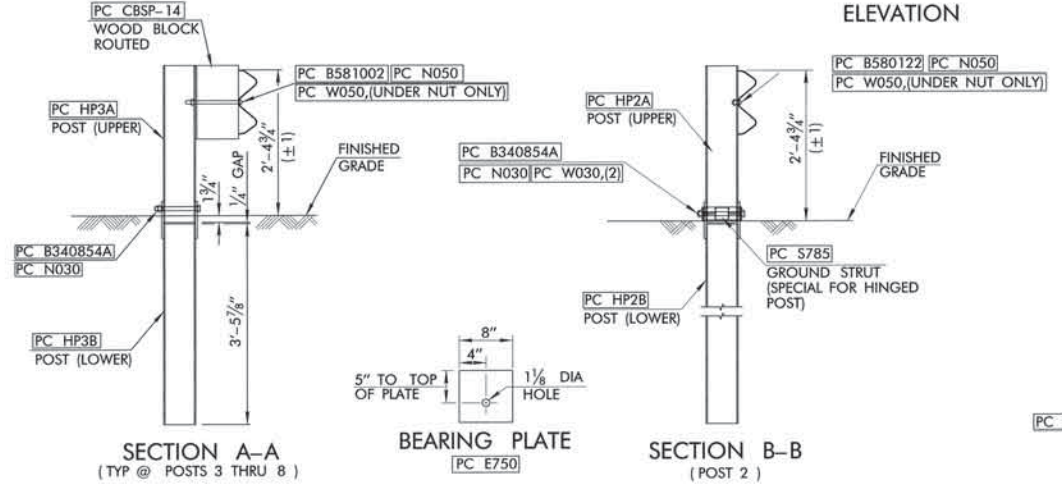
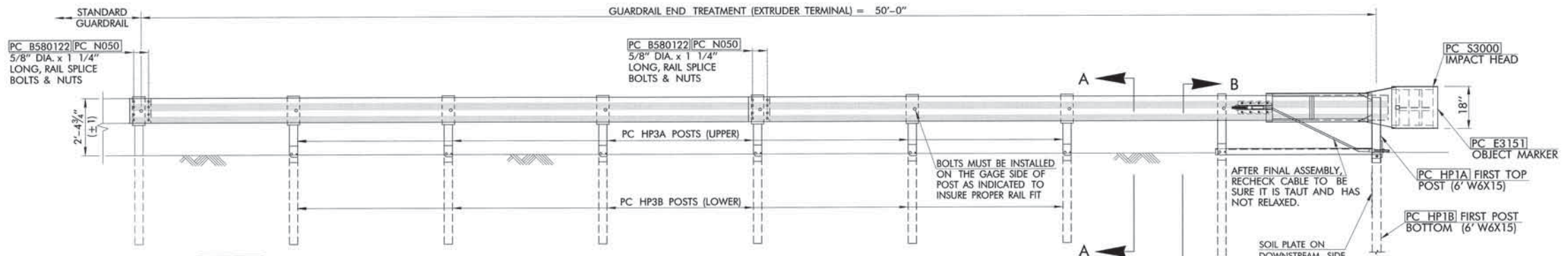
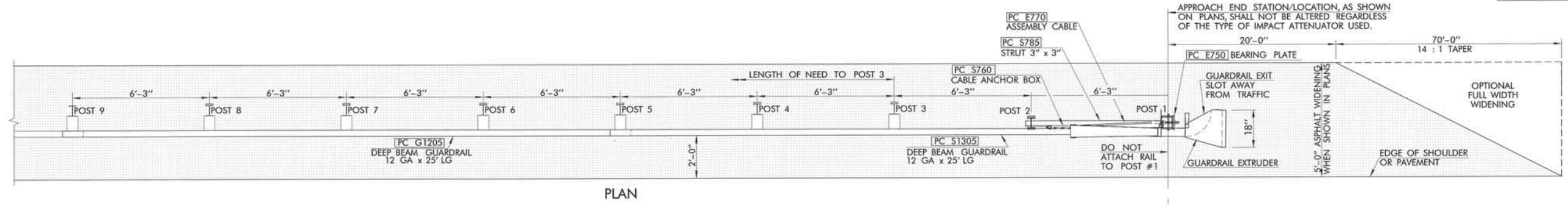
APPROVED BY TRAFFIC ENGINEER *David Small* DATE: 6/23/10

TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS15-1 00
T-515

REVISIONS	
DESCRIPTION	DATE

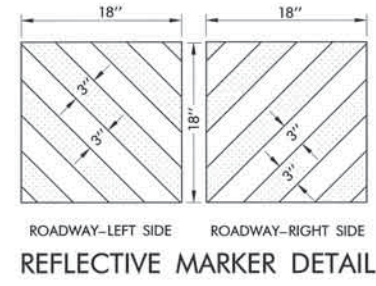


- ### GENERAL NOTES
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - ONLY 25'-0" W-BEAM GUARDRAIL ELEMENTS MAY BE USED FOR THIS DESIGN BETWEEN POST 1 & POST 5. STANDARD 12'-6" ELEMENTS MAY BE USED BETWEEN POST 5 & POST 9, IF APPROVED BY THE ENGINEER.
 - THE 3/8" FLAT WASHER IS USED UNDER THE NUT BEHIND THE POST ONLY. NO WASHER IS USED ON THE TRAFFIC SIDE OF GUARDRAIL.
 - EXTRUDER TYPE TERMINALS SHALL NOT BE INSTALLED WHEN ADJACENT DRIVING LANES ARE WITHIN 25 FEET (HORIZONTAL) OF EXTRUSION SIDE OF THE EXTRUDER TERMINAL.
 - WOOD OR RECYCLED COMPOSITE (PLASTIC) BLOCKOUTS MAY BE USED THROUGHOUT THE LENGTH OF THE TERMINAL, IF APPROVED BY THE ENGINEER.
 - INSTALL RAIL PARALLEL TO ROADWAY EDGE LINE. WHEN TAPER IS REQUIRED, USE A 30:1 OR FLATTER TAPER RATE.

BILL OF MATERIAL					
PC	QTY	DESCRIPTION	PC	QTY	DESCRIPTION
S3000	1	IMPACT HEAD	B580122	17	5/8" Dia. x 1 1/4" SPLICE BOLT, POST #2
S1305	1	W-BEAM GUARDRAIL END SECTION - 12 GA., 25'	B580904A	1	5/8" Dia. x 9" HEX BOLT GR. 5
G1205	1	W-BEAM GUARDRAIL - 12 GA., 25'	B340854A	7	3/4" Dia. x 8 1/2" HEX BOLT GR. 5
HP1A	1	FIRST POST ASSEMBLY TOP, 2'- 4 3/8"	B581002	6	5/8" Dia. x 10" H.G.R. BOLT (Posts 3-8)
HP1B	1	FIRST POST ASSEMBLY BOTTOM, 6'- 0"	N055	1	3/8" Dia. HEX NUT (Post 1 only)
HP2A	1	SECOND POST ASSEMBLY TOP, 2'- 6 3/8"	N050	23	3/8" Dia. H.G.R. NUT (at splice (16) & at Posts 1-8)
HP2B	1	SECOND POST ASSEMBLY BOTTOM, 6'- 0"	W050	9	H.G.R. WASHER (At Post 1 (2), & Post 2-8)
HP3A	6	HINGED LINE POST TOP, 2'- 5 5/8"	N100	2	1" ANCHOR CABLE HEX NUT
HP3B	6	HINGED LINE POST BOTTOM, 3'- 5 7/8"	W100	2	1" ANCHOR CABLE WASHER
E750	1	BEARING PLATE	B140404A	2	1/4" x 4" HEX BOLT GR. 5
S760	1	CABLE ANCHOR BOX	N014	2	1/2" HEX NUT
E770	1	BCT CABLE ANCHOR ASSEMBLY	W014	4	1/4" WASHER
S785	1	GROUND STRUT (SPECIAL FOR HINGED POST)	SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
CBSP-14	6	ROUTED BLOCK	N030	7	3/4" HEX NUT
			N055A	8	1/2" A325 STR. NUT
			W030	2	3/4" WASHER
			W050A	16	1 1/4" OD x 3/4" ID A325 STR. WASHER
			E3151	1	OBJECT MARKER (18" x 18")

PC = PRODUCT CODE ET HBA = EXTRUDER TERMINAL HINGED BREAK AWAY

- ### REFLECTIVE MARKER
- REFLECTORIZED MARKER(S) SHOULD BE ATTACHED TO THE VERTICAL END (18" x 18" FACE - TYP.) OF THE G.E.T PRIOR TO INSTALLATION.
 - ATTACHMENT SURFACE SHOULD BE THOROUGHLY CLEANED & DRY BEFORE ATTACHING ADHESIVE MARKER (STICK-ON SHEETING).
 - ATTACHED ADHESIVE SHEETING SHOULD BE FREE OF AIR BUBBLES WITH ALL EDGES FIRMLY BONDED.
 - STRIPING PATTERN MAY CONSIST OF 3" OR 4" STRIPES.



BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623(G)	GUARDRAIL END TREATMENT - EXTRUDER TERMINAL	EA.

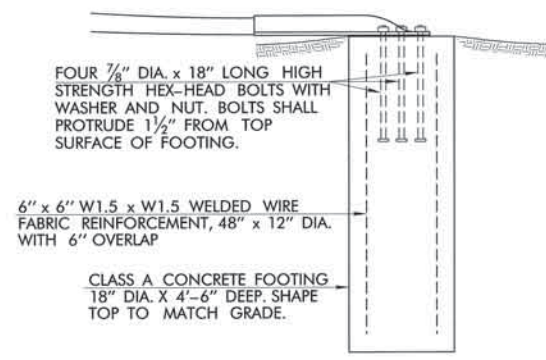
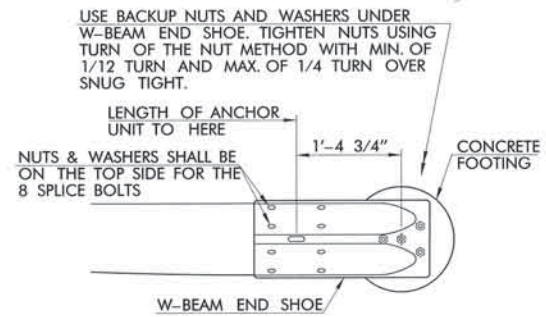
APPROVED BY
TRAFFIC ENGINEER: *David Grady* DATE: 4/9/12

TRAFFIC MAINTENANCE STANDARD

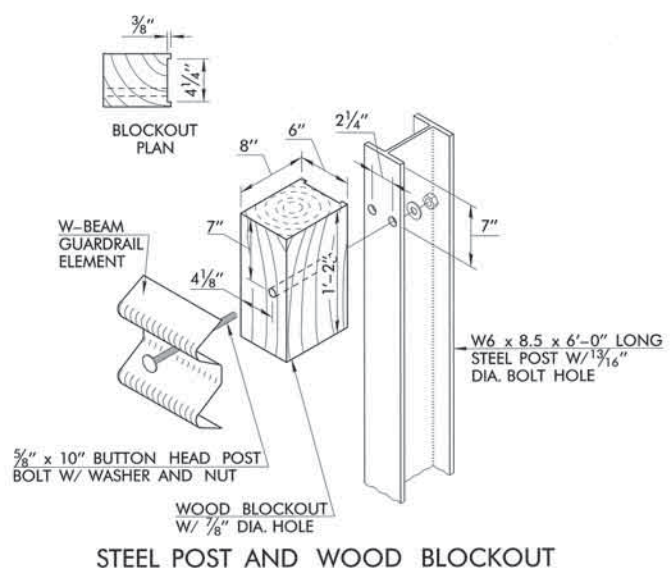
GUARDRAIL END TREATMENT -
SKT-350, HBA STEEL POST
(27 3/4" SYSTEM)

2009 SPECIFICATIONS GET-2 00 M-023

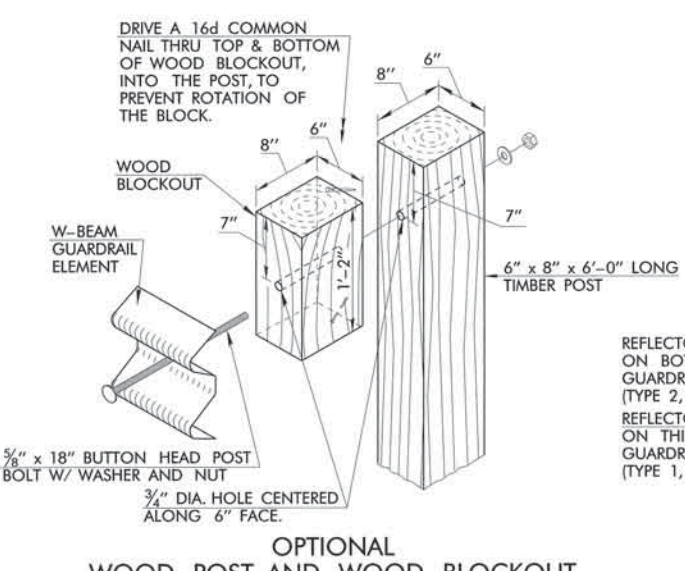
DESCRIPTION	REVISIONS	DATE



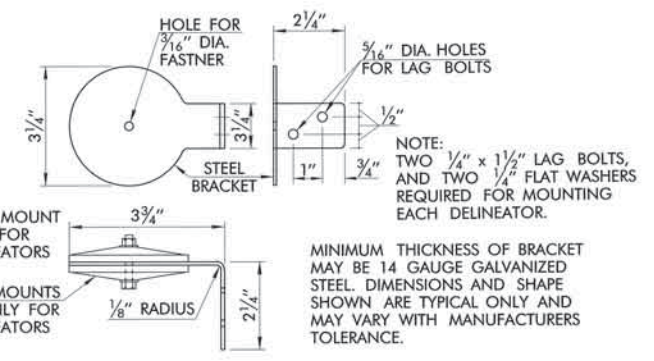
GROUND ANCHOR FOOTING DETAIL



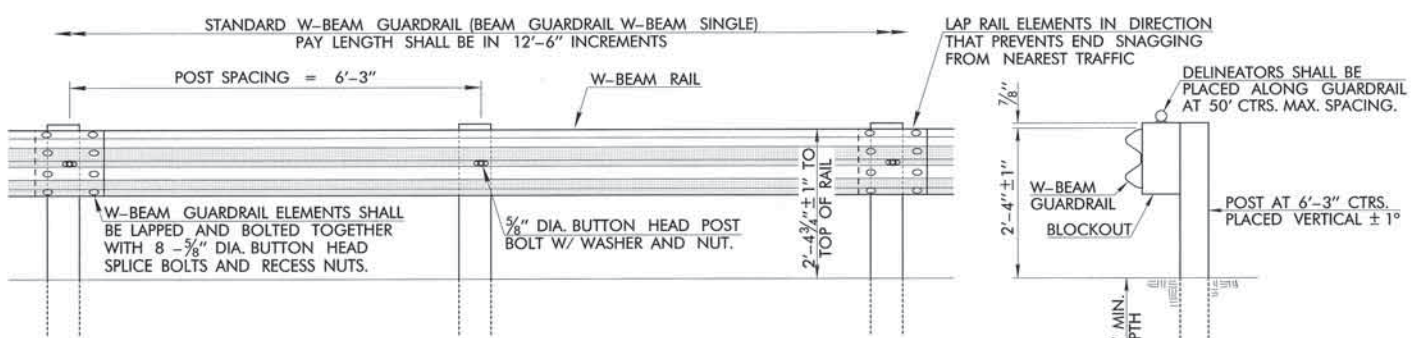
STEEL POST AND WOOD BLOCKOUT



OPTIONAL WOOD POST AND WOOD BLOCKOUT

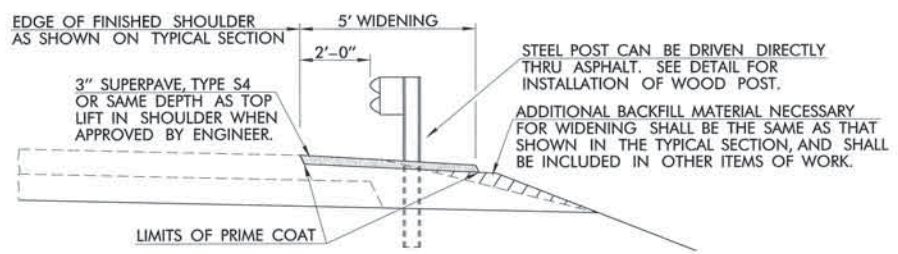


TYPICAL BRACKET FOR MOUNTING 3 1/4\"/>

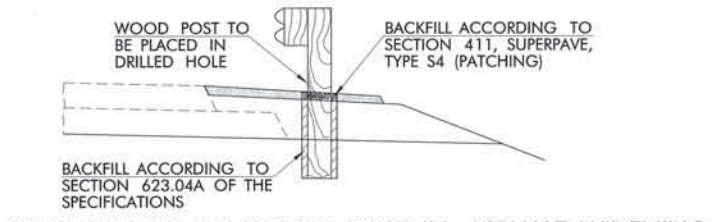


STANDARD W-BEAM GUARDRAIL ELEVATION

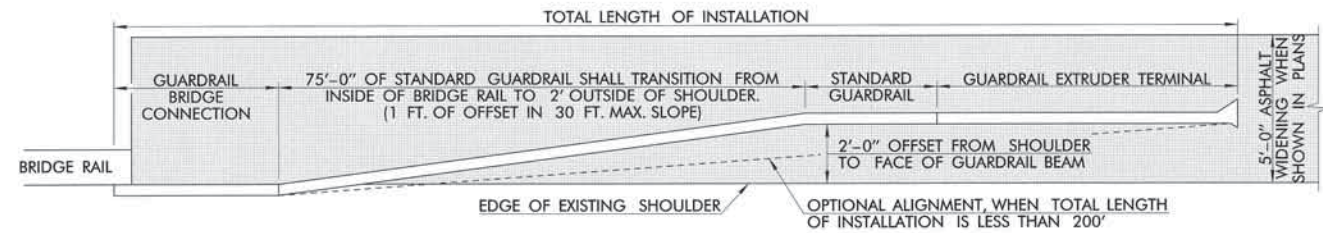
STANDARD W-BEAM GUARDRAIL SECTION



DETAIL OF SHOULDER WIDENING FOR STANDARD GUARDRAIL



INSTALLATION OF WOOD POST IN ASPHALT WIDENING



TYPICAL GUARDRAIL INSTALLATION AT BRIDGE

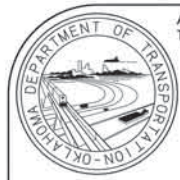
OPTIONAL TYPE POSTS OR BLOCKOUTS FOR STANDARD GUARDRAIL

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.

- GENERAL NOTES**
1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 2. STANDARD GUARDRAIL WITH 6'-3" POST SPACING MEETS NHCRC-350, TEST LEVEL 3. IF A RIGID HAZARD IS TO BE LEFT BEHIND THE GUARDRAIL, WITHIN 3'-0" OF THE RAIL, CONSIDER USING A DIFFERENT TREATMENT.
 3. WOOD POSTS AND BLOCKOUTS SHALL BE STRESS GRADE 1200F.
 4. 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.
 5. ALL GUARDRAIL, METAL POSTS, PLATES AND HARDWARE SHALL BE GALVANIZED AFTER FABRICATION.
 6. ANY FIELD CUTS OR HOLES DRILLED IN GALVANIZED MATERIALS SHALL BE COATED WITH A ZINC OXIDE PAINT. SEE SECTION 730 OF THE SPECIFICATIONS.
 7. 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.

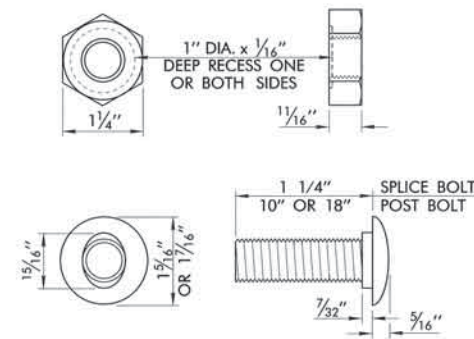
NOTE: PAYITEM GUARDRAIL ANCHOR UNIT TYPE B INCLUDES ALL LABOR AND MATERIALS TO INSTALL 25'-0" TWISTED RAIL ELEMENT, W-BEAM END SHOE, CONC. FOOTING, AND FOUR ANCHOR BOLTS.



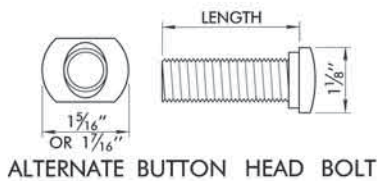
APPROVED BY: *David Smaly* DATE: 4/9/12
TRAFFIC MAINTENANCE STANDARD

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

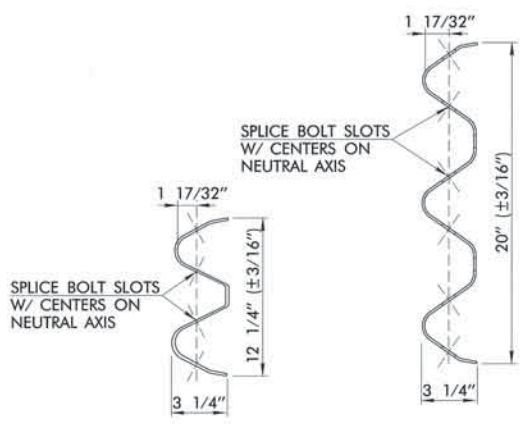
DESCRIPTION	REVISIONS	DATE



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

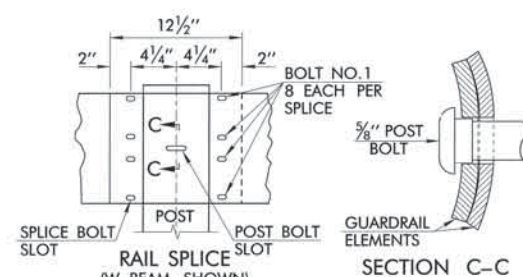


ALTERNATE BUTTON HEAD BOLT



W-BEAM GUARDRAIL SECTION

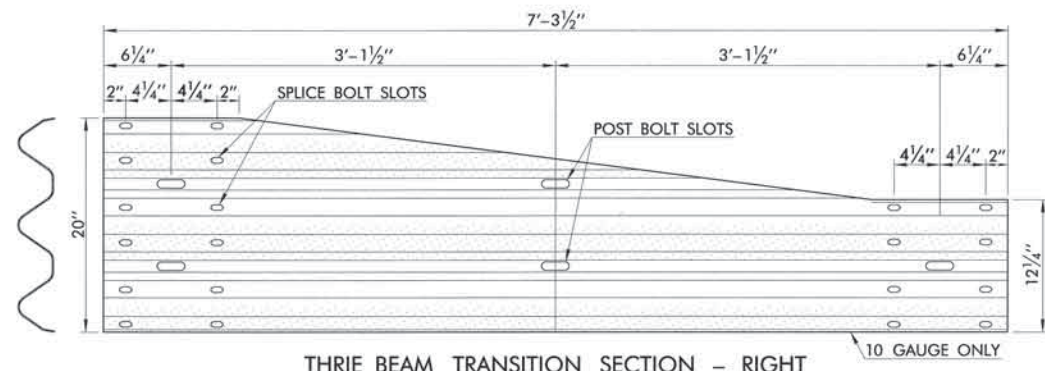
THRIE BEAM GUARDRAIL SECTION



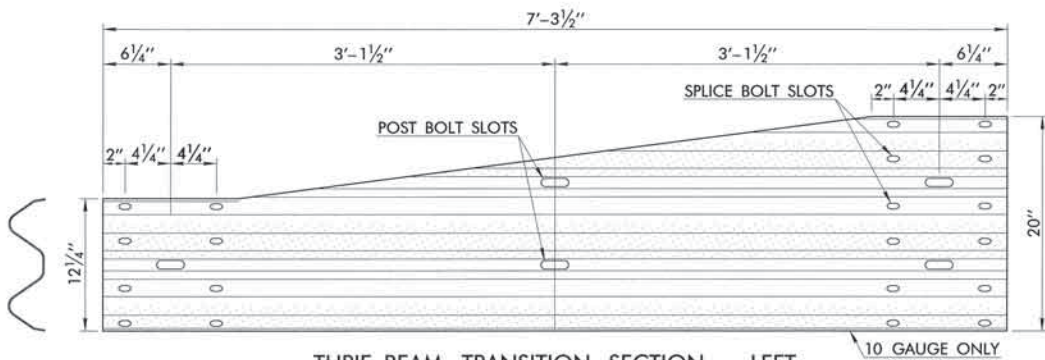
RAIL SPLICE (W-BEAM SHOWN) SECTION C-C

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).

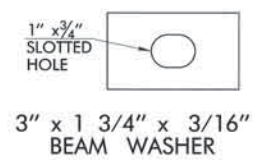
RAIL SPLICE



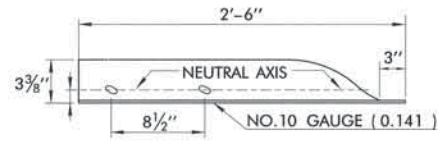
THRIE BEAM TRANSITION SECTION - RIGHT (THRIE BEAM TO W-BEAM CONNECTION)



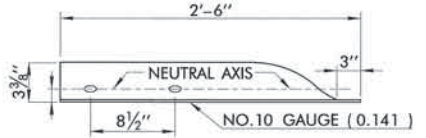
THRIE BEAM TRANSITION SECTION - LEFT (THRIE BEAM TO W-BEAM CONNECTION)



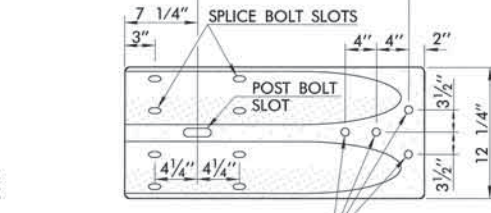
3" x 1 3/4" x 3/16" BEAM WASHER



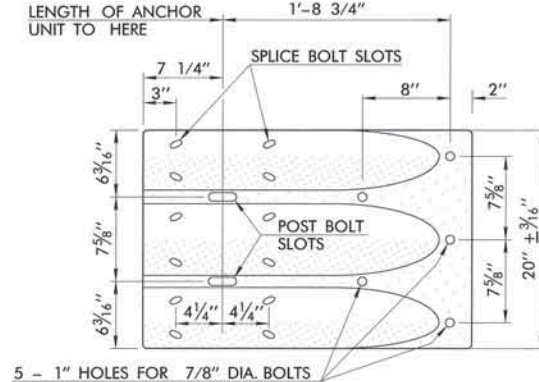
LENGTH OF ANCHOR UNIT TO HERE 1'-8 3/4"



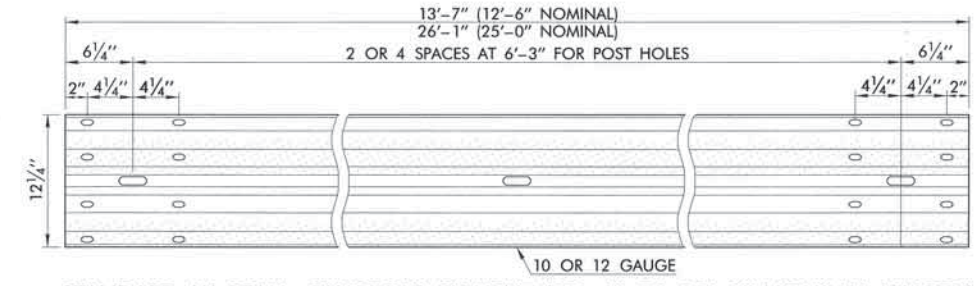
LENGTH OF ANCHOR UNIT TO HERE 1'-8 3/4"



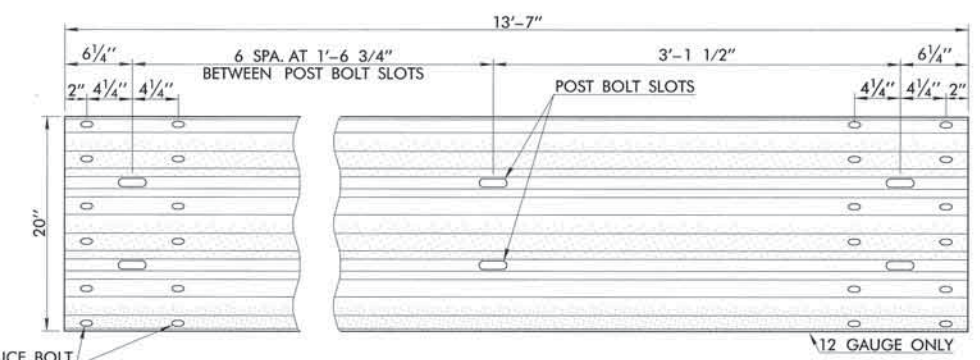
4 - 1" HOLES FOR 7/8" DIA. BOLTS WITH NUTS AND STEEL WASHERS. THRIE BEAM TERMINAL CONNECTION (END SHOE)



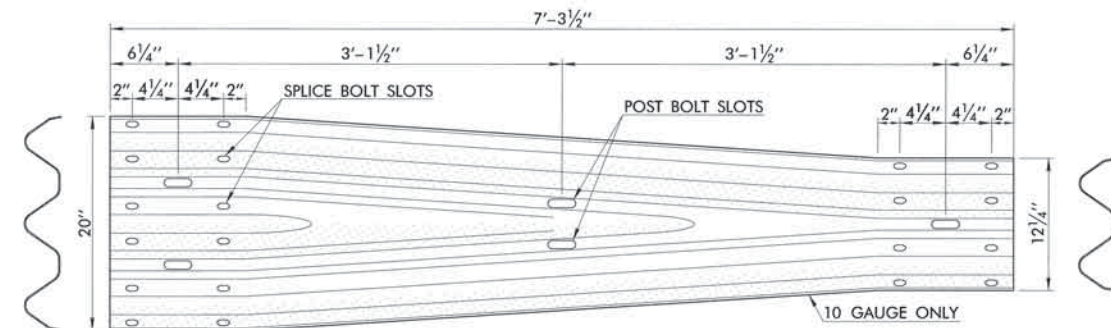
5 - 1" HOLES FOR 7/8" DIA. BOLTS WITH NUTS AND STEEL WASHERS. THRIE BEAM TERMINAL CONNECTION 10 GAUGE ONLY (END SHOE)



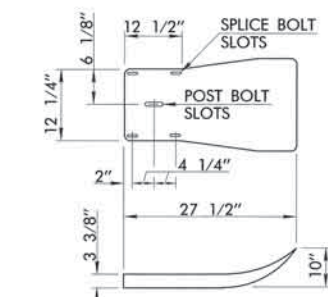
STANDARD W-BEAM GUARDRAIL ELEMENT (12'-6" OR 25'-0" NOMINAL LENGTH)



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)

2009 SPECIFICATIONS

GRH2-1	00
M-028	

