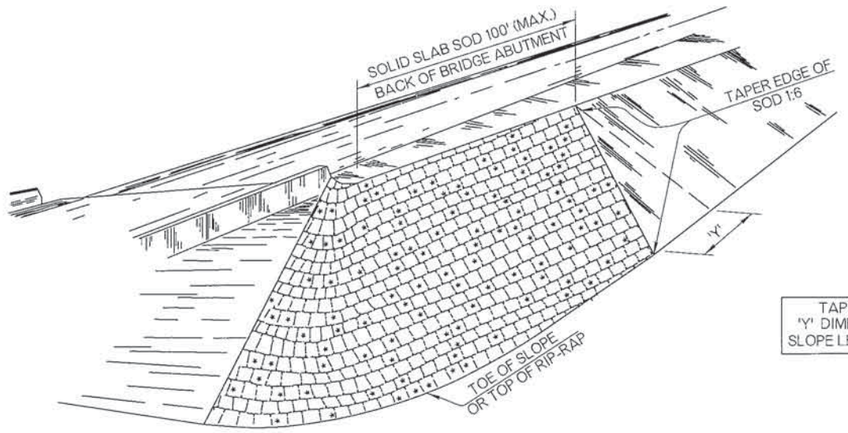
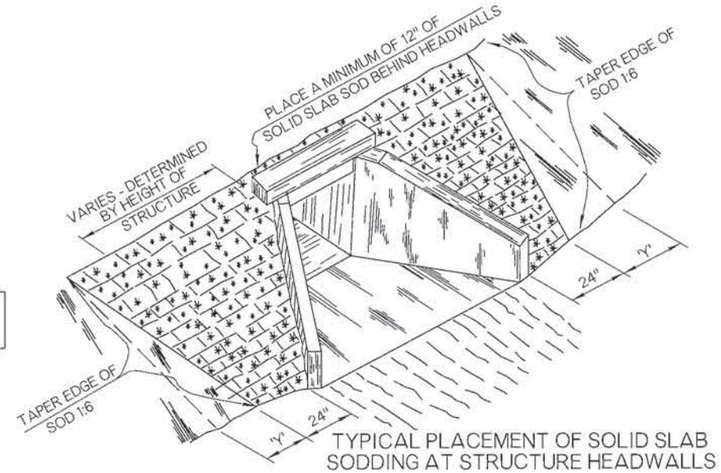
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

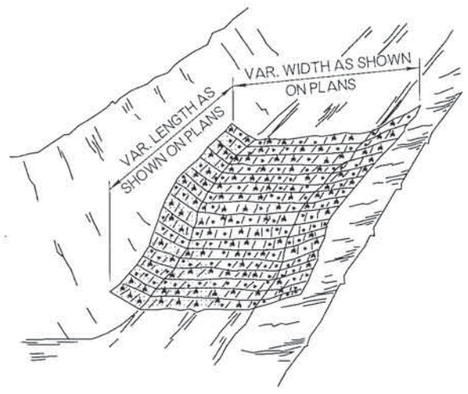


TYPICAL PLACEMENT OF SOLID SLAB SODDING
ON FILL SLOPES, APPROACHES TO OVERPASSES AND BRIDGES.

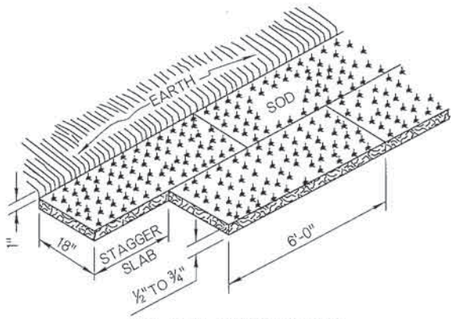
TAPER NOTE
'Y' DIMENSION =
SLOPE LENGTH x 0.17



TYPICAL PLACEMENT OF SOLID SLAB
SODDING AT STRUCTURE HEADWALLS



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.

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.

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

APPROVED BY
ROADWAY ENGINEER: _____ DATE: 04/16/15

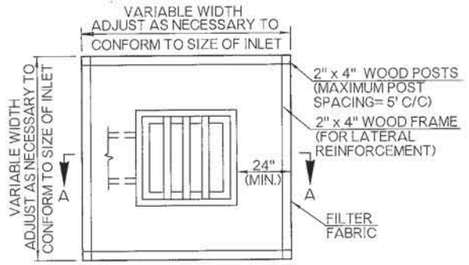
ROADWAY DESIGN DIVISION STANDARD

SOLID SLAB SODDING

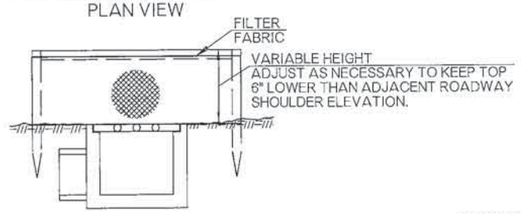
OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

SSS-1	1
	R-3

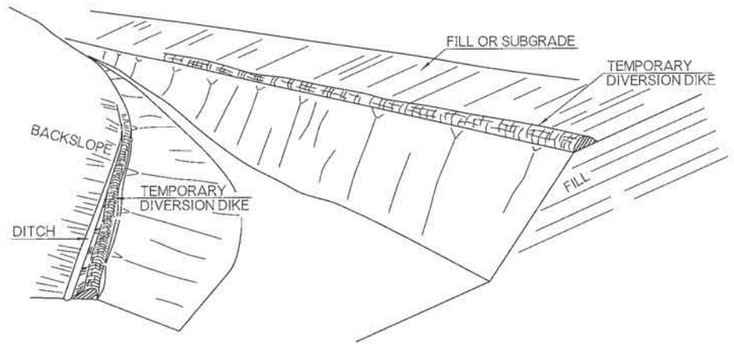
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



PLAN VIEW



SECTION A - A
SEDIMENT FILTER



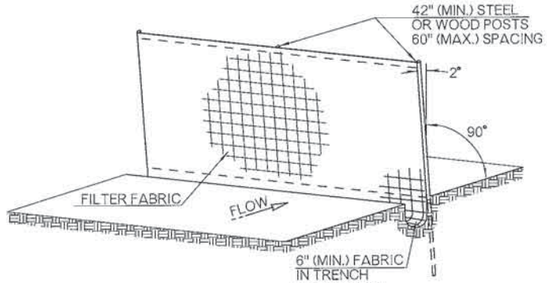
DIVERSION DIKES

TEMPORARY SEDIMENT FILTER

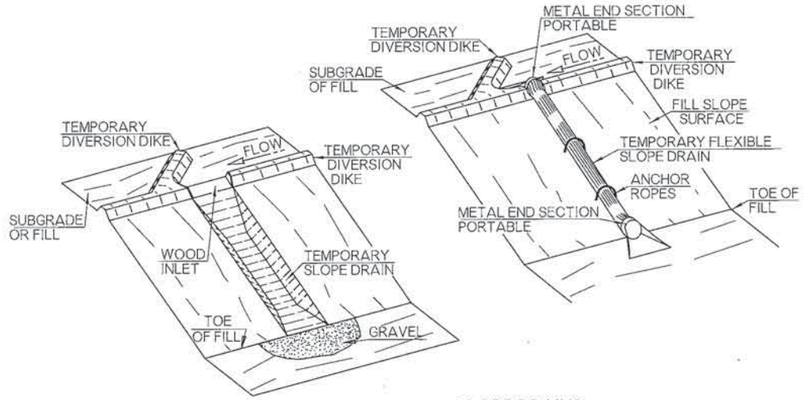
SYMBOLOGY

SYMBOL TO BE USED TO DENOTE DEVICE ON PLANS

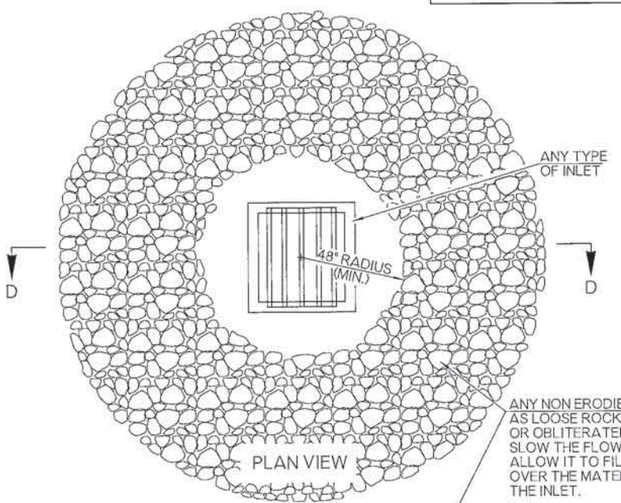
TSF
#



TEMPORARY SILT FENCE
RECOMMENDED TOE-IN METHOD



SLOPE DRAINS



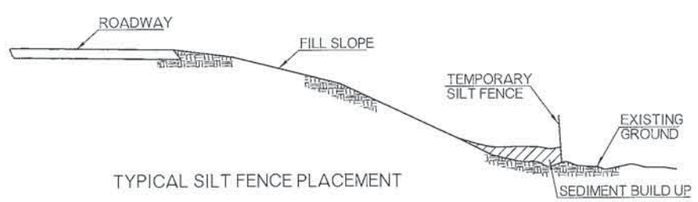
SECTION D-D

SEDIMENT FILTER
(TYPE II)

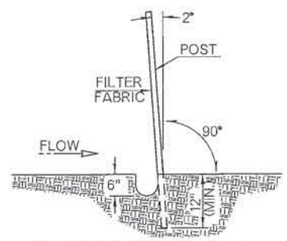
TEMPORARY SILT FENCE

SYMBOLOGY

SYMBOL TO BE USED TO DENOTE DEVICE ON PLANS



TYPICAL SILT FENCE PLACEMENT



TEMPORARY SILT FENCE
SECTION

TEMPORARY SLOPE DRAIN

SYMBOLOGY

SYMBOL TO BE USED TO DENOTE DEVICE ON PLANS

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: Caleb F. H DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

TEMPORARY SEDIMENT CONTROLS

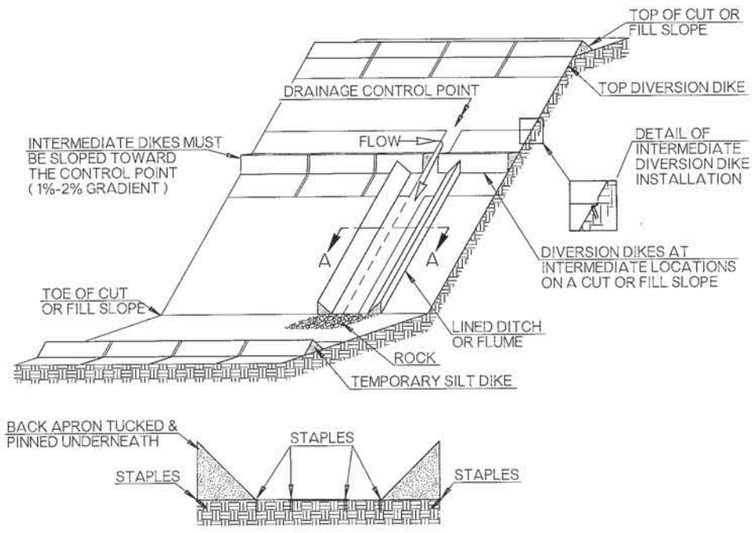
OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

TSC2-3 | 2

R-5

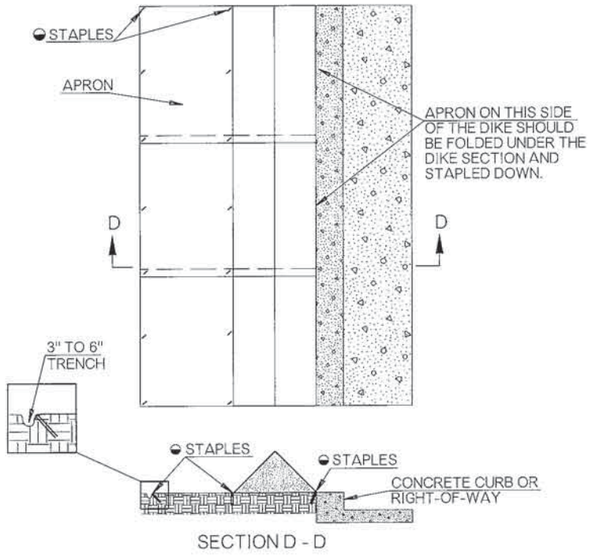
OKLAHOMA DEPARTMENT OF TRANSPORTATION
STANDARD REVISIONS

DESCRIPTION	DATE



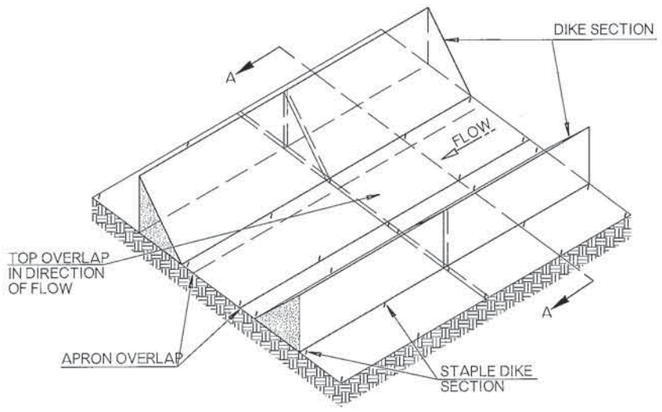
TEMPORARY DITCH LINER
SECTION A - A

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

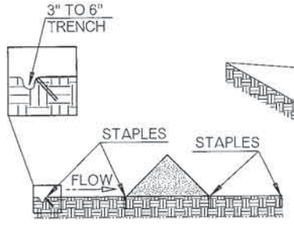


SECTION D - D

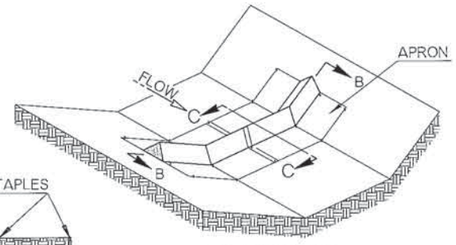
TEMPORARY SILT DIKE INSTALLATION FOR CONTINUOUS BARRIER



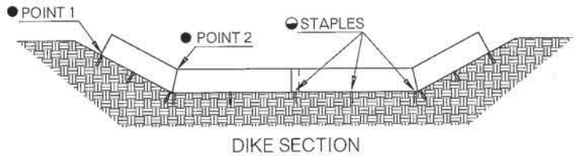
TEMPORARY SILT DIKE INSTALLATION FOR TEMPORARY DITCH LINER



SECTION C - C



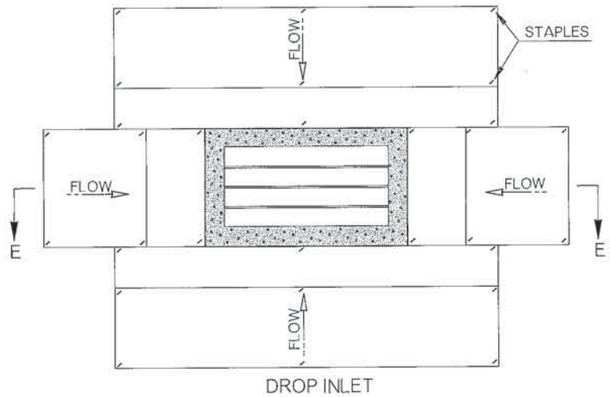
SILT DIKE UNIT
ISOMETRIC / CUT SECTION



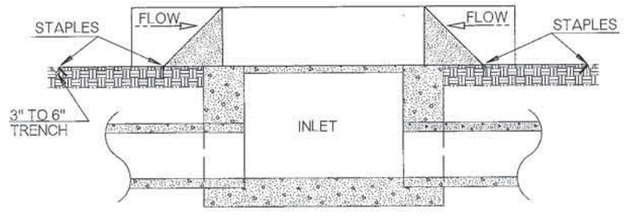
DIKE SECTION
SECTION B - B

TEMPORARY SILT DIKE INSTALLATION FOR ROADWAY DITCH OR DRAINAGE DITCH

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



DROP INLET



SECTION E - E

TEMPORARY SILT DIKE INSTALLATION FOR DROP INLETS

SYMBOLOGY
SYMBOL TO BE USED TO DENOTE DEVICE ON PLANS

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

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.

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. H DATE 04/16/15

ROADWAY DESIGN DIVISION STANDARD

ODOT

TEMPORARY SILT DIKE

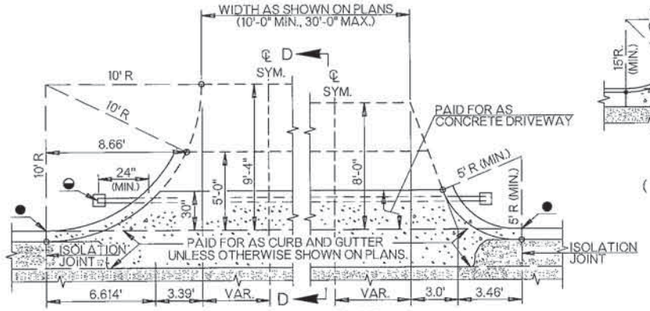
OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

TSD-2	0

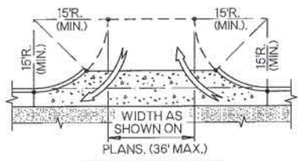
R-6

OKLAHOMA DEPARTMENT OF TRANSPORTATION

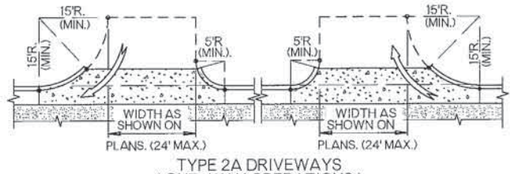
STANDARD REVISIONS	
DESCRIPTION	DATE



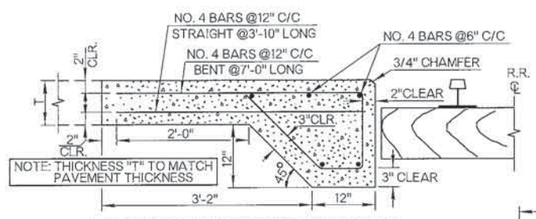
TYPE I DRIVEWAYS
(PRIVATE OR RESIDENTIAL)



TYPE 2 DRIVEWAY
(TWO -WAY OPERATION)

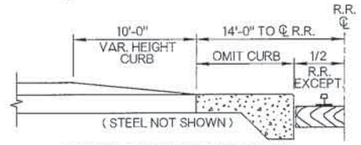


TYPE 2A DRIVEWAYS
(ONE -WAY OPERATIONS)



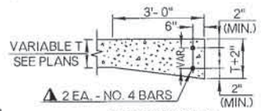
P. C. RAILROAD APPROACH SLAB WITH
THICKENED EDGE AT RAILROAD CROSSING

THICKENED EDGE OF CONCRETE RAILROAD APPROACH SLAB SHALL EXTEND FROM OUTSIDE TO OUTSIDE OF SHOULDERS. COST OF CLASS A CONCRETE & REINFORCING STEEL TO BE INCLUDED IN THE PRICE BID FOR RAILROAD APPROACH SLAB.

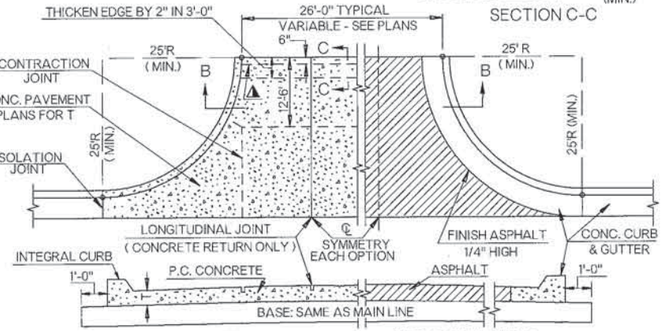


DETAIL OF CURBS ADJACENT
TO RAILROAD CROSSINGS

- IF SPECIFIED IN THE PLANS, CONSTRUCT CONDUIT CROSSING OF THE SPECIFIC SIZE AND TYPE AT APPROXIMATELY 30" BELOW FINISHED GRADE OF THE RAMP. SEE GENERAL NOTES FOR DETAILS.
- BEGIN ROLL CURB. TERMINATE CURB & GUTTER.



SECTION C-C

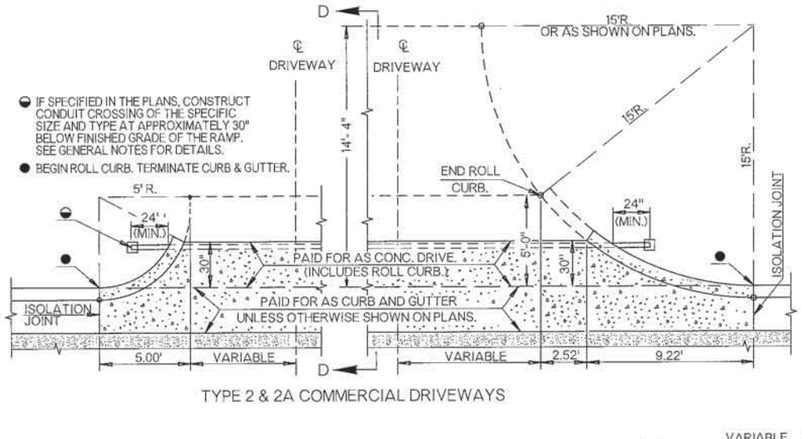


ALT. SECTION B-B
CONCRETE RETURN

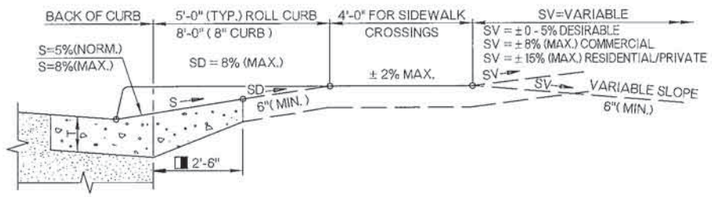
ALT. SECTION B-B
ASPHALT RETURN
(WHERE CURB AND GUTTER IS USED)

TYPICAL STREET RETURN

- IF SPECIFIED IN THE PLANS, CONSTRUCT CONDUIT CROSSING OF THE SPECIFIC SIZE AND TYPE AT APPROXIMATELY 30" BELOW FINISHED GRADE OF THE RAMP. SEE GENERAL NOTES FOR DETAILS.
- BEGIN ROLL CURB. TERMINATE CURB & GUTTER.

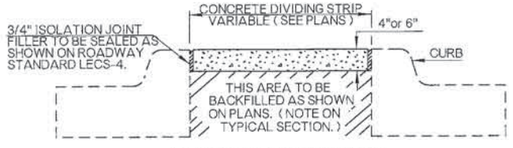


TYPE 2 & 2A COMMERCIAL DRIVEWAYS

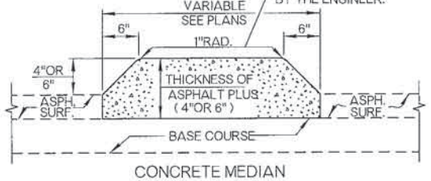


SECTION D-D ALONG ℄ DRIVE

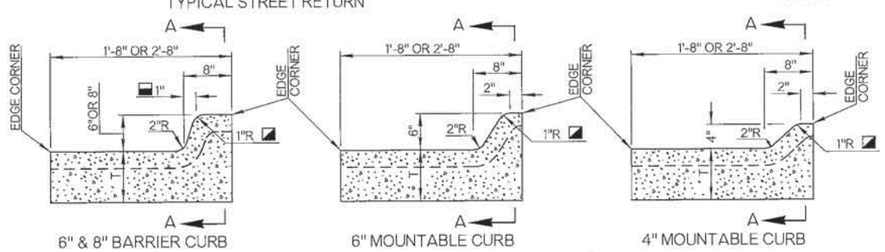
◨ WHEN SIDEWALK IS BUILT DIRECTLY BEHIND CURB, THE CONCRETE DRIVEWAY SHOULD BE CONSTRUCTED & EXTENDED TO THE BACK EDGE OF SIDEWALK.

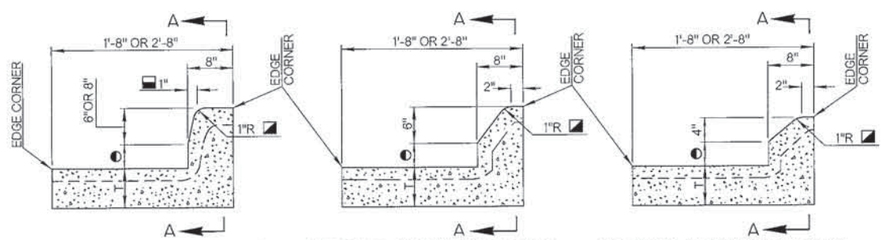


CONCRETE DIVIDING STRIP



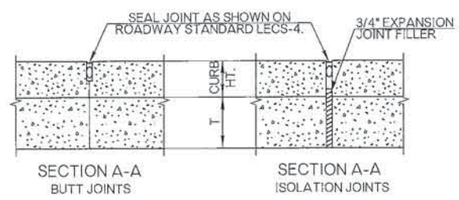
CONCRETE MEDIAN
MOUNTABLE CURB TYPE
(TO BE PAID FOR AS CLASS A CONCRETE.)



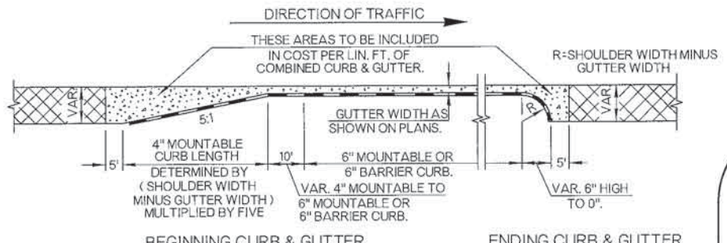


COMBINED CURB & GUTTER TYPICAL SECTIONS

NOTE: T DIMENSION EQUALS THE THICKNESS SHOWN ON TYPICAL SECTION. (MIN.=6")
◐ DIMENSION EQUALS THE THICKNESS ASPHALT CONC. SHOWN ON TYPICAL SECTION. (MIN.=2"; MAX.=4")
◪ RADIUS OF 2" MAY BE USED IF APPROVED BY THE ENGINEER.
▬ BATTER OF 2" MAY BE USED IF APPROVED BY THE ENGINEER.



CURB & GUTTER JOINTS
BUTT & ISOLATION JOINTS TO EXTEND THROUGH CURB & GUTTER TO BACK OF CURB



BEGINNING CURB & GUTTER

ENDING CURB & GUTTER

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. COST OF JOINT FILLERS, SEALING AND REINFORCING STEEL SHALL BE INCLUDED IN PRICE BID FOR OTHER ITEMS OF WORK.
3. TRANSVERSE ISOLATION JOINTS FOR CONCRETE DIVIDING STRIP AND CONCRETE MEDIAN (MOUNTABLE CURB TYPE) TO BE 1/2" ISOLATION JOINT FILLER AT 50' C/C, 1/4" ISOLATION JOINT MATERIAL AT 1/3 POINTS BETWEEN 1/2" ISOLATION JOINTS. FILLER MATERIAL TO BE PREMOLDED AND JOINTS TO BE SEALED AS SHOWN ON ROADWAY STANDARD LECS-4.
4. COMBINED CURB & GUTTER SHALL HAVE 3/4" ISOLATION JOINTS AT DRAINAGE STRUCTURES, STREET CURB RETURNS AND AT THOSE LOCATIONS SHOWN ON THE PLANS. BUTT OR SAWED JOINTS SHALL BE SPACED AT 20'-0" CENTERS MAX. JOINT FILLER IN THE CURBS SHALL EXTEND TO WITHIN 2" OF THE FACE & TOP OF CURB. ALL JOINTS SHALL BE SEALED AS SHOWN ON ROADWAY STANDARD LECS-4.
5. ALL CONDUIT CROSSINGS ARE TO BE TRENCHED, PLACED, BACKFILLED AND COMPACTED PRIOR TO SURFACING. BORING OR PUSHING PROCEDURES MAY BE USED WHERE SURFACING IS ALREADY IN PLACE AND IF APPROVED BY THE ENGINEER.
6. IF CONDUIT IS NOT CONTINUOUS BETWEEN DRIVEWAYS OR RAMPS, CAP BOTH ENDS OF EACH CONDUIT CROSSING AND PLACE MARKER TO PREVENT DAMAGE DURING CONSTRUCTION.
7. CONDUIT SHALL NOT TERMINATE BELOW A SURFACED AREA, BUT SHALL EXTEND A MINIMUM OF 2'-0" PAST EDGE OF PAVING.
8. FOR PULL BOX INSTALLATION DETAILS, SEE TRAFFIC STANDARD PBDI-1 (PULL BOX DETAILS).

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
414 (H)	P. C. RAILROAD APPROACH SLABS	SY
509 (B)	CLASS A CONCRETE	CY
609 (B)	■ COMBINED CURB & GUTTER (▲)	LF
610 (B)	▼ CONCRETE DRIVEWAY	SY
610 (C)	▼ CONCRETE DIVIDING STRIP	SY
610 (H)	▼ ASPHALT DIVIDING STRIP	SY

■ WIDTH OF CURB & GUTTER WILL BE SPECIFIED.
▲ HEIGHT & TYPE OF CURB SHALL BE SPECIFIED.
▼ THICKNESS WILL BE SPECIFIED.

APPROVED BY ROADWAY ENGINEER: Caleb L-A DATE 04/14/15

ROADWAY DESIGN DIVISION STANDARD

ODOT

ASPHALT SURFACING
CONSTRUCTION DETAILS

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

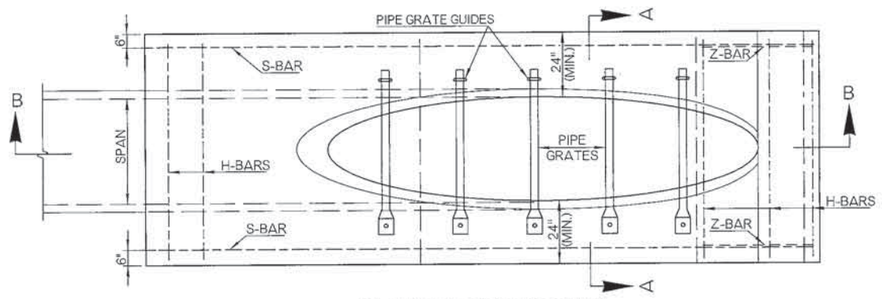
ASCD-5 | 2
R-11

OKLAHOMA DEPARTMENT OF TRANSPORTATION

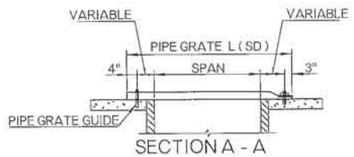
STANDARD REVISIONS	
DESCRIPTION	DATE

TABLE A - SCHEDULE OF PIPE SAFETY GRATES

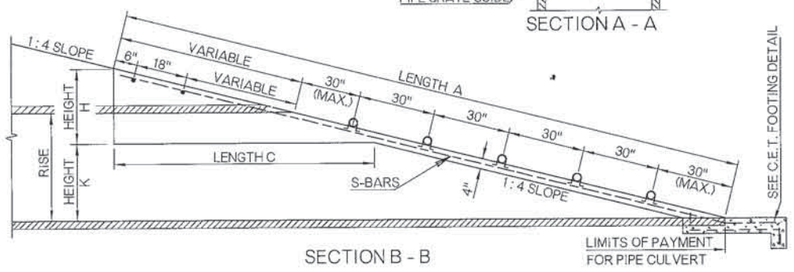
C. E. T. TYPE	CULVERT TYPE: REINF. CONC., STEEL OR ALUMINUM ROUND PIPE	REINF. CONC. ARCH PIPE	REINF. CONC. ELLIPTICAL PIPE (RISE x SPAN)	STEEL OR ALUMINUM ARCH PIPE	SIDE DRAIN: NO. OF GRATES	SIDE DRAIN: GRATE LENGTH L (SD)	CROSS DRAIN: NO. OF GRATES	CROSS DRAIN: GRATE LENGTH L (CD)
A4	18"				2	36"		NONE
		22" x 13"	14" x 23"	21" x 15"	2	42"		NONE
				24" x 18"	2	45"		NONE
B4	24"				2	45"		NONE
		28" x 18"	19" x 30"		2	48"	1	10'-9"
				28" x 20"	2	48"		NONE
		36" x 22"	22" x 34"		3	54"	1	12'-0"
				35" x 24"	3	54"	1	12'-6"
			24" x 38"		3	57"	1	12'-6"
C4	30"				5	50"		NONE
		43" x 26"			3	64"	1	13'-6"
				42" x 29"	3	64"	1	14'-3"
			29" x 45"		3	64"	1	14'-3"
		51" x 31"			4	70"	1	15'-3"
				49" x 33"	4	70"	1	15'-9"
			34" x 53"		4	72"	1	15'-9"
D4	36"				4	54"	1	16'-6"
	42"				5	60"	1	18'-9"
		58" x 36"	38" x 60"	57" x 38"	5	78"	1	17'-3"
		65" x 40"			5	84"	2	18'-0"
				64" x 43"	5	84"	2	19'-0"
E4	48"				6	66"	1	20'-9"
			43" x 68"		5	88"	2	19'-0"
		73" x 45"		71" x 47"	6	92"	2	20'-6"
			48" x 76"		6	96"	2	20'-9"



PLAN (SIDE DRAIN SHOWN)



SECTION A - A

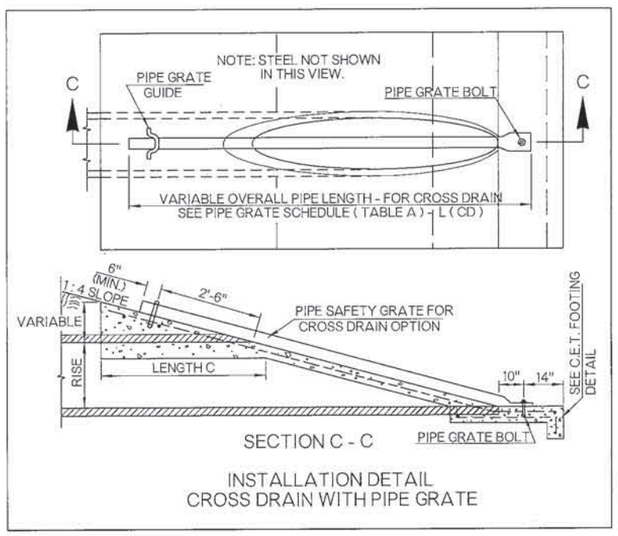


SECTION B - B

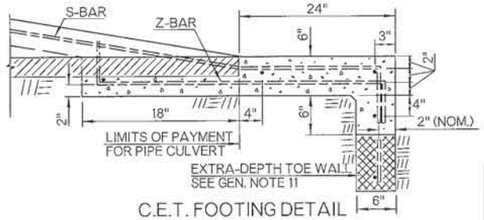
TABLE B - SCHEDULE OF DIMENSIONS

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"

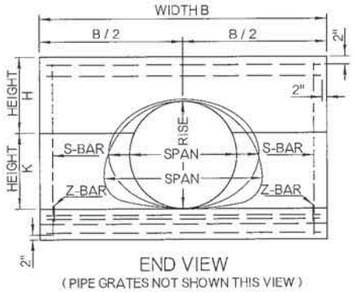
Ⓡ ROUND SHAPE CULVERT OPTIONS
Ⓐ ARCH SHAPE CULVERT OPTIONS
Ⓔ HORIZONTAL ELLIPSE SHAPE CULVERT OPTIONS



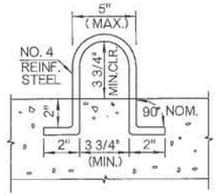
INSTALLATION DETAIL
CROSS DRAIN WITH PIPE GRATE



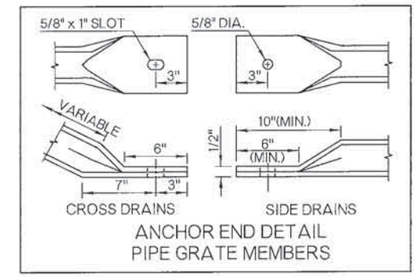
C.E.T. FOOTING DETAIL



END VIEW
(PIPE GRATES NOT SHOWN THIS VIEW)



PIPE GRATE GUIDE (U-BOLT)



ANCHOR END DETAIL
PIPE GRATE MEMBERS

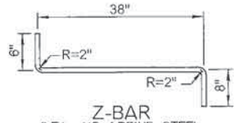
GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. 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.
3. 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.
4. 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.
5. ALL SIZES OF CULVERT PIPE WILL BE CUT ON 1 TO 4 SLOPE.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.

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

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: _____ DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

CULVERT END TREATMENT
SINGLE PIPE INSTALLATION
1 TO 4 SAFETY SLOPE

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

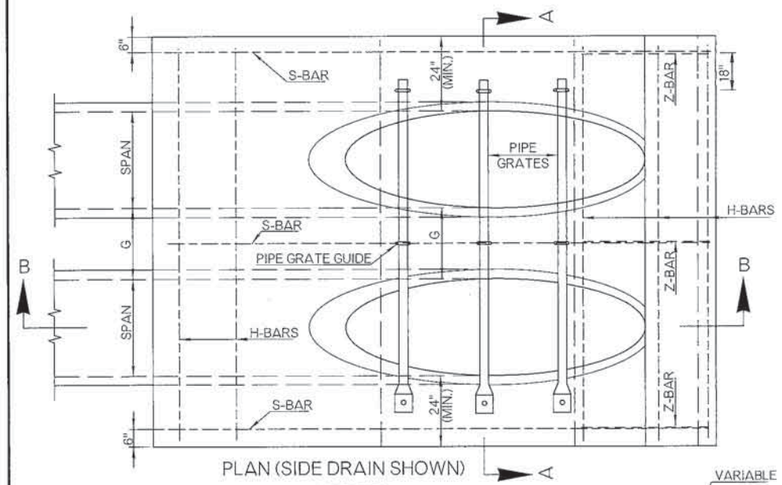
CET4S-3 | 2

R-26

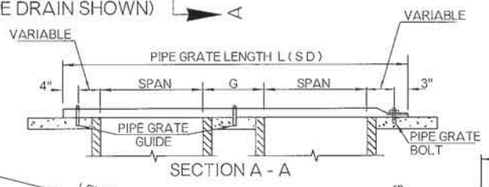
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

TABLE A - SCHEDULE OF PIPE SAFETY GRATES

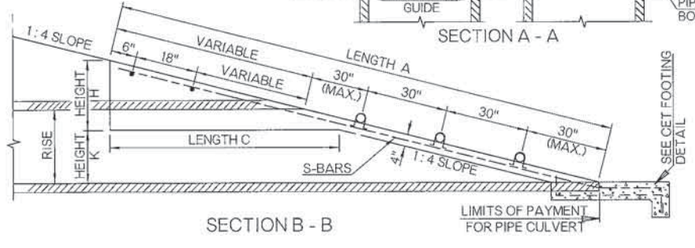
CET TYPE	CULVERT TYPE				SIDE DRAIN		CROSS DRAIN		G DIMENSION
	REINF. CONC., STEEL OR ALUMINUM ROUND PIPE	REINF. CONC. ARCH PIPE	REINF. CONC. ELLIPTICAL PIPE (RISE x SPAN)	STEEL OR ALUMINUM ARCH PIPE	NO. OF GRATES	GRATE LENGTH L (SD)	NO. OF GRATES	GRATE LENGTH L (CD)	
AA4	18"				2	5'-8"	NONE		12"
		22" x 13"	14" x 23"	21" x 15"	2	6'-6"	NONE		12"
				24" x 18"	2	6'-8"	NONE		12"
BB4	24"				2	6'-8"	NONE		12"
		28" x 18"	19" x 30"		2	7'-8"	2	10'-9"	12"
				28" x 20"	2	7'-8"	NONE		12"
		36" x 22"	22" x 34"		3	8'-6"	2	12'-0"	12"
				35" x 24"	3	8'-6"	2	12'-6"	12"
			24" x 38"		3	9'-2"	2	12'-6"	15"
CC4	30"				5	7'-10"	NONE		15"
		43" x 26"			3	10'-0"	2	13'-6"	15"
				42" x 29"	3	10'-0"	2	14'-3"	15"
			29" x 45"		3	10'-4"	2	14'-3"	15"
		51" x 31"			4	11'-8"	2	15'-3"	18"
				49" x 33"	4	11'-3"	2	15'-9"	18"
			34" x 53"		4	12'-0"	2	15'-9"	18"
DD4	36"				4	9'-8"	2	16'-6"	18"
	42"				5	10'-4"	2	18'-9"	21"
		58" x 36"	38" x 60"	57" x 38"	5	13'-4"	2	17'-3"	21"
		65" x 40"			5	14'-2"	4	18'-0"	21"
				64" x 43"	5	14'-2"	4	19'-0"	21"
EE4	48"				6	11'-8"	2	20'-9"	24"
			43" x 68"		5	15'-0"	4	19'-0"	24"
		73" x 45"		71" x 47"	6	15'-9"	4	20'-6"	24"
			48" x 76"		6	16'-5"	4	20'-9"	26"



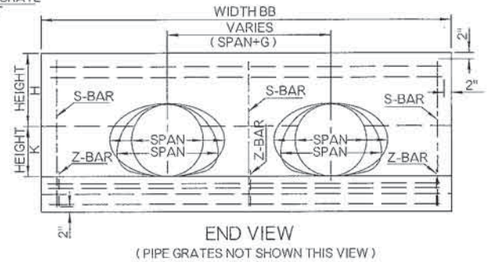
PLAN (SIDE DRAIN SHOWN)



SECTION A - A



SECTION B - B



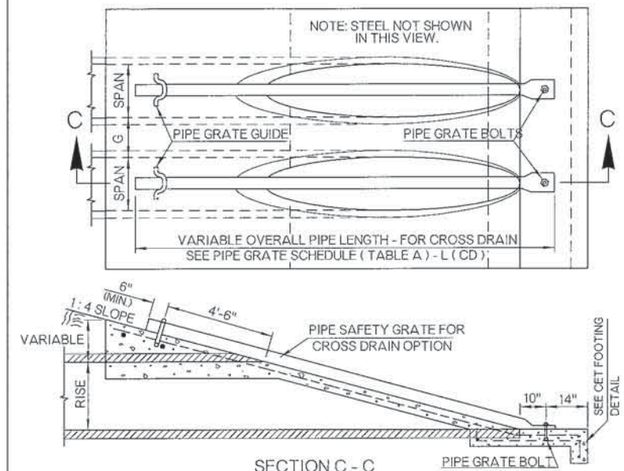
END VIEW
(PIPE GRATES NOT SHOWN THIS VIEW)

TABLE B - SCHEDULE OF DIMENSIONS

CET TYPE	LENGTH A	(R) WIDTH BB	(A)(E) WIDTH BB	LENGTH C	HEIGHT H	HEIGHT K	(R) CONC. CY	(A)(E) CONC. CY	STEEL LENGTH (R) H-BARS	STEEL LENGTH (A)(E) H-BARS	STEEL LENGTH S-BARS
AA4	10'- 4"	8'-0"	9'-4"	5'- 8"	21"	9"	2.45	2.90	7'-8"	9'- 0"	12'- 4"
BB4	12'- 4"	9'-0"	11'-0"	6'- 0"	22"	14"	2.95	3.75	8'-8"	10'- 8"	15'- 4"
CC4	15'- 9"	10'-4"	14'-0"	7'- 4"	26"	20"	4.45	5.75	10'-0"	13'- 8"	19'- 6"
DD4	19'- 3"	12'-9"	16'-6"	8'- 0"	28"	27"	6.00	8.00	12'-5"	16'- 2"	21'- 6"
EE4	20'- 8"	14'-0"	18'-0"	8'- 8"	30"	30"	7.35	9.30	13'-8"	17'- 8"	23'- 4"

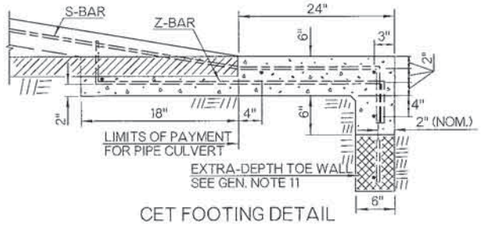
(R) ROUND SHAPE CULVERT OPTIONS
(A) ARCH SHAPE CULVERT OPTIONS
(E) HORIZONTAL ELLIPSE SHAPE CULVERT OPTIONS

NOTE: FOR G DIMENSION, SEE TABLE A



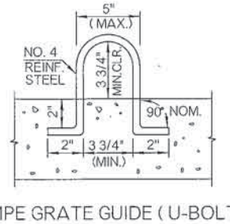
SECTION C - C

INSTALLATION DETAIL
CROSS DRAIN WITH PIPE GRATE

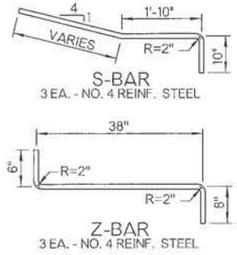


CET FOOTING DETAIL

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

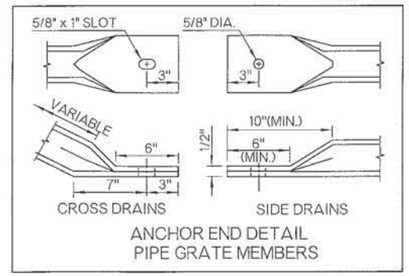


PIPE GRATE GUIDE (U-BOLT)



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

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



ANCHOR END DETAIL
PIPE GRATE MEMBERS

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. 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.
3. TYPES AA4 THROUGH EE4 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 ROUND OR ARCH CULVERT PIPE WITHIN TYPE.
4. 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.
5. ALL SIZES OF CULVERT PIPE WILL BE CUT ON 1 TO 4 SLOPE.
6. 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 CET
7. 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.
8. 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.
9. 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.
10. 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.
11. FOR TOTAL QUANTITY OF EXTRA DEPTH TOE WALL, MULTIPLY WIDTH BB 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.

BASIS OF PAYMENT

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

◒ SPECIFY TYPE OF END TREATMENT (EXAMPLE: TYPE BB4 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: Caleb F. A DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

CULVERT END TREATMENT DOUBLE PIPE INSTALLATION 1 TO 4 SAFETY SLOPE

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

CET4D-3	2
	R-28

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

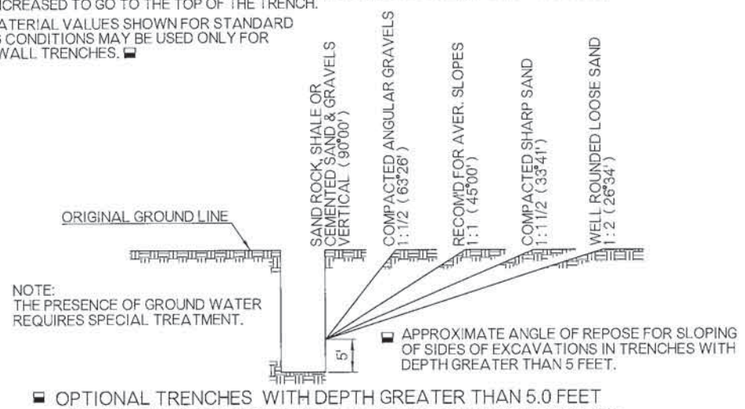
TRENCHING DIMENSIONS AND STANDARD BEDDING MATERIAL QUANTITIES

	PIPE DIAM. OR DESIGN EQUIV.	H ■	T	SINGLE PIPE STANDARD TRENCHING W	SINGLE PIPE STANDARD TRENCHING STANDARD BEDDING MATERIAL ■	DOUBLE PIPE STANDARD TRENCHING W	DOUBLE PIPE STANDARD TRENCHING STANDARD BEDDING MATERIAL ■	TRIPLE PIPE STANDARD TRENCHING W	TRIPLE PIPE STANDARD TRENCHING STANDARD BEDDING MATERIAL ■	SPECIAL TRENCHING SINGLE, DOUBLE & TRIPLE PIPE OPTIONS W+12" ADD'L STANDARD BEDDING MATERIAL
	IN.	FT.	FT.	FT.	CY/LF	FT.	CY/LF	FT.	CY/LF	CY/LF
ROUND PIPE	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	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
ARCH PIPE	18	2.88	0.208	3.50	0.271	6.33	0.471	9.17	0.671	0.106
	21	3.08	0.229	4.12	0.338	7.29	0.567	10.46	0.796	0.114
	24	3.33	0.250	4.38	0.374	7.75	0.624	11.13	0.874	0.123
	30	3.79	0.291	6.10	0.603	10.13	0.915	14.16	1.227	0.140
	36	4.20	0.333	6.81	0.700	11.67	1.097	16.53	1.493	0.156
	42	4.69	0.375	7.50	0.813	13.17	1.308	18.83	1.802	0.173
	⊠ 48	5.17	0.416	9.21	1.180	15.71	1.842	22.21	2.504	0.191
	⊠ 54	5.58	0.458	9.83	1.243	17.05	1.946	24.28	2.649	0.207
	⊠ 60	6.08	0.500	10.58	1.392	18.69	2.228	26.81	3.064	0.225
	⊠ 66	6.75	0.542	11.00	1.488	19.56	2.365	28.11	3.242	0.250
	⊠ 72	7.00	0.583	12.00	1.690	21.78	2.803	31.55	3.917	0.259
	⊠ 78	7.83	0.625	12.42	1.854	22.64	3.071	32.86	4.288	0.272
	⊠ 84	7.83	0.667	13.33	1.983	24.67	3.385	36.00	4.788	0.290
	⊠ 90	8.92	0.708	14.50	2.382	27.08	4.131	39.67	5.881	0.330
	⊠ 96	9.46	0.750	15.17	2.625	28.33	4.549	41.50	6.473	0.350
HORIZONTAL ELLIPTICAL PIPE	18	2.96	0.229	3.62	0.282	6.54	0.487	9.46	0.691	0.109
	24	3.46	0.27	4.54	0.387	8.04	0.640	11.54	0.893	0.128
	30	3.96	0.312	6.29	0.629	10.51	0.954	14.74	1.28	0.147
	36	4.50	0.375	7.00	0.743	12.00	1.153	17.00	1.564	0.167
	⊠ 42	5.00	0.416	7.75	0.862	13.64	1.379	19.53	1.896	0.185
	⊠ 48	5.42	0.458	9.42	1.170	16.08	1.788	22.75	2.406	0.200
	⊠ 54	5.92	0.5	10.17	1.311	17.72	2.050	25.28	2.789	0.219
	⊠ 60	6.42	0.541	10.92	1.478	19.36	2.368	27.81	3.259	0.238
	⊠ 66	6.91	0.583	11.58	1.626	20.81	2.648	30.03	3.67	0.256
	⊠ 72	7.41	0.625	12.33	1.807	22.44	3.004	32.56	4.201	0.275
	⊠ 78	7.91	0.667	13.00	1.962	23.89	3.305	34.78	4.649	0.293
	⊠ 84	8.58	0.708	13.75	2.239	25.53	3.850	37.31	5.462	0.318
	⊠ 90	9.00	0.75	14.42	2.364	26.83	4.062	39.25	5.759	0.333
	⊠ 96	9.5	0.791	15.17	2.570	28.25	4.408	41.33	6.245	0.352

NOTE: QUANTITIES FOR 66" & 78" EQUIV. DIAM. 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.

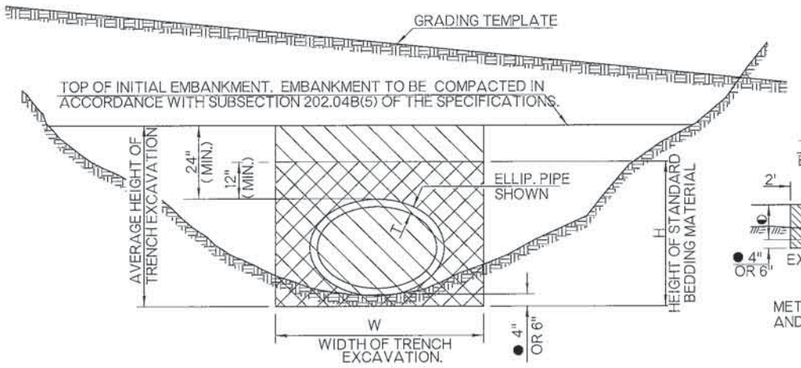
▨ BEDDING MATERIAL VALUES SHOWN FOR STANDARD TRENCHING CONDITIONS MAY BE USED ONLY FOR VERTICAL WALL TRENCHES. ⬓



⬓ APPROXIMATE ANGLE OF REPOSE FOR SLOPING OF SIDES OF EXCAVATIONS IN TRENCHES WITH DEPTH GREATER THAN 5 FEET.

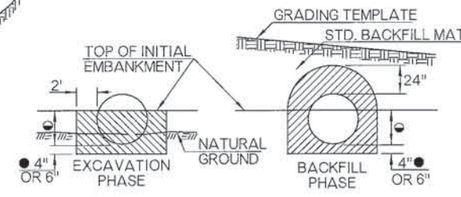
⬓ OPTIONAL TRENCHES WITH DEPTH GREATER THAN 5.0 FEET

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

◒ 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"

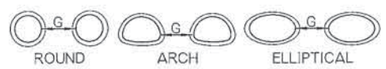


METHOD NO. 1 PAY QUANTITIES WILL BE CALCULATED AND PAID FOR WHEN METHOD NO. 2 IS USED.

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

TRENCH EXCAVATION IN EMBANKMENT SECTIONS

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

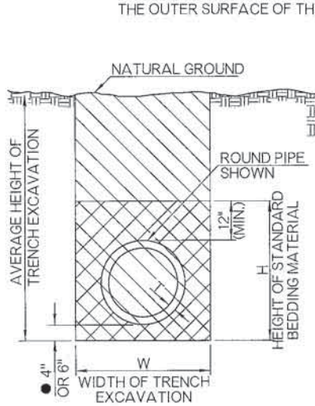


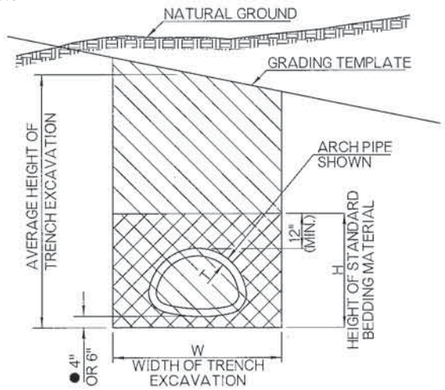
DOUBLE PIPE INSTALLATION
(USED WITH CET END TREATMENTS)

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.

LIMITS OF TRENCH EXCAVATION





TRENCH EXCAVATION IN CUT SECTIONS

TABLE OF EQUIVALENT PIPES

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.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. TRENCH EXCAVATION AND BEDDING MATERIAL WILL NOT BE REQUIRED FOR PIPE INSTALLATIONS OF SIDE DRAINS UNLESS OTHERWISE NOTED ON THE PLANS.
3. FOR PIPE UNDERDRAIN INSTALLATIONS, SEE ROADWAY STANDARD PUD-3.
4. ⬓ 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.
5. 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.
6. 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.
7. ○ STANDARD BEDDING QUANTITIES FOR ROUND PIPE ARE BASED ON AASHTO DESIGNATED CLASS III (WALL B) REINFORCED CONCRETE PIPE.
8. ⬓ 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.
9. ⊠ PROPER COMPACTION OF BACKFILL REQUIRES A VERTICAL WALLED TRENCH TO 24 INCHES ABOVE TOP OF PIPE, REGARDLESS OF EXCAVATION ABOVE THAT ELEVATION.
10. ● EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES OF BEDDING MATERIAL BELOW PIPE CONDUIT.
11. ◑ ELLIPTICAL PIPE DIMENSIONS CONFORM TO AASHTO M 207, AS DESIGNATED RISE BY SPAN.
12. FOR COMPUTING TRENCH EXCAVATION & STANDARD BEDDING QUANTITIES, THE LENGTH OF THE CULVERT SHALL INCLUDE END SECTION AND END TREATMENT LENGTHS.
13. MULTIPLE PIPE INSTALLATIONS WILL REQUIRE A MINIMUM OF 12" BETWEEN PIPES FOR PROPER COMPACTION.

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
613 (V)	TRENCH EXCAVATION	CY

APPROVED BY ROADWAY ENGINEER: Caleb F. H DATE 04/16/15

ROADWAY DESIGN DIVISION STANDARD

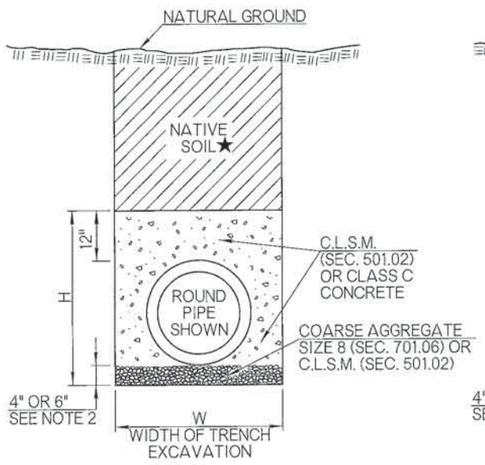
STANDARD PIPE INSTALLATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

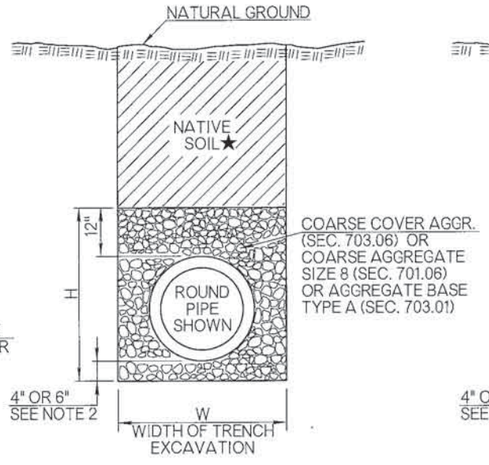
SPI-4 | 1

R-47

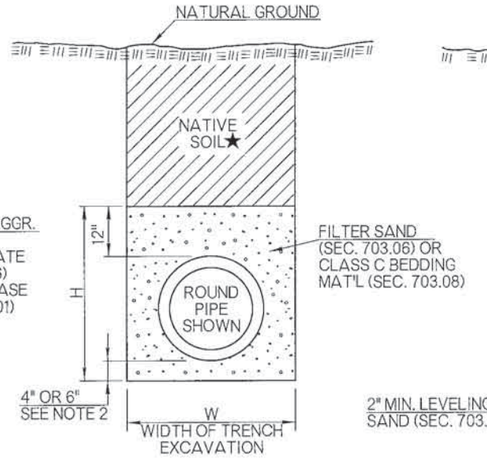
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



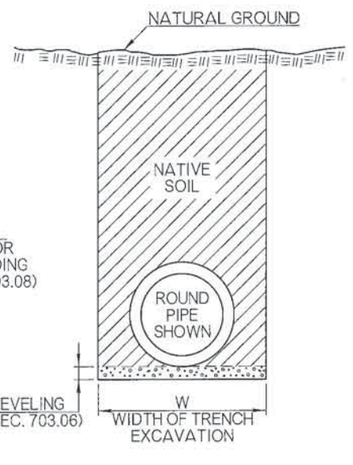
CLASS A BEDDING



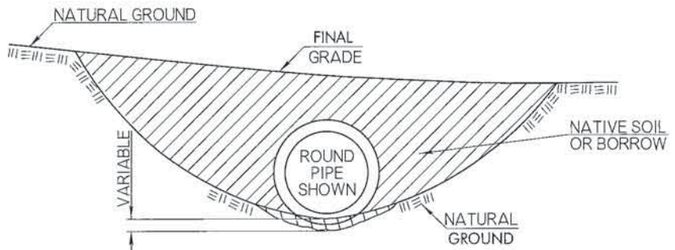
CLASS B BEDDING



CLASS C BEDDING



CLASS D BEDDING
ALTERNATE 1



NATIVE SOIL OR SAND (SEC. 703.06) MAY BE USED TO ADJUST FLOWLINE OF NATURAL DITCH TO PROVIDE SMOOTH BEDDING SURFACE FOR PIPE CONDUIT AND ATTAIN PROPER DESIGN GRADE. SEE SECTION 613.04.G

CLASS D BEDDING
ALTERNATE 2

PIPE BEDDING CLASS/DESIGN TABLE							
	■ UNDER PAVING				OUTSIDE PAVING		
TYPE OF PIPE	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.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES OF BEDDING MATERIAL BELOW PIPE CONDUIT.
3. NATIVE SOIL FOR BACKFILL, TO BE COMPACTED IN ACCORDANCE WITH SECTION 202.04 OF THE STANDARD SPECIFICATIONS.
4. A BETTER CLASS OF BEDDING MAY BY SUBSTITUTED FOR THE NEXT LOWER CLASS. EXAMPLE: CLASS A STANDARD BEDDING CAN BE USED IN LIEU OF CLASS B STANDARD BEDDING.
5. FOR TRENCH WIDTH (W), BEDDING HEIGHT (H), PIPE DATA, MULTIPLE PIPE SPACING & BEDDING DATA, SEE ROADWAY STANDARDS SPI-4 & FPI-3.
6. DATA TABLE WILL DISPLAY 'NA' WHEN PIPE MATERIALS ARE NOT ALLOWED.
7. 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.
8. PIPE MATERIAL(S)/PRODUCT(S) NOT SHOWN IN THE PIPE BEDDING TABLE WILL BE EVALUATED AND APPROVED ON A CASE BY CASE BASIS.
9. ALL TEMPORARY PIPES SHALL HAVE CLASS D BEDDING UNLESS OTHERWISE SHOWN IN THE PLANS.
10. 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.

12. THE USE OF AN ALTERNATE PIPE AND ITS CORRESPONDING BEDDING MATERIAL WILL BE ACCEPTABLE PROVIDED THE CRITERIA IN THE DESIGN TABLE IS MET
13. POLYPROPYLENE PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.

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: Caleb F. A DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

STANDARD PIPE BEDDING

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

SPB-1 | 4

R-49

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

REQUIRED PIPE CLASS FOR REINFORCED CONCRETE ROUND PIPE IN CUT SECTIONS

PIPE DIAMETER	●MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE												
	1' TO 2'	2' THRU 10'	12'	14'	16'	18'	20'	25'	30'	35'	40'	45'	50'
12" 15" 18"	IV III III	II II II	II II II	II II II	II II II	II II II	III II II	III III III	III III III	III III III	III III III	III III III	III III III
24" 27" 30" 36"	III II II II	II II II II	II II II III	III III III III	III III III IV	III III III IV	III III III IV	IV IV IV IV	IV IV IV IV	IV IV IV/V	IV IV IV/V	IV IV IV/V	IV IV IV/V
42" 48" 54" 60"	II II II II	II II II II	III III III III	III III III III	III III III IV	IV IV IV IV	IV IV IV IV	IV IV IV IV	IV IV IV IV/V	IV/V IV/V IV/V IV/V	V V V V	IV/V IV/V IV/V V	IV/V IV/V IV/V V
66" 72" 78" 84"	II II II II	II II II II	III III III III	III III III III	IV IV III III	IV IV IV IV	IV IV IV IV	IV IV IV IV	IV/V IV/V IV/V IV/V	IV/V IV/V IV/V IV/V	V V V V	V V V V	V V V V
90" 96" 102" 108"	II II II II	II II II II	II II II II	III III III III	III III III III	IV IV IV IV	IV IV IV IV	IV IV IV IV	IV/V IV/V IV/V IV/V	IV/V IV/V IV/V IV/V	V V V V	V V V V	V V V V

REQUIRED PIPE CLASS FOR REINFORCED CONCRETE ROUND PIPE IN FILL SECTIONS

PIPE DIAMETER	●MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE												
	1' TO 2'	2' THRU 10'	12'	14'	16'	18'	20'	25'	30'	35'	40'	45'	50'
12" 15" 18"	IV III III	II II II	III III III	III III III	IV IV IV	IV IV IV	IV IV IV	IV/V IV/V IV/V	V V V	* * *	* * *	* * *	* * *
24" 27" 30" 36"	III II II II	II II II II	III III III III	III III III III	IV IV IV IV	IV IV IV IV	IV IV IV IV	IV/V IV/V IV/V IV/V	V V V V	* * * *	* * * *	* * * *	* * * *
42" 48" 54" 60"	II II II II	II II II II	III III III II	III III III III	IV IV IV III	IV IV IV IV	IV IV IV IV	IV/V IV/V IV/V IV/V	V V V V	* * * *	* * * *	* * * *	* * * *
66" 72" 78" 84"	II II II II	II II II II	II II II II	III III III III	III III III III	IV IV IV IV	IV IV IV IV	IV/V IV/V IV/V IV/V	V V V V	V V V V	* * * *	* * * *	* * * *
90" 96" 102" 108"	II II II II	II II II II	II II II II	III III III III	III III III III	IV IV IV IV	IV IV IV IV	IV/V IV/V IV/V IV/V	V V V V	V V V V	* * * *	* * * *	* * * *

* SPECIAL DESIGN PIPE. DESIGN METHOD TO CONFORM TO CURRENT AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.

● FILL HEIGHT MEASURED FROM TOP OF PIPE TO TOP OF SUBGRADE.

REINFORCED CONCRETE ARCH/ELLIPTICAL PIPE

▲ CLASS A - III ARCH
CLASS HE - III HORIZONTAL ELLIPTICAL
CLASS VE - IVVERTICAL ELLIPTICAL

APPROXIMATE EQUIVALENT ROUND PIPE	ARCH SIZE SPAN x RISE	HORIZONTAL ELLIPTICAL SIZE RISE x SPAN	VERTICAL ELLIPTICAL SIZE RISE x SPAN	MINIMUM COVER	MAXIMUM COVER
15"	18" x 11"			12"	10'
18"	22" x 13"	14" x 23"	23" x 14"	12"	10'
24"	28" x 18"	19" x 30"	30" x 19"	12"	10'
30"	36" x 22"	24" x 38"	38" x 24"	12"	10'
36"	43" x 26"	29" x 45"	45" x 29"	12"	10'
42"	51" x 31"	34" x 53"	53" x 34"	12"	10'
48"	58" x 36"	38" x 60"	60" x 38"	12"	10'
54"	65" x 40"	43" x 68"	68" x 43"	12"	10'
60"	73" x 45"	48" x 76"	76" x 48"	12"	10'
66"		53" x 83"	83" x 53"	12"	10'
72"	88" x 54"	58" x 91"	91" x 58"	12"	10'
78"		63" x 98"	98" x 63"	12"	10'
84"	102" x 62"	68" x 106"	106" x 68"	12"	10'
90"	115" x 72"	72" x 113"	113" x 72"	12"	10'
96"	122" x 77"	77" x 121"	121" x 77"	12"	10'
102"		82" x 128"	128" x 82"	12"	10'
108"	138" x 87"	87" x 136"	136" x 87"	12"	10'
114"		92" x 143"	143" x 92"	12"	10'
120"		97" x 151"	151" x 97"	12"	10'

▲ DIMENSIONS LISTED FOR ARCH PIPE IN PAY ITEMS SHOW TRUNCATED INCHES.

GENERAL NOTES

1. FILL HEIGHT DESIGNS ARE BASED ON A CLASS B BEDDING, NEGATIVE PROJECTION, HS-20 LIVE LOADING, AND 120 LBS/C.F. SOIL WEIGHT.
2. MINIMUM HEIGHT OF COVER FROM TOP OF PIPE TO TOP OF SUBGRADE FOR REINFORCED CONCRETE PIPE SHALL BE 12 INCHES.
3. IN THE EVENT LOADS IN EXCESS OF HS-20 ARE TO BE OPERATED OVER OR ADJACENT TO THE PIPE INSTALLATION DURING THE CONSTRUCTION PHASE, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A MINIMUM OF FOUR FEET OF COVER OVER THE PIPE AT WHEEL OR TRACK PATHS.
4. PROPER INSTALLATION PRACTICES MUST BE ADHERED TO AS SHOWN ON ROADWAY STANDARDS SPI-4, FPI-3 AND SPB-1.
5. ANY PIPE CRACKED PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED BY THE CONTRACTOR AT HIS EXPENSE. SURFACE DISTRESS MUST BE REPAIRED TO THE SATISFACTION OF THE ENGINEER, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
6. PIPE DIMENSIONS LISTED IN TABLES CONFORM TO 2005 AASHTO DESIGNATIONS.
7. CLASS IV/V REINFORCED CONCRETE PIPE SHALL MEET STRENGTH TEST REQUIREMENTS OF A MAXIMUM 2000 POUNDS FOR CLASS IV AND 3000 POUNDS FOR CLASS V PIPE - FORCE PER LINEAR FOOT PER FOOT OF DIAMETER TO PRODUCE A 0.01 INCH CRACK, CONFORMING TO TEST PROCEDURE REFERENCES IN AASHTO M 170.

APPROVED BY ROADWAY ENGINEER: Caleb F. H DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

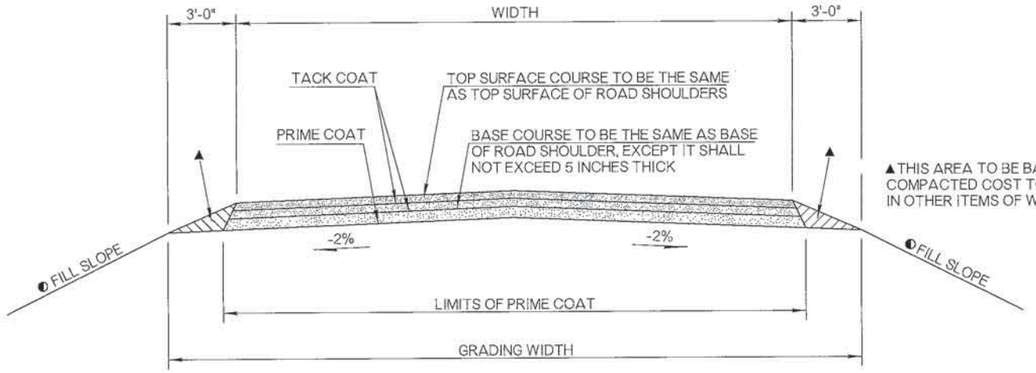
FILL HEIGHT TABLES (CONCRETE PIPES)

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

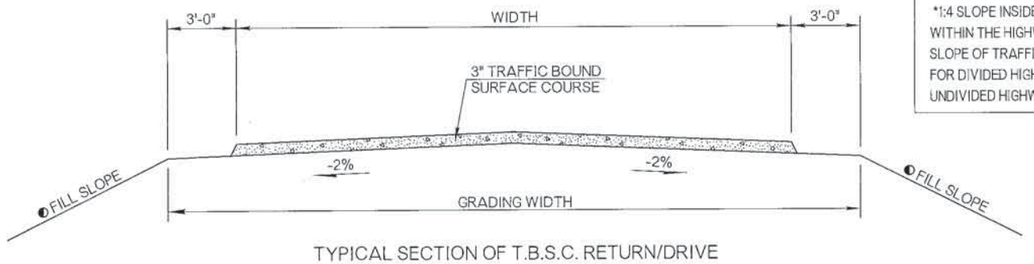
FHTCP-3 | 1

R-51

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

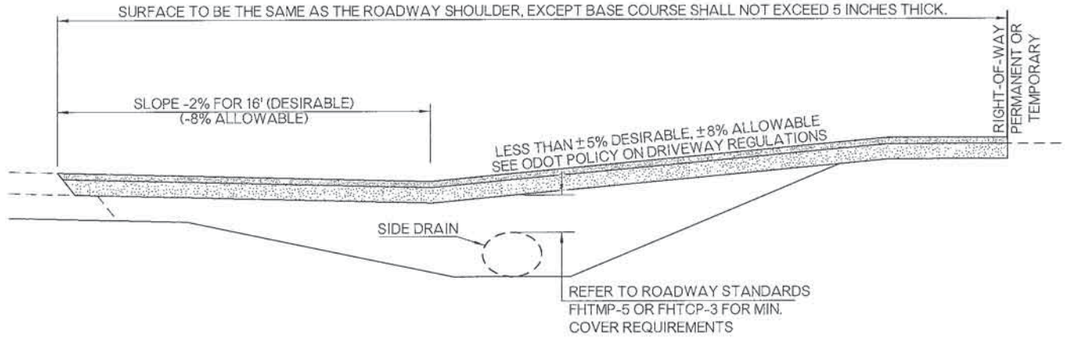


TYPICAL SECTION OF ASPHALT RETURN/DRIVE

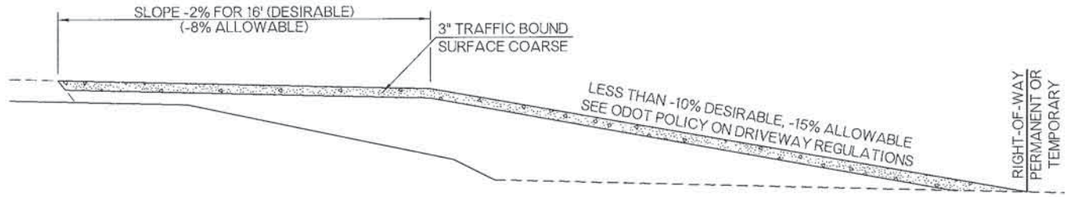


TYPICAL SECTION OF T.B.S.C. RETURN/DRIVE

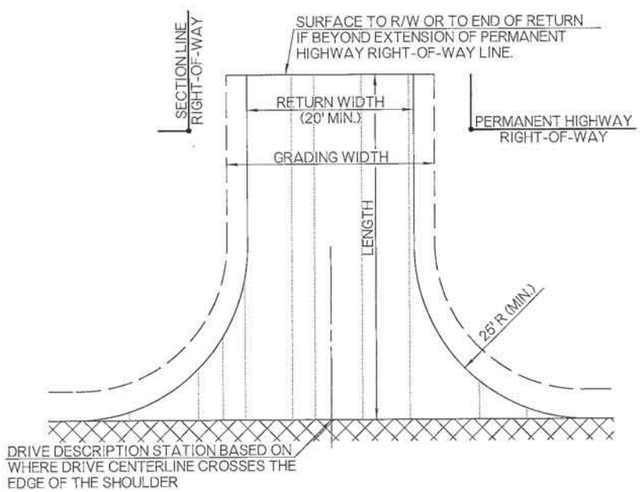
◐FILL SLOPE NOTES:
FILL SLOPE AS SHOWN IN TYPICAL SECTIONS SHALL NOT EXCEED:
*1:3 SLOPE OUTSIDE HIGHWAY CLEARZONE
*1:4 SLOPE INSIDE HIGHWAY CLEARZONE
WITHIN THE HIGHWAY CLEARZONE, ADJUST SLOPE OF TRAFFIC APPROACH END TO 1:10 FOR DIVIDED HIGHWAYS AND 1:6 FOR UNDIVIDED HIGHWAYS.



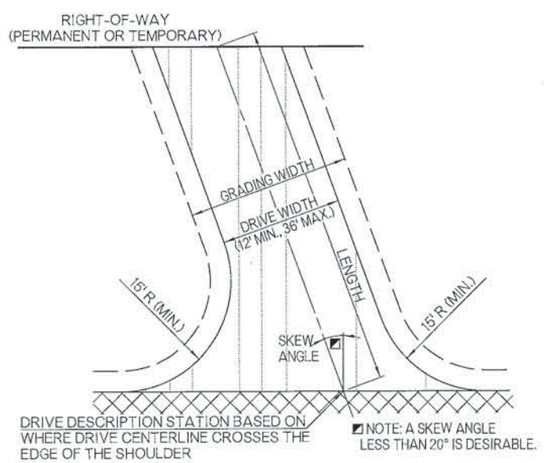
PROFILE OF TYPICAL ASPHALT RETURN/DRIVE ON ROADWAY CUT SECTION



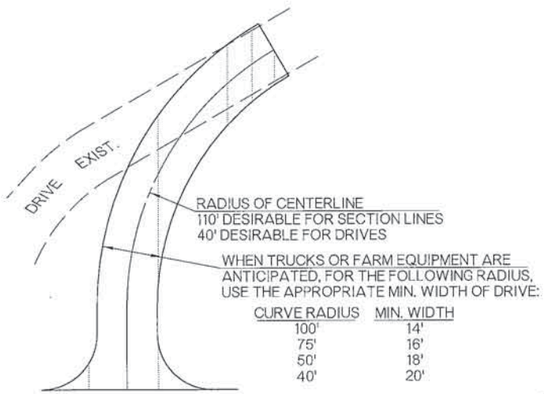
PROFILE OF TYPICAL T.B.S.C. RETURN/DRIVE ON ROADWAY FILL SECTION



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

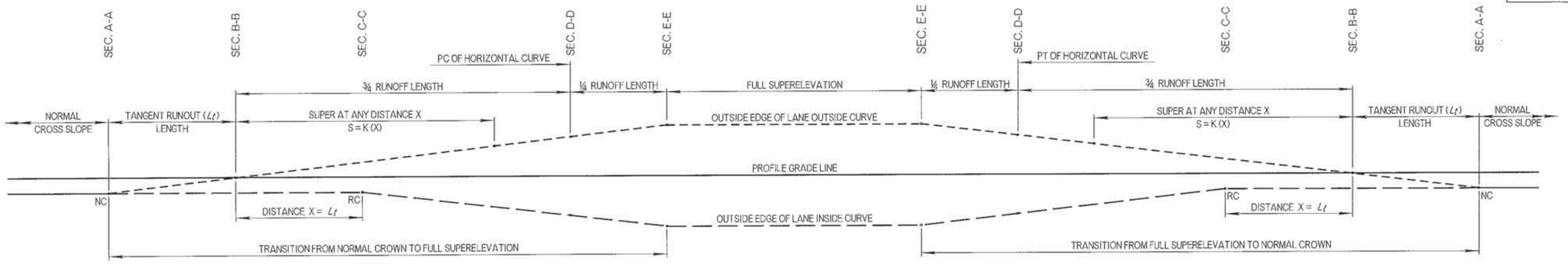
APPROVED BY ROADWAY ENGINEER: Calvin F. A DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

RURAL DRIVEWAY INSTALLATION

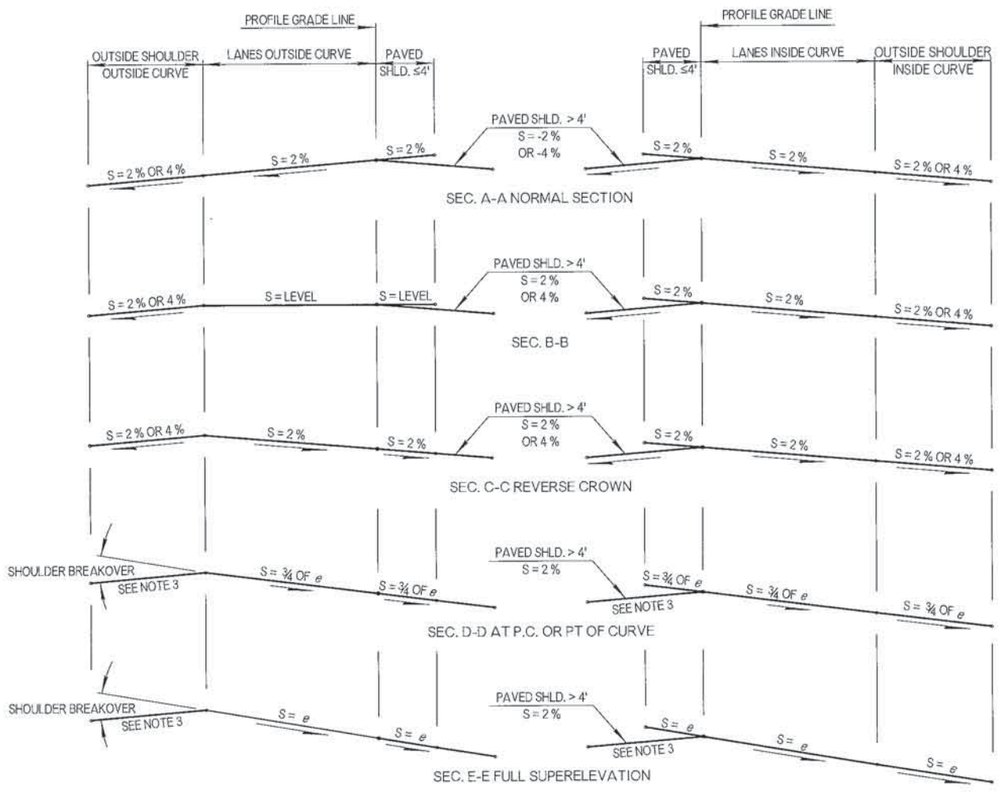
OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



PROFILE FOR UNDIVIDED (CROWN SECTION) AND DIVIDED HIGHWAYS

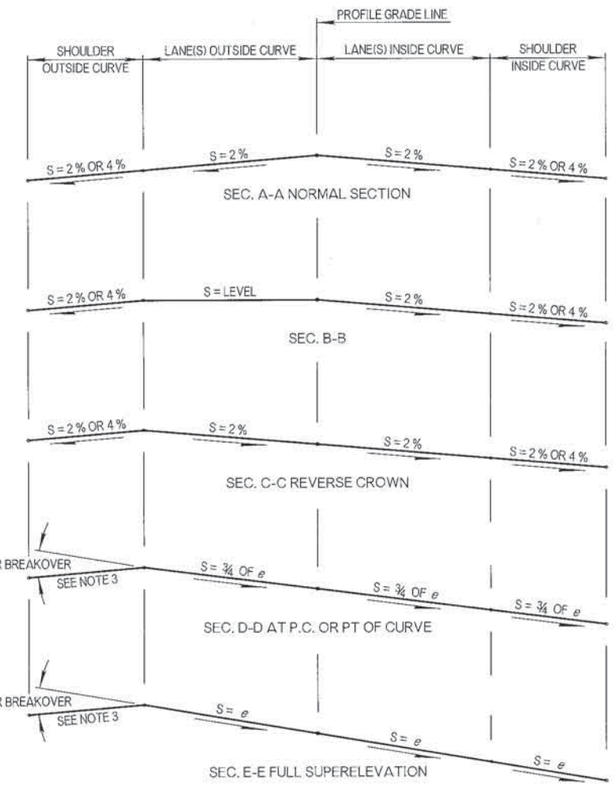
PROFILE GRADE IS FINISH GRADE LINE



TYPICAL SECTIONS FOR DIVIDED HIGHWAYS

NOTE: FOR DIVIDED HIGHWAYS WITH MEDIAN WIDTH GREATER THAN 46 FEET, TREAT EACH DIRECTION AS A SEPARATE ROADWAY.

PROFILE GRADE IS FINISH GRADE LINE



TYPICAL SECTIONS FOR UNDIVIDED HIGHWAYS

PROFILE GRADE IS FINISH GRADE LINE

RUNOFF LENGTH ADJUSTMENTS		
NUMBER OF LANES ROTATED n_l	ADJUSTMENT FACTOR b_w	LENGTH INCREASE RELATIVE TO 1 LANE $= n_l b_w$
1.0	1.00	1.00
1.5	0.83	1.25
2.0	0.75	1.50
2.5	0.70	1.75
3.0	0.67	2.00
3.5	0.64	2.25

SUPERELEVATION NOMENCLATURE

b_w = ADJUSTMENT FACTOR FOR ROTATED LANES.
e_d = DESIGN SUPERELEVATION RATE (%)
L_r = MINIMUM LENGTH OF SUPERELEVATION RUNOFF.
L_t = MINIMUM LENGTH OF TANGENT RUNOUT.
n_l = NUMBER OF LANES ROTATED.
NC = NORMAL CROWN.
RC = REVERSE CROWN
S = CROSS SLOPE (%).
V_d = DESIGN SPEED (MILES PER HOUR)
$K = \frac{e_d(.01)}{L_r}$ (FT/FT)

SUPERELEVATION RATE GUIDELINES

$e_{max.}$ = 6.0 % ELEVATED OR INTERMITTENTLY ELEVATED ROADWAYS (BRIDGES, BOXES), ROADWAYS WITH FREQUENT SLOW MOVING VEHICLES, URBAN STREETS WHERE ROADSIDE DEVELOPMENT PRECLUDES HIGHER SUPERELEVATION RATE

$e_{max.}$ = 8.0 % DEPRESSED OR GROUND-LEVEL ROADWAYS; ROADWAYS ON STEEP OR LONG DOWNGRADES, ROADWAYS WHERE DRAINAGE CONSIDERATIONS ARE PRIMARY LOW VOLUME GRAVEL-SURFACED ROADS

GENERAL NOTES

1. THIS STANDARD DRAWING PROVIDES BASIC GUIDELINES FOR SUPERELEVATION DEVELOPMENT FOR TWO OR FOUR LANE, OPEN ROADWAY CONDITIONS ONLY; FOR OTHER SUPERELEVATION DESIGN CRITERIA, SEE THE 2011 AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS".
2. FOR CURVES WITH SPIRALS, RUNOFF LENGTH IS EQUAL TO SPIRAL LENGTH, WITH FULL SUPERELEVATION REACHED AT S.C. or C.S. OF CURVE. CHECK RAMP GRADES AND SUPERELEVATION TRANSITIONS AT RAMP TERMINALS DURING STAKING AND MAKE ADJUSTMENTS AS REQUIRED TO OBTAIN SMOOTH PROFILES FOR BOTH EDGES OF THE RAMP PAVEMENT. CROSSOVER CROWN LINE BREAKOVER SHALL NOT EXCEED 5.0% (CALCULATED AS THE ALGEBRAIC DIFFERENCE IN CROSS SLOPES OF ADJACENT PAVEMENTS), WITHOUT THE APPROVAL OF ODOT ENGINEER.
3. IF PRACTICAL THE SHOULDER BREAKOVER SHOULD NOT EXCEED 0.07 FEET PER FOOT, CALCULATED AS THE ALGEBRAIC DIFFERENCE IN CROSS SLOPE OF PAVEMENT AND SHOULDER SURFACES. IT IS ACCEPTABLE FOR THE BREAKOVER TO BE 8%. ROTATE SHOULDER TO MAINTAIN DESIRABLE BREAKOVER. CONTINUOUS SHOULDER CROSS SLOPE SHOULD BE AT LEAST 1% TO INSURE PROPER DRAINAGE.
4. CROSS SLOPE (S) IS NORMALLY SET AT 3/4 (75%) SUPER AT THE P.C. AND PT OF A CURVE, HOWEVER THE DESIGNER MAY ADJUST THIS PERCENTAGE TO BE FROM 60% TO 90%, TO ACCOMMODATE SITE CONDITIONS.
5. THE SUPERELEVATION TABLE FOR LOW SPEED URBAN STREETS MAY BE USED WHERE THE DESIGN SPEED IS NOT GREATER THAN 45 MPH.

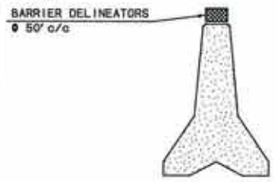
APPROVED BY ROADWAY ENGINEER: Caleb F. H DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

SUPERELEVATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

BARRIER DELINEATOR SHALL BE PLACED AT 50' c/c (MAX). DELINEATOR SHALL HAVE 6" (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 FOR PERMANENTLY INSTALLED CONCRETE MEDIAN BARRIER

TYPE 1 (CRYSTAL)

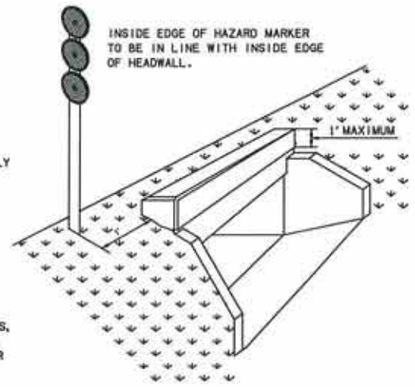
TYPE 1 (AMBER)

TYPE 2 (CRYSTAL/CRYSTAL)

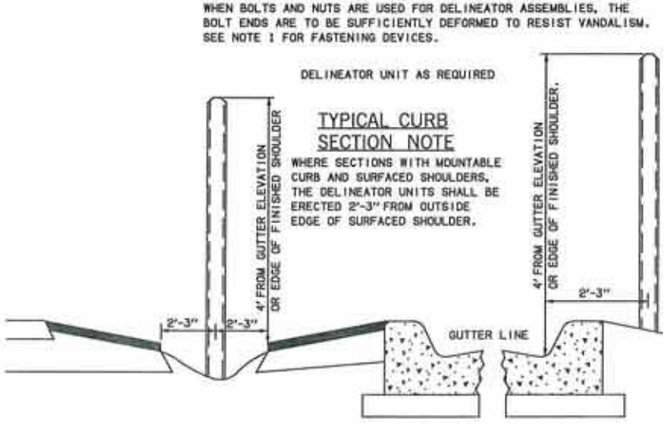
TYPE 2 (AMBER/AMBER)

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.

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.

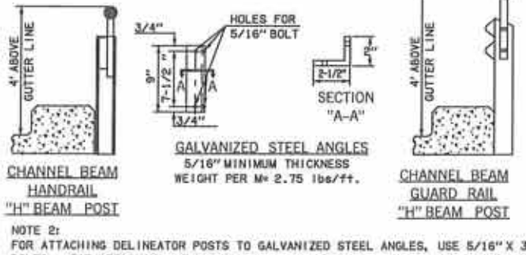


NOTE 3:
WHEN BOLTS AND NUTS ARE USED FOR DELINEATOR ASSEMBLIES, THE BOLT ENDS ARE TO BE SUFFICIENTLY DEFORMED TO RESIST VANDALISM. SEE NOTE 1 FOR FASTENING DEVICES.



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.



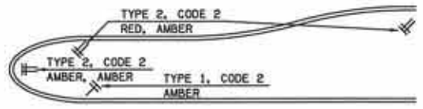
CHANNEL BEAM HANDRAIL "H" BEAM POST

GALVANIZED STEEL ANGLES
5/16" MINIMUM THICKNESS
WEIGHT PER M= 2.75 lbs/ft.

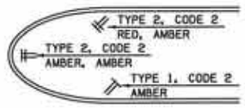
CHANNEL BEAM GUARD RAIL "H" BEAM POST

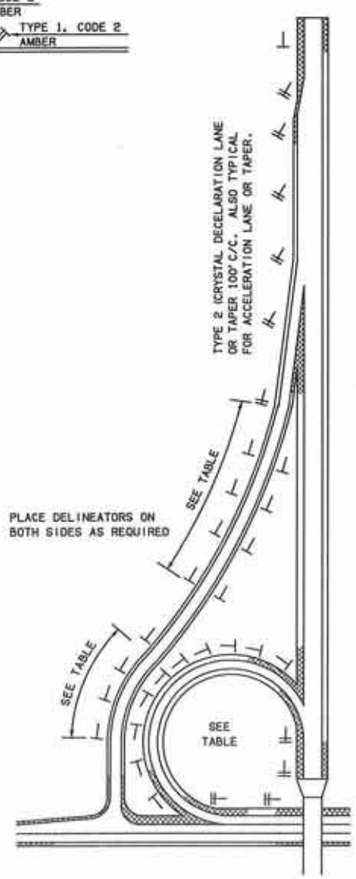
NOTE 2:
FOR ATTACHING DELINEATOR POSTS TO GALVANIZED STEEL ANGLES, USE 5/16" X 3/4" GALVANIZED STEEL BOLTS. FOR ATTACHING DELINEATORS POST OR GALVANIZED STEEL ANGLES TO ALUMINUM OR "H" BEAM HANDRAIL POST, USE 5/16" X 1" GALVANIZED STEEL BOLTS. FOR ATTACHING GALVANIZED STEEL ANGLES TO CONCRETE POSTS,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

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





TYPICAL DELINEATOR SPACING FOR INTERCHANGE RAMPS

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 W1-8 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'

REVISIONS	
DESCRIPTION	DATE

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 CUIRVES HAVING A RADIUS OF 2500' OR LESS.

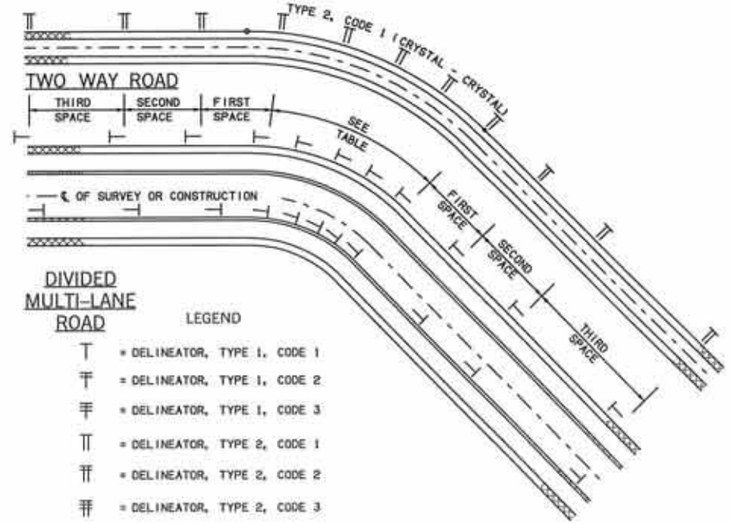
ON TWO-WAY ROADWAYS, CONSTRUCT BI-DIRECTIONAL TYPE 2, CODE 1 DELINEATORS ON OUTSIDE OF CURVES HAVING A RADIUS OF 2500' OR LESS.

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

T = DELINEATOR, TYPE 1, CODE 2

T = DELINEATOR, TYPE 1, CODE 3

T = DELINEATOR, TYPE 2, CODE 1

T = DELINEATOR, TYPE 2, CODE 2

T = DELINEATOR, TYPE 2, CODE 3

$\frac{\text{LENGTH OF CURVE}}{\text{REQUIRED SPACING}} + T =$ TOTAL POSTS REQUIRED FOR CURVE AND RUNOUT SPACINGS

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
853	DELINEATORS	EA

APPROVED BY TRAFFIC ENGINEER: David Shanks DATE: 8/5/10

TRAFFIC STANDARD

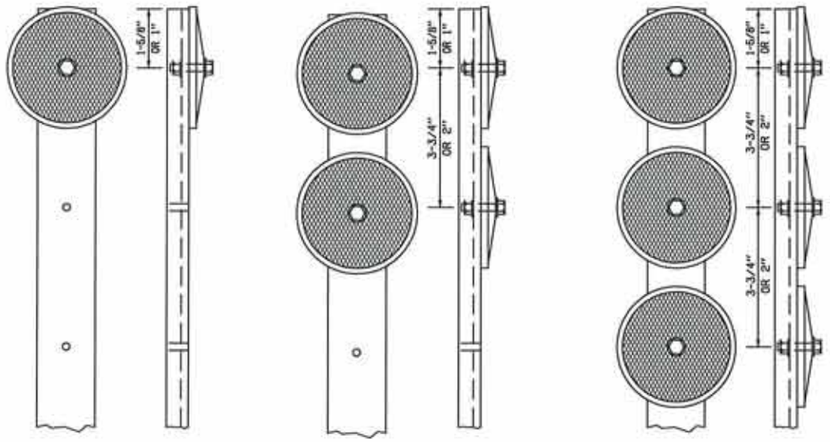
STANDARD DELINEATOR UNITS

2009 SPECIFICATIONS

DU1-1 | 00

T-109

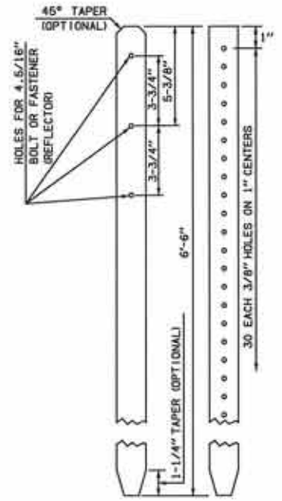
REVISIONS		
DESCRIPTION		DATE



TYPE 1
CODE 1

TYPE 1
CODE 2

TYPE 1
CODE 3

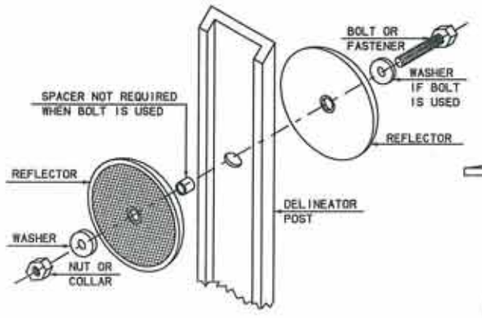


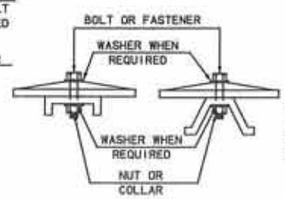
TYPE 2 DELINEATORS SHALL BE THE SAME AS SHOWN ABOVE EXCEPT THAT REFLECTORS ARE MOUNTED ON BOTH SIDES OF THE POST. COLOR OF THE REFLECTORS SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST REVISION.

MATERIALS SPECIFICATIONS

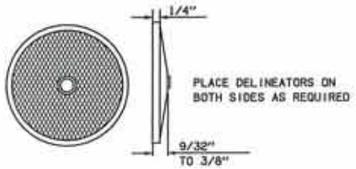
THE WEIGHT OF EACH POST BEFORE GALVANIZING & PUNCHING SHALL BE 1.12 lbs/ft. THE WEIGHT TOLERANCE SHALL BE ±3-1/2%.

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

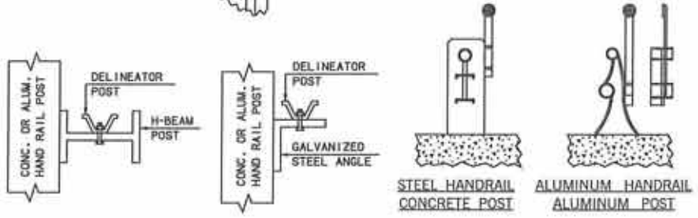




NOTE 3:
WHEN BOLTS AND NUTS ARE USED FOR DELINEATOR ASSEMBLIES, THE BOLT ENDS ARE TO BE SUFFICIENTLY DEFORMED TO RESIST VANDALISM. SEE NOTE 1 FOR FASTENING DEVICES.

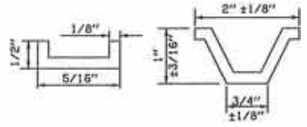


CENTER MOUNT REFLECTOR



STEEL HANDRAIL
CONCRETE POST

ALUMINUM HANDRAIL
ALUMINUM POST



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 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.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
853	DELINEATORS	EA

APPROVED BY TRAFFIC ENGINEER: [signature] DATE: 8/5/10

TRAFFIC STANDARD

STANDARD DELINEATOR UNITS

2009 SPECIFICATIONS

DU2-1	00

T-110

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

REVISIONS	
DESCRIPTION	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 THIER 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 THIER 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: _____ DATE: 3/21/11

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL CONSTRUCTION NOTES

2009 SPECIFICATIONS

TCS1-1	01
	T-501

$$date$$

REVISIONS		
DESCRIPTION		DATE

TAPER LENGTH CRITERIA FOR WORK ZONES

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

NOTES:

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

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

L = TAPER LENGTH IN FEET

W = WIDTH OF OFFSET IN FEET

S = POSTED SPEED OR OFF-PEAK 85 PERCENTILE SPEED IN MPH

TYPE OF TAPER	TAPER LENGTH
UPSTREAM TAPERS	
MERGING TAPER	L MINIMUM
SHIFTING TAPER	1/2 L MINIMUM
SHOULDER TAPER	1/3 L MINIMUM
TWO-WAY TRAFFIC TAPER	100 FEET MAXIMUM
DOWNSTREAM TAPERS (USE IS OPTIONAL)	100 FEET PER LANE

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.

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.

RECOMMENDED DISTANCE BETWEEN SIGNS (MIN.)

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

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. "

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°
		R.	382	521	716	955	1146	1433	1910	2292	2865	3183
20	32		219	256	301	348	382	427	493	541	605	637
30	42		250	293	344	398	437	489	565	619	692	730
40	52		277	325	382	443	485	543	628	688	770	812
50	62		301	354	417	483	529	593	685	751	841	886
60	72		324	381	448	519	570	638	738	809	905	955
70	82		344	405	478	554	608	681	787	863	966	1,018
80	92		363	428	505	586	643	720	833	914	1,023	1,078
90	102		381	450	531	616	676	758	877	962	1,076	1,135
100	112		398	470	555	644	708	793	918	1,007	1,127	1,189
110	122		414	489	578	672	738	827	958	1,050	1,176	1,240
120	132		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: Chad Grant DATE: 6/23/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD

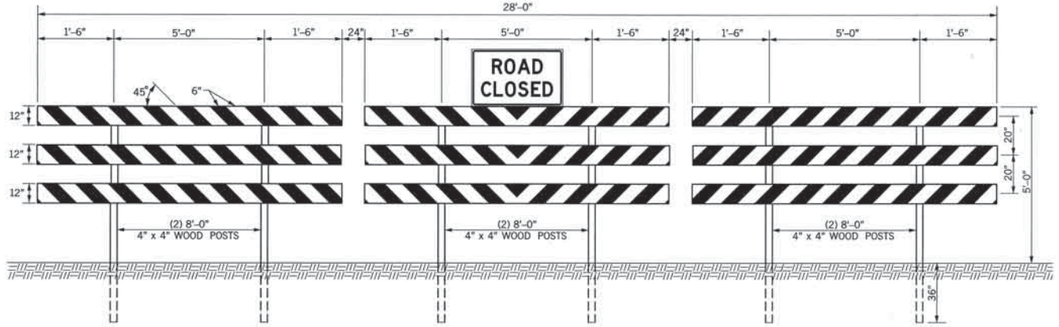
TRAFFIC CONTROL TABLES AND CHARTS

2009 SPECIFICATIONS

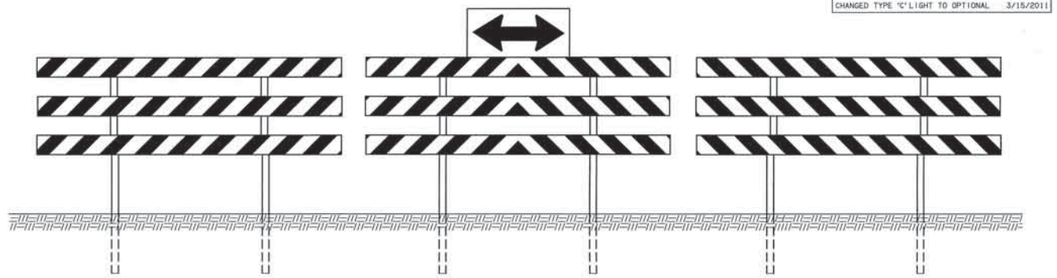
TCS2-1 | 00

T-502

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



WHEN ROAD ENDS



FOR T-INTERSECTIONS

PERMANENT TYPE III(A/B) BARRICADE

(DIMENSIONS ARE TYPICAL FOR BOTH BARRICADES)

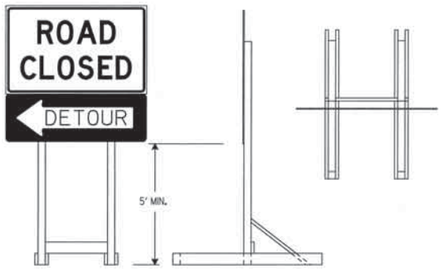
NOTES: A PERMANENT BARRICADE TYPE III(A) SHALL CONSIST OF NINE (9) PANELS AND SIX (6) POSTS.

TYPICAL INSTALLATION AS SHOWN IS FOR AN ABSOLUTE CLOSURE.

BARRICADES SHOULD NOT BE PLACED PARALLEL TO TRAFFIC IF NOT OUTSIDE OF CLEAR ZONE.

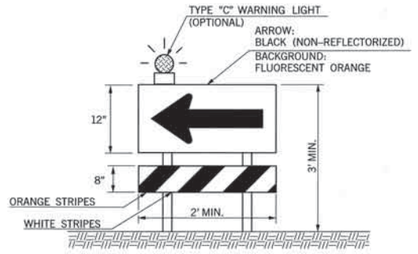
PERMANENT BARRICADE TYPE III(B) WILL BE IDENTICAL TO TYPE III(A) WITH NINE (9) ADDITIONAL RETROREFLECTORIZED 3/4"x12" LUMBER PANELS ATTACHED TO THE BACK SIDE OF THE BARRICADE.

COLOR: BACKGROUND – WHITE (REFLECTORIZED)
DIAGONAL STRIPES – RED (REFLECTORIZED)

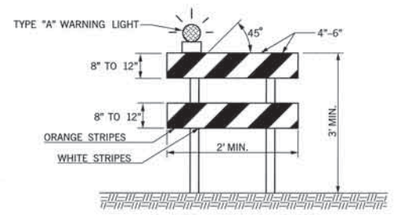


Skid-Mounted
Sign Support
with plywood sign

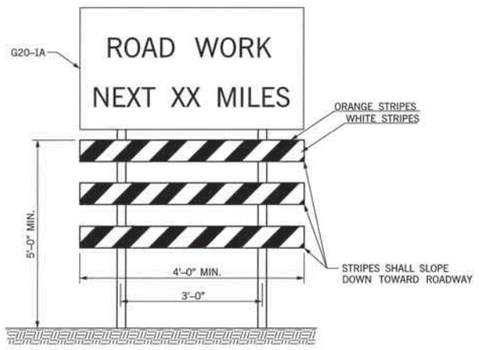
LONG/INTERMEDIATE TERM STATIONARY
PORTABLE SIGN SUPPORTS
5 Foot Mounting Height
(SKID MOUNTED)
(SHALL BE PLACED BEHIND TYPE III BARRICADE)



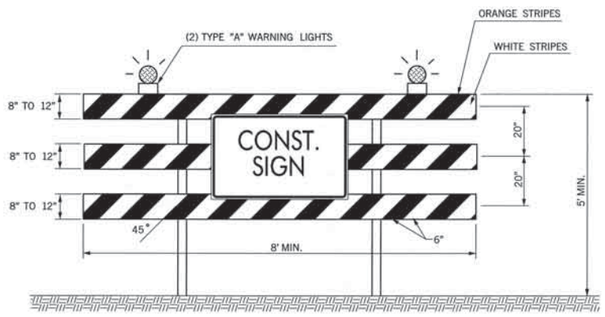
DIRECTION INDICATOR
BARRICADE



TYPE II BARRICADE



WING BARRICADE



TYPE III 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, RETRO-REFLECTIVE 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.

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

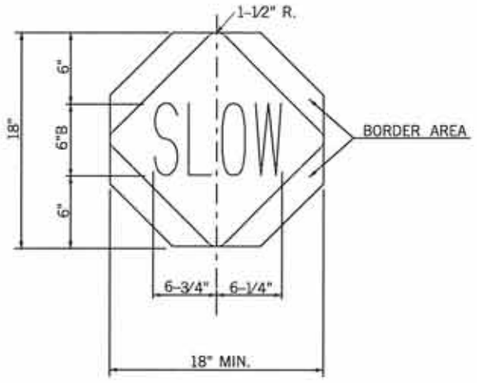
2009 SPECIFICATIONS

TCS4-1	01
	T-504

$$date$$

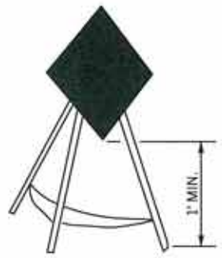
DESCRIPTION	REVISIONS	DATE

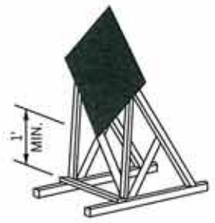
STOP:
LEGEND AND BORDER: WHITE (REFLECTORIZED)
BACKGROUND: RED (REFLECTORIZED)

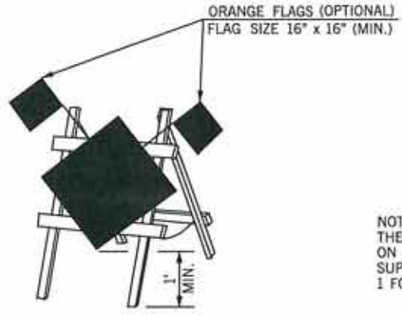


SLOW:
LEGEND AND BORDER AREA: BLACK (NON-REFLECTORIZED)
BACKGROUND: ORANGE (REFLECTORIZED)

STOP–SLOW PADDLE

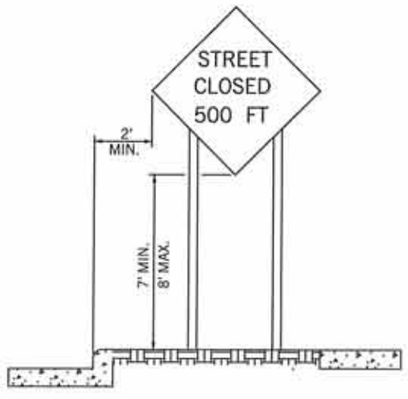




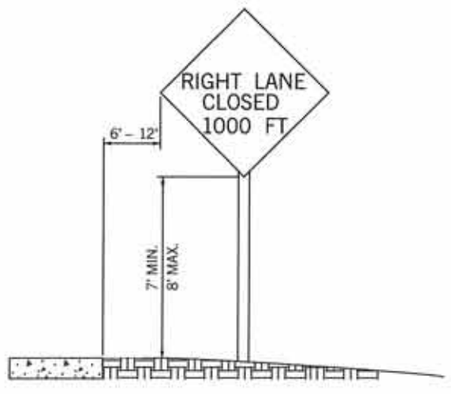


NOTE:
THE BOTTOM OF SIGNS MOUNTED ON BARRICADES OR TEMPORARY SUPPORTS SHALL NOT BE LESS THAN 1 FOOT ABOVE THE TRAVELED WAY.

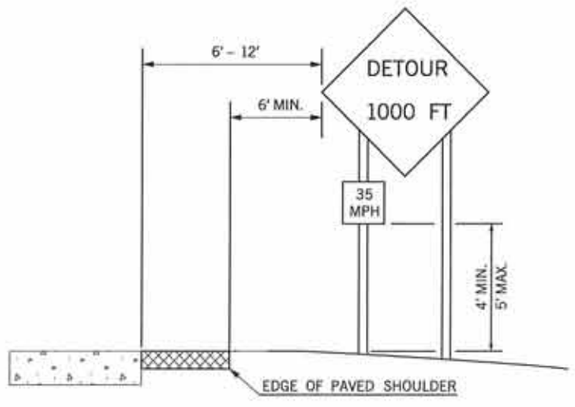
PORTABLE AND TEMPORARY MOUNTINGS
METHODS OF MOUNTING SIGNS OTHER THAN ON POSTS



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 Gerald Smith DATE 6/23/10

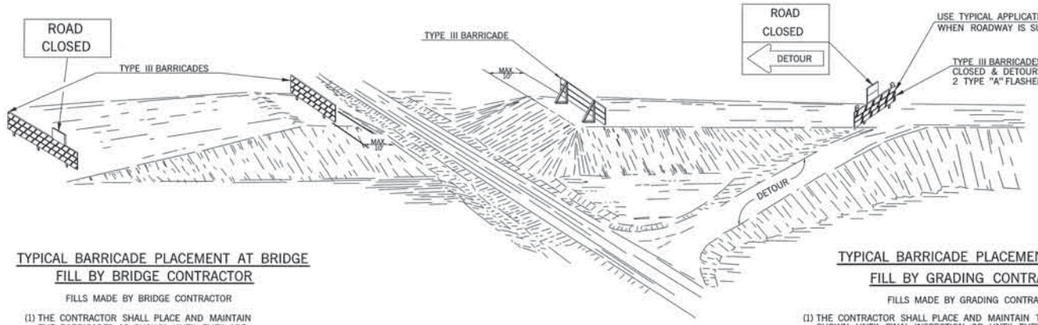
TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
TYPICAL SIGN INSTALLATION

2009 SPECIFICATIONS

TCS5–1	00
	T–505

TRFPC36 M:\2009_Standards_TC\t505.dgn 8:16:51 AM 6/2/2010 d:\usr2\flib\leroyh.pen R:\TRAF_PLOT\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.

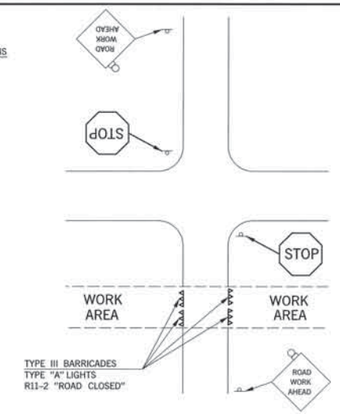
(2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO REMOVAL OF THE BARRICADES.

(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) SUFFICENT 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

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.

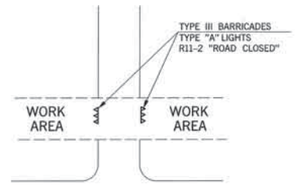
(4) PLACEMENT OF TYPE III BARRICADES SHALL BE APPROVED BY THE ENGINEER.

(5) TYPE II BARRICADES, DRUMS AND/OR VERTICAL PANELS MAY BE SUBSTITUTED FOR TYPE III BARRICADES TO AVOID OBSTRUCTING THE MOTORISTS VIEW.

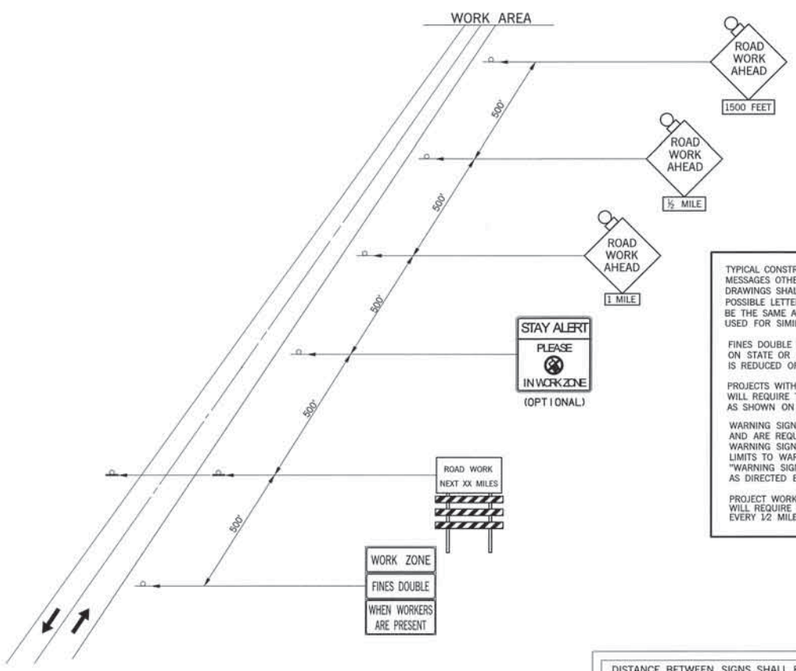
(6) IF TWO OR MORE DRIVEWAYS ARE IN CLOSE PROXIMITY, THE BARRICADES BETWEEN THE DRIVEWAYS MAY BE OMITTED AT THE DISCRETION OF THE ENGINEER.

(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.

REVISIONS	
DESCRIPTION	DATE
MODIFIED NOTE	3/15/2011
ADD "NO CELL PHONE" USAGE IN WORK ZONE, DISTANCE SIGN TO WARNING SIGNS	4/2/2013



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.

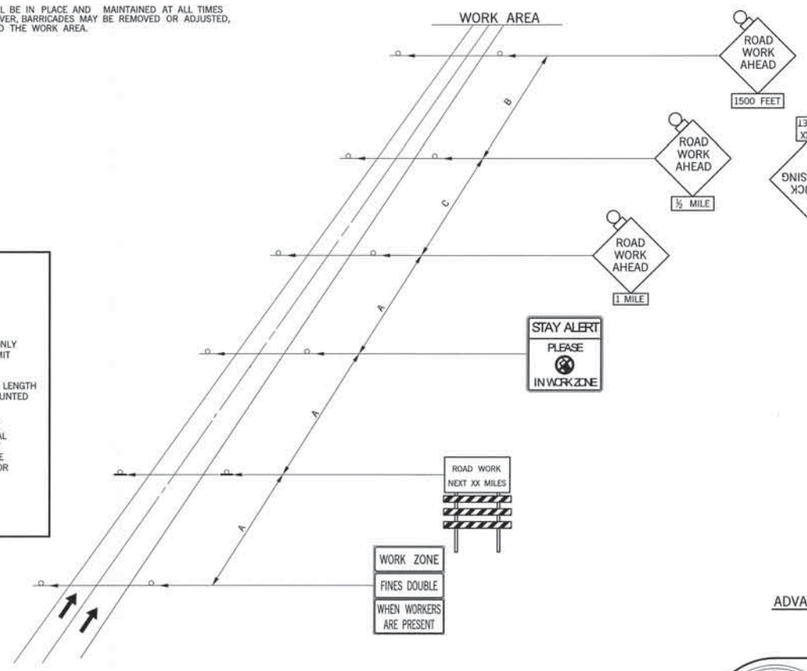
FINES DOUBLE IN WORK ZONE SIGNS ARE TO BE USED ONLY ON STATE OR FEDERAL HIGHWAYS WHERE THE SPEED LIMIT IS REDUCED OR AS DIRECTED BY THE ENGINEER.

PROJECTS WITH WORK LIMITS OF 1.0 MILES OR MORE IN LENGTH WILL REQUIRE THE G20-1A SIGN. THE SIGN SHALL BE MOUNTED AS SHOWN ON TCS4-1-(LATEST REVISION).

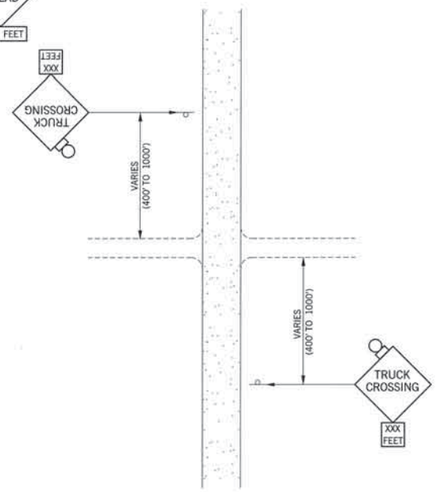
WARNING SIGNS SHOWN ARE "ADVANCE" WARNING SIGNS AND ARE REQUIRED ON ALL STATE HIGHWAYS. ADDITIONAL WARNING SIGNS MAY BE REQUIRED WITHIN THE PROJECT LIMITS TO WARN DRIVERS OF SPECIFIC HAZARDS. ADVANCE "WARNING SIGNS" MAY CHANGE AS CONDITIONS CHANGE OR AS DIRECTED BY THE ENGINEER.

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.

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



TYPICAL APPLICATION ADVANCE WARNING SIGNS ON A DIVIDED HIGHWAY



TYPICAL APPLICATION ADVANCE SIGNING WHERE TRUCKS ARE CROSSING

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 4/8/2013

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD PLACEMENT OF ADVANCE WARNING SIGNS

2009 SPECIFICATIONS

TCS7-1	02
	T-507

$$date$$

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)

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)

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)

KEEP RIGHT SIGN

R4-7	24 x 30	5.00 SF
R4-7E	36 x 48	12.00 SF
R4-7F	48 x 60	20.00 SF

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

KEEP LEFT SIGN

R4-8	24 x 30	5.00 SF
R4-8E	36 x 48	12.00 SF
R4-8F	48 x 60	20.00 SF

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

KEEP RIGHT

R4-7a(R)	24 x 30	5.00 SF
R4-7a(R)E	36 x 48	12.00 SF
R4-7a(R)F	48 x 60	20.00 SF

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

KEEP LEFT

R4-7a(L)	24 x 30	5.00 SF
R4-7a(L)E	36 x 48	12.00 SF
R4-7a(L)F	48 x 60	20.00 SF

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

DO NOT ENTER

R5-1	30 x 30	6.25 SF
R5-1E	36 x 36	9.00 SF
R5-1F	48 x 48	16.00 SF

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

ONE WAY

R6-1(L)	36 x 12	3.00 SF
R6-1E(L)	54 x 18	6.75 SF
R6-1F(L)	54 x 18	6.75 SF

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

ONE WAY

R6-1(R)	36 x 12	3.00 SF
R6-1E(R)	54 x 18	6.75 SF
R6-1F(R)	54 x 18	6.75 SF

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

STOP HERE ON RED

R10-6	24 x 36	6.00 SF

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

REVISIONS		
DESCRIPTION		DATE

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

APPROVED BY TRAFFIC ENGINEER Chad Smith DATE 6/23/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS8-1	00
T-508	

TRFPC36 M:\2009 Standards TC\t508.dgn 8:18:06 AM 6/2/2010 d:\usr2\fib\leroyh.pen R:\TRAF PLOT\bw.tbl

ROAD CLOSED

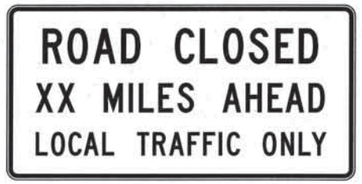
R11-2 48 x 30 10.00 SF

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

LANE CLOSED

R11-2(LANE) 48 x 30 10.00 SF

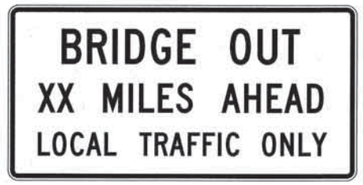
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



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)

REVISIONS	
DESCRIPTION	DATE
CHANGED SIGN DESIGNATION	3/15/2011

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

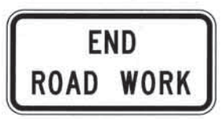
M4-10(L) 48 x 18 6.00 SF

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:
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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: _____ DATE: 3/21/11

TRAFFIC STANDARD

TRAFFIC CONTROL STANARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS9-1 | 01

T-509

$$date$$

TURN LEFT

W1-1(L) 48 x 48 16.00 SF

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

TURN RIGHT

W1-1(R) 48 x 48 16.00 SF

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

CURVE LEFT

W1-2(L) 48 x 48 16.00 SF

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

CURVE RIGHT

W1-2(R) 48 x 48 16.00 SF

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

LEFT REVERSE TURN

W1-3(L) 48 x 48 16.00 SF

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

RIGHT REVERSE TURN

W1-3(R) 48 x 48 16.00 SF

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

LEFT REVERSE CURVE

W1-4(L) 48 x 48 16.00 SF

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

RIGHT REVERSE CURVE

W1-4(R) 48 x 48 16.00 SF

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

LEFT REVERSE CURVE

W1-4B(L) 48 x 48 16.00 SF

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

RIGHT REVERSE CURVE

W1-4B(R) 48 x 48 16.00 SF

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

LEFT REVERSE CURVE

W1-4C(L) 48 x 48 16.00 SF

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

RIGHT REVERSE CURVE

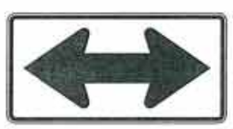
W1-4C(R) 48 x 48 16.00 SF

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

ARROW

W1-6 48 x 24 8.00 SF
W1-6E 60 x 30 12.50 SF

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



DOUBLE ARROW

W1-7 48 x 24 8.00 SF
W1-7E 60 x 30 12.50 SF

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

REVISIONS	
DESCRIPTION	DATE

NOTES:
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ALL DIAMOND SHAPE CONSTRUCTION WARNING SIGNS SHALLBE 48 INCHES X 48 INCHES UNLESS OTHERWISE NOTED IN THE PLANS.

* SUPPLEMENTAL SIGNS SHALL ONLY BE USED IN CONJUCTION 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.

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

APPROVED BY TRAFFIC ENGINEER: Ronald Sman DATE: 6/25/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS10-1 00

T-510

CHEVRON

W1-8	18 x 24	3.00 SF
W1-8E	30 x 36	7.50 SF
W1-8F	36 x 48	12.00 SF

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

STOP AHEAD

W3-1 48 x 48 16.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)
SYMBOL:
WHITE BORDER ON RED BACKGROUND
(REFLECTORIZED)

YIELD AHEAD

W3-2 48 x 48 16.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)
SYMBOL:
WHITE BORDER ON RED BACKGROUND
(REFLECTORIZED)

SIGNAL AHEAD

W3-3 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)
R = RED (REFLECTORIZED)
Y = YELLOW (REFLECTORIZED)
G = GREEN (REFLECTORIZED)

BE PREPARED TO STOP SIGN

W3-4 48 x 48 16.00 SF

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

SPEED REDUCTION

W3-5 48 x 48 16.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)
SYMBOL:
BLACK BORDER AND TEXT ON
WHITE BACKGROUND (REFLECTORIZED)

LEFT LANE ENDS

W4-2(L) 48 x 48 16.00 SF

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

RIGHT LANE ENDS

W4-2(R) 48 x 48 16.00 SF

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

ROAD NARROWS

W5-1 48 x 48 16.00 SF

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

NARROW BRIDGE

W5-2 48 x 48 16.00 SF

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

ONE LANE BRIDGE

W5-3 48 x 48 16.00 SF

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

DIVIDED HIGHWAY

W6-1 48 x 48 16.00 SF

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

DIVIDED HIGHWAY

W6-2 48 x 48 16.00 SF

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

TWO WAY TRAFFIC SIGN

W6-3 48 x 48 16.00 SF

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

REVISIONS	
DESCRIPTION	DATE
CHANGE DESIGN NUMBER	07/19/10

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

APPROVED BY TRAFFIC ENGINEER: [signature] DATE: 5/6/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS11-1 | 01

T-511

REVISIONS	
DESCRIPTION	DATE

ROAD WORK SIGN

W20-1 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DETOUR SIGN

W20-2 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

ROAD CLOSED SIGN

W20-3 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

STREET CLOSED SIGN

W20-3A 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

ONE LANE ROAD SIGN

W20-4 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

LEFT LANE CLOSED SIGN

W20-5(L) 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

RIGHT LANE CLOSED SIGN

W20-5(R) 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

FLAGGER SIGN

W20-7 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

FLAGGER SIGN

W20-7a 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

WORKERS SIGN

W21-1 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

FRESH OIL SIGN

W21-2 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

ROAD MACHINERY AHEAD SIGN

W21-3 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

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BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD

APPROVED BY TRAFFIC ENGINEER [signature] DATE 6/23/10

TRAFFIC STANDARD

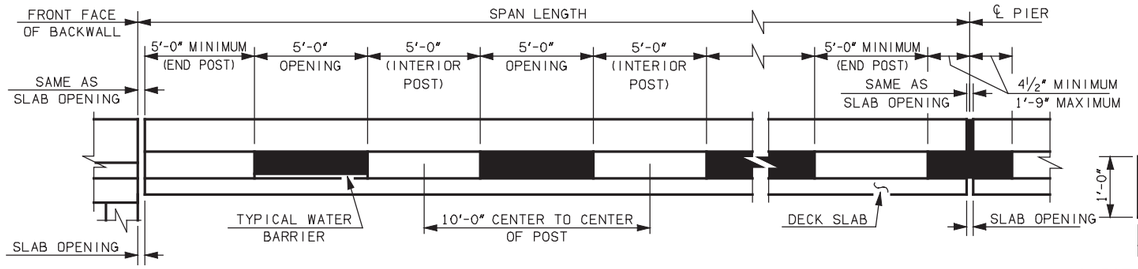
TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS14-1 00

T-514

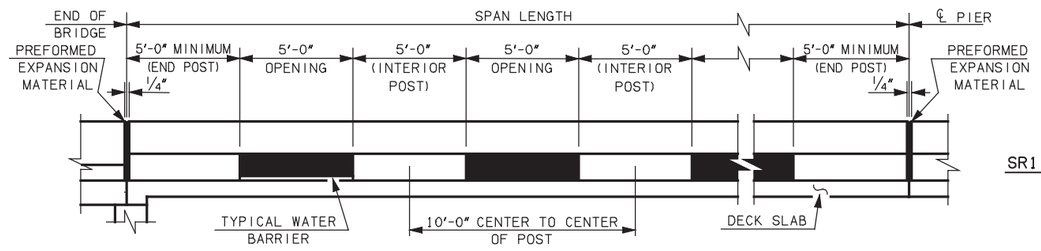
REVISIONS		
DESCRIPTION		DATE



AT EXPANSION ABUTMENTS

AT EXPANSION PIERS

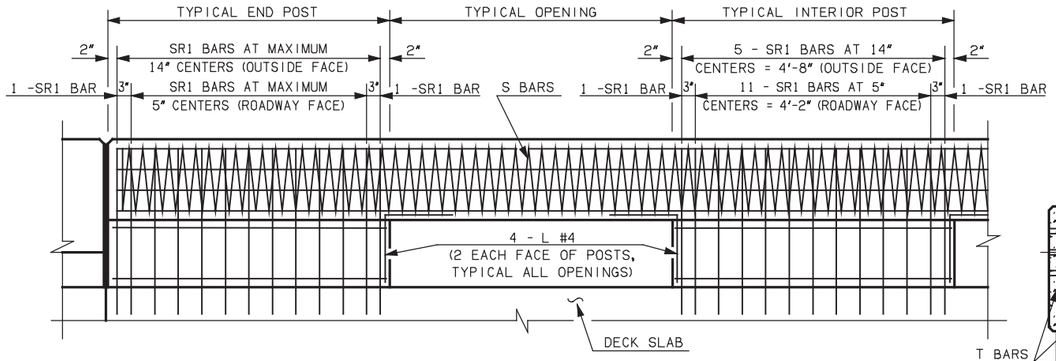
ELEVATION OF RAIL WITH EXPANSION JOINTS



AT FIXED ABUTMENTS

AT FIXED PIERS

ELEVATION OF RAIL WITH FIXED JOINTS



TRAFFIC RAIL REINFORCING

SECTION THRU POST OPENING

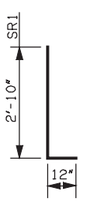
SECTION THRU POST

SECTION THRU RAIL AT BRIDGE DECK OR APPROACH SLAB

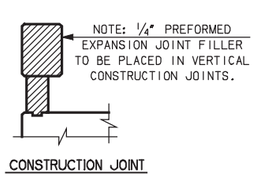
SIBAR

L BAR #4 x 2'-0"

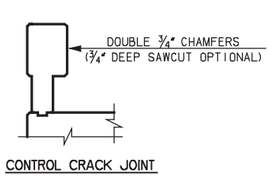
T BARS #4 x 6'-10"



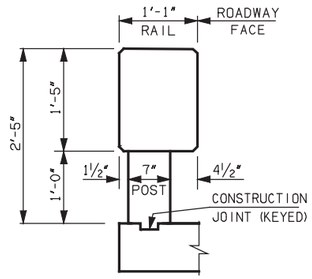
SR1 BARS #5 x 3'-10"



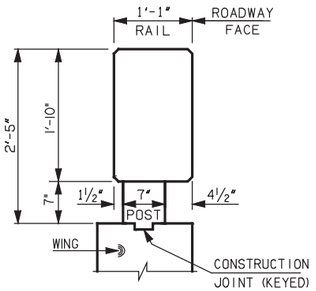
CONSTRUCTION JOINT



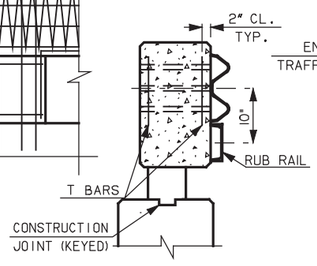
CONTROL CRACK JOINT



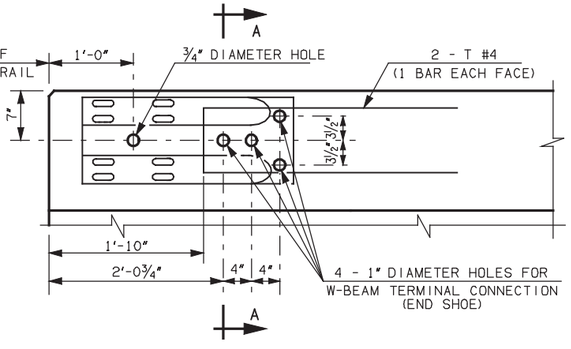
TRAFFIC RAIL DETAIL



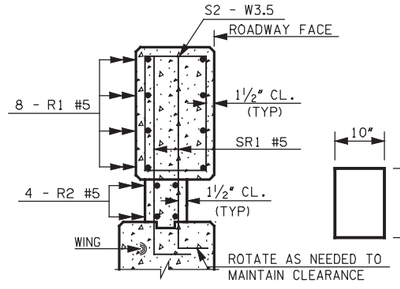
TRAFFIC RAIL DETAIL AT WING



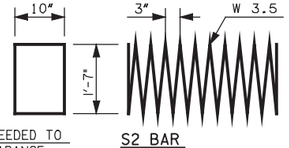
SECTION "A-A"



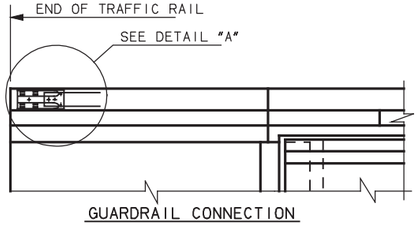
DETAIL "A"



TRAFFIC RAIL SECTION AT WING



S2 BAR



GUARDRAIL CONNECTION

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)".

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

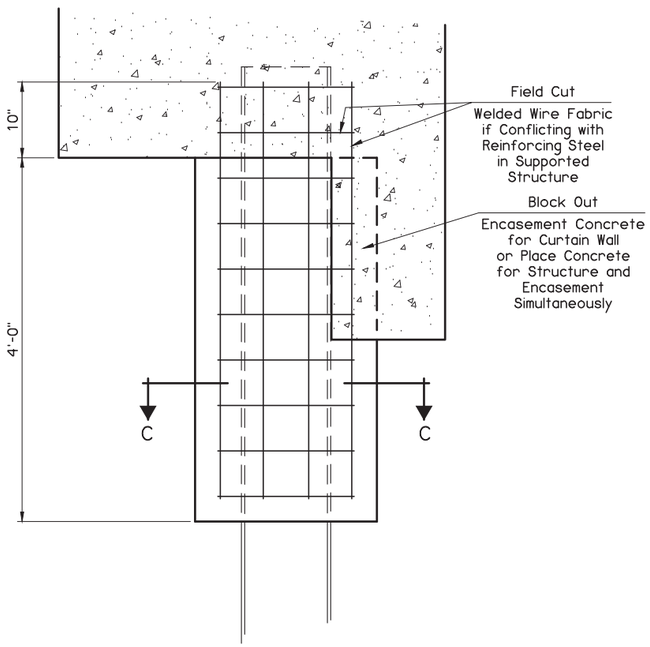
APPROVED BY BRIDGE ENGINEER: [signature] DATE: 1/1/18

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

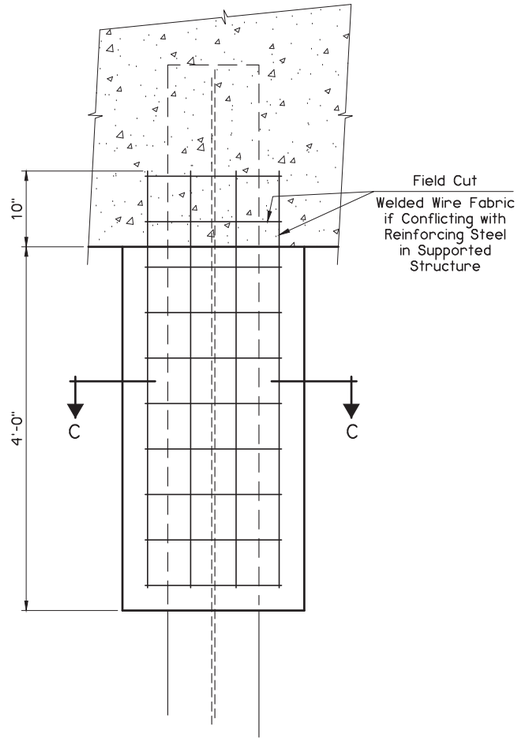
CONCRETE RAIL (TR3)

2009 SPECIFICATIONS

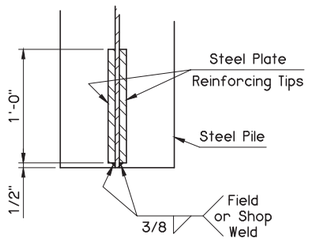
TR3-2 | 01E
B-01E



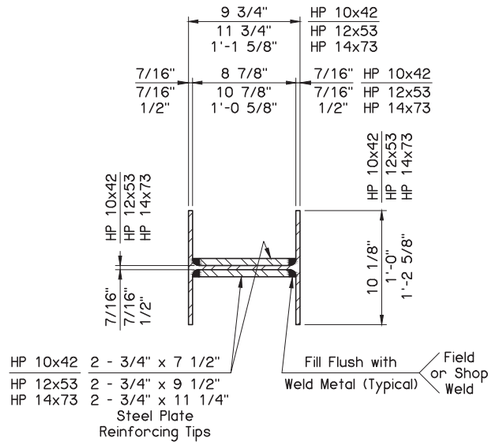
ELEVATION AT CURTAIN WALL



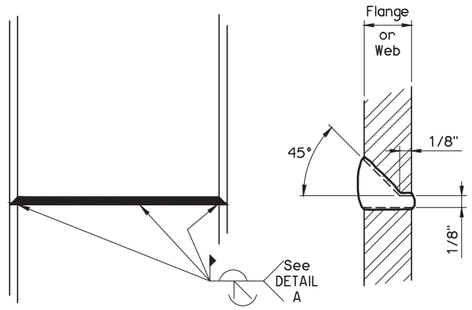
TYPICAL ELEVATION



SECTION A-A



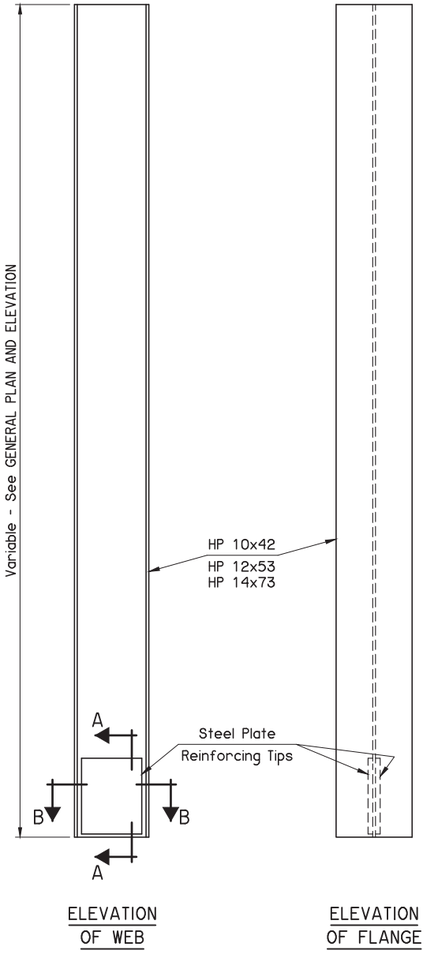
SECTION B-B



DETAIL OF WELDED SPLICE

DETAIL A

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

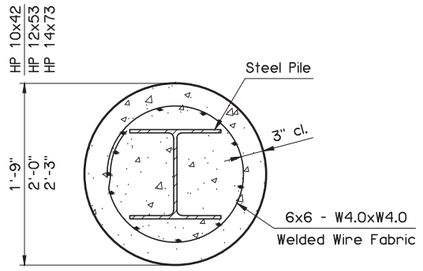


ELEVATION OF WEB

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.



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.

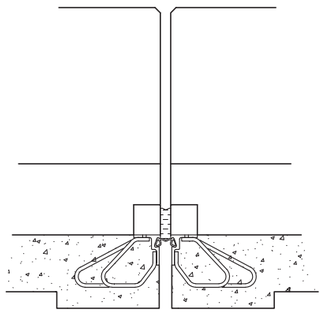
PILE ENCASEMENT QUANTITIES PER PILE				
ITEM	UNIT	HP 10x42	HP 12x53	HP 14x73
CLASS A CONCRETE	C.Y.	0.34	0.45	0.57
REINFORCING STEEL	LB.	16.2	18.3	20.3

APPROVED BY BRIDGE ENGINEER DATE 12-20-16

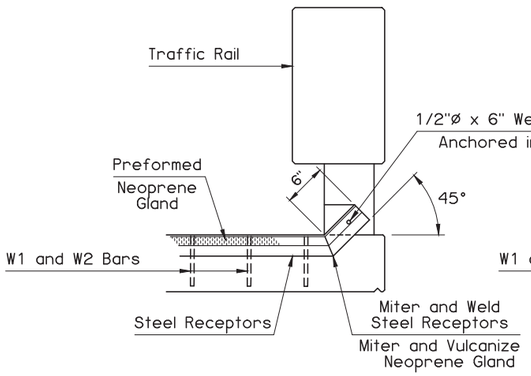
OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

STEEL PILING

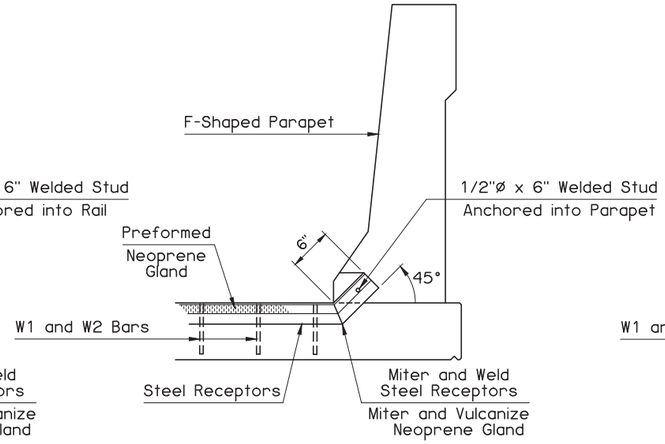
2009 SPECIFICATIONS	HP1-2	01E
		B-11E



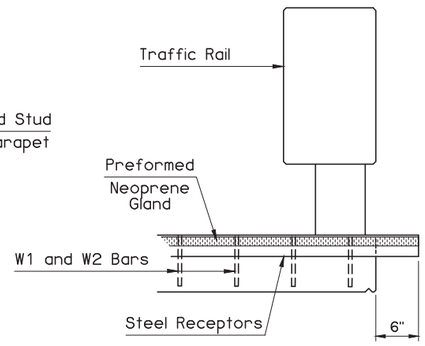
ELEVATION
WITHOUT OPENINGS



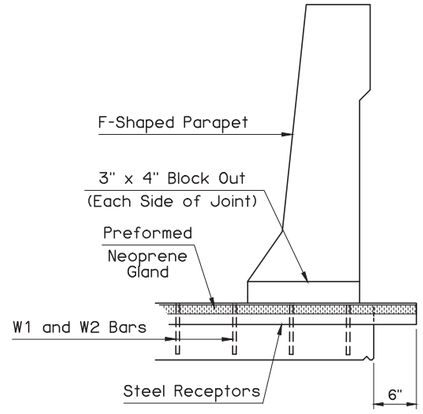
SECTION AT TRAFFIC RAIL
WITHOUT OPENINGS



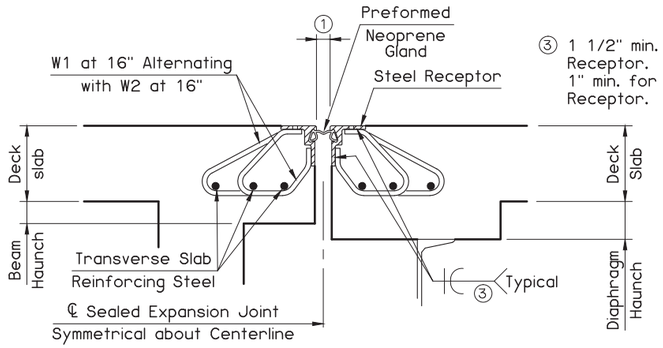
SECTION AT F-SHAPED PARAPET
WITHOUT OPENINGS



SECTION AT TRAFFIC RAIL
WITH OPENINGS

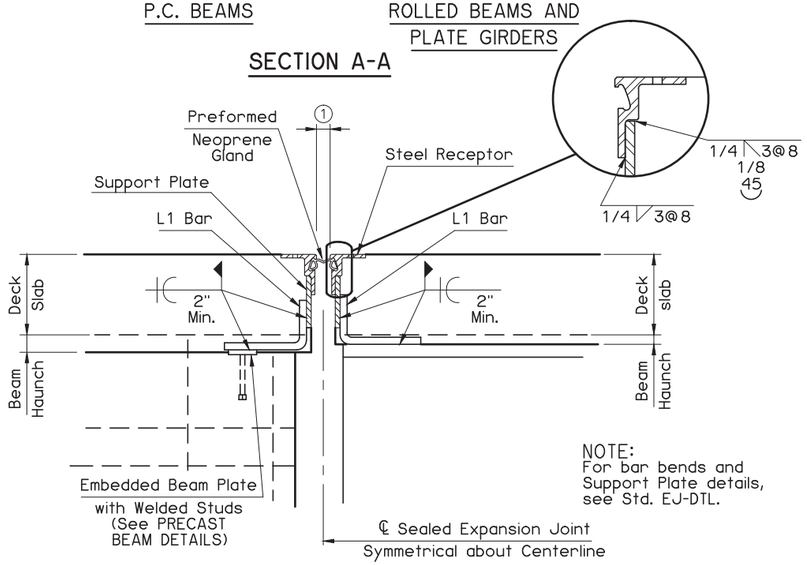


SECTION AT F-SHAPED PARAPET
WITH OPENINGS



P.C. BEAMS ROLLED BEAMS AND PLATE GIRDERS

SECTION A-A



P.C. BEAMS ROLLED BEAMS AND PLATE GIRDERS

SECTION B-B

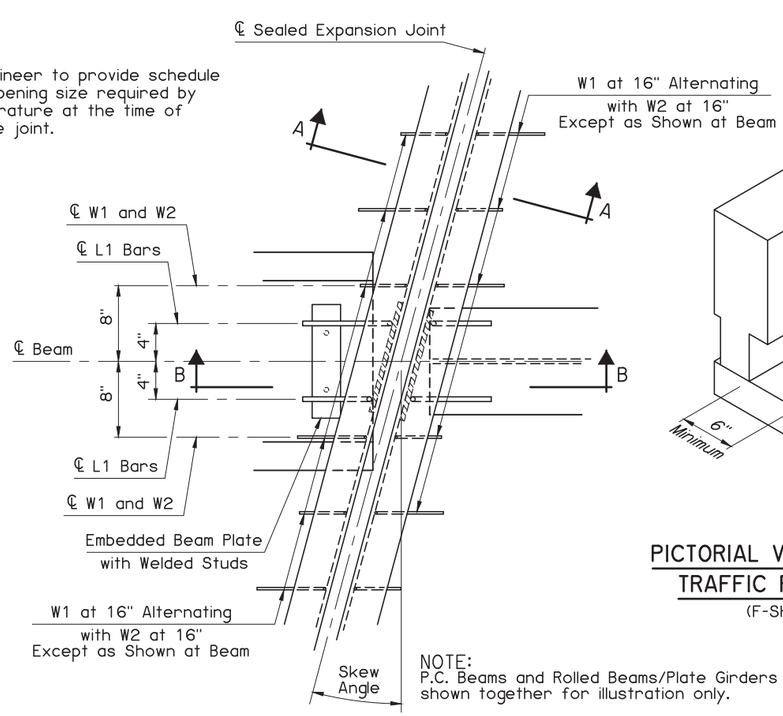
NOTE:
For bar bends and Support Plate details, see Std. EJ-DTL.

TEMPERATURE CHANGE PER EVERY 1/8" CHANGE IN BRIDGE LENGTH ②					
BEAM TYPE	TOTAL EXPANSION LENGTH				
	100'	200'	300'	400'	500'
CONCRETE	17.3°F	8.7°F	5.8°F	4.3°F	3.5°F
STEEL	16.0°F	8.0°F	5.3°F	4.0°F	3.2°F

③ 1 1/2" min. for Type Q Receptor.
1" min. for Type SSCM-OK Receptor.

① Design Engineer to provide schedule of joint opening size required by the temperature at the time of setting the joint.

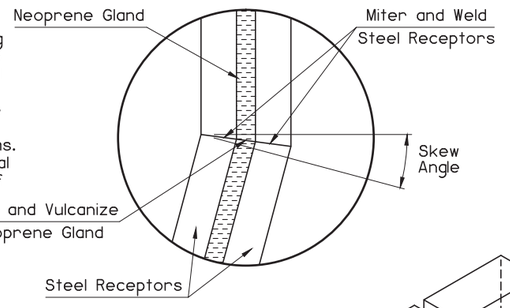
② Table is for assisting in determining joint opening size. A nominal 2" joint opening corresponds to 43°F for new prestressed concrete beams and 60°F for steel beams. Decrease opening as temperature rises and increase as temperature drops.
Measure change in bridge length parallel to beams. For change in joint opening size measured normal to joint, divide temperature change by cosine of skew angle.



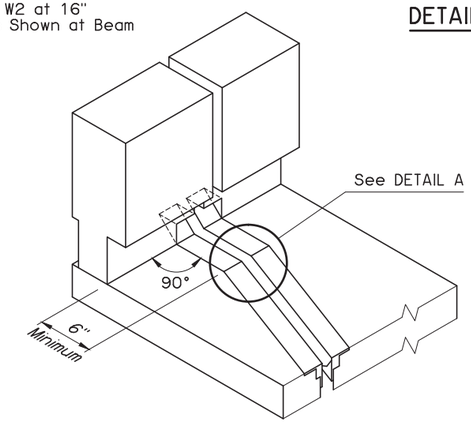
P.C. BEAMS ROLLED BEAMS AND PLATE GIRDERS

PLAN

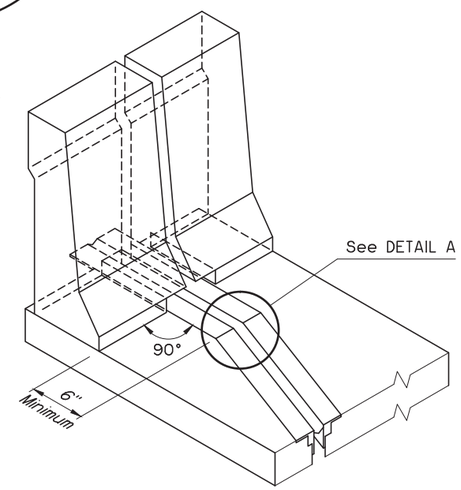
NOTE:
P.C. Beams and Rolled Beams/Plate Girders shown together for illustration only.



DETAIL A



PICTORIAL VIEW OF SEALED JOINT AT
TRAFFIC RAIL WITHOUT OPENINGS
(F-SHAPED PARAPET SIMILAR)



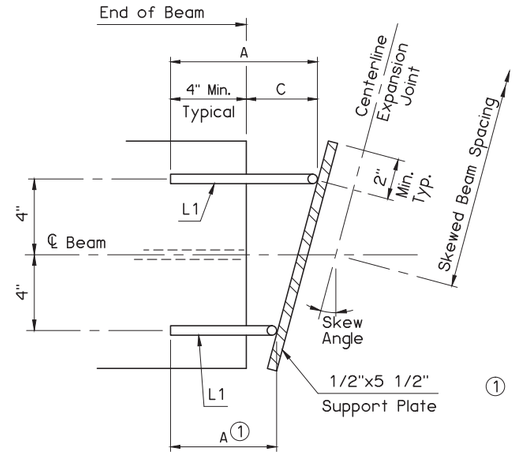
PICTORIAL VIEW OF SEALED JOINT AT
F-SHAPED PARAPET WITH OPENINGS
(TRAFFIC RAIL SIMILAR)

APPROVED BY BRIDGE ENGINEER DATE 12-20-16

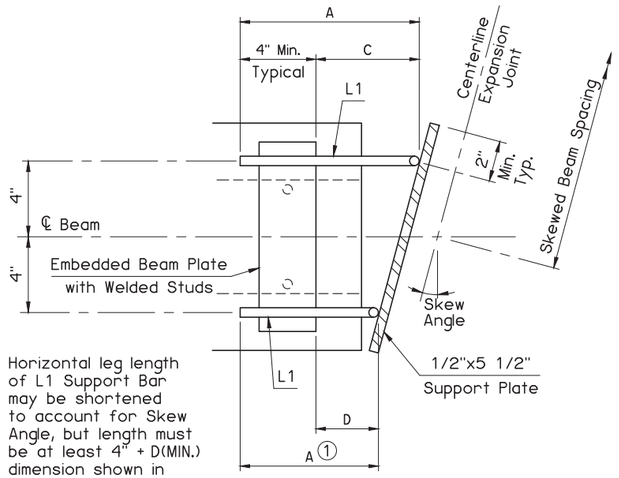
OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

SKEWED SEALED EXPANSION JOINT CONVENTIONAL

2009 SPECIFICATIONS	EJ-SK	04E
		B-09E



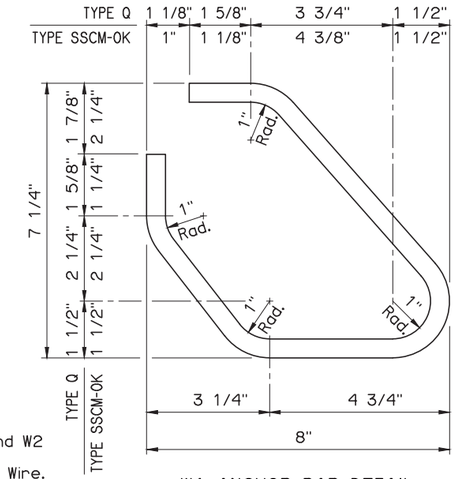
ROLLED BEAMS AND PLATE GIRDERS



① Horizontal leg length of L1 Support Bar may be shortened to account for Skew Angle, but length must be at least 4" + D(MIN.) dimension shown in L1 SUPPORT BAR PIN DIAMETER SCHEDULE.

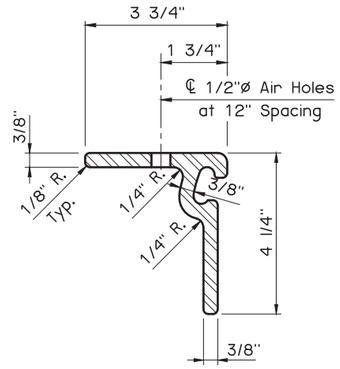
P.C. BEAMS

SUPPORT PLATE SCHEDULE	
SKEW ANGLE	PLATE LENGTH
0°	1'-0"
1° thru 25°	1'-1"
25° thru 35°	1'-2"
35° thru 45°	1'-4"
45° thru 55°	1'-6"
55° thru 60°	1'-8"
60° thru 65°	2'-0"
65° thru 70°	2'-4"



NOTE:
Fabricate W1 and W2 bars from W20 Deformed Steel Wire.

W1 ANCHOR BAR DETAIL



WATSON BOWMAN AND ACME
TYPE Q STEEL EXTRUSION
RECEPTOR DETAIL

SEALED EXPANSION JOINT SUPPORT PLANS

GUIDE FOR SIZING SEALED EXPANSION JOINT SUPPORT MEMBERS

1. After determining Skewed Beam Spacing and C, find Support Bar diameter from L1 SUPPORT BAR DIAMETER SCHEDULE.
2. Knowing Support Bar diameter, find Pin Diameter from L1 SUPPORT BAR PIN DIAMETER SCHEDULE. Adjust the location of the Embedded Beam Plate for P.C. Beams if actual D dimension is less than D(MIN.) scheduled. No check of D(MIN.) from the end of Rolled Beams and Plate Girders is required.
3. Dimension A of Support Bars is 4" minimum plus C or D. Horizontal leg length of L1 Support Bar may be shortened to account for Skew Angle, but length must be at least 4" + D(MIN.) dimension shown in L1 SUPPORT BAR PIN DIAMETER SCHEDULE.
4. Dimension B of Support Bar is dependent upon Haunch Thickness as shown in L1 SUPPORT BAR DIMENSION B SCHEDULE.
5. Length of Support Plate is dependent upon Skew Angle as shown in SUPPORT PLATE SCHEDULE.

L1 SUPPORT BAR DIAMETER SCHEDULE		
SKEWED BEAM SPACING	C (MAX.)	SUPPORT BAR DIAMETER
8'-0" or Less	3"	3/4"
	6"	1"
	1'-3"	1 1/4"
	1'-9"	1 1/2"
	2'-0"	1 3/4"
Over 8'-0" to 11'-0"	3"	3/4"
	6"	1"
	1'-0"	1 1/4"
	1'-6"	1 1/2"
	2'-0"	1 3/4"
Over 11'-0" to 14'-0"	6"	1"
	1'-0"	1 1/4"
	1'-6"	1 1/2"
	1'-9"	1 3/4"
	2'-0"	2"
Over 14'-0" to 20'-0"	3"	1"
	9"	1 1/4"
	1'-3"	1 1/2"
	1'-9"	1 3/4"
	2'-0"	2"
Over 20'-0" to 25'-0"	3"	1"
	6"	1 1/4"
	1'-0"	1 1/2"
	1'-6"	1 3/4"
	2'-0"	2"

L1 SUPPORT BAR PIN DIAMETER SCHEDULE		
SUPPORT BAR DIAMETER	PIN ② DIA.	D ③ (MIN.)
3/4"	2 1/4"	2 3/8"
1"	3"	3"
1 1/4"	3 3/4"	3 5/8"
1 1/2"	4 1/2"	4 1/4"
1 3/4"	5 1/4"	4 7/8"
2"	6"	5 1/2"

L1 SUPPORT BAR DIMENSION B SCHEDULE	
HAUNCH ④ THICKNESS	B ⑤
1"	6 3/4" ⑥
2"	7 1/2" ⑦
3"	8 1/2"
4"	8 1/2"

② Pin Diameter shown is based on ASTM A6, Appendix X4 for Grade 36 steel.

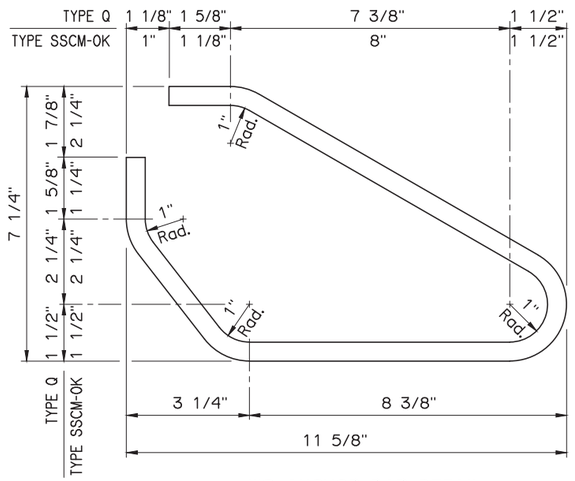
③ D dimension required to maintain minimum weld of Support Bar to Embedded Beam Plate for P.C. Beams.

④ Haunch Thickness measured from top of Beam to bottom of Deck Slab.

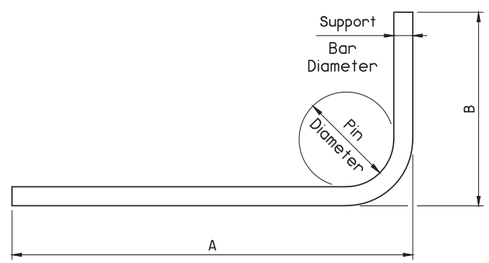
⑤ Dimension B assumes an 8" Deck Slab. If a differenent Deck Slab thickness is used, adjust Dimension B accordingly.

⑥ 1 3/4"ø and 2"ø L1 Support Bars cannot be used with 1" Haunch unless L1 Support Bars are hotbent around 3 1/2"ø Pin maximum.

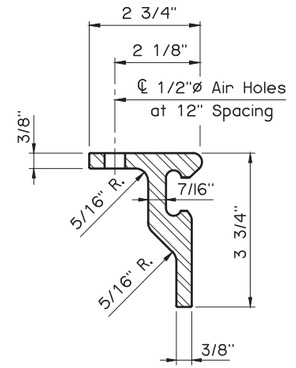
⑦ 2"ø L1 Support Bars cannot be used with 2" Haunch unless L1 Support Bars are hotbent around 5 1/2"ø Pin maximum.



W2 ANCHOR BAR DETAIL



L1 SUPPORT BAR DETAIL



D.S. BROWN
TYPE SSCM-OK STEEL EXTRUSION
RECEPTOR DETAIL

SEALED EXPANSION JOINT NOTES

Use a Sealed Expansion Joint which has a total movement range of 4" and seals the deck to prevent moisture or other contaminants from descending onto the lower structure components.

Provide either the Watson, Bowman and Acme Type Q Steel Extrusion Receptor or the D.S. Brown Type SSCM-OK Steel Extrusion Receptor as shown on this sheet.

MATERIALS

Provide Steel Receptors, Support Plates and L1 Support Bars conforming to AASHTO M270 (ASTM A709), Grade 36, 50 or 50W (Charpy V-Notch testing not required).

Provide W1 and W2 Anchor Bars conforming to AASHTO M225 (ASTM A496). Include all bar dimensions in the shop drawings.

Use Preformed Neoprene Gland lubricant and adhesive in accordance with the manufacturer's published literature.

FABRICATION OF JOINT

Perform welding of Steel Receptors, Support Plates, L1 Support Bars and W1 and W2 Anchor Bars in accordance with Subsection 724.03 of the Specifications.

Apply two shop coats - one an inorganic zinc rich (IZ) primer, the other an inorganic zinc rich (IZ) intermediate coat - to the entire surface of the Steel Receptor, Support Plates, L1 Support Bars and W1 and W2 Anchor Bars. Apply one field application of urethane topcoat to all exposed surfaces after installation. Perform all painting in accordance with Section 512 of the Specifications.

At locations where joint is shown to be mitered at any angle for turn-up at traffic rail or for skew, shop splice Neoprene Gland with heat vulcanizing or other method of equal effectiveness as recommended by the listed joint manufacturer or approved equal and approved by the Engineer.

BASIS OF PAYMENT

The Department will consider the cost of the complete joint including Neoprene Gland, Support Plates, Steel Receptors, L1 Support Bars, W1 and W2 Anchor Bars, welding, equipment, labor and any other incidentals to be included in the contract unit price of SEALED EXPANSION JOINT.

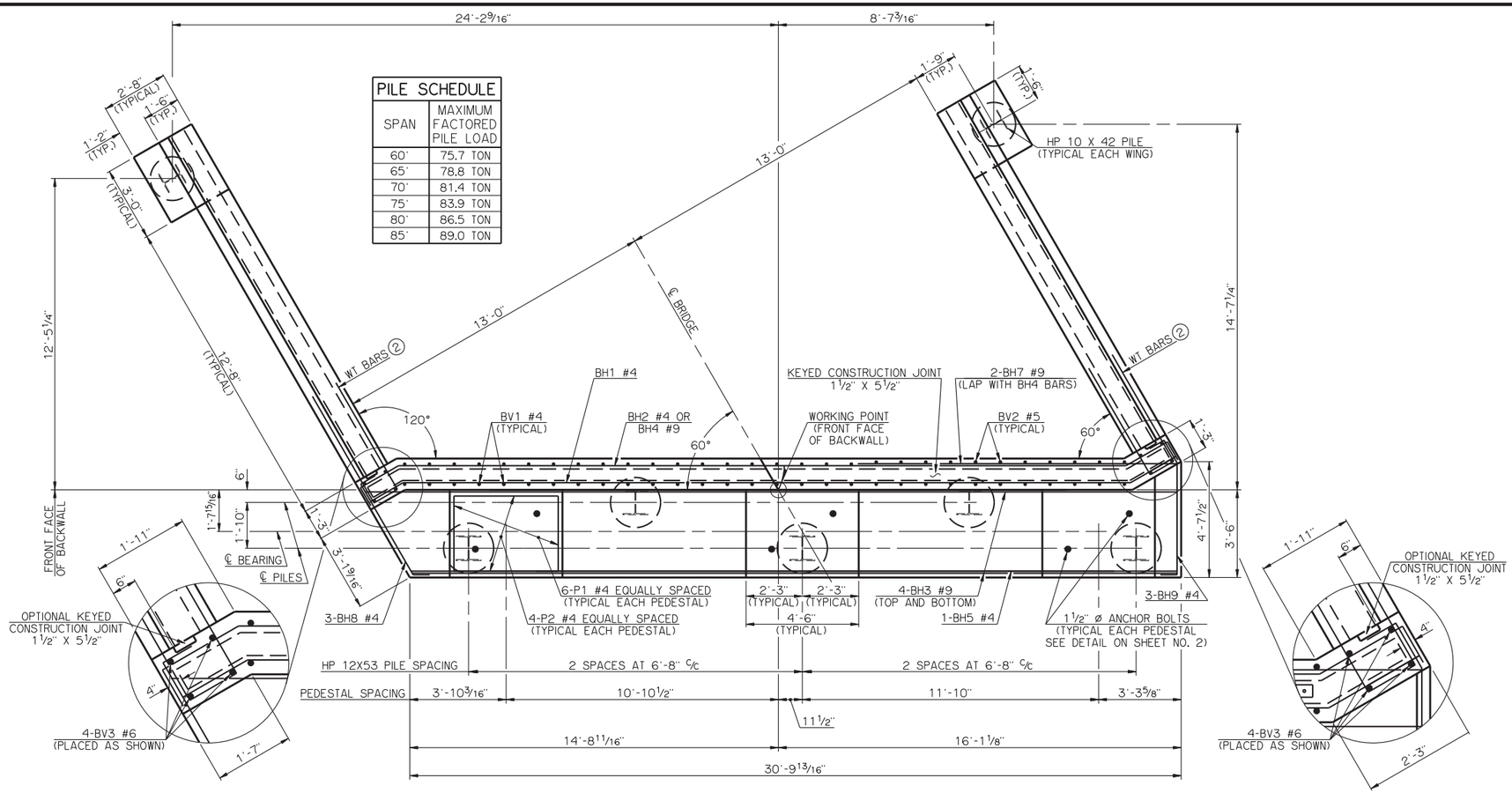
APPROVED BY BRIDGE ENGINEER DATE 12-20-16

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

SEALED EXPANSION JOINT DETAILS

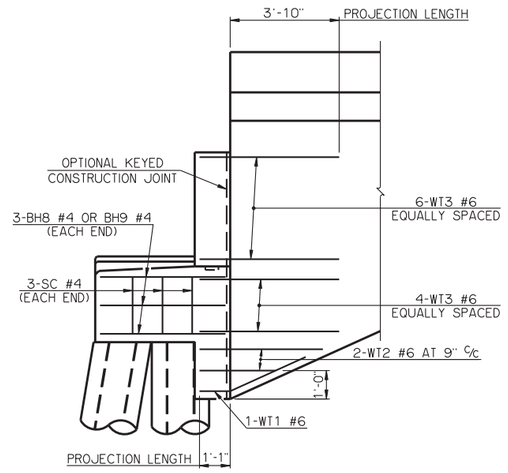
2009 SPECIFICATIONS	EJ-DTL	02E
		B-10E

PILE SCHEDULE	
SPAN	MAXIMUM FACTORED PILE LOAD
60'	75.7 TON
65'	78.8 TON
70'	81.4 TON
75'	83.9 TON
80'	86.5 TON
85'	89.0 TON

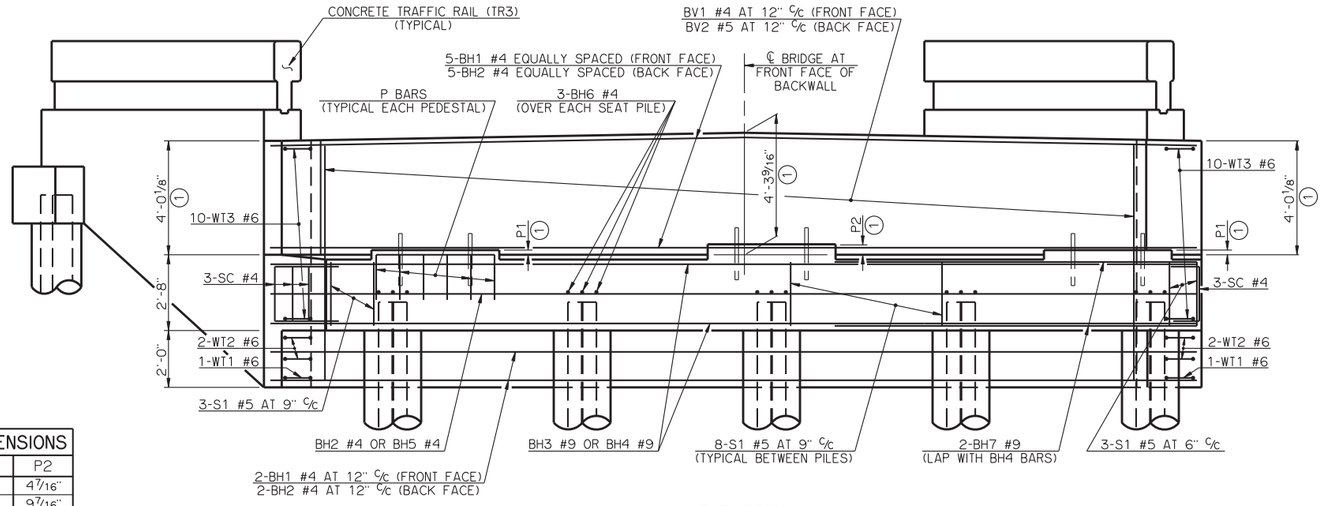


PLAN

LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND



SIDE VIEW



ELEVATION

LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND

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

SUMMARY OF QUANTITIES - ONE ABUTMENT (3)		
ITEM	UNIT	TOTAL
SUBSTRUCTURE EXCAVATION, COMMON	CY	70.00
GRANULAR BACKFILL	CY	44.00
CLASS A CONCRETE	CY	25.50
REINFORCING STEEL	LB	3,260.00
PILES, FURNISHED (HP 12X53)	LF	-
PILES, DRIVEN (HP 12X53)	LF	-
6" PERFORATED PIPE UNDERDRAIN	LF	30.00
6" NON-PERFORATED PIPE UNDERDRAIN	LF	-

(3) EXCLUDES WINGS

(1) DIMENSIONS ARE FROM TOP OF BRIDGE SEAT AT FRONT FACE OF BACKWALL.

(2) ALL WT WING REINFORCING STEEL TIED TO THE ABUTMENT BRIDGE SEAT, BACKWALL AND CURTAIN WALL REINFORCING STEEL MUST BE IN PLACE PRIOR TO POURING ABUTMENT CONCRETE. FOR ADDITIONAL INFORMATION SEE WING DETAILS.

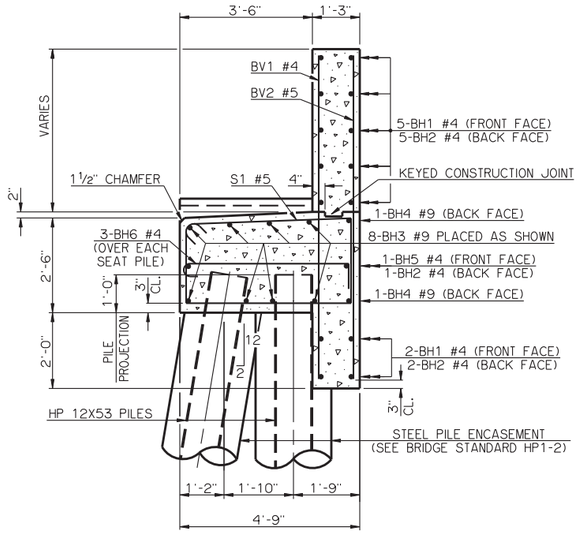
APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

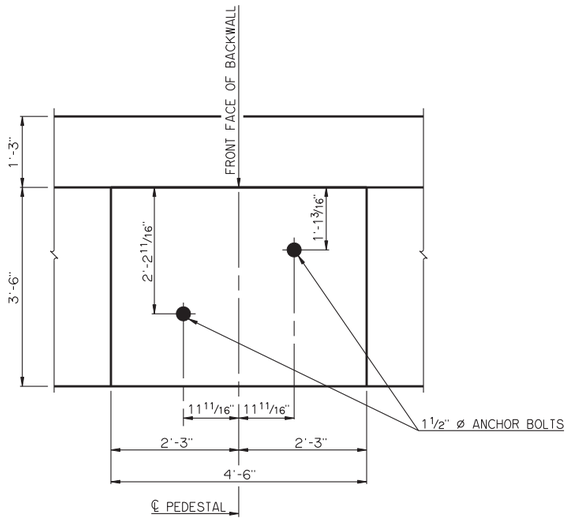
ABUTMENT DETAILS TYPE III AND TYPE C P.C. BEAMS (SHEET NO. 1 OF 2)

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

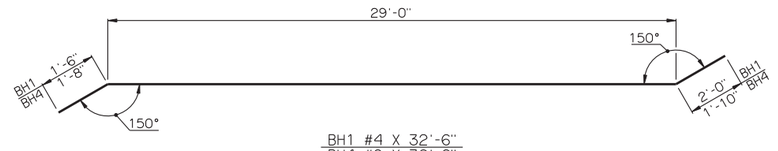
2009 SPECIFICATIONS	CB26-C-SK30-ABUT-PC3-1	01E
		CB-197E



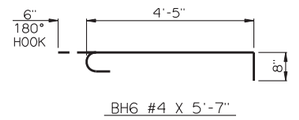
TYPICAL SECTION THRU ABUTMENT



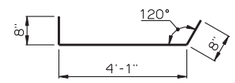
DETAIL OF PEDESTAL WITH LAYOUT OF ANCHOR BOLTS



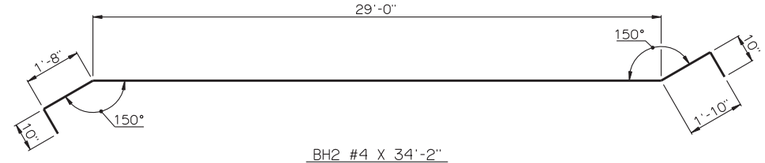
BH1 #4 X 32'-6"
BH4 #9 X 32'-6"



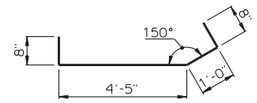
BH6 #4 X 5'-7"



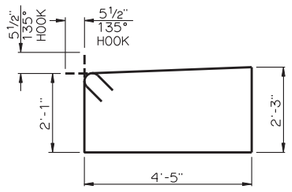
BH8 #4 X 5'-5"



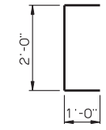
BH2 #4 X 34'-2"



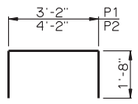
BH9 #4 X 6'-9"



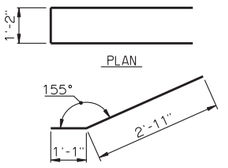
S1 #5 X 14'-1"



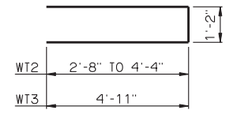
SC #4 X 4'-0"



P1 #4 X 6'-6"
P2 #4 X 7'-6"



ELEVATION
WT1 #6 X 9'-2"



WT2 #6 X 8'-2 AVG.
WT3 #6 X 11'-0"

DETAILS OF BENT REINFORCING STEEL

BAR LIST - ONE ABUTMENT

	MARK	NO.	SIZE	FORM	LENGTH	LENGTH VARIATION
	BH1	7	#4	BNT.	32'-6"	-
	BH2	8	#4	BNT.	34'-2"	-
(1)	BH3	8	#9	STR.	31'-6" AVG.	30'-7" TO 32'-5"
	BH4	2	#9	BNT.	32'-6"	-
	BH5	1	#4	STR.	30'-7"	-
	BH6	15	#4	BNT.	5'-7"	-
	BH7	2	#9	STR.	12'-9"	-
	BH8	3	#4	BNT.	5'-5"	-
	BH9	3	#4	BNT.	6'-9"	-
(2)	BV1	30	#4	STR.	8'-5" AVG.	8'-3" TO 8'-7"
(2)	BV2	30	#5	STR.	8'-5" AVG.	8'-3" TO 8'-7"
	BV3	8	#6	STR.	8'-3"	-
	P1	18	#4	BNT.	6'-6"	-
	P2	12	#4	BNT.	7'-6"	-
	S1	38	#5	BNT.	14'-1"	-
	SC	6	#4	BNT.	4'-0"	-
	WT1	2	#6	BNT.	9'-2"	-
(3)	WT2	4	#6	BNT.	8'-2" AVG.	6'-6" TO 9'-10"
	WT3	20	#6	BNT.	11'-0"	-

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

APPROVED BY BRIDGE ENGINEER Robert J. Rusch DATE 10-31-2011

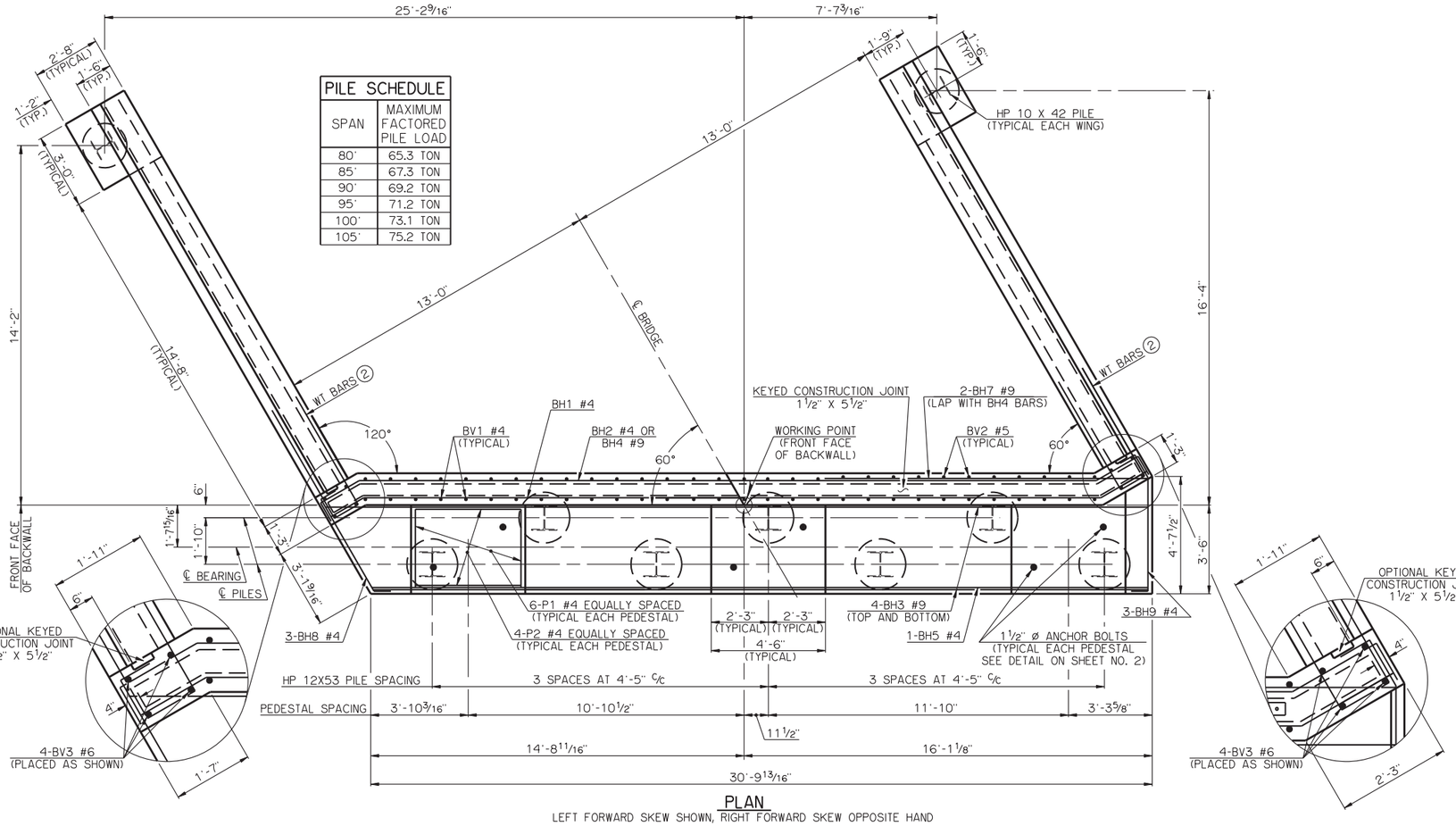
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

ABUTMENT DETAILS
TYPE III AND TYPE C P.C. BEAMS
(SHEET NO. 2 OF 2)

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

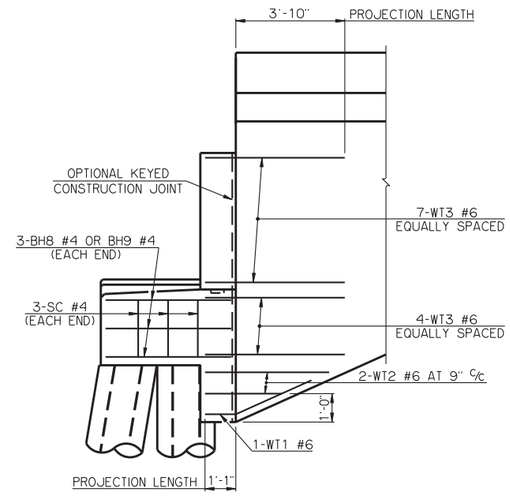
2009 SPECIFICATIONS	CB26-C-SK30-ABUT-PC3-2	02E
		CB-198E

PILE SCHEDULE	
SPAN	MAXIMUM FACTORED PILE LOAD
80'	65.3 TON
85'	67.3 TON
90'	69.2 TON
95'	71.2 TON
100'	73.1 TON
105'	75.2 TON

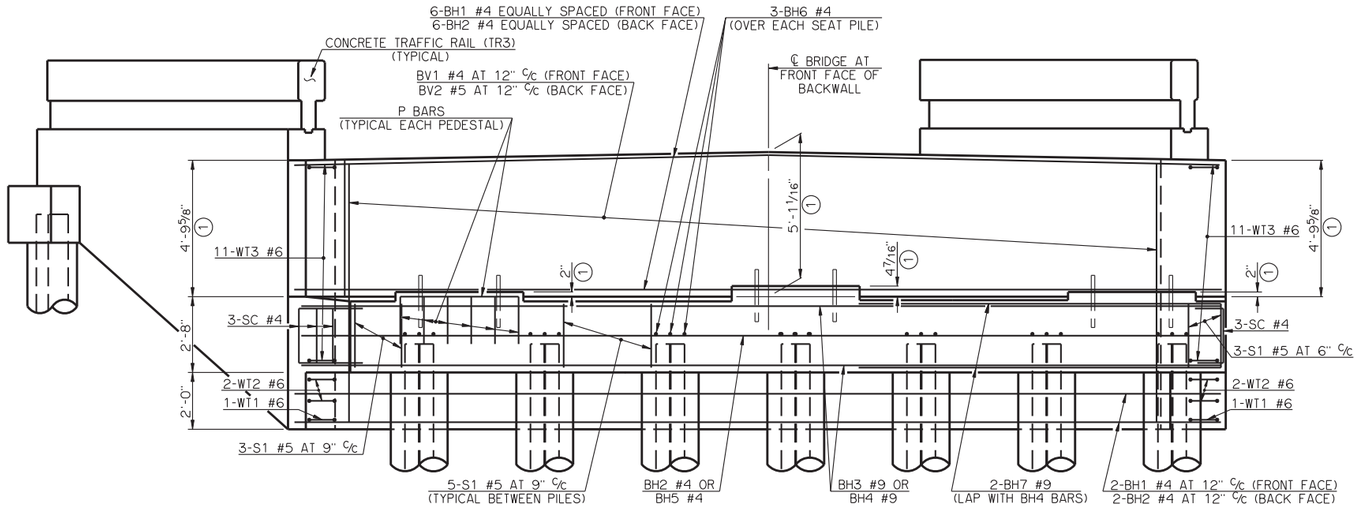


PLAN

LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND



SIDE VIEW



ELEVATION

LEFT FORWARD SKEW SHOWN, RIGHT FORWARD SKEW OPPOSITE HAND

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

(3) EXCLUDES WINGS

(1) DIMENSIONS ARE FROM TOP OF BRIDGE SEAT AT FRONT FACE OF BACKWALL.

(2) ALL WT WING REINFORCING STEEL TIED TO THE ABUTMENT BRIDGE SEAT, BACKWALL AND CURTAIN WALL REINFORCING STEEL MUST BE IN PLACE PRIOR TO POURING ABUTMENT CONCRETE. FOR ADDITIONAL INFORMATION SEE WING DETAILS.

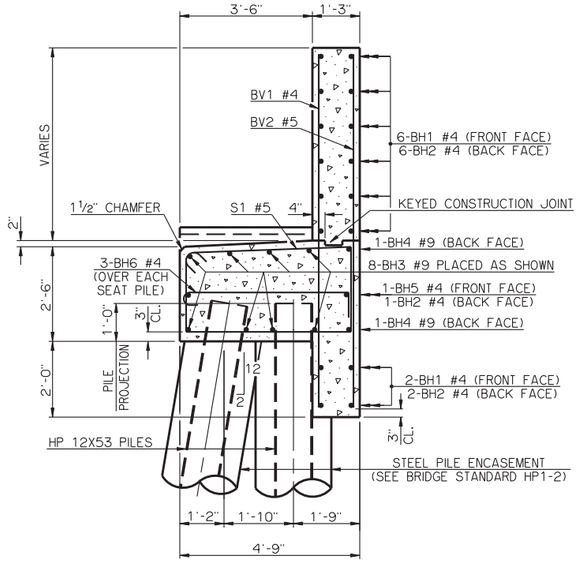
APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

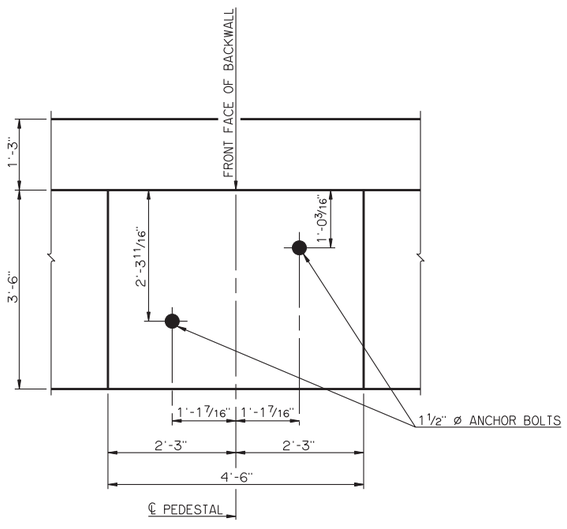
ABUTMENT DETAILS TYPE IV P.C. BEAMS (SHEET NO. 1 OF 2)

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

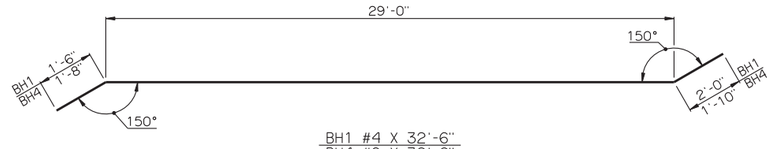
2009 SPECIFICATIONS	CB26-C-SK30-ABUT-PC4-1	01E
		CB-199E



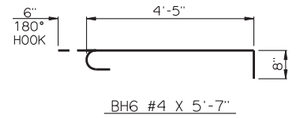
TYPICAL SECTION THRU ABUTMENT



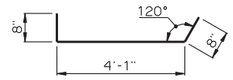
DETAIL OF PEDESTAL WITH LAYOUT OF ANCHOR BOLTS



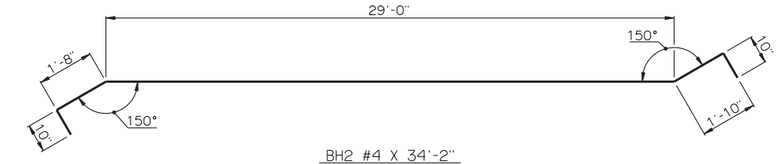
BH1 #4 X 32'-6"
BH4 #9 X 32'-6"



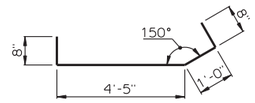
BH6 #4 X 5'-7"



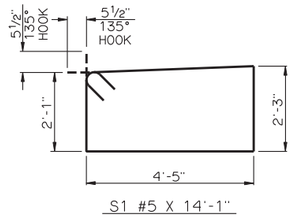
BH8 #4 X 5'-5"



BH2 #4 X 34'-2"

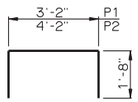


BH9 #4 X 6'-9"

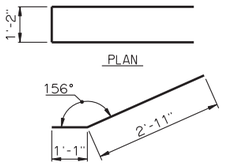


S1 #5 X 14'-1"

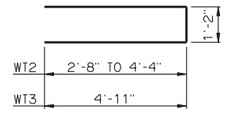
SC #4 X 4'-0"



P1 #4 X 6'-6"
P2 #4 X 7'-6"



ELEVATION
WT1 #6 X 9'-2"



WT2 #6 X 8'-2" AVG.
WT3 #6 X 11'-0"

DETAILS OF BENT REINFORCING STEEL

BAR LIST - ONE ABUTMENT

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

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

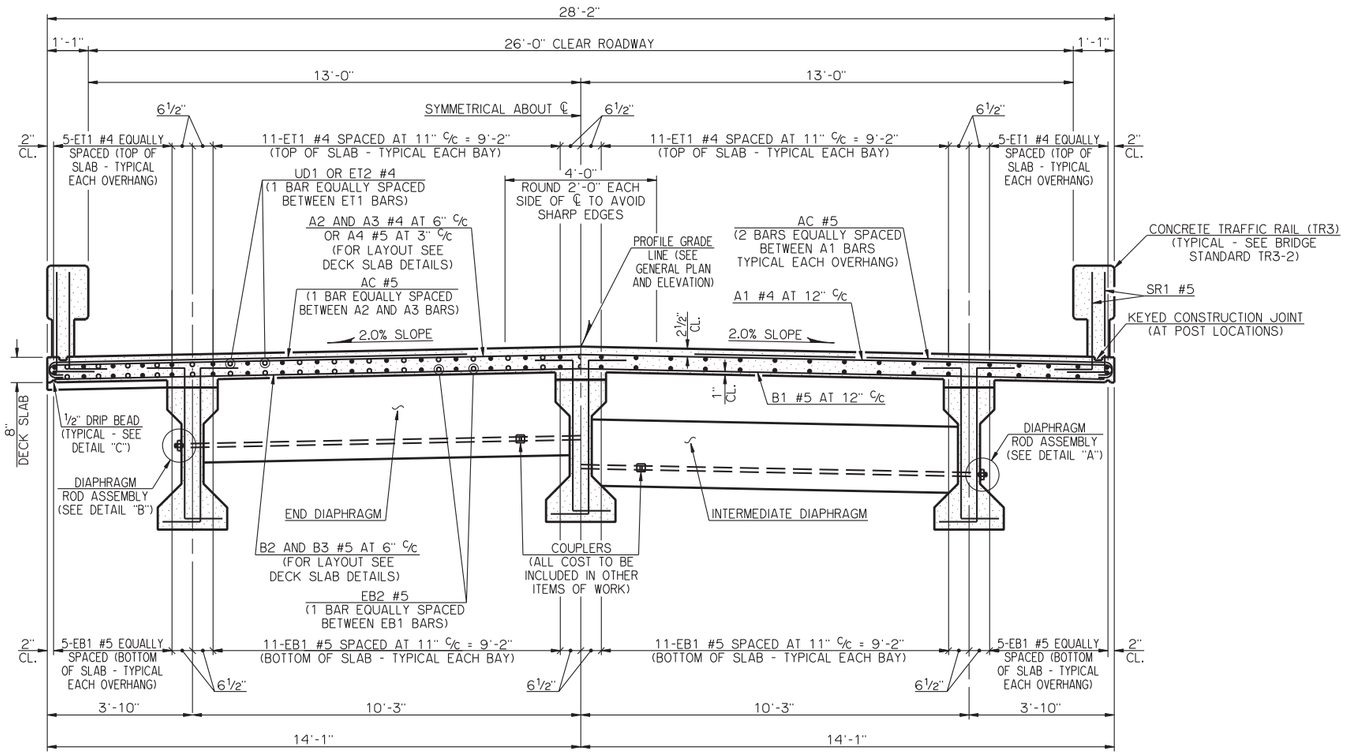
APPROVED BY BRIDGE ENGINEER Robert J. Rusch DATE 10-31-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

ABUTMENT DETAILS
TYPE IV P.C. BEAMS
(SHEET NO. 2 OF 2)

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

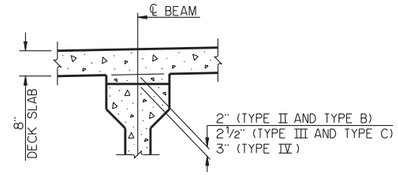
2009 SPECIFICATIONS	CB26-C-SK30-ABUT-PC4-2	02E
		CB-200E



HALF SECTION OF END ZONE REINFORCING AT END DIAPHRAGM

HALF SECTION OF TYPICAL REINFORCING AT INTERMEDIATE DIAPHRAGM

TYPICAL CROSS SECTION



DETAIL OF HAUNCH

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

NOTES

ROTATE HOOKS ON A4 AND AC BARS TO MAINTAIN MINIMUM CLEARANCE.

DO NOT PLACE THE CONCRETE FOR THE DECK SLAB OR APPLY OTHER MASSIVE LOADS TO THE BEAMS, INTERMEDIATE DIAPHRAGMS OR END DIAPHRAGMS UNTIL THE CONCRETE IN THE INTERMEDIATE AND END DIAPHRAGMS HAS BEEN IN PLACE A MINIMUM OF 10 DAYS OR AT THE DISCRETION OF THE ENGINEER. THIS TIME MAY BE SHORTENED IF THE CONCRETE HAS ATTAINED 80% OF THE SPECIFIED COMPRESSIVE STRENGTH.

STAY-IN-PLACE STEEL DECK FORMS MAY BE USED IF THE MINIMUM DECK SLAB THICKNESS OF 8" IS OBTAINED BY MEASURING FROM THE TOP OF THE DECK SLAB TO THE TOP PORTION OF THE STEEL CORRUGATION. NO ADDITIONAL CONCRETE WEIGHT OF THE DECK SLAB IS PERMITTED. ADDITIONAL STEEL WEIGHT OF THE DECK FORMS SHALL NOT EXCEED 5 PSF. STAY-IN-PLACE PRESTRESSED CONCRETE DECK FORMS MAY BE USED IF THE FOLLOWING CONDITIONS ARE MET:

1) SHOP DRAWINGS AND STRUCTURAL CALCULATIONS FOR THE FORMS ARE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL.
2) A NEW STRUCTURAL DESIGN, STRUCTURAL CALCULATIONS, AND A NEW REINFORCING SCHEDULE FOR THE DECK SLAB ARE SUBMITTED TO THE BRIDGE ENGINEER FOR APPROVAL.
3) SHOP DRAWINGS, NEW DECK SLAB REINFORCING SCHEDULE AND STRUCTURAL DESIGNS AND CALCULATIONS SHALL BE PREPARED BY AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF OKLAHOMA.

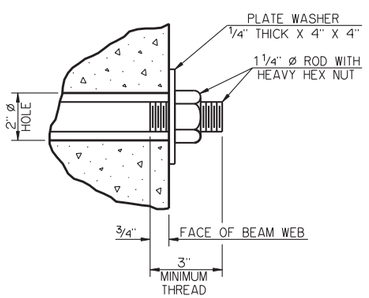
ALL COSTS ASSOCIATED WITH THE USE OF STAY-IN-PLACE FORMS, INCLUDING ALL PROFESSIONAL SERVICES, MATERIAL, LABOR, EQUIPMENT AND INCIDENTALS, SHALL BE AT THE CONTRACTOR'S EXPENSE. FOR ADDITIONAL INFORMATION CONCERNING THE USE OF STAY-IN-PLACE FORMS, SEE SECTION 502 OF THE STANDARD SPECIFICATIONS.

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

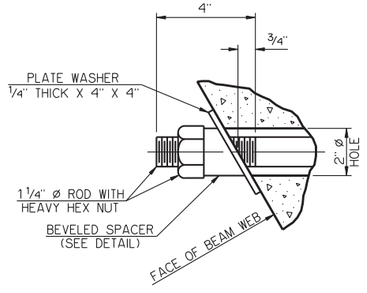
CONSTRUCTION JOINTS AT THE FIXED PIERS SHALL NOT BE KEYED. IN THE EVENT OF AN EMERGENCY, POURING OF THE DECK SLAB MAY BE HALTED WITH A CONSTRUCTION JOINT MADE PERPENDICULAR TO THE DIRECTION OF TRAFFIC AS DIRECTED BY THE ENGINEER. ALL LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH ALL CONSTRUCTION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

DO NOT SAW-CUT GROOVE THE DECK SLAB WITHIN 6" OF ANY CONSTRUCTION JOINT.

FOR BAR LIST AND DETAILS OF BENT REINFORCING STEEL, SEE DECK SLAB BAR LIST.

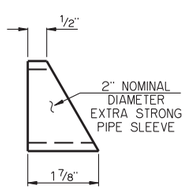


DETAIL "A"

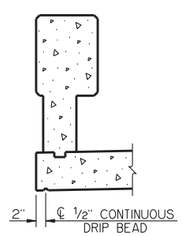


DETAIL "B"

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



DETAIL OF BEVELED SPACER



DETAIL "C"

APPROVED BY BRIDGE ENGINEER Robert J Rusch DATE 9-9-2011

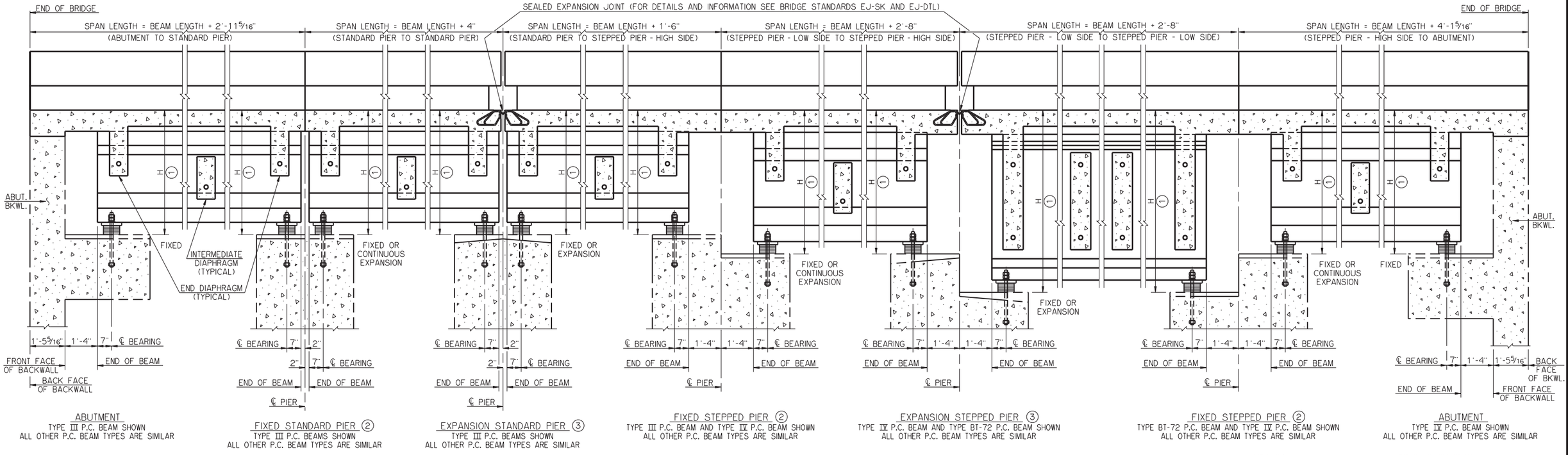
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

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

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

2009 SPECIFICATIONS	CB26-C-SK30-XSECT-PC234	01E

CB-223E



ABUTMENT
TYPE III P.C. BEAM SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

FIXED STANDARD PIER (2)
TYPE III P.C. BEAMS SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

EXPANSION STANDARD PIER (3)
TYPE III P.C. BEAMS SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

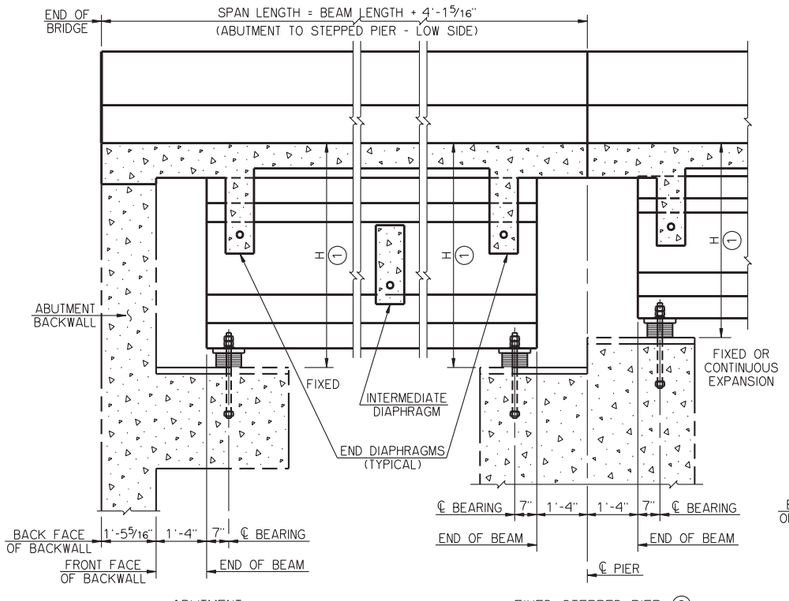
FIXED STEPPED PIER (2)
TYPE III P.C. BEAM AND TYPE IV P.C. BEAM SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

EXPANSION STEPPED PIER (3)
TYPE IV P.C. BEAM AND TYPE BT-72 P.C. BEAM SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

FIXED STEPPED PIER (2)
TYPE BT-72 P.C. BEAM AND TYPE IV P.C. BEAM SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

ABUTMENT
TYPE IV P.C. BEAM SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

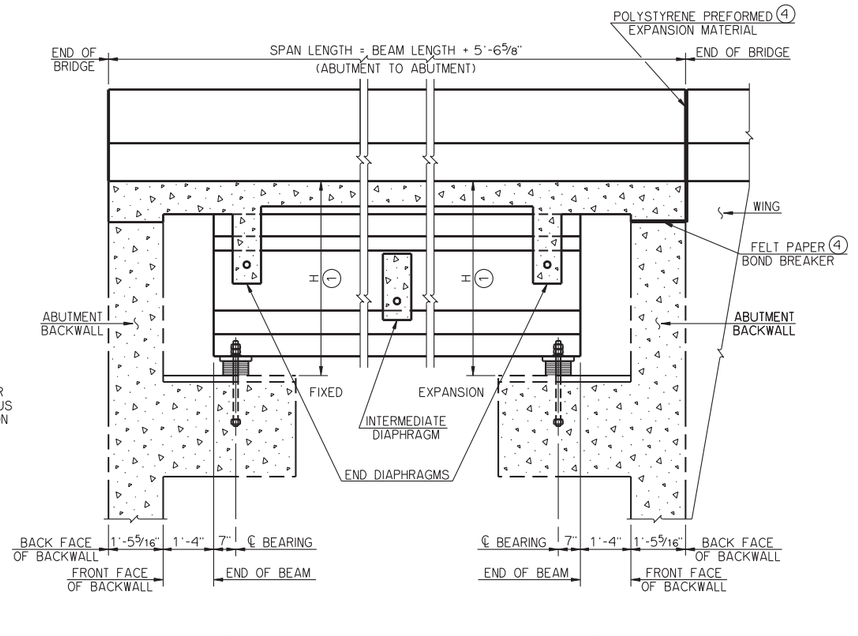
LONGITUDINAL SECTION



ABUTMENT
TYPE IV P.C. BEAM SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

FIXED STEPPED PIER (2)
TYPE IV P.C. BEAM AND TYPE III P.C. BEAM SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

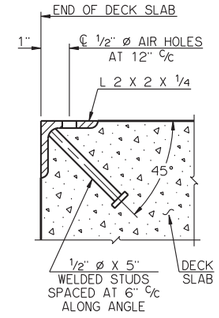
LONGITUDINAL SECTION



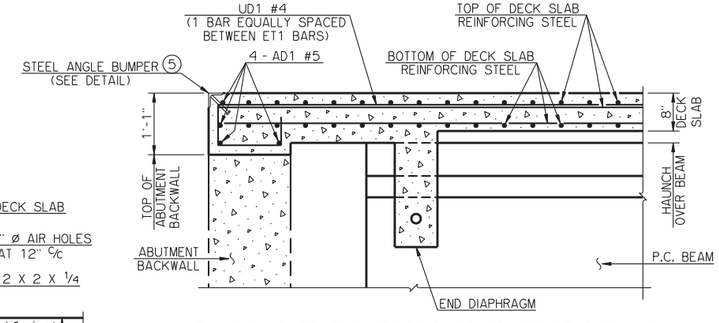
ABUTMENT
TYPE III P.C. BEAM SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

ABUTMENT
TYPE III P.C. BEAM SHOWN
ALL OTHER P.C. BEAM TYPES ARE SIMILAR

LONGITUDINAL SECTION



DETAIL OF STEEL ANGLE BUMPER



TYPICAL SLAB REINFORCING AT ABUTMENT BACKWALL

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

(1) DIMENSION IS FROM TOP OF DECK SLAB TO BOTTOM OF BEARING ASSEMBLY AT ℄ BEARING.

(2) FIXED PIER DESIGNATION INDICATES CONTINUOUS DECK SLAB OVER PIER. ENGINEER SHALL DETERMINE WHETHER FIXED OR EXPANSION BEARING ASSEMBLIES ARE REQUIRED.

(3) EXPANSION PIER DESIGNATION INDICATES EXPANSION JOINT IN DECK SLAB OVER PIER. EXPANSION PIER REQUIRES EXPANSION BEARING ASSEMBLIES IN AT LEAST ONE OF THE SPANS. ENGINEER SHALL DETERMINE WHETHER FIXED OR EXPANSION BEARING ASSEMBLIES ARE REQUIRED IN THE ADJACENT SPAN.

(4) AT EXPANSION ABUTMENTS, FELT PAPER BOND BREAKER SHALL BE PLACED ON TOP OF THE BACKWALL FOR THE FULL WIDTH OF THE DECK SLAB, AND 3/4" THICK POLYSTYRENE PREFORMED EXPANSION MATERIAL SHALL BE PLACED BETWEEN THE END OF THE DECK SLAB AND THE ENDS OF THE WINGS AND BETWEEN THE ENDS OF THE CONCRETE TRAFFIC RAILS (TR3) ON THE DECK SLAB AND WINGS. ALL COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

(5) STEEL ANGLE BUMPERS SHALL BE OMITTED FROM ENDS OF DECK SLABS ADJOINING AN APPROACH ROADWAY COMPRISED OF ASPHALT OR P.C. CONCRETE PAVEMENT.

APPROVED BY BRIDGE ENGINEER Robert J. Lusch DATE 9-9-2011

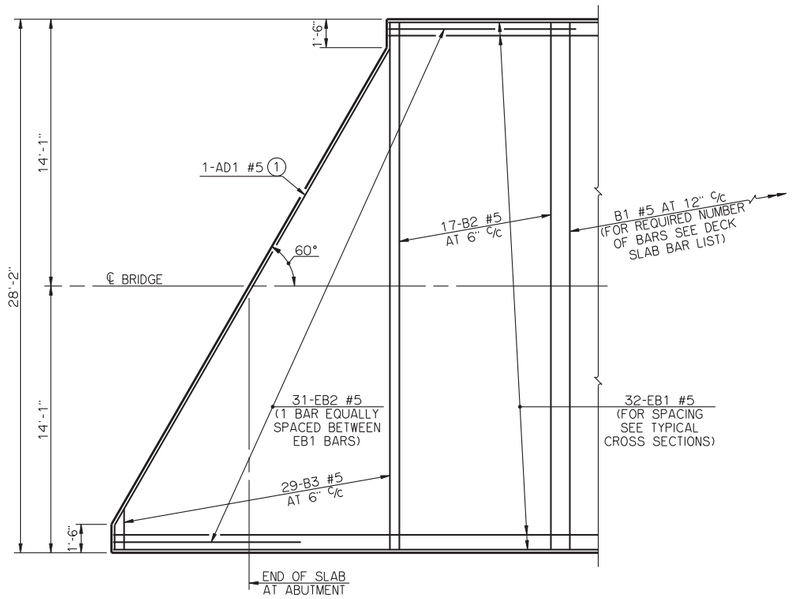
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

LONGITUDINAL SECTION P.C. BEAMS

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

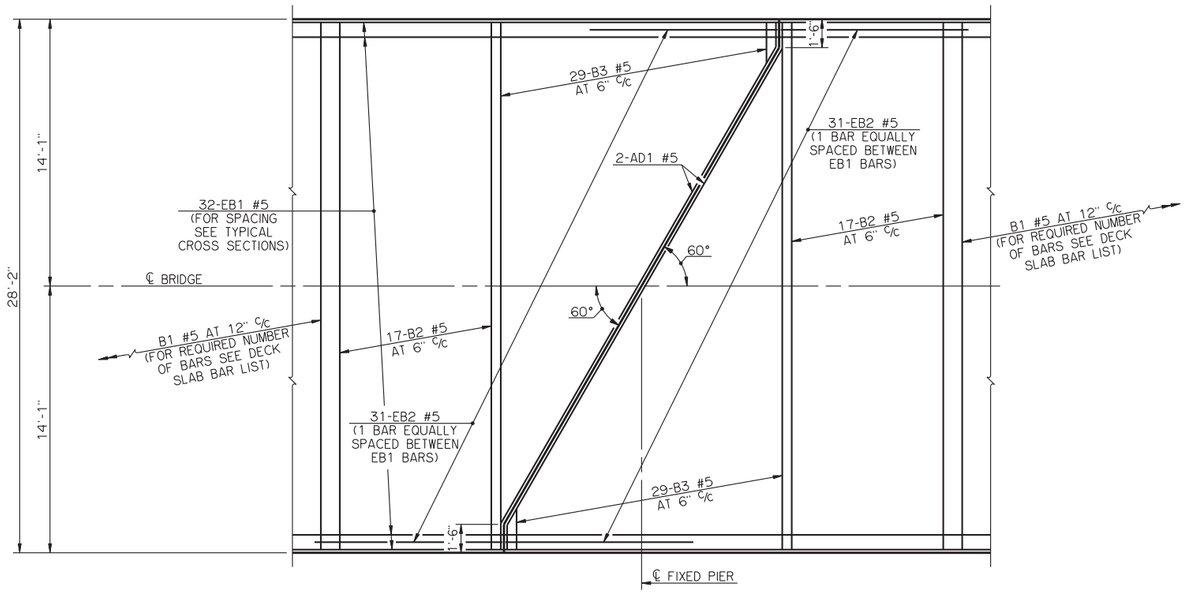
2009 SPECIFICATIONS	CB26-C-SK30-LSECT-PCB	01E

CB-228E

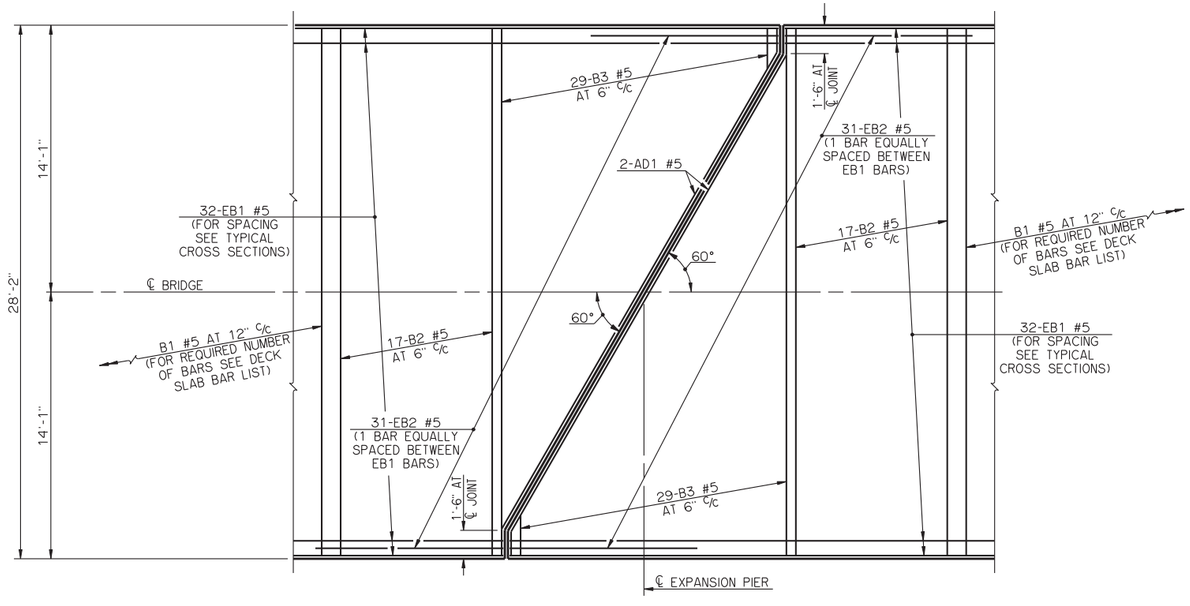


PLAN OF DECK SLAB WITH TYPICAL BOTTOM LAYER
OF END ZONE REINFORCING STEEL AT ABUTMENT

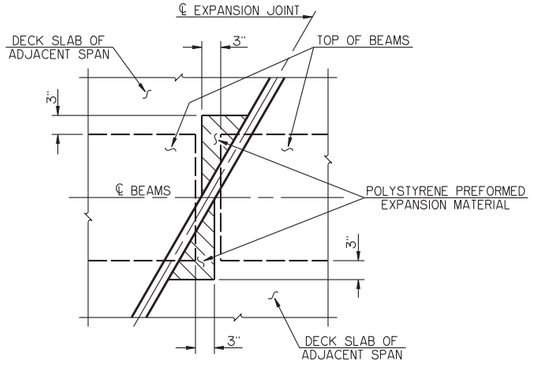
(1) SEE DETAIL "TYPICAL SLAB REINFORCING AT ABUTMENT BACKWALL" ON LONGITUDINAL SECTION SHEET FOR LAYOUT OF AD1 BARS.



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



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



PLAN OF BEAM CORNERS AT SKEWED EXPANSION JOINT

WHERE THE TOP CORNER OF A BEAM PROJECTS UNDER THE DECK SLAB OF THE ADJACENT SPAN, ½" POLYSTYRENE PREFORMED EXPANSION MATERIAL SHALL BE PLACED BETWEEN THE TOP OF THE BEAM AND THE BOTTOM OF THE DECK SLAB IN THE HATCHED AREAS SHOWN ABOVE. ALL COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

NOTES

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

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

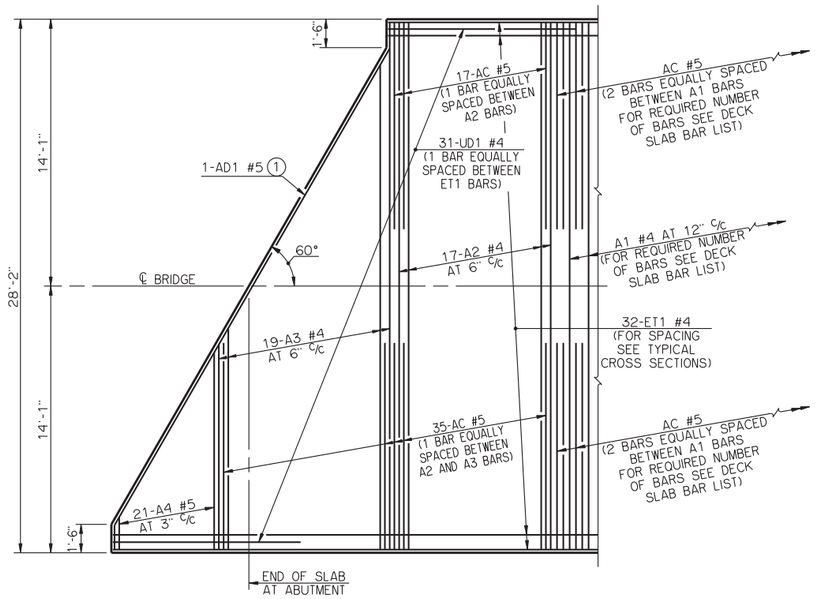
APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

DECK SLAB DETAILS
(SHEET NO. 1 OF 2)

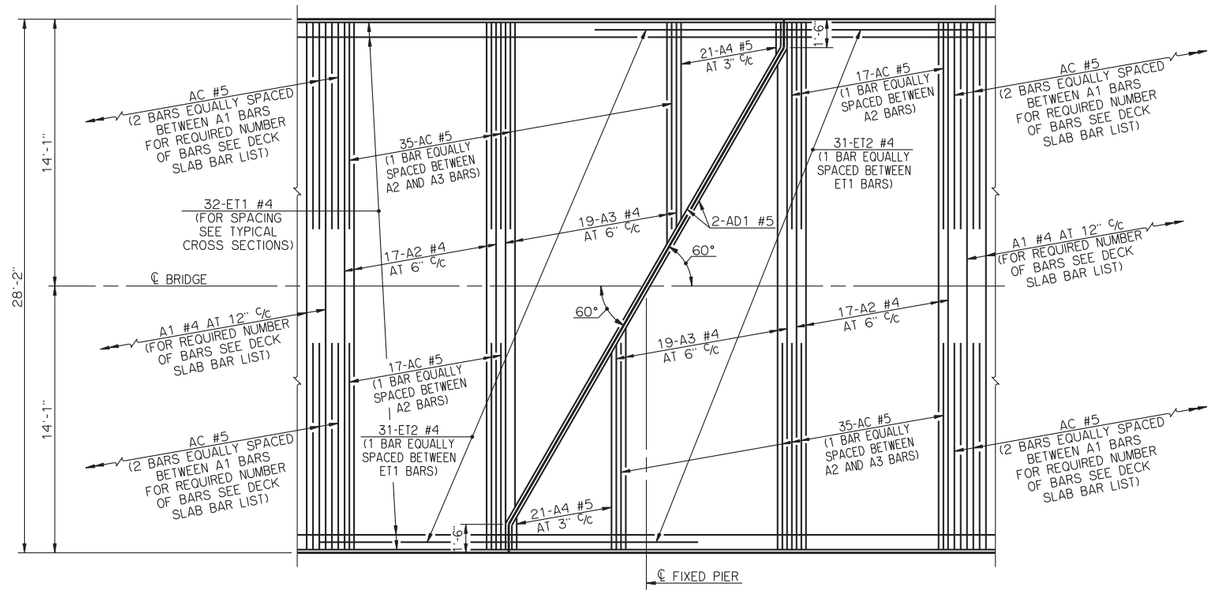
26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

2009 SPECIFICATIONS	CB26-C-SK30-DKSLB-1	01E
		CB-232E

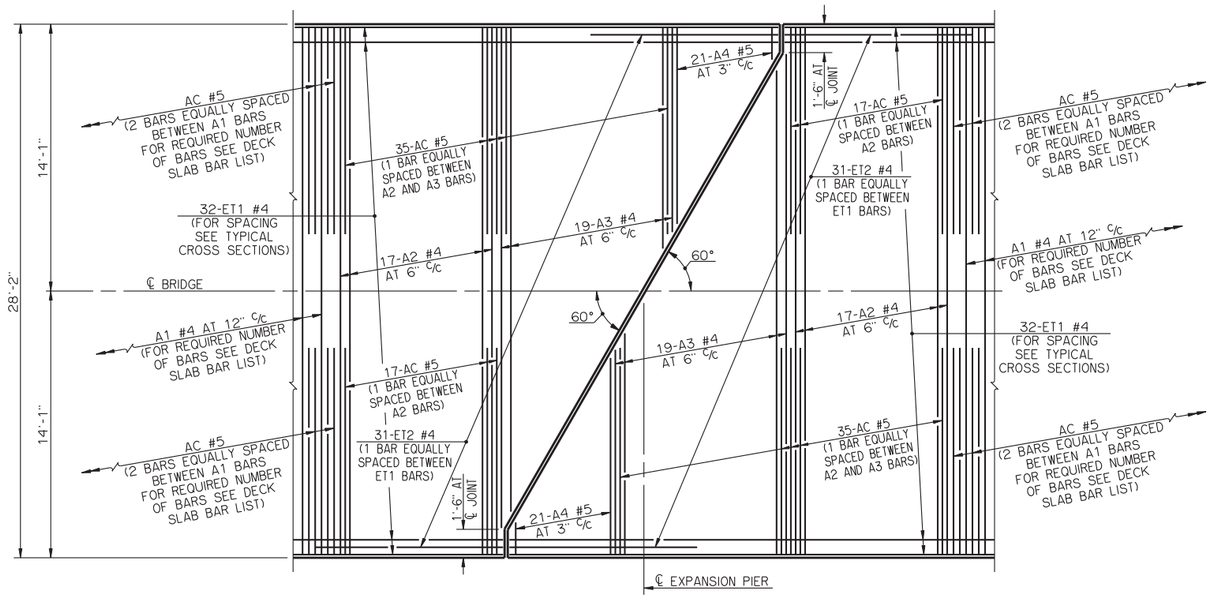


PLAN OF DECK SLAB WITH TYPICAL TOP LAYER OF END ZONE REINFORCING STEEL AT ABUTMENT

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



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



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

NOTES

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

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

APPROVED BY BRIDGE ENGINEER Robert J Rusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

DECK SLAB DETAILS (SHEET NO. 2 OF 2)

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

2009 SPECIFICATIONS	CB26-C-SK30-DKSLB-2	01E
		CB-233E

BAR LIST - DECK SLAB

MARK	SIZE	FORM	SPAN TYPE: ABUTMENT TO ABUTMENT NUMBER	LENGTH	VARIANCE	ABUTMENT TO FIXED PIER NUMBER	LENGTH	VARIANCE	ABUTMENT TO EXPANSION PIER NUMBER	LENGTH	VARIANCE
A1	#4	BNT.	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	28'-10"	-	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	28'-10"	-	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	28'-10"	-
A2	#4	BNT.	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	28'-10"	-	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	28'-10"	-	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	28'-10"	-
A3	#4	BNT.	38 (4)	19'-2" AVG.	11'-4" TO 27'-0"	38 (4)	19'-2" AVG.	11'-4" TO 27'-0"	38 (4)	19'-2" AVG.	11'-4" TO 27'-0"
A4	#5	BNT.	42 (5)	6'-8" AVG.	2'-4" TO 11'-0"	42 (5)	6'-8" AVG.	2'-4" TO 11'-0"	42 (5)	6'-8" AVG.	2'-4" TO 11'-0"
AC	#5	BNT.	(4 x SL) - 20 (1)	11'-6"	-	(4 x SL) - 20 (1)	11'-6"	-	(4 x SL) - 20 (1)	11'-6"	-
AD1	#5	BNT.	8	31'-9"	-	6	31'-9"	-	5	31'-9"	-
B1	#5	STR.	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	27'-10"	-	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	27'-10"	-	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	27'-10"	-
B2	#5	STR.	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	27'-10"	-	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	27'-10"	-	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	27'-10"	-
B3	#5	STR.	58 (6)	14'-4" AVG.	2'-2" TO 26'-6"	58 (6)	14'-4" AVG.	2'-2" TO 26'-6"	58 (6)	14'-4" AVG.	2'-2" TO 26'-6"
(2) EB1	#5	STR.	32	SPAN LENGTH - 2"	-	32	SPAN LENGTH - 1" (3)	-	32	SPAN LENGTH - 3"	-
EB2	#5	STR.	62	9'-11"	-	62	9'-11"	-	62	9'-11"	-
(2) ET1	#4	STR.	32	SPAN LENGTH - 2"	-	32	SPAN LENGTH - 1" (3)	-	32	SPAN LENGTH - 3"	-
ET2	#4	STR.	-	-	-	31	9'-11"	-	31	9'-11"	-
SR1	#5	BNT.	36 x IP + 7.5 x EP (7)	3'-10"	-	36 x IP + 7.5 x EP (7)	3'-10"	-	36 x IP + 7.5 x EP (7)	3'-10"	-
UD1	#4	BNT.	62	12'-3"	-	31	12'-3"	-	31	12'-3"	-

BAR LIST - DECK SLAB

MARK	SIZE	FORM	SPAN TYPE: FIXED PIER TO FIXED PIER NUMBER	LENGTH	VARIANCE	FIXED PIER TO EXPANSION PIER NUMBER	LENGTH	VARIANCE	EXPANSION PIER TO EXPANSION PIER NUMBER	LENGTH	VARIANCE
A1	#4	BNT.	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	28'-10"	-	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	28'-10"	-	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	28'-10"	-
A2	#4	BNT.	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	28'-10"	-	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	28'-10"	-	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	28'-10"	-
A3	#4	BNT.	38 (4)	19'-2" AVG.	11'-4" TO 27'-0"	38 (4)	19'-2" AVG.	11'-4" TO 27'-0"	38 (4)	19'-2" AVG.	11'-4" TO 27'-0"
A4	#5	BNT.	42 (5)	6'-8" AVG.	2'-4" TO 11'-0"	42 (5)	6'-8" AVG.	2'-4" TO 11'-0"	42 (5)	6'-8" AVG.	2'-4" TO 11'-0"
AC	#5	BNT.	(4 x SL) - 20 (1)	11'-6"	-	(4 x SL) - 20 (1)	11'-6"	-	(4 x SL) - 20 (1)	11'-6"	-
AD1	#5	BNT.	4	31'-9"	-	3	31'-9"	-	2	31'-9"	-
B1	#5	STR.	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	27'-10"	-	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	27'-10"	-	FOR SL < 32: 0 (1) FOR SL ≥ 32: SL - 32 (1)	27'-10"	-
B2	#5	STR.	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	27'-10"	-	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	27'-10"	-	FOR SL < 32: (2 x SL) - 29 (1) FOR SL ≥ 32: 34 (1)	27'-10"	-
B3	#5	STR.	58 (6)	14'-4" AVG.	2'-2" TO 26'-6"	58 (6)	14'-4" AVG.	2'-2" TO 26'-6"	58 (6)	14'-4" AVG.	2'-2" TO 26'-6"
(2) EB1	#5	STR.	32	SPAN LENGTH (3)	-	32	SPAN LENGTH - 2" (3)	-	32	SPAN LENGTH - 4"	-
EB2	#5	STR.	62	9'-11"	-	62	9'-11"	-	62	9'-11"	-
(2) ET1	#4	STR.	32	SPAN LENGTH (3)	-	32	SPAN LENGTH - 2" (3)	-	32	SPAN LENGTH - 4"	-
ET2	#4	STR.	62	9'-11"	-	62	9'-11"	-	62	9'-11"	-
SR1	#5	BNT.	36 x IP + 7.5 x EP (7)	3'-10"	-	36 x IP + 7.5 x EP (7)	3'-10"	-	36 x IP + 7.5 x EP (7)	3'-10"	-
UD1	#4	BNT.	-	-	-	-	-	-	-	-	-

(1) SL = NUMBER OF FEET IN SPAN LENGTH. EXAMPLE: FOR SPAN LENGTH = 31'-8", SL = 31.

(2) THE LENGTHS SHOWN DO NOT INCLUDE LAP SPLICES. THE LENGTH OF ALL REQUIRED LAP SPLICES SHALL BE ADDED TO THE LENGTHS SHOWN. THE MINIMUM LAP SPLICE LENGTH FOR #5 REINFORCING STEEL BARS SHALL BE 2'-6", AND THE MINIMUM LAP SPLICE LENGTH FOR #4 REINFORCING STEEL BARS SHALL BE 1'-8". THE LAP SPLICES SHALL BE STAGGERED.

(3) THE LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU ALL CONSTRUCTION JOINTS AT FIXED PIERS. TO DETERMINE THE ACTUAL REINFORCING STEEL BAR LENGTH, COMBINE THE LENGTHS SHOWN FOR ALL SPAN TYPES OCCURRING BETWEEN AN ABUTMENT AND EXPANSION PIER OR BETWEEN TWO EXPANSION PIERS CONTAINED WITHIN THE BRIDGE INCLUDING ALL REQUIRED LAP SPLICE LENGTHS. NO LAP SPLICE SHALL BE PLACED WITHIN 10'-0" OF THE CENTERLINE OF FIXED PIERS.

(4) NUMBER INCLUDES TWO SETS OF 19 BARS.

(5) NUMBER INCLUDES TWO SETS OF 21 BARS.

(6) NUMBER INCLUDES TWO SETS OF 29 BARS.

(7) CALCULATION IN TABLE SHALL BE ROUNDED UP TO THE NEAREST NUMBER OF BARS.

IP = NUMBER OF INTERIOR POSTS IN CONCRETE TRAFFIC RAIL (TR3) CALCULATED AS FOLLOWS:

FOR ABUTMENT TO EXPANSION PIER OR FIXED PIER TO EXPANSION PIER:
IP = INTEGER AMOUNT OF (SPAN LENGTH - 15.375)/10

FOR EXPANSION PIER TO EXPANSION PIER:
IP = INTEGER AMOUNT OF (SPAN LENGTH - 15.75)/10

FOR ALL OTHER CASES:
IP = INTEGER AMOUNT OF (SPAN LENGTH - 15)/10

EP = TOTAL LENGTH OF END POSTS IN CONCRETE TRAFFIC RAIL (TR3) CALCULATED AS FOLLOWS:

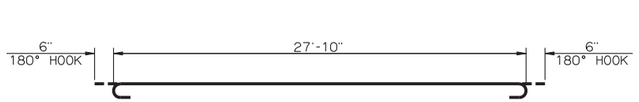
FOR ABUTMENT TO EXPANSION PIER OR FIXED PIER TO EXPANSION PIER:
EP = SPAN LENGTH - 5.375 - (10 x IP)

FOR EXPANSION PIER TO EXPANSION PIER:
EP = SPAN LENGTH - 5.75 - (10 x IP)

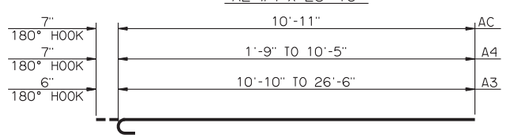
FOR ALL OTHER CASES:
EP = SPAN LENGTH - 5 - (10 x IP)

EXAMPLE: FOR FIXED PIER TO EXPANSION PIER WITH SPAN LENGTH = 80'-4"
IP = (80.34 - 15.375)/10 = 6
EP = 80.34 - 5.375 - (10 x 6) = 14.97

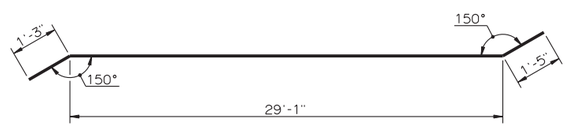
FOR ADDITIONAL DETAILS AND INFORMATION, SEE BRIDGE STANDARD TR3-2. SR1 BARS SHALL NOT BE EPOXY COATED AS INDICATED ON THE BRIDGE STANDARD.



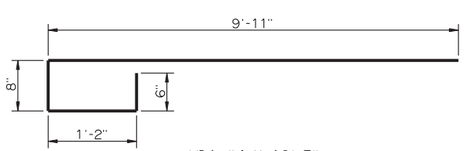
A1 #4 X 28'-10"
A2 #4 X 28'-10"



A3 #4 X 19'-2" AVG.
A4 #5 X 6'-8" AVG.
AC #5 X 11'-6"



AD1 #5 X 31'-9"



UD1 #4 X 12'-3"

DETAILS OF BENT REINFORCING STEEL

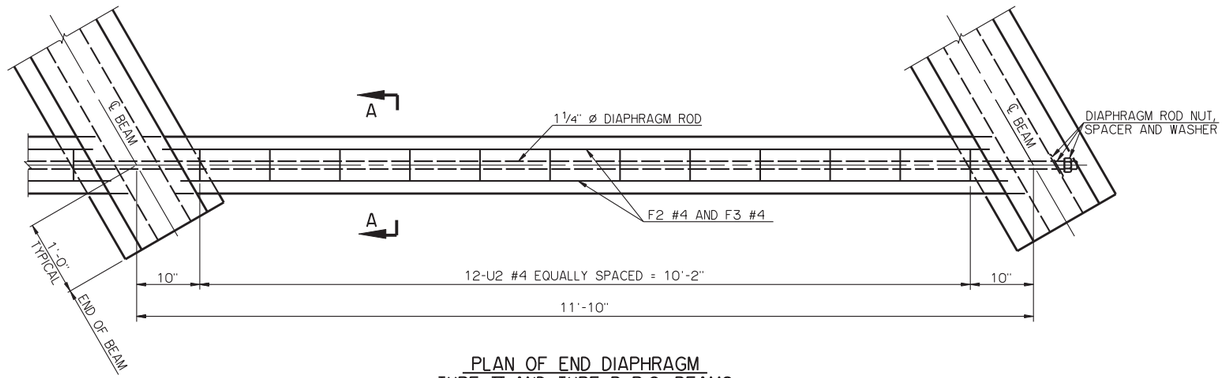
APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

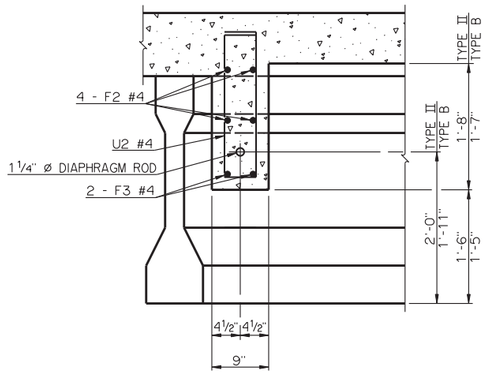
DECK SLAB BAR LIST

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

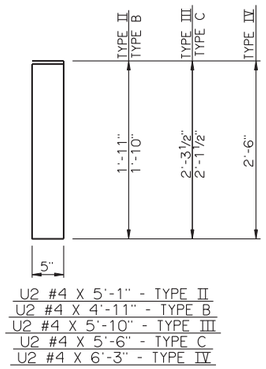
2009 SPECIFICATIONS	CB26-C-SK30-DKSLB-BLIST	01E
		CB-236E



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



SECTION A-A



U2 #4 X 5'-1" - TYPE II
U2 #4 X 4'-11" - TYPE B
U2 #4 X 5'-10" - TYPE III
U2 #4 X 5'-6" - TYPE C
U2 #4 X 6'-3" - TYPE IV

DETAILS OF BENT REINFORCING STEEL

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

SECTION B-B

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

SECTION C-C

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

APPROVED BY BRIDGE ENGINEER Robert J. Rusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

END DIAPHRAGM DETAILS
TYPE II, B, III, C AND IV P.C. BEAMS

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

2009 SPECIFICATIONS	CB26-C-SK30-DIA-END-PC234	01E
		CB-240E

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	CONCRETE RAIL (TR3)	STRUCTURAL STEEL (2)	WEATHERING STEEL FIXED BEARING ASSEMBLY (3)	WEATHERING STEEL EXPANSION BEARING ASSEMBLY (3)	CLASS AA CONCRETE	REINFORCING STEEL (4)	PRESTRESSED CONCRETE BEAMS (TYPE (1))	SAW-CUT GROOVING	CONCRETE RAIL (TR3)	STRUCTURAL STEEL (2)	WEATHERING STEEL FIXED BEARING ASSEMBLY (3)	WEATHERING STEEL FIXED OR EXPANSION BEARING ASSEMBLY (3)	CLASS AA CONCRETE	REINFORCING STEEL (5)	PRESTRESSED CONCRETE BEAMS (TYPE (1))	SAW-CUT GROOVING	CONCRETE RAIL (TR3)	STRUCTURAL STEEL (2)	WEATHERING STEEL FIXED BEARING ASSEMBLY (3)	WEATHERING STEEL FIXED OR EXPANSION BEARING ASSEMBLY (3)	CLASS AA CONCRETE	REINFORCING STEEL (5)
		(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	83.3	70.5	580	3	3	29.5	9,260	89.00	76.9	65.3	450	3	3	26.9	8,860	89.00	79.8	67.6	450	3	3	27.9	9,050
	B	89.00	83.3	70.5	580	3	3	29.3	9,250	89.00	76.9	65.3	450	3	3	26.7	8,850	89.00	79.8	67.6	450	3	3	27.7	9,040
35'	II	104.00	95.5	80.5	580	3	3	33.0	10,170	104.00	89.2	75.3	450	3	3	30.4	9,600	104.00	92.0	77.6	450	3	3	31.4	9,800
	B	104.00	95.5	80.5	580	3	3	32.9	10,160	104.00	89.2	75.3	450	3	3	30.2	9,590	104.00	92.0	77.6	450	3	3	31.2	9,790
40'	II	119.00	107.8	90.5	580	3	3	36.5	10,910	119.00	101.4	85.3	450	3	3	33.9	10,510	119.00	104.2	87.6	450	3	3	34.9	10,700
	B	119.00	107.8	90.5	580	3	3	36.4	10,900	119.00	101.4	85.3	450	3	3	33.7	10,500	119.00	104.2	87.6	450	3	3	34.8	10,690
45'	II	134.00	120.0	100.5	580	3	3	40.1	11,820	134.00	113.6	95.3	450	3	3	37.4	11,260	134.00	116.5	97.6	450	3	3	38.4	11,450
	B	134.00	120.0	100.5	580	3	3	39.9	11,810	134.00	113.6	95.3	450	3	3	37.3	11,250	134.00	116.5	97.6	450	3	3	38.3	11,450
50'	II	149.00	132.2	110.5	580	3	3	43.6	12,570	149.00	125.8	105.3	450	3	3	40.9	12,220	149.00	128.7	107.6	450	3	3	42.0	12,420
	B	149.00	132.2	110.5	580	3	3	43.4	12,560	149.00	125.8	105.3	450	3	3	40.8	12,220	149.00	128.7	107.6	450	3	3	41.8	12,410
55'	II	164.00	144.4	120.5	580	3	3	47.1	13,470	164.00	138.1	115.3	450	3	3	44.5	12,970	164.00	140.9	117.6	450	3	3	45.5	13,170
	B	164.00	144.4	120.5	580	3	3	46.9	13,470	164.00	138.1	115.3	450	3	3	44.3	12,960	164.00	140.9	117.6	450	3	3	45.3	13,160
60'	II	179.00	156.7	130.5	580	3	3	50.6	14,340	179.00	150.3	125.3	450	3	3	48.0	13,880	179.00	153.1	127.6	450	3	3	49.0	14,070
	C	179.00	156.7	130.5	580	3	3	51.3	14,340	179.00	150.3	125.3	450	3	3	48.6	13,880	179.00	153.1	127.6	450	3	3	49.7	14,070
65'	III	194.00	168.9	140.5	580	3	3	55.3	15,260	194.00	162.5	135.3	450	3	3	52.6	14,640	194.00	165.3	137.6	450	3	3	53.7	14,830
	C	194.00	168.9	140.5	580	3	3	54.8	15,240	194.00	162.5	135.3	450	3	3	52.2	14,620	194.00	165.3	137.6	450	3	3	53.2	14,820
70'	III	209.00	181.1	150.5	580	3	3	58.8	16,010	209.00	174.7	145.3	450	3	3	56.1	15,600	209.00	177.6	147.6	450	3	3	57.2	15,800
	C	209.00	181.1	150.5	580	3	3	58.4	15,990	209.00	174.7	145.3	450	3	3	55.7	15,590	209.00	177.6	147.6	450	3	3	56.8	15,780
75'	III	224.00	193.3	160.5	580	3	3	62.4	16,910	224.00	186.9	155.3	450	3	3	59.7	16,350	224.00	189.8	157.6	450	3	3	60.8	16,550
	C	224.00	193.3	160.5	580	3	3	61.9	16,900	224.00	186.9	155.3	450	3	3	59.2	16,340	224.00	189.8	157.6	450	3	3	60.3	16,530
80'	III	239.00	205.5	170.5	580	3	3	65.9	17,660	239.00	199.2	165.3	450	3	3	63.3	17,260	239.00	202.0	167.6	450	3	3	64.3	17,450
	IV	239.00	205.5	170.5	590	3	3	67.0	17,680	239.00	199.2	165.3	460	3	3	64.3	17,270	239.00	202.0	167.6	460	3	3	65.4	17,470
85'	III	254.00	217.8	180.5	580	3	3	69.5	18,570	254.00	211.4	175.3	450	3	3	66.8	18,010	254.00	214.2	177.6	450	3	3	67.9	18,200
	IV	254.00	217.8	180.5	590	3	3	70.6	18,580	254.00	211.4	175.3	460	3	3	67.9	18,020	254.00	214.2	177.6	460	3	3	69.0	18,220
90'	IV	269.00	230.0	190.5	590	3	3	74.2	19,330	269.00	223.6	185.3	460	3	3	71.5	18,930	269.00	226.5	187.6	460	3	3	72.6	19,120
95'	IV	284.00	242.2	200.5	590	3	3	77.8	20,240	284.00	235.8	195.3	460	3	3	75.1	19,680	284.00	238.7	197.6	460	3	3	76.2	19,870
100'	IV	299.00	254.4	210.5	590	3	3	81.4	20,980	299.00	248.1	205.3	460	3	3	78.7	20,580	299.00	250.9	207.6	460	3	3	79.8	20,770
105'	IV	314.00	266.7	220.5	690	3	3	86.1	22,030	314.00	260.3	215.3	560	3	3	83.4	21,530	314.00	263.1	217.6	560	3	3	84.5	21,720
110'	BT-72	329.00	278.9	230.5	1,100	3	3	101.4	24,010	329.00	272.5	225.3	970	3	3	98.6	23,670	329.00	275.3	227.6	970	3	3	99.8	23,860
	J	329.00	278.9	230.5	1,100	3	3	101.4	24,010	329.00	272.5	225.3	970	3	3	98.6	23,670	329.00	275.3	227.6	970	3	3	99.8	23,860
115'	BT-72	344.00	291.1	240.5	1,100	3	3	105.2	25,030	344.00	284.7	235.3	970	3	3	102.4	24,410	344.00	287.6	237.6	970	3	3	103.6	24,610
	J	344.00	291.1	240.5	1,100	3	3	105.2	25,030	344.00	284.7	235.3	970	3	3	102.4	24,410	344.00	287.6	237.6	970	3	3	103.6	24,610
120'	BT-72	359.00	303.3	250.5	1,100	3	3	109.0	25,780	359.00	296.9	245.3	970	3	3	106.2	25,320	359.00	299.8	247.6	970	3	3	107.4	25,510
	J	359.00	303.3	250.5	1,100	3	3	109.0	25,780	359.00	296.9	245.3	970	3	3	106.2	25,320	359.00	299.8	247.6	970	3	3	107.4	25,510
125'	J	374.00	315.5	260.5	1,100	3	3	112.8	26,690	374.00	309.2	255.3	970	3	3	110.0	26,070	374.00	312.0	257.6	970	3	3	111.2	26,260
130'	J	389.00	327.8	270.5	1,100	3	3	116.6	27,440	389.00	321.4	265.3	970	3	3	113.8	26,970	389.00	324.2	267.6	970	3	3	115.0	27,170
135'	J	404.00	340.0	280.5	1,100	3	3	120.4	28,340	404.00	333.6	275.3	970	3	3	117.6	27,720	404.00	336.5	277.6	970	3	3	118.8	27,920

(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 130 POUNDS FROM THE QUANTITIES SHOWN.

(3) PROVIDE AND INSTALL FIXED OR 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 FIXED OR EXPANSION BEARING ASSEMBLY. ALL COST OF PROVIDING AND INSTALLING THE FIXED OR 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 FIXED BEARING ASSEMBLY" OR "WEATHERING STEEL EXPANSION BEARING ASSEMBLY."

(4) QUANTITY INCLUDES PROVISION FOR LAP SPLICES REQUIRED IN THE LONGITUDINAL REINFORCING STEEL AS FOLLOWS:
30' THRU 55' SPANS - NO LAP SPLICES
60' THRU 110' SPANS - 1 LAP SPLICE
115' THRU 135' SPANS - 2 LAP SPLICES

(5) 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.

SUMMARY OF QUANTITIES - BEARING ASSEMBLY STRUCTURAL STEEL (PER EACH ASSEMBLY)

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

SUMMARY OF QUANTITIES SEALED EXPANSION JOINT (PER EXPANSION JOINT)

ITEM	UNIT	TOTAL
SEALED EXPANSION JOINT	LF	33.06

NOTES

QUANTITY CALCULATIONS ASSUME ALL PIERS ARE FIXED PIERS. ANY ADJUSTMENTS TO THE QUANTITIES OF "SAW-CUT GROOVING", "CONCRETE RAIL (TR3)", "CLASS AA CONCRETE" AND "REINFORCING STEEL" NECESSARY TO ACCOUNT FOR EXPANSION JOINT OPENINGS WITHIN THE BRIDGE ARE MINOR AND HAVE NOT BEEN CONSIDERED. PAYMENT FOR "SAW-CUT GROOVING", "CONCRETE RAIL (TR3)", "CLASS AA CONCRETE" AND "REINFORCING STEEL" WILL BE BASED ON PLAN QUANTITY.

APPROVED BY BRIDGE ENGINEER Robert J Lusch 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 - CONVENTIONAL - SKEWED 30°

2009 SPECIFICATIONS	CB26-C-SK30-SPR-QUAN-PCB-1	01E
		CB-254E

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 FIXED OR EXPANSION BEARING ASSEMBLY ②	CLASS AA CONCRETE	REINFORCING STEEL ③	PRESTRESSED CONCRETE BEAMS (TYPE ①)	SAW-CUT GROOVING	CONCRETE RAIL (TR3)	STRUCTURAL STEEL	WEATHERING STEEL FIXED OR EXPANSION BEARING ASSEMBLY ②	CLASS AA CONCRETE	REINFORCING STEEL ③	PRESTRESSED CONCRETE BEAMS (TYPE ①)	SAW-CUT GROOVING	CONCRETE RAIL (TR3)	STRUCTURAL STEEL	WEATHERING STEEL FIXED OR EXPANSION BEARING ASSEMBLY ②	CLASS AA CONCRETE	REINFORCING STEEL ③
		(LF)	(SY)	(LF)	(LB)	(EA)	(CY)	(LB)	(LF)	(SY)	(LF)	(LB)	(EA)	(CY)	(LB)	(LF)	(SY)	(LF)	(LB)	(EA)	(CY)	(LB)
30'	II	89.00	70.6	60.0	320	6	24.2	8,280	89.00	73.4	62.4	320	6	25.2	8,530	89.00	76.3	64.7	320	6	26.2	8,720
	B	89.00	70.6	60.0	320	6	24.1	8,270	89.00	73.4	62.4	320	6	25.1	8,520	89.00	76.3	64.7	320	6	26.1	8,710
35'	II	104.00	82.8	70.0	320	6	27.7	9,080	104.00	85.6	72.4	320	6	28.8	9,270	104.00	88.5	74.7	320	6	29.8	9,470
	B	104.00	82.8	70.0	320	6	27.6	9,070	104.00	85.6	72.4	320	6	28.6	9,270	104.00	88.5	74.7	320	6	29.6	9,460
40'	II	119.00	95.0	80.0	320	6	31.3	9,980	119.00	97.9	82.4	320	6	32.3	10,180	119.00	100.7	84.7	320	6	33.3	10,370
	B	119.00	95.0	80.0	320	6	31.1	9,980	119.00	97.9	82.4	320	6	32.1	10,170	119.00	100.7	84.7	320	6	33.1	10,360
45'	II	134.00	107.2	90.0	320	6	34.8	10,730	134.00	110.1	92.4	320	6	35.8	10,930	134.00	112.9	94.7	320	6	36.8	11,120
	B	134.00	107.2	90.0	320	6	34.6	10,720	134.00	110.1	92.4	320	6	35.6	10,920	134.00	112.9	94.7	320	6	36.7	11,120
50'	II	149.00	119.4	100.0	320	6	38.3	11,700	149.00	122.3	102.4	320	6	39.3	11,890	149.00	125.2	104.7	320	6	40.3	12,090
	B	149.00	119.4	100.0	320	6	38.2	11,690	149.00	122.3	102.4	320	6	39.2	11,890	149.00	125.2	104.7	320	6	40.2	12,080
55'	II	164.00	131.7	110.0	320	6	41.8	12,450	164.00	134.5	112.4	320	6	42.8	12,640	164.00	137.4	114.7	320	6	43.9	12,840
	B	164.00	131.7	110.0	320	6	41.7	12,440	164.00	134.5	112.4	320	6	42.7	12,630	164.00	137.4	114.7	320	6	43.7	12,830
60'	II	179.00	143.9	120.0	320	6	45.4	13,350	179.00	146.7	122.4	320	6	46.4	13,550	179.00	149.6	124.7	320	6	47.4	13,740
	C	179.00	143.9	120.0	320	6	45.9	13,350	179.00	146.7	122.4	320	6	47.0	13,550	179.00	149.6	124.7	320	6	48.1	13,740
65'	III	194.00	156.1	130.0	320	6	49.9	14,110	194.00	159.0	132.4	320	6	51.0	14,310	194.00	161.8	134.7	320	6	52.0	14,500
	C	194.00	156.1	130.0	320	6	49.5	14,100	194.00	159.0	132.4	320	6	50.5	14,290	194.00	161.8	134.7	320	6	51.6	14,490
70'	III	209.00	168.3	140.0	320	6	53.5	15,080	209.00	171.2	142.4	320	6	54.5	15,280	209.00	174.0	144.7	320	6	55.6	15,470
	C	209.00	168.3	140.0	320	6	53.0	15,060	209.00	171.2	142.4	320	6	54.1	15,260	209.00	174.0	144.7	320	6	55.1	15,450
75'	III	224.00	180.6	150.0	320	6	57.0	15,830	224.00	183.4	152.4	320	6	58.1	16,020	224.00	186.3	154.7	320	6	59.1	16,220
	C	224.00	180.6	150.0	320	6	56.6	15,810	224.00	183.4	152.4	320	6	57.6	16,010	224.00	186.3	154.7	320	6	58.7	16,200
80'	III	239.00	192.8	160.0	320	6	60.6	16,730	239.00	195.6	162.4	320	6	61.6	16,930	239.00	198.5	164.7	320	6	62.7	17,120
	IV	239.00	192.8	160.0	330	6	61.6	16,750	239.00	195.6	162.4	330	6	62.7	16,940	239.00	198.5	164.7	330	6	63.8	17,140
85'	III	254.00	205.0	170.0	320	6	64.1	17,480	254.00	207.9	172.4	320	6	65.2	17,680	254.00	210.7	174.7	320	6	66.2	17,870
	IV	254.00	205.0	170.0	330	6	65.2	17,500	254.00	207.9	172.4	330	6	66.3	17,690	254.00	210.7	174.7	330	6	67.4	17,890
90'	IV	269.00	217.2	180.0	330	6	68.8	18,400	269.00	220.1	182.4	330	6	69.9	18,600	269.00	222.9	184.7	330	6	71.0	18,790
95'	IV	284.00	229.4	190.0	330	6	72.4	19,150	284.00	232.3	192.4	330	6	73.5	19,350	284.00	235.2	194.7	330	6	74.6	19,540
100'	IV	299.00	241.7	200.0	330	6	76.0	20,060	299.00	244.5	202.4	330	6	77.1	20,250	299.00	247.4	204.7	330	6	78.2	20,450
105'	IV	314.00	253.9	210.0	430	6	80.7	21,000	314.00	256.7	212.4	430	6	81.8	21,200	314.00	259.6	214.7	430	6	82.9	21,390
110'	BT-72	329.00	266.1	220.0	840	6	95.8	23,140	329.00	269.0	222.4	840	6	97.0	23,340	329.00	271.8	224.7	840	6	98.2	23,530
	J	329.00	266.1	220.0	840	6	95.8	23,140	329.00	269.0	222.4	840	6	97.0	23,340	329.00	271.8	224.7	840	6	98.2	23,530
115'	BT-72	344.00	278.3	230.0	840	6	99.6	23,890	344.00	281.2	232.4	840	6	100.8	24,080	344.00	284.0	234.7	840	6	102.0	24,280
	J	344.00	278.3	230.0	840	6	99.6	23,890	344.00	281.2	232.4	840	6	100.8	24,080	344.00	284.0	234.7	840	6	102.0	24,280
120'	BT-72	359.00	290.6	240.0	840	6	103.4	24,790	359.00	293.4	242.4	840	6	104.6	24,990	359.00	296.3	244.7	840	6	105.8	25,180
	J	359.00	290.6	240.0	840	6	103.4	24,790	359.00	293.4	242.4	840	6	104.6	24,990	359.00	296.3	244.7	840	6	105.8	25,180
125'	J	374.00	302.8	250.0	840	6	107.2	25,540	374.00	305.6	252.4	840	6	108.4	25,740	374.00	308.5	254.7	840	6	109.6	25,930
130'	J	389.00	315.0	260.0	840	6	111.0	26,450	389.00	317.9	262.4	840	6	112.2	26,640	389.00	320.7	264.7	840	6	113.4	26,840
135'	J	404.00	327.2	270.0	840	6	114.8	27,200	404.00	330.1	272.4	840	6	116.0	27,390	404.00	332.9	274.7	840	6	117.2	27,590

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 PROVIDE AND INSTALL FIXED OR 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 FIXED OR EXPANSION BEARING ASSEMBLY. ALL COST OF PROVIDING AND INSTALLING THE FIXED OR 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 FIXED BEARING ASSEMBLY" OR "WEATHERING STEEL EXPANSION BEARING ASSEMBLY."

③ 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.

NOTES

QUANTITY CALCULATIONS ASSUME ALL PIERS ARE FIXED PIERS. ANY ADJUSTMENTS TO THE QUANTITIES OF "SAW-CUT GROOVING", "CONCRETE RAIL (TR3)", "CLASS AA CONCRETE" AND "REINFORCING STEEL" NECESSARY TO ACCOUNT FOR EXPANSION JOINT OPENINGS WITHIN THE BRIDGE ARE MINOR AND HAVE NOT BEEN CONSIDERED. PAYMENT FOR "SAW-CUT GROOVING", "CONCRETE RAIL (TR3)", "CLASS AA CONCRETE" AND "REINFORCING STEEL" WILL BE BASED ON PLAN QUANTITY.

APPROVED BY BRIDGE ENGINEER Robert J Rusch DATE 9-9-2011

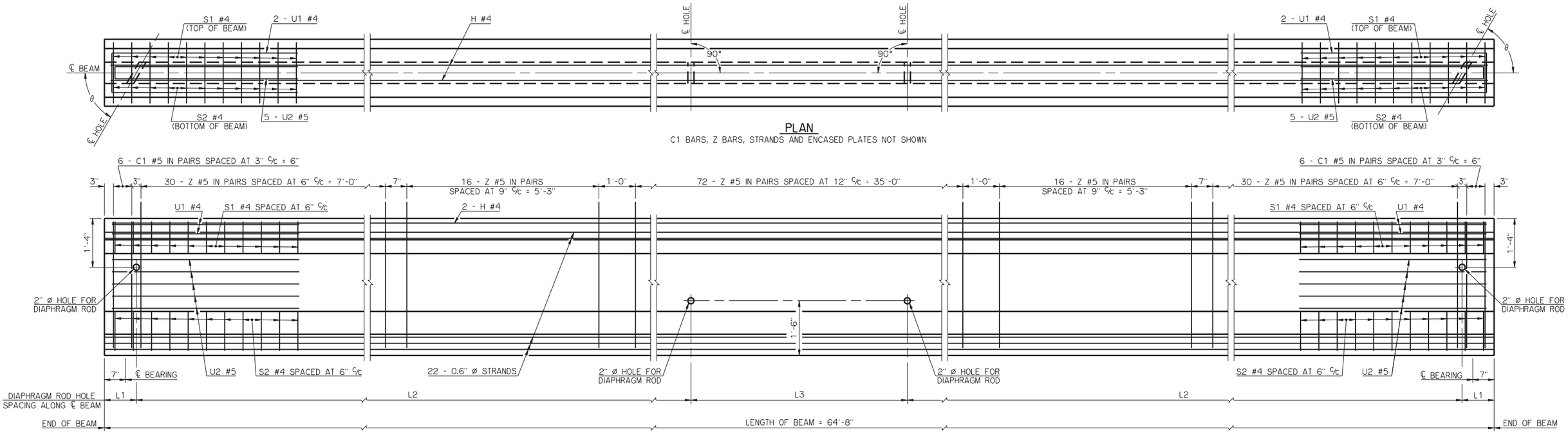
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

SUPERSTRUCTURE QUANTITIES
P.C. BEAMS
(SHEET NO. 2 OF 2)

26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 30°

2009 SPECIFICATIONS | CB26-C-SK30-SPR-QUAN-PCB-2 | 01E

CB-255E



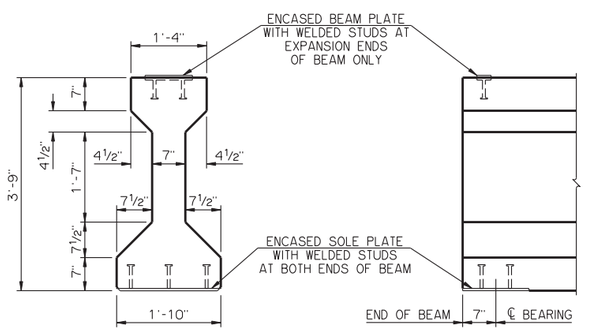
PLAN

C1 BARS, Z BARS, STRANDS AND ENCASED PLATES NOT SHOWN

ELEVATION

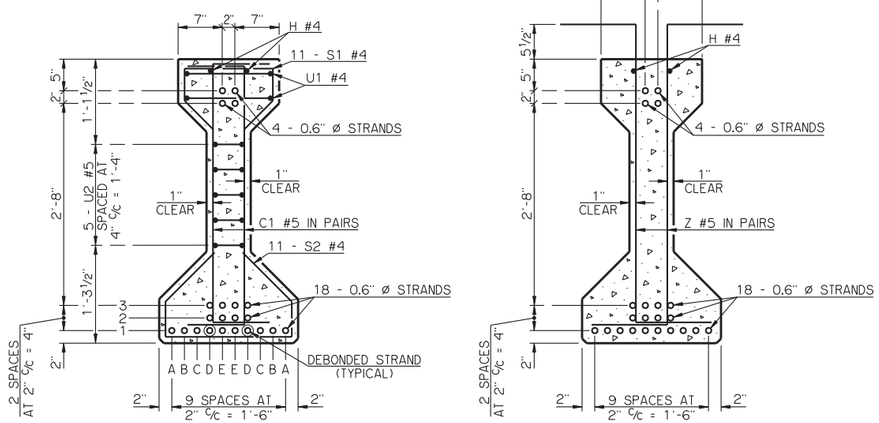
ENCASED PLATES NOT SHOWN

DIAPHRAGM ROD HOLE SCHEDULE				
BRIDGE SKEW	θ	L1	L2	L3
0°	90°	10½"	31'-5½"	0'-0"
30° LEFT FORWARD	60°	1'-0"	28'-4½"	5'-11"
30° RIGHT FORWARD	120°	1'-0"	28'-4½"	5'-11"



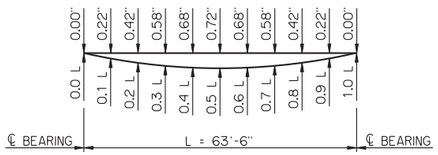
END VIEW

END ELEVATION



BEAM SECTIONS
(22 - 0.6" Ø STRANDS)

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



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.

APPROVED BY BRIDGE ENGINEER Robert J Rusch DATE 9-9-2011

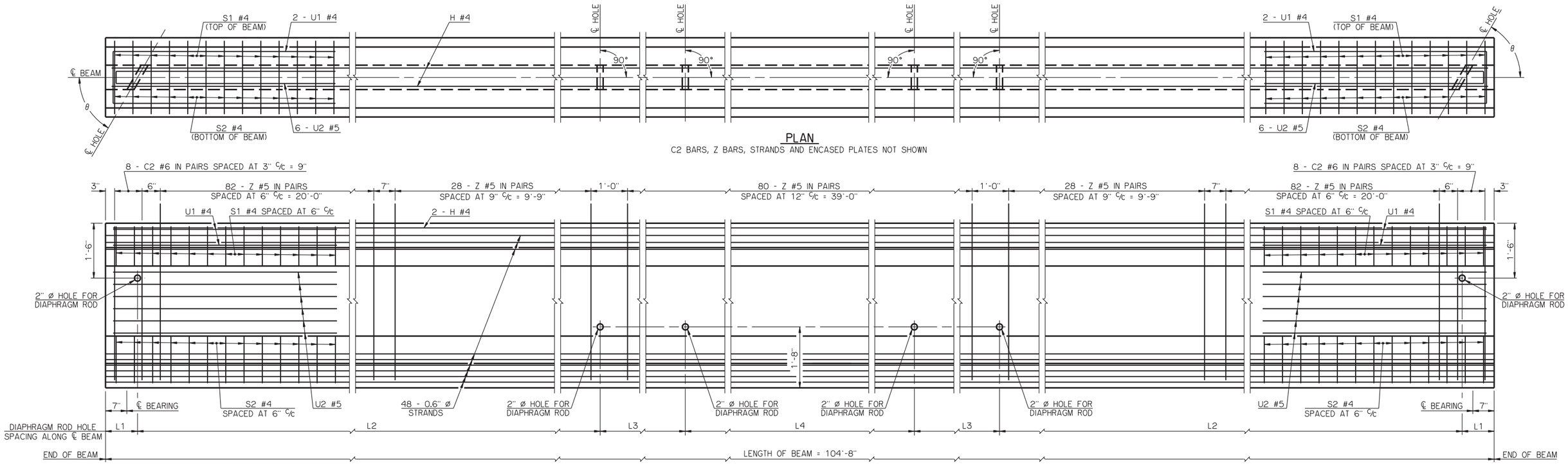
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

P.C. BEAM DETAILS
TYPE III - 65' SPAN

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

2009 SPECIFICATIONS	CB26-C-SKO..30-PCB-III-65	01E

CB-276E



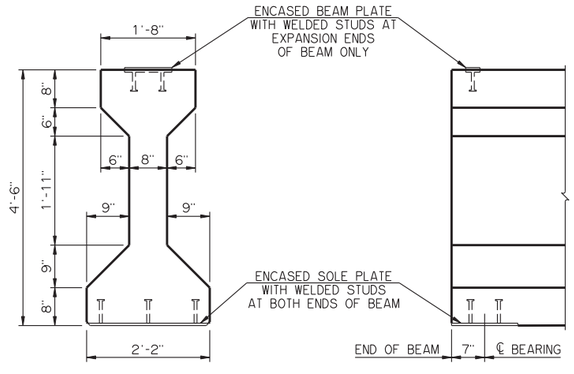
PLAN

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

ELEVATION

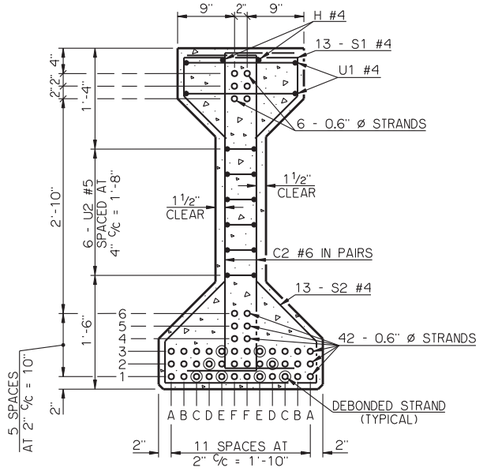
ENCASED PLATES NOT SHOWN

DIAPHRAGM ROD HOLE SCHEDULE					
BRIDGE SKEW	θ	L1	L2	L3	L4
0°	90°	10½"	34'-2"	0'-0"	34'-7"
30° LEFT FORWARD	60°	1'-0"	31'-1"	5'-11"	28'-8"
30° RIGHT FORWARD	120°	1'-0"	31'-1"	5'-11"	28'-8"

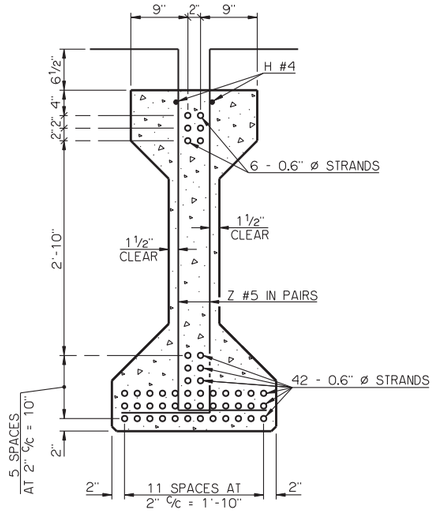


END VIEW

END ELEVATION



END SECTION

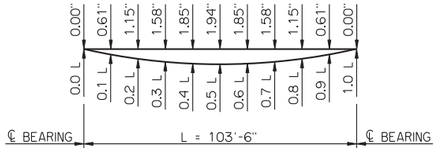


℄ SECTION

BEAM SECTIONS

(48 - 0.6" ø STRANDS)

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



DEAD LOAD DEFLECTIONS

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

MATERIAL PROPERTIES

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

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

LFD OPERATING RATING - HS 55.0

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

APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

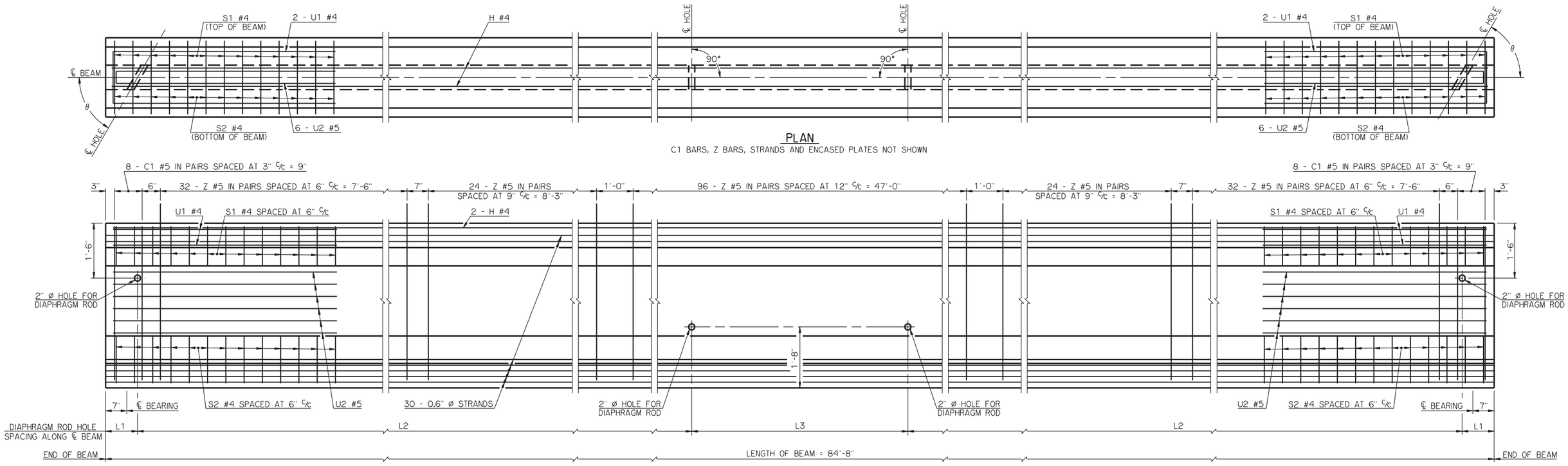
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

P.C. BEAM DETAILS TYPE IV - 105' SPAN

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

2009 SPECIFICATIONS | CB26-C-SK0..30-PCB-IV-105 | 01E

CB-294E



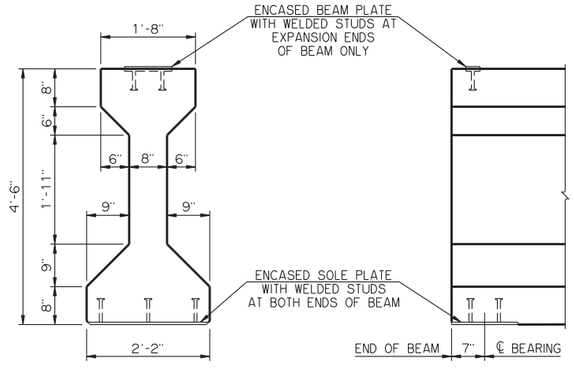
PLAN

C1 BARS, Z BARS, STRANDS AND ENCASED PLATES NOT SHOWN

ELEVATION

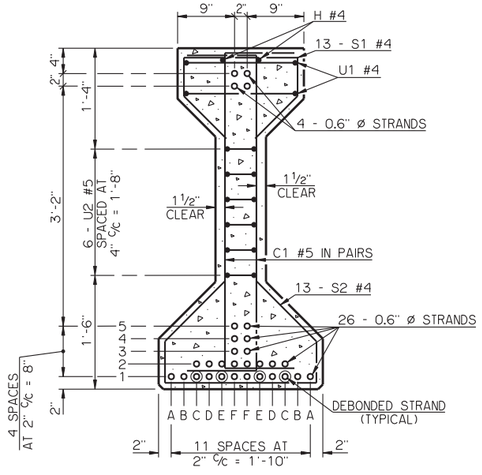
ENCASED PLATES NOT SHOWN

DIAPHRAGM ROD HOLE SCHEDULE				
BRIDGE SKEW	θ	L1	L2	L3
0°	90°	10½"	41'-5½"	0'-0"
30° LEFT FORWARD	60°	1'-0"	38'-4½"	5'-11"
30° RIGHT FORWARD	120°	1'-0"	38'-4½"	5'-11"

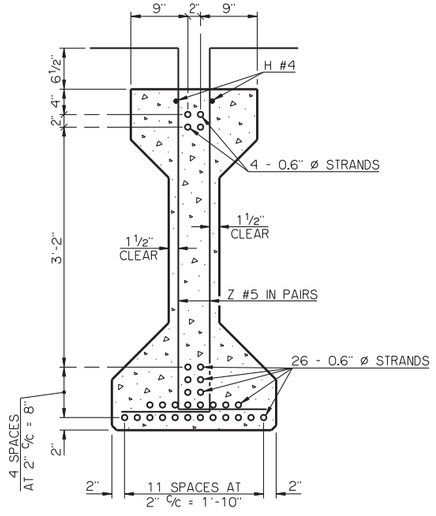


END VIEW

END ELEVATION



END SECTION

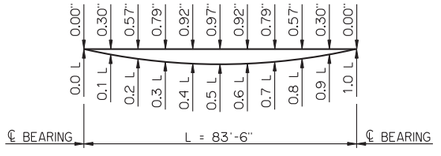


℄ SECTION

BEAM SECTIONS

(30 - 0.6" ø STRANDS)

DEBOND SCHEDULE	
DEBOND PAIR	DEBOND LENGTH FROM END OF BEAM
C1	4'-0"
E1	4'-0"



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 5,250 PSI AT THE TIME OF TRANSFER OF THE PRESTRESSING FORCE AND NO LESS THAN 7,000 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 45.8

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.

APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

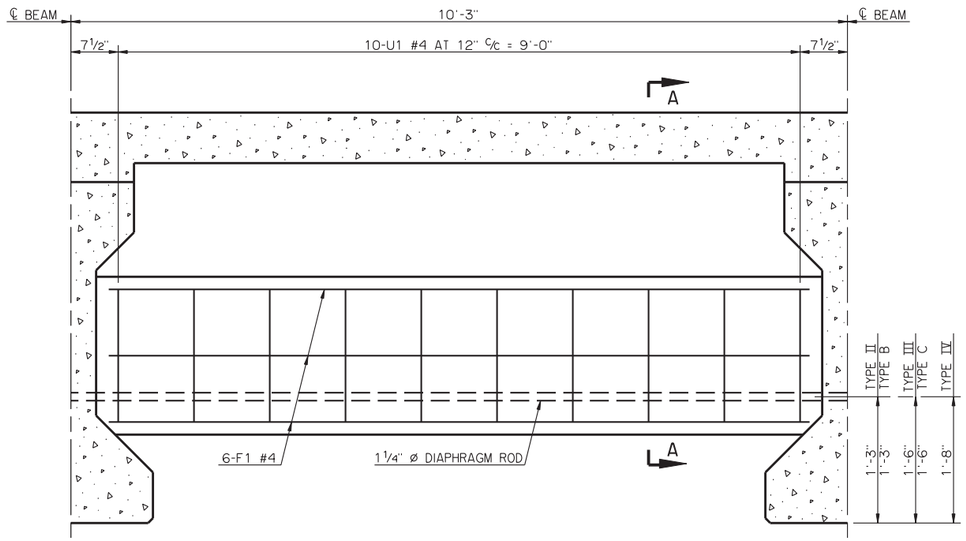
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

P.C. BEAM DETAILS
TYPE IV - 85' SPAN

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

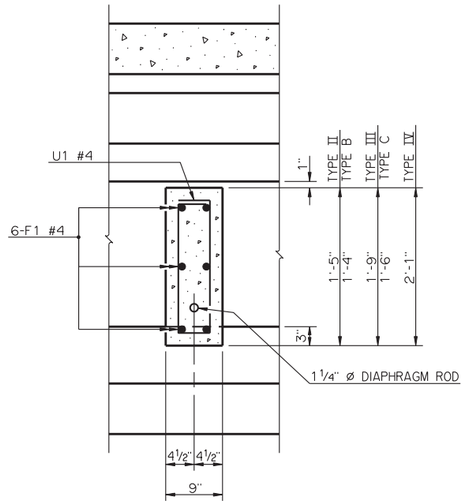
2009 SPECIFICATIONS | CB26-C-SKO..30-PCB-IV-85 | 01E

CB-290E

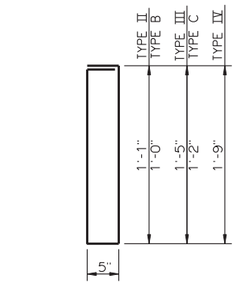


ELEVATION OF INTERMEDIATE DIAPHRAGM TYPE II, B, III, C AND IV P.C. BEAMS

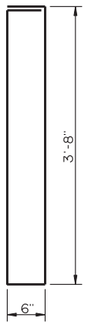
FOR SPANS OF 100' OR LESS IN LENGTH - INCLUDE ONE LINE OF INTERMEDIATE DIAPHRAGMS PER SPAN.
FOR SPANS OVER 100' IN LENGTH - INCLUDE TWO LINES OF INTERMEDIATE DIAPHRAGMS PER SPAN.



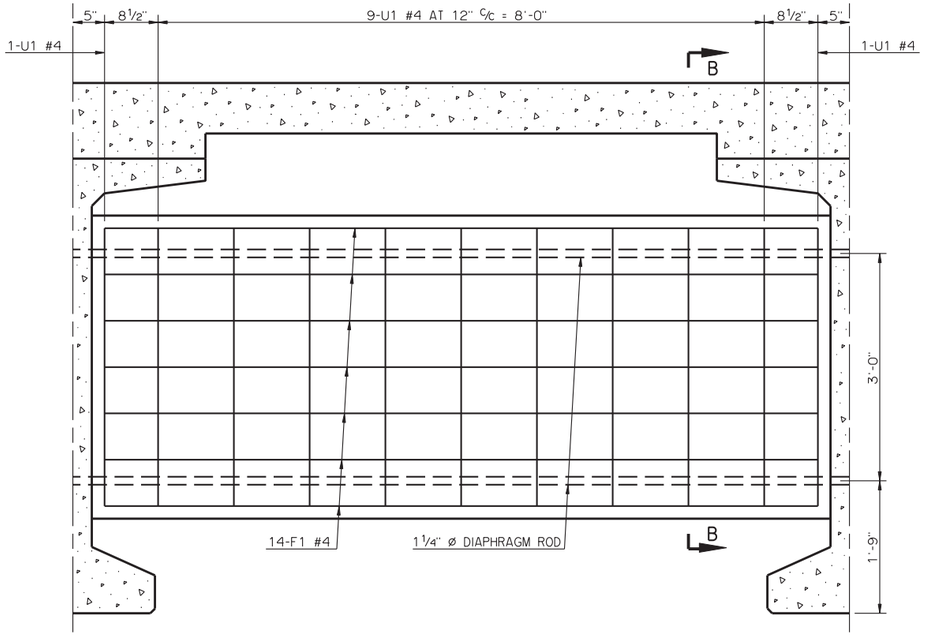
SECTION A-A



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

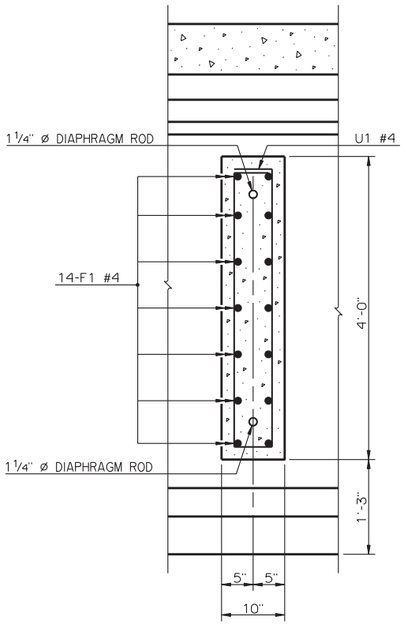


U1 #4 X 8'-10" - TYPE BT-72 AND TYPE J



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

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



SECTION B-B

DETAILS OF BENT REINFORCING STEEL

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

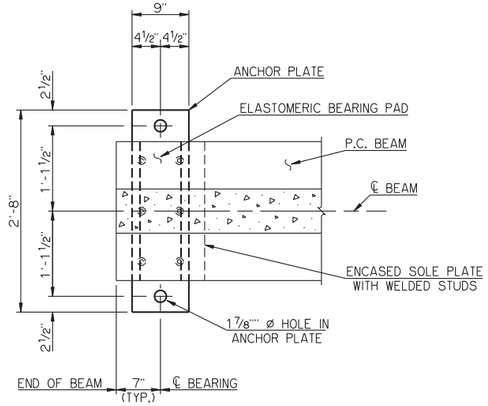
APPROVED BY BRIDGE ENGINEER Robert J. Rusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

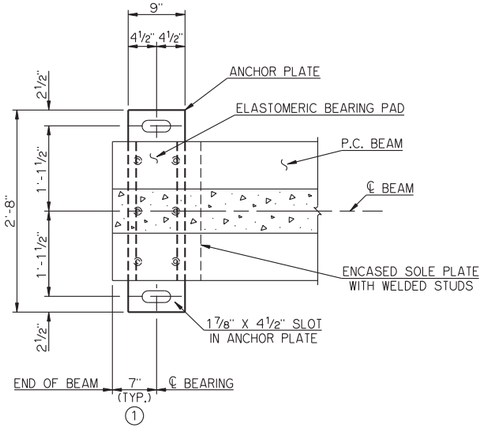
INTERMEDIATE DIAPHRAGM DETAILS P.C. BEAMS

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

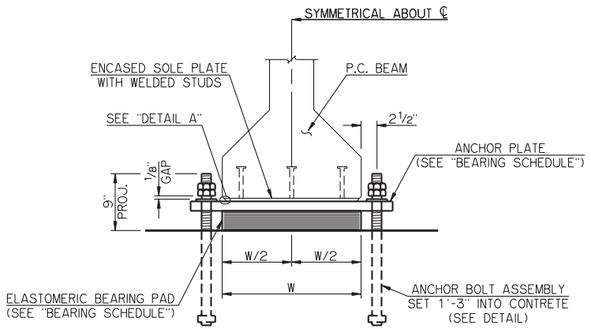
2009 SPECIFICATIONS	CB26-C-SK0..30-DIA-INT-PCB	01E
		CB-347E



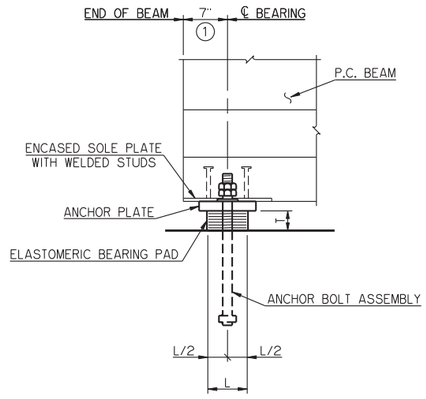
FIXED BEARING PLAN
ANCHOR BOLT ASSEMBLIES NOT SHOWN



EXPANSION BEARING PLAN
ANCHOR BOLT ASSEMBLIES NOT SHOWN



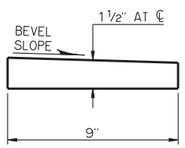
END VIEW



SIDE VIEW

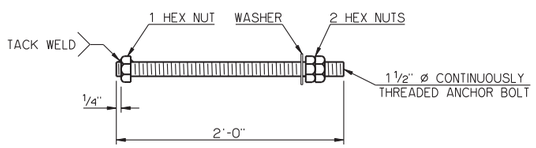
BEARING DETAILS
60' AND 65' SPANS

DETAIL A

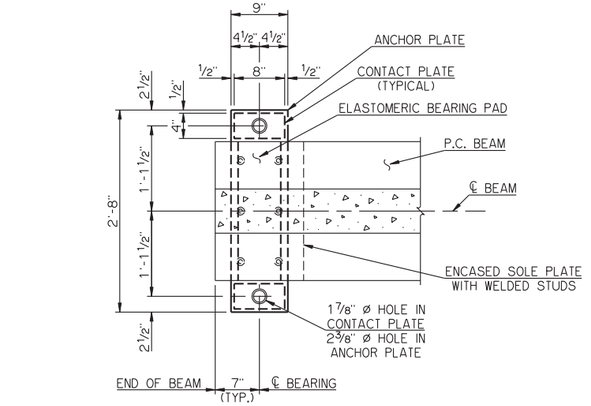


BEVELED ANCHOR PLATE DETAIL

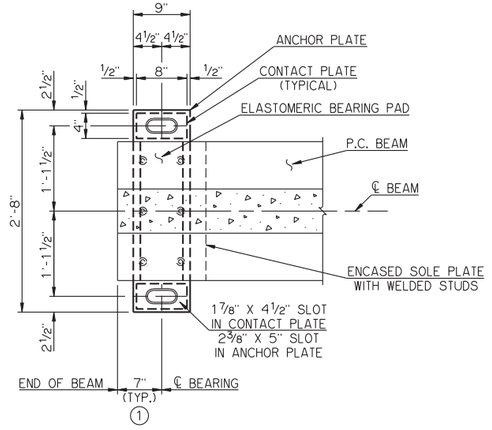
BEVELED ANCHOR PLATE IS REQUIRED WHEN ANGLE BETWEEN UNDERSIDE OF BEAM AND HORIZONTAL EXCEEDS 1.0%. BEVEL SLOPE TO MATCH ANGLE BETWEEN BEAM AND HORIZONTAL. PAINT THICKER EDGE RED.



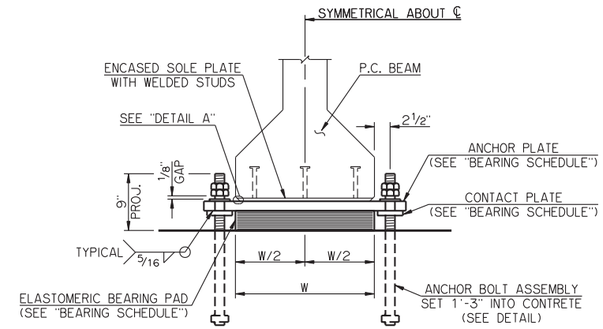
ANCHOR BOLT ASSEMBLY DETAIL



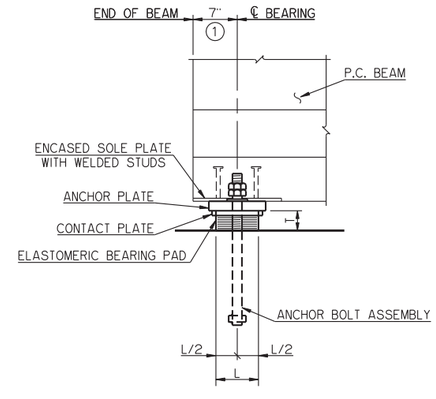
FIXED BEARING PLAN
ANCHOR BOLT ASSEMBLIES NOT SHOWN



EXPANSION BEARING PLAN
ANCHOR BOLT ASSEMBLIES NOT SHOWN



END VIEW



SIDE VIEW

BEARING DETAILS
70' THRU 85' SPANS

BEARING SCHEDULE

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	LAMINATE PLATE	
60'	1½" X 9" X 2'-8"	---	3⅛" X 6½" X 1'-10"	2-¼"	5-⅜"	6-⅛"	235'
65'	1½" X 9" X 2'-8"	---	3⅛" X 6½" X 1'-10"	2-¼"	5-⅜"	6-⅛"	255'
70'	1½" X 9" X 2'-8"	1/2" X 4" X 8"	3⅛" X 6½" X 1'-10"	2-¼"	5-⅜"	6-⅛"	260'
75'	1½" X 9" X 2'-8"	1/2" X 4" X 8"	3⅛" X 6¾" X 1'-10"	2-¼"	5-⅜"	6-⅛"	260'
80'	1½" X 9" X 2'-8"	1/2" X 4" X 8"	3⅛" X 6¾" X 1'-10"	2-¼"	5-⅜"	6-⅛"	260'
85'	1½" X 9" X 2'-8"	3/4" X 4" X 8"	3⅛" X 6¾" X 1'-10"	2-¼"	5-⅜"	6-⅛"	260'

NOTES

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

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

APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

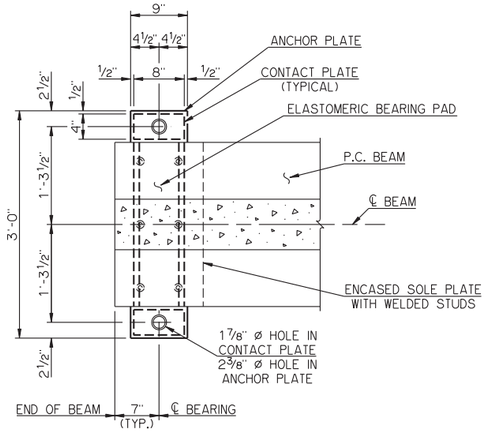
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

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

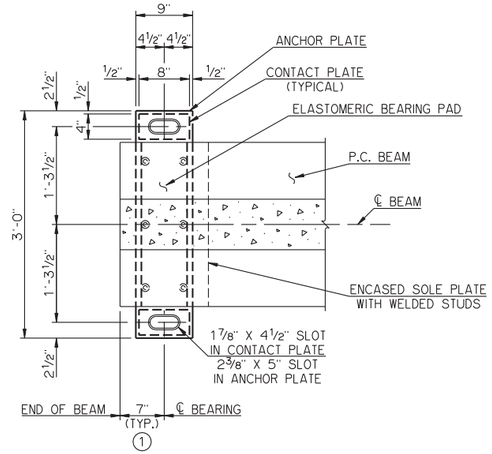
26' CLEAR ROADWAY - CONVENTIONAL - SKEWED 0° AND 30°

2009 SPECIFICATIONS | CB26-C-SK0..30-BRG-PC3 | 01E

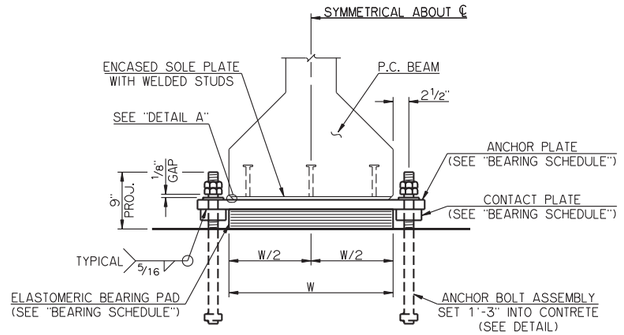
CB-360E



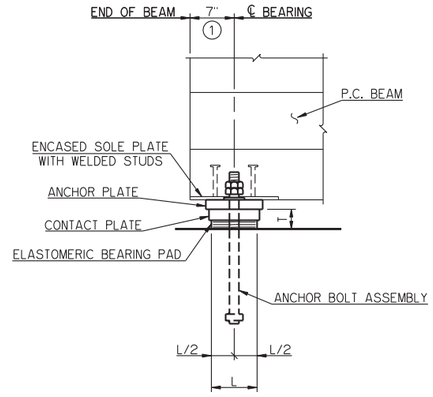
FIXED BEARING PLAN
ANCHOR BOLT ASSEMBLIES NOT SHOWN



EXPANSION BEARING PLAN
ANCHOR BOLT ASSEMBLIES NOT SHOWN

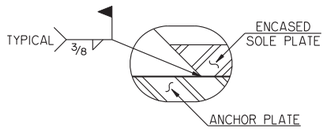


END VIEW

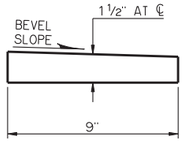


SIDE VIEW

BEARING DETAILS

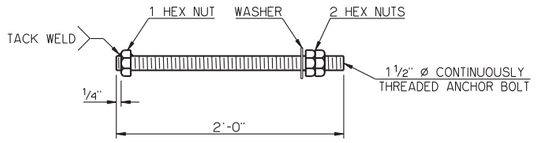


DETAIL A



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

BEARING SCHEDULE							
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	LAMINATE PLATE	
80'	1½" X 9" X 3'-0"	¾" X 4" X 8"	3⅛" X 6½" X 2'-2"	2-¼"	5-⅜"	6-⅛"	260'
85'	1½" X 9" X 3'-0"	1" X 4" X 8"	3⅛" X 6½" X 2'-2"	2-¼"	5-⅜"	6-⅛"	260'
90'	1½" X 9" X 3'-0"	1" X 4" X 8"	3⅛" X 6¾" X 2'-2"	2-¼"	5-⅜"	6-⅛"	260'
95'	1½" X 9" X 3'-0"	1¼" X 4" X 8"	3⅛" X 6¾" X 2'-2"	2-¼"	5-⅜"	6-⅛"	260'
100'	1½" X 9" X 3'-0"	1¼" X 4" X 8"	3⅛" X 6¾" X 2'-2"	2-¼"	5-⅜"	6-⅛"	260'
105'	1½" X 9" X 3'-0"	1½" X 4" X 8"	3⅛" X 7" X 2'-2"	2-¼"	5-⅜"	6-⅛"	260'
110'	1½" X 9" X 3'-0"	1½" X 4" X 8"	3⅛" X 7" X 2'-2"	2-¼"	5-⅜"	6-⅛"	260'
115'	1½" X 9" X 3'-0"	1¾" X 4" X 8"	3⅛" X 7" X 2'-2"	2-¼"	5-⅜"	6-⅛"	260'
120'	1½" X 9" X 3'-0"	1¾" X 4" X 8"	3⅛" X 7¼" X 2'-2"	2-¼"	5-⅜"	6-⅛"	260'

NOTES

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

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

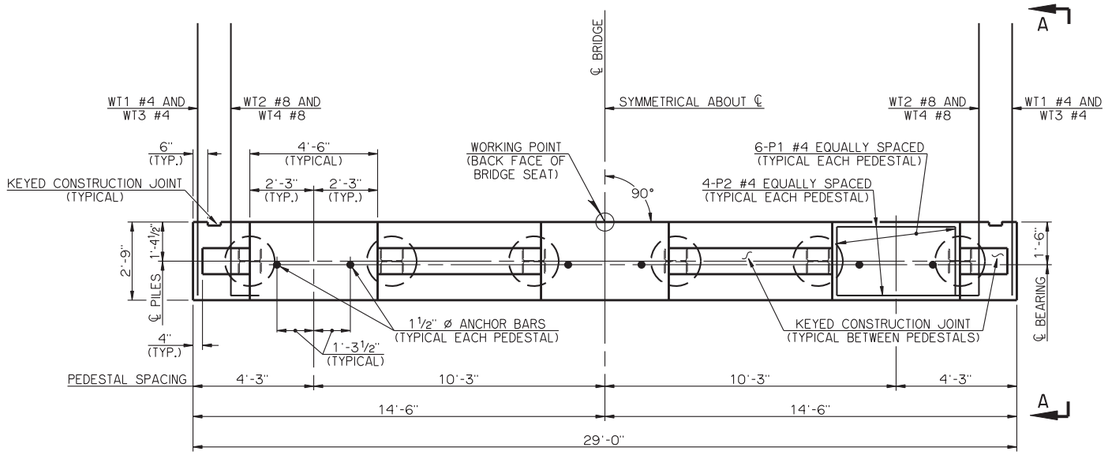
APPROVED BY BRIDGE ENGINEER Robert J. Lusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

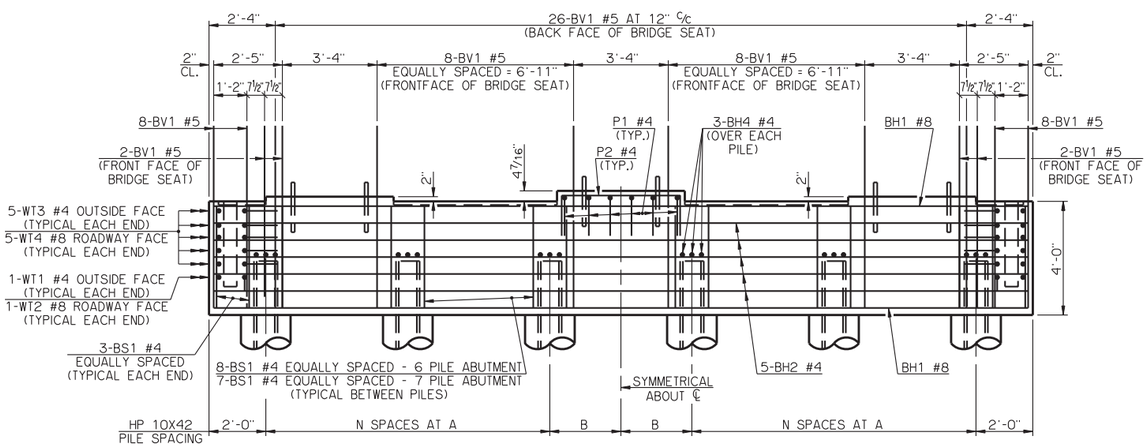
BEARING DETAILS
TYPE IV AND TYPE BT-72 P.C. BEAMS

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

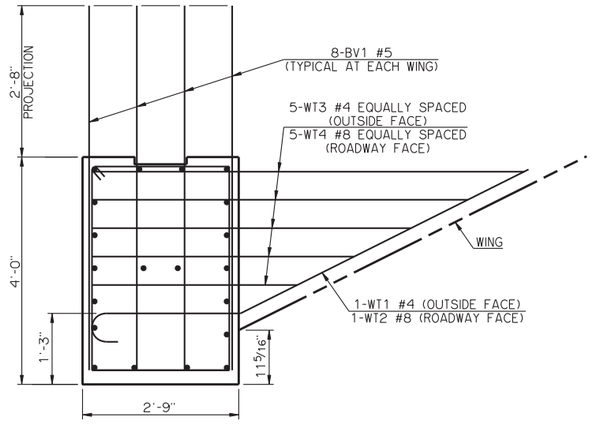
2009 SPECIFICATIONS	CB26-C-SK0..30-BRG-PC4	01E
		CB-361E



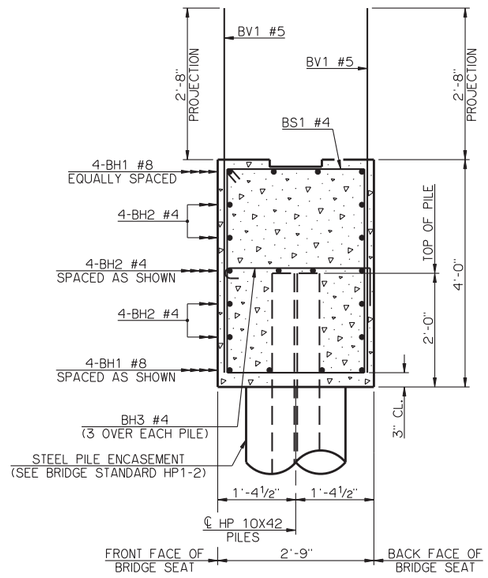
PLAN



ELEVATION



VIEW A-A



TYPICAL SECTION THRU BRIDGE SEAT

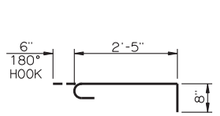
PILE SCHEDULE					
SPAN	TOTAL NUMBER OF PILES	N SPACES	A	B	MAXIMUM FACTORED PILE LOAD
80'	6	2	5'-0"	2'-6"	76.2 TON
85'	7	3	4'-2"	0'-0"	67.3 TON
90'	7	3	4'-2"	0'-0"	69.2 TON
95'	7	3	4'-2"	0'-0"	71.1 TON
100'	7	3	4'-2"	0'-0"	73.1 TON
105'	7	3	4'-2"	0'-0"	75.2 TON

BAR LIST - ONE ABUTMENT					
MARK	NO.	SIZE	FORM	LENGTH	LENGTH VARIATION
BH1	8	#8	STR.	28'-8"	-
BH2	12	#4	STR.	28'-8"	-
BV1	62	#5	STR.	6'-5"	-
P1	18	#4	BNT.	4'-11"	-
P2	12	#4	BNT.	6'-8"	-
WT1	2	#4	BNT.	5'-2"	-
WT2	2	#8	BNT.	11'-2"	-
(1) WT3	10	#4	STR.	5'-7" AVG.	3'-7" TO 7'-7"
(1) WT4	10	#8	BNT.	6'-11" AVG.	4'-11" TO 8'-11"
ADDITIONAL BARS TO BE USED WITH 6 PILE ABUTMENTS					
BH3	18	#4	BNT.	3'-7"	-
BS1	46	#4	BNT.	12'-9"	-
ADDITIONAL BARS TO BE USED WITH 7 PILE ABUTMENTS					
BH3	21	#4	BNT.	3'-7"	-
BS1	48	#4	BNT.	12'-9"	-

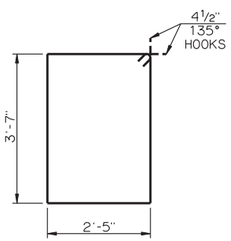
(1) NO. INCLUDES TWO SETS OF 5 BARS

SUMMARY OF QUANTITIES - ONE ABUTMENT (2)		
ITEM	UNIT	TOTAL
SUBSTRUCTURE EXCAVATION, COMMON	CY	30.00
GRANULAR BACKFILL	CY	35.00
CLASS A CONCRETE	CY	12.10
REINFORCING STEEL	LB	2,120.00
PILES, FURNISHED (HP 10X42)	LF	-
PILES, DRIVEN (HP 10X42)	LF	-
6" PERFORATED PIPE UNDERDRAIN	LF	26.00
6" NON-PERFORATED PIPE UNDERDRAIN	LF	-

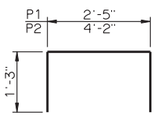
(2) EXCLUDES WINGS



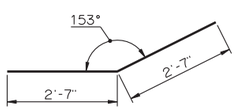
BH3 #4 X 3'-7"



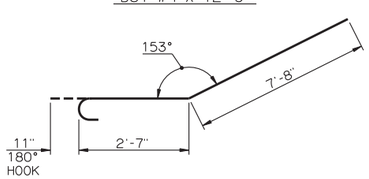
BS1 #4 X 12'-9"



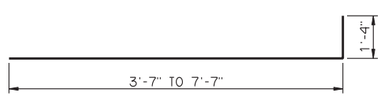
P1 #4 X 4'-11"
P2 #4 X 6'-8"



WT1 #4 X 5'-2"

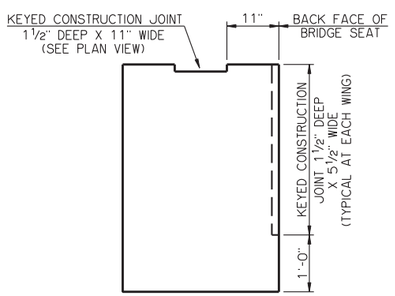


WT2 #8 X 11'-2"



WT4 #8 X 6'-11" AVG.

DETAILS OF BENT REINFORCING STEEL



DETAIL OF CONSTRUCTION JOINTS

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.

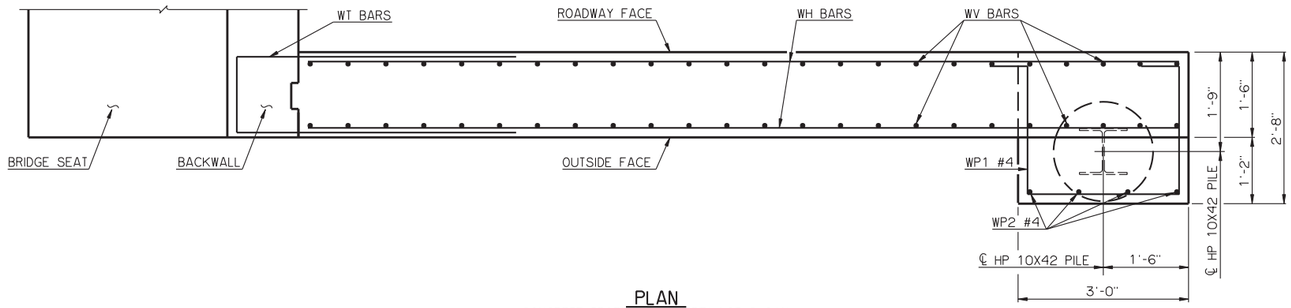
APPROVED BY BRIDGE ENGINEER Robert J. Rusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

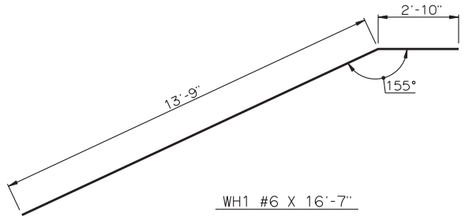
ABUTMENT DETAILS
TYPE IV P.C. BEAMS

26' CLEAR ROADWAY - INTEGRAL - SKEWED 0°

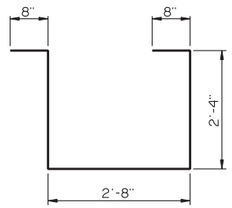
2009 SPECIFICATIONS	CB26-I-SKO-ABUT-PC4	01E
		CB-371E



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

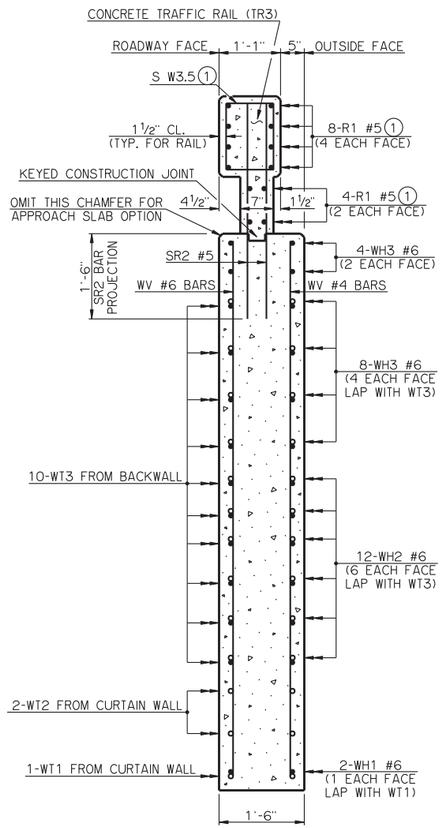


WH1 #6 X 16'-7"

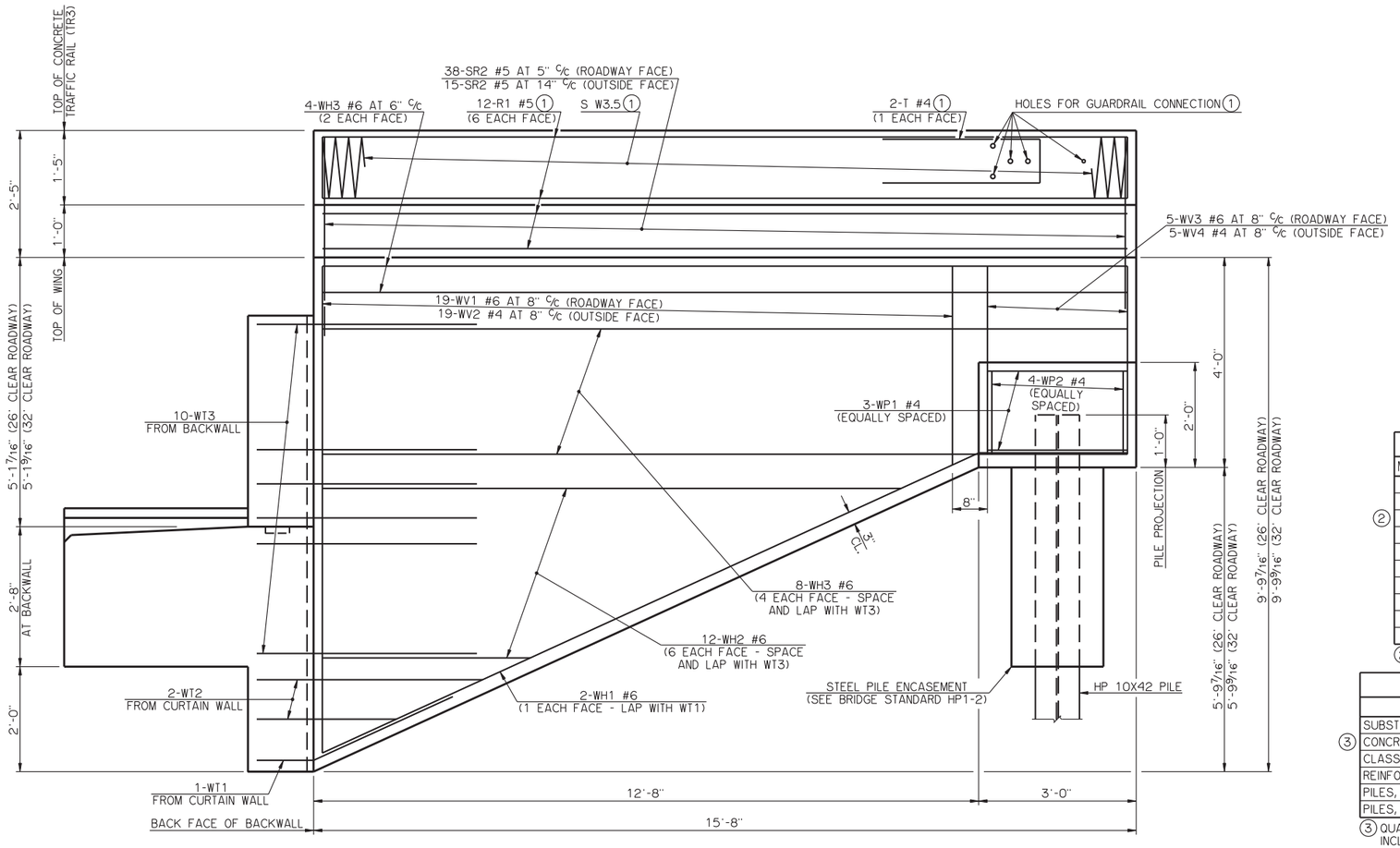


WP1 #4 X 8'-8"

DETAILS OF BENT REINFORCING STEEL



SECTION THRU WING AT BACK FACE OF BACKWALL



ELEVATION

BAR LIST - ONE WING					
MARK	NO.	SIZE	FORM	LENGTH	LENGTH VARIATION
SR2	53	#5	STR.	3'-9"	-
WH1	2	#6	BNT.	16'-7"	-
(2) WH2	10	#6	STR.	7'-9½" AVG.	4'-2" TO 11'-5"
WH3	12	#6	STR.	15'-4"	-
WV1	19	#6	STR.	6'-6" AVG.	3'-9" TO 9'-3"
WV2	19	#4	STR.	6'-6" AVG.	3'-9" TO 9'-3"
WV3	5	#6	STR	3'-7"	-
WV4	5	#4	STR.	3'-7"	-
WP1	3	#4	BNT.	8'-8"	-
WP2	4	#4	STR.	1'-7"	-

(2) NO. INCLUDES TWO SETS OF 6 BARS

SUMMARY OF QUANTITIES - ONE WING		
ITEM	UNIT	TOTAL
SUBSTRUCTURE EXCAVATION, COMMON	CY	15.00
(3) CONCRETE RAIL (TR3)	LF	15.70
CLASS A CONCRETE	CY	5.80
REINFORCING STEEL	LB	980.00
PILES, FURNISHED (HP 10X42)	LF	-
PILES, DRIVEN (HP 10X42)	LF	-

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

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

APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

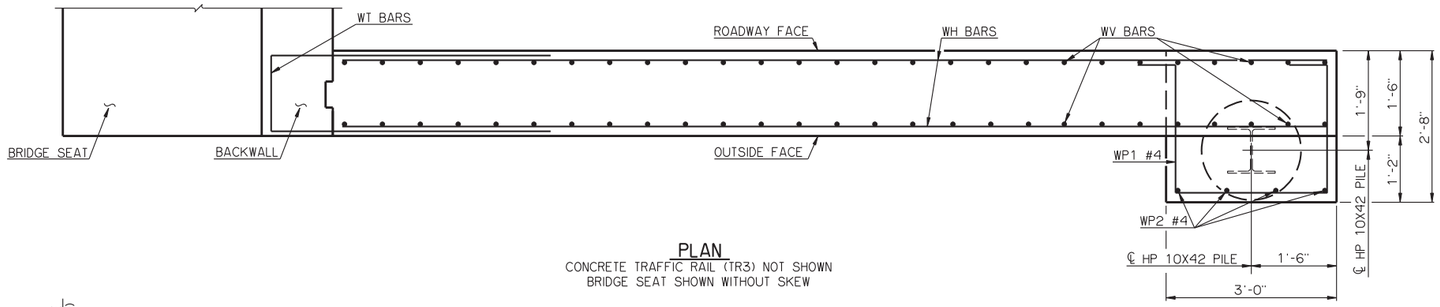
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

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

26' AND 32' CLEAR ROADWAYS - CONVENTIONAL - SKEWED 30°

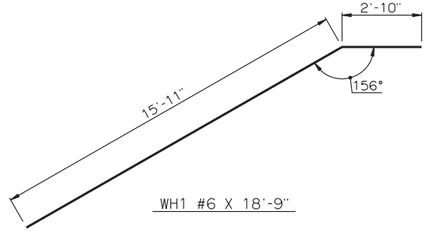
2009 SPECIFICATIONS	CB26..32-C-SK30-WING-PC3	01E

CB-925E

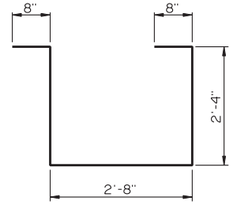


PLAN

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

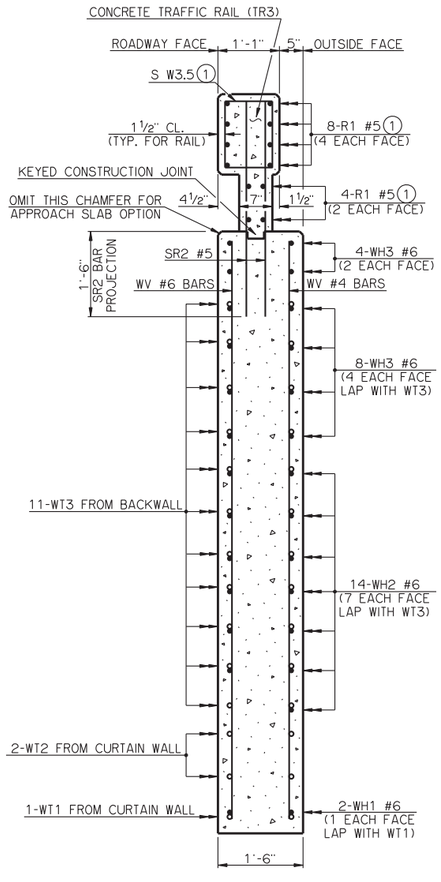


WH1 #6 X 18'-9"

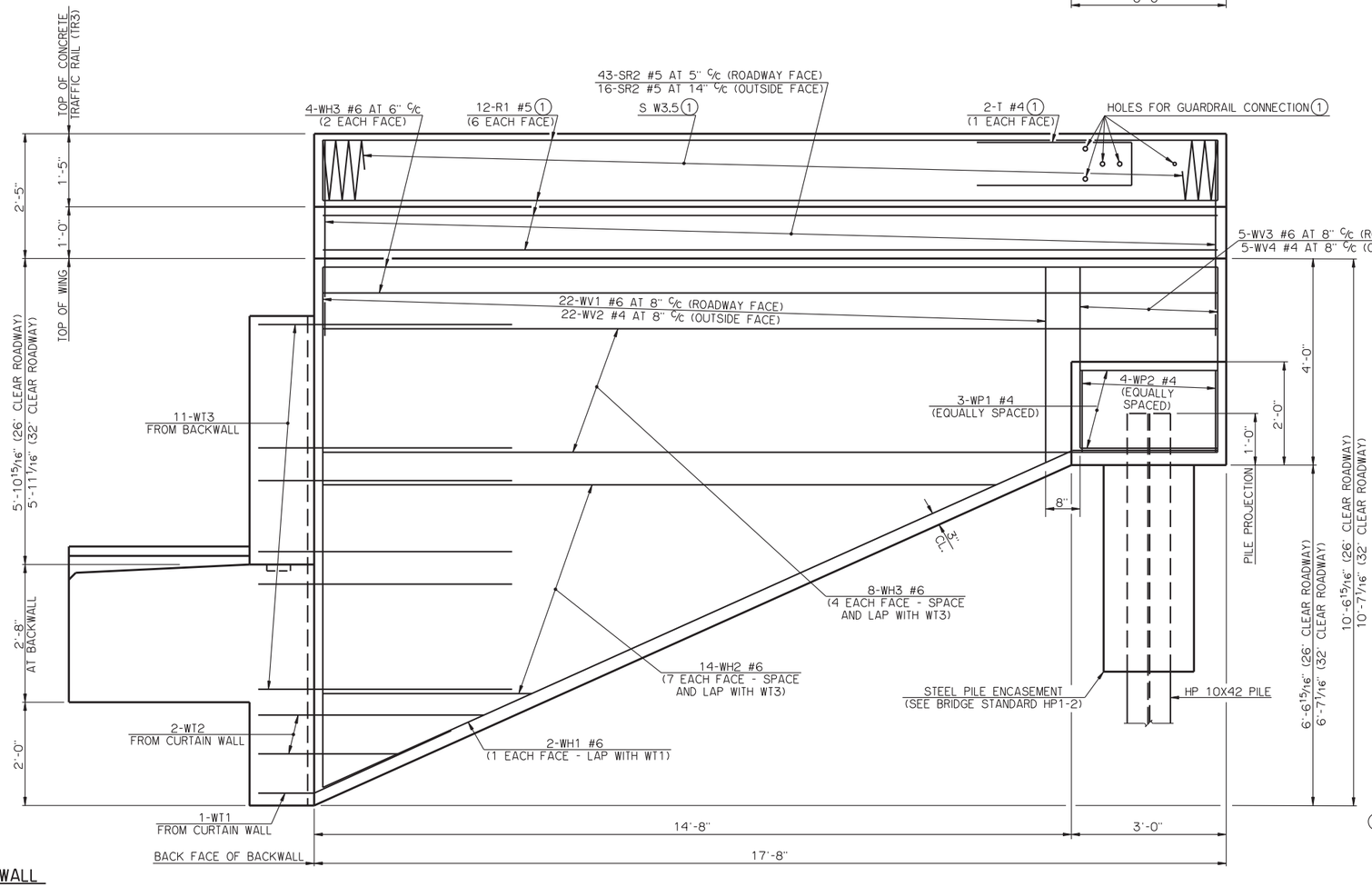


WP1 #4 X 8'-8"

DETAILS OF BENT REINFORCING STEEL



SECTION THRU WING AT BACK FACE OF BACKWALL



ELEVATION

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

(2) NO. INCLUDES TWO SETS OF 7 BARS

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

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

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

APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

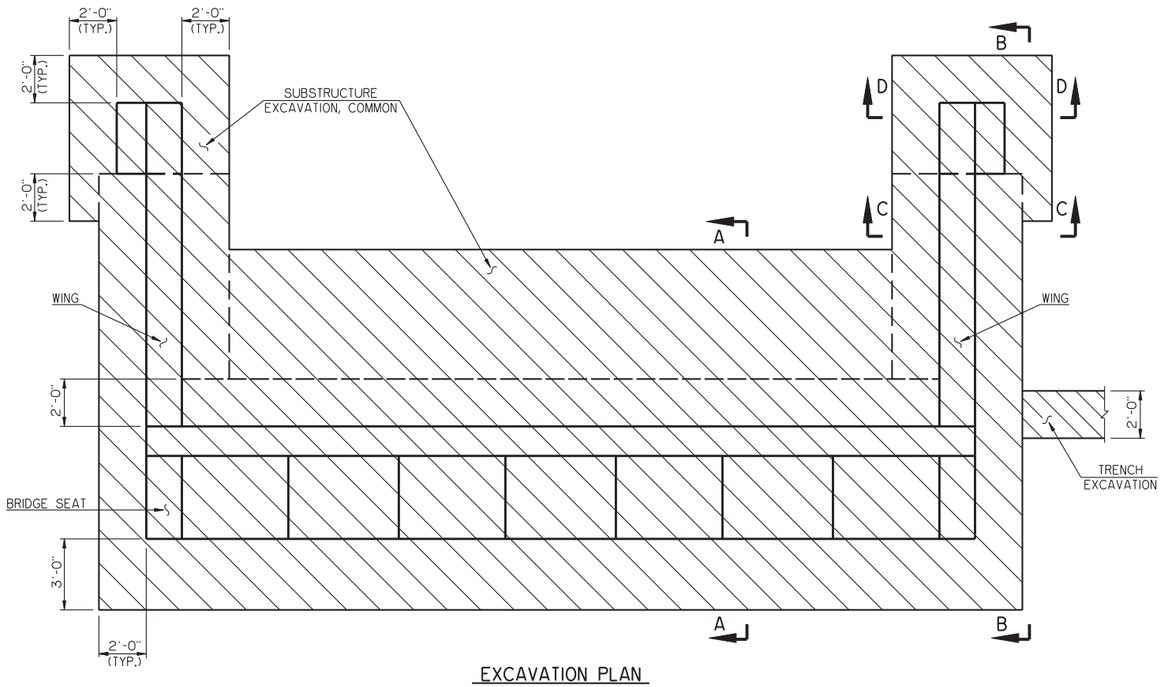
OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

WING DETAILS
TYPE IV P.C. BEAMS

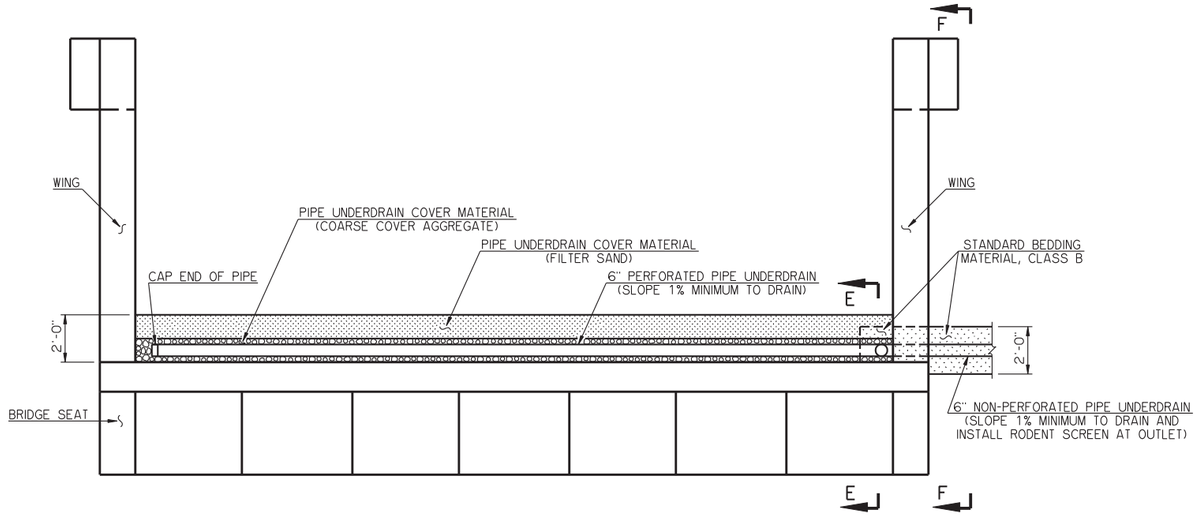
26' AND 32' CLEAR ROADWAYS - CONVENTIONAL - SKEWED 30°

2009 SPECIFICATIONS	CB26..32-C-SK30-WING-PC4	01E

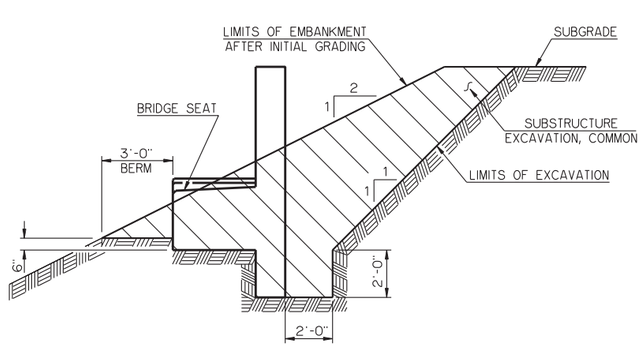
CB-926E



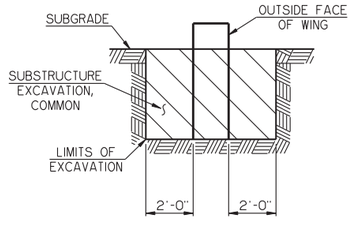
EXCAVATION PLAN



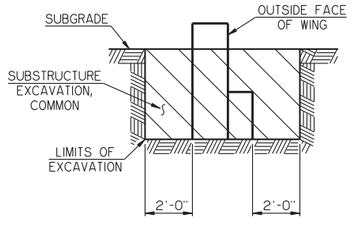
PIPE UNDERDRAIN PLAN



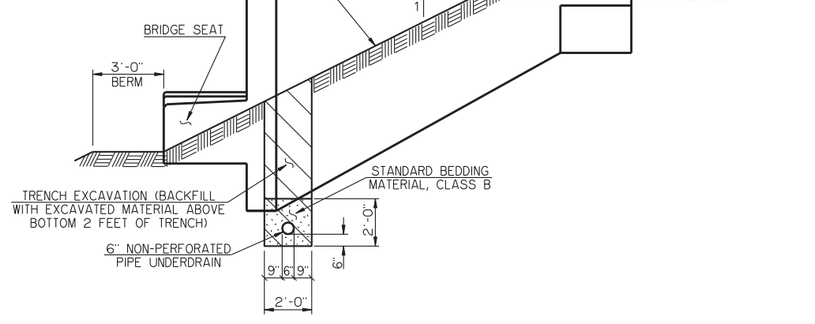
SECTION A-A



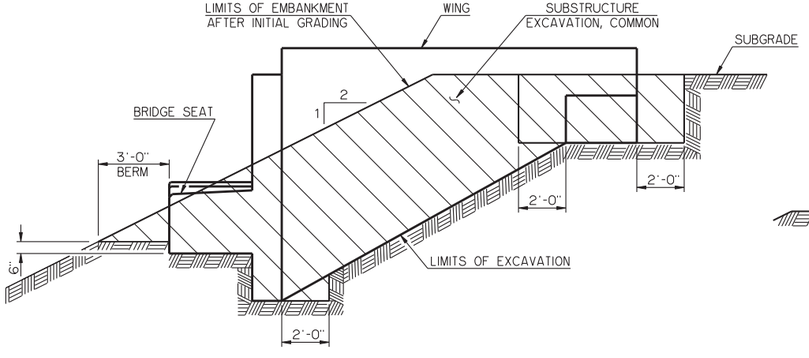
SECTION C-C



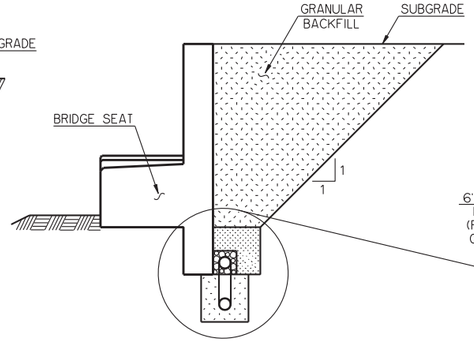
SECTION D-D



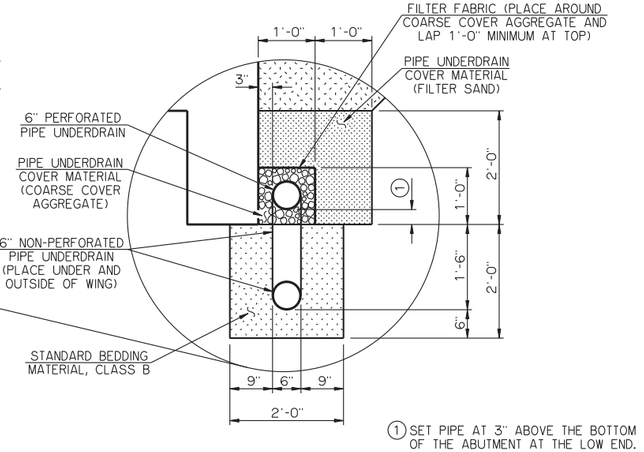
SECTION F-F



SECTION B-B



SECTION E-E



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

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 PEFORATED AND NON-PEFORATED 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."

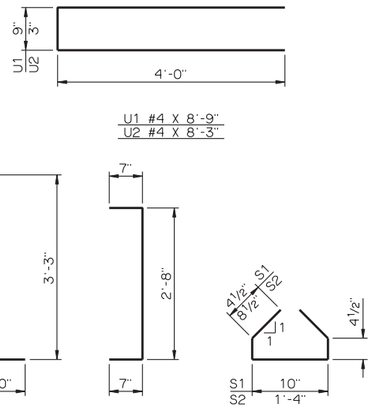
APPROVED BY BRIDGE ENGINEER Robert J Rusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

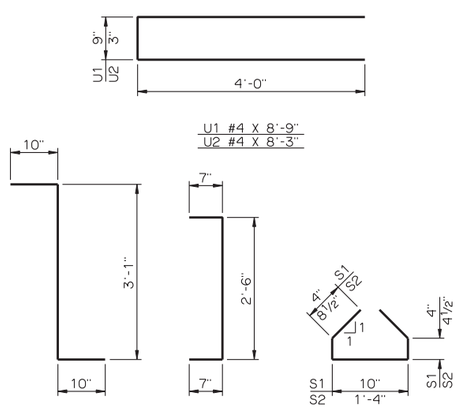
SUBSTRUCTURE EXCAVATION AND PIPE UNDERDRAIN ASSEMBLY DETAILS

26' AND 32' CLEAR ROADWAY - CONVENTIONAL - SKEWED 0°

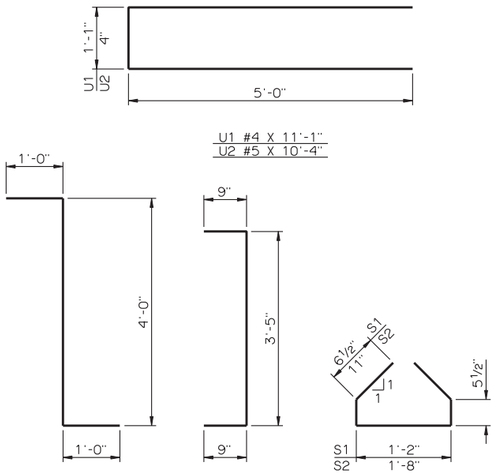
2009 SPECIFICATIONS	CB26.32-C-SKO-ABUT-MISC	01E
		CB-921E



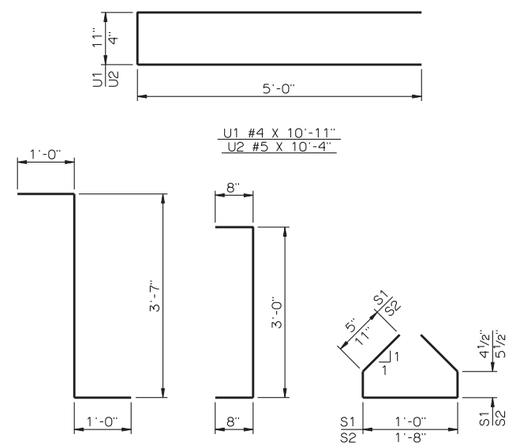
TYPE II P.C. BEAMS



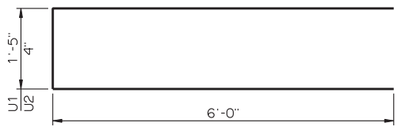
TYPE B P.C. BEAMS



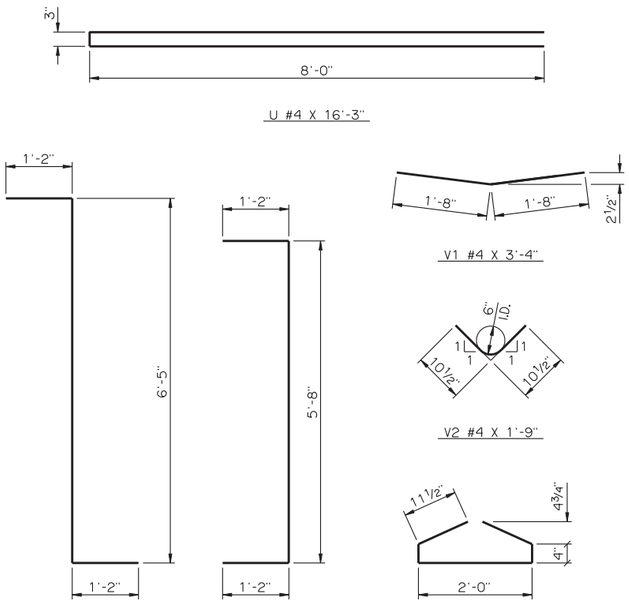
TYPE III P.C. BEAMS



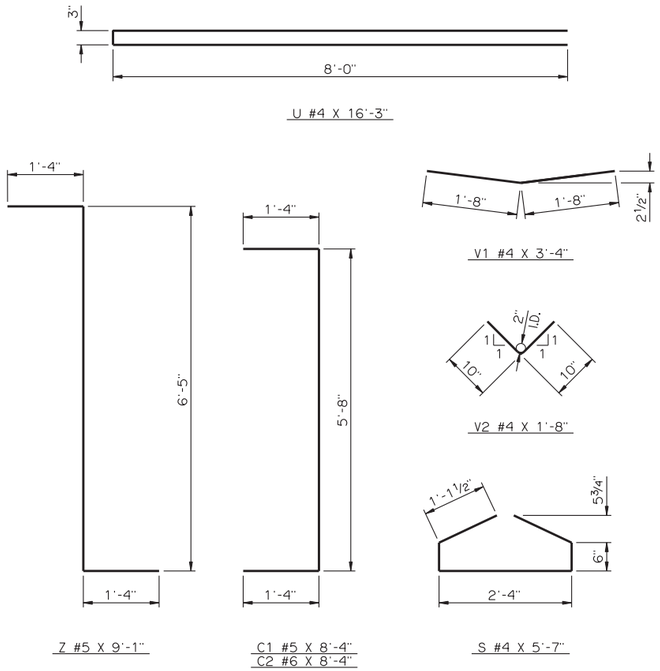
TYPE C P.C. BEAMS



TYPE IV P.C. BEAMS



TYPE BT-72 P.C. BEAMS



TYPE J P.C. BEAMS

DETAILS OF BENT REINFORCING STEEL

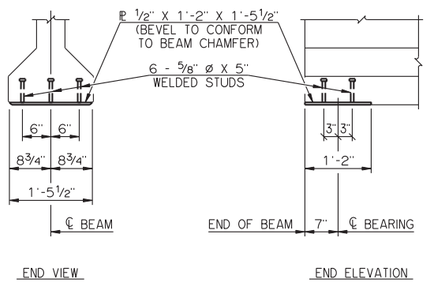
APPROVED BY BRIDGE ENGINEER Robert J Rusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

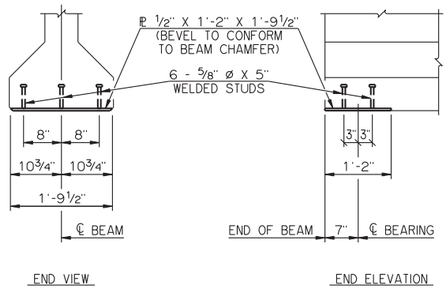
P.C. BEAM DETAILS
TYPE II, B, III, C, IV, BT-72 AND J P.C. BEAMS
(SHEET NO. 1 OF 2)

26' AND 32' CLEAR ROADWAYS - CONVENTIONAL AND INTEGRAL - SKEWED 0° AND 30°

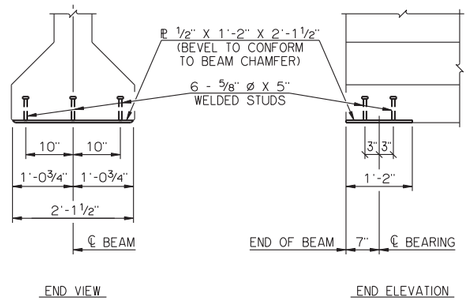
2009 SPECIFICATIONS	CB26..32-C..I-SKO..30-PCB-DTL-1	01E
		CB-958E



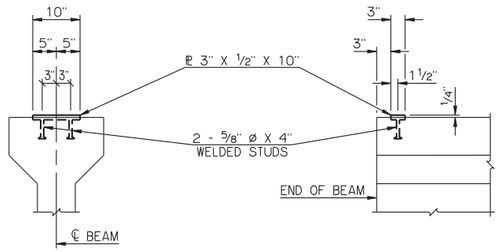
TYPE II AND TYPE B P.C. BEAMS



TYPE III AND TYPE C P.C. BEAMS

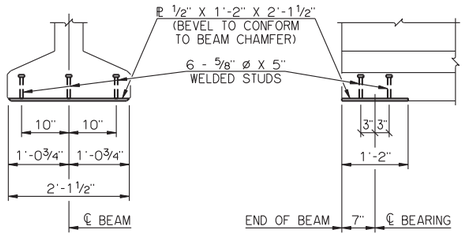


TYPE IV P.C. BEAMS

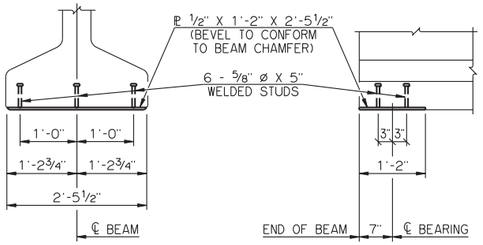


END VIEW

END ELEVATION

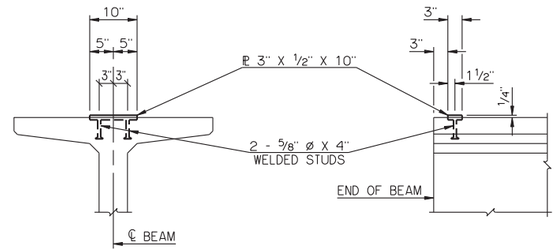


TYPE BT-72 P.C. BEAMS



TYPE J P.C. BEAMS

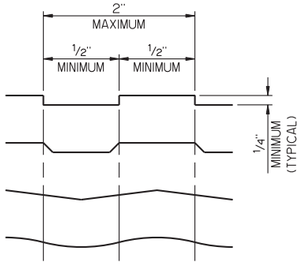
ENCASED SOLE PLATE DETAILS



END VIEW

END ELEVATION

ENCASED BEAM PLATE DETAILS



INTENTIONALLY ROUGHENED SURFACE EXAMPLES

TOP SURFACE OF P.C. BEAMS SHALL BE INTENTIONALLY ROUGHENED TO A MINIMUM HEIGHT OF ¼" 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 ½" 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 ¼", OR BY ANOTHER METHOD APPROVED BY THE ENGINEER.

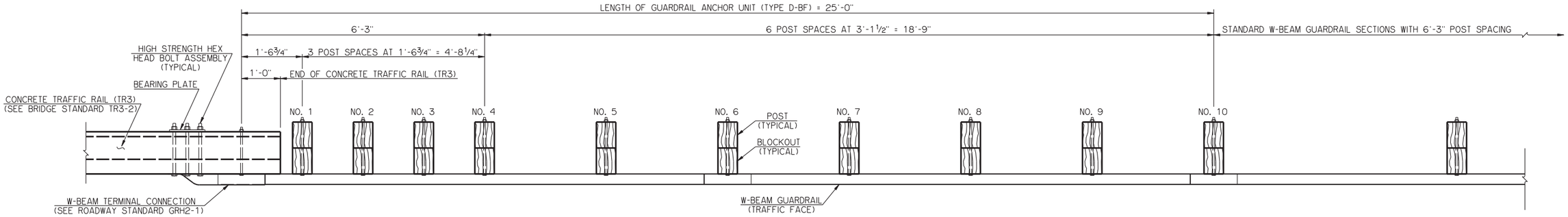
APPROVED BY BRIDGE ENGINEER Robert J Lusch DATE 9-9-2011

OKLAHOMA DEPARTMENT OF TRANSPORTATION
COUNTY BRIDGE STANDARD (ENGLISH)

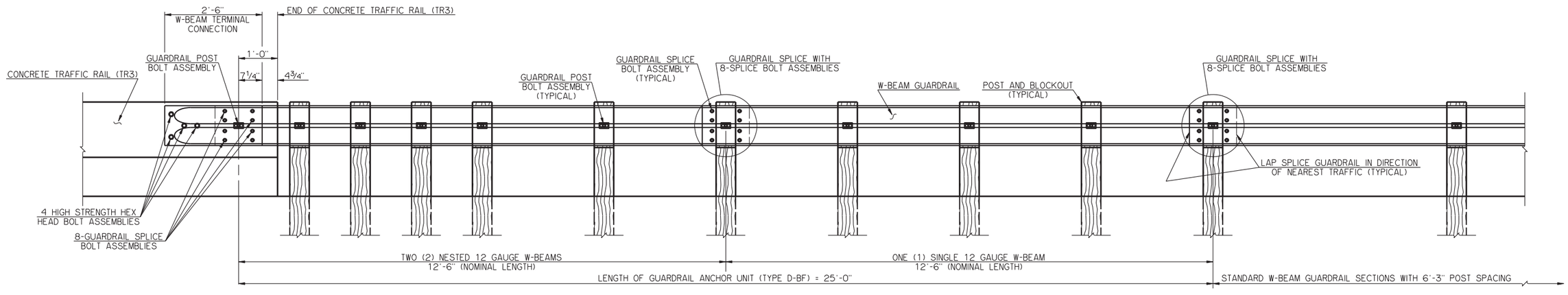
P.C. BEAM DETAILS
TYPE II, B, III, C, IV, BT-72 AND J P.C. BEAMS
(SHEET NO. 2 OF 2)

26' AND 32' CLEAR ROADWAYS - CONVENTIONAL AND INTEGRAL - SKEWED 0° AND 30°

2009 SPECIFICATIONS	CB26..32-C..I-SK0..30-PCB-DTL-2	01E
		CB-959E

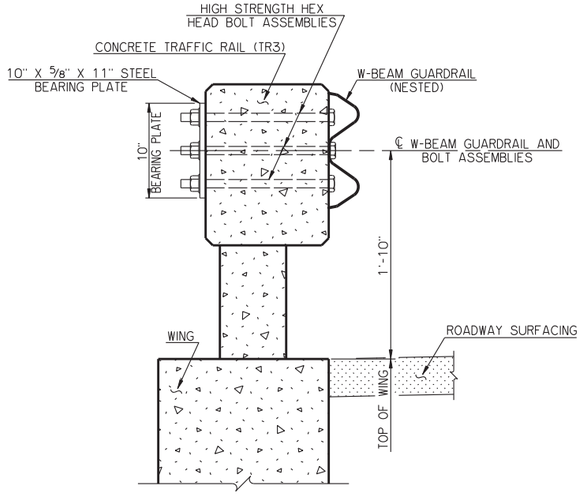


PLAN

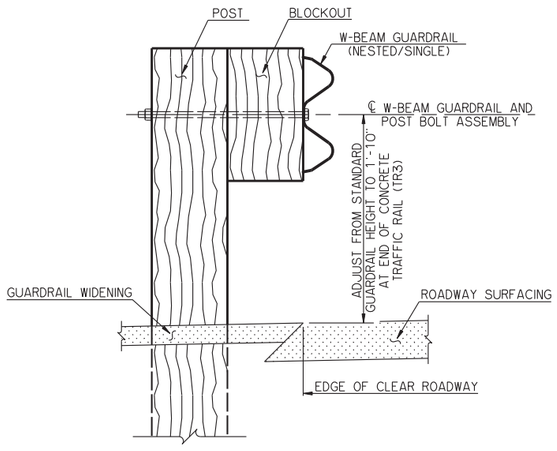


DIRECTION OF NEAREST TRAFFIC

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 1¾" 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.

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

APPROVED BY BRIDGE ENGINEER Robert J Rusch 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-SK0..30-GRAU-BC	OOE
		CB-969E