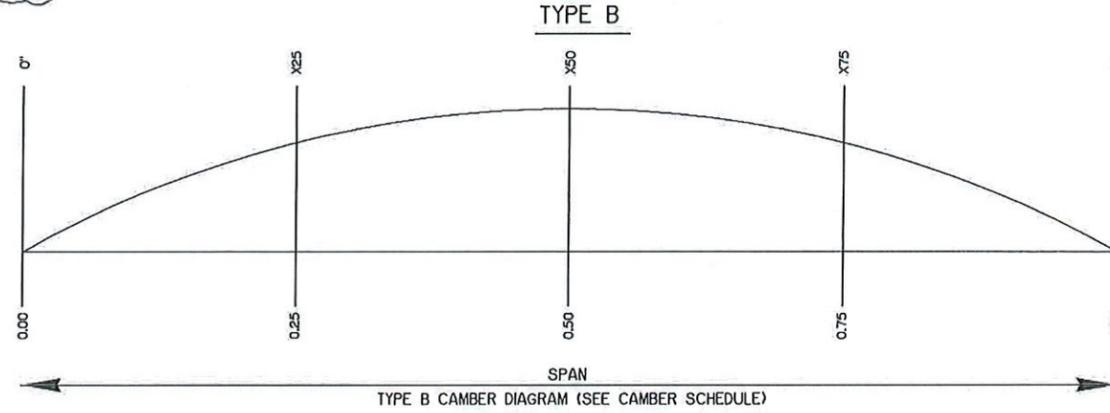
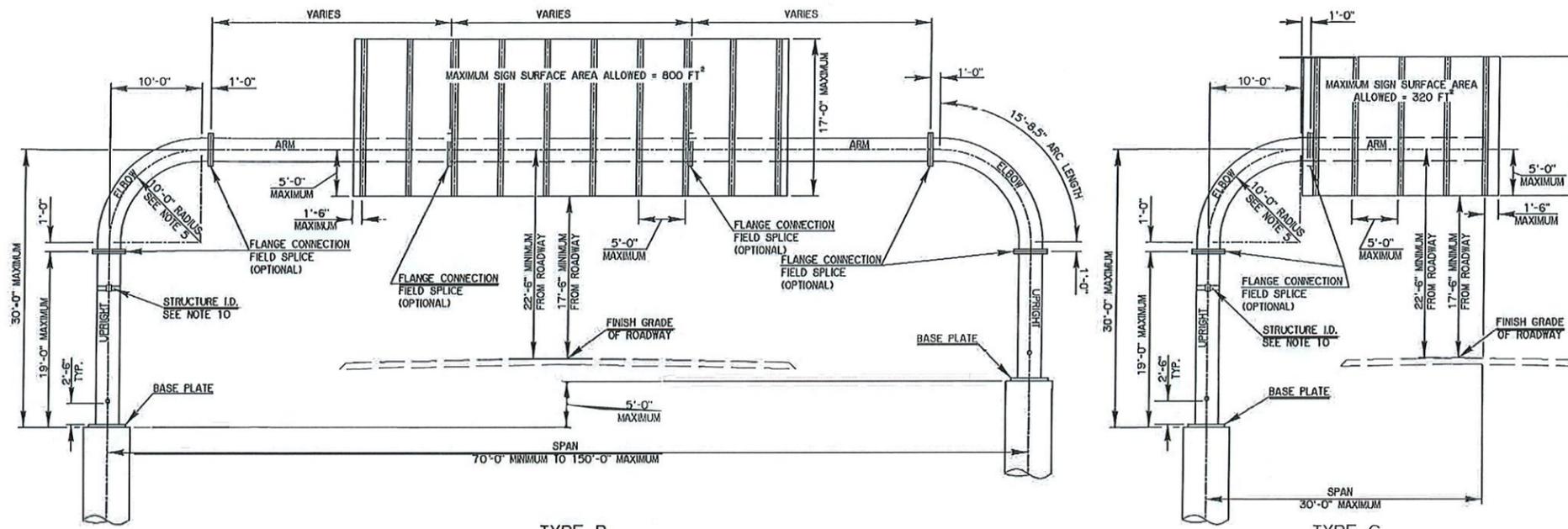


EXHIBIT 3

REV. NO.	REVISION	DATE



TYPE B CAMBER SCHEDULE			
SPAN (FT)	X25 (IN)	X50 (IN)	X75 (IN)
70	1.08	1.27	1.08
75	1.20	1.43	1.20
80	1.32	1.61	1.32
85	1.46	1.81	1.46
90	1.61	2.03	1.61
95	1.62	1.94	1.62
100	1.77	2.22	1.77
105	1.93	2.46	1.93
110	2.10	2.72	2.10
115	2.28	3.00	2.28
120	2.48	3.31	2.48
125	2.60	3.65	2.60
130	2.92	4.01	2.92
135	3.17	4.40	3.17
140	3.43	4.83	3.43
145	3.71	5.29	3.71
150	4.02	5.78	4.02

TYPE C CAMBER SCHEDULE			
SPAN (FT)	X33 (IN)	X67 (IN)	X100 (IN)
30	0.86	1.44	2.03

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
852(D)	OVHD.SN.STR., MONOTUBE TYPE B	EA
852(E)	OVHD.SN.STR., MONOTUBE TYPE C	EA

GENERAL INSTALLATION PROCEDURES

ENSURE THAT ALL ANCHOR BOLTS, BASE PLATES, AND FLANGE PLATES ARE PROPERLY ALIGNED TO PREVENT UNACCEPTABLE DISTORTION OF THE STRUCTURE UPON FINAL INSTALLATION. IN THE EVENT THAT THE DRILLED SHAFT AND ANCHOR BOLTS ARE INSTALLED PRIOR TO THE FABRICATION OF THE MONOTUBE STRUCTURE, THE MONOTUBE FABRICATOR SHOULD COORDINATE WITH THE DRILLED SHAFT CONTRACTOR TO ENSURE THAT THE BASE PLATES AND FLANGES ARE FABRICATED SO THAT PROPER ALIGNMENT OF ALL BOLT HOLES IS ACHIEVED. IN THE EVENT THAT THE MONOTUBE SIGN STRUCTURE IS FABRICATED PRIOR TO THE INSTALLATION OF THE DRILLED SHAFT AND ANCHOR BOLTS, THE DRILLED SHAFT CONTRACTOR SHOULD COORDINATE WITH THE SIGN STRUCTURE FABRICATOR TO ENSURE THAT THE ANCHOR BOLT INSTALLATION ALLOWS FOR PROPER ALIGNMENT OF ALL BOLTED CONNECTIONS. CONSTRUCTION TOLERANCES SET FORTH IN THE 2009 OKLAHOMA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION SHALL APPLY.

ERECT MONOTUBE SIGN STRUCTURE IN A MANNER APPROVED BY THE RESIDENT ENGINEER. SUPPORT ALL COMPONENTS OF THE STRUCTURE UNTIL FINAL TENSIONING OF ALL BOLTS AND FASTENERS IS COMPLETE.

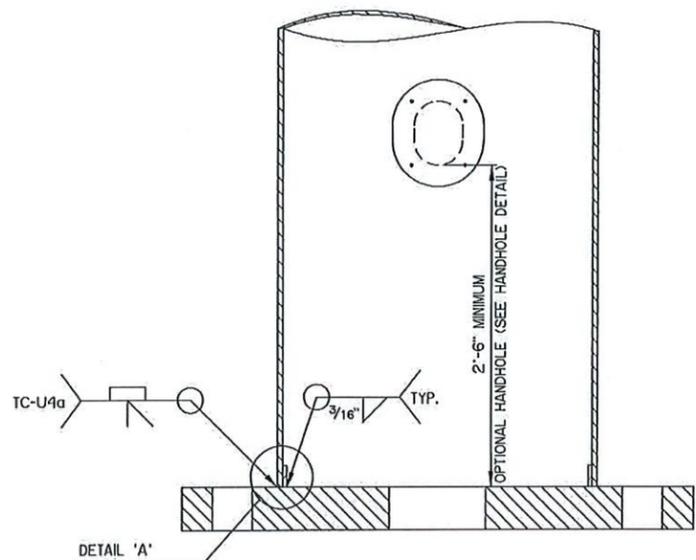
INSTALLATION OF ALL FASTENERS AND BOLTS USING DIRECT TENSION INDICATORS SHALL BE IN ACCORDANCE WITH THE 2009 OKLAHOMA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. ENSURE THAT THE MONOTUBE SIGN STRUCTURE IS PROPERLY ATTACHED TO THE ANCHOR BOLTS AND THAT ALL LEVELING NUTS ARE FLUSH WITH THE BOTTOM OF THE BASE PLATE. ENSURE THAT ALL FLANGES HAVE BEEN SECURELY FASTENED.

- ### GENERAL NOTES
1. MAXIMUM SIGN HEIGHT TO BE USED ON THE TYPE C STRUCTURE SHALL BE 15 FEET. MAXIMUM SIGN HEIGHT TO BE USED ON THE TYPE B STRUCTURE SHALL BE 17 FEET.
 2. MAXIMUM SIGN AREA TO BE USED ON THE TYPE C STRUCTURE SHALL BE 320 SQUARE FEET. MAXIMUM SIGN AREA TO BE USED ON THE TYPE B STRUCTURE SHALL BE 800 SQUARE FEET.
 3. FOR SIGNS LESS THAN 10'-0" TALL, SIGNS SHALL BE CENTERED ON THE SPAN. FOR SIGNS GREATER THAN OR EQUAL TO 10'-0" TALL, BOTTOM OF SIGNS SHALL BE 5'-0" BELOW C OF THE SPAN.
 4. THE LENGTH OF THE ARM MEMBERS LABELED AS 'VARIES' SHOULD BE A MINIMUM OF 30'-0" FOR TYPE 'B' MONOTUBE SIGN STRUCTURES.
 5. ADJUST BEND RADIUS ACCORDING TO CAMBER DIAGRAM. ALL TRANSVERSE PLATES CONNECTING TO AN ELBOW SHALL BE PERPENDICULAR TO THE CENTERLINE OF THE ELBOW AT THE LOCATION OF THE CONNECTION.
 6. STRUCTURAL STEEL TUBING USED IN THE FABRICATION OF MONOTUBES SHALL EITHER BE COLD-FORMED WELDED OR SEAMLESS TUBING CONFORMING TO THE ASTM A500, GRADE C (MEETING AASHTO M270 ZONE 2 FRACTURE CRITICAL CHARPY V-NOTCH REQUIREMENTS) OR API 5L PSL 2, GRADE X52 (MEETING AASHTO M270 ZONE 2 FRACTURE CRITICAL CHARPY V-NOTCH REQUIREMENTS).
 7. BASE PLATES, FLANGE PLATES, AND FILLER PLATES TO BE STRUCTURAL STEEL CONFORMING TO THE SPECIFICATIONS OF ASTM DESIGNATION: A709, GRADE 50.
 8. ALL FLANGE BOLTS TO CONFORM TO THE SPECIFICATIONS OF ASTM A490, TYPE 1, AND SHALL BE TIGHTENED AND INSPECTED USING DIRECT TENSION INDICATORS TO CONFORM TO THE SPECIFICATIONS OF ASTM F959, TYPE 490. ALL WASHERS TO CONFORM TO THE SPECIFICATIONS OF ASTM F436, TYPE 1. ALL NUTS USED TO FASTEN ASTM A490 BOLTS SHALL BE ASTM A563, GRADE 55. ALL ANCHOR BOLTS TO CONFORM TO THE SPECIFICATIONS OF ASTM F1554-GRADE 55 (MEETING ASTM F1554 CHARPY V-NOTCH REQUIREMENTS) AND TO BE TIGHTENED AND INSPECTED USING DIRECT TENSION INDICATORS CONFORMING TO THE SPECIFICATIONS OF ASTM F2437 (TYPE 1 GRADE 55). ALL ANCHOR BOLT NUTS TO CONFORM TO THE SPECIFICATIONS OF ASTM A563-GRADE A. ALL ANCHOR BOLT WASHERS TO CONFORM TO THE SPECIFICATIONS OF ASTM F436, TYPE 1.
 9. HOT-DIP GALVANIZE ALL TUBE MEMBERS AND PLATES PER ASTM A123. COAT ASTM A490 FASTENERS PER ASTM F1136, GRADE 3. WHEN COATING ASTM A490 FASTENERS HYDROGEN EMBRITTLEMENT SHALL BE INVESTIGATED AND PREVENTED PER THE APPLICABLE ASTM SPECIFICATIONS. COAT NUTS USED WITH ASTM A490 FASTENERS PER ASTM F1136, GRADE 5. COAT WASHERS USED WITH ASTM A490 FASTENERS PER ASTM F1136, GRADE 3. COAT ANCHOR BOLTS, NUTS USED WITH ANCHOR BOLTS, AND WASHERS USED WITH ANCHOR BOLTS PER ASTM F2329.
 10. STAMP STRUCTURE IDENTIFICATION ON UPRIGHT OF STRUCTURE WITH THE FOLLOWING INFORMATION: JP#, TYPE 'B' OR TYPE 'C', STRUCTURE LENGTH, MAXIMUM ALLOWABLE SIGN AREA, MAXIMUM ALLOWABLE SIGN HEIGHT, DATE MANUFACTURED, AND MANUFACTURER'S NAME.
 11. MAST ARMS TO BE TEMPORARILY SUPPORTED TO TAKE ALL LOAD OFF OF THE FIELD SPLICES WHILE BOLTS ARE BEING TIGHTENED IN ORDER TO FIRMLY SEAT THE FLANGE PLATES AND BASE PLATES.
 12. POSTS FOR TUBULAR SIGN STRUCTURES TO BE FORMED TO THE RADII SHOWN ON THE PLANS BY FABRICATION METHODS WHICH WILL NOT CRIMP OR BUCKLE THE INTERIOR RADIUS OF THE PIPE BEND.
 13. CLIPS, EYES OR REMOVABLE BRACKETS TO BE AFFIXED TO ALL POSTS AND MAST ARMS, AS NECESSARY, TO SECURE THE SIGN DURING SHIPPING AND FOR LIFTING AND MOVING DURING ERECTION. THIS IS TO PREVENT DAMAGE TO THE FINISHED GALVANIZED OR PAINTED SURFACES. BRACKETS ON TUBULAR SIGN STRUCTURES TO BE REMOVED AFTER ERECTION. DETAILS OF SUCH DEVICES TO BE SHOWN ON THE SHOP DRAWINGS.
 14. BOLTS WITH DIAMETERS EXCEEDING BY UP TO 1/4 INCH THE DIAMETER OF THE BOLTS SHOWN ON THE PLANS MAY BE USED, PROVIDED THAT THE REQUIRED CLEARANCES AND EDGE DISTANCE ARE NOT REDUCED BELOW THAT REQUIRED FOR THE LARGER BOLT.
 15. FABRICATE ALL SIGN STRUCTURES TO THE LARGEST PRACTICAL SECTIONS PRIOR TO GALVANIZING. SPLICE LOCATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL AND THE CONTRACTOR SHALL NOT COMMENCE FABRICATION UNTIL SUCH SPLICE LOCATIONS ARE APPROVED.
 16. ALL TYPE 'C' SIGN STRUCTURES TO HAVE A REMOVABLE CAP ON THE END OF THE HORIZONTAL MEMBER OF THE STRUCTURE.
 17. WELDING OF STEEL TO CONFORM TO THE REQUIREMENTS OF AWS D1.1 (LATEST REVISION). GRIND ALL AREAS TO BE WELDED TO BRIGHT METAL. COMPLETE ALL WELDING AND REQUIRED NON-DESTRUCTIVE TESTING BEFORE MATERIAL IS GALVANIZED. TEST ALL CIRCUMFERENTIAL WELDS NON-DESTRUCTIVELY USING THE ENHANCED MAGNETIC PARTICLE METHOD IN ACCORDANCE WITH ODOT STANDARD SPECIFICATION 720.03B. MAXIMUM WELD UNDERCUT SHALL BE 0.01".
 18. ALL TUBE-TO-TRANSVERSE PLATE COMPLETE JOINT PENETRATION (CJP) GROOVE WELDS SHALL BE ULTRASONICALLY TESTED (UT) FOR CRACKS BEFORE AND AFTER GALVANIZATION.
 19. WELD FILLER MATERIAL SHALL MEET ALL CHARPY V-NOTCH REQUIREMENTS SPECIFIED IN AWS D1.1 AT A TEMPERATURE OF 40°F.
 20. ALL BASE METAL SHALL BE PREHEATED IN ACCORDANCE WITH AWS D1.1 PRIOR TO WELDING.
 21. BACKING RING SHALL BE THOROUGHLY FUSED WITH THE WELD MATERIAL.
 22. SMAW ELECTRODES SHALL BE THE LOW-HYDROGEN CLASSIFICATION AS DEFINED BY AWS D1.1.
 23. STORAGE, HANDLING, AND USE OF LOW-HYDROGEN ELECTRODES SHALL BE IN CONFORMANCE WITH AWS D1.1.
 24. THERE SHALL BE NO POST WELD HEAT TREATMENT OF THE TUBE-TO-TRANSVERSE PLATE CONNECTION.
 25. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS TO ODOT BRIDGE DIVISION. A WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE ATTACHED TO THE SHOP DRAWINGS.
 26. BACKING RING MATERIAL SHALL BE IN ACCORDANCE WITH AWS D1.1.

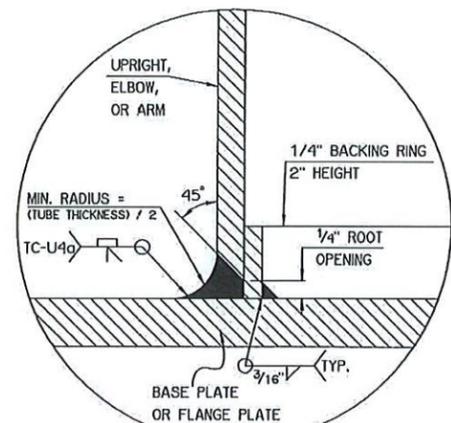
PRELIMINARY -- NOT FOR CONSTRUCTION

<p style="font-size: 1.2em; margin: 0;">MONOTUBE STRUCTURE (TYPE 'B' & TYPE 'C')</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="font-size: 0.8em;">Design</td><td>JG</td><td>JW</td></tr> <tr><td style="font-size: 0.8em;">Detail</td><td>JG</td><td>JW</td></tr> <tr><td style="font-size: 0.8em;">Check</td><td>JG</td><td>JW</td></tr> <tr><td style="font-size: 0.8em;">Supv. SUPERVISOR</td><td></td><td></td></tr> <tr><td style="font-size: 0.8em;">Eng. ENGINEER</td><td></td><td></td></tr> </table>	Design	JG	JW	Detail	JG	JW	Check	JG	JW	Supv. SUPERVISOR			Eng. ENGINEER		
Design	JG	JW														
Detail	JG	JW														
Check	JG	JW														
Supv. SUPERVISOR																
Eng. ENGINEER																
STATE OF OKLAHOMA	DEPARTMENT OF TRANSPORTATION															
JOB PRICE NO.	SHEET NO. M1															

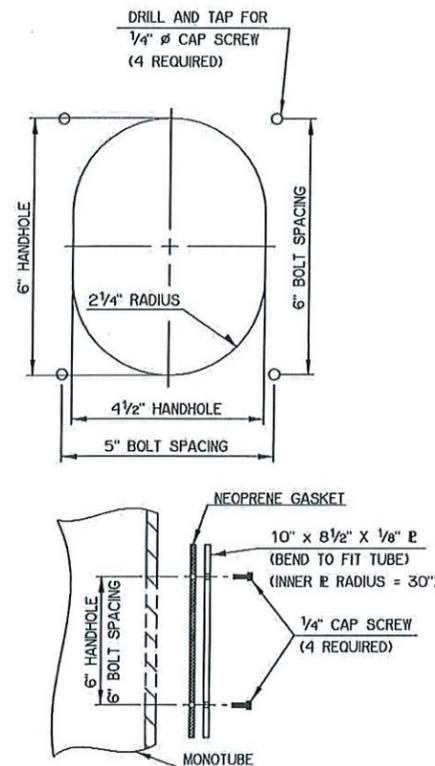
REV. NO.	DESCRIPTION	REVISIONS	DATE



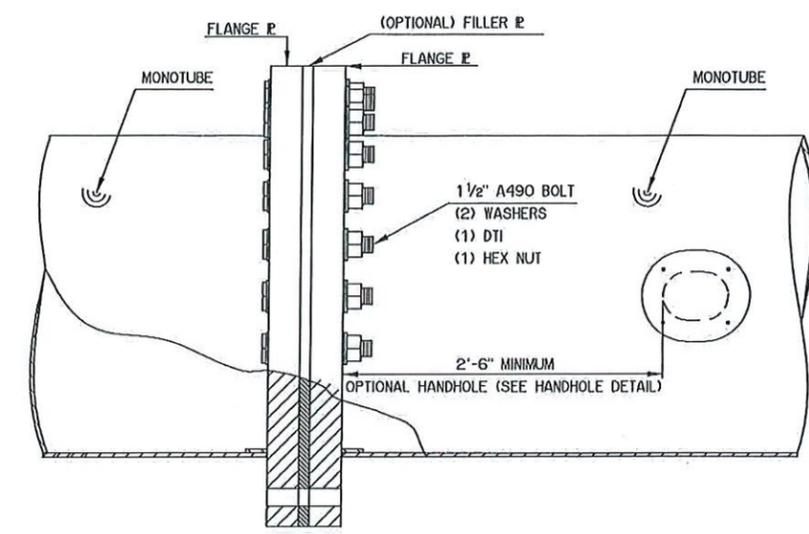
TUBE-TO-TRANSVERSE-PLATE DETAIL (TYPICAL)
(DETAIL TYPICAL FOR BASE AND FLANGE PLATES)



DETAIL 'A'



HANDHOLE DETAIL (OPTIONAL)



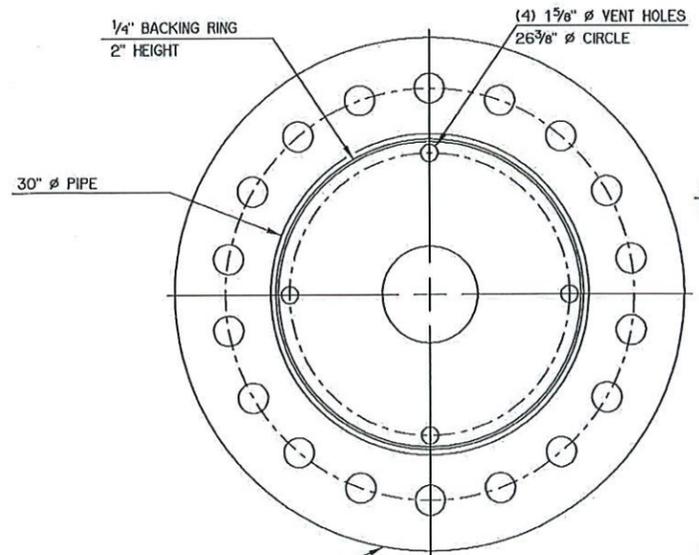
TYPICAL FLANGE CONNECTION DETAIL

NOTE: OPTIONAL HANDHOLES FOR TYPE 'B' STRUCTURES SHOULD BE POSITIONED ON THE ROADWAY FACE OF THE TUBE.

OPTIONAL FILLER PLATE NOTE:

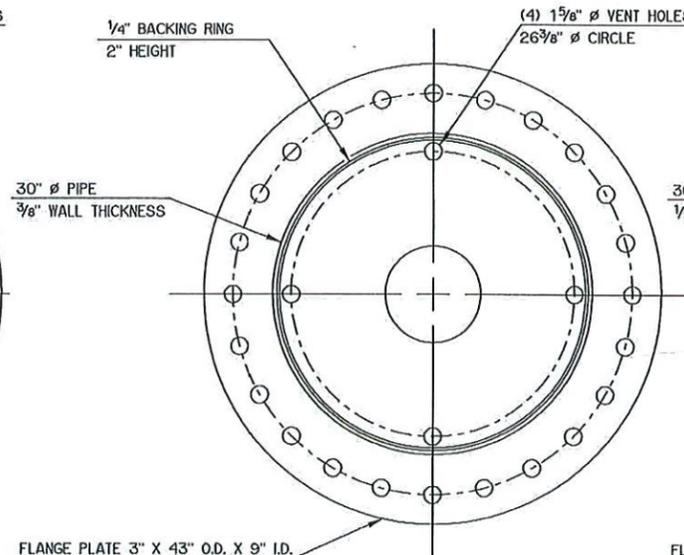
DURING ASSEMBLY OF THE FLANGE CONNECTIONS, THE TWO ADJOINING MEMBERS SHALL NOT BE PULLED TOGETHER AND TIGHTENED IF A GAP OF OVER 1/8" EXISTS. IF A GAP EXCEEDING THIS TOLERANCE IS ENCOUNTERED, THE CONTRACTOR IS PERMITTED TO USE A FILLER PLATE AT A HORIZONTAL MEMBER FLANGE CONNECTION. THE MAXIMUM THICKNESS OF A FILLER PLATE AT ANY SINGLE FLANGE CONNECTION IS 1". IF MORE THAN 1", BUT LESS THAN OR EQUAL TO 6", IS REQUIRED FOR ASSEMBLY THE REQUIRED DIMENSION SHALL BE SEPERATED INTO TWO DIFFERENT FLANGE CONNECTIONS AND THE TWO FLANGE CONNECTIONS SHALL BE LOCATED SYMMETRICALLY ALONG THE TYPE B MONOTUBE STRUCTURE. ADDITION OF FILLER PLATES SHALL BE AT THE COST OF THE CONTRACTOR.

MONOTUBE SCHEDULE				
SPAN	TUBE DIAMETER (ALL TUBES)	TUBE THICKNESS (ALL TUBES)	BASE R	FLANGE R
70FT - 90FT	30"	3/8"	TYPICAL	A
95FT - 150FT	30"	1/2"	TYPICAL	B



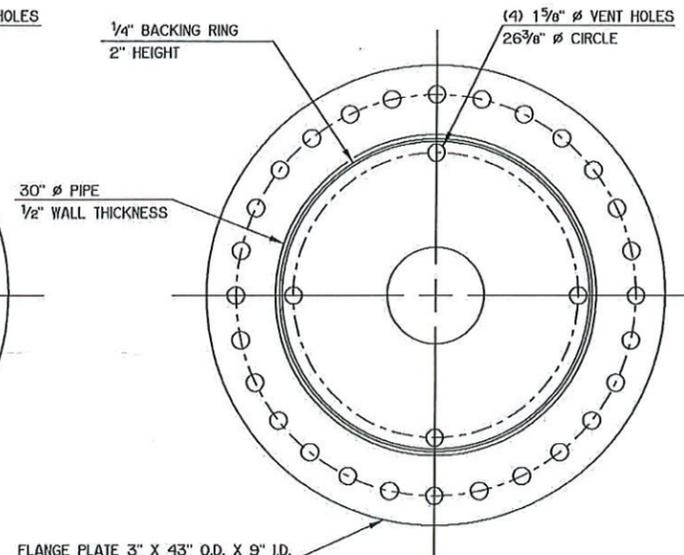
BASE PLATE 4" X 48" O.D. X 9" I.D.
(18) 2 13/16" Ø BOLT HOLES
BOLT CIRCLE 38 1/2" Ø
2 1/2" F1554 GR.55 ANCHOR BOLTS

BASE PLATE



FLANGE PLATE 3" X 43" O.D. X 9" I.D.
(24) 1 5/8" Ø BOLT HOLES
BOLT CIRCLE 37 1/2" Ø
1 1/2" A490 BOLTS

FLANGE PLATE 'A'



FLANGE PLATE 3" X 43" O.D. X 9" I.D.
(28) 1 5/8" Ø BOLT HOLES
BOLT CIRCLE 37 1/2" Ø
1 1/2" A490 BOLTS

FLANGE PLATE 'B'

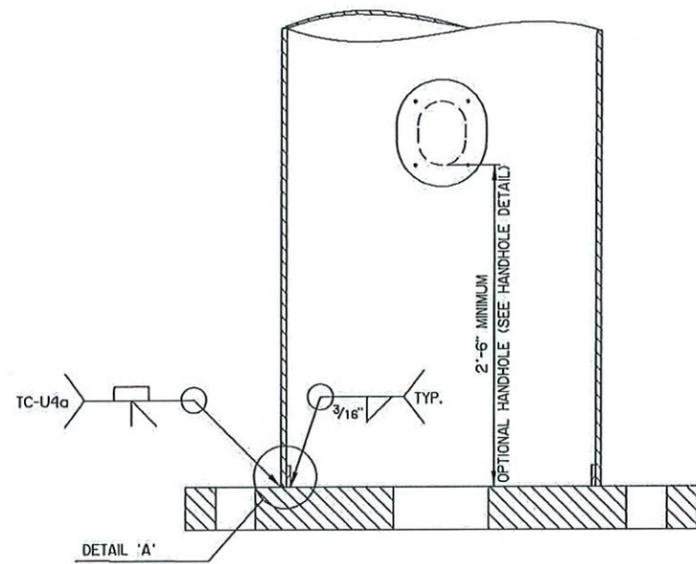
PRELIMINARY -- NOT FOR CONSTRUCTION

MONOTUBE STRUCTURE (TYPE 'B' DETAIL)

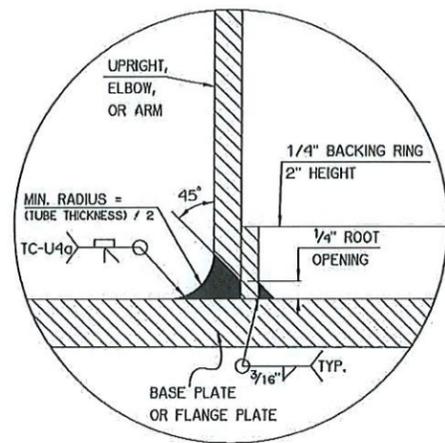
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Detail	JG	JW
Check	JG	JW
Supervisor	SUPERVISOR	
Engineer	ENGINEER	

STATE OF OKLAHOMA DEPARTMENT OF TRANSPORTATION

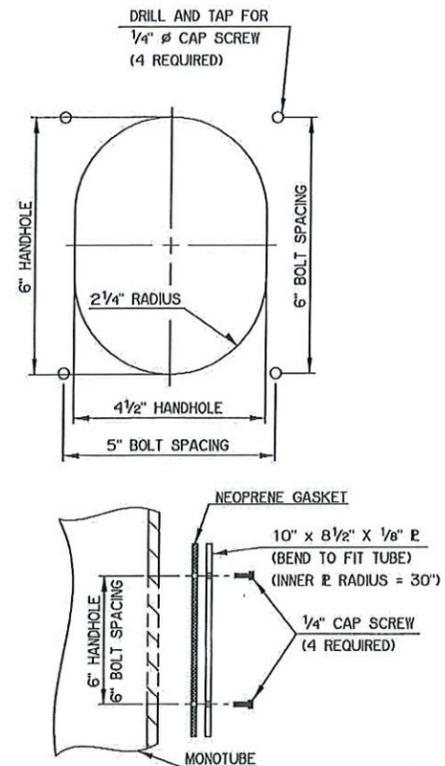
SHEET NO. M2



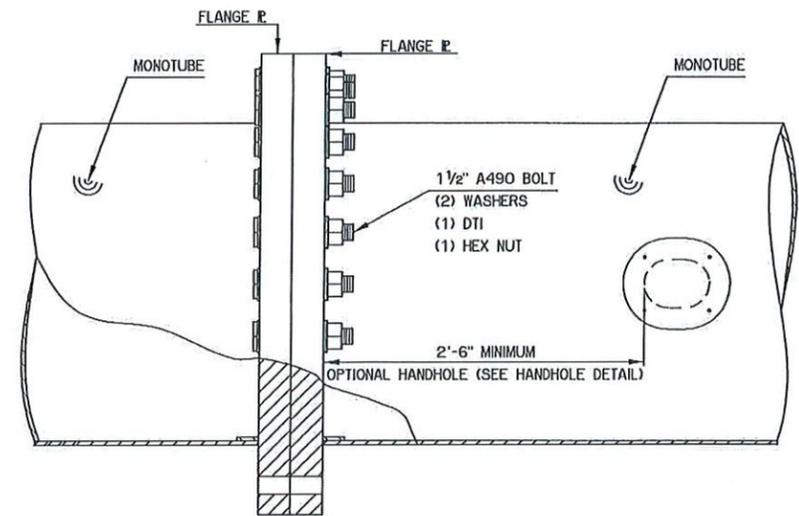
TUBE-TO-TRANSVERSE-PLATE DETAIL (TYPICAL)
(DETAIL TYPICAL FOR BASE AND FLANGE PLATES)



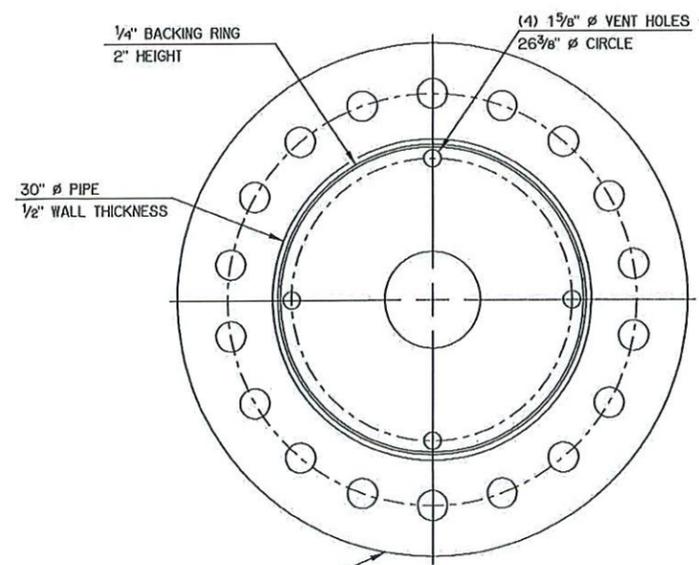
DETAIL 'A'



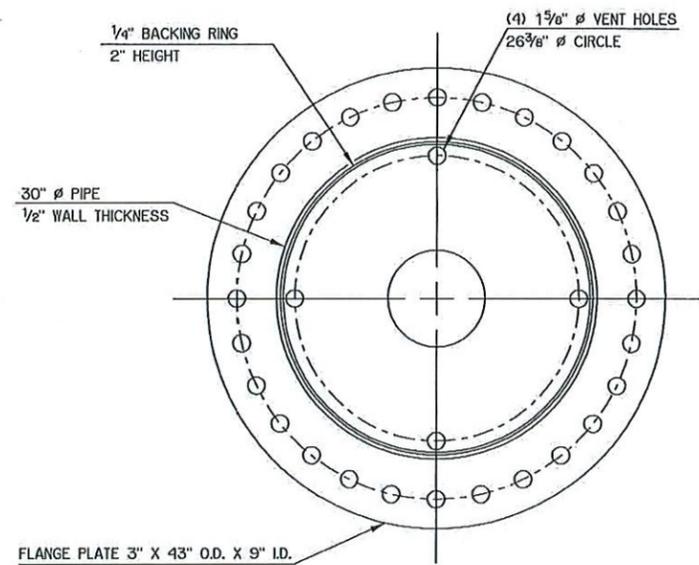
HANDHOLE DETAIL
(OPTIONAL)



TYPICAL FLANGE CONNECTION DETAIL
NOTE: OPTIONAL HANDHOLES FOR TYPE 'C' STRUCTURES SHOULD BE POSITIONED ON THE DOWN TRAFFIC FACE OF THE TUBE.



BASE PLATE
BASE PLATE 4\"/>

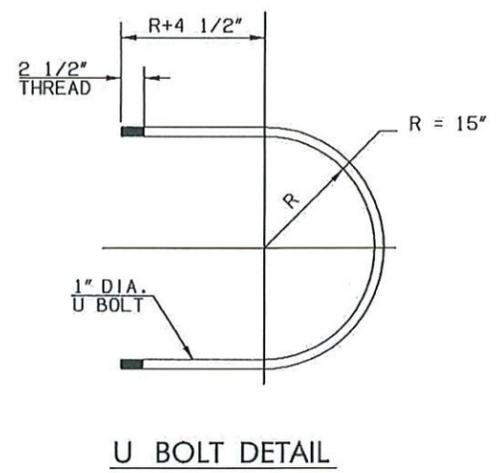
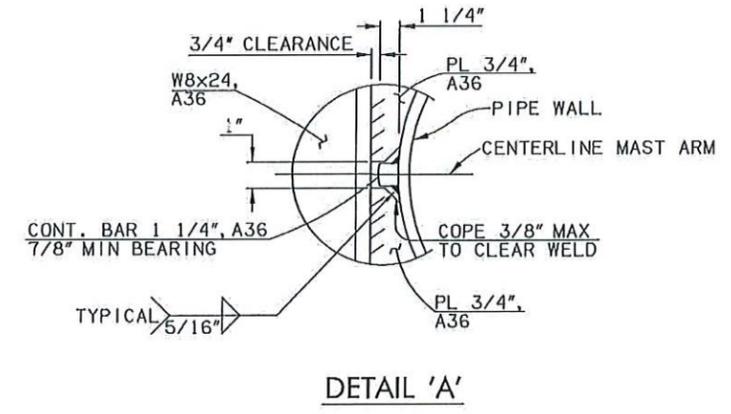
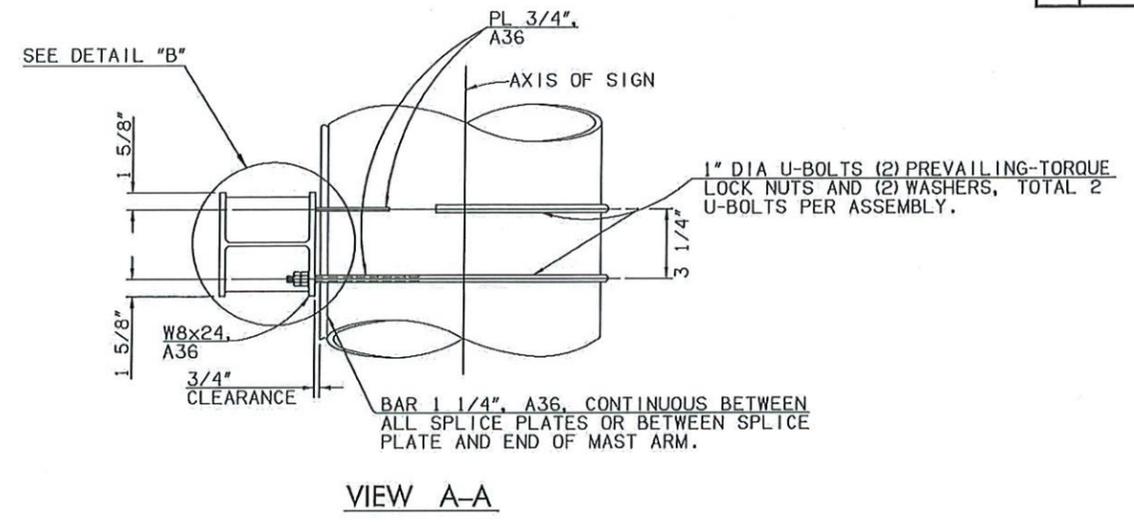
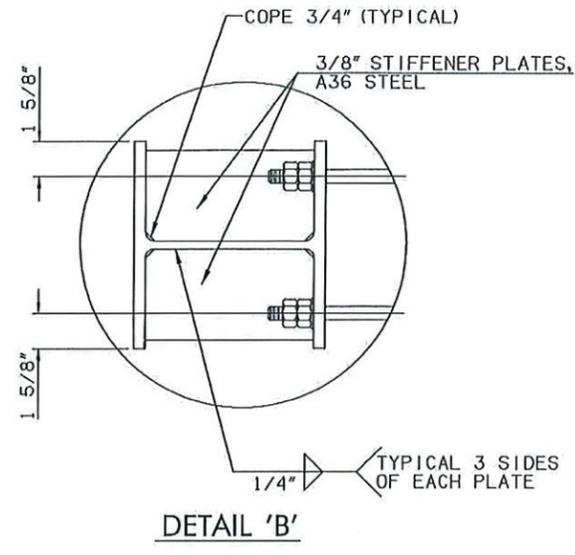
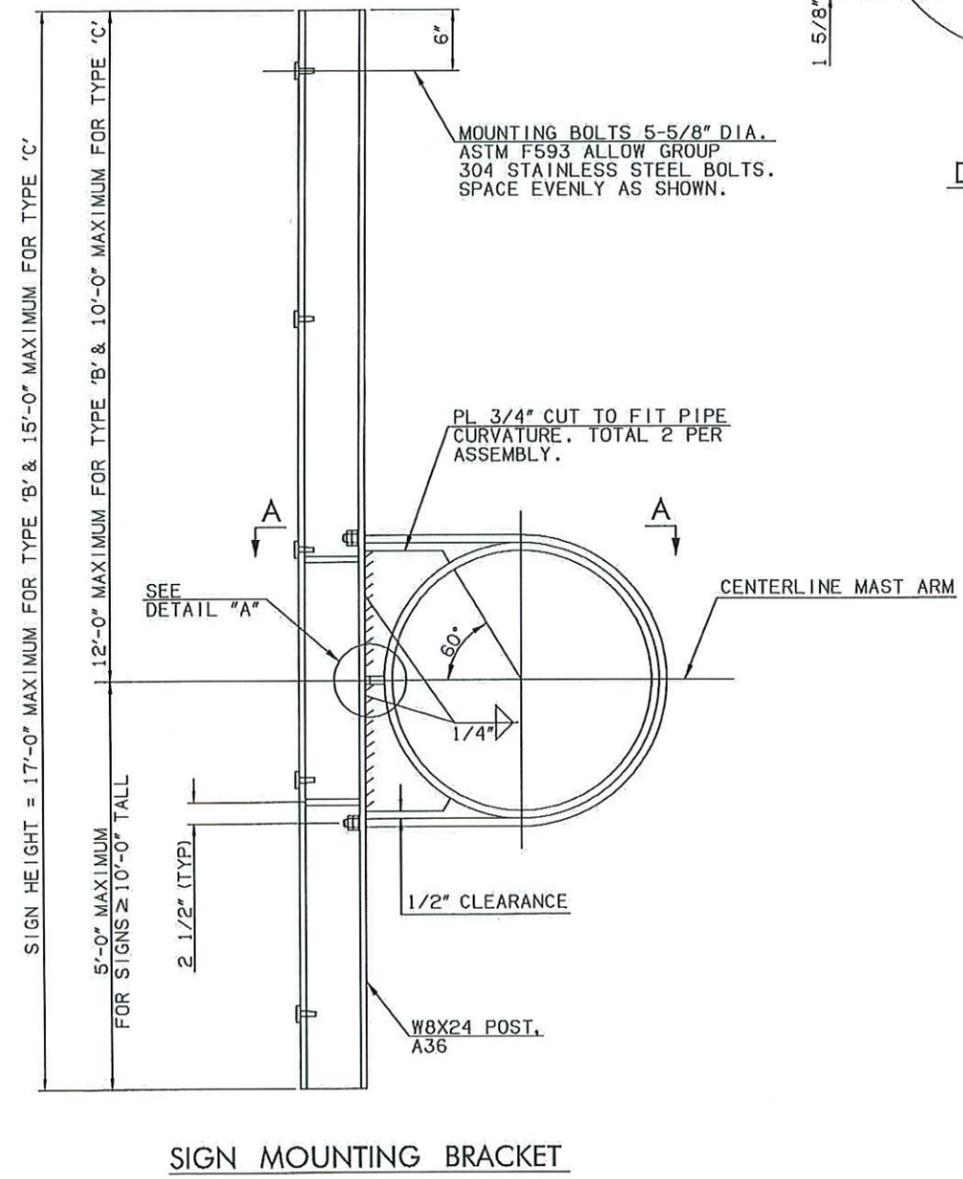


FLANGE PLATE
FLANGE PLATE 3\"/>

PRELIMINARY -- NOT FOR CONSTRUCTION

MONOTUBE STRUCTURE (TYPE 'C' DETAILS)	Design	JG	JW
	Draft	JG	JW
	Check	JG	JW
	Signed	SUPERVISOR Eng. ENGINEER	
STATE OF OKLAHOMA		DEPARTMENT OF TRANSPORTATION	
X0000000		SHEET NO. M3	

REV. NO.	DESCRIPTION	REVISIONS	DATE



GENERAL NOTES

1. ALL U-BOLTS SHALL CONFORM TO THE MATERIAL SPECIFICATIONS OF ASTM A193-B7, AND THREADS SHALL CONFORM TO ASTM A325 SECTION 7.2. ALL U-BOLT NUTS SHALL BE PREVAILING-TORQUE LOCK NUTS AND SHALL CONFORM TO THE SPECIFICATION OF ASTM A194-2H. ALL WASHERS SHALL CONFORM TO THE SPECIFICATIONS OF ASTM F436.

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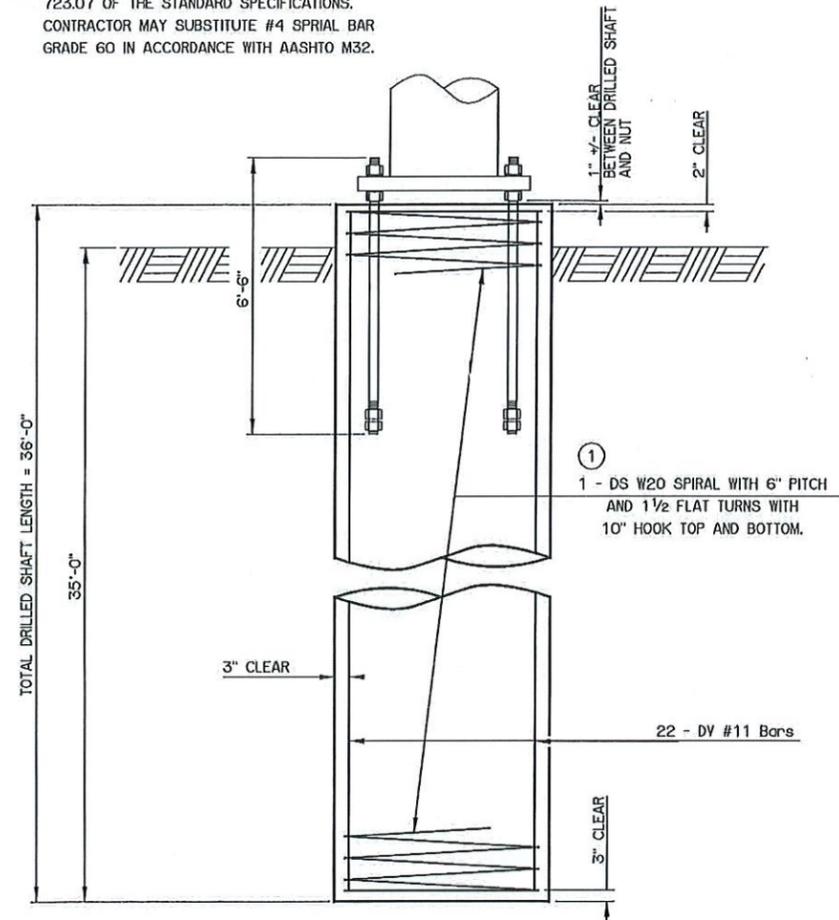
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Detail	JG	JW
Check	JG	JW
Supv	SUPERVISOR	
Eng.	ENGINEER	

MONOTUBE STRUCTURE
(OVERHEAD SIGN BRACKET DETAIL)

STATE OF OKLAHOMA DEPARTMENT OF TRANSPORTATION
JOB PRICE NO. SHEET NO. M4

REV. NO.	DESCRIPTION	REVISIONS	DATE

① USE W20 SPIRAL IN ACCORDANCE WITH 723.07 OF THE STANDARD SPECIFICATIONS. CONTRACTOR MAY SUBSTITUTE #4 SPIRAL BAR GRADE 60 IN ACCORDANCE WITH AASHTO M32.



DRILLED SHAFT NOTES:

MATERIAL PROPERTIES
 CLASS 'AA' CONCRETE = 4,000 PSI
 REINFORCING STEEL = 60,000 PSI

THE DRILLED SHAFT FOR THE MONOTUBE SIGN STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING PROPERTIES:

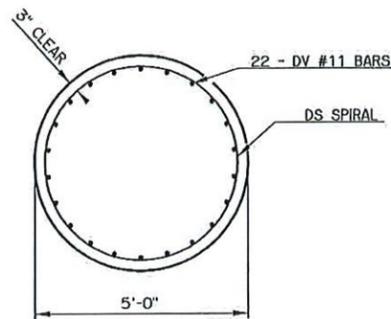
- COHESIVE SOIL
 UNIT WEIGHT = 120 PCF
 COHESION = 1000 PSF
- GRANULAR SOIL
 UNIT WEIGHT = 120 PCF
 INTERNAL FRICTION ANGLE = 28 DEGREES

IF SITE CONDITIONS ARE ENCOUNTERED THAT DIFFER FROM THOSE SPECIFIED ABOVE, THE ENGINEER SHALL BE CONTACTED. SUCH CONDITIONS ARE, BUT NOT LIMITED TO, AS FOLLOWS:

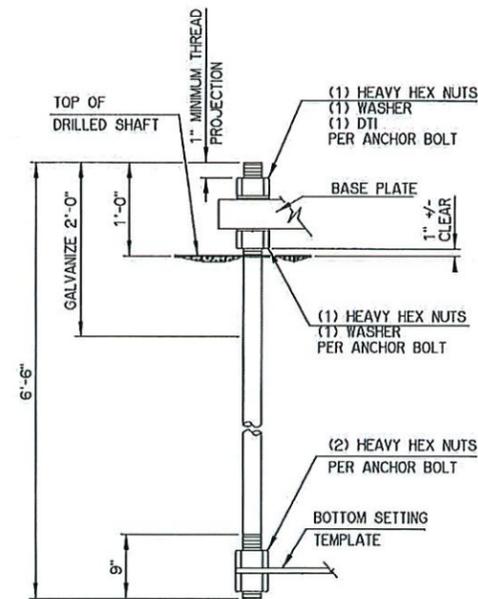
- SOIL HAS HIGH ORGANIC CONTENT OR CONSISTS OF SATURATED SILT AND CLAY.
- THE SITE WON'T SUPPORT THE WEIGHT OF THE DRILLING RIG.
- ROCK IS ENCOUNTERED.

DRILLED SHAFTS SHALL BE CONSTRUCTED ACCORDING TO THE OKLAHOMA DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND ASSOCIATED SPECIAL PROVISIONS. THE USE OF THE "DOUBLE CASING METHOD" IS NOT ALLOWED FOR THIS DESIGN.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFIRMING THAT THE LOCATION AND ELEVATION OF THE DRILLED SHAFT ARE AS REQUIRED IN THE PLANS. THE CONTRACTOR SHALL COORDINATE WITH THE MONOTUBE SUPPLIER TO ENSURE THAT THE ORIENTATION OF THE ANCHOR BOLTS IN THE DRILLED SHAFT ALLOW FOR PROPER ALIGNMENT OF ALL BASE PLATES AND FLANGES UPON FINAL INSTALLATION.



TYPICAL SECTION THRU 60" DRILLED SHAFT



2 1/2" Ø ANCHOR BOLT DETAIL (F1554 GR. 55)

NOTE: FOR ADDITIONAL DRILLED SHAFT DETAILS, SEE "MONOTUBE STRUCTURE (DRILLED SHAFT DETAILS) (SHEET 3 OF 3)". FOR DRILLED SHAFT DETAILS IN THE MEDIAN, SEE "MONOTUBE STRUCTURE (DRILLED SHAFT DETAILS) (SHEET 2 OF 3)".

DRILLED SHAFT BAR LIST (INCLUDED IN CONTRACT UNIT PRICE OF DRILLED SHAFT)				
MARK	SIZE	NO.	FORM	LENGTH
PLAIN REINFORCING BARS				
DS	W20	1	BNT	1,052'-9"
DV	#11	22	STR	35'-7"

BASIS OF PAYMENT		
ITEM NO.	DESCRIPTION	UNIT
② 516(A)	DRILLED SHAFTS 60" DIAMETER	L.F.

② ALL COSTS OF CONCRETE AND REINFORCING IN DRILLED SHAFTS SHALL BE INCLUDED IN THE PRICE BID FOR "DRILLED SHAFTS 60" DIAMETER".

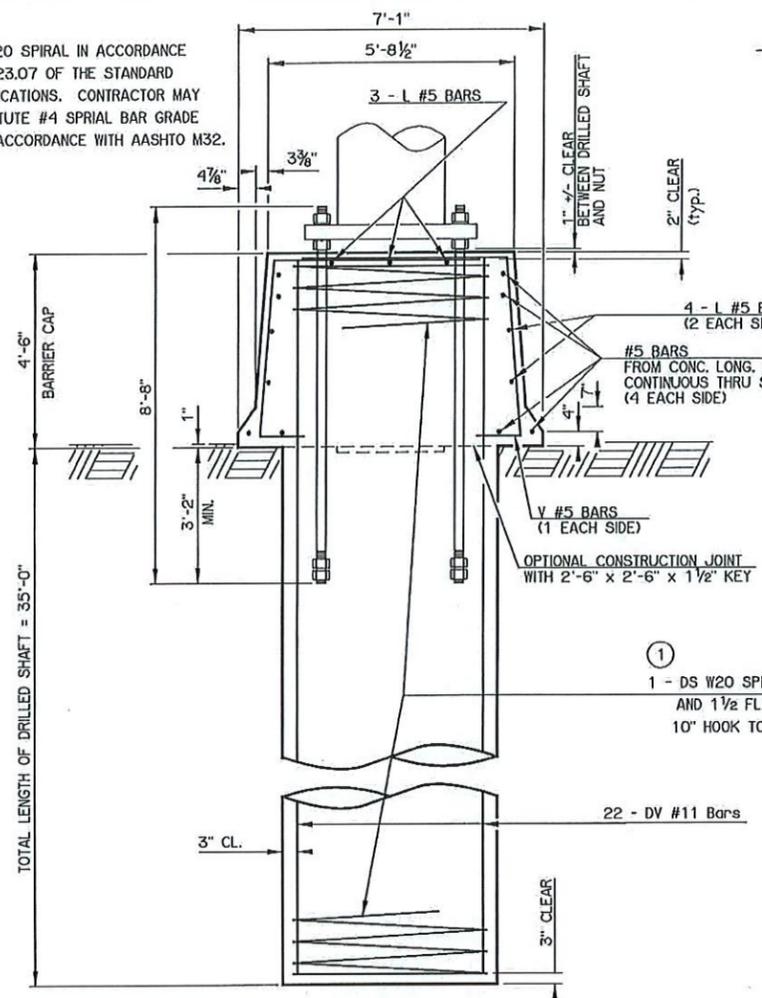
PRELIMINARY -- NOT FOR CONSTRUCTION

MONOTUBE STRUCTURE (DRILLED SHAFT DETAILS) (SHEET 1 OF 3)

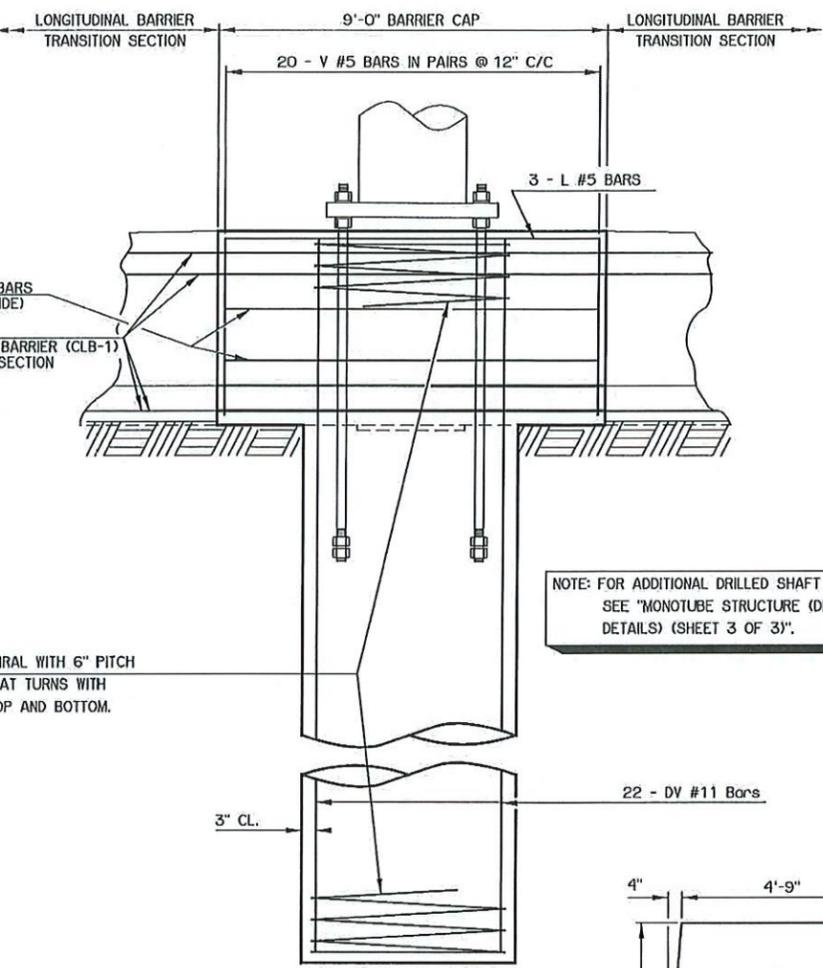
Drawn	JG	JW
Check	JG	JW
Spot	SUPERVISOR	
Eng.	ENGINEER	

REV. NO.	DESCRIPTION	REVISIONS	DATE

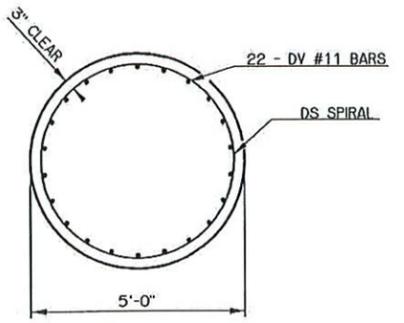
① USE W20 SPIRAL IN ACCORDANCE WITH 723.07 OF THE STANDARD SPECIFICATIONS. CONTRACTOR MAY SUBSTITUTE #4 SPIRAL BAR GRADE 60 IN ACCORDANCE WITH AASHTO M32.



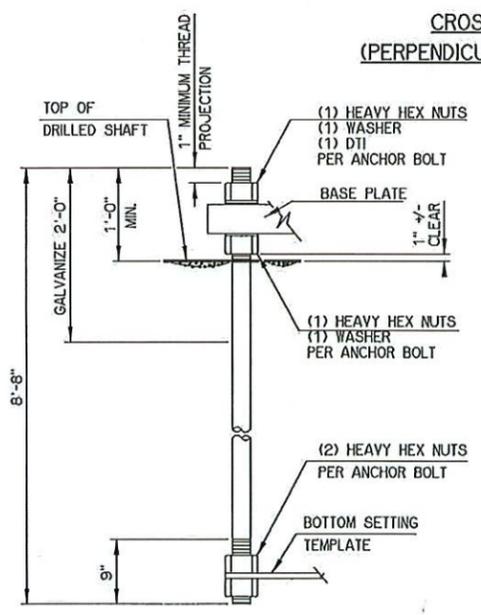
CROSS SECTION (PARALLEL TO TRAFFIC)



CROSS SECTION (PERPENDICULAR TO TRAFFIC)

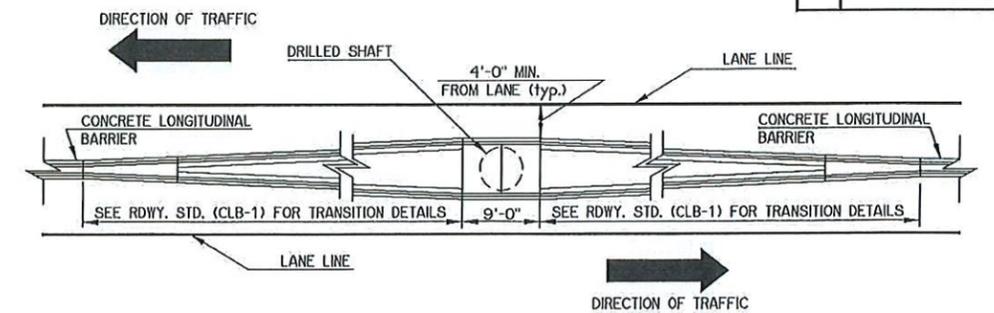


TYPICAL SECTION THRU 60" DRILLED SHAFT

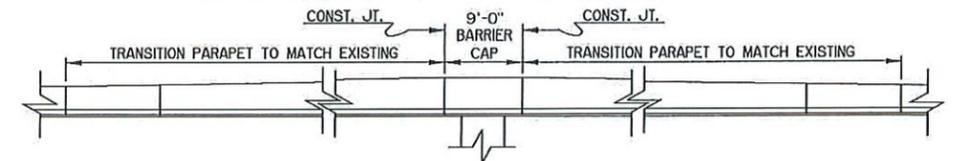


2 1/2" Ø ANCHOR BOLT DETAIL (F1554 GR. 55)

NOTE: FOR ADDITIONAL DRILLED SHAFT DETAILS, SEE "MONOTUBE STRUCTURE (DRILLED SHAFT DETAILS) (SHEET 3 OF 3)".



CONCRETE LONGITUDINAL BARRIER DETAIL (PLAN VIEW)



CONCRETE LONGITUDINAL BARRIER DETAIL (ELEVATION VIEW)

NOTE: CONCRETE LONGITUDINAL BARRIER SHALL BE CONSTRUCTED IN ACCORDANCE WITH ROADWAY STANDARD CLB-1 EXCEPT FOR AS SHOWN HERE.

DRILLED SHAFT NOTES:

MATERIAL PROPERTIES
 CLASS 'AA' CONCRETE = 4,000 PSI
 REINFORCING STEEL = 60,000 PSI

THE DRILLED SHAFT FOR THE MONOTUBE SIGN STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING PROPERTIES:

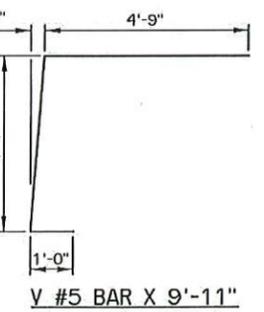
- COHESIVE SOIL
 UNIT WEIGHT = 120 PCF
 COHESION = 1000 PSF
- GRANULAR SOIL
 UNIT WEIGHT = 120 PCF
 INTERNAL FRICTION ANGLE = 28 DEGREES

IF SITE CONDITIONS ARE ENCOUNTERED THAT DIFFER FROM THOSE SPECIFIED ABOVE, THE ENGINEER SHALL BE CONTACTED. SUCH CONDITIONS ARE, BUT NOT LIMITED TO, AS FOLLOWS:

- SOIL HAS HIGH ORGANIC CONTENT OR CONSISTS OF SATURATED SILT AND CLAY.
- THE SITE WON'T SUPPORT THE WEIGHT OF THE DRILLING RIG.
- ROCK IS ENCOUNTERED.

DRILLED SHAFTS SHALL BE CONSTRUCTED ACCORDING TO THE OKLAHOMA DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND ASSOCIATED SPECIAL PROVISIONS. THE USE OF THE "DOUBLE CASING METHOD" IS NOT ALLOWED FOR THIS DESIGN.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFIRMING THAT THE LOCATION AND ELEVATION OF THE DRILLED SHAFT ARE AS REQUIRED IN THE PLANS. THE CONTRACTOR SHALL COORDINATE WITH THE MONOTUBE SUPPLIER TO ENSURE THAT THE ORIENTATION OF THE ANCHOR BOLTS IN THE DRILLED SHAFT ALLOW FOR PROPER ALIGNMENT OF ALL BASE PLATES AND FLANGES UPON FINAL INSTALLATION.



V #5 BAR X 9'-11"

BARRIER CAP QUANTITIES (INCLUDED IN CONTRACT UNIT PRICE OF DRILLED SHAFT)		
ITEM	UNIT	QTY.
CLASS AA CONCRETE	CY	12.50
REINFORCING STEEL	LB	270.00

BARRIER CAP BAR LIST (INCLUDED IN CONTRACT UNIT PRICE OF DRILLED SHAFT)				
MARK	SIZE	NO.	FORM	LENGTH
PLAIN REINFORCING BARS				
L	#5	7	STR	8'-8"
V	#5	20	BNT	9'-11"

DRILLED SHAFT BAR LIST (INCLUDED IN CONTRACT UNIT PRICE OF DRILLED SHAFT)				
MARK	SIZE	NO.	FORM	LENGTH
PLAIN REINFORCING BARS				
DS	W20	1	BNT	1,156'-6"
DV	#11	22	STR	39'-1"

BASIS OF PAYMENT		
ITEM NO.	DESCRIPTION	UNIT
② 516(A)	DRILLED SHAFTS 60" DIAMETER	L.F.

② ALL COSTS OF CONCRETE AND REINFORCING IN DRILLED SHAFTS SHALL BE INCLUDED IN THE PRICE BID FOR "DRILLED SHAFTS 60" DIAMETER".
 ② ALL COSTS OF CONCRETE AND REINFORCING IN THE BARRIER CAP SHALL BE INCLUDED IN THE PRICE BID FOR "DRILLED SHAFTS 60" DIAMETER".

PRELIMINARY -- NOT FOR CONSTRUCTION

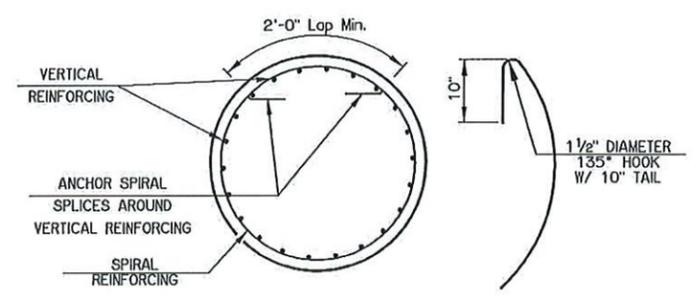
MONOTUBE STRUCTURE (DRILLED SHAFT DETAILS) (SHEET 2 OF 3)

Drawn	JG	JW
Check	JG	JW
Spot	SUPERVISOR	ENGR.

STATE OF OKLAHOMA DEPARTMENT OF TRANSPORTATION

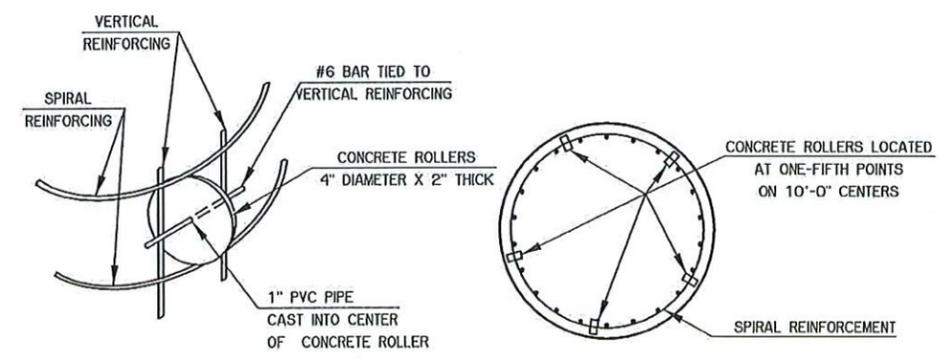
JOB PRICE NO. SHEET NO. MG

REV. NO.	DESCRIPTION	REVISIONS	DATE



SPIRAL REINFORCING SPLICE DETAIL

NOTE: SPIRAL BAR LENGTH QUANTITY DOES NOT INCLUDE LAP. IF LAP IS REQUIRED, THE LENGTH OF THE LAP SHALL BE AS SHOWN.

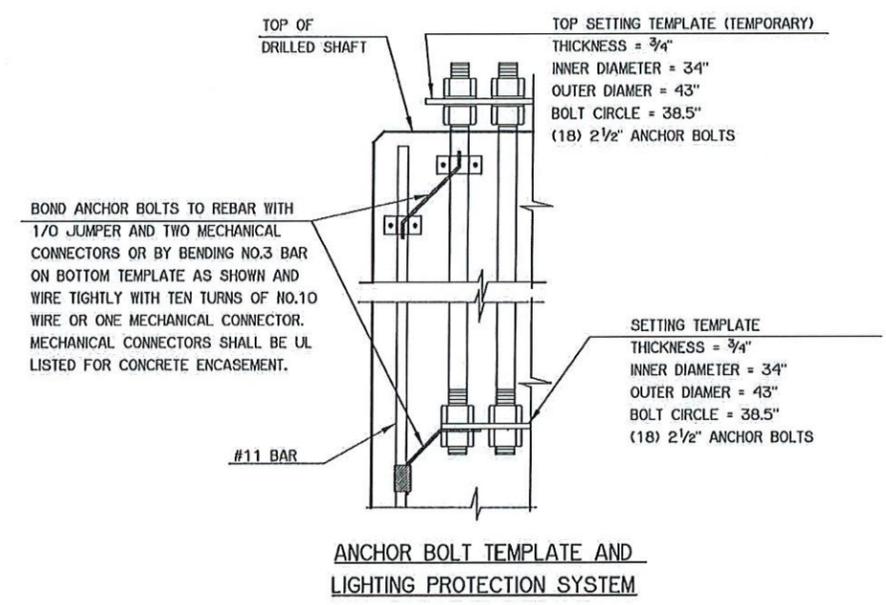


ROLLER INSTALLATION

ROLLER PLACEMENT

DETAIL OF CONCRETE ROLLERS

NOTE: CONCRETE USED IN THE CONCRETE ROLLERS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 P.S.I. SLAB BOLSTERS, HIGH CHAIRS, AND PLASTIC ROLLERS SHALL NOT BE SUBSTITUTED FOR THE CONCRETE ROLLERS.

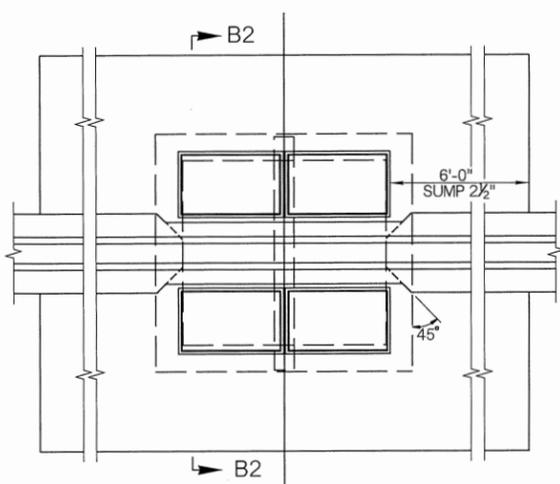


PRELIMINARY -- NOT FOR CONSTRUCTION

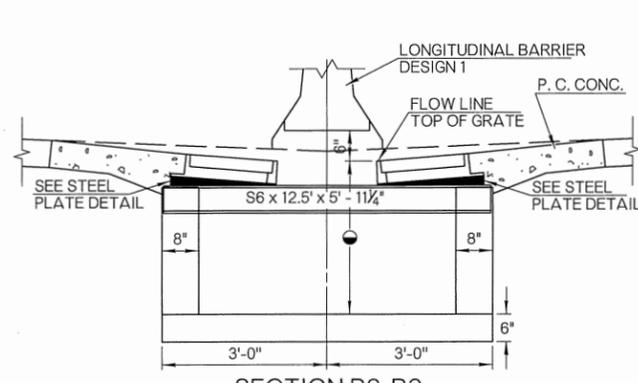
MONOTUBE STRUCTURE (DRILLED SHAFT DETAILS) (SHEET 3 OF 3)	Design	JG	JW
	Draft	JG	JW
	Check	JG	JW
Signed		SUPERVISOR	
Eng.		ENGINEER	
STATE OF OKLAHOMA		DEPARTMENT OF TRANSPORTATION	
JOB FILE NO.		SHEET NO. M7	

EXHIBIT 4

STANDARD REVISIONS		
DESCRIPTION	DATE	



PLAN OF DOUBLE SIDED INLET (TYPE II)
IN LONGITUDINAL BARRIER



SECTION B2-B2

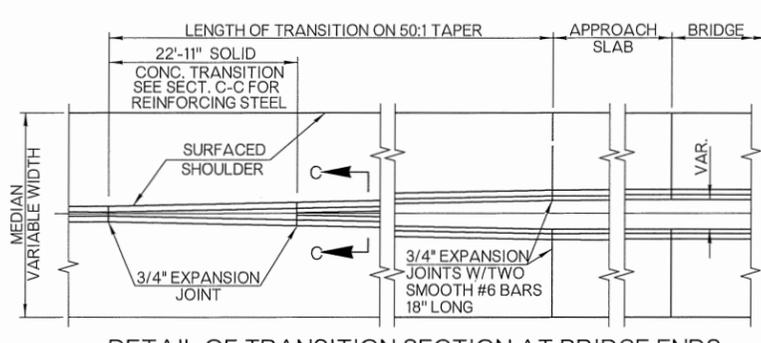
RCP SIZE	MIN. DEPTH
18" RCP	2' - 8"
24" RCP	3' - 2"
30" RCP	3' - 8"

NOTE: SEE ROADWAY STDS. SSIF-4 & CIG-3 FOR AVAILABLE INLET FRAME & GRATES TO BE USED ON SINGLE (TYPE I) OR DOUBLE (TYPE II) SIDED INLETS.

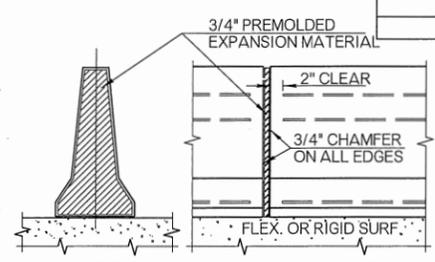
BENDING DIAGRAM
BAR C (J-HOOK)@10" C/C

L(MIN.)	GRADE DIFF.	OVERALL
41"	12" THRU 18"	54"
47"	19" THRU 24"	60"
53"	25" THRU 30"	67"
59"	31" THRU 36"	73"

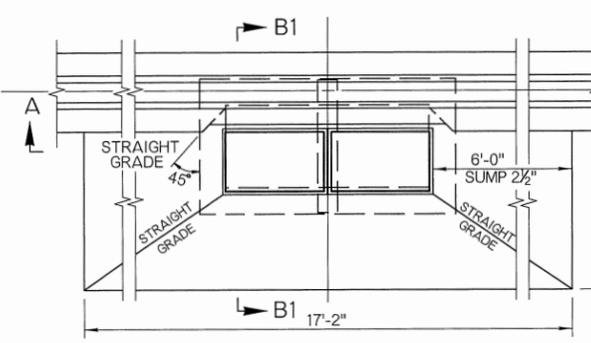
NOTE: FOR GRADE DIFFERENCE OF 0" TO 11" BETWEEN OPPOSITE SIDES OF BARRIER, NO ADDITIONAL REINFORCEMENT IS REQUIRED.



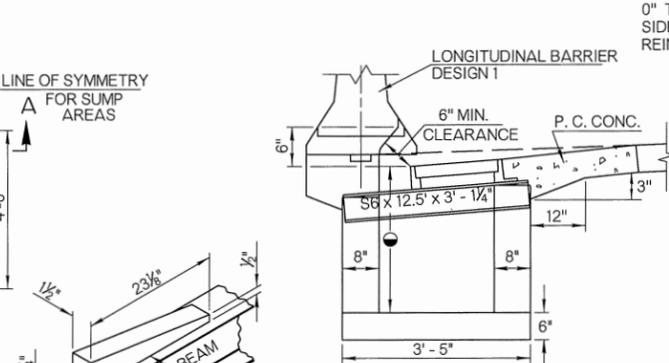
DETAIL OF TRANSITION SECTION AT BRIDGE ENDS



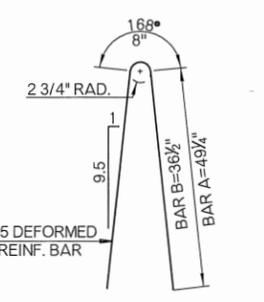
DETAIL EXPANSION JOINT



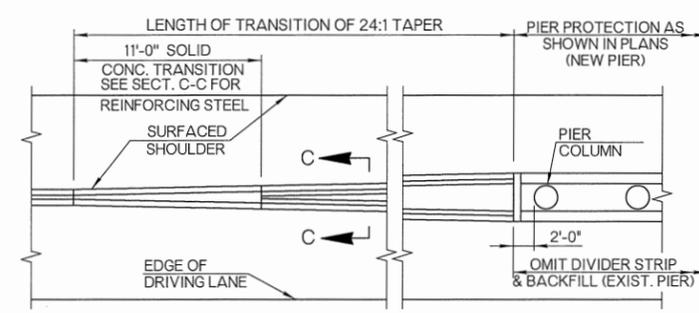
PLAN OF SINGLE SIDED INLET (TYPE I)
IN LONGITUDINAL BARRIER



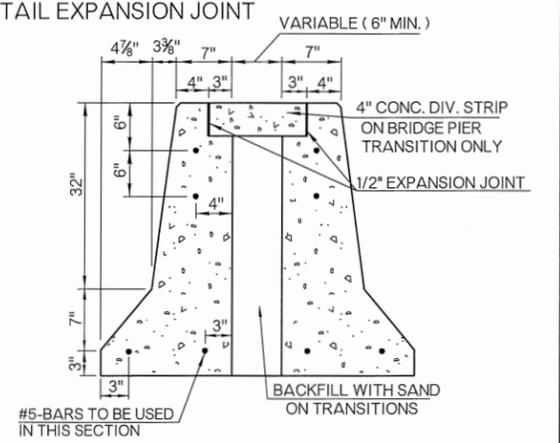
SECTION B1-B1



BENDING DIAGRAM
BARS A & B

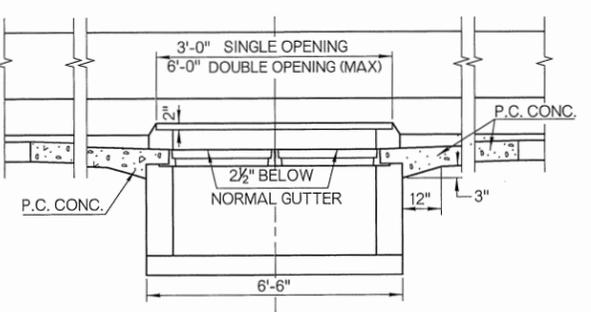
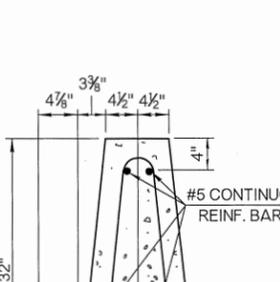


DETAIL OF TRANSITION SECTION AT BRIDGE PIERS

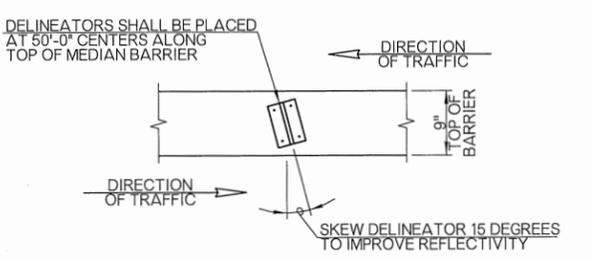


SECTION C-C

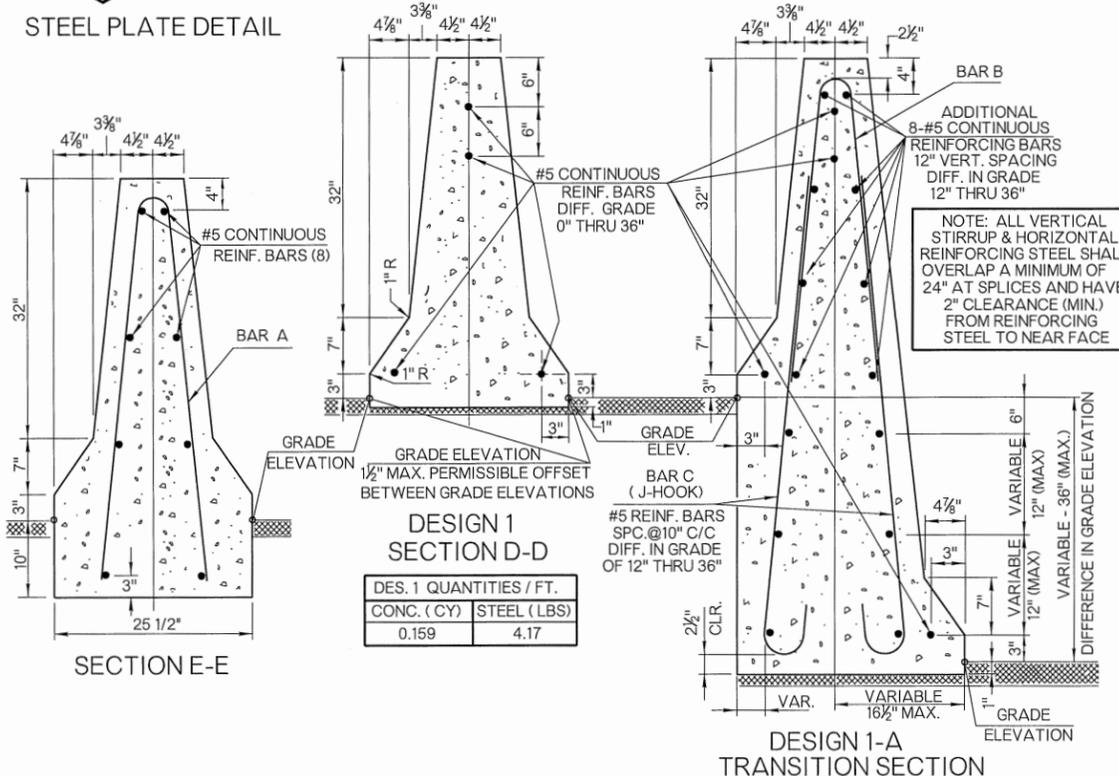
STEEL PLATE DETAIL



SECTION A-A



PLAN OF DELINEATOR PLACEMENT



DES. 1 QUANTITIES / FT.

CONC. (CY)	STEEL (LBS)
0.159	4.17

LONGITUDINAL BARRIER DESIGN 1-A QUANTITIES
DIFFERENTIAL GRADE SECTION

DIFFERENCE IN GRADE ELEVATION	TOTAL CONCRETE CU.YDS. PER LF.	HORIZ. REINF. #5 BARS EACH	BAR B #5 BAR @10"C/C INCHES	BAR C #5 BAR @10"C/C INCHES	TOTAL REINF. QUANTITY LBS./LF.
1"	0.164	4	-	-	4.17
2"	0.170	4	-	-	4.17
3"	0.176	4	-	-	4.17
4"	0.181	4	-	-	4.17
5"	0.187	4	-	-	4.17
6"	0.193	4	-	-	4.17
7"	0.198	4	-	-	4.17
8"	0.204	4	-	-	4.17
9"	0.210	4	-	-	4.17
10"	0.216	4	-	-	4.17
11"	0.222	4	-	-	4.17
12"	0.228	14	1@81	2@54	34.48
13"	0.233	14	1@81	2@54	34.48
14"	0.239	14	1@81	2@54	34.48
15"	0.245	14	1@81	2@54	34.48
16"	0.251	16	1@81	2@54	34.48
17"	0.257	16	1@81	2@54	34.48
18"	0.263	16	1@81	2@54	34.56
19"	0.269	16	1@81	2@60	34.83
20"	0.276	16	1@81	2@60	34.83
21"	0.282	16	1@81	2@60	34.83
22"	0.288	16	1@81	2@60	34.83
23"	0.294	16	1@81	2@60	34.83
24"	0.300	18	1@81	2@60	34.83
25"	0.306	18	1@81	2@67	39.30
26"	0.313	18	1@81	2@67	39.30
27"	0.319	18	1@81	2@67	39.30
28"	0.325	18	1@81	2@67	39.30
29"	0.332	18	1@81	2@67	39.30
30"	0.338	18	1@81	2@67	41.39
31"	0.344	18	1@81	2@74	42.86
32"	0.351	18	1@81	2@74	42.86
33"	0.357	18	1@81	2@74	42.86
34"	0.364	18	1@81	2@74	42.86
35"	0.370	18	1@81	2@74	42.86
36"	0.377	18	1@81	2@74	42.86

- GENERAL NOTES**
- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
 - PRICE BID SHALL INCLUDE PAYMENT FOR MATERIALS, LABOR, PIPE SLEEVES, EXPANSION JOINTS, AND ALL INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION.
 - FOR DETAILS OF LONGITUDINAL BARRIER MOUNTED LIGHT POLE BASES AND INSTALLATIONS, SEE TRAFFIC STANDARD BMF1-1.
 - LONGITUDINAL BARRIER SHALL BE MEASURED FOR PAYMENT AS CONTINUOUS BARRIER. PAYMENT FOR LIGHT POLE FOOTINGS TO BE INCLUDED IN OTHER ITEMS OF WORK.
 - WHEN LONGITUDINAL BARRIER IS PLACED ON FLEXIBLE BASE OR SURFACING, CONTRACTION JOINTS OR CHAMFERS ARE REQUIRED AT MAX. 20 FT. C/C SPACING AND EXPANSION JOINTS ARE REQUIRED AT MAX. 200 FT. C/C SPACING. WHEN THE LONGITUDINAL BARRIER IS PLACED ON P.C. CONCRETE SURFACING THE JOINTS SHALL MATCH THE JOINTS ON THE RIGID SURFACING. SAW-CUT JOINTS WITHIN 10 HOURS OF BARRIER PLACEMENT.
 - WHEN LONGITUDINAL BARRIER IS CONSTRUCTED OR EXISTS PRIOR TO CONSTRUCTION OF ADJACENT SHOULDERS OR OVERLAYS, THE SHOULDER LAYERING SHALL NOT ALTER THE ORIGINAL TRAFFIC SIDE GEOMETRY OF THE LONGITUDINAL BARRIER.
 - DELINEATOR UNITS SHALL BE PLACED ON MEDIAN BARRIER ACCORDING TO TRAFFIC STANDARD DU1-1. ALL COST OF INSTALLATION SHALL BE INCLUDED IN UNIT PRICE BID OF TRAFFIC PAY ITEM BARRIER DELINEATORS.
 - AN ALTERNATE DESIGN (INCLUDING PRECAST) CONCRETE LONGITUDINAL BARRIER, MEETING NCHRP 350 REQUIREMENTS, MAY BE USED WHEN APPROVED BY THE ENGINEER.
 - WALLS OF INLETS MAY BE MADE OF BRICK MASONRY OR OF CLASS A CONCRETE, TO THE SAME DIMENSIONS. PRICE OF I-BEAM, FRAMES & GRATES SHALL BE INCLUDED IN PRICE BID OF INLET. WELDING SHALL BE PER CURRENT AWS D1.1 STRUCTURAL WELDING CODE.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
627 (A)	CONCRETE LONGITUDINAL BARRIER DESIGN 1	LF
627 (B)	CONCRETE LONGITUDINAL BARRIER END SECTION	EA
509 (B)	CLASS A CONCRETE (LONG.BAR.DES.1-A)	CY
511 (A)	REINFORCING STEEL	LBS
611 (G)	INLET - LONGITUDINAL BARRIER - TYPE I, DES. 1	EA
611 (G)	INLET - LONGITUDINAL BARRIER - TYPE II, DES. 2	EA

■ SPECIFY DESIGN 1 (SINGLE FRAME & GRATE) OR 2 (DOUBLE FRAME & GRATE)

APPROVED BY ROADWAY ENGINEER: *Calder F. A.* DATE: 04/14/15

ROADWAY DESIGN DIVISION STANDARD

DOT CONCRETE LONGITUDINAL BARRIER (NCHRP 350 F-SHAPE)