



ROADSIDE DYNAMIC MESSAGE SIGN SUPPORT STANDARDS

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RDMS-06-13	3D PDF ROTATIONAL VIEW	"DMS" = DYNAMIC MESSAGE SIGN

ANCHOR-BOLT NUT TIGHTENING PROCEDURE:

- THIS WORK SHALL BE PERFORMED ONLY ON DAYS WITH WINDS LESS THAN 15 MPH. ALL TIGHTENING OF THE NUTS IS TO BE DONE IN THE PRESENCE OF THE INSPECTOR. ONCE THE TIGHTENING PROCEDURE IS STARTED IT MUST BE COMPLETED ON ALL OF THE BASE PLATE NUTS WITHOUT PAUSE OR DELAY.
- PROPERLY SIZED WRENCHES DESIGNED FOR TIGHTENING NUTS AND/OR BOLTS SHALL BE USED TO AVOID ROUNDING OR OTHER DAMAGE TO THE NUTS. ADJUSTABLE END WRENCHES OR PIPE WRENCHES MAY NOT BE USED.
- BASE PLATE, ANCHOR BOLTS AND NUTS ARE TO BE FREE OF ANY DIRT OR DEBRIS.
- APPLY STICK WAX OR BEES WAX TO THE THREADS AND BEARING SURFACES OF THE ANCHOR BOLTS, NUTS AND WASHERS.
- TIGHTEN TOP NUTS SO THEY FULLY CONTACT THE BASE PLATE. TIGHTEN LEVELING NUTS TO SNUG-TIGHT CONDITION. SNUG TIGHT IS DEFINED AS THE FULL EFFORT OF ONE PERSON ON A WRENCH WITH A LENGTH EQUAL TO 21 INCHES. APPLY FORCE AS CLOSE TO THE END OF THE WRENCH AS POSSIBLE. PULL FIRMLY BY LEANING BACK AND USING ENTIRE BODY WEIGHT ON THE END OF THE WRENCH UNTIL THE NUT STOPS ROTATING. USE A MINIMUM OF TWO SEPARATE PASSES OF TIGHTENING. SEQUENCE THE TIGHTENING IN EACH PASS SO THAT THE NUT ON THE OPPOSITE SIDE, TO THE EXTENT POSSIBLE, WILL BE SUBSEQUENTLY TIGHTENED UNTIL ALL NUTS IN THAT PASS HAVE BEEN TIGHTENED.
- TIGHTEN TOP NUTS TO SNUG TIGHT AS DESCRIBED FOR THE LEVELING NUTS.
- MATCH-MARK THE TOP NUTS AND BASE PLATE USING PAINT, CRAYON OR OTHER APPROVED MEANS TO PROVIDE A REFERENCE FOR DETERMINING THE RELATIVE ROTATION OF THE NUT AND BASE PLATE DURING TIGHTENING. USING A STRIKING OR HYDRAULIC WRENCH, FURTHER TIGHTEN THE TOP NUTS IN TWO PASSES AS LISTED BELOW. SEQUENCE THE TIGHTENING IN EACH PASS SO THAT THE NUT ON THE OPPOSITE SIDE, TO THE EXTENT POSSIBLE, WILL BE SUBSEQUENTLY TIGHTENED UNTIL ALL NUTS IN THAT PASS HAVE BEEN TURNED. DO NOT ROTATE THE LEVELING NUT DURING THE TOP NUT TIGHTENING.

ANCHOR-BOLT SIZE	FIRST PASS	SECOND PASS	TOTAL ROTATION
1 1/2" φ	1/6 TURN	1/6 TURN	1/3 TURN

- LUBRICATE, PLACE AND TIGHTEN THE JAM NUTS TO SNUG TIGHT.

SPECIFICATIONS:

DESIGN: AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2013 WITH INTERIMS.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

DESIGN STRESSES:

DESIGN STRESSES FOR MATERIALS ARE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2013 WITH INTERIMS.

REINFORCING STEEL IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002, SECTION 8, GRADE 60.

CONCRETE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002, SECTION 8, f'c = 4.0 KSI.

GALVANIZED STEEL NOTES:

ALL STEEL MAST ARMS SHALL COMPLY WITH ASTM A53 GRADE B, TYPE E OR S; THE AMERICAN PETROLEUM INSTITUTE (API) 5L GRADE B; ASTM A500 GRADE B; ASTM A500 GRADE C; ASTM A1085; API 5L GRADE X42; OR API 5L GRADE X52. THESE MEMBERS DESIGNATED AS STEEL PIPE SHALL HAVE A MINIMUM YIELD STRENGTH OF 35 KSI.

THE STEEL SUPPORT POST SHALL COMPLY WITH ASTM A500 GRADE B, ASTM A500 GRADE C, ASTM A1085, API 5L GRADE X42 OR API 5L GRADE X52. THIS MEMBER DESIGNATED AS A 16.000 x 0.500 HOLLOW STRUCTURAL SECTION (HSS) SHALL HAVE A MINIMUM YIELD STRENGTH OF 42 KSI.

ALL STEEL BARS AND PLATES SHALL COMPLY WITH ASTM A36, ASTM A572 GRADE 50, ASTM A709 GRADE 36 OR ASTM A709 GRADE 50. ALL STEEL W-SECTIONS SHALL COMPLY WITH ASTM A992, ASTM A36, ASTM A572 GRADE 50, ASTM A709 GRADE 36, ASTM A709 GRADE 50, OR ASTM A709 GRADE 50S. ALL STEEL BAR GRATING SECTIONS INCLUDING BEARING BARS, CROSS BARS AND BANDING BARS SHALL COMPLY WITH ASTM A1011 TYPE 2.

STEEL WELDING SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE AWS SPECIFICATIONS D1.1, STRUCTURAL WELDING CODE--STEEL.

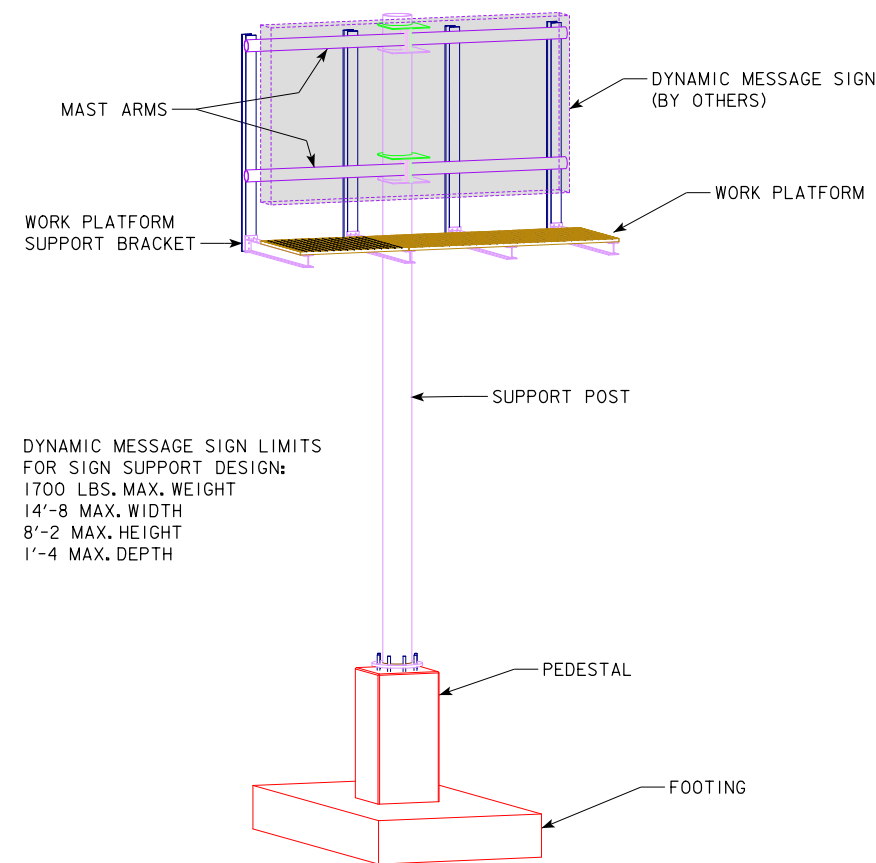
ULTRASONIC TESTING SHALL BE PERFORMED ON THE POST-TO-BASE-PLATE COMPLETE-JOINT-PENETRATION GROOVE WELD.

ALL STEEL SECTIONS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. PROVIDE VENT HOLES FOR GALVANIZING. SHOW LOCATION AND SIZE OF VENT HOLES ON SHOP DRAWINGS.

GALVANIZED STEEL FASTENER NOTES:

GALVANIZED STEEL FASTENERS SHALL BE IN ACCORDANCE WITH ARTICLE 2408.03, S AND ARTICLE 4187.01, C, 2 OF THE STANDARD SPECIFICATIONS. REGULAR NUTS AND JAM NUTS SHALL BE ASTM A563 GRADE DH HEAVY HEX. REGULAR NUTS MAY BE SUBSTITUTED FOR JAM NUTS. LOCK WASHERS SHALL NOT BE SUBSTITUTED FOR JAM NUTS. ASTM A449 TYPE I BOLTS OR ASTM F3125 GRADE A325-T TYPE I BOLTS MAY BE SUBSTITUTED FOR ASTM F3125 GRADE A325 TYPE I BOLTS WHERE NECESSARY TO ASSURE PROPER BOLT LENGTH AND THREAD LENGTH.

UNLESS OTHERWISE NOTED ON THE PLANS, GALVANIZED STEEL FASTENERS SHALL BE TENSIONED BY TURN-OF-NUT METHOD.



DYNAMIC MESSAGE SIGN LIMITS FOR SIGN SUPPORT DESIGN:
1700 LBS. MAX. WEIGHT
14'-8" MAX. WIDTH
8'-2" MAX. HEIGHT
1'-4" MAX. DEPTH

GENERAL INFORMATION VIEW

GENERAL NOTES:

ALL ROADSIDE DYNAMIC MESSAGE SIGN (DMS) SUPPORTS ARE DESIGNED FOR 40 LB/FT² WIND PRESSURE ON MEMBERS AND DMS PANEL.

SHOP DRAWINGS SHALL BE SUBMITTED BY THE CONTRACTOR IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.

CLEAR DISTANCE FROM FACE OF CONCRETE TO THE NEAREST REINFORCING BAR SHALL BE 2" UNLESS OTHERWISE SHOWN.

UNLESS OTHERWISE NOTED ON THE PLANS, KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

ROADSIDE DMS SUPPORTS SHALL NOT BE USED ON BRIDGES.

THE FOUNDATION SHALL BE BACKFILLED PRIOR TO ERECTING THE DMS SUPPORT FRAME.

THE FOUNDATION DESIGN IS BASED ON AN ALLOWABLE SOIL BEARING OF 0.75 TON/FT² FOR LOCATIONS WITHIN 30 FEET OF THE EDGE OF PAVEMENT.

FOR LOCATIONS MORE THAN 30 FEET FROM THE EDGE OF PAVEMENT, THE ENGINEER SHALL INSPECT THE SOIL IN CONSULTATION WITH IOWA DOT SOILS DESIGN SECTION TO MAKE SURE THE SOIL IS MEETING THE 0.75 TON/FT² ALLOWABLE SOIL BEARING CAPACITY.

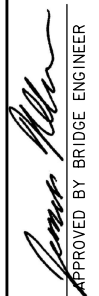

STRUCTURAL ALIGNMENT/TOLERANCE NOTES:

THE PRECISE INSTALLATION AND ALIGNMENT OF ALL COMPONENTS OF THE ROADSIDE DYNAMIC MESSAGE SIGN SUPPORT SHALL BE CONSIDERED ESSENTIAL. THE CONTRACTOR SHALL SUBMIT DOCUMENTATION TO THE ENGINEER SHOWING THAT THE VARIOUS COMPONENTS HAVE BEEN MEASURED AND ARE LOCATED WITHIN THE TOLERANCES LISTED BELOW.

- THE ELEVATION AT THE TOP OF THE FOUNDATION SHALL BE WITHIN 1 INCH OF PLAN ELEVATION.
- ANCHOR BOLT GROUPS SHALL BE LOCATED ACCURATELY BY TEMPLATE OR OTHER POSITIVE MEANS, WITH CENTERS OF ADJACENT ANCHOR BOLT GROUPS WITHIN 1/8 INCH OF THE CORRECT DISTANCE APART.
- ANCHOR BOLTS SHALL BE PLUMB WITHIN 1/4 INCH PER FOOT FROM VERTICAL.
- ANCHOR BOLTS SHALL PROJECT ABOVE TOP OF FOUNDATION WITHIN 1/4 INCH OF THE PLAN DIMENSION.
- WELDING OR BENDING OF ANCHOR BOLTS SHALL NOT BE ALLOWED. THE CONTRACTOR SHALL OBTAIN A TEMPLATE FROM THE MANUFACTURER / FABRICATOR FOR PROPER PLACEMENT OF THE ANCHOR BOLTS.
- THE SUPPORT POST SHALL BE PLUMB WITHIN 1/8 INCH PER FOOT OF VERTICAL IN TWO PERPENDICULAR DIRECTIONS, IN THE COMPLETED STRUCTURE.
- A HORIZONTAL LINE ALONG EACH MAST ARM SHALL BE LEVEL WITHIN 1/8 INCH PER FOOT OF ORIZONTAL, IN THE COMPLETED STRUCTURE.

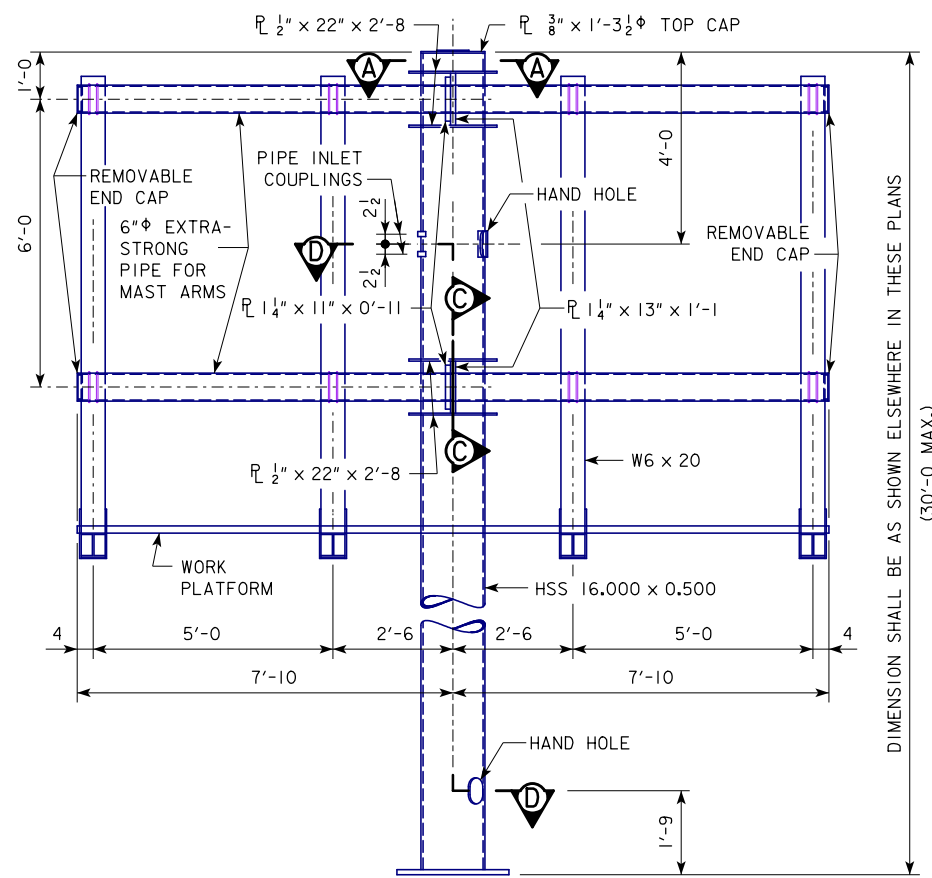
U-BOLT NOTES:

U-BOLTS MAY BE MADE OF GALVANIZED STEEL OR STAINLESS STEEL AND SHALL BE IN ACCORDANCE WITH ARTICLE 4187.01, C, 2 OF THE STANDARD SPECIFICATIONS. WASHERS, REGULAR NUTS AND JAM NUTS SHALL USE THE SAME ALLOY PROPERTIES AS THOSE OF THE U-BOLTS SPECIFIED. REGULAR NUTS MAY BE SUBSTITUTED FOR JAM NUTS. LOCK WASHERS SHALL NOT BE SUBSTITUTED FOR JAM NUTS.

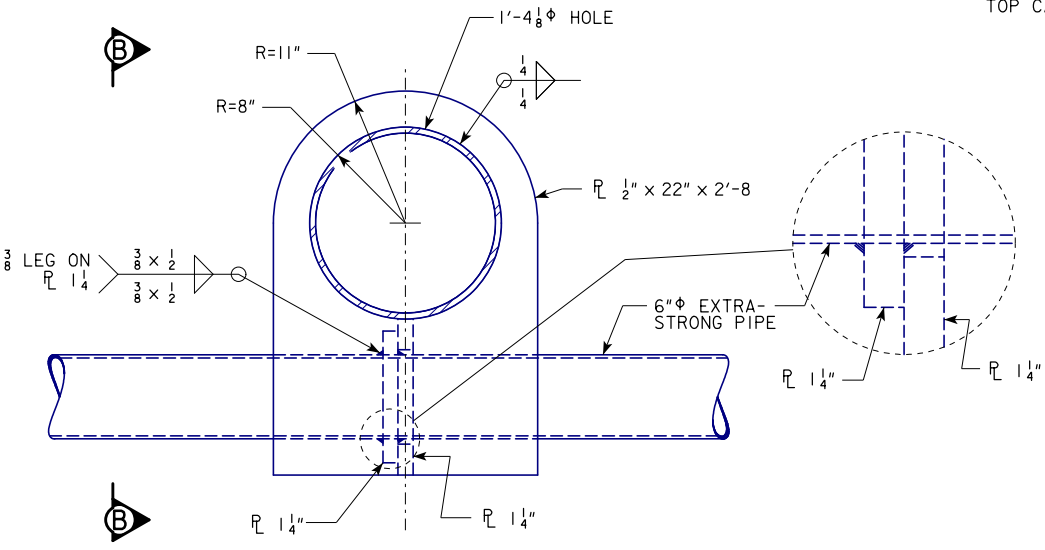
12-2021 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN ROADSIDE DYNAMIC MESSAGE SIGN (DMS) SUPPORT APRIL, 2013	
		INDEX AND NOTES	RDMS-01-13

*REVISED 03-2019: MODIFIED GALVANIZED STEEL NOTES TO ADDRESS MATERIAL AVAILABILITY ISSUES. MODIFIED GALVANIZED STEEL FASTENER NOTES TO ADDRESS CHANGES IN ASTM SPECIFICATIONS. UPDATED SHOP DRAWING SUBMITTAL NOTE TO CONFORM TO CURRENT IOWA DOT STANDARD SPECIFICATIONS. UPDATED DESIGN SPECIFICATIONS AND DESIGN STRESSES TO COMPLY WITH AASHTO LTS-6 (2013). REMOVED STRUCTURE DIMENSION LINES SHOWN IN GENERAL INFORMATION VIEW FOR IMPROVED CLARITY. UPDATED BRIDGE ENGINEER SIGNATURE.
 *REVISED 12-2021: CLARIFIED THAT A WRENCH WITH A 21-INCH HANDLE LENGTH IS REQUIRED TO TIGHTEN ANCHOR-BOLT NUTS TO SNUG-TIGHT CONDITION.
 *ROADSIDEDMSUPPORT.DGN - RDMS-01-13 - THIS SHEET ISSUED 04-2013.

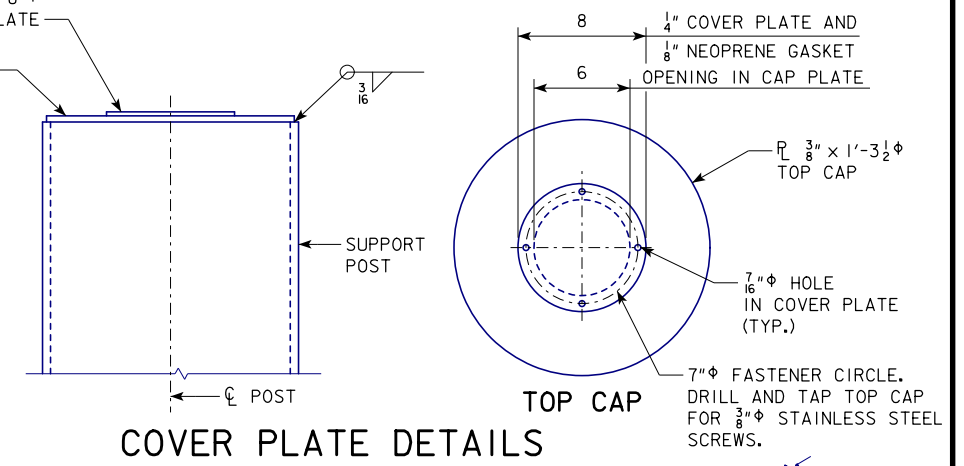
*REVISED 03-2019: MODIFIED FASTENER NOTE TO ADDRESS CHANGE IN ASTM SPECIFICATIONS. ADDED LABEL FOR DETAIL ASSOCIATED WITH SECTION D-D AND CHANGED DETAIL C LABEL TO DETAIL D.
 *CORRECTED WELD SYMBOL ASSOCIATED WITH HAND HOLE RIM, UPDATED IOWA DOT LOGO IN TITLE BLOCK. UPDATED BRIDGE ENGINEER SIGNATURE.
 *ROADSIDEDMSSUPPORT.DGN - RDMS-02-13 - THIS SHEET ISSUED 04-2013.



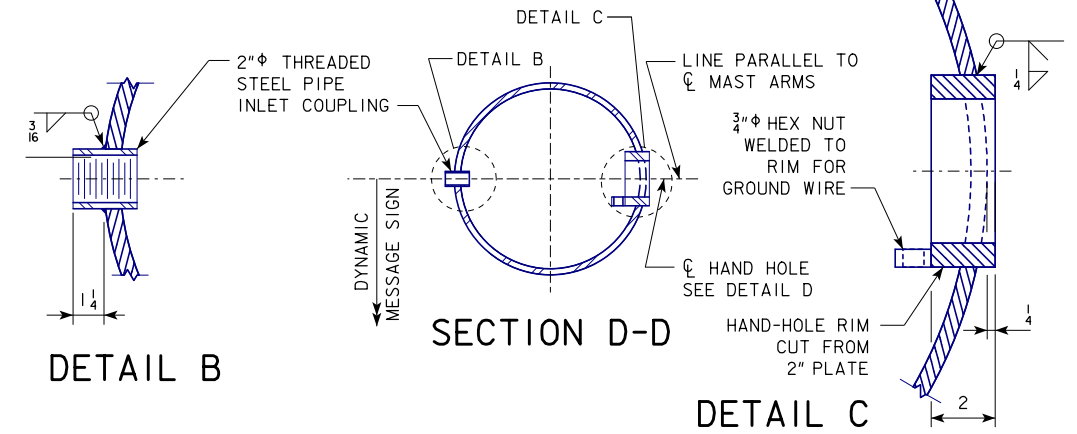
ELEVATION VIEW



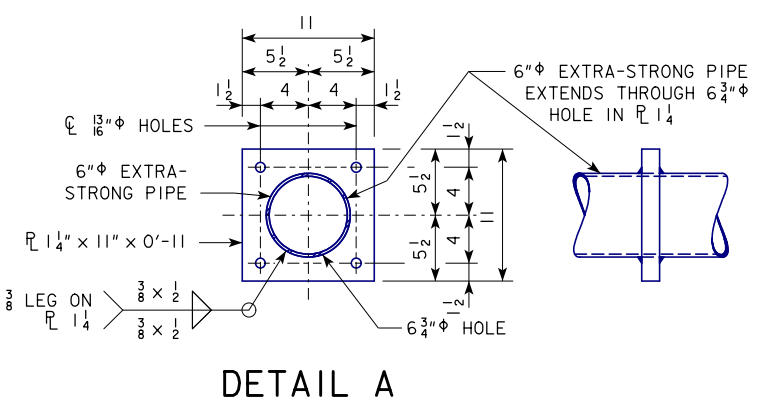
SECTION A-A



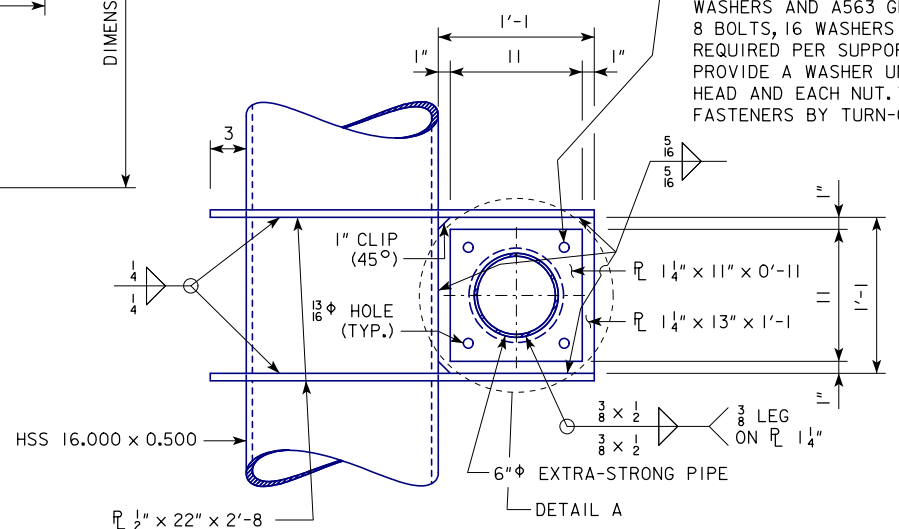
COVER PLATE DETAILS



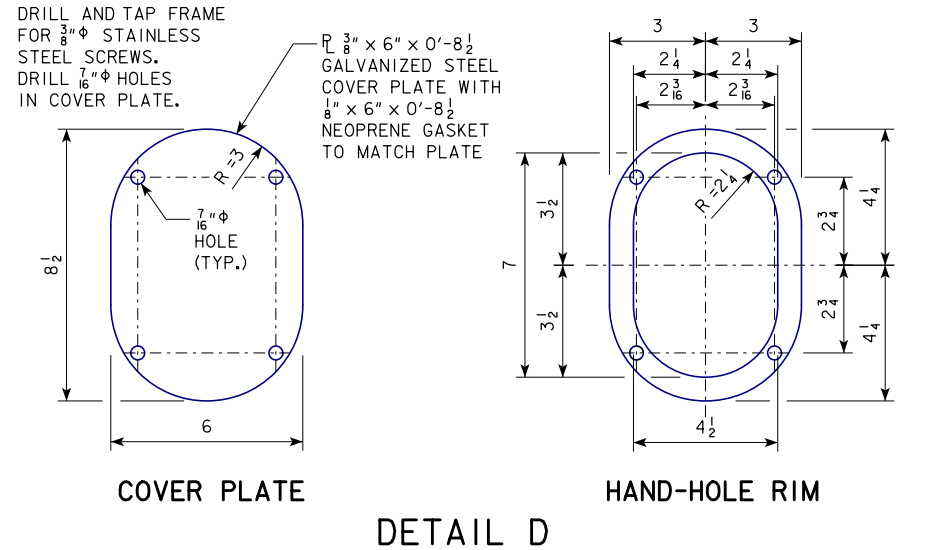
SECTION D-D



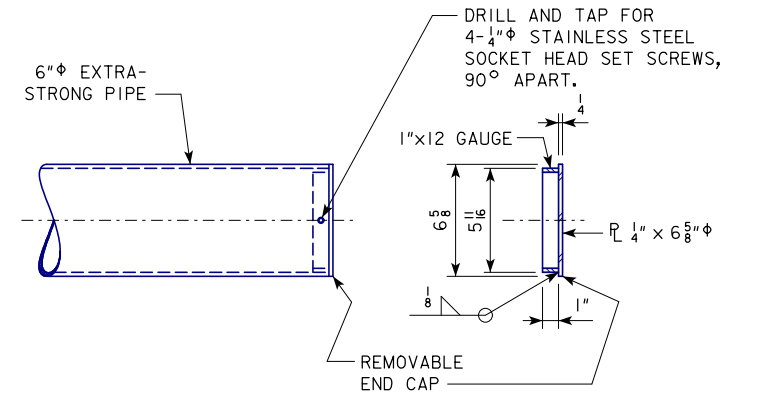
DETAIL A



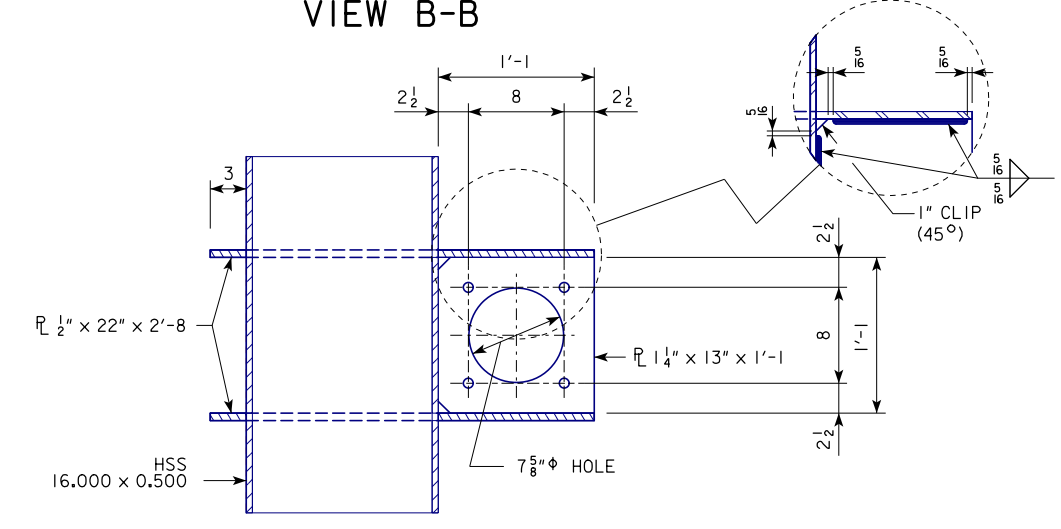
VIEW B-B



DETAIL D



END CAP DETAIL

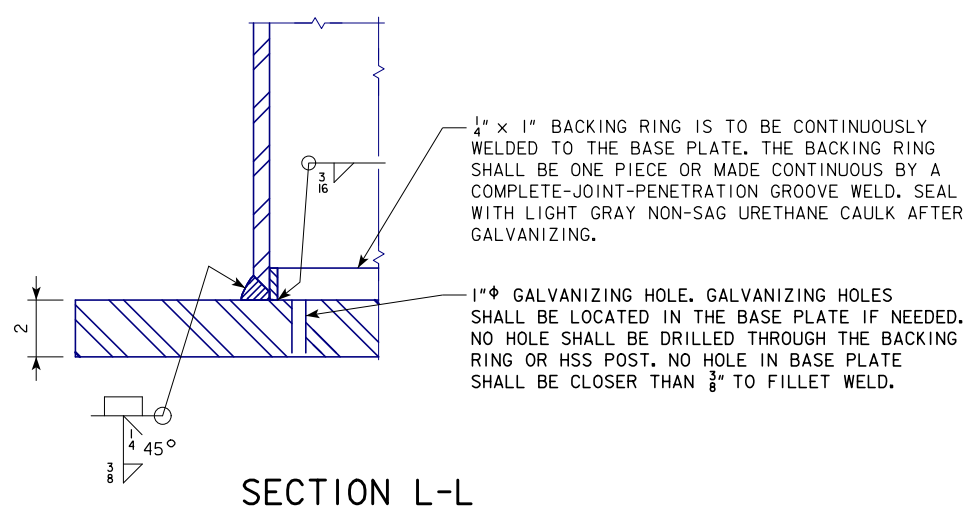


SECTION C-C

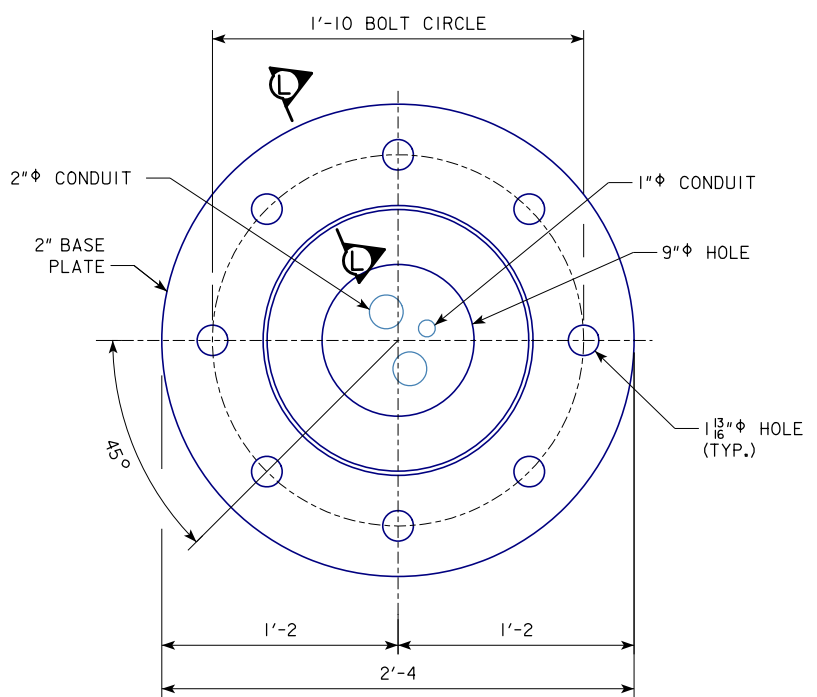
(6" EXTRA-STRONG PIPE NOT SHOWN)

03-2019 LATEST REVISION DATE		APPROVED BY BRIDGE ENGINEER	IOWA DOT	
			STANDARD DESIGN ROADSIDE DYNAMIC MESSAGE SIGN (DMS) SUPPORT APRIL, 2013	
			SUPPORT FRAME DETAILS	RDMS-02-13

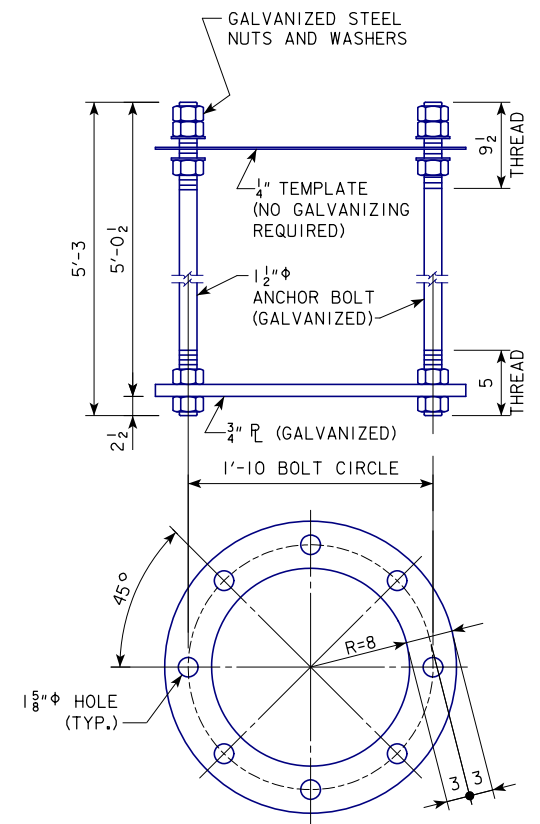
*REVISED 04-2020: CHANGED "GALVANIZING VENT HOLE" TO "GALVANIZING HOLE" IN SECTION J-J TO REFLECT HOLE USE AS A GALVANIZING VENT HOLE AND/OR A GALVANIZING DRAIN HOLE. REVISED SECTION L-L POST-TO-BASE-PLATE WELD SYMBOL TO SHOW A STANDARD-SIZED BACKING ELEMENT. CHANGED "FULL-PENETRATION GROOVE WELD" TO "COMPLETE-JOINT-PENETRATION GROOVE WELD" TO CONFORM TO AWS NOMENCLATURE. -ROADSIDEDMSUPPORT.dgn - RDMS-01-13 - THIS SHEET ISSUED 04-2013.



SECTION L-L

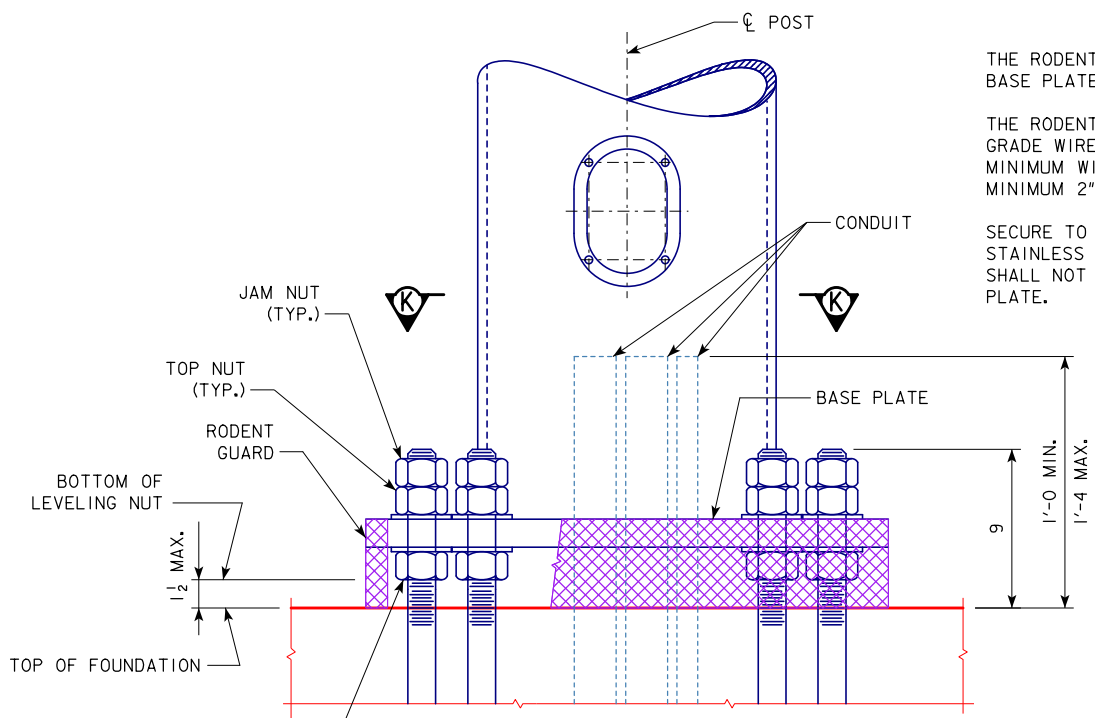


SECTION K-K



ANCHOR BOLT ASSEMBLY

WEIGHT OF ONE ANCHOR BOLT ASSEMBLY: 421 LBS. (INCLUDES TEMPLATE, EXCLUDES GALVANIZING WEIGHT)



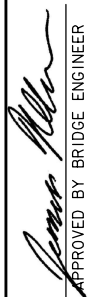

POST BASE DETAIL
SHOWING THE RODENT GUARD

THE RODENT GUARD SHALL BE PLACED AROUND THE BASE PLATE.

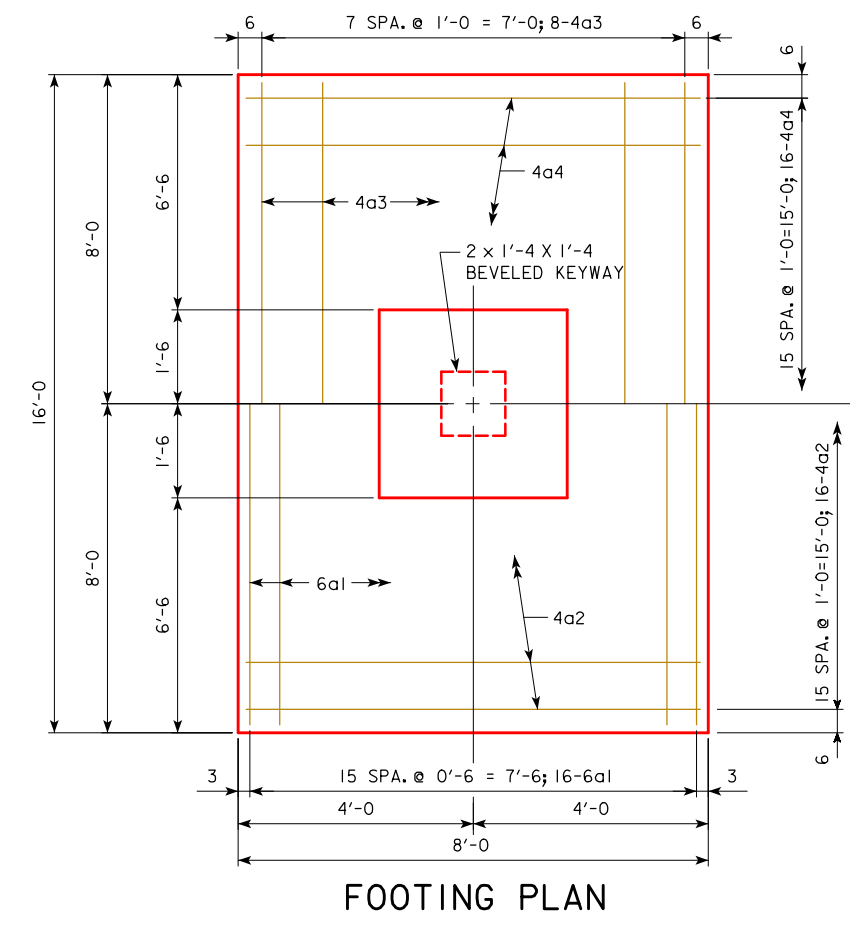
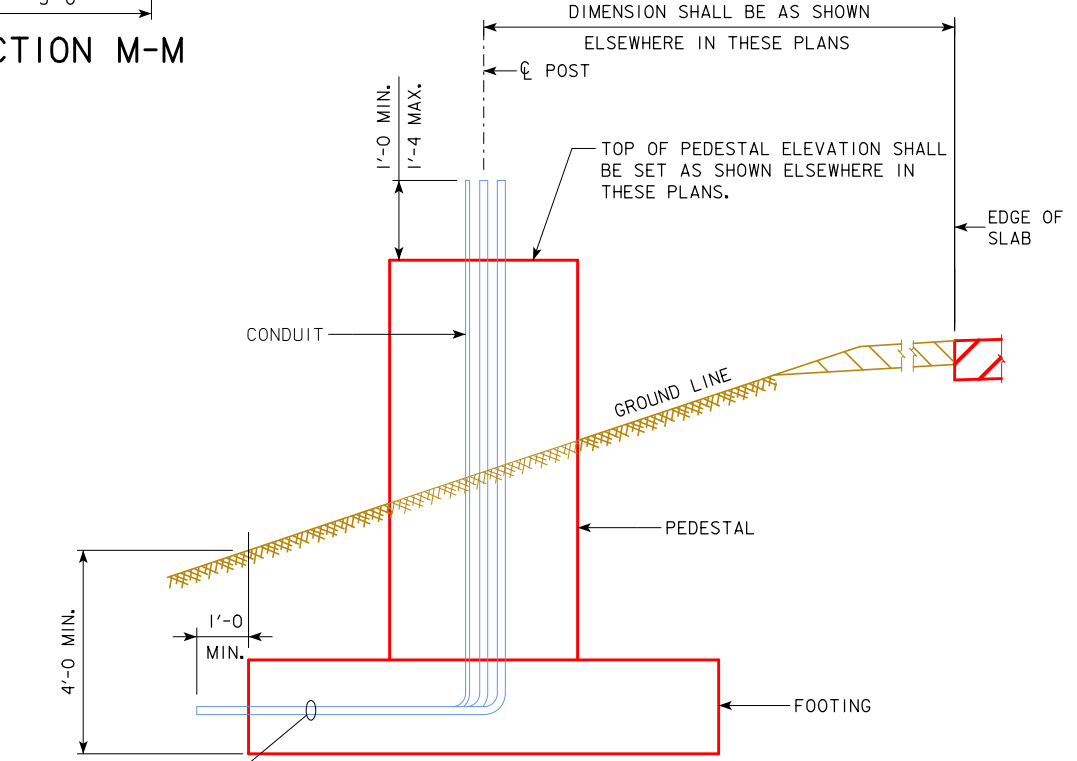
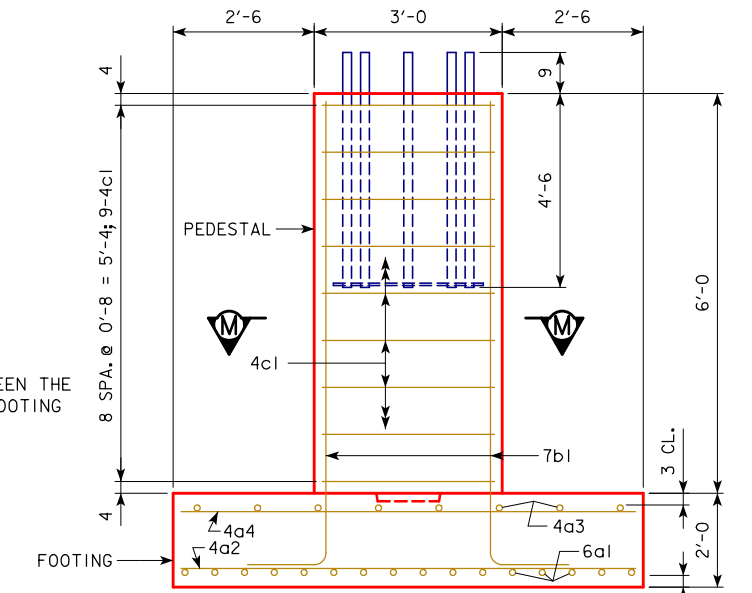
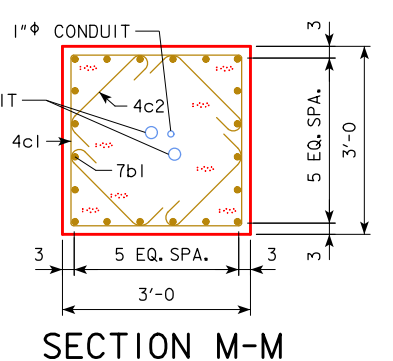
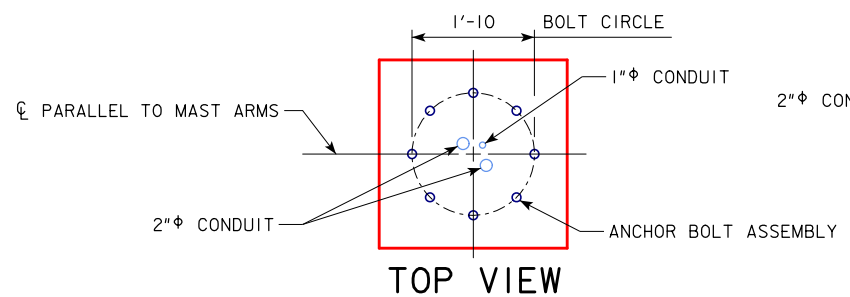
THE RODENT GUARD IS STAINLESS STEEL STANDARD GRADE WIRE CLOTH, 1/4" MAXIMUM OPENING WITH A MINIMUM WIRE DIAMETER OF AWG NO. 16 WITH A MINIMUM 2" LAP.

SECURE TO BASE PLATE AFTER ERECTION WITH 3/4" STAINLESS STEEL BANDING. THE RODENT GUARD SHALL NOT EXTEND ABOVE THE TOP OF THE BASE PLATE.

SEE STANDARD SHEET RDMS-05-13 FOR ANCHOR BOLT NOTES.

04-2020 LATEST REVISION DATE  APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN ROADSIDE DYNAMIC MESSAGE SIGN (DMS) SUPPORT APRIL, 2013
	SUPPORT POST BASE DETAILS RDMS-04-13

*REVISED 03-2019: ADDED TWO SPECIAL BID ITEMS ("ANCHOR BOLT ASSEMBLY—FURNISH" AND "ANCHOR BOLT ASSEMBLY—INSTALL AND SURVEY") TO CLARIFY CONTRACTOR RESPONSIBILITY TO ACCURATELY INSTALL ANCHOR BOLT ASSEMBLY. UPDATED IOWA DOT LOGO IN TITLE BLOCK. UPDATED BRIDGE ENGINEER SIGNATURE. *ROADSIDEDMSSUPPORT.DGN - RDMS-05-13 - THIS SHEET ISSUED 04-2013.



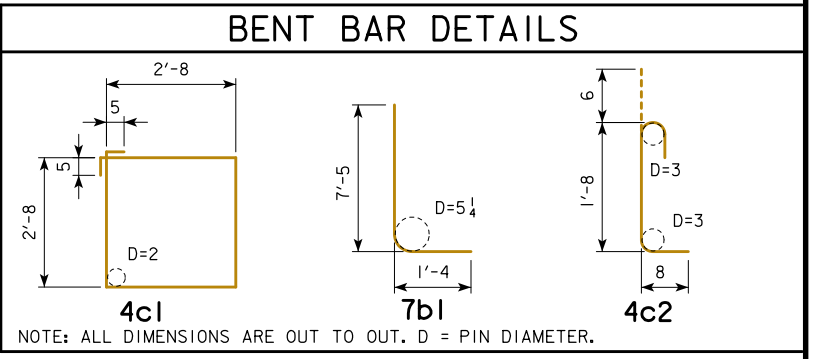
TOP REINFORCING STEEL

BOTTOM REINFORCING STEEL

CONCRETE PLACEMENT QUANTITIES (ONE FOUNDATION)	
PEDESTAL	2.0
FOOTING	9.5
TOTAL - C.Y.	11.5

ESTIMATED FOUNDATION QUANTITIES (ONE FOUNDATION)		
ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (MISCELLANEOUS)	C.Y.	11.5
REINFORCING STEEL-EPOXY COATED	LBS.	1120

EPOXY-COATED REINFORCING BAR LIST					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	FOOTING BOTTL., LONGIT.	—	16	15'-8"	377
4a2	FOOTING BOTTL., TRANSV.	—	16	7'-8"	82
4a3	FOOTING TOP, LONGIT.	—	8	15'-8"	84
4a4	FOOTING TOP, TRANSV.	—	16	7'-8"	82
7b1	FOOTING-TO-PEDESTAL DOWEL	L	20	8'-9"	358
4c1	PEDESTAL HOOPS	□	9	11'-6"	69
4c2	PEDESTAL TIES	U	36	2'-10"	68
REINFORCING STEEL - EPOXY COATED TOTAL (LBS.)					1120



ANCHOR BOLT NOTES:

ALL ANCHOR BOLT MATERIAL AND GALVANIZING SHALL BE IN ACCORDANCE WITH ARTICLE 4187.01, C, 3 OF THE STANDARD SPECIFICATIONS.

THE ANCHOR BOLT ASSEMBLY SHALL BE PROPERLY ALIGNED AT THE CENTER OF PEDESTAL AND SECURELY WIRED IN PLACE BEFORE CONCRETE IS PLACED.

BENDING OR WELDING OF ANCHOR BOLTS SHALL NOT BE ALLOWED.

PRICE BID FOR CONTRACT ITEMS SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY TO CONSTRUCT ROADSIDE DYNAMIC MESSAGE SIGN SUPPORT FOUNDATION AS DETAILED HEREON. THE COST OF FURNISHING AND INSTALLING RODENT GUARD SHALL BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (MISCELLANEOUS)" AND NO SEPARATE PAYMENT WILL BE MADE. THE COST OF FURNISHING ANCHOR BOLT ASSEMBLY SHALL BE INCLUDED IN THE PRICE BID FOR "ANCHOR BOLT ASSEMBLY—FURNISH". (NOTE THAT THIS IS A SPECIAL BID ITEM.) THE COST OF ACCURATELY INSTALLING AND SURVEYING ANCHOR BOLT ASSEMBLY SHALL BE INCLUDED IN THE PRICE BID FOR "ANCHOR BOLT ASSEMBLY—INSTALL AND SURVEY". (NOTE THAT THIS IS A SPECIAL BID ITEM.) SEE STRUCTURAL ALIGNMENT/TOLERANCE NOTES ON SHEET RDMS-01-13 FOR ANCHOR BOLT ASSEMBLY ALIGNMENT DOCUMENTATION REQUIREMENTS.

CONTRACT ITEMS FOR ROADSIDE DYNAMIC MESSAGE SIGN SUPPORT FOUNDATION CONSTRUCTION ARE:

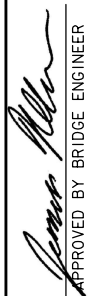

- REINFORCING STEEL, EPOXY COATED - POUNDS
- STRUCTURAL CONCRETE (MISCELLANEOUS) - CUBIC YARDS
- EXCAVATION - CUBIC YARDS OF CLASS SPECIFIED
- ANCHOR BOLT ASSEMBLY—FURNISH (SPECIAL BID ITEM) - POUNDS
- ANCHOR BOLT ASSEMBLY—INSTALL AND SURVEY (SPECIAL BID ITEM) - EACH

03-2019 LATEST REVISION DATE	APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN ROADSIDE DYNAMIC MESSAGE SIGN (DMS) SUPPORT APRIL, 2013	
FOUNDATION DETAILS		RDMS-05-13	

•REVISED 11-2013; ROTATED ANCHOR BOLT CIRCLE ORIENTATION.
•REVISED 03-2019; UPDATED BRIDGE ENGINEER SIGNATURE.
•ROADSIDEDMSSUPPORT.DGN - RDMS-06-13 - THIS SHEET ISSUED 04-2013.

THIS IS A 3D FILE THAT CAN BE VIEWED ELECTRONICALLY.
YOU WILL BE ABLE TO ZOOM IN OR OUT, PAN, ROTATE, ETC.

THIS STRUCTURE SHALL BE CONSTRUCTED FROM DIMENSIONS
SHOWN ON THE PREVIOUS STANDARD SHEETS. THIS SHEET IS
INTENDED TO CLARIFY THE DESIGN DETAILS AS AN AID IN
FABRICATION AND ERECTION OF THE STRUCTURE. CLICK ON
THE DEFAULT VIEW ICON (THE HOUSE ICON 🏠) IN ADOBE
ACROBAT READER TO RETURN TO THE ORIGINAL VIEW.

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