STEEL CANTILEVER SIGN TRUSS STANDARDS

11/29/2021 9:42:40 AM bkloss pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Highway\Bridge\Standards\SignTrusses\SCST-17.dgn SCST-00-17 11x17_pdf.pltcfg

INDEX FOR
STEEL CANTILEVER SIGN TRUSS STANDARDS

ANCHOR-BOLT NUT TIGHTENING PROCEDURE:

1) 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.

2) 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 SHALL NOT BE USED.

3) BASE PLATE, ANCHOR BOLTS AND NUTS ARE TO BE FREE OF ANY DIRT OR DEBRIS.

4) APPLY STICK WAX OR BEES WAX TO THE THREADS AND BEARING SURFACES OF THE ANCHOR BOLTS, NUTS AND WASHERS.

5) 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 42 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.

6) TIGHTEN TOP NUTS TO SNUG TIGHT AS DESCRIBED FOR THE LEVELING NUTS.

7) 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
3"Φ	1/12 TURN	1/12 TURN	1/6 TURN

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

GALVANIZED STEEL NOTES:

ALL STEEL DIAGONALS AND STRUTS 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.

ALL STEEL CHORDS SHALL COMPLY WITH ASTM A500 GRADE B, ASTM A500 GRADE C, ASTM A1085, API 5L GRADE X42 OR API 5L GRADE X52. THESE MEMBERS DESIGNATED AS HOLLOW STRUCTURAL SECTIONS (HSS) SHALL HAVE A MINIMUM YIELD STRENGTH OF 42 KSI.

THE STEEL END POST SHALL COMPLY WITH API 5L GRADE X42 OR APL 5L GRADE X52. THE POST SHALL HAVE A MINIMUM YIELD STRENGTH OF 42 KSI.

ALL STEEL SHAPES, BARS AND PLATES SHALL COMPLY WITH ASTM A36, ASTM A572 GRADE 50, ASTM A709 GRADE 36 OR ASTM A709 GRADE 50.

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.

CHARPY V-NOTCH TOUGHNESS REQUIREMENTS IN ACCORDANCE WITH ARTICLE 4152.02, OF THE STANDARD SPECIFICATIONS SHALL APPLY TO ALL STEEL GREATER THAN $\frac{1}{2}$ INCH IN THICKNESS.

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 1 BOLTS OR ASTM F3125 GRADE A325-T TYPE 1 BOLTS MAY BE SUBSTITUTED FOR ASTM F3125 GRADE A325 TYPE 1 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.

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.

ANCHOR BOLT NOTES:

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

BENDING OR WELDING OF ANCHOR BOLTS SHALL NOT BE ALLOWED.

ANCHOR BOLTS SHALL COMPLY WITH ASTM F1554 GRADE 105.

GENERAL NOTES:

ALL STEEL CANTILEVER TRUSS SIGN SUPPORTS ARE DESIGNED FOR 50 LB/FT^2 WIND PRESSURE ON SUPPORT MEMBERS AND 50 LB/FT^2 ON SIGNS.

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.

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

STEEL CANTILEVER SIGN TRUSSES SHALL NOT BE USED ON BRIDGES WITHOUT THE APPROVAL OF THE BRIDGES AND STRUCTURES BUREAU.

STRUCTURAL ALIGNMENT/TOLERANCE NOTES:

THE PRECISE INSTALLATION AND ALIGNMENT OF ALL COMPONENTS OF THE CANTILEVER SIGN TRUSS AND ITS 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.

1) THE FOUNDATION SHALL BE ACCURATELY LOCATED, WITH THE CENTER OF THE ANCHOR BOLT GROUP NOT MORE THAN 1 INCH FROM THE PLAN LOCATION IN THE DIRECTION PARALLEL WITH THE TRUSS AND NOT MORE THAN 1 INCH FROM THE PLAN LOCATION IN THE DIRECTION PERPENDICULAR TO THE TRUSS.

2) ANCHOR BOLTS SHALL BE PLUMB WITHIN $\frac{1}{4}$ INCH PER FOOT FROM VERTICAL.

3) ANCHOR BOLTS SHALL PROJECT ABOVE TOP OF FOUNDATION WITHIN $\frac{1}{4}$ INCH OF THE PLAN DIMENSION.

4) THE TRUSS SUPPORT POST SHALL BE PLUMB WITHIN $\frac{1}{16}$ INCH PER FOOT OF VERTICAL IN TWO PERPENDICULAR DIRECTIONS.

5) THE HORIZONTAL LINES BETWEEN CHORDS SHALL BE LEVEL WITHIN $\frac{1}{16}$ INCH PER FOOT OF HORIZONTAL, AND THE VERTICAL LINES BETWEEN CHORDS SHALL BE PLUMB WITHIN $\frac{1}{16}$ INCH PER FOOT OF VERTICAL.

SPECIFICATIONS:

DESIGN: AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2015.
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 LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2015.

REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SERIES OF 2014, SECTION 5, GRADE 60.

SPREAD FOOTING FOUNDATION CONCRETE IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SERIES OF 2014, SECTION 5, f'c = 4.0 KSI.

DRILLED SHAFT FOUNDATION CONCRETE IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SERIES OF 2014, SECTION 5, f'c = 4.0 KSI.

12-2021 LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT

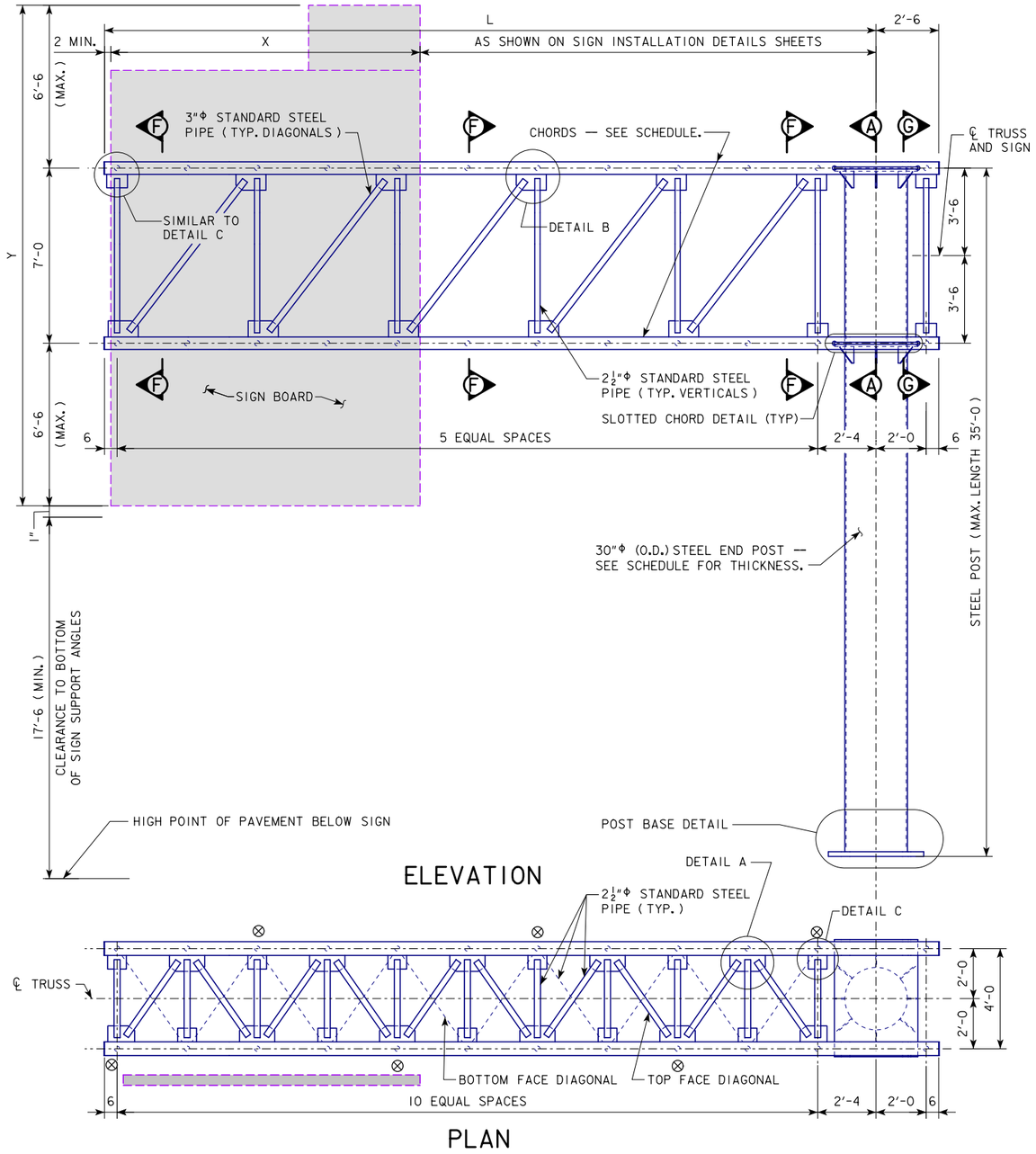
STANDARD DESIGN

STEEL CANTILEVER SIGN TRUSS

JULY, 2017

INDEX AND NOTES | SCST-01-17

·REVISED 03-2019: MODIFIED GALVANIZED STEEL NOTES TO ADDRESS MATERIAL AVAILABILITY ISSUES. MODIFIED GALVANIZED STEEL FASTENER NOTES TO ADDRESS CHANGES IN ASTM SPECIFICATIONS.
·REVISED 04-2020: CHANGED "OFFICE OF BRIDGES AND STRUCTURES" TO "BRIDGES AND STRUCTURES BUREAU". REVISED "0.5 INCH" TO "1/2 INCH" IN CHARPY V-NOTCH TOUGHNESS NOTE FOR TEXT UNIFORMITY. CHANGED "FULL-PENETRATION GROOVE WELD" TO "COMPLETE-JOINT-PENETRATION GROOVE WELD" TO CONFORM TO AWS NOMENCLATURE.
·REVISED 12-2021: CLARIFIED THAT A WRENCH WITH A 42-INCH HANDLE LENGTH IS REQUIRED TO TIGHTEN ANCHOR-BOLT NUTS TO SNUG-TIGHT CONDITION.
·STEELCANTILEVERSIGNTRUSS.dgn - SCST-01-17 - THIS SHEET ISSUED 07-2017.



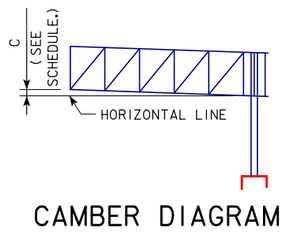
⊗ INDICATES THE CONNECTION OF INTERIOR DIAGONALS IN VERTICAL PLANE TO THE TOP CHORD MEMBERS. SEE SECTION F-F.

TRUSS LENGTH MAX. L	MAX. SIGN HEIGHT Y	MAX. SIGN AREA X*Y FT²	CHORDS	POST WALL THICKNESS	CAMBER C
40'-0 (1)	20'-0	400	HSS 6.625 x 0.500 (2)	0.625"	4"
38'-0	20'-0	400	HSS 6.625 x 0.432	0.625"	3½"
36'-0	20'-0	400	HSS 6.625 x 0.432	0.625"	3"
34'-0	20'-0	400	HSS 6.625 x 0.375 (3)	0.625"	2½"
32'-0	20'-0	400	HSS 6.625 x 0.375 (3)	0.625"	2½"
30'-0	20'-0	400	HSS 6.625 x 0.375 (3)	0.625"	2"

(1) ALTHOUGH THESE STANDARDS ALLOW FOR A TRUSS MAXIMUM CANTILEVER LENGTH OF 40'-0, THE DESIGNER SHOULD CHECK MATERIAL AVAILABILITY BEFORE SELECTING A TRUSS LENGTH GREATER THAN 39'-6. HSS 6.625 CHORDS ARE TYPICALLY STOCKED IN 42'-0 LENGTHS. A TRUSS LENGTH OF 40'-0 REQUIRES A TOTAL CHORD LENGTH OF 42'-6.

(2) HSS 6.625 x 0.562 MAY BE SUBSTITUTED FOR HSS 6.625 x 0.500 FOR TRUSS LENGTHS FROM 39'-6 TO 40'-0.

(3) HSS 6.625 x 0.432 MAY BE SUBSTITUTED FOR HSS 6.625 x 0.375 FOR TRUSS LENGTHS FROM 30'-0 TO 36'-0.



CAMBER DIAGRAM

SEE STANDARD SHEET SCST-04-17 FOR SECTION A-A.

SEE STANDARD SHEET SCST-05-17 FOR DETAILS A, B AND C; SECTIONS F-F AND G-G; AND SLOTTED CHORD DETAIL.

SEE STANDARD SHEET SCST-06-17 FOR POST BASE DETAIL.

12-2021 LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT

STANDARD DESIGN

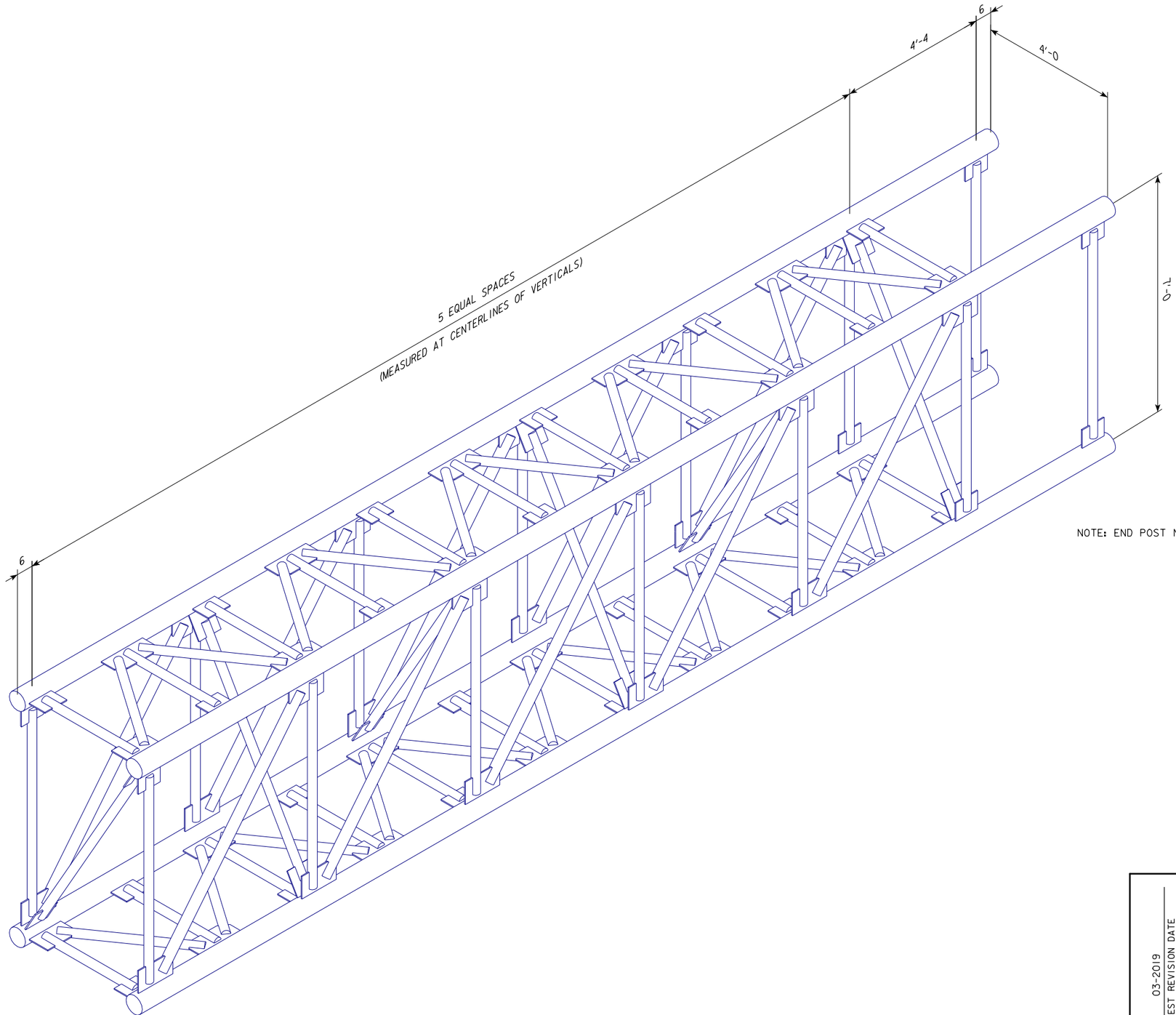
STEEL CANTILEVER SIGN TRUSS

JULY, 2017

SIGN SUPPORT VIEWS

SCST-02-17

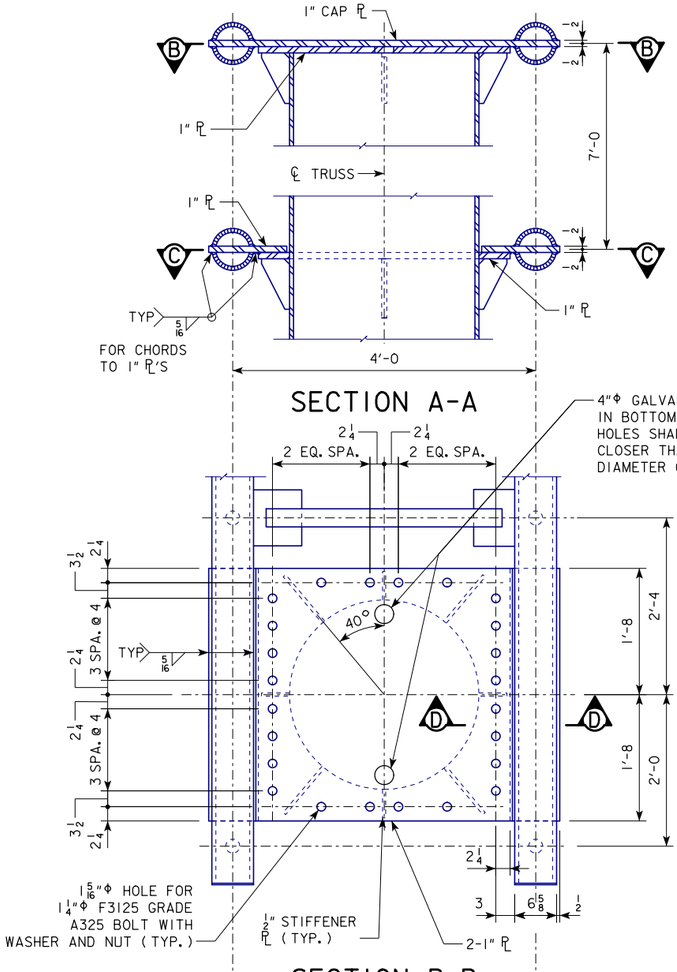
·REVISED 03-2019: MODIFIED CHORD SCHEDULE TO ADDRESS MATERIAL AVAILABILITY ISSUES. REPLACED NOTE IDENTIFIER ASTRISKS WITH ENCIRCLED NUMBERS TO IMPROVE READABILITY.
·REVISED 04-2020: CLARIFIED THAT 17'-6 MINIMUM CLEARANCE IS FROM HIGH POINT OF PAVEMENT BELOW SIGN TO BOTTOM OF SIGN SUPPORT ANGLES.
·REVISED 12-2021: CHANGED DESIGNATION OF ENCIRCLED NOTE 2 TO ENCIRCLED NOTE 3 TO PERMIT INSERTION OF NEW ENCIRCLED NOTE 2. ADDED NEW ENCIRCLED NOTE 2 THAT ALLOWS SUBSTITUTION OF HSS 6.625 x 0.562 FOR HSS 6.625 x 0.500 FOR TRUSS LENGTHS FROM 39'-6 TO 40'-0.
·STEELCANTILEVERSIGNTRUSS.dgn - SCST-02-17 - THIS SHEET ISSUED 07-2017.



NOTE: END POST NOT SHOWN FOR CLARITY.

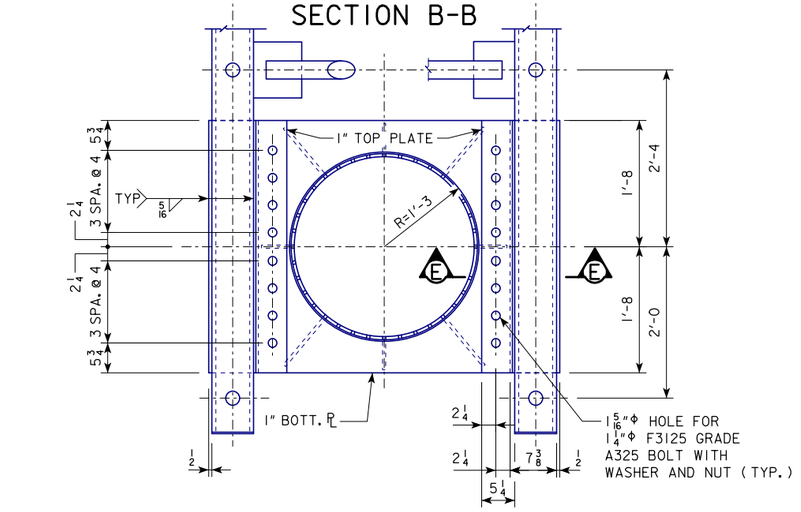
03-2019 LATEST REVISION DATE	APPROVED BY BRIDGE ENGINEER	IOWADOT STANDARD DESIGN STEEL CANTILEVER SIGN TRUSS JULY, 2017
		ISOMETRIC VIEW TYPICAL TRUSS — SCST-03-17

·REVISED 03-2018: UPDATED BRIDGE ENGINEER SIGNATURE.
·REVISED 03-2019: MODIFIED NOTE TO IMPROVE CLARITY.
·STEELCANTILEVERSIGNTRUSS.dgn - SCST-03-17 - THIS SHEET ISSUED 07-2017.

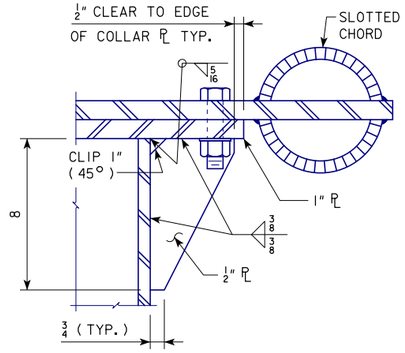


SECTION A-A

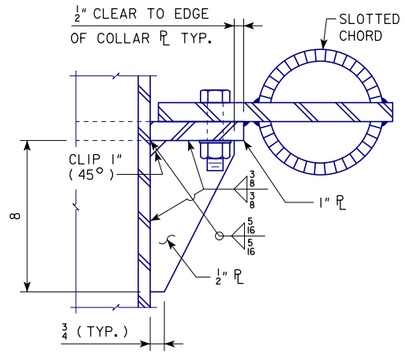
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

SEE STANDARD SHEET SCST-02-17 FOR LOCATION OF SECTION A-A.

03-2019
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT

STANDARD DESIGN

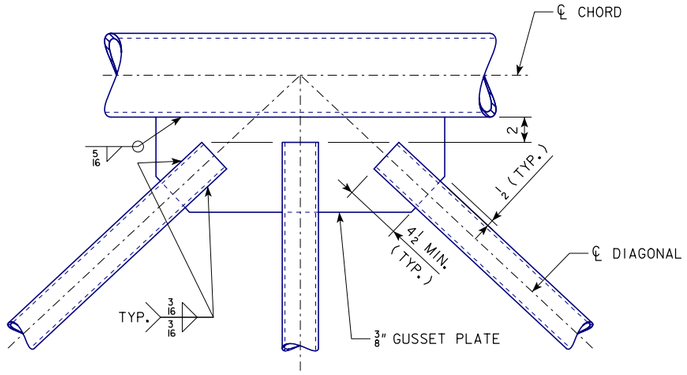
STEEL CANTILEVER SIGN TRUSS

JULY, 2017

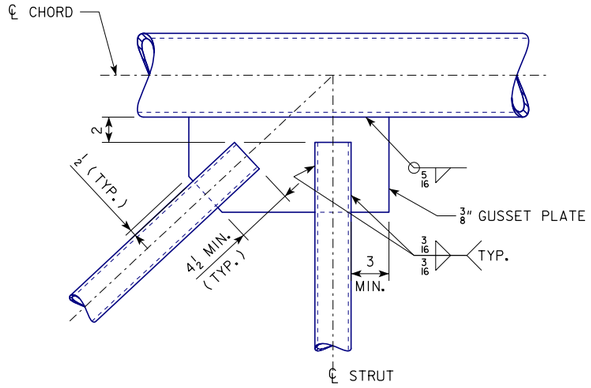
TRUSS-TO-POST CONNECTION DETAILS

SCST-04-17

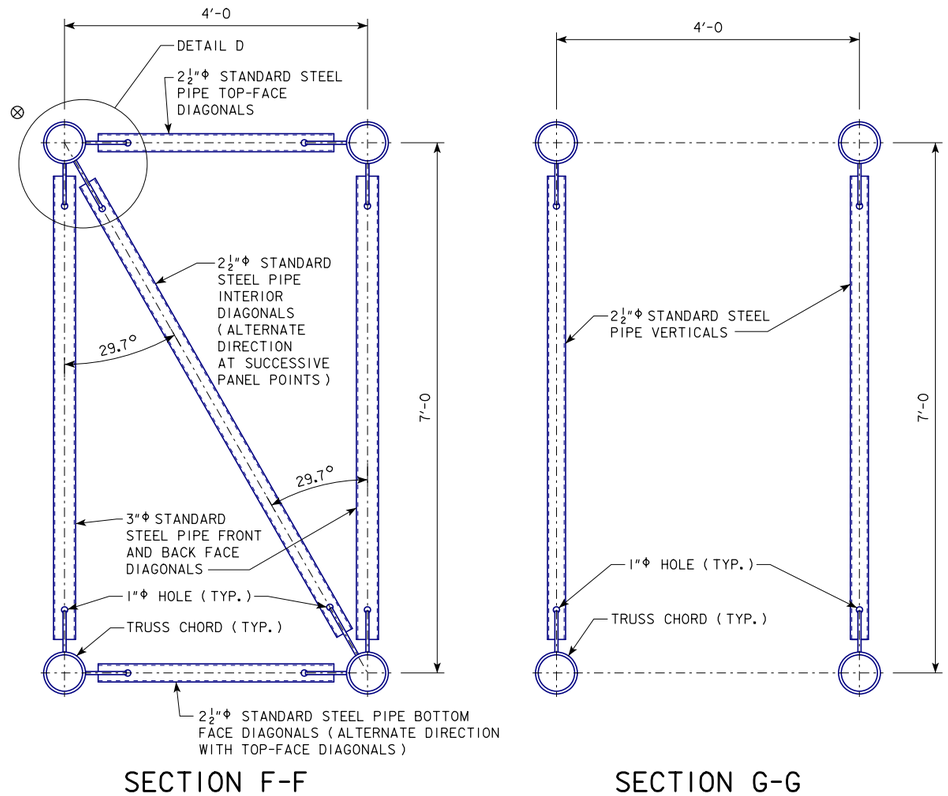
·REVISED 03-2018: UPDATED BRIDGE ENGINEER SIGNATURE.
·REVISED 03-2019: ADDED 4"Φ GALVANIZING HOLES IN PLATE TO IMPROVE CONSTRUCTIBILITY. MODIFIED CALLOUTS TO ADDRESS CHANGE IN ASTM SPECIFICATIONS. ADDED FASTENERS IN SECTION D-D AND SECTION E-E TO IMPROVE CLARITY.
·STEELCANTILEVERSIGNTRUSS.dgn - SCST-04-17 - THIS SHEET ISSUED 07-2017.



DETAIL A

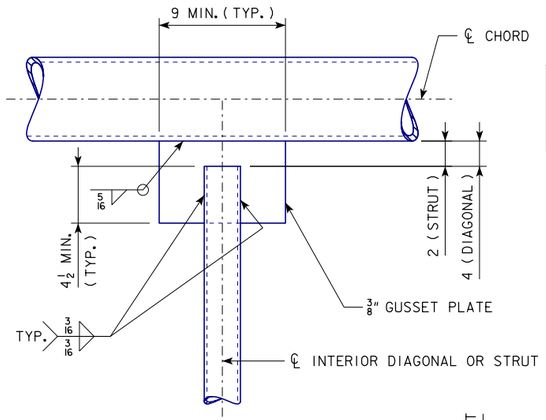


DETAIL B



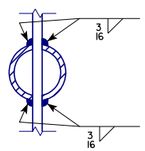
SECTION F-F

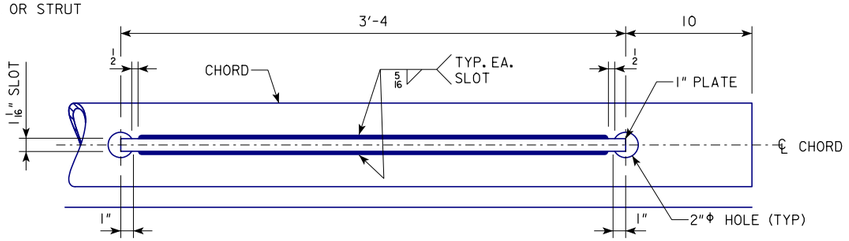
SECTION G-G



DETAIL C

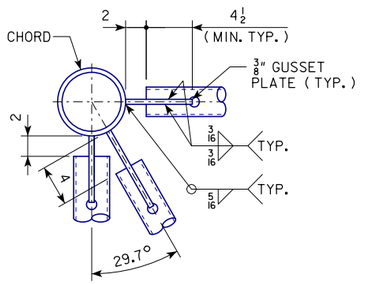
DETAIL A, DETAIL B, AND DETAIL C SHOW CONNECTIONS AT TOP CHORDS. CONNECTIONS AT BOTTOM CHORDS ARE SIMILAR.





SLOTTED CHORD DETAIL

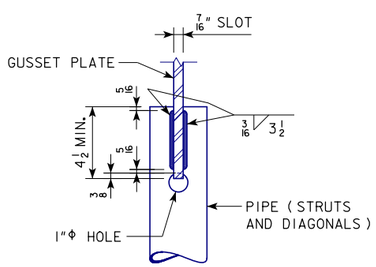
TYPICAL AT CHORD-TO-1"-PLATE CONNECTIONS



DETAIL D

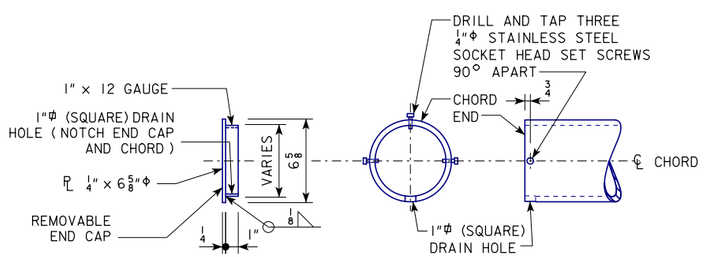
⊗ INDICATES THE CONNECTION OF INTERIOR DIAGONALS IN VERTICAL PLANE TO THE TOP CHORD MEMBERS. SEE SECTION F-F.

SEE STANDARD SHEET SCST-02-17 FOR LOCATIONS OF DETAILS A, B AND C AND SECTIONS F-F AND G-G.



SLOTTED PIPE ENDS

TYPICAL FOR STRUTS AND DIAGONALS



END CAP DETAIL

TYPICAL FOR ENDS OF CHORDS

04-2020 LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT

STANDARD DESIGN

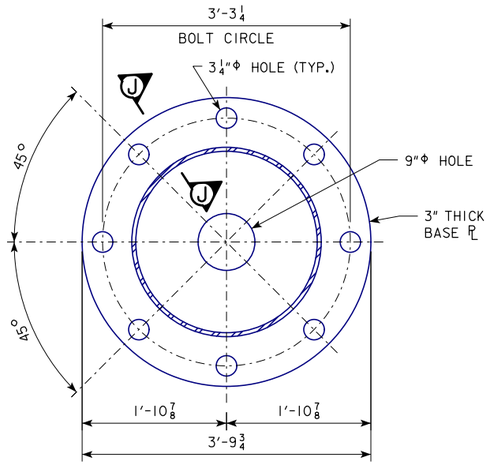
STEEL CANTILEVER SIGN TRUSS

JULY, 2017

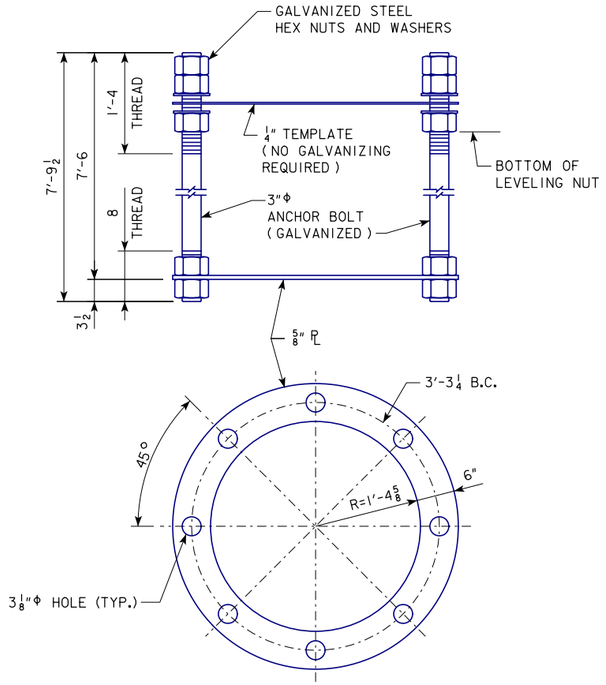
GUSSET PLATE CONNECTION DETAILS

SCST-05-17

·REVISED 03-2018: UPDATED BRIDGE ENGINEER SIGNATURE.
·REVISED 03-2019: MODIFIED FORMATTING OF CALLOUTS TO IMPROVE CLARITY.
·REVISED 04-2020: LENGTHENED DIMENSIONAL EXTENSION LINE IN DETAILS A AND B TO CLARIFY 2" DISTANCE BETWEEN END OF WEB MEMBERS AND CHORD. ADDED 3/4" DIMENSION TO CLARIFY LOCATION OF SET SCREWS IN END CAP DETAIL. LENGTHENED DIMENSIONAL EXTENSION LINE IN DETAILS A AND B TO CLARIFY THAT DIMENSIONAL EXTENSION LINE IS TANGENT TO CIRCULAR HOLE.
·STEELCANTILEVERSIGNTRUSS.dgn - SCST-05-17 - THIS SHEET ISSUED 07-2017.



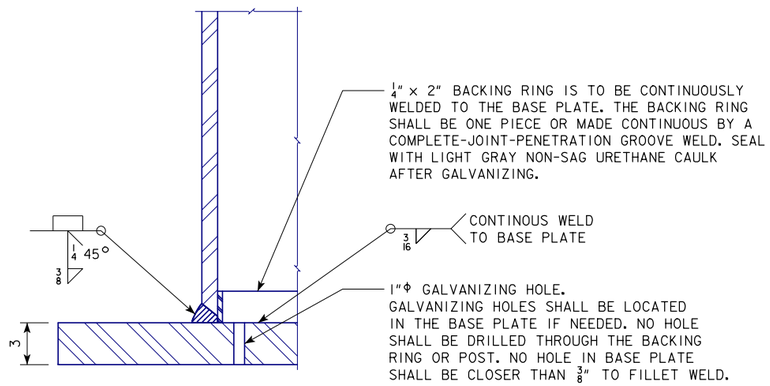
SECTION H-H



ANCHOR BOLT ASSEMBLY

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

WEIGHT OF ONE ANCHOR BOLT ASSEMBLY: 2063 LBS. (INCLUDES TEMPLATE, EXCLUDES GALVANIZING WEIGHT)



SECTION J-J

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 WIRE CLOTH 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 SCST-02-17 FOR LOCATION OF POST BASE DETAIL.

SEE STANDARD SHEET SCST-08-17 FOR SPREAD FOOTING FOUNDATION DETAILS.

SEE STANDARD SHEET SCST-09-17 FOR DRILLED SHAFT FOUNDATION DETAILS.

04-2020
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT

STANDARD DESIGN

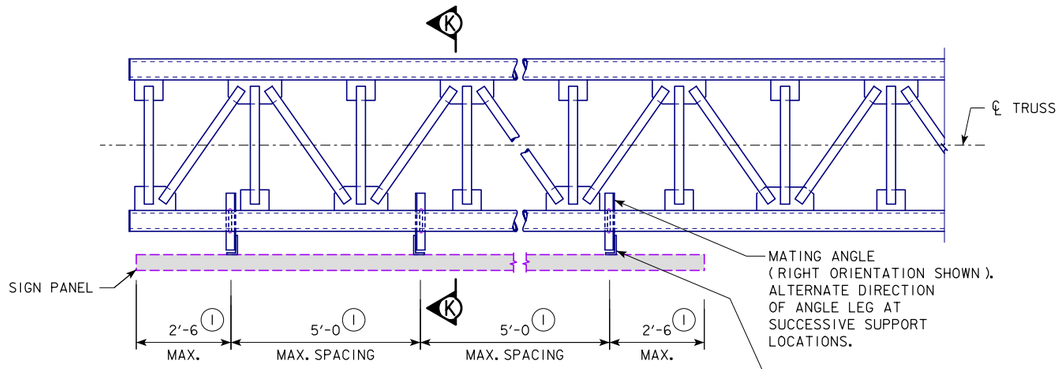
STEEL CANTILEVER SIGN TRUSS

JULY, 2017

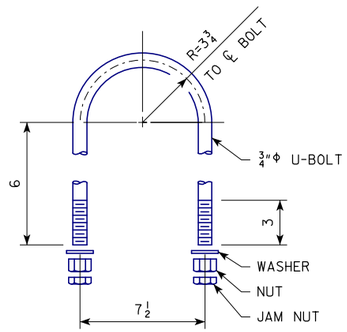
POST BASE SUPPORT DETAILS

SCST-06-17

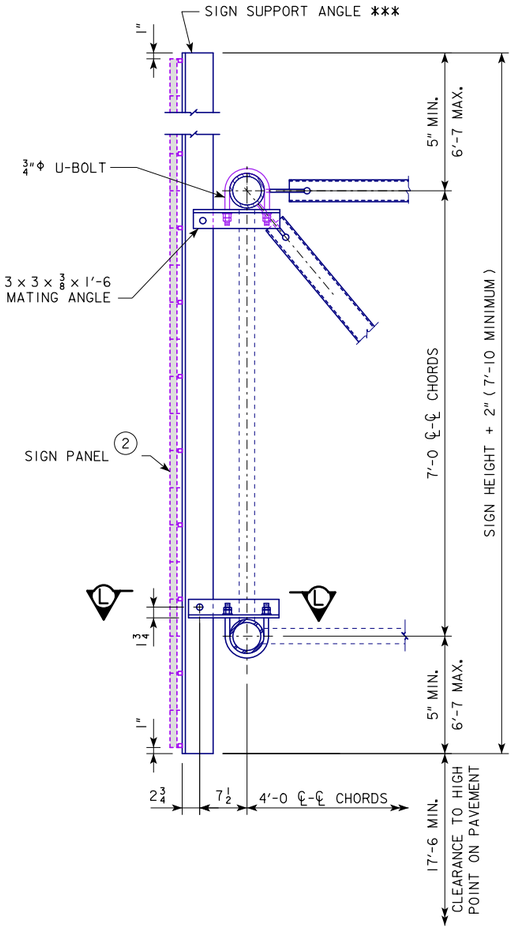
•REVISED 04-2020: CHANGED "GALVANIZING VENT HOLE" TO "GALVANIZING HOLE" IN SECTION J-J TO REFLECT HOLE USE AS A GALVANIZING VENT HOLE AND/OR A GALVANIZING DRAIN HOLE. REVISED SECTION J-J POST-TO-BASE-PLATE WELD SYMBOL TO SHOW A STANDARD-SIZED BACKING ELEMENT. CHANGED "FULL-PENETRATION GROOVE WELD" TO "COMPLETE-JOINT-PENETRATION GROOVE WELD" TO CONFORM TO AWS NOMENCLATURE. ADDED CALLOUT IN ANCHOR BOLT ASSEMBLY DETAIL TO CLARIFY THAT ANCHOR BOLT HOLES IN ANNULAR PLATES HAVE A 3/8" DIAMETER. CHANGED "3 1/4Φ HOLES" TO "3 1/4Φ HOLE (TYP.)" IN SECTION H-H FOR UNIFORMITY.
•STEELCANTILEVERSIGNTRUSS.dgn - SCST-06-17 - THIS SHEET ISSUED 07-2017.



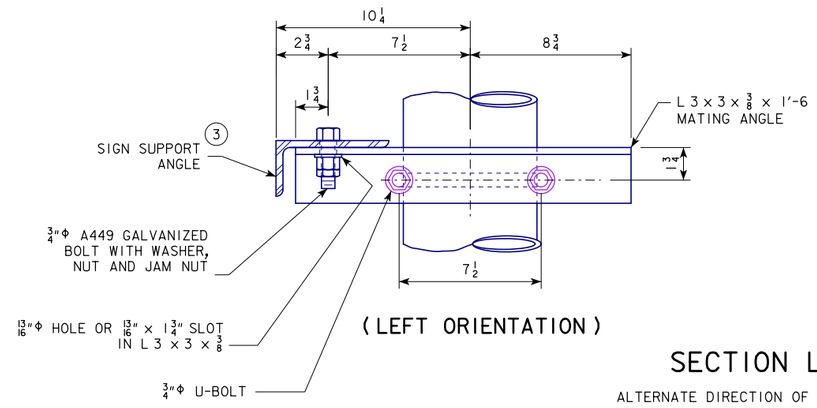
PART SIGN TRUSS PLAN



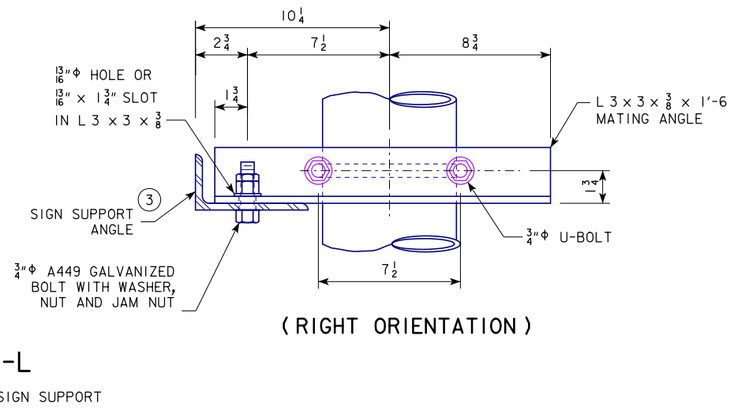
U-BOLT DETAIL



SECTION K-K



(LEFT ORIENTATION)



(RIGHT ORIENTATION)

SECTION L-L

ALTERNATE DIRECTION OF SIGN SUPPORT ANGLE LEG AND MATING ANGLE LEG AT SUCCESSIVE SUPPORTS AS SHOWN IN PART SIGN TRUSS PLAN.

(1) DIMENSION RESTRICTIONS APPLY TO MAIN SIGN PANEL AND ANY SUPPLEMENTAL SIGN PANELS THAT MAY BE PRESENT.

(2) CENTER THE MAIN SIGN PANEL VERTICALLY ON THE TRUSS IF THE SUPPLEMENTARY SIGN PANEL LENGTH IS LESS THAN HALF THE LENGTH OF THE MAIN SIGN PANEL, OTHERWISE CENTER THE COMBINED HEIGHT OF THE MAIN SIGN PANEL AND SUPPLEMENTARY SIGN PANEL VERTICALLY ON THE TRUSS.

(3) USE L 6 x 3 1/2 x 1/2 FOR SIGN HEIGHT OVER 10'-0 TO 20'-0 AND L 5 x 3 x 3/8 FOR SIGN HEIGHT OF 10'-0 OR LESS. A TOTAL SIGN HEIGHT GREATER THAN 20'-0, SIGN VERTICAL CANTILEVER LENGTH GREATER THAN 6'-7, AND/OR SIGN SUPPORT ANGLE HORIZONTAL SPACING GREATER THAN 5'-0 REQUIRES APPROVAL BY THE BRIDGES AND STRUCTURES BUREAU.

04-2020
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT

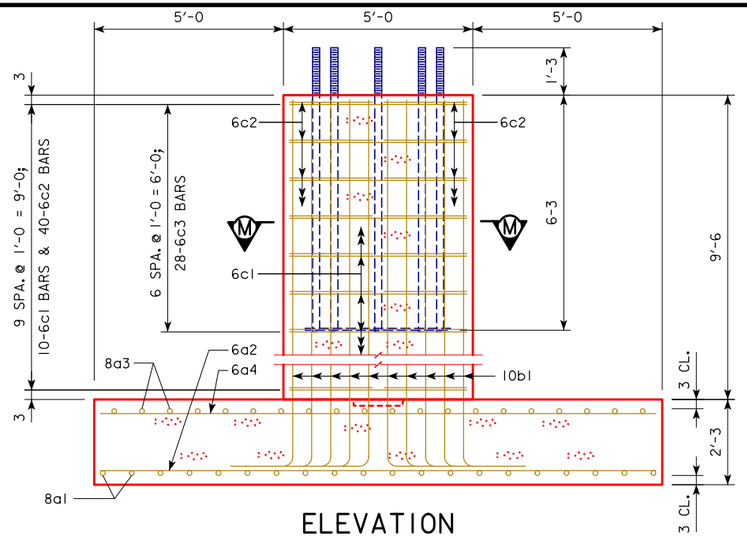
STANDARD DESIGN

STEEL CANTILEVER SIGN TRUSS

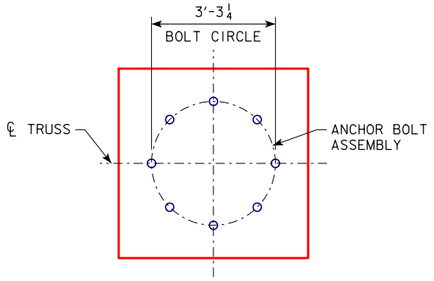
JULY, 2017

SIGN ATTACHMENT DETAILS | SCST-07-17

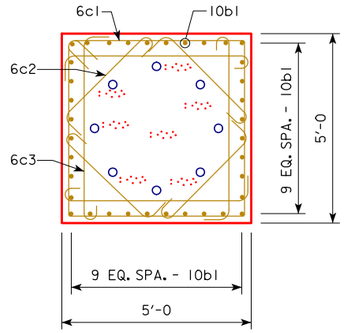
•REVISED 04-2020: CHANGED "OFFICE OF BRIDGES AND STRUCTURES" TO "BRIDGES AND STRUCTURES BUREAU", DESIGNATED L 3 x 3 x 3/8 x 1'-6 AS A MATING ANGLE FOR CLARITY IN PART SIGN TRUSS PLAN, SECTION K-K, AND SECTION L-L. ADDED ADDITIONAL DETAIL TO SECTION L-L AND MODIFIED CALLOUTS TO CLARIFY THAT DIRECTION OF ANGLE LEG IS TO ALTERNATE AT SUCCESSIVE SUPPORTS FOR BOTH SIGN SUPPORT ANGLES AND MATING ANGLES. MOVED SECTION K-K CUT LINE IN PART SIGN TRUSS PLAN TO ACCURATELY REFLECT LOCATION OF SECTION K-K. MODIFIED DEPICTION OF MATING ANGLES IN FLIPPED ORIENTATION OF TOP-CHORD-TO-MATING-ANGLE U-BOLT CONNECTION FOR UNIFORMITY WITH PART SIGN TRUSS PLAN TO ACCURATELY SHOW THAT DIRECTION OF ANGLE LEG ALTERNATES AT SUCCESSIVE SUPPORTS. REVISED DEPICTION OF U-BOLT IN SECTION F-F TO ACCURATELY SHOW U-BOLT SIZE.
•STEELCANTILEVERSIGNTRUSS.dgn - SCST-07-17 - THIS SHEET ISSUED 07-2017.



ELEVATION



TOP VIEW



SECTION M-M

4-6c3 BARS ARE TO BE PLACED WITH EVERY LAYER OF 6c1 BARS IN THE TOP 6'-3 OF THE PEDESTAL.

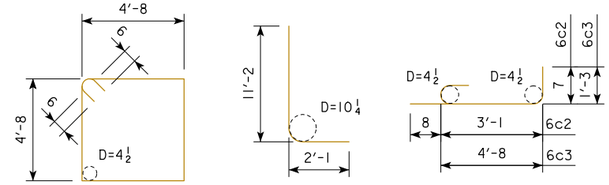
CONCRETE PLACEMENT QUANTITIES

PEDESTAL	8.8
FOOTING	25.0
TOTAL - C.Y.	33.8

EPOXY COATED REINFORCING BAR LIST

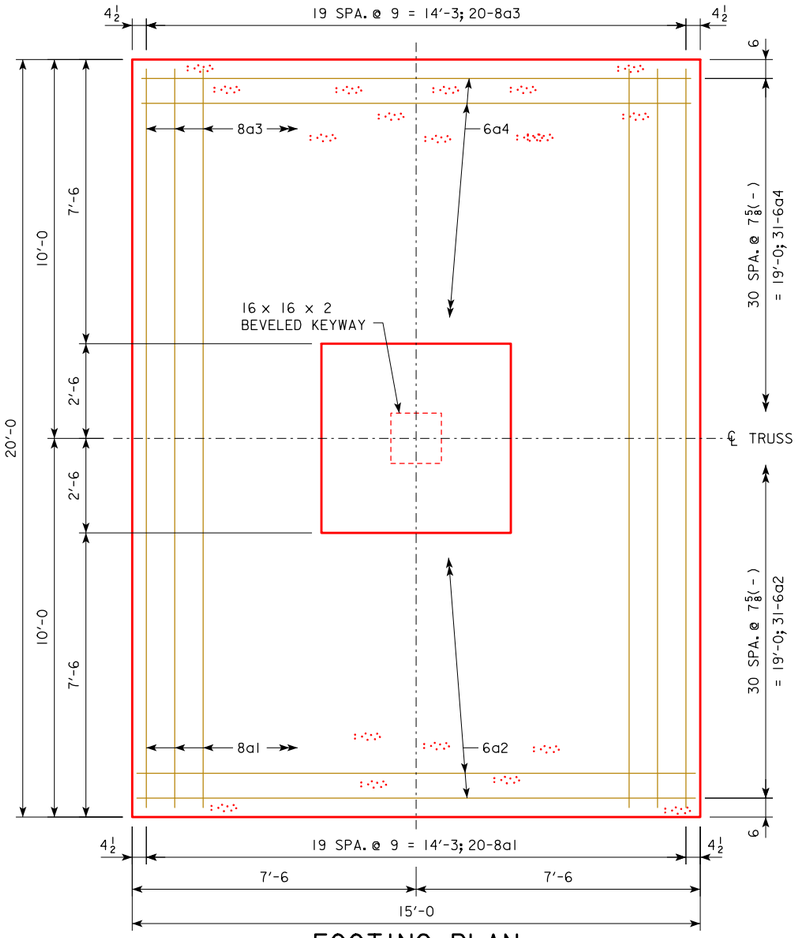
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
8a1	FOOTING BOTT., LONGIT.	—	20	19'-8	1050
6a2	FOOTING BOTT., TRANSV.	—	31	14'-8	683
8a3	FOOTING TOP, LONGIT.	—	20	19'-8	1050
6a4	FOOTING TOP, TRANSV.	—	31	14'-8	683
10b1	FOOTING TO PEDESTAL DOWEL	L	36	13'-3	2053
6c1	PEDESTAL TIES	□	10	19'-8	295
6c2	PEDESTAL TIES	⊔	40	4'-4	260
6c3	PEDESTAL TIES	⊔	28	6'-7	277
	EPOXY COATED REINFORCING STEEL - TOTAL (LBS.)				6351

BENT BAR DETAILS



6c1 10b1 6c2 & 6c3

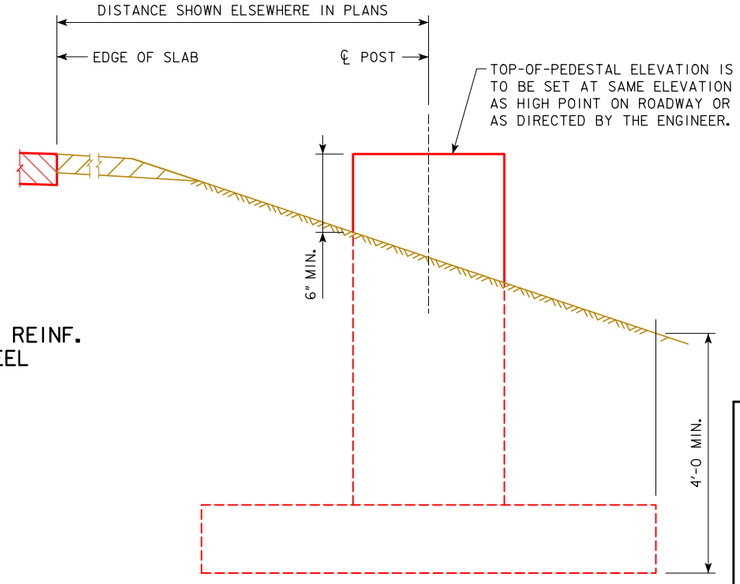
NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.



FOOTING PLAN

TOP REINF. STEEL

BOTTOM REINF. STEEL



ELEVATION - TOP OF PEDESTAL AND BACKFILL

GENERAL NOTES:

STRUCTURAL CONCRETE, CLASS C, SHALL BE USED FOR THE FOUNDATION.

ALL EXPOSED CORNERS 90° OR SHARPER SHALL BE FILLETED WITH A ¾" DRESSED AND BEVELED STRIP.

EXCAVATION FOR THE FOUNDATION SHALL BE TO NEAT LINES AND CONCRETE SHALL BE PLACED AGAINST THE UNDISTURBED MATERIAL. ALL EXCAVATION FOR THE FOUNDATION SHALL BE DISPOSED IN THE AREA ADJACENT TO THE FOUNDATION AND SHAPED TO NORMAL GROUND CONTOUR, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

ONE ANCHOR BOLT ASSEMBLY INCLUDING ANCHOR PLATE, TEMPLATE, NUTS (5 PER BOLT) AND WASHERS (2 PER BOLT) ARE REQUIRED PER FOUNDATION.

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

THE FOUNDATION DETAILS SHOWN ARE BASED ON A NET ALLOWABLE SOIL BEARING PRESSURE (FOR SETTLEMENT) OF 1.0 TON/FT².

PRICE BID FOR CONTRACT ITEMS SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY TO CONSTRUCT CANTILEVER SIGN TRUSS 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 SCST-01-17 FOR ANCHOR BOLT ASSEMBLY ALIGNMENT DOCUMENTATION REQUIREMENTS. CONTRACT ITEMS FOR OVERHEAD SIGN TRUSS 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

IOWADOT

STANDARD DESIGN

STEEL CANTILEVER SIGN TRUSS

JULY, 2017

FOUNDATION DETAILS - SPREAD FOOTING

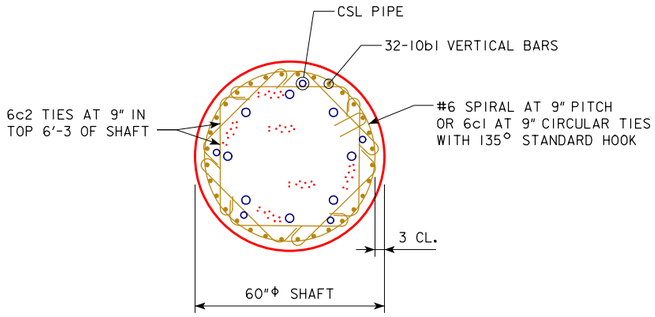
SCST-08-17

- REVISED 03-2018: UPDATED BRIDGE ENGINEER SIGNATURE.
- REVISED 03-2019: ADDED TWO SPECIAL BID ITEMS ("ANCHOR BOLT ASSEMBLY—FURNISH" AND "ANCHOR BOLT ASSEMBLY—INSTALL AND SURVEY"). REORDERED NOTES TO IMPROVE READABILITY.
- STEELCANTILEVERSIGNTRUSS.dgn - SCST-08-17 - THIS SHEET ISSUED 07-2017.

- REVISED 03-2018: UPDATED BRIDGE ENGINEER SIGNATURE.
- REVISED 03-2019: ADDED NOTES INCLUDING BID ITEM NOTE TO IMPROVE CLARITY. NEW BID ITEM "ANCHOR BOLT ASSEMBLY—INSTALL AND SURVEY") TO CLARIFY CONTRACTOR RESPONSIBILITY TO ACCURATELY INSTALL ANCHOR BOLT ASSEMBLY. REORDERED NOTES TO IMPROVE READABILITY. MODIFIED ALTERNATE 6c1 SHAFT CIRCULAR TIES TO INCLUDE 135° HOOKS.
- STEELCANTILEVERSIGNTRUSS.dgn - SCST-09-17 - THIS SHEET ISSUED 07-2017.

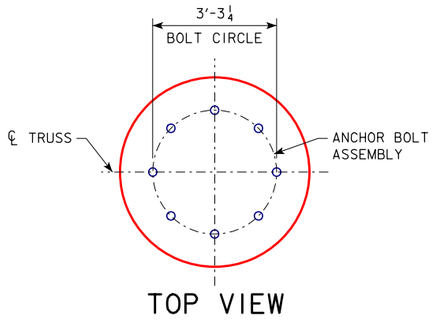
DRILLED SHAFT QUANTITIES

TRUSS LENGTH	SHAFT LENGTH "L"	EPOXY COATED REBAR	STRUCTURAL CONCRETE
30 FT.	24 FT.	4531 LBS.	17.45 C.Y.
32 FT.	25 FT.	4701 LBS.	18.18 C.Y.
34 FT.	27 FT.	5041 LBS.	19.63 C.Y.
36 FT.	29 FT.	5381 LBS.	21.09 C.Y.
38 FT.	31 FT.	5721 LBS.	22.54 C.Y.
40 FT.	33 FT.	6061 LBS.	24.00 C.Y.

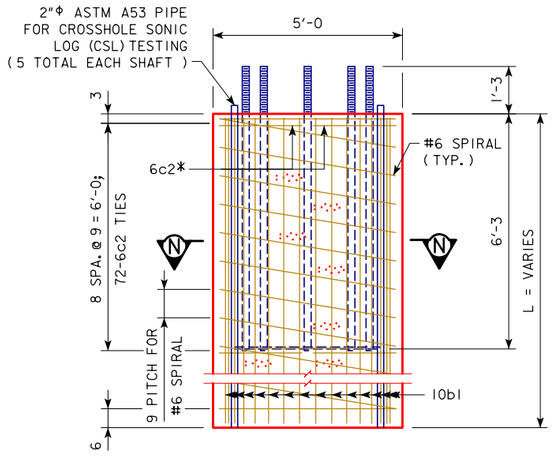


SECTION N-N

8 - 6c2 TIES ARE TO BE PLACED WITH EVERY LAYER OF #6 SPIRAL/6c1 CIRCULAR TIES IN THE TOP 6'-3 OF THE SHAFT

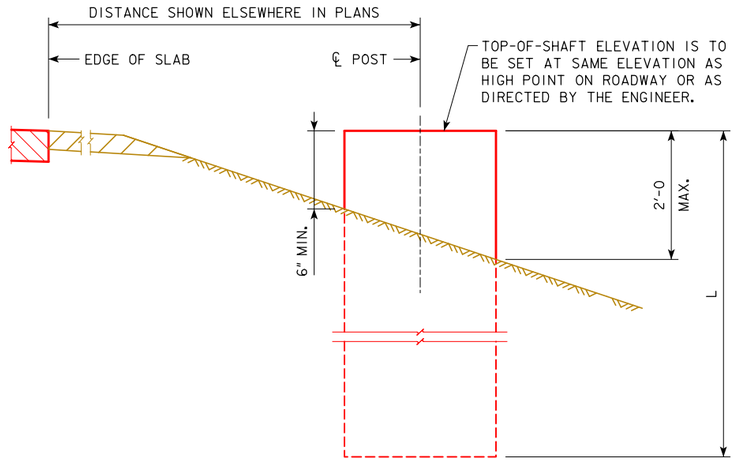


TOP VIEW



ELEVATION

* NOT ALL 6c2 TIES ARE SHOWN



ELEVATION - TOP OF SHAFT AND BACKFILL

GENERAL NOTES (CONTINUED):

DRILLED SHAFT SHALL HAVE CROSSHOLE SONIC LOGGING (CSL) PIPES AS SHOWN. CSL PIPES SHALL BE PLACED IN A PATTERN SO THAT EACH PIPE IS SPACED THE MAXIMUM DISTANCE POSSIBLE FROM ADJACENT PIPES.

A NORMAL SURFACE FINISH FOLLOWED BY A CONCRETE SEALER APPLICATION IS REQUIRED ON CONCRETE SURFACES ABOVE THE LOWEST ELEVATION 6" BELOW FINISHED GROUND LINE.

PRICE BID FOR CONTRACT ITEMS SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY TO CONSTRUCT CANTILEVER SIGN TRUSS 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 SCST-01-17 FOR ANCHOR BOLT ASSEMBLY ALIGNMENT DOCUMENTATION REQUIREMENTS. CONTRACT ITEMS FOR CANTILEVER SIGN TRUSS FOUNDATION CONSTRUCTION ARE:

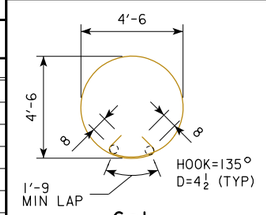
- REINFORCING STEEL, EPOXY COATED - POUNDS
- REINFORCING STEEL - POUNDS
- STRUCTURAL CONCRETE (MISCELLANEOUS) - CUBIC YARDS
- CONCRETE DRILLED SHAFT, 30 IN. DIAMETER - LINEAR FEET
- CLASS 20 EXCAVATION - CUBIC YARDS
- ANCHOR BOLT ASSEMBLY—FURNISH (SPECIAL BID ITEM) - POUNDS
- ANCHOR BOLT ASSEMBLY—INSTALL AND SURVEY (SPECIAL BID ITEM) - EACH

REINFORCING BAR LIST - EPOXY COATED

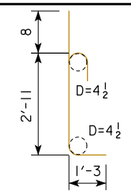
ONE FOUNDATION

BAR	LOCATION	SHAPE	TABULATED VALUE FOR L = 24'-0			EACH ADDITIONAL 1'-0 OF L		
			NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT
10b1	SHAFT VERTICAL		32	23'-3	3201	32	1'-0	138
6c1	SHAFT CIRCULAR TIES (ALTERNATE)		32	18'-1	0	1.33	18'-1	0
6c2	SHAFT TIES		72	4'-10	522	0	4'-10	0
#6	SHAFT SPIRAL		1	487'-11	733	1	19'-2	29
	SPIRAL SPACER L 1" x 1" x ⅛		4	23'-3	75	4	1'-0	3
					TOTAL 4531 LBS.			TOTAL 170 LBS.

BENT BAR DETAILS



6c1 (ALTERNATE TIE)



6c2

NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

GENERAL NOTES:

STRUCTURAL CONCRETE, CLASS C, SHALL BE USED FOR THE DRILLED SHAFT.

ALL EXPOSED CORNERS 90° OR SHARPER SHALL BE FILLETED WITH A ¾" DRESSED AND BEVELED STRIP.

SPIRAL REINFORCING IS TO BE NO. 6 BAR WITH A 4'-6 OUTSIDE DIAMETER AND 9" PITCH WITH 4 EQUALLY SPACED L 1" x 1" x ⅛ SPACERS PUNCHED TO HOLD SPIRALS. SPIRALS ARE TO HAVE 1½ EXTRA TURNS AT TOP AND BOTTOM OF SHAFT.

THE SPIRAL REINFORCING MAY BE SPLICED BY LAPPING 3'-1. THE LENGTH OF THE SPIRAL SHOWN DOES NOT INCLUDE THE LAPPED LENGTH OF THE SPLICES. THE COST OF THE LAPS AT SPLICES IS TO BE INCLUDED IN THE PRICE BID FOR OTHER REINFORCEMENT.

CIRCULAR TIES MAY BE SUBSTITUTED FOR THE SPIRAL REINFORCEMENT. PAYMENT WILL BE BASED ON THE WEIGHT OF SPIRAL REINFORCEMENT. NO ADJUSTMENTS IN REINFORCING STEEL PAY WEIGHT WILL BE ALLOWED. SEE BENT BAR DETAILS FOR ALTERNATE TIE CONFIGURATION.

ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE CONCRETE IS POURED.

ONE ANCHOR BOLT ASSEMBLY INCLUDING ANCHOR PLATE, TEMPLATE, NUTS (5 PER BOLT) AND WASHERS (2 PER BOLT) ARE REQUIRED PER FOUNDATION.

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

THE FOUNDATION DETAILS SHOWN ARE BASED ON COMMON COHESIVE SOIL CONDITIONS (SILTY OR SANDY CLAY) WITH AN AVERAGE UNCONFINED COMPRESSIVE STRENGTH (q_u) OF AT LEAST 1.25 TON/FT^2, WHICH MUST BE DETERMINED BY PREVIOUS SOIL INVESTIGATIONS AT THE JOBSITE. WHEN OTHER CONDITIONS ARE INDICATED, THE BORING DATA WILL BE INCLUDED IN THE PLANS AND THE FOUNDATION EMBEDMENT WILL BE THE RESULT OF SITE SPECIFIC DESIGNS.

IF THE CONDITIONS ENCOUNTERED ARE DIFFERENT THAN THOSE INDICATED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE IF THE FOUNDATION EMBEDMENT NEEDS TO BE MODIFIED. IF THE EMBEDMENT IS REVISED BY MORE THAN 12" BY THE CONTRACTOR, "AS-BUILT" PLANS SHALL BE PREPARED AND SUBMITTED TO THE IOWA DOT FOR FUTURE REFERENCE.

DESIGN EMBEDMENT LENGTHS LISTED IN THE SHAFT EMBEDMENT TABLE ARE BASED ON A SOIL UNDRAINED COHESION OF 0.625 TON/FT^2, A SOIL EFFECTIVE UNIT WEIGHT OF 57.6 LB/FT^3, AND A SOIL STRAIN FACTOR (E50) OF 0.007.

EXCAVATIONS SHALL BE DEWATERED BEFORE CONCRETE PLACEMENT AT NO ADDITIONAL COST TO THE STATE.

CONCRETE SHALL BE PLACED MONOLITHICALLY WITHOUT CONSTRUCTION JOINTS.

03-2019 LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT

STANDARD DESIGN

STEEL CANTILEVER SIGN TRUSS

JULY, 2017

FOUNDATION DETAILS - DRILLED SHAFT

SCST-09-17