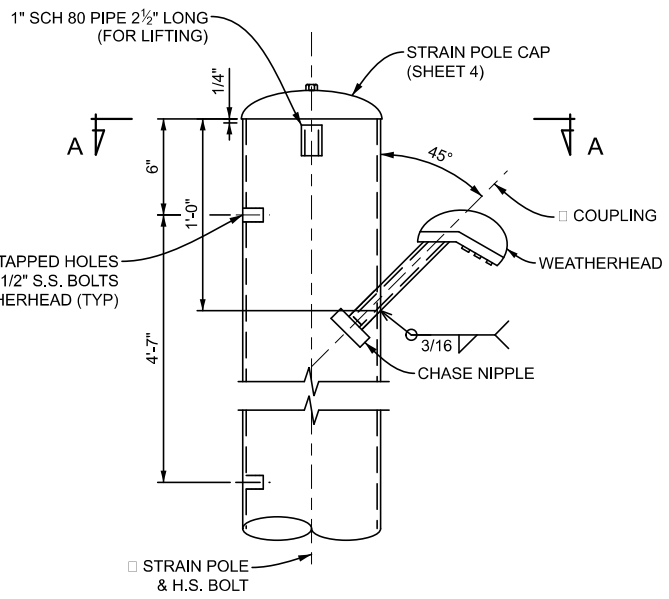
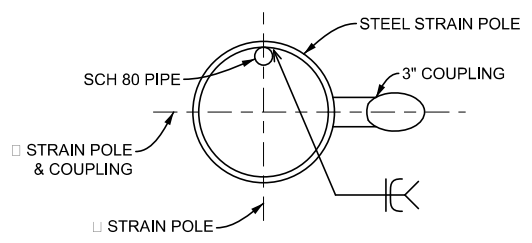


1 **DETAIL - STEEL STRAIN POLE**



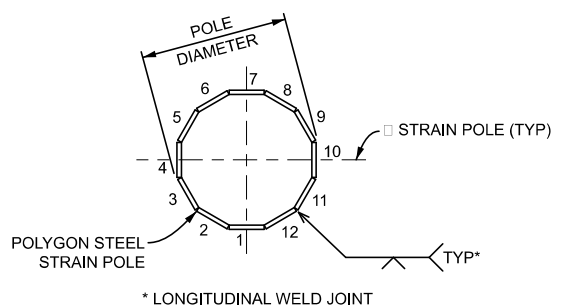
ORIENTATION OF 3\"/>

2 **DETAIL - COUPLING**



SCH 80 PIPE ORIENTED 180° TO POLE HAND HOLE

A **SECTION - ROUND POLE**



A' **SECTION - 12-SIDED POLYGON (OPTIONAL)**

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT



STANDARD PLAN FOR 6 ANCHOR BOLT TRAFFIC SIGNAL STRAIN POLE AND COUPLING DETAILS			
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-021-A	SHEET 1 OF 7

STRAIN POLE REQUIREMENTS

MARK	DESCRIPTION	UNIT	NOT CONNECTED TO TIE-OFF SPANS			CONNECTED TO TIE-OFF SPANS		
			SIZE 1	SIZE 2	SIZE 3	SIZE 4	SIZE 5	
A	POLE LENGTH	FT	30	36	40	36	40	
W	MIN POLE WALL THICKNESS	GR 50 STEEL	IN	5/8	5/8	5/8	5/8	5/8
		GR 65 STEEL	IN	1/2	1/2	1/2	1/2	1/2
B'	POLE DIAMETER - TOP *	IN	12.3 (MIN) ± 1/2	13.96 (MIN) ± 1/2	14.4 (MIN) ± 1/2	14.96 (MIN) ± 1/2	15.4 (MIN) ± 1/2	
B	POLE DIAMETER - BOTTOM *	IN	16.5 ± 1/2	19 ± 1/2	20 ± 1/2	20 ± 1/2	21 ± 1/2	
-	FULL LENGTH TAPER	IN / FT		+0.002	+0.002	+0.002	+0.002	+0.002
				0.14	0.14	0.14	0.14	0.14
				-0.000	-0.000	-0.000	-0.000	-0.000
E	POLE BASE FILLET WELD	GR 50 STEEL	IN	7/16	7/16	1/2	7/16	1/2
		GR 65 STEEL	IN	7/16	7/16	7/16	7/16	7/16
F	POLE BASE LANDING	IN	1/2	5/8	5/8	5/8	5/8	
-	ANCHOR BOLT DIAMETER	IN	1 3/4	2	2	2	2	2
			2 1/16	2 5/16	2 5/16	2 5/16	2 5/16	2 5/16
			24	27	27	27	29	29
C	ANCHOR BOLT CHORD	IN	12	13 1/2	13 1/2	13 1/2	14 1/2	14 1/2
D	BASE PLATE EDGE	IN	15 1/4	17 1/2	17 1/2	17 1/2	20 1/4	20 1/4
T	BASE PLATE THICKNESS	IN	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4
P.O.C.H.	12 1/2" POLE BAND CLAMP	FT-IN	21'-6" TO 28'-6"	-	-	-	-	
P.O.C.H.	13 1/2" POLE BAND CLAMP	FT-IN	17'-0" TO 21'-0"	32'-6" TO 34'-6"	-	-	-	
P.O.C.H.	14 1/2" POLE BAND CLAMP	FT-IN	-	25'-6" TO 32'-0"	32'-6" TO 38'-6"	32'-6" TO 34'-6"	-	
P.O.C.H.	15 1/2" POLE BAND CLAMP	FT-IN	-	18'-0" TO 25'-0"	25'-6" TO 32'-0"	25'-6" TO 32'-0"	32'-6" TO 38'-6"	
P.O.C.H.	16 1/2" POLE BAND CLAMP	FT-IN	-	17'-0" TO 17'-6"	18'-0" TO 25'-0"	18'-0" TO 25'-0"	25'-6" TO 32'-0"	
P.O.C.H.	17 1/2" POLE BAND CLAMP	FT-IN	-	-	17'-0" TO 17'-6"	17'-0" TO 17'-6"	18'-0" TO 25'-0"	
P.O.C.H.	18 1/2" POLE BAND CLAMP	FT-IN	-	-	-	-	17'-0" TO 17'-6"	

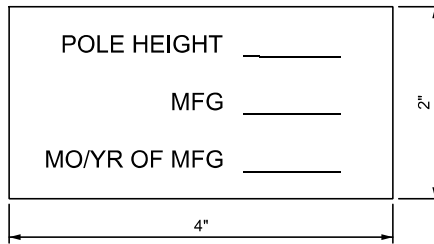
* DIAMETERS GIVEN ARE O.D.

NOTES:

1. ROUND OR 12-SIDED SECTIONS ARE ALLOWED.
2. MULTI-PLY SECTIONS ARE NOT ALLOWED.
3. STRAIN POLES USED IN APPLICATIONS OTHER THAN TRAFFIC SIGNALS REQUIRE UNIQUE DESIGN CALCULATIONS FOR THE SPECIFIC LOADING CASE.
4. E70 ELECTRODE REQUIRED FOR GR 50 STEEL. E80 ELECTRODE REQUIRED FOR GR 65 STEEL.

ABBREVIATIONS:

- S.S. = STAINLESS STEEL
- GA. = GAUGE
- GR = GRADE
- O.D. = OUTSIDE DIAMETER
- I.D. = INSIDE DIAMETER
- H.S. = HIGH STRENGTH
- SCH. = SCHEDULE
- P.O.C.H. = POINT OF CONTACT HEIGHT OF THE POLE BAND CLAMP, MEASURED FROM THE BOTTOM OF THE STRAIN POLE

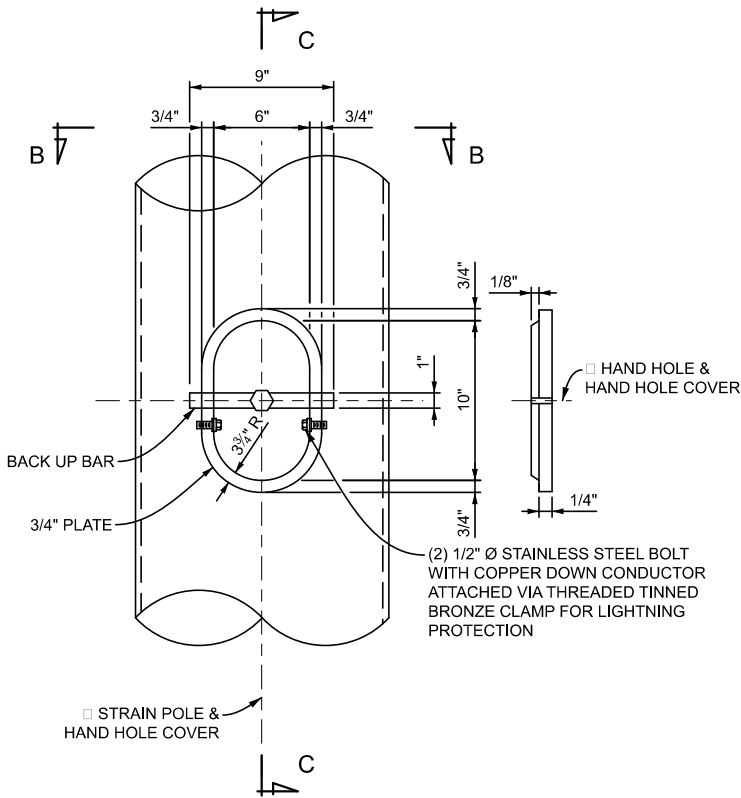


NOTES:

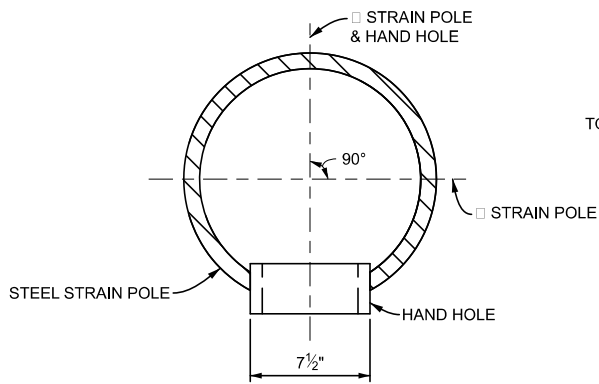
1. ATTACH ID TAG TO STRAIN POLE AT LOCATIONS SHOWN 4" ABOVE BASE OF TUBE, BELOW HANDHOLE, WITH (4) #8 x 3/8" S.S. TYPE U DRIVE SCREWS.
2. STAMP IN LETTERS WITH 3/8" CHARACTERS.

3 DETAIL - STRAIN POLE S.S. ID TAG

 Michigan Department of Transportation	STANDARD PLAN FOR STRAIN POLE REQUIREMENTS			SHEET 2 OF 7
	(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-021-A	
DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE				SECT

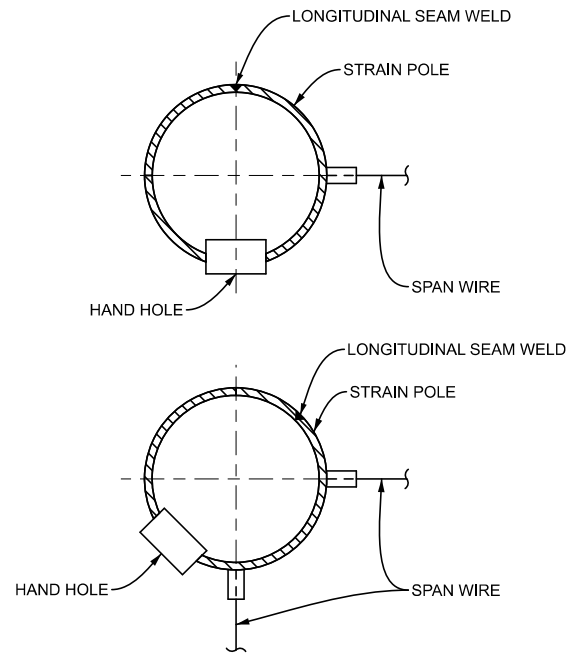


4 DETAIL - HAND HOLE



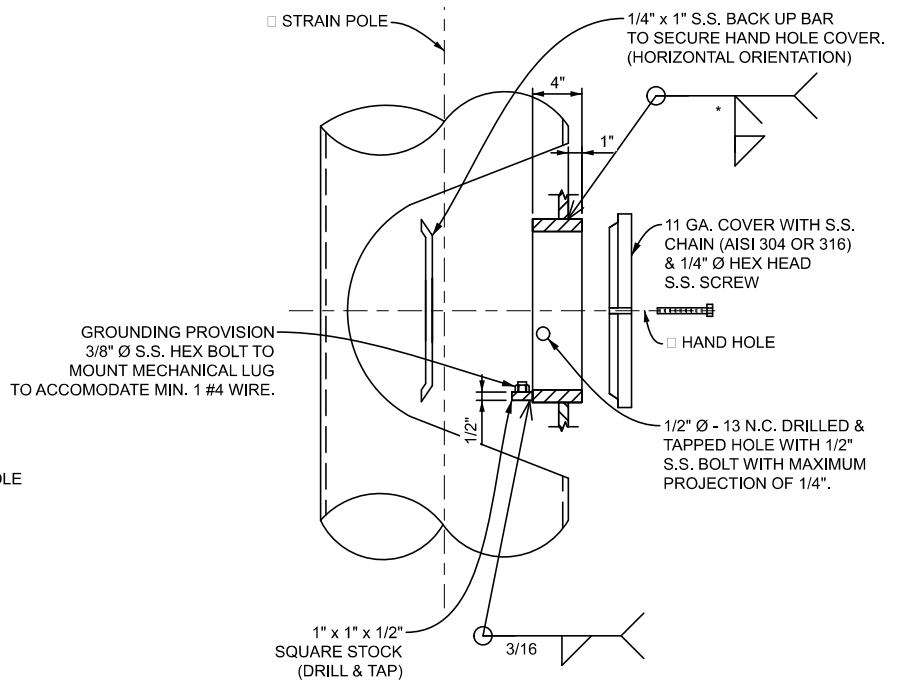
SEE STRAIN POLE ORIENTATION DETAIL

B SECTION - HAND HOLE



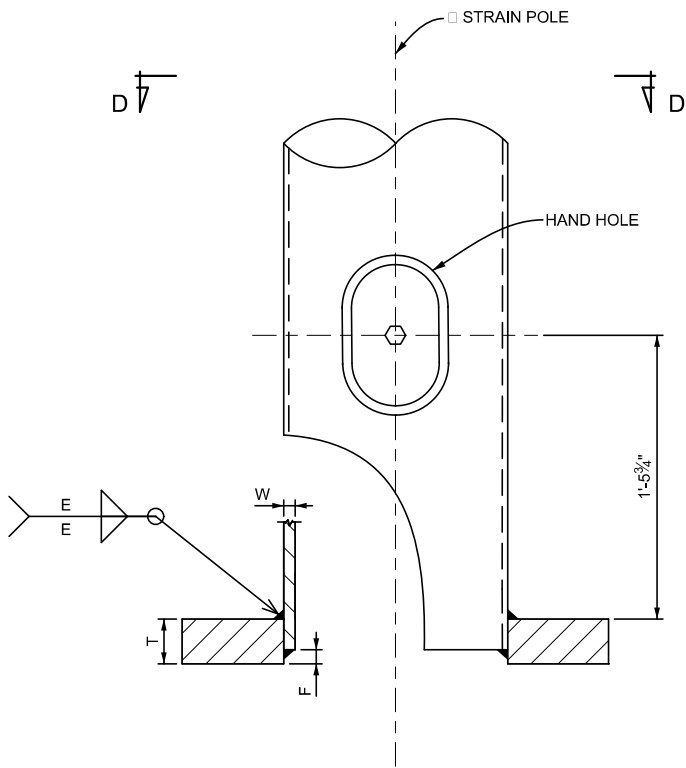
LONGITUDINAL SEAM WELD MUST BE 90° MINIMUM FROM THE HAND HOLE AND 30° MINIMUM FROM THE □ COUPLING (SEE SECTION A FOR □ COUPLING).

5 DETAIL - STRAIN POLE ORIENTATION



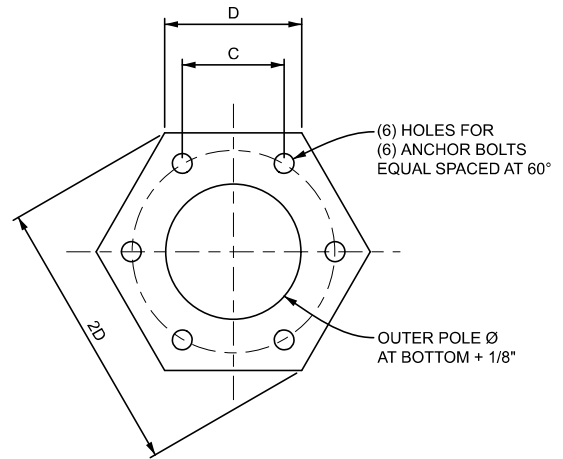
C SECTION - HAND HOLE

<p>MDOT Michigan Department of Transportation</p> <p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	<p>STANDARD PLAN FOR HAND HOLE & STRAIN POLE ORIENTATION DETAILS</p>			<p>SHEET 3 OF 7</p>
	<p>(SPECIAL DETAIL) FHWA APPROVAL</p>	<p>07/27/23 PLAN DATE</p>	<p>SIG-021-A</p>	



ANCHOR BOLTS NOT SHOWN FOR CLARITY.

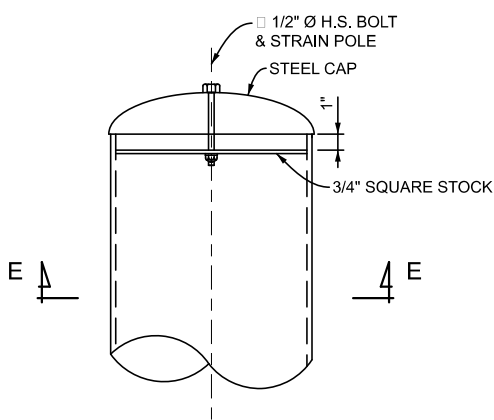
6 DETAIL - BASE PLATE



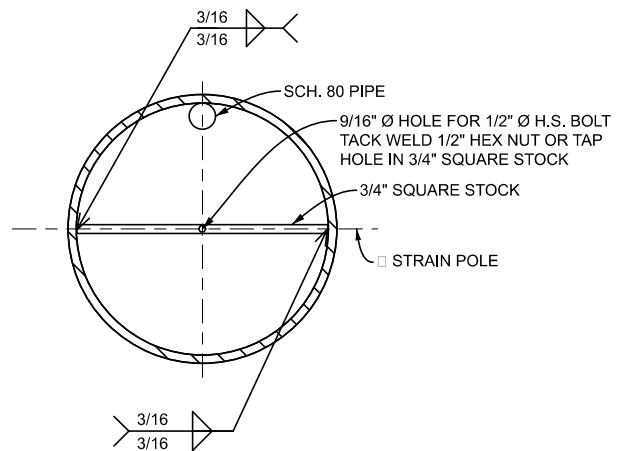
NOTES:

1. STRAIN POLE NOT SHOWN FOR CLARITY.
2. SEE STRAIN POLE REQUIREMENTS TABLE ON SHEET 2 FOR:
 ANCHOR BOLT CIRCLE Ø
 ANCHOR BOLT HOLE Ø
 ANCHOR BOLT Ø

D SECTION - BASE PLATE



7 DETAIL - STRAIN POLE CAP



E SECTION - STRAIN POLE CAP



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
BASE PLATE AND STRAIN
POLE CAP DETAILS

(SPECIAL DETAIL)
FHWA APPROVAL

07/27/23
PLAN DATE

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SHEET
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SECT

STRAIN POLE FOUNDATION REQUIREMENTS							
MARK	DESCRIPTION	UNIT	NOT CONNECTED TO TIE-OFF SPANS			CONNECTED TO TIE-OFF SPANS	
			SIZE 1	SIZE 2	SIZE 3	SIZE 4	SIZE 5
A	POLE LENGTH	FT	30	36	40	36	40
	ANCHOR BOLT DIAMETER	IN	1 3/4	2	2	2	2
	ANCHOR BOLT CIRCLE DIAMETER	IN	24	27	27	29	29
	ANCHOR BOLT LENGTH	IN	72	72	72	72	72
	FOUNDATION DIAMETER	IN	42	48	48	48	48

NOTES:

- ALL WORK AND MATERIALS MUST BE IN ACCORDANCE WITH THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION. CONSTRUCT STRAIN POLE FOUNDATIONS ACCORDING TO SECTION 718.03 OF THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- IF SOIL CONDITIONS INDICATE THERE IS NO NEED FOR A CASING PAY ITEM AS SHOWN ON THE PLAN, THE CONTRACTOR SHALL REQUEST PERMISSION OF THE ENGINEER TO INSTALL THE FOUNDATION WITHOUT CASING.
- WHEN THE CASING PAY ITEM IS INCLUDING ON THE PLANS FOR A FOUNDATION (DUE TO GRANULAR SOILS, A WET HOLE OR OTHER UNSTABLE CONDITIONS), STEEL CASING (SMOOTH WALLED) IS TO BE INSTALLED TO ENABLE THE FOUNDATION TO BE POURED. THE THICKNESS OF THE STEEL CASING IS TO BE DETERMINED BY THE CONTRACTOR. THE STEEL MUST BE LEFT IN PLACE. SMOOTH WALLED STEEL CASING OUTSIDE DIAMETER TO MEET OR EXCEED FOUNDATION DIAMETER. IF SOIL EXTENDING LATERALLY WITHIN 6 FEET OF THE DRILLED SHAFT FOUNDATION IS LOOSENEED OR OTHERWISE DISTURBED, SCARIFY MATERIAL AT THE BASE OF THE EXCAVATION BELOW THE DEPTH OF DISTURBANCE AND RECOMPACT IN ACCORDANCE WITH 206.03.B OF THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION. COMPACT ALL BACKFILL PLACED ABOVE THE RECOMPACTED BASE OF EXCAVATION IN ACCORDANCE WITH 206.03.B OF THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- WHEN THE CASING PAY ITEM IS CALLED FOR ON THE PLANS, THE STEEL CASING MAY STOP AT THE CONDUIT ENTRANCE TO FOUNDATION. TOP OF FOUNDATION MUST THEN BE FORMED SEPARATELY, EVEN THOUGH THE STEEL CASING STOPS AT THE CONDUIT ENTRANCE. THE CASING PAY ITEM QUANTITY WILL BE PAID FOR BASED ON ACTUAL LINEAR FEET INSTALLED.
- CONSTRUCT STRAIN POLE FOUNDATIONS, CASED OR UNCASD, ACCORDING TO SUBSECTION 820.03.A AND 718 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION. ALL WORK AND MATERIALS MUST BE IN ACCORDANCE WITH THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- STEEL REINFORCEMENT MUST CONFORM TO SECTION 905 OF THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- EXPOSED CONCRETE SURFACES MUST BE CAST IN FORMS.
- CONDUITS AND ANCHOR BOLTS MUST BE RIGIDLY INSTALLED BEFORE CONCRETE IS PLACED. ANCHOR BOLTS MUST BE SPACED BY MEANS OF A TEMPLATE. THE CENTER OF THE TEMPLATE MUST COINCIDE WITH THE CENTER OF THE FOUNDATION.
- GROUNDING OF POLE INCLUDES ADDING #4 BARE COPPER GROUND WIRE BONDED BY LISTED MECHANICAL CONNECTION TO FOUNDATION REINFORCING STEEL AND HAVING 24" OF SLACK ABOVE THE TOP OF FOUNDATION.
- INSTALL COPPER CLAD GROUND ROD(S) AS DIRECTED BY ENGINEER AND IN ACCORDANCE WITH CURRENT N.E.C. ALL GROUNDS MUST PROVIDE LESS THAN 10 OHM RESISTANCE TO GROUND.



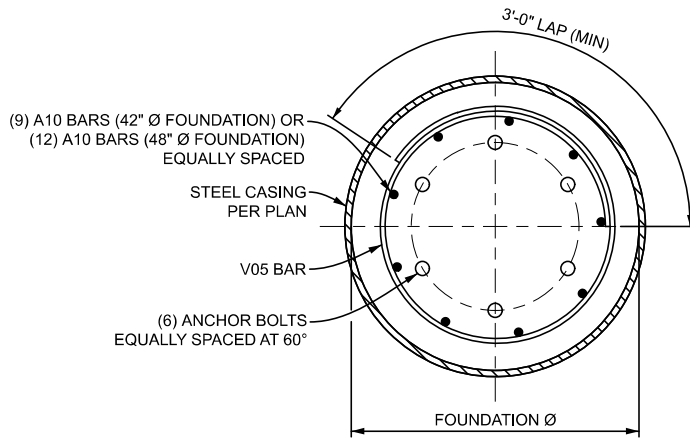
STANDARD PLAN FOR
FOUNDATION REQUIREMENTS

(SPECIAL DETAIL)
FHWA APPROVAL

07/27/23
PLAN DATE

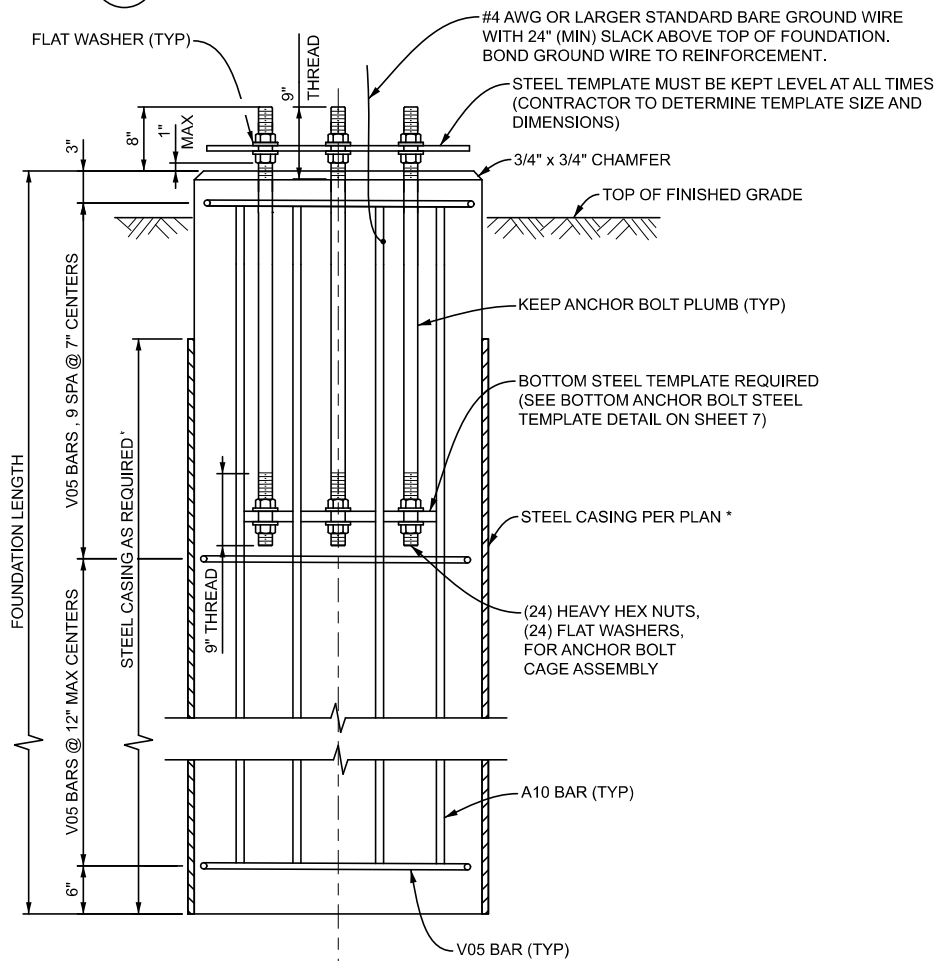
SIG-021-A

SHEET
5 OF 7



SEE STRAIN POLE FOUNDATION REQUIREMENTS TABLE ON PAGE 5 FOR:
ANCHOR BOLT CIRCLE Ø, ANCHOR BOLT Ø, & FOUNDATION Ø

8 DETAIL - FOUNDATION PLAN



* SEE FOUNDATION NOTES AND PLANS FOR STEEL CASING PAY ITEM

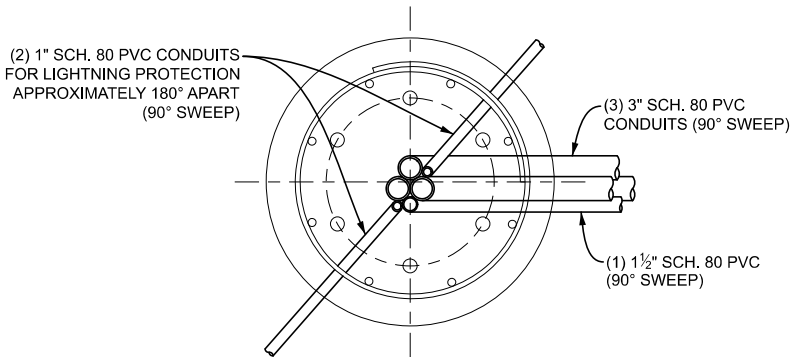
9 DETAIL - FOUNDATION ELEVATION

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

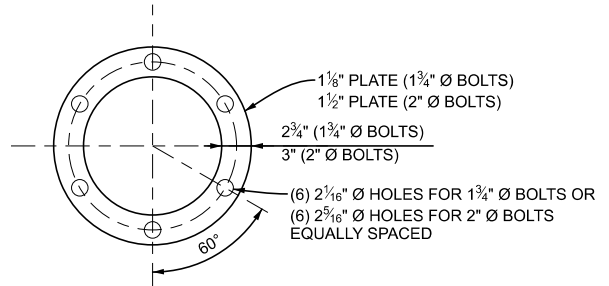
STANDARD PLAN FOR FOUNDATION DETAILS			
(SPECIAL DETAIL)	07/27/23	SIG-021-A	SHEET
FHWA APPROVAL	PLAN DATE		6 OF 7

SECT



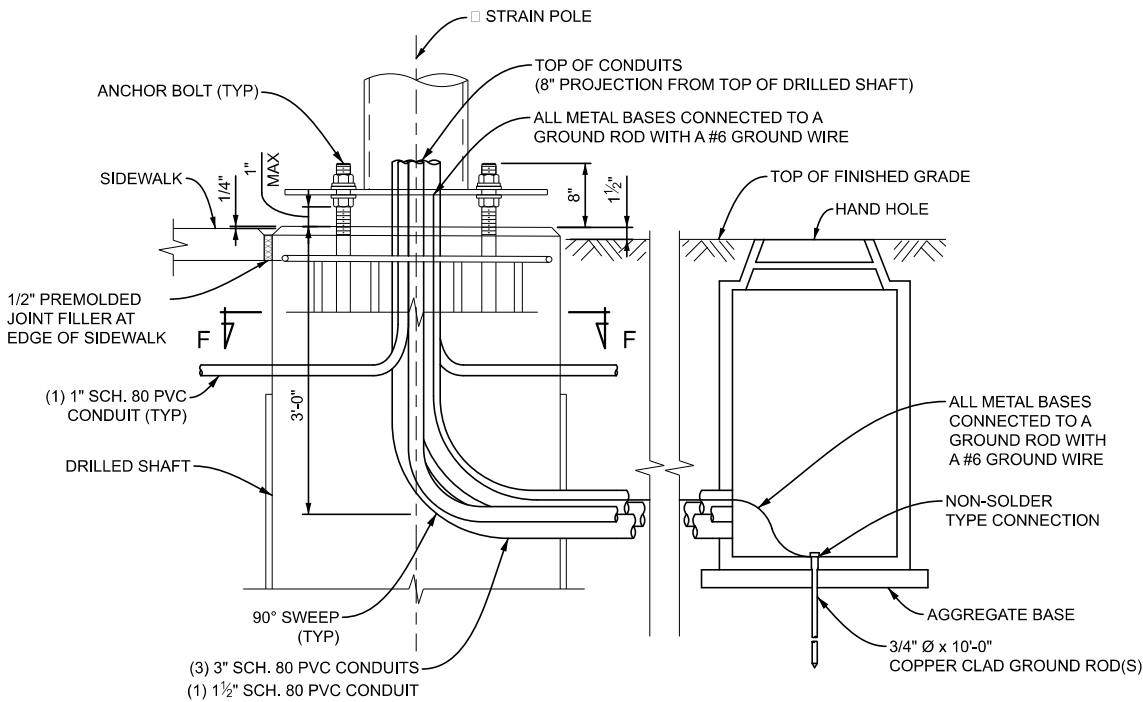
SECURE CONDUITS TOGETHER WITH SUITABLE BANDING TO ENSURE PLACEMENT TOGETHER PRIOR TO CONCRETE POUR.

F SECTION-CONDUIT LAYOUT



SEE STRAIN POLE FOUNDATION REQUIREMENTS TABLE ON SHEET 5 FOR:
ANCHOR BOLT CIRCLE Ø
ANCHOR BOLT HOLE Ø
FOUNDATION Ø

11 DETAIL - BOTT. ANCHOR BOLT STEEL TEMPLATE



10 DETAIL - CONDUIT LAYOUT