Michigan Department of Transportation
Traffic and Safety

STATEWIDE TRAFFIC SIGNAL DETAILS

SIG-10-A THROUGH SIG-460-A

ENGLISH VERSION

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

PREPARED BY
TRAFFIC AND SAFETY

ENGINEER OF TRAFFIC AND SAFETY

DRAWN BY: MTS

CHECKED BY: JAT

MDOTProjectwise\Documents\Reference Documents\Traffic Reference\Statewide Special Details\Develop

Check if Applicable	TRAFFIC SIGNAL SPECIAL DETAILS INDEX/CHECKLIST *One Completed Checklist required upon plan submittal for each contract package		
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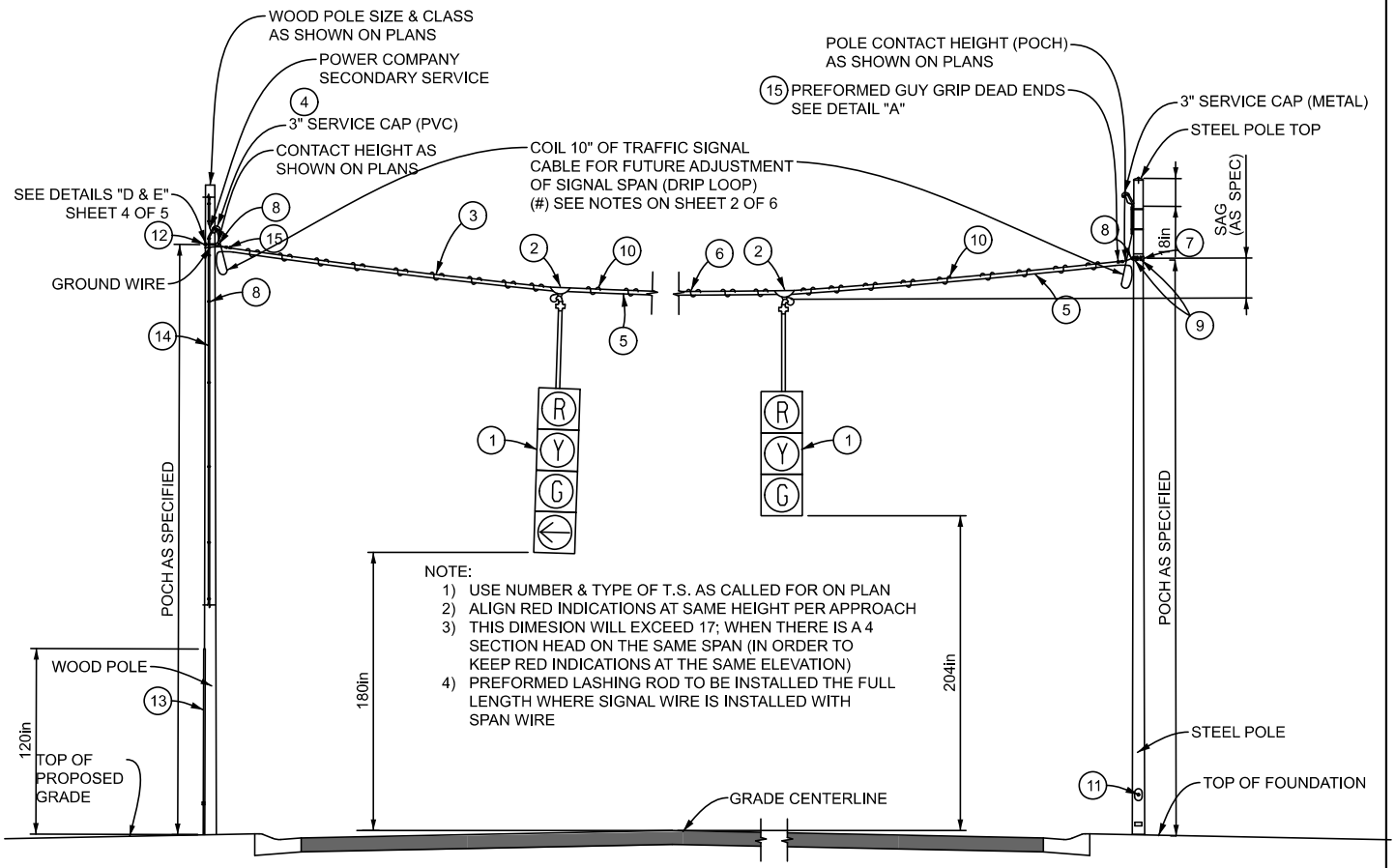
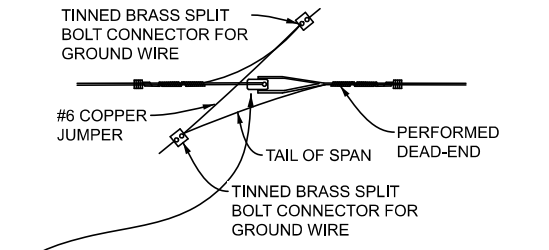


1 DETAIL - TYPICAL SPAN WIRE INSTALLATION T.S.
NTS STEEL POLE & WOOD POLES

NO.	ITEM
1	TRAFFIC SIGNAL (NO. HEADS AS INDICATED)
2	SPAN WIRE HANGER
3	5/16" EXTRA HIGH STRENGTH SPAN WIRE
4	3" SERVICE CAP (WEATHERHEAD), (METAL FOR STEEL AND PVC FOR WOOD POLES)
5	P.J. TRAFFIC SIGNAL CABLE (AS SPECIFIED)
6	PREFORMED LASHING RODS
7	POLE BAND CLAMP (STEEL POLE)
8	GUY THIMBLE (2" DIA.)
9	(2) 5/8" X 4" LONG BOLT, NUT, WASHERS PER POLE BAND CLAMP (STEEL POLE)
10	INSTALL SPAN WIRE PREFORMED (ARMOR ROD) UNDER EACH SPAN HANGER
11	ACCESS HAND HOLE ALL NEW & EXISTING STEEL POLES
12	5/8" EYEBOLT, OVAL EYE AND NUT
13	WOOD MOULDING OR PLASTIC DUCT (10' FROM GROUND LEVEL)
14	3" SCHEDULE 80 PVC OR RIGID METAL (*) SEE NOTE ON SHEET 2 OF 5
15	PREFORMED GUY GRIP DEAD ENDS



DETAIL - COPPER JUMPER
NTS

NOTE:
PORCELAIN STRAIN INSULATOR (IF REQUIRED SHALL MEET THE CODES AND PLACEMENT REQUIREMENTS OF THE LOCAL UTILITY CO.

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

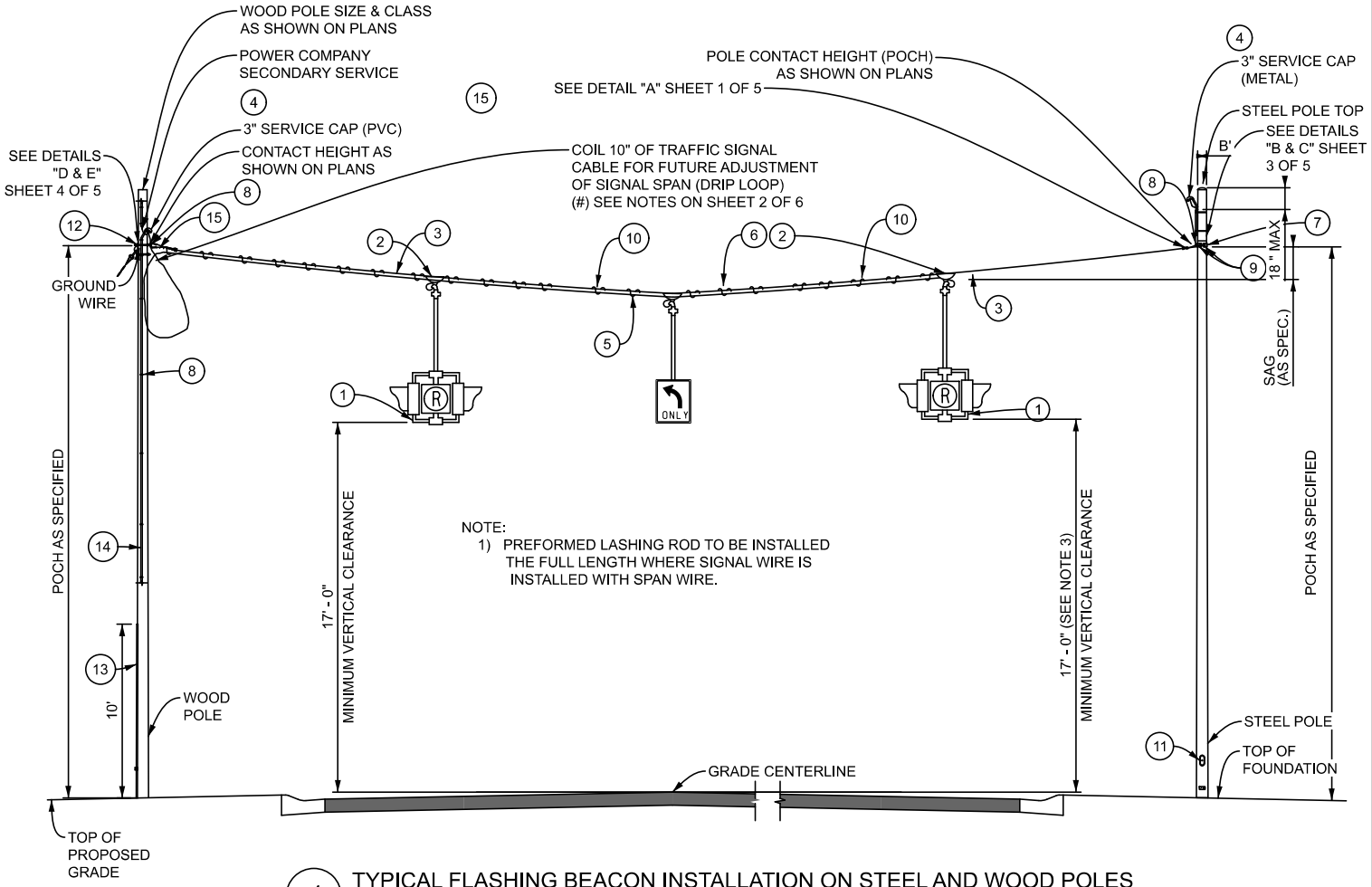
APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
SPAN WIRE CASING DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-010-A	SHEET 1 OF 7



1 TYPICAL FLASHING BEACON INSTALLATION ON STEEL AND WOOD POLES
NTS

NO.	ITEM
1	TRAFFIC SIGNAL (NO. HEADS AS INDICATED)
2	SPAN WIRE HANGER
3	5/16" EXTRA HIGH STRENGTH SPAN WIRE
4	3" SCHEDULE 80 PVC OR RIGID METAL (*) SEE NOTE ON SHEET 2 OF 5
5	P.J. TRAFFIC SIGNAL CABLE (AS SPECIFIED)
6	PREFORMED LASHING RODS
7	POLE BAND CLAMP (STEEL POLE)
8	GUY THIMBLE (2" DIA.)
9	(2) 5/8" X 4" LONG BOLT, NUT, WASHERS PER POLE BAND CLAMP (STEEL POLE)
10	INSTALL SPAN WIRE PREFORMED (ARMOR ROD) UNDER EACH SPAN HANGER
11	ACCESS HAND HOLE ALL NEW & EXISTING STEEL POLES
12	5/8" EYEBOLT, OVAL EYE AND NUT
13	WOOD MOULDING OR PLASTIC DUCT (10' FROM GROUND LEVEL)
14	3" SERVICE CAP (WEATHERHEAD), (METAL FOR STEEL AND PVC FOR WOOD POLES)
15	PREFORMED GUY GRIP DEAD ENDS

NOTES:
(*) FOR PROJECTS MAINTAINED BY THE WAYNE CO. DEPARTMENT OF PUBLIC SERVICES (WCDPS), USE RIGID METAL FOR CONDUIT(S) FROM GRADE LEVEL TO 10' (MIN.) ABOVE GRADE OR AS DIRECTED BY THE ENGINEER.

(#) FOR PROJECTS MAINTAINED BY THE ROAD COMMISSION FOR OAKLAND COUNTY (RCOC), USE DRIP LOOP (WITHOUT COIL) FOR FUTURE ADJUSTMENT OF SIGNAL SPAN.

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STANDARD PLAN FOR
SPAN WIRE CASING DETAILS

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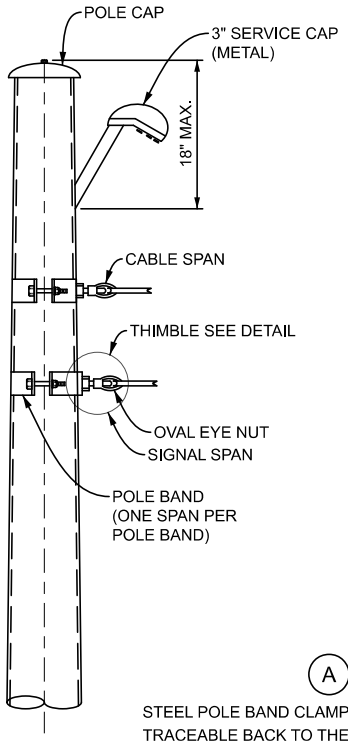
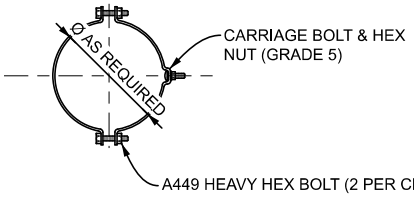
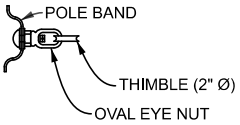
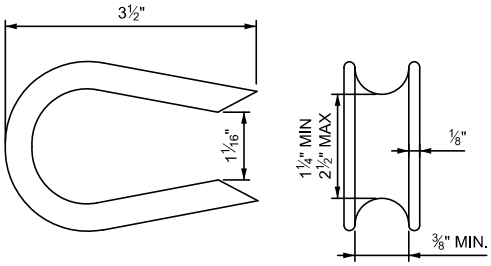


A DETAIL - POLE BAND CLAMP ON STEEL POLE

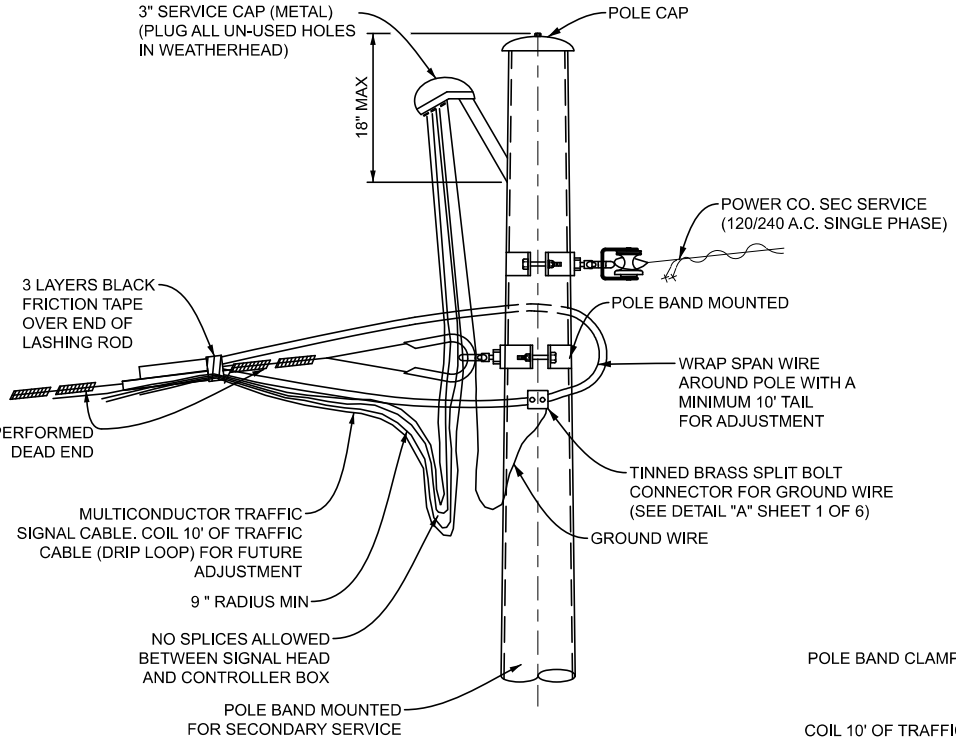
STEEL POLE BAND CLAMPS MUST BE STAMPED WITH IDENTIFICATION THAT IS TRACEABLE BACK TO THE MANUFACTURER, WHICH CAN BE USED TO DETERMINE THE MONTH AND YEAR OF CLAMP MANUFACTURE. THE STAMPING METHOD MUST BE A LOW STRESS STAMPING METHOD. THE STAMP CANNOT BE LOCATED NEAR THE BOLTED FLANGE, MUST BE LOCATED NEAR THE CENTER OF THE CLAMP ON THE BACK SIDE FACING AWAY FROM TRAFFIC, AND BE VISIBLE AFTER GALVANIZING. ALL BEND RADII ARE TO BE A MINIMUM OF 1.5 TIMES THE POLE BAND THICKNESS.



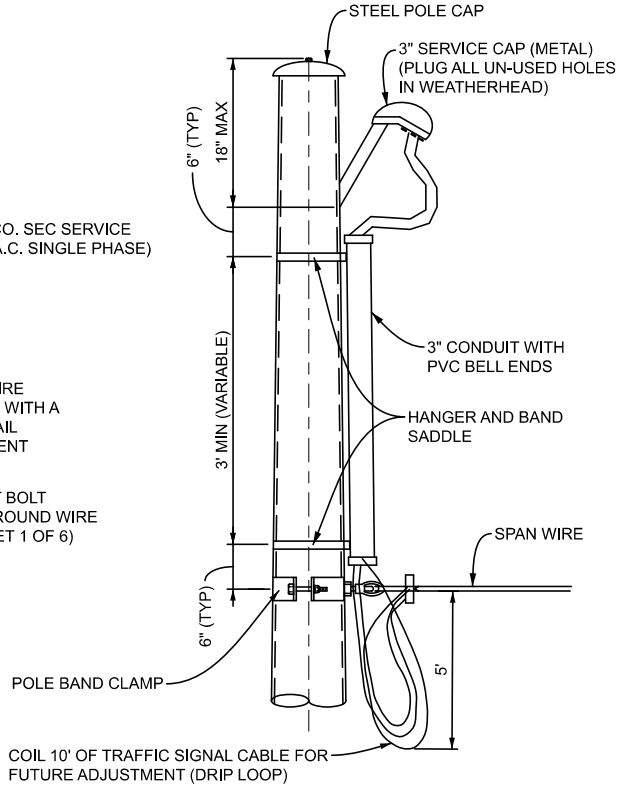




B DETAIL - THIMBLE



C DETAIL-CABLING ON STEEL POLE



D DETAIL - SERVICE CABLE ON STEEL POLE

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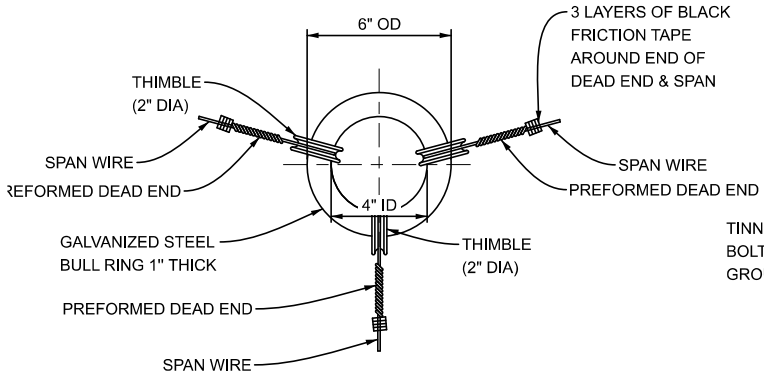
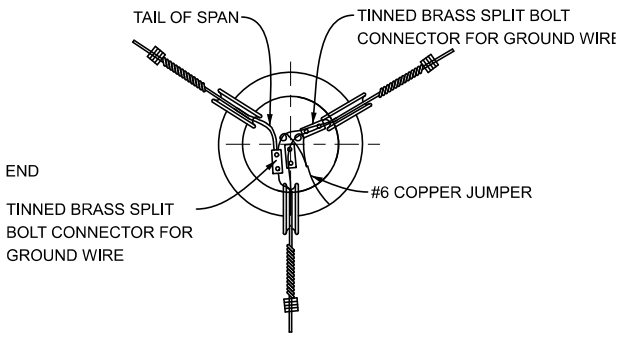
STANDARD PLAN FOR
SPAN WIRE CASING DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-010-A	SHEET 3 OF 7

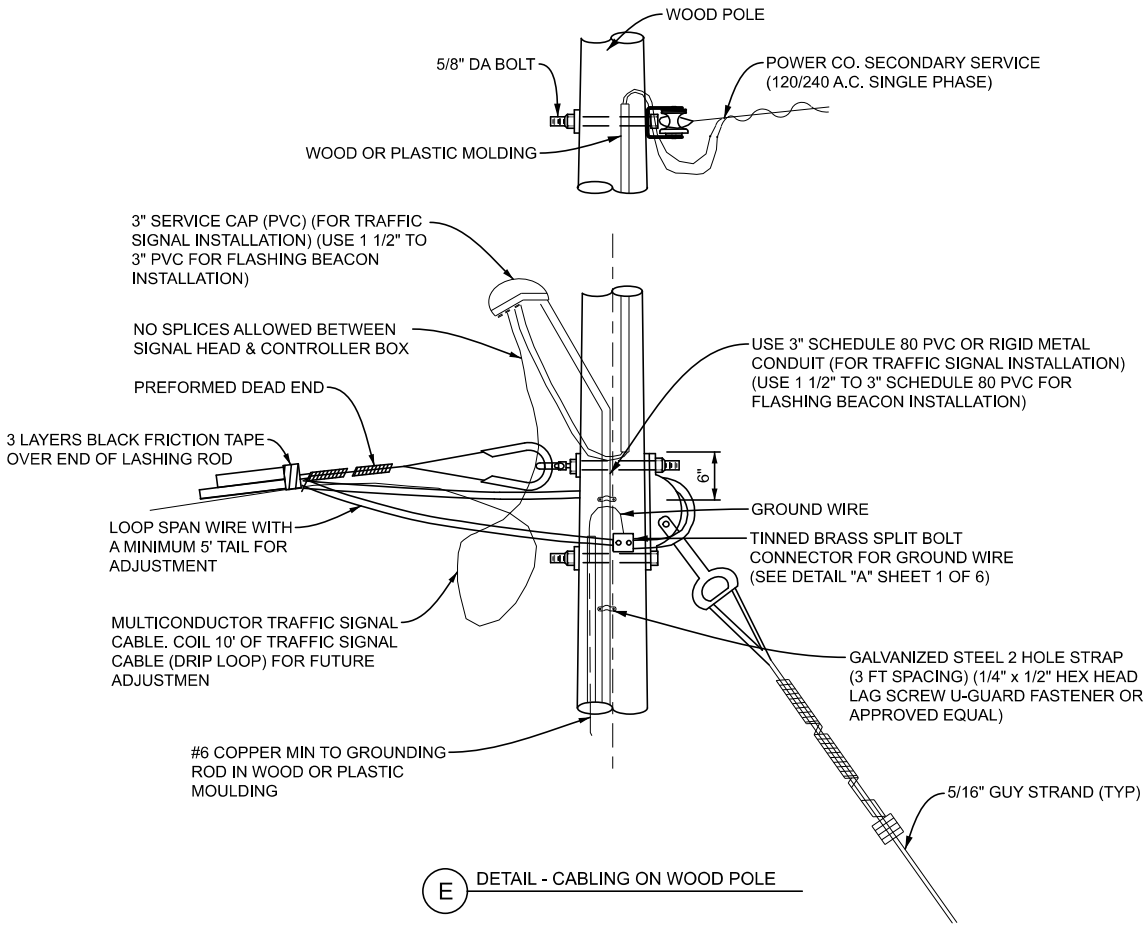


DETAIL
3-WAY TIE OFF BULL RING



DETAIL COPPER JUMPER
3-WAY TIE OFF

NOTE:
PORCELAIN STRAIN INSULATOR (IF REQUIRED) SHALL MEET THE CODES AND PLACEMENT REQUIREMENTS OF THE LOCAL UTILITY CO.



E DETAIL - CABLING ON WOOD POLE

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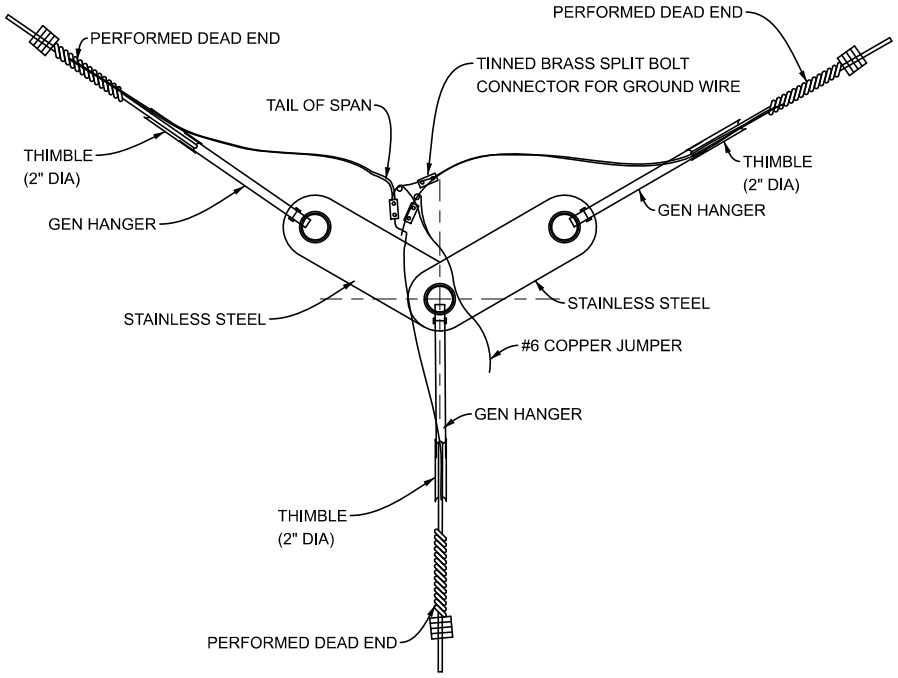
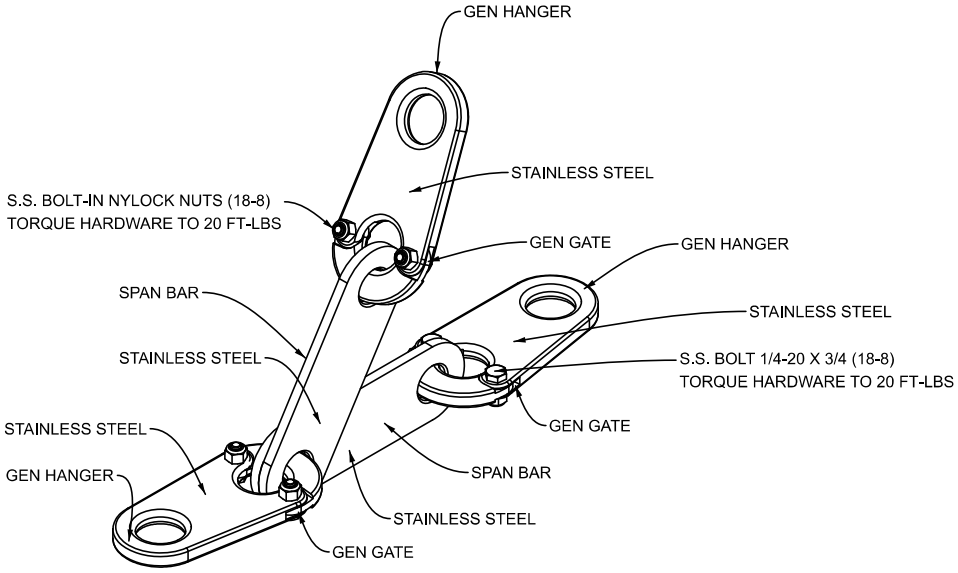
STANDARD PLAN FOR
SPAN WIRE CASING DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-010-A	SHEET 4 OF 7
			SECT

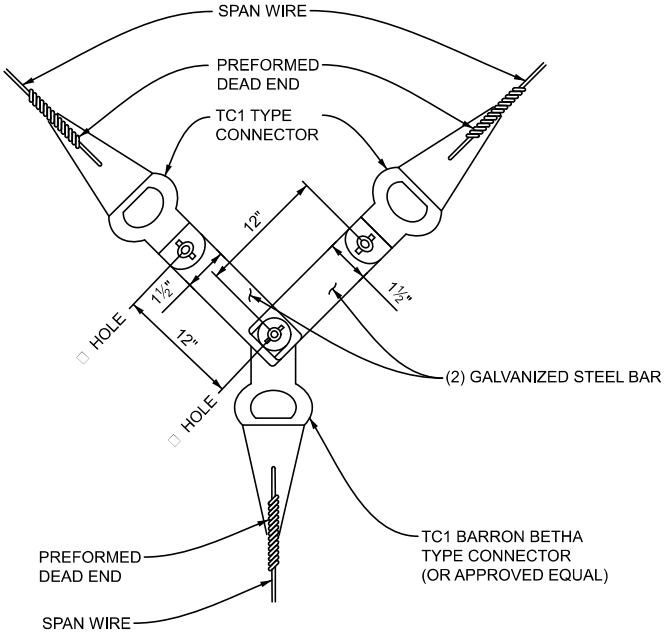


DETAIL COPPER JUMPER
3-WAY TIE OFF

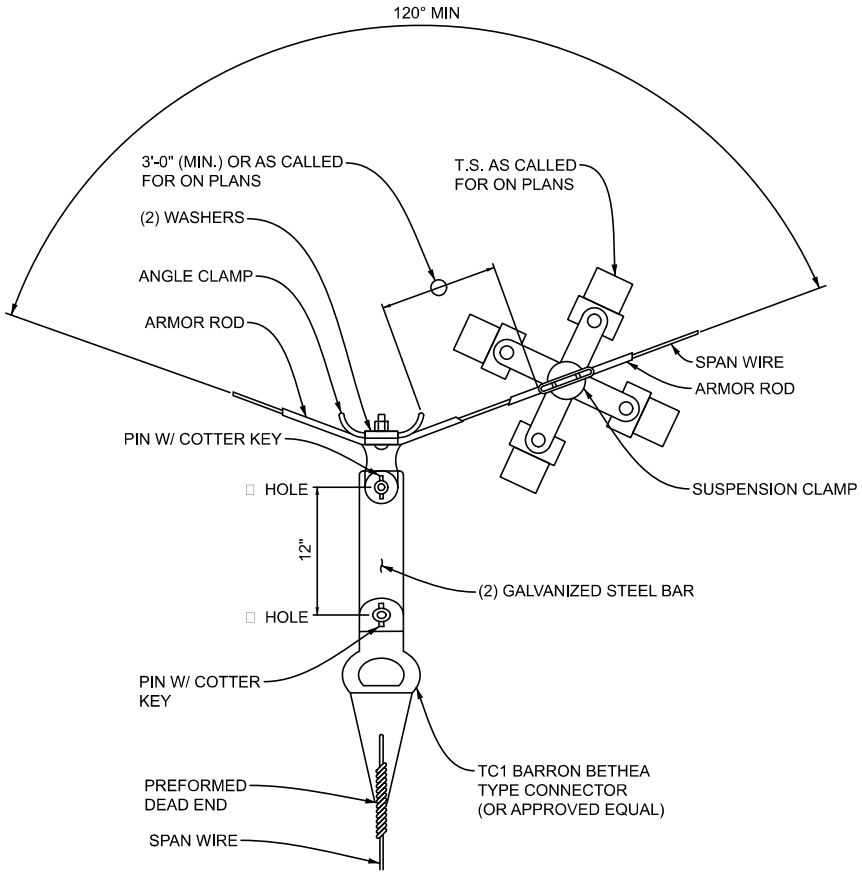


DETAIL SPAN HANGER ASSEMBLY (ALTERNATE)

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SPAN WIRE CASING DETAILS			
	(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-010-A	SHEET 5 OF 7



PULL-OFF CONNECTION DETAIL (ALTERNATE)
FOR 3-WAY SUSPENSION



PULL-OFF CONNECTION DETAIL (ALTERNATE)
FOR 3-WAY SUSPENSION

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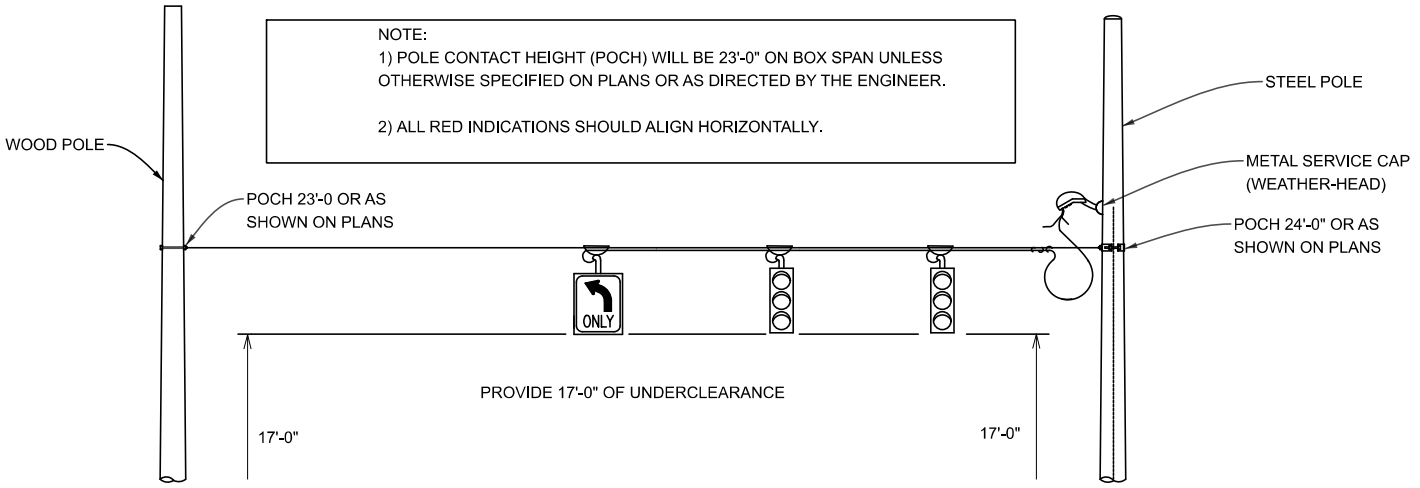
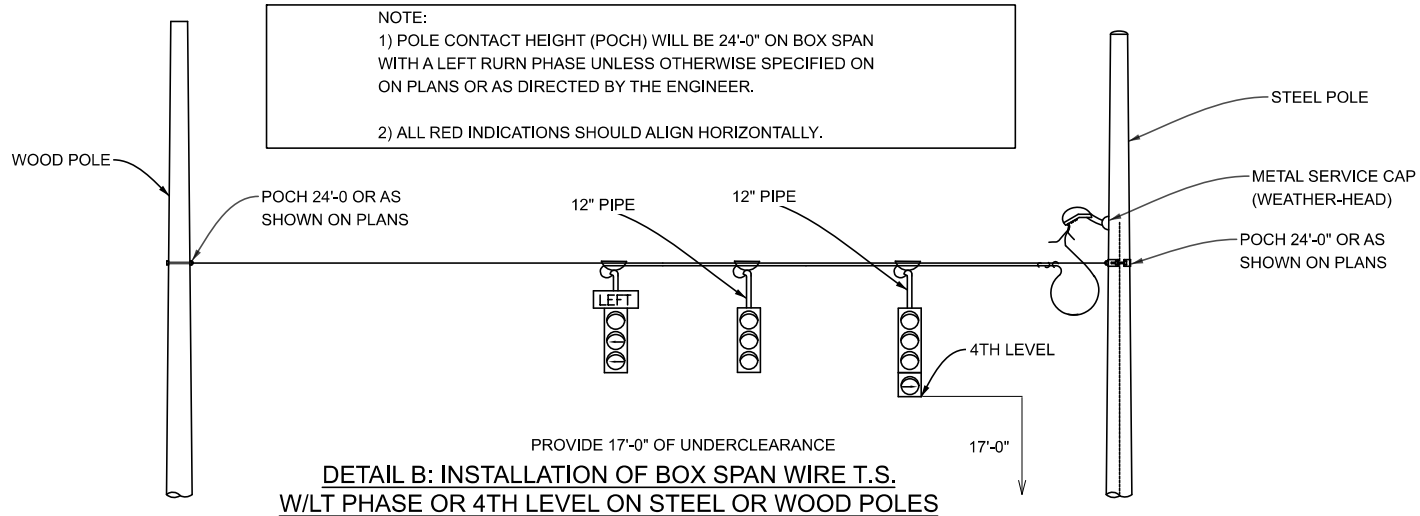
STANDARD PLAN FOR
SPAN WIRE CASING DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-010-A	SHEET 6 OF 7

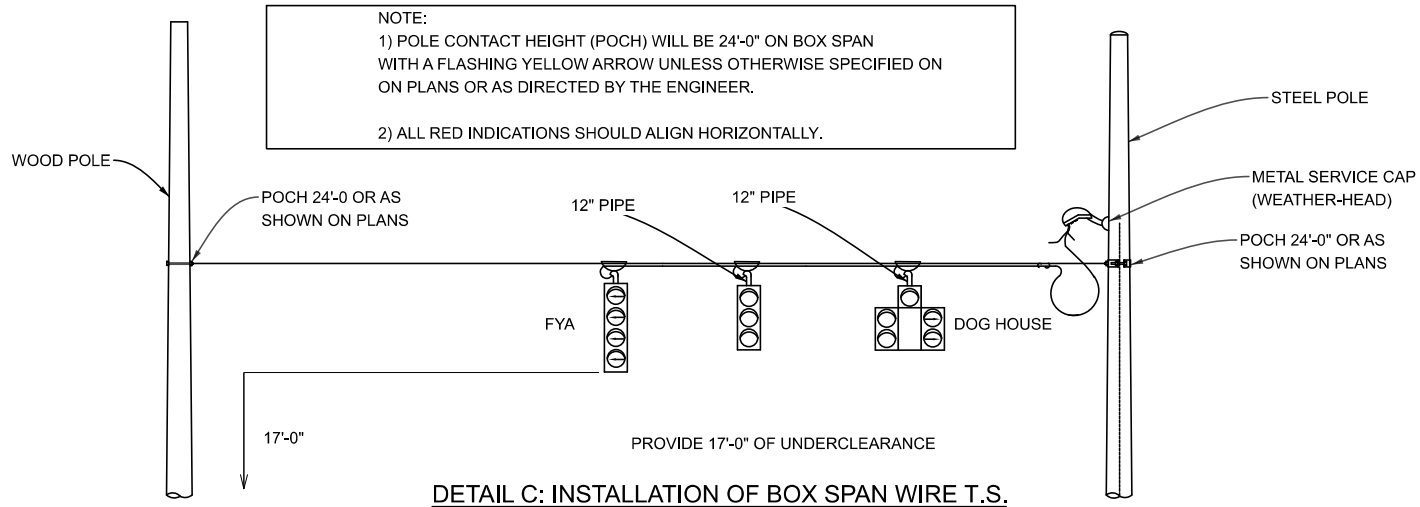
SECT



DETAIL INSTALLATION OF BOX SPAN WIRE T.S. ON STEEL OR WOOD POLES



DETAIL B: INSTALLATION OF BOX SPAN WIRE T.S.
W/LT PHASE OR 4TH LEVEL ON STEEL OR WOOD POLES



DETAIL C: INSTALLATION OF BOX SPAN WIRE T.S.
FYA AND DOGHOUSE ON STEEL OR WOOD POLES

BOX SPAN WIRE T.S ON STEEL OR WOOD POLES FOR USE ON OAKLAND COUNTY ROADS ONLY

MDOT Michigan Department of Transportation

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STANDARD PLAN FOR
SPAN WIRE CASING DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-010-A	SHEET 7 OF 7

SECT

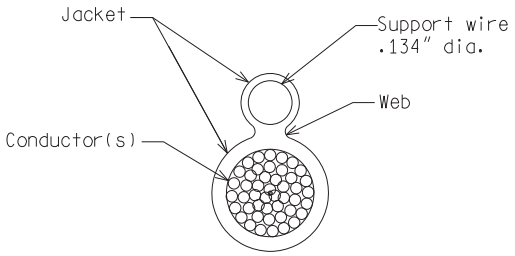
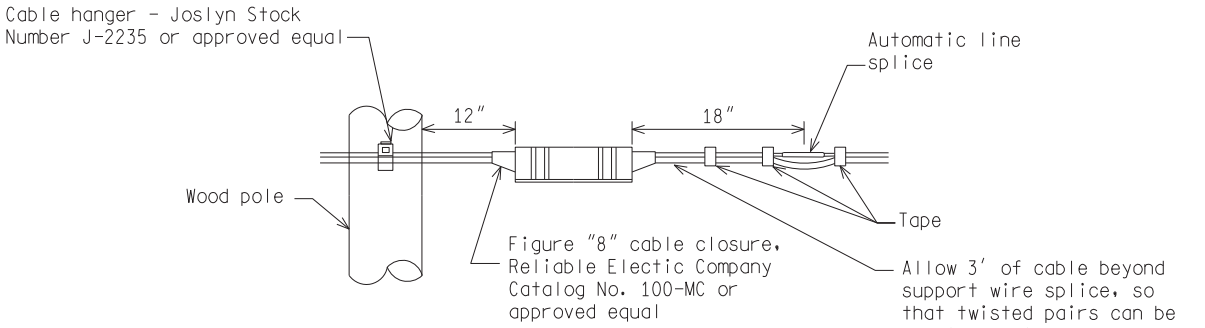
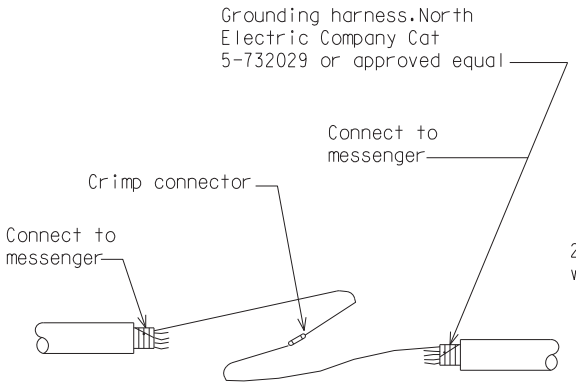


FIGURE 8 CABLE

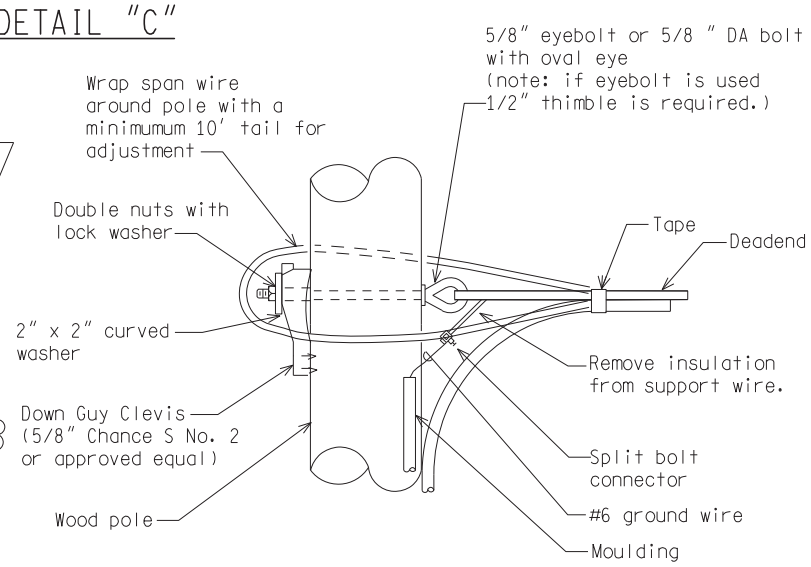
INTERGRAL MESSENGER (I.M.) CABLE SECTION
DETAIL "A"



AERIAL SPLICE
DETAIL "C"



CABLE CLOSURE
DETAIL "D"



DEAD-END POLE
DETAIL "E"

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG011A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

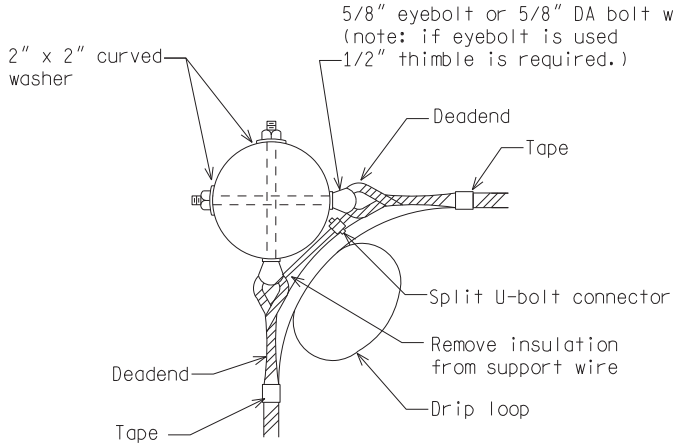
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

INSTALLATION OF INTEGRAL MESSENGER CABLE

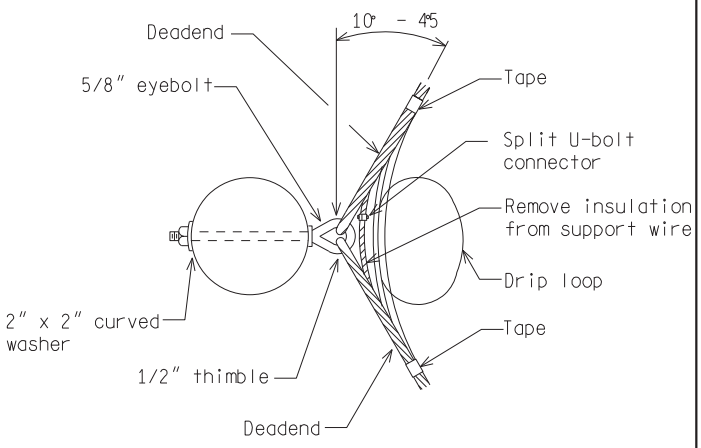
PLAN DATE

SIG-011-A

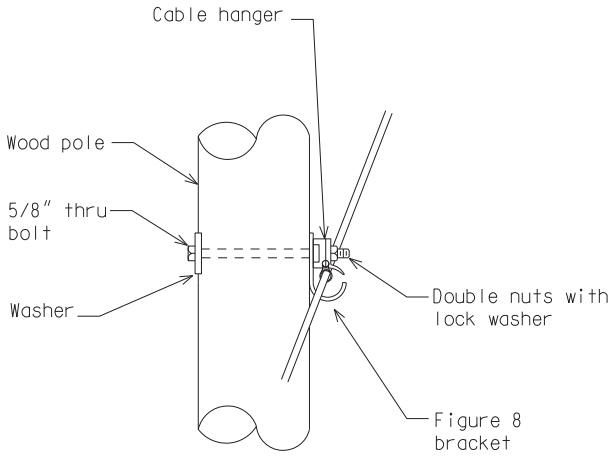
SHEET
1 of 4



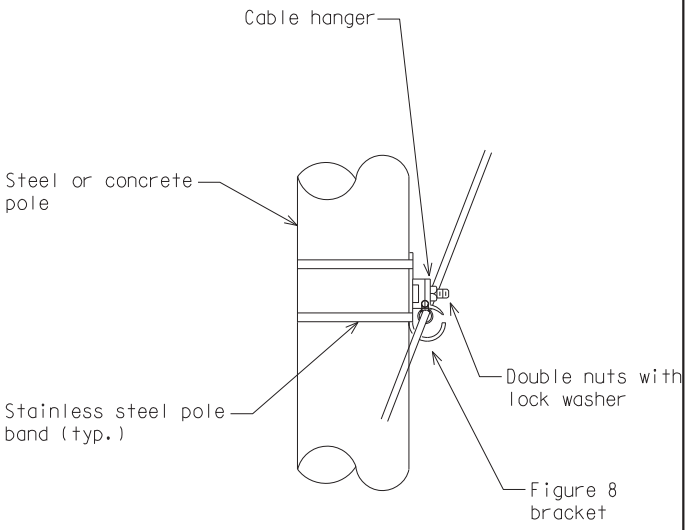
90 DEG. CORNER POLE
DETAIL "F"



10 DEG. - 45 DEG. ANGLE POLE
DETAIL "G"



TANGENT POLE (WOOD POLE)
DETAIL "H"



TANGENT POLE
(STEEL OR CONCRETE POLE)
DETAIL "I"

NOTE FOR DETAILS "E", "F", "G":
Individual connectors to be taped with 3 layers of approved plastic tape & overall one layer of half lap approved plastic tape

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-011-A	SHEET 2 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG011A.dgn Rev. 02/16/17		PLAN DATE		

DESCRIPTION:
Integral messenger wire consists of a support wire and a conductor core laid parallel and covered with a single extrusion of black low density polyethylene. The single extrusion provides a jacket over the support wire and core, and forms a web joining the two. See detail "A" this sheet. The support wire is 0.134 inches in diameter. Grade 190 steel, Class A galvanized, Extra High Strength steel having a rated breaking strength of 2680 pounds.

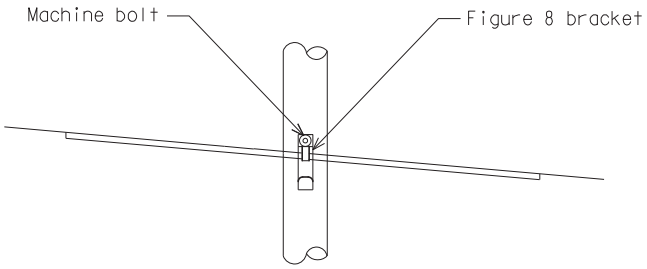
INSTALLATION:
Every effort shall be made to limit the length of spans to a maximum of 250 feet. Integral messenger wire is prone to low frequency wind vibration commonly referred to as "dancing" while "dancing" may not be so violent in low wind areas as to attract attention. Prolonged low amplitude vibration will eventually cause open circuits and/or support wire failure. Therefore, REA recommends that all integral messenger distribution wire be spiraled approximately one spiral for each 15 feet of span.

Spiraling of the wire should be done from every other pole by applying the spiraling torque to the support clamp after the two outside bolts have been properly tightened, thus keeping the spiraling torque on the support wire and not on the core. As spiraling operations proceed along a lead, spiraling at alternate poles should be in opposite directions, thereby reducing the torsion otherwise imposed on those clamps which are at the intermediate poles. The procedure to be followed in spiraling distribution wire is shown in detail "B" of this sheet.

If clamps are not adequately tightened the torsion developed in spiraling will cause the support wire to turn in the clamp resulting in the migration of the spirals from the spans toward the pole. "Dancing" of the wire and damage to it at the poles will be the final results of inadequate clamping. The proper type of support clamps must be used on all corners as shown in details "E", "F", "G" and "I" of this sheet.

When pulling the wire up to correct sag, a suitable wire grip should be used directly on the insulated support wire. The grip should be of such desig n as to give proper holding power and yet not damage the support wire jacket. The Crescent Tool Company #800 or an equivalent grip is suggested. A standard line wire grip should not be used because it will damage the insulation. If the insulation is damaged in any way, it must be repaired with sealing compound or by cutting out the damaged portion. At deadends, it is necessary to remove the support wire covering before applying the deadend grips. It must be done carefully to avoid damaging the support wire or core the eclectrical continuity of the support wire must be maintained throughout the lead.

NOT TO SCALE

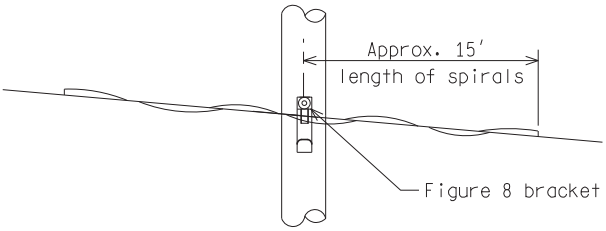


Step 1 - Support and position integral messenger wire with cable brackets.

Step 2 - Fasten and support clamp to the support messenger at the pole. Tighten the carriage bolts to the manufacturer's specifications.

Step 3 - Spiral wire in the opposite direction from which the previous adjacent spiraling operation was performed. If the adjacent spans are unequal, use the shorter span for determining the number of spirals.

Step 4 - Place the clamp on the machine bolt and tighten nuts to the manufacturer's specifications.



I.M. CABLE SPIRALS
DETAIL "B"

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-011-A	SHEET 4 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG011A.dgn Rev. 02/16/17		PLAN DATE		

STRAIN POLE DESIGN CRITERIA:

THE DESIGN OF THE STRAIN POLE STRUCTURES SHOWN ON SIG-021-A IS BASED ON THE AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, FIRST EDITION (2015), WITH 2017 TO 2022 INTERIM REVISIONS.

THE DESIGN IS BASED ON THE MAXIMUM WIND AREAS AND WEIGHTS SHOWN BELOW IN THE SPAN WIRE LOADING TABLE. THE SUM OF THE WEIGHTS AND AREAS (VIEWED PERPENDICULAR TO THE SPAN) OF ALL SIGNALS, SIGNS, DEVICES AND OTHER EQUIPMENT SUPPORTED ON EACH SPAN MUST BE LESS THAN THE MAXIMUM VALUES SHOWN. THE SPAN LENGTH IS DEFINED AS THE STRAIGHT HORIZONTAL DISTANCE BETWEEN POLES. FOR TIE-OFF CONFIGURATIONS, THE SPAN LENGTH IS DEFINED AS THE LONGEST HORIZONTAL DISTANCE BETWEEN ANY TWO ADJACENT POLES MEASURED ALONG THE LENGTHS OF EACH WIRE.

LOAD PARAMETERS:

WIND LOAD (EXTREME EVENT LIMIT STATE): 1700-YEAR MRI BASIC WIND SPEED MAP, 120 MPH DESIGN WIND SPEED

WIND LOAD (SERVICE I EVENT LIMIT STATE): 10-YEAR MRI BASIC WIND SPEED MAP, 76 MPH DESIGN WIND SPEED

HEIGHT AND EXPOSURE FACTOR (K_z): K_z IS CALCULATED USING A HEIGHT (Z) MEASURED FROM TOP OF THE DRILLED SHAFT (IT IS ASSUMED THAT THE POLE IS GROUND-MOUNTED).

DIRECTIONALITY FACTOR (K_z): 0.85

GUST EFFECT FACTOR (G): 1.14

WIND DRAG COEFFICIENT FOR WIND AREA (C_d): 1.2

WIND LOAD REDUCTION FACTOR FOR FREE-SWINGING DEVICES SUPPORTED BY THE SPAN WIRE (UNTETHERED CONFIGURATIONS): 0.65

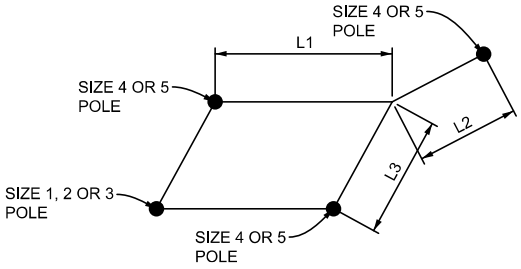
WIRE SAG: 5% (TYPICAL), 6.5% FOR SPANS WITH TIE-OFFS

STRAIN POLE LOADING: SEE SPAN WIRE LOADING TABLE BELOW. IN ADDITION, A DISAPPEARING LEGEND SIGN IS APPLIED MIDWAY ALONG ALL TIE-OFF SPANS (WHERE APPLICABLE). NO OTHER LOAD IS ALLOWED ON TIE-OFF SPANS.

SPAN WIRE + ELECTRIC CABLES WEIGHT: 1.155 LB/FT FOR 5/16" SPAN WIRE AND 1.467 LB/FT FOR 1/2" SPAN WIRE

SERVICABILITY PARAMETERS:

LIMIT FOR HORIZONTAL DEFLECTION AT TOP OF POLE UNDER DEAD LOAD ONLY: 2.5% OF POLE HEIGHT

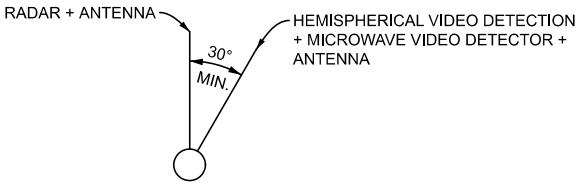


NOTES:
1. L1, L2 AND L3 ARE TIE-OFF SPANS.
2. SEE SIG-021 FOR POLE SIZES.
3. USE A SPAN LENGTH OF MAX(L1+L2, L2+L3) FOR DRILLED SHAFT LENGTH SELECTION FOR POLES CONNECTED TO TIE-OFF SPANS.

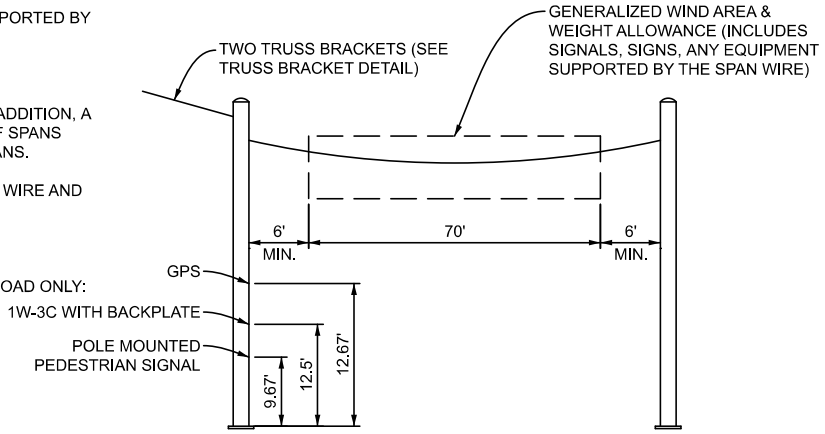
3 DETAIL - STRAIN POLE CONFIGURATION

SPAN WIRE LOADING TABLE			
SPAN LENGTH	WEIGHT OF GENERALIZED LOAD (LBS)**	MAX PERP. WIND AREA (TETHERED SPANS, SIGNALS WITH BACKPLATES) (SFT)**	MAX PERP. WIND AREA (UNTETHERED SPANS, SIGNALS WITHOUT BACKPLATES) (SFT)**
UP TO 100 FT	328	58.0	31.0
101 FT TO 120 FT	328	58.0	31.0
121 FT TO 150 FT	328	58.0	31.0
151 FT TO 175 FT	370	58.0	37.0
176 FT TO 200 FT	370	58.0	37.0

**WEIGHTS AND AREAS INCLUDE ALLOWANCE FOR SIGNALS, SIGNS, AND ANYTHING ELSE CARRIED BY THE CABLES.



1 DETAIL - TRUSS BRACKET



2 DETAIL - STRAIN POLE LOADING ELEVATION VIEW

STRAIN POLE LOADING TABLE (POLE MOUNTED EQUIPMENT)		
EQUIPMENT	WEIGHT LBS	AREA SFT
ANTENNA	20	0.09
GPS MODULE	30	0.75
POLE MOUNTED PEDESTRIAN SIGNAL	25	1.78
1W-3C SIGNAL (WITH BACKPLATE)	43	8.67
18' STEEL TRUSS BRACKET	106	7.29
HEMISPHERICAL VIDEO DETECTION	22	2.11
MICROWAVE VEHICLE DETECTOR	4	0.97
RADAR VEHICLE DETECTOR	4	0.97
DISAPPEARING LEGEND SIGN	45	9

SEE ELEVATION VIEW FOR EQUIPMENT MOUNTING LOCATIONS.

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

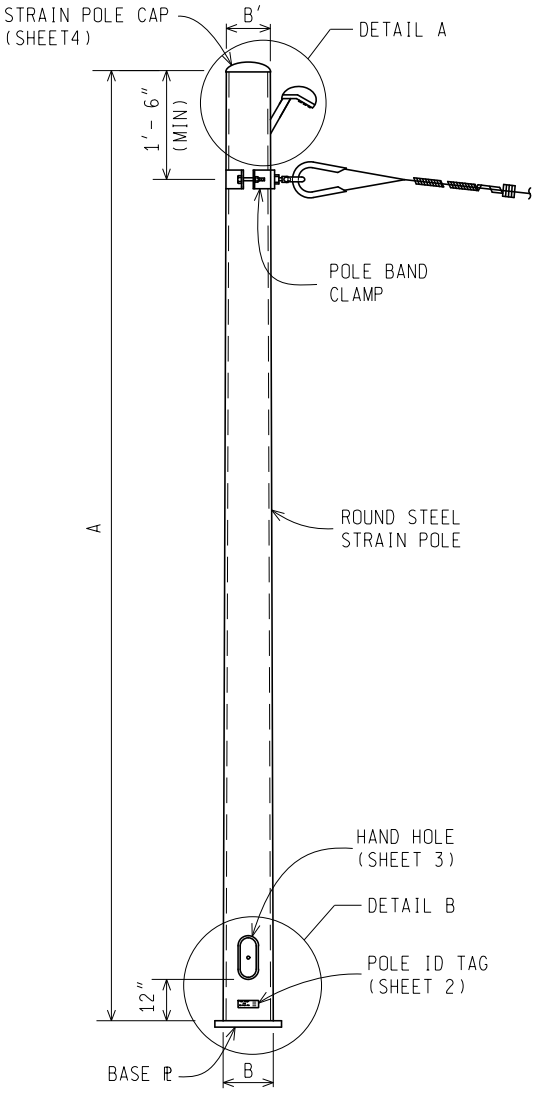
APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT Michigan Department of Transportation

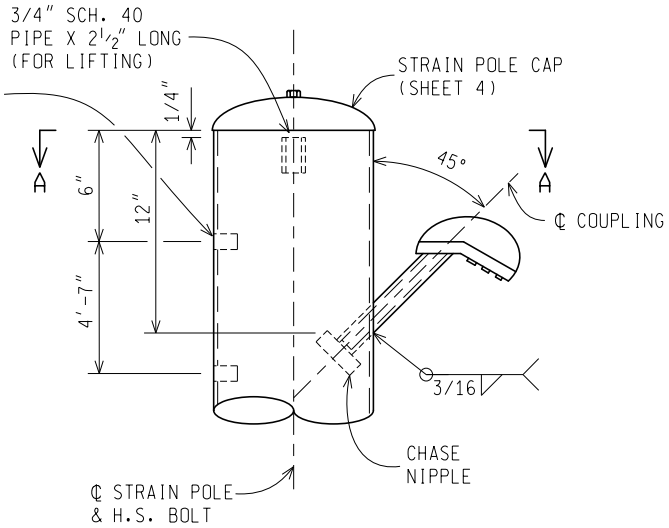
DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
TRAFFIC SIGNAL STRAIN POLE LOADING TABLE AND DESIGN CRITERIA

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-020-A	SHEET 1 OF 1

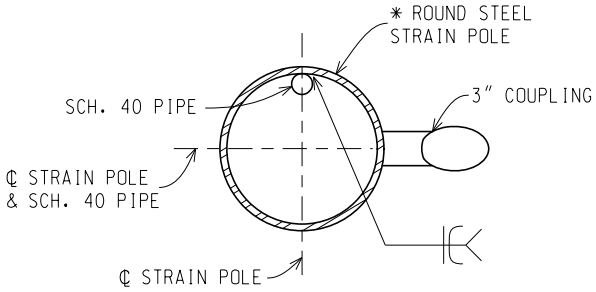


STEEL STRAIN POLE



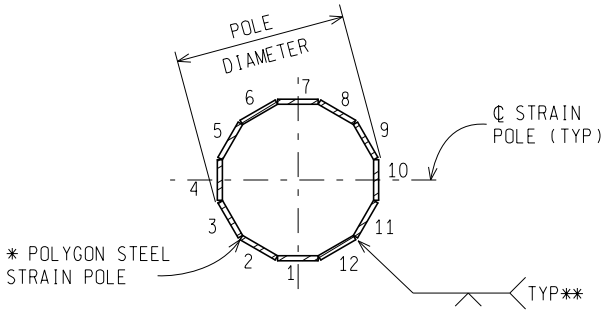
DETAIL A

ORIENTATION OF 3" COUPLING 90° OR 270° FROM POLE HAND HOLE



SECTION A-A

SCH. 40 PIPE ORIENTED 180° TO POLE HAND HOLE
* SINGLE PLY SHOWN, BUT MULTI-PLY IS ALLOWED



OPTIONAL POLYGON CROSS SECTION

* SINGLE PLY SHOWN, BUT MULTI-PLY IS ALLOWED
** LONGITUDINAL WELD JOINT

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG020B.dgn Rev. 11/05/18

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

6 ANCHOR BOLT
STRAIN POLE AND FOUNDATION

PLAN DATE

SIG-020-B

SHEET
1 of 7

STRAIN POLE REQUIREMENTS						
POLE LENGTH (FT)		A	30 FT		36 FT	40 FT
MIN. POLE WALL THICKNESS (IN)		W	0.429		0.625	0.625
* POLE DIAMETER (IN)	AT TOP	B'	8 (MIN) ± 1/2		8 (MIN) ± 1/2	8 1/2 (MIN) ± 1/2
	AT BOTTOM	B	13 ± 1/2		13 ± 1/2	14 ± 1/2
FULL LENGTH TAPER (IN/FT)			+0.002 0.14 -0.000		+0.002 0.14 -0.000	+0.002 0.14 -0.000
POLE BASE FILLET WELD (IN)		E	5/16		1/2	1/2
POLE BASE LANDING (IN)		F	3/8		5/8	5/8
ANCHOR BOLT DIAMETER (IN)			1 1/2	1 3/4	1 3/4	1 3/4
ANCHOR BOLT HOLE DIAMETER (IN)			1 13/16	2 1/16	2 1/16	2 1/16
ANCHOR BOLT CIRCLE DIAMETER (IN)			18	21	21	21
ANCHOR BOLT CHORD (IN)		C	9	10 1/2	10 1/2	10 1/2
BASE PLATE EDGE (IN)		D	12 1/4	14 1/4	14 1/4	14 1/4
BASE PLATE THICKNESS (IN)		T	2	2 1/4	2 1/4	2 1/4
POLE BAND (SPAN CLAMP)		8 1/2"	P.O.C.H. 25'-6" TO 28'-6"		P.O.C.H. 32'-6" TO 34'-6"	P.O.C.H. 36'-0" TO 38'-6"
		9 1/2"	P.O.C.H. 20'-6" TO 25'-0"		P.O.C.H. 25'-0" TO 32'-0"	P.O.C.H. 29'-0" TO 35'-6"

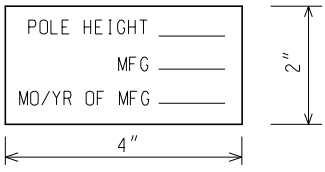
* DIAMETERS GIVEN ARE O.D.

NOTES:

1. THE DESIGN OF THIS STRUCTURE IS BASED ON THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, FIFTH EDITION, 2009.

2. S.S. DENOTES STAINLESS STEEL. GA. DENOTES GAUGE. O.D. DENOTES OUTSIDE DIAMETER. I.D. DENOTES INSIDE DIAMETER. H.S. DENOTES HIGH STRENGTH. SCH. DENOTES SCHEDULE.

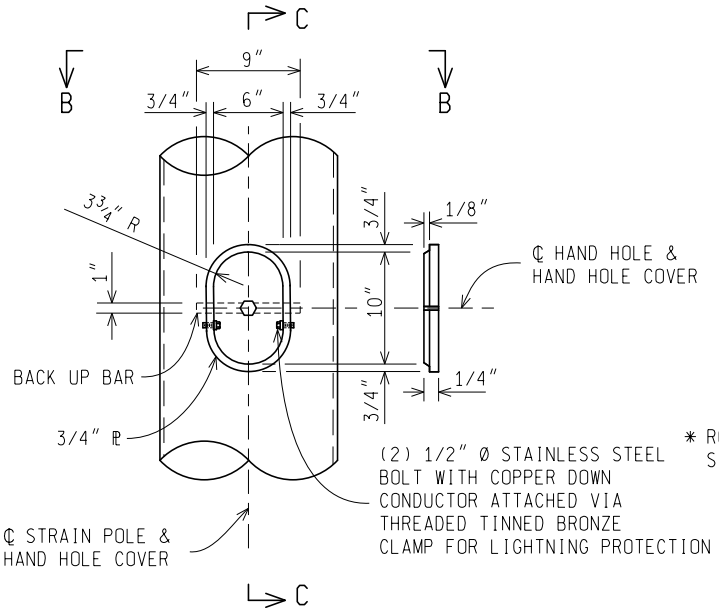
3. P.O.C.H. IS THE POINT OF CONTACT HEIGHT OF THE POLE BAND CLAMP FROM THE BOTTOM OF THE STRAIN POLE.



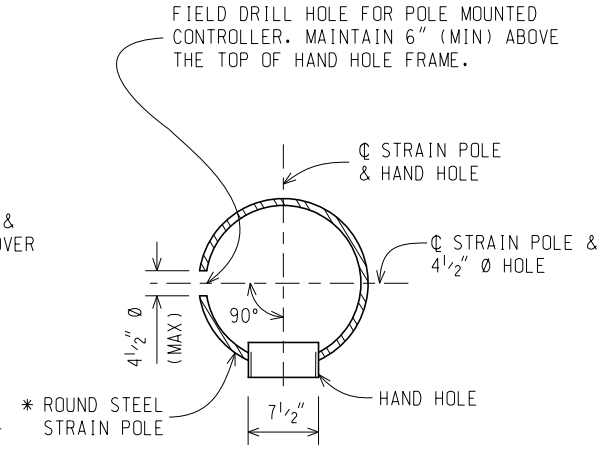
STRAIN POLE STAINLESS STEEL ID TAG DETAIL

TO BE ATTACHED TO STRAIN POLE AT LOCATIONS SHOWN 4" FROM BASE OF TUBE BELOW HANDHOLE WITH (4) #8 X 3/8" S.S. TYPE U DRIVE SCREWS. (LETTERS STAMPED IN 3/8" CHARACTERS)

NOT TO SCALE

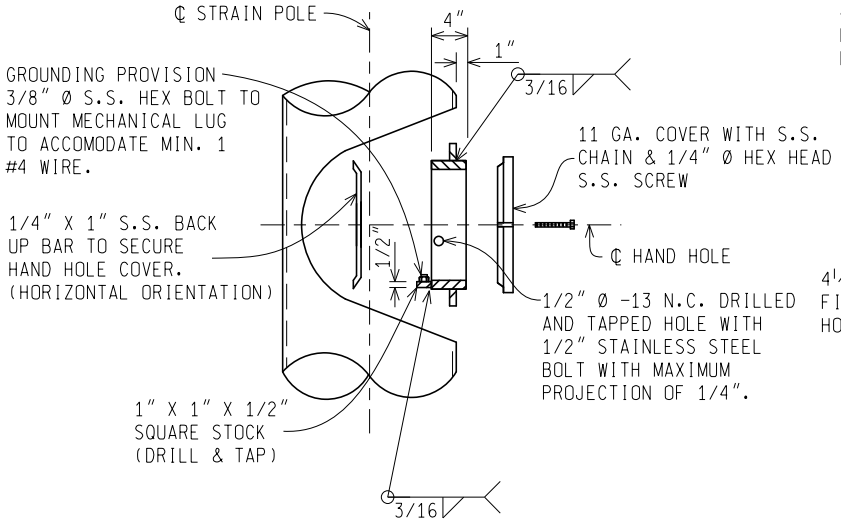


HAND HOLE DETAIL

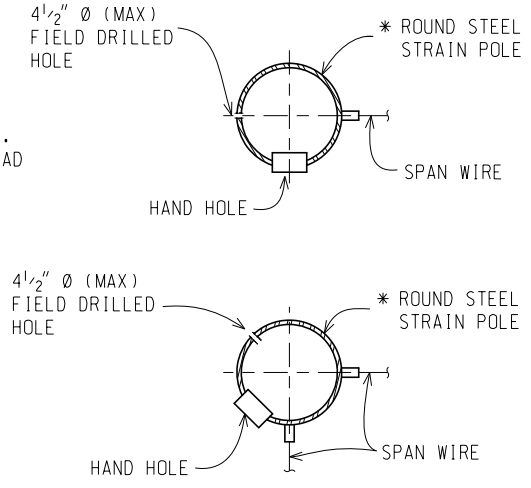


SECTION B-B

SEE ORIENTAION OF STRAIN POLE BELOW
* SINGLE PLY SHOWN, BUT MULTI-PLY IS ALLOWED



SECTION C-C

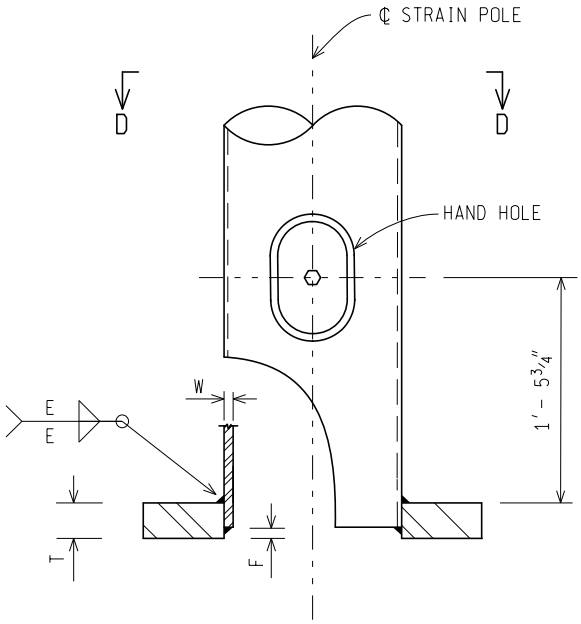


STRAIN POLE ORIENTATION

* SINGLE PLY SHOWN, BUT MULTI-PLY IS ALLOWED

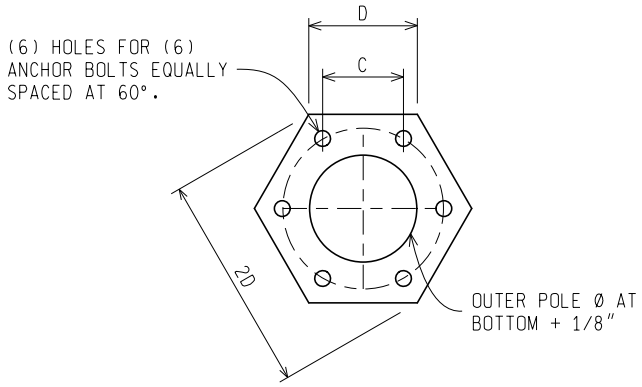
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-020-B	SHEET 3 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG020B.dgn Rev. 11/05/18		PLAN DATE		



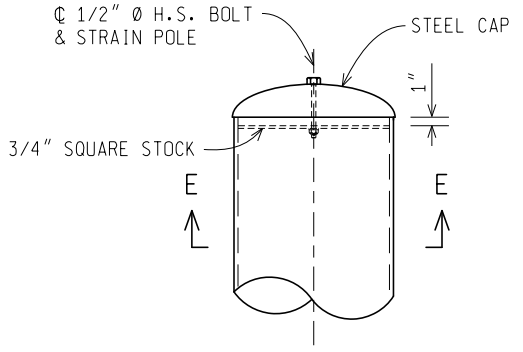
DETAIL B

ANCHOR BOLTS NOT SHOWN FOR CLARITY

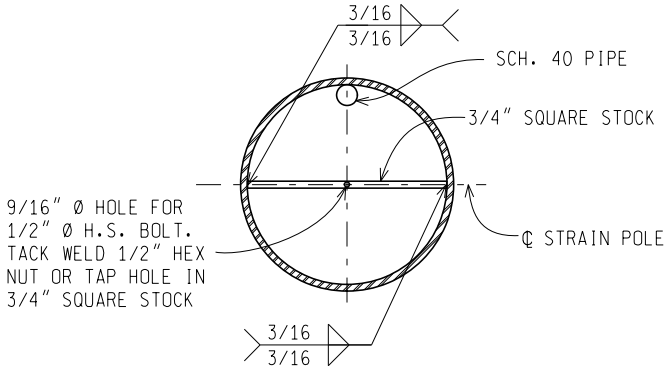


SECTION D-D - BASE PLATE

SEE CHART ON PAGE 2 FOR ANCHOR BOLT CIRCLE Ø,
ANCHOR BOLT HOLE Ø, AND ANCHOR BOLT Ø.
(STRAIN POLE NOT SHOWN FOR CLARITY)



STRAIN POLE CAP DETAIL



SECTION E-E

NOT TO SCALE

STRAIN POLE FOUNDATION REQUIREMENTS				
POLE LENGTH (FT)	30 FT		36 FT	40 FT
ANCHOR BOLT DIAMETER (IN)	$1^{1}/_{2}$	$1^{3}/_{4}$	$1^{3}/_{4}$	$1^{3}/_{4}$
ANCHOR BOLT CIRCLE DIAMETER (IN)	18	21	21	21
ANCHOR BOLT LENGTH (IN)	72		72	72
FOUNDATION DIAMETER (IN)	36	42	42	42

NOTES:

1. 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.

2. IF SOIL CONDITIONS INDICATE THERE IS NO NEED FOR A CASING PAY ITEM AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL REQUEST PERMISSION OF THE ENGINEER TO INSTALL THE FOUNDATION WITHOUT CASING.

3. WHEN THE CASING PAY ITEM IS INCLUDING ON THE PLANS FOR A FOUNDATION (DUE TO GRANULAR SOILS OR A WET HOLE), 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. A SUITABLE METHOD OF COMPACTION MUST BE EMPLOYED TO ENSURE THE SOIL IMMEDIATELY OUTSIDE THE CASING IS COMPACTED PROPERLY.

4. 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.

5. DEWATERING OF WET SHAFTS IS NOT ALLOWED. A WET SHAFT IS DEFINED AS HAVING MORE THAN 3" OF STANDING WATER OR AS HAVING WATER INFILTRATING AT A RATE EQUAL TO OR EXCEEDING 12" PER HOUR. FOR WET SHAFTS, CONCRETE IS TO BE PLACED IN ACCORDANCE WITH SECTION 705 (WET CONSTRUCTION METHOD) WITH A TREMIE TUBE OR CONCRETE PUMP BEGINNING AT THE SHAFT BOTTOM. GRADE T CONCRETE MUST BE USED FOR UNDERWATER PLACEMENT. GRADE S2 MAY BE USED IN DRY EXCAVATIONS ONLY. SEE MDOT STANDARD SPECIFICATIONS TABLE 701-1 (CONCRETE STRUCTURE MIXTURES)

6. PER MDOT STANDARD SPECIFICATIONS 718.02, THE GRADE S2 ACCEPTABLE SLUMP RANGE IS 4-6 INCHES THE GRADE T ACCEPTABLE SLUMP RANGE IS 8-10 INCHES.

7. CONSTRUCT STRAIN POLE FOUNDATIONS, CASED OR UNCASED, ACCORDING TO SUBSECTION 810.03.J AND 705 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION. ALL WORK AND MATERIALS MUST BE IN ACCORDANCE WITH THE MDOT STANDARD SPECIFICATION FOR CONSTRUCTION.

8. STEEL REINFORCEMENT MUST CONFORM TO SECTION 921 OF THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

9. EXPOSED CONCRETE SURFACES MUST BE CAST IN FORMS

10. STEEL REINFORCEMENT MUST HAVE A CLEAR COVER OF 3.00 INCHES UNLESS OTHERWISE NOTED. STEEL REIFORCEMENT MAY BE ADJUSTED TO ENSURE PROPER CLEAR COVER.

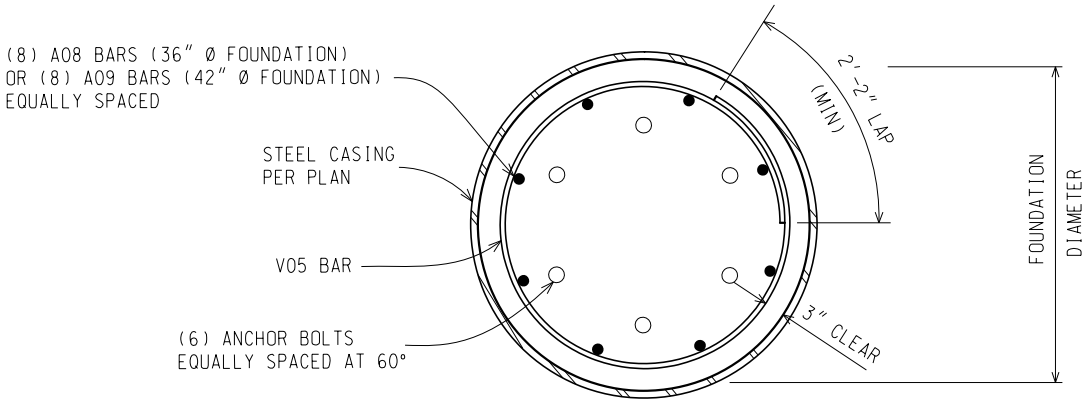
11. CONDUITS AND ANCHOR BOLTS MUST BE RIGIDLY INSTALLED BEFORE CONCRETE IS PLACED. ANCHOR BOLTS MUST BE SPACED BY MEANS OF A TEMPLATE. THE CENTER OF THE TEMPLATE MUST COINCIDE WITH THE CENTER OF THE FOUNDATION.

12. 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.

13. 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.

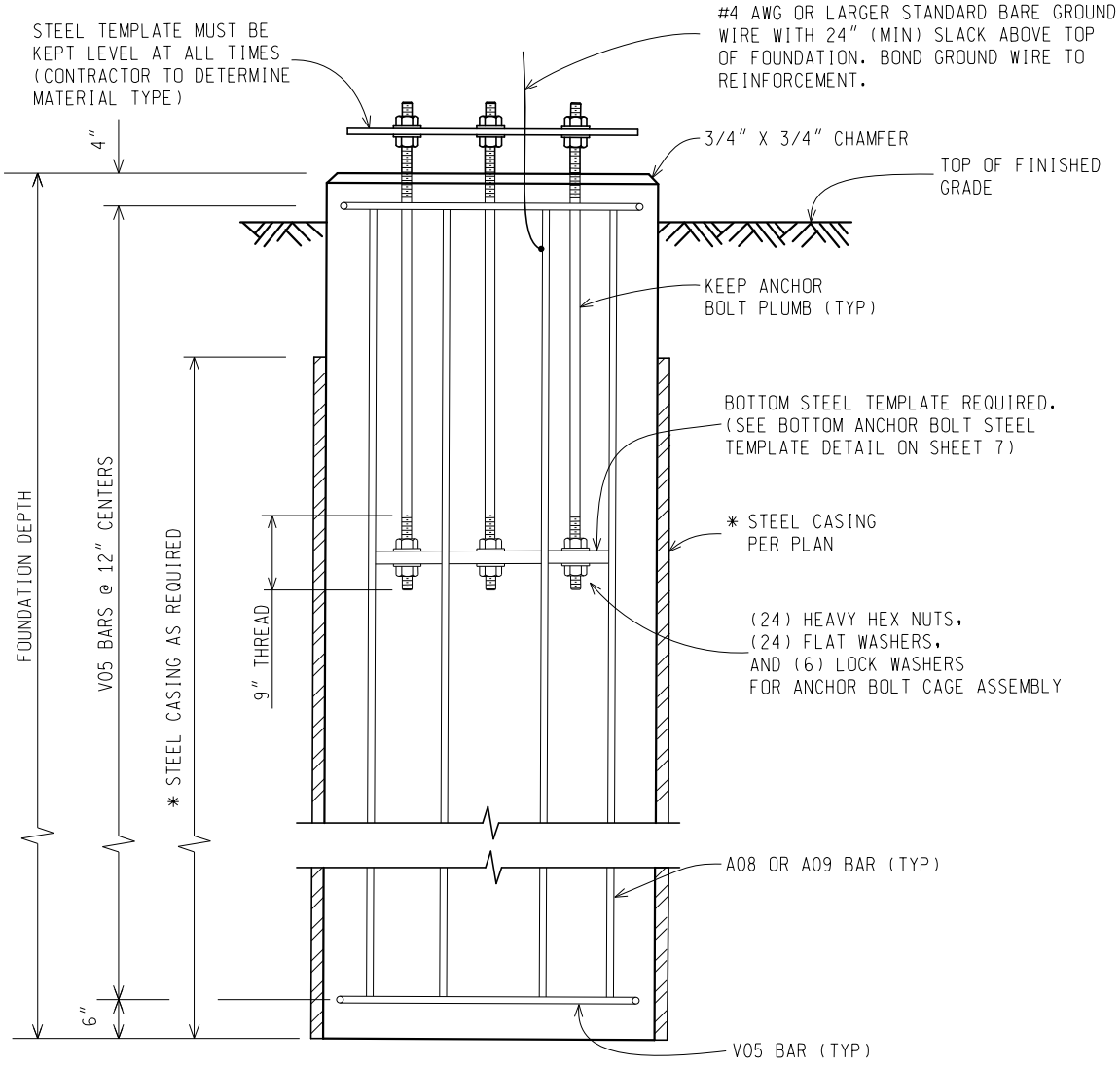
14. REFER TO THE FOLLOWING SPECIAL PROVISIONS FOR 6 ANCHOR BOLT STRAIN POLES:
    - STEEL STRAIN POLE
    - STRAIN POLE FOUNDATION AND ANCHOR BOLTS
    - CASING USED WITH STRAIN POLES AND MAST ARM POLES

NOT TO SCALE



PLAN VIEW - FOUNDATION DETAIL

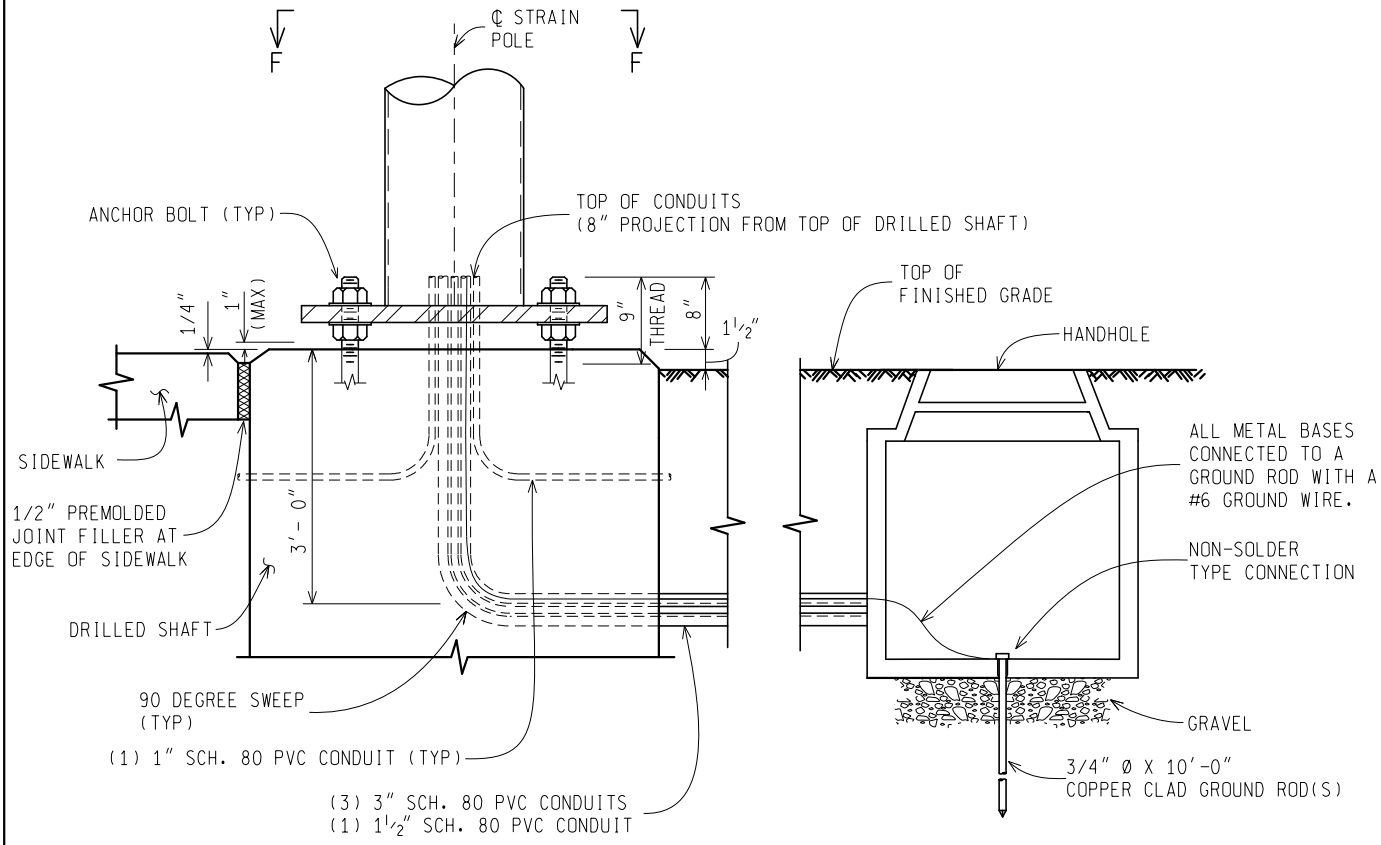
SEE CHART ON PAGE 5 FOR ANCHOR BOLT CIRCLE Ø,
ANCHOR BOLT Ø, AND FOUNDATION Ø.



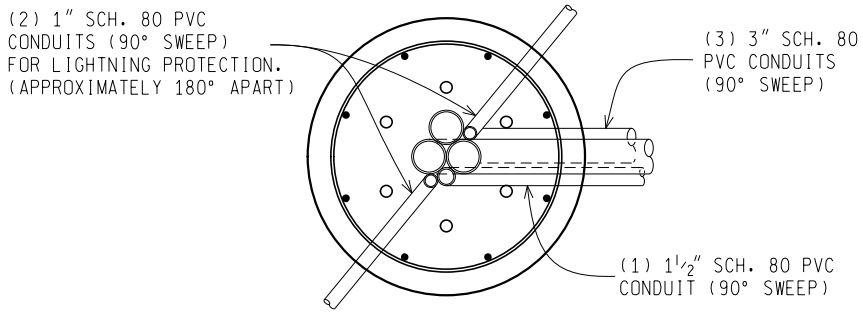
ELEVATION VIEW - FOUNDATION DETAIL

* SEE FOUNDATION NOTES AND PLANS FOR STEEL CASING PAY ITEM

NOT TO SCALE

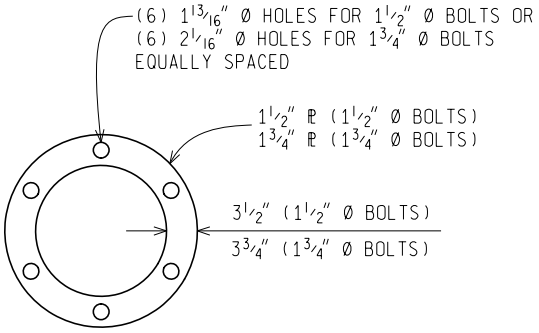


CONDUIT LAYOUT



SECTION F-F

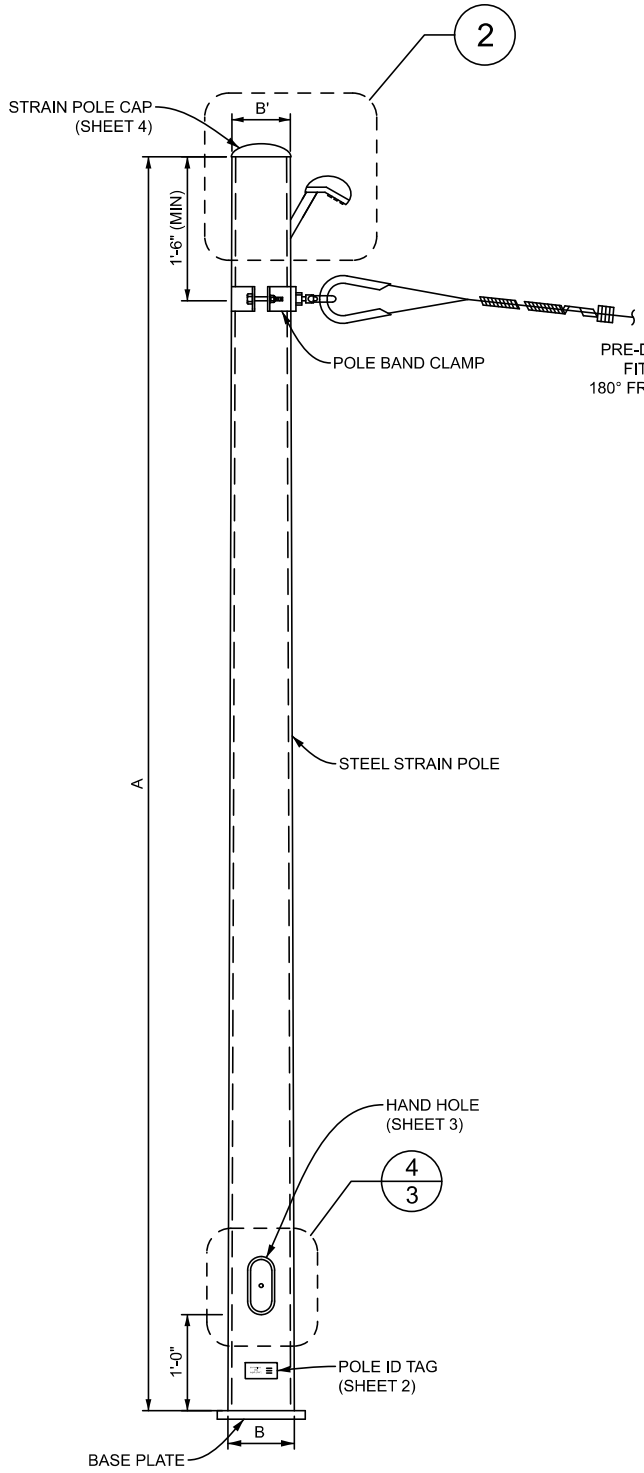
SECURE CONDUITS TOGETHER WITH SUITABLE BANDING TO ENSURE PLACEMENT PRIOR TO CONCRETE POUR.



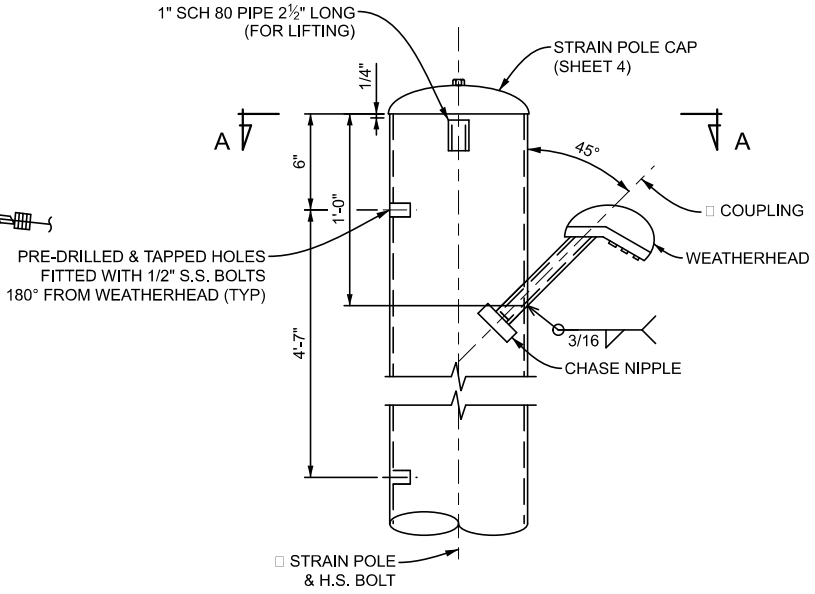
BOTTOM ANCHOR BOLT STEEL TEMPLATE DETAIL

SEE CHART ON PAGE 5 FOR ANCHOR BOLT CIRCLE Ø, ANCHOR BOLT HOLE Ø, AND FOUNDATION Ø

NOT TO SCALE

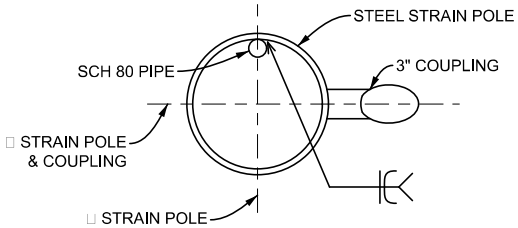


1 DETAIL - STEEL STRAIN POLE



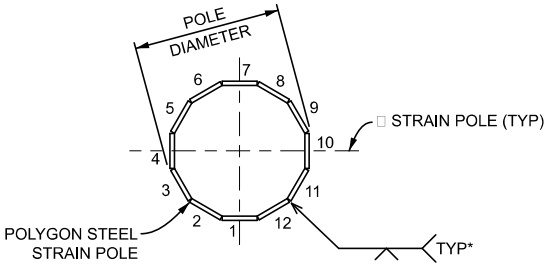
ORIENTATION OF 3" COUPLING TO BE 90° OR 270° FROM POLE HAND HOLE

2 DETAIL - COUPLING



SCH 80 PIPE ORIENTED 180° TO POLE HAND HOLE

A SECTION - ROUND POLE



* LONGITUDINAL WELD JOINT

A' SECTION - 12-SIDED POLYGON (OPTIONAL)

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
6 ANCHOR BOLT TRAFFIC SIGNAL
STRAIN POLE AND COUPLING DETAILS

(SPECIAL DETAIL)	07/27/23	SIG-021-A	SHEET
FHWA APPROVAL	PLAN DATE		1 OF 7

STRAIN POLE REQUIREMENTS

				NOT CONNECTED TO TIE-OFF SPANS			CONNECTED TO TIE-OFF SPANS	
MARK	DESCRIPTION		UNIT	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 0.14 -0.000	+0.002 0.14 -0.000	+0.002 0.14 -0.000	+0.002 0.14 -0.000	+0.002 0.14 -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
-	ANCHOR BOLT HOLE DIAMETER		IN	2 1/16 | 2 5/16	2 5/16	2 5/16	2 5/16	2 5/16
-	ANCHOR BOLT CIRCLE DIAMETER		IN	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"

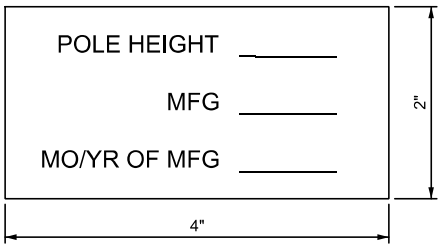
* DIAMETERS GIVEN ARE O.D.

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

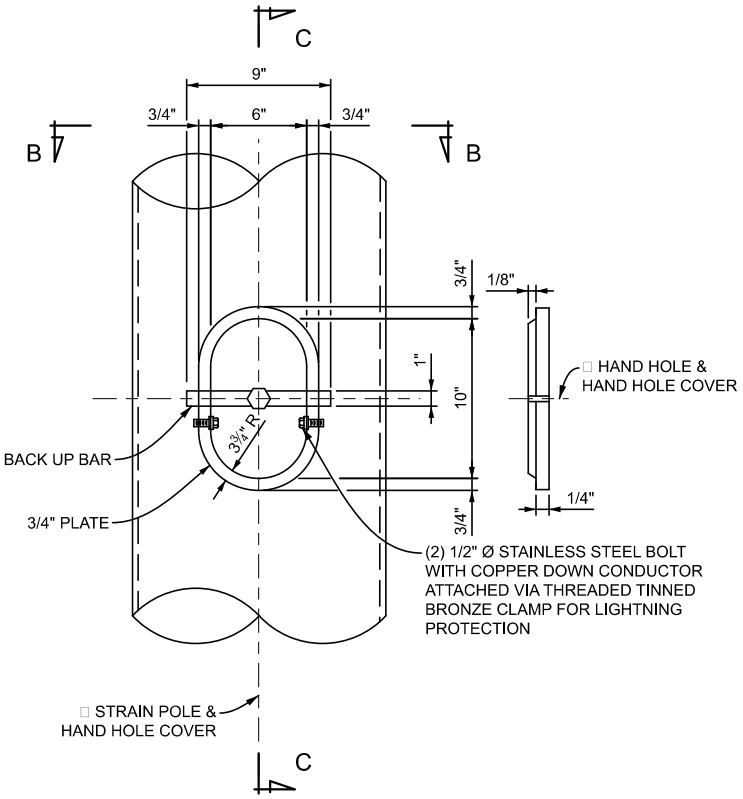
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

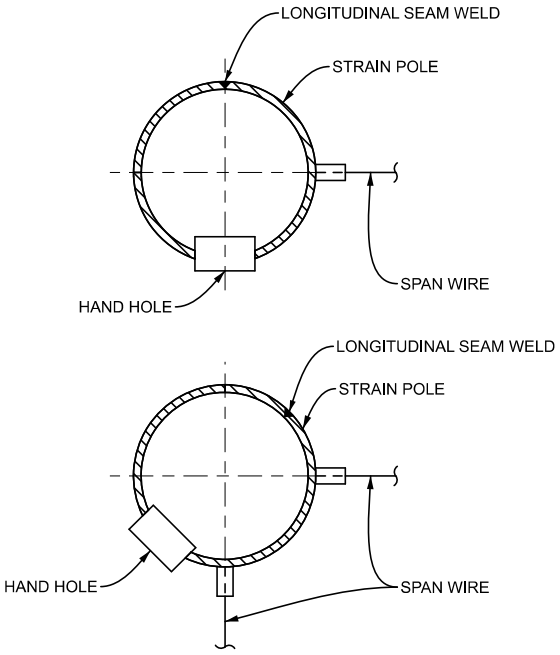
STANDARD PLAN FOR
STRAIN POLE REQUIREMENTS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-021-A	SHEET 2 OF 7

SECT

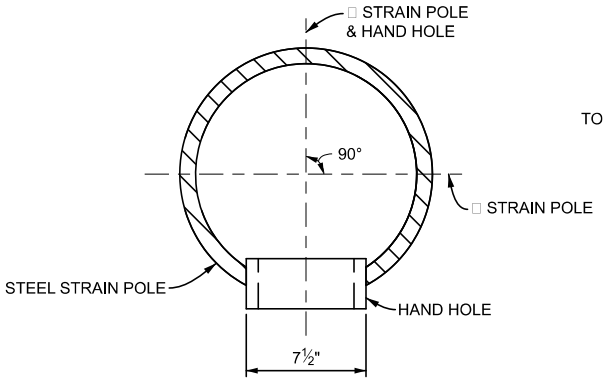


4 DETAIL - HAND HOLE



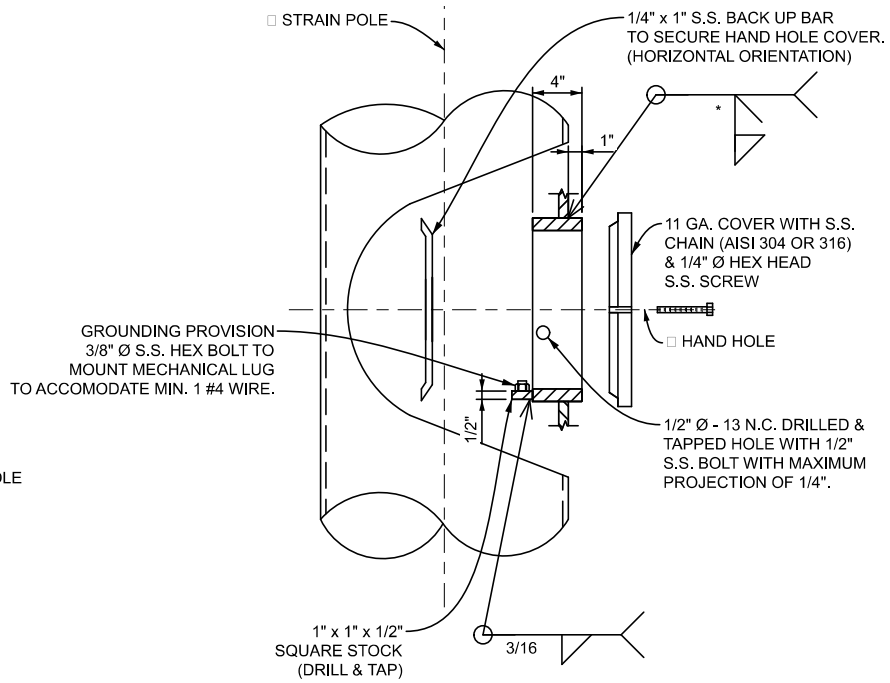
LONGITUDINAL SEAM WELD MUST BE 90° MINIMUM FROM THE HAND HOLE AND 30° MINIMUM FROM THE □ COUPLING (SEE SECTION A FOR □ COUPLING).

5 DETAIL - STRAIN POLE ORIENTATION



SEE STRAIN POLE ORIENTATION DETAIL

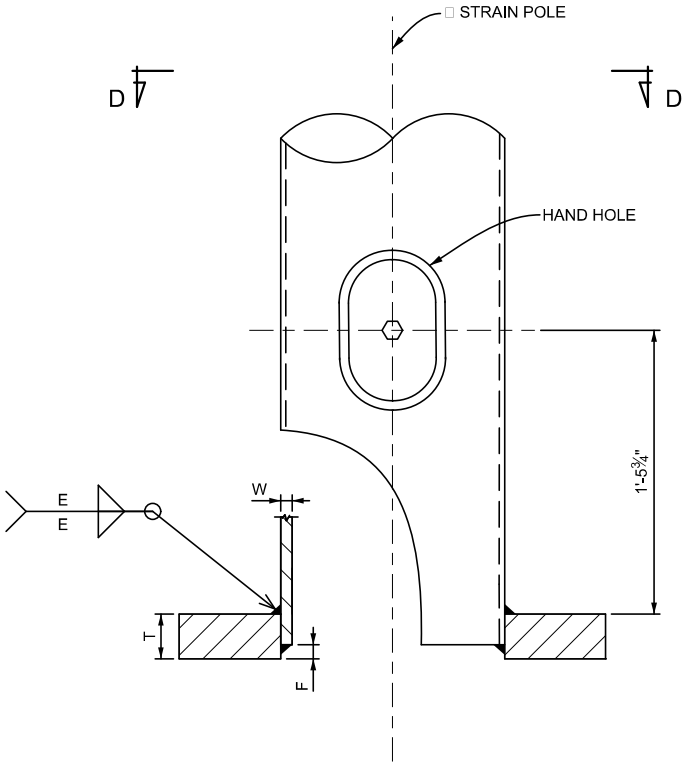
B SECTION - HAND HOLE



*0.9 x POLE WALL THICKNESS

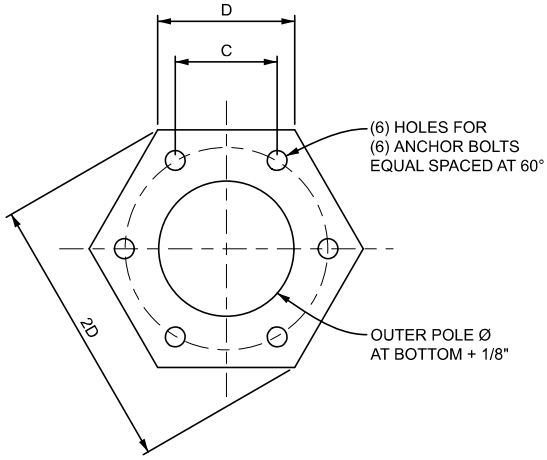
C SECTION - HAND HOLE

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



ANCHOR BOLTS NOT SHOWN FOR CLARITY.

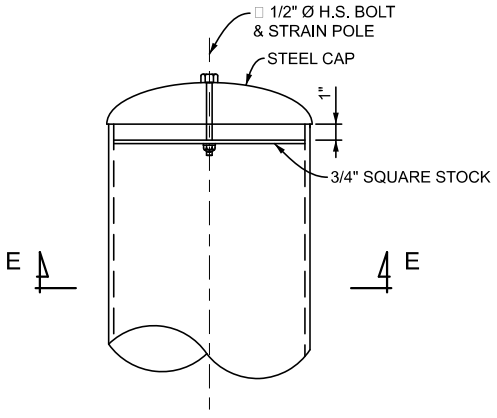
6 DETAIL - BASE PLATE



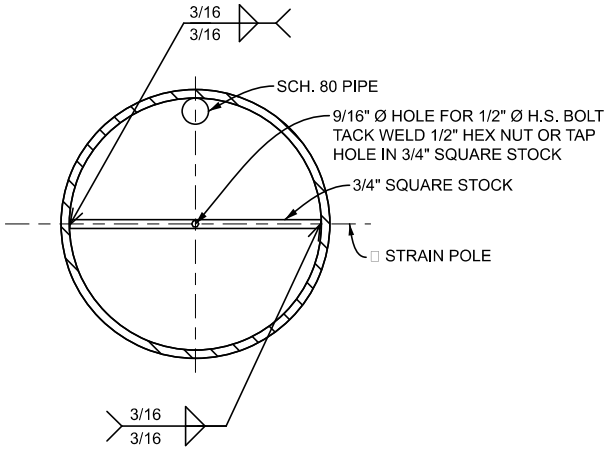
NOTES:

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

MDOT Michigan Department of Transportation

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	SIG-021-A	SHEET 4 OF 7

SECT

STRAIN POLE FOUNDATION REQUIREMENTS								
			NOT CONNECTED TO TIE-OFF SPANS				CONNECTED TO TIE-OFF SPANS	
MARK	DESCRIPTION	UNIT	SIZE 1		SIZE 2	SIZE 3	SIZE 4	SIZE 5
A	POLE LENGTH	FT	30		36	40	36	40
	ANCHOR BOLT DIAMETER	IN	1 ¾	2	2	2	2	2
	ANCHOR BOLT CIRCLE DIAMETER	IN	24	27	27	27	29	29
	ANCHOR BOLT LENGTH	IN	72		72	72	72	72
	FOUNDATION DIAMETER	IN	42	48	48	48	48	48

NOTES:

1. 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.

2. 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.

3. 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 LOOSENED 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.

4. 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.

5. CONSTRUCT STRAIN POLE FOUNDATIONS, CASED OR UNCASED, 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.

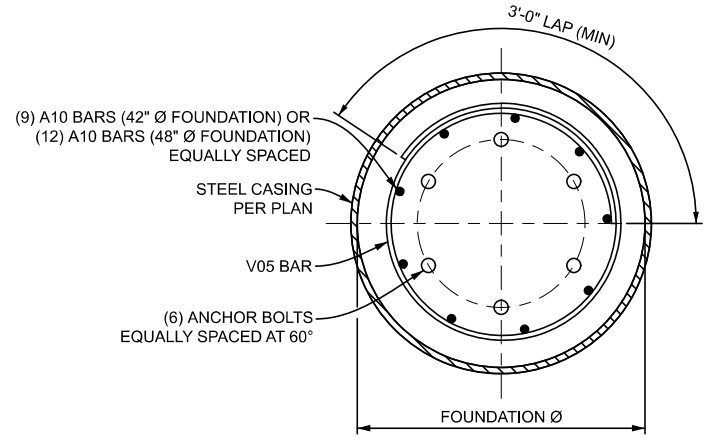
6. STEEL REINFORCEMENT MUST CONFORM TO SECTION 905 OF THE MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

7. EXPOSED CONCRETE SURFACES MUST BE CAST IN FORMS.

8. 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.

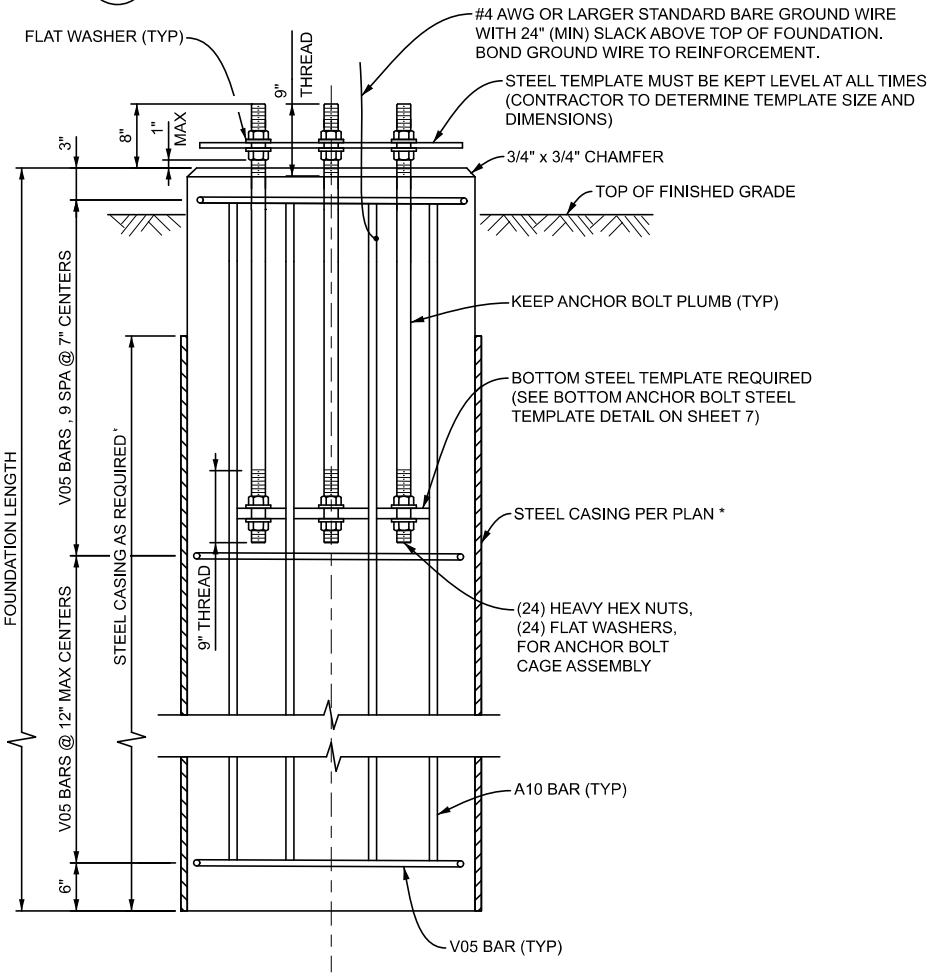
9. GROUNDING OF POLE INCLUDES ADDING #4 BARE COPPER GROUND WIRE BONDED BY LISTED MECHANICAL CONNECTION TO FOUNDATION REINFORCING STEEL AND HAVING 24" OF SLACK ABOVE THE TOP OF FOUNDATION.

10. 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.



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

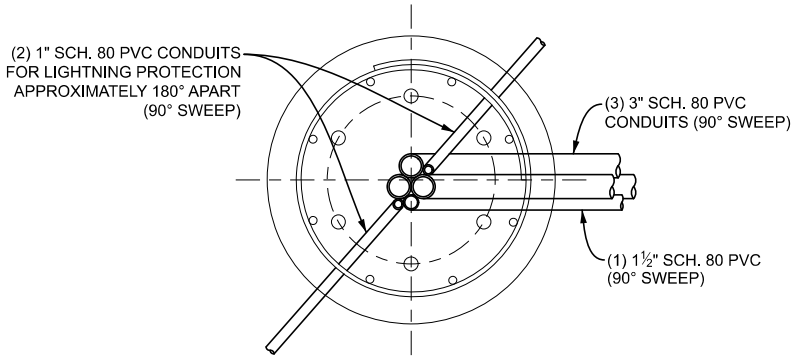
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
FOUNDATION DETAILS

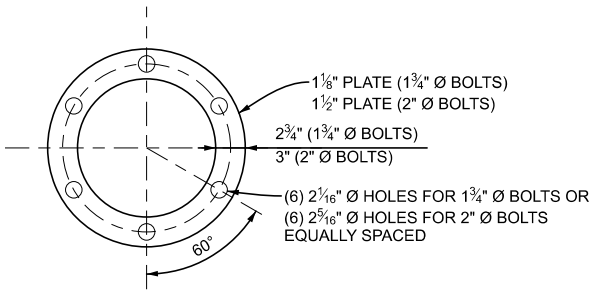
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-021-A	SHEET 6 OF 7

SECT



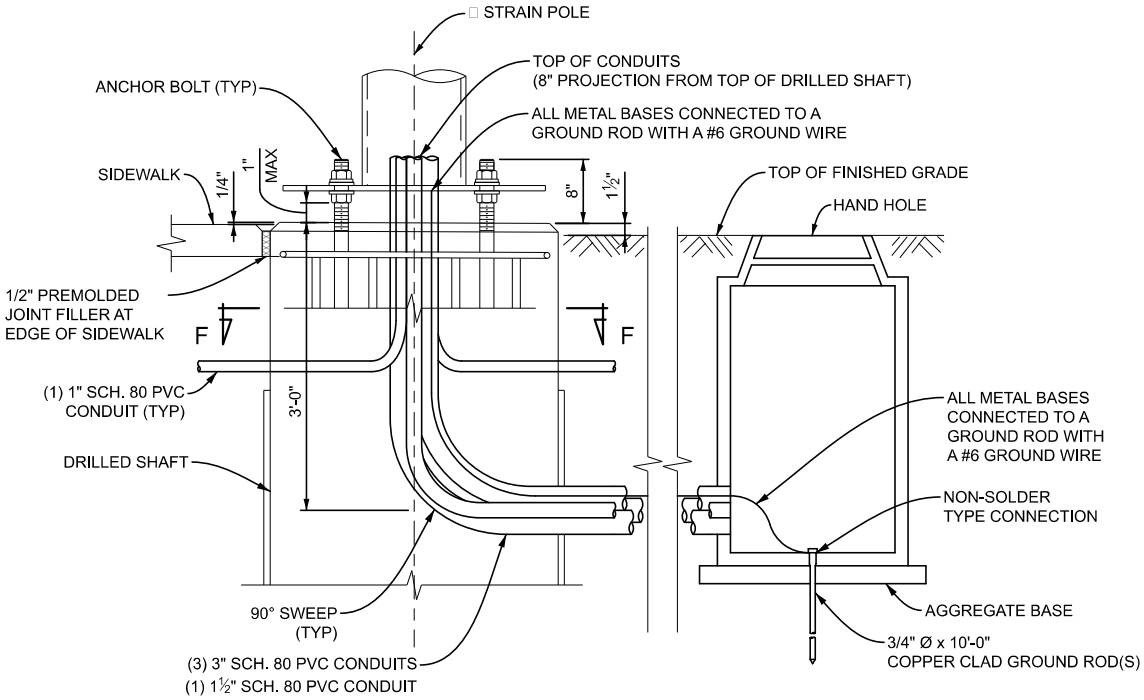
SECURE CONDUITS TOGETHER WITH SUITABLE BANDING TO ENSURE PLACEMENT TOGETHER PRIOR TO CONCRETE POUR.

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

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
CONDUIT DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-021-A	SHEET 7 OF 7

MAST ARM DESIGN CRITERIA:

THE DESIGN OF THE MAST ARM STRUCTURES SHOWN ON SIG-031-A, SIG-032-A & SIG-033-A IS BASED ON THE AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, FIRST EDITION (2015), WITH 2017 TO 2022 INTERIM REVISIONS.

LOAD PARAMETERS:

WIND LOAD (EXTREME EVENT LIMIT STATE): 1700-YEAR MRI BASIC WIND SPEED MAP, 120 MPH DESIGN WIND SPEED

WIND LOAD (SERVICE I EVENT LIMIT STATE): 10-YEAR MRI BASIC WIND SPEED MAP, 76 MPH DESIGN WIND SPEED

HEIGHT AND EXPOSURE FACTOR (K_z): K_z IS CALCULATED USING A HEIGHT (Z) MEASURED FROM TOP OF THE DRILLED SHAFT (IT IS ASSUMED THAT THE POLE IS GROUND-MOUNTED).

DIRECTIONALITY FACTOR (K_d): 0.85

GUST EFFECT FACTOR (G): 1.14

MAST ARM LOADING: SEE MAST ARM LOADING TABLE BELOW. AREAS AND WEIGHTS SHOWN IN THE TABLE FOR SIGNALS INCLUDE BACKPLATES EXTENDING 5" FROM SIGNAL ON ALL SIDES. FOR TWIN MAST ARMS, THE LOADING IS THE SAME ON BOTH ARMS.

SERVICEABILITY PARAMETERS:

LIMIT FOR SLOPE AT TOP OF POLE UNDER DEAD LOAD ONLY: 0.35 IN/FT

LIMIT FOR MAST ARM VERTICAL DEFLECTION UNDER GALLOPING AND TRUCK GUST-INDUCED LOADING: 8 IN

FATIGUE PARAMETERS:

FATIGUE CATEGORY:
- SIG-031-A: CATEGORY I
- SIG-032-A: CATEGORY II
- SIG-033-A: CATEGORY III

MINIMUM BEND RADIUS FOR 16-SIDED SECTIONS: 5 X WALL THICKNESS OR 1", WHICHEVER IS GREATER

MAST ARM LOADING TABLE

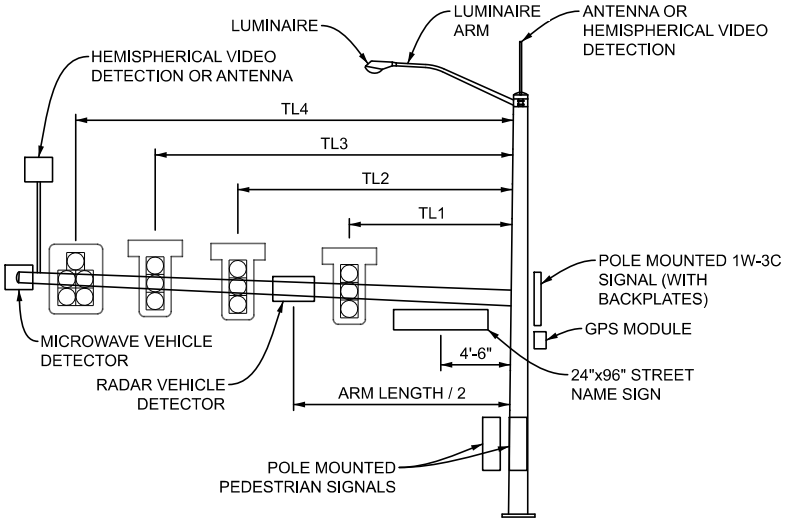
MAST ARM DATA			TL1 (1W-3C SIGNAL)**				TL2 (1W-3C SIGNAL)				TL3 (1W-3C SIGNAL)				TL4 (1W-5C DOGHOUSE SIGNAL)			
SPAN FT	MTG HT SINGLE	MTG HT TWIN*	DISTANCE	WEIGHT LBS	AREA SFT	INC. 12"x27" SIGN?	DISTANCE	WEIGHT LBS	AREA SFT	INC. 12"x27" SIGN?	DISTANCE	WEIGHT LBS	AREA SFT	INC. 12"x27" SIGN?	DISTANCE	WEIGHT LBS	AREA SFT	INC. 12"x27" SIGN?
20	19'-0"	18'-6" & 21'-0"	–	--	–	–	12'-0"	43	8.67	NO	20'-0"	43	8.67	NO	–	--	–	–
25							17'-0"				25'-0"							
30							22'-0"				30'-0"							
35							19'-0"	75	10.92	YES	27'-0"	75	10.92	YES	35'-0"	69	13.72	NO
40							24'-0"				32'-0"				40'-0"			
45							29'-0"				37'-0"				45'-0"			
50			26'-0"***	75**	10.92**	YES**	34'-0"				42'-0"				50'-0"			

*TWIN MAST ARMS NOT ALLOWED FOR CATEGORY III MAST ARMS. MINIMUM ALLOWABLE ANGLE BETWEEN ARMS IS 45 DEGREES.
**TL1 NOT ALLOWED FOR 50FT TWIN MAST ARMS

MAST ARM LOADING TABLE (CONT'D)

EQUIPMENT	WEIGHT LBS	AREA SFT
ANTENNA	20	0.09
GPS MODULE	30	0.75
POLE MOUNTED PEDESTRIAN SIGNAL	25	1.78
1W-3C SIGNAL (WITH BACKPLATE)	43	8.67
LUMINAIRE	50	1.00
LUMINAIRE ARM	SEE SIG-031, SIG-032, AND SIG-033 FOR DETAILS	
HEMISPHERICAL VIDEO DETECTION	22	2.11
MICROWAVE VEHICLE DETECTOR	4	0.97
RADAR VEHICLE DETECTOR	4	0.97
24x96 STREET NAME SIGN	90	14.93

SEE ELEVATION VIEW FOR EQUIPMENT MOUNTING LOCATIONS.



1 DETAIL - MAST ARM LOADING ELEVATION VIEW

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

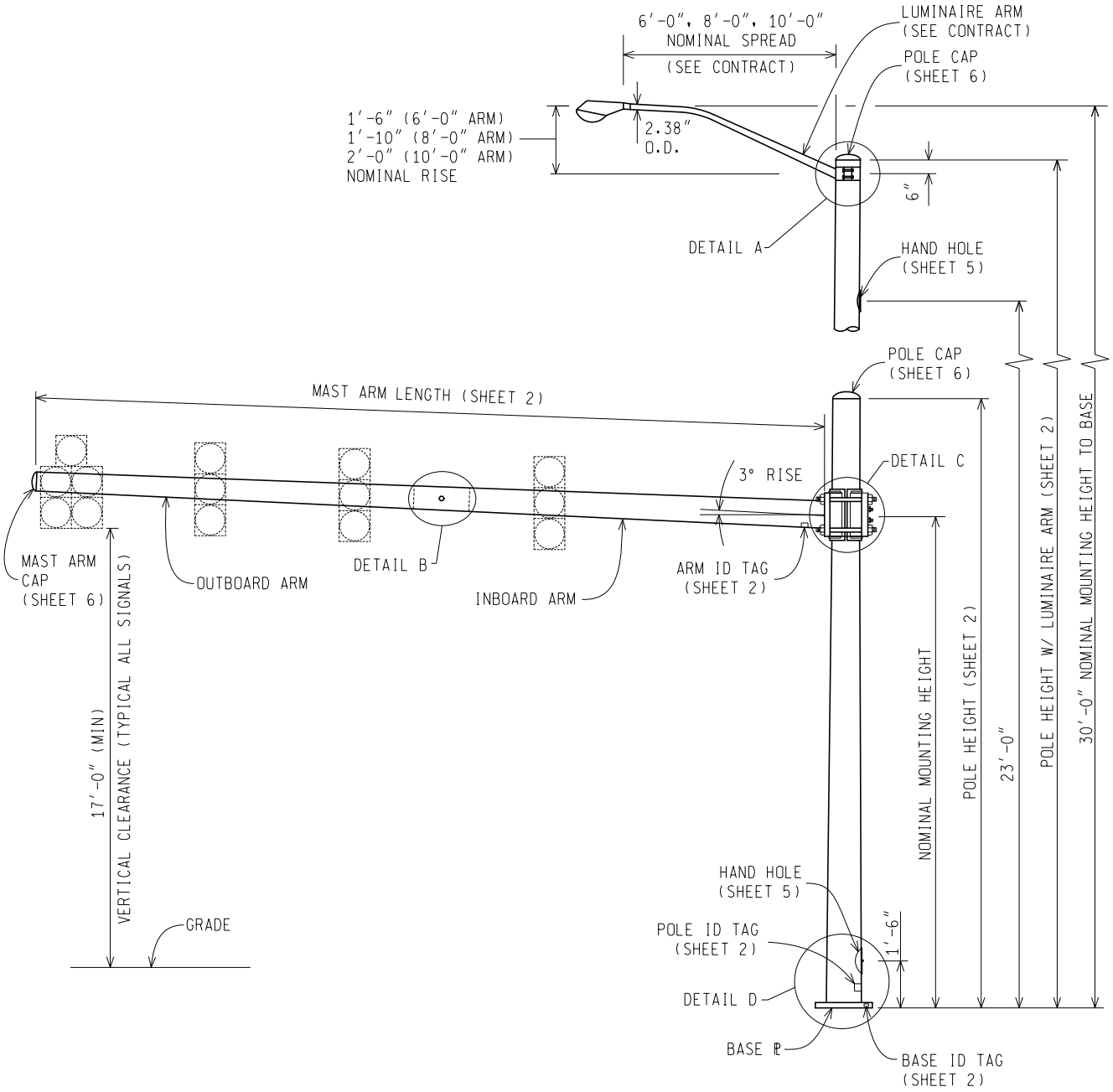
APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
TRAFFIC SIGNAL MAST ARM POLE AND MAST ARM LOADING TABLE AND DESIGN CRITERIA

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-030-A	SHEET 1 OF 1



NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG030B.dgn Rev. 11/05/18

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

TRAFFIC SIGNAL MAST ARM POLE AND MAST ARM DETAILS - CATEGORY I

PLAN DATE

SIG-030-B

SHEET
1 of 6

ROUND TAPERED STEEL MAST ARM			
MAST ARM LENGTH	* MAST ARM DIMENSIONS	MTG HT SINGLE	MTG HT TWIN
20'-0"	0.1793"-16.50" x 13.70" x 20'-0"	19'-0"	18'-6" & 21'-0"
25'-0"	0.1793"-16.50" x 13.00" x 25'-0"		
30'-0"	0.1793"-16.50" x 12.30" x 30'-0"		
35'-0"	0.4290"-16.50" x 13.70" x 20'-0" 0.1793"- ** x 12.00" x **		
40'-0"	0.4290"-16.50" x 13.70" x 20'-0" 0.1793"- ** x 11.30" x **		
45'-0"	0.4290"-16.50" x 13.70" x 20'-0" 0.1793"- ** x 10.60" x **		
50'-0"	0.5000"-16.75" x 13.95" x 20'-0" 0.1793"- ** x 10.15" x **		

MAST ARM TUBE TAPER IS 0.140 IN/FT

* DIAMETERS GIVEN ARE O.D.

** TO BE DETERMINED BY CONTRACTOR BASED ON REQUIRED MAST ARM LENGTH AND TELESCOPIC SPLICE LENGTH.

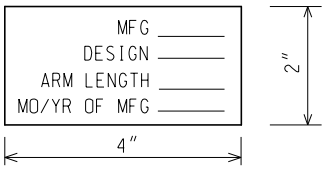
ROUND TAPERED STEEL MAST ARM POLE	
* POLE DIMENSIONS	LUMINAIRE ARM
0.4375"-18.00" x 14.78" x 23'-0"	NO
0.4375"-18.00" x 13.94" x 29'-0"	YES

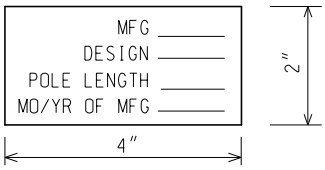
POLE TUBE TAPER IS 0.140 IN/FT

* DIAMETERS GIVEN ARE O.D.

NOTES:

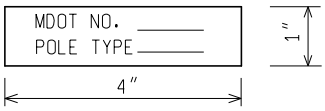
1. THE DESIGN OF THIS STRUCTURE IS BASED ON THE 2001 AASHTO STANDARD SPECIFICATONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS FOR 90 MPH WIND LOAD AND CATEGORY I WITH GALLOPING, NATURAL WIND GUSTS, AND TRUCK INDUCED FATIGUE LOADS.
2. WELD THE LONGITUDINAL ARM SEAM ON THE INBOARD AND OUTBOARD SECTIONS OF THE TELESCOPIC FIELD SPLICE WITH A COMPLETE JOINT PENETRATION (CJP) WELD A MINIMUM OF 36 INCHES LONG. IN ADDITION, LONGITUDINAL SEAM WELDS MUST BE CJP FOR A MINIMUM OF 6 INCHES FROM TUBE TO PLATE CJP WELDS.
3. SEAM WELDS MUST BE 90° ± FROM HAND HOLE AT BASE.
4. LUMINAIRE ARM IS 11 GAUGE ROUND STEEL WITH 0.140 INCH PER FOOT TAPER.
5. BACKING BAR FOR PIPE TO BASE PLATE (℄) AND MAST ARM TO MAST ARM PLATE MUST BE MINIMUM 5/16 INCH X 2 INCH PLATE.
6. 1/2 INCH DIAMETER (Ø) ROUND STOCK C-HOOK ATTACHED TO ALL POLE SIZES. 3/4 INCH SCHEDULE (SCH.) 40 PIPE ATTACHED TO ALL POLE SIZES AND INBOARD AND OUTBOARD ARM.
7. S.S. DENOTES STAINLESS STEEL. GA. DENOTES GAUGE. O.D. DENOTES OUTSIDE DIAMETER. I.D. DENOTES INSIDE DIAMETER. H.S. DENOTES HIGH STRENGTH.





ARM/POLE S.S. ID TAG DETAIL

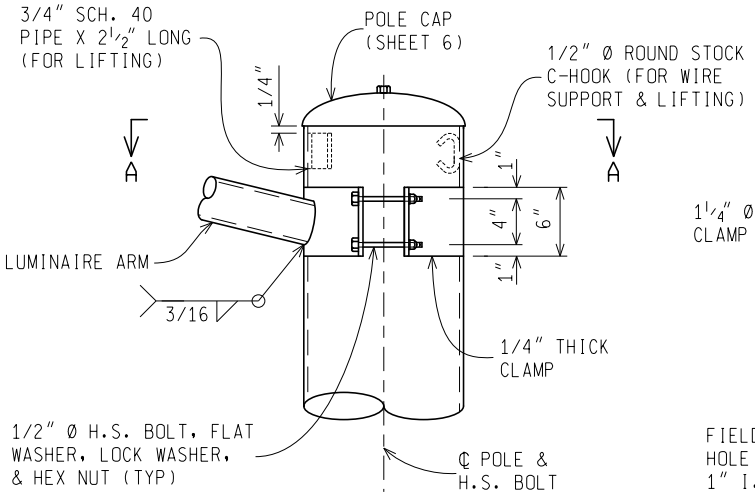
TO BE ATTACHED TO POLE OR MAST ARM AT LOCATIONS SHOWN 4" FROM BASE OF TUBE BELOW HANDHOLE WITH (4) #8 X 3/8" S.S. TYPE U DRIVE SCREWS.
(LETTERS STAMPED IN 3/8" CHARACTERS)



BASE S.S. ID TAG DETAIL

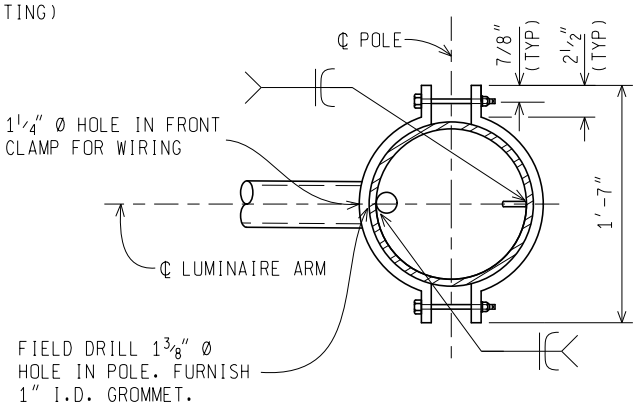
WELD TAG TO EDGE OF BASE ℄
(LETTERS STAMPED IN 3/8" CHARACTERS)

NOT TO SCALE

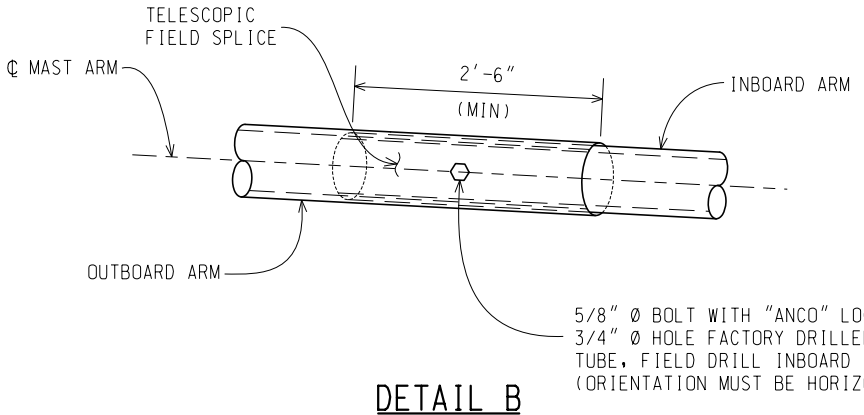


DETAIL A

ORIENTATION OF SCH. 40 PIPE 180° FROM HAND HOLE AT BASE & C-HOOK 180° FROM SCH. 40 PIPE

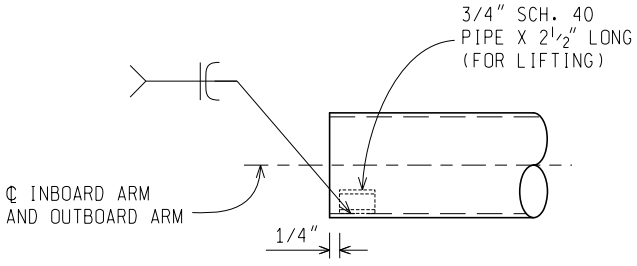


SECTION A-A



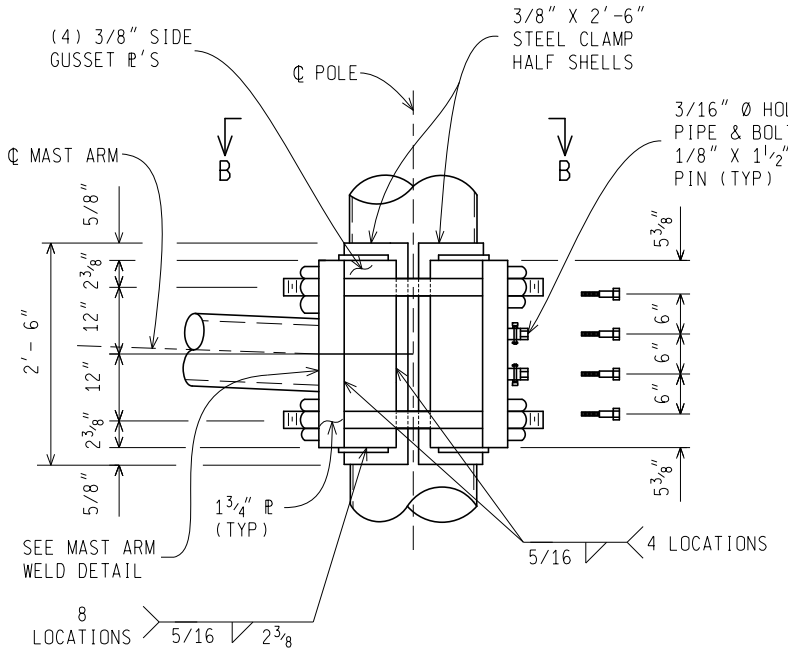
DETAIL B

(35'-0" ARMS AND GREATER)

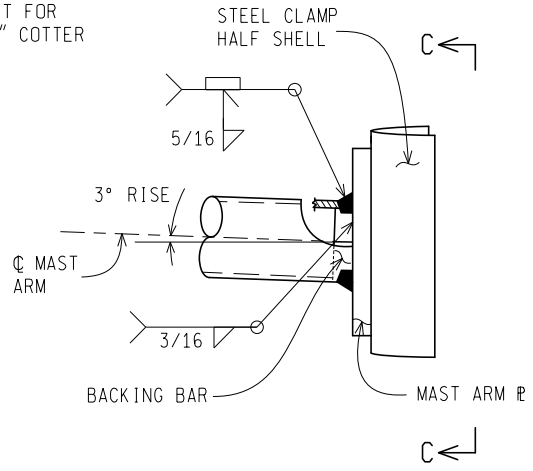


INBOARD/OUTBOARD ARM LIFTING DEVICE

NOT TO SCALE

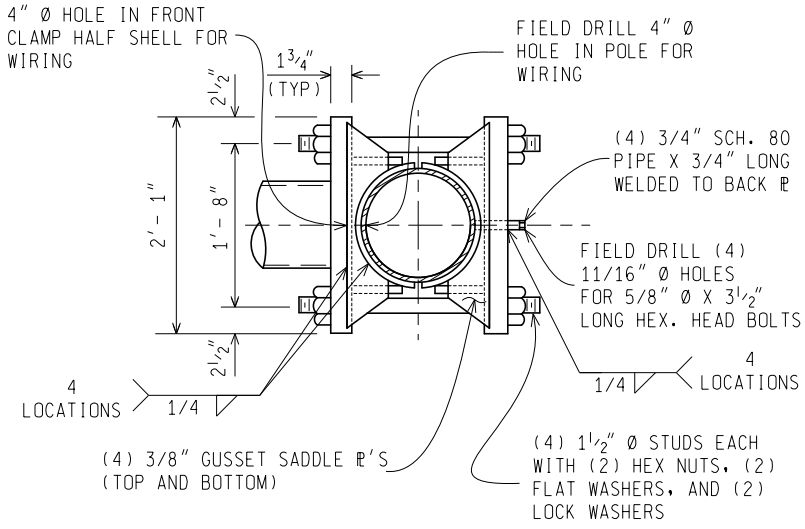


DETAIL C

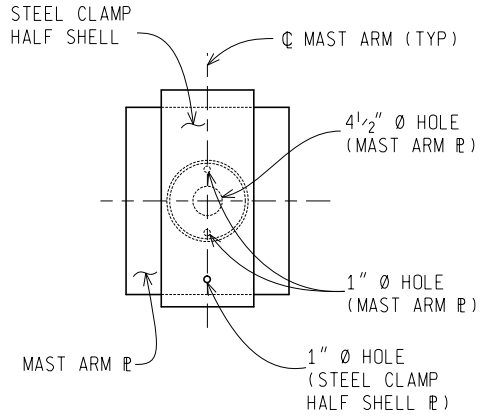


MAST ARM WELD DETAIL

SIDE GUSSET PL'S AND SADDLE PL'S NOT SHOWN FOR CLARITY



SECTION B-B

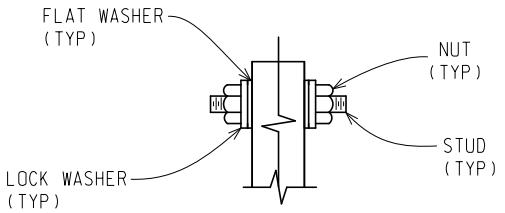


SECTION C-C

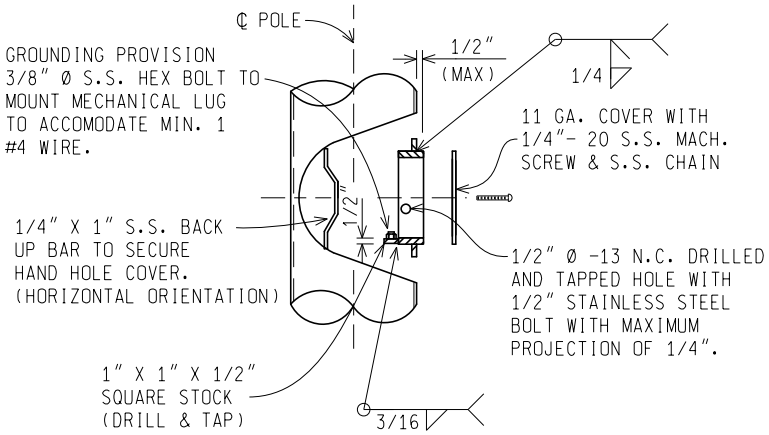
SIDE GUSSET PL'S AND SADDLE PL'S NOT SHOWN FOR CLARITY

NOT TO SCALE

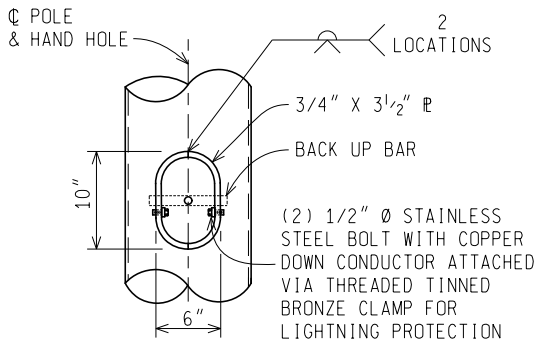
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-030-B	SHEET 4 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG030B.dgn Rev. 11/05/18		PLAN DATE		



MAST ARM CLAMP WASHER PLACEMENT

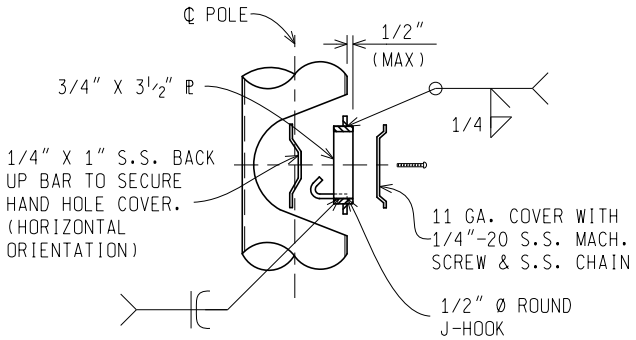


6" X 10" BAR BOTTOM HAND HOLE



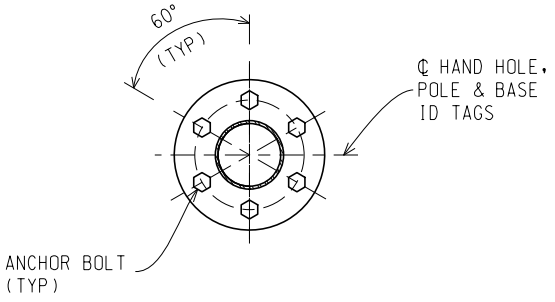
6" X 10" BAR BOTTOM HAND HOLE

(VIEW ROTATED 90 DEGREES)



4" X 6½" BAR TOP HAND HOLE

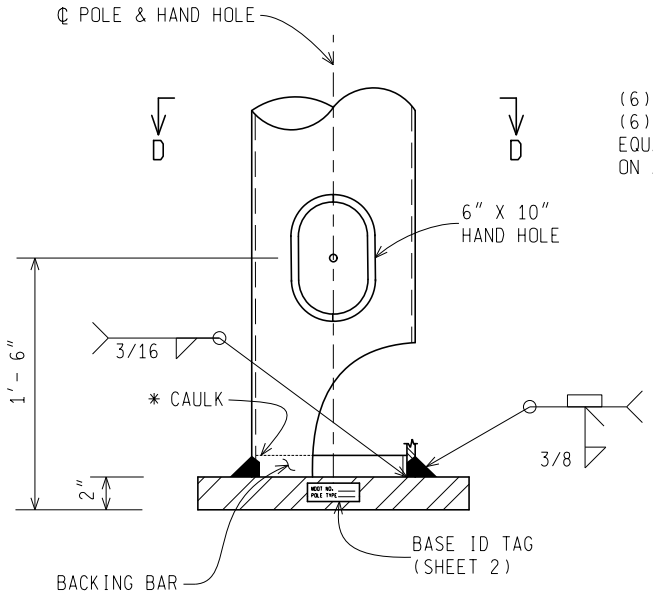
DESIGN WITH 29'-0" POLE ONLY



ORIENTATION OF HAND HOLE

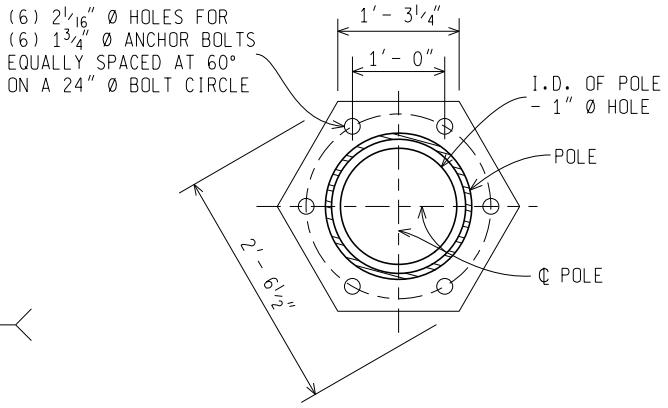
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-030-B	SHEET 5 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG030B.dgn Rev. 11/05/18		PLAN DATE		

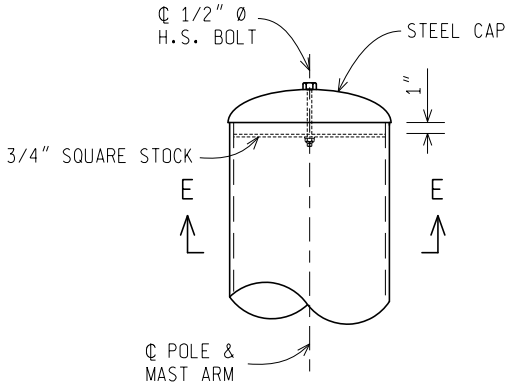


DETAIL D

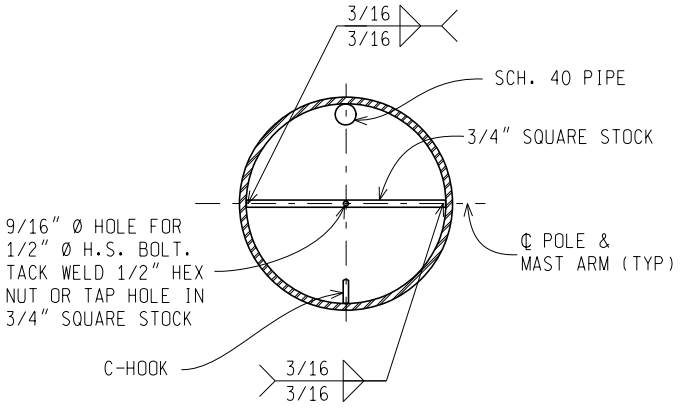
(VIEW ROTATED 90 DEGREES)
✳ SEAL JOINT WITH CAULK AFTER GALVANIZING



SECTION D-D



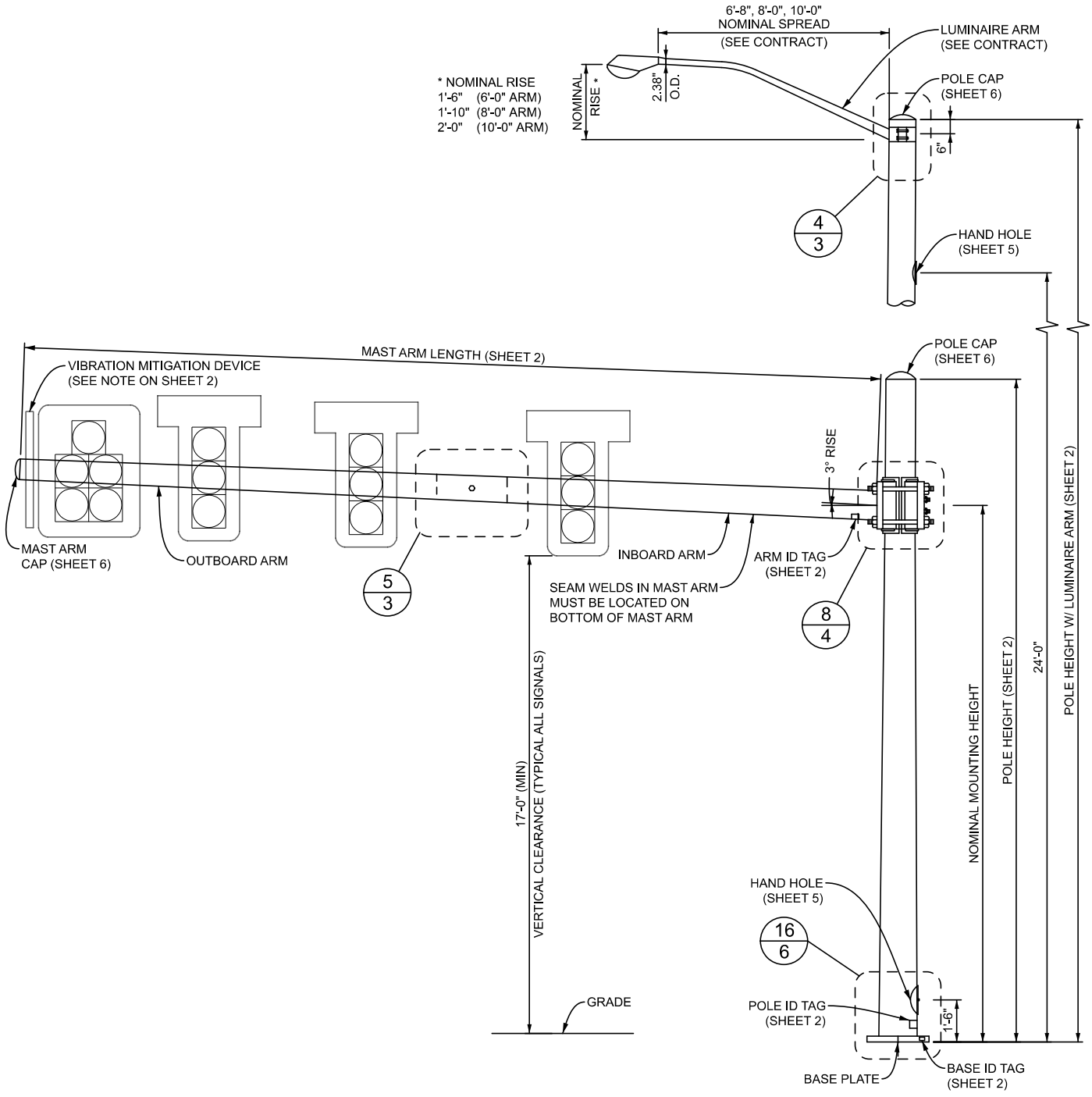
POLE AND MAST ARM CAP DETAIL



SECTION E-E

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-030-B	SHEET 6 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG030B.dgn Rev. 11/05/18		PLAN DATE		



ELEVATION - MAST ARM POLE

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
TRAFFIC SIGNAL MAST ARM POLE AND
MAST ARM DETAILS - CATEGORY I

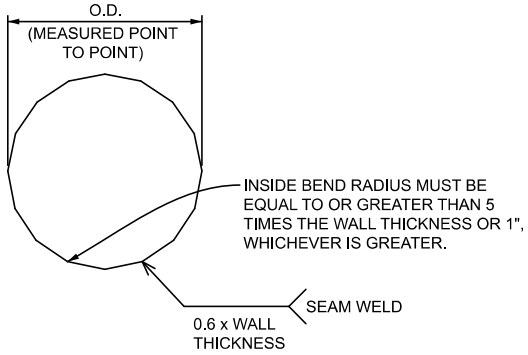
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-031-A	SHEET 1 OF 6

TAPERED STEEL MAST ARM POLE		
POLE DIMENSIONS *	LUMINAIRE ARM	MAST ARM LENGTH (FT)
0.4375"-18.00" x 14.78" x 23'-0"	NO	20, 25, 30, 35, 40, 45
0.4375"-18.00" x 13.94" x 29'-0"	YES	
0.5000"-18.00" x 14.78" x 23'-0"	NO	50
0.5000"-18.00" x 13.94" x 29'-0"	YES	

POLE TUBE TAPER IS 0.140 IN/FT
* DIAMETERS ARE GIVEN BY O.D.

TAPERED STEEL MAST ARM			
MAST ARM LENGTH	MAST ARM DIMENSIONS *	MTG HT SINGLE	MTG HT TWIN
20'-0"	0.1793"-16.50" x 13.70" x 20'-0"	19'-0"	18'-6" & 21'-6"
25'-0"	0.1793"-16.50" x 13.00" x 25'-0"		
30'-0"	0.1793"-16.50" x 12.30" x 30'-0"		
35'-0"	0.4290"-16.50" x 13.70" x 20'-0" 0.1793"-14.30" x 12.00" x 16'-9"		
40'-0"	0.4290"-16.50" x 13.70" x 20'-0" 0.1793"-14.30" x 11.30" x 21'-9"		
45'-0"	0.4290"-16.50" x 13.70" x 20'-0" 0.1793"-14.30" x 10.60" x 26'-9"		
50'-0"	0.4290"-17.50" x 14.70" x 20'-0" 0.2391"-15.45" x 11.00" x 31'-11"		

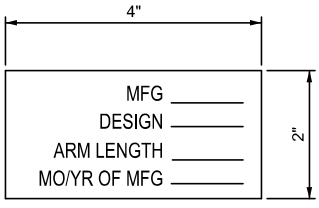
MAST ARM TUBE TAPER IS 0.140 IN/FT
* DIAMETERS ARE GIVEN BY O.D.

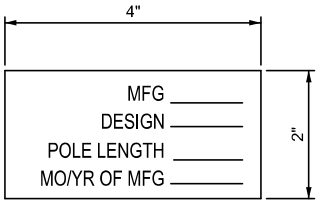


1 DETAIL - 16-SIDED SECTION

NOTES:

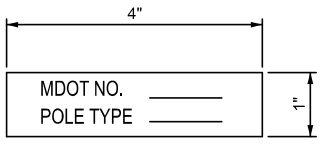
1. THE DESIGN OF THIS STRUCTURE IS BASED ON CATEGORY I GALLOPING, NATURAL WIND GUSTS, AND TRUCK INDUCED FATIGUE LOADS.
2. WELD THE LONGITUDINAL ARM SEAM ON THE INBOARD AND OUTBOARD SECTIONS OF THE TELESCOPIC FIELD SPLICE WITH A COMPLETE JOINT PENETRATION (CJP) WELD WITH A LENGTH EQUAL TO THE TELESCOPIC FIELD SPLICE LENGTH PLUS 6 INCHES. THE LAP OF THE ARM SECTIONS CANNOT EXTEND BEYOND THE LONGITUDINAL ARM SEAM CJP WELD WHEN THE FIELD SPLICE IS ERECTED AND IN ITS FINAL POSITION. IN ADDITION, LONGITUDINAL SEAM WELDS MUST HAVE 60% MINIMUM PENETRATION OR FUSION AND MUST BE CJP FOR A MINIMUM OF 6 INCHES FROM TUBE TO PLATE CJP WELDS.
3. SEAM WELDS IN MAST ARM POLE MUST BE 90° ± FROM HAND HOLE AT BASE. SEAM WELDS IN MAST ARM MUST BE LOCATED ON BOTTOM OF MAST ARMS.
4. LUMINAIRE ARM IS 11 GAUGE ROUND STEEL WITH 0.140 INCH PER FOOT TAPER.
5. BACKING BAR FOR PIPE TO BASE PLATE (□) AND MAST ARM TO MAST ARM PLATE MUST BE MINIMUM 5/16 INCH X 2 INCH PLATE.
6. 1/2 INCH DIAMETER (Ø) ROUND STOCK C-HOOK ATTACHED TO ALL POLE SIZES. 1 INCH SCHEDULE (SCH.) 80 PIPE ATTACHED TO ALL POLE SIZES AND INBOARD AND OUTBOARD ARM.
7. S.S. DENOTES STAINLESS STEEL. GA. DENOTES GAUGE. O.D. DENOTES OUTSIDE DIAMETER. I.D. DENOTES INSIDE DIAMETER. H.S. DENOTES HIGH STRENGTH.
8. ROUND OR 16-SIDED SECTIONS ARE ALLOWED.
9. MULTI-PLY SECTIONS ARE NOT ALLOWED.
10. A VIBRATION MITIGATION DEVICE IS REQUIRED FOR 50 FOOT ARM AND SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE END OF THE ARM.





ATTACH TO POLE OR MAST ARM AT LOCATIONS SHOWN 4" FROM BASE OF TUBE BELOW HANDHOLE WITH (4) #8 x 3/8" S.S. TYPE U DRIVE SCREWS.
(LETTERS STAMPED IN 3/8" CHARACTERS)

2 DETAIL - ARM/POLE S.S. ID TAG



WELD TAG TO EDGE OF BASE PLATE
(LETTERS STAMPED IN 3/8" CHARACTERS)

3 DETAIL - BASE S.S. ID TAG

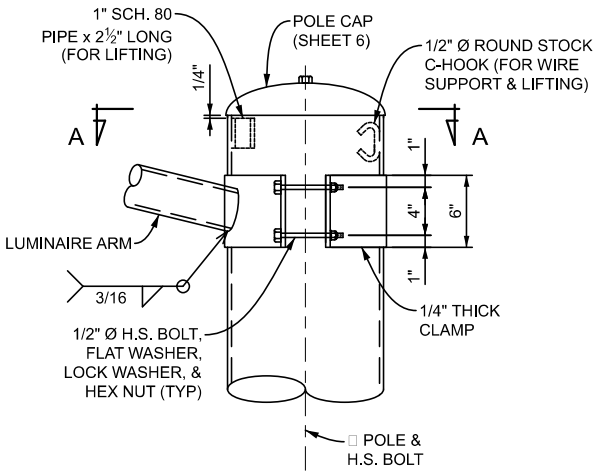
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
MAST ARM POLE AND MAST ARM REQUIREMENTS

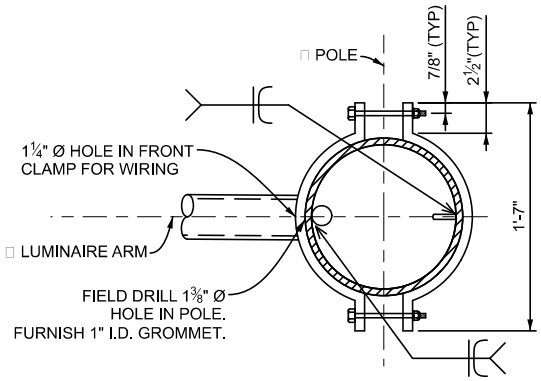
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-031-A	SHEET 2 OF 6

SECT

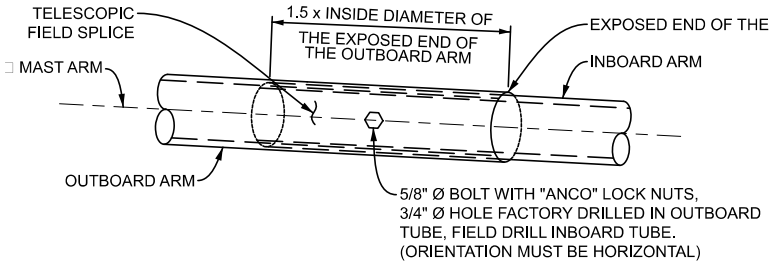


ORIENTATION OF SCH. 80 PIPE 180° FROM HAND HOLE AT BASE & C-HOOK 180° FROM SCH. 80 PIPE

4 DETAIL - LUMINAIRE ARM BRACKET

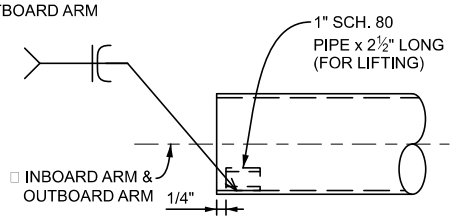


A SECTION - LUMINAIRE ARM BRACKET



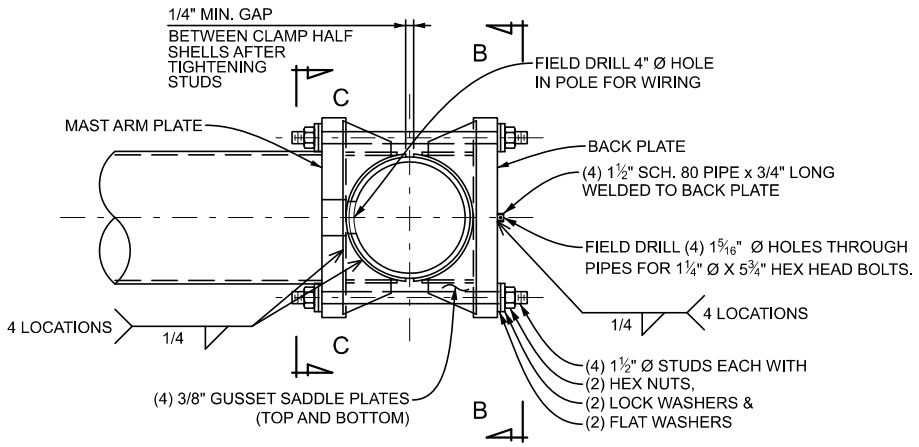
NOTES:
1. FOR 35'-0" ARMS AND GREATER.
2. THE INBOARD AND OUTBOARD ARMS MUST FIT TIGHTLY.

5 DETAIL - TELESCOPIC SPLICE



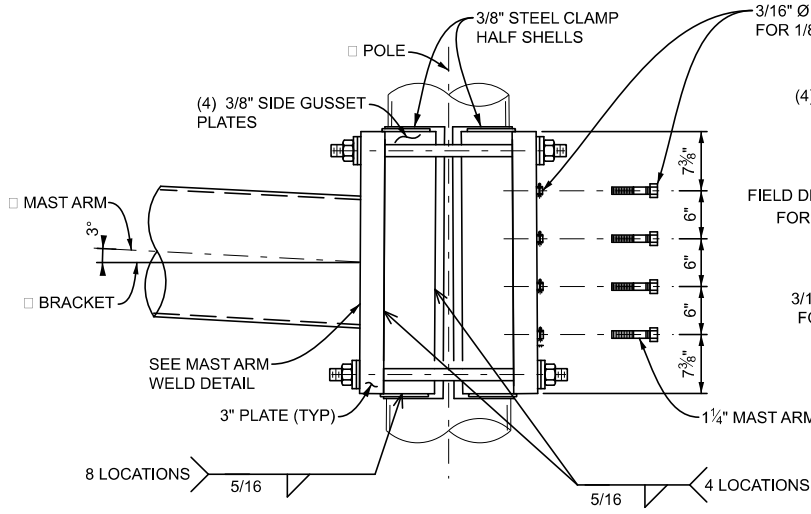
6 INBOARD/OUTBOARD ARM DETAIL - LIFTING DEVICE

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR LUMINAIRE ARM BRACKET, TELESCOPIC SPLICE, AND LIFTING DEVICE DETAILS		
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-031-A	SHEET 3 OF 6

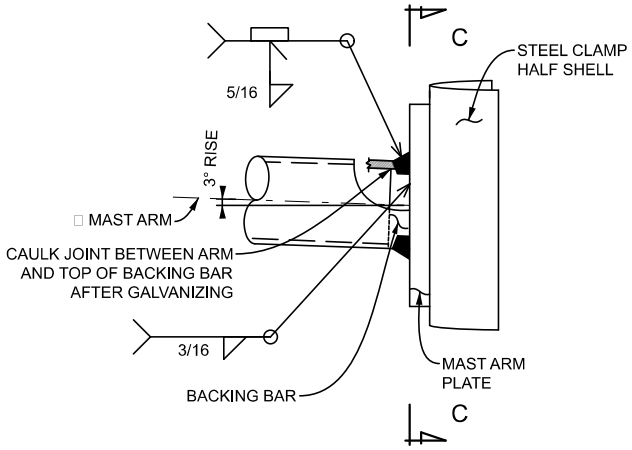


ROUND SECTION SHOWN,
SAME CONNECTION DETAILS FOR 16-SIDED SECTION
GUSSET SADDLE PLATES MUST MATCH 16-SIDED POLE SHAPE

7 DETAIL - MAST ARM BRACKET PLAN

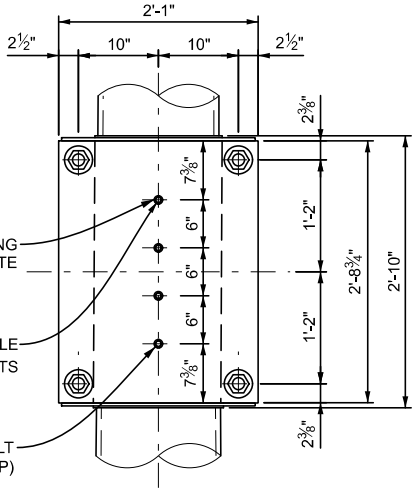


8 DETAIL - MAST ARM BRACKET ELEVATION



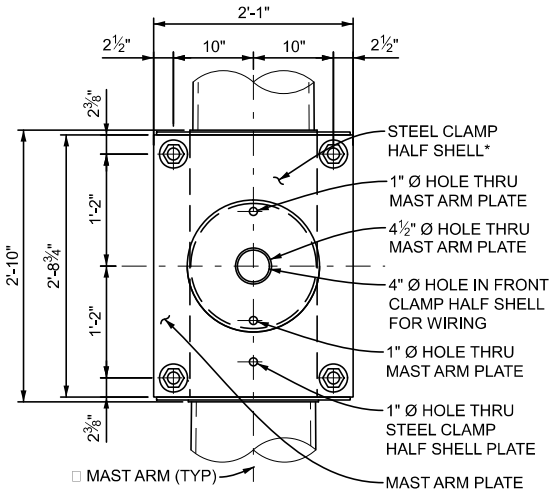
SIDE GUSSET PLATES AND SADDLE PLATES NOT SHOWN FOR CLARITY

9 DETAIL - MAST ARM WELD



SIDE GUSSET PLATES AND SADDLE PLATES NOT SHOWN FOR CLARITY

B SECTION - BACK PLATE



SIDE GUSSET PLATES AND SADDLE PLATES NOT SHOWN FOR CLARITY

*INSIDE RADIUS OF STEEL CLAMP HALF SHELL SHALL BE WITHIN 1/4" OF THE DESIGNED POLE OUTSIDE RADIUS AT THE INTENDED MOUNTING HEIGHT

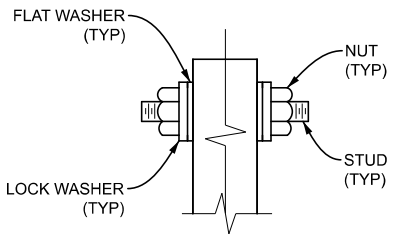
C SECTION - MAST ARM PLATE

MDOT
Michigan Department of Transportation

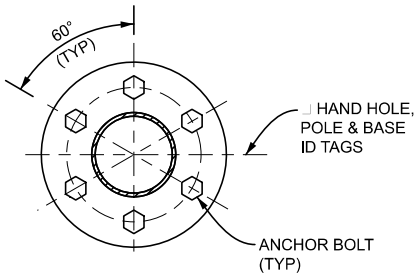
DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
MAST ARM BRACKET DETAILS

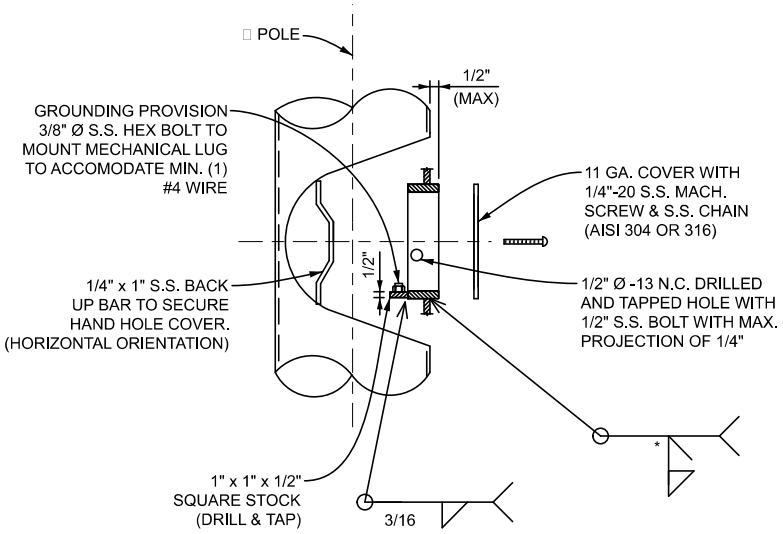
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-031-A	SHEET 4 OF 6
			SECT



10 DETAIL - MAST ARM BRACKET WASHERS

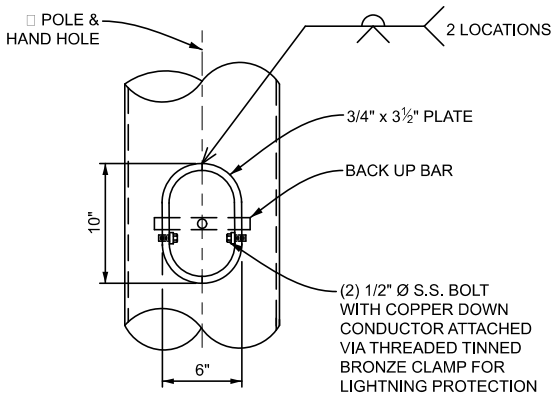


11 DETAIL - ORIENTATION OF HAND HOLE



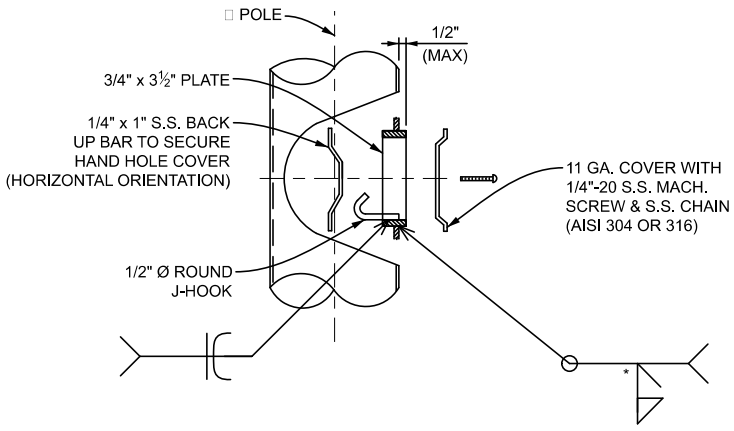
*S (WELD SIZE) = 0.9 x POLE WALL THICKNESS

12 DETAIL - 6" X 10" BAR BOTTOM HAND HOLE



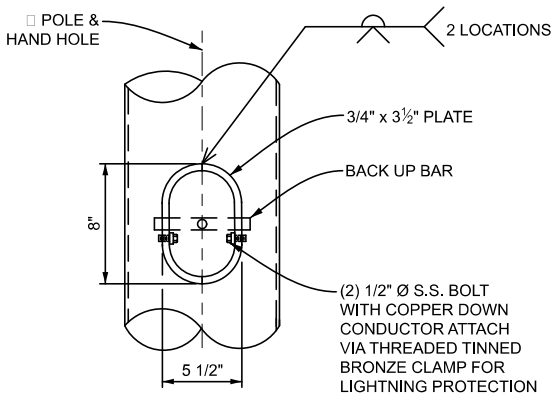
13 DETAIL - 6" X 10" BAR BOTTOM HAND HOLE

VIEW ROTATED 90 DEGREES



*S (WELD SIZE) = 0.9 x POLE WALL THICKNESS

14 DETAIL - 5 1/2" X 8" BAR TOP HAND HOLE



15 DETAIL - 5 1/2" X 8" BAR TOP HAND HOLE

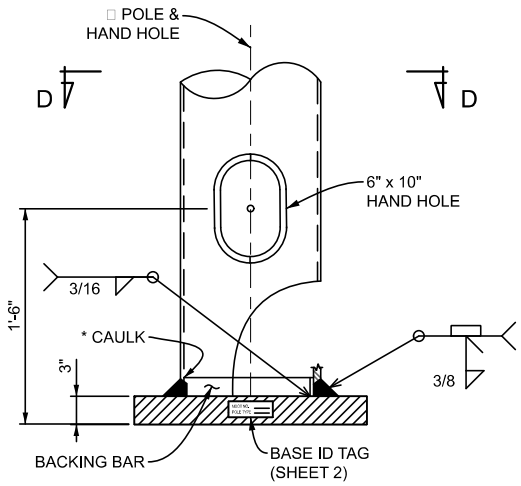
VIEW ROTATED 90 DEGREES

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

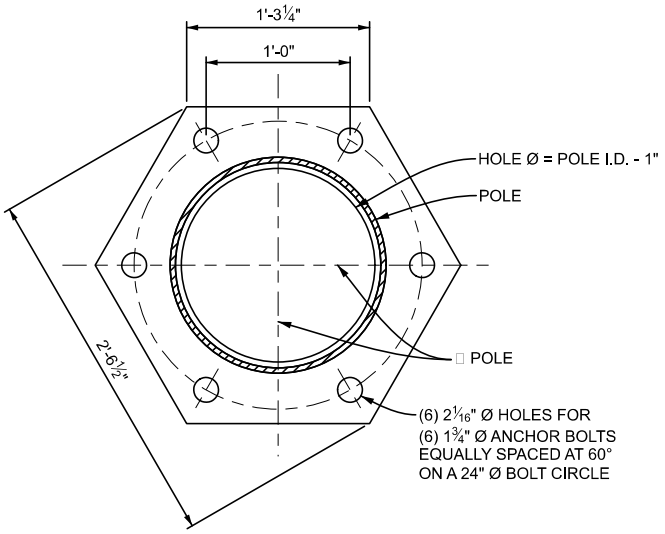
STANDARD PLAN FOR
HAND HOLE DETAILS

(SPECIAL DETAIL)	07/27/23	SIG-031-A	SHEET
FHWA APPROVAL	PLAN DATE		5 OF 6

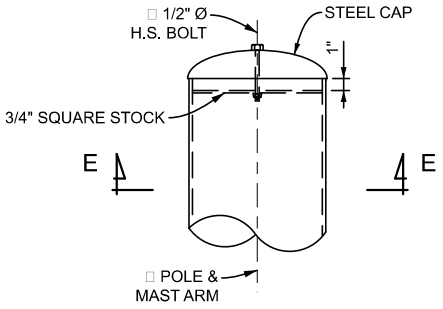


*SEAL JOINT WITH CAULK AFTER GALVANIZING

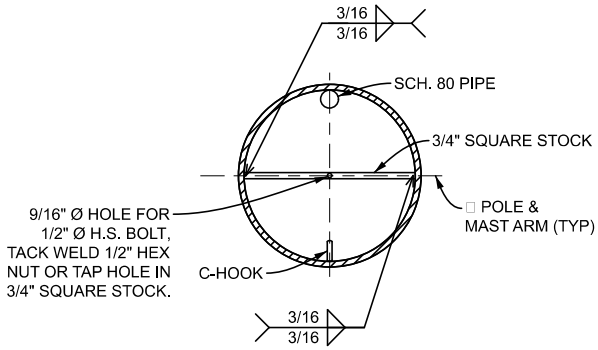
16 DETAIL - BASE PLATE WELD
VIEW ROTATED 90 DEGREES



D SECTION - BASE PLATE



17 DETAIL - POLE AND MAST ARM CAP



E SECTION - POLE AND MAST ARM CAP

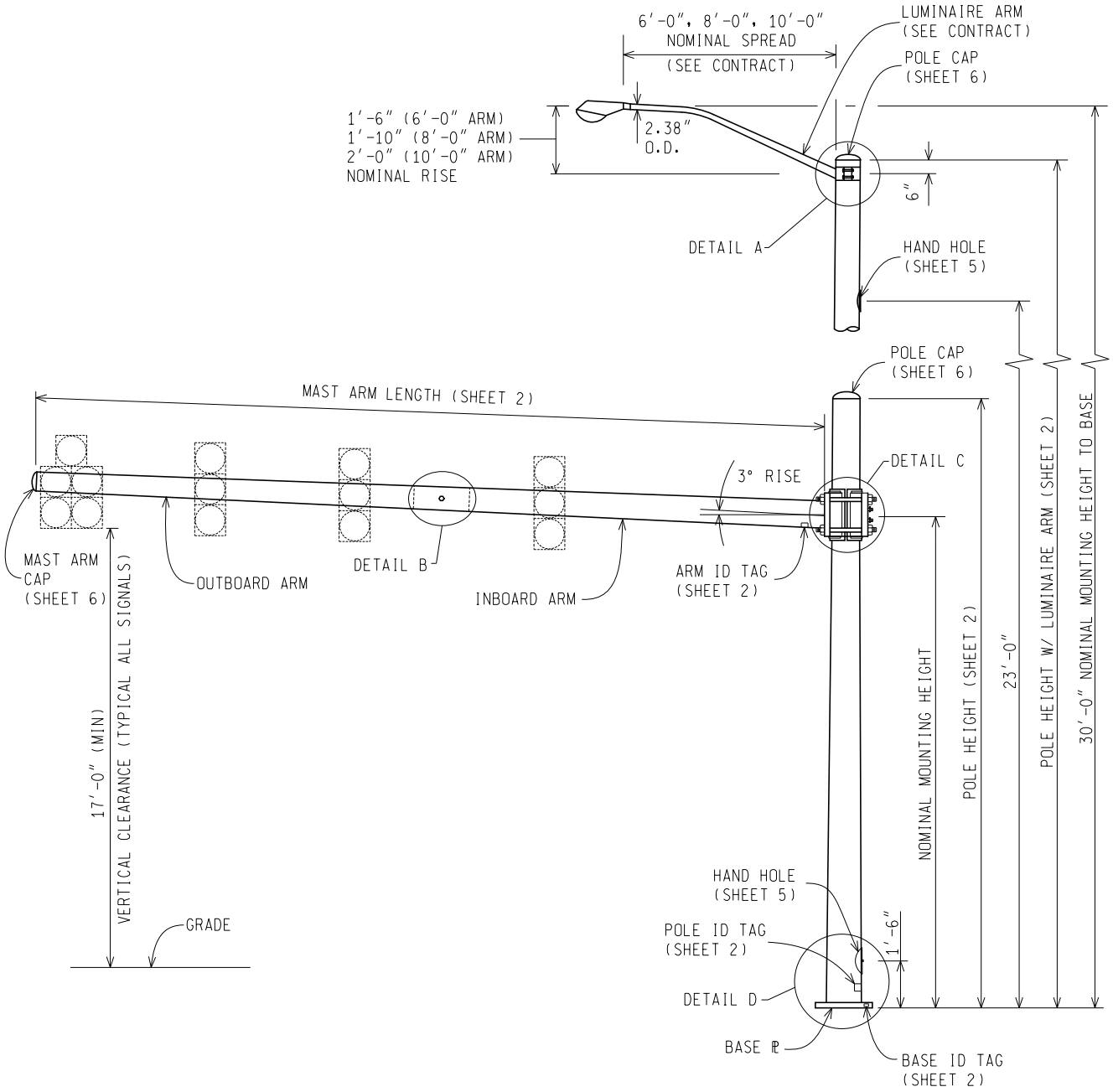
MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
BASE PLATE, MAST ARM POLE CAP, AND
MAST ARM CAP DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-031-A	SHEET 6 OF 6

SECT



NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG031B.dgn Rev. 11/05/18

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

TRAFFIC SIGNAL MAST ARM POLE AND MAST ARM DETAILS - CATEGORY II

PLAN DATE

SIG-031-B

SHEET
1 of 6

ROUND TAPERED STEEL MAST ARM			
MAST ARM LENGTH	* MAST ARM DIMENSIONS	MTG HT SINGLE	MTG HT TWIN
20'-0"	0.2500"-8.50" x 5.70" x 20'-0"	19'-0"	18'-6" & 21'-0"
25'-0"	0.2500"-9.50" x 6.00" x 25'-0"		
30'-0"	0.2500"-10.50" x 6.30" x 30'-0"		
35'-0"	0.4290"-12.00" x 10.60" x 10'-0" 0.1793"- ** x 7.50" x **		
40'-0"	0.5000"-12.00" x 10.60" x 10'-0" 0.1793"- ** x 6.80" x **		
45'-0"	0.5000"-12.00" x 9.90" x 15'-0" 0.1793"- ** x 6.10" x **		
50'-0"	0.7500"-12.0" x 9.20" x 20'-0" 0.1793"- ** x 5.36" x **		

MAST ARM TUBE TAPER IS 0.140 IN/FT

* DIAMETERS GIVEN ARE O.D.

** TO BE DETERMINED BY CONTRACTOR BASED ON REQUIRED MAST ARM LENGTH AND TELESCOPIC SPLICE LENGTH.

ROUND TAPERED STEEL MAST ARM POLE		
* POLE DIMENSIONS	LUMINAIRE ARM	MAST ARM LENGTH (FT)
0.313"-14.00" x 10.92" x 22'-0"	NO	20, 25
0.313"-14.00" x 9.94" x 29'-0"	YES	30, 35
0.358"-14.00" x 10.92" x 22'-0"	NO	40, 45
0.358"-14.00" x 9.94" x 29'-0"	YES	
0.478"-14.00" x 10.92" x 22'-0"	NO	50
0.478"-14.00" x 9.94" x 29'-0"	YES	

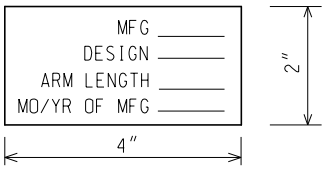
POLE TUBE TAPER IS 0.140 IN/FT

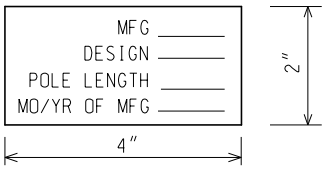
* DIAMETERS GIVEN ARE O.D.

NOTE: ONLY USE THE MAST ARM LENGTHS WITH POLE SIZES AS INDICATED IN TABLE ABOVE

NOTES:

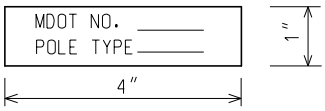
1. THE DESIGN OF THIS STRUCTURE IS BASED ON THE 2001 AASHTO STANDARD SPECIFICATONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS FOR 90 MPH WIND LOAD AND CATEGORY II WITH GALLOPING, NATURAL WIND GUSTS, AND TRUCK INDUCED FATIGUE LOADS.
2. WELD THE LONGITUDINAL ARM SEAM ON THE INBOARD AND OUTBOARD SECTIONS OF THE TELESCOPIC FIELD SPLICE WITH A COMPLETE JOINT PENETRATION (CJP) WELD A MINIMUM OF 36 INCHES LONG. IN ADDITION, LONGITUDINAL SEAM WELDS MUST BE CJP FOR A MINIMUM OF 6 INCHES FROM TUBE TO PLATE CJP WELDS.
3. SEAM WELDS MUST BE 90° ± FROM HAND HOLE AT BASE.
4. LUMINAIRE ARM IS 11 GAUGE ROUND STEEL WITH 0.140 INCH PER FOOT TAPER.
5. BACKING BAR FOR PIPE TO BASE PLATE (℄) AND MAST ARM TO MAST ARM PLATE MUST BE MINIMUM 5/16 INCH X 2 INCH PLATE.
6. 1/2 INCH DIAMETER (Ø) ROUND STOCK C-HOOK ATTACHED TO ALL POLE SIZES. 3/4 INCH SCHEDULE (SCH.) 40 PIPE ATTACHED TO ALL POLE SIZES AND INBOARD AND OUTBOARD ARM.
7. S.S. DENOTES STAINLESS STEEL. GA. DENOTES GAUGE. O.D. DENOTES OUTSIDE DIAMETER. I.D. DENOTES INSIDE DIAMETER. H.S. DENOTES HIGH STRENGTH.





ARM/POLE S.S. ID TAG DETAIL

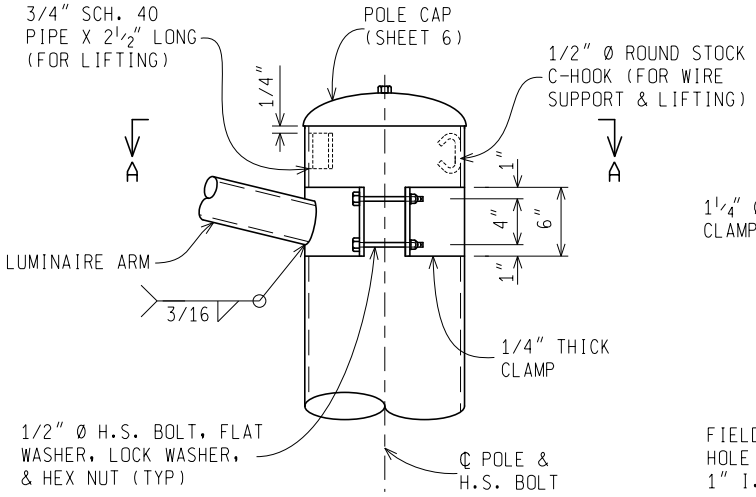
TO BE ATTACHED TO POLE OR MAST ARM AT LOCATIONS SHOWN 4" FROM BASE OF TUBE BELOW HANDHOLE WITH (4) #8 X 3/8" S.S. TYPE U DRIVE SCREWS.
(LETTERS STAMPED IN 3/8" CHARACTERS)



BASE S.S. ID TAG DETAIL

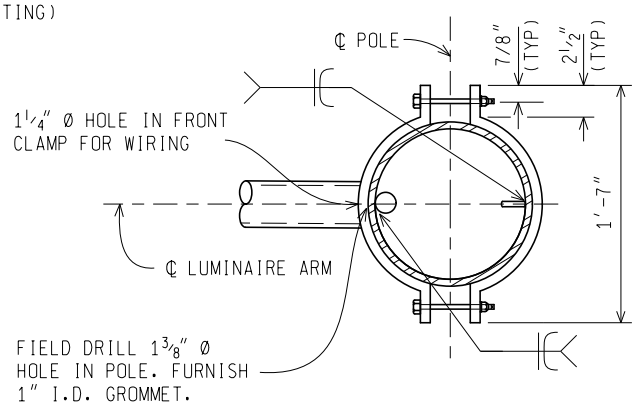
WELD TAG TO EDGE OF BASE ℄
(LETTERS STAMPED IN 3/8" CHARACTERS)

NOT TO SCALE

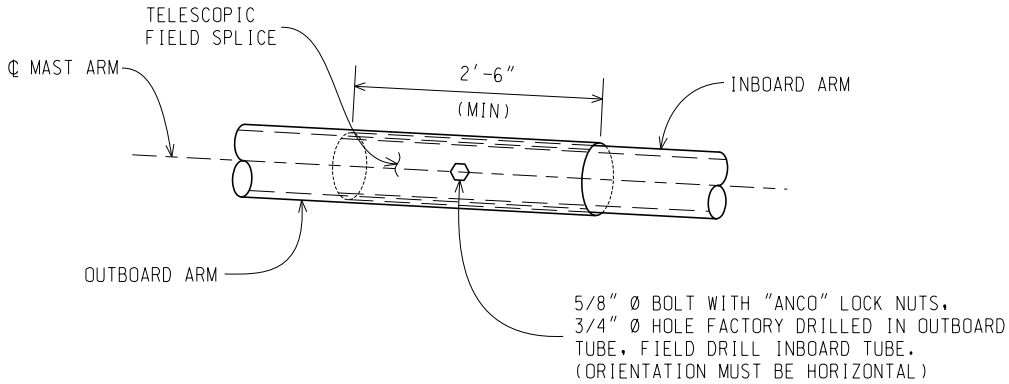


DETAIL A

ORIENTATION OF SCH. 40 PIPE 180° FROM HAND HOLE AT BASE & C-HOOK 180° FROM SCH. 40 PIPE

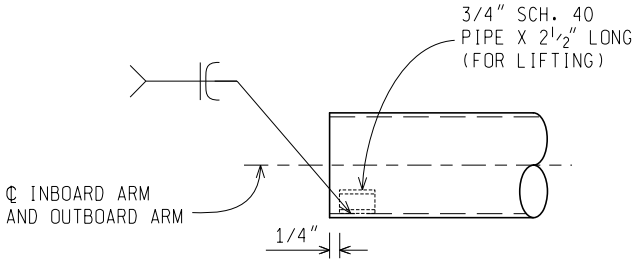


SECTION A-A



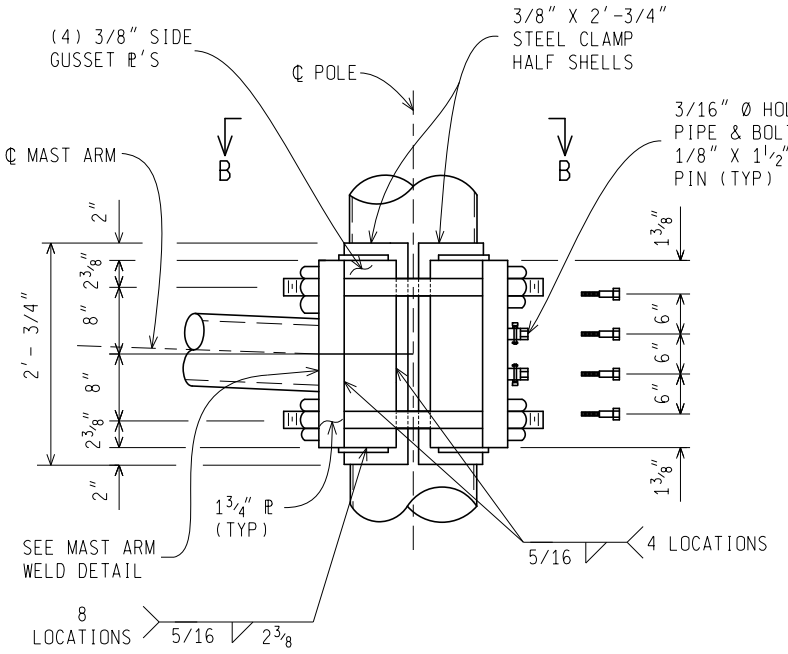
DETAIL B

(35'-0" ARMS AND GREATER)

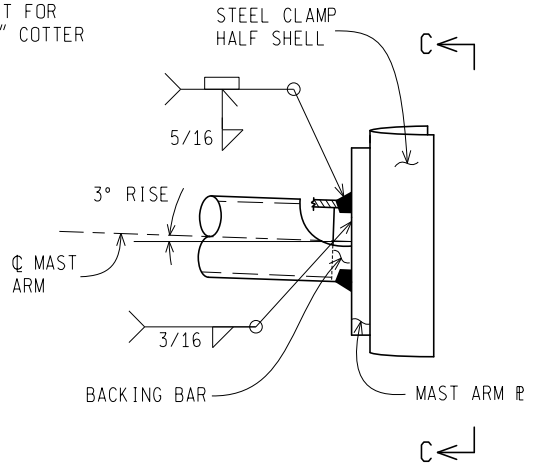


INBOARD/OUTBOARD ARM LIFTING DEVICE

NOT TO SCALE

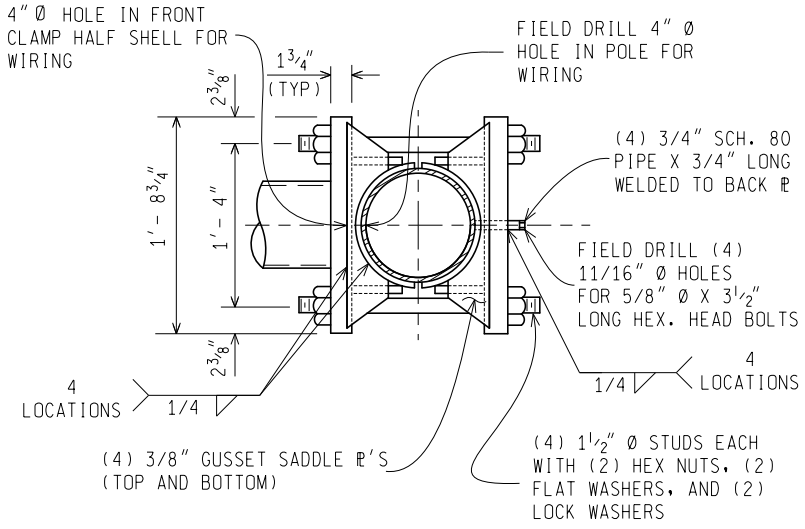


DETAIL C

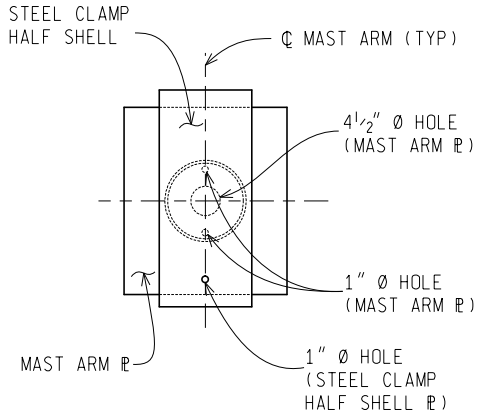


MAST ARM WELD DETAIL

SIDE GUSSET PL'S AND SADDLE PL'S NOT SHOWN FOR CLARITY



SECTION B-B

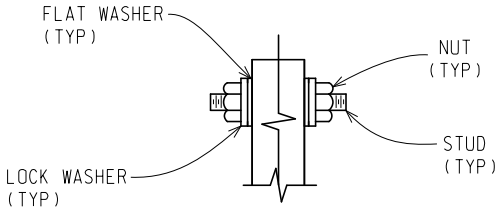


SECTION C-C

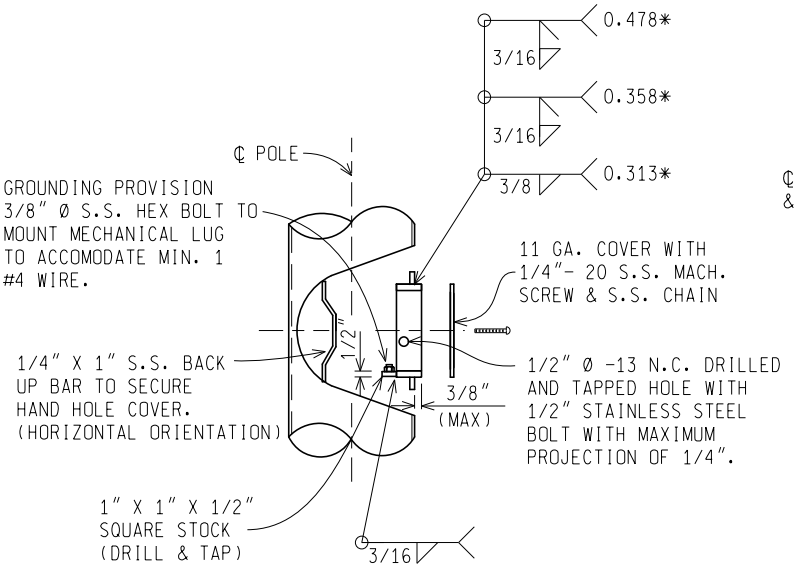
SIDE GUSSET PL'S AND SADDLE PL'S NOT SHOWN FOR CLARITY

NOT TO SCALE

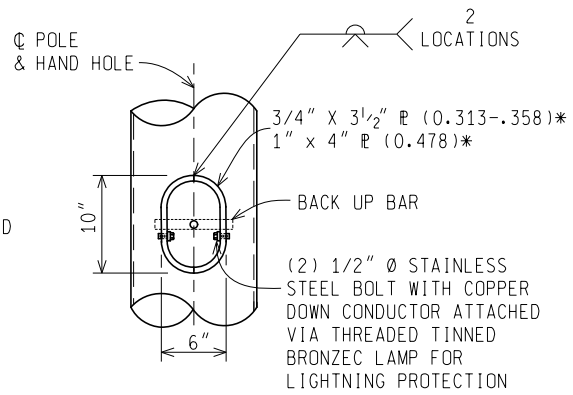
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-031-B	SHEET 4 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG031B.dgn Rev. 11/05/18		PLAN DATE		



MAST ARM CLAMP WASHER PLACEMENT

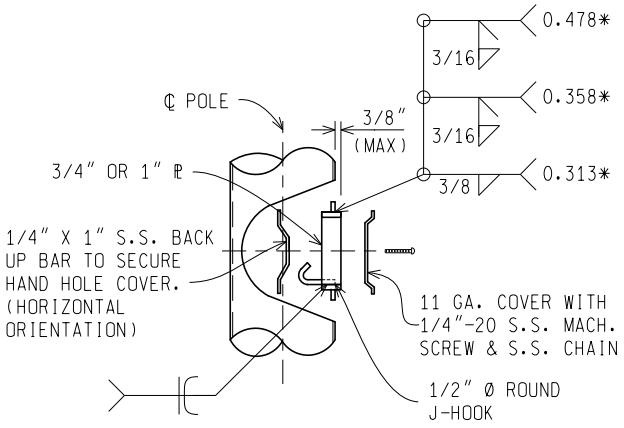


6" X 10" BAR BOTTOM HAND HOLE



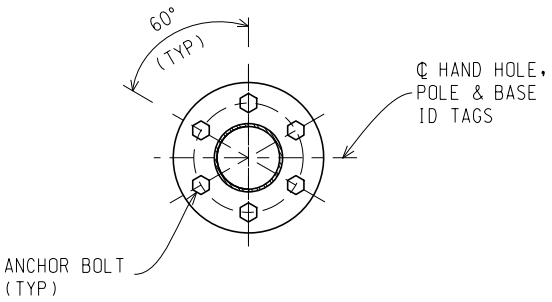
6" X 10" BAR BOTTOM HAND HOLE

(VIEW ROTATED 90 DEGREES)



4" X 6½" BAR TOP HAND HOLE

DESIGN WITH 29'-0" POLE ONLY

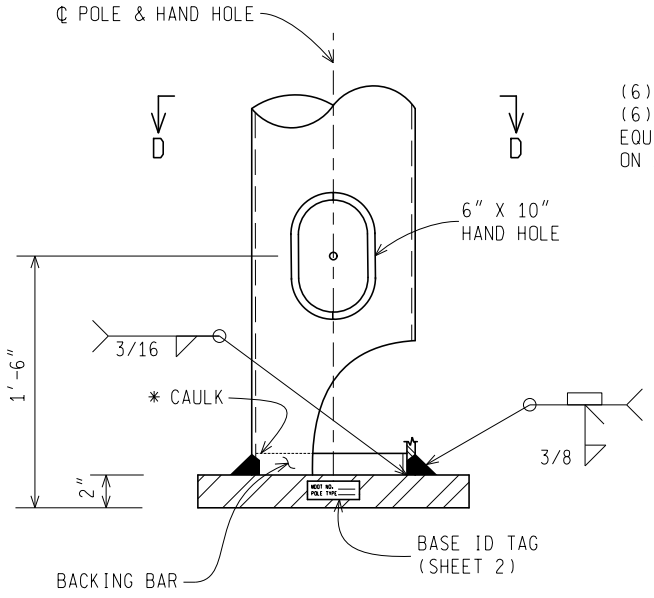


ORIENTATION OF HAND HOLE

* THICKNESS OF POLE

NOT TO SCALE

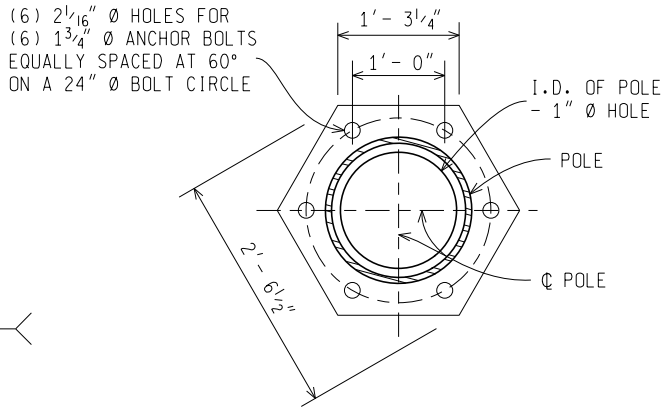
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-031-B	SHEET 5 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG031B.dgn Rev. 11/05/18		PLAN DATE		



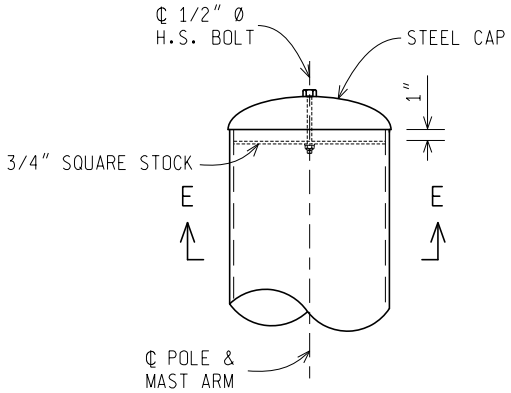
DETAIL D

(VIEW ROTATED 90 DEGREES)

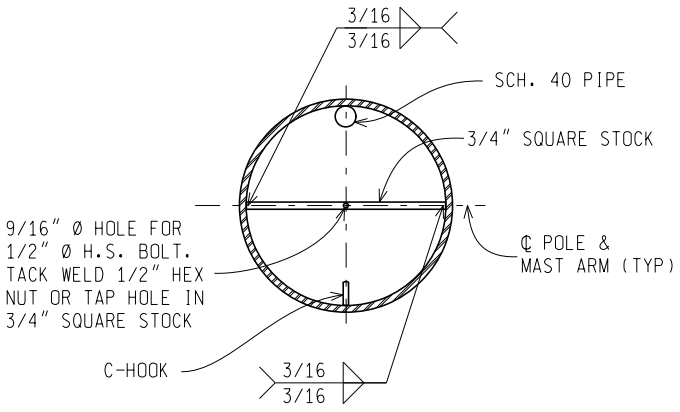
✱ SEAL JOINT WITH CAULK AFTER GALVANIZING



SECTION D-D



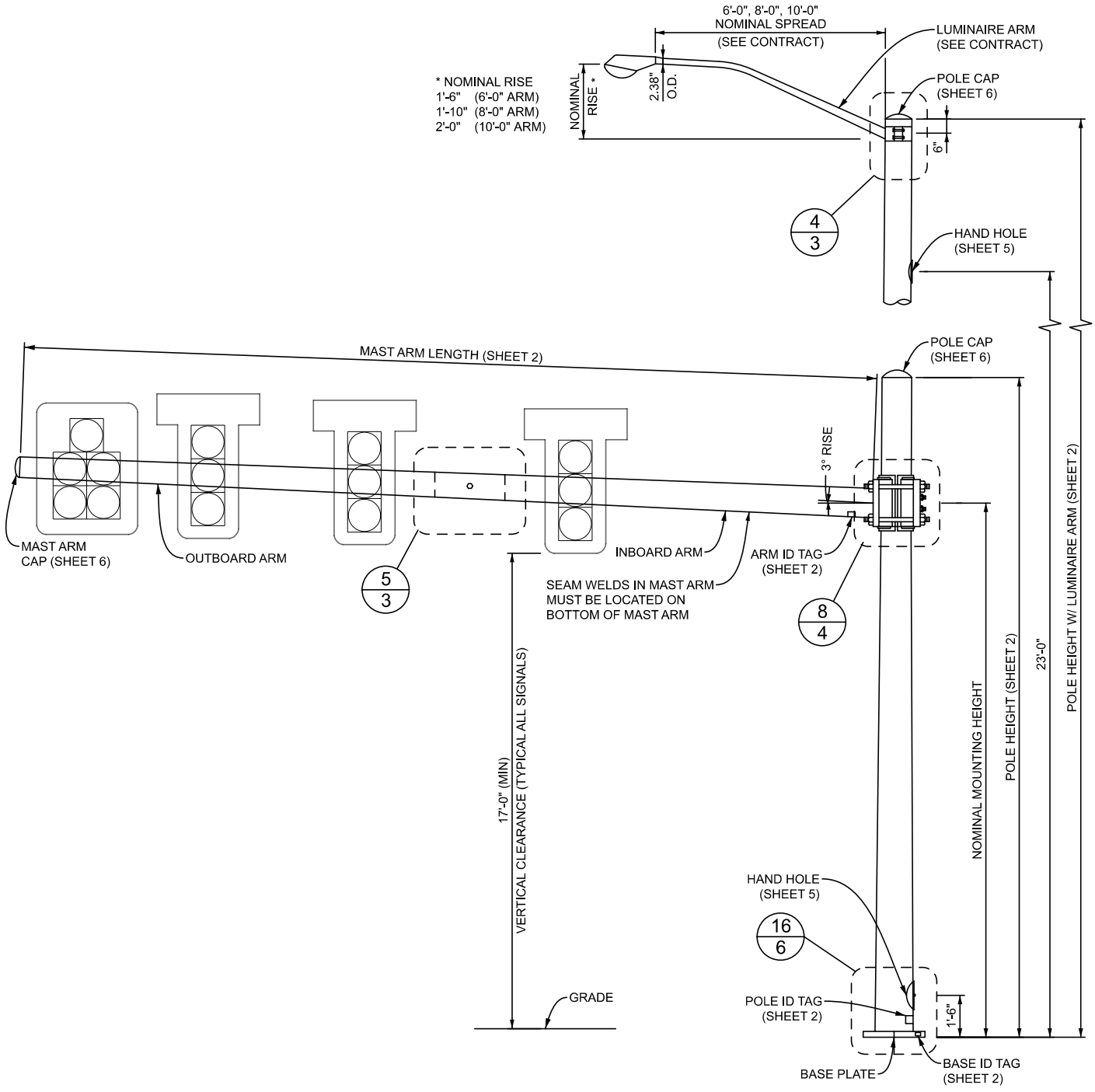
POLE AND MAST ARM CAP DETAIL



SECTION E-E

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-031-B	SHEET 6 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG031B.dgn Rev. 11/05/18		PLAN DATE		



ELEVATION - MAST ARM POLE

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
TRAFFIC SIGNAL MAST ARM POLE AND
MAST ARM DETAILS - CATEGORY II

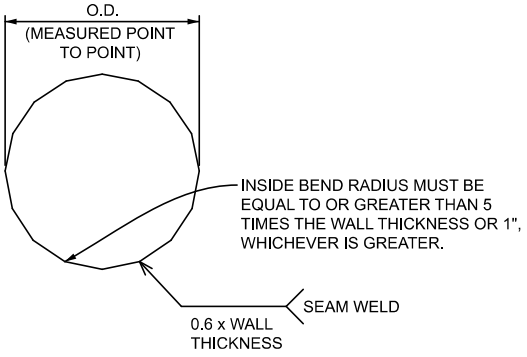
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-032-A	SHEET 1 OF 6

TAPERED STEEL MAST ARM POLE		
POLE DIMENSIONS *	LUMINAIRE ARM	MAST ARM LENGTH (FT)
0.313"-15.00" x 11.78" x 23'-0"	NO	20, 25, 30
0.313"-15.00" x 10.94" x 29'-0"	YES	
0.429"-15.00" x 11.78" x 23'-0"	NO	35 & 40
0.429"-15.00" x 10.94" x 29'-0"	YES	
0.500"-15.50" x 12.28" x 23'-0"	NO	45 & 50
0.500"-15.50" x 11.44" x 29'-0"	YES	

POLE TUBE TAPER IS 0.140 IN/FT
* DIAMETERS ARE GIVEN BY O.D.

TAPERED STEEL MAST ARM			
MAST ARM LENGTH	MAST ARM DIMENSIONS *	MTG HT SINGLE	MTG HT TWIN
20'-0"	0.2500"-8.50" x 5.70" x 20'-0"	19'-0"	18'-6" & 21'-0"
25'-0"	0.2500"-9.50" x 6.00" x 25'-0"		
30'-0"	0.2500"-10.50" x 6.30" x 30'-0"		
35'-0"	0.4290"-13.50" x 12.10" x 10'-0" 0.1793"-12.68" x 8.96" x 26'-7"		
40'-0"	0.5000"-13.50" x 12.10" x 10'-0" 0.2391"-12.80" x 8.38" x 31'-7"		
45'-0"	0.4290"-15.00" x 12.90" x 15'-0" 0.2391"-13.61" x 9.18" x 31'-8"		
50'-0"	0.5000"-15.50" x 12.70" x 20'-0" 0.2391"-13.41" x 8.98" x 31'-8"		

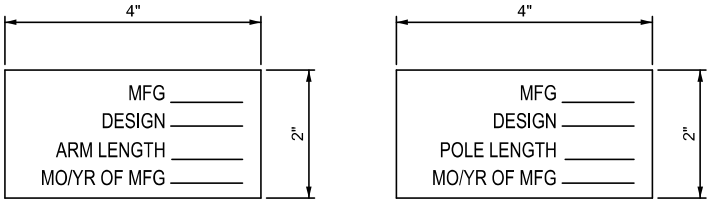
MAST ARM TUBE TAPER IS 0.140 IN/FT
* DIAMETERS ARE GIVEN BY O.D.



1 DETAIL - 16-SIDED SECTION

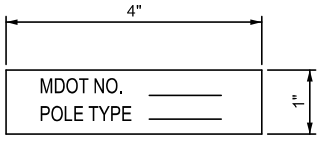
NOTES:

1. THE DESIGN OF THIS STRUCTURE IS BASED ON CATEGORY II GALLOPING, NATURAL WIND GUSTS, AND TRUCK INDUCED FATIGUE LOADS.
2. WELD THE LONGITUDINAL ARM SEAM ON THE INBOARD AND OUTBOARD SECTIONS OF THE TELESCOPIC FIELD SPLICE WITH A COMPLETE JOINT PENETRATION (CJP) WELD WITH A LENGTH EQUAL TO THE TELESCOPIC FIELD SPLICE LENGTH PLUS 6 INCHES. THE LAP OF THE ARM SECTIONS CANNOT EXTEND BEYOND THE LONGITUDINAL ARM SEAM CJP WELD WHEN THE FIELD SPLICE IS ERECTED AND IN ITS FINAL POSITION. IN ADDITION, LONGITUDINAL SEAM WELDS MUST HAVE 60% MINIMUM PENETRATION OR FUSION AND MUST BE CJP FOR A MINIMUM OF 6 INCHES FROM TUBE TO PLATE CJP WELDS.
3. SEAM WELDS IN MAST ARM POLE MUST BE 90° ± FROM HAND HOLE AT BASE. SEAM WELDS IN MAST ARM MUST BE LOCATED ON BOTTOM OF MAST ARMS.
4. LUMINAIRE ARM IS 11 GAUGE ROUND STEEL WITH 0.140 INCH PER FOOT TAPER.
5. BACKING BAR FOR PIPE TO BASE PLATE (□) AND MAST ARM TO MAST ARM PLATE MUST BE MINIMUM 5/16 INCH X 2 INCH PLATE.
6. 1/2 INCH DIAMETER (Ø) ROUND STOCK C-HOOK ATTACHED TO ALL POLE SIZES. 1 INCH SCHEDULE (SCH.) 80 PIPE ATTACHED TO ALL POLE SIZES AND INBOARD AND OUTBOARD ARM.
7. S.S. DENOTES STAINLESS STEEL. GA. DENOTES GAUGE. O.D. DENOTES OUTSIDE DIAMETER. I.D. DENOTES INSIDE DIAMETER. H.S. DENOTES HIGH STRENGTH.
8. ROUND OR 16-SIDED SECTIONS ARE ALLOWED.
9. MULTI-PLY SECTIONS ARE NOT ALLOWED.



ATTACH TO POLE OR MAST ARM AT LOCATIONS SHOWN
4" FROM BASE OF TUBE BELOW HANDHOLE WITH (4) #8 x 3/8"
S.S. TYPE U DRIVE SCREWS.
(LETTERS STAMPED IN 3/8" CHARACTERS)

2 DETAIL - ARM/POLE S.S. ID TAG



WELD TAG TO EDGE OF BASE PLATE
(LETTERS STAMPED IN 3/8" CHARACTERS)

3 DETAIL - BASE S.S. ID TAG

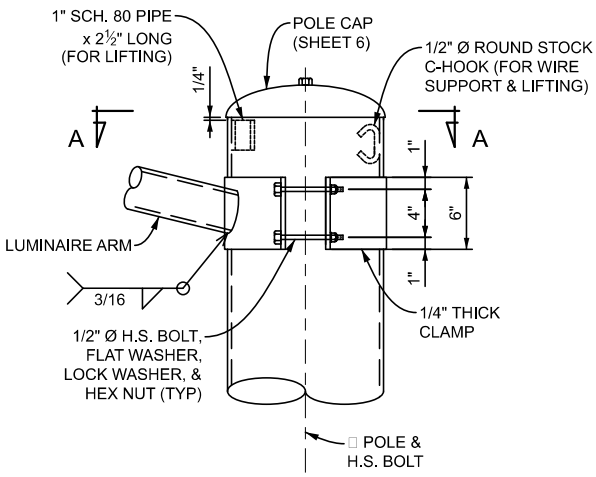
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
MAST ARM POLE AND MAST ARM REQUIREMENTS

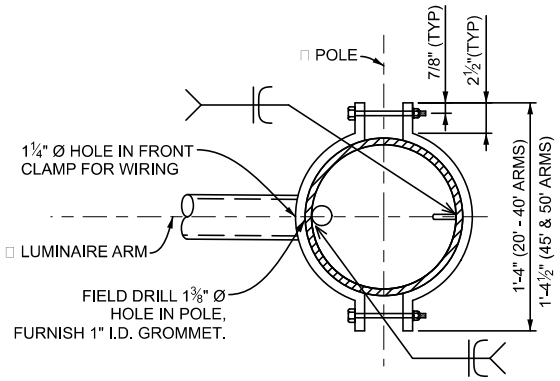
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-032-A	SHEET 2 OF 6

SECT

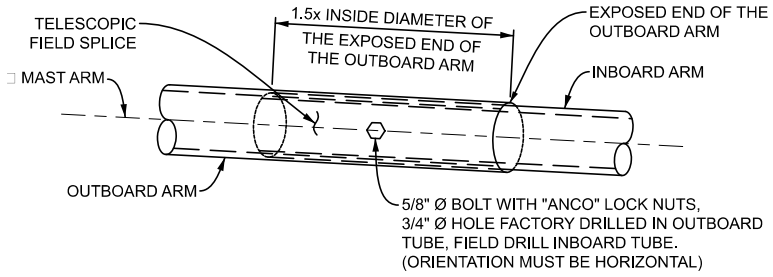


ORIENTATION OF SCH. 80 PIPE 180° FROM HAND HOLE AT BASE & C-HOOK 180° FROM SCH. 80 PIPE

4 DETAIL - LUMINAIRE ARM BRACKET

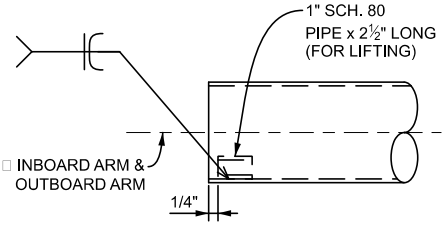


A SECTION - LUMINAIRE ARM BRACKET



NOTES:
1. FOR 35'-0" ARMS AND GREATER.
2. THE INBOARD AND OUTBOARD ARMS MUST FIT TIGHTLY.

5 DETAIL - TELESCOPIC SPLICE



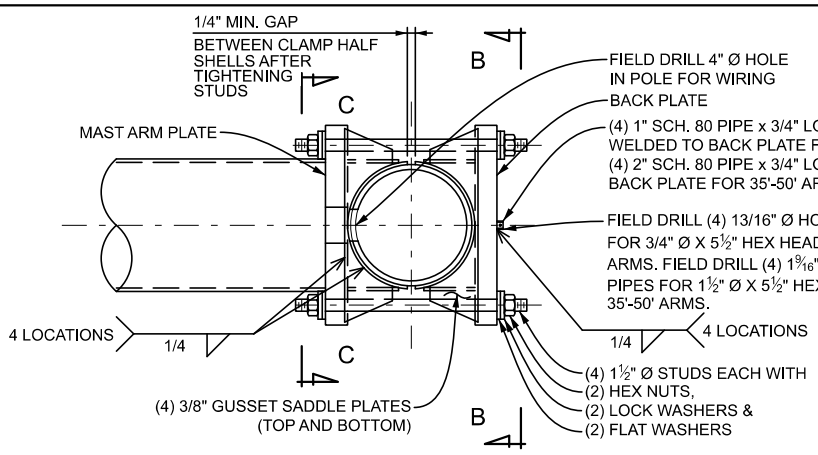
6 INBOARD/OUTBOARD ARM DETAIL - LIFTING DEVICE

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

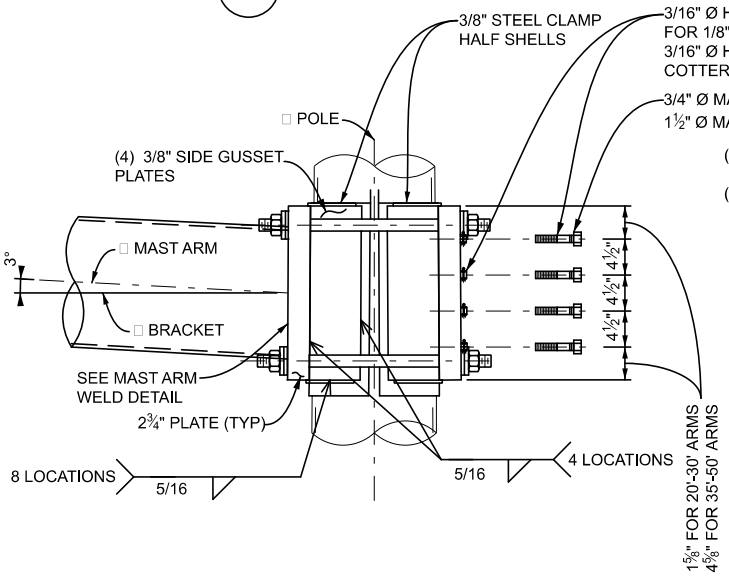
STANDARD PLAN FOR
LUMINAIRE ARM BRACKET, TELESCOPIC SPLICE, AND LIFTING DEVICE DETAILS

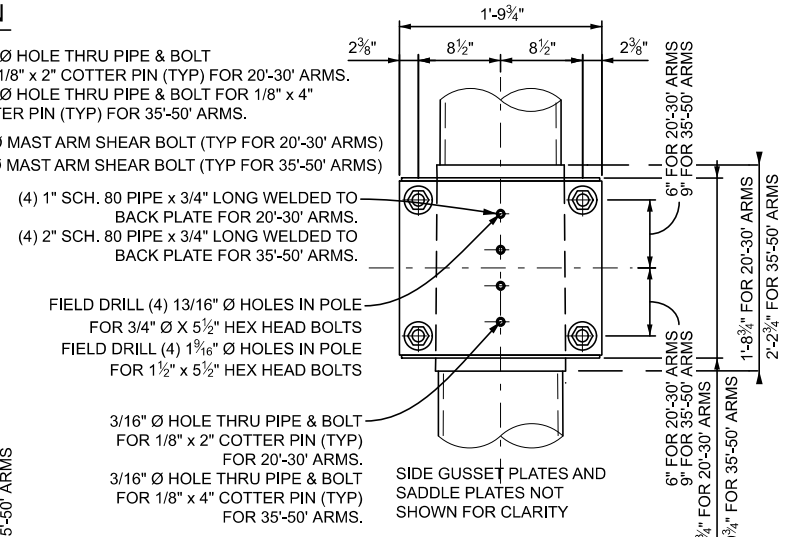
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-032-A	SHEET 3 OF 6



ROUND SECTION SHOWN.
SAME CONNECTION DETAILS FOR 16-SIDED SECTION
GUSSET SADDLE PLATES MUST MATCH 16-SIDED POLE SHAPE

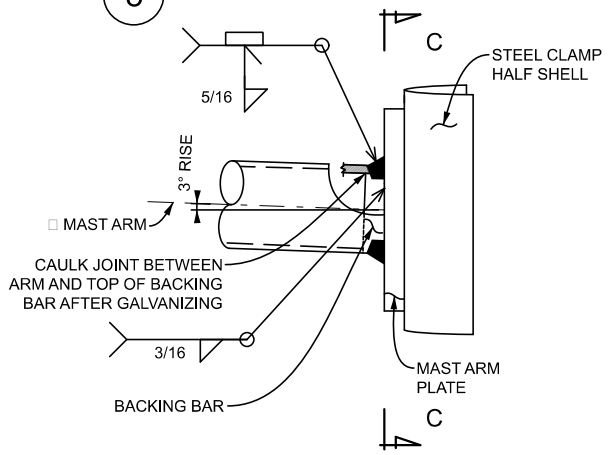
7 DETAIL - MAST ARM BRACKET PLAN





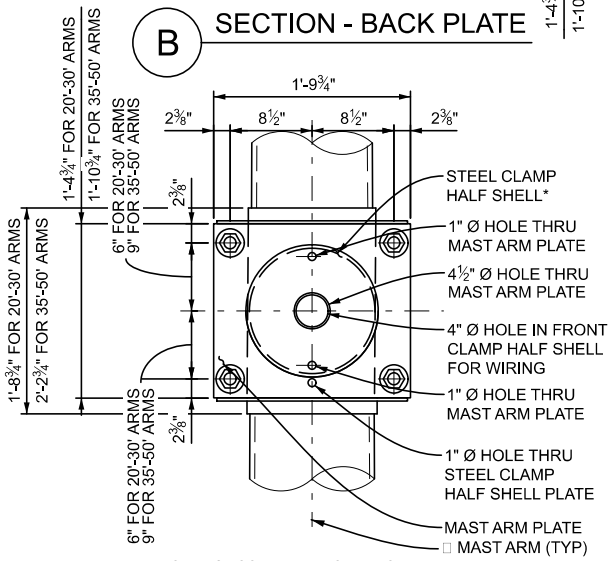
B SECTION - BACK PLATE

8 DETAIL - MAST ARM BRACKET ELEVATION



SIDE GUSSET PLATES AND SADDLE PLATES NOT SHOWN FOR CLARITY

9 DETAIL - MAST ARM WELD



SIDE GUSSET PLATES AND SADDLE PLATES NOT SHOWN FOR CLARITY

*INSIDE RADIUS OF STEEL CLAMP HALF SHELL SHALL BE WITHIN 1/4" OF THE DESIGNED POLE OUTSIDE RADIUS AT THE INTENDED MOUNTING HEIGHT

C SECTION - MAST ARM PLATE

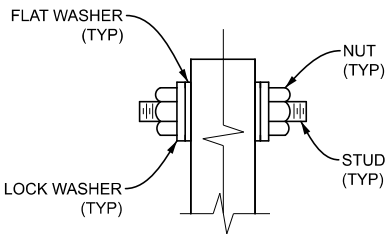
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

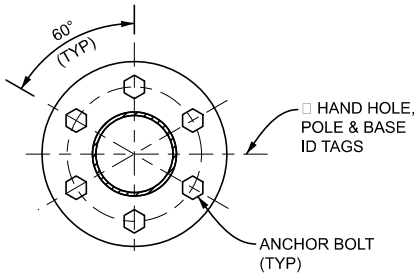
STANDARD PLAN FOR
MAST ARM BRACKET DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-032-A	SHEET 4 OF 6

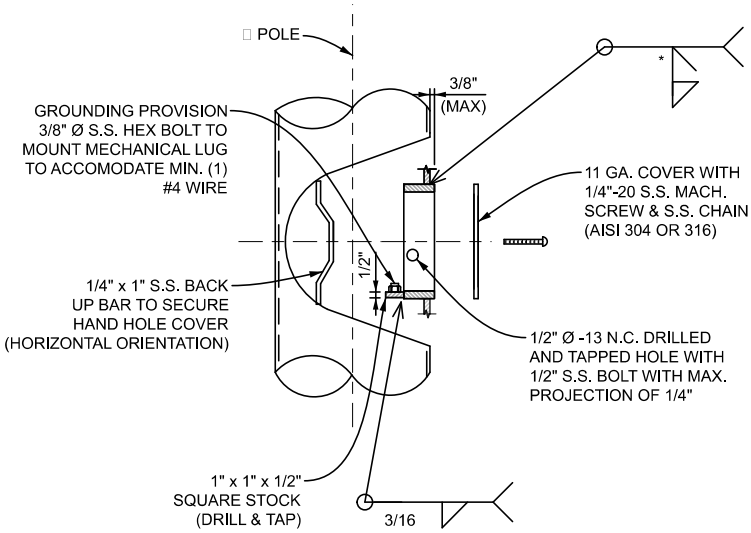
SECT



10 DETAIL - MAST ARM BRACKET WASHERS

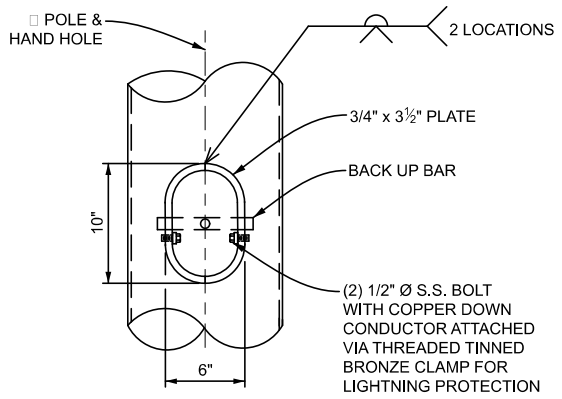


11 DETAIL - ORIENTATION OF HAND HOLE



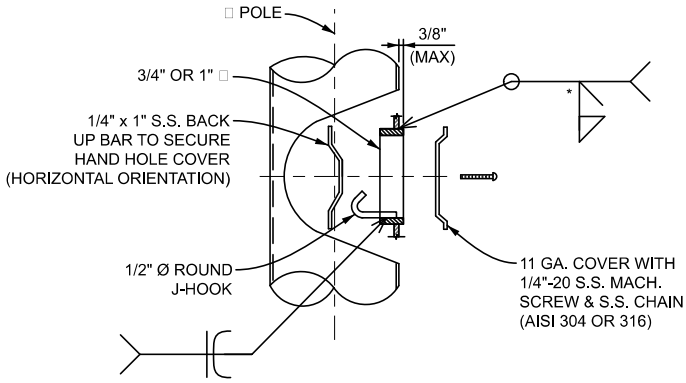
*S (WELD SIZE) = 0.9 x POLE WALL THICKNESS

12 DETAIL - 6" X 10" BAR BOTTOM HAND HOLE



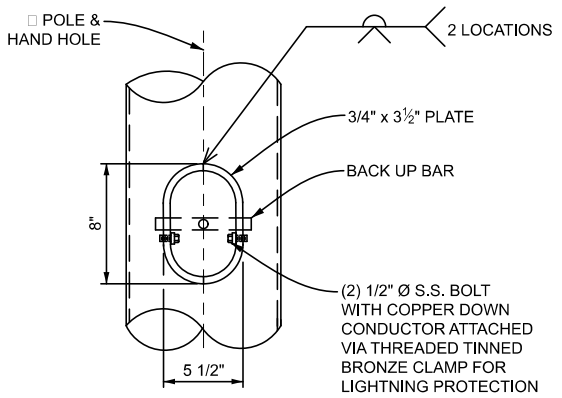
13 DETAIL - 6" X 10" BAR BOTTOM HAND HOLE

VIEW ROTATED 90 DEGREES



*S (WELD SIZE) = 0.9 x POLE WALL THICKNESS

14 DETAIL - 5½" X 8" BAR TOP HAND HOLE



15 DETAIL - 5 1/2" X 8" BAR TOP HAND HOLE

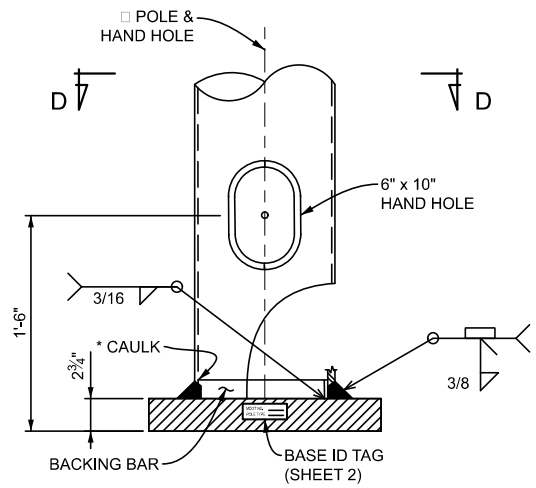
VIEW ROTATED 90 DEGREES

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

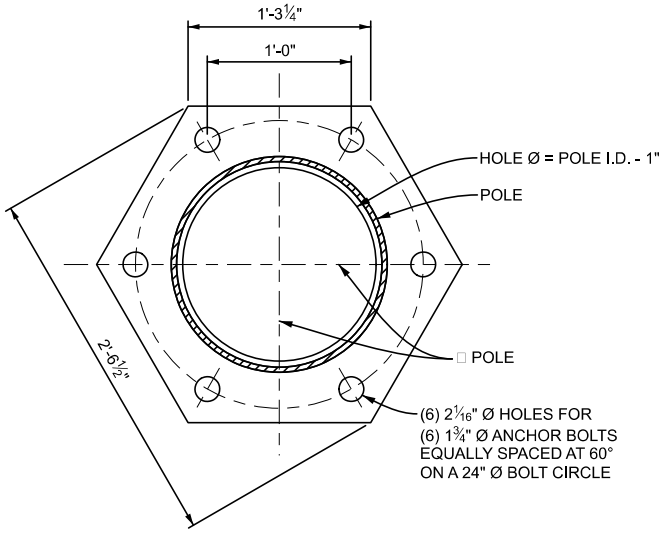
STANDARD PLAN FOR
HAND HOLE DETAILS

(SPECIAL DETAIL)	07/27/23	SIG-032-A	SHEET
FHWA APPROVAL	PLAN DATE		5 OF 6

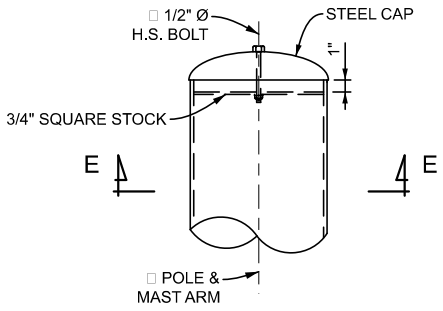


*SEAL JOINT WITH CAULK AFTER GALVANIZING

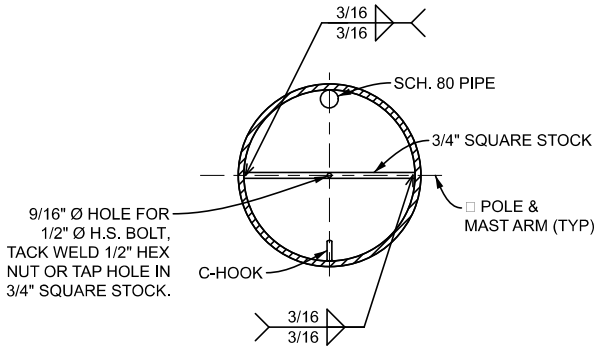
16 DETAIL - BASE PLATE WELD
VIEW ROTATED 90 DEGREES



D SECTION - BASE PLATE



17 DETAIL - POLE AND MAST ARM CAP



E SECTION - POLE AND MAST ARM CAP

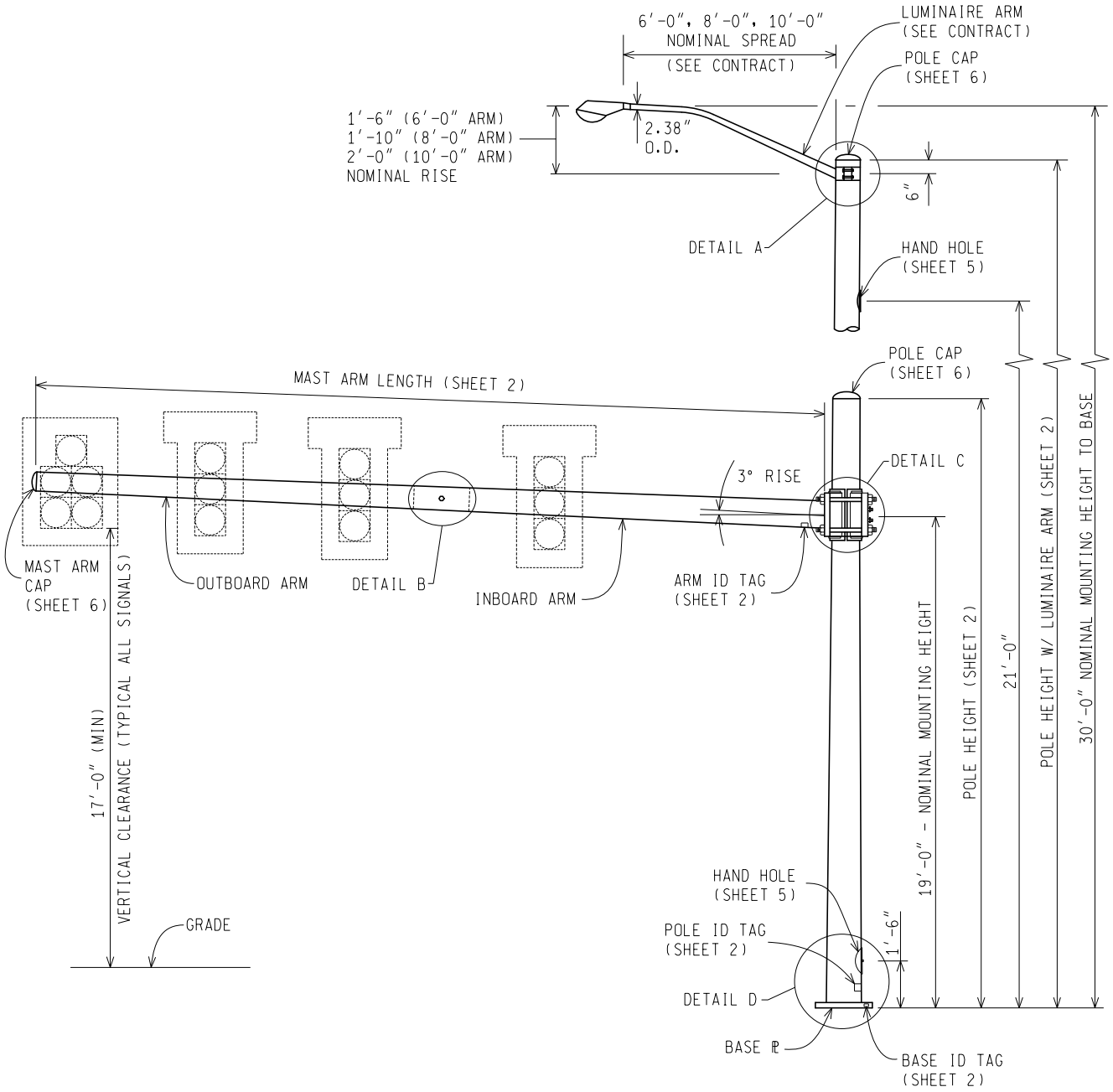
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
BASE PLATE, MAST ARM POLE CAP, AND
MAST ARM CAP DETAILS

(SPECIAL DETAIL) / FHWA APPROVAL	07/27/23 / PLAN DATE	SIG-032-A	SHEET 6 OF 6

SECT



NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG032B.dgn Rev. 11/05/18

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

TRAFFIC SIGNAL MAST ARM POLE AND MAST ARM DETAILS - CATEGORY III

PLAN DATE

SIG-032-B

SHEET
1 of 6

ROUND TAPERED STEEL MAST ARM	
MAST ARM LENGTH	* MAST ARM DIMENSIONS
20'-0"	0.2500"-8.00" x 5.20" x 20'-0"
25'-0"	0.2500"-8.00" x 4.50" x 25'-0"
30'-0"	0.2500"-8.00" x 3.80" x 30'-0"
35'-0"	0.2500"-9.00" x 4.10" x 35'-0"
40'-0"	0.2500"-11.00" x 5.40" x 40'-0"
45'-0"	0.3125"-11.0" x 8.66" x 16'-9" 0.1793"- ** x 5.10" x **
50'-0"	0.3125"-11.0" x 8.66" x 16'-9" 0.1793"-9.30" x 4.40" x 35'-0"

MAST ARM TUBE TAPER IS 0.140 IN/FT

* DIAMETERS GIVEN ARE O.D.

** TO BE DETERMINED BY CONTRACTOR BASED ON REQUIRED MAST ARM LENGTH AND TELESCOPIC SPLICE LENGTH.

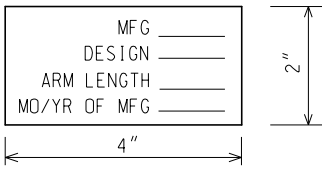
ROUND TAPERED STEEL MAST ARM POLE	
* POLE DIMENSIONS	LUMINAIRE ARM SPAN
0.3125"-14.00" x 11.06" x 21'-0"	6'-0"
0.3125"-14.00" x 9.80" x 30'-0"	8'-0"
0.3125"-14.00" x 8.96" x 36'-0"	10'-0"
0.3125"-14.00" x 8.40" x 40'-0"	24'-0"

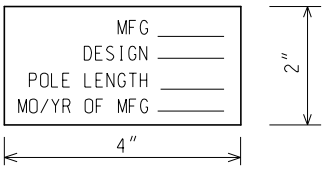
POLE TUBE TAPER IS 0.140 IN/FT

* DIAMETERS GIVEN ARE O.D.

NOTES:

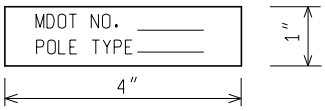
1. THE DESIGN OF THIS STRUCTURE IS BASED ON THE 2001 AASHTO STANDARD SPECIFICATONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS FOR 90 MPH WIND LOAD AND CATEGORY III WITH GALLOPING, NATURAL WIND GUSTS, AND TRUCK INDUCED FATIGUE LOADS.
2. WELD THE LONGITUDINAL ARM SEAM ON THE INBOARD AND OUTBOARD SECTIONS OF THE TELESCOPIC FIELD SPLICE WITH A COMPLETE JOINT PENETRATION (CJP) WELD A MINIMUM OF 36 INCHES LONG. IN ADDITION, LONGITUDINAL SEAM WELDS MUST BE CJP FOR A MINIMUM OF 6 INCHES FROM TUBE TO PLATE CJP WELDS.
3. SEAM WELDS MUST BE 90° ± FROM HAND HOLE AT BASE.
4. LUMINAIRE ARM IS 11 GAUGE ROUND STEEL WITH 0.140 INCH PER FOOT TAPER.
5. BACKING BAR FOR PIPE TO BASE PLATE (℄) AND MAST ARM TO MAST ARM PLATE MUST BE MINIMUM 5/16 INCH X 2 INCH PLATE.
6. 1/2 INCH DIAMETER (Ø) ROUND STOCK C-HOOK ATTACHED TO ALL POLE SIZES. 3/4 INCH SCHEDULE (SCH.) 40 PIPE ATTACHED TO ALL POLE SIZES AND INBOARD AND OUTBOARD ARM.
7. S.S. DENOTES STAINLESS STEEL. GA. DENOTES GAUGE. O.D. DENOTES OUTSIDE DIAMETER. I.D. DENOTES INSIDE DIAMETER. H.S. DENOTES HIGH STRENGTH.





ARM/POLE S.S. ID TAG DETAIL

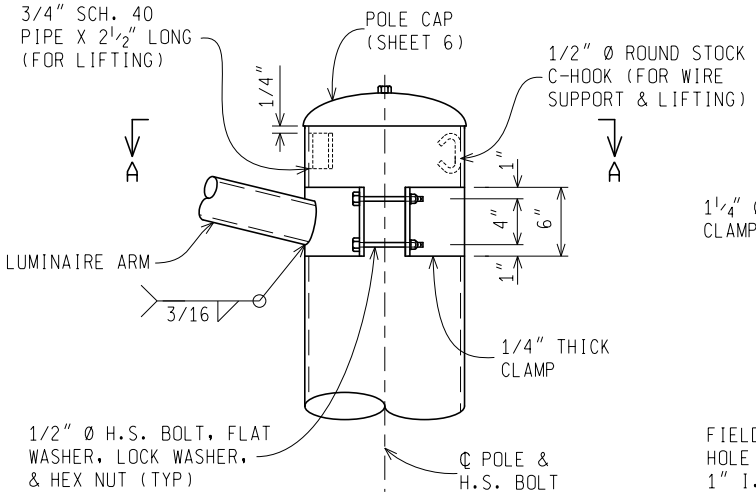
TO BE ATTACHED TO POLE OR MAST ARM AT LOCATIONS SHOWN 4" FROM BASE OF TUBE BELOW HANDHOLE WITH (4) #8 X 3/8" S.S. TYPE U DRIVE SCREWS.
(LETTERS STAMPED IN 3/8" CHARACTERS)



BASE S.S. ID TAG DETAIL

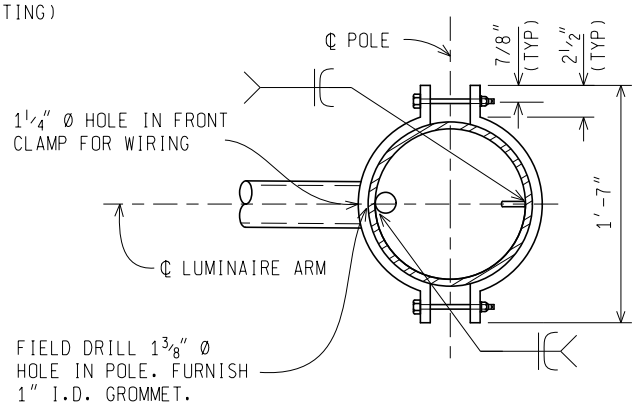
WELD TAG TO EDGE OF BASE ℄
(LETTERS STAMPED IN 3/8" CHARACTERS)

NOT TO SCALE

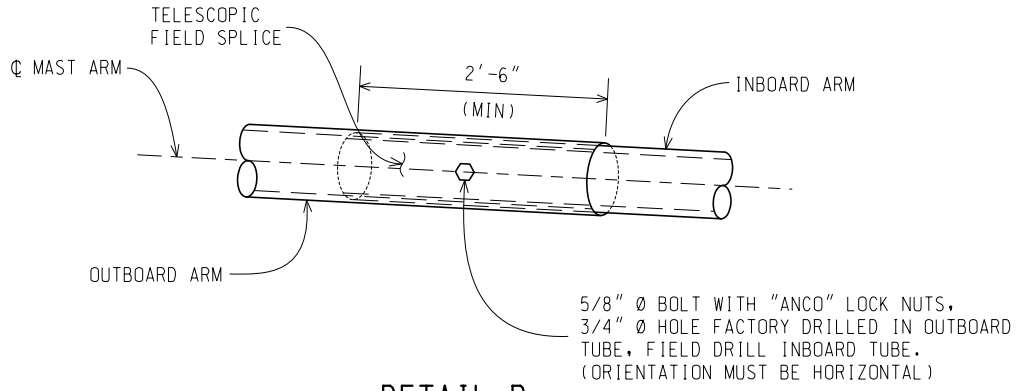


DETAIL A

ORIENTATION OF SCH. 40 PIPE 180° FROM HAND HOLE AT BASE & C-HOOK 180° FROM SCH. 40 PIPE

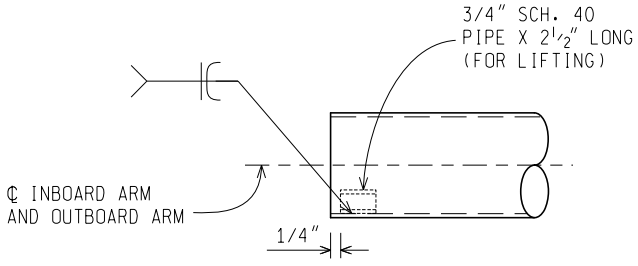


SECTION A-A



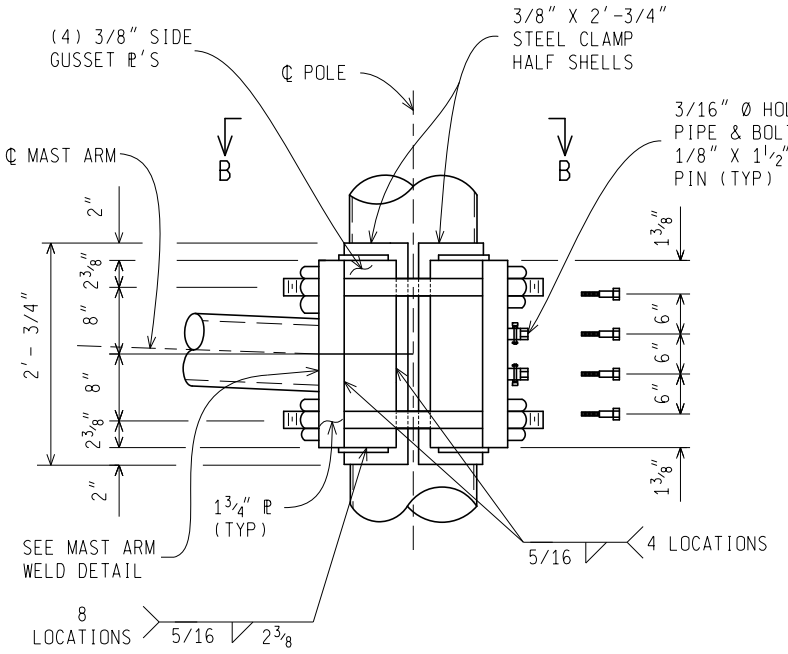
DETAIL B

(45'-0" ARMS AND GREATER)

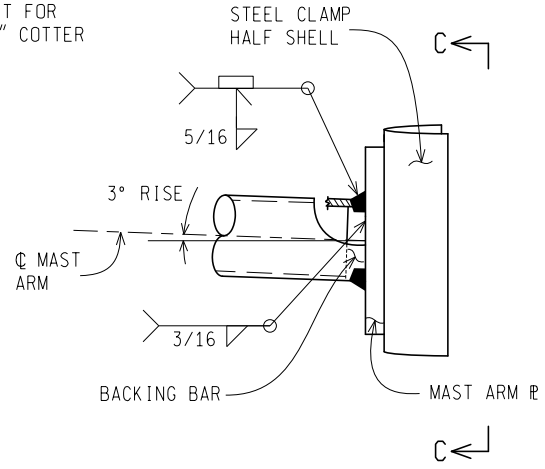


INBOARD/OUTBOARD ARM LIFTING DEVICE

NOT TO SCALE

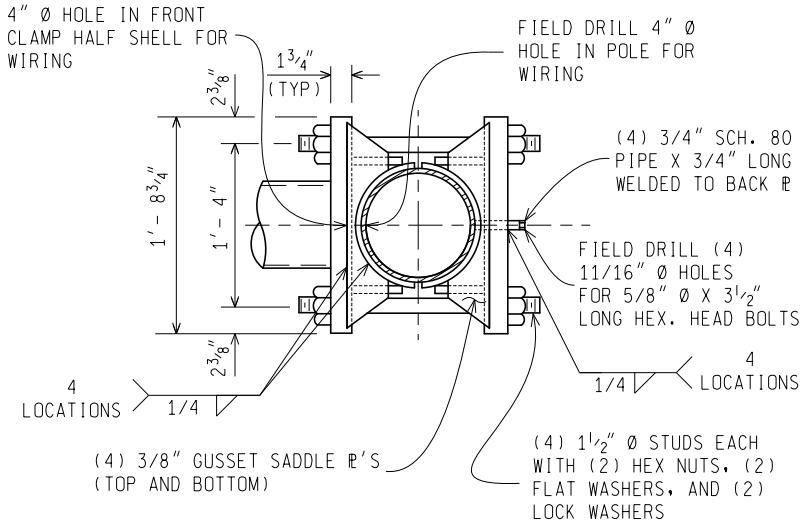


DETAIL C

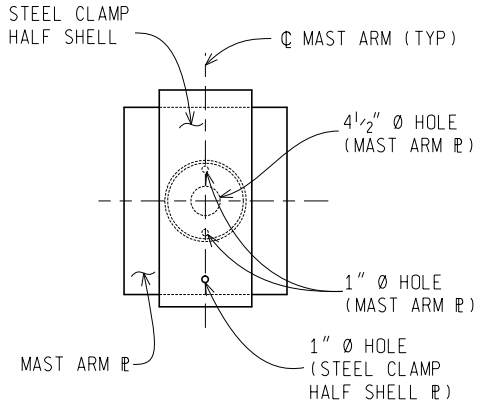


MAST ARM WELD DETAIL

SIDE GUSSET PL'S AND SADDLE PL'S NOT SHOWN FOR CLARITY



SECTION B-B



SECTION C-C

SIDE GUSSET PL'S AND SADDLE PL'S NOT SHOWN FOR CLARITY

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-032-B	SHEET 4 of 6
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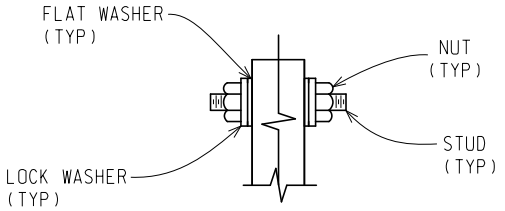
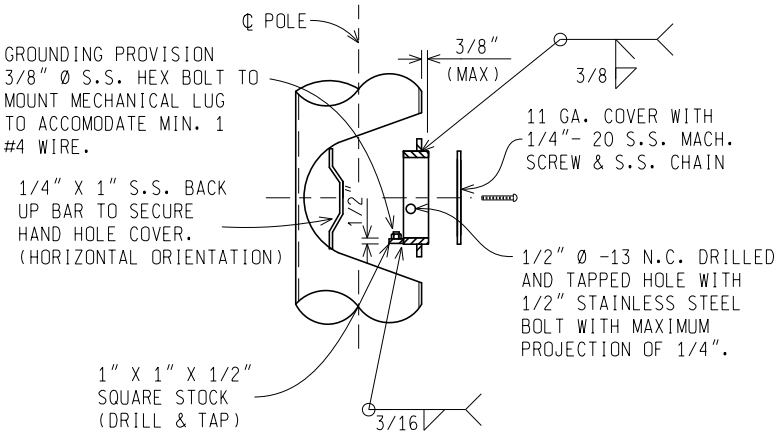
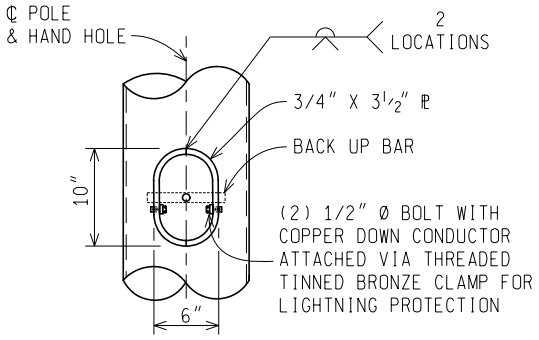


MAST ARM CLAMP WASHER PLACEMENT

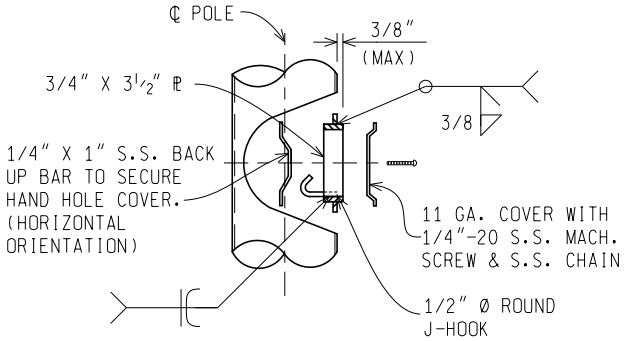


6" X 10" BAR BOTTOM HAND HOLE

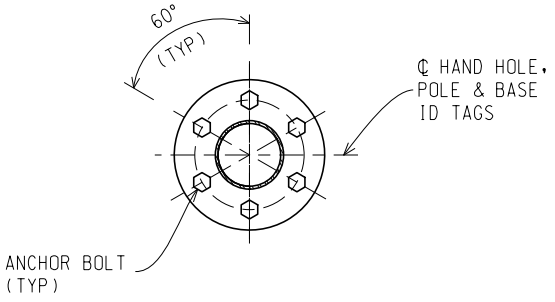


6" X 10" BAR BOTTOM HAND HOLE

(VIEW ROTATED 90 DEGREES)



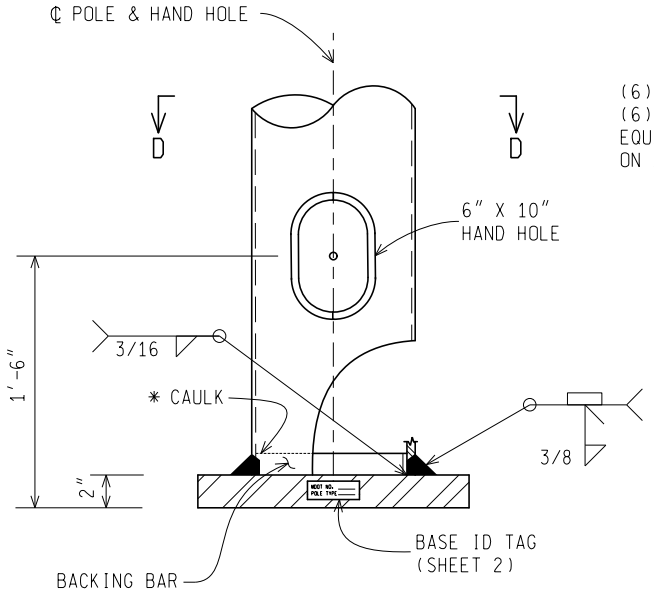
4" X 6½" BAR TOP HAND HOLE



ORIENTATION OF HAND HOLE

NOT TO SCALE

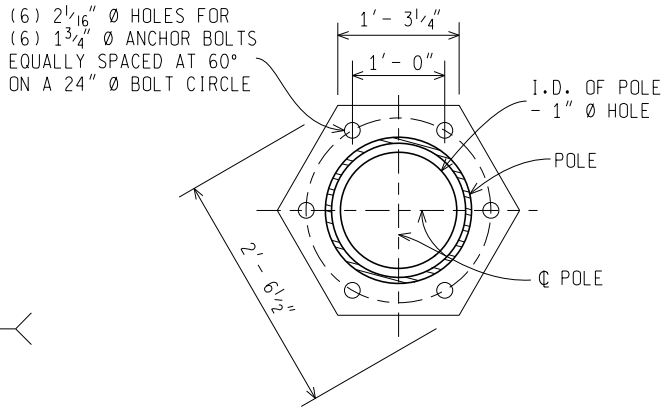
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-032-B	SHEET 5 of 6
File: RefDoc/TR/Signals/Web/Sp_Det/Fin/SIG032B.dgn Rev. 11/05/18		PLAN DATE		



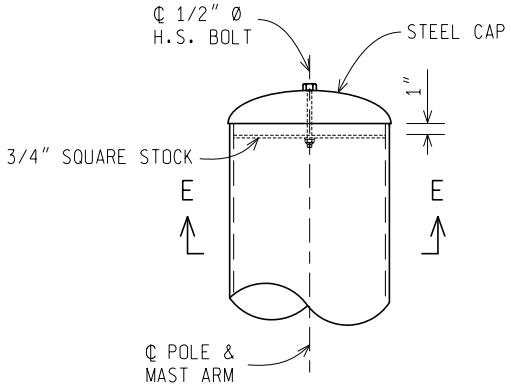
DETAIL D

(VIEW ROTATED 90 DEGREES)

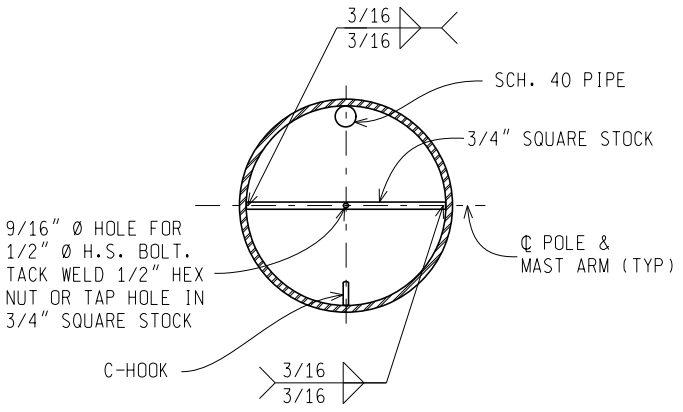
* SEAL JOINT WITH CAULK AFTER GALVANIZING



SECTION D-D



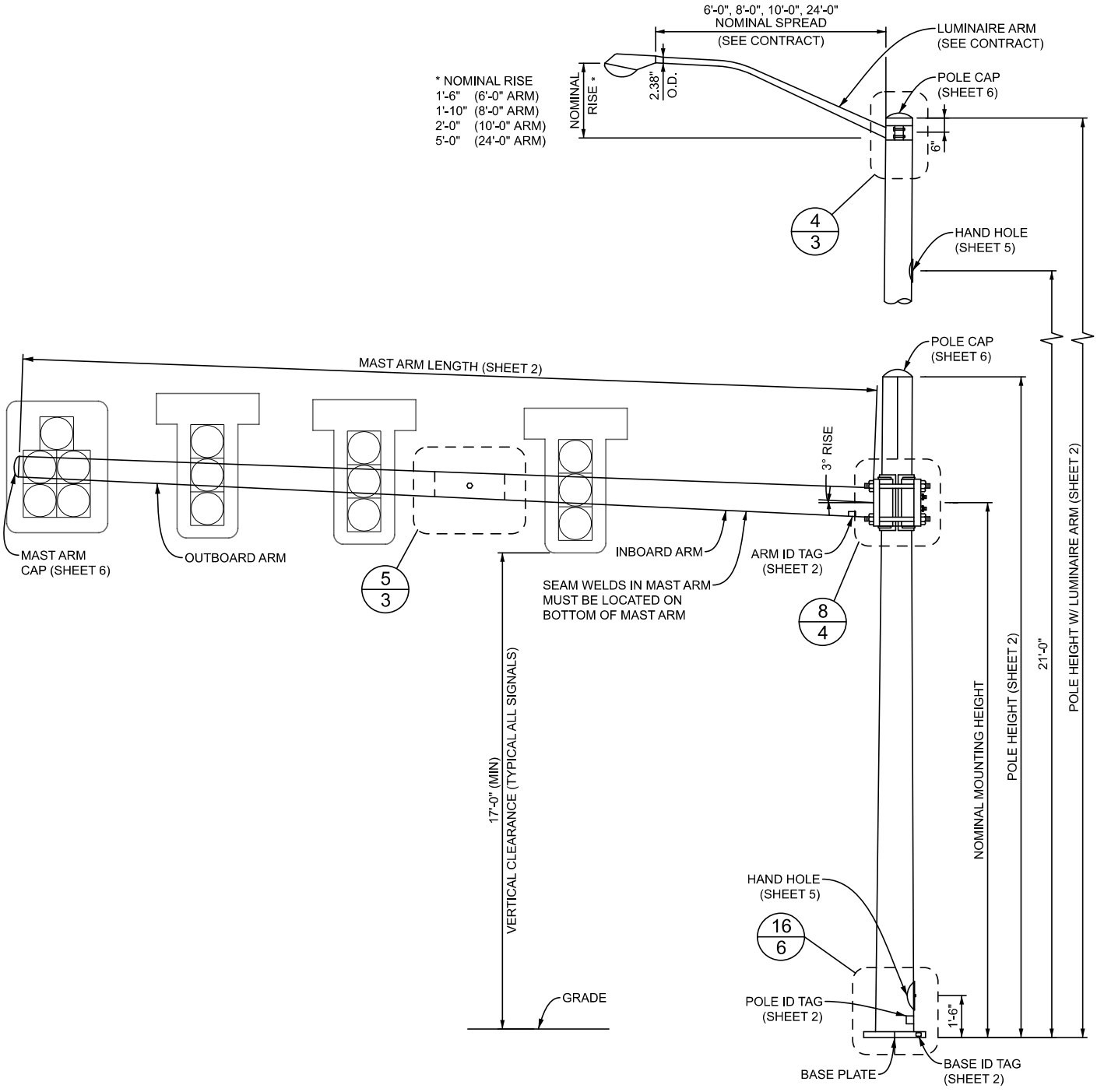
POLE AND MAST ARM CAP DETAIL



SECTION E-E

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-032-B	SHEET 6 of 6
File: RefDoc/TR/Signals/Web/Sp_Det/Fin/SIG032B.dgn Rev. 11/05/18		PLAN DATE		



ELEVATION - MAST ARM POLE

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
TRAFFIC SIGNAL MAST ARM POLE AND
MAST ARM DETAILS - CATEGORY III

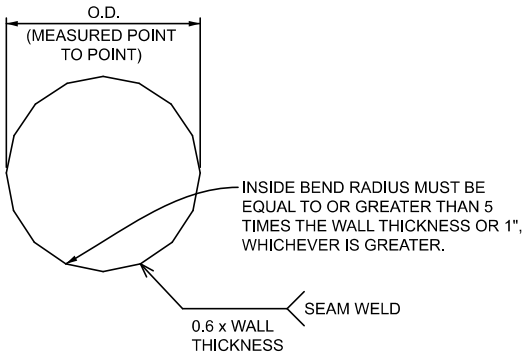
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-033-A	SHEET 1 OF 6

TAPERED STEEL MAST ARM POLE	
POLE DIMENSIONS*	LUMINAIRE ARM DIMENSIONS
0.4375"-14.00" x 11.06" x 21'-0"	6'-0"
0.4375"-14.00" x 9.80" x 30'-0"	8'-0"
0.4375"-14.00" x 8.96" x 36'-0"	10'-0"
0.4375"-14.00" x 8.40" x 40'-0"	24'-0"

POLE TUBE TAPER IS 0.140 IN/FT
* DIAMETERS GIVEN ARE O.D.

TAPERED STEEL MAST ARM	
MAST ARM LENGTH	MAST ARM DIMENSIONS*
20'-0"	0.2500"-8.00" x 5.20" x 20'-0"
25'-0"	0.2500"-8.00" x 4.50" x 25'-0"
30'-0"	0.2500"-8.00" x 3.80" x 30'-0"
35'-0"	0.2500"-11.00" x 6.10" x 35'-0"
40'-0"	0.2500-11.00" x 5.40" x 40'-0"
45'-0"	0.3125"-11.00" x 8.66" x 16-9" 0.1793"-9.18" x 5.10" x 29'-5"
50'-0"	0.3750"-15.00" x 12.66" x 16'-9" 0.2391"-13.37" x 8.48" x 34'-11"

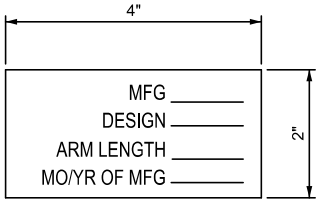
MAST ARM TUBE TAPER IS 0.140 IN/FT
* DIAMETERS GIVEN ARE O.D.

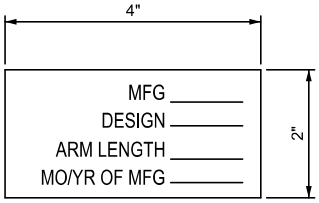


1 DETAIL - 16-SIDED SECTION

NOTES:

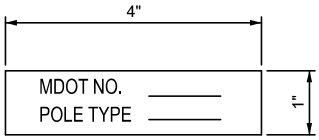
1. THE DESIGN OF THIS STRUCTURE IS BASED ON CATEGORY III GALLOPING, NATURAL WIND GUSTS, AND TRUCK INDUCED FATIGUE LOADS.
2. WELD THE LONGITUDINAL ARM SEAM ON THE INBOARD AND OUTBOARD SECTIONS OF THE TELESCOPIC FIELD SPLICE WITH A COMPLETE JOINT PENETRATION (CJP) WELD WITH A LENGTH EQUAL TO THE TELESCOPIC FIELD SPLICE LENGTH PLUS 6 INCHES. THE LAP OF THE ARM SECTIONS CANNOT EXTEND BEYOND THE LONGITUDINAL ARM SEAM CJP WELD WHEN THE FIELD SPLICE IS ERECTED AND IN ITS FINAL POSITION. IN ADDITION, LONGITUDINAL SEAM WELDS MUST HAVE 60% MINIMUM PENETRATION OR FUSION AND MUST BE CJP FOR A MINIMUM OF 6 INCHES FROM TUBE TO PLATE CJP WELDS.
3. SEAM WELDS IN MAST ARM POLE MUST BE 90° ± FROM HAND HOLE AT BASE. SEAM WELDS IN MAST ARM MUST BE LOCATED ON BOTTOM OF MAST ARMS.
4. LUMINAIRE ARM IS 11 GAUGE ROUND STEEL WITH 0.140 INCH PER FOOT TAPER.
5. BACKING BAR FOR PIPE TO BASE PLATE (□) AND MAST ARM TO MAST ARM PLATE MUST BE MINIMUM 5/16 INCH X 2 INCH PLATE.
6. 1/2 INCH DIAMETER (Ø) ROUND STOCK C-HOOK ATTACHED TO ALL POLE SIZES. 1 INCH SCHEDULE (SCH.) 80 PIPE ATTACHED TO ALL POLE SIZES AND INBOARD AND OUTBOARD ARM.
7. S.S. DENOTES STAINLESS STEEL. GA. DENOTES GAUGE. O.D. DENOTES OUTSIDE DIAMETER. I.D. DENOTES INSIDE DIAMETER. H.S. DENOTES HIGH STRENGTH.
8. ROUND OR 16-SIDED SECTIONS ARE ALLOWED.
9. MULTI-PLY SECTIONS ARE NOT ALLOWED.





ATTACH TO POLE OR MAST ARM AT LOCATIONS SHOWN
4" FROM BASE OF TUBE BELOW HANDHOLE WITH (4) #8 x 3/8"
S.S. TYPE U DRIVE SCREWS.
(LETTERS STAMPED IN 3/8" CHARACTERS)

2 DETAIL - ARM/POLE S.S. ID TAG



WELD TAG TO EDGE OF BASE PLATE
(LETTERS STAMPED IN 3/8" CHARACTERS)

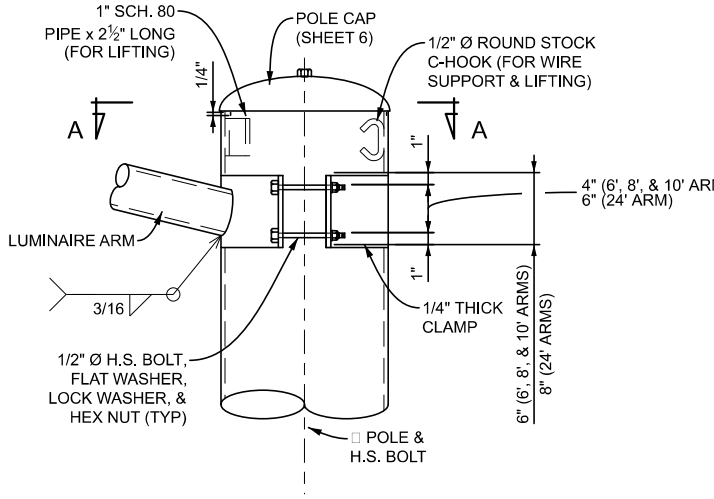
3 DETAIL - BASE S.S. ID TAG

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

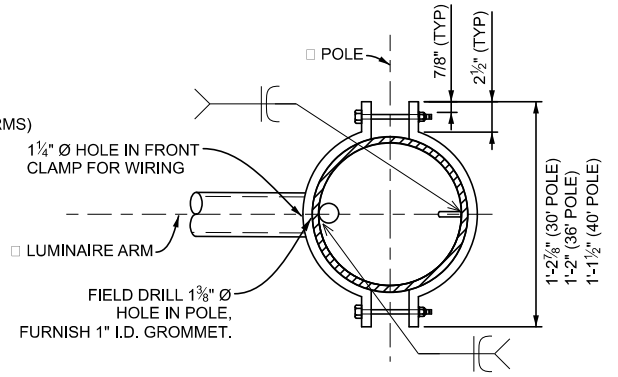
STANDARD PLAN FOR
MAST ARM POLE AND MAST ARM REQUIREMENTS

(SPECIAL DETAIL)	07/27/23	SIG-033-A	SHEET
FHWA APPROVAL	PLAN DATE		2 OF 6
			SECT

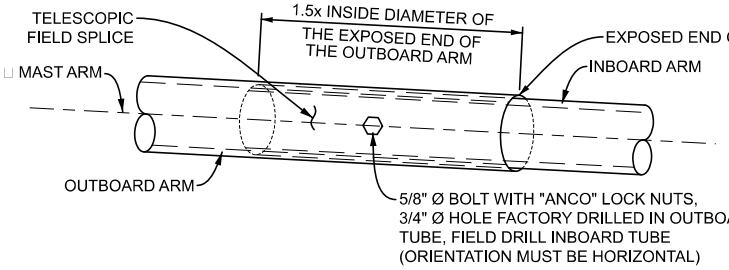


ORIENTATION OF SCH. 80 PIPE 180° FROM HAND HOLE AT BASE & C-HOOK 180° FROM SCH. 80 PIPE

4 DETAIL - LUMINAIRE ARM BRACKET

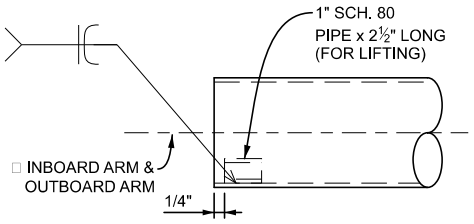


A SECTION - LUMINAIRE ARM BRACKET



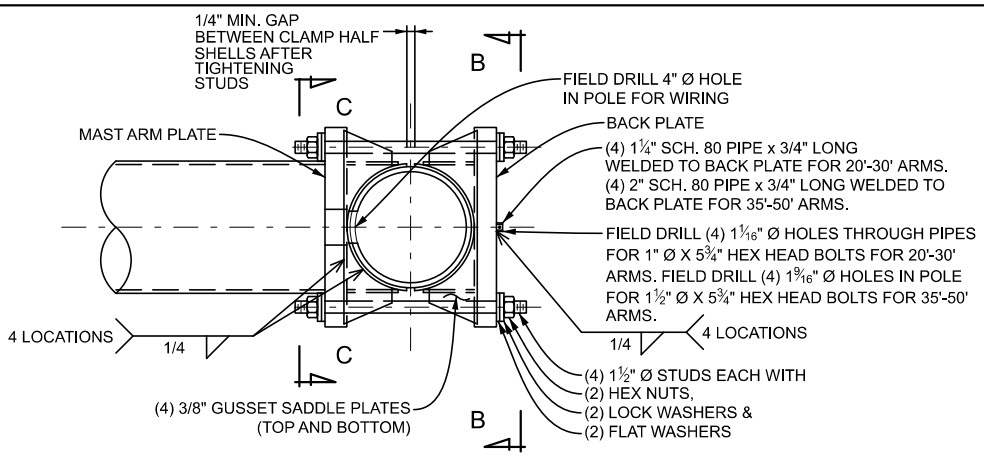
NOTES:
1. FOR 45'-0" ARMS AND GREATER.
2. THE INBOARD AND OUTBOARD ARMS MUST FIT TIGHTLY.

5 DETAIL - TELESCOPIC SPLICE



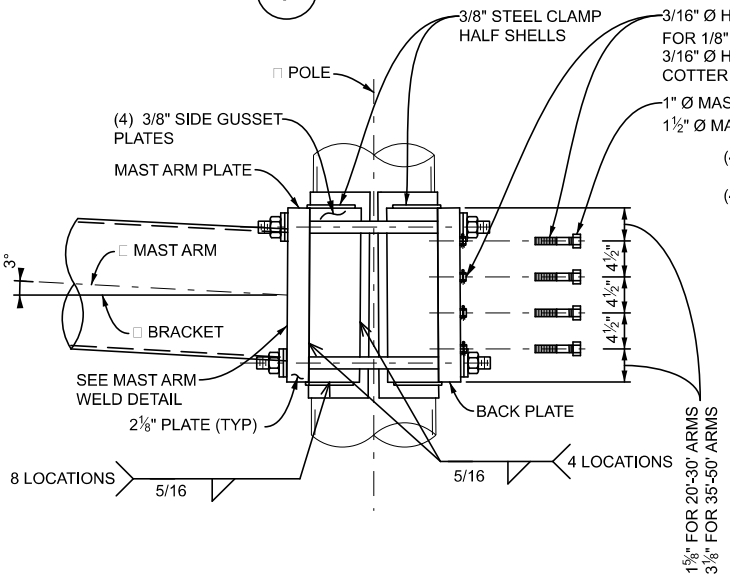
6 INBOARD/OUTBOARD ARM DETAIL - LIFTING DEVICE

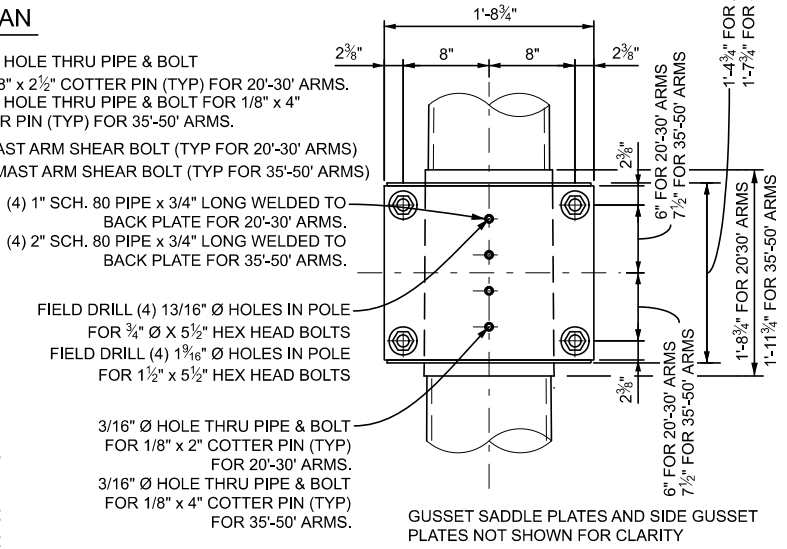
MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR LUMINAIRE ARM BRACKET, TELESCOPIC SPLICE, AND LIFTING DEVICE DETAILS		
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-033-A	SHEET 3 OF 6



ROUND SECTION SHOWN,
SAME CONNECTION DETAILS FOR 16-SIDED SECTION
GUSSET SADDLE PLATES MUST MATCH 16-SIDED POLE SHAPE

7 DETAIL - MAST ARM BRACKET PLAN

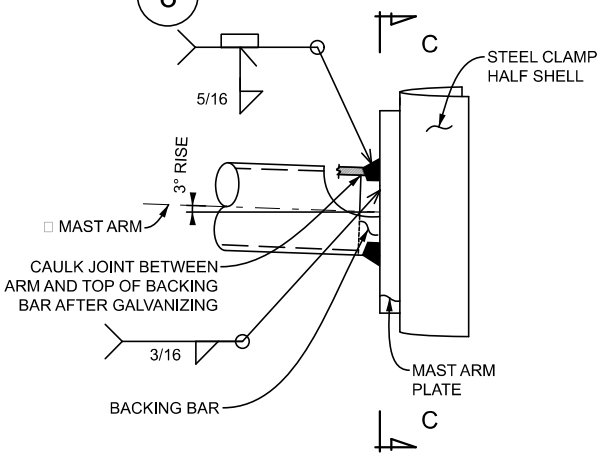




GUSSET SADDLE PLATES AND SIDE GUSSET PLATES NOT SHOWN FOR CLARITY

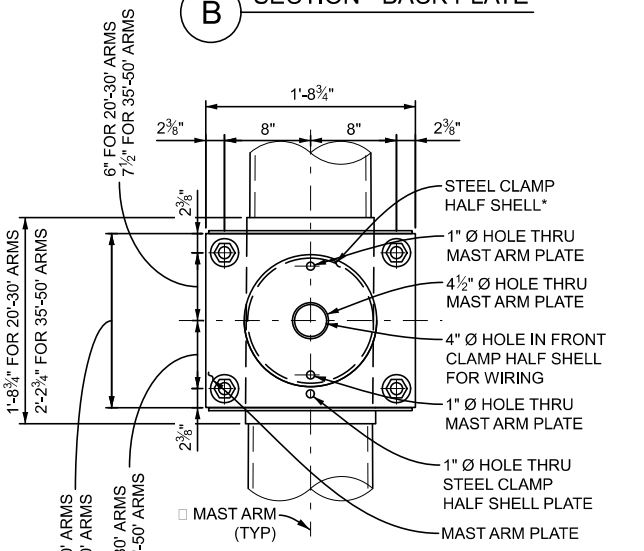
B SECTION - BACK PLATE

8 DETAIL - MAST ARM BRACKET ELEVATION



GUSSET SADDLE PLATES AND SIDE GUSSET PLATES NOT SHOWN FOR CLARITY

9 DETAIL - MAST ARM WELD



GUSSET SADDLE PLATES AND SIDE GUSSET PLATES NOT SHOWN FOR CLARITY

*INSIDE RADIUS OF STEEL CLAMP HALF SHELL SHALL BE WITHIN 1/4" OF THE DESIGNED POLE OUTSIDE RADIUS AT THE INTENDED MOUNTING HEIGHT

C SECTION - MAST ARM PLATE

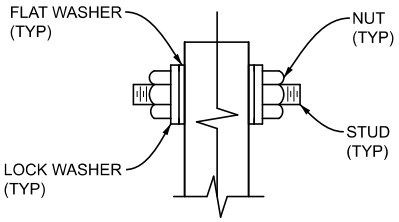
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

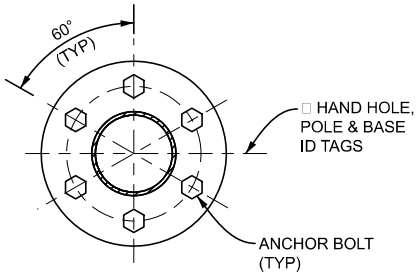
STANDARD PLAN FOR
MAST ARM BRACKET DETAILS

(SPECIAL DETAIL) / FHWA APPROVAL	07/27/23 / PLAN DATE	SIG-033-A	SHEET 4 OF 6

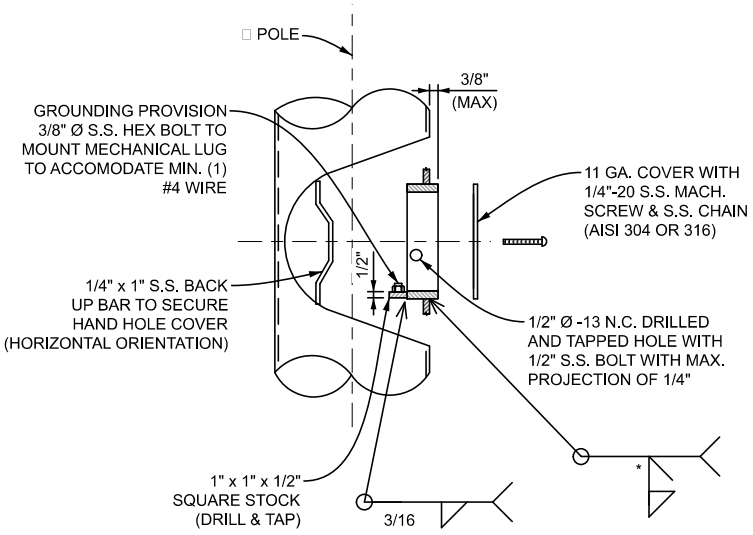
SECT



10 DETAIL - MAST ARM BRACKET WASHERS

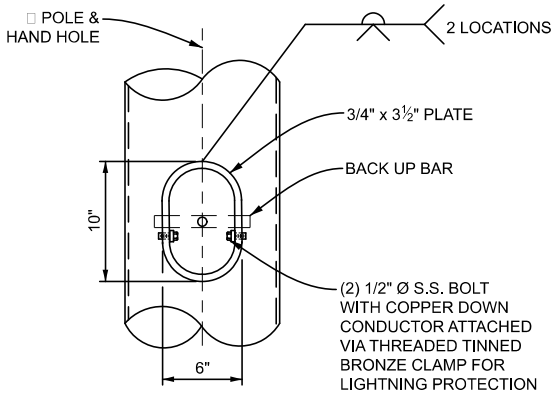


11 DETAIL - ORIENTATION OF HAND HOLE

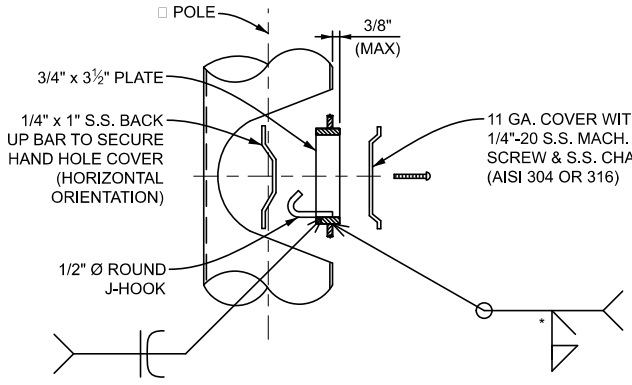


*S (WELD SIZE) = 0.9 x POLE WALL THICKNESS

12 DETAIL - 6" X 10" BAR BOTTOM HAND HOLE

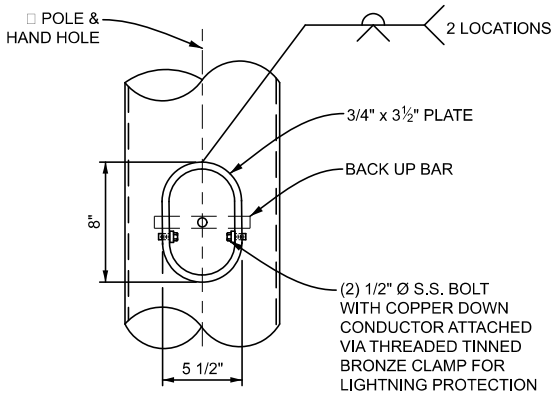


13 DETAIL - 6" X 10" BAR BOTTOM HAND HOLE
VIEW ROTATED 90 DEGREES



*S (WELD SIZE) = 0.9 x POLE WALL THICKNESS

14 DETAIL - 5 1/2" X 8" BAR TOP HAND HOLE



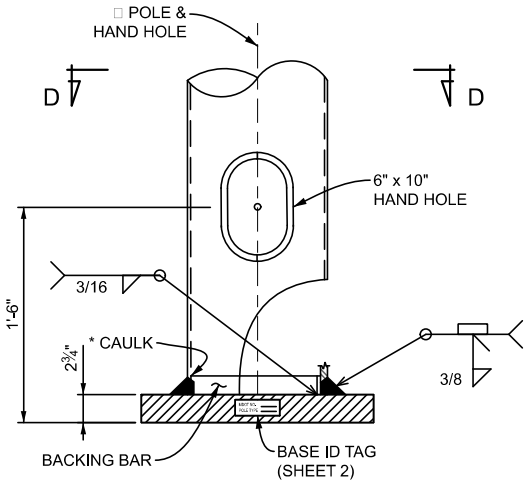
15 DETAIL - 5 1/2" X 8" BAR TOP HAND HOLE
VIEW ROTATED 90 DEGREES

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

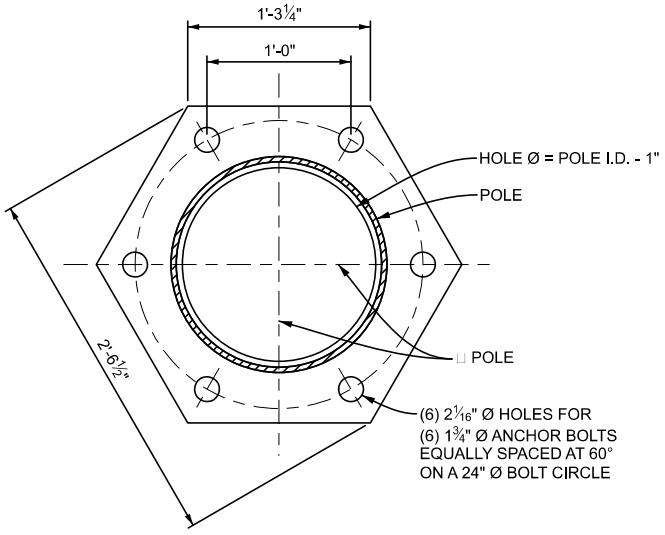
STANDARD PLAN FOR
HAND HOLE DETAILS

(SPECIAL DETAIL) / FHWA APPROVAL	07/27/23 / PLAN DATE	SIG-033-A	SHEET 5 OF 6

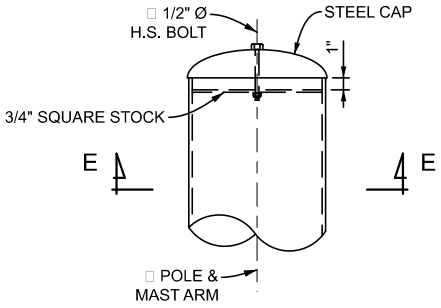


*SEAL JOINT WITH CAULK AFTER GALVANIZING

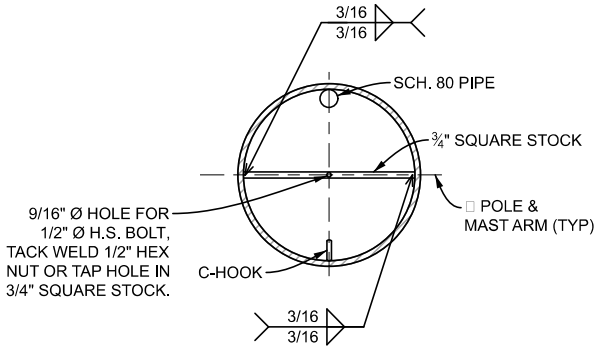
16 DETAIL - BASE PLATE WELD
VIEW ROTATED 90 DEGREES



D SECTION - BASE PLATE



17 DETAIL - POLE AND MAST ARM CAP



E SECTION - POLE AND MAST ARM CAP

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
BASE PLATE, MAST ARM POLE CAP, AND
MAST ARM CAP DETAILS

(SPECIAL DETAIL) / FHWA APPROVAL	07/27/23 / PLAN DATE	SIG-033-A	SHEET 6 OF 6

SECT

NOTES:

1) All ground rods shall be 3/4"x10' copper clad rod a minimum of 2 ground rods shall be used (one for the service disconnect and one for the messenger cable & pole).

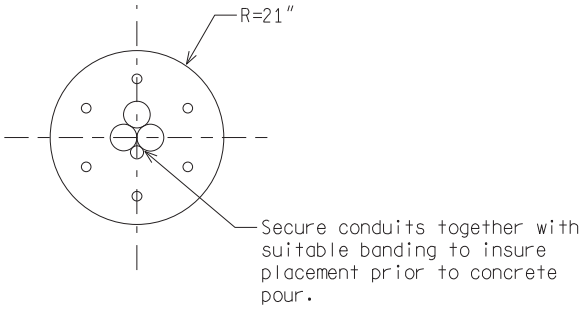
2) Ground rod placement shall not be less than 12" from the foundation with a minimum of 6' between ground rods. Placement shall be as directed by the Engineer and in compliance with N.E.C.

3) Ground wire connection to grounding rod(s) shall utilize a non-solder type connection.

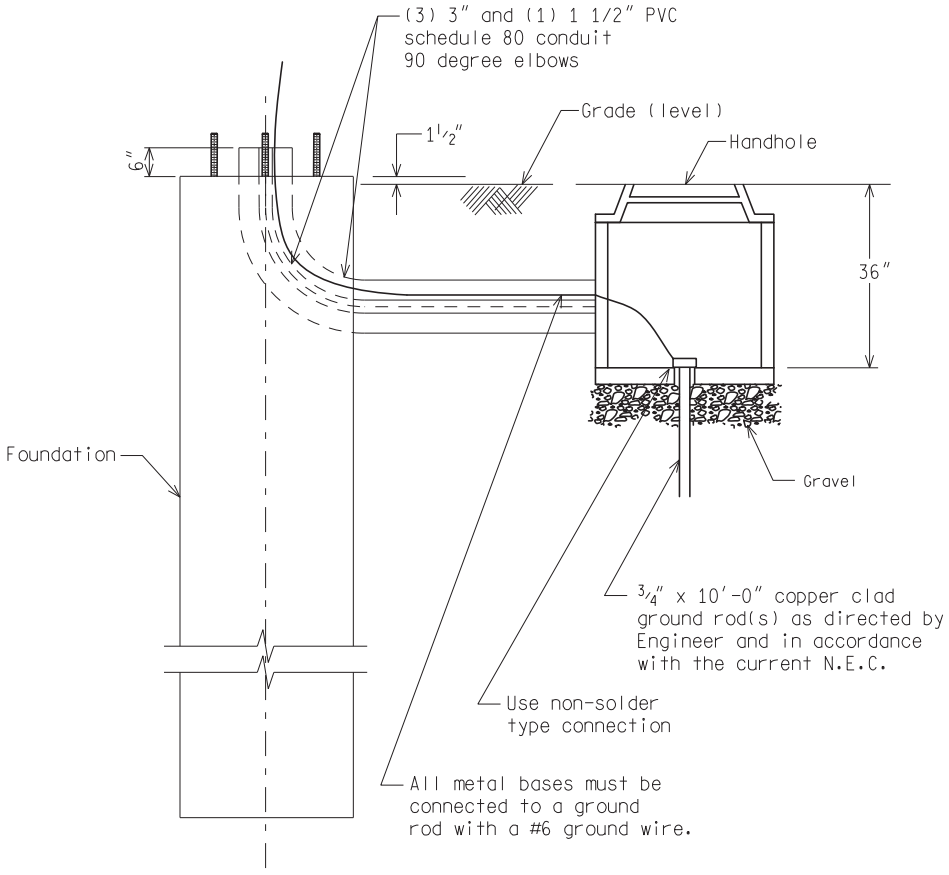
4) Indicate the direction of conduits in foundation top with an arrow.

5) Install pole that the foundation & anchor bolts are plumb.

6) All grounds shall provide less than 10 ohm resistance to ground.



PLAN



ELEVATION

MAST ARM FOUNDATION CONDUIT AND GROUNDING

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG040A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

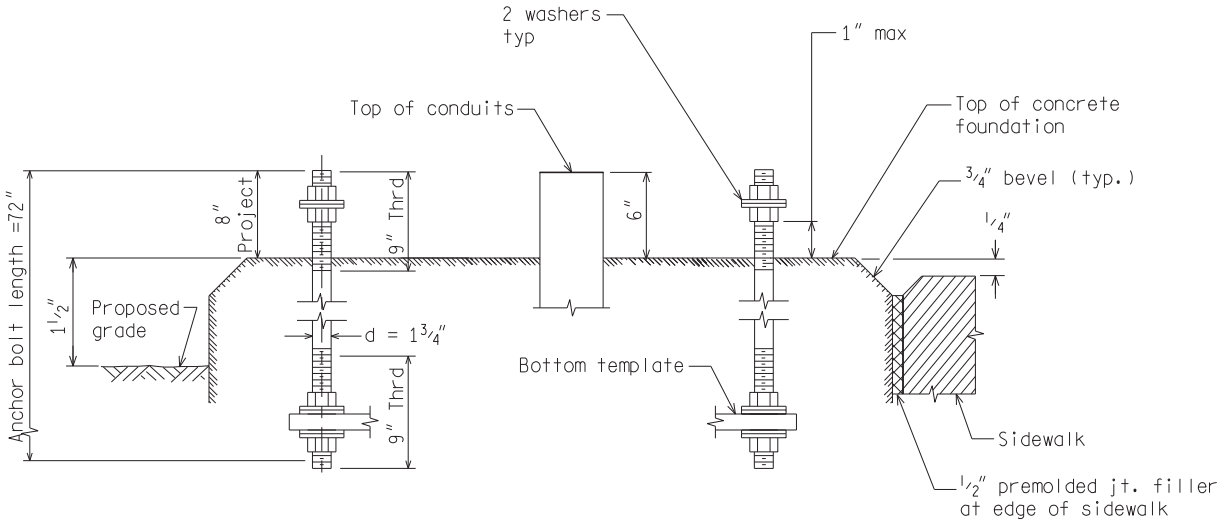
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

TRAFFIC SIGNAL MAST ARM STANDARD FOUNDATIONS

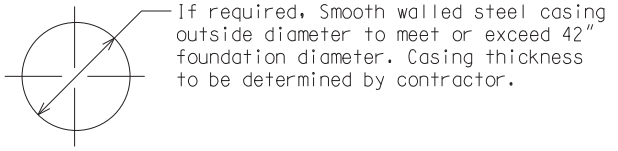
PLAN DATE

SIG-040-A

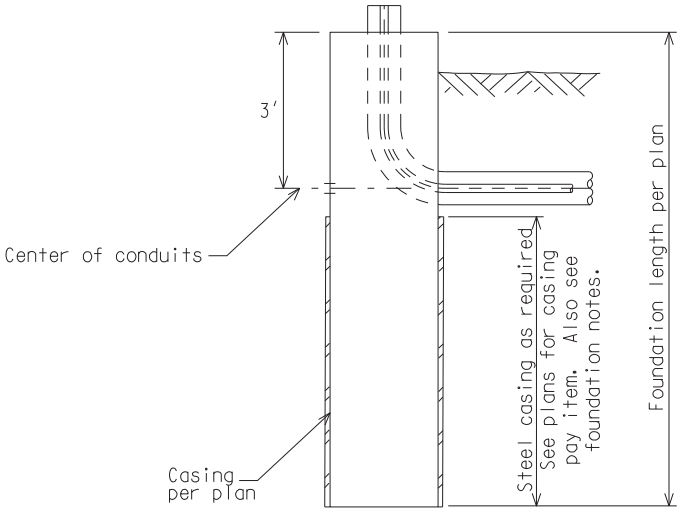


ANCHOR BOLTS

NOTE:
Trench for placement of conduits after casing is in place and before dewatering.



PLAN



ELEVATION

DRILLED FOUNDATION SHAFT (SHOWN WITH CASING PAY ITEM)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG040A.dgn Rev. 02/16/17		PLAN DATE	SIG-040-A	SHEET 2 of 4

NOTES:

1. Anchor bolts shall be set and held vertical at the correct location and at the proper elevation with a 3/4" steel (or approved equal) template a minimum of 24 hours after the concrete placement has been completed.

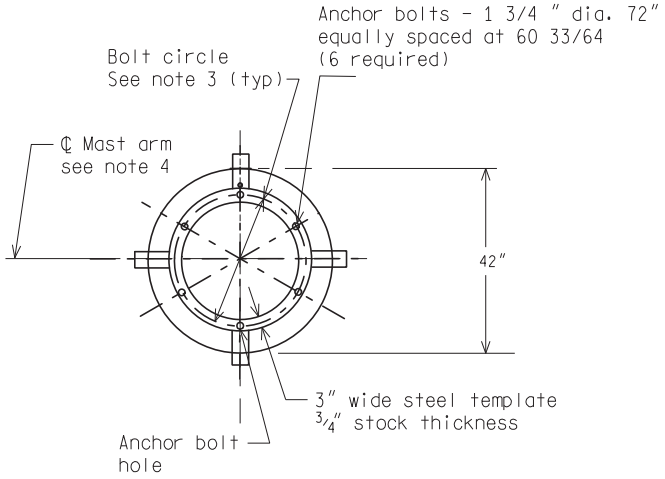
2. (6) 1 3/4" - 72" Anchor bolts with (4) Hex nuts and (4) washers per bolt.

3. 24" dia bolt circle for Category I, Category II, and Category III Mast Arms.

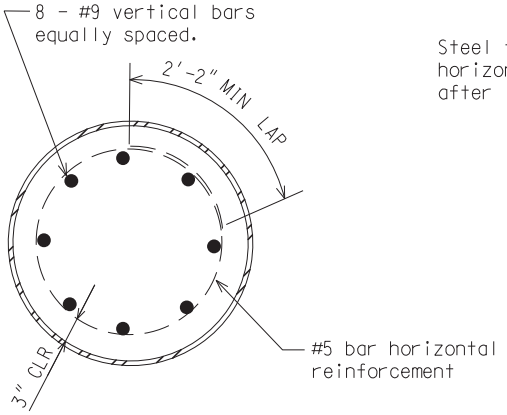
4. Mast arm orientation is not dependent on anchor bolt position.

5. Use #4 AWG or larger standard bare ground wire bonded by mechanical connection to foundation reinforcing steel and having 24" of slack above the top of foundation.

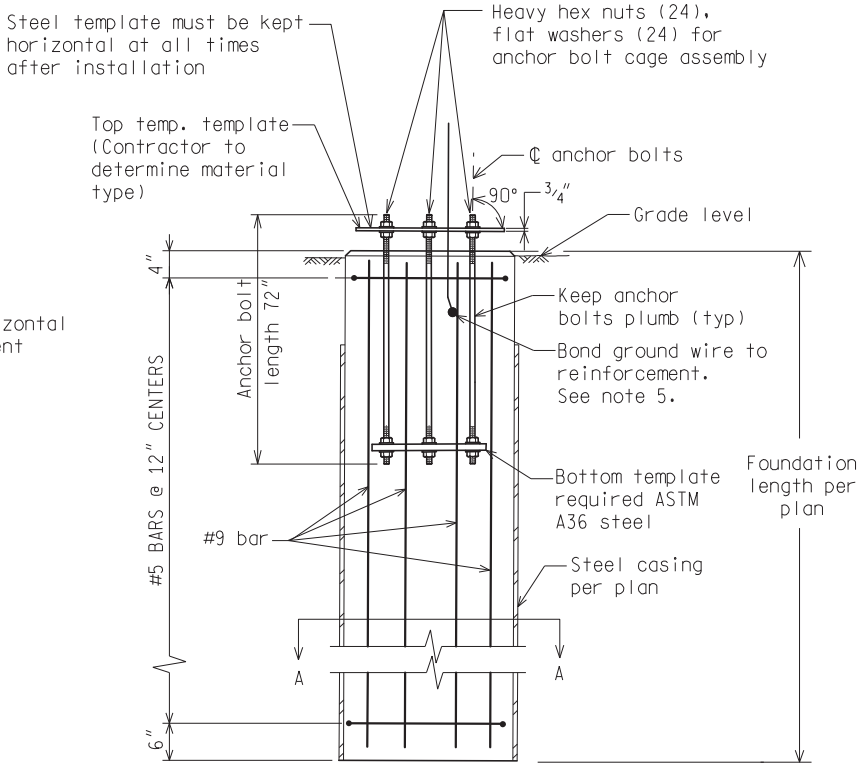
6. Galvanize all exposed nuts, bolts, and washers according to ASTM F2329. Galvanize all other steel items according to ASTM A123. Embedded nuts, bolts, washers, and steel ring need not be galvanized.



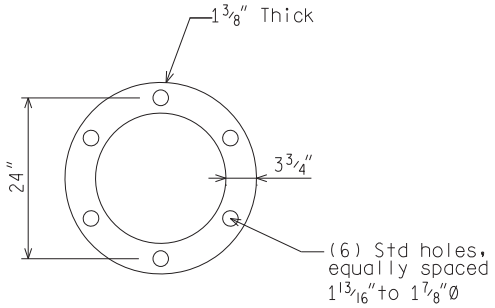
PLAN VIEW



SECTION A-A



ELEVATION



BOTTOM STEEL TEMPLATE

MAST ARM FOUNDATION (SHOWN WITH CASING PAY ITEM)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-040-A	SHEET 3 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG040A.dgn Rev. 02/16/17		PLAN DATE		

Foundation Notes:

1. Refer to the following special provisions related to 6 anchor bolt mast arm poles:
   Traffic Signal Mast Arm Pole and Mast Arm
   Mast Arm Pole Foundation and Anchor Bolts
   Casing Used With Strain Poles and Mast Arm Poles

2. Templates shall be shop fabricated and assembled prior to being approved by MDOT for shipping.

3. Diameter of bolt holes in template shall be 1/16 " larger than anchor bolt diameter.

4. Conduits and anchor bolts shall be rigidly installed before concrete is placed. The center of the template shall coincide with the center of the foundation. The template and handles shall be well supported, horizontally level and firmly anchored in place a minimum of 24 hours after the concrete placement is completed.

5. Due care shall be taken during the concrete placement to avoid displacing the anchor bolts.

6. No hammering on the anchor bolts or template will be allowed.

7. After template is removed, thread nuts on to the bolt flush with the bolt end to protect threads until signal support is erected.

8. For anchor bolt material refer to section 908.14 A and B of the Michigan Standard Specifications for Construction. For anchor bolt installation and tightening refer to section 810.03 N.

9. Dewatering of wet shafts is not allowed. A wet shaft is defined as having more than 3 inches of standing water or as having water infiltrating at a rate equal to or exceeding 12 inches per hour. For wet shafts, Concrete is to be placed in accordance with section 718.03. (wet construction method) with a tremie tube or concrete pump beginning at the shaft bottom. Grade T concrete must be used for underwater placement. Grade S2 may be used in dry excavations only. See MDOT standard specifications Tables 701-1A and 701-1B (Concrete Structure Mixtures).

10. Per MDOT standard specifications 718.02, the Grade S2 acceptable slump range is 6-8 inches. The Grade T acceptable slump range is 7-9 inches.

11. If soil conditions indicate there is no need for a casing pay item as shown on the plans, the contractor should request permission of the engineer to install the foundation without casing.

12. When the casing pay item is included on the plans for a foundation (due to granular soils or a wet hole), steel casing (smooth walled) is to be installed to enable the foundation to be poured. The thickness of the steel is to be determined by the contractor. The steel casing shall be left in place. A suitable method of compaction must be employed to ensure the soil immediately outside the casing is compacted properly.

13. 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. The casing pay item quantity will be paid for based on actual linear feet installed.

14. Construct mast arm foundations, according to subsections 718.03 of the Standard Specifications for Construction. All work and materials shall be in accordance with the MDOT Standard Specifications.

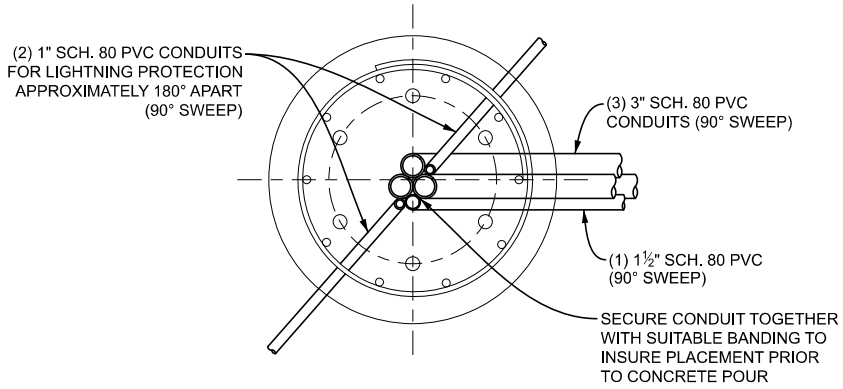
15. Steel reinforcement shall be ASTM A615 grade 60 without epoxy coating.

16. Exposed concrete surfaces shall be cast in forms. Exposed concrete edges shall be beveled 3/4".

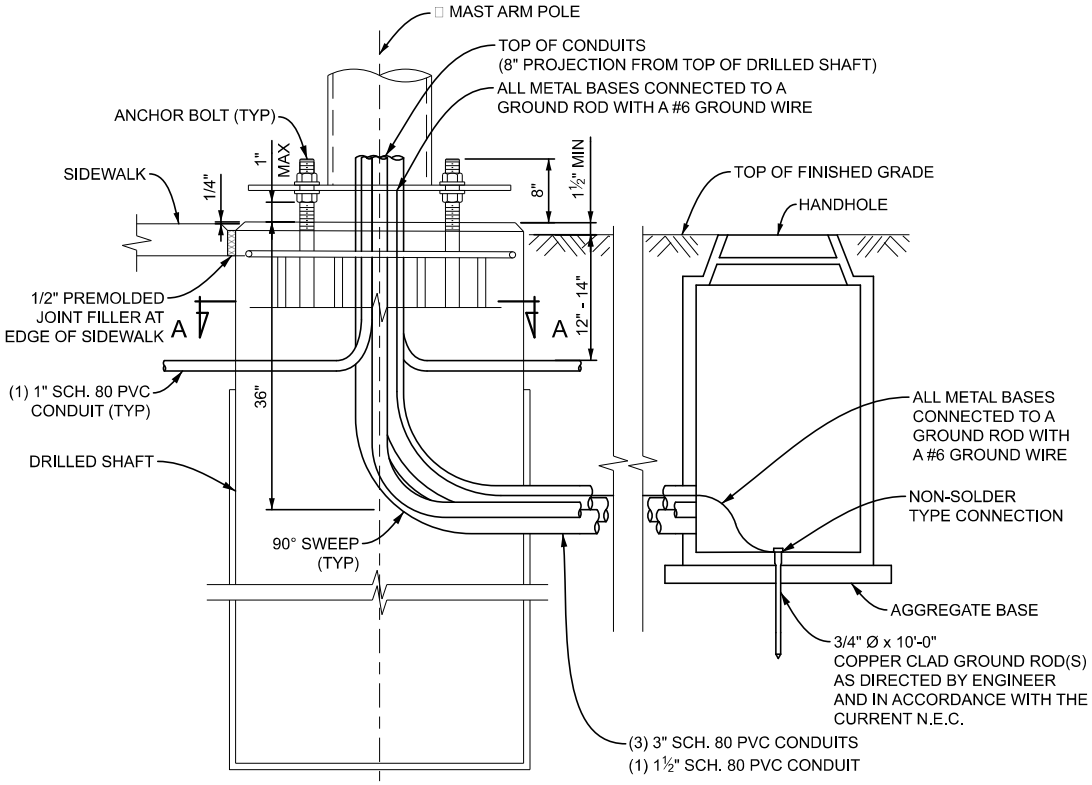
17. Steel reinforcement shall have a clear cover of 3 inches unless noted otherwise. Steel Reinforcement may be adjusted to ensure proper clear cover.

18. Grounding of pole includes adding #4 bare copper ground wire bonded by mechanical connection to foundation reinforcing steel and having 24" of slack above the top of foundation.

NOT TO SCALE



A SECTION - CONDUIT LAYOUT



1 DETAIL - CONDUIT LAYOUT AND GROUNDING

NOTES:

1. ALL GROUND RODS SHALL BE 3/4" X 10' COPPER CLAD ROD. A MINIMUM OF 2 GROUND RODS SHALL BE USED (ONE FOR THE SERVICE DISCONNECT AND ONE FOR THE MESSENGER CABLE & POLE).
2. GROUND ROD PLACEMENT SHALL NOT BE LESS THAN 12" FROM THE FOUNDATION WITH A MINIMUM OF 6' BETWEEN GROUND RODS. PLACEMENT SHALL BE AS DIRECTED BY THE ENGINEER AND IN COMPLIANCE WITH N.E.C.
3. GROUND WIRE CONNECTION TO GROUNDING ROD(S) SHALL UTILIZE A NON-SOLDER TYPE CONNECTION.
4. INDICATE THE DIRECTION OF CONDUITS IN FOUNDATION TOP WITH AN ARROW.
5. INSTALL POLE SUCH THAT THE FOUNDATION & ANCHOR BOLTS ARE PLUMB.
6. ALL GROUNDS SHALL PROVIDE LESS THAN 10 OHM RESISTANCE TO GROUND.

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

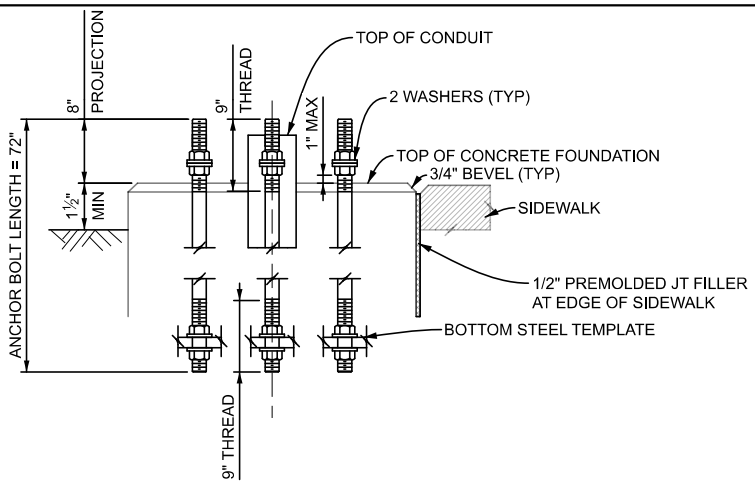
APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

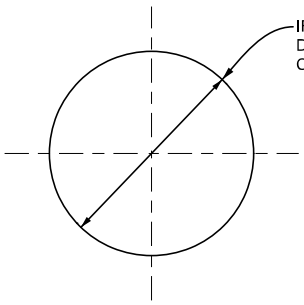
STANDARD PLAN FOR
TRAFFIC SIGNAL MAST ARM
STANDARD FOUNDATIONS

(SPECIAL DETAIL)	07/27/23	SIG-040-B	SHEET
FHWA APPROVAL	PLAN DATE		1 OF 4

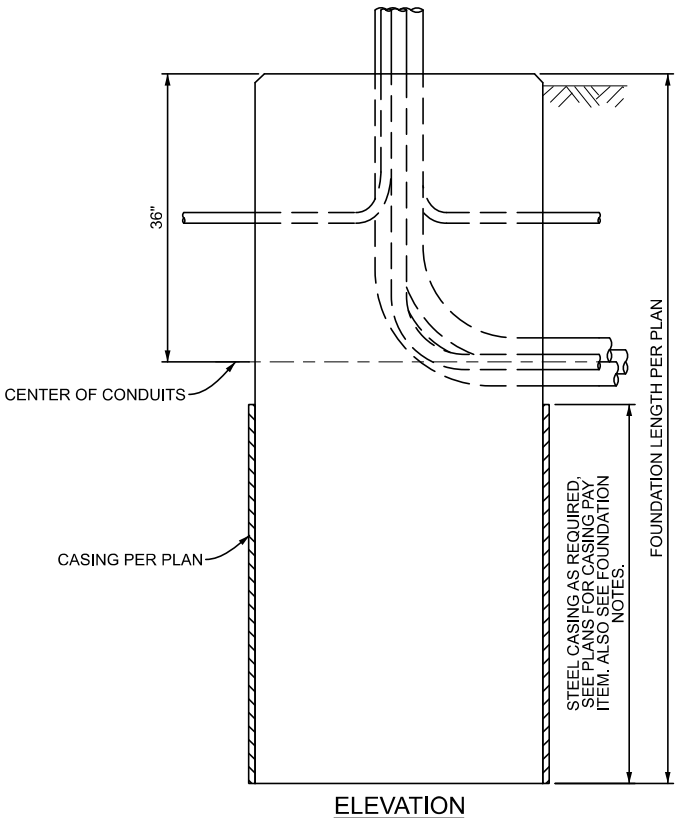


TRENCH FOR PLACEMENT OF CONDUITS AFTER CASING IS IN PLACE AND BEFORE DEWATERING.

2 DETAIL - ANCHOR BOLTS



PLAN



ELEVATION

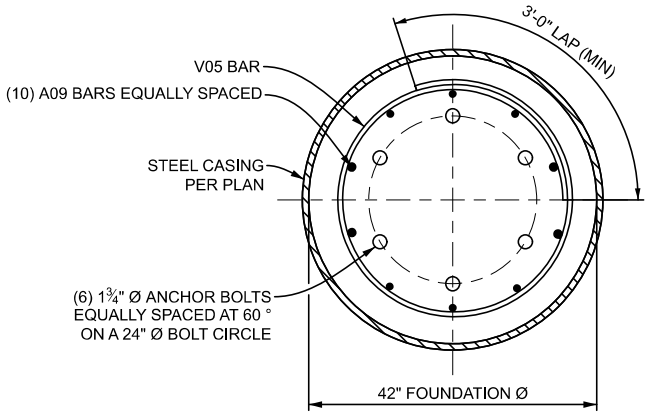
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

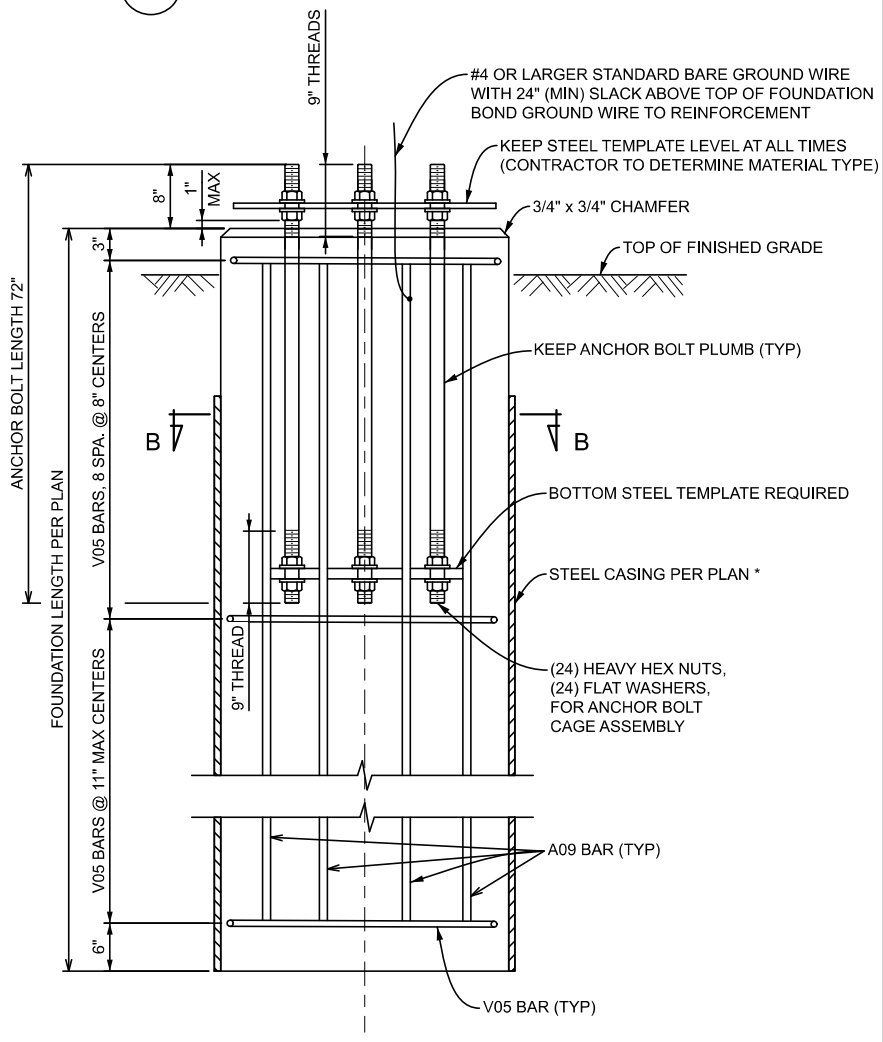
STANDARD PLAN FOR
DRILLED FOUNDATION SHAFT
(SHOWN WITH CASING PAY ITEM)

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-040-B	SHEET 2 OF 4

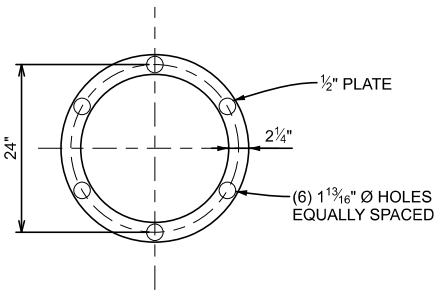
SECT



B SECTION - FOUNDATION PLAN



* SEE FOUNDATION NOTES AND PLANS FOR STEEL CASING PAY ITEM



3 DETAIL - BOTTOM STEEL TEMPLATE

4 DETAIL - MAST ARM FOUNDATION ELEVATION
SHOWN WITH CASING PAY ITEM

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
MAST ARM FOUNDATION
(SHOWN WITH CASING PAY ITEM)

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-040-B	SHEET 3 OF 4

FOUNDATION NOTES:

1. TEMPLATES SHALL BE SHOP FABRICATED AND ASSEMBLED PRIOR TO BEING APPROVED BY MDOT FOR SHIPPING.

2. DIAMETER OF BOLT HOLES IN TEMPLATE SHALL BE 1/16" LARGER THAN ANCHOR BOLT DIAMETER.

3. MAST ARM ORIENTATION IS NOT DEPENDENT ON ANCHOR BOLT POSITION.

4. CONDUITS AND ANCHOR BOLTS SHALL BE RIGIDLY INSTALLED BEFORE CONCRETE IS PLACED. THE CENTER OF THE TEMPLATE SHALL COINCIDE WITH THE CENTER OF THE FOUNDATION. THE TEMPLATE AND HANDLES SHALL BE WELL SUPPORTED, HORIZONTALLY LEVEL, HELD VERTICAL AT THE PROPER ELEVATION, AND FIRMLY ANCHORED IN PLACE A MINIMUM OF 24 HOURS AFTER THE CONCRETE PLACEMENT IS COMPLETED.

5. DUE CARE SHALL BE TAKEN DURING THE CONCRETE PLACEMENT TO AVOID DISPLACING THE ANCHOR BOLTS.

6. NO HAMMERING ON THE ANCHOR BOLTS OR TEMPLATE WILL BE ALLOWED.

7. AFTER TEMPLATE IS REMOVED, THREAD NUTS ON TO THE BOLT FLUSH WITH THE BOLT END TO PROTECT THREADS UNTIL SIGNAL SUPPORT IS ERECTED.

8. GALVANIZE ALL EXPOSED NUTS, BOLTS, AND WASHERS ACCORDING TO ASTM F2329. GALVANIZE ALL OTHER STEEL ITEMS ACCORDING TO ASTM A123. EMBEDDED NUTS, BOLTS, WASHERS, AND BOTTOM STEEL TEMPLATE NEED NOT BE GALVANIZED.

9. FOR ANCHOR BOLT MATERIAL, REFER TO SECTION 908.14 A AND B OF THE MICHIGAN STANDARD SPECIFICATIONS FOR CONSTRUCTION. FOR ANCHOR BOLT INSTALLATION AND TIGHTENING, REFER TO SECTION 810.03 N.

10. IF SOIL CONDITIONS INDICATE THERE IS NO NEED FOR A CASING PAY ITEM AS SHOWN ON THE PLANS, THE CONTRACTOR SHOULD REQUEST PERMISSION OF THE ENGINEER TO INSTALL THE FOUNDATION WITHOUT CASING.

11. WHEN THE CASING PAY ITEM IS INCLUDED 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 IS TO BE DETERMINED BY THE CONTRACTOR. THE STEEL CASING SHALL BE LEFT IN PLACE. IF SOIL EXTENDING LATERALLY WITHIN 6 FEET OF THE DRILLED SHAFT FOUNDATION IS LOOSENED 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.

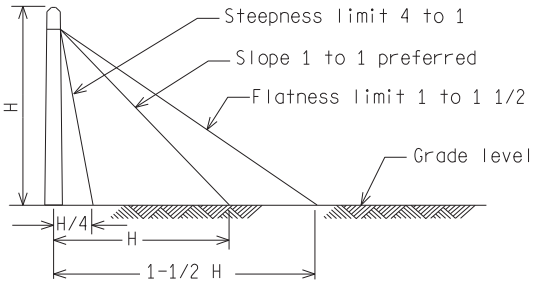
12. WHEN THE CASING PAY ITEM IS CALLED FOR ON THE PLANS, THE STEEL CASING MAY STOP AT THE CONDUIT ENTRANCE TO FOUNDATION. TOP OF FOUNDATION MUST THEN BE FORMED SEPARATELY. THE CASING PAY ITEM QUANTITY WILL BE PAID FOR BASED ON ACTUAL LINEAR FEET INSTALLED.

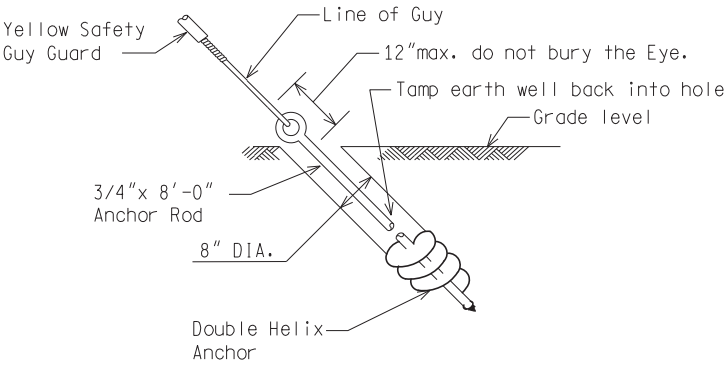
13. CONSTRUCT MAST ARM FOUNDATIONS, ACCORDING TO SUBSECTIONS 718.03 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE MDOT STANDARD SPECIFICATIONS.

14. STEEL REINFORCEMENT SHALL BE ASTM A615 GRADE 60 WITHOUT EPOXY COATING.

15. EXPOSED CONCRETE SURFACES SHALL BE CAST IN FORMS. EXPOSED CONCRETE EDGES SHALL BE BEVELED 3/4".

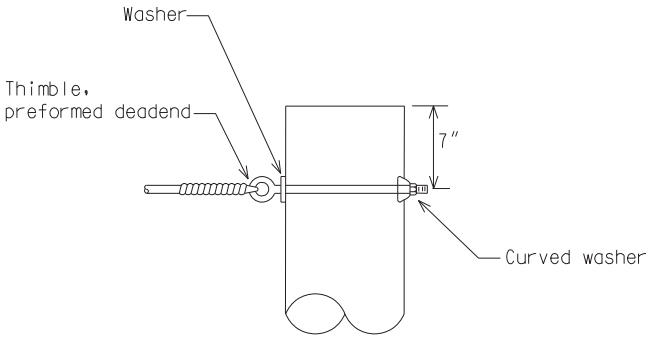
16. GROUNDING OF POLE INCLUDES ADDING #4 BARE COPPER GROUND WIRE BONDED BY MECHANICAL CONNECTION TO FOUNDATION REINFORCING STEEL AND HAVING 24" OF SLACK ABOVE THE TOP OF FOUNDATION.



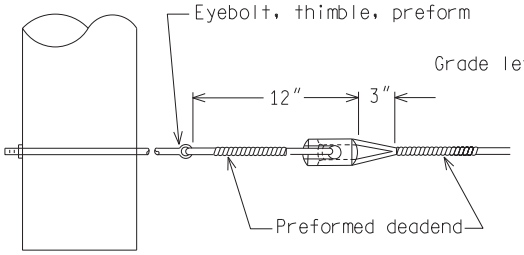


SLOPE LIMITS FOR ANCHOR GUYS

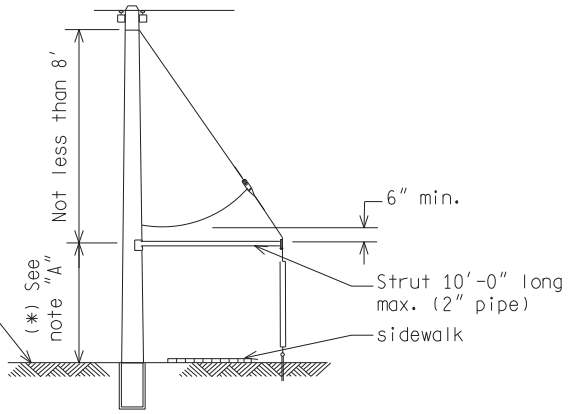
NOTE:
Use screw anchor or Double Helix anchor according to soil condition as directed by the Engineer.



POLE GUY

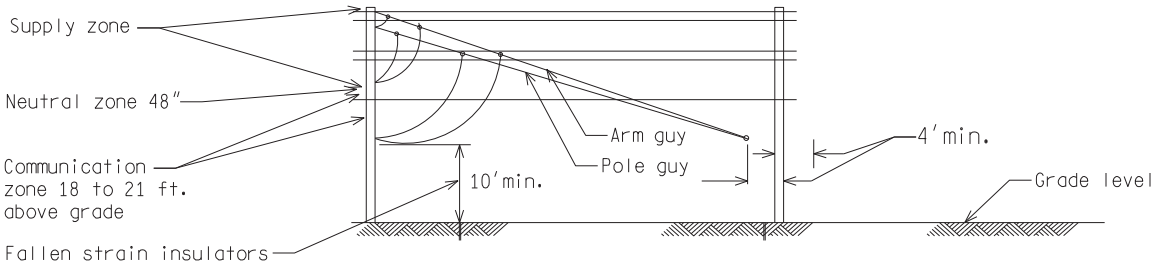


ARM GUY



GUY STRUT

(*) NOTE: "A"
This dimension to be 10' unless otherwise specified.



STRAIN INSULATOR POSITIONS IN GUY WIRES

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG050A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

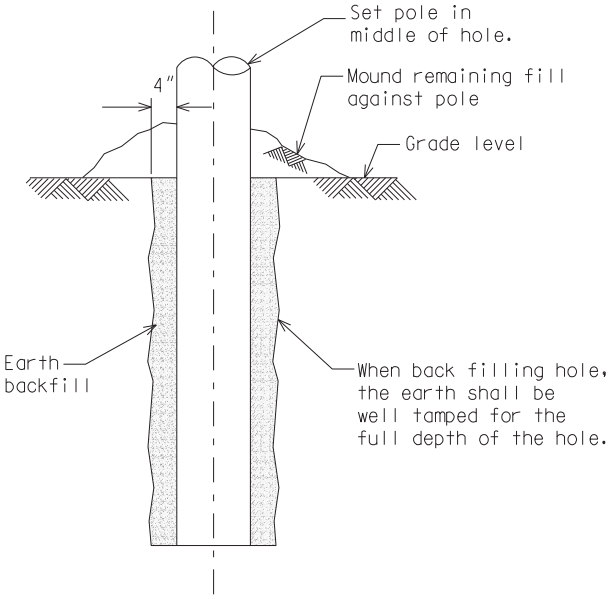
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

WOOD POLE GUYS AND SETTING DEPTH

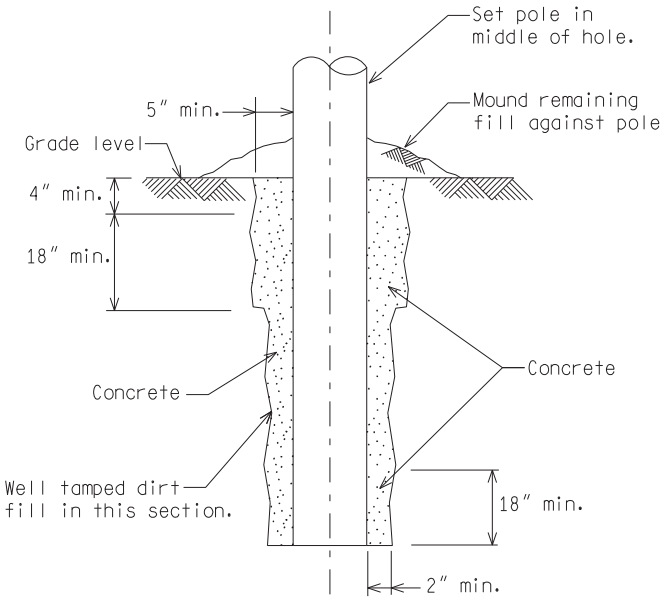
PLAN DATE

SIG-050-A

SHEET
1 of 2



WOOD POLE INSTALLATION



SELF SUPPORTING WOOD POLE IN CONCRETE

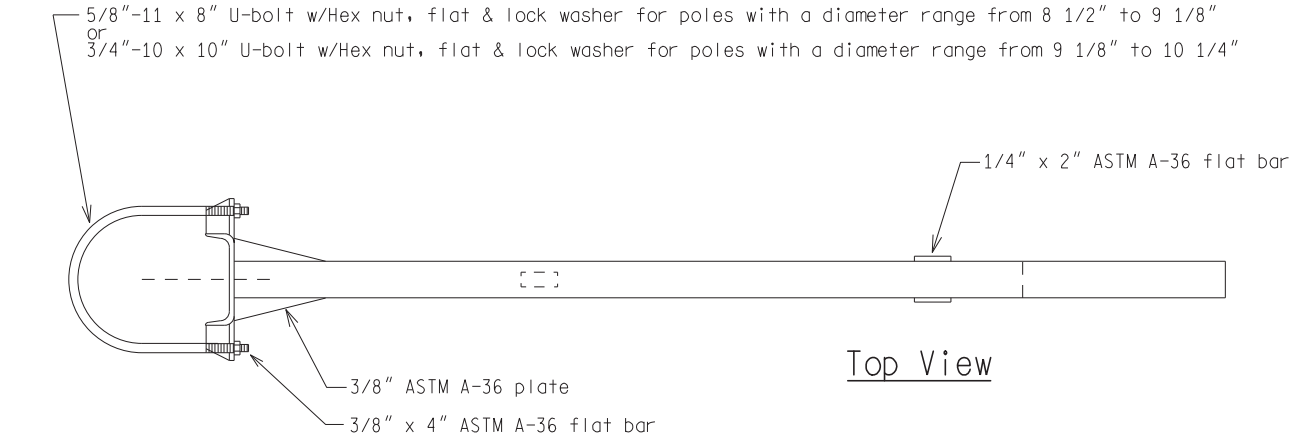
POLE HEIGHT	SETTING DEPTH
30'	6.0'
35'	6.0'
40'	6.0'
45'	6.5'
50'	7.0'
55'	7.5'
60'	8.0'

WOOD POLE SETTING DEPTHS

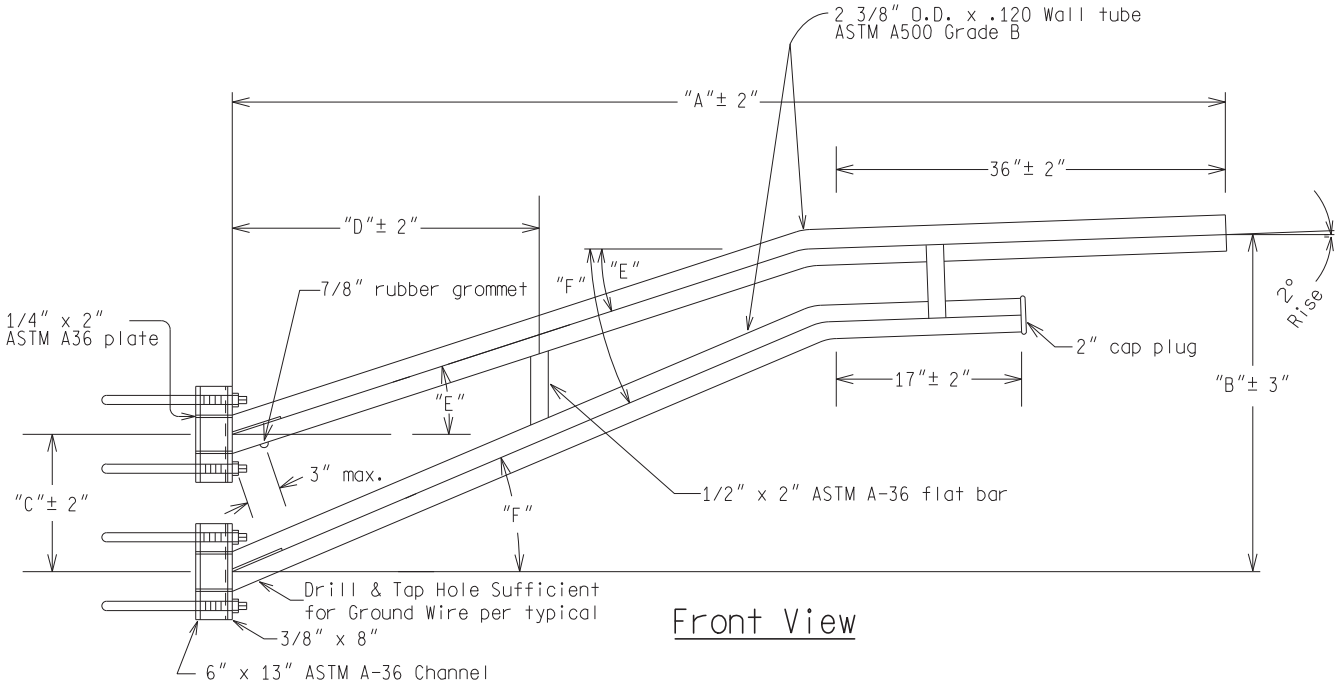
Reference Standard Specification for Construction Section 819.03

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-050-A	SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG050A.dgn Rev. 02/16/17		PLAN DATE		



Top View



Front View

Steel Pole Mount Truss Bracket Assembly

"Dimensions" Size Table

A	B	C	D	E	F
18'- 0"	81 3/4"	21 3/4"	84"	18°	23°
15'- 0"	66"	18"	66"	18°	23°
12'- 0"	50 3/8"	14 1/4"	54"	18°	23°
9'- 0"	36 3/4"	12"	36"	18°	23°
6'- 0"	23"	10"	18"	18°	27°

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: JAM

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

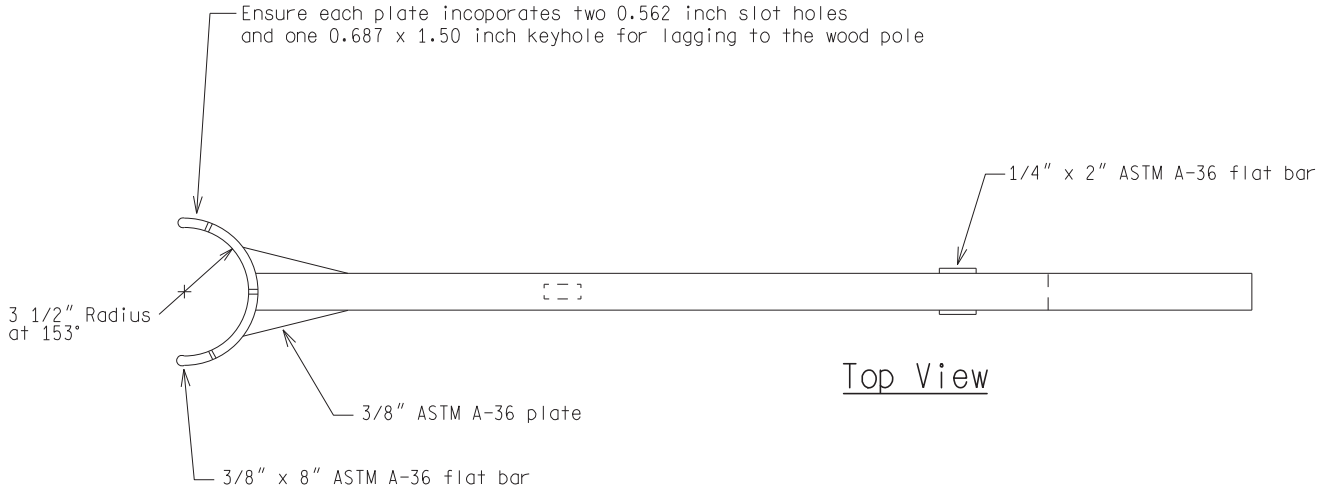
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

STEEL TRUSS BRACKETS

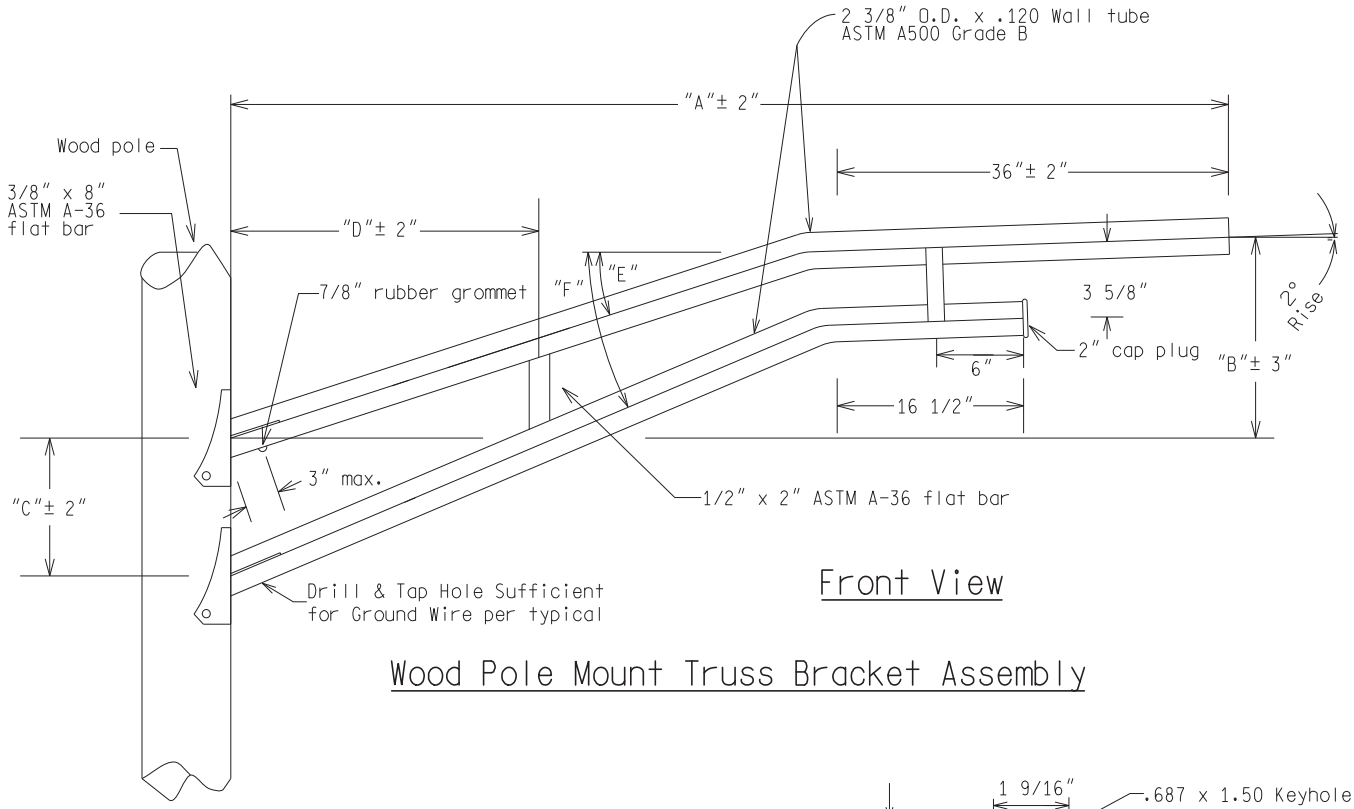
PLAN DATE

SIG-060-A

SHEET 1 of 3



Top View

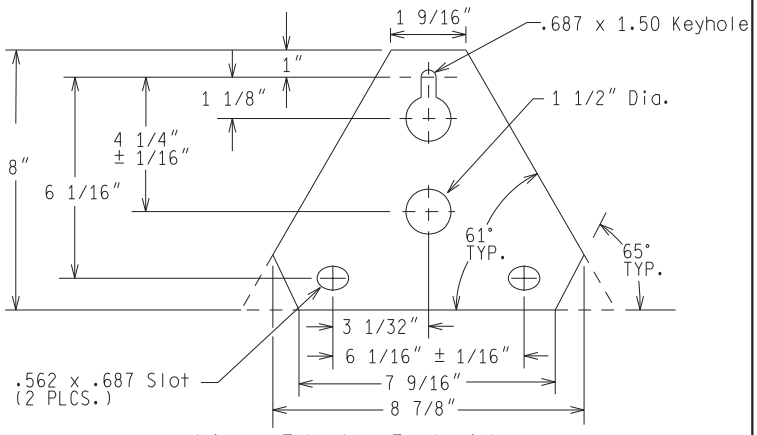


Front View

Wood Pole Mount Truss Bracket Assembly

"Dimensions" Size Table

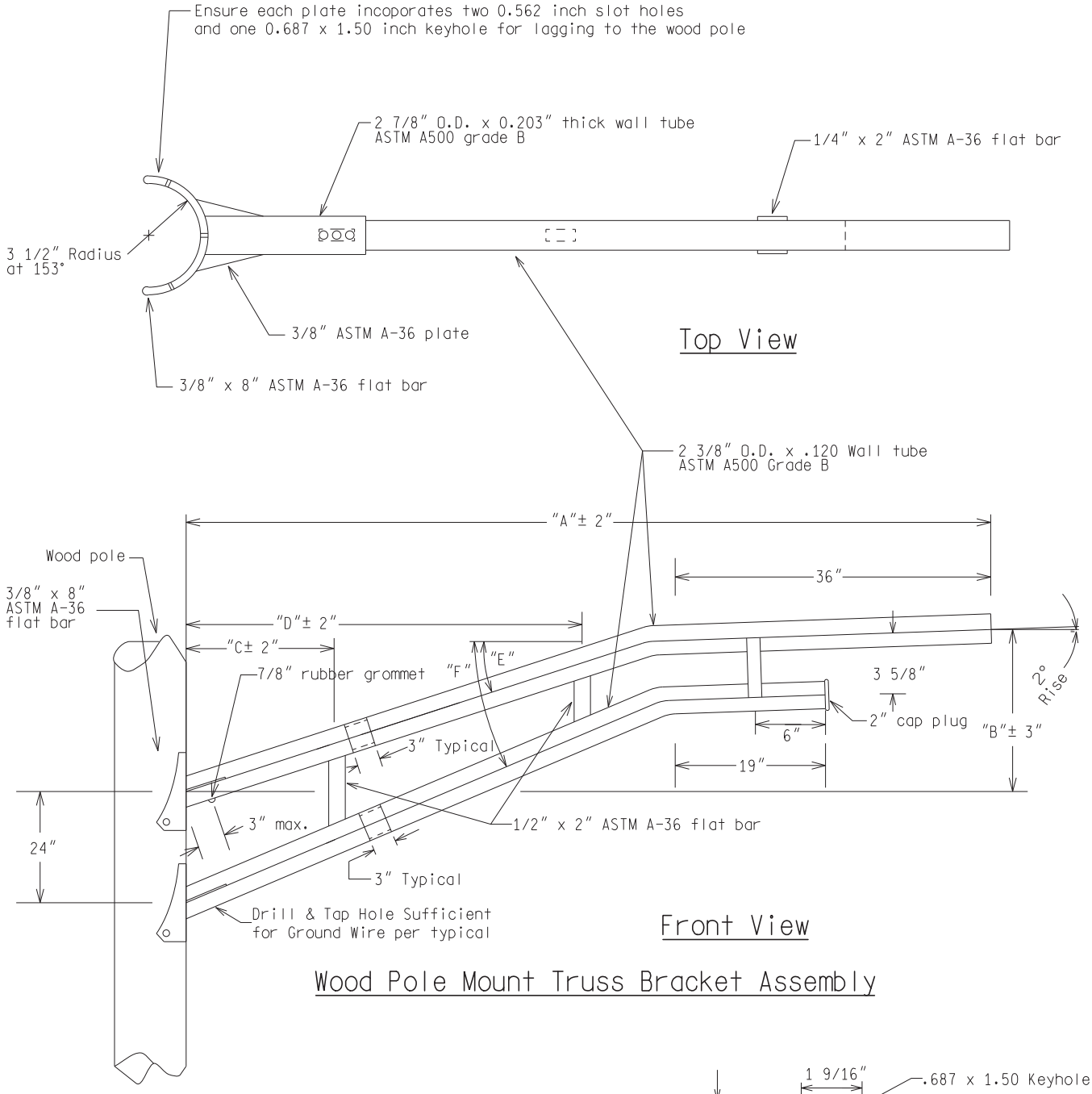
A	B	C	D	E	F
15'- 0"	47 3/4"	18"	66"	18°	23°
12'- 0"	36"	14 3/8"	48"	18°	23°
9'- 0"	26 3/8"	12"	36"	18°	23°
6'- 0"	12 1/2"	8 1/2"	18"	18°	23°



Mounting Plate Detail

NOT TO SCALE

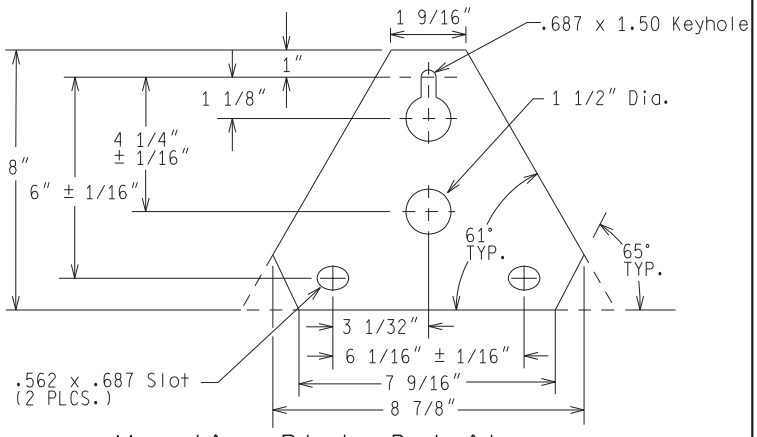
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-060-A	SHEET 2 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG060A.dgn Rev. 02/16/17		PLAN DATE		



Wood Pole Mount Truss Bracket Assembly

"Dimensions" Size Table

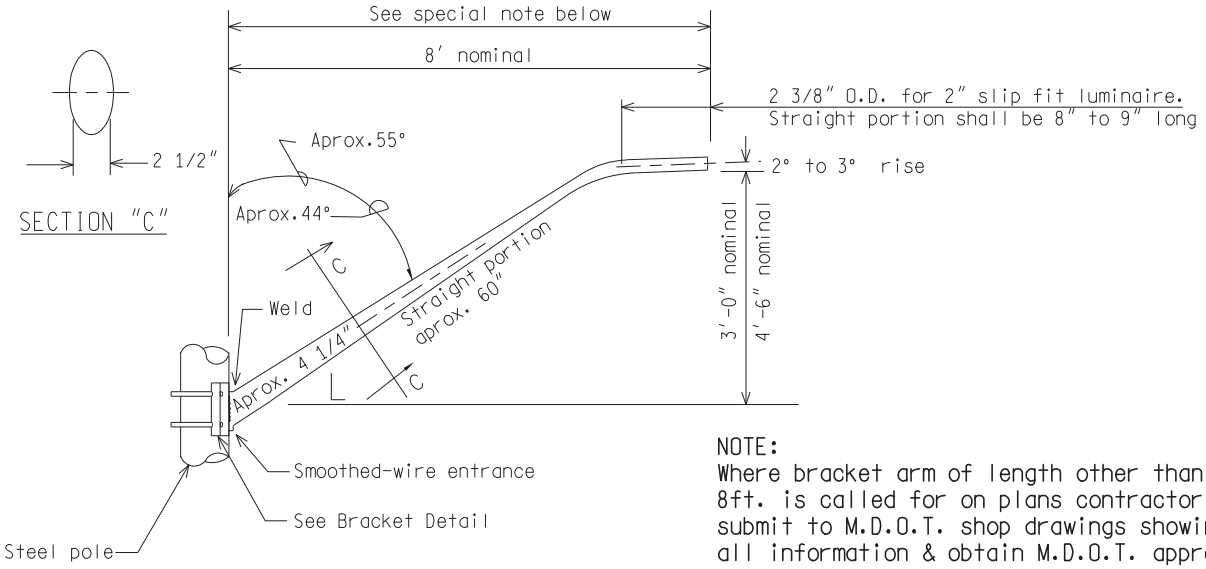
A	B	C	D	E	F
17'-6"	60"	28"	80"	19°	26°



Mounting Plate Detail

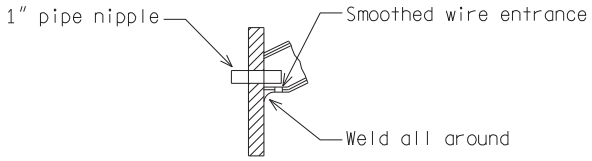
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-060-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG060A.dgn Rev. 02/16/17		PLAN DATE		



NOTE:
Where bracket arm of length other than 8ft. is called for on plans contractor shall submit to M.D.O.T. shop drawings showing all information & obtain M.D.O.T. approval.

CLAMP ON BRACKET ARM ASSEMBLY (STREET LIGHT)



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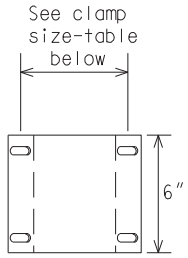
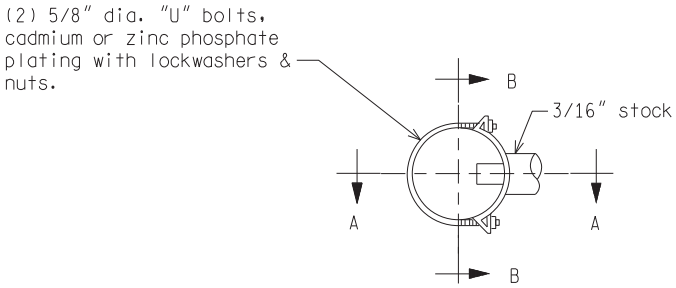


SECTION "B-B"



CLAMP SIZE TABLE

TYPE	POLE DIAMETER
A	3.6"- 4.5"
B	6.1"- 6.9"
C	7.5"- 8.5"

BRACKET DETAIL

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG061A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

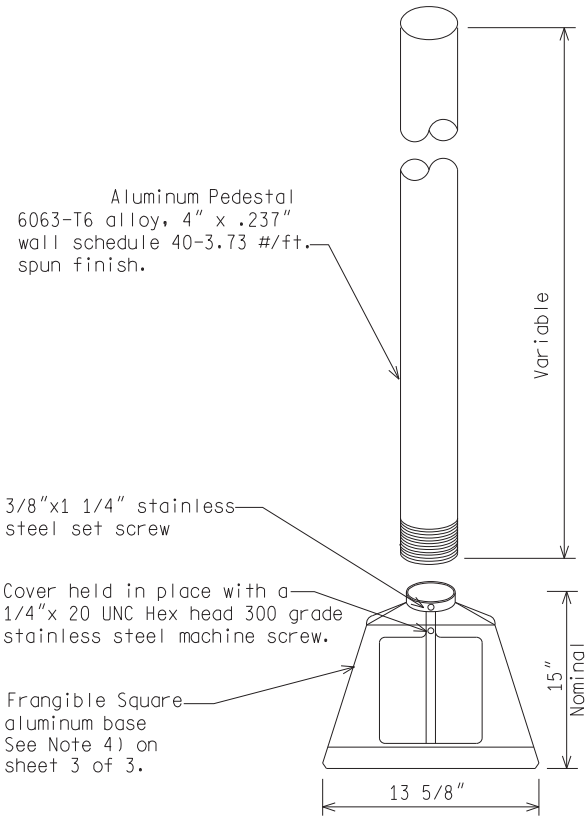
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

CLAMP ON BRACKET ARM ASSEMBLY (STREET LIGHT)

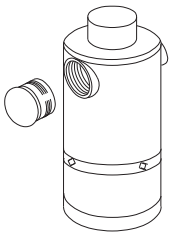
PLAN DATE

SIG-061-A

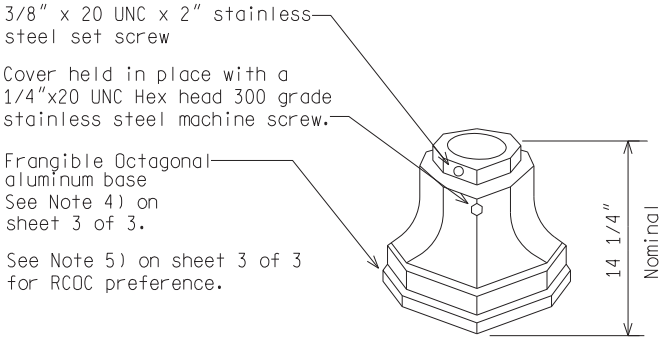
SHEET 1 of 1



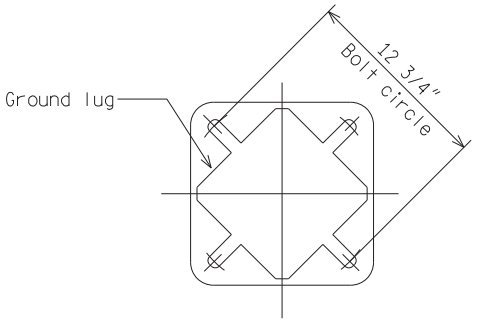
SQUARE ALUMINUM BASE



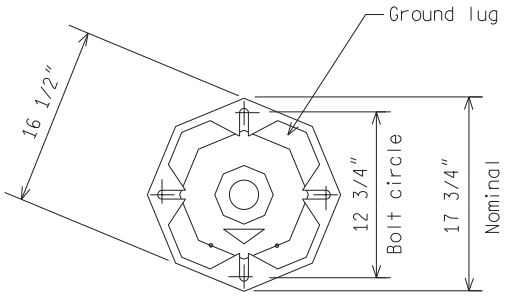
POST TOP
(SLIP FITTER)



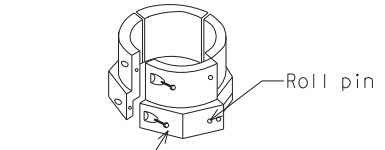
OCTAGONAL BASE



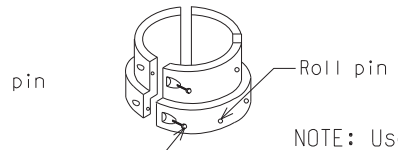
SQUARE BASE
BOTTOM PLAN



OCTAGONAL BASE
BOTTOM PLAN



COLLAR
(OCTAGONAL BASE)



COLLAR
(SQUARE BASE)

NOTE: Use pedestal collar for pedestal length greater than or equal to 14' (typical for 3 color traffic signals with pedestrian signals)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG070A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

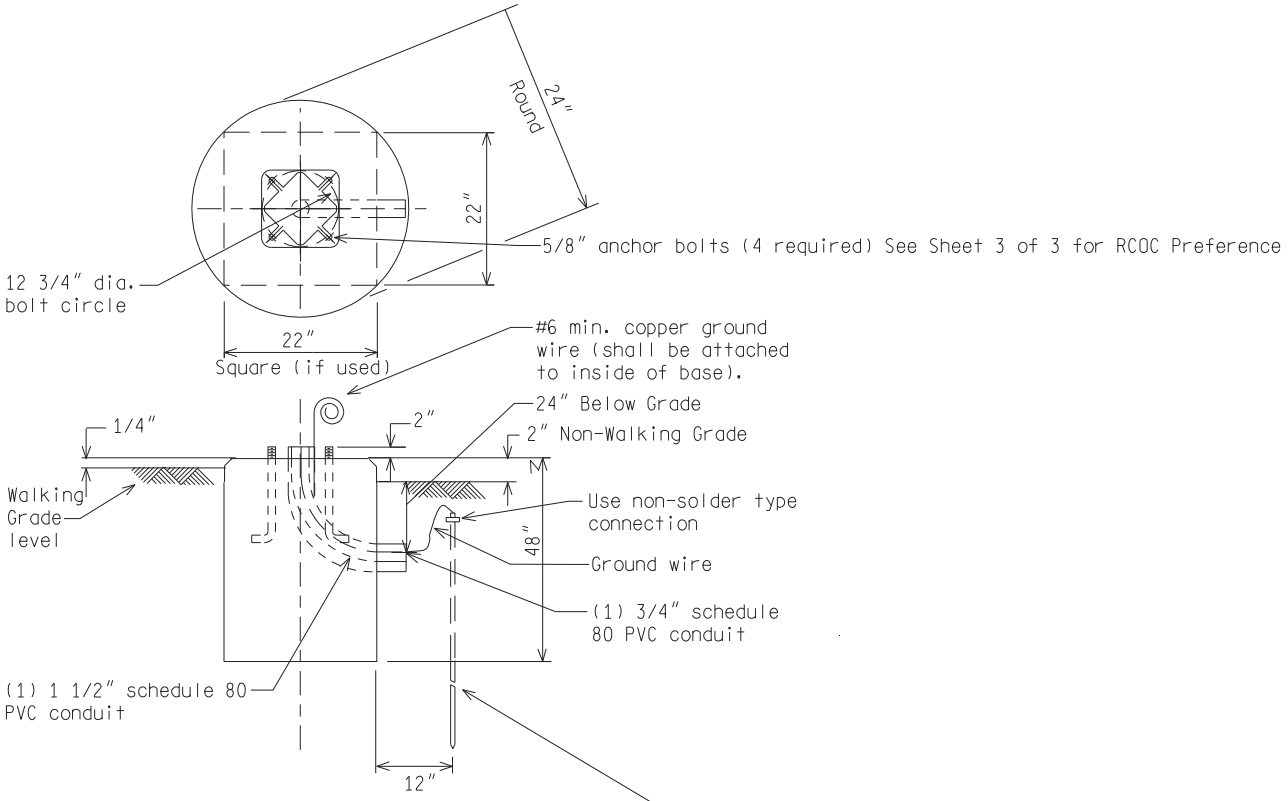
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

PEDESTAL FOUNDATION

PLAN DATE

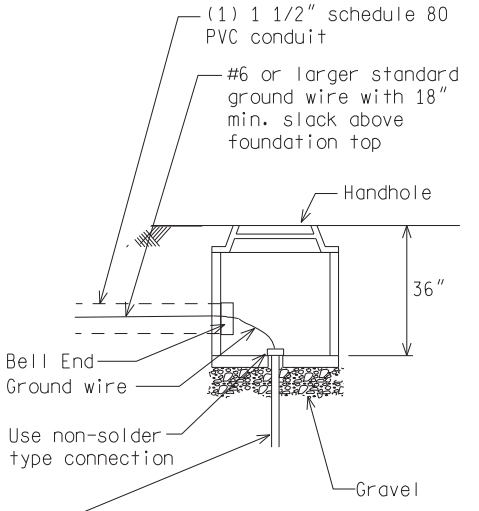
SIG-070-A

SHEET
1 of 3



PEDESTAL FOUNDATION

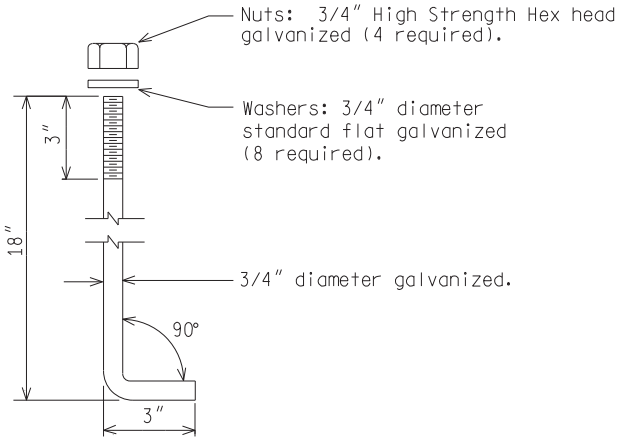
See notes 1, 2 & 3 on sheet 3 of 3.



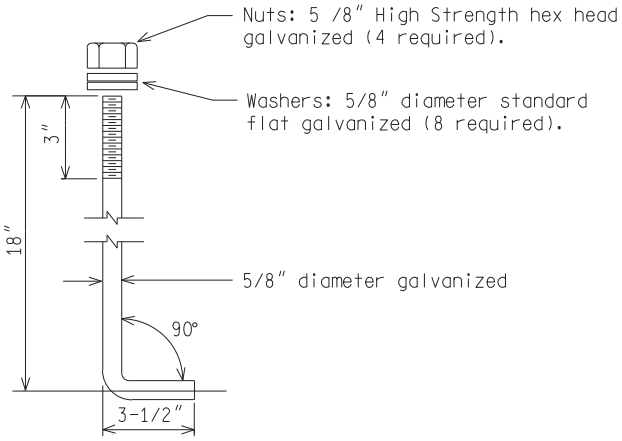
HANDHOLE DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG070A.dgn Rev. 02/16/17		PLAN DATE	SIG-070-A	SHEET 2 of 3



For use on MDOT Trunkline.



For use on Oakland County Roads only.

ANCHOR BOLT DETAIL

NOTE: Anchor bolts are to be ASTM-A307 steel (4-required)

NOTES:

1) Alternate foundation may be constructed 22"x22" square - 48" deep.

2) Grounding system shall measure 10 ohm or less to ground.

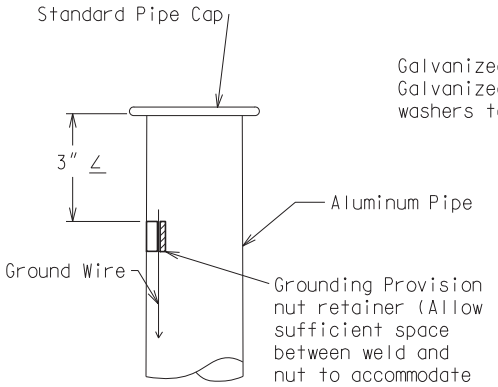
3) Construction joints not permitted in foundation.

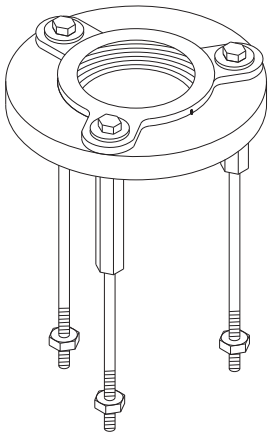
4) Pedestal base must meet the requirements of National Cooperative Highway Research Program Report 350 (NCHRP 350) or Manual for Assessing Safety Hardware (MASH) and have Federal Highway Administration (FHWA) acceptance. Pedestal base must also be certified to have a 4-inch maximum stub height after the support has broken away from its base, as specified in the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals and the AASHTO Roadside Design Guide.

5) Use the Octagonal Base as a preference by the Road Commission for Oakland County (RCOC), for use on Oakland County roads only.

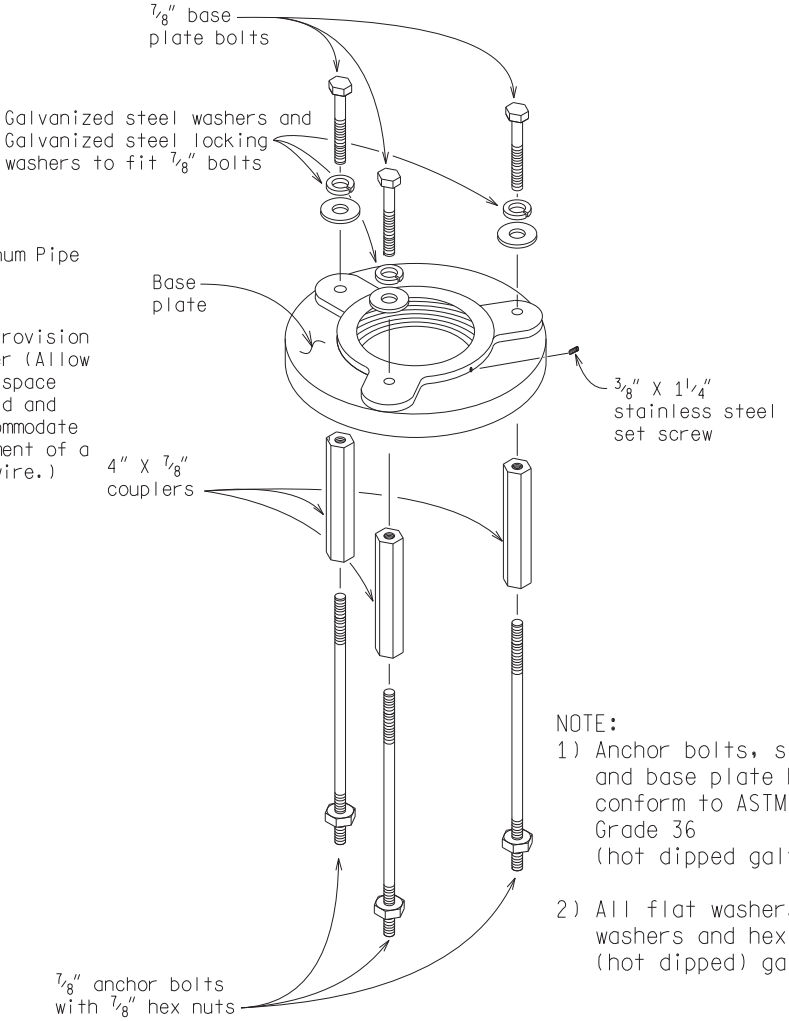
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-070-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG070A.dgn Rev. 02/16/17		PLAN DATE		





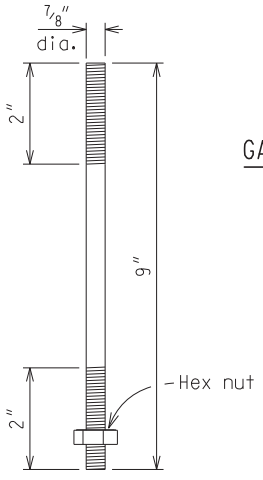
ISOMETRIC VIEW



ASSEMBLY VIEW

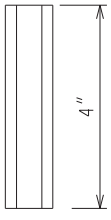
NOTE:
1) Anchor bolts, steel couplers, and base plate bolts shall conform to ASTM F1554, Grade 36 (hot dipped galvanized)

2) All flat washers, lock washers and hex nuts are (hot dipped) galvanized



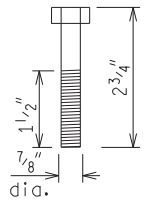
7/8" GALVANIZED STEEL ANCHOR BOLTS
(3 REQUIRED)

GALVANIZED STEEL WASHER TO FIT 7/8" BOLT
(3 REQUIRED)



GALVANIZED STEEL 7/8" COUPLERS
(3 REQUIRED)

3/8" X 1 1/4" STAINLESS STEEL SET SCREW
(1 REQUIRED)



7/8" GALVANIZED STEEL BASE PLATE BOLTS
(3 REQUIRED)

GALVANIZED STEEL LOCKING WASHER TO FIT 7/8" BOLT
(3 REQUIRED)

7/8" HEX NUT
(3 REQUIRED)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG071A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

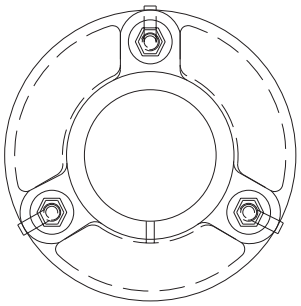
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

PEDESTAL BASE ALTERNATE ANCHORAGE DETAILS

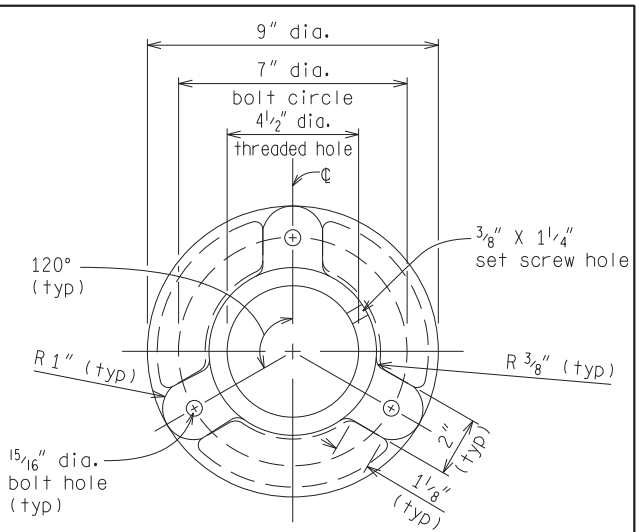
PLAN DATE

SIG-071-A

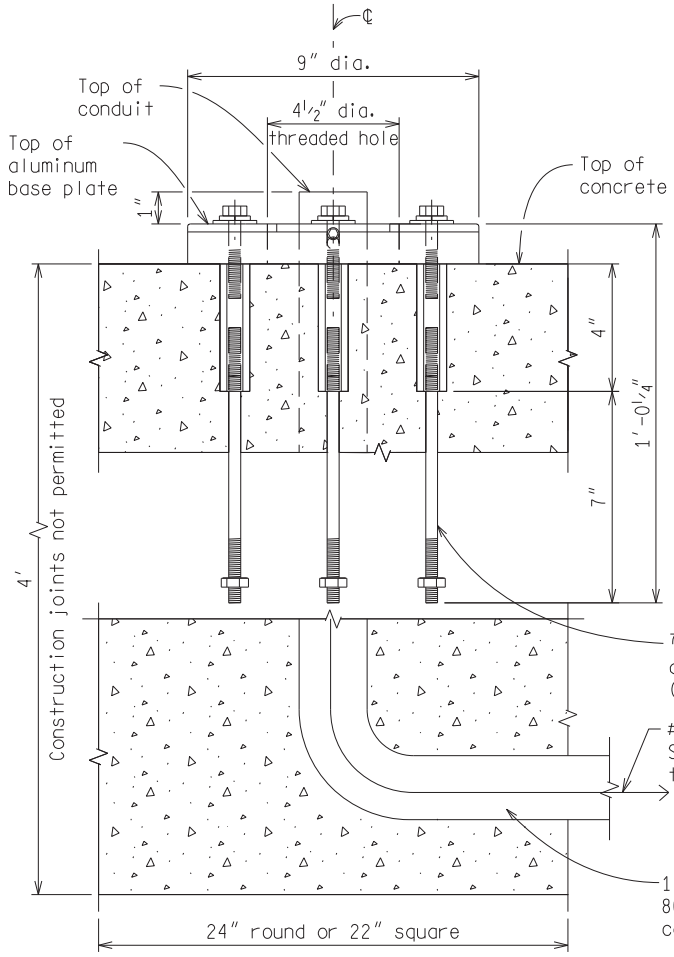
SHEET 1 of 2



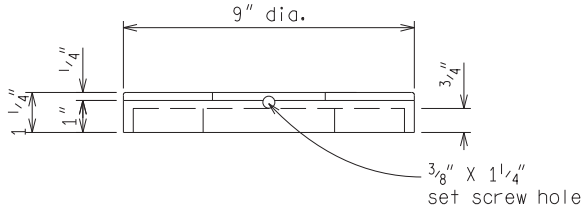
TOP VIEW
(ASSEMBLED)



TOP VIEW
(ROUND ALUMINUM BASE PLATE)

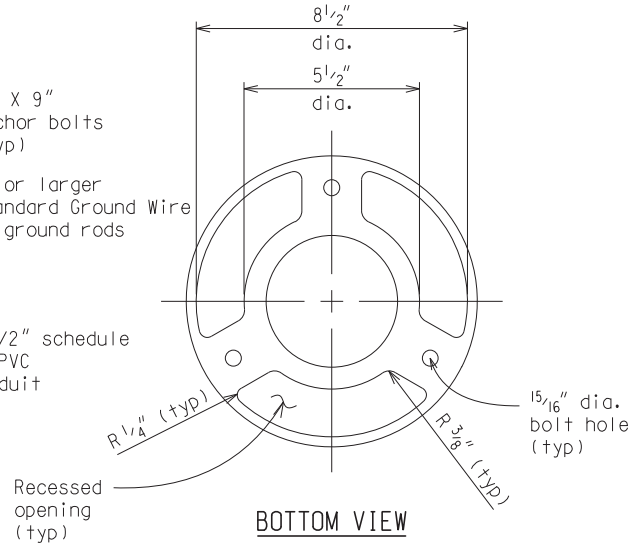


FRONT VIEW
(ASSEMBLED)



FRONT VIEW
(ROUND ALUMINUM BASE PLATE)

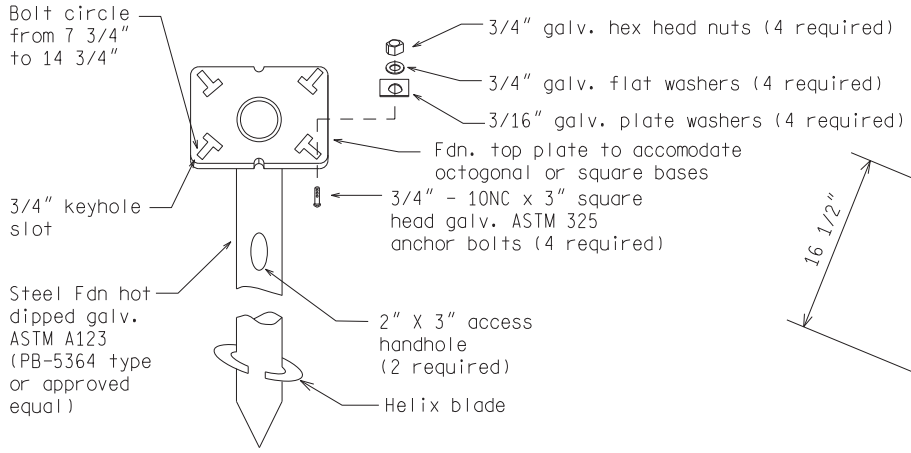
NOTE: WHERE THE 1 1/2" CONDUIT DOES NOT FEED INTO A HANDHOLE, INSTALL AN ADDITIONAL 3/4" SCHEDULE 80 PVC CONDUIT FOR GROUNDING. 3/4" X 10'-0" COPPER CLAD GROUND RODS IN ACCORDANCE WITHIN THE CURRENT N.E.C.



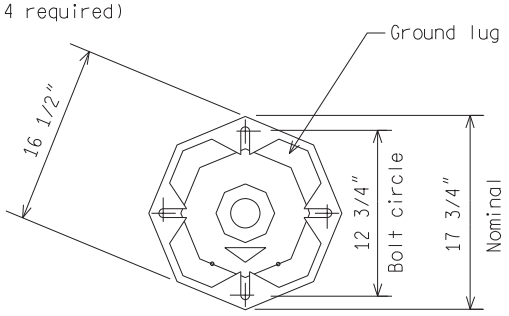
BOTTOM VIEW
(ROUND ALUMINUM BASE PLATE)

NOT TO SCALE

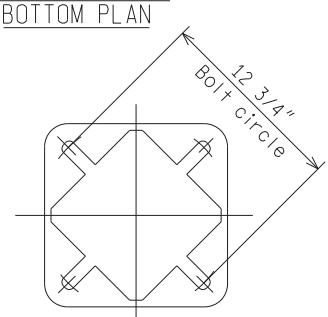
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG071A.dgn Rev. 02/16/17		PLAN DATE	SIG-071-A	SHEET 2 of 2



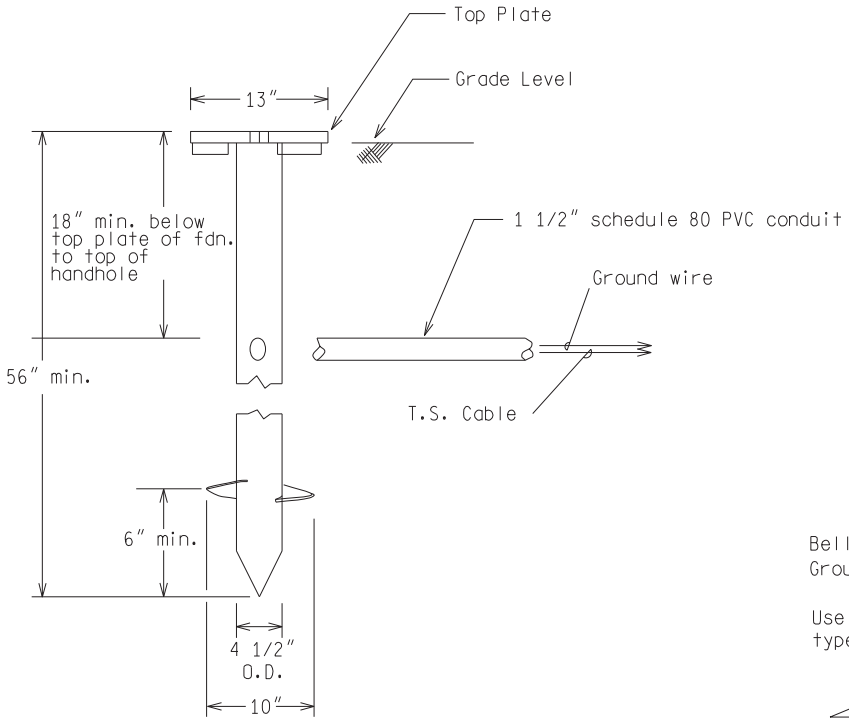
ISOMETRIC VIEW



OCTAGONAL BASE
BOTTOM PLAN

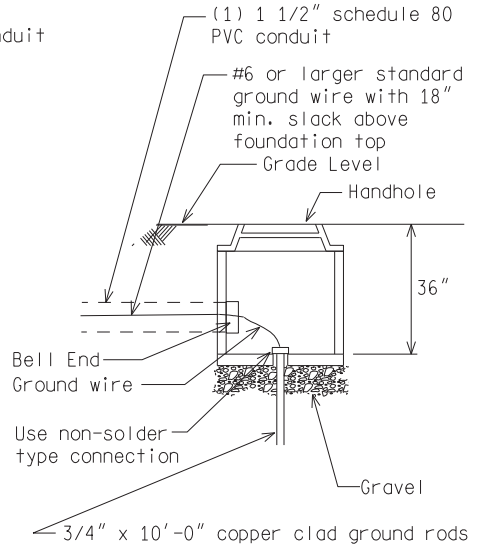


SQUARE BASE
BOTTOM PLAN



HELIX FOUNDATION ANCHOR ASSEMBLY

FOR PEDESTRIAN PUSHBUTTON PEDESTAL ONLY
(REFER TO SIG-120-A)



3/4" x 10'-0" copper clad ground rods a variable distance from foundation as directed by Engineer and in accordance with the current N.E.C.

HANDHOLE DETAIL

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG072A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: JAM

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

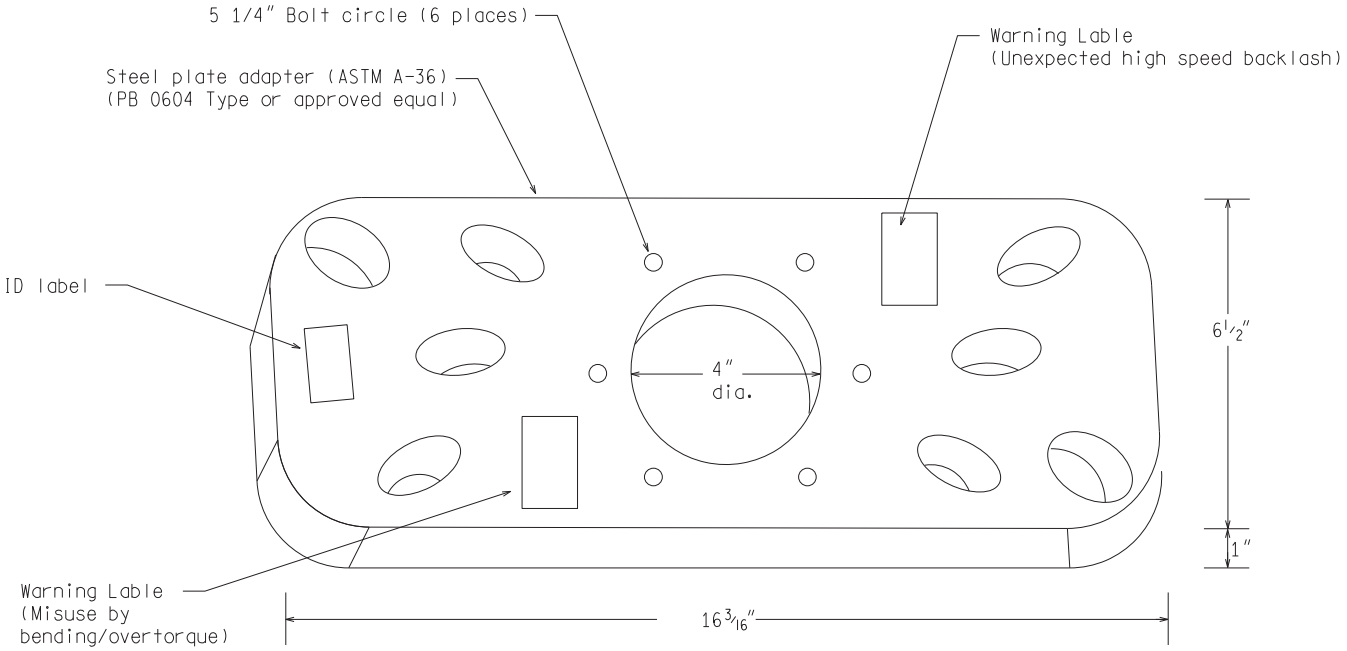
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

HELIX PEDESTAL FOUNDATION

PLAN DATE

SIG-072-A

SHEET 1 of 2



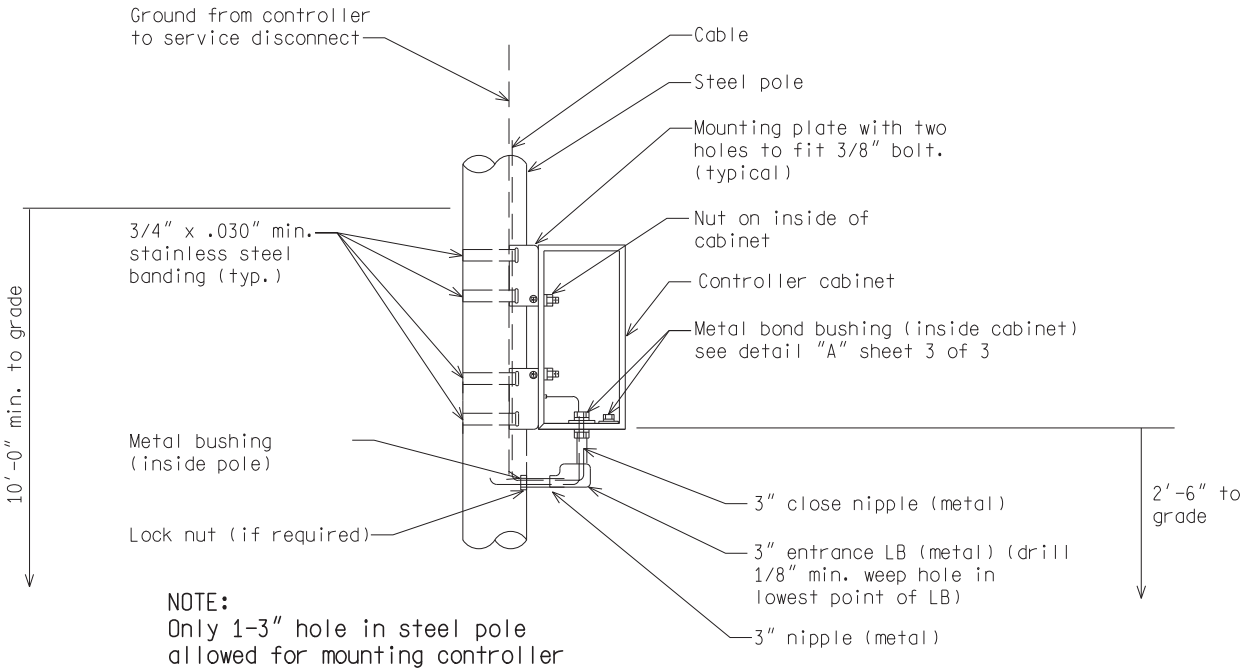
STEEL DRIVER ADAPTER

(FOR 4",6", OR 8" SCREW IN FOUNDATION ANCHORS)

NOTE: Typically the driver adapter is attached between the Kelly Bar Adapter (hub) on the drill equipment and the top plate of the foundation anchor.

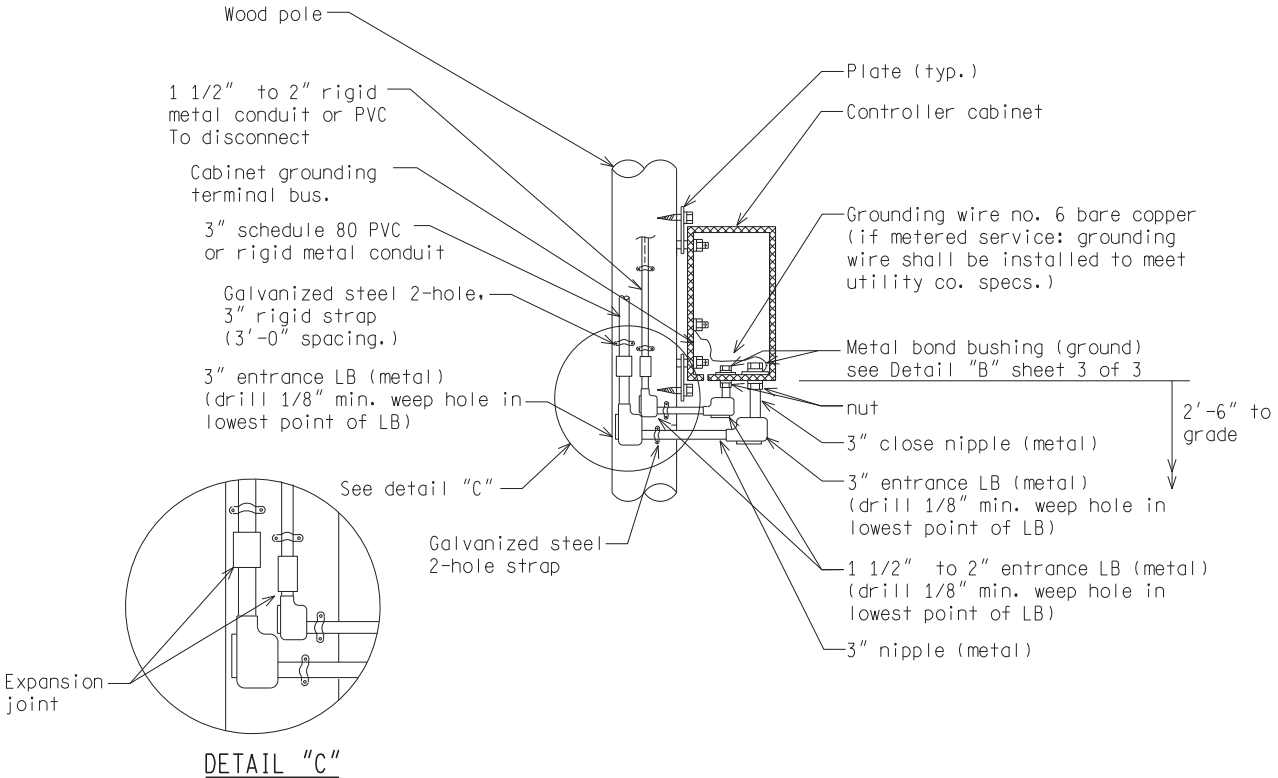
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-072-A	SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG072A.dgn Rev. 02/16/17				



NOTE:
Only 1-3" hole in steel pole allowed for mounting controller

TRAFFIC SIGNAL CONTROLLER CABINET MOUNTED ON STEEL POLES



DETAIL "C"

TRAFFIC SIGNAL CONTROLLER CABINET MOUNTED ON WOOD POLES

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG100A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

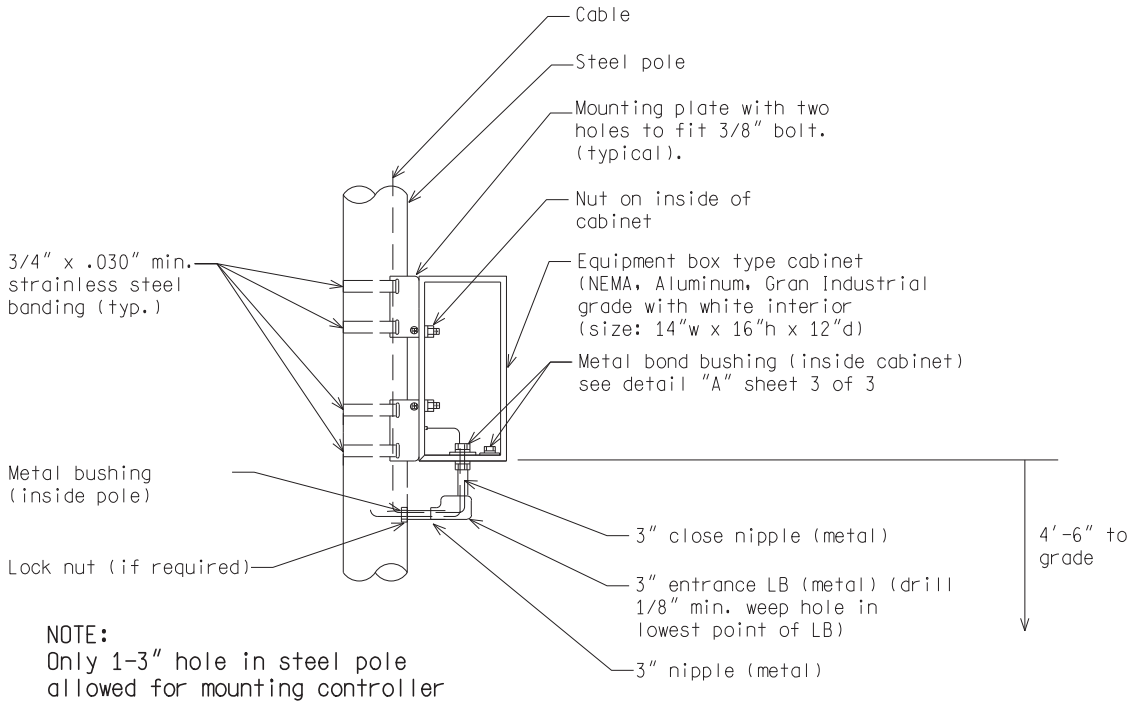
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

CONTROLLER CABINET MOUNTED ON STEEL OR WOOD POLES

PLAN DATE

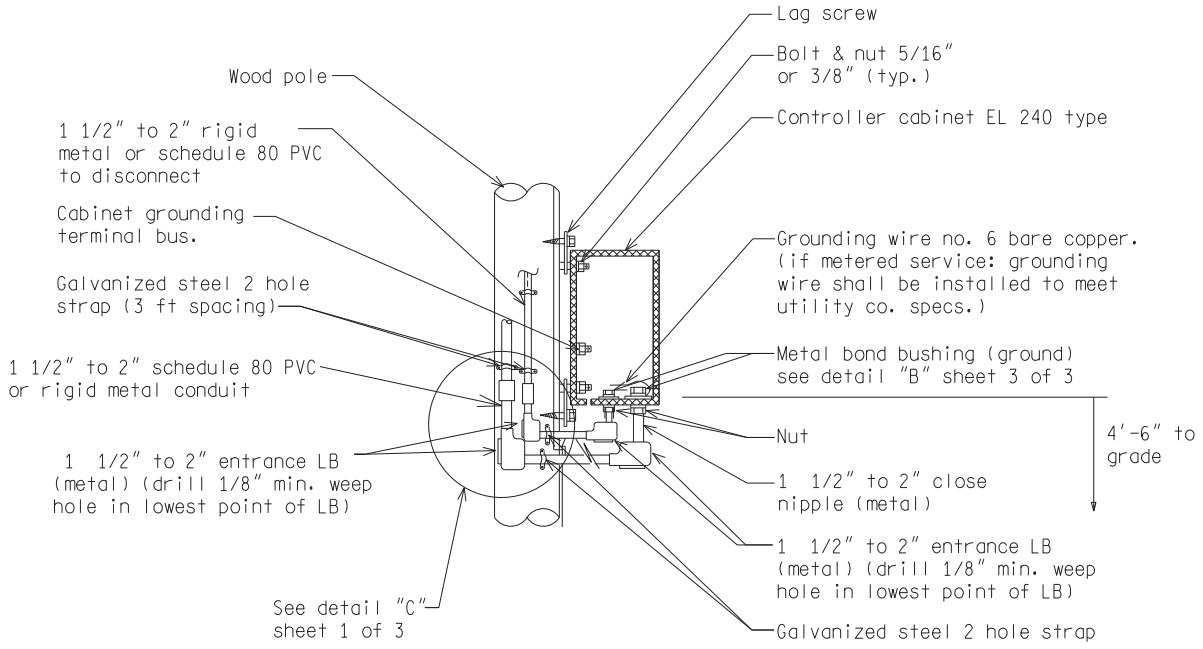
SIG-100-A

SHEET 1 of 3



NOTE:
Only 1-3" hole in steel pole allowed for mounting controller

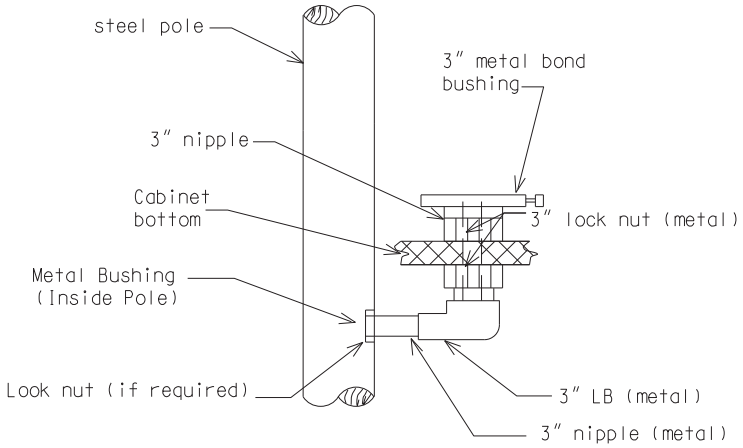
FLASHING BEACON CONTROLLER CABINET (EQUIPMENT BOX) MOUNTED ON STEEL POLES



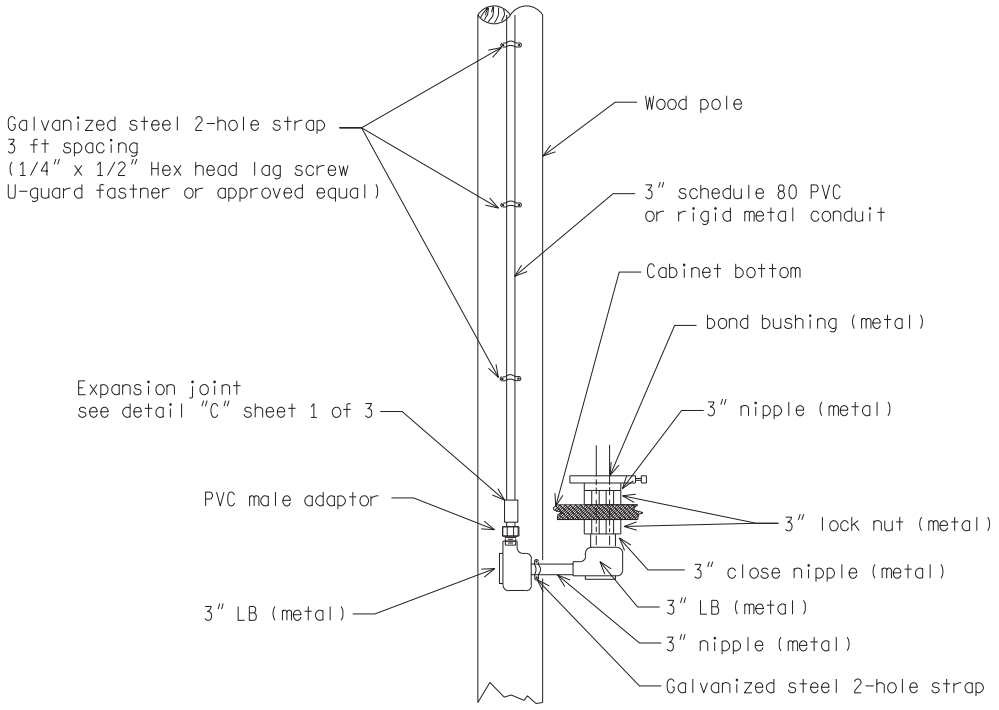
FLASHING BEACON CONTROLLER CABINET (EL 240 TYPE OR EQUIVALENT) MOUNTED ON WOOD POLES

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-100-A	SHEET 2 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG100A.dgn Rev. 02/16/17		PLAN DATE		



CONTROLLER CABINET MOUNTED ON STEEL POLE DETAIL "A"



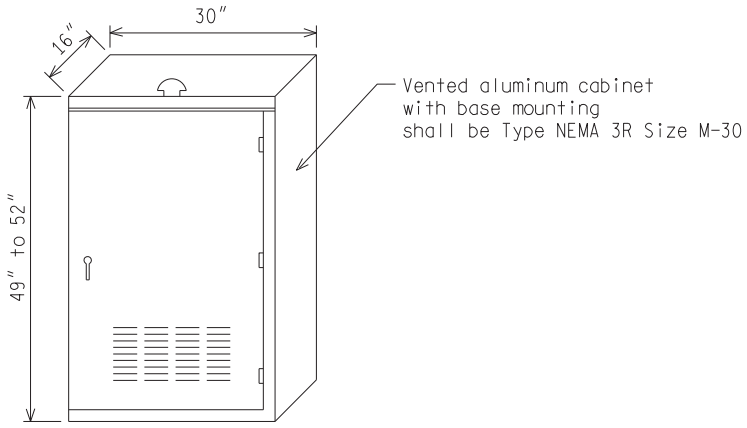
CONTROLLER CABINET MOUNTED ON WOOD POLE DETAIL "B"

NOTE:
The distance between LB's as shown on this detail is for clarity of the drawing only. Actual distance between LB's shall be minimized as is practical to the installation.

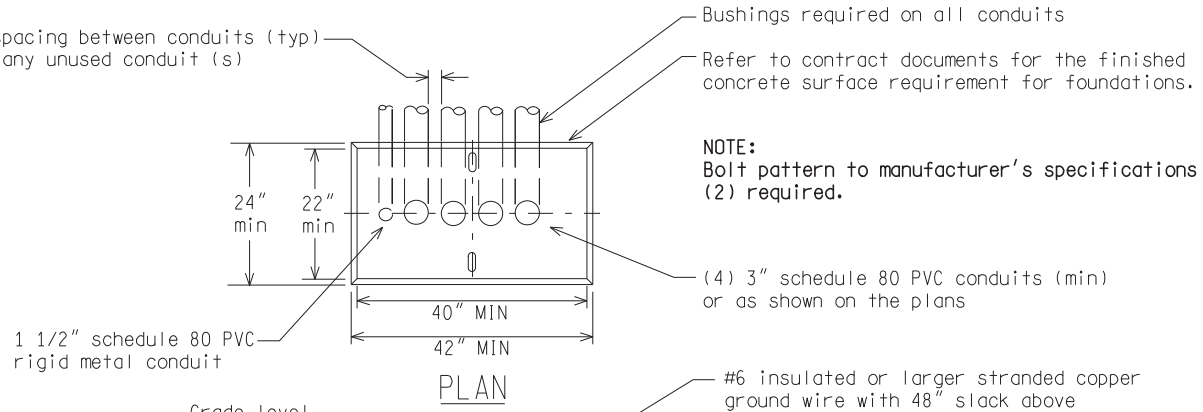
NOTE:
If rigid metal conduit is used, the conduit must be bonded according to the current N.E.C.

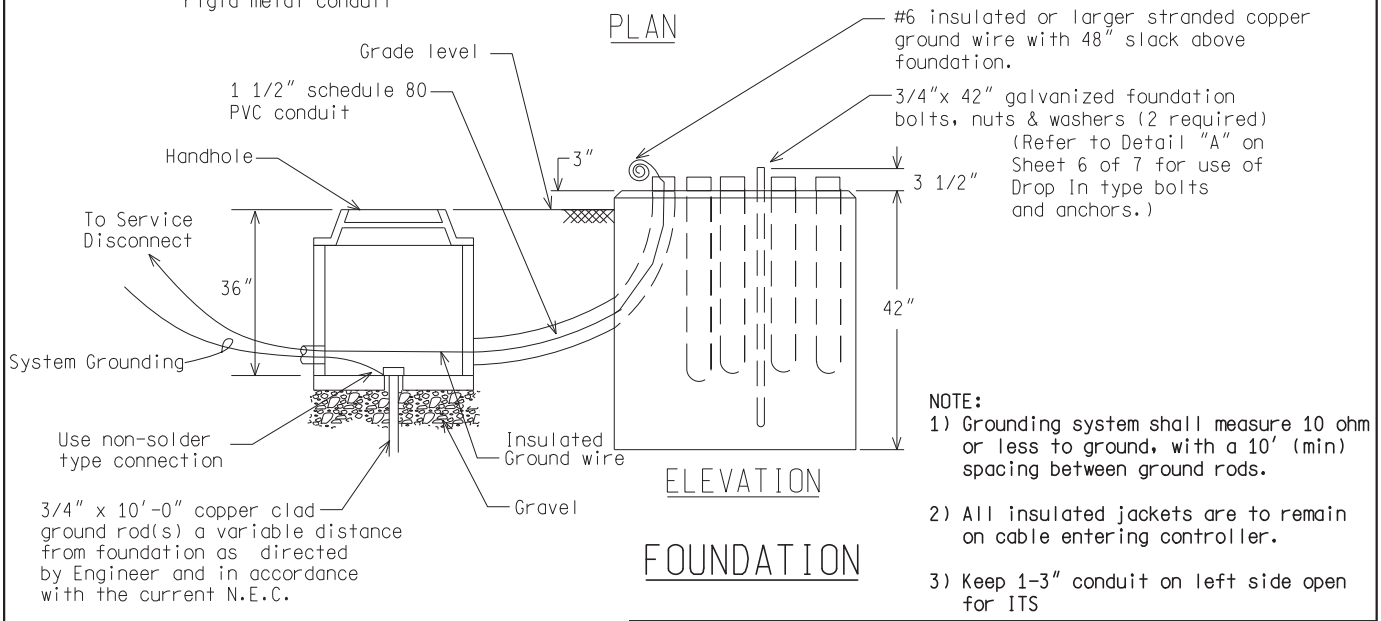
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-100-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG100A.dgn Rev. 02/16/17		PLAN DATE		



BASE MOUNTED TRAFFIC SIGNAL CONTROLLER CABINET





NOTE:
1) Grounding system shall measure 10 ohm or less to ground, with a 10′ (min) spacing between ground rods.

2) All insulated jackets are to remain on cable entering controller.

3) Keep 1-3″ conduit on left side open for ITS

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG110A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

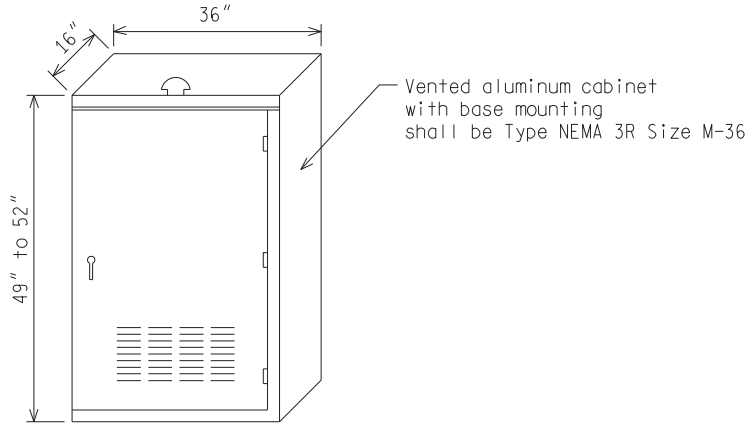
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

BASE MOUNTED T.S.
CONTROLLER CABINET/FOUNDATIONS

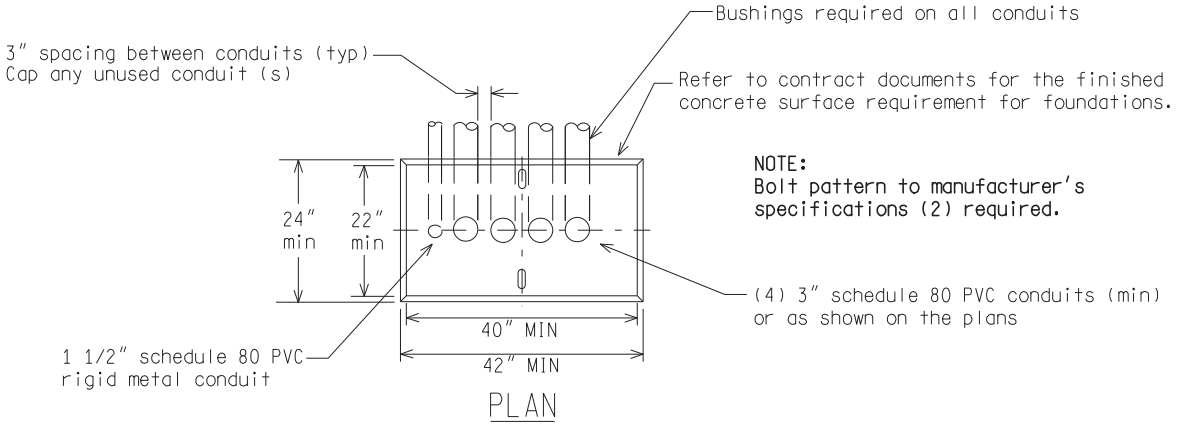
PLAN DATE

SIG-110-A

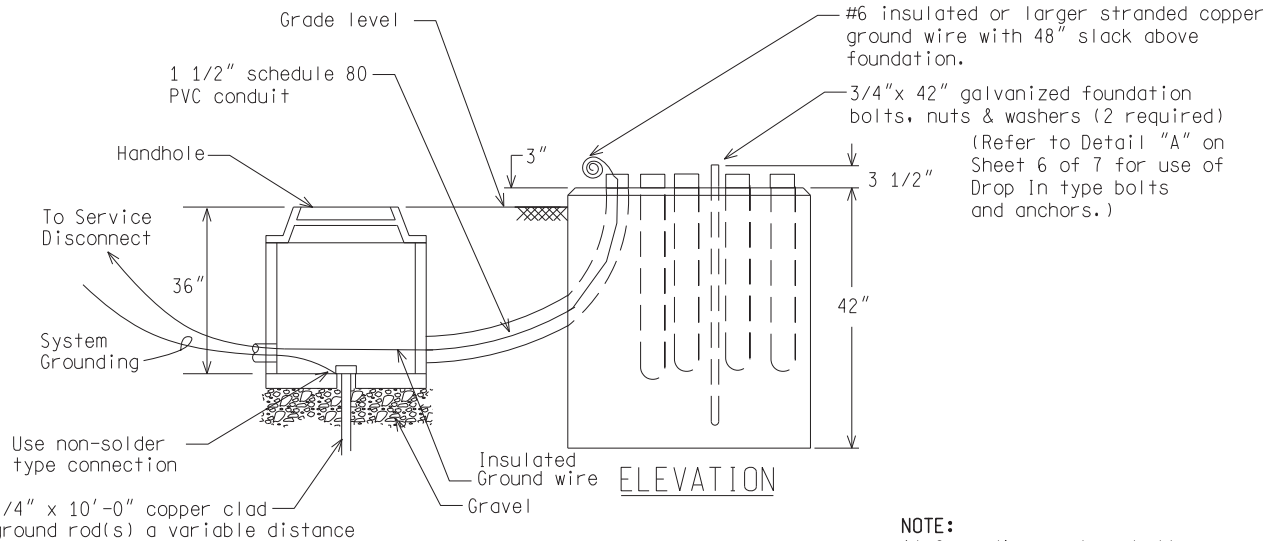
SHEET 1 of 7



BASE MOUNTED TRAFFIC SIGNAL CONTROLLER CABINET



PLAN



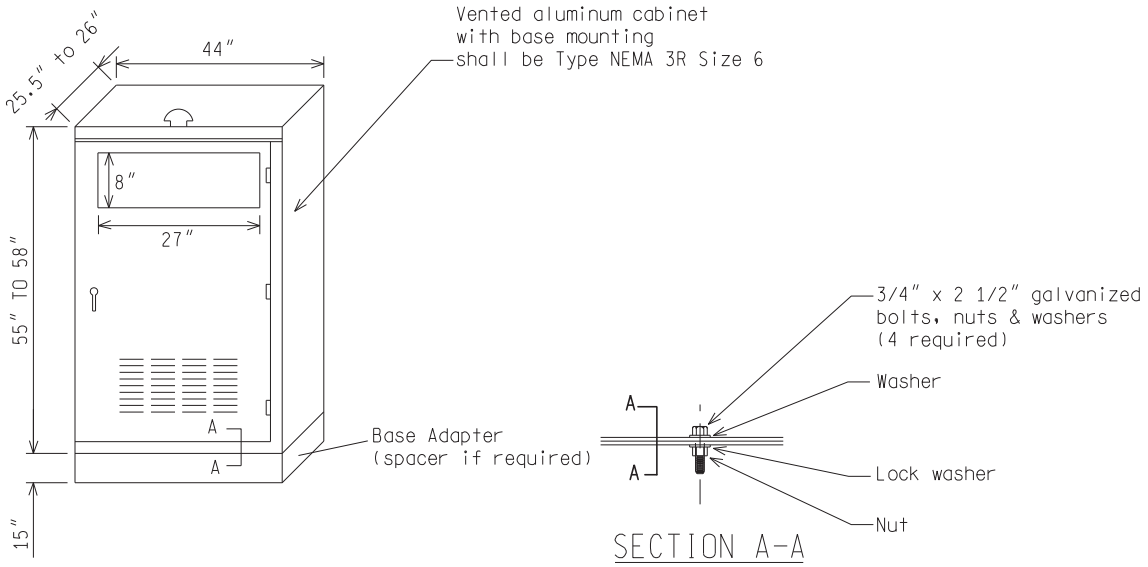
FOUNDATION

NOTE:
1) Grounding system shall measure 10 ohm or less to ground, with a 10' (min) spacing between ground rods.

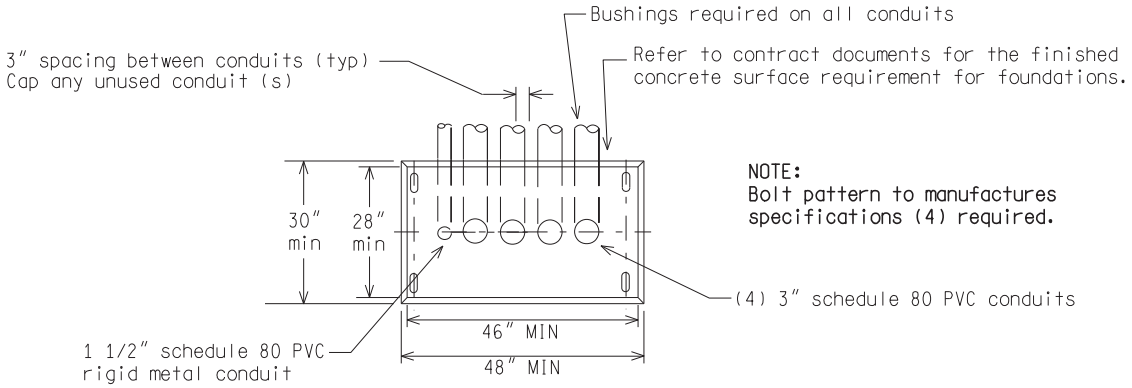
2) All insulated jackets are to remain on cable entering controller.

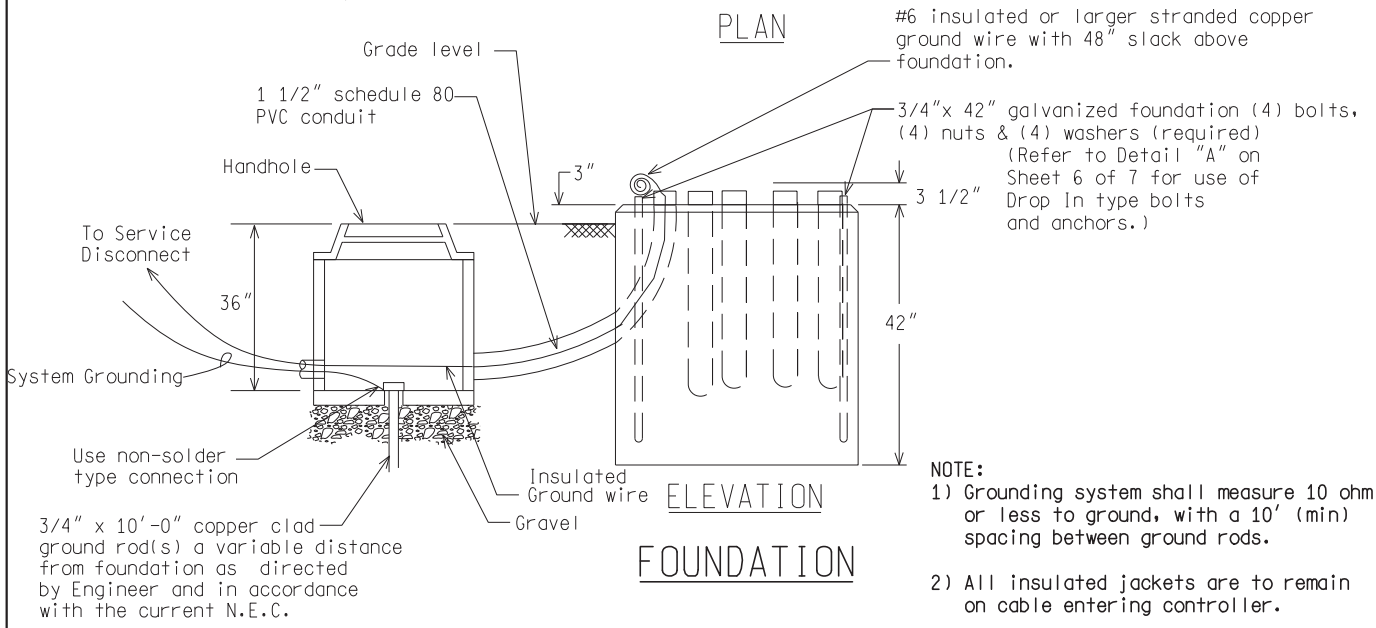
3) Keep 1-3" conduit on left side open for ITS

NOT TO SCALE



BASE MOUNTED TRAFFIC SIGNAL CONTROLLER CABINET





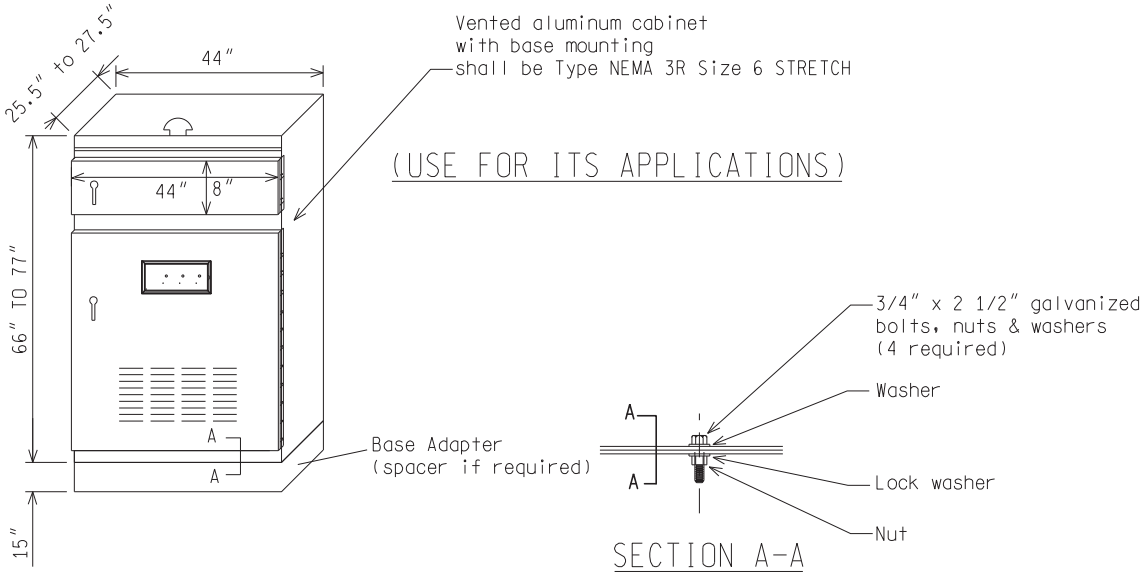
NOTE:
1) Grounding system shall measure 10 ohm or less to ground, with a 10' (min) spacing between ground rods.

2) All insulated jackets are to remain on cable entering controller.

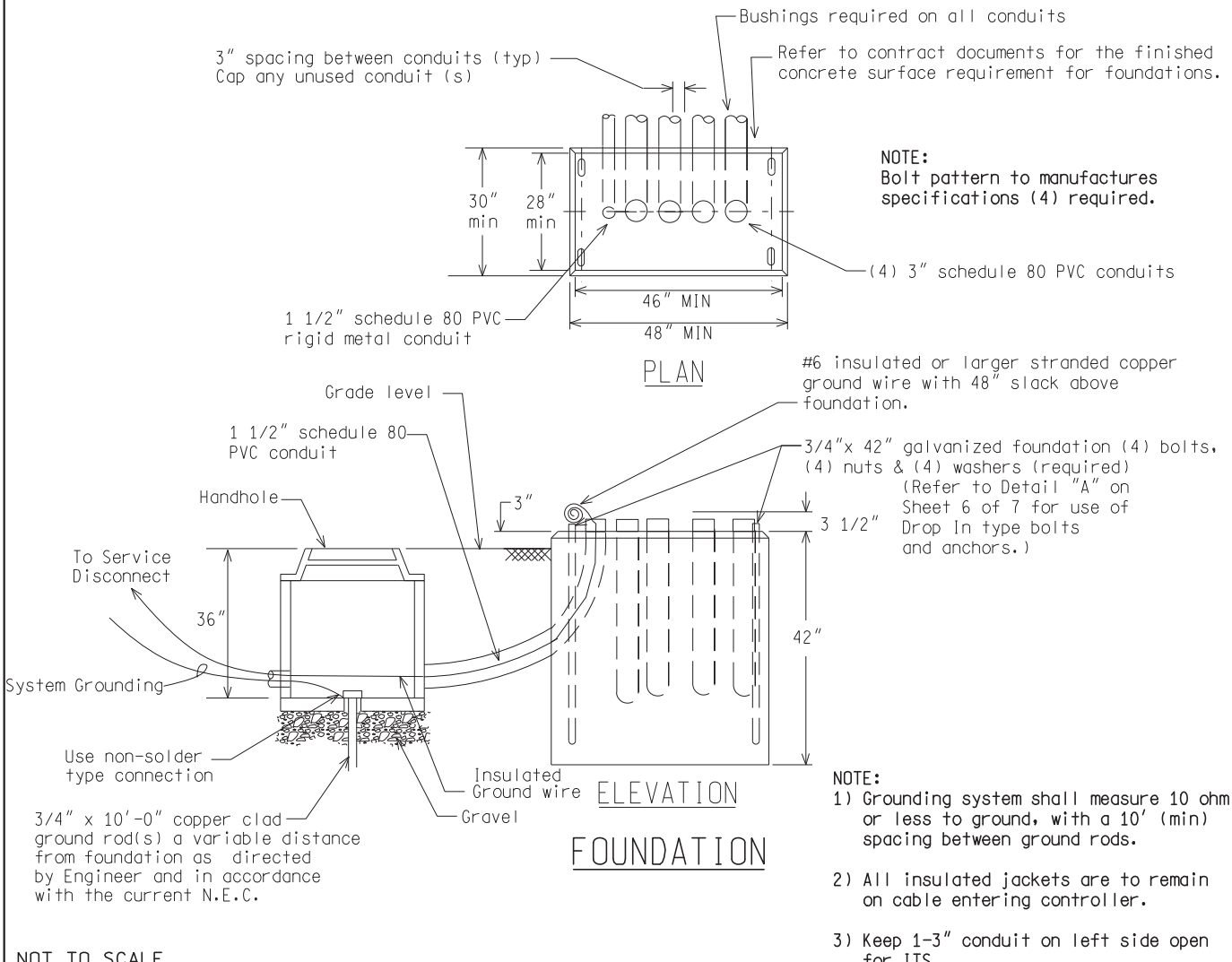
3) Keep 1-3" conduit on left side open for ITS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File:RefDoc/TR/Signals/Web/Sp Det/Fin/SIG110A.dgn Rev.02/16/17		PLAN DATE	SIG-110-A	SHEET 3 of 7



BASE MOUNTED TRAFFIC SIGNAL ITS CONTROLLER CABINET (IF USED)



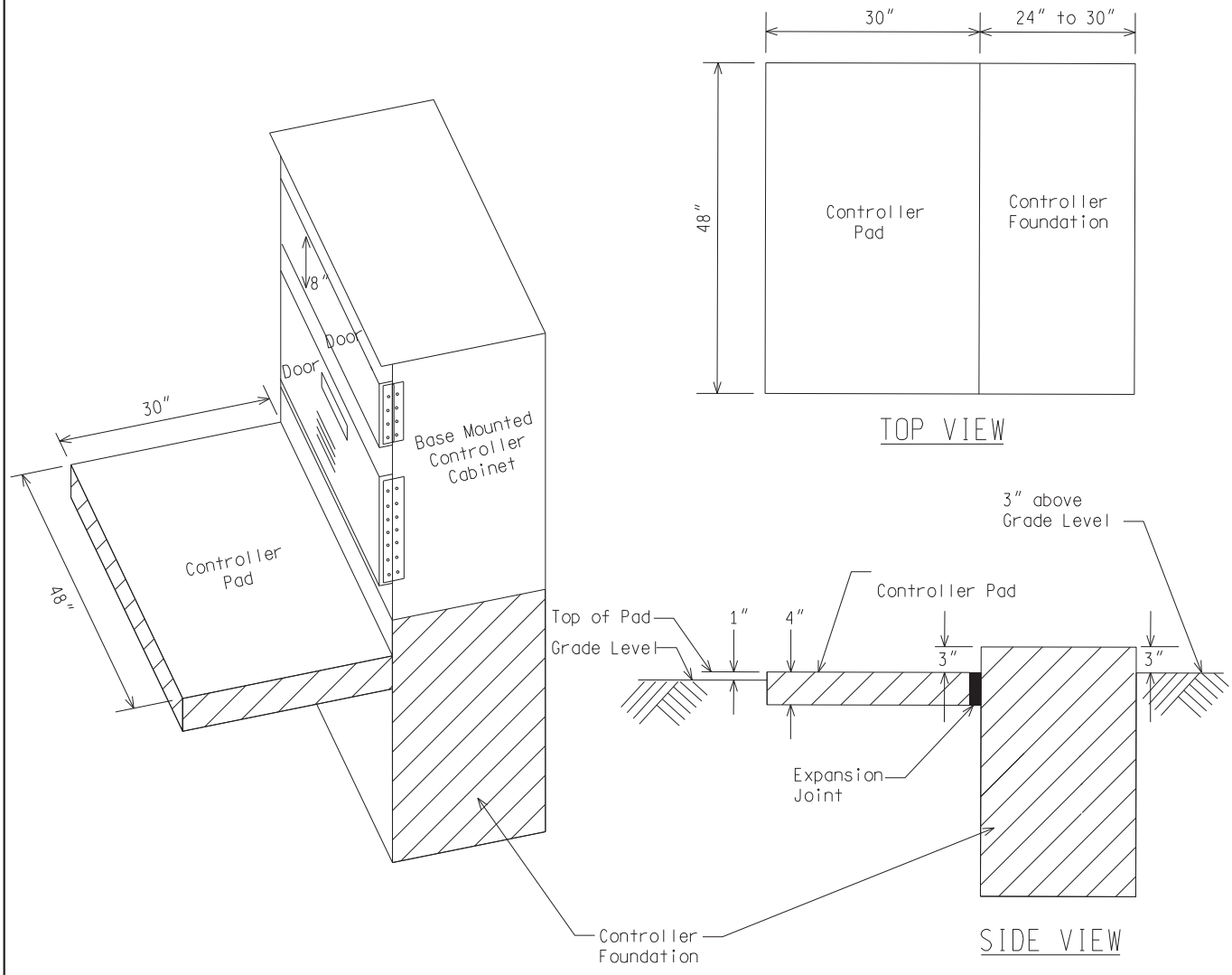
NOTE:
1) Grounding system shall measure 10 ohm or less to ground, with a 10' (min) spacing between ground rods.

2) All insulated jackets are to remain on cable entering controller.

3) Keep 1-3" conduit on left side open for ITS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG110A.dgn Rev. 02/16/17		PLAN DATE	SIG-110-A	SHEET 4 of 7

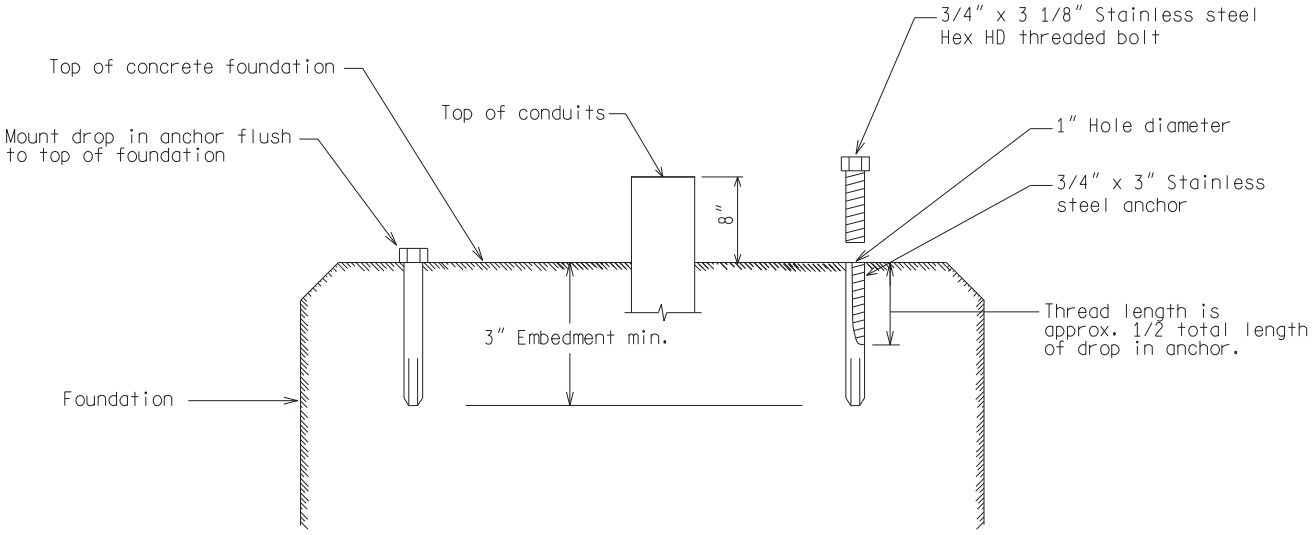


BASE MOUNTED CONTROLLER PAD

NOTE:
Payment for controller pad to be included in controller foundation pay item.
Controller cabinet door to open toward pad.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-110-A	SHEET 5 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG110A.dgn Rev. 02/16/17		PLAN DATE		

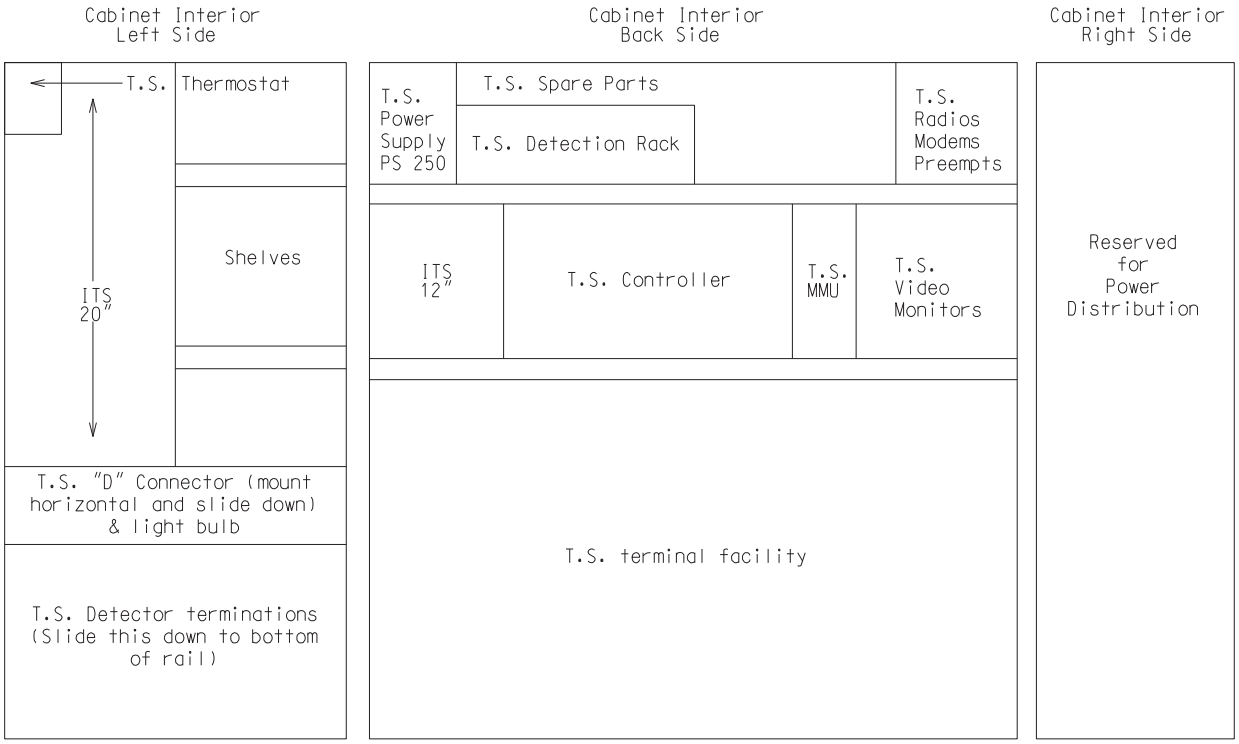


Notes:
1. Use AISI 300 Series Stainless Steel for all bolts and anchors.
2. Use Drop In foundation bolts and anchors as directed by the Engineer.

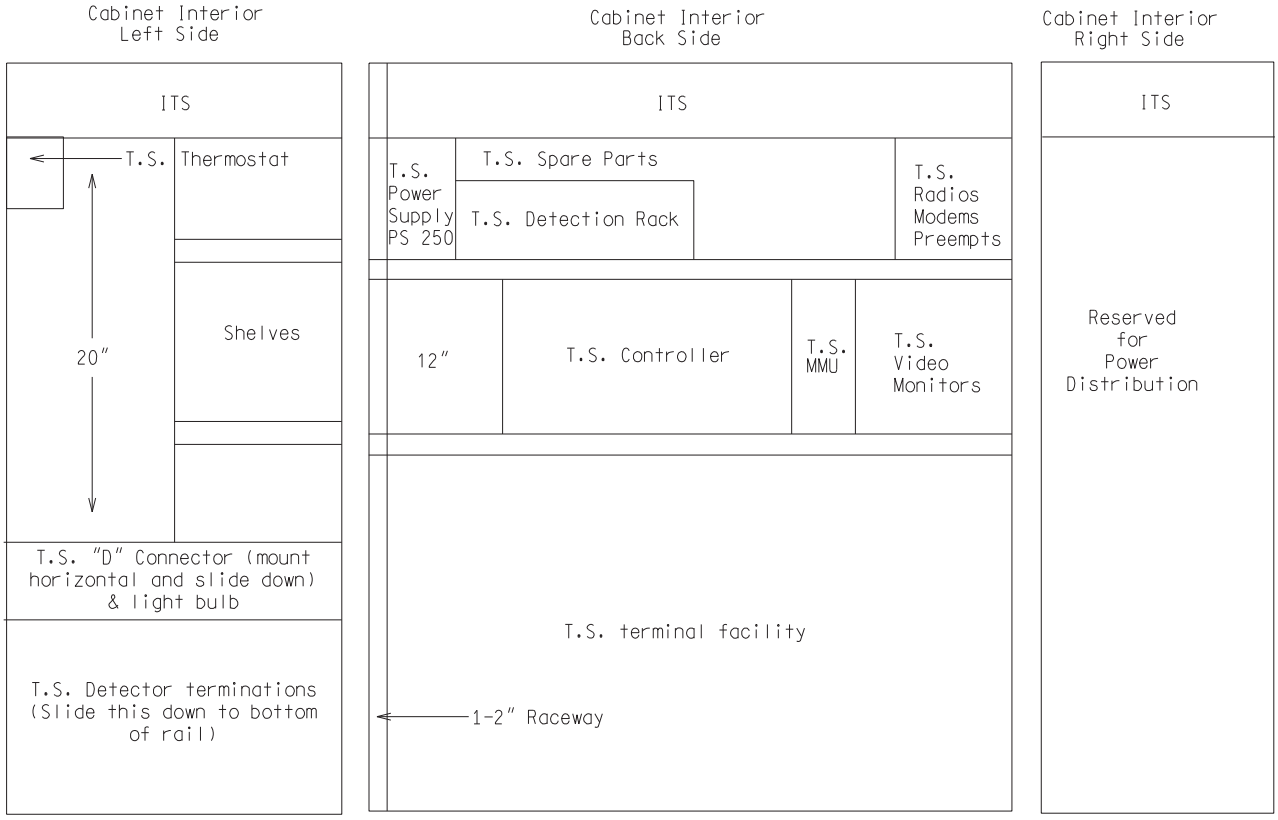
ALTERNATIVE DETAIL "A": DROP IN FOUNDATION BOLTS & ANCHORS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-110-A	SHEET 6 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG110A.dgn Rev. 02/16/17		PLAN DATE		



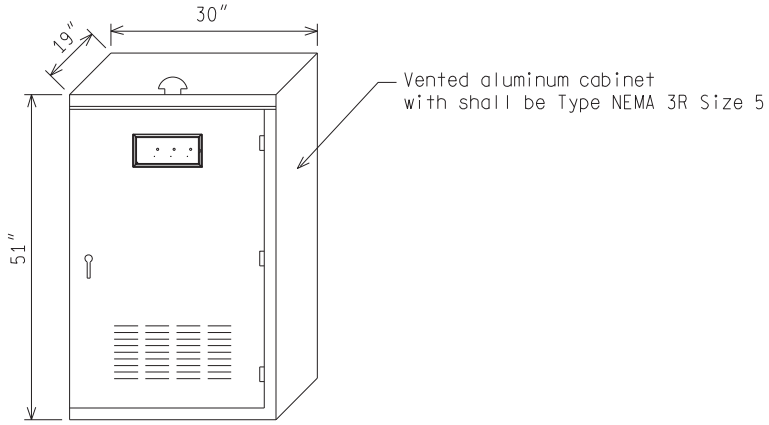
TRAFFIC SIGNAL NEMA 3R SIZE 6 CABINET REQUIREMENTS



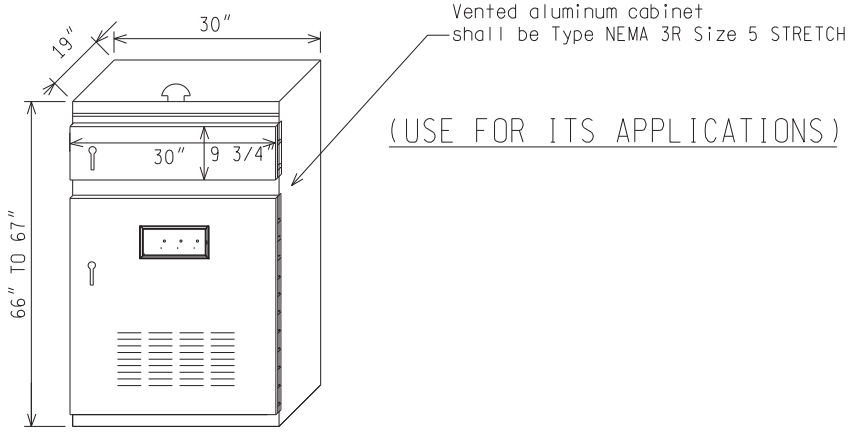
TRAFFIC SIGNAL NEMA 3R SIZE 6 STRETCH CABINET REQUIREMENTS FOR ITS APPLICATIONS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-110-A	SHEET 7 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG110A.dgn Rev. 02/16/17		PLAN DATE		



POLE MOUNTED TRAFFIC SIGNAL CONTROLLER CABINET



(USE FOR ITS APPLICATIONS)

POLE MOUNTED TRAFFIC SIGNAL ITS CONTROLLER CABINET (IF USED)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG111A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

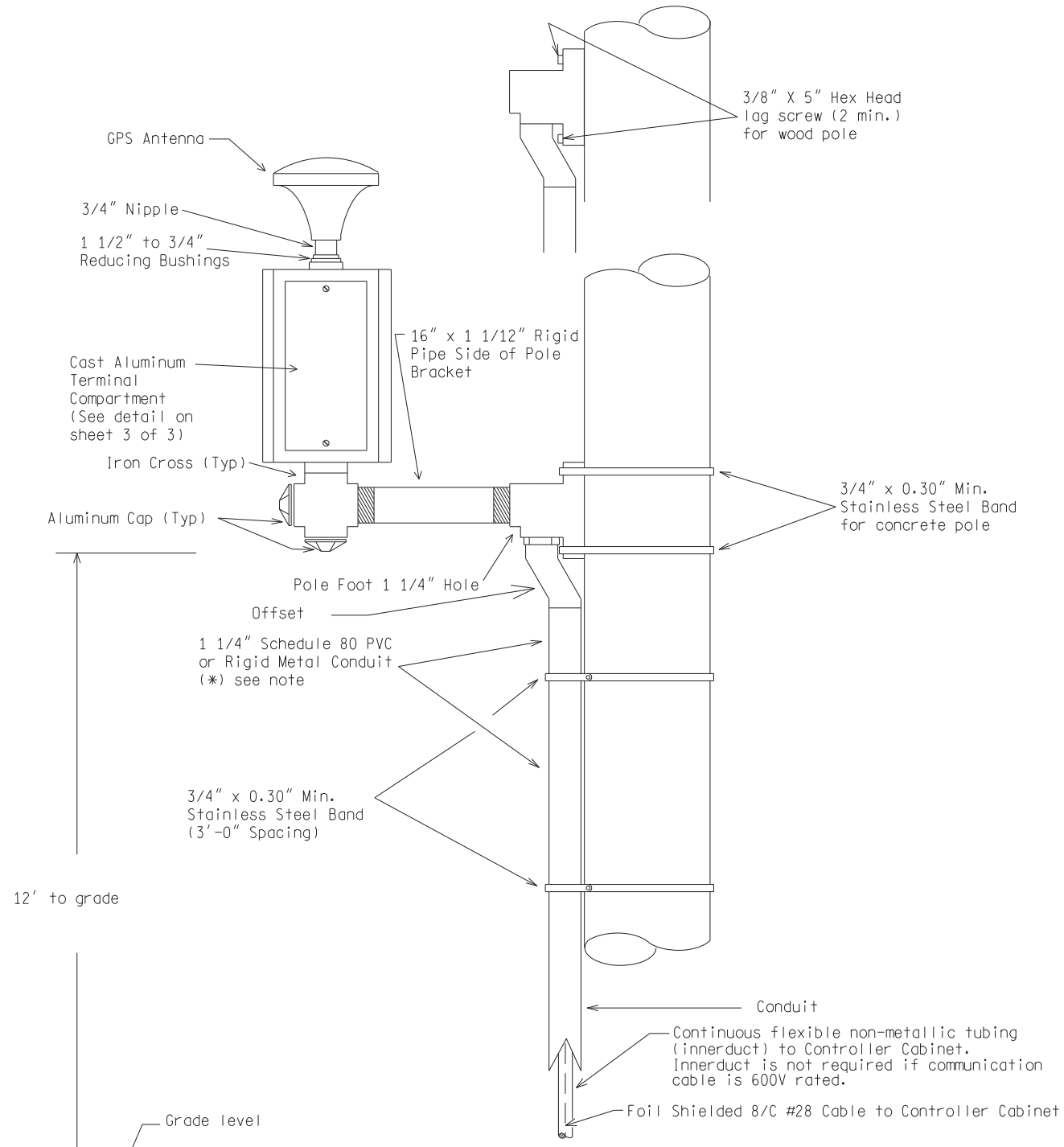
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

POLE MOUNTED T.S.
CONTROLLER CABINET/FOUNDATIONS

PLAN DATE

SIG-111-A

SHEET 1 of 1



Note: For projects maintained by the Wayne Co. Department of Public Services (WCDPS), use rigid metal for conduit(s) from grade level to 10' (min.) above grade or as directed by the Engineer.

GLOBAL POSITIONING SYSTEM (GPS) MODULE MOUNTED ON WOOD/CONCRETE POLE

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG120A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: JJE

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

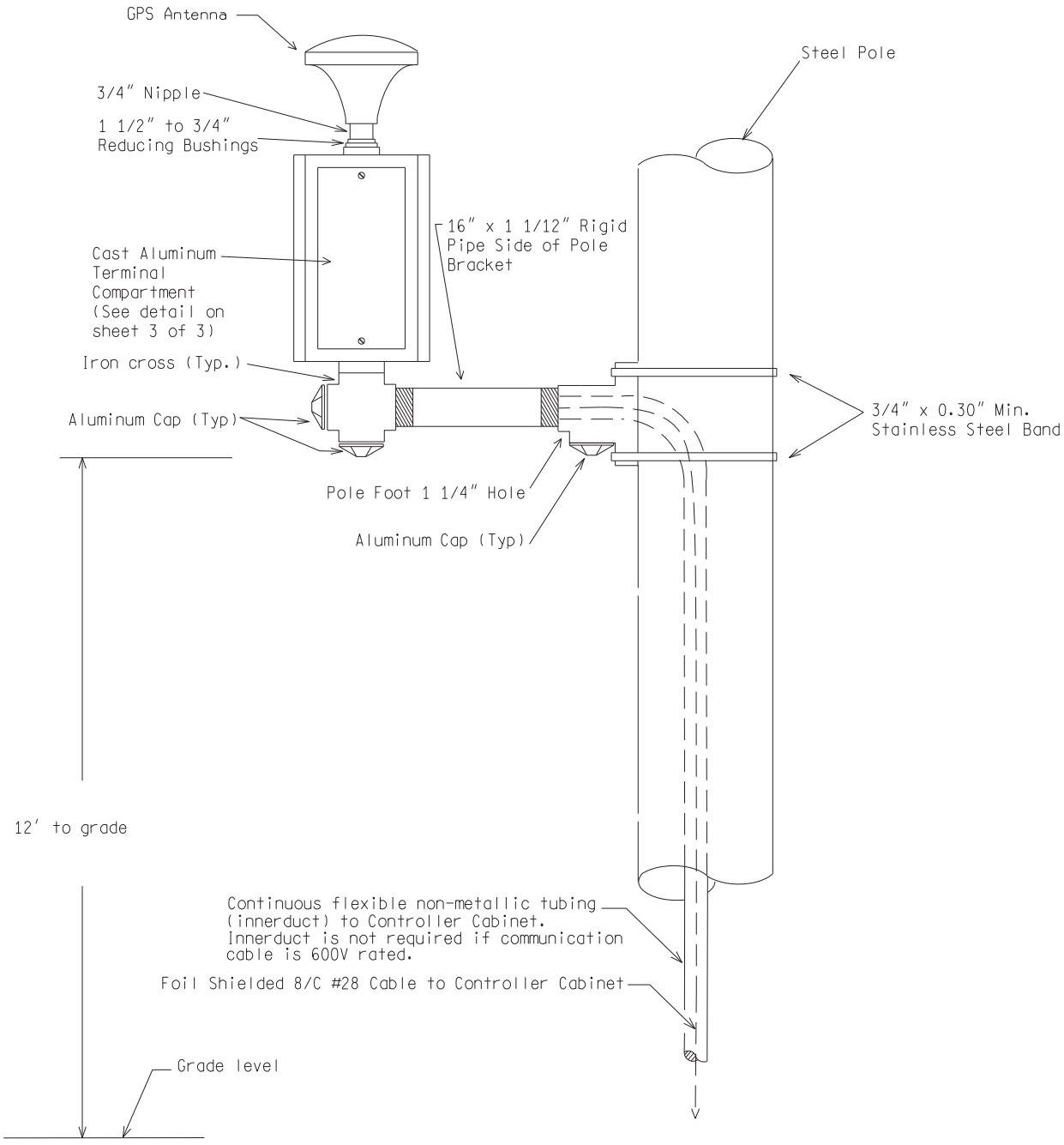
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

GLOBAL POSITIONING SYSTEM (GPS) MODULE

PLAN DATE

SIG-120-A

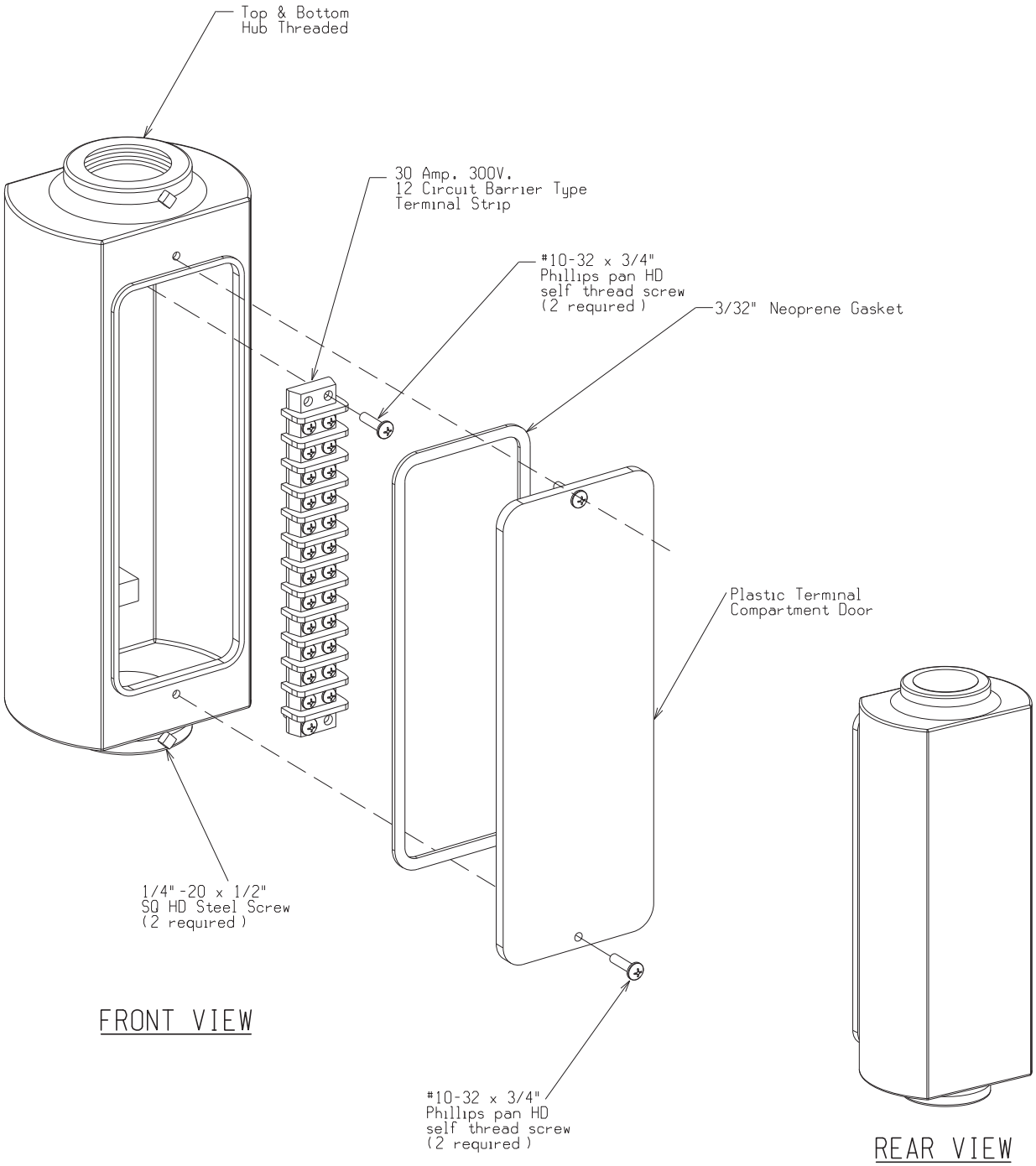
SHEET 1 of 3



GLOBAL POSITIONING SYSTEM (GPS) MODULE MOUNTED ON STEEL POLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE	PLAN DATE	SIG-120-A	SHEET 2 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG120A.dgn Rev. 02/16/17				

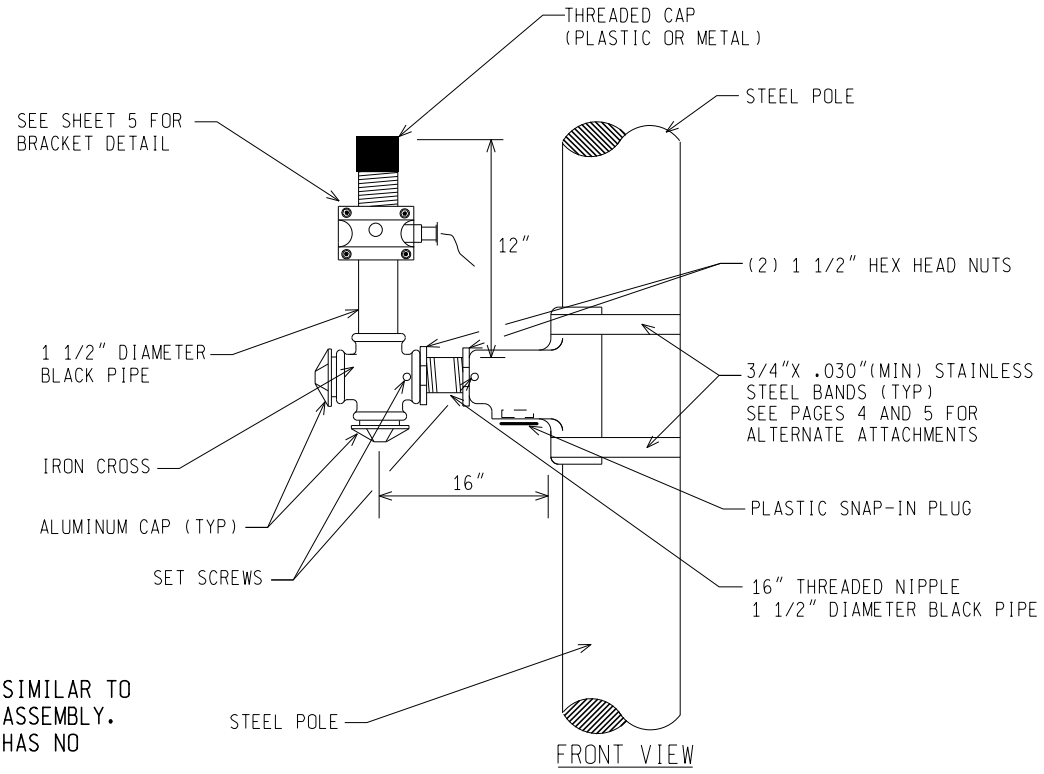


CAST ALUMINUM COMPARTMENT DETAIL

NOTE: All hardware is stainless steel

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE	PLAN DATE	SIG-120-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG120A.dgn Rev. 02/16/17				



(*) NOTE:
ANTENNA ATTACHMENT SIMILAR TO PED SIGNAL BRACKET ASSEMBLY. (FINISHED ASSEMBLY HAS NO THREADS EXPOSED.)

ANTENNA ATTACHMENT DETAIL (STEEL POLE) FOR REMOTE LOCATION

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG130B.dgn Rev. 02/06/2018

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

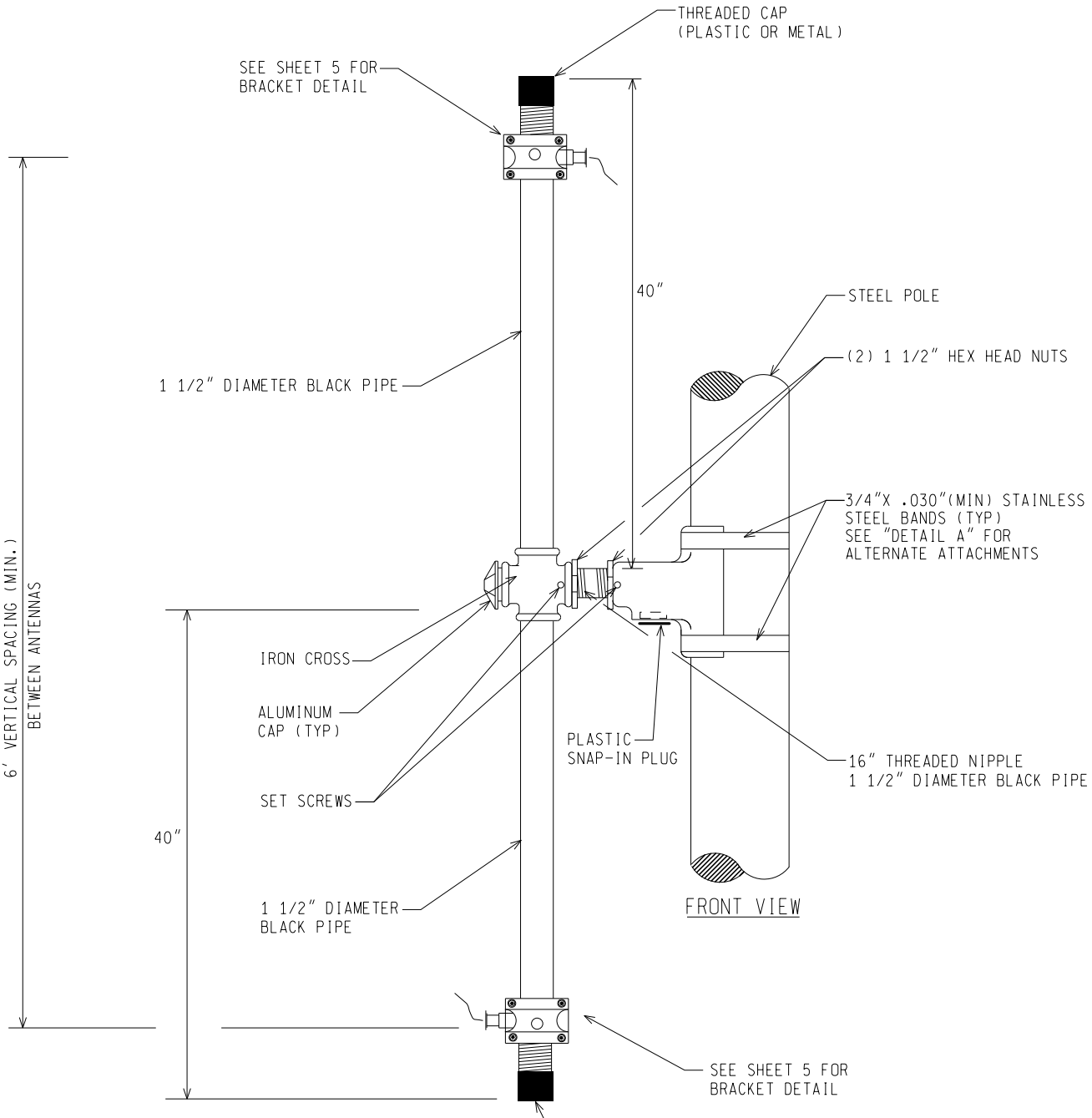
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

ANTENNA ATTACHMENT DETAIL

PLAN DATE

SIG-130-B

SHEET 1 of 6

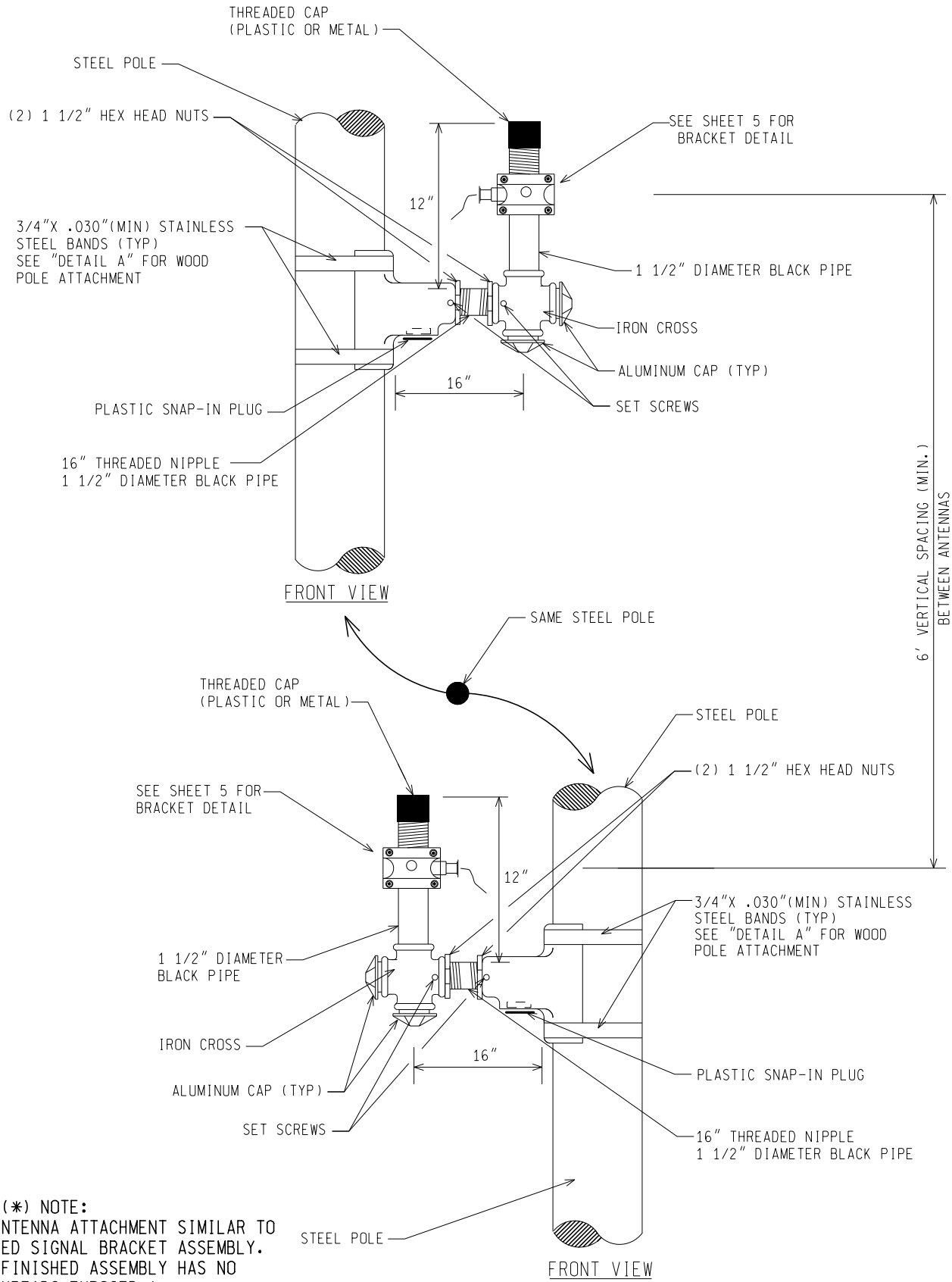


(*) NOTE:
ANTENNA ATTACHMENT SIMILAR TO
PED SIGNAL BRACKET ASSEMBLY.
(FINISHED ASSEMBLY HAS NO
THREADS EXPOSED.)

ANTENNA ATTACHMENT DETAIL (STEEL POLE)
FOR MASTER OR REPEATER LOCATION
SINGLE BRACKET METHOD PREFERRED

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-130-B	SHEET 2 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG130B.dgn Rev. 02/06/18		PLAN DATE		

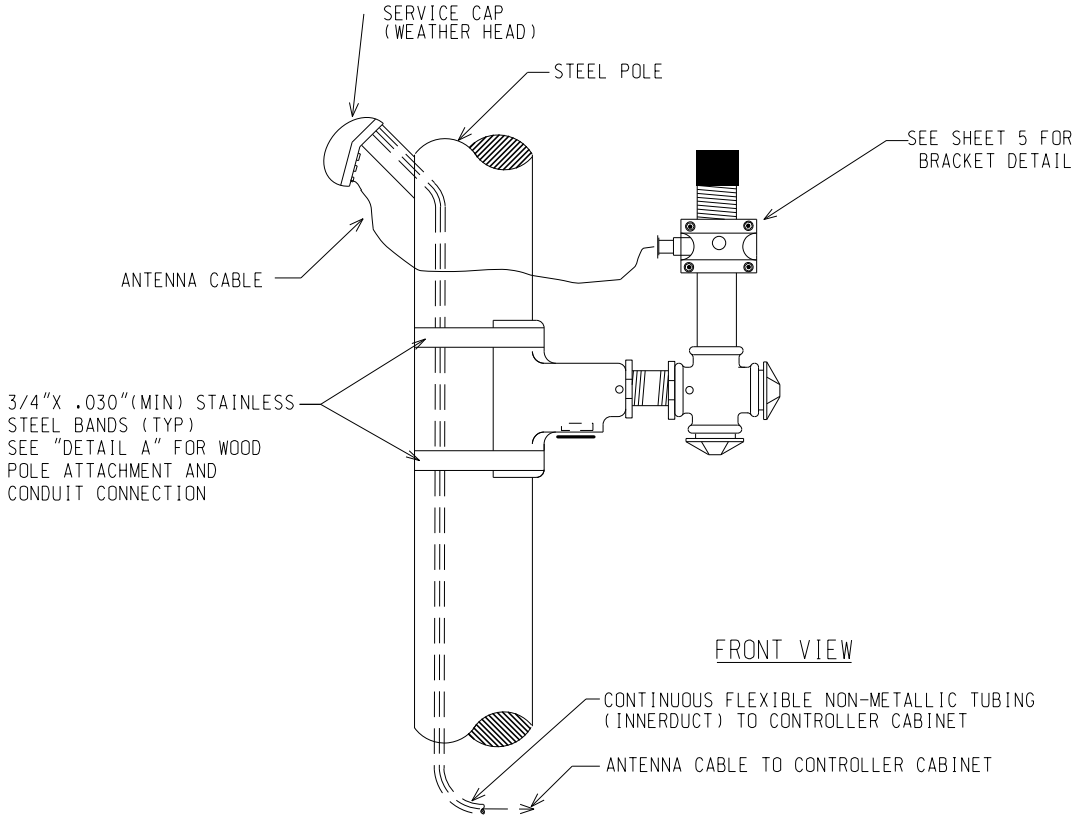


(*) NOTE:
ANTENNA ATTACHMENT SIMILAR TO PED SIGNAL BRACKET ASSEMBLY. (FINISHED ASSEMBLY HAS NO THREADS EXPOSED.)

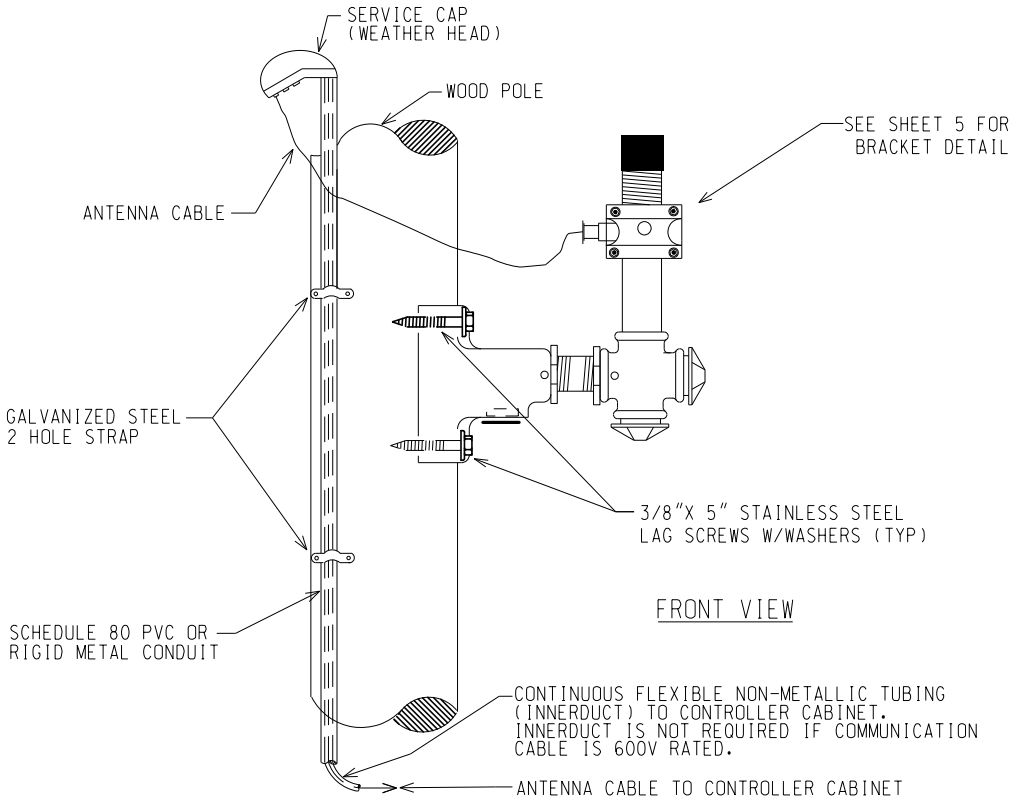
ANTENNA ATTACHMENT DETAIL (STEEL POLE)
FOR MASTER OR REPEATER LOCATION
USE WHEN 2 BRACKETS ARE REQUIRED

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-130-B	SHEET 3 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG130B.dgn Rev. 02/06/18		PLAN DATE		



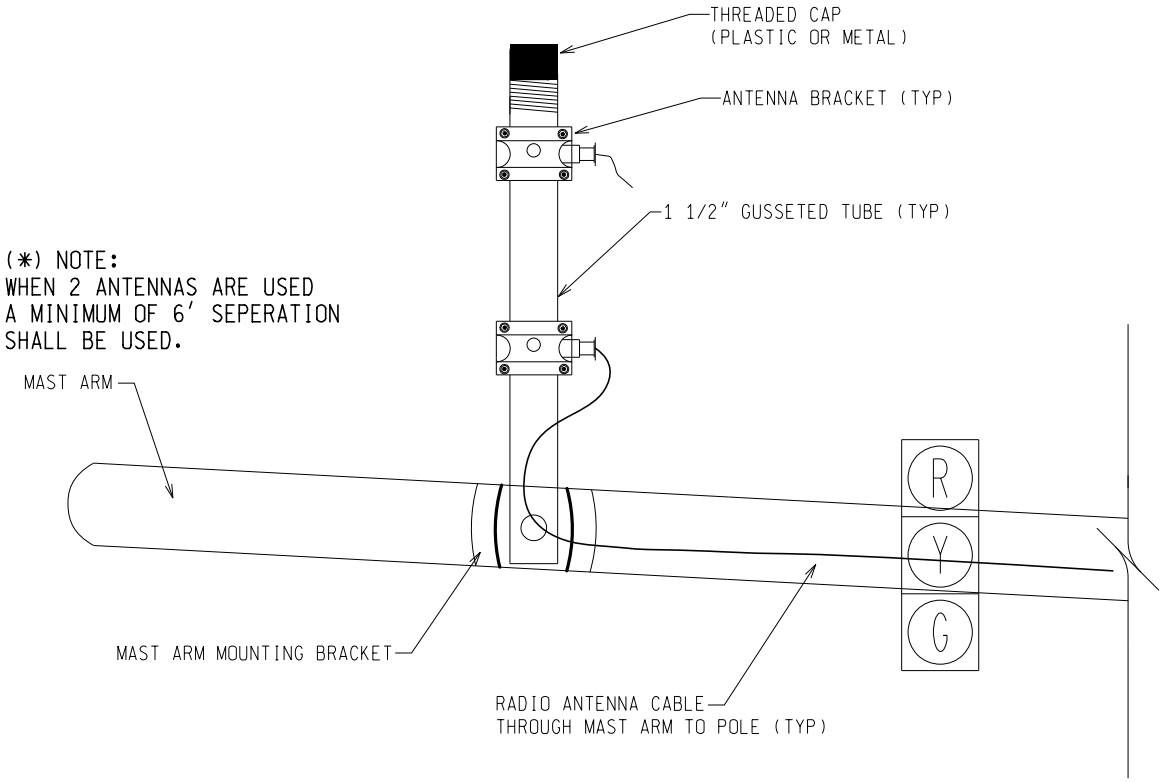
ANTENNA ATTACHMENT DETAIL (STEEL POLE)



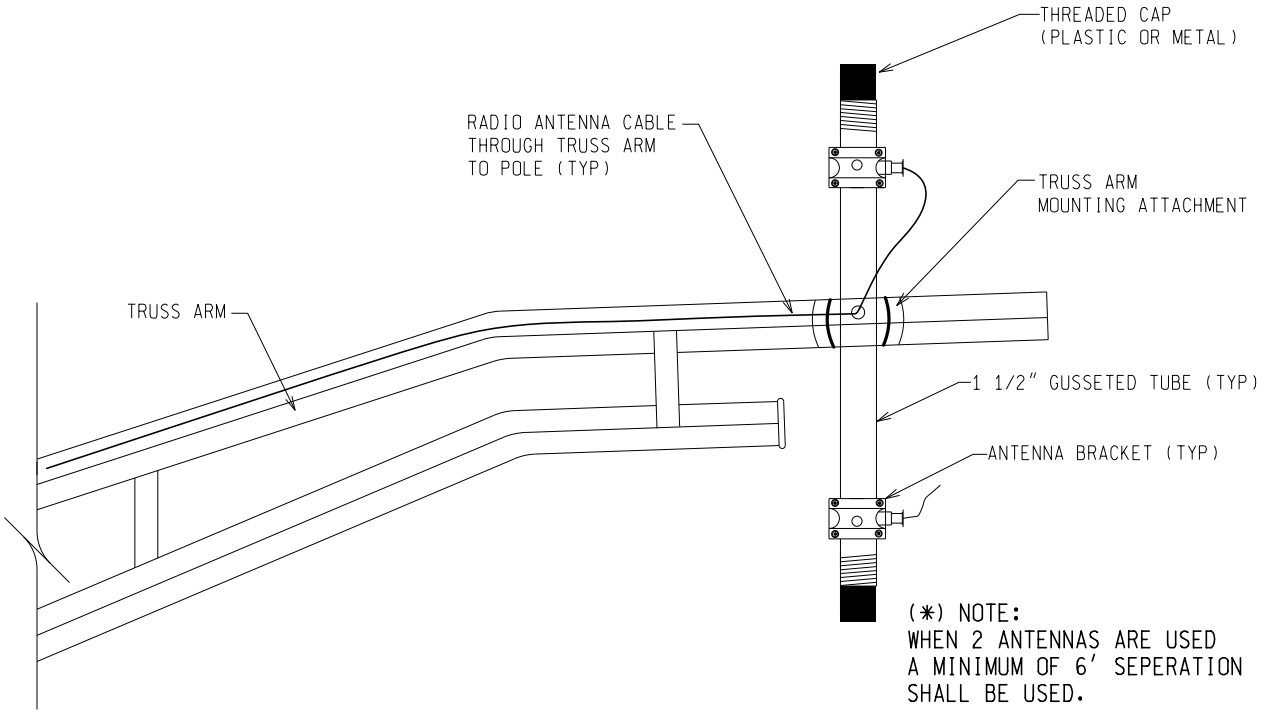
ANTENNA ATTACHMENT DETAIL (WOOD POLE)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-130-B	SHEET 4 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG130B.dgn Rev. 02/06/18		PLAN DATE		



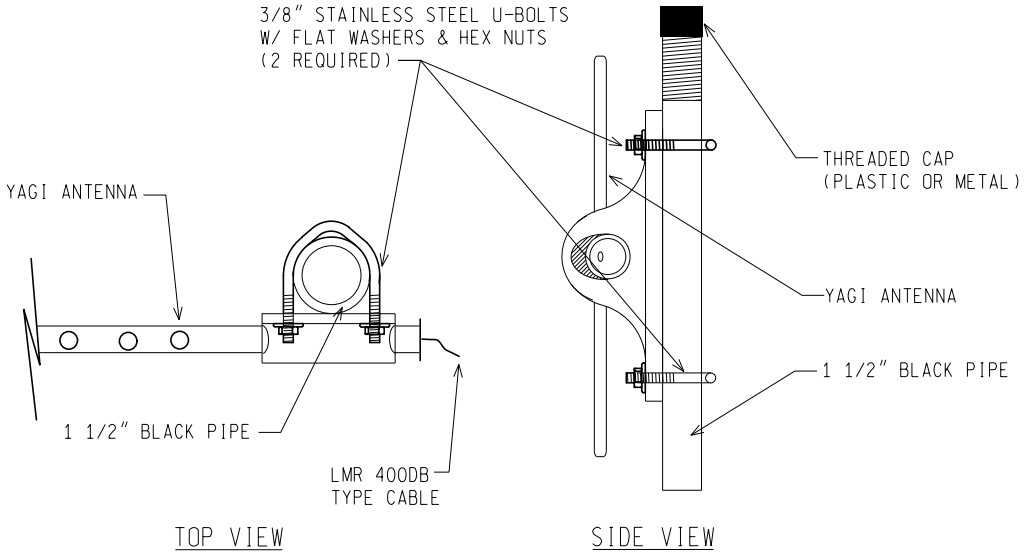
ANTENNA ATTACHMENT DETAIL (MAST ARM)



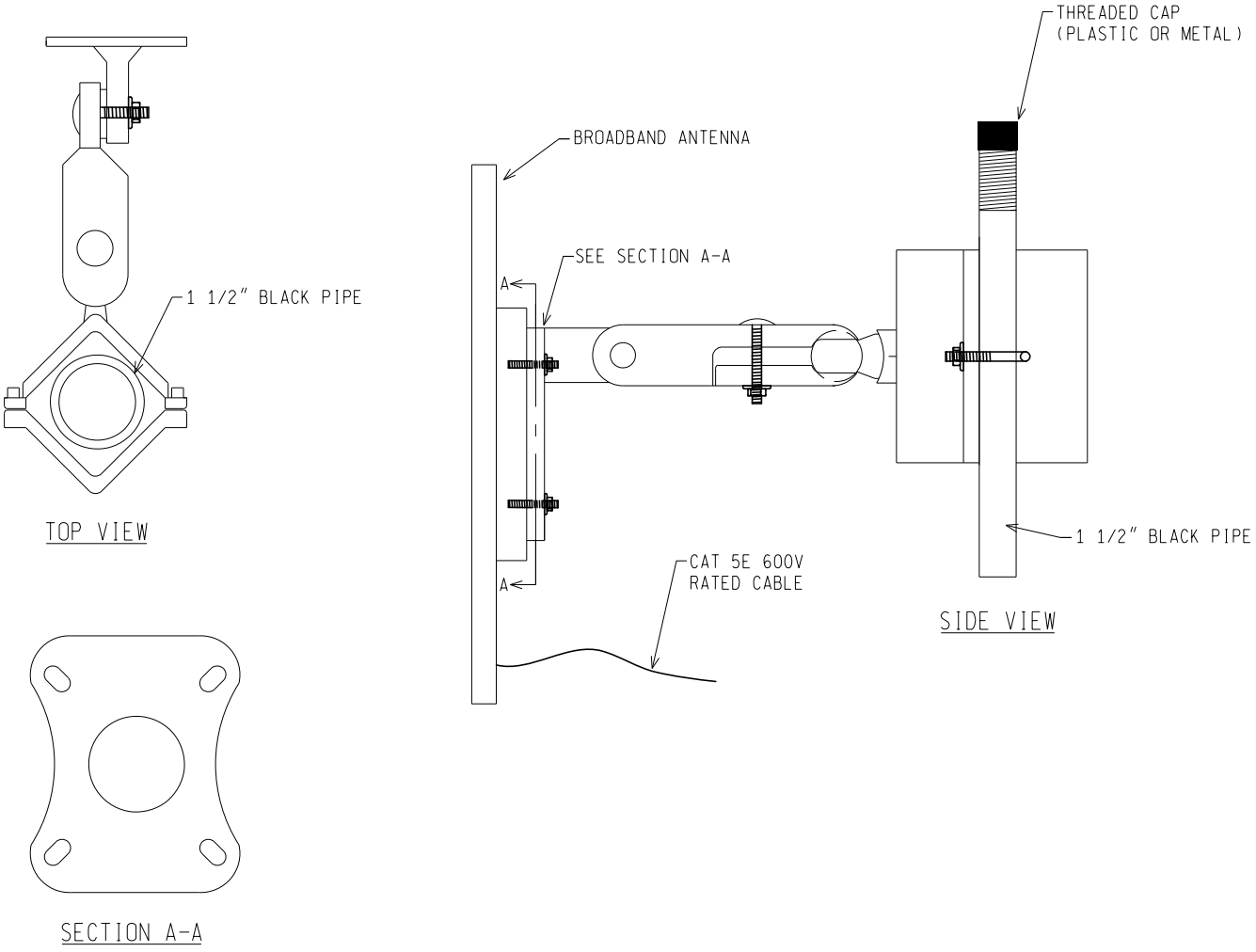
ANTENNA ATTACHMENT DETAIL (TRUSS ARM)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-130-B	SHEET 5 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG130B.dgn Rev. 02/06/18		PLAN DATE		



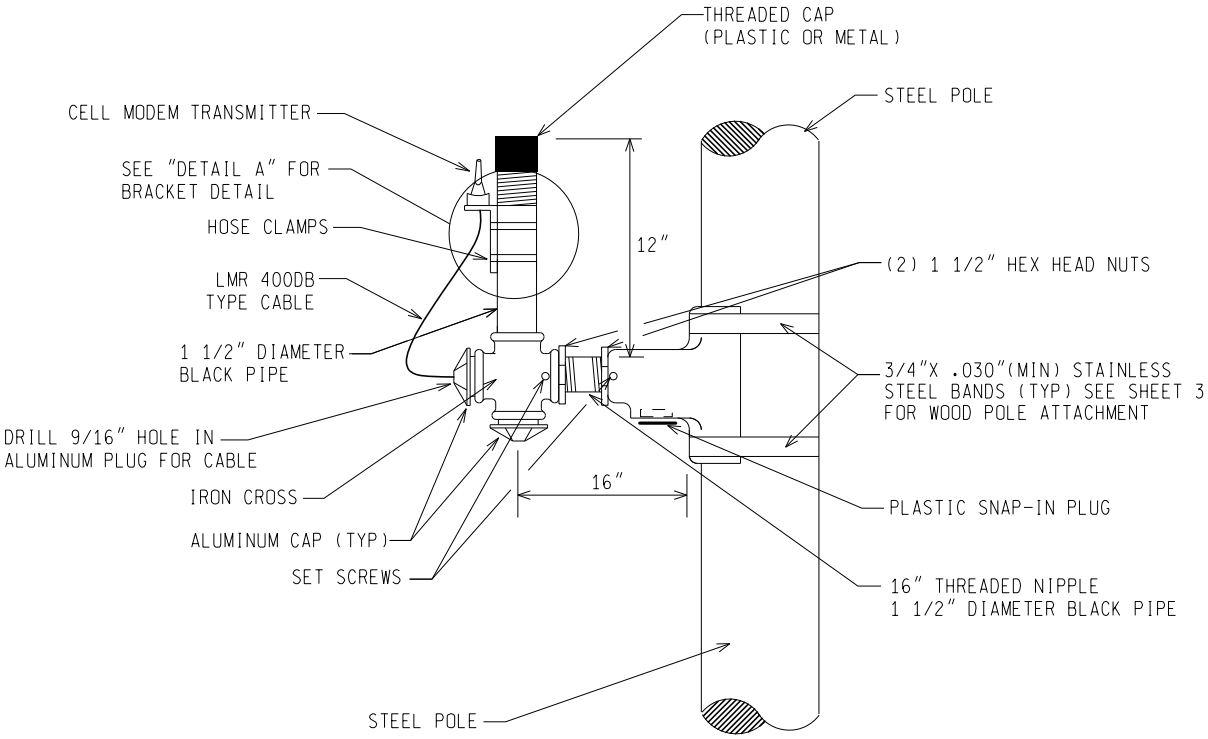
YAGI ANTENNA BRACKET ATTACHMENT DETAIL



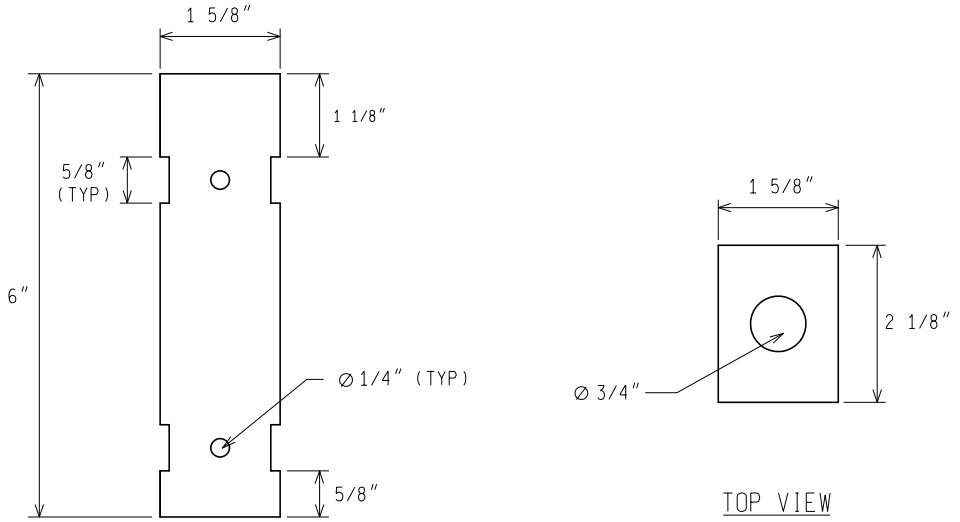
BROADBAND ANTENNA BRACKET ATTACHMENT DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-130-B	SHEET 6 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG130B.dgn Rev. 02/06/18		PLAN DATE		



ANTENNA ATTACHMENT DETAIL (STEEL POLE) FOR CELL MODEM TRANSMITTER



FRONT VIEW

TOP VIEW

CELL MODEM TRANSMITTER BRACKET DETAIL "A"

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG131A.dgn Rev.

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

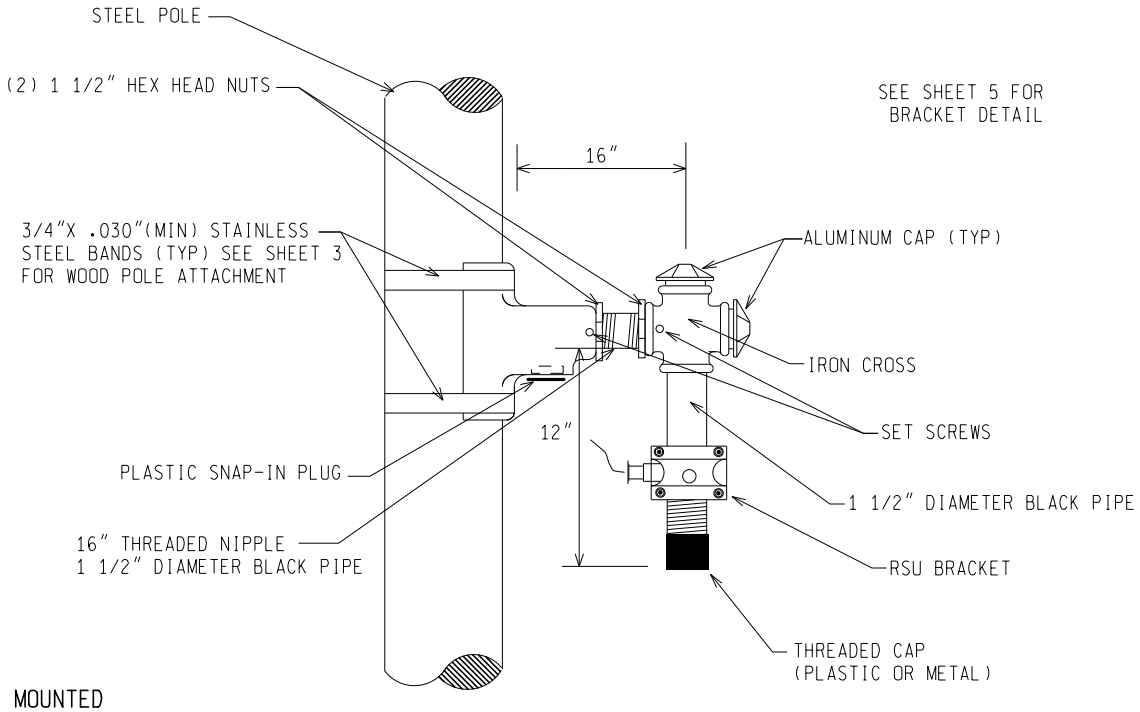
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

CELL MODEM AND RSU ATTACHMENT DETAIL

02/06/18
PLAN DATE

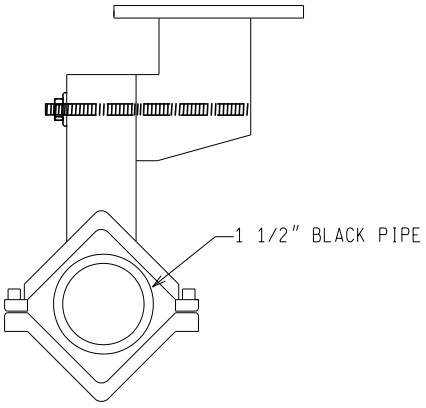
SIG-131-A

SHEET
1 of 3

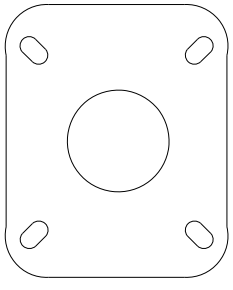


(*) NOTE:
RSU SHALL BE MOUNTED BETWEEN 19' AND 25'

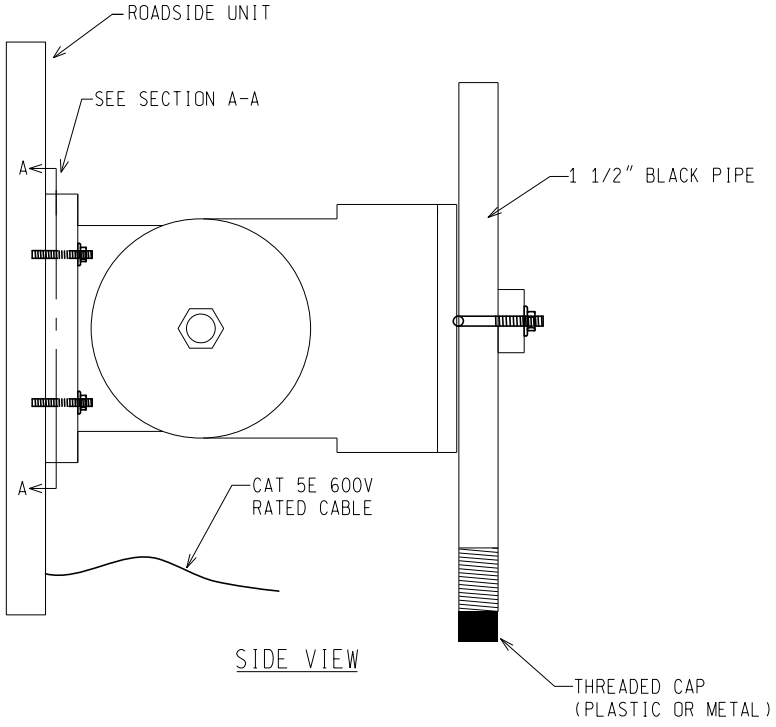
ANTENNA ATTACHMENT DETAIL (STEEL POLE) FOR CELL MODEM TRANSMITTER



TOP VIEW



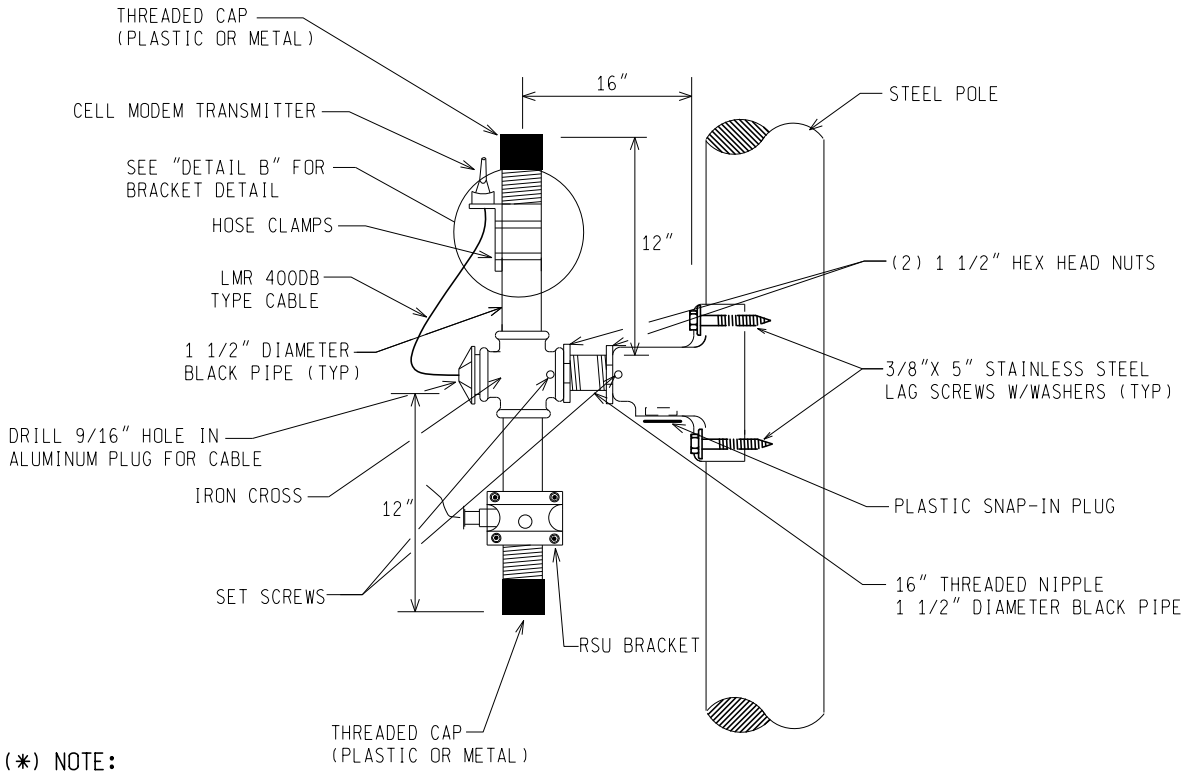
SECTION A-A



SIDE VIEW

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/06/18 PLAN DATE	SIG-131-A	SHEET 2 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG131A.dgn Rev.				

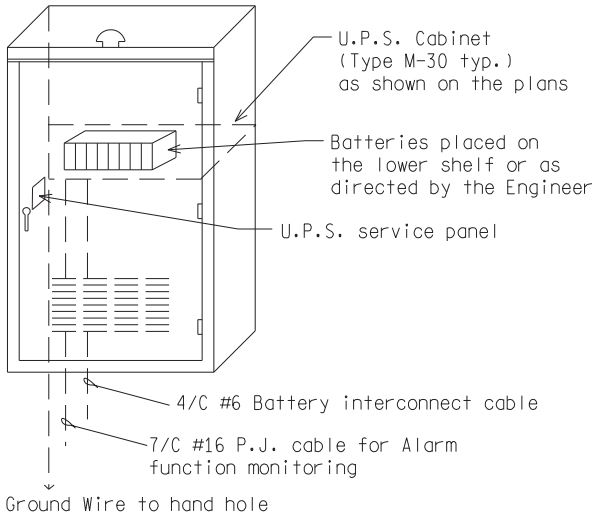


(*) NOTE:
RSU SHALL BE MOUNTED
BETWEEN 19' AND 25'

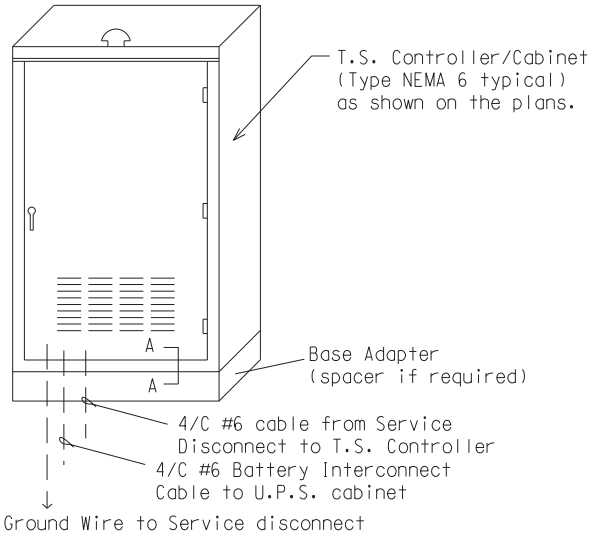
ANTENNA ATTACHMENT DETAIL (WOOD POLE)
FOR CELL MODEM TRANSMITTER AND RSU COMBO

NOT TO SCALE

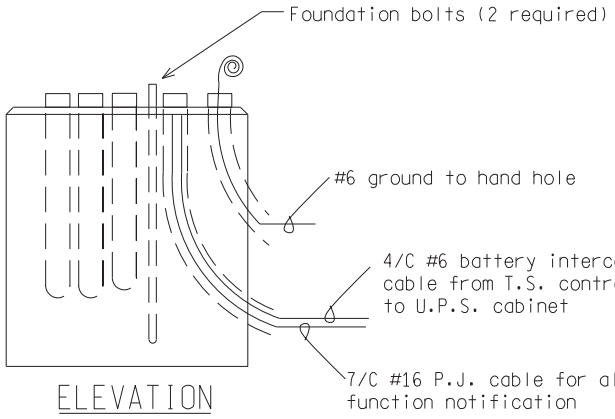
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/06/18 PLAN DATE	SIG-131-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG131A.dgn Rev.				



U.P.S. CABINET BASE MOUNTED



TRAFFIC SIGNAL CONTROLLER/ CABINET BASE MOUNTED

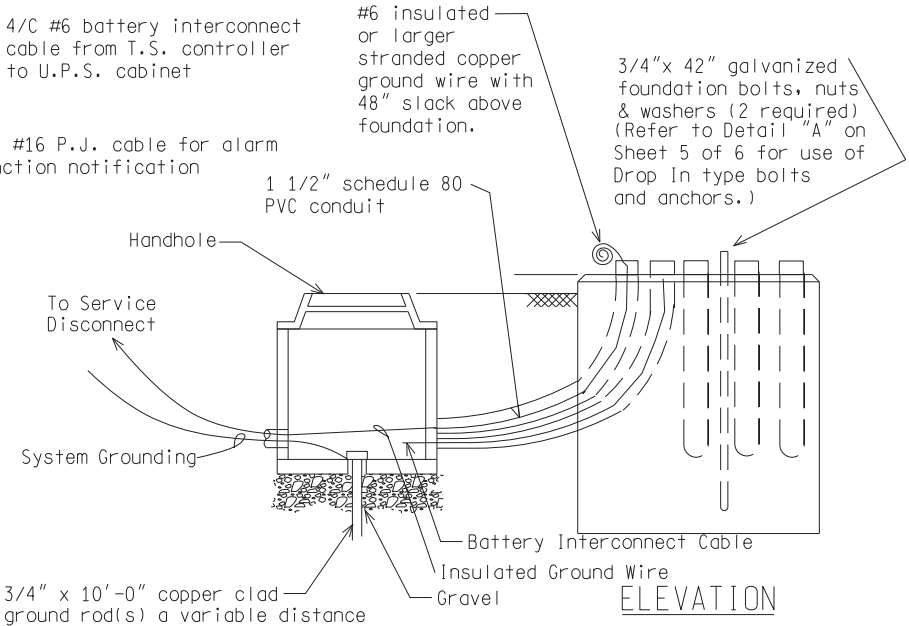


CABINET FOUNDATION

NOTE:
1. Refer to SIG-011-A for Controller Cabinet Mounting on Steel or Wood Pole

2. Refer to SIG-045-A for T.S. Base Mounted Controller Cabinet foundations.

3. Refer to SIG-153-A for strain pole foundation details.



CABINET FOUNDATION

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG140A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

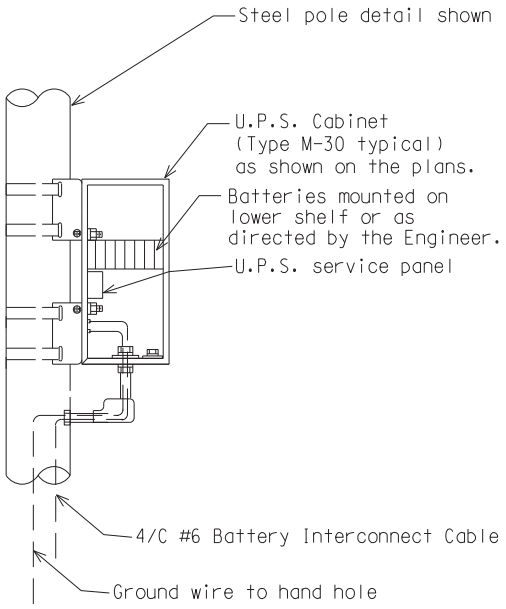
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

TRAFFIC SIGNAL UNINTERRUPTIBLE POWER SYSTEM

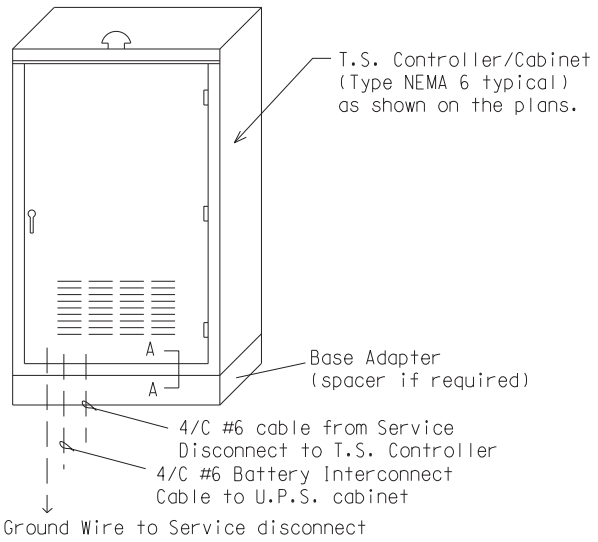
PLAN DATE

SIG-140-A

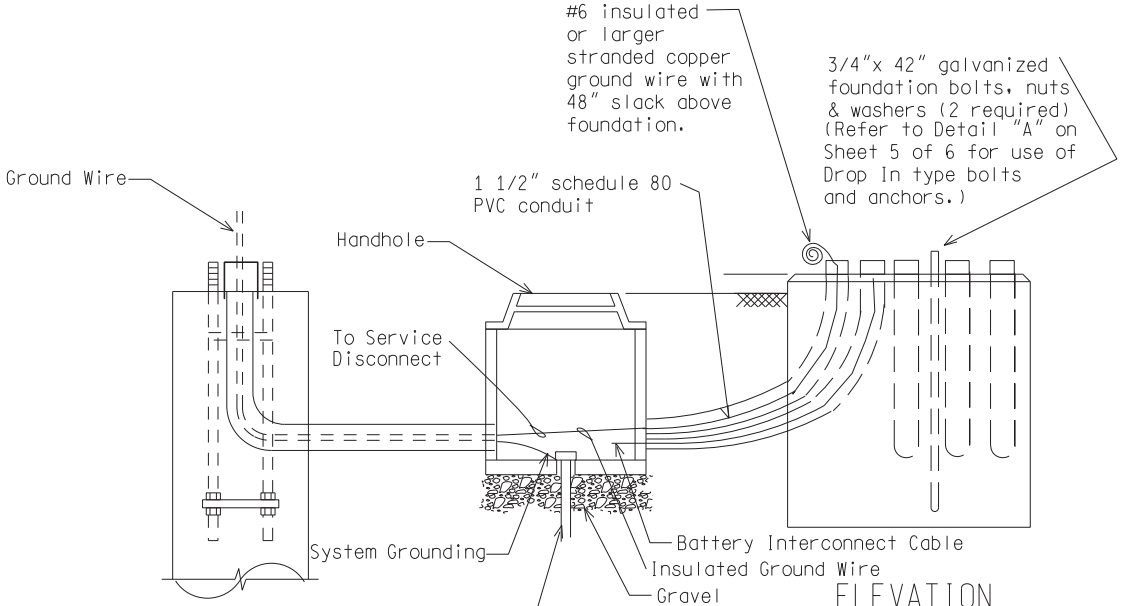
SHEET 1 of 2



U.P.S. CABINET POLE MOUNTED



TRAFFIC SIGNAL CONTROLLER/ CABINET BASE MOUNTED



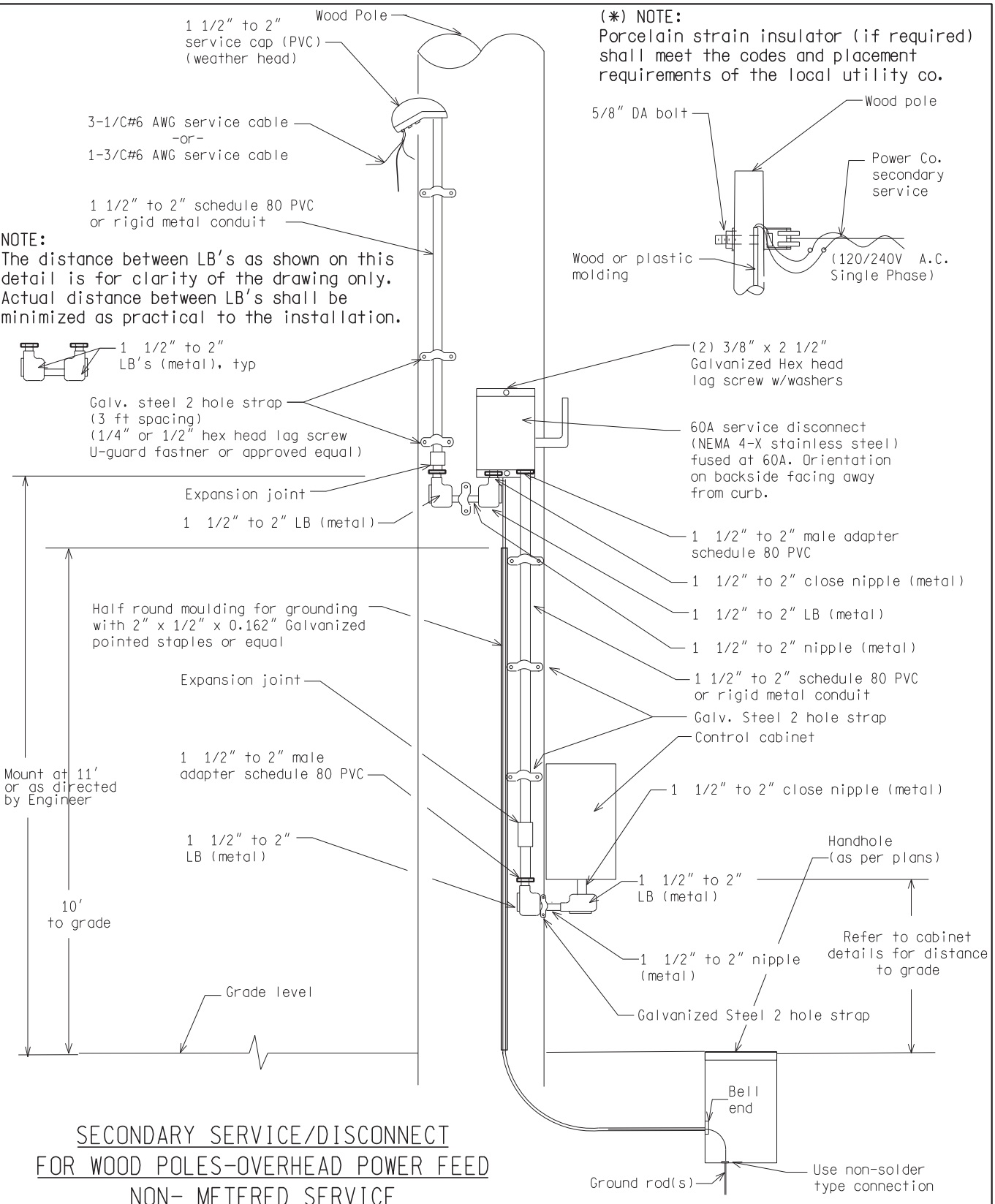
ANCHOR BASE STEEL STRAIN POLE FOUNDATION

CABINET FOUNDATION

3/4" x 10'-0" copper clad
ground rod(s) a variable distance
from foundation as directed
by Engineer and in accordance
with the current N.E.C.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-140-A	SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG140A.dgn Rev. 02/16/17		PLAN DATE		



SECONDARY SERVICE/DISCONNECT FOR WOOD POLES-OVERHEAD POWER FEED NON- METERED SERVICE

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG200A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

SECONDARY SERVICE/DISCONNECT FOR WOOD POLES

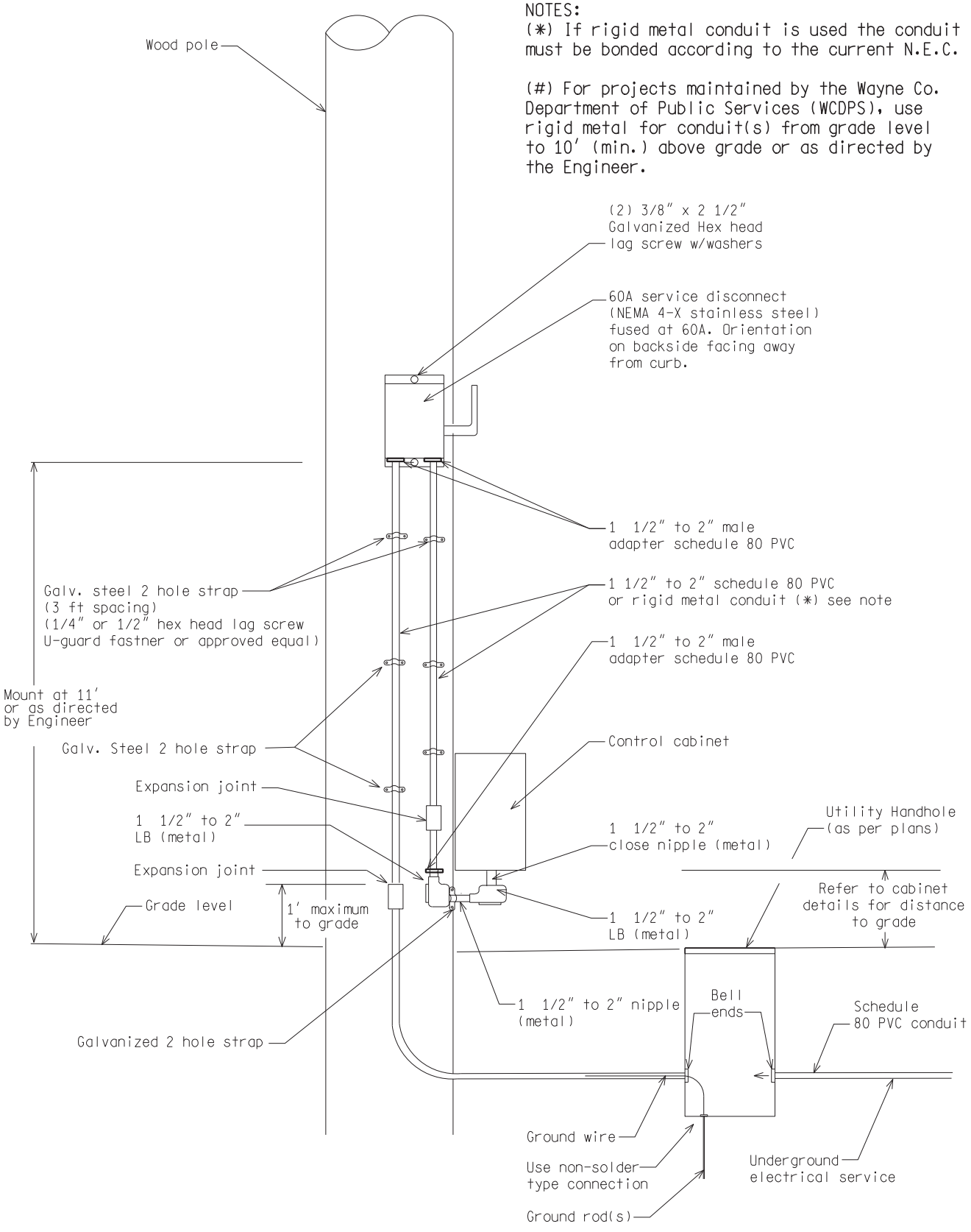
PLAN DATE

SIG-200-A

SHEET 1 of 4

NOTES:
(*) If rigid metal conduit is used the conduit must be bonded according to the current N.E.C.

(#) For projects maintained by the Wayne Co. Department of Public Services (WCDPS), use rigid metal for conduit(s) from grade level to 10′ (min.) above grade or as directed by the Engineer.



SECONDARY SERVICE/DISCONNECT FOR WOOD POLES-UNDERGROUND POWER FEED

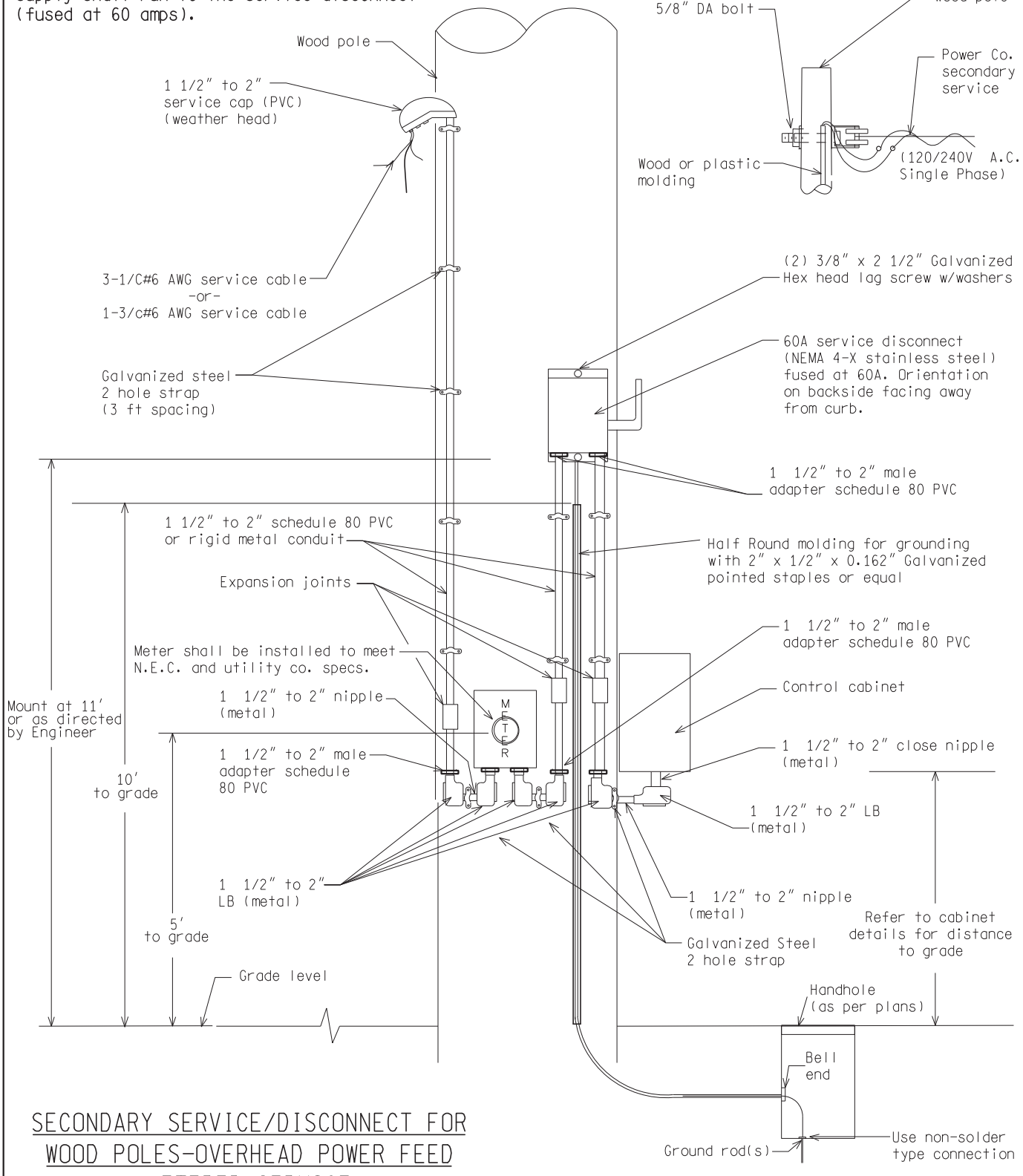
NON-METERED SERVICE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG200A.dgn Rev. 02/16/17		PLAN DATE	SIG-200-A	SHEET 2 of 4

(*) NOTE:
This detail is illustrated as a metered installation. If the plans call for an un-metered installation, then the meter shall be omitted and a direct electrical supply shall run to the service disconnect (fused at 60 amps).

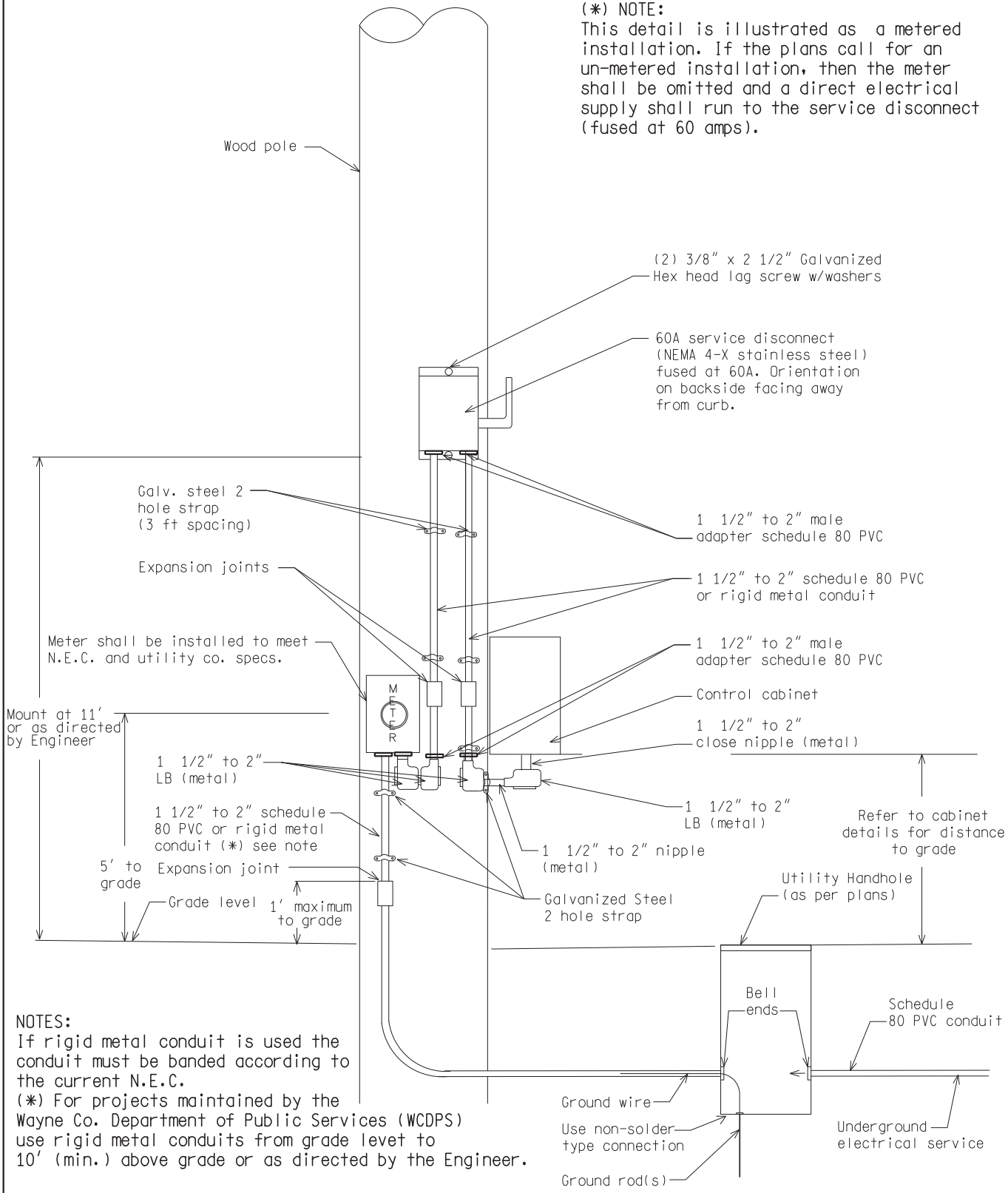
(*) NOTE:
Porcelain strain insulator (if required) shall meet the codes and placement requirements of the local utility co.



SECONDARY SERVICE/DISCONNECT FOR WOOD POLES-OVERHEAD POWER FEED METERED SERVICE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG200A.dgn Rev. 02/16/17		PLAN DATE	SIG-200-A	SHEET 3 of 4

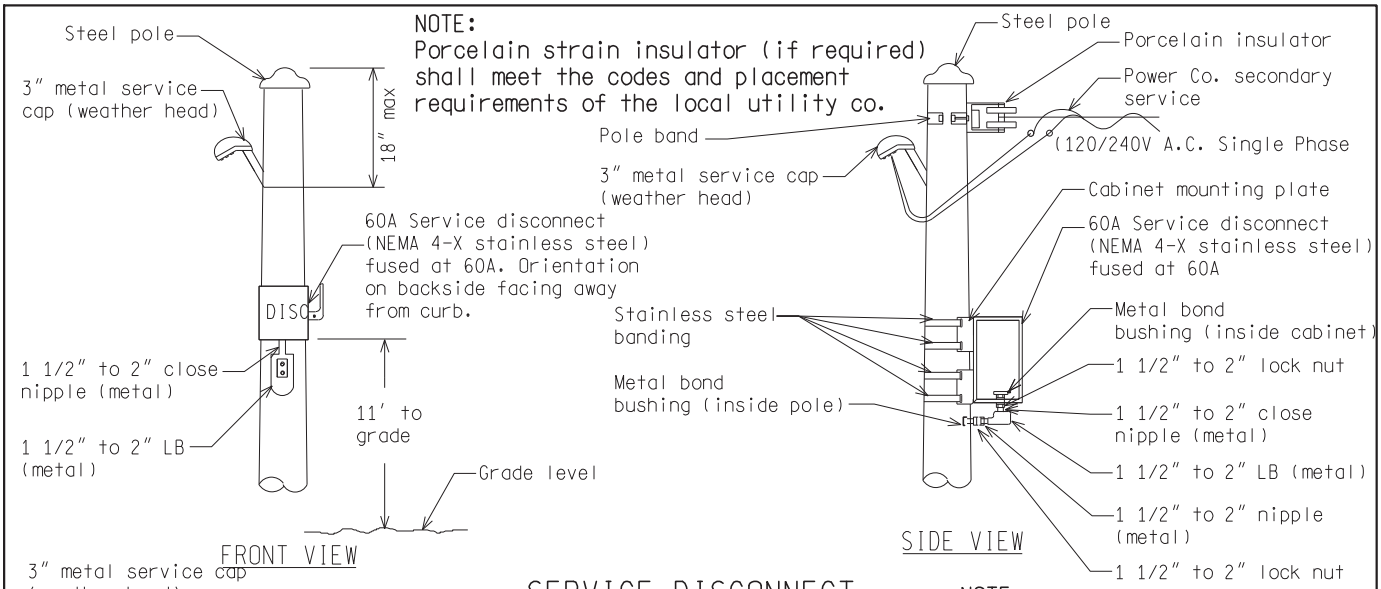


NOTES:
If rigid metal conduit is used the conduit must be banded according to the current N.E.C.
(*) For projects maintained by the Wayne Co. Department of Public Services (WCDPS) use rigid metal conduits from grade levet to 10' (min.) above grade or as directed by the Engineer.

SECONDARY SERVICE/DISCONNECT FOR WOOD POLES-UNDERGROUND POWER FEED METERED SERVICE

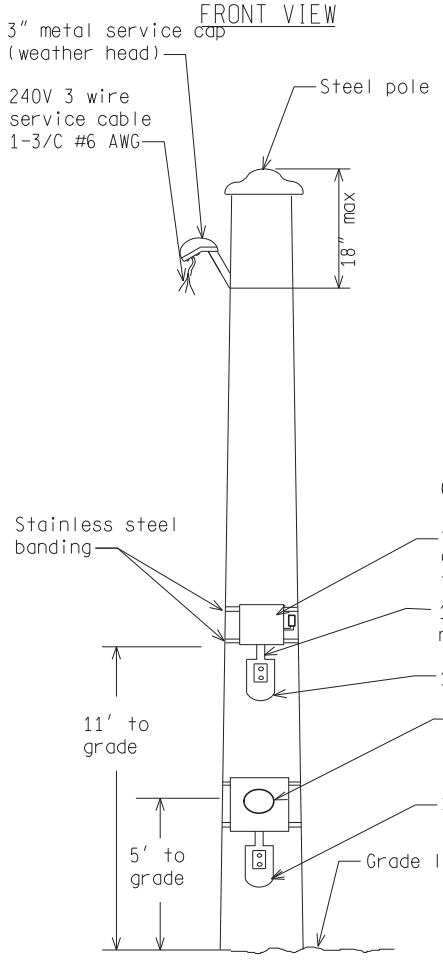
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG200A.dgn Rev. 02/16/17		PLAN DATE	SIG-200-A	SHEET 4 of 4

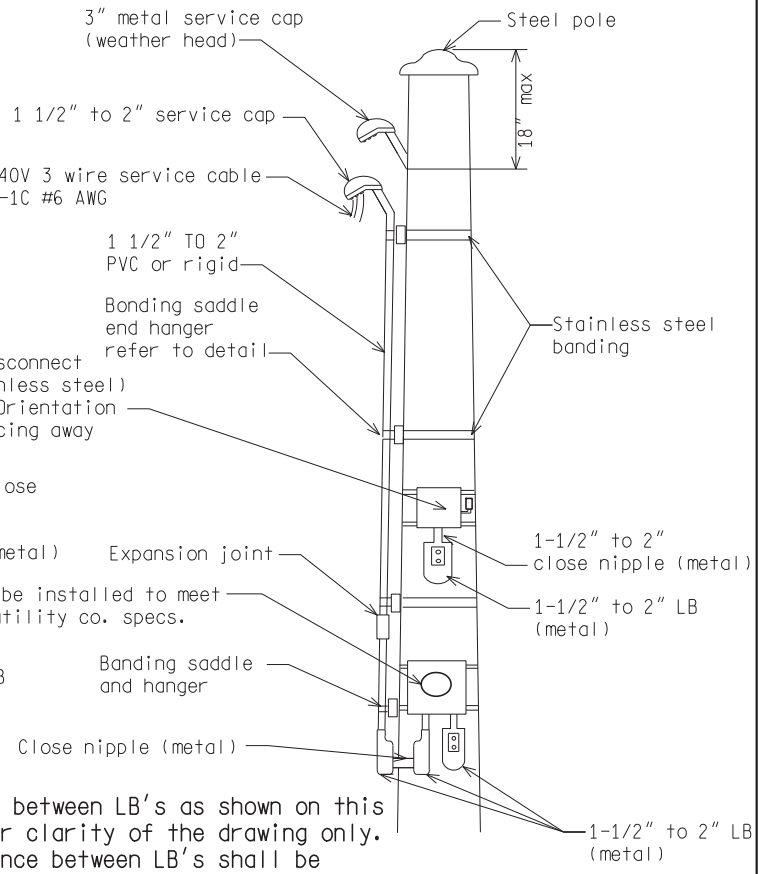


SERVICE DISCONNECT

NOTE:
Only 1-2" hole in steel pole allowed for mounting disconnect.



METERED SERVICE WITH 1-3/C #6 AWG SERVICE CABLE



NOTE:
The distance between LB's as shown on this detail is for clarity of the drawing only. Actual distance between LB's shall be minimized as practical to the installation.

METERED SERVICE WITH 3-1/C #6 AWG SERVICE CABLE

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG201A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

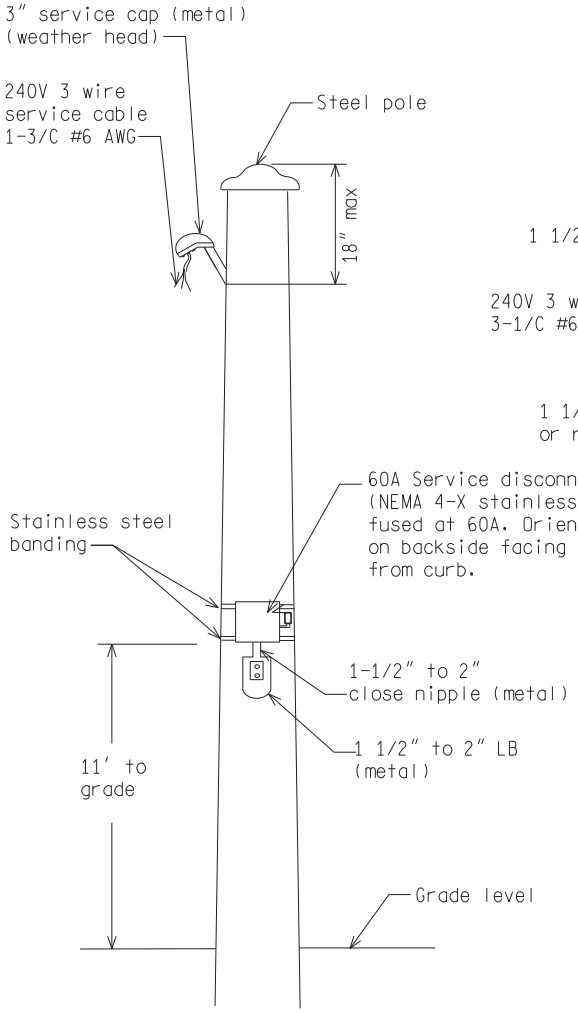
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

SECONDARY SERVICE/DISCONNECT FOR STEEL POLES

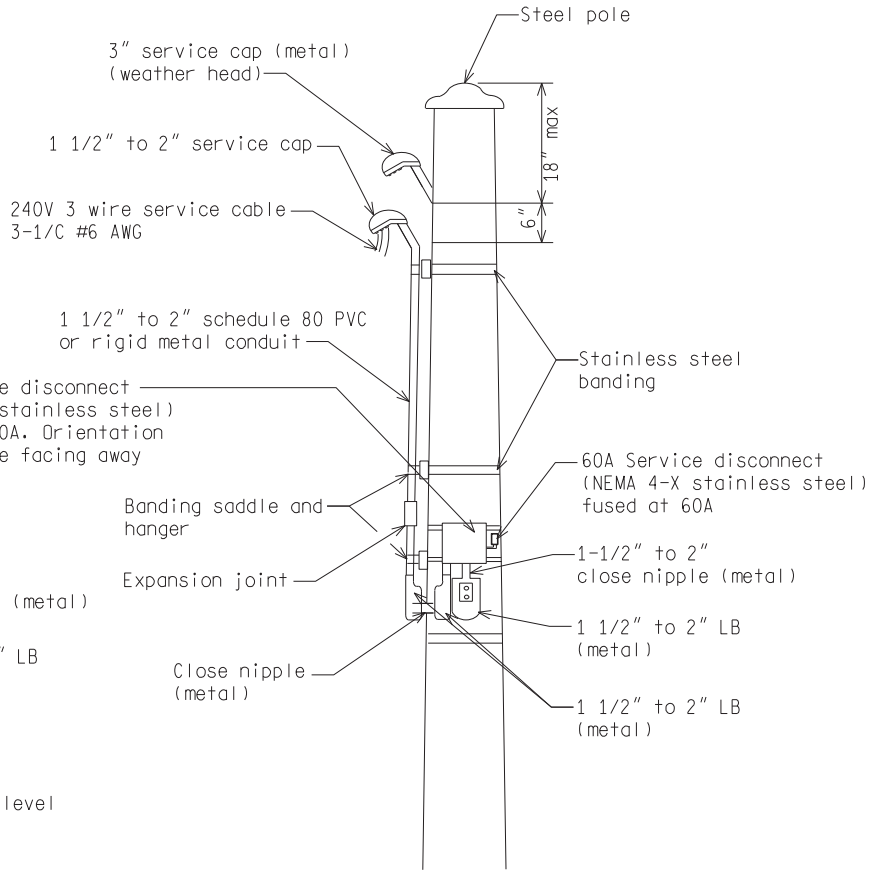
PLAN DATE

SIG-201-A

SHEET 1 of 2



NON-METERED SERVICE WITH
1-3/C #6 AWG SERVICE CABLE

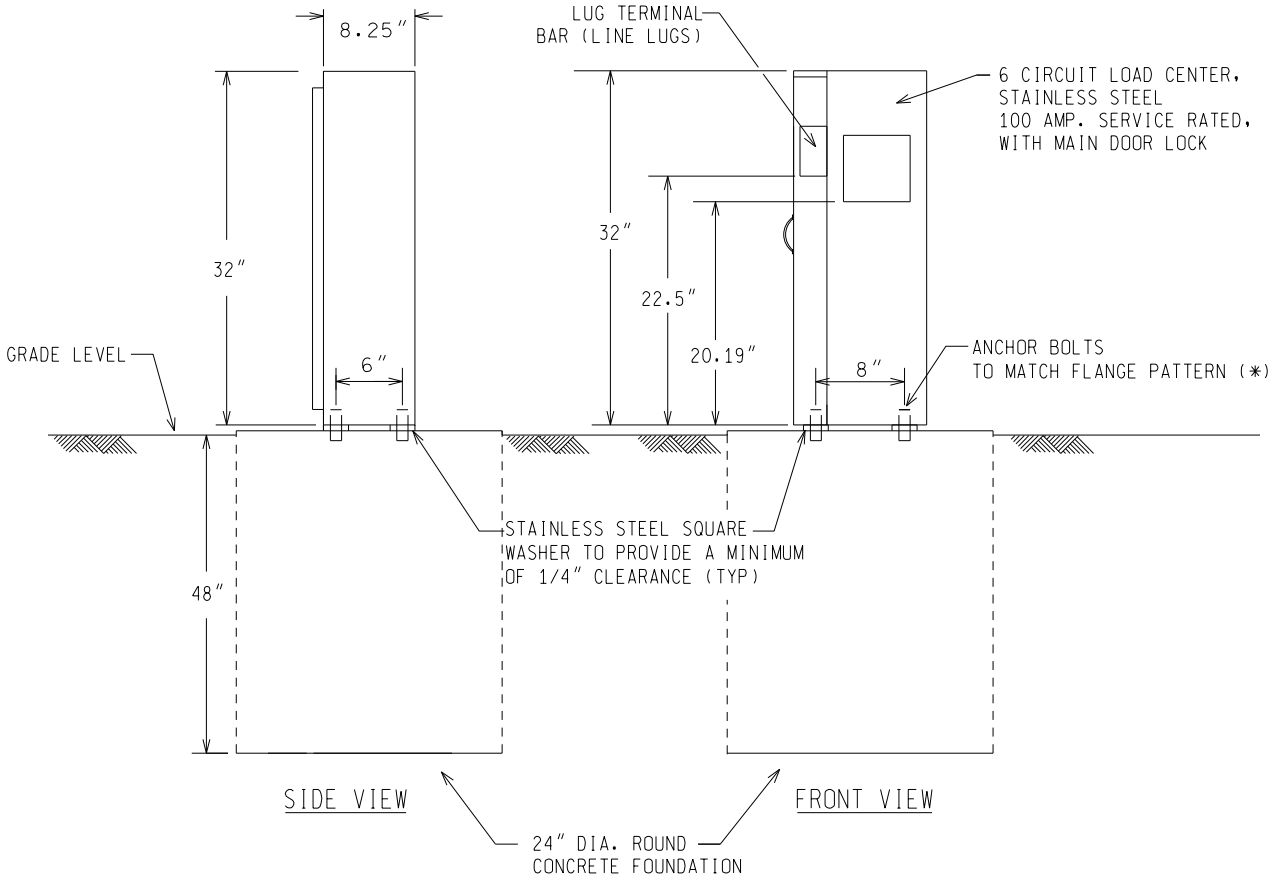


NON-METERED SERVICE WITH
3-1/C #6 AWG SERVICE CABLE

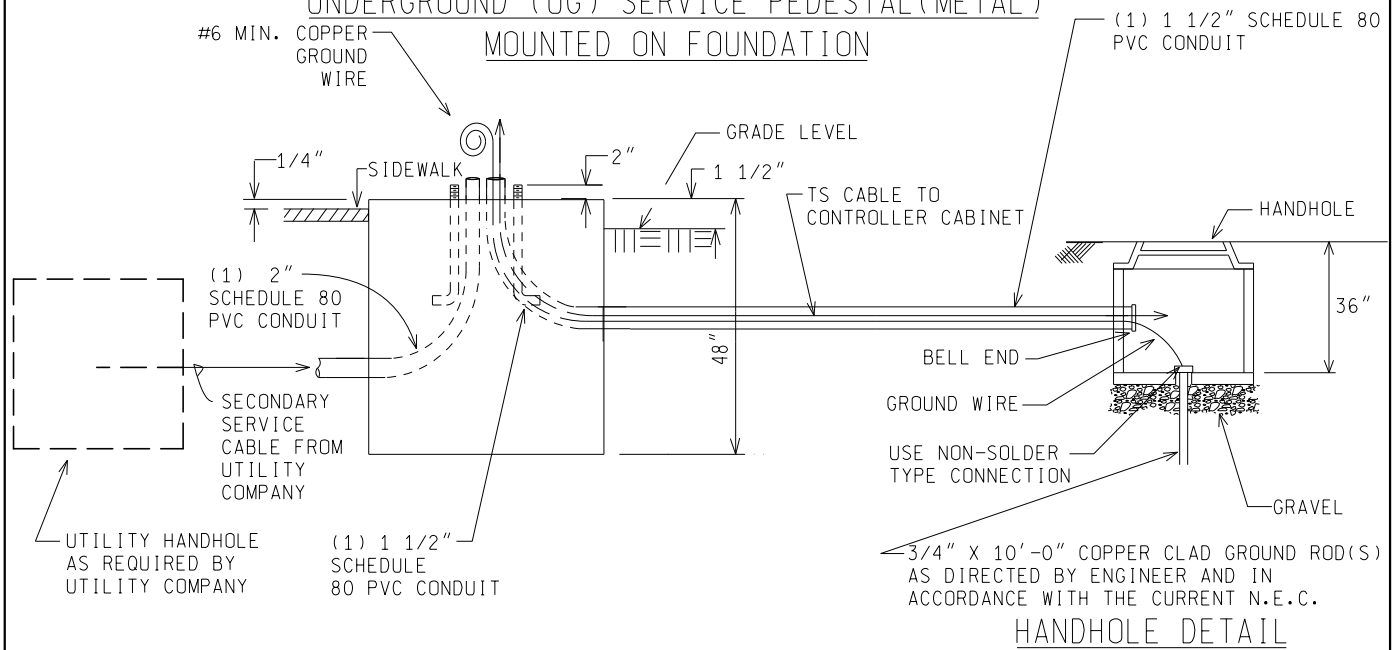
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG201A.dgn Rev. 02/16/17		PLAN DATE	SIG-201-A	SHEET 2 of 2

(*) NOTE: STAINLESS STEEL ANCHOR BOLTS OR STAINLESS STEEL DROP INS, TO BE USED ON EXISTING FOUNDATIONS WITH PROPER GRADE AND SIZE.



UNDERGROUND (UG) SERVICE PEDESTAL(METAL) MOUNTED ON FOUNDATION



HANDHOLE DETAIL

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG210B.dgn Rev. 02/06/18

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

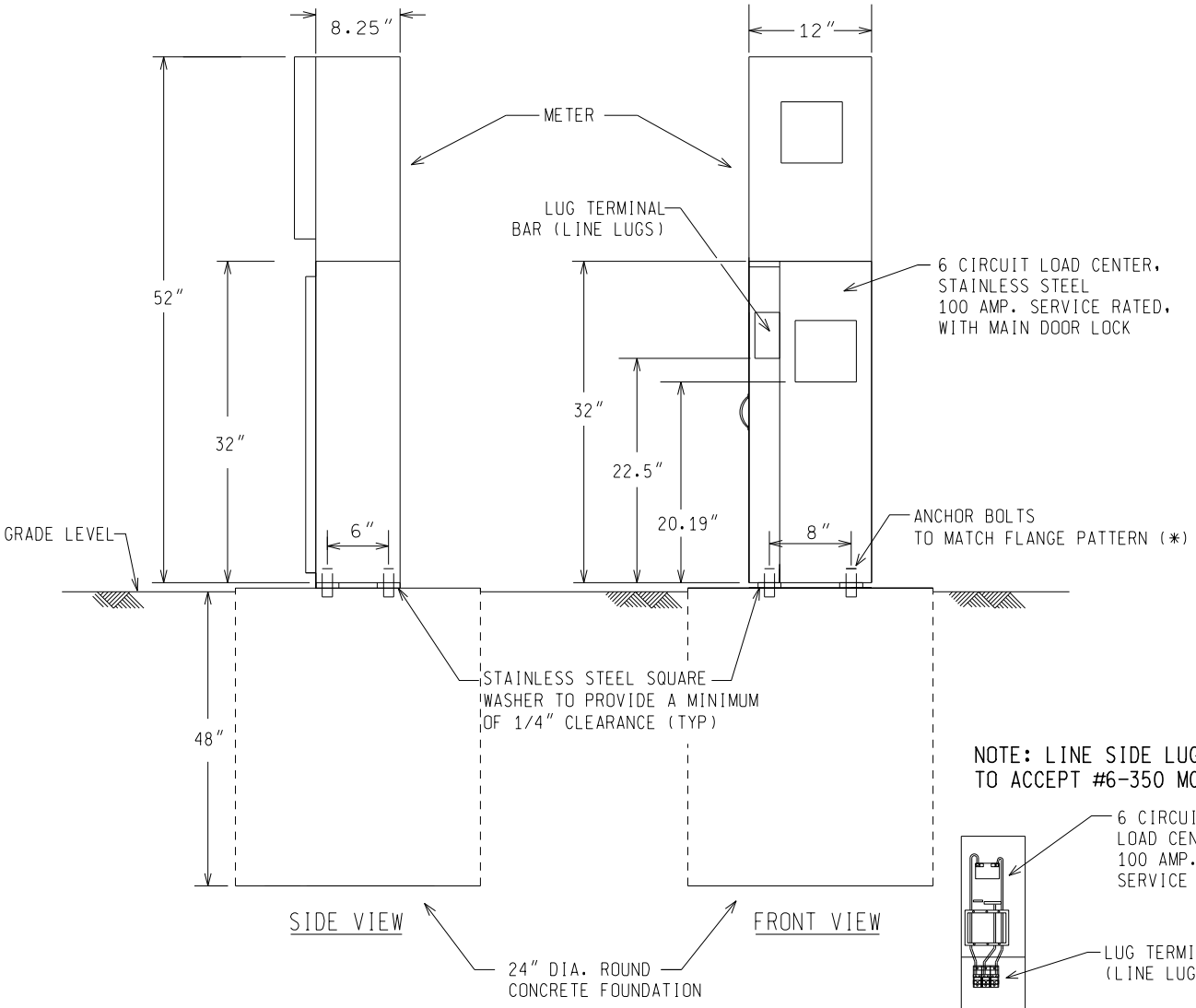
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

UNDERGROUND SERVICE METERED AND UNMETERED

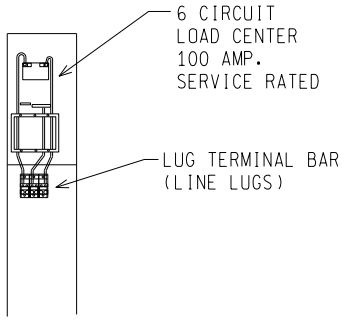
PLAN DATE

SIG-210-B

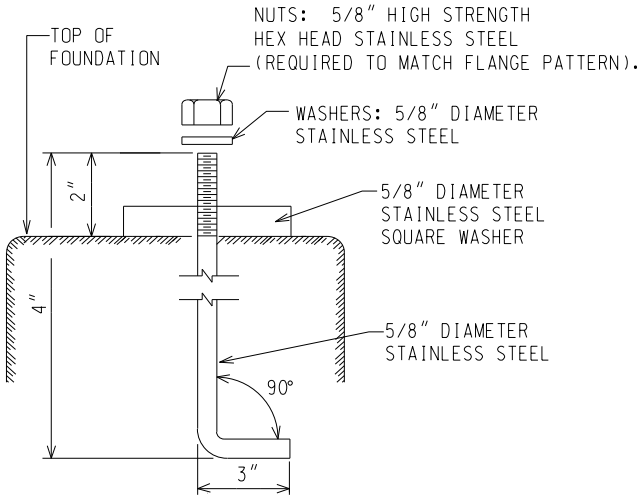
SHEET 1 of 3



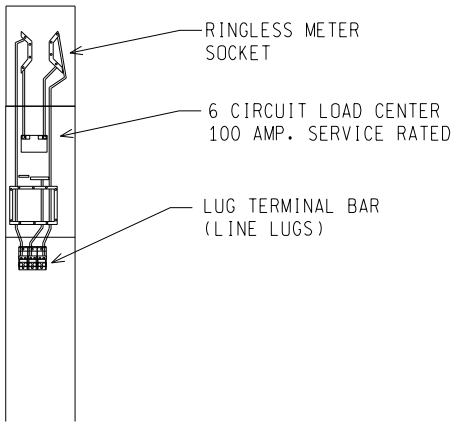
NOTE: LINE SIDE LUGS TO ACCEPT #6-350 MCM AWG



DETAIL WIRING DIAGRAM
(UNMETERED)



ANCHOR BOLT DETAIL

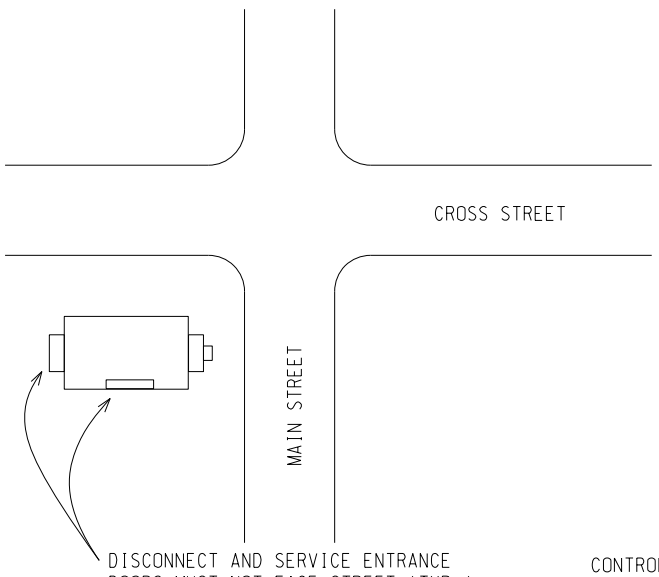


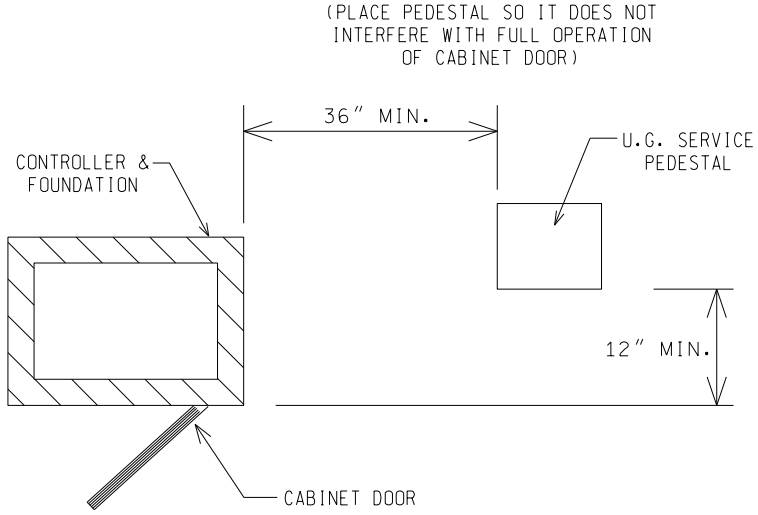
DETAIL WIRING DIAGRAM
(METERED)

NOT TO SCALE

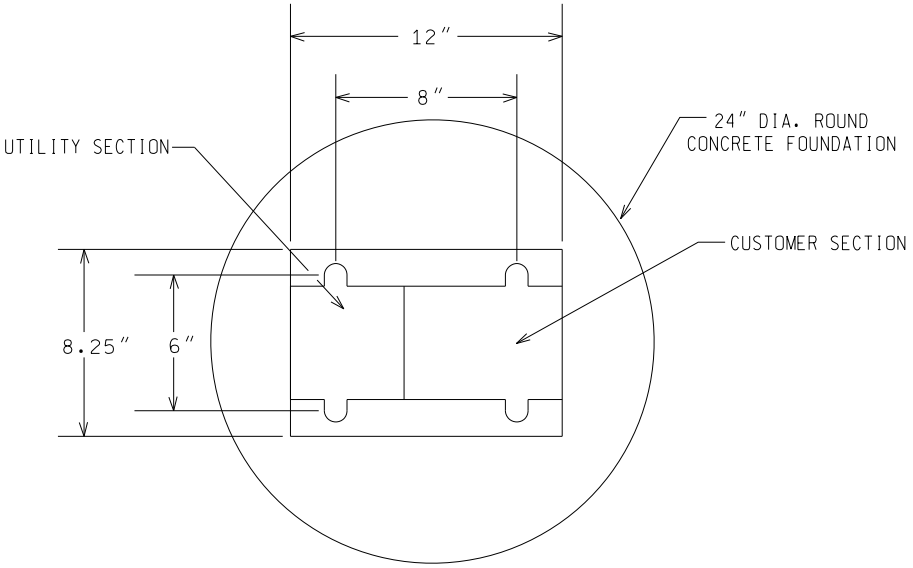
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-210-B	SHEET 2 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG210B.dgn Rev. 02/06/18		PLAN DATE		

PREFERRED SITE ORIENTATION PLAN





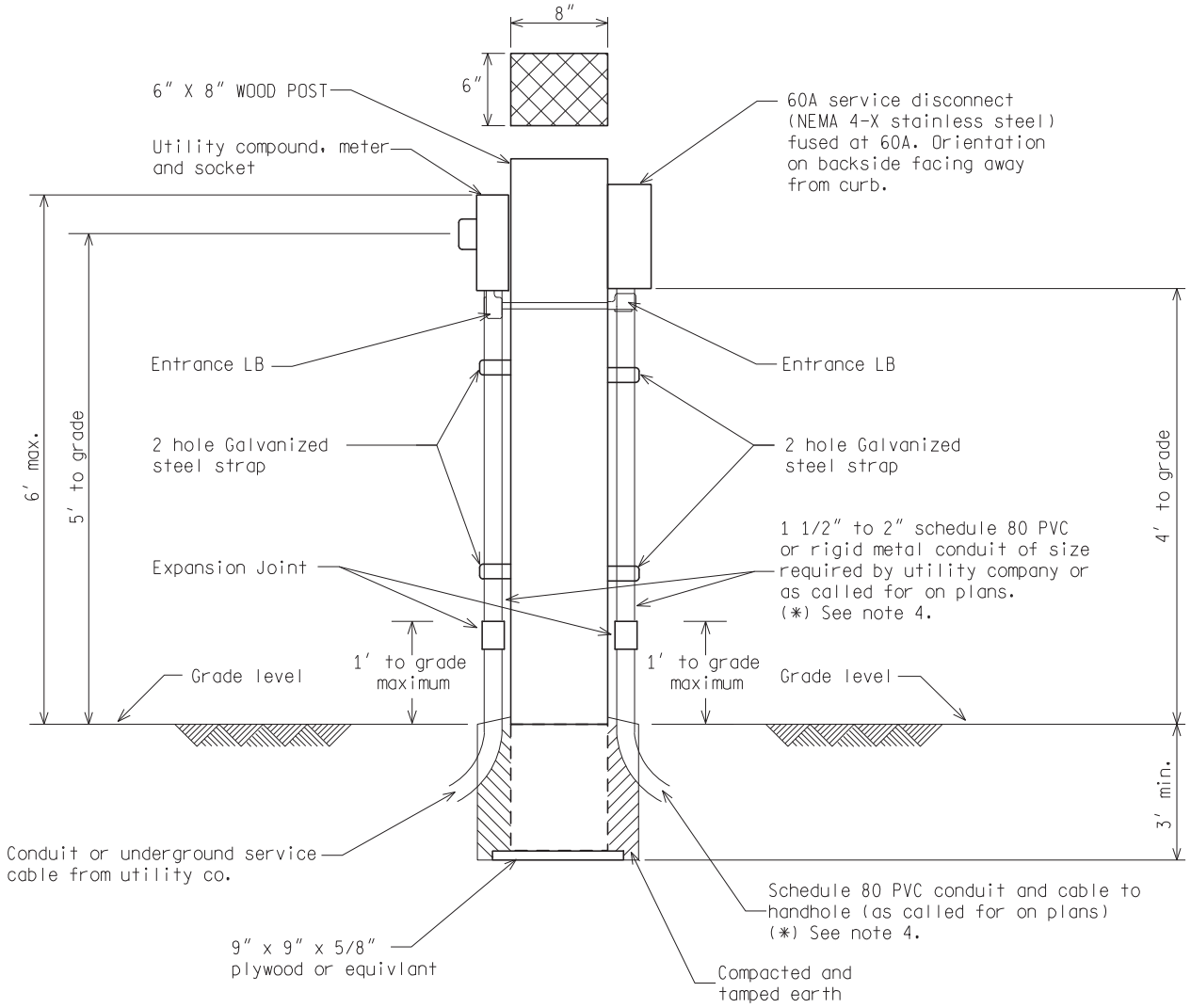
PREFERRED PEDESTAL & FOUNDATION ORIENTATION PLAN



BOLT PATTERN LAYOUT

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-210-B	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG210B.dgn Rev. 02/06/18		PLAN DATE		



UNDERGROUND METERED SERVICE
(120/240V 60 HZ)

NOTES:

1) The 6″ x 8″ wood post shall meet the requirement of the current M.D.O.T. Standard Specifications for Construction.

2) The meter and socket shall be as approved and required by the local power company.

3) All National Electric Code and local utility requirements for underground metered service shall be met.

4) For projects maintained by the Wayne Co. Department of Public Services (WCDPS), use rigid metal for conduit(s) from grade level to 10′ (min.) above grade or as directed by the Engineer.

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG211A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

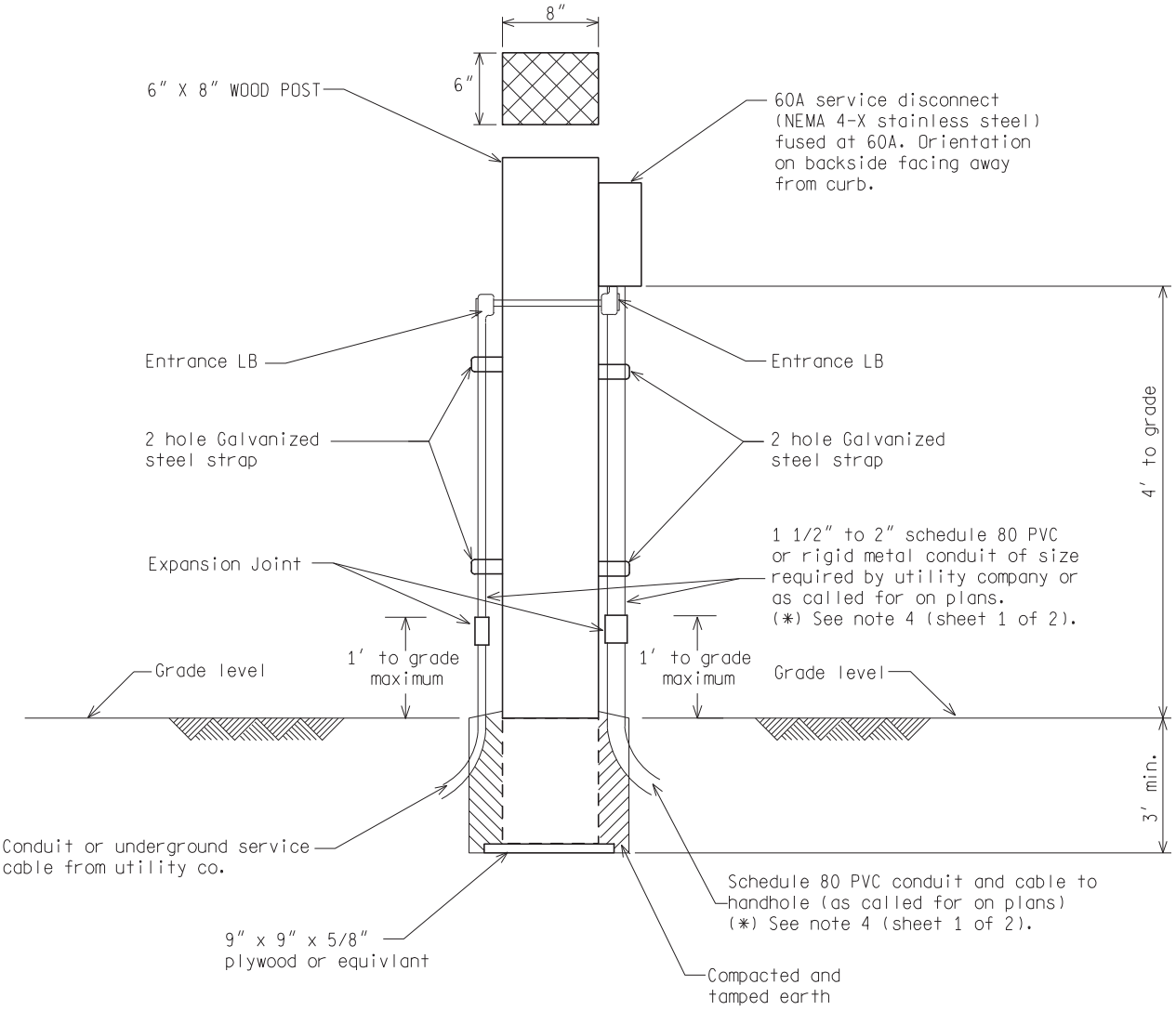
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

UNDERGROUND SERVICE/ DISCONNECT WOOD POST

PLAN DATE

SIG-211-A



UNDERGROUND NON-METERED SERVICE, (120/240V 60 HZ)

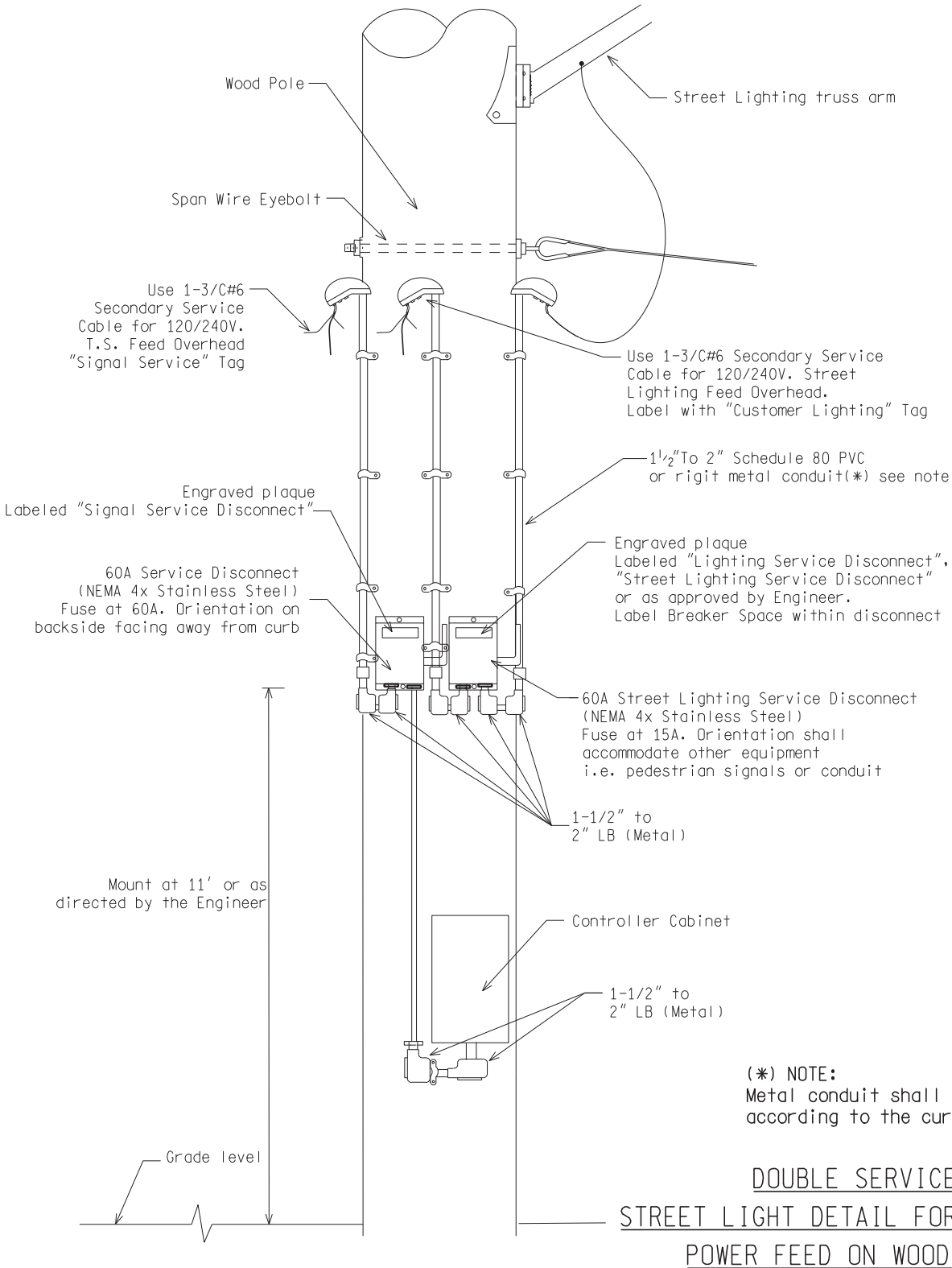
NOTES:

1) The 6″ x 8″ wood post shall meet the requirement of the current M.D.O.T. Standard Specifications for Construction.

2) All National Electric Code and local utility requirements for underground non metered service shall be met.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-211-A	SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG211A.dgn Rev. 02/16/17		PLAN DATE		



(*) NOTE:
Metal conduit shall be bonded according to the current N.E.C.

DOUBLE SERVICE STREET LIGHT DETAIL FOR OVERHEAD POWER FEED ON WOOD POLE

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG220A.dgn Rev.

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

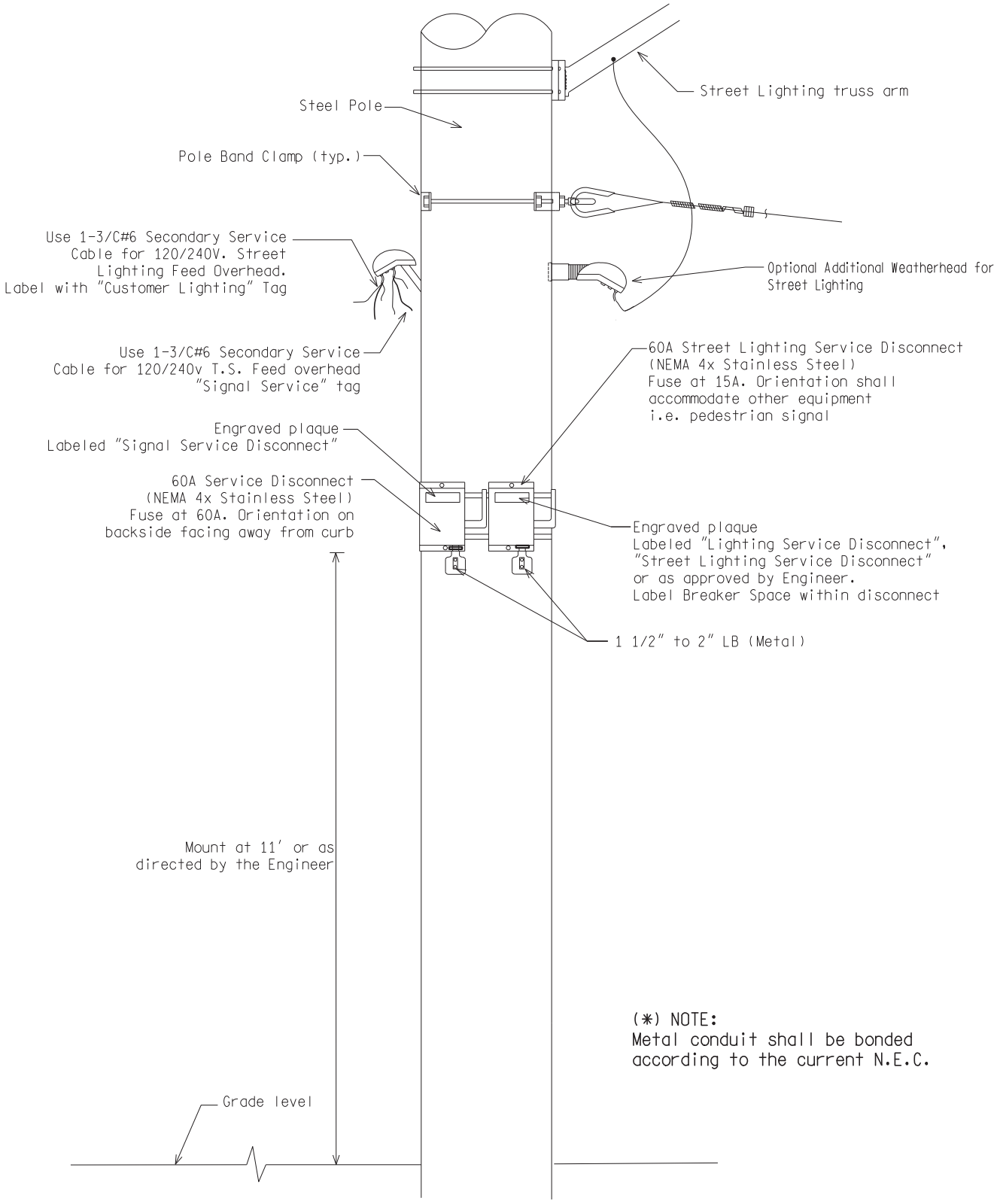
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

SECONDARY SERVICE FOR STREET LIGHTING AND STREET NAME SIGNS

02/16/17
PLAN DATE

SIG-220-A

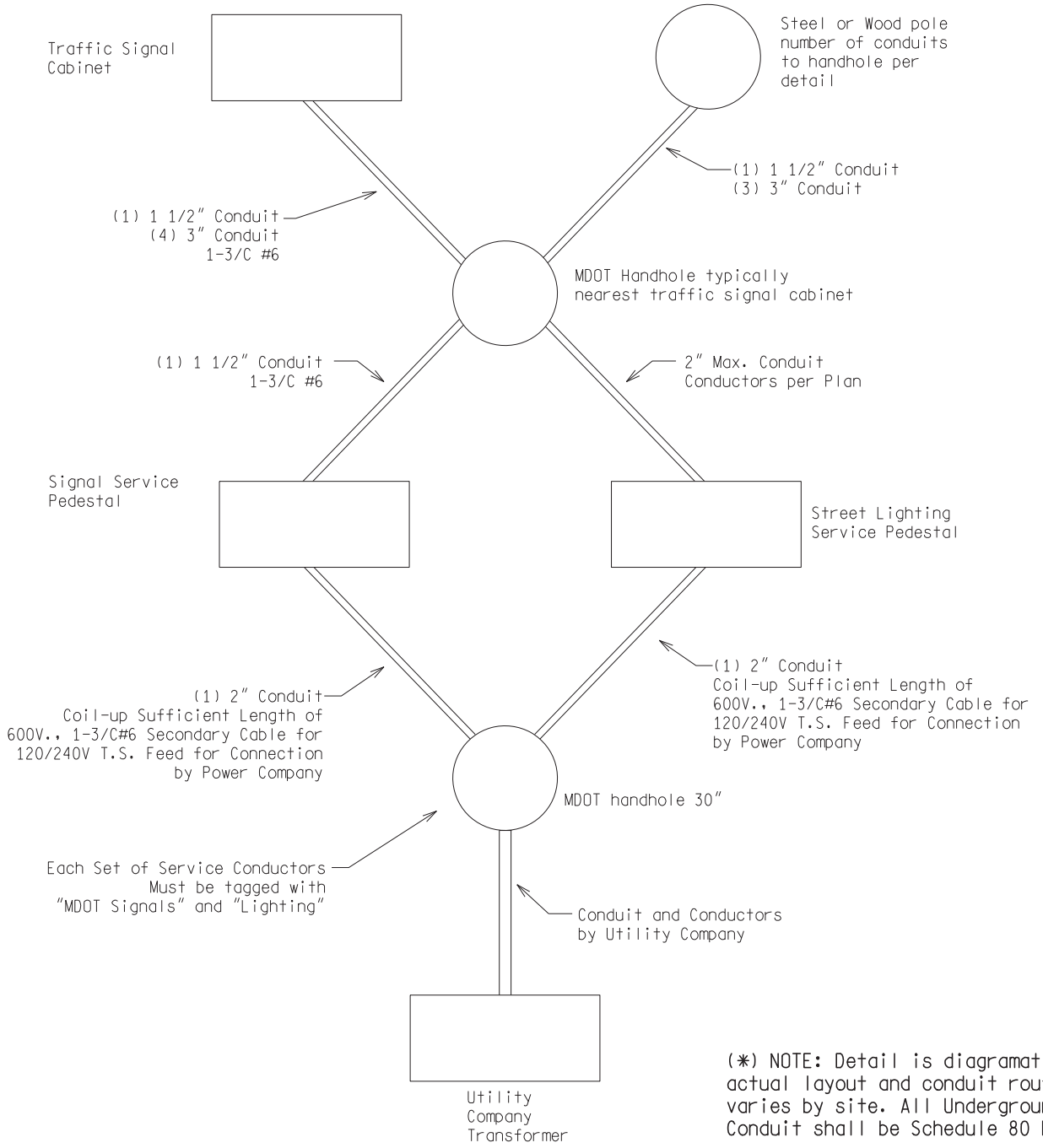
SHEET
1 of 4



DOUBLE SERVICE
STREET LIGHT DETAIL FOR OVERHEAD
POWER FEED ON STEEL POLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/16/17 PLAN DATE	SIG-220-A	SHEET 2 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG220A.dgn Rev.				

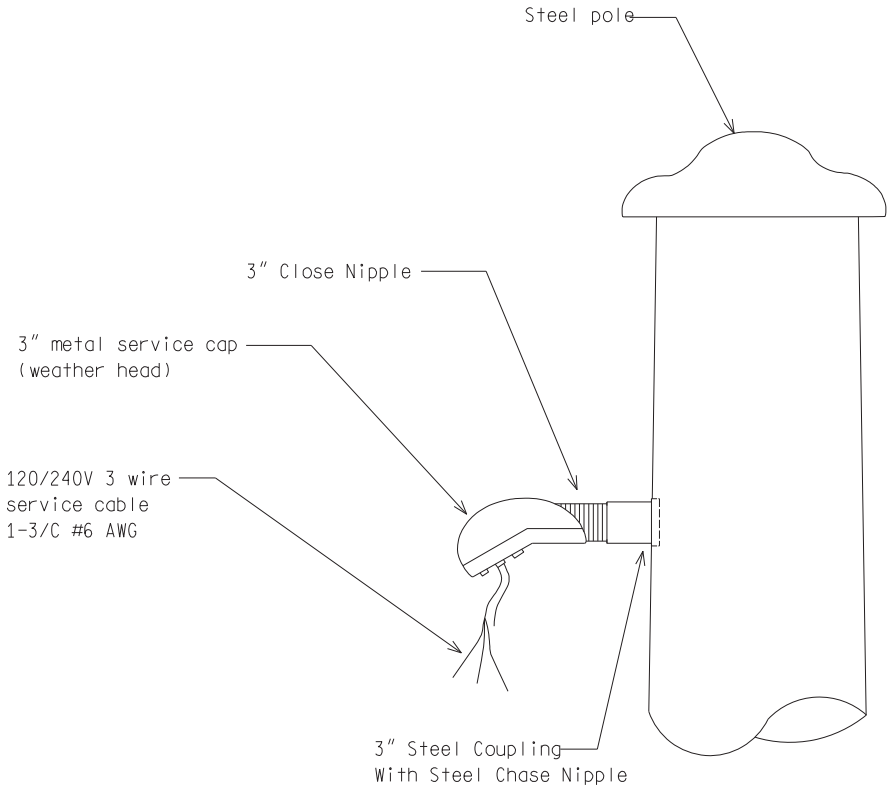


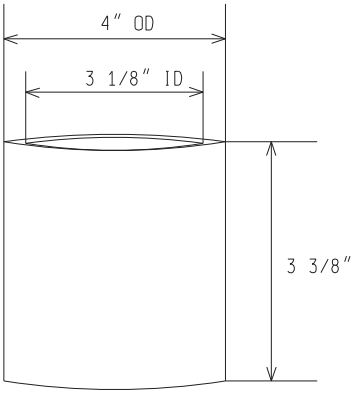
(*) NOTE: Detail is diagramatic only. actual layout and conduit routing varies by site. All Underground Conduit shall be Schedule 80 PVC.

UNDERGROUND DOUBLE SERVICE STREET LIGHTING WIRING DIAGRAM

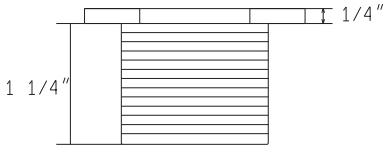
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/16/17 PLAN DATE	SIG-220-A	SHEET 3 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG220A.dgn Rev.				

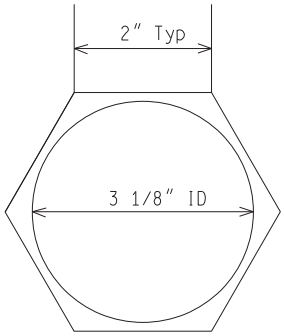




Steel Coupling



Chase Nipple A

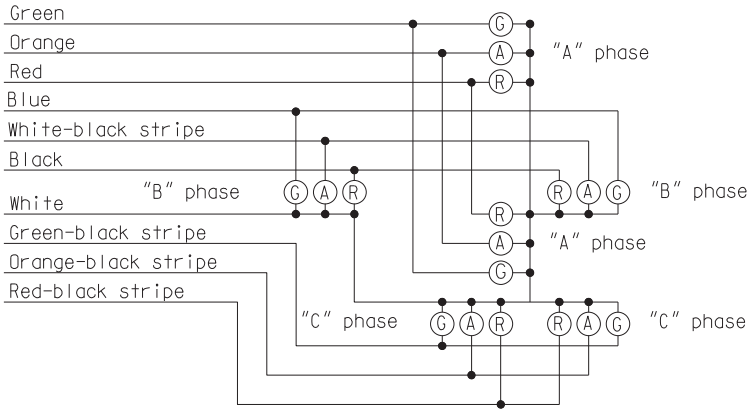


Chase Nipple B

STRAIN POLE WEATHER HEAD INSTALLATION

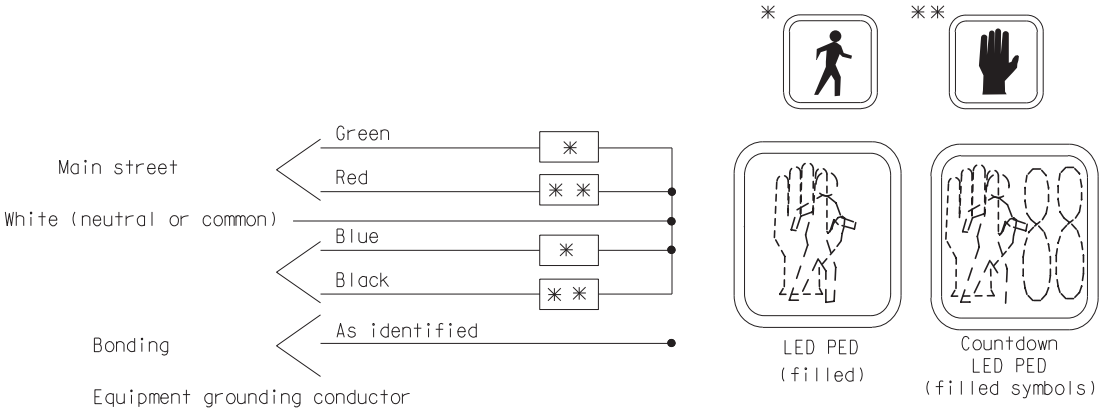
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/16/17 PLAN DATE	SIG-220-A	SHEET 4 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG220A.dgn Rev.				



COLOR CODE FOR WIRING CONNECTING TRAFFIC SIGNAL LAMPS

NOTE:No splices allowed between traffic signal head and controller.



COLOR CODE FOR WIRING CONNECTING PEDESTRIAN SIGNAL LAMPS
(WALKING PERSON - HAND SYMBOL)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

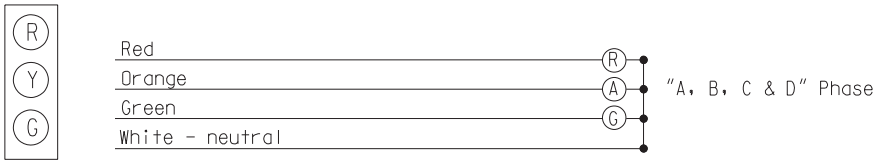
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

COLOR CODE WIRING/ EQUIPMENT GROUNDING

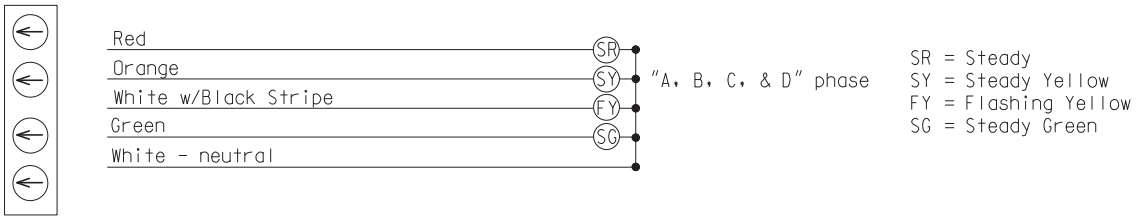
PLAN DATE

SIG-230-A

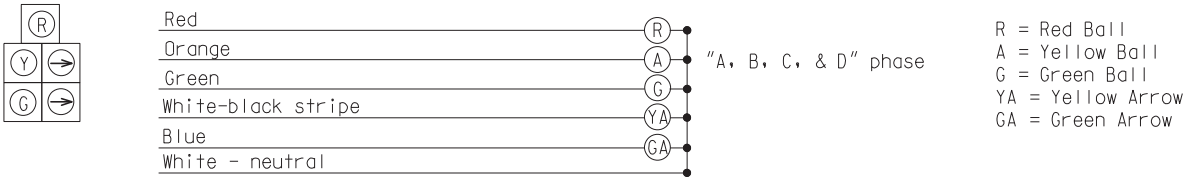
SHEET 1 of 6



STANDARD - 3 COLOR SIGNAL DISPLAY



FLASHING YELLOW ARROW (FYA) - 4 COLOR SIGNAL DISPLAY

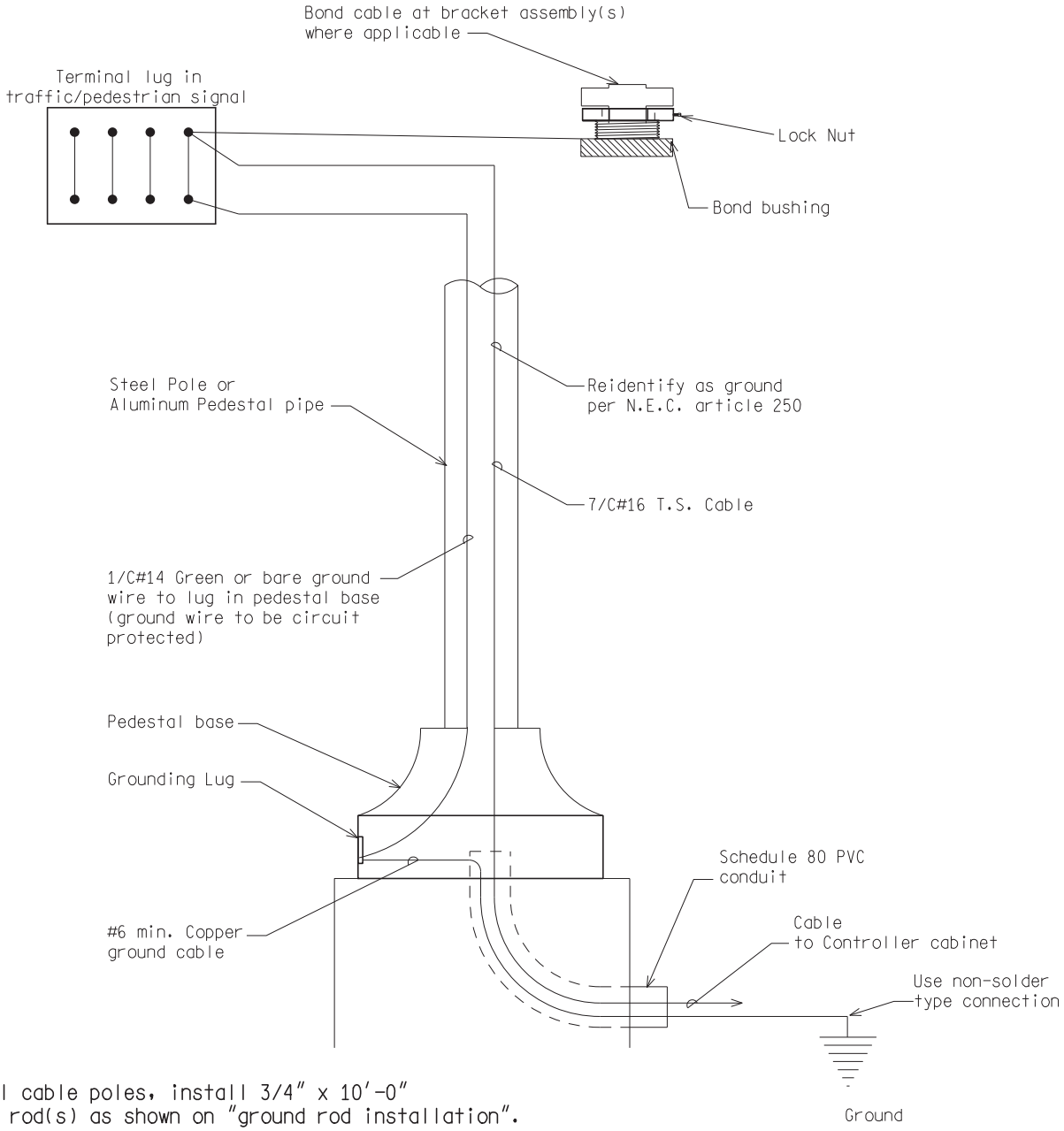


DOG HOUSE W/RIGHT TURNS - 5 COLOR SIGNAL DISPLAY

COLOR CODE FOR WIRING CONNECTING TRAFFIC SIGNAL LAMPS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-230-A	SHEET 2 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17		PLAN DATE		

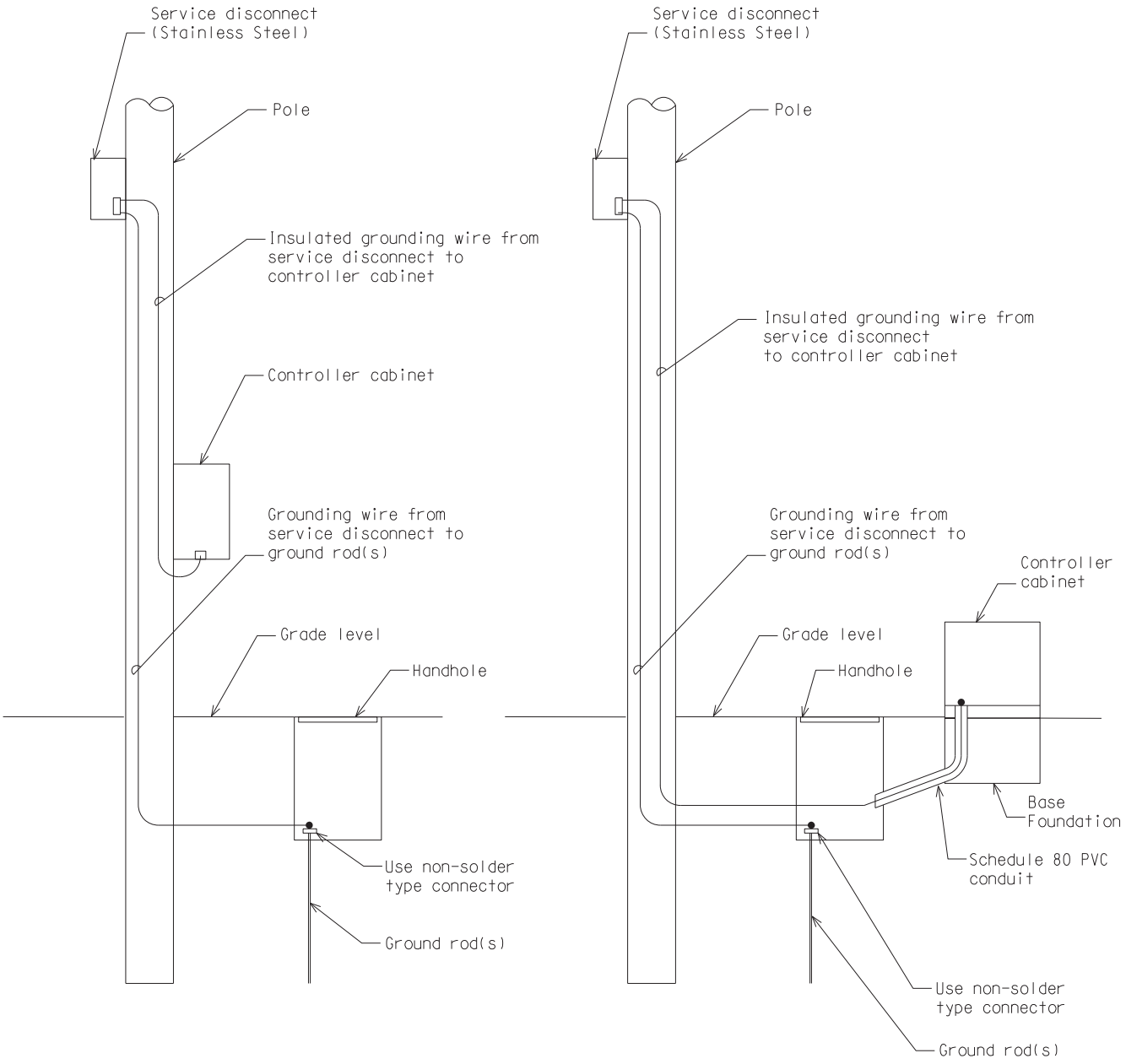


NOTE:
For all cable poles, install 3/4" x 10'-0"
ground rod(s) as shown on "ground rod installation".
Connect ground rod(s) with #6 min. copper wire to
messenger wire with non-solder type connection.

STEEL POLE/PEDESTAL GROUNDING DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-230-A	SHEET 3 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17				



GROUNDING

Install 3/4 " x 10'-0" copper clad ground rod(s) as required to provide less than 10 OHM resistance to ground.

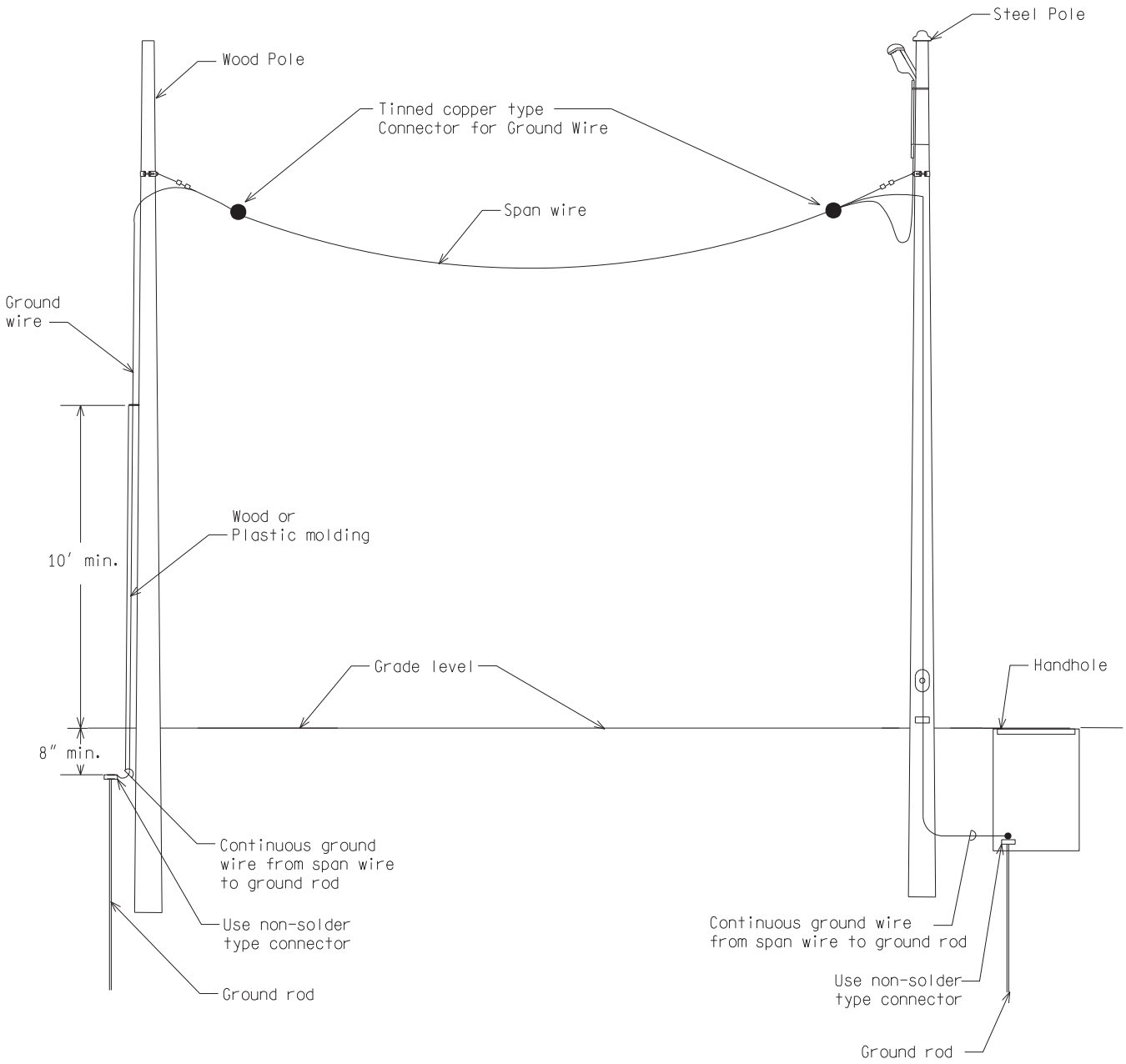
Grounding wire #6 AWG min. bare copper grounding wire shall be installed to meet N.E.C. and utility company specs.

Ground wire from disconnect to ground rod to be in moulding (wood pole or post) or inside the pole (steel). Ground wire from disconnect to controller cabinet to be in conduit (wood pole, wood post, and steel pole).

CONTROLLER CABINET GROUNDING DETAIL

NOT TO SCALE

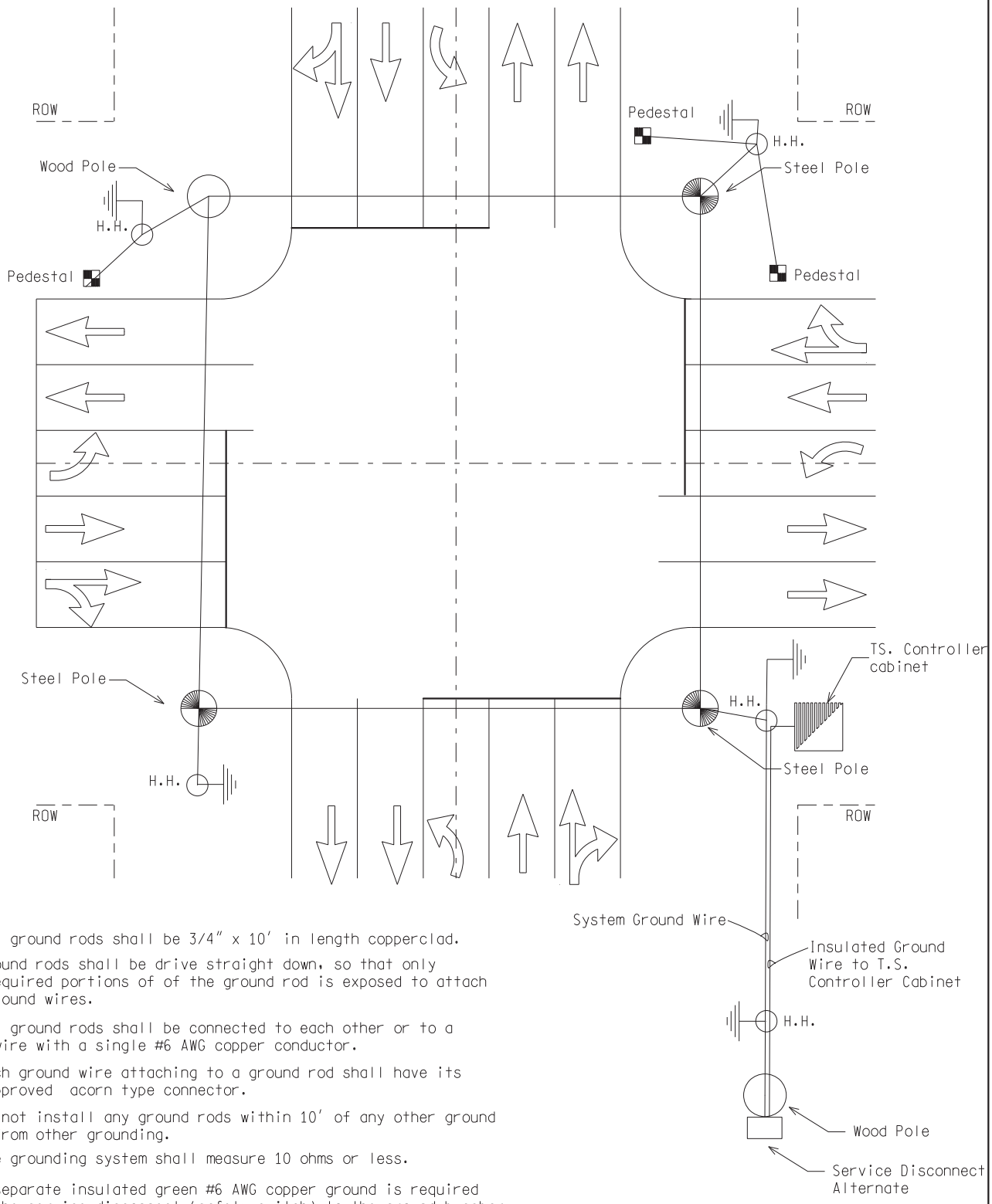
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17		PLAN DATE	SIG-230-A	SHEET 4 of 6



SPAN WIRE GROUNDING DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17		PLAN DATE	SIG-230-A	SHEET 5 of 6



1) All ground rods shall be 3/4" x 10' in length copperclad.

2) Ground rods shall be drive straight down, so that only the required portions of of the ground rod is exposed to attach the ground wires.

3) All ground rods shall be connected to each other or to a span wire with a single #6 AWG copper conductor.

4) Each ground wire attaching to a ground rod shall have its own approved acorn type connector.

5) Do not install any ground rods within 10' of any other ground rods from other grounding.

6) The grounding system shall measure 10 ohms or less.

7) A separate insulated green #6 AWG copper ground is required from the service disconnect (safety switch) to the ground bussbar in the controller cabinet.

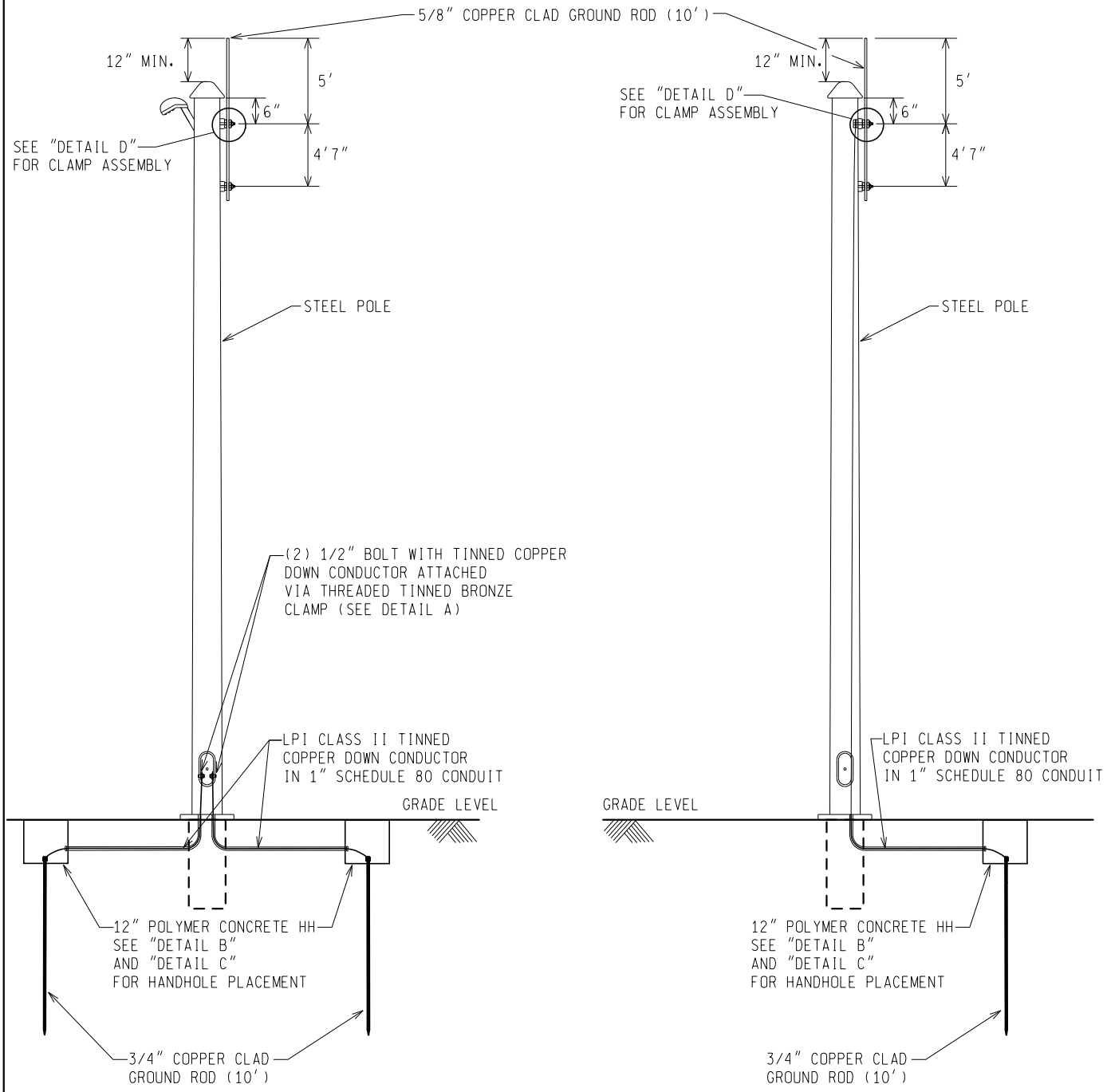
8) Ground rod for each steel pole, wood pole, pedestal and/or traffic signal controller cabinet shall be located in the adjacent handhole as indicated on the plans or as directed by the Engineer.

9) All metal bases must be connected to a ground rod with a #6 ground wire.

SYSTEM GROUNDING DETAL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG230A.dgn Rev. 02/16/17		PLAN DATE	SIG-230-A	SHEET 6 of 6



LIGHTNING PROTECTION ON STEEL POLE

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG231A.dgn Rev. 11/05/18

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

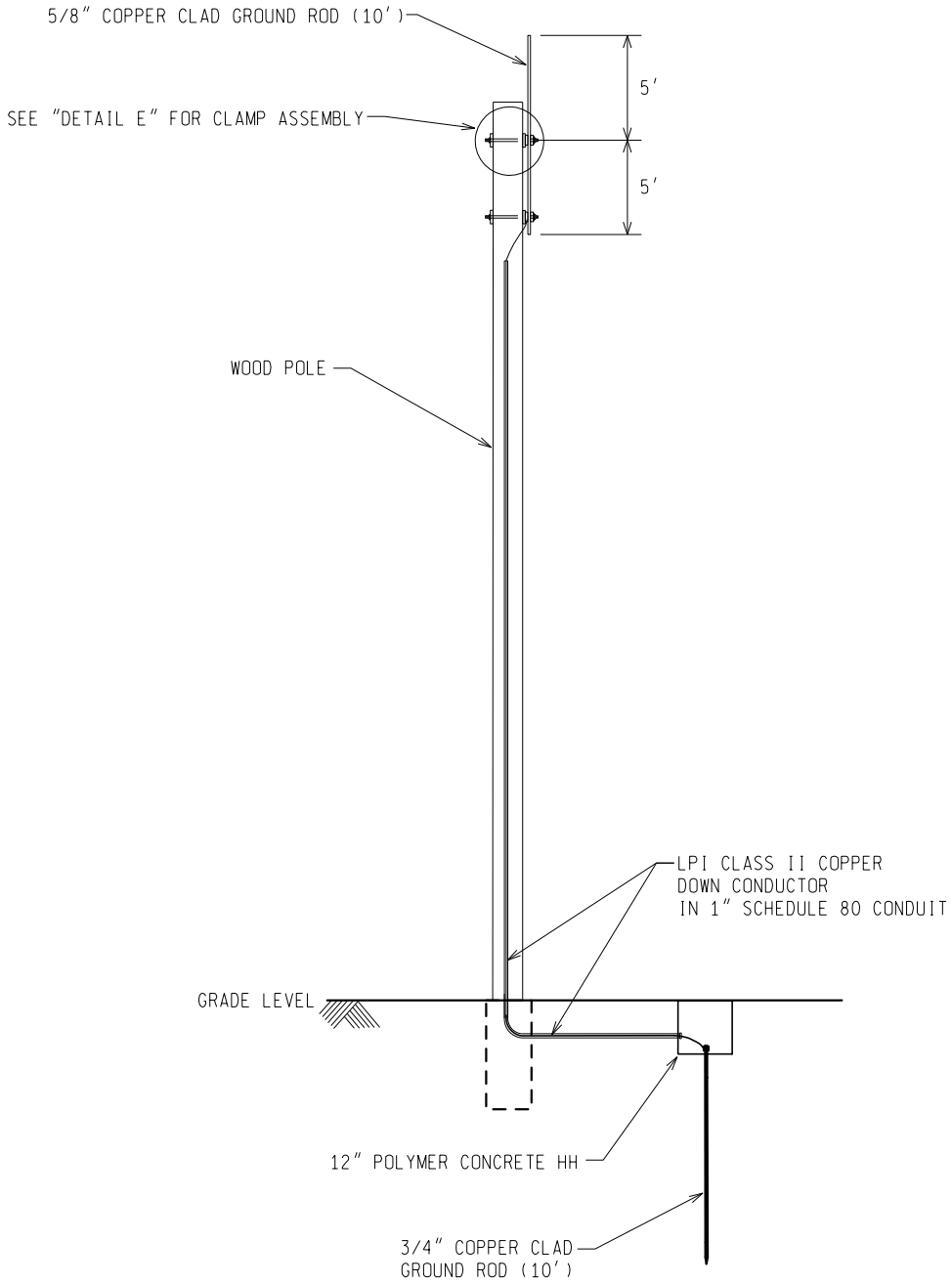
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

LIGHTNING PROTECTION DETAIL

PLAN DATE

SIG-231-A

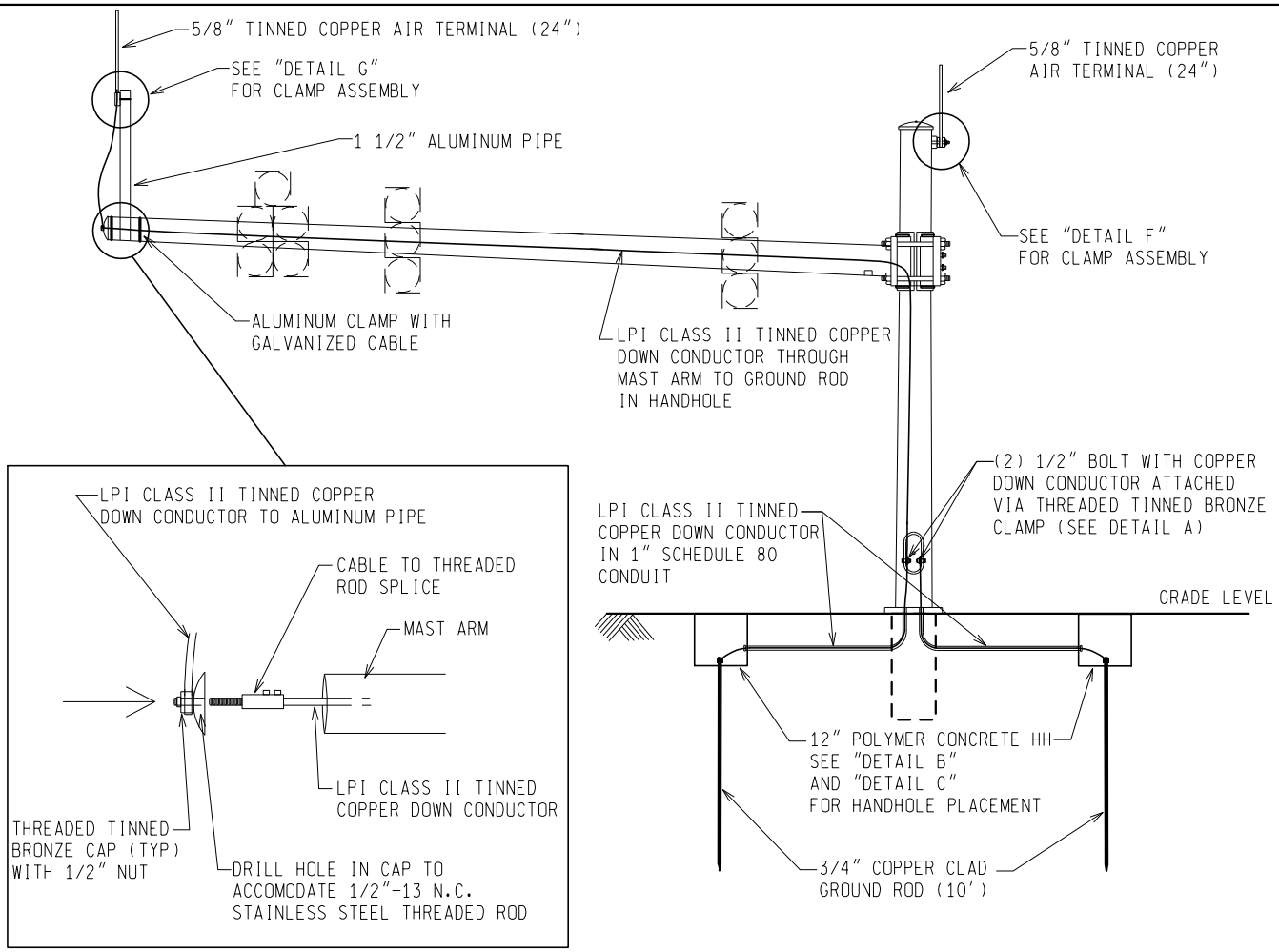
SHEET 1 of 6



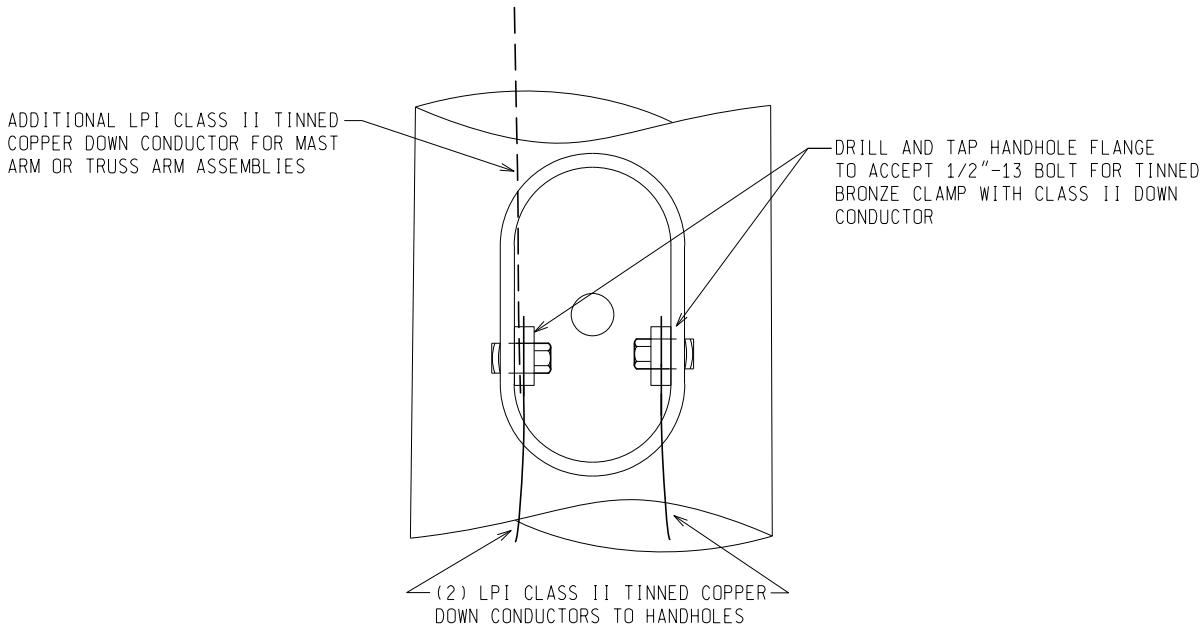
LIGHTNING PROTECTION ON WOOD POLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-231-A	SHEET 2 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG231B.dgn Rev. 11/05/18		PLAN DATE		



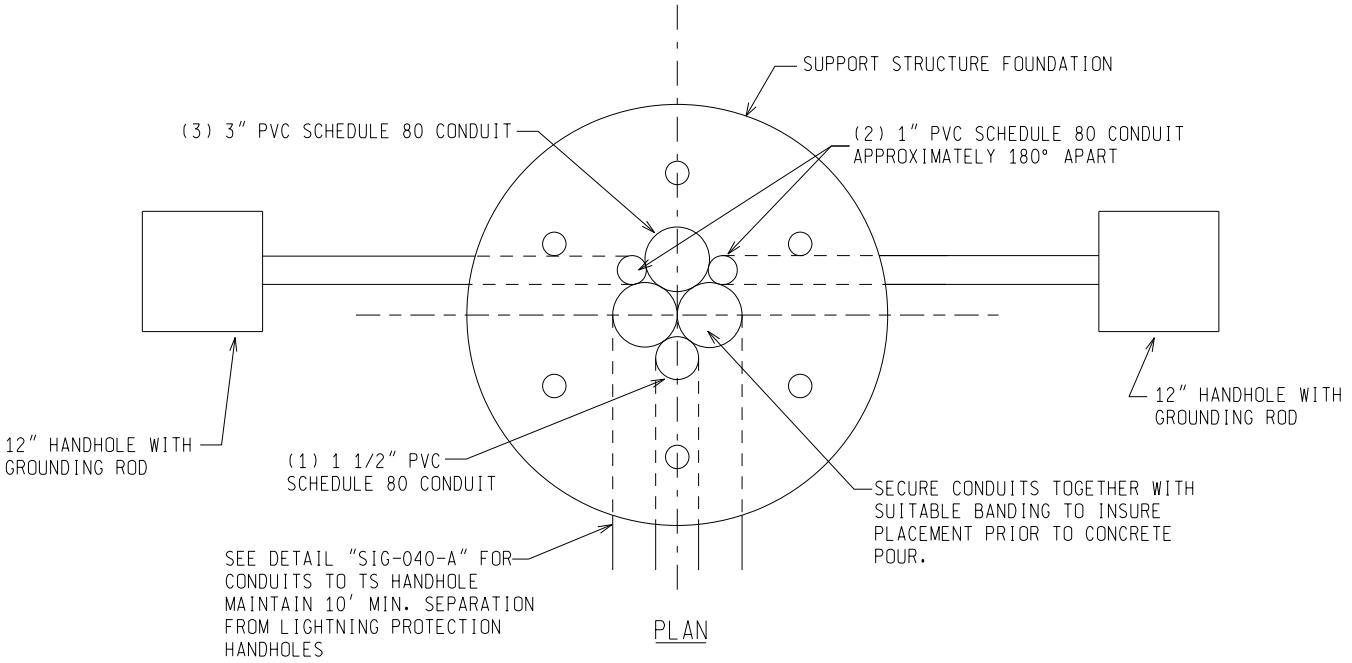
LIGHTNING PROTECTION ON MAST ARM



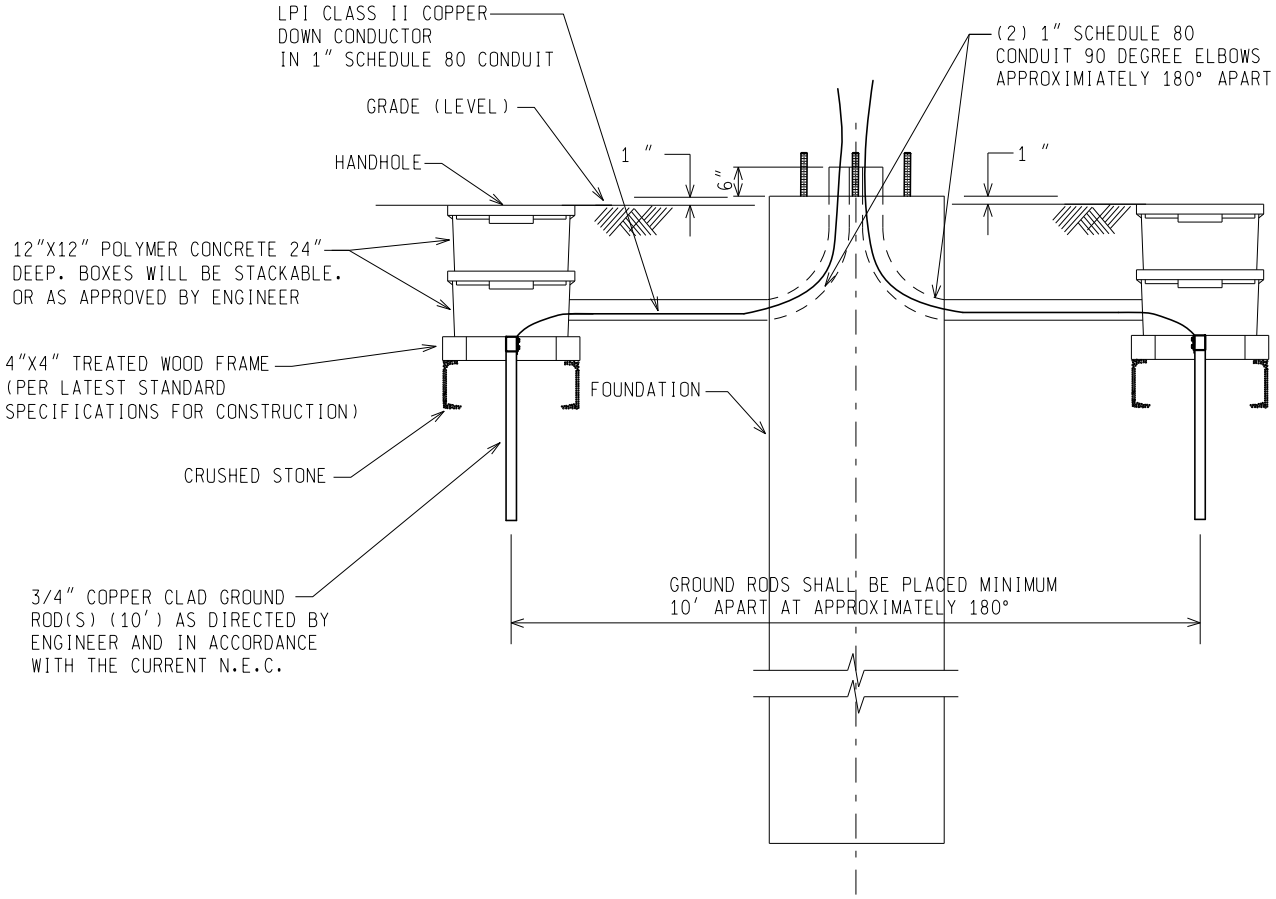
POLE HANDHOLE "DETAIL A"

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-231-A	SHEET 3 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG231A.dgn Rev. 11/05/18		PLAN DATE		



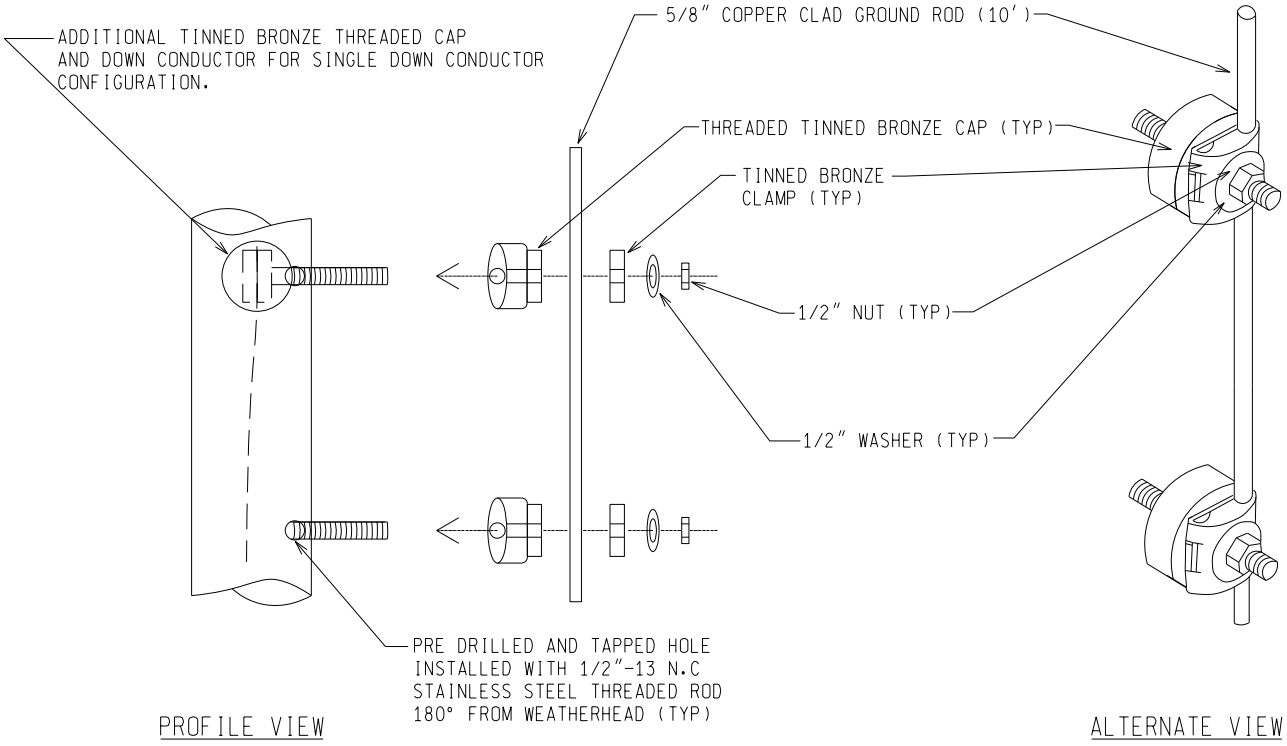
STEEL POLE HANDHOLE PLAN VIEW
LAYOUT "DETAIL B"



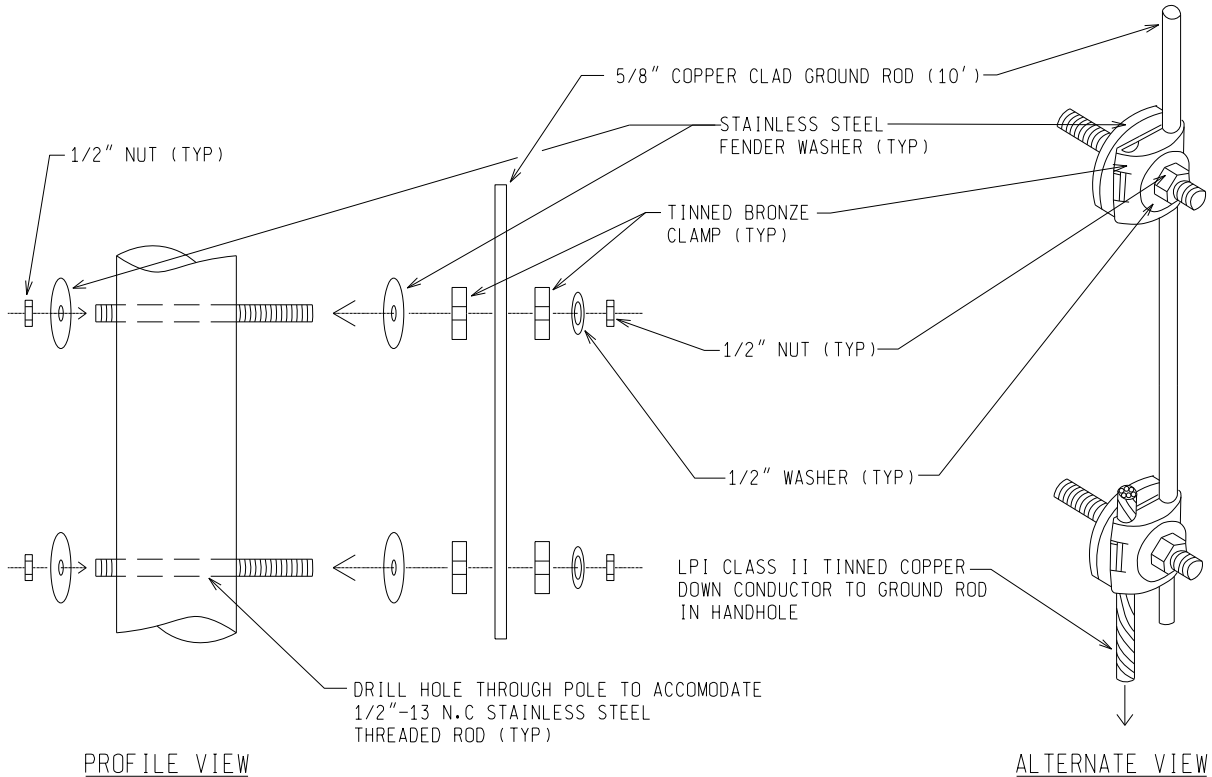
STEEL POLE HANDHOLE ELEVATION VIEW
LAYOUT "DETAIL C"

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-231-A	SHEET 4 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG231A.dgn Rev. 11/05/18		PLAN DATE		

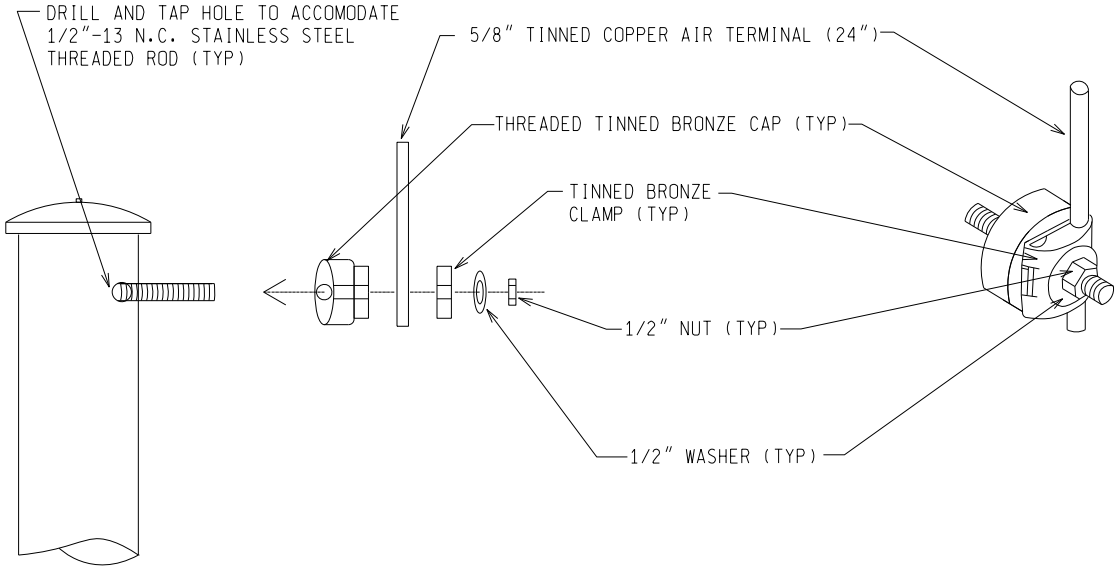


LIGHTNING PROTECTION CLAMP ON STEEL POLE "DETAIL D"



LIGHTNING PROTECTION CLAMP ON WOOD POLE "DETAIL E"

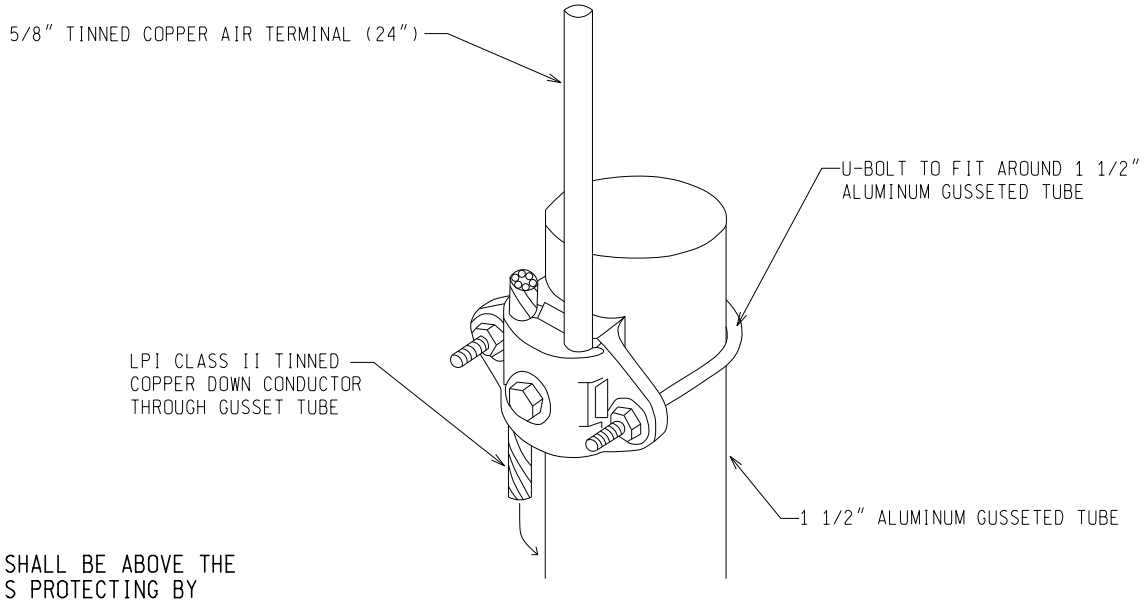
NOT TO SCALE



PROFILE VIEW

ALTERNATE VIEW

LIGHTNING PROTECTION CLAMP ON MAST ARM POLE "DETAIL F"

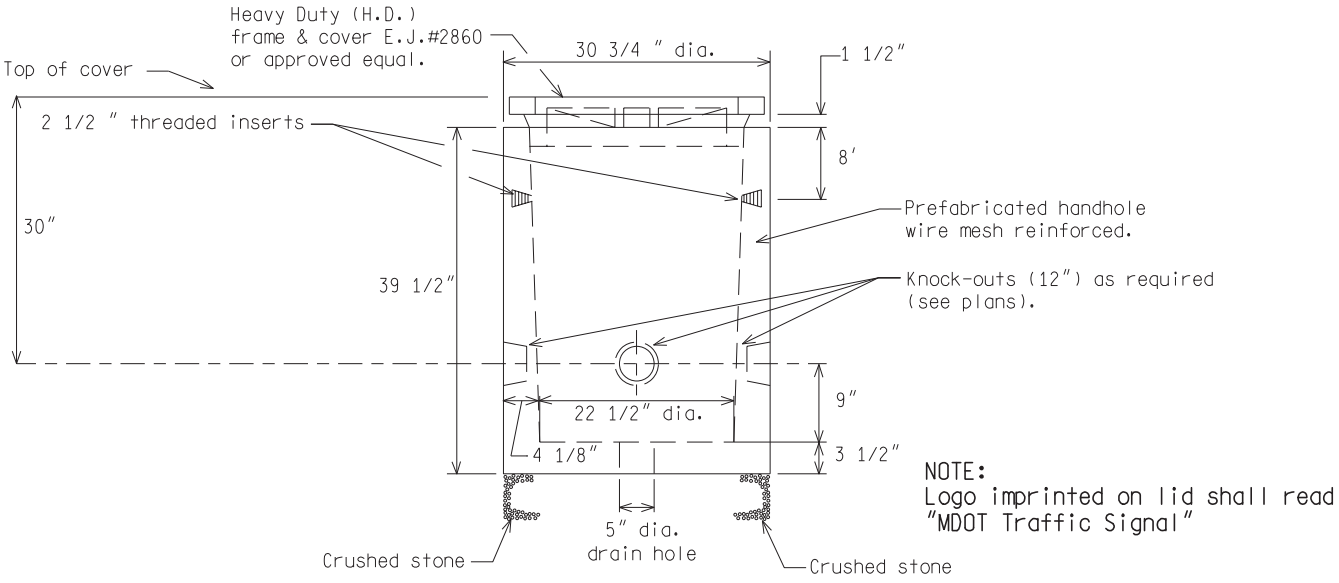


(*) NOTE:
AIR TERMINAL SHALL BE ABOVE THE DEVICE(S) IT'S PROTECTING BY A MINIMUM OF 12 INCHES.

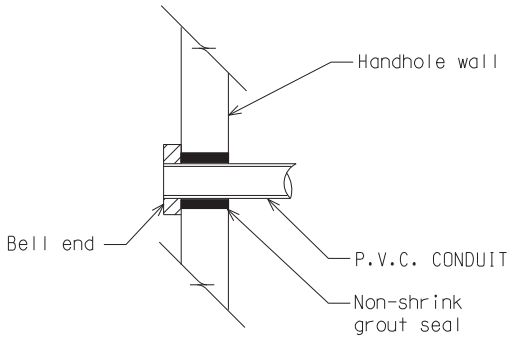
LIGHTNING PROTECTION CLAMP ON ALUMINUM STEEL GUSSETED TUBE "DETAIL G"

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-231-A	SHEET 6 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG231A.dgn Rev. 11/05/18		PLAN DATE		



2' PRECAST ROUND HANDHOLE WITH FLOOR



TYPICAL CONDUIT ENTRANCE
AT HANDHOLE

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

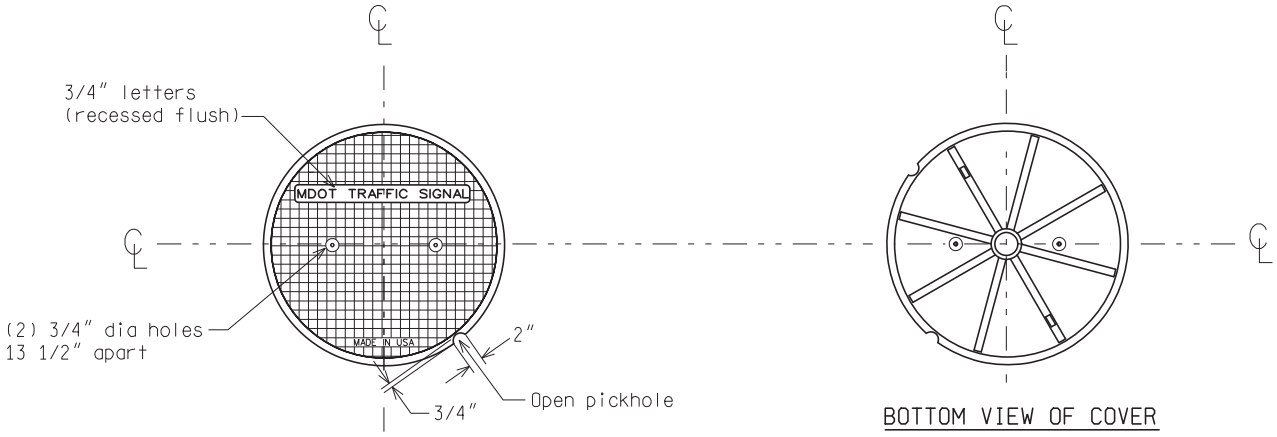
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

HANDHOLE- PRECAST, POLYMER CONCRETE

PLAN DATE

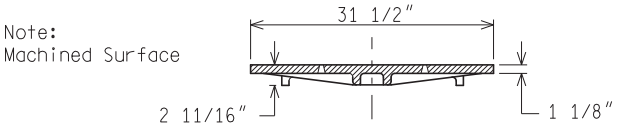
SIG-240-A

SHEET
1 of 6

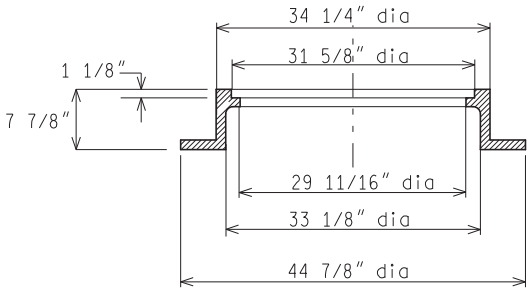


TOP VIEW OF COVER

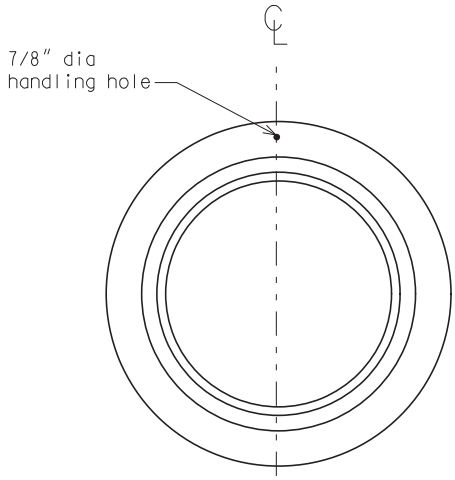
BOTTOM VIEW OF COVER



COVER SECTION



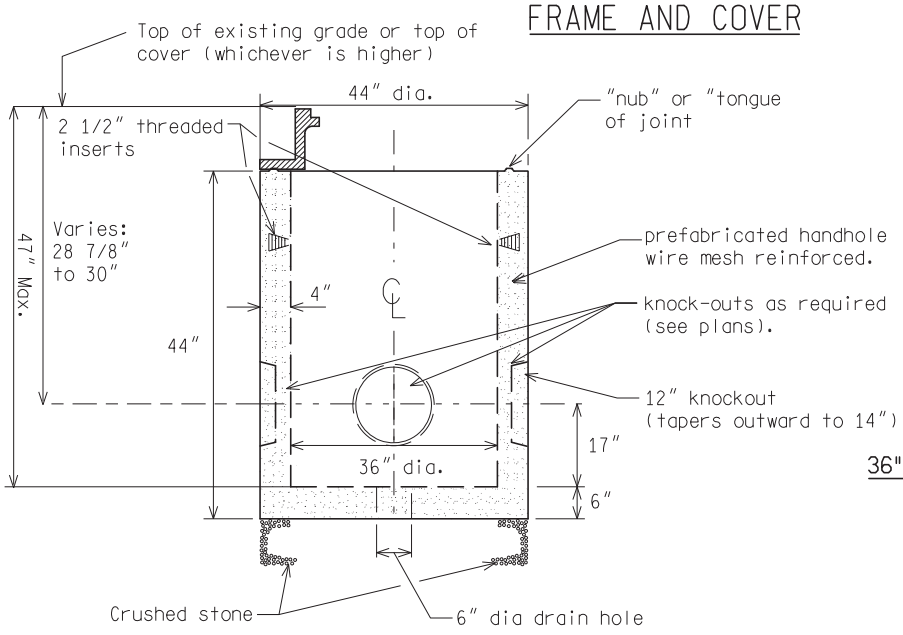
FRAME SECTION



TOP VIEW OF FRAME

The H. D. frame and cover shall be manufactured by East Jordan Iron Works, Model 1220 or approved equal.

FRAME AND COVER



3' DIAMETER ROUND PRECAST CONCRETE HANDHOLE

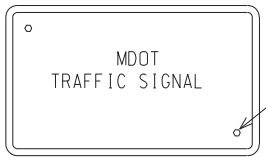
NOTE:
Logo imprint may read "Traffic Signal" for non MDOT Installation

36" PRECAST ROUND HANDHOLE SECTION DETAIL

NOT TO SCALE

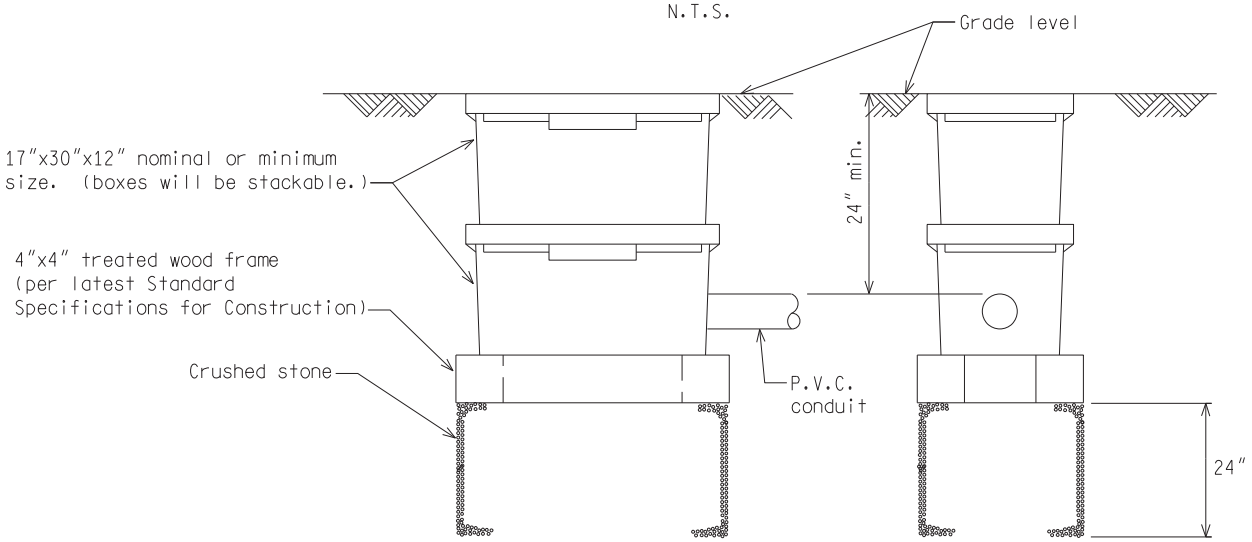
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-240-A	SHEET 2 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17		PLAN DATE		

NOTE:
Logo imprint may read "Traffic Signal" for non MDOT installations



3/8 "-16NC stainless steel Hex bolt & washer

COVER
N.T.S.



POLYMER CONCRETE HANDHOLE

NOTES PERTAIN TO PRECAST OR BRICK:

1) The material and workmanship shall be in accordance with the current M.D.O.T. Standard Specifications for Construction.

2) All concrete masonary shall be grade 30M.

3) The inner surface of the handhole shall be smooth.

4) Heavy Duty covers shall be castings which meet the requirements of the current specifications for gray iron castings ASTM designation A48 and shall have a minimum strength as provided for Class No. 30 gray iron castings.

5) All castings shall be cleaned by sand blasting.

6) The seating face of the cover and the seat for the same on the frame if required, shall be ground or machined so that the cover shall have an even bearing on its seat to prevent rocking or tilting.

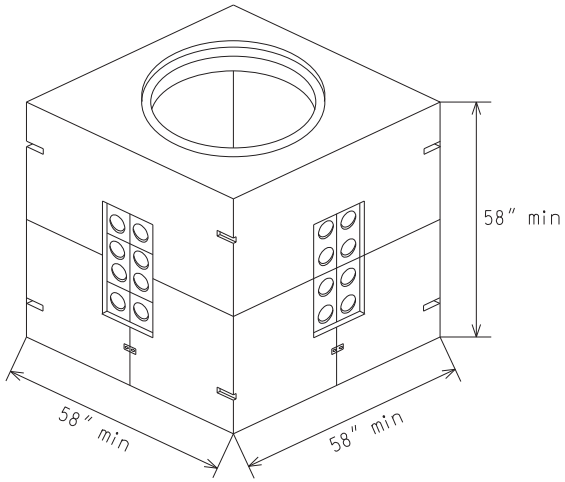
7) The castings shall be free of pouring faults, blow holes, cracks,and other imperfections. They shall be sound, true to form and thickness, clean and neatly finished and shall be coated with tar pitch varnish.

8) Light Duty cover shall be bolted to frame with not less than 2 countersunk Hex head bronze bolts.

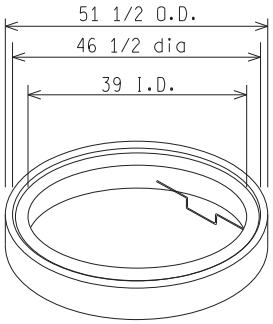
9) The Heavy Duty cover & frame shall be East Jordan Iron Works #8206 Neenah Foundry, #R-6662-HP for square cover or East Jordan Iron Works #2860 Type "A", Neenah Foundry #R-6052 D for circular cover or an approved equal.

10) Handhole shall be equipped with cable rack and hooks to train cable.

NOT TO SCALE



NOTE:
Galvanized step is standard with grade ring ASTM C478.



Dimensions	
A	Min Wt. (lbs)
6	440
9	650
12	860

	Length	Width	Height
Inside	48	48	48
Outside	58	58	58
Recommended Hole size	82	82	--

GRADE RING WITH 39" I.D. & 46 1/2" RECESS

	Min Thickness
Wall	5
Roof	5
Floor	5

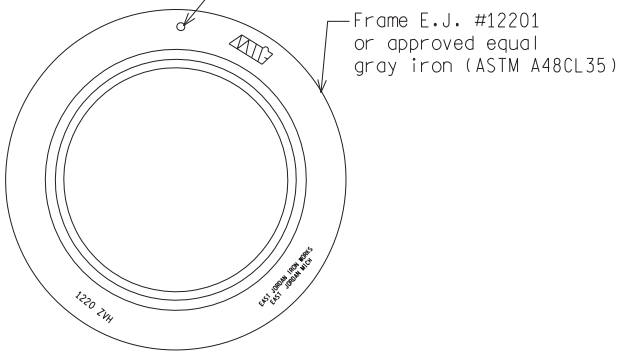
	Min Weight lbs
Top	3300
Bottom	3850
Total	7150

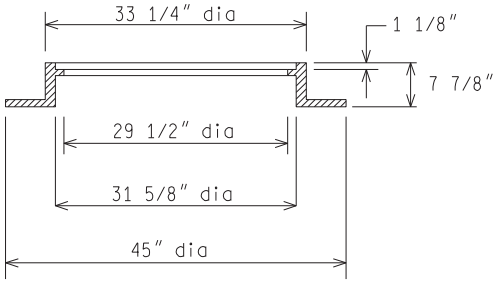
4' x 4' x 4' PRECAST CONCRETE HANDHOLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-240-A	SHEET 4 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17		PLAN DATE		

NOTE:
Logo imprint it on cover shall read "MDOT Traffic Signal" for MDOT installations



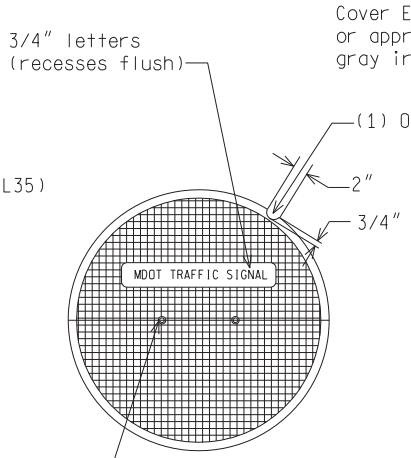


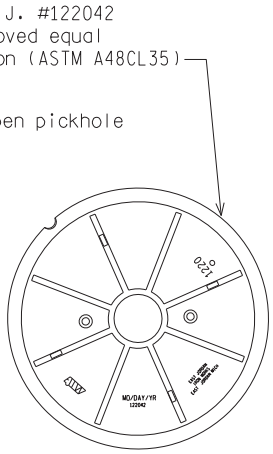
FRAME SECTION

MANHOLE FRAME (HEAVY DUTY)

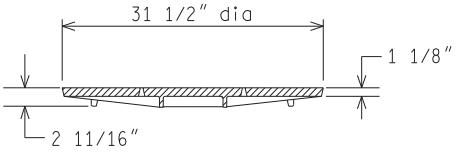
Estimated weight 410 lbs

NOTE:
Machined surface





BOTTOM VIEW OF COVER



COVER SECTION

NOTE:
Machined surface

MANHOLE COVER (HEAVY DUTY)

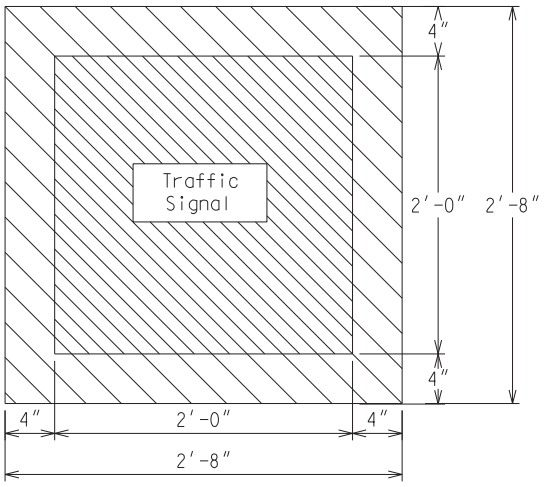
Estimated weight 245 lbs

4' x 4' x 4' PRECAST CONCRETE HANDHOLE

NOT TO SCALE

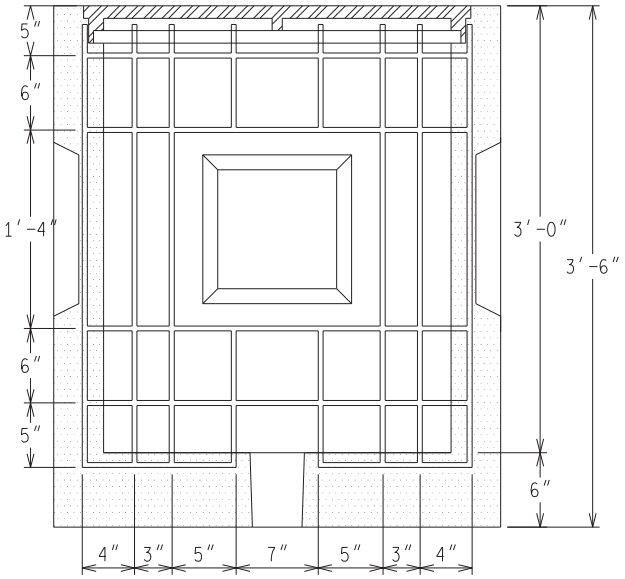
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17		PLAN DATE	SIG-240-A	SHEET 5 of 6

Concrete: 4500 p.s.i. @ 28 days
Reinforcement: Grade 60 rebar
All bars are #4



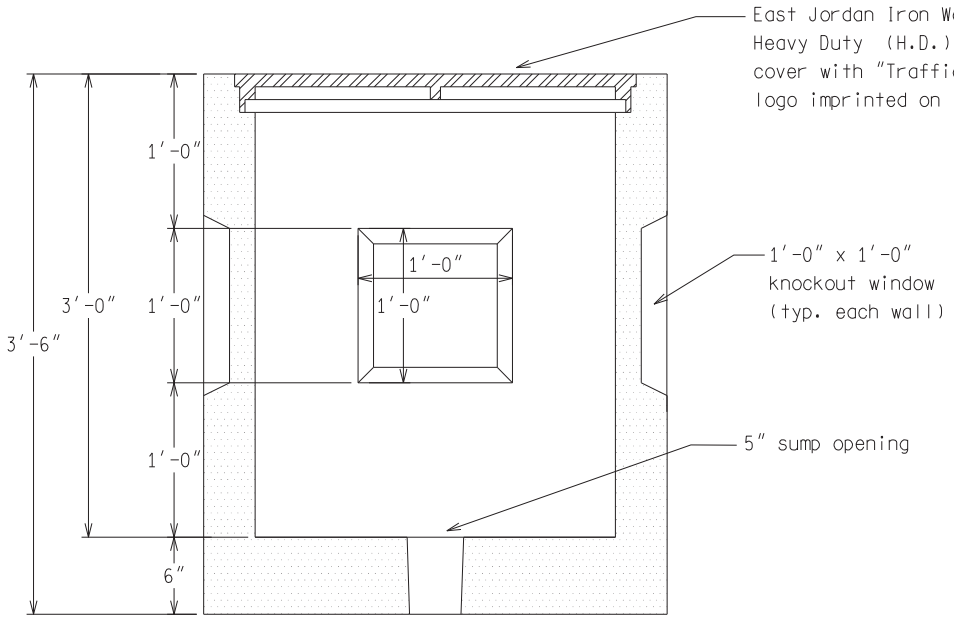
PLAN VIEW

With out frame & cover



SECTION VIEW

Typ. reinforcement all walls



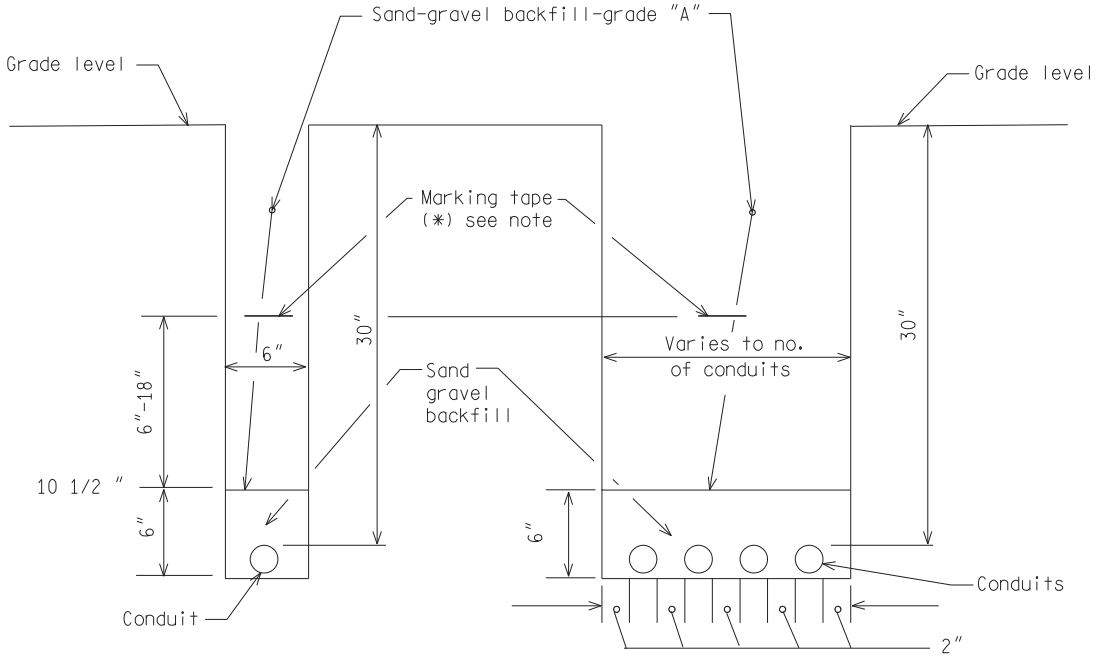
SECTION VIEW

2' x 2' SQUARE x 3' HANDHOLE

For use on Oakland County roads only.

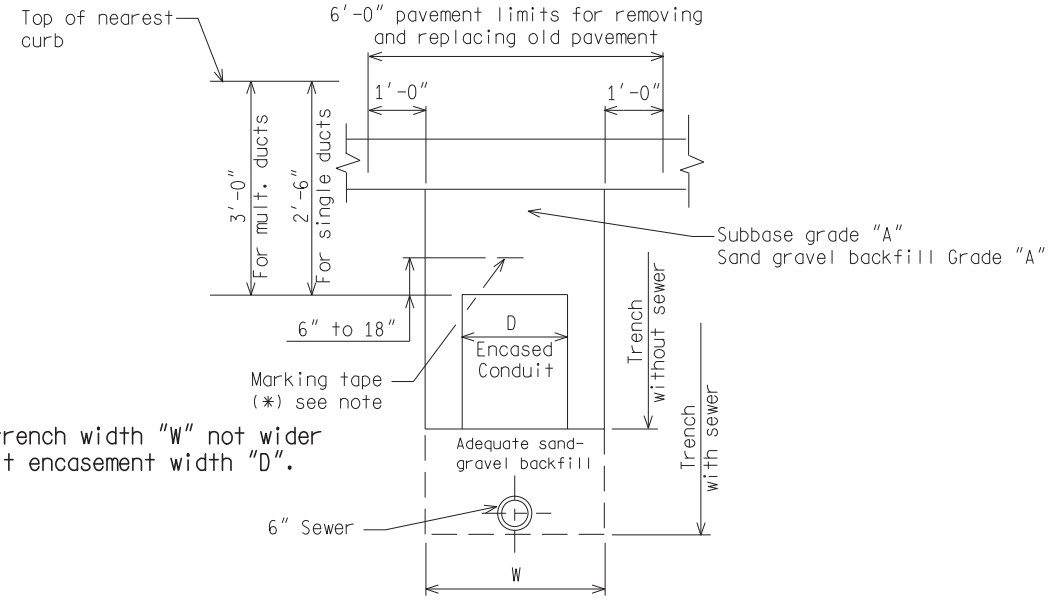
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-240-A	SHEET 6 of 6
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG240A.dgn Rev. 02/16/17				



(*) NOTE:
Marking tape shall have proper logo as supplied by the Engineer and installed by the Contractor.

DIRECT BURIAL CONDUIT(S)/CABLE(S)



NOTE:
Preferred trench width "W" not wider than conduit encasement width "D".

TYPICAL SECTION OF TRENCH
ENCASED CONDUIT

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG250A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

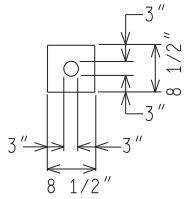
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

CONDUIT
(DIRECT BURIAL/ENCASED)

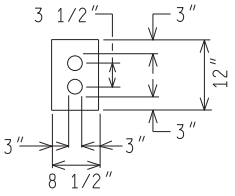
PLAN DATE

SIG-250-A

SHEET
1 of 2



1 2″ CONDUIT



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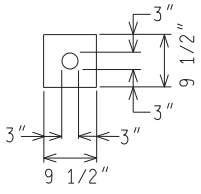
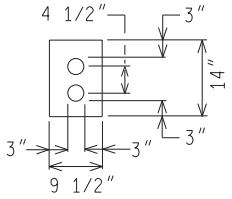
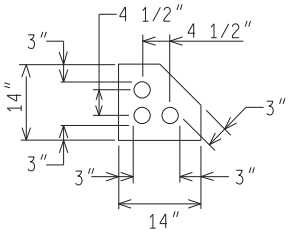


ONE
2 1/2″ CONDUIT



TWO
2 1/2″ CONDUIT



THREE
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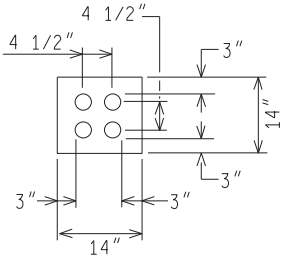
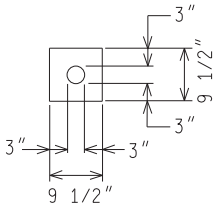
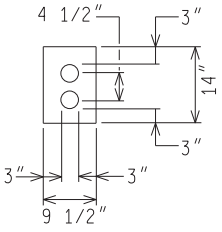


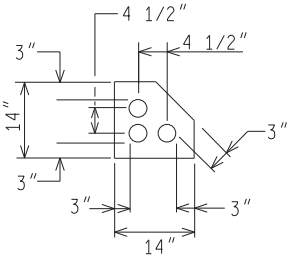
FOUR
2 1/2″ CONDUIT



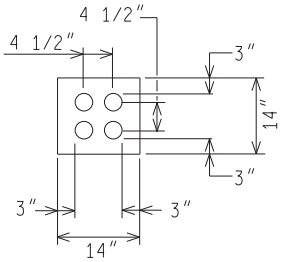
1 3″ CONDUIT



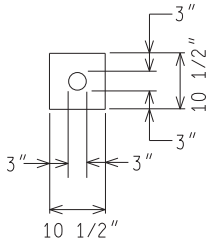
2 3″ CONDUIT



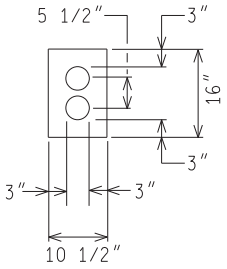
3 3″ CONDUIT



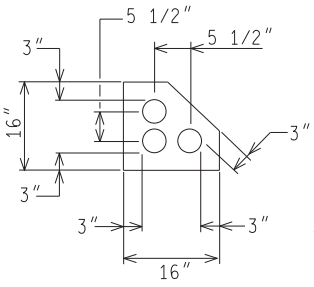
4 3″ CONDUIT



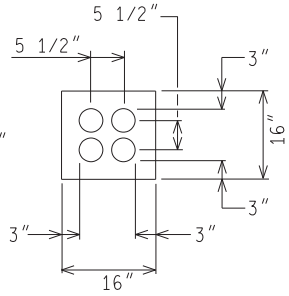
1 4″ CONDUIT



2 4″ CONDUIT



3 4″ CONDUIT

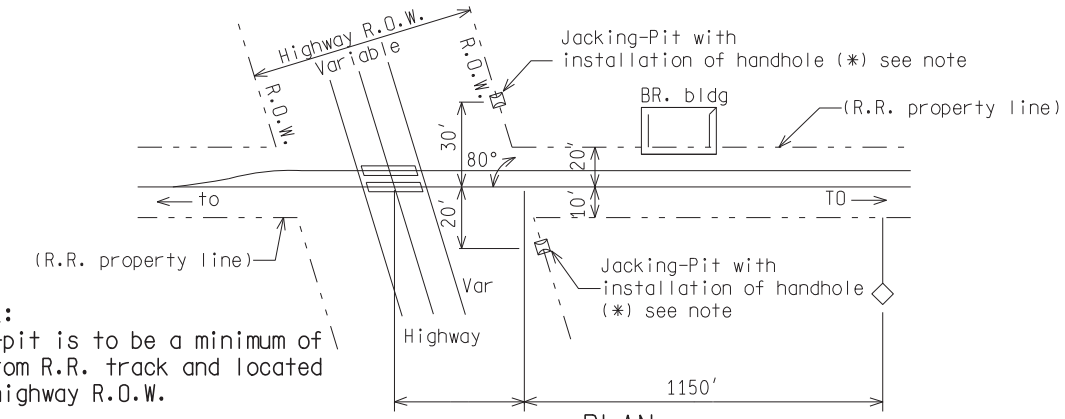


4 4″ CONDUIT

ENCASED CONDUIT SECTIONS

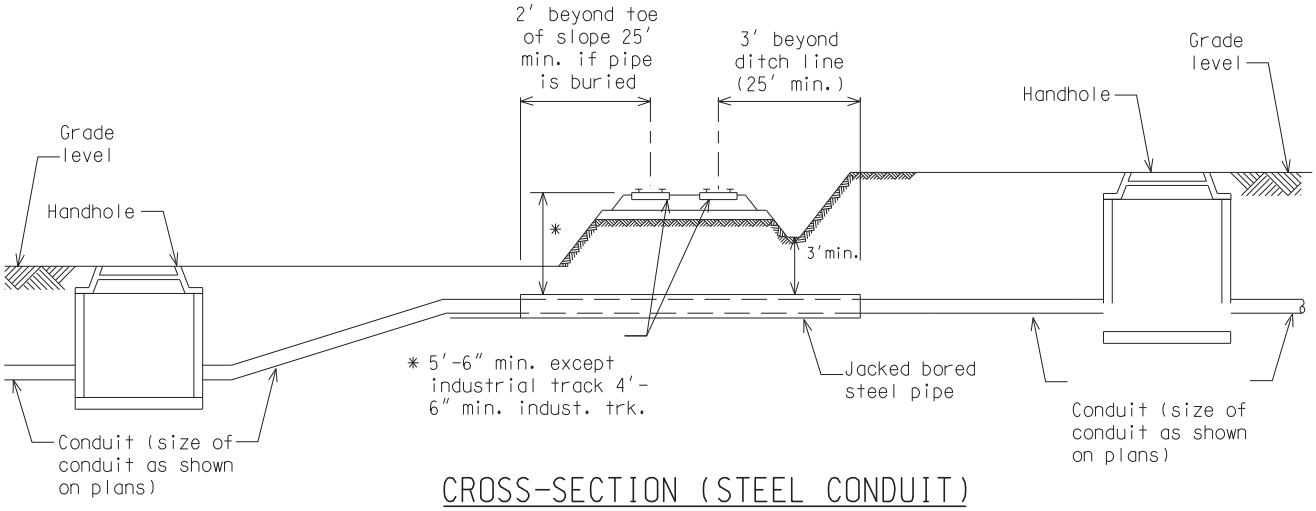
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-250-A	SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG250A.dgn Rev. 02/16/17		PLAN DATE		

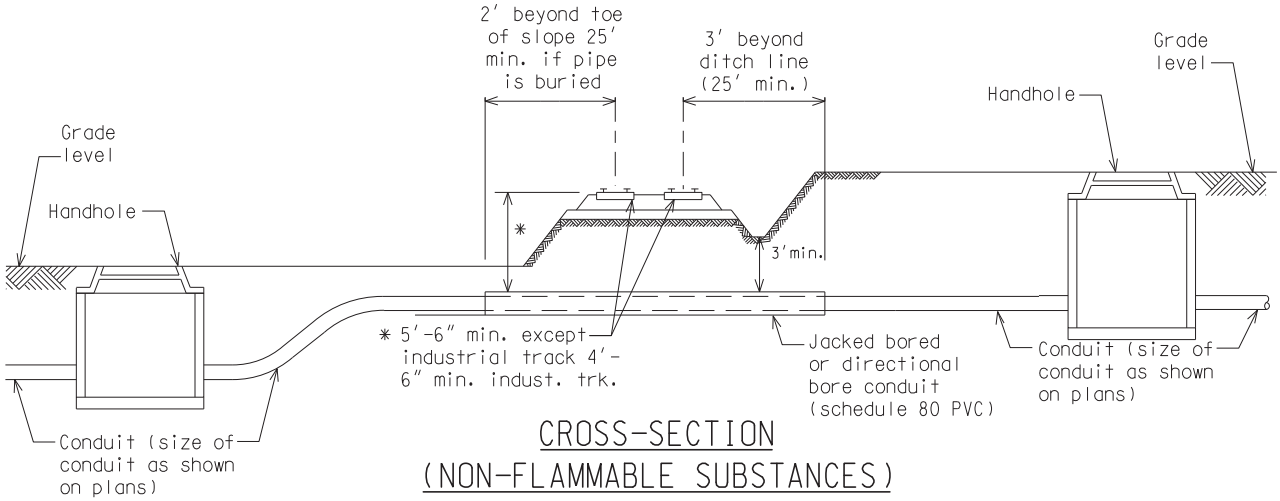


(*) NOTE:
Jacking-pit is to be a minimum of 25 ft from R.R. track and located within highway R.O.W.

PLAN



CROSS-SECTION (STEEL CONDUIT)



CROSS-SECTION
(NON-FLAMMABLE SUBSTANCES)

HORIZONTAL DISTANCES ARE MEASURED AT RIGHT ANGLES TO CENTERLINE OF TRACK

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

CONDUIT UNDER RAILROAD TRACKS

PLAN DATE

SIG-251-A

SHEET
1 of 2

NOTES:

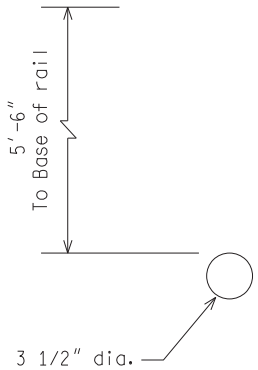
1) The conduit shall be installed at a min. depth of 5′-6″ with reinforced bars (if required per R.R. requirements) as shown in detail and as indicated on the plans within the entire crossing of railroad R.O.W.

2) Track support devices shall be placed & removed to carry the railroad. tracks over the open trench installation with the trench properly supported with sheeting & any other supports required to complete the conduit installation within the railroad R.O.W. the extra cost of such installation shall be incidental to the encased conduit item.

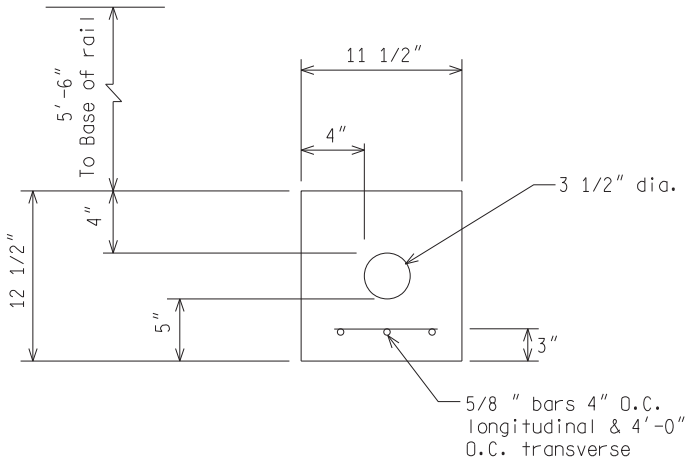
3) Contractor shall contact Division Engineer of railroad before starting excavation for conduit installation.

4) Contractor shall reimburse railroad Co. for services performed by railroad Co. where required.

5) All work shall be conducted so as not to interfere with, interrupt or endanger the integrity of rail operation.



(1) 3″ CONDUIT
N.T.S.

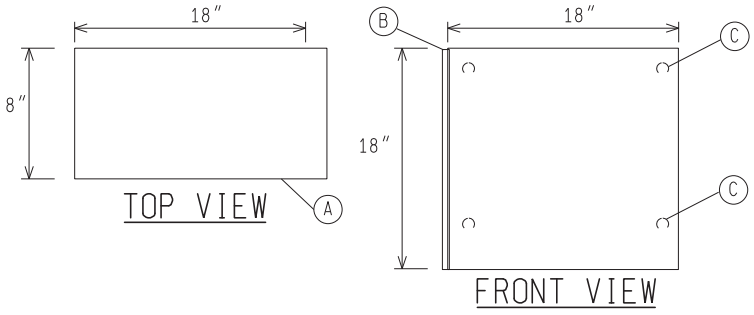


(1) 3″ REINFORCED CONDUIT
N.T.S.

CONDUIT UNDER RAILROAD TRACKS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-251-A	SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG250A.dgn Rev. 02/16/17		PLAN DATE		

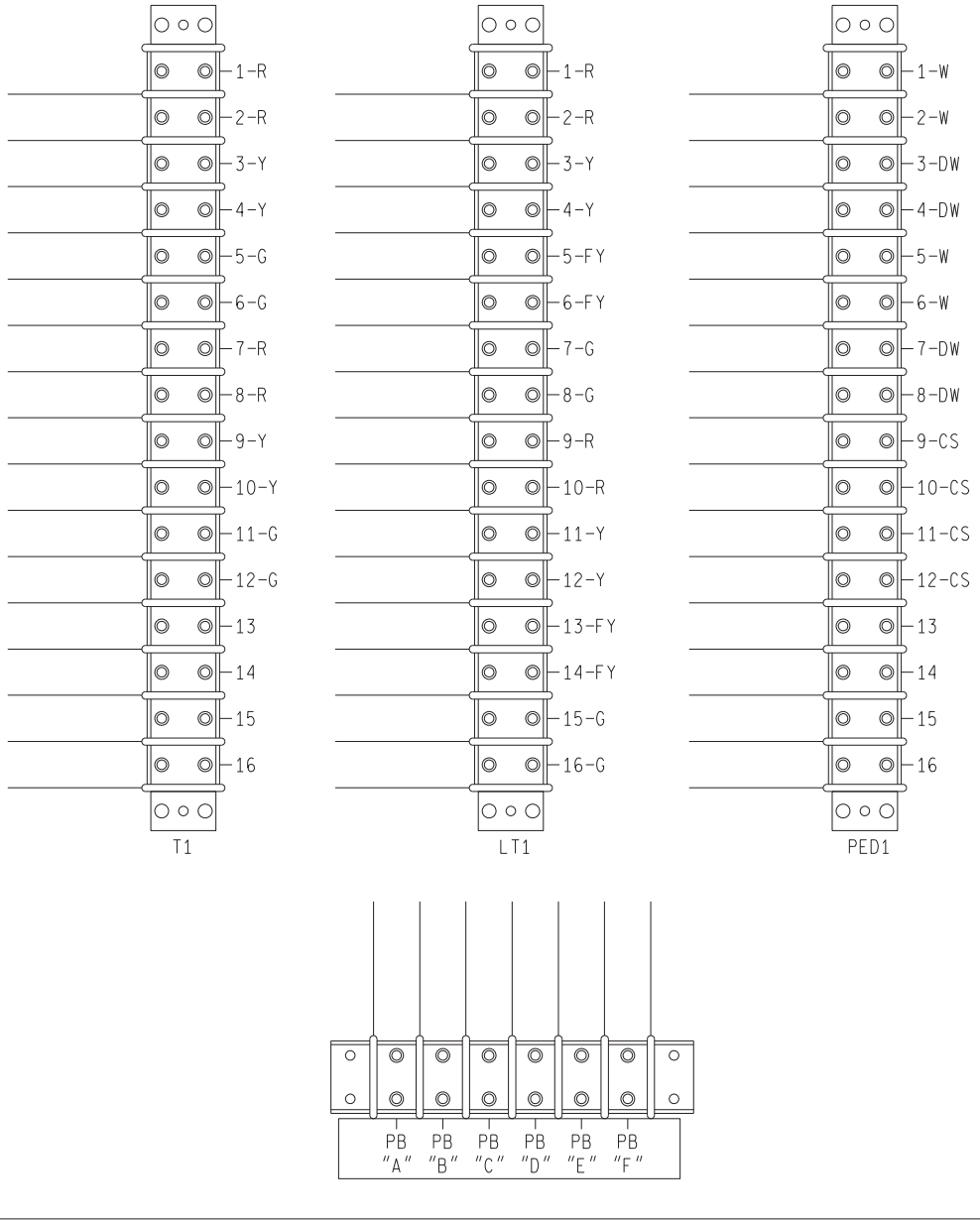


(A) .125 inch ASTM 5052-H32 Aluminum

(B) Stainless steel continous hinge on left side for door opening

(C) Predrilled holes (4) on back of encloseure to accept two cabinet mounting brackets.

SPLICE BOX ENCLOSURE



SPLICE BOX WIRING DIAGRAM

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

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ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

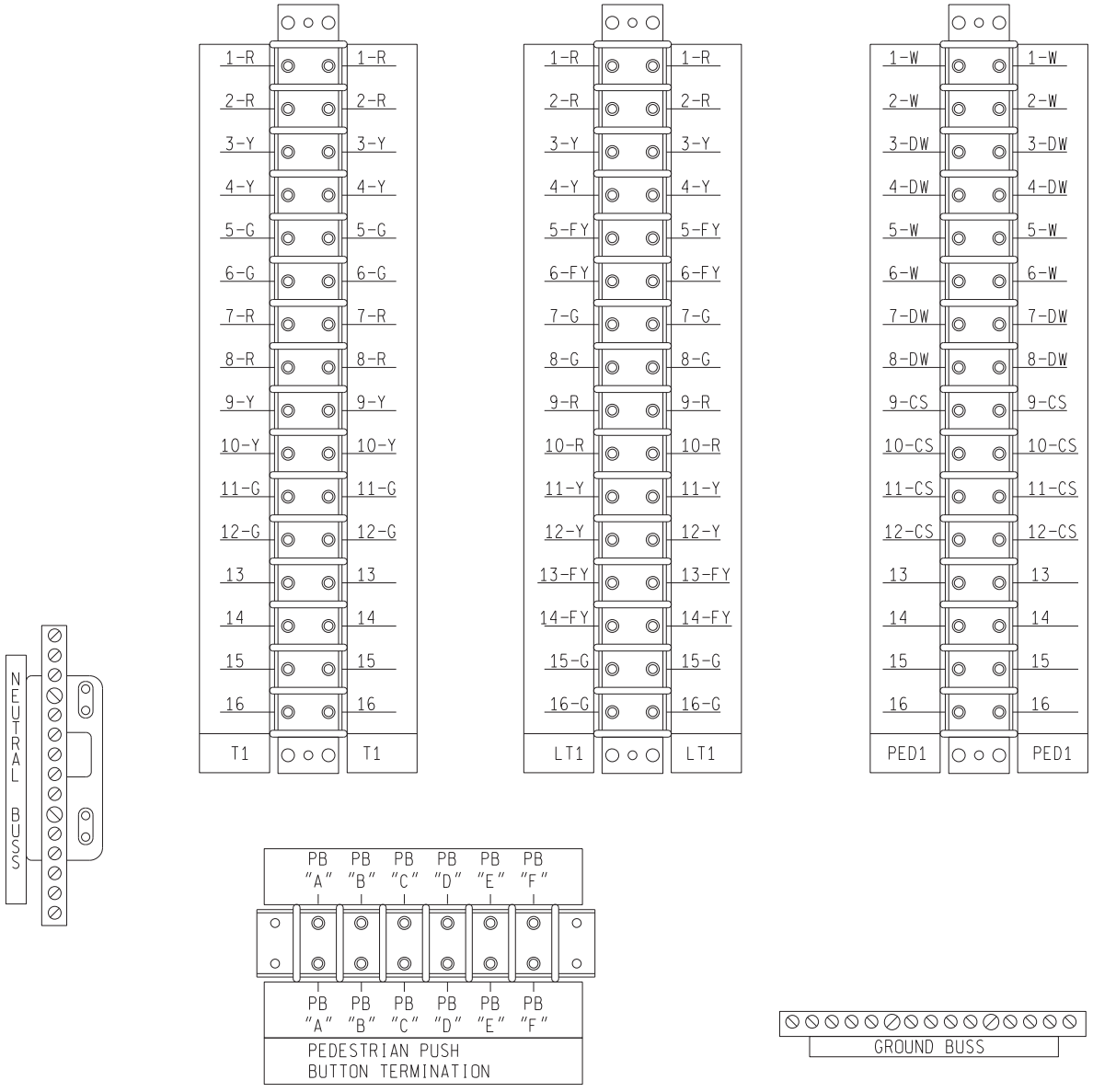
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

SPLICE BOX

PLAN DATE

SIG-260-A

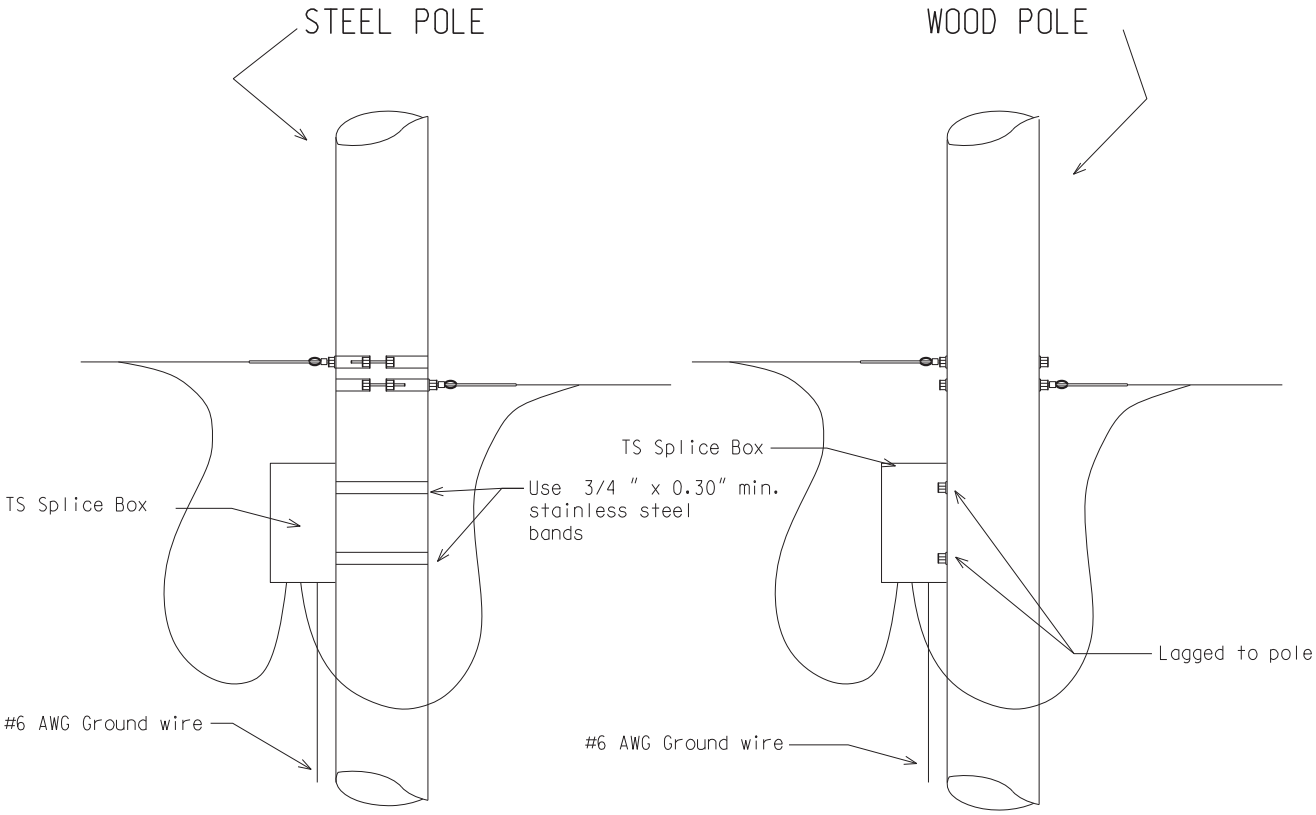
SHEET 1 of 3



SPLICE BOX BACK PANEL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-260-A	SHEET 2 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG260A.dgn Rev. 02/16/17				



NOTES: 1) Splice box to be constructed to provide a weather tight encolsure.
2) All cables shall enter TS splice box through bottom of enclosure with a water tight fitting.
3) Bushing for cable entrance into enclosure to be liquid tight and sized per cable used.

TRAFFIC SIGNAL (TS) SPLICE BOX MOUNTED ON STEEL OR WOOD POLES

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-260-A	SHEET 3 of 3
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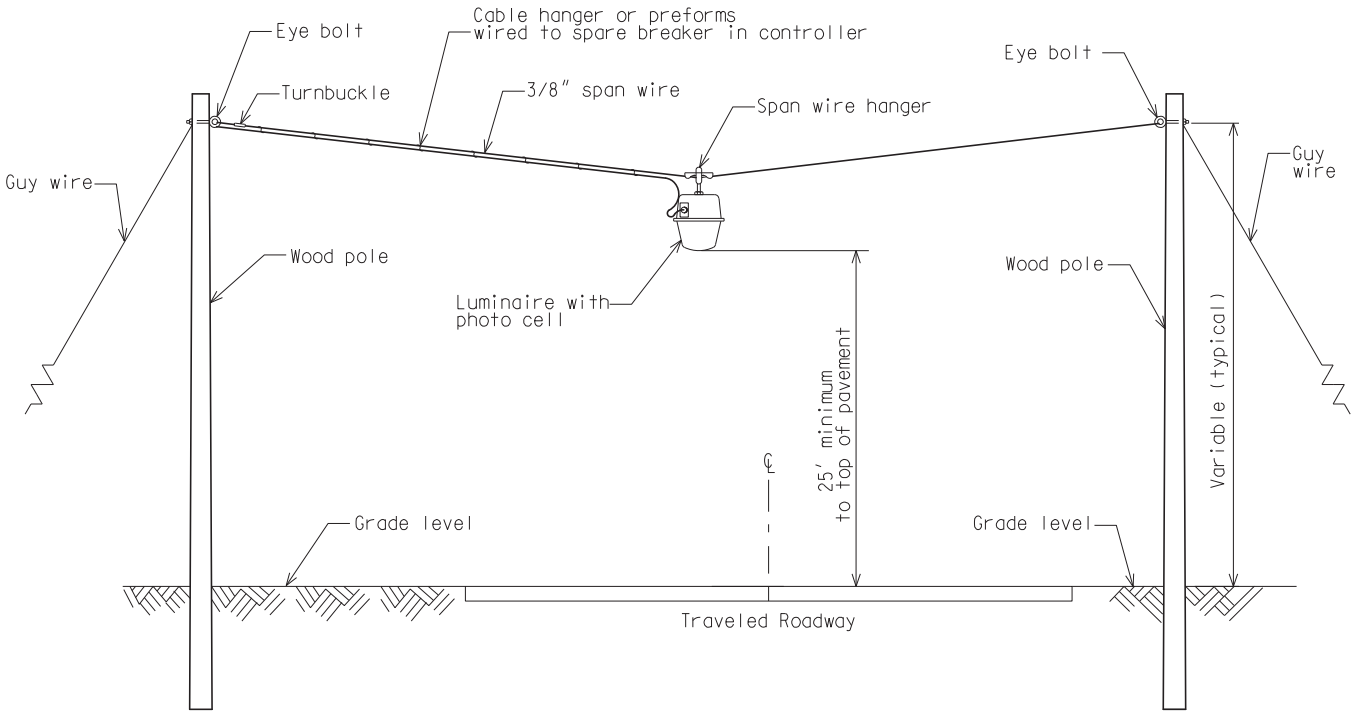

OVERHEAD LIGHTING DETAIL

TEMPORARY STREET LIGHTING TYPICAL ELECTRICAL DETAIL

NOT TO SCALE

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ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

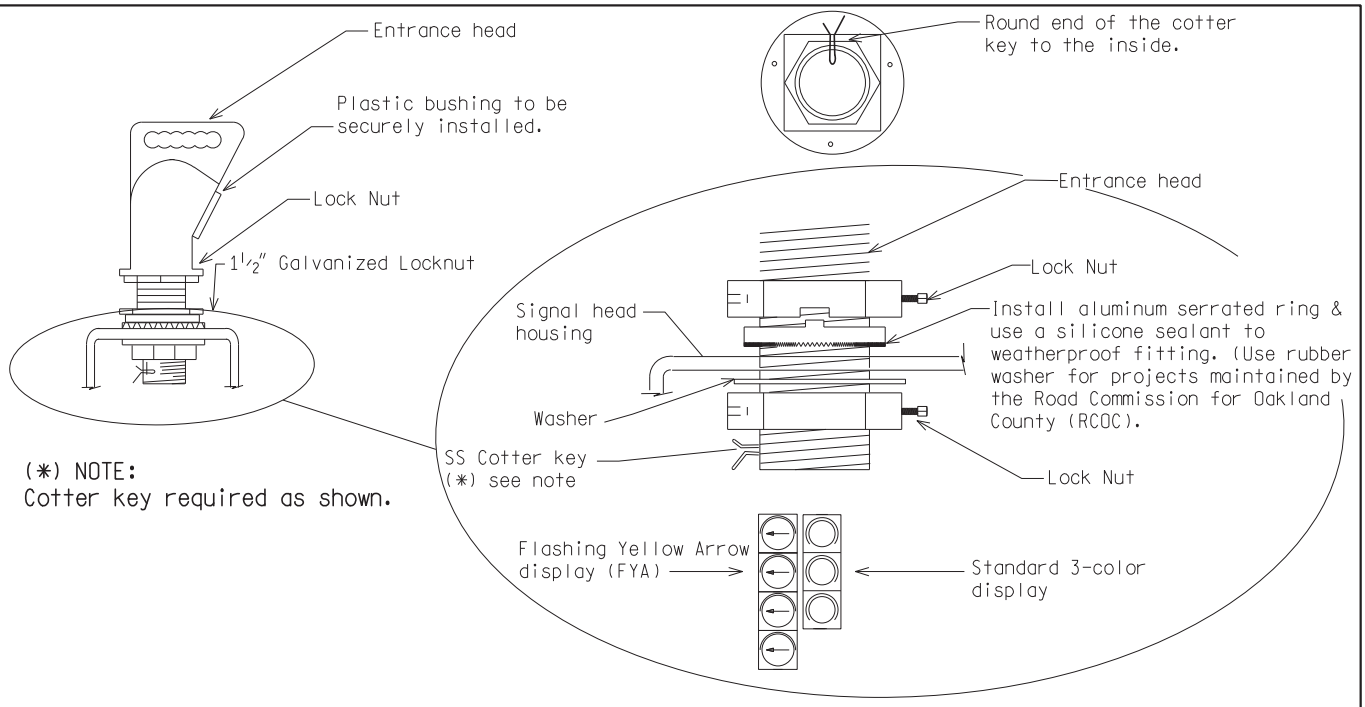
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

TYPICAL TEMPORARY STREET LIGHTING ELECTRICAL DETAIL

PLAN DATE

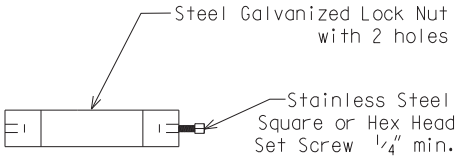
SIG-270-A

SHEET
1 of 1

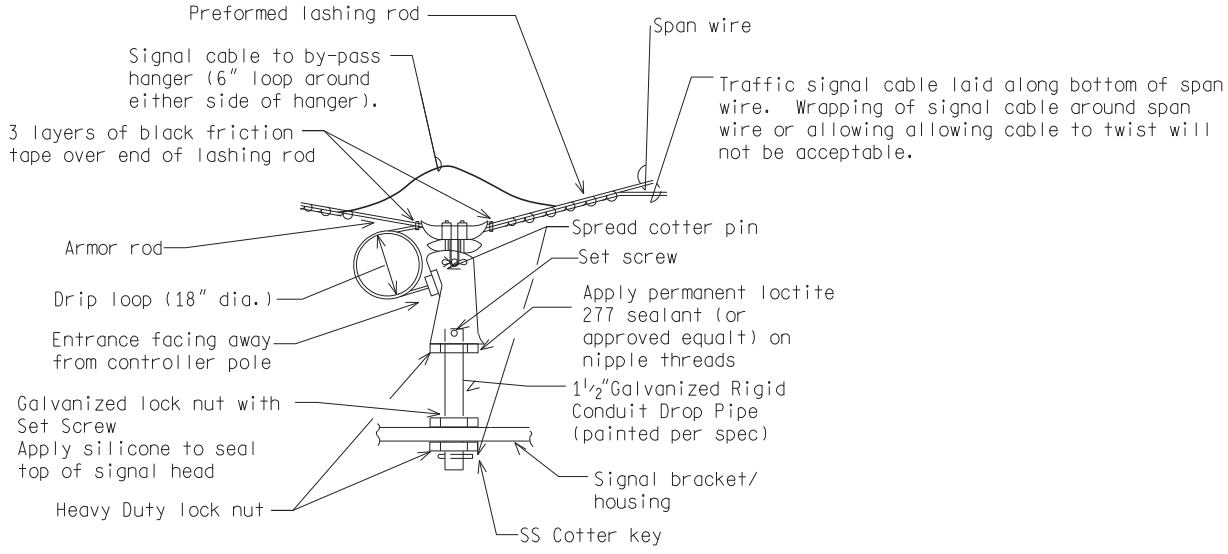


(*) NOTE:
Cotter key required as shown.

ONE-WAY TRAFFIC SIGNAL HEAD



OH SIGNAL LOCK NUT DETAIL



HANGER ATTACHMENT

NOT TO SCALE

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MDOT Michigan Department of Transportation

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CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

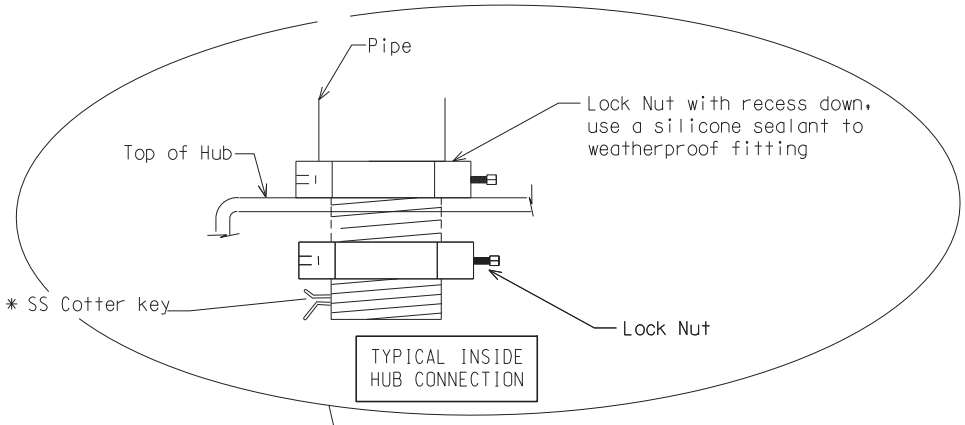
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

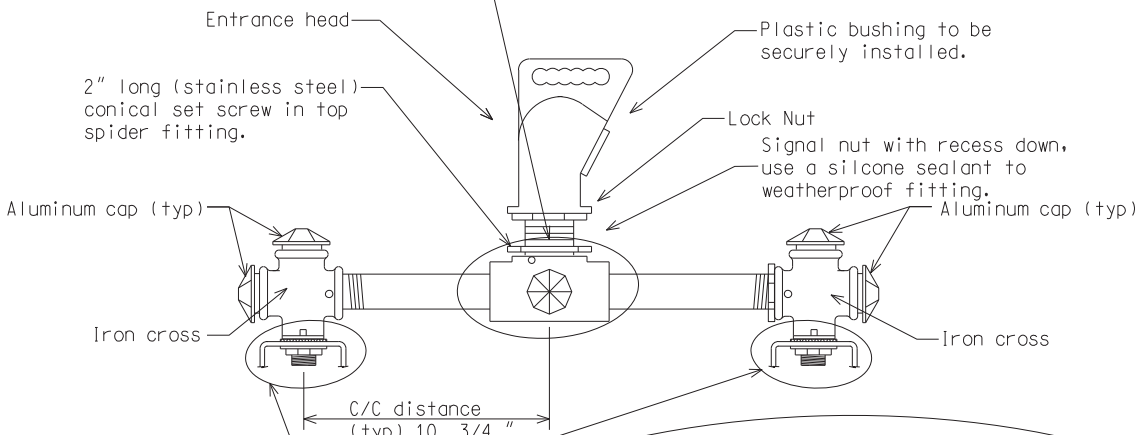
SPAN WIRE MOUNTED T.S. BRACKET ASSEMBLY

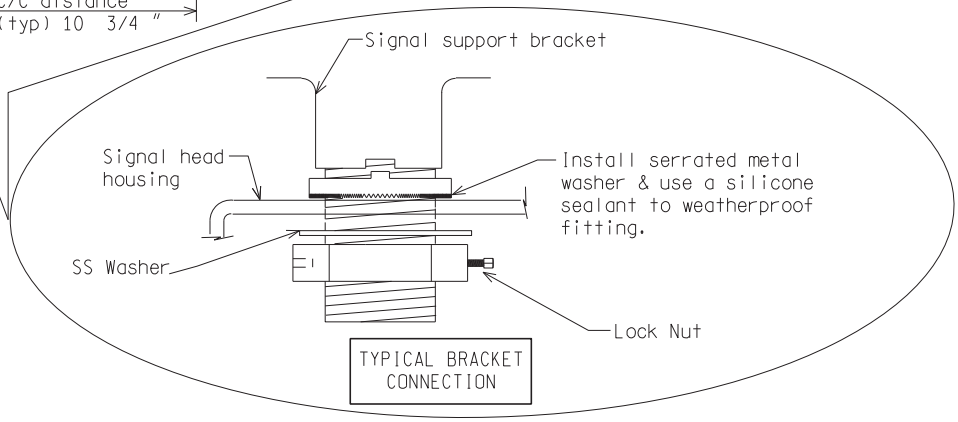
PLAN DATE

SIG-300-A

SHEET 1 of 3







NOTE:
2-way T.S. shown
3-way T.S. & 4-way similar

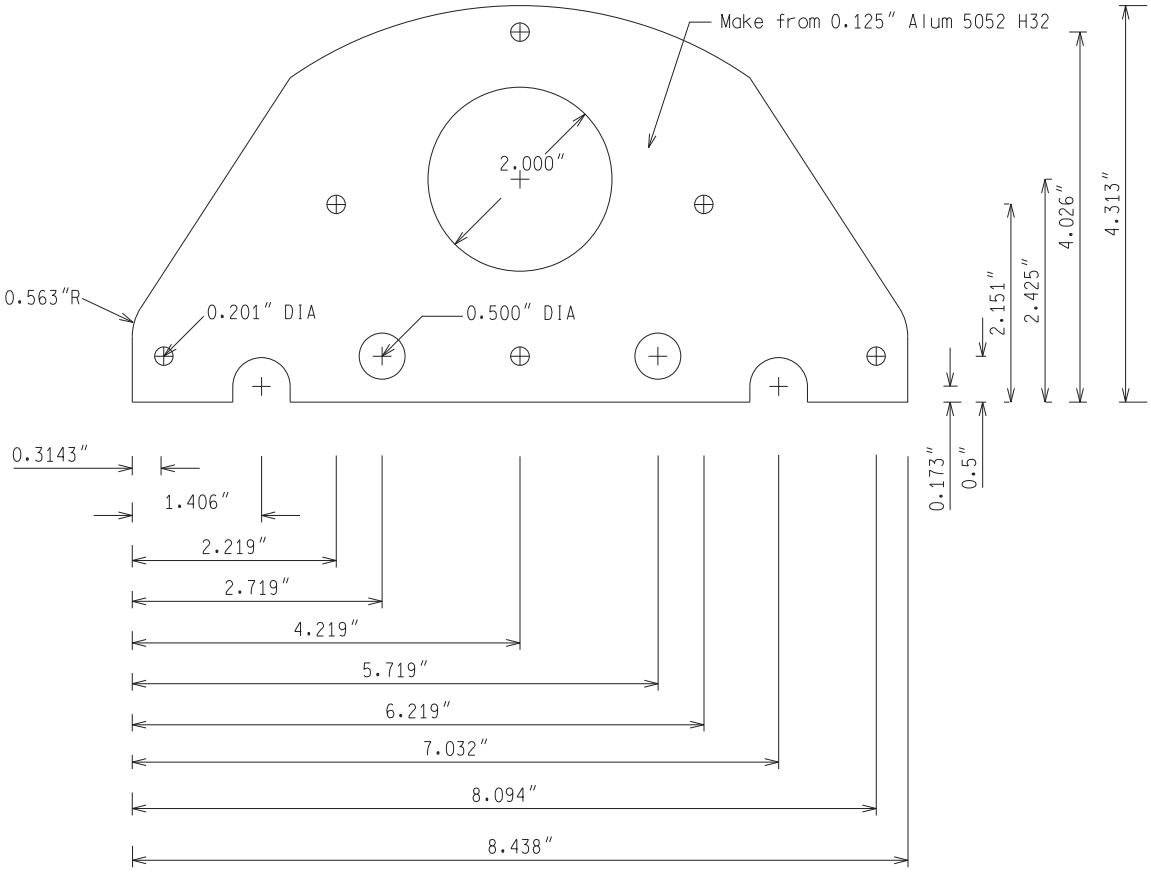
MULTIPLE-WAY TRAFFIC SIGNAL HEAD(S)

NOTE:
1) Exterior surface of all mounting assemble located below span clamps, including stems, lock nuts, and related hardware must match the current FHWA Highway yellow color tolerance chart per the Standard Specifications for Construction.

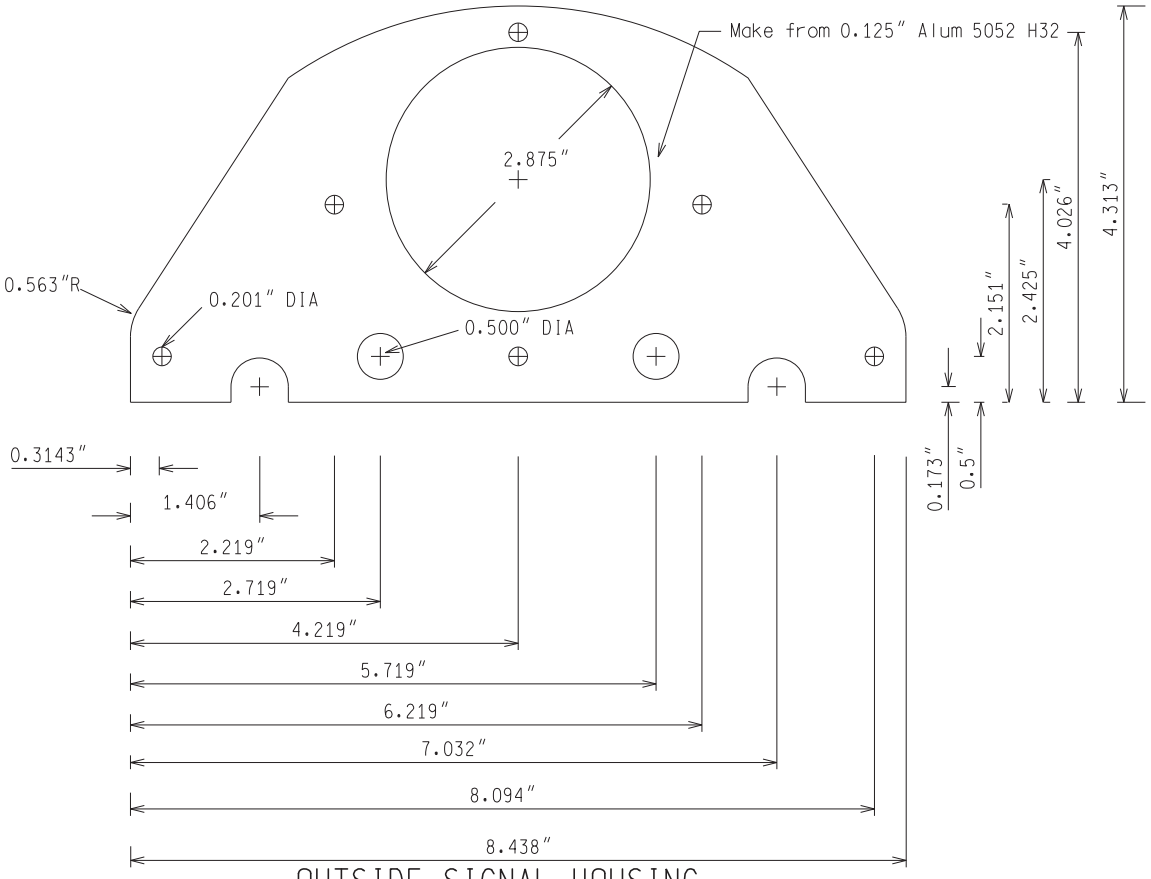
2) Tolerance within $\pm 1/8$" for all bracketing.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG300A.dgn Rev. 02/16/17		PLAN DATE	SIG-300-A	SHEET 2 of 3



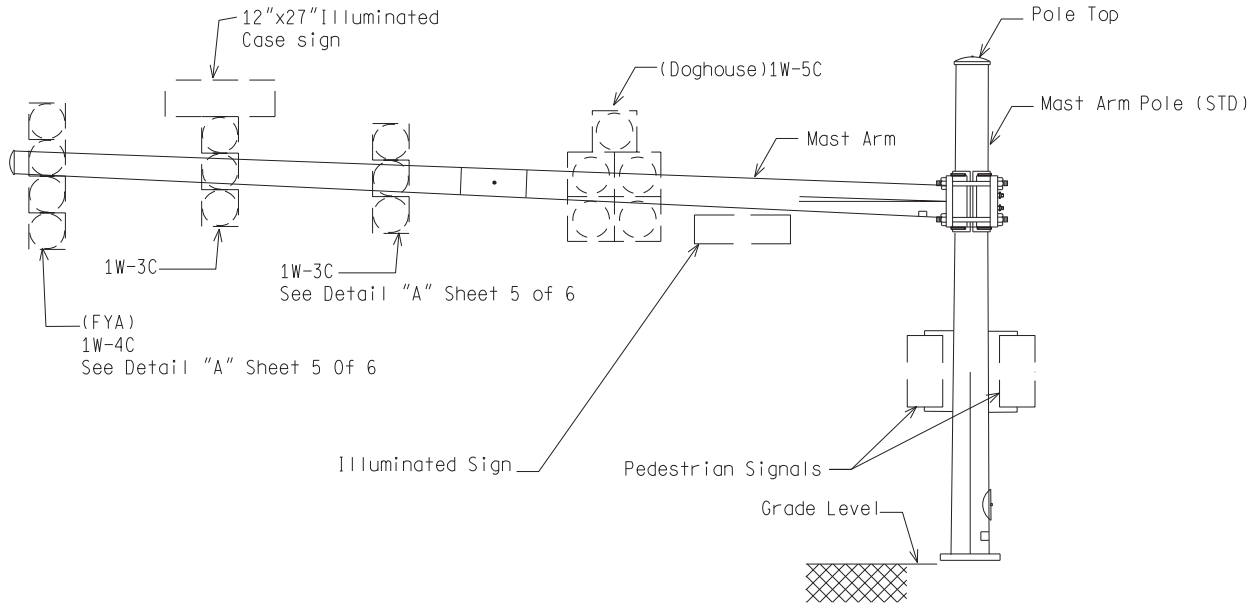
INSIDE SIGNAL HOUSING



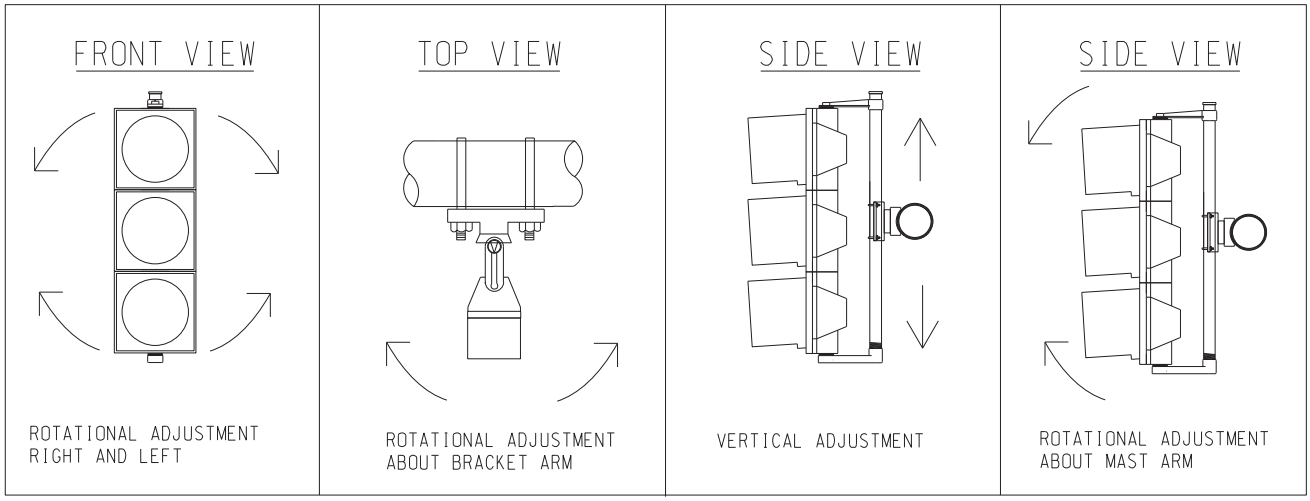
OUTSIDE SIGNAL HOUSING

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-300-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG300A.dgn Rev. 02/16/17		PLAN DATE		



TYPICAL SIGNAL DISPLAYS



SIGNAL HEAD BRACKET ADJUSTMENT

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: JEV

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

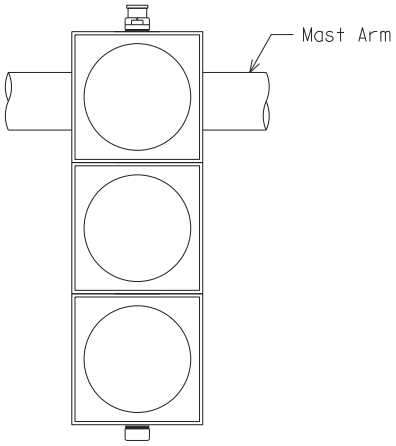
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

MAST ARM MOUNTED T.S. BRACKET ASSEMBLY

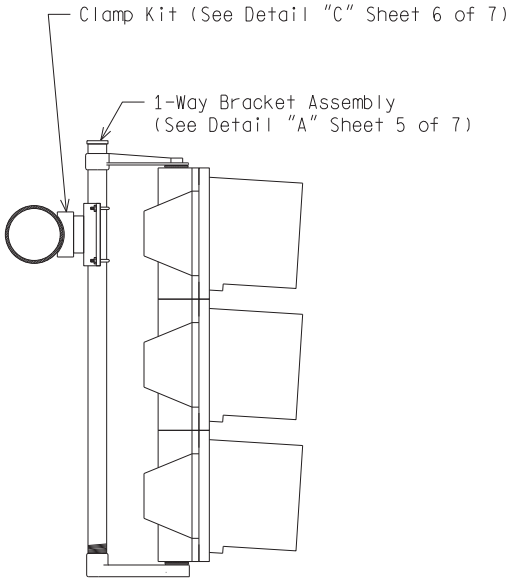
PLAN DATE

SIG-301-A

SHEET 1 of 7

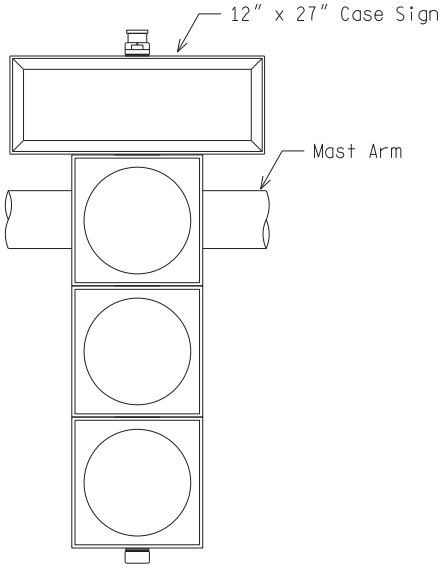


FRONT VIEW

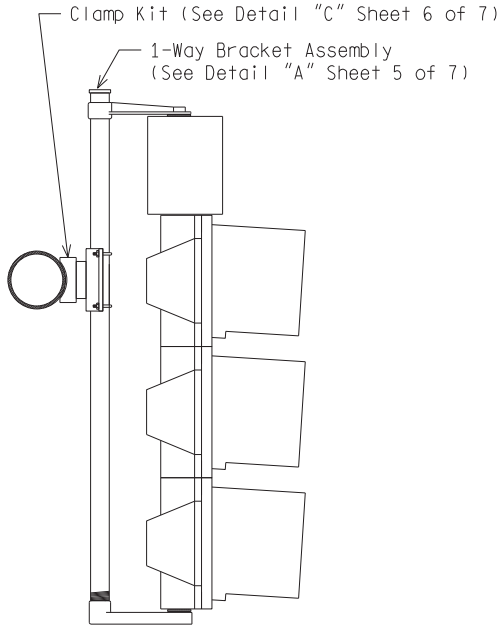


SIDE VIEW

1W-3C



FRONT VIEW

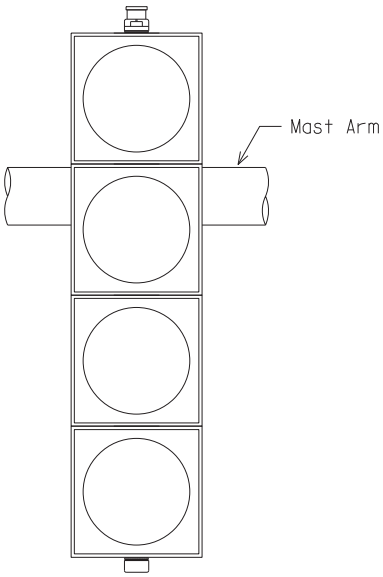


SIDE VIEW

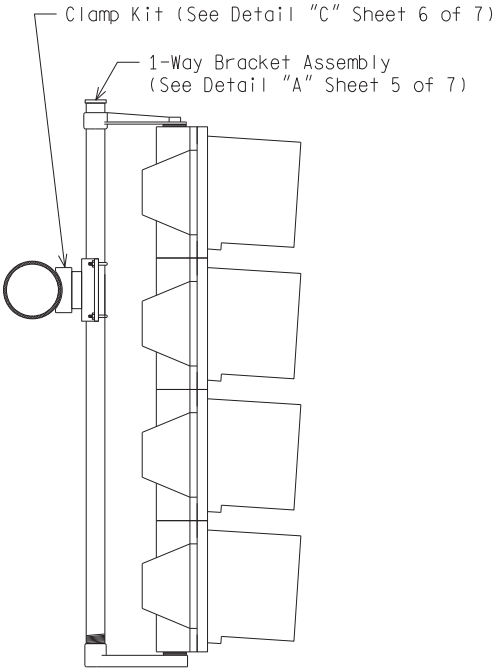
1W-3C With 12" x 27" Case Sign

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-301-A	SHEET 2 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG301A.dgn Rev. 02/16/17		PLAN DATE		

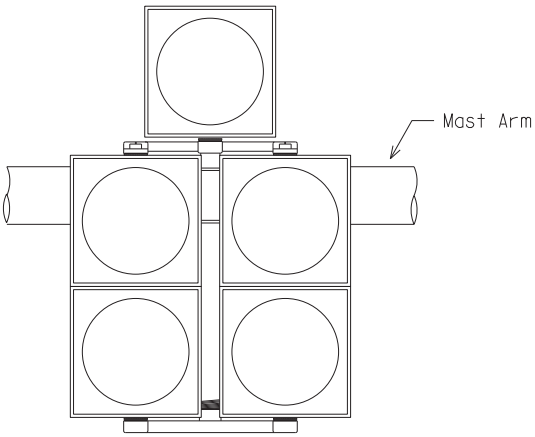


FRONT VIEW

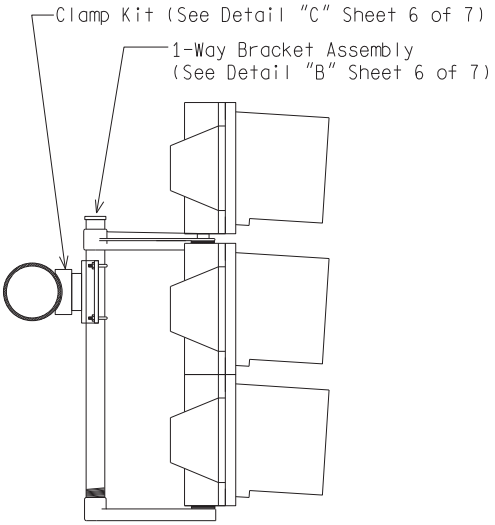


SIDE VIEW

1W-4C (FYA)



FRONT VIEW

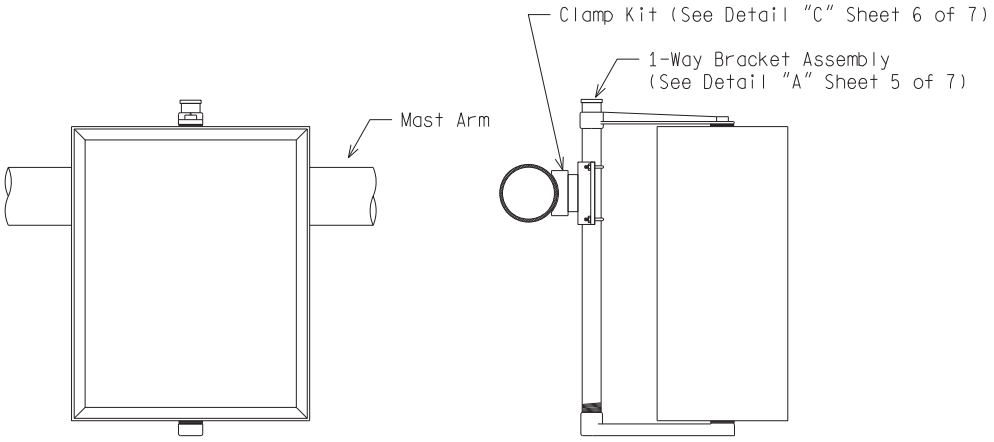


SIDE VIEW

1W-5C (Doghouse)

NOT TO SCALE

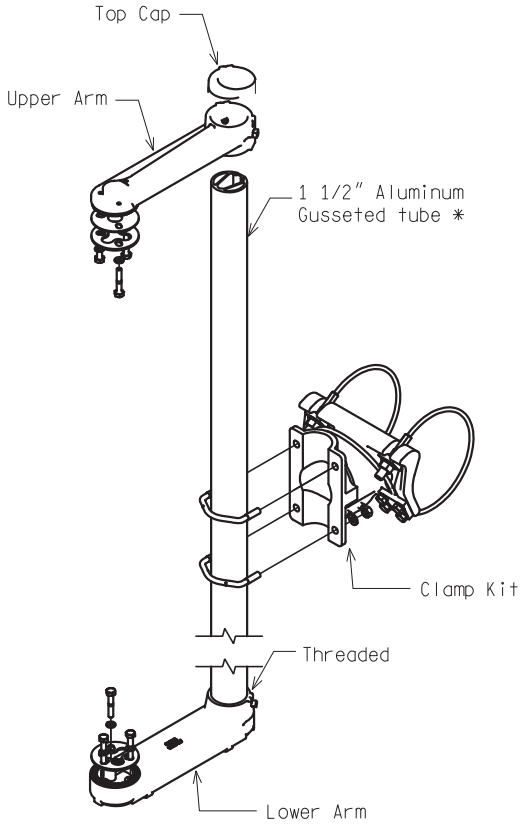
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-301-A	SHEET 3 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG301A.dgn Rev. 02/16/17		PLAN DATE		



1W-Case Sign (24" x 30" Shown)

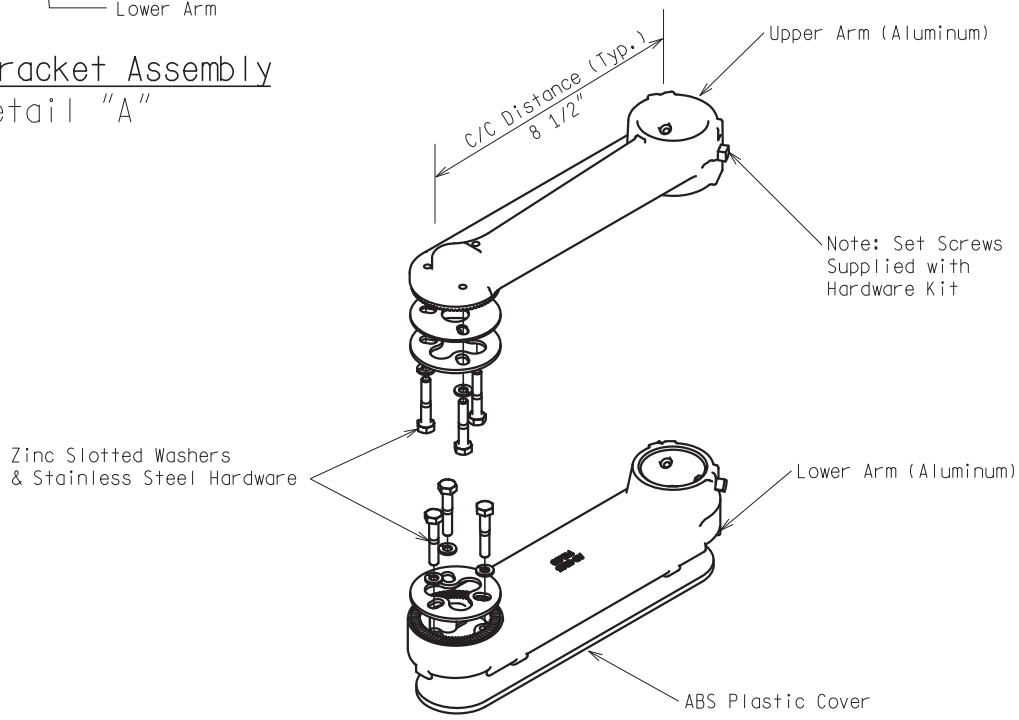
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-301-A	SHEET 4 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG301A.dgn Rev. 02/16/17		PLAN DATE		



* Note: Use 46" tube for 3 section T.S.
Use 58" tube for 4 section T.S.

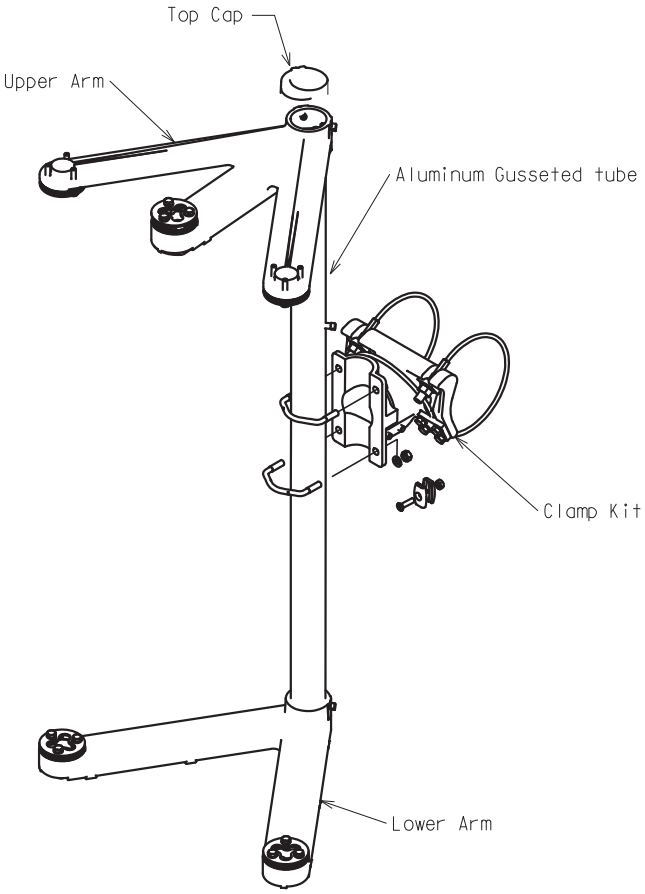
1-WAY Bracket Assembly
Detail "A"



1-WAY Bracket Arm Assembly

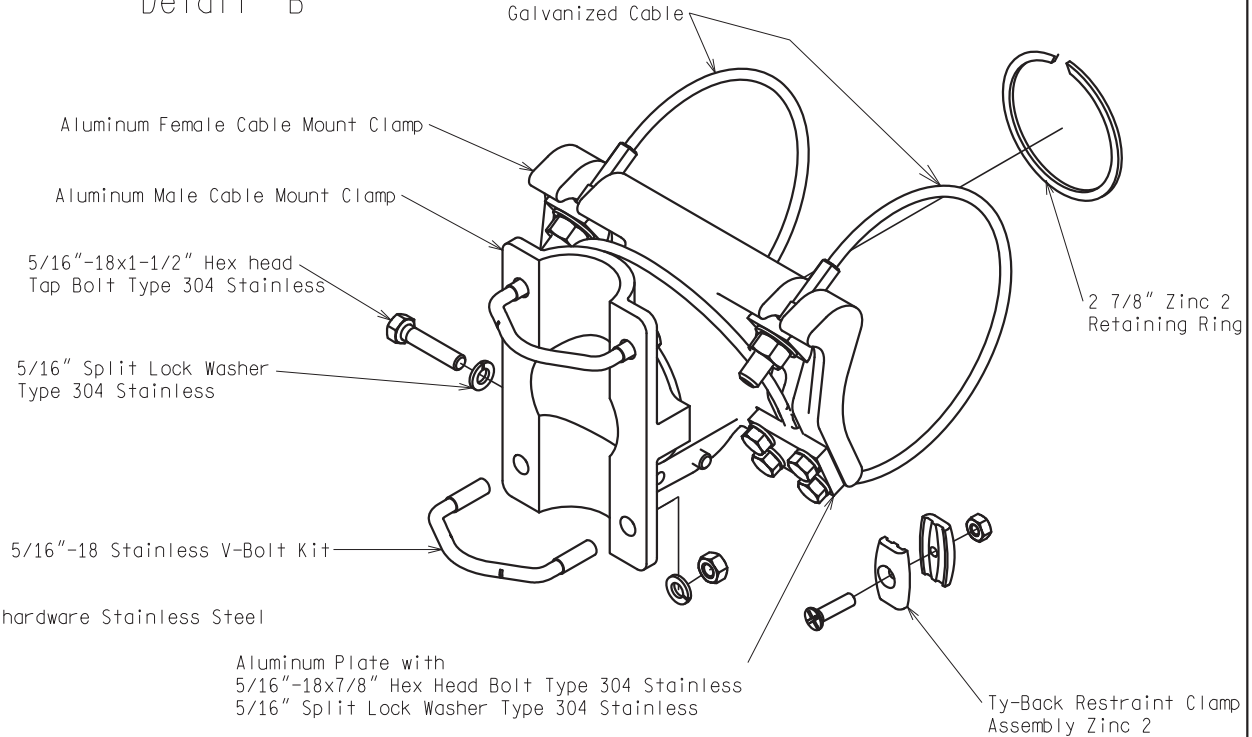
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-301-A	SHEET 5 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG301A.dgn Rev. 02/16/17		PLAN DATE		



1-WAY 5-Section Cluster Bracket Assembly

Detail "B"



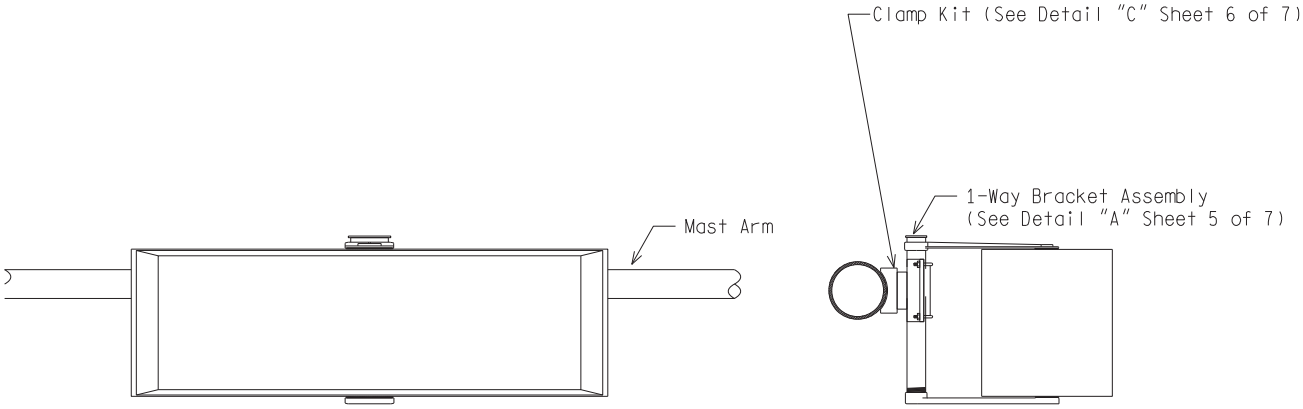
Note: All hardware Stainless Steel

Aluminum Clamp With Galvanized Cable

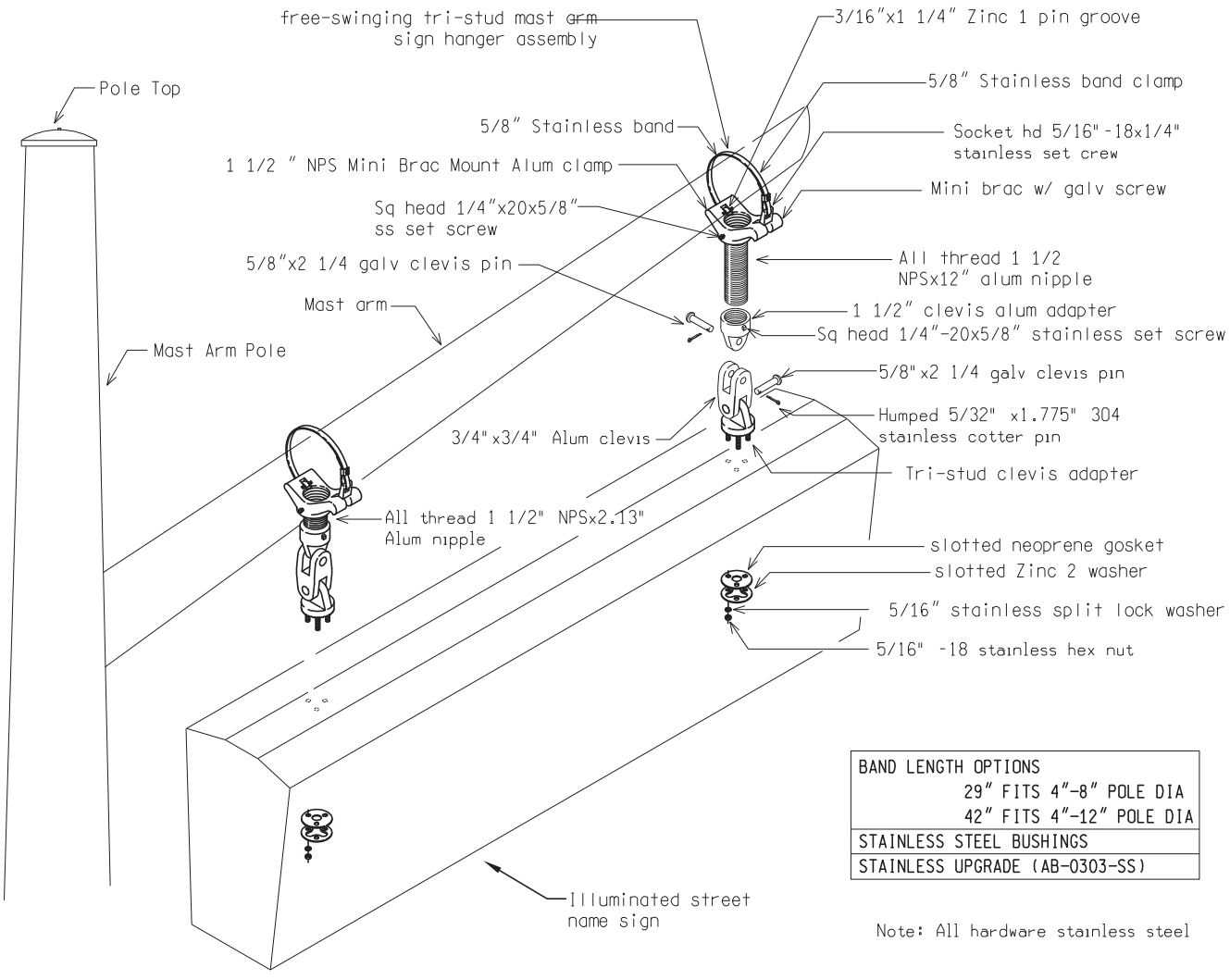
Detail "C"

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-301-A	SHEET 6 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG301A.dgn Rev. 02/16/17		PLAN DATE		



1W-Illuminated Street Name Sign



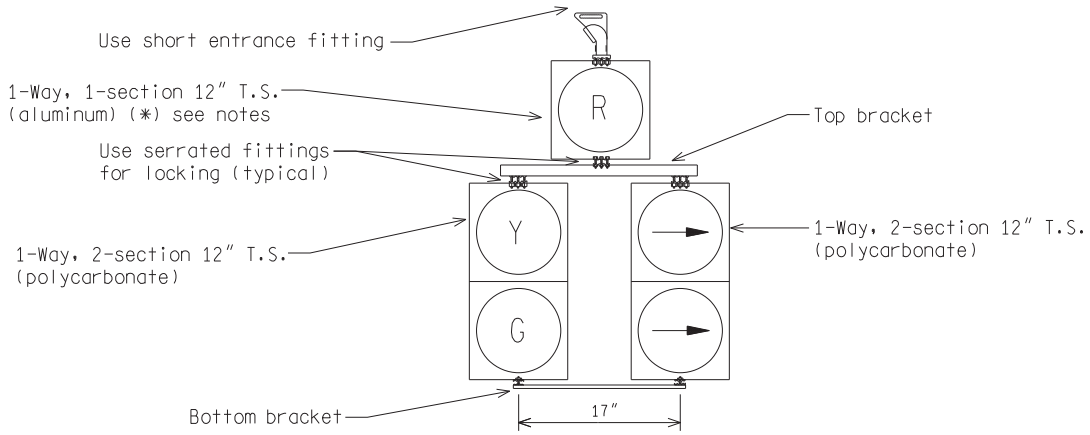
BAND LENGTH OPTIONS
29" FITS 4"-8" POLE DIA
42" FITS 4"-12" POLE DIA
STAINLESS STEEL BUSHINGS
STAINLESS UPGRADE (AB-0303-SS)

Note: All hardware stainless steel

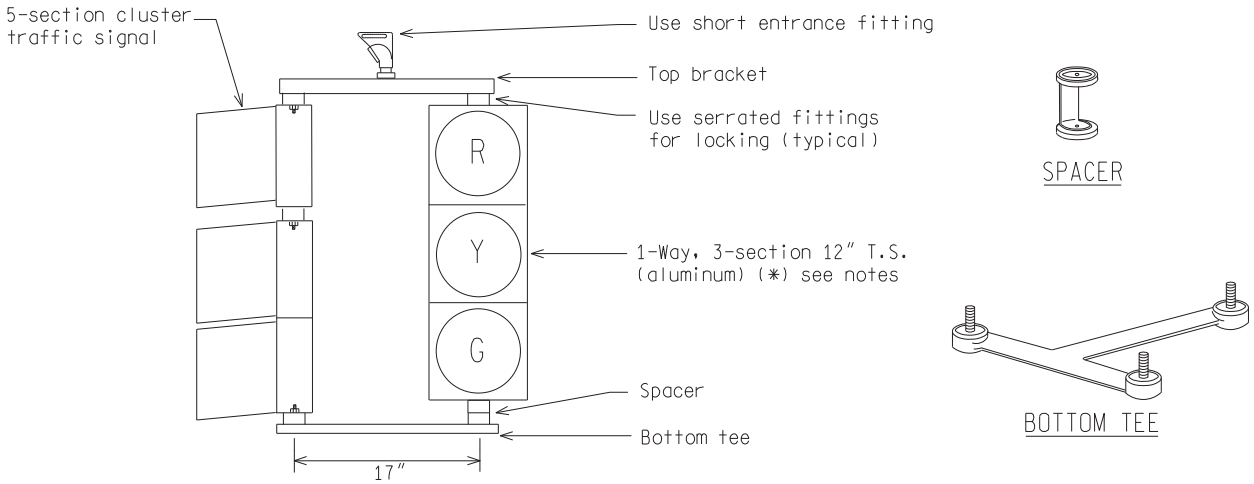
2W-Illuminated Street Name Sign

NOT TO SCALE

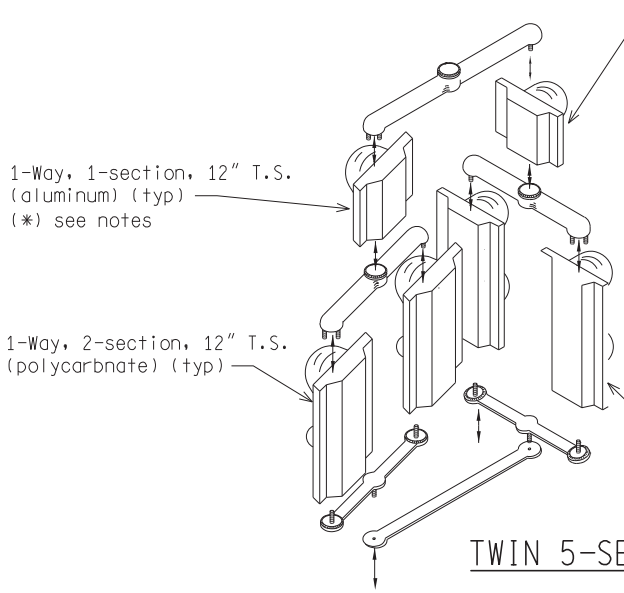
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	PLAN DATE	SIG-301-A	SHEET 7 of 7
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG301A.dgn Rev. 02/16/17				



5-SECTION CLUSTER (DOGHOUSE) TRAFFIC SIGNAL



COMBINATION 5-SECTION CLUSTER & 1-WAY T.S. (ALUMINUM)



(*) NOTES:

1) Traffic signals must conform to the current ITE publication "Vehicle Traffic Control Signal Heads."
2) Provide cast aluminum alloy housings with a 2" diam. hole top and bottom to receive 1 1/2" inch supporting pipe.
3) Provide a detachable, sheet aluminum visor (min. 0.057" thick), for each signal indication.
4) Provide twist on slots for visor mounting that are either in the visor or on the tabs formed on the visor.

TWIN 5-SECTION CLUSTER TRAFFIC SIGNAL

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG302A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

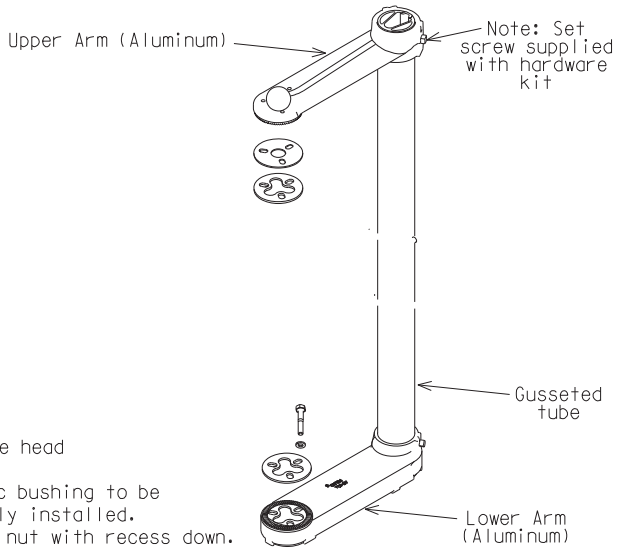
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

BRACKETING FOR 5-SECTION HEADS

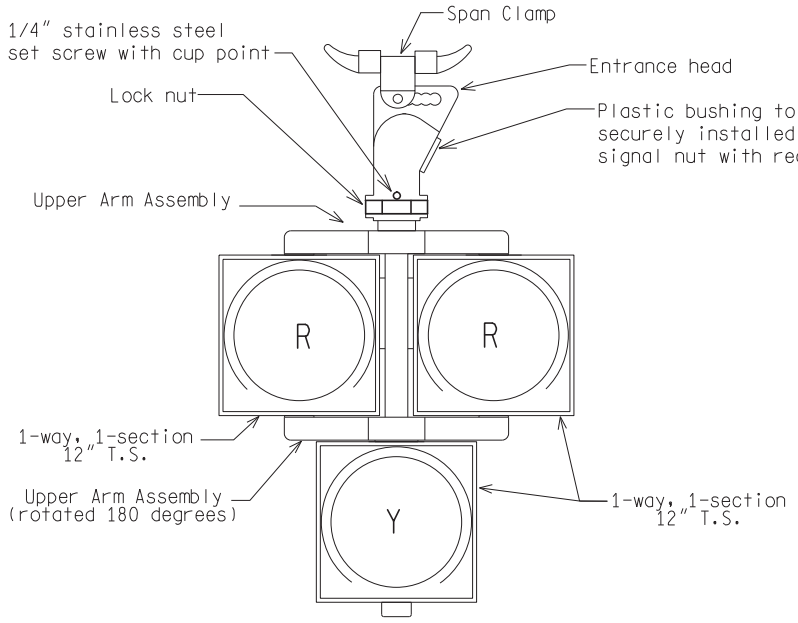
PLAN DATE

SIG-302-A

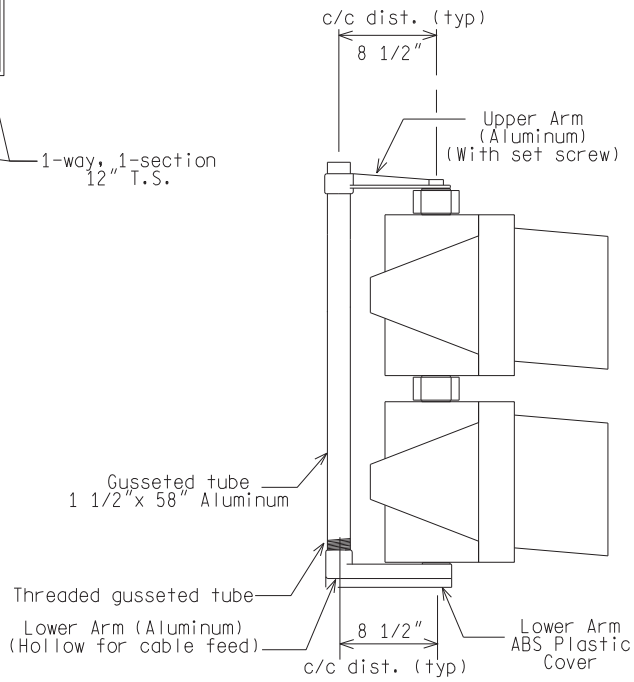
SHEET 1 of 1



ISOMETRIC VIEW



SPAN WIRE DISPLAY



SIDE VIEW

HIGH INTENSITY ACTUATED CROSSWALK BEACON (TO STOP TRAFFIC FOR PEDESTRIAN CROSSING LOCATIONS)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG303A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: JAM

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

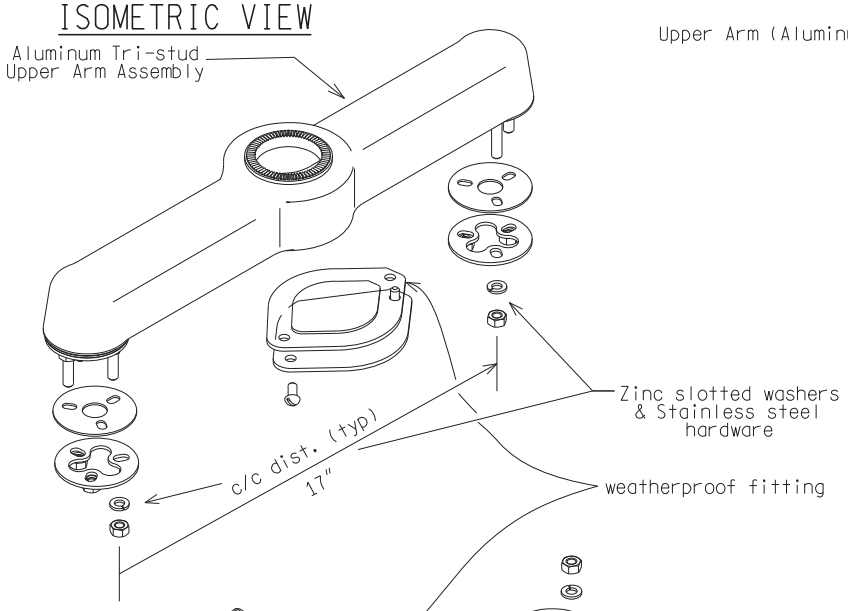
BRACKETING FOR HAWK SIGNAL DISPLAY

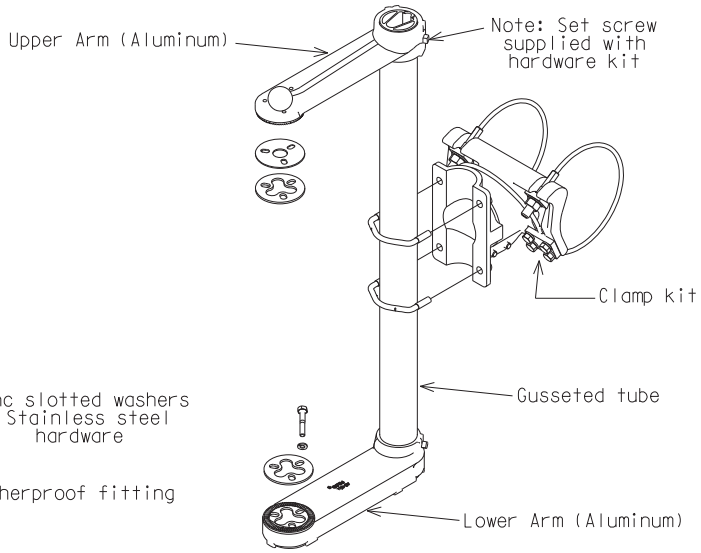
PLAN DATE

SIG-303-A

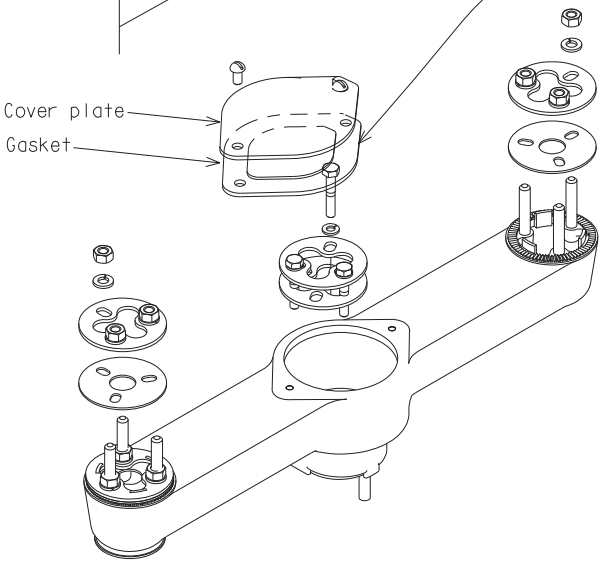
SHEET 1 of 2

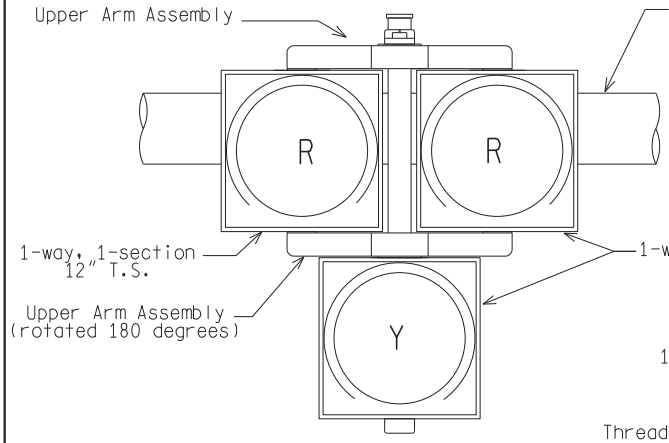
ISOMETRIC VIEW



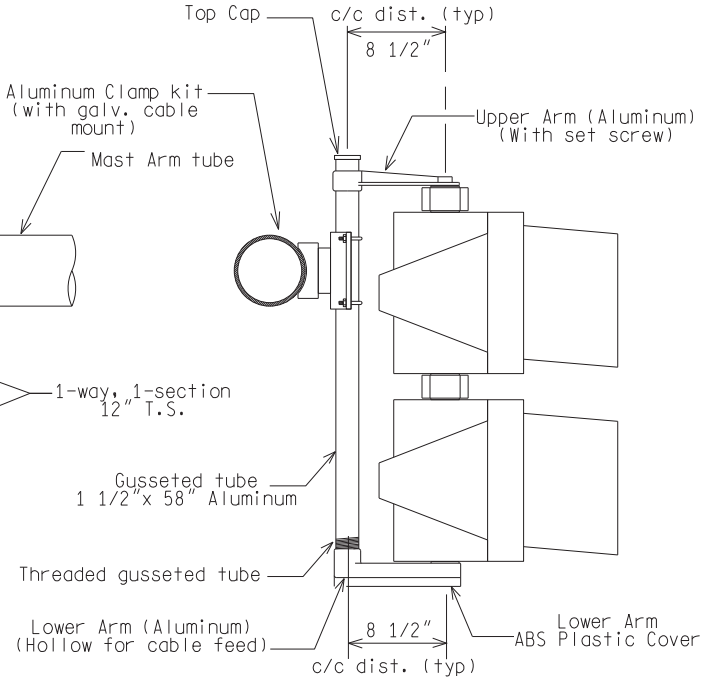


ISOMETRIC VIEW





FRONT VIEW

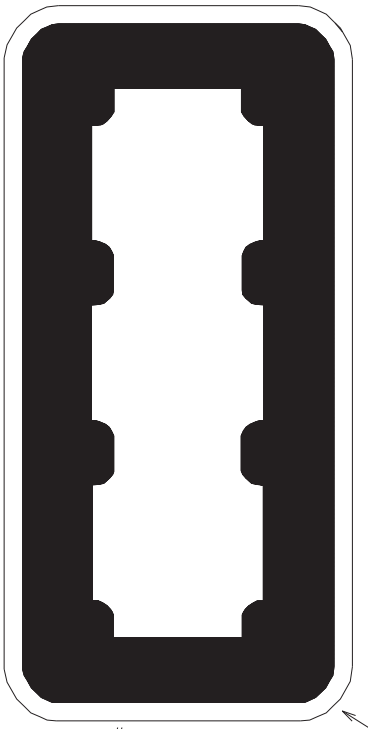


SIDE VIEW

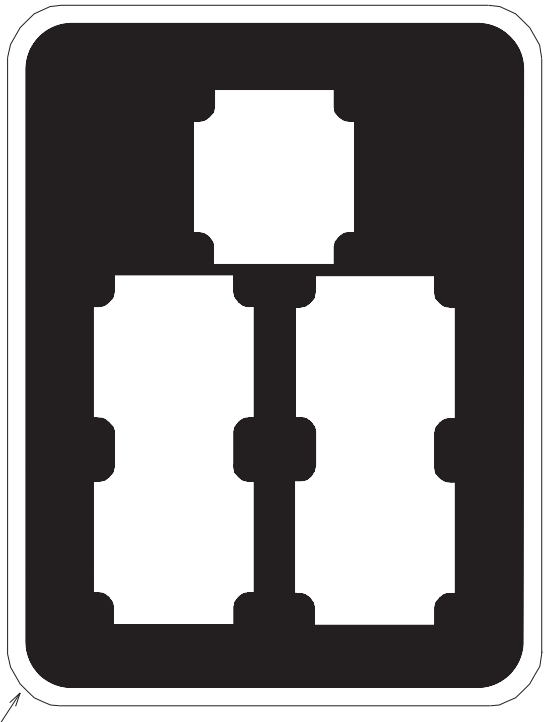
NOT TO SCALE

MAST ARM DISPLAY

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG303A.dgn Rev. 02/16/17		PLAN DATE	SIG-303-A

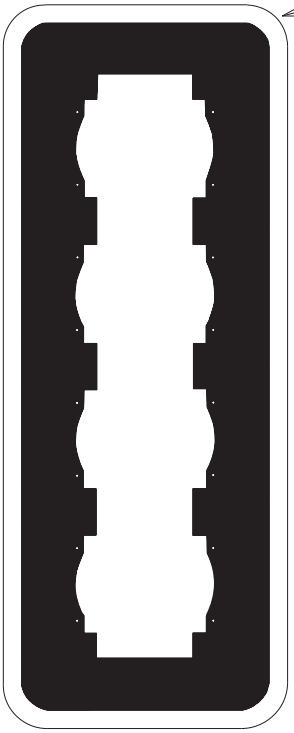


12", 3 SECTION



12", 5 SECTION

ASTM TYPE IV Reflective yellow tape border.



12", 4 SECTION

NOTES:

1) Backplates are to be used for mast arm type (fixed support) or tethered span wire type installations as indicated on the plans or as directed by the Engineer.

2) Backplates must be a one piece construction unless otherwise directed by the Engineer.

3) Do not cut the backplate for installation.

4) Use one inch border with yellow signal heads and visors.

TRAFFIC SIGNAL BACKPLATES

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG304A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

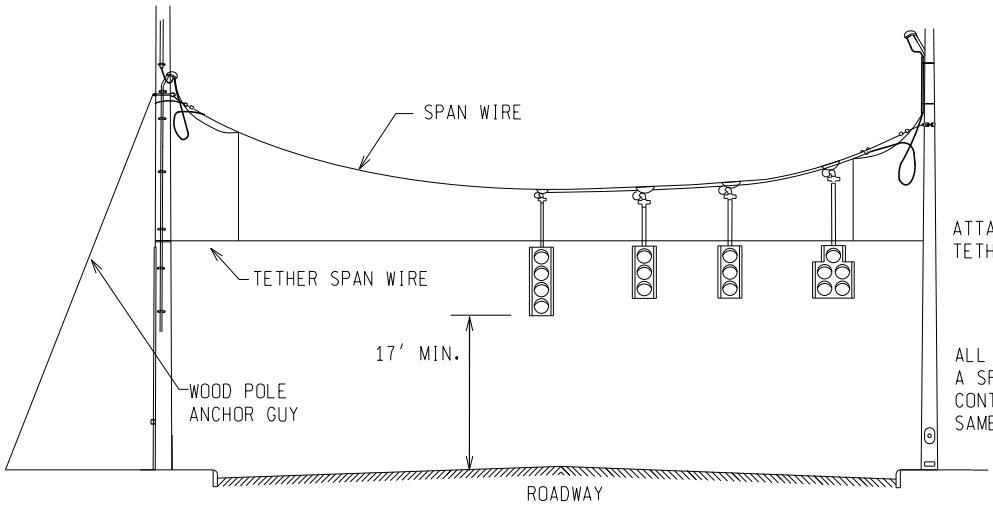
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

TRAFFIC SIGNAL BACKPLATES

PLAN DATE

SIG-304-A

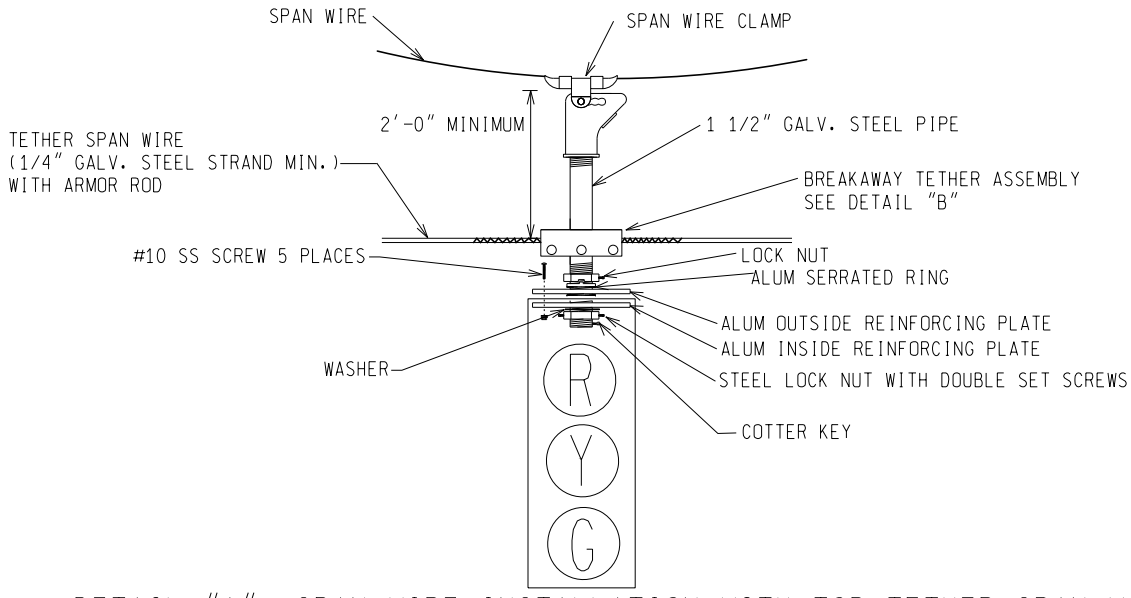
SHEET 1 of 1



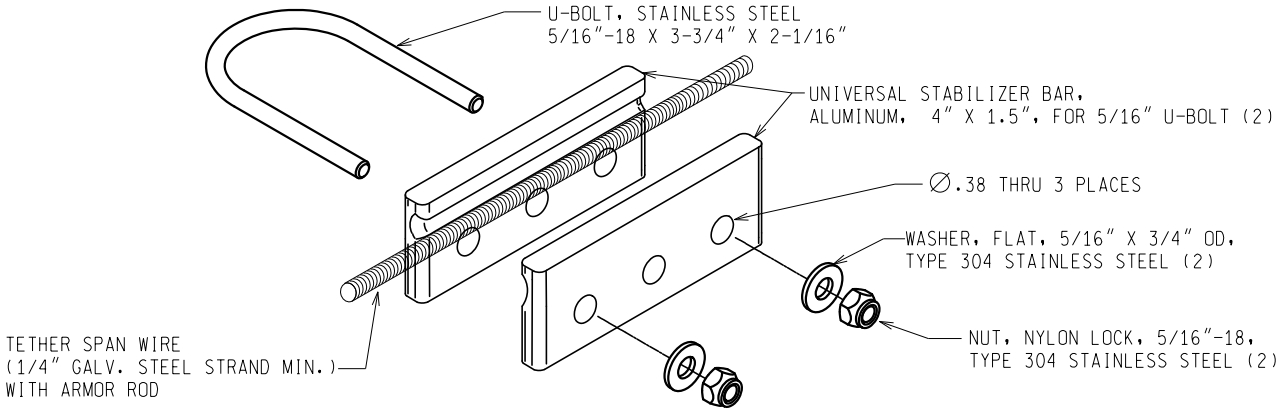
ATTACH TETHER ASSEMBLY SO THAT TETHER SPAN WIRE RUNS STRAIGHT ACROSS.

ALL VEHICLE SIGNALS AND SIGNS HUNG ON A SPAN SHALL BE TETHERED. SPAN POLE CONTACT HEIGHTS NEED NOT BE AT THE SAME ELEVATION.

ELEVATION VIEW: TOP TETHER INSTALLATION



DETAIL "A": SPAN WIRE INSTALLATION WITH TOP TETHER SPAN WIRE



DETAIL "B": BREAK-AWAY TETHER ASSEMBLY FOR TOP OF SIGNAL HEAD

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG305C.dgn Rev. 04/08/19

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

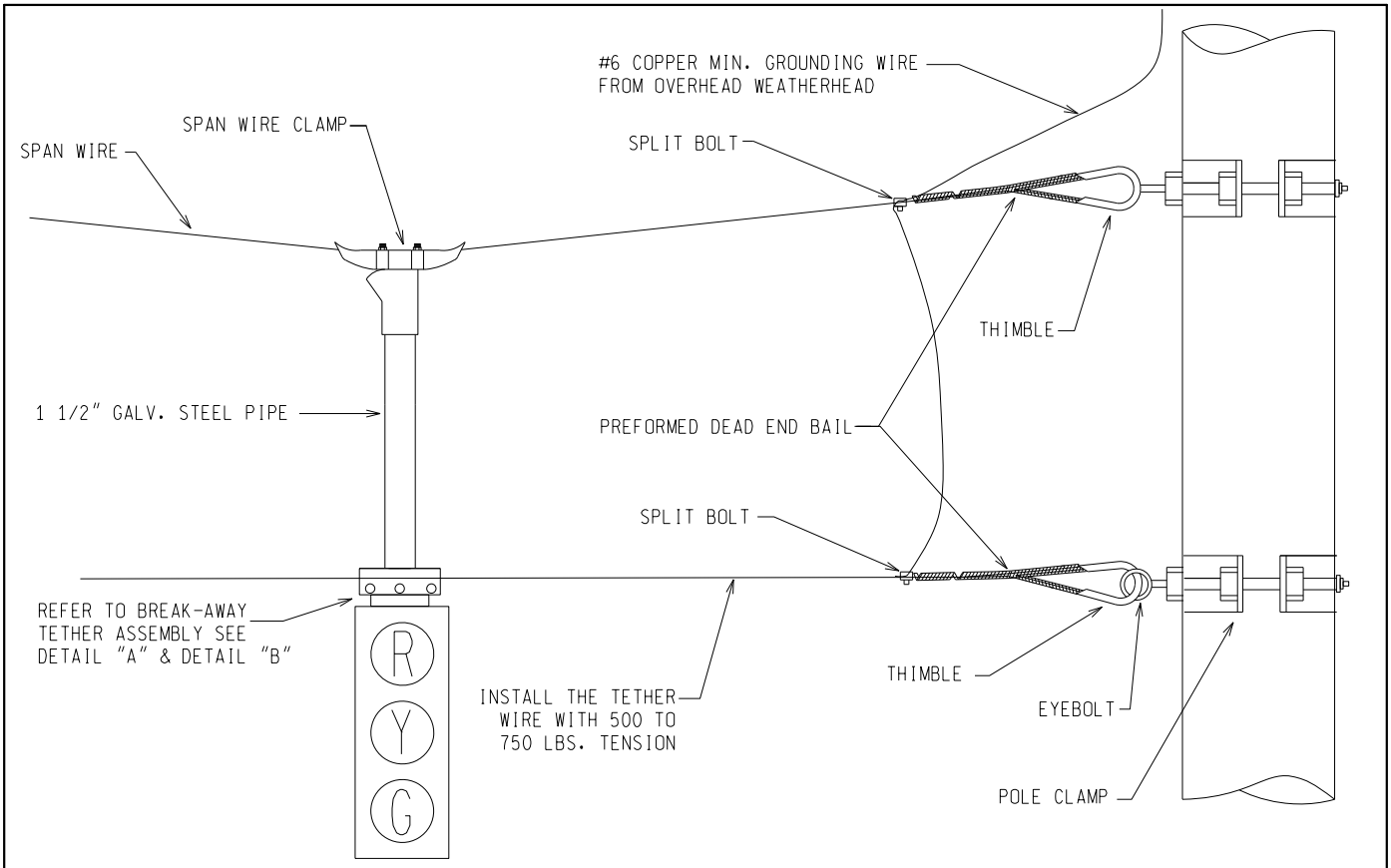
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

SPAN WIRE TETHER DETAILS

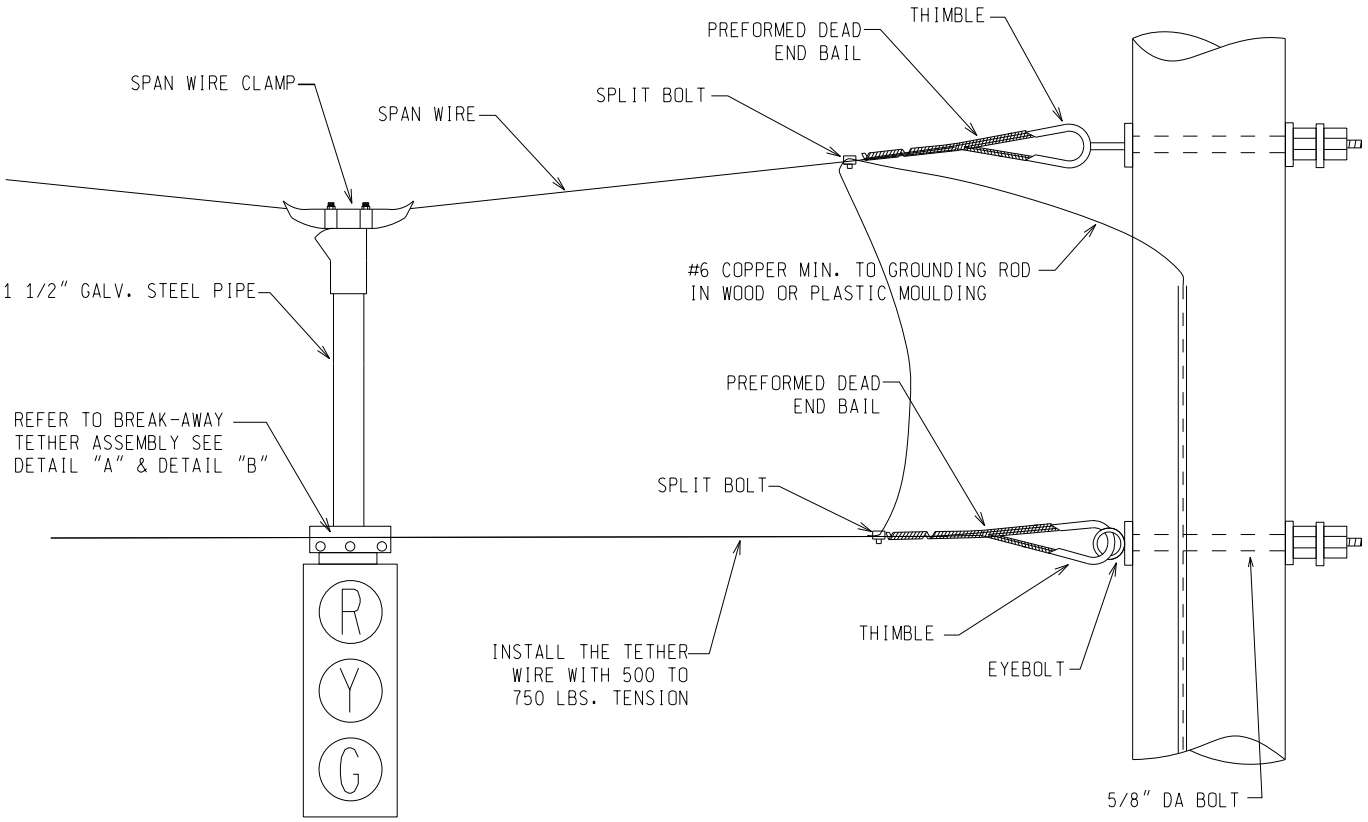
PLAN DATE

SIG-305-C

SHEET 1 of 5



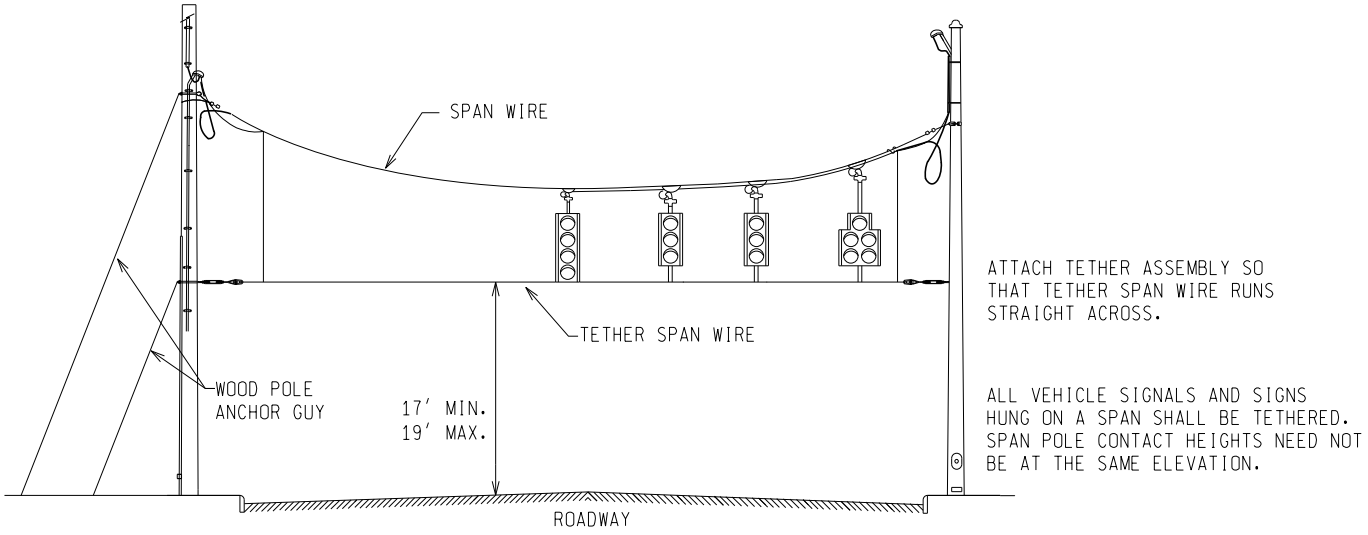
TOP TETHER SPAN WIRE STEEL POLE CONNECTION DETAIL



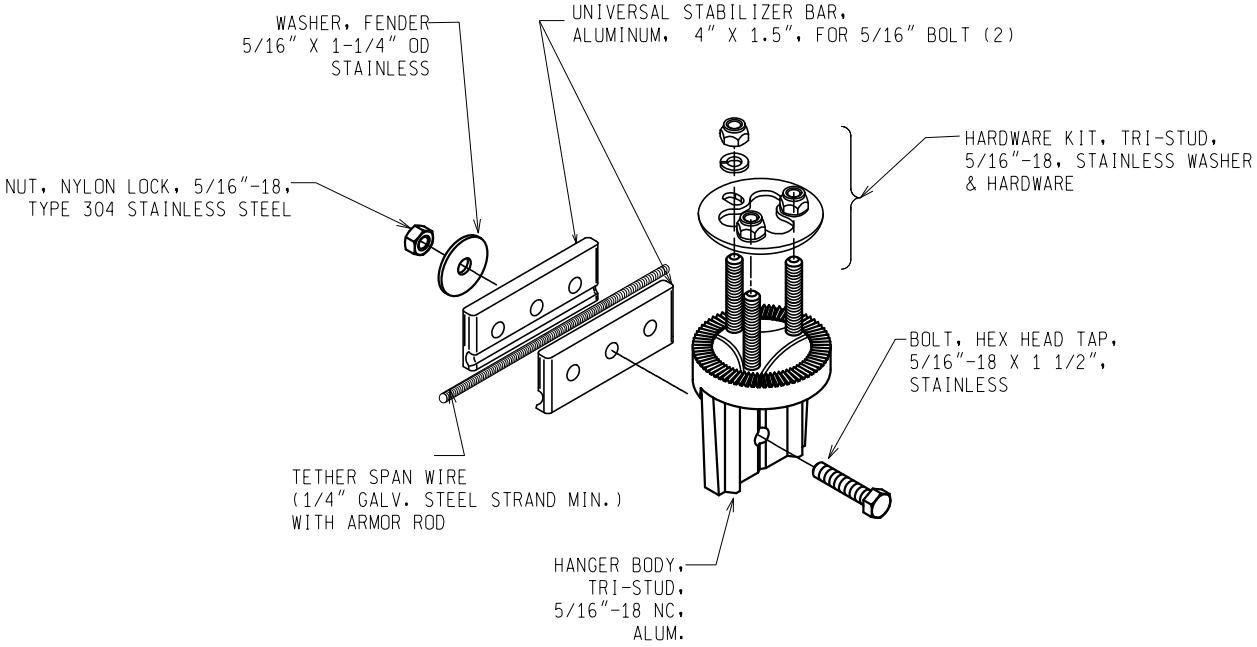
TOP TETHER SPAN WIRE WOOD POLE CONNECTION DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-305-C	SHEET 2 of 5
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG305C.dgn Rev. 04/08/19		PLAN DATE		

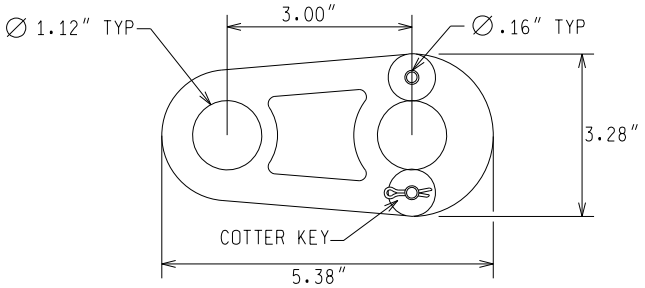


ELEVATION VIEW: BOTTOM TETHER INSTALLATION

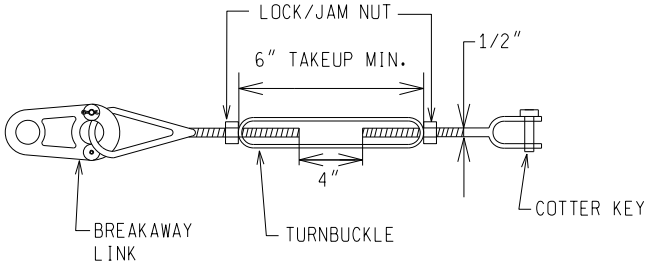


DETAIL "C": TETHER ASSEMBLY TRI-STUD BREAK-A-WAY

DETAIL "D": BREAK-AWAY TETHER ASSEMBLY FOR BOTTOM OF SIGNAL HEAD



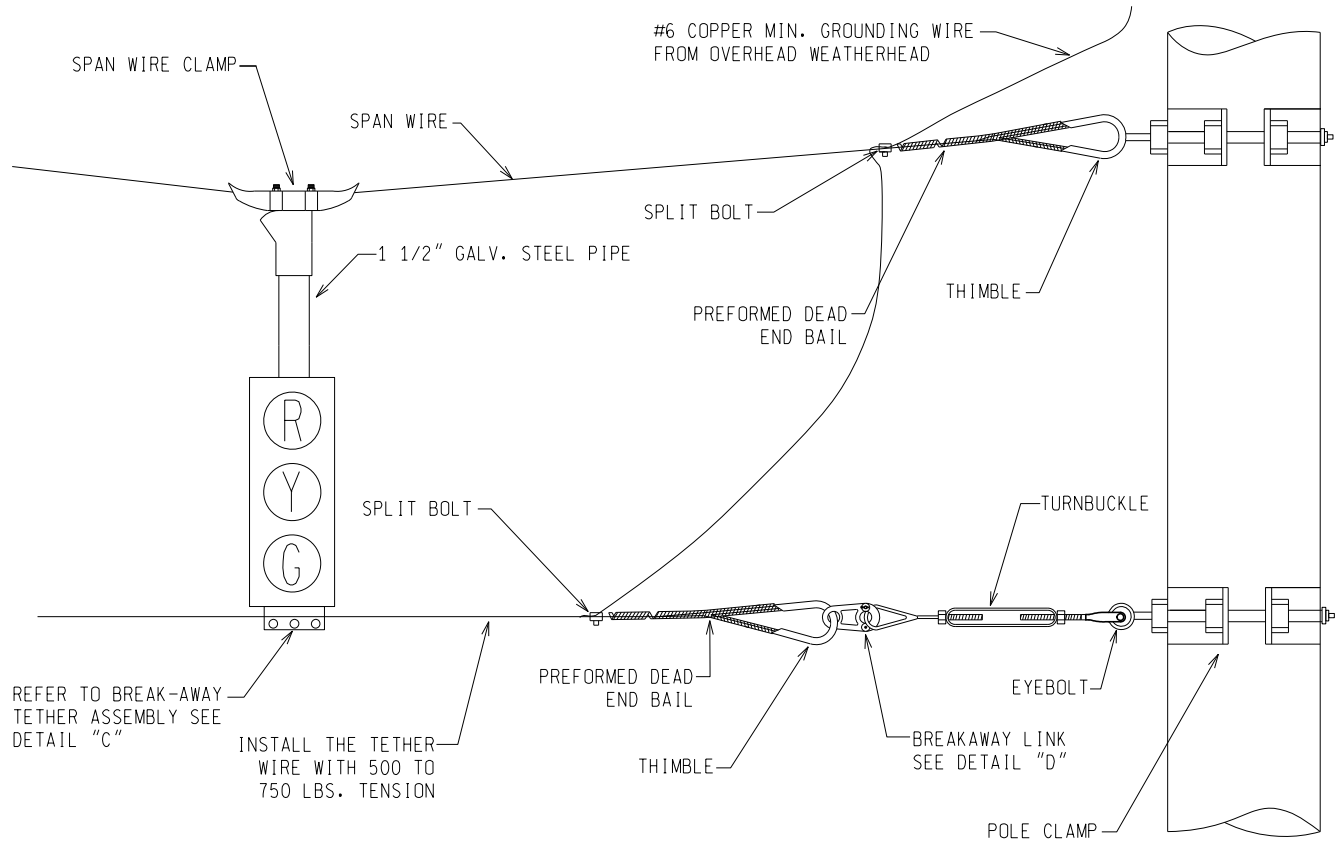
BOTTOM TETHER BREAKAWAY LINK



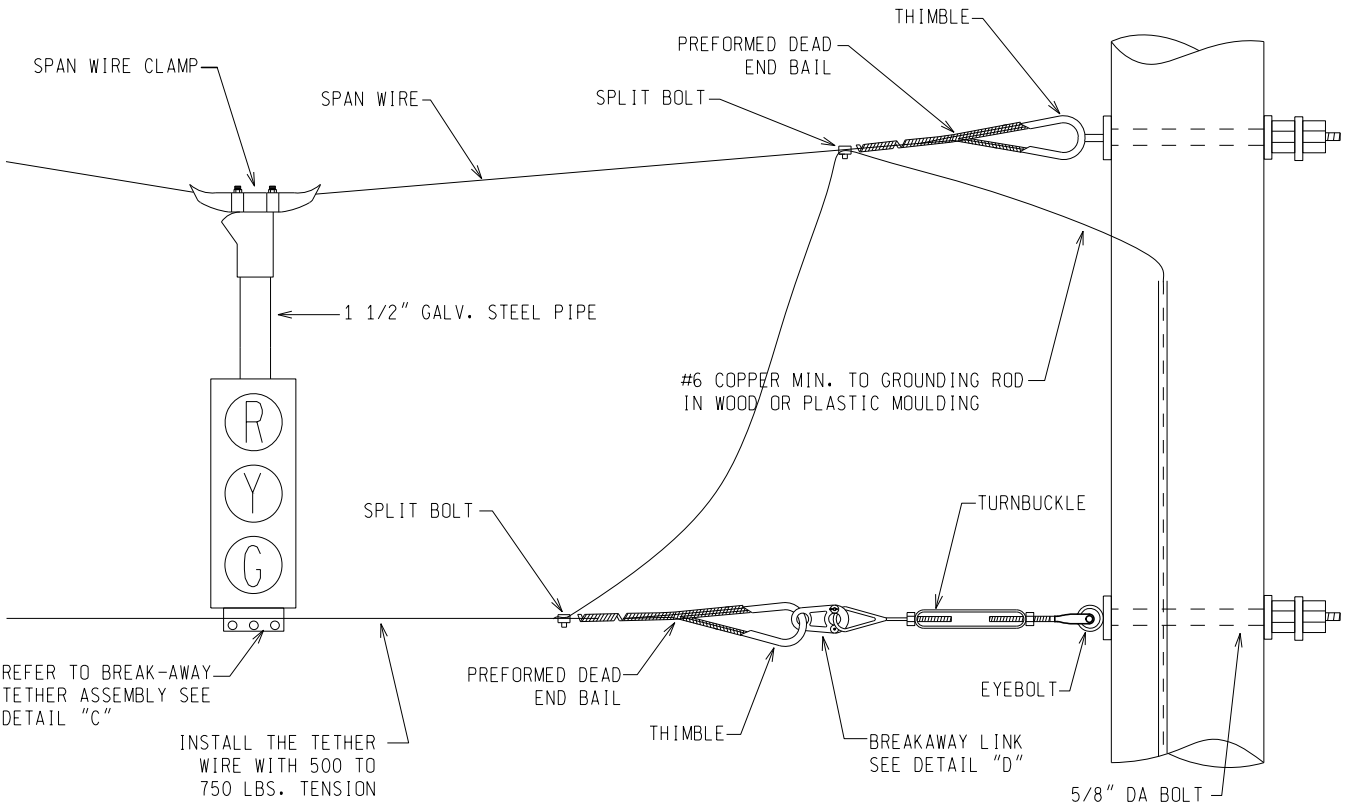
TURNBUCKLE DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-305-C	SHEET 3 of 5
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG305C.dgn Rev. 04/08/19		PLAN DATE		



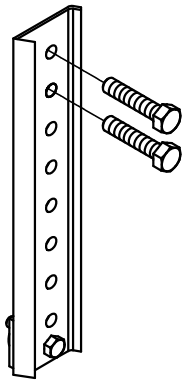
BOTTOM TETHER SPAN WIRE STEEL POLE CONNECTION



BOTTOM TETHER SPAN WIRE WOOD POLE CONNECTION

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-305-C	SHEET 4 of 5
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG305C.dgn Rev. 04/08/19		PLAN DATE		



EXTENDER OPTION 8", 11", 19", 24", & 72"
(CUT TO LENGTH)

NOTES

1. BREAKAWAY LINK AND TURNBUCKLE ARE REQUIRED AT BOTH ENDS OF ALL BOTTOM TETHER SPANS, IF BREAKAWAY LINK BEGINS TO YIELD DURING INSTALLATION, IT SHALL BE REMOVED AND REPLACED. THE WIRE TENSION SHALL BE ADJUSTED TO MINIMIZE MOVEMENT OF SIGNAL HEADS IN HIGH WINDS. TYPICAL TENSION IS 500 TO 750 LBS.

2. INSTALL GROUND WIRE AT BOTH ENDS OF TOP AND BOTTOM TETHERING.

3. IF SIGNAL ORIENTATION IS NOT PERPENDICULAR TO SPAN AND TETHER WIRE, THEN USE AN ANCHOR EXTENSION. CLAMP ASSEMBLY MUST BE ATTACHED TO THE FLAT SIDE OF THE EXTENDER BAR.

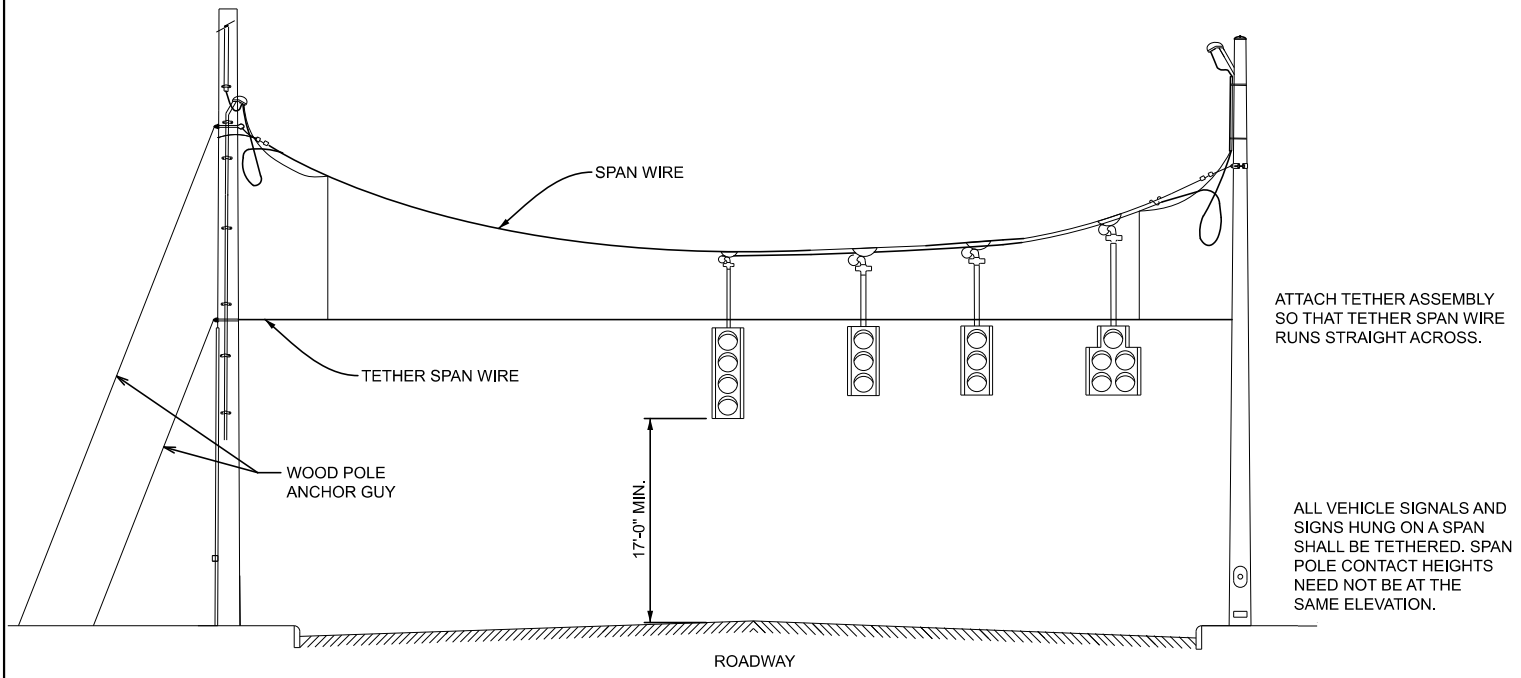
4. BREAKAWAY LINK SHALL YIELD AT 3325 LBS OF TENSION.

5. TETHER WIRE SHALL BE 7-STRAND ASTM A475 HS 1/4 INCH. ON ALL SPANS, INSTALL TETHER HORIZONTALLY. MAINTAIN CLEARANCE OF 17' OVER ROADWAY.

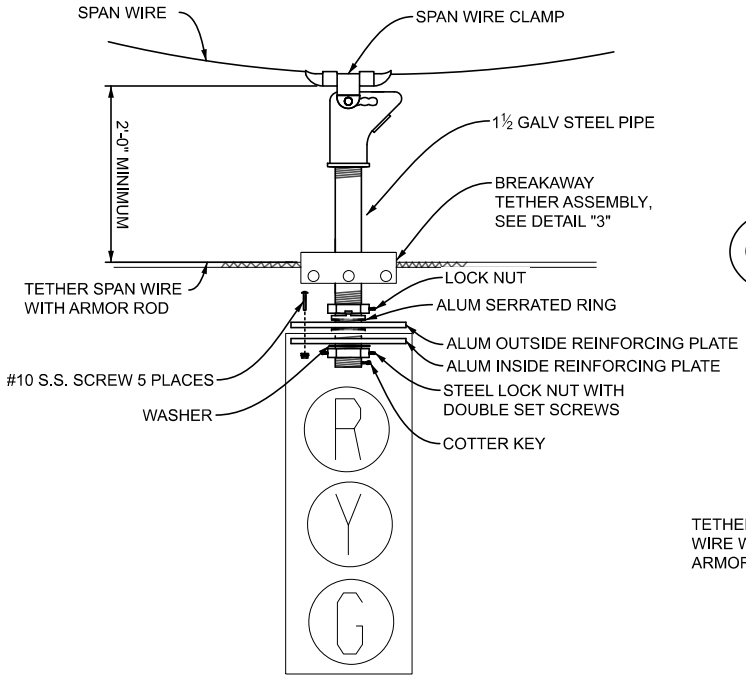
6. GROUNDING WIRE ANCHOR HEIGHT TO THE SPAN WIRE IS ADJUSTED IN THE FIELD BEFORE BREAKAWAY LINK IS INSTALLED. GROUNDING WIRE LENGTH SHALL BE ADJUSTED SO THAT THE MINIMUM VERTICAL CLEARANCE OF THE SAGGING TETHER WIRE ABOVE THE PAVEMENT WITHOUT THE BREAKAWAY LINK INSTALLED IS AT LEAST 14'. GROUNDING WIRE SHALL CONTAIN ENOUGH SLACK FOR HEAD TO SWAY IN HIGH WINDS. GROUNDING WIRE SHALL BE ATTACHED TO THE SPAN WIRE USING A TINNED COPPER SPLIT BOLT.

7. TRAFFIC SIGNAL HOUSING REINFORCEMENT PLATES ARE REQUIRED WHEN TETHERING.
   A. TOP TETHERING REQUIRES REINFORCEMENT PLATES AT THE TOP OF THE POLYCARBONATE HOUSING. (2 PLATES TOTAL)
   B. BOTTOM TETHERING REQUIRES REINFORCEMENT PLATES AT THE TOP AND BOTTOM OF POLYCARBONATE HOUSING. (4 PLATES TOTAL)
   C. BOTTOM TETHERING 5-SECTION HEADS REQUIRES REINFORCEMENT PLATES ON THE TOP AND BOTTOM OF THE POLYCARBONATE HOUSING (8 TOTAL) AND AN ALUMINUM TRI-STUD UPPER ARM ASSEMBLY IN PLACE OF THE BOTTOM BRACKET.
   D. IF POLYCARBONATE HOUSING CONNECTS TO AN ALUMINUM CASE SIGN, REINFORCEMENT PLATES MUST BE USED AT THE CONNECTION.

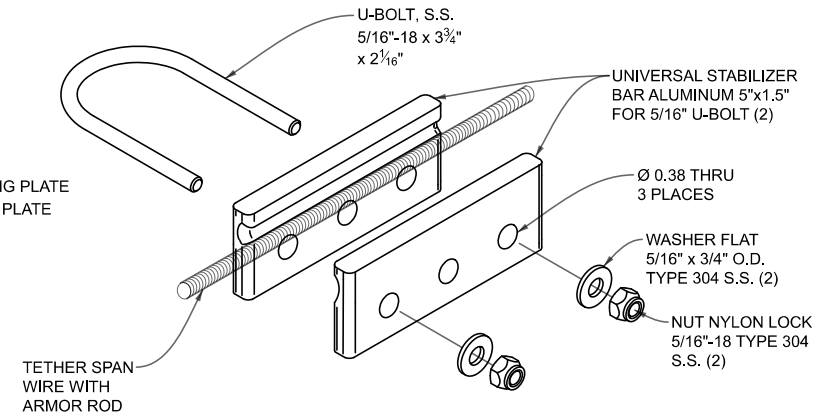
NOT TO SCALE



1 DETAIL - TOP TETHER



2 DETAIL - SPAN WIRE INSTALLATION



3 DETAIL - BREAKAWAY TETHER ASSEMBLY FOR TOP OF SIGNAL HEAD

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

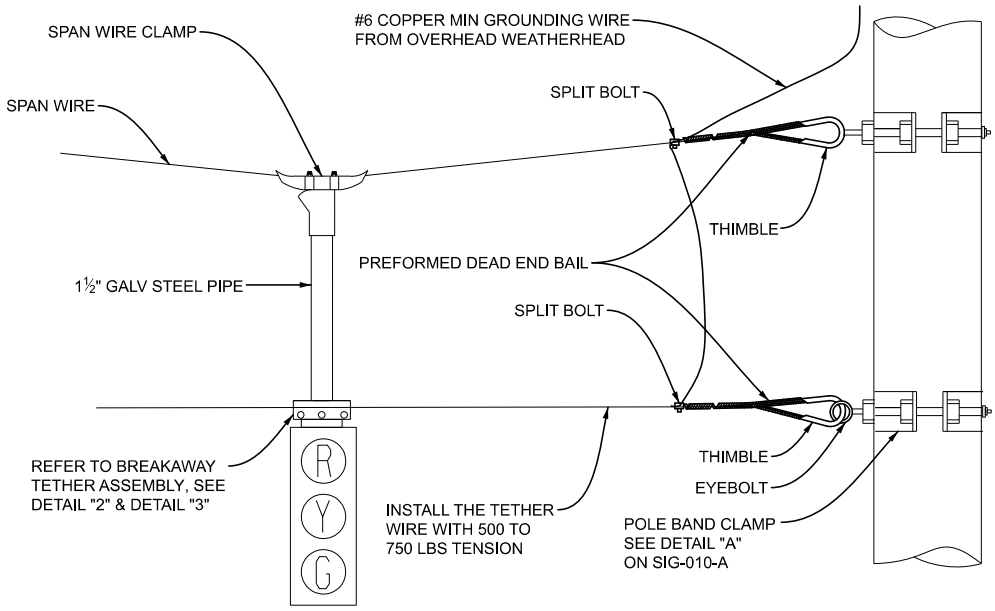
APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MDOT
Michigan Department of Transportation

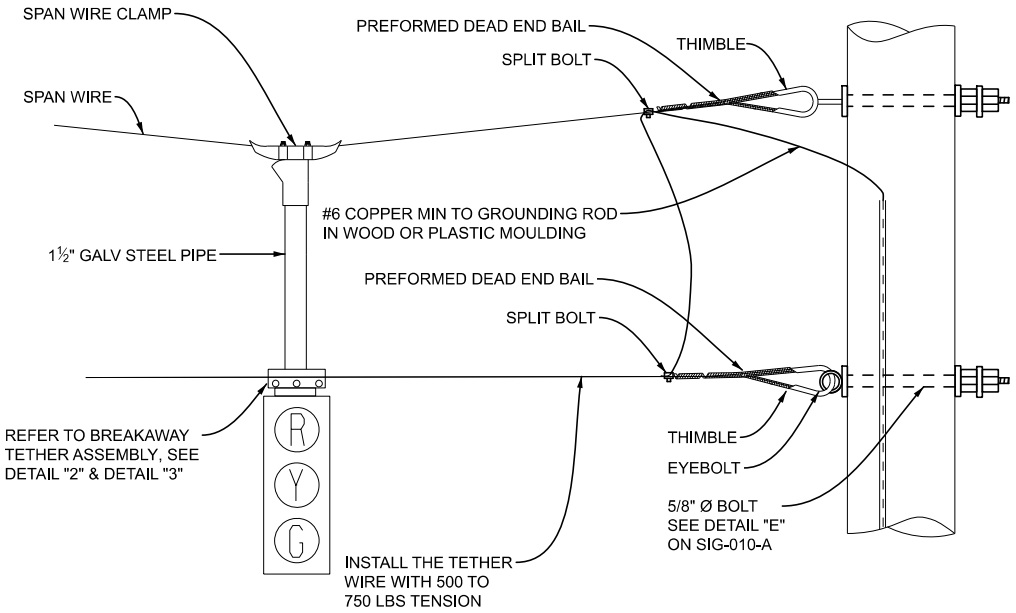
DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
SPAN WIRE TOP TETHER DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-305-D	SHEET 1 OF 5



4 TOP TETHER SPAN WIRE STEEL POLE CONNECTION



5 TOP TETHER SPAN WIRE WOOD POLE CONNECTION

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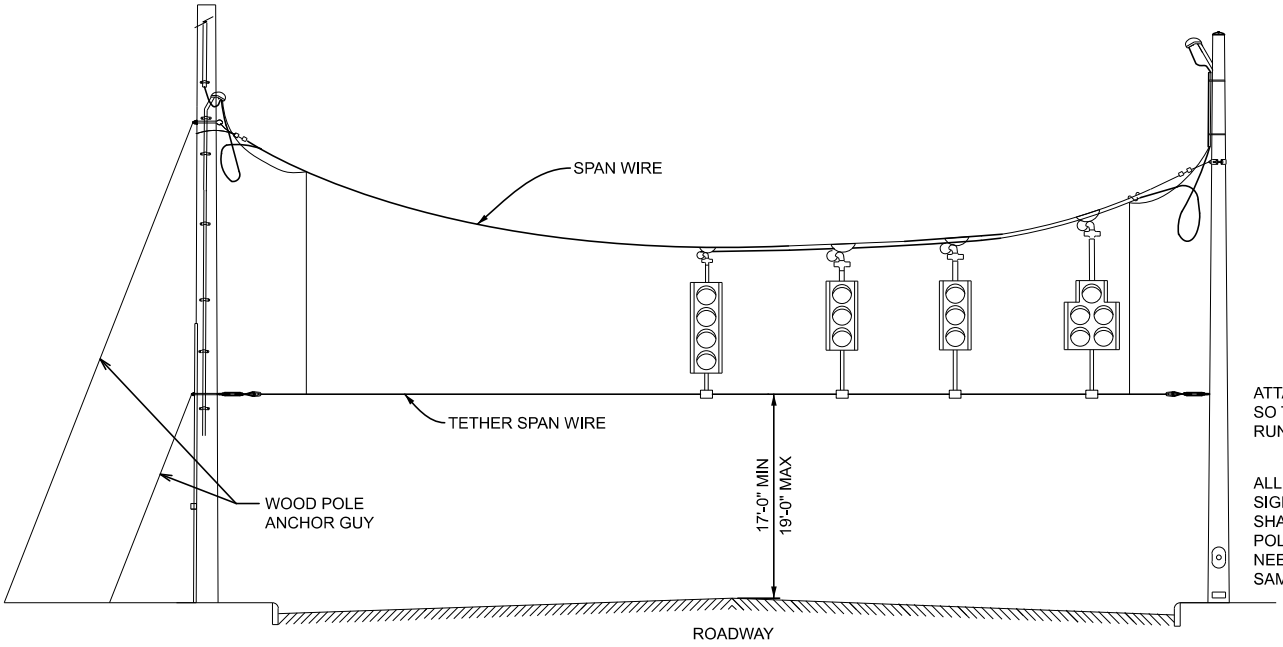
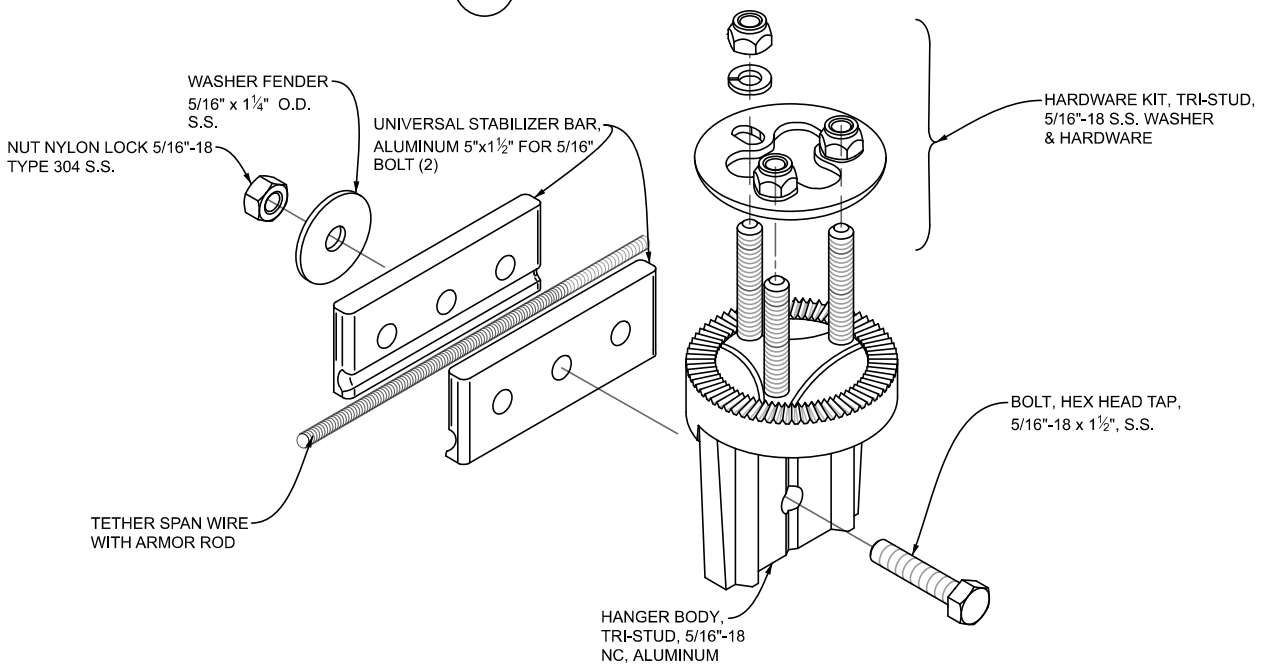
DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
TOP TETHER CONNECTION DETAILS

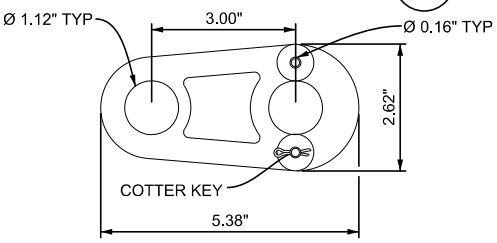
(SPECIAL DETAIL)	07/27/23	SIG-305-D	SHEET
FHWA APPROVAL	PLAN DATE		2 OF 5
			SECT



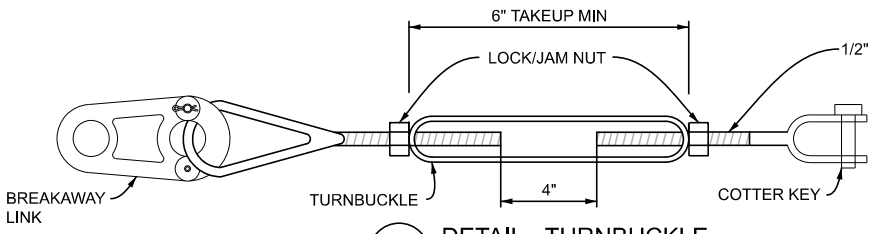
6 BOTTOM TETHER INSTALLATION



7 DETAIL - TETHER ASSEMBLY TRI-STUD BREAKAWAY

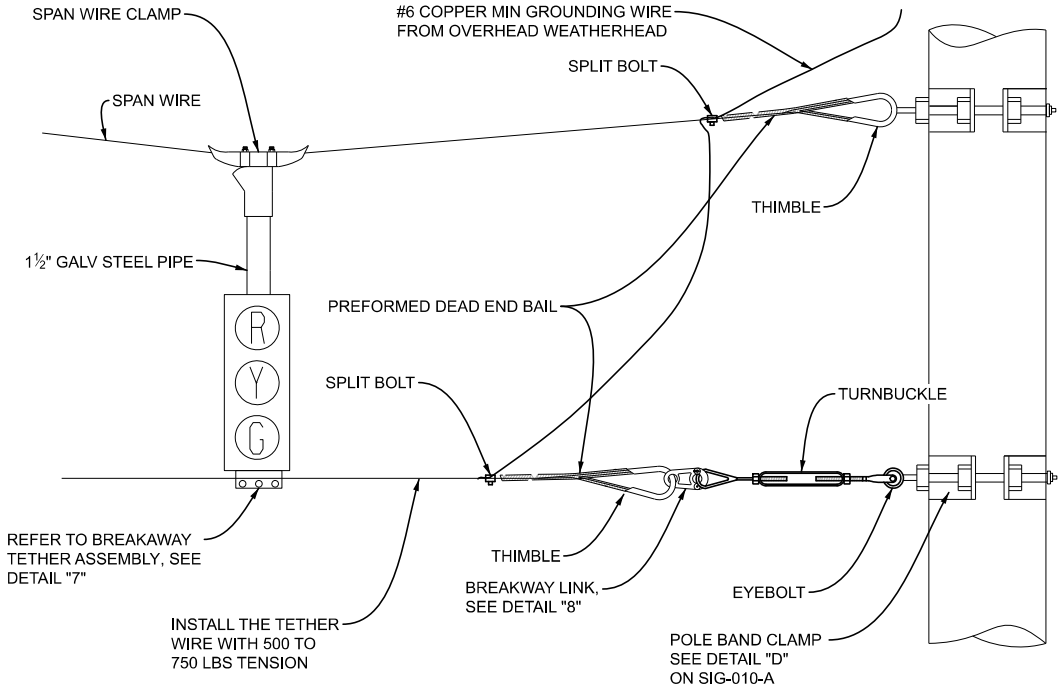


8 DETAIL - BREAKAWAY TETHER ASSEMBLY FOR BOTTOM OF SIGNAL HEAD

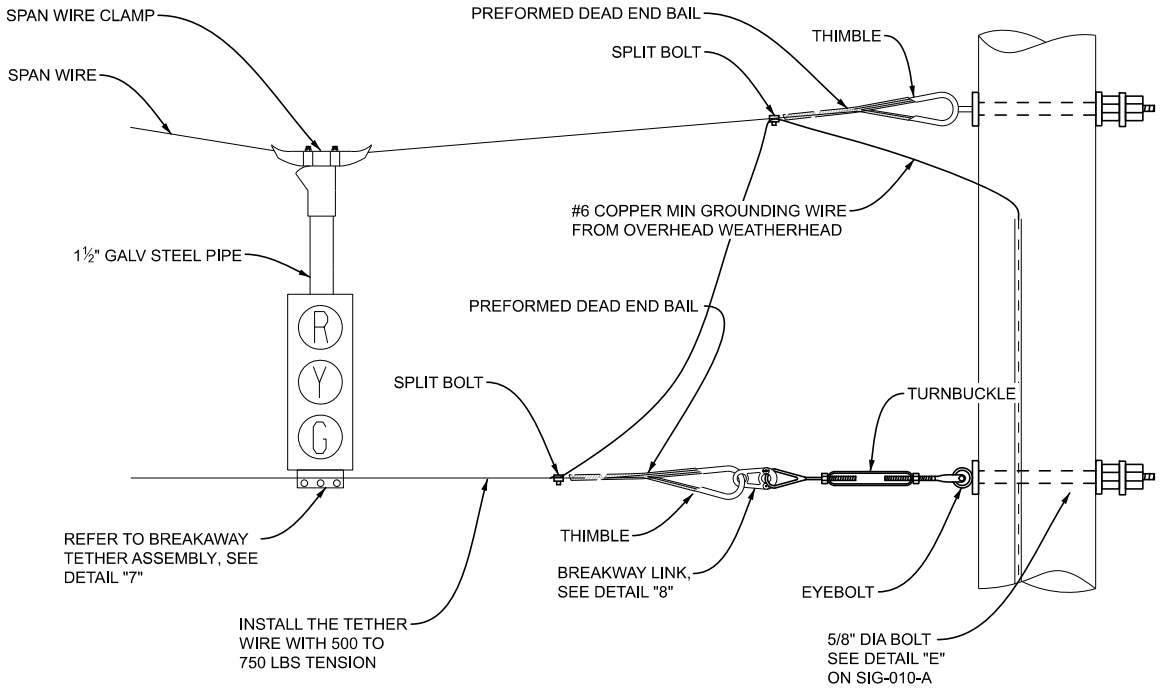


9 DETAIL - TURNBUCKLE

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SPAN WIRE BOTTOM TETHER DETAILS		
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-305-D	SHEET 3 OF 5



10 BOTTOM TETHER SPAN WIRE STEEL POLE CONNECTION



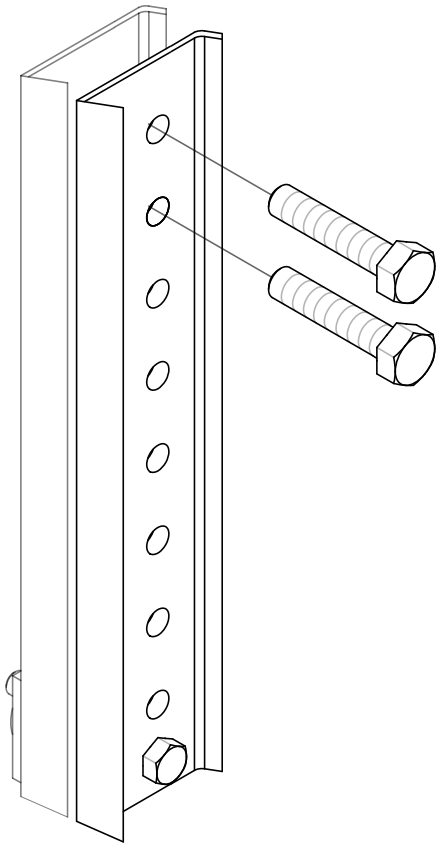
11 BOTTOM TETHER SPAN WIRE WOOD POLE CONNECTION

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
BOTTOM TETHER CONNECTION DETAILS

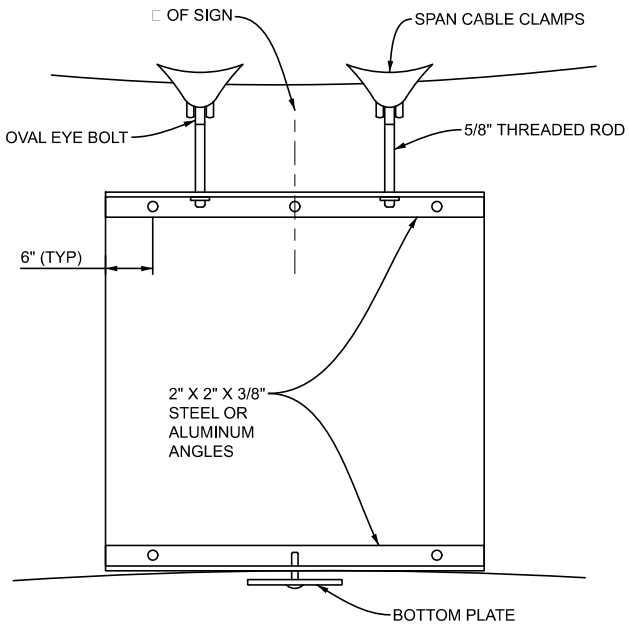
(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-305-D	SHEET 4 OF 5
			SECT



12 EXTENDER OPTION 8", 11", 19", 24", & 72 (CUT TO LENGTH)

NOTES:

1. BREAKAWAY LINK AND TURNBUCKLE ARE REQUIRED AT BOTH ENDS OF ALL BOTTOM TETHER SPANS. IF BREAKAWAY LINK BEGINS TO YIELD DURING INSTALLATION, IT SHALL BE REMOVED AND REPLACED. THE WIRE TENSION SHALL BE ADJUSTED TO MINIMIZE MOVEMENT OF SIGNAL HEADS IN HIGH WINDS. TYPICAL TENSION IS 500 TO 750 LBS.
2. INSTALL GROUND WIRE AT BOTH ENDS OF TOP AND BOTTOM TETHERING.
3. IF SIGNAL ORIENTATION IS NOT PERPENDICULAR TO SPAN AND TETHER WIRE, THEN USE AN ANCHOR EXTENSION. CLAMP ASSEMBLY MUST BE ATTACHED TO THE FLAT SIDE OF THE EXTENDER BAR.
4. GROUNDING WIRE ANCHOR HEIGHT TO THE SPAN WIRE IS ADJUSTED IN THE FIELD BEFORE BREAKAWAY LINK IS INSTALLED. GROUNDING WIRE LENGTH SHALL BE ADJUSTED SO THAT THE MINIMUM VERTICAL CLEARANCE OF THE SAGGING TETHER WIRE ABOVE THE PAVEMENT WITHOUT THE BREAKAWAY LINK INSTALLED IS AT LEAST 14'. GROUNDING WIRE SHALL CONTAIN ENOUGH SLACK FOR HEAD TO SWAY IN HIGH WINDS. GROUNDING WIRE SHALL BE ATTACHED TO THE SPAN WIRE USING A TINNED COPPER SPLIT BOLT.
5. TRAFFIC SIGNAL HOUSING REINFORCEMENT PLATES ARE REQUIRED WHEN TETHERING.
   - A. TOP TETHERING REQUIRES REINFORCEMENT PLATES AT THE TOP OF THE POLYCARBONATE HOUSING. (2 PLATES TOTAL)
   - B. BOTTOM TETHERING REQUIRES REINFORCEMENT PLATES AT THE TOP AND BOTTOM OF POLYCARBONATE HOUSING. (4 PLATES TOTAL)
   - C. BOTTOM TETHERING 5-SECTION HEADS REQUIRES REINFORCEMENT PLATES ON THE TOP AND BOTTOM OF THE POLYCARBONATE HOUSING (12 TOTAL) AND AN ALUMINUM TRI-STUD UPPER ARM ASSEMBLY IN PLACE OF THE BOTTOM BRACKET.
   - D. IF POLYCARBONATE HOUSING CONNECTS TO AN ALUMINUM CASE SIGN, REINFORCEMENT PLATES MUST BE USED AT THE CONNECTION.



13 DETAIL - OVERHEAD LANE ASSIGNMENT SIGN CONNECTION

NOTES:

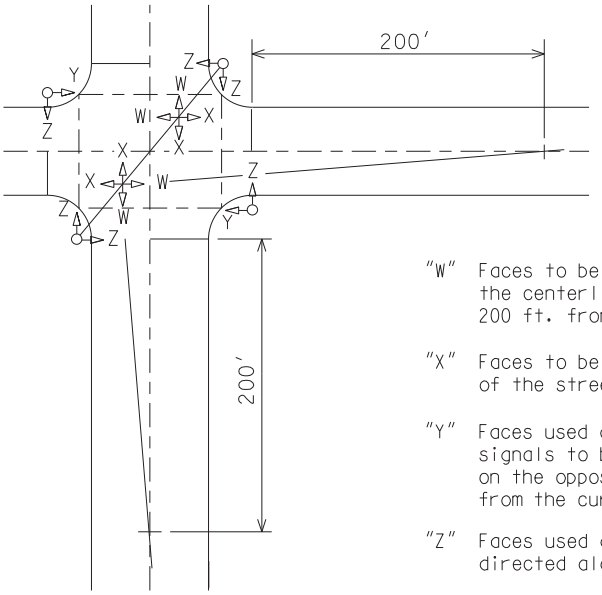
1. ALUMINUM ANGLES SHALL BE USED FOR ALUMINUM SIGNS (TYPE III).
2. STEEL OR ALUMINUM ANGLES MAY BE USED ON PLYWOOD SIGNS (TYPE II).

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
EXTENDER OPTION AND OVERHEAD LANE ASSIGNMENT SIGN CONNECTION DETAILS

(SPECIAL DETAIL) FHWA APPROVAL	07/27/23 PLAN DATE	SIG-305-D	SHEET 5 OF 5



NOTE:
Where field conditions require deviation from these standards, Engineer will furnish specific directional setting for signals at time of installation.

"W" Faces to be directed to intersect a point on the centerline of the street they control 200 ft. from the stop bar.

"X" Faces to be directed parallel to the centerline of the street they control.

"Y" Faces used as starting signals with near side signals to be directed to intersect a point on the opposite stop bar approximately 4 ft. from the curb.

"Z" Faces used as pedestrian signals to be directed along crosswalks.

DIAGONAL SPAN WIRE STANDARD FOR DIRECTIONAL SETTINGS OF TRAFFIC SIGNALS

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG310A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

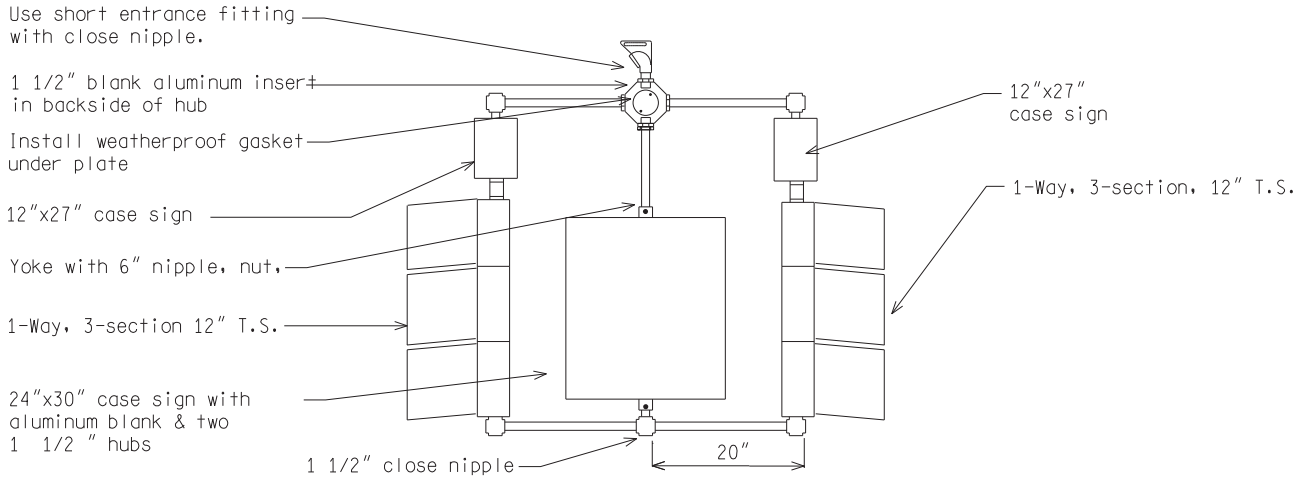
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

ALIGNMENT OF TRAFFIC SIGNAL HEADS (DIAGONAL)

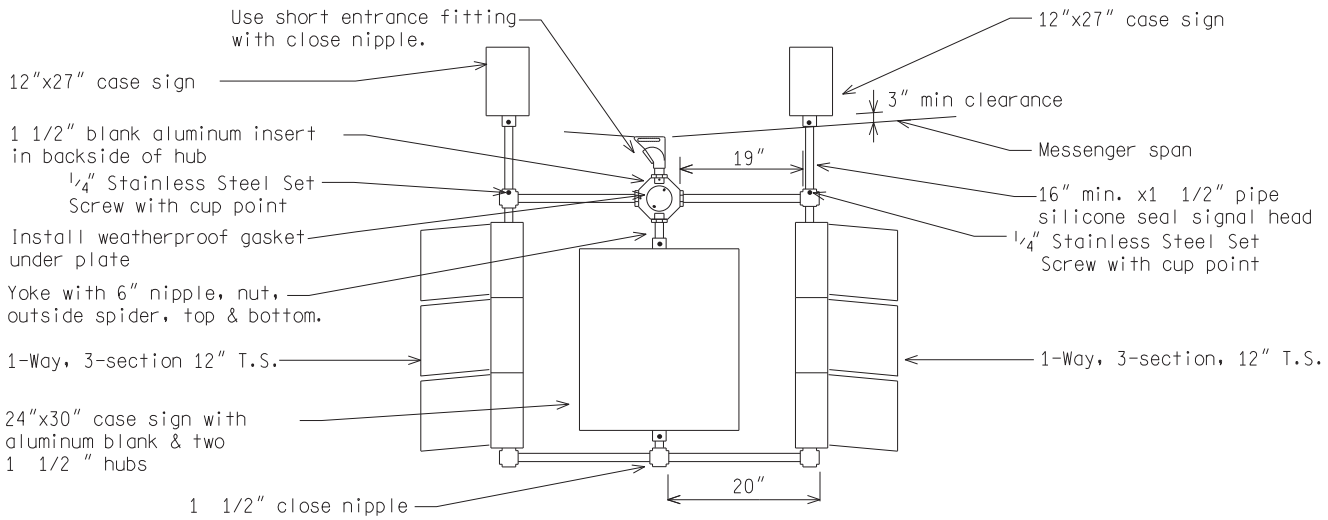
PLAN DATE

SIG-310-A

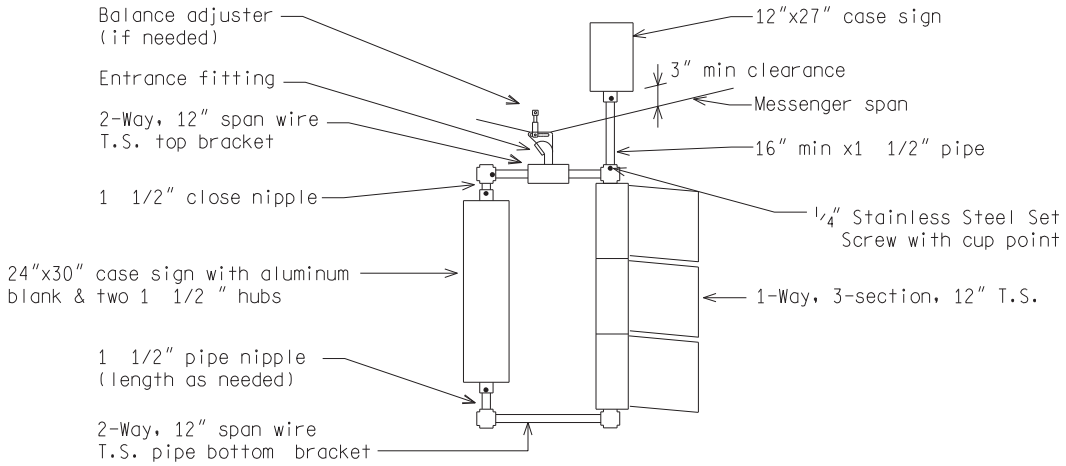
SHEET 1 of 1



PREFERRED METHOD 2-WAY T.S./CASE SIGN COMBINATION BELOW HUB



(ALTERNATE) 2-WAY T.S./CASE SIGN COMBINATION ABOVE HUB



1-WAY T.S./CASE SIGN COMBINATION ABOVE HUB

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG311A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

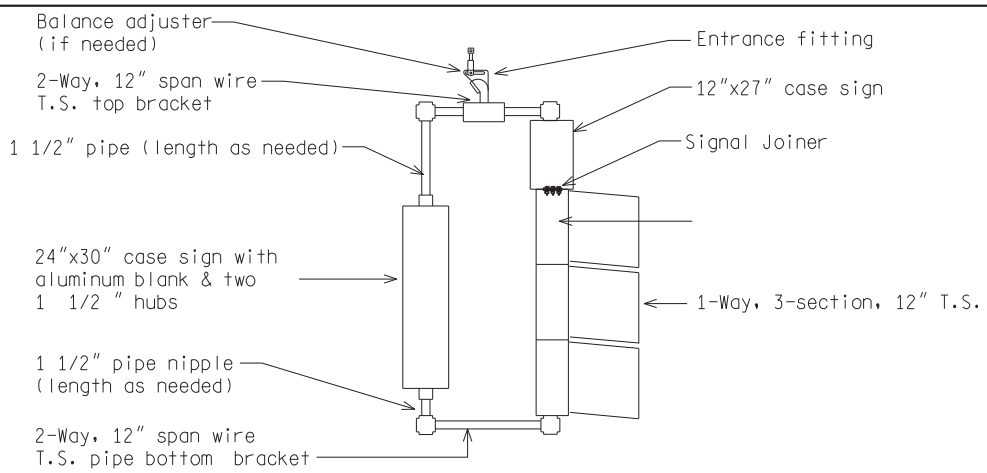
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

BRACKETING FOR SIGNAL HEAD/CASE SIGN COMBINATIONS

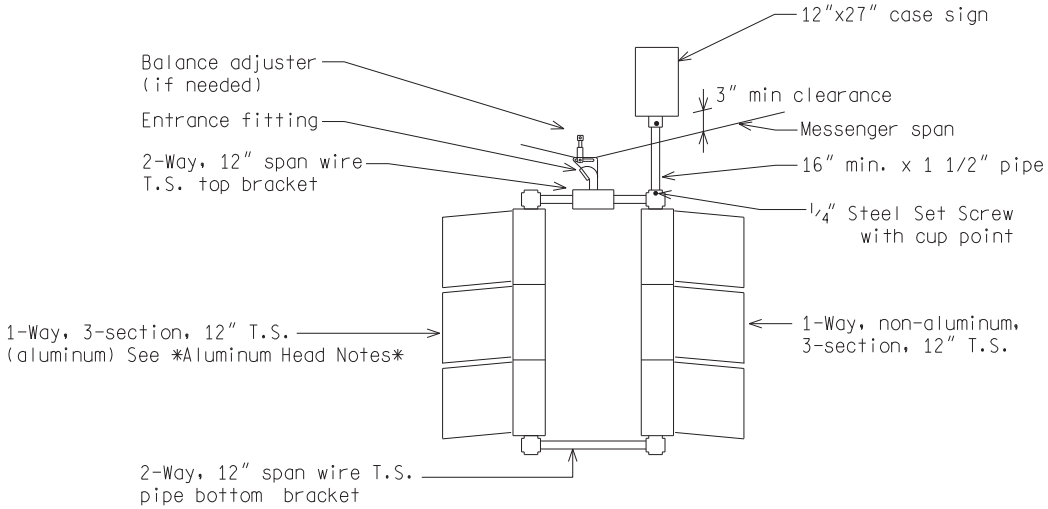
PLAN DATE

SIG-311-A

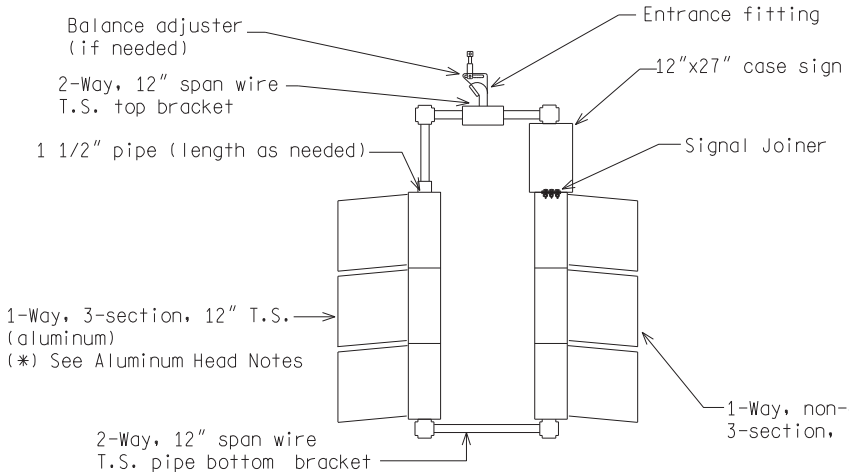
SHEET 1 of 5



1-WAY T.S./CASE SIGN COMBINATION BELOW HUB



1-WAY (ALUMINUM) & 1-WAY T.S./CASE SIGN COMBINATION ABOVE HUB



(*) Aluminum Head Notes:

6) Traffic signals must conform to the requirements of the current ITE publication "Vehicle Traffic Control Signal Heads."

7) Provide cast alum. alloy housings with a 2" diam. hole top & bottom to receive 1 1/2" supporting pipe.

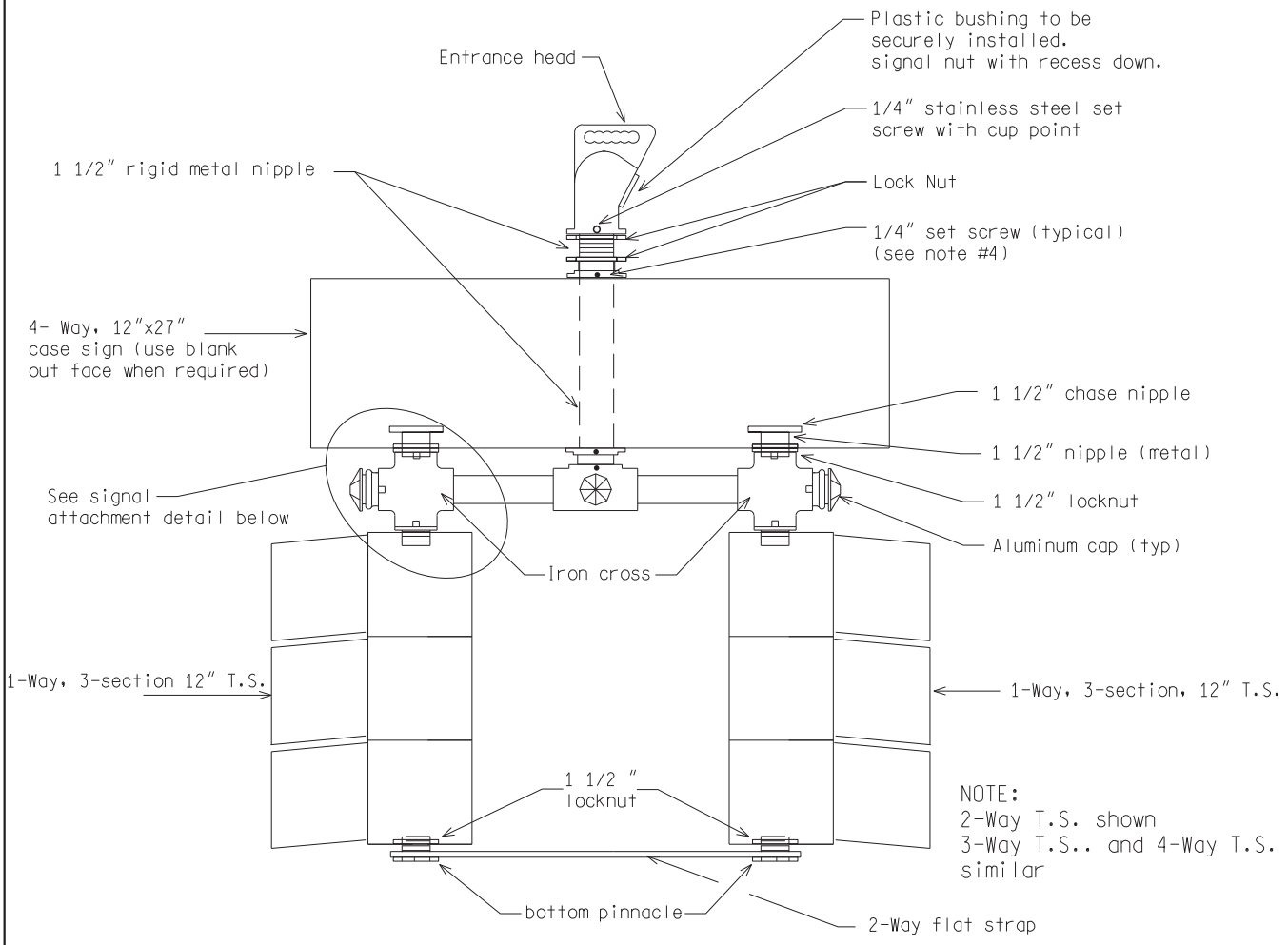
8) Provide a detachable, sheet alum. visor (min. 0.057" thick), for each signal indication.

9) Provide twist on slots for visor mounting that are either in the visor or on the tabs formed on the visor.

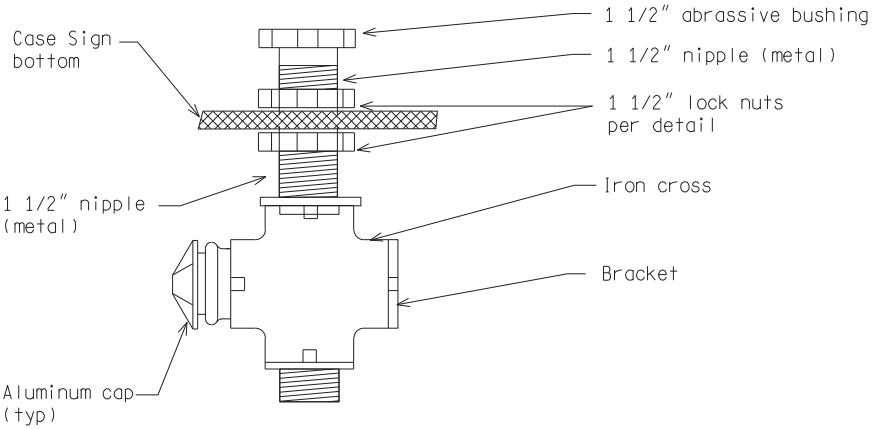
1-WAY (ALUMINUM) & 1-WAY T.S./CASE SIGN COMBINATION BELOW HUB

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG311A.dgn Rev. 02/16/17		PLAN DATE	SIG-311-A	SHEET 2 of 5



SPAN WIRE MOUNTED T.S. BRACKET ASSEMBLY WITH 4-WAY CASE SIGN COMBINATION BELOW HUB

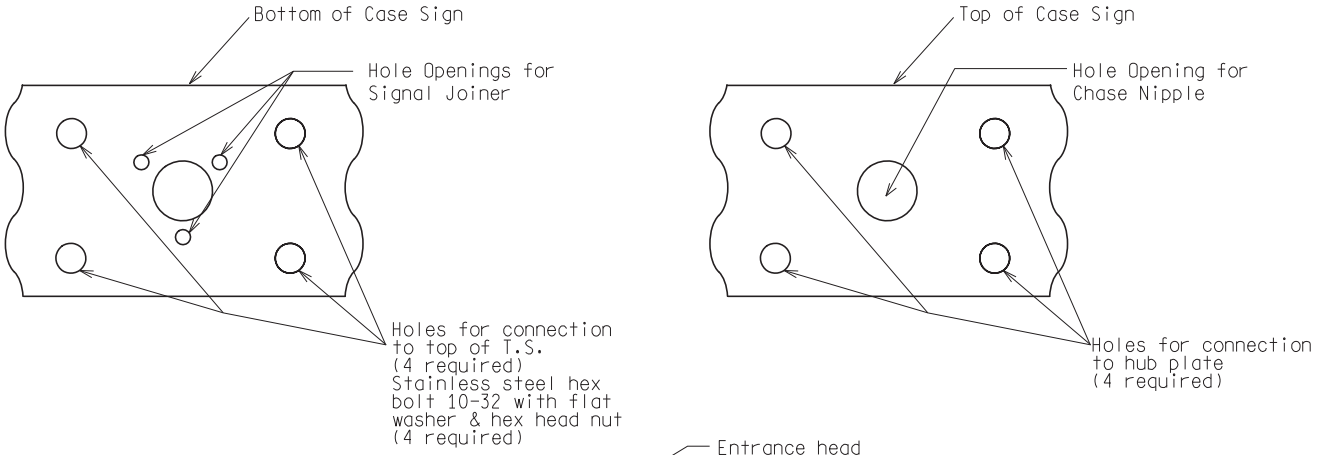


SIGNAL ATTACHMENT DETAIL

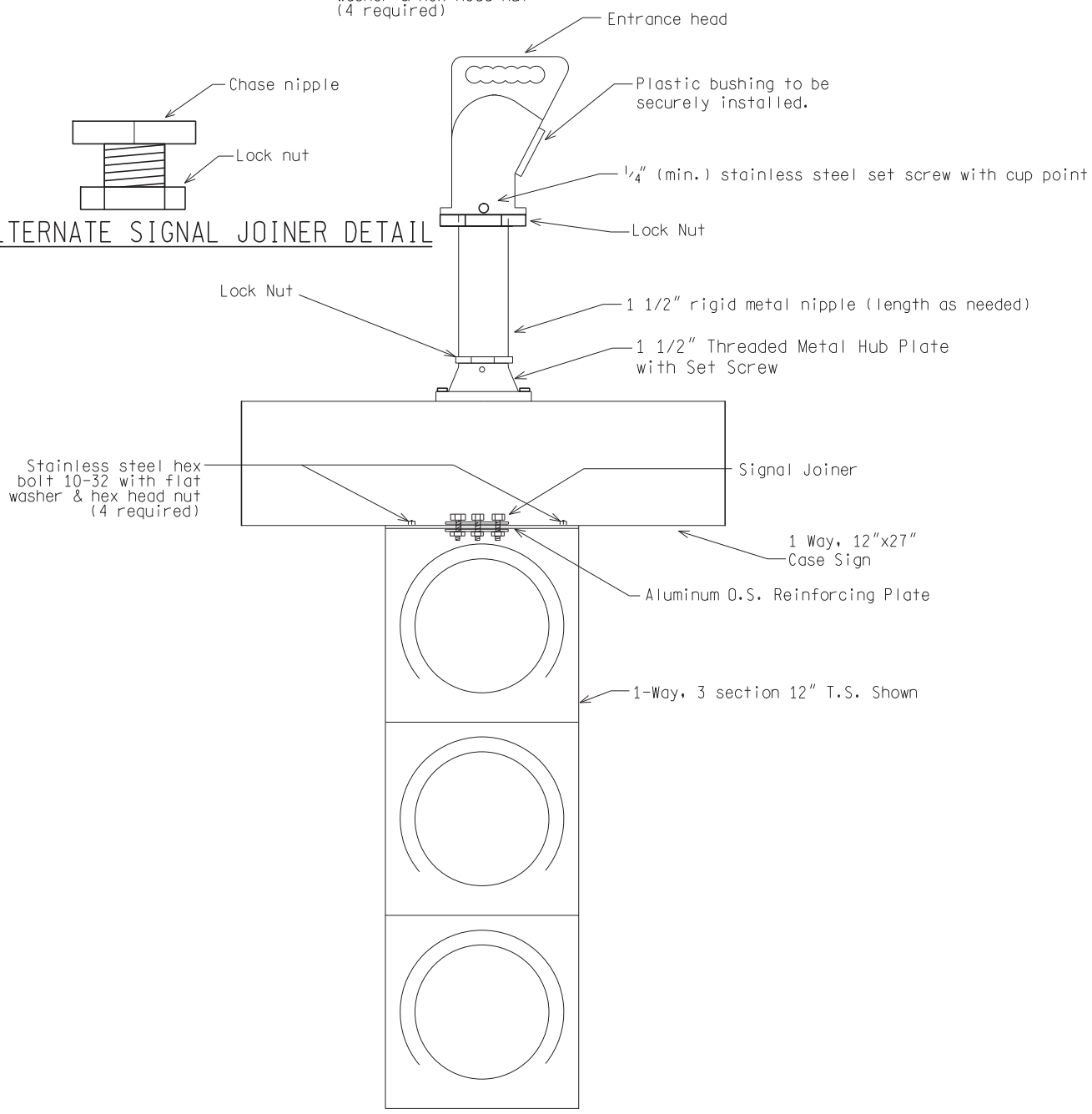
NOTES for all details:
1) All pipe sizes include thread.
2) Install pinnacles in all unused openings in hubs, crosses & tees.
3) 4-Way case sign legend to be as shown on plans.
4) Denotes 1/4" stainless steel set screw (typical)
5) Apply silicon sealant to the fittings on the top of case signs, and the top and bottom connections of signal heads

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG311A.dgn Rev. 02/16/17		PLAN DATE	SIG-311-A	SHEET 3 of 5



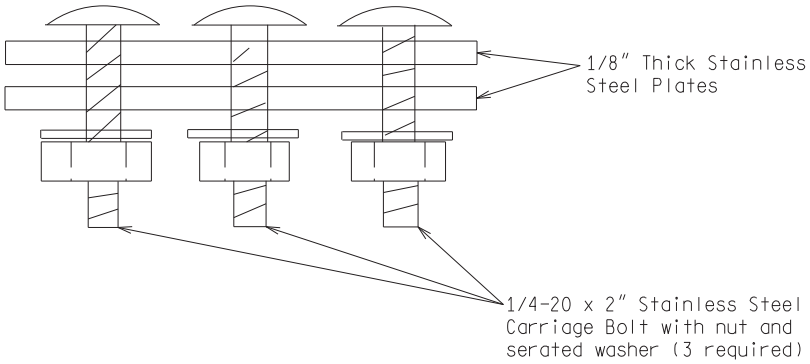
ALTERNATE SIGNAL JOINER DETAIL

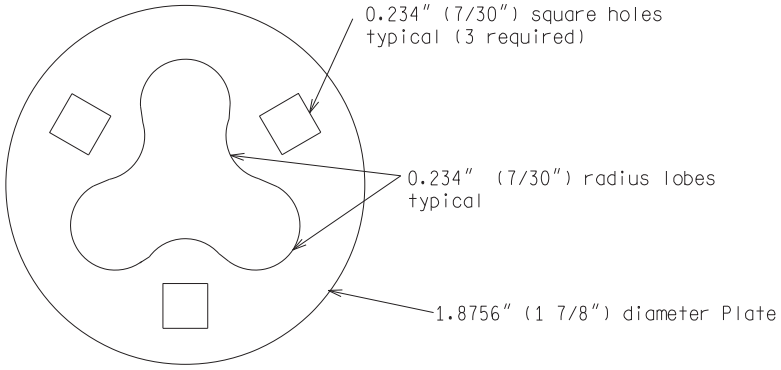


T.S. MOUNTED BELOW CASE SIGN

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG311A.dgn Rev. 02/16/17		PLAN DATE	SIG-311-A	SHEET 4 of 5



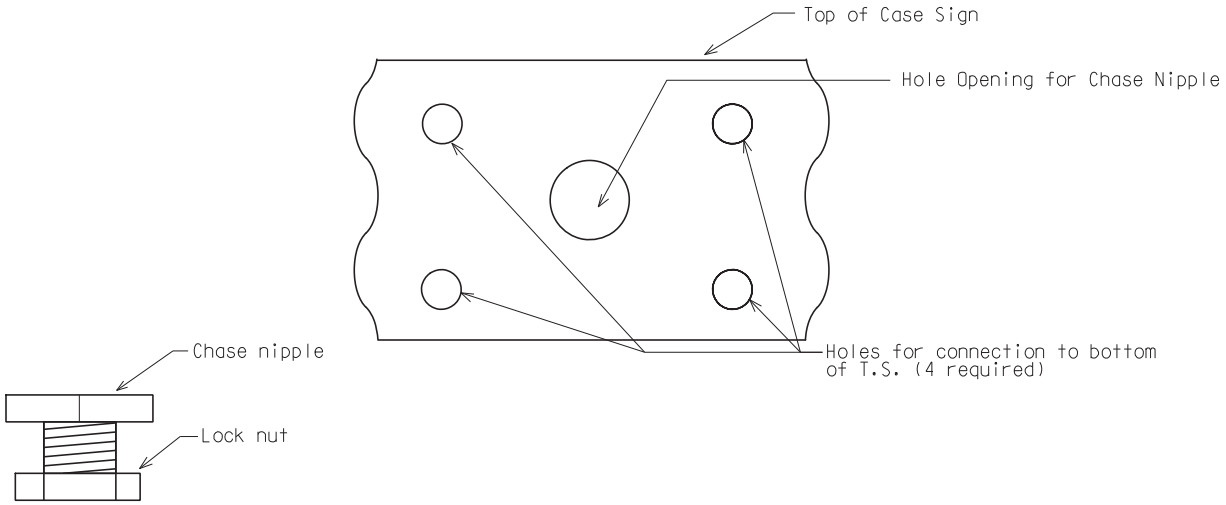


1/8" Thick Steel Plate

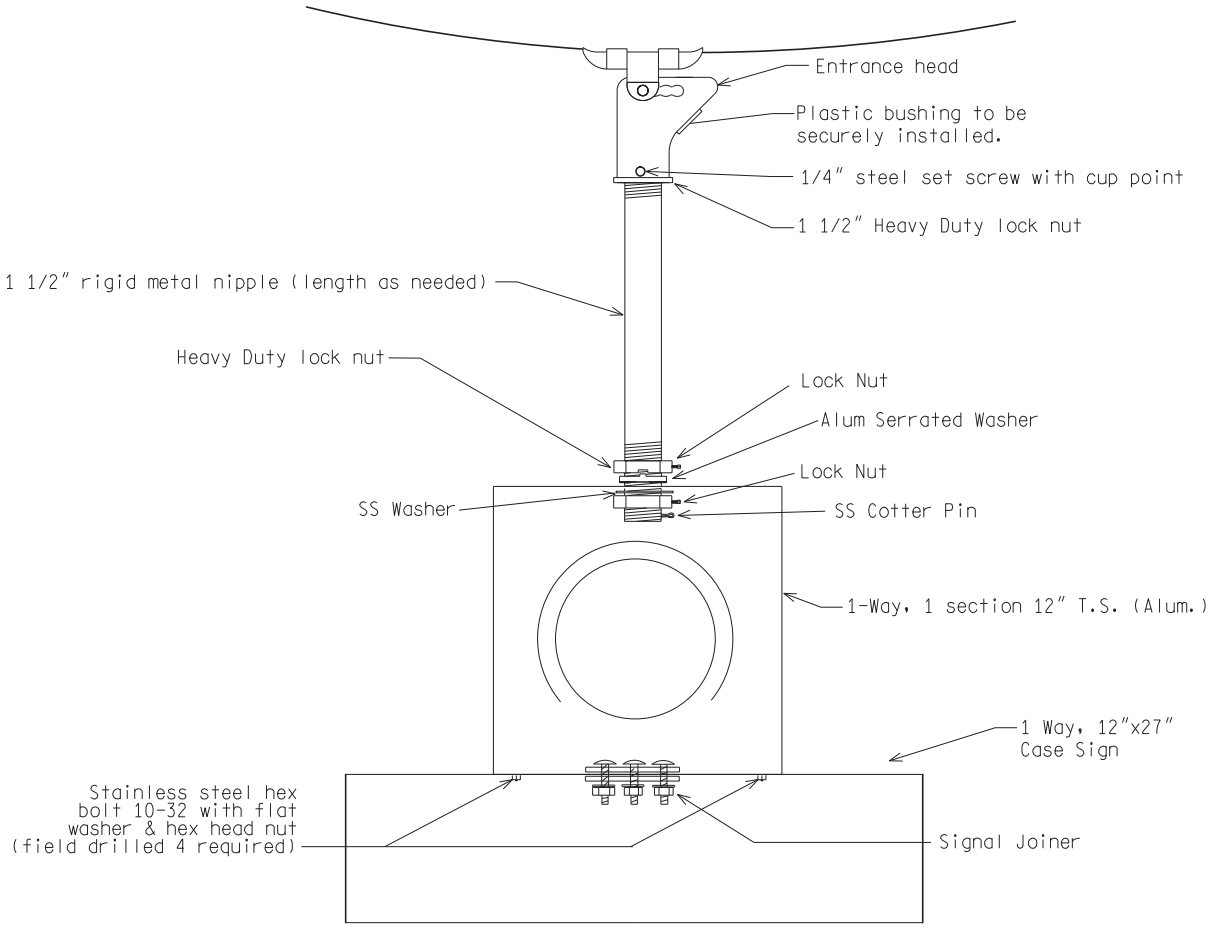
SIGNAL JOINER

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-311-A	SHEET 5 of 5
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG311A.dgn Rev. 02/16/17		PLAN DATE		



ALTERNATE SIGNAL JOINER DETAIL



T.S. MOUNTED ON CASE SIGN

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG312A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

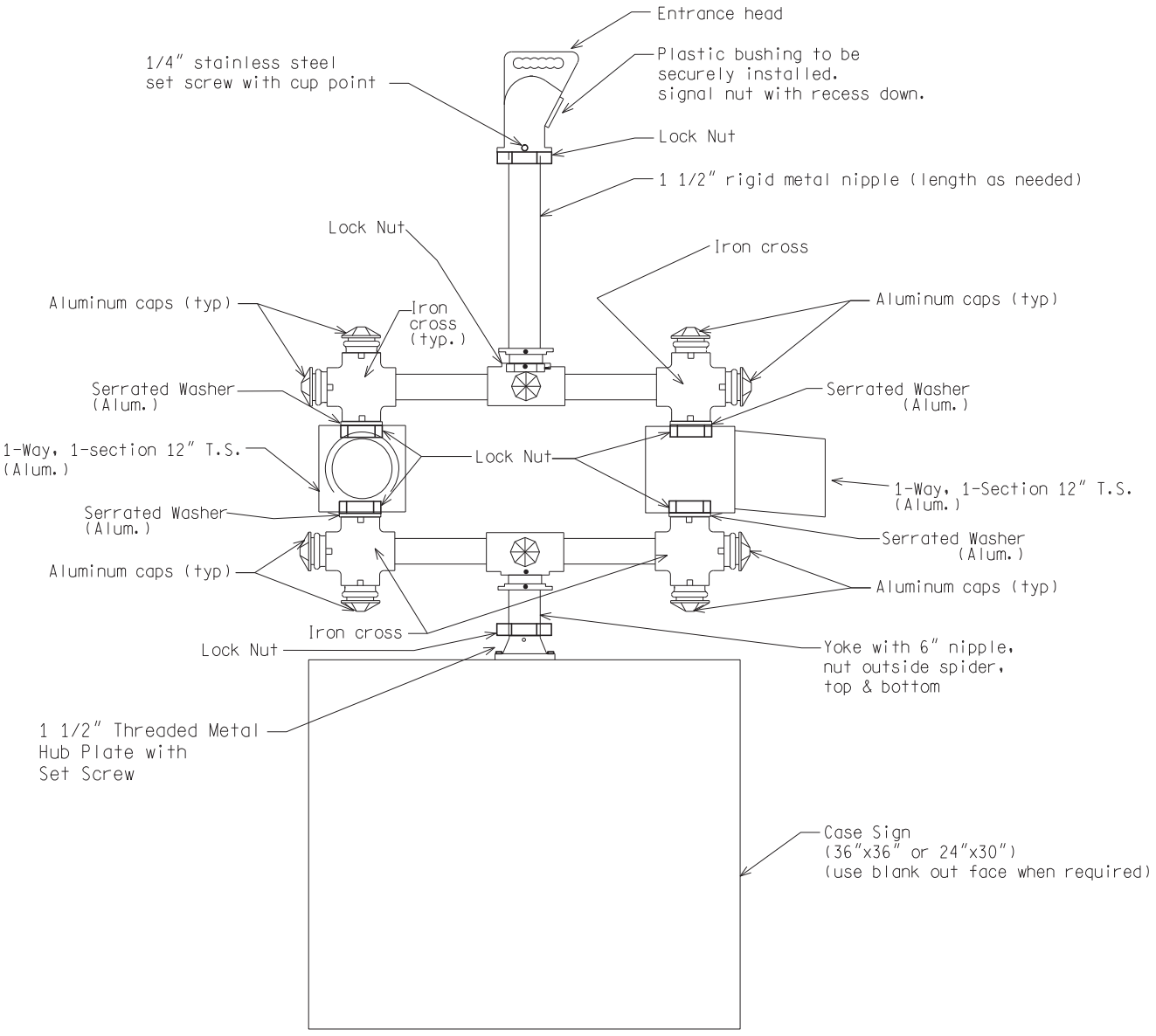
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

BRACKETING FOR FLASHING BEACON/CASE SIGN COMBINATIONS

PLAN DATE

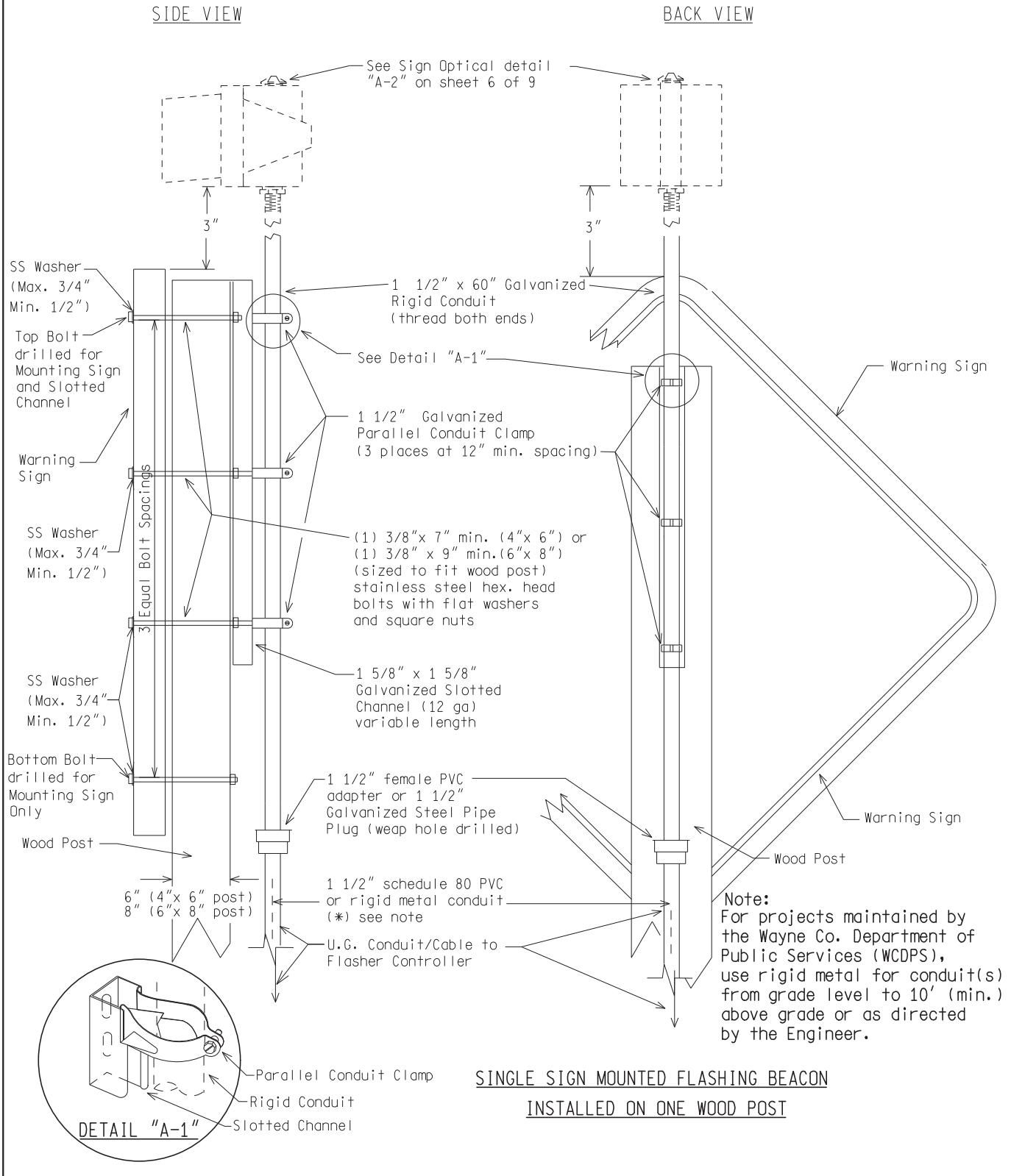
SIG-312-A

SHEET 1 of 2



NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG312A.dgn Rev. 02/16/17		PLAN DATE	SIG-312-A	SHEET 2 of 2



SINGLE SIGN MOUNTED FLASHING BEACON
INSTALLED ON ONE WOOD POST

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

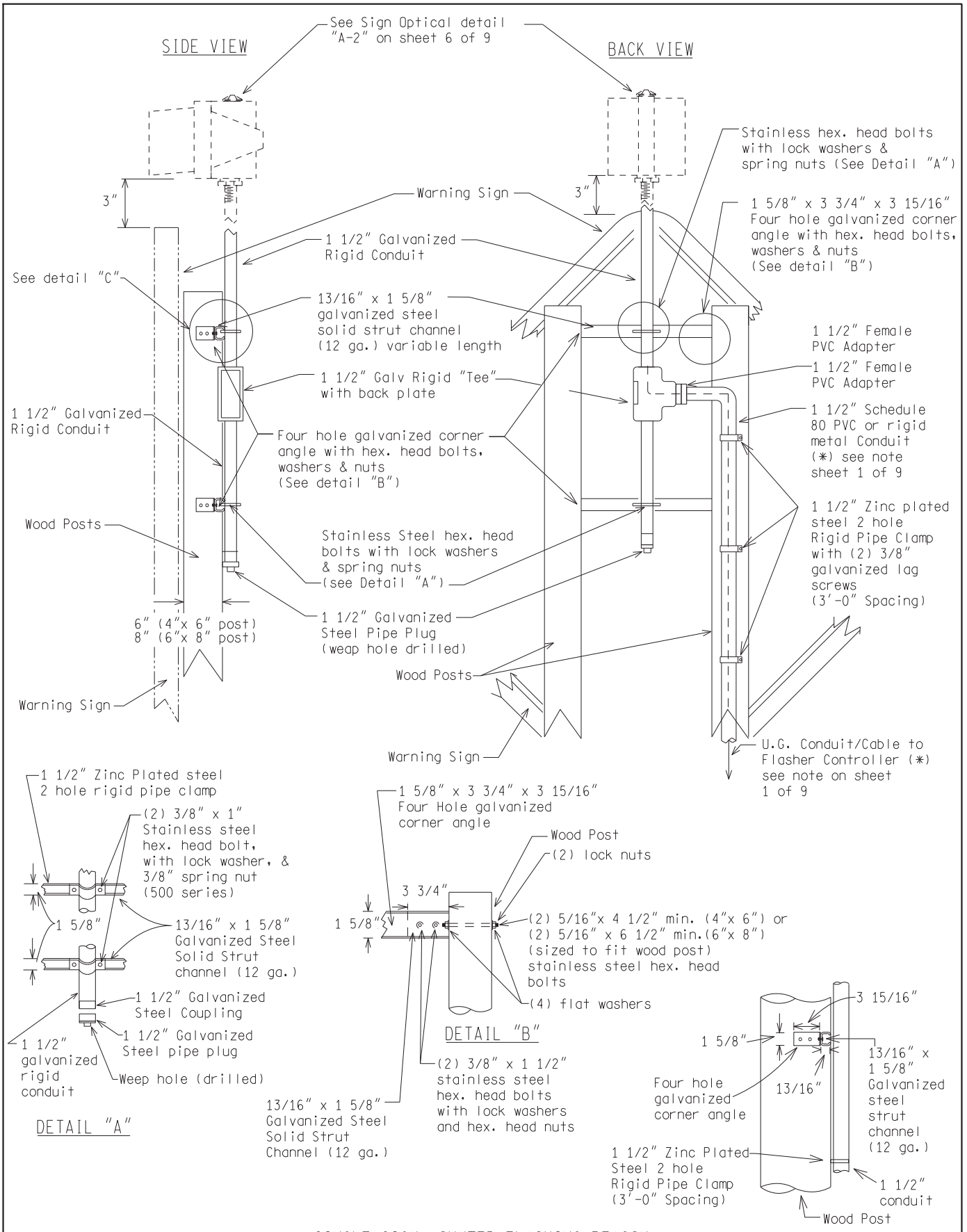
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

SIGN MOUNTED BEACON

PLAN DATE

SIG-320-A

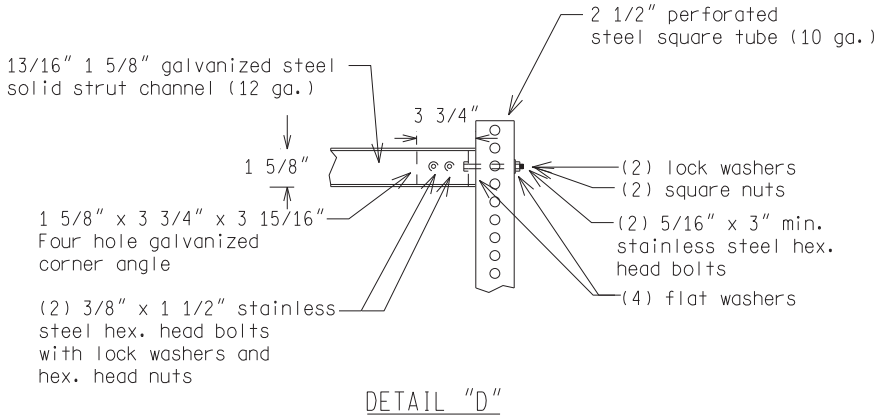
SHEET 1 of 9



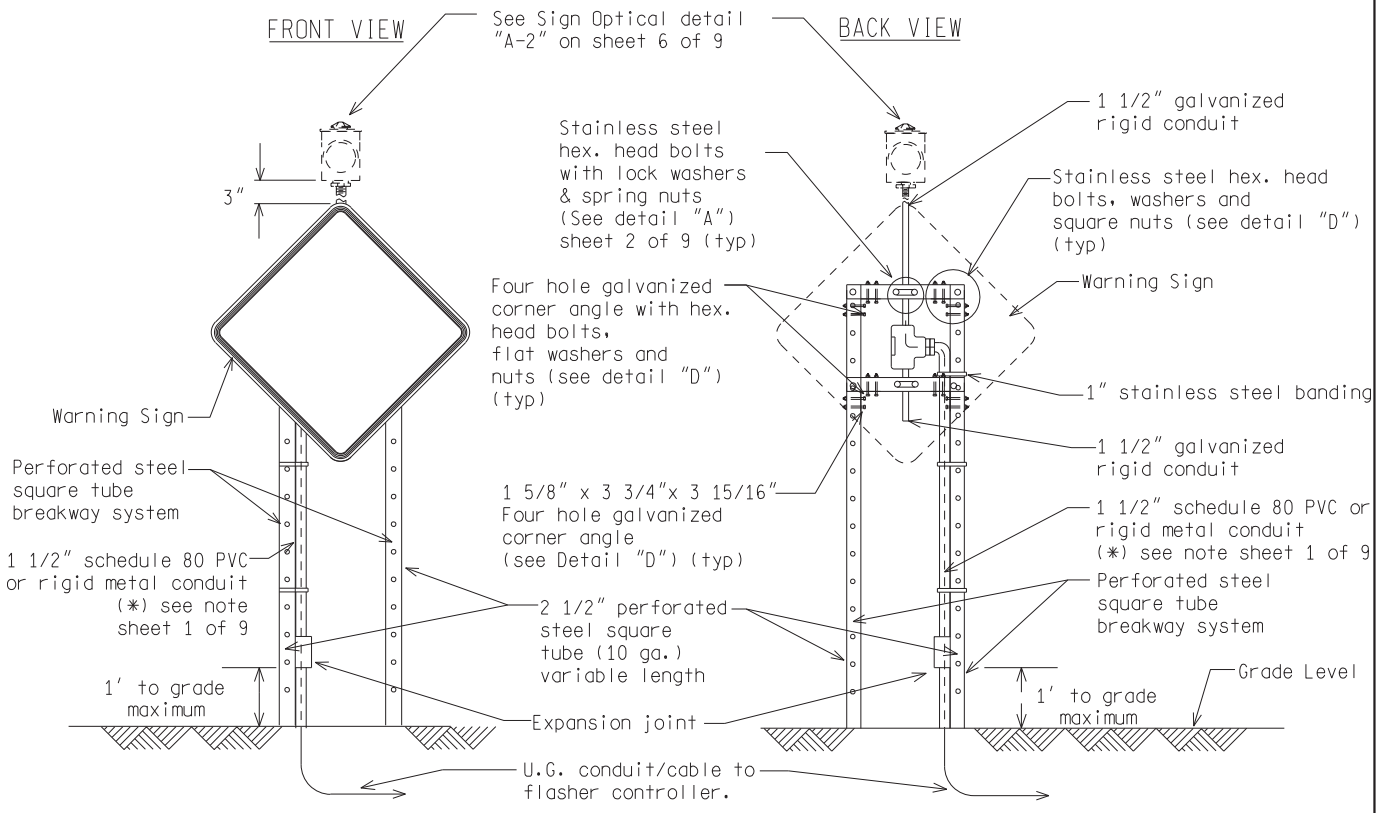
SINGLE SIGN MOUNTED FLASHING BEACON
INSTALLED ON TWO WOOD POSTS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE	SIG-320-A	SHEET 2 of 9



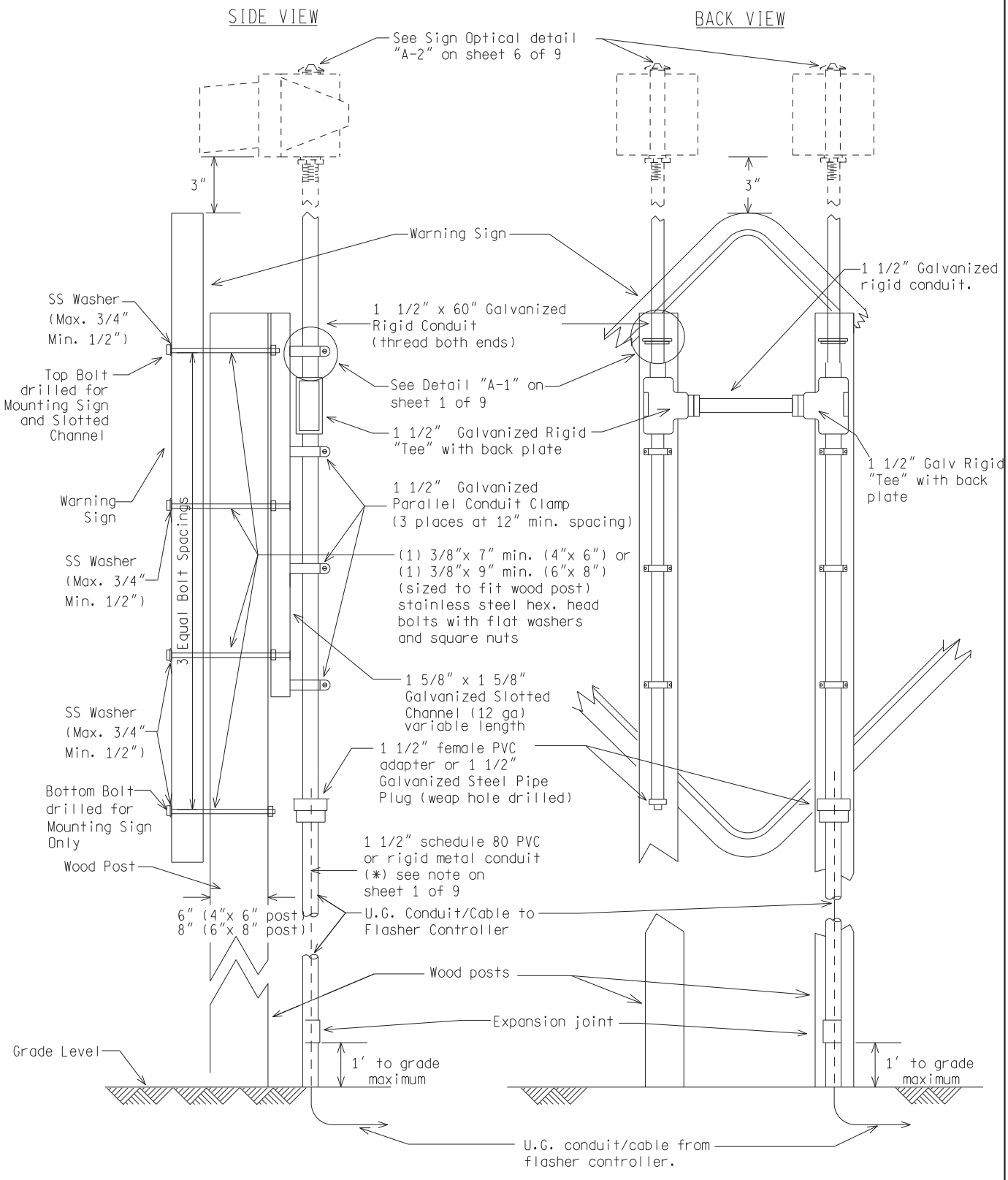
DETAIL "D"



SINGLE SIGN MOUNTED FLASHING BEACON
INSTALLED ON TWO STEEL POSTS
(PERFORATED STEEL SQUARE TUBE BREAKAWAY SYSTEM)

NOT TO SCALE

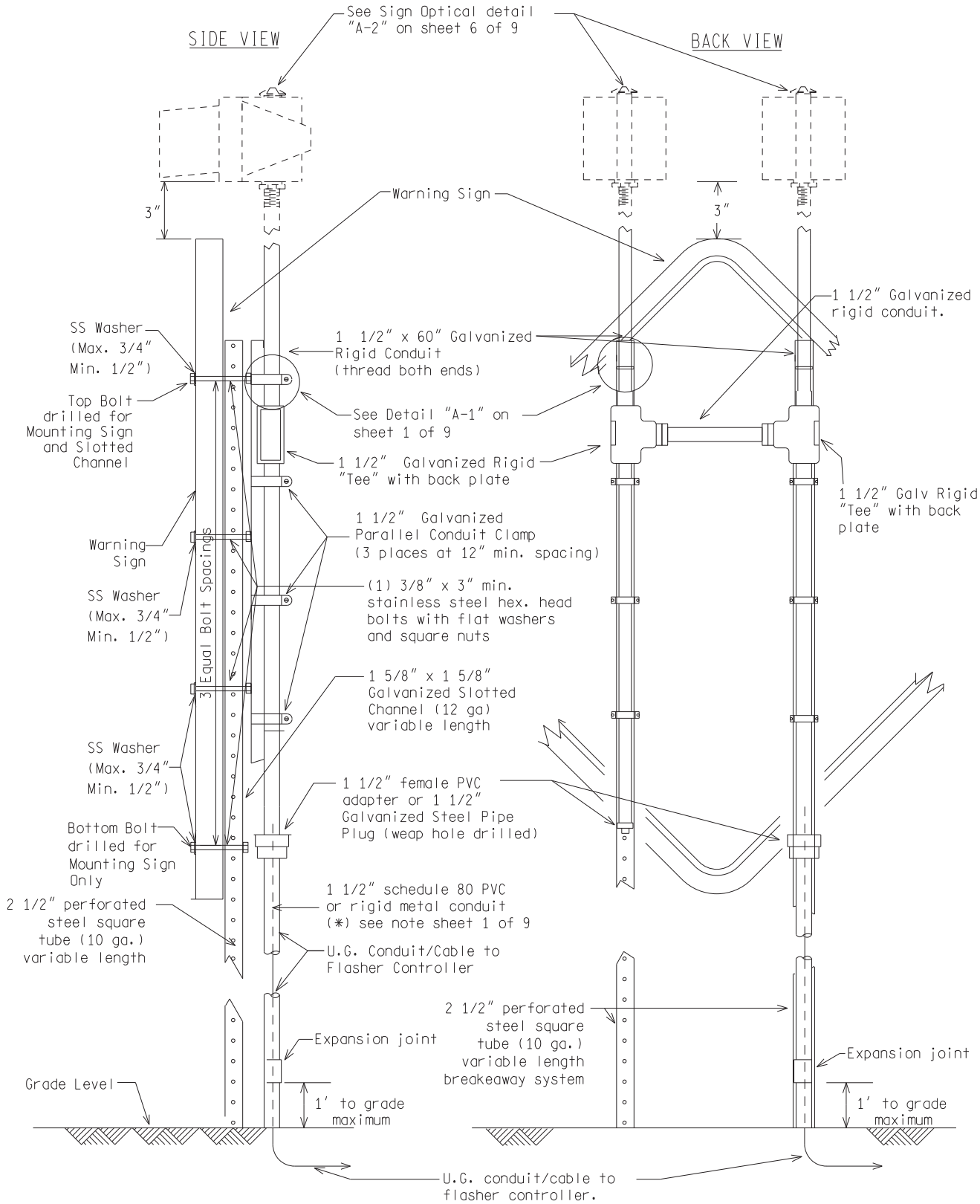
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE	SIG-320-A	SHEET 3 of 9



SIGN MOUNTED DUAL FLASHING BEACONS
INSTALLED ON TWO WOOD POSTS

NOT TO SCALE

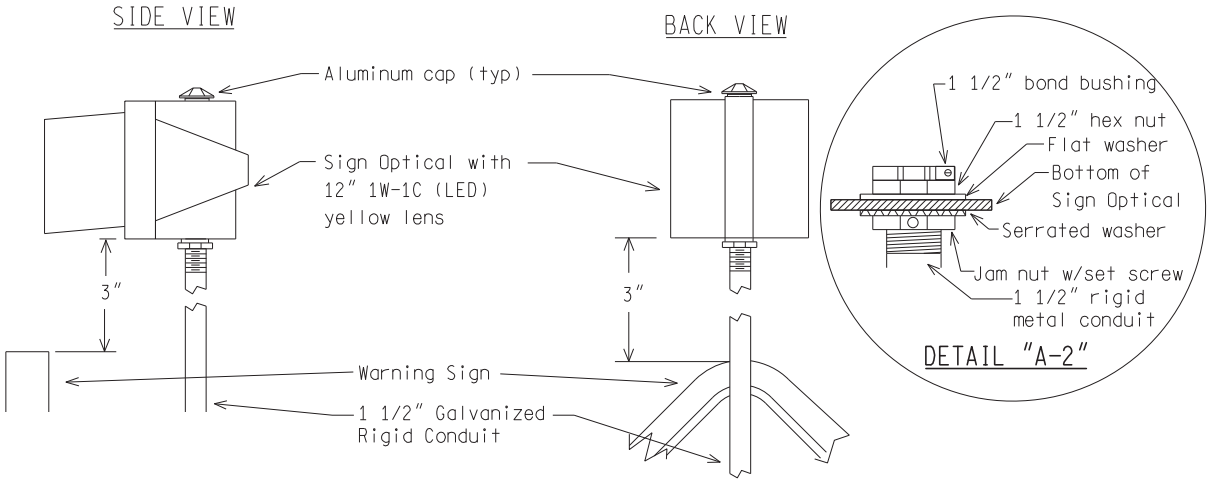
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE	SIG-320-A	SHEET 4 of 9



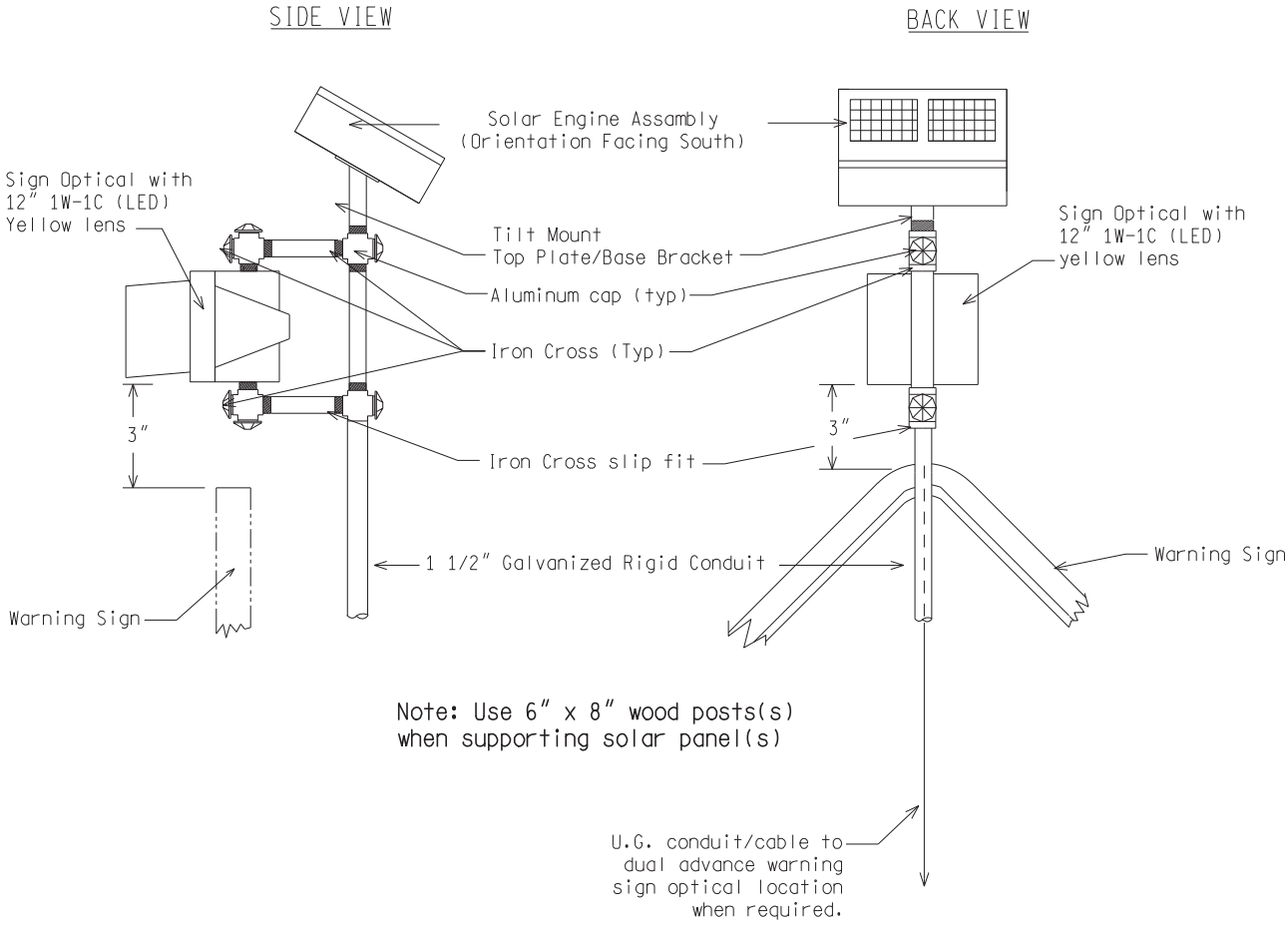
SIGN MOUNTED DUAL FLASHING BEACONS INSTALLED ON TWO STEEL POSTS (PERFORATED STEEL SQUARE TUBE BREAKAWAY SYSTEM

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE		SIG-320-A	SHEET 5 of 9
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE		



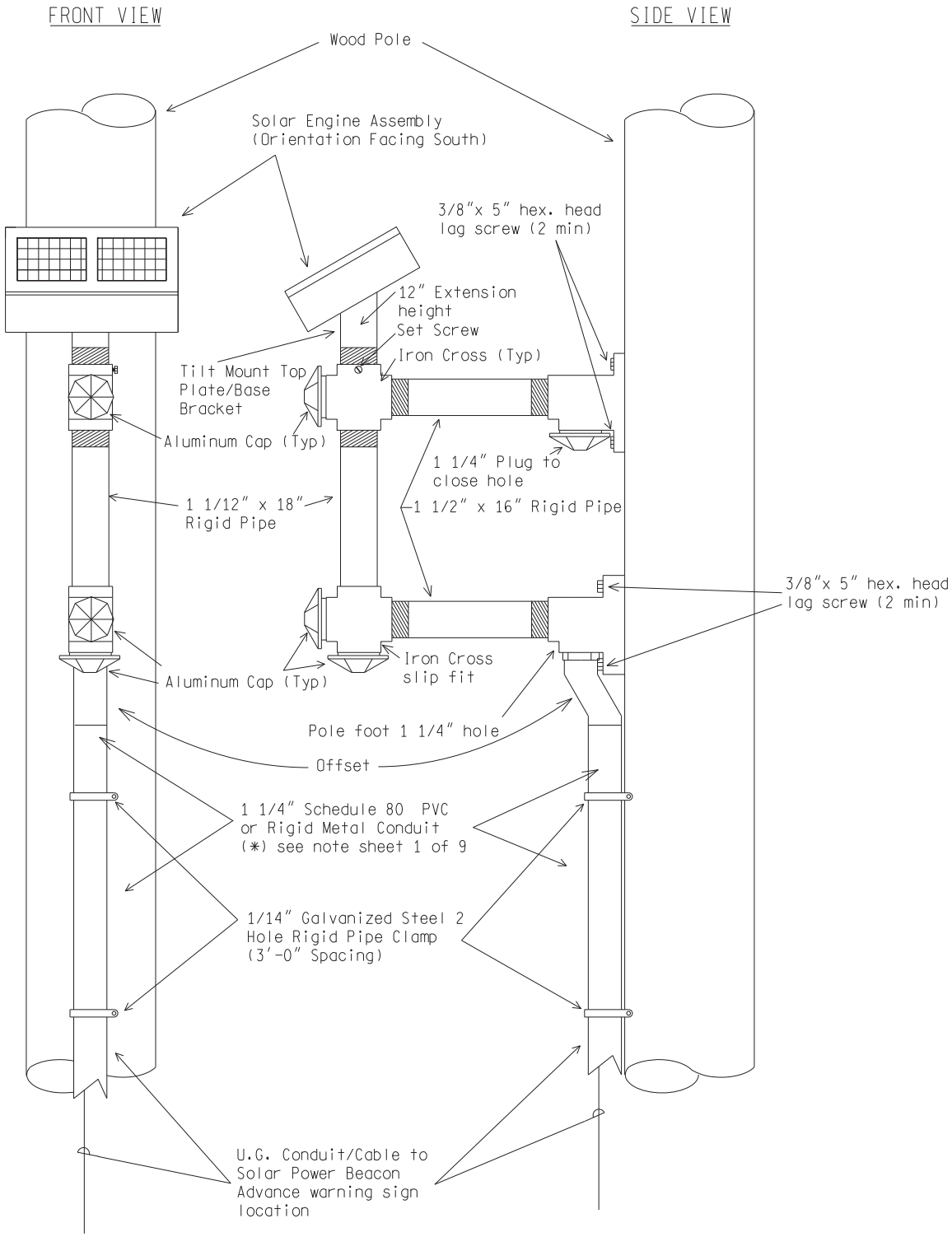
SIGN MOUNTED FLASHING BEACON



SIGN MOUNTED
FLASHING BEACON (ONE SOLAR ENGINE ASSEMBLY)

NOT TO SCALE

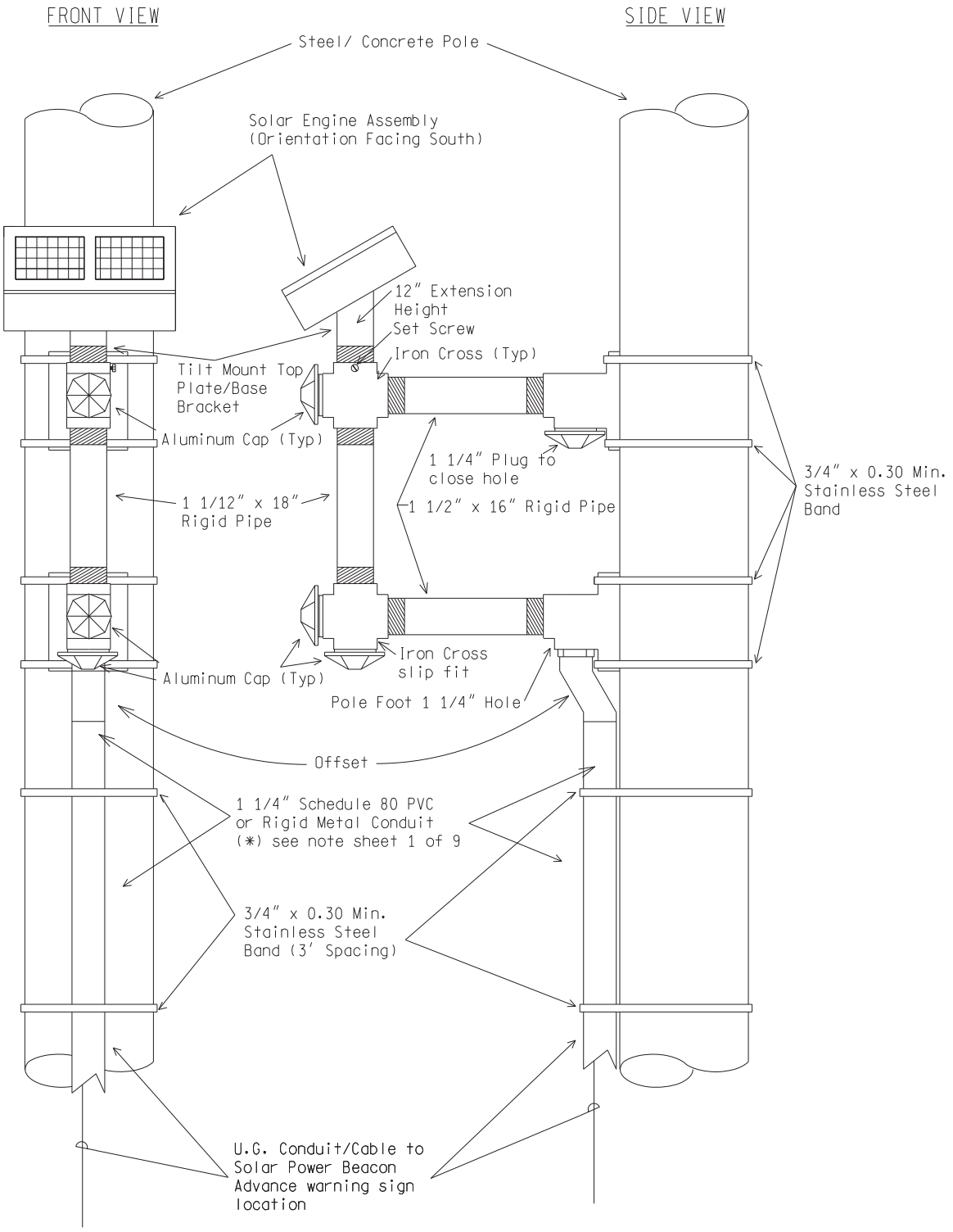
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE	SIG-320-A	SHEET 6 of 9



SOLAR ENGINE ASSEMBLY MOUNTED WOOD POLE

NOT TO SCALE

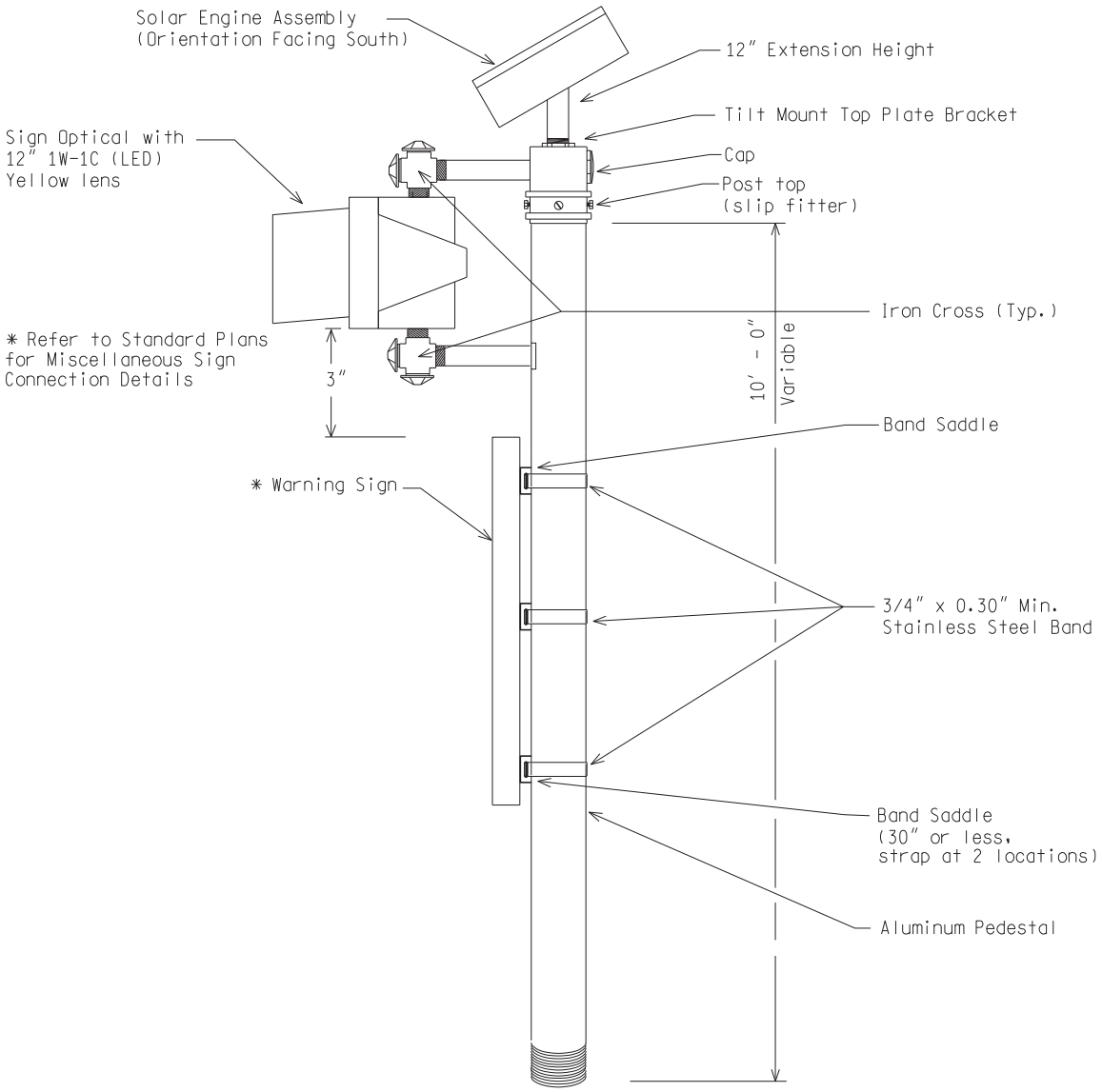
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	FHWA APPROVAL DATE	PLAN DATE	SIG-320-A	SHEET 7 of 9
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17				

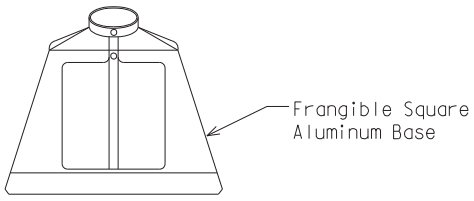


SOLAR ENGINE ASSEMBLY MOUNTED ON STEEL/CONCRETE POLE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE	SIG-320-A	SHEET 8 of 9





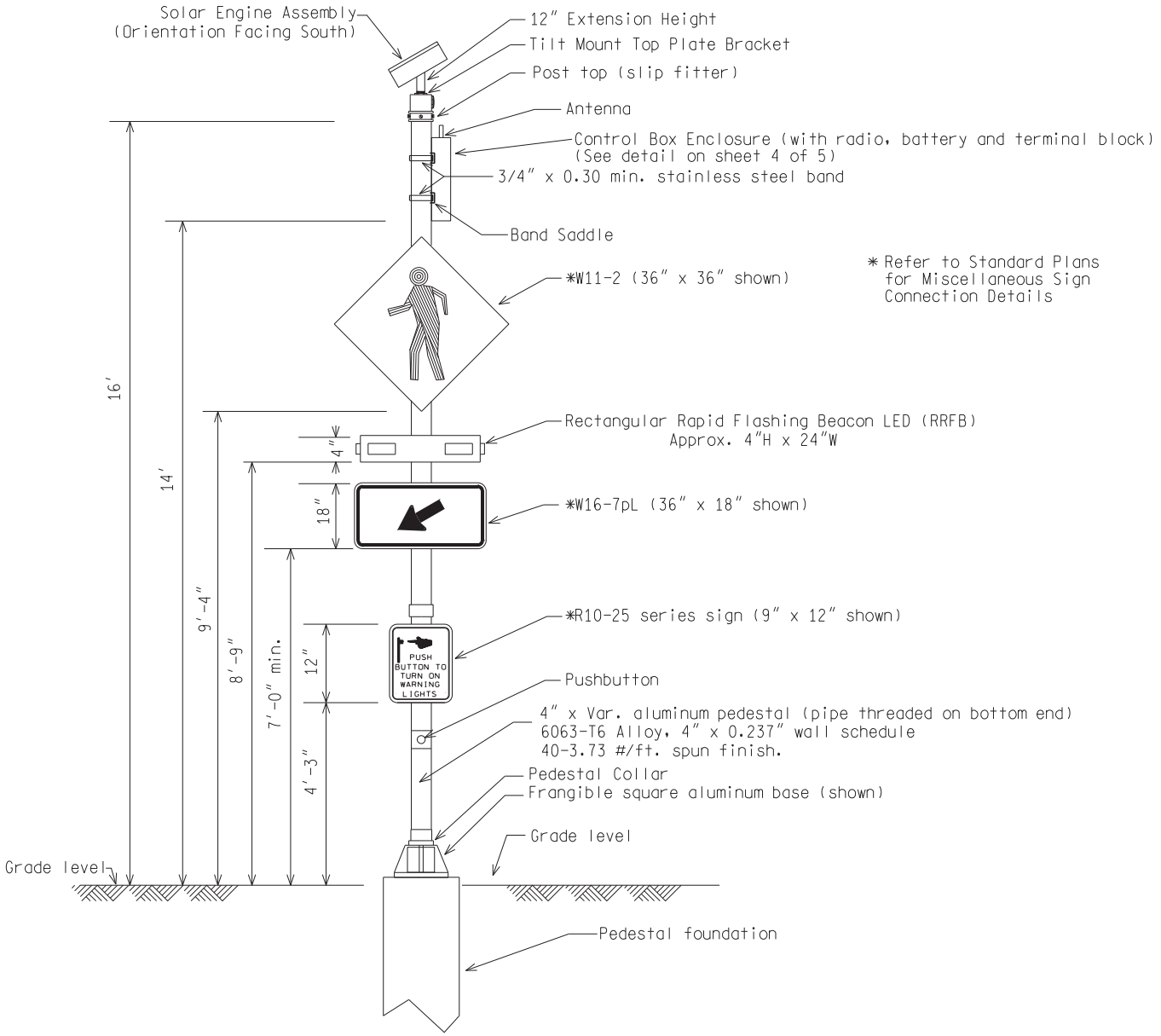
SQUARE ALUMINUM BASE

Note: Use pedestal collar for pedestal length greater than 14'

SOLAR ENGINE MOUNTED ON PEDESTAL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG320A.dgn Rev. 02/16/17		PLAN DATE	SIG-320-A	SHEET 9 of 9



FRONT VIEW

SOLAR POWER ASSEMBLY (ONE-SIDED RRFB)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG321A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

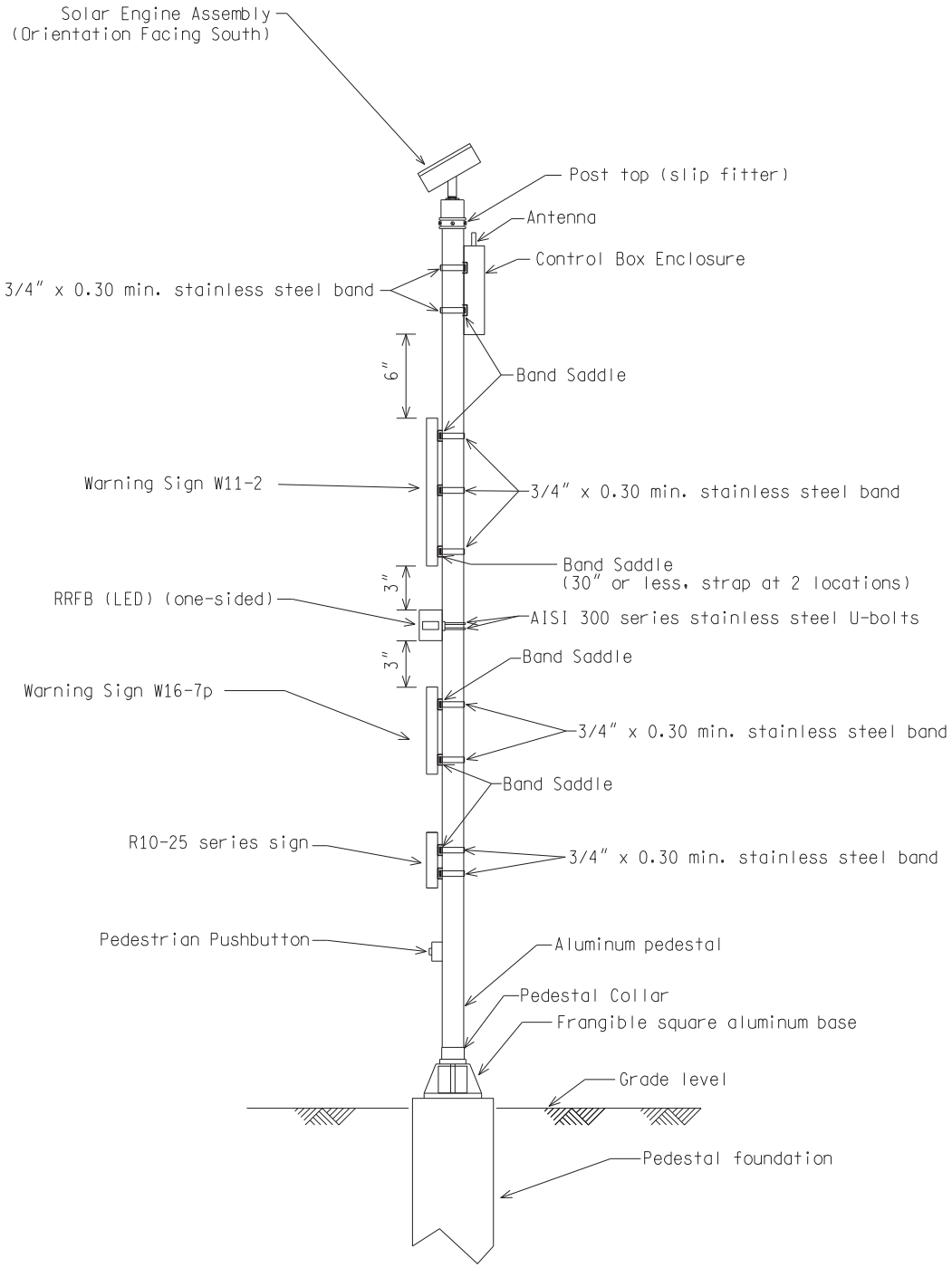
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

RECTANGULAR RAPID FLASHING BEACON

PLAN DATE

SIG-321-A

SHEET 1 of 5

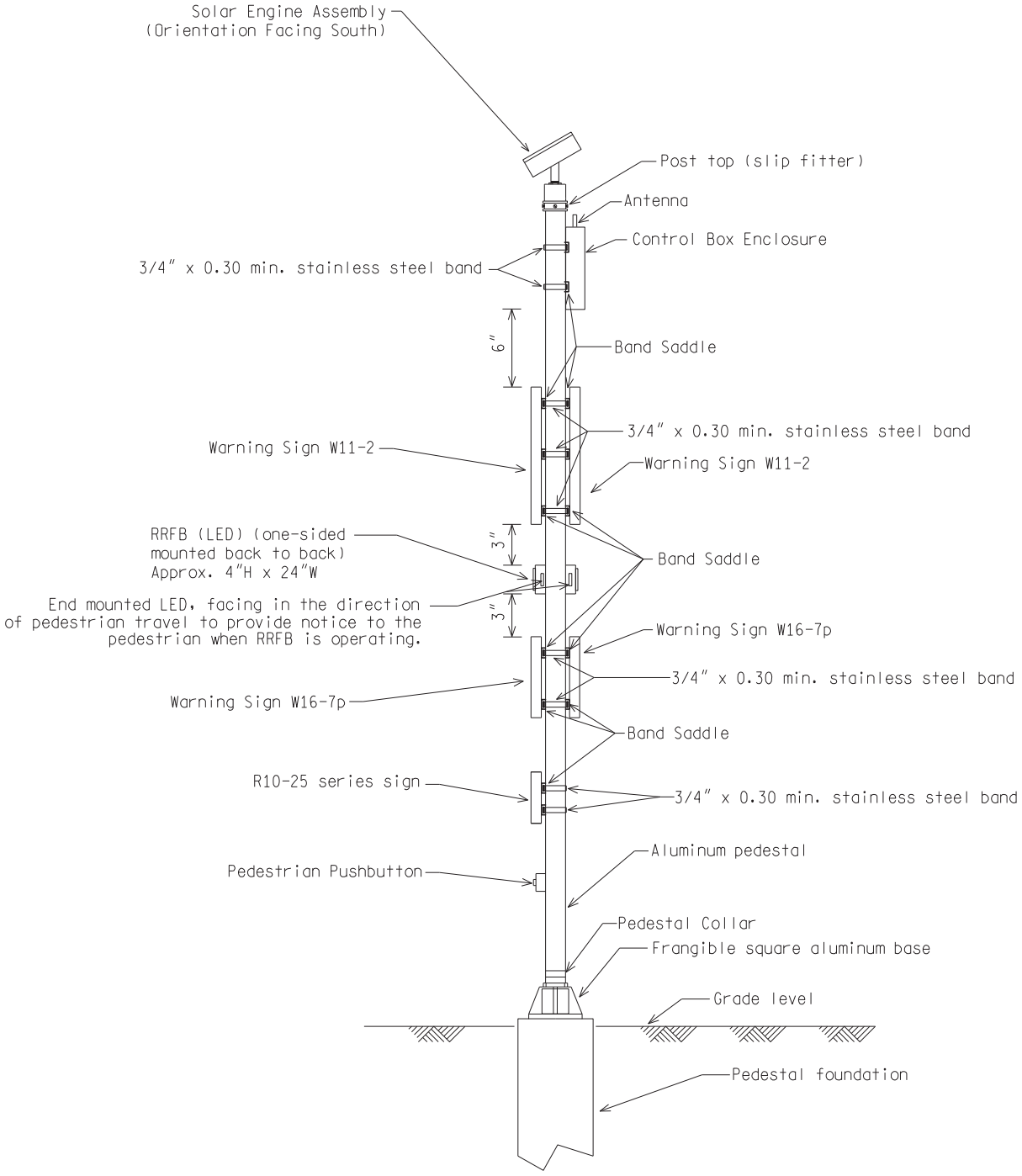


SIDE VIEW

SOLAR POWER ASSEMBLY (ONE-SIDED RRFB)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-321-A	SHEET 2 of 5
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG321A.dgn Rev. 02/16/17		PLAN DATE		

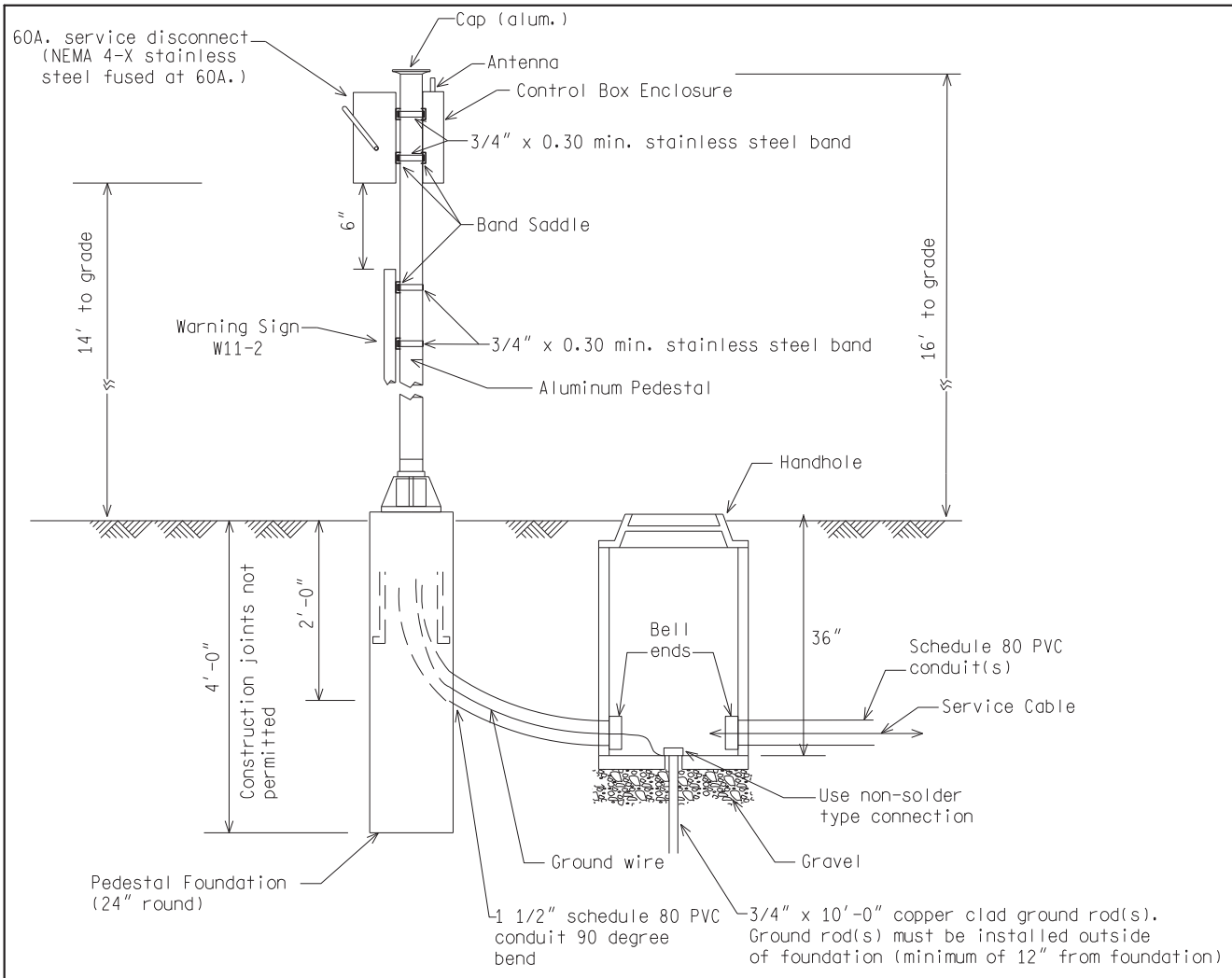


SIDE VIEW

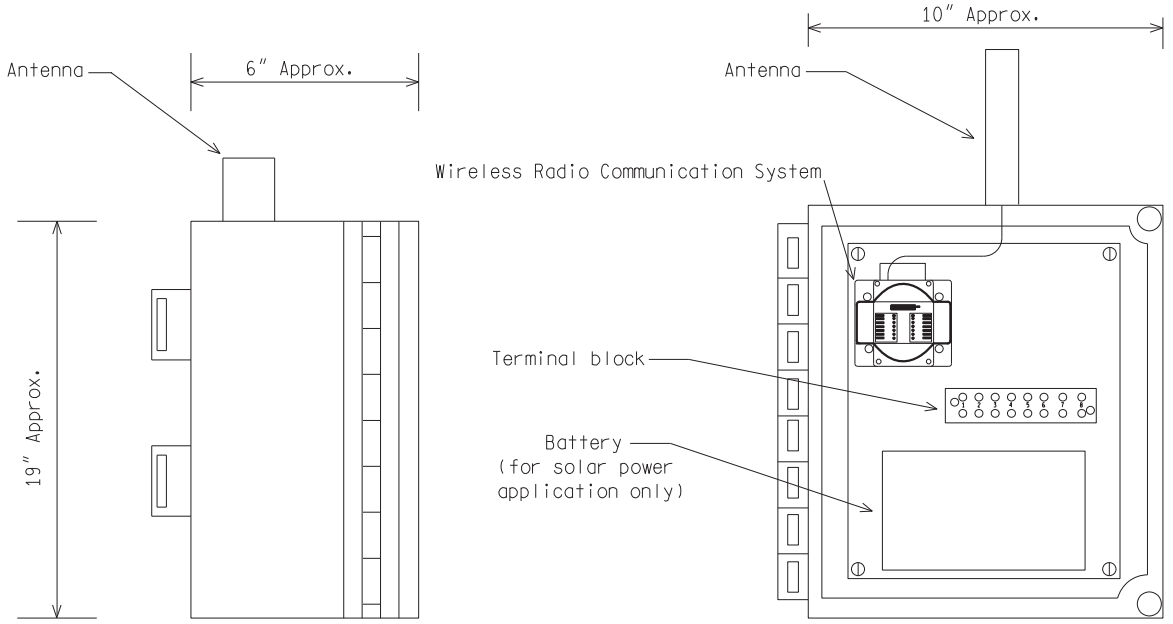
SOLAR POWER ASSEMBLY (TWO-SIDED RRFB)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-321-A	SHEET 3 of 5
File:RefDoc/TR/Signals/Web/Sp Det/Fin/SIG321A.dgn Rev.02/16/17		PLAN DATE		



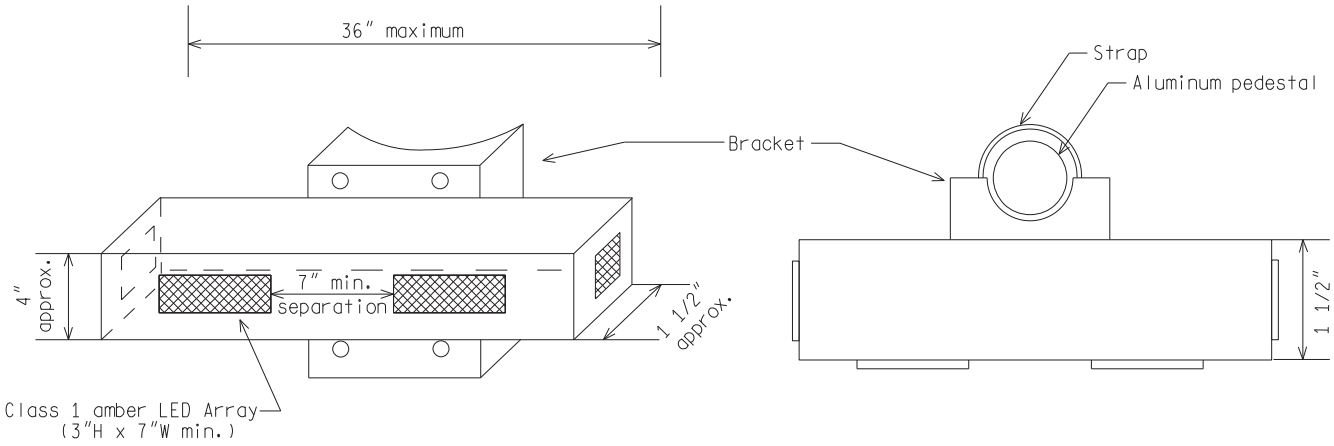
PERMANENT POWER SOURCE (RRFB)



SIDE VIEW — CONTROL BOX ENCLOSURE DETAIL — INSIDE VIEW

NOT TO SCALE

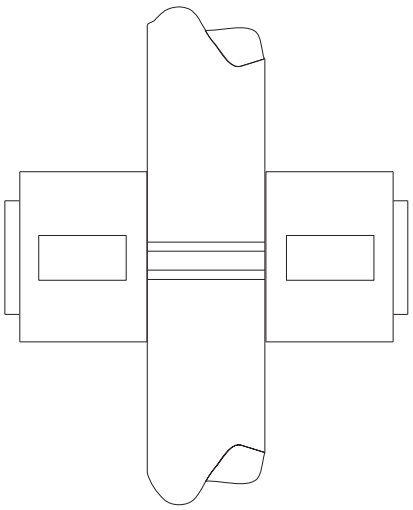
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG321A.dgn Rev. 02/16/17		PLAN DATE	SIG-321-A	SHEET 4 of 5



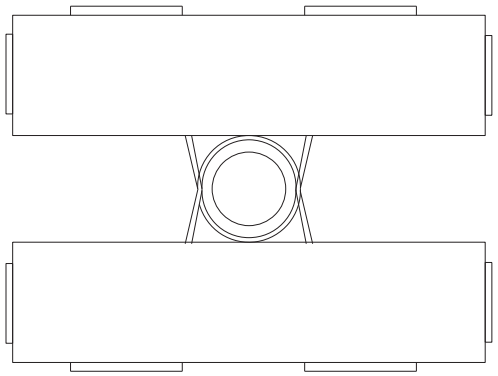
FRONT VIEW

TOP VIEW

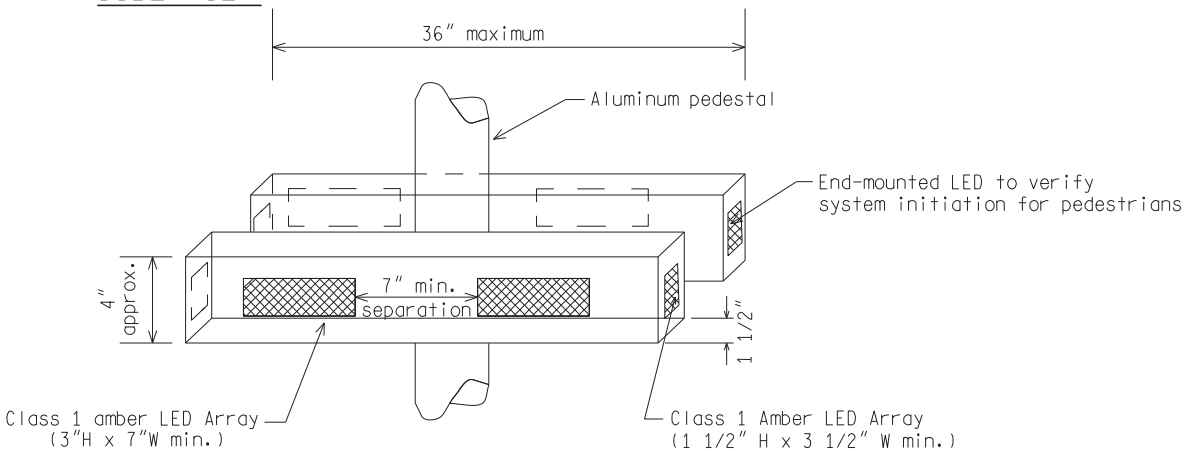
ONE-WAY RRFB (4 LED'S)



SIDE VIEW



TOP VIEW



FRONT VIEW

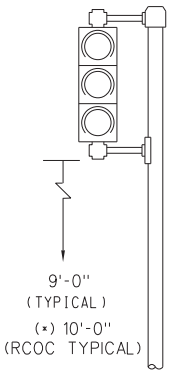
TWO-WAY RRFB (8 LED'S)
TWO ONE WAY MOUNTED BACK TO BACK

Notes: 1) All dimensions are approximate.
2) Use manufacturer's recommended mounting brackets, fittings, and connectors.
3) Use AISI 300 series stainless steel hardware.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-321-A	SHEET 5 of 5
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG321A.dgn Rev. 02/16/17		PLAN DATE		

(*) Refer to Note 4 on Sheet 2 of 2.



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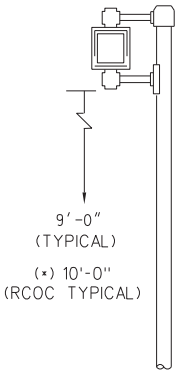
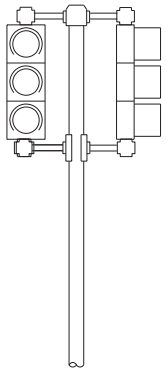
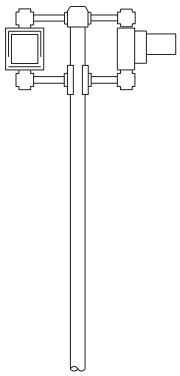


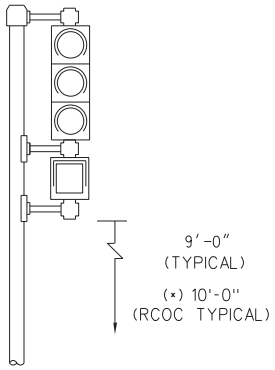
DETAIL "B-2"



DETAIL "C-2"



DETAIL "D-2"



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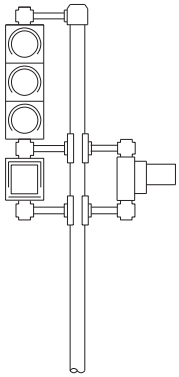

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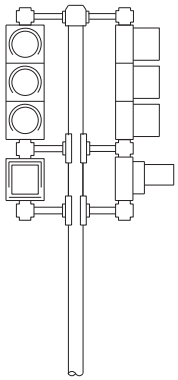
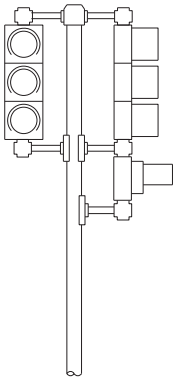


DETAIL "G-2"



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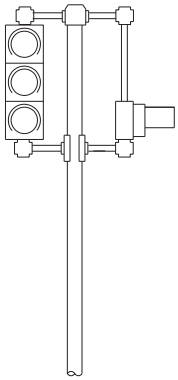
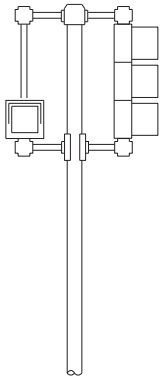
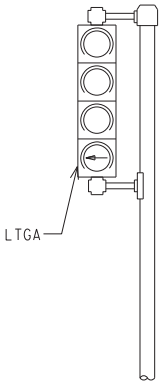


DETAIL "I-2"



DETAIL "J-2"



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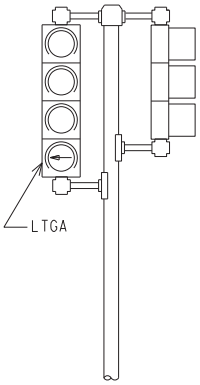

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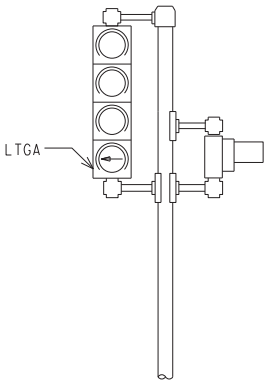

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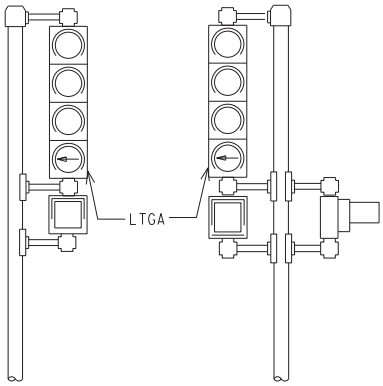

DETAIL "N-2"

DETAIL "O-2"

Left Turn Green Arrow (LTGA)

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

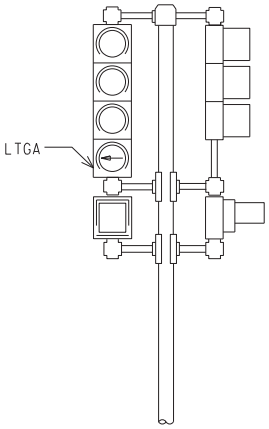
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

PEDESTAL MOUNTED SIGNAL DISPLAYS

PLAN DATE

SIG-330-A

SHEET 1 of 2



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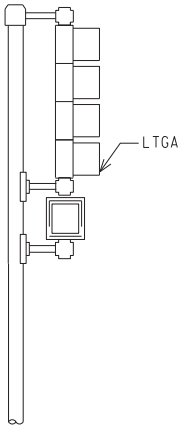

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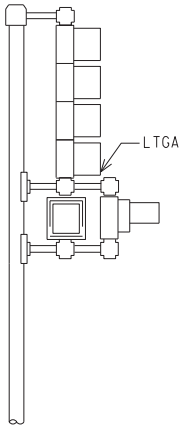
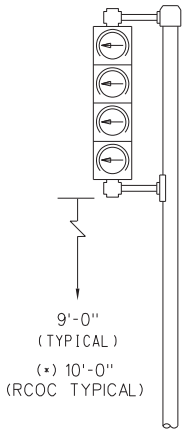
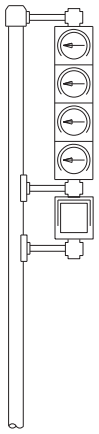


DETAIL "R-2"

Left Turn Green Arrow (LTGA)

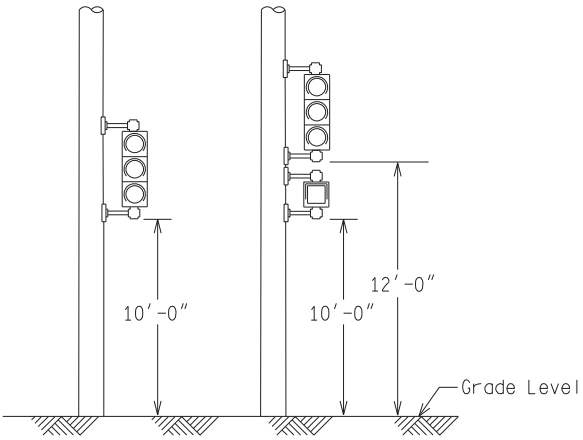


DETAIL "S-2"
(FYA)

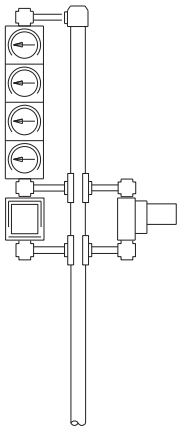


DETAIL "T-2"
(FYA)

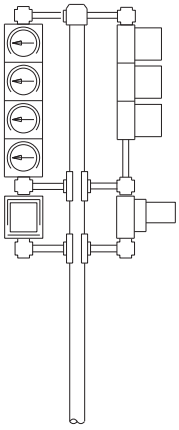
Flashing Yellow Arrow (FYA)



RCOC Mounting Detail (*) see note

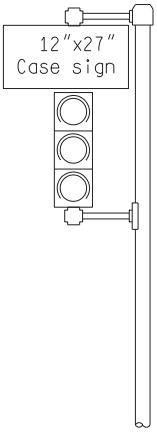


DETAIL "U-2"
(FYA)



DETAIL "V-2"
(FYA)

Flashing Yellow Arrow (FYA)



DETAIL "Typical"
WITH CASE SIGN

NOTE:

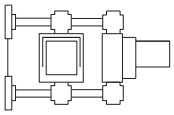
1) Pipe assembly shall be such length and height as to accommodate traffic signals and pedestrian signals for proper maintenance and clear vehicular and pedestrian viewing.

2) Pipe assembly shall be of such length and height as to accommodate an illuminated (12"x27") case sign for proper maintenance and clear vehicular viewing.

3) Bracket lengths are 16 inches for LED pedestrian signals and for LED pedestrian countdown signals.

4) Tolerance within +/- 1/8" for bracketing.

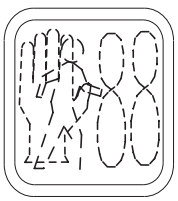
(*) For projects maintained by the Road Commission for Oakland County (RCOC), use the bottom heights and bracket assemblies as shown for the RCOC mounting detail.



LED PED

NOTE:
Walking person and hand symbol are filled.

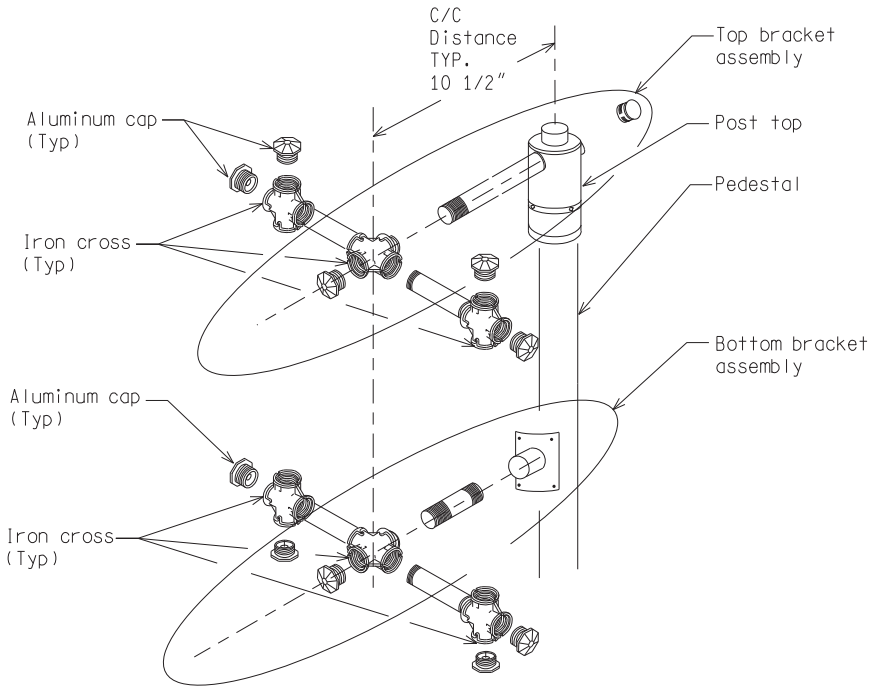
LED PED
(filled)



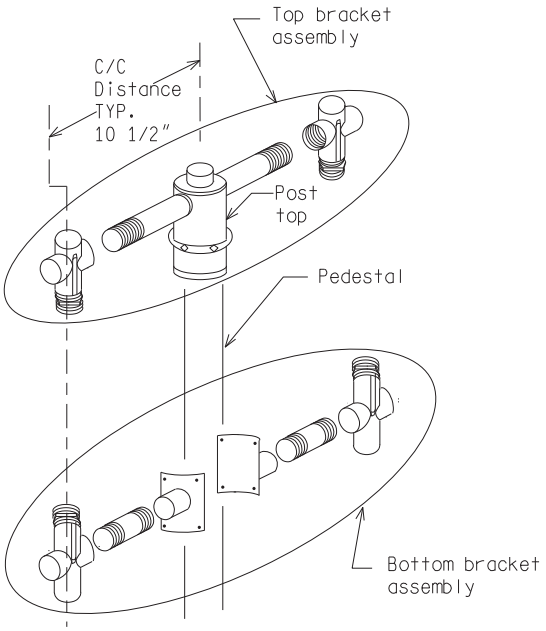
Countdown
LED PED
(filled symbols)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG330A.dgn Rev. 02/16/17		PLAN DATE	SIG-330-A	SHEET 2 of 2



SIGNAL MOUNTING HARDWARE FOR BACKSIDE BRACKET



SIGNAL MOUNTING HARDWARE - STANDARD BRACKET

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG331A.dgn Rev.

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

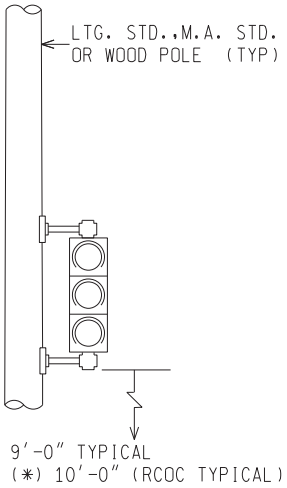
PEDESTAL MOUNTING FOR SIGNALS

02/16/17
PLAN DATE

SIG-331-A

SHEET
1 of 1

(*) Refer to Note 5 on Sheet 2 of 2.



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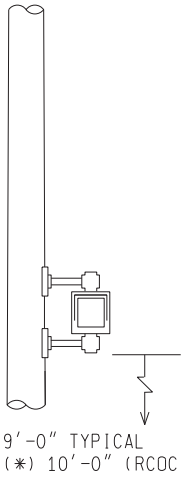

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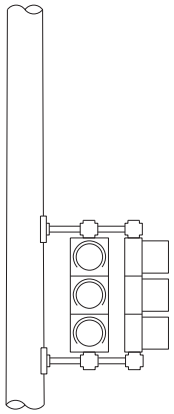

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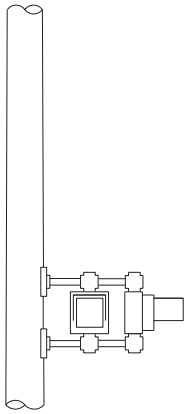

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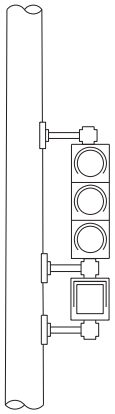

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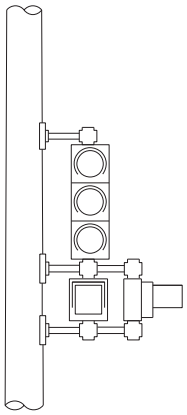

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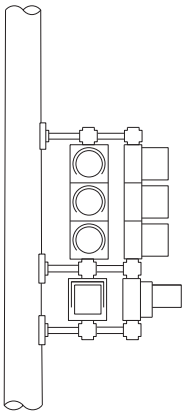

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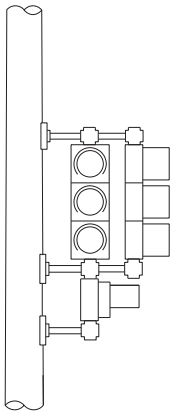

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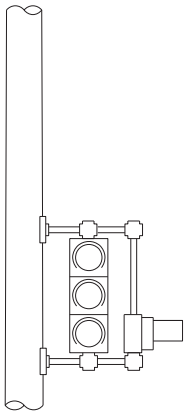

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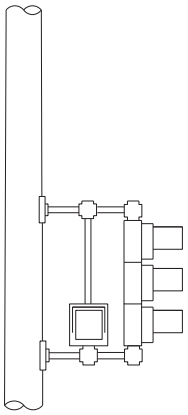

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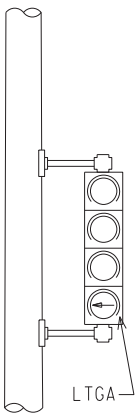

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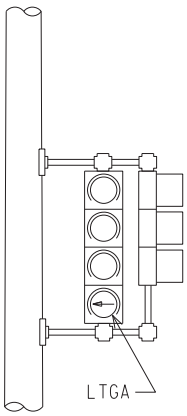

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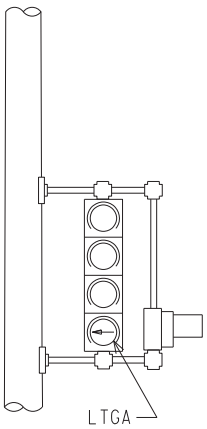

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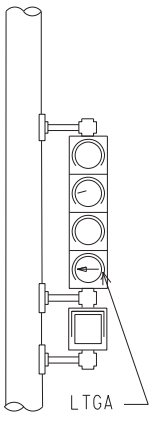

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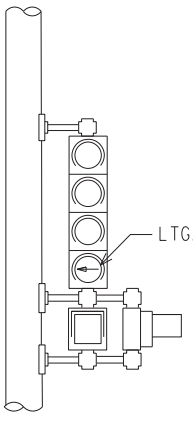

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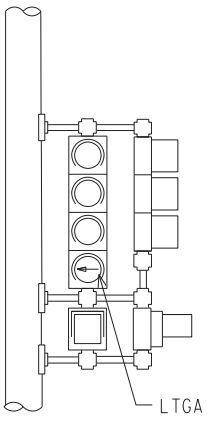

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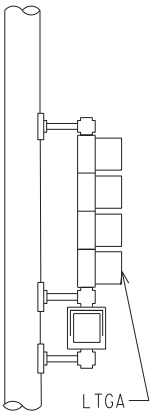


DETAIL "Q-1"

Left Turn Green Arrow (LTGA)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG340A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

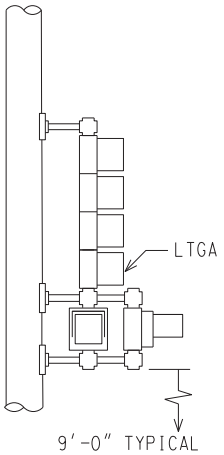
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

POLE MOUNTED SIGNAL DISPLAYS

PLAN DATE

SIG-340-A

SHEET 1 of 2



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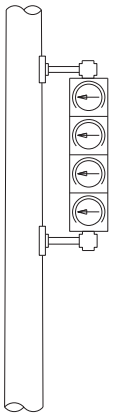
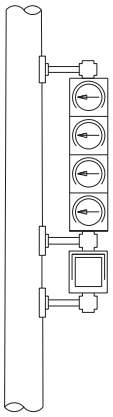


DETAIL "S-1"
(FYA)



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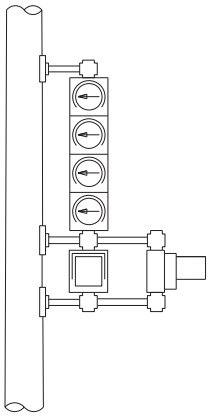
(FYA)



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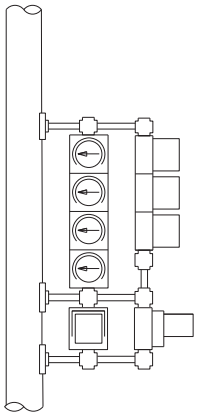
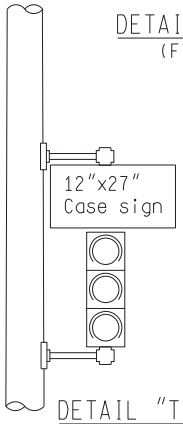
(FYA)

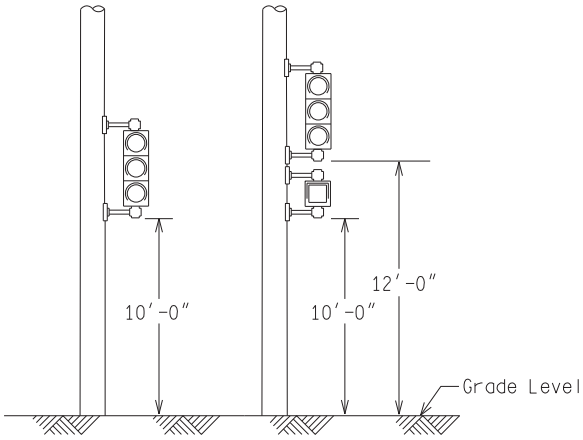


DETAIL "V-1"
(FYA)

Flashing Yellow Arrow (FYA)



DETAIL "TYPICAL"
WITH CASE SIGN



RCOC Mounting Detail (∗) see note

NOTES:

1) The relative position of 2-Way T.S. & pedestrian bracket arm signals within the bracket assembly shall be reversed (i.e. the signal nearest the pole goes to the outside of the bracket assembly & the outside signal goes inboard or nearest to pole) according to the plan view to provide clear vehicular and pedestrian viewing.

2) Pipe assembly shall be of such length and height as to accommodate traffic signals and pedestrian signals for proper maintenance and clear vehicular and pedestrian viewing.

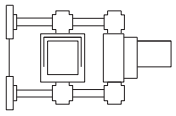
3) Pipe assembly shall be of such length and height as to accommodate an illuminated (12″x27″) case sign for proper maintenance and clear vehicular viewing.

4) Bracket lengths are 16 inches for LED pedestrian signals and LED pedestrian countdown signals.

5) For poles located 6′ or less from face of curb, contact Engineer for traffic and/or pedestrian bracket type and orientation if field installation requires a change from information shown on the plans.

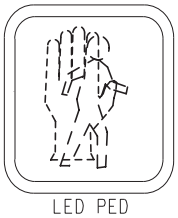
6) Tolerance within +/- 1/8″ for bracketing.

(∗) For projects maintained by the Road Commission for Oakland County (RCOC), use the bottom heights and bracket assemblies as shown for the RCOC mounting detail.

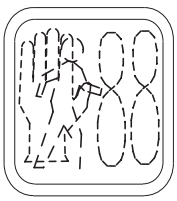


LED PED

NOTE:
Walking person and hand symbol are filled.



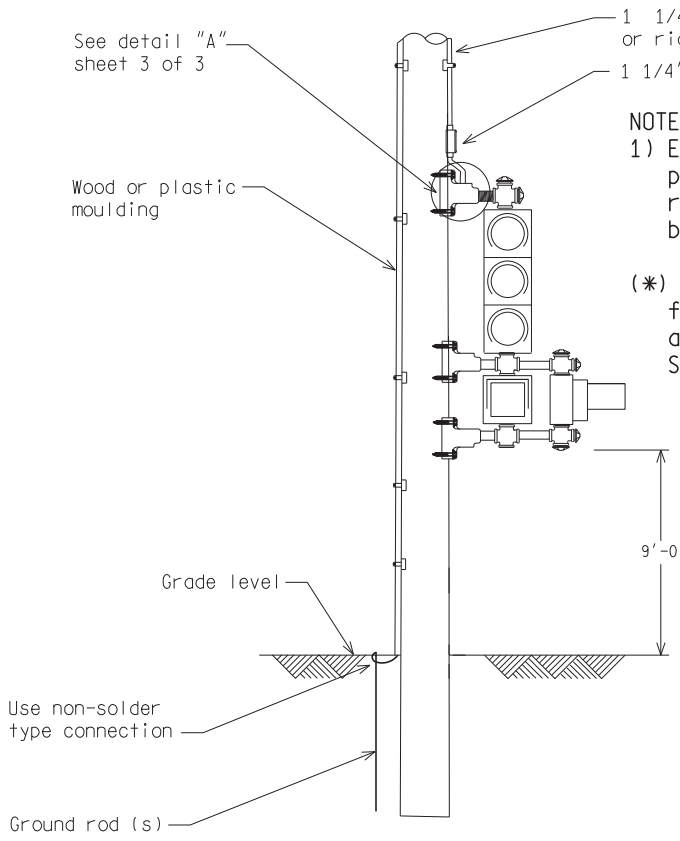
LED PED
(filled)



Countdown
LED PED
(filled symbols)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG340A.dgn Rev. 02/16/17		PLAN DATE	SIG-340-A	SHEET 2 of 2

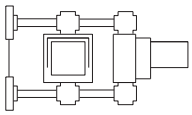


WOOD POLE

NOTES:

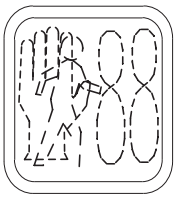
1) Exterior surface of all mounting assemblies for pedestrian signals including brackets, nuts and related hardware shall be weather- resistant black enamel.

(*) For projects maintained by the Road Commission for Oakland County (RCOC), use the bottom heights and bracket assemblies as shown on SIG-028A, SIG-029A or SIG-029B for the RCOC Mounting Detail.



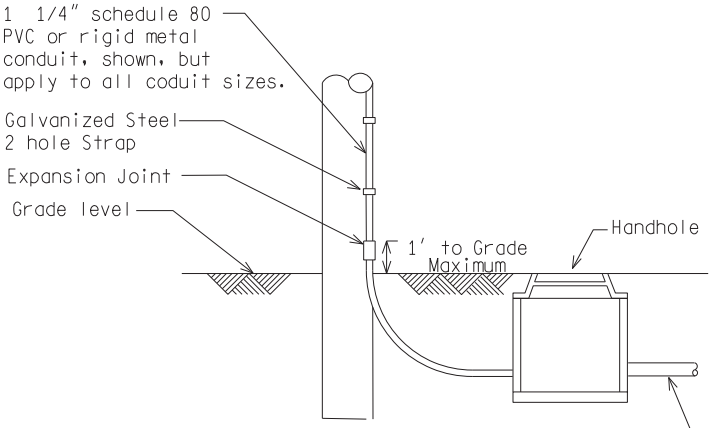
LED ped

LED PED (filled)

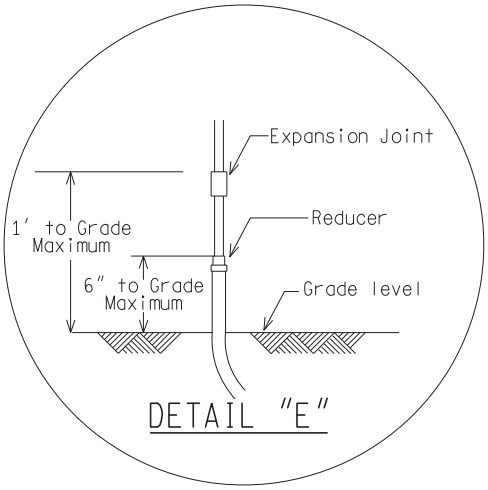


Countdown LED PED (filled symbols)

OVERHEAD FEED



WOOD POLE



DETAIL "E"

NOTE:
If rigid metal conduit is used, the conduit must be bonded according to the current N.E.C.

Schedule 80 PVC conduit (size of conduit as shown on plans)

UNDERGROUND ALTERNATE (COUPLING NOT SHOWN)

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

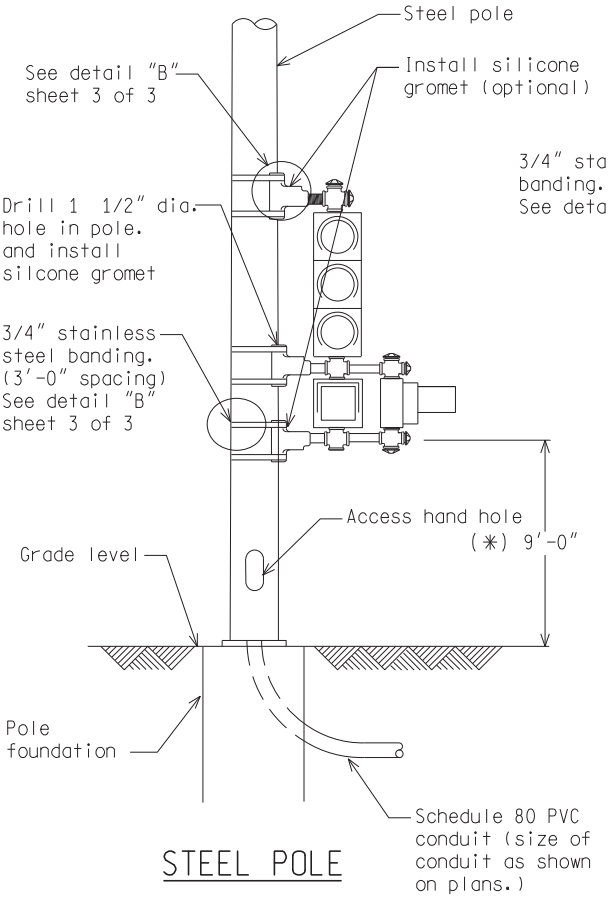
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

POLE MOUNTING DETAILS FOR SIGNALS

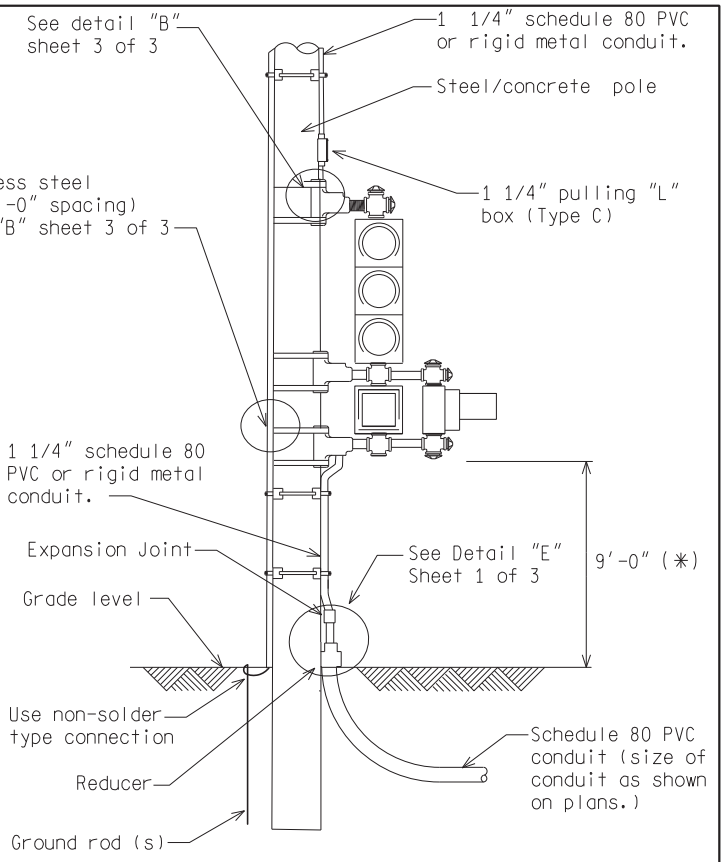
PLAN DATE

SIG-341-A

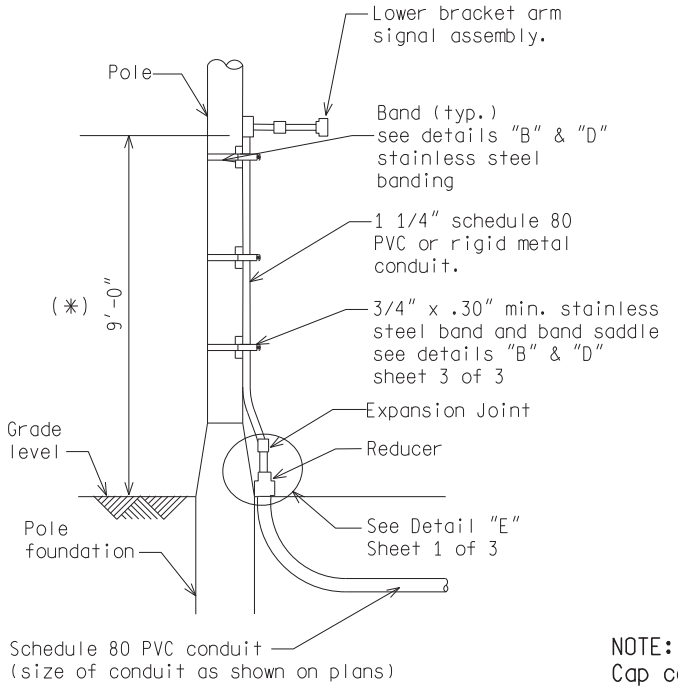
SHEET 1 of 3



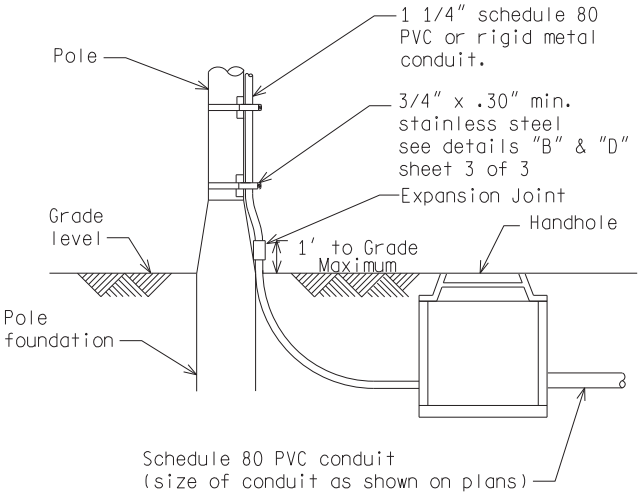
STEEL POLE



STEEL STREET LIGHT POLE
OR CONCRETE POLE

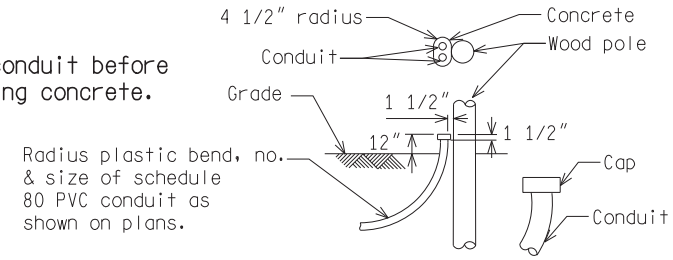


INSTALLATION OF CONDUIT
ON OUTSIDE OF POLE



INSTALLATION OF CONDUIT
ON OUTSIDE OF POLE (ALTERNATE)

NOTE:
Cap conduit before pouring concrete.

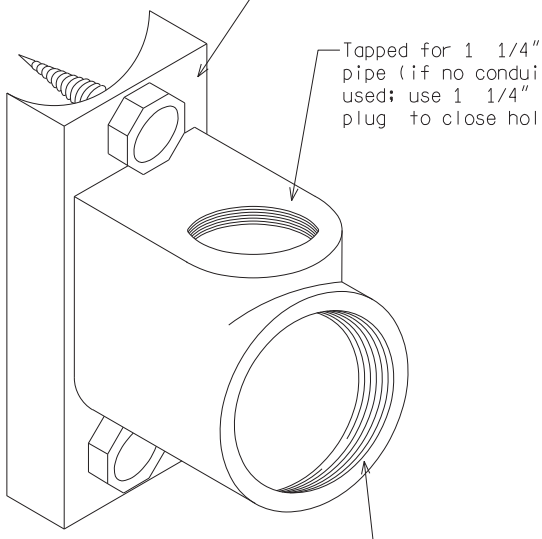


INSTALLATION OF CONDUIT AT CABLE POLE

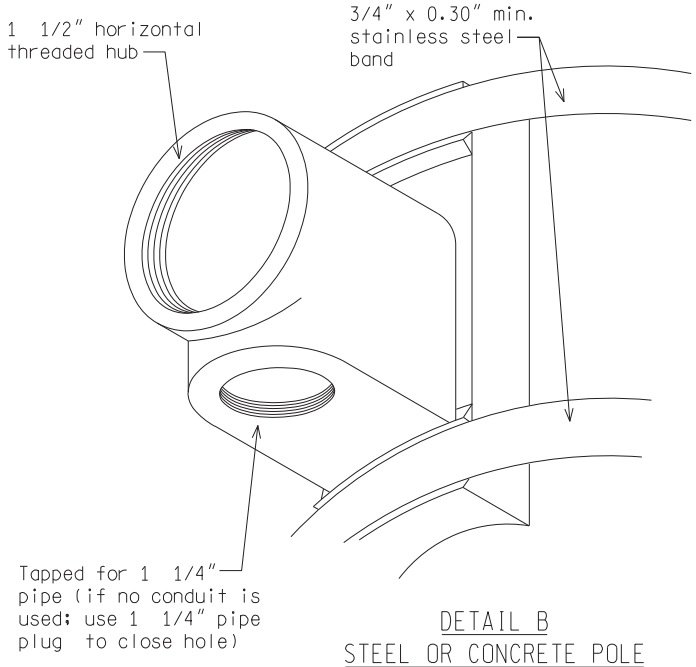
(*) Refer to Note 2 on Sheet 1 of 3.

NOT TO SCALE

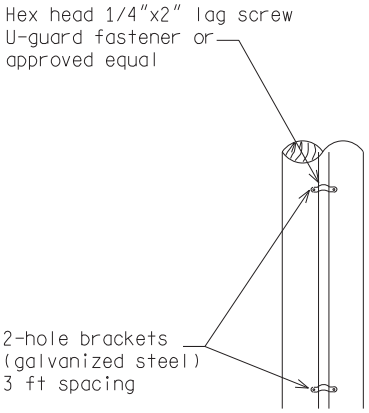
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-341-A	SHEET 2 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG341A.dgn Rev. 02/16/17		PLAN DATE		



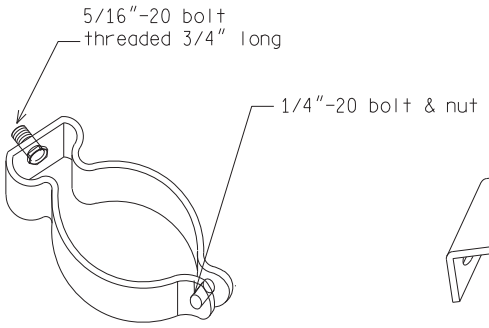
DETAIL A
WOOD POLE



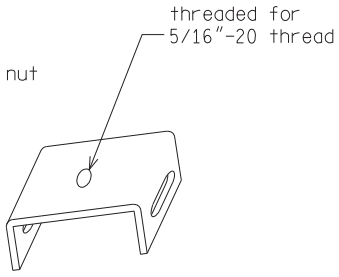
DETAIL B
STEEL OR CONCRETE POLE



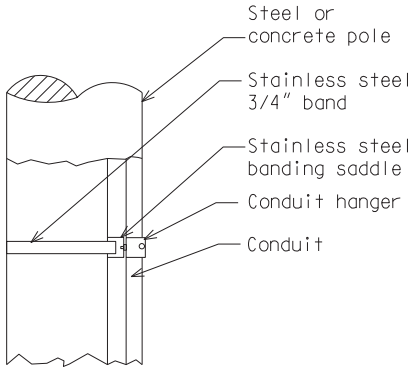
DETAIL C
TYPICAL CONDUIT ATTACHMENT
TO WOOD POLE



HANGER
To fit conduit size hanger as called for on plans.
(zinc plated)



BANDING SADDLE



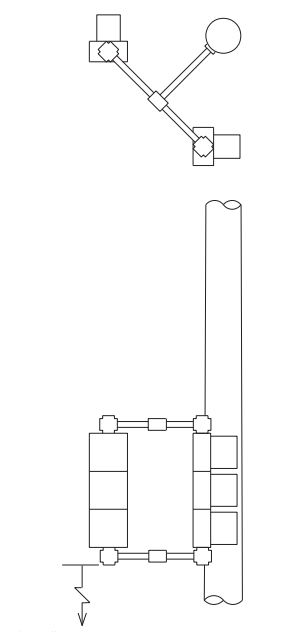
DETAIL D
TYPICAL CONDUIT ATTACHMENT
TO STEEL OR CONCRETE POLE.

NOTES:
1) Install 3/4" x 10'-0" copper clad ground rod (s) as required to provide less than 10 ohm resistance to ground. install #6 min. copper wires from ground rod (s) to span wire at each supporting pole using non-solder type connections for span wire ground.

2) Use conduit size specified (min.) unless current N.E.C. indicates a larger size is required.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG341A.dgn Rev. 02/16/17		PLAN DATE	SIG-341-A	SHEET 3 of 3



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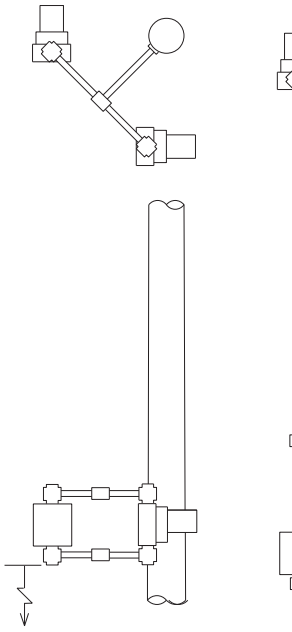

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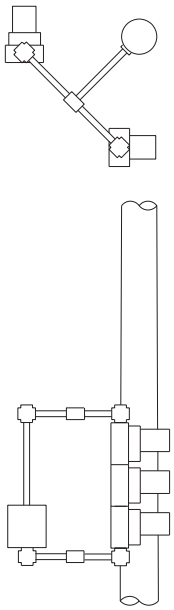

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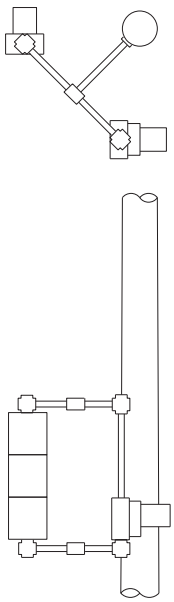

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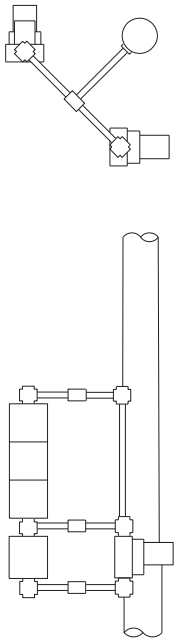
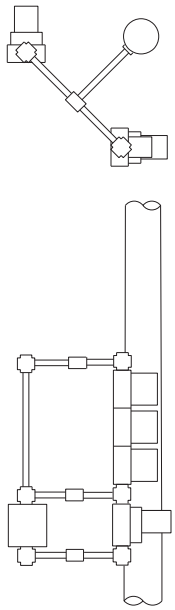


DETAIL "E-3"



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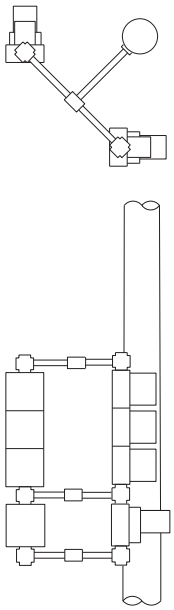

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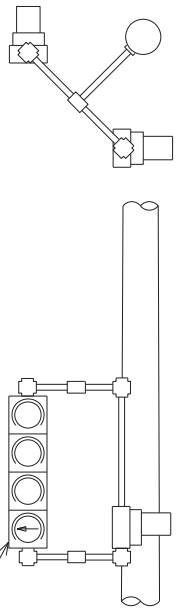

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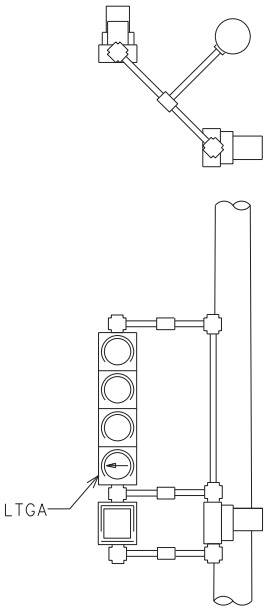


DETAIL "I-3"

Left Turn Green Arrow (LTGA)

(*) Refer to Note 5 on Sheet 2 of 2.

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG342A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

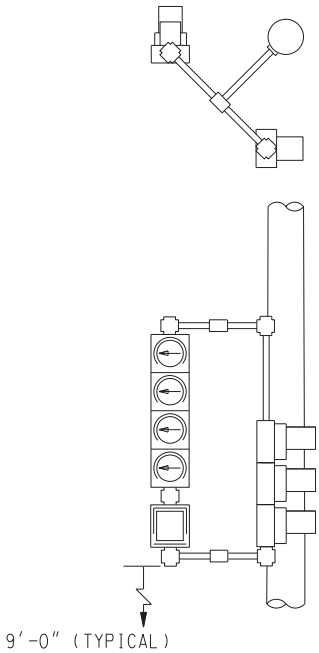
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

BACK BRACKET SIGNAL DISPLAYS

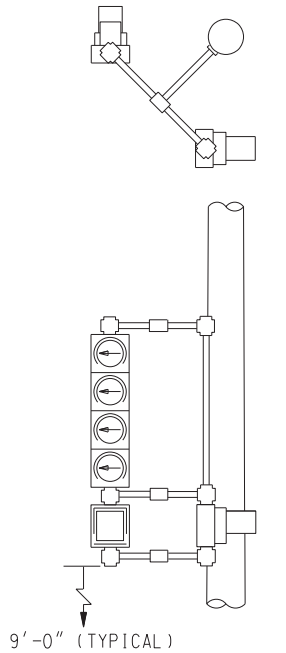
PLAN DATE

SIG-342-A

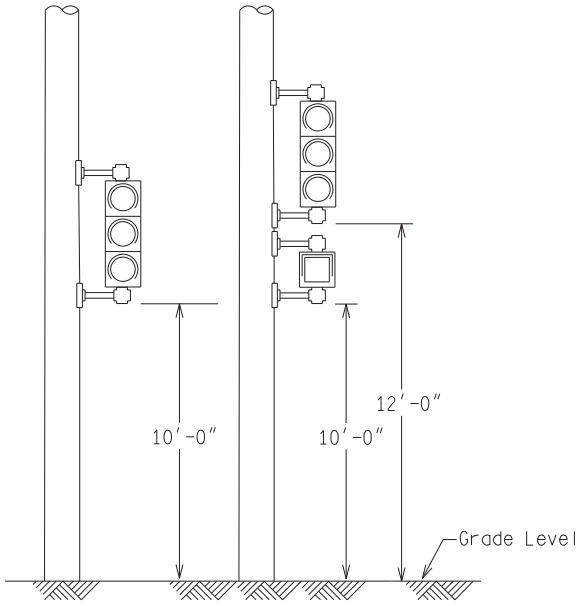
SHEET 1 of 2



DETAIL "J-3"
(FYA)

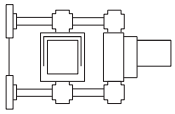


DETAIL "K-3"
(FYA)



RCOC Mounting Detail (*) see note

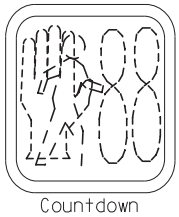
Flashing Yellow Arrow (FYA)



LED PED

NOTES: Walking person and hand symbol are filled.

LED PED
(filled)



Countdown
LED PED
(filled symbols)

NOTES:

1) The relative position of 2-Way T.S. & pedestrian bracket arm signals within the bracket assembly shall be reversed (i.e. the signal nearest the pole goes to the outside of the bracket assembly & the outside signal goes inboard or nearest to pole) according to the plan view to provide clear vehicular and pedestrian viewing.

2) Pipe assembly shall be of such length and height as to accommodate traffic signals and pedestrian signals for proper maintenance and clear vehicular and pedestrian viewing.

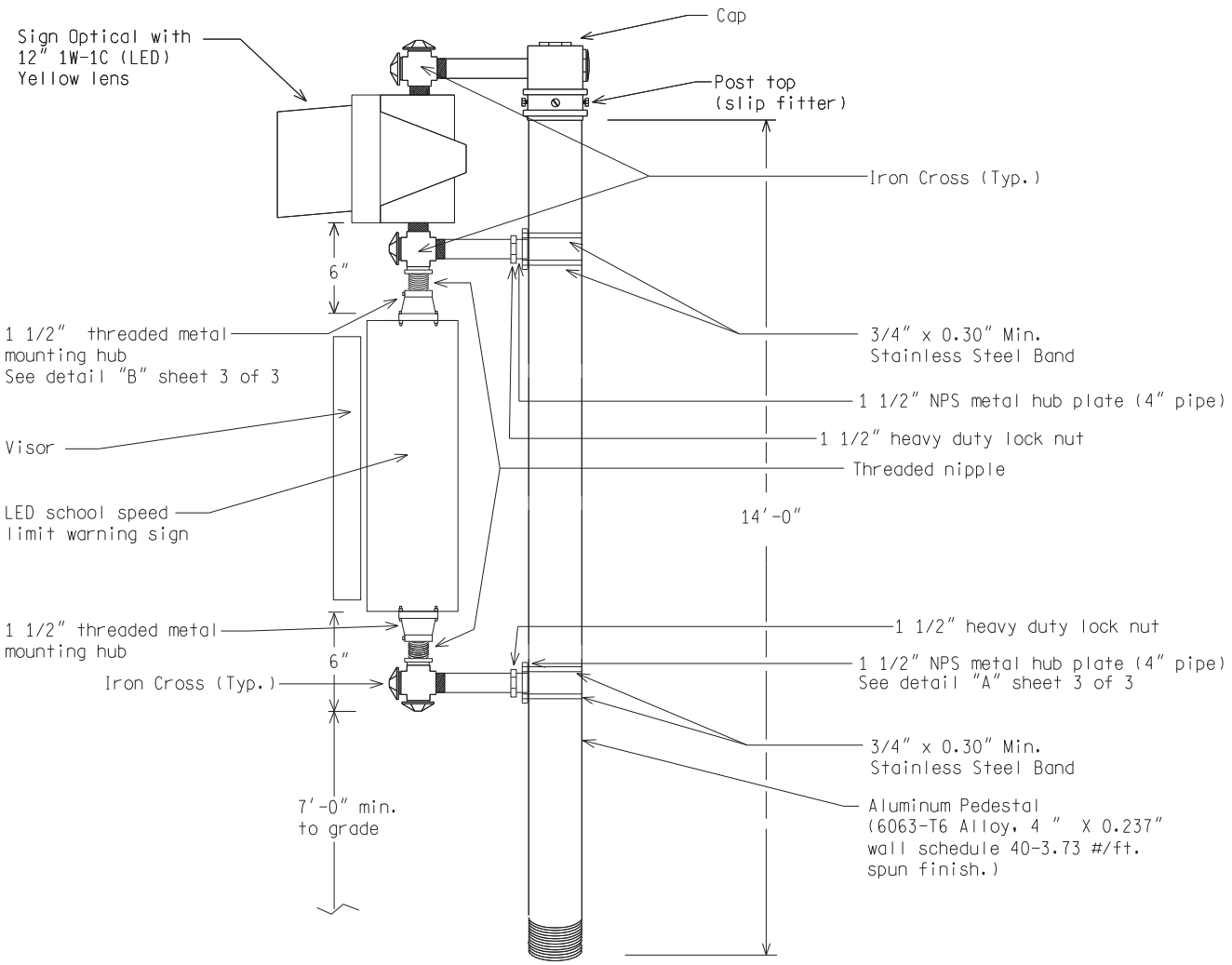
3) Pipe assembly shall be of such length and height as to accommodate an illuminated (12"x27") case sign for proper maintenance and clear vehicular viewing.

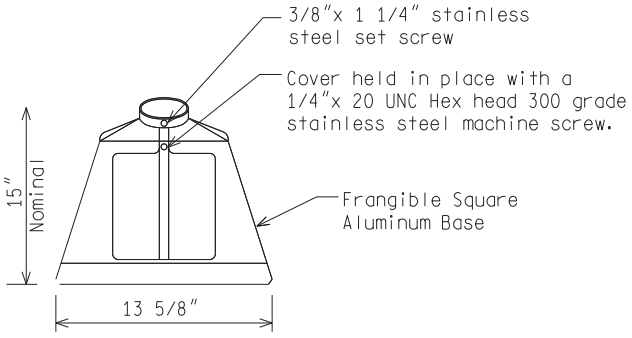
4) Bracket lengths are 16 inches for LED pedestrian signals and LED pedestrian countdown signals.

6) Tolerance within +/- $\frac{1}{8}$" for bracketing.

(*) For projects maintained by the Road Commission for Oakland County (RCOC), use the bottom heights and bracket assemblies as shown for the RCOC mounting detail.

NOT TO SCALE





SQUARE ALUMINUM BASE

NOTE: Use pedestal collar for pedestal length greater than or equal to 14' (typical for 3 color traffic signals with pedestrian signals)

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

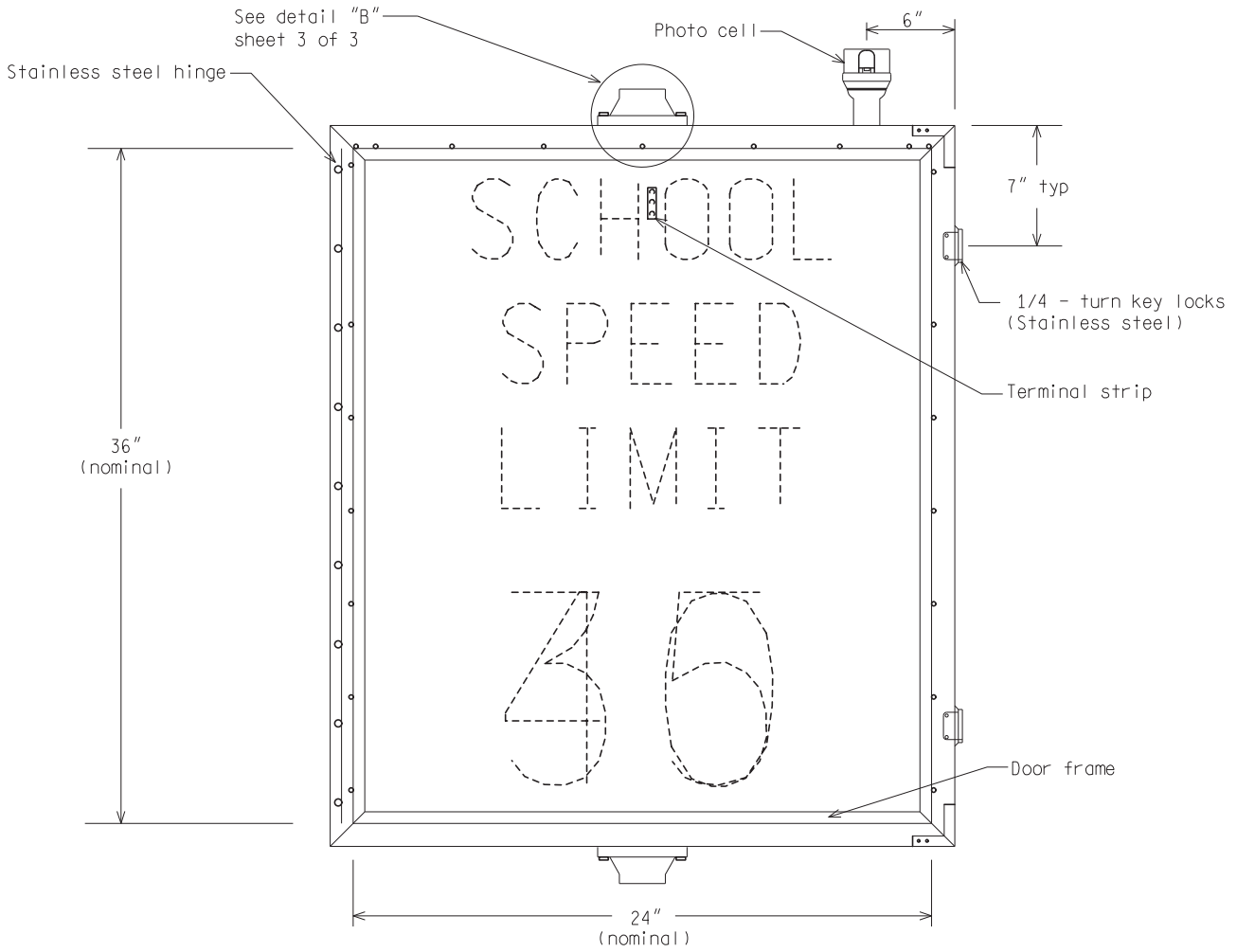
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

SCHOOL SPEED LIMIT SIGN (LED)

PLAN DATE

SIG-350-A

SHEET
1 of 3



NOTES:

1) "SIGN MESSAGE" shall utilize a single row of LED's to form each character or numeral, and capable of displaying messages in one direction
2) Message displays and colors:

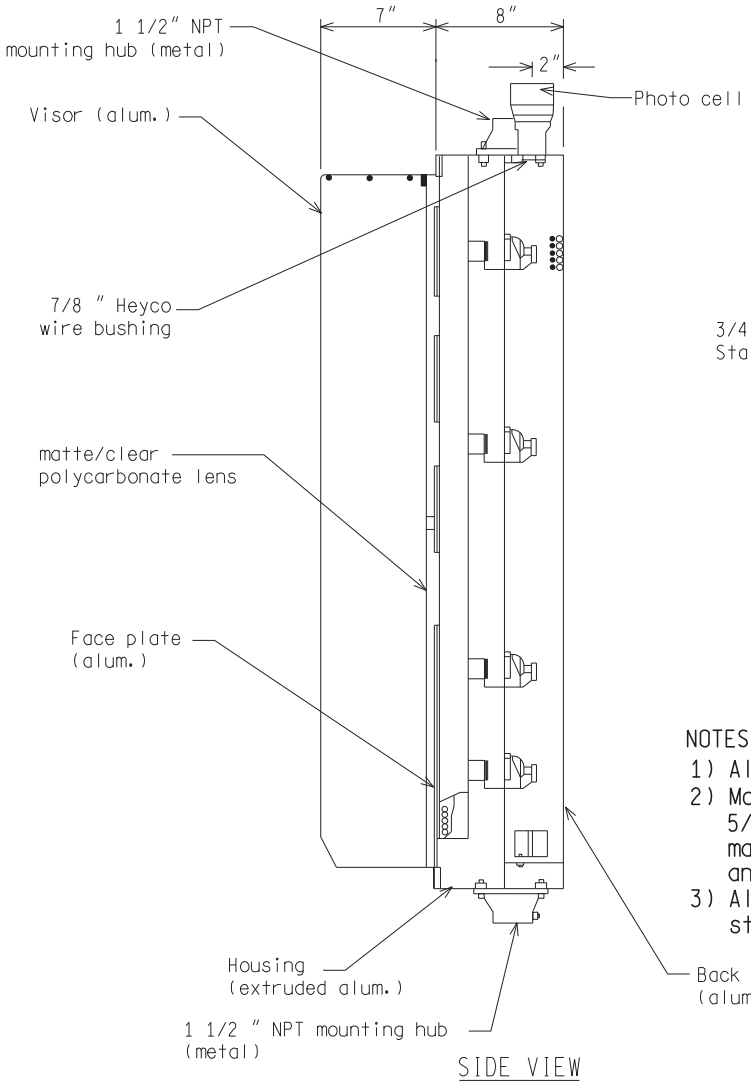
Message 1
(white)

Message 2
("SCHOOL" - yellow)
("SPEED LIMIT 30" - white)

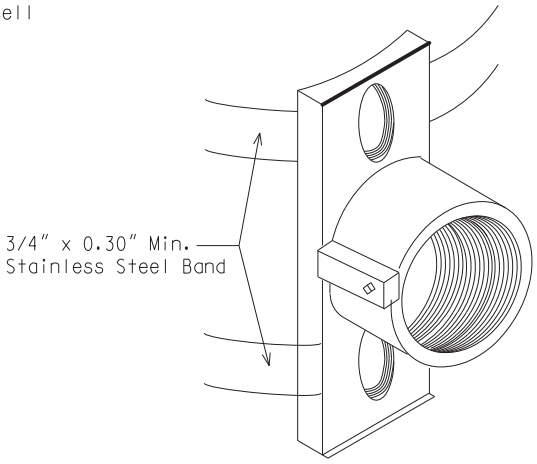
3) Provide a dimming device with photo cell for improved night time visiblilty.
4) Sign housing shall be pre-drilled for power entry through top mounting hub.
5) Provide a sign with nominal viewing area of 24" by 36" or otherwise indicated on the plans or directed by the Engineer.
6) Provide a three-sided visor
7) All hardware shall be AISI series 300 stainless steel

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG350A.dgn Rev. 02/16/17		PLAN DATE	SIG-350-A	SHEET 2 of 3



SIDE VIEW

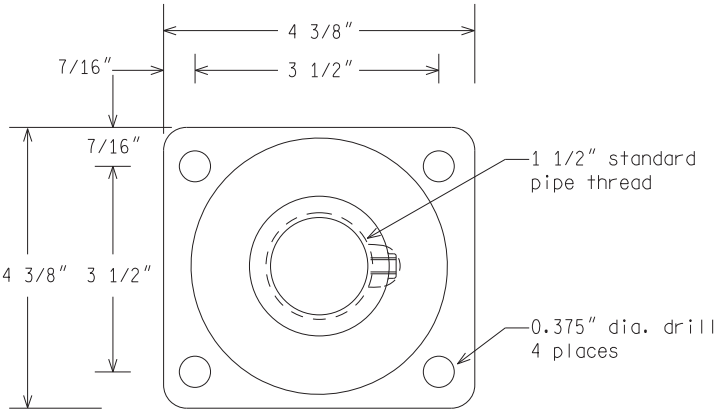


DETAIL "A"

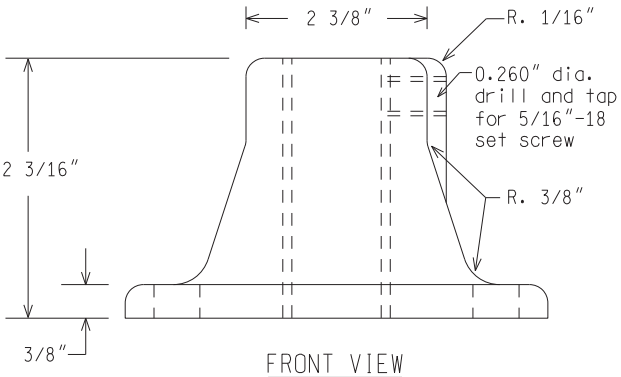
1 1/2" NPS Metal Hub Plate
(4" Pipe)

NOTES:

1) All fillets to be 1 1/8", unless specified
2) Mount to sign housing with four (4) 5/16"-18 x 1 1/4" stainless steel hex machine screw bolts, hex locknuts, flat washers, and bonded seal washers
3) All hardware to be AISI 300 series stainless steel



TOP VIEW



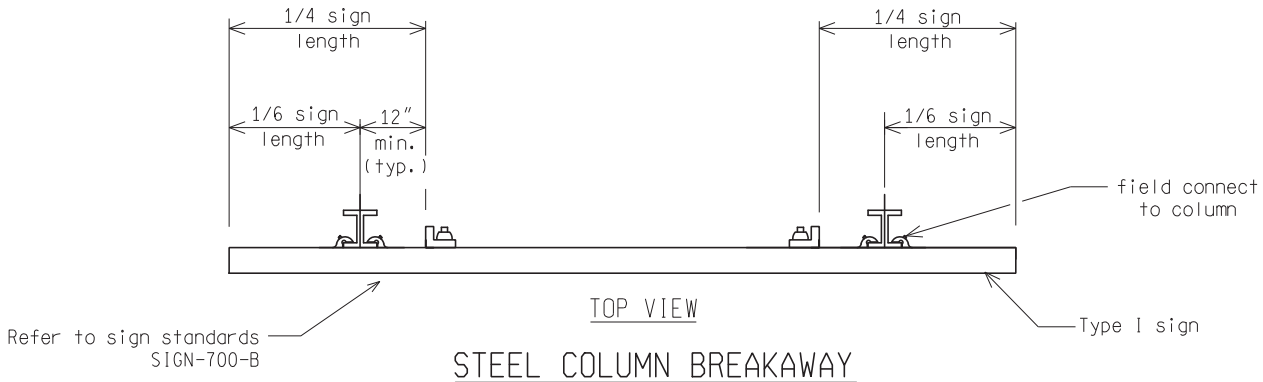
FRONT VIEW

DETAIL "B"

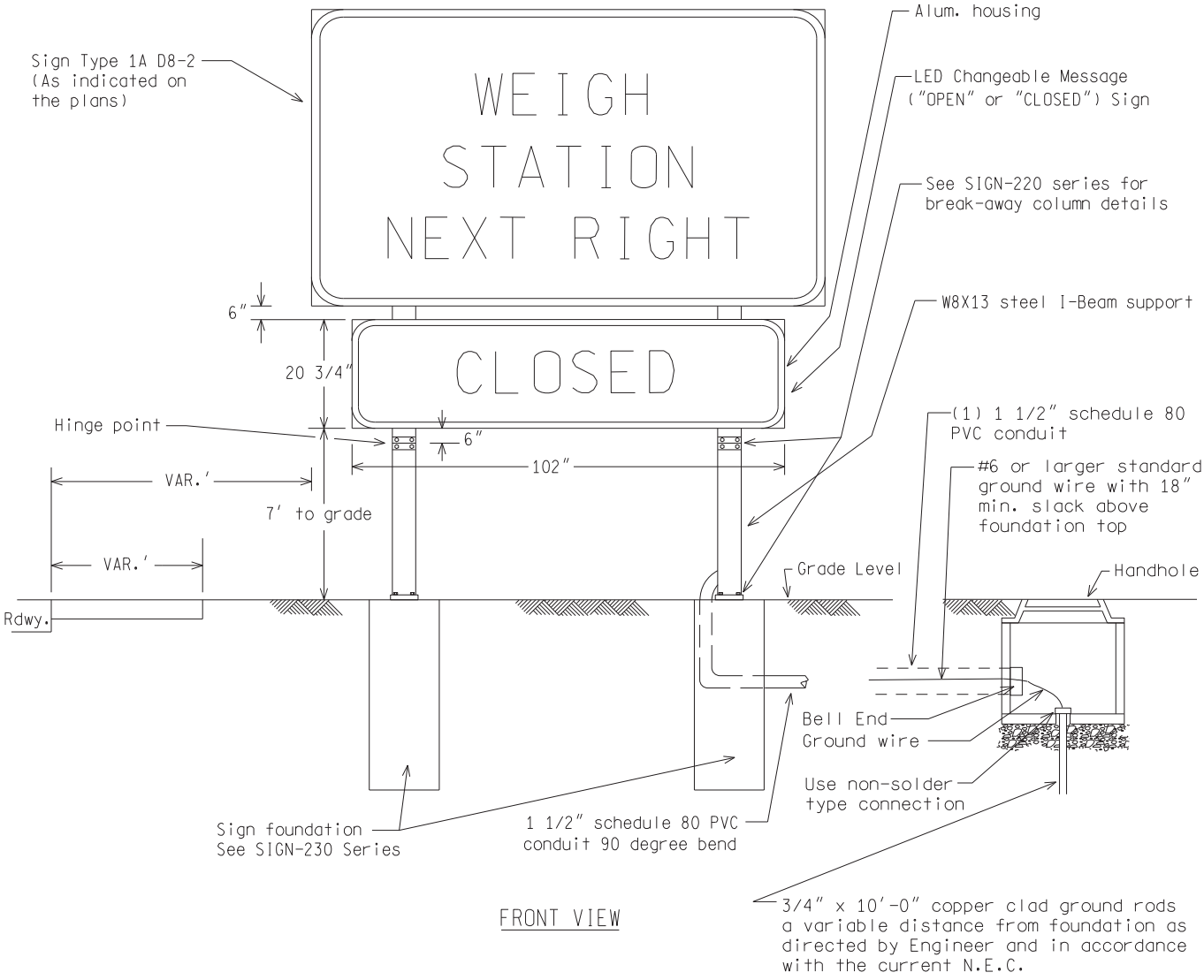
1 1/2" Threaded Metal Hub Plate

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-350-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG350A.dgn Rev. 02/16/17		PLAN DATE		



STEEL COLUMN BREAKAWAY



FRONT VIEW

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG360A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

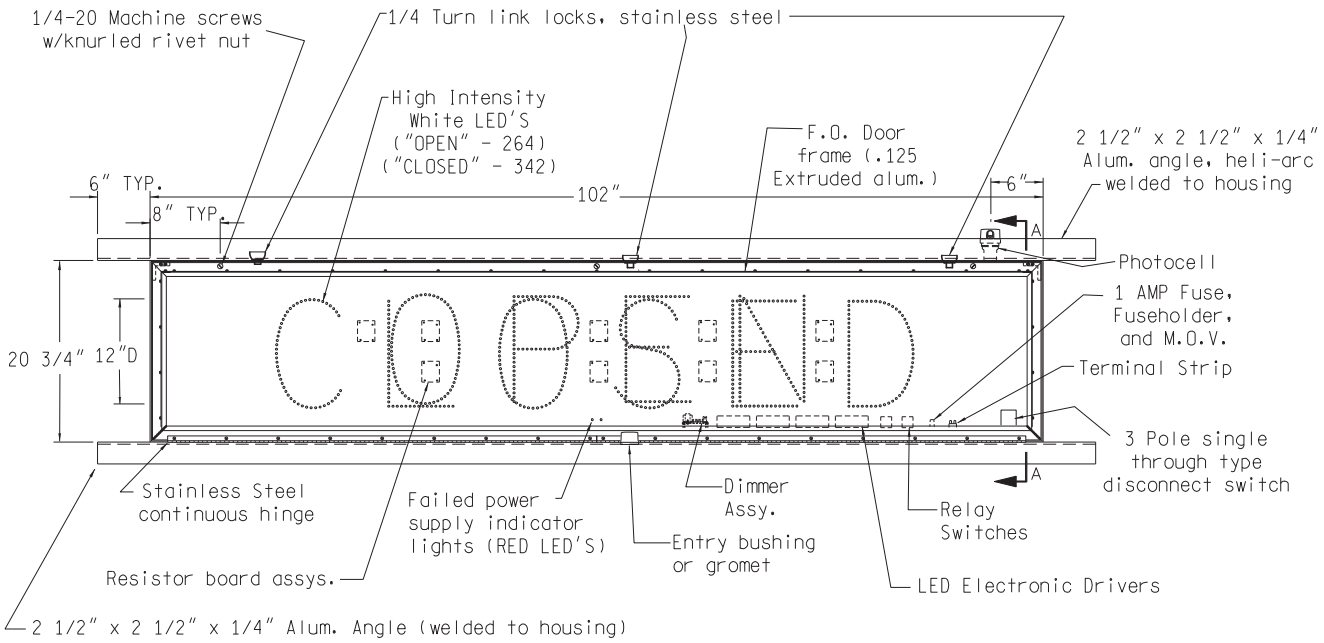
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

LED CHANGEABLE MESSAGE "OPEN-CLOSED" SIGN

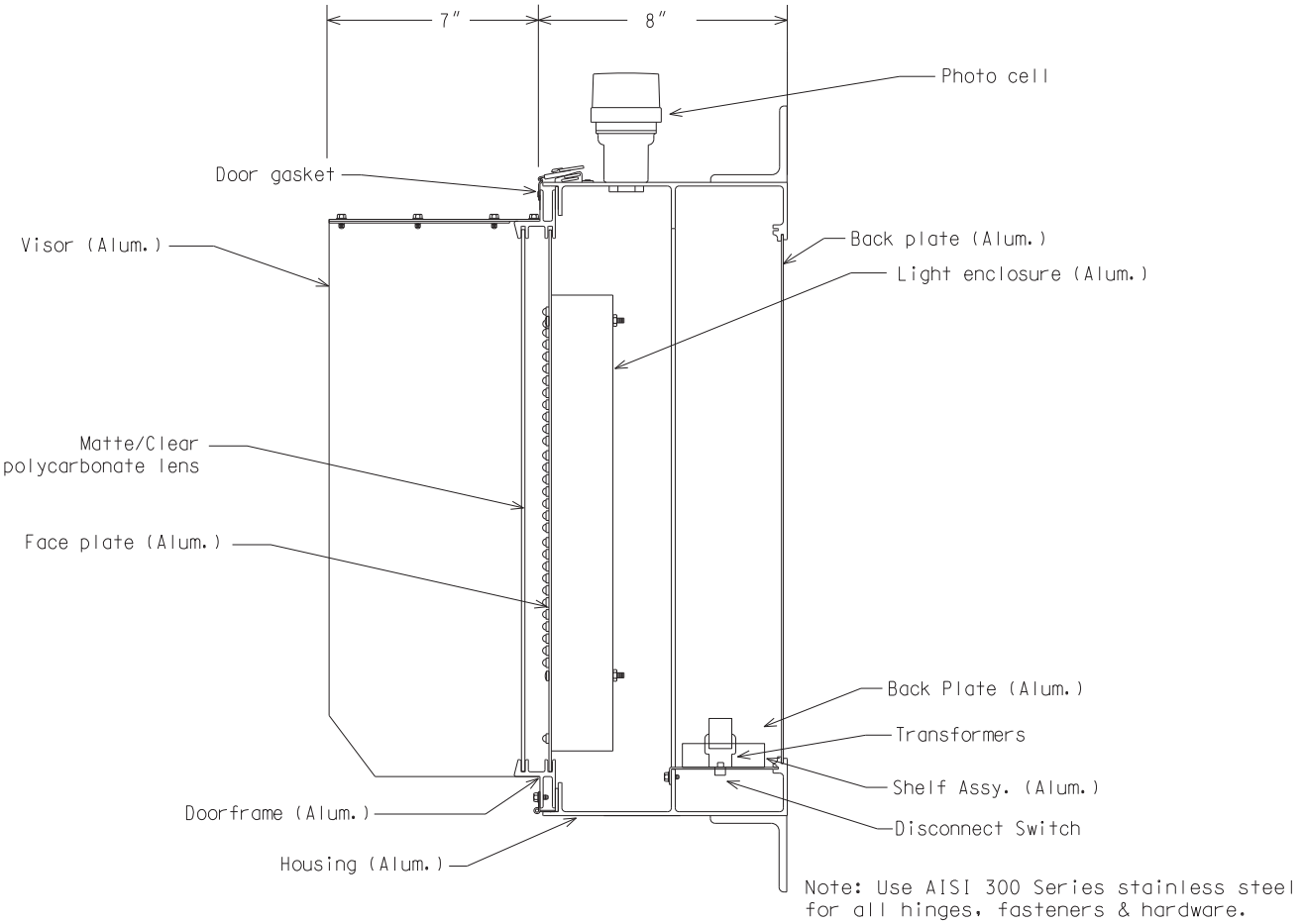
PLAN DATE

SIG-360-A

SHEET 1 of 4



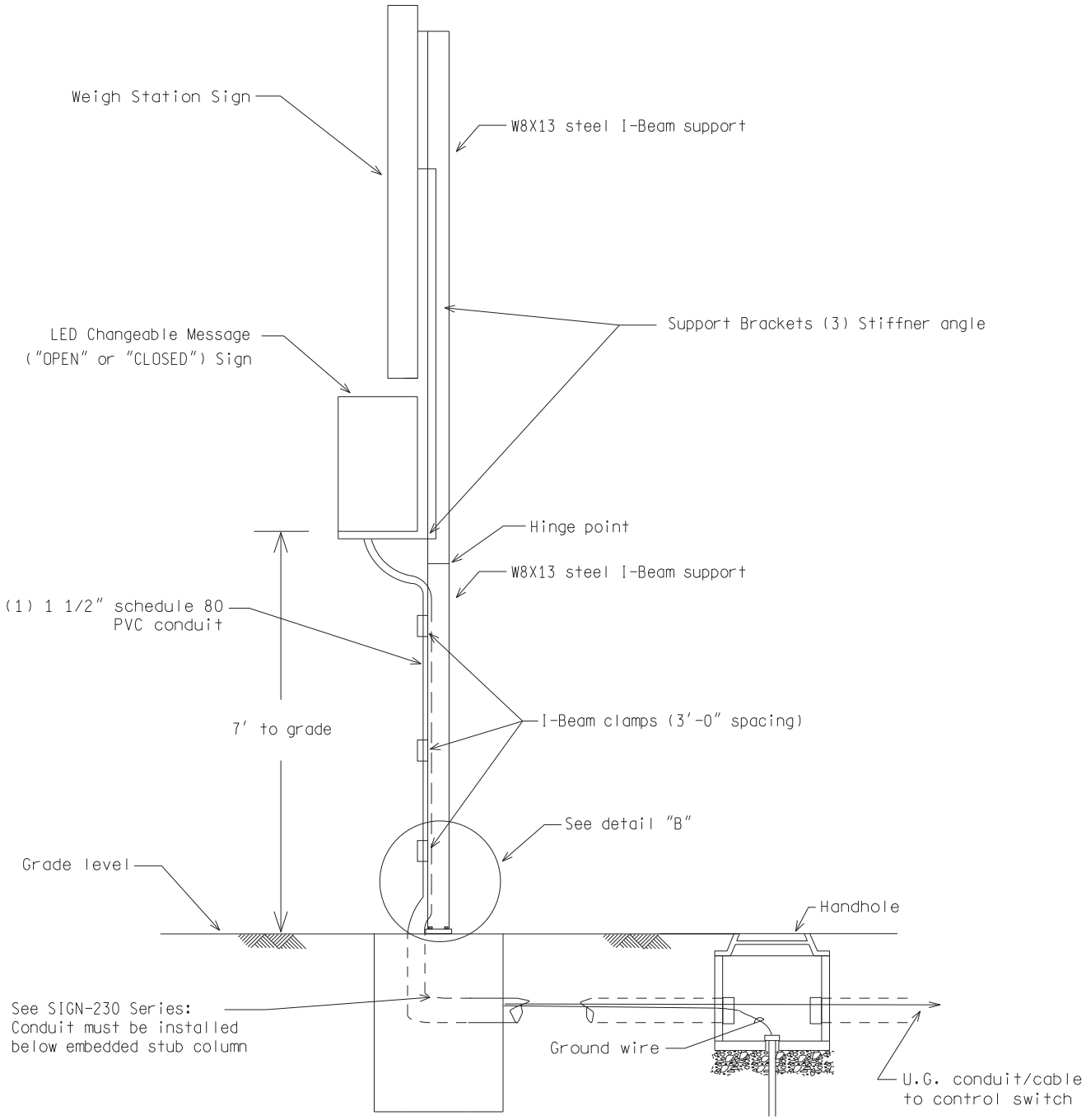
FRONT VIEW



SECTION A-A

NOT TO SCALE

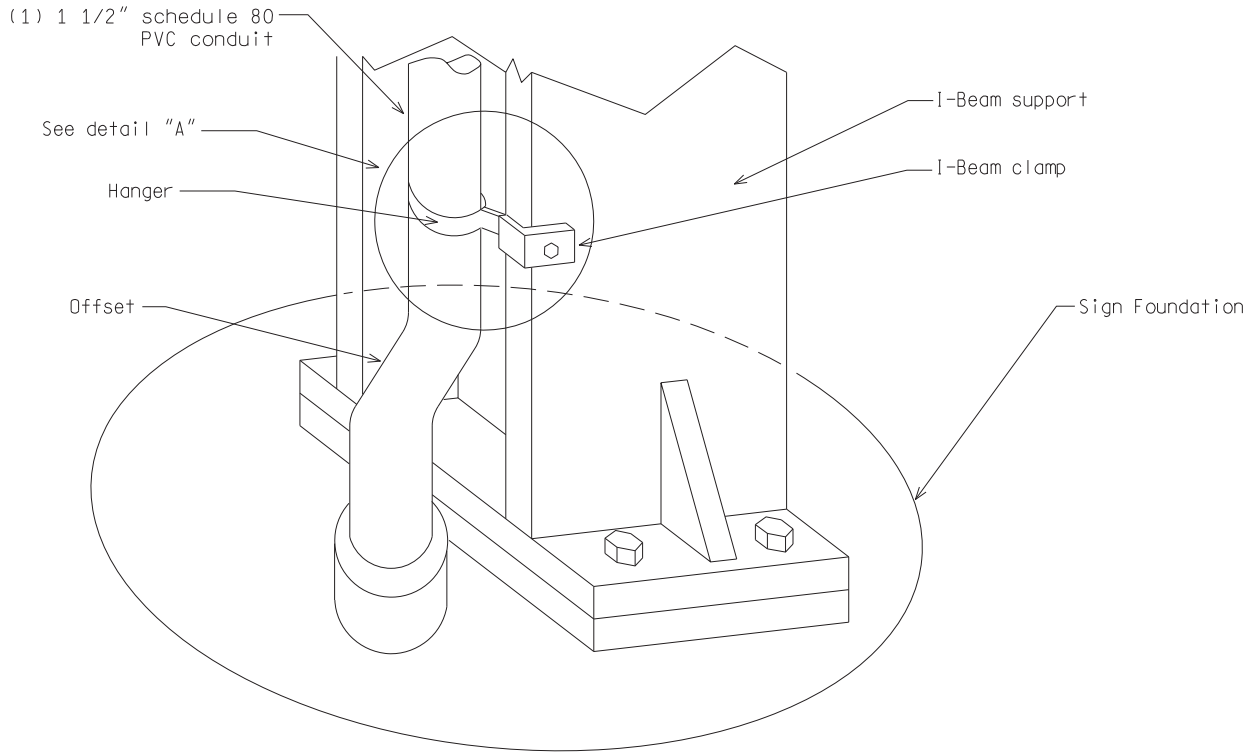
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG360A.dgn Rev. 02/16/17		PLAN DATE	SIG-360-A	SHEET 2 of 4



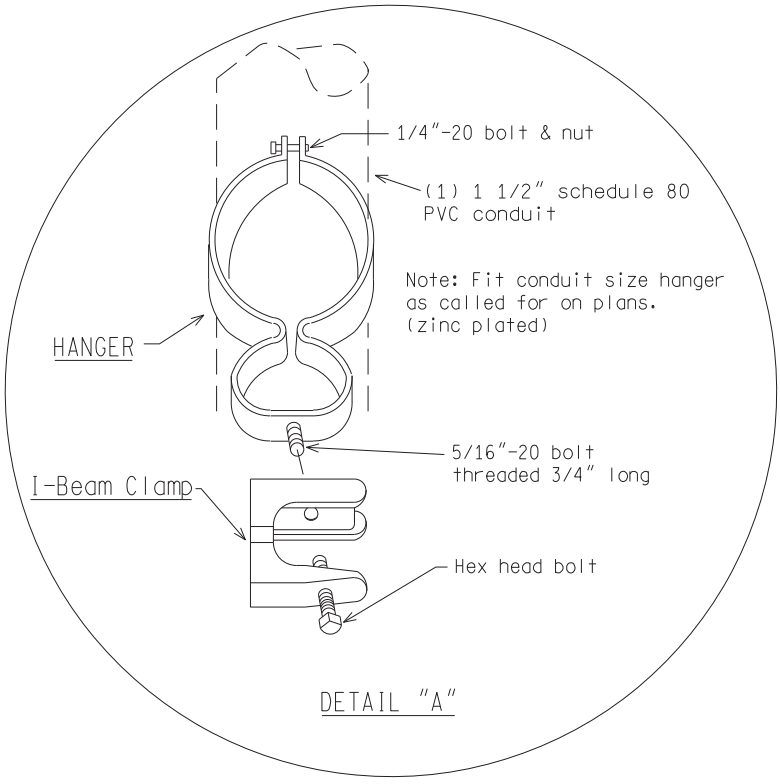
I-BEAM SIDE VIEW

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG360A.dgn Rev. 02/16/17		PLAN DATE	SIG-360-A	SHEET 3 of 4



DETAIL "B"

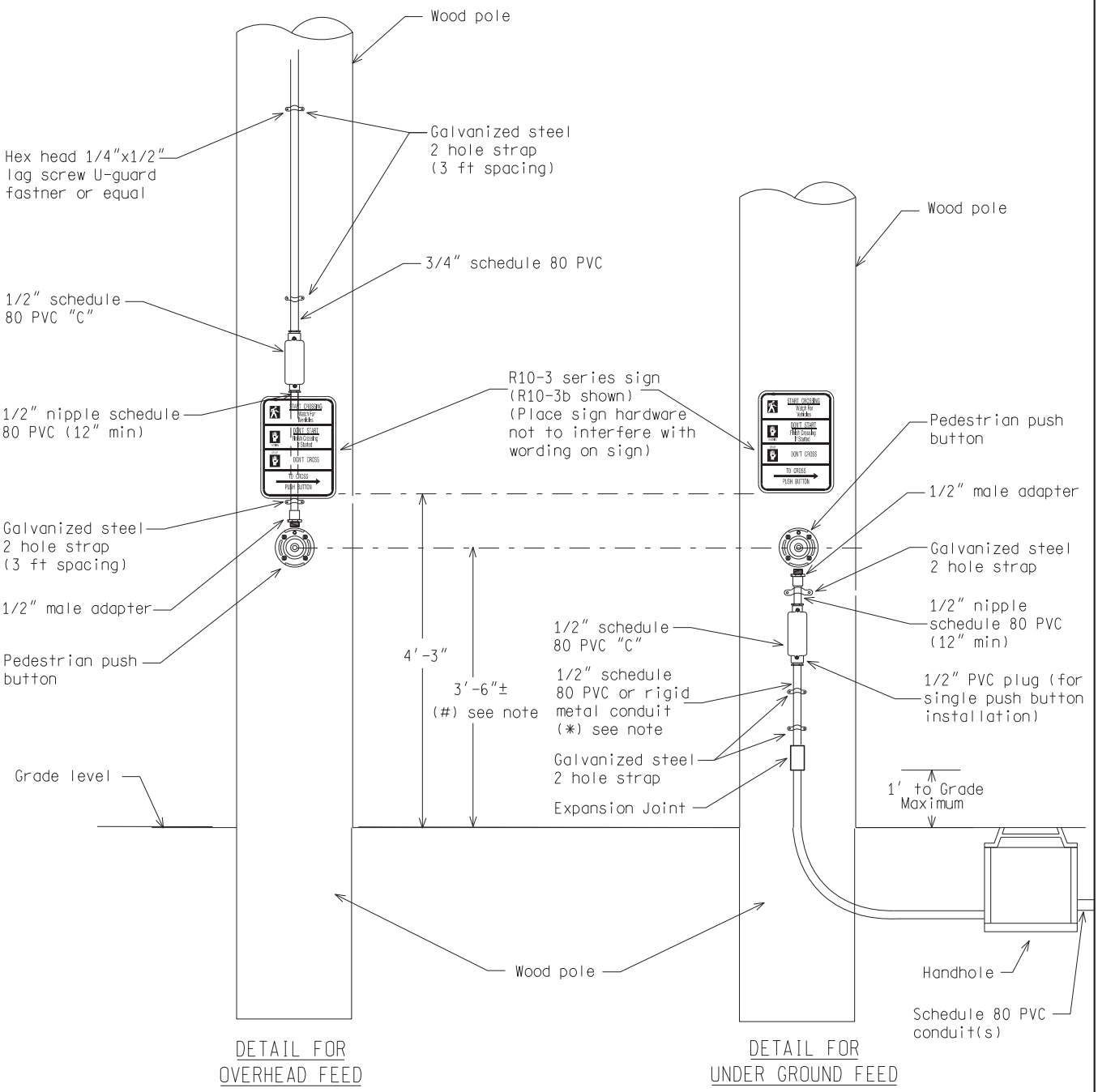


DETAIL "A"

I-BEAM CONDUIT ATTACHMENT DETAILS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-360-A	SHEET 4 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG360A.dgn Rev. 02/16/17		PLAN DATE		



Note: (*) For projects maintained by the Wayne Co. Department of Public Services (WCDPS), use rigid metal for conduit(s) from grade level to 10' (min.) above grade or as directed by the Engineer.

(#) If pushbutton is from 10" to 24" from edge of sidewalk an acceptable range is 38" to 46"

PEDESTRIAN PUSH BUTTON DETAILS ON WOOD POLE

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG400A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

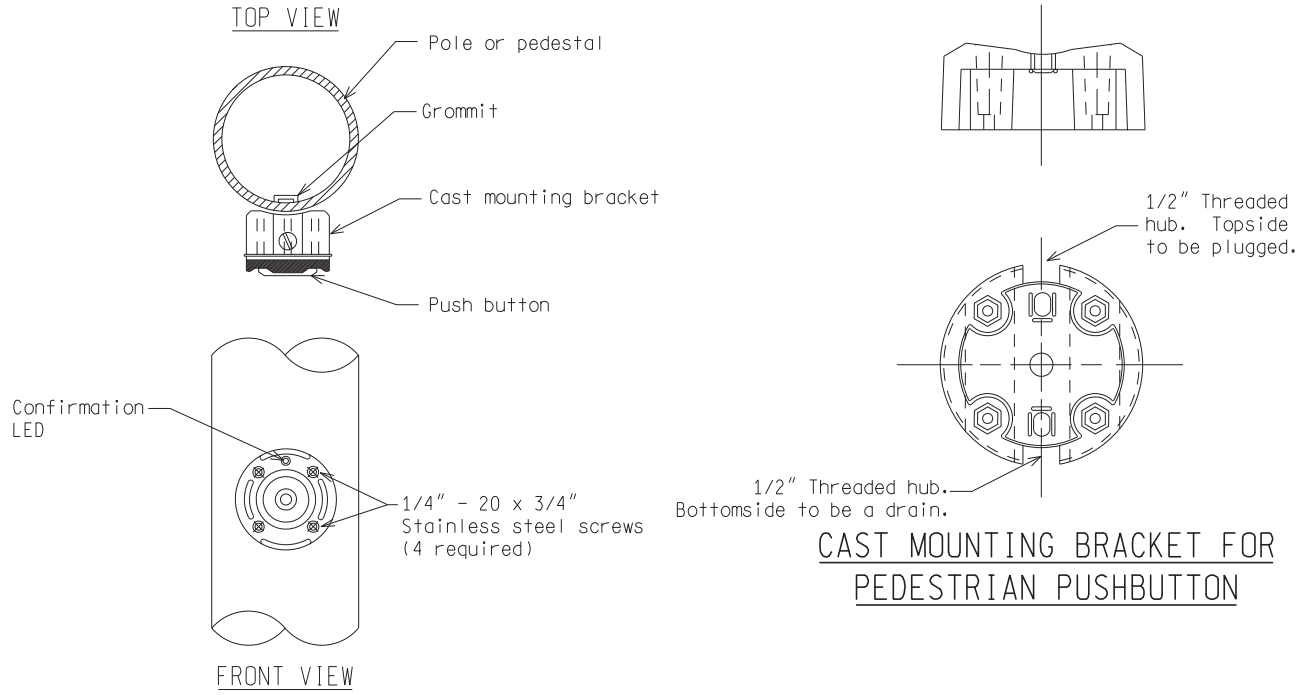
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

PEDESTRIAN PUSH BUTTON DETAILS

PLAN DATE

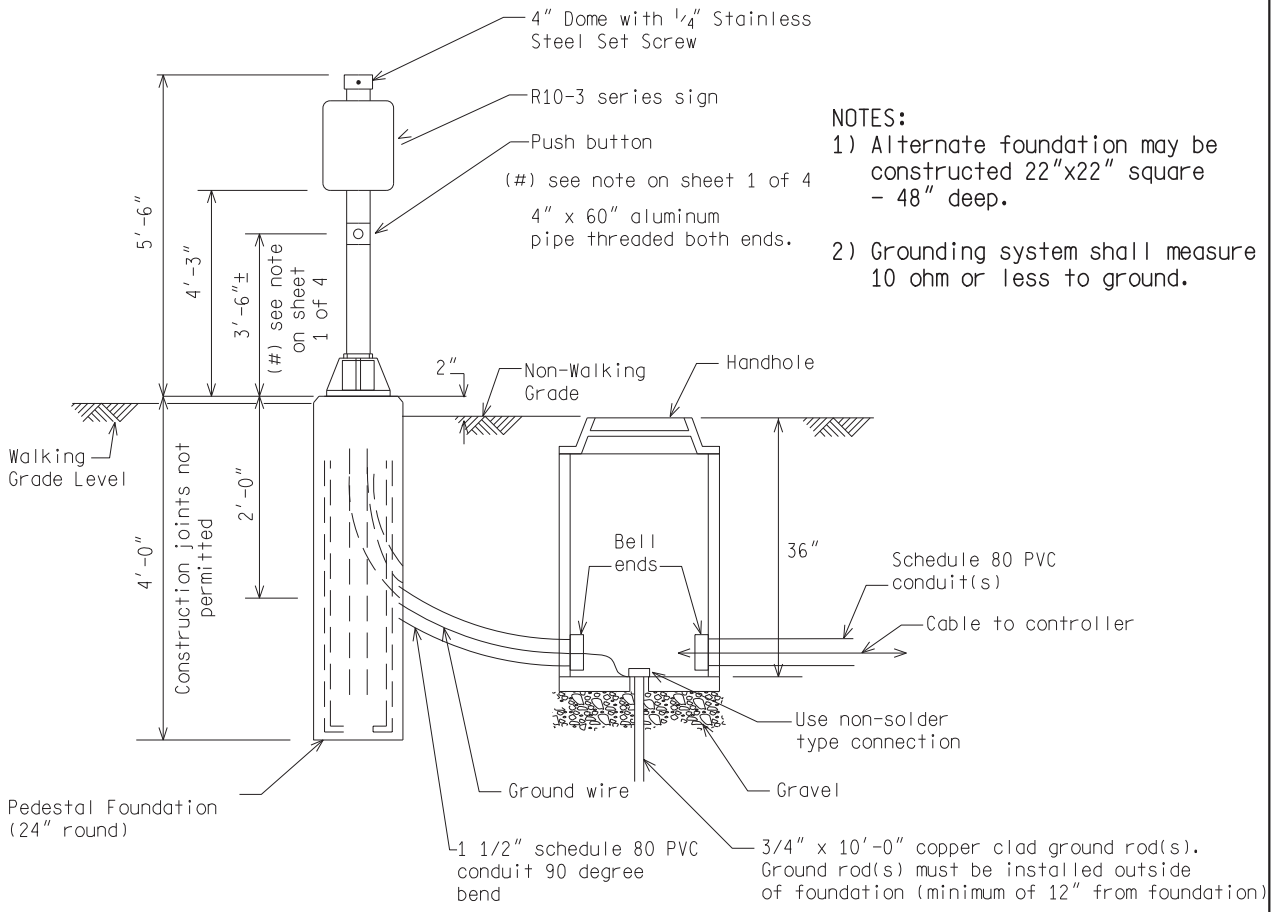
SIG-400-A

SHEET 1 of 4



CAST MOUNTING BRACKET FOR PEDESTRIAN PUSHBUTTON

PEDESTRIAN PUSHBUTTON INSTALLATION ON STEEL POLE OR PEDESTAL

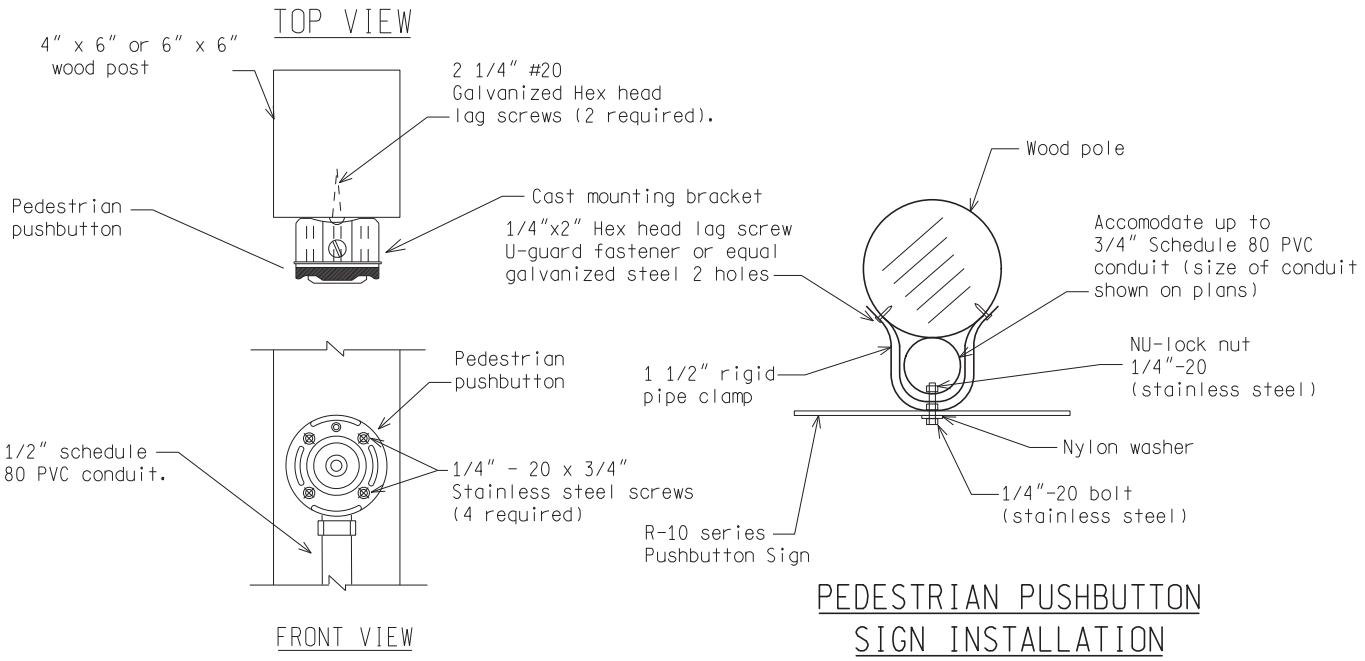


NOTES:
1) Alternate foundation may be constructed 22"x22" square - 48" deep.
2) Grounding system shall measure 10 ohm or less to ground.

PUSH BUTTON PEDESTAL

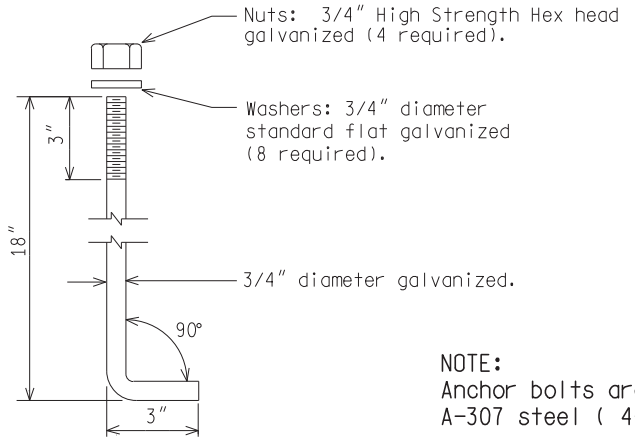
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-400-A	SHEET 2 of4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG400A.dgn Rev. 02/16/17		PLAN DATE		



PEDESTRIAN PUSHBUTTON INSTALLATION ON WOOD POST

PEDESTRIAN PUSHBUTTON SIGN INSTALLATION ON WOOD POLE

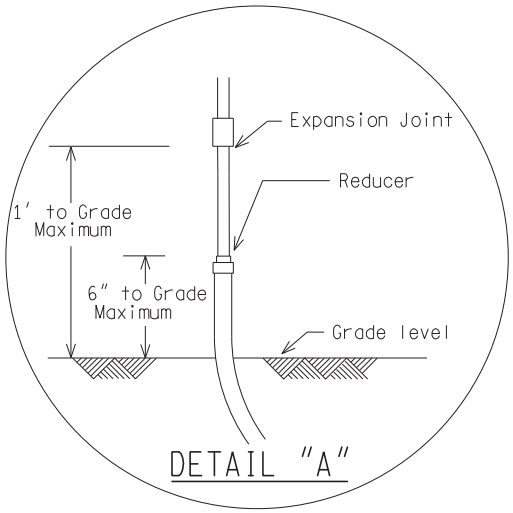


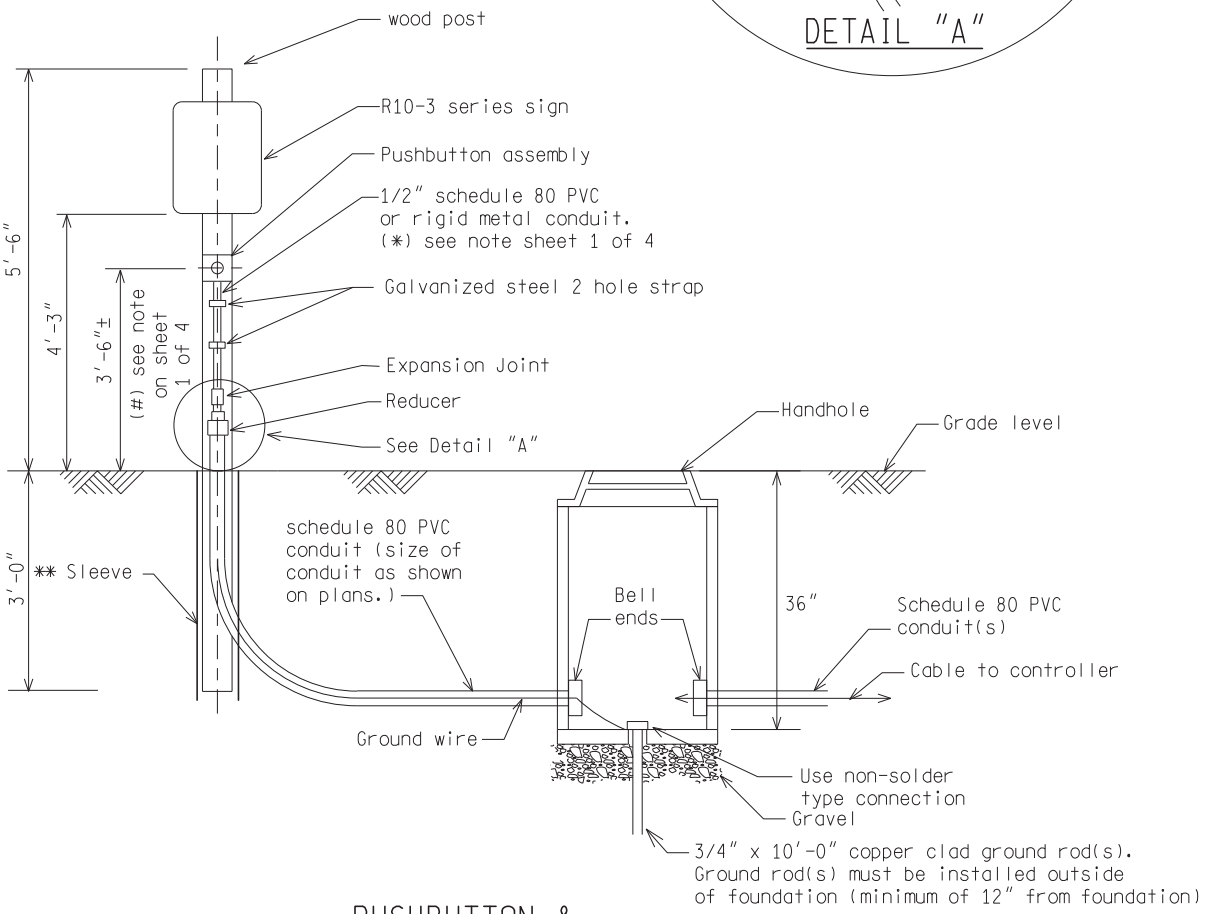
NOTE:
Anchor bolts are to be ASTM A-307 steel (4-required)

ANCHOR BOLT DETAIL

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-400-A	SHEET 3 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG400A.dgn Rev. 02/16/17		PLAN DATE		



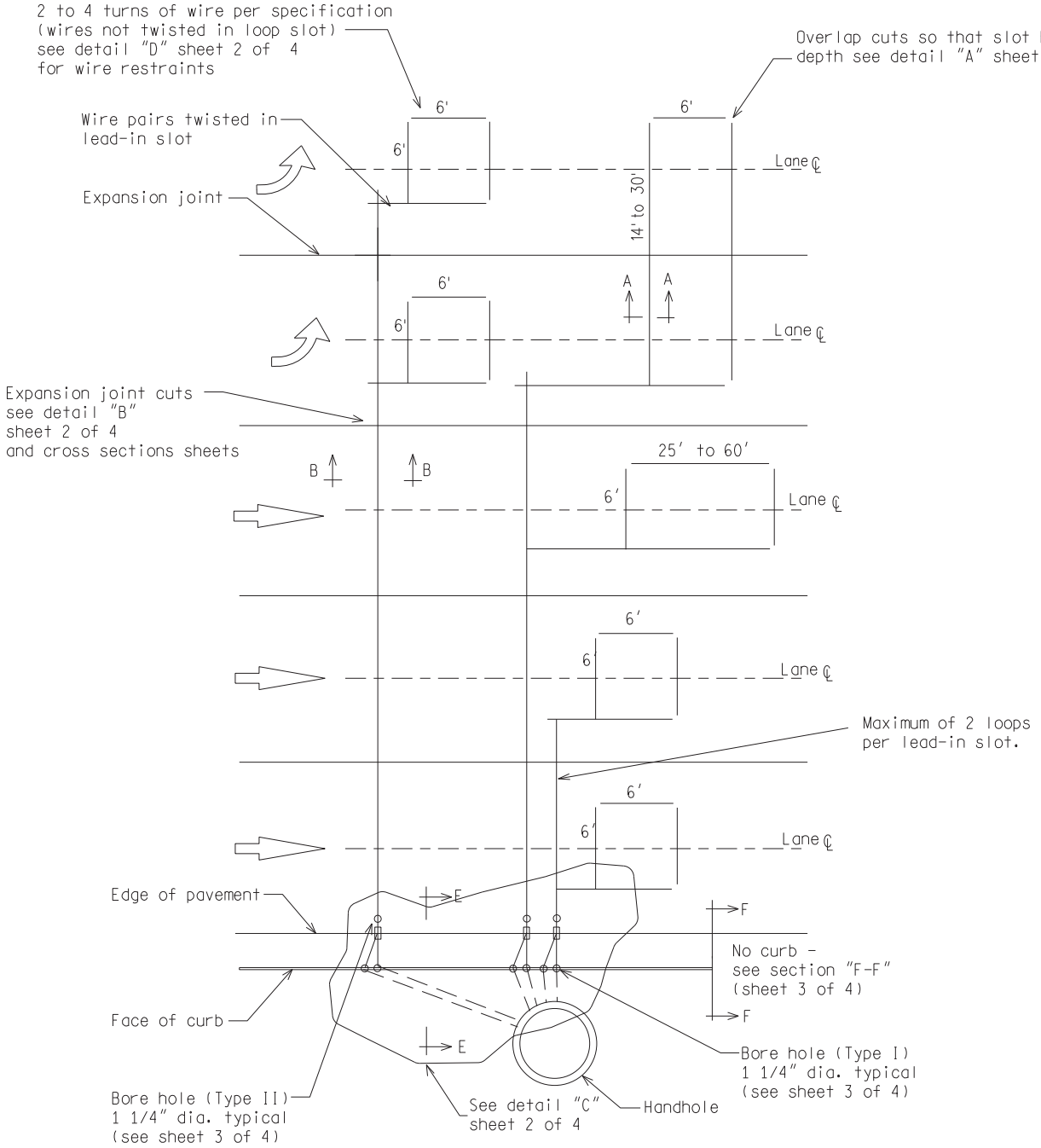


PUSHBUTTON & WOOD POST

** Refer to Standard Plan for Wood Posts

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-400-A	SHEET 4 of4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG400A.dgn Rev. 02/16/17		PLAN DATE		



NOTES:
Lead-in slot may be on either near or far side of loop approach as directed by the Engineer.
Two loops maximum allowed per saw cut from loop to curb.
3 turns required for loops equal to or greater than 6'x10'
4 turns required for loops less than 6'x10'
Refer to contract documents for high pressure washing of saw cuts and removal of debris

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG410A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

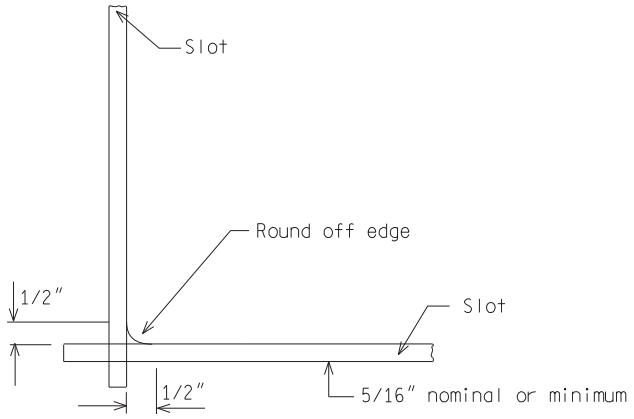
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

TRAFFIC LOOPS

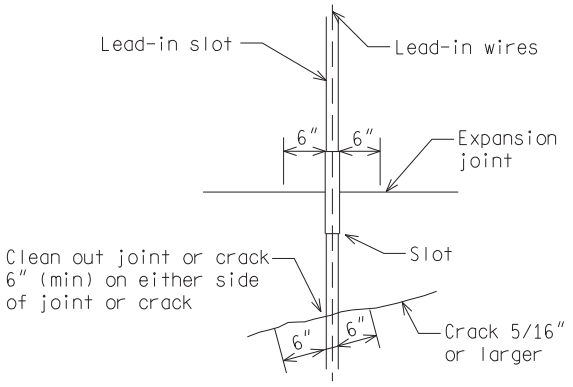
PLAN DATE

SIG-410-A

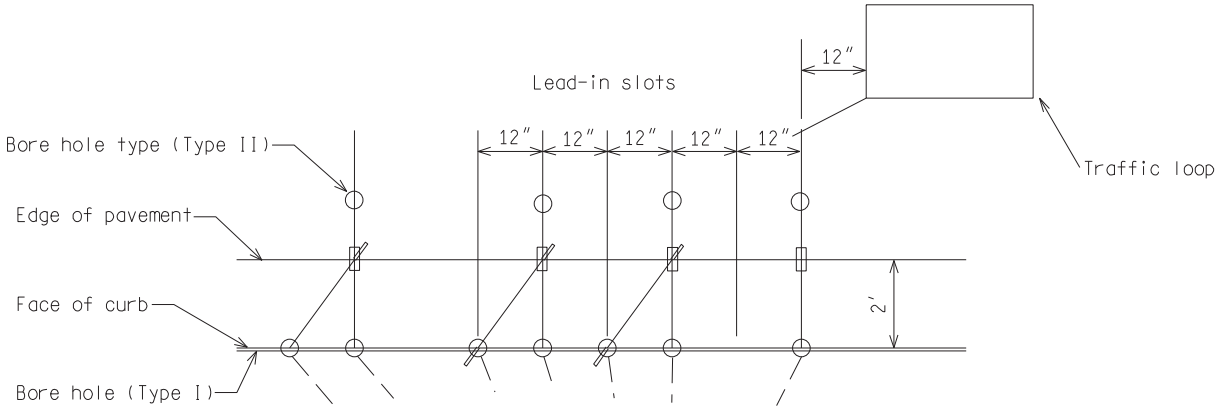
SHEET 1 of 4



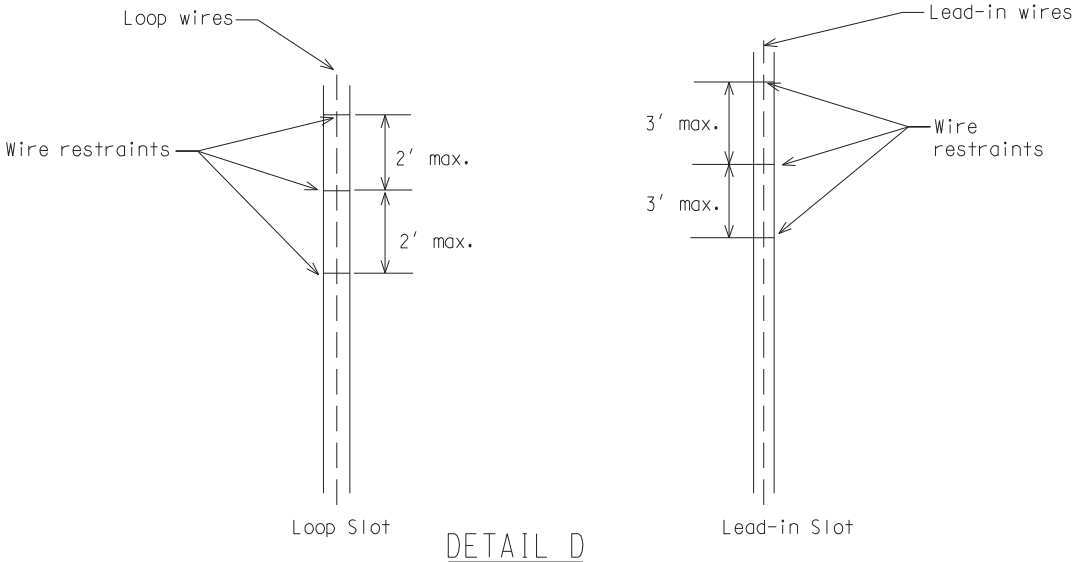
DETAIL A
CORNER CUTS



DETAIL B
EXPANSION JOINT CUTS



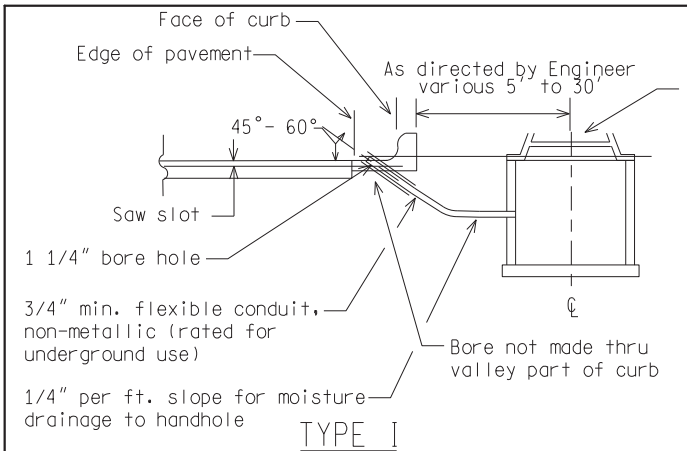
DETAIL C
TERMINATION OF LEAD-IN SLOTS



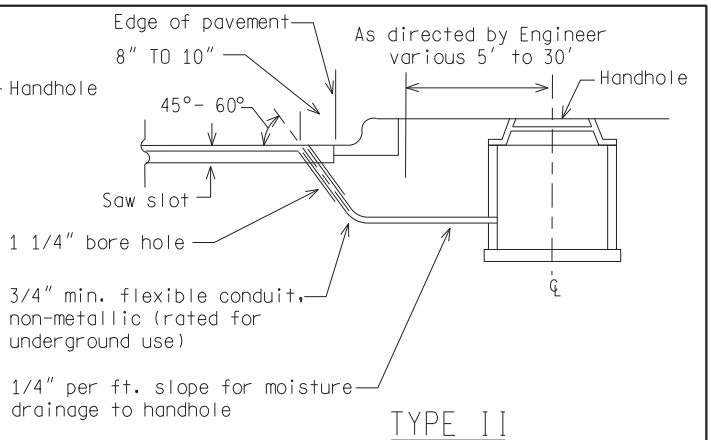
DETAIL D
WIRE RESTRAINTS

NOT TO SCALE

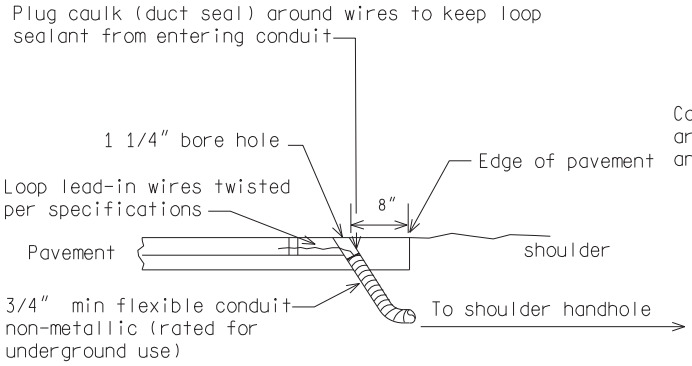
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG410A.dgn Rev. 02/16/17		PLAN DATE	SIG-410-A	SHEET 2 of 4



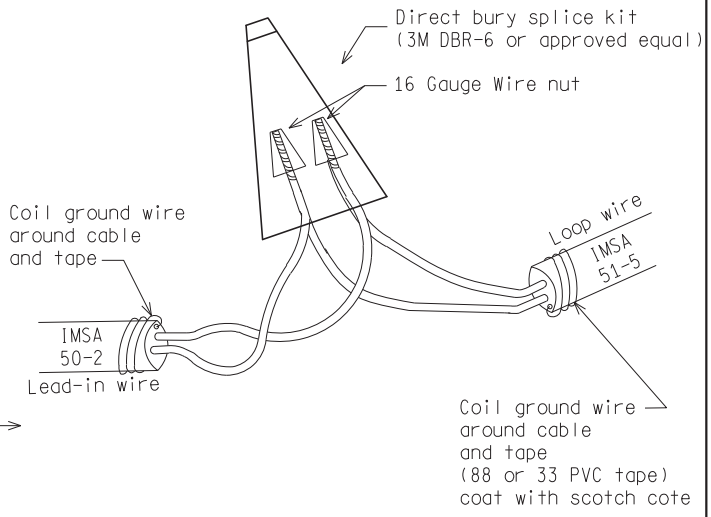
TYPE I
SECTION "E-E"
UNDER CURB INSTALLATION



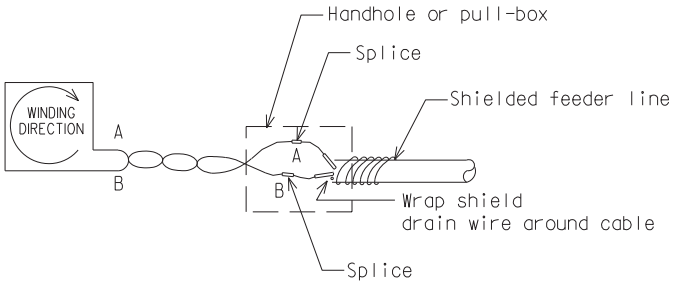
TYPE II
SECTION "E-E"
UNDER CURB INSTALLATION



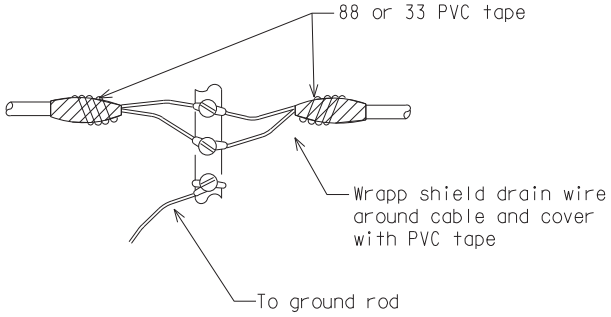
BORE HOLE & LOOP WIRING
SECTION F-F
UNDER PAVEMENT INSTALLATION



HANDHOLE & PULL-BOX SPLICES
(WATERPROOF)



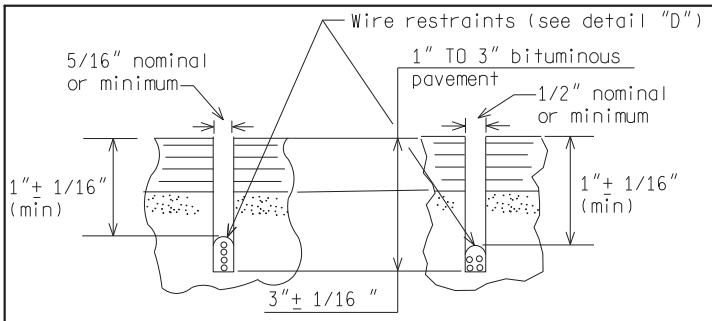
SINGLE LOOP CONNECTION



CONTROLLER CABINET CONNECTION

NOT TO SCALE

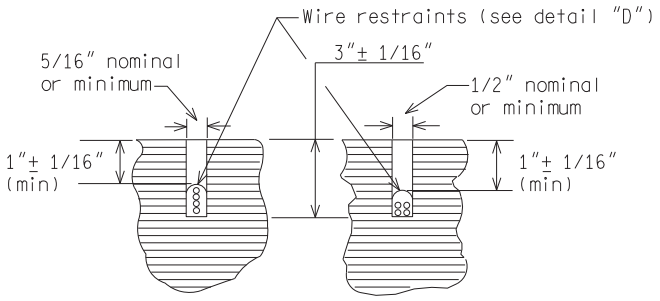
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG410A.dgn Rev. 02/16/17		PLAN DATE	SIG-410-A	SHEET 3 of 4



SECTION A-A
LOOP SLOT

SECTION B-B
LEAD-IN SLOT

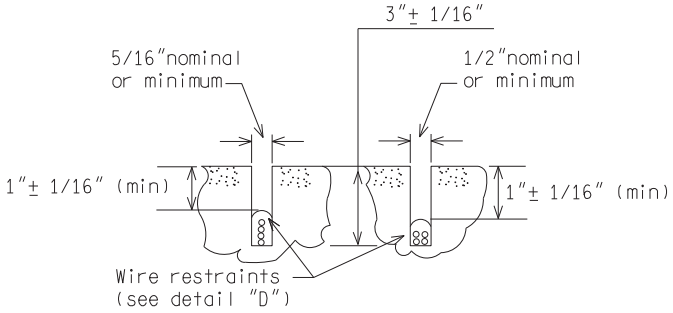
SLOT CROSS SECTIONS
(BITUMINOUS PAVEMENT OVER CONCRETE)



SECTION A-A
LOOP SLOT

SECTION B-B
LEAD-IN SLOT

SLOT CROSS SECTIONS
(BITUMINOUS PAVEMENT)



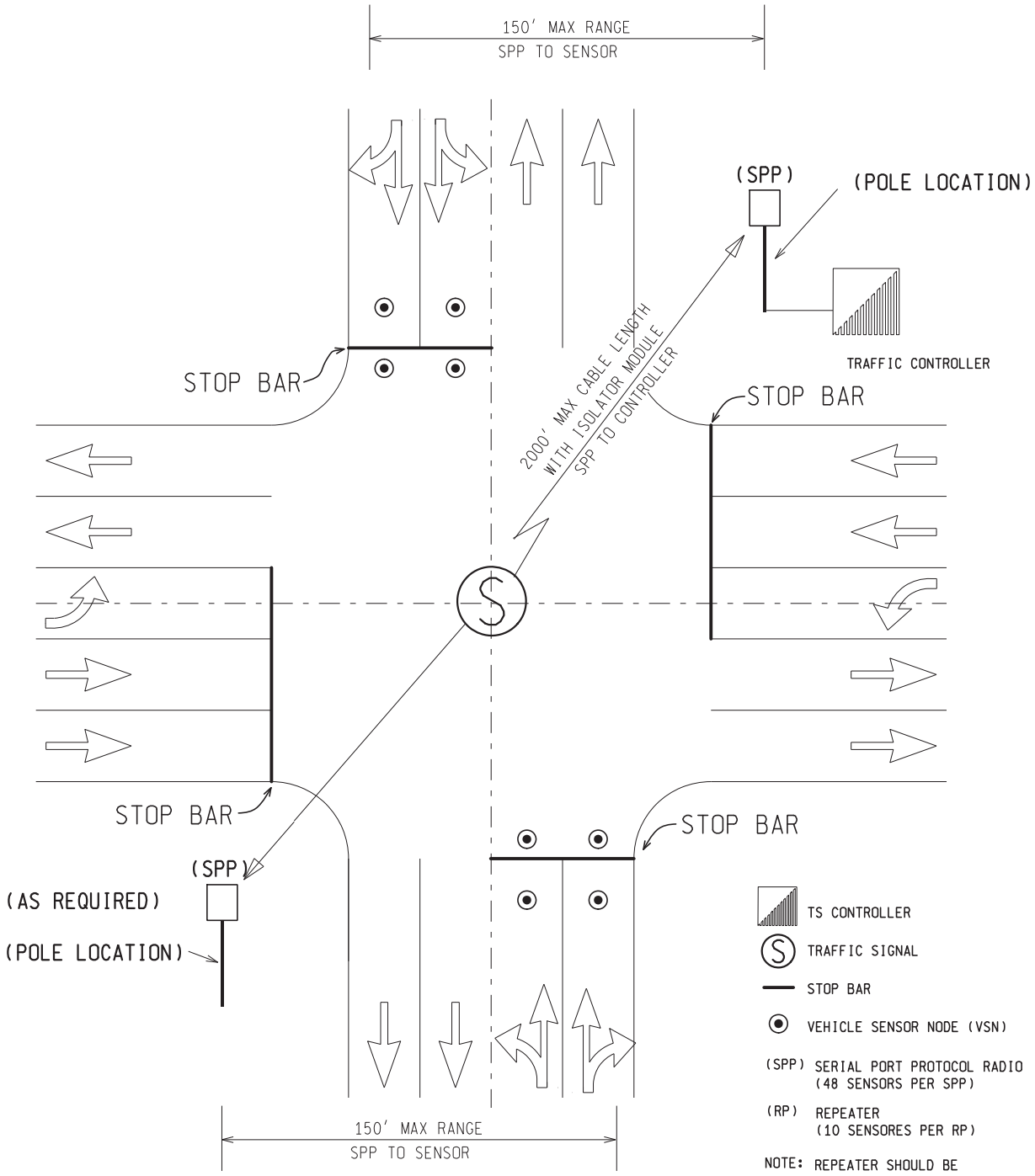
SECTION A-A
LOOP SLOT

SECTION B-B
LEAD-IN SLOT

SLOT CROSS SECTIONS
(CONCRETE PAVEMENT)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG410A.dgn Rev. 02/16/17		PLAN DATE	SIG-410-A	SHEET 4 of 4



TYPICAL VEHICLE SENSOR NODE CONFIGURATION

INTERSECTION DETECTION CROSS ROAD ACTIVATED (NON-LOCKING)

NOT TO SCALE

File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn Rev. 06/18/2013

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: KMZ

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

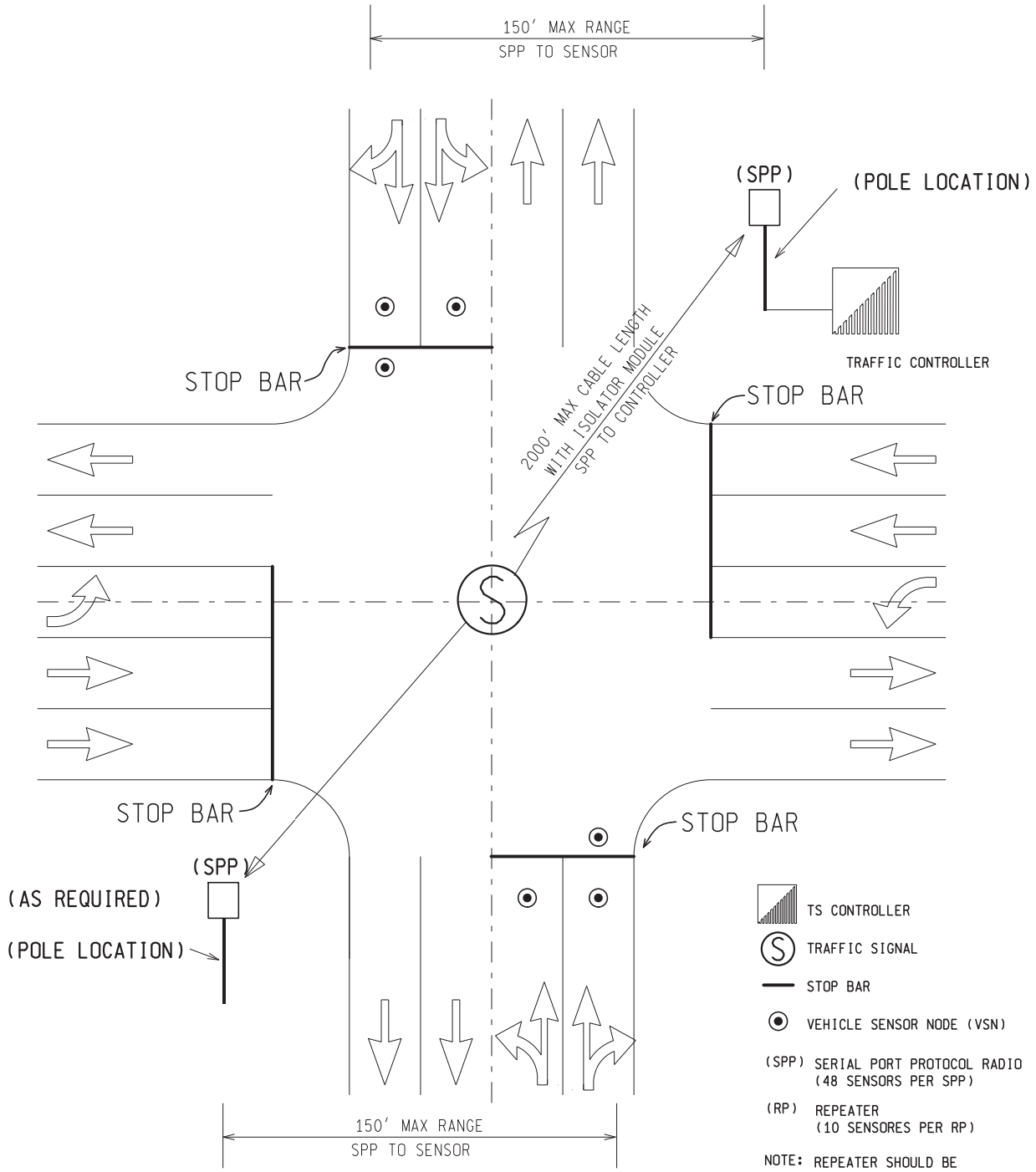
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

WIRELESS VEHICLE DETECTION SYSTEM

PLAN DATE

SIG-420-A

SHEET
1 of 10

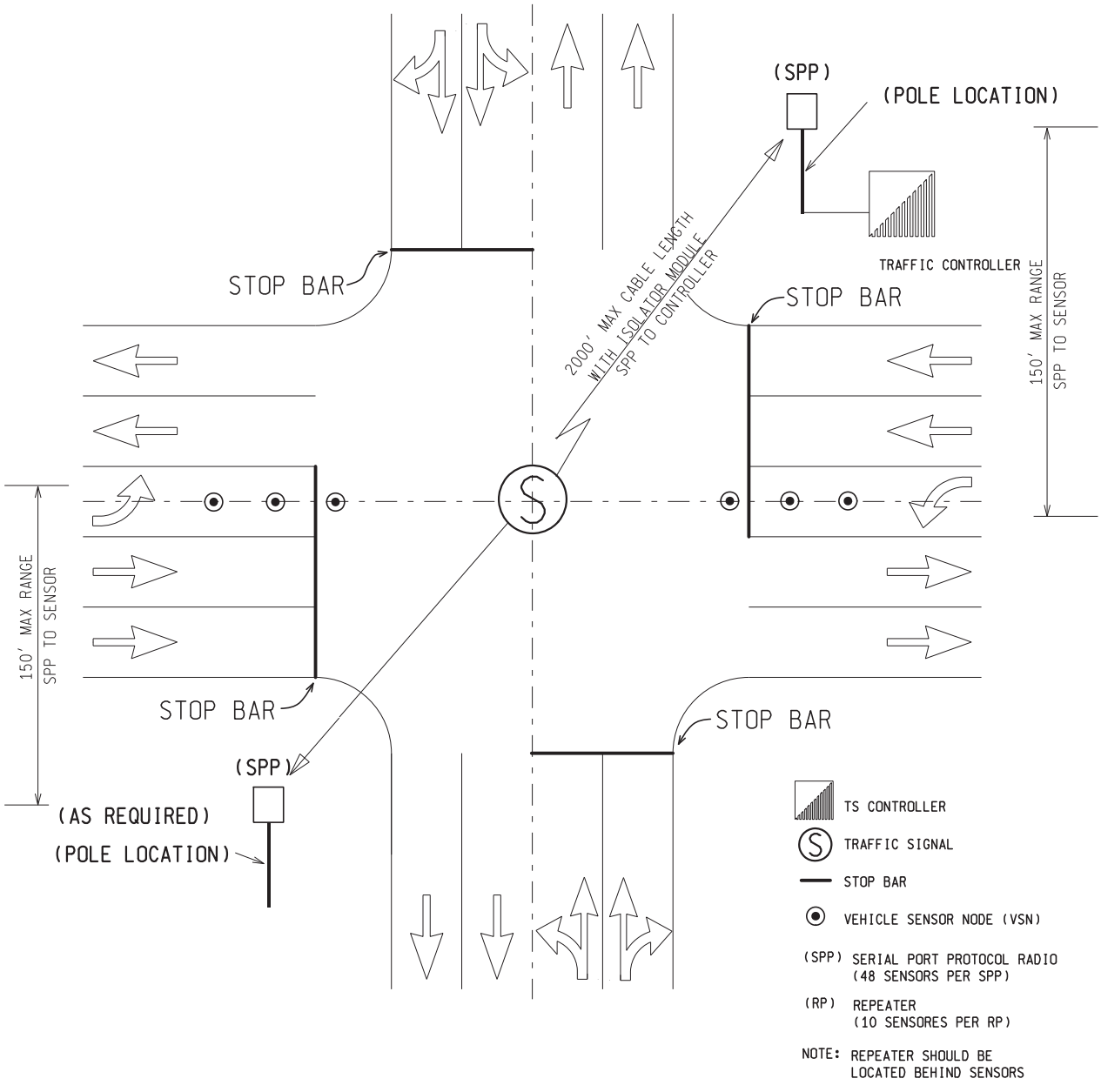


TYPICAL VEHICLE SENSOR NODE CONFIGURATION

INTERSECTION DETECTION CROSS ROAD ACTIVATED (LOCKING)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn	Rev. 06/18/2013	PLAN DATE	SIG-420-A	SHEET 2 of 10

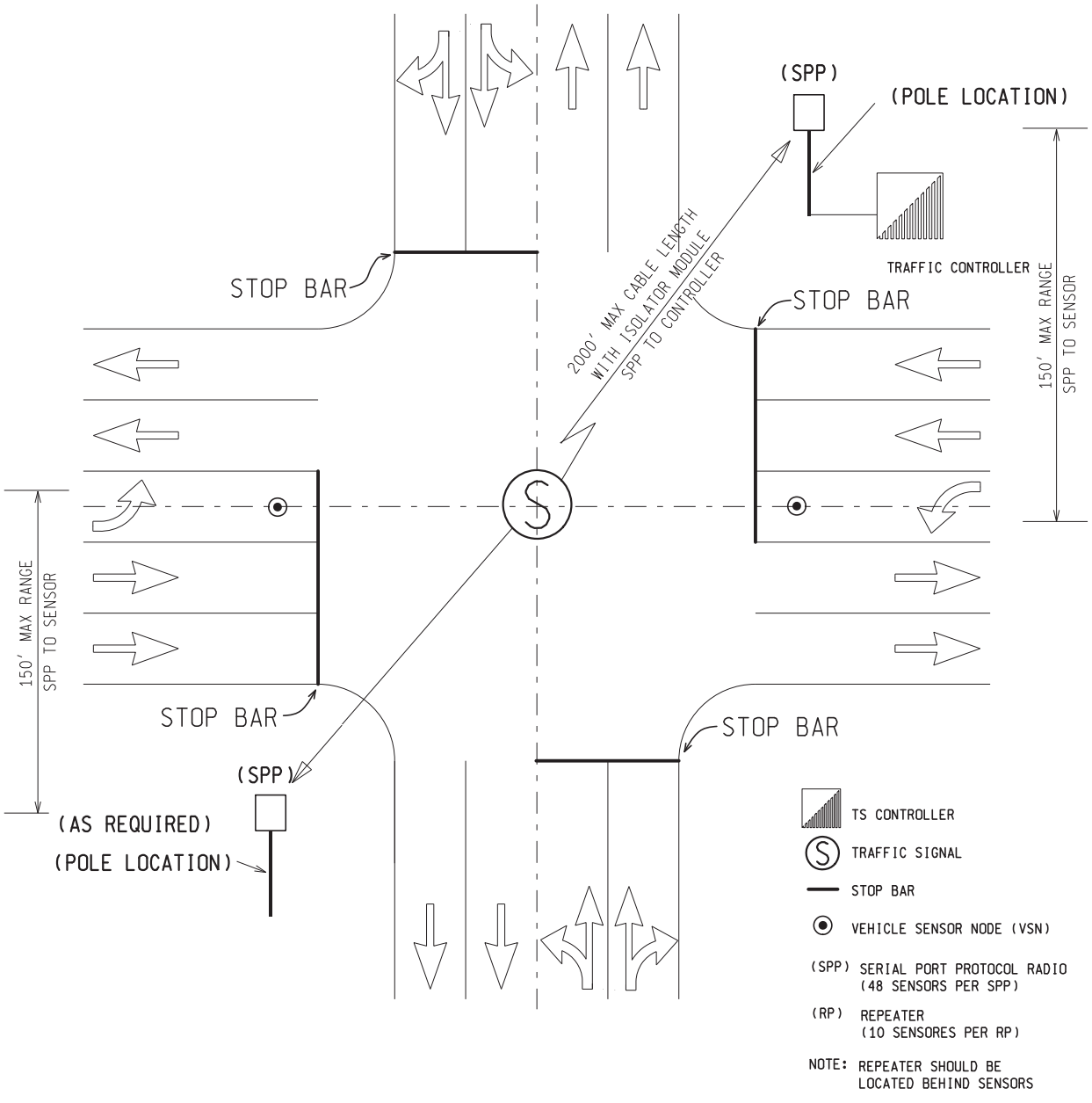


TYPICAL VEHICLE SENSOR NODE CONFIGURATION

INTERSECTION DETECTION LEFT-TURN ACTIVATED
PERMISSIVE PROTECTED (NON-LOCKING)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-420-A	SHEET 3 of 10
File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn	Rev. 06/18/2013	PLAN DATE		

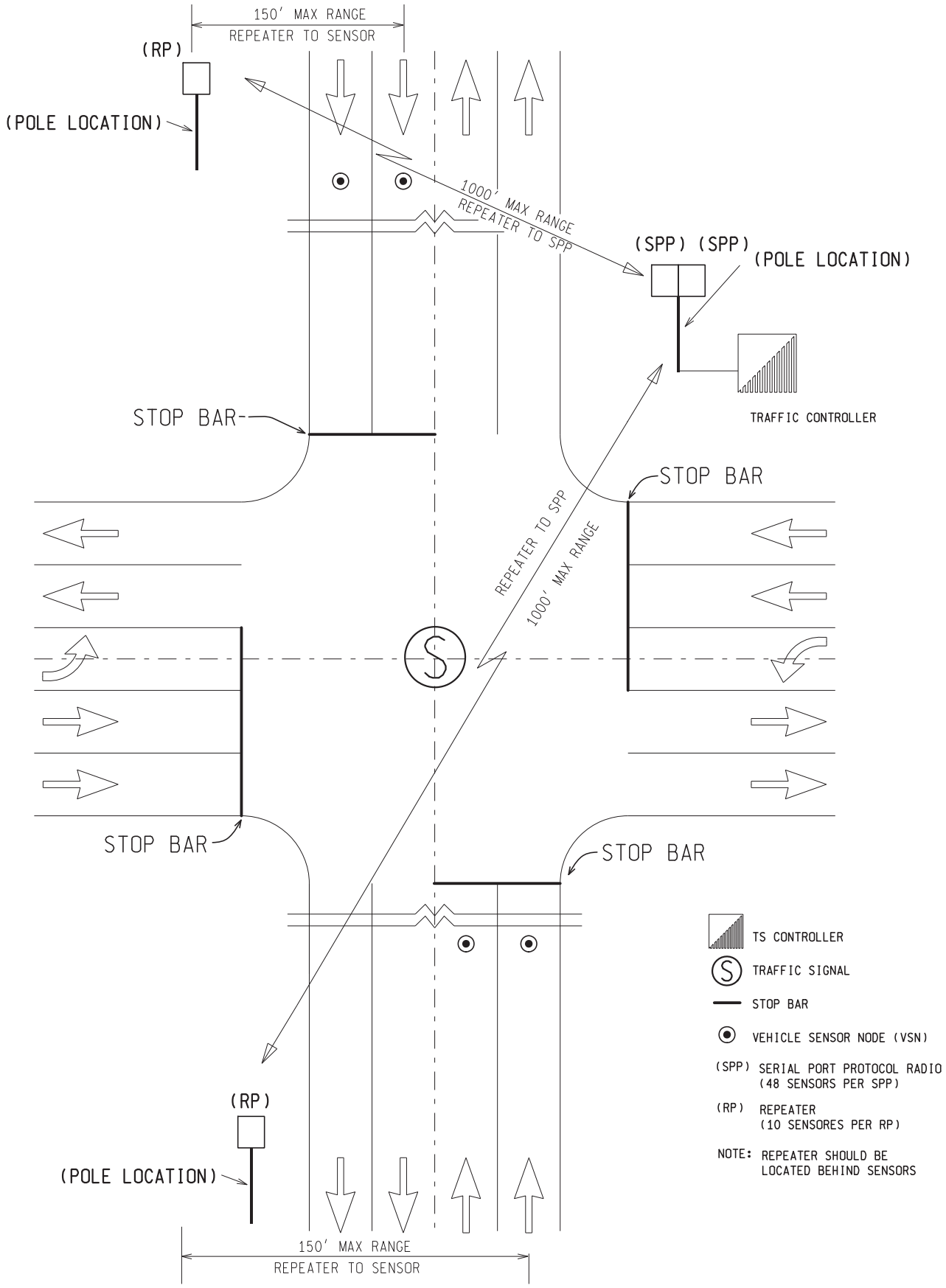


TYPICAL VEHICLE SENSOR NODE CONFIGURATION

INTERSECTION DETECTION LEFT-TURN ACTIVATED PROTECTED ONLY (LOCKING)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-420-A	SHEET 4 of 10
File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn	Rev. 06/18/2013	PLAN DATE		

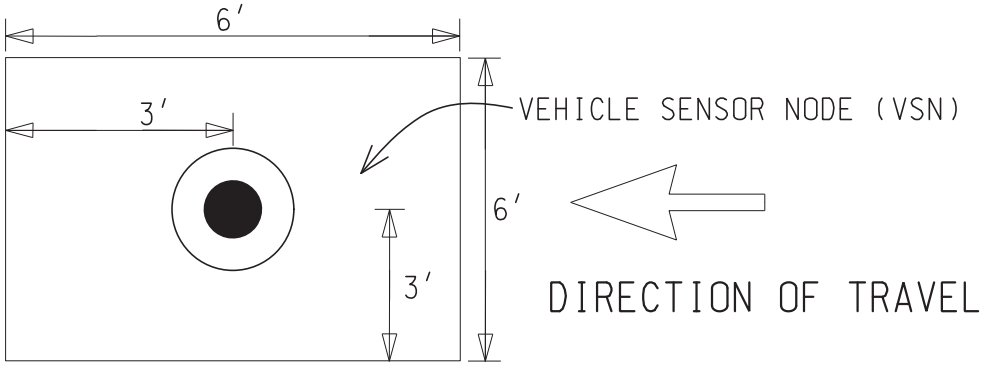


TYPICAL VEHICLE SENSOR NODE CONFIGURATION

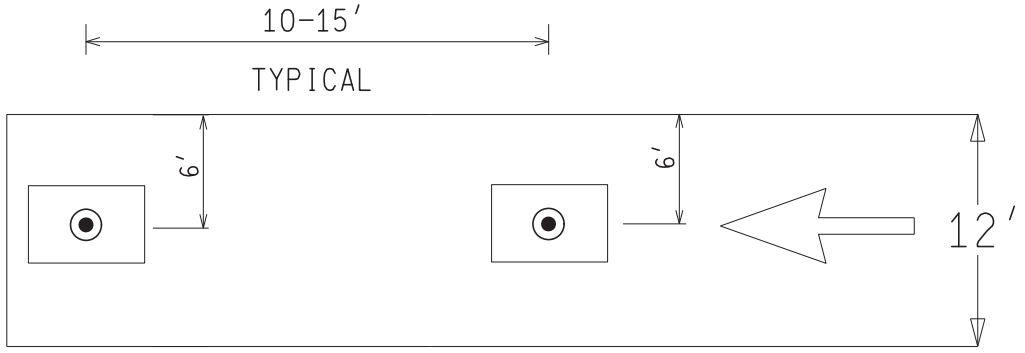
NOT TO SCALE

ADVANCE DETECTION

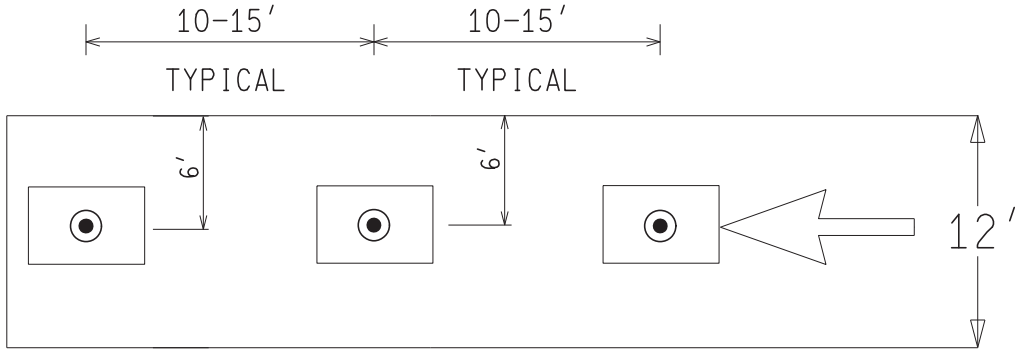
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-420-A	SHEET 5 of 10
File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn	Rev. 06/18/2013	PLAN DATE		



TYPICAL 6′ X 6′ DETECTION ZONE



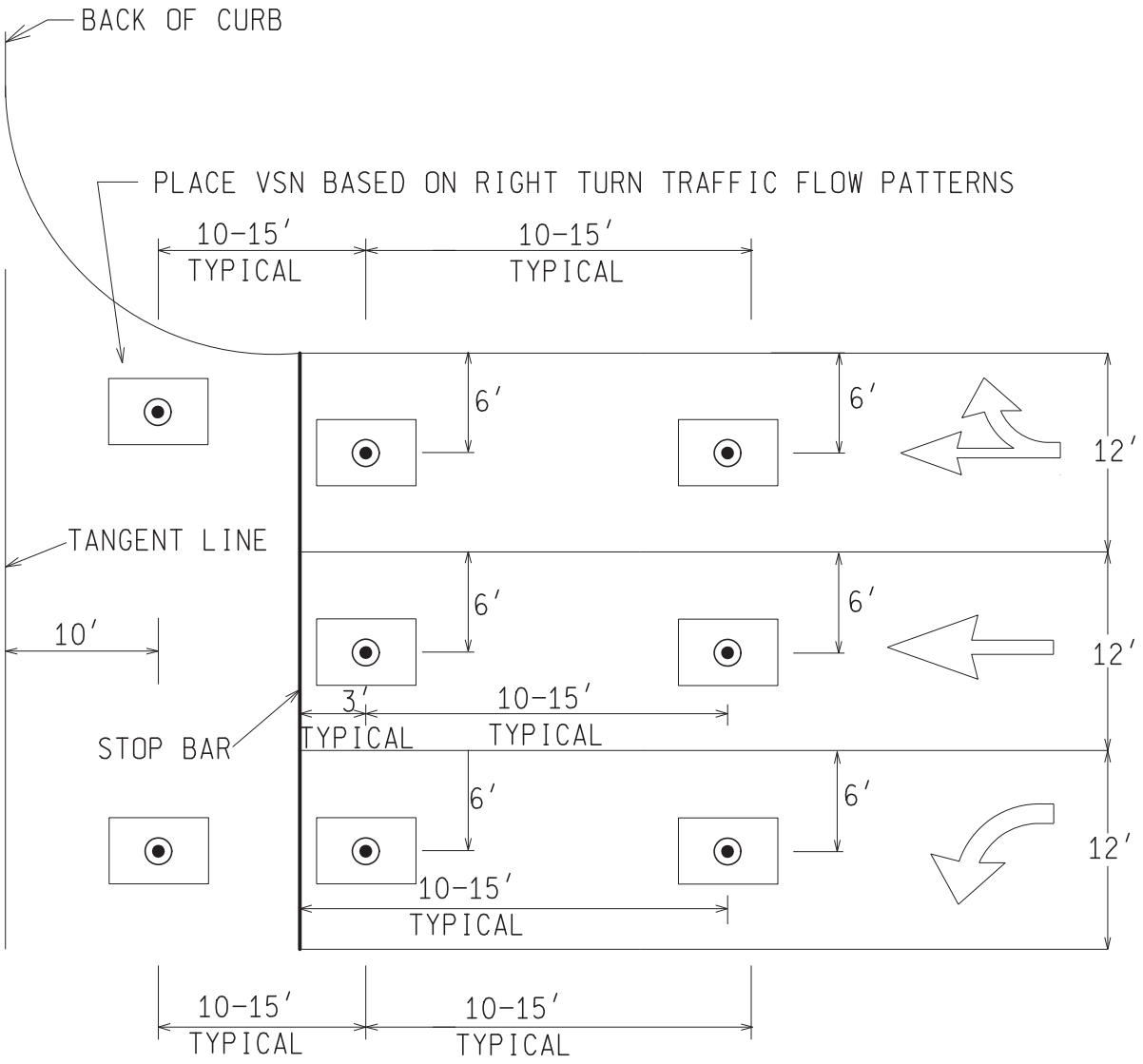
TYPICAL 6′ X 20′ DETECTION ZONE



TYPICAL 6′ X 30′ DETECTION ZONE

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-420-A	SHEET 6 of 10
File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn Rev. 06/18/2013		PLAN DATE		

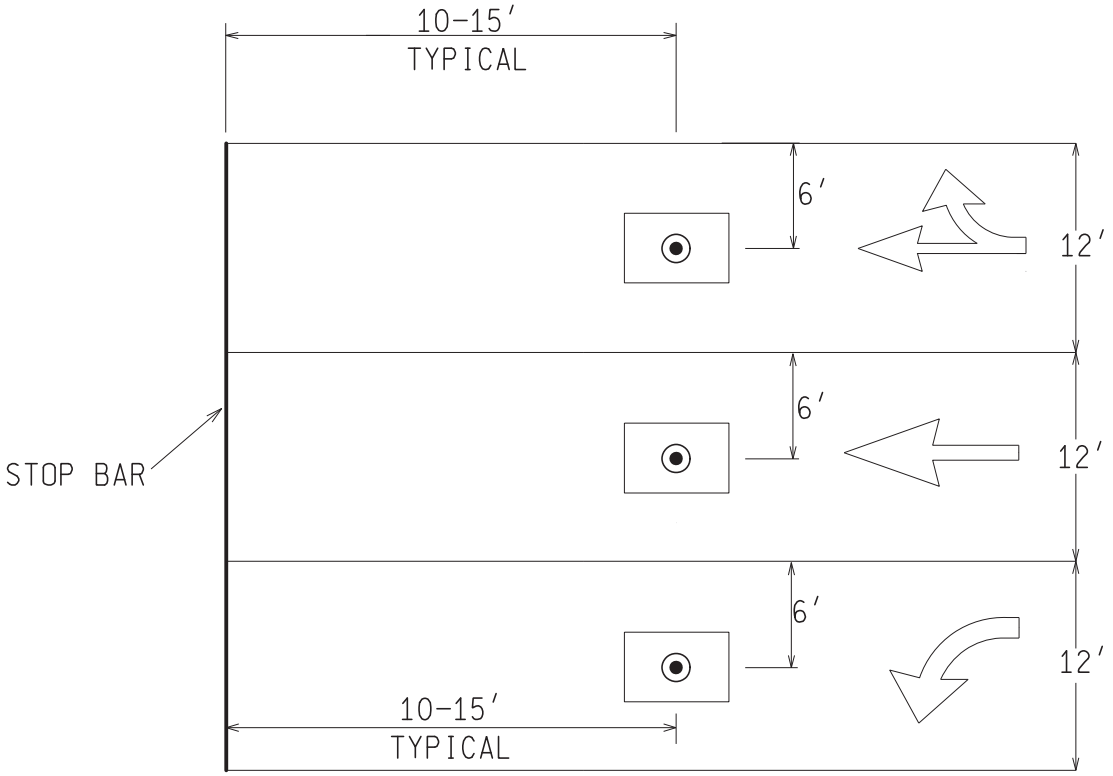


TYPICAL VEHICLE SENSOR NODE (NON-LOCKING) INSTALLATION DIAGRAM

FOR A TWO PHASE (NON-COORDINATED) APPROACH WITH (NON-LOCKING) PERMISSIVE OR PERMISSIVE-PROTECTED LEFT TURN PHASING

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-420-A	SHEET 7 of 10
File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn	Rev. 06/18/2013	PLAN DATE		

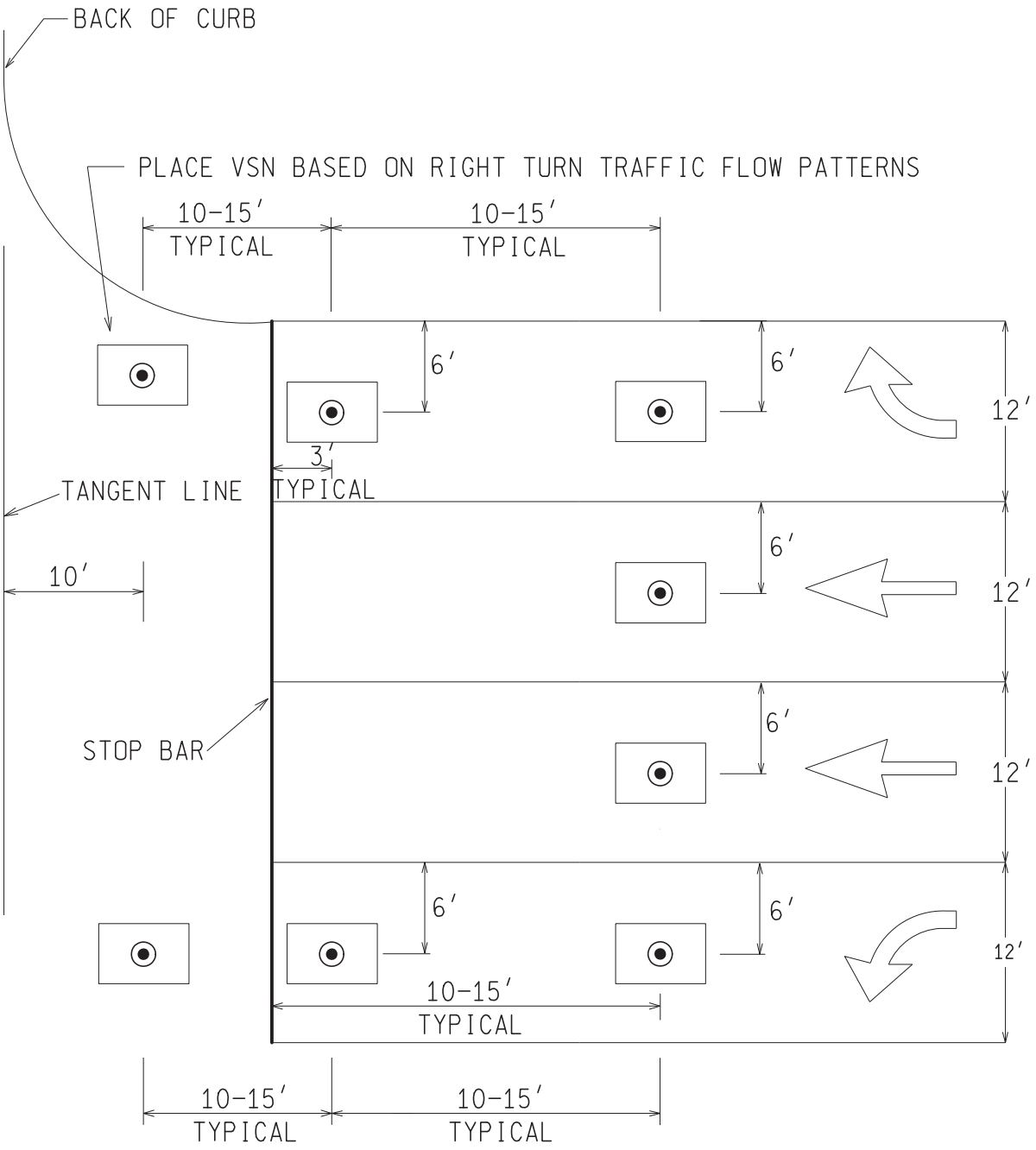


TYPICAL VEHICLE SENSOR NODE (LOCKING) INSTALLATION DIAGRAM

FOR AT TWO PHASE APPROACH WITH (LOCKING)
PROTECTED ONLY LEFT TURN PHASING

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-420-A	SHEET 8 of 10
File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn	Rev. 06/18/2013	PLAN DATE		

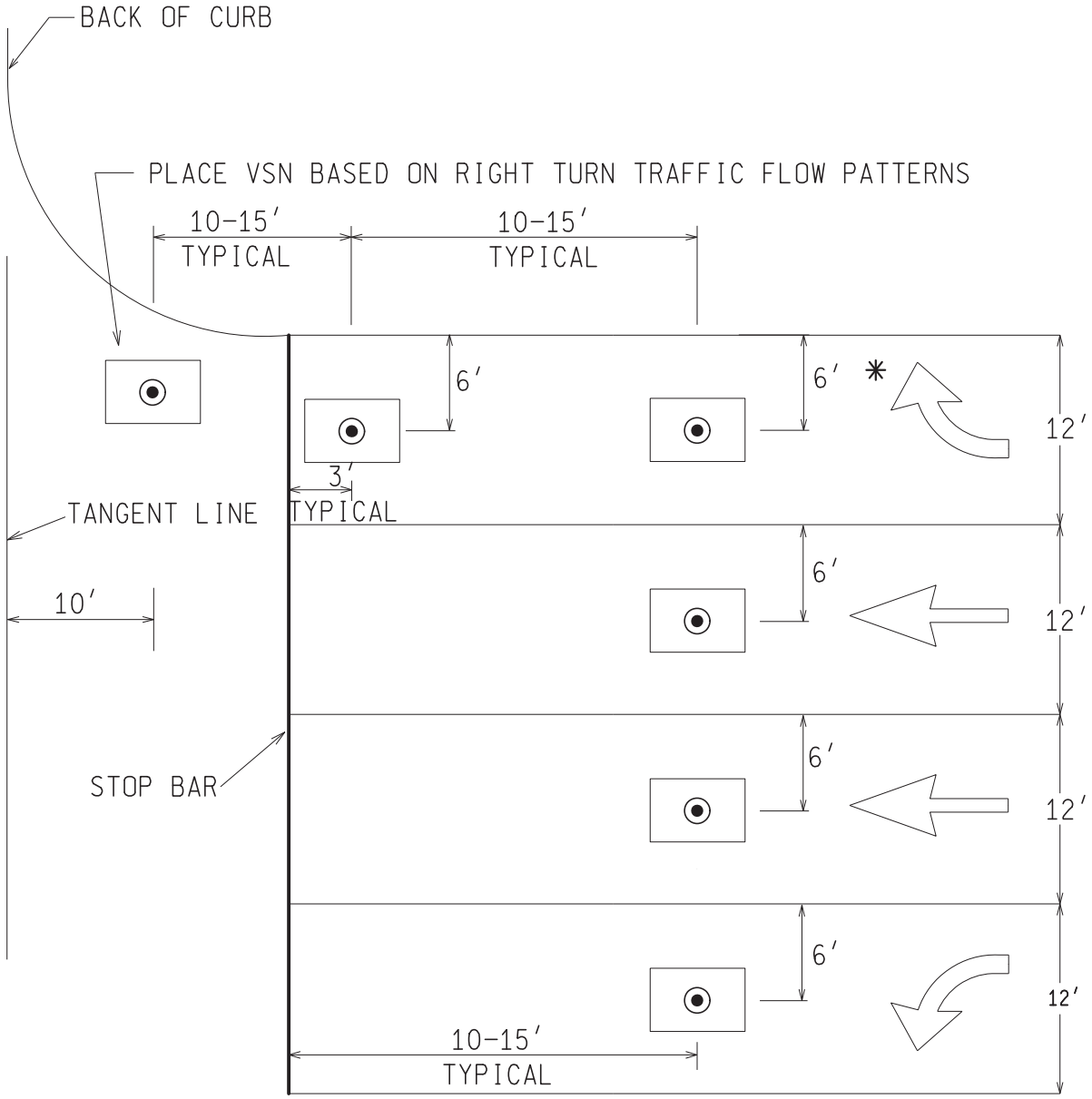


TYPICAL VEHICLE SENSOR NODE (NON-LOCKING) INSTALLATION DIAGRAM

FOR A TWO PHASE (COORDINATED) APPROACH WITH (NON-LOCKING)
PERMISSIVE OR PERMISSIVE-PROTECTED LEFT TURN PHASING

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-420-A	SHEET 9 of 10
File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn	Rev. 06/18/2013	PLAN DATE		



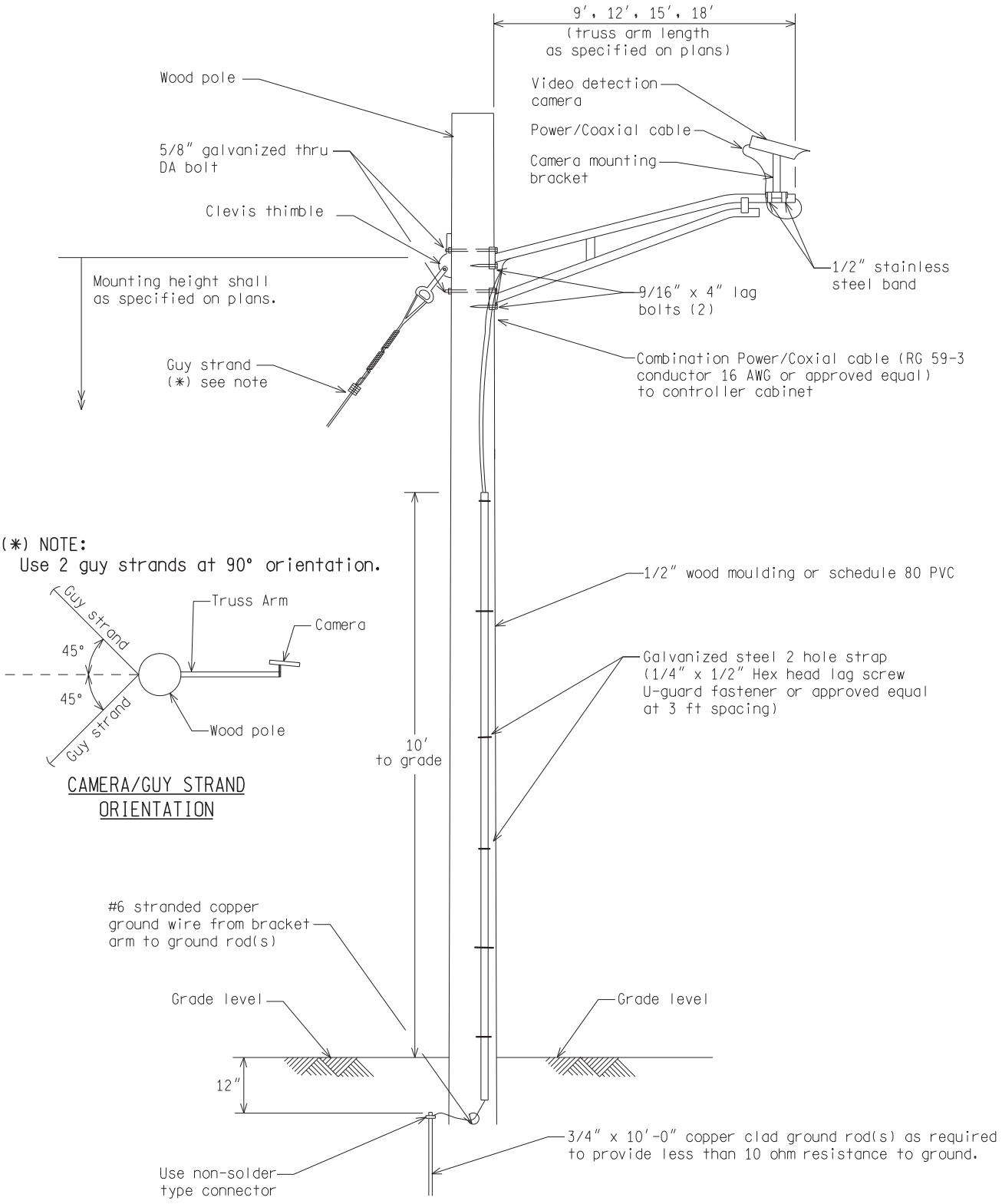
TYPICAL VEHICLE SENSOR NODE (LOCKING) INSTALLATION DIAGRAM

FOR A TWO PHASE APPROACH WITH PROTECTED ONLY LEFT TURN PHASING

* RIGHT TURNS MAY BE NON-LOCKING OR LOCKING WITH RIGHT TURN DELAYS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-420-A	SHEET 10 of 10
File: PW:RD/T&S/Standards/Signals/mdot 420a.dgn	Rev. 06/18/2013	PLAN DATE		



BRACKET TRUSS ARM MOUNTED CAMERA (WOOD POLE)

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG430A.dgn Rev. 02/16/17

MDOT Michigan Department of Transportation

PREPARED BY
TRAFFIC AND SAFETY

DRAWN BY: DJF

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)
FHWA APPROVAL DATE

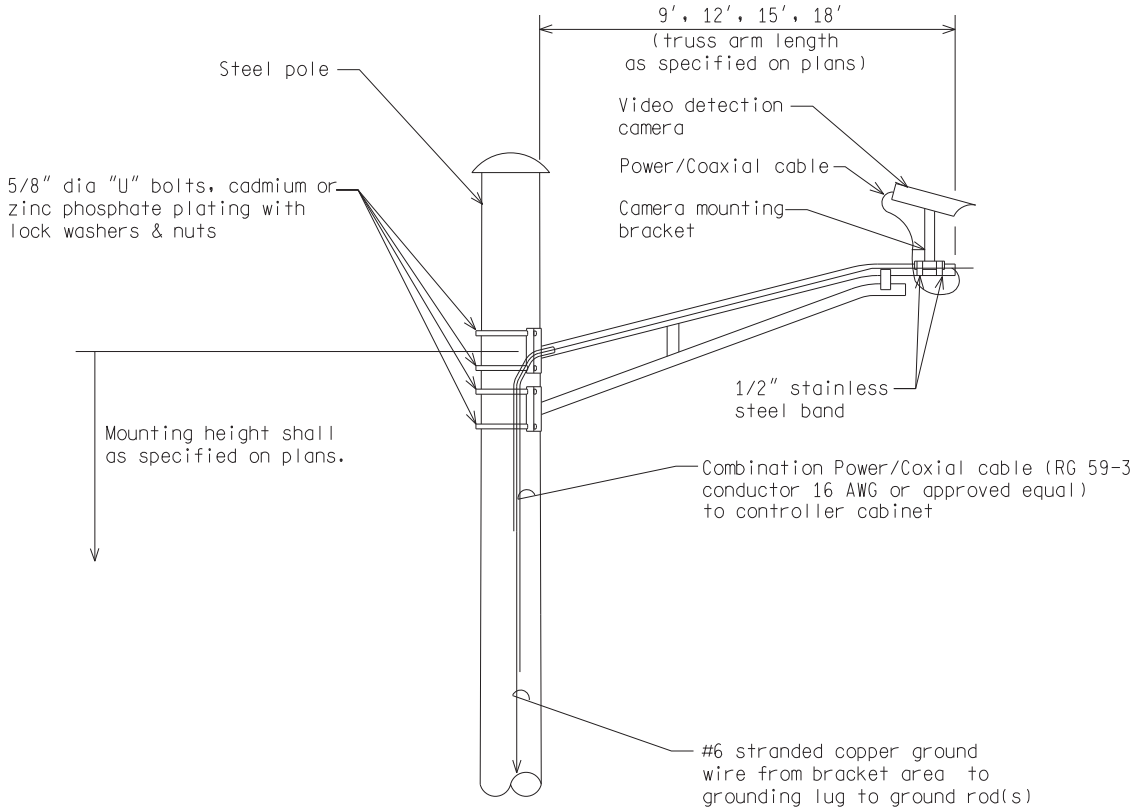
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

VIDEO DETECTION CAMERA

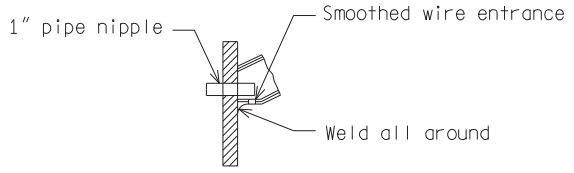
PLAN DATE

SIG-430-A

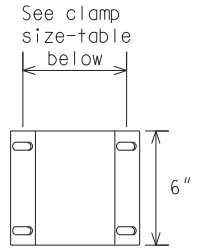
SHEET
1 of 2



BRACKET TRUSS ARM MOUNTED CAMERA (STEEL POLE)



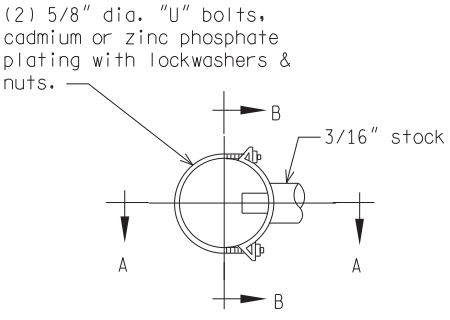
SECTION "A-A"



SECTION "B-B"

CLAMP SIZE TABLE

TYPE	POLE DIAMETER
A	3.6"- 4.5"
B	6.1"- 6.9"

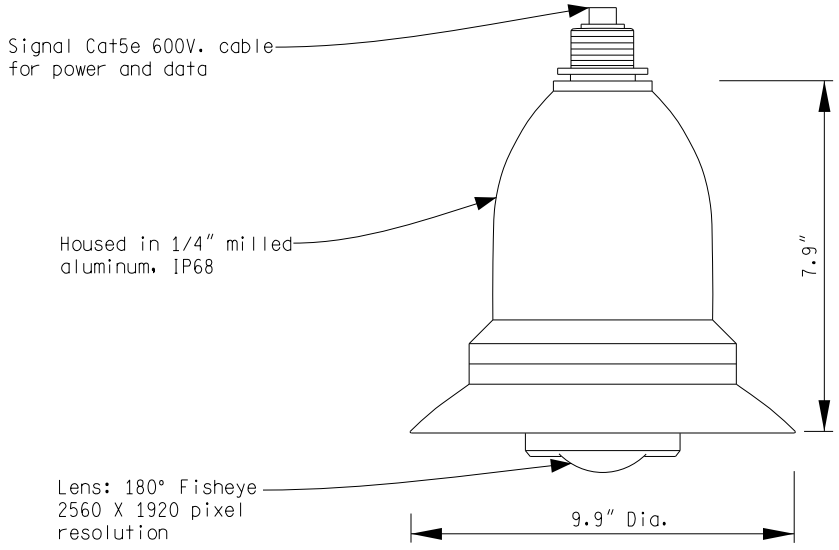


DETAIL "F"

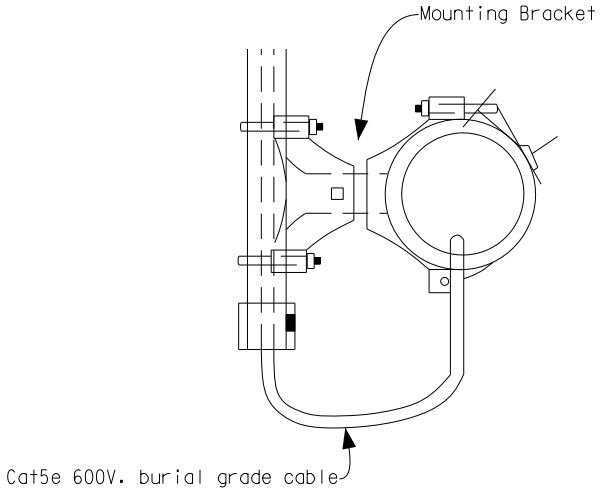
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-430-A	SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG430A.dgn Rev. 02/16/17		PLAN DATE		

HEMISPHERICAL CAMERA



TYPICAL WIRING OF BRACKET ARM/MAST ARM MOUNTED HEMISPHERICAL CAMERA AND MOUNTING BRACKET



NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG431A.dgn Rev. 05/15/23

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY:

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

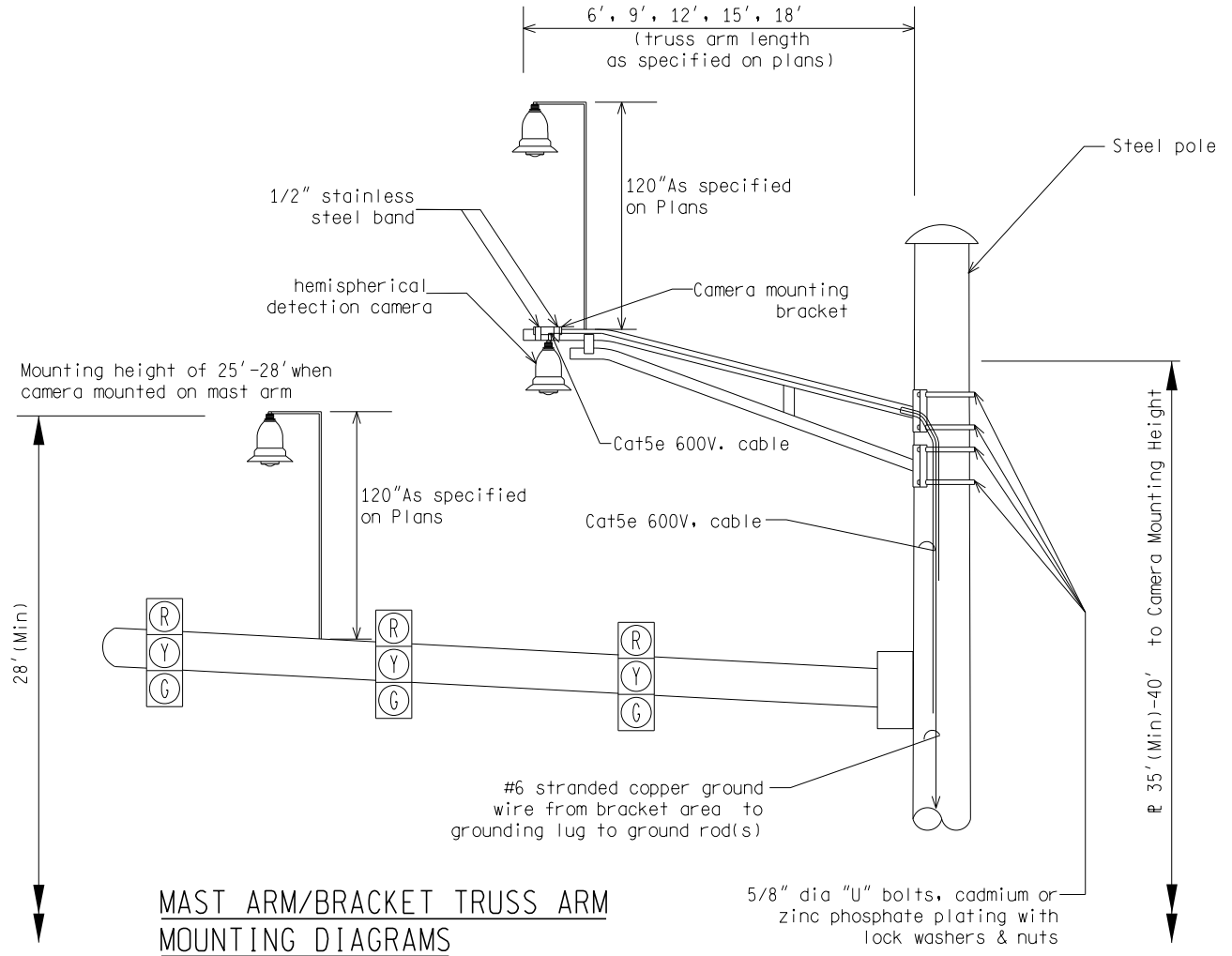
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

HEMISPHERICAL VIDEO DETECTION SYSTEM

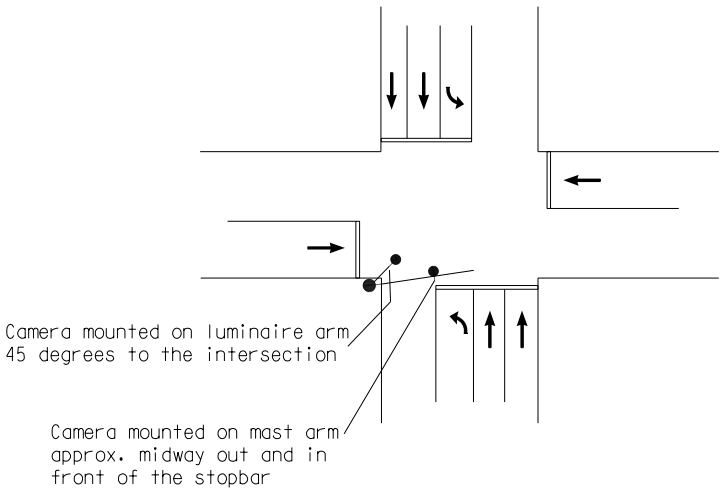
PLAN DATE

SIG-431-A



MAST ARM/BRACKET TRUSS ARM MOUNTING DIAGRAMS

HEMISPHERICAL CAMERA PLACEMENT RELATIVE TO INTERSECTION



Notes:

1. Camera should be mounted at least 35' high when using a luminaire arm and no less than 28' when using a mast arm. Or as specified on the plans.

2. Mast arm mounts are only acceptable if the camera can be located near the center of the intersection with no occlusion.

3. Camera must be less than 75' from the intersection center when mounted on a luminare arm and 50' on mast arm

4. Camera should be located with the least amount of occlusion.

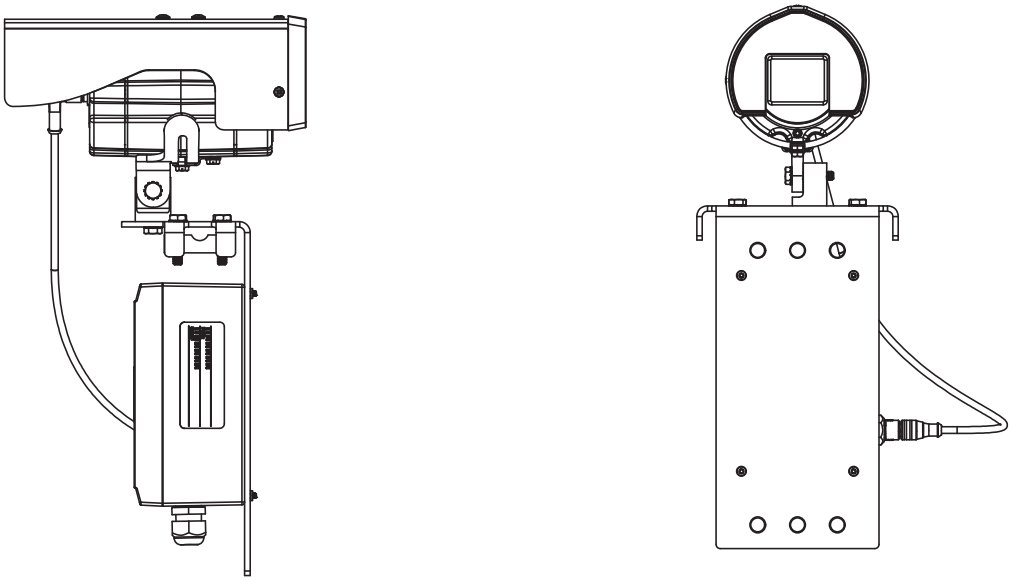
5. Installer should aim for the best "head-on" view of all approaches.

6. Hemispherical camera shall only be installed on steel poles

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-431-A	SHEET 2 of 2
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG431A.dgn Rev. 05/15/23		PLAN DATE		

CONTROL SECTION	JOB NO.	SHEET NO.



SPAN WIRE MOUNTED VIDEO DETECTION CAMERA

NOT TO SCALE

File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG432A.dgn Rev.

MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

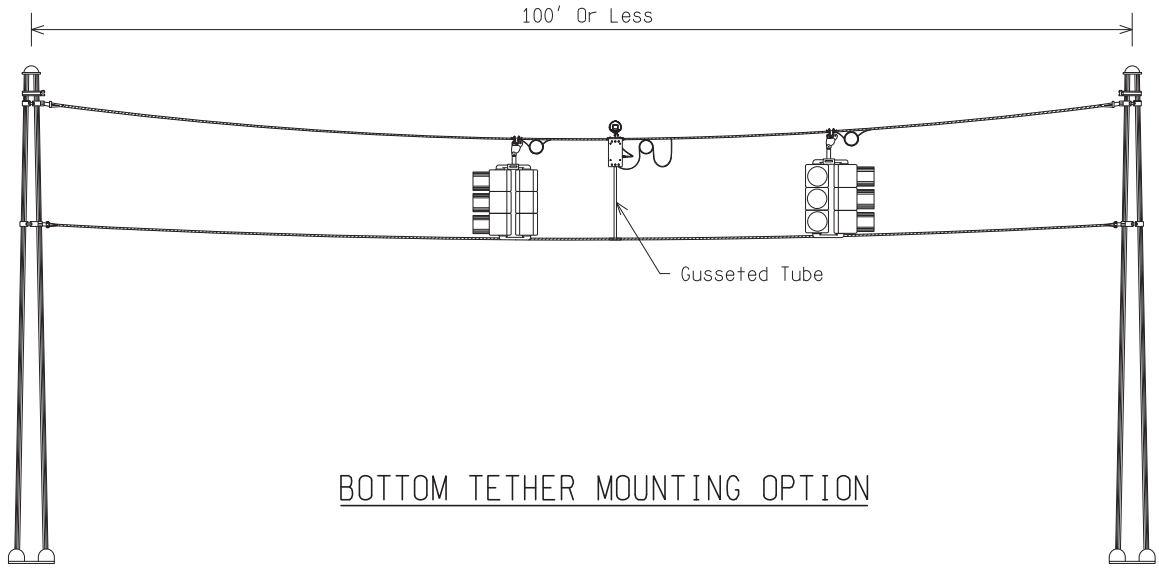
FHWA APPROVAL DATE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

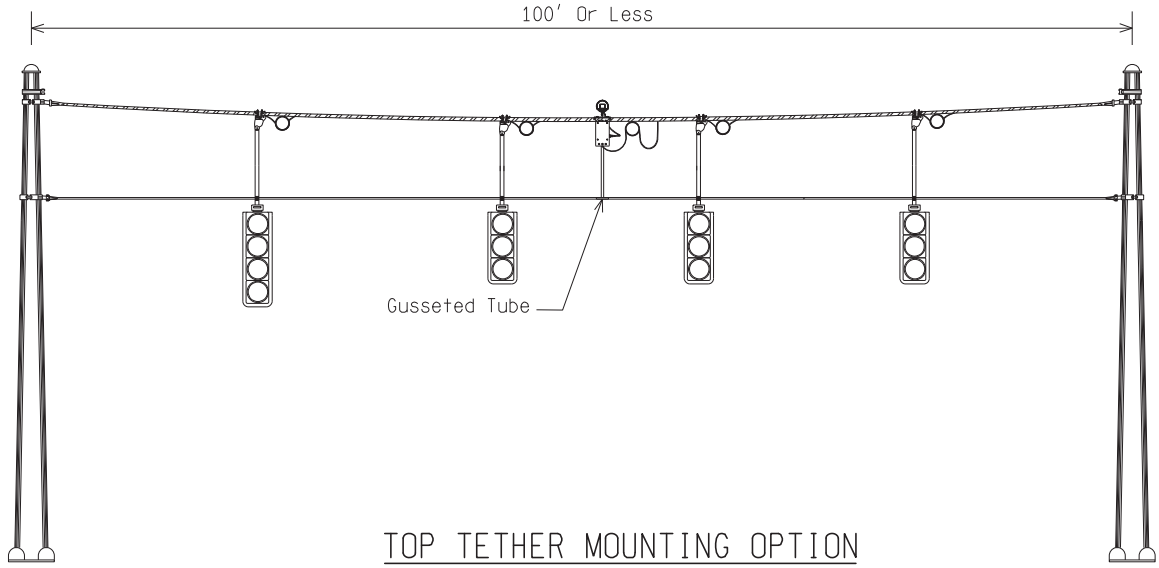
SPAN WIRE MOUNTED VIDEO DETECTION CAMERA

02/16/17
PLAN DATE

SIG-432-A



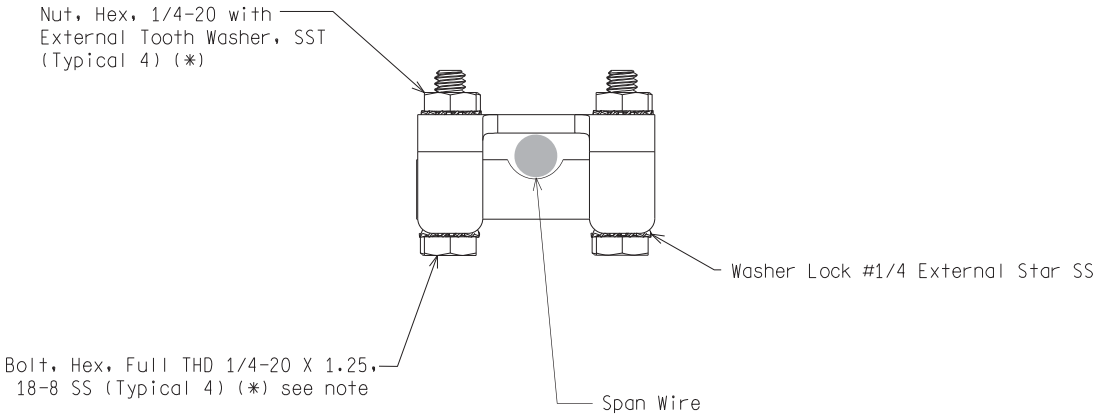
BOTTOM TETHER MOUNTING OPTION



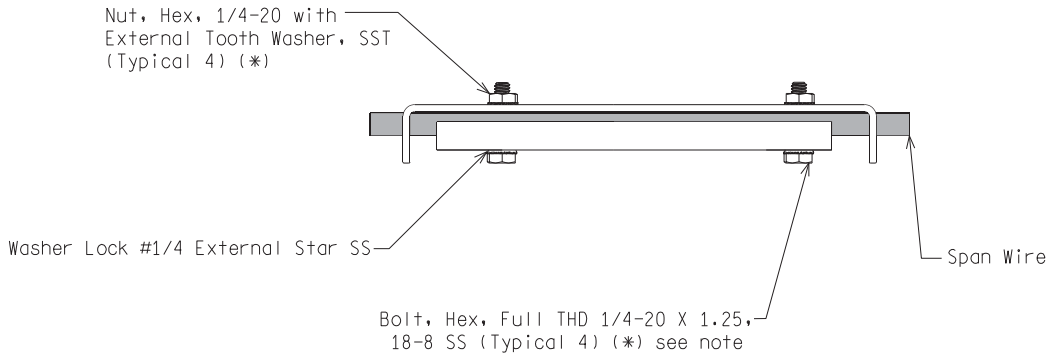
TOP TETHER MOUNTING OPTION

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	2/16/17 PLAN DATE	SIG-432-A	SHEET 2 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG432A.dgn Rev.				



SPAN WIRE CONNECTION BRACKET, FRONT VIEW

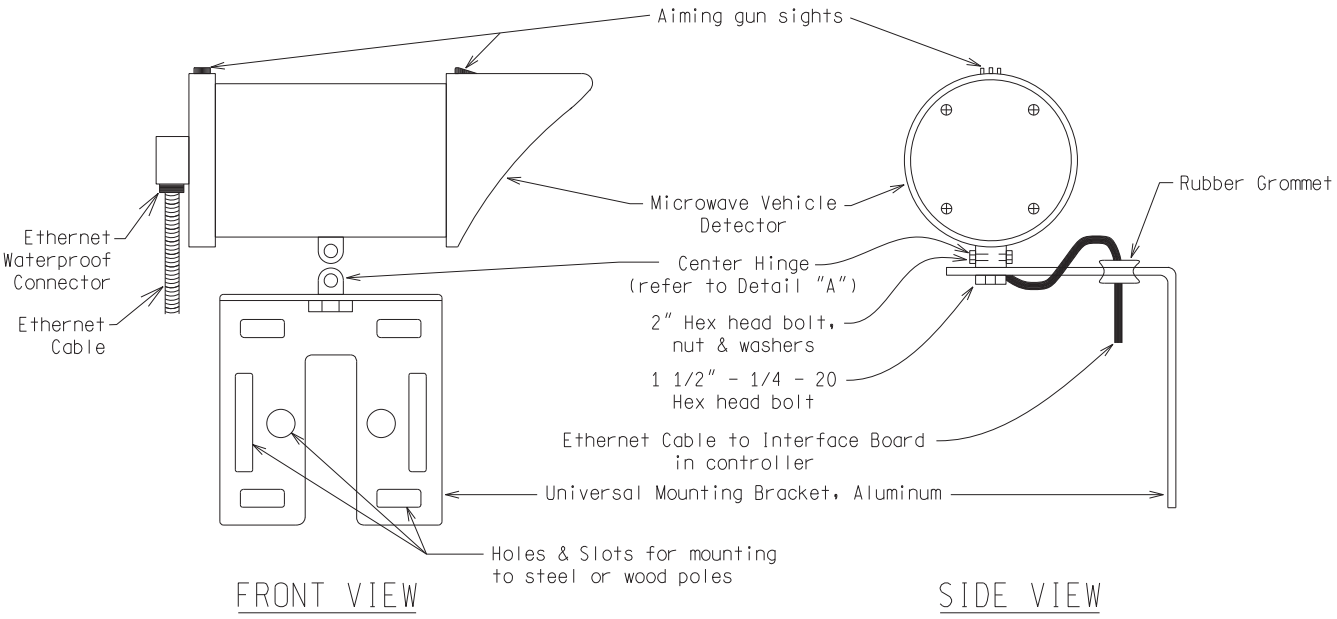


SPAN WIRE CONNECTION BRACKET, SIDE VIEW

(*) NOTE:
For Span Wires over 1/2" to 7/8" use Bolt, Hex HD,
Full THD 1/4-20 X 1.75 LG, SST.

NOT TO SCALE

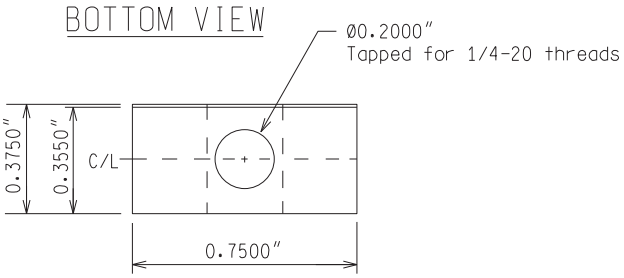
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/16/17 PLAN DATE	SIG-432-A	SHEET 3 of 3
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG432A.dgn Rev.				

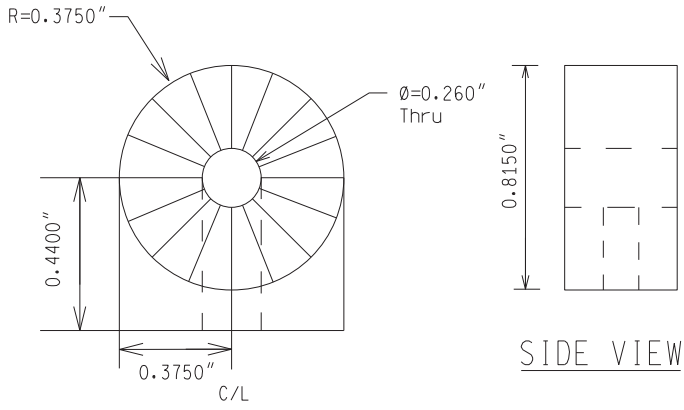


FRONT VIEW

SIDE VIEW

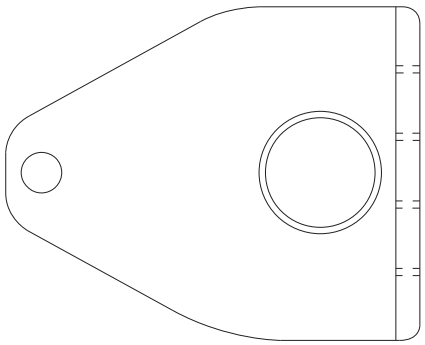
BOTTOM VIEW





FRONT VIEW

SIDE VIEW



UNIVERSAL MOUNT BRACKET

TOP VIEW

CENTER HINGE STAINLESS STEEL
DETAIL "A"

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DCK

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

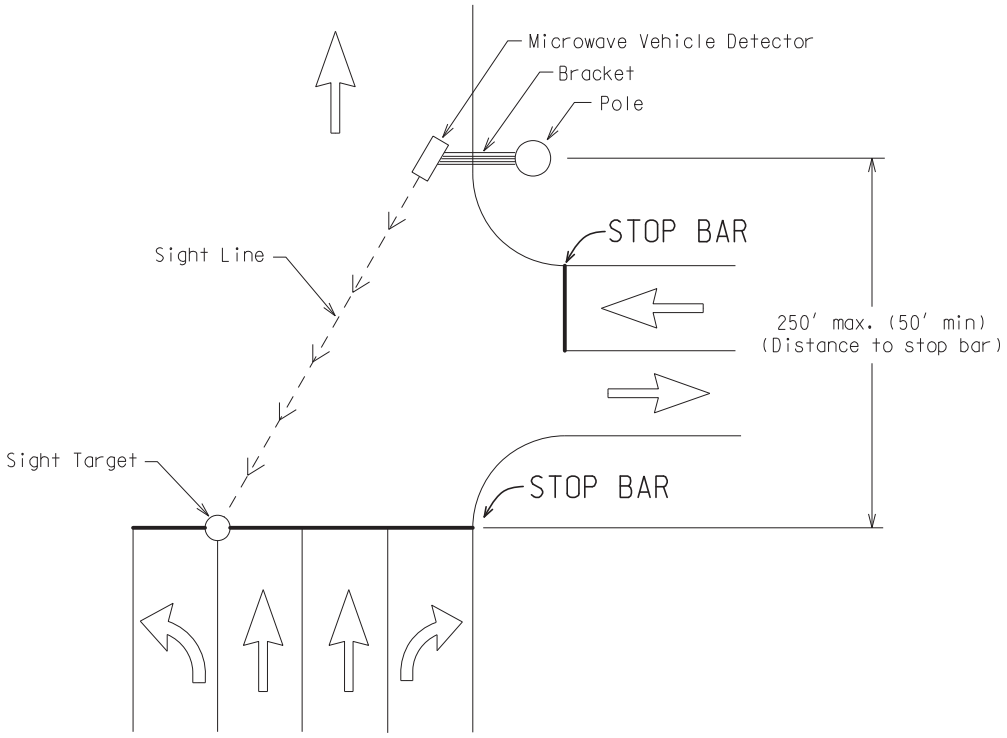
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

MICROWAVE VEHICLE DETECTOR

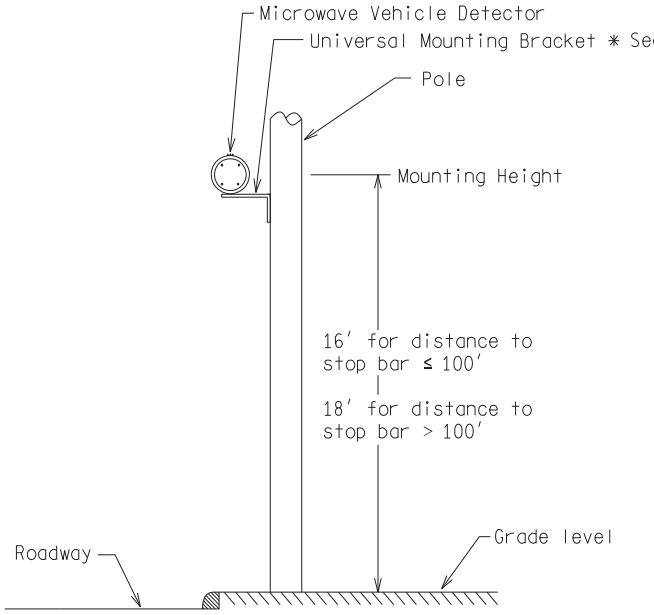
PLAN DATE

SIG-440-A

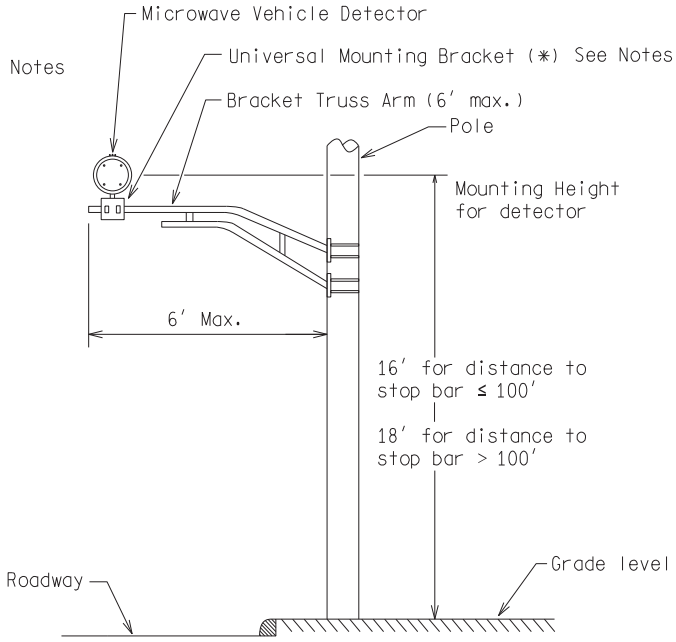
SHEET 1 of 4



SIGHT ORIENTATION DIAGRAM



SIDE POLE MOUNTED

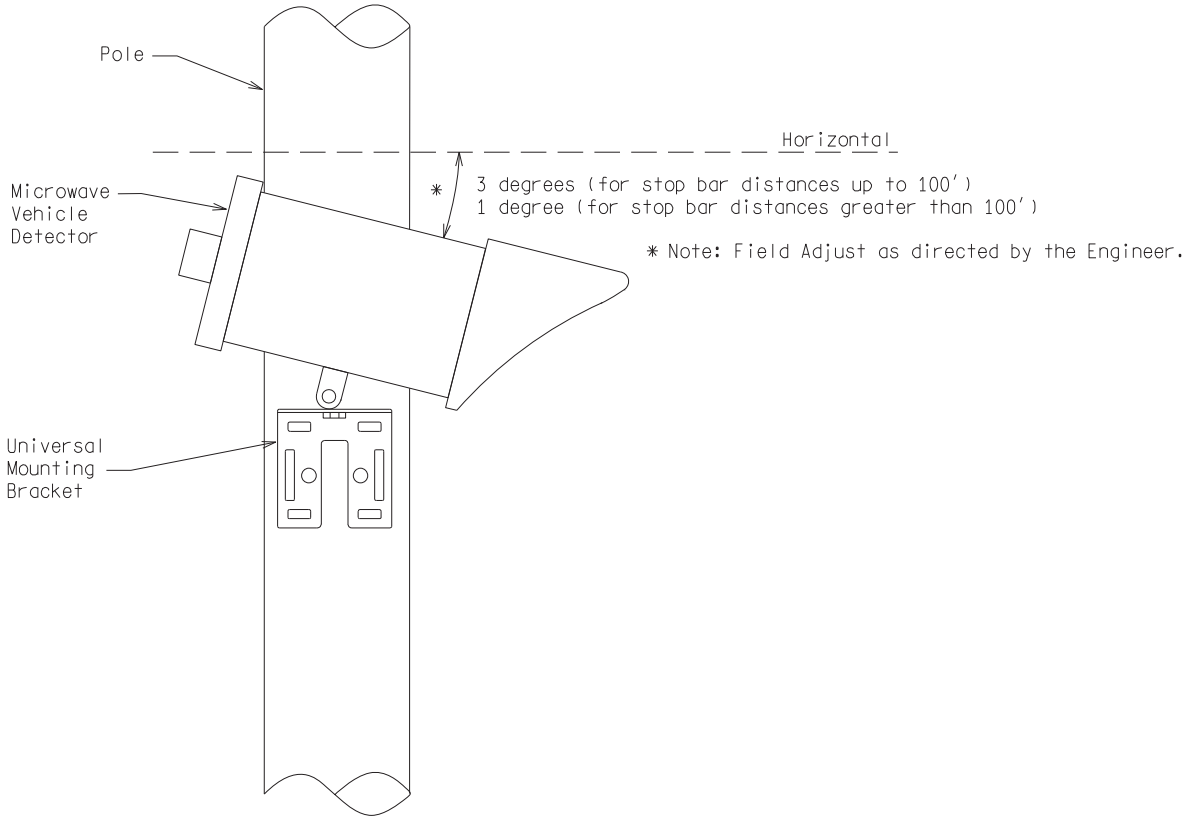


BRACKET TRUSS ARM MOUNTED

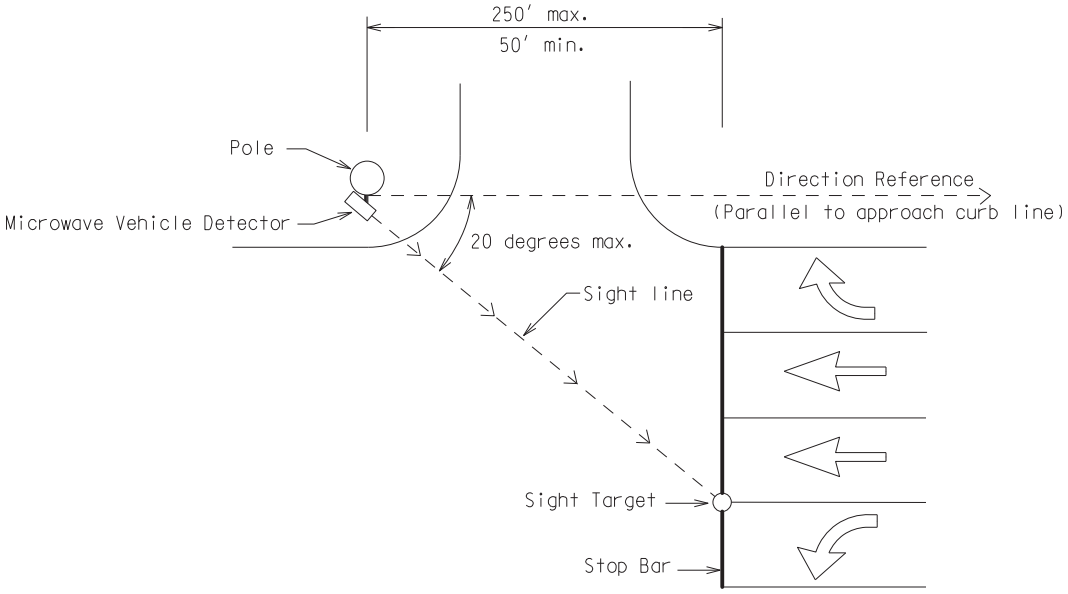
(*) Notes:
1. Use 3/8" x 5" Hex head screw (2" min.) for mounting to wood poles.
2. Use 3/4" x 0.30 min. stainless steel band for mounting to steel poles, pedestals or bracket truss arms.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE			
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG440A.dgn Rev. 02/16/17		PLAN DATE	SIG-440-A	SHEET 2 of 4



VERTICAL ORIENTATION

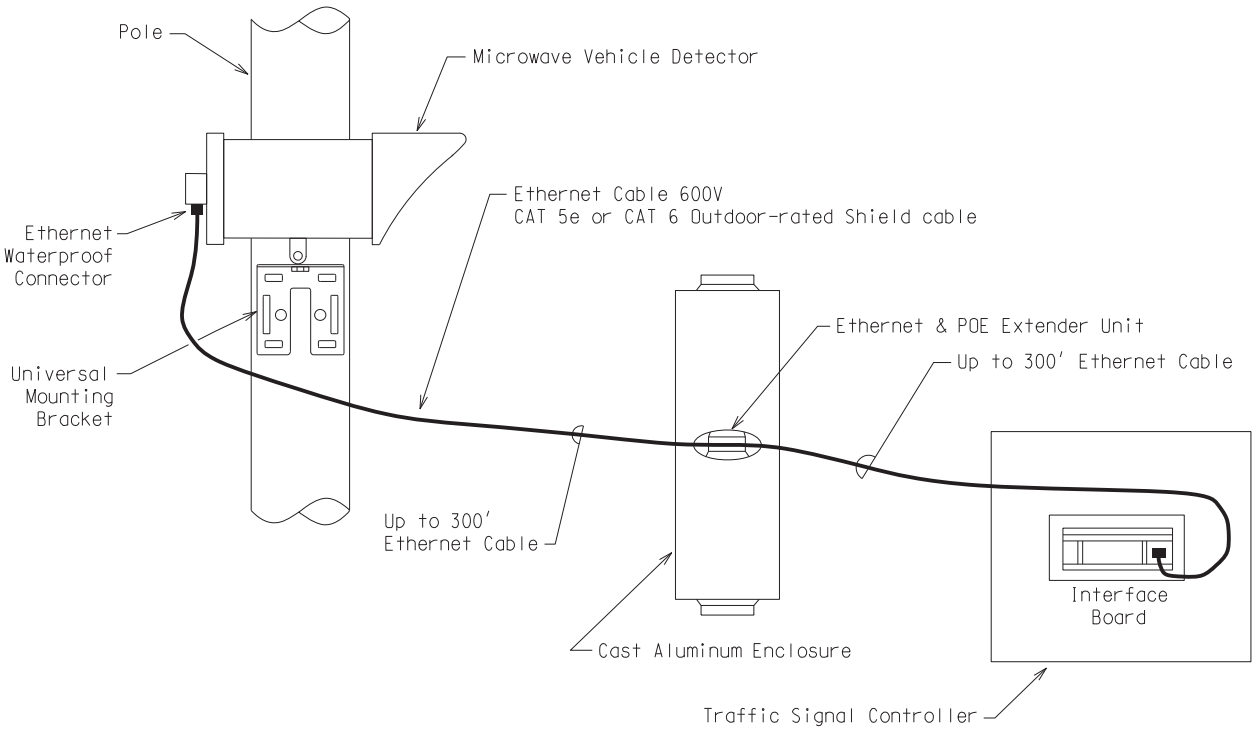


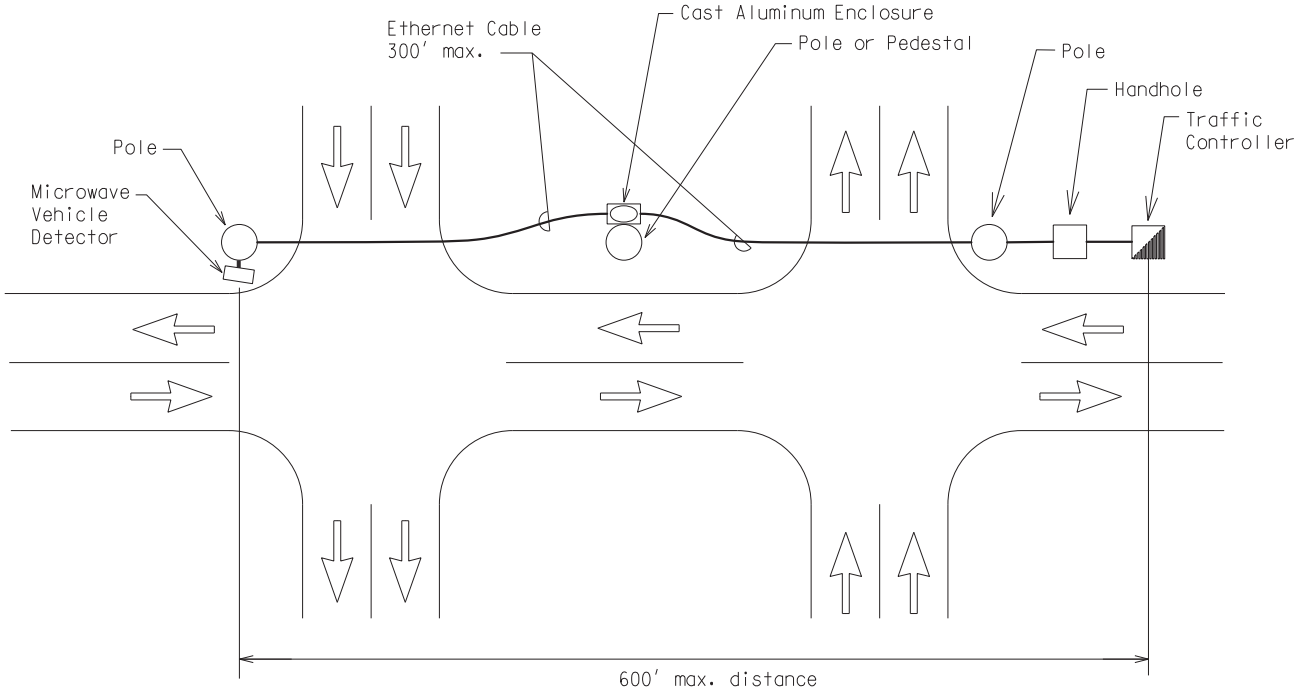
HORIZONTAL ORIENTATION

MICROWAVE VEHICLE SENSOR ORIENTATION DIAGRAM

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-440-A	SHEET 3 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG440A.dgn Rev. 02/16/17		PLAN DATE		



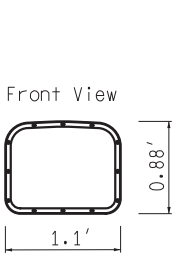


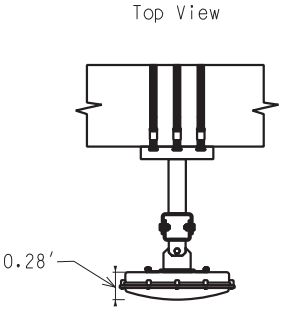
ETHERNET CABLE EXTENSION ORIENTATION DIAGRAM

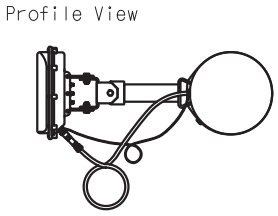
NOT TO SCALE

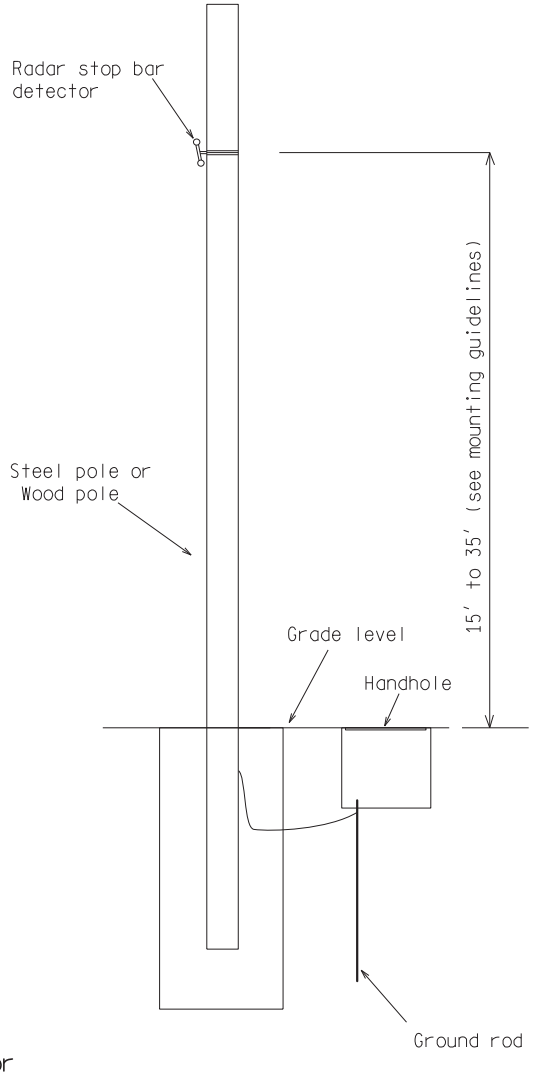
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE		SIG-440-A	SHEET 4 of 4
File: RefDoc/TR/Signals/Web/Sp Det/Fin/SIG440A.dgn Rev. 02/16/17		PLAN DATE		

RADAR VEHICLE PRESENCE
STOP-BAR DETAIL









Note:
Radar Vehicle Presence Stop-bar Detector (RVPSD) shall be installed and configured in coordination with agency and/or manufacturer representative.

NOT TO SCALE

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MDOT Michigan Department of Transportation

PREPARED BY TRAFFIC AND SAFETY

DRAWN BY: DSP

CHECKED BY:

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

(SPECIAL DETAIL)

FHWA APPROVAL DATE

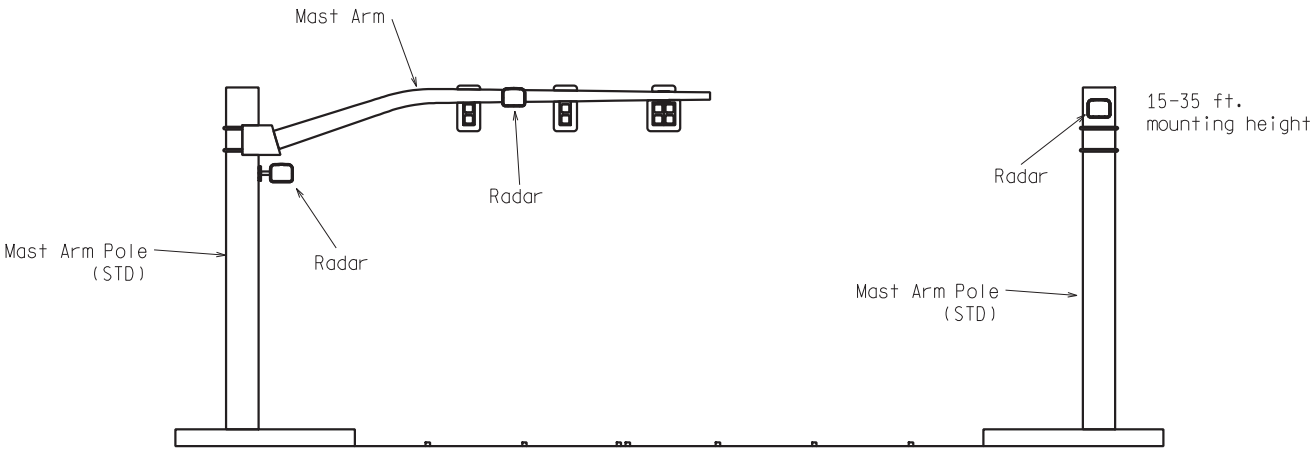
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

RADAR STOP BAR DETECTION

02/16/17
PLAN DATE

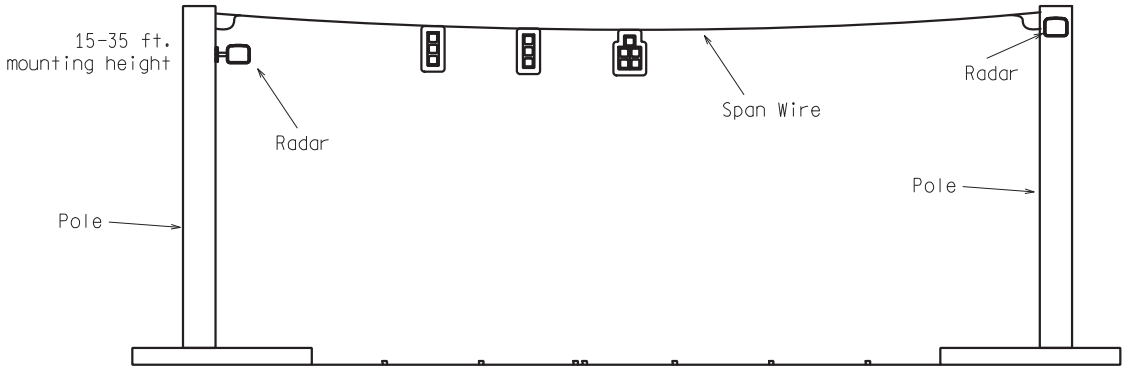
SIG-460-A

RADAR VEHICLE PRESENCE STOP-BAR DETECTOR
MAST ARM INSTALLATION DETAIL



Preferred Mounting Locations

RADAR VEHICLE PRESENCE STOP-BAR DETECTOR
SPAN WIRE INSTALLATION DETAIL



Preferred Mounting Locations

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	02/16/17 PLAN DATE	SIG-460-A	SHEET 2 of 2
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