

INDEX

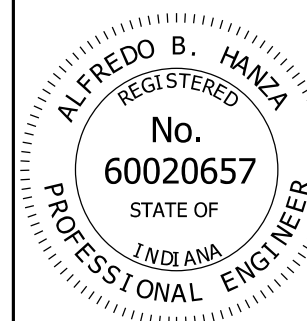
SHEET NO.	SUBJECT
1	Index
2	Pole Dimensions and Details
3	Arm Dimensions and Details
4	Base Plate and Pole Top Cover Details
5	Arm Connection Details
6	Handhole and I.D. Tag Details
7	Loading Diagrams
8	Foundation, Drilled Shaft Type E, for Dual Arms 35' or Less
9	Foundation, Drilled Shaft Type F, for Dual Arms Greater Than 35' to 45'

INDIANA DEPARTMENT OF TRANSPORTATION

SIGNAL DUAL ARM CANTILEVERS
DRAWING INDEX

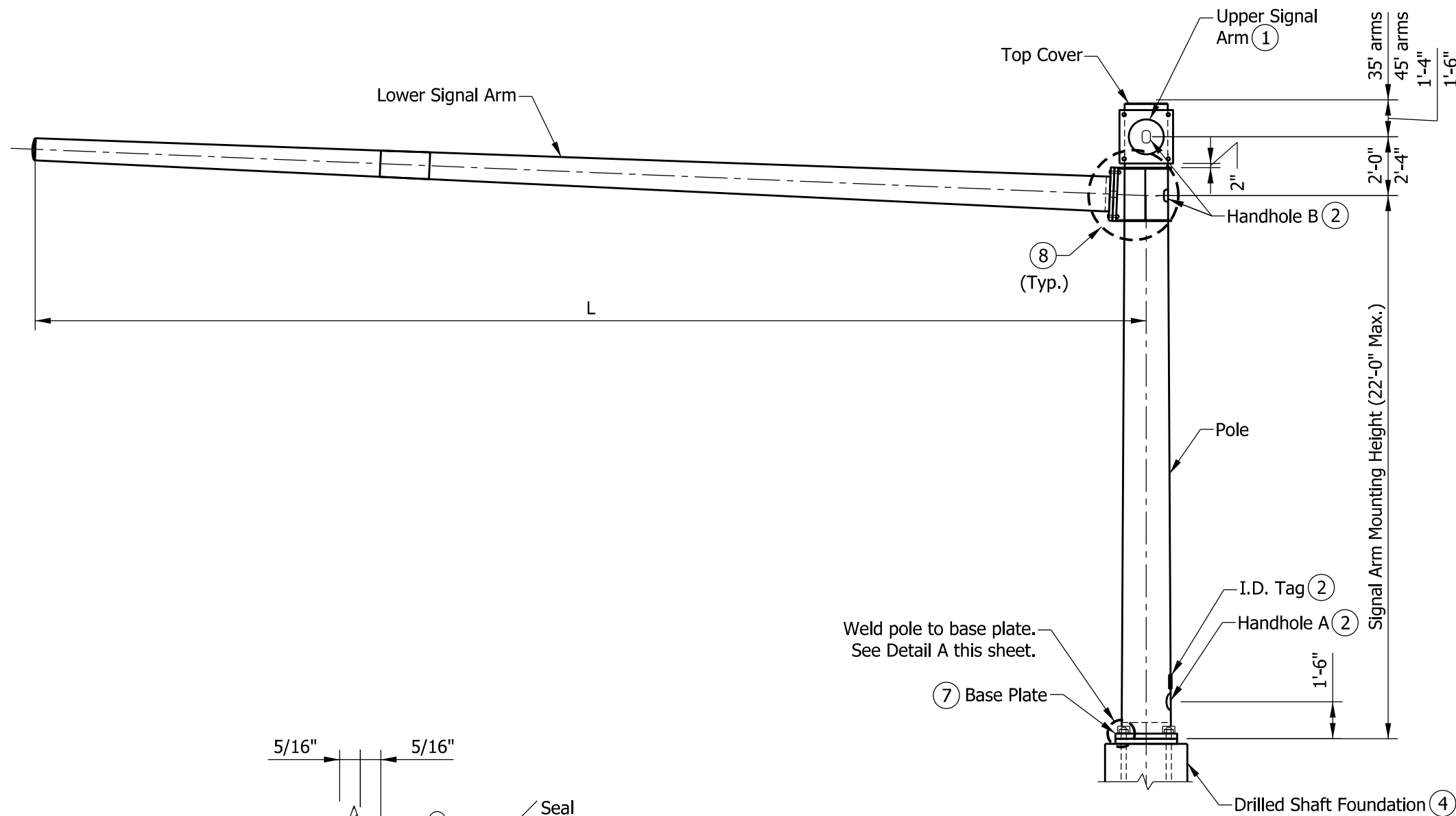
SEPTEMBER 2013

STANDARD DRAWING NO. E 805-SDAC-01



<i>/s/ Alfredo B. Hanza</i>	02/05/13
DESIGN STANDARDS ENGINEER	DATE

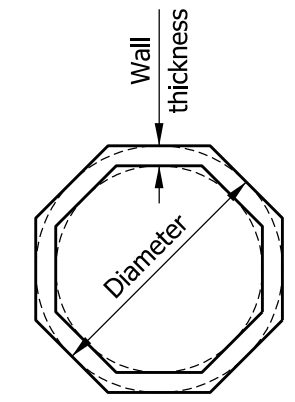
<i>/s/ Mark A. Miller</i>	03/27/13
CHIEF ENGINEER	DATE



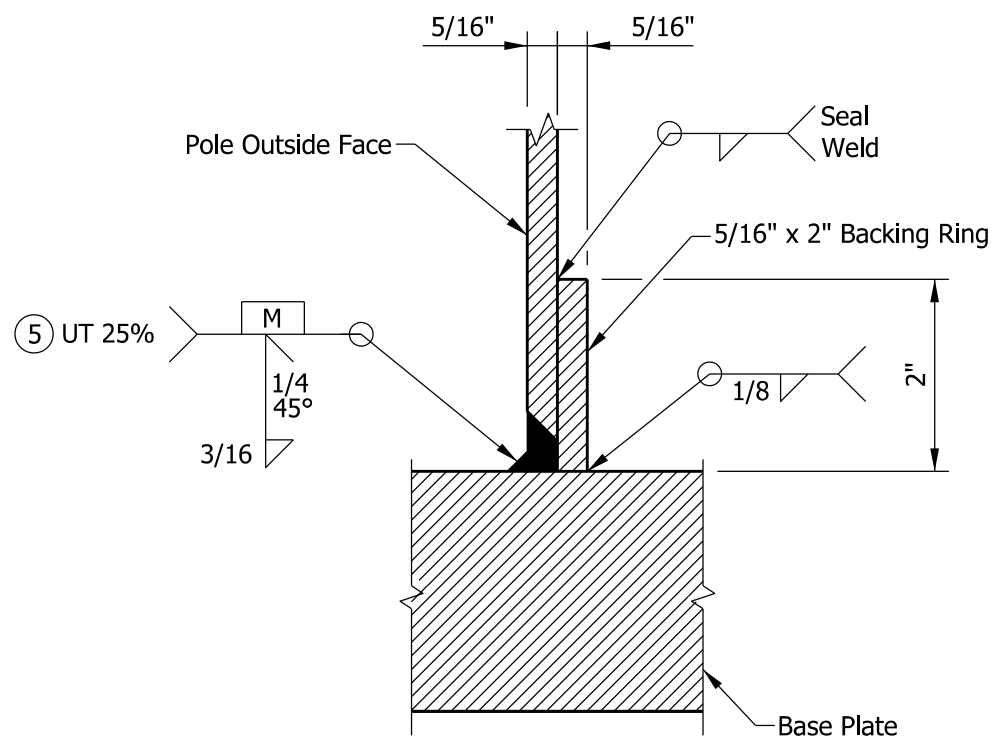
ELEVATION

NOTES:

- ① This structure is a dual arm cantilever design for traffic signals. Cantilever arms can be positioned at 20° to 180° to each other.
- ② See Standard Drawing E 805-SDAC-06 for handhole and I.D. tag details.
- ③ See Standard Drawings E 805-SGGR-01 through -03 for grounding details.
- ④ See Standard Drawings E 805-SDAC-08 and -09 for foundation details.
- ⑤ A minimum of 25% of the pole to base plate welds shall be ultrasonically tested (UT).
- ⑥ Pole and arms may be octagonal or circular shaped and shall have a 0.14 in./ft taper. All member diameters shown are outside diameter.
- ⑦ See Standard Drawing E 805-SDAC-04 for base plate details.
- ⑧ See Standard Drawing E 805-SDAC-05 for arm connection details.



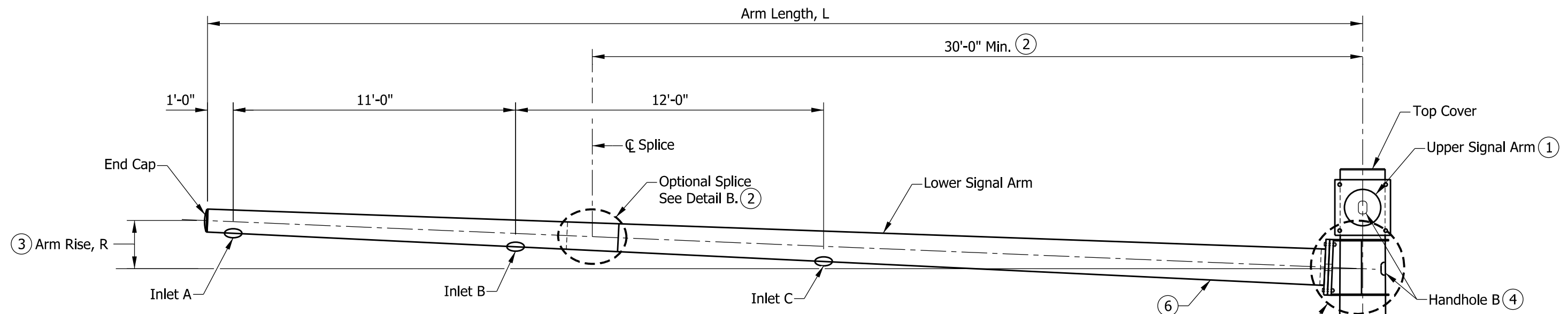
OCTAGON AND CIRCULAR TUBULAR SHAPE ⑥



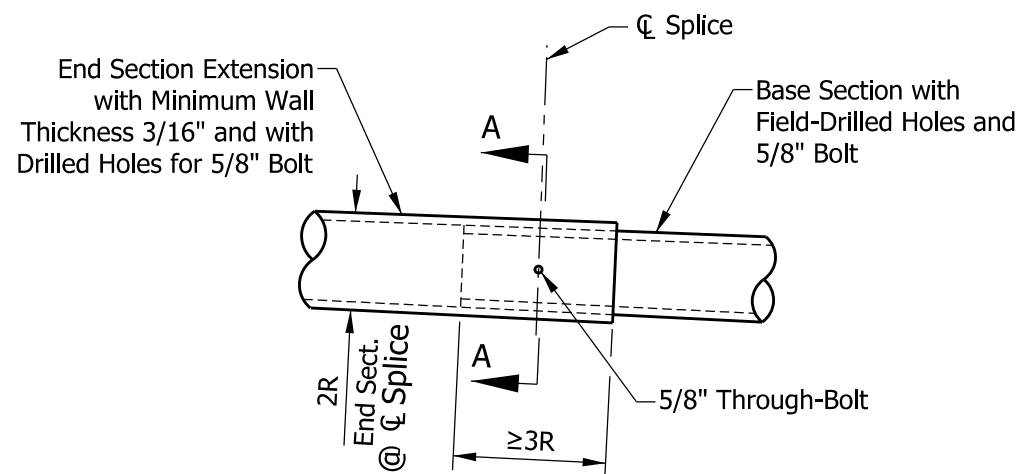
**POLE/BASE PLATE WELD
DETAIL A**

POLE DIMENSIONS ⑥		
CANTILEVER ARM LENGTHS L (FT)	BASE DIAMETER (IN.)	WALL THICKNESS (IN.)
15' to 35'	18	5/16
> 35' to 45'	24	5/16

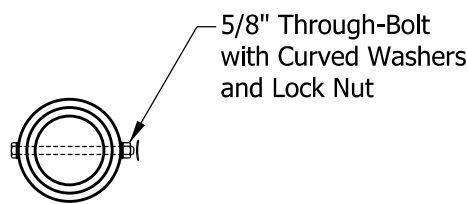
INDIANA DEPARTMENT OF TRANSPORTATION									
SIGNAL DUAL ARM CANTILEVERS POLE DIMENSIONS AND DETAILS									
SEPTEMBER 2013									
STANDARD DRAWING NO.	E 805-SDAC-02								
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%; border-bottom: 1px solid black;">/s/ <i>Alfredo B. Hanza</i></td> <td style="width: 20%; border-bottom: 1px solid black;">02/05/13</td> </tr> <tr> <td style="font-size: small;">DESIGN STANDARDS ENGINEER</td> <td style="font-size: small;">DATE</td> </tr> <tr> <td style="border-bottom: 1px solid black;">/s/ <i>Mark A. Miller</i></td> <td style="border-bottom: 1px solid black;">03/27/13</td> </tr> <tr> <td style="font-size: small;">CHIEF ENGINEER</td> <td style="font-size: small;">DATE</td> </tr> </table>	/s/ <i>Alfredo B. Hanza</i>	02/05/13	DESIGN STANDARDS ENGINEER	DATE	/s/ <i>Mark A. Miller</i>	03/27/13	CHIEF ENGINEER	DATE
/s/ <i>Alfredo B. Hanza</i>	02/05/13								
DESIGN STANDARDS ENGINEER	DATE								
/s/ <i>Mark A. Miller</i>	03/27/13								
CHIEF ENGINEER	DATE								



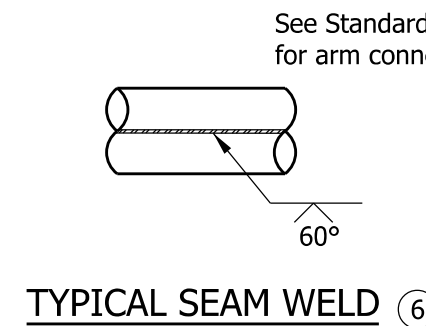
ELEVATION



DETAIL B



SECTION A-A



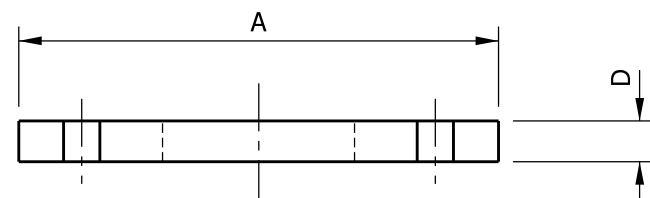
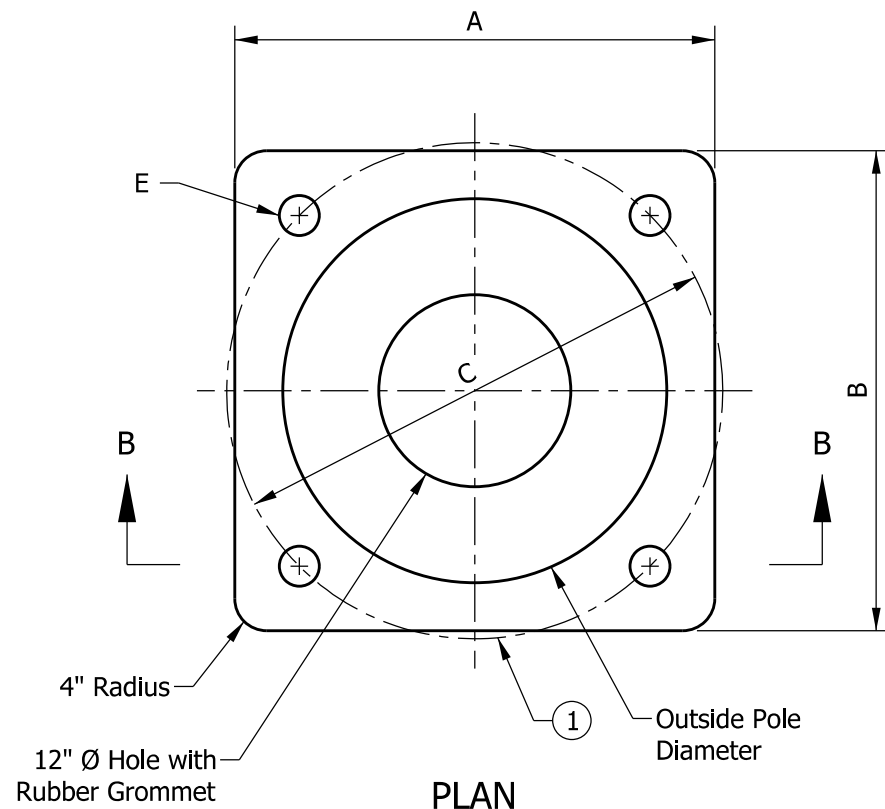
See Standard Drawing E 805-SDAC-05 for arm connection details. (Typ.)

NOTES:

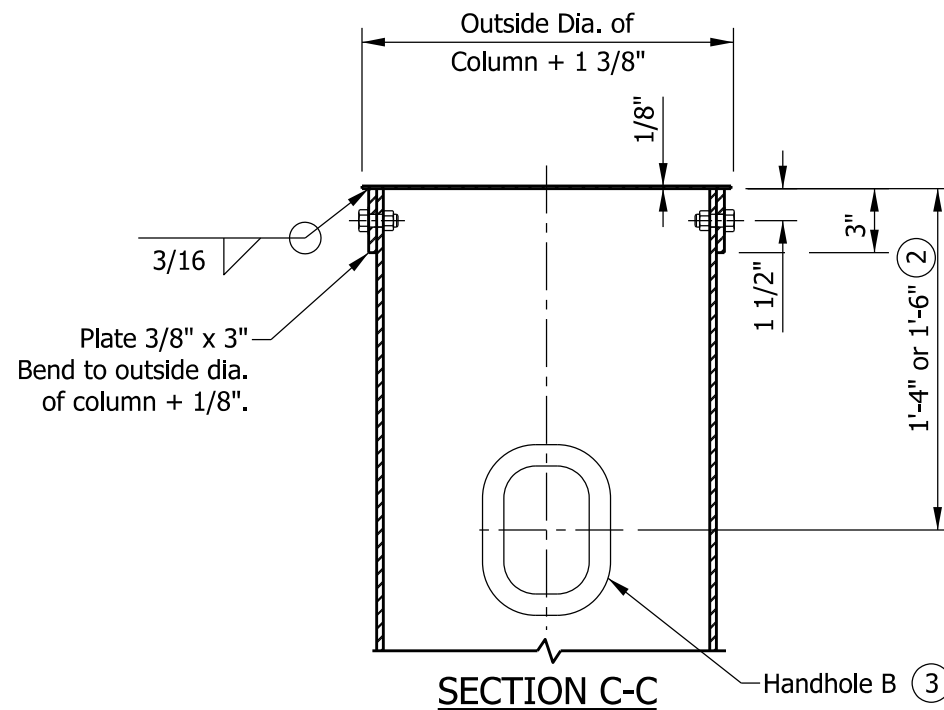
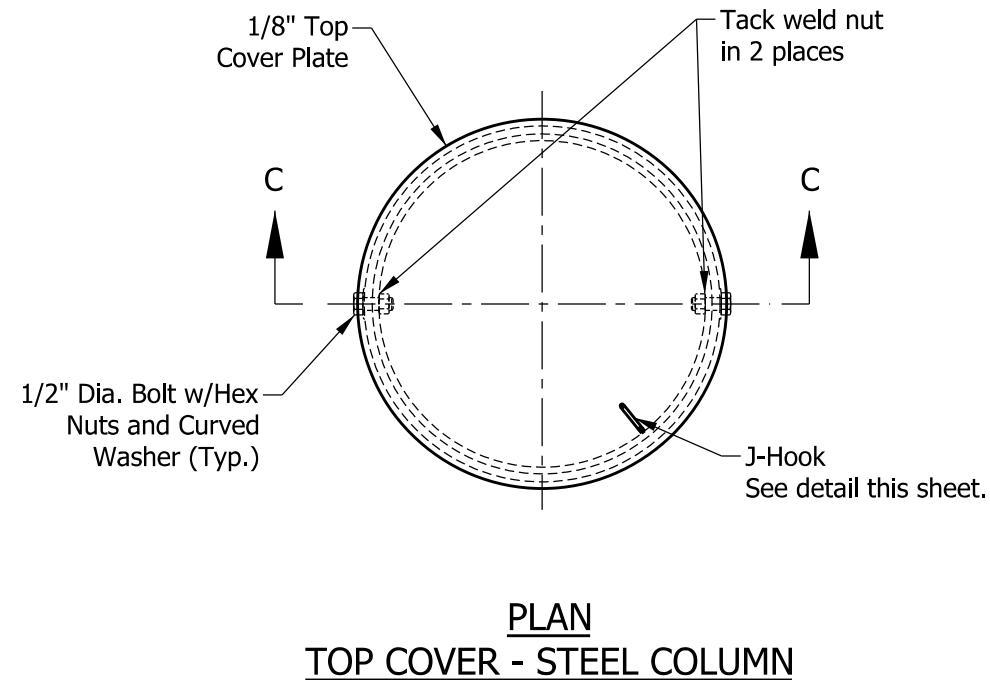
- ① Upper signal arm can be oriented 20° to 180° from lower signal arm. The dimensions and details shall be as shown on this drawing.
- ② Optional splices can be used for greater than 40' mast arms. The splice shall be located a minimum of 30' from the pole. The end extension section of the arm shall have a wall thickness of 3/16" or greater. Field assembly to achieve a snug tight joint (min. overlap not less than 3 times the inside radius of the end section).
- ③ Arm rise is measured in the undeflected position without vertical loads on the arm.
- ④ See Standard Drawing E 805-SDAC-06 for handhole B details.
5. See Standard Drawing E 805-SDAC-07 for loading diagrams.
- ⑥ If seam welds are used, the weld location shall be along the bottom for the arms, and on the side of pole as shown. All pole and arm seam welds shall be 100% ultrasonically tested.
7. Number of cable inlets depends on arm L (see table on this sheet). The inlet diameter shall be 1 3/4" with rubber grommet (typ.).

SIGNAL DUAL ARM CANTILEVER DATA				
ARM LENGTH L (FT.)	ARM DIAMETER AT POLE (IN.)	ARM WALL THICKNESS (IN.)	ARM RISE R (IN.) ③	CABLE INLETS
15	14	5/16	7 1/2	A, B
20	14	5/16	10	A, B
25	14	5/16	12 1/2	A, B
30	14	5/16	15	A, B
35	14	5/16	17 1/2	A, B, C
40	17	5/16	20	A, B, C
45	17	5/16	22 1/2	A, B, C

INDIANA DEPARTMENT OF TRANSPORTATION	
SIGNAL DUAL ARM CANTILEVERS ARM DIMENSIONS AND DETAILS	
SEPTEMBER 2013	
STANDARD DRAWING NO.	E 805-SDAC-03
	/s/ Alfredo B. Hanza 02/05/13 DESIGN STANDARDS ENGINEER DATE
	/s/ Mark A. Miller 03/27/13 CHIEF ENGINEER DATE

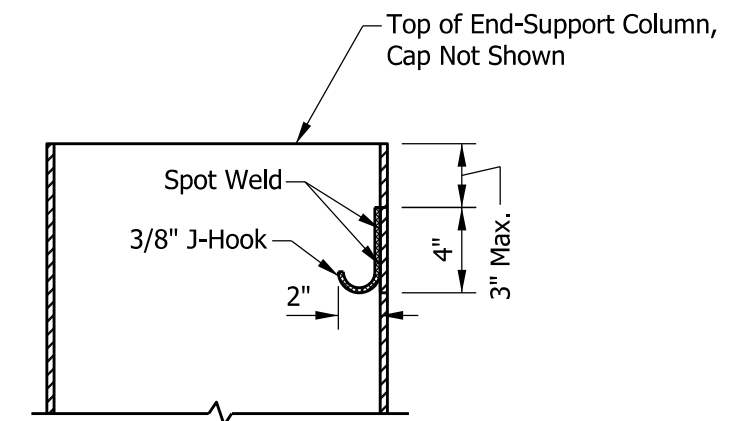


BASE PLATE DATA				
POLE DIAMETER (IN.)	PLATE DIMENSIONS A X B (IN. X IN.)	ANCHOR BOLTS CIRCLE C (IN.)	PLATE THICKNESS D (IN.)	BOLT HOLE DIAMETER E (IN.)
18	26 x 26	25	2 1/4	2 9/16
24	30 x 30	31	2 1/2	2 13/16

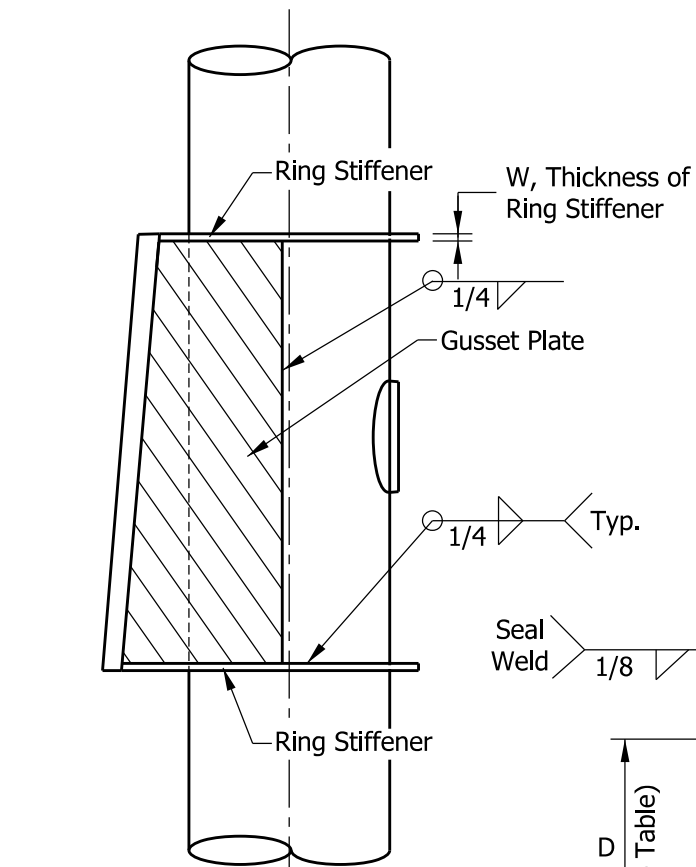


NOTES:

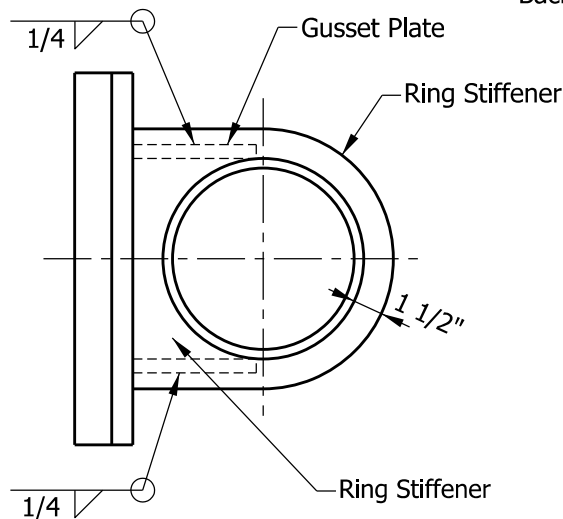
- Anchor bolt circle shall allow clearance for the anchor bolt washers. Cutting or trimming of the washers will not be allowed.
- See Standard Drawing E 805-SDAC-02 for handhole locations.
- See Standard Drawing E 805-SDAC-06 for handhole details.



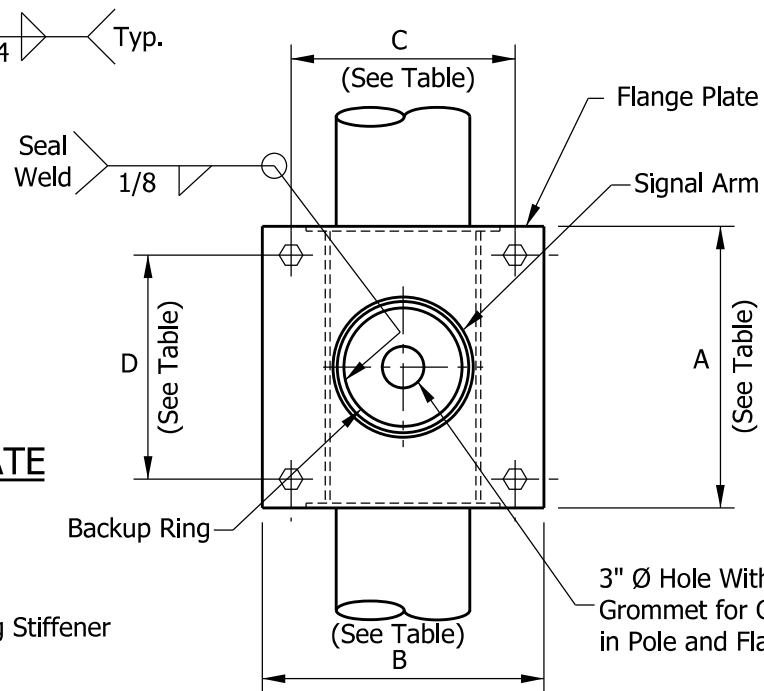
INDIANA DEPARTMENT OF TRANSPORTATION	
SIGNAL DUAL ARM CANTILEVERS BASE PLATE AND POLE TOP COVER DETAILS	
SEPTEMBER 2013	
STANDARD DRAWING NO.	E 805-SDAC-04
	/s/ <i>Alfredo B. Hanza</i> 02/05/13 DESIGN STANDARDS ENGINEER DATE
	/s/ <i>Mark A. Miller</i> 03/27/13 CHIEF ENGINEER DATE



ELEVATION OF GUSSET PLATE

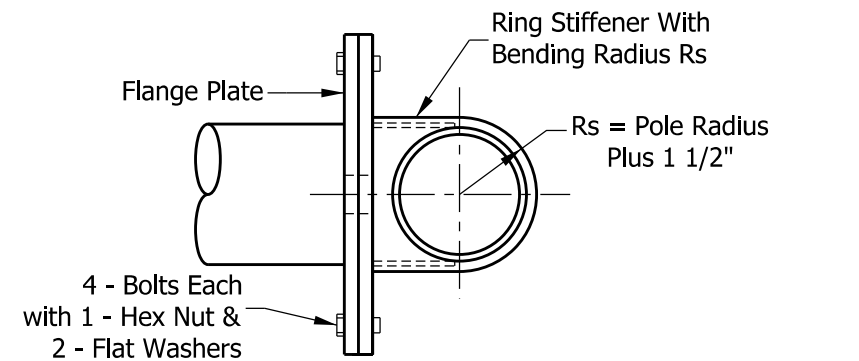


TOP OF GUSSET PLATE

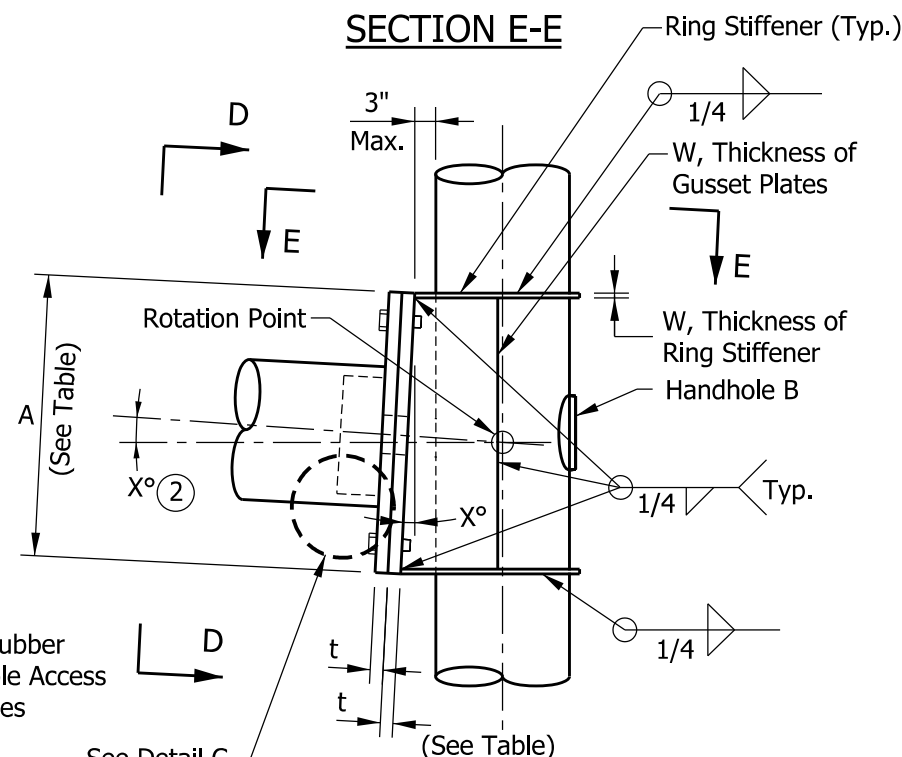


SECTION D-D

SIGNAL ARM CONNECTION DETAIL



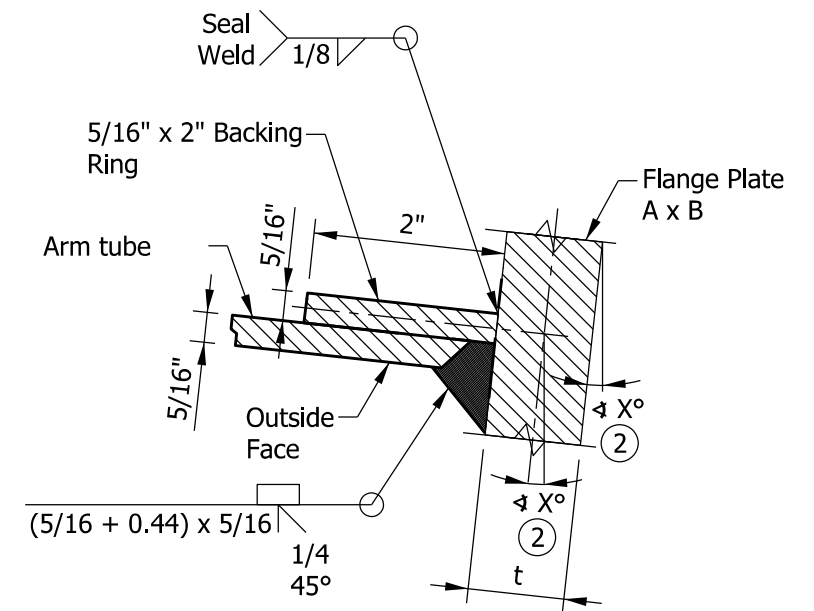
SECTION E-E



ELEVATION

NOTES:

- See Standard Drawing E 805-SDAC-06 for Handhole B details.
- The required signal arm rise shall be built into the gusset plate at the angle X. The angle X is described as arc tan R/L, where R is the arm rise and L is the arm length. Both R and L vary and are listed in the Signal Dual Arm Cantilever Data table on Standard Drawing E 805-SDAC-03.



**DETAIL C
ARM WELD**

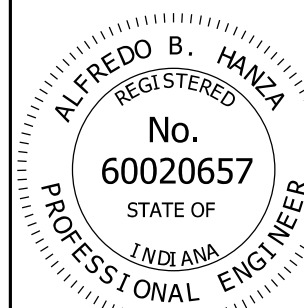
TABLE OF PLATES AND BOLTS FOR SIGNAL DUAL ARM CANTILEVER						
ARM LENGTH (FT)	FLANGE PLATE A X B (IN.)	BOLT PATTERN C X D (IN. X IN.)	RING STIFFENER & GUSSET PLATE THICKNESS W (IN.)	FLANGE PLATE THICKNESS t (IN.)	BOLT DIAMETER (IN.)	BOLT LENGTH (IN.)
15 to 35	22 x 22	17 1/2 x 17 1/2	3/8	1 1/2	1 1/4	5
> 35 to 45	26 x 26	21 1/2 x 21 1/2	1/2	2	1 1/2	6

INDIANA DEPARTMENT OF TRANSPORTATION

SIGNAL DUAL ARM CANTILEVERS
ARM CONNECTION DETAILS

SEPTEMBER 2013

STANDARD DRAWING NO. E 805-SDAC-05

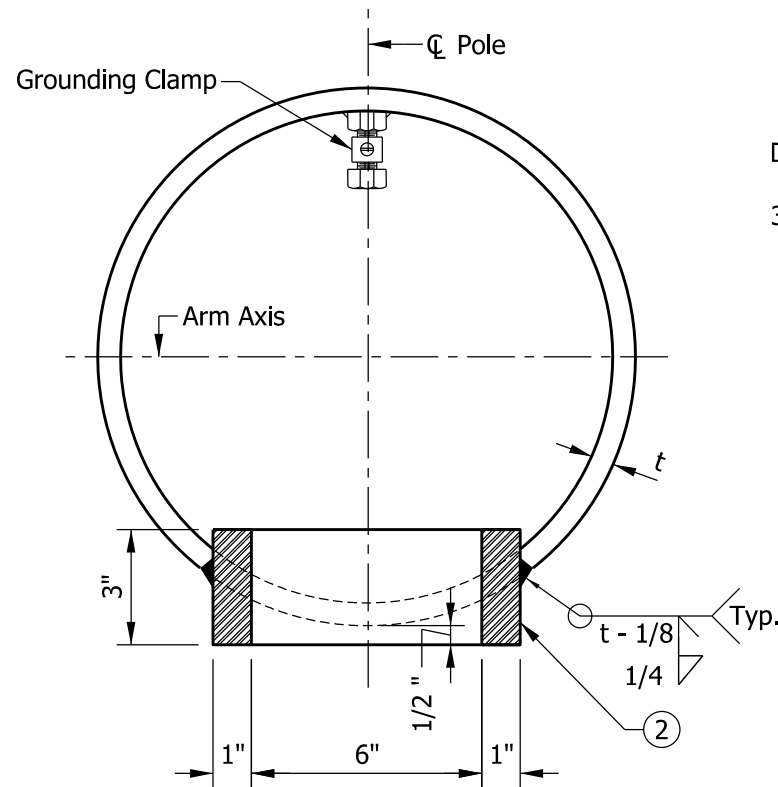


/s/ Alfredo B. Hanza 02/05/13

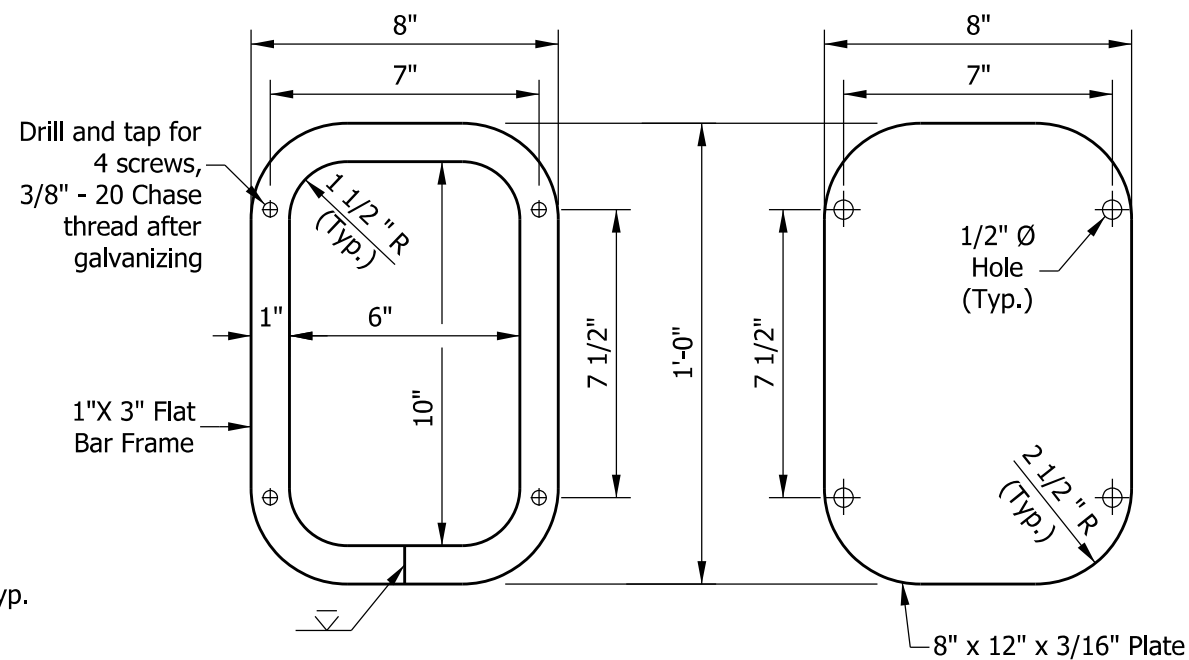
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/27/13

CHIEF ENGINEER DATE



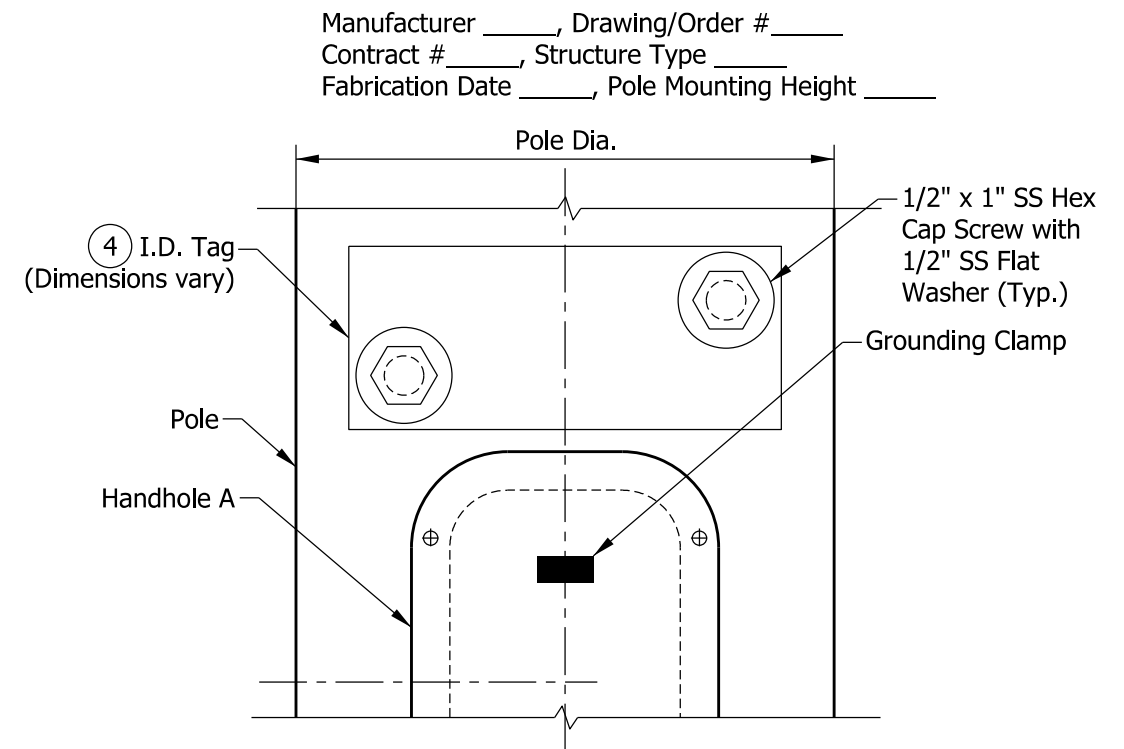
**HANDHOLE A
SECTION ACROSS POLE**



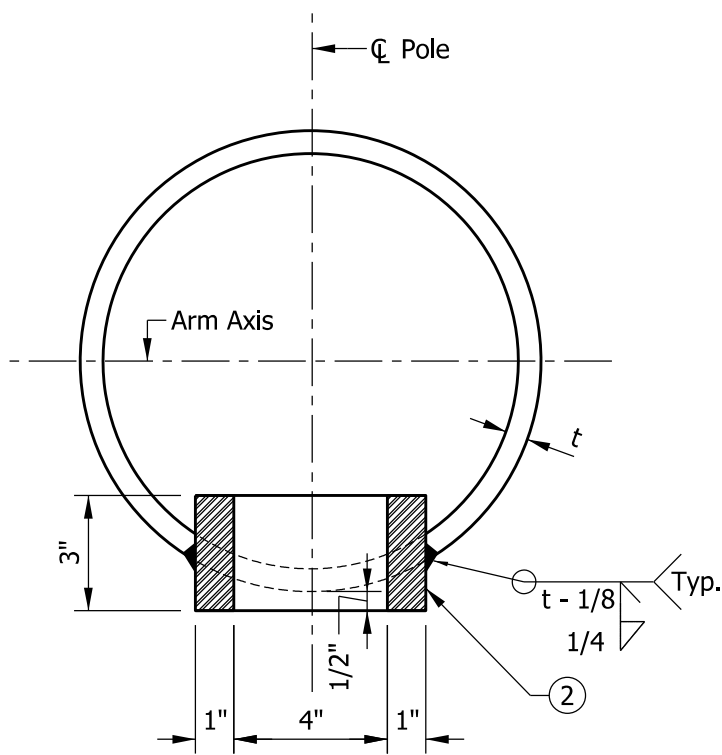
FRAME DETAIL

COVER

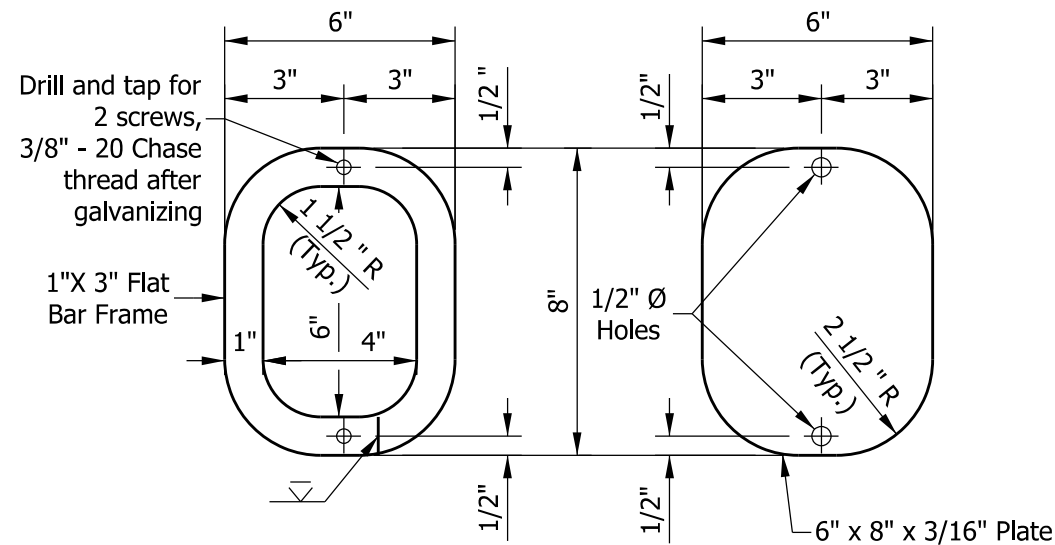
HANDHOLE A



**PARTIAL ELEVATION
AT HANDHOLE A**



**HANDHOLE B
SECTION ACROSS POLE**



FRAME DETAIL

COVER

HANDHOLE B

NOTES:

1. Handhole A to be used at the base of the pole. Handhole B to be used at all other locations.
- 2 In lieu of fabricated handhole frame as shown, frame may be cut from 3" plate (rolling direction vertical).
3. See Standard Drawing E 805-SDAC-02 for handhole locations.
- 4 I.D. tag is a 1/8" stainless steel plate with the following information stamped in 1/2" black letters:

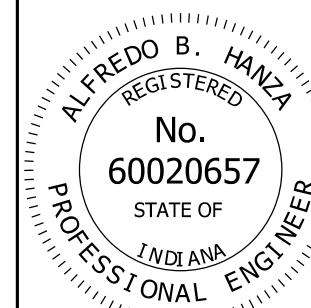
Manufacturer _____, Drawing/Order # _____
 Contract # _____, Structure Type _____
 Fabrication Date _____, Pole Mounting Height _____

INDIANA DEPARTMENT OF TRANSPORTATION

SIGNAL DUAL ARM CANTILEVERS
HANDHOLE AND I.D. TAG DETAILS

SEPTEMBER 2013

STANDARD DRAWING NO. E 805-SDAC-06

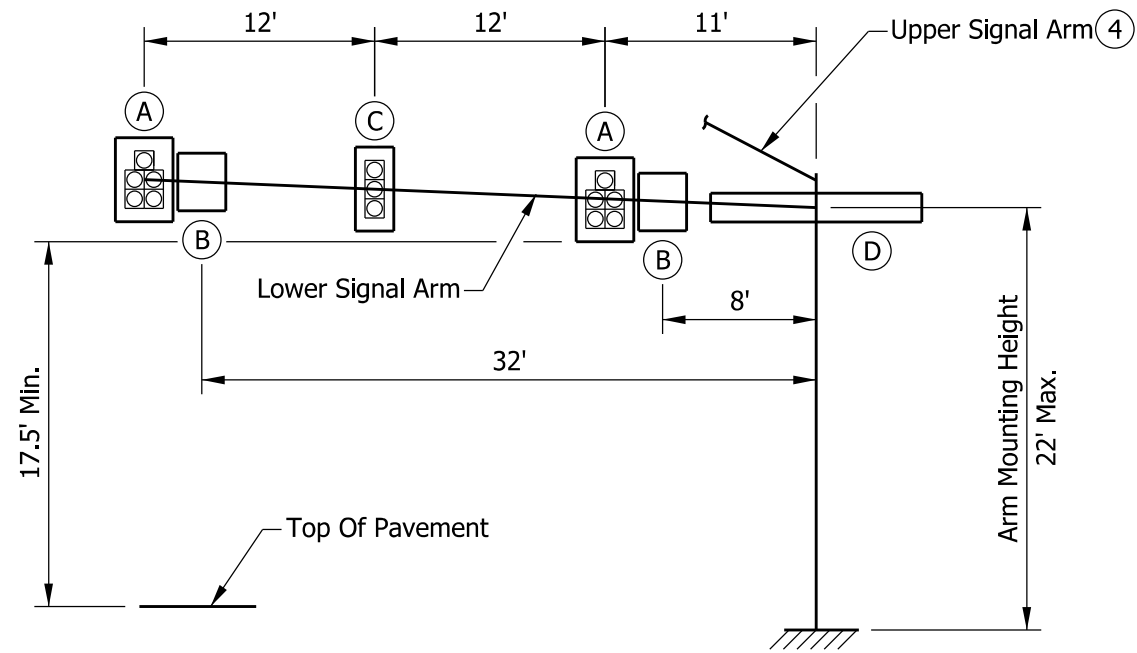


/s/ Alfredo B. Hanza 02/05/13

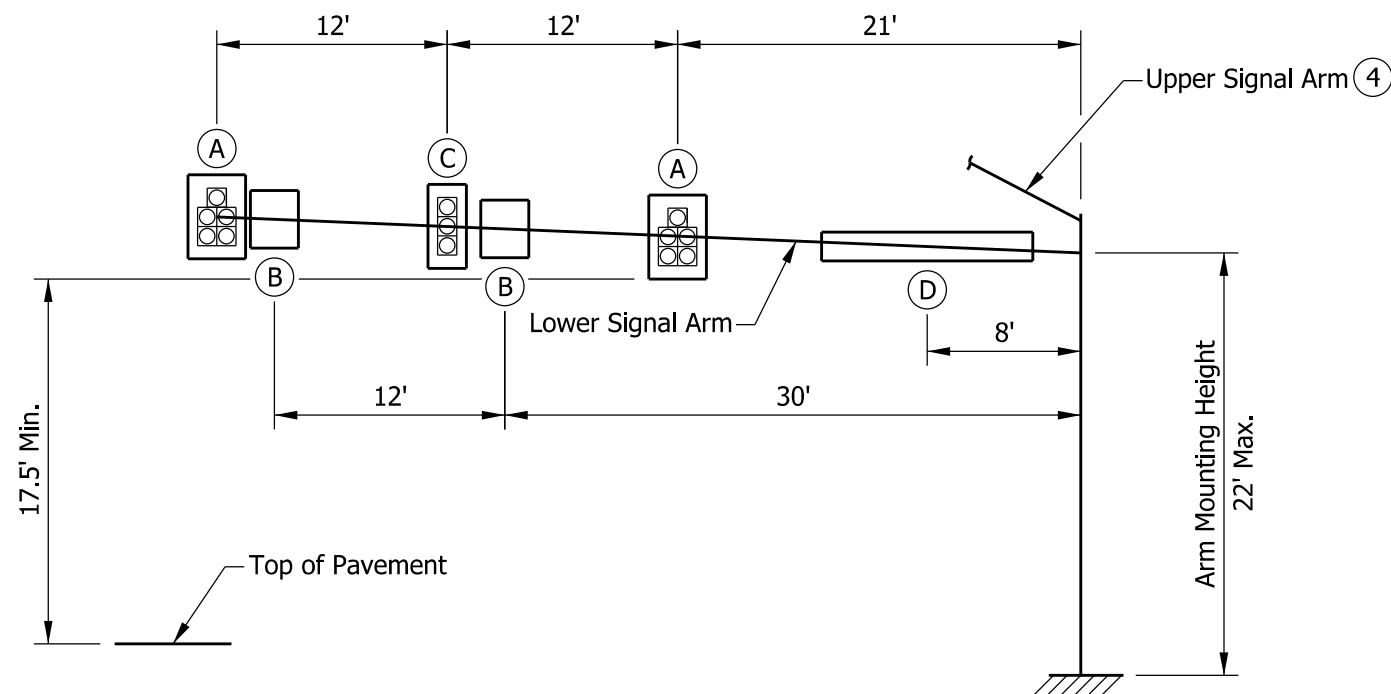
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/27/13

CHIEF ENGINEER DATE



35' ARMS



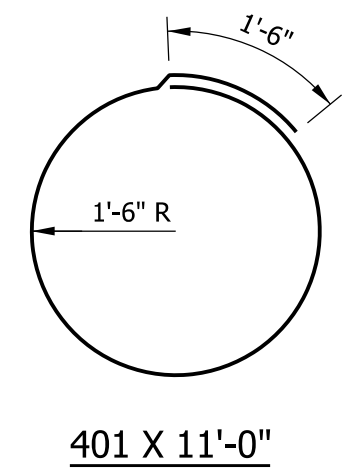
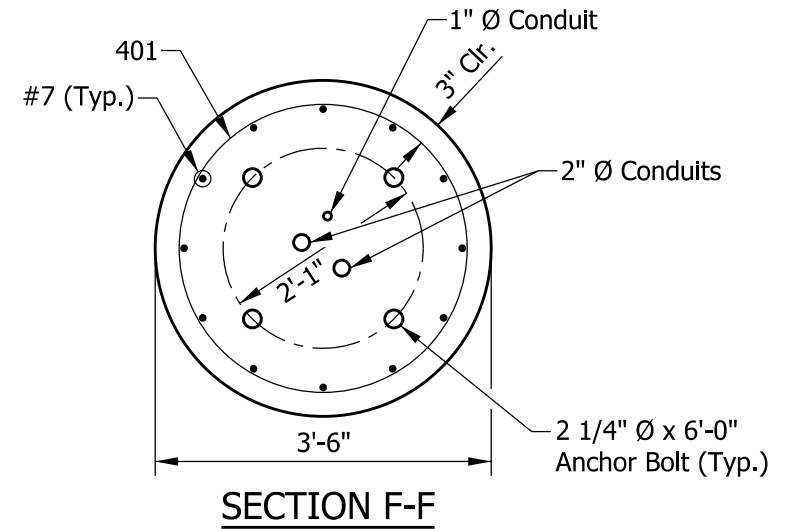
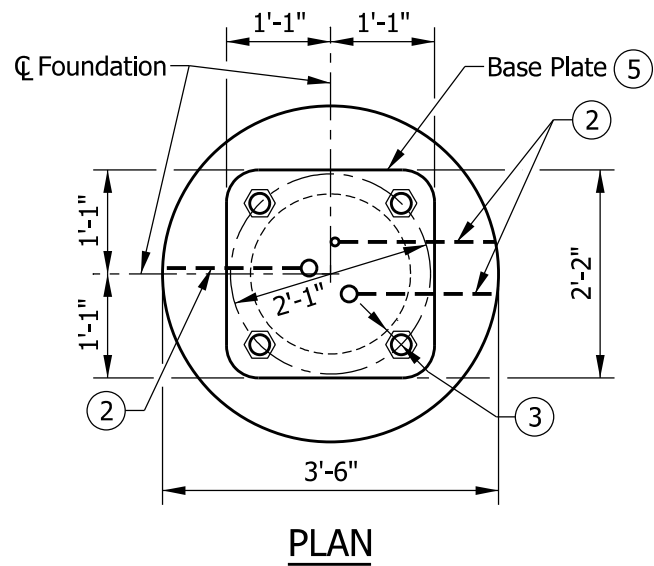
45' ARMS

NOTES:

1. The arms and pole are designed for the loading conditions shown. For arm lengths shorter than 35', the loading shall not exceed the loading shown for the 35' arm length.
 2. Foundation Type E is designed for arm length of 35' or less. See Standard Drawing E 805-SDAC-08.
 3. Foundation Type F is designed for arm length of greater than 35' to 45'. See Standard Drawing E 805-SDAC-09.
- ④ Both arms can be loaded as shown in loading diagrams.

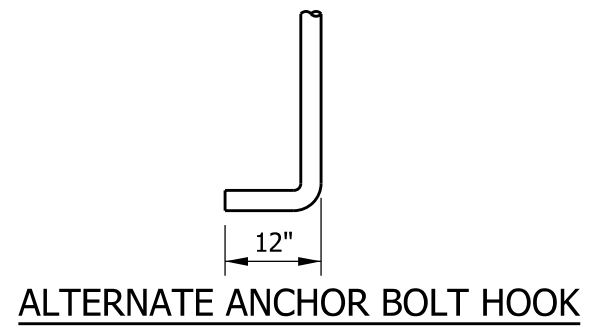
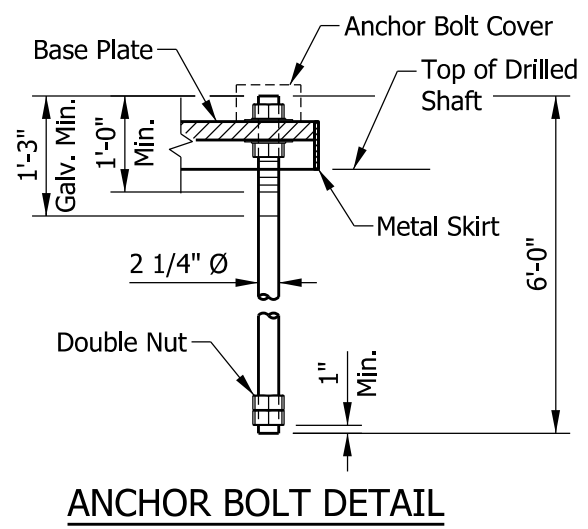
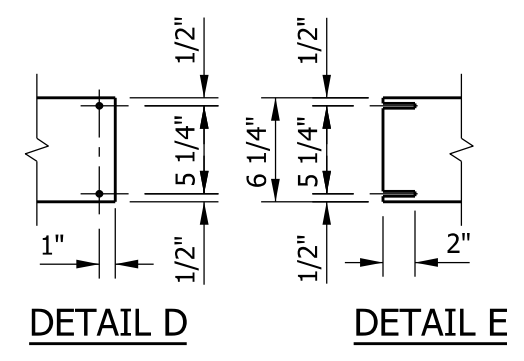
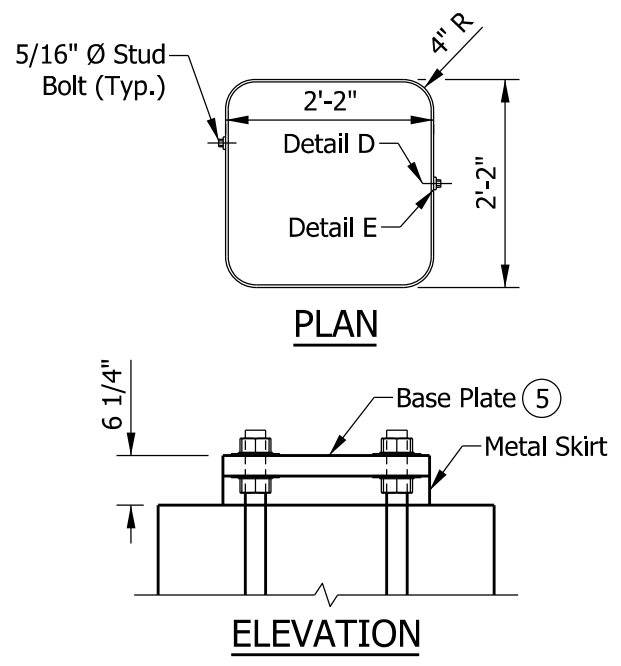
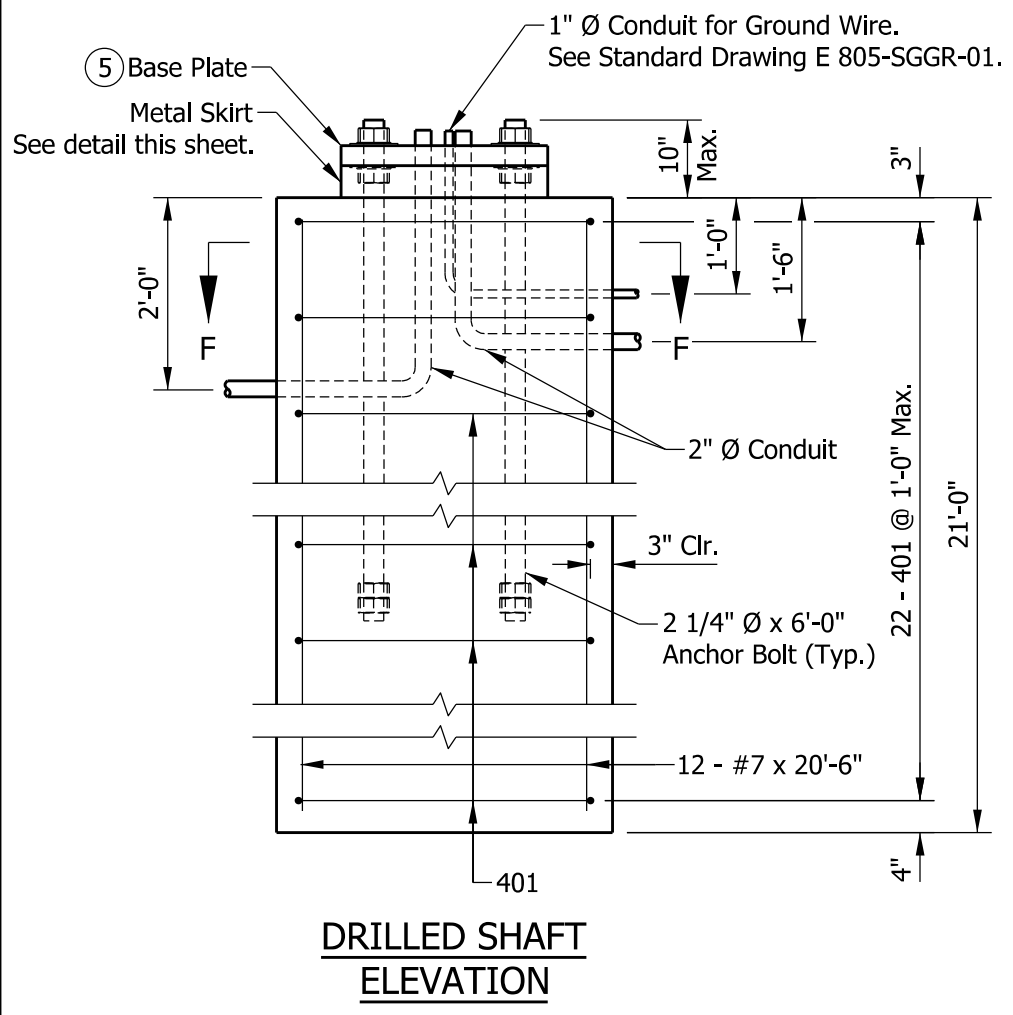
SIGNAL AND SIGN LOADING INFORMATION TABLE			
DEVICE	DESCRIPTION	DEVICE AREA (SQ FT)	WEIGHT (LBS)
Ⓐ	12" - 5 section signal head with backplates	14.5	69
Ⓑ	36" x 30" regulatory sign	7.5	19
Ⓒ	12" - 3 section signal head with backplates	10.1	55
Ⓓ	18" x 11'-0" street name sign	16.5	41

INDIANA DEPARTMENT OF TRANSPORTATION	
SIGNAL DUAL ARM CANTILEVERS LOADING DIAGRAMS	
SEPTEMBER 2013	
STANDARD DRAWING NO.	E 805-SDAC-07
	<i>/s/ Alfredo B. Hanza</i> 02/05/13 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Mark A. Miller</i> 03/27/13 CHIEF ENGINEER DATE



NOTES:

1. The Type E foundations are to be used for 35' dual arm structures and cohesive soil with minimum $Q_u = 750$ lb/ft or sand with minimum friction angle 30° .
2. A tooled line or other permanent marking shall be provided on the top of the foundation to indicate the direction of the conduits' exit ends.
3. 2 1/2" minimum clearance to weld at pole. Anchor bolt circle shall allow clearance for the anchor bolt washers. Cutting or trimming of the washers will not be allowed.
4. The foundation shall be poured monolithically and shall have no construction joint.
5. See Standard Drawing E 805-SDAC-04 for base plate details.



BILL OF MATERIALS			
REINFORCING BARS			
MARK OR SIZE	NO. OF BARS	LENGTH	WEIGHT
#7	12	20'-6"	
Total #7			503 LBS
401	22	11'-0"	
Total #4			162 LBS
Total Reinforcing Bars			665 LBS
CONCRETE			
Concrete, Class A			7.5 CYS

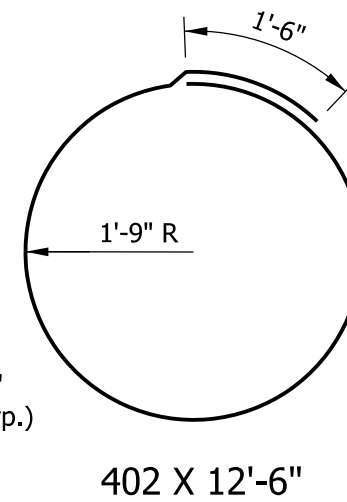
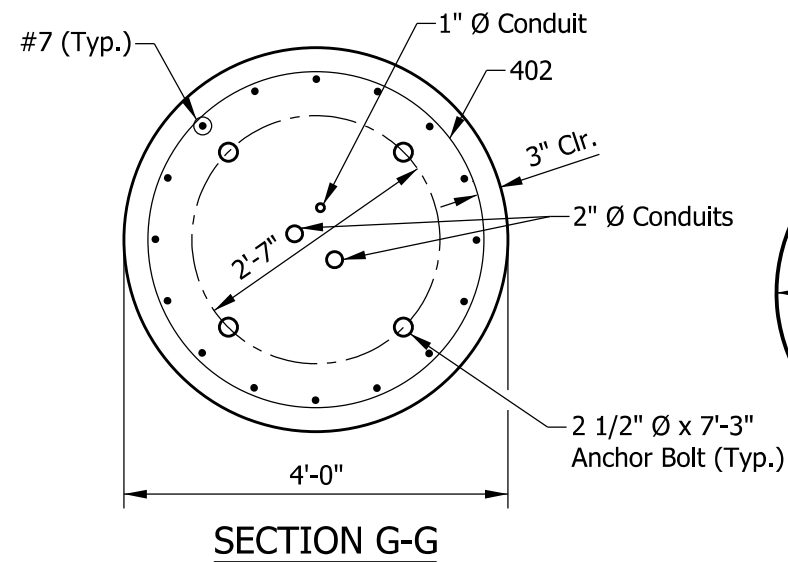
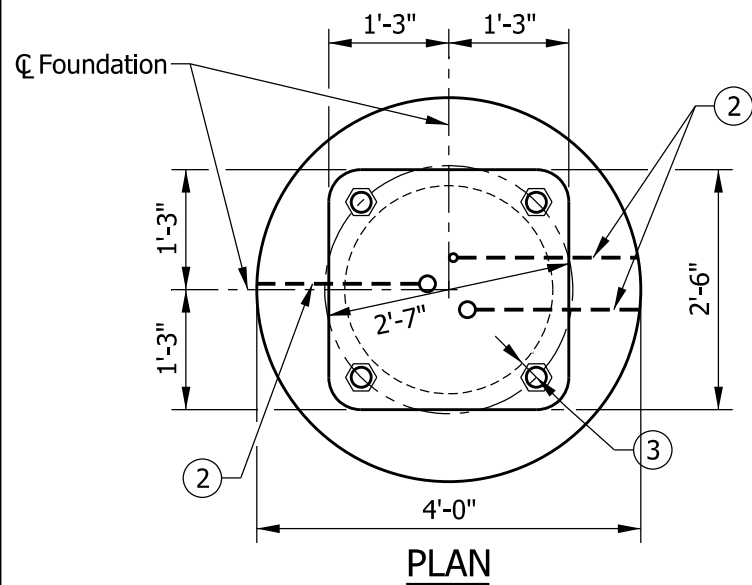
INDIANA DEPARTMENT OF TRANSPORTATION

**SIGNAL DUAL ARM CANTILEVERS
FOUNDATION, DRILLED SHAFT TYPE E
FOR DUAL ARMS 35' OR LESS**

SEPTEMBER 2013

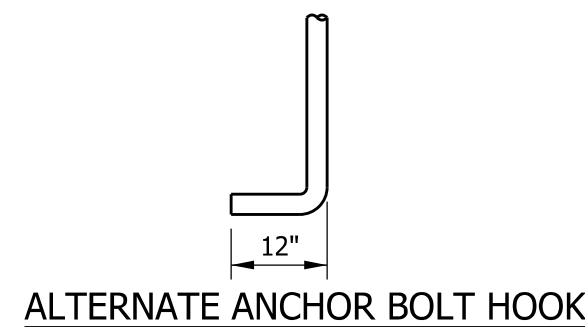
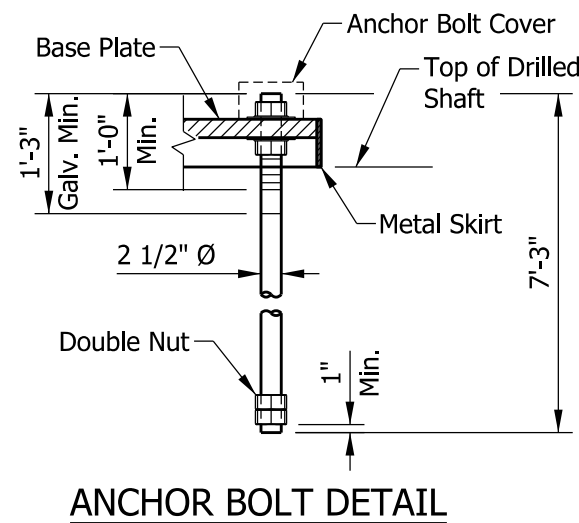
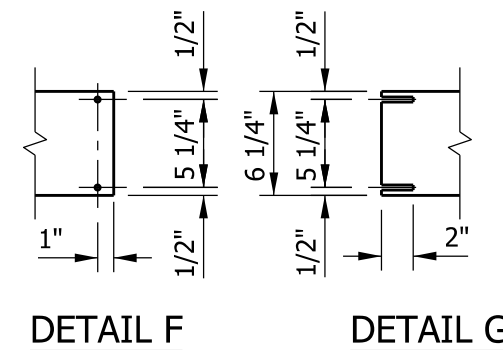
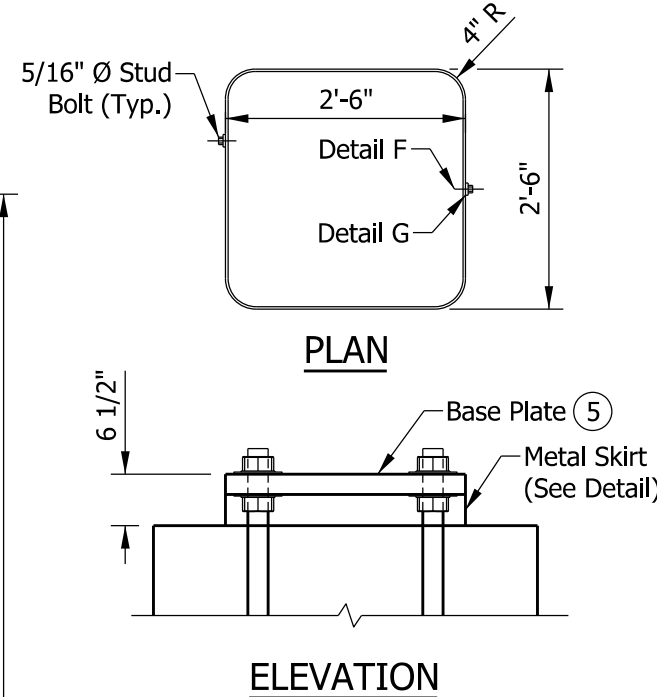
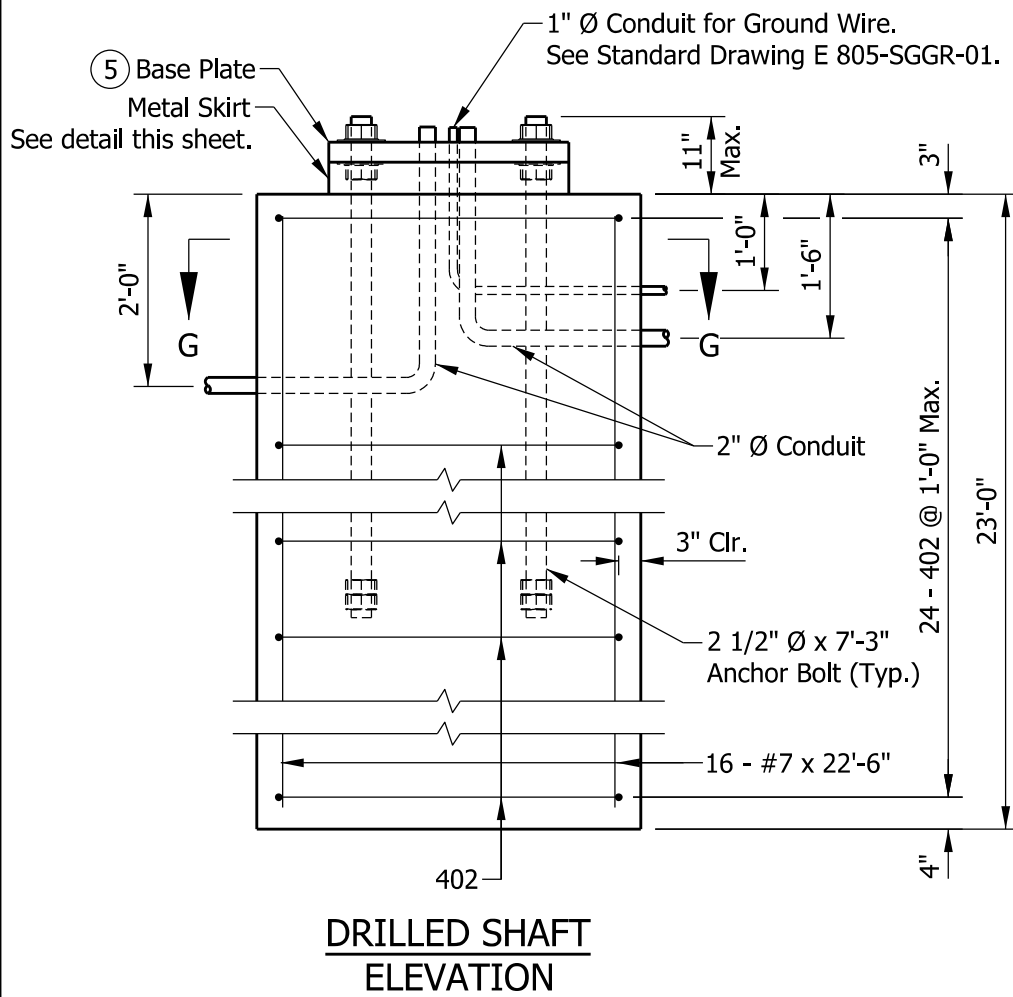
STANDARD DRAWING NO. E 805-SDAC-08

	<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">/s/ <i>Alfredo B. Hanza</i></td> <td style="width: 40%;">02/05/13</td> </tr> <tr> <td>DESIGN STANDARDS ENGINEER</td> <td>DATE</td> </tr> <tr> <td colspan="2"><hr/></td> </tr> <tr> <td>/s/ <i>Mark A. Miller</i></td> <td>03/27/13</td> </tr> <tr> <td>CHIEF ENGINEER</td> <td>DATE</td> </tr> </table>	/s/ <i>Alfredo B. Hanza</i>	02/05/13	DESIGN STANDARDS ENGINEER	DATE	<hr/>		/s/ <i>Mark A. Miller</i>	03/27/13	CHIEF ENGINEER	DATE
/s/ <i>Alfredo B. Hanza</i>	02/05/13										
DESIGN STANDARDS ENGINEER	DATE										
<hr/>											
/s/ <i>Mark A. Miller</i>	03/27/13										
CHIEF ENGINEER	DATE										



NOTES:

1. The Type E foundations are to be used for 35' dual arm structures and cohesive soil with minimum $Q_u = 750$ lb/ft or sand with minimum friction angle 30° .
2. A tooled line or other permanent marking shall be provided on the top of the foundation to indicate the direction of the conduits' exit ends.
3. 2 1/2" minimum clearance to weld at pole. Anchor bolt circle shall allow clearance for the anchor bolt washers. Cutting or trimming of the washers will not be allowed.
4. The foundation shall be poured monolithically and shall have no construction joint.
5. See Standard Drawing E 805-SDAC-04 for base plate details.



BILL OF MATERIALS			
REINFORCING BARS			
MARK OR SIZE	NO. OF BARS	LENGTH	WEIGHT
#7	16	22'-6"	
Total #7			736 LBS
402	24	12'-6"	
Total #4			201 LBS
Total Reinforcing Bars			937 LBS
CONCRETE			
Concrete, Class A			10.7 CYS

INDIANA DEPARTMENT OF TRANSPORTATION

**SIGNAL DUAL ARM CANTILEVERS
FOUNDATION, DRILLED SHAFT TYPE F
FOR DUAL ARMS GREATER THAN 35' TO 45'**

SEPTEMBER 2013

STANDARD DRAWING NO. E 805-SDAC-09

	/s/ <i>Alfredo B. Hanza</i>	02/05/13
	DESIGN STANDARDS ENGINEER	DATE
	/s/ <i>Mark A. Miller</i>	03/27/13
	CHIEF ENGINEER	DATE