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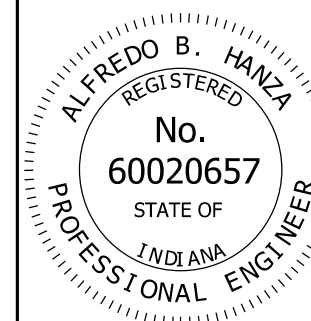
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3	Signal Arm Dimensions & Details
4	Signal Arm Pole Base Plate, Bottom Splice Plates, and Pole Top Cover Details
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INDIANA DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL CANTILEVER STRUCTURE
DRAWING INDEX

SEPTEMBER 2013

STANDARD DRAWING NO. E 805-TSCS-01

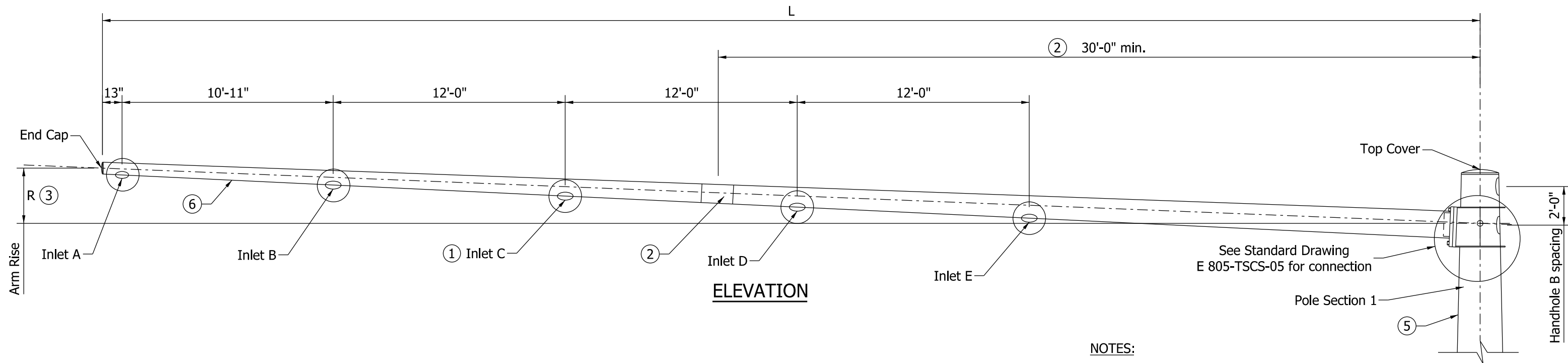


/s/ Alfredo B. Hanza 02/05/13

DESIGN STANDARDS ENGINEER DATE

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

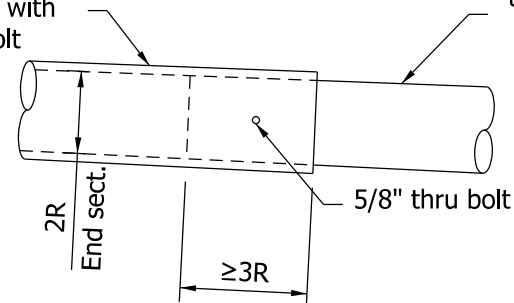
CHIEF ENGINEER DATE



NOTES:

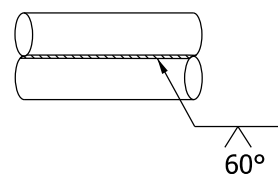
- ① Number of cable inlets depends on arm L (See Arm Dimensions Table). The inlet diameter shall be 1 3/4" with rubber grommet (Typ.)
- ② Optional splice can be used for arm length of greater than 40'. Field assembly shall achieve a snug tight joint, with minimum overlap not less than 1.5 times the inside dimension of the end section.
- ③ Arm rise R is measured in the undeflected position without vertical loads on the arm.
4. See Standard Drawings E 805-TSCS-07 and -08 for placement of signal and signs for each arm length.
- ⑤ If seam welds are used, the weld location for the arms shall be along the bottom, and on the side of pole as shown.

End section extension with wall thickness 3/16" min. and with drilled hole for 5/8" bolt



② OPTIONAL ARM SPLICE DETAIL

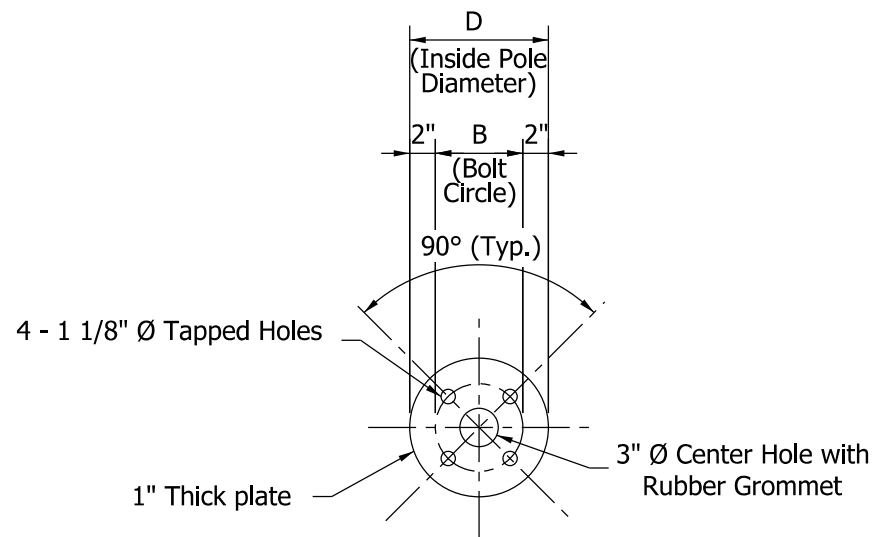
Base section with wall thickness 5/16" and field drilled hole for 5/8" bolt with curved washer and lock nut



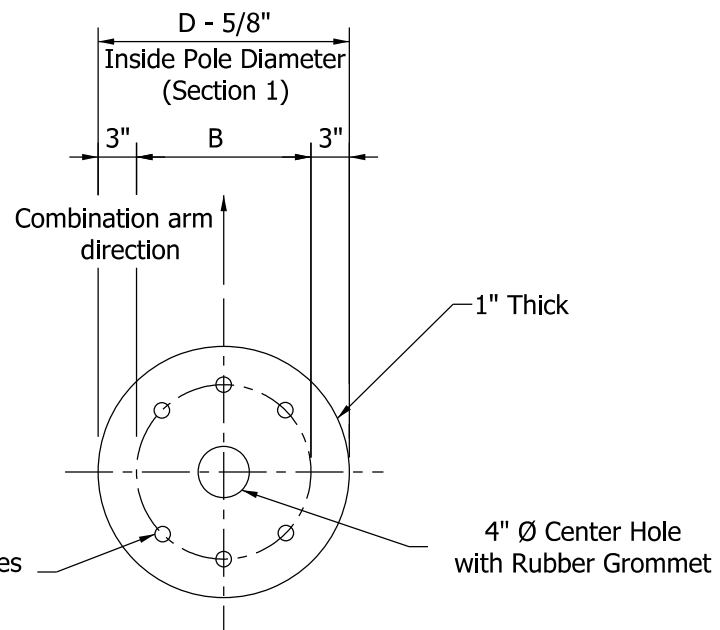
⑤ TYPICAL SEAM WELD

ARM DIMENSIONS TABLE				
L (ft.)	ARM DIAMETER AT POLE	ARM WALL THICKNESS (in.)	R (in.)	CABLE INLETS
15	8"	5/16"	7 1/2"	A, B
20	10"	5/16"	10"	A, B
25	11"	5/16"	1'-0 1/2"	A, B
30	13"	5/16"	1'-3"	A, B
35	14"	5/16"	1'-5 1/2"	A, B, C
40	15"	5/16"	1'-8"	A, B, C
45	17"	5/16"	1'-10 1/2"	A, B, C
50	19"	5/16"	2'-1"	A, B, C, D
55	20"	5/16"	2'-3 1/2"	A, B, C, D
60	21"	5/16"	2'-6"	A, B, C, D, E

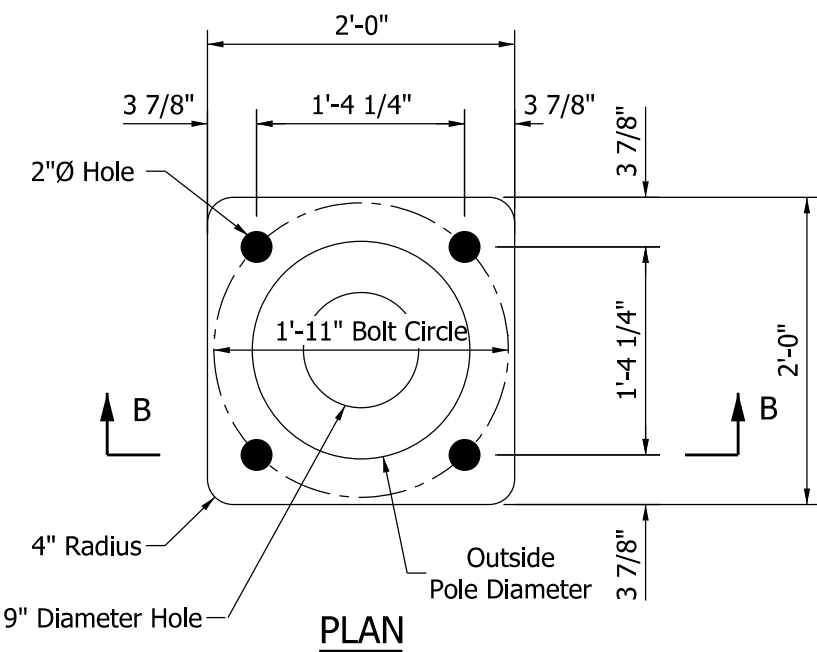
INDIANA DEPARTMENT OF TRANSPORTATION									
TRAFFIC SIGNAL CANTILEVER STRUCTURE SIGNAL ARM DIMENSIONS & DETAILS									
SEPTEMBER 2013									
STANDARD DRAWING NO.	E 805-TSCS-03								
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">/s/ <i>Alfredo B. Hanza</i></td> <td style="text-align: right;">02/05/13</td> </tr> <tr> <td style="text-align: center;">DESIGN STANDARDS ENGINEER</td> <td style="text-align: right;">DATE</td> </tr> <tr> <td style="text-align: center;">/s/ <i>Mark A. Miller</i></td> <td style="text-align: right;">03/27/13</td> </tr> <tr> <td style="text-align: center;">CHIEF ENGINEER</td> <td style="text-align: right;">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								



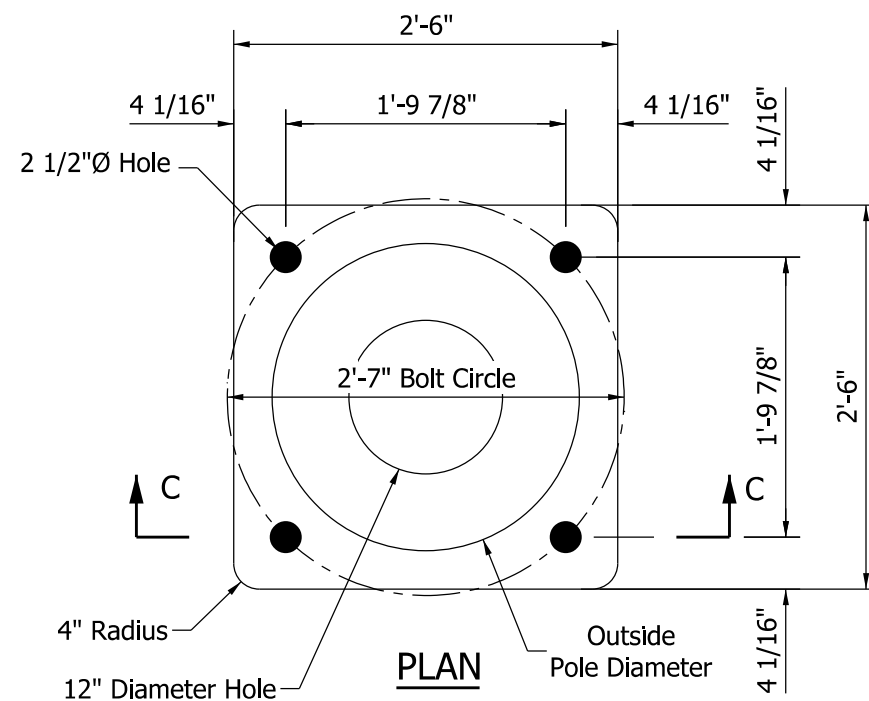
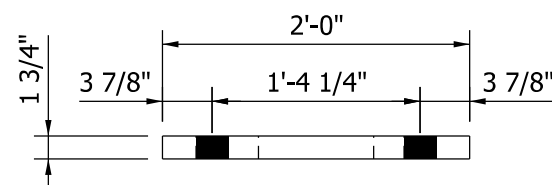
① **BOTTOM SPLICE PLATE**
(For Cantilever Arm Length of 35' or Less)



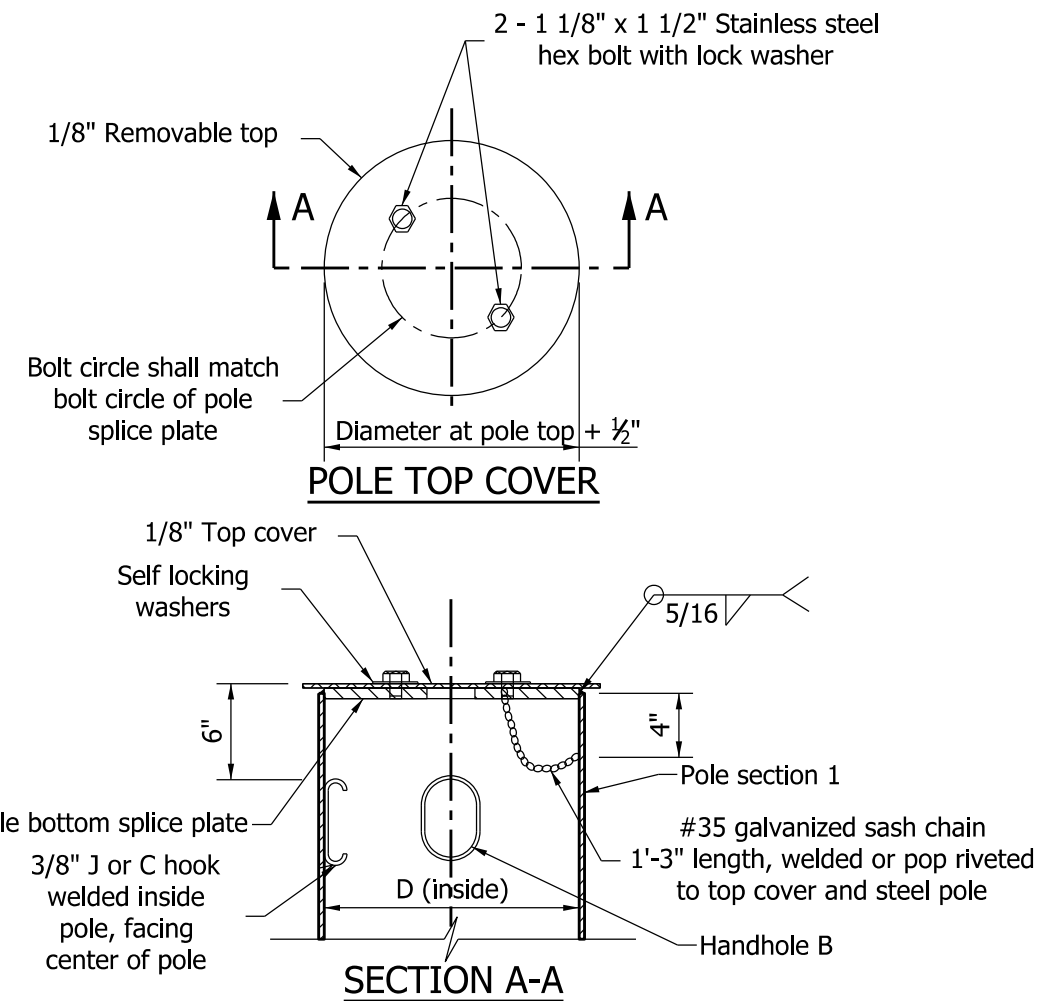
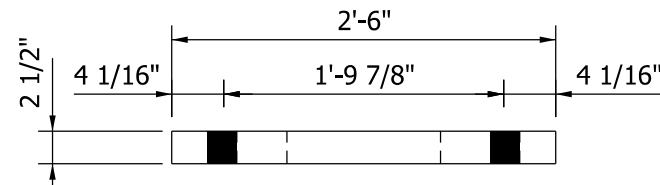
① **BOTTOM SPLICE PLATE**
(For Cantilever Arm Length Greater Than 35' to 60')



SECTION B-B
BASE PLATE A



SECTION C-C
BASE PLATE B

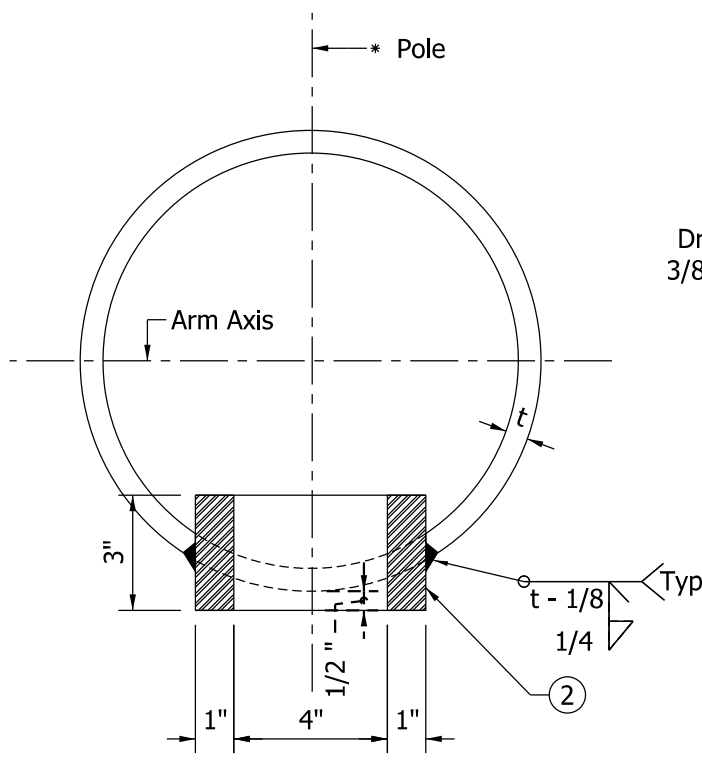


① **Pole bottom splice plate**
3/8" J or C hook welded inside pole, facing center of pole

NOTES:

- ① See Standard Drawings E 805-TSCS-12 and -13 for bottom splice details.
2. Bolt circle shall allow clearance for the plate washer. Cutting or trimming the washer will not be allowed.

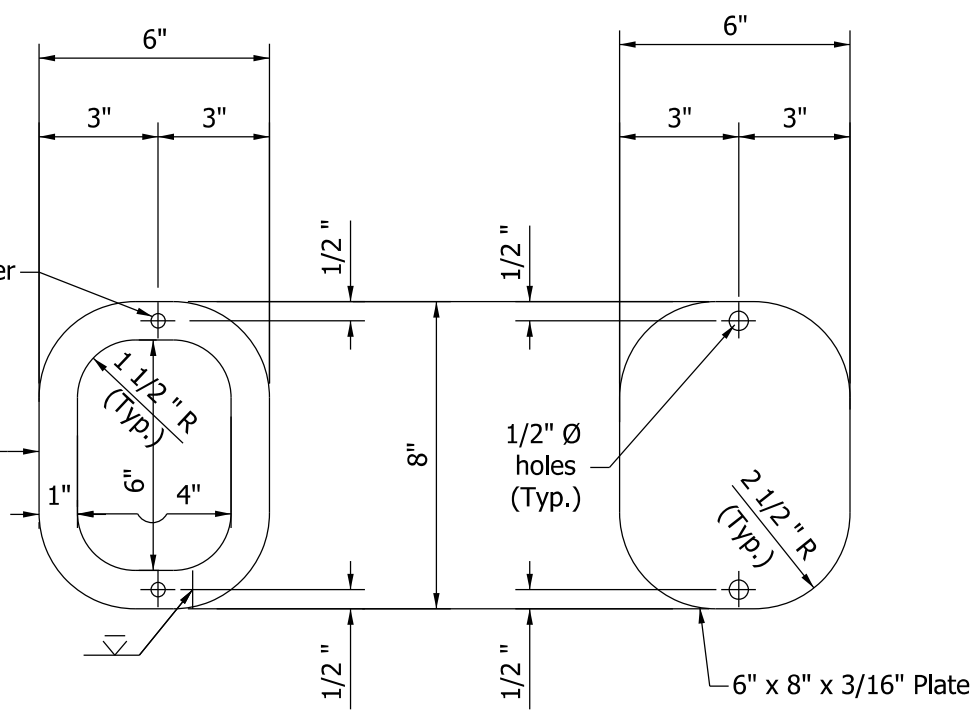
INDIANA DEPARTMENT OF TRANSPORTATION	
TRAFFIC SIGNAL CANTILEVER STRUCTURE SIGNAL ARM POLE BASE PLATE, BOTTOM SPLICE PLATES, AND POLE TOP COVER DETAILS	
SEPTEMBER 2013	
STANDARD DRAWING NO. E 805-TSCS-04	
	/s/ <i>Alfredo B. Hanza</i> 03/26/13 DESIGN STANDARDS ENGINEER DATE
	/s/ <i>Mark A. Miller</i> 03/27/13 CHIEF ENGINEER DATE



**HANDHOLE B
SECTION ACROSS POLE**

Drill and tap for 2 screws,
3/8" - 20 Chase thread after
galvanizing

1"x 3" flat
bar frame



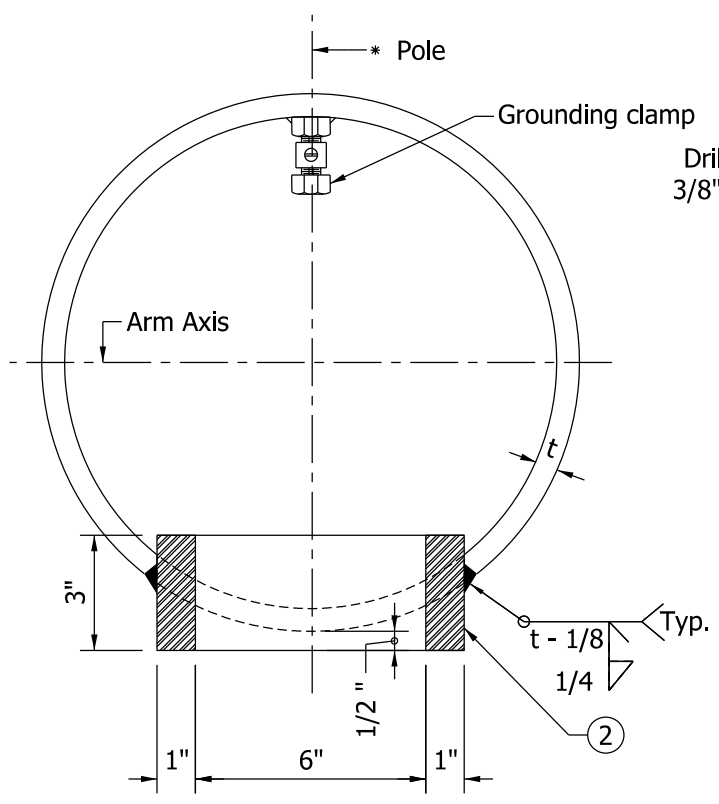
FRAME DETAIL

COVER

HANDHOLE B

NOTES:

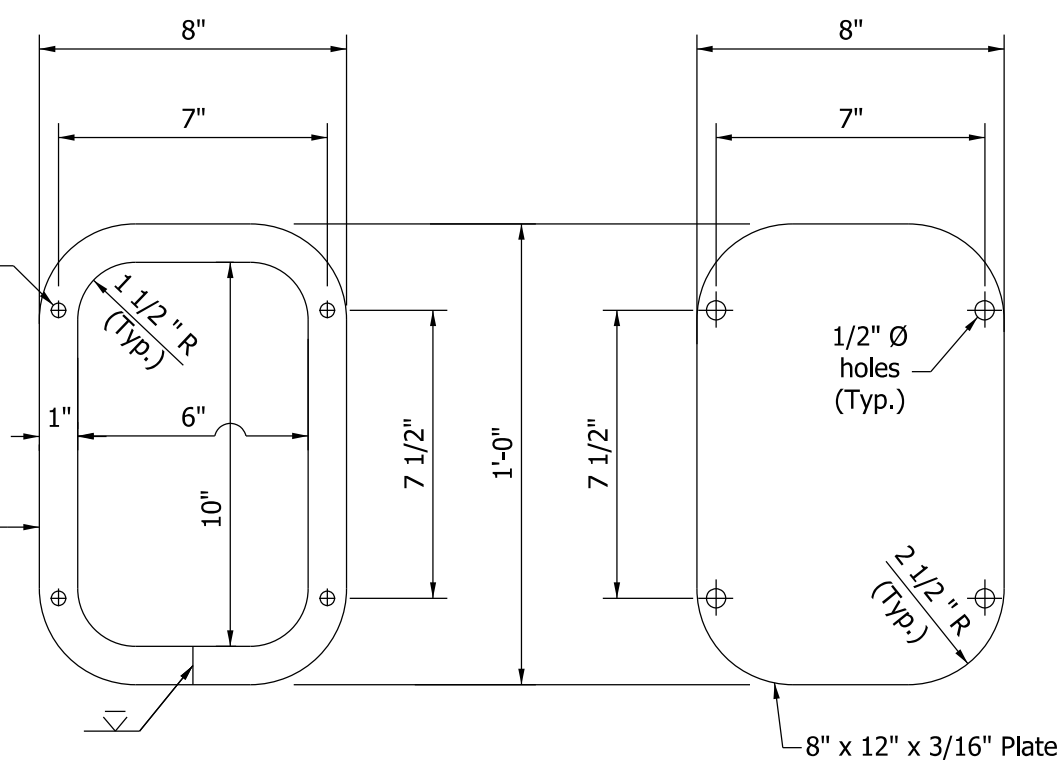
- 1 Handhole A shall be used at the base of the pole. Handhole B shall be used at all other locations.
- ② In lieu of fabricated handhole frame as shown, frame may be cut from 3" plate with rolling direction vertical.
- 3 See Standard Drawings E 805-TSCS-02 and -09 for handhole locations.



**HANDHOLE A
SECTION ACROSS POLE**

Drill and tap for 4 screws,
3/8" - 20 Chase thread after
galvanizing

1"x 3" flat
bar frame

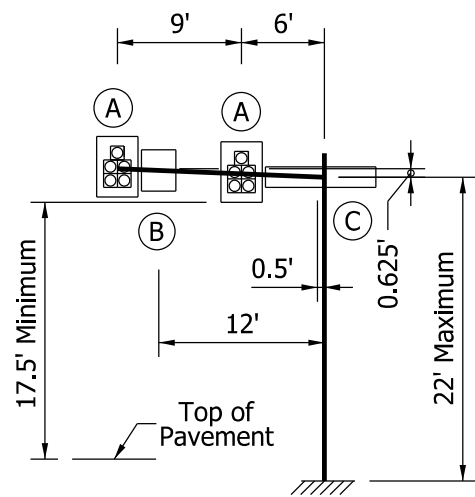


FRAME DETAIL

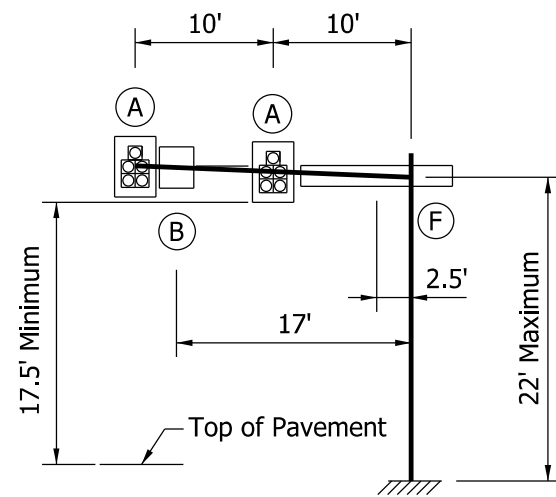
COVER

HANDHOLE A

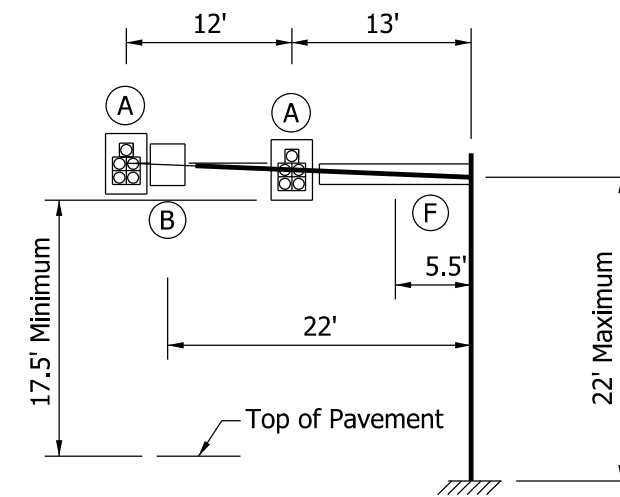
INDIANA DEPARTMENT OF TRANSPORTATION		
TRAFFIC SIGNAL CANTILEVER STRUCTURE HANDHOLE DETAILS		
SEPTEMBER 2013		
STANDARD DRAWING NO.		E 805-TSCS-06
	/s/ Alfredo B. Hanza	02/05/13
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	03/27/13
	CHIEF ENGINEER	DATE



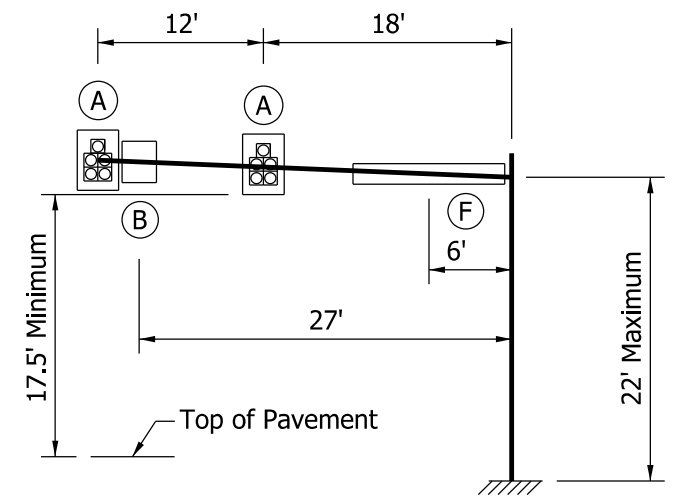
15' ARM



20' ARM



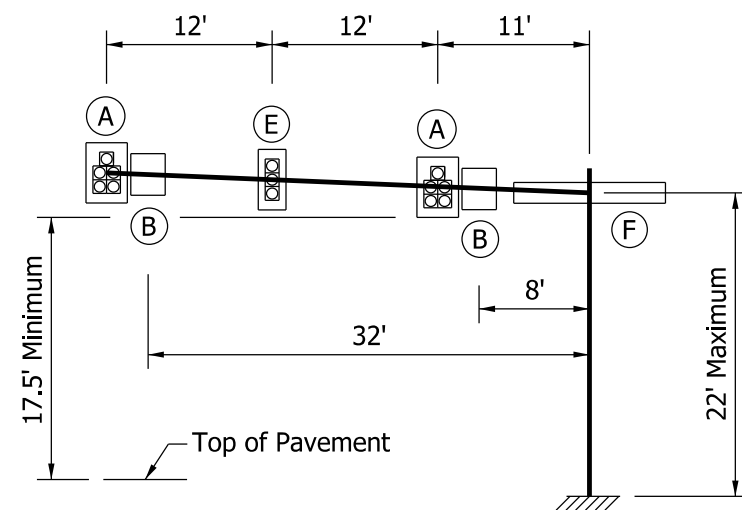
25' ARM



30' ARM

NOTE:

1. The structure arms and pole are designed for the above loading conditions. Foundation types A and C are designed for arms having length of 35 ft or less. See Standard Drawings E 805-TSCS-16 and -18 for foundation types A and C.



35' ARM

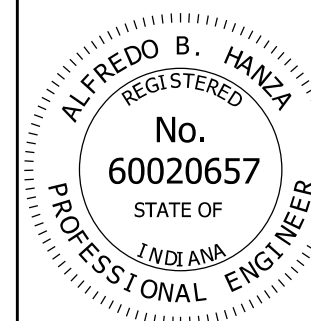
LEGEND	
Device	Description
(A)	12" - 5 Section Signal Head With Backplates
(B)	36" x 30" Regulatory Sign
(C)	18" x 96" Street Name Sign
(E)	12" - 3 Section Signal Head With Backplates
(F)	18" x 132" Street Name Sign

INDIANA DEPARTMENT OF TRANSPORTATION

**TRAFFIC SIGNAL CANTILEVER STRUCTURE
PLACEMENT OF SIGNALS AND SIGNS
LOADING FOR ARM OF 35' OR LESS**

SEPTEMBER 2013

STANDARD DRAWING NO. E 805-TSCS-07

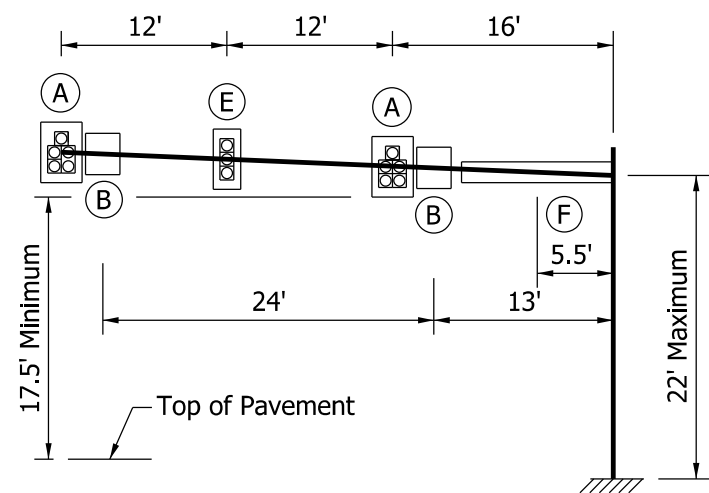


/s/ Alfredo B. Hanza 02/05/13

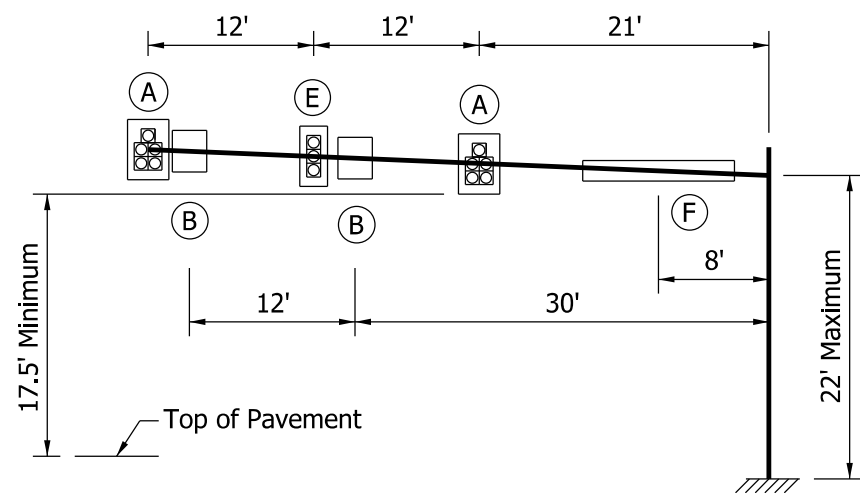
DESIGN STANDARDS ENGINEER DATE

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

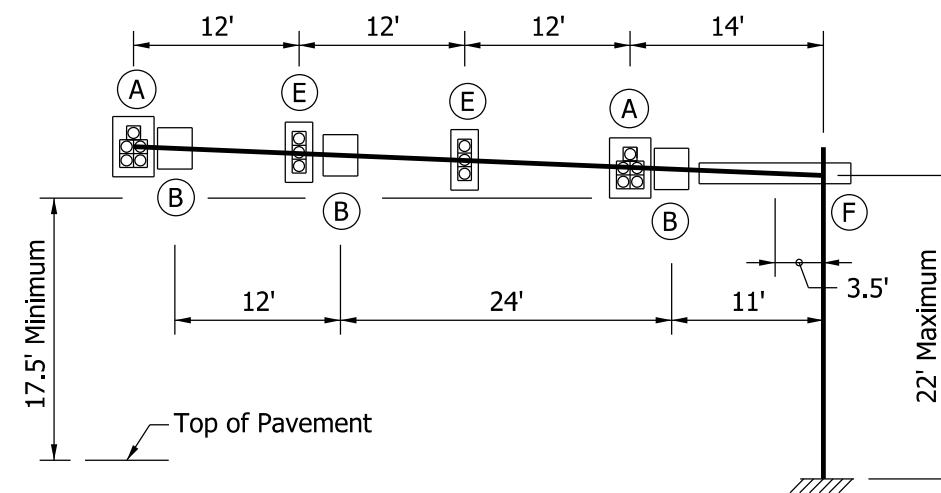
CHIEF ENGINEER DATE



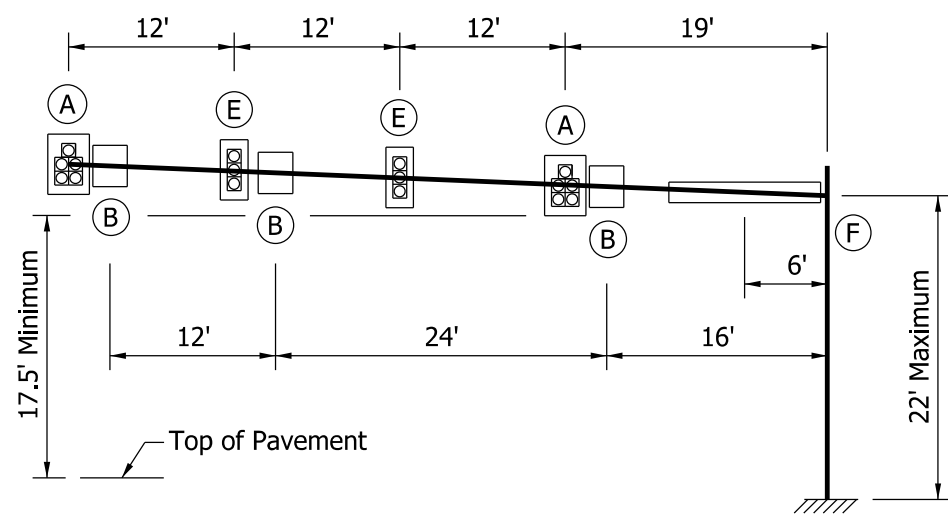
40' ARM



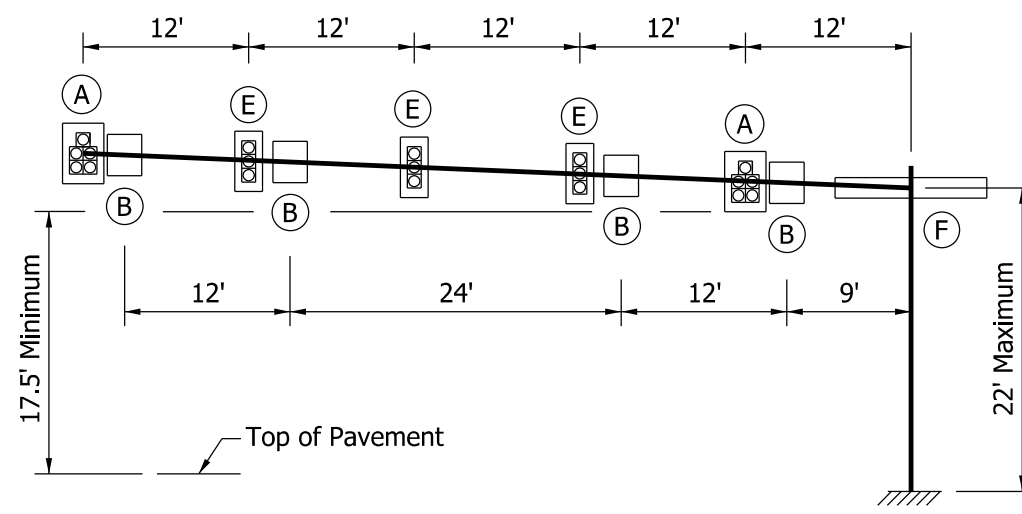
45' ARM



50' ARM



55' ARM

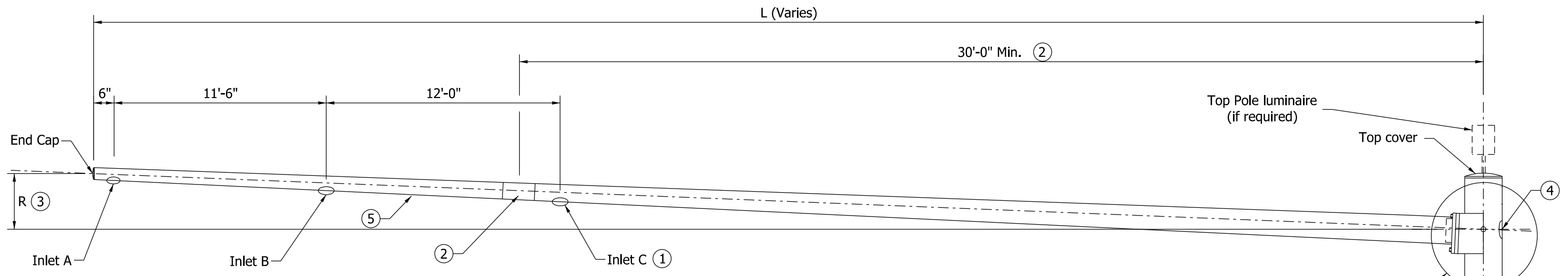


60' ARM

NOTES:

1. See Standard Drawing E 805-TSCS-07 for Legend.
2. The structure arms and pole are designed for the above loading conditions. Foundation types B and D are designed for arms having length of greater than 35 ft to 60 ft. See Standard Drawings E 805-TSCS-17 and -19 for foundation types B and D.

INDIANA DEPARTMENT OF TRANSPORTATION	
TRAFFIC SIGNAL CANTILEVER STRUCTURE PLACEMENT OF SIGNALS AND SIGNS LOADING FOR ARM OF GREATER THAN 35' TO 60' SEPTEMBER 2013	
STANDARD DRAWING NO. E 805-TSCS-08	
	/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



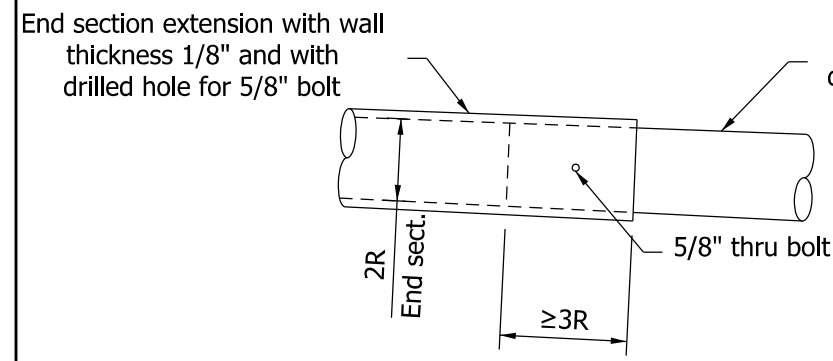
ELEVATION

NOTES:

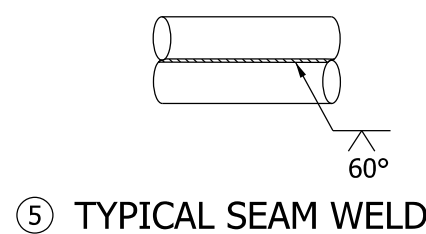
- ① Number of cable inlets depends on L. See Arm Dimensions Table. The inlet diameter shall be 1 3/4" with rubber grommet (typ.).
- ② Optional splice can be used for arm length of greater than 40 ft. Field assembly shall achieve a snug tight joint having overlap not less than 1.5 times the inside dimension of the end section.
- ③ Arm rise R is measured in the undeflected position without vertical loads on the arm.
- ④ See Standard Drawing E 805-TSCS-06 for handhole details.
- ⑤ If seam welds are used, the weld location for the arms shall be along the bottom, and on the side of the pole as shown.

See Standard Drawing E 805-TSCS-11 for connection details.

Pole Section 2, see Standard Drawing E 805-TSCS-10.



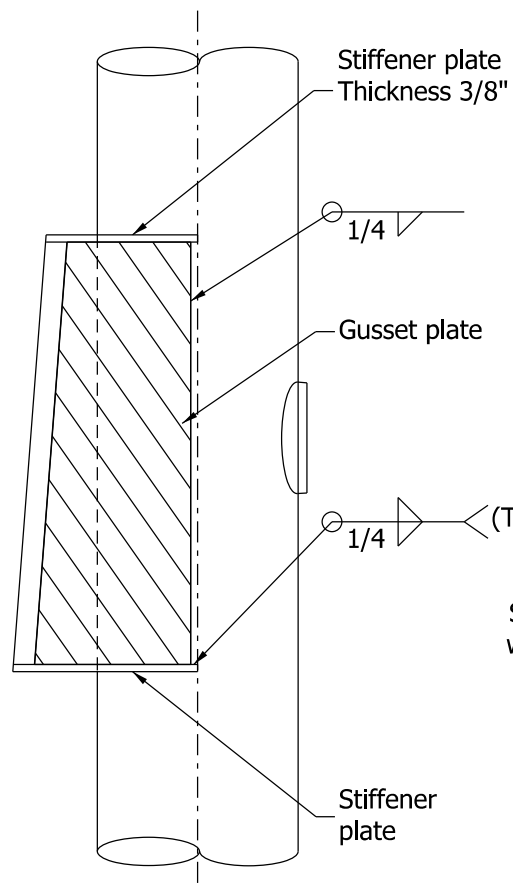
② **OPTIONAL ARM SPLICE DETAIL**



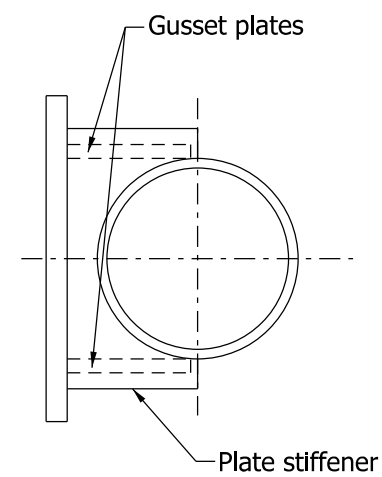
⑤ **TYPICAL SEAM WELD**

ARM DIMENSIONS TABLE				
L	ARM DIAMETER AT POLE	ARM WALL THICKNESS	R ③	CABLE INLETS ①
15'	5 1/2"	1/8"	7 1/2"	A
20'	5 1/2"	1/8"	10"	A
25'	7"	1/8"	1'-0 1/2"	A
30'	8"	1/8"	1'-3"	A, B
35'	8"	1/8"	1'-5 1/2"	A, B
40'	9"	1/8"	1'-8"	A, B, C
45'	10"	1/8"	1'-10 1/2"	A, B, C
50'	11"	1/8"	2'-1"	A, B, C
55'	11"	1/8"	2'-3 1/2"	A, B, C
60'	12"	1/8"	2'-6"	A, B, C

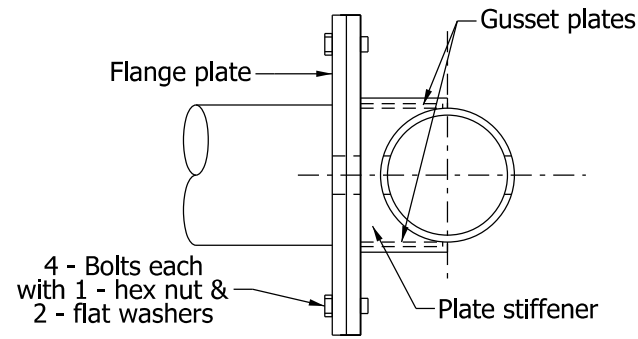
INDIANA DEPARTMENT OF TRANSPORTATION	
TRAFFIC SIGNAL CANTILEVER STRUCTURE COMBINATION ARM DIMENSIONS & DETAILS	
SEPTEMBER 2013	
STANDARD DRAWING NO.	E 805-TSCS-10
	/s/ Alfredo B. Hanza 02/05/13 DESIGN STANDARDS ENGINEER DATE
	/s/ Mark A. Miller 03/27/13 CHIEF ENGINEER DATE



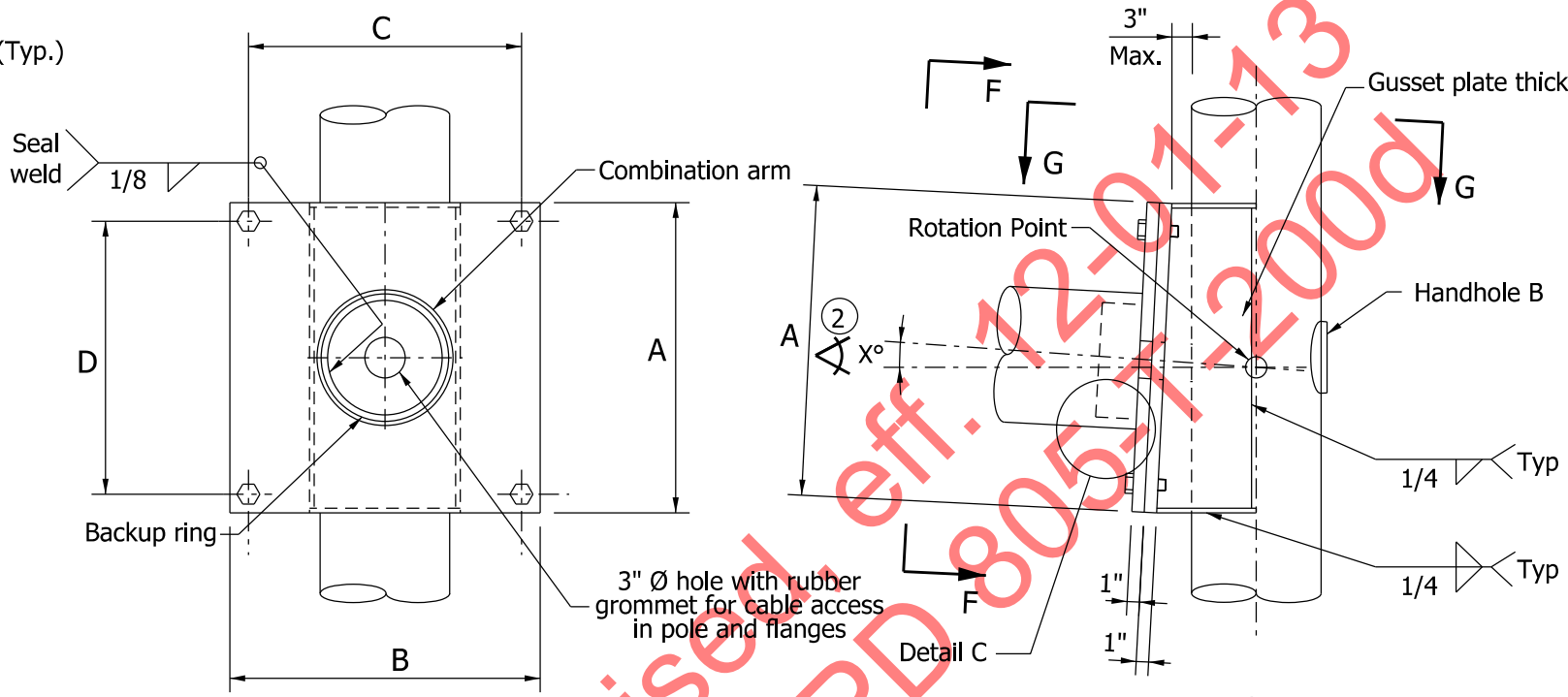
ELEVATION OF GUSSET PLATES



TOP OF GUSSET PLATES



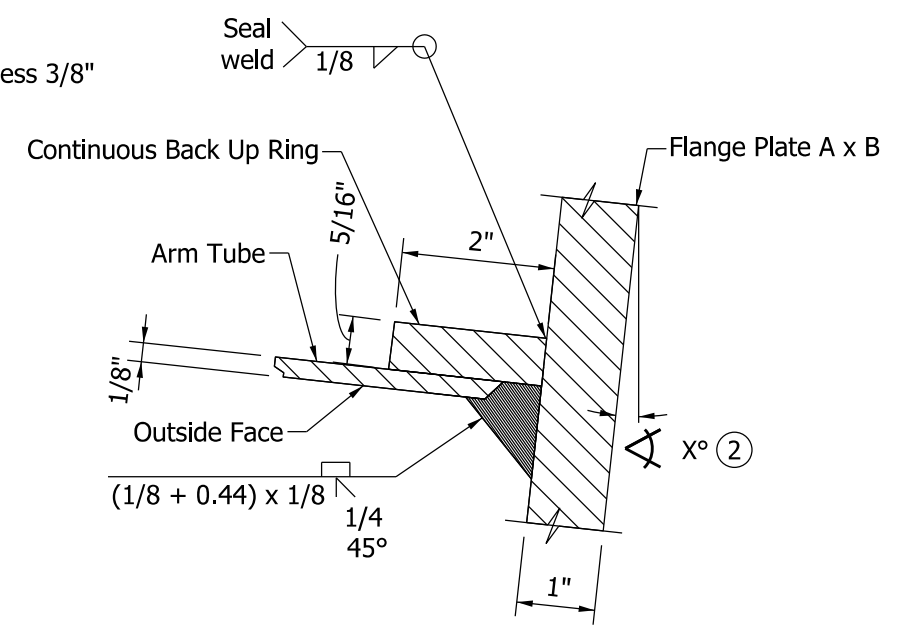
SECTION G-G



COMBINATION ARM CONNECTION DETAIL

NOTES:

1. See Standard Drawing E 805-TSCS-06 for handhole details.
2. The required combination 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 combination arm rise and L is the arm length. Both R and L vary and are listed in the Arm Dimensions Table on Standard Drawing E 805-TSCS-03.



DETAIL C - ARM WELD

PLATES AND BOLTS FOR COMBINATION ARM CANTILEVER				
ARM LENGTH	FLANGE PLATE A x B	BOLT PATTERN C x D	FLANGE PLATE THICKNESS	BOLT
15' TO 35'	20" x 20"	17" x 17"	1"	7/8" - 9 UNC x 3.5" LONG
>35' TO 60'	25" x 25"	22" x 22"	1"	7/8" - 9 UNC x 3.5" LONG

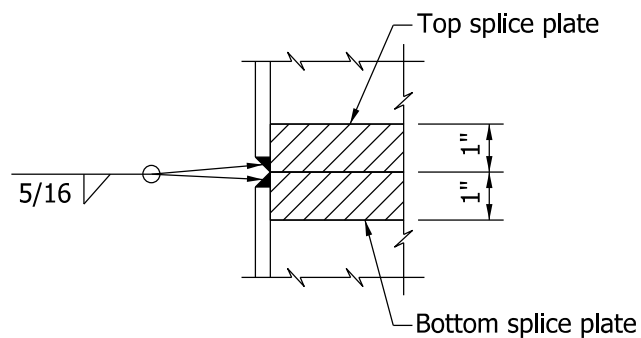
INDIANA DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL CANTILEVER STRUCTURE
COMBINATION ARM CONNECTION DETAILS

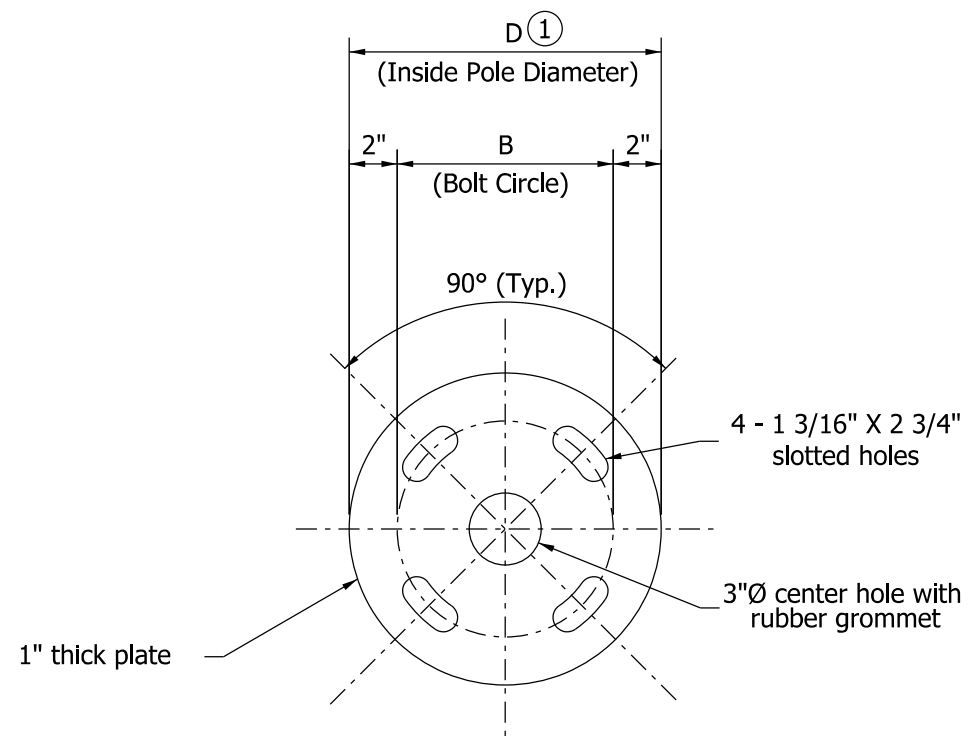
SEPTEMBER 2013

STANDARD DRAWING NO. E 805-TSCS-11

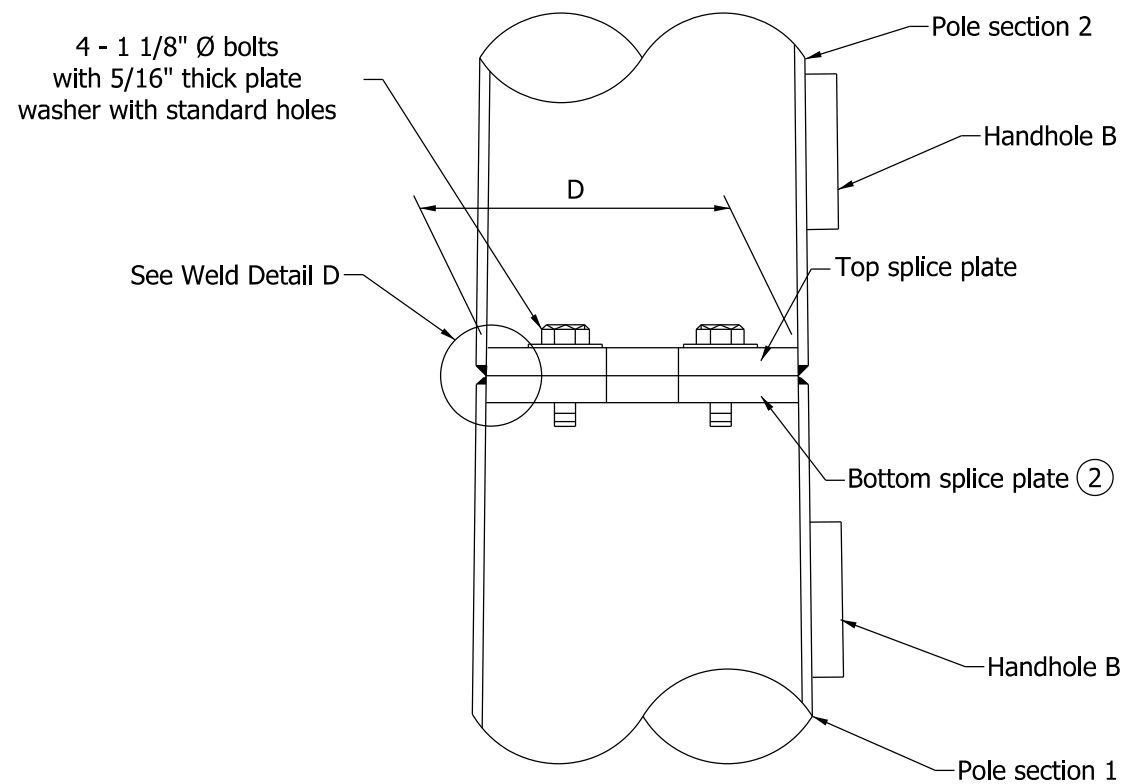
	/s/ <i>Alfredo B. Hanza</i> 02/05/13 DESIGN STANDARDS ENGINEER DATE
	/s/ <i>Mark A. Miller</i> 03/27/13 CHIEF ENGINEER DATE



WELD DETAIL D



TOP SPLICE PLATE



ELEVATION

NOTES:

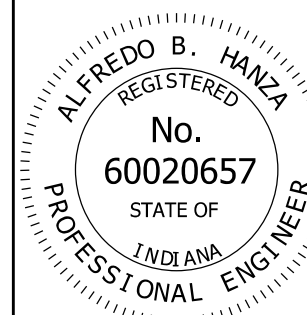
- ① See Standard Drawing E 805-TSCS-09 for pole dimensions.
- ② See Standard Drawings E 805-TSCS-04 and -13 for bottom splice plate details.
3. Diameter at the bottom of Pole Section 2 shall match the diameter at the top of Pole Section 1.

INDIANA DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL CANTILEVER STRUCTURE
COMBINATION POLE SPLICE DETAILS
FOR ARMS 35' OR LESS

SEPTEMBER 2013

STANDARD DRAWING NO. E 805-TSCS-12

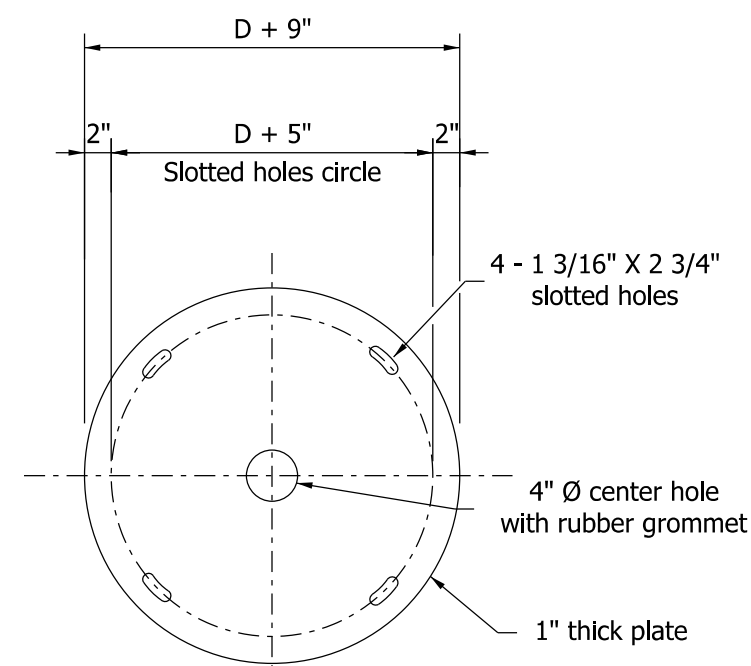


/s/ Alfredo B. Hanza 02/05/13

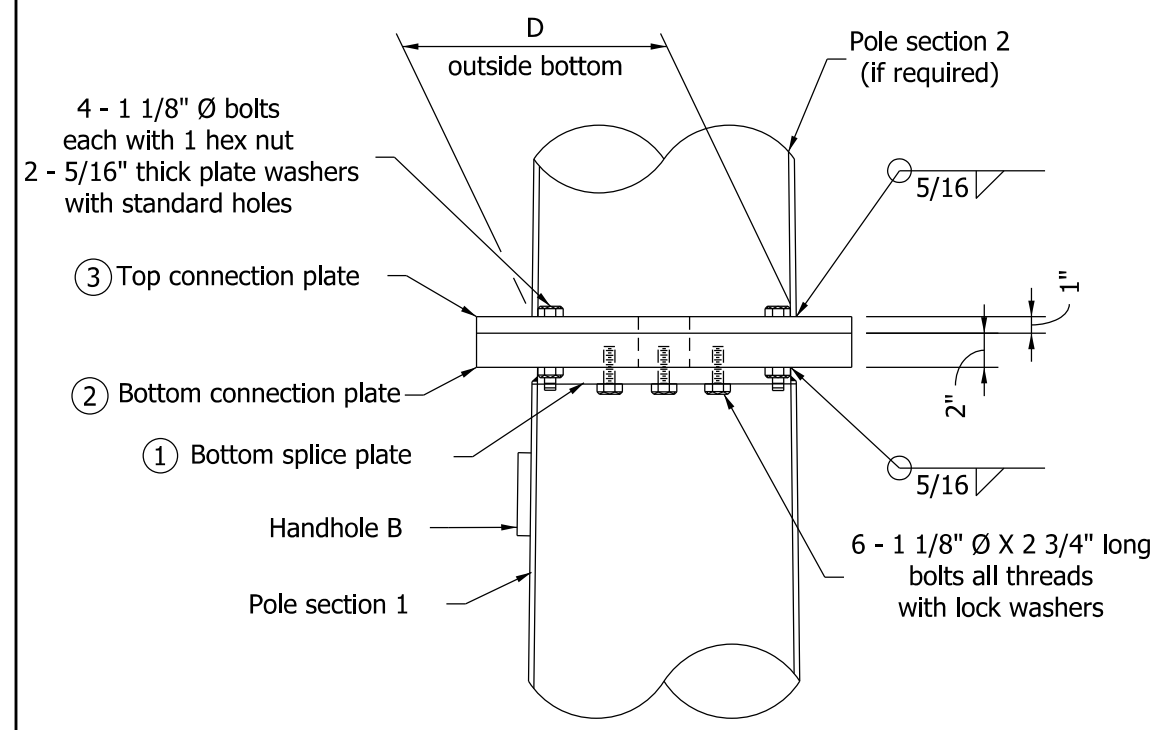
DESIGN STANDARDS ENGINEER DATE

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

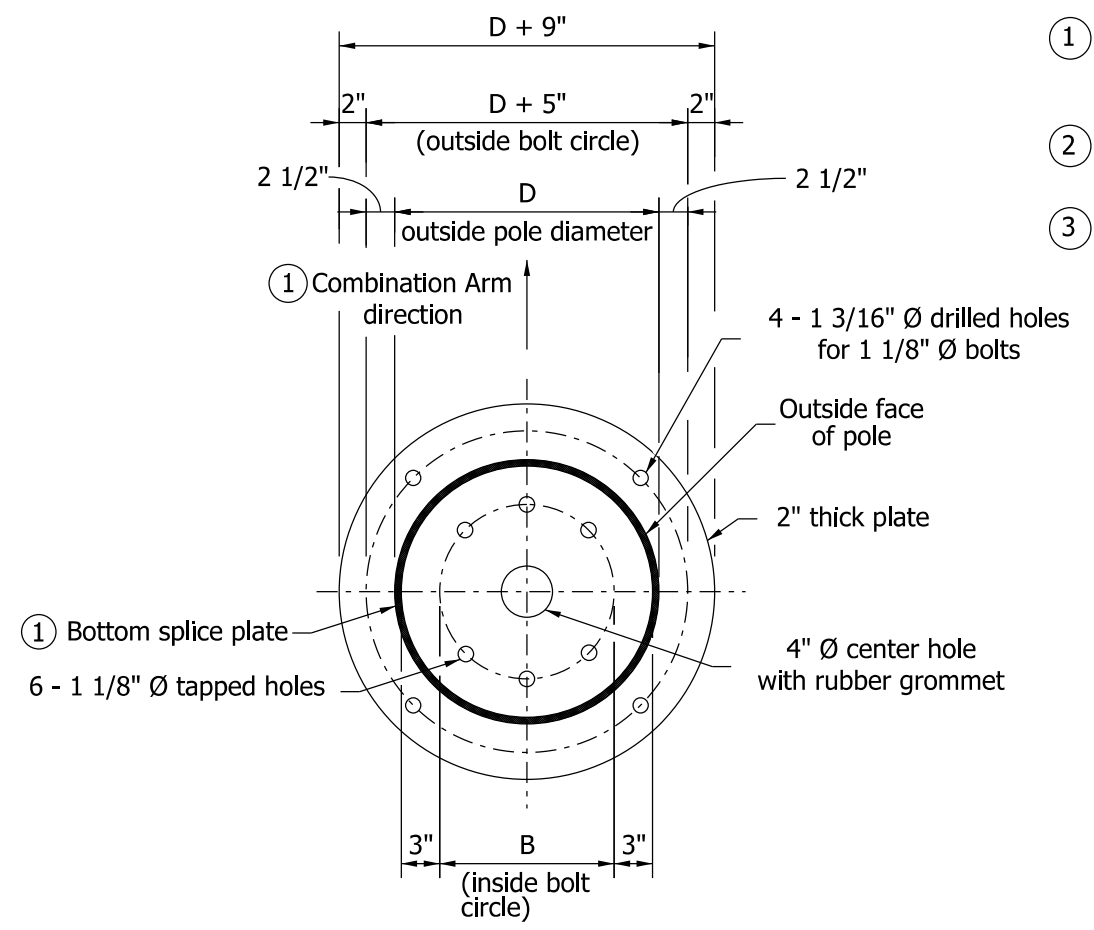
CHIEF ENGINEER DATE



③ **TOP CONNECTION PLATE**



ELEVATION

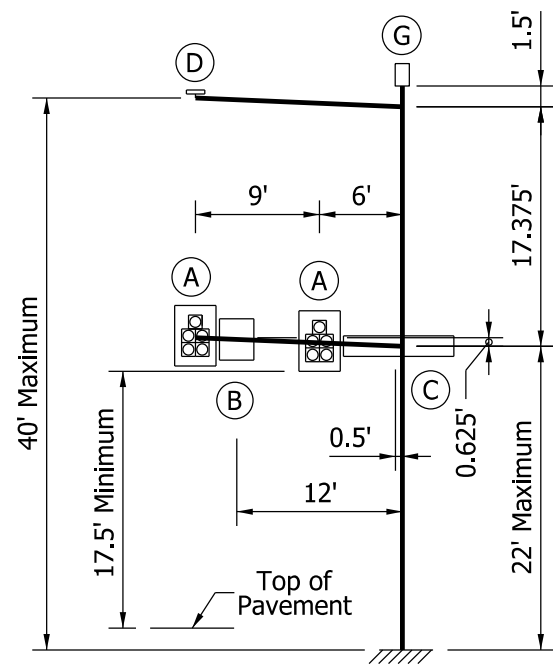


② **BOTTOM CONNECTION PLATE**

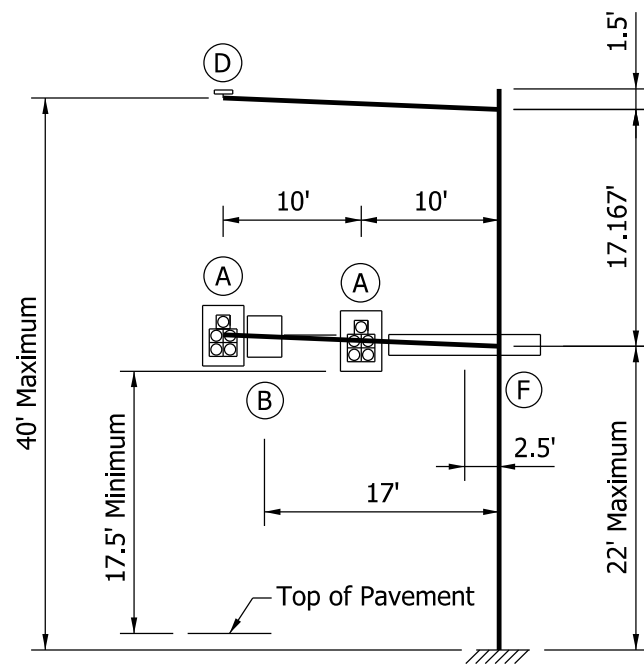
NOTES:

- ① Orient bottom splice and bottom connection plates with combination arm as shown on the bottom splice plate detail on Standard Drawings E 805-TSCS-04 and -12.
- ② All plate dimensions shall be based upon the outside diameter D at the top of pole section 1.
- ③ Diameter at bottom of pole section 2 shall match the diameter at the top of pole section 1.

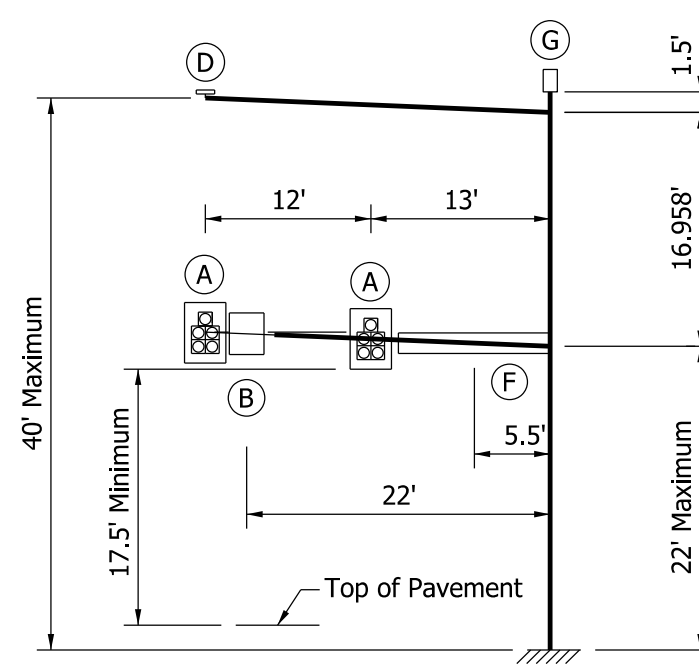
INDIANA DEPARTMENT OF TRANSPORTATION	
TRAFFIC SIGNAL CANTILEVER STRUCTURE COMBINATION POLE SPLICE DETAILS FOR ARM OF GREATER THAN 35' TO 60' SEPTEMBER 2013	
STANDARD DRAWING NO. E 805-TSCS-13	
	/s/ <i>Alfredo B. Hanza</i> 02/05/13 DESIGN STANDARDS ENGINEER DATE
	/s/ <i>Mark A. Miller</i> 03/27/13 CHIEF ENGINEER DATE



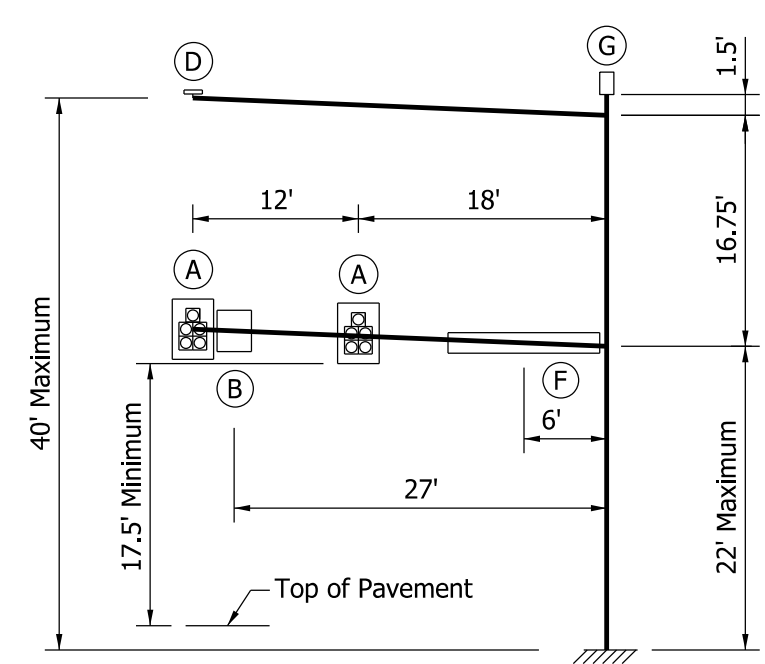
15' ARM



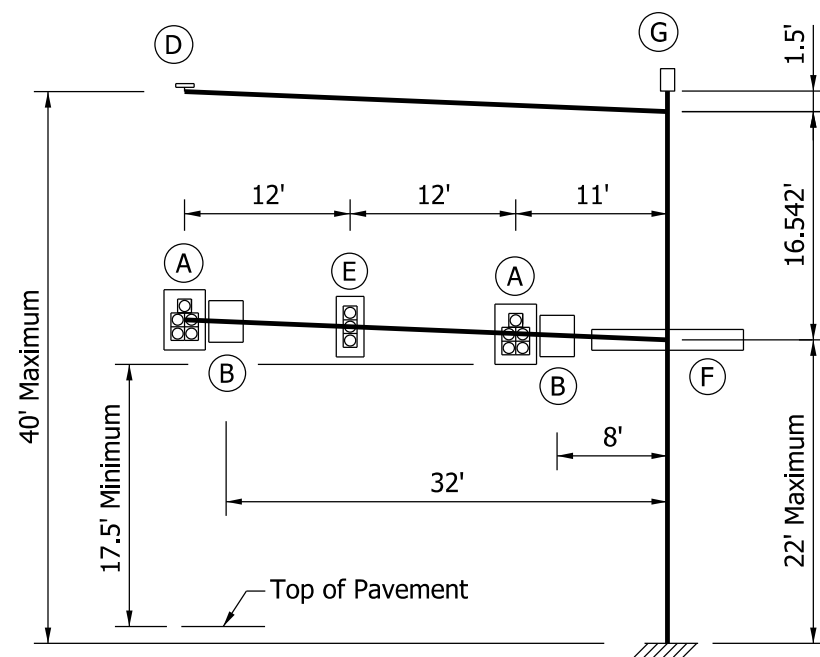
20' ARM



25' ARM



30' ARM



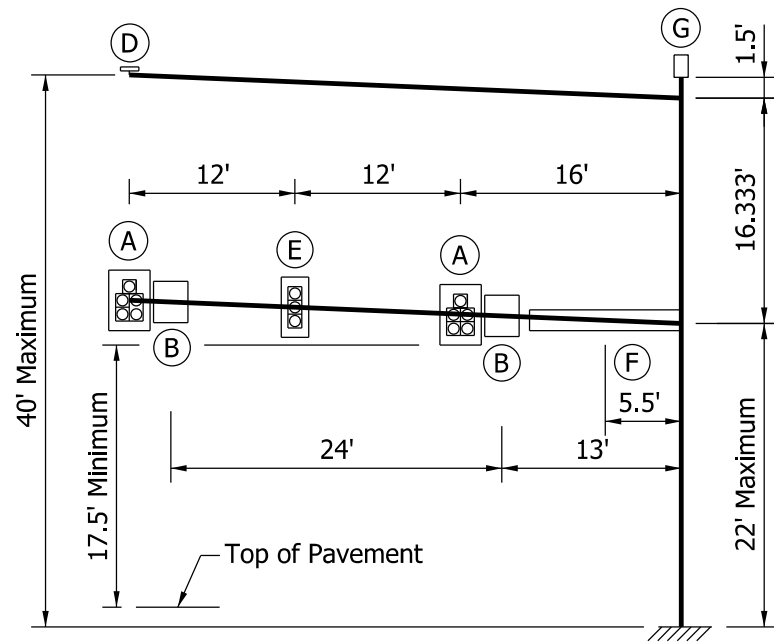
35' ARM

LEGEND	
DEVICE	DESCRIPTION
(A)	12" - 5 Section Signal Head With Backplates
(B)	36" x 30" Regulatory Sign
(C)	18" x 96" Street Name Sign
(D)	1 - Mounted Camera
(E)	12" - 3 Section Signal Head With Backplates
(F)	18" x 132" Street Name Sign
(G)	Top Pole Luminaire

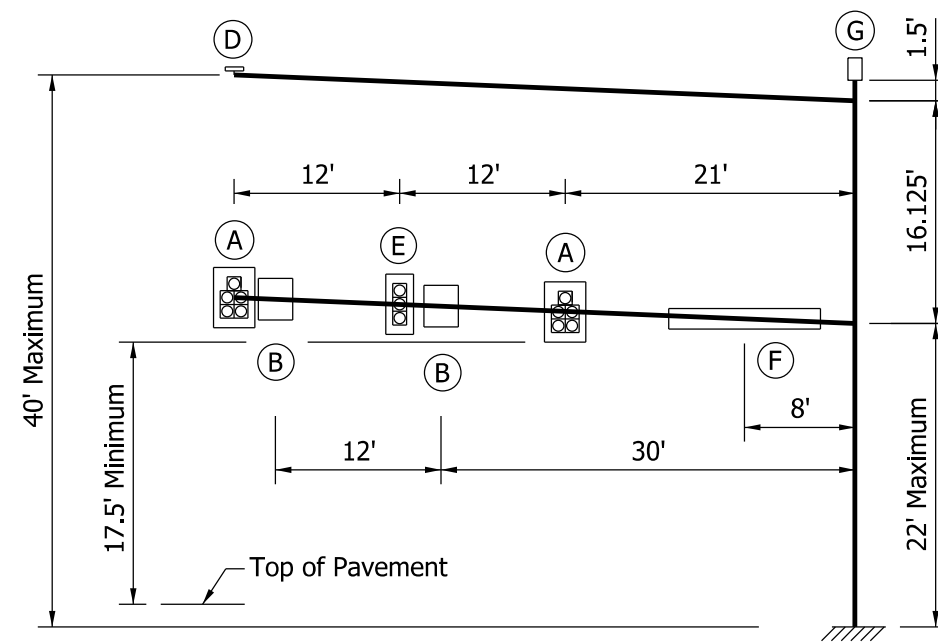
NOTE:

- The structure arms and pole are designed for the above loading conditions. Foundation types A and C are designed for arms having length of 35 ft or less. See Standard Drawings E 805-TSCS-16 and -18 for foundation types A and C.

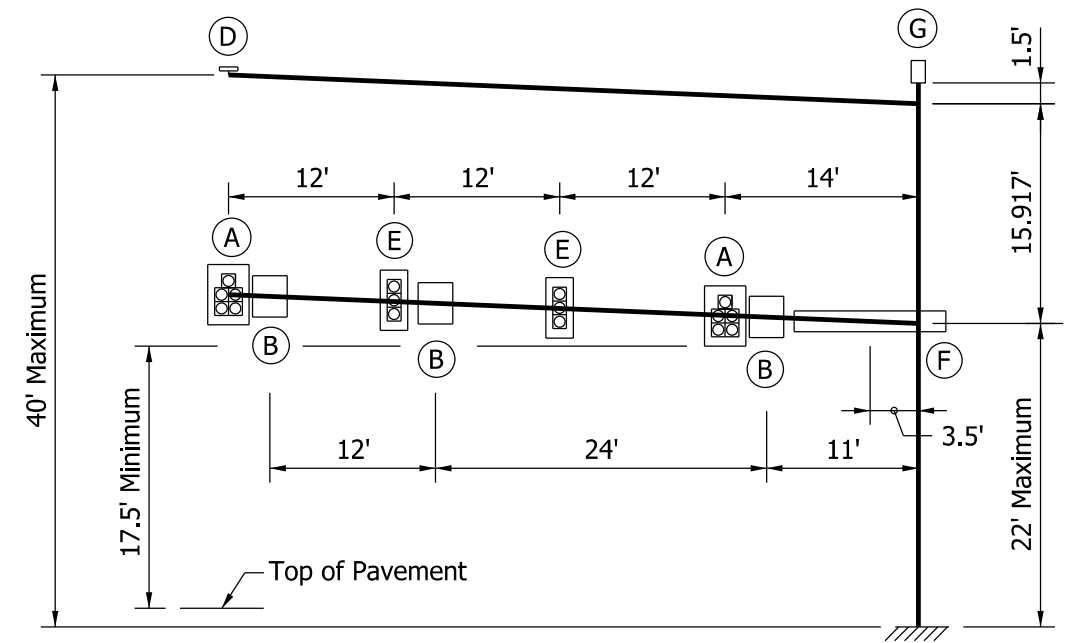
INDIANA DEPARTMENT OF TRANSPORTATION	
TRAFFIC SIGNAL CANTILEVER STRUCTURE COMBINATION ARM LOADING FOR ARM OF 35' OR LESS SEPTEMBER 2013	
STANDARD DRAWING NO. E 805-TSCS-14	
	<i>/s/ Alfredo B. Hanza</i> 02/05/13 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Mark A. Miller</i> 03/27/13 CHIEF ENGINEER DATE



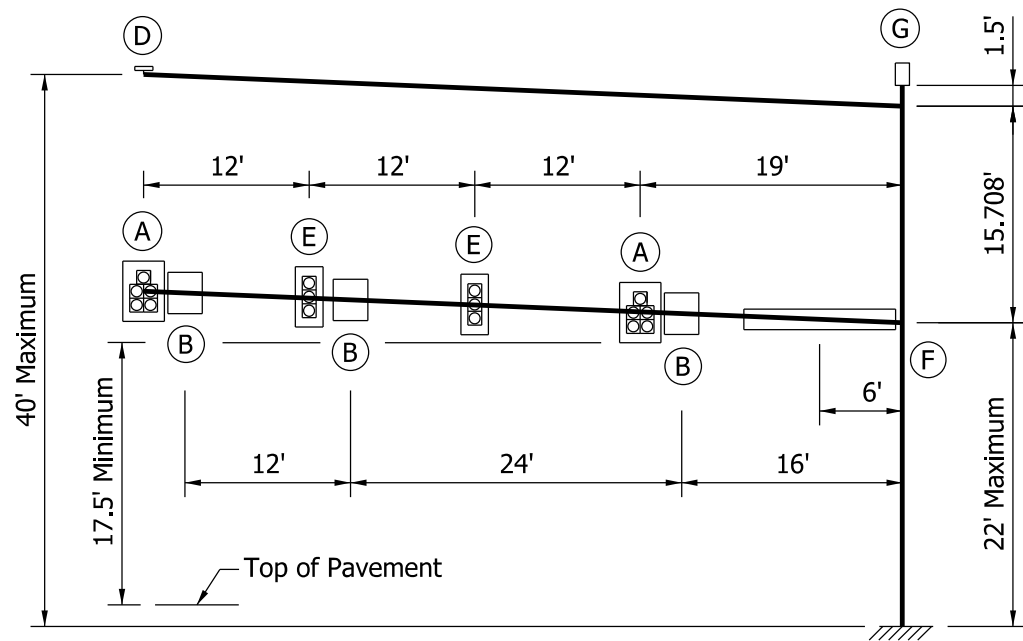
40' ARM



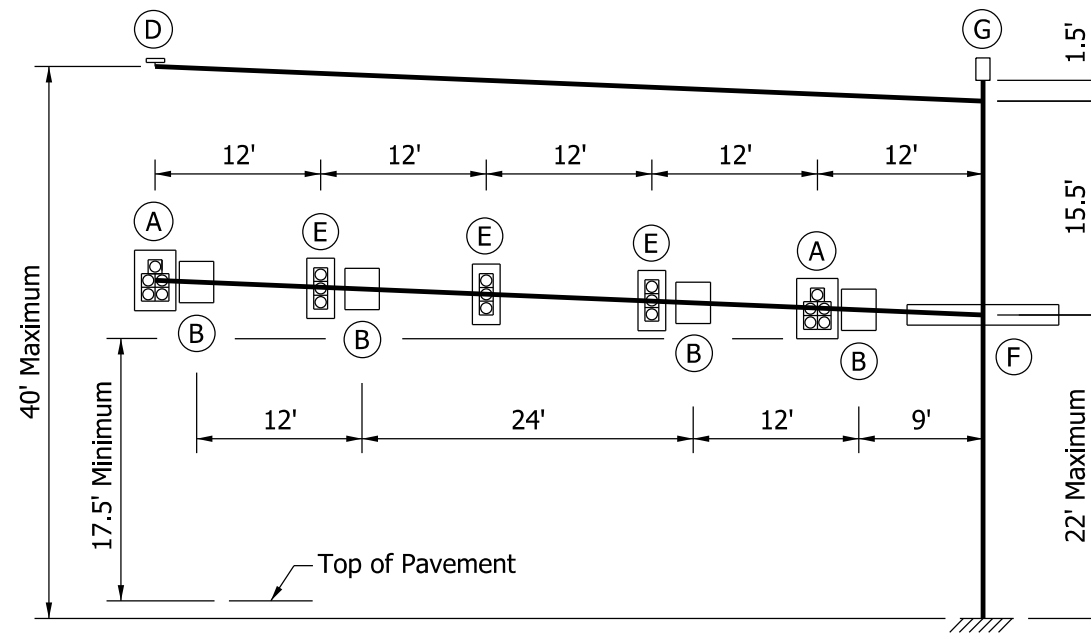
45' ARM



50' ARM



55' ARM



60' ARM

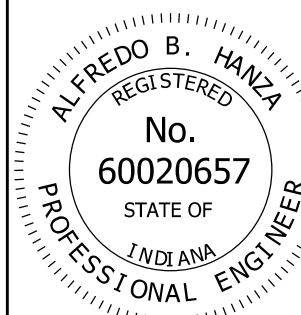
NOTES:

1. See Standard Drawing E 805-TSCS-14 for Legend.
2. The structure arms and pole are designed for the above loading conditions. Foundation types B and D are designed for arms having length of greater than 35 ft to 60 ft. See Standard Drawings E 805-TSCS-17 and -19 for foundation types B and D.

INDIANA DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL CANTILEVER STRUCTURE
COMBINATION ARM LOADING
FOR ARM OF GREATER THAN 35' TO 60'
SEPTEMBER 2013

STANDARD DRAWING NO. E 805-TSCS-15

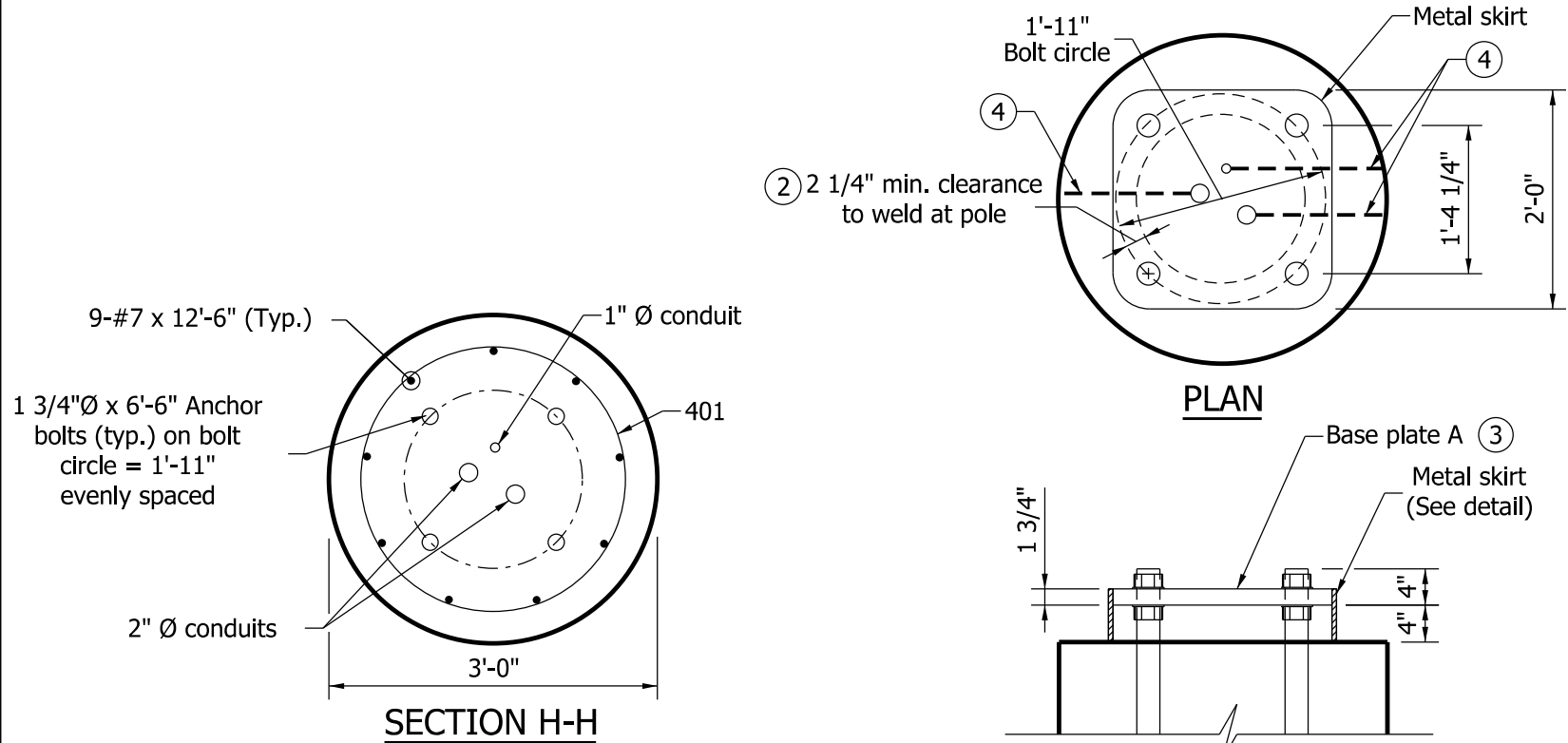


/s/ Alfredo B. Hanza 02/05/13

DESIGN STANDARDS ENGINEER DATE

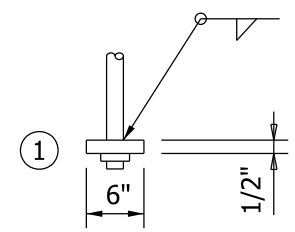
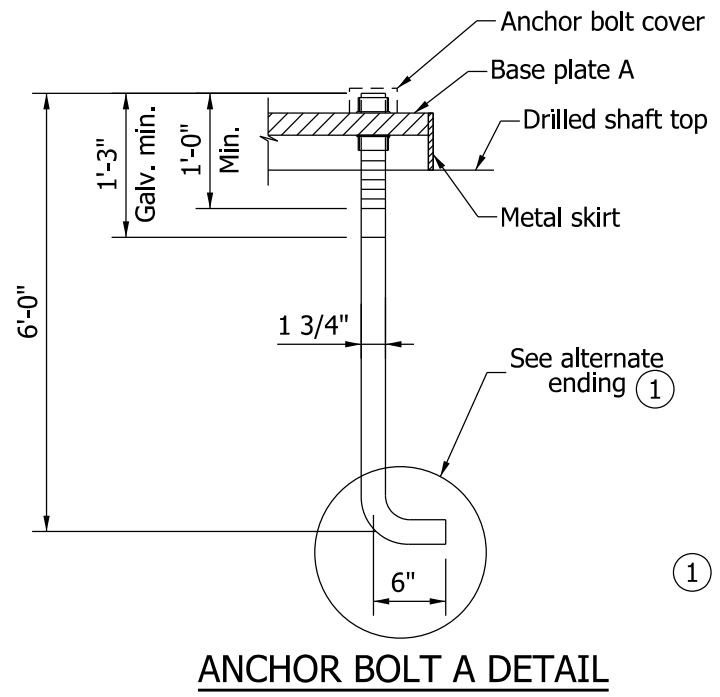
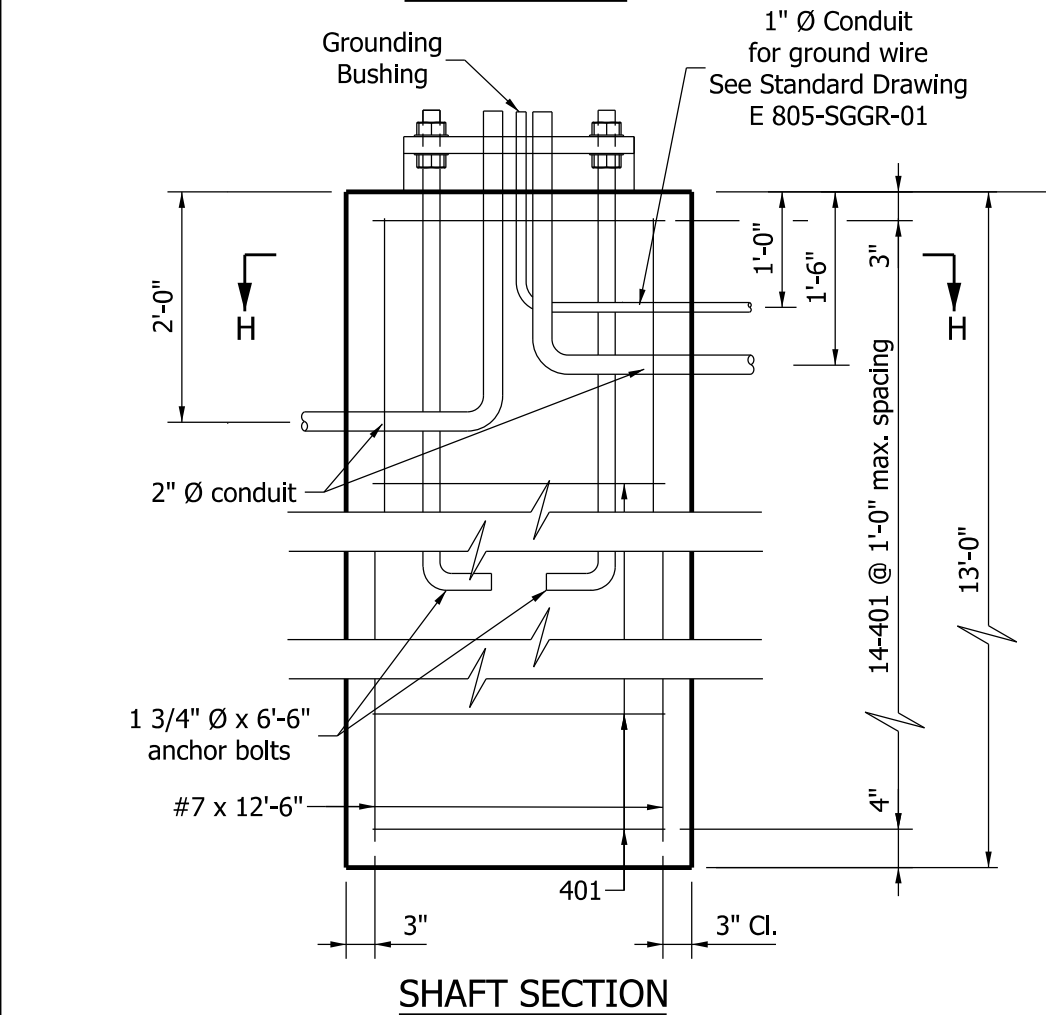
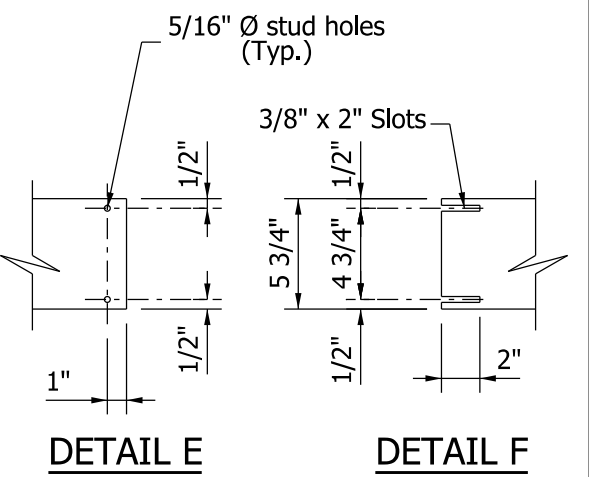
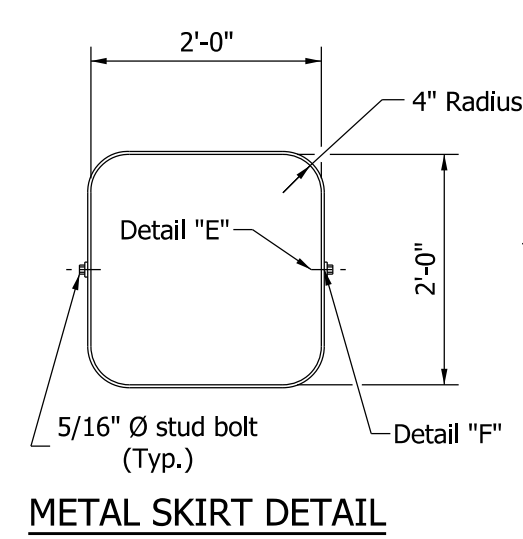
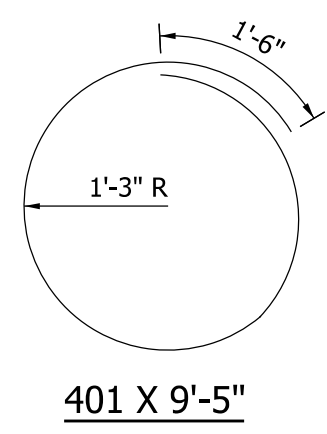
/s/ Mark A. Miller 03/27/13

CHIEF ENGINEER DATE



- NOTES:**
- 1 Alternate 6" x 6" x 1/2" square washer with hex nut welded to lower end may be substituted for bent anchor bolt.
 - 2 Bolt circle, b, shall allow clearance for the plate washer. Cutting or trimming the washer will not be allowed.
 - 3 See Standard Drawing E 805-TSCS-04 for base plate A details.
 - 4 A tooled line or other type of permanent marking shall be provided on the top of the foundation to indicate the direction of the conduit.

BILL OF MATERIALS DRILLED SHAFT TYPE A			
REINFORCING BARS			
SIZE OR MARK	NUMBER OF BARS	LENGTH (ft.)	WEIGHT (lbs.)
#7	9	12'-6"	
Total #7			230
401	14	9'-5"	
Total #4			88
Total Reinforcing Bars			318
CONCRETE			
Concrete, Class A			3.4 CYS



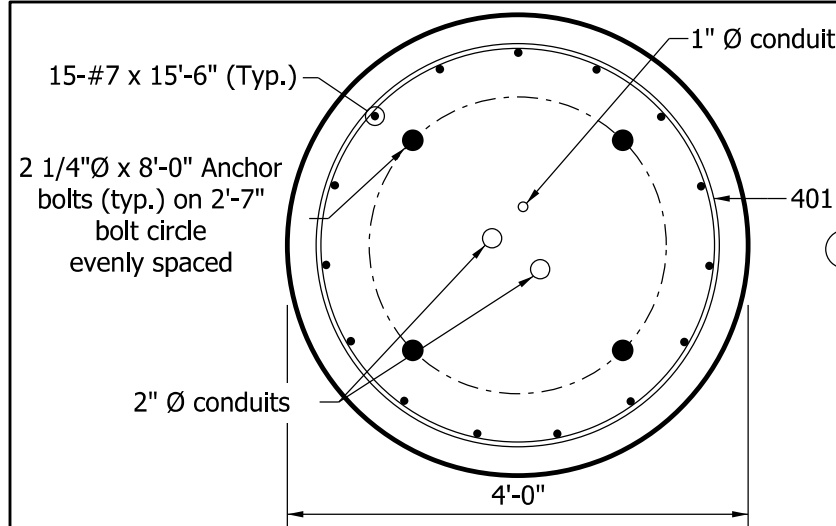
INDIANA DEPARTMENT OF TRANSPORTATION

**TRAFFIC SIGNAL CANTILEVER STRUCTURE
DRILLED SHAFT FOUNDATION TYPE A
FOR ARM OF 35' OR LESS**

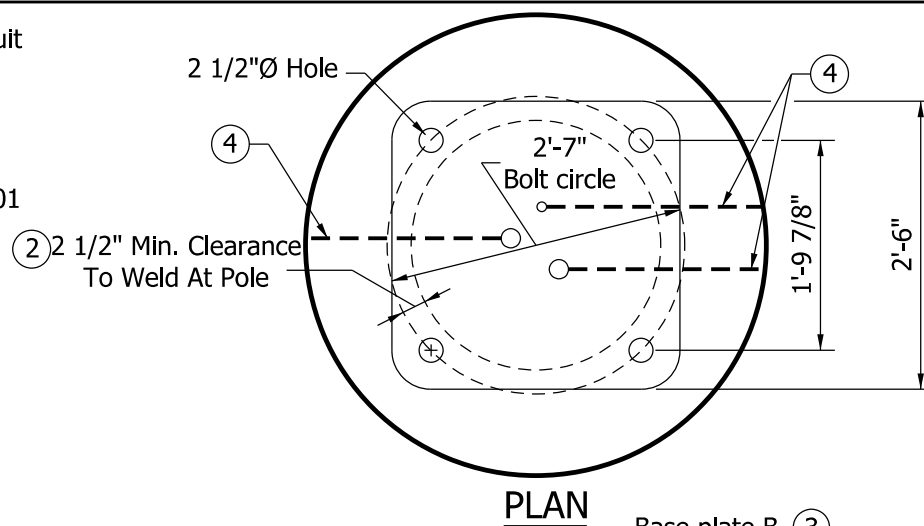
SEPTEMBER 2013

STANDARD DRAWING NO. E 805-TSCS-16

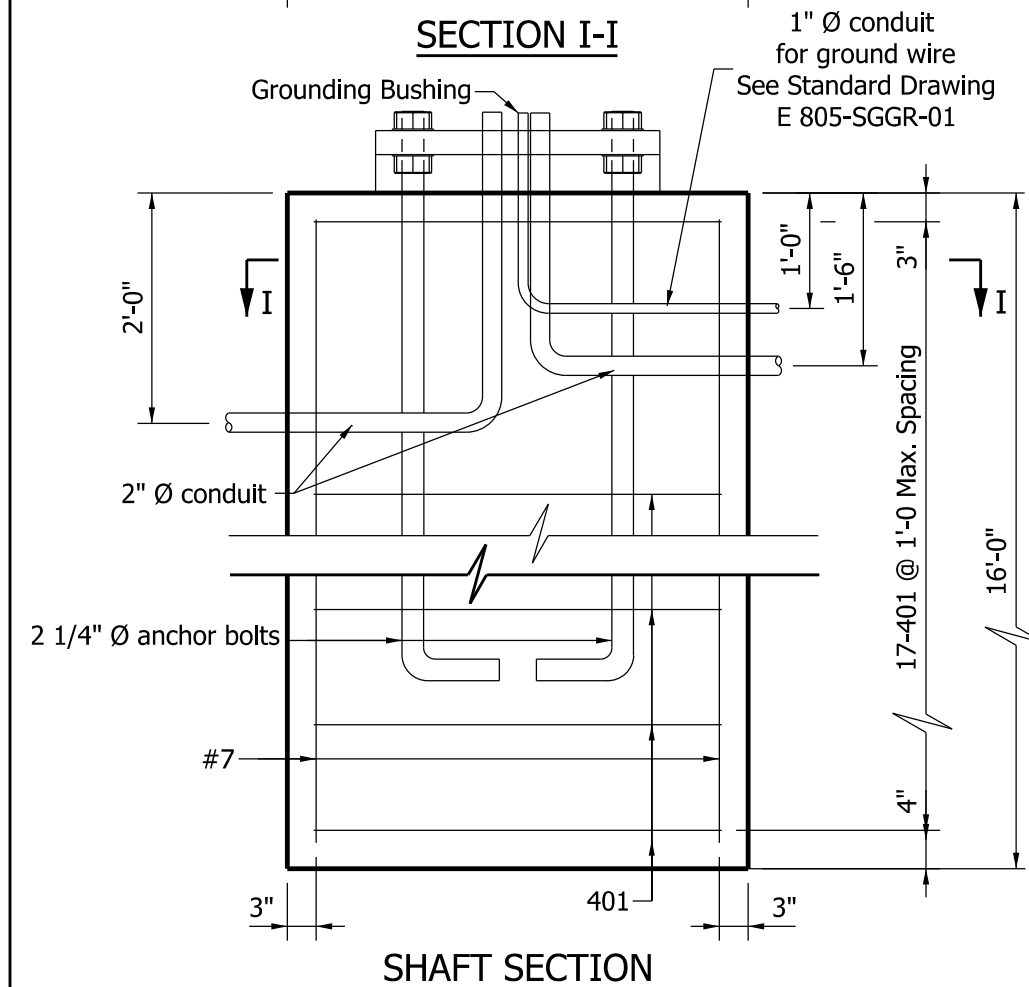
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<i>/s/ Alfredo B. Hanza</i>	02/05/13										
DESIGN STANDARDS ENGINEER	DATE										
<hr/>											
<i>/s/ Mark A. Miller</i>	03/27/13										
CHIEF ENGINEER	DATE										



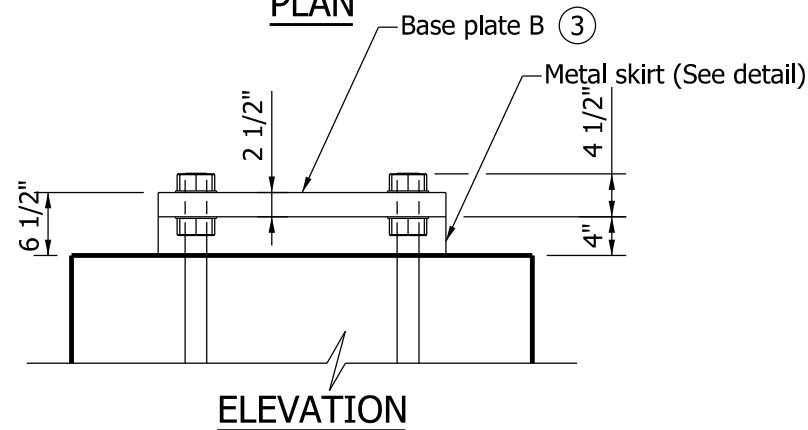
SECTION I-I



PLAN



SHAFT SECTION

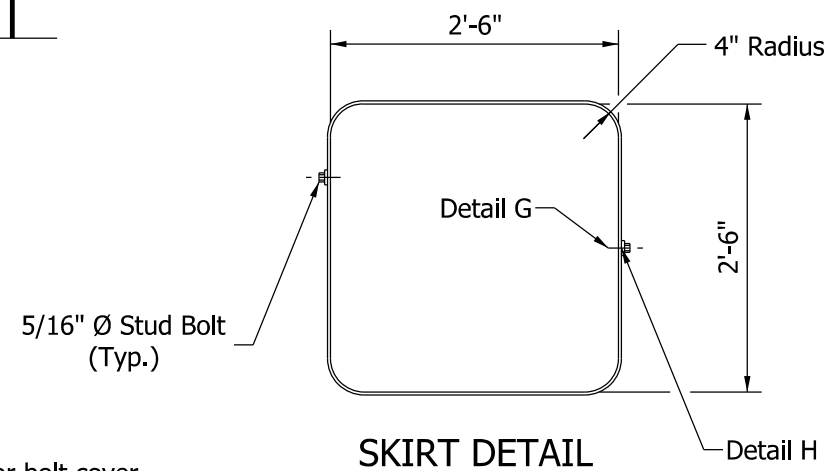


ELEVATION

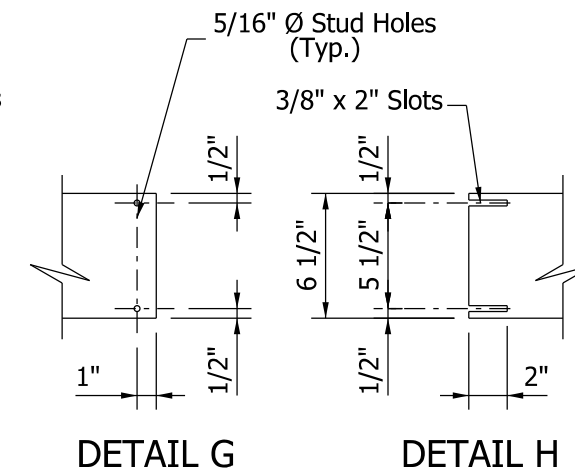
NOTES:

- ① Alternate 8" x 8" x 1/2" square plate tapped and welded to the anchor bolt may be substituted for bent anchor bolt.
- ② Bolt circle, b, shall allow clearance for the plate washer. Cutting or trimming the washer will not be allowed.
- ③ See Standard Drawing E 805-TSCS-04 for base plate B details.
- ④ A tooled line or other type of permanent marking shall be provided on the top of the foundation to indicate the direction of the conduits.

BILL OF MATERIALS DRILLED SHAFT TYPE B			
REINFORCING BARS			
SIZE OR MARK	NUMBER OF BARS	LENGTH	WEIGHT (lbs.)
#7	15	15'-6"	
Total #7			475
401	17	12'-6"	
Total #4			142
Total Reinforcing Bars			617
CONCRETE			
Concrete, Class A			7.5 CYS

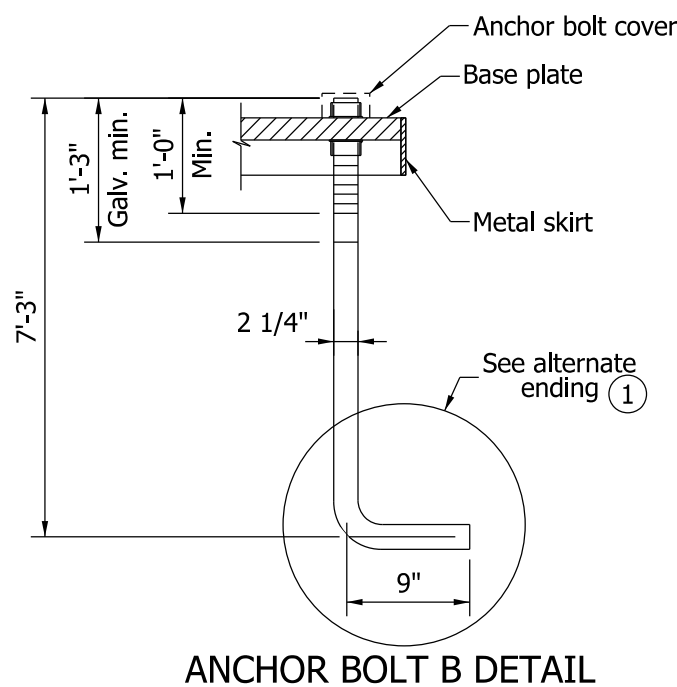
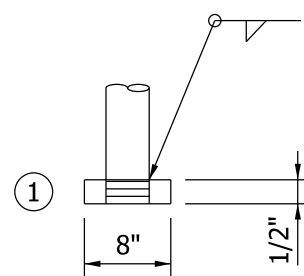


SKIRT DETAIL

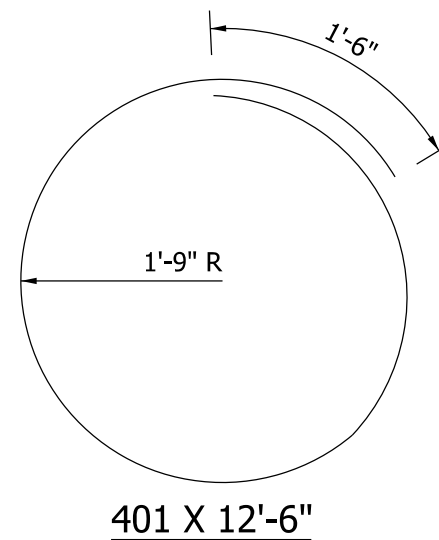


DETAIL G

DETAIL H



ANCHOR BOLT B DETAIL



401 X 12'-6"

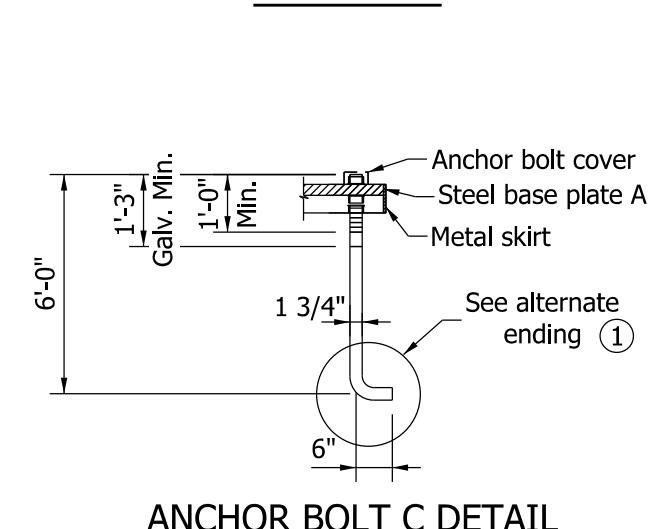
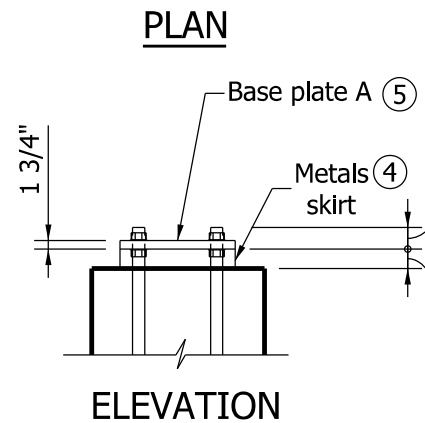
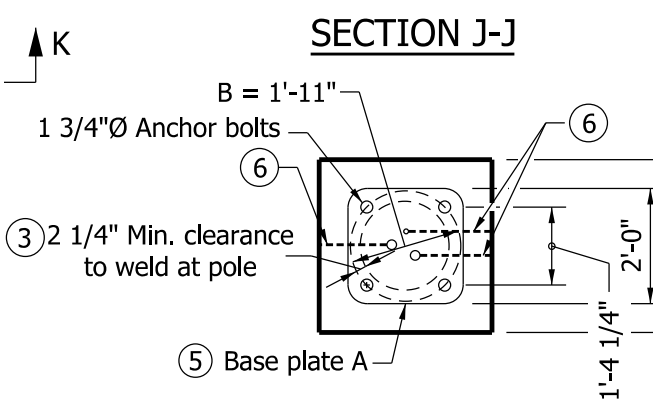
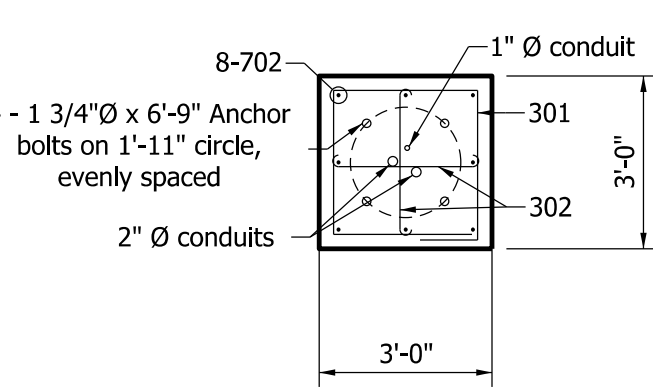
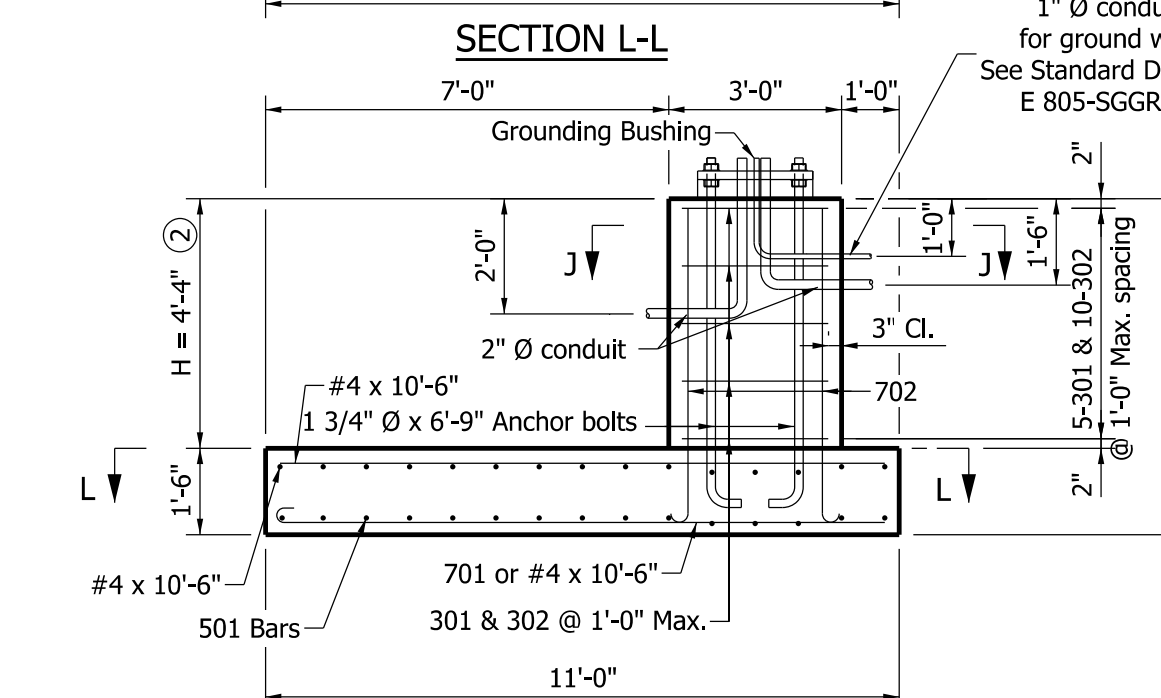
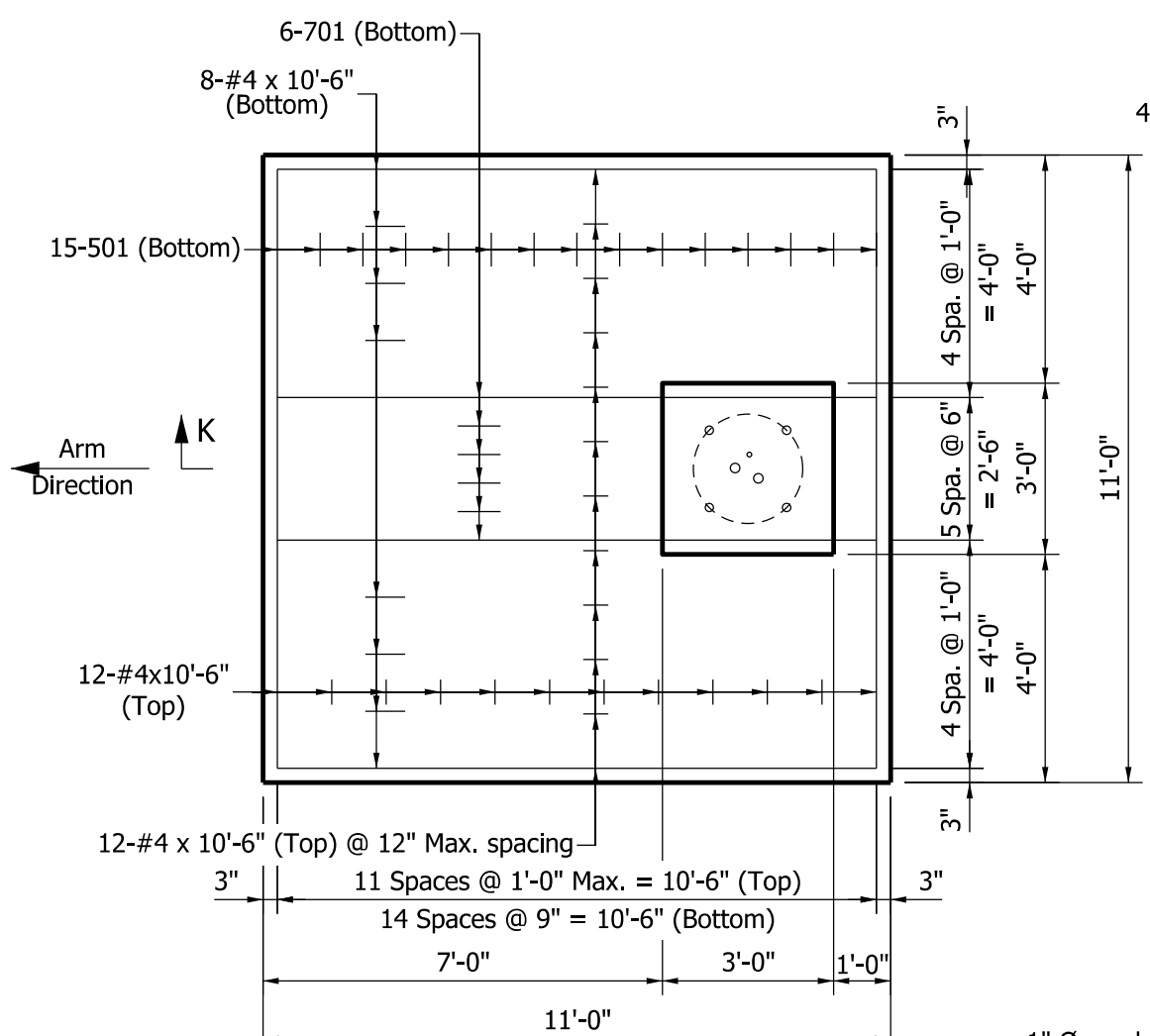
INDIANA DEPARTMENT OF TRANSPORTATION

**TRAFFIC SIGNAL CANTILEVER STRUCTURE
DRILLED SHAFT FOUNDATION TYPE B
FOR ARM OF GREATER THAN 35' TO 60'**

SEPTEMBER 2013

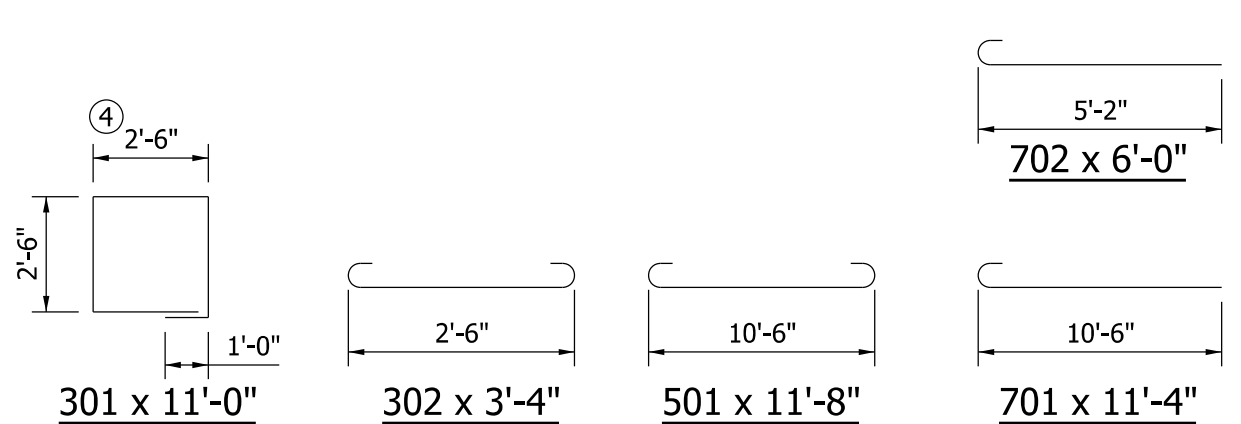
STANDARD DRAWING NO. **E 805-TSCS-17**

	<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 Alternate 6" x 6" x 1/2" square washer with hex nut welded to lower end may be substituted for the bend in the anchor bolt.
 - ② Minimum H required is 4 ft. soil cover over the entire footing area.
 - ③ Bolt circle, B, shall allow clearance for the plate washer. Cutting or trimming the washer will not be allowed.
 - ④ See Standard Drawing E 805-TSCS-16 for metal skirt details.
 - ⑤ See Standard Drawing E 805-TSCS-04 for base plate A details.
 - ⑥ A tooled line or other type of permanent marking shall be provided on the top of the foundation to indicate the direction of the conduits.

BILL OF MATERIALS			
SPREAD FOOTING			
TYPE C			
REINFORCING BARS			
SIZE OR MARK	NUMBER OF BARS	LENGTH	WEIGHT (lbs.)
701	6	11'-4"	
702	8	6'-0"	
Total #7			237
501	15	11'-8"	
Total #5			183
#4	32	10'-6"	
Total #4			224
301	5	11'-0"	
302	10	3'-4"	
Total #3			33
Total Reinforcing Bars			677
CONCRETE			
Concrete, Class A			8.2 CYS

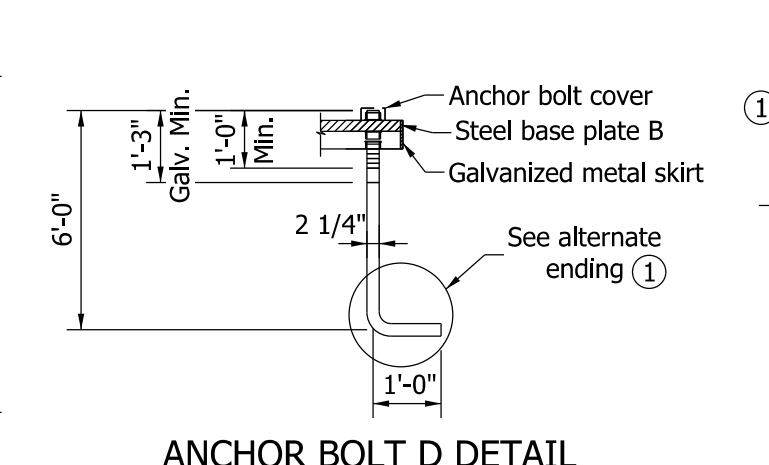
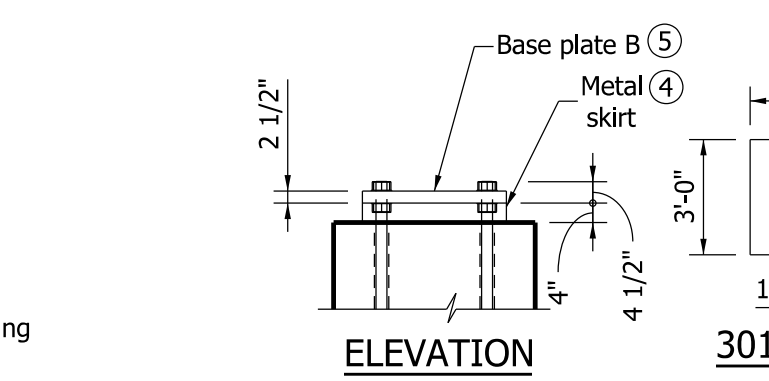
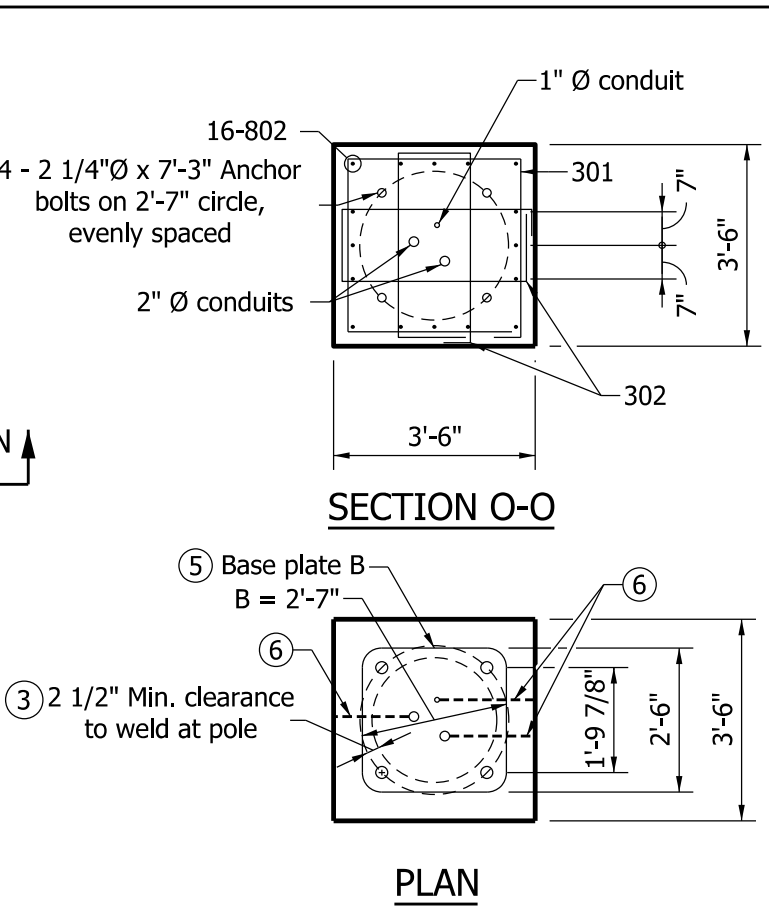
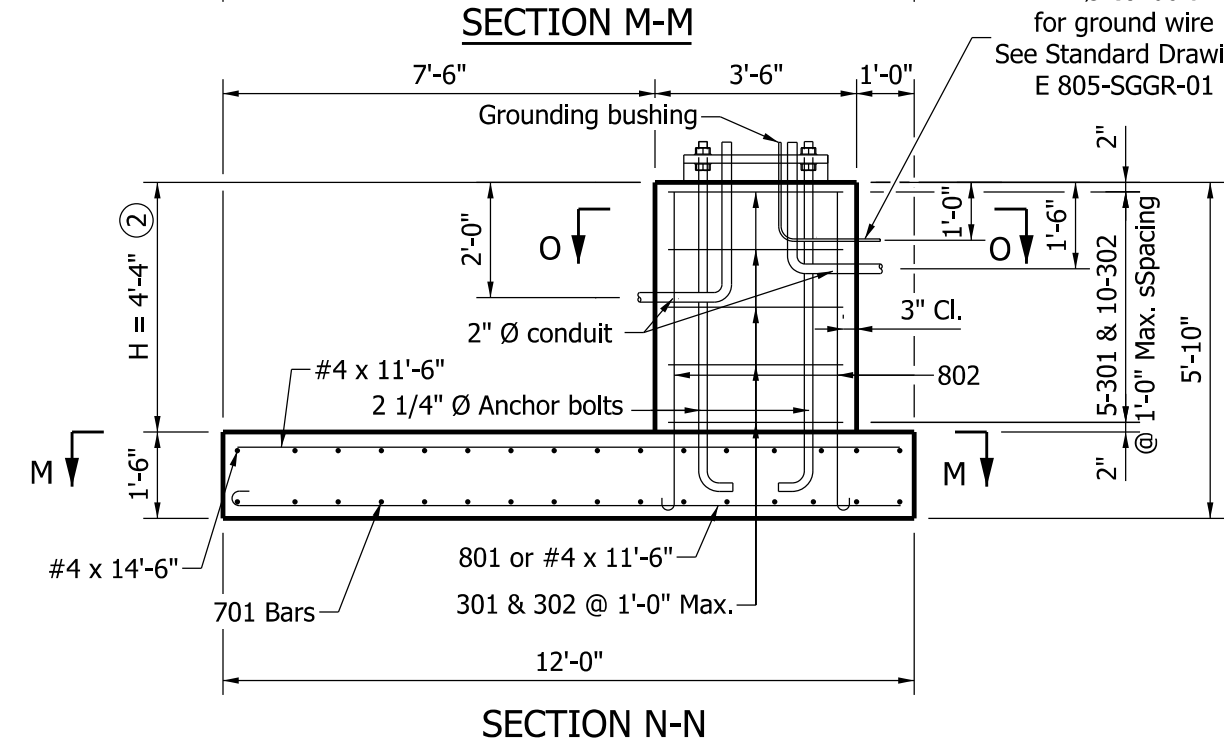
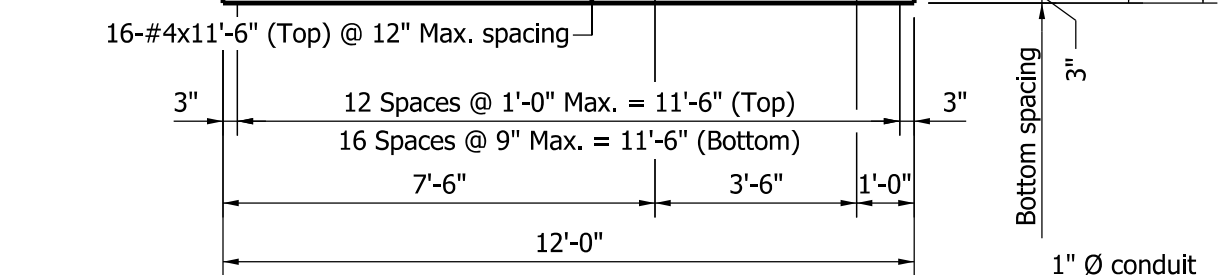
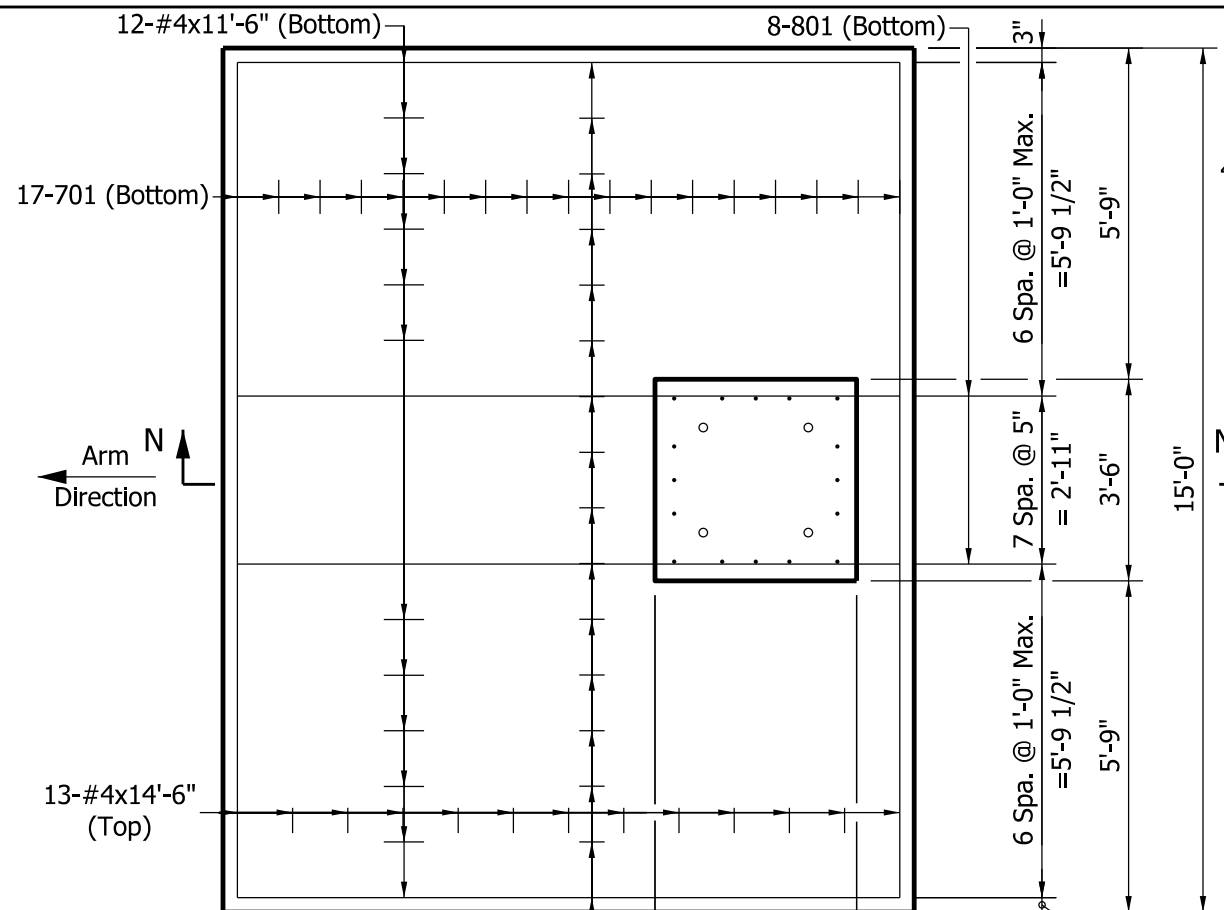


INDIANA DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL CANTILEVER STRUCTURE
SPREAD FOOTING FOUNDATION TYPE C
FOR ARM OF 35' OR LESS
SEPTEMBER 2013

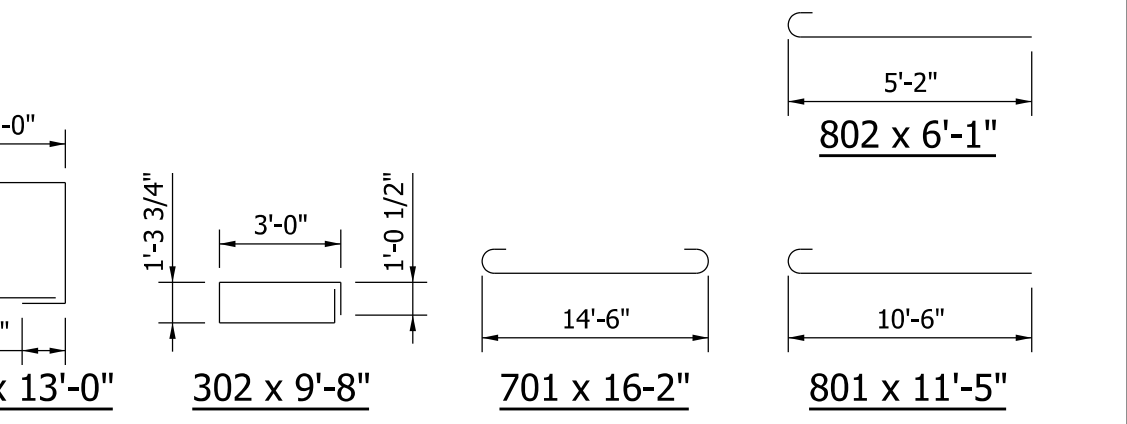
STANDARD DRAWING NO. E 805-TSCS-18

	<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 Alternate 8" x 8" x 1/2" square plate tapped and welded to anchor bolt may be substituted for the bent anchor bolt.
 - ② Minimum H required is 4 ft. soil cover over the entire footing area.
 - ③ Bolt circle, B, shall allow clearance for the plate washer. Cutting or trimming the washer will not be allowed.
 - ④ See Standard Drawing E 805-TSCS-17 for metal skirt details.
 - ⑤ See Standard Drawing E 805-TSCS-04 for base plate B details.
 - ⑥ A tooled line or other type of permanent marking shall be provided on the top of the foundation to indicate the direction of the conduits.

BILL OF MATERIALS SPREAD FOOTING TYPE D			
REINFORCING BARS			
SIZE OR MARK	NUMBER OF BARS	LENGTH	WEIGHT (lbs.)
801	8	11'-5"	
802	16	6'-1"	
Total #8			504
701	17	16'-2"	
Total #7			562
#4	13	14'-6"	
#4	28	11'-6"	
Total #4			341
301	5	13'-0"	
302	10	9'-8"	
Total #3			61
Total Reinforcing Bars			1468
CONCRETE			
Concrete, Class A			12.0 CYS



INDIANA DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL CANTILEVER STRUCTURE
SPREAD FOOTING FOUNDATION TYPE D
FOR ARM OF GREATER THAN 35' TO 60'

SEPTEMBER 2013

STANDARD DRAWING NO. E 805-TSCS-19

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