

INDEX

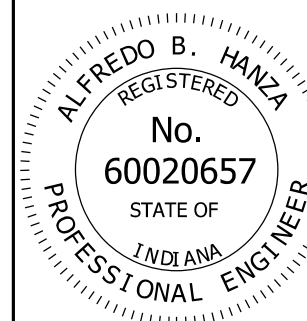
SHEET NO.	SUBJECT
1	Drawing Index
2	Plan, Elevation, Member Sizes, and Camber
3	Quadri-Chord and Flange Details
4	Upper Chords Connection Details
5	Lower Chords Connection and Wire Outlet Details
6	Base Plate, Anchor Bolt, and Metal Skirt Details
7	Handhole and I.D. Tag Details
8	Foundation at 33" Concrete Barrier
9	Foundation at 45" Concrete Barrier

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN CANTILEVER STRUCTURE BUTTERFLY  
DRAWING INDEX

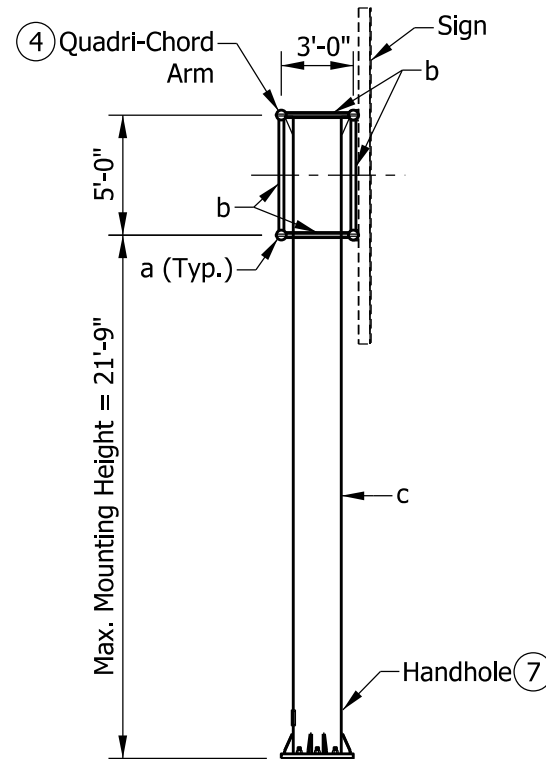
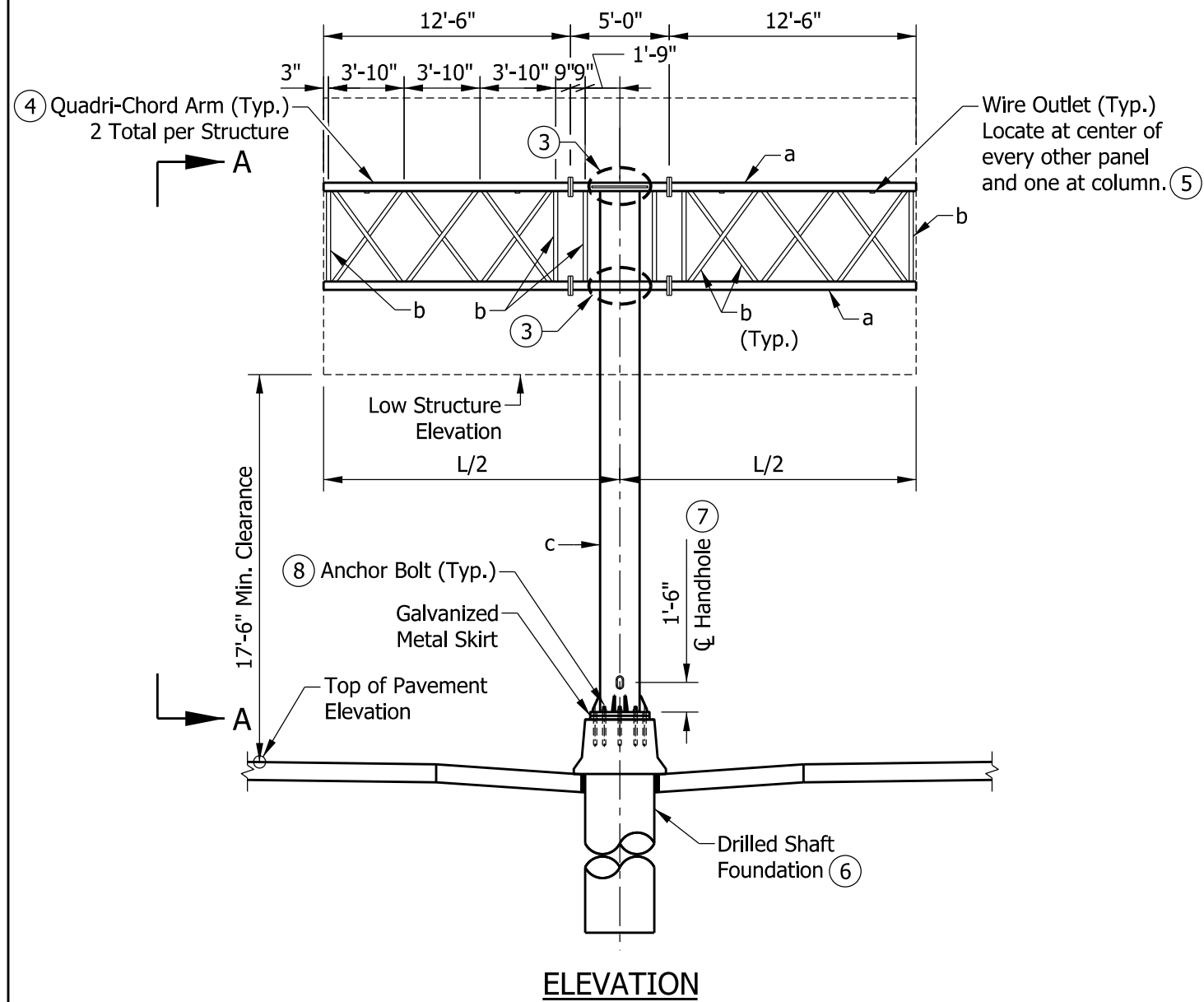
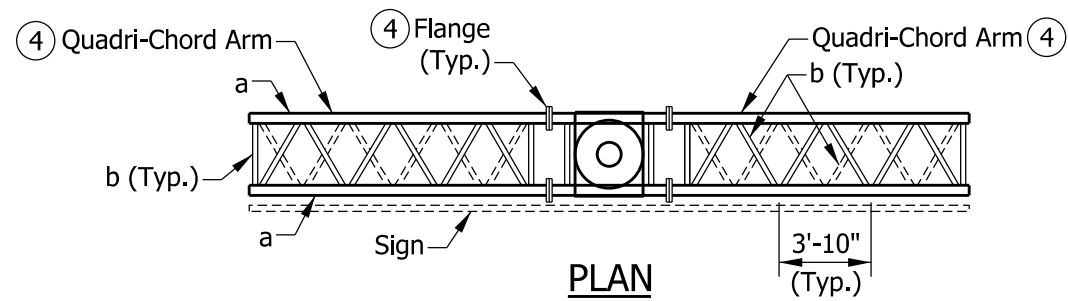
SEPTEMBER 2014

STANDARD DRAWING NO. E 802-SCSB-01

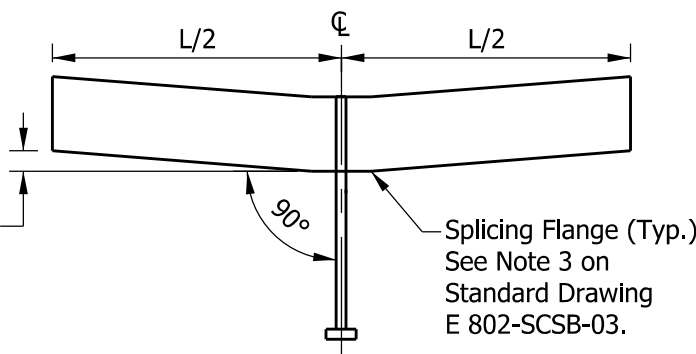


<i>/s/ Alfredo B. Hanza</i>	09/20/13
DESIGN STANDARDS ENGINEER	DATE

<i>/s/ Mark A. Miller</i>	09/26/13
CHIEF ENGINEER	DATE



SIDE ELEVATION A-A



CAMBER DIAGRAM

**NOTES:**

1. Maximum deviation of any chord from a straight line shall be 1/8".
2. All butterfly structure members are steel.
3. See Standard Drawings E 802-SCSB-04 and -05 for upper and lower chord connection details.
4. See Standard Drawing E 802-SCSB-03 for quadri-chord and flange details.
5. See Standard Drawing E 802-SCSB-05 for wire outlet detail.
6. See Standard Drawings E 802-SCSB-08 and -09 for foundation details.
7. See Standard Drawing E 802-SCSB-07 for handhole and I.D. tag details.
8. See Standard Drawing E 802-SCSB-06 for base plate, anchor bolt, and metal skirt details.

**LEGEND:**

- a - Chord Member
- b - Interior Member  
Verticals and Vertical Diagonals in Front and Back Faces, and  
Horizontals and Horizontal Diagonals in Top and Bottom Faces  
of Quadri-Chord Arm
- c - Column

MEMBER SIZES							
MAX SPAN L/2 (FT)	MAX SIGN AREA (SF)	CHORD a		VERT./HORIZ./DIAG. b		COLUMN c	
		O.D. (IN.)	WALL THICK. (IN.)	O.D. (IN.)	WALL THICK. (IN.)	O.D. (IN.)	WALL THICK. (IN.)
15	400	5.563	0.375	2.875	0.276	24.000	0.688

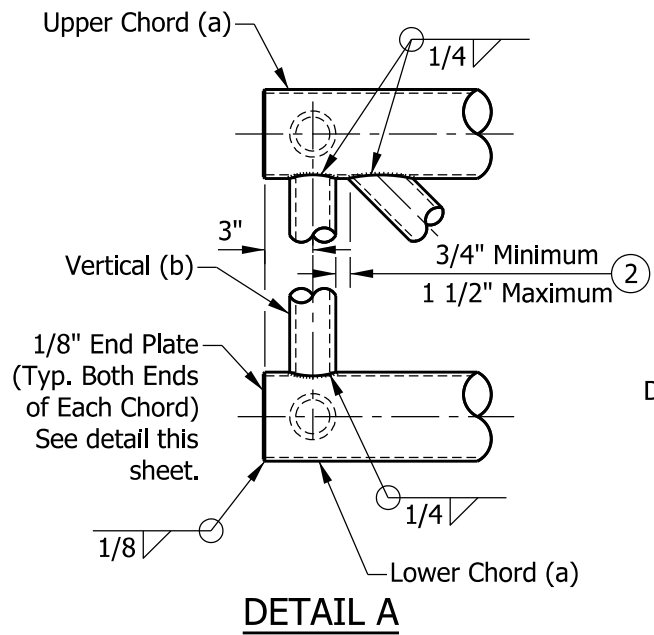
INDIANA DEPARTMENT OF TRANSPORTATION

SIGN CANTILEVER STRUCTURE BUTTERFLY  
PLAN, ELEVATION, MEMBER SIZE, AND CAMBER

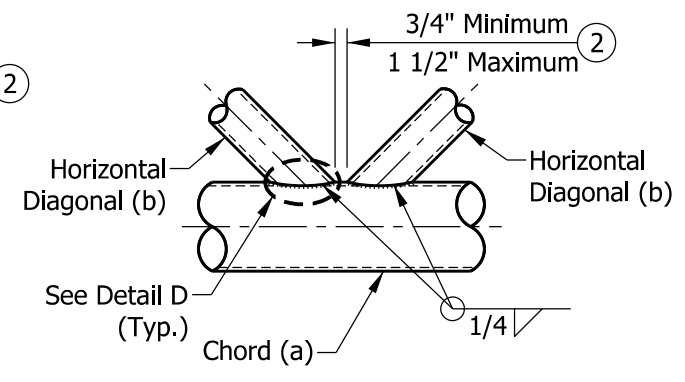
SEPTEMBER 2014

STANDARD DRAWING NO. E 802-SCSB-02

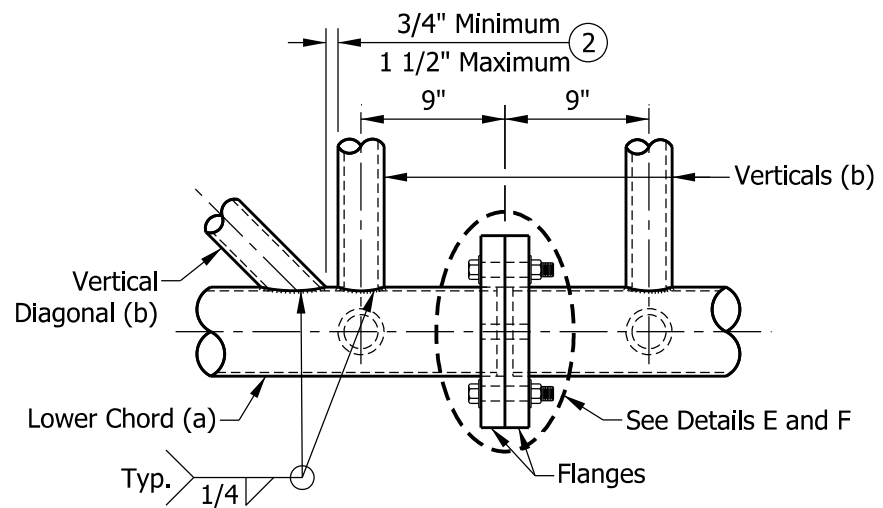
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/s/ Alfredo B. Hanza	09/20/13								
DESIGN STANDARDS ENGINEER	DATE								
/s/ Mark A. Miller	09/26/13								
CHIEF ENGINEER	DATE								



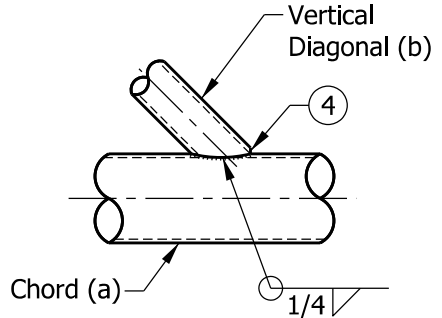
**DETAIL A**



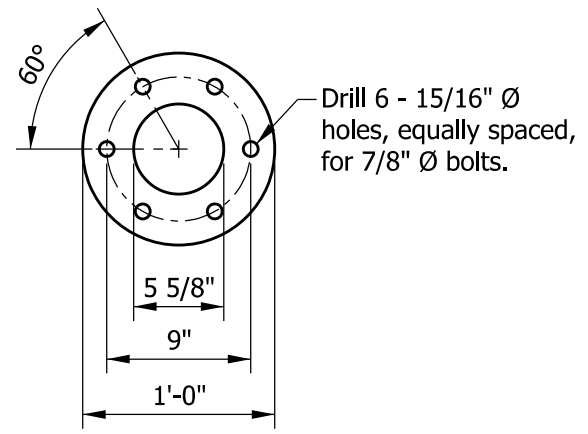
**DETAIL B**



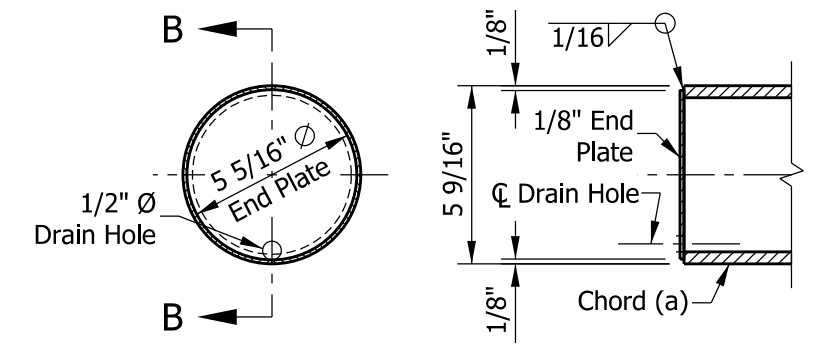
**DETAIL C**



**DETAIL D**



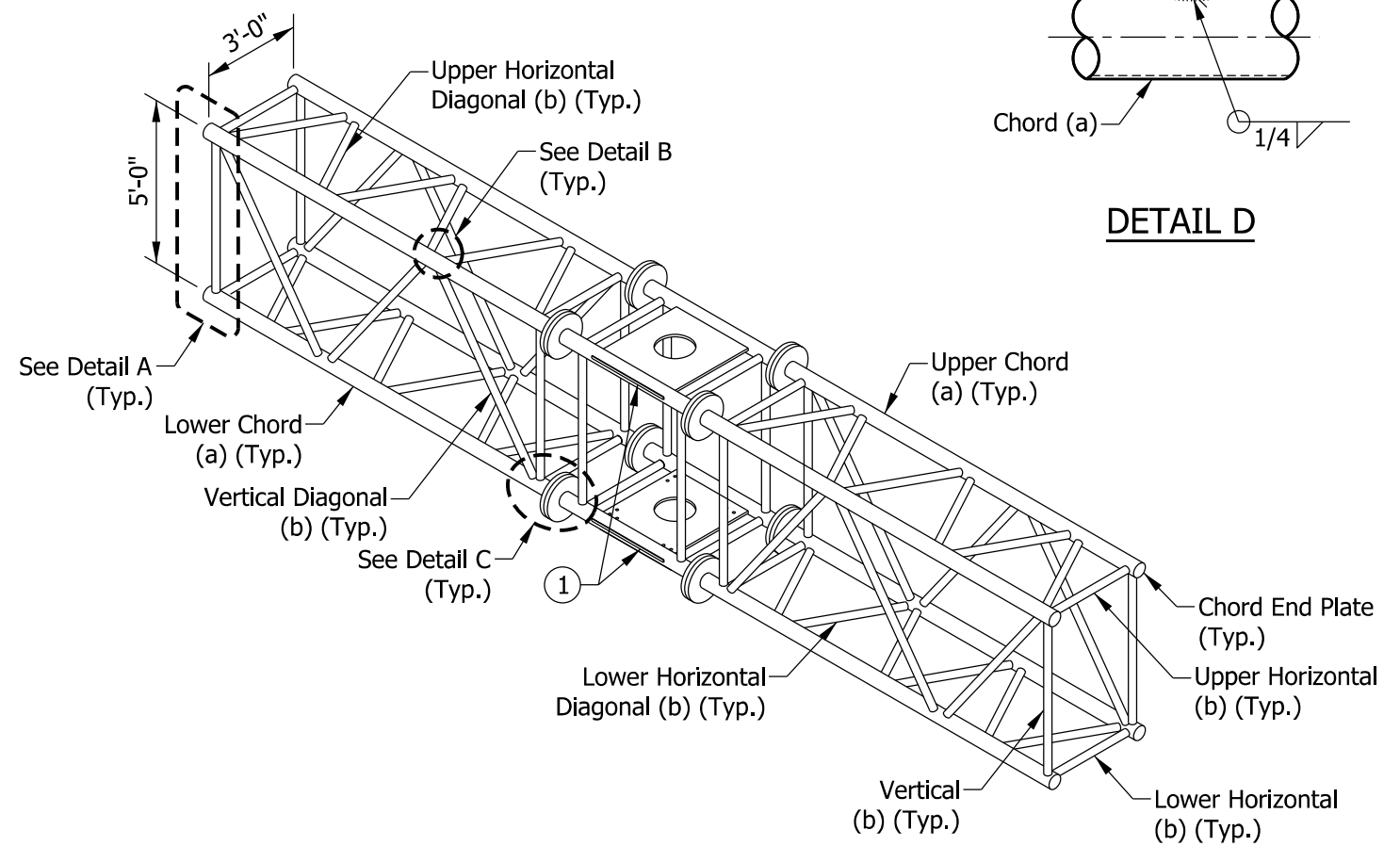
**FLANGE DETAIL E**



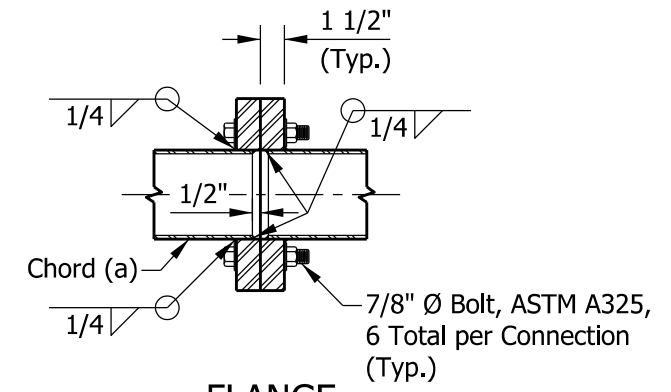
**END VIEW**

**SECTION B-B**

**CHORD END PLATE DETAIL**



**TYPICAL QUADRI-CHORD ARM PAIR**

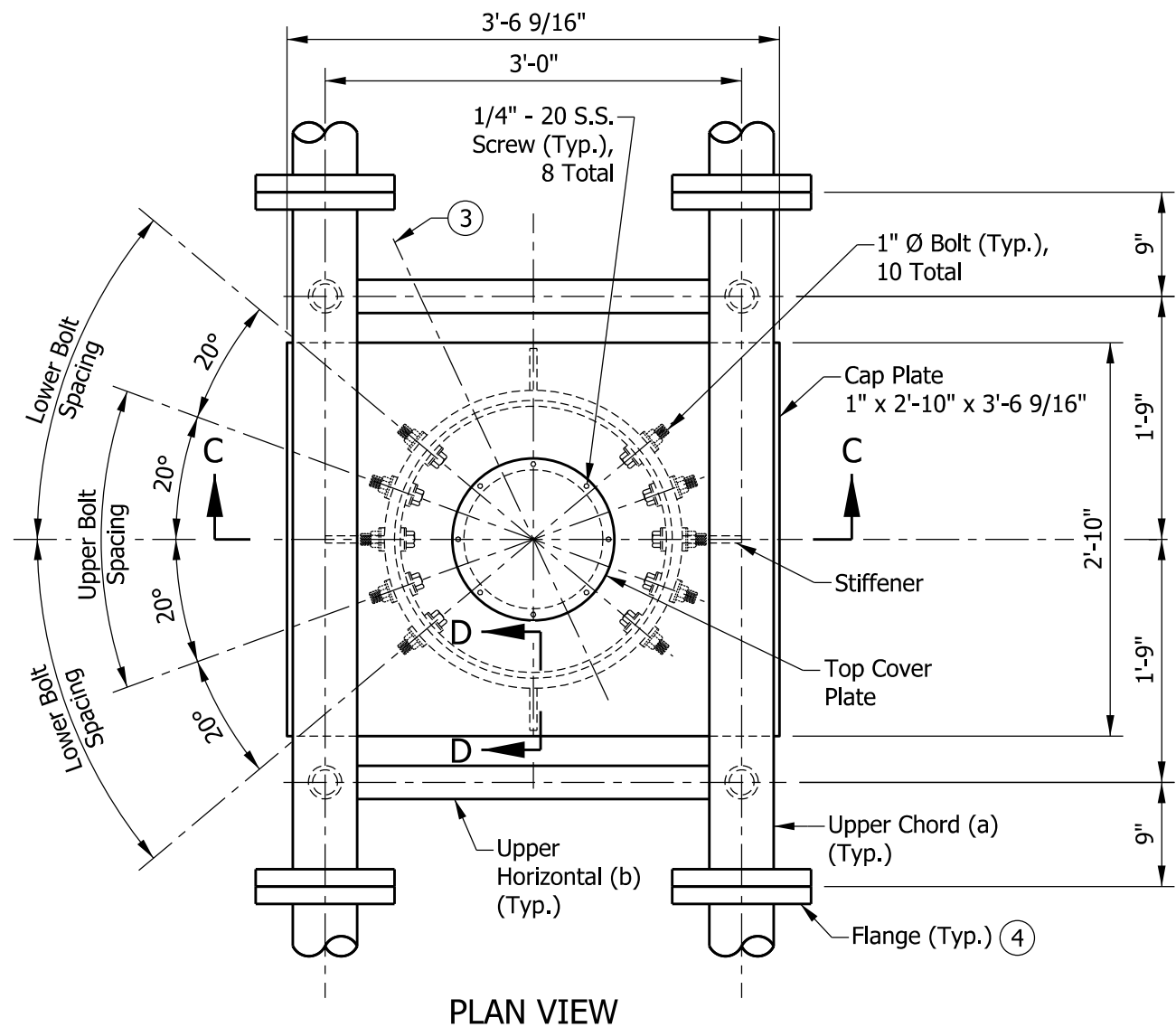


**FLANGE DETAIL F**

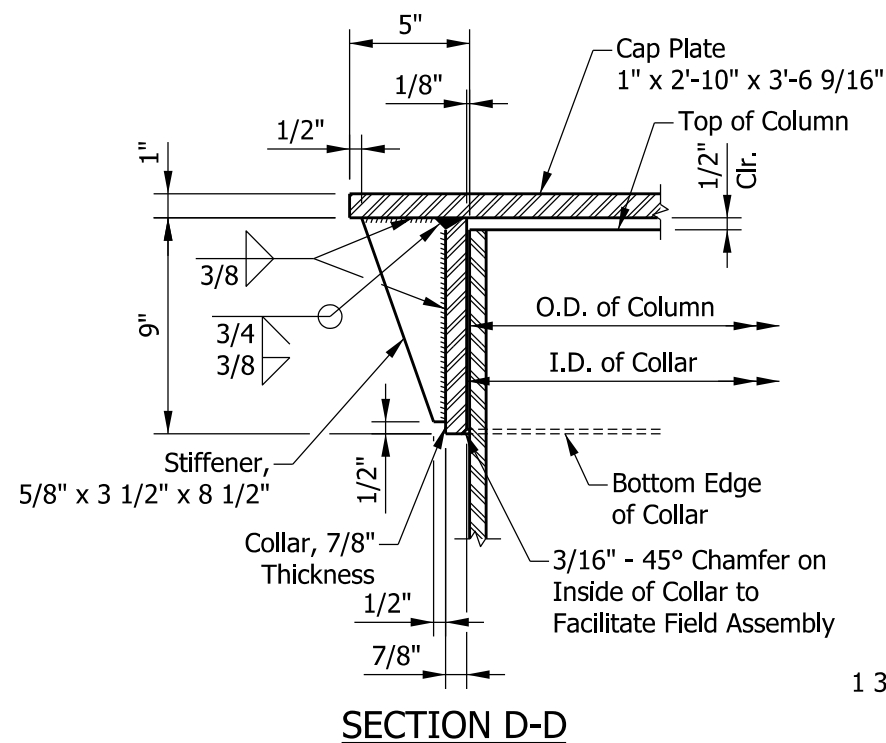
**NOTES:**

- ① See Standard Drawings E 802-SCSB-04 and -05 for upper and lower chords connection details.
- ② Diagonals shall be detailed for minimum offset from the panel point based on the following: Offset shall be such as to provide a 3/4" minimum to 1 1/2" maximum clearance between any diagonal and any vertical member, and to provide clearance for U-bolt connections of signs.
3. Splicing flanges shall be attached to each arm unit with the arm shop-assembled to camber shown. Arm units shall be in proper alignment and flange surfaces shall be shop-bolted into full contact before welding. Sufficient external welds or tacks shall be made to secure flanges until remaining welds are made after disassembly. Adjacent flanges shall be "match marked" to insure proper field assembly.
- ④ Toe edge of diagonal member shall be cut back to facilitate throat thickness per AWS D1.1, Figure 3.2.

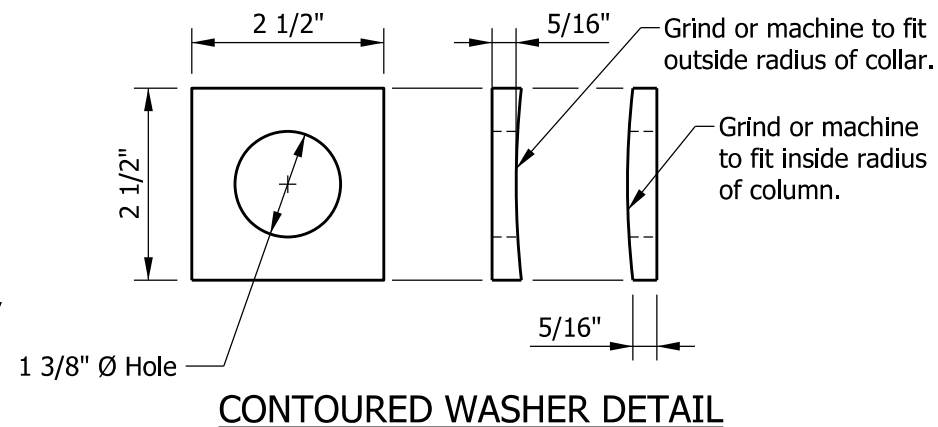
INDIANA DEPARTMENT OF TRANSPORTATION		
SIGN CANTILEVER STRUCTURE BUTTERFLY QUADRI-CHORD AND FLANGE DETAILS		
SEPTEMBER 2014		
STANDARD DRAWING NO.	E 802-SCSB-03	
	/s/ Alfredo B. Hanza	09/20/13
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	09/26/13
	CHIEF ENGINEER	DATE



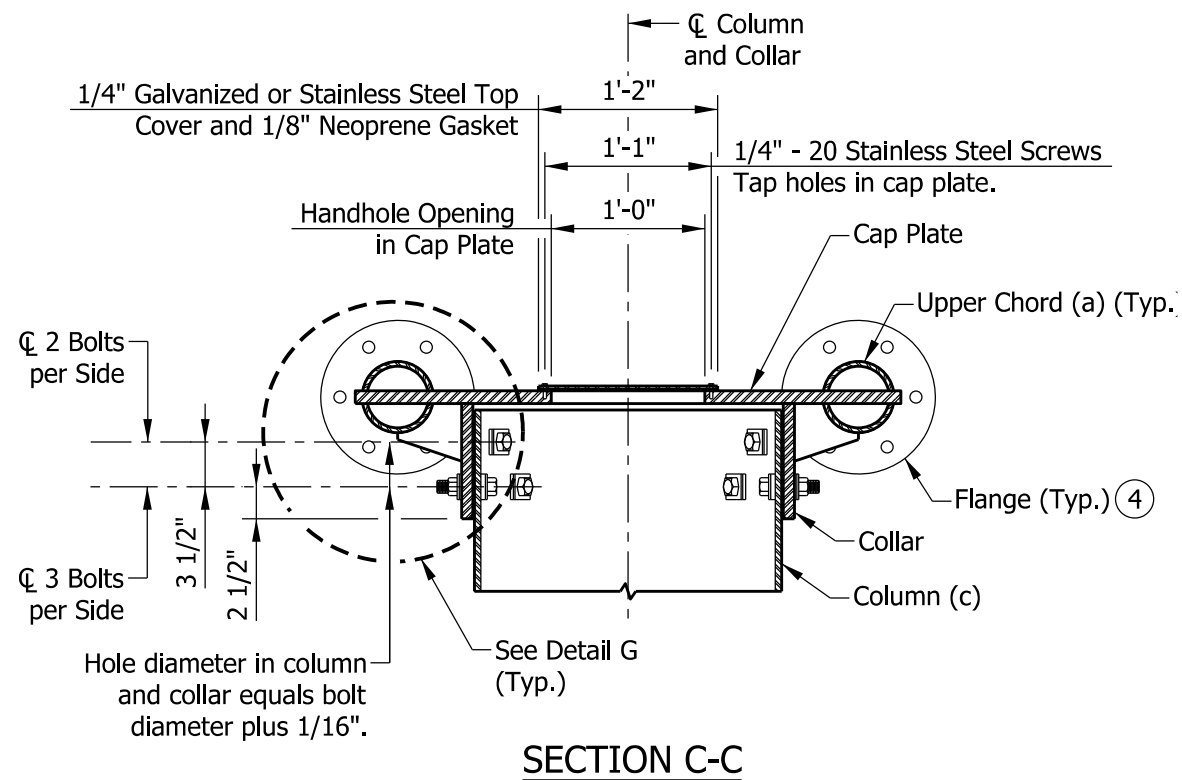
**PLAN VIEW**



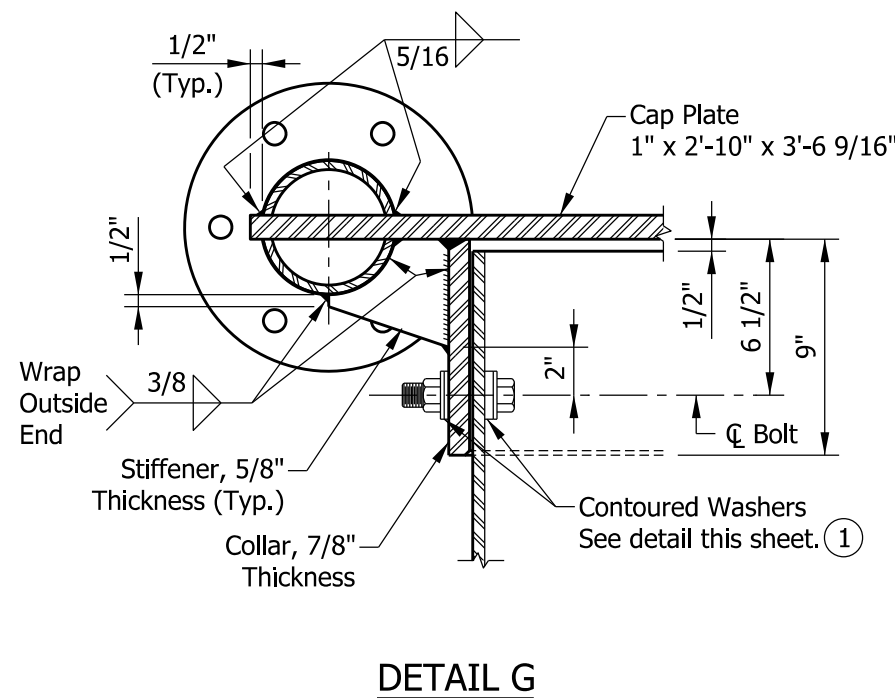
**SECTION D-D**



**CONTOURED WASHER DETAIL**



**SECTION C-C**

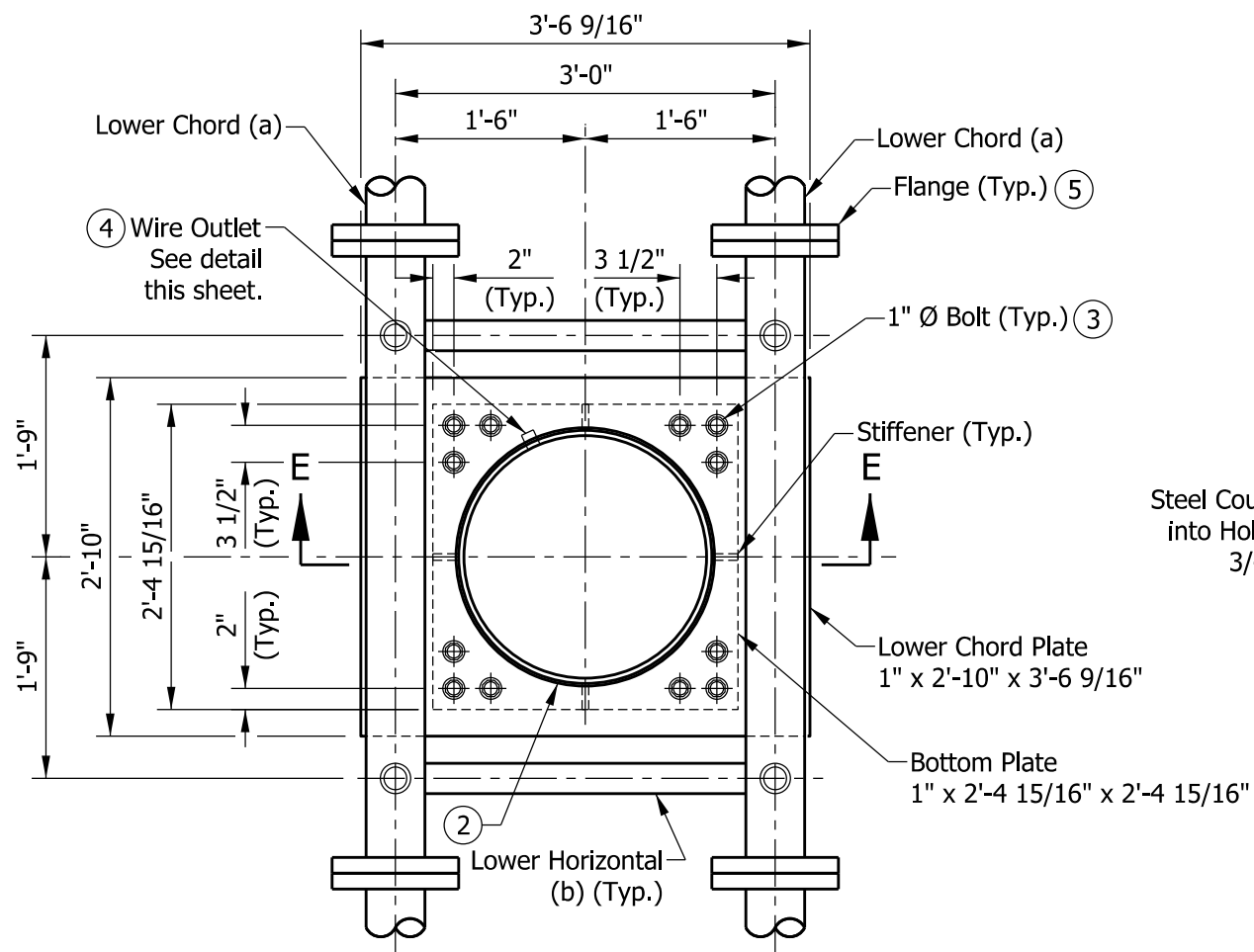


**DETAIL G**

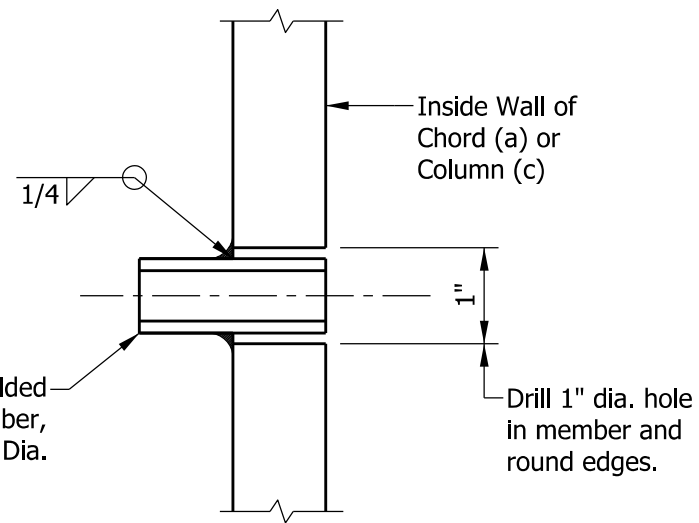
**NOTES:**

1. Connection bolts in collar and bolts at lower chord connection must be high strength with matching locknuts. Connection bolts shall each have two (2) stainless steel flat washers. Bolts, contoured washers, and locknuts shall be galvanized.
2. After galvanizing, collar inside diameter shall equal outside diameter of galvanized column plus 1/8" ( $\pm 1/16"$ ). Maximum gap between column and collar at any location shall be 1/8" before tightening bolts.
- ③ Optional full-penetration weld in collar may be made at two (2) locations 180° apart. X-ray or UT 100%.
- ④ See Standard Drawing E 802-SCSB-03 for flange details.

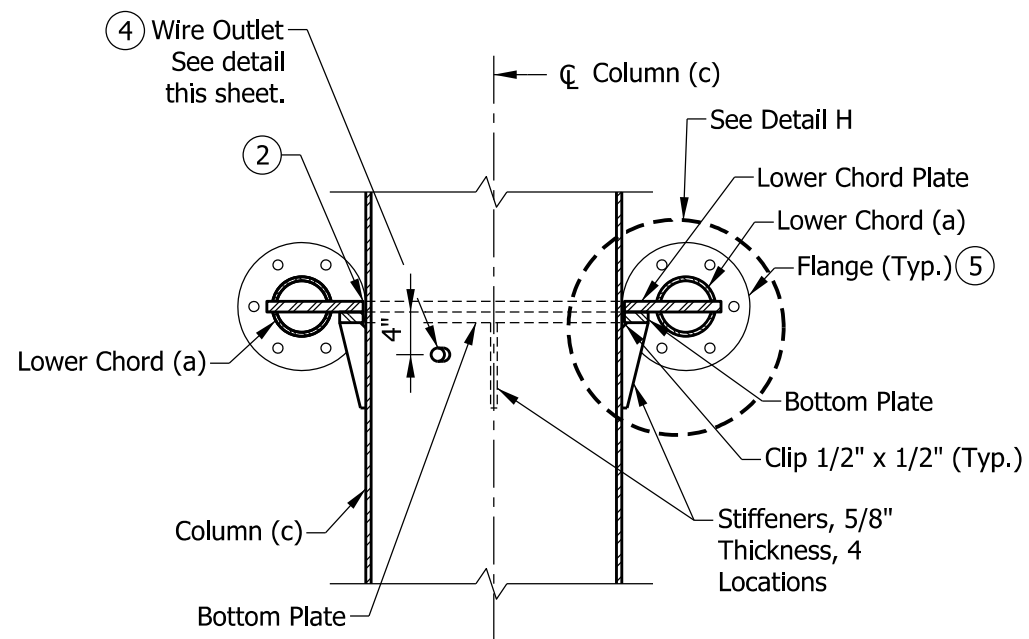
<b>INDIANA DEPARTMENT OF TRANSPORTATION</b>											
<b>SIGN CANTILEVER STRUCTURE BUTTERFLY UPPER CHORDS CONNECTION</b>											
SEPTEMBER 2014											
STANDARD DRAWING NO. E 802-SCSB-04											
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;"><i>/s/ Alfredo B. Hanza</i></td> <td style="width: 30%; text-align: right;">09/20/13</td> </tr> <tr> <td>DESIGN STANDARDS ENGINEER</td> <td style="text-align: right;">DATE</td> </tr> <tr> <td colspan="2" style="height: 10px;"></td> </tr> <tr> <td><i>/s/ Mark A. Miller</i></td> <td style="text-align: right;">09/26/13</td> </tr> <tr> <td>CHIEF ENGINEER</td> <td style="text-align: right;">DATE</td> </tr> </table>	<i>/s/ Alfredo B. Hanza</i>	09/20/13	DESIGN STANDARDS ENGINEER	DATE			<i>/s/ Mark A. Miller</i>	09/26/13	CHIEF ENGINEER	DATE
<i>/s/ Alfredo B. Hanza</i>	09/20/13										
DESIGN STANDARDS ENGINEER	DATE										
<i>/s/ Mark A. Miller</i>	09/26/13										
CHIEF ENGINEER	DATE										



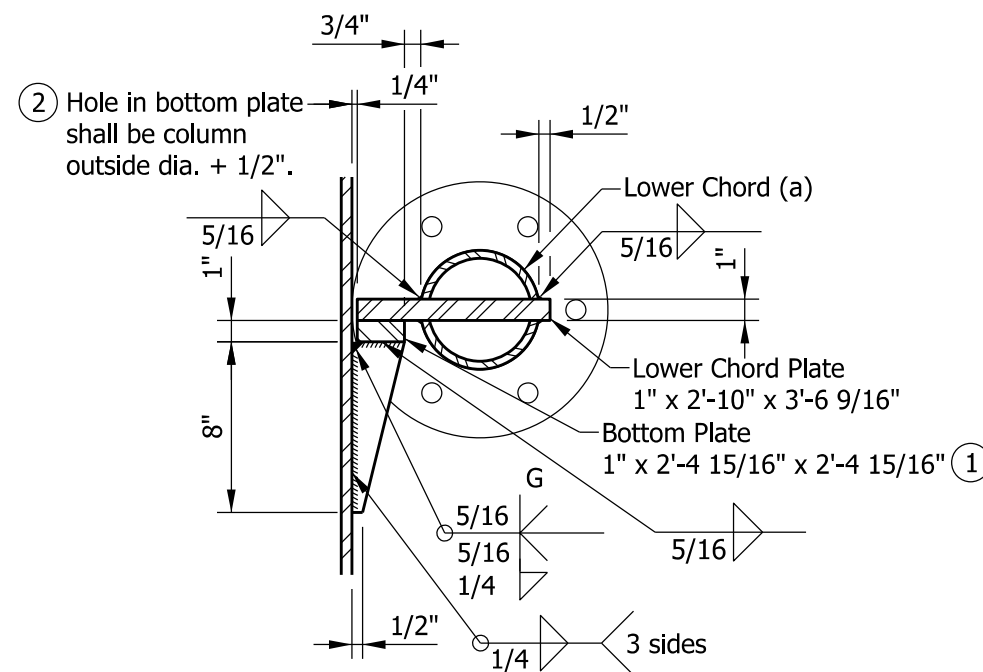
**PLAN SECTION THROUGH COLUMN ABOVE LOWER CHORDS**



**WIRE OUTLET**



**SECTION E-E**



**DETAIL H**

**NOTES:**

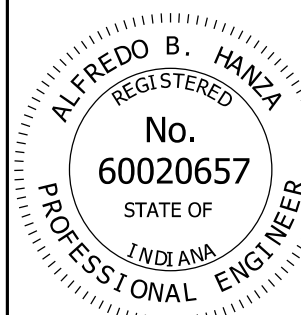
- ① Grind top plate if required to fully seat lower chord plate. Repair damaged galvanizing before assembly.
- ② After tightening lower connection bolts, fill gap with non-hardening silicone caulk suitable for exterior exposure.
- ③ Connection bolts in collar and bolts at lower chord connection must be high strength with matching locknuts. Connection bolts shall each have two (2) stainless steel flat washers. Bolts, contoured washers, and locknuts shall be galvanized.
- ④ Orient pipe toward sign. Hole diameter in column shall equal outside pipe diameter + 1/8\".
- ⑤ See Standard Drawing E 802-SCSB-03 for flange details.

INDIANA DEPARTMENT OF TRANSPORTATION

SIGN CANTILEVER STRUCTURE BUTTERFLY  
LOWER CHORDS CONNECTION  
AND WIRE OUTLET DETAIL

SEPTEMBER 2014

STANDARD DRAWING NO. E 802-SCSB-05

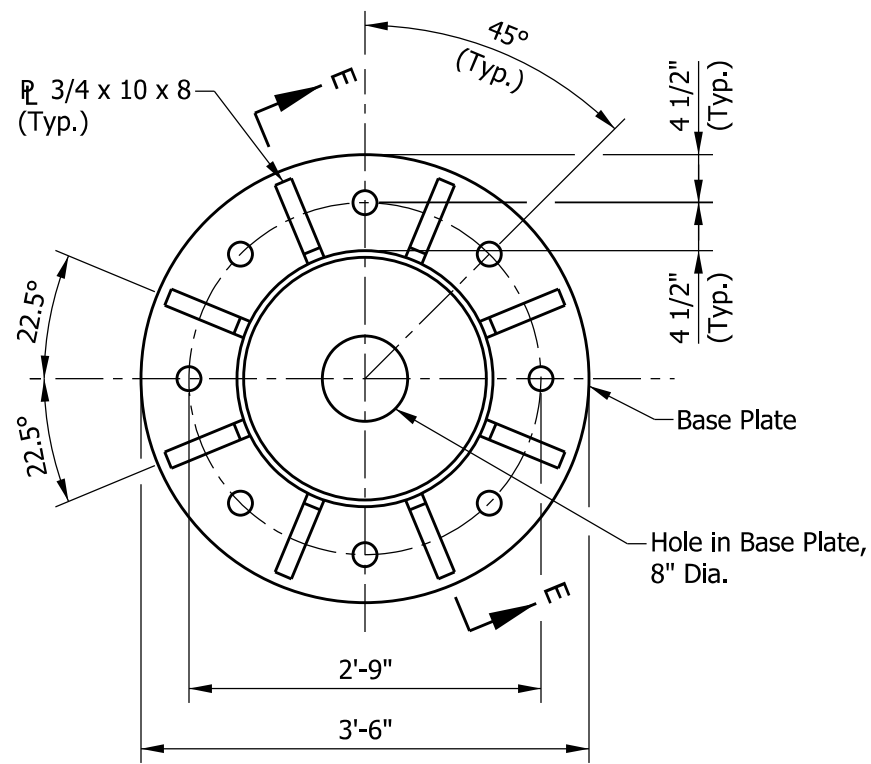


/s/ Alfredo B. Hanza 09/25/13

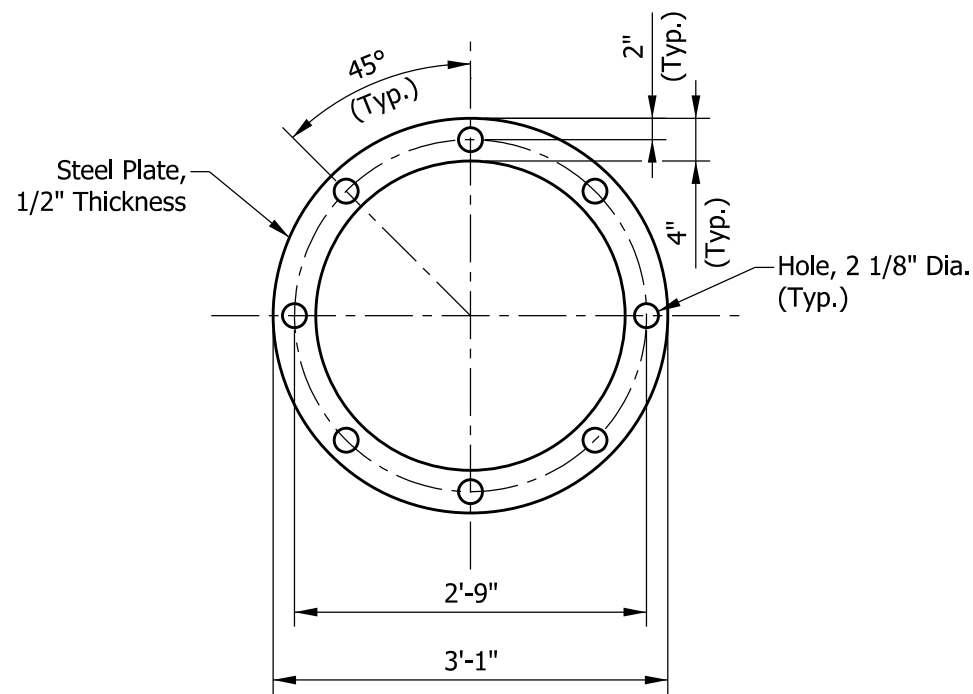
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/26/13

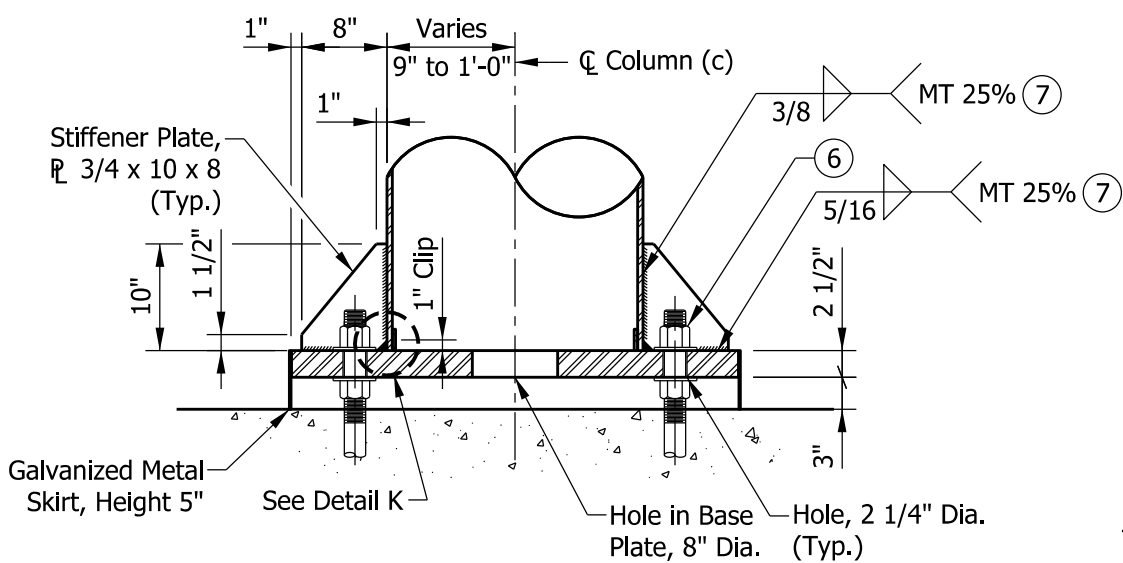
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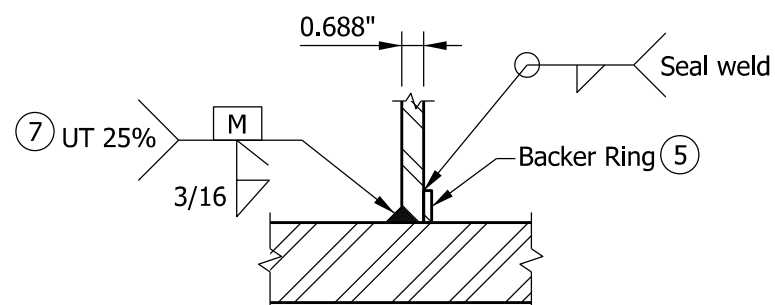
PLAN



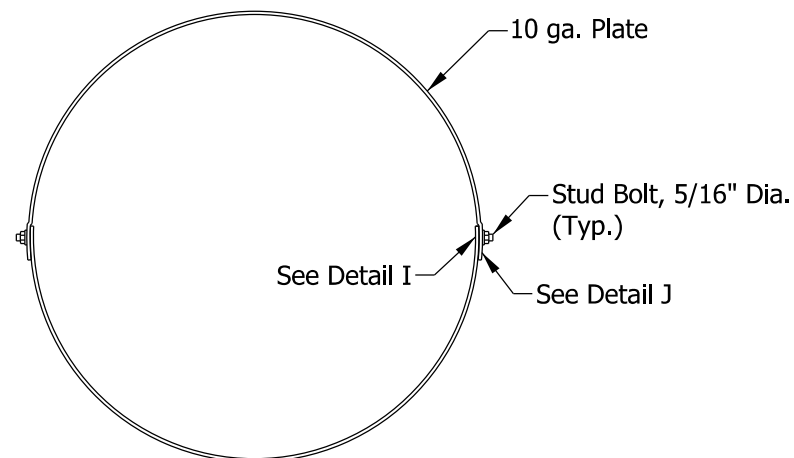
ANCHOR AND POSITIONING PLATE



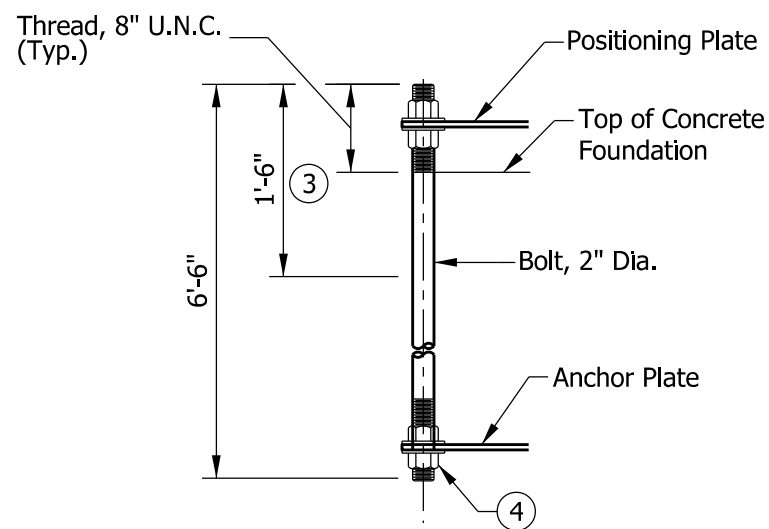
SECTION E-E



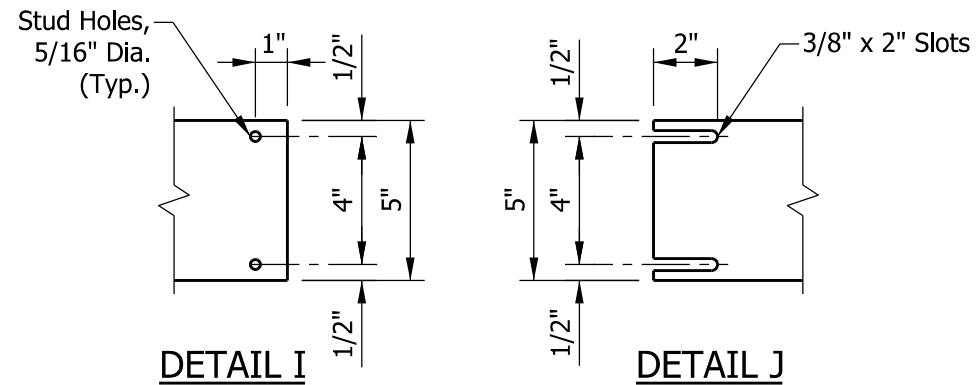
DETAIL K  
BASE PLATE WELD



METAL SKIRT DETAIL



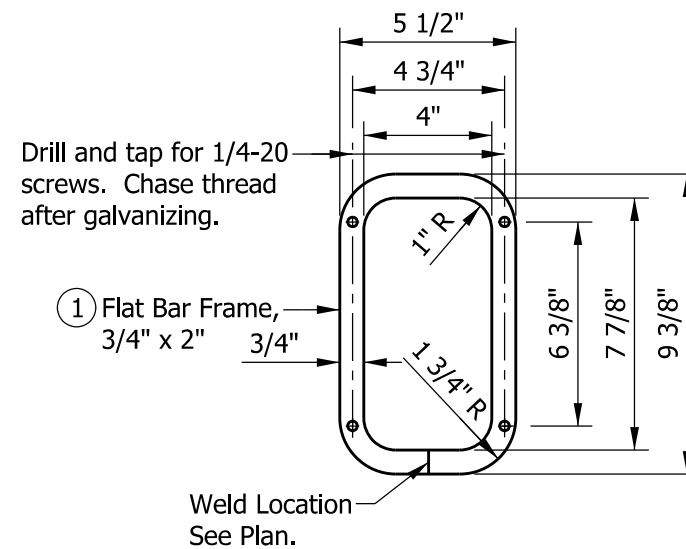
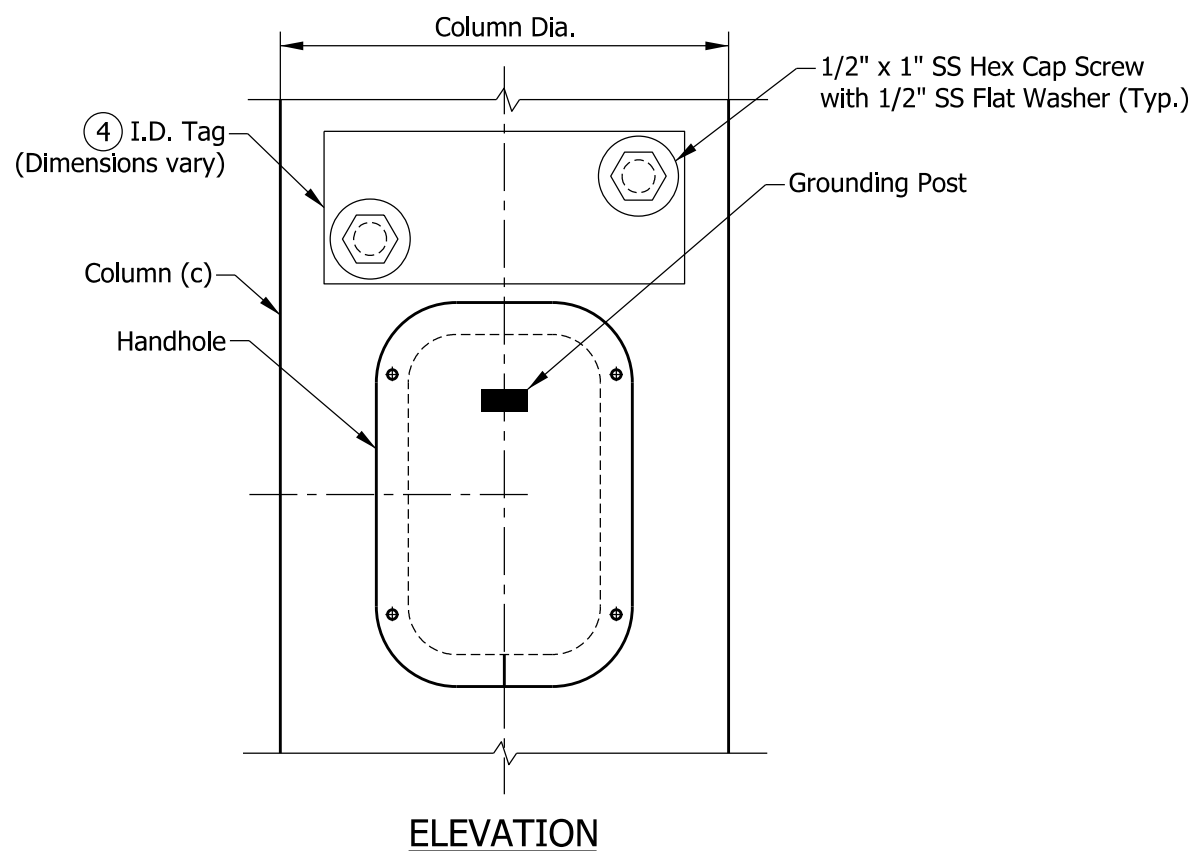
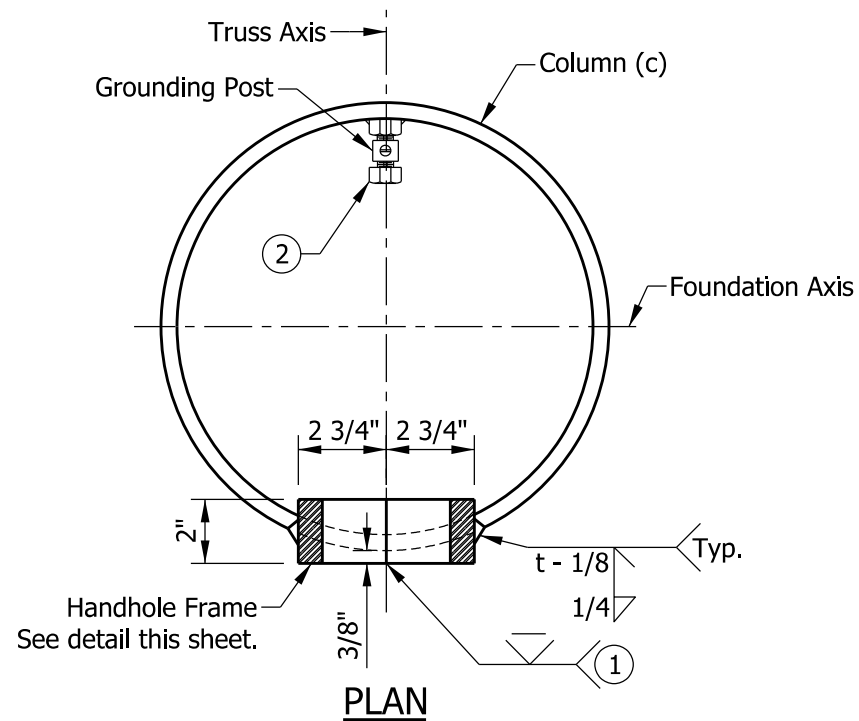
ANCHOR BOLT DETAIL



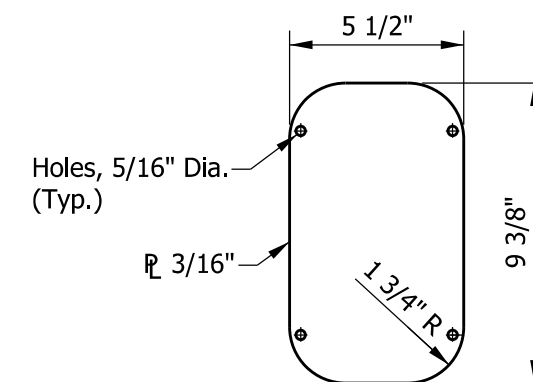
**NOTES:**

1. Utilize temporary positioning plate and leveling nuts or other engineer-approved methods to maintain anchor bolt alignment during concrete placement. Positioning plate and associated nuts shall be removed upon completion of the foundation.
2. Protect threads during concreting with tape, sleeves, or other means.
3. 1'-6" is the minimum length which shall be galvanized. Entire bolt may be galvanized at contractor's option.
4. Provide uncoated nut at bottom of anchor plate. Deform thread or use chemical thread lock to secure.
5. Use continuous backer ring, 1/4" x 1" minimum. Tack weld only in root area of final weld.
6. Anchor bolt nuts shall be tightened against the base plate by turning the nut a minimum of 1/6 turn from snug tight condition.
7. UT - Ultrasonic Testing, 25% of entire column to base plate weld.  
MT - Magnetic Particle Testing, 25% or 1 side of 4 stiffeners.

<b>INDIANA DEPARTMENT OF TRANSPORTATION</b>									
<b>SIGN CANTILEVER STRUCTURE BUTTERFLY BASE PLATE, ANCHOR BOLT, AND METAL SKIRT DETAILS</b>									
SEPTEMBER 2014									
STANDARD DRAWING NO.	E 802-SCSB-06								
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/s/ Alfredo B. Hanza	09/20/13								
DESIGN STANDARDS ENGINEER	DATE								
/s/ Mark A. Miller	09/26/13								
CHIEF ENGINEER	DATE								



**HANDHOLE FRAME**



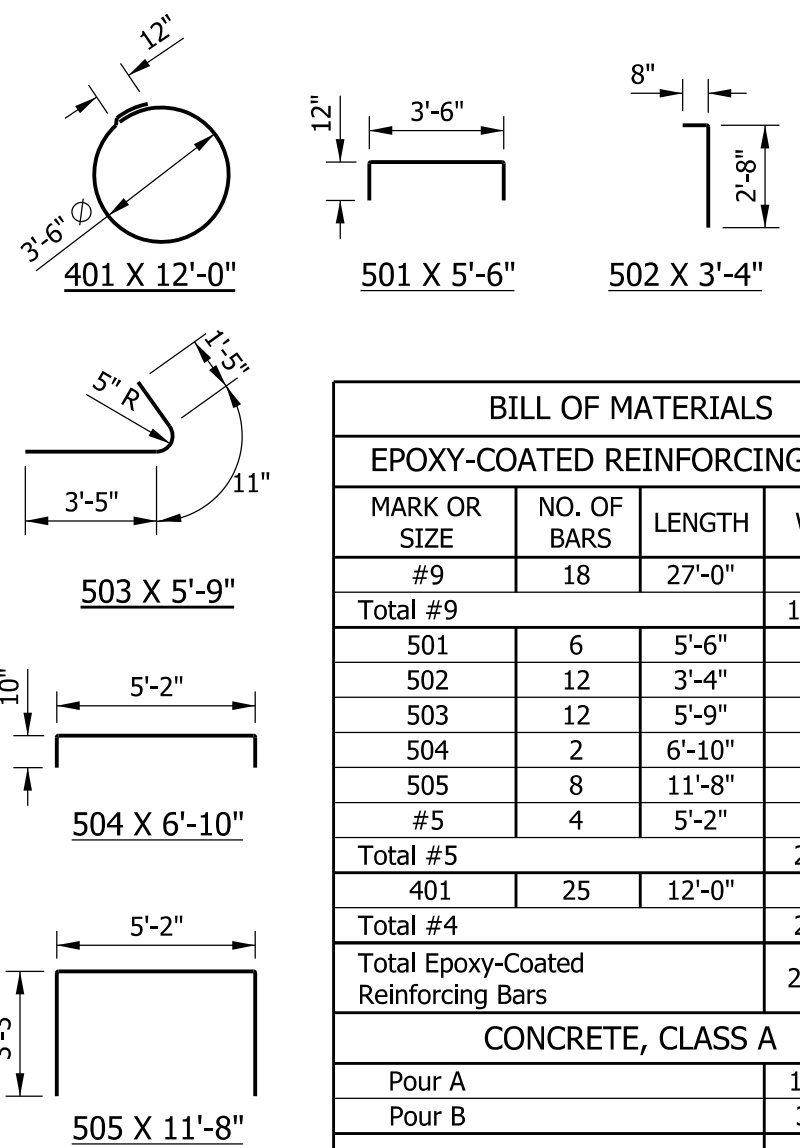
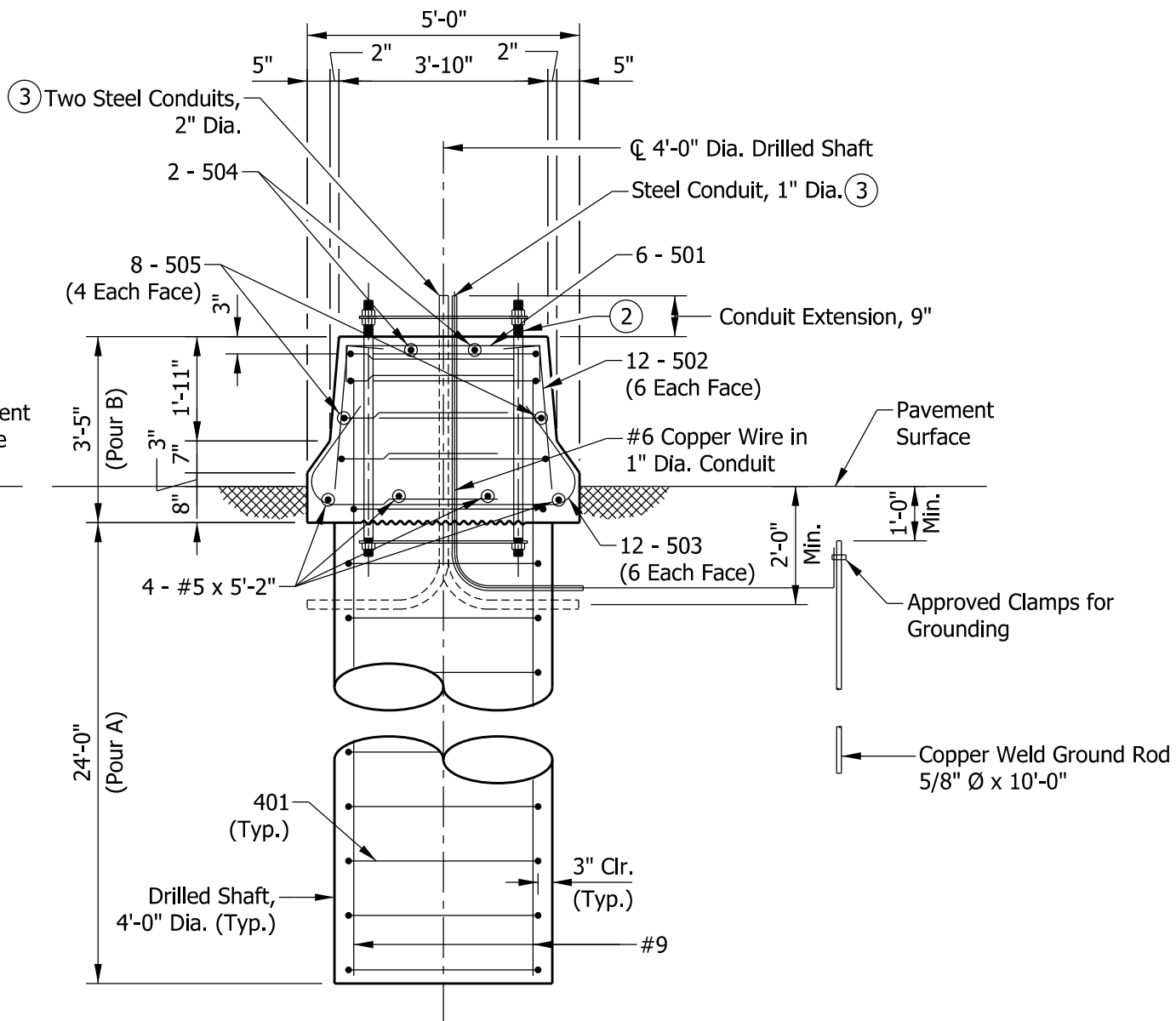
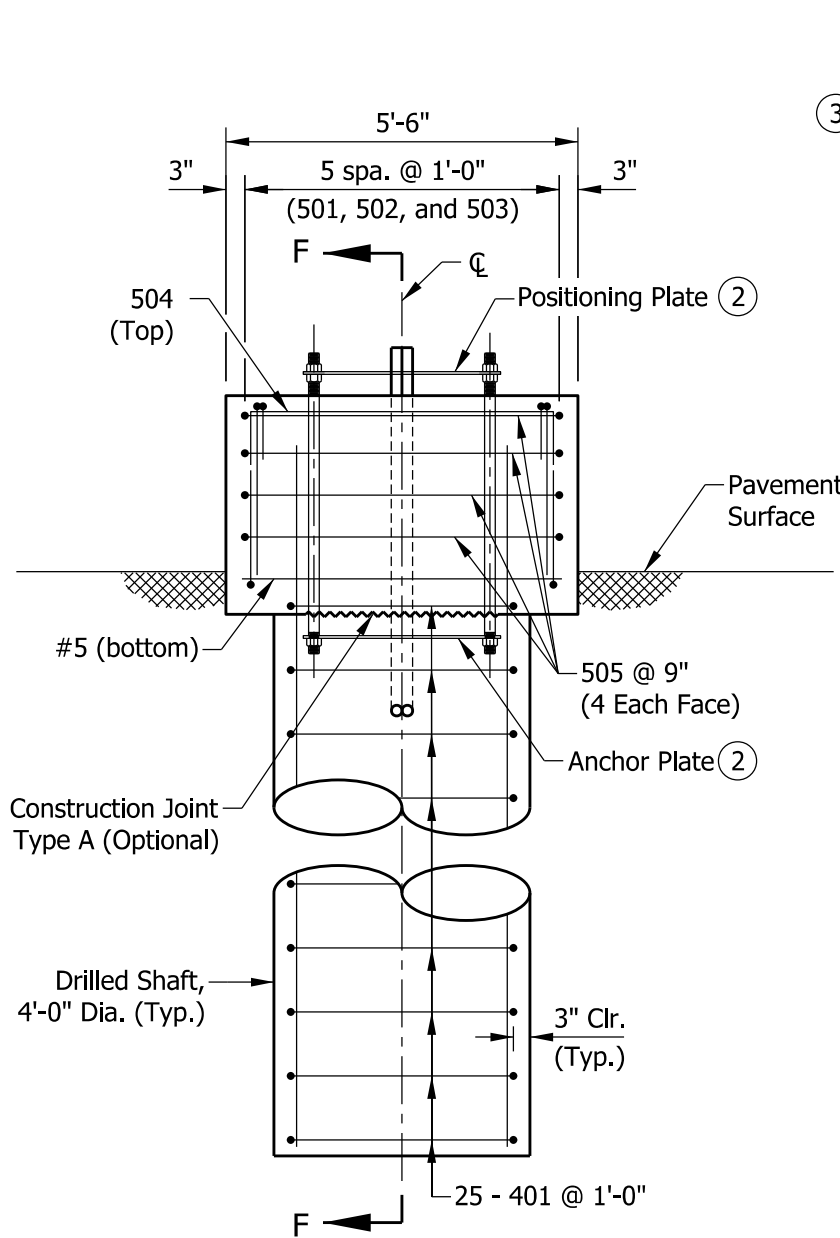
**HANDHOLE COVER**

**NOTES:**

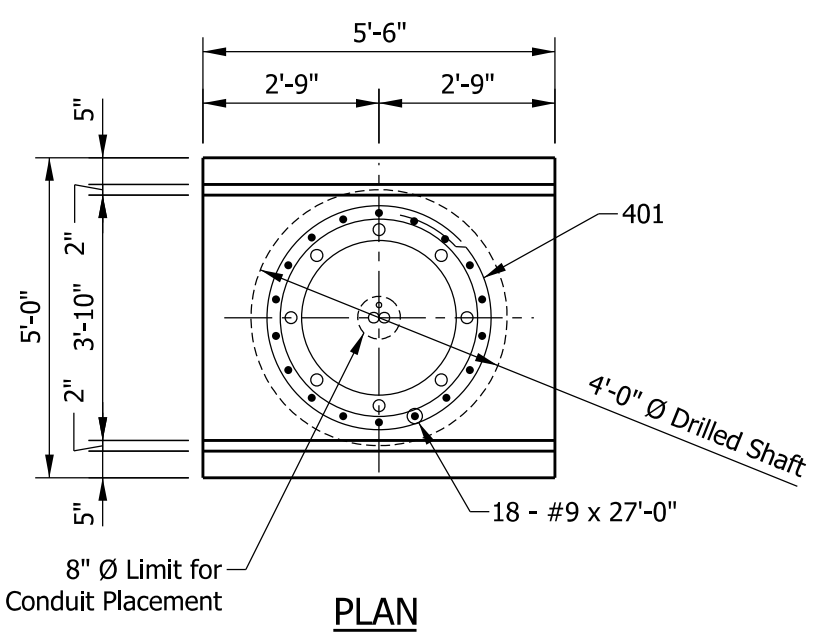
- ① In lieu of fabricated handhole frame as shown, frame may be cut from 2" plate with rolling direction vertical.
- ② See Standard Drawing E 802-SNWR-03 for grounding post details. Grounding post shall be placed on far side of support directly opposite center of handhole.
3. See Standard Drawing E 802-SCSB-02 for handhole location.
- 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 \_\_\_\_\_, Arm Length \_\_\_\_\_  
 Pole Mounting Height \_\_\_\_\_

INDIANA DEPARTMENT OF TRANSPORTATION	
SIGN CANTILEVER STRUCTURE BUTTERFLY HANDHOLE AND I.D. TAG DETAILS	
SEPTEMBER 2014	
STANDARD DRAWING NO.	E 802-SCSB-07
	/s/ Alfredo B. Hanza 09/20/13 DESIGN STANDARDS ENGINEER DATE
	/s/ Mark A. Miller 09/26/13 CHIEF ENGINEER DATE



BILL OF MATERIALS			
EPOXY-COATED REINFORCING BARS			
MARK OR SIZE	NO. OF BARS	LENGTH	WEIGHT
#9	18	27'-0"	
Total #9			1652 LBS
501	6	5'-6"	
502	12	3'-4"	
503	12	5'-9"	
504	2	6'-10"	
505	8	11'-8"	
#5	4	5'-2"	
Total #5			281 LBS
401	25	12'-0"	
Total #4			200 LBS
Total Epoxy-Coated Reinforcing Bars			2133 LBS
CONCRETE, CLASS A			
Pour A			11.2 CYS
Pour B			3.0 CYS
Total Concrete, Class A			14.2 CYS
MISCELLANEOUS			
Surface Seal			5.9 SYS



- NOTES:**
- See Standard Drawing E 602-CCMB-03 for barrier wall width transition.
  - See Standard Drawing E 802-SCSB-06 for anchor and positioning plate and anchor bolt details.
  - Thread and cap both ends of steel conduit.
  - Surface seal top and sides of barrier railing to the pavement surface.

INDIANA DEPARTMENT OF TRANSPORTATION

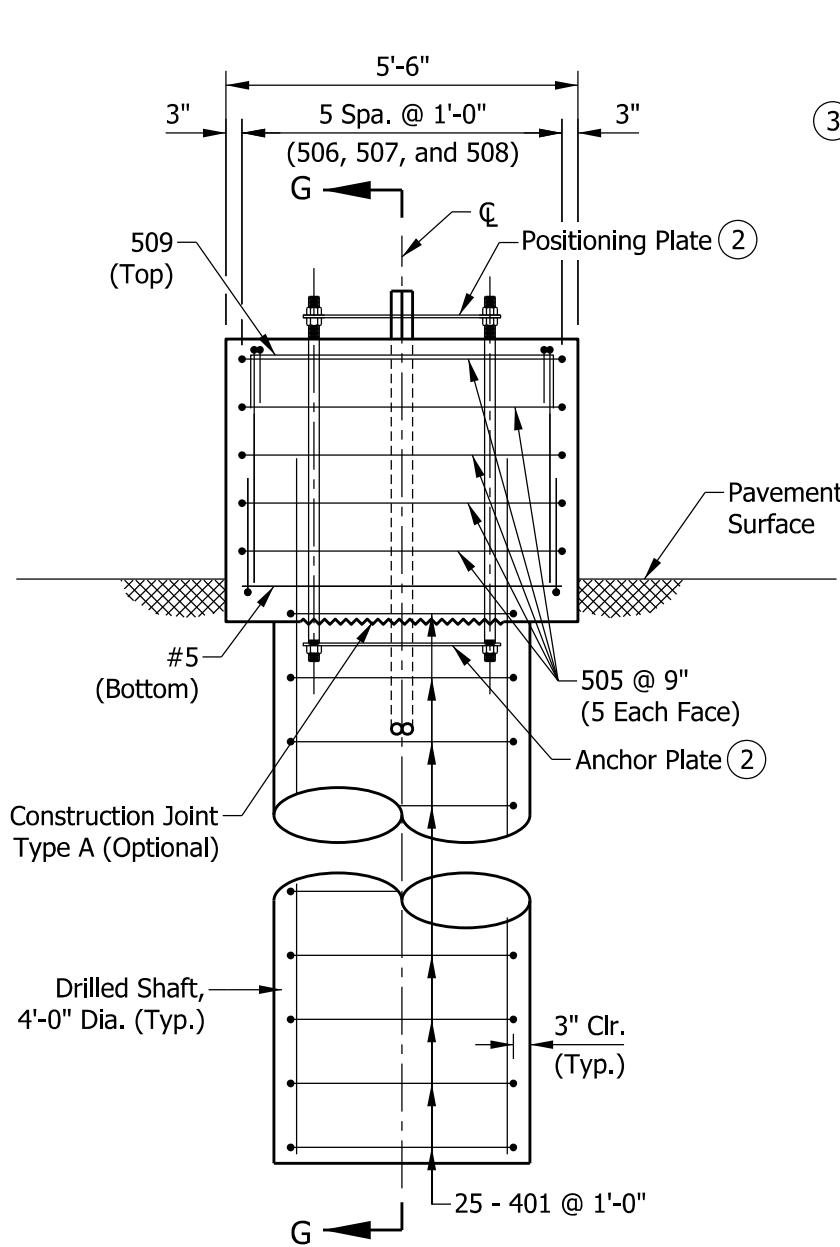
SIGN CANTILEVER STRUCTURE BUTTERFLY FOUNDATION AT 33" CONCRETE BARRIER

SEPTEMBER 2014

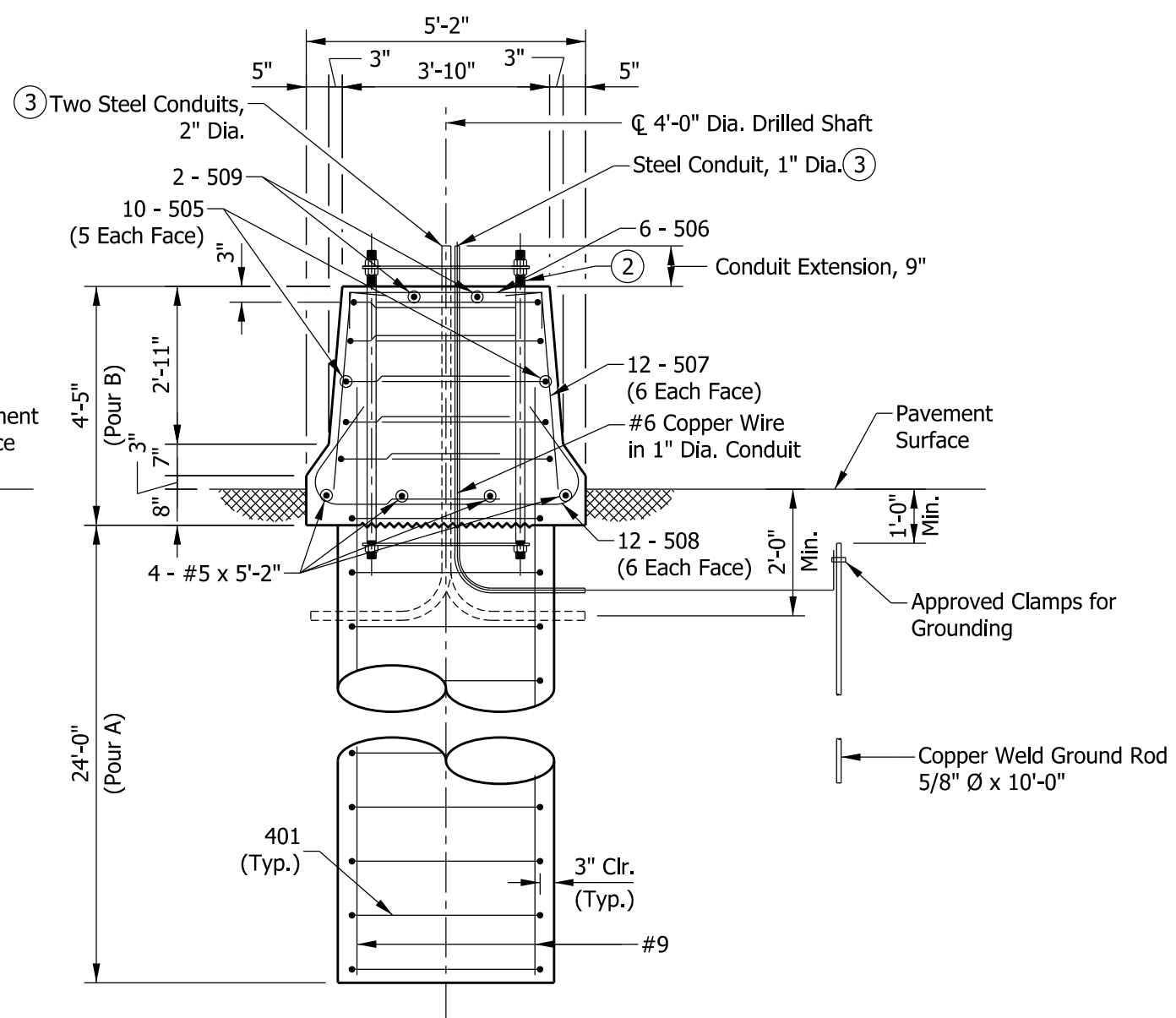
STANDARD DRAWING NO. E 802-SCSB-08

	/s/ Alfredo B. Hanza	09/20/13
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	09/26/13
	CHIEF ENGINEER	DATE

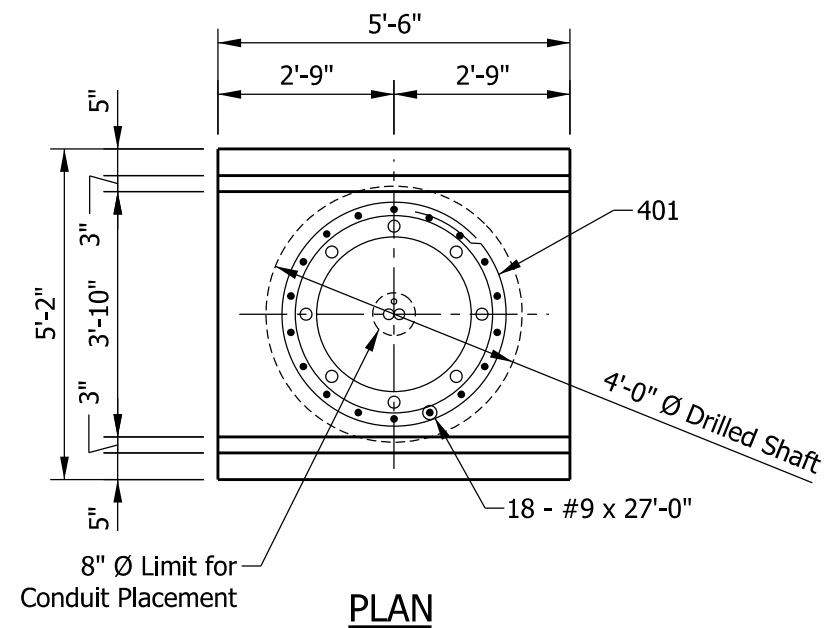




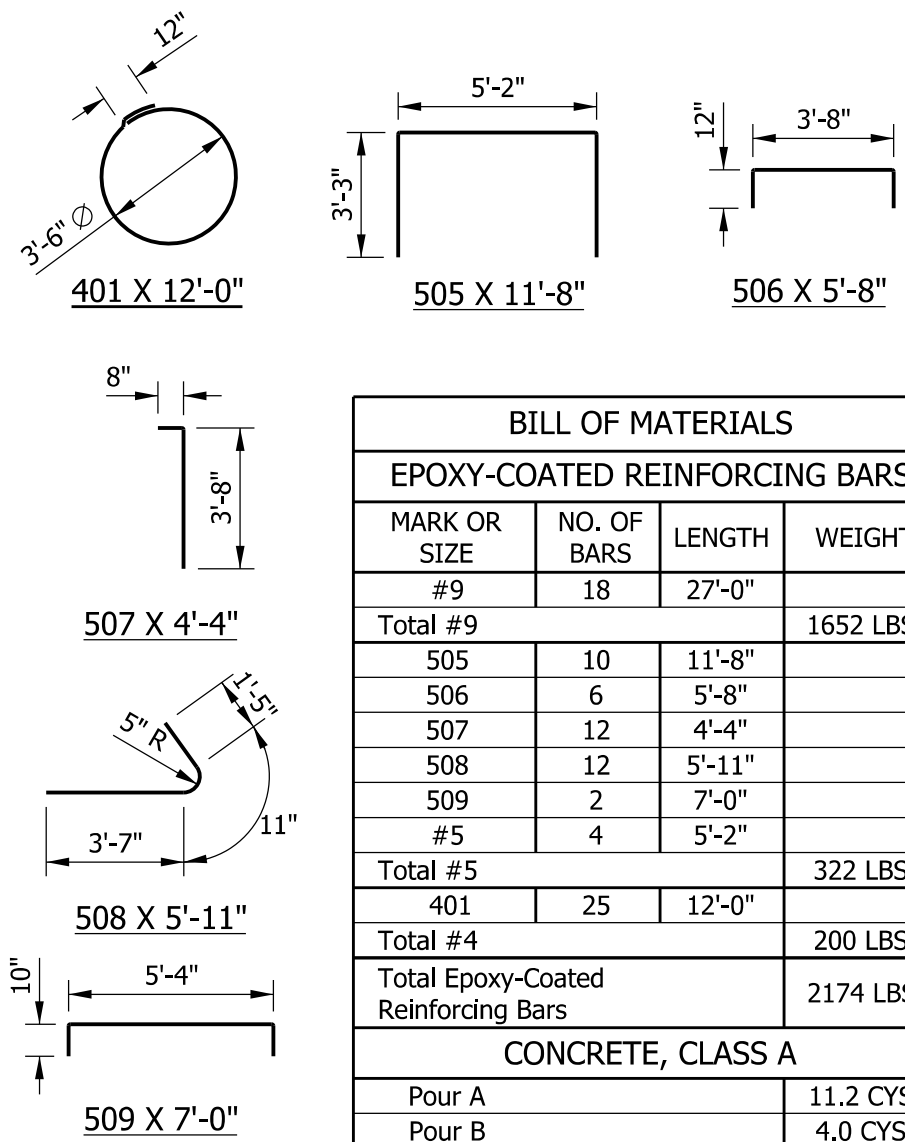
**ELEVATION**



**SECTION G-G**



**PLAN**



BILL OF MATERIALS			
EPOXY-COATED REINFORCING BARS			
MARK OR SIZE	NO. OF BARS	LENGTH	WEIGHT
#9	18	27'-0"	
Total #9			1652 LBS
505	10	11'-8"	
506	6	5'-8"	
507	12	4'-4"	
508	12	5'-11"	
509	2	7'-0"	
#5	4	5'-2"	
Total #5			322 LBS
401	25	12'-0"	
Total #4			200 LBS
Total Epoxy-Coated Reinforcing Bars			2174 LBS
CONCRETE, CLASS A			
Pour A			11.2 CYS
Pour B			4.0 CYS
Total Concrete, Class A			15.2 CYS
MISCELLANEOUS			
Surface Seal			7.1 SYS

**NOTES:**

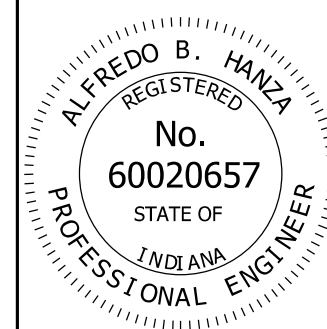
1. See Standard Drawing E 602-CCMB-03 for barrier wall width transition.
2. See Standard Drawing E 802-SCSB-06 for anchor and positioning plate and anchor bolt details.
3. Thread and cap both ends of steel conduit.
4. Surface seal top and sides of barrier railing to the pavement surface.

**INDIANA DEPARTMENT OF TRANSPORTATION**

**SIGN CANTILEVER STRUCTURE BUTTERFLY FOUNDATION AT 45" CONCRETE BARRIER**

SEPTEMBER 2014

STANDARD DRAWING NO. E 802-SCSB-09



/s/ Alfredo B. Hanza 09/20/13  
 DESIGN STANDARDS ENGINEER DATE  
 /s/ Mark A. Miller 09/26/13  
 CHIEF ENGINEER DATE