

6 April 2015

Mr. Daniel P. Farley
Chief, Traffic Signal and Arterial Management Section
Pennsylvania Department of Transportation
Bureau of Maintenance and Operations
400 North Street
Harrisburg, PA 17120

Re: ECMS Agreement E02404
Work Order 16 – Traffic Operations Support
Review of Union Metal Corporation's Recertification of Traffic Signal Support Structures

Dear Mr. Farley:

Baker has completed our review of Union Metal's revised shop drawings (enclosed) for standard traffic signal support structures including mast arms, strain poles and pedestal poles. Baker finds that the shop drawings conform to the following requirements:

- PennDOT Publication 148 - Traffic Standards – Signals, dated December, 2011
- PennDOT Publication 149 - Traffic Signal Design Handbook, dated May, 2013
- PennDOT Publication 408/2011 - Highway Specifications, dated October, 2014

Accordingly, we recommend listing Union Metal as an approved fabricator in Section 1104.02(a) of PennDOT Publication 35 - Approved Construction Materials (Bulletin 15) for the mast arms, strain poles, and pedestal poles in the attached shop drawings.

If you have any questions or require additional information, please contact me at 717-221-2058.

Sincerely,

MICHAEL BAKER JR., INC.



Todd J. Trautz, P.E.
Traffic Project Manager

AMERICAN INDUSTRIAL ACQUISITION CORPORATION

Stamford • New York • London • Paris • Barcelona • Singapore

250 PARK AVENUE
NEW YORK, NEW YORK 10177

For Immediate Release

May 02, 2018

American Industrial Acquisition Corporation (AIAC) has purchased the former assets of Union Metal Corporation in Canton, Ohio. The assets were purchased from PNC Bank National Association in a foreclosure sale. These assets will be held in a new company; Union Metal Industries Corporation (UMIC). This acquisition will further enhance AIAC's capabilities in the worldwide steel and metal fabrication and machining industries.

Leonard Levie Chairman of AIAC, stated; "We are very pleased to welcome Union Metal's highly skilled workforce and its 112-year heritage of producing quality street and lighting poles for customers throughout North America. This acquisition provides AIAC companies and our global customers valuable technical capabilities."

Union Metal Industries will operate from its historic location in Canton, OH.

About Union Metal:

For over a century, Union Metal has been the country's premier light pole manufacturer by engineering, designing, and manufacturing a vast range of standard and custom pole solutions for street lighting, traffic control, signage, and communications. The quality and reliability of our products will help you create the safest, most convenient and enjoyable environments for the public you serve.

Our continual improvements in design, engineering and manufacturing processes have created an innovative and diverse product offering. Our innovation, combined with our extensive experience and expertise, has allowed us to become a leader in the light pole manufacturing industry. In addition to our full range of pole products, Union Metal provides unparalleled support to our customers. From the engineering and technology behind our designs to the custom solutions we provide, our century of experience has taught us the best ways to help you meet your goals.

About AIAC:

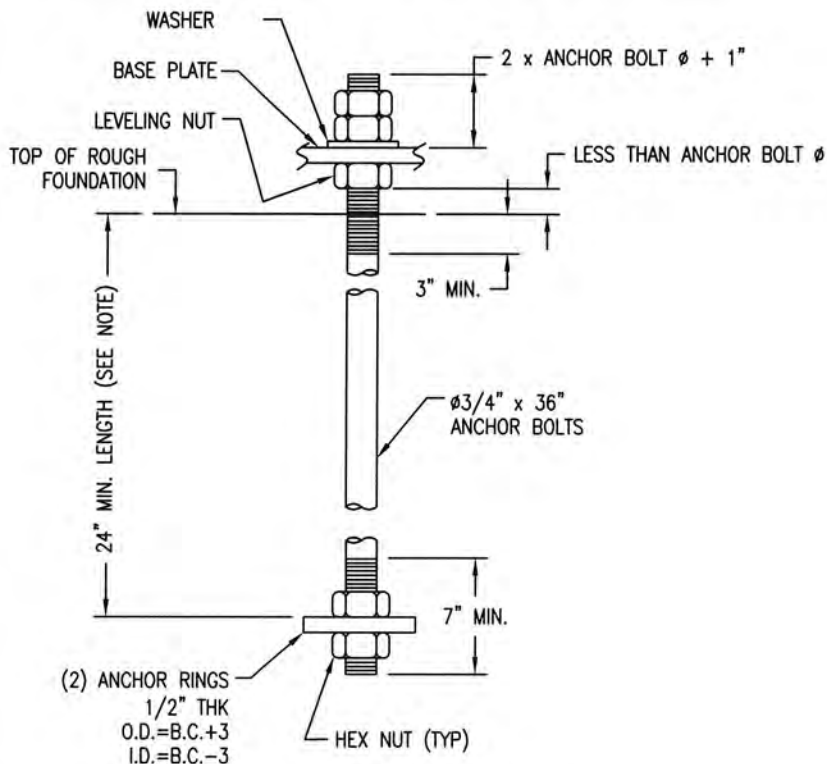
Founded in 1996, AIAC is a closely-held industrial group of 76 manufacturing operations with over 10,500 employees in 24 countries in North America, Europe, Africa, and Asia. Total annual revenues exceed \$1.5 billion. AIAC's companies manufacture precision products and equipment for a wide variety of end markets including automotive, truck, rail, appliance, aerospace, defense, petro-chemical, mining, power generation, refrigeration, packaging, and medical.

Contact:

Union Metal Industries Corporation
1432 Maple Ave. NE
Canton, OH 44705
(330) 456-7653

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QTY	CUSTOMER ITEM NUMBER	OAL HEIGHT	UMC DESIGN NUMBER	AKRON FOUNDRY PART NUMBER	PIPE LENGTH
		2'-0"	50205-A3-Y1	UM4-2-TS1000	0'-10 3/4"
		3'-6"	50205-A3-Y2	UM4-3.5-TS1000	2'-4 3/4"
		7'-0"	50205-A3-Y3	UM4-7-TS1000	5'-10 3/4"
		8'-0"	50205-A3-Y4	UM4-8-TS1000	6'-10 3/4"
		9'-0"	50205-A3-Y5	UM4-9-TS1000	7'-10 3/4"
		10'-0"	50205-A3-Y6	UM4-10-TS1000	8'-10 3/4"
		11'-0"	50205-A3-Y7	UM4-11-TS1000	9'-10 3/4"
		12'-0"	50205-A3-Y8	UM4-12-TS1000	10'-10 3/4"
		13'-0"	50205-A3-Y9	UM4-13-TS1000	11'-10 3/4"
		14'-0"	50205-A3-Y10	UM4-14-TS1000	12'-10 3/4"



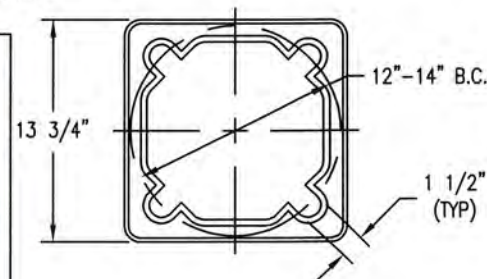
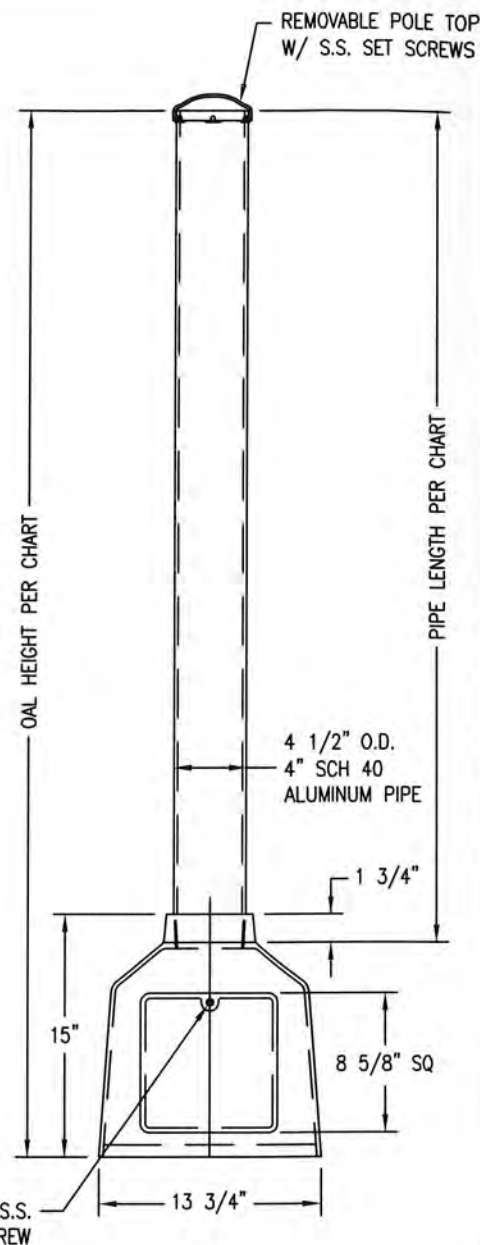
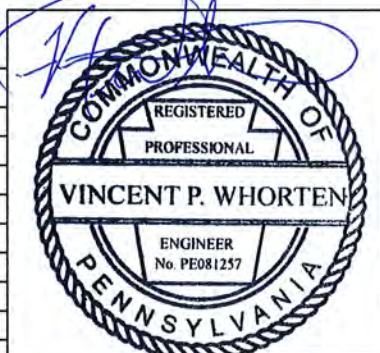
ANCHOR BOLT DETAIL

NOTE:

1) LONGER ANCHOR BOLTS MAY BE REQUIRED TO AVOID CONFLICTS WITH TOP LAYER OF REINFORCEMENT IN FOUNDATION TYPE B.

MATERIAL SPECIFICATIONS

ALUMINUM PIPE	ASTM B241 or B429 (6061-T6)
ANCHOR RING	ASTM A36
PEDESTAL BASE	ASTM B108 (356-T6)
S.S. HARDWARE	AISI 300 SERIES (18-8)
POLE TOP	ASTM B26 (319F)
ANCHOR BOLTS	ASTM F1554 GR 55
ANCHOR BOLT NUTS	ASTM A563 GR A
WASHERS	ASTM F436 (Mechanically Galvanized)
STEEL PLATE	ASTM A36
STRUCTURE FINISH	PER SALES ORDER



STATE: PA	REQ# / SO# :	REV	DESCRIPTION	DATE	REV BY	CHK BY
PROJECT NAME:		REVISIONS				
ALUMINUM POLE WITH PEDESTAL BASE (AKRON FOUNDRY TS-1000 BASE) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION						
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		JMW	JAD	3/9/10	NTS	50205-A2
50205-A3				REVISION	SHEET	
				R5	1 OF 1	

LUMINAIRE ARM DATA					
LUM ARM SPREAD	ARM RISE	NOM MTG HEIGHT			LUMINAIRE TUBE SIZE
		FOR 25'-6" SHAFT	FOR 30'-6" SHAFT	FOR 35'-6" SHAFT	
6'-0"	2'-6"	27'-0"	32'-0"	37'-0"	11EB-3.40x2.38x7'-3" <u>OR</u> 11EV-3.42x2.40x7'-3"
8'-0"	3'-0"	27'-6"	32'-6"	37'-6"	11EB-3.68x2.38x9'-3" <u>OR</u> 11EV-3.70x2.40x9'-3"
10'-0"	4'-0"	28'-6"	33'-6"	38'-6"	11EB-4.00x2.38x11'-6" <u>OR</u> 11EV-4.02x2.40x11'-6"
12'-0"	4'-9"	29'-3"	34'-6"	39'-3"	11EB-4.31x2.38x13'-9" <u>OR</u> 11EV-4.33x2.40x13'-9"
15'-0"	5'-6"	30'-0"	35'-0"	40'-0"	11EB-4.61x2.30x16'-6" <u>OR</u> 11EV-4.71x2.40x16'-6"

DESIGN CRITERIA:

1. STRUCTURES DESIGNED IN ACCORDANCE WITH THE 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" (INCLUDING INTERIM SPECIFICATIONS THROUGH 2006) USING APPENDIX C: ALTERNATE METHOD FOR WIND PRESSURES (80 MPH WIND ZONE) AND COMMONWEALTH OF PENNSYLVANIA D.O.T. PUBLICATIONS: 148 "TRAFFIC STANDARDS – SIGNALS" (DEC. 2011), 149 "TRAFFIC SIGNAL DESIGN HANDBOOK" (MAY 2013) AND 408/2011 "SPECIFICATIONS".
2. ANCHOR BOLTS ANALYZED FOR STEEL STRENGTH ONLY. THE ANCHOR BOLT EMBEDMENT LENGTH SHOWN ON THIS DRAWING SHALL BE VERIFIED BY THE FOUNDATION ENGINEER.
3. THE CLEARANCE BETWEEN THE BOTTOM OF THE LEVELING NUTS AND THE TOP OF THE CONCRETE FOUNDATION SHALL NOT BE GREATER THAN ONE BOLT DIAMETER.
4. ALL MAIN LOAD CARRYING TENSION MEMBERS GREATER THAN 1/2" IN THICKNESS MUST MEET AASHTO ZONE 2, NON FRACTURE CRITICAL MEMBER COMPONENTS CHARPY V-NOTCH (CVN) REQUIREMENTS.
5. THE TENSION DUE TO DEAD LOAD IS ASSUMED NOT TO EXCEED 75% OF THE SPECIFIED DESIGN TENSION; SHOULD THE STRINGING TENSION EXCEED 75% OF THE SPECIFIED DESIGN TENSION, THE STRUCTURE MUST BE CHECKED FOR ADEQUACY.
6. WHEN LUMINAIRE ARMS LONGER THAN 15' ARE SPECIFIED, THE STRUCTURE SHALL BE ANALYZED TO VERIFY ITS CAPACITY.
7. WHEN LUMINAIRE ARMS LONGER THAN 15' ARE SPECIFIED, THE STANDARD FOUNDATIONS SHALL BE ANALYZED TO VERIFY THEIR CAPACITY.
8. ALL WELDING TO CONFORM WITH AWS D1.1-2008.
9. CUSTOMER TO CONFIRM ALL DIMENSIONS & ORIENTATIONS BEFORE RELEASING ORDER FOR MANUFACTURING.

ORDERING NOTE:

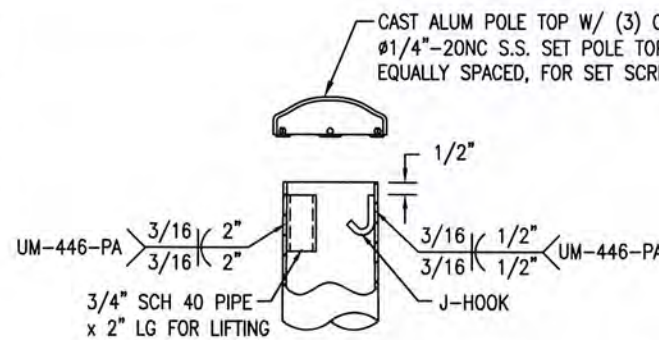
DESIGNS WILL BE FURNISHED AS SHOWN TO SPECIFIED POLE HEIGHT AND LUMINAIRE ARM. IF CUSTOM POLE HEIGHT IS REQUIRED, SHOW DESIGN NO. & LENGTH DESIRED. CUSTOMER TO SPECIFY LUMINAIRE ARM SPREAD AS WELL AS 4" FULL COUPLING HUB ORIENTATION IF SO REQUIRED.

EXAMPLE: 33'-6" POLE AT 7,000 POUND DESIGN TENSION THAT IS GALVANIZED AND INSPECTED WITH A 12' LUMINAIRE ARM SPREAD AND A 4" COUPLING AT 90 DEGREES SHOULD BE ORDERED AS:
50054-B1604-Y67GI-336-12-C-90

STRUCTURE FINISH _____
INSPECTION REQ'D _____
MODIFIED LENGTH (FT-IN) _____

ORIENTATION _____
COUPLING _____
LUMINAIRE ARM SPREAD _____

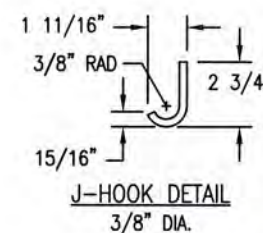
MATERIAL SPECIFICATIONS	
TAPERED STEEL TUBES	ASTM A595 GR A
STEEL PLATE & BAR	ASTM A709 GR36 or A572 GR 50 (See Note 5)
HAND HOLE FRAME	ASTM A572 GR 50 (See Note 5)
J-HOOK	ASTM A36
COUPLINGS	ASTM A53 GR B or A500 GR B
ANCHOR BOLTS	ASTM F1554 GR 55
ANCHOR BOLT NUTS	ASTM A563 GR A
WASHERS	ASTM F436 (Mechanically Galvanized)
POLE TOP	ASTM B26 (356.0F)
LIFTING PIPE	ASTM A53 GR B or A500 GR B or C
S.S. HARDWARE	AISI 300 SERIES
STRUCTURE FINISH	GALVANIZE TO ASTM A123
HARDWARE FINISH	GALVANIZE TO ASTM A153



TOP OF POLE DETAIL
ORIENTATION OF PIPE &
J-HOOK AS REQUIRED

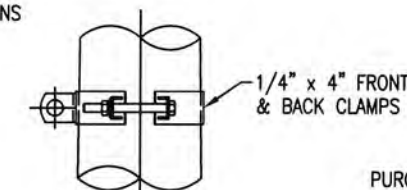
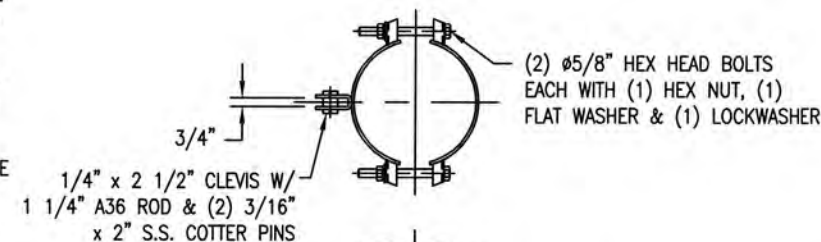
WELD INSPECTION CRITERIA:

1. LONGITUDINAL SEAM WELDS: PROVIDE COMPLETE JOINT PENETRATION WITHIN 6" OF ALL CIRCUMFERENTIALLY WELDED CONNECTIONS (TUBE TO PLATE). PROVIDE COMPLETE JOINT PENETRATION ALONG FEMALE SECTION AT ALL SLIP JOINTS FOR A LENGTH EQUAL TO THE MINIMUM REQUIRED SLIP LENGTH PLUS AN ADDITIONAL 6". COMPLETE JOINT PENETRATION SEAM WELDS SHALL BE RADIOGRAPHICALLY TESTED WHERE THE MATERIAL IS LESS THAN 5/16" THICK WHILE ULTRASONIC METHODS SHALL BE USED FOR MATERIAL 5/16" or GREATER IN THICKNESS. PROVIDE A MINIMUM 60% PENETRATION FOR THE REMAINING LENGTH OF THE TUBE.
2. EACH COMPONENT TUBE OF MULTI-PLY CONSTRUCTION SHALL BE (MT) MAGNETIC PARTICLE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408. THE OUTER PLY OF THE ASSEMBLED MULTI-PLY TUBE MEMBER SHALL BE (MT) MAGNETIC PARTICLE TESTED AFTER PROCESS COMPLETION. THIS METHOD CONSTITUTES A PROGRESSIVE MAGNETIC PARTICLE INSPECTION ACCEPTABLE FOR USE WHERE MEMBER CONSTRUCTION PROHIBITS INSPECTION BY THE (UT) ULTRASONIC METHOD.
3. NON-DESTRUCTIVE TESTING OF CJP WELDS FOR POLE SHAFT TO BASE PLATE SHALL BE (UT) ULTRASONICALLY TESTED EXCEPT WHERE (PMT) PROGRESSIVE MAGNETIC PARTICLE TESTING IS APPROPRIATE (MULTI-PLY MEMBERS ONLY).
4. NON-DESTRUCTIVE TESTING OF CJP WELDS FOR MAST ARMS TO FLANGE PLATE SHALL BE INSPECTED BY THE (UT) ULTRASONIC TESTING PROCESS.
5. FILLET WELDS SHALL BE (MT) MAGNETIC PARTICLE TESTED FOR 30% OF THE TOTAL LENGTH.
6. REFER TO PENNDOT PUBLICATION 408 SECTION 1104.01(b) FOR ADDITIONAL WELD INSPECTION GUIDELINES.

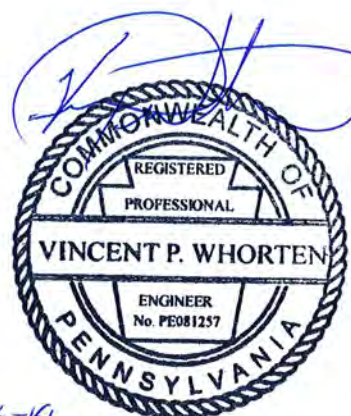
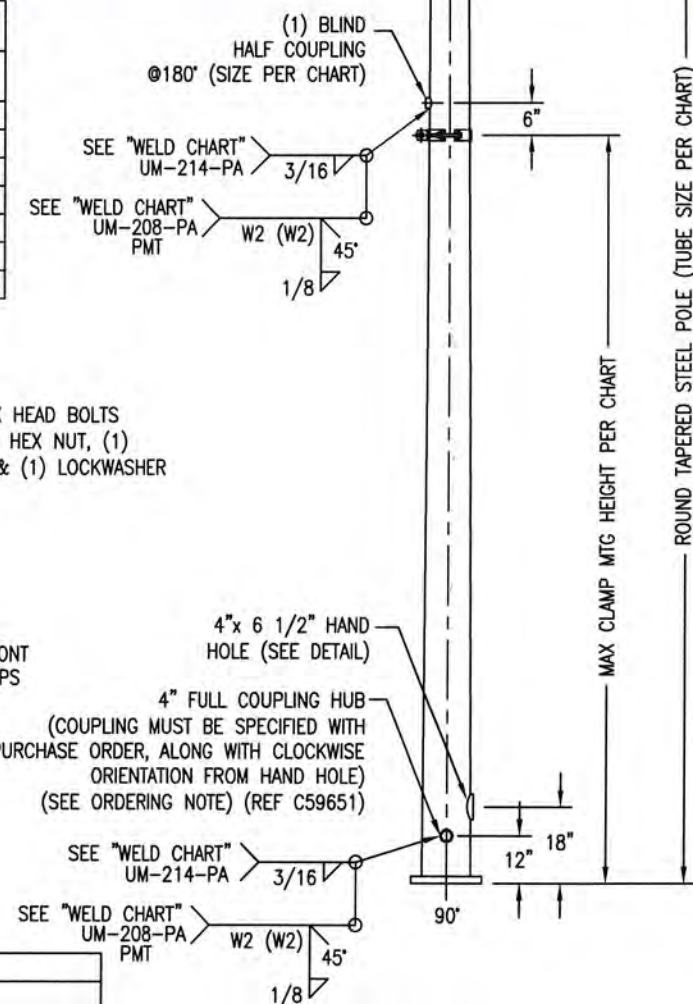


BLIND HALF COUPLING SIZE CHART	
TOP DIAMETER	COUPLING
$d < 7"$	2"
$7" \leq d < 9"$	3"
$d \geq 9"$	4"

COUPLING WELD CHAR	
TUBE GAUGE (t)	W2
7	FILLET
3	FILLET
0	FILLET
7+7	3/16
3+7	1/4
3+3	5/16
0+3	7/16



SPAN WIRE CLAMP
(ORDER AS SEPARATE ITEM)
SEE B82-B104



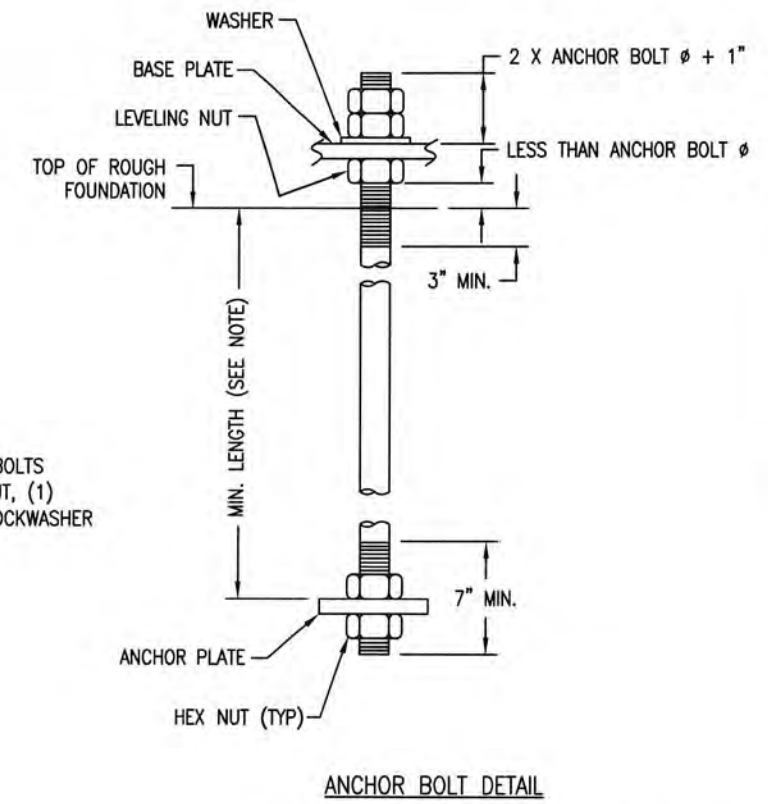
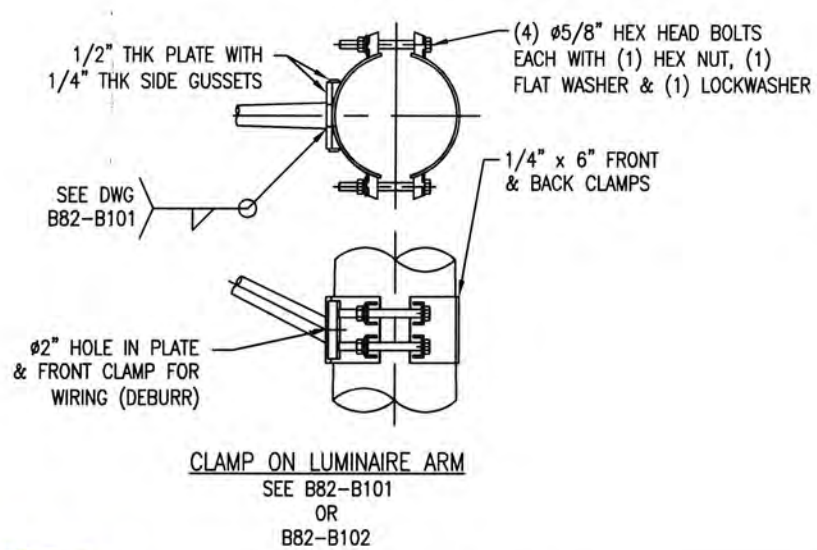
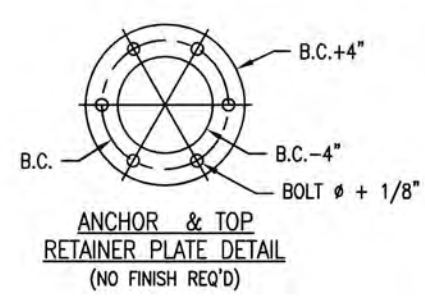
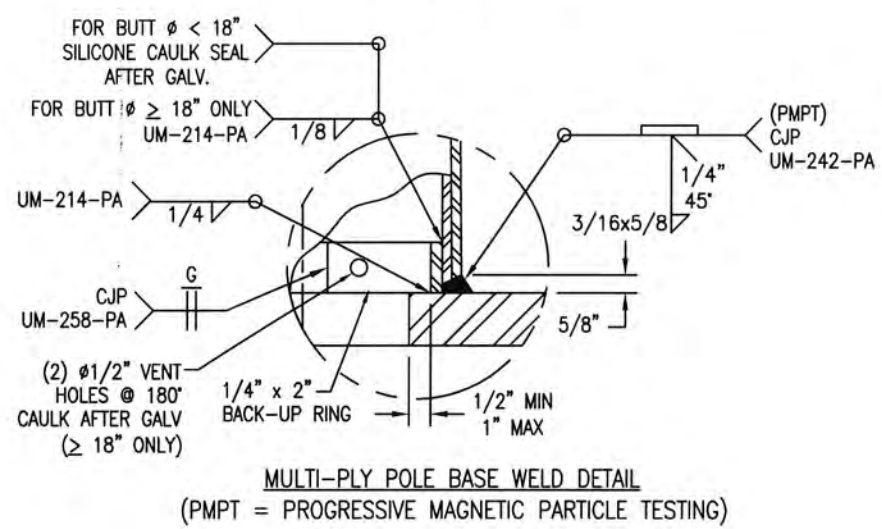
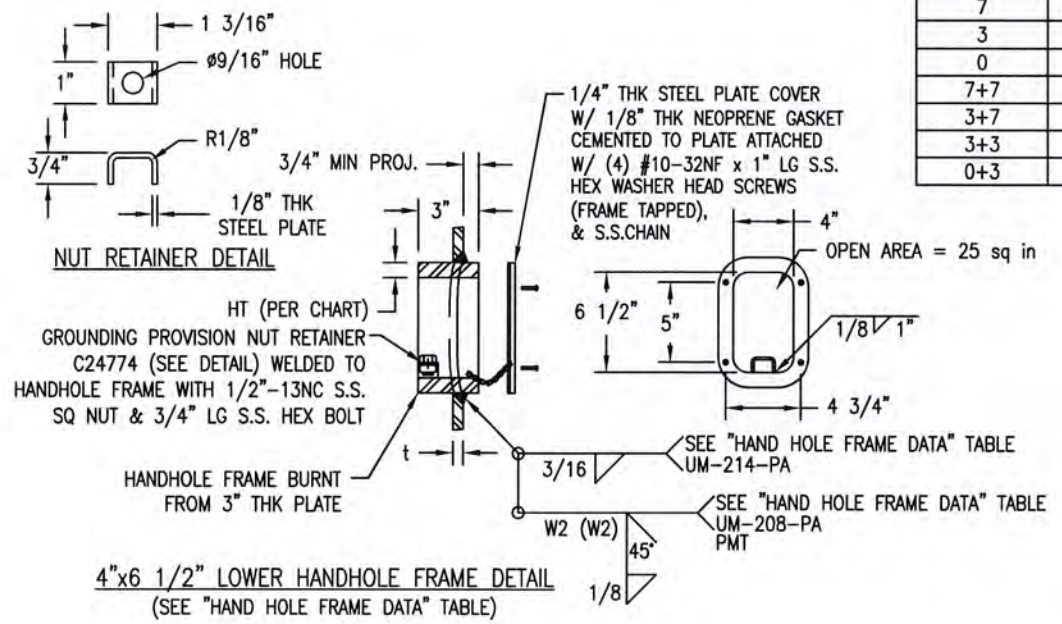
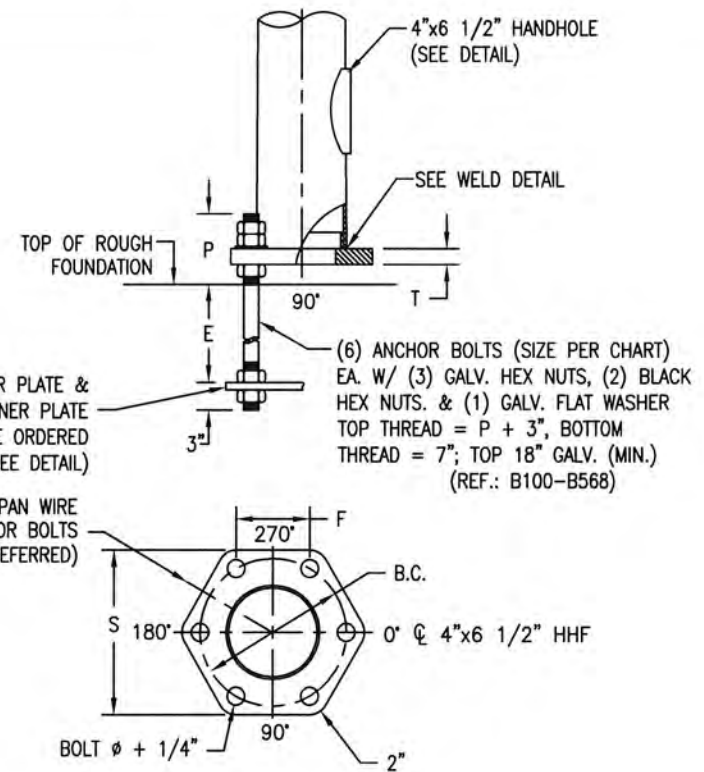
PROJECT INFORMATION		PMT		45°	
PROJECT:				1/8	
COUNTY:					
CITY:					
REQ:					
STATE: PA	REQ# / SO# : 31255-7	REV	DESCRIPTION	DATE	REV BY / CHK BY
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS		REVISIONS			
ROUND TAPERED STEEL STRAIN POLES (W/ LUMINAIRE) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION					
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		DAB	JAD	2/26/14	NTS
		50054-B1604			ENG REF
					50054-B1328
		REVISION			SHEET
		R0			1 OF 3

12-16-14

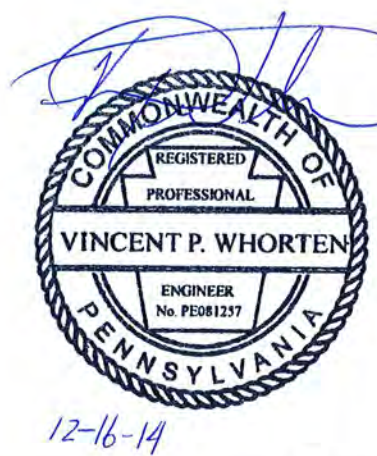
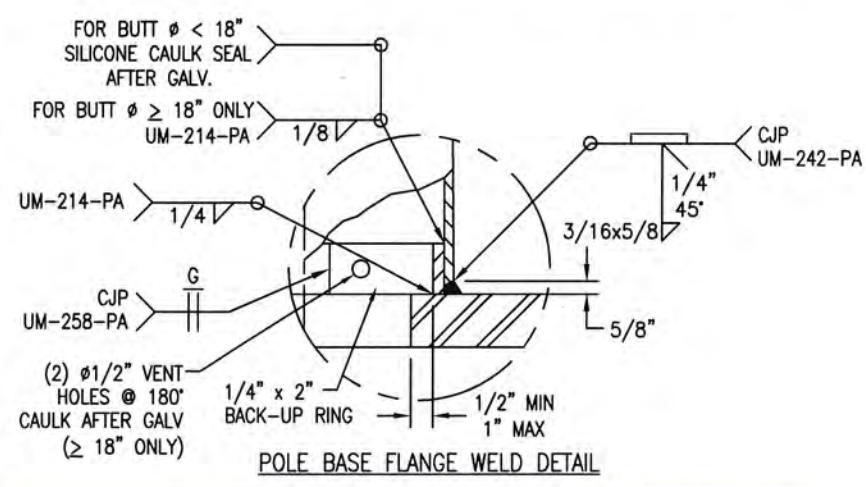
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QTY	STATE NUMBER	UMC DESIGN NUMBER	LUM ARM SPREAD	CLAMP MTG HEIGHT	DESIGN TENSION (lb)	POLE TUBE SIZE	BASE & ANCHOR BOLT DATA						ANCHOR BOLT EMBEDMENT (E) TYPE A & B	MIN. OVERALL ANCHOR BOLT LENGTH
							B.C.	S	F	P	T	ANCHOR BOLT Ø		
		50054-B1604-Y1		19'-0"	1000	7E-8.50x4.93x25'-6"	18	21	9	10	2	1 3/4	35"	48"
		50054-B1604-Y2			2000	7E-10.00x6.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y3			3000	7E-12.00x8.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y4			4000	7E-13.00x9.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y5			5000	3E-12.00x8.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y6			6000	3E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4	45"	60"
		50054-B1604-Y7			7000	0E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y8			8000	(7+7)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y9			9000	(3+7)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y10			10000	(3+7)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y11		21'-0"	1000	7E-8.50x4.93x25'-6"	18	21	9	10	2	1 3/4	35"	48"
		50054-B1604-Y12			2000	7E-10.00x6.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y13			3000	7E-12.00x8.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y14			4000	3E-12.00x8.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y15			5000	3E-13.00x9.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y16			6000	0E-12.50x8.93x25'-6"	18	22 1/2	9	12	2	2 1/4	45"	60"
		50054-B1604-Y17			7000	0E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y18			8000	(7+7)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y19			9000	(3+7)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y20			10000	(3+3)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y21		23'-0"	1000	7E-8.50x4.93x25'-6"	18	21	9	10	2	1 3/4	35"	48"
		50054-B1604-Y22			2000	7E-11.00x7.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y23			3000	7E-13.00x9.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y24			4000	3E-12.00x8.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y25			5000	3E-13.00x9.43x25'-6"	18	21	9	10	2	1 3/4		
		50054-B1604-Y26			6000	0E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4	45"	60"
		50054-B1604-Y27			7000	(7+7)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y28			8000	(3+7)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y29			9000	(3+3)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y30			10000	(3+3)E-13.00x9.43x25'-6"	18	22 1/2	9	12	2	2 1/4		
		50054-B1604-Y31		25'-0"	1000	7E-9.00x4.73x30'-6"	18	22	9	11	2	2	40"	54"
		50054-B1604-Y32			2000	7E-11.00x6.73x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y33			3000	7E-13.00x8.73x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y34			4000	3E-13.00x8.73x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y35			5000	0E-12.50x8.23x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y36			6000	3E-16.00x11.73x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1604-Y37			7000	3E-16.00x11.73x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y38			8000	0E-16.00x11.73x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y39			9000	0E-16.00x11.73x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y40			10000	(7+7)E-15.88x11.61x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y41		27'-0"	1000	7E-9.00x4.73x30'-6"	18	22	9	11	2	2	40"	54"
		50054-B1604-Y42			2000	7E-12.00x7.73x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y43			3000	3E-12.00x7.73x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y44			4000	3E-13.00x8.73x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y45			5000	0E-13.00x8.73x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y46			6000	3E-16.00x11.73x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1604-Y47			7000	0E-15.00x10.73x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y48			8000	0E-16.00x11.73x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y49			9000	(7+7)E-15.88x11.61x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y50			10000	(3+7)E-15.88x11.61x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y51		29'-0"	1000	7E-9.00x4.73x30'-6"	18	22	9	11	2	2	40"	54"
		50054-B1604-Y52			2000	7E-12.00x7.73x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y53			3000	3E-12.00x7.73x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y54			4000	0E-12.50x8.23x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y55			5000	(7+7)E-13.50x9.23x30'-6"	18	22	9	11	2	2		
		50054-B1604-Y56			6000	3E-16.00x11.73x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1604-Y57			7000	0E-16.00x11.73x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y58			8000	(7+7)E-15.88x11.61x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y59			9000	(3+7)E-15.88x11.61x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y60			10000	(3+3)E-15.88x11.61x30'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y61		31'-0"	1000	7E-11.00x6.03x35'-6"	18	22	9	11	2	2	40"	54"
		50054-B1604-Y62			2000	7E-13.00x8.03x35'-6"	18	22	9	11	2	2		
		50054-B1604-Y63			3000	3E-13.00x8.03x35'-6"	18	22	9	11	2	2		
		50054-B1604-Y64			4000	0E-12.50x7.53x35'-6"	18	22	9	11	2	2		
		50054-B1604-Y65			5000	(3+7)E-13.50x8.53x35'-6"	18	22	9	11	2	2		
		50054-B1604-Y66			6000	0E-15.00x10.03x35'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1604-Y67			7000	0E-16.00x11.03x35'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y68			8000	(7+7)E-15.88x10.91x35'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y69			9000	(3+7)E-15.88x10.91x35'-6"	21	25	10 1/2	13 1/2	2 1/2	2 1/2		
		50054-B1604-Y70			10000	(3+3)E-15.88x10.91x35'-6"	21	25	10 1/2	13 1/2	2 1/2	2 1/2		
		50054-B1604-Y71		33'-0"	1000	7E-11.00x6.03x35'-6"	18	22	9	11	2	2	40"	54"
		50054-B1604-Y72			2000	7E-13.00x8.03x35'-6"	18	22	9	11	2	2		
		50054-B1604-Y73			3000	3E-13.00x8.03x35'-6"	18	22	9	11	2	2		
		50054-B1604-Y74			4000	(7+7)E-13.50x8.53x35'-6"	18	22	9	11	2	2		
		50054-B1604-Y75			5000	(3+3)E-13.50x8.53x35'-6"	18	22	9	11	2	2		
		50054-B1604-Y76			6000	0E-16.00x11.03x35'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1604-Y77			7000	(7+7)E-15.88x10.91x35'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y78			8000	(3+7)E-15.88x10.91x35'-6"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1604-Y79			9000	(3+3)E-15.88x10.91x35'-6"	21	25	10 1/2	13 1/2	2 1/2	2 1/2		
		50054-B1604-Y80			10000	(0+3)E-15.88x10.91x35'-6"	21	25	10 1/2	13 1/2	2 1/2	2 1/2		

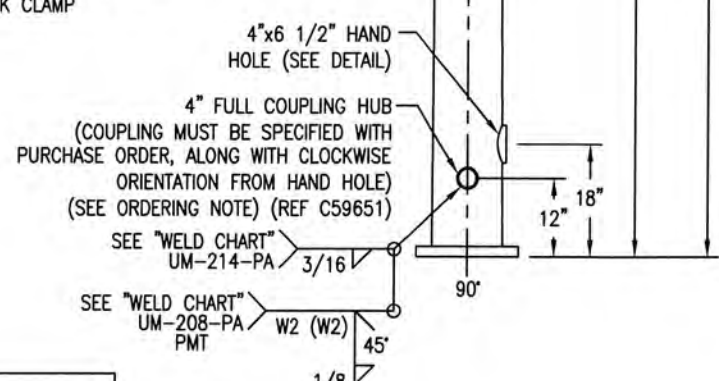
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NOTE:
1) LONGER ANCHOR BOLTS MAY BE REQUIRED TO AVOID CONFLICTS WITH TOP LAYER OF REINFORCEMENT IN FOUNDATION TYPE B.



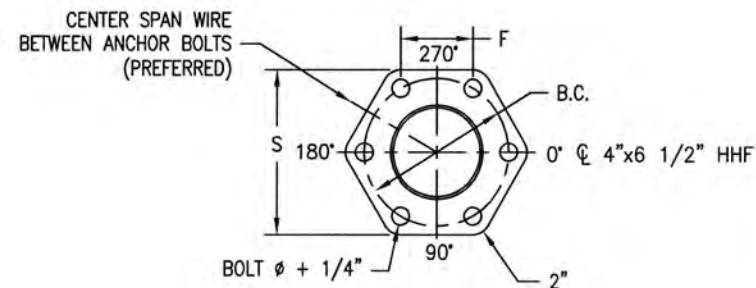
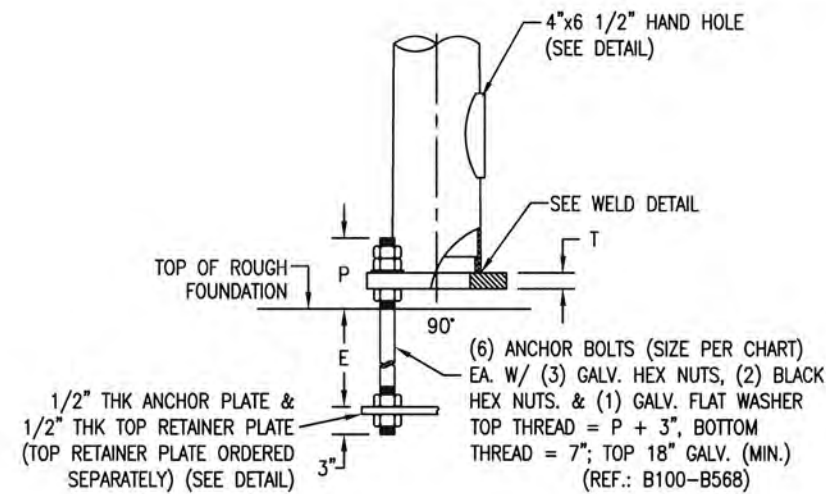
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COUNTY:				
CITY:				
REQ:				
STATE: PA	REQ# / SO# : 31255-7	REV	DESCRIPTION	DATE
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS		REVISIONS		
ROUND TAPERED STEEL STRAIN POLES (W/ LUMINAIRE) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION				
DESIGNED BY	CHECKED BY	DATE	SCALE	ENG REF
DAB	JAD	2/26/14	NTS	50054-B1328
50054-B1604			REVISION	SHEET
			R0	3 OF 3



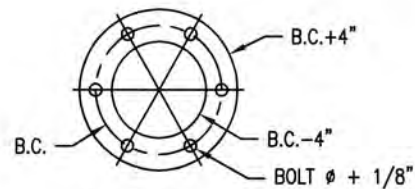
PROJECT INFORMATION		1/8 ✓	
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CITY:			
REQ:			
STATE: PA	REQ# / SO# : 31255-7	REV	DESCRIPTION
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS		DATE	
		REV BY	CHK BY
REVISIONS			
ROUND TAPERED STEEL STRAIN POLES FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION			
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		DATE	SCALE
		DAB	LD
		2/26/14	NTS
		50054-B1605	REVISION
		R0	SHEET
		1 of 3	

A		B		C		D							
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QTY	STATE NUMBER	UMC DESIGN NUMBER	POLE HEIGHT	DESIGN TENSION (lb)	POLE TUBE SIZE	BASE & ANCHOR BOLT DATA (in)						ANCHOR BOLT EMBEDMENT (E) TYPE A & B	MIN. OVERALL ANCHOR BOLT LENGTH
						B.C.	S	F	P	T	ANCHOR BOLT Ø		
		50054-B1605-Y1	20'-0"	1000	7E-8.50x5.70x20'-0"	18	21	9	10	2	1 3/4	35"	48"
		50054-B1605-Y2		2000	7E-10.00x7.20x20'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y3		3000	7E-12.00x9.20x20'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y4		4000	7E-13.00x10.20x20'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y5		5000	3E-12.00x9.20x20'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y6		6000	3E-13.00x10.20x20'-0"	18	22 1/2	9	12	2	2 1/4	45"	60"
		50054-B1605-Y7		7000	0E-13.00x10.20x20'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y8		8000	(7+7)E-13.00x10.20x20'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y9		9000	(3+7)E-13.00x10.20x20'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y10		10000	(3+7)E-13.00x10.20x20'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y11	22'-0"	1000	7E-8.50x5.42x22'-0"	18	21	9	10	2	1 3/4	35"	48"
		50054-B1605-Y12		2000	7E-10.00x6.92x22'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y13		3000	7E-12.00x8.92x22'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y14		4000	3E-12.00x8.92x22'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y15		5000	3E-13.00x9.92x22'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y16		6000	0E-12.50x9.42x22'-0"	18	22 1/2	9	12	2	2 1/4	45"	60"
		50054-B1605-Y17		7000	0E-13.00x9.92x22'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y18		8000	(7+7)E-13.00x9.92x22'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y19		9000	(3+7)E-13.00x9.92x22'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y20		10000	(3+3)E-13.00x9.92x22'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y21	24'-0"	1000	7E-8.50x5.14x24'-0"	18	21	9	10	2	1 3/4	35"	48"
		50054-B1605-Y22		2000	7E-11.00x7.64x24'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y23		3000	7E-13.00x9.64x24'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y24		4000	3E-12.00x8.64x24'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y25		5000	3E-13.00x9.64x24'-0"	18	21	9	10	2	1 3/4		
		50054-B1605-Y26		6000	0E-13.00x9.64x24'-0"	18	22 1/2	9	12	2	2 1/4	45"	60"
		50054-B1605-Y27		7000	(7+7)E-13.00x9.64x24'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y28		8000	(3+7)E-13.00x9.64x24'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y29		9000	(3+3)E-13.00x9.64x24'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y30		10000	(3+3)E-13.00x9.64x24'-0"	18	22 1/2	9	12	2	2 1/4		
		50054-B1605-Y31	26'-0"	1000	7E-9.00x5.36x26'-0"	18	22	9	11	2	2	40"	54"
		50054-B1605-Y32		2000	7E-11.00x7.36x26'-0"	18	22	9	11	2	2		
		50054-B1605-Y33		3000	7E-13.00x9.36x26'-0"	18	22	9	11	2	2		
		50054-B1605-Y34		4000	3E-13.00x9.36x26'-0"	18	22	9	11	2	2		
		50054-B1605-Y35		5000	0E-12.50x8.86x26'-0"	18	22	9	11	2	2		
		50054-B1605-Y36		6000	3E-16.00x12.36x26'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1605-Y37		7000	3E-16.00x12.36x26'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y38		8000	0E-16.00x12.36x26'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y39		9000	0E-16.00x12.36x26'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y40		10000	(7+7)E-15.88x12.24x26'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y41	28'-0"	1000	7E-9.00x5.08x28'-0"	18	22	9	11	2	2	40"	54"
		50054-B1605-Y42		2000	7E-12.00x8.08x28'-0"	18	22	9	11	2	2		
		50054-B1605-Y43		3000	3E-12.00x8.08x28'-0"	18	22	9	11	2	2		
		50054-B1605-Y44		4000	3E-13.00x9.08x28'-0"	18	22	9	11	2	2		
		50054-B1605-Y45		5000	0E-13.00x9.08x28'-0"	18	22	9	11	2	2		
		50054-B1605-Y46		6000	3E-16.00x12.08x28'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1605-Y47		7000	0E-15.00x11.08x28'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y48		8000	0E-16.00x12.08x28'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y49		9000	(7+7)E-15.88x11.96x28'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y50		10000	(3+7)E-15.88x11.96x28'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y51	30'-0"	1000	7E-9.00x4.80x30'-0"	18	22	9	11	2	2	40"	54"
		50054-B1605-Y52		2000	7E-12.00x7.80x30'-0"	18	22	9	11	2	2		
		50054-B1605-Y53		3000	3E-12.00x7.80x30'-0"	18	22	9	11	2	2		
		50054-B1605-Y54		4000	0E-12.50x8.30x30'-0"	18	22	9	11	2	2		
		50054-B1605-Y55		5000	(7+7)E-13.50x9.30x30'-0"	18	22	9	11	2	2		
		50054-B1605-Y56		6000	3E-16.00x11.80x30'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1605-Y57		7000	0E-16.00x11.80x30'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y58		8000	(7+7)E-15.88x11.68x30'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y59		9000	(3+7)E-15.88x11.68x30'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y60		10000	(3+3)E-15.88x11.68x30'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y61	32'-0"	1000	7E-11.00x6.52x32'-0"	18	22	9	11	2	2	40"	54"
		50054-B1605-Y62		2000	7E-13.00x8.52x32'-0"	18	22	9	11	2	2		
		50054-B1605-Y63		3000	3E-13.00x8.52x32'-0"	18	22	9	11	2	2		
		50054-B1605-Y64		4000	0E-12.50x8.02x32'-0"	18	22	9	11	2	2		
		50054-B1605-Y65		5000	(3+7)E-13.50x9.02x32'-0"	18	22	9	11	2	2		
		50054-B1605-Y66		6000	0E-15.00x10.52x32'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1605-Y67		7000	0E-16.00x11.52x32'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y68		8000	(7+7)E-15.88x11.40x32'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y69		9000	(3+7)E-15.88x11.40x32'-0"	21	25	10 1/2	13 1/2	2 1/2	2 1/2		
		50054-B1605-Y70		10000	(3+3)E-15.88x11.40x32'-0"	21	25	10 1/2	13 1/2	2 1/2	2 1/2		
		50054-B1605-Y71	34'-0"	1000	7E-11.00x6.24x34'-0"	18	22	9	11	2	2	40"	54"
		50054-B1605-Y72		2000	7E-13.00x8.24x34'-0"	18	22	9	11	2	2		
		50054-B1605-Y73		3000	3E-13.00x8.24x34'-0"	18	22	9	11	2	2		
		50054-B1605-Y74		4000	(7+7)E-13.50x8.74x34'-0"	18	22	9	11	2	2		
		50054-B1605-Y75		5000	(3+3)E-13.50x8.74x34'-0"	18	22	9	11	2	2		
		50054-B1605-Y76		6000	0E-16.00x11.24x34'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4	45"	60 1/2"
		50054-B1605-Y77		7000	(7+7)E-15.88x11.12x34'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y78		8000	(3+7)E-15.88x11.12x34'-0"	21	25	10 1/2	12 1/2	2 1/2	2 1/4		
		50054-B1605-Y79		9000	(3+3)E-15.88x11.12x34'-0"	21	25	10 1/2	13 1/2	2 1/2	2 1/2		
		50054-B1605-Y80		10000	(0+3)E-15.88x11.12x34'-0"	21	25	10 1/2	13 1/2	2 1/2	2 1/2		

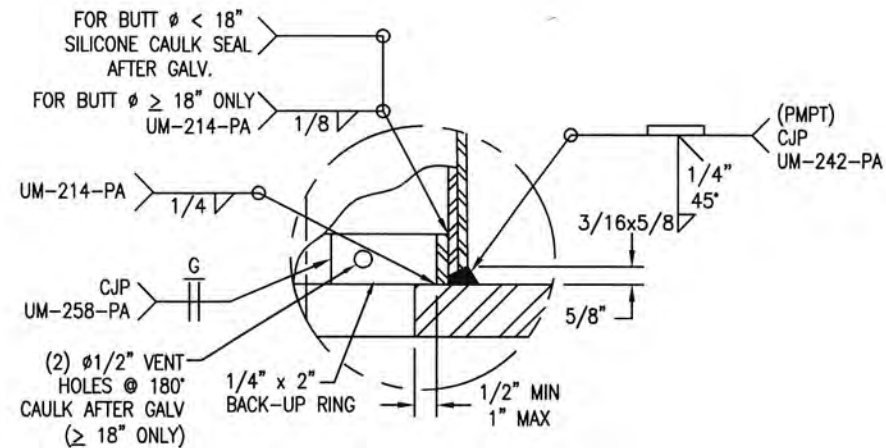
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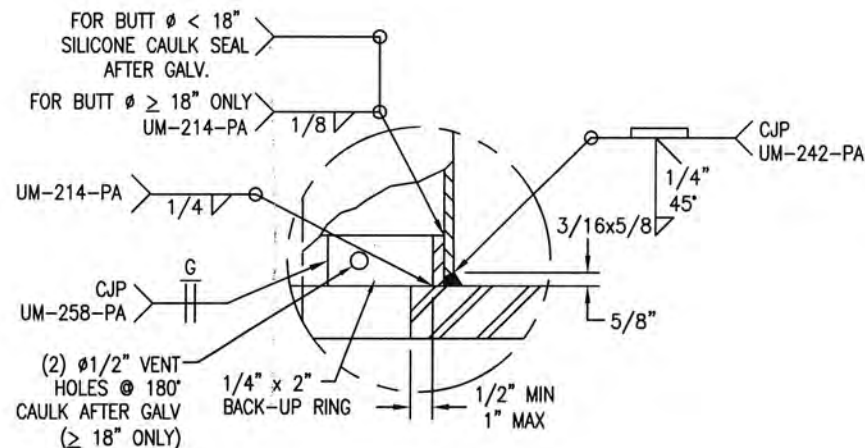
BASE PLATE DETAIL



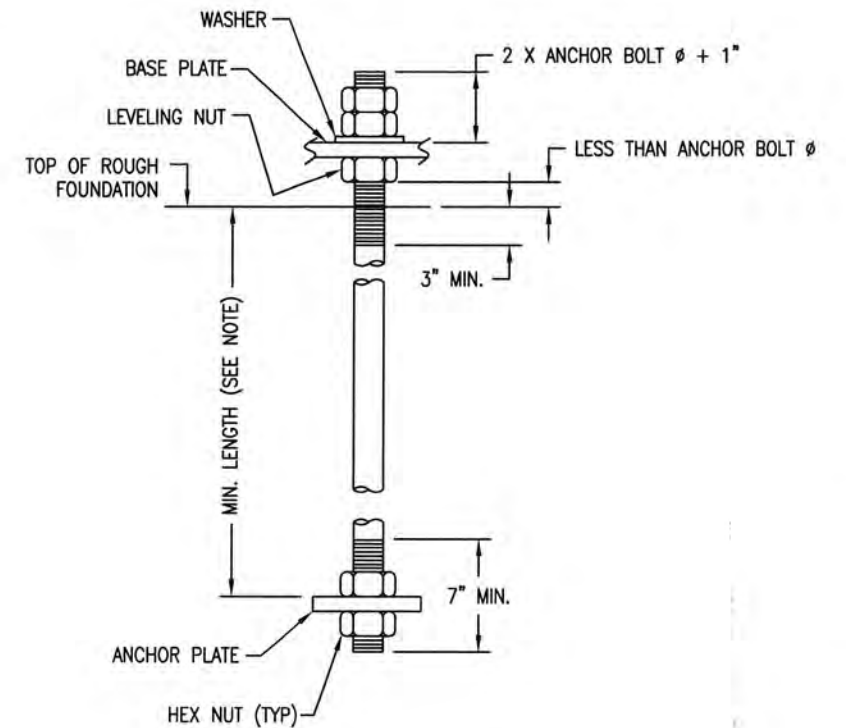
ANCHOR & TOP RETAINER PLATE DETAIL (NO FINISH REQ'D)



MULTI-PLY POLE BASE WELD DETAIL (PMPT = PROGRESSIVE MAGNETIC PARTICLE TESTING)

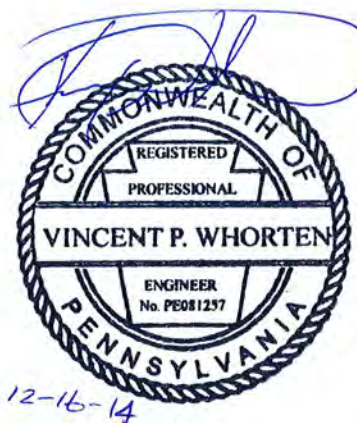


POLE BASE FLANGE WELD DETAIL

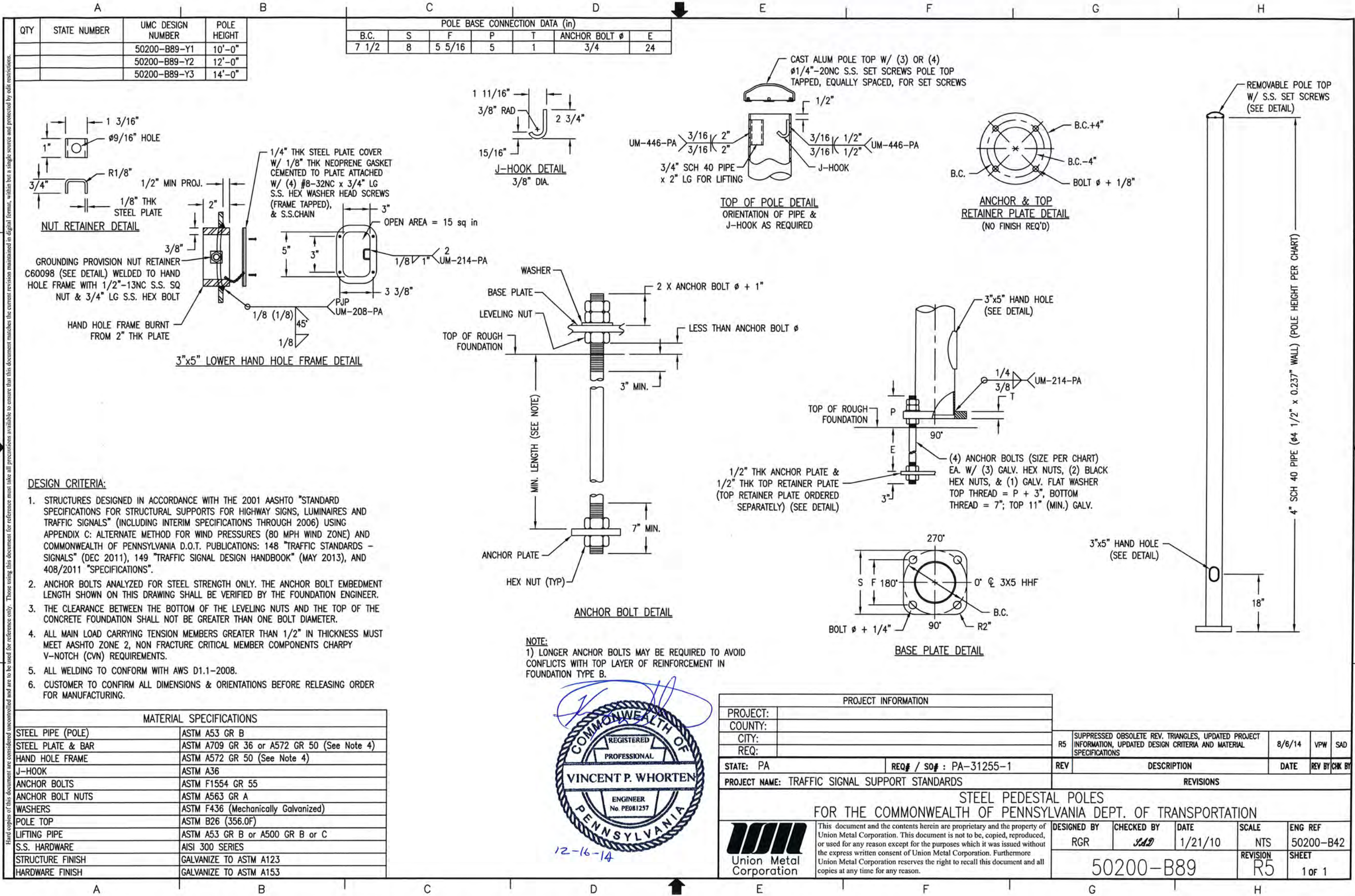


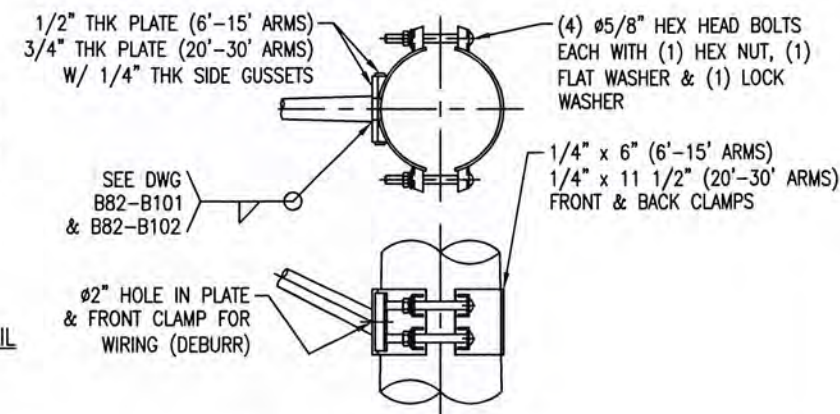
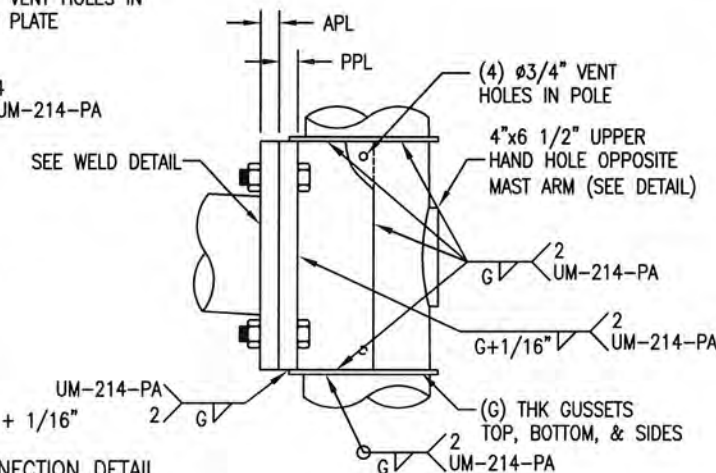
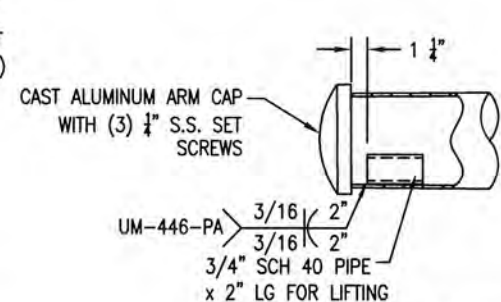
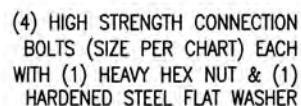
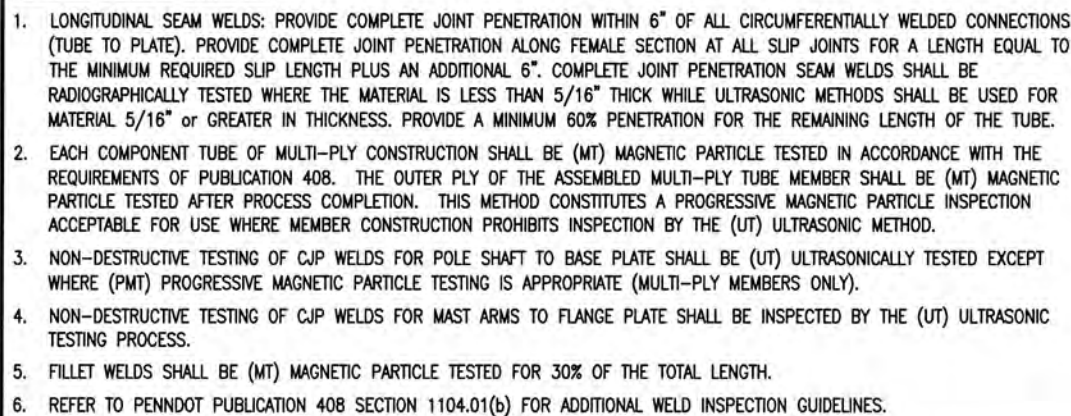
ANCHOR BOLT DETAIL

NOTE:
1) LONGER ANCHOR BOLTS MAY BE REQUIRED TO AVOID CONFLICTS WITH TOP LAYER OF REINFORCEMENT IN FOUNDATION TYPE B.

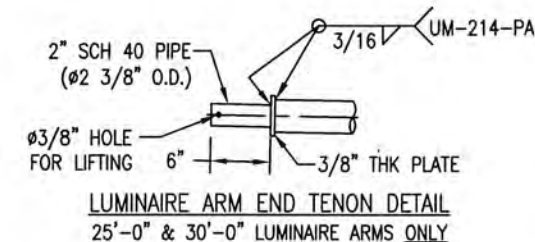


PROJECT INFORMATION				
PROJECT:				
COUNTY:				
CITY:				
REQ:				
STATE: PA	REQ# / SO# : 31255-7	REV	DESCRIPTION	DATE
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS		REVISIONS		
ROUND TAPERED STEEL STRAIN POLES FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION				
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	50054-B1605		SCALE NTS	ENG REF 50054-B1285
		REVISION R0	SHEET 3 OF 3	





CLAMP ON LUMINAIRE ARM
SEE B82-B101 (6'-15' ARMS)
B82-B102 (20'-30' ARMS)



MAST ARM FLANGE CONNECTION DATA (in)										
ARM SIZE	LENGTH	MFG ANGLE	BOLT ϕ	X	Y	W	H	APL	PPL	G
0E-6.50	10'	3	1	11 1/2	6 1/2	15	10	2	2	3/16
0E-7.25	15'	3'	1	12 1/2	7 1/2	16	11	2	2	3/16
0E-8.00	20'	3'	1	14 1/2	8 1/2	18	12	2	2	1/4
0E-8.50	25'	3'	1	14 1/2	8 1/2	18	12	2	2	1/4
0E-9.75	30'	3'	1	15 1/2	9 1/2	19	13	2	2	5/16
0E-11.25	35'	3'	1 1/4	17	11	21	15	2	2	5/16
0E-12.50	40'	3'	1 1/4	18	13	22	17	2	2	5/16
0E-14.00	45'	3'	1 1/4	20	14	24	18	2 1/2	2 1/2	5/16
0E-15.50	50'	3'	1 1/2	22	16	27	21	2 1/2	2 1/2	3/8
0E-16.75	55'	3'	1 1/2	22	17	27	22	2 1/2	2 1/2	3/8
0E-17.65	60'	3'	1 1/2	22	17	27	22	2 1/2	2 1/2	3/8



PROJECT INFORMATION																
PROJECT:																
COUNTY:																
CITY:																
REQ#:																
STATE: PA			REQ# / SO# : PA-51920-1			REV		DESCRIPTION		DATE	REV BY	CHK BY				
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS						REVISIONS										
ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES (W/ LUMINAIRE) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION																
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							DAB		UPW		6/17/14		NTS		50700-B197	
							50400-B495			REVISION		SHEET				
										R0				2 of 3		

ARM SPREAD RANGE

POLE SIZE

B.C.

S

F

P

T

ANCHOR BOLT Ø

>1'-10'	OE-9.50	18	21	9	10	2	1 3/4
>10'-15'	OE-10.50	18	21	9	10	2	1 3/4
>15'-20'	OE-11.50	18	21	9	10	2	1 3/4
>20'-25'	OE-12.00	18	21	9	10	2	1 3/4
>25'-30'	OE-13.50	21	24	10 1/2	10 1/2	2 1/2	1 3/4
>30'-35'	OE-13.50	21	24	10 1/2	10 1/2	2 1/2	1 3/4
>35'-40'	OE-14.50	24	27	12	11 1/2	2 1/2	2
>40'-45'	OE-16.00	24	27	12	11 1/2	2 1/2	2
>45'-50'	OE-17.00	24	27	12	11 1/2	2 1/2	2
>50'-55'	OE-18.50	24	27	12	11 1/2	2 1/2	2
>55'-60'	OE-18.50	24	27	12	11 1/2	2 1/2	2

ANCHOR BOLT EMBEDMENT "E" (TYPE A & B)

MIN. OVERALL ANCHOR BOLT LENGTH

35"	48"
40"	54 1/2"

FOR BUTT Ø < 18"

SILICONE CAULK SEAL AFTER GALV.

FOR BUTT Ø ≥ 18" ONLY

UM-214-PA

1/8"

1/4"

CJP

UM-258-PA

3/16x5/8"

45°

1/4"

5/8"

(2) Ø1/2" VENT HOLES @ 180° CAULK AFTER GALV (≥ 18" ONLY)

1/4" x 2" BACK-UP RING

1/2" MIN 1" MAX

POLE BASE FLANGE WELD DETAIL

WASHER

BASE PLATE

LEVELING NUT

TOP OF ROUGH FOUNDATION

MIN. LENGTH (SEE NOTE)

3" MIN.

7" MIN.

ANCHOR PLATE

HEX NUT (TYP)

ANCHOR BOLT DETAIL

WASHER

BASE PLATE

LEVELING NUT

TOP OF ROUGH FOUNDATION

MIN. LENGTH, L1, L2, OR L3 (SEE NOTE) (AS SHOWN IN ANCHOR BOLT DESIGN CHART)

3" MIN.

BEND Ø

OPTIONAL "J" ANCHOR BOLT DETAIL

NOTE:

1) MUST BE APPROVED BY BUREAU OF MAINTENANCE & OPERATIONS.

2) DUE TO OVERLAPPING 'J' ANCHOR BOLTS, VARY EMBEDMENT BY 6" FOR EACH 2-BOLT PAIR FOR Ø1 1/2" BOLTS & BY 12" FOR EACH 2-BOLT PAIR FOR Ø2" BOLTS. SEE L1, L2, & L3 EMBEDMENT DEPTHS IN ANCHOR BOLT DESIGN CHART.

4"x6 1/2" LOWER HAND HOLE (SEE DETAIL)

SEE WELD DETAIL

TOP OF ROUGH FOUNDATION

90°

1/2" THK ANCHOR PLATE & 1/2" THK TOP RETAINER PLATE (TOP RETAINER PLATE ORDERED SEPARATELY) (SEE DETAIL)

3"

(6) ANCHOR BOLTS (SIZE PER CHART) EA. W/ (3) GALV. HEX NUTS, (2) BLACK HEX NUTS, & (1) GALV. FLAT WASHER TOP THREAD = P + 3", BOTTOM THREAD = 7"; TOP 15" (MIN.) GALV.

270°

F

B.C.

MAST ARM 180°

0°

4"x6 1/2" HHF

90°

R2"

BOLT Ø + 1/4"

BASE PLATE DETAIL

B.C.+4"

B.C.-4"

BOLT Ø + 1/8"

ANCHOR & TOP RETAINER PLATE DETAIL (NO FINISH REQ'D)

PROJECT INFORMATION

PROJECT:

COUNTY:

CITY:

REQ:

STATE: PA

REQ# / SO# : PA-51920-1

REV

DESCRIPTION

DATE

REV BY

CHK BY

PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS

REVISIONS

ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES (W/ LUMINAIRE) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION

DESIGNED BY

CHECKED BY

DATE

SCALE

ENG REF

50400-B495

REVISION

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SHEET

3 OF 3

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COMMONWEALTH OF PENNSYLVANIA

REGISTERED PROFESSIONAL

VINCENT P. WHORTEN

ENGINEER

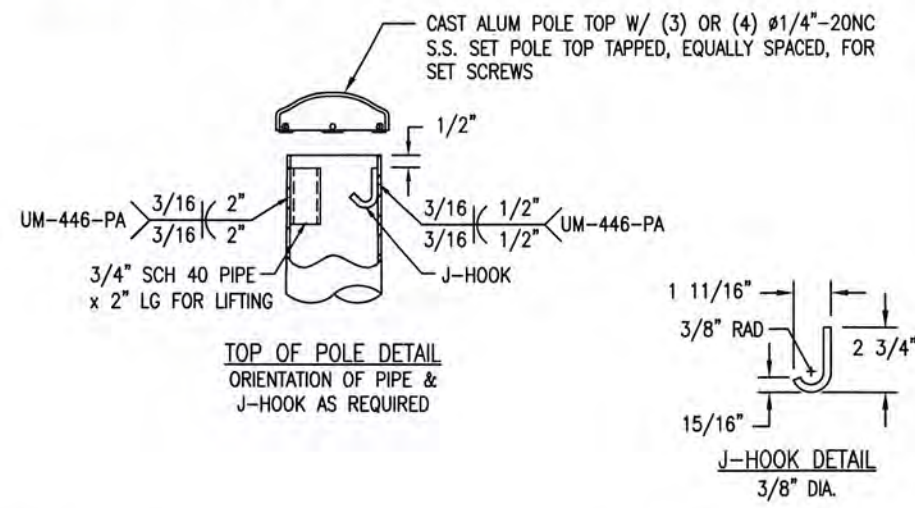
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12-16-14

A			B		C		D		E											Y MAX (ft)
QTY	STATE NUMBER	UMC DESIGN NUMBER	BASIC ARM SPREAD	POLE TUBE SIZE	ARM TUBE SIZE	ARM SPREAD RANGE	SLIP JOINT LENGTH	REQUIRED MAST ARM SPREAD	SIGNALS					SIGNS						
									M	N	O	P	Q	R	S	T	U	V	Y	
		50400-B496-Y1	10'-0"	0E-9.50x6.42x22'-0"	0E-6.50x5.10x10'-0"	UP TO 10'-0"	-		W 70	-	-	-	123	-	-	-	-	39	87	5.2
		50400-B496-Y2	15'-0"	0E-10.50x7.42x22'-0"	0E-7.25x5.15x15'-0"	11'-0"- 15'-0"	-		A 8.76	-	-	-	8.82	-	-	-	-	7.48	10.5	
		50400-B496-Y3	20'-0"	0E-11.50x8.42x22'-0"	0E-8.00x5.20x20'-0"	16'-0"- 20'-0"	-		W 70	-	-	-	123	39	-	-	-	39	106	6.6
		50400-B496-Y4	25'-0"	0E-12.00x8.92x22'-0"	0E-8.50x5.00x25'-0"	21'-0"- 25'-0"	-		A 8.76	-	-	-	8.82	7.48	-	-	-	7.48	21.3	
		50400-B496-Y5	30'-0"	0E-13.50x10.42x22'-0"	0E-9.75x5.55x30'-0"	26'-0"- 30'-0"	-		W 97	70	-	-	123	39	39	-	-	39	106	8.5
		50400-B496-Y6	35'-0"	0E-13.50x10.42x22'-0"	0E-11.25x6.35x35'-0"	31'-0"- 35'-0"	-		A 13.89	8.76	-	-	8.82	7.48	7.48	-	-	7.48	21.3	
		50400-B496-Y7	40'-0"	0E-14.50x11.42x22'-0"	0E-12.50x6.90x40'-0"	36'-0"- 40'-0"	-		W 97	70	97	-	123	39	39	-	-	39	106	10.8
		50400-B496-Y8	45'-0"	0E-14.50x11.42x22'-0"	0E-12.50x6.90x40'-0"	36'-0"- 40'-0"	-		A 13.89	8.76	13.89	-	8.82	7.48	7.48	-	-	7.48	21.3	
		50400-B496-Y9	50'-0"	0E-15.50x13.47x14'-6"	0E-14.33x9.05x37'-9"	41'-0"- 45'-0"	2'-0"		W 97	70	97	-	123	39	39	39	-	39	106	15.7
		50400-B496-Y10	55'-0"	0E-16.75x13.46x23'-6"	0E-15.50x13.47x14'-6"	46'-0"- 50'-0"	2'-3"		A 13.89	8.76	13.89	-	8.82	7.48	7.48	7.48	-	7.48	21.3	
		50400-B496-Y11	60'-0"	0E-17.65x13.45x30'-0"	0E-16.75x13.46x23'-6"	51'-0"- 55'-0"	2'-3"		W 97	70	70	97	123	39	39	-	39	39	106	17.7
		50400-B496-Y12	65'-0"	0E-18.50x15.42x22'-0"	0E-17.65x13.45x30'-0"	56'-0"- 60'-0"	2'-3"		A 13.89	8.76	8.76	13.89	8.82	7.48	7.48	-	7.48	7.48	21.3	
		50400-B496-Y13	70'-0"	0E-19.50x17.42x22'-0"	0E-18.50x15.42x22'-0"	61'-0"- 65'-0"	2'-3"		W 97	70	70	97	123	39	39	-	39	39	106	27.9
		50400-B496-Y14	75'-0"	0E-20.50x19.42x22'-0"	0E-19.50x17.42x22'-0"	66'-0"- 70'-0"	2'-3"		A 13.89	8.76	8.76	13.89	8.82	7.48	7.48	-	7.48	7.48	21.3	

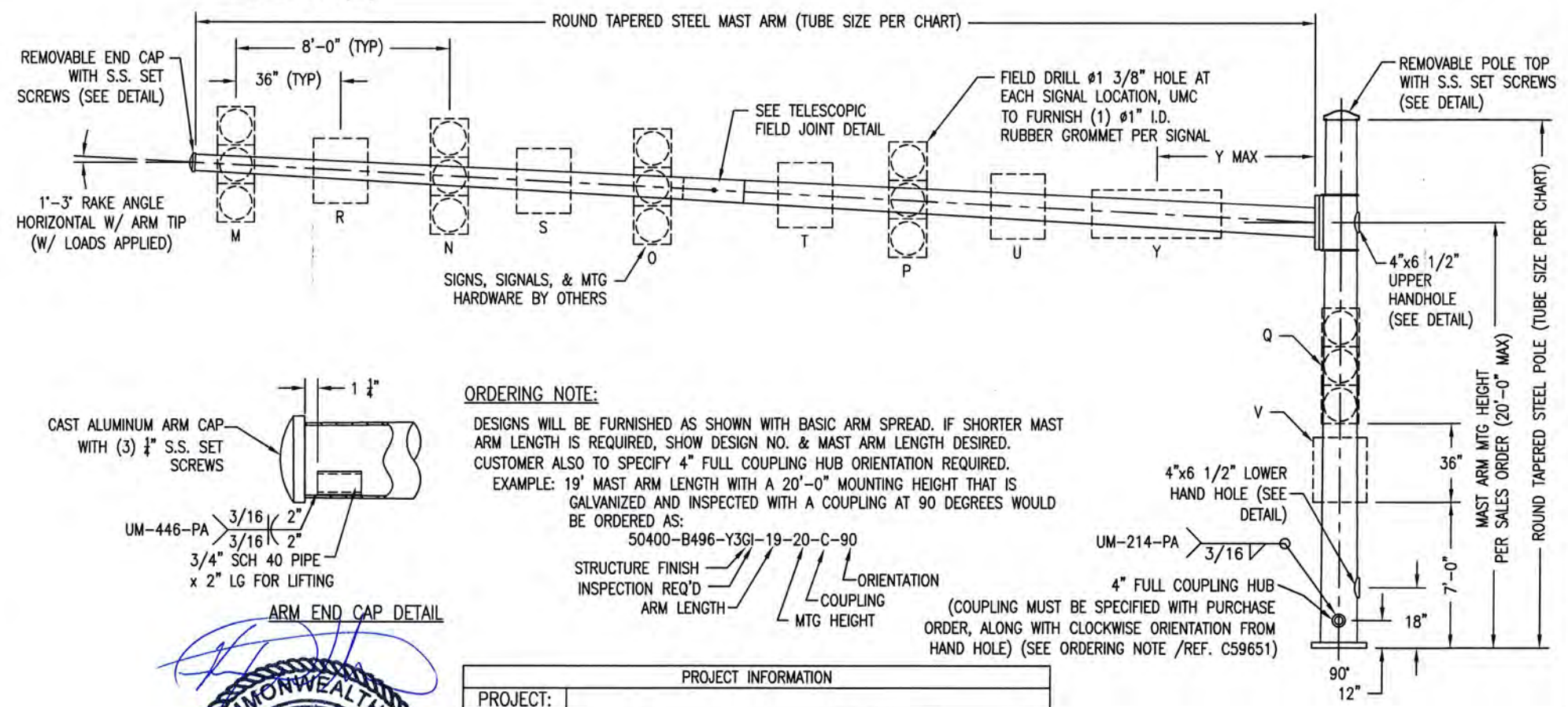
W = WEIGHT (lb)
A = AREA (sq ft)

3 GA = 0.250" WALL THICKNESS
0 GA = 0.313" WALL THICKNESS
E = ROUND STEEL TUBE TAPERED @ 0.14 in/ft



DESIGN CRITERIA:

- STRUCTURES DESIGNED IN ACCORDANCE WITH THE 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" (INCLUDING INTERIM SPECIFICATIONS THROUGH 2006) USING APPENDIX C: ALTERNATE METHOD FOR WIND PRESSURES (80 MPH WIND ZONE) AND COMMONWEALTH OF PENNSYLVANIA D.O.T. PUBLICATIONS: 148 "TRAFFIC SIGNALS - SIGNALS" (DEC 2011), 149 "TRAFFIC SIGNAL DESIGN HANDBOOK" (MAY 2013), AND 408/2011 "SPECIFICATIONS".
- ANCHOR BOLTS ANALYZED FOR STEEL STRENGTH ONLY. THE ANCHOR BOLT EMBEDMENT LENGTH SHOWN ON THIS DRAWING SHALL BE VERIFIED BY THE FOUNDATION ENGINEER.
- THE CLEARANCE BETWEEN THE BOTTOM OF THE LEVELING NUTS AND THE TOP OF THE CONCRETE FOUNDATION SHALL NOT BE GREATER THAN ONE BOLT DIAMETER.
- PER AASHTO THE MINIMUM LENGTH OF ANY TELESCOPIC FIELD JOINT SHALL BE 1.5 TIMES THE INSIDE DIAMETER OF THE END OF THE FEMALE SECTION. A THROUGH BOLT MUST BE PROVIDED FOR A POSITIVE CONNECTION FOR ALL TELESCOPIC FIELD JOINTS PER PUBLICATION 149.
- VIBRATION IS MORE LIKELY TO OCCUR WHEN STRUCTURES ARE INSTALLED WITHOUT ATTACHING THE SIGNALS AND OR SIGNS. THEREFORE, THE INTENDED EQUIPMENT OR DAMPENING DEVICES MUST BE INSTALLED AT THE TIME OF ERECTION. BECAUSE VIBRATION IS GENERALLY UNPREDICTABLE, A MAINTENANCE PROGRAM SHOULD INCLUDE INSPECTION FOR INDICATIONS OF EXCESSIVE VIBRATION OR FATIGUE AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING.
- ALL MAIN LOAD CARRYING TENSION MEMBERS GREATER THAN 1/2" IN THICKNESS MUST MEET AASHTO ZONE 2, NON FRACTURE CRITICAL MEMBER COMPONENTS CHARNY V-NOTCH (CVN) REQUIREMENTS.
- ALL WELDING TO CONFORM WITH AWS D1.1 - 2008.
- CUSTOMER TO CONFIRM ALL DIMENSIONS & ORIENTATIONS BEFORE RELEASING ORDER FOR MANUFACTURING.



ORDERING NOTE:

DESIGNS WILL BE FURNISHED AS SHOWN WITH BASIC ARM SPREAD. IF SHORTER MAST ARM LENGTH IS REQUIRED, SHOW DESIGN NO. & MAST ARM LENGTH DESIRED. CUSTOMER ALSO TO SPECIFY 4" FULL COUPLING HUB ORIENTATION REQUIRED. EXAMPLE: 19' MAST ARM LENGTH WITH A 20'-0" MOUNTING HEIGHT THAT IS GALVANIZED AND INSPECTED WITH A COUPLING AT 90 DEGREES WOULD BE ORDERED AS:
50400-B496-Y3GI-19-20-C-90
STRUCTURE FINISH INSPECTION REQ'D ARM LENGTH COUPLING MTG HEIGHT ORIENTATION (COUPLING MUST BE SPECIFIED WITH PURCHASE ORDER, ALONG WITH CLOCKWISE ORIENTATION FROM HAND HOLE) (SEE ORDERING NOTE /REF. C59651)

MATERIAL SPECIFICATIONS	
TAPERED STEEL TUBES	ASTM A595 GR A
STEEL PLATE & BAR	ASTM A709 GR36 or A572 GR 50 (See Note 7)
HAND HOLE FRAME	ASTM A572 GR 50 (See Note 7)
J-HOOK	ASTM A36
ANCHOR BOLTS	ASTM F1554 GR 55
ANCHOR BOLT NUTS	ASTM A563 GR A
WASHERS	ASTM F436 (Mechanically Galvanized)
HIGH STRENGTH BOLTS	ASTM A325 TYPE I (Mechanically Galvanized)
HEAVY HEX NUTS	ASTM A563 GR DH or A194 GR 2H (Mechanically Galvanized)
ARM JOINT STUD	ASTM A36 or A572 GR 50
ARM JOINT LOCK NUT	ASTM A194 GR 2H (Anco type or equivalent)
POLE TOP / ARM END CAP	ASTM B26 (356.0F)
LIFTING PIPE / TENON PIPE	ASTM A53 GR B or A500 GR B or C
COUPLING	ASTM A53 GR B or A500 GR B
S.S. HARDWARE	AISI 300 SERIES
STRUCTURE FINISH	GALVANIZE TO ASTM A123
HARDWARE FINISH	GALVANIZE TO ASTM A153



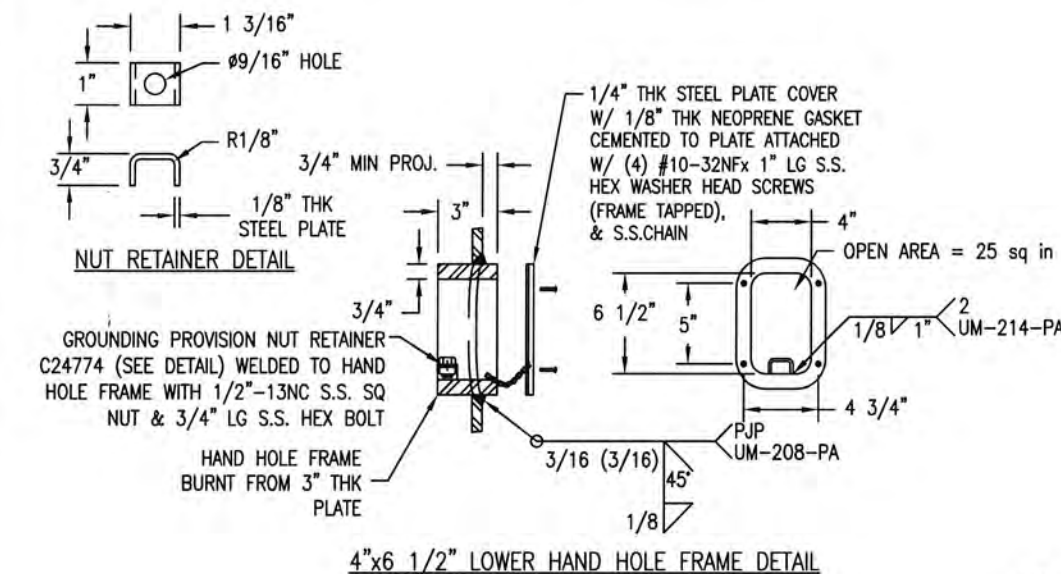
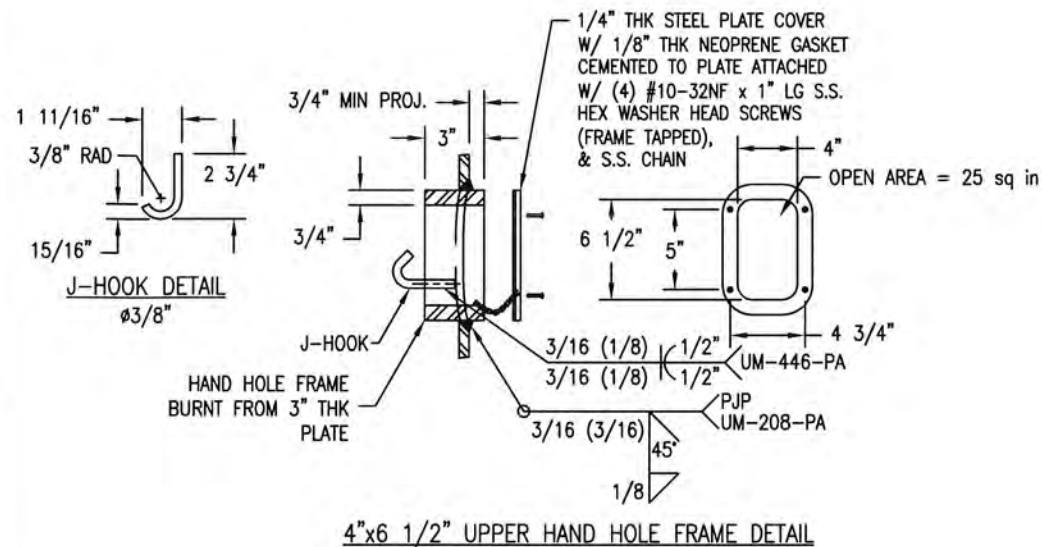
PROJECT INFORMATION	
PROJECT:	
COUNTY:	
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REQ:	
STATE: PA	REQ# / SO#: PA-51920-1
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS	
REVISIONS	
DESIGNED BY	CHECKED BY
DAB	UPW
DATE	6/18/14
SCALE	NTS
ENG REF	50700-B198
REVISION	RO
SHEET	1 of 3

50400-B496



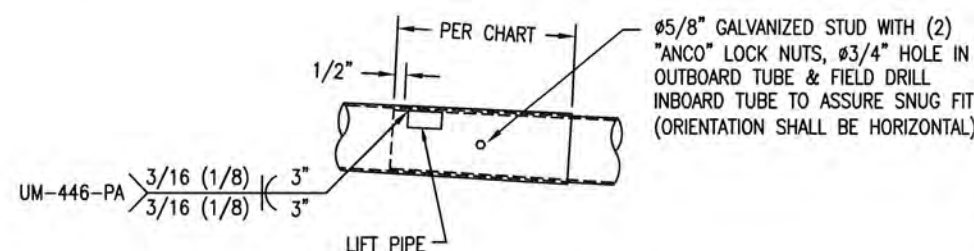
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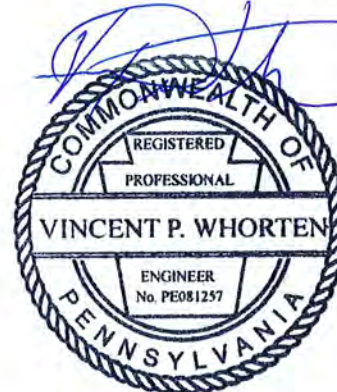


WELD INSPECTION CRITERIA:

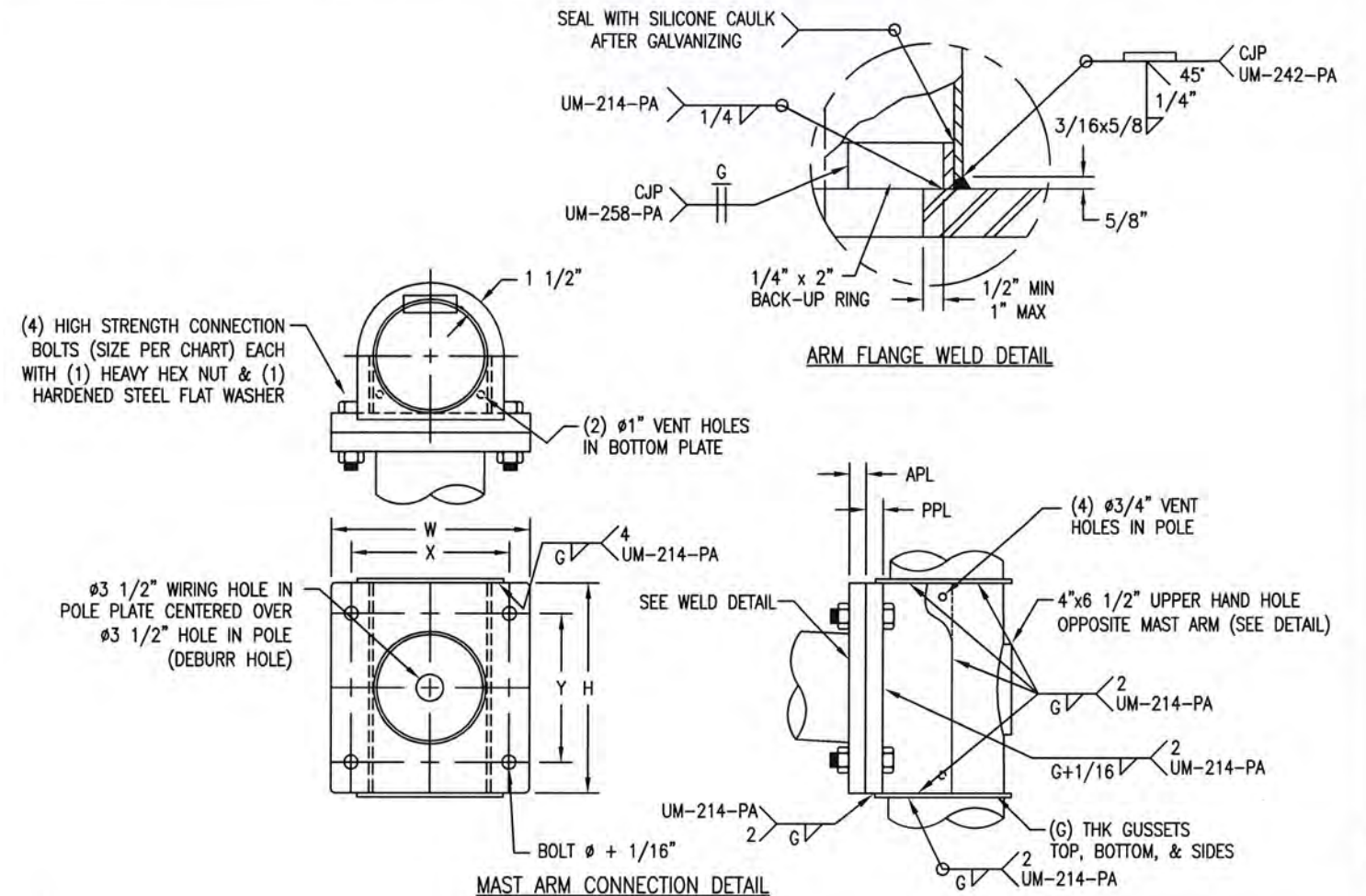
1. LONGITUDINAL SEAM WELDS: PROVIDE COMPLETE JOINT PENETRATION WITHIN 6" OF ALL CIRCUMFERENTIALLY WELDED CONNECTIONS (TUBE TO PLATE). PROVIDE COMPLETE JOINT PENETRATION ALONG FEMALE SECTION AT ALL SLIP JOINTS FOR A LENGTH EQUAL TO THE MINIMUM REQUIRED SLIP LENGTH PLUS AN ADDITIONAL 6". COMPLETE JOINT PENETRATION SEAM WELDS SHALL BE RADIOGRAPHICALLY TESTED WHERE THE MATERIAL IS LESS THAN 5/16" THICK WHILE ULTRASONIC METHODS SHALL BE USED FOR MATERIAL 5/16" OR GREATER IN THICKNESS. PROVIDE A MINIMUM 60% PENETRATION FOR THE REMAINING LENGTH OF THE TUBE.
2. EACH COMPONENT TUBE OF MULTI-PLY CONSTRUCTION SHALL BE (MT) MAGNETIC PARTICLE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408. THE OUTER PLY OF THE ASSEMBLED MULTI-PLY TUBE MEMBER SHALL BE (MT) MAGNETIC PARTICLE TESTED AFTER PROCESS COMPLETION. THIS METHOD CONSTITUTES A PROGRESSIVE MAGNETIC PARTICLE INSPECTION ACCEPTABLE FOR USE WHERE MEMBER CONSTRUCTION PROHIBITS INSPECTION BY THE (UT) ULTRASONIC METHOD.
3. NON-DESTRUCTIVE TESTING OF CJP WELDS FOR POLE SHAFT TO BASE PLATE SHALL BE (UT) ULTRASONICALLY TESTED EXCEPT WHERE (PMT) PROGRESSIVE MAGNETIC PARTICLE TESTING IS APPROPRIATE (MULTI-PLY MEMBERS ONLY).
4. NON-DESTRUCTIVE TESTING OF CJP WELDS FOR MAST ARMS TO FLANGE PLATE SHALL BE INSPECTED BY THE (UT) ULTRASONIC TESTING PROCESS.
5. FILLET WELDS SHALL BE (MT) MAGNETIC PARTICLE TESTED FOR 30% OF THE TOTAL LENGTH.
6. REFER TO PENNDOT PUBLICATION 408 SECTION 1104.01(b) FOR ADDITIONAL WELD INSPECTION GUIDELINES.



TELESCOPIC FIELD JOINT DETAIL
(FOR ARMS OVER 40'-0")



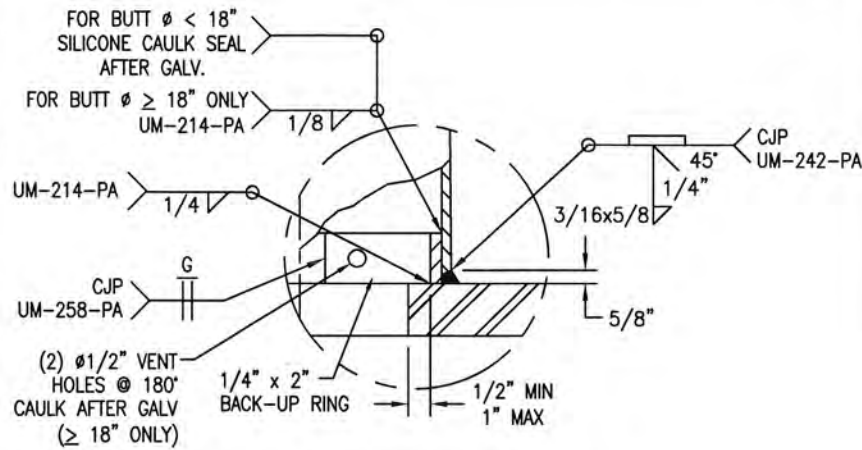
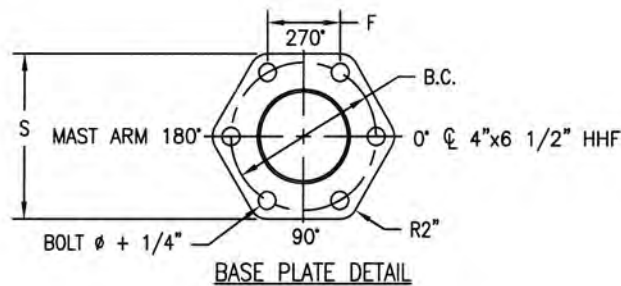
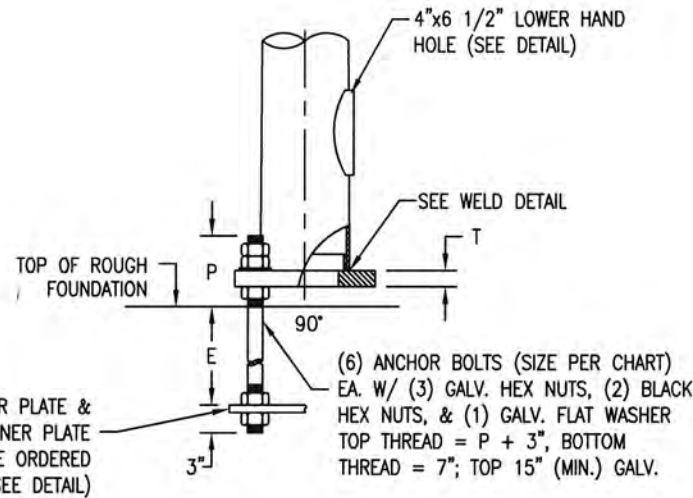
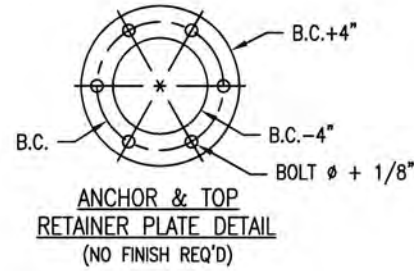
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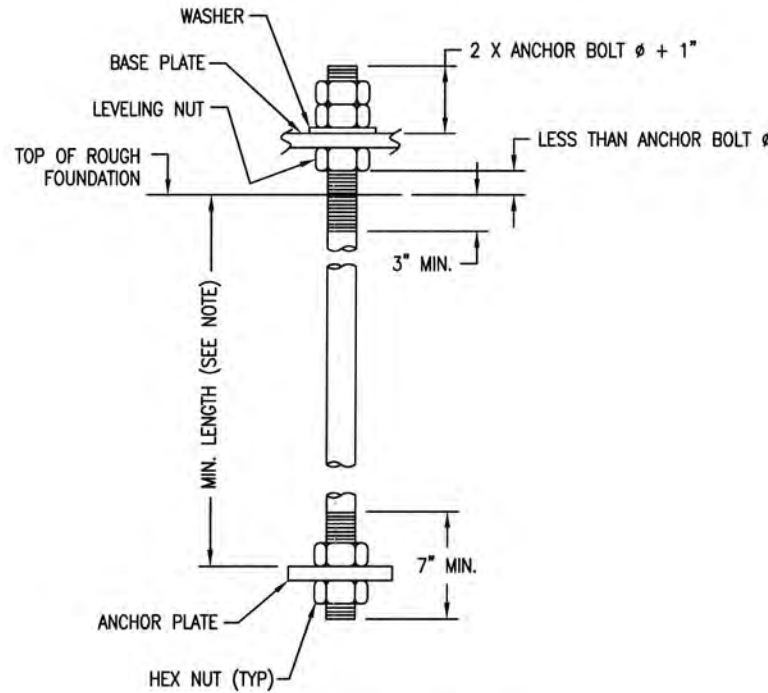
MAST ARM FLANGE CONNECTION DATA (in)										
ARM SIZE	LENGTH	MFG ANGLE	BOLT ø	X	Y	W	H	APL	PPL	G
OE-6.50	10'	3°	1	11 1/2	6 1/2	15	10	2	2	3/16
OE-7.25	15'	3°	1	12 1/2	7 1/2	16	11	2	2	3/16
OE-8.00	20'	3°	1	14 1/2	8 1/2	18	12	2	2	1/4
OE-8.50	25'	3°	1	14 1/2	8 1/2	18	12	2	2	1/4
OE-9.75	30'	3°	1	15 1/2	9 1/2	19	13	2	2	5/16
OE-11.25	35'	3°	1 1/4	17	11	21	15	2	2	5/16
OE-12.50	40'	3°	1 1/4	18	13	22	17	2	2	5/16
OE-14.00	45'	3°	1 1/4	20	14	24	18	2 1/2	2 1/2	5/16
OE-15.50	50'	3°	1 1/2	22	16	27	21	2 1/2	2 1/2	3/8
OE-16.75	55'	3°	1 1/2	22	17	27	22	2 1/2	2 1/2	3/8
OE-17.65	60'	3°	1 1/2	22	17	27	22	2 1/2	2 1/2	3/8

PROJECT INFORMATION																						
PROJECT:																						
COUNTY:																						
CITY:																						
REQ:																						
STATE: PA	REQ# / SO# : PA-51920-1	REV	DESCRIPTION					DATE	REV BY	CHK BY												
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS																						
REVISIONS																						
ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION																						
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								DAB	USP	6/18/14												
50400-B496								SCALE	ENG REF													
								NTS	50700-B198													
								REVISION	SHEET													
								R0	2 OF 3													

ARM SPREAD RANGE	POLE BASE CONNECTION DATA (in)							ANCHOR BOLT EMBEDMENT "E" (TYPE A & B)	MIN. OVERALL ANCHOR BOLT LENGTH
	POLE SIZE	B.C.	S	F	P	T	ANCHOR BOLT ϕ		
>1'-10'	0E-9.50	18	21	9	10	2	1 3/4	35"	48"
>10'-15'	0E-10.50	18	21	9	10	2	1 3/4		
>15'-20'	0E-11.50	18	21	9	10	2	1 3/4		
>20'-25'	0E-12.00	18	21	9	10	2	1 3/4		
>25'-30'	0E-13.50	21	24	10 1/2	10 1/2	2 1/2	1 3/4		
>30'-35'	0E-13.50	21	24	10 1/2	10 1/2	2 1/2	1 3/4	40"	48 1/2"
>35'-40'	0E-14.50	24	27	12	11 1/2	2 1/2	2		
>40'-45'	0E-16.00	24	27	12	11 1/2	2 1/2	2		
>45'-50'	0E-17.00	24	27	12	11 1/2	2 1/2	2		
>50'-55'	0E-18.50	24	27	12	11 1/2	2 1/2	2		
>55'-60'	0E-18.50	24	27	12	11 1/2	2 1/2	2		

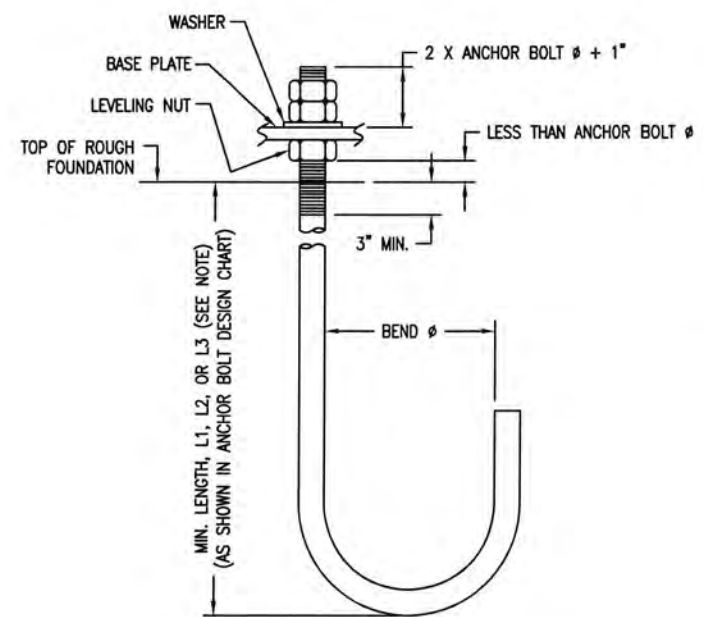


POLE BASE FLANGE WELD DETAIL



NOTE:
1) LONGER ANCHOR BOLTS MAY BE REQUIRED TO AVOID CONFLICTS WITH TOP LAYER OF REINFORCEMENT IN FOUNDATION TYPE B.

OPTIONAL "J" ANCHOR BOLT DESIGN (in)									
MAST ARM LENGTH	QTY	BOLT ϕ	BEND ϕ	L1	L2	L3	BC	HOLE	
>1'-10'	6	1 3/4	17 1/2	42	48	54	18	2	
>10'-15'	6	1 3/4	17 1/2	42	48	54	18	2	
>15'-20'	6	1 3/4	17 1/2	42	48	54	18	2	
>20'-25'	6	1 3/4	17 1/2	42	48	54	18	2	
>25'-30'	6	1 3/4	17 1/2	42	48	54	21	2	
>30'-35'	6	1 3/4	17 1/2	42	48	54	21	2	
>35'-40'	6	2	22	48	60	72	24	2 1/4	
>40'-45'	6	2	22	48	60	72	24	2 1/4	
>45'-50'	6	2	22	48	60	72	24	2 1/4	
>50'-55'	6	2	22	48	60	72	24	2 1/4	
>55'-60'	6	2	22	48	60	72	24	2 1/4	



NOTE:
1) MUST BE APPROVED BY BUREAU OF MAINTENANCE & OPERATIONS.
2) DUE TO OVERLAPPING 'J' ANCHOR BOLTS, VARY EMBEDMENT BY 6" FOR EACH 2-BOLT PAIR FOR #1 3/4" BOLTS & BY 12" FOR EACH 2-BOLT PAIR FOR #2" BOLTS. SEE L1, L2, & L3 EMBEDMENT DEPTHS IN ANCHOR BOLT DESIGN CHART.



PROJECT INFORMATION			
PROJECT:			
COUNTY:			
CITY:			
REQ:			
STATE: PA	REQ# / SO#: PA-51920-1	REV	
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS		DESCRIPTION	
		DATE	REV BY/CHK BY
REVISIONS			
ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION			
DESIGNED BY	CHECKED BY	DATE	SCALE
DAB	UPW	6/18/14	NTS
50400-B496		REVISION	ENG REF
		R0	50700-B198
			SHEET
			3 OF 3

4

3

2

1

A			B		C			D			E					F					Y MAX (ft)		
QTY	STATE NUMBER	UMC DESIGN NUMBER	BASIC ARM SPREAD	POLE TUBE SIZE	ARM TUBE SIZE	ARM SPREAD RANGE	SLIP JOINT LENGTH	REQUIRED ARM SPREAD	REQUIRED LUM ARM SPREAD	MAST ARM ORIENT	SIGNALS					SIGNS							
											M	N	O	P	Q	R	S	T	U	V		Y	
		50400-B497-Y1	10'-0"	0E-10.00x x'-"	0E-6.50x5.10x10'-0"	UP TO 10'-0"	-				W	70	-	-	-	123	-	-	-	-	39	87	5.2
			10'-0"		0E-6.50x5.10x10'-0"	UP TO 10'-0"	-					W	70	-	-	-	123	-	-	-	-	7.48	
		50400-B497-Y2	15'-0"	0E-11.00x x'-"	0E-7.25x5.15x15'-0"	11'-0"- 15'-0"	-				W	70	-	-	-	123	39	-	-	-	39	106	6.6
			15'-0"		0E-7.25x5.15x15'-0"	11'-0"- 15'-0"	-					W	70	-	-	-	123	39	-	-	-	39	
		50400-B497-Y3	20'-0"	0E-12.50x x'-"	0E-8.00x5.20x20'-0"	16'-0"- 20'-0"	-				W	97	70	-	-	123	39	-	-	-	39	106	6.6
			20'-0"		0E-8.00x5.20x20'-0"	16'-0"- 20'-0"	-					W	97	70	-	-	123	39	-	-	-	39	
		50400-B497-Y4	25'-0"	0E-12.50x x'-"	0E-8.50x5.00x25'-0"	21'-0"- 25'-0"	-				W	97	70	-	-	123	39	39	-	-	39	106	8.5
			25'-0"		0E-8.50x5.00x25'-0"	21'-0"- 25'-0"	-					W	97	70	-	-	123	39	39	-	-	39	
		50400-B497-Y5	30'-0"	0E-13.50x x'-"	0E-9.75x5.55x30'-0"	26'-0"- 30'-0"	-				W	97	70	97	-	123	39	39	-	-	39	106	8.5
			30'-0"		0E-9.75x5.55x30'-0"	26'-0"- 30'-0"	-					W	97	70	97	-	123	39	39	-	-	39	
		50400-B497-Y6	35'-0"	0E-14.50x x'-"	0E-11.25x6.35x35'-0"	31'-0"- 35'-0"	-				W	97	70	97	-	123	39	39	39	-	39	106	10.8
			35'-0"		0E-11.25x6.35x35'-0"	31'-0"- 35'-0"	-					W	97	70	97	-	123	39	39	39	-	39	
		50400-B497-Y7	40'-0"	0E-16.00x x'-"	0E-12.50x6.90x40'-0"	36'-0"- 40'-0"	-				W	97	70	97	-	123	39	39	39	-	39	106	15.7
			40'-0"		0E-12.50x6.90x40'-0"	36'-0"- 40'-0"	-					W	97	70	97	-	123	39	39	39	-	39	
		50400-B497-Y8	45'-0"	0E-17.00x x'-"	0E-14.00x11.17x20'-3" 3E-11.99x8.25x26'-9"	41'-0"- 45'-0"	2'-0"				W	97	70	97	-	123	39	39	39	-	39	106	20.7
			45'-0"		0E-14.00x11.17x20'-3" 3E-11.99x8.25x26'-9"	41'-0"- 45'-0"	2'-0"					W	97	70	97	-	123	39	39	39	-	39	
		50400-B497-Y9	50'-0"	0E-18.50x x'-"	0E-15.50x13.47x14'-6" 3E-14.33x9.05x37'-9"	46'-0"- 50'-0"	2'-3"				W	97	70	70	97	123	39	39	-	39	39	106	17.7
			50'-0"		0E-15.50x13.47x14'-6" 3E-14.33x9.05x37'-9"	46'-0"- 50'-0"	2'-3"					W	97	70	70	97	123	39	39	-	39	39	
		50400-B497-Y10	55'-0"	(3+7)E-18.72x x'-"	0E-16.75x13.46x23'-6" 3E-14.32x9.60x33'-9"	51'-0"- 55'-0"	2'-3"				W	97	70	70	97	123	39	39	-	39	39	106	27.9
			55'-0"		0E-16.75x13.46x23'-6" 3E-14.32x9.60x33'-9"	51'-0"- 55'-0"	2'-3"					W	97	70	70	97	123	39	39	-	39	39	
		50400-B497-Y11	60'-0"	(3+7)E-18.72x x'-"	0E-17.65x13.45x30'-0" 3E-14.31x9.80x32'-3"	55'-0"- 60'-0"	2'-3"				W	97	70	70	97	123	39	39	-	39	39	106	27.9
			60'-0"		0E-17.65x13.45x30'-0" 3E-14.31x9.80x32'-3"	55'-0"- 60'-0"	2'-3"					W	97	70	70	97	123	39	39	-	39	39	

11 GA = 0.120" WALL THICKNESS
3 GA = 0.250" WALL THICKNESS
0 GA = 0.313" WALL THICKNESS
3+7 GA = 0.429" WALL THICKNESS
E = ROUND STEEL TUBE TAPERED @ 0.14 in/ft

SEE LUMINAIRE ARM CHART FOR TUBE LENGTH

W = WEIGHT (lb)
A = AREA (sq ft)

MATERIAL SPECIFICATIONS	
TAPERED STEEL TUBES	ASTM A595 GR A
STEEL PLATE & BAR	ASTM A709 GR 36 or A572 GR 50 (See Note 7)
HAND HOLE FRAME	ASTM A572 GR 50 (See Note 7)
J-HOOK	ASTM A36
ANCHOR BOLTS	ASTM F1554 GR 55
ANCHOR BOLT NUTS	ASTM A563 GR A
WASHERS	ASTM F436 (Mechanically Galvanized)
HIGH STRENGTH BOLTS	ASTM A325 TYPE I (Mechanically Galvanized)
HEAVY HEX NUTS	ASTM A563 GR DH or A194 GR 2H (Mechanically Galvanized)
ARM JOINT STUD	ASTM A36 or A572 GR 50
ARM JOINT LOCK NUT	ASTM A194 GR 2H (Anco type or equivalent)
POLE TOP / ARM END CAP	ASTM B26 (356.0F)
LIFTING PIPE / TENON PIPE	ASTM A53 GR B or A500 GR B or C
COUPLING	ASTM A53 GR B or A500 GR B
S.S. HARDWARE	AISI 300 SERIES
STRUCTURE FINISH	GALVANIZE TO ASTM A123
HARDWARE FINISH	GALVANIZE TO ASTM A153



PROJECT INFORMATION	
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STATE: PA	REQ# / SO# : PA-51920-1	REV	DESCRIPTION	DATE	REV BY/CHK BY
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS		REVISIONS			
ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES (DUAL MAST ARMS W/ LUMINAIRE) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION					
DESIGNED BY	CHECKED BY	DATE	SCALE	ENG REF	
DAB	UPW	6/19/14	NTS	50700-B199	
50400-B497			REVISION	SHEET	
			R0	1 of 4	

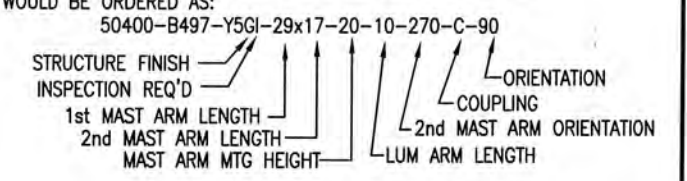
DESIGN CRITERIA:

- STRUCTURES DESIGNED IN ACCORDANCE WITH THE 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRE AND TRAFFIC SIGNALS" (INCLUDING INTERIM SPECIFICATIONS THROUGH 2006) USING APPENDIX C: ALTERNATE METHOD FOR WIND PRESSURES (80 MPH WIND ZONE) AND COMMONWEALTH OF PENNSYLVANIA D.O.T. PUBLICATIONS: 148 "TRAFFIC STANDARDS - SIGNALS" (DEC 2011), 149 "TRAFFIC SIGNAL DESIGN HANDBOOK" (MAY 2013), AND 408/2011 "SPECIFICATIONS".
- ANCHOR BOLTS ANALYZED FOR STEEL STRENGTH ONLY. THE ANCHOR BOLT EMBEDMENT LENGTH SHOWN ON THIS DRAWING SHALL BE VERIFIED BY THE FOUNDATION ENGINEER.
- THE CLEARANCE BETWEEN THE BOTTOM OF THE LEVELING NUTS AND THE TOP OF THE CONCRETE FOUNDATION SHALL NOT BE GREATER THAN ONE BOLT DIAMETER.
- PER AASHTO THE MINIMUM LENGTH OF ANY TELESCOPIC FIELD JOINT SHALL BE 1.5 TIMES THE INSIDE DIAMETER OF THE END OF THE FEMALE SECTION. A THROUGH BOLT MUST BE PROVIDED FOR A POSITIVE CONNECTION FOR ALL TELESCOPIC FIELD JOINTS PER PUBLICATION 149.
- VIBRATION IS MORE LIKELY TO OCCUR WHEN STRUCTURES ARE INSTALLED WITHOUT ATTACHING THE SIGNALS AND OR SIGNS. THEREFORE, THE INTENDED EQUIPMENT OR DAMPENING DEVICES MUST BE INSTALLED AT THE TIME OF ERECTION. BECAUSE VIBRATION IS GENERALLY UNPREDICTABLE, A MAINTENANCE PROGRAM SHOULD INCLUDE INSPECTION FOR INDICATIONS OF EXCESSIVE VIBRATION OR FATIGUE AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING.
- ALL MAIN LOAD CARRYING TENSION MEMBERS GREATER THAN 1/2" IN THICKNESS MUST MEET AASHTO ZONE 2, NON FRACTURE CRITICAL MEMBER COMPONENTS CHARPY V-NOTCH (CVN) REQUIREMENTS.
- ALL WELDING TO CONFORM WITH AWS D1.1 - 2008.
- CUSTOMER TO CONFIRM ALL DIMENSIONS & ORIENTATIONS BEFORE RELEASING ORDER FOR MANUFACTURING.

ORDERING NOTE:

DESIGNS WILL BE FURNISHED AS SHOWN WITH BASIC ARM SPREAD. IF SHORTER MAST ARM LENGTH IS REQUIRED, SHOW DESIGN NO. & MAST ARM LENGTH DESIRED. CUSTOMER ALSO TO SPECIFY LUMINAIRE ARM SPREAD & 4" FULL COUPLING HUB ORIENTATION REQUIRED.

EXAMPLE: 29' 1st MAST ARM LENGTH, 17' 2nd MAST ARM LENGTH AT 270° ORIENTATION, 20' MOUNTING HEIGHT AND A 10' LUMINAIRE ARM THAT IS GALVANIZED AND INSPECTED WITH A COUPLING AT 90 DEGREES WOULD BE ORDERED AS:



LUMINAIRE ARM DATA				
SPREAD	RISE	NOMINAL ANGLE	POLE LENGTH	LUMINAIRE TUBE SIZE
6'-0"	2'-6"	30°	28'-6"	11EB-3.40x2.38x7'-3" OR 11EV-3.42x2.40x7'-3"
8'-0"	3'-0"	28°	28'-0"	11EB-3.68x2.38x9'-3" OR 11EV-3.70x2.40x9'-3"
10'-0"	4'-0"	29°	27'-0"	11EB-4.00x2.38x11'-6" OR 11EV-4.02x2.40x11'-6"
12'-0"	4'-9"	30°	26'-3"	11EB-4.31x2.38x13'-9" OR 11EV-4.33x2.40x13'-9"
15'-0"	5'-6"	28°	25'-6"	11EB-4.61x2.30x16'-6" OR 11EV-4.71x2.40x16'-6"
20'-0"	7'-6"	29°	23'-6"	11EB-5.50x2.38x22'-3" OR 11EV-5.52x2.40x22'-3"
25'-0" *	8'-6"	26°	22'-6"	11E-6.87x3.13x26'-9" (SEE TENON DETAIL)
30'-0" *	9'-6"	25°	21'-6"	11E-7.56x3.12x31'-9" (SEE TENON DETAIL)

* MAST ARM ATTACHMENT HEIGHT MUST NOT EXCEED 18'-6"

PER CHART

1/2"

UM-446-PA

3/16 (1/8)

3/16 (1/8)

3"

LIFT PIPE

TELESCOPIC FIELD JOINT DETAIL (FOR ARMS OVER 40'-0")

CAST ALUM. POLE TOP W/ (3) OR (4) Ø1/4"-20NC S.S. SET POLE TOP TAPPED, EQUALLY SPACED, FOR SET SCREWS

1/2"

UM-446-PA

3/16 (1/2)

3/16 (1/2)

UM-446-PA

3/4" SCH 40 PIPE x 2" LG FOR LIFTING

J-HOOK

TOP OF POLE DETAIL ORIENTATION OF PIPE & J-HOOK AS REQUIRED

CAST ALUMINUM ARM CAP WITH (3) 1/4" S.S. SET SCREWS

UM-446-PA

3/16 (2")

3/16 (2")

3/4" SCH 40 PIPE x 2" LG FOR LIFTING

ARM END CAP DETAIL

1'-3" RAKE ANGLE HORIZONTAL W/ ARM TIP (W/ LOADS APPLIED)

REMOVABLE END CAP WITH S.S. SCREW (SEE DETAIL)

8'-0" (TYP)

36" (TYP)

M

R

N

S

T

P

O

Y MAX

SEES TELESCOPIC FIELD JOINT DETAIL

FIELD DRILL Ø1 3/8" HOLE AT EACH SIGNAL LOCATION. UMC TO FURNISH (1) Ø1" I.D. RUBBER GROMMET PER SIGNAL

1 1/2" THK PLATE (6'-15' ARMS)

3/4" THK PLATE (20'-30' ARMS) W/ 1/4" THK SIDE GUSSETS

(4) Ø5/8" HEX HEAD BOLTS EACH WITH (1) HEX NUT, (1) FLAT WASHER & (1) LOCK WASHER

1/4" x 6" (6'-15' ARMS)

1/4" x 11 1/2" (20'-30' ARMS)

FRONT & BACK CLAMPS

SEE DWG B82-B101 & B82-B102

Ø2" HOLE IN PLATE & FRONT CLAMP FOR WIRING (DEBURR)

CLAMP ON LUMINAIRE ARM SEE B82-B101 (6'-15' ARMS) B82-B102 (20'-30' ARMS)

2" SCH 40 PIPE (Ø2 3/8" O.D.)

Ø3/8" HOLE FOR LIFTING

6"

3/8" THK PLATE

LUMINAIRE ARM END TENON DETAIL 25'-0" & 30'-0" LUMINAIRE ARMS ONLY

2" SLIP FIT LUMINAIRE (BY OTHERS) MAX WEIGHT = 75 lb & MAX EPA = 3.3 sq ft

ARM SPREAD PER CHART (CUSTOMER TO SPECIFY WITH ORDER)

TAPERED STEEL LUMINAIRE ARM (TUBE SIZE PER CHART)

RISE (PER CHART)

30'-0" NOM MTG HEIGHT TO BASE PLATE

CONTRACTOR TO FIELD DRILL Ø1 3/8" HOLE IN POLE, UMC TO PROVIDE (1) Ø1" I.D. RUBBER GROMMET (SEE LUM CLAMP DETAIL)

REMOVABLE POLE TOP WITH S.S. SET SCREWS (SEE DETAIL)

12"

4"x6 1/2" UPPER HAND HOLE (SEE DETAIL)

4"x6 1/2" LOWER HAND HOLE (SEE DETAIL)

Y10 & Y11 ONLY UM-208-PA PMT

1/4 (1/4)

45°

1/8

UM-214-PA

3/16

4" FULL COUPLING HUB (COUPLING MUST BE SPECIFIED WITH PURCHASE ORDER, ALONG WITH CLOCKWISE ORIENTATION FROM HAND HOLE) SEE ORDERING NOTE (REF. C59651)

90°

12"

36"

7'-0"

MAST ARM MTG HEIGHT PER SALES ORDER (20'-0" MAX)

ROUND TAPERED STEEL POLE (TUBE SIZE PER CHART)

WELD INSPECTION CRITERIA:

- LONGITUDINAL SEAM WELDS: PROVIDE COMPLETE JOINT PENETRATION WITHIN 6" OF ALL CIRCUMFERENTIALLY WELDED CONNECTIONS (TUBE TO PLATE). PROVIDE COMPLETE JOINT PENETRATION ALONG FEMALE SECTION AT ALL SLIP JOINTS FOR A LENGTH EQUAL TO THE MINIMUM REQUIRED SLIP LENGTH PLUS AN ADDITIONAL 6". COMPLETE JOINT PENETRATION SEAM WELDS SHALL BE RADIOGRAPHICALLY TESTED WHERE THE MATERIAL IS LESS THAN 5/16" THICK WHILE ULTRASONIC METHODS SHALL BE USED FOR MATERIAL 5/16" OR GREATER IN THICKNESS. PROVIDE A MINIMUM 60% PENETRATION FOR THE REMAINING LENGTH OF THE TUBE.
- EACH COMPONENT TUBE OF MULTI-PLY CONSTRUCTION SHALL BE (MT) MAGNETIC PARTICLE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408. THE OUTER PLY OF THE ASSEMBLED MULTI-PLY TUBE MEMBER SHALL BE (MT) MAGNETIC PARTICLE TESTED AFTER PROCESS COMPLETION. THIS METHOD CONSTITUTES A PROGRESSIVE MAGNETIC PARTICLE INSPECTION ACCEPTABLE FOR USE WHERE MEMBER CONSTRUCTION PROHIBITS INSPECTION BY THE (UT) ULTRASONIC METHOD.
- NON-DESTRUCTIVE TESTING OF CJP WELDS FOR POLE SHAFT TO BASE PLATE SHALL BE (UT) ULTRASONICALLY TESTED EXCEPT WHERE (PMT) PROGRESSIVE MAGNETIC PARTICLE TESTING IS APPROPRIATE (MULTI-PLY MEMBERS ONLY).
- NON-DESTRUCTIVE TESTING OF CJP WELDS FOR MAST ARMS TO FLANGE PLATE SHALL BE INSPECTED BY THE (UT) ULTRASONIC TESTING PROCESS.
- FILLET WELDS SHALL BE (MT) MAGNETIC PARTICLE TESTED FOR 30% OF THE TOTAL LENGTH.
- REFER TO PENNDOT PUBLICATION 408 SECTION 1104.01(b) FOR ADDITIONAL WELD INSPECTION GUIDELINES.

PROJECT INFORMATION

PROJECT: COUNTY: CITY: REQ:

STATE: PA REQ# / SO#: PA-51920-1

PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS

ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES (DUAL MAST ARMS W/ LUMINAIRE) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION

DESIGNED BY: DAB CHECKED BY: VSW DATE: 6/19/14 SCALE: NTS ENG REF: 50700-B199

50400-B497 REVISION: R0 SHEET: 2 OF 4

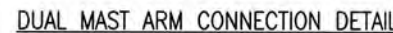
COMMONWEALTH OF PENNSYLVANIA

REGISTERED PROFESSIONAL

VINCENT P. WHORTEN

ENGINEER No. PE081257

12-16-14



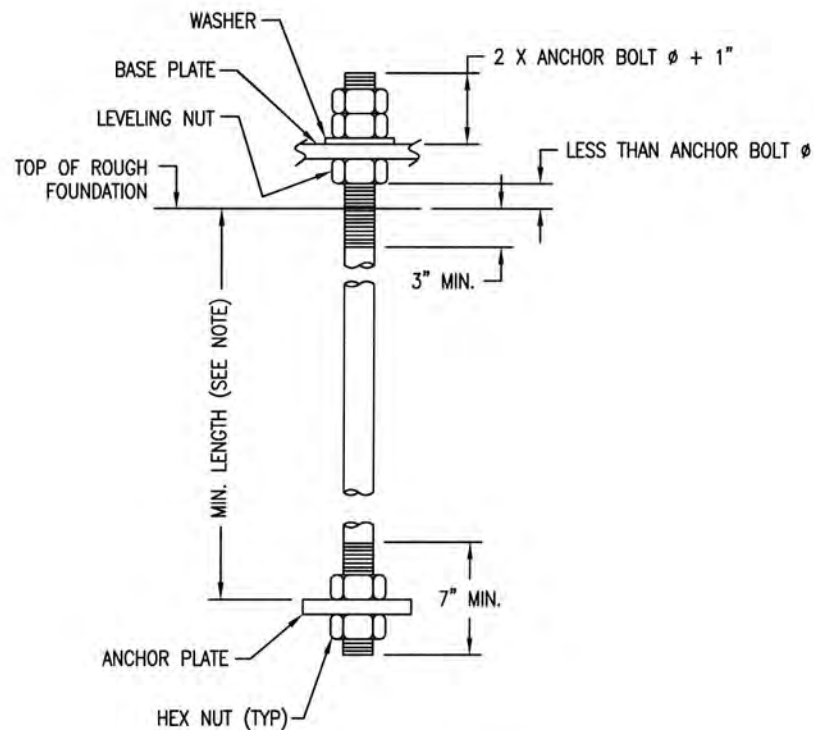
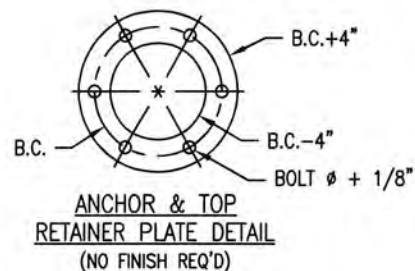
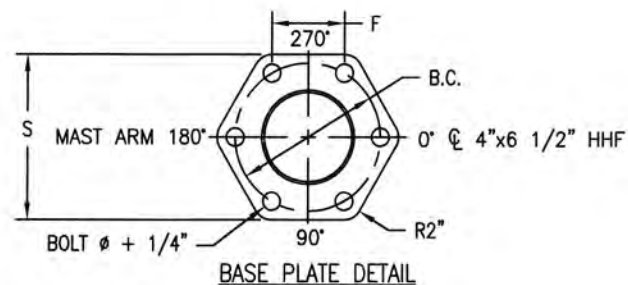
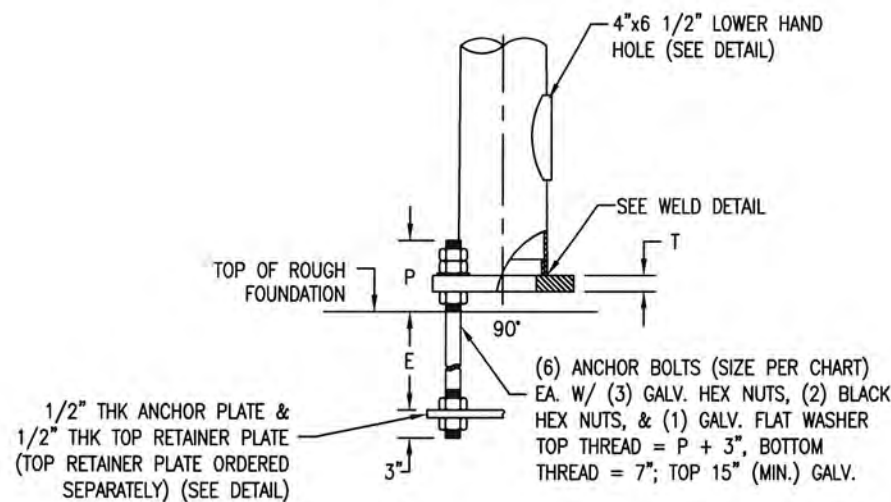
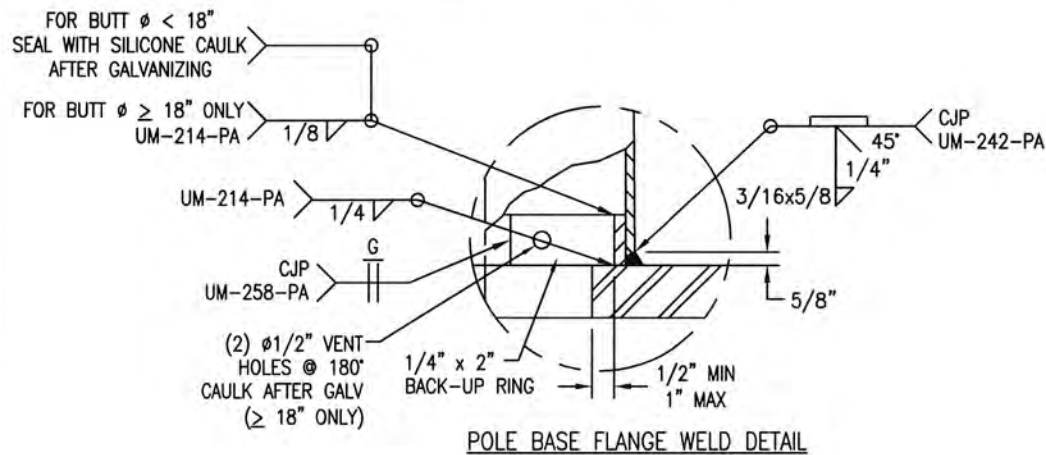
ENG NOTE:
G MUST BE $\geq 1/4"$
W1 IS THE DEPTH OF BEVEL
(W1) IS THE EFFECTIVE WELD SIZE
 $W1 = G - 1/8"$
 $W2 = t - 1/8"$

MAST ARM FLANGE CONNECTION DATA (in)													
ARM SIZE	LENGTH	MFG ANGLE	BOLT ϕ	X	Y	W	H	APL	PPL	D	G	GW	W1
OE-6.50	10'	3°	1	11 1/2	6 1/2	15	10	2	2	11 1/2	1/4	3/16	1/8
OE-7.25	15'	3°	1	12 1/2	7 1/2	16	11	2	2	12	1/4	3/16	1/8
OE-8.00	20'	3°	1	14 1/2	8 1/2	18	12	2	2	13	5/16	1/4	3/16
OE-8.50	25'	3°	1	14 1/2	8 1/2	18	12	2	2	13	5/16	1/4	3/16
OE-9.75	30'	3°	1	15 1/2	9 1/2	19	13	2	2	13 1/2	3/8	5/16	1/4
OE-11.25	35'	3°	1 1/4	17	11	21	15	2	2	14 1/2	3/8	5/16	1/4
OE-12.50	40'	3°	1 1/4	18	13	22	17	2	2	15	3/8	5/16	1/4
OE-14.00	45'	3°	1 1/4	20	14	24	18	2 1/2	2 1/2	16 1/2	3/8	5/16	1/4
OE-15.50	50'	3°	1 1/2	22	16	27	21	2 1/2	2 1/2	18	1/2	7/16	3/8
OE-16.75	55'	3°	1 1/2	22	17	27	22	2 1/2	2 1/2	18	1/2	7/16	3/8
OE-17.65	60'	3°	1 1/2	22	17	27	22	2 1/2	2 1/2	18	1/2	7/16	3/8

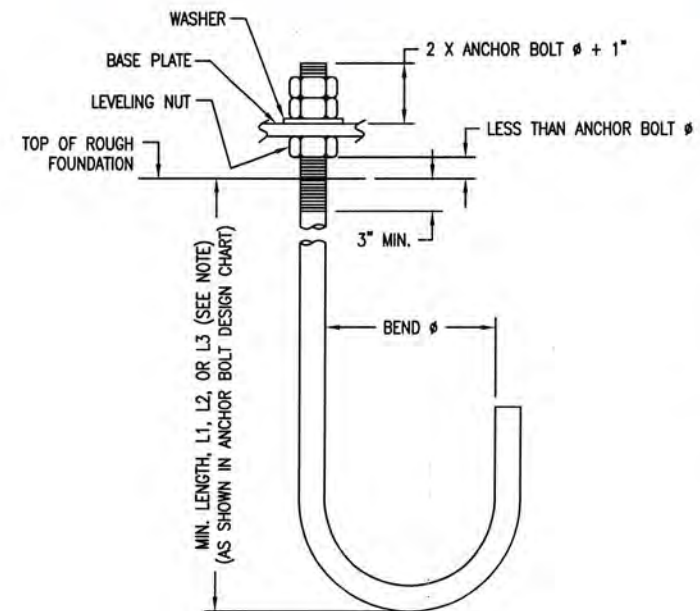
PROJECT INFORMATION		LARGER OF THE TWO WILL BE USED FOR BOTH ARMS.						
PROJECT:		EXAMPLE:						
COUNTY:		WHEN A 0E-9.75 ARM & A 0E-8.00 ARM ARE USED ON THE SAME						
CITY:		POLE, THE FLANGE DIMENSIONS FROM THE 0E-9.75 ARM WILL BE USED						
REQ:		FOR BOTH ARMS.						
STATE: PA		REQ# / SO# : PA-51920-1		REV	DESCRIPTION	DATE	REV BY/CHK	
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS				REVISIONS				
ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES (DUAL MAST ARMS W/ LUMINAIRE) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION								
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			50400-B497			REVISION	SHEET	
						R0	3 of 4	

ARM SPREAD RANGE	POLE BASE CONNECTION DATA (in) *							ANCHOR BOLT EMBEDMENT "E" (TYPE A & B)	MIN. OVERALL ANCHOR BOLT LENGTH
	POLE SIZE	B.C.	S	F	P	T	ANCHOR BOLT Ø		
>1'-10'	0E-10.00	18	21	9	10	2	1 3/4	35"	48"
>11'-15'	0E-11.00	18	21	9	10	2	1 3/4		
>15'-20'	0E-12.50	18	21	9	10	2	1 3/4		
>20'-25'	0E-12.50	18	21	9	10	2	1 3/4		
>25'-30'	0E-13.50	21	24	10 1/2	10 1/2	2 1/2	1 3/4		
>30'-35'	0E-14.50	21	24	10 1/2	10 1/2	2 1/2	1 3/4		
>35'-40'	0E-16.00	24	27	12	11 1/2	2 1/2	2	40"	54 1/2"
>40'-45'	0E-17.00	24	27	12	11 1/2	2 1/2	2		
>45'-50'	0E-18.50	24	27	12	11 1/2	2 1/2	2		
>50'-55'	3+7E-18.72	24	27	12	11 1/2	2 1/2	2		
>55'-60'	3+7E-18.72	24	27	12	11 1/2	2 1/2	2		

* TWO ARMS PERPENDICULAR TO EACH OTHER. ADDITIONAL STRUCTURAL ANALYSIS IS REQUIRED FOR TWO MAST ARMS AT ACUTE OR OBTUSE ANGLES TO EACH OTHER.



NOTE:
1) LONGER ANCHOR BOLTS MAY BE REQUIRED TO AVOID CONFLICTS WITH TOP LAYER OF REINFORCEMENT IN FOUNDATION TYPE B.



NOTE:
1) MUST BE APPROVED BY BUREAU OF MAINTENANCE & OPERATIONS.
2) DUE TO OVERLAPPING 'J' ANCHOR BOLTS, VARY EMBEDMENT BY 6" FOR EACH 2-BOLT PAIR FOR Ø 1 3/4" BOLTS & BY 12" FOR EACH 2-BOLT PAIR FOR Ø 2" BOLTS. SEE L1, L2, & L3 EMBEDMENT DEPTHS IN ANCHOR BOLT DESIGN CHART.

OPTIONAL "J" ANCHOR BOLT DESIGN TWO ARMS * (in)								
MAST ARM LENGTH	QTY	BOLT Ø	BEND Ø	L1	L2	L3	BC	HOLE
>1'-10'	6	1 3/4	17 1/2	42	48	54	18	2
>11'-15'	6	1 3/4	17 1/2	42	48	54	18	2
>15'-20'	6	1 3/4	17 1/2	42	48	54	18	2
>20'-25'	6	1 3/4	17 1/2	42	48	54	18	2
>25'-30'	6	1 3/4	17 1/2	42	48	54	21	2
>30'-35'	6	1 3/4	17 1/2	42	48	54	21	2
>35'-40'	6	2	22	48	60	72	24	2 1/4
>40'-45'	6	2	22	48	60	72	24	2 1/4
>45'-50'	6	2	22	48	60	72	24	2 1/4
>50'-55'	6	2	22	48	60	72	24	2 1/4
>55'-60'	6	2	22	48	60	72	24	2 1/4

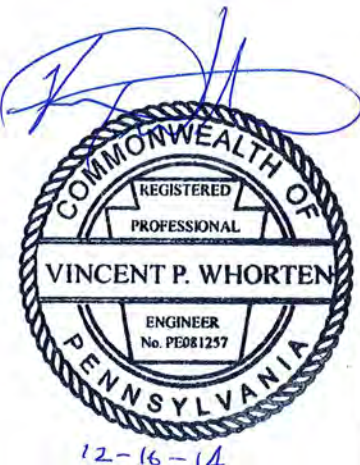
* TWO ARMS PERPENDICULAR TO EACH OTHER. ADDITIONAL STRUCTURAL ANALYSIS IS REQUIRED FOR TWO MAST ARMS AT ACUTE OR OBTUSE ANGLES TO EACH OTHER.

PROJECT INFORMATION				
PROJECT:				
COUNTY:				
CITY:				
REQ:				
STATE: PA	REQ# / SO# : PA-51920-1	REV	DESCRIPTION	DATE
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS		REVISIONS		
ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES (DUAL MAST ARMS W/ LUMINAIRE) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION				
	DESIGNED BY		CHECKED BY	DATE
	DAB		UPW	6/19/14
50400-B497		SCALE		ENG REF
		NTS		50700-B199
		REVISION		SHEET
		R0		4 OF 4

A			B		C		D			E										F		
QTY	STATE NUMBER	UMC DESIGN NUMBER	BASIC ARM SPREAD	POLE TUBE SIZE	ARM TUBE SIZE	ARM SPREAD RANGE	SLIP JOINT LENGTH	REQUIRED ARM SPREAD	MAST ARM ORIENT	SIGNALS					SIGNS					Y MAX (ft)		
										M	N	O	P	Q	R	S	T	U	V		Y	
		50400-B498-Y1	10'-0"	0E-10.00x6.92x22'-0"	0E-6.50x5.10x10'-0"	UP TO 10'-0"	-			W	70	-	-	-	123	-	-	-	-	39	87	5.2
			10'-0"		0E-6.50x5.10x10'-0"	UP TO 10'-0"	-			A	8.76	-	-	-	8.82	-	-	-	-	7.48	10.5	
		50400-B498-Y2	15'-0"	0E-11.00x7.92x22'-0"	0E-7.25x5.15x15'-0"	11'-0"-15'-0"	-			W	70	-	-	-	123	39	-	-	-	39	106	6.6
			15'-0"		0E-7.25x5.15x15'-0"	11'-0"-15'-0"	-			A	8.76	-	-	-	8.82	7.48	-	-	-	7.48	21.3	
		50400-B498-Y3	20'-0"	0E-12.50x9.42x22'-0"	0E-8.00x5.20x20'-0"	16'-0"-20'-0"	-			W	70	-	-	-	123	39	-	-	-	39	106	6.6
			20'-0"		0E-8.00x5.20x20'-0"	16'-0"-20'-0"	-			A	8.76	-	-	-	8.82	7.48	-	-	-	7.48	21.3	
		50400-B498-Y4	25'-0"	0E-12.50x9.42x22'-0"	0E-8.50x5.00x25'-0"	21'-0"-25'-0"	-			W	97	70	-	-	123	39	-	-	-	39	106	8.5
			25'-0"		0E-8.50x5.00x25'-0"	21'-0"-25'-0"	-			A	13.89	8.76	-	-	8.82	7.48	7.48	-	-	7.48	21.3	
		50400-B498-Y5	30'-0"	0E-13.50x10.42x22'-0"	0E-9.75x5.55x30'-0"	26'-0"-30'-0"	-			W	97	70	97	-	123	39	39	-	-	39	106	8.5
			30'-0"		0E-9.75x5.55x30'-0"	26'-0"-30'-0"	-			A	13.89	8.76	13.89	-	8.82	7.48	7.48	-	-	7.48	21.3	
		50400-B498-Y6	35'-0"	0E-14.50x11.42x22'-0"	0E-11.25x6.35x35'-0"	31'-0"-35'-0"	-			W	97	70	97	-	123	39	39	39	-	39	106	10.8
			35'-0"		0E-11.25x6.35x35'-0"	31'-0"-35'-0"	-			A	13.89	8.76	13.89	-	8.82	7.48	7.48	7.48	-	7.48	21.3	
		50400-B498-Y7	40'-0"	0E-16.00x12.92x22'-0"	0E-12.50x6.90x40'-0"	36'-0"-40'-0"	-			W	97	70	97	-	123	39	39	39	-	39	106	15.7
			40'-0"		0E-12.50x6.90x40'-0"	36'-0"-40'-0"	-			A	13.89	8.76	13.89	-	8.82	7.48	7.48	7.48	-	7.48	21.3	
		50400-B498-Y8	45'-0"	0E-17.00x13.92x22'-0"	0E-14.00x11.17x20'-3"	41'-0"-45'-0"	2'-0"			W	97	70	97	-	123	39	39	39	-	39	106	20.7
			45'-0"		3E-11.99x8.25x26'-9"	41'-0"-45'-0"	2'-0"			A	13.89	8.76	13.89	-	8.82	7.48	7.48	7.48	-	7.48	21.3	
		50400-B498-Y9	50'-0"	0E-18.50x15.42x22'-0"	0E-15.50x13.47x14'-6"	46'-0"-50'-0"	2'-3"			W	97	70	70	97	123	39	39	-	39	39	106	17.7
			50'-0"		3E-14.33x9.05x37'-9"	46'-0"-50'-0"	2'-3"			A	13.89	8.76	8.76	13.89	8.82	7.48	7.48	-	7.48	7.48	21.3	
		50400-B498-Y10	55'-0"	(3+7)E-18.72x15.64x22'-0"	0E-16.75x13.46x23'-6"	51'-0"-55'-0"	2'-3"			W	97	70	70	97	123	39	39	-	39	39	106	27.9
			55'-0"		3E-14.32x9.60x33'-9"	51'-0"-55'-0"	2'-3"			A	13.89	8.76	8.76	13.89	8.82	7.48	7.48	-	7.48	7.48	21.3	
		50400-B498-Y11	60'-0"	(3+7)E-18.72x15.64x22'-0"	0E-17.65x13.45x30'-0"	55'-0"-60'-0"	2'-3"			W	97	70	70	97	123	39	39	-	39	39	106	27.9
			60'-0"		3E-14.31x9.80x32'-3"	55'-0"-60'-0"	2'-3"			A	13.89	8.76	8.76	13.89	8.82	7.48	7.48	-	7.48	7.48	21.3	

3 GA = 0.250" WALL THICKNESS
0 GA = 0.313" WALL THICKNESS
3+7 GA = 0.429" WALL THICKNESS
E = ROUND STEEL TUBE TAPERED @ 0.14 in/ft

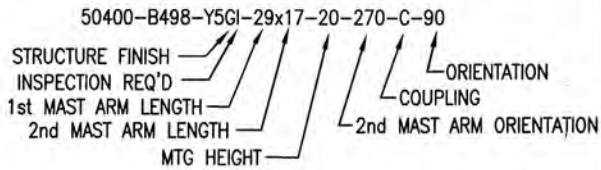
MATERIAL SPECIFICATIONS	
TAPERED STEEL TUBES	ASTM A595 GR A
STEEL PLATE & BAR	ASTM A709 GR 36 or A572 GR 50 (See Note 7)
HAND HOLE FRAME	ASTM A572 GR 50 (See Note 7)
J-HOOK	ASTM A36
ANCHOR BOLTS	ASTM F1554 GR 55
ANCHOR BOLT NUTS	ASTM A563 GR A
WASHERS	ASTM F436 (Mechanically Galvanized)
HIGH STRENGTH BOLTS	ASTM A325 TYPE I (Mechanically Galvanized)
HEAVY HEX NUTS	ASTM A563 GR DH or A194 GR 2H (Mechanically Galvanized)
ARM JOINT STUD	ASTM A36 or A572 GR 50
ARM JOINT LOCK NUT	ASTM A194 GR 2H (Anco type or equivalent)
POLE TOP / ARM END CAP	ASTM B26 (356.0F)
LIFTING PIPE / TENON PIPE	ASTM A53 GR B or A500 GR B or C
COUPLING	ASTM A53 GR B or A500 GR B
S.S. HARDWARE	AISI 300 SERIES
STRUCTURE FINISH	GALVANIZE TO ASTM A123
HARDWARE FINISH	GALVANIZE TO ASTM A153



PROJECT INFORMATION				
PROJECT:				
COUNTY:				
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STATE: PA	REQ# / SO# : PA-51920-1	REV	DESCRIPTION	DATE
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS				
ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES (DUAL MAST ARMS) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION				
DESIGNED BY	CHECKED BY	DATE	SCALE	ENG REF
DAB	UPW	6/19/14	NTS	50400-B200
50400-B498			REVISION	SHEET
			R0	1 of 4

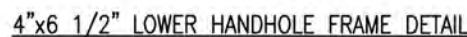
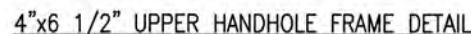
- DESIGN CRITERIA:
- STRUCTURES DESIGNED IN ACCORDANCE WITH THE 2001 AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" (INCLUDING INTERIM SPECIFICATIONS THROUGH 2006) USING APPENDIX C: ALTERNATE METHOD FOR WIND PRESSURES (80 MPH WIND ZONE) AND COMMONWEALTH OF PENNSYLVANIA D.O.T. PUBLICATIONS: 148 "TRAFFIC STANDARDS - SIGNALS" (DEC 2011), 149 "TRAFFIC SIGNAL DESIGN HANDBOOK" (MAY 2013) AND 408/2011 "SPECIFICATIONS".
 - ANCHOR BOLTS ANALYZED FOR STEEL STRENGTH ONLY. THE ANCHOR BOLT EMBEDMENT LENGTH SHOWN ON THIS DRAWING SHALL BE VERIFIED BY THE FOUNDATION ENGINEER.
 - THE CLEARANCE BETWEEN THE BOTTOM OF THE LEVELING NUTS AND TOP OF THE CONCRETE FOUNDATION SHALL NOT BE GREATER THAN ONE BOLT DIAMETER.
 - PER AASHTO THE MINIMUM LENGTH OF ANY TELESCOPIC FIELD JOINT SHALL BE 1.5 TIMES THE INSIDE DIAMETER OF THE END OF THE FEMALE SECTION. A THROUGH BOLT MUST BE PROVIDED FOR A POSITIVE CONNECTION FOR ALL TELESCOPIC FIELD JOINTS PER PUBLICATION 149.
 - VIBRATION IS MORE LIKELY TO OCCUR WHEN STRUCTURES ARE INSTALLED WITHOUT ATTACHING THE SIGNALS AND OR SIGNS. THEREFORE, THE INTENDED EQUIPMENT OR DAMPENING DEVICES MUST BE INSTALLED AT THE TIME OF ERECTION. BECAUSE VIBRATION IS GENERALLY UNPREDICTABLE, A MAINTENANCE PROGRAM SHOULD INCLUDE INSPECTION FOR INDICATIONS OF EXCESSIVE VIBRATION OR FATIGUE AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING.
 - ALL MAIN LOAD CARRYING TENSION MEMBERS GREATER THAN 1/2" IN THICKNESS MUST MEET AASHTO ZONE 2, NON FRACTURE CRITICAL MEMBER COMPONENTS CHARPY V-NOTCH (CVN) REQUIREMENTS.
 - ALL WELDING TO CONFORM WITH AWS D1.1 - 2008.
 - CUSTOMER TO CONFIRM ALL DIMENSIONS & ORIENTATIONS BEFORE RELEASING ORDER FOR MANUFACTURING.

ORDERING NOTE:
DESIGNS WILL BE FURNISHED AS SHOWN WITH BASIC ARM SPREAD. IF SHORTER MAST ARM LENGTH IS REQUIRED, SHOW DESIGN NO. & MAST ARM LENGTH DESIRED. CUSTOMER ALSO TO SPECIFY 4" FULL COUPLING HUB ORIENTATION REQUIRED.
EXAMPLE: 29' 1st MAST ARM LENGTH, 17' 2nd MAST ARM LENGTH AT 270° ORIENTATION, 20' MOUNTING HEIGHT, THAT IS GALVANIZED AND INSPECTED, WITH A COUPLING AT 90 DEGREES WOULD BE ORDERED AS:



PROJECT INFORMATION															
PROJECT:															
COUNTY:															
CITY:															
REQ:															
STATE: PA			REQ# / SO# : PA-51920-1			REV		DESCRIPTION		DATE	REV BY	CHK BY			
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS						REVISIONS									
ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES (DUAL MAST ARMS) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION															
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						DAB		USPW		6/19/14		NTS		50400-B200	
						50400-B498				REVISION		SHEET			
										R0		2 OF 4			

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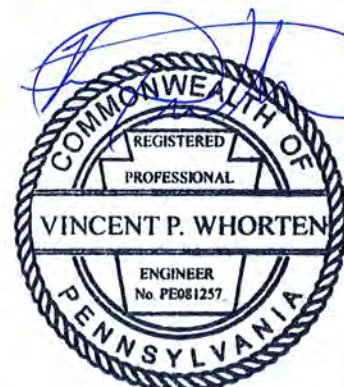


ENG NOTE:
G MUST BE $\geq 1/4"$
W1 IS THE DEPTH OF BEVEL
(W1) IS THE EFFECTIVE WELD SIZE
 $W1 = G - 1/8"$
 $W2 = t - 1/8"$

MAST ARM FLANGE CONNECTION DATA (in)													
ARM SIZE	LENGTH	MFG ANGLE	BOLT ϕ	X	Y	W	H	APL	PPL	D	G	GW	W1
OE-6.50	10'	3°	1	11 1/2	6 1/2	15	10	2	2	11 1/2	1/4	3/16	1/8
OE-7.25	15'	3°	1	12 1/2	7 1/2	16	11	2	2	12	1/4	3/16	1/8
OE-8.00	20'	3°	1	14 1/2	8 1/2	18	12	2	2	13	5/16	1/4	3/16
OE-8.50	25'	3°	1	14 1/2	8 1/2	18	12	2	2	13	5/16	1/4	3/16
OE-9.75	30'	3°	1	15 1/2	9 1/2	19	13	2	2	13 1/2	3/8	5/16	1/4
OE-11.25	35'	3°	1 1/4	17	11	21	15	2	2	14 1/2	3/8	5/16	1/4
OE-12.50	40'	3°	1 1/4	18	13	22	17	2	2	15	3/8	5/16	1/4
OE-14.00	45'	3°	1 1/4	20	14	24	18	2 1/2	2 1/2	16 1/2	3/8	5/16	1/4
OE-15.50	50'	3°	1 1/2	22	16	27	21	2 1/2	2 1/2	18	1/2	7/16	3/8
OE-16.75	55'	3°	1 1/2	22	17	27	22	2 1/2	2 1/2	18	1/2	7/16	3/8
OE-17.65	60'	3°	1 1/2	22	17	27	22	2 1/2	2 1/2	18	1/2	7/16	3/8

NOTE:
WHEN USING TWO DIFFERENT SIZED TUBES, THE FLANGE DATA FROM THE LARGER OF THE TWO WILL BE USED FOR BOTH ARMS.
EXAMPLE:
WHEN A OE-9.75 ARM & A OE-8.00 ARM ARE USED ON THE SAME POLE, THE FLANGE DIMENSIONS FROM THE OE-9.75 ARM WILL BE USED FOR BOTH ARMS.

PROJECT INFORMATION		LARGER OF THE TWO WILL BE USED FOR BOTH ARMS.				
PROJECT:		EXAMPLE:				
COUNTY:		WHEN A 0E-9.75 ARM & A 0E-8.00 ARM ARE USED ON THE SAME				
CITY:		POLE, THE FLANGE DIMENSIONS FROM THE 0E-9.75 ARM WILL BE USED				
REQ:		FOR BOTH ARMS.				
STATE: PA	REQ# / SO# : PA-51920-1	REV	DESCRIPTION	DATE	REV BY/CHK	
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS		REVISIONS				
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FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION						
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		50400-B498			REVISION	SHEET
					R0	3 of 4



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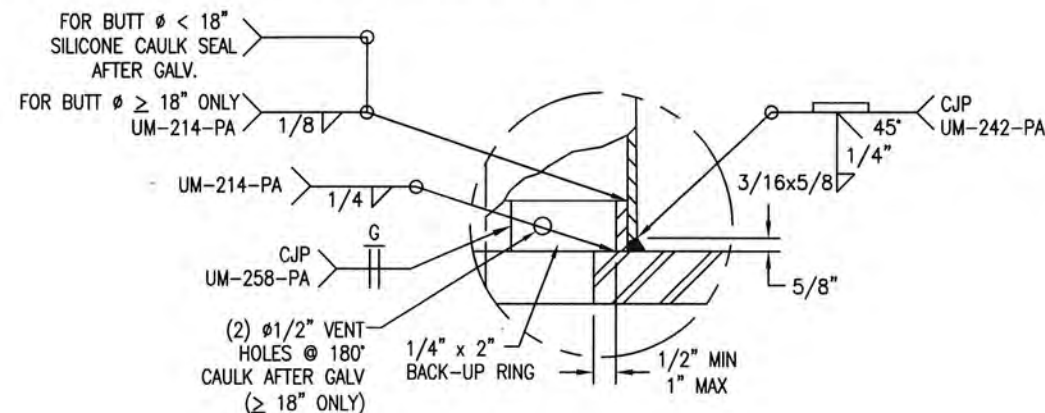
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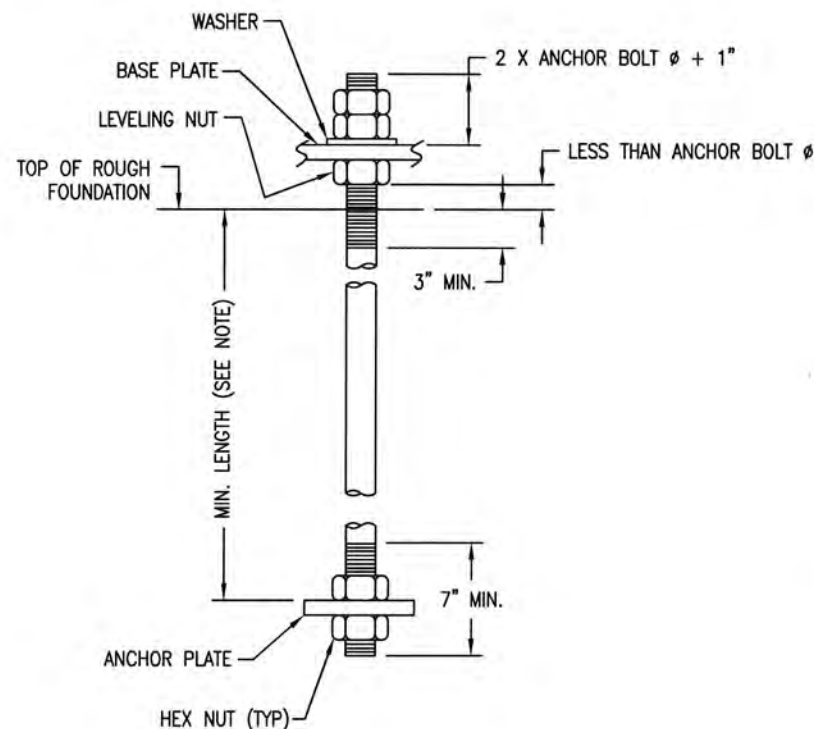
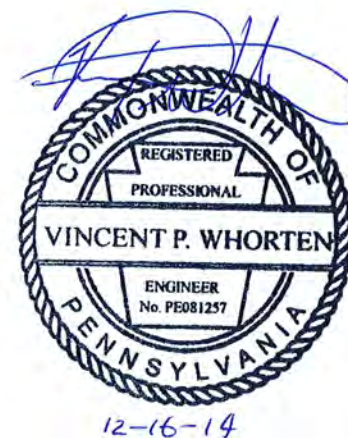
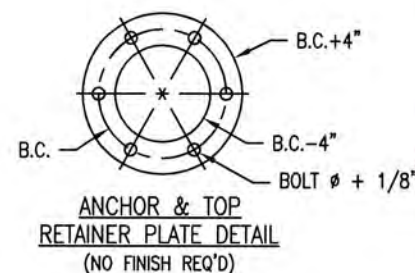
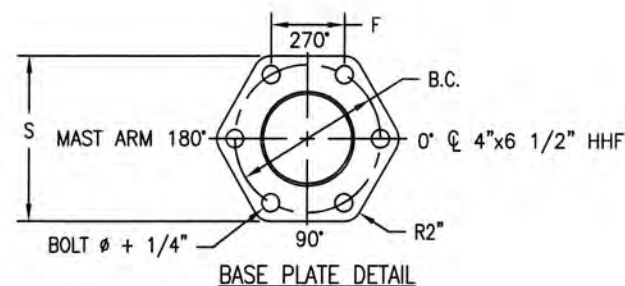
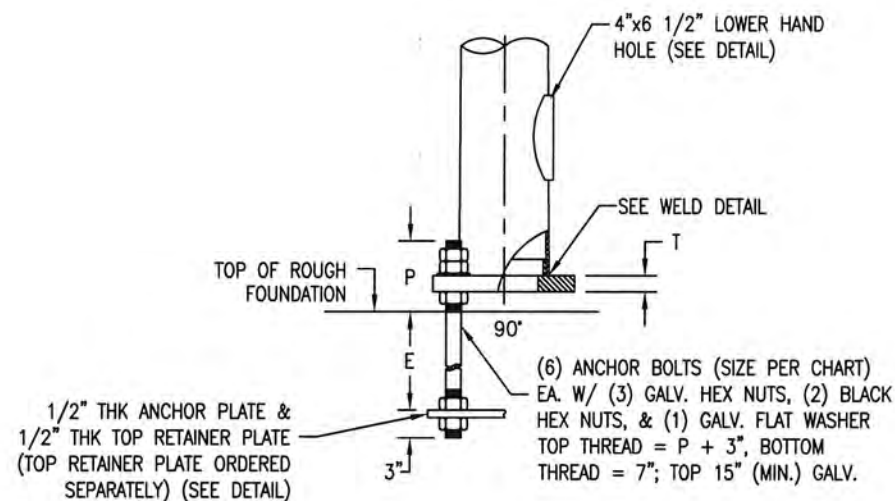
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ARM SPREAD RANGE	POLE BASE CONNECTION DATA (in) *							ANCHOR BOLT EMBEDMENT "E" (TYPE A & B)	MIN. OVERALL ANCHOR BOLT LENGTH
	POLE SIZE	B.C.	S	F	P	T	ANCHOR BOLT ϕ		
>1'-10'	0E-10.00	18	21	9	10	2	1 3/4	35"	48"
>10'-15'	0E-10.50	18	21	9	10	2	1 3/4		
>15'-20'	0E-12.00	18	21	9	10	2	1 3/4		
>20'-25'	0E-13.25	18	21	9	10	2	1 3/4		
>25'-30'	3E-15.75	21	24	10 1/2	10 1/2	2 1/2	1 3/4		
>30'-35'	3E-15.75	21	24	10 1/2	10 1/2	2 1/2	1 3/4		
>35'-40'	3E-17.50	24	27	12	11 1/2	2 1/2	2	40"	54 1/2"
>40'-45'	3E-18.50	24	27	12	11 1/2	2 1/2	2		
>45'-50'	0E-18.50	24	27	12	11 1/2	2 1/2	2		
>50'-55'	0E-19.50	24	27	12	12	3	2		
>55'-60'	0E-19.50	24	27	12	12	3	2		

* TWO ARMS PERPENDICULAR TO EACH OTHER. ADDITIONAL STRUCTURAL ANALYSIS IS REQUIRED FOR TWO MAST ARMS AT ACUTE OR OBTUSE ANGLES TO EACH OTHER.



POLE BASE FLANGE WELD DETAIL

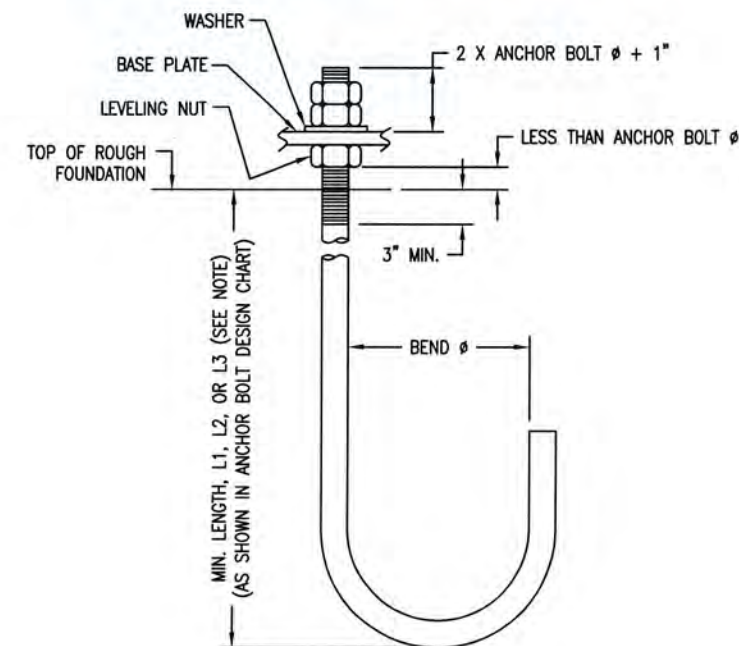


ANCHOR BOLT DETAIL

NOTE:
1) LONGER ANCHOR BOLTS MAY BE REQUIRED TO AVOID CONFLICTS WITH TOP LAYER OF REINFORCEMENT IN FOUNDATION TYPE B.

OPTIONAL "J" ANCHOR BOLT DESIGN TWO ARMS * (in)									
MAST ARM LENGTH	QTY	BOLT ϕ	BEND ϕ	L1	L2	L3	BC	HOLE	
>1'-10'	6	1 3/4	17 1/2	42	48	54	18	2	
>10'-15'	6	1 3/4	17 1/2	42	48	54	18	2	
>15'-20'	6	1 3/4	17 1/2	42	48	54	18	2	
>20'-25'	6	1 3/4	17 1/2	42	48	54	18	2	
>25'-30'	6	1 3/4	17 1/2	42	48	54	21	2	
>30'-35'	6	1 3/4	17 1/2	42	48	54	21	2	
>35'-40'	6	2	22	48	60	72	24	2 1/4	
>40'-45'	6	2	22	48	60	72	24	2 1/4	
>45'-50'	6	2	22	48	60	72	24	2 1/4	
>50'-55'	6	2	22	48	60	72	24	2 1/4	
>55'-60'	6	2	22	48	60	72	24	2 1/4	

* TWO ARMS PERPENDICULAR TO EACH OTHER. ADDITIONAL STRUCTURAL ANALYSIS IS REQUIRED FOR TWO MAST ARMS AT ACUTE OR OBTUSE ANGLES TO EACH OTHER.

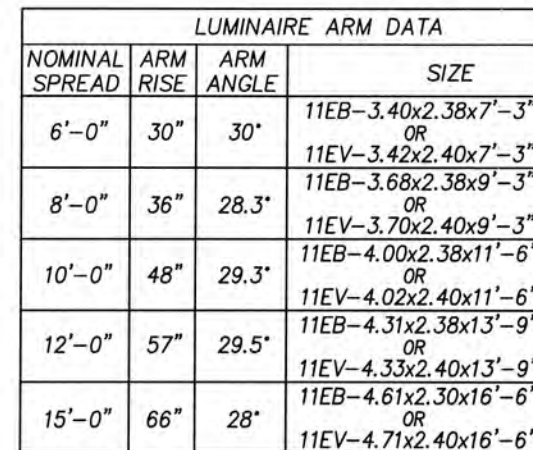
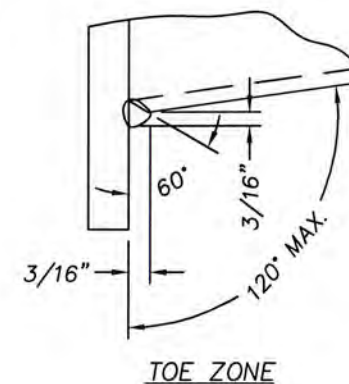


OPTIONAL "J" ANCHOR BOLT DETAIL

NOTE:
1) MUST BE APPROVED BY BUREAU OF MAINTENANCE & OPERATIONS.
2) DUE TO OVERLAPPING 'J' ANCHOR BOLTS, VARY EMBEDMENT BY 6" FOR EACH 2-BOLT PAIR FOR $\phi 1 3/4"$ BOLTS & BY 12" FOR EACH 2-BOLT PAIR FOR $\phi 2"$ BOLTS. SEE L1, L2, & L3 EMBEDMENT DEPTHS IN ANCHOR BOLT DESIGN CHART.

PROJECT INFORMATION									
PROJECT:									
COUNTY:									
CITY:									
REQ:									
STATE: PA	REQ# / SO# : PA-51920-1	REV		DESCRIPTION	DATE	REV BY	CHK BY		
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS									
ROUND TAPERED STEEL TRAFFIC SIGNAL SUPPORT STRUCTURES (DUAL MAST ARMS) FOR THE COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION									
	DESIGNED BY	CHECKED BY	DATE	SCALE	ENG REF				
	DAB	UPW	6/19/14	NTS	50400-B200				
50400-B498					REVISION				
					R0				
					SHEET				
					4 OF 4				

1



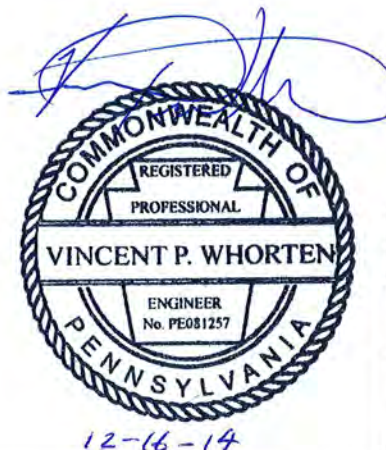
REQUIRED FINISH	
B	UNFINISHED
G	H.D. GALVANIZED
V	H.D. GALVANIZED AND FINISH PAINT

NOTE: ARM SPREAD AND FINISH
TO BE SPECIFIED WITH
PURCHASE ORDER
(SEE ORDERING INSTRUCTIONS)

ORDERING INSTRUCTIONS:

— IF A GALVANIZED 15' LUMINAIRE ARM WITH A "D9" CLAMP SIZE IS REQUIRED,
ORDER: B82-B101-15-D9-G

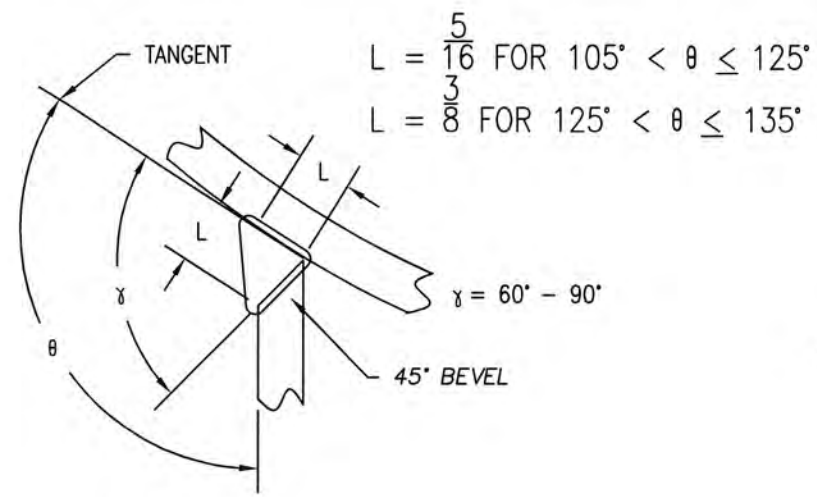
MATERIAL SPECIFICATIONS	
TAPERED STEEL TUBES	ASTM A595 GR A
STEEL PLATES AND SHAPES	ASTM A36
HIGH STRENGTH BOLTS	ASTM A325 TYPE I (Fully Threaded) (Mechanically Galvanized)
HEAVY HEX NUTS	ASTM A563 GR DH (Mechanically Galvanized)
FLAT WASHER (Type I, Circular)	ASTM F436 (Mechanically Galvanized)
LOCK WASHER (Helical Spring, Reg.)	ASME B18.21.1 MECHANICAL GALV.



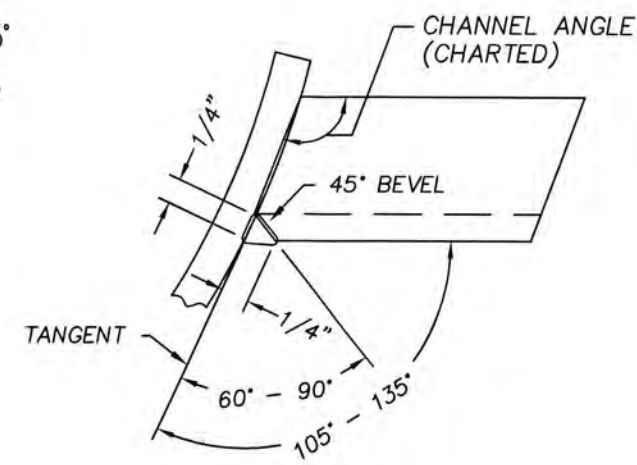
12-16-14

		R6	SUPPRESSED OBSOLETE REV. TRIANGLES, UPDATE TITLE BLOCK, UPDATE MATERIAL SPECIFICATIONS; REMOVE CLAMP D5; CLARIFY CHANNEL WELD AS PJP GROOVE WELD		12/16/14	VPW	SAD	
STATE: PA		REQ# / SO# :		REV	DESCRIPTION		DATE	REV BY/CHK
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS				REVISIONS				
4-BOLT STEEL CLAMP-ON LUMINAIRE ARM (6'-0" THROUGH 15'-0" SPANS) FOR COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION								
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				JDH	PH	04/25/05	NONE	
				B82-B101		REVISION	SHEET	
						R6	1 OF 2	

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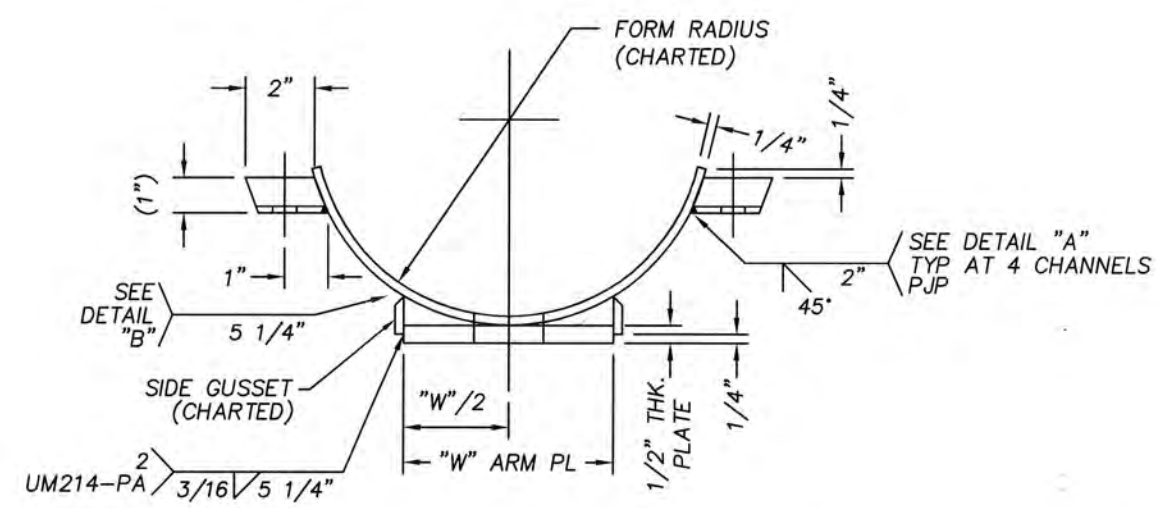
DETAIL "B"



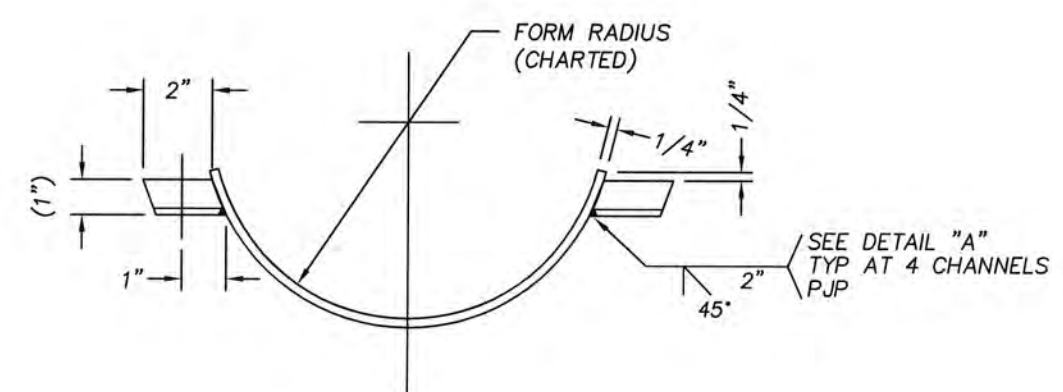
DETAIL "A"

CLAMP	RANGE	DEVELOP LENGTH (in)	FORM RADIUS (in)	CHANNEL ANGLE	BOLT Q TO Q	"W" ARM PL	SIDE GUSSET
D6	5.9-6.89	9 1/8	3 7/16	114°	8 1/8	5 1/4	1/4 x 1 3/8
D7	6.9-7.89	10 13/16	3 15/16	114°	9 1/4	6	1/4 x 1 1/2
D8	7.9-8.89	12 1/4	4 7/16	114°	10 1/4	6	1/4 x 1 1/4
D9	8.9-9.89	13 7/8	4 15/16	107°	11 1/2	6	1/4 x 1 1/8
D10	9.9-10.89	15 7/16	5 7/16	107°	12 1/2	6	1/4 x 1 1/8
D11	10.9-11.89	17 1/16	5 15/16	107°	13 1/2	6	1/4 x 1
D12	11.9-12.89	18 9/16	6 7/16	107°	14 5/8	6	1/4 x 1
D13	12.9-13.89	20 1/8	6 15/16	107°	15 5/8	6	1/4 x 1
D14	13.9-14.89	21 13/16	7 7/16	107°	16 5/8	6	1/4 x 1
D15	14.9-15.89	23 3/8	7 15/16	100°	17 3/4	6	1/4 x 3/4
D16	15.9-16.89	24 13/16	8 7/16	100°	18 7/8	6	1/4 x 3/4
D17	16.9-17.89	26 1/4	8 15/16	100°	19 7/8	6	1/4 x 3/4
D18	17.9-18.89	27 3/4	9 7/16	100°	20 7/8	6	1/4 x 3/4

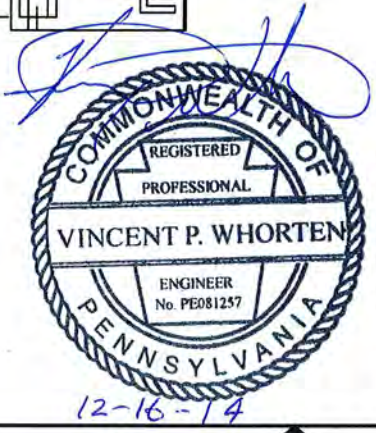
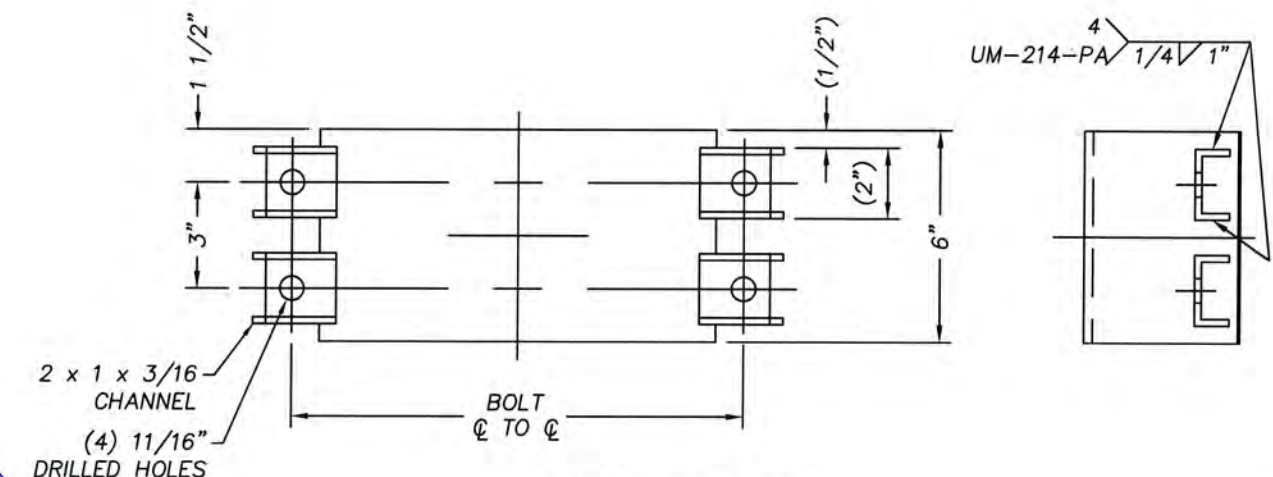
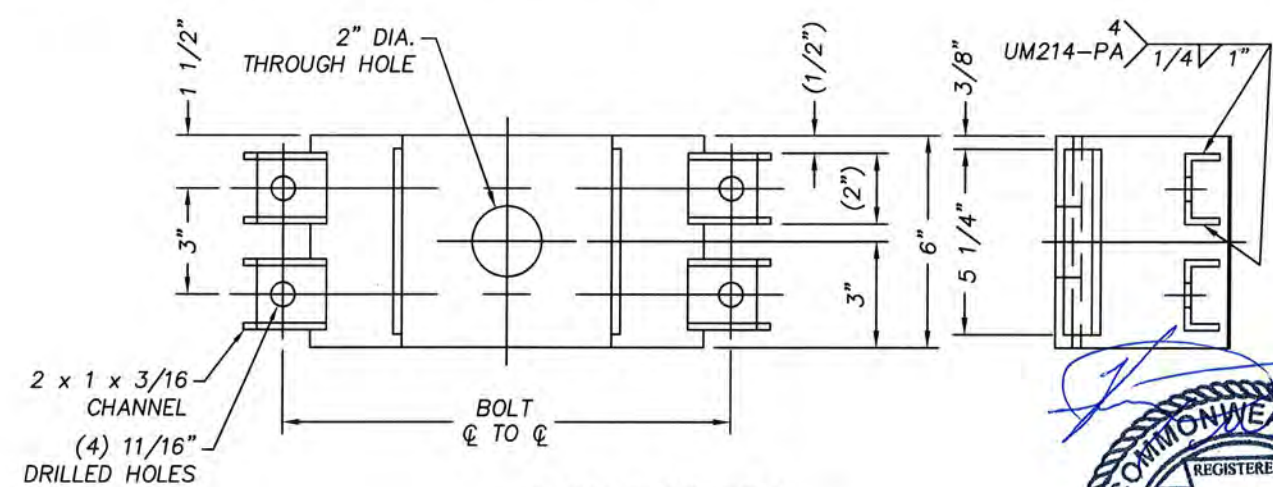
NOTE: CLAMP TO BE SPECIFIED WITH PURCHASE ORDER (SEE ORDERING INSTRUCTIONS)



FRONT CLAMP DETAIL

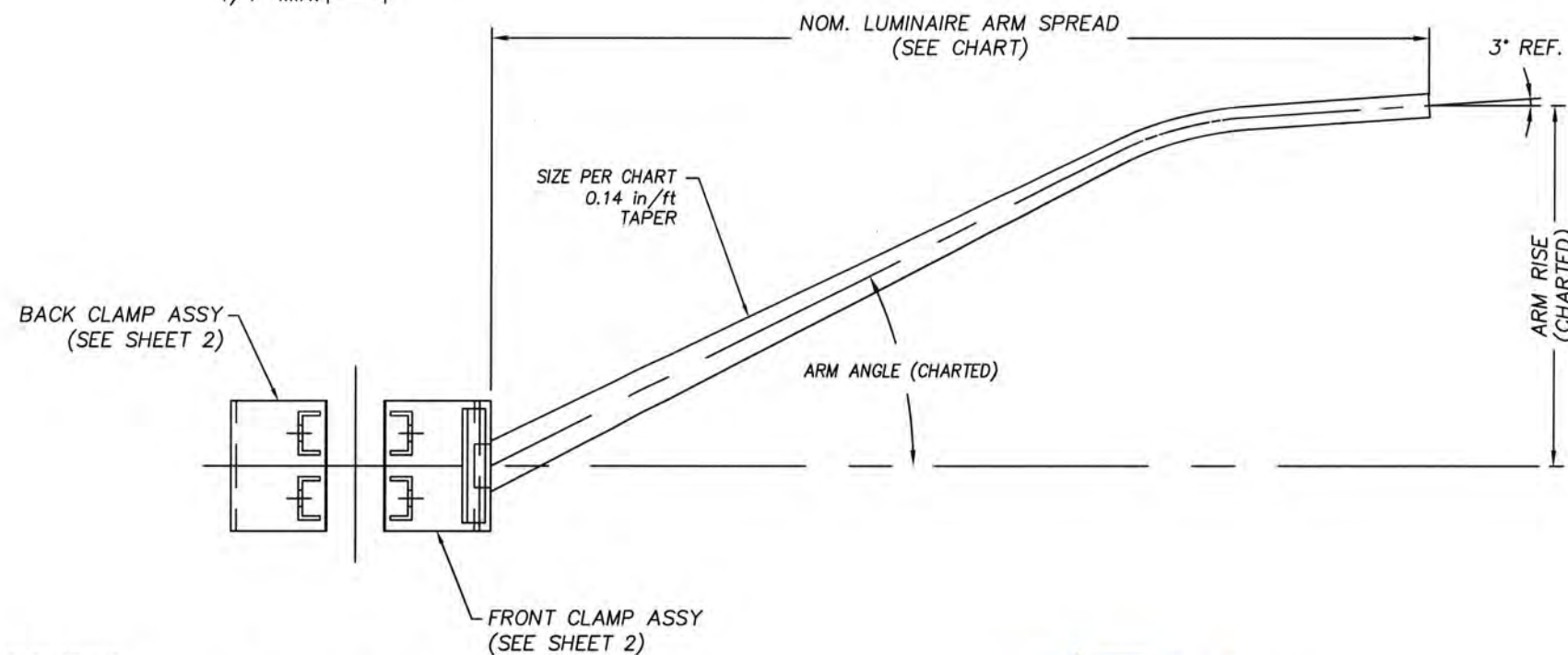
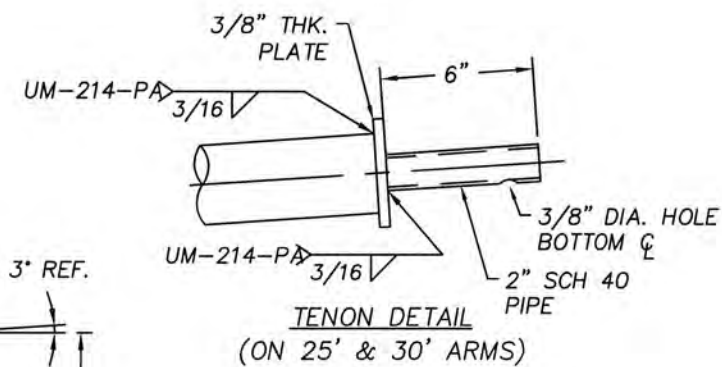
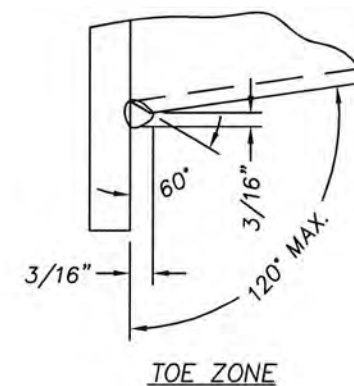
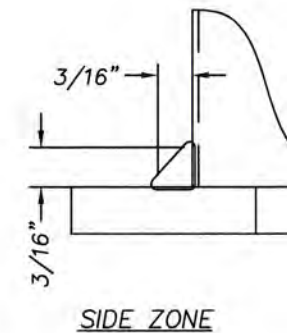
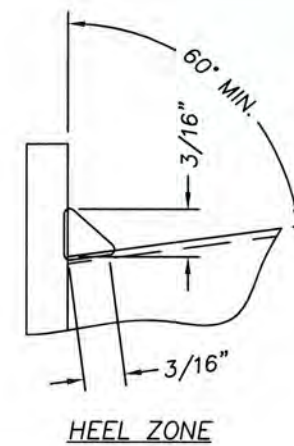
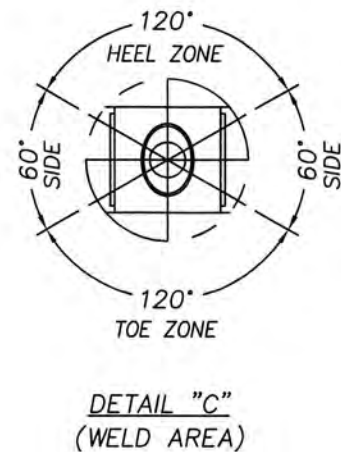
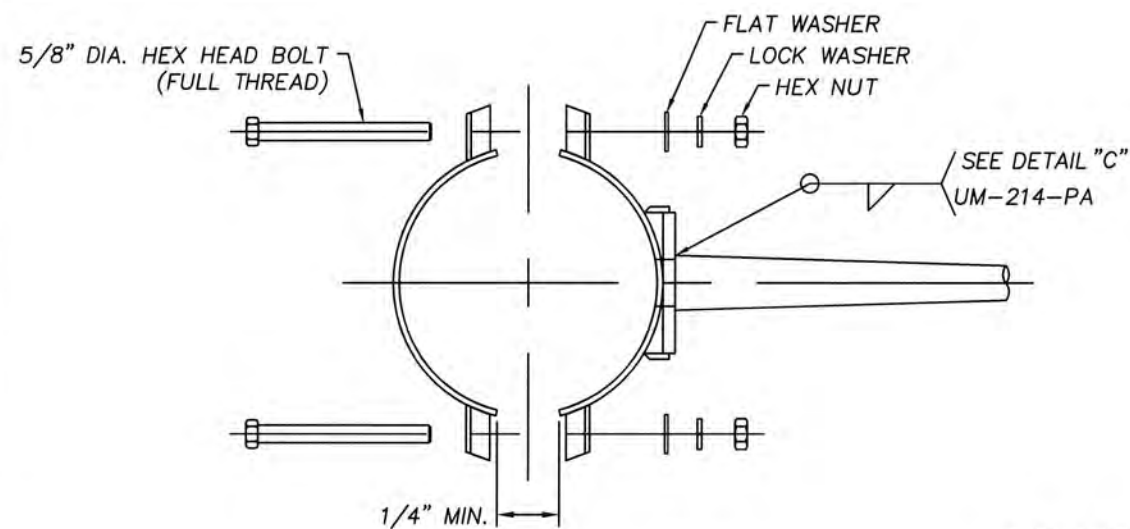


BACK CLAMP DETAIL



STATE: PA	REQ# / SO# :	REV	DESCRIPTION	DATE	REV BY	CHK BY
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS			REVISIONS			
4-BOLT STEEL CLAMP-ON LUMINAIRE ARM (6'-0" THROUGH 15'-0" SPANS) FOR COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION						
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		JDH	PH	04/25/05	NONE	
B82-B101				REVISION	SHEET	
				R6	2 of 2	

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LUMINAIRE ARM DATA				MIN. CLAMP SIZE
NOMINAL SPREAD	ARM RISE	ARM ANGLE	SIZE	
20'-0"	90"	29°	11EB-5.50x2.38x22'-3" OR 11EV-5.52x2.40x22'-3"	D7
25'-0"	102"	26°	11E-6.87x3.13x26'-9"	D8
30'-0"	114"	25°	11E-7.56x3.12x31'-9"	D9

11 GA - 0.120" WALL THICKNESS
E = ROUND STEEL TUBE TAPERED @ 0.14 in/ft

NOTE: ARM SPREAD AND FINISH TO BE SPECIFIED WITH PURCHASE ORDER (SEE ORDERING INSTRUCTIONS)

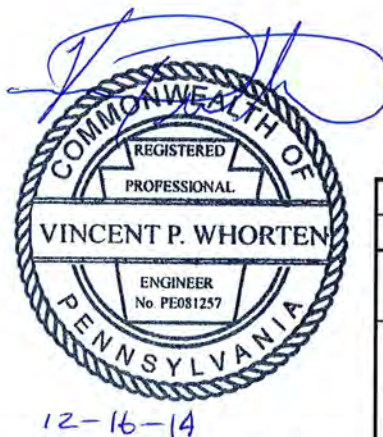
REQUIRED FINISH	
B	UNFINISHED
G	H.D. GALVANIZED
V	H.D. GALVANIZED AND FINISH PAINT

ORDERING INSTRUCTIONS:

- IF A GALVANIZED 30' LUMINAIRE ARM WITH A D9 CLAMP SIZE IS REQUIRED, ORDER: B82-B102-30-D9-G

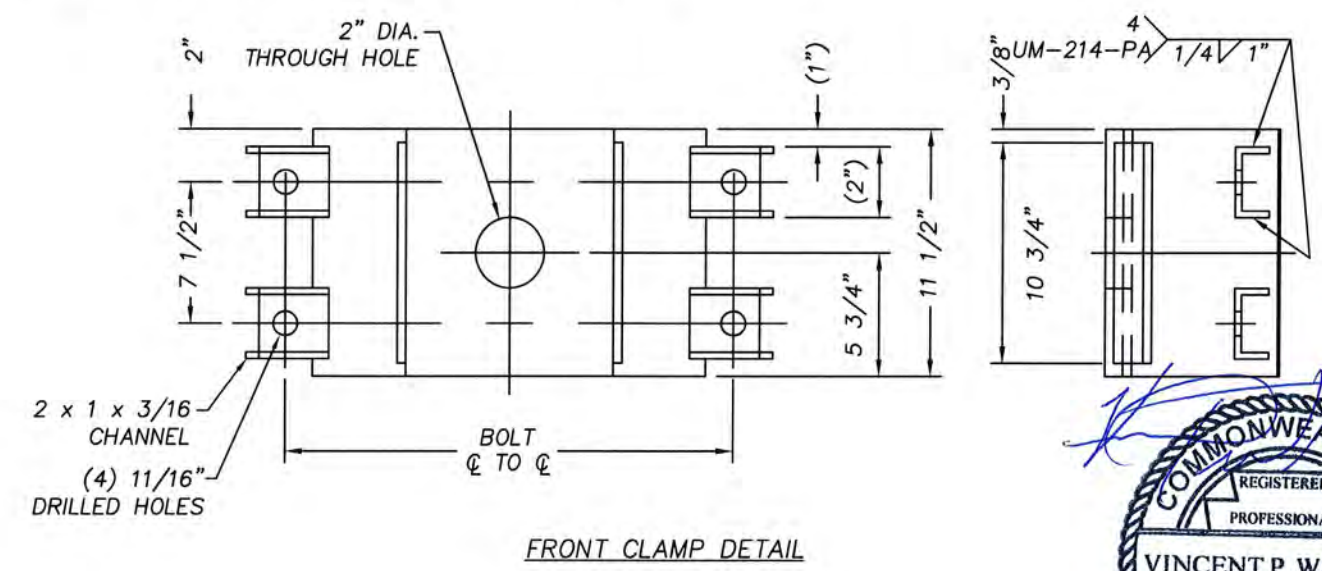
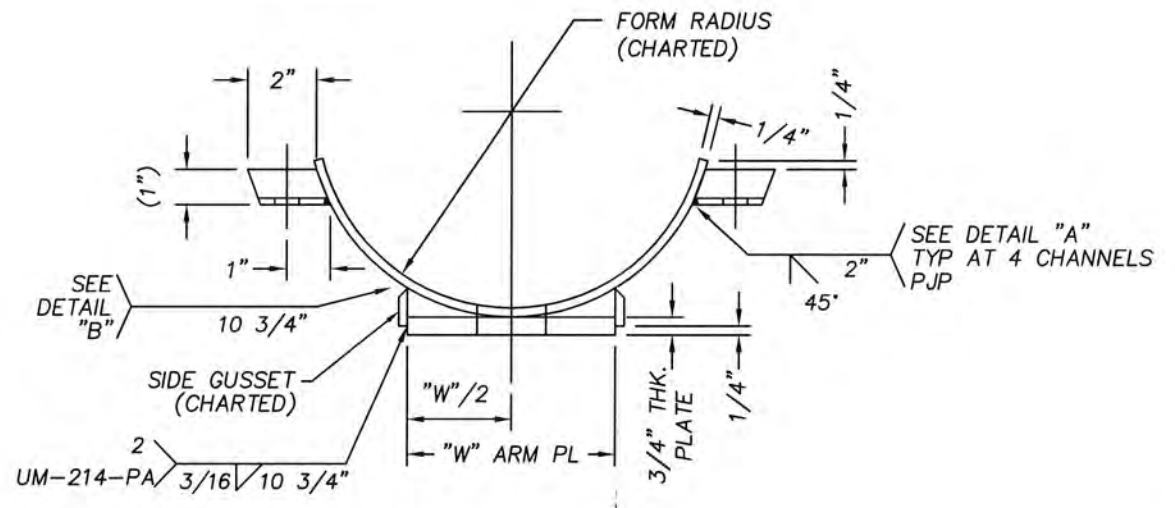
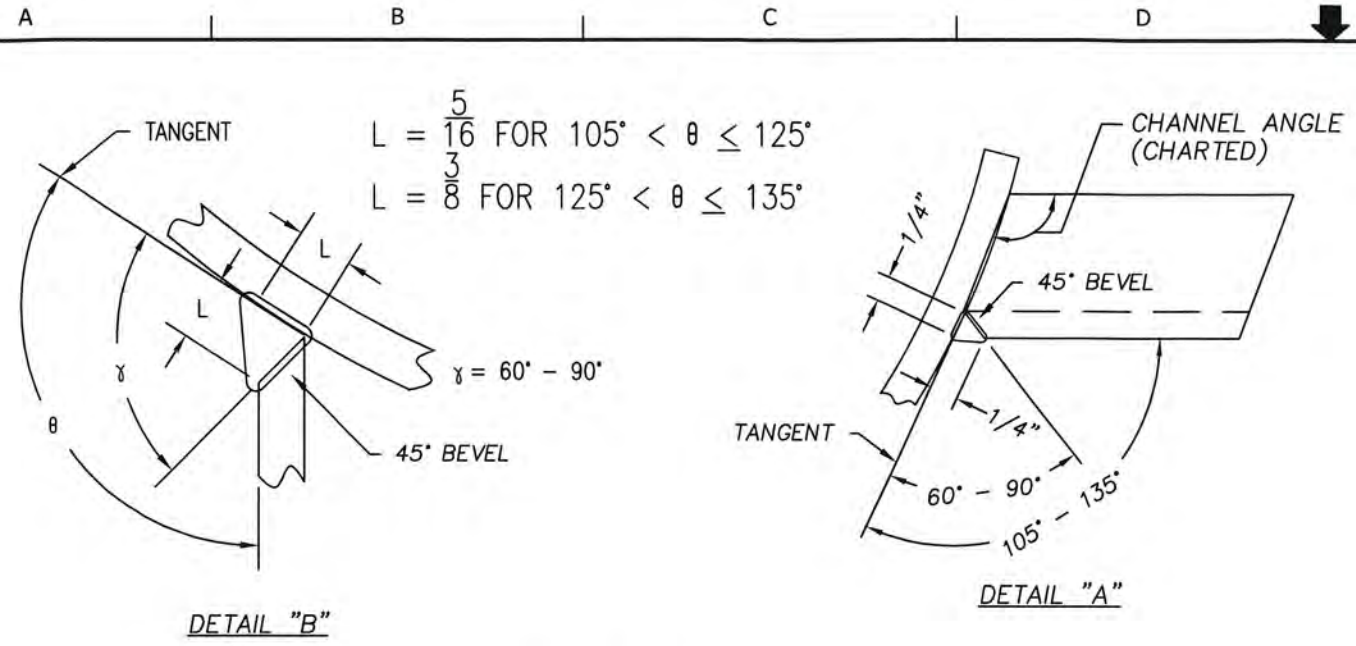
MATERIAL SPECIFICATIONS

TAPERED STEEL TUBES	ASTM A595 GR A
STEEL PLATES AND SHAPES	ASTM A36
TENON PIPE	ASTM A53 GR B or A500 GR B or C
HIGH STRENGTH BOLTS	ASTM A325 Type I (Fully Threaded) (Mechanically Galvanized)
HEAVY HEX NUTS	ASTM A563 GR DH (Mechanically Galvanized)
FLAT WASHER (Type I, Circular)	ASTM F436 (Mechanically Galvanized)
LOCK WASHER (Helical Spring, Reg.)	ASME B18.21.1 (Mechanically Galvanized)



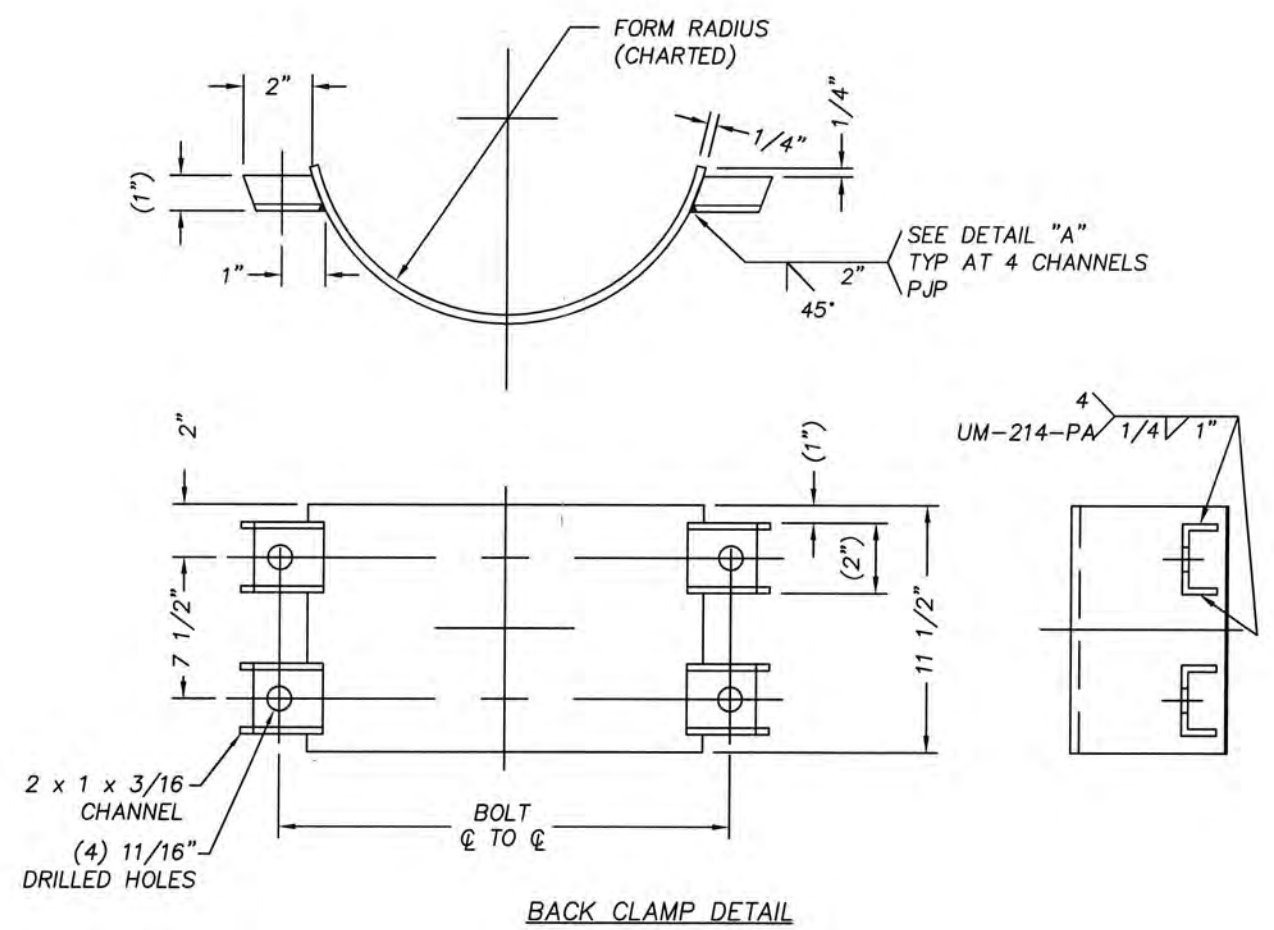
STATE: PA		REQ# / SO# :		REV	DESCRIPTION		DATE	REV BY	CHK
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS				REVISIONS					
4-BOLT STEEL CLAMP-ON LUMINAIRE ARM (20'-0" THROUGH 30'-0" SPANS) FOR COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION									
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				JDH	PH	3/23/06	NTS	B82-B101	
				B82-B102			REVISION	SHEET	
							R7	1 OF 2	

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	NOMINAL ARM SPREAD			POLE O.D. RANGE	DEVELOP LENGTH (in)	FORM RADIUS (in)	CHANNEL ANGLE	BOLT $\varnothing$ TO $\varnothing$	"W" ARM PL	SIDE GUSSET
	20'-0"	25'-0"	30'-0"							
CLAMP	D7	--	--	6.9-7.89	10 13/16	3 15/16	114°	9 1/4"	6 1/2"	1/4" x 2"
	D8	D8	--	7.9-8.89	12 1/4	4 7/16	114°	10 1/4"	8"	1/4" x 2 3/4"
	D9	D9	D9	8.9-9.89	13 7/8	4 15/16	107°	11 1/2"	8 1/2"	1/4" x 2 3/4"
	D10	D10	D10	9.9-10.89	15 7/16	5 7/16	107°	12 1/2"	8 1/2"	1/4" x 2 3/8"
	D11	D11	D11	10.9-11.89	17 1/16	5 15/16	107°	13 1/2"	8 1/2"	1/4" x 2 1/8"
	D12	D12	D12	11.9-12.89	18 9/16	6 7/16	107°	14 5/8"	8 1/2"	1/4" x 1 7/8"
	D13	D13	D13	12.9-13.89	20 1/8	6 15/16	107°	15 5/8"	8 1/2"	1/4" x 1 7/8"
	D14	D14	D14	13.9-14.89	21 13/16	7 7/16	107°	16 5/8"	8 1/2"	1/4" x 1 7/8"
	D15	D15	D15	14.9-15.89	23 3/8	7 15/16	100°	17 3/4"	8 1/2"	1/4" x 1 5/8"
	D16	D16	D16	15.9-16.89	24 13/16	8 7/16	100°	18 7/8"	8 1/2"	1/4" x 1 5/8"
	D17	D17	D17	16.9-17.89	26 1/4	8 15/16	100°	19 7/8"	8 1/2"	1/4" x 1 1/2"
	D18	D18	D18	17.9-18.89	27 3/4	9 7/16	100°	20 7/8"	8 1/2"	1/4" x 1 1/2"

NOTE: CLAMP TO BE SPECIFIED WITH PURCHASE ORDER (SEE ORDERING INSTRUCTIONS)



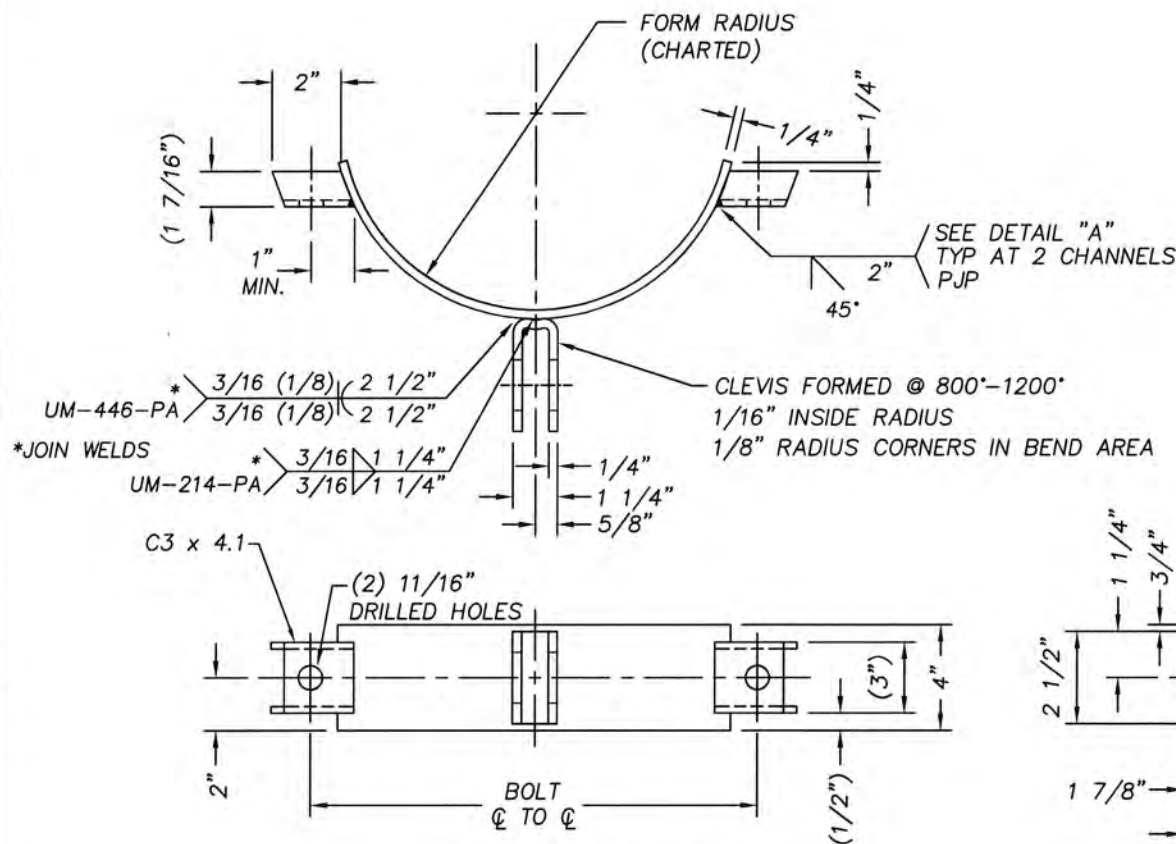
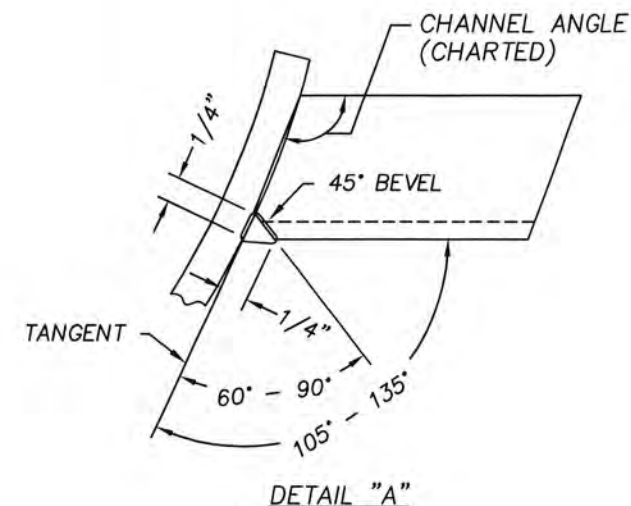
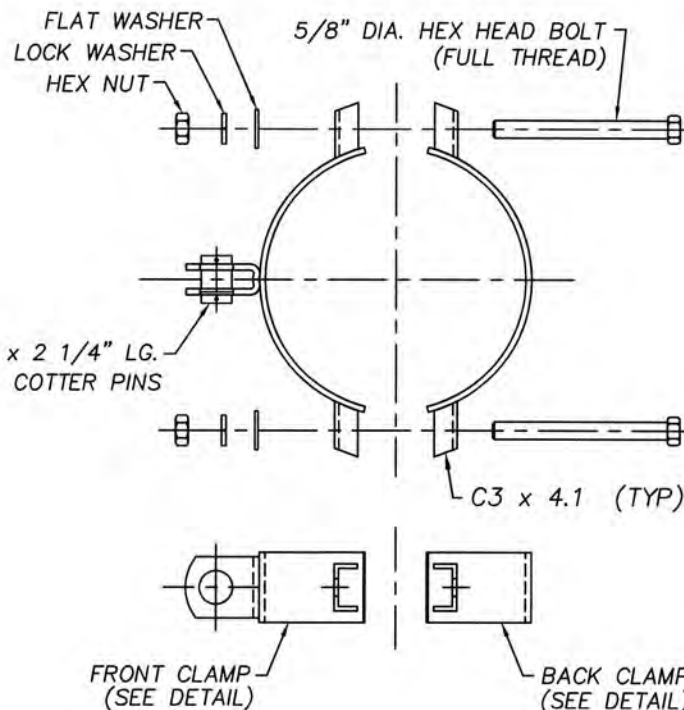
STATE: PA	REQ# / SO# :	REV	DESCRIPTION	DATE	REV BY/CHK BY
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS			REVISIONS		
4-BOLT STEEL CLAMP-ON LUMINAIRE ARM (20'-0" THROUGH 30'-0" SPANS) FOR COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION					
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		JDH	PH	3/23/06	NTS
B82-B102				REVISION	ENG REF
				R7	B82-B101
					SHEET
					2 of 2

CLAMP	POLE OD RANGE	DEVELOP LENGTH (in)	FORM RADIUS (in)	CHANNEL ANGLE	BOLT SPACING
D6	5.9-6.89	9 1/8	3 7/16	114°	8 1/8
D7	6.9-7.89	10 13/16	3 15/16	114°	9 1/4
D8	7.9-8.89	12 1/4	4 7/16	114°	10 1/4
D9	8.9-9.89	13 7/8	4 15/16	107°	11 1/4
D10	9.9-10.89	15 7/16	5 7/16	107°	12 1/4
D11	10.9-11.89	17 1/16	5 15/16	107°	13 1/4
D12	11.9-12.89	18 9/16	6 7/16	107°	14 3/8
D13	12.9-13.89	20 1/8	6 15/16	107°	15 3/8
D14	13.9-14.89	21 13/16	7 7/16	107°	16 3/8

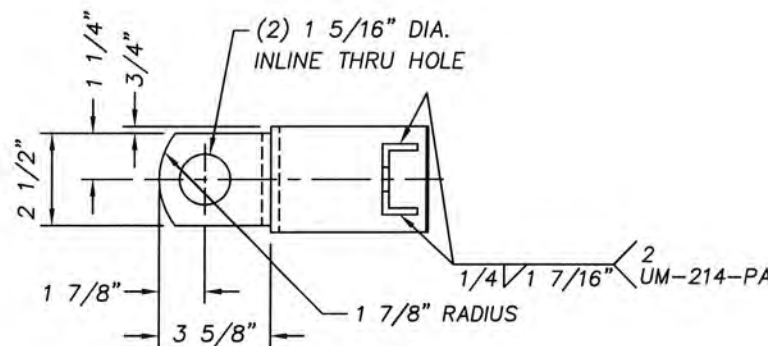
NOTE: CLAMP AND FINISH TO BE SPECIFIED WITH PURCHASE ORDER (SEE ORDERING INSTRUCTIONS)

REQUIRED FINISH	
B	UNFINISHED
G	H.D. GALVANIZED
V	H.D. GALVANIZED AND FINISH PAINT

1 1/4" A36 ROD (SOLID) x 2 1/4" LG.
AND (2) 3/16" x 2" S.S. COTTER PINS



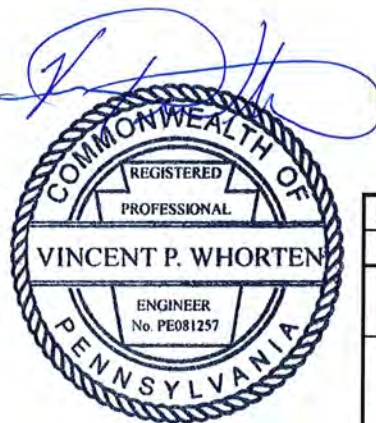
SPAN WIRE CLAMP DETAIL
(FRONT CLAMP)



SPAN WIRE CLAMP DETAIL
(BACK CLAMP)

ORDERING INSTRUCTIONS:

- IF A GALVANIZED D9 CLAMP IS REQUIRED,
ORDER: B82-B104-D9-G



12-16-14

MATERIAL SPECIFICATIONS	
STEEL PLATES AND SHAPES	ASTM A36
HIGH STRENGTH BOLTS	ASTM A325 Type I (Mechanically Galvanized)
HEAVY HEX NUTS	ASTM A563 GR DH (Mechanically Galvanized)
BAR	ASTM A36
FLAT WASHER (Type I, Circular)	ASTM F436 (Mechanically Galvanized)
LOCK WASHER (Helical Spring, Reg.)	ASME B18.21.1 (Mechanically Galvanized)

STATE: PA		REQ# / SO# :		REV	DESCRIPTION		DATE	REV BY	CHK BY
PROJECT NAME: TRAFFIC SIGNAL SUPPORT STANDARDS				REVISIONS					
2-BOLT STEEL CLAMP-ON SPAN WIRE CLAMP FOR COMMONWEALTH OF PENNSYLVANIA DEPT. OF TRANSPORTATION									
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				ALB	SAD	6/24/10	NONE		
				B82-B104			REVISION	SHEET	
							R3	1 of 1	