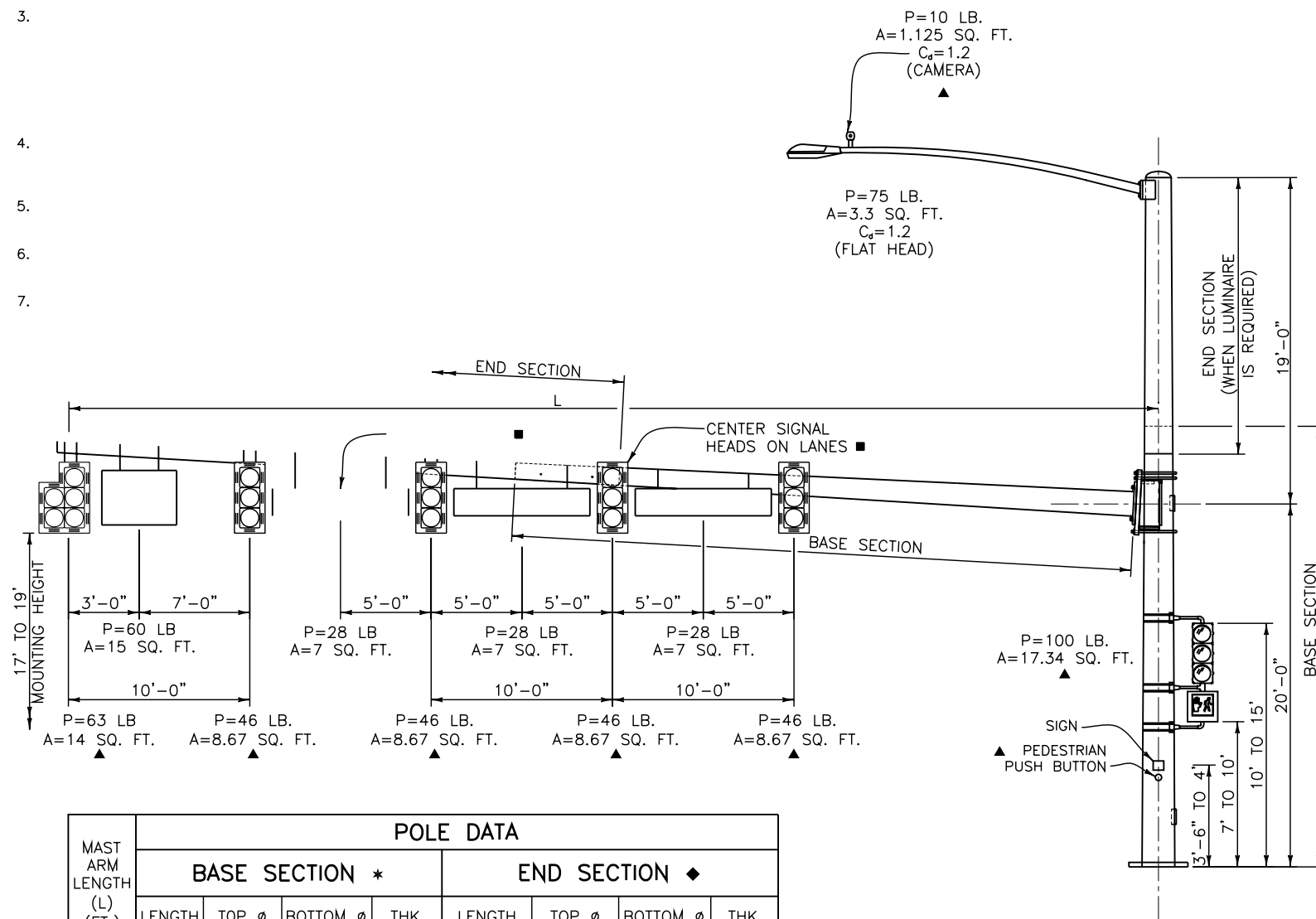


GENERAL NOTES

1. ■
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
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- 23.
- 24.
- 25.
- 26.
- 27.
28. IF THE VERTICAL DEFLECTIONS DURING A 10 TO 20 MPH WIND EXCEED THE GALLOPING DEFLECTION LIMITS LISTED IN THE TABLE ON SHEET 2 OF 5, THE OWNER SHALL INSTALL AN ALUMINUM SIGN BLANK (16" X 66" OR LARGER) NEAR THE FREE END OF THE TRAFFIC SIGNAL MAST ARM. SAID SIGN BLANK SHALL BE ROTATED ABOUT THE LONGITUDINAL AXIS OF THE ARM WHILE THE WIND BLOWS TO MINIMIZE THE GALLOPING DEFLECTIONS. CONTACT STAFF BRIDGE FOR MORE INFORMATION.
29. ONE DRILLED HOLE WITH A MAXIMUM DIAMETER OF 3/4" IS ALLOWED AT LOCATIONS MARKED WITH A ▲ TO ACCOMMODATE ELECTRICAL WIRING.

DESIGN DATA

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.



MAST ARM LENGTH (L) (FT.)	POLE DATA							
	BASE SECTION *				END SECTION ◆			
	LENGTH (FT.)	TOP Ø (IN.)	BOTTOM Ø (IN.)	THK. (IN.)	LENGTH (FT.)	TOP Ø (IN.)	BOTTOM Ø (IN.)	THK. (IN.)
ALL ARMS	24.47	11.57	15.00	0.3125	16.00	9.90	12.14	0.1793

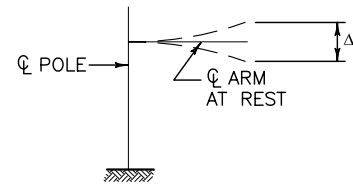
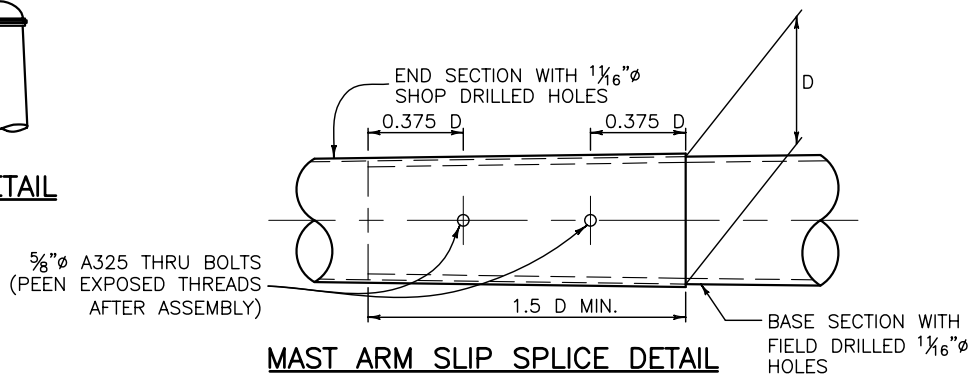
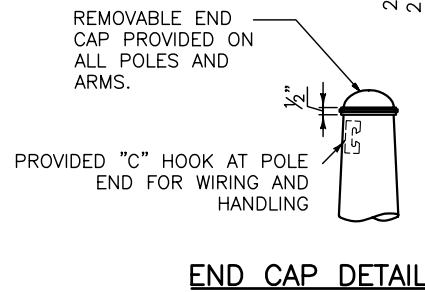
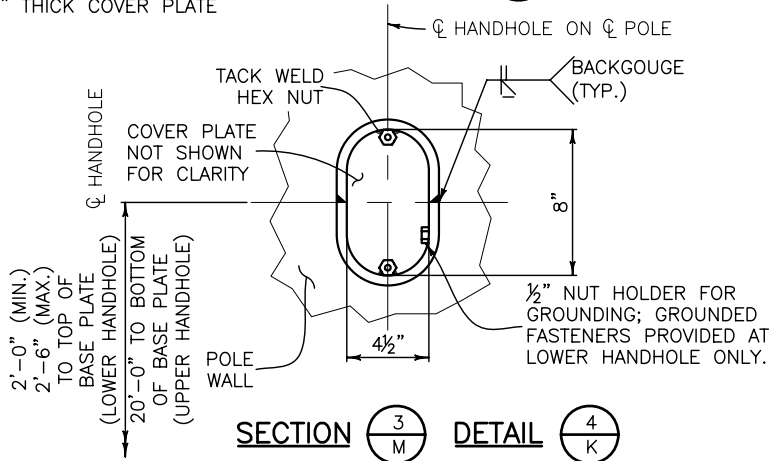
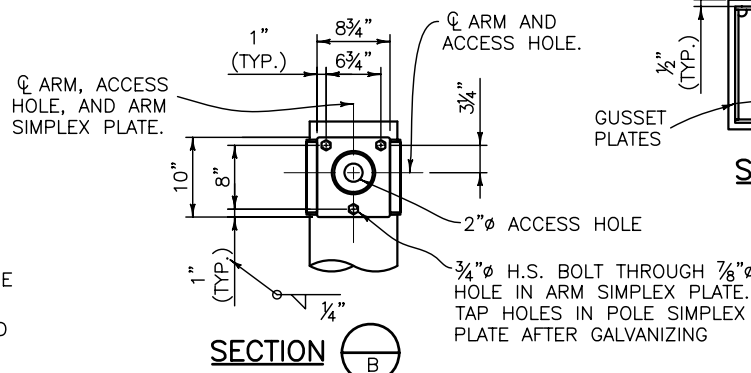
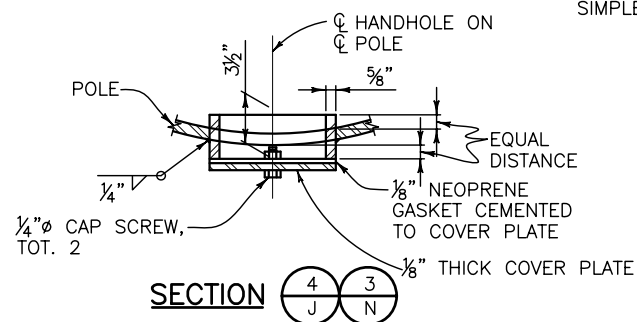
* BASE SECTION LENGTHS INCLUDE THE SPLICE LENGTH AS PER THE "MAST ARM SPLICE DETAIL" ON SHEET 2 OF 5
 ◆ SEE GENERAL NOTE 26

○ CROSS REFERENCE DRAWING NUMBER (IF BLANK, REFERENCE IS TO SAME SHEET)
 — SECTION OR DETAIL IDENTIFICATION
 ▲ ARROW HEAD FOR SECTION CUT AND LEADER LINE FOR DETAIL

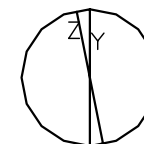
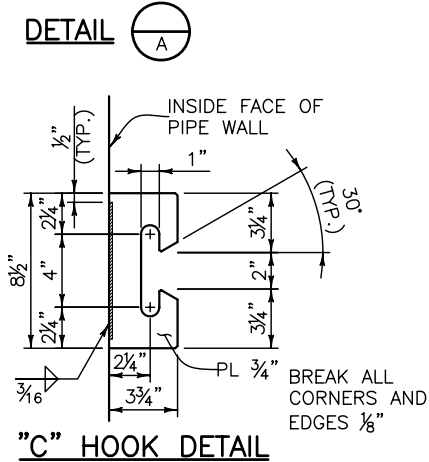
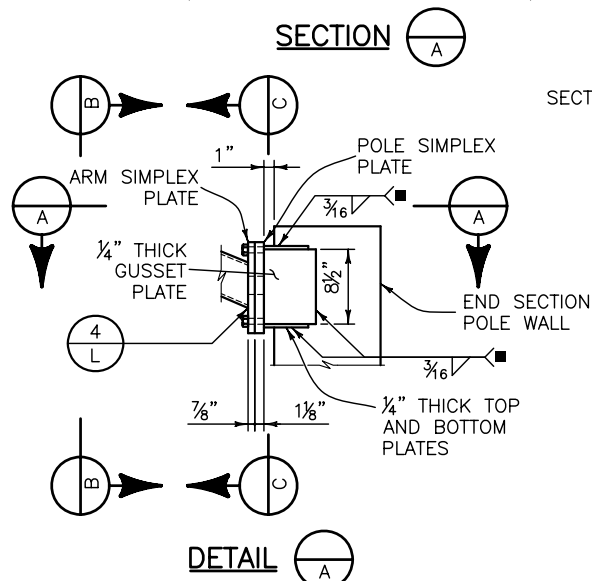
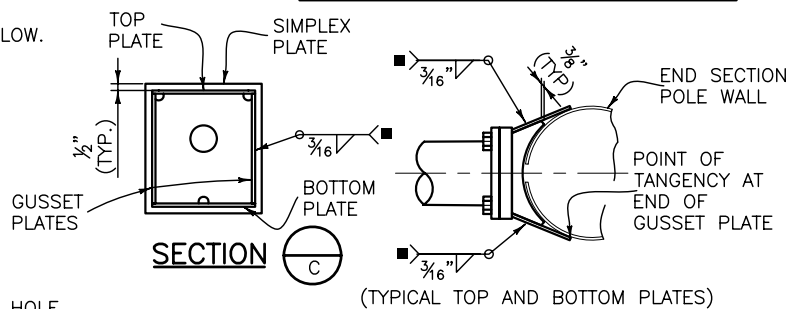
URING WELDING TO PREVENT DISTORTION.

MAST ARM LENGTH (L) (FT.)	MAST ARM DATA								GALLOPING DEFLECTION LIMITS (Δ) (IN) •
	BASE SECTION *				END SECTION ♦				
	LENGTH (FT.)	TIP ϕ (IN.)	TRUNK ϕ (IN.)	THK. (IN.)	LENGTH (FT.)	TIP ϕ (IN.)	TRUNK ϕ (IN.)	THK. (IN.)	
25	23.92	6.65	10.00	0.2391	N.A.	N.A.	N.A.	N.A.	+
35	33.92	7.50	12.25	0.2391	N.A.	N.A.	N.A.	N.A.	+
45	25.16	9.73	13.25	0.3125	20.00	7.46	10.26	0.1793	6"
55	25.34	11.20	14.75	0.3125	30.00	7.56	11.76	0.1793	11"

- * BASE SECTION LENGTH INCLUDES THE SPLICE LENGTH AS PER THE "MAST ARM SLIP SPLICE DETAIL" BELOW.
- ♦ SEE GENERAL NOTE 26 ON SHEET 1 OF 5.
- SEE GENERAL NOTE 28 ON SHEET 1 OF 5.
- + DEFLECTION TOO SMALL TO MEASURE.
- STOP ALL WELDS 1/2" SHORT OF PLATE EDGES AND BOLT HOLES.

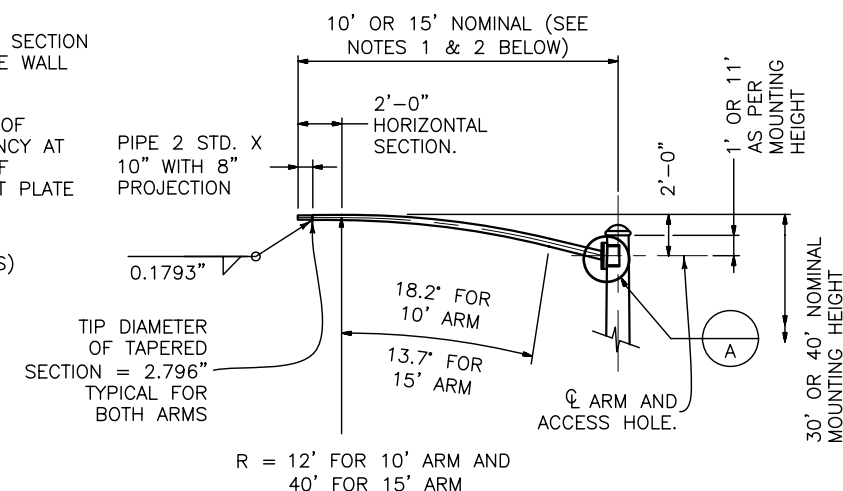


GALLOPING DEFLECTION LIMITS



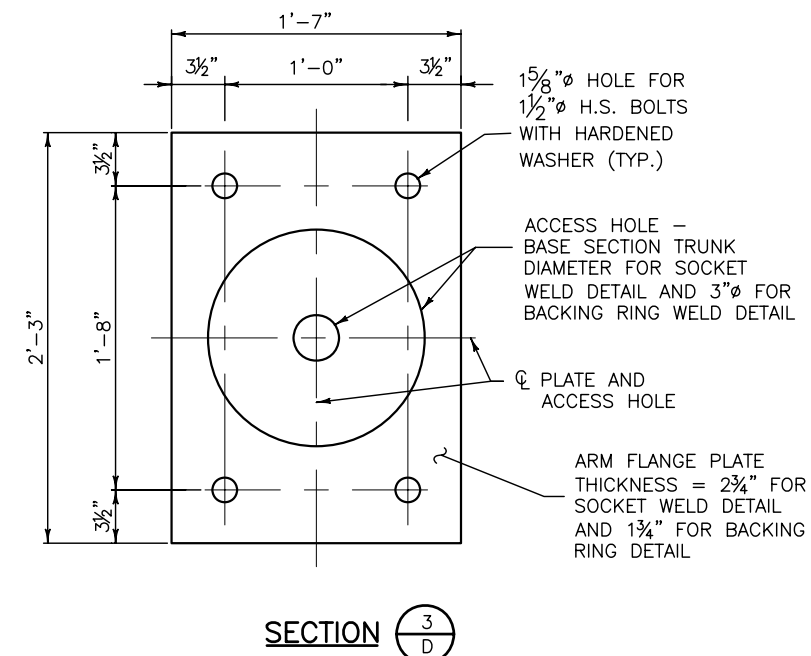
Y = DIAMETER OF A ROUND TUBE.
Z = PERPENDICULAR DISTANCE BETWEEN FLATS.
Y AND Z ARE OUTSIDE DIAMETER DIMENSIONS.
Z/Y RATIO MUST BE .98 MINIMUM.

OPTIONAL MULTI-SIDED POLE OR MAST ARM



LUMINAIRE ARM NOTES

- 10' LUMINAIRE ARM SHAFT: WALL THICKNESS = 0.1793"; LINEAR TAPER = 0.14 IN./FT.; DIAMETER AT ARM SIMPLEX PLATE = 4.066".
- 15' LUMINAIRE ARM SHAFT: WALL THICKNESS = 0.1793"; LINEAR TAPER = 0.14 IN./FT.; DIAMETER AT ARM SIMPLEX PLATE = 4.679".



Computer File Information	
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Sheet Revisions	
Date:	Comments
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(R-X)	
(R-X)	

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ALTERNATE TRAFFIC SIGNAL INSTALLATION DETAILS

Issued By: Traffic Engineering Unit July 4, 2006

STANDARD PLAN NO.

S-614-40A

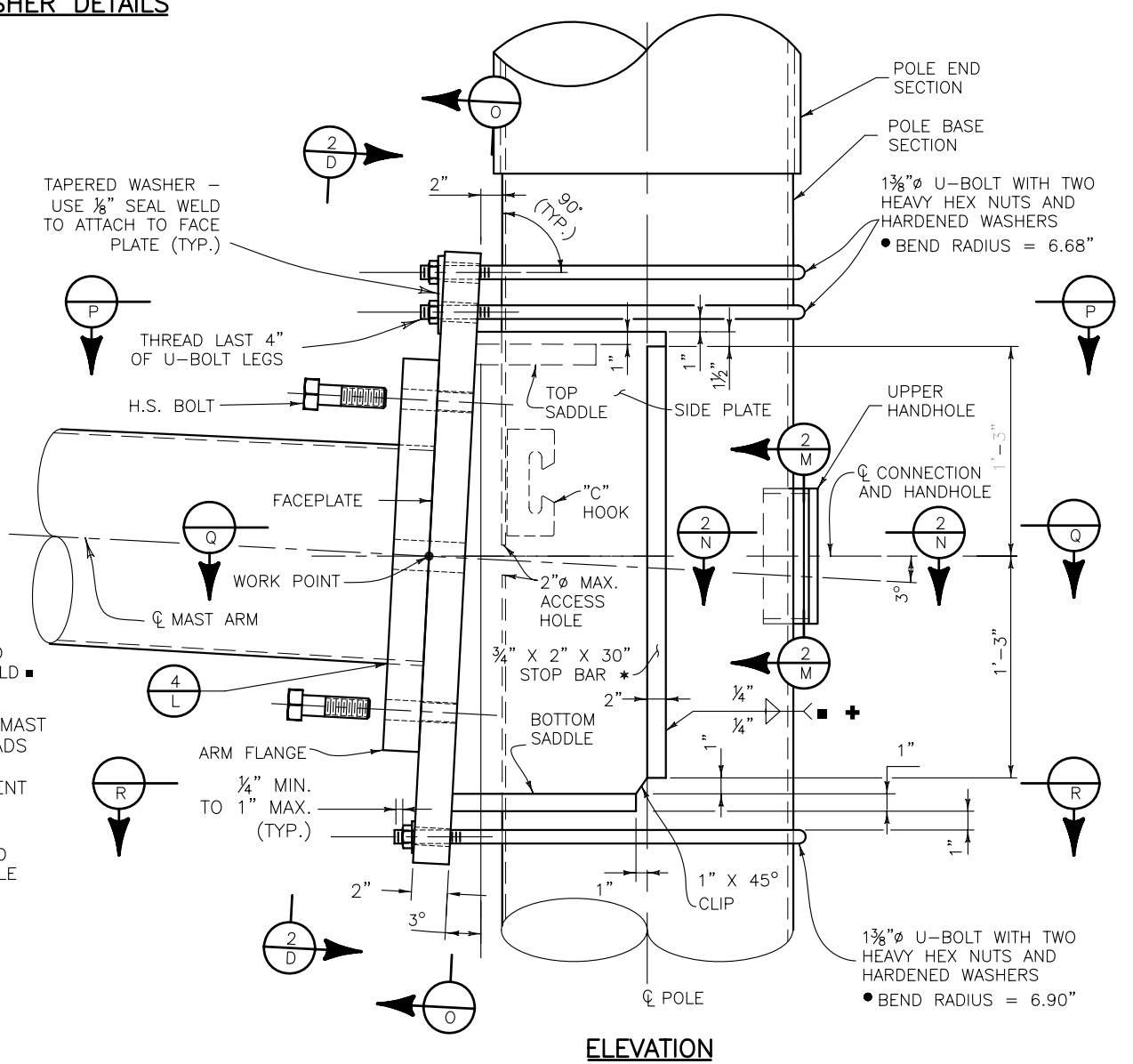
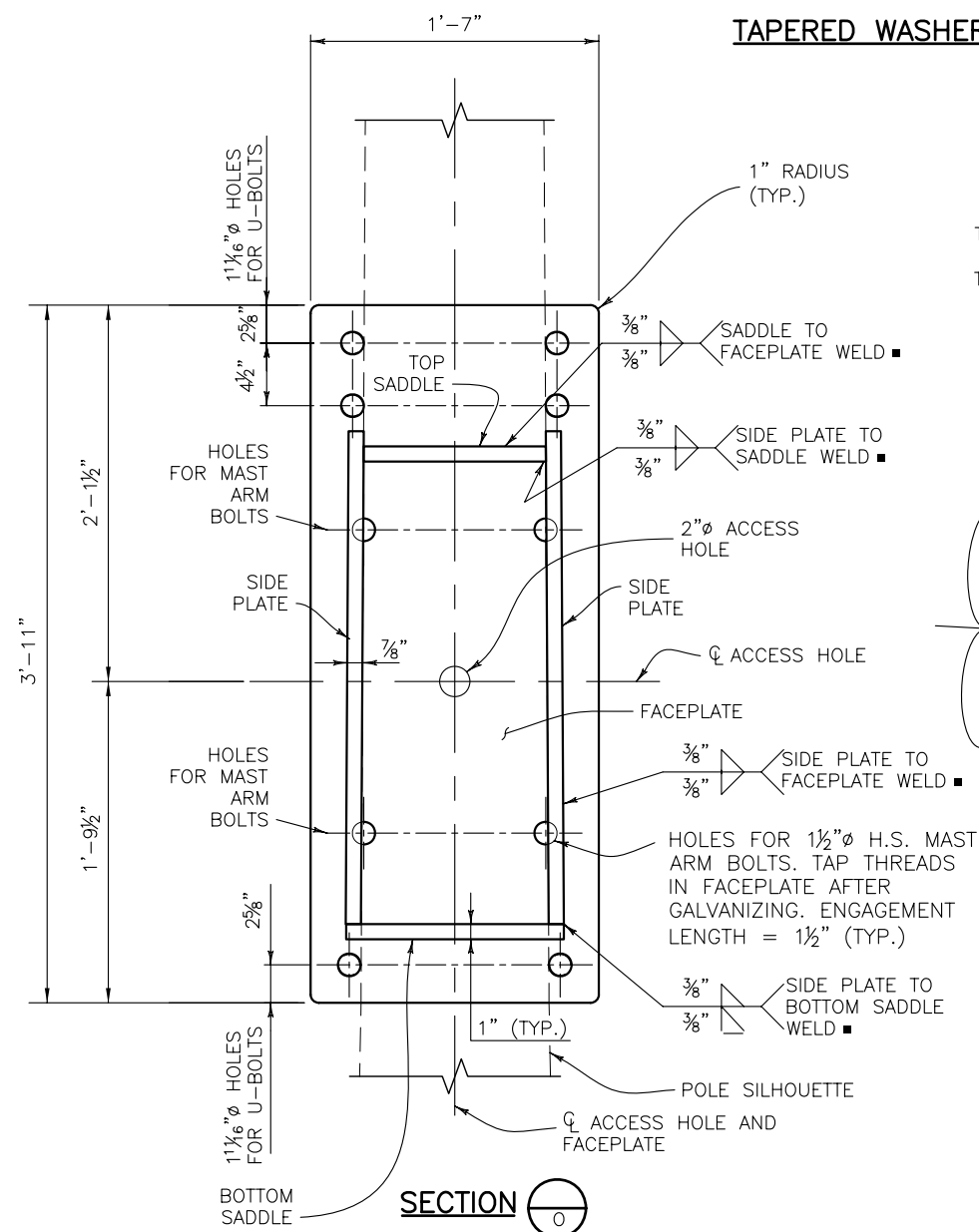
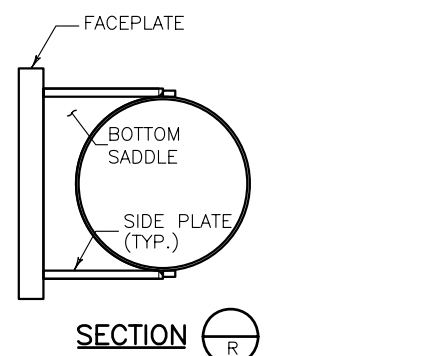
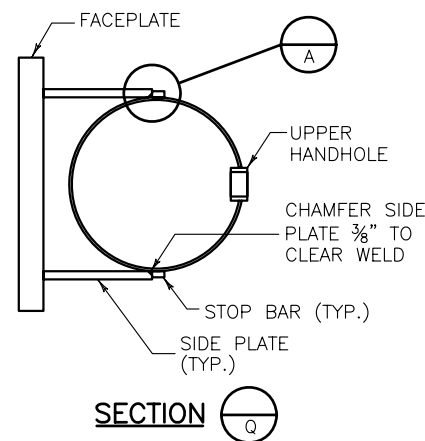
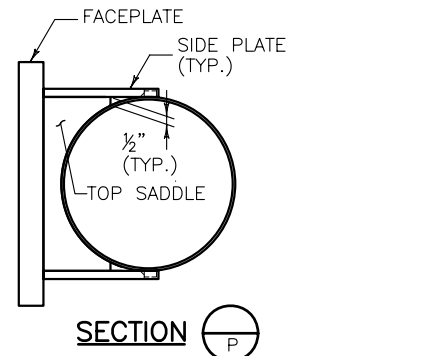
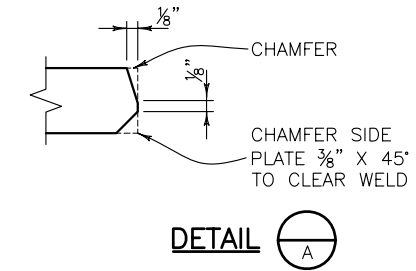
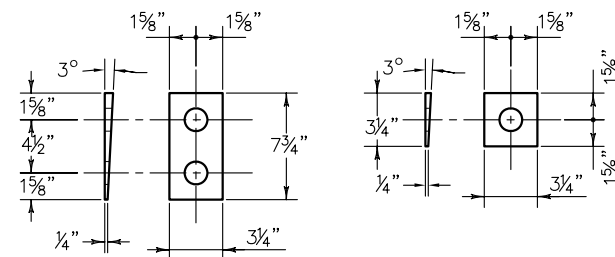
Sheet No. 2 of 5

- BEND RADIUS MEASURED TO THE ϕ OF EACH U-BOLT. INCREASE RADII AS NEEDED TO ACCOMMODATE OUT-OF-ROUNDNESS, GALVANIZING THICKNESS AND SEAM WELD PROFILES. U-BOLTS SHALL BE TIGHTENED $\frac{1}{2}$ TURN ($30^\circ \pm 5'$) PAST SNUG TIGHT; PEEN THREADS AFTER TIGHTENING. U-BOLTS AND FACEPLATE SHALL BE MOUNTED ON BASE SECTION PRIOR TO SHIPMENT.

- ◆ MATCH FIT STOP BAR TO SIDE PLATE USING TACK WELDS TO ENSURE UNIFORM REARING.

- STOP ALL WELDS $\frac{1}{2}$ " SHORT OF PLATE EDGES AND BOLT HOLES.

- * BEND STOP BAR TO MATCH POLE CURVATURE.



Computer File Information	
Creation Date: 07-04-06	Initials: TDE
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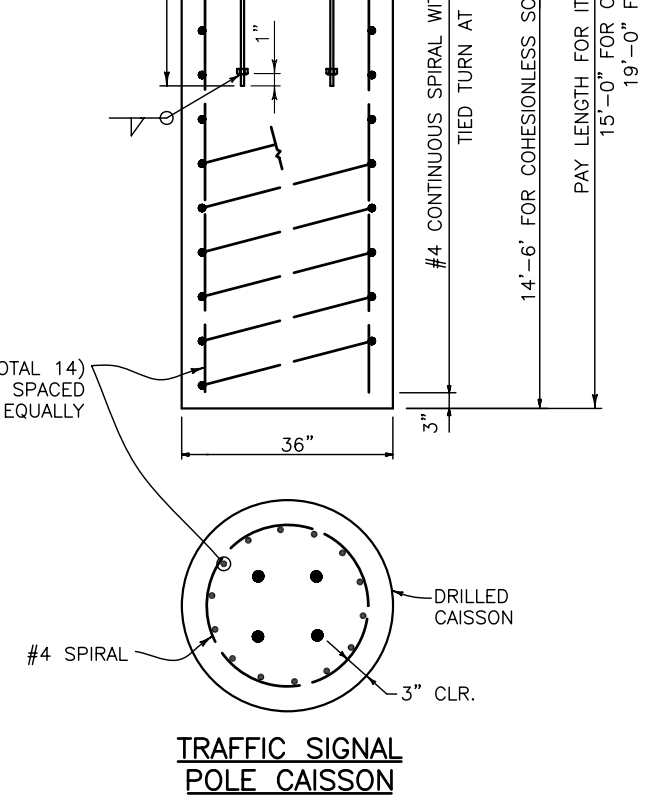
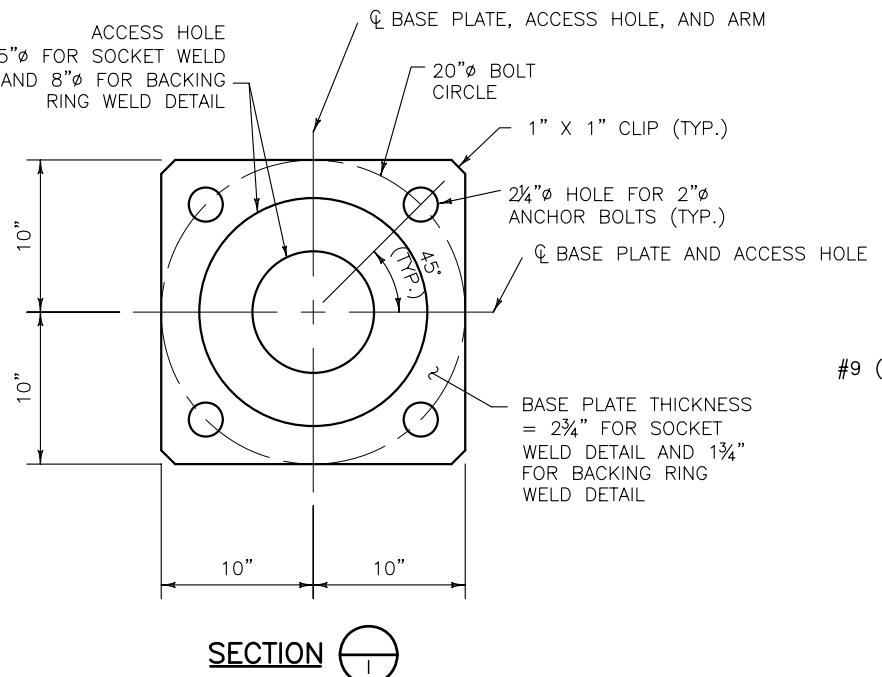
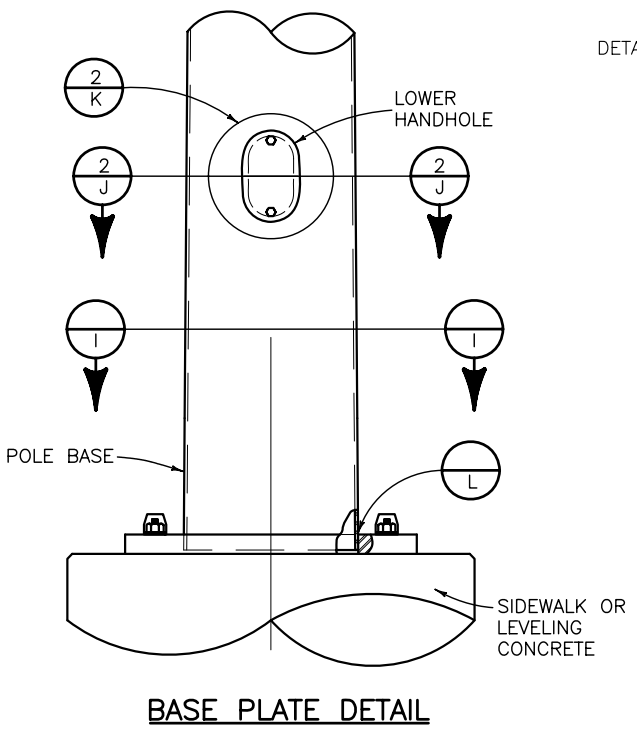
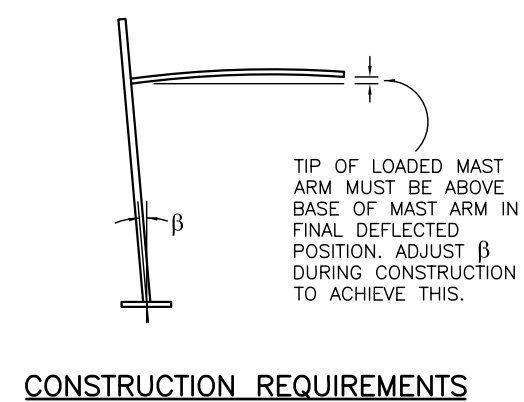
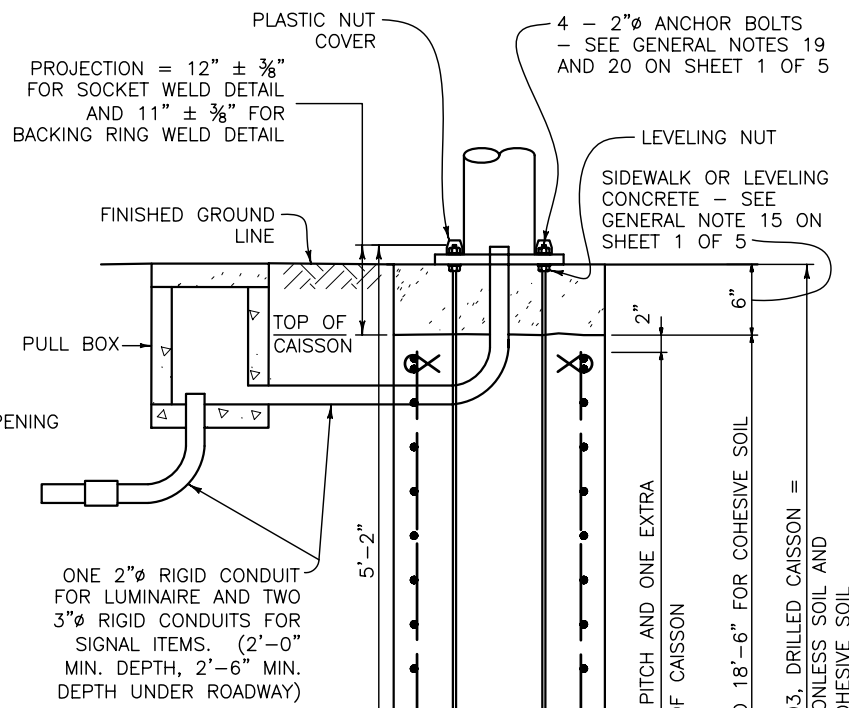
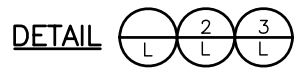
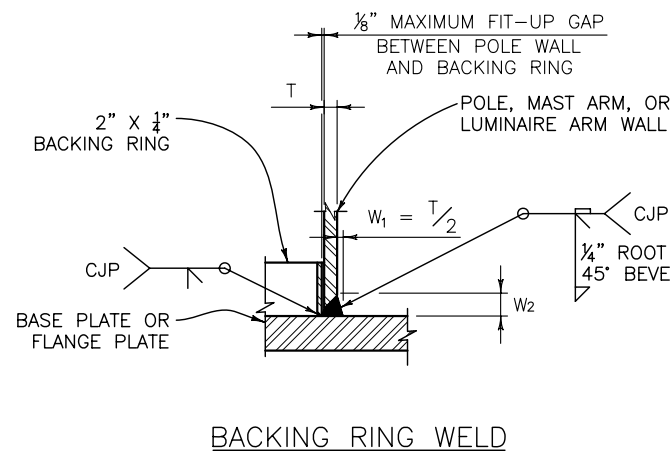
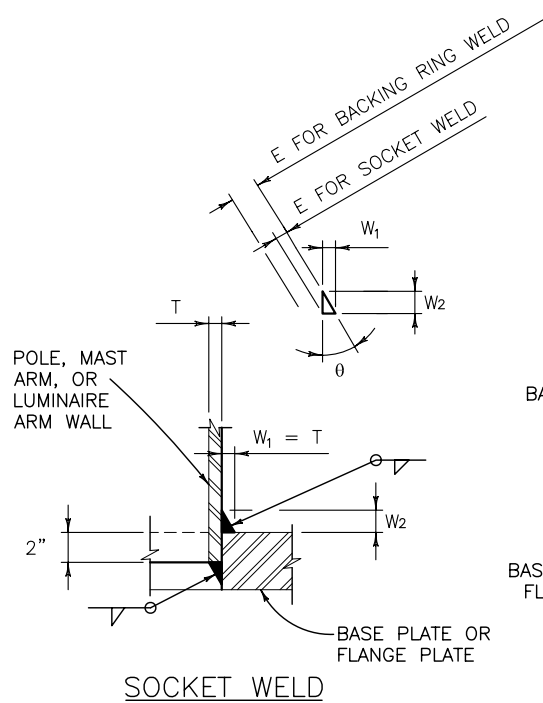
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ALTERNATE TRAFFIC SIGNAL
 INSTALLATION DETAILS
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STANDARD PLAN NO.
 S-614-40A
 Sheet No. 3 of 5

SOCKET WELD DATA					
	ARM LENGTH (FT.)	W ₁ (IN.)	W ₂ (IN.)	E (IN.)	θ (DEG.)
MAST ARMS	25	0.2391	0.285	0.183	40
	35	0.2391	0.285	0.183	40
	45	0.3125	0.372	0.239	40
	55	0.3125	0.372	0.239	40
POLE	ALL	0.3125	0.372	0.239	40
LUMINAIRE ARMS	ALL	0.1793	0.214	0.138	40

BACKING RING WELD DATA					
	ARM LENGTH (FT.)	W ₁ (IN.)	W ₂ (IN.)	E (IN.)	θ (DEG.)
MAST ARMS	25	0.1196	0.489	0.289	14
	35	0.1196	0.489	0.289	14
	45	0.1566	0.563	0.385	16
	55	0.1566	0.563	0.385	16
POLE	ALL	0.1566	0.563	0.385	16
LUMINAIRE ARMS	ALL	0.0897	0.429	0.212	12



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STANDARD PLAN NO.
 S-614-40A
 Sheet No. 4 of 5

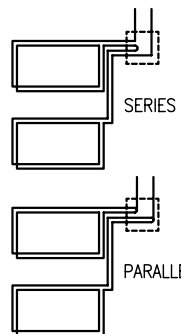
STANDARD LOOP

WIRING AND CONNECTION TABLE

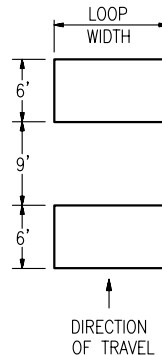
NO. OF LOOPS	WIDTH OF LOOP (FEET)										
	6	8	10	12	14	16	18	20	22	24-36	40+
1	4	3	3	3	3	3	3	3	2	2	2
2	3S	3S	3S	3P	2S	2S	2S	2S	2S	2S	2P
3	3S	3S	2S	2S	3SP	3SP	3SP	3SP	2SP	2SP	2P
4	3SP	3SP	3SP	3SP	3SP	3SP	3SP	2SP	2SP	2SP	2SP

URNS PER LOOP AND TYPE CONNECTION
(S = SERIES, P = PARALLEL)

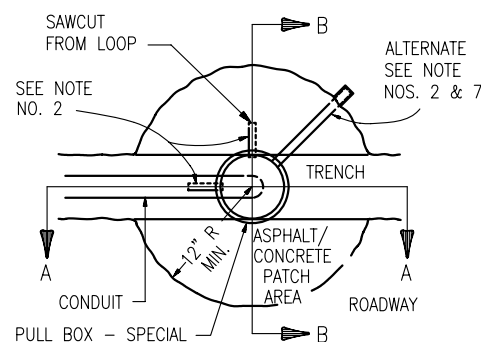
WIRE CONFIGURATION



LAYOUT



TOP VIEW



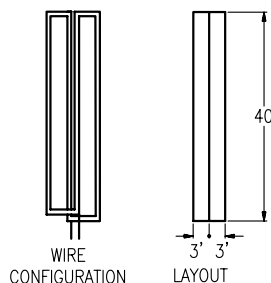
PULL BOX - SPECIAL NOTES:

- PULL BOX-SPECIAL SHALL BE A WATER VALVE STEM TYPE PULL BOX MADE OF CAST IRON OR STEEL. THE PULL BOX ITSELF SHALL HAVE CAPABILITY OF ACCEPTING RISER RINGS FOR FUTURE OVERLAYS. THE LID SHALL HAVE THE WORD "TRAFFIC" PRINTED ON IT.
- PULL BOXES SHALL HAVE 3/4 IN. TO 1 IN. DIAMETER HOLES DRILLED OR TORCHED 3 IN. FROM TOP TO ACCEPT A 4 IN. TO 6 IN. LONG RUBBER TUBE (3/4 IN. GARDEN HOSE). THE NUMBER OF HOLES SHALL BE AS PER PLANS OR AS DIRECTED BY THE ENGINEER.
- CARE SHALL BE TAKEN DURING BACKFILL COMPACTION TO PREVENT COLLAPSE OF THE TUBES.
- A MINIMUM 2 FEET OF SLACK IS TO BE PROVIDED ON BOTH FEED AND LOOP WIRES SO THAT ALL TESTING AND SPLICING CAN BE DONE OUTSIDE THE PULL BOX.
- PULL BOX LID IS TO BE SEALED WATER TIGHT BY CAULKING.
- PULL BOX IS TO BE LOCATED IN AN AREA OF THE STREET NOT HEAVILY TRAVELED, IF POSSIBLE, AND A MINIMUM OF 12 IN. FROM THE CONCRETE GUTTER PAN.
- IF HOT ASPHALT IS NOT AVAILABLE, A CONCRETE RING (12 IN. MINIMUM RADIUS AND 8 IN. MINIMUM DEPTH) MAY BE ALLOWED BY THE ENGINEER. IF CONCRETE IS ALLOWED, THE RUBBER TUBE MUST BE EXTENDED BEYOND THE CONCRETE TO THE ASPHALT JOINT.
- ALL WORK LISTED ABOVE FOR INSTALLATION OF PULL BOXES SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE PRICE OF CONDUIT.

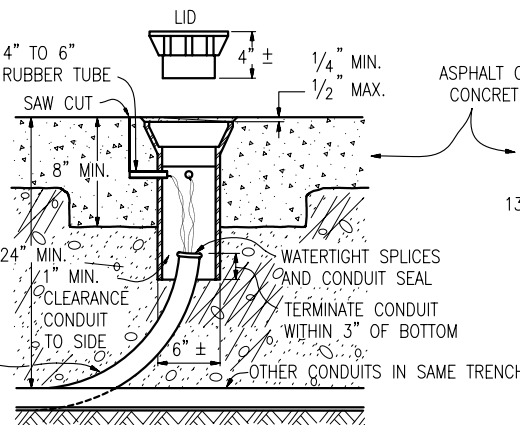
LOOP INSTALLATION PROCEDURE

- CUT SLOTS IN PAVEMENT TO 3 IN. MINIMUM DEPTH.
- CLEAN AND DRY SLOTS WITH OIL-FREE COMPRESSED AIR.
- ONE CONTINUOUS LENGTH OF 14/IC, RHW, USE, XLPE, RHWN OR THWN WIRE SHALL BE USED FOR EACH LOOP FROM SIGNAL BASE OR PULL BOX AROUND THE LOOP WITH THE NUMBER OF TURNS SPECIFIED AND BACK TO THE SIGNAL BASE OR PULL BOX. LOOP WIRE SHALL BE DUCT TYPE.
- USE A BLUNT, NON-METALLIC INSTRUMENT TO PUSH WIRE INTO SLOT. DO NOT COIL LEADS.
- CONNECT DETECTOR AND TEST LOOP.
- SEAL SLOTS AS SPECIFIED.

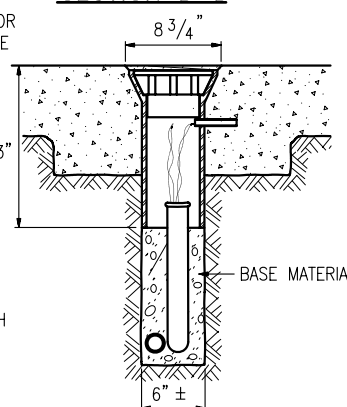
STANDARD LOOP



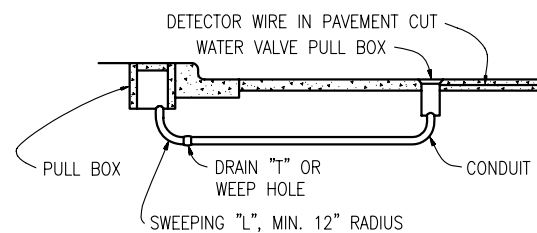
SECTION A-A



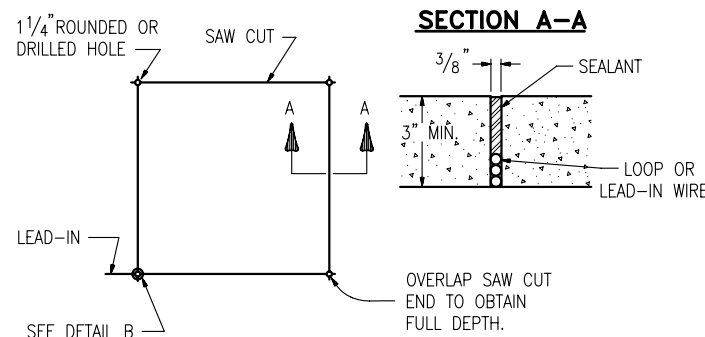
SECTION B-B



DUAL LOOP



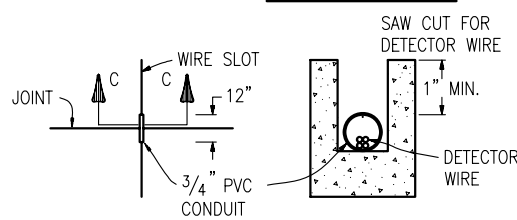
LOOP DETECTOR LEAD-IN



VEHICLE DETECTOR LOOP SAW CUT DETAILS

(FOR USE WITH VINYL TUBING ENCASED LOOP DETECTOR WIRE)

SECTION C-C

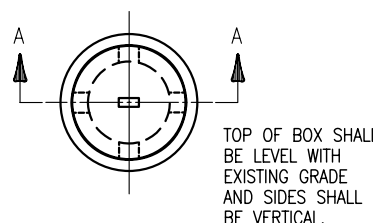


DETECTOR WIRE ACROSS BRIDGE JOINTS

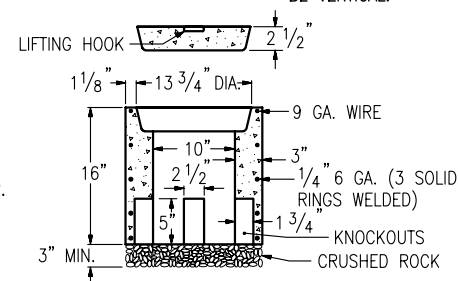
DUAL LOOPS SHALL BE OF THE SIZE SHOWN UNLESS NOTED OTHERWISE ON THE PLANS.

PULL BOX - SPECIAL FOR LOOP DETECTOR WIRE

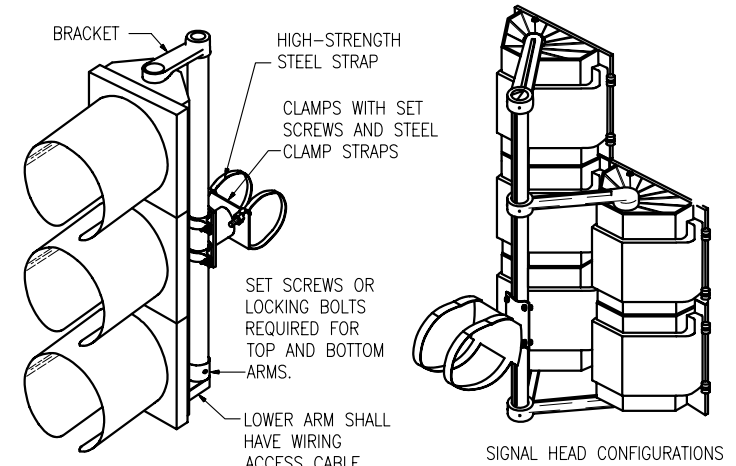
SECTION A-A



ACCEPTABLE ALTERNATES:
STANDARD 10 IN. I.D. REINFORCED CONCRETE PIPE SECTION.
PRECAST MOLDED FROM ACRYLONITRILE-BUTADINE STYRENE THERMOPLASTIC STRUCTURAL MATERIAL.
OTHER SIZES AND SHAPES MAY BE USED WHEN APPROVED BY THE ENGINEER.



PULL BOX



ASTRO-TYPE MOUNTING BRACKET

SIGNAL HEAD CONFIGURATIONS SHALL BE AS SHOWN ON PLANS.

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Last Modification Date: 07-04-06	Initials: RD								
Full Path: www.dot.state.co.us/DesignSupport/									
Drawing File Name: S61440A0505.dwg						Safety & Traffic Engineering Branch		KCM	
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