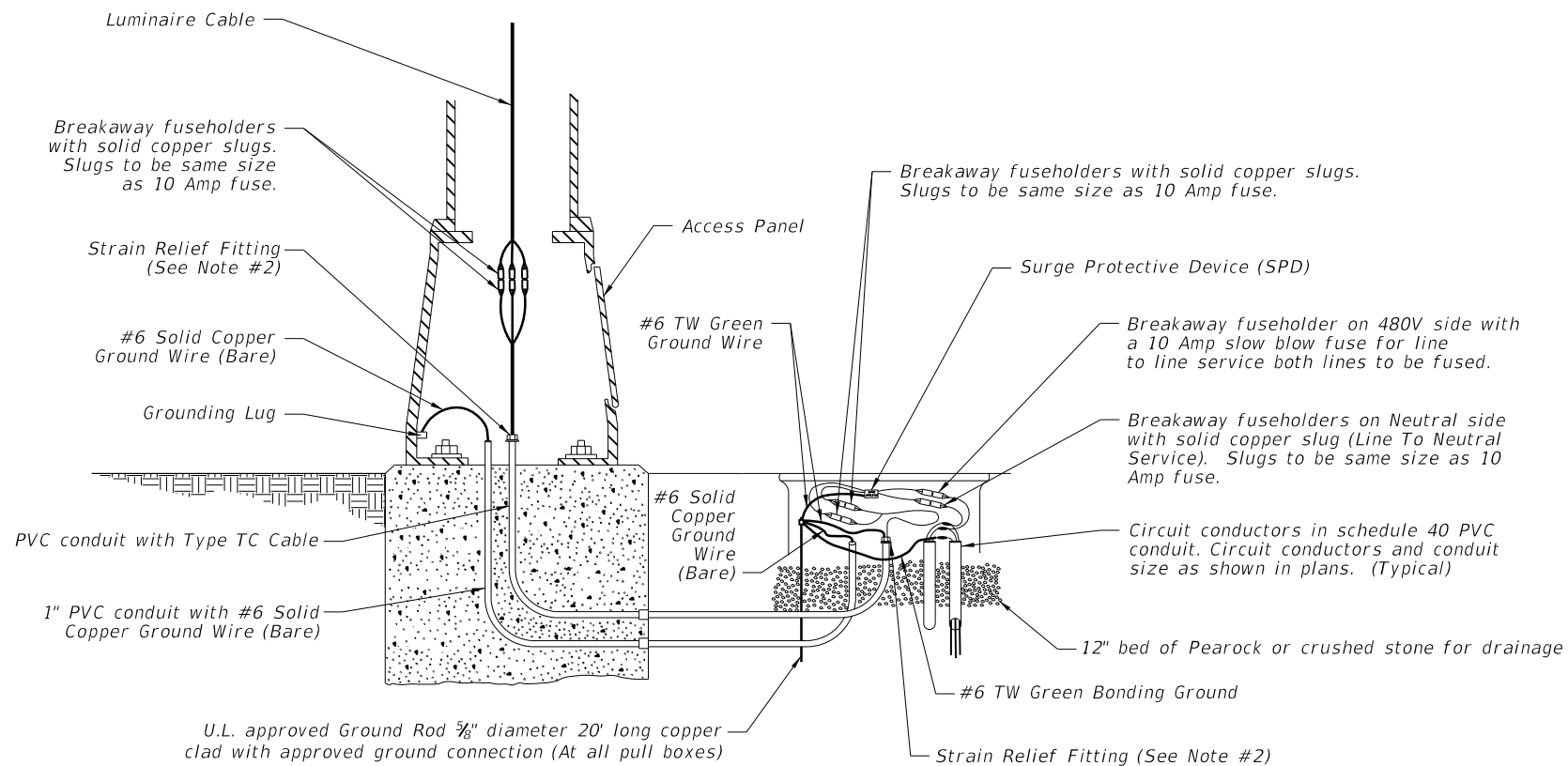
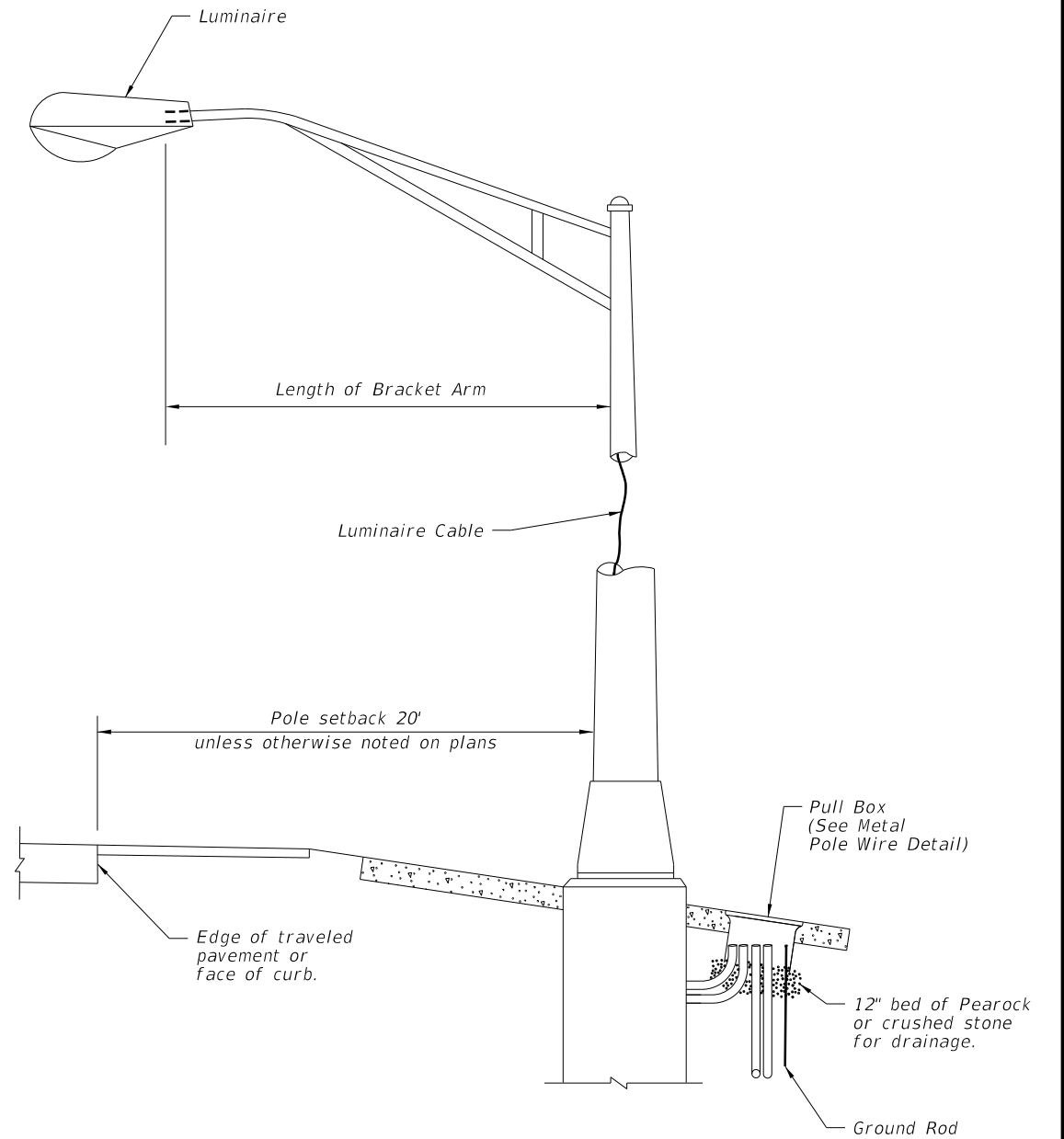


**WIRING DIAGRAM**



**METAL POLE WIRING DETAIL**



**METAL POLE DETAIL**

**NOTES:**

1. Barrier wall or bridge mounted poles: The wiring shall be in accordance with Section 992 of the Standard Specifications.
2. Provide cable length to remove fuseholders from transformer base, pole base or pullbox for maintenance. Remove slack from the luminaire cable to provide tension on the fuseholders if the pole breaks away. Pull excess cable into pull box tighten strain relief fittings or cable clamps at both ends of conduit to prevent cable from slipping.

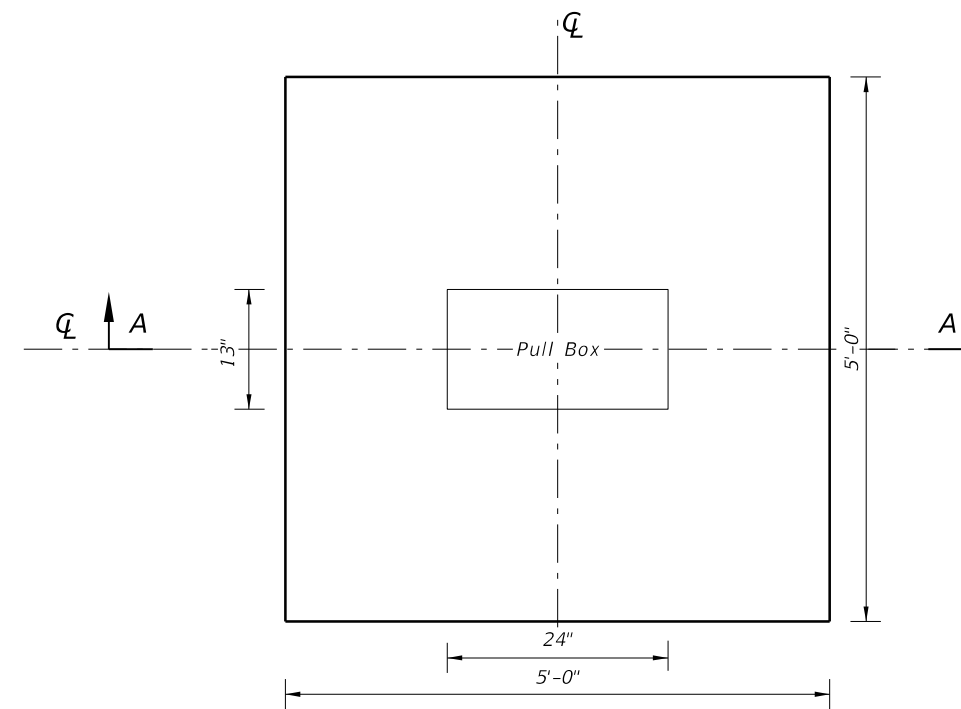
**WIRING DETAILS**

6/12/2014 4:00:29 PM

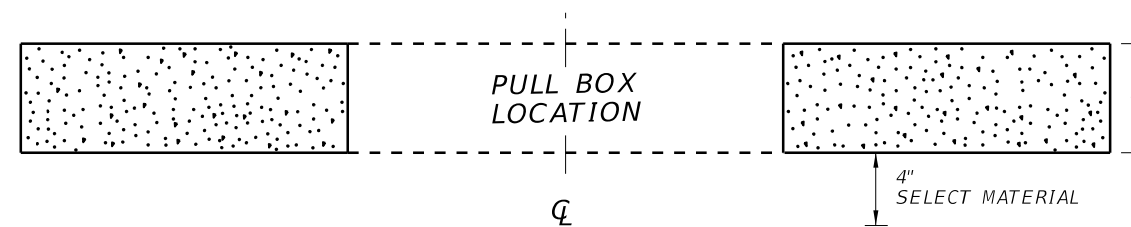
LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 <b>2015</b> <b>DESIGN STANDARDS</b>	<b>CONVENTIONAL LIGHTING</b>	INDEX NO. <b>17500</b>	SHEET NO. <b>1 of 3</b>
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**NOTES:**

1. Use compacted select material in accordance with Index 505.
2. Concrete shall be Class NS with a minimum strength at 28 days of  $f'c=2.5$  ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 13" x 24"; others approved under Section 635 of the Standard Specifications may be used.
5. Slabs to be placed around all Poles and Pull Boxes in rural locations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around pull boxes shall be included in the price of pull box.




SLAB DIMENSIONS



SECTION A-A

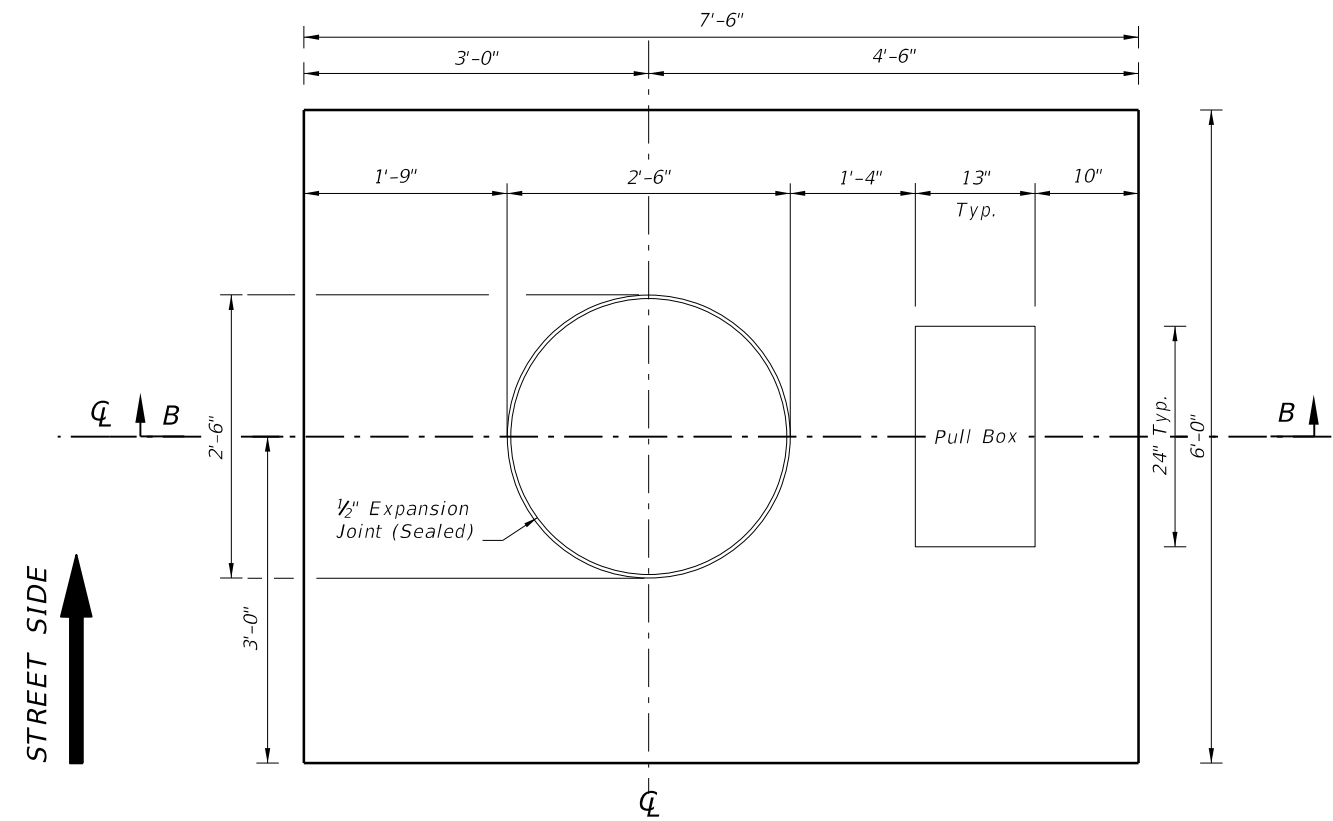
SLAB DETAILS FOR INTERMEDIATE PULLBOX LOCATIONS

6/2/2014 4:00:29 PM

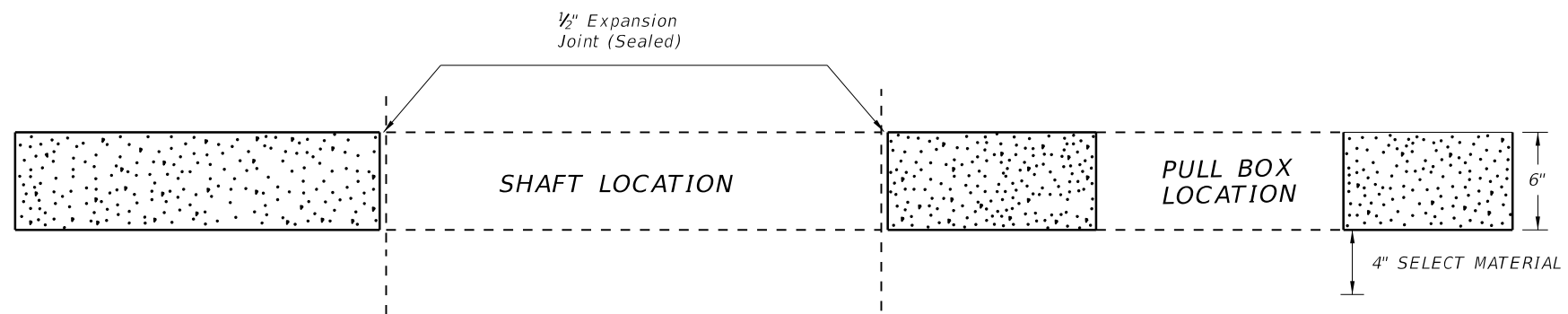
LAST REVISION 01/01/12	REVISION	DESCRIPTION:	 <b>2015</b> DESIGN STANDARDS	CONVENTIONAL LIGHTING	INDEX NO. 17500	SHEET NO. 2 of 3
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**NOTES:**

1. Use compacted select material in accordance with Index 505.
2. Concrete shall be Class NS with a minimum strength at 28 days of  $f'c=2.5$  ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 13" x 24"; others approved under Section 635 of the Standard Specifications may be used.
5. Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.
7. The expansion joint shall consist of  $\frac{1}{2}$ " of closed-cell polyethelene foam expansion material. The top  $\frac{1}{2}$ " of expansion material shall be removed after pouring the slab and sealed with an APL approved Type A sealant meeting the requirements of Section 932.




SLAB DIMENSIONS



SECTION B-B

SLAB DETAILS  
FOR POLE AND PULL BOX LOCATIONS

6/2/2014 4:00:30 PM

LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>CONVENTIONAL LIGHTING</b>	INDEX NO. 17500	SHEET NO. 3 of 3
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**GENERAL NOTES**


1. All grounding system connections shall be exothermically welded. This includes all cables, ground electrode and arrays. Do not exothermically bond grounding electrode to grounding electrode. Method of Measurement and Basis of Payment as per Section 620 of the Standard Specifications.
2. The contractor shall be responsible for contacting all utility companies prior to any underground work. The utility company will locate and identify their facilities.
3. Contractor shall determine the service required date for the power company transformer installation at the pre-construction conference.
4. The power company reserves the right to install the riser, switch gear and weatherhead on power company poles at the expense of the contractor. Contact the power company for cost or for authorization for an alternate procedure.
5. Any damaged portions of galvanized steel poles and bracket arms shall be painted in accordance with Section 562 of the Standard Specifications.
6. Before final acceptance, contractor shall provide 2 sets of full size as built plans to the maintaining agency.
7. Conduit routing shall be pole to pole, maintaining pole setback distance from edge of pavement. Any cable routing in locations where guardrail is proposed shall be 2' in front of the standard guardrail position.
8. Pole positions and conduit routing may be adjusted, as approved by the Engineer, to prevent conflicts with utility and drainage structures not indicated, and prevent guardrail post conflict with underground lighting circuits.
9. Where guardrail is constructed, the poles shall be placed a minimum of 4' behind the face of the guardrail.
10. Install pole foundations in accordance with Section 715 of the Standard Specifications.
11. All splices shall be made in pull boxes or the pole base. No splices shall be made inside the conduit. The wires at pullboxes shall have sufficient length to completely remove connectors to the outside of pull boxes remove connectors to the outside of pull boxes to make connectors accessible for changing fuses and trouble shooting the system.
12. Neutral wires to have white insulation. Do not use white or green insulated wires for ungrounded conductors.
13. All exposed or surfaced mounted conduit shall be rigid or intermediate metal. These exposed runs of conduit shall be provided with either expansion joints or flexible metal conduit sections adequate to take care of vibrations and thermal expansions. All metal conduit shall be grounded. Steel conduit shall be hot-dipped galvanized.
14. All conduit that will remain empty as spares shall be mandrel tested, cleaned inside and both ends capped. Leave the corrosion resistant pull/drag wire and place pull boxes to mark the location of the ends of the conduits.
15. Pull boxes shall be located at ends of conduit crossing roadways, and as necessary for the completion of the project.
16. These plans represent minimum acceptable criteria. The inspection per these drawings represent the minimum base of acceptance.
17. All material, unless otherwise specified, shall be Underwriters Laboratory approved.
18. A pull box shall be installed at each pole location. Pull boxes should be located 2' max from pole unless otherwise directed by the project engineer. Metal pull box covers shall be grounded. See General Requirements Section 635-5 of the Standard Specifications for Road and Bridge Construction.
19. At all pull boxes and pole bases, ends of conduit shall be sealed in accordance with Section 630 of the Standard Specifications for Road and Bridge Construction.
20. All mounting heights are ± 2'-6" unless otherwise noted in plans.
21. A handhole is required in all poles. Handhole should be located opposite approaching traffic with cover fastened with Stainless Steel Screws. The handhole opening shall be at least 20 square inches.
22. The luminaire and arm on joint use poles shall be grounded.

**BREAKAWAY FEATURE**

All ground mounted metal light poles, 50 feet in height or less, shall be mounted on a frangible metal base. The base shall be one piece and be designed to breakaway without the aid of any slipping or sliding surfaces. The design of the breakaway feature shall be in accordance with the breakaway performance requirements of the AASHTO 'Standard Specifications For Structural Supports For Highway Signs, Luminaires and Traffic Signals'. The contractor (supplier) shall submit copies of test reports as evidence the breakaway feature meets the above specifications and calculations to verify the design will meet the AASHTO wind loading specified in the contract plans. No poles are to be installed prior to approval of submittal data.

Poles behind bridge rail or barrier wall mounted, shall be installed on non-frangible bases.

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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>HIGHWAY LIGHTING GENERAL NOTES</b>	INDEX NO. <b>17501</b>	SHEET NO. <b>1 of 1</b>
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**HIGHMAST LIGHTING NOTES:**

1. High Mast materials:
  - a. Pole: ASTM A1011 Grade 50, 55, 60 or 65 (Less than 1/4") or ASTM A572 Grade 50, 55, 60, or 65 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).
  - b. Steel Plates: ASTM A709 Grade 36 or ASTM A36
  - c. Weld Metal: E70XX
  - d. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563, Grade A heavy-hex nuts and plate washer.
  - e. Handhole: ASTM A709 Grade 36 or ASTM A36 Frame with ASTM A36 cover.
  - f. Caps: ASTM A1011 Grade 50, 55, 60 or 65 or ASTM B209.
  - g. Nut Covers: ASTM B26 (319-F)
  - h. Stainless Steel Screws: AISI Type 316
2. Reinforcing steel: ASTM A615, Grade 60.
3. Concrete: Class IV (Drilled Shaft) with a minimum 4,000 psi compressive strength at 28 days for all environmental classifications.
4. Perform all welding in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (Current edition). For additional welding requirements see AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals, Section 5.15, Welded Connections.
5. Galvanization:
  - a. Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329.
  - b. Other items (Including Pole): ASTM A123
6. Hole diameters for anchor bolts: not greater than the bolt diameter plus 1/2".
7. Poles: Tapered with the diameter changing at a rate of 0.14 inch per foot with a minimum 16-sided pole shaft and maximum of two longitudinal seam welds. Circumferentially welded pole shaft butt splices and laminated pole shafts are not permitted. Longitudinal seam welds within 6 inches of pole to base must be complete penetration welds. Longitudinal seam welds at telescopic field joints must be complete penetration welds for the splice length plus 6 inches.
8. Furnish each pole with a 2"x4" (Max.) aluminum identification tag. Submit details for approval. Secure to pole with 0.124" stainless steel rivets or screws. Locate identification tag on the inside of pole and visible from handhole. Include the following information: Financial Project ID, Pole Mounting Height, Manufacturer's Name, Fy of Steel, and Base Wall Thickness.
9. Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location ± two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.
10. This Design Standard is considered fully detailed and no shop drawings are necessary. Submit shop drawings for minor modifications not detailed in the plans.


**DESIGN CRITERIA:**

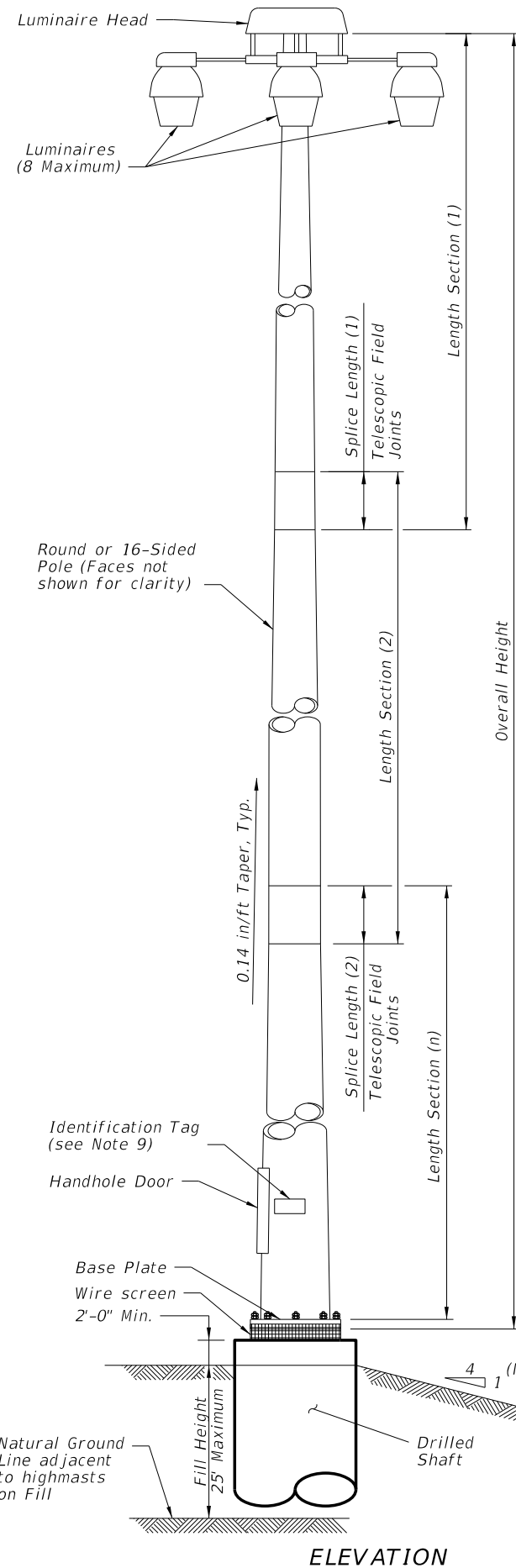
1. Designed in accordance with the FDOT Structures Manual.
2. Poles are designed to support the following:
  - a. (1) cylindrical head assembly with a maximum effective projected area of 6 SF (Cd=1) and 340 lbs (Max).
  - b. (8) cylindrical luminaires with a maximum effective projected area of 3.0 SF (Cd=0.5) and 77 lbs. each.
3. Foundation design based upon the following soil criteria:
  - Classification = Cohesionless (Fine Sand)
  - Friction Angle = 30 Degrees (30°)
  - Unit Weight = 50 pcf (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.
4. Foundation applies only to slopes of 1:4 or flatter. Provide a minimum 24" shaft projection on the high side.
5. Poles are designed for 6 mil galvanization thickness.

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**STANDARD POLE DESIGN NOTES**

LAST REVISION 07/01/13	REVISION	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>HIGH MAST LIGHTING</b>	INDEX NO. 17502	SHEET NO. 1 of 6
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POLE DESIGN TABLE*																
Design Wind Speed	Pole Overall Height (ft)	SECTION 1 (TOP)					SECTION 2					SECTION 3				
		Length	Wall Thickness (in.)	Minimum Splice L.	Tip Dia. (in.)	Base Dia. (in.)	Length	Wall Thickness (in.)	Minimum Splice L.	Tip Dia. (in.)	Base Dia. (in.)	Length	Wall Thickness (in.)	Minimum Splice L.	Tip Dia. (in.)	Base Dia. (in.)
110 mph	80	41'-9"	0.250	2'-0"	5.375	11.219	40'-0"	0.250	--	10.375	16.000	--	--	--	--	--
	100	24'-3"	0.179	2'-0"	6.438	9.844	40'-0"	0.250	2'-6"	9.188	14.781	40'-0"	0.250	--	13.875	19.500
	120	44'-6"	0.250	2'-0"	6.313	12.531	40'-0"	0.250	2'-9"	11.688	17.313	40'-0"	0.313	--	16.375	22.000
130 mph	80	41'-9"	0.250	2'-0"	5.344	11.188	40'-0"	0.313	--	10.375	16.000	--	--	--	--	--
	100	24'-3"	0.179	2'-0"	6.938	10.344	40'-0"	0.250	2'-6"	9.656	15.281	40'-0"	0.313	--	14.375	20.000
	120	45'-3"	0.250	2'-6"	9.281	15.625	40'-0"	0.250	3'-0"	14.719	20.344	40'-0"	0.313	--	19.375	25.000
150 mph	80	42'-0"	0.250	2'-3"	7.344	13.219	40'-0"	0.313	--	12.375	18.000	--	--	--	--	--
	100	24'-3"	0.250	2'-0"	8.219	11.625	40'-0"	0.313	2'-6"	10.781	16.406	40'-0"	0.375	--	15.375	21.000
	120	46'-3"	0.250	3'-0"	12.469	18.938	40'-0"	0.313	3'-6"	17.938	23.563	40'-0"	0.375	--	22.375	28.000

\* Diameter Measured Flat to Flat

BASE PLATE AND BOLTS DESIGN TABLE							
Design Wind Speed	Pole Overall Height (ft)	Base Plate Diameter (in.)	Base Plate Thickness (in.)	Bolt Circle (in.)	No. Bolts	Bolt Diameter (in.)	Bolt Embedment (in.)
110 mph	80	30.0	3.0	23.0	8	1.75	38
	100	33.5	3.0	26.5	8	1.75	42
	120	36.0	3.0	29.0	8	1.75	45
130 mph	80	30.0	3.0	23.0	8	1.75	43
	100	34.0	3.0	27.0	8	1.75	50
	120	41.0	3.5	33.0	8	2.00	52
150 mph	80	32.0	3.0	25.0	8	1.75	49
	100	37.0	3.0	29.0	8	2.00	53
	120	46.0	3.5	37.0	10	2.25	57

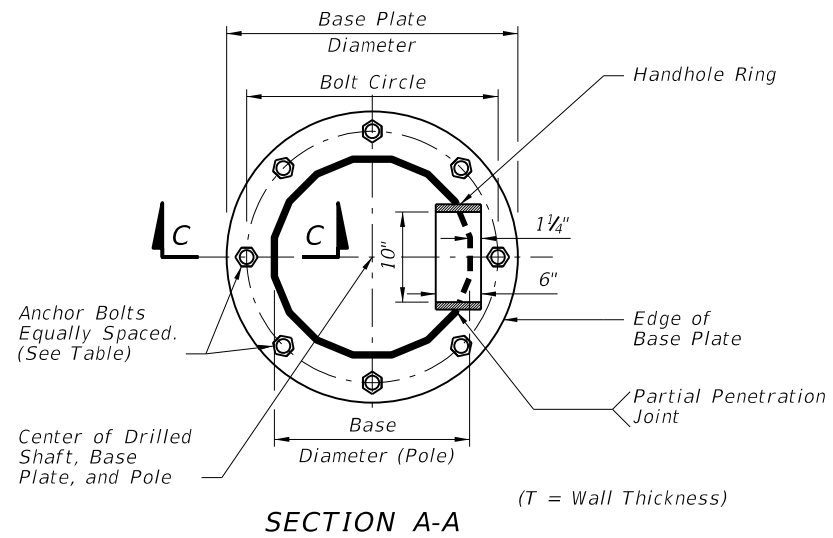
SHAFT DESIGN TABLE				
Design Wind Speed	Pole Overall Height (ft)	Shaft Diameter	Shaft Length	Longitudinal Reinforcement
110 mph	80	4'-0"	13'-0"	14- #11
	100	4'-6"	14'-0"	16- #11
	120	4'-6"	16'-0"	16- #11
130 mph	80	4'-0"	14'-0"	14- #11
	100	4'-6"	16'-0"	16- #11
	120	5'-0"	17'-0"	18- #11
150 mph	80	4'-6"	15'-0"	16- #11
	100	4'-6"	17'-0"	16- #11
	120	5'-0"	20'-0"	18- #11

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ELEVATION

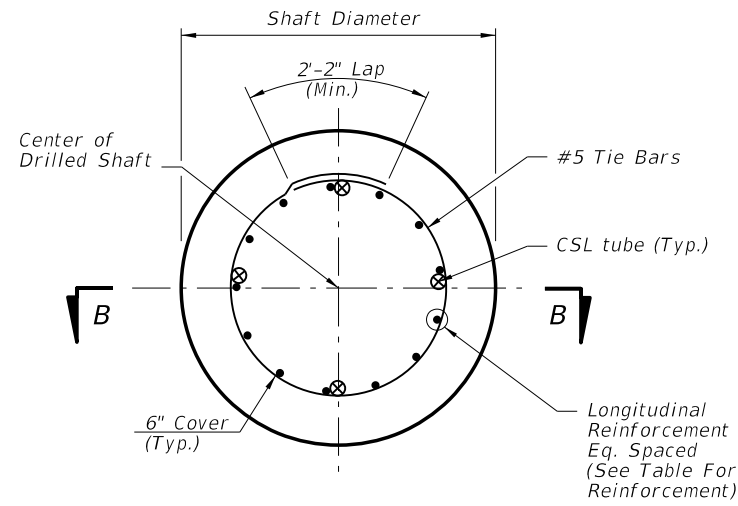
POLE DESIGN TABLES

LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	HIGH MAST LIGHTING	INDEX NO. 17502	SHEET NO. 2 of 6
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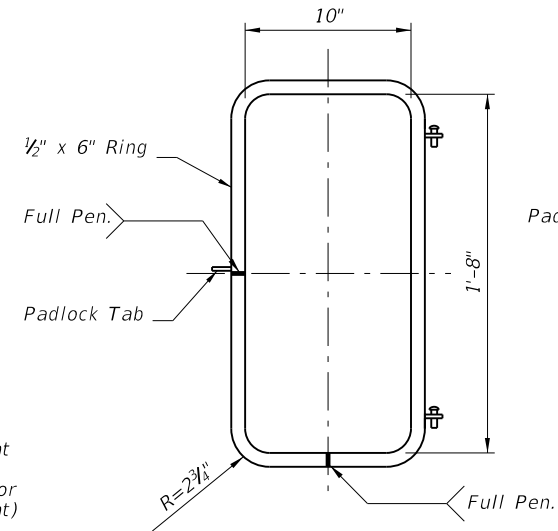


SECTION A-A

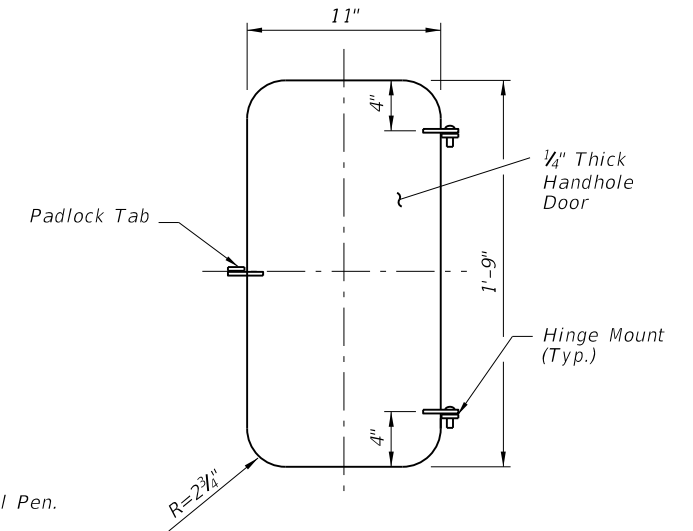
(T = Wall Thickness)



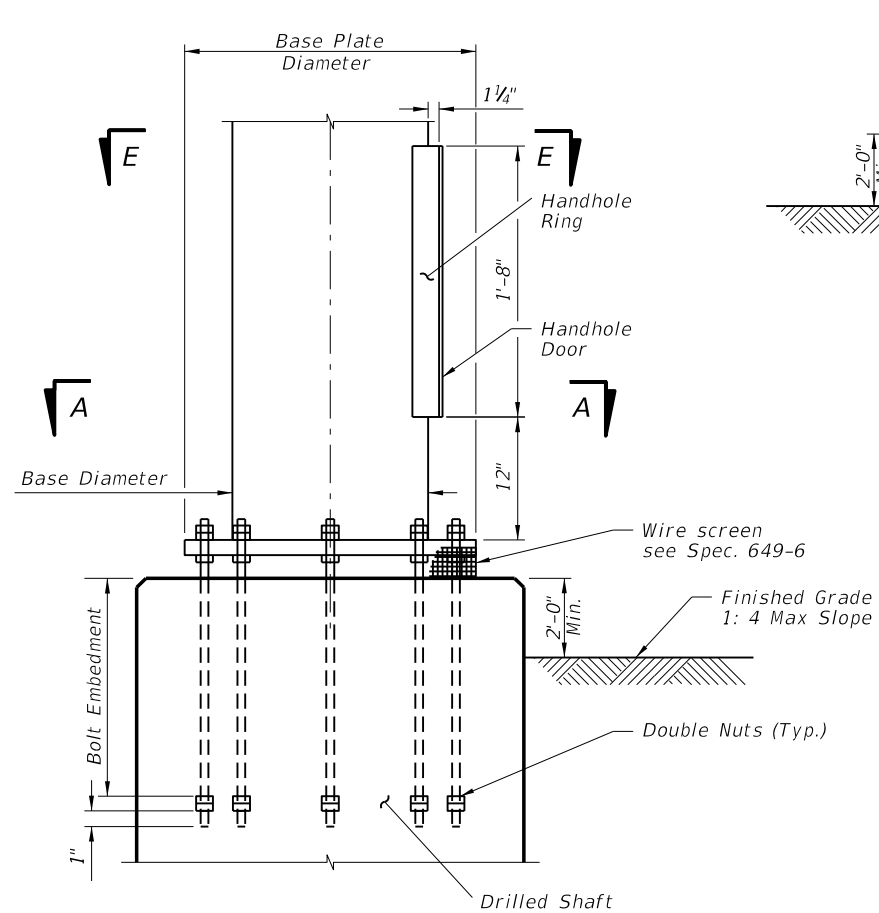
FOUNDATION PLAN  
(Anchor Bolts and Conduits Not Shown)



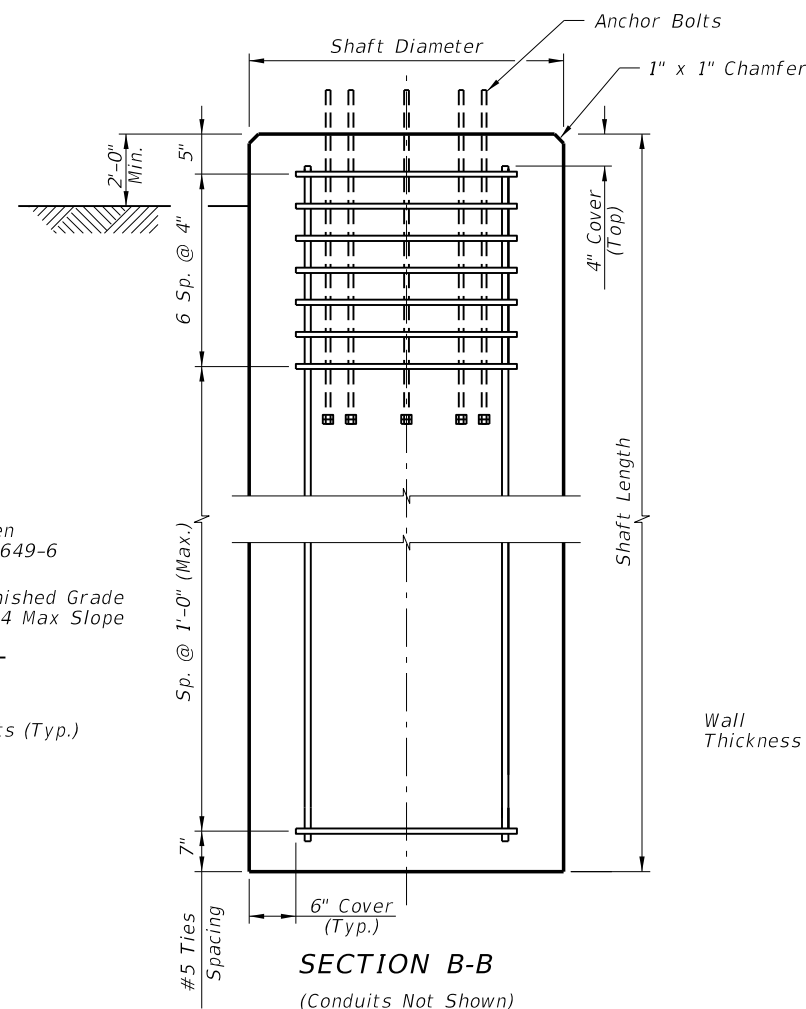
HANDHOLE RING



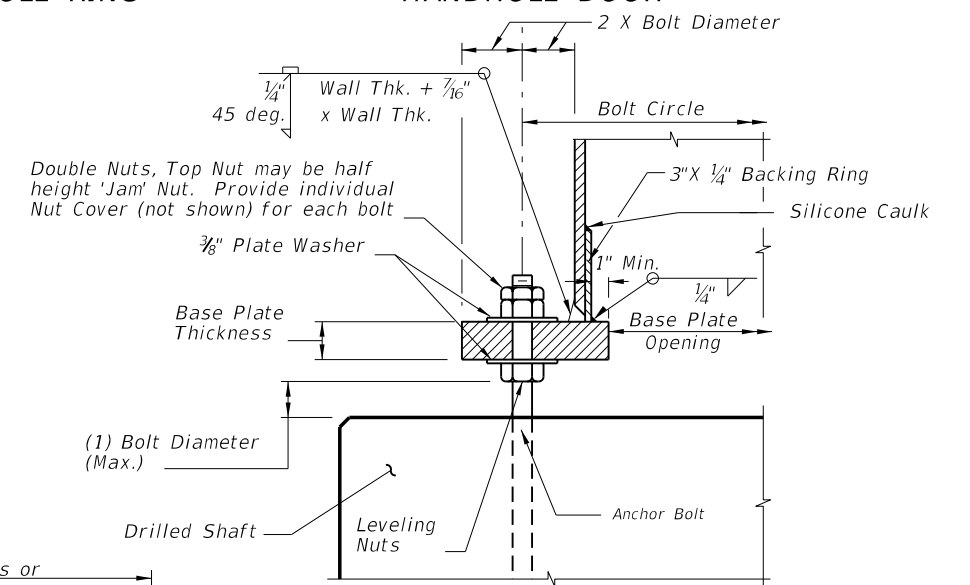
HANDHOLE DOOR



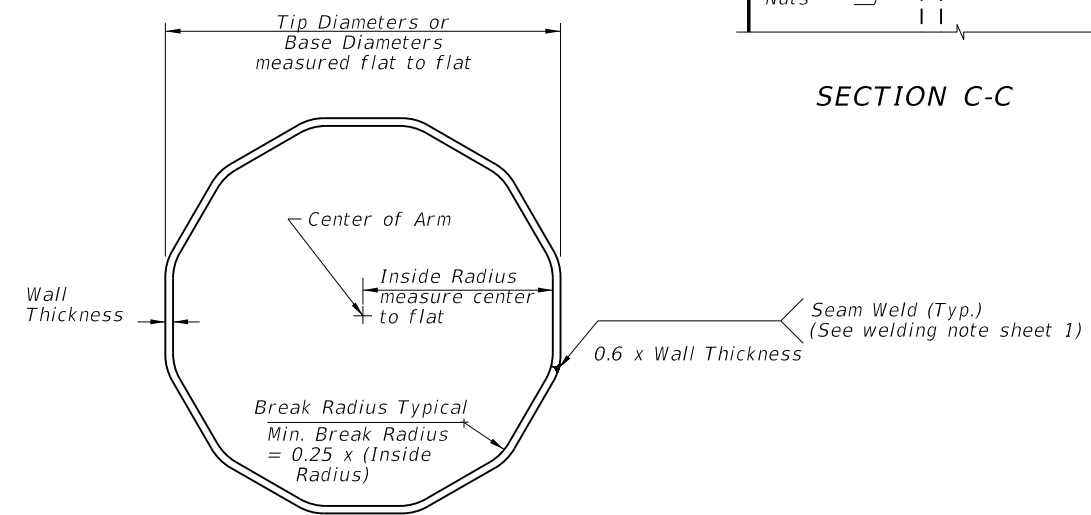
BASE PLATE AND ANCHORAGE ELEVATION  
(Conduits Not Shown)



SECTION B-B  
(Conduits Not Shown)



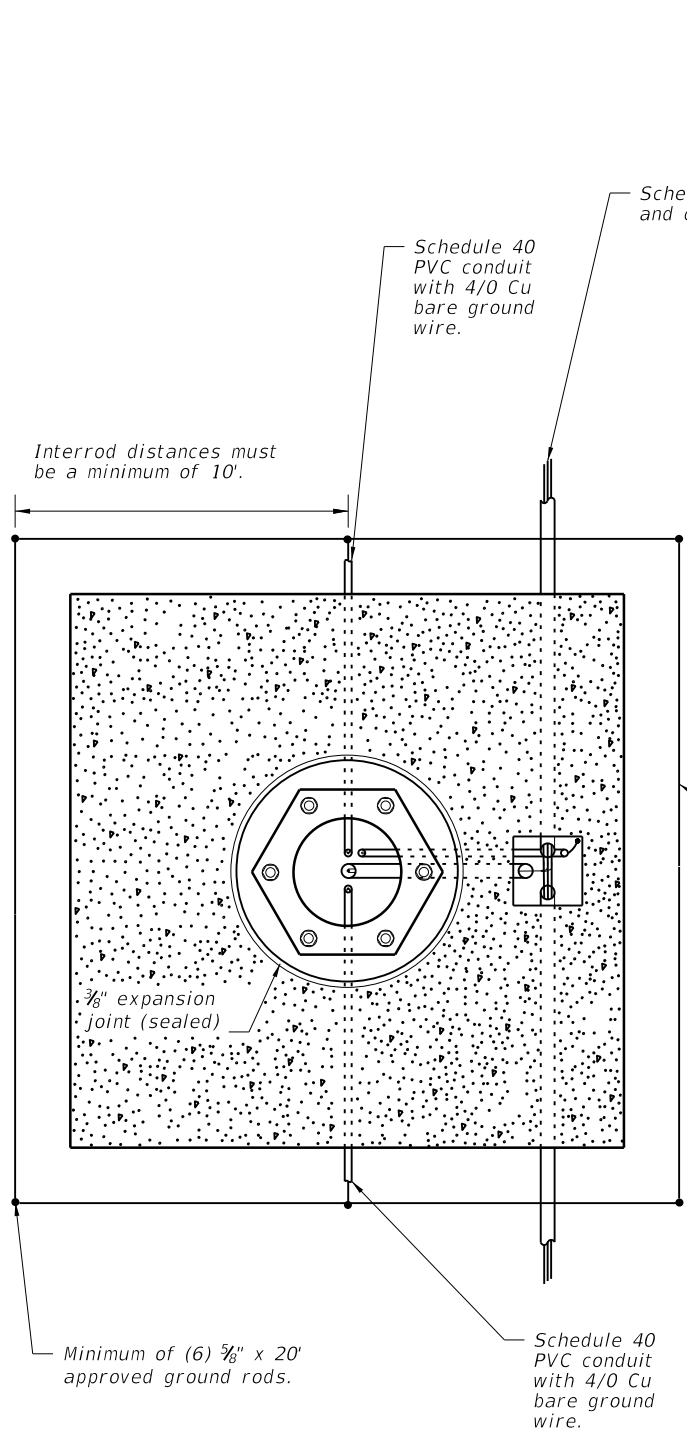
SECTION C-C



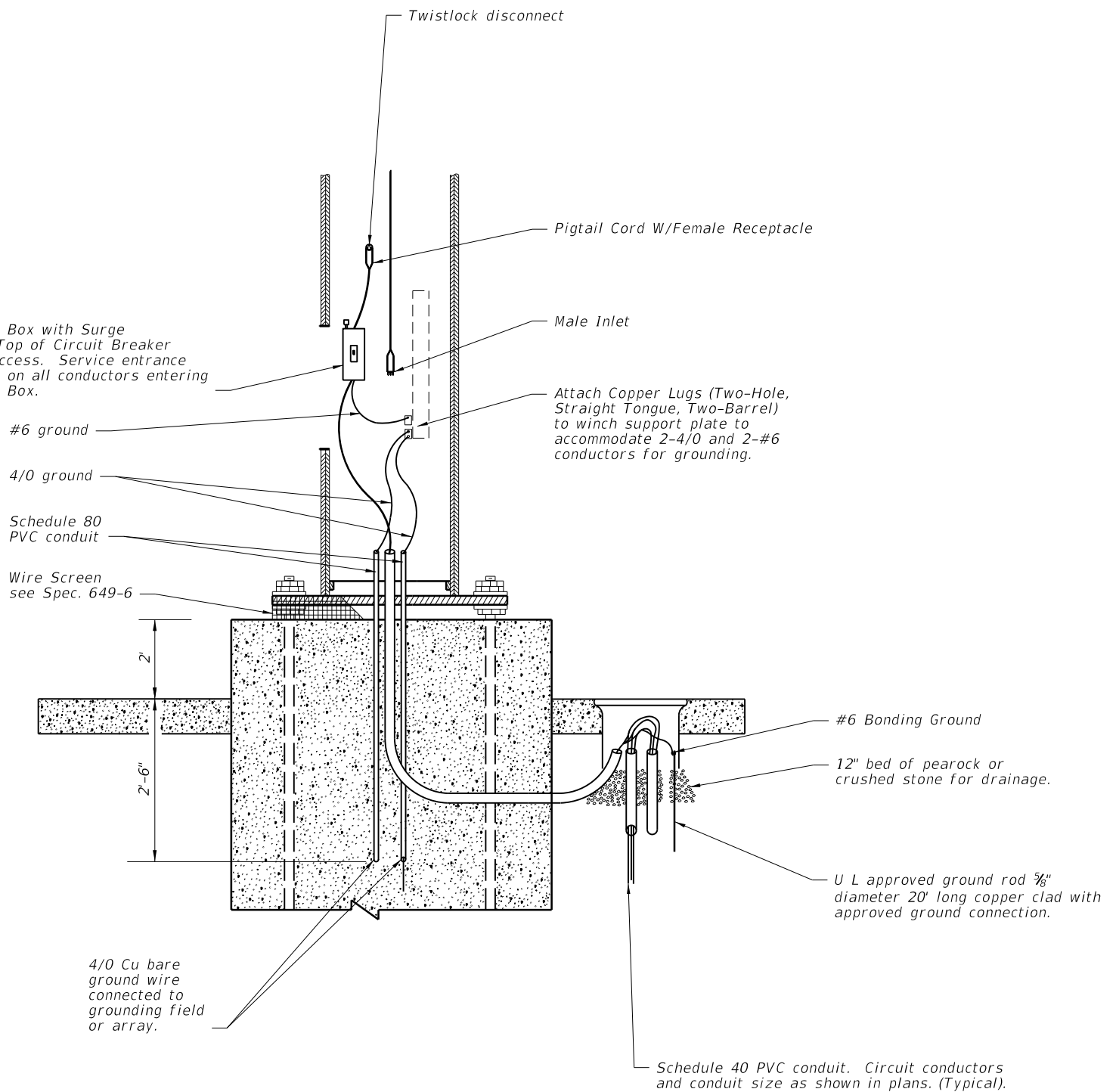
SECTION E-E

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LAST REVISION	DESCRIPTION:
07/01/13	



Circuit Breaker Panel Box with Surge Arrester mounted to Top of Circuit Breaker Panel Box for easy access. Service entrance fittings shall be used on all conductors entering Circuit Breaker Panel Box.



4/0 AWG stranded CU bare ground wire connected to grounding lug inside pole.

NOTES:

1. At all pull boxes and pole bases, ends of conduit shall be sealed in accordance with Section 630 of the Standard Specifications For Road And Bridge Construction.
2. Slabs to be placed around all Poles and Pull Boxes.
3. For Pull Boxes between Poles refer to Index 17500.

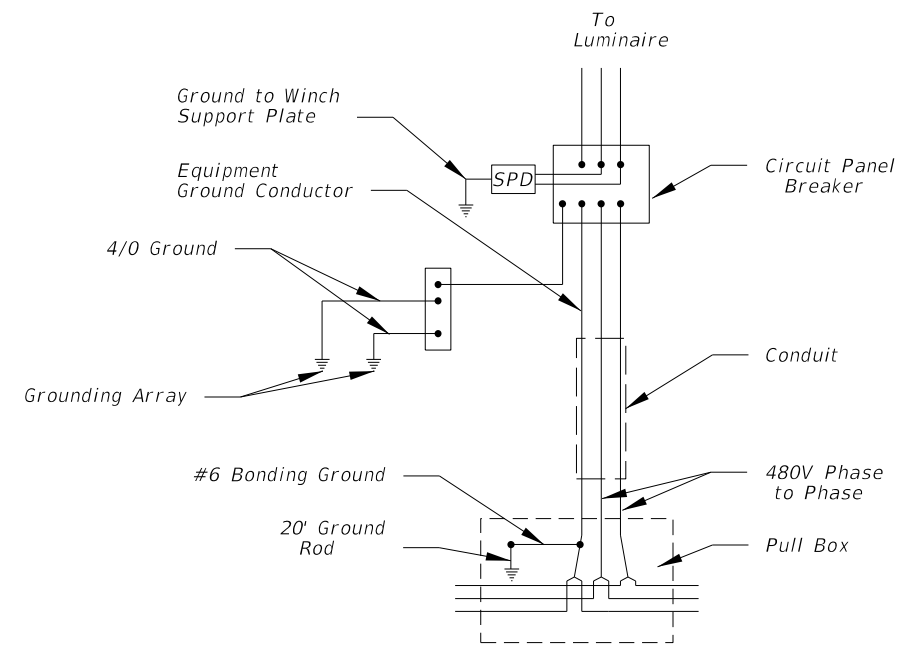
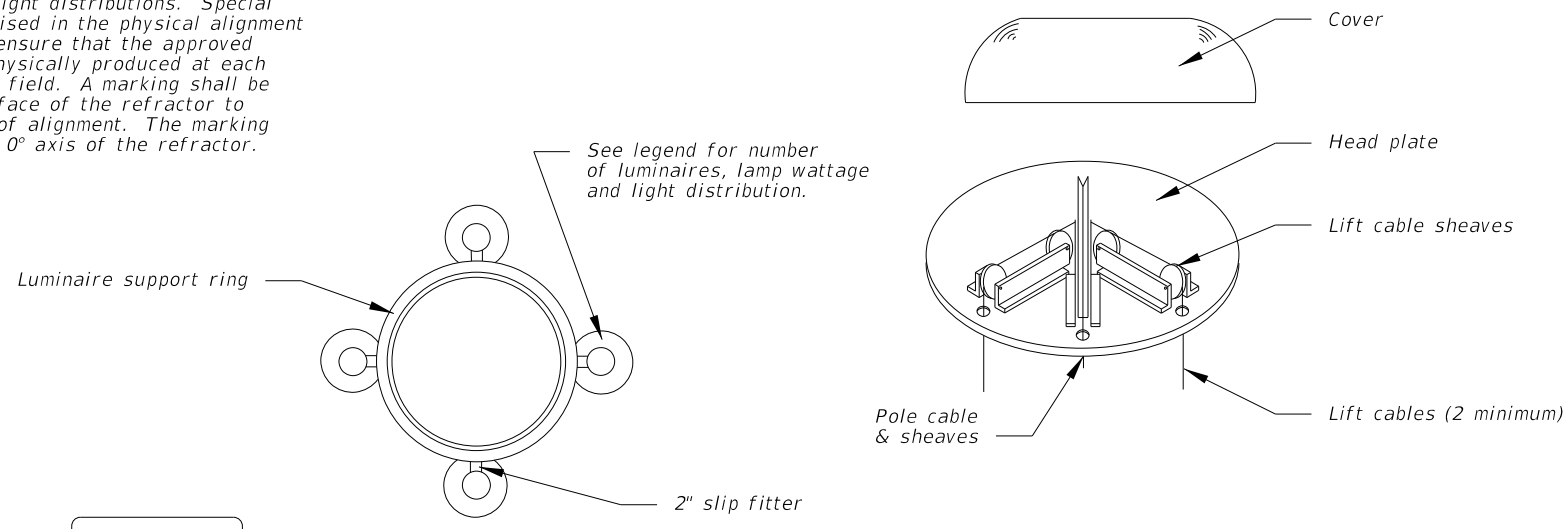
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WIRING DETAILS

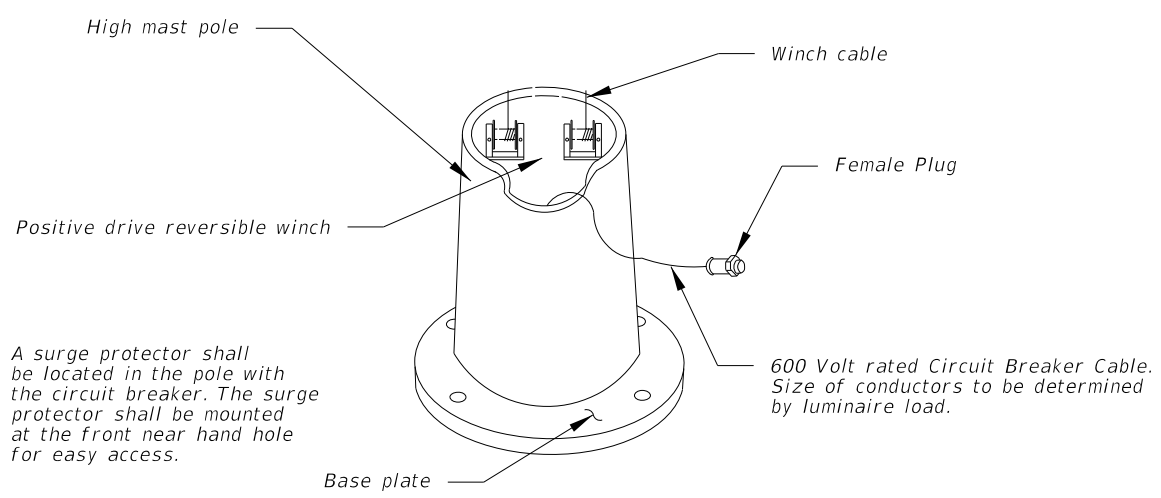
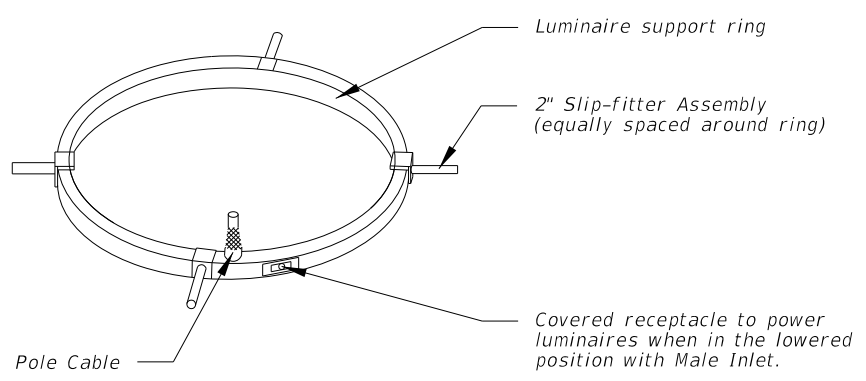
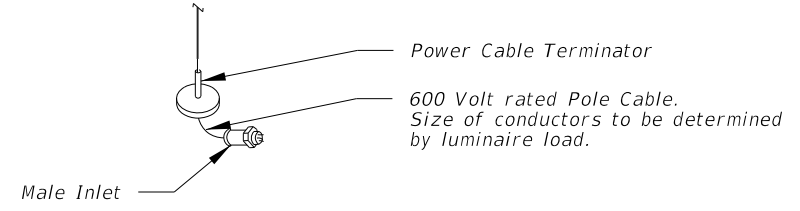
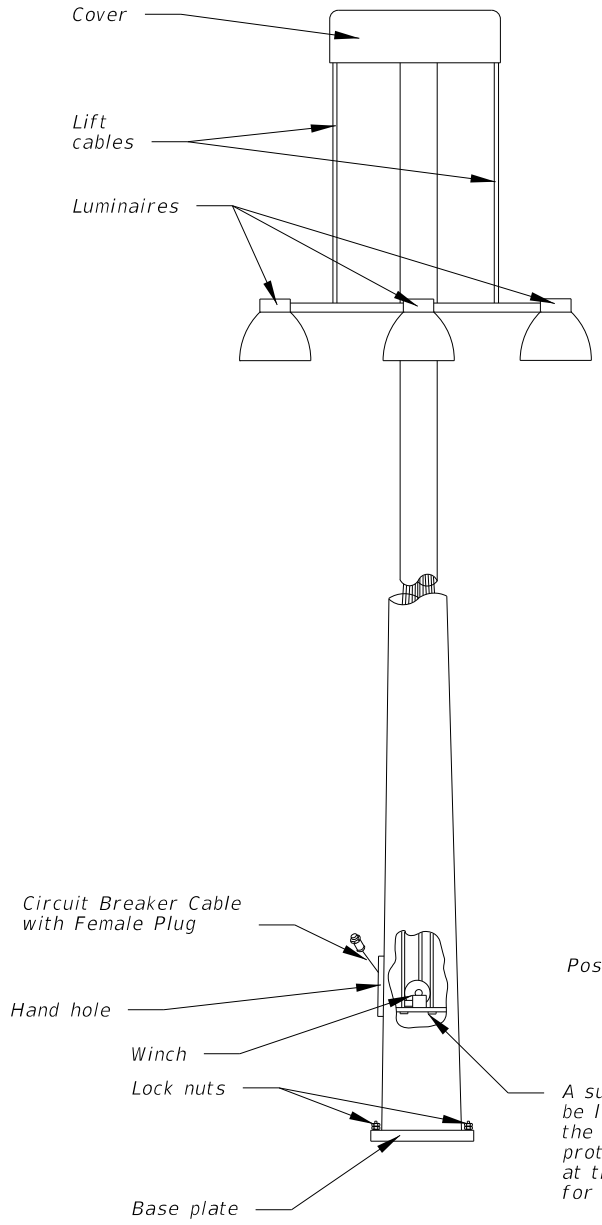
LAST REVISION 01/01/12	REVISION	DESCRIPTION:	 <b>2015</b> DESIGN STANDARDS	<b>HIGH MAST LIGHTING</b>	INDEX NO. <b>17502</b>	SHEET NO. <b>4 of 6</b>
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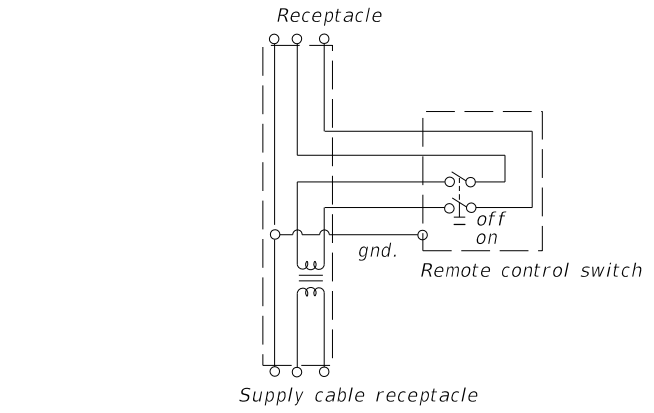
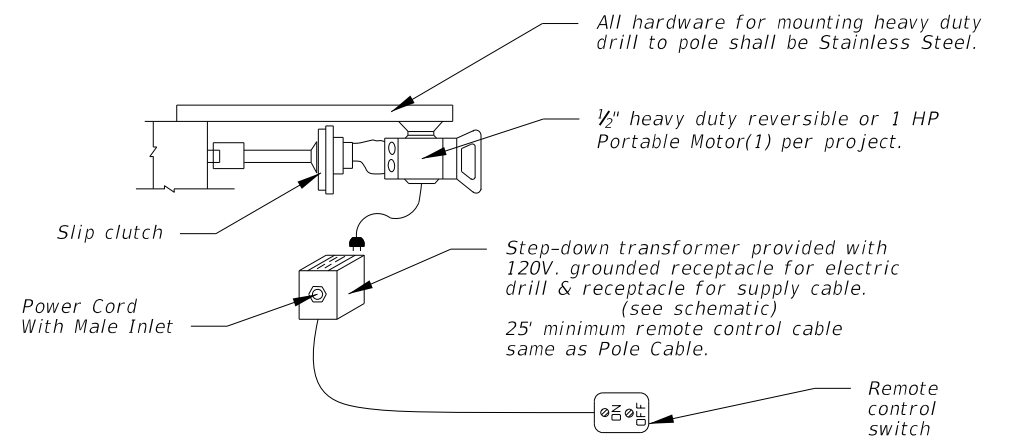
The contractor's attention is directed to those plan sheets detailing the mounting of luminaires at the pole top. Particular attention is directed to alignment of luminaire light distributions. Special attention must be exercised in the physical alignment of these luminaires to ensure that the approved photometric layout is physically produced at each lighting standard in the field. A marking shall be placed on the external face of the refractor to allow visual inspection of alignment. The marking shall correspond to the 0° axis of the refractor.



HIGH MAST POLE WIRING DIAGRAM



A surge protector shall be located in the pole with the circuit breaker. The surge protector shall be mounted at the front near hand hole for easy access.



SCHEMATIC OF REMOTE AUXILIARY POWER UNIT

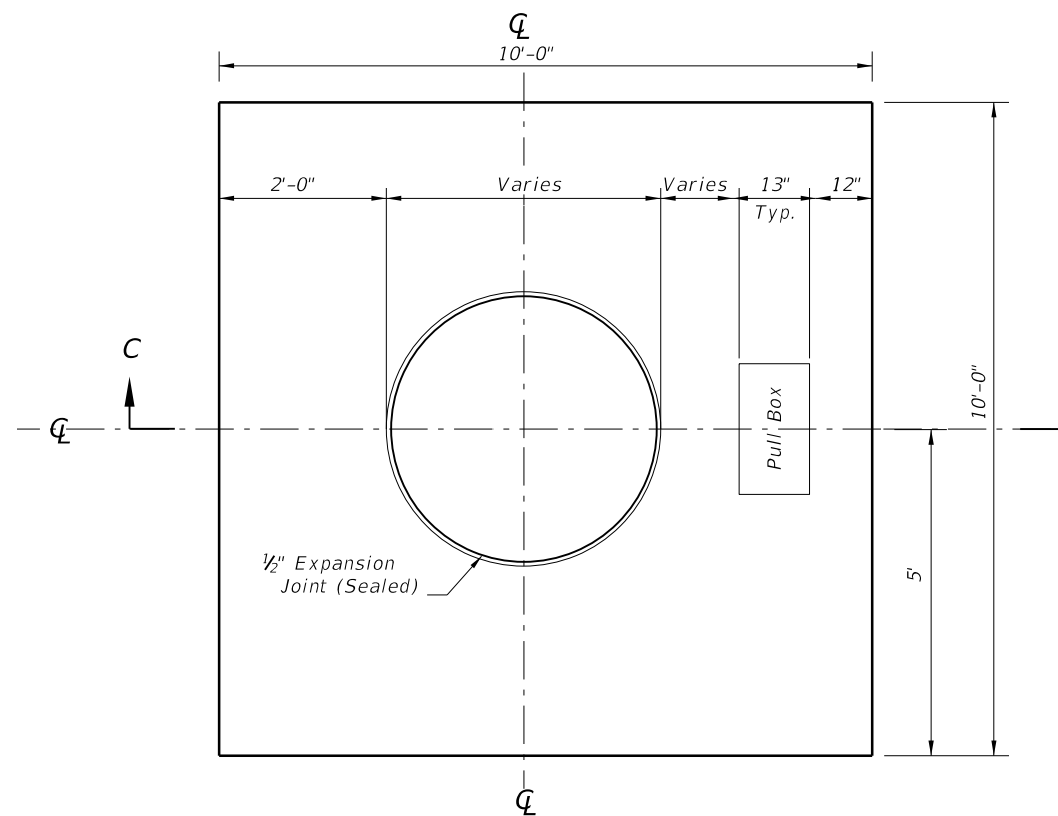
LOWERING DETAILS

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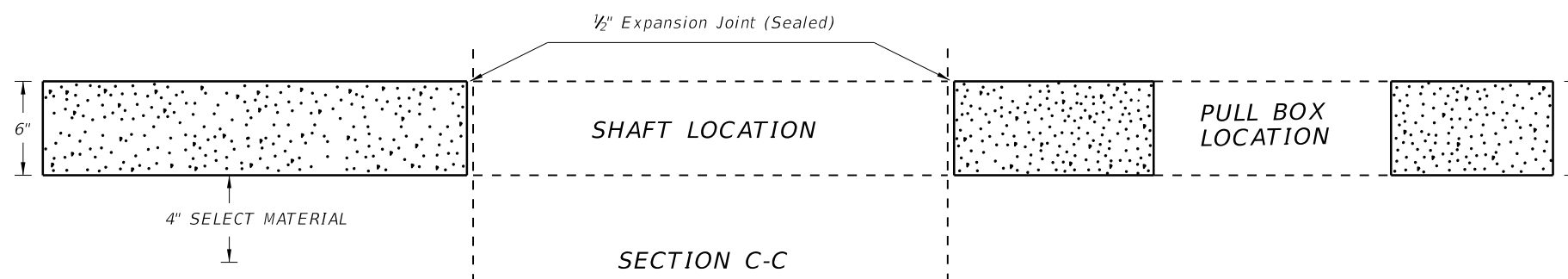
LAST REVISION 01/01/12	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>HIGH MAST LIGHTING</b>	INDEX NO. 17502	SHEET NO. 5 of 6

**NOTES:**

1. Use compacted select material in accordance with Index 505.
2. Concrete shall be Class NS with a minimum strength at 28 days of  $f'c=2.5$  ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 13" x 24"; others approved under Section 635 of the Standard Specifications may be used.
5. Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.
7. The expansion joint shall consist of  $\frac{1}{2}$ " of closed-cell polyethelene foam expansion material. The top  $\frac{1}{2}$ " of expansion material shall be removed after pouring the slab and sealed with an APL approved Type A sealant meeting the requirements of Section 932.



SLAB DIMENSIONS



**SLAB DETAILS**

LAST REVISION  
07/01/14

REVISION

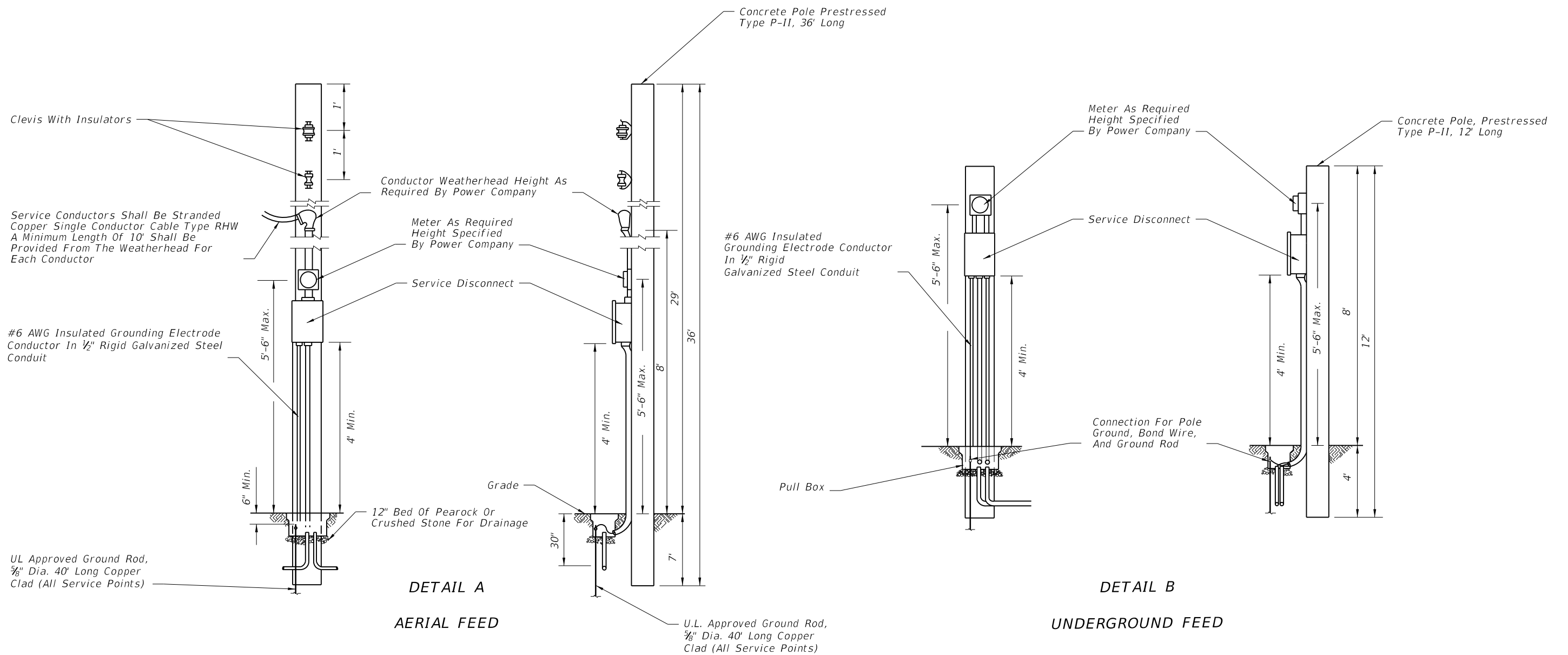
DESCRIPTION:

**FDOT** 2015  
DESIGN STANDARDS

HIGH MAST LIGHTING

INDEX NO.  
17502


SHEET NO.  
6 of 6



GENERAL NOTES:

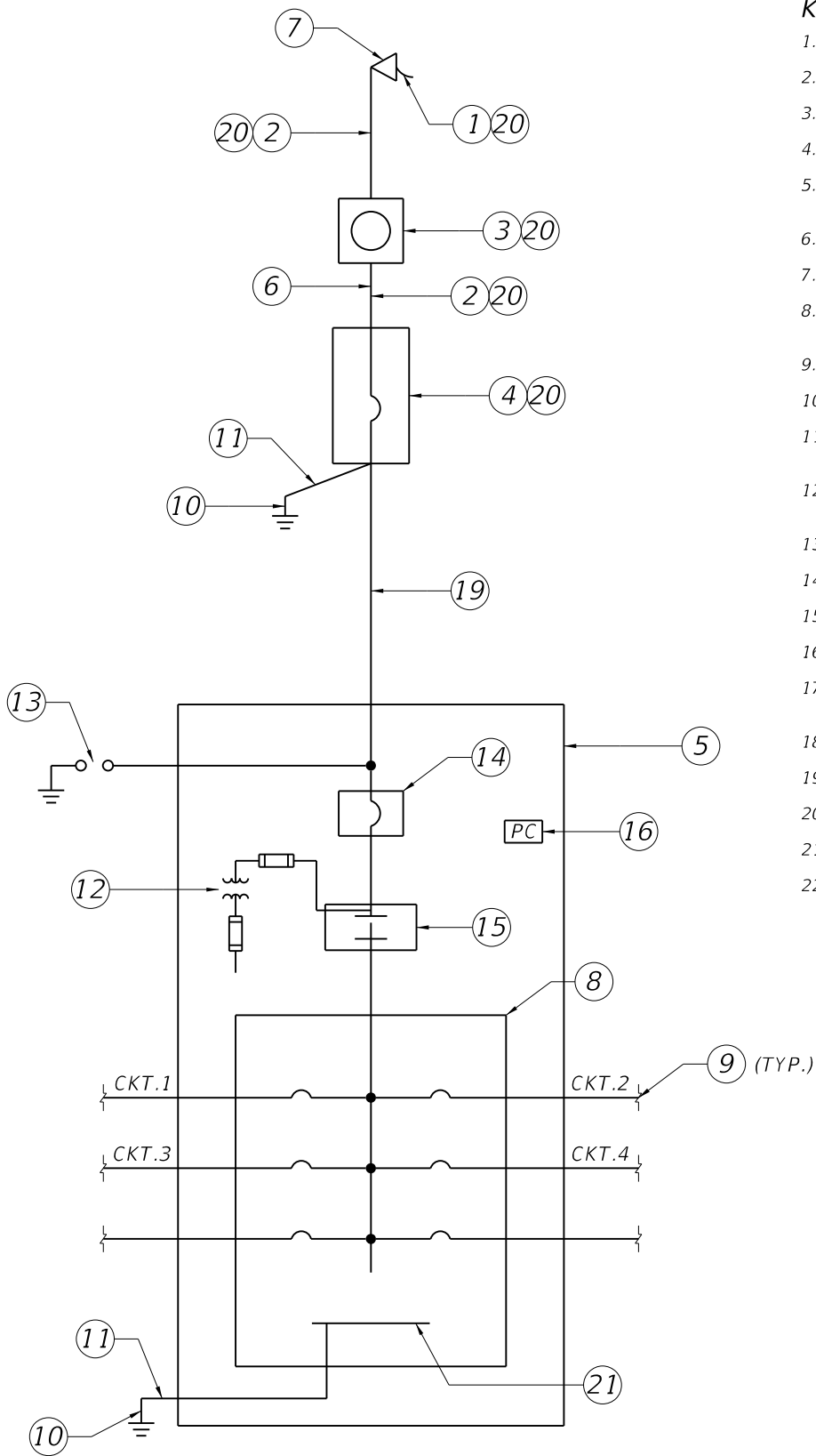
1. It shall be the contractors responsibility to provide a complete service assembly as per the plans and service specifications.
2. The service installation shall meet the requirements of the national electric code and applicable local codes.
3. Shop drawings are not required for service equipment, unless noted in the plans.
4. A Pull Box is required at each service point.

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7/1/2014

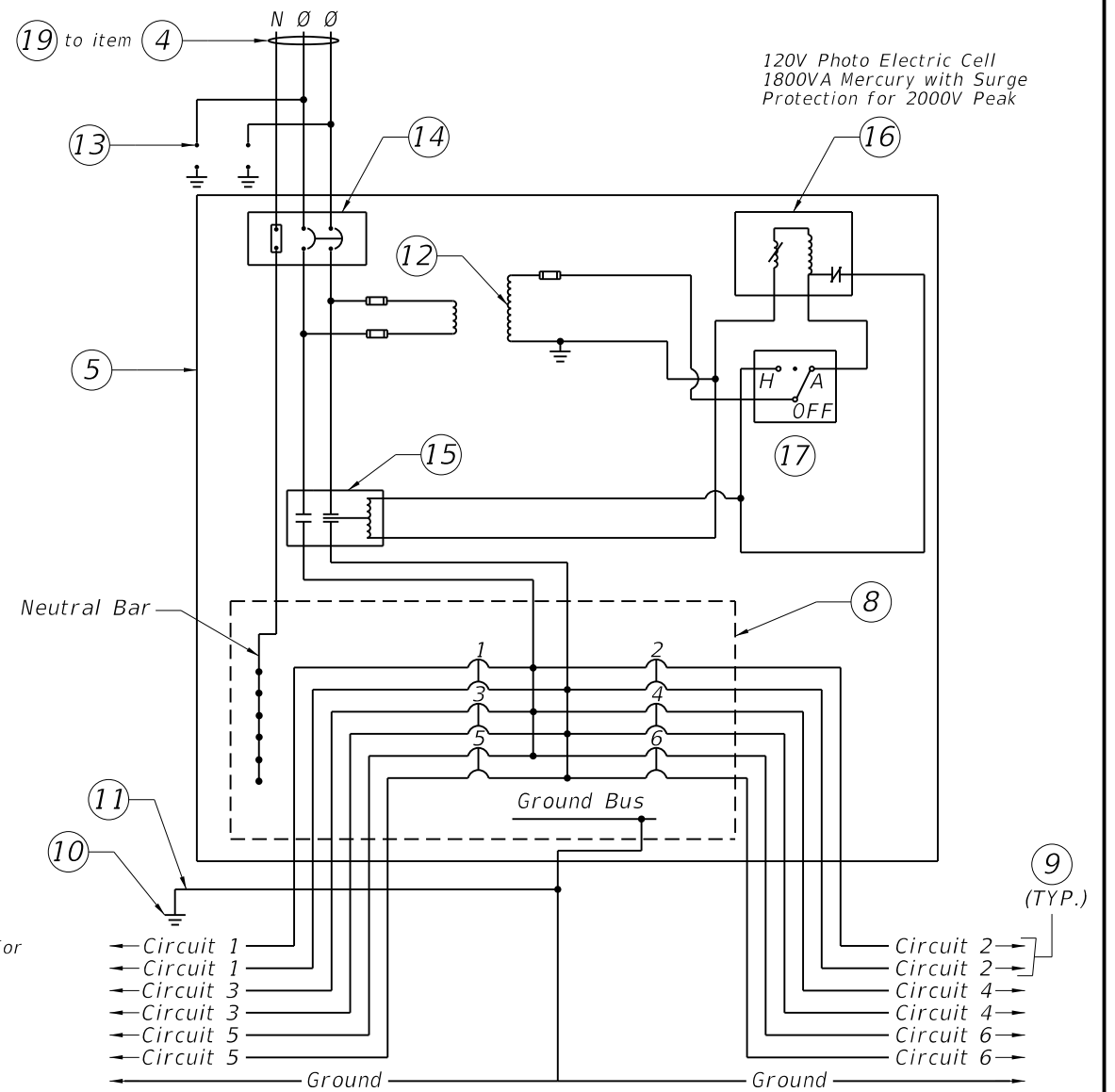
LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>SERVICE POINT DETAILS</b>	INDEX NO. <b>17504</b>	SHEET NO. <b>1 of 2</b>
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**Keyed Notes:**

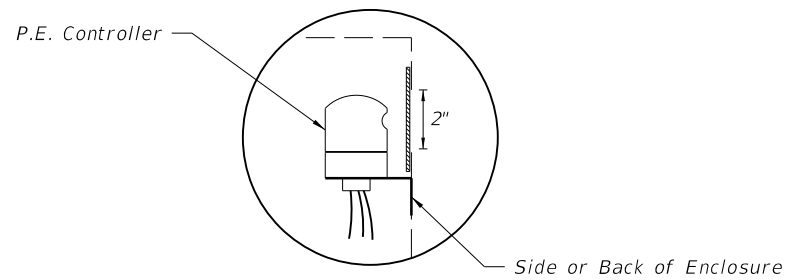
1. 240/480V, Single Phase 3 Wire Electric Distribution Overhead Service Drop.
2. Service Feeder in Rigid Galvanized Steel Conduit.
3. Meter Socket by Contractor
4. Service Main Disconnect.
5. Lighting Control Panel Enclosure. Dimensions as Necessary for Equipment Inside. Ground Mounted Cabinet per Index 17736.
6. Concrete Riser Pole.
7. Weatherhead.
8. Electrical Panel. Number and Rating of Branch Circuit Breakers shall be as Indicated on Distribution Point Description on Lighting Plan Sheets.
9. Branch Circuit to Roadway Luminaires.
10. 5/8" Copper Clad Ground Rod, 40' Long.
11. #6 Insulated Copper Ground Wire. Bond the Service Neutral to Ground at Service Main Disconnect.
12. Fused Control Power Transformer 0.5 KVA, Single Phase, 480V Primary, 120V Secondary (Part of Lighting Contactor, Shown Outside for Clarity).
13. Lightning Arrester Mounted on Outside of Enclosure.
14. Lighting Control Panel Main Breaker.
15. 2 Pole Electrical Lighting Contactor.
16. Photo Electric Switch-120V Rated.
17. Hand-off Automatic Selector Switch (Part of Lighting Contactor, Shown Outside for Clarity).
18. Concrete Pad.
19. Underground Feeder Conduit.
20. Mount on Riser Pole.
21. Ground BUS.
22. NEMA 4X SST Ground Mounted Storage Cabinet with Two Shelves. Only Required for High Mast Lighting Systems.



ONE LINE DIAGRAM DISTRIBUTION POINT

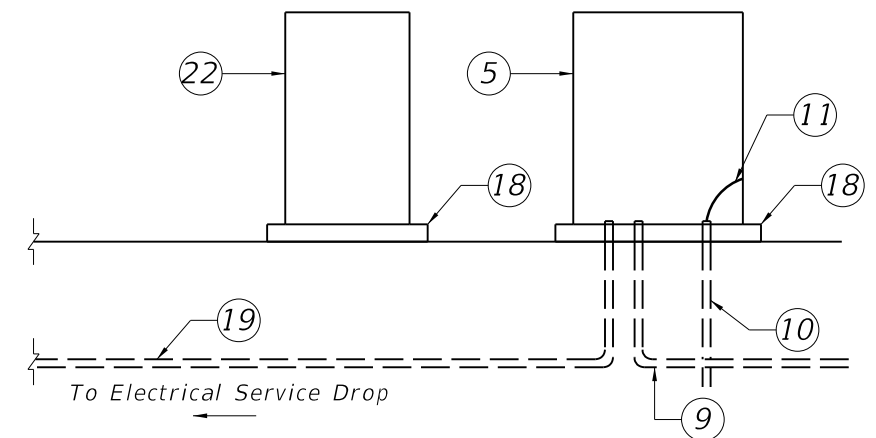


TYPICAL DISTRIBUTION POINT SCHEMATIC DETAIL



Cut a 2" hole in the side of the Lighting Control Panel enclosure for the operation and mounting of the P.E. controller. Use plexiglass and a clear silicone sealant to cover hole, install P.E. Controller.

PHOTO ELECTRIC CONTROLLER DETAIL



RISER DIAGRAM - TYPICAL DISTRIBUTION POINT

10:33:44 AM 7/1/2014

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## SIGN LIGHTING INSTALLATION

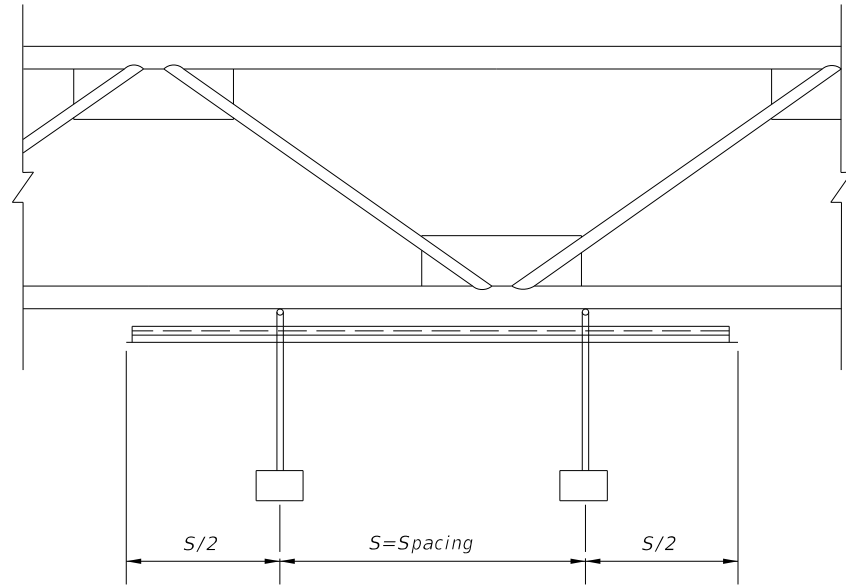
*Roadway Lighting included in contract:*

The power for the sign lighting shall be provided from the roadway lighting circuit. The lighting plans shall indicate the sign location and a pull box location for connection to the sign lights. The lighting contractor shall install pull box and loop 2' of lighting circuit conductors in the pull box for connection by the signing contractor.

The signing contractor shall furnish and install luminaires, Nema 3R enclosure, 30 amp breaker, conduit, conductors and all other electrical equipment necessary for connection to the lighting circuit.

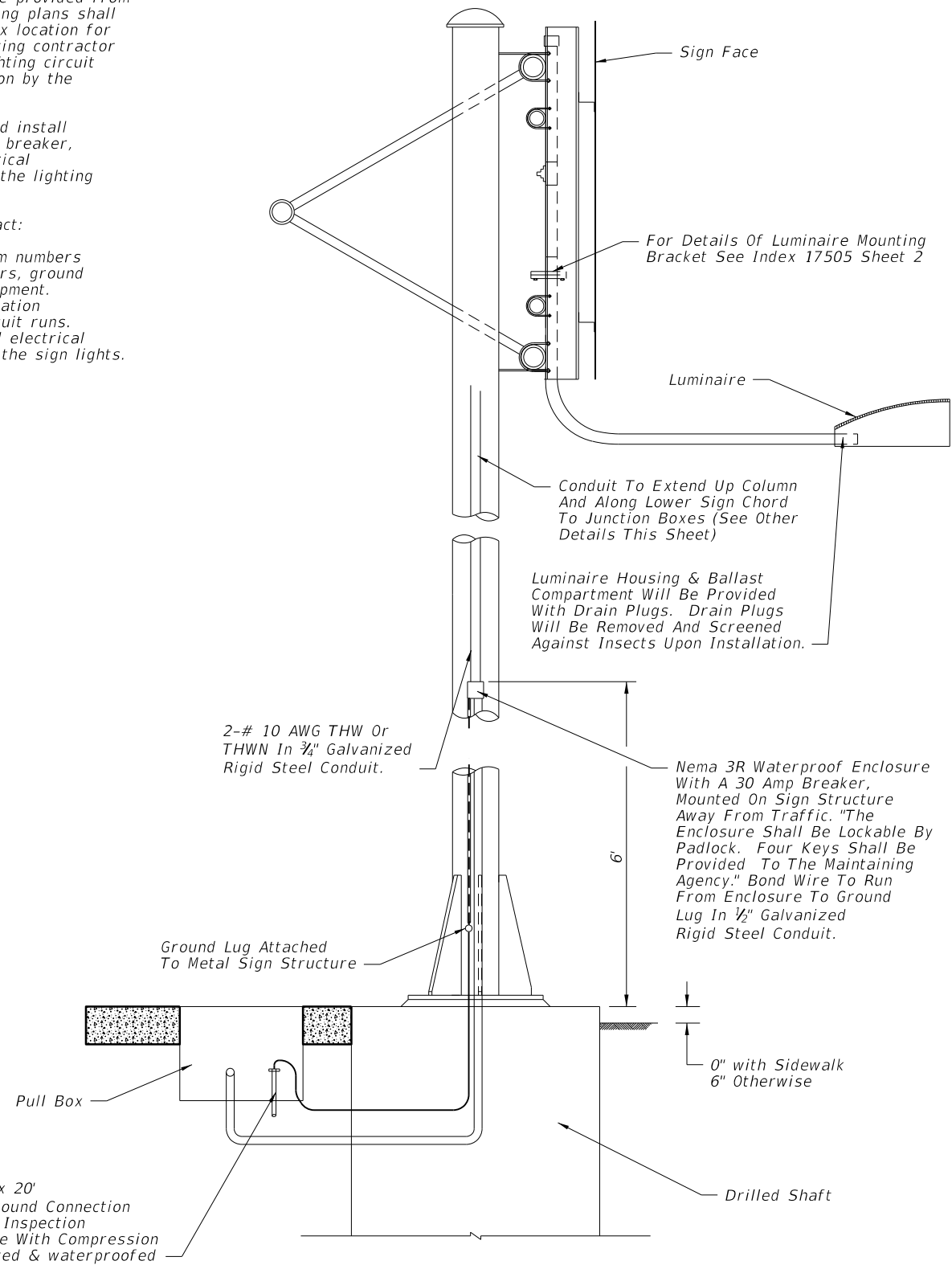
*Roadway Lighting not included in contract:*

The signing plans shall include pay item numbers to furnish and install conduit, conductors, ground rods, pull boxes and service point equipment. The signing plans shall indicate the location of the service point equipment and circuit runs. The signing contractor shall provide all electrical equipment necessary for connection of the sign lights.



### PLACEMENT OF SIGN LIGHTS

1. Luminaires that recommend their fixture be tilted shall be mounted on a bracket which provides the recommended tilt.
2. Luminaire spacing and arm length is shown on guide sign worksheet.
3. Guide sign worksheet indicates sign luminaire used for basis of design. The contractor may propose a different luminaire by submitting photometric calculations for each lighted sign for review.

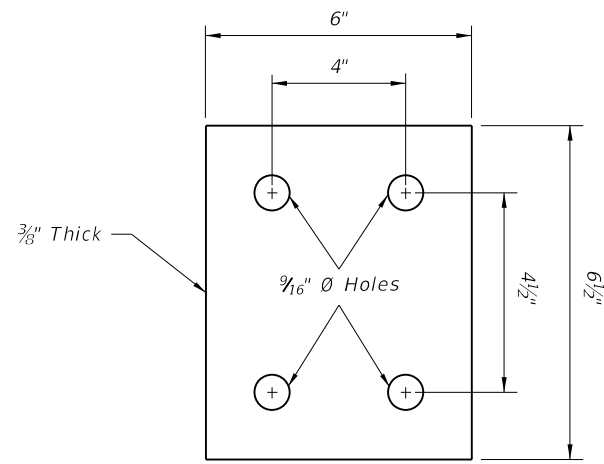


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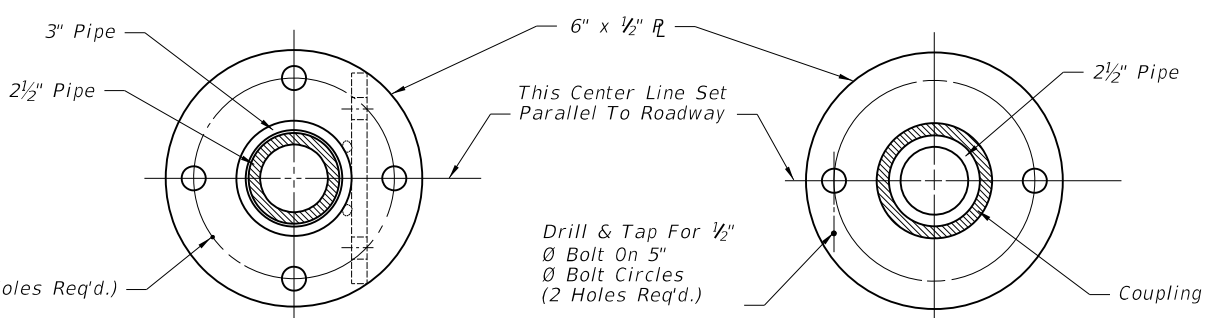
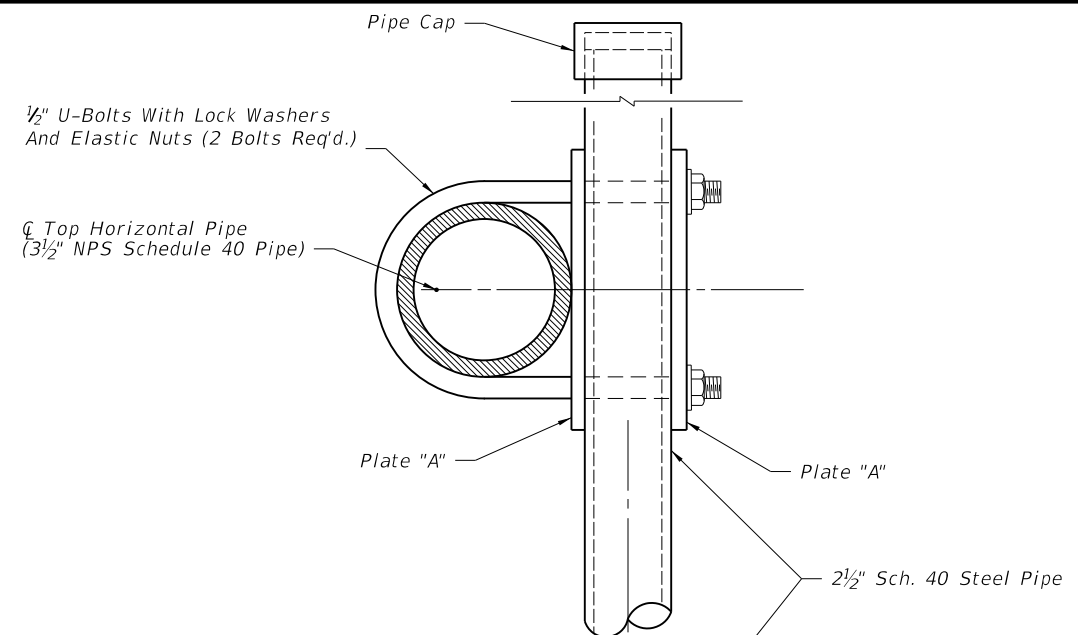
LAST REVISION 07/01/13	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	EXTERNAL LIGHTING FOR SIGNS	INDEX NO. 17505	SHEET NO. 1 of 2
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**NOTES**

- 1 Dimension to be established by type and make of luminaire to be purchased and used on the project.
- 2 The center lines of both flange plates and the luminaire support arm are to be set parallel to the roadway before the set screw is seated.
- 3 All steel pipe shall meet the strength requirements of ASTM Specification A53 Grade "A" or Grade "B". Steel plates shall meet the requirements of A36 and bolts, nuts and washers shall meet the requirements of ASTM A307.
- 4 All items shall be hot dip galvanized after fabrication in accordance with the requirements of Specification Section 962.
- 5 Luminaire support arm shall be free to rotate in a clockwise or counter clockwise direction. When service or maintenance is required for sign face or vertical face of truss.
- 6 All pipe dimensions are NPS.
- 7 The 5X3.25X4.01 Zee vertical hanger option cannot be used when installing sign lighting.

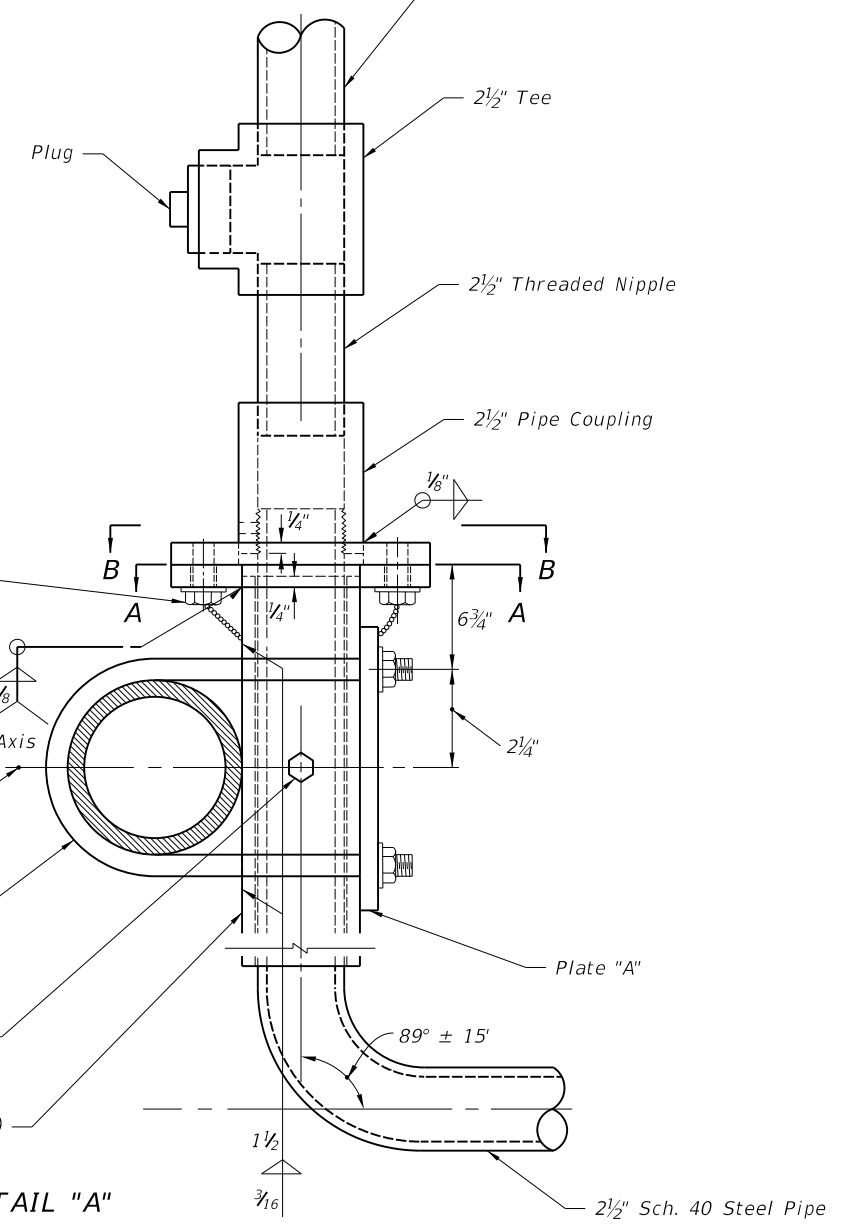
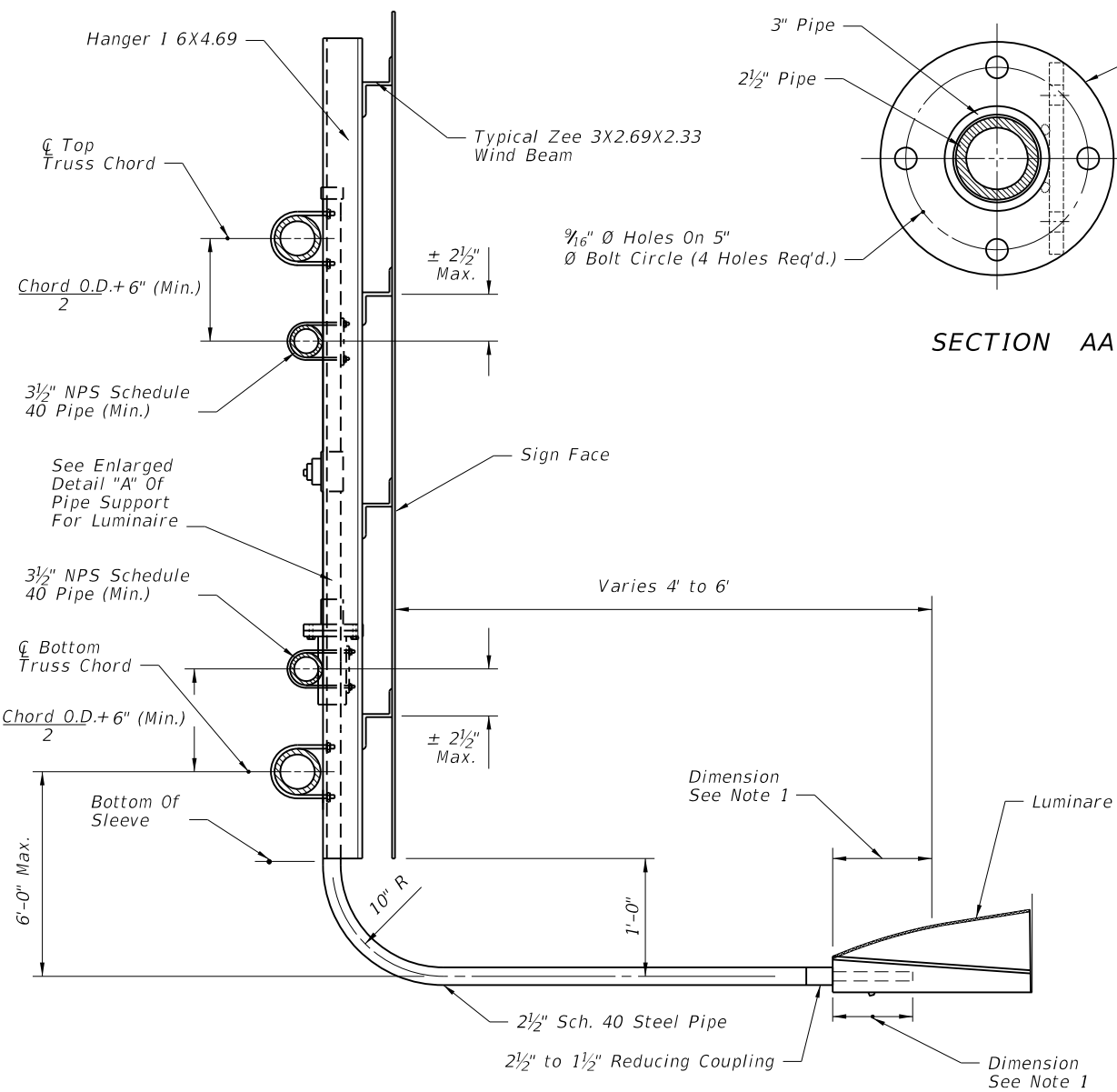


**PLATE A**



**SECTION AA**

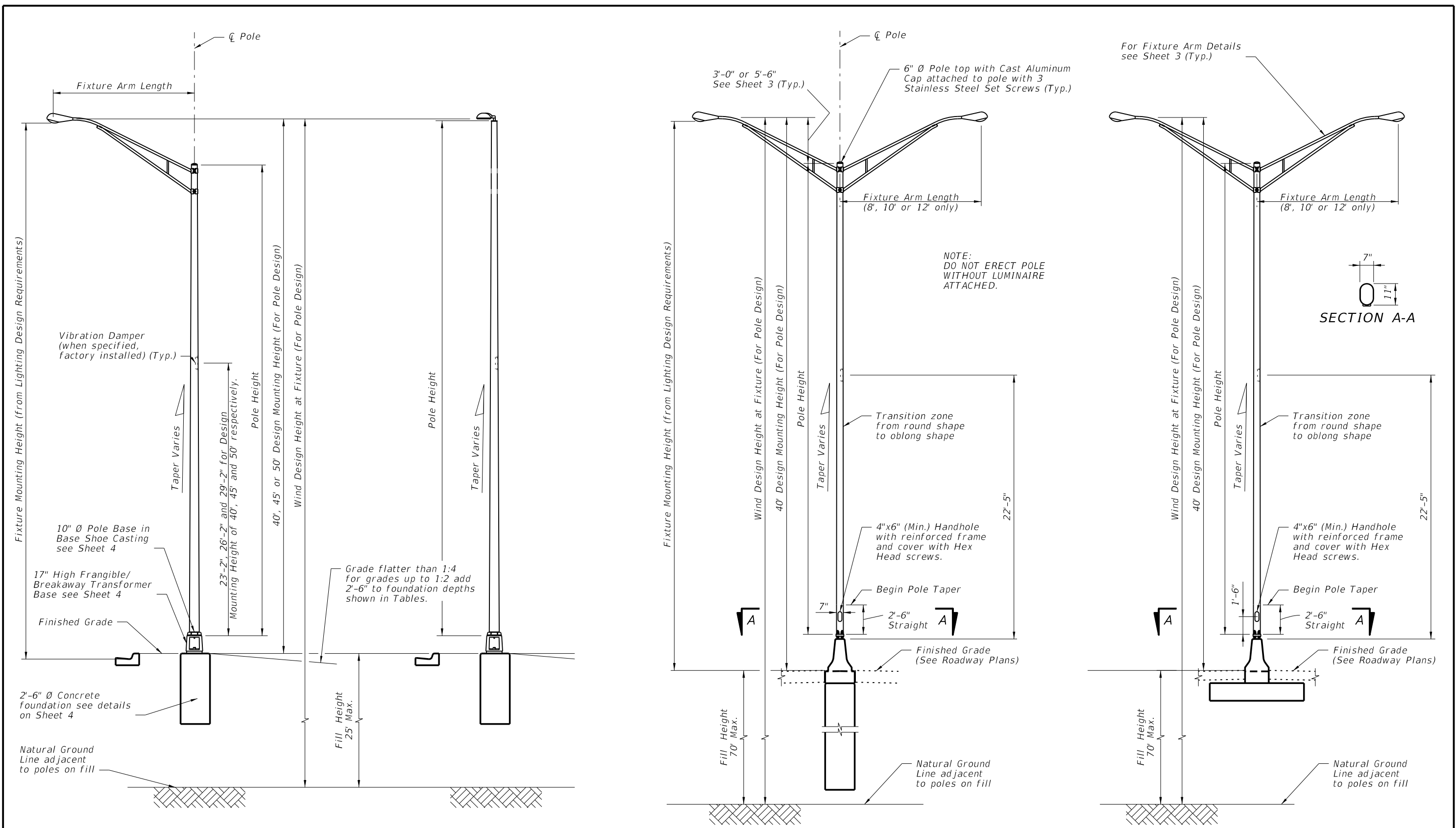
**SECTION BB**



**DETAIL "A"**

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LAST REVISION 07/01/13	DESCRIPTION:	<b>2015 DESIGN STANDARDS</b>	<b>EXTERNAL LIGHTING FOR SIGNS</b>	INDEX NO. <b>17505</b>	SHEET NO. <b>2 of 2</b>
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STANDARD ROADWAY ALUMINUM LIGHT POLE W/ARM

STANDARD ROADWAY ALUMINUM LIGHT POLE W/TOP MOUNT

MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON CYLINDRICAL FOUNDATION

MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON SPREAD FOOTING FOUNDATION

ELEVATIONS

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**ALUMINUM LIGHT POLE GENERAL NOTES**

1. Designed in accordance with FDOT Structures Manual.
2. All tables were developed assuming the following Luminaire properties: Effective Projected Area of 1.55 sq. ft. (includes wind drag coefficient) and 75 pounds (max.)
3. Perform all welding in accordance with the American Welding Society Structural Welding Code Aluminum ANSI/AWS D1.2 (current edition).
4. See Standard Index No. 17500 for grounding and wiring details.
5. Light Pole Specifications:
  - a. Poles: ASTM B221, Alloy 6063-T6.
  - b. Arm Tube Extrusions: ASTM B221 - Alloy 6063-T6.
  - c. Finish: For pole and arms: 50 grit satin rubbed finish.
  - d. Pole Connection Extrusions, Bars and Plates: ASTM B221 - Alloy 6063-T6.
  - e. Aluminum Caps and Covers: ASTM B-26(319-F).
  - f. Weld Metal: ER4043.
  - g. Stainless Steel Fasteners and Hardware: AISI Grade 304.
  - h. Aluminum alloy 6063: T4 condition and heat treated in accordance with ASTM B597 to T6.
  - i. Frangible Base: ASTM B26 Alloy 356-T6 or ASTM 108 Alloy 356-T6.
6. Provide "J", "S" or "C" hook at top of pole for electrical cable.
7. Furnish each pole with a 2"x4" (max) aluminum identification tag. Submit details for approval. Secure to Transformer Base with 0.125" stainless steel rivets or screws. Locate Identification Tag on the inside of base and visible from the door opening. Include the following information: Financial Project ID, Pole Height and Manufacturer's Name.
8. For Clamp and Frangible Transformer Base Design, certify that the components are capable of providing the required capacity. Certify that the frangible Transformer Base conforms to the current FHWA required AASHTO Frangibility Requirements, tested under NCHRP Report 350 Guidelines (eg. Akron Foundry TB1-17).
9. For Median Barrier Mounted Aluminum Light Poles, the fabricator must demonstrate the ability to produce a crack free pole. The fabricator's FDOT approved QC Plan must contain the following information prior to construction:
  - Tests demonstrating a pole with a 0.25" wall thickness achieves an ultimate moment capacity of 36 k-ft in the strong axis and 30 k-ft in the weak axis.
  - Tests demonstrating a pole with a 0.313" wall thickness achieves an ultimate moment capacity of 44 k-ft in the strong axis and 37 k-ft in the weak axis.
  - Test results showing that under the ultimate moment capacity loads, the pole does not buckle at the shape transition area.
  - Complete details and calculations for the reinforced 4"x6"(min.) handhole located 1'-6" above the base plate.
10. This Design Standard is considered fully detailed and no shop drawings are necessary. Submit shop drawings for minor modifications not detailed in the plans.

**ROADWAY ALUMINUM LIGHTING POLE NOTES**

1. Foundation Materials:
  - a. Reinforcing Steel: ASTM A615 Grade 60.
  - b. Concrete: Class I.
  - c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329).
2. Shoe Base and Frangible/Breakaway Transformer Base Casting Specifications.
  - a. Shoe Base Casting: ASTM B26 - Alloy 356-T6 or ASTM B108 - Alloy 356-T6.
  - b. Frangible/Breakaway Transformer Base Casting: ASTM B26 - Alloy 356-T6 or ASTM B108 - Alloy 356-T6.
  - c. Shoe Base Connection Bolts: ASTM A325 Type 1 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329).
3. Pole Notes:
  - a. Tapered as required to provide a top outside diameter (O.D.) of 6" with a base O.D. of 10". Portions of the shaft near the base shoe and at the arm connections may be held constant at 10" and 6" respectively to simplify fabrication.
  - b. Transverse welds are allowed only at the base.
  - c. Poles constructed out of two or more sections with overlapping splices are not permitted.
  - d. Equip poles with a vibration damper at locations per Specification Section 715.

**MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE**

1. Foundation Materials:
  - a. Reinforcing Steel: ASTM A615 Grade 60.
  - b. Concrete: Class I.
  - c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade DH nuts and ASTM A36 Plate Washer or ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329). Coupler shall be in accordance with AASHTO 5.11.5.2.2.
2. Base Connection Materials:
  - a. Aluminum Base Plate and Stiffener: Alloy 6061-T6.
  - b. Backer Ring: ASTM B221, Alloy 6063-T6.
  - c. Bearing Plate for Anchor Bolts: ASTM A709 Grade 36 or ASTM A36.
3. Pole Notes:
  - a. Tapered as required to provide a 6" (O.D.) round top with a 11"x7" (O.D.) oblong base. Portions of the shaft near the base and at the arm connections may be held constant at 11"x7" oblong and 6" round respectively to simplify fabrication.
  - b. Transverse welds are allowed only at the base.
  - c. Poles constructed out of two or more sections with overlapping splices are not permitted.
  - d. Equip poles with a damping device.

**FOUNDATION NOTES**


The foundations for Standard Roadway Aluminum Light Poles are pre-designed and are based upon the following conservative soil criteria which covers the majority of soil types found in Florida:  
 Classification = Cohesionless (Fine Sand)  
 Friction Angle = 30 Degrees (30°)  
 Unit Weight = 50 lbs./cu. ft. (assumed saturated)  
 Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

**EMBEDDED JUNCTION BOX NOTES**

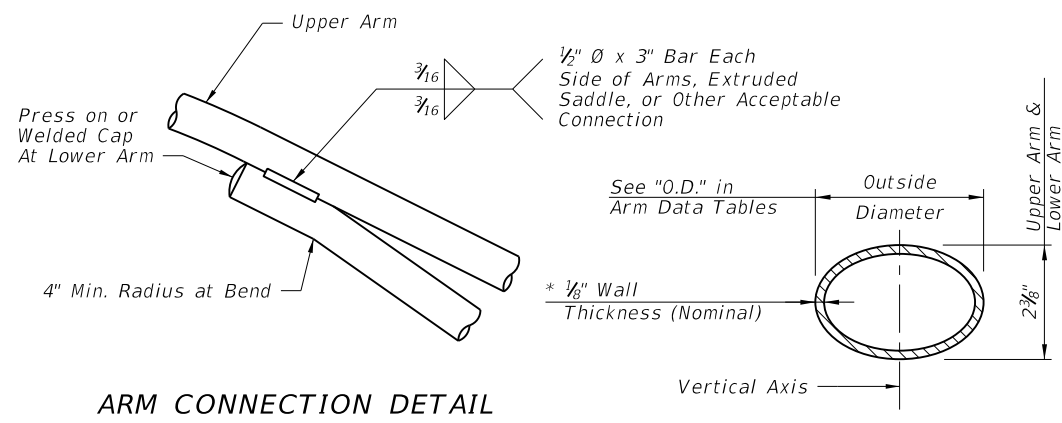
1. Fabricate embedded junction boxes from ASTM A 36 steel and hot-dip galvanized in accordance with ASTM A 123 after fabrication. All seams shall be continuously welded and ground smooth. Provide watertight cover with neoprene gasket and secure cover with galvanized screws.
2. Completed embedded junction box and conduit risers are incidental to the cost of concrete barrier wall.

**NOTES**

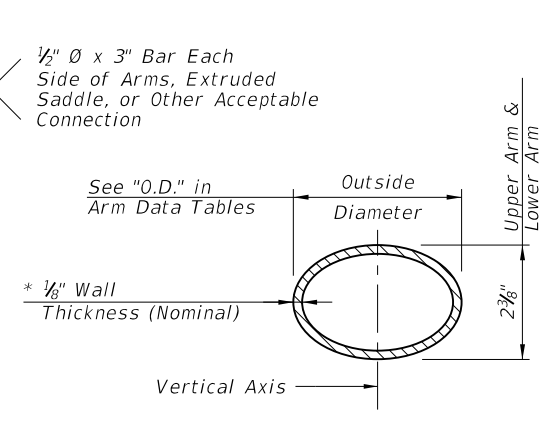
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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>STANDARD ALUMINUM LIGHTING</b>	INDEX NO. <b>17515</b>	SHEET NO. <b>2 of 8</b>
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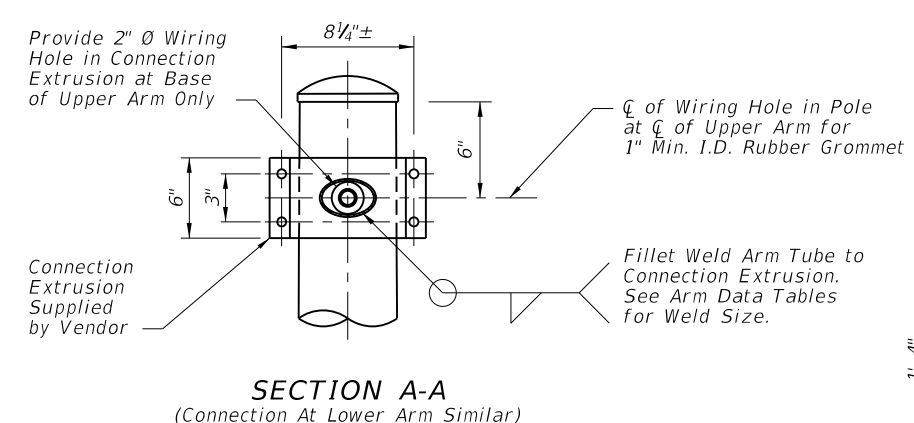




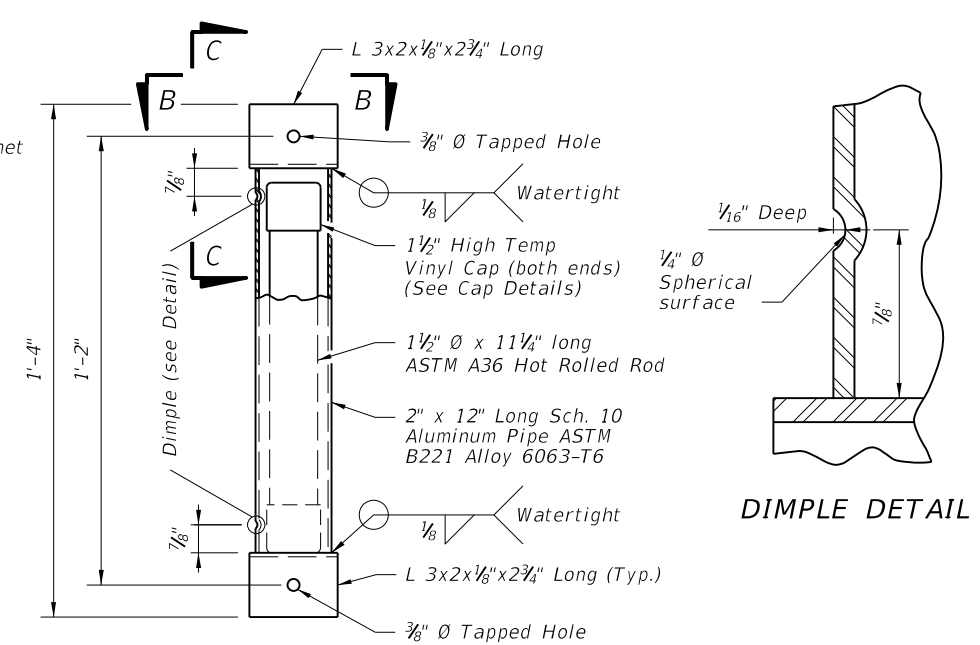
ARM CONNECTION DETAIL



ARM SECTION

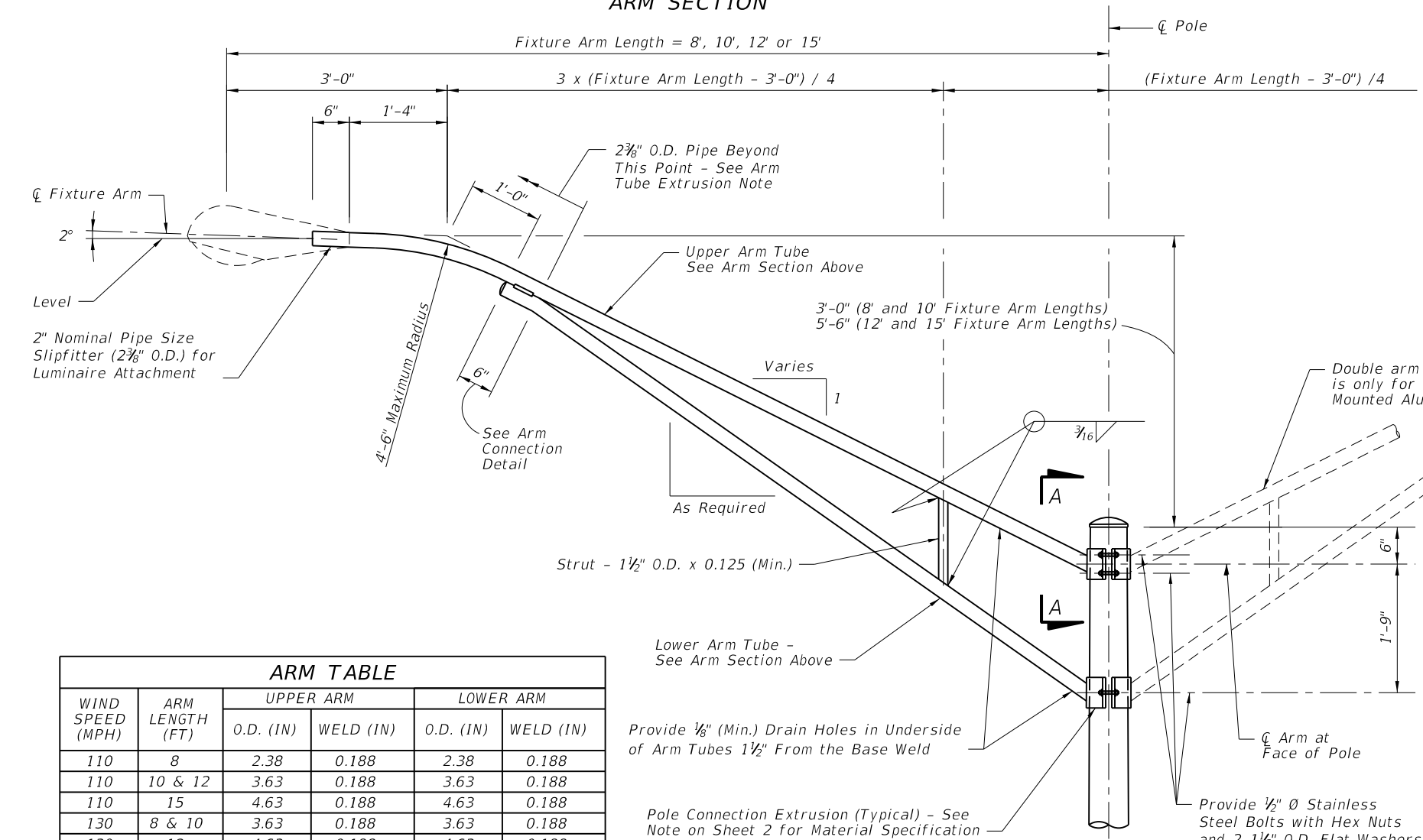


SECTION A-A  
(Connection At Lower Arm Similar)

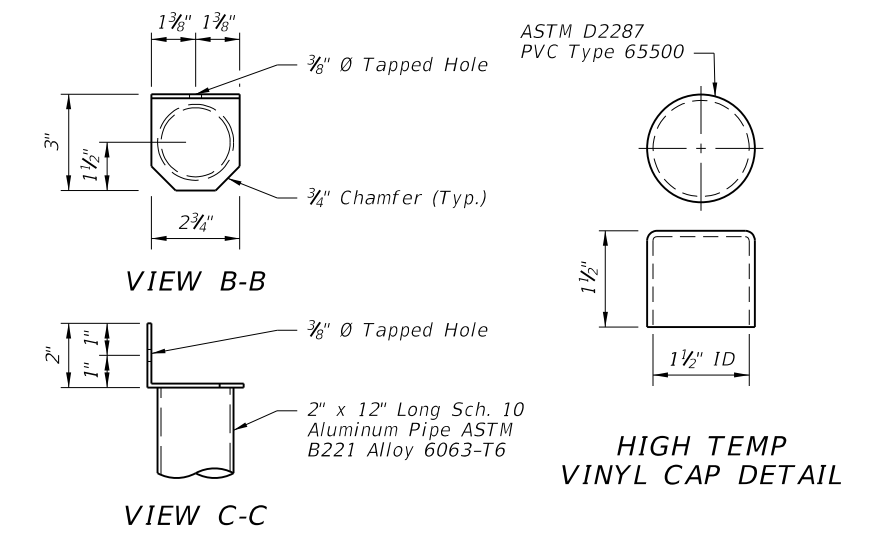


VIBRATION DAMPER ELEVATION

DIMPLE DETAIL



ARM ELEVATION



VIEW B-B

VIEW C-C

HIGH TEMP VINYL CAP DETAIL

ARM TABLE					
WIND SPEED (MPH)	ARM LENGTH (FT)	UPPER ARM		LOWER ARM	
		O.D. (IN)	WELD (IN)	O.D. (IN)	WELD (IN)
110	8	2.38	0.188	2.38	0.188
110	10 & 12	3.63	0.188	3.63	0.188
110	15	4.63	0.188	4.63	0.188
130	8 & 10	3.63	0.188	3.63	0.188
130	12	4.63	0.188	4.63	0.188
130	15	4.63	0.25	4.63	0.25
150	8	3.63	0.188	3.63	0.188
150	10	3.63	0.250	3.63	0.250
150	12	4.63	0.250	4.63	0.250
150	15	4.63	0.313	4.63	0.313

\* Increase Member Wall Thickness as Necessary to Meet Minimum Requirements of the Welding Code for the Connection Weld Sizes Shown in the Arm and Pole Tables.

ARM TUBE EXTRUSIONS NOTES:

At the pole connections, provide arm tube extrusions with dimensions as shown in the ARM SECTION and as tabulated in the ARM DATA Tables. Uniformly transition elliptical section to a cylindrical section at the arm connection.

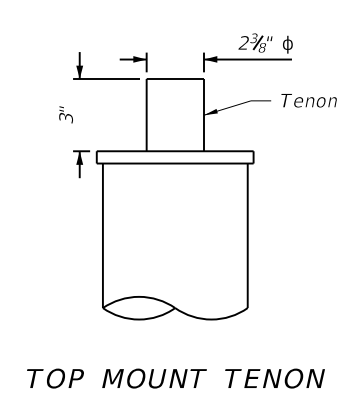
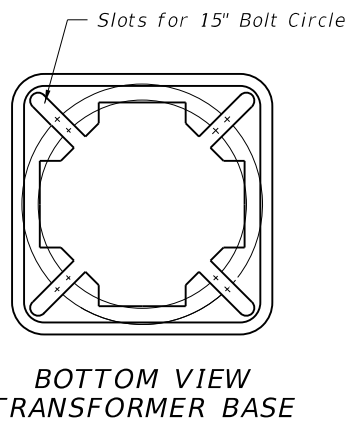
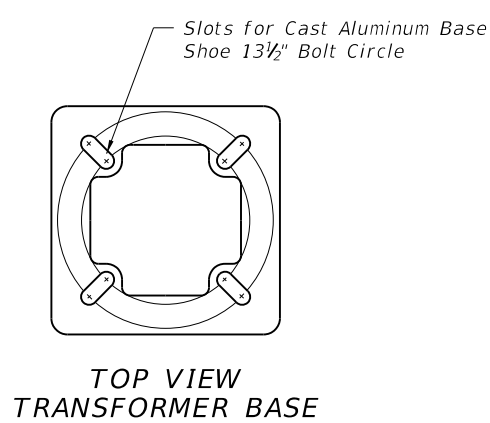
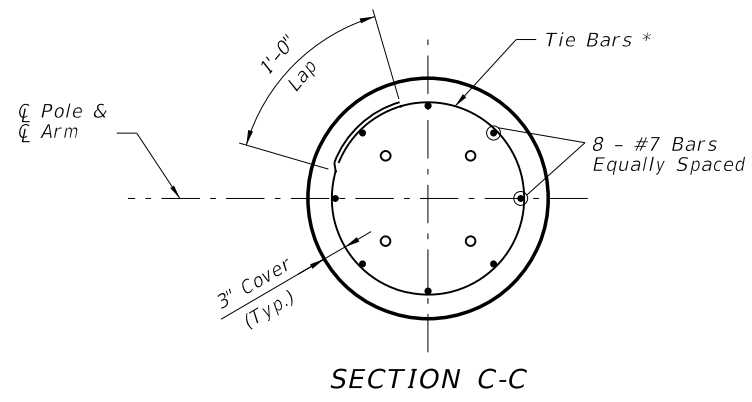
The fabricator may substitute elliptical cross sections other than those tabulated, provided the section properties about the vertical axis and the area of the section equal or exceed that of the required section, and provide minimum wall thickness of 1/8" nominal and within the Aluminum Association Tolerances.

The outside diameter about the minor axis should be held at 2 3/8" at the upper and lower arms.

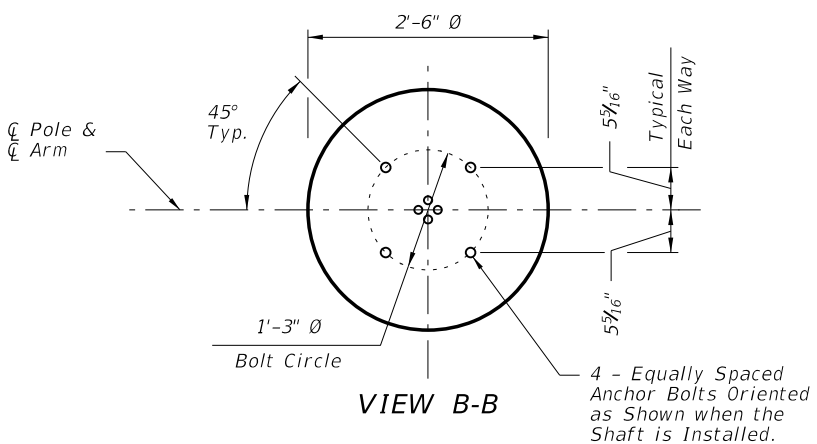
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ARM & DAMPER DETAILS

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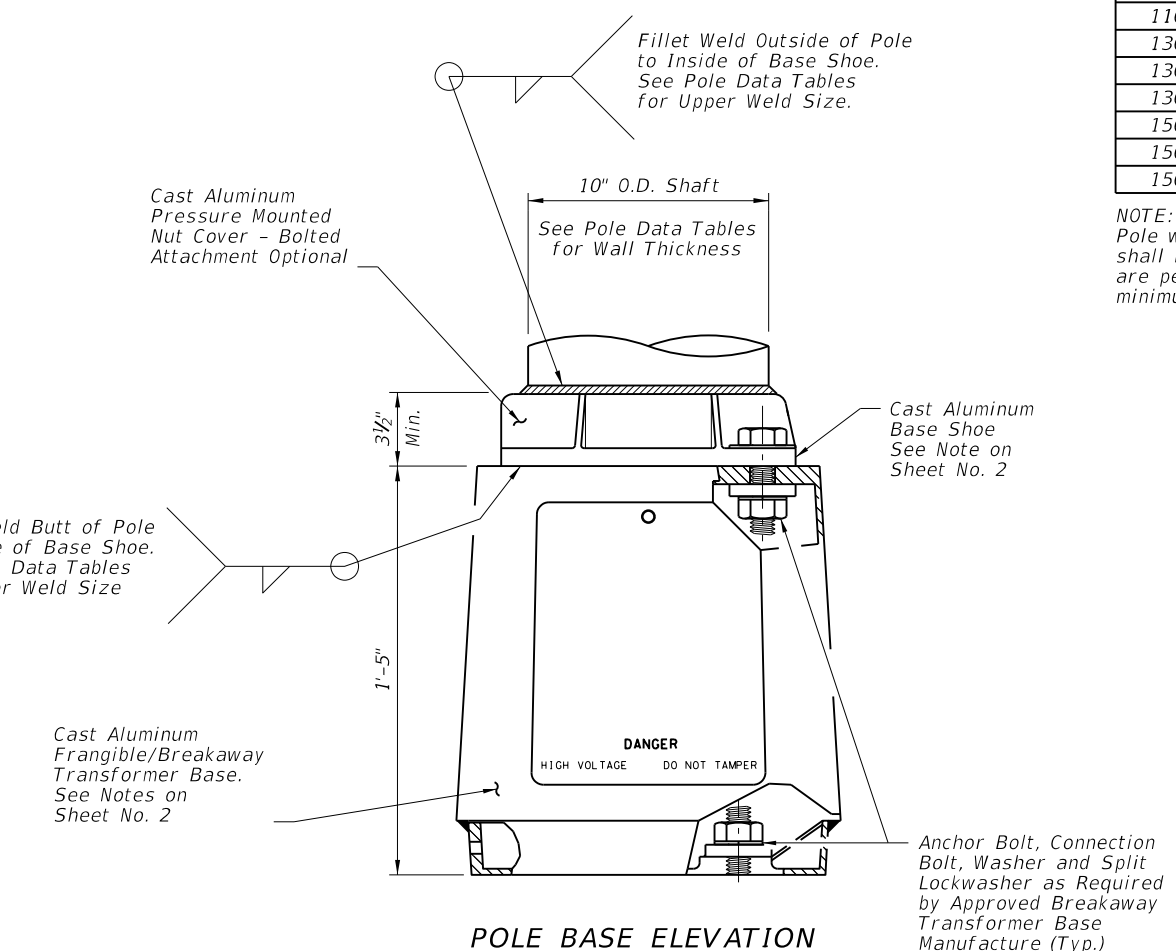
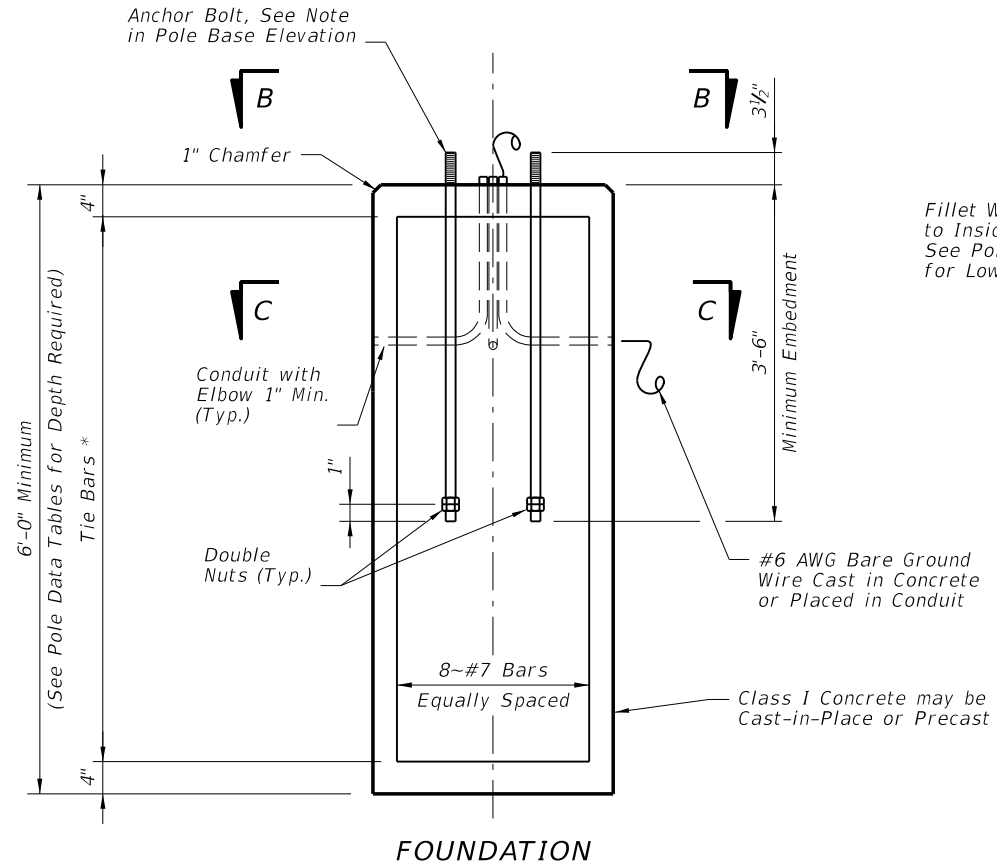


POLE TABLE W/ARM					
WIND SPEED (MPH)	ARM LENGTH (FT)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	UPPER WELD (IN)	LOWER WELD (IN)
110	8, 10, 12 & 15	40 & 45	0.156	0.156	0.156
110	8, 10, 12 & 15	50	0.188	0.188	0.188
130	8, 10 & 12	40	0.156	0.156	0.156
130	15	40	0.188	0.188	0.188
130	8, 10, & 12	45	0.188	0.188	0.188
130	15	45	0.250	0.250	0.250
130	8, 10, 12 & 15	50	0.250	0.250	0.250
150	8, 10, & 12	40	0.188	0.188	0.188
150	15	40	0.250	0.250	0.250
150	8, 10, 12 & 15	45	0.250	0.250	0.250
150	8, 10, 12 & 15	50	0.313	0.313	0.313



POLE TABLE W/TOP MOUNT				
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	UPPER WELD (IN)	LOWER WELD (IN)
110	40 & 45	0.125	0.125	0.125
110	50	0.156	0.156	0.156
130	40	0.125	0.125	0.125
130	45	0.156	0.156	0.156
130	50	0.188	0.188	0.188
150	40	0.156	0.156	0.156
150	45	0.188	0.188	0.188
150	50	0.250	0.250	0.250

NOTE: Pole wall thicknesses shown in the POLE TABLE are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.



FOUNDATION TABLE W/ARM		
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	TOTAL DEPTH (FT) **
110	40	7
110	45 & 50	8
130	40 & 45	8
130	50	9
150	40 & 45	9
150	50	10

FOUNDATION TABLE W/TOP MOUNT		
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	TOTAL DEPTH (FT) **
110	40	6
110	45 & 50	7
130	40	6
130	45 & 50	7
150	40 & 45	7
150	50	8

\*\* Depths shown in table are for grades flatter than 1:4, for grades up to 1:2 add 2'-6" to foundation depths shown in table.

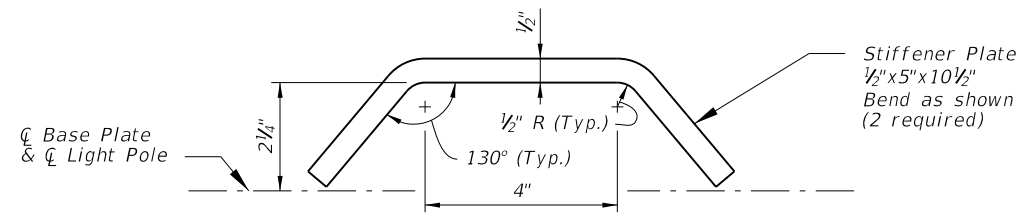
- Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:
  - The reinforcing bars conform to ASTM Specification A706/706M.
  - The holding wires conform to ASTM Specification A1064.
  - The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
  - Quality control yield strength and tensile strength tests are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.
- #4 Tie Bars @ 12" centers (max.) or D10 (or W10) spiral @ 6" pitch, 3 flat turns top and 1 flat turn bottom.

POLE AND BASE DETAILS FOR ROADWAY ALUMINUM LIGHT POLE

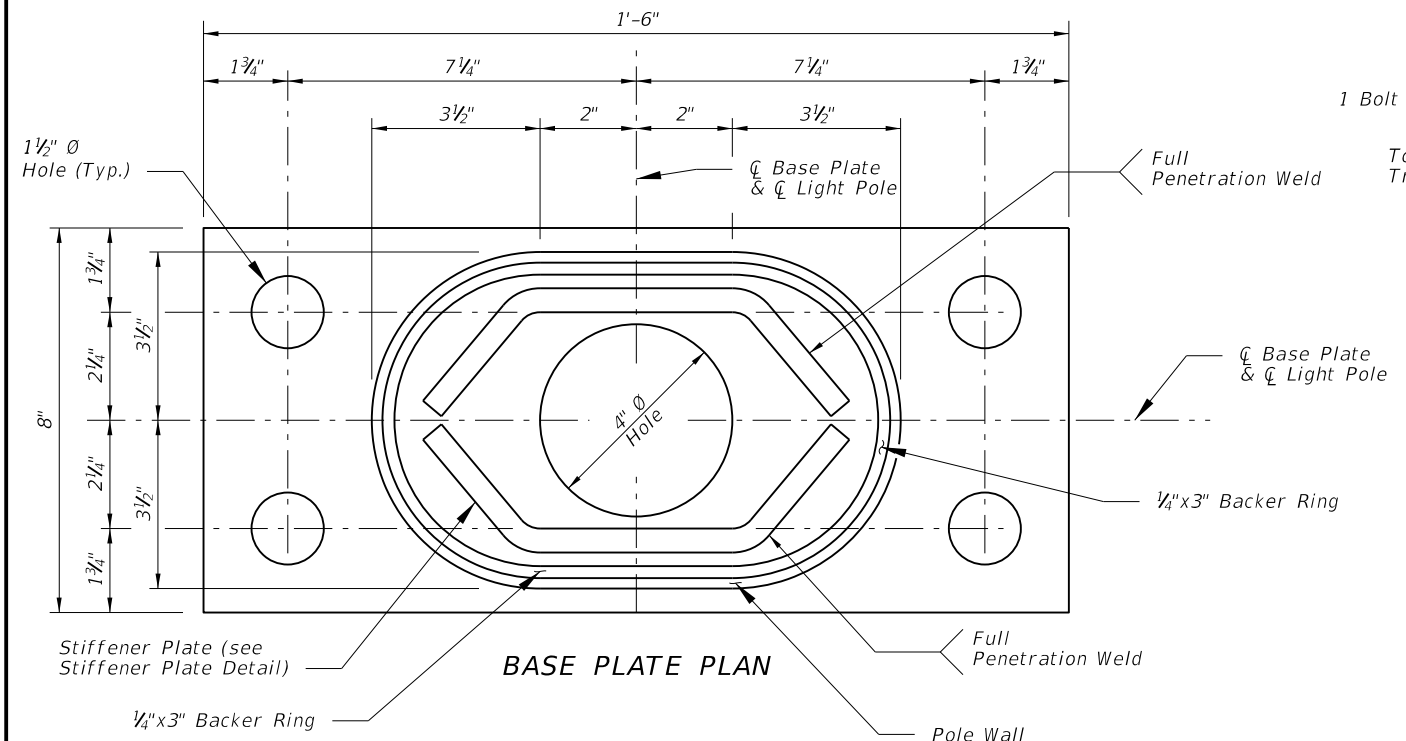
STANDARD ALUMINUM LIGHTING

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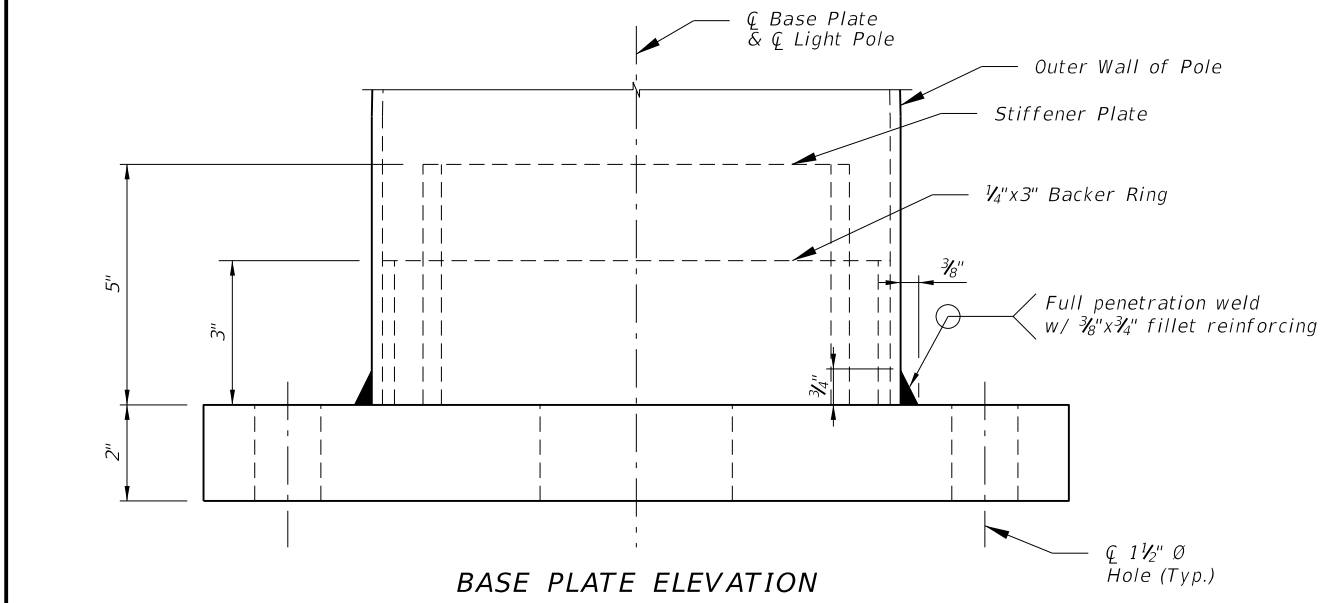
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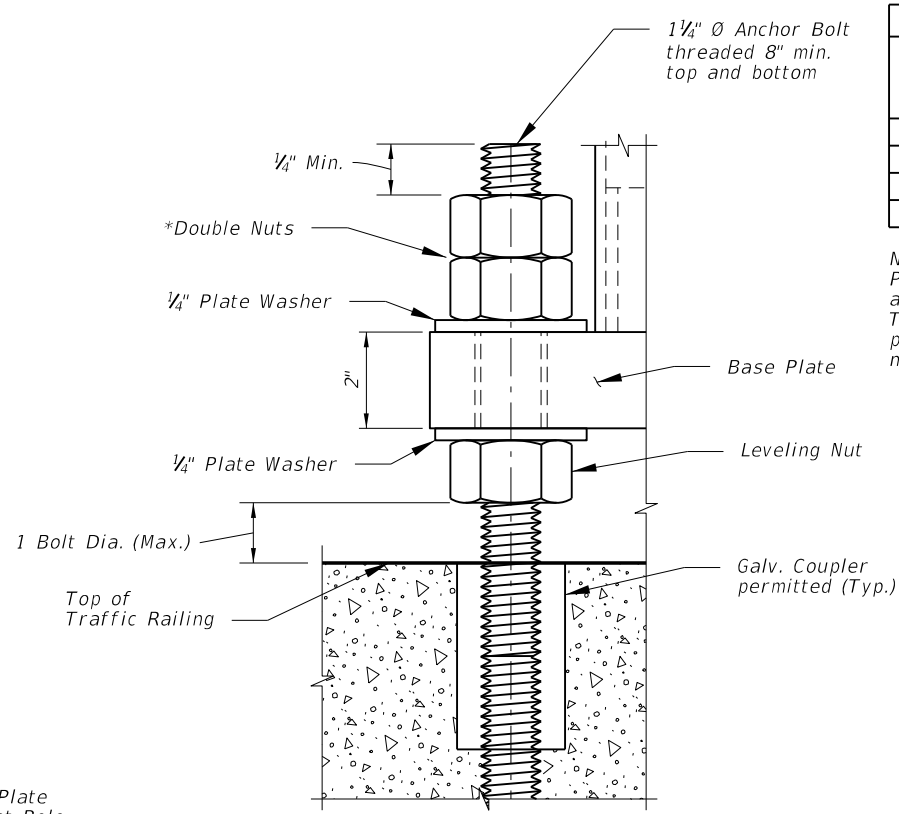
STIFFENER PLATE DETAIL



BASE PLATE PLAN



BASE PLATE ELEVATION



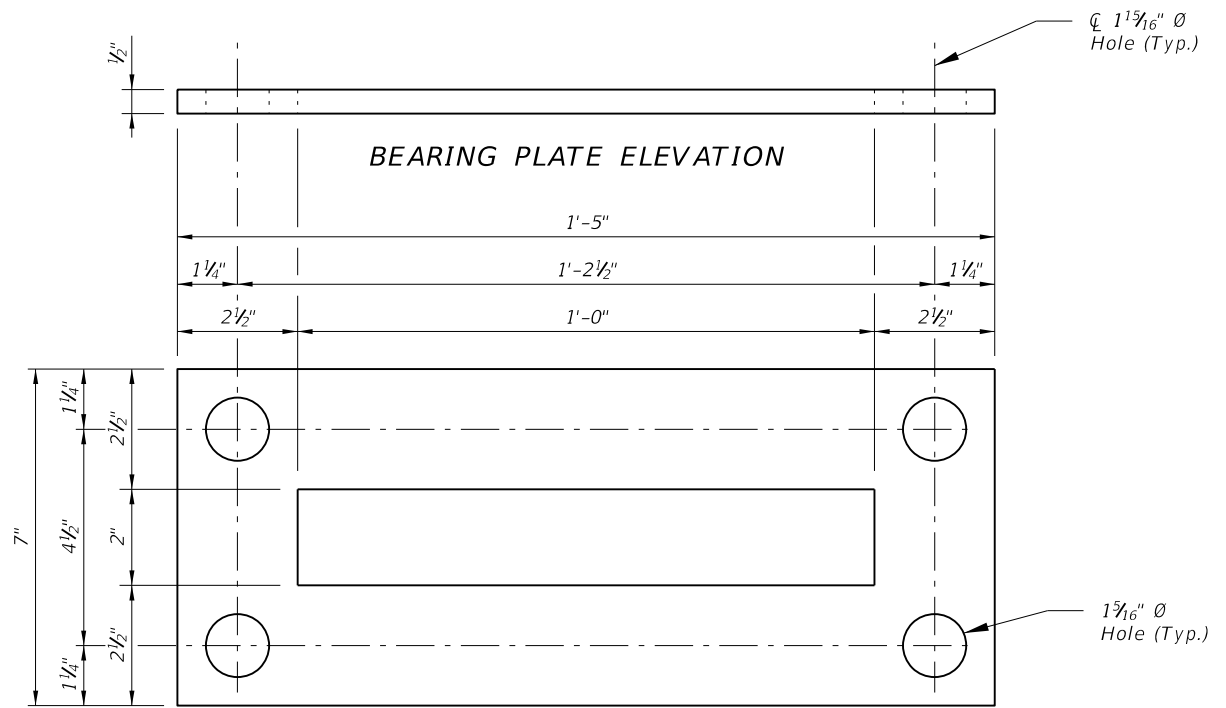
DETAIL 'A'

\*Top nut may be 1/2 height Jam Nut. Provide individual nut cover (not shown) for each bolt.

POLE TABLE				
WIND SPEED (MPH)	ARM LENGTH (FT)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	FILL HEIGHT (FT)
110	8, 10, 12	40	0.25	Up to 70'
130	8, 10, 12	40	0.25	Up to 70'
150	8, 10, 12	40	0.25	Up to 20'
150	8, 10, 12	40	0.313	>20' to 70'

NOTE:  
Pole wall thicknesses shown in the POLE TABLE are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.

NOTE:  
For locations of Bearing Plates, Base Plates and Detail 'A' see Sheets 6 & 7.

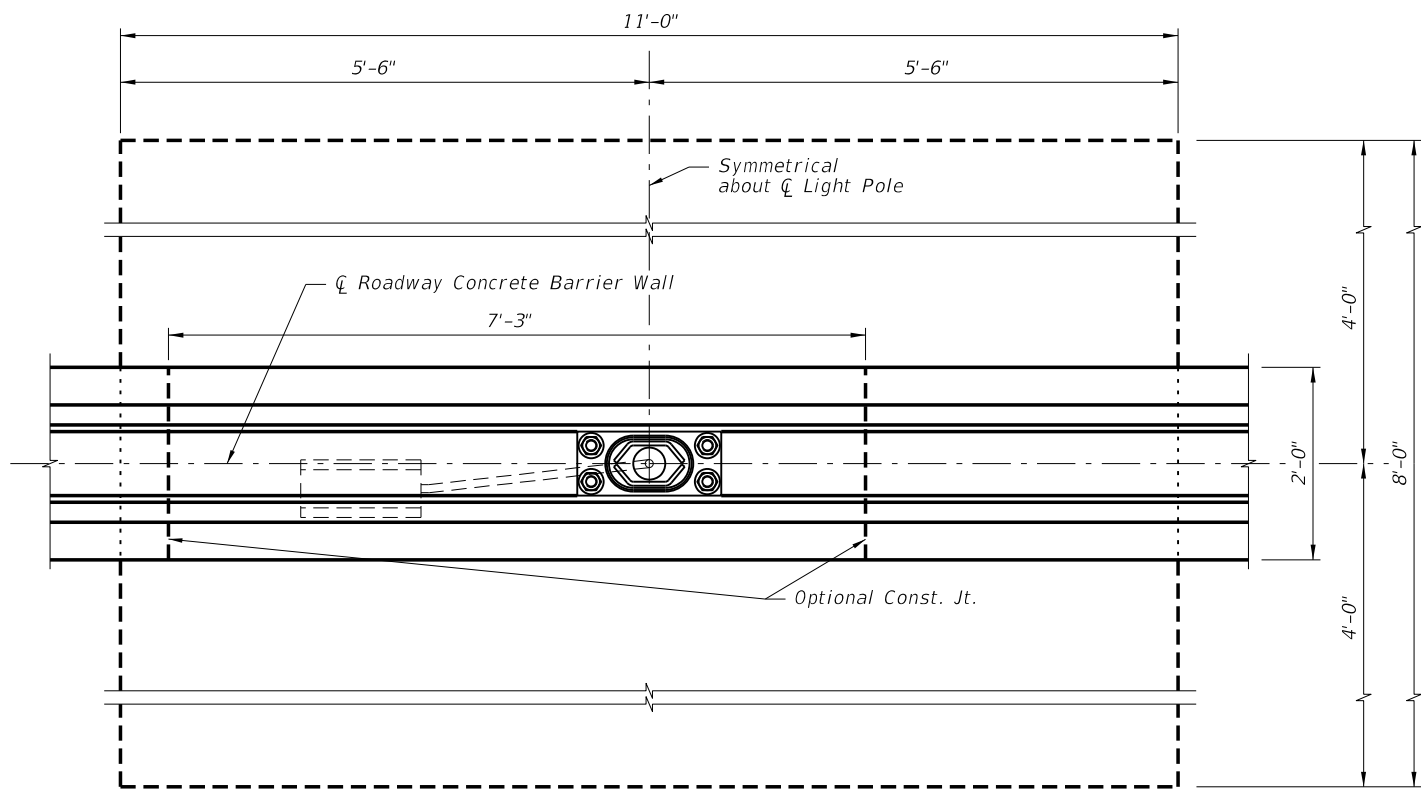


BEARING PLATE ELEVATION

BEARING PLATE PLAN

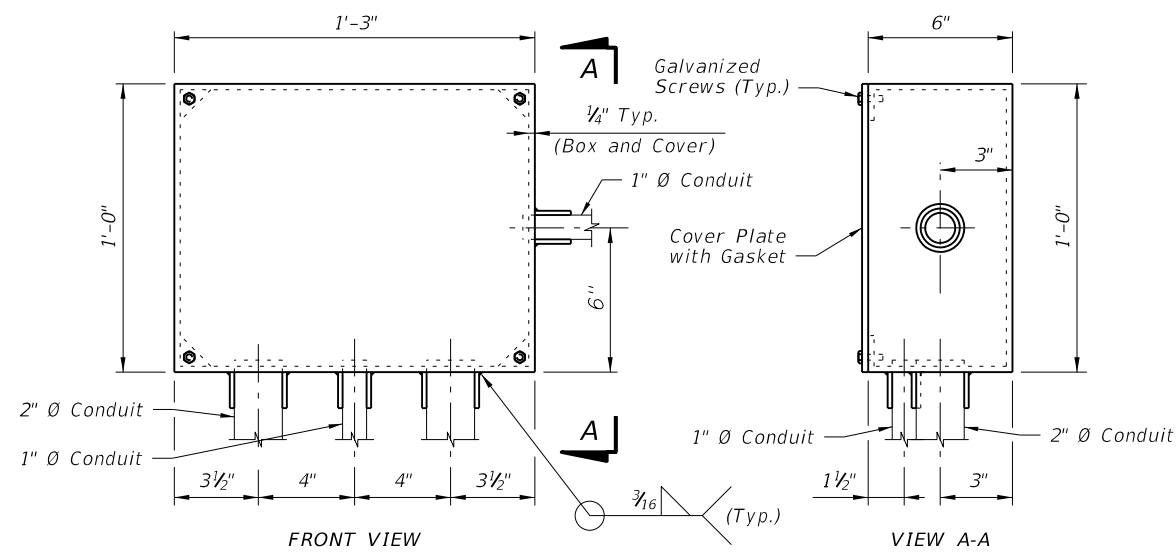
BASE PLATE DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE

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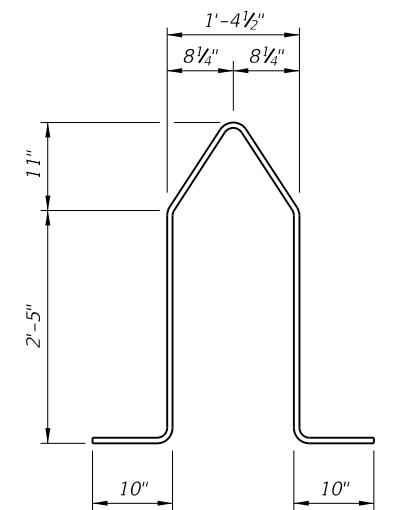


Provide dowel bars @ construction joint

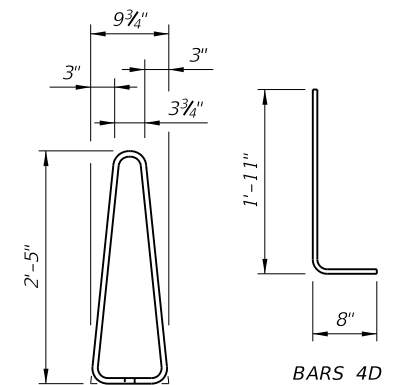
**PLAN**  
(Reinforcing steel not shown)



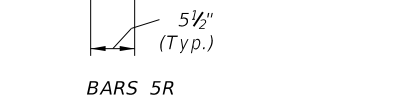
**EMBEDDED JUNCTION BOX DETAILS**



**BARS 5W1**

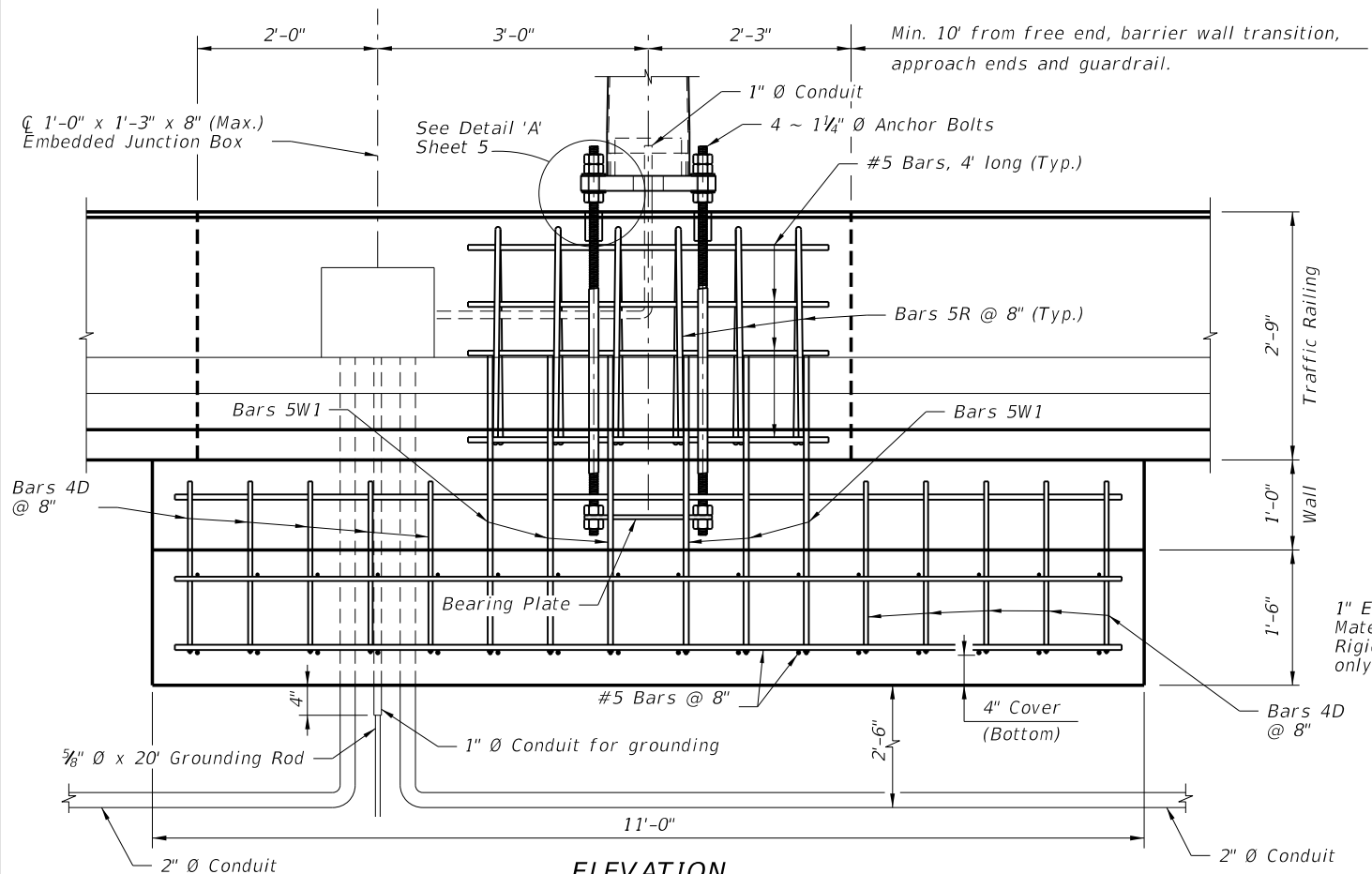


**BARS 4D**



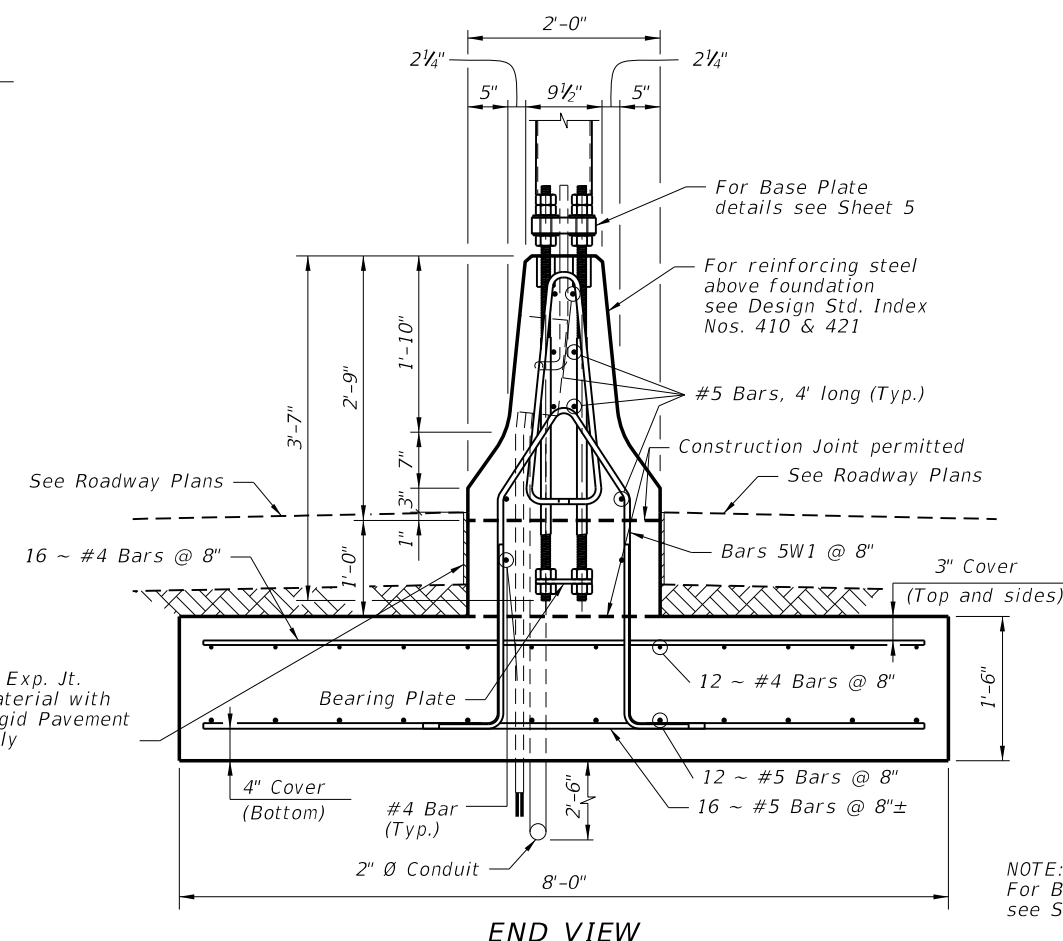
**BARS 5R**

**BAR BENDING DIAGRAMS**



**ELEVATION**

(For Roadway Concrete Barrier Wall reinforcing steel see Design Std. Index No. 410)



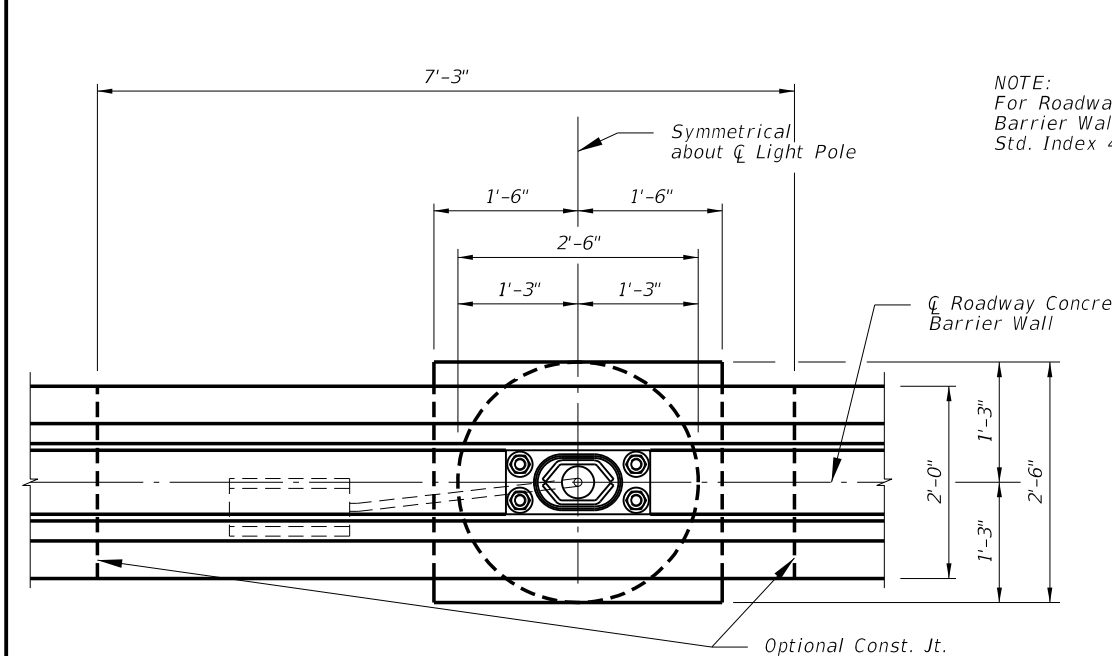
**END VIEW**

NOTE:  
For Bearing Plate Details see Sheet 5.

**SPREAD FOOTING DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE**

6/3/2014 2:15:29 PM

LAST REVISION 07/01/09	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>STANDARD ALUMINUM LIGHTING</b>	INDEX NO. <b>17515</b>	SHEET NO. <b>6 of 8</b>
REVISION					

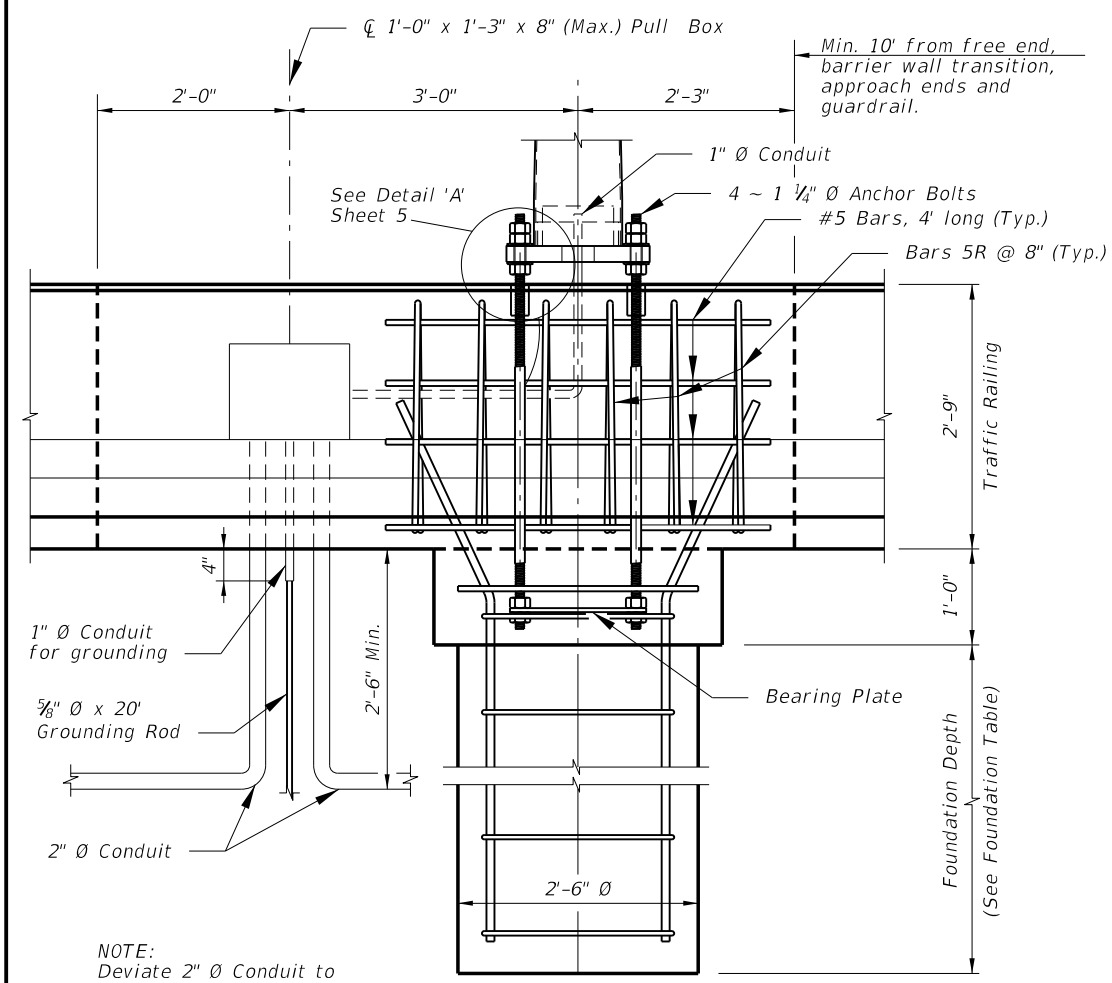


NOTE:  
 For Roadway Concrete Barrier Wall see Design Std. Index 410

NOTE:  
 For Base Plate Details, Bearing Plate Detail and Detail 'A' see Sheet 5

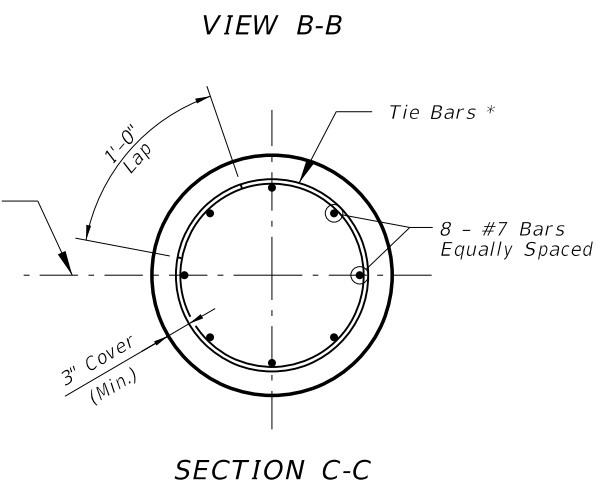
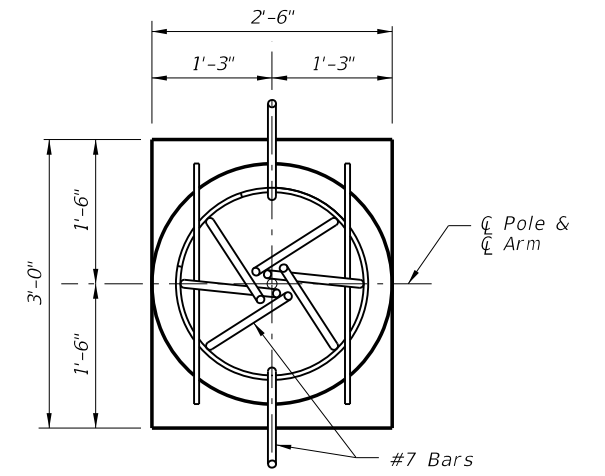
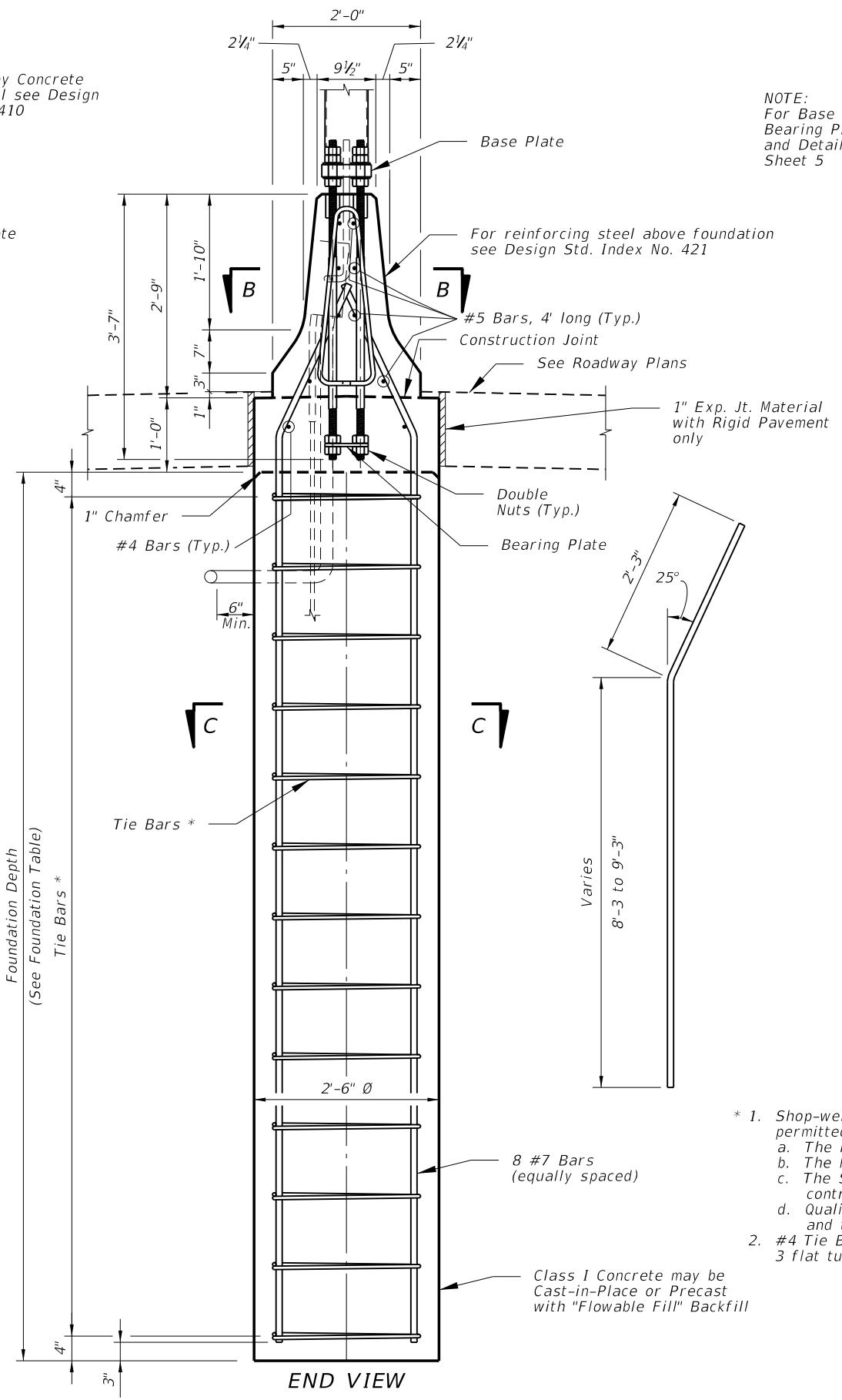
FOUNDATION TABLE		
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	FOUNDATION DEPTH (FT)
110	40	8
130	40	9
150	40	9

**PLAN**  
 (Reinforcing steel not shown)  
 Provide dowel bars @ construction joint



NOTE:  
 Deviate 2"  $\bar{O}$  Conduit to avoid cylindrical foundation.

(For Roadway Concrete Barrier Wall reinforcing steel see Design Std. Index No. 410)

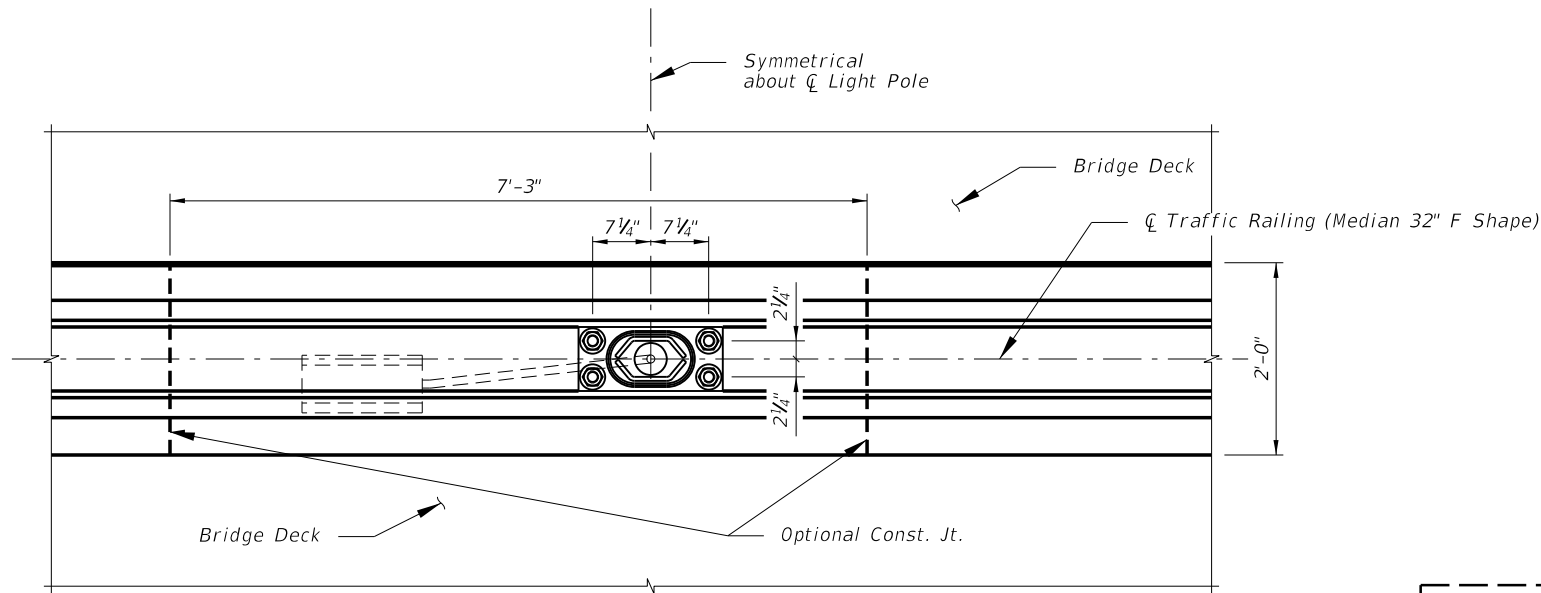


- \* 1. Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:
  - a. The reinforcing bars conform to ASTM Specification A706/706M.
  - b. The holding wires conform to ASTM Specification A82 or A496.
  - c. The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
  - d. Quality control tests are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.
- 2. #4 Tie Bars @ 12" centers (max.) or D10 (or W10) spiral @ 6" pitch, 3 flat turns top and 1 flat turn bottom.

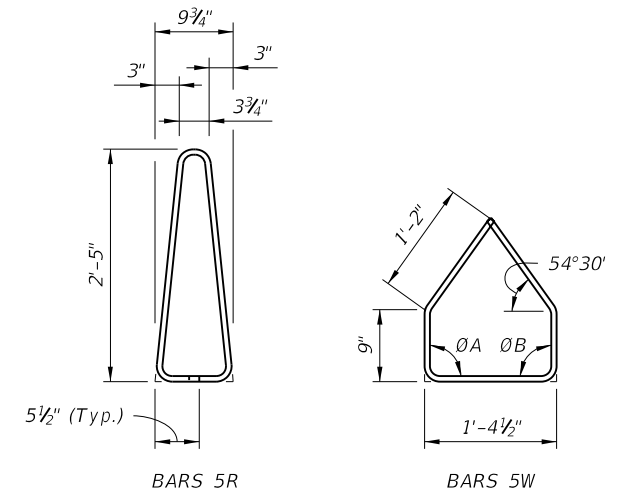
**CYLINDRICAL FOUNDATION DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE**

6/3/2014 2:15:29 PM

LAST REVISION 07/01/09	DESCRIPTION:	FDOT 2015 DESIGN STANDARDS	STANDARD ALUMINUM LIGHTING	INDEX NO. 17515	SHEET NO. 7 of 8
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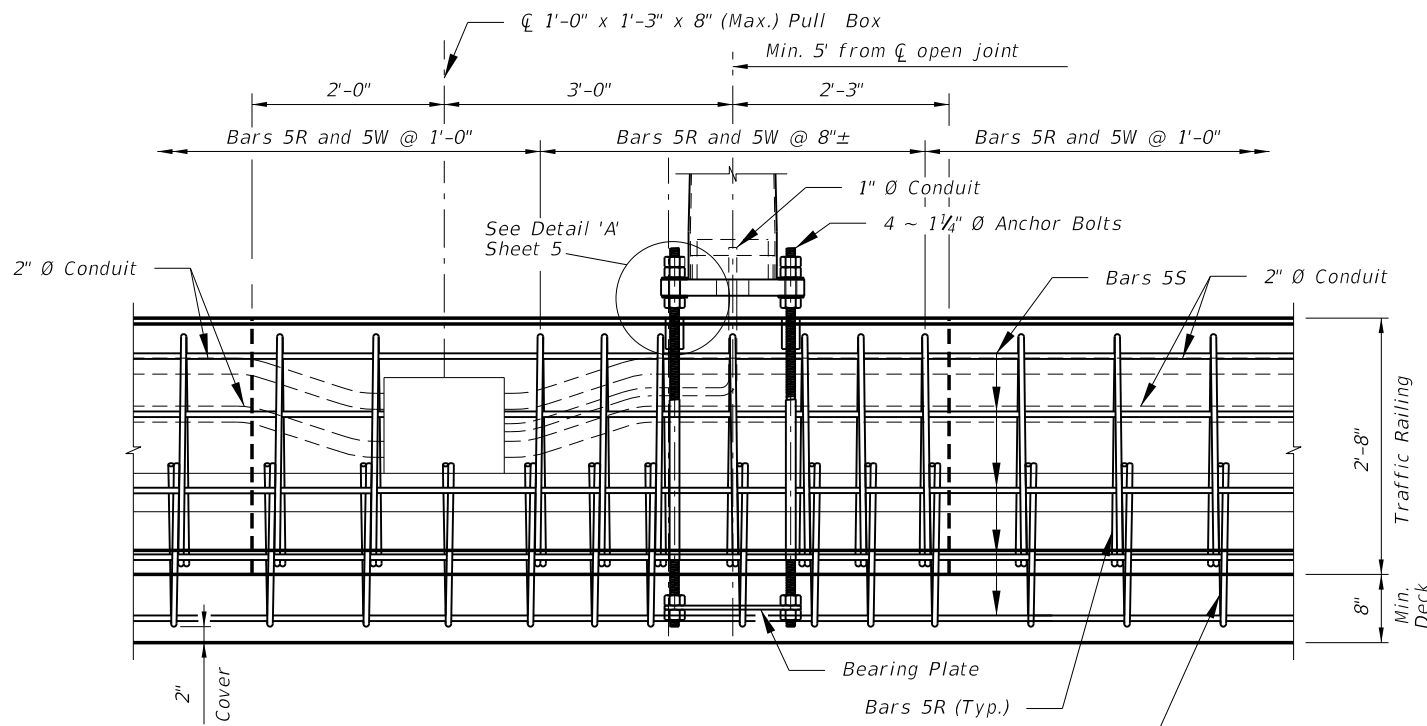
**PLAN**  
(Reinforcing steel not shown)



**BAR BENDING DIAGRAMS**

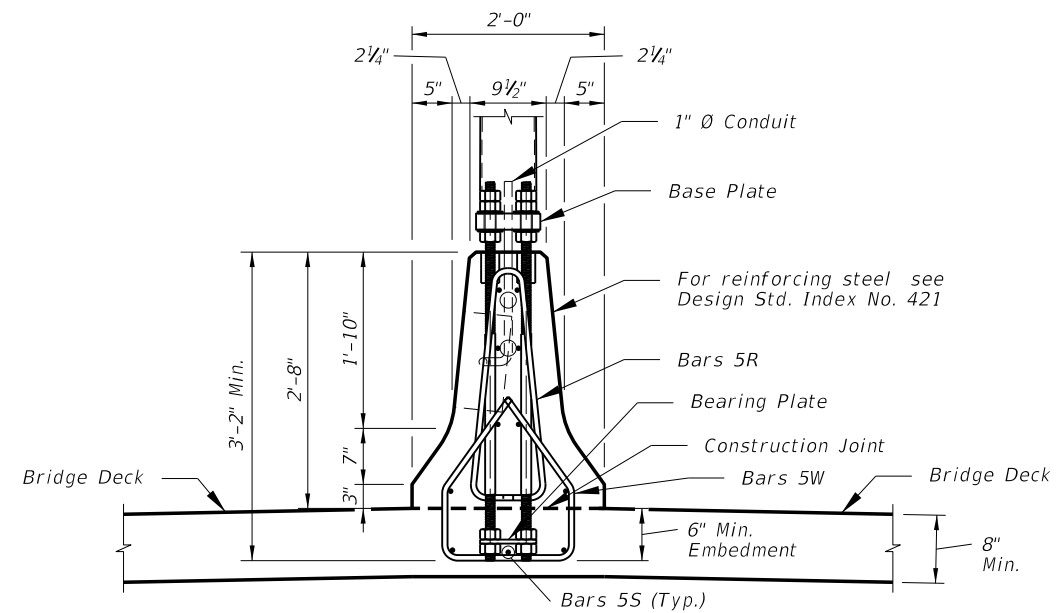
**INSTRUCTIONS TO DESIGNER:**

In order to minimize vibration of light poles due to traffic, locate light poles near substructure supports.



**ELEVATION**

(Longitudinal and transverse deck reinforcing steel not shown)



**END VIEW**

(Longitudinal and transverse deck reinforcing steel not shown)

**NOTES:**

1. For Base Plate Details, Bearing Plate Details and Detail 'A' see sheet 5.
2. See Design Standard Index No. 421 for details of Traffic Railing (Median 32" F Shape) and angles LA and LB.

**DETAILS FOR TRAFFIC RAILING (MEDIAN 32" F SHAPE) MOUNTED ALUMINUM LIGHT POLE**

6/3/2014 2:15:30 PM

LAST REVISION 07/01/09	REVISION	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>STANDARD ALUMINUM LIGHTING</b>	INDEX NO. <b>17515</b>	SHEET NO. <b>8 of 8</b>
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