

Street Lighting Notes

1. All underground wiring shall be copper XLP type-USE, extra abrasion resistance, 600 volts, in SCH 40 HDPE conduit buried a minimum 30 inches below finished grade, following the roadway or sidewalk edge. Minimum wire size shall be #8 AWG. Minimum conduit size shall be 1 1/4" diameter.
2. Circuits shall be alternating along roadway and sized for a maximum 5% voltage drop.
3. Rigid galvanized conduit sleeves shall be installed under all cross roads and driveways.
4. To maintain the structural integrity of light poles with mast arms, they shall not be erected and left to stand without luminaires.
5. Two sets of full size record drawings shall be furnished to the engineer upon completion of the improvements. The drawings shall show the installed locations of all light poles, underground conduits/wiring, handholes, junction boxes & controller cabinets. The drawings will be reviewed by the engineer.
6. All wires shall be labeled with wire markers indicating the circuit ID in every controller, pole base, hand hole and splice/connection point. Wire markers shall be white nylon with integral mechanical fastener with minimum 3/4" x 1" writeable area.



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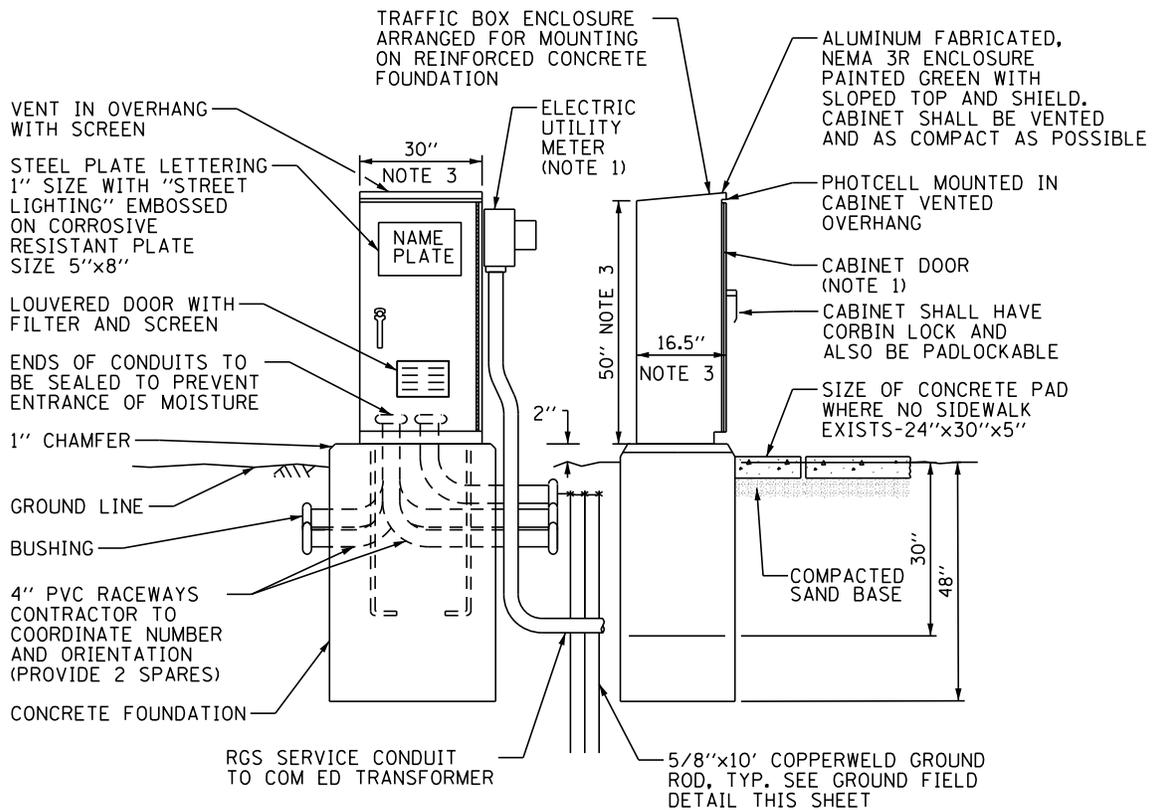
ENGINEERING DETAILS

STREET LIGHTING NOTES

DATE:	8/17/2018
REV 1:	9/13/2018
REV 2:	
REV 3:	

DETAIL NO.

L-0

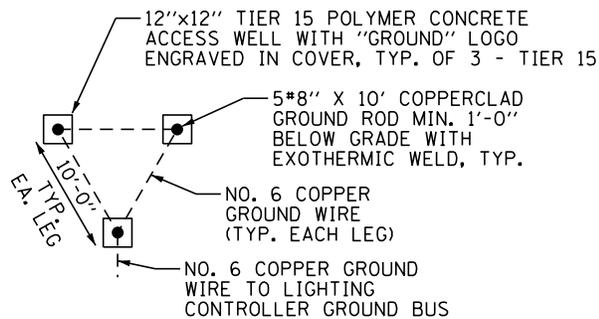


NOTES:

1. CABINET DIMENSIONS SHOWN ARE APPROXIMATE, CABINET SHALL BE AS COMPACT AS POSSIBLE, CONTRACTOR TO COORDINATE.

LIGHTING CONTROLLER CABINET AND FOUNDATION

N.T.S.



GROUND FIELD DETAIL (TYP.)

N.T.S.



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ENGINEERING DETAILS

LIGHTING CONTROLLER CABINET

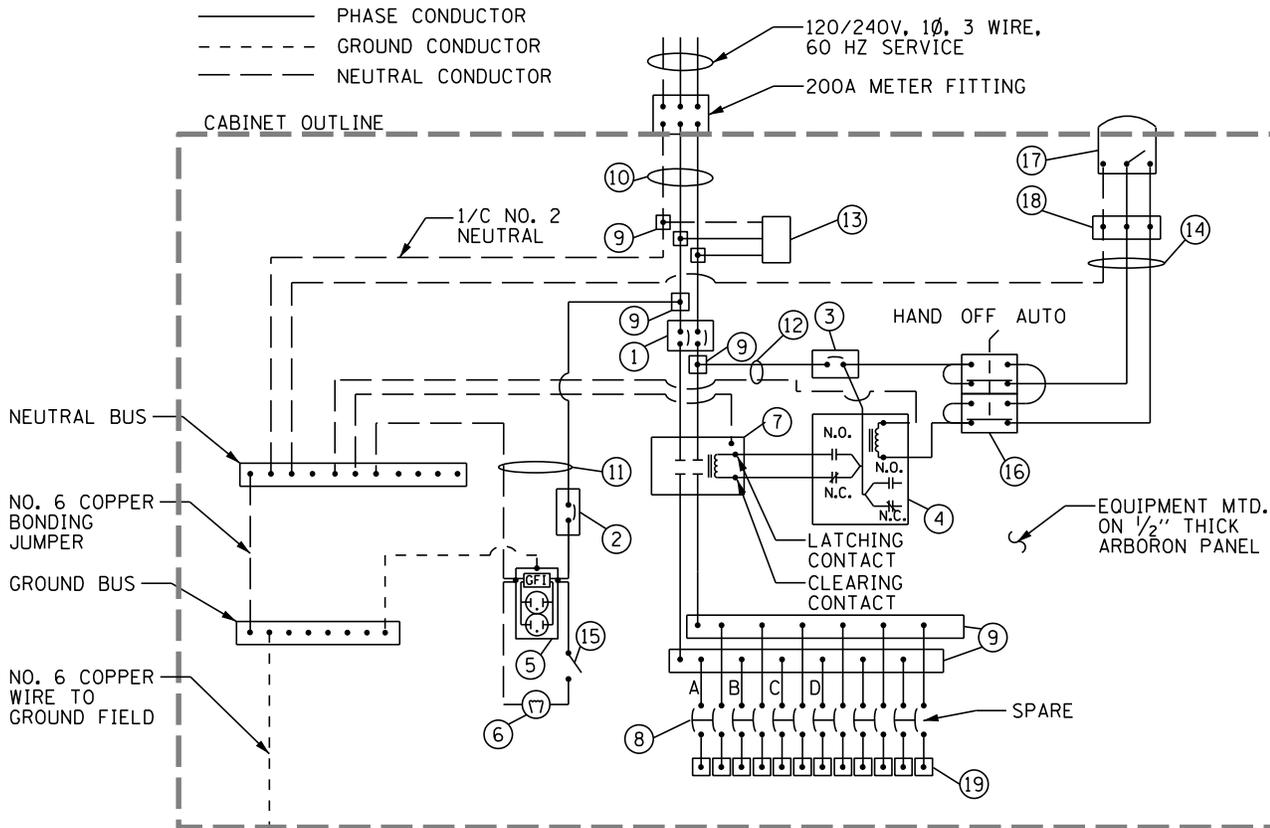
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REV 2:	
REV 3:	

DETAIL NO.

L-1

LIGHTING CONTROLLER CIRCUIT LOADS

CIRCUIT ID	ROADWAY LUMINAIRE		TOTAL CIRCUIT LOAD	
	QTY.	LOAD/FIXT. (WATTS)	(WATTS)	AMPS (VOLTS)
A		W	W	A (240V)
B		W	W	A (240V)
C		W	W	A (240V)
D		W	W	A (240V)
TOTAL		N/A	W	A (240V)



NOTES:

1. ALL GROUND CONDUCTORS SHALL BE GREEN AND NEUTRAL CONDUCTORS SHALL BE WHITE. PHASE CONDUCTORS SHALL BE COLOR CODED IN ACCORDANCE WITH SECTION 1066.02 OF THE STANDARD SPECIFICATIONS. CONTRACTOR SHALL ONLY USE SOLID COLOR CODED INSULATIONS. COLOR STRIPPING OF PHASE CONDUCTORS SHALL NOT BE ALLOWED.
2. IN ADDITION TO THE TERMINATIONS SHOWN, THE NEUTRAL AND GROUND BUS BARS SHALL ACCOMMODATE A MINIMUM OF 8 ADDITIONAL TERMINATIONS (*2-#14).

LIGHTING CONTROLLER WIRING DIAGRAM

N.T.S.



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ENGINEERING DETAILS

LIGHTING CONTROLLER

DATE: 8/17/2018

REV 1:

REV 2:

REV 3:

DETAIL NO.

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ITEM	SPECIFICATION	MFG./MODEL NO. OR APPR'D EQUAL
① MAIN CIRCUIT BREAKER	MOLDED CASE, PANEL-MOUNTED, 100 AMPERE, 2P, 240V SERVICE RATING, 10KAIC	SQUARE D
② LAMPHOLDER CIRCUIT BREAKER	MOLDED CASE, PANEL-MOUNTED, 20 AMPERE, 1P, 120V RATING, 10KAIC	SQUARE D
③ PHOTOELECTRIC CONTROL CIRCUIT BREAKER	MOLDED CASE, PANEL-MOUNTED, 15 AMPERE, 1P, 120V RATING, 10KAIC	SQUARE D
④ AUXILIARY RELAY	120 V OPERATED DPDT 60 HZ COIL, 2 NO & 2 NC CONTACTS	MAGNECRAFT NO. 389 FXBXC1 - 120A
⑤ CABINET RECEPTACLE AND BOX	COMMERCIAL GRADE GFCI 20A/120V, W.R., MOUNTED IN A WEATHERPROOF CAST ALUMINUM SINGLE GANG BOX WITH WEATHERPROOF COVER	RECEPTACLE: LEVITON NO. 8899, BOX: APPLETON NO. WSM150 COVER: APPLETON NO. WHG1
⑥ CABINET LIGHT	5 WATT LED STRIP LIGHT, 60K HOUR RATING, 65K COLOR TEMPERATURE, DOOR SWITCH CONTROLLED, FASTENED TO TOP OF CABINET	PENTAIR NO. LEDA1S35
⑦ CONTACTOR	100 AMPERE, 2P, 120V COIL, MECHANICALLY HELD	SQUARE D NO. 8903 S0010 V02
⑧ BRANCH LINE CIRCUIT BREAKERS	MOLDED CASE, PANEL-MOUNTED, 20A, 2P, 240V RATING, 10KAIC (MIN 2 SPARES)	SQUARE D
⑨ POWER DISTRIBUTION BLOCK	600 VOLT, INSULATED, SIZE AS REQ'D, 10KAIC	N/A
⑩ SERVICE CABLES	3-600V XLP NO. 2	MARATHON
⑪ LAMPHOLDER WIRE	2-600V XLP NO. 12	N/A
⑫ CONTROL WIRE	2-600V XLP NO. 12	N/A
⑬ SURGE ARRESTOR	10 K AMPERE RATING	SQUARE D NO. SDSA 1175
⑭ PHOTOELECTRIC CONTROL WIRE	3-600V XLP NO. 10	N/A
⑮ DOOR SWITCH	20A/120V, DOOR MOUNTED SNAP ACTION TYPE PLUNGER SWITCH	OMRON NO. A-20G0-K
⑯ HAND-AUTO-OFF CONTROL SWITCH	20A, 3 POS. MTD IN CAST ALUM. ENCLOSURE	SQUARE D NO. 9001 KYK 111
⑰ PHOTOCCELL	120V, MTD. ON CABINET, DELAY TYPE, SPST-NC	FISHER PIERCE NO. FPFA-105M
⑱ TERMINAL BLOCK	3 TERMINAL, SCREW TYPE, MAX. #10 WIRE SIZE	CINCH NO. 3-142
⑲ CIRCUIT BREAKER DISTRIBUTION BLOCKS	30A, 600V, 10 KAIC - WIRE RANGE: LINE SIDE LUG (1) #2/0-#14 AWG, LOAD SIDE LUGS (6) #4-#14 AWG	MARATHON

NOTES:

1. THE LIGHTING CONTROLLER TOGETHER WITH ALL OF ITS COMPONENTS SHALL BE UL LISTED AS AN "ENCLOSED INDUSTRIAL CONTROL PANEL" UNDER UL508A.
2. CONNECTION OF SURGE ARRESTOR TO LINE SIDE OF MAIN CIRCUIT BREAKER SHALL NOT BE "DOUBLE LUGGED."
3. THE MAIN CIRCUIT BREAKER SHALL BE LABELED "SERVICE DISCONNECT".
4. ALL SWITCHES AND CONTROLS SHALL BE IDENTIFIED USING TWO COLOR ENGRAVED NAMEPLATES.
5. THE PANEL MANUFACTURER SHALL LABEL THE CABINET WITH THE APPROPRIATE ARC FLASH WARNING AND PERSONNEL PROTECTION EQUIPMENT REQUIRED FOR SERVICING.
6. ALL EXPOSED BUS BARS SHALL BE INSULATED.
7. ALL WIRING SHALL BE COPPER.



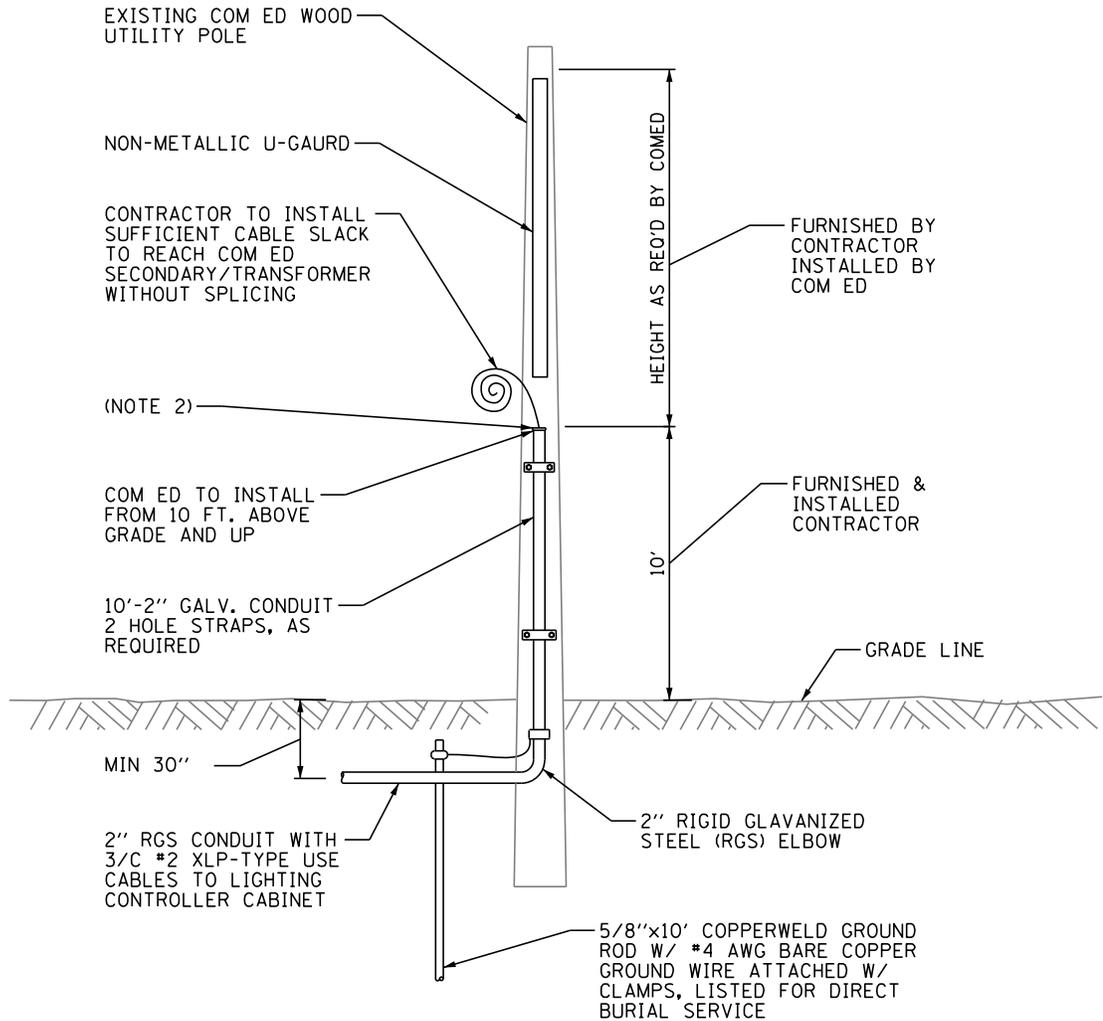
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ENGINEERING DETAILS

**LIGHTING CONTROLLER
 COMPONENT SCHEDULE**

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REV 1:	
REV 2:	
REV 3:	

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NOTES:

1. ALL WORK SHALL CONFORM TO COM ED'S BOOK OF "INFORMATION AND REQUIREMENTS FOR THE SUPPLY OF ELECTRIC SERVICE."
2. CONTRACTOR SHALL PROVIDE CONDUIT BUSHING AND SEALING COMPOUND AT TOP OF RISER.



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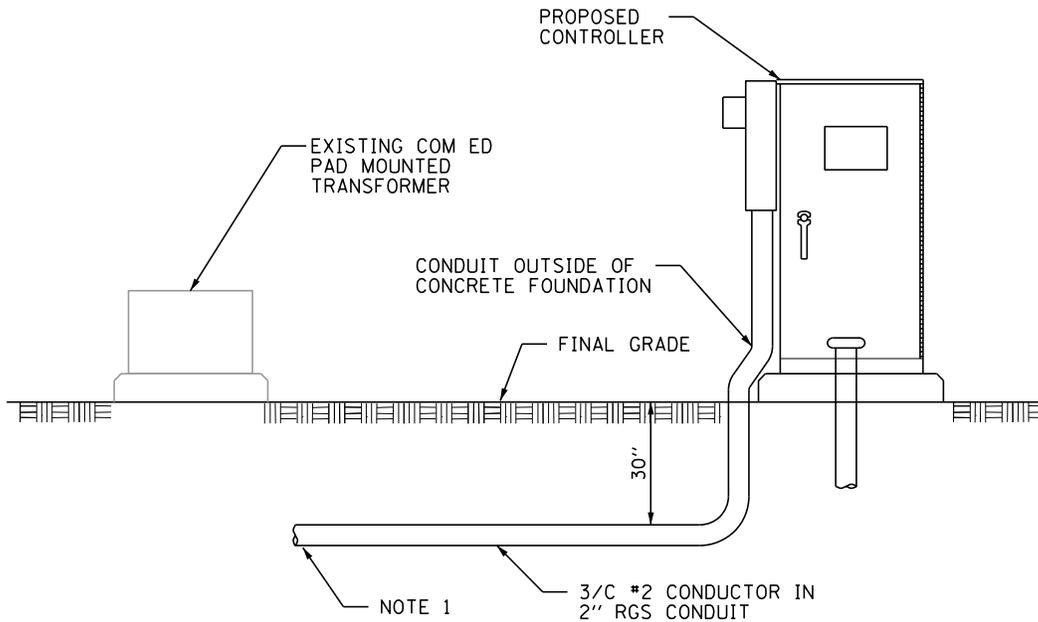
ENGINEERING DETAILS

COM ED OVERHEAD SERVICE CONNECTION

DATE:	8/17/2018
REV 1:	
REV 2:	
REV 3:	

DETAIL NO.

L-4



NOTES:

1. ROUTE SERVICE CONDUIT UP TO 2 FT AWAY FROM TRANSFORMER. PROVIDE ADEQUATE SLACK CABLE COILED UP FOR COM ED TO CONNECT.
2. CONTRACTOR TO SCHEDULE & COORDINATE ALL WORK WITH COM ED. END OF CONDUIT SHALL HAVE A PROTECTIVE BUSHING.



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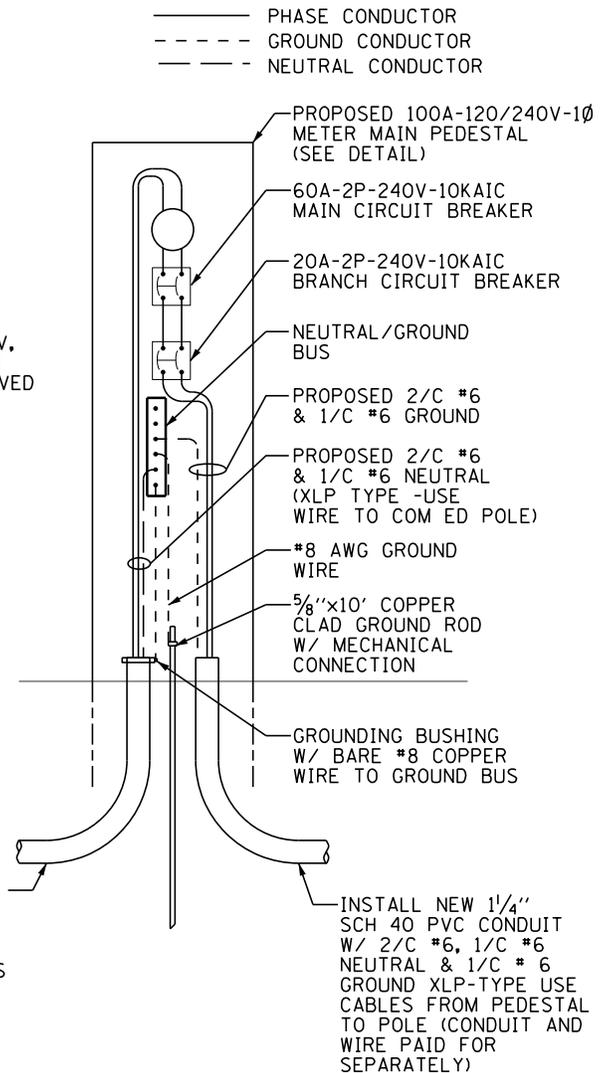
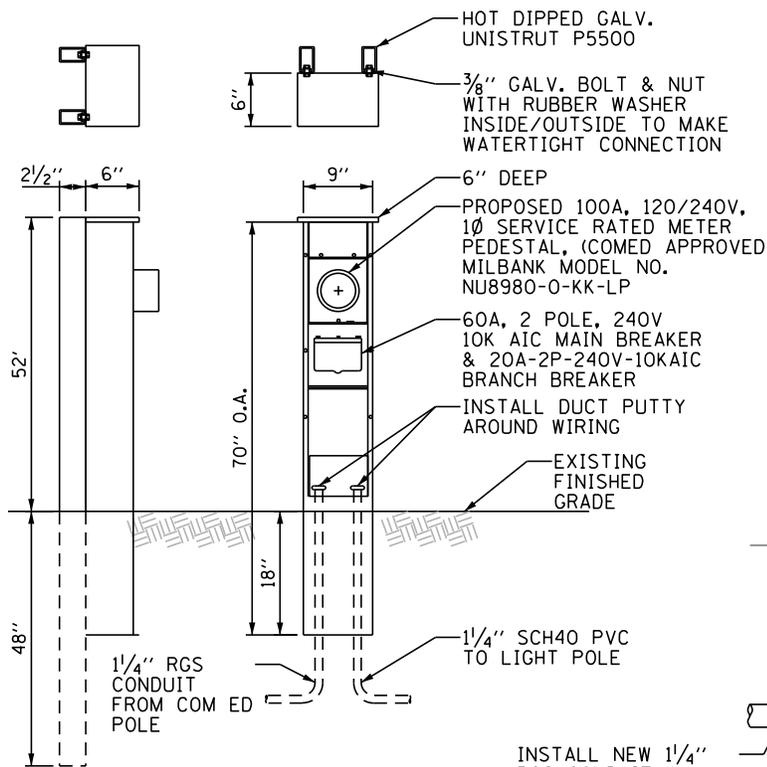
ENGINEERING DETAILS

**COM ED UNDERGROUND
 SERVICE CONNECTION**

DATE:	8/17/2018
REV 1:	
REV 2:	
REV 3:	

DETAIL NO.

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SERVICE METER PEDESTAL DETAIL

N.T.S.

WIRING DIAGRAM



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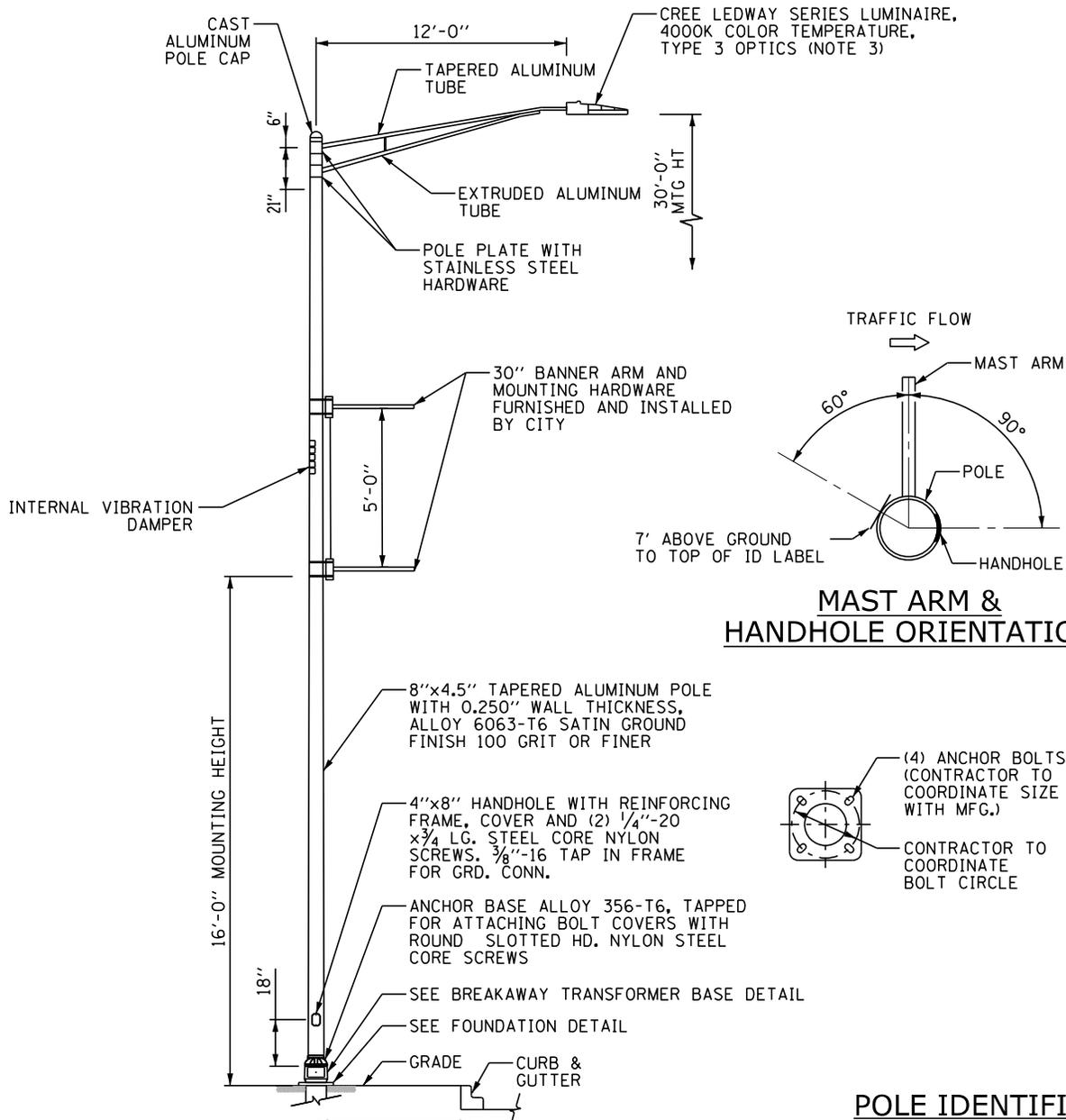
ENGINEERING DETAILS

DIRECT CONNECT SERVICE DISCONNECT PEDESTAL

DATE:	8/17/2018
REV 1:	
REV 2:	
REV 3:	

DETAIL NO.

L-6



NOTES:

1. LIGHT POLES SHALL MEET WIND LOADING & VIBRATION REQUIREMENTS ACCORDING TO THE LATEST AASHTO STANDARDS AND ARTICLE 1069.01 IN STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. WIND LOADING SHALL INCLUDE BANNER.
2. POLE HANDHOLE SHALL FACE AWAY FROM TRAFFIC.
3. LED LUMINAIRE SHALL BE CREE "STR-LWY" TYPE. CONTRACTOR TO VERIFY PHOTOMETRICS TO DETERMINE WATTAGE

POLE IDENTIFICATION

- ☐ CONTROLLER #
 - ☐ CIRCUIT
 - ☐ POLE #
- WHITE CHARACTERS ON GREEN BACKGROUND



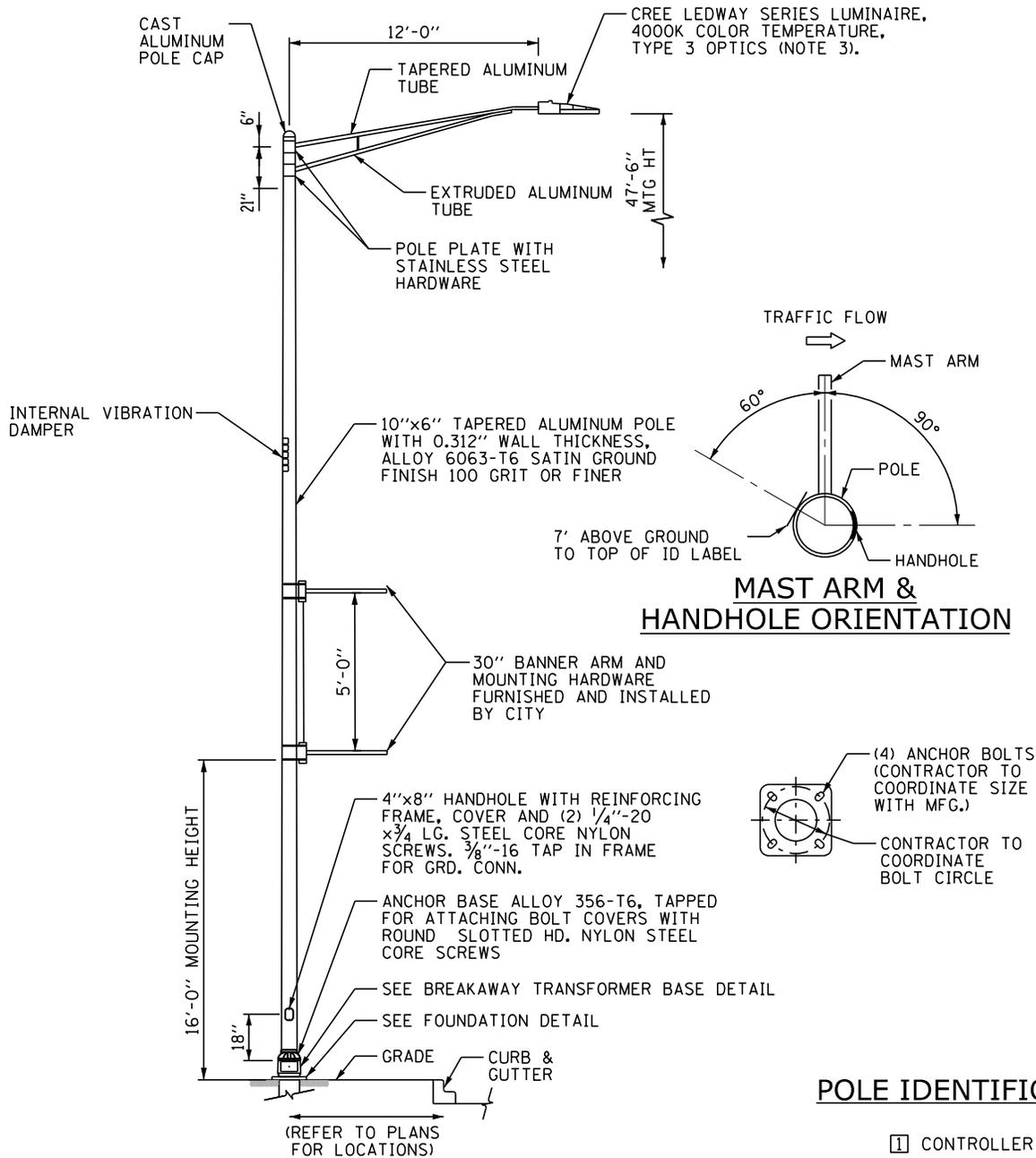
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ENGINEERING DETAILS

**ALUMINUM LIGHT POLE
 (30 FOOT MOUNTING HEIGHT)**

DATE:	8/17/2018
REV 1:	
REV 2:	
REV 3:	

DETAIL NO.	L-7
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NOTES:

1. LIGHT POLES SHALL MEET WIND LOADING & VIBRATION REQUIREMENTS ACCORDING TO THE LATEST AASHTO STANDARDS AND ARTICLE 1069.01 IN STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. WIND LOADING SHALL INCLUDE BANNER.
2. POLE HANDHOLE SHALL FACE AWAY FROM TRAFFIC.
3. LED LUMINAIRE SHALL BE CREE "STR-LWY" TYPE. CONTRACTOR TO VERIFY PHOTOMETRICS TO DETERMINE WATTAGE

POLE IDENTIFICATION

☐ CONTROLLER #

☐ CIRCUIT

☐ POLE #

WHITE CHARACTERS ON GREEN BACKGROUND



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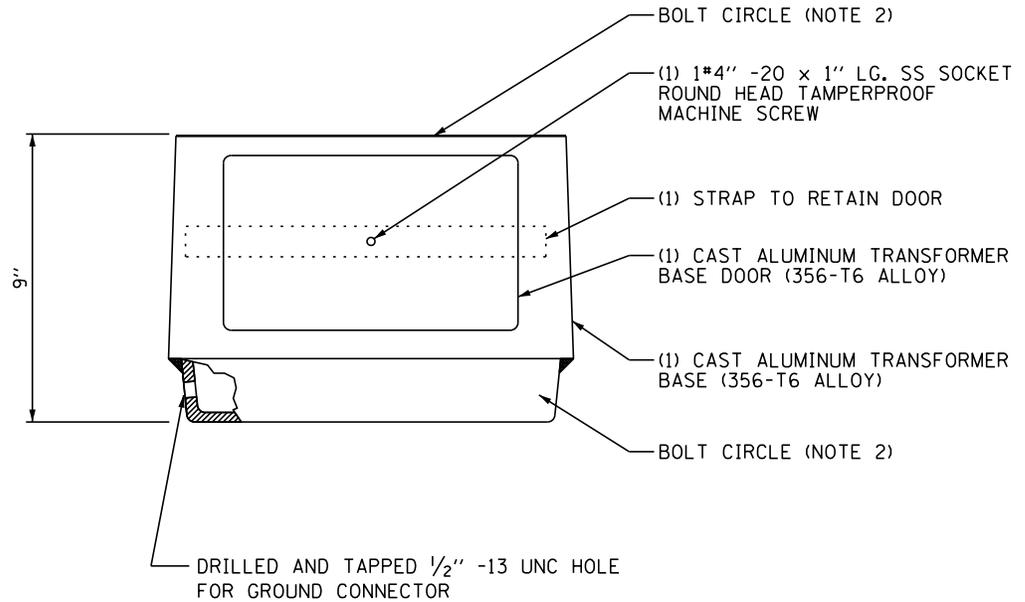
ENGINEERING DETAILS

**ALUMINUM LIGHT POLE
 (47.5 FOOT MOUNTING HEIGHT)**

DATE:	8/17/2018
REV 1:	
REV 2:	
REV 3:	

DETAIL NO.

L-8



NOTES:

1. BEFORE INSTALLATION OF BREAKAWAY BASE, USER SHOULD CONSULT WITH AUTHORIZED DISTRIBUTOR REGARDING USERS PROPOSED APPLICATION, LOAD REQUIREMENTS AND INSTALLATION METHODS. FAILURES CAN RESULT FROM USERS MISAPPLICATION OR IMPROPER INSTALLATION. TO APPROACH OPTIMUM STATIC LOADS, USE THE LARGEST POSSIBLE BOLT CIRCLES. SHIMS SHALL NOT BE ALLOWED.
2. CONTRACTOR SHALL COORDINATE BOLT CIRCLE DIMENSIONS.



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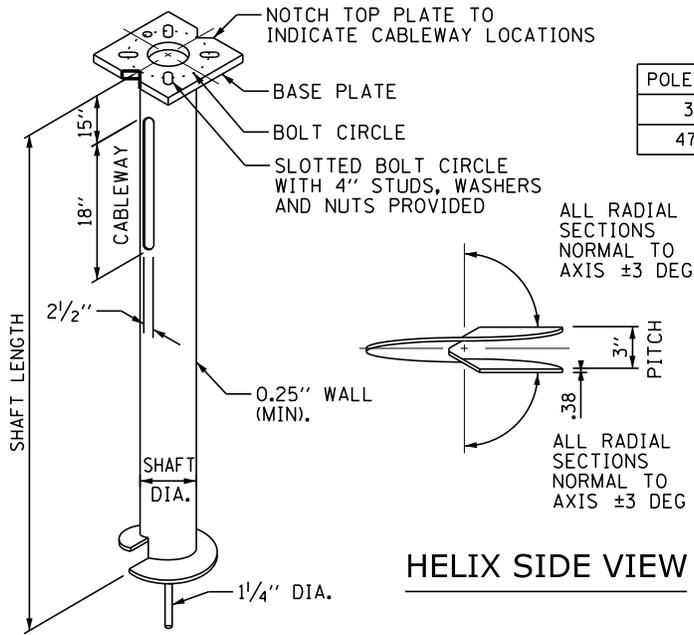
ENGINEERING DETAILS

BREAKAWAY TRANSFORMER BASE

DATE:	8/17/2018
REV 1:	
REV 2:	
REV 3:	

DETAIL NO.

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POLE MTG HT	BOLT CIRCLE	SHAFT DIA.	SHAFT LENGTH	BASEPLATE
30 FT	11 1/2"	8 5/8"	6.0 FT	12"x12"x1"
47.5 FT	15"	10"	8.0 FT	15"x15"x1 1/4"

HELIX FOUNDATION MATERIALS	
ITEM	MATERIAL REQUIREMENT
BASE PLATE	AASHTO M 270M, GRADE 36 (M270M, GRADE 250)
SHAFT	ASTM A 252, GRADE 2 (PHOSPHOROUS 0.04% MAXIMUM, SULFUR 0.05% MAXIMUM)
HELIX SCREW	AASHTO M 183 (ASTM A 635)
PILOT POINT	AASHTO M 270 (ASTM A 575)
ANCHOR RODS/STUDS	AASHTO M 314 (ASTM F 1554)
HEXAGON NUTS	AASHTO M 291M (ASTM A 563) GRADE DH, OR AASHTO M 292 (ASTM A 194) GRADE 2H
WASHERS	AASHTO M 293 (ASTM F 436)

HELIX FOUNDATION

NOTES:

1. ALL MATERIALS SHALL BE GALVANIZED ACCORDING TO AASHTO M111 (LATEST REVISION).
2. ALL WELDS SHALL BE CONTINUOUS AND NOT LESS THAN 1/4" FILLET WELDS. THE WELDED FOUNDATION SHALL BE CAPABLE OF WITHSTANDING 10,000 FT/LBS OF INSTALLATION TORQUE APPLIED ABOUT THE AXIS OF THE FOUNDATION.
3. THE HELIX FOUNDATION SHAFT SHALL BE INSTALLED VERTICAL AND THE BASE PLATE SHALL BE IN LEVEL. THE BREAKAWAY COUPLINGS AND HARDWARE SHALL NOT BE USED TO ALIGN POLE INSTALLATION.
4. THE CABLE TRENCH SHALL BE BACKFILLED AND FIRMLY COMPACTED BEFORE THE INSTALLATION OF THE LIGHT POLE.
5. THE CONTRACTOR SHALL COORDINATE EXTENSION OF ANCHOR BOLTS ABOVE TOP OF THE BASE PLATE WITH THE BREAKAWAY DEVICE MANUFACTURER'S REQUIREMENTS.
6. ANY VOIDS WITHIN THE METAL FOUNDATION SHALL BE FILLED WITH FINE AGGREGATE.
7. METAL FOUNDATIONS SHALL BE INSTALLED IN UNDISTURBED SOIL. PREDRILLING A PILOT HOLE AND/OR BACK FILLING AROUND THE FOUNDATION IS NOT ALLOWED.
8. THE METAL FOUNDATION SHALL NOT BE INSTALLED TO A TORQUE WHICH EXCEEDS THE MANUFACTURER'S MAXIMUM TORQUE RATING NOR SHALL IT BE INSTALLED TO AN INSTALLATION TORQUE VALUE OF LESS THAN 3,500 FT LB. METAL FOUNDATIONS THAT ARE NOT INSTALLED TO FULL INSTALLATION DEPTH OR DO NOT ACHIEVE THE MINIMUM INSTALLATION TORQUE SHALL BE REMOVED AND REPLACE WITH A CONCRETE FOUNDATION.
9. BASE PLATE TO BE PERPENDICULAR TO SHAFT AXIS (± 1 DEG) AND HOLE CENTERLINE CONCENTRIC (± 0.188) TO THE SHAFT AXIS.
10. PILOT POINT AND SHAFT AXES TO BE CONCENTRIC (± 125 FIM) AND IN LINE (± 2 DEG).
11. BASE PLATE SHALL BE PERMANENTLY STAMPED WITH MANUFACTURER'S NAME AND DATE.
12. 5/8"x10' COPPER CLAD STEEL GROUND ROD SHALL BE INSTALLED THRU WIREWAY WITH 8 FEET IN CONTACT WITH SOIL.



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ENGINEERING DETAILS

METAL HELIX FOUNDATION DETAIL

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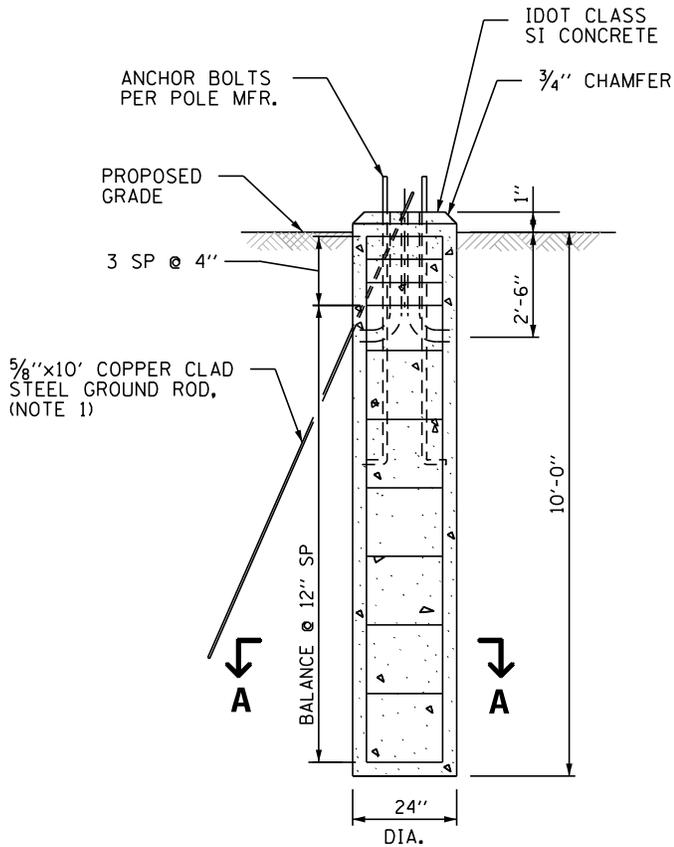
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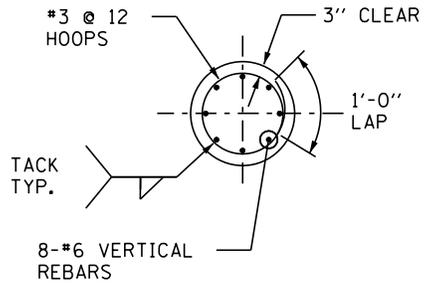
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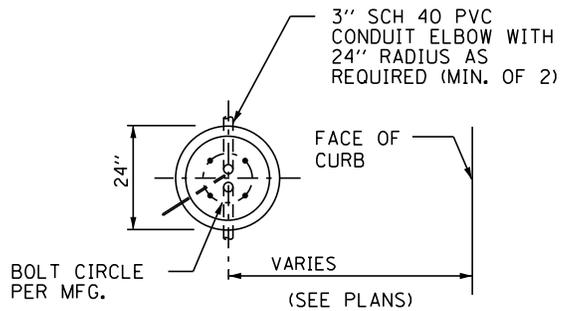
L-10



ELEVATION



SECTION A-A



PLAN

NOTES:

1. GROUND ROD SHALL BE CAST INTO CONCRETE FOUNDATION WITH 8 FEET IN CONTACT WITH SOIL.
2. FOUNDATIONS SHALL BE VIBRATED IN ACCORDANCE WITH IDOT STANDARD PRACTICES.



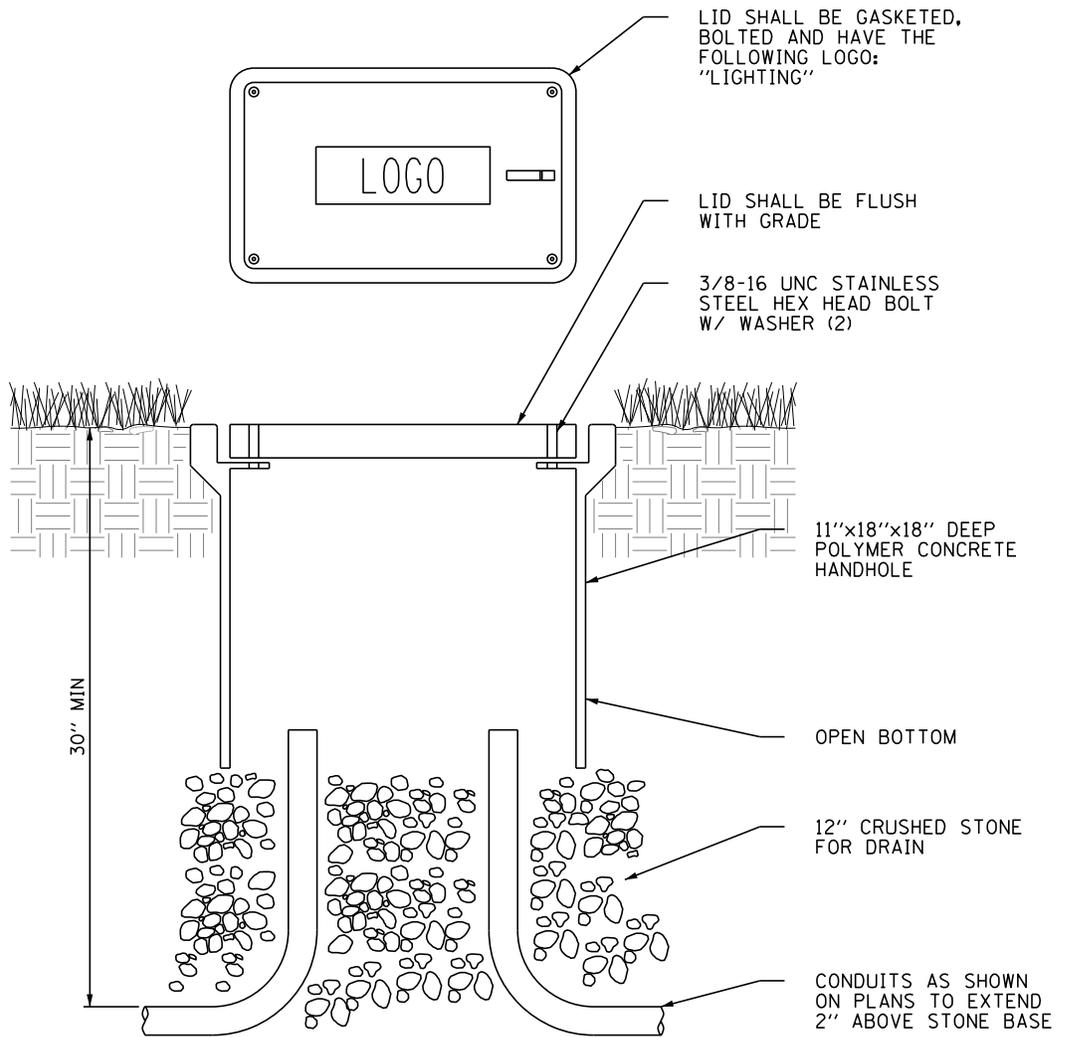
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ENGINEERING DETAILS

**CONCRETE FOUNDATION
 DETAIL**

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REV 2:	
REV 3:	

DETAIL NO.
L-11



NOTES:

1. NO SPLICING ALLOWED IN HANDHOLE
2. POLYMER CONCRETE HANDHOLE AND LID SHALL BE GREY.
3. BOX & LID SHALL MEET/EXCEED ANSI TIER 15 LOADING REQUIREMENTS AND BE TESTED IN ACCORDANCE WITH THE LATEST EDITION OF THE ANSI/SCTE 77 "SPECIFICATION FOR UNDERGROUND ENCLOSURE INTEGRITY", AND THE PROVISIONS OF PARAGRAPHS 5.2.3 AND 5.2.4 OF WESTERN UNDERGROUND COMMITTEE GUIDE 3.6.



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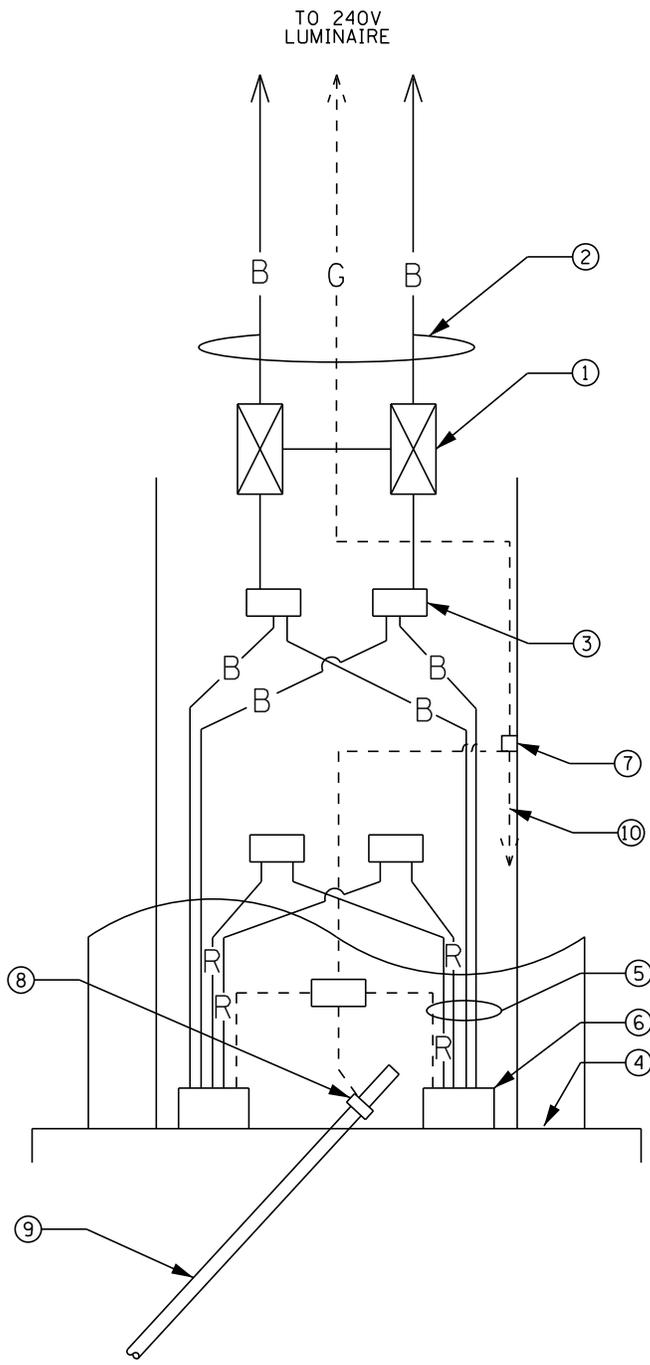
ENGINEERING DETAILS

COMPOSITE CONCRETE HANDHOLE

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REV 1:	
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- _____ PHASE CONDUCTOR
 - - - - - GROUND CONDUCTOR
- ① 5 AMP FUSE INSIDE A TWO POLE BREAKAWAY WATERPROOF FUSE HOLDER AND INSULATING BOOTS
 - ② NO. 10 XLP-TYPE USE POLE WIRES (COLOR TO MATCH BRANCH WIRING)
 - ③ MULTIPLE COMPRESSION FITTINGS (SPLICE)
 - ④ FOUNDATION
 - ⑤ WIRE AS SHOWN ON PLANS
 - ⑥ CONDUIT AS SHOWN ON PLANS
 - ⑦ POLE GROUND LUG
 - ⑧ #6 SOLID GROUND WIRE MECHANICALLY CONNECTED TO GROUND ROD
 - ⑨ 5/8" DIA.x10' GROUND ROD
 - ⑩ #6 SOLID BONDING JUMPER TO BREAKAWAY TRANSFORMER BASE

WIRE COLOR
 R = RED
 B = BLACK
 G = GREEN



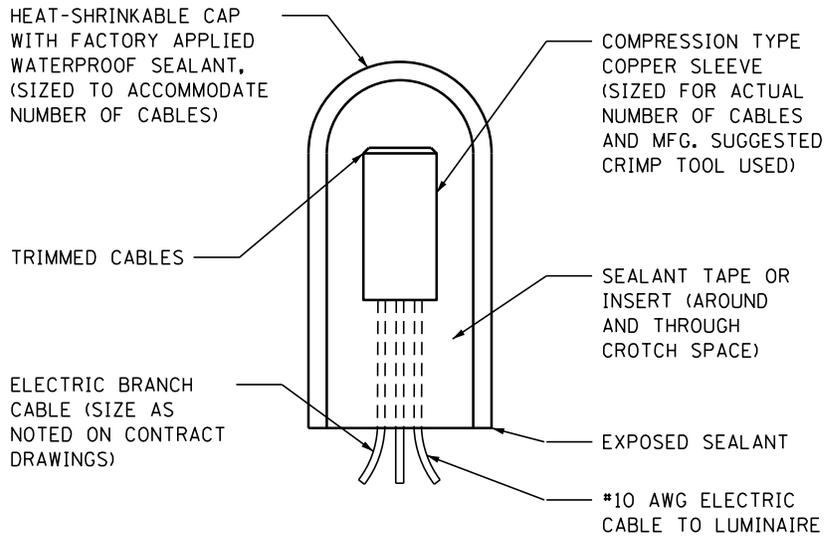
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ENGINEERING DETAILS

**LIGHT POLE
HANDHOLE WIRING DIAGRAM**

DATE:	8/17/2018
REV 1:	
REV 2:	
REV 3:	

DETAIL NO.
L-13



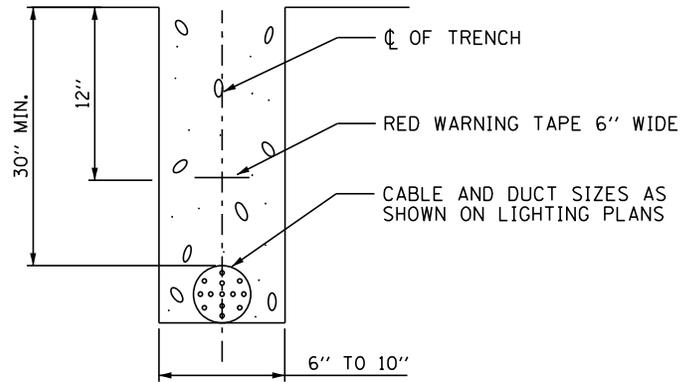
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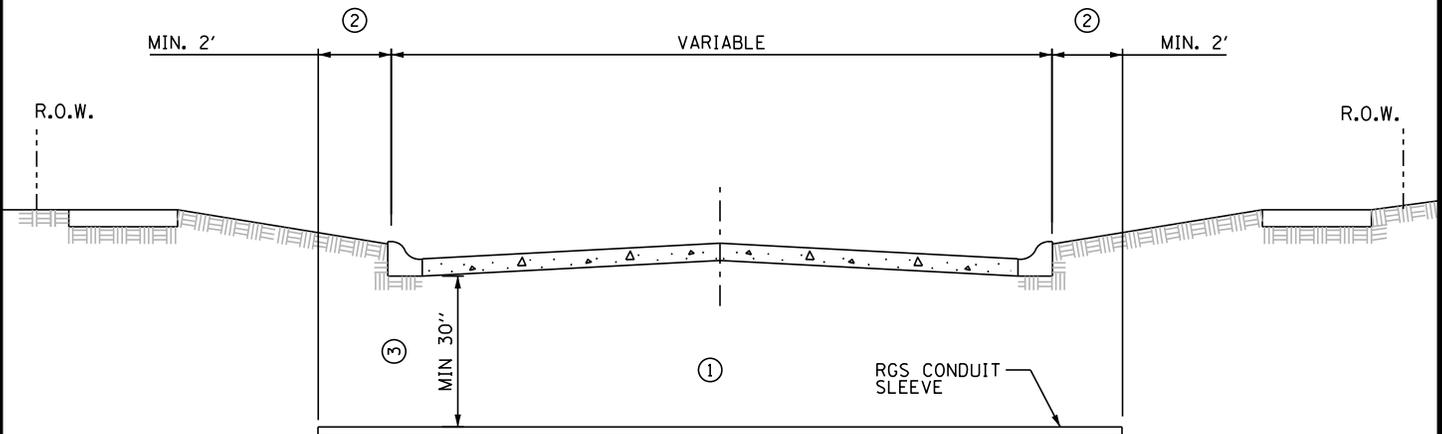
ELECTRIC CABLE SPLICING

DATE:	8/17/2018
REV 1:	
REV 2:	
REV 3:	

DETAIL NO.
L-14



TRENCH CROSS SECTION



NOTES:

- ① SLEEVE SHALL BE HEAVY WALL RIGID GALVANIZED STEEL (RGS) CONDUIT.
- ② SLEEVE SHALL EXTEND A MINIMUM OF 2 FT. BEYOND BACK OF CURB.
- ③ SLEEVE SHALL BE A MINIMUM OF 30" BELOW ROADWAY OR CURB BOTTOM.

ROADWAY / PAVEMENT CROSSING



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ENGINEERING DETAILS

UNDERGROUND CONDUIT INSTALLATION

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REV 1:	
REV 2:	
REV 3:	

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