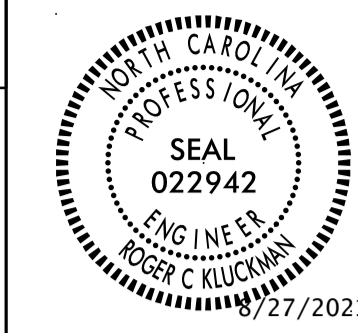


# PLANS AND DETAILS FOR PROPOSED LIGHTING /ELECTRICAL CONSTRUCTION

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



DocuSigned by:  
*Roger Kluckman*  
Professional Engineer

## NOTES

- 1 PROVIDE FLAG POLE LIGHT AND CONNECTION TO LIGHT. COORDINATE INSTALLATION AND AIMING OF FLAG POLE LIGHT(S) WITH THE ENGINEER.
- 2 INSTALL ALL BORE PITS OUTSIDE THE CLEAR ZONE, AS DEFINED BY THE 2011 AASHTO ROADSIDE DESIGN GUIDE OR AS DIRECTED BY THE ENGINEER.
- 3 LOCATE ALL JUNCTION BOXES OUTSIDE CLEAR ZONE AND IN AN AREA UNLIKELY TO BE USED BY TRAFFIC.
- 4 LOCATE PROPOSED CONTROL SYSTEM IN AN AREA ACCESSIBLE FOR MAINTENANCE VEHICLES AND OUTSIDE OF CLEAR ZONE AS DEFINED BY THE 2011 AASHTO ROADSIDE DESIGN GUIDE.
- 5 INSTALL RIGID GALVANIZED CONDUIT (RGC) ABOVE GROUND, AND POLYVINYL CHLORIDE (PVC) SCHEDULE 40 CONDUIT UNDERGROUND, EXCEPT AS MODIFIED ON THESE PLANSHEETS OR IN APPLICABLE SECTIONS OF THE ROADWAY STANDARD DRAWINGS FOR THIS PROJECT.
- 6 ALL JUNCTION BOXES SHALL BE 18" HIGH, UNLESS OTHERWISE NOTED.
- 7 CONTRACTOR SHALL RECORD THE GPS COORDINATES OF EACH JUNCTION BOX IN THE JUNCTION BOX SUMMARY, TABLE C. PROVIDE A COPY OF THE JUNCTION BOX SUMMARY WITH THESE COORDINATES TO THE LIGHTING ENGINEER DURING PROJECT INSPECTION.
- 8 POLE NUMBERING CONVENTION: CONTROL SYSTEM-POLE #-CKT # (A-3-2).
- 9 JUNCTION BOXES SHOWN NEAR LIGHT STANDARDS (LSJB) ARE SHOWN FOR CLARITY. THESE JUNCTION BOXES ARE TO BE USED AS A TEE POINT FOR CIRCUITRY TO THE STANDARD, AND SHALL BE INSTALLED FOR BEST ALIGNMENT OF CIRCUITRY WHILE MAINTAINING THE OFFSETS SHOWN IN TABLE "C". SEE STANDARD DRAWINGS 1401.01 AND 1406.01 FOR INSTALLATION DETAILS.
- 10 AT MANY LOCATIONS ON SHEET E2, THERE IS VERY LITTLE ROOM BETWEEN THE BACK OF PROPOSED SIDEWALK AND RIGHT-OF-WAY. THE SYMBOLOGY ON THE PLANS APPEARS TO SHOW THE LIGHT STANDARD AND/OR JUNCTION BOX OUTSIDE OF THE RIGHT-OF-WAY OR IN THE SIDEWALK. THE CONTRACTOR SHALL INSTALL ALL LIGHT STANDARDS, JUNCTION BOXES AND FEEDER CIRCUITS IN THE GRASSY STRIP BETWEEN THE BACK OF PROPOSED SIDEWALK AND INSIDE OF THE RIGHT-OF-WAY.
- 11 INSTALL LIGHT STANDARDS SO THAT TWIN LUMINAIRES ARE MOUNTED PERPENDICULAR TO THE ROADWAY.
- 12 INSTALL PULL ROPE IN THE CONDUIT IN ACCORDANCE WITH 1400-2(H).
- 13 LOCATION OF EXISTING SERVICE AND PLACEMENT OF JUNCTION BOXES ARE ESTIMATED. CONSULT NCDOT ENGINEER FOR EXACT PLACEMENT.
- 14 MOVE THE EXISTING RED CONDUCTOR TO THE CONTACTOR TERMINAL ADJACENT TO THE EXISTING BLACK CONDUCTOR THEREBY MOVING ALL EXISTING LIGHTING TO CIRCUIT-1 WHICH ALLOWS THE SPARE TO BE USED FOR THE FLAGPOLE LIGHTS

## SCOPE OF WORK

PLACE ROADWAY LIGHTING SYSTEM INTO SERVICE BY PROVIDING AND INSTALLING LIGHT STANDARDS WITH LIGHT EMITTING DIODE LUMINAIRES, UNDERGROUND CIRCUITRY, CONTROL SYSTEM AND JUNCTION BOXES.

## DESIGN CRITERIA

- 2018 AASHTO ROADWAY LIGHTING DESIGN GUIDE
- FATIGUE CATEGORY II SHALL BE USED IN DESIGN
- 2017 NATIONAL ELECTRICAL CODE
- 2011 AASHTO ROADSIDE DESIGN GUIDE

## ROADWAY STANDARDS

THE FOLLOWING ROADWAY ENGLISH STANDARDS AS APPEAR IN "NCDOT ROADWAY STANDARD DRAWINGS", ROADWAY DESIGN UNIT-N.C. DEPARTMENT OF TRANSPORTATION RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD NO.	TITLE
1405.01	STANDARD FOUNDATION
1407.01	ELECTRIC SERVICE POLE AND LATERAL
1409.01	ELECTRICAL DUCT
1410.01	FEEDER CIRCUITS
1411.01	ELECTRICAL JUNCTION BOXES

ALL WORK SHALL BE IN CONFORMANCE WITH DIVISION 14 OF THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, DATED JANUARY 2018.

## LEGEND

- PROPOSED DIRECT BURIED BREAKAWAY LIGHT STANDARD 16' MH WITH 2.5' TWIN ARM AND 120V WEATHERPROOF RECEPTACLE. INCLUDES JUNCTION BOX & 130 W MAX LED ROADWAY LUMINAIRE WITH PHOTOCONTROL. IES DISTRIBUTION: TYPE III.
- PROPOSED CONTROL SYSTEM WITH JUNCTION BOX. SIZE BREAKERS AS SHOWN IN LOAD SCHEDULE. SEE SHEET(S) E2.
- EXISTING CONTROL SYSTEM
- PROPOSED ELECTRICAL JUNCTION BOX. SEE TABLE C, SHEET E1A, FOR DETAILS AND TYPE.
- REFERENCE TO CORRESPONDING NOTE AS NUMBERED.
- PROPOSED FEEDER CIRCUIT. CONTROL SYSTEM (A), CIRCUIT NUMBER (1) PLAN SYMBOL (8). SEE TABLE A, THIS SHEET.
- PROPOSED 30' CLASS 4 SERVICE POLE AND LATERAL 3 #1/0 USE CONDUCTORS 2" CONDUIT
- PROPOSED ELECTRICAL DUCT SIZE 3" TYPE (JA) OR (BD) LOCATION: SEE TABLE B, SHEET E1A.

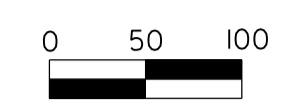
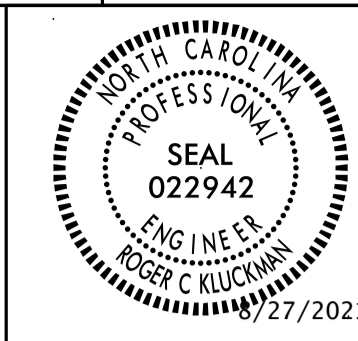
PLAN SYMBOL	DESCRIPTION	CONTRACT ITEM
8	2 #8 Ø 1 #10G 1.5" P	2 AWG SIZE 8 CONDUCTOR (BK & RD) 1 AWG SIZE 10 GROUNDING CONDUCTOR 1.5" PVC CONDUIT
6	2 #6 Ø 1 #6 N 1 #8 G 2" P	2 AWG SIZE 6 CONDUCTOR (BK & RD) 1 AWG SIZE 6 NEUTRAL CONDUCTOR 1 AWG SIZE 8 GROUNDING CONDUCTOR 2" PVC CONDUIT
4	2 #4 Ø 1 #4 N 1 #6 G 2" P	2 AWG SIZE 4 CONDUCTOR (BK & RD) 1 AWG SIZE 4 NEUTRAL CONDUCTOR 1 AWG SIZE 6 GROUNDING CONDUCTOR 2" PVC CONDUIT
2	2 #2 Ø 1 #2 N 1 #4 G 2" P	2 AWG SIZE 2 CONDUCTOR (BK & RD) 1 AWG SIZE 2 NEUTRAL CONDUCTOR 1 AWG SIZE 4 GROUNDING CONDUCTOR 2" PVC CONDUIT

### ABBREVIATIONS

BD	BURIED	PVC	PVC SCHEDULE 40 CONDUIT
LT	LIGHT	RGC	RIGID GALVANIZED STEEL CONDUIT
JA	JACKED	C	CONDUIT
MH	MOUNTING HEIGHT	CKT	CIRCUIT
Ø	PHASE	N	NEUTRAL
SER LAT	SERVICE LATERAL	G	GROUND
IGJB	IN GROUND JUNCTION BOX	HM	HIGH MAST
LED	LIGHT EMITTING DIODE	LSJB	LIGHT STANDARD JUNCTION BOX
HMJB	HIGH MAST JUNCTION BOX	CSJB	CONTROL SYSTEM JUNCTION BOX

COMPUTED BY: SAM DATE: 08/23/21  
CHECKED BY: RGH DATE: 08/23/21

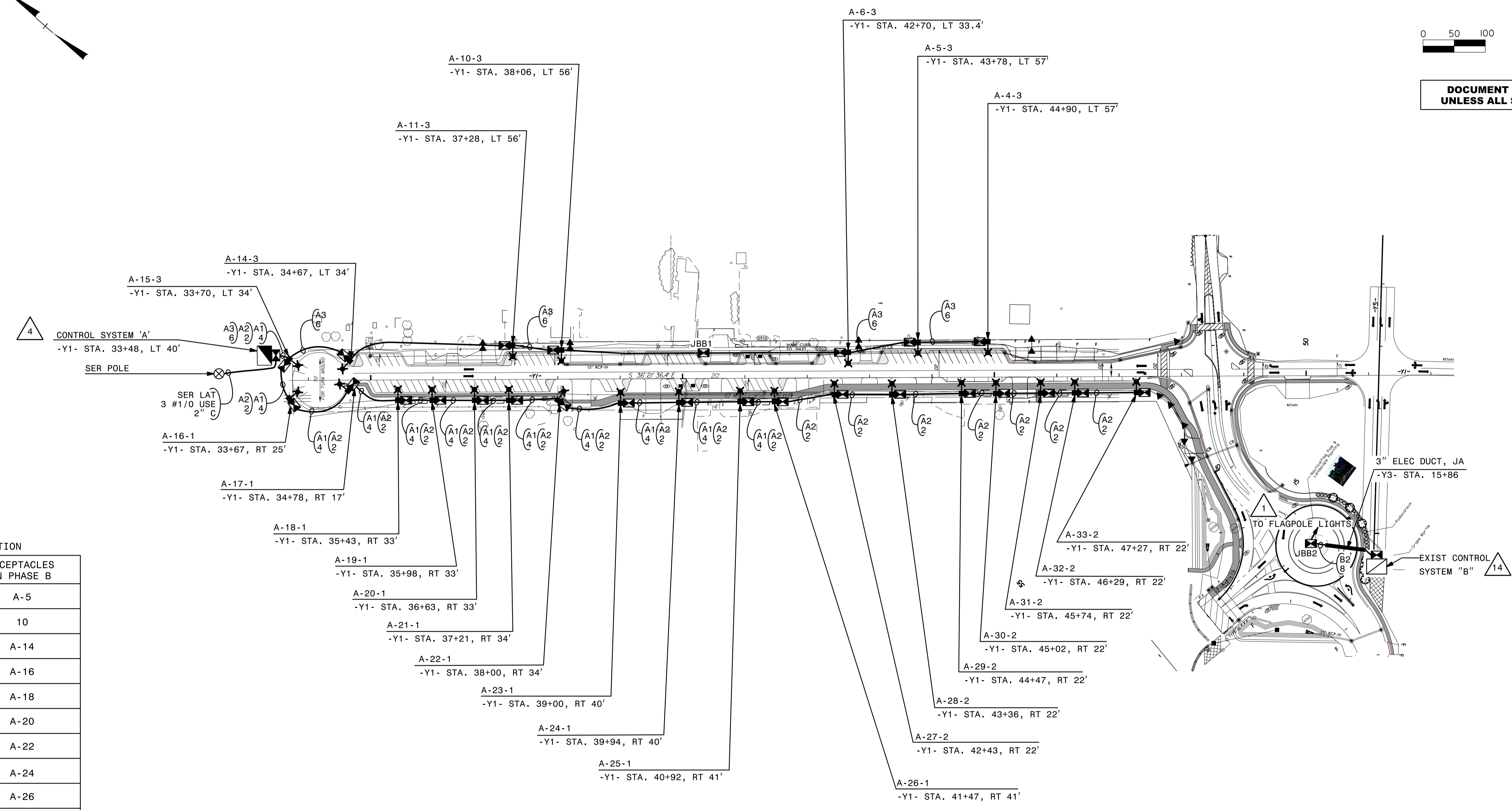
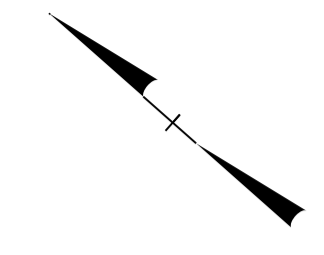




Designed by: Roger Kluckman

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# USE FOR LIGHTING CONSTRUCTION ONLY



RECEPTACLE DESIGNATION

RECEPTACLES ON PHASE A	RECEPTACLES ON PHASE B
A-4	A-5
A-6	10
A-11	A-14
A-15	A-16
A-17	A-18
A-19	A-20
A-21	A-22
A-23	A-24
A-25	A-26
A-27	A-28
A-29	A-30
A-31	A-32
A-33	

SITE LIGHTING LOAD SCHEDULE  
ROLAND AVE, SURF CITY  
CONTROL SYSTEM "A"

CIRCUIT ID	DECORATIVE TWIN ARM 130W (MAX) LED	RECEPTACLES	CIRCUIT KW	AMPS	BREAKER
A1	A-16 TO A-26	A-16 TO A-26	2.9	12.1	50
A2	A-27 TO A-33	A-27 TO A-33	1.9	7.7	50
A3	A-10, A-11, A-14, A-15 A-4, A-5, A-6	A-10, A-11, A-14, A-15 A-4, A-5, A-6	1.6	6.6	50
SPARE	---	---	---	---	50
TOTAL	25	25	6.4	26.4	

LOAD SCHEDULE  
PATH & FLAGPOLE LIGHTS  
EXISTING CONTROL SYSTEM "B"

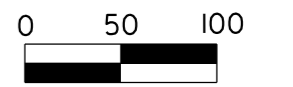
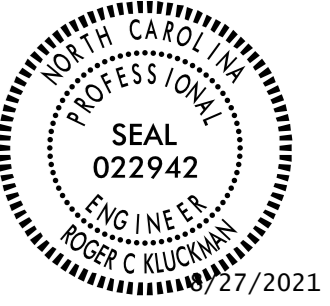
CIRCUIT ID	EXISTING			PROPOSED			
	PATH LIGHTS 15 W LED	AMPS @ 240V	KW LOAD	PATH LIGHTS 15 W LED	FLAGPOLE LIGHTS 200W MAX LED	AMPS @ 240V	KW LOAD
B1	L161 - L320	10.0	2.4	L161 - L320		10.0	2.4
*B2					FPL1, FPL2	1.67	0.4
TOTAL	160	10.0	2.4	160	2	11.67	2.8

NOTE: USE SPARE BREAKER AS 'B2' IN THE EXISTING CONTROL SYSTEM

SEE SHEET "E1" FOR LEGEND & Δ NOTES

2			
1			
Rev.	Date	Description	Approved
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN LIGHTING/ELECTRICAL SECTION <b>DECORATIVE LIGHTING LAYOUT</b> ROLAND AVE, SURF CITY PENDER COUNTY			
Drawn By:	SAM	Approved By:	RGH
Dwg No.:			

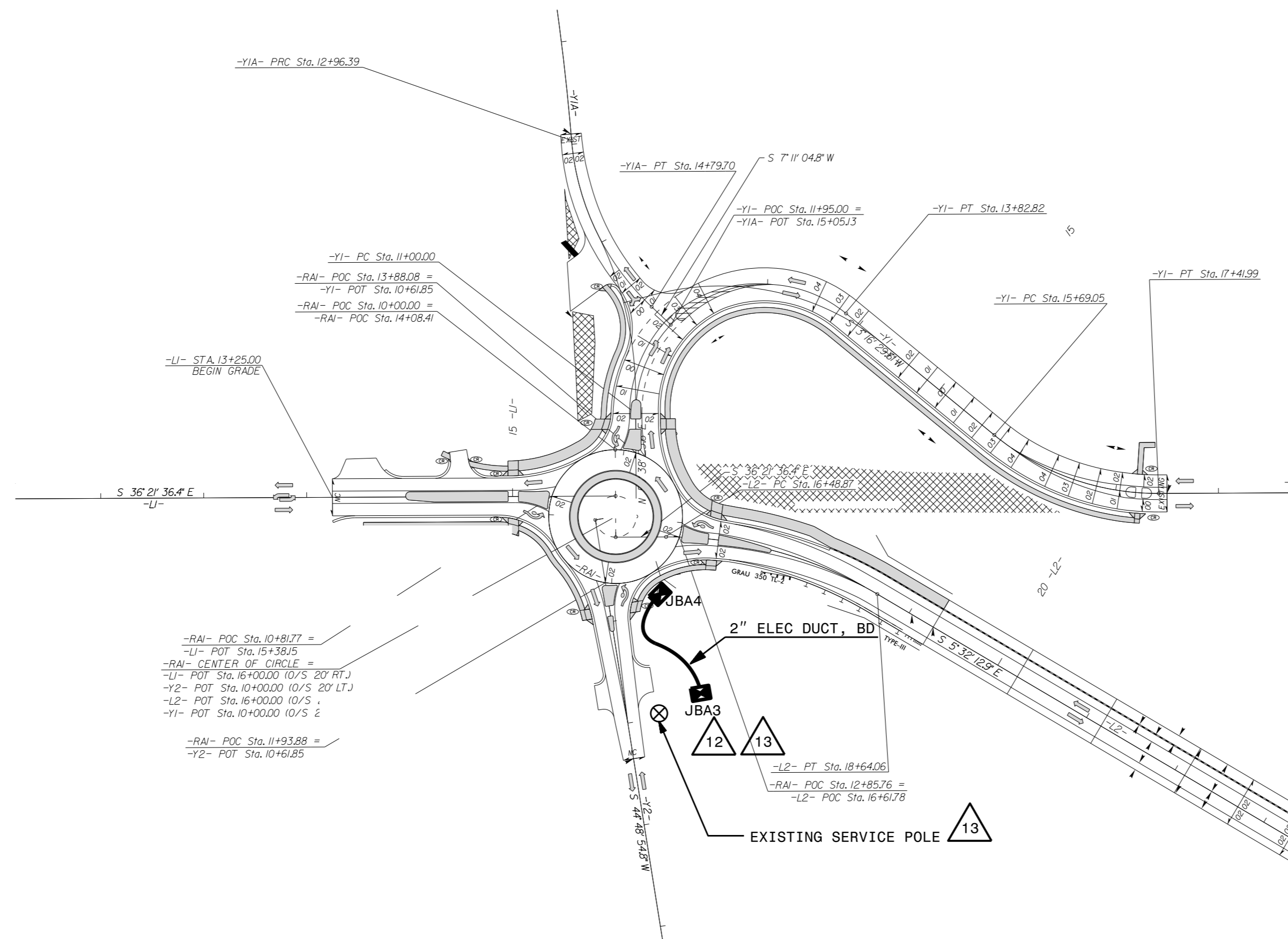
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Designed by:  
Roger Kluckman

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USE FOR LIGHTING CONSTRUCTION ONLY

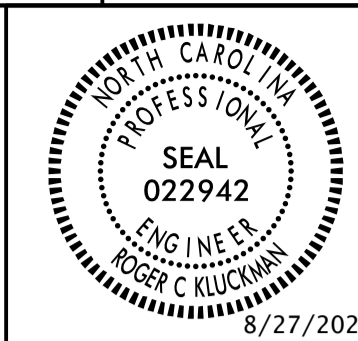


SEE SHEET "E1" FOR  
LEGEND & △ NOTES

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Rev.	Date	Description	Approved
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<b>LIGHTING LAYOUT</b> ROLAND AVE SURF CITY PENDER COUNTY			
Drawn By:	SAM	Approved By:	RGH
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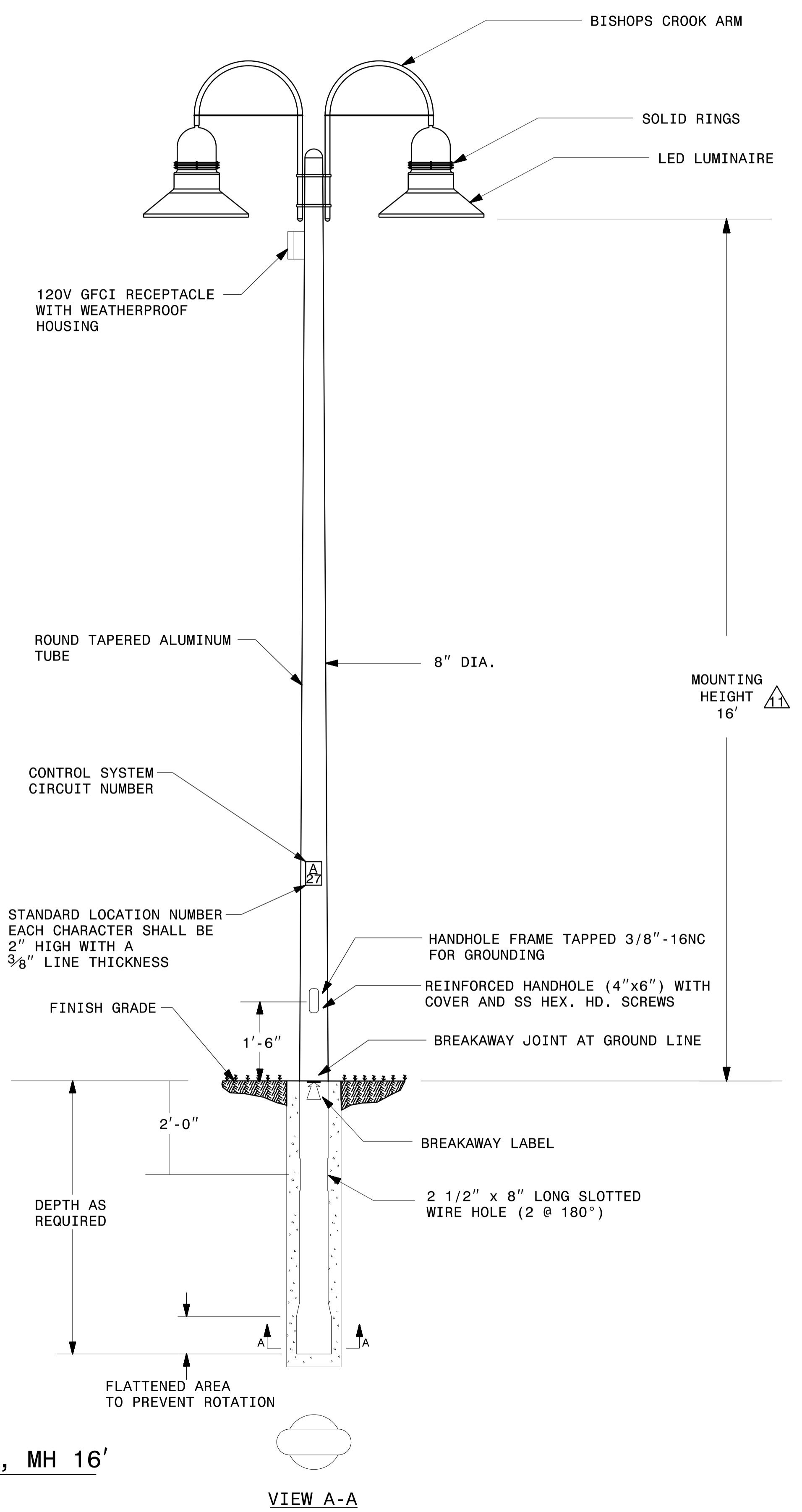
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PROJECT REFERENCE NO. B-4929	SHEET NO. E4
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LIGHT STANDARD WITH BISHOPS CROOK TWIN ARMS, MH 16'

SEE SHEET "E1" FOR  
LEGEND & △ NOTES

2			
1			
Rev.	Date	Description	Approved
<b>NORTH CAROLINA DEPARTMENT OF TRANSPORTATION</b> ROADWAY DESIGN    LIGHTING/ELECTRICAL SECTION			
<b>LIGHT STANDARD DETAILS</b> ROLAND AVE PENDER COUNTY			
Drawn By:	SAM	Approved By:	RGH
Dwg No.:			

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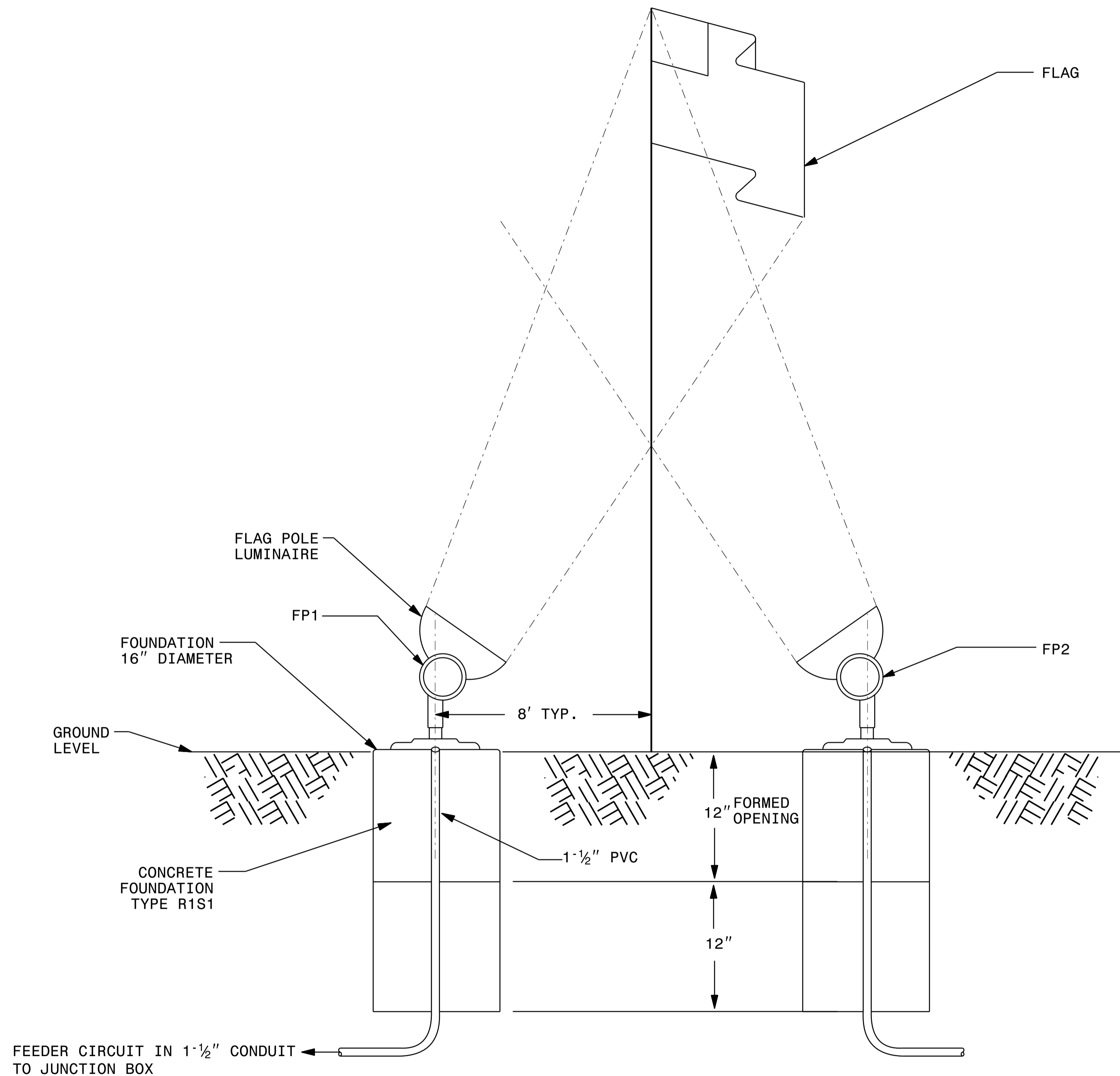
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PROJECT REFERENCE NO. SHEET NO.  
B-4929 E5



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Roger Kluckman

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**FLAGPOLE LIGHT DETAILS**

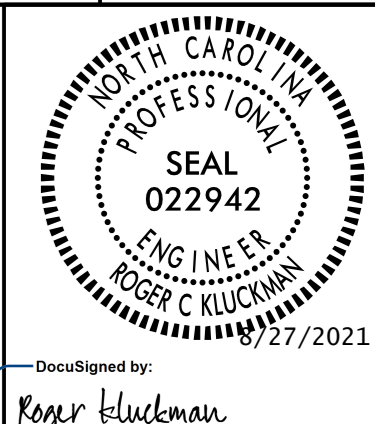
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**NOTE: FLAGPOLE AND FLAG TO BE PROVIDED BY OTHERS**

SEE SHEET "E1" FOR  
LEGEND & △ NOTES

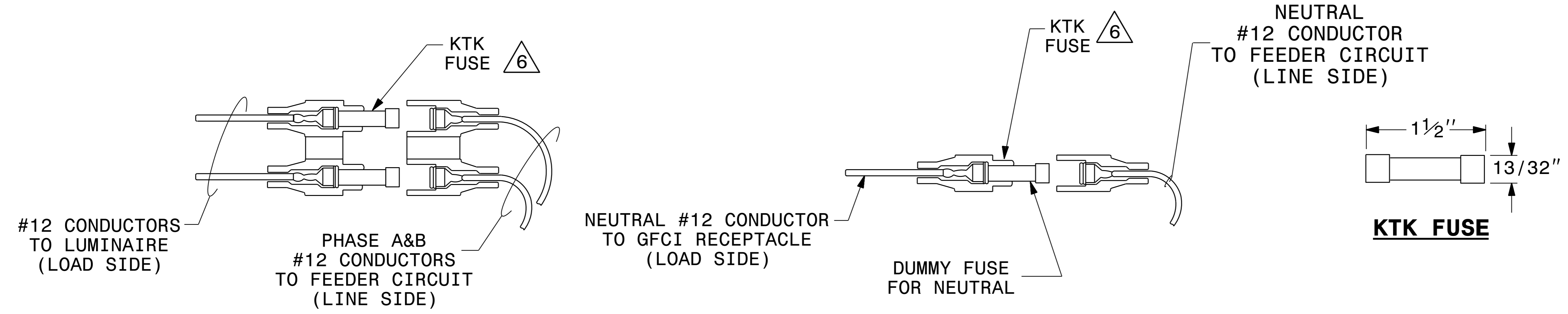
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Drawn By:	SAM	Approved By:	RGH
Dwg No.:			

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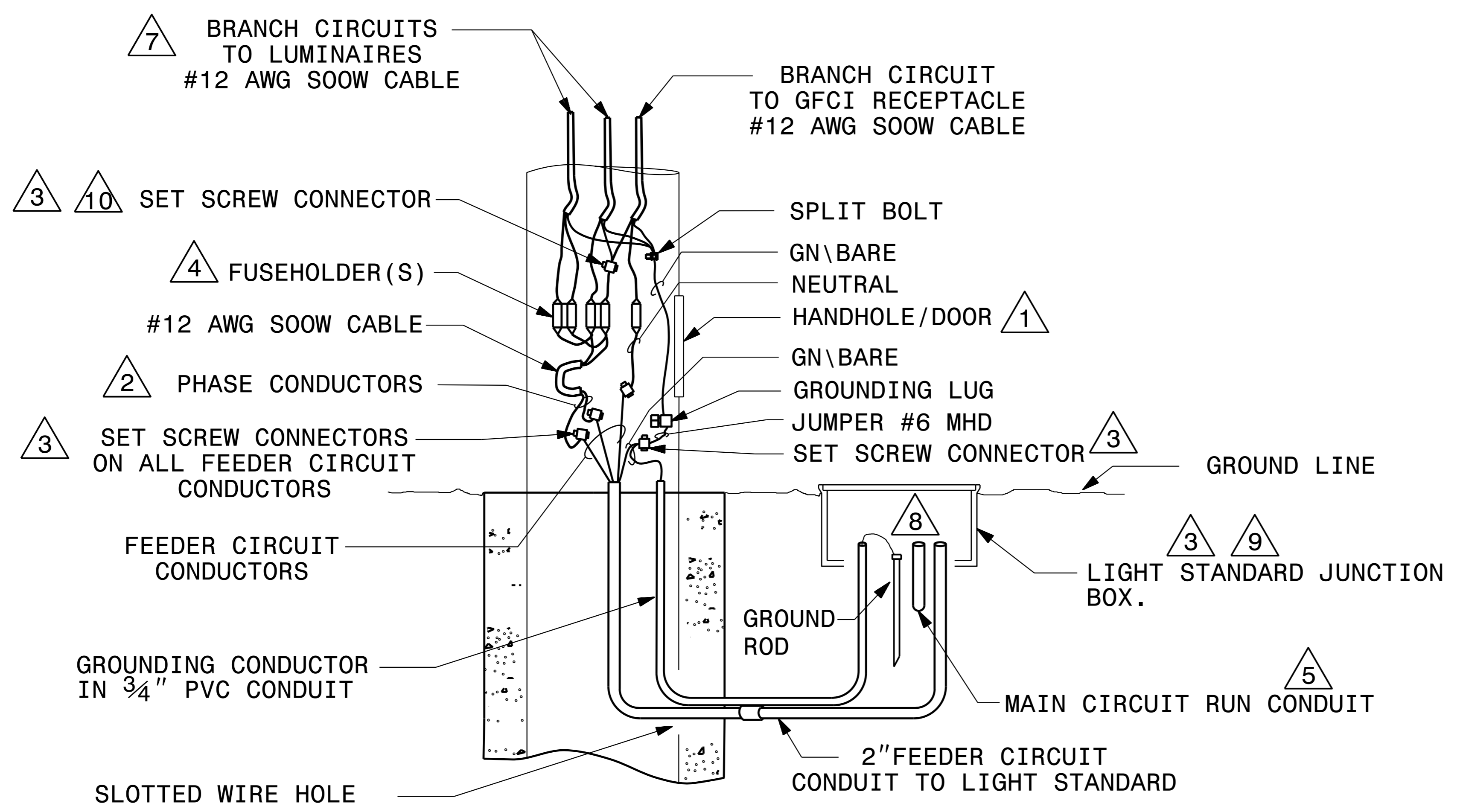


**LUMINAIRE FUSEHOLDER (ONE PER LUMINAIRE)**

**RECEPTACLE FUSEHOLDER**

**NOTES**

- 1 PROVIDE ACCESS TO FUSEHOLDERS FROM HANDHOLE.
- 2 SEE STANDARD SPECIFICATIONS SECTION 1400-4(F) FOR WIRING METHODS. USE TAPE OR HEAT SHRINK TO COLOR CONDUCTORS TO MATCH PHASE COLOR (RED/BLACK).
- 3 MAKE SPLICES IN ACCORDANCE WITH SECTION 1400-4(F) OF THE STANDARD SPECIFICATIONS.
- 4 BREAKAWAY FUSEHOLDERS REQUIRED AT ALL LIGHT STANDARDS.
- 5 SIZE FEEDER CIRCUIT CONDUCTORS AS SHOWN IN THE PLANS.
- 6 SEE STANDARD SPECIFICATIONS SECTION 1400-2(E) FOR FUSEHOLDERS.
- 7 SEPARATE SOOW CORD REQUIRED TO EACH LUMINAIRE
- 8 PERMANENTLY ATTACH GROUNDING CONDUCTOR TO GROUND ROD VIA IRREVERSIBLE CLAMP.
- 9 SEE STANDARD DRAWING 1411.01 FOR LIGHT STANDARD JUNCTION BOX REQUIREMENTS.
- 10 SPLICE PHASE CONDUCTOR USING APPROVED SPLICING DEVICES TO PROVIDE 120V POWER TO RECEPTACLE. SEE SHEET E2 FOR CORRECT PHASE.



**WIRING DIAGRAM**  
@ BASE OF LIGHT STANDARD

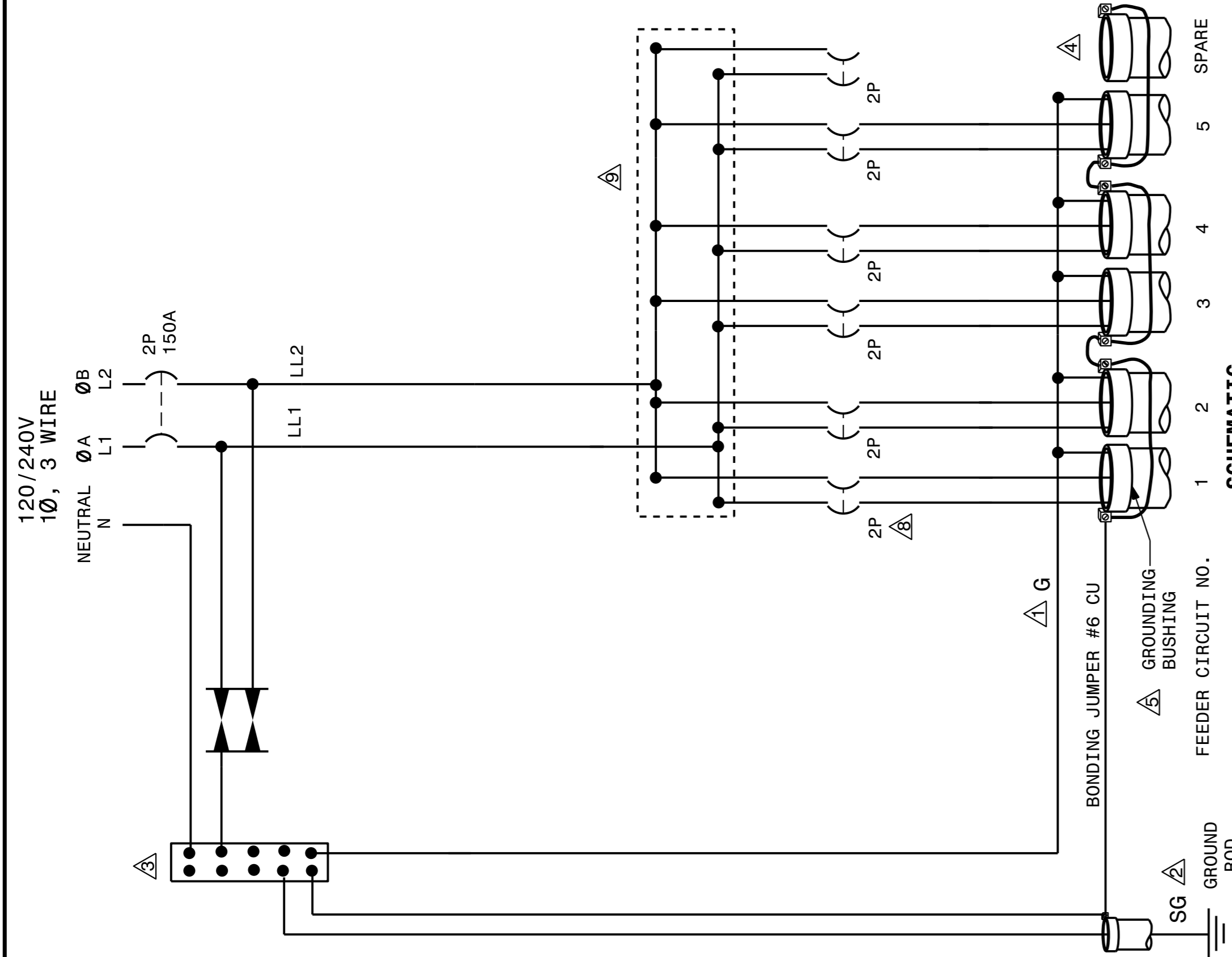
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Drawn By:	Approved By:	Dwg No.:	
SAM	RGH		

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STATE OF NORTH CAROLINA  
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 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

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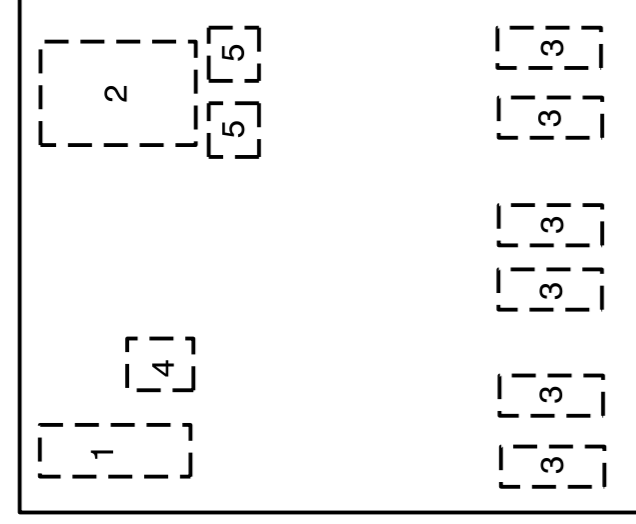
ENGLISH STANDARD DRAWING FOR  
**LIGHT CONTROL SYSTEM**  
 SCHEMATIC



SCHEMATIC

SHEET 1 OF 3  
**1408D01**

- NOTES**
- △ EQUIPMENT GROUNDS (G) SHALL BE SIZED ACCORDING TO CIRCUIT DESCRIPTION. SEE PLANS.
  - △ SYSTEM GROUND (SG) SHALL BE CONTINUOUS FROM THE NEUTRAL BAR TO THE GROUNDING ELECTRODE (GROUND ROD).
  - △ THE NEUTRAL BAR SHALL BE BONDED TO THE PANEL.
  - △ FEEDER CIRCUITS NOT SHOWN ON THE PLANS SHALL NOT BE INSTALLED, BUT CONDUIT SHALL BE INSTALLED AND CAPPED.
  - △ INSTALL A GROUNDING BUSHING ON EACH METAL CONDUIT. CONNECT BONDING JUMPER AS REQUIRED BY NEC.
  - △ SEE SHEET 3 OF 3 FOR ENCLOSURE.
  - △ THE CONTROL SYSTEM MUST BE LABELED "SUITABLE FOR USE AS SERVICE EQUIPMENT," REFER TO PROJECT SPECIAL PROVISIONS FOR OTHER REQUIREMENTS.
  - △ SEE PLANS FOR BREAKER SIZES.
  - △ PROVIDE MULTI-TAP LOAD LUGS OR POWER DISTRIBUTION BLOCKS.
  - △ PROVIDE MANUFACTURER SUPPLIED MOUNTING BRACKETS OR SCREW STUDS PERMANENTLY ATTACHED TO THE BACK PANEL, FOR MOUNTING COMPONENTS.
  - △ PROVIDE AND INSTALL A CONDUIT CHOKE ON THE UNDERGROUND END OF THE 3/4" RGS SYSTEM GROUND CONDUIT.



**INTERIOR PANEL**  
 COMPONENT LAYOUT

**COMPONENT LIST**

#	QTY	DESCRIPTION	SPECIFICATIONS
1	1	NEUTRAL BAR	
2	1	SERVICE CIRCUIT BREAKER	2P, 240V, 150A
3	6	FEEDER CIRCUIT BREAKERS	2P, 240V, 50A MAX
4	1	LIGHTNING ARRESTER	
5	2	POWER DISTRIBUTION LUGS OR BLOCKS	
		MOUNTING BRACKETS OR SCREW STUDS	

ENGLISH STANDARD DRAWING FOR  
**LIGHT CONTROL SYSTEM**  
 SCHEMATIC

SHEET 1 OF 3  
**1408D01**

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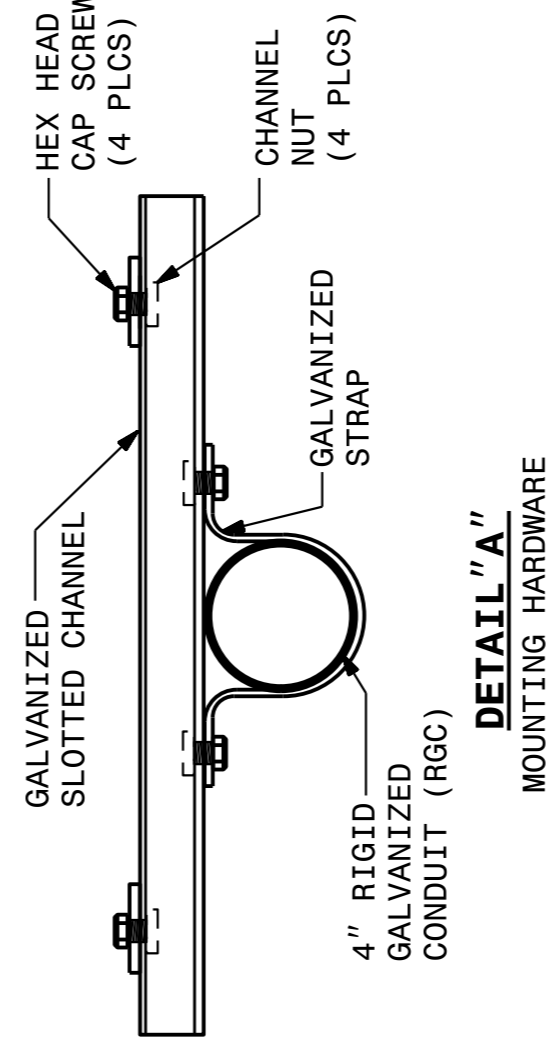
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ENGLISH STANDARD DRAWING FOR  
**LIGHT CONTROL SYSTEM**  
 ASSEMBLY

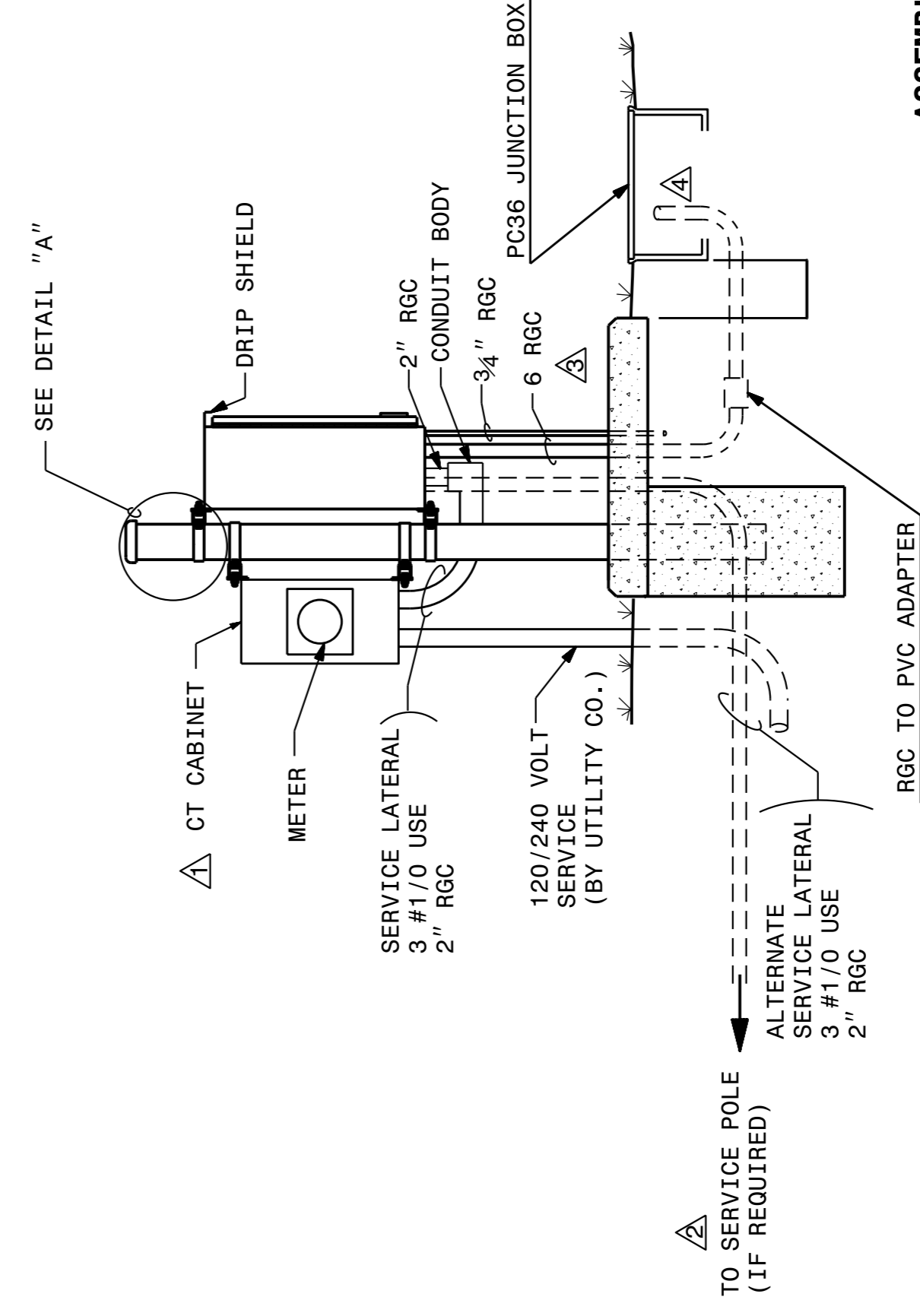
- NOTES**
- △ CURRENT TRANSFORMER (CT) CABINET AND METER MAY BE MOUNTED ON SERVICE POLE OR BACK OF CONTROL ENCLOSURE.
  - △ SEE SECTION 1407 OF THE STANDARD SPECIFICATIONS FOR SERVICE POLE AND SERVICE LATERAL.
  - △ SEE PLANS FOR SIZE OF CONDUITS AND/OR ELECTRICAL DUCT.
  - △ STUB FEEDER CIRCUIT CONDUITS INTO JUNCTION BOX. CAP UNUSED CONDUITS. FEEDER CIRCUITS MUST BE MINIMUM 30" BELOW GRADE.
  - △ SEE SECTION 1411 OF THE STANDARD SPECIFICATIONS FOR JUNCTION BOX INSTALLATION.
  - △ ALL ABOVE GROUND CIRCUITRY TO BE INSTALLED IN RIGID GALVANIZED CONDUIT.
  - △ UNDERGROUND FEEDER CIRCUITS TO BE INSTALLED IN SCH 40 PVC CONDUIT.
  - △ LIGHTNING ARRESTOR INSTALLED OUTSIDE OF CABINET. NOT SHOWN FOR CLARITY.



**DETAIL "A"**  
 MOUNTING HARDWARE

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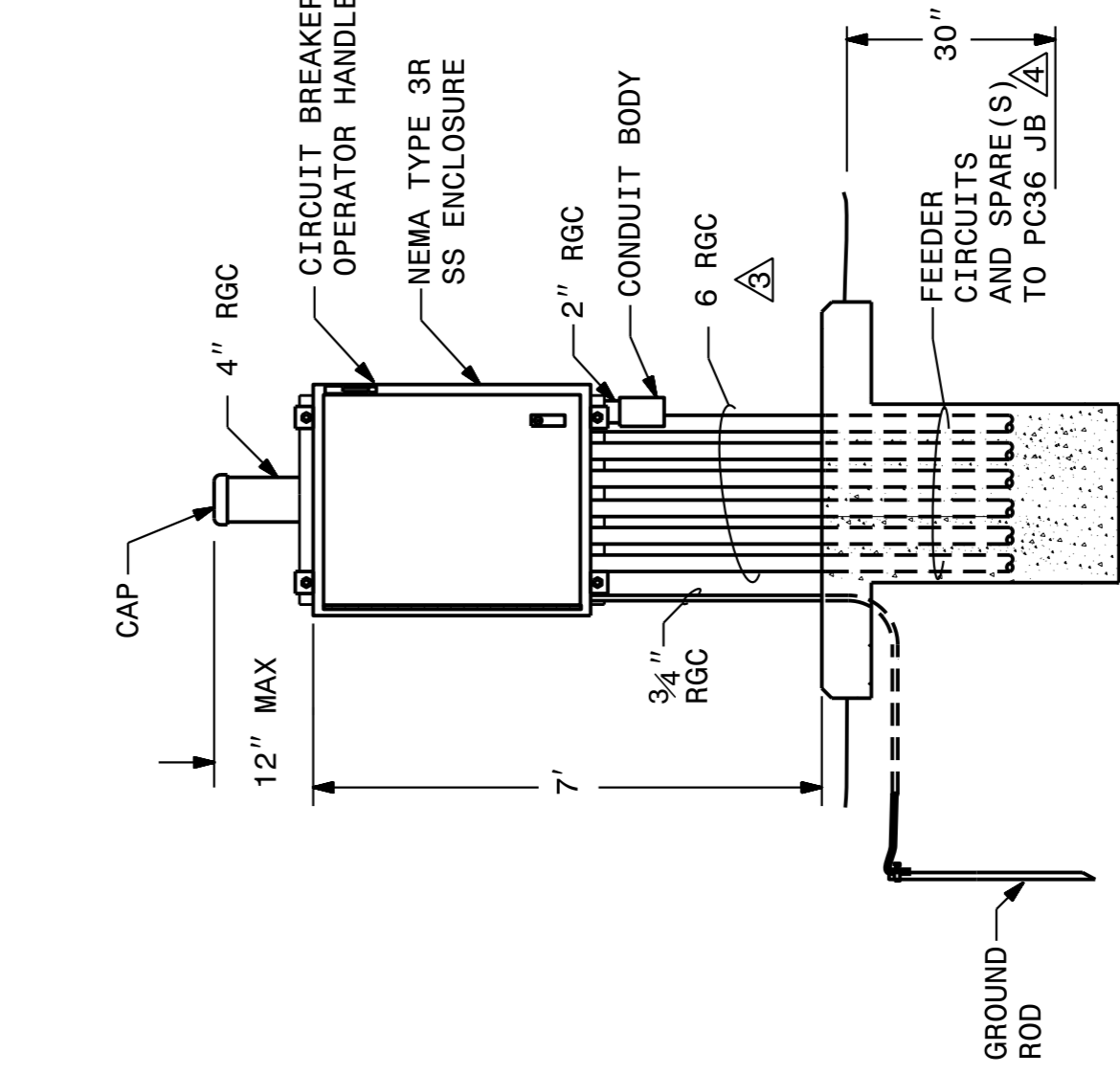
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**ASSEMBLY**

ENGLISH STANDARD DRAWING FOR  
**LIGHT CONTROL SYSTEM**  
 ASSEMBLY

SHEET 2 OF 3  
**1408D01**



SHEET 2 OF 3  
**1408D01**

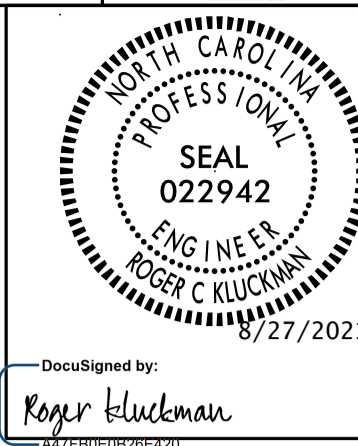
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Rev.	Date	Description	Approved
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Drawn By:	RGH	Approved By:	Dwg No.:

PROJECT REFERENCE NO. B-4929 SHEET NO. E 7

SEAL 022942  
 NORTH CAROLINA PROFESSIONAL ENGINEER  
 ROGER C. KLUCKNER  
 7/27/2021

Designed by:  
 Roger Kluclman  
 Professional Engineer



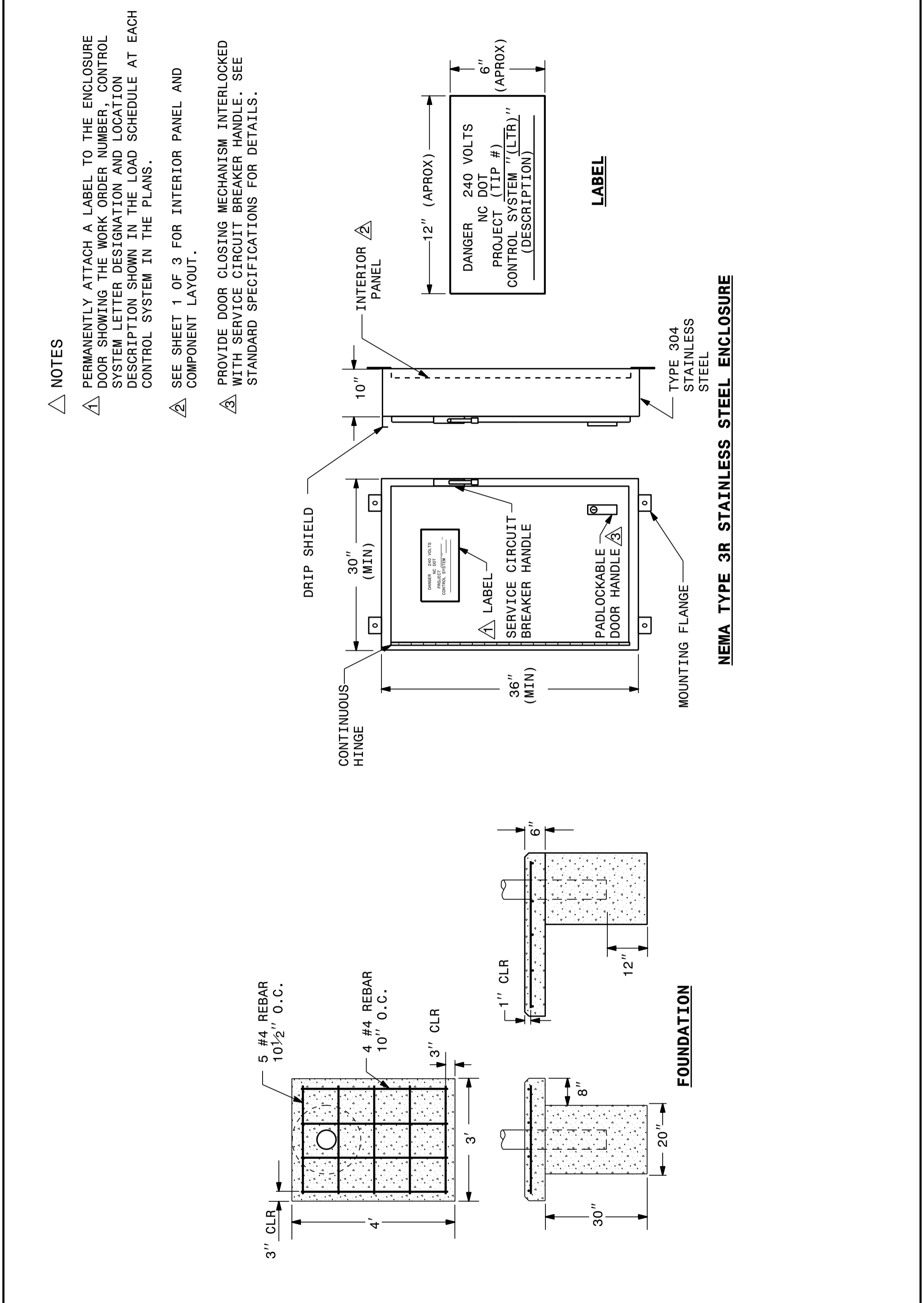


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1-18

ENGLISH STANDARD DRAWING FOR  
**LIGHT CONTROL SYSTEM**  
 FOUNDATION AND ENCLOSURE

SHEET 3 OF 3  
**1408D01**



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 RALEIGH, N.C.

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ENGLISH STANDARD DRAWING FOR  
**LIGHT CONTROL SYSTEM**  
 FOUNDATION AND ENCLOSURE

SHEET 3 OF 3  
**1408D01**

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Rev.	Date	Description	Approved
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN LIGHTING/ELECTRICAL SECTION <b>120/240V LIGHT CONTROL SYSTEM DETAILS</b> SHEET 2 OF 2 ROLAND AVE, SURF CITY PENDER COUNTY			
Drawn By:	RGH	Approved By:	Dwg No.: