02/03/98

PROJECT REFERENCE NO.	SHEET NO.
U-3601	E1

PLANS AND DETAILS FOR PROPOSED LIGHTING /ELECTRICAL CONSTRUCTION

SEAL 022582 ENGINEER PAUL KI-BUN CHAN
1/4/07

△ NOTES

1. AT THESE LOCATIONS, PROVIDE ELECTRICAL DUCT IN ACCORDANCE WITH NEC REQUIRMENTS FOR AN APPROVED RACEWAY FOR ELECTRICAL CIRCUITS. SEE TABLE "C"
2. INSTALL ALL BORE PITS OUTSIDE THE CLEAR ZONE, AS DEFINED BY THE 2002 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 2002 AASHTO ROADSIDE DESIGN GUIDE.
5. TYPE PC18 JUNCTION BOXES ARE 18" L X 12" W X 18" H.
6. AT THESE LOCATIONS PROVIDE OVERSIZED PC 30 JUNCTION BOXES TYPE PC30 JUNCTION BOXES ARE 30" L X 17" W X 18" H.
7. HIGH MAST INSTALLED WITH STATE PROJECT 8.1908301 HAS BEEN REMOVED AND A JUNCTION BOX HAS BEEN MOUNTED TO THE REMAINING FOUNDATION. RETURN JUNCTION BOX TO ENGINEER AND REMOVE FOUNDATION.
8. PLACE AND POSITION JB SO THAT EXISTING CIRCUITRY CAN BE INTERCEPTED AND ROUTED INTO BOX FOR SPLICING
9. JB4 SHOULD BE PLACED ON UPSLOPE TO AVOID FILLING WITH WATER AND BEING COVERED BY ERODING SOIL.
10. RELOCATE 15' BEHIND PROPOSED EDGE OF TRAVEL. SEE PROJECT SPECIAL PROVISIONS.

SCOPE OF WORK

RENOVATE EXISTING ROADWAY LIGHTING SYSTEMS BY REPLACING CONTROL SYSTEMS, UNDERGROUND CIRCUITRY, JUNCTION BOXES, RELOCATING SINGLE ARM LIGHT STANDARDS AND AND REPLACING 100' HIGH MOUNT STANDARD.

DESIGN CRITERIA

2005 AASHTO ROADWAY LIGHTING DESIGN GUIDE

2001 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS

2005 NATIONAL ELECTRICAL CODE

2002 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 JULY 2006 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD NO.	TITLE
1401D01	HIGH MOUNT STANDARD (USE ATTACHED DETAILS SHEET 2 IN LIEU OF STANDARD SHEET 2)
1401.01	HIGH MOUNT STANDARD (SHEETS 1 ONLY)
1402.01	HIGH MOUNT FOUNDATION
1403.01	HIGH MOUNT LUMINAIRES
1404.01	LIGHT STANDARDS
1405.01	STANDARD FOUNDATION
1406.01	LIGHT STANDARD LUMINAIRES
1407.01	ELECTRIC SERVICE POLE AND LATERAL
1408D01	LIGHT CONTROL SYSTEM (USE ATTACHED DETAILS SHEET 1 IN LIEU OF STANDARD SHEET 1)
1408.01	LIGHT CONTROL SYSTEM (SHEETS 2 & 3 ONLY)
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 JULY 2006.

LEGEND

- 6 — PROPOSED 100' HIGH MAST STANDARD W/ HM FOUNDATION & (6) 240V HM LUMINAIRES 750W HPS, MEDIUM, CUTOFF, TYPE V, DESIGNED FOR 90 MPH WINDSPEED.
- 6 — EXISTING 100' HIGH MAST STANDARD
- PROPOSED CONTROL SYSTEM. BREAKER SIZE SHOWN IN LOAD SCHEDULE, SHEETS E2 & E3
- EXISTING CONTROL SYSTEM TO BE REMOVED
- RELOCATED SINGLE ARM LIGHT STANDARD
- EXISTING SINGLE ARM LIGHT STANDARD
- JB1 — PROPOSED ELECTRICAL JUNCTION BOX SEE TABLE B, THIS SHEET
- EXISTING ELECTRICAL JUNCTION BOX
- 1 — REFERENCE TO CORRESPONDING NOTE AS NUMBERED
- C1 **4 — PROPOSED FEEDER CIRCUIT CONTROL SYSTEM(C), CIRCUIT(1) PLAN SYMBOL (**4) SEE TABLE A, THIS SHEET
- C1 — EXISTING FEEDER CIRCUIT AND/OR DUCT
- 3#1/0 USE 2" — PROPOSED SERVICE POLE AND LATERAL 30' CLASS 4 3#1/0 USE CONDUCTORS 2" CONDUIT
- 2", 3" OR 4" ELEC. DUCT JA & BD — PROPOSED ELECTRICAL DUCT SIZE 2", 3" OR 4" TYPE (JA) OR (BD) LOCATION: SEE TABLE C, THIS SHEET

TABLE "A"
CIRCUITRY CONDUCTOR CONDUIT TYPE & SIZE*

PLAN SYMBOL	DESCRIPTION	CONTRACT ITEM
**4P	2 #4Ø 2 AWG SIZE 4 PHASE CONDUCTOR (BK & RD) 1 #4 1 AWG SIZE 4 NEUTRAL CONDUCTOR (WH) 1 #6G 1 AWG SIZE 6 GROUNDING CONDUCTOR 1.5" P 1.5" PVC CONDUIT	3 - 4 W/G FEEDER CIRCUIT IN 1.5" CONDUIT
*4P	1 #4Ø 1 AWG SIZE 4 PHASE CONDUCTOR (BK OR RD) 1 #4 1 AWG SIZE 4 NEUTRAL CONDUCTOR (WH) 1 #6G 1 AWG SIZE 6 GROUNDING CONDUCTOR 1.5" P 1.5" PVC CONDUIT	2 - 4 W/G FEEDER CIRCUIT IN 1.5" CONDUIT
**4	2 #4Ø 2 AWG SIZE 4 PHASE CONDUCTOR (BK & RD) 1 #4 1 AWG SIZE 4 NEUTRAL CONDUCTOR (WH) 1 #6G 1 AWG SIZE 6 GROUNDING CONDUCTOR	3 - 4 W/G FEEDER CIRCUIT
**2P	2 #2Ø 2 AWG SIZE 2 PHASE CONDUCTOR (BK & RD) 1 #2 1 AWG SIZE 2 NEUTRAL CONDUCTOR (WH) 1 #4G 1 AWG SIZE 4 GROUNDING CONDUCTOR 2" P 2" PVC CONDUIT	3 - 2 W/G FEEDER CIRCUIT IN 2" CONDUIT
**2	2 #2Ø 2 AWG SIZE 2 PHASE CONDUCTOR (BK & RD) 1 #2 1 AWG SIZE 2 NEUTRAL CONDUCTOR (WH) 1 #4G 1 AWG SIZE 4 GROUNDING CONDUCTOR	3 - 2 W/G FEEDER CIRCUIT

*PLAN SYMBOLOGY SHOWN AS INCLUDED WITH ORIGINAL LIGHTING PLANS FOR PROJECT CONTINUITY.

TABLE "B"
JUNCTION BOX SUMMARY

NUMBER	LOCATION	TYPE		SHEET
JB1	108+31 -L- 100' RT		PC30	E2
JB2	106+82 -L- 86' RT	PC18		E2
JB3	105+00 -L- 145' RT	PC18		E3
JB4	103+71 -L- 68' LT	PC18		E3
JB5	11+62 -LPA- 80' RT		PC30	E3
JB6	15+39 -L- 122' LT	PC18		E3
TOTALS		4	2	

TABLE "C"
ELECTRICAL DUCT SUMMARY
(ESTIMATED LENGTH IN FEET)

LOCATION	RACEWAY △1	SHEET	TYPE: JACKED (JA) FEET SIZE 2"	JACKED (JA) FEET SIZE 3"	JACKED (JA) FEET SIZE 4"	BURIED (BD) FEET SIZE 2"	BURIED (BD) FEET SIZE 3"	BURIED (BD) FEET SIZE 4"
11+35 -LPA-		E2			98			
11+35 -LPA-	JB5 - JB6	E2				345		
I-40 E OF NC191		E3			148			
104+13 -L-		E3			115			
TOTALS					361	345		

EQUIVALENTS		
TRADE SIZE	METRIC	ENGLISH
½	16mm	½"
¾	21mm	¾"
1	27mm	1"
1.5	41mm	1½"
2	53mm	2"
3	78mm	3"

ABBREVIATIONS

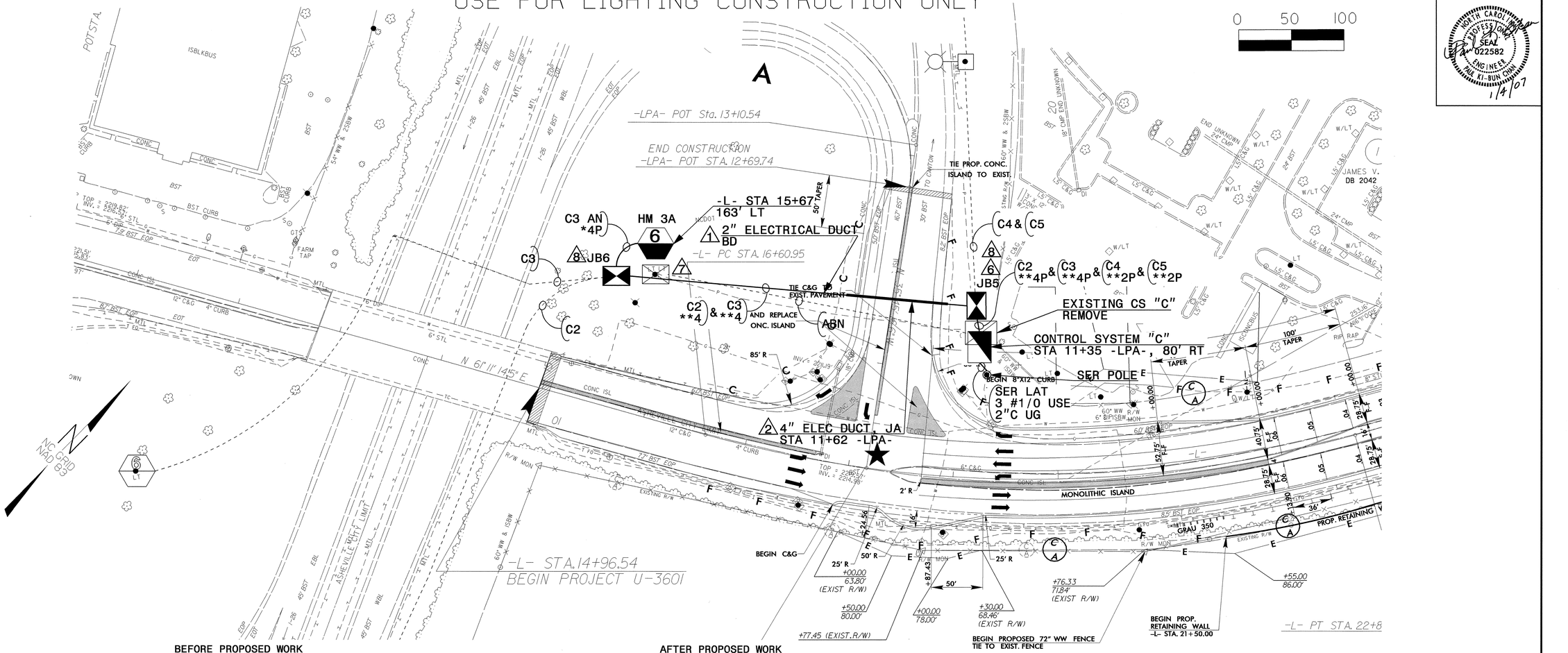
BD	BURIED	PVC	PVC SCHEDULE 40 CONDUIT
LT	LIGHT	RGC	RIGID GALVANIZED STEEL CONDUIT
JA	JACKED	C	CONDUIT
MH	MOUNTING HEIGHT	CKT	CIRCUIT
Ø	PHASE	N	NEUTRAL
SER LAT	SERVICE LATERAL	G	GROUND
ABN	ABANDON	HM	HIGH MAST
		REL	RELOCATE

COMPUTED BY: RGH DATE:
CHECKED BY: DATE:

02/03/98

PROJECT REFERENCE NO.	SHEET NO.
U-3601	E2

USE FOR LIGHTING CONSTRUCTION ONLY



BEFORE PROPOSED WORK

LOAD SCHEDULE
NC191/I-26 INTERCHANGE, INSIDE LOOP A
1Ø, 3W, 240/480 VAC (AN = BLACK Ø TO WHITE N) (BN = RED Ø TO WHITE N) CONTROL SYSTEM "C"

CKT		50' SA STD		100' HM STD		BREAKER
		#	KW LOAD	#	KW LOAD	SIZE (AMPS)
C2	AN	4	4.4			50
	BN	4	4.4			
C3	AN					50
	BN			1	6.6	
C4	AN	7	7.7			50
	BN	6	6.6			
C5	AN	6	6.6			50
	BN	6	6.6			
TOTAL		33	36.3	1	6.6	

*EXISTING LIGHTING SYSTEM ORIGINALLY INSTALLED UNDER STATE PROJECT 8.1908301 (1972)

AFTER PROPOSED WORK

LOAD SCHEDULE
NC191/I-26 INTERCHANGE, INSIDE LOOP A
1Ø, 3W, 240/480 VAC (AN = BLACK Ø TO WHITE N) (BN = RED Ø TO WHITE N) CONTROL SYSTEM "C"

CKT		50' SA STD		100' HM STD		BREAKER
		#	KW LOAD	#	KW LOAD	SIZE (AMPS)
C2	AN	4	4.4			25
	BN	4	4.4			
C3	AN			1	5.1	35
	BN			1	6.6	
C4	AN	7	7.7			40
	BN	6	6.6			
C5	AN	6	6.6			35
	BN	6	6.6			
SPARE BREAKER						40
TOTAL		33	36.3	2	11.7	

SEE SHEET "E1" FOR LEGEND & △ NOTES

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022582 PAK KI-BUN CHAN 1/4/07

Rev.	Date	Description	Approved
2			
1			

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN LIGHTING/ELECTRICAL SECTION

LIGHTING LAYOUT

NC191/I-26 INTERCHANGE

BUNCOMBE COUNTY

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

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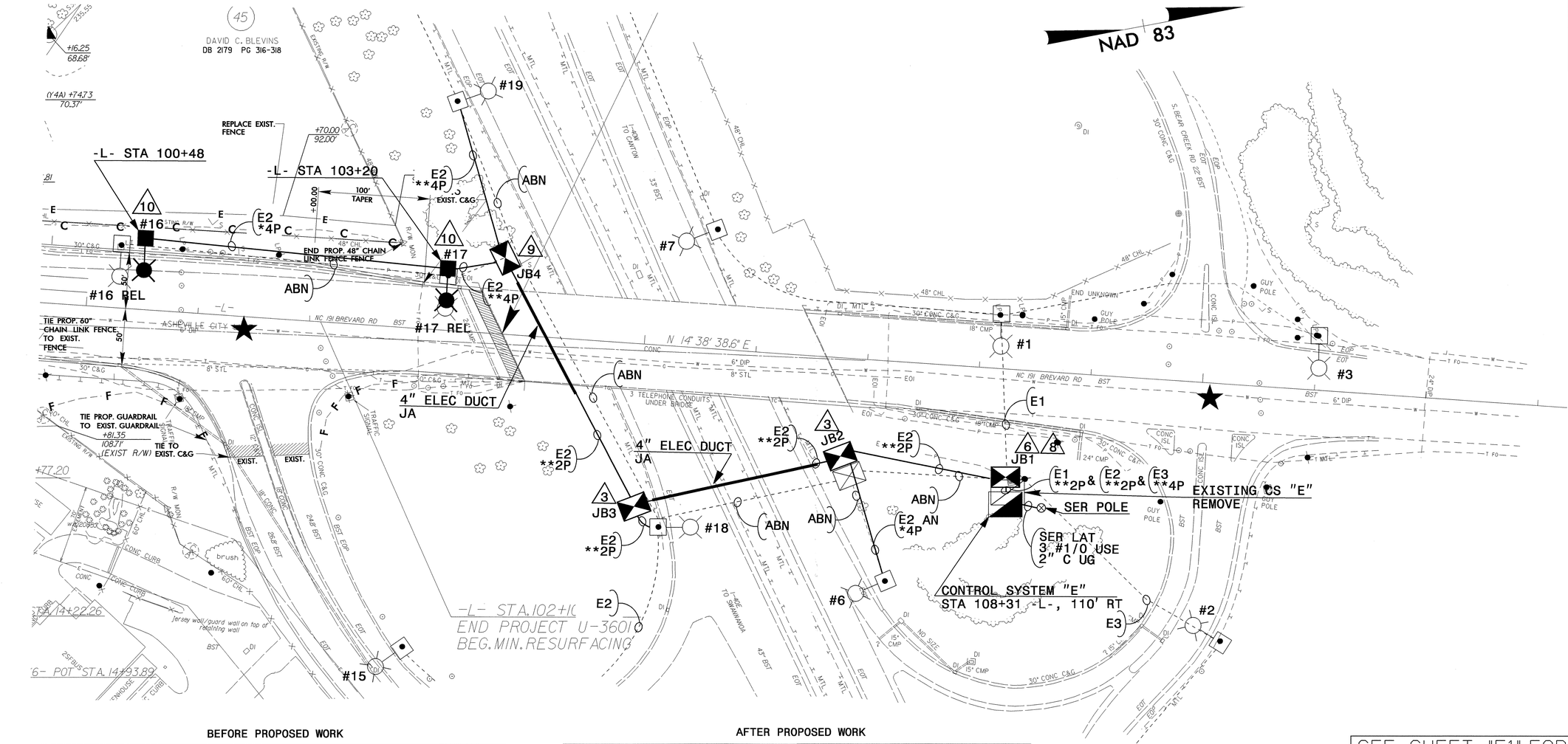
02/03/98

PROJECT REFERENCE NO.	SHEET NO.
U-3601	E3

USE FOR LIGHTING CONSTRUCTION ONLY

0 50 100

NAD 83



BEFORE PROPOSED WORK

LOAD SCHEDULE
NC191/I-40 INTERCHANGE, INSIDE LOOP A

1Ø, 3W, 240/480 VAC (AN = BLACK Ø TO WHITE N) (BN = RED Ø TO WHITE N) CONTROL SYSTEM "E"

CKT		SINGLE ARM 1 @ 400W HPS	AMPS @ 480V	KW LOAD	BREAKER SIZE (AMPS)
E1	AN	1, 8, 10, 12	7.8	1.88	50
	BN	3, 7, 9, 11	7.8	1.88	
E2	AN	6, 14, 16, 18, 19, 21, 23	13.7	3.29	50
	BN	13, 15, 17, 20, 22, 24	11.7	2.82	
E3	AN	4	1.9	.47	50
	BN	2, 5	3.9	.94	
TOTAL	AN	12 400W HPS			
	BN	12 400W HPS			

*THIS PROJECT ORIGINALLY INSTALLED UNDER STATE PROJECT 8.1908301 (1972) AND RENOVATED UNDER STATE PROJECT 8.4840301 (1986)

AFTER PROPOSED WORK

LOAD SCHEDULE
NC191/I-40 INTERCHANGE, INSIDE LOOP A

1Ø, 3W, 240/480 VAC (AN = BLACK Ø TO WHITE N) (BN = RED Ø TO WHITE N) CONTROL SYSTEM "E"

CKT		SINGLE ARM 1 @ 400W HPS	AMPS @ 480V	KW LOAD	BREAKER SIZE (AMPS)
E1	AN	1, 8, 10, 12	7.8	1.88	15
	BN	3, 7, 9, 11	7.8	1.88	
E2	AN	6, 14, 16, 18, 19, 21, 23	13.7	3.29	20
	BN	13, 15, 17, 20, 22, 24	11.7	2.82	
E3	AN	4	1.9	.47	15
	BN	2, 5	3.9	.94	
		SPARE BREAKER			20
TOTAL	AN	12 400W HPS			
	BN	12 400W HPS			

SEE SHEET "E1" FOR LEGEND & △ NOTES

Rev.	Date	Description	Approved
2			
1			

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN SERVICES LIGHTING/ELECTRICAL SECTION

LIGHTING LAYOUT

NC191/I-40 INTERCHANGE

BUNCOMBE COUNTY

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

02/03/98

PROJECT REFERENCE NO.	SHEET NO.
U-3601	E4

NORTH CAROLINA PROFESSIONAL SEAL 022582 ENGINEER HUA-I-BUN CHAN 1/4/07

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

7-06

ENGLISH STANDARD DRAWING FOR
LIGHT CONTROL SYSTEM
SCHEMATIC

SHEET 1 OF 3 — 1408D01

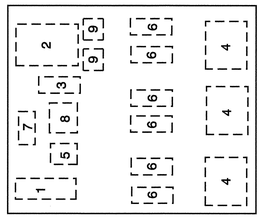
NOTES

1. EQUIPMENT GROUNDS (G) SHALL BE SIZED ACCORDING TO CIRCUIT DESCRIPTION. SEE PLANS.
2. SYSTEM GROUND (SG) SHALL BE CONTINUOUS FROM THE NEUTRAL BAR TO THE GROUNDING ELECTRODE (GROUND ROD).
3. THE NEUTRAL BAR SHALL BE BONDED TO THE PANEL.
4. FEEDER CIRCUITS NOT SHOWN ON THE PLANS SHALL NOT BE INSTALLED, BUT CONDUIT SHALL BE INSTALLED AND CAPPED.
5. INSTALL A GROUNDING BUSHING ON EACH CONDUIT. CONNECT BONDING JUMPER AS REQUIRED BY NEC.
6. SEE SHEET 3 OF 3 FOR ENCLOSURE.
7. THE CONTROL SYSTEM MUST BE LABELED "SUITABLE FOR USE AS SERVICE EQUIPMENT." REFER TO STANDARD SPECIFICATION 1408-2 FOR OTHER REQUIREMENTS.
8. SEE PLANS FOR BREAKER SIZES.
9. PROVIDE MULTI-TAP LOAD LUGS OR POWER DISTRIBUTION BLOCKS.
10. PROVIDE MANUFACTURER SUPPLIED MOUNTING BRACKETS OR SCREW STUDS PERMANENTLY ATTACHED TO THE BACK PANEL, FOR MOUNTING COMPONENTS.
11. NEUTAL CONDUCTORS (N) SHALL BE SIZED ACCORDING TO CIRCUIT DESCRIPTION. SEE PLANS.

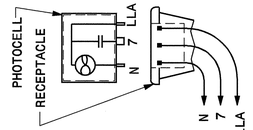
COMPONENT LIST

#	QTY	DESCRIPTION	SPECIFICATIONS
1	1	NEUTRAL BAR	
2	1	SERVICE CIRCUIT BREAKER	2P, 480V, 150A
3	1	CONTROL CIRCUIT BREAKER	1P, 240V, 20A
4	3	MECHANICALLY HELD CONTACTORS	4P, 480V, 60A W/240V COIL
5	1	CONTROL RELAY W/NC & NO CONTACT	240V, 10A, W/240V COIL
6	6	FEEDER CIRCUIT BREAKERS	2P, 480V, 50A MAX
7	1	LIGHTNING ARRESTER	
8	1	SELECTOR SWITCH (ON-OFF-AUTO)	240V, 10A
9	2	POWER DISTRIBUTION LUGS OR BLOCKS	
		MOUNTING BRACKETS OR SCREW STUDS	

INTERIOR PANEL
COMPONENT LAYOUT
△6 △7 △10



PHOTOCELL CONNECTIONS



SCHEMATIC

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

7-06

ENGLISH STANDARD DRAWING FOR
LIGHT CONTROL SYSTEM
SCHEMATIC

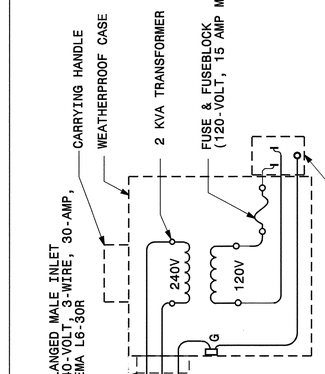
SHEET 1 OF 3 — 1408D01

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

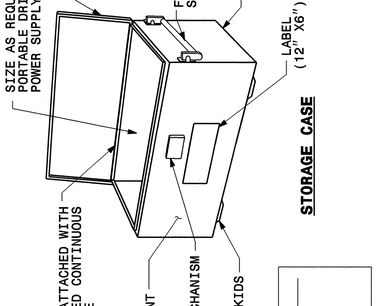
ENGLISH DETAIL DRAWING FOR
HIGH MOUNT STANDARD
WIRING DIAGRAM

SHEET 2 OF 2 — 1401D01

PORTABLE DRIVE POWER SUPPLY



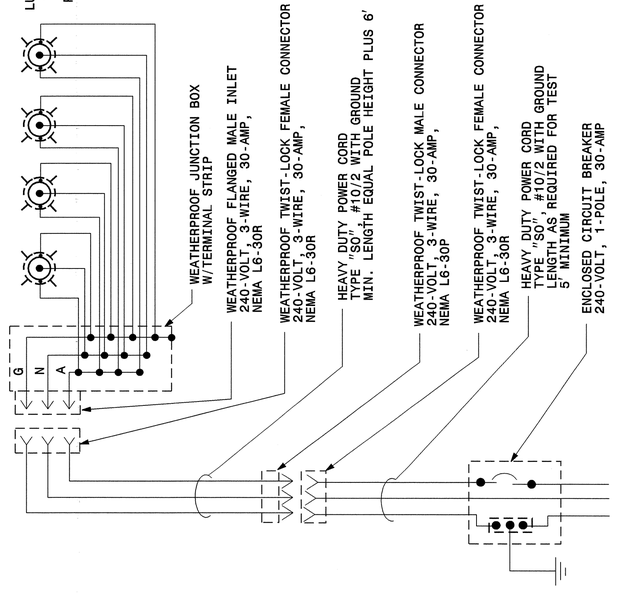
STORAGE CASE



STORAGE CASE LABEL

PROJECT LOCATION: _____
TIP NO.: _____
LET DATE: _____
XFORMER PRIMARY VOLTAGE: _____
LOWERING DEVICE MFG.: _____

HIGH MOUNT WIRING DIAGRAM



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

ENGLISH DETAIL DRAWING FOR
HIGH MOUNT STANDARD
WIRING DIAGRAM

SHEET 2 OF 2 — 1401D01

Rev.	Date	Description	Approved
2			
1			

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN — LIGHTING/ELECTRICAL SECTION

ROADWAY LIGHTING DETAILS

BUNCOMBE COUNTY

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

20-DEC-2006 15:30
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