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**CONTRACT: C204655 TIP PROJECT: I-5997**

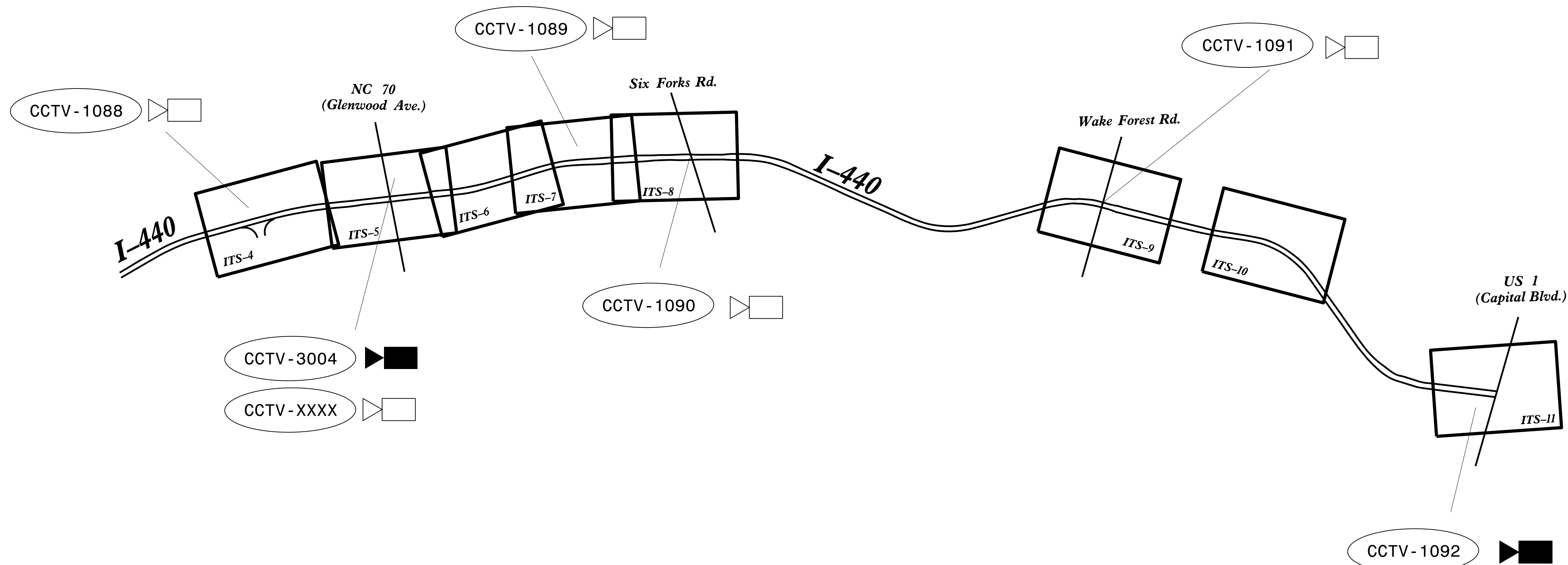
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**WAKE COUNTY**

**LOCATION: I-440 BETWEEN RIDGE RD AND US 1**

**TYPE OF WORK: REPLACE CCTV AND WIRELESS COMMUNICATIONS ON I-440**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.
N.C.	I-5997	ITS-1
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
47952.3.1		CONST.



2018 STANDARD SPECIFICATIONS

PROJECT LENGTH  
PROJECT LENGTH = 5 MILES

LETTING DATE:

INDEX OF SHEETS

SHEET ITS 1	TITLE SHEET
SHEET ITS 2	LEGEND
SHEET ITS 3	SYSTEM LAYOUT
SHEET ITS 4-11	ITS PLANS
SHEET ITS 12	TYPICAL DETAILS

**ROADWAY STANDARD DRAWINGS**

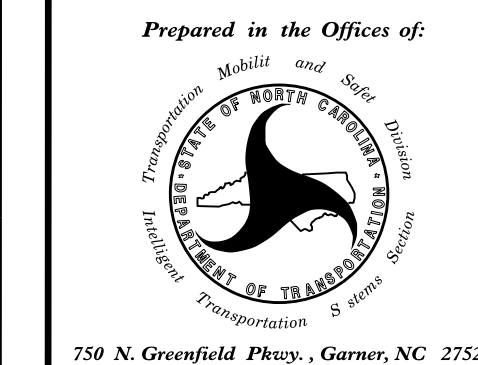
THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" ROADWAY DESIGN UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.04	TEMPORARY SHOULDER CLOSURES
1700.01	ELECTRICAL SERVICE OPTIONS
1700.02	ELECTRICAL SERVICE GROUNDING

2018 STANDARD SPECIFICATION

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**NCDOT CONTACT:**  
TRANSPORTATION MOBILITY AND SAFETY  
M.M. MCDIARMID, P.E., CPM  
STATE TRANSPORTATION SYSTEMS  
MANAGEMENT & OPERATIONS ENGINEER





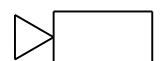

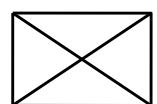
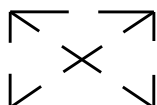


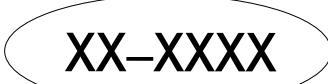





**ENGLISH**  
ALL DIMENSIONS IN THESE PLANS ARE IN FEET UNLESS OTHERWISE NOTED

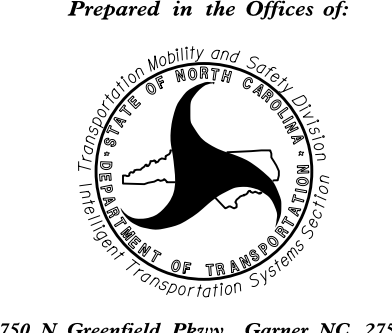
SEAL

DocuSigned by:  
*Andrew J. Skuse*  
DATE: 05/13/2022

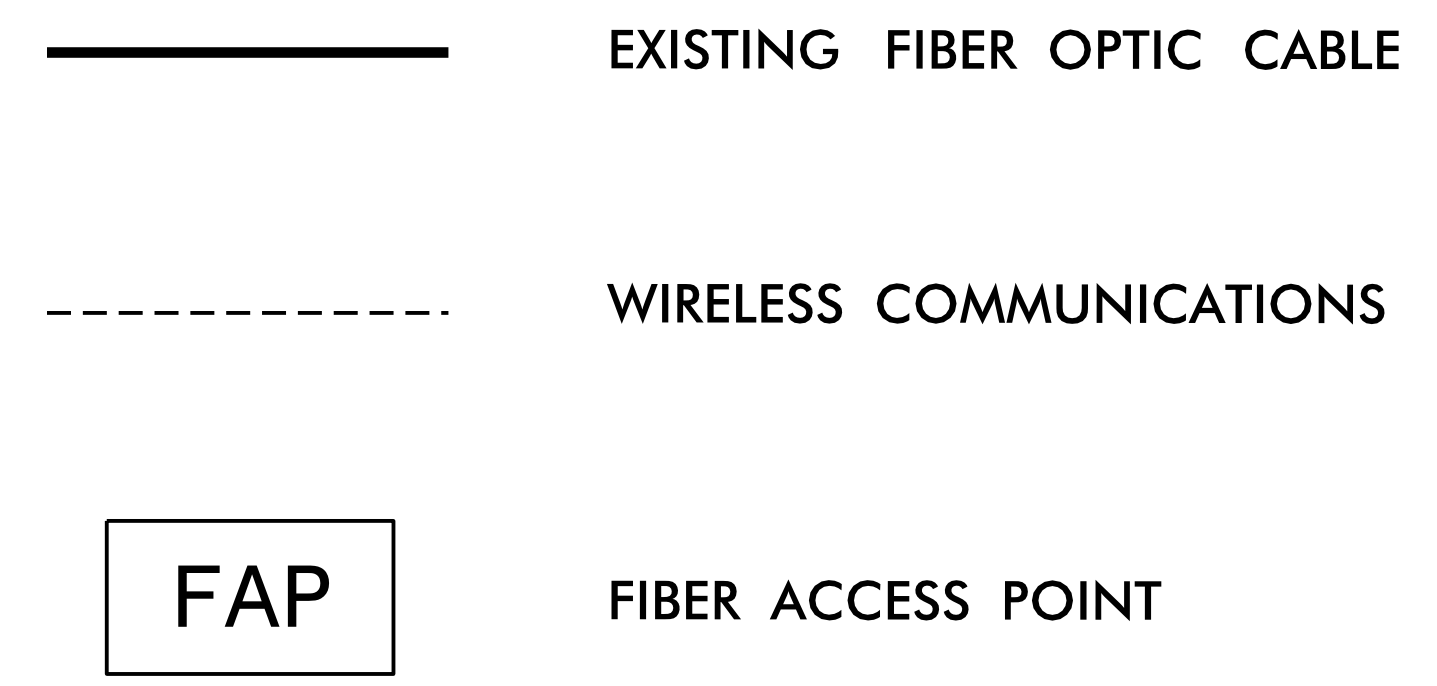
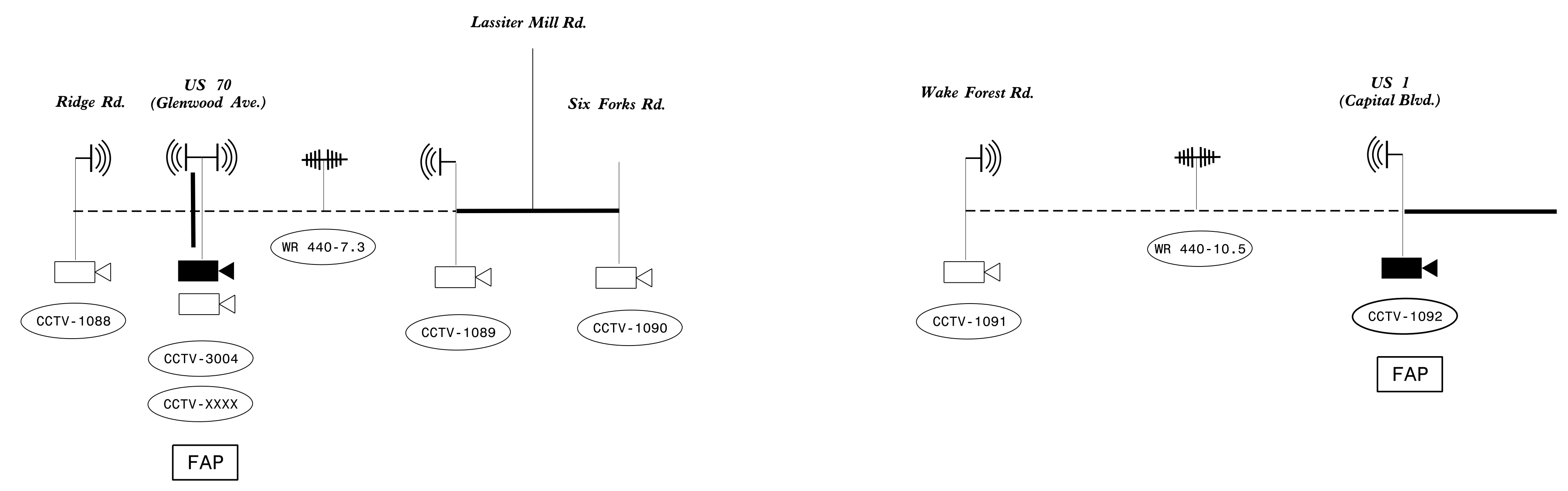
LEGEND

-  NEW CONDUIT
-  EXISTING GUARDRAIL
-  NEW CCTV WOOD POLE
-  EXISTING CCTV WOOD POLE
-  NEW CCTV CAMERA
-  EXISTING CCTV CAMERA
-  NEW ITS EQUIPMENT CABINET
-  EXISTING ITS EQUIPMENT CABINET
-  NEW WIRELESS ETHERNET SYSTEM
-  NEW WIRELESS ETHERNET REPEATER SYSTEM
-  ITS DEVICE NUMBER
-  NEW ELECTRICAL SERVICE
-  EXISTING ELECTRICAL SERVICE
-  EXISTING METAL POLE

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

 Prepared in the Offices of: 750 N. Greenfield Pkwy., Garner, NC 27529	<b>ITS DEVICE REPLACEMENT</b>		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER ANDREW J. SKUCE 050152
	DIVISION 05 WAKE CO. PLAN DATE: SEPTEMBER 2021 PREPARED BY: B. CHRISTIAN	REVIEWED BY: A. J. SKUCE, PE REVIEWED BY:	REVISIONS _____ _____ _____
SCALE 0 _____ NTS	Documented by: Andrew J. Skuce DATE: 11/28/2021		

# WIRELESS SYSTEM LAYOUT

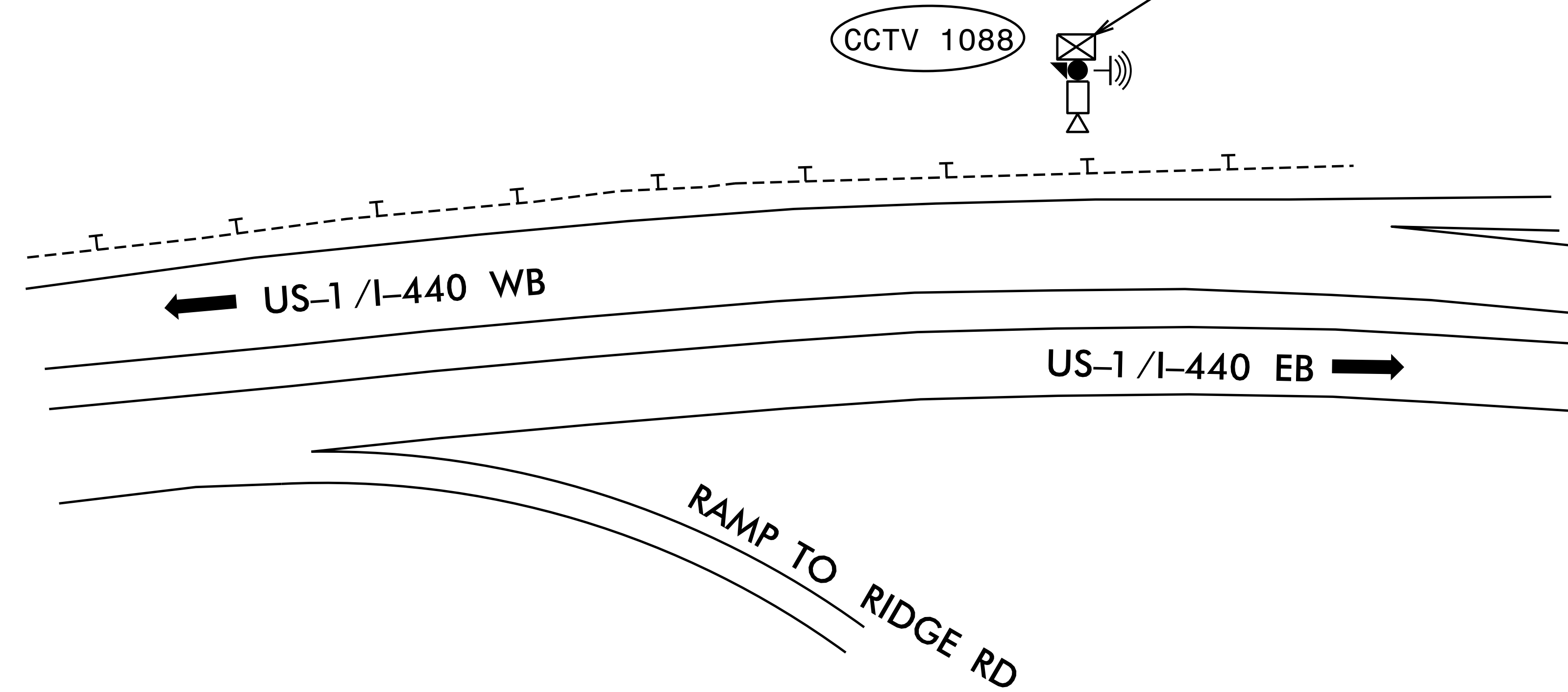


**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

 <small>750 N. Greenfield Pkwy., Garner, NC 27529</small>	<b>ITS DEVICE REPLACEMENT</b>		 <small>DocuSigned by: Andrew J. Skuce</small>								
	DIVISION 05      WAKE CO. PLAN DATE: SEPTEMBER 2021      PREPARED BY: J. WALDEN      REVIEWED BY: A. J. SKUCE, PE.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>		REVISIONS	INIT.	DATE					
REVISIONS	INIT.	DATE									

CCTV 1088 GPS COORDINATES  
35.83319 N, -78.67552 W

INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1 EA	DIGITAL CCTV CAMERA ASSEMBLY
1 EA	FIELD EQUIPMENT CABINET
1 EA	WIRELESS ETHERNET SYSTEM
1 EA	MODIFY EXISTING ELECTRICAL SERVICE



**NOTES**

1. REMOVE EXISTING CCTV CAMERA ASSEMBLY, EQUIPMENT CABINET, AND WIRELESS SYSTEM.
2. INSTALL NEW CCTV CAMERA ASSEMBLY, EQUIPMENT CABINET, AND WIRELESS SYSTEM ON EXISTING WOOD POLE.
3. CONTRACTOR SHALL MAINTAIN AND RE-USE EXISTING ELECTRICAL SERVICE AND FEEDER CONDUCTORS.

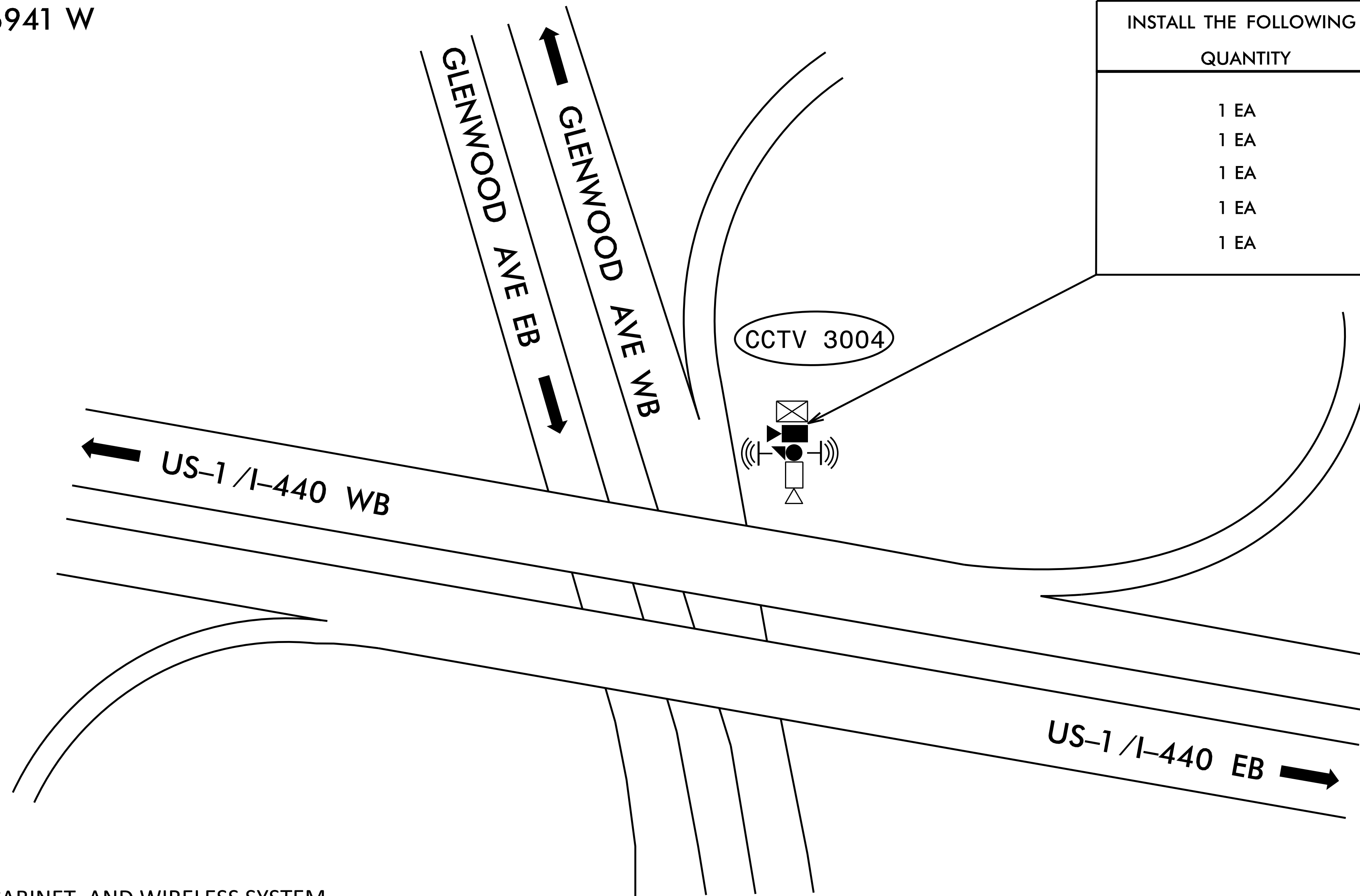
MM 6

**DOCUMENT NOT CONSIDERED FINAL  
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	<b>ITS DEVICE REPLACEMENT</b>		
	DIVISION 05 WAKE CO. PLAN DATE: SEPTEMBER 2021 PREPARED BY: B. CHRISTIAN REVISIONS: _____ SCALE: _____ DATE: _____	REVIEWED BY: A. J. SKUCE, PE REVIEWED BY: _____ INIT. DATE: _____ DATE: _____	

### CCTV 3004 GPS COORDINATES

35.83564 N, -78.66941 W



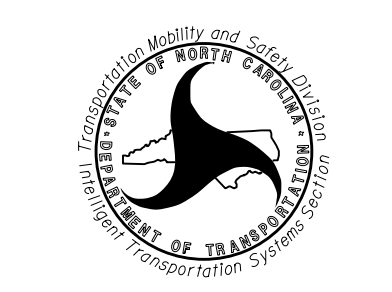
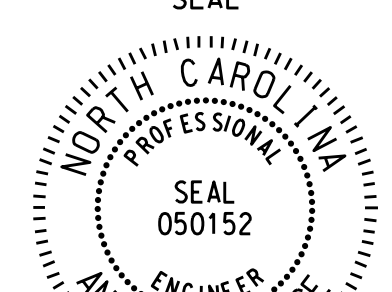
INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1 EA	DIGITAL CCTV CAMERA ASSEMBLY
1 EA	FIELD EQUIPMENT CABINET
1 EA	WIRELESS ETHERNET SYSTEM
1 EA	MODIFY EXISTING ELECTRICAL SERVICE
1 EA	INTERCONNECT CENTER

#### NOTES

1. REMOVE EQUIPMENT CABINET, AND WIRELESS SYSTEM. RETAIN EXISTING CAMERA INSTALLATION.
2. INSTALL NEW NCDOT CCTV CAMERA ASSEMBLY, EQUIPMENT CABINET, AND WIRELESS SYSTEM ON EXISTING WOOD POLE.
3. MOUNT NEW NCDOT CAMERA AT 3 FEET BELOW EXISTING CITY OF RALEIGH CAMERA. ENSURE NEW NCDOT CAMERA POSITION PRIORITIZES I-440 TRAFFIC IN FIELD OF VIEW.
4. CONTRACTOR SHALL MAINTAIN AND RE-USE EXISTING ELECTRICAL SERVICE AND FEEDER CONDUCTORS.
5. TRANSFER CITY OF RALEIGH ANALOG CAMERA EQUIPMENT, INCLUDING CONTROLLER AND VIDEO TRANSCEIVER, INTO NEW FIELD EQUIPMENT CABINET.
6. TRANSFER NCDOT ETHERNET SWITCH TO NEW FIELD EQUIPMENT CABINET.
7. ENSURE EXISTING FIBER OPTIC CABLE CONNECTIONS FOR NCDOT ETHERNET COMMUNICATIONS AND CITY OF RALEIGH SERIAL COMMUNICATIONS ARE LABELED BEFORE DISCONNECTING. RESPLICE OR RECONNECT FIBER OPTIC CABLE BASED ON EXISTING TERMINATION CONFIGURATION. WORK IS NOT COMPLETE UNTIL ALL FIBER OPTIC COMMUNICATIONS ARE OPERATIONAL.

MM 7

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

 <small>750 N. Greenfield Pkwy., Garner, NC 27529</small>	<b>ITS DEVICE REPLACEMENT</b>		
	DIVISION 05 WAKE CO. PLAN DATE: SEPTEMBER 2021 PREPARED BY: B. CHRISTIAN REVISIONS: _____	REVIEWED BY: A. J. SKUCE, PE. REVIEWED BY: _____ INIT. DATE: _____	

REPEATER WR 440-7.3 GPS COORDINATES  
35.83693 N, -78.66516 W

INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1 EA	WIRELESS ETHERNET REPEATER SYSTEM
1 EA	MODIFY EXISTING ELECTRICAL



**NOTES**

1. REMOVE EXISTING WIRELESS REPEATER SYSTEM.
2. INSTALL NEW WIRELESS REPEATER SYSTEM ON METAL SIGN STRUCTURE.
3. CONTRACTOR SHALL MAINTAIN AND RE-USE EXISTING ELECTRICAL SERVICE AND FEEDER CONDUCTORS.

MM 7.3

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

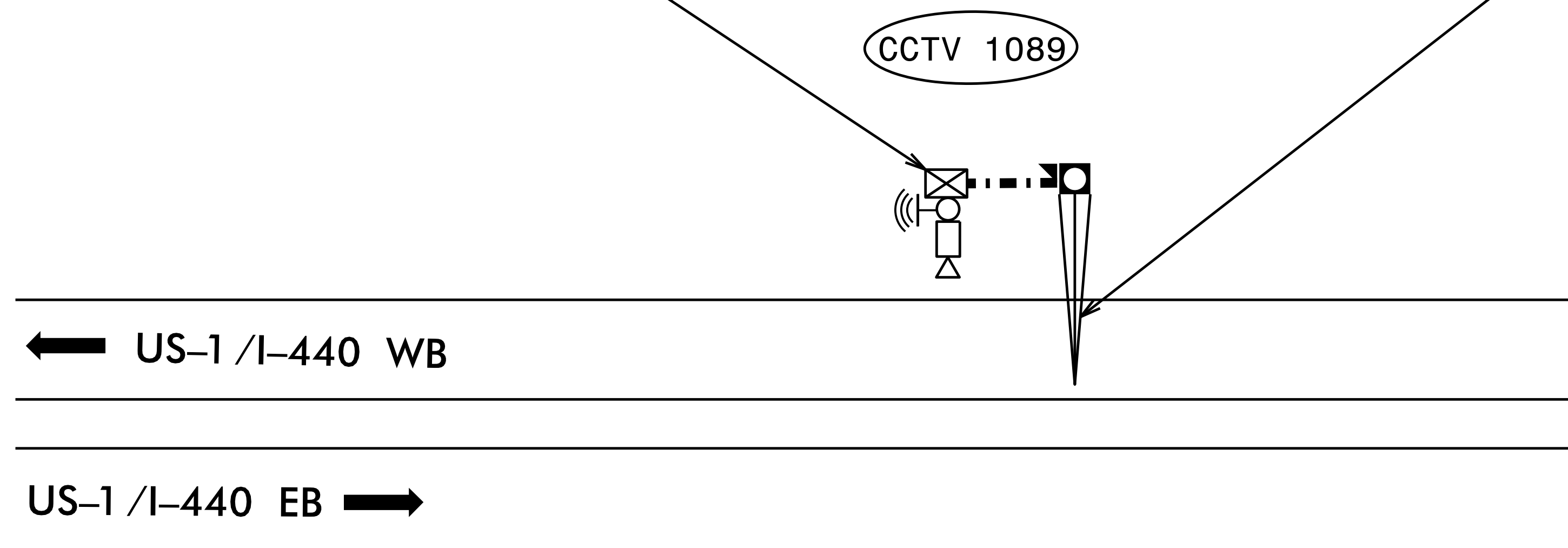
	<p>ITS DEVICE REPLACEMENT</p>	
	<p>DIVISION 05 WAKE CO.</p> <p>PLAN DATE: SEPTEMBER 2021</p> <p>PREPARED BY: B. CHRISTIAN</p>	<p>REVIEWED BY: A. J. SKUCE, PE</p> <p>REVIEWED BY:</p>
<p>750 N. Greenfield Pkwy., Garner, NC 27529</p> <p>SCALE</p> <p>0</p>	<p>REVISIONS</p> <p>INIT.</p> <p>DATE</p>	<p>SEAL</p> <p>050152</p> <p>ANDREW J. SKUCE</p> <p>DATE: 9/28/2021</p>

**CCTV 1089 GPS COORDINATES**  
**35.83613 N, -78.64985 W**

INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1 EA	DIGITAL CCTV CAMERA ASSEMBLY
1 EA	FIELD EQUIPMENT CABINET
1 EA	CCTV WOOD POLE
1 EA	INTERCONNECT CENTER
1 EA	ETHERNET EDGE SWITCH
1 EA	WIRELESS ETHERNET SYSTEM
1 EA	MODIFY EXISTING ELECTRICAL SERVICE
30 LF	UNPAVED TRENCHING (1) (2")
35 LF	3-WIRE #12 COPPER FEEDER CONDUCTORS

**EXITS 7 B - A**

**Glenwood Ave**  
**Crabtree Valley**  
**Durham**  
**1 MILE**



**NOTES**

1. REMOVE EXISTING CCTV CAMERA ASSEMBLY, EQUIPMENT CABINET, INTERCONNECT CENTER, CCTV WOOD POLE AND WIRELESS SYSTEM.
2. INSTALL NEW CCTV CAMERA ASSEMBLY, EQUIPMENT CABINET, AND WIRELESS SYSTEM ON NEW CCTV WOOD POLE. INSTALL ETHERNET EDGE SWITCH AND INTERCONNECT CENTER IN NEW EQUIPMENT CABINET.
3. ENSURE EXISTING FIBER OPTIC CABLE CONNECTIONS ARE LABELED BEFORE DISCONNECTING. RESPLICE OR RECONNECT FIBER OPTIC CABLE BASED ON EXISTING TERMINATION CONFIGURATION. WORK IS NOT COMPLETE UNTIL ALL FIBER OPTIC COMMUNICATIONS ARE OPERATIONAL.
4. CONTRACTOR SHALL MAINTAIN AND RE-USE EXISTING ELECTRICAL SERVICE.

**MM 7.5**

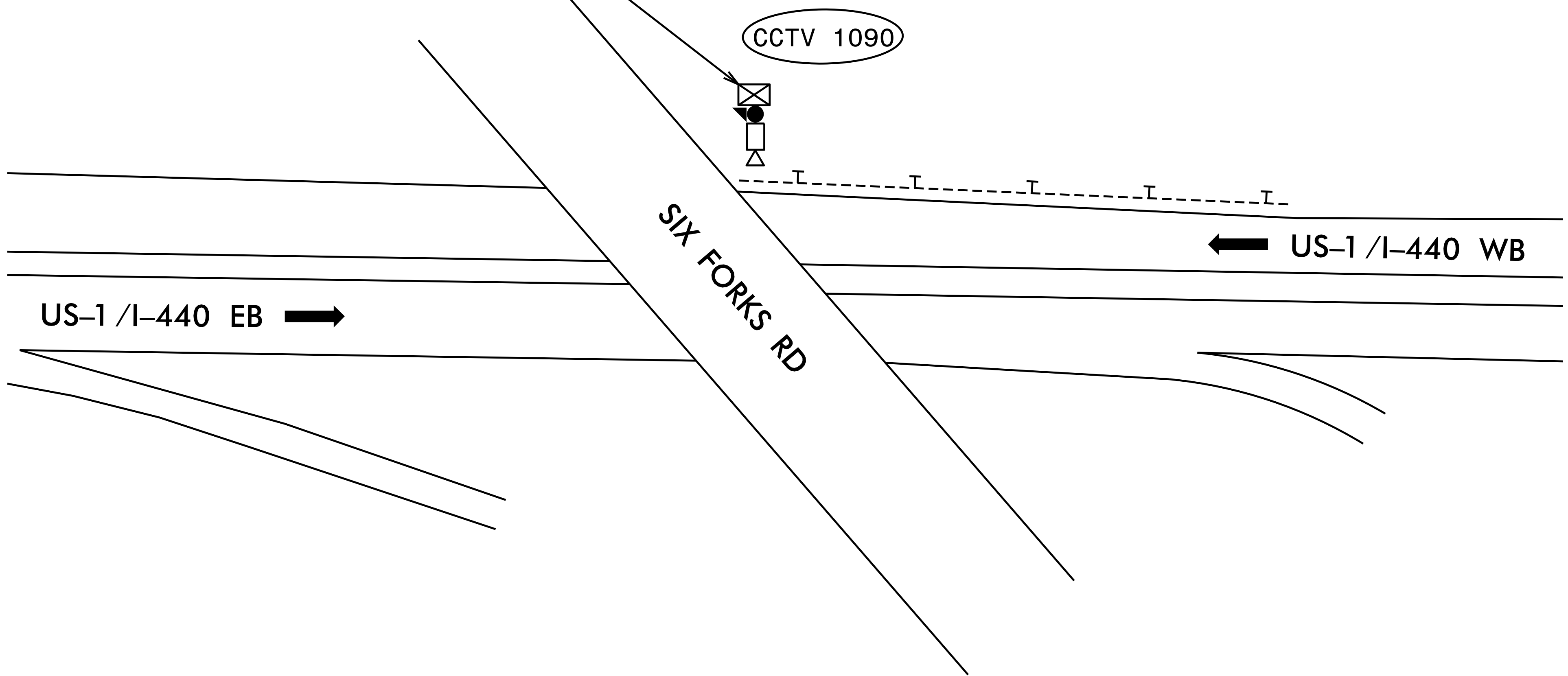
**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

	<b>ITS DEVICE REPLACEMENT</b>		
	DIVISION 05 WAKE CO. PLAN DATE: SEPTEMBER 2021 PREPARED BY: B. CHRISTIAN REVISIONS: _____	REVIEWED BY: A. J. SKUCE, PE REVIEWED BY: _____ INIT. DATE: _____	



**CCTV 1090 GPS COORDINATES**  
**35.83472 N, -78.63863 W**

INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1 EA	DIGITAL CCTV CAMERA ASSEMBLY
1 EA	FIELD EQUIPMENT CABINET
1 EA	ETHERNET EDGE SWITCH
1 EA	INTERCONNECT CENTER
1 EA	MODIFY EXISTING ELECTRICAL SERVICE



**NOTES**

1. REMOVE EXISTING CCTV CAMERA ASSEMBLY, EQUIPMENT CABINET AND INTERCONNECT CENTER.
2. INSTALL NEW CCTV CAMERA ASSEMBLY, AND EQUIPMENT CABINET ON EXISTING WOOD POLE. INSTALL INTERCONNECT CENTER AND ETHERNET EDGE SWITCH IN NEW EQUIPMENT CABINET.
3. ENSURE EXISTING FIBER OPTIC CABLE CONNECTIONS ARE LABELED BEFORE DISCONNECTING. RESPLICE OR RECONNECT FIBER OPTIC CABLE BASED ON EXISTING TERMINATION CONFIGURATION. WORK IS NOT COMPLETE UNTIL ALL FIBER OPTIC COMMUNICATIONS ARE OPERATIONAL.
4. CONTRACTOR SHALL MAINTAIN AND RE-USE EXISTING ELECTRICAL SERVICE AND FEEDER CONDUCTORS.

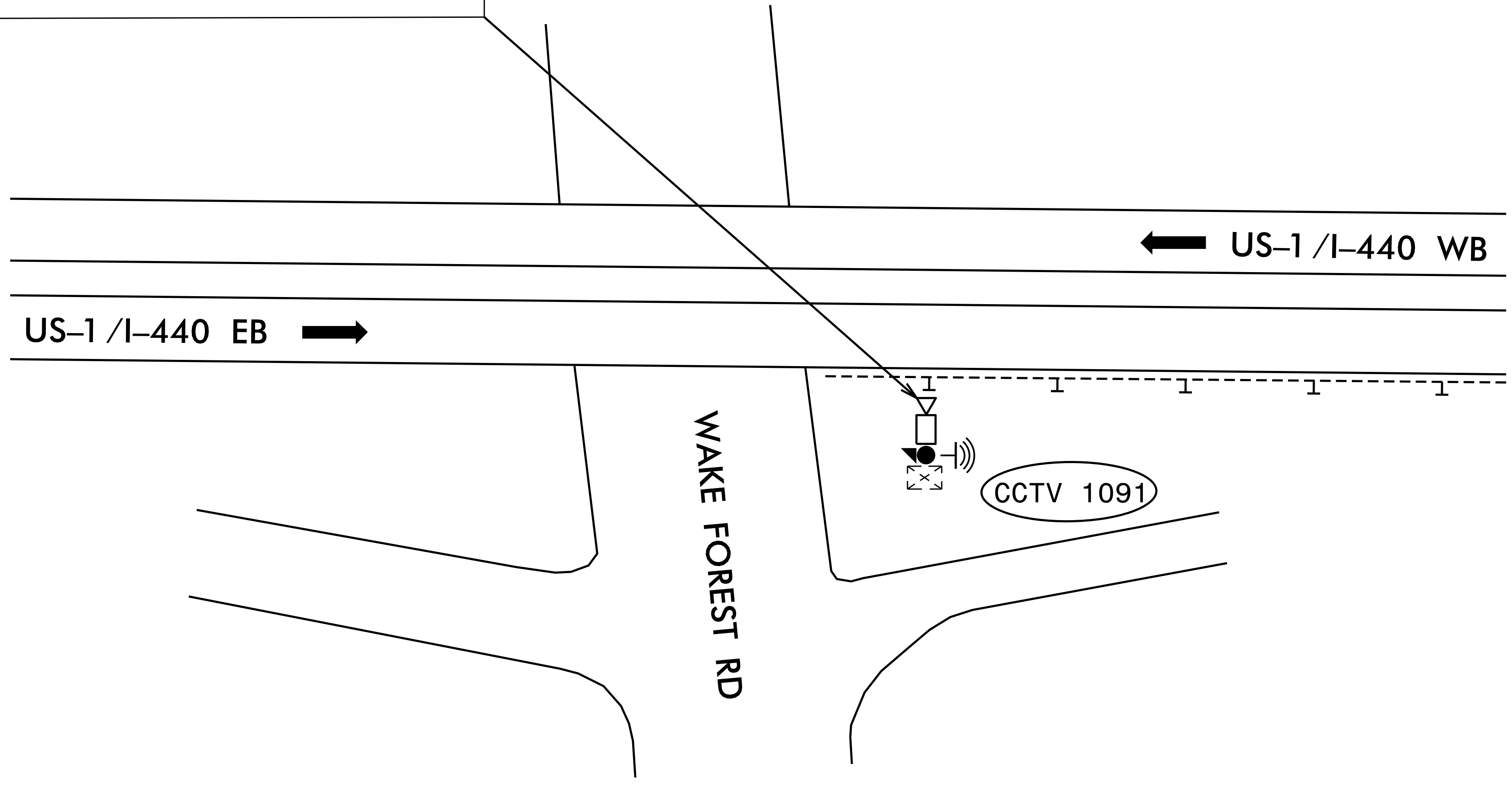
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**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

	<b>ITS DEVICE REPLACEMENT</b>	
	DIVISION 05 WAKE CO. PLAN DATE: SEPTEMBER 2021 PREPARED BY: B. CHRISTIAN SCALE: 0	REVIEWED BY: A. J. SKUCE, PE. REVIEWED BY: DATE: 9/28/2021
750 N. Greenfield Pkwy., Garner, NC 27529 	REVISIONS INIT. DATE	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER ANDREW J. SKUCE DATE

**CCTV 1091 GPS COORDINATES**  
 35.82501 N, -78.62110 W

INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1 EA	DIGITAL CCTV CAMERA
1 EA	WIRELESS ETHERNET SYSTEM
1 EA	MODIFY EXISTING ELECTRICAL SERVICE



**NOTES**

1. REMOVE EXISTING CCTV CAMERA AND WIRELESS ETHERNET SYSTEM.
2. INSTALL NEW CCTV CAMERA , AND WIRELESS ETHERNET SYSTEM ON EXISTING WOOD POLE.
3. CONTRACTOR SHALL MAINTAIN AND RE-USE EXISTING ELECTRICAL SERVICE AND FEEDER CONDUCTORS.

**MM 10**

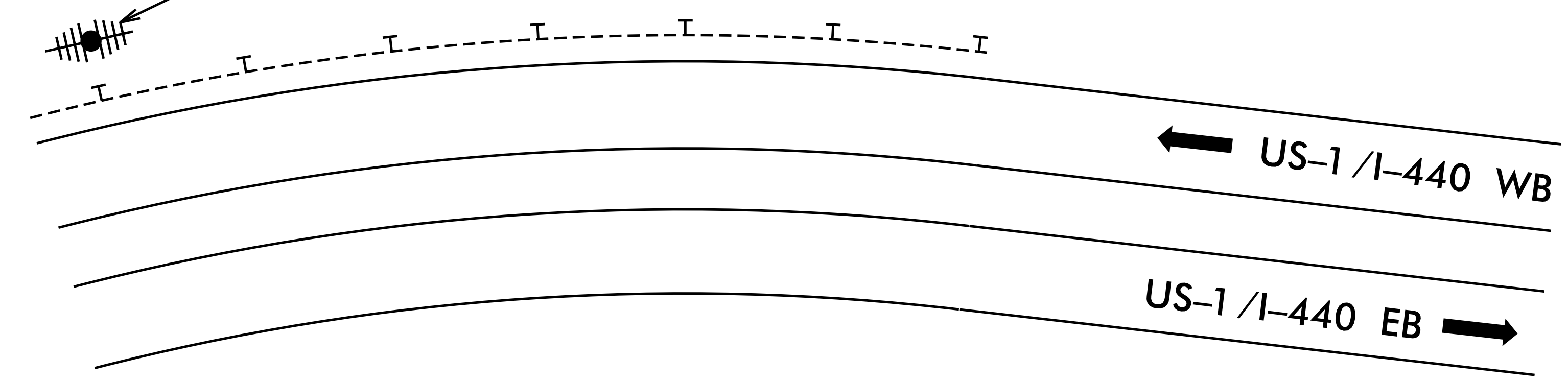
**DOCUMENT NOT CONSIDERED FINAL  
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	<b>ITS DEVICE REPLACEMENT</b>		
	DIVISION 05 WAKE CO. PLAN DATE: SEPTEMBER 2021 REVIEWED BY: A. J. SKUCE, PE PREPARED BY: B. CHRISTIAN REVIEWED BY:		
750 N. Greenfield Pkwy., Garner, NC 27529 	REVISIONS _____ _____ _____	INIT. _____ _____ _____	DATE _____ _____ _____

REPEATER WR 440-10.5 GPS COORDINATES  
35.82052 N, -78.60998 W

INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1 EA	WIRELESS ETHERNET REPEATER SYSTEM

WR 440-10.5



NOTES

1. REMOVE EXISTING WIRELESS REPEATER SYSTEM.
2. INSTALL NEW WIRELESS REPEATER SYSTEM ON EXISTING WOOD POLE.
3. CONTRACTOR SHALL MAINTAIN AND RE-USE EXISTING ELECTRICAL SERVICE AND FEEDER CONDUCTORS.

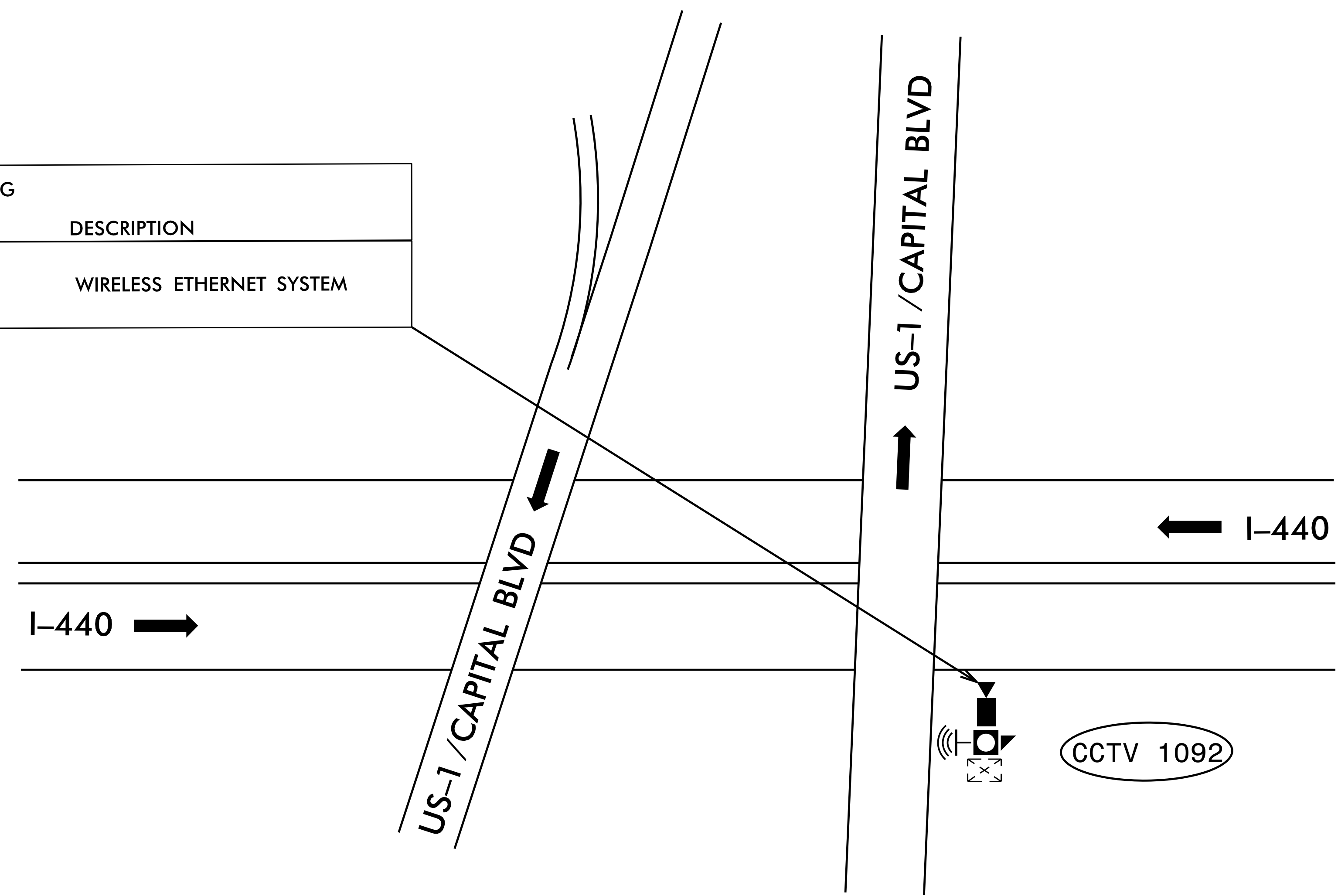
MM 10.5

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UNLESS ALL SIGNATURES COMPLETED

	ITS DEVICE REPLACEMENT		
	DIVISION 05 WAKE CO. PLAN DATE: SEPTEMBER 2021 REVIEWED BY: A. J. SKUCE, PE PREPARED BY: B. CHRISTIAN REVIEWED BY:		
	REVISIONS _____ _____ _____	INIT. _____ _____ _____	DATE _____ _____ _____

CCTV 1092 GPS COORDINATES  
 35.81411 N, -78.60520 W

INSTALL THE FOLLOWING	
QUANTITY	DESCRIPTION
1 EA	WIRELESS ETHERNET SYSTEM



**NOTES**

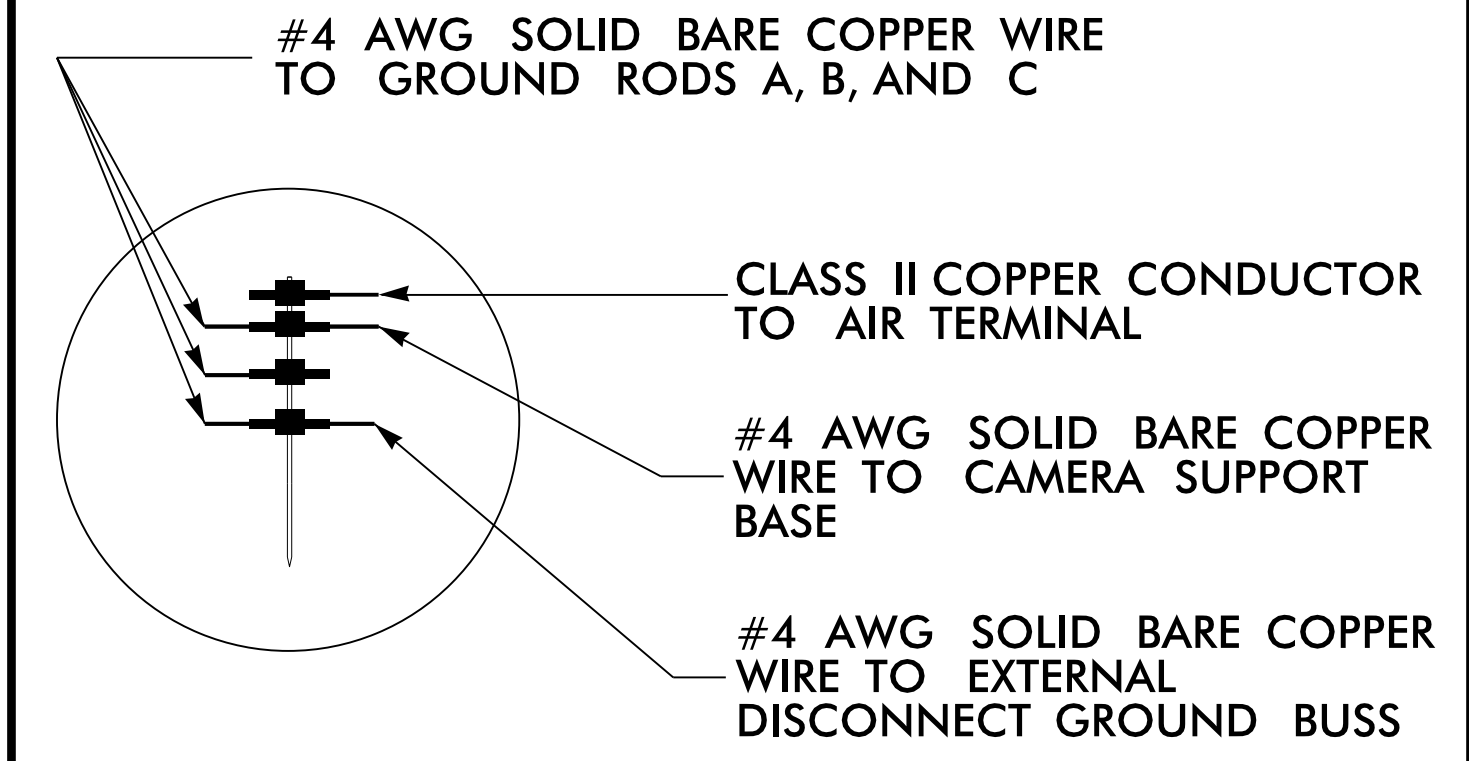
1. REMOVE EXISTING WIRELESS ETHERNET SYSTEM.
2. INSTALL NEW WIRELESS ETHERNET SYSTEM ON EXISTING METAL POLE.
3. MAINTAIN EXISTING CAMERA EQUIPMENT, EQUIPMENT CABINET, AND FIBER OPTIC COMMUNICATIONS EQUIPMENT.

MM 11

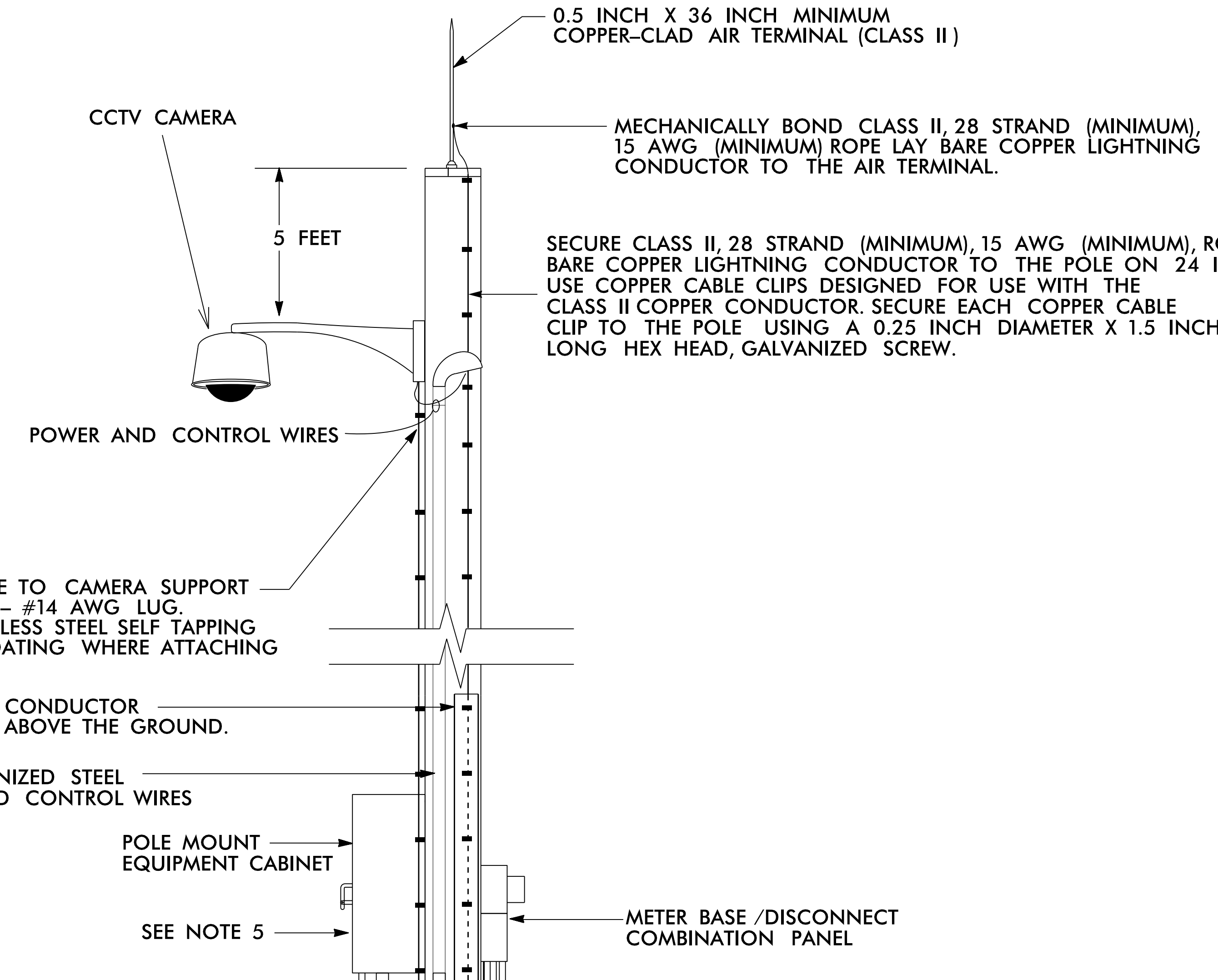
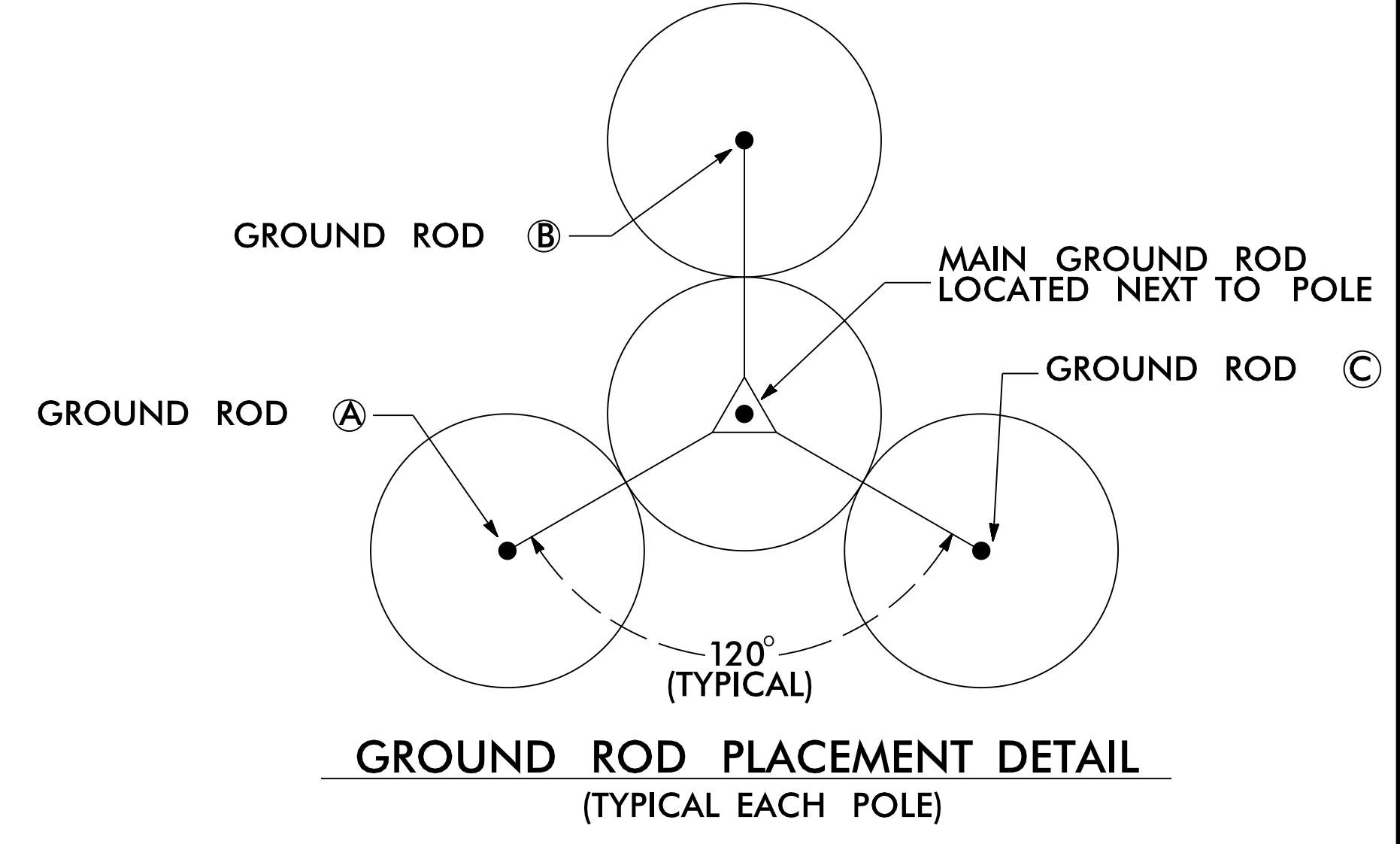
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	<b>ITS DEVICE REPLACEMENT</b>		
	DIVISION 05 WAKE CO. PLAN DATE: SEPTEMBER 2021 PREPARED BY: B. CHRISTIAN REVISIONS: _____ SCALE: _____ 	REVIEWED BY: A. J. SKUCE, PE. REVIEWED BY: _____ INIT. DATE _____ _____	

INSET 'A'



10 FOOT RADIUS EACH "SPHERE OF INFLUENCE"



BOND #4 AWG SOLID BARE COPPER WIRE TO CAMERA SUPPORT BASE BY AN ALUMINUM TO COPPER #2 - #14 AWG LUG. ATTACH TO CAMERA BASE WITH A STAINLESS STEEL SELF TAPPING SCREW. REMOVE PAINT OR PROTECTIVE COATING WHERE ATTACHING LUG ONLY.

INSTALL 2-INCH PVC U-GUARD OVER COPPER CONDUCTOR FROM GROUND LEVEL TO 10 FEET (MINIMUM) ABOVE THE GROUND.

2-INCH RIGID GALVANIZED STEEL RISER FOR POWER AND CONTROL WIRES

POLE MOUNT EQUIPMENT CABINET

SEE NOTE 5

METER BASE /DISCONNECT COMBINATION PANEL

1-INCH RIGID GALVANIZED STEEL CONDUIT FOR POWER

INSTALL MARKER TAPE 12 INCHES BELOW GRADE AND ABOVE ALL GROUNDING CONDUCTORS.

FINISHED GRADE

24 INCH MIN.

IRREVERSIBLE MECHANICAL CRIMP

GROUND ROD (A)

TO GROUND ROD (B)

TO GROUND ROD (C)

MAIN GROUND ROD INDICATED BY "▲" IN GROUND ROD PLACEMENT DETAIL THIS SHEET

TO EXTERNAL DISCONNECT GROUND BUSS

UNDERGROUND SERVICE LATERAL CONDUCTORS INSTALLED BY UTILITY COMPANY

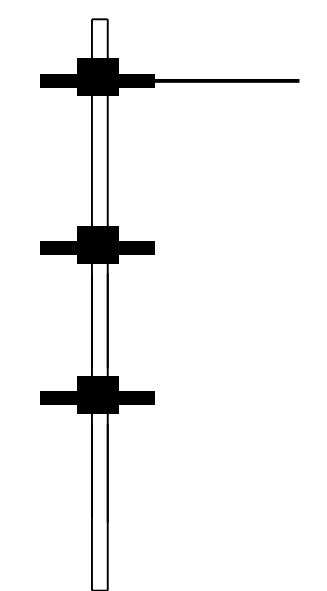
12 INCH MINIMUM

5/8 INCH X 10 FOOT MIN. COPPER CLAD STEEL GROUND RODS DRIVEN INTO UNDISTURBED EARTH

10 - 20 FEET

ALTERNATE GROUNDING METHOD

IF SPACE IS NOT AVAILABLE TO DRIVE MULTIPLE RODS, DRIVE SECTIONAL GROUND RODS A MINIMUM OF 30 FEET.



JOIN SECTIONAL GROUND RODS BY IRREVERSIBLE COMPRESSION COUPLER

NOTES

1. BOND CLASS II, 28 STRAND (MINIMUM), 15 AWG (MINIMUM) ROPE-LAY BARE COPPER CONDUCTOR TO THE MAIN GROUND ROD BY AN IRREVERSIBLE MECHANICAL CRIMP. MAINTAIN MAXIMUM HORIZONTAL SEPARATION BETWEEN COPPER CONDUCTOR AND RISER.
2. ALL CONNECTIONS TO GROUND RODS SHOULD BE MADE WITH AN IRREVERSIBLE MECHANICAL CRIMP METHOD.
3. THE CONTRACTOR MAY, UPON APPROVAL OF THE ENGINEER, INSTALL A 30-FOOT SECTIONAL GROUND ROD FOR INSTANCES WHEN CONDITIONS WILL NOT ALLOW FOR THE INSTALLATION OF THE 3 - RADIAL GROUND RODS.
4. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12 INCHES.
5. REMOVE BONDING JUMPER BETWEEN EQUIPMENT CABINET GROUND BUSS AND NEUTRAL BUSS.

	<p>CCTV CAMERA INSTALLATION FOR WOOD POLES WITH UNDERGROUND ELECTRICAL SERVICE TYPICAL DETAIL</p>		
	<p>PLAN DATE: SEPTEMBER 2021</p>	<p>REVIEWED BY:</p>	
<p>250 N. Greenfield Plaza, Garner, NC 27529</p>	<p>PREPARED BY:</p>	<p>REVIEWED BY:</p>	<p>DATE</p>
<p>SCALE: NONE</p>	<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>
<p>2018 STANDARD SPECIFICATIONS UPGRADE TO IRREVERSIBLE MECHANICAL CRIMP</p>	<p>A.J.S.</p>	<p>11/2017</p>	<p>9/28/2021</p>