WBS: 33879.2.81

CONTRACT: 11901232

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 JULY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
862.01	GUARDRAIL PLACEMENT
862.02	GUARDRAIL INSTALLATION
1101.01	WORK ZONE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW BOARDS
1130.01	DRUM
1135.01	CONES
1165.01	WORK VEHICLE LIGHTING SYSTEMS AND TMA DELINEATION
1180.01	SKINNY – DRUM
1261.01	GUARDRAIL AND BARRIER DELINEATORS – INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS – TYPES AND MOUNTING
1262.01	GUARDRAIL AND DELINEATION
1700.01	ELECTRICAL SERVICE OPTIONS
1700.02	ELECTRICAL SERVICE GROUNDING
1715.01	UNDERGROUND CONDUIT
1716.01	JUNCTION BOXES
1725.01	INDUCTIVE DETECTIVE LOOPS
1740.01	METAL POLES
1742.01	METAL POLE FOUNDATIONS
1751.01	CONTROLLERS AND CABINETS – ELECTRICAL SERVICE GROUNDING
1751.02	CONTROLLERS AND CABINETS – ELECTRICAL SERVICE DETAILS
1752.01	CONTROLLERS AND CABINETS – POWER, GROUND AND AUXILIARY POWER SYSTEMS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

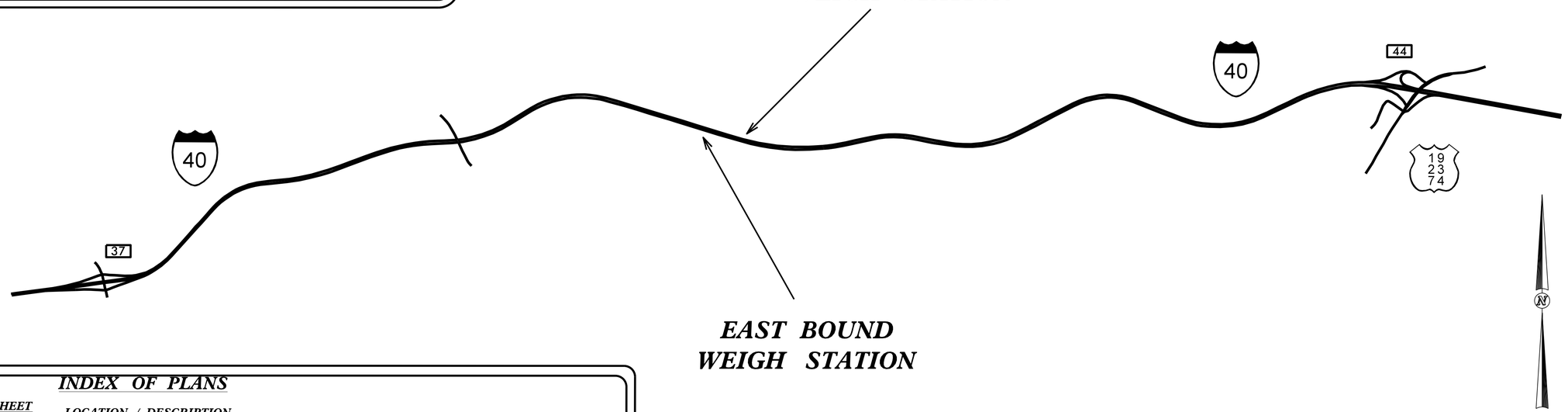
BUNCOMBE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.
N.C.	33879.2.81	ITS-1
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
48293.3.1	N/A	CONST

PLANS FOR PROPOSED

I–40 EASTBOUND WEIGH STATION UPGRADE

THIS PROJECT CONSISTS OF FURNISHING AND INSTALLING EQUIPMENT AND MATERIALS FOR THE INSTALLATION OF A WEIGH IN MOTION SYSTEM, TRUCK BYPASS SYSTEM, TIRE MONITORING SYSTEM, AUTOMATED LICENSE PLATE READER, AND IMAGE CAPTURE CAMERA NEAR ASHEVILLE, NORTH CAROLINA. RELATED MATERIALS CONSIST OF LOCAL CABINETS AND CONTROLLERS, WEIGH IN MOTION SENSORS, ALPR CAMERAS, SOFTWARE, INFRARED ILLUMINATORS, CMS, TMS SENSORS, DATABASE INTERFACE, METAL POLES, METAL POLES WITH MAST ARMS, METAL POLE FOUNDATION, IMAGE CAPTURE CAMERA ASSEMBLY, AND GUARDRAIL.



INDEX OF PLANS

2016 CVISN

2018 STANDARD SPECIFICATIONS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

NCDOT CONTACTS:
TRANSPORTATION MOBILITY AND SAFETY

MEREDITH McDIARMID, P.E.
STATE ITS & SIGNALS ENGINEER

Prepared in the Offices of:
Transportation Mobility and Safety Division
North Carolina Department of Transportation
750 N. Greenfield Pkwy., Garner, NC 27529

ENGLISH

ALL DIMENSIONS IN THESE PLANS ARE IN FEET UNLESS OTHERWISE NOTED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER
MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
5D6B0BA6DBB6495...
SIGNATURE

5/22/2019
DATE

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-2

LEGEND

PROPOSED		EXISTING
	TRENCHED CONDUIT	
	DIRECTIONAL DRILLED CONDUIT	
	ELECTRICAL SERVICE	
	CAMERA POLE	N/A
	JUNCTION BOX	
	STANDARD INDUCTIVE LOOP DETECTOR	N/A
	CAMERA ASSEMBLY	N/A
	EQUIPMENT CABINET	N/A
	PIEZOELECTRIC QUARTZ SENSOR	N/A
	DRILL THROUGH SHOULDER FOR CONDUIT	N/A
	TIRE MONITORING SENSOR	N/A
	GUARDRAIL	
	METAL POLE WITH MAST ARM	
	CHANGEABLE MESSAGE SIGN	
	TRANSPONDER/AVI READER	

GENERAL NOTES

1. OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION FOR ITEMS TO BE INSTALLED AS PART OF THIS PROJECT.
2. BURIED UTILITIES AND STRUCTURES: PIPELINES, STORM SEWERS, POWER CABLES, UTILITY CABLES, AND OTHER PUBLICLY AND PRIVATELY OWNED UNDERGROUND OBSTRUCTIONS MAY EXIST ADJACENT TO AND WITHIN THE ROADWAY RIGHT–OF–WAY WITHIN THE CONSTRUCTION LIMITS OF THIS PROJECT. INVESTIGATE THE LOCATION OF SUCH BURIED UTILITIES AND STRUCTURES WITH PUBLIC AND PRIVATE UTILITIES.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE OWNER OF ALL AFFECTED UTILITIES FOR WORK THAT MAY IMPACT ANY UTILITY FACILITY.
4. ALL WORK SHOWN ON THESE PLANS IS TO BE PERFORMED BY THE CONTRACTOR UNLESS IT IS SPECIFICALLY NOTED THAT THE WORK WILL BE PERFORMED BY OTHERS.

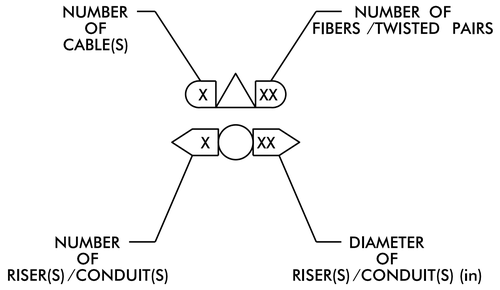
CONSTRUCTION NOTE SYMBOLOGY KEY

(X) INDICATES NUMBER OF CABLES, LOOPS, ETC.

(XX) INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.

X INDICATES NUMBER OF RISER(S)/CONDUIT(S)

XX INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (in)



ABBREVIATIONS

AVI	AUTOMATIC VEHICLE IDENTIFICATION
ALPR	AUTOMATED LICENSE PLATE READER
HDPE	HIGH DENSITY POLYETHYLENE
L	LOOP DETECTOR
N.T.S.	NOT TO SCALE
WIM	WEIGH IN MOTION
PQS	PIEZOELECTRIC QUARTZ SENSOR
S	SENSOR
NCSHP	NORTH CAROLINA STATE HIGHWAY PATROL
TMS	TIRE MONITORING SENSOR

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

LEGEND, GENERAL NOTES AND ABBREVIATIONS

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE: MAY 2019 REVIEWED BY: I.N. AVERY

PREPARED BY: G.A. GREEN REVIEWED BY:

SCALE 0 N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
5D980BA6DBB6495...
SIGNATURE

5/22/2019
DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-3

- 1 INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL REA, PE – 38, (FIGURE – 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 3 INSTALL REA, PE – 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 3A INSTALL ALPR CABLE(S) *
- 3B INSTALL AVI CABLE(S) *
- 3C INSTALL WIMSORT SIGNAL CABLE(S) *
- 3D INSTALL PIEZOELECTRIC QUARTZ SENSOR CABLES *
- 3E INSTALL LOOP WIRE
- 3F INSTALL LEAD–IN CABLE
- 3G INSTALL CCTV VIDEO AND POWER CABLES *
- 3H INSTALL FOUR #8 COPPER FEEDER CONDUCTORS
- 3I INSTALL DMS CONTROL AND POWER CABLES
- 3J INSTALL TIRE MONITORING SENSOR CABLES
- 3K INSTALL COAXIAL CABLE
- 3L INSTALL CAT5 CABLE
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH
- 8A SAW CUT PAVEMENT
- 9 INSTALL PVC CONDUIT
- 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
- 13 INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
- 14 INSTALL POLYETHYLENE CONDUIT
- 15 DIRECTIONAL DRILL CONDUIT
- 16 BORE AND JACK CONDUIT
- 17 INSTALL CABLE(S) IN EXISTING CONDUIT
- 18 INSTALL CABLE(S) IN NEW CONDUIT
- 19 INSTALL CABLE(S) IN EXISTING RISER
- 20 INSTALL CABLE(S) IN NEW RISER
- 21 INSTALL CABLE(S) IN EXISTING CONDUIT STUB–OUTS
- 21A INSTALL CABLE(S) IN NEW CONDUIT STUB–OUTS
- 22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
- 24 INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
- 25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26 TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 27 INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPLICE ENCLOSURE
- 30 MODIFY EXISTING SPLICE CENTER
- 31 INSTALL POLE MOUNTED CABINET
- 32 INSTALL BASE MOUNTED CABINET WITH EXTENDER
- 33 REMOVE EXISTING SPLICE CABINET
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 INSTALL SPECIAL OVERSIZED JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48 REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
- 49 REMOVE EXISTING COMMUNICATIONS CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 50 FEET OF COMMUNICATIONS CABLE
- 54 INSTALL ISOLATION TRANSFORMER
- 55 INSTALL INDUSTRIAL ETHERNET SWITCH
- 56 INSTALL VIDEO ENCODER
- 56A INSTALL VIDEO DECODER
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE
- 58A INSTALL EQUIPMENT CABINET DISCONNECT
- 59 INSTALL PIEZOELECTRIC QUARTZ SENSORS
- 60 INSTALL AUTOMATED LICENSE PLATE RECOGNITION SYSTEM
- 61 INSTALL AUTOMATED USDOT RECOGNITION SYSTEM
- 62 INSTALL IMAGE CAPTURE CCTV CAMERA ASSEMBLY
- 63 INSTALL STANDARD INDUCTIVE LOOP
- 64 INSTALL OVERHEIGHT DETECTOR ASSEMBLY WITH METAL POLE AND FOUNDATION
- 65 INSTALL STEEL POLE, MASTARM AND FOUNDATION
- 66 INSTALL LED LANE CONTROL SIGN
- 67 INSTALL TRANSPONDER/AVI READER
- 68 INSTALL CHANGABLE MESSAGE SIGN, STRUCTURE, AND FOUNDATION
- 69 INSTALL STEEL POLE FOUNDATION
- 70 INSTALL TIRE MONITORING SENSORS
- 71 INSTALL TIRE MONITORING ELECTRONICS

* CABLES SHALL BE PER EQUIPMENT MANUFACTURER'S SPECIFICATIONS AND RATED FOR WET LOCATIONS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

Prepared in the Offices of:
Transportation Mobility and Safety Division
North Carolina Department of Transportation
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 N/A

CONSTRUCTION NOTES

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE: MAY 2019 REVIEWED BY: I.N. AVERY

PREPARED BY: G.A. GREEN REVIEWED BY:

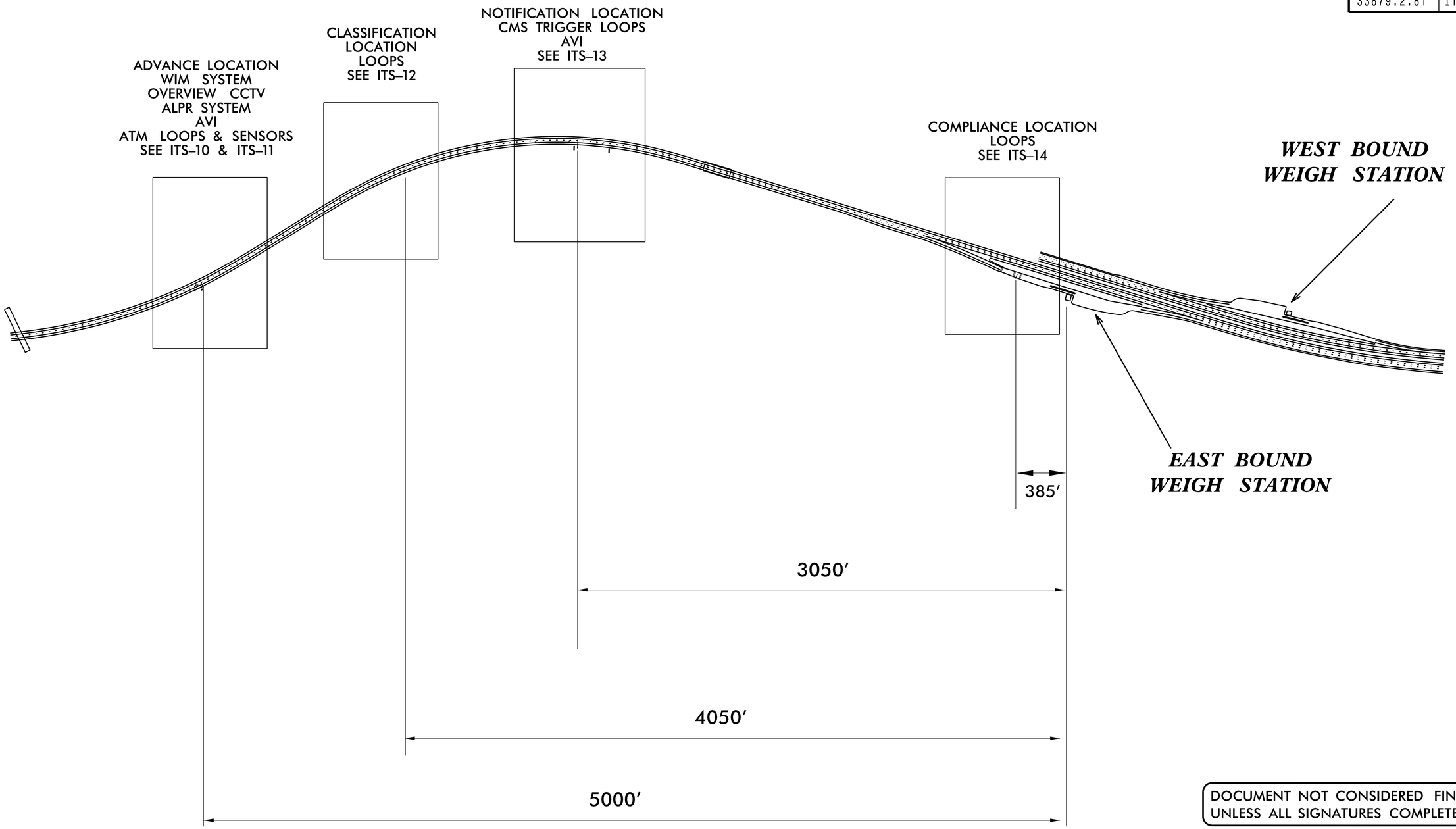
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami 5/22/2019
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-4



NOTE:
DISTANCES SHOWN ARE TYPICAL AND MAY BE FIELD ADJUSTED UPON APPROVAL BY THE ENGINEER.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

Prepared in the Offices of:
NC DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0
N/A

PROJECT AREA
OVERVIEW

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

REVISIONS	INIT.	DATE

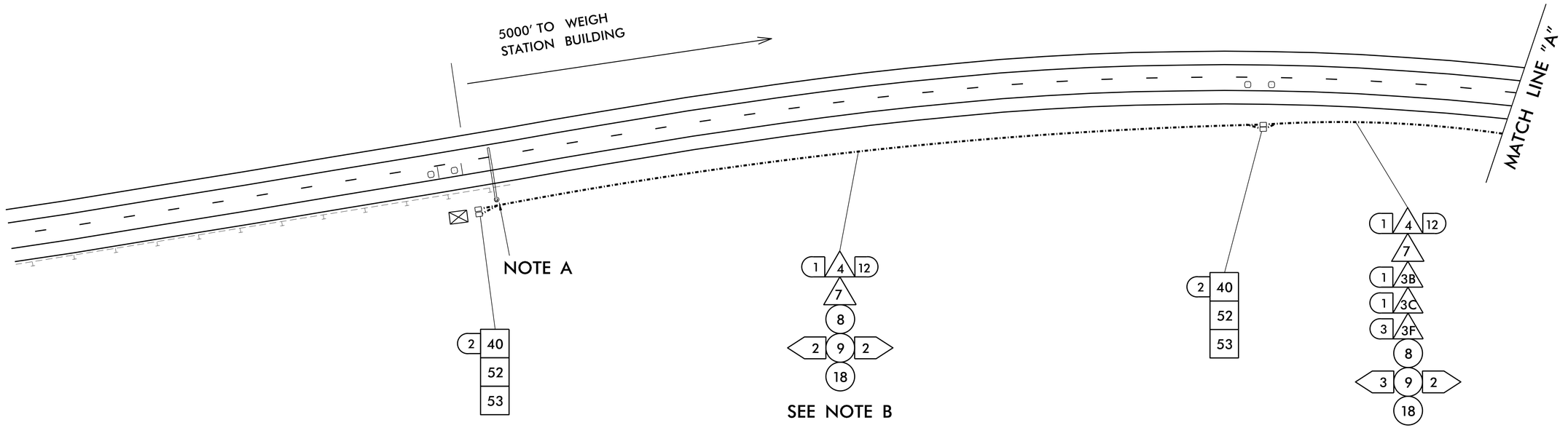
SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
032108
ENGINEER
MOHD A. ASLAMI

DocuSigned by:
Mohd Aslami
5D9B0BA8D8B6495...
SIGNATURE

5/22/2019
DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-5



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

NOTES:
A. INSTALL METAL POLE WITH MAST ARM SIX (6) FEET BEHIND EXISTING GUARDRAIL.
B. INSTALL THREE (3) TWO (2) INCH CONDUITS. THE FIBER OPTIC CABLE(S) SHALL BE ISOLATED FROM ALL OTHER CABLES USING ONE 2 INCH CONDUIT AND SEPARATE JUNCTION BOXES.

Prepared in the Offices of:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intermodal Transportation Planning Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0
N/A

COMMUNICATIONS CABLE AND CONDUIT ROUTING

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

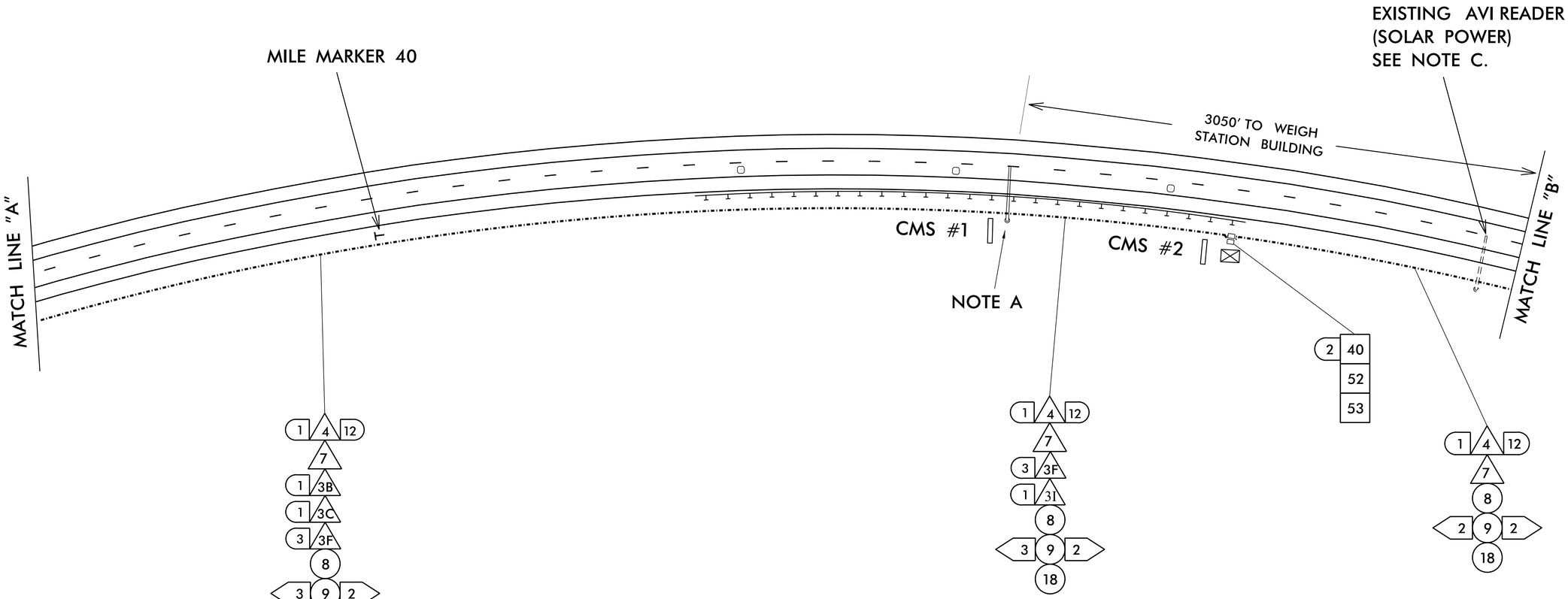
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
5D9B08A6CBB6495...
SIGNATURE 5/22/2019 DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-6



NOTES:

A. INSTALL METAL POLE WITH MAST ARM SIX (6) FEET BEHIND NEW GUARDRAIL.

B. INSTALL THREE (3) TWO (2) INCH CONDUITS. THE FIBER OPTIC CABLE(S) SHALL BE ISOLATED FROM ALL OTHER CABLES USING ONE 2 INCH CONDUIT AND SEPARATE JUNCTION BOXES.

C. REMOVE EXISTING TRANSPONDER, METAL POLE, AND SOLAR POWER EQUIPMENT. DELIVER THIS EQUIPMENT TO A NCDOT DIVISION 13 FACILITY AS DIRECTED BY THE ENGINEER.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

Prepared in the Offices of:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intelligent Transportation Systems Section

750 N. Greenfield Pkwy., Garner, NC 27529

SCALE: 0 N/A

COMMUNICATIONS CABLE AND CONDUIT ROUTING

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE: MAY 2019 REVIEWED BY: I.N. AVERY

PREPARED BY: G.A. GREEN REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

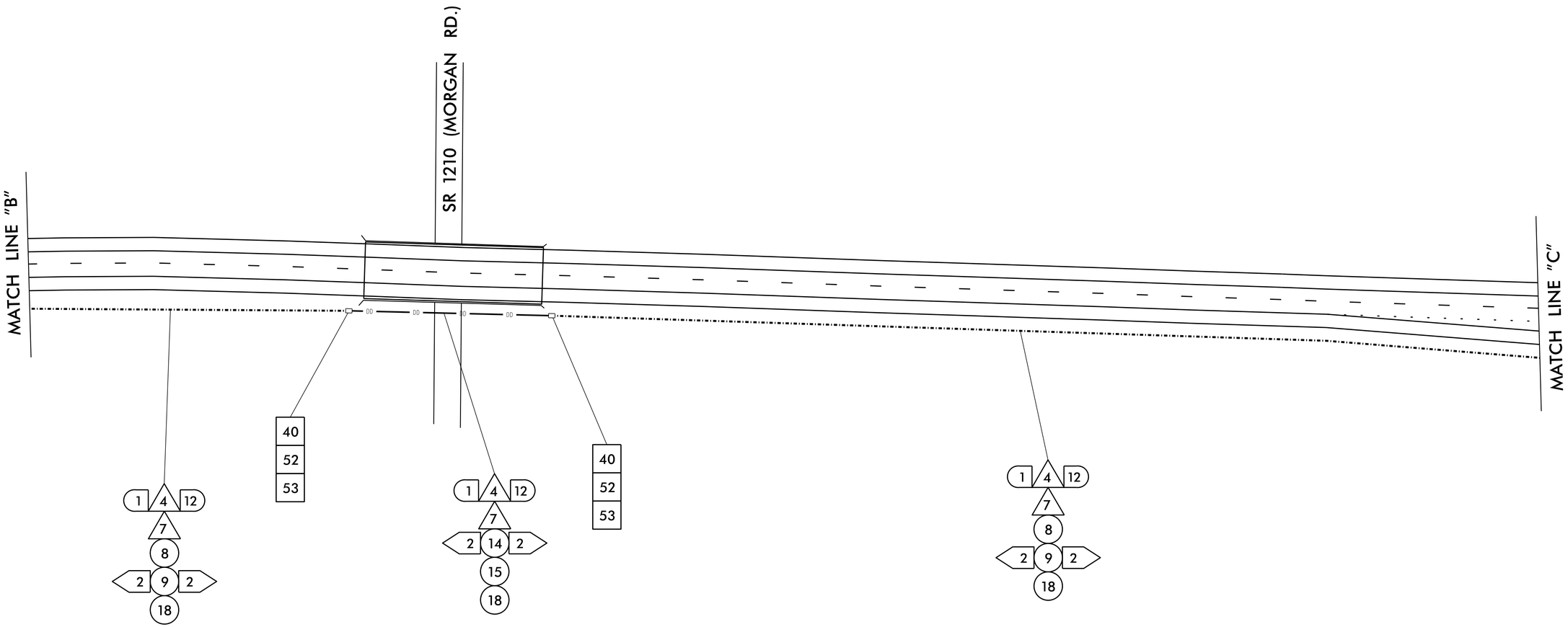
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami 5/22/2019

SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-7



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section

750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0
N/A

COMMUNICATIONS CABLE AND CONDUIT ROUTING

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL

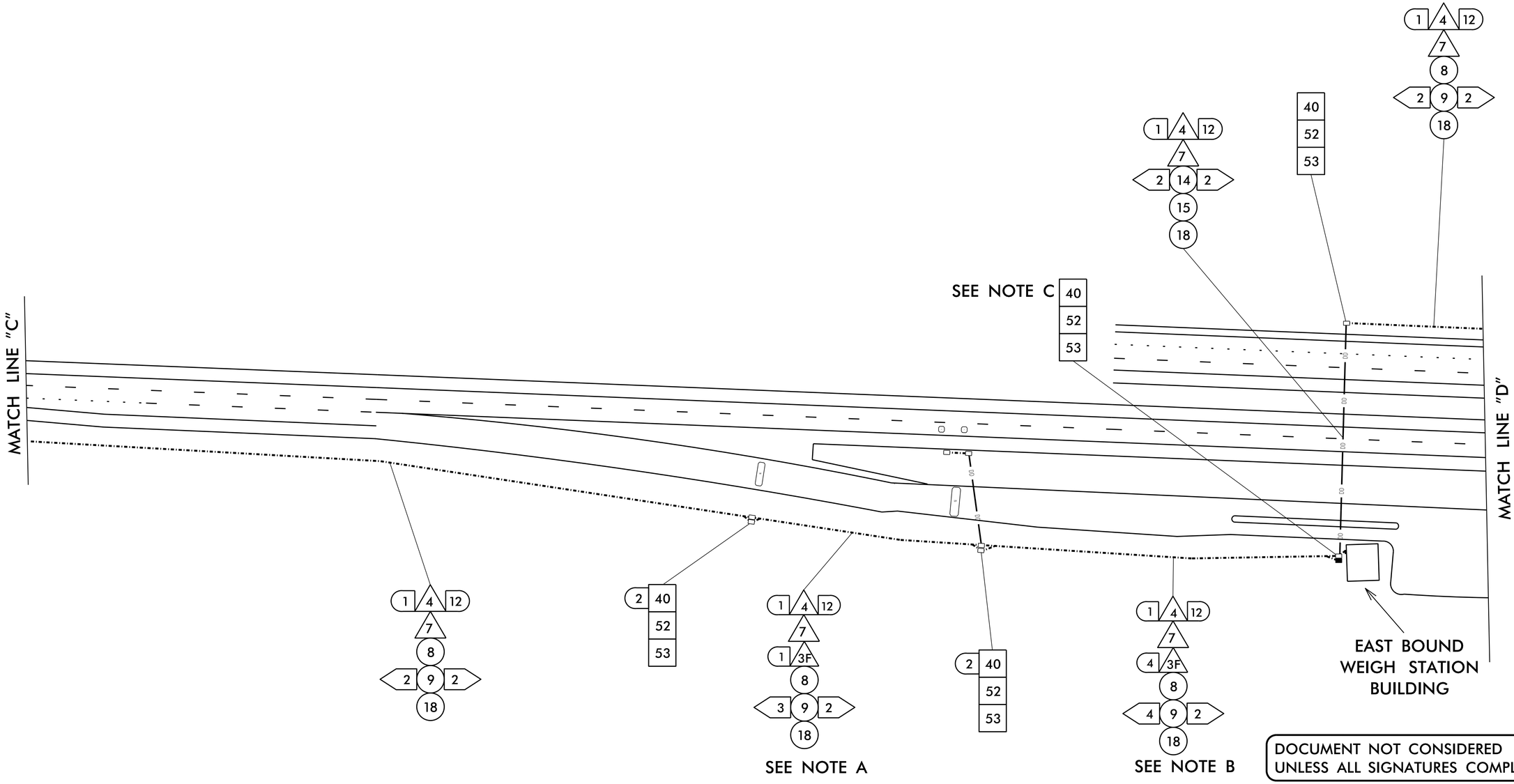
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
SIGNATURE

5/22/2019
DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-8



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

NOTES:

A. INSTALL THREE (3) TWO (2) INCH CONDUITS. THE FIBER OPTIC CABLE(S) SHALL BE ISOLATED FROM ALL OTHER CABLES USING ONE 2 INCH CONDUIT AND SEPARATE JUNCTION BOXES.

B. INSTALL FOUR (4) TWO (2) INCH CONDUITS. THE FIBER OPTIC CABLE(S) SHALL BE ISOLATED FROM ALL OTHER CABLES USING ONE 2 INCH CONDUIT AND SEPARATE JUNCTION BOXES.

C. INTERCEPT EXISTING SPARE CONDUIT WITH NEW FIBER JUNCTION BOX TO ENTER WEIGH STATION BUILDING.

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0
N/A

COMMUNICATIONS CABLE AND CONDUIT ROUTING

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

REVISIONS	INIT.	DATE

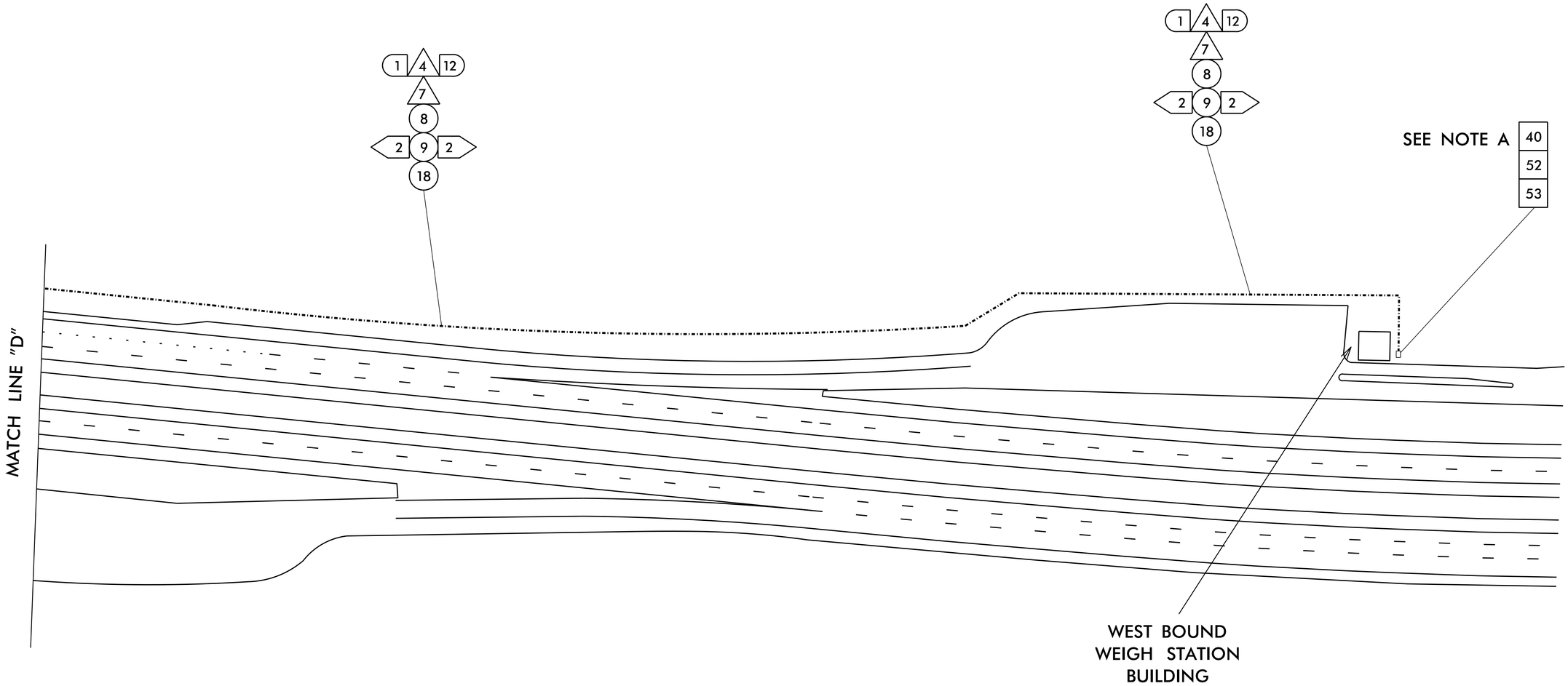
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
SIGNATURE

5/22/2019
DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-9



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY
SEALED BY MOHD A. ASLAMI ON 2/20/19

NOTES:
A. INTERCEPT EXISTING SPARE CONDUIT WITH NEW FIBER JUNCTION BOX TO ENTER WEIGH STATION BUILDING.

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Statewide Transportation & Intermodal Solutions
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0
N/A

COMMUNICATIONS CABLE
AND CONDUIT ROUTING

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
032108
ENGINEER
MOHD A. ASLAMI

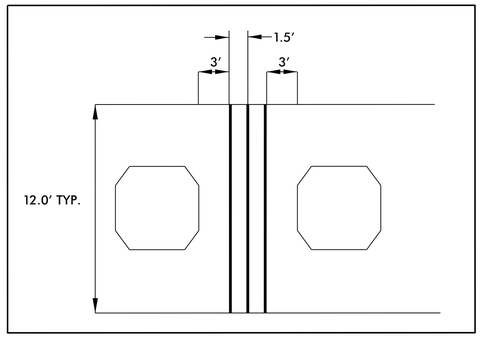
DocuSigned by:
Mohd Aslami
SIGNATURE

5/22/2019
DATE

CADD Filename:

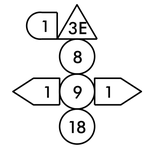
PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-10

TMS DETAIL LAYOUT

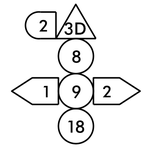


SENSOR SPACING SHOWN IS TYPICAL REQUIREMENT. ACTUAL SENSOR SPACING MAY BE ALTERED TO SUIT SITE CONDITIONS AND MANUFACTURER'S SPECIFICATIONS UPON APPROVAL BY THE ENGINEER.

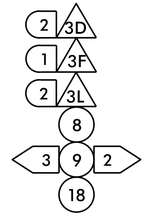
NOTE 1



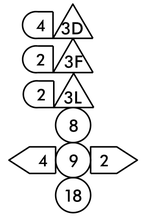
NOTE 2



NOTE 3

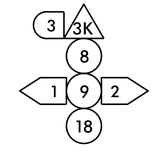


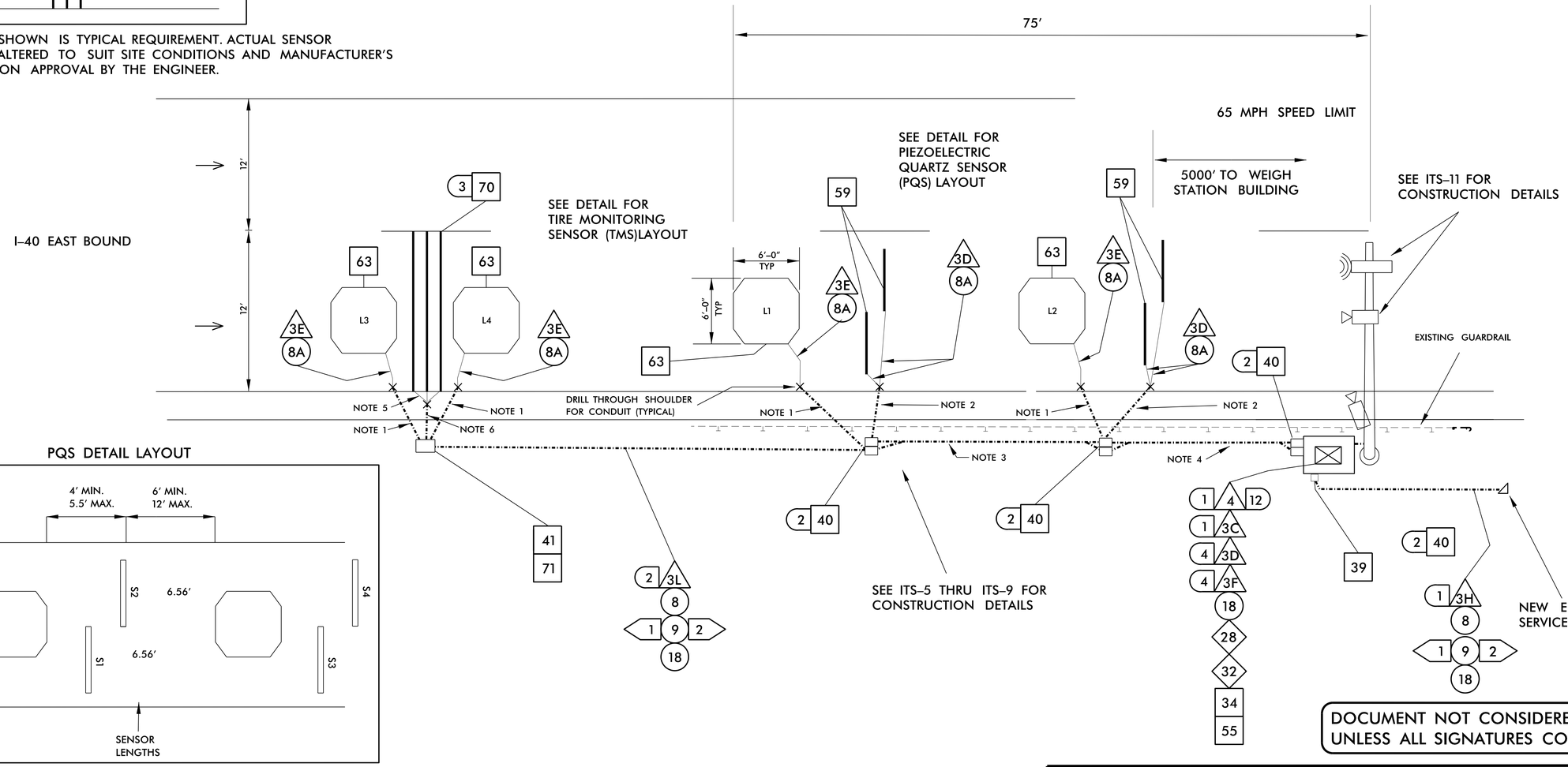
NOTE 4



NOTE 5

NOTE 6





PQS DETAIL LAYOUT

SENSOR SPACING SHOWN IS TYPICAL REQUIREMENT. ACTUAL SENSOR SPACING MAY BE ALTERED TO SUIT SITE CONDITIONS AND MANUFACTURER'S SPECIFICATIONS UPON APPROVAL BY THE ENGINEER.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

NOTES:

A. EXISTING FIBER OPTIC CABLE AND CONDUIT SYSTEM RUNS FROM THE WEIGH STATION BUILDING TO THE EXISTING "OPEN/CLOSED" SIGN. IN ADDITION, THERE IS AN EXISTING QUEUE DETECTION SYSTEM AND STREET LIGHT CIRCUITS ON THE RAMP. BEFORE BEGINNING ANY UNDERGROUND WORK CONTACT THE DIVISION TRAFFIC ENGINEER (ANNA HENDERSON) AT (828) 250–3000 TO LOCATE THE EXISTING UNDERGROUND COMPONENTS.

B. PIEZOELECTRIC QUARTZ SENSOR, TIRE MONITORING SENSOR, AND INDUCTIVE LOOP SAW SLOTS, INCLUDING TAIL AND LEAD–IN SECTIONS, MUST BE INSTALLED PER THE MANUFACTURERS RECOMENDATIONS.

Prepared in the Offices of:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Mobility and Safety Division
Intelligent Transportation Systems
750 N. Greenfield Pkwy., Garner, NC 27529

ADVANCE LOCATION

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE: 0 N/A

SEAL

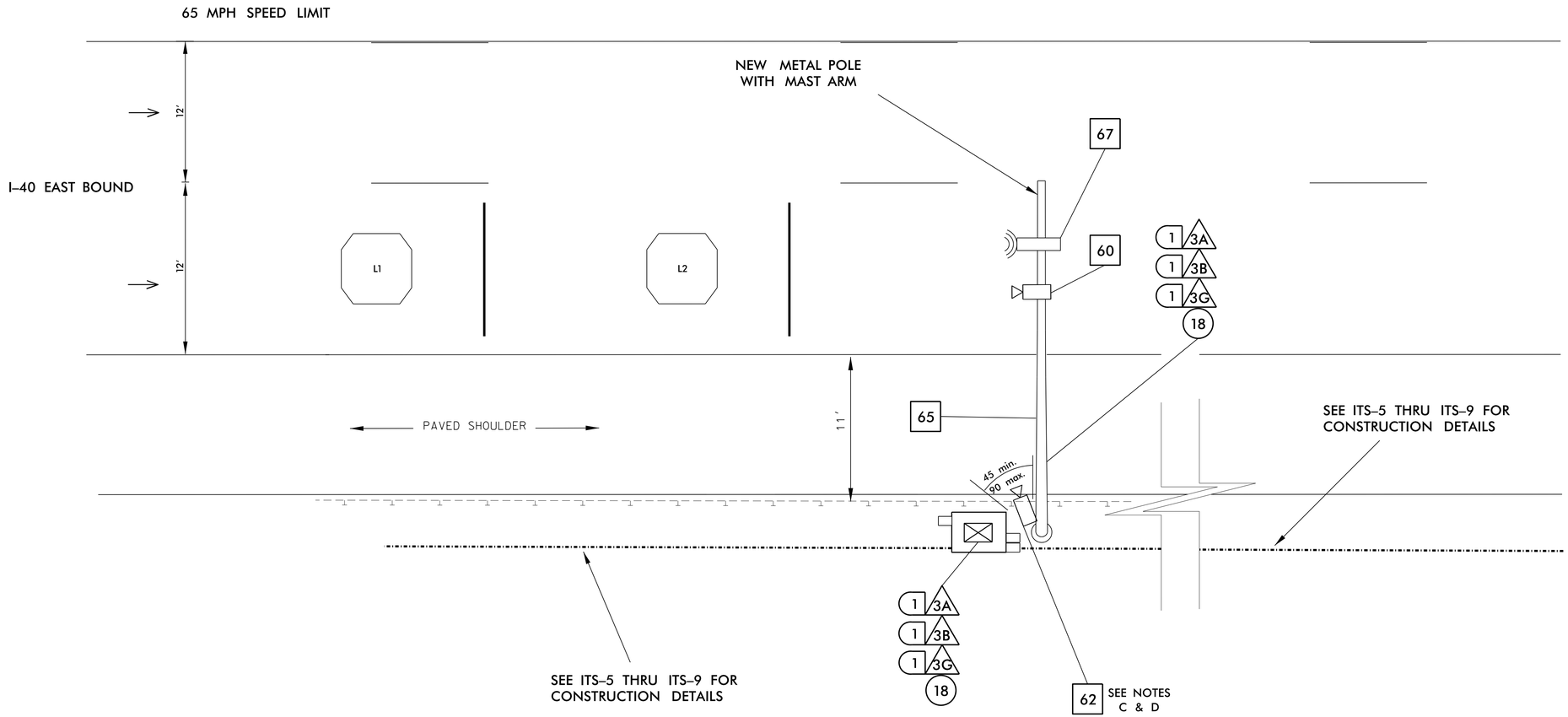
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami 5/22/2019

SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-11



NOTES:

A. EXISTING FIBER OPTIC CABLE AND CONDUIT SYSTEM RUNS FROM THE WEIGH STATION BUILDING TO THE EXISTING "OPEN/CLOSED" SIGN. IN ADDITION, THERE IS AN EXISTING QUEUE DETECTION SYSTEM AND OVERHEAD LIGHTING CIRCUITS ON THE RAMP. BEFORE BEGINNING ANY UNDERGROUND WORK CONTACT THE DIVISION TRAFFIC ENGINEER (ANNA HENDERSON) AT (828) 250–3000 TO LOCATE THE EXISTING UNDERGROUND COMPONENTS.

B. PIEZOELECTRIC QUARTZ SENSOR AND INDUCTIVE LOOP SAW SLOTS, INCLUDING TAIL AND LEAD–IN SECTIONS, MUST BE INSTALLED PER THE MANUFACTURERS RECOMENDATIONS.

C. TRIGGER LOOPS FOR THE IMAGE CAPTURE CCTV AND ALPR CAMERAS SHALL BE IN–LINE WITH THE UPSTREAM EDGE OF THE CAMERA FIELD OF VIEW.

D. IMAGE CAPTURE TO BE TRIGGERED BY THE LEADING EDGE OF THE LOOP.

E. THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER BEFORE ORDERING GUARDRAIL MATERIAL. GUARDRAIL EXTENSION DESIGN INCLUDING OVERALL LENGTH BY OTHERS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0
N/A

IMAGE CAPTURE CCTV, TRANSPONDER READER, ALPR SYSTEM, AND TMS

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

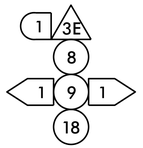
DocuSigned by: Mohd Aslami
5D9B0BA6D8B6495...
SIGNATURE

5/22/2019
DATE

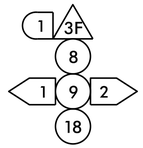
CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-12

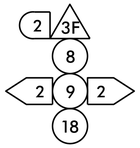
NOTE 1

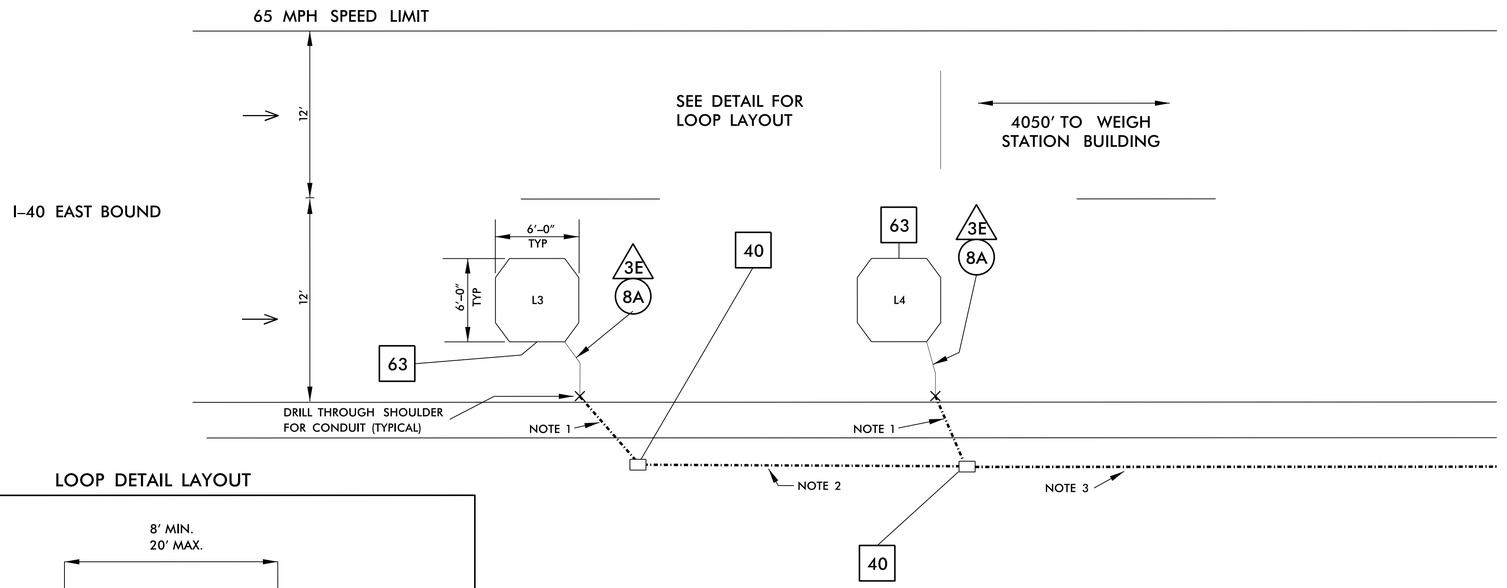


NOTE 2

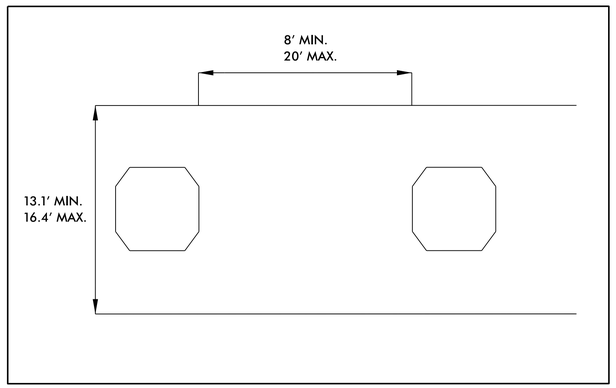


NOTE 3





LOOP DETAIL LAYOUT



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

NOTES:

A. EXISTING FIBER OPTIC CABLE AND CONDUIT SYSTEM RUNS FROM THE WEIGH STATION BUILDING TO THE EXISTING "OPEN/CLOSED" SIGN. IN ADDITION, THERE IS AN EXISTING QUEUE DETECTION SYSTEM AND OVERHEAD LIGHTING CIRCUITS ON THE RAMP. BEFORE BEGINNING ANY UNDERGROUND WORK CONTACT THE DIVISION TRAFFIC ENGINEER (ANNA HENDERSON) AT (828) 250-3000 TO LOCATE THE EXISTING UNDERGROUND COMPONENTS.

B. INDUCTIVE LOOP SAW SLOTS, INCLUDING TAIL AND LEAD-IN SECTIONS, CAN BE WET CUT AT THIS LOCATION.

Prepared in the Offices of:

NCDOT Transportation Mobility and Safety Division

750 N. Greenfield Pkwy., Garner, NC 27529

CLASSIFICATION LOCATION

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE: MAY 2019 REVIEWED BY: I.N. AVERY

PREPARED BY: G.A. GREEN REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 N/A

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

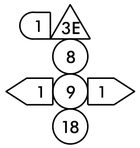
DocuSigned by: Mohd Aslami 5/22/2019

SIGNATURE DATE

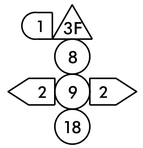
CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-13

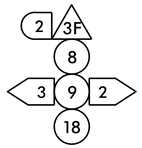
NOTE 1



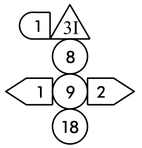
NOTE 2



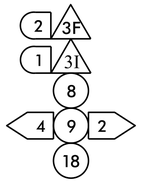
NOTE 3



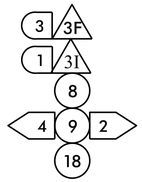
NOTE 4



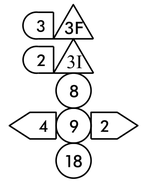
NOTE 5

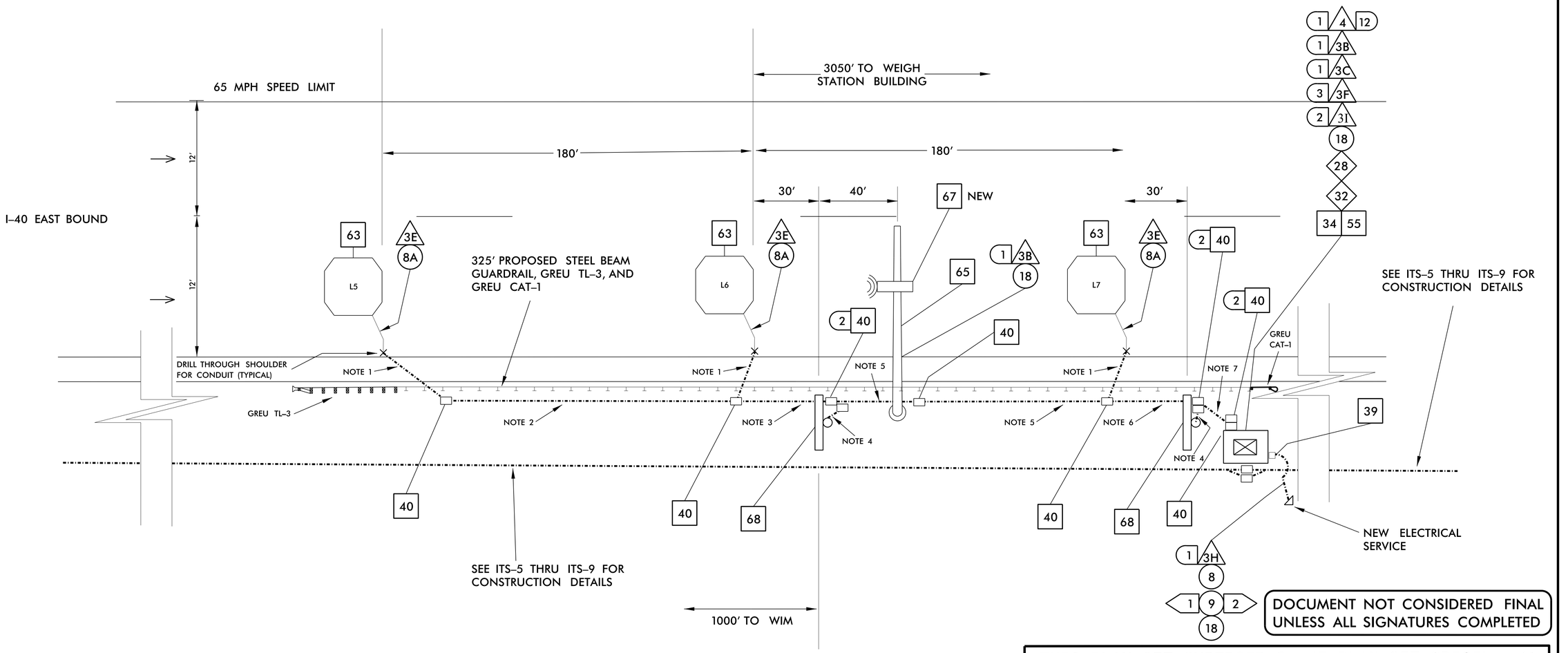


NOTE 6



NOTE 7





DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

NOTES:

A. EXISTING FIBER OPTIC CABLE AND CONDUIT SYSTEM RUNS FROM THE WEIGH STATION BUILDING TO THE EXISTING "OPEN/CLOSED" SIGN. IN ADDITION, THERE IS AN EXISTING QUEUE DETECTION SYSTEM AND OVERHEAD LIGHTING CIRCUITS ON THE RAMP. BEFORE BEGINNING ANY UNDERGROUND WORK CONTACT THE DIVISION TRAFFIC ENGINEER (ANNA HENDERSON) AT (828) 250–3000 TO LOCATE THE EXISTING UNDERGROUND COMPONENTS.

B. INDUCTIVE LOOP SAW SLOTS, INCLUDING TAIL AND LEAD–IN SECTIONS, CAN BE WET CUT AT THIS LOCATION.

C. THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER BEFORE ORDERING GUARDRAIL MATERIAL. GUARDRAIL DESIGN INCLUDING OVERALL LENGTH BY OTHERS.

Prepared in the Offices of:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Integrated Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

NOTIFICATION LOCATION, AVI READER, & CHANGABLE MESSAGE SIGNS

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

SCALE 0 N/A

REVISIONS	INIT.	DATE

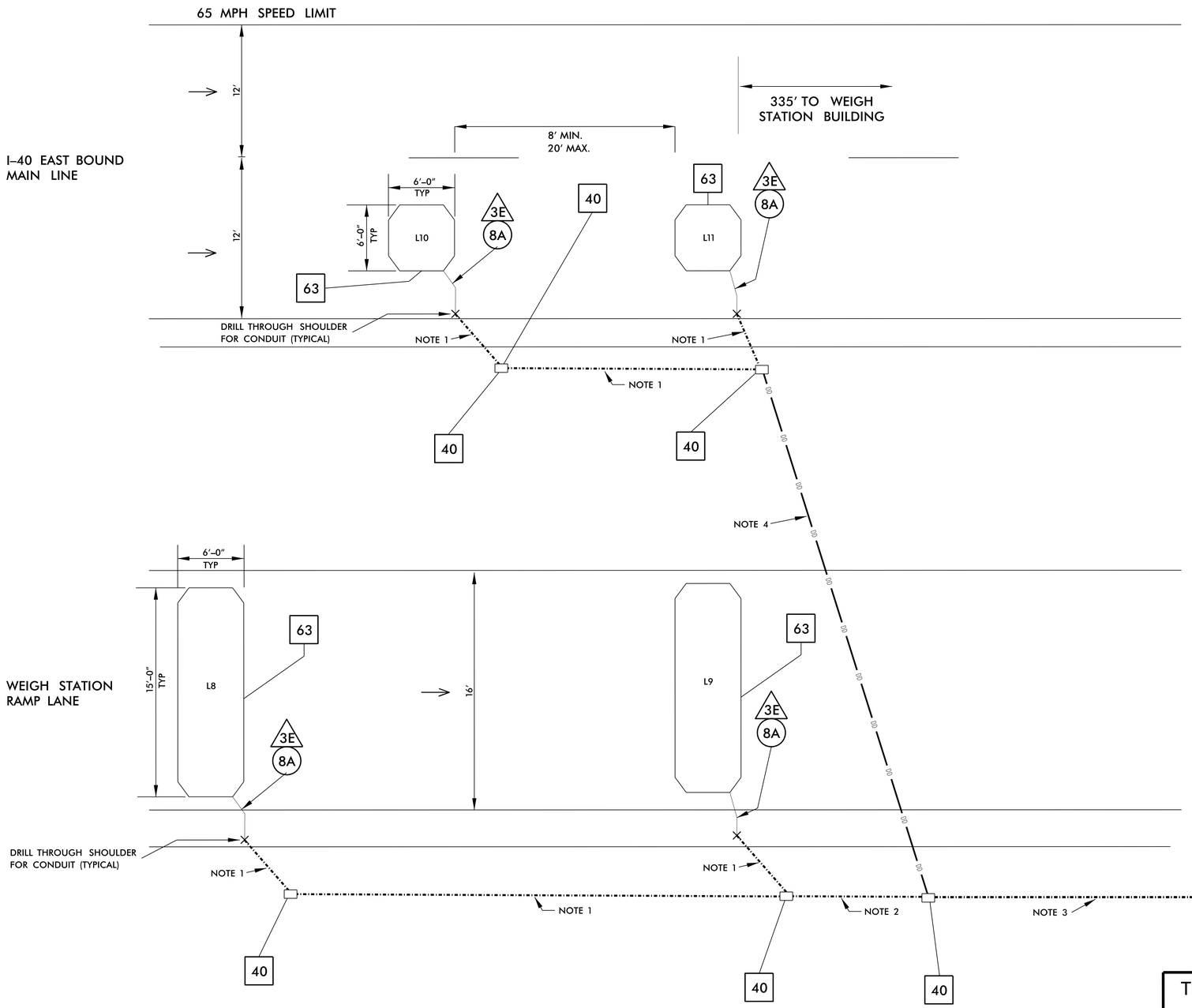
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami 1D5B0D84CF0B4E95... SIGNATURE

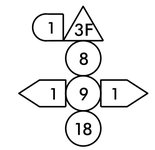
5/22/2019 DATE

CADD Filename:

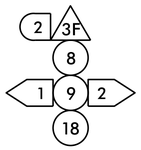
PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-14



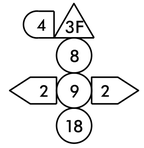
NOTE 1



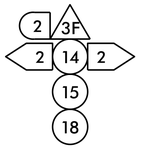
NOTE 2



NOTE 3



NOTE 4



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

NOTES:

A. EXISTING FIBER OPTIC CABLE AND CONDUIT SYSTEM RUNS FROM THE WEIGH STATION BUILDING TO THE EXISTING "OPEN/CLOSED" SIGN. IN ADDITION, THERE IS AN EXISTING QUEUE DETECTION SYSTEM AND OVERHEAD LIGHTING CIRCUITS ON THE RAMP. BEFORE BEGINNING ANY UNDERGROUND WORK CONTACT THE DIVISION TRAFFIC ENGINEER (ANNA HENDERSON) AT (828) 250–3000 TO LOCATE THE EXISTING UNDERGROUND COMPONENTS.

B. INDUCTIVE LOOP SAW SLOTS, INCLUDING TAIL AND LEAD–IN SECTIONS, CAN BE WET CUT AT THIS LOCATION.

Prepared in the Offices of:

Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section

750 N. Greenfield Pkwy., Garner, NC 27529

COMPLIANCE LOCATION

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

SCALE: 0 — N/A

REVISIONS	INIT.	DATE

SEAL

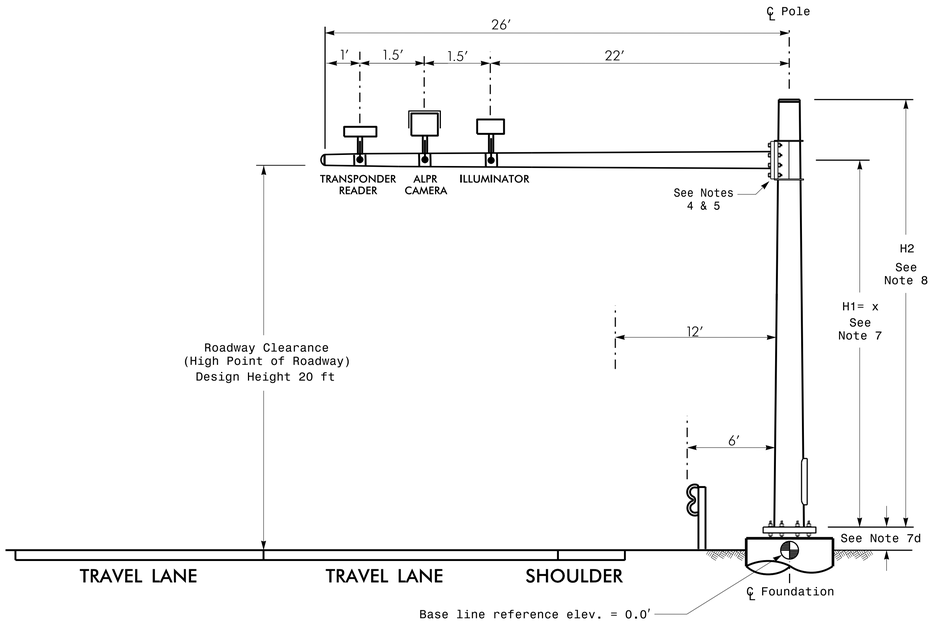
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
SIGNATURE

5/22/2019
DATE

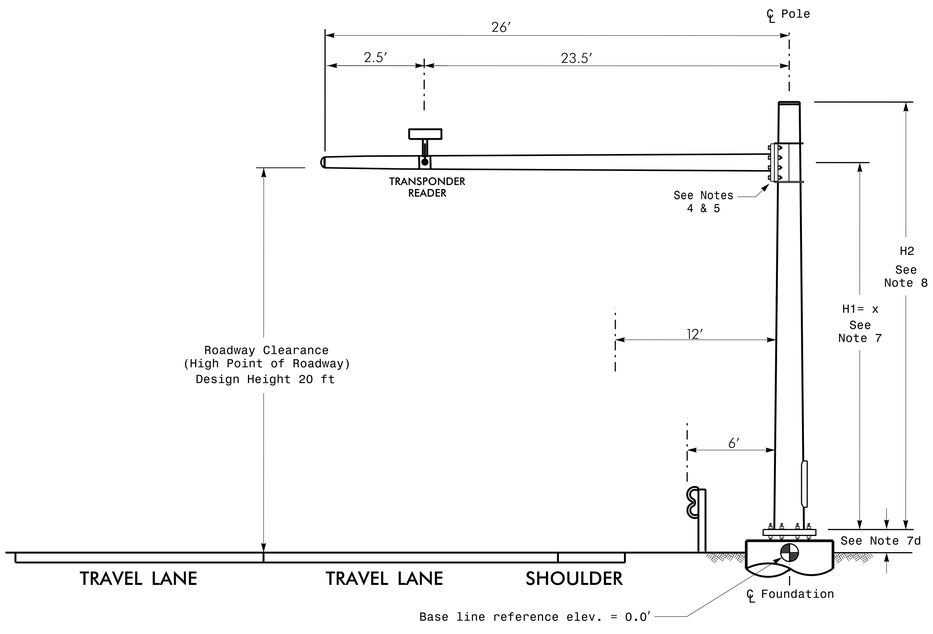
CADD Filename:

Design Loading for Metal Pole #1 with Folding Mast Arm



Elevation View

Design Loading for Metal Pole #2 with Folding Mast Arm



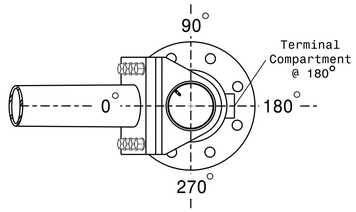
Elevation View

SPECIAL NOTES

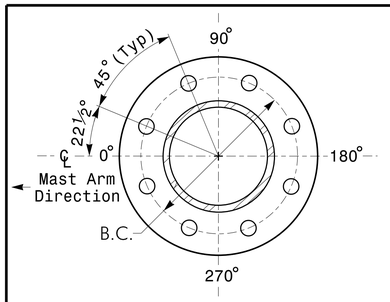
1. The contractor is responsible for determining the mast arm attachment height (H1). Ensure that the mast arm attachment height will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval.
2. ALPRs and Infrared Illuminators are shown on top of the mast arm for illustration purposes. If the contractor elects to install these devices under the mast arm then, the 20 Ft. roadway clearance applies to the lowest device.

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	SIZE	WEIGHT
▭	TRANSPONDER READER	6.5″ W x 4.5″ L x 4.0″ D	7 LBS
▭	LICENSE PLATE READER CAMERA	13.0″ W x 6.0″ L x 5.5″ D	6 LBS
▭	INFRARED ILLUMINATOR	3.0″ W x 3.0″ L x 3.0″ D	5 LBS

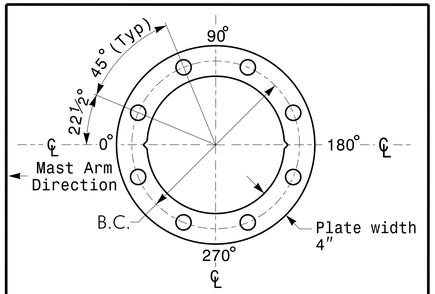


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

NOTES

Design Reference Material

1. Design the metal pole structure and foundation in accordance with:
   - The 6th Edition, 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2018 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the ITS and Signals project special provisions.
   - The 2018 NCDOT Roadway Standard Drawings.
   - The project plans and special provisions.
   - The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

Design Requirements

2. Design the metal pole structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads".
3. Design all metal pole supports using stress ratios that do not exceed 0.9.
4. The camber design for mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded or any other load condition.
5. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
6. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Attachments to the mast arm are rigid mounted and vertically centered on the arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is .75 feet above the ground elevation.
7. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus ½ of the total height of the mast arm attachment assembly plus 1 foot.
8. If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the ITS & Signals Structural Engineer for assistance at (919) 814-5000.
9. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the attached equipment over the roadway.
10. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Integrity Transparency Service Excellence
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 N/A N/A

METAL POLE WITH MAST ARM

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	C. F. ANDREWS

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by: Kevin C. Durigon 5/21/2019
SIGNATURE DATE

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-16

LEGEND
X = FUSION SPLICE
C = CAP

COLOR CODE
TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

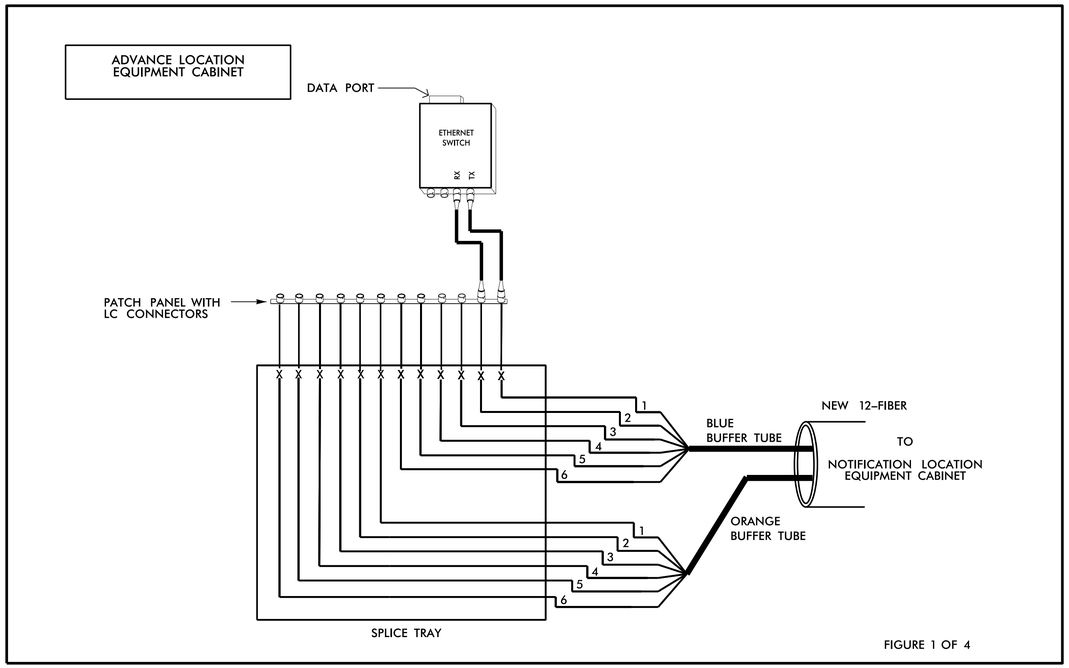


FIGURE 1 OF 4

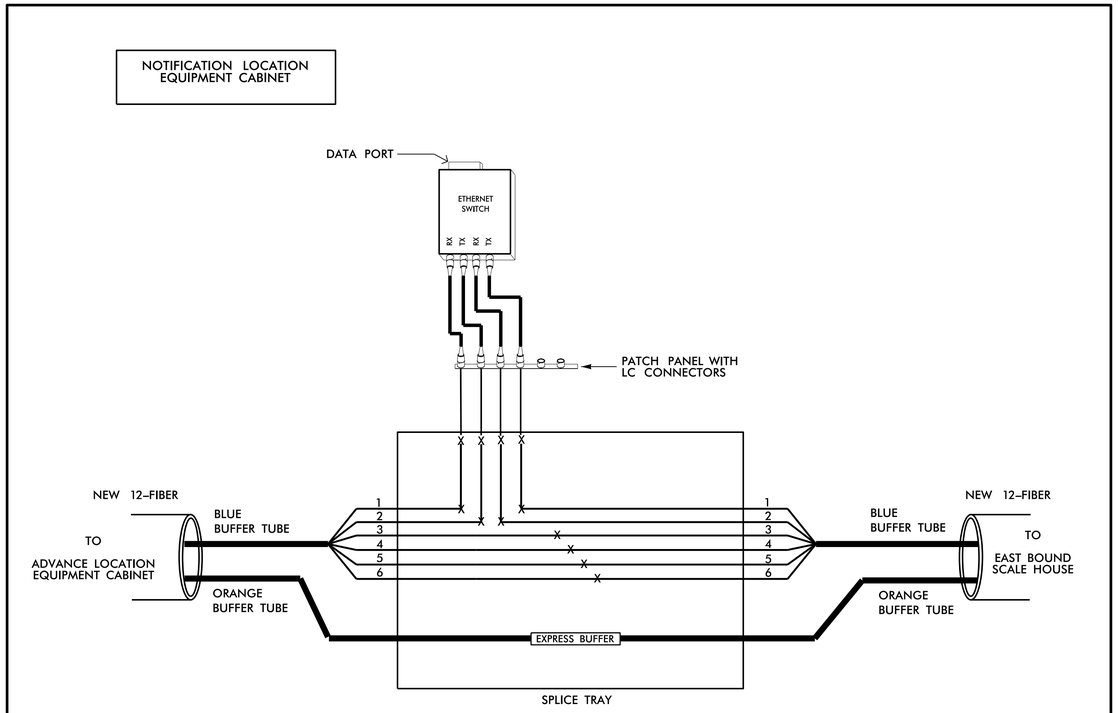


FIGURE 2 OF 4

NOTES:
1. ETHERNET TERMINATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR ENSURING PROPER TERMINATIONS.
2. COIL AND STORE ALL UNUSED FIBERS IN SPLICE TRAY.
3. COIL AND STORE ALL UNUSED BUFFER TUBES IN SPLICE TRAY.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

Prepared in the Offices of:
Transportation Mobility and Safety Division
North Carolina Department of Transportation
Integrated Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0
N/A

SPLICE DETAIL

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
SIGNATURE
5/22/2019
DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
33879.2.81	ITS-17

LEGEND
X = FUSION SPLICE
C = CAP

COLOR CODE
TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

INTERCONNECT CENTER
IN EAST BOUND SCALE HOUSE

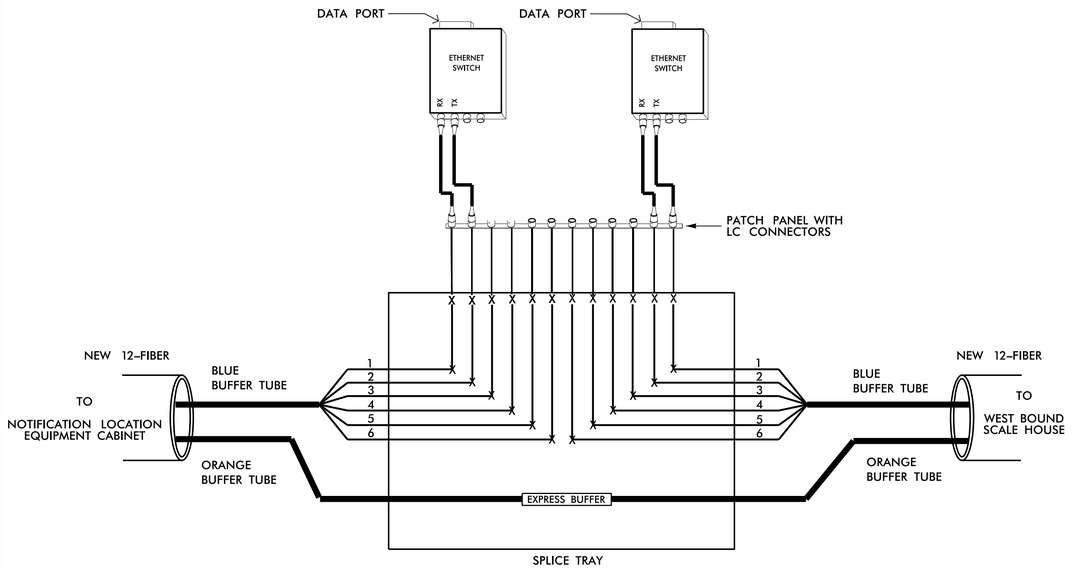


FIGURE 3 OF 4

INTERCONNECT CENTER
IN WEST BOUND SCALE HOUSE

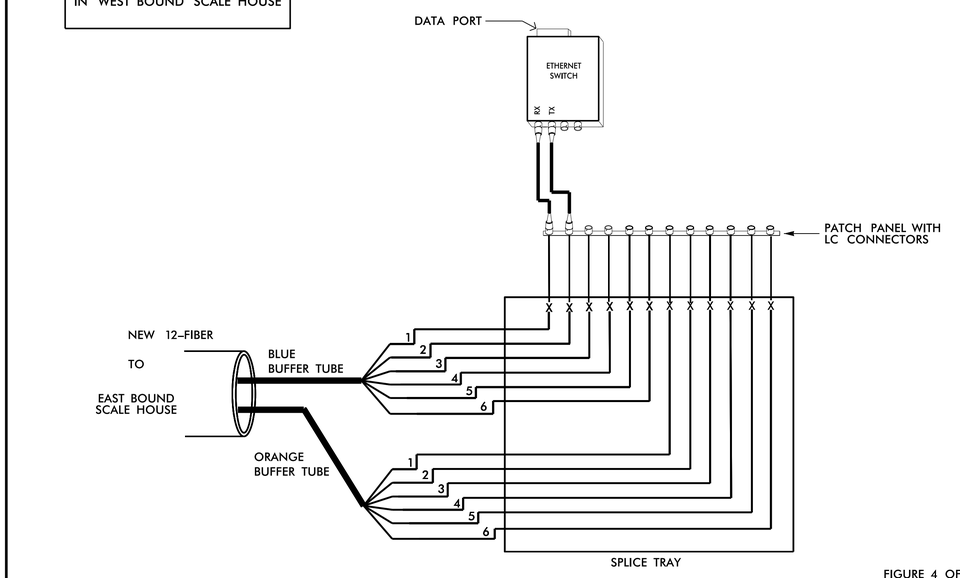


FIGURE 4 OF 4

NOTES:

1. ETHERNET TERMINATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR ENSURING PROPER TERMINATIONS.
2. COIL AND STORE ALL UNUSED FIBERS IN SPLICE TRAY.
3. COIL AND STORE ALL UNUSED BUFFER TUBES IN SPLICE TRAY.

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SPLICE DETAIL

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE:	MAY 2019	REVIEWED BY:	I.N. AVERY
PREPARED BY:	G.A. GREEN	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE
0
N/A

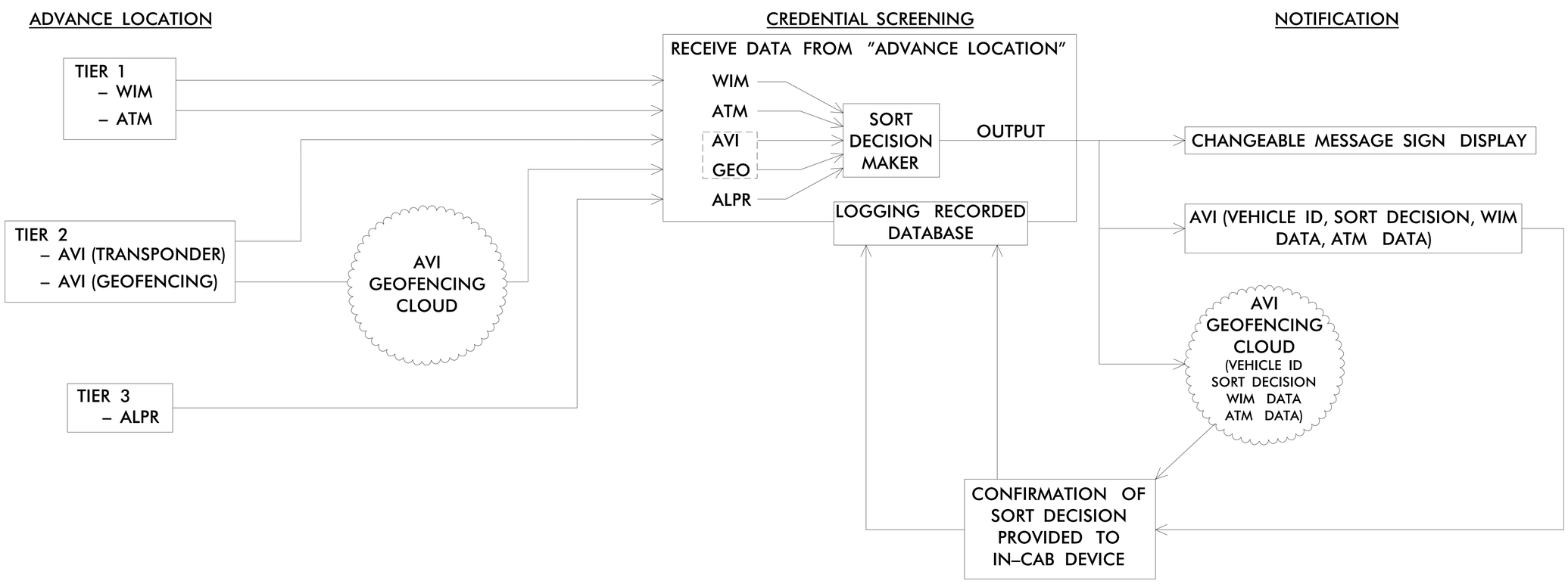
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
SIGNATURE

5/22/2019
DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
36879.2.81	ITS-18



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS PLAN SET SUPERSEDES THE PLAN SET ORIGINALLY SEALED BY MOHD A. ASLAMI ON 2/20/19

Prepared in the Offices of:

Transportation Mobility and Safety Division
Intermodal Transportation Branch

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N. Greenfield Pkwy., Garner, NC 27529

SCALE
0
N/A

SPLICE DETAIL

DIVISION 13 BUNCOMBE CO. NEAR ASHEVILLE

PLAN DATE: MAY 2019	REVIEWED BY: I.N. AVERY
PREPARED BY: G.A. GREEN	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by:
Mohd Aslami
SIGNATURE

5/22/2019
DATE

CADD Filename:

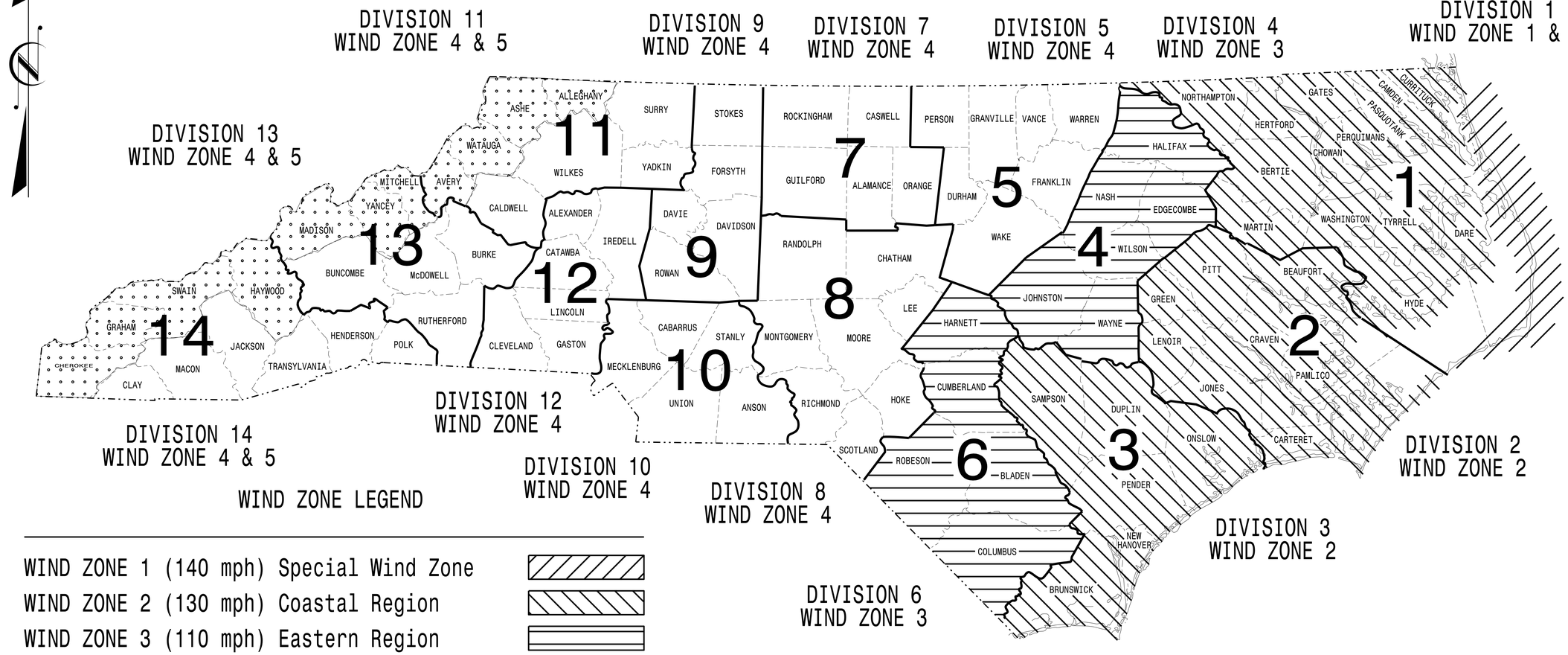
PROJECT I.D. NO.	SHEET NO.
	Sig.M1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES

POLE STANDARDS

NCDOT METAL P



WIND ZONE LEGEND

WIND ZONE 1 (140 mph) Special Wind Zone	
WIND ZONE 2 (130 mph) Coastal Region	
WIND ZONE 3 (110 mph) Eastern Region	
WIND ZONE 4 (90 mph) Central & Mtn. Region	
WIND ZONE 5 (120 mph) Special Wind Zone	

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

Prepared In the Offices of:

Transportation Mobility and Safety Division
Signal Design Section
STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy.
Garner,NC 27529

Designed in conformance with the latest 2015 Interim to the 6th Edition 2013

AASHTO

Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION – ITS AND SIGNALS UNIT

M.M. MCDIARMID, P.E. – STATE ITS AND SIGNALS ENGINEER

J. P. GALLOWAY, P.E. – STATE SIGNALS ENGINEER

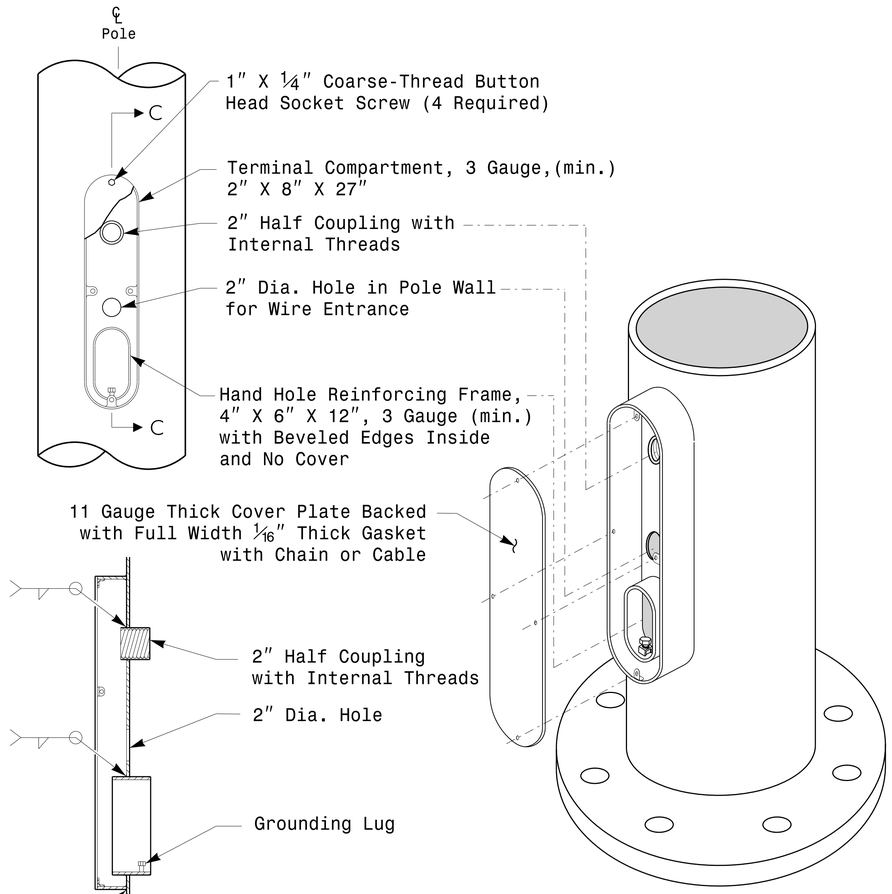
D.C. SARKAR, P.E. – ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by: Debesh C. Sarkar 44E8E3... SIGNATURE

10/11/2017 DATE



Section C-C

Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail

MFG _____ MFG. DATE: MM/YY
SHAFT D/T/L/Y ----/----/----/----
ARM-A D/T/L/Y ----/----/----/----
----/----/----/----
ARM-B D/T/L/Y ----/----/----/----
----/----/----/----
A.B. DIA./B.C./L/Y ----/----/----/----
NCDOT SIG. INV. NO. _ _ _ _ _ _ _ _
NCDOT POLE NO. _ _ _ _ _ _ _ _

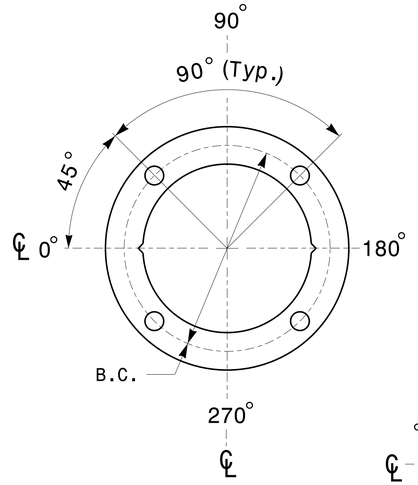
Shaft I.D. Tag
(Provide on Shaft of Strain Poles and Mast Arm Poles Shaft)

MFG _____ MFG. DATE: MM/YY
SECTION D/T/L/Y ----/----/----/----
NCDOT SIG. INV. NO. _ _ _ _ _ _ _ _
NCDOT POLE NO. _ _ _ _ _ _ _ _

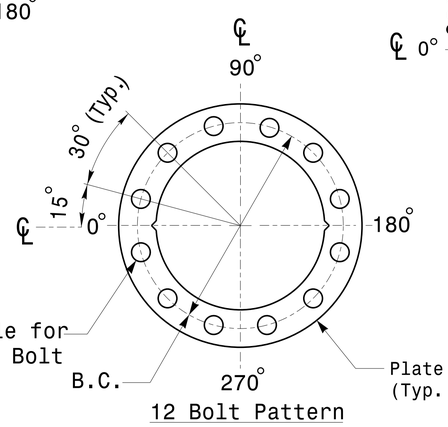
Arm I.D. Tag
(Provide on each section of a multi-section mast arm.)

Notes:
1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
2) A.B. = Anchor Bolt
3) B.C. = Bolt Circle of Anchor Bolts
4) If Custom Design, use "NCDOT STANDARD" line for Signal Inv. Number and pole I.D. number
5) See drawing M3 and M4 for mounting positions of I.D. tags.

Identification Tag Details



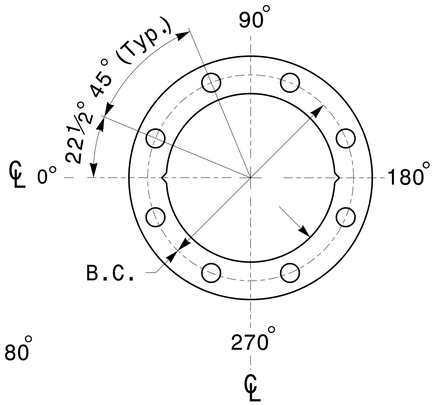
4 Bolt Pattern



2¼"" dia. hole for 2"dia. Anchor Bolt

Plate Width = 4" min. (Typ. for all plates)

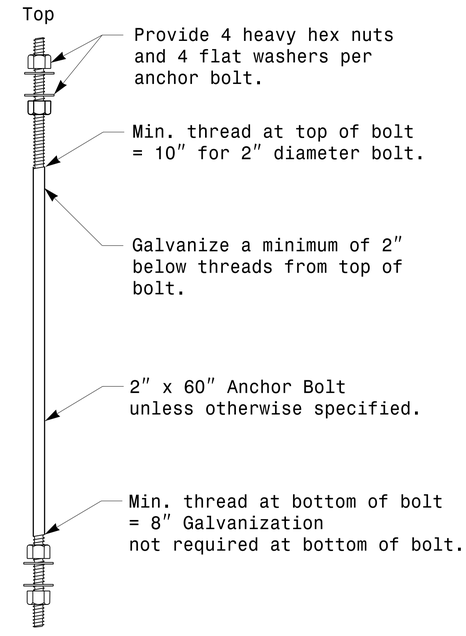
12 Bolt Pattern



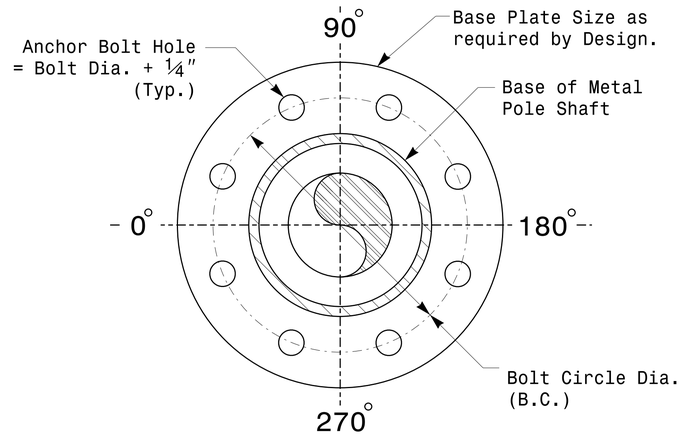
8 Bolt Pattern

Construct Templates and Plates from ¼" min. thick Steel. Galvanizing is not required.

Base Plate Template and Anchor Bolt Lock Plate Details



Anchor Bolt Detail



Note: Base plate may be circular,octagonal,square or rectangular in shape.

Typical Base Plate Detail

Fabrication Details – All Metal Poles

PROJECT ID. NO.	SHEET NO.
	Sig.M2

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 NA NONE

Typical Fabrication Details For All Metal Poles

PLAN DATE:	OCTOBER 2017	DESIGNED BY:	C.F.ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

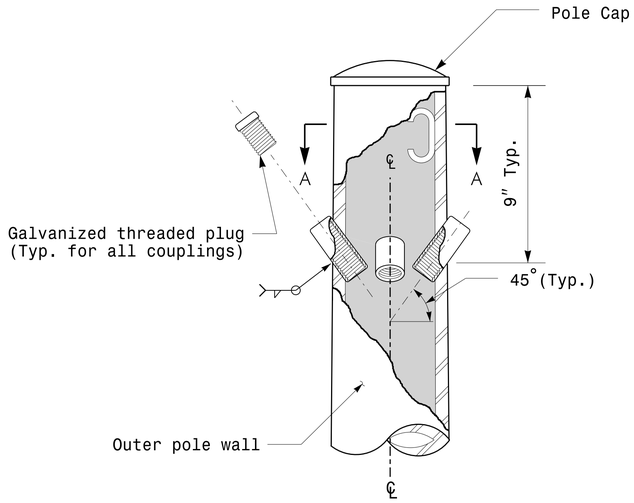
DocuSigned by: Debesh C. Sarkar 44EBE32B5B4A...
SIGNATURE

10/11/2017
DATE

11-OCT-2017 08:30
S:\ATS&SU\ITS Signals\Signal Design Section\Eastern Region\MM Sheets\2016\2014 Sig.M2 Std. Fabrication Details-All Poles..dgn
rstrickler

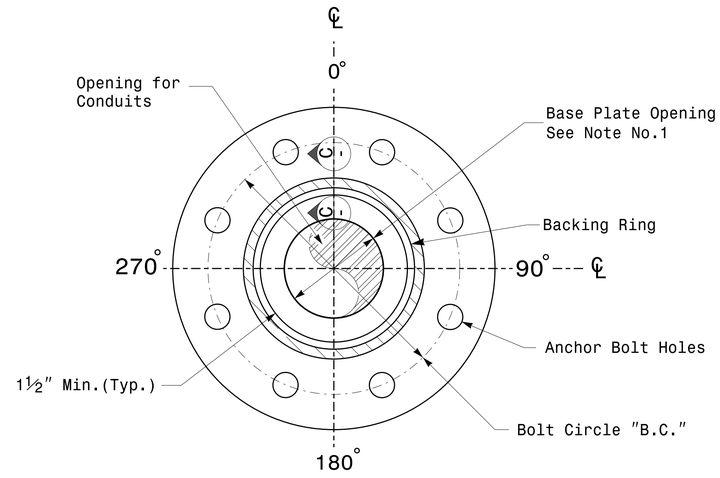
PROJECT ID. NO.	SHEET NO.
	Sig.M3

Details – Strain Poles



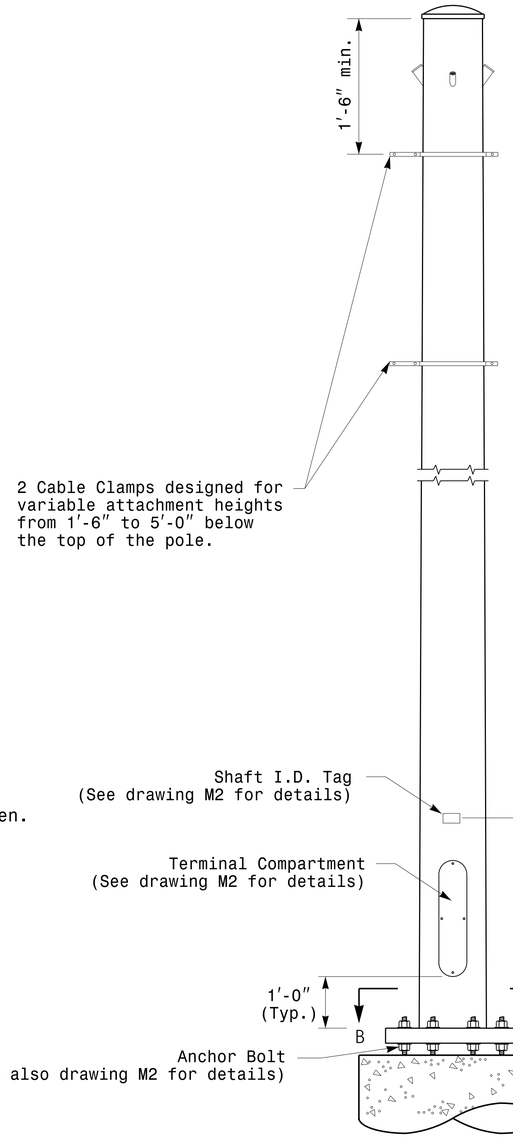
Cable Entrances at Top of Pole

Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3½" but shall not be less than 8½".

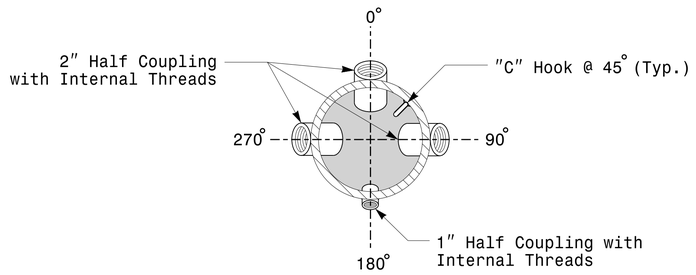


Section B-B

Pole Base Plate Details
(8 and 12 Bolt Pattern)

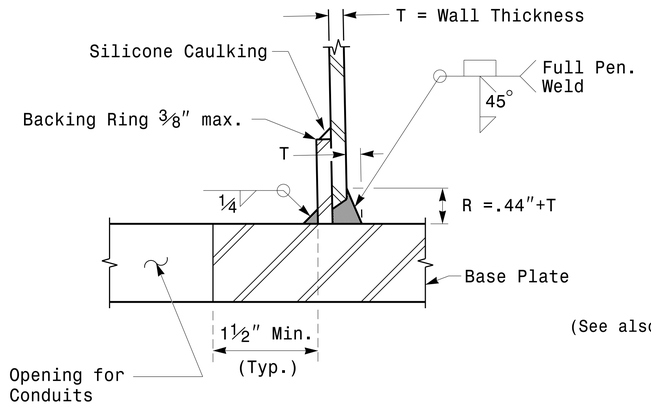


Monotube Strain Pole



Section A-A

Radial Orientation for Factory Installed
Accessories at Top of Pole



Section C-C

(Pole Attachment to Base Plate)

Full-Penetration
Groove Weld Detail

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

Typical Fabrication Details
For
Strain Poles

PLAN DATE:	OCTOBER 2017	DESIGNED BY:	K.C.DURIGON
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SCALE
0 NA
NONE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
028094
ENGINEER
DEBESH C. SARKAR

DocuSigned by:
Debesh C. Sarkar
44EBE83B3A7C4FF...SIGNATURE

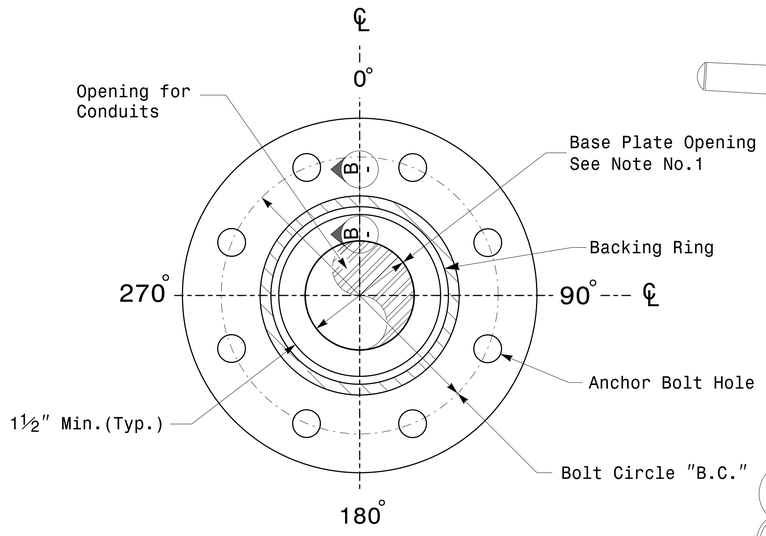
10/11/2017
DATE

11-OCT-2017 08:25
S:*ITS&SIG*ITS Signals*Signal Design Section\Eastern Region\MJ Sheets\2016\2014 Sig-M3 Std. Fabrication Details-Strain Poles.dgn
rmathisdgn

PROJECT ID. NO.	SHEET NO.
	Sig.M4

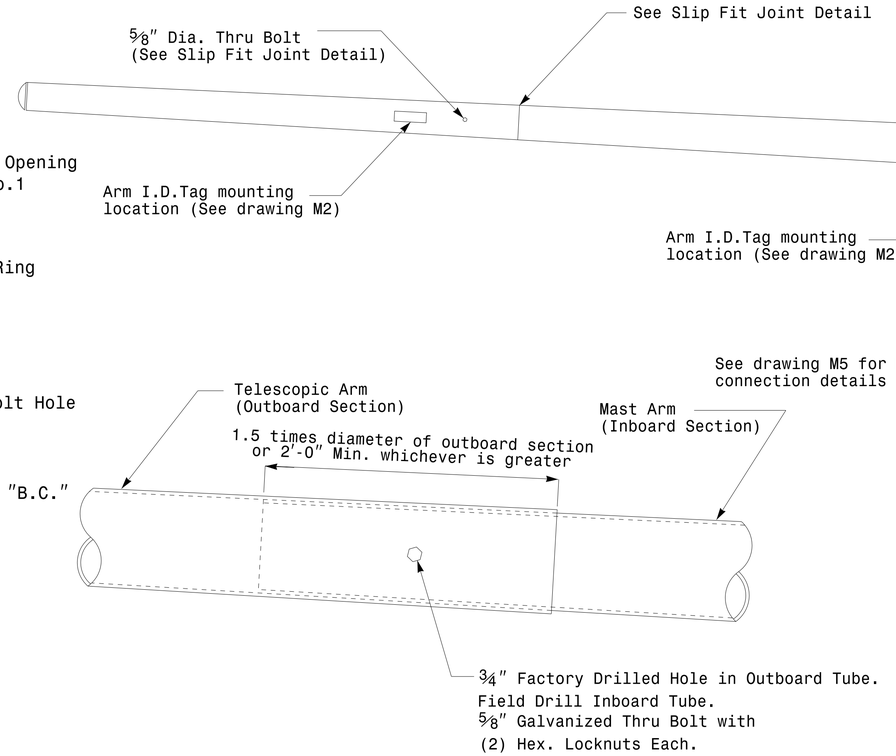
Fabrication Details – Mast Arm Poles

Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3½" but shall not be less than 8½".



Section A-A

Pole Base Plate Details

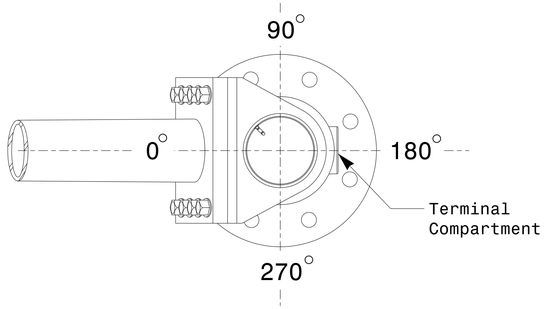


Slip Fit Joint Detail for Mast Arm

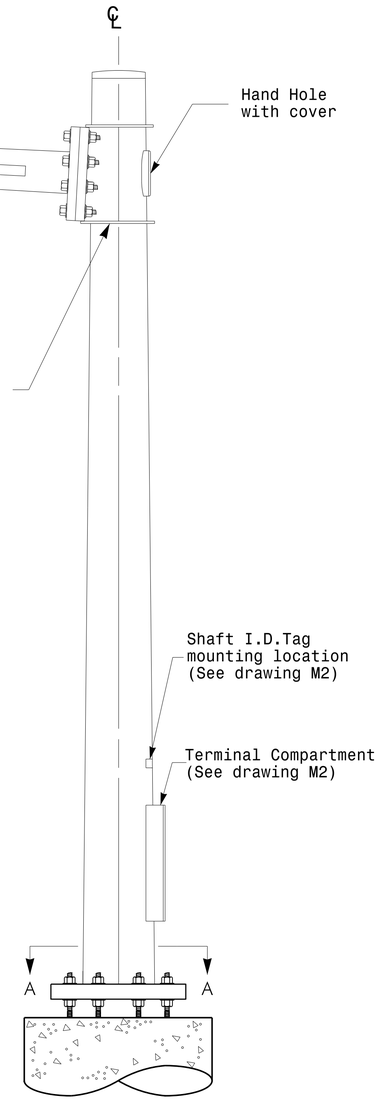
Section B-B

(Pole Attachment to Base Plate)

Full-Penetration Groove Weld Detail



Mast Arm Radial Orientation



Mast Arm Pole

Prepared in the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SCALE: 0 NA — NONE

Typical Fabrication Details For Mast Arm Poles

PLAN DATE:	OCTOBER 2017	DESIGNED BY:	K.C.DURIGON
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

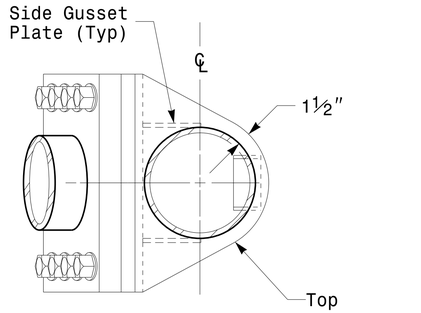
DocuSigned by: Debesh C. Sarkar 44EBE3B5B5A47...
SIGNATURE

10/11/2017
DATE

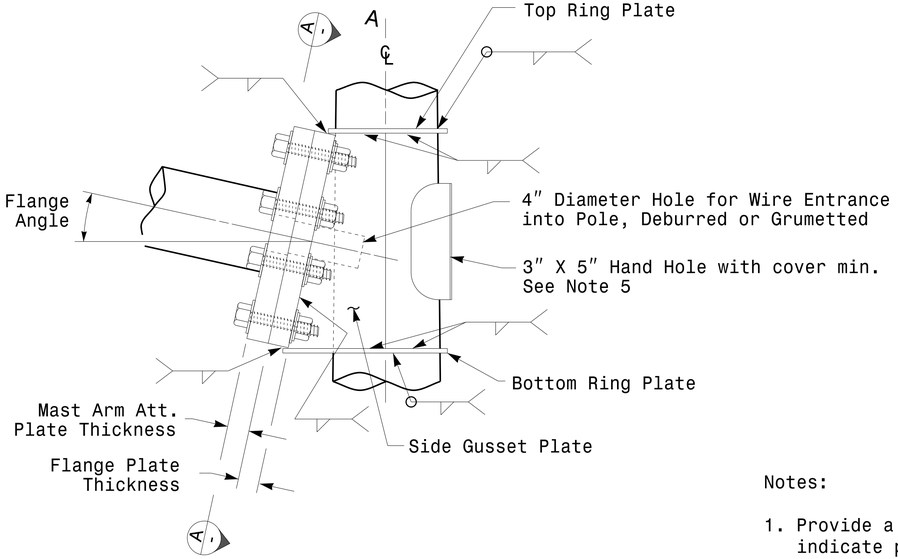
11-OCT-2017 08:33
S:*ITS&SU\ITS Signals\Signal Design Section\Eastern Region\MS Sheets\2016\2014 Sig.M4 Std. Fabrication Details-Mast Arm Poles.dgn
rmitchell

Welded Ring Stiffened Mast Arm Connection

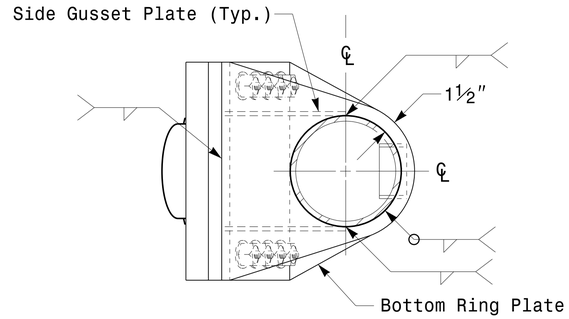
PROJECT ID. NO.	SHEET NO.
	Sig.M5



Plan View



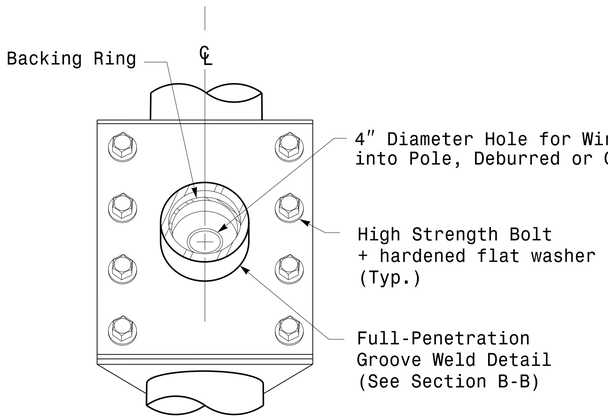
Side Elevation View



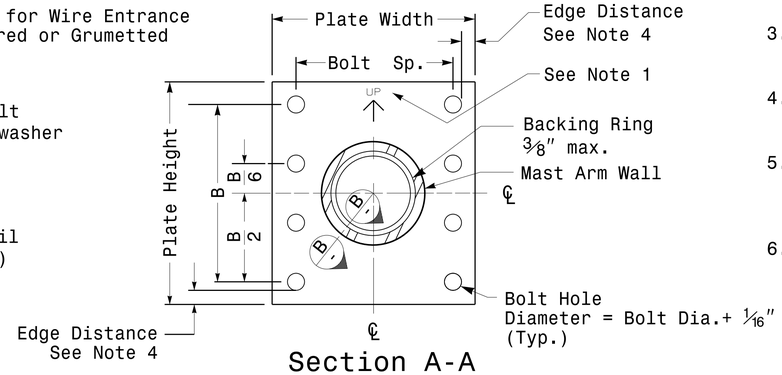
Bottom View

Notes:

1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Fabricator is responsible for providing appropriate holes at drainage points to drain galvanizing materials.
4. For minimum edge distance follow AISC Table J3.4 and J3.5. For nominal bolt hole size use Table J3.3.
5. Provide upper handhole as necessary when shaft extensions are reguired for luminaire arms or camera. For poles without luminaires/camera, wiring can be done through the top of pole.
6. Allowable range of flange tilt angle will vary from 0° to as required.

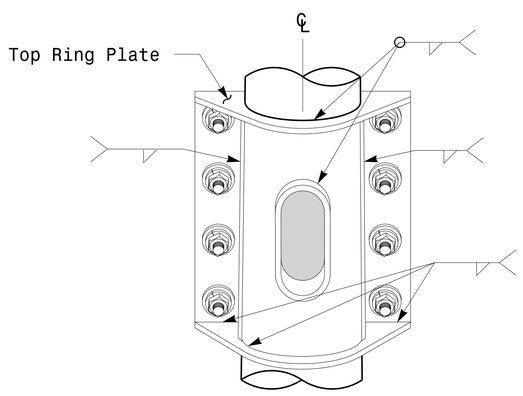


Front Elevation View

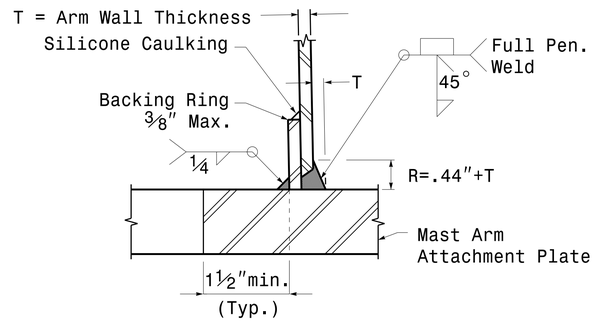


Section A-A

Mast Arm Attachment Plate



Back Elevation View



Section B-B

Full-Penetration Groove Weld Detail

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

Typical Fabrication Details For Mast Arm Connection To Pole

PLAN DATE:	OCTOBER 2017	DESIGNED BY:	C.F.ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SCALE 0 NA NONE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

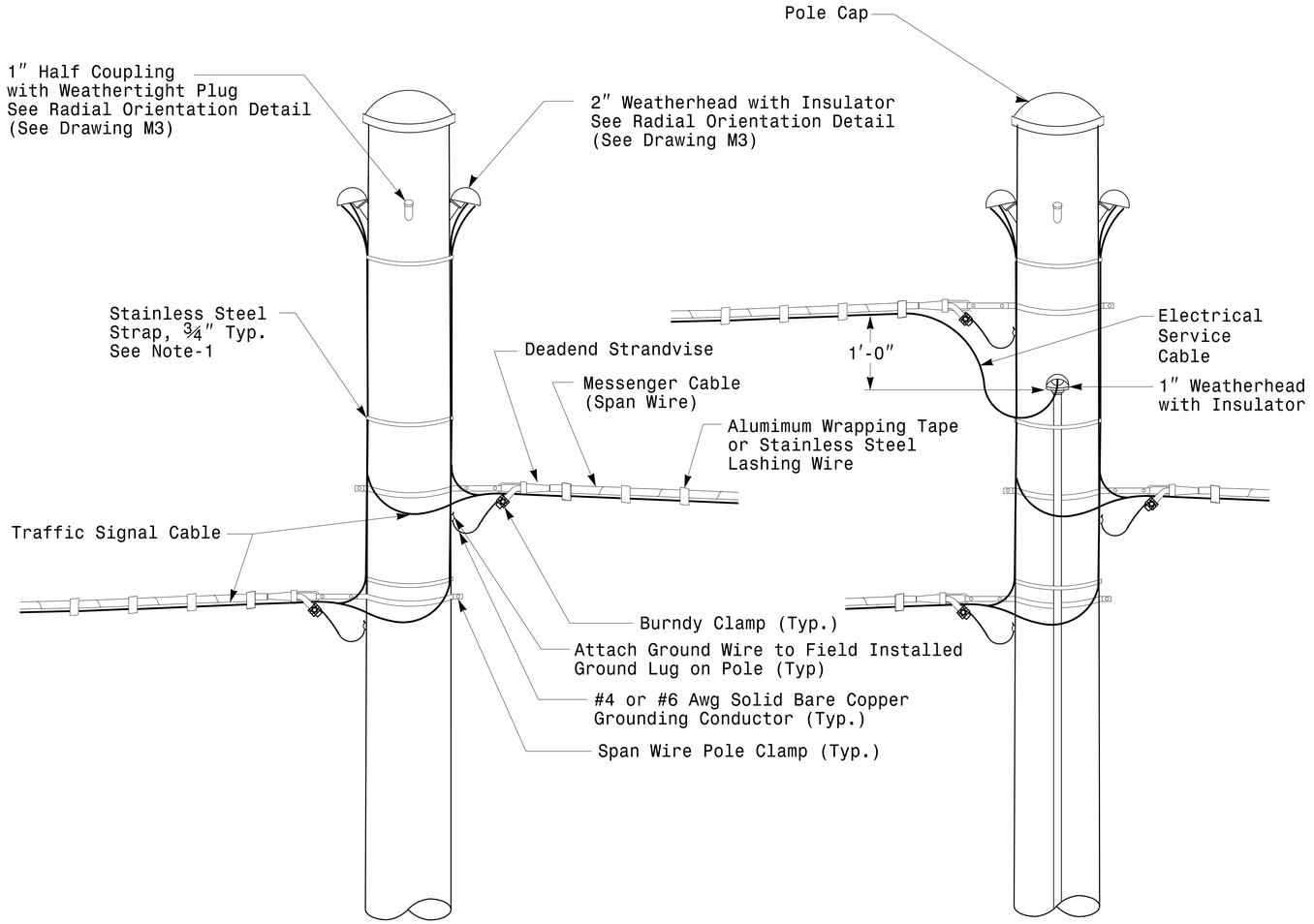
DocuSigned by: Debesh C. Sarkar 44EBE3E5A0A44... SIGNATURE

10/11/2017 DATE

Fabrication Details — Mast Arm Connection

PROJECT ID. NO.	SHEET NO.
	Sig.M6

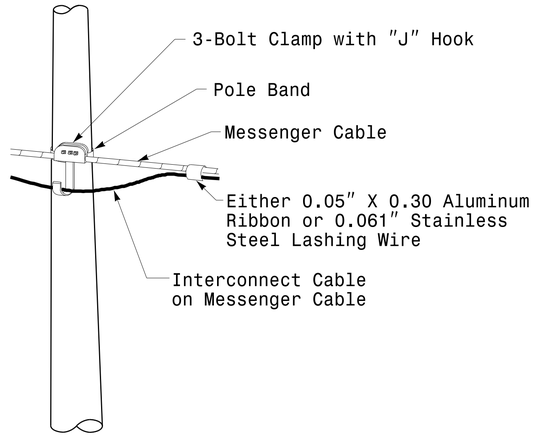
Fabrication Details – Strain Pole Attachments



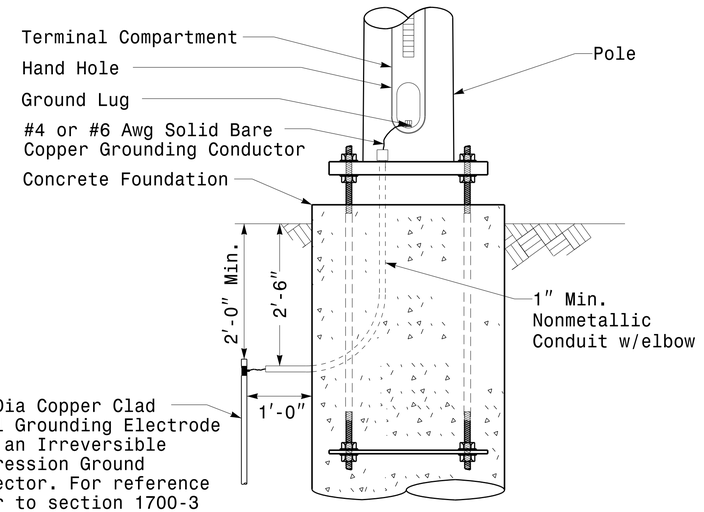
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with ¾″ stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3′-0″.
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For general requirements refer to NCDOT Standard Specifications for Roadway and Structures, January 2018.



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail For Strain Pole and Mast Arm

Prepared in the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.Garner.NC 27529

SCALE
0 NA
NONE

Typical Fabrication Details
For
Strain Pole Attachments

PLAN DATE:	OCTOBER 2017	DESIGNED BY:	C.F.ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

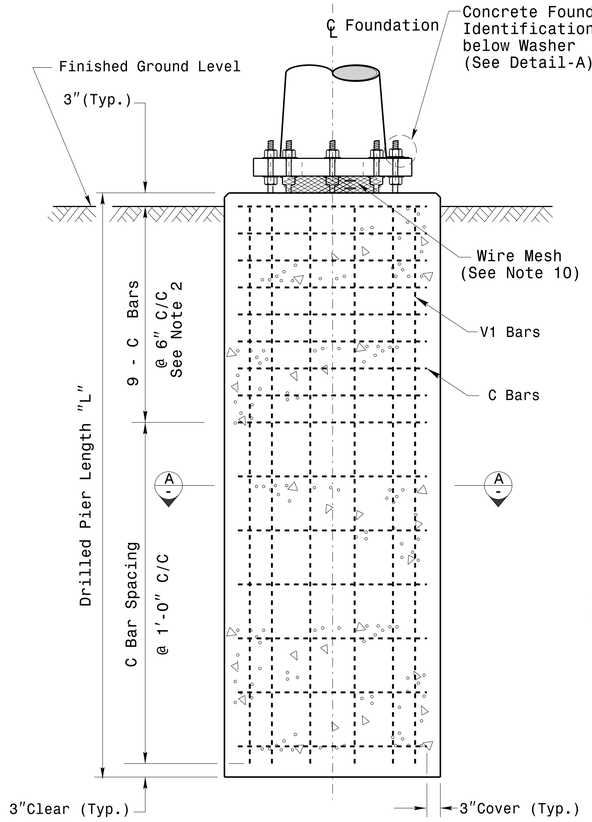
DocuSigned by: Debesh C. Sarkar
SIGNATURE

10/11/2017
DATE

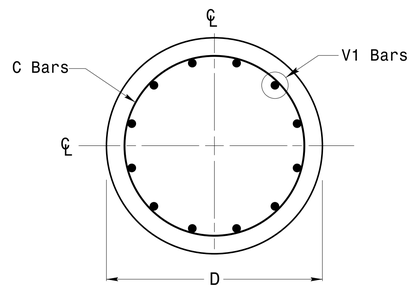
11-OCT-2017 08:36
S:\ITS&SU\ITS Signals\Signal Design Section\Eastern Region\MU Sheets\2016\2014 Sig_M6 Std. Fabrication Details-Strain Poles.dgn
rgithaer

PROJECT ID. NO.	SHEET NO.
	Sig.M7

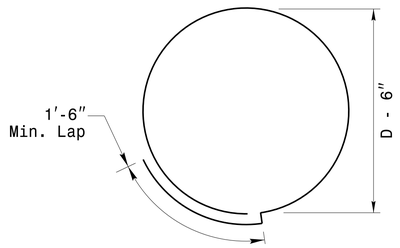
Construction Details – Foundations



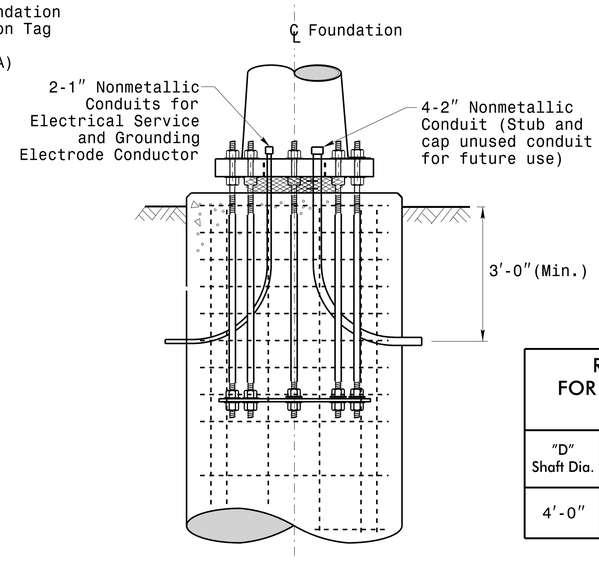
Concrete Shaft Elevation



Section A-A



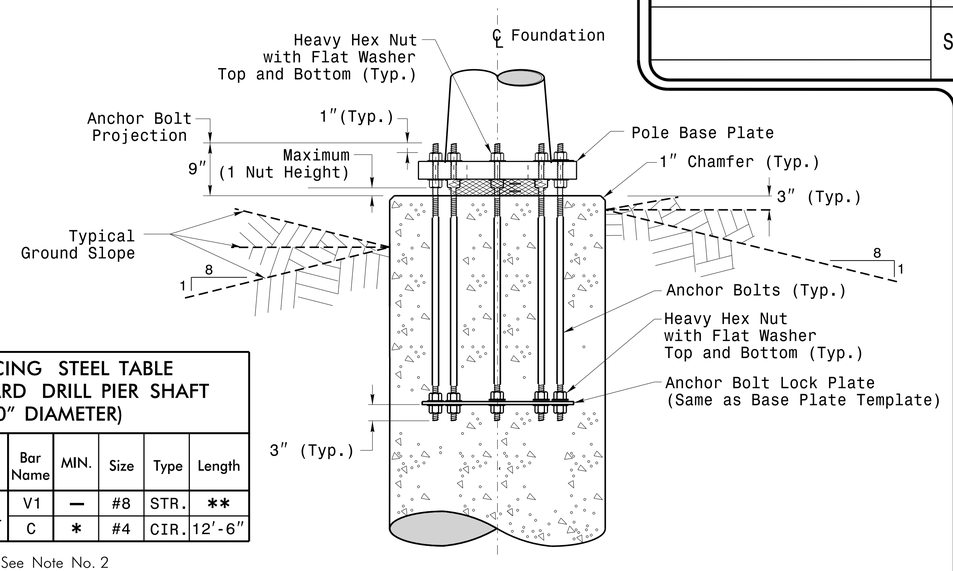
Typical "C" Bar Detail



Typical Foundation Conduit Details

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4′–0″ DIAMETER)						
"D" Shaft Dia.	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
4′-0″	.465 x L	V1	—	#8	STR.	**
		C	*	#4	CIR.	12′-6″

* See Note No. 2
** See Note No. 3



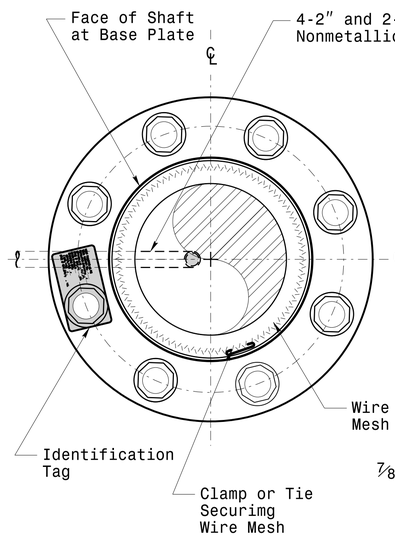
Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)

General Notes:

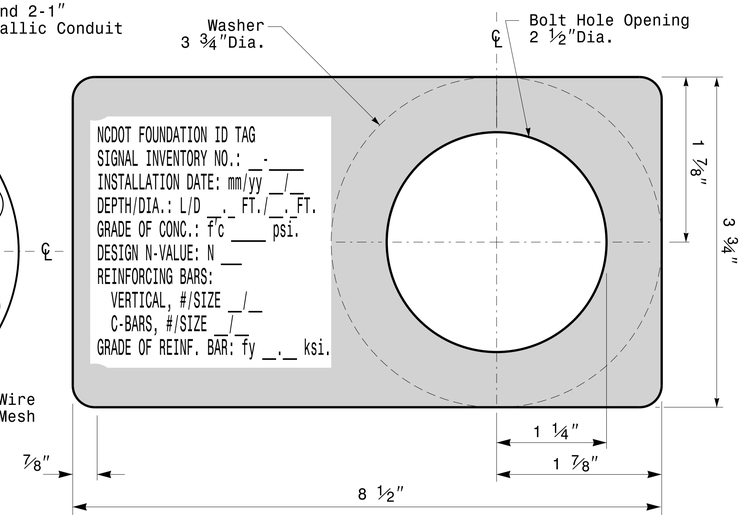
1. If actual subsurface conditions differ significantly from boring data contact the Engineer before excavating or placing concrete.
2. Circular tie reinforcing rings may be vertically adjusted by +/-3″ at a depth between 2′-0″ and 3′-0″ to facilitate the installation of electrical conduit entering in the cage.
3. For standard foundations, see sheet Sig. M8 for details. Vertical reinforcing bars (V1) may be horizontally adjusted by +/-3″ to facilitate the installation of electrical conduit entering into the cage.
4. Provide 2″ to 5″ foundation projection above ground level depending on the ground slope.
5. Unless otherwise shown, foundation designs are based on non-sloping level ground surfaces with slope ratios of 8:1 (H:V) or flatter. If actual ground line slopes are steeper contact the Engineer before excavating or placing concrete.
6. Construct foundations in accordance with NCDOT Standard Provisions SP09 R005- Foundations and Anchor Rod Assemblies for Metal Poles. All applicable 2018 NCDOT Standard Specifications are referenced in this provision. Refer to the NCDOT Resources/Specifications page located on the Connect NCDOT website.

   https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx
7. Use air entrained AA concrete mix with a compression strength of f′c=4500 psi.(min.) after 28 days.
8. Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3″ cover on all reinforcement.
9. Locate the Identification Tag on the top of the base plate, directly above the conduit's entry point.
10. Provide two layers of galvanized welded 23 gauge (0.25) 6″ wide 4 mesh wire around pipes under the base plate and secure it with ties if necessary.
11. Preferred location for the I.D. Tag is as shown in Detail-A; directly above the conduit entering the foundation.



D = Diameter
L = Length/Depth
mm = Month
yy = Year

Detail-A



Concrete Foundation Identification Tag Details

Prepared in the Offices of:
Transportation Mobility and Safety Division
Traffic Engineering Branch
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

Construction Details For Foundations			
PLAN DATE:	OCTOBER 2018	DESIGNED BY:	C.B.COGDELL
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

REV. NO.	COMMENTS	INIT.	DATE
1	Revised Foundation Tag Details	N.B.	5/11/2015

SCALE: 0 NA — NONE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by: Debesh C. Sarkar 4AE8E3D5SIGNATURE — 10/11/2017 DATE

11-OCT-2017 08:37
S:\ITS&SU\ITS Signals\Signal Design Section\Eastern Region\MM Sheets\2016\2014 Sig.M7 Std. Construction Details-Strain Poles.dgn
rsatcher

SOIL CONDITION

		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base: Axial (kip)	Reactions at the Pole Base: Shear (kip)	Reactions at the Pole Base: Moment (ft-kip)	Clay: Medium N-Value 4–8	Clay: Stiff N-Value 9–15	Clay: Very Stiff N-Value 16–30	Clay: Hard N-Value >30	Sand: Loose N-Value 4–10	Sand: Medium N-Value 11–30	Sand: Dense N-Value >30	Reinforcement: Longitudinal Bar Size (#)	Reinforcement: Longitudinal Quantity (ea.)	Reinforcement: Stirrups Bar Size (#)	Reinforcement: Stirrups Spacing (in.)
		STANDARD STRAIN POLES						STANDARD FOUNDATIONS 48″ Diameter Drilled Pier Length (L) – Feet							Reinforcement			
					Reactions at the Pole Base			Clay				Sand			Longitudinal		Stirrups	
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	19	13	10	8	17	14.5	12.5	8	12	4	12
		S30L3	30	25	2	11	300	19.5	13.5	10	8	17.5	15	13	8	14	4	12
		S35L3	35	25	3	11	320	20	13.5	10.5	8	17.5	15	13	8	14	4	12
	HEAVY	S30H3	30	29	3	16	450	24.5	16	12	9	21	17.5	15	8	16	4	6
		S35H3	35	29	4	16	515	26	17	12.5	9.5	22	18.5	16	8	16	4	6
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	16	11.5	8.5	8	15	12.5	11	8	12	4	12
		S30L1	30	22	2	8	205	16.5	11.5	9	8	15	13	11.5	8	12	4	12
		S35L1	35	22	3	8	230	17	12	9	8	15.5	13.5	11.5	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	20.5	13.5	10.5	8	18	15	13.5	8	16	4	6
		S35H1	35	25	4	12	350	21	14	10.5	8.5	18.5	15.5	13.5	8	16	4	6
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6

48″ Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Drilled Pier Length

General Notes:

1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from M 1 drawing.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate standard pole case number from the plans or from the Engineer.
5. Select the appropriate column under "Standard Foundations" based on soil type and "N" value. Select the appropriate row based on the pole load case.
6. The foundation depth is the value shown in the "Standard Foundations" category where the column and the row intersect.
7. Use Construction Procedures and Design Methods prescribed by FHWA-NHI-10-016 for Reference Drilled Shafts.

PROJECT ID. NO.

SHEET NO. Sig.M8

Standard Strain Pole Foundation–All Soil Condition

Prepared in the Offices of: Transportation Mobility and Safety Division, NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, Signal Design Section
750 N.Greenfield Pkwy.,Garner,NC 27529

SCALE 0 NA NONE

Standard Strain Pole Foundation for All Soil Conditions

PLAN DATE: OCTOBER 2017 | DESIGNED BY: C.B. COGDELL
PREPARED BY: N. BITTING | REVIEWED BY: D.C. SARKAR

REVISIONS	INIT.	DATE
Changed "Foundation Depth" to "Drilled Pier Length"in Conc. Eqn.	N.B.	7/12/2015

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by: Debesh C. Sarkar
SIGNATURE

10/11/2017
DATE

11-OCT-2017 08:40
S:\TS&SU\TS Signals\Signal Design Section\Eastern Region\MW Sheets\2016\2014 Sig.M8 Std. Strain Pole Found.-Saturated Soil Condition.dgn
rtaylor

CONTRACT: I190122 WBS: 33879.2.81

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
WBS: 33879.2.81	SIGN-01

DocuSigned by: Renee Roach
APPROVED: 9E8A5B0D31194...
DATE: 5/16/2019

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B. ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIGNING PLAN
BUNCOMBE COUNTY

LOCATION: I–40 EASTBOUND WEIGH STATION UPGRADE

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES 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
901.10	TYPE 'A' SIGNS
901.70	SIGN STRINGERS AND SUPPORT SPACING
901.80	SIGN MOUNTING DETAILS - FOR TYPE A AND TYPE B SIGNS
903.10	GROUND MOUNTED SIGN SUPPORTS
904.10	ORIENTATION OF GROUND MOUNTED SIGNS

GENERAL NOTES

. SIGNS FURNISHED BY STATE
. CONFIRM IN WRITING AT LEAST 4 MONTHS IN ADVANCE, THE ACTUAL DATE THE DEPARTMENT FURNISHED SIGNS WILL BE REQUIRED.
. WHEN EXISTING SIGNS ARE REMOVED AND INSTALLED ON NEW SUPPORTS, THE RE-ERECTION SHALL IMMEDIATELY FOLLOW THE REMOVAL.
. DO NOT BEGIN FABRICATION FOR TYPES A & B SIGNS MOUNTED ON OVERHEAD STRUCTURES OR STEEL SUPPORTS UNTIL "S" DIMENSIONS HAVE BEEN FIELD VERIFIED.
. SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.

SUMMARY OF QUANTITIES

ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4054000000	902	PLAIN CONCRETE SIGN FOUNDATION	1	C.Y.
4060000000	903	SUPPORTS, BREAKAWAY STEEL BEAM	279	LB.
4066000000	903	SUPPORTS, SIMPLE STEEL BEAM	622	LB.
4110000000	904	SIGN ERECTION, TYPE A (GROUND MOUNTED)	1	EA.
4110000000	904	SIGN ERECTION, TYPE B (GROUND MOUNTED)	2	EA.
4152000000	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	1	EA.

INDEX

PLAN PREPARED BY: N.C.D.O.T. SIGNING AND DELINEATION UNIT

K. L. JORDAN — SIGNING & DELINEATION REGIONAL ENGINEER

J.Navarrete — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

05/5/19
S:\S&D\TIPPROJECTS\Mecklenburg Weigh Station\WBS33879.2.76.dgn
User:jnavarrete

PROJECT REFERENCE NO.	SHEET NO.
WBS: 33879.2.81	SIGN-02

APPROVED: DocuSigned by: Renee Roach 3E0436000D196431

DATE: 5/16/2019

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Version: 3.1 Posted: 6/2/2017

*	SIGN					ROADWAY	NUMBER OF	BEAM	SUPPORT TYPE	OMNI	ATTACHMENT	MOUNTING	HORIZONTAL	SUPPORT	LENGTH (ft)			LEFT SUPPORT (ft)			CENTER SUPPORT (ft)			RIGHT SUPPORT (ft)			SUPPORT WEIGHTS		FOOTINGS				FIELD VERIFIED
	NUMBER	TYPE	SIZE (in.) w	x	h	STATION	SUPPORTS	SECTION	BA or S	COUPLER	METHOD	METHOD	CLEARANCE* (ft.)	SPACING	SNS HT "H"	MTG HT "C"	EMBED-MENT	S	L	LENGTH	S	L	LENGTH	S	L	LENGTH	B/A (lbs.)	SIMPLE (lbs.)	DIAMETER (ft.)	DEPTH (ft.)	REINFORCED (c.y.)	PLAIN (c.y.)	SEE NOTE 2 (mm/dd/yy)
	101	A	144	x	54	SEE SIGN-04	2	S4x7.7	BA	N/A	N/A	N/A	18.00	7.03	4.50	10.00	3.0	-1.00	13.50	16.50	0.00	0.00	0.00	-3.00	11.50	14.50	278.70	0	1.0	3.5	0.00	0.20	_____
*	CMS-1	B	120	x	44	SEE ITS-06	2	W6x9	S	N/A	N/A	N/A	20.00	5.86	3.67	7.00	2.5	5.00	15.67	18.17	0.00	0.00	0.00	8.00	18.67	21.17	0.00	354	1.5	3	0.39	0.00	_____
*	CMS-2	B	144	x	44	SEE ITS-06	2	S4x7.7	S	N/A	N/A	N/A	20.00	7.03	3.67	7.00	3.0	3.00	13.67	16.67	0.00	0.00	0.00	4.00	14.67	17.67	0.00	264.366667	1.0	3.5	0.00	0.20	_____
																											TOTAL 278.70	TOTAL 618.37			TOTAL 0.39	TOTAL 0.41	
																										USE:	279.00	619.00			1.00	1.00	

* S–DIMENSIONS ON PLANS ARE SHOWN FOR ESTIMATING PURPOSE. FIELD VERIFICATION IS REQUIRED

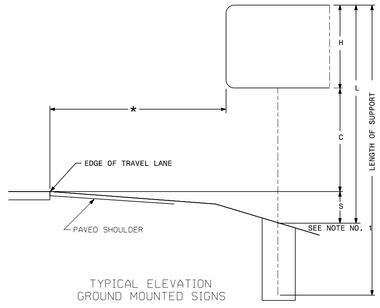
CMS–1 & CMS–2 ARE REQUIRED TO BE PROTECTED BY GUARDRAIL

NOTES

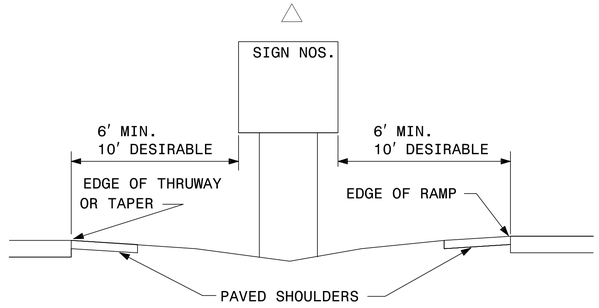
1. DIMENSION "S" REPRESENTS AN INCREASE (+), OR A DECREASE (-) IN POLE LENGTH, RELATIVE TO THE ELEVATION OF THE EDGE OF PAVEMENT.

2. FIELD VERIFICATIONS SHALL BE REQUIRED FOR ALL SUPPORTS, SEE (*) ARTICLE 903-3. FABRICATORS SHALL BE AISC CERTIFIED IN CATEGORY 1, SEE (*) ARTICLE 1072-1. (*) = N.C.D.O.T. STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES

3. PLAN LOCATIONS FOR EXISTING UTILITIES ARE BASED ON THE BEST AVAILABLE INFORMATION AND, THEREFORE MAY NOT BE PRECISELY ACCURATE. THEREFORE, IT IS INCUMBENT UPON THE CONTRACTOR TO DETERMINE THE EXACT LOCATION OF UTILITIES BEFORE BEGINNING WORK IN A LOCATION.



TYPICAL ELEVATION
GROUND MOUNTED SIGNS



TYPE "A" AND TYPE "B" GROUND MOUNTED SIGNS

05/15/19
S:\S&DU\TIPPROJECTS\Mecklenburg Weigh Station\WBS33879.2.76.dgn
User:jmoyer@ncdot.gov

PROJECT REFERENCE NO.	SHEET NO.
WBS: 33879.2.81	SIGN-03

APPROVED: DocuSigned by: Renee Roach 3E84360BD316431...

DATE: 5/16/2019

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B. ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIGN NUMBER: 101
TYPE: A
QUANTITY: 1

SIGN WIDTH: 12′-0″
HEIGHT: 4′-6″
TOTAL AREA: 54.0 Sq.Ft.

BORDER TYPE: FLUSH
RECESS: 0″
WIDTH: 2″
RADII: 6″

NO. Z BARS: 2
LENGTH: 136.0

BACKG COLOR: White
COPY COLOR: Black

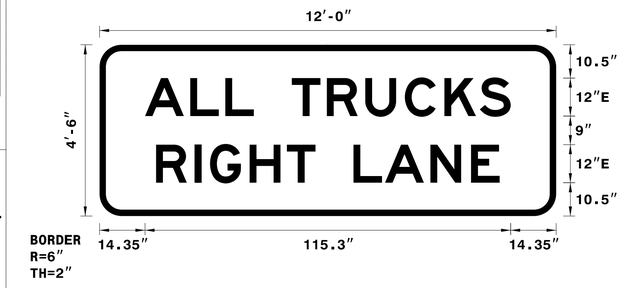
SYMBOL	X	Y	WID	HT

MAT'L:
0.125″ (3.2 mm) ALUMINUM

USE NOTES: 1,2

1. Legend and border(except those that are colored black) shall be direct applied Grade A sheeting.
2. Background shall be Grade C reflective sheeting.

DESIGN BY: J.Navarrete CHECKED BY: KLJ Dec 05, 2018
PROJECT ID: 33879.2.81 LOCATION: I-40 DIV: 13



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

																										Series/Size Text Length
		A	L	L		T	R	U	C	K	S															E 2000
	14.3	14.3	11	9	12	11	12.1	12.5	12.5	11.2	9.7	14.3														115.3
		R	I	G	H	T		L	A	N	E															E 2000
	17.8	12.1	4.9	12.5	11.8	9	12	10	14.3	12.8	9	17.8														108.4

FILENAME: 2016 Sign Designs

NORTH CAROLINA D.O.T. SIGN DETAIL

SIGN DESIGNS

05/5/19
S:\S&DD\TIPPROJECTS\Mecklenburg Weigh Station\WBS33879.2.76.dgn
User:jnavarrete

TIP NO.	SHEET NO.
WBS: 33879.2.81	SIGN-04

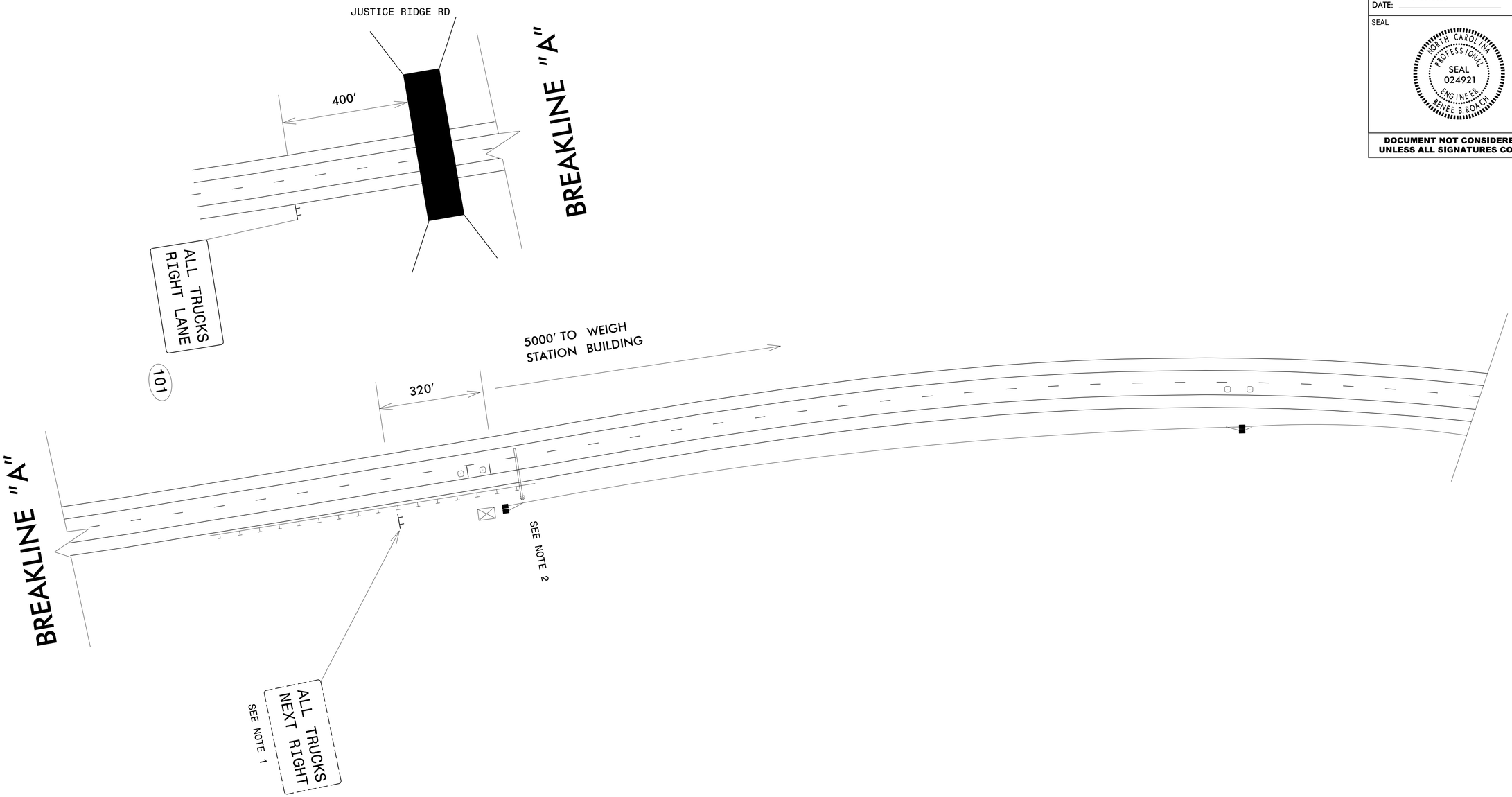
APPROVED: DocuSigned by: Renee Roach 3EB4360BD316431...

DATE: 5/16/2019

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 024921 ENGINEER RENEE B. ROACH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROJECT NOTES

1 DISPOSAL OF SIGN SYSTEM, STEEL BEAM

2 PROPOSED METAL POLE (SEE SHEET ITS-5)

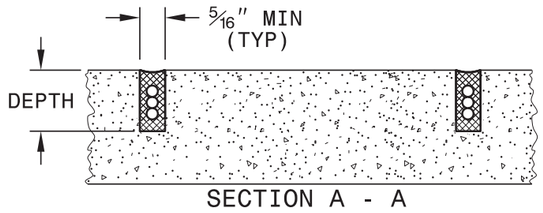
PROPOSED SIGNS

05/15/19
St:\S&DU\TIPPROJECTS\Mecklenburg Weigh Station\WBS33879.2.76.dgn
User:jmavarete

CONVENTIONAL 4-SIDED LOOP

SAW SLOT DEPTH CHART

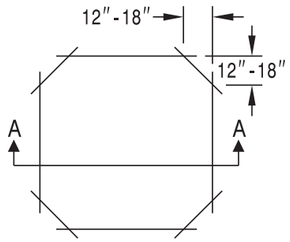
DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0



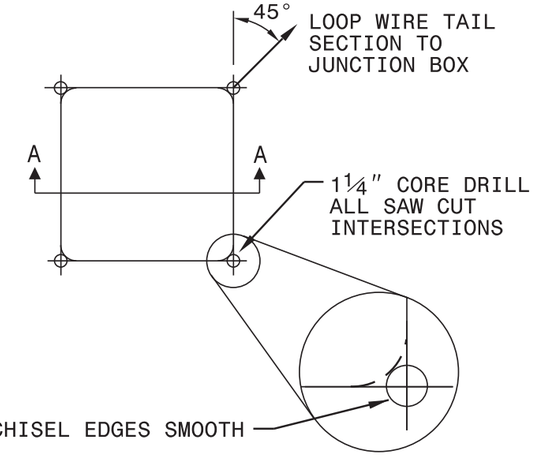
SECTION A - A

SAW CUT OPTIONS

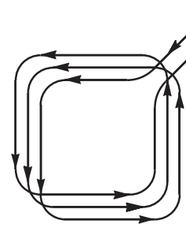
OPTION 1

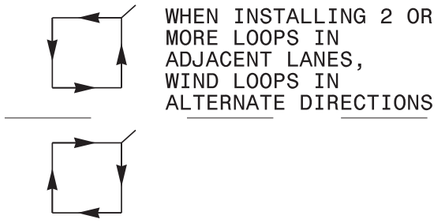


OPTION 2
(POOR PAVEMENT)



LOOP WINDING METHOD





LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE

CORRECT WAY TO TWIST WIRE

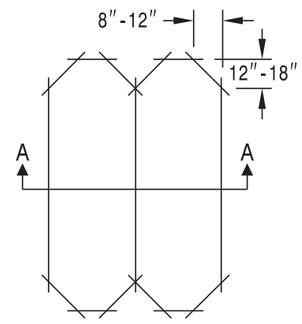
NOTES

1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

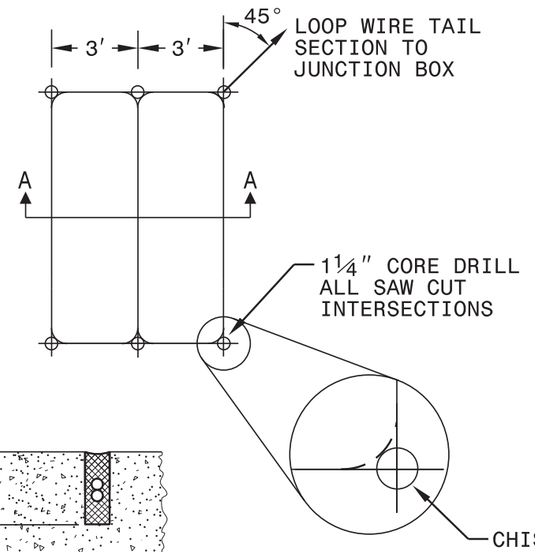
QUADRUPOLE LOOP

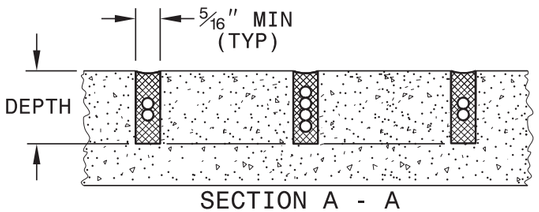
SAW CUT OPTIONS

OPTION 1



OPTION 2
(POOR PAVEMENT)

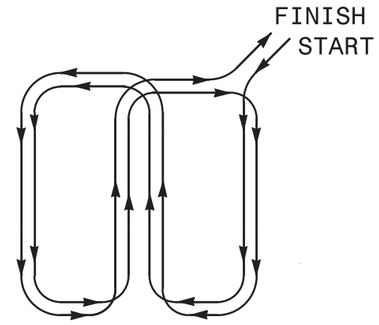




SECTION A - A

DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

LOOP WINDING METHOD



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

1-18

ROADWAY STANDARD DRAWING FOR

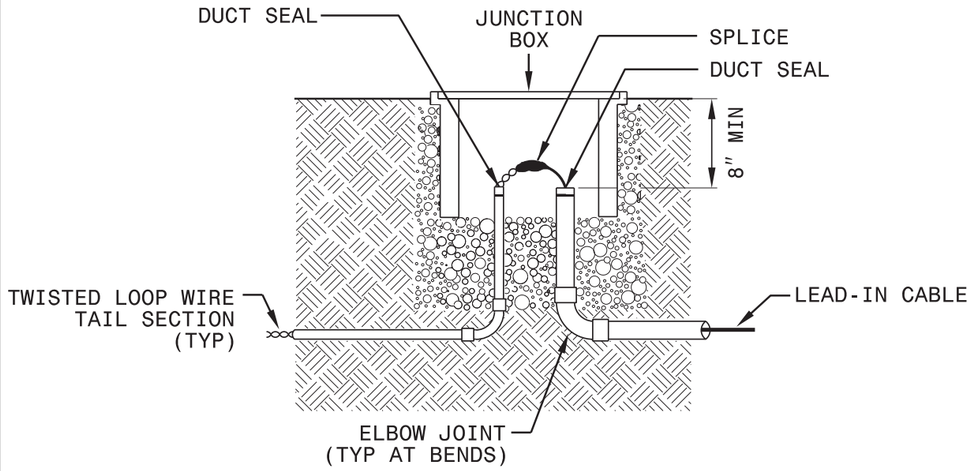
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3

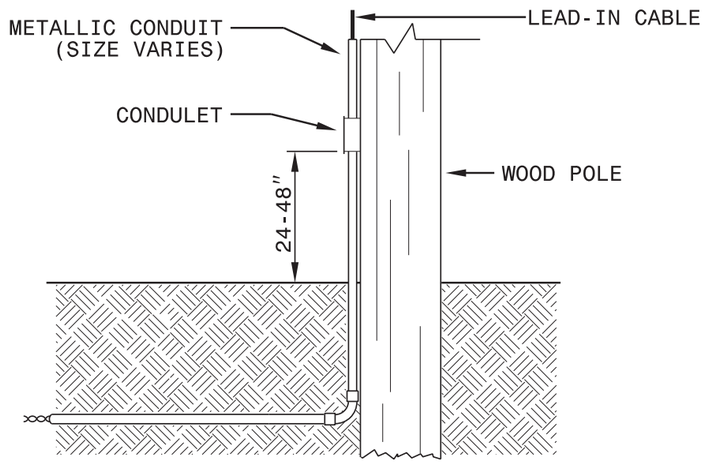
1725.01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

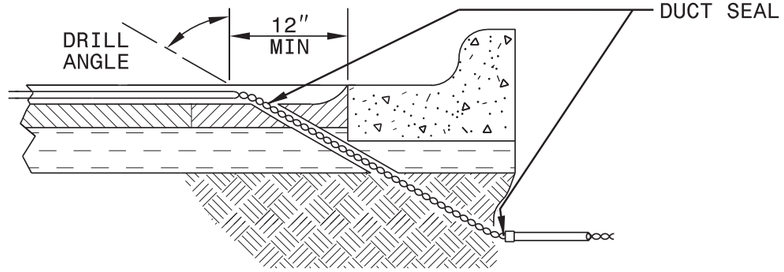


NOTE

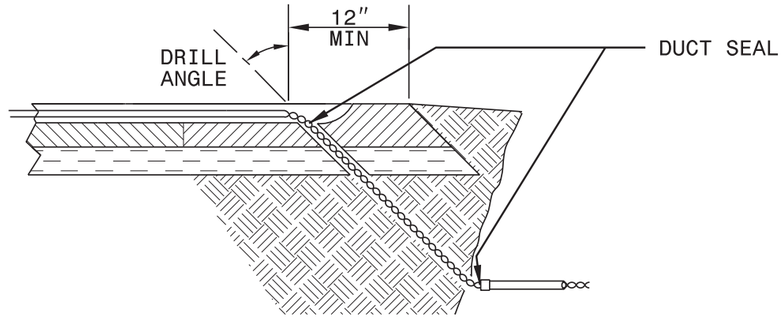
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

1. DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
2. TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
3. BEFORE SEALING LOOPS, INSTALL DUCT SEAL WHERE LOOP WIRE TAIL SECTION LEAVES SAW CUT IN PAVEMENT AND AT ENTRANCE OF CONDUIT TO JUNCTION BOX.

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

1-18

ROADWAY STANDARD DRAWING FOR

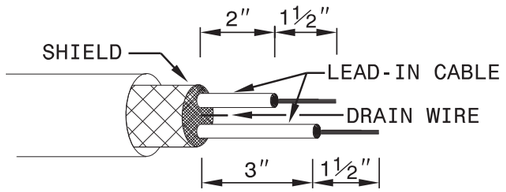
INDUCTIVE DETECTION LOOPS

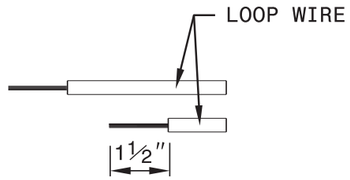
LOOP WIRE DETAILS

SHEET 2 OF 3

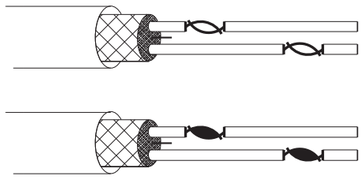
1725.01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE



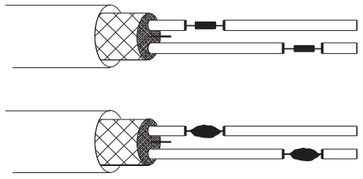


STEP 2. CONNECT AND SOLDER



TWIST BARE CONDUCTORS TOGETHER AND SOLDER WITH RESIN CORE SOLDER

OR



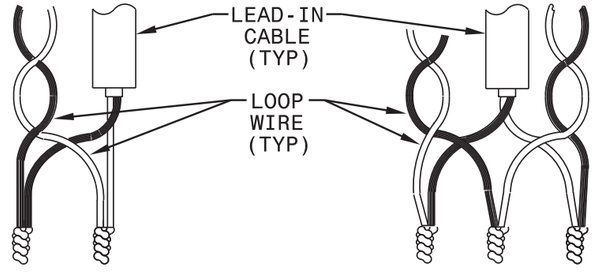
CRIMP BARE CONDUCTORS TOGETHER WITH AN UNINSULATED BUTT CONNECTOR AND SOLDER WITH RESIN CORE SOLDER

BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

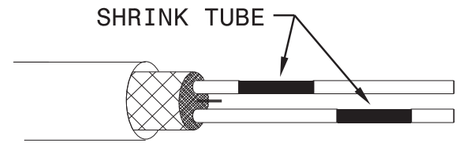
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS

SINGLE CONNECTION

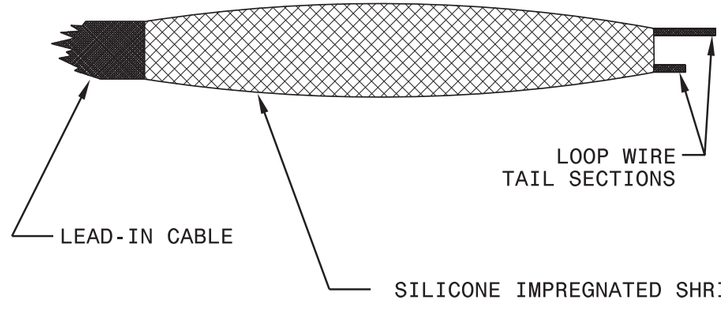
SERIES CONNECTION



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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

1-18

ROADWAY STANDARD DRAWING FOR

INDUCTIVE DETECTION LOOPS

SPLICING FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3

1725.01