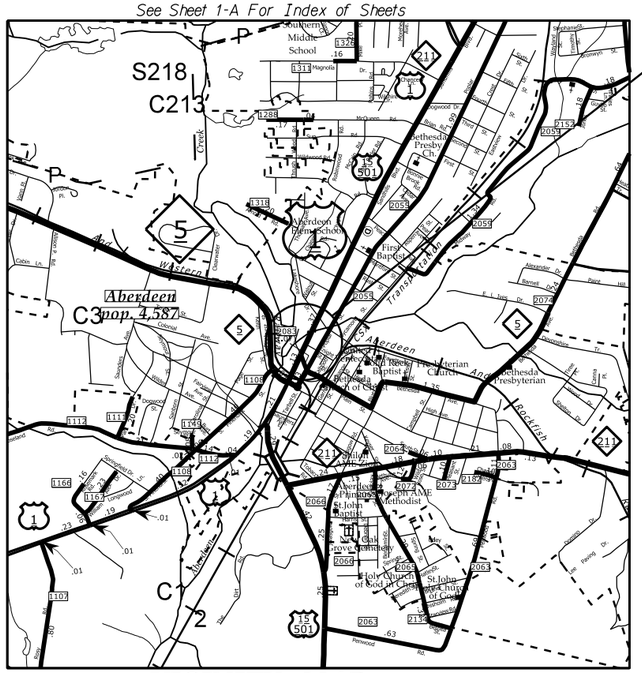
TIP PROJECT: EB-5741 PROJECT: US 1 ABERDEEN CROSSWALK



VICINITY MAP

PROJECT LOCATION

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MOORE COUNTY

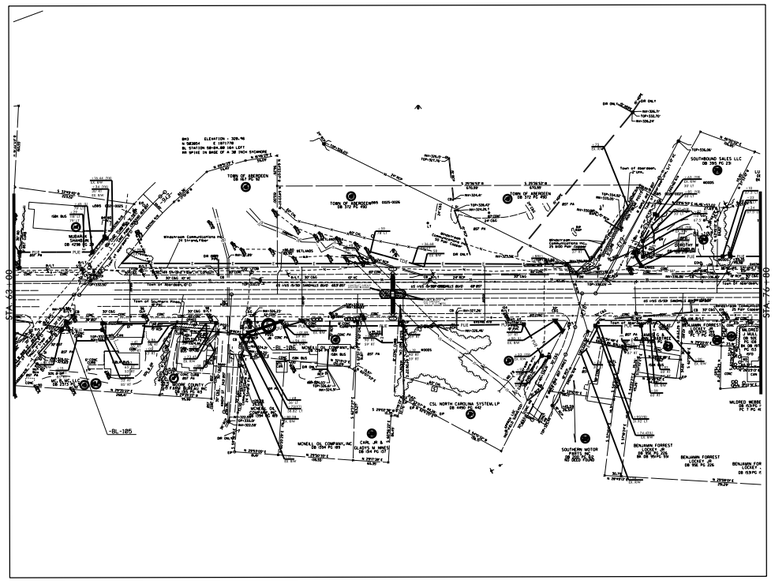
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	EB–5741	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
51064.1.1	TAP–0801(023)	PE
51064.3.1	TAP–0801(023)	CONST

LOCATION: US 1 (ABERDEEN) BETWEEN KNIGHT ST. AND MAPLE AVE.

TYPE OF WORK: CURB RAMPS, PAVEMENT MARKINGS, AND SIGNALS

4



GRAPHIC SCALES

PLANS

PROFILE (HORIZONTAL)

PROFILE (VERTICAL)

DESIGN DATA

ADT 2020 = 26,500
ADT 2040 =
V = 50 MPH
FUNC CLASS =
PRINCIPAL ARTERIAL

Prepared in the Office of:
DIVISION OF HIGHWAYS
DIVISION 8 DESIGN & CONSTRUCT UNIT
121 DOT DRIVE
CARTHAGE NC 28327
PLANS PREPARED BY: DDC

PROJECT LENGTH
ROADWAY: 0.02 MILES
STRUCTURE: MILES
TOTAL: 0.02 MILES

DIVISION OF HIGHWAYS

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
April 19, 2023

LETTING DATE:
August 8, 2023

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

DIVISION PROJECT ENGINEER

DocuSigned by:
Michael Ricketts
3B420DAD60B44EB...
P.E.
SIGNATURE:
06/29/2023

DIVISION PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 052140 ENGINEER MICHAEL E. RICKETTS

12/2/2016

PROJECT REFERENCE NO.	SHEET NO.
EB-5741	1-B

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP)
- Computed Property Corner
- Property Monument (ECM)
- Parcel/Sequence Number (123)
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary (WLB)
- Proposed Wetland Boundary (WLB)
- Existing Endangered Animal Boundary (EAB)
- Existing Endangered Plant Boundary (EPB)
- Existing Historic Property Boundary (HPB)
- Known Contamination Area: Soil
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign (S)
- Well (W)
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream (JS)
- Buffer Zone 1 (BZ 1)
- Buffer Zone 2 (BZ 2)
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch (FLOW)
- False Sump

RAILROADS:

- Standard Gauge (CSX TRANSPORTATION)
- RR Signal Milepost (MILEPOST 35)
- Switch (SWITCH)
- RR Abandoned
- RR Dismantled

RIGHT OF WAY & PROJECT CONTROL:

- Secondary Horiz and Vert Control Point
- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Exist Permanent Easment Pin and Cap
- New Permanent Easement Pin and Cap
- Vertical Benchmark
- Existing Right of Way Marker
- Existing Right of Way Line
- New Right of Way Line (RW)
- New Right of Way Line with Pin and Cap (RW)
- New Right of Way Line with Concrete or Granite R/W Marker (RW)
- New Control of Access Line with Concrete C/A Marker (CA)
- Existing Control of Access (CA)
- New Control of Access (CA)
- Existing Easement Line (E)
- New Temporary Construction Easement (E)
- New Temporary Drainage Easement (TDE)
- New Permanent Drainage Easement (PDE)
- New Permanent Drainage / Utility Easement (DUE)
- New Permanent Utility Easement (PUE)
- New Temporary Utility Easement (TUE)
- New Aerial Utility Easement (AUE)

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut (C)
- Proposed Slope Stakes Fill (F)
- Proposed Curb Ramp (CR)
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard (Vineyard)

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert (CONC)
- Bridge Wing Wall, Head Wall and End Wall (CONC WW)

MINOR:

- Head and End Wall (CONC HW)
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB (CB)
- Paved Ditch Gutter
- Storm Sewer Manhole (S)
- Storm Sewer (S)

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole (P)
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line LOS B (S.U.E.*) (P)
- U/G Power Line LOS C (S.U.E.*) (P)
- U/G Power Line LOS D (S.U.E.*) (P)

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole (T)
- Telephone Pedestal (T)
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole (HH)
- U/G Telephone Cable LOS B (S.U.E.*) (T)
- U/G Telephone Cable LOS C (S.U.E.*) (T)
- U/G Telephone Cable LOS D (S.U.E.*) (T)
- U/G Telephone Conduit LOS B (S.U.E.*) (TC)
- U/G Telephone Conduit LOS C (S.U.E.*) (TC)
- U/G Telephone Conduit LOS D (S.U.E.*) (TC)
- U/G Fiber Optics Cable LOS B (S.U.E.*) (T FO)
- U/G Fiber Optics Cable LOS C (S.U.E.*) (T FO)
- U/G Fiber Optics Cable LOS D (S.U.E.*) (T FO)

WATER:

- Water Manhole (W)
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line LOS B (S.U.E*) (W)
- U/G Water Line LOS C (S.U.E*) (W)
- U/G Water Line LOS D (S.U.E*) (W)
- Above Ground Water Line (A/G Water)

TV:

- TV Pedestal (C)
- TV Tower
- U/G TV Cable Hand Hole (HH)
- U/G TV Cable LOS B (S.U.E.*) (TV)
- U/G TV Cable LOS C (S.U.E.*) (TV)
- U/G TV Cable LOS D (S.U.E.*) (TV)
- U/G Fiber Optic Cable LOS B (S.U.E.*) (TV FO)
- U/G Fiber Optic Cable LOS C (S.U.E.*) (TV FO)
- U/G Fiber Optic Cable LOS D (S.U.E.*) (TV FO)

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line LOS B (S.U.E.*) (G)
- U/G Gas Line LOS C (S.U.E.*) (G)
- U/G Gas Line LOS D (S.U.E.*) (G)
- Above Ground Gas Line (A/G Gas)

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line (SS)
- Above Ground Sanitary Sewer (A/G Sanitary Sewer)
- SS Forced Main Line LOS B (S.U.E.*) (FSS)
- SS Forced Main Line LOS C (S.U.E.*) (FSS)
- SS Forced Main Line LOS D (S.U.E.*) (FSS)

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box (S)
- Utility Unknown U/G Line LOS B (S.U.E.*) (?UTL)
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. (UST)
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)
- Abandoned According to Utility Records (AATUR)
- End of Information (E.O.I.)

PROJECT NO.	SHEET NO.	TOTAL NO.
51064.3.1 (EB-5741)	**3**	

SUMMARY OF QUANTITIES

													2605000000-N	2647000000-E	2759000000-N	5255000000-N	7048500000-E	7060000000-E	7120000000-E	7300000000-E		7301000000-E	7324000000-N
PROJECT NO	**COUNTY**	**MAP NO**	**ROUTE**	**DESCRIPTION**	**TYP NO**	**LANES**	**LANE TYPE**	**FINAL SURFACE TESTING REQUIRED**	**WARM MIX ASPHALT REQUIRED**	**LENGTH**	**WIDTH**		**CONCRETE CURB RAMP**	**5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)**	**GENERIC PAVING ITEM - TRUNCATED DOMES (24" X 96")**	**PORTABLE LIGHTING**	**PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)**	**SIGNAL CABLE**	**VEHICLE SIGNAL HEAD (12", 3 SECTION)**	**UNPAVED TRENCHING (1 CONDUIT, 2")**	**UNPAVED TENCHING (2 CONDUIT, 2 INCH)**	**DIRECTIONAL DRILL (2 CONDUIT, 2 INCH)**	**JUNCTION BOX (STANDARD SIZE)**
										MI	**FT**		**EA**	**SY**	**EA**	**LS**	**EA**	**LF**	**EA**	**LF**	**LF**	**LF**	**EA**
51064.3.1 (EB-5741)	Moore	1	US 1/15/501	SIGNALIZED PEDESTRIAN CROSSING		4	MU	NO	NO	0.01	20		2	65	2	1	2	450	4	50	25	100	3
TOTAL FOR MAP NO. 1										**0.01**			**2**	**65**	**2**	**1**	**2**	**450**	**4**	**50**	**25**	**100**	**3**
TOTAL FOR PROJ NO. 51064.3.1 (EB-5741)										**0.01**			**2**	**65**	**2**	**1**	**2**	**450**	**4**	**50**	**25**	**100**	**3**
																				75			
GRAND TOTAL										**0.01**			**2**	**65**	**2**	**1**	**2**	**450**	**4**	**50**	**25**	**100**	**3**
																				75			

													7456000000-E	7588000000-N	7613000000-N	7614100000-E	7631000000-N	7636000000-N	7642100000-N	7642200000-N	7696000000-N	7744000000-N	7901000000-N
PROJECT NO	**COUNTY**	**MAP NO**	**ROUTE**	**DESCRIPTION**	**TYP NO**	**LANES**	**LANE TYPE**	**FINAL SURFACE TESTING REQUIRED**	**WARM MIX ASPHALT REQUIRED**	**LENGTH**	**WIDTH**		**LEAD-IN CABLE (14-2 PAIR)**	**METAL POLE WITH SINGLE MAST ARM**	**SOIL TEST**	**DRILLED PIER FOUNDATION**	**MAST ARM WITH METAL POLE DESIGN**	**SIGN FOR SIGNALS**	**TYPE I POST WITH FOUNDATION**	**TYPE II PEDESTAL WITH FOUNDATION**	**CONTROLLER WITH CABINET (TYPE 2070E, BASE MOUNTED)**	**DETECTOR CARD (TYPE 170)**	**CABINET BASE EXTENDER**
										MI	**FT**		**LF**	**EA**	**EA**	**CY**	**EA**	**EA**	**EA**	**EA**	**EA**	**EA**	**EA**
51064.3.1 (EB-5741)	Moore	1	US 1/15/501	SIGNALIZED PEDESTRIAN CROSSING		4	MU	NO	NO	0.01	20		500	2	2	12	2	4	1	2	1	2	1
TOTAL FOR MAP NO. 1										**0.01**			**500**	**2**	**2**	**12**	**2**	**4**	**1**	**2**	**1**	**2**	**1**
TOTAL FOR PROJ NO. 51064.3.1 (EB-5741)										**0.01**			**500**	**2**	**2**	**12**	**2**	**4**	**1**	**2**	**1**	**2**	**1**
GRAND TOTAL										**0.01**			**500**	**2**	**2**	**12**	**2**	**4**	**1**	**2**	**1**	**2**	**1**

PROJECT NO.	SHEET NO.	TOTAL NO.
51064.3.1 (EB-5741)	3A	

THERMOPLASTIC AND PAINT QUANTITIES

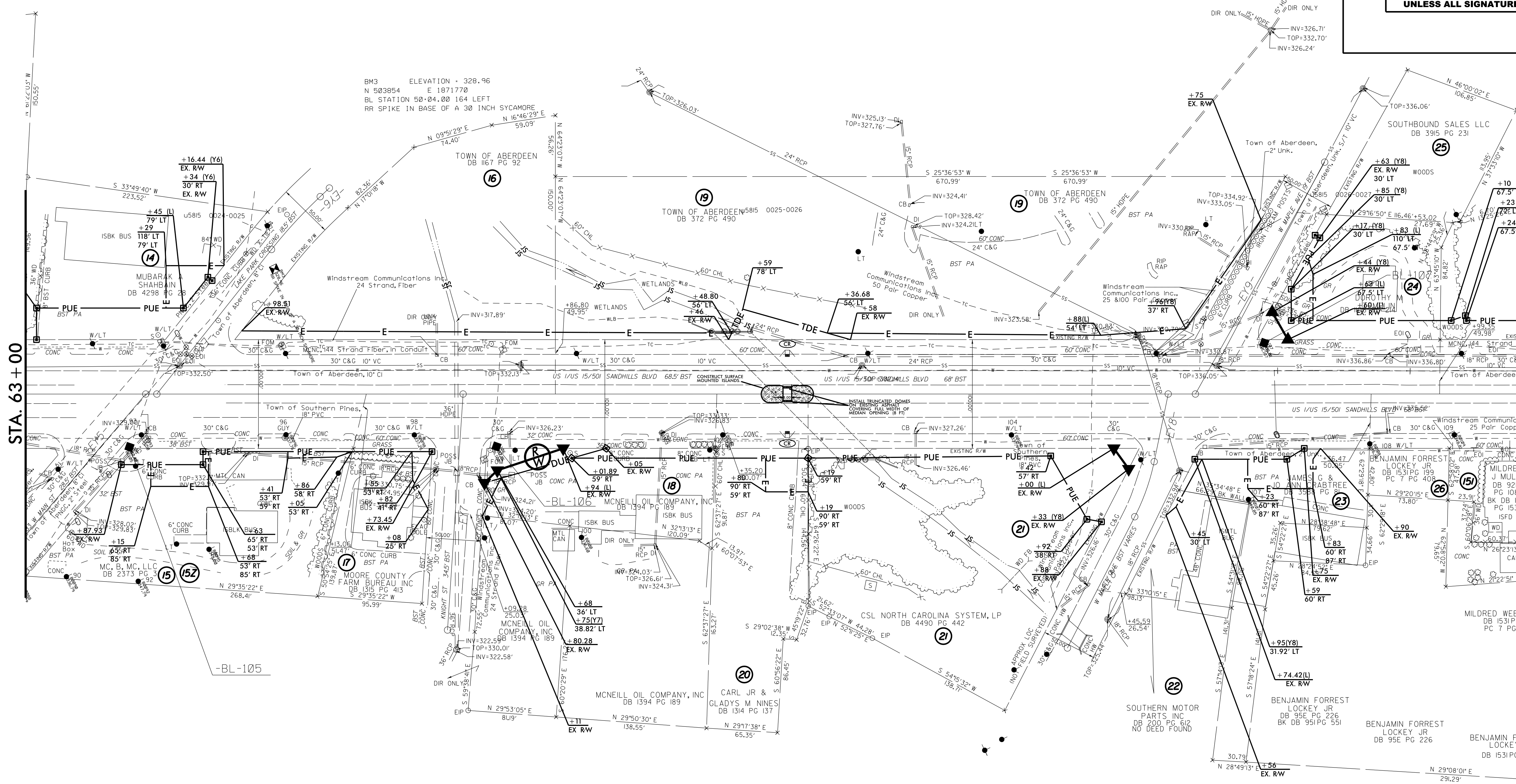
										4457000000-N	4685000000-E	4700000000-E	4709000000-E	4850000000-E	4905100000-N
PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LANES	LANE TYPE	LENGTH	WIDTH	TEMPORARY TRAFFIC CONTROL	4" X 90 M YELLOW THERMO	12" X 90 M YELLOW THERMO	24" X 90 M WHITE THERMO	4" LINE REMOVAL	NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKER Y&Y
								MI	FT	LS	LF	LF	LF	LF	EA
51064.3.1 (EB-5741)	Moore	1	US 1/15/501	SIGNALIZED PEDESTRIAN CROSSING		4	MU	0.01	20	1.0000	400	135	208	100	5
TOTAL FOR MAP NO. 1								**0.01**		**1**	**400**	**135**	**208**	**100.000**	**5**
TOTAL FOR PROJ NO. 51064.3.1 (EB-5741)								**0.01**		**1**	**400**	**135**	**208**	**100.000**	**5**
GRAND TOTAL								**0.01**		**1**	**400**	**135**	**208**	**100.000**	**5**

PROJECT REFERENCE NO.	SHEET NO.
EB-5741	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 052140 MICHAEL E. RICKETTS

06/29/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
EB-5741	4A

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 052140 ENGINEER MICHAEL E. RICKETTS

06/29/2023

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REVISIONS

8/17/99

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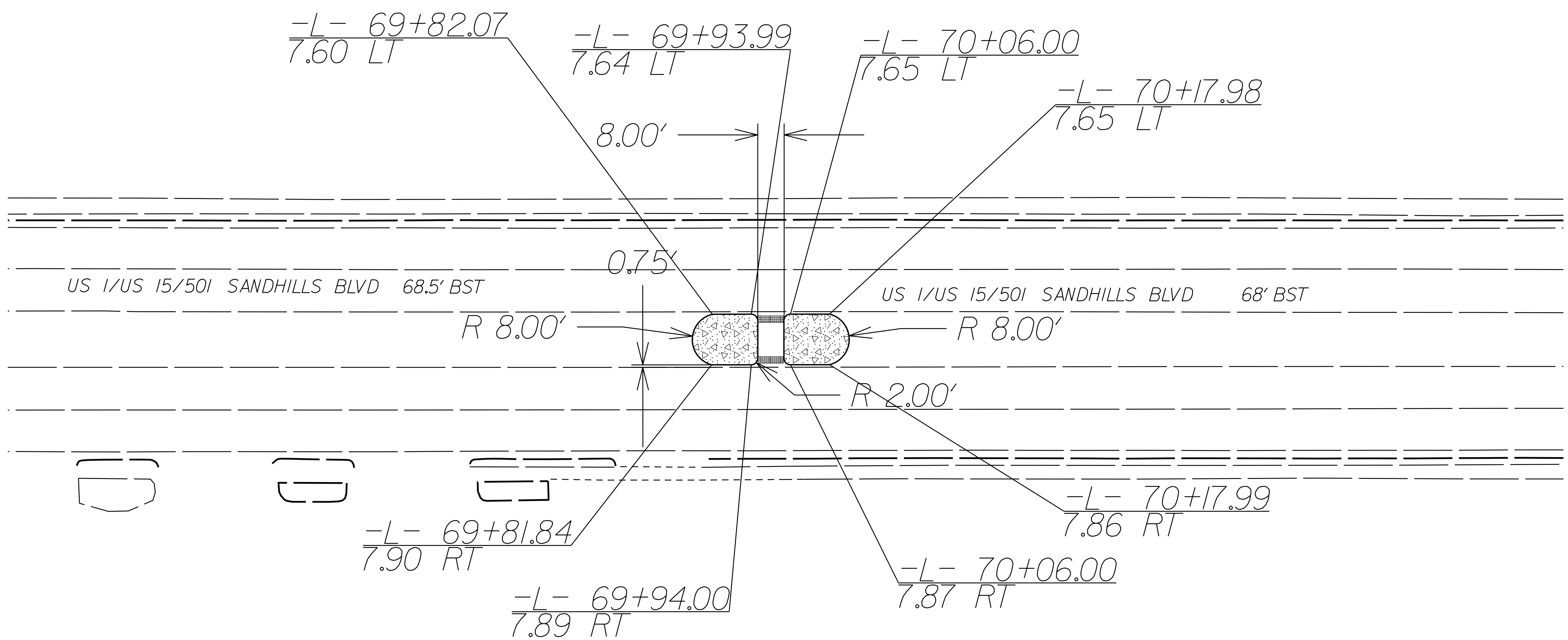

PROJECT: EB-5741

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE PROJECT REFERENCE NO.	SHEET NO.
EB-5741	PMP-1

PAVEMENT MARKING PLAN

MOORE COUNTY

LOCATION: US 1 ABERDEEN BETWEEN KNIGHT ST. AND MAPLE AVE.

INDEX OF SHEETS

SHEET NO.	TITLE
PMP-1	PAVEMENT MARKING PLAN COVER SHEET
PMP-2	PAVEMENT MARKING DETAIL SHEET

GENERAL NOTES

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

PAVEMENT MARKING:

· INSTALL PAVEMENT MARKINGS AND MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
US 1	THERMOPLASTIC	SNOWPLOWABLES

· TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

· REMOVE/REPLACE ANY CONFLICTING PAVEMENT MARKINGS.

· REPLACE ANY PAVEMENT MARKINGS BEYOND THE PROJECT LIMITS DAMAGED BY THE CONTRACTORS' OPERATIONS DURING CONSTRUCTION.

PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
THERMOPLASTIC (4″, 90 MILS)	
T13	YELLOW DOUBLE CENTER
THERMOPLASTIC (12″, 90 MILS)	
T52	YELLOW DIAGONAL
THERMOPLASTIC (24″, 90 MILS)	
T61	WHITE STOPBAR
T62	WHITE CROSSWALK LINE

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
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - DIVIDED AND UNDIVIDED ROADWAYS
1205.07	PAVEMENT MARKINGS - PEDESTRIAN CROSSWALKS
1205.09	PAVEMENT MARKINGS - PAINTED ISLANDS
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1253.01	RAISED PAVEMENT MARKERS - SNOWPLOWABLE

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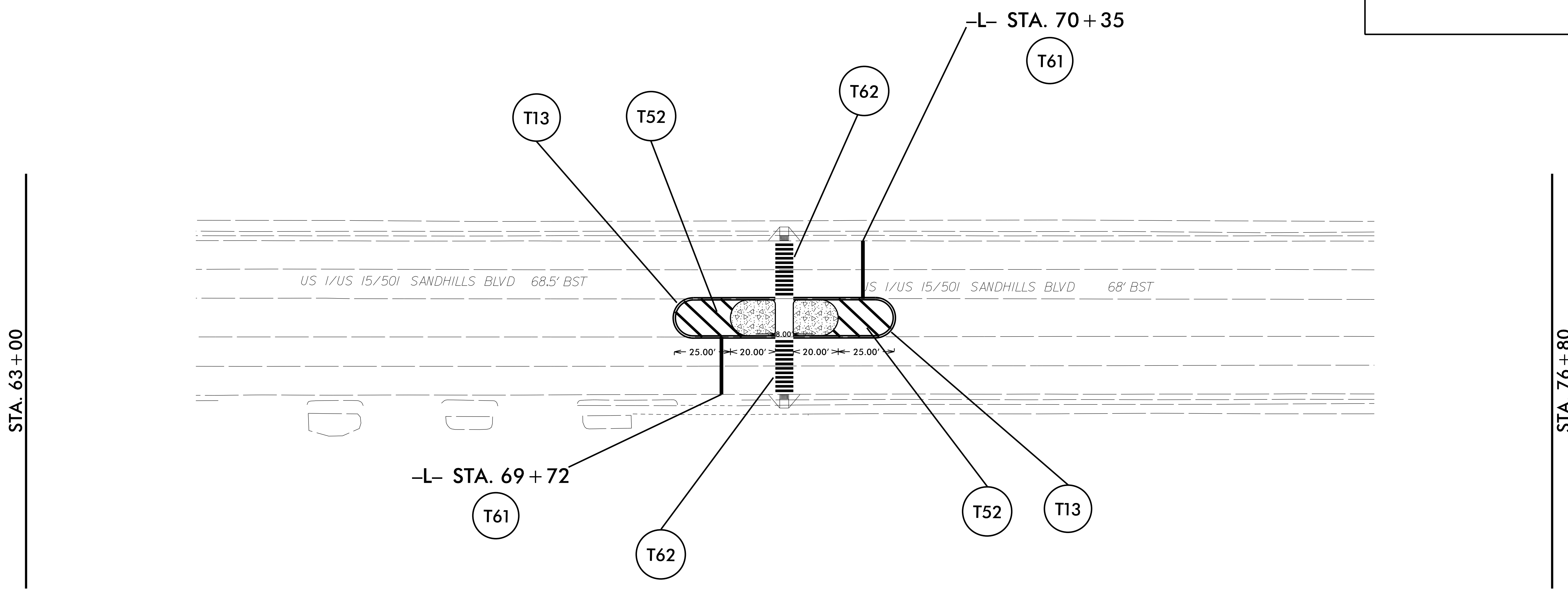
mcricketts AT DIV08-33008AL

PROJECT REFERENCE NO.	SHEET NO.
EB-5741	PMP-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Docusigned by: Michael Ricketts
SEAL 052140
MICHAEL E. RICKETTS
06/29/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PAVEMENT MARKING LINES

- (T13) THERMOPLASTIC (4" YELLOW, 90 MILS) DOUBLE CENTERLINE
- (T52) THERMOPLASTIC (12" YELLOW, 90 MILS) DIAGONALS
- (T61) THERMOPLASTIC (24" WHITE, 90 MILS) STOPBAR
- (T62) THERMOPLASTIC (24" WHITE, 90 MILS) CROSSWALK LINES

SPECIAL PAVEMENT MARKING NOTES

THE CONTRACTOR SHALL BE REQUIRED TO REMOVE ALL CONFLICTING PAVEMENT MARKINGS BY THE END OF THE WORKDAY.

THE CONTRACTOR SHALL INSTALL ALL PAVEMENT LINES AND SYMBOLS AS REQUIRED (SEE ROADWAY STANDARD DRAWINGS 1205.01 THRU 1205.12.

THE CONTRACTOR SHALL BE REQUIRED TO REPLACE ANY PAVEMENT MARKINGS, WHICH HAVE BEEN OBLITERATED BY CONSTRUCTION PROCEDURES, BY THE END OF THE WORKDAY.

THE CONTRACTOR SHALL BE REQUIRED TO COVER ALL CONFLICTING STATIONARY CONSTRUCTION SIGNING WHEN A LANE CLOSURE UTILIZING PORTABLE CONSTRUCTION SIGNS IS IN EFFECT. THE CONTRACTOR SHALL NOT HAVE AN OVERLAP IN THE SEQUENCE OF CONSTRUCTION SIGNING.

THE CONTRACTOR SHALL PLACE ALL FINAL PAVEMENT MARKING LINES AND SYMBOLS (THERMOPLASTIC ALKYD-MALEIC) USING THE EXTRUSION METHOD.

CHANGES TO PAVEMENT MARKINGS MAY AND SHALL BE MADE AT THE DIRECTION OF THE ENGINEER.

SPECIAL PAVEMENT MARKER NOTES

PAVEMENT MARKERS SHOULD NOT BE PLACED CLOSER THAN 2 INCHES TO A PAVEMENT CONSTRUCTION JOINT (AS FEASIBLE), EXCEPT WHEN PLACED BETWEEN DOUBLE YELLOW CENTER LINES, AND ALONG YELLOW SKIP LINES AND TWO-LANE, TWO-WAY ROADWAYS WHERE PASSING IS ALLOWED IN BOTH DIRECTIONS.

PAVEMENT MARKERS SHALL NOT BE PLACED DIRECTLY ON PAVEMENT MARKING LINES.

PAVEMENT MARKERS USED IN CONJUNCTION WITH DOUBLE YELLOW CENTER LINES SHALL BE PLACED MID-WAY BETWEEN THE LINES, PROVIDED WITH A GAP BETWEEN THE LINES AND THE MARKER TO REDUCE OVERSPRAYING THE MARKER DURING THE REPAINTING OPERATIONS.

MARKERS ARE NOT REQUIRED ALONG MINI-SKIP LINES IN TAPERS.

CHANGES TO PAVEMENT MARKERS MAY AND SHALL BE MADE AT THE DIRECTION OF THE ENGINEER.

REVISIONS

8/17/99

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PROJ. REFERENCE NO.	SHEET NO.
EB-5741	TMP-1

GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS, OR RESULT IN DUPLICATE, OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING OR REMOVAL OF DEVICES, AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

TIME RESTRICTIONS

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTION
US 1/15/501	MONDAY THRU THURSDAY 6:00 AM - 9:00 PM (NIGHT WORK ONLY) 6:00 AM FRIDAY THRU 9:00 PM SUNDAY NO WORK PERMITTED

B) DO NOT CLOSE OR NARROW TRAVEL LANES DURING HOLIDAYS AND SPECIAL EVENTS AS FOLLOWS:

ROAD NAME

US 1/15/501

HOLIDAY

1. FOR ANY UNEXPECTED OCCURRENCE THAT CREATES UNUSUALLY HIGH TRAFFIC VOLUMES, AS DIRECTED BY THE ENGINEER.
2. FOR NEW YEAR'S, BETWEEN THE HOURS OF 5:00 P.M. DECEMBER 31st TO 8:30 A.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 8:30 A.M. THE FOLLOWING TUESDAY.
3. FOR EASTER, BETWEEN THE HOURS OF 5:00 P.M. THURSDAY AND 8:30 A.M. MONDAY.
4. FOR MEMORIAL DAY, BETWEEN THE HOURS OF 5:00 P.M FRIDAY TO 8:30 A.M. TUESDAY.
5. FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 5:00 P.M. THE DAY BEFORE INDEPENDENCE DAY AND 8:30 A.M. THE DAY AFTER INDEPENDENCE DAY.

   IF INDEPENDENCE DAY IS ON A FRIDAY, SATURDAY, SUNDAY OR MONDAY THEN BETWEEN THE HOURS OF 5:00 P.M. THE THURSDAY BEFORE INDEPENDENCE DAY AND 8:30 A.M. THE TUESDAY AFTER INDEPENDENCE DAY.
6. FOR LABOR DAY, BETWEEN THE HOURS OF 5:00 P.M. FRIDAY AND 8:30 A.M. TUESDAY.
7. FOR THANKSGIVING DAY, BETWEEN THE HOURS OF 5:00 P.M. TUESDAY TO 8:30 A.M. MONDAY.
8. FOR CHRISTMAS, BETWEEN THE HOURS OF 5:00 P.M. THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 8:30 A.M. THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS.

C) DO NOT CONDUCT ANY HAULING OPERATIONS AGAINST THE FLOW OF TRAFFIC OF AN OPEN TRAVELWAY UNLESS THE HAULING OPERATION IS PROTECTED BY BARRIER OR GUARDRAIL OR AS DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

D) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED, OR AS DIRECTED BY THE ENGINEER.

E) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.

F) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

G) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

H) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

PAVEMENT EDGE DROP OFF REQUIREMENTS

I) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

J) DO NOT EXCEED A DIFFERNCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING " UNEVEN LANES" SIGNS (W8-1) 500 FT IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THOUGHOUT THE UNEVEN AREA.

TRAFFIC PATTERN ALTERATIONS

K) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

L) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

M) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

N) SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER THAN TWICE THE POSTED SPEED LIMIT (MPH), EXCEPT 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY, WHEN LANE CLOSURES ARE NOT IN EFFECT. WHEN SKINNY DRUMS ARE ALLOWED, REFER TO SECTION 1180 OF STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES OR AS SHOWN IN THE PLANS.

O) PLACE ADDITIONAL SETS OF THREE CHANNELIZING DEVICES (DRUMS, CONES OR SKINNY DRUMS) PERPENDICULAR TO THE EDGE OF TRAVELWAY ON 500 FT CENTERS WHEN UNOPENED LANES ARE CLOSED TO TRAFFIC.

PAVEMENT MARKINGS AND MARKERS

P) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
NB US 1/15/501	THERMO	SNOWPLOWABLE
SB US 1/15/501	THERMO	SNOWPLOWABLE

Q) INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY PAVEMENT MARKERS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
NB US 1/15/501	PAINT	N/A
SB US 1/15/501	PAINT	N/A

R) PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INITIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.

S) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

T) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

U) TRACE THE EXISTING AND PROPOSED MONOLITHIC ISLAND LOCATIONS WITH PROPER COLOR PAVEMENT MARKINGS PRIOR TO REMOVAL AND INSTALLATION. PLACE DRUMS TO DELINEATE ANY AN EXISTING AND PROPOSED MONOLITHIC ISLANDS AFTER REMOVAL AND BEFORE INSTALLATION

APPROVED: _____ DATE: _____

SEAL
052140
NORTH CAROLINA PROFESSIONAL ENGINEER MICHAEL F. RICKETTS

Docusigned by: Michael Ricketts 3B420DAD...

07/07/2023

DIVISION OF HIGHWAYS • STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION • WORK ZONE TRAFFIC CONTROL

TRANSPORTATION MANAGEMENT PLAN

GENERAL NOTES

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PROJ. REFERENCE NO.	SHEET NO.
EB-5741	TMP-2

MANAGEMENT STRATEGIES

– US 1/15/501 TRAFFIC WILL BE MAINTAINED THROUGH LANE CLOSURES AT NIGHT.

– THE EXISTING TWO WAY LEFT TURN LANE WILL BE CLOSED FOR THE CONSTRUCTION OF THE MEDIAN CONCRETE ISLANDS AND FINAL MARKINGS.

PHASING

STEP 1:
INSTALL WORK ZONE ADVANCE WARNING SIGNS IN ACCORDANCE WITH NCDOT ROADWAY STANDARD DRAWING NO. 1101.01. WHEN NO WORK IS BEING CONDUCTED FOR A PERIOD LONGER THAN ONE WEEK, REMOVE OR COVER ALL ADVANCE WORK ZONE SIGNS, AS DIRECTED BY THE ENGINEER.

STEP 2:
CONTRACTOR SHALL UTILIZE LANE CLOSURES ON US 1/15/501 TO MAINTAIN TRAFFIC.

USING NCDOT STANDARD DRAWING NO. 1101.02 (SHEET 3 OF 14) FOR RIGHT LANE CLOSURES, BEGIN CONSTRUCTION OF MAST ARM SIGNALS AND OTHER ASSOCIATED ITEMS.

NOTE:
AT THE END OF EACH WORK DAY, CONTRACTOR SHALL OPEN ALL NB AND SB THRU LANES TO TRAFFIC.

STEP 3:
CLOSE TWO WAY LEFT TURN LANE AND CONSTRUCT CONCRETE MEDIAN ISLANDS IN THE EXISTING TWO WAY LEFT TURN LANE.

USING NCDOT STANDARD DRAWING NO. 1101.02 (SHEET 7 OF 14) FOR CENTER LANE CLOSURES, BEGIN CONSTRUCTION OF MEDIAN CONCRETE ISLANDS AND PAVEMENT MARKINGS.

STEP 4:

COMPLETE FINAL PAVEMENT MARKINGS AND MARKERS ON US 1/15/501.

STEP 5:

REMOVE ALL WORK ZONE TRAFFIC CONTROL DEVICES AND OPEN US 1/15/501 TO FINAL TRAFFIC PATTERN.
CROSSWALK SHALL NOT BE IN OPERATION UNTIL ALL WORK IS COMPLETE.

APPROVED: _____ DATE: _____

SEAL
Michael Ricketts
Digitally signed by:
NORTH CAROLINA PROFESSIONAL SEAL 052140 ENGINEER MICHAEL E. RICKETTS
06/29/2023

DIVISION OF HIGHWAYS · STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION · WORK ZONE TRAFFIC CONTROL

TEMPORARY TRAFFIC CONTROL PHASING

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mericketts AT DW08-330084L

Project: EB–5741

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

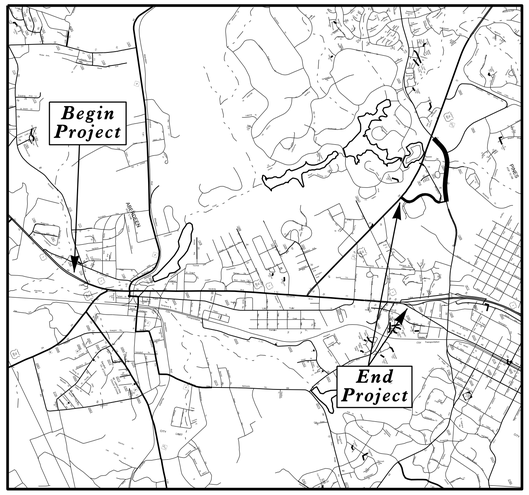
Project No.	Sheet No.
EB–5741	Sig. 1.0

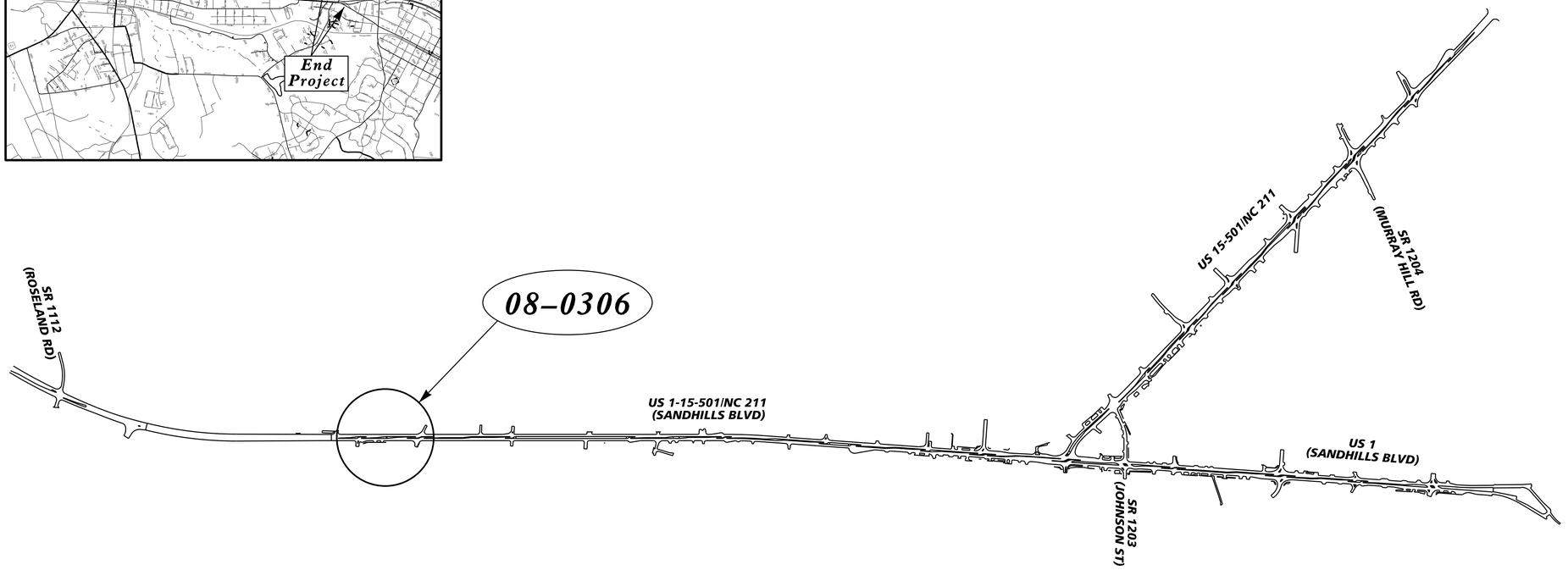
MOORE COUNTY

LOCATION: US 1–15–501/NC 211 (SANDHILLS BLVD) AT ABERDEEN GREENWAY TRAIL CROSSING

TYPE OF WORK: TRAFFIC SIGNALS

Vicinity





Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1.0	--------	Title Sheet
Sig. 1.1–1.2	--------	Standard Plate Sheets
Sig. 2.0–2.4	08–0306	Pedestrian Hybrid Beacon on US 1–15–501/NC 211 (Sandhills Boulevard) at Aberdeen Greenway
M1–M8	--------	Standard Metal Pole Sheets

TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS UNIT

Contacts:

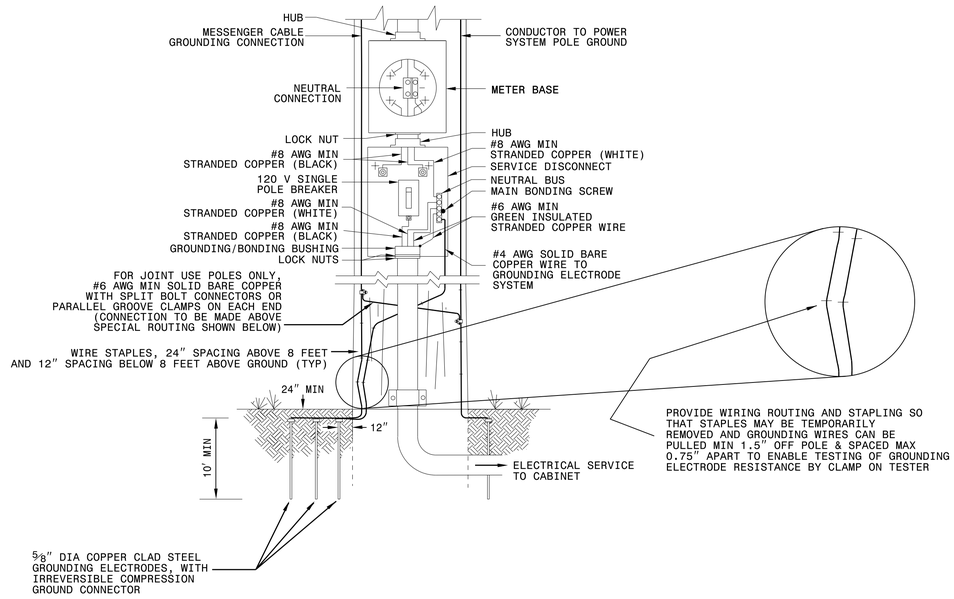
Robert J. Ziemba, PE – Central Region Signals Engineer
Ryan W. Hough, PE – Signal Equipment Design Engineer

Prepared In the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY & SAFETY DIVISION

TSMO UNIT

750 N. Greenfield Parkway, Garner, NC 27529

PROJECT NO.	SHEET NO.
EB-5741	Sig. 1.1



1-18

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

ENGLISH STANDARD DRAWING FOR

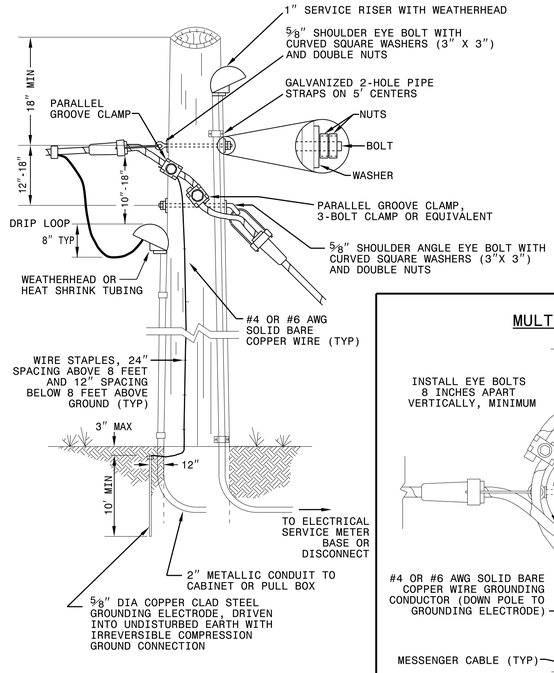
ELECTRICAL SERVICE GROUNDING

GROUNDING AND BONDING

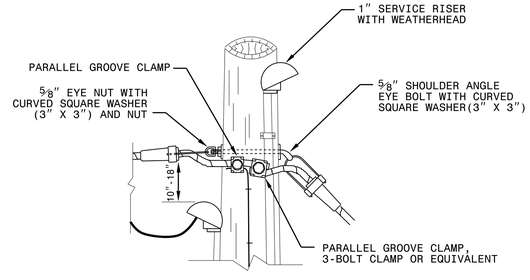
SHEET 1 OF 1

1700D01

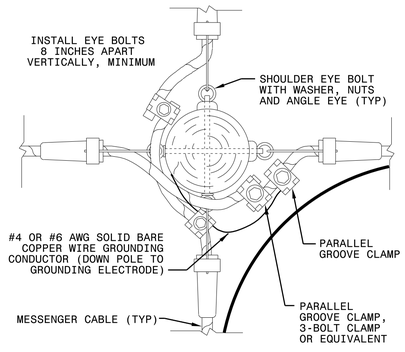
TWO-BOLT METHOD (PREFERRED)



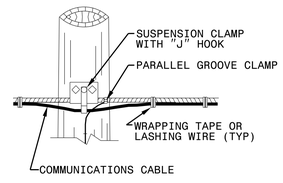
ONE-BOLT METHOD



MULTIPLE SPANS



COMMUNICATIONS CABLE AT INTERMEDIATE POLE



NOTE

FOR CONNECTING MESSENGER TO MESSENGER, USE PARALLEL GROOVE CLAMP, 3-BOLT CLAMP OR EQUIVALENT. FOR CONNECTING COPPER WIRE TO MESSENGER, USE PARALLEL GROOVE CLAMP.

1-18

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

ENGLISH STANDARD DRAWING FOR

WOOD POLES

METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1

1720D01

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

See Plate for Title

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Unit

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 032108 ENGINEER MOHD A. ASLAMI

DocuSigned by: Mohd Aslami
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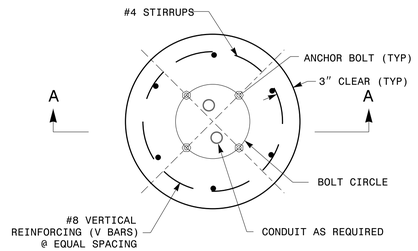
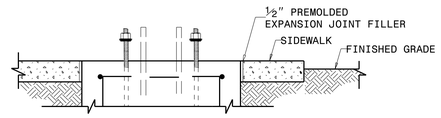
PROJECT NO.	SHEET NO.
EB-5741	Sig. 1.2



PEDESTAL FOUNDATION - PLAN VIEW

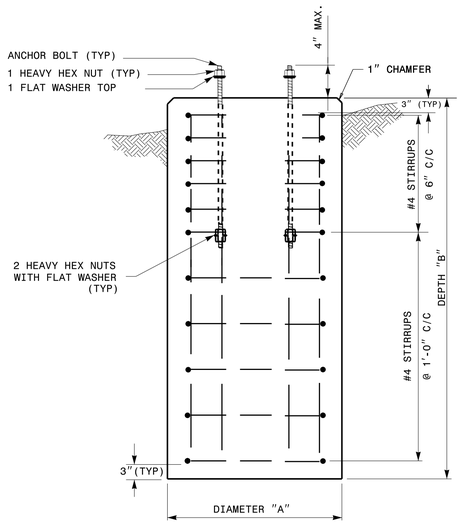


PEDESTAL FOUNDATION DETAILS FOR SIDEWALK

NOTES:

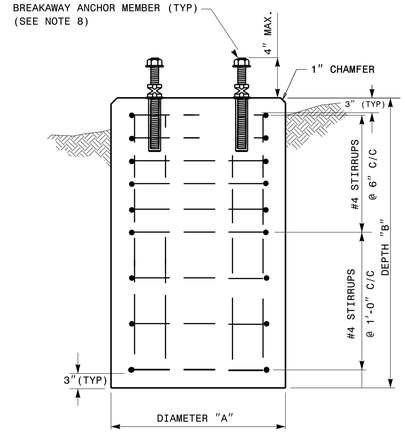
1. CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
2. COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
3. USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF F'c= 3000 PSI (MIN.).
4. USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
5. GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
   A. SANDY TYPE SOIL
   B. NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
   C. WIND SPEED NOT TO EXCEED 140 MPH

   IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.
6. MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
7. ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
8. USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4½" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6⅝". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.



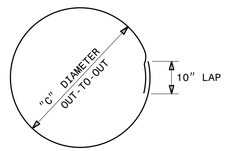
TYPES I, II & III

SECTION A-A

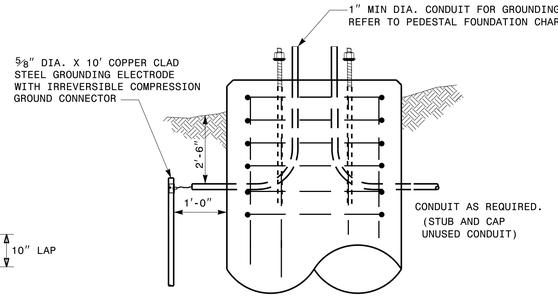


TYPES I & II ONLY

SECTION A-A



CLOSED HOOPS



GROUNDING & CONDUIT DETAIL

PEDESTAL FOUNDATION TYPE AND SIZE

TYPE	PEDESTAL DESCRIPTION	SIZE			ANCHOR BOLT		INSTALL GROUNDING SYSTEM (YES/NO)
		DIAMETER "A" FT	DEPTH "B" FT	CONCRETE VOLUME CY	DIAMETER (MIN.) IN	LENGTH FT-IN	
I	PEDESTRIAN PUSHBUTTON	2'-0"	3'-6"	.41	½	1'-6"	NO
II	NORMAL-DUTY	2'-0"	5'-0"	.58	¾	2'-0"	YES
III	HEAVY-DUTY	2'-6"	7'-0"	1.27	1	4'-0"	YES

REINFORCING STEEL SCHEDULE

TYPE	V-BAR				STIRRUP								TOTAL STEEL WEIGHT LBS
	SIZE #	QTY	LENGTH	WEIGHT LBS	SIZE #	QUANTITY VERTICAL SPACING ON 6" CENTERS	QUANTITY VERTICAL SPACING ON 12" CENTERS	QUANTITY TOTAL	LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	
I	8	6	3'-0"	56	4	0	4	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	8	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	11	7'-2"	2'-0"	0'-10"	53	175

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

1-18

ENGLISH STANDARD DRAWING FOR

PEDESTALS

FOUNDATIONS

SHEET 1 OF 1

1743D01

See Plate for Title

Prepared in the Offices of:

Transportation Mobility and Safety Division
ITS & Signals Unit
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N. Greenfield Parkway
Garner, NC 27529

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
028094
ENGINEER
DEBESH C. SARKAR

DocuSigned by:
Debesh C. Sarkar
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DATE

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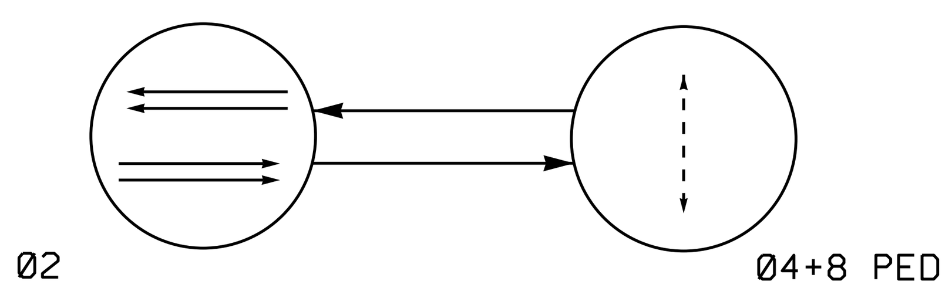
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

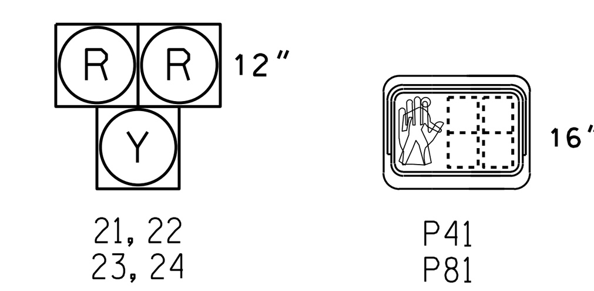
SIGNAL FACE	PHASE: Ø2 DARK	ACTIVATION	STEADY YELLOW	ALL RED	Ø4+8 PED WALK	Ø4+8 PED CLEAR	FLASH
21, 22	DRK	FY	Y	R	R	FR*	Y
23, 24	DRK	FY	Y	R	R	FR*	Y
P41	DW	DW	DW	DW	W	DW	DRK
P81	DW	DW	DW	DW	W	DW	DRK

* Alternating Flash

Y - Steady Yellow
FY - Flashing Yellow
R - Steady Red
FR - Flashing Red
W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.

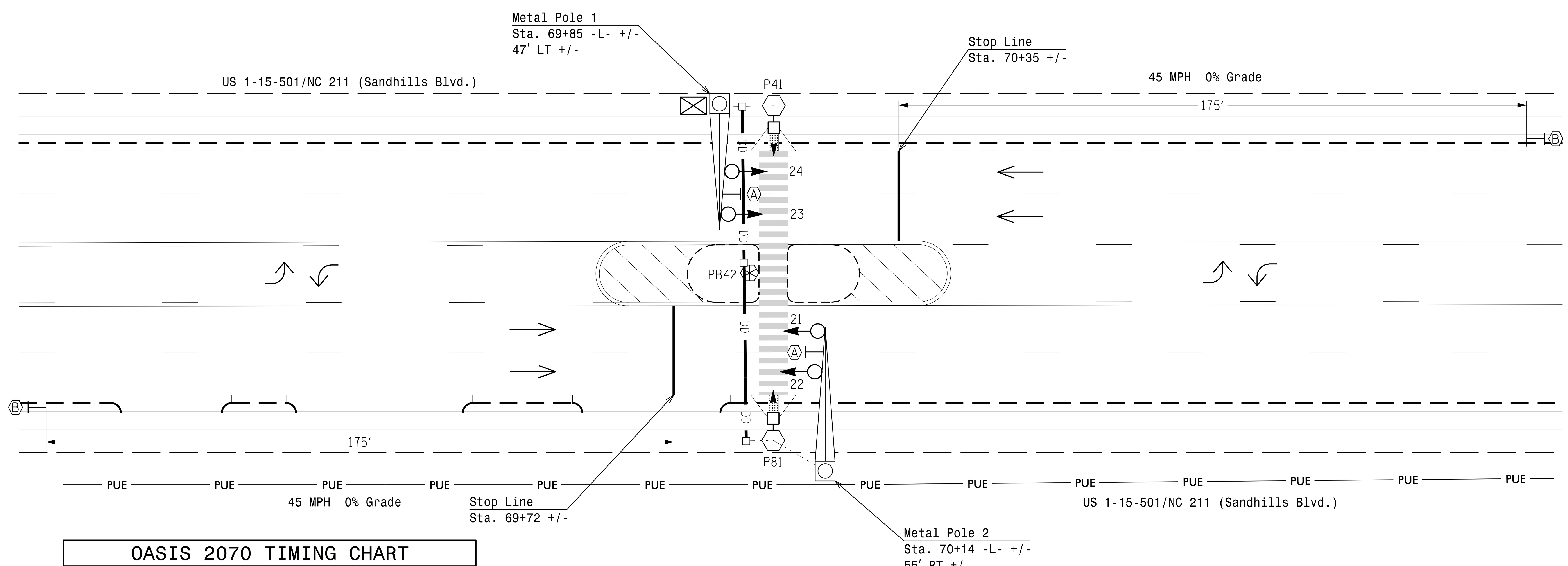
All Heads L.E.D.



2 Phase
Semi-Actuated
Pedestrian Hybrid Beacon
(Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
3. Enable Ped Yellow Clear for phase 4 PED and phase 8 PED.
4. Locate Pedestrian and Crosswalk advance signs in accordance with Table 2C-4 in Section 2C.05 of the 2009 MUTCD or as otherwise directed by the Engineer.



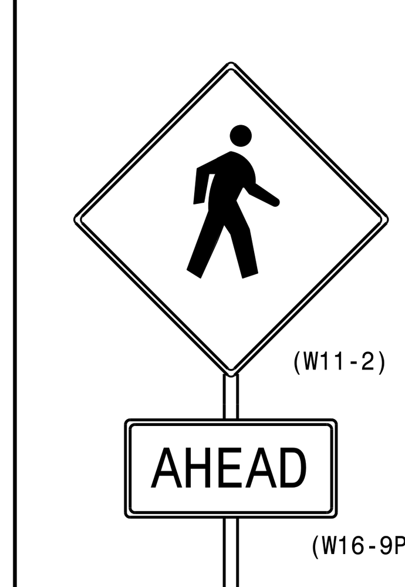
OASIS 2070 TIMING CHART

FEATURE	PHASE 2	4 PED	8 PED	OLA
Min Green 1 *	12	7	7	5.0
Extension 1 *	0.0	0.0	0.0	
Max Green 1 *	30	0	0	
Yellow Clearance	5.0	3.0	3.0	4.5
Red Clearance	2.0	0.0	0.0	2.0
Walk 1 *	-	7	7	
Don't Walk 1	-	17	17	
Seconds Per Actuation *	-	-	-	
Max Variable Initial *	-	-	-	
Time Before Reduction *	-	-	-	
Time To Reduce *	-	-	-	
Minimum Gap	-	-	-	
Recall Mode	MAX RECALL	-	-	
Vehicle Call Memory	-	-	-	
Dual Entry	-	-	-	
Simultaneous Gap	ON	ON	ON	

Serves as Flashing Yellow Time (Phase 2 Yellow Clearance)
Serves as Steady Yellow Clearance Time (OLA Yellow Clearance)
Serves as All Red Clearance Time (OLA Red Clearance)

* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 2 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Figure 1



This plan supersedes the plan signed and sealed on 6/20/22.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
PUE	Permanent Utility Easement	N/A
DD	Directional Drill	N/A
N/A	Curb Ramp	
	Metal Pole with Mastarm	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
A	"CROSSWALK-STOP ON RED" Ball Sign (R10-23)	A
B	Pedestrian Warning Sign (W11-2) w/ "AHEAD" Plaque (W16-9P) (See Figure 1)	B

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

Pedestrian Hybrid Beacon on US 1-15-501/NC 211 (Sandhills Boulevard) at Aberdeen Greenway

Division 8 | Moore County | Aberdeen

PLAN DATE:	August 2022	REVIEWED BY:
PREPARED BY:	J.A. Lohr	REVIEWED BY:

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA
DocuSigned by:
09/19/2022
DATE
SIG. INVENTORY NO. 08-0306

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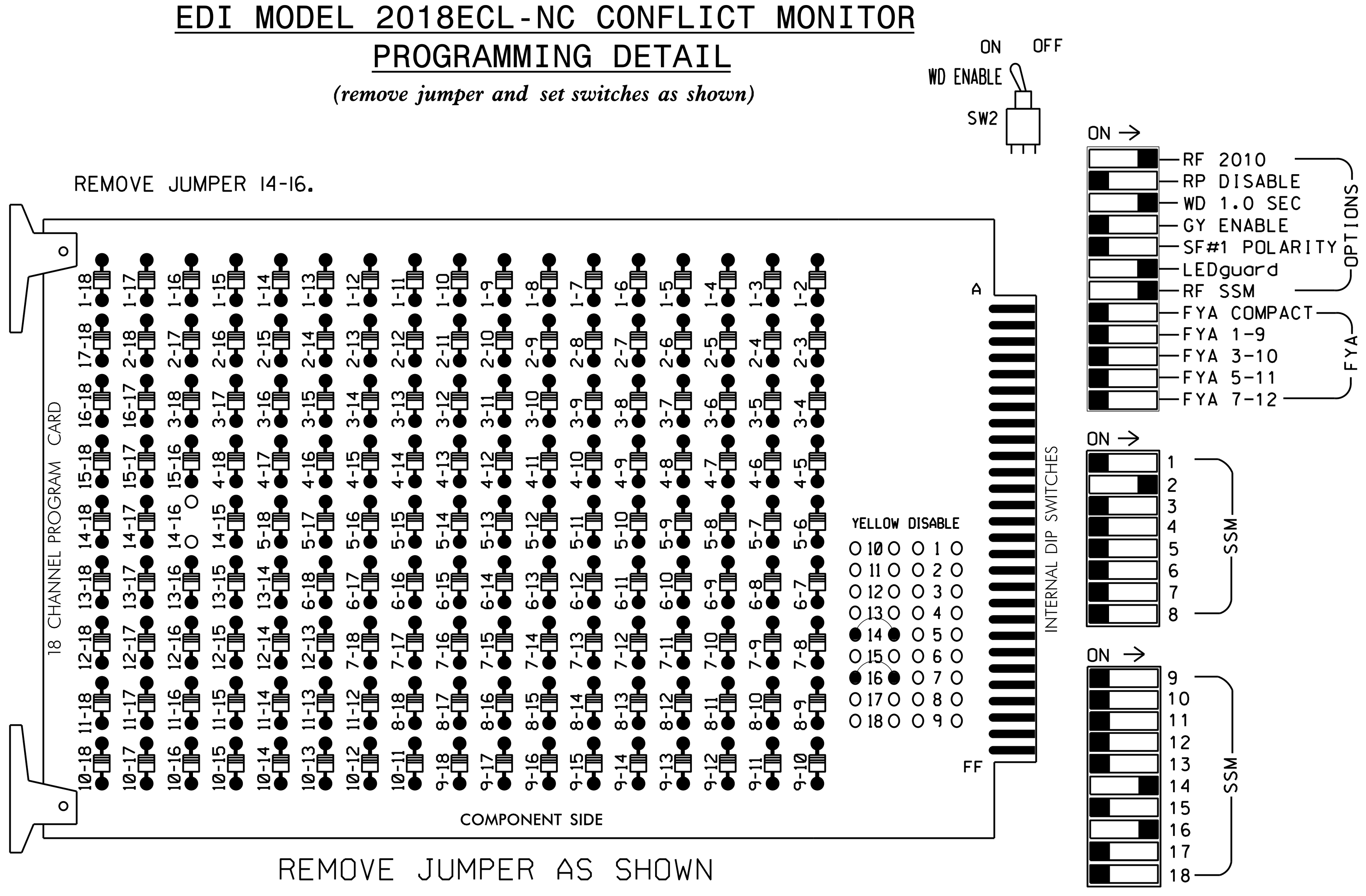
rziemba

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



REMOVE JUMPER AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.
5. BE SURE TO INSTALL YELLOW DISABLE JUMPER FOR CHANNELS 14 (4 PED) AND 16 (8PED).

NOTES

1. Insert yellow flash program blocks for phases 1 and 2. Insert red flash program blocks for all remaining unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Program Phases 4 and 8 for Ped Yellow Clear.
3. Program phase 2 for Startup In Green.
4. Program phases 4 and 8 for Startup Ped Call.
5. Program Phase 2 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER..............2070
CABINET.................332
SOFTWARE................ECONOLITE OASIS
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S1,S2,S6,S12
PHASES USED.............2,4*,8*,4PED,8PED
OVERLAP "A".............2**
OVERLAP "B".............NONE
OVERLAP "C".............NONE
OVERLAP "D".............NONE

* Phase used for timing purposes only.

** Used to control clearance intervals.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	OLA DUP.	2 / OLA	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	21,22 23,24	21,22 23,24	NU	NU	NC	P41	NU	NU	NU	NU	NC	P81
RED	125	128										
YELLOW	*	129										
GREEN	*	*										
RED ARROW												
YELLOW ARROW												
GREEN ARROW												
(Don't walk)						104						110
(Walk)						106						112

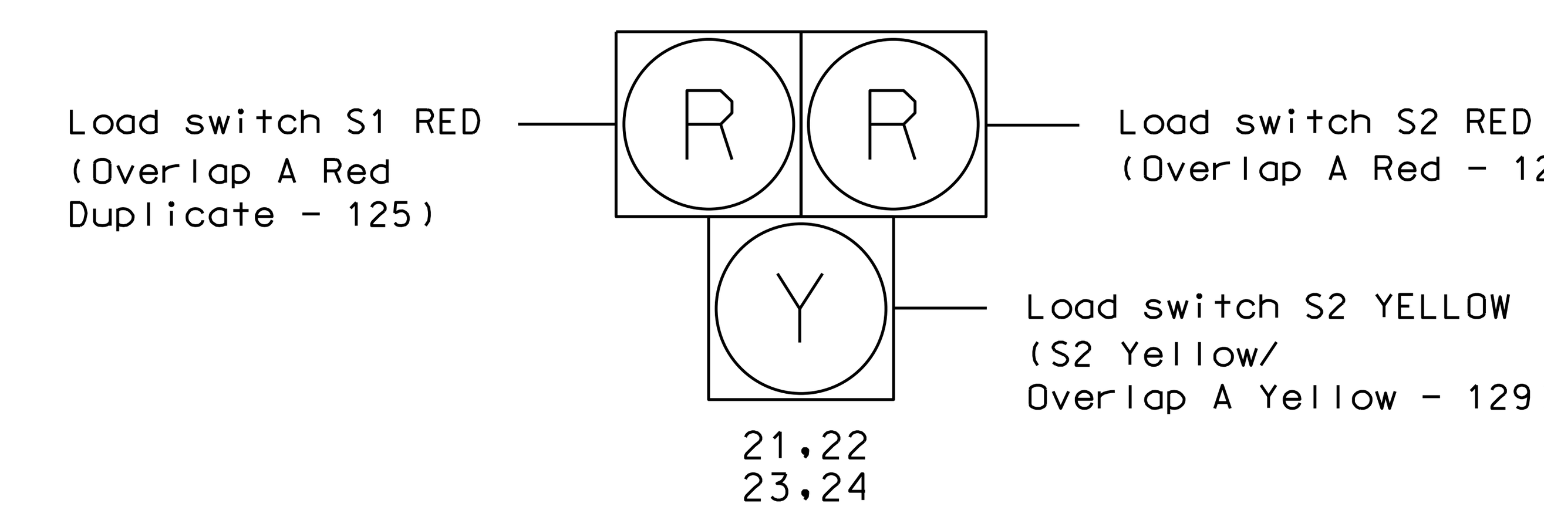
NU = Not Used

NC = Not Connected

* Denotes install load resistor. See load resistor installation detail on sheet 3.

SIGNAL HEAD WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	NOT USED	FS DC ISOLATOR
	L												Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
PED PUSH BUTTONS											
P41	TB8-5,6	I12L	69	31	PED 4	4/8 PED *					
P81	TB8-8,9	I13L	70	32	PED 8	8/4 PED *					

NOTE:
INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.

INPUT FILE POSITION LEGEND: I2L
FILE I
SLOT 2
LOWER

* See Pedestrian Detector Programming Detail on Sheet 3.

OPERATIONAL NOTES

1. In order for the controller to perform the "Pedestrian Hybrid Beacon" (aka. HAWK signal) sequence, special logic and output programming is necessary. See programming details on sheet 2 of this electrical detail.
2. The modified Phase 2 Yellow output is used to produce the flashing yellow clearance. The Overlap 'A' yellow output has been remapped to the phase 2 yellow output to produce the steady yellow clearance interval and time for this interval shall be implemented in Overlap 'A' Yellow Clear timing. See the signal plan for timing values.
3. Phase 2 Yellow Clear and Overlap 'A' GREEN EXTENSION times <u>must</u> be equal. This is necessary so that when flashing yellow clear ends the steady yellow clear begins.
4. Phases 4 and 8 Red Clear times <u>must</u> be set to 0.0 sec.
5. The Ped 4 push button is programmed to call Ped 4 and Ped 8, and the Ped 8 push button is programmed to call Ped 8 and Ped 4.

This plan supersedes the plan signed and sealed on 06/21/22.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0306
DESIGNED: August 2022
SEALED: 09/19/2022
REVISED:

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy.Garner,NC 27529

Pedestrian Hybrid Beacon on US 1-15-501/NC 211 (Sandhills Boulevard) at Aberdeen Greenway

Division 8 Moore County Aberdeen

PLAN DATE: September 2022 REVIEWED BY:
PREPARED BY: S.Kirkpatrick REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 430320FAA2654C3... DATE 09/20/2022

SIG. INVENTORY NO. 08-0306

PROJECT REFERENCE NO.	SHEET NO.
EB-5741	Sig. 2.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL PEDESTRIAN HYBRID BEACON SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  PED CLEAR ON PHASE #4   IS ON
AND OUTPUT  ASSIGNMENT #1   IS ON

SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #11 OFF
```

NOTE: LOGIC TO PRODUCE ALTERNATING FLASHING RED INDICATIONS ON HEADS 21, 22, 23, 24 DURING PED 4+8 CLEAR.

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  PED CLEAR ON PHASE #4   IS ON
AND OUTPUT  ASSIGNMENT #1   IS OFF

SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #14 OFF
```

NOTE: LOGIC TO PRODUCE ALTERNATING FLASHING RED INDICATIONS ON HEADS 21, 22, 23, 24 DURING PED 4+8 CLEAR.

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  VEH CALL ON PHASE  #4   IS ON
OR  VEH CALL ON PHASE  #8   IS ON

SCROLL DOWN
THEN:
SET INPUT   ASSIGNMENT  #31 ON
```

NOTE: LOGIC TO ENSURE THAT PHASE 4 PED AND PHASE 8 PED ARE ALWAYS SERVED WITH PHASE 4 VEHICLE AND PHASE 8 VEHICLE

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

I/O REFERENCE SCHEDULE

OUTPUT 1 = PHASE 4 DON'T WALK
OUTPUT 11 = OLA RED
OUTPUT 14 = OLA RED (DUPLICATE)
INPUT 31 = PHASE 4 & 8 PED CALL

OUTPUT REMAPPING DETAIL FOR SPECIAL PEDESTRIAN HYBRID BEACON SEQUENCE

(program controller as shown)

NOTE: THIS CHANGE REASSIGNS THE PHASE 2 VEHICLE RED OUTPUT AS OVERLAP 'A' RED AND IS USED TO DRIVE LOAD SWITCH S2 RED.

FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS).
WITH CURSOR IN "OUTPUT ASSIGNMENT#" POSITION, ENTER "11"

```
PAGE:1  C1 PIN:12  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................11
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

THIS OUTPUT IS DEFAULTED AS A VEHICLE PHASE. THIS SETTING WILL REMAIN UNTIL CHANGE IS MADE.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:12  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER ENTERING DATA, THEN 'ESC'.

PRESS "+" KEY TO ADVANCE TO OUTPUT 12

NOTE: THIS CHANGE MODIFIES THE PHASE 2 YELLOW LOAD SWITCH OUTPUT TO FLASH AND WILL PRODUCE THE OUTPUT FOR THE FLASHING YELLOW CLEARANCE INTERVAL.

```
PAGE:1  C1 PIN:13  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................12
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...1.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...50
MODE (0=SOLID,1=FLASH)..............1
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP.....................
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

MODIFY DATA AS SHOWN TO MAKE OUTPUT 12 (PHASE 2 YELLOW) A FLASHING OUTPUT

PRESS "+" KEY TWICE TO ADVANCE TO OUTPUT 14

NOTE: THIS CHANGE REASSIGNS THE PHASE 1 VEHICLE RED OUTPUT AS OVERLAP 'A' RED DUPLICATE AND IS USED TO DRIVE LOAD SWITCH S1 RED.

```
PAGE:1  C1 PIN:16  VEHICLE PHASE
OUTPUT ASSIGNMENT #.................14
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................Y
PEDESTRIAN PHASE....................
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

THIS OUTPUT IS DEFAULTED AS A VEHICLE PHASE. THIS SETTING WILL REMAIN UNTIL CHANGE IS MADE.

ENTER A "Y" FOR VEHICLE OVERLAP.

```
PAGE:1  C1 PIN:16  VEHICLE PHASE
SELECT VEHICLE OVERLAP (A=1,P=16)...1
SELECT COLOR(0=RED,1=YEL,2=GRN).....0
```

WHEN A 'Y' IS ENTERED FOR 'VEHICLE PHASE' THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN.

PRESS THE 'ENT' KEY AFTER ENTERING DATA, THEN 'ESC'.

PRESS "+" KEY TO MULTIPLE TIMES TO ADVANCE TO OUTPUT 51

CHANGE C1 PIN NUMBER FROM 98 TO 13 AS SHOWN

NOTE: THIS CHANGE REMAPS THE OVERLAP 'A' YELLOW OUTPUT TO THE SAME C1 PIN AS PHASE 2 YELLOW AND WILL PRODUCE THE OUTPUT FOR THE STEADY YELLOW CLEARANCE.

```
PAGE:1  C1 PIN:13  VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.................51
FREQUENCY (0=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (0=DEFAULT) (0 - 100%)...0
MODE (0=SOLID,1=FLASH)..............0
SELECT ASSIGNMENT:
NOT ENABLED.........................
VEHICLE PHASE.......................
PEDESTRIAN PHASE...................._
VEHICLE OVERLAP.....................Y
PEDESTRIAN OVERLAP.................._
WATCHDOG............................_
DETECTOR RESET......................_
ADVANCE BEACON......................_
OUT OF PHASE FLASHER................_
CONTROLLER FLASH...................._
RUN FREE............................_
RESERVED............................_
PREEMPT............................._
SOFT PREEMPT........................_
ANY PREEMPT........................._
COORDINATION PLAN..................._
OFFSET.............................._
PHASE CHECK........................._
PHASE ON............................_
PHASE NEXT.........................._
```

OUTPUT PROGRAMMING COMPLETE

This plan supersedes the plan signed and sealed on 06/21/22.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0306
DESIGNED: August 2022
SEALED: 09/19/2022
REVISED:

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of:
Transportation Mobility and Safety Division — ITS & Signals Management Section — State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

Pedestrian Hybrid Beacon on US 1-15-501/NC 211 (Sandhills Boulevard) at Aberdeen Greenway

Division 8 | Moore County | Aberdeen

PLAN DATE: September 2022	REVIEWED BY:
PREPARED BY: S.Kirkpatrick	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036833 RYAN W. HOUGH

DocuSigned by: Ryan W. Hough
430320EAA2654C3...
09/20/2022
DATE

SIG. INVENTORY NO. 08-0306

PROJECT REFERENCE NO.	SHEET NO.
EB-5741	Sig.2.3

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```
 PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
 PHASE:          ¦12345678910111213141516
VEH OVL PARENTS:¦ X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦ X
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........5
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..4.5
RED CLEAR (0=PARENT,0.1-25.5 SEC)...2.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

NOTICE TIMING INTERVALS ← THESE COME FROM THE SIGNAL PLAN

OVERLAP PROGRAMMING COMPLETE

TIMING INTERVAL

PHASE 2 GREEN REST = Dark Display

PHASE 2 YELLOW CLEAR TIME = Flashing Yellow Display

OVERLAP 'A' YELLOW CLEAR TIME = Steady Yellow Display

OVERLAP 'A' RED CLEAR TIME = Steady Red Display

PHASE 4+8 WALK = Steady Red Display

PHASE 4+8 PED CLEAR = Alternating Flashing Red Display

PHASE 4+8 VEH YEL CLR = Alternating Flashing Red Display

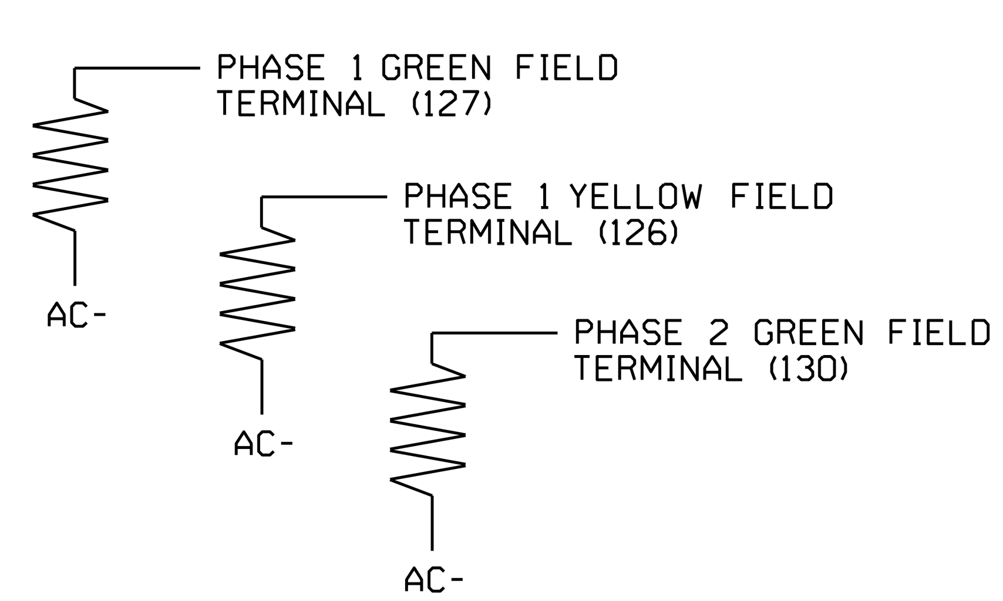
PHASE 4+8 VEH RED CLR = Alternating Flashing Red Display

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



PEDESTRIAN DETECTOR ASSIGNMENT PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS). PRESS '+' UNTIL PED DETECTOR #4 IS REACHED.

```
PED DETECTOR #4  SETTINGS   (+/- DET)
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦   X   X
SETTING:                          (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................Y
ENABLE DIAGNOSTICS..................N
RECALL IF FAILED....................Y
MAX CALLS/MINUTE (0-255)............255
MAX CALLS/DIAG PERIOD (0-255).......0
MAX OCCUPANCY % (0-100%)............100
```

PRESS '+' UNTIL PED DETECTOR #8 IS REACHED

```
PED DETECTOR #8  SETTINGS   (+/- DET)
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦   X   X
SETTING:                          (Y/N)
ENABLE DETECTOR.....................Y
ENABLE LOGGING......................Y
ENABLE DIAGNOSTICS..................N
RECALL IF FAILED....................Y
MAX CALLS/MINUTE (0-255)............255
MAX CALLS/DIAG PERIOD (0-255).......0
MAX OCCUPANCY % (0-100%)............100
```

PROGRAMMING COMPLETE

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

This plan supersedes the plan signed and sealed on 06/21/22.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0306
DESIGNED: August 2022
SEALED: 09/19/2022
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Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: ITS & Signals Management Section, Transportation Mobility and Safety Division, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy.Garner,NC 27529

Pedestrian Hybrid Beacon on US 1-15-501/NC 211 (Sandhills Boulevard) at Aberdeen Greenway

Division 8 | Moore County | Aberdeen

PLAN DATE: September 2022	REVIEWED BY:
PREPARED BY: S.Kirkpatrick	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

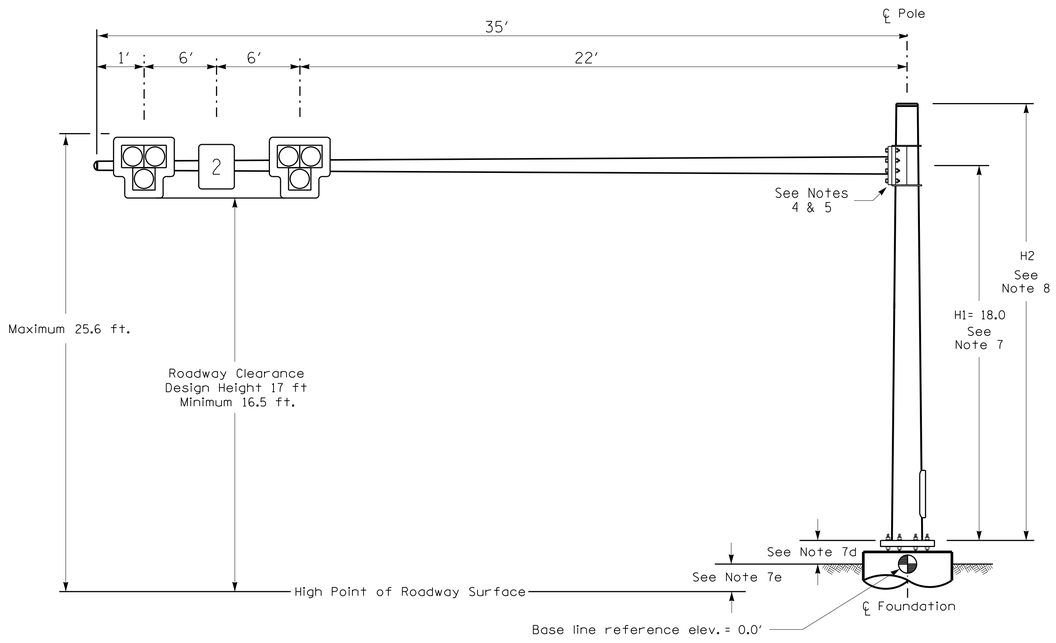
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036833 ENGINEER RYAN W. HOUGH

DocuSigned by: Ryan W. Hough 09/20/2022
430320FAA2654C3...
DATE

SIG. INVENTORY NO. 08-0306

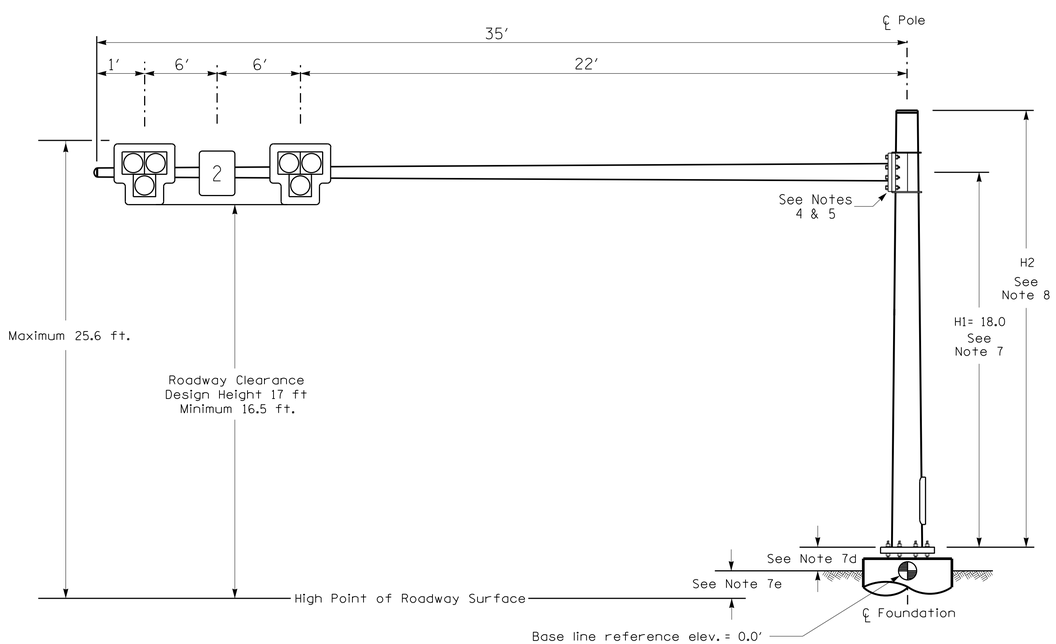
20-SEP-2022 14:51
S:*ITS&SU*ITS Signals*Workgroups*Sig Man*Projects From Signal Design*Active Projects*Kirkpatrick*08-0306*080306_sm_ele_20220920.dgn
sgkirkpatrick

Design Loading for METAL POLE NO. 1



Elevation View

Design Loading for METAL POLE NO. 2



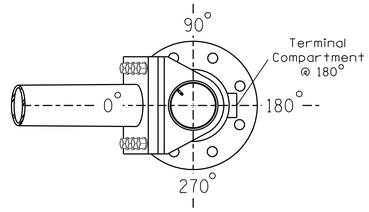
Elevation View

SPECIAL NOTE

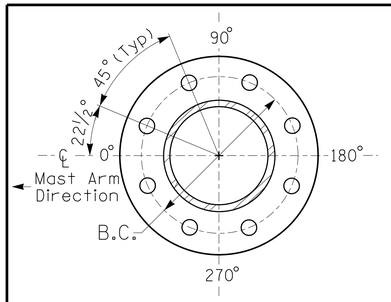
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at ℄ Foundation @ ground level ⊕	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-0.2 ft.	+0.1ft.
Elevation difference at Edge of travelway or face of curb	+0.5 ft.	+1.2 ft.

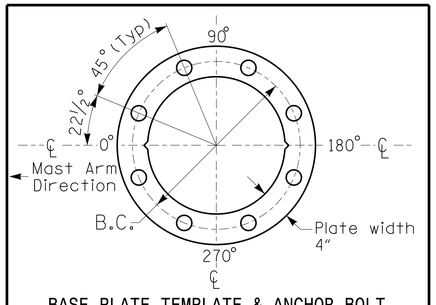


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
▭	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	10.0 S.F.	38.0" W X 38.0" L	70 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal 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 the specifications can be found in the traffic signal project special provisions.
   - The 2018 NCDOT Roadway Standard Drawings.
   - The traffic signal 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 traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. The camber design for the 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.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. 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. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. 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 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. 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 Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. 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)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

Pedestrian Hybrid Beacon on US 1-15-501/NC 211 (Sandhills Boulevard) at Aberdeen Greenway

Division 8 Moore County Aberdeen

PLAN DATE:	March 2022	REVIEWED BY:	
PREPARED BY:	J.A. Lohr	REVIEWED BY:	

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by: 07/01/2022

SIG. INVENTORY NO. 08-0306

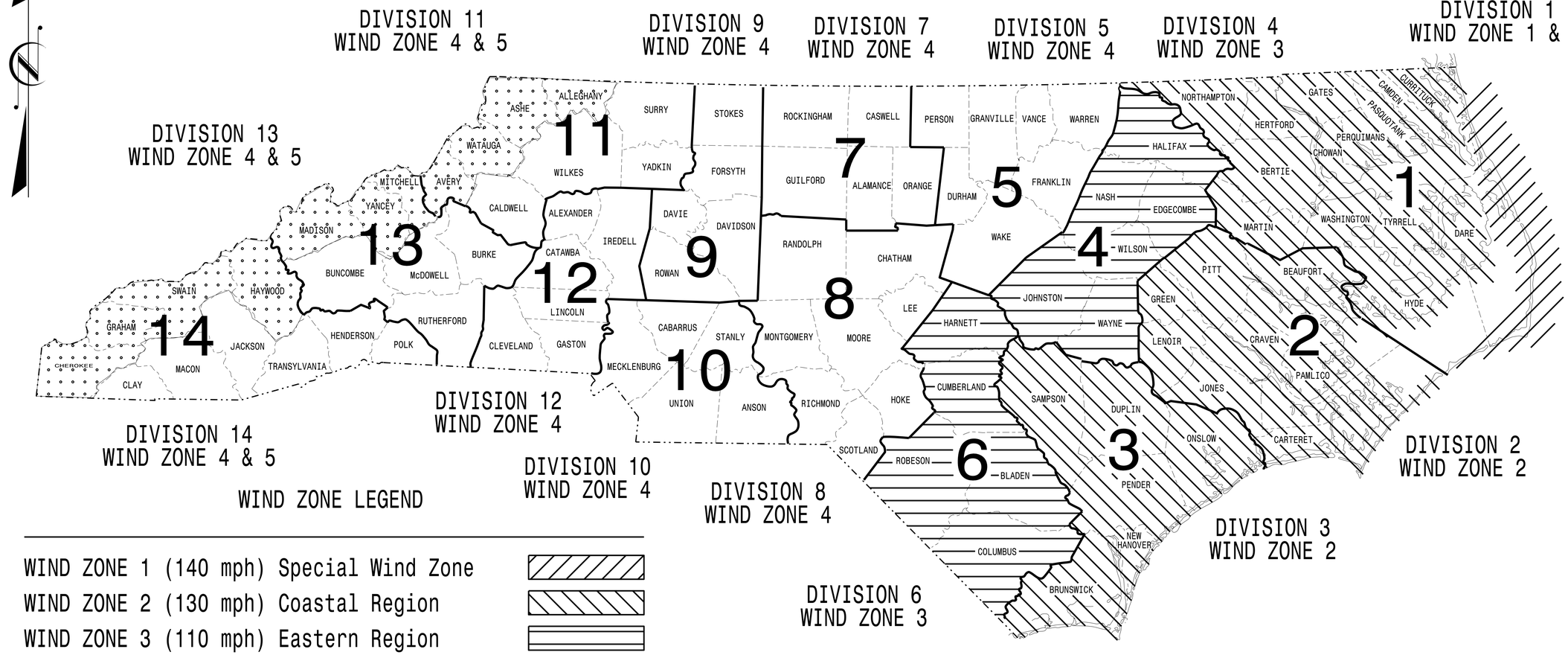
PROJECT I.D. NO.	SHEET NO.
EB-5741	Sig.M1

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

DRAWING NUMBER	DESCRIPTION
Sig. M 1	Statewide Wind Zone Map
Sig. M 2	Typical Fabrication Details–All Metal Poles
Sig. M 3	Typical Fabrication Details–Strain Poles
Sig. M 4	Typical Fabrication Details–Mast Arm Poles
Sig. M 5	Typical Fabrication Details–Mast Arm Connection
Sig. M 6	Typical Fabrication Details–Strain Pole Attachments
Sig. M 7	Construction Details–Foundations
Sig. M 8	Standard Strain Pole Foundation–All Soil Conditions

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

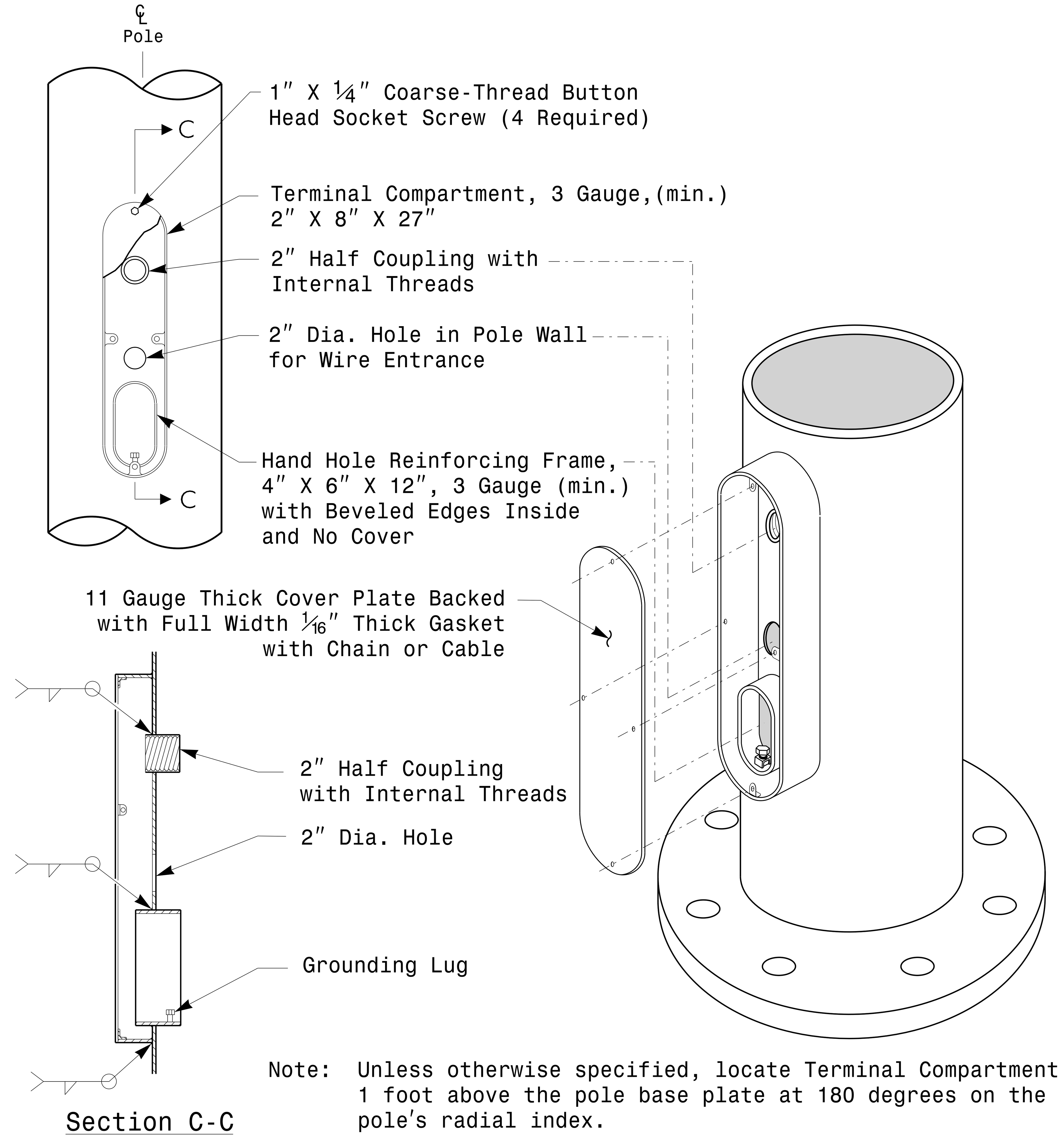
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

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

10/11/2017 DATE

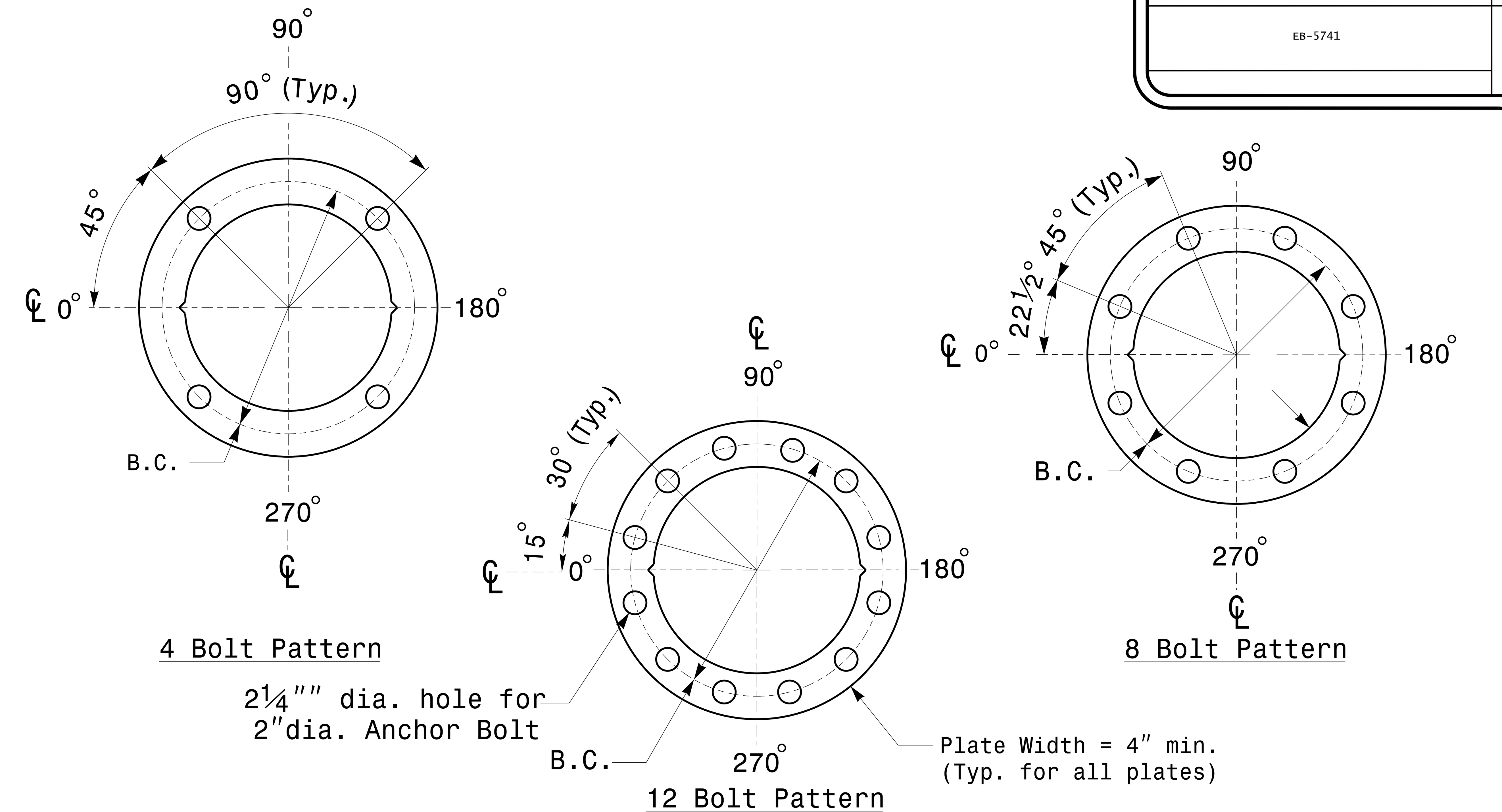
PROJECT ID. NO.	SHEET NO.
EB-5741	Sig.M2

Fabrication Details – All Metal Poles



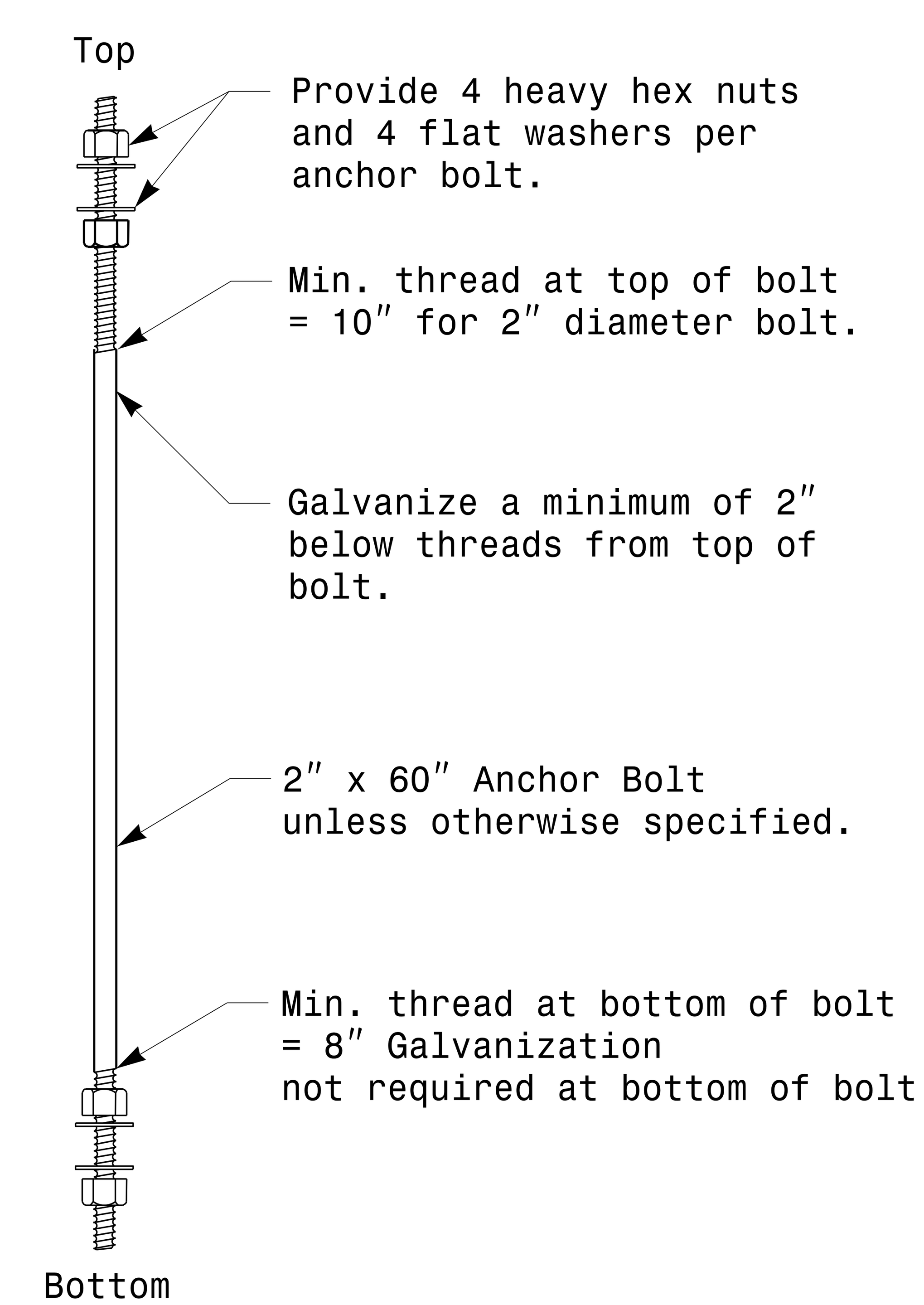
Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail

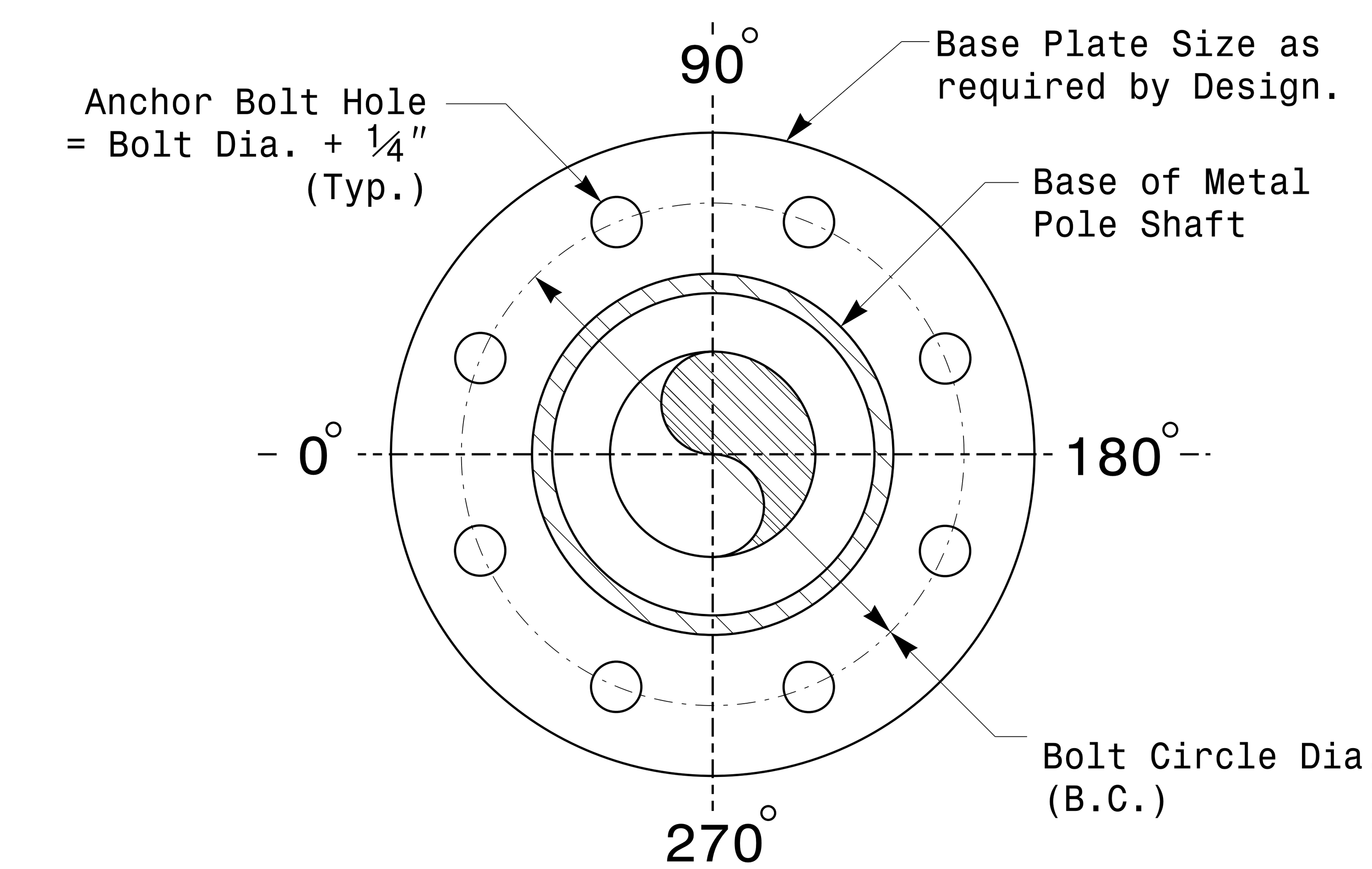


Construct Templates and Plates from ¼″ min. thick Steel. Galvanizing is not required.

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

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

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

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

SCALE 0 NA NONE

REVISIONS | INIT. | DATE

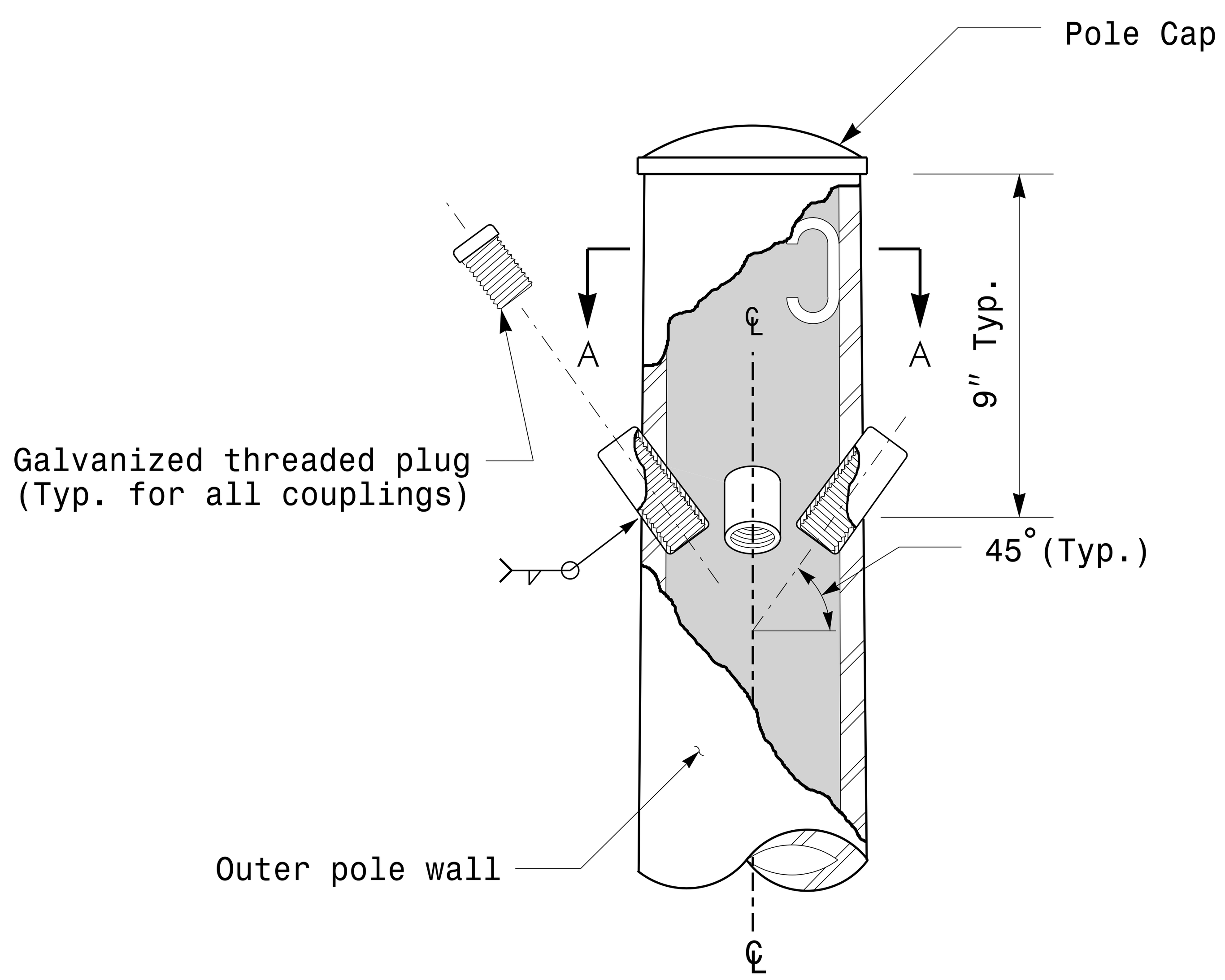
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR
DocuSigned by: Debesh C. Sarkar
SIGNATURE 10/11/2017 DATE

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

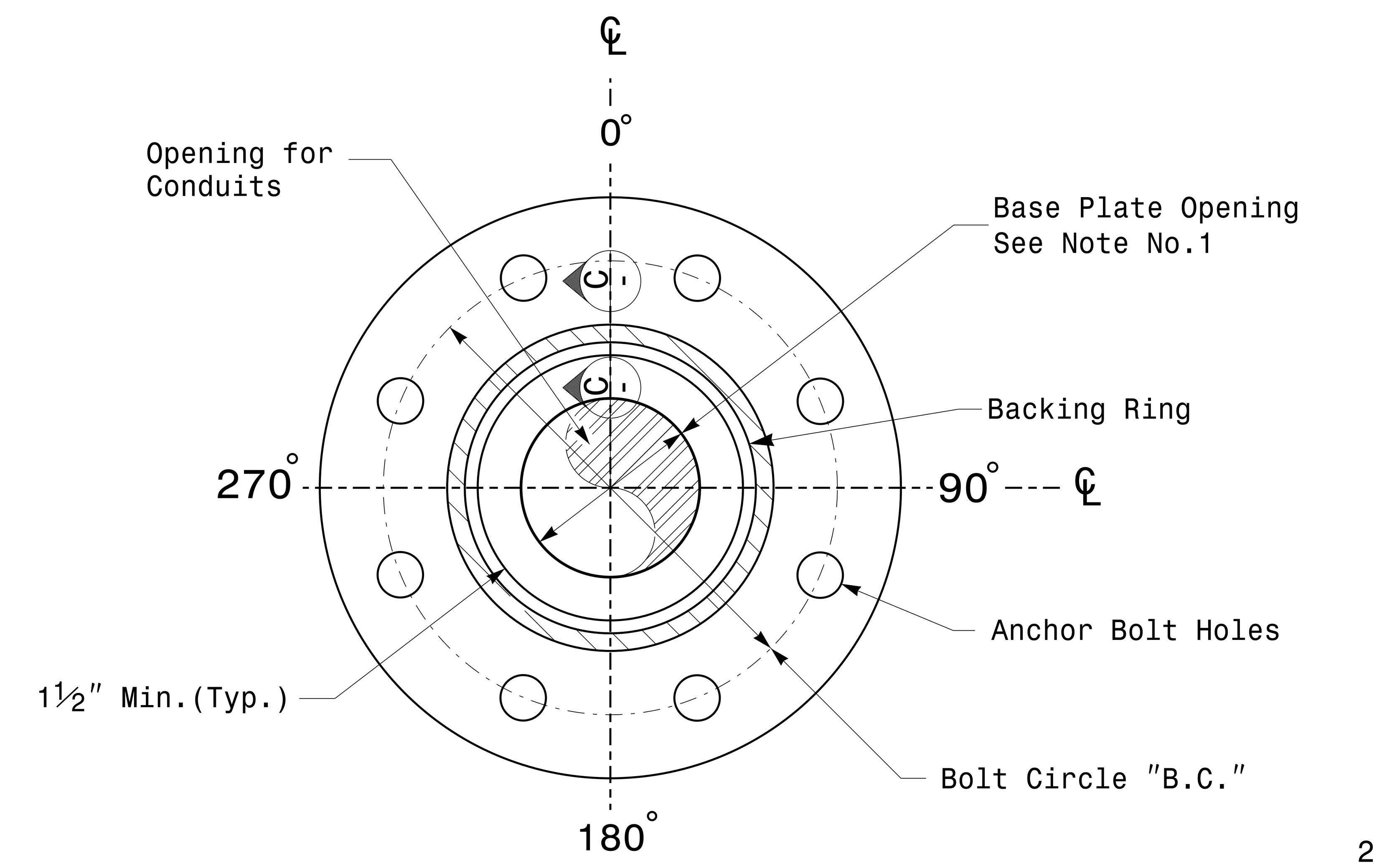
PROJECT ID. NO.	SHEET NO.
EB-5741	Sig.M3

Fabrication Details – Strain 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″.

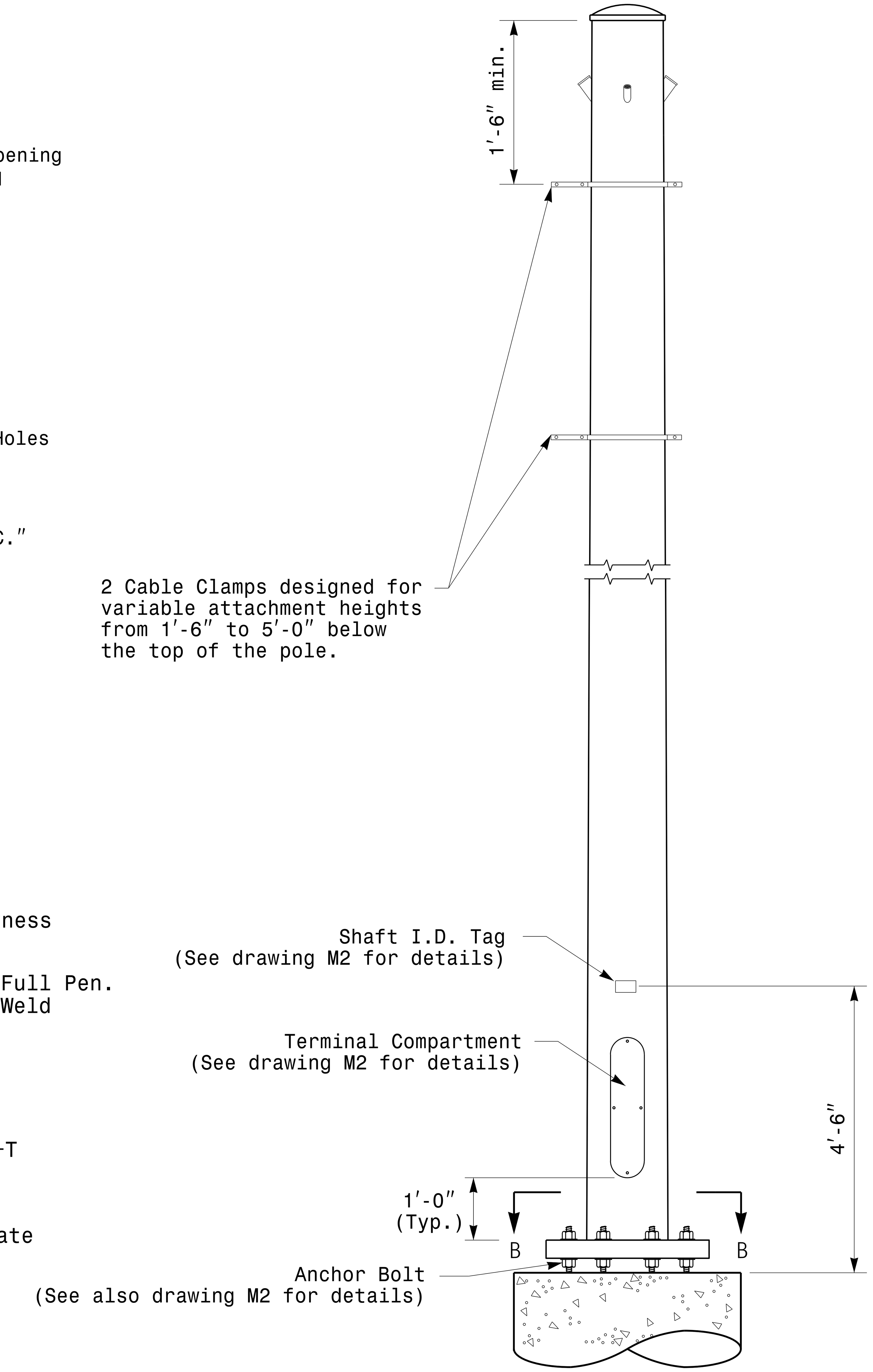


Cable Entrances at Top of Pole

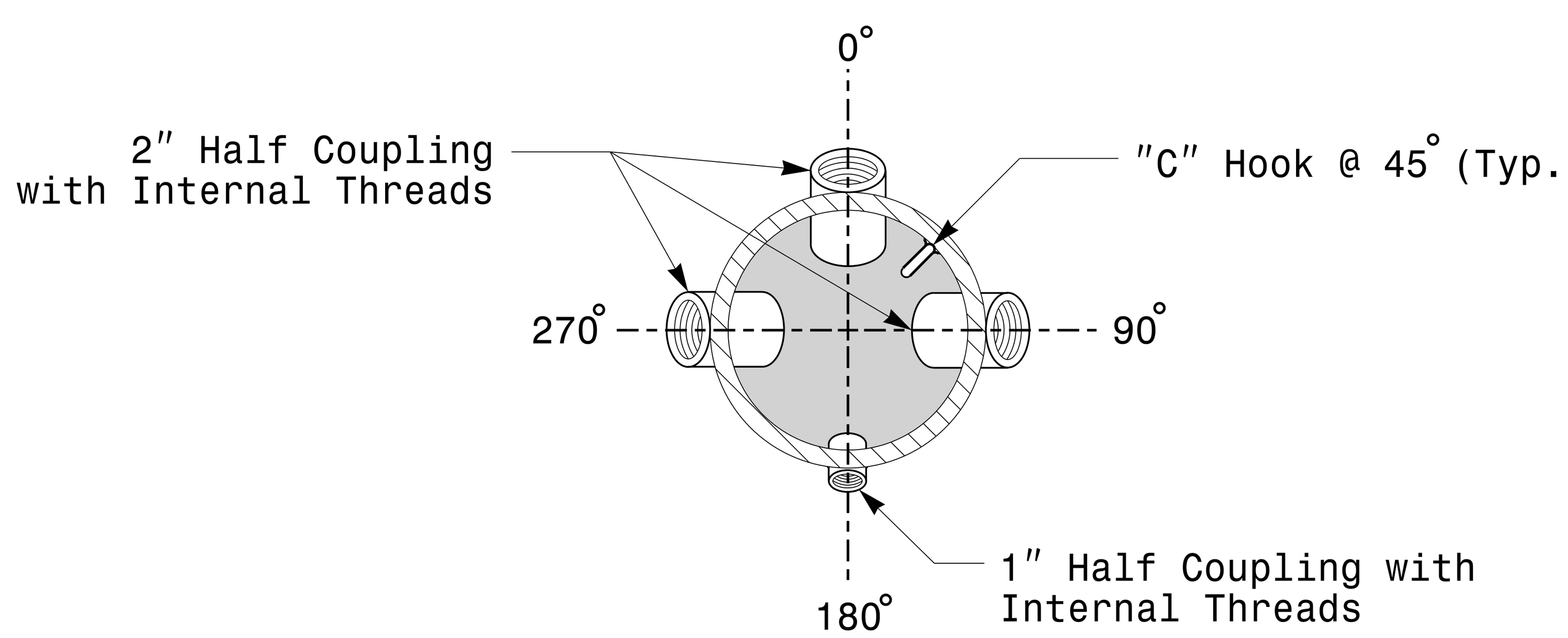


Section B-B

Pole Base Plate Details (8 and 12 Bolt Pattern)

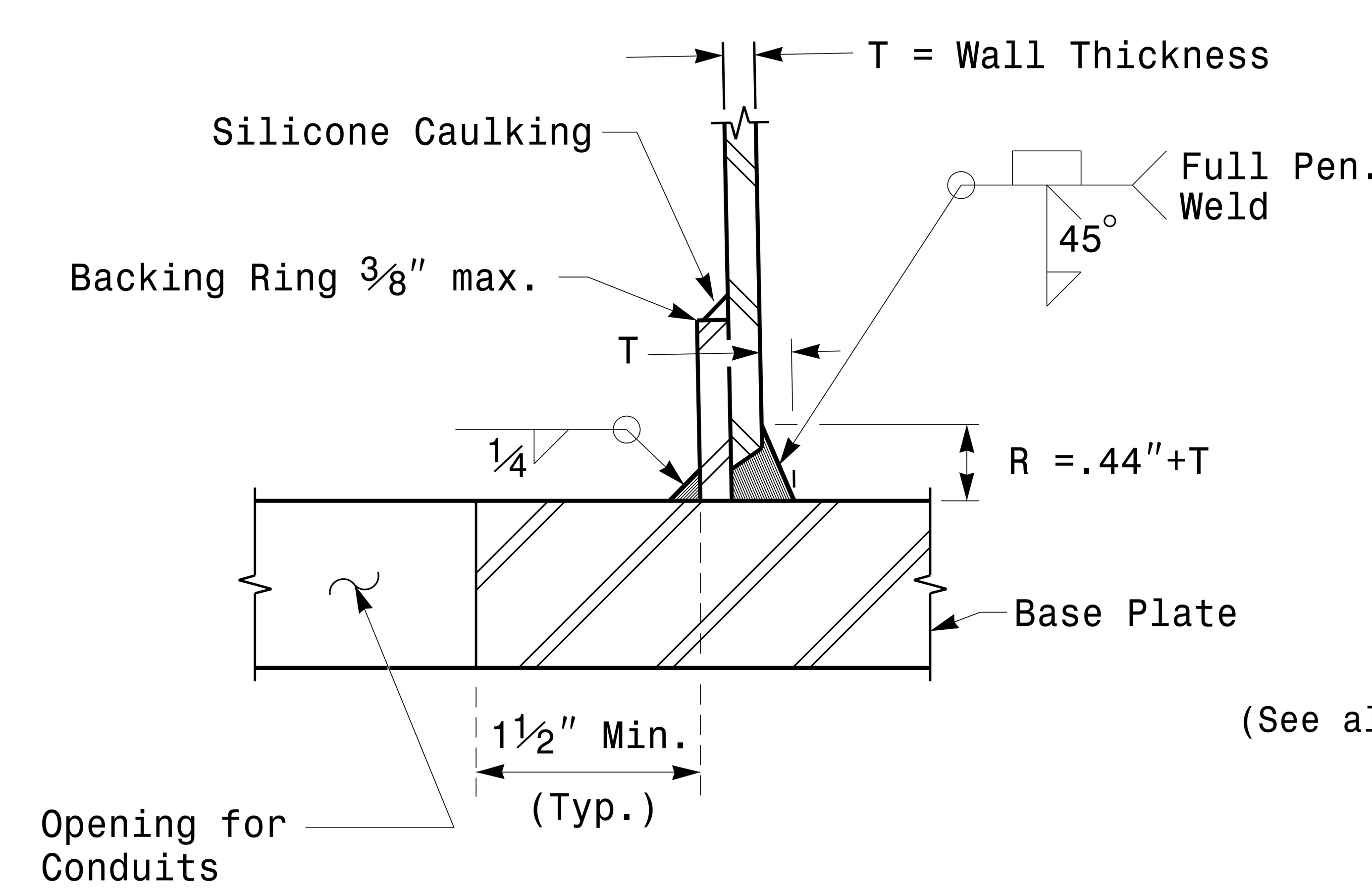


Monotube Strain Pole



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, 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

SCALE: 0 NA — NONE

REVISIONS | INIT. | DATE

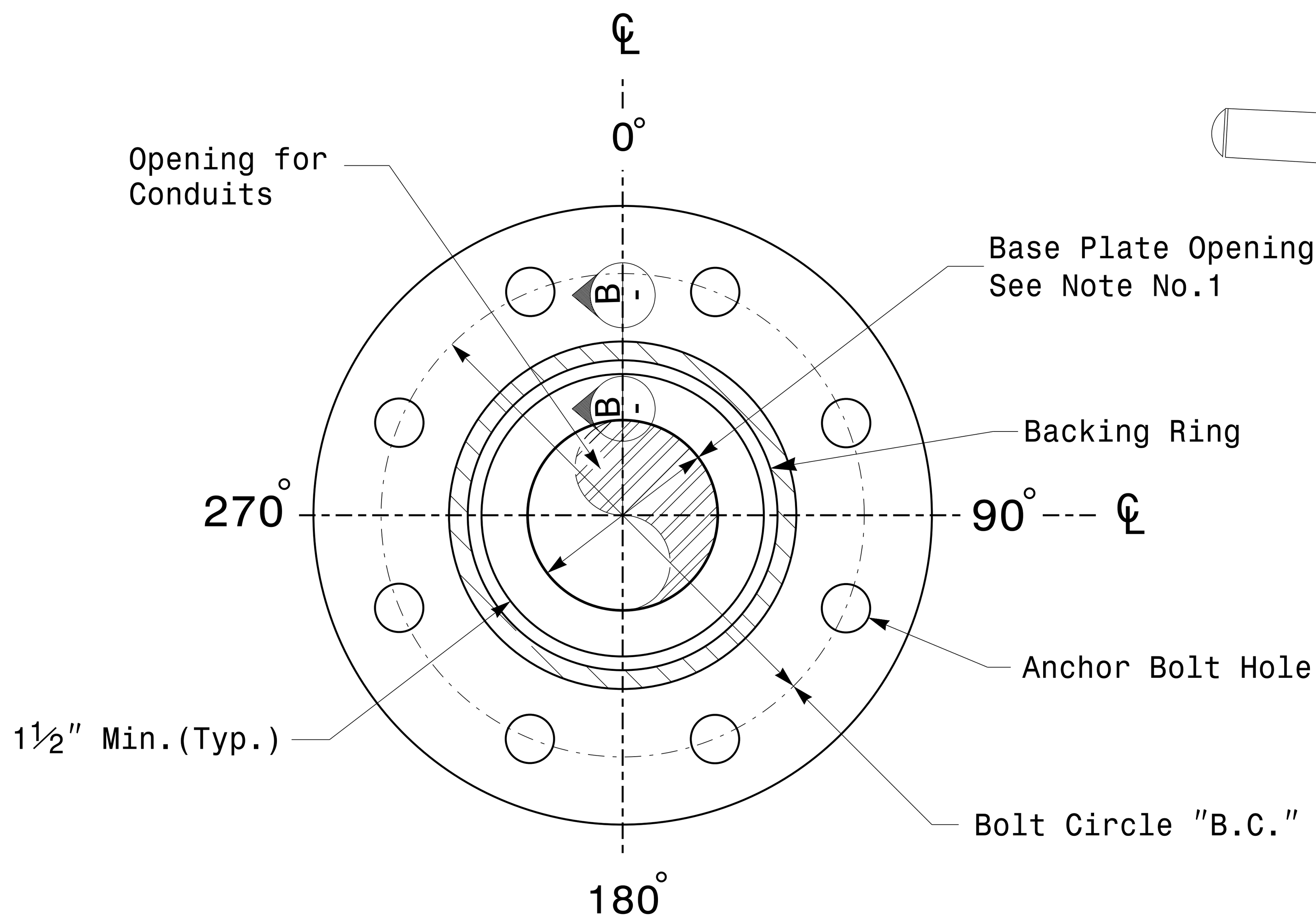
SEAL — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR

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

PROJECT ID. NO.	SHEET NO.
EB-5741	Sig.M4

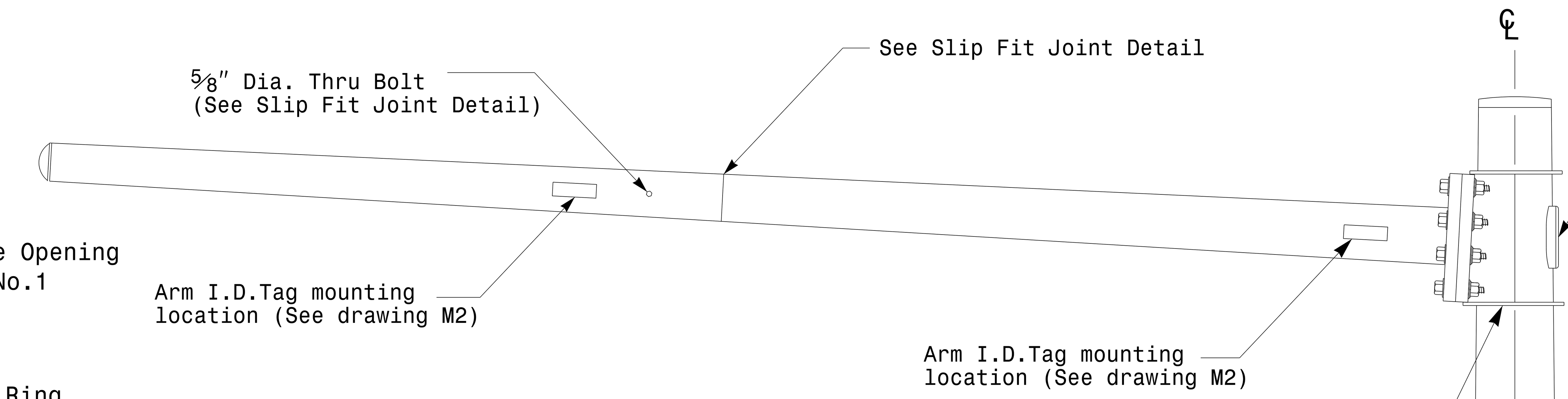
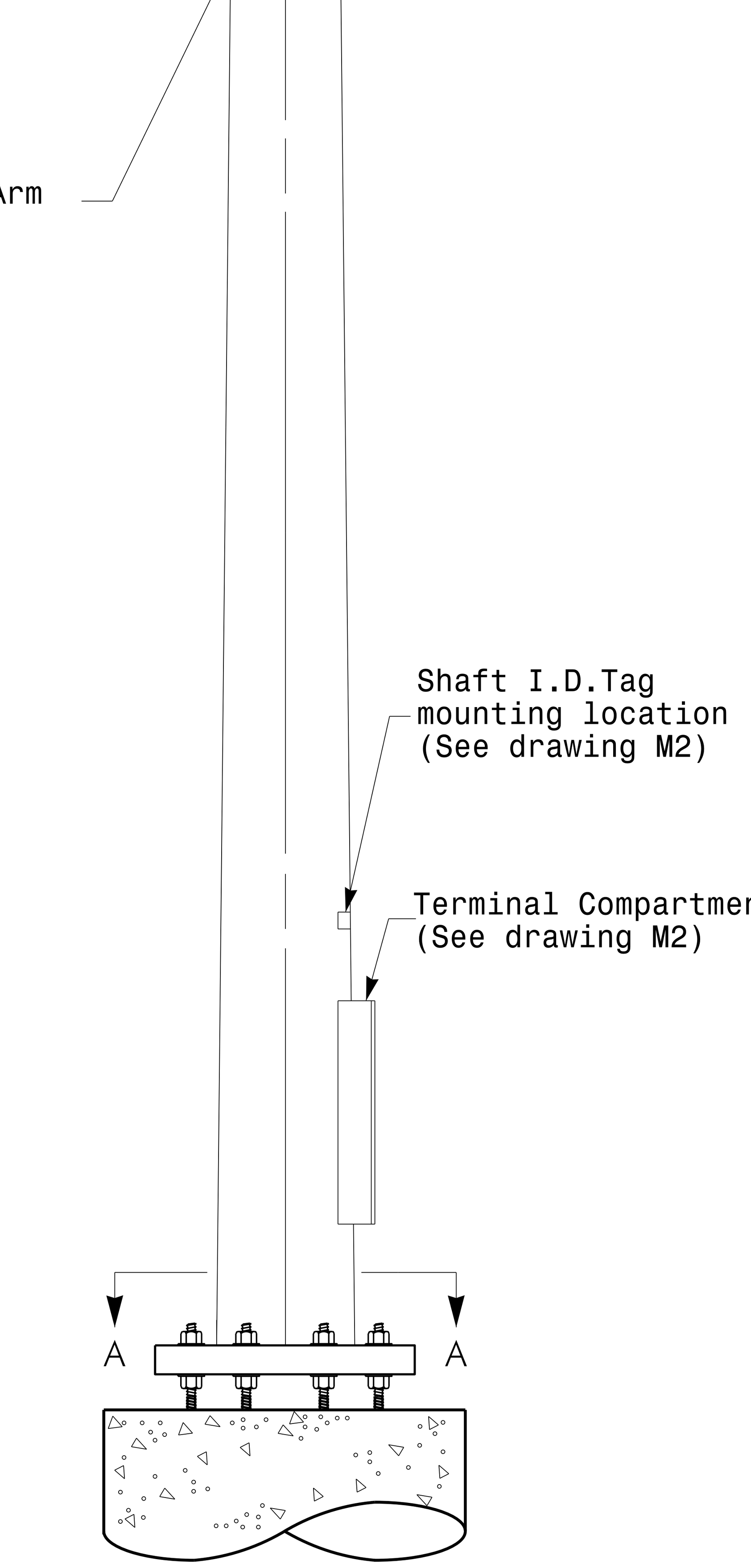
Fabrication Details – Mast Arm Poles

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

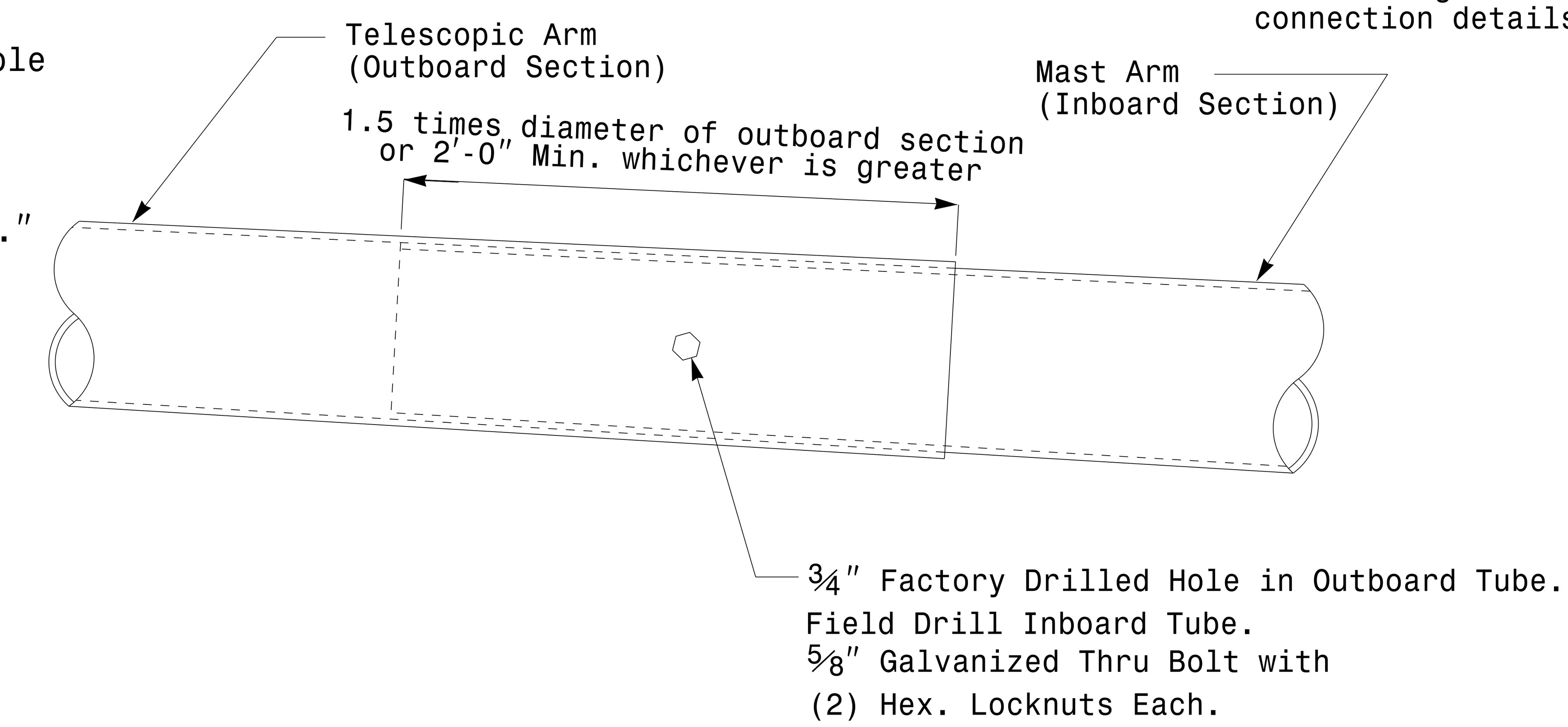


Section A-A

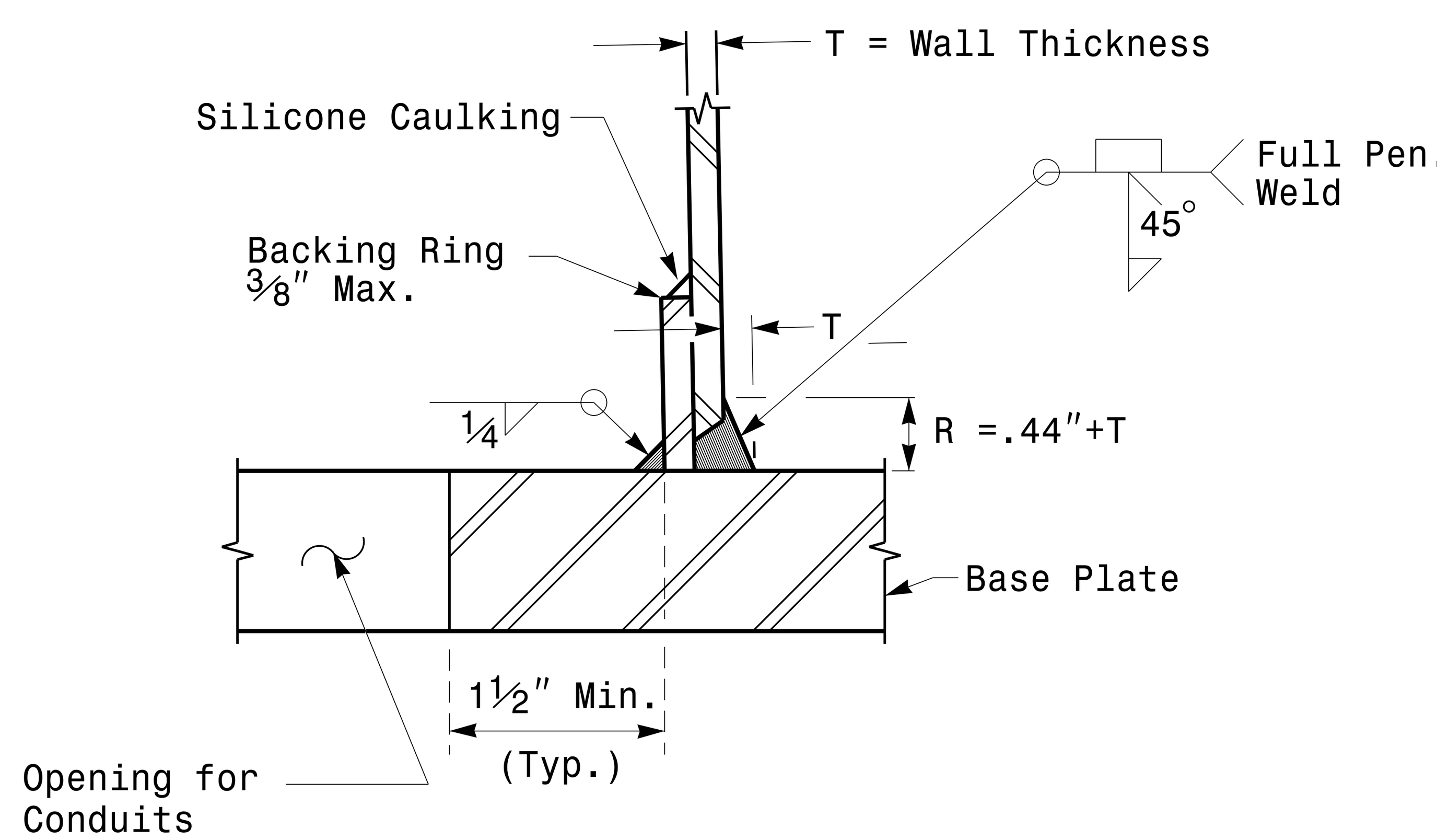
Pole Base Plate Details

Mast Arm Pole



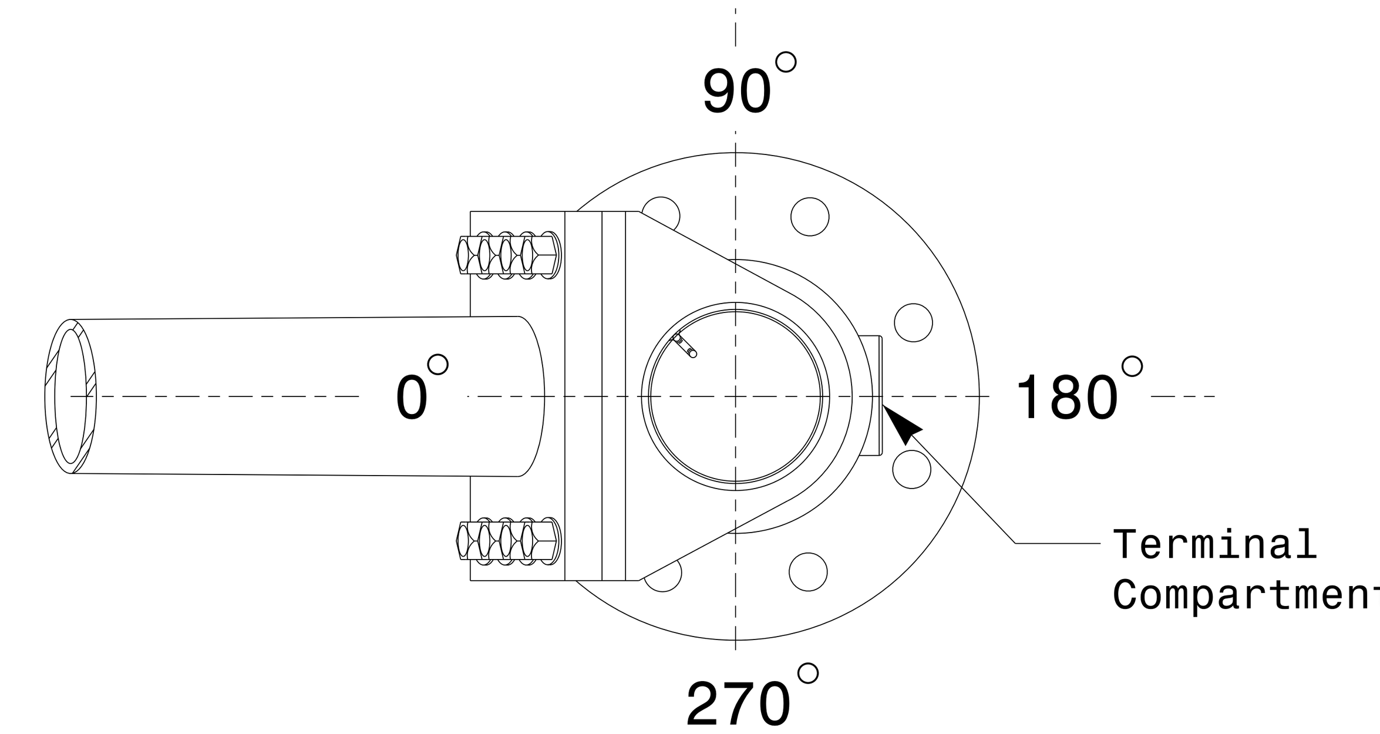
Slip Fit Joint Detail for Mast Arm



Section B-B

(Pole Attachment to Base Plate)

Full-Penetration Groove Weld Detail



Mast Arm Radial Orientation

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 Poles

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

REVISIONS	INIT.	DATE

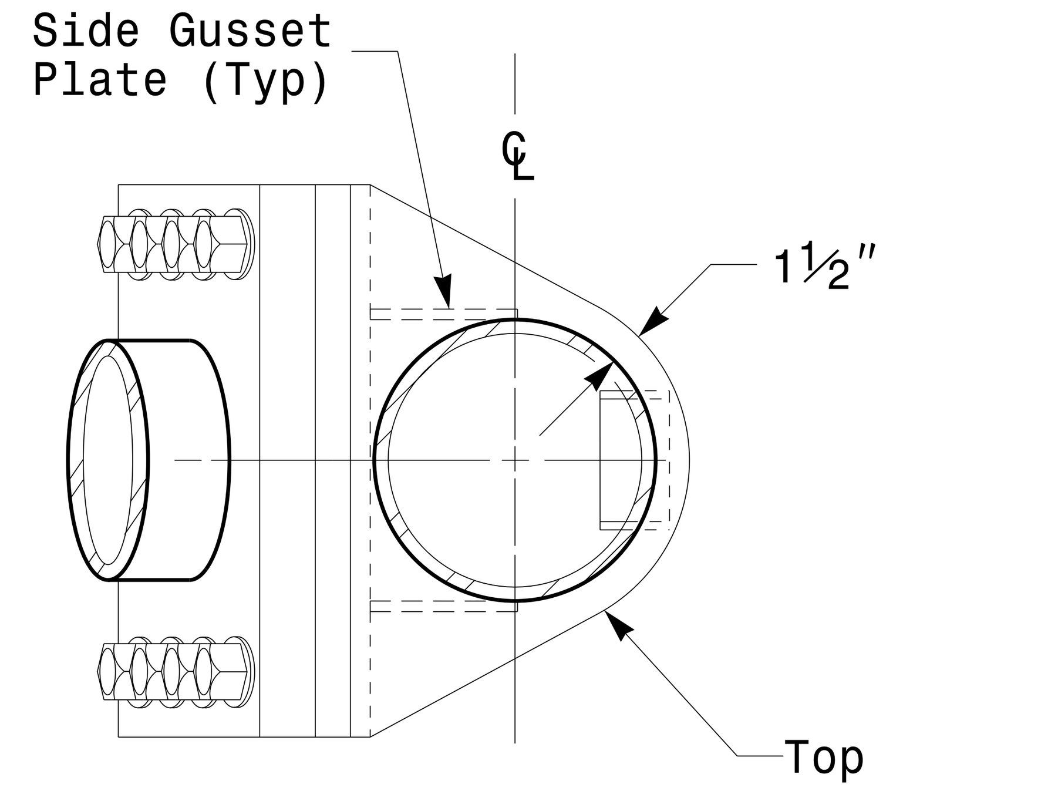
SCALE
0 NA
NONE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR

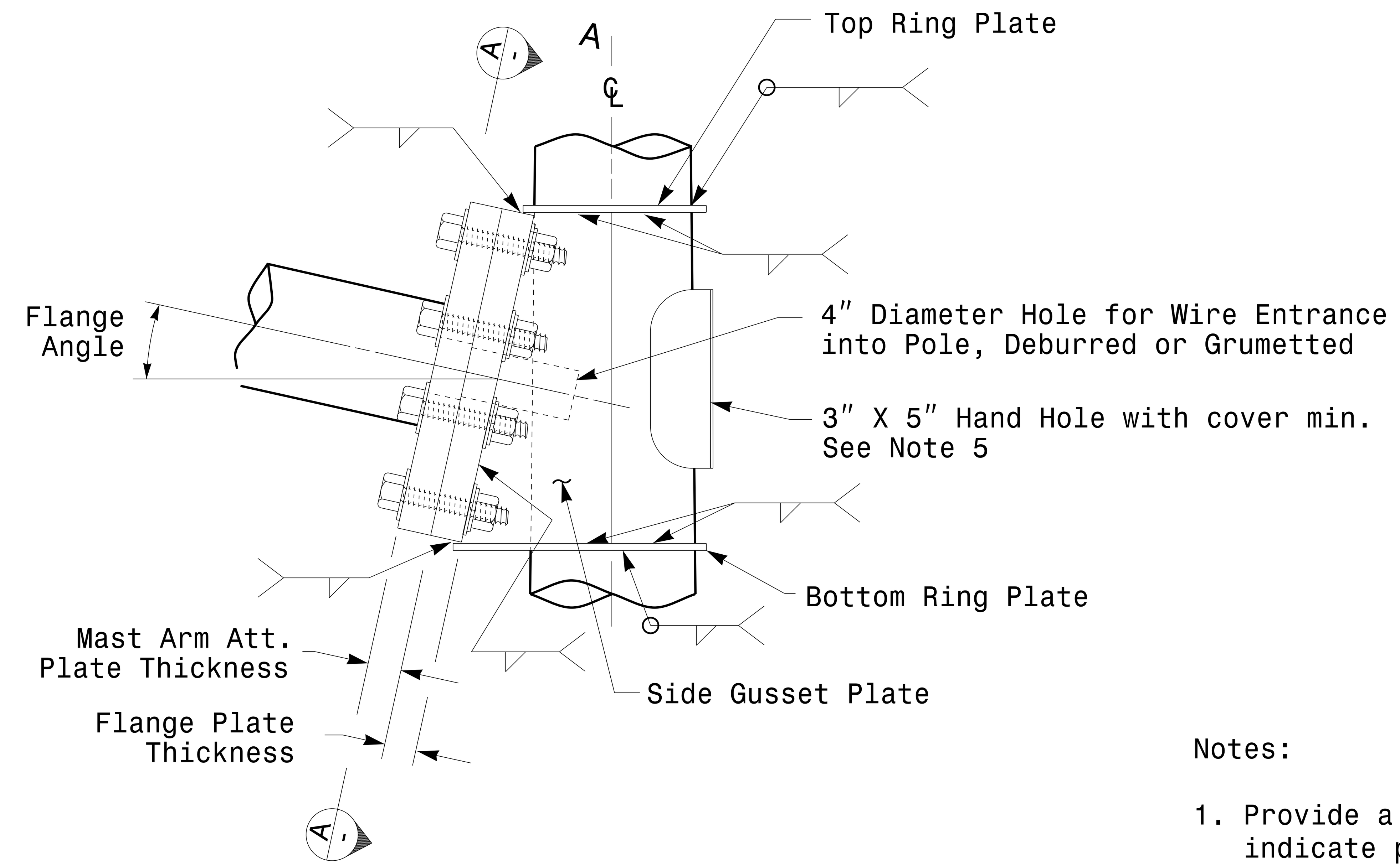
DocuSigned by: Debesh C. Sarkar
SIGNATURE
10/11/2017
DATE

Welded Ring Stiffened Mast Arm Connection

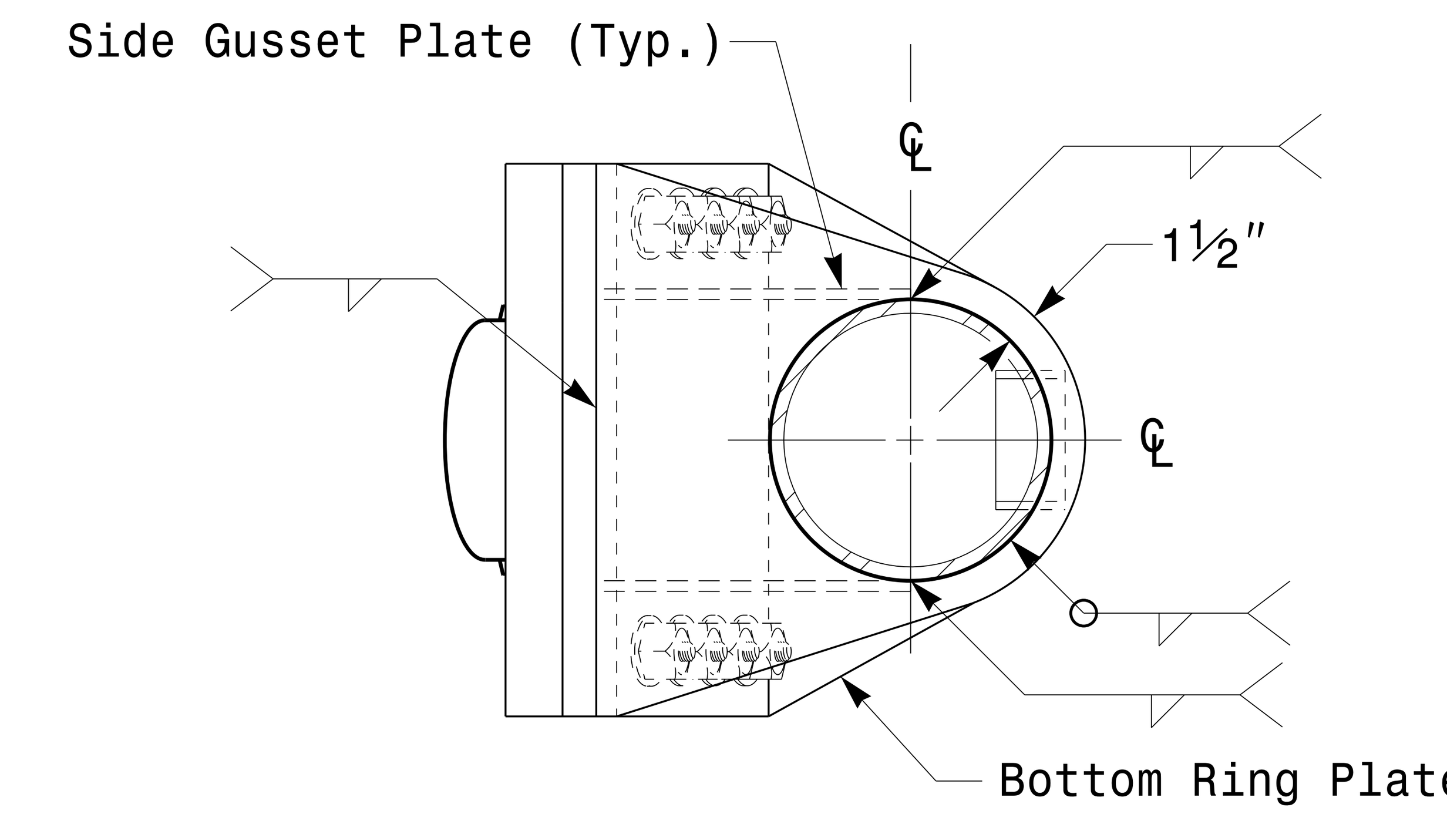
PROJECT ID. NO.	SHEET NO.
EB-5741	Sig.M5



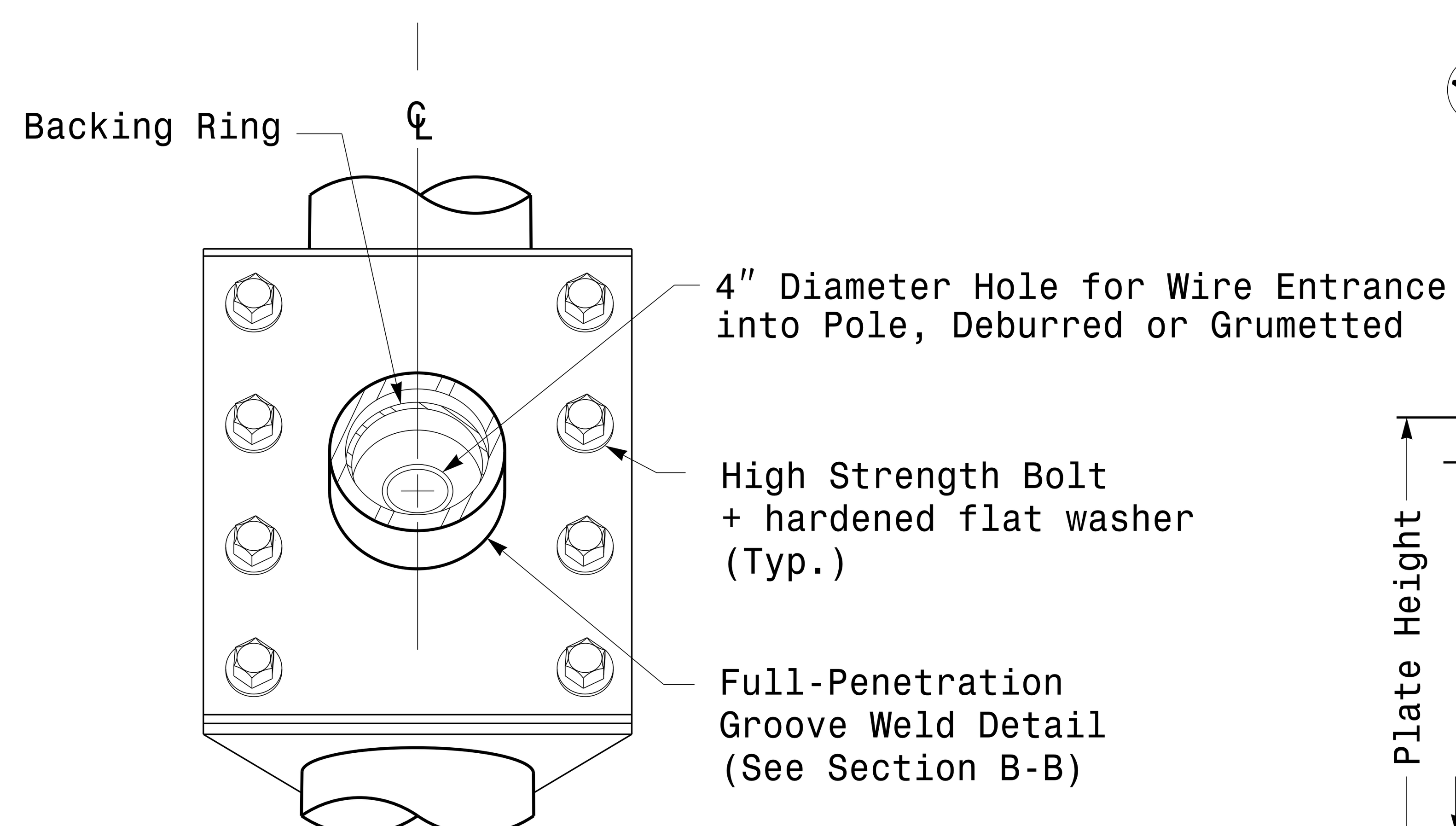
Plan View



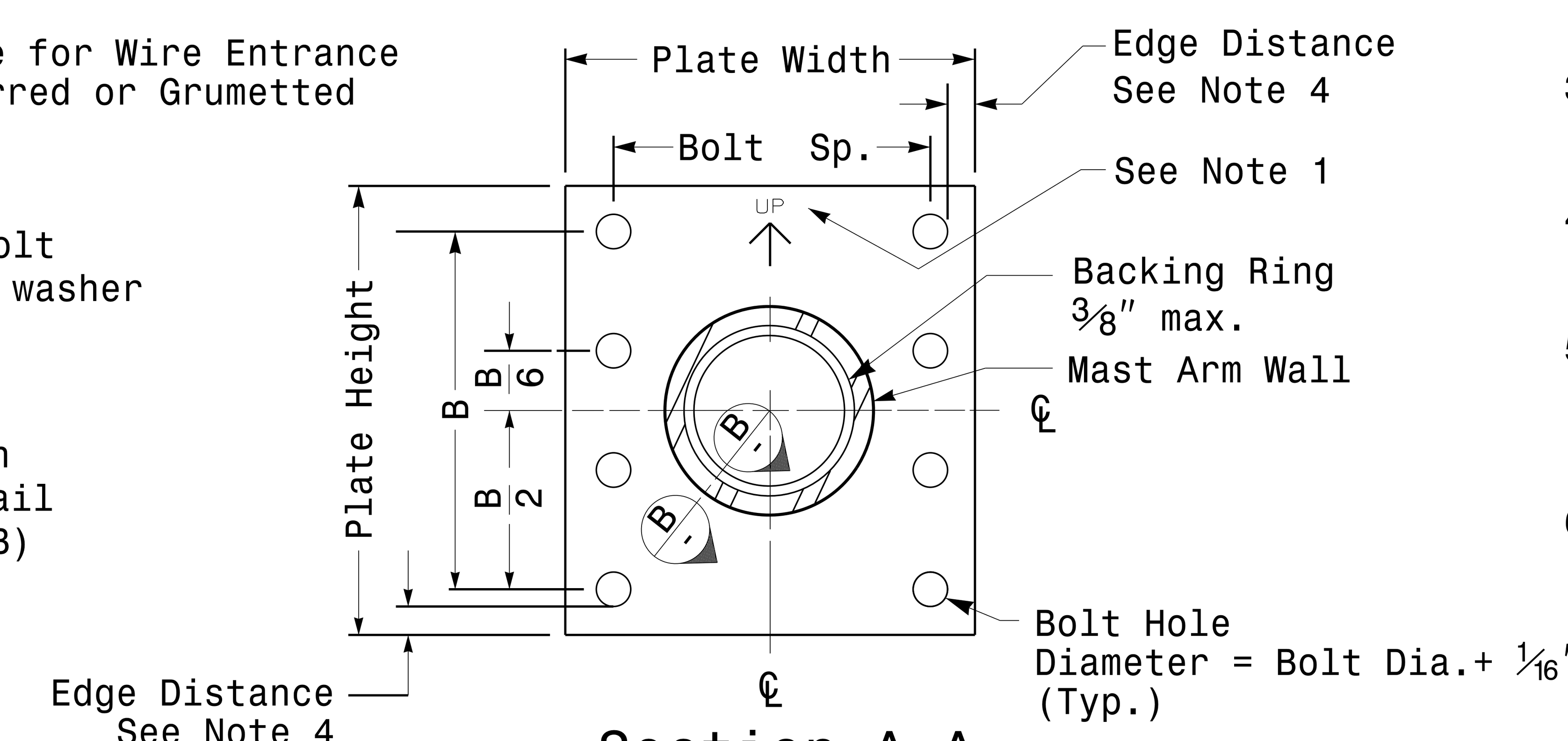
Side Elevation View



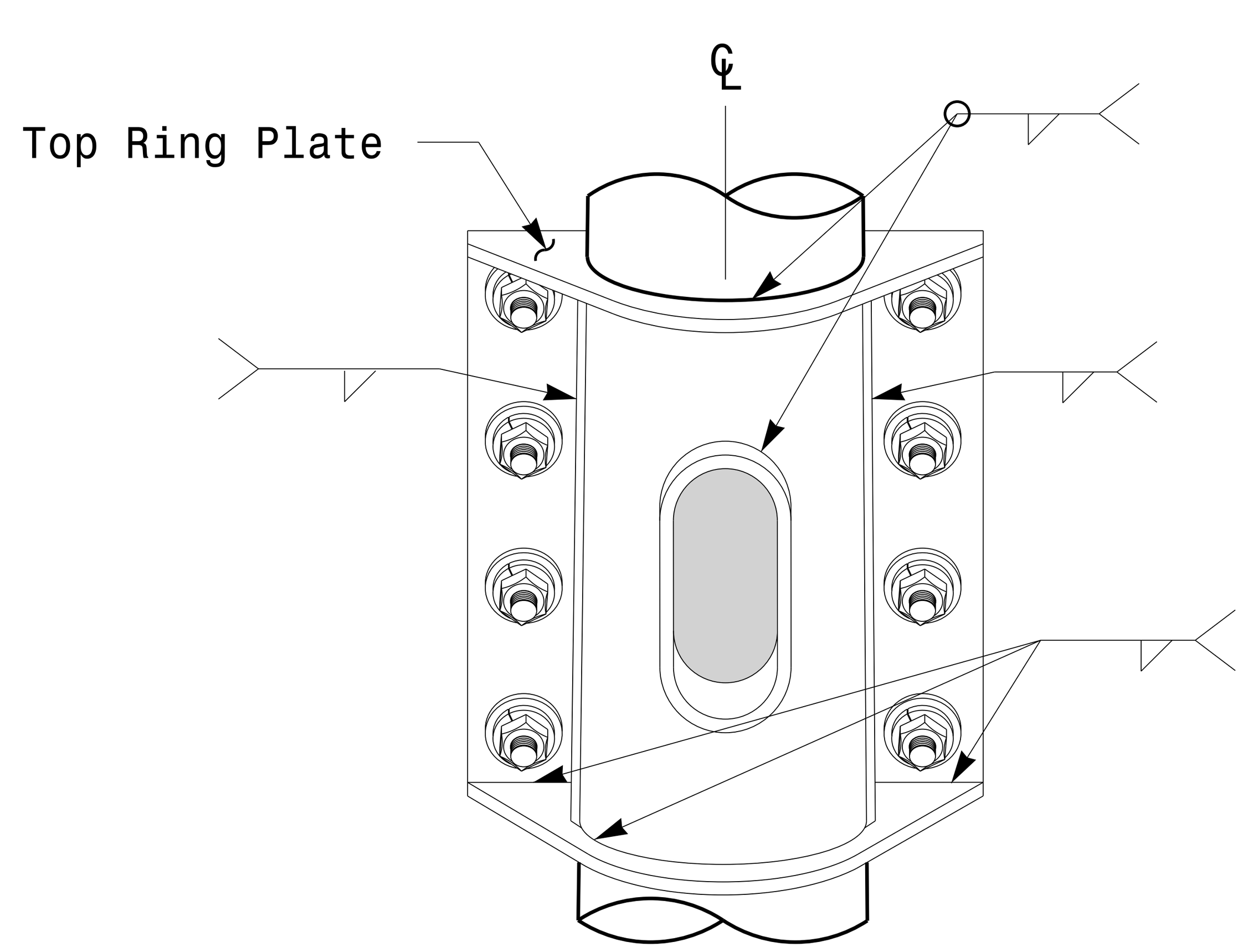
Bottom View



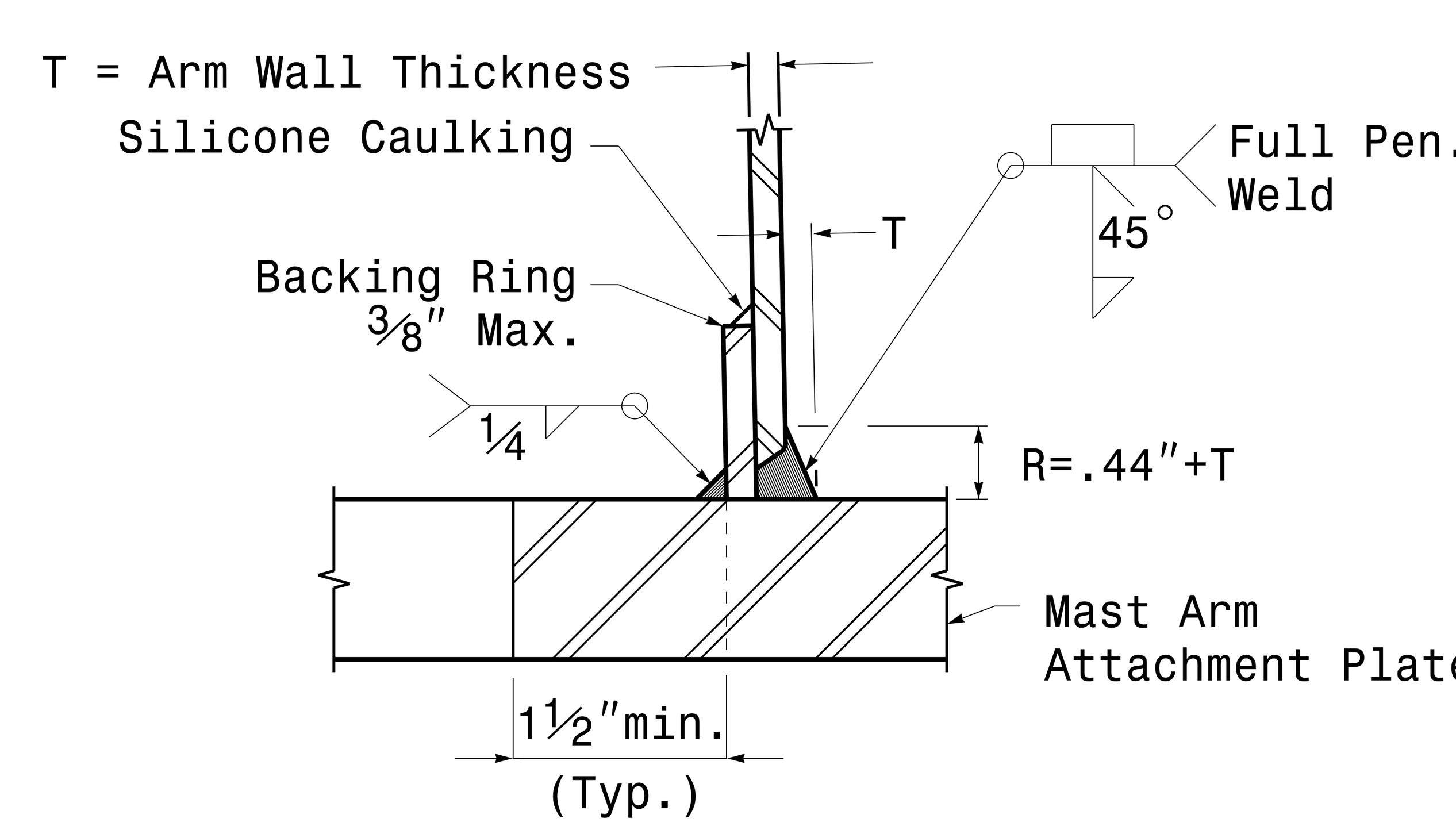
Front Elevation View



Section A-A
Mast Arm Attachment Plate



Back Elevation View



Section B-B
Full-Penetration Groove Weld Detail

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.

Fabrication Details – Mast Arm Connection

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

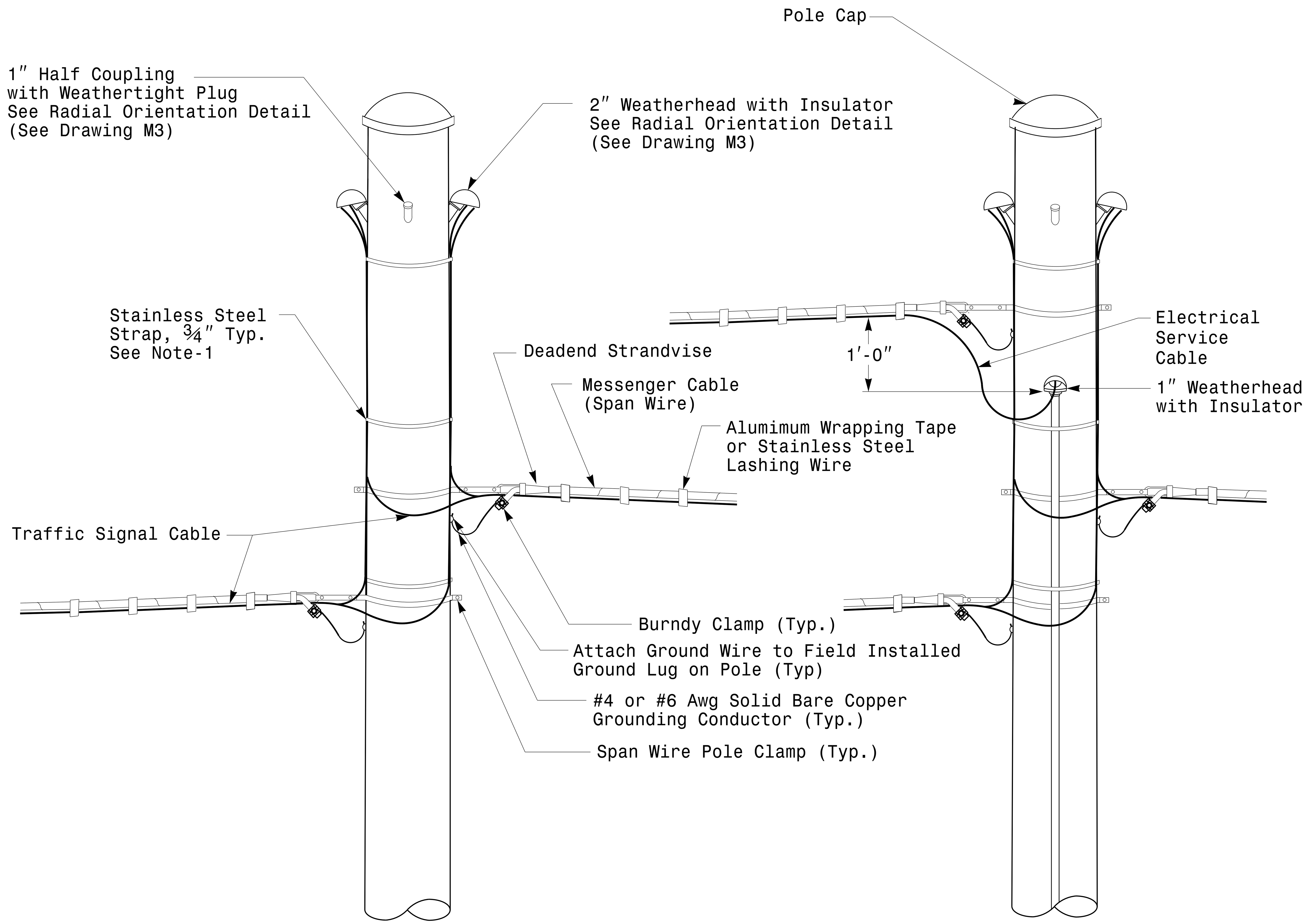
REVISIONS	INIT.	DATE

SCALE: 0 NA — NONE

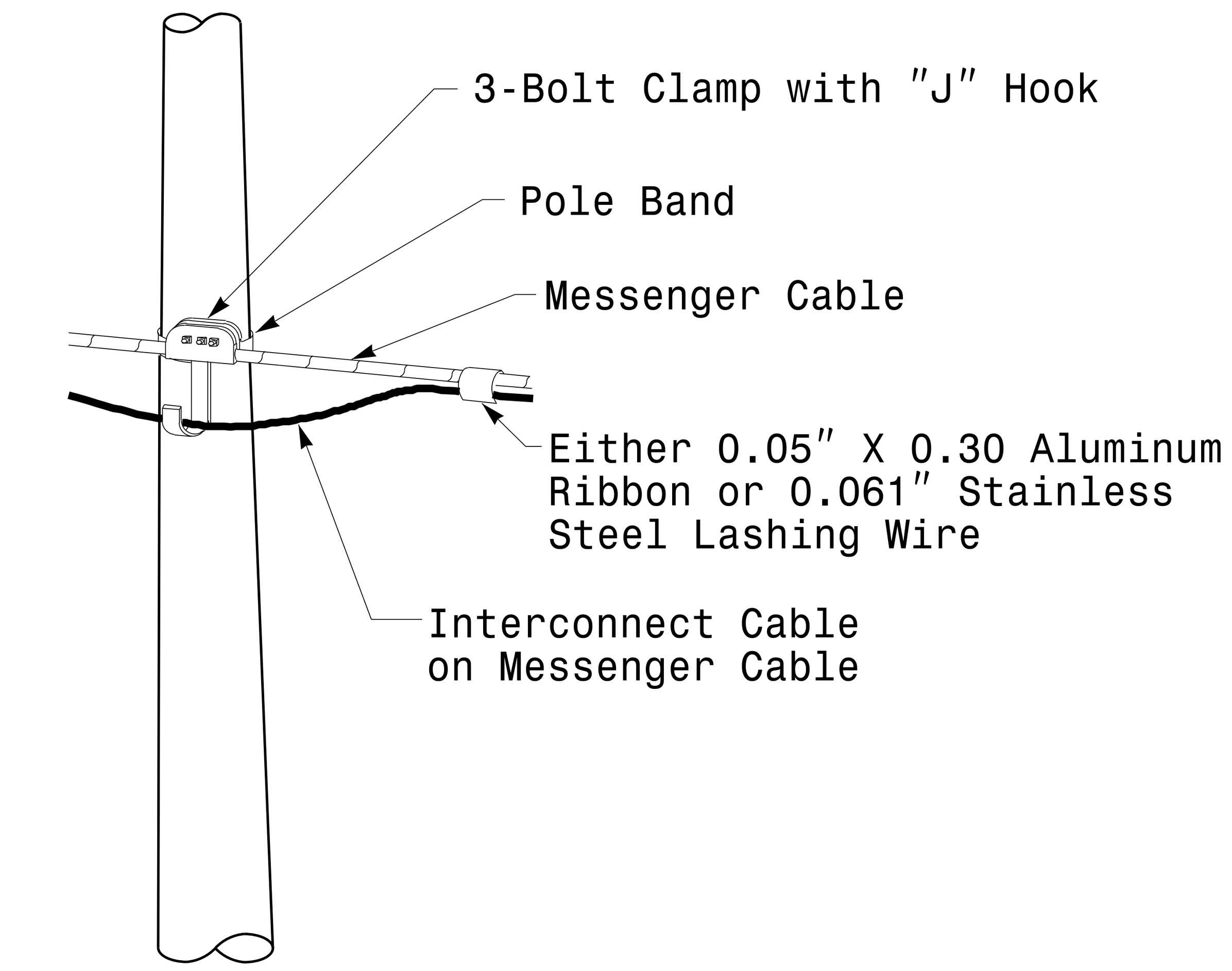
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR

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

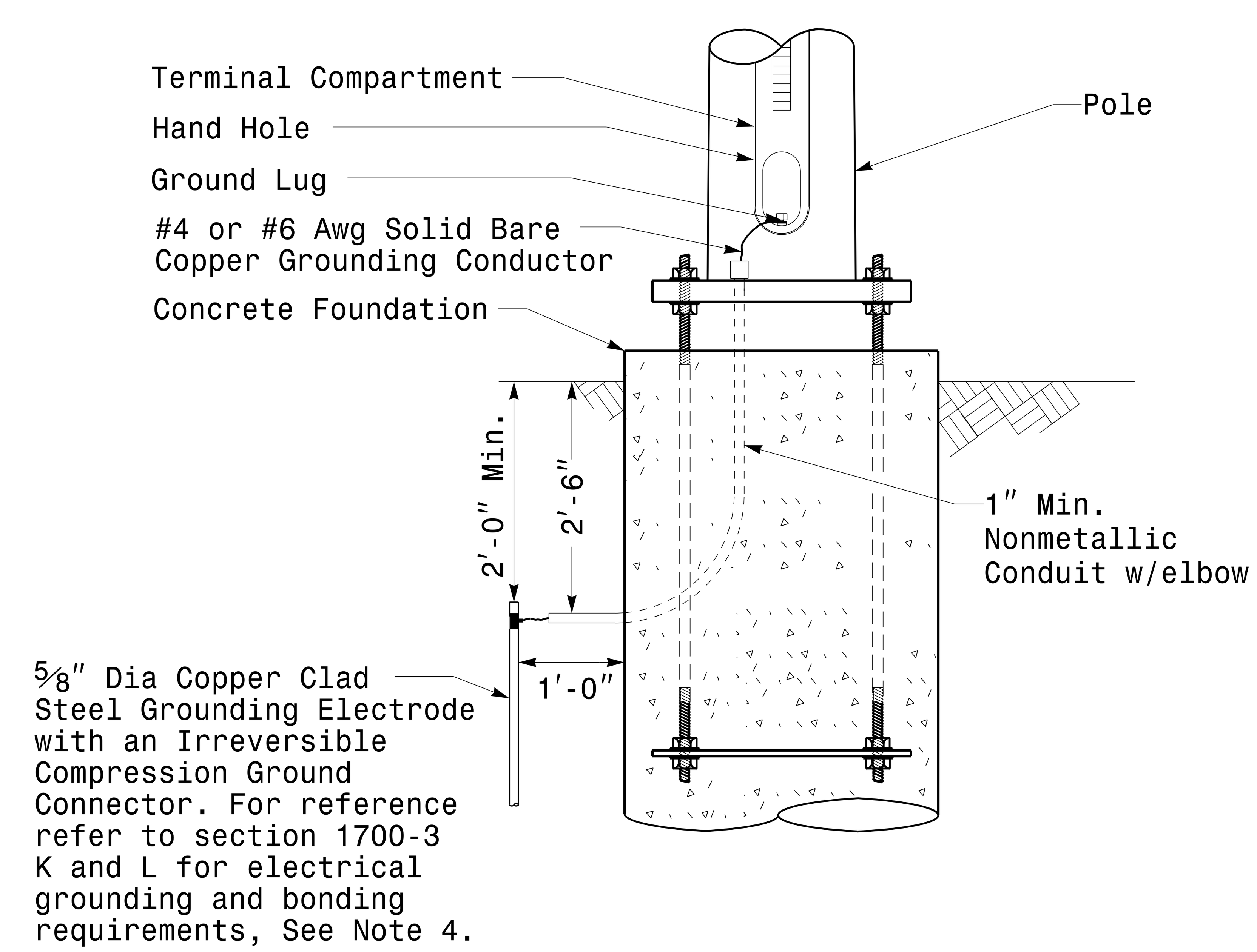
Fabrication Details – Strain Pole Attachments



Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail For Strain Pole and Mast Arm

NOTE:

1. Strap all signal cables to the side of the pole with 3/4″ 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.

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

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

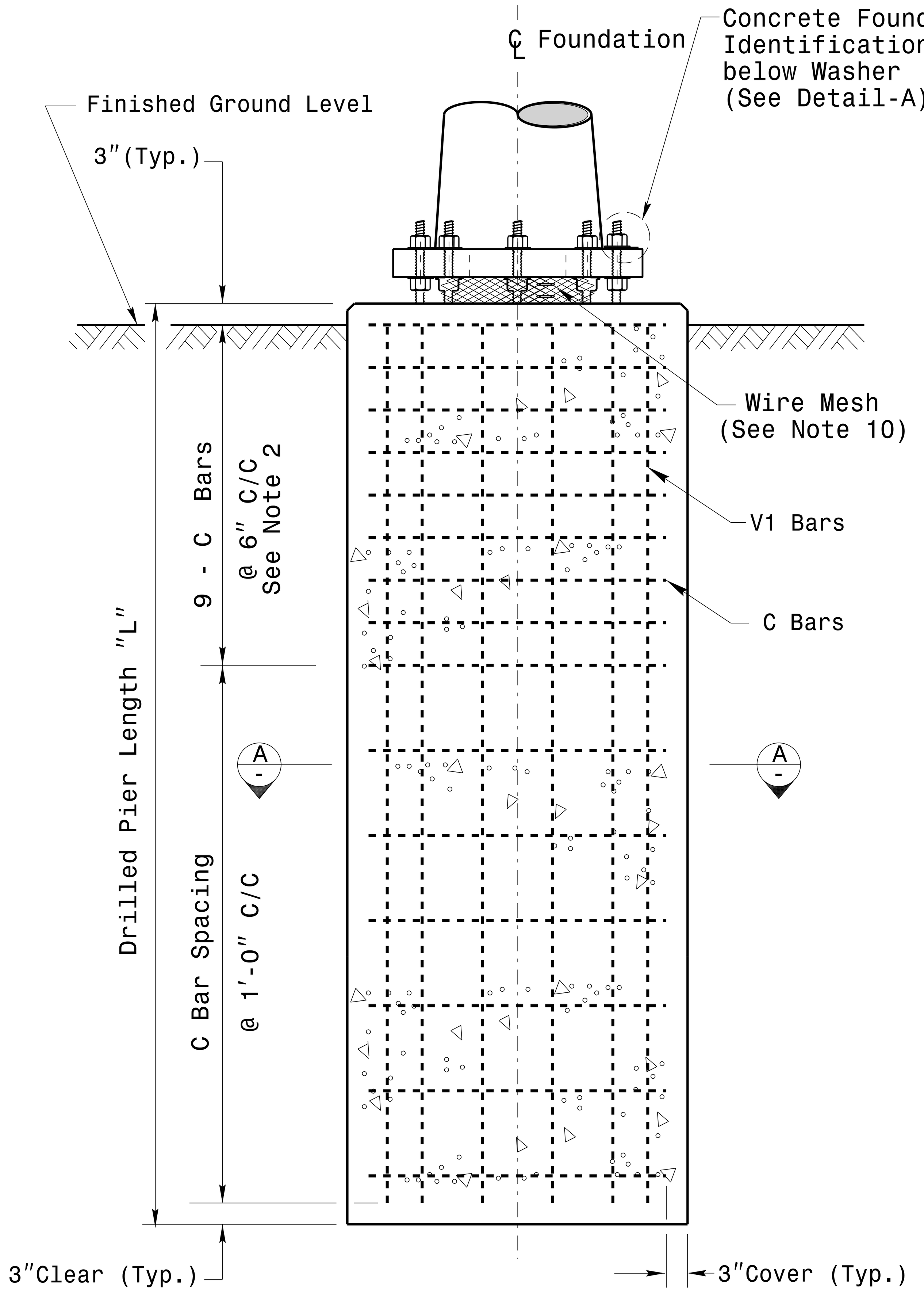
SCALE
0 NA
NONE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028094 DEBESH C. SARKAR

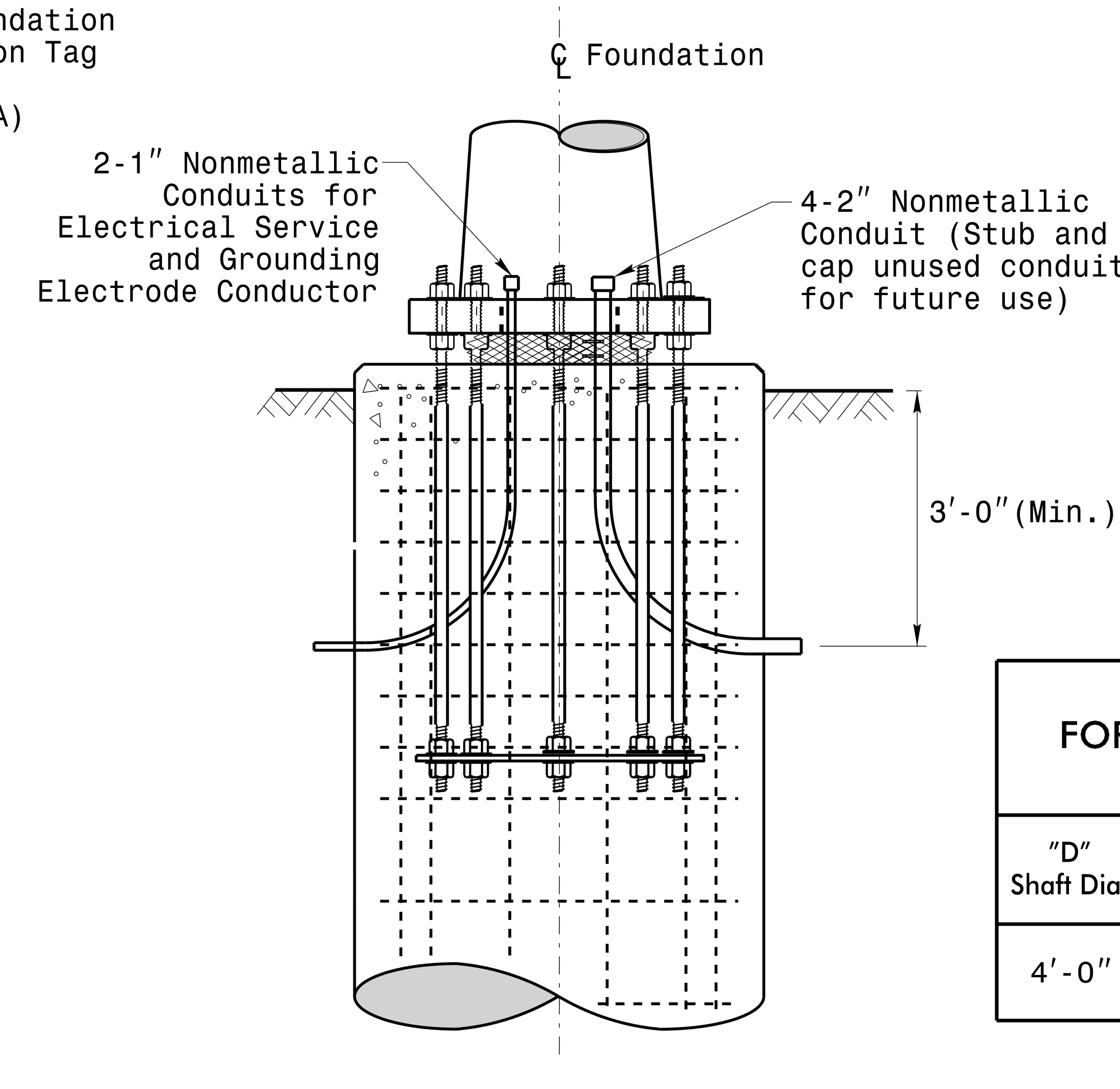
DocuSigned by: Debesh C. Sarkar
SIGNATURE 10/11/2017 DATE

PROJECT ID. NO.	SHEET NO.
EB-5741	Sig.M7

Construction Details – Foundations



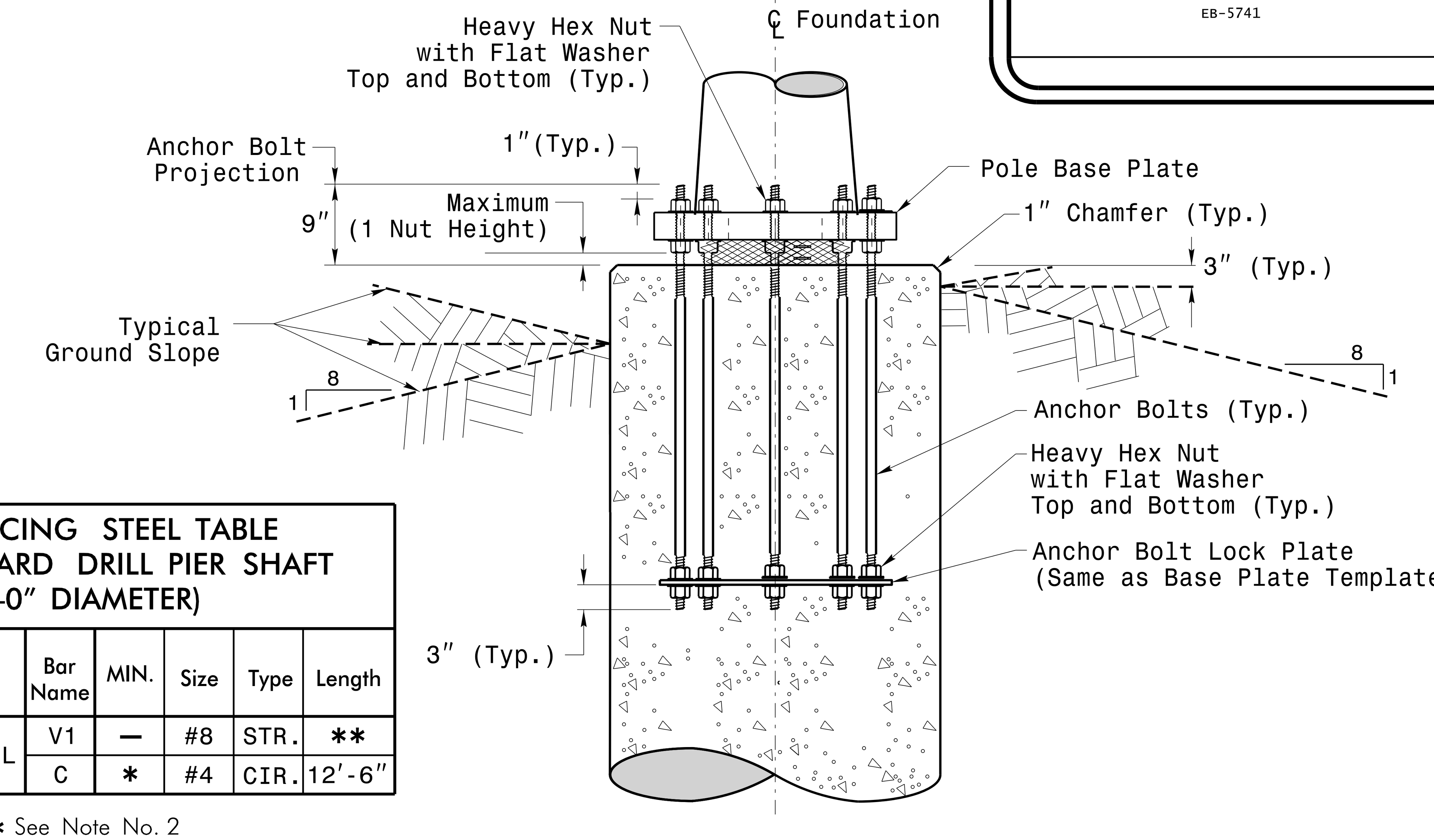
Concrete Shaft Elevation



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



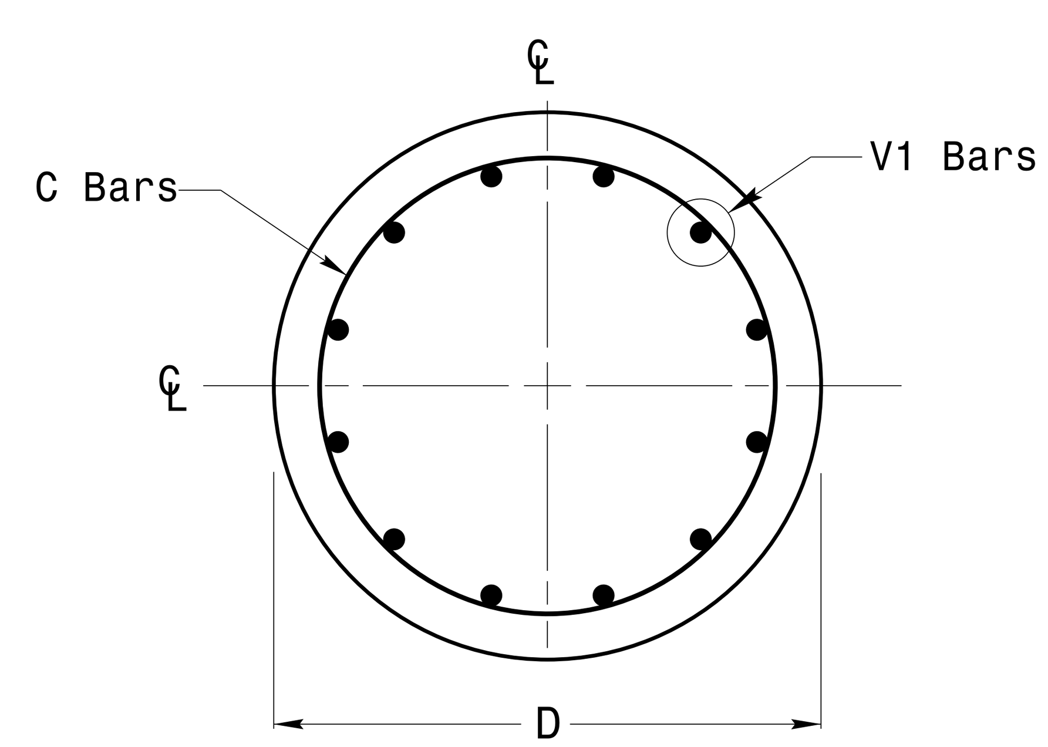
Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)

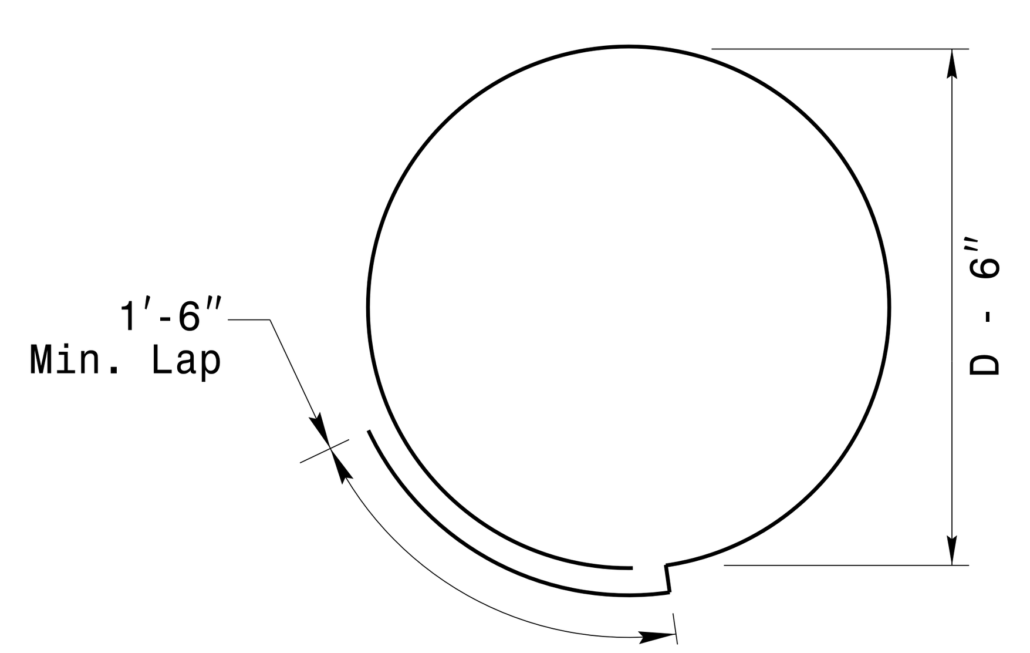
General Notes:

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.

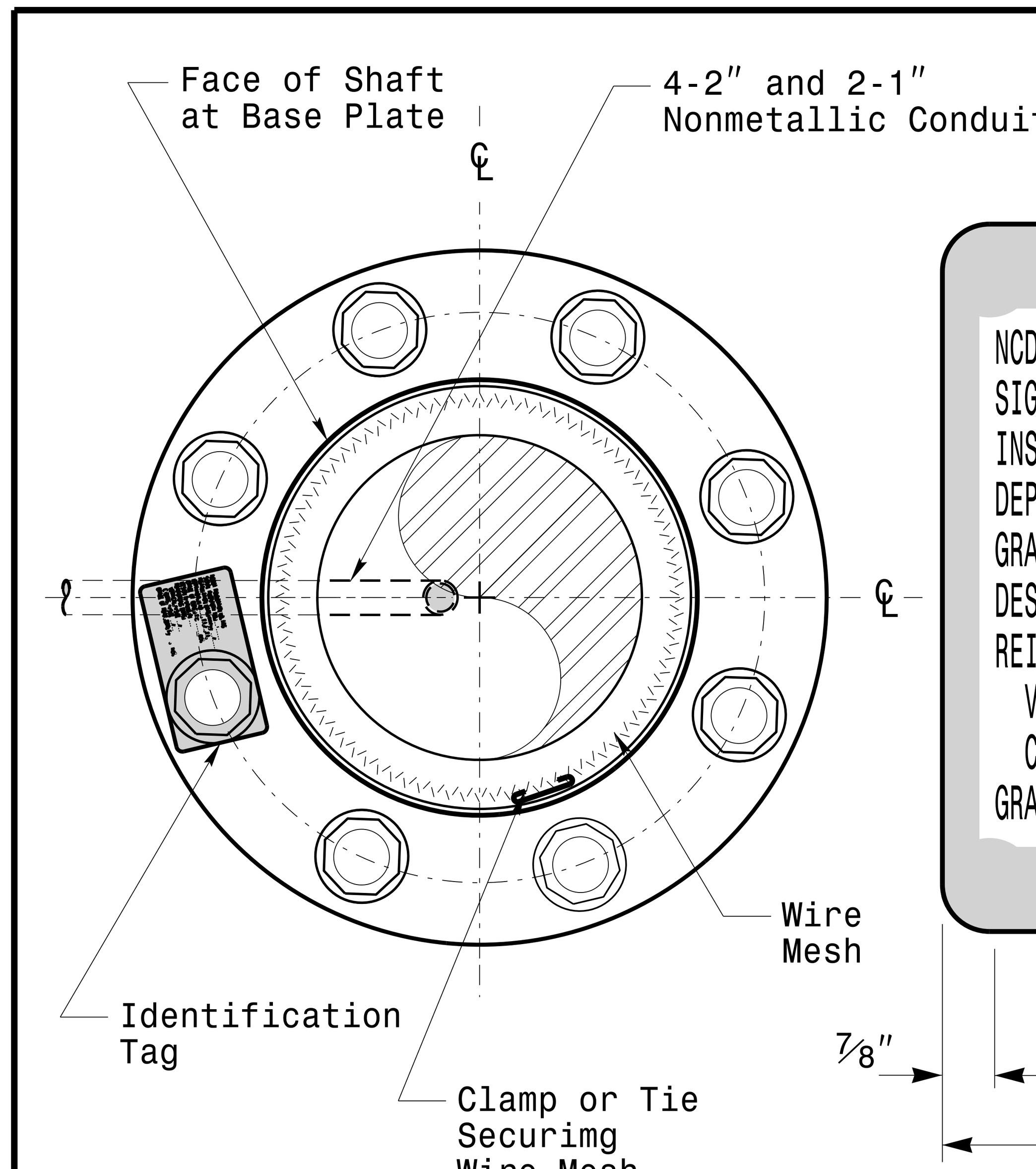
   https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx
7. Use air entrained AA concrete mix with a compression strength of f′c=4500 psi.(min.) after 28 days.
8. Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3″ cover on all reinforcement.
9. 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.



Section A-A

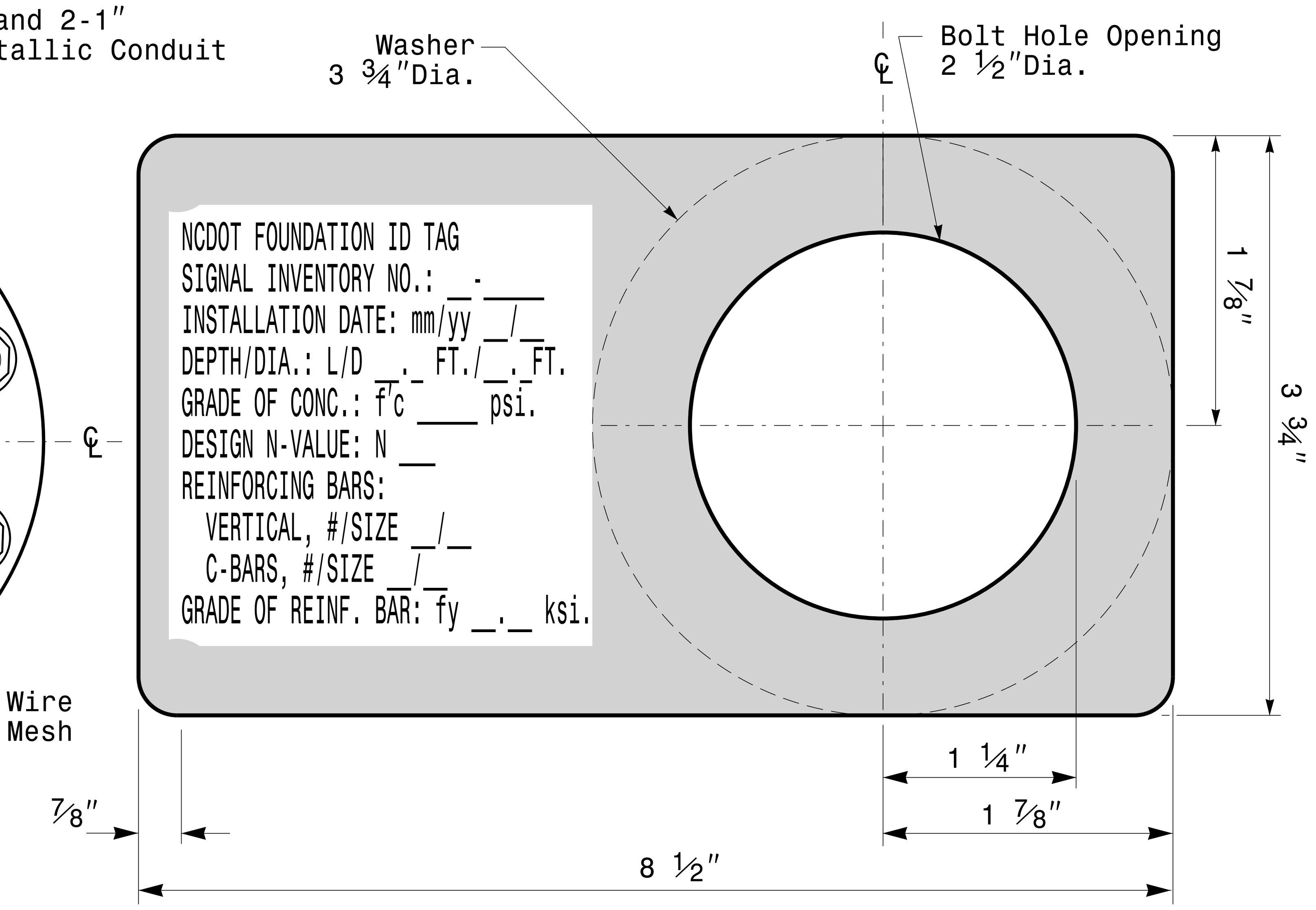


Typical "C" Bar Detail



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, 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
SIGNATURE
10/11/2017
DATE

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

SOIL CONDITION

		STANDARD STRAIN POLES						STANDARD FOUNDATIONS 48″ Diameter Drilled Pier Length (L) – Feet							Reinforcement			
					Reactions at the Pole Base			Clay				Sand			Longitudinal		Stirrups	
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Axial (kip)	Shear (kip)	Moment (ft–kip)	Medium N–Value 4–8	Stiff N–Value 9–15	Very Stiff N–Value 16–30	Hard N–Value >30	Loose N–Value 4–10	Medium N–Value 11–30	Dense N–Value >30	Bar Size (#)	Quantity (ea.)	Bar Size (#)	Spacing (in.)
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

PROJECT ID. NO.	SHEET NO.
EB-5741	Sig.M8

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.

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

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

SCALE: 0 NA NONE

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\M Sheets\2016\2014 Sig.M8 Std. Strain Pole Found.-Saturated Soil Condition.dgn
rtaylor