09/08/99

TIP PROJECT: W-5206AF

CONTRACT: DF00106

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

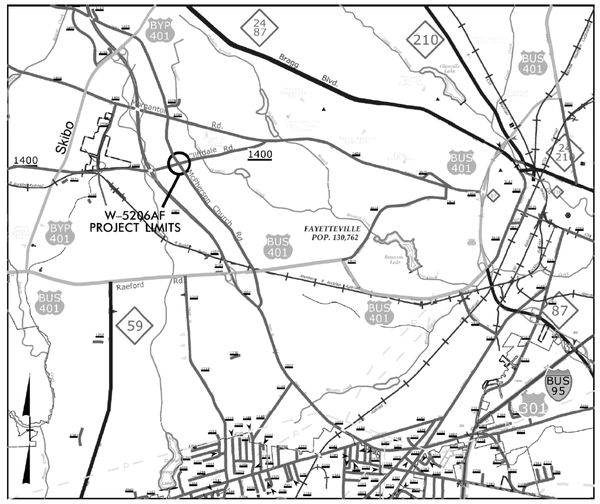
CUMBERLAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5206AF	1	

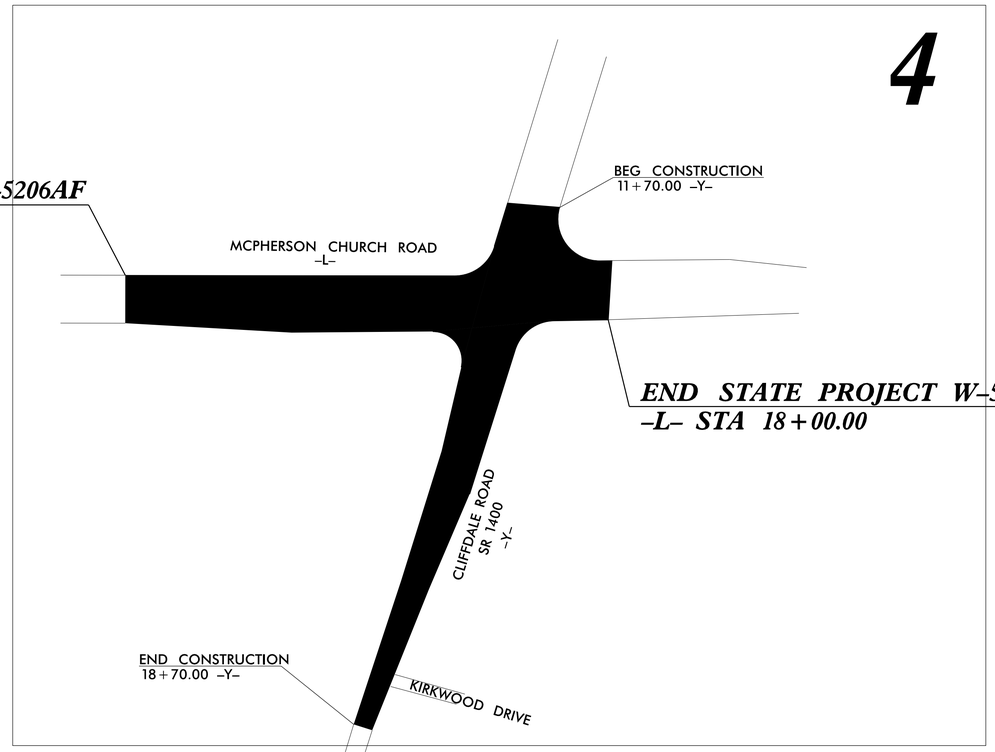
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
45336.1.FD32	HSIP-1400(9)	P.E.
45336.2.FD32	HSIP-1400(9)	ROW, UTILS
45336.3.32	HSIP-1400(9)	CONSTR

LOCATION: CLIFFDALE ROAD (SR 1400) AT McPHERSON CHURCH ROAD

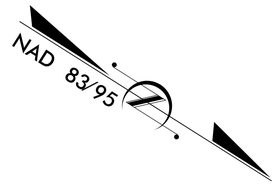
TYPE OF WORK: WIDENING, GRADING, PAVING, SIGNAL REVISION AND PAVEMENT MARKINGS



VICINITY MAP



BEGIN STATE PROJECT W-5206AF
-L- STA 11+75.00



GRAPHIC SCALES

50 25 0 50 100
PLANS

DESIGN DATA

ADT 19000 = 2012
ADT 33500 = 2032

V = 50 MPH

PROJECT LENGTH

TOTAL LENGTH OF STATE PROJECT W-5206AF = 0.113mi

Prepared in the Office of:
DIVISION OF HIGHWAYS
431 Transportation Drive Fayetteville, NC 28301

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 30, 2014

LETTING DATE:
SEPTEMBER 16, 2015

SEAN MATUSZEWSKI
PROJECT ENGINEER

NEIL BUTLER
PROJECT DESIGN ENGINEER

11-AUG-2015 11:09
H:\DDC\Projects\W-5206AF Cliffdale Rd at McPherson Church Rd_Cumberland Co\Roadway\proj\W5206AF_Rdy_tsh.dgn
$$$$USERNAME$$$$

04/06/15

PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	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
- 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:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — CA
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

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 — G
- 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

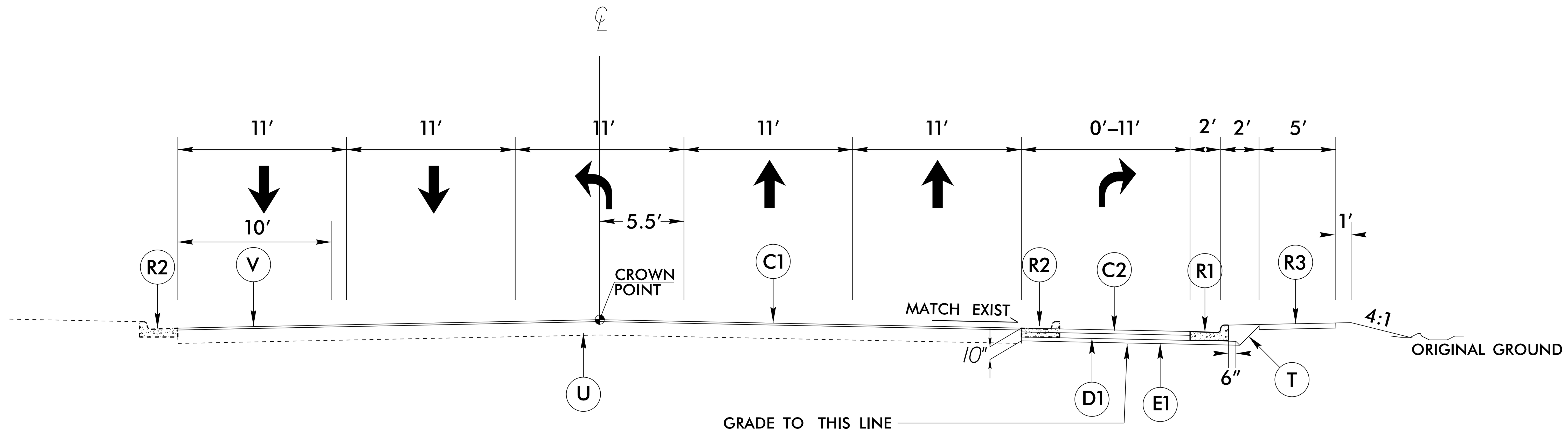
SANITARY SEWER:

- 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:

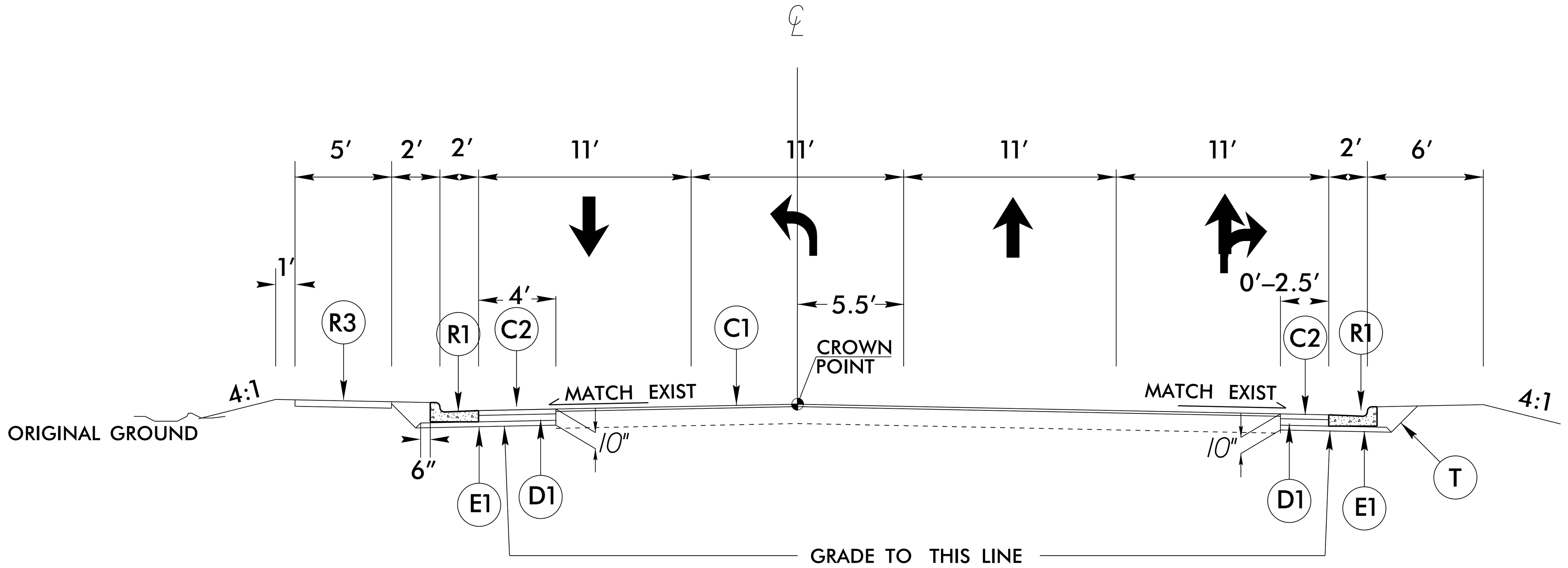
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line LOS B (S.U.E.*) — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole LOS A (S.U.E.*)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

PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	2



TYPICAL SECTION NO. 1

-L- STA. 11+75.00 TO STA 16+30.00



TYPICAL SECTION NO. 2

-Y- STA. 13+35.00 TO STA 15+45.00

PAVEMENT SCHEDULE

C1	PROP. APPROX. 1½″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
D1	PROP. APPROX. 4″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E1	PROP. APPROX. 3″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
R1	2′ 6″ CONCRETE CURB AND GUTTER
R2	EXISTING 2′ 6″ CONCRETE CURB AND GUTTER
R3	4″ CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING FOR CURB AND GUTTER TIE IN

PROJECT NOTES

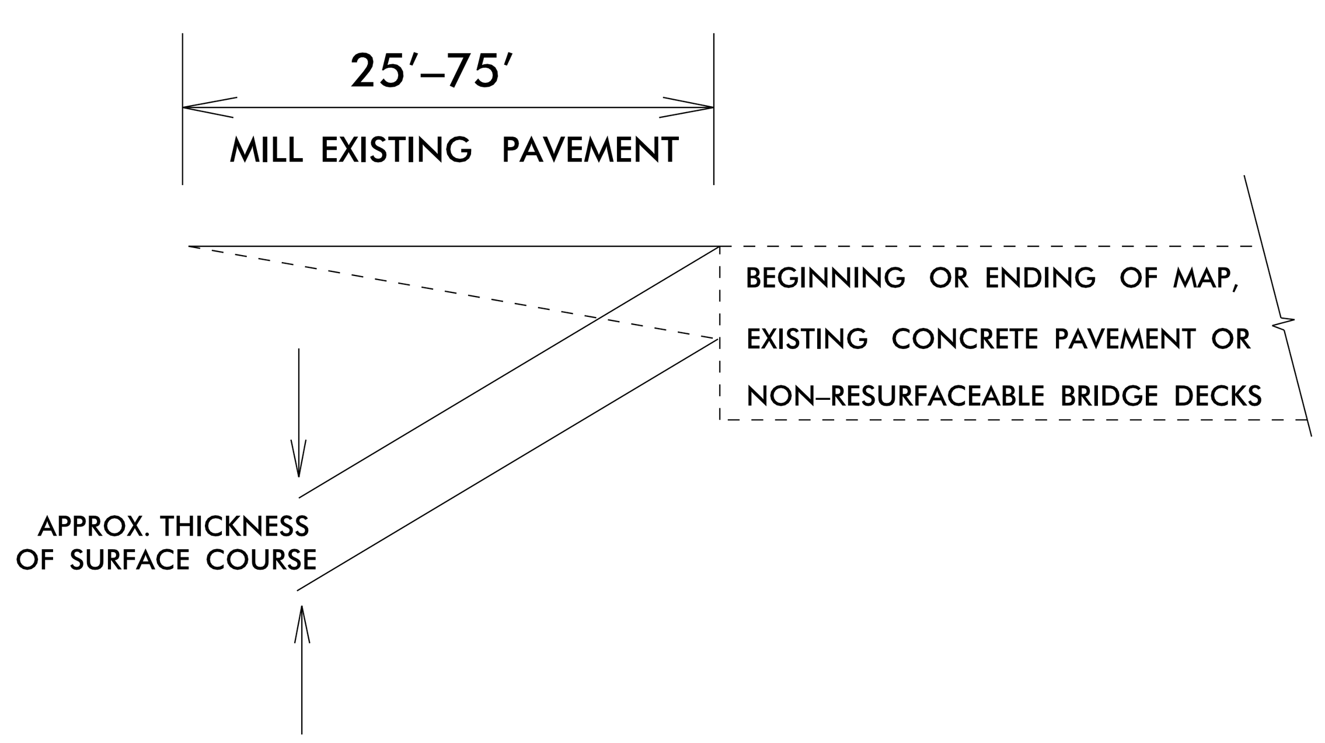
1. The Contractor shall not work on both sides of the road simultaneously within the same area.
2. Ingress and egress shall be maintained to all businesses and dwellings on the project.
3. At the end of each workday, the Contractor shall be required to backfill any area adjacent to existing travelway that has been graded leaving no more than a 1½″ drop-off.
4. A minimum of two-way, two-lane traffic (plus all existing left and right turn lanes) shall be maintained during periods of construction inactivity.
5. The Contractor shall not be allowed to stop traffic for more than 5 minutes at a time in any one direction.
6. During periods of construction inactivity, the difference in elevation between lanes shall not exceed 1-1/2 inch.
7. Access to police and fire station, fire hydrants, and hospitals shall be maintained at all times.
8. During periods of construction inactivity, place cones/drums 3′ from existing edge of pavement (travelway) as directed by the Engineer.
9. Channelizing devices in work areas shall be spaced not greater than 50′ on center in tangent areas, 45′ on center in tapers, and 10′ on center in radii, and shall be set 3′ off the edge of travelway, unless otherwise indicated on plans.
10. Contractor to install Erosion Control devices as directed by the Engineer.
11. Contractor shall coordinate with the Division Six Traffic Services Unit (910-486-1452) for placement of all pavement markings and signs.

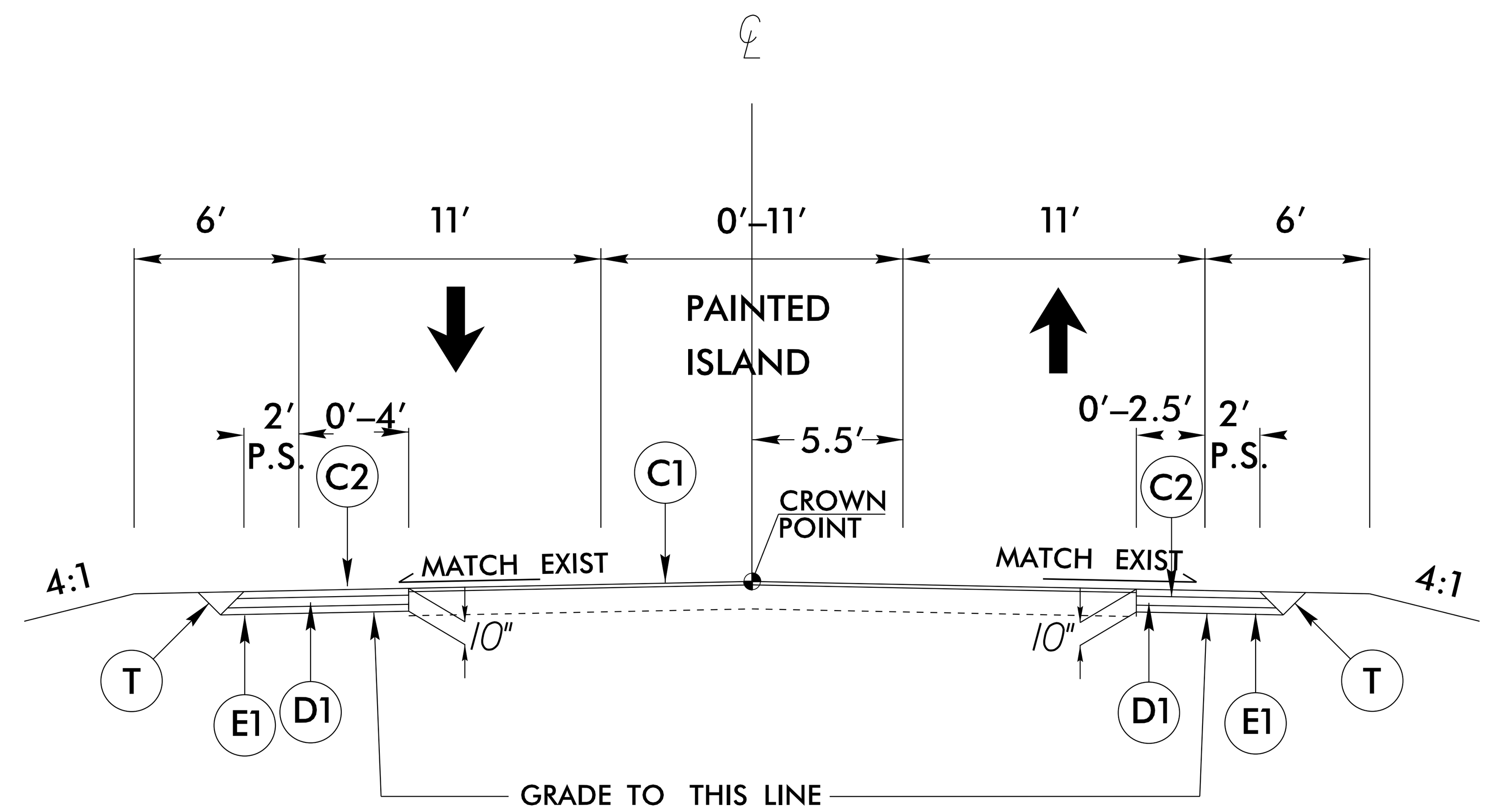
NOTES TO CONTRACTOR

For surface mixes over 1″ in thickness, mill the existing pavement in accordance with the following sketch as directed by the Engineer.

Locations shall include ties into existing concrete pavement, at bridge approaches where the bridge will not be resurfaced, and at the beginning and ending point of each resurfacing map.

Perform the work in accordance with Section 607 of the January 2012 North Carolina Department of Transportation Standard Specifications for Roads and Structures. Resurfacing will be accomplished at the same time as the milling operation.





TYPICAL SECTION NO. 3

-Y- STA. 15+45.00 TO STA 18+70.00

4/04/06

COMPUTED BY: ________________ DATE: ______________
CHECKED BY: ________________ DATE: ______________

PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	3

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
SUB–REGIONAL & REGIONAL
LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

NOTE: Invert Elevations are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300–5".

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	36" .079	42" .109	48" .109
15+88.14 –L–	RT	401	402	221.30	218.15	218.11																				
15+88.39 –L–	RT	402			218.11																					
14+79.19 –Y–	LT	404	403	219.98	216.55	216.53																				
14+79.30 –Y–	LT	403			216.53																					
15+11.45 –Y–	LT	406	405	219.90	216.24	216.22																				
15+10.78 –Y–	LT	405			216.22																					
16+28.41 –Y–	RT	407		220.15	215.75																					
16+30.76 –Y–	LT	409	408	219.41	213.68	213.65																				
16+31.56 –Y–	LT	408			213.65																					
PROJECT TOTALS																										
SAY																										

STATION	R.C. PIPE (CLASS III) 15"	18"	24"	30"	36"	42"	48"	R.C. PIPE (CLASS IV) 12"	15"	18"	24"	30"	36"	42"	48"	**" R. C. PIPE (CLASS V)	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	**" R. C. PIPE CULVERTS, CONTRACTOR DESIGN PIPE	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.
15+88.14 –L–									12													
15+88.39 –L–																						
14+79.19 –Y–									5													
14+79.30 –Y–																						
15+11.45 –Y–									6													
15+10.78 –Y–																						
16+28.41 –Y–																						
16+30.76 –Y–									11													
16+31.56 –Y–																						
PROJECT TOTALS									34													
SAY									40													

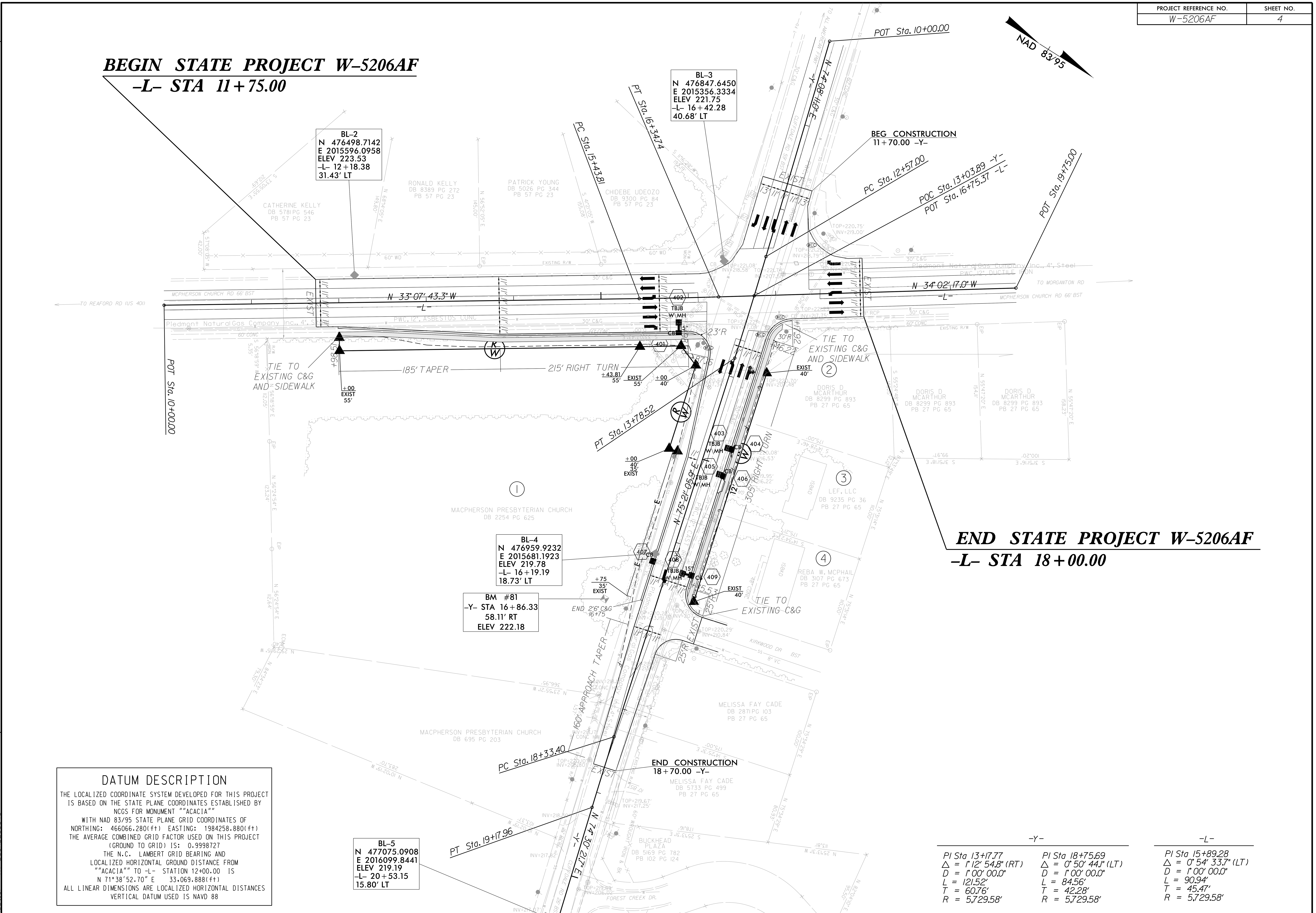
STATION	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G		CONCRETE TRANSITIONAL SECTION CATCH BASIN	DROP INLET		CONV. EXIST. C.B. TO T.B.J.B.	CONV. EXIST. D.I. TO T.B.J.B.	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	M.H. FRAME & COVER STD. 840.54	T.B.J.B. STD. 840.34	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
15+88.14 –L–	1					1															
15+88.39 –L–												1			1	1					
14+79.19 –Y–	1						1														
14+79.30 –Y–												1			1	1					
15+11.45 –Y–	1						1														
15+10.78 –Y–												1			1	1					
16+28.41 –Y–	1					1															
16+30.76 –Y–	1	0.7					1														
16+31.56 –Y–													1		1	1					
PROJECT TOTALS	5	0.7				2	3					3	1		4	4					
SAY																					

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

31-JUL-2015 10:45
dale Rd at McPherson Church Rd_Cumberland Co\Roadway\proj\W5206AF_Rdy_sum.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	4



BEGIN STATE PROJECT W-5206AF
-L- STA 11+75.00
END STATE PROJECT W-5206AF
-L- STA 18+00.00
NAD 83/95
BL-2
N 476498.7142
E 2015596.0958
ELEV 223.53
-L- 12+18.38
31.43' LT
BL-3
N 476847.6450
E 2015356.3334
ELEV 221.75
-L- 16+42.28
40.68' LT
BL-4
N 476959.9232
E 2015681.1923
ELEV 219.78
-L- 16+19.19
18.73' LT
BL-5
N 477075.0908
E 2016099.8441
ELEV 219.19
-L- 20+53.15
15.80' LT
BM #81
-Y- STA 16+86.33
58.11' RT
ELEV 222.18
POT Sta. 10+00.00
BEG CONSTRUCTION
11+70.00 -Y-
END CONSTRUCTION
18+70.00 -Y-
PC Sta. 12+57.00
POC Sta. 13+03.89 -Y-
POT Sta. 16+75.37 -L-
POT Sta. 19+75.00
PC Sta. 15+43.81
PT Sta. 16+34.74
PT Sta. 13+78.52
PC Sta. 18+33.40
PT Sta. 19+17.96
N 33° 07' 43.3" W
N 34° 02' 17.0" W
N 74° 08' 11.0" E
N 75° 21' 05.9" E
N 74° 30' 21.7" E
-L-
-Y-
MCPHERSON CHURCH RD 66' BST
TO REAFORD RD (US 401)
TO MORGANTON RD
185' TAPER
215' RIGHT TURN
305' RIGHT TURN
160' APPROACH TAPER
TIE TO EXISTING C&G AND SIDEWALK
TIE TO EXISTING C&G
END 2'6" C&G 16+75
MACPHERSON PRESBYTERIAN CHURCH
DB 2254 PG 625
MACPHERSON PRESBYTERIAN CHURCH
DB 695 PG 203
DORIS D. MCARTHUR
DB 8299 PG 893
PB 27 PG 65
LEF, LLC
DB 9235 PG 36
PB 27 PG 65
REBA W. MCPHAIL
DB 3107 PG 673
PB 27 PG 65
MELISSA FAY CADE
DB 2871 PG 103
PB 27 PG 65
MELISSA FAY CADE
DB 5733 PG 499
PB 27 PG 65
BUCKHEAD PLAZA
DB 5169 PG 782
PB 102 PG 124
CATHERINE KELLY
DB 5781 PG 546
PB 57 PG 23
RONALD KELLY
DB 8389 PG 272
PB 57 PG 23
PATRICK YOUNG
DB 5026 PG 344
PB 57 PG 23
CHIDEBE UDEOZO
DB 9300 PG 84
PB 57 PG 23
KIRKWOOD DR
FOREST CREEK DR.
REVISIONS

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT ""ACACIA"" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 466066.280(ft) EASTING: 1984258.880(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9998727 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM ""ACACIA"" TO -L- STATION 12+00.00 IS N 71°38′52.70″ E 33,069.888(ft) ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

-Y-	-Y-	-L-
PI Sta 13+17.77	PI Sta 18+75.69	PI Sta 15+89.28
Δ = 1° 12′ 54.8″ (RT)	Δ = 0° 50′ 44.1″ (LT)	Δ = 0° 54′ 33.7″ (LT)
D = 1° 00′ 00.0″	D = 1° 00′ 00.0″	D = 1° 00′ 00.0″
L = 121.52′	L = 84.56′	L = 90.94′
T = 60.76′	T = 42.28′	T = 45.47′
R = 5,729.58′	R = 5,729.58′	R = 5,729.58′

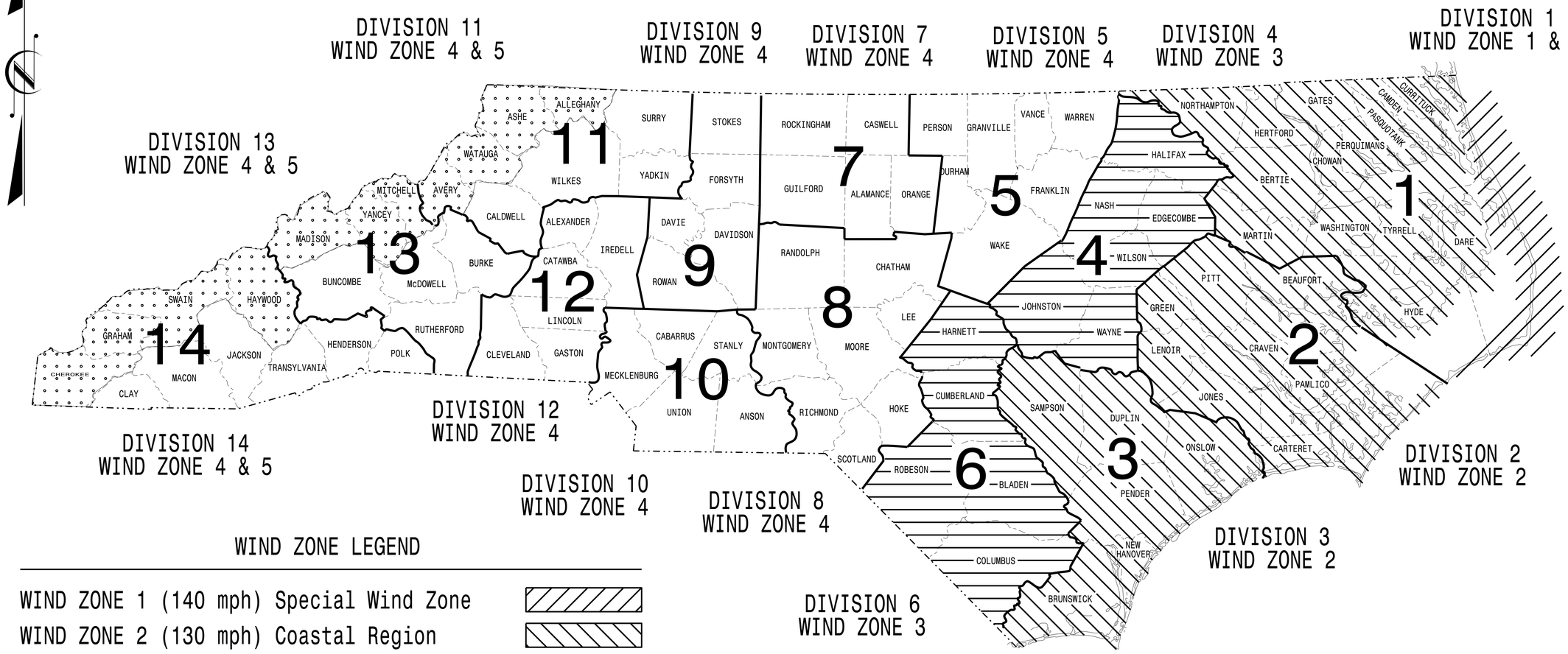
PROJECT NO.	SHEET NO.
W-5206AF	Sig. M1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR 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 2012 Interim to the 5th Edition 2009

AASHTO

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

INDEX OF PLANS

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION – ITS AND SIGNALS UNIT

G. A. FULLER, P.E. – STATE ITS AND SIGNALS ENGNEER

G. G. MURR, JR., P.E. – STATE SIGNALS ENGINEER

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

C.F. ANDREWS – ITS AND SIGNALS JOURNEY STRUCTURAL ENGINEER

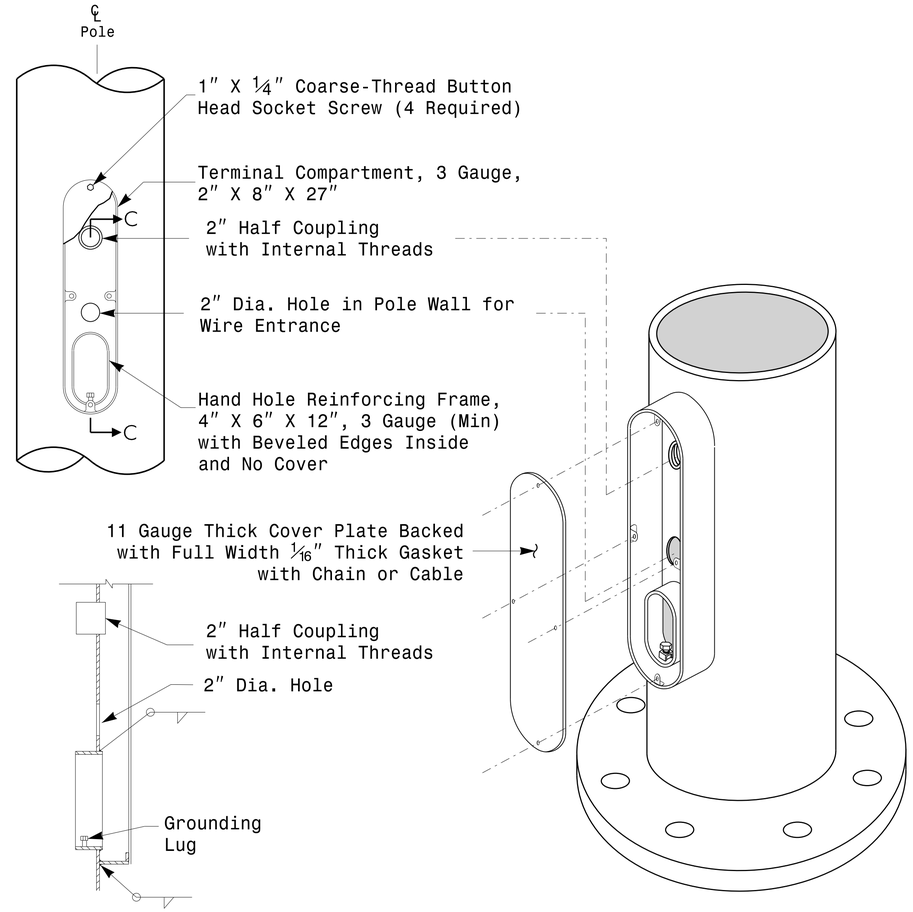
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by: Debesh C. Sarkar 44EBE32E147E4C4...

8/26/2014
DATE

Fabrication Details – All Poles



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 STANDARD ----------

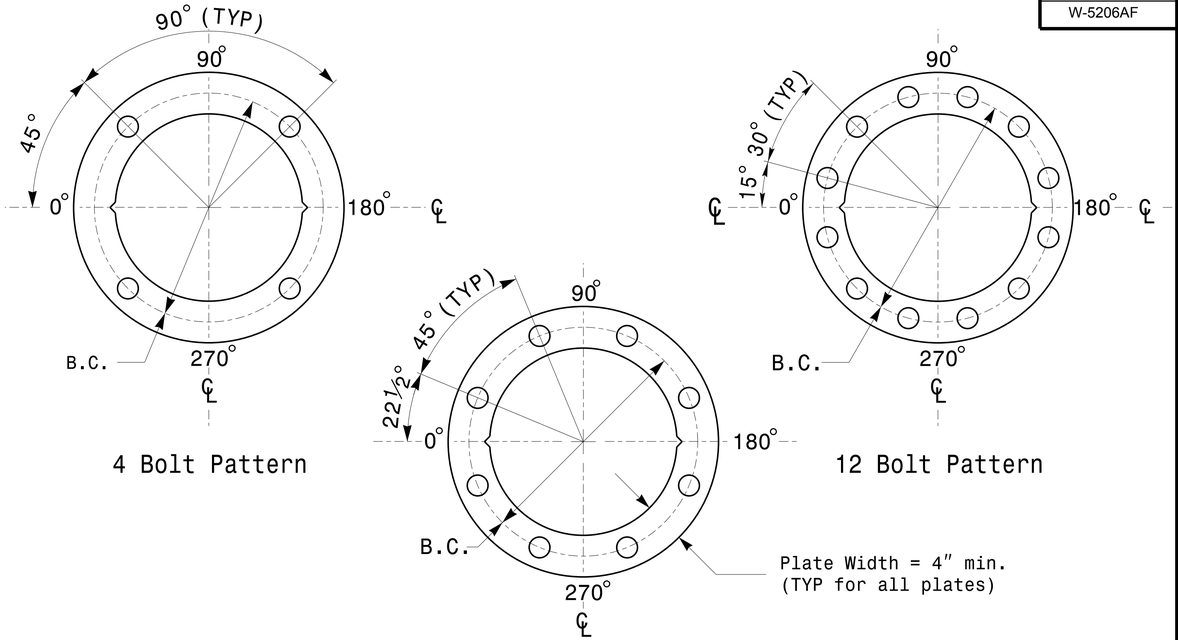
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

MFG _____ MFG. DATE: MM/YY
SECTION D/T/L/Y ----/----/----/----
NCDOT STANDARD ----------

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

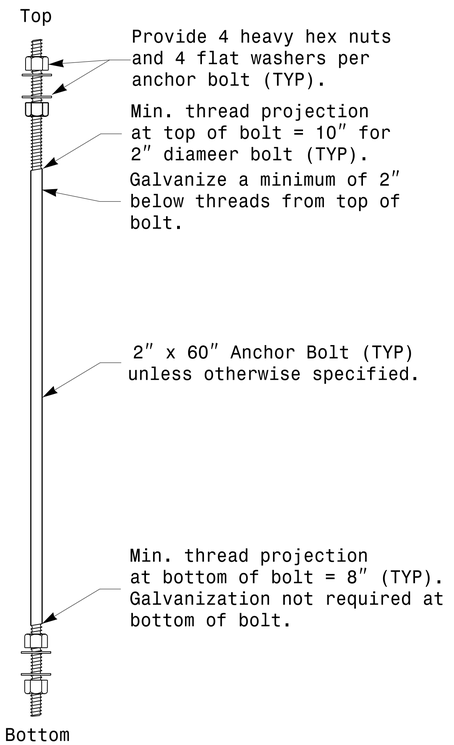
Notes:
1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
2) A.B. = Anchor Bolt
3) B.C. = Bolt Circle of Anchor Bolts
4) If Custom Design, use "NCDOT STANDARD" line for pole I.D. number and Signal Inv. Number.
5) See drawing M4 for mounting positions of I.D. tags.

Identification Tag Details



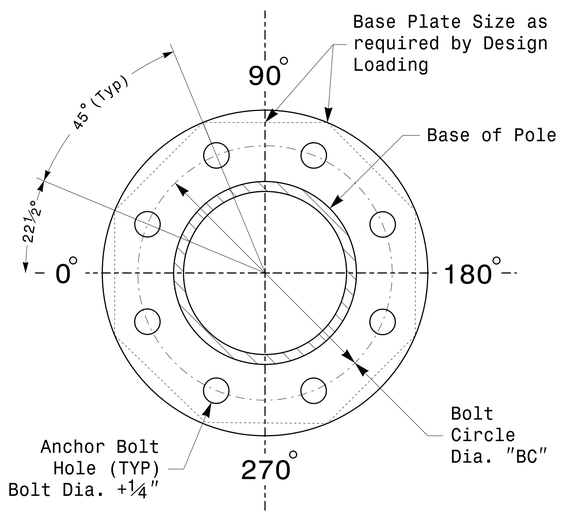
Construct Templates and Plates from ¼″ min. thick Steel. Galvanizing is not required.

Base Plate Template and Anchor Bolt Lock Plate Details



Anchor Bolt Detail

Note: See Strain Pole drawing M3 and Mast arm drawing M4 for base plate weld details.



8 Bolt Base Plate 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 Common To All Metal Poles

PLAN DATE:	AUGUST 2013	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

SCALE 0 NA NONE

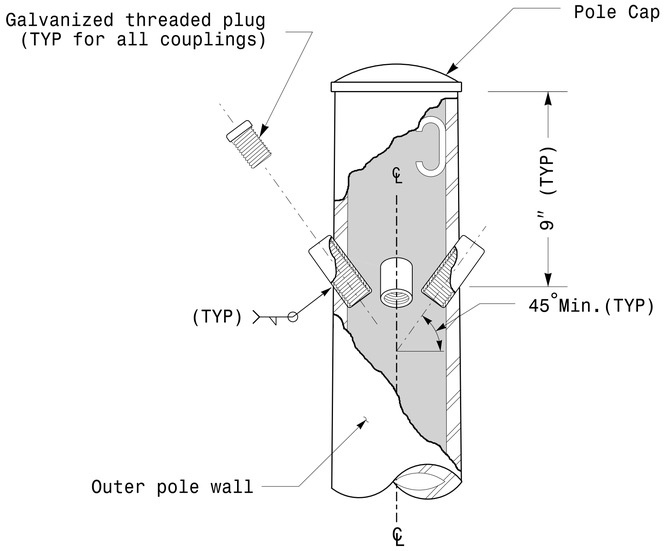
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

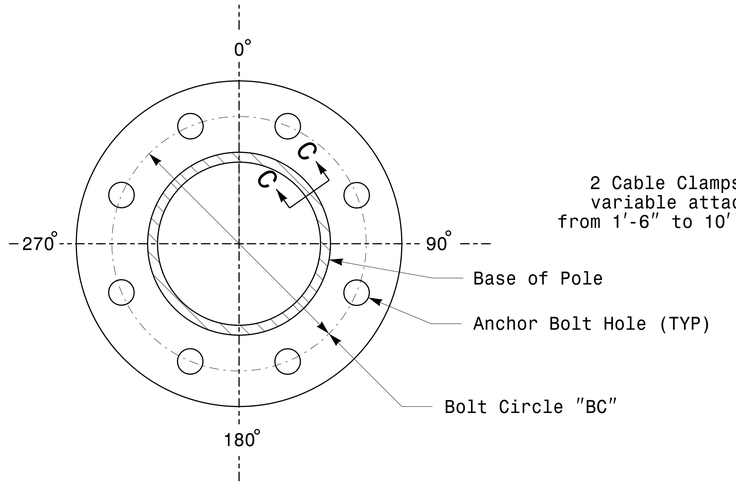
DocuSigned by: Debesh C. Sarkar 44EBE83DE147E4C4... 8/26/2014 DATE

SIG. INVENTORY NO.

Fabrication Details – Strain Poles



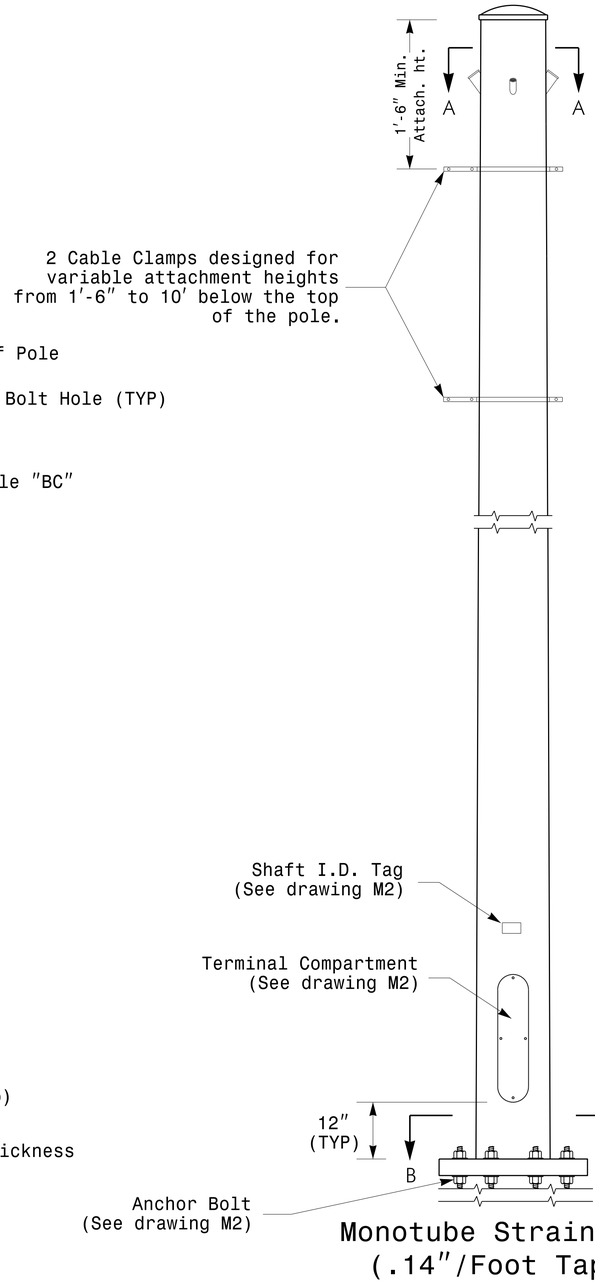
Cable Entrances at Top of Pole



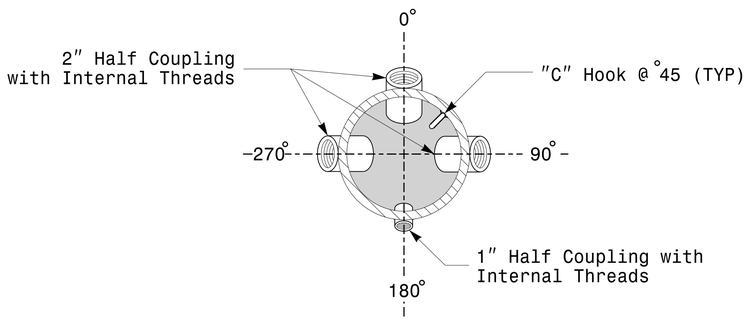
Section B-B

(See drawing M2)

Pole Base Plate

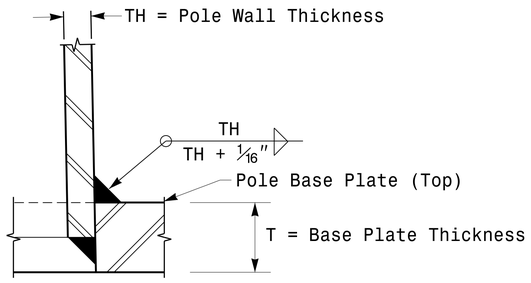


Monotube Strain Pole (.14"/Foot Taper)



Section A-A

Radial Orientation for Factory Installed Accessories at Top of Pole



Section C-C

Socket Connection Weld Detail

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

Typical Fabrication Details For Strain Poles

PLAN DATE:	AUGUST 2013	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR

SCALE 0 NA NONE

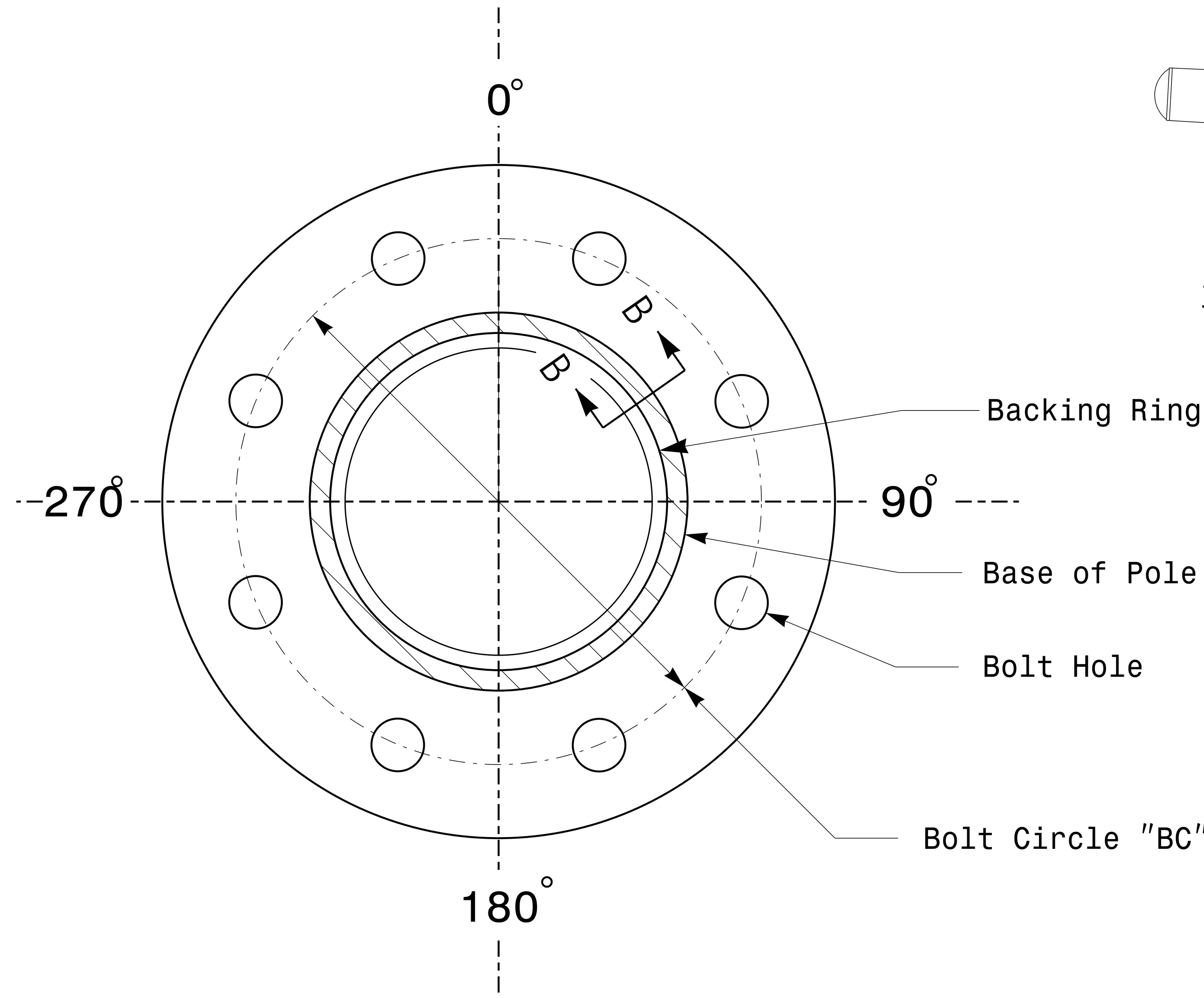
REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by: Debesh C. Sarkar 44E83E147E4C4... 8/26/2014 DATE

SIG. INVENTORY NO.

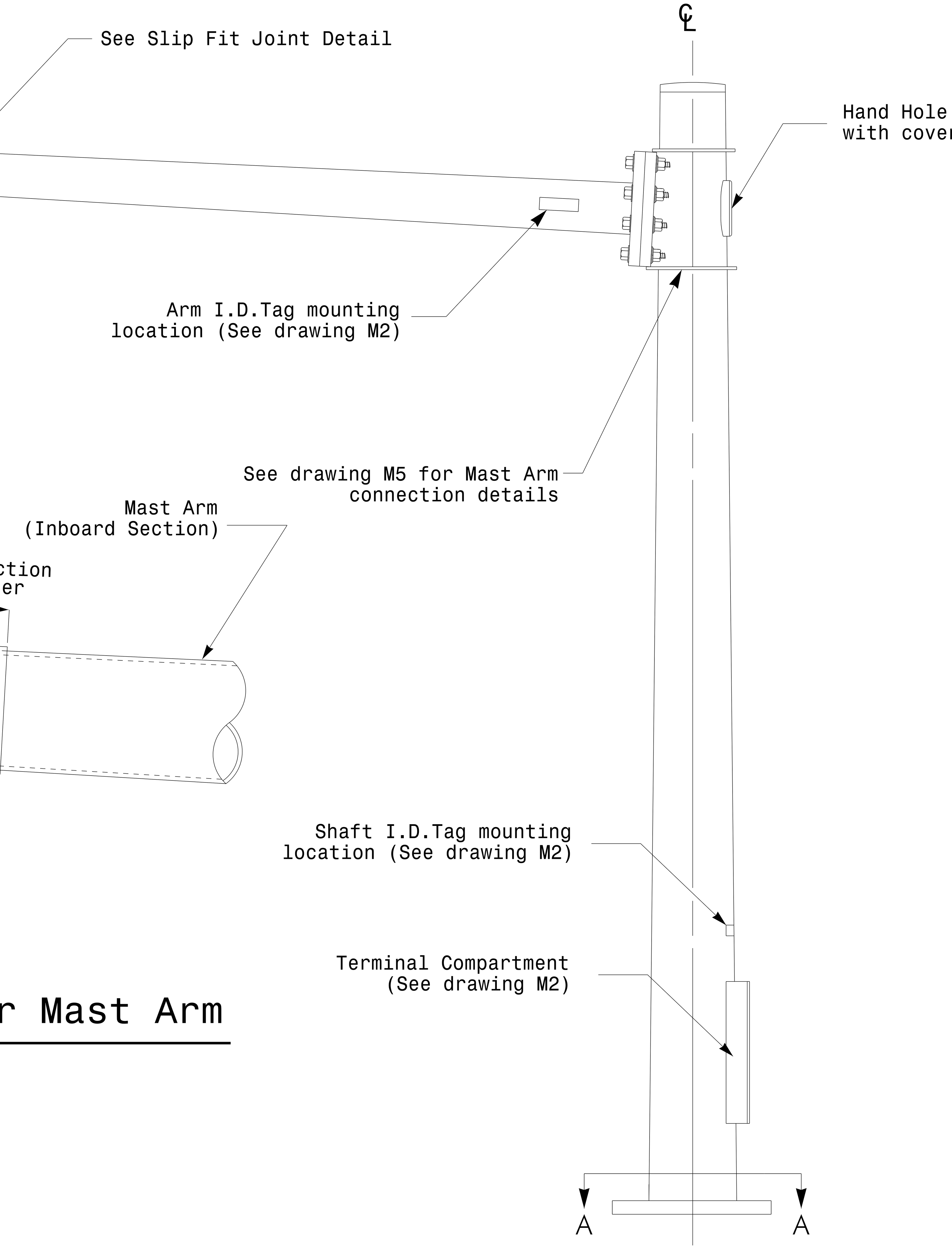
Fabrication Details – Mast Arm Poles



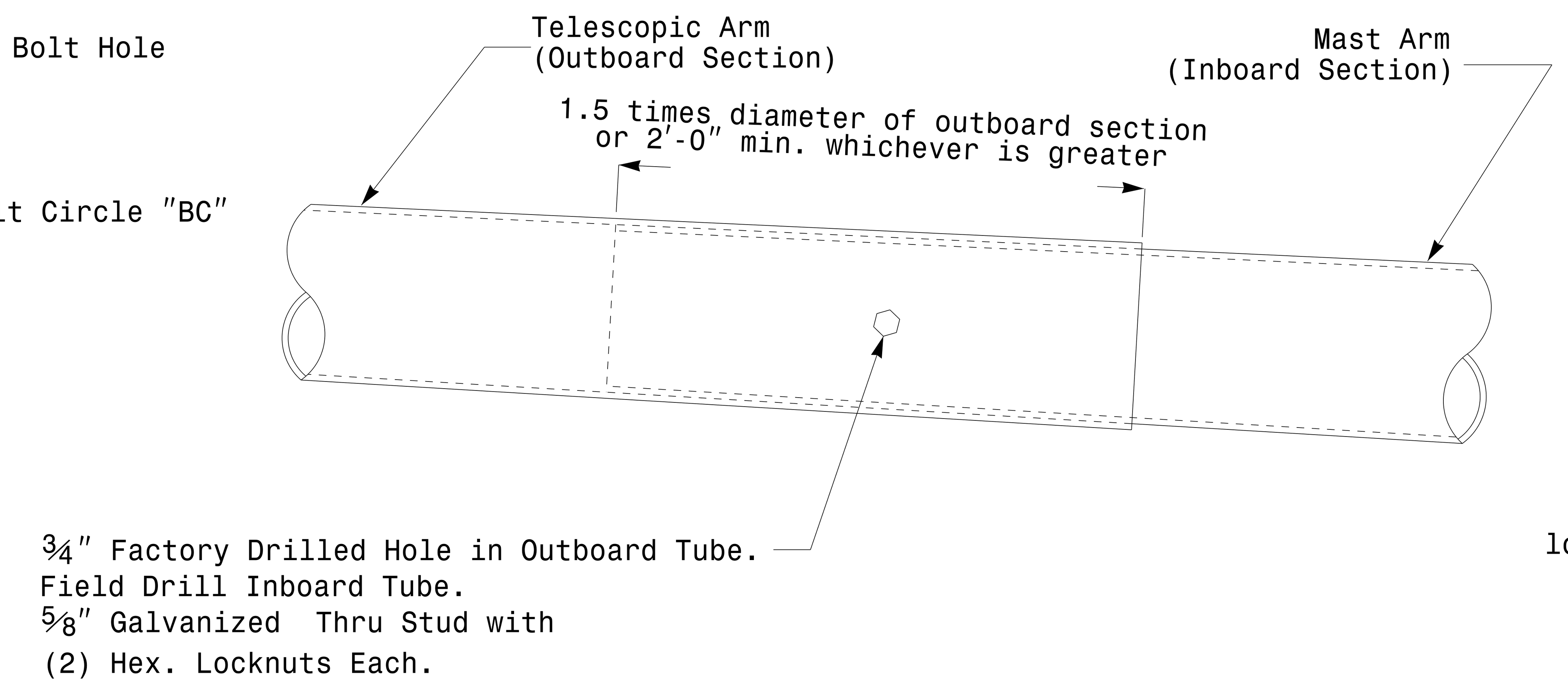
Section A-A

(See drawing M 2)

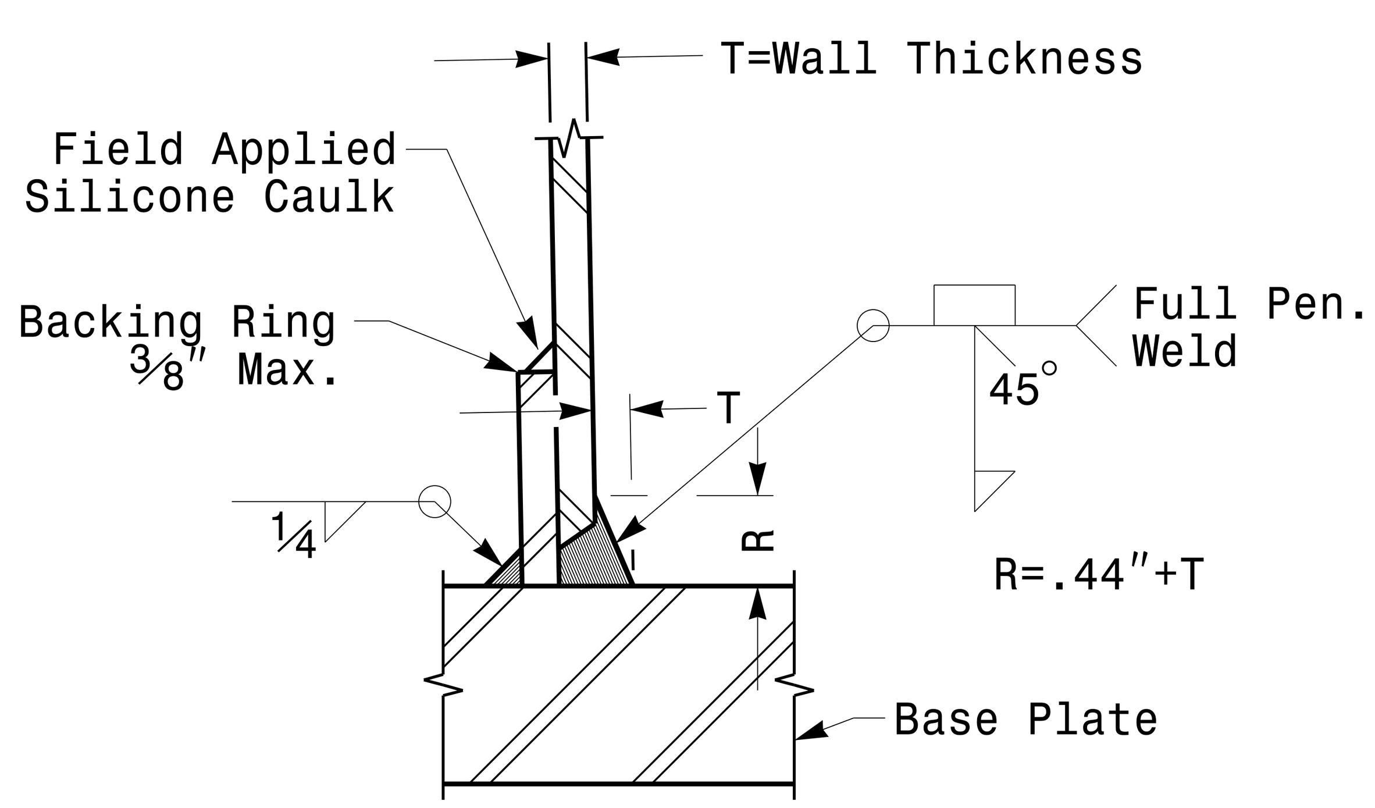
Pole Base Plate



Monotube Mast Arm Pole
(.14in./ft. taper)



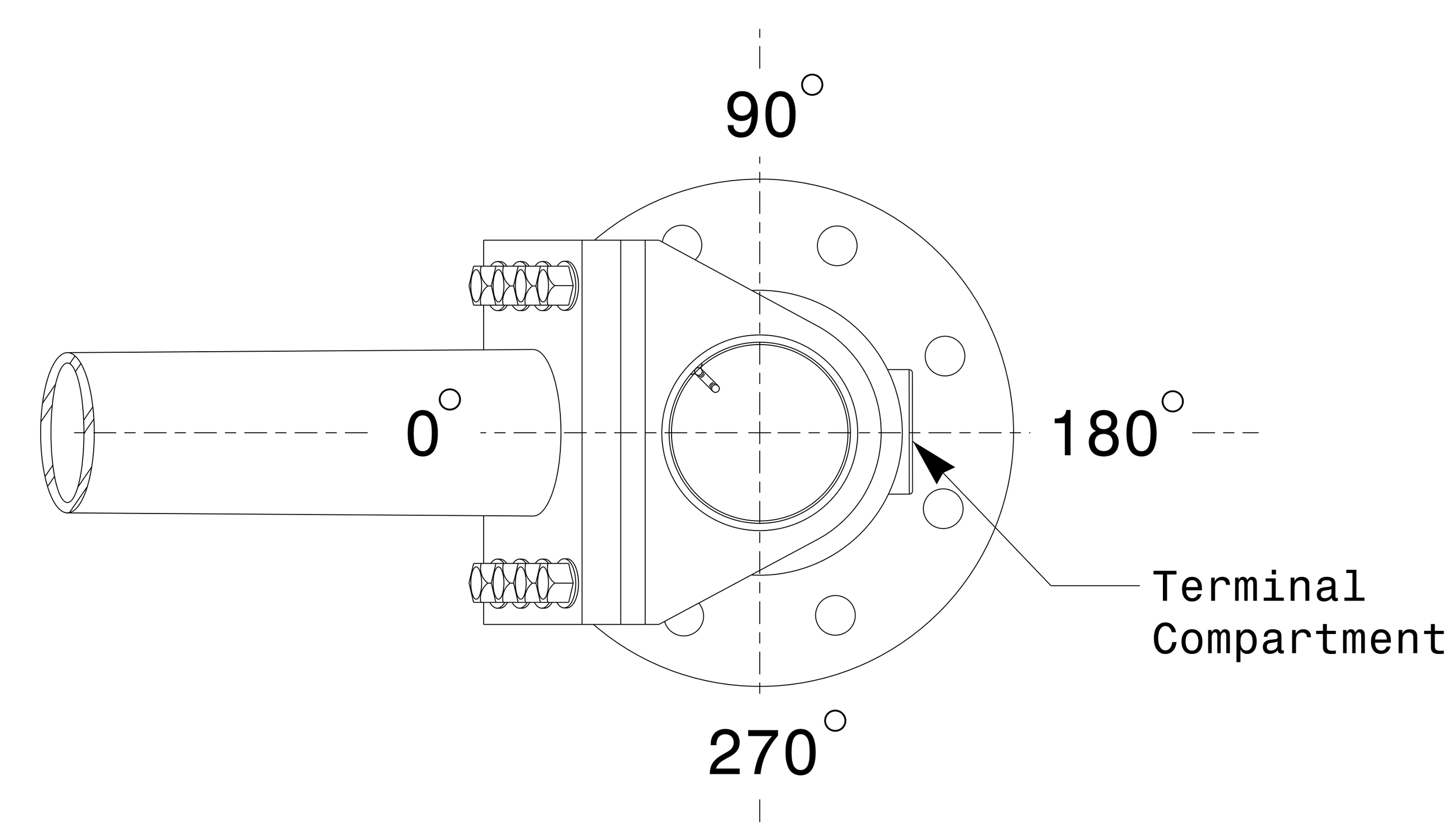
Slip Fit Joint Detail for Mast Arm



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:	AUGUST 2013	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 8/26/2014 DATE

SIG. INVENTORY NO.

26-AUG-2014 08:50
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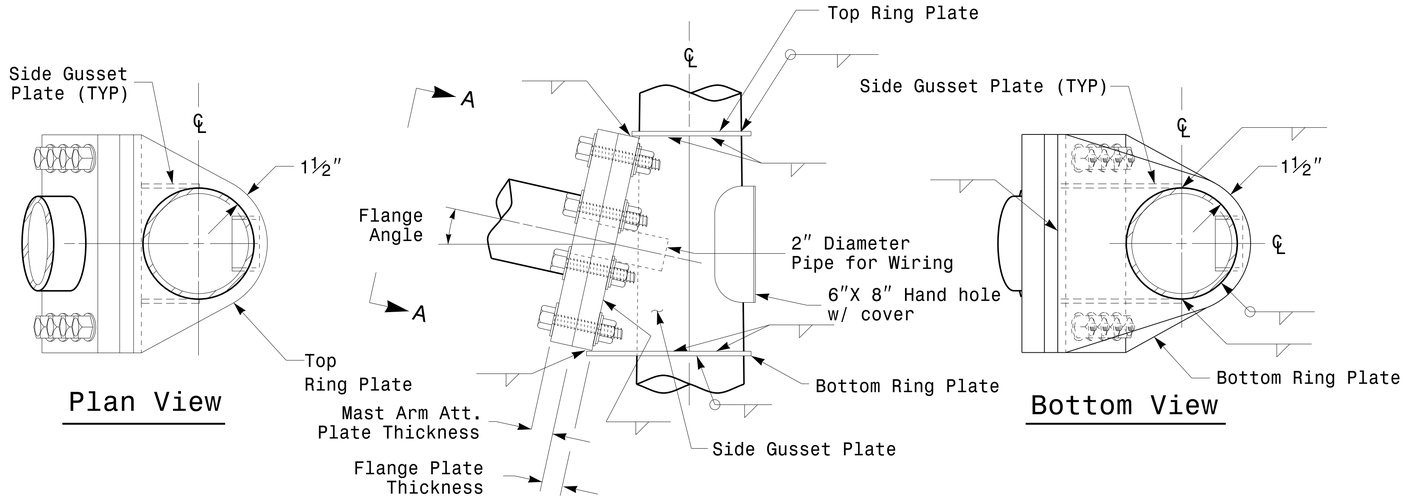
jgalloway

Welded Ring Stiffened Mast Arm Connection

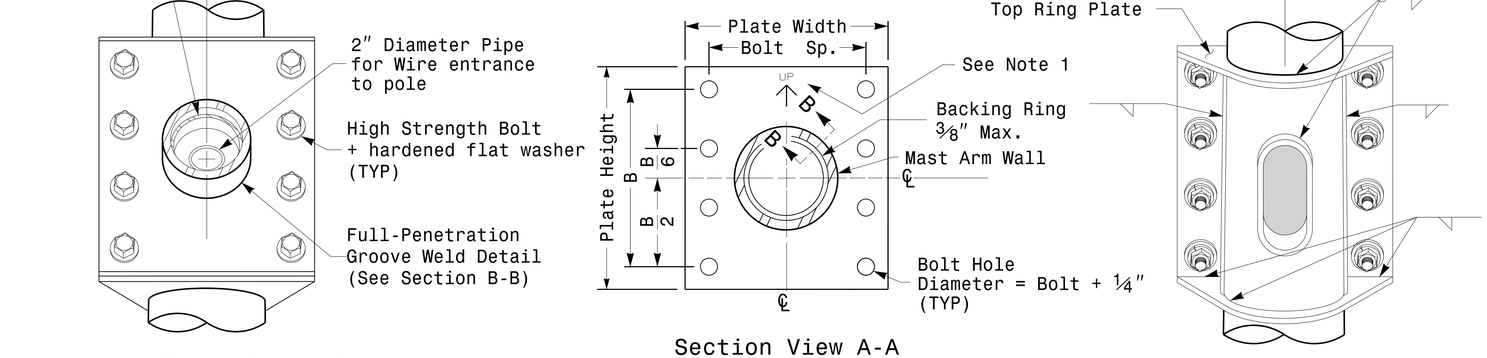
PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	Sig. M5



Plan View

Side Elevation View

Bottom View

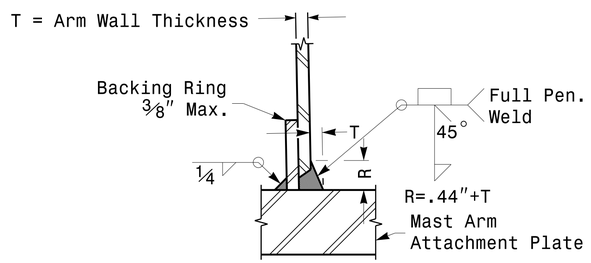


Front Elevation View

Section View 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. Designer is responsible for providing appropriate drainage points.

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

Fabrication Details For Mast Arm Connection To Pole

PLAN DATE:	AUGUST 2013	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 SEAL 028094 ENGINEER DEBESH C. SARKAR

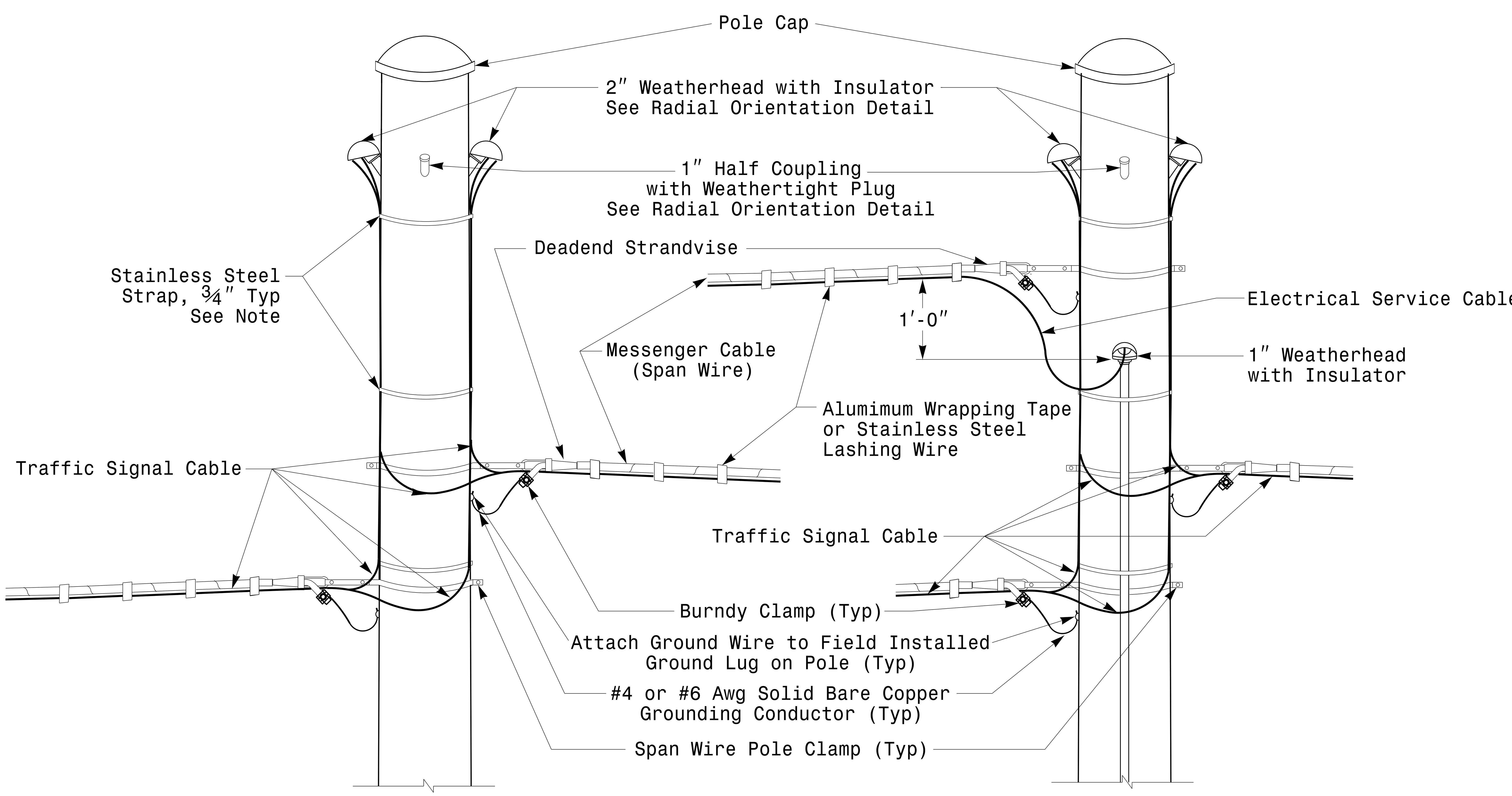
DocuSigned by: Debesh C. Sarkar 44EBE32E147E4C4... 8/26/2014 DATE

SIG. INVENTORY NO.

Fabrication Details – Mast Arm Poles

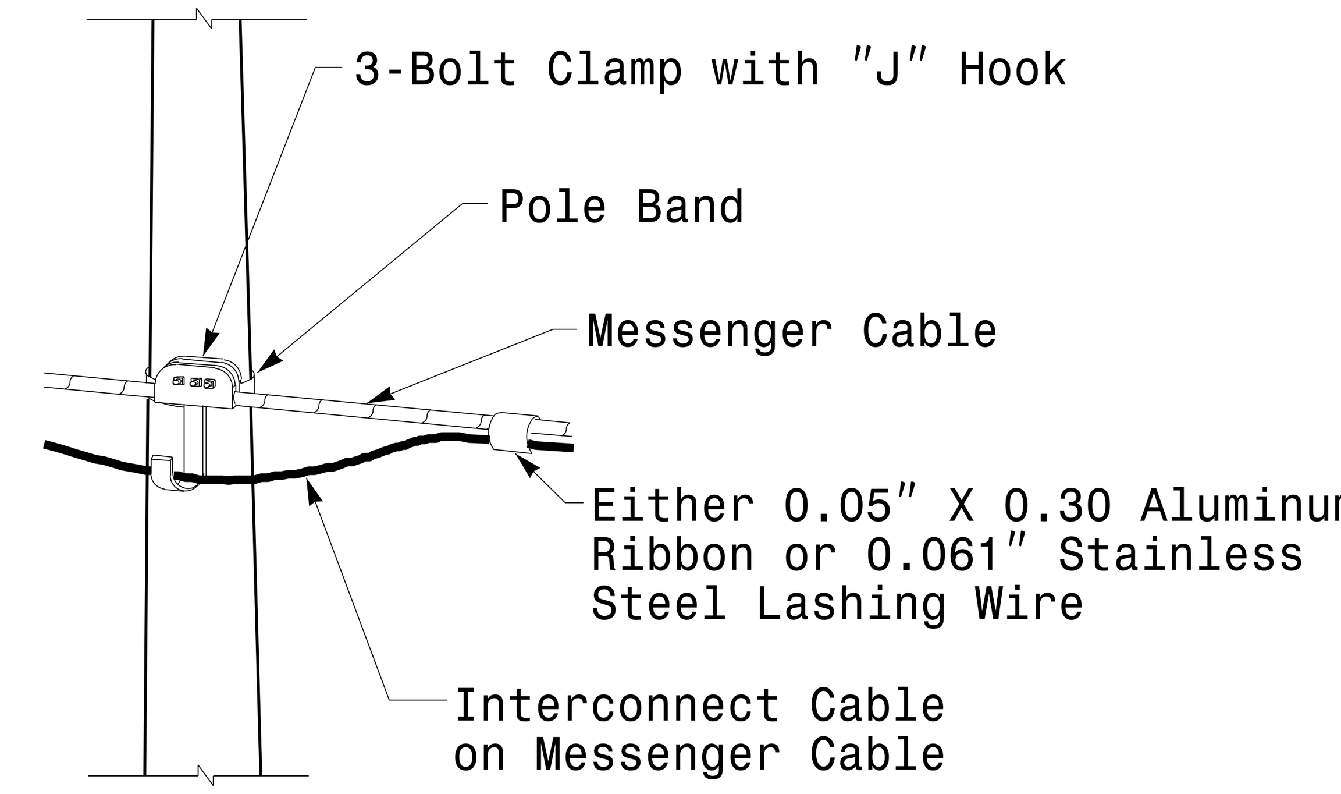
PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	Sig. M6

Construction Details – Strain Poles

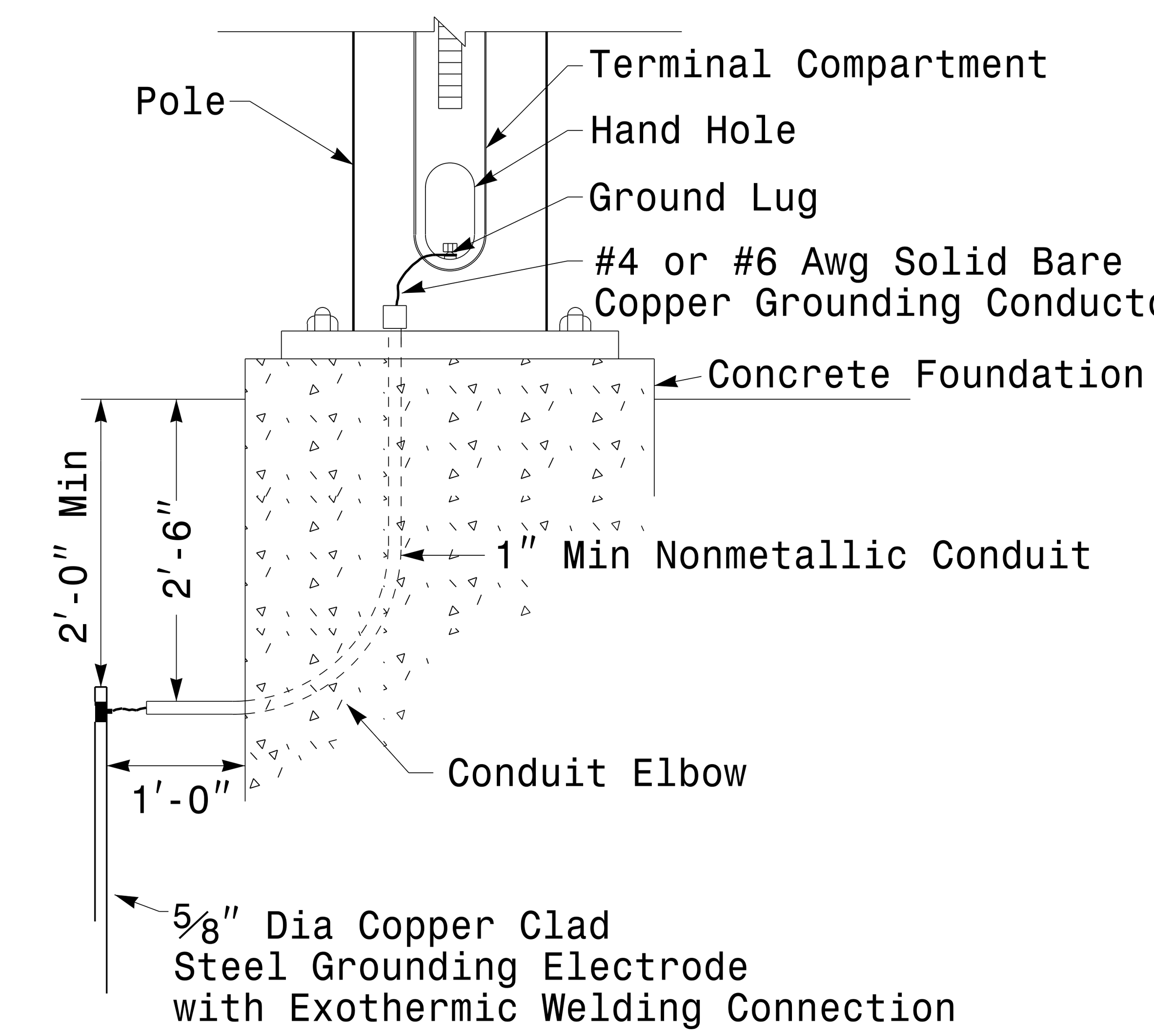


Strain Pole Attachments

Note: 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 36"



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail

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

Construction Details
Strain Poles

PLAN DATE:	AUGUST 2013	REVIEWED 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

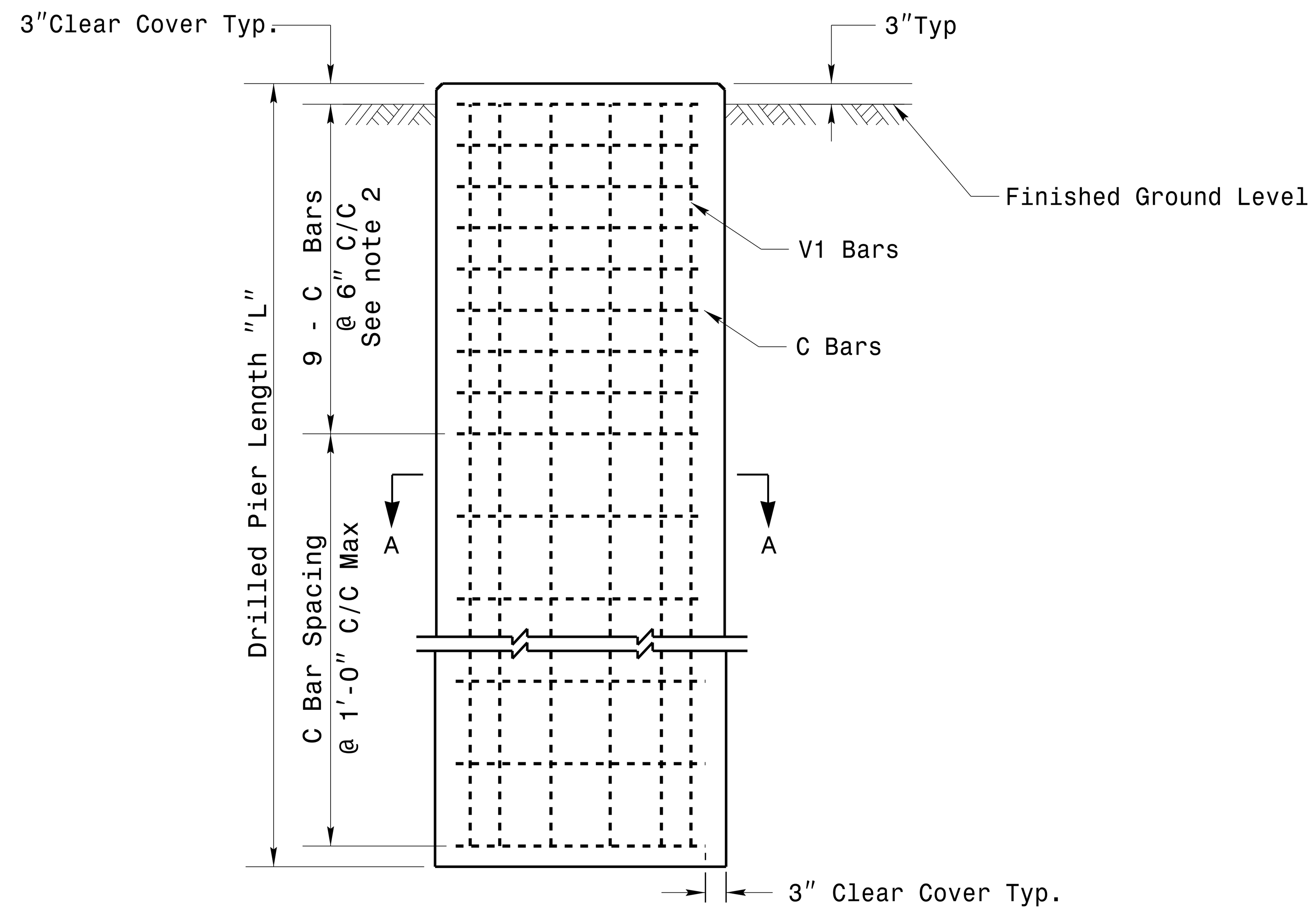
DocuSigned by: Debesh C. Sarkar 8/26/2014
DATE

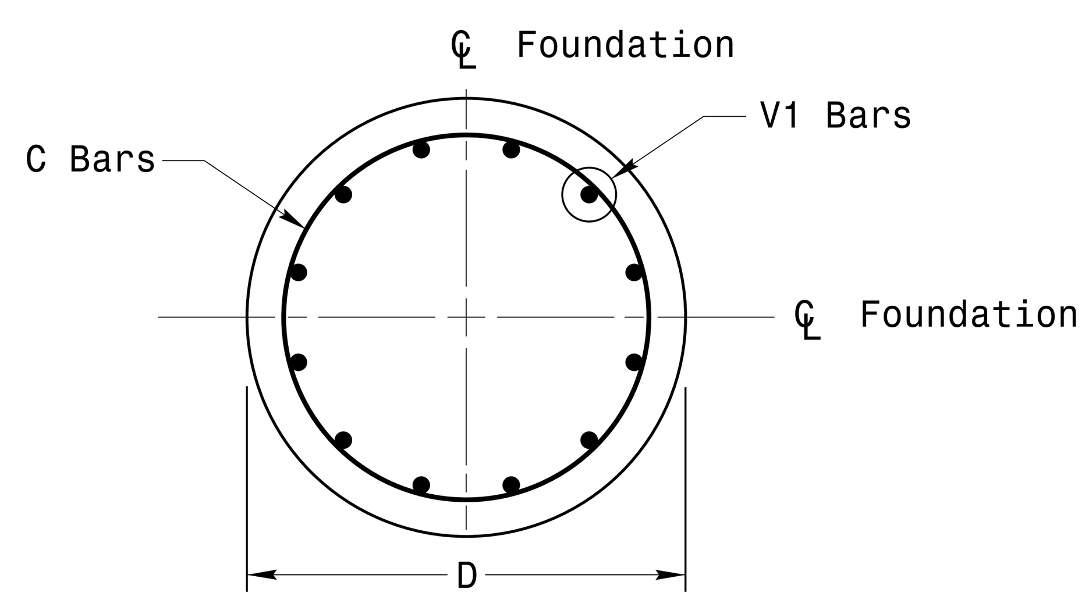
SIG. INVENTORY NO.

PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	Sig. M7

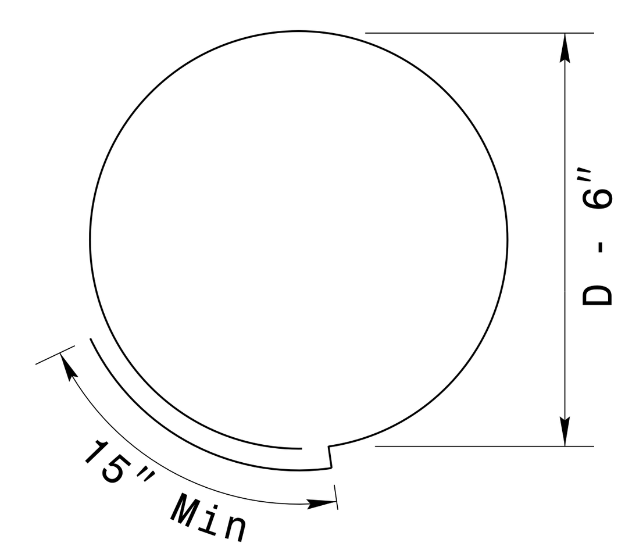
Construction Details – Foundations

Reinforcing Steel Bars





Section A-A



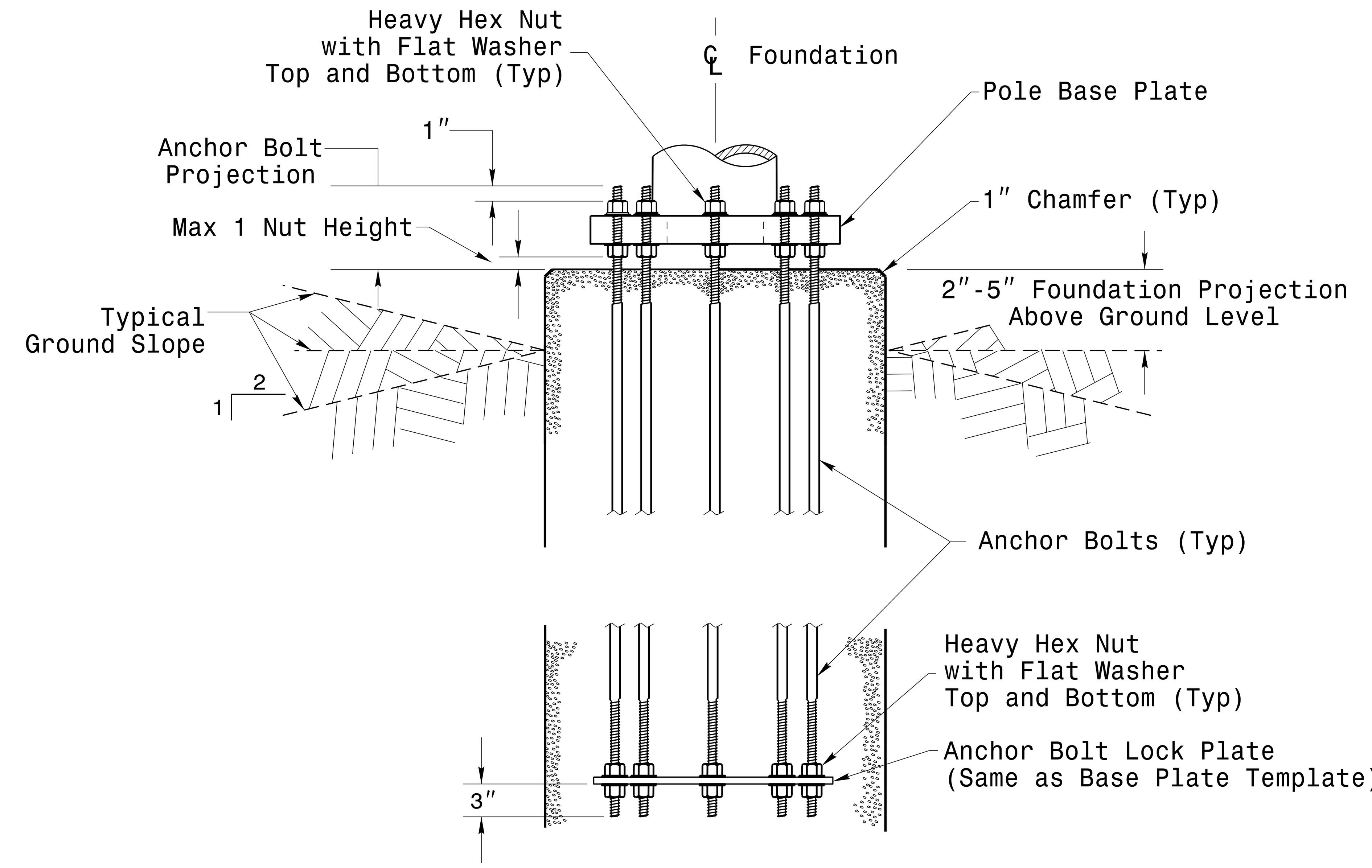
Typical "C" Bars

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4′–0″ DIAMETER)						
Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
48″	.465 x L	V1	***	#8	STR.	**
		C	*	#4	CIR.	12′-6″

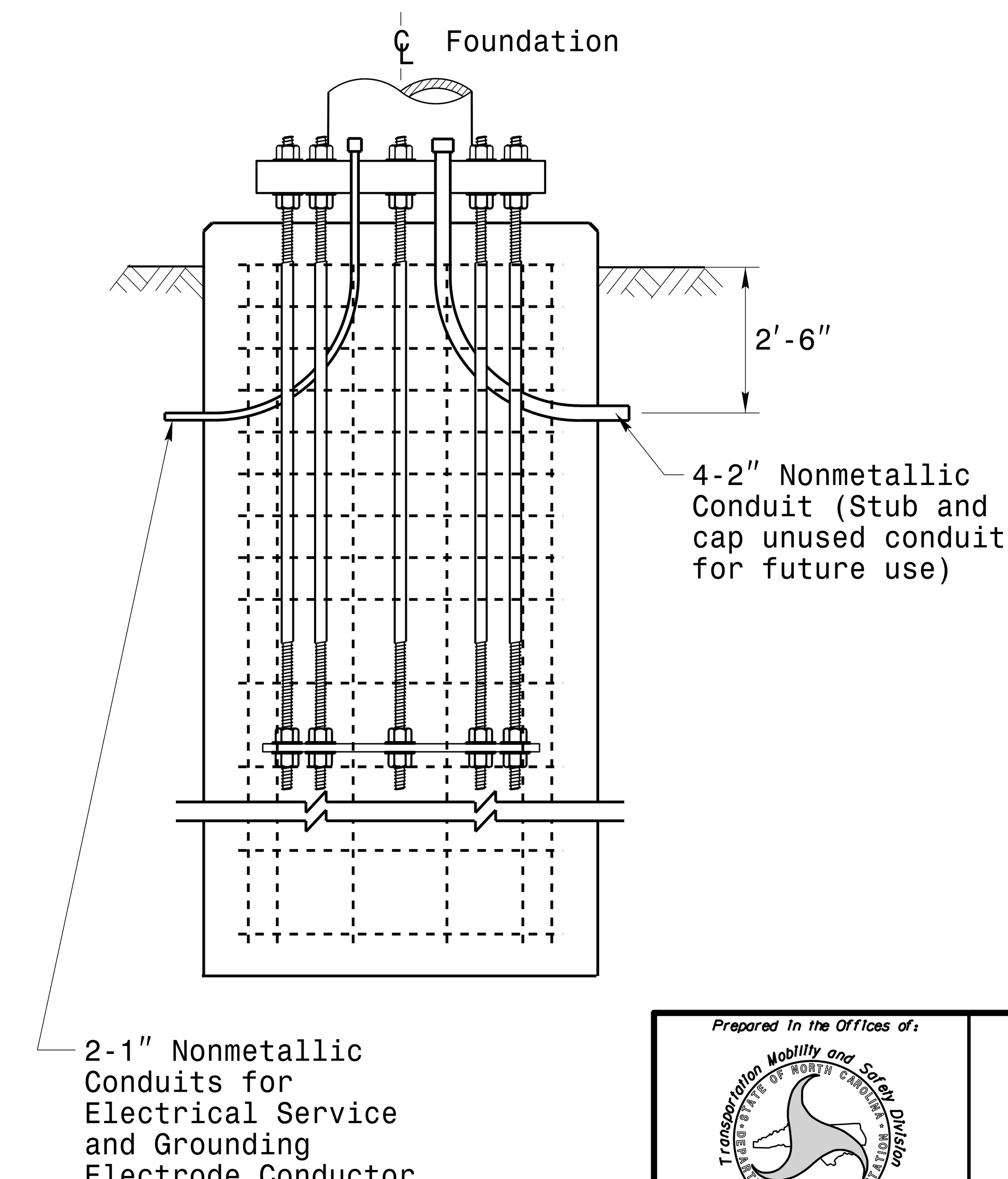
* See Note No. 1
** See Note No. 3
*** See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



Notes

1. The number of C-bars is based on foundation depth and/or as required. For standard foundations, see sheets M 8 and M 9 for details.
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. The length of V1-bars is based on foundation depth. For standard foundations, see sheets M 8 and M 9 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 vertical reinforcement as required per design. See sheets M 8 and M9 for details.

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

Construction Details
Foundations

PLAN DATE:	AUGUST 2013	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 SEAL 028094 ENGINEER DEBESH C. SARKAR

DocuSigned by:
Debesh C. Sarkar
44E8E32E147E4C4...
8/26/2014
DATE

SIG. INVENTORY NO.

26-AUG-2014 08:44
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jgalloway

PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	Sig. M8

SATURATED SOIL CONDITION

Wind Zone	Load	STANDARD STRAIN POLES: Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base: Axial (kip)	Shear (kip)	Moment (ft–kip)	STANDARD FOUNDATIONS 48″ Diameter Drilled Pier Length (L) – Feet: 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 (#)	Longitudinal Quantity	Stirrups Bar Size (#)	Stirrups Spacing (in.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	19	13	9	8	17	14.5	12.5	8	13	4	12
		S30L3	30	25	2	11	300	20	13.5	9	8	17.5	15	13	8	14	4	12
		S35L3	35	25	3	11	320	20	13.5	9.5	8	17.5	15	13	8	15	4	12
	HEAVY	S30H3	30	29	3	16	450	24.5	17	13	11	21	17.5	15	8	18	4	12
		S35H3	35	29	4	16	515	26	17.5	12	8.5	22	18.5	16	8	20	4	12
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	18	12.5	8.5	8	16.5	14	12	8	13	4	12
		S30L2	30	23	2	10	270	19	12.5	9	8	16.5	14	12.5	8	13	4	12
		S35L2	35	23	3	10	300	19.5	13	9	8	17	14.5	13	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	25.5	15.5	11	8	20	17	14.5	8	17	4	12
		S35H2	35	29	4	15	475	25	16.5	11.5	8	21	17.5	15.5	8	19	4	12
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	18	12.5	8.5	8	16.5	14	12	8	13	4	12
		S30L2	30	23	2	10	270	19	12.5	9	8	16.5	14	12.5	8	13	4	12
		S35L2	35	23	3	10	300	19.5	13	9	8	17	14.5	13	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	25.5	15.5	11	8	20	17	14.5	8	17	4	12
		S35H2	35	29	4	15	475	25	16.5	11.5	8	21	17.5	15.5	8	19	4	12
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	16	11	8	8	15	12.5	11	8	12	4	12
		S30L1	30	22	2	8	205	16.5	11.5	8	8	15	13	11.5	8	12	4	12
		S35L1	35	22	3	8	230	17	12	8	8	15.5	13.5	11.5	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	20.5	14	9.5	8	18	15	13.5	8	15	4	12
		S35H1	35	25	4	12	350	21	14.5	10	8	18.5	15.5	13.5	8	16	4	12
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	18	12.5	8.5	8	16.5	14	12	8	13	4	12
		S30L2	30	23	2	10	270	19	12.5	9	8	16.5	14	12.5	8	13	4	12
		S35L2	35	23	3	10	300	19.5	13	9	8	17	14.5	13	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	25.5	15.5	11	8	20	17	14.5	8	17	4	12
		S35H2	35	29	4	15	475	25	16.5	11.5	8	21	17.5	15.5	8	19	4	12

48″ Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Foundation Depth

Fabrication Design 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. Min. base plate thickness (T) is 2.0 inches.

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 in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case.
   The foundation depth is the value where the column and the row intersect.
6. Reference Drilled Shafts: Construction Procedures and Design Methods, FHWA -IF-99-025

S30H1 - Hard Clay-Stirrup Spacing: 6 in. c/c
S30H2 - Hard Clay-Stirrup Spacing: 6 in. c/c
S30H3 - Hard Clay-Stirrup Spacing: 6 in. c/c
      - Dense Sand-Stirrup Spacing: 6 in. c/c
S35H1 - Hard Clay - Stirrup Spacing: 6 in. c/c
S35H2 - Very Stiff Clay-Stirrup Spacing: 6 in. c/c
      - Hard Clay- Stirrup Spacing: 6 in. c/c
      - Dense Sand- Stirrup Spacing: 6 in. c/c
S35H3 - Very Stiff Clay-Stirrup Spacing: 6 in. c/c
      - Dense Sand-Stirrup Spacing: 6 in. c/c

Standard Strain Pole Foundation–Saturated Soil Condition

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

Standard Strain Pole Foundation for Saturated Soil Condition

PLAN DATE: SEPTEMBER 2013 | DESIGNED BY: C.B COGDELL
PREPARED BY: N. BITTING | REVIEWED BY: D. SARKAR

SCALE: 0 NA — None

REVISIONS | INIT. | DATE

SEAL: North Carolina Professional Engineer, SEAL 028094, Debesh C. Sarkar

DocuSigned by: Debesh C. Sarkar 8/26/2014
DATE

26-AUG-2014 08:42
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jgalloway

DRY SOIL CONDITION

Wind Zone	Load	Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base: Axial (kip)	Shear (kip)	Moment (ft-kip)	Clay: Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Sand: Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30	Longitudinal: Bar Size (#)	Quantity	Stirrups: Bar Size (#)	Spacing (in.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	18	12.5	9	8	14.5	11	10	8	13	4	12
		S30L3	30	25	2	11	300	18.5	13	9	8	15	11.5	10	8	14	4	12
		S35L3	35	25	3	11	320	19	13.5	9.5	8	15	11.5	10.5	8	15	4	12
	HEAVY	S30H3	30	29	3	16	450	23	16	11	8	17.5	13.5	11.5	8	18	4	12
		S35H3	35	29	4	16	515	24.5	16.5	12	8.5	18.5	14	12	8	20	4	12
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	17	12	8.5	8	14	11	9.5	8	13	4	12
		S30L2	30	23	2	10	270	18	12.5	8.5	8	14.5	11	10	8	13	4	12
		S35L2	35	23	3	10	300	18.5	13	9	8	14.5	11.5	10	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	22	15	10.5	8	17	13	11.5	8	17	4	12
		S35H2	35	29	4	15	475	23.5	16	11.5	8	18	13.5	12	8	19	4	12
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	17	12	8.5	8	14	11	9.5	8	13	4	12
		S30L2	30	23	2	10	270	18	12.5	8.5	8	14.5	11	10	8	13	4	12
		S35L2	35	23	3	10	300	18.5	13	9	8	14.5	11.5	10	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	22	15	10.5	8	17	13	11.5	8	17	4	12
		S35H2	35	29	4	15	475	23.5	16	11.5	8	18	13.5	12	8	19	4	12
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	15.5	10.5	8	8	13	10	9	8	12	4	12
		S30L1	30	22	2	8	205	15.5	11	8	8	13	10	9	8	12	4	12
		S35L1	35	22	3	8	230	16.5	11.5	8	8	13.5	10.5	9	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	19.5	13.5	9.5	8	15	12	10.5	8	15	4	12
		S35H1	35	25	4	12	350	20	14	10	8	15.5	12	10.5	8	15	4	12
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	17	12	8.5	8	14	11	9.5	8	13	4	12
		S30L2	30	23	2	10	270	18	12.5	8.5	8	14.5	11	10	8	13	4	12
		S35L2	35	23	3	10	300	18.5	13	9	8	14.5	11.5	10	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	22	15	10.5	8	17	13	11.5	8	17	4	12
		S35H2	35	29	4	15	475	23.5	16	11.5	8	18	13.5	12	8	19	4	12

Column groups: STANDARD STRAIN POLES; STANDARD FOUNDATIONS — 48" Diameter Drilled Pier Length (L) – Feet (Clay, Sand); Reinforcement (Longitudinal, Stirrups).

48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Foundation Depth

Fabrication Design 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. Min. base plate thickness (T) is 2.0 inches.

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 in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case.
   The foundation depth is the value where the column and the row intersect.
6. Reference Drilled Shafts: Construction Procedures and Design Methods, FHWA -IF-99-025

S30H1 - Hard Clay-Stirrup Spacing: 6 in. c/c
- Dense Sand-Stirrup Spacing: 6 in. c/c

S30H2 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c
- Hard Clay: Stirrup Spacing: 6 in. c/c
- Medium Clay: Stirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c

S30H3 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c
- Hard Clay: Stirrup Spacing: 6 in. c/c
- Medium Clay: Stirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c

S35H1 - Hard Clay: tirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c

S35H2 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c
- Hard Clay: Stirrup Spacing: 6 in. c/c
- Medium Clay: Stirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c

S35H3 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c
- Hard Clay: Stirrup Spacing: 6 in. c/c
- Medium Clay: Stirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c

Standard Strain Pole Foundation–Dry Soil Condition

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

Standard Strain Pole Foundation for Dry Soil Condition

PLAN DATE: SEPTEMBER 2013	DESIGNED BY: C.B COGDELL	PREPARED BY: N. BITTING	REVIEWED BY: D. SARKAR

SCALE 0 NA None

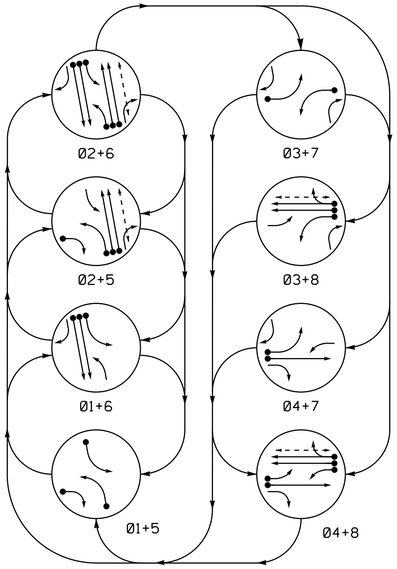
REVISIONS | INIT. | DATE

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

DocuSigned by: Debesh C. Sarkar 8/26/2014 DATE

PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	Sig. 1.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.

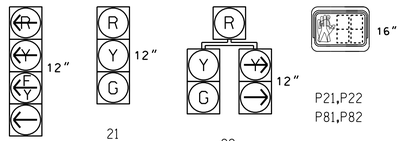


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH
11	←	←	F Y	F Y	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R / →	R / →	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	F Y	F Y	~~R~~
41	R	R	R	R	R	R	G	G	R
42	R / →	R	R / →	R	R	R	G	G	R
51	←	F Y	←	F Y	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R / →	R	R / →	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	F Y	←	F Y	~~R~~
81,82	R	R	R	R	R	G	R	G	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DRK

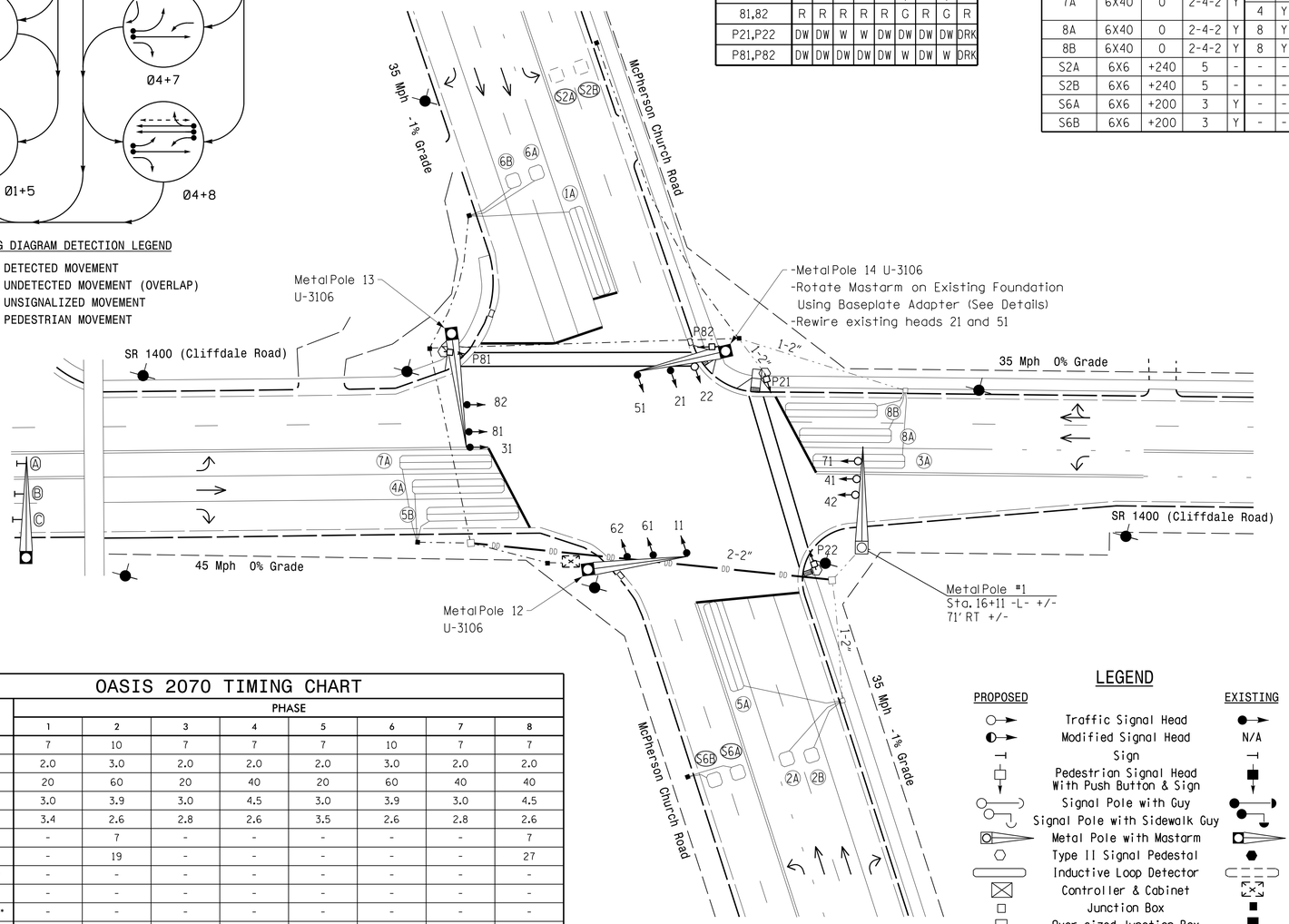
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	-
					6	Y	Y	-	-	-	-	-
2A,2B	6X6	70	4	Y	2	Y	Y	-	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	15	-	-
					8	Y	Y	-	-	3	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	-
					2	Y	Y	-	-	-	-	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	20	-	-
6A,6B	6X6	70	4	Y	6	Y	Y	-	-	-	-	-
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	15	-	-
					4	Y	Y	-	-	3	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	10	-	-
S2A	6X6	+240	5	-	-	-	-	-	-	-	Y	-
S2B	6X6	+240	5	-	-	-	-	-	-	-	Y	-
S6A	6X6	+200	3	Y	-	-	-	-	-	-	Y	-
S6B	6X6	+200	3	Y	-	-	-	-	-	-	Y	-

8 Phase
Fully Actuated
Fayetteville City System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads numbered 21, 81, and 82.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pedestrian pedestals are conceptual and shown for reference only. See sheets P1-P3 for pushbutton location details.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



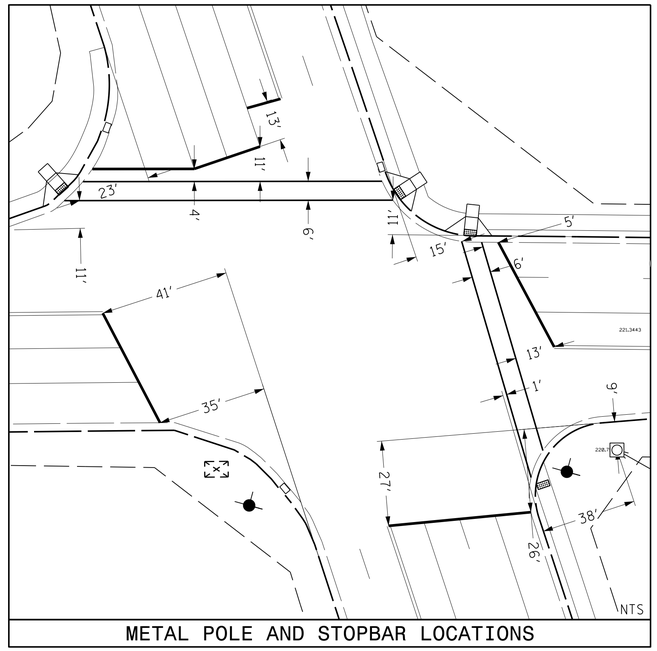
LEGEND

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	●
▭	Metal Pole with Mastarm	▭
⬡	Type II Signal Pedestal	⬢
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
□	Over-sized Junction Box	■
·····	2-in Underground Conduit	·····
DD	Directional Drill	N/A
N/A	Right of Way	-----
→	Directional Arrow	→
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Through Arrow "ONLY" Sign (R3-5A)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	10	7	7	7	10	7	7
Extension 1 *	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
Max Green 1 *	20	60	20	40	20	60	40	40
Yellow Clearance	3.0	3.9	3.0	4.5	3.0	3.9	3.0	4.5
Red Clearance	3.4	2.6	2.8	2.6	3.5	2.6	2.8	2.6
Walk 1 *	-	7	-	-	-	-	-	7
Don't Walk 1	-	19	-	-	-	-	-	27
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



METAL POLE AND STOPBAR LOCATIONS

Signal Upgrade

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

McPherson Church Road
At
SR 1400 (Cliffdale Road)

Division 6 Cumberland County Fayetteville

PLAN DATE:	March 2015	REVIEWED BY:	PLA
PREPARED BY:	JPG	REVIEWED BY:	

REVISIONS	INIT.	DATE

SCALE 0 30 1"=30'

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 029904
ENGINEER
JASON P. GALLOWAY

DocuSigned by: Jason Galloway 4/14/2015
F700EA70481841D... DATE

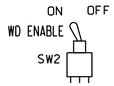
SIG. INVENTORY NO. 06-0225

11-JUN-2015 15:51
S:\NSU\Traffic Signals\Signal Design Section\Eastern Region\Div-06\W-5206AF\060225_sig_dsn_20150414.dgn
jgalloway

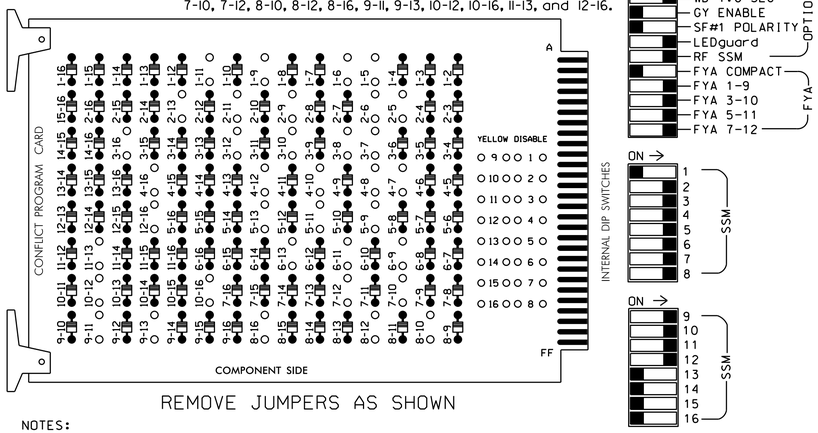
PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	Sig.1.1

⚠ EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

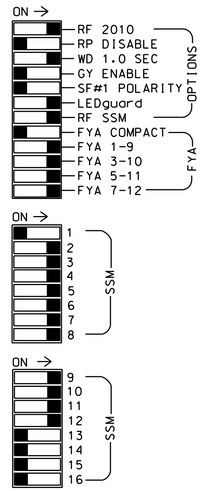
(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 3-7, 3-8, 3-10, 3-12, 3-16, 4-7, 4-8, 4-10, 4-12, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 7-10, 7-12, 8-10, 8-12, 8-16, 9-11, 9-13, 10-12, 10-16, 11-13, and 12-16.



REMOVE JUMPERS 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. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. ⚠ Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1, 13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 4 and 8, for Dual Entry.
4. Enable Simultaneous Gap-Out for all phases.
5. Program phases 2 and 6 for Start Up In Green.
6. ⚠ Program phases 2 and 8 for 'STARTUP PED CALL'.
7. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
8. The cabinet and controller are part of the Fayetteville City System.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
⚠ LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S5,S6,S7, S8,S8P,S9,S10,S12,S13
⚠ PHASES USED.....1,2,2PED,3,4,5,6,7,8,8PED
OVERLAP "A".....1+2
OVERLAP "B".....3+4
OVERLAP "C".....5+6
OVERLAP "D".....7+8

⚠ SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4	S4P	S5		S6	S6P	S7		S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3		4	4 PED	5		6	6 PED	7		8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11 ★	21,22	P21, P22	22	31 ★	41,42	NU	51 ★	42	61,62	NU	71 ★	62	81,82	P81, P82	11 ★	31 ★	NU	51 ★	71 ★	NU
RED		128		✳		101		✳		134		✳		107							
YELLOW	✳	129				102				135				108							
GREEN		130				103				136				109							
RED ARROW																A121	A124		A114	A101	
YELLOW ARROW				117					132				123			A122	A125		A115	A102	
FLASHING YELLOW ARROW																A123	A126		A116	A103	
GREEN ARROW	127			118	118			133	133			124	124								
✋			113												110						
🚶			115												112						

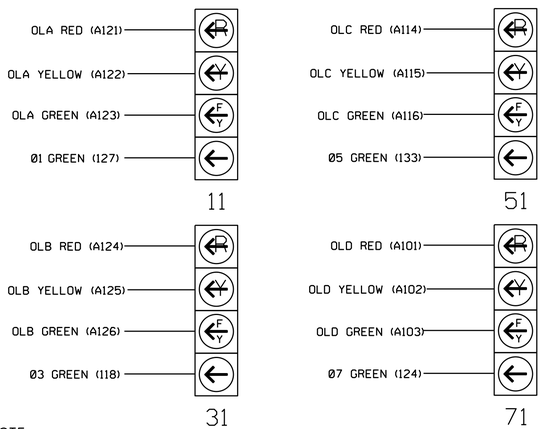
NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for these signals require special logic programming. See sheet 2 for programming instructions.

⚠ INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A,2B	SLOT EMPTY	WIRED INPUT ⊗	Ø3 3A	Ø4 4A	SLOT EMPTY	WIRED INPUT ⊗	SYS. DET. S2A	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	NOT USED	FS DC ISOLATOR
	L	NOT USED	NOT USED			NOT USED	NOT USED			SYS. DET. S2B			NOT USED	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	SLOT EMPTY	WIRED INPUT ⊗	Ø7 7A	Ø8 8A	SLOT EMPTY	WIRED INPUT ⊗	SYS. DET. S6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6A,6B			NOT USED	Ø8 8B			SYS. DET. S6B					

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

⚠ 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.

⚠ 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
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A[2]	TB4-5,6	I5U	58	20	3	3	Y	Y			15
	-	J8U	50	12	28	8	Y	Y			3
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
✳S2A	TB6-9,10	I9U	60	22	11	SYS					
✳S2B	TB6-11,12	I9L	62	24	13	SYS					
5A[3]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			20
6A,6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A[4]	TB5-5,6	J5U	57	19	7	7	Y	Y			15
	-	I8U	49	11	24	4	Y	Y			3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			10
✳S6A	TB7-9,10	J9U	59	21	15	SYS					
✳S6B	TB7-11,12	J9L	61	23	17	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29	PED 2	2 PED					
P81,P82	TB8-8,9	I13L	70	32	PED 8	8 PED					

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

[1] Add jumper from I1-W to J4-W, on rear of input file.
[2] Add jumper from I5-W to J8-W, on rear of input file.
[3] Add jumper from J1-W to I4-W, on rear of input file.
[4] Add jumper from J5-W to I8-W, on rear of input file.

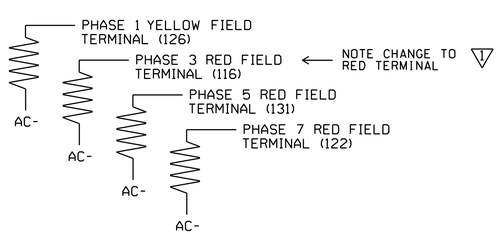
✳ System detector only. Remove the vehicle phase assigned to this detector in the default programming.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

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)



! IMPORTANT: Move Load Resistor from Yellow Field Terminal to Red Field Terminal for Phase 3.

⚠ THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 06-0225
DESIGNED: March 2015
SEALED: 4/14/2015
REVISED: N/A

REVISION ⚠ SEAL

NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

DocuSigned by: John T. Rowe, Jr. 4/17/2015 DATE
641D60C145EE4F5...

ELECTRICAL DETAIL SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

McPherson Church Road at SR 1400 (Cliffdale Road)

Division 06 Cumberland County Fayetteville

PLAN DATE:	3-10-10	REVIEWED BY:	D.T. Joyce
PREPARED BY:	D.H. Spaulding	REVIEWED BY:	

REVISIONS	UNIT.	DATE
⚠ Added 5-section head 22, peds, and loop 8B. (WSA)	JTR	4/17/2015

SEAL

This document originally issued and sealed by George C. Brown, #022013, on 03/26/2010. This media shall not be considered a certified document.

DATE

SIG. INVENTORY NO. 06-0225

16-APR-2015 07:58
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mstrong

PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	Sig.1.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL 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, 3, 4, 5, 6, 7, 8, 9, 10, 11, AND 12.

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

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE         #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE         #1  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE         #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE         #5  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #7  (+/-COMMAND#)
IF  ACTIVE PHASE         #3  IS ON
AND RED CLEAR ON PHASE #3  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #47 ON
SET OUTPUT  ASSIGNMENT #48 OFF
```

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

PRESS '+'

```
LOGICAL I/O COMMAND #8  (+/-COMMAND#)
IF  ACTIVE PHASE         #3  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #49 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

PRESS '+'

```
LOGICAL I/O COMMAND #9  (+/-COMMAND#)
IF  YELLOW ON PHASE    #3  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #48 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

PRESS '+'

```
LOGICAL I/O COMMAND #10 (+/-COMMAND#)
IF  ACTIVE PHASE         #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #39 ON
SET OUTPUT  ASSIGNMENT #40 OFF
```

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

PRESS '+'

```
LOGICAL I/O COMMAND #11 (+/-COMMAND#)
IF  ACTIVE PHASE         #7  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #41 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

PRESS '+'

```
LOGICAL I/O COMMAND #12 (+/-COMMAND#)
IF  YELLOW ON PHASE    #7  IS ON
        ↓
   SCROLL DOWN
THEN:
SET OUTPUT  ASSIGNMENT #40 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green
OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

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: :XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE:           :12345678910111213141516
VEH OVL PARENTS: :  XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:           :12345678910111213141516
VEH OVL PARENTS: :    XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

PRESS '+'

```
PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE:           :12345678910111213141516
VEH OVL PARENTS: :      XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:    (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

FLASHER CIRCUIT MODIFICATION DETAIL

IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

1. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-4 AND TERMINATE ON T2-2.
2. ON REAR OF PDA - REMOVE WIRE FROM TERM. T2-5 AND TERMINATE ON T2-3.
3. REMOVE FLASHER UNIT 2.

THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

▽1

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 06-0225
DESIGNED: March 2015
SEALED: 4/14/2015
REVISED: N/A

ELECTRICAL DETAIL SHEET 2 OF 2

REVISION ▽1 SEAL

NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

DocuSigned by: John T. Rowe, Jr. 641D60C145EE4F5... 4/17/2015 DATE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Transportation Mobility and Safety Division, State of North Carolina Department of Transportation, Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

McPherson Church Road at SR 1400 (Cliffdale Road)

Division 06	Cumberland County		Fayetteville
PLAN DATE: 3-10-10		REVIEWED BY: D.T. Joyce	
PREPARED BY: D.H. Spaulding		REVIEWED BY:	

REVISIONS	INIT.	DATE
▽1 Added 5-section head 22, peds, and loop 8B. (WSA)	JTR	4/17/2015

SEAL

This document originally issued and sealed by George C. Brown, #022013, on 03/26/2010. This media shall not be considered a certified document.

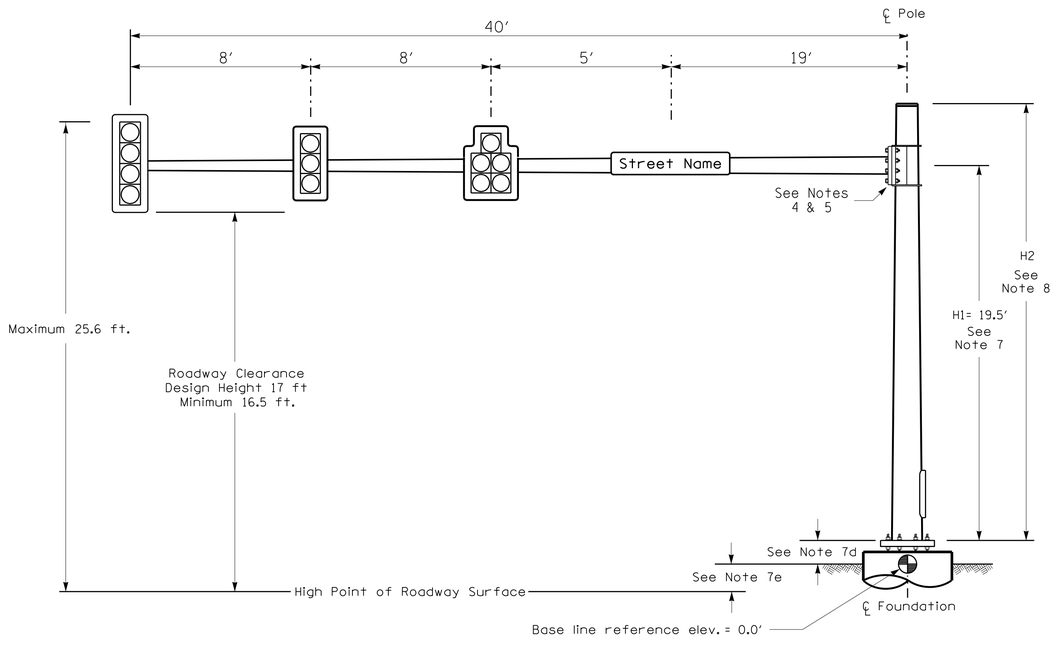
SIGNATURE DATE

SIG. INVENTORY NO. 06-0225

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	Sig. 1.3

Design Loading for METAL POLE NO. 1



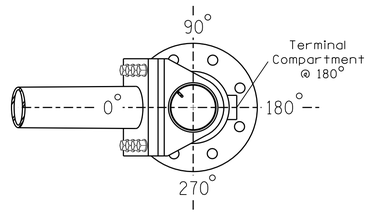
Elevation View

SPECIAL NOTE

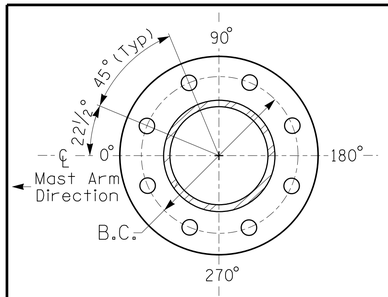
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

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

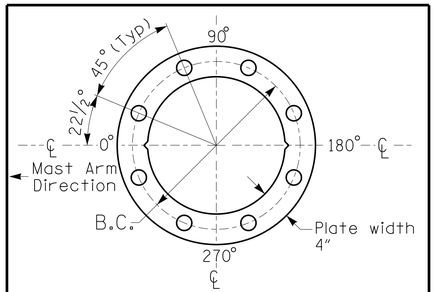


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0" W X 56.0" L	103 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

DESIGN REFERENCE MATERIAL

1. Design the traffic signal structure and foundation in accordance with:
   - The 5th Edition 2009 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2012 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2012 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) 773-2800.
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 3 (110 mph)

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

McPherson Church Road
At
SR 1400 (Cliffdale Road)

Division 6 Cumberland County Fayetteville

PLAN DATE:	April 2015	REVIEWED BY:	PLA
PREPARED BY:	JPG	REVIEWED BY:	

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

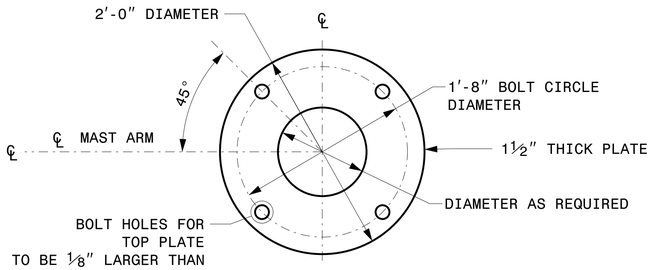
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 029904 ENGINEER JASMIN P. GALLOWAY

DocuSigned by: Jasm Galloway 4/28/2015
F700EA7D481841D... DATE

SIG. INVENTORY NO. 06-0225

28-APR-2016 10:15
S:*TSAG*ITS Signals\Signal Design Section\Eastern Region\Div-06\W-5206AF\060225_sig_mp1_201504.dgn
jgalloway

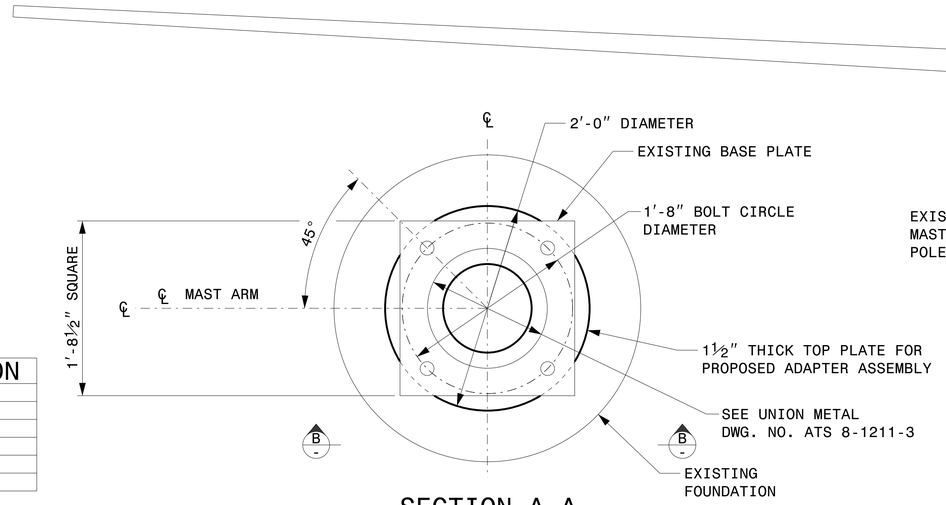
PROJECT REFERENCE NO.	SHEET NO.
W-5206AF	Sig. 1.4



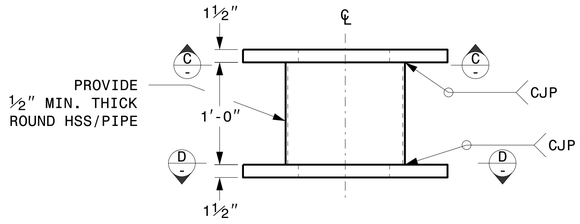
SECTION C-C

(TOP PLATE)
HSS/PIPE NOT SHOW FOR CLARITY

ITEM DESCRIPTION	MATERIAL SPECIFICATION
FLATWASHERS	ASTM-F436
NUTS	ASTM-A563 GR DH
H.S. BOLTS	ASTM-A325
PLATE	ASTM-A572 GR 50 OR ASTM-A709 GR 50
ROUND HSS	ASTM-A500 GR B
PIPE	ASTM-A53 GR B



SECTION A-A



ADAPTER ASSEMBLY DETAIL

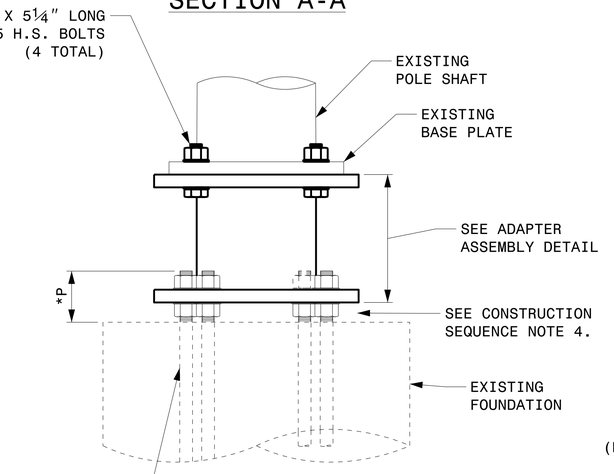
EXISTING STRUCTURE NOT SHOWN FOR CLARITY

GENERAL NOTES:

1. FIELD VERIFY EXISTING ANCHOR BOLTS AND BASE PLATE FOR POSSIBLE CORROSION.
2. FIELD VERIFY EXISTING ANCHOR BOLT PROJECTION (6" PER UNION METAL DWG. NO. ATS 8-1211-3 REVIEWED BY NCDOT ON 12/4/1998).
3. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE LATEST SIGNALS AND ITS PROJECT SPECIAL PROVISION.
4. VERIFY ALL ELEVATIONS AND DIMENSIONS IN THE FIELD PRIOR TO FABRICATION AND CONSTRUCTION.
5. VERIFY AND LOCATE ALL EXISTING UTILITIES PRIOR TO STARTING WORK. CONDUCT OPERATIONS IN A MANNER WHICH ENSURES THAT UTILITIES WILL NOT BE DISTURBED OR ENDANGERED.
6. REFER TO NCDOT STANDARD CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION INCLUDING GROUNDING LUG PROVISIONS.

CONSTRUCTION SEQUENCE:

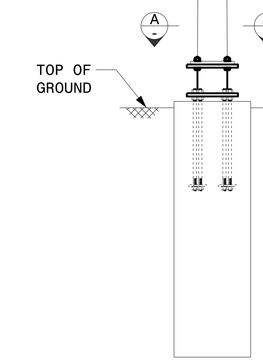
1. REMOVE EXISTING TOP NUT COVERS.
2. VERIFY ANCHOR BOLT PROJECTION FROM TOP OF FOUNDATION IS GREATER THAN OR EQUAL TO DIMENSION "P" PROVIDED IN THE ORIGINAL SHOP DRAWING (SEE SECTION B-B).
3. REMOVE TOP NUTS AND WASHERS AT BASE PLATE, AND CAREFULLY REMOVE MAST ARM POLE WITH BASE PLATE AWAY FROM FOUNDATION WITHOUT CAUSING DAMAGE TO EXISTING STRUCTURE, ANCHORS BOLTS, FOUNDATION AND SURROUNDING PROPERTY.
4. REMOVE EXISTING GROUT FROM UNDER EXISTING BASE PLATE AND FROM AROUND ANCHOR BOLTS.
5. ATTACH ADAPTER ASSEMBLY TO EXISTING ANCHOR BOLTS USING THE PREVIOUSLY REMOVED WASHERS AND NUTS IF THEY ARE IN GOOD CONDITION. OTHERWISE, USE NEW NUTS AND WASHERS. REFER TO FOUNDATION AND ANCHOR ROD ASSEMBLIES FOR METALS POLES SP09_R005 FOR THE ANCHOR ROD NUT TIGHTENING, PREPARATION AND LEVELING.
6. VERIFY ADAPTER ASSEMBLY IS LEVEL FOR INSTALLING EXISTING MAST ARM POLE.
7. ATTACH EXISTING MAST ARM POLE TO TOP OF ADAPTER ASSEMBLY USING FOUR (4) - 1½" DIA. X 5¼" LG ASTM-A325 H.S. BOLTS.
8. INSTALL RODENT BARRIER BETWEEN PLATE AND TOP OF FOUNDATION.



SECTION B-B

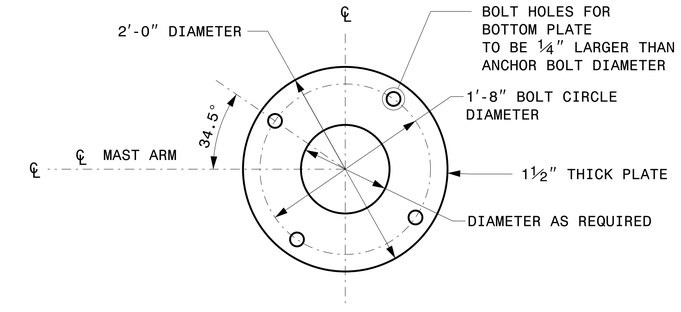
* SEE GENERAL NOTE 2.

** EACH H.S. BOLT SHALL HAVE (1) ASTM-A563 NUT AND (2) ASTM-F436 CIRCULAR WASHERS.



MAST ARM POLE NO.14

(EXISTING POLE WITH ADAPTER ASSEMBLY)



SECTION D-D

(BOTTOM PLATE)
HSS/PIPE NOT SHOWN FOR CLARITY

WIND ZONE 03-110 mph

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

Metal Pole Adapter for MP#14
at
McPherson Church Road
and
SR 1400 (Cliffdale Road)

Division 6 Cumberland County Fayetteville

PLAN DATE:	June 2015	DESIGNED BY:	K. Durigon
PREPARED BY:	K. Durigon	REVIEWED BY:	D. Sarkar

REVISIONS	REV.	INIT.	DATE

SCALE
0 N/A
N/A

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by: Kevin C. Durigon 4AFE13FDD78749A...
SIGNATURE 6/23/2015 DATE

SIG. INVENTORY NO. 06-0225

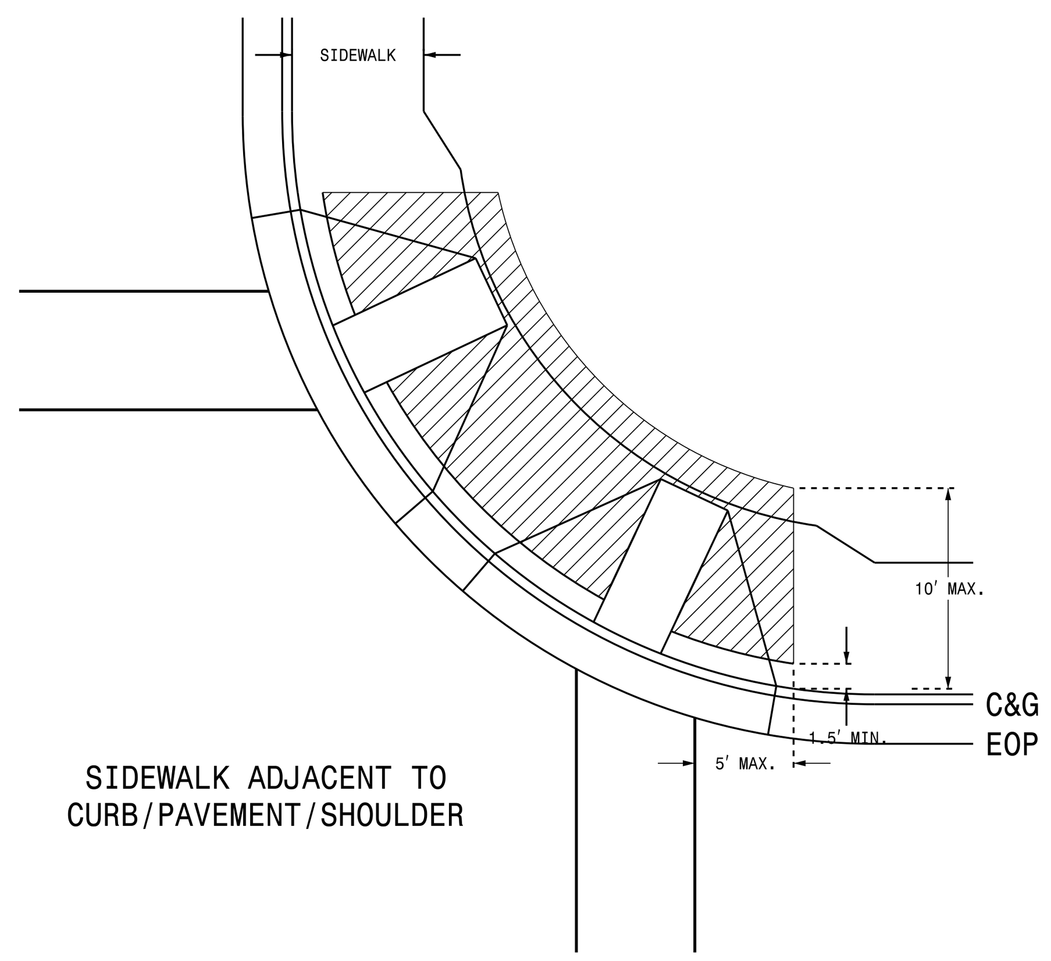
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

06-14

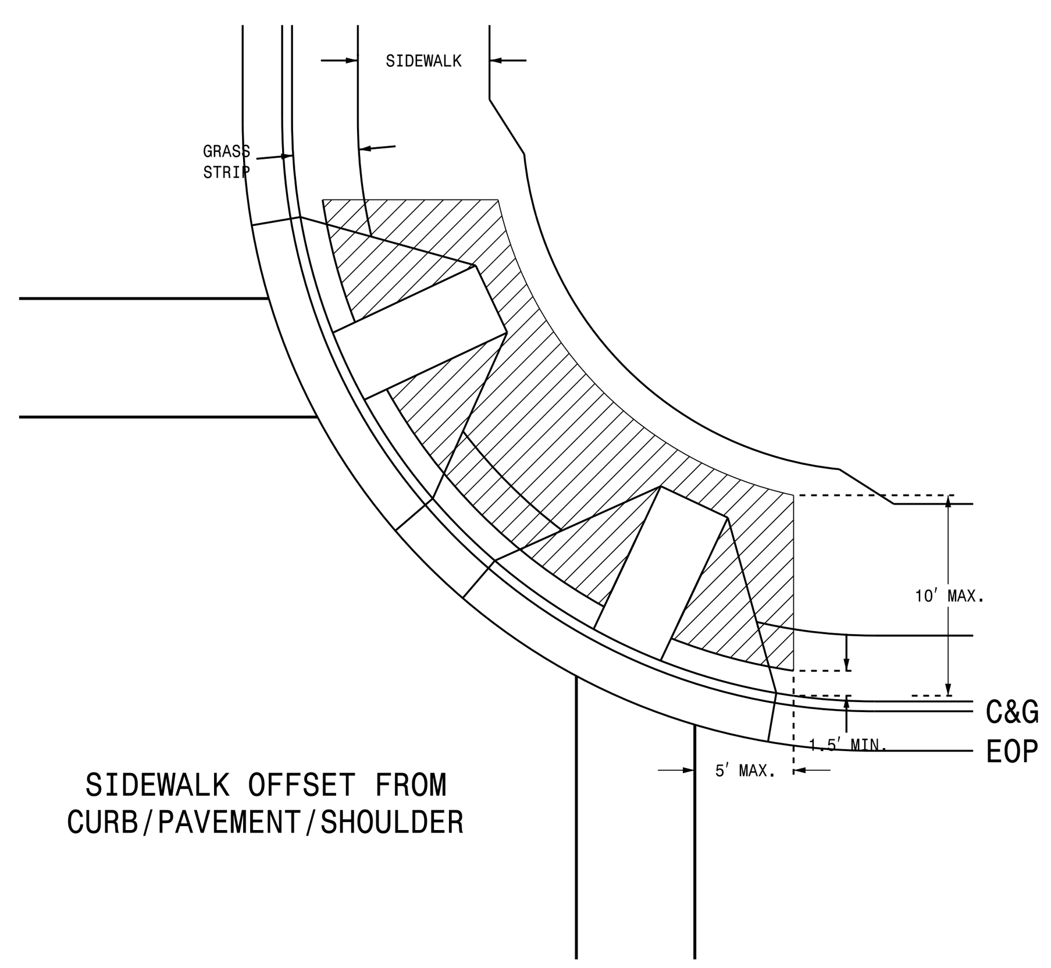
ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

SHEET 1 OF 3
1705D01

PUSHBUTTON PLACEMENT
SEPARATE CURB RAMPS

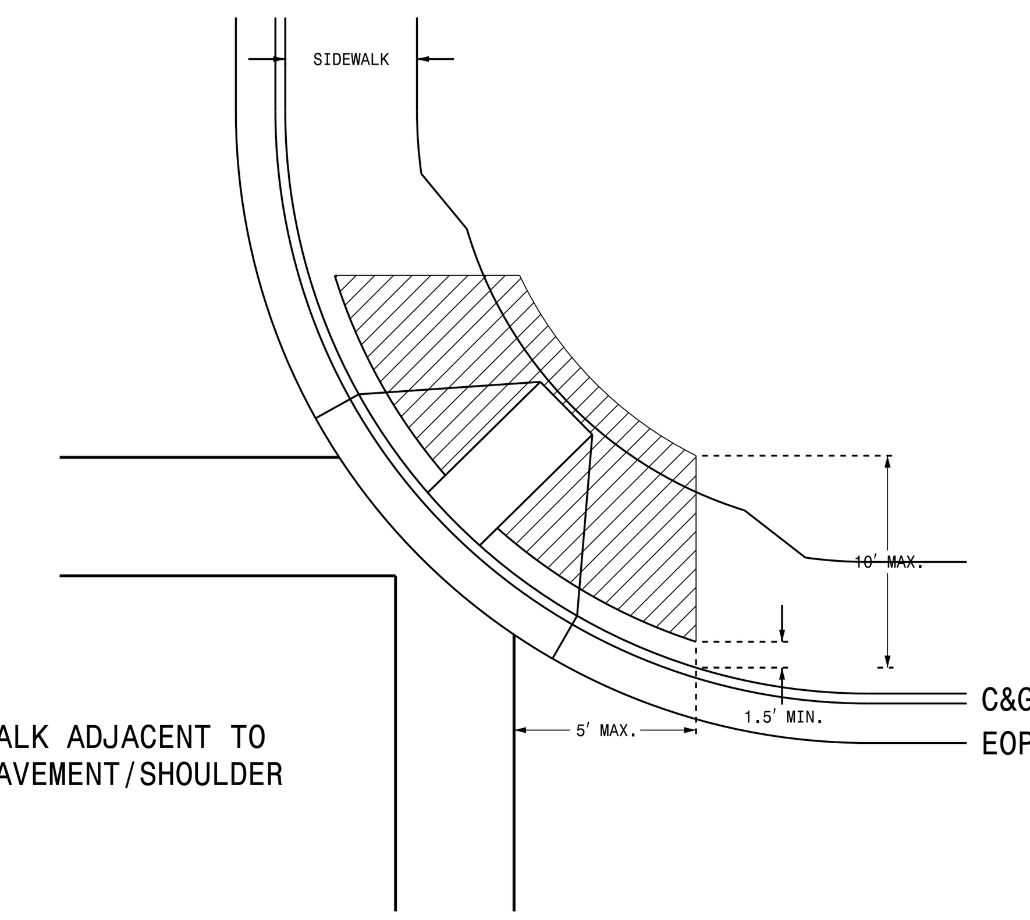


SIDEWALK ADJACENT TO CURB/PAVEMENT/SHOULDER

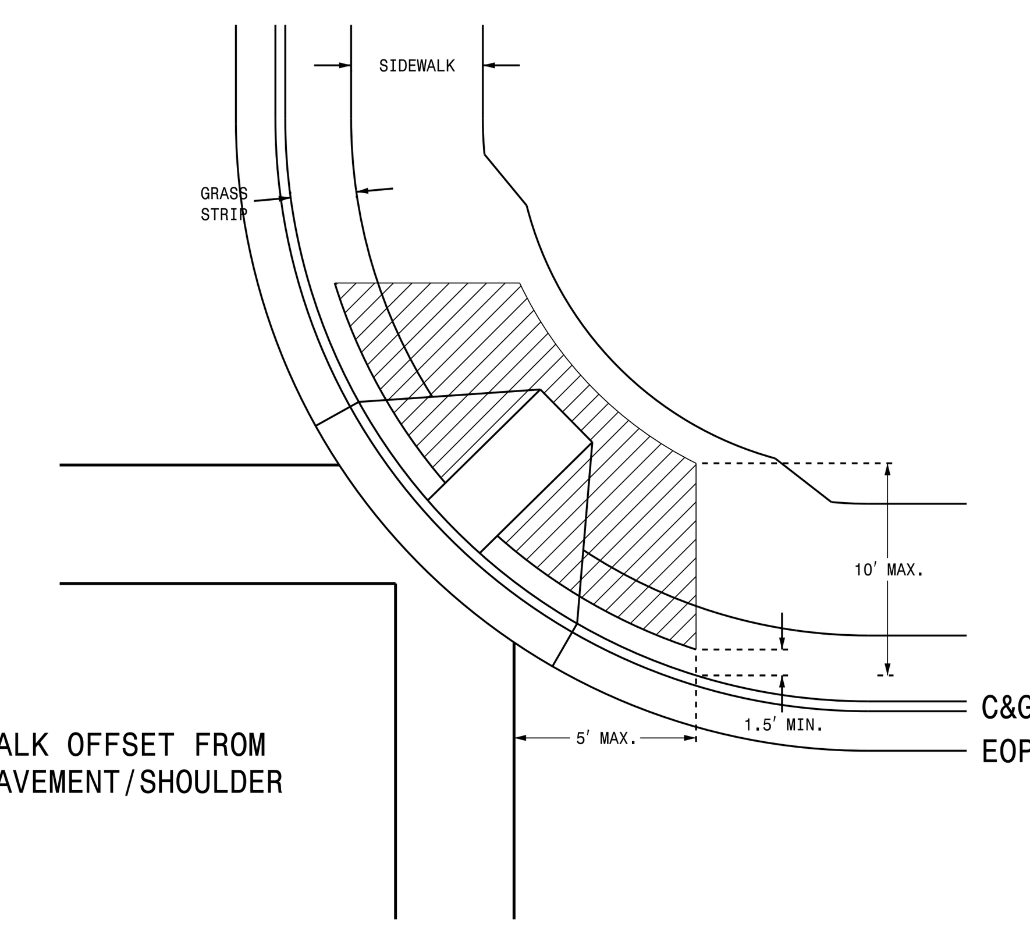


SIDEWALK OFFSET FROM CURB/PAVEMENT/SHOULDER

PUSHBUTTON PLACEMENT
SHARED CURB RAMP



SIDEWALK ADJACENT TO CURB/PAVEMENT/SHOULDER



SIDEWALK OFFSET FROM CURB/PAVEMENT/SHOULDER

NOTES

1. Pushbutton pedestals should not be located further than 10 feet from the edge of curb, shoulder, or pavement.
2. The face of the pushbutton should be parallel to the applicable crosswalk.
3. Separate pushbuttons used on the same corner should be separated by a distance of at least 10 feet.
4. Pushbuttons shall be installed adjacent to a level surface with a maximum reach distance of 10 inches.
5. Maintain 4 feet of clearance around pedestal if located in sidewalk.
6. Refer to section 1705 of the 2012 NCDOT Roadway Standard Drawings for Pushbutton Assembly details.
7. Refer to section 1743 of the 2012 NCDOT Roadway Standard Drawings for Pedestal details.
8. Contact Division Traffic Engineer for pushbutton location approval prior to installation.
9. Curb ramps are for symbolic use only and may not reflect actual design or field conditions.

LEGEND

PROPOSED

- Signal Pole
- Type I Pushbutton Post
- Type II Signal Pedestal
- Pushbutton & Sign
- Pedestrian Signal Head
- Curb Ramp
- Pushbutton Location Area

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

06-14

ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

SHEET 1 OF 3
1705D01

See Plate for Title

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

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZIEMBA

DocuSigned by:
SIGNATURE 6/17/2014 DATE

PROJECT NO.	SHEET NO.
W-5206AF	Sig. P2

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

06-14

ENGLISH DETAIL DRAWING FOR

PEDESTRIAN PUSHBUTTON LOCATIONS

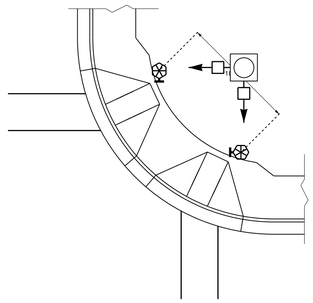
PLACEMENT DETAIL

SHEET 2 OF 3

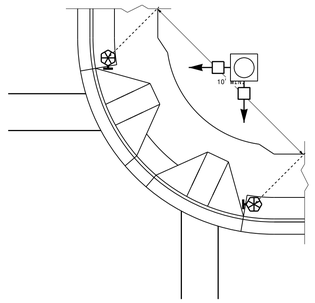
1705D01

TYPICAL PUSHBUTTON LOCATIONS (CASE I)

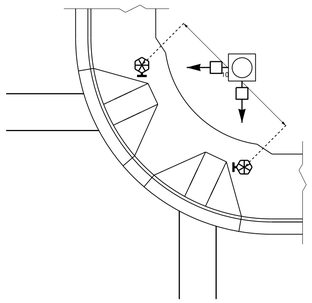
SEPARATE CURB RAMPS W/ TYPE I PEDESTALS



BACK OF SIDEWALK IS WITHIN 10'
OF CURB OR PAVEMENT/SHOULDER



GRASS STRIP PLACEMENT IF BACK
OF SIDEWALK EXCEEDS 10' FROM
CURB OR PAVEMENT/SHOULDER



PUSHBUTTON PLACEMENT
IN WIDE SIDEWALK

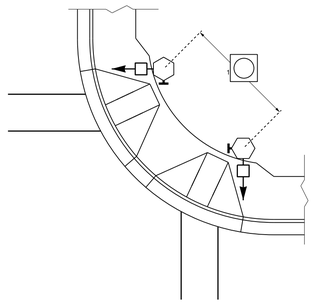
PROPOSED

LEGEND

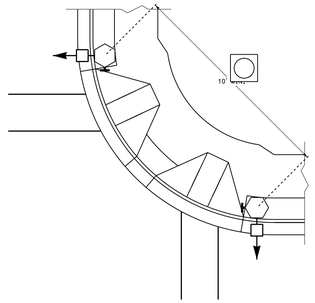
- Signal Pole
- Type I Pushbutton Post
- Type II Signal Pedestal
- Pushbutton & Sign
- Pedestrian Signal Head
- Curb Ramp
- Pushbutton Location Area

TYPICAL PUSHBUTTON LOCATIONS (CASE II)

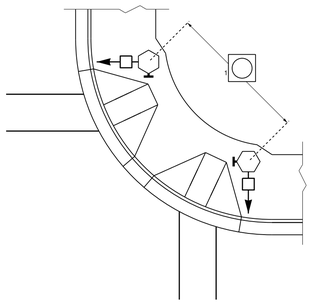
SEPARATE CURB RAMPS W/ TYPE II PEDESTALS



BACK OF SIDEWALK IS WITHIN 10'
OF CURB OR PAVEMENT/SHOULDER



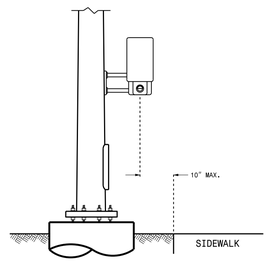
GRASS STRIP PLACEMENT IF BACK
OF SIDEWALK EXCEEDS 10' FROM
CURB OR PAVEMENT/SHOULDER



PUSHBUTTON PLACEMENT
IN WIDE SIDEWALK

OPTIONAL PUSHBUTTON EXTENSION

FACE OF PUSHBUTTON PARALLEL TO
APPLICABLE CROSSWALK



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

06-14

ENGLISH DETAIL DRAWING FOR

PEDESTRIAN PUSHBUTTON LOCATIONS

PLACEMENT DETAIL

SHEET 2 OF 3

1705D01

See Plate for Title

Prepared in the Offices of:

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

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026486 ENGINEER ROBERT J. ZIEMBA

DocuSigned by:
[signature]
SIGNATURE

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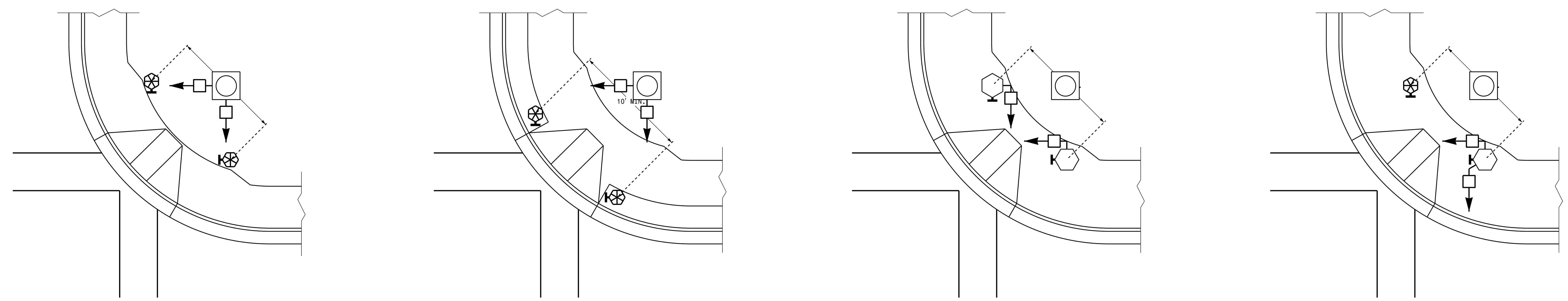
RALEIGH, N.C.

06-14

ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

TYPICAL PUSHBUTTON LOCATIONS (CASE III)

SHARED CURB RAMPS



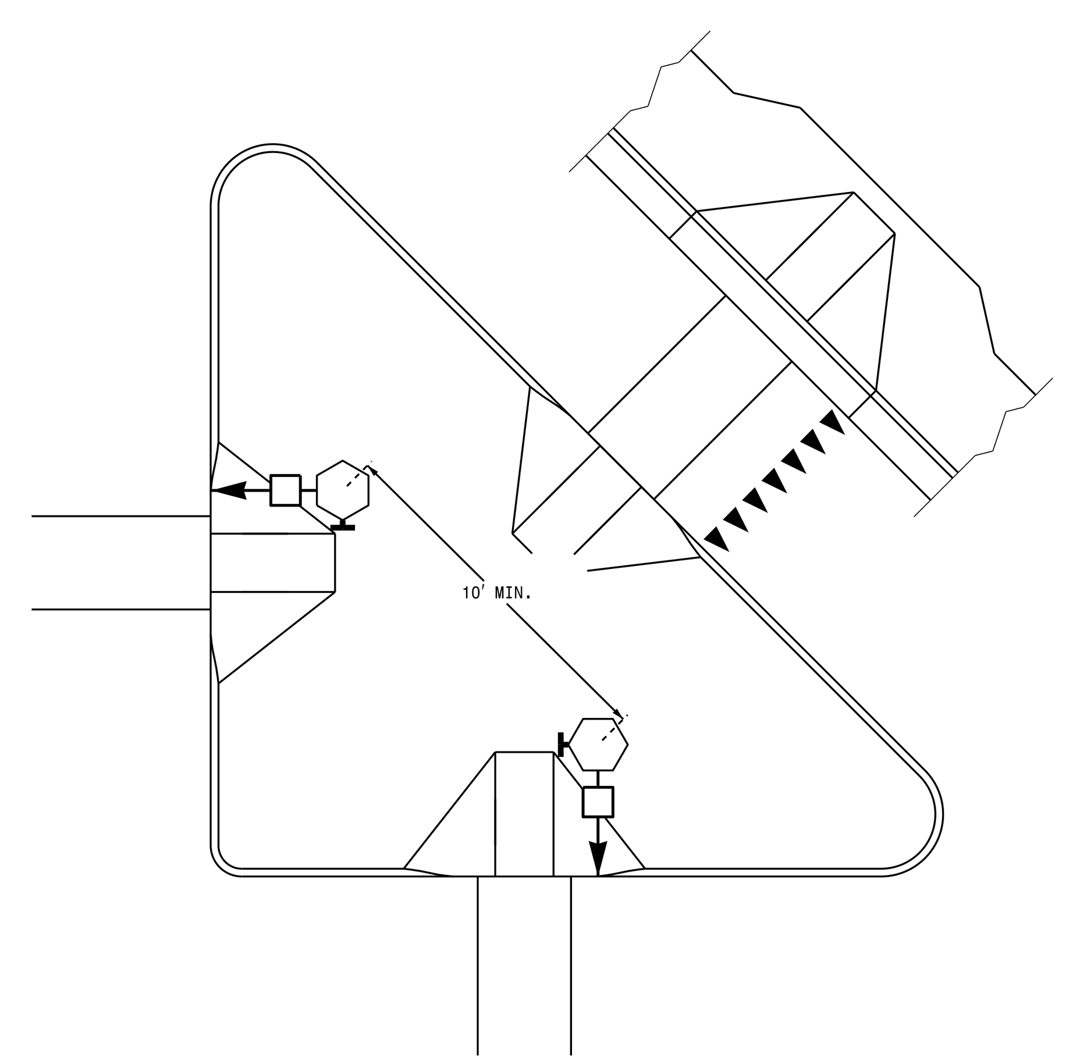
BACK OF SIDEWALK IS WITHIN 10' OF CURB OR PAVEMENT/SHOULDER

GRASS STRIP PLACEMENT IF BACK OF SIDEWALK EXCEEDS 10' FROM CURB OR PAVEMENT/SHOULDER

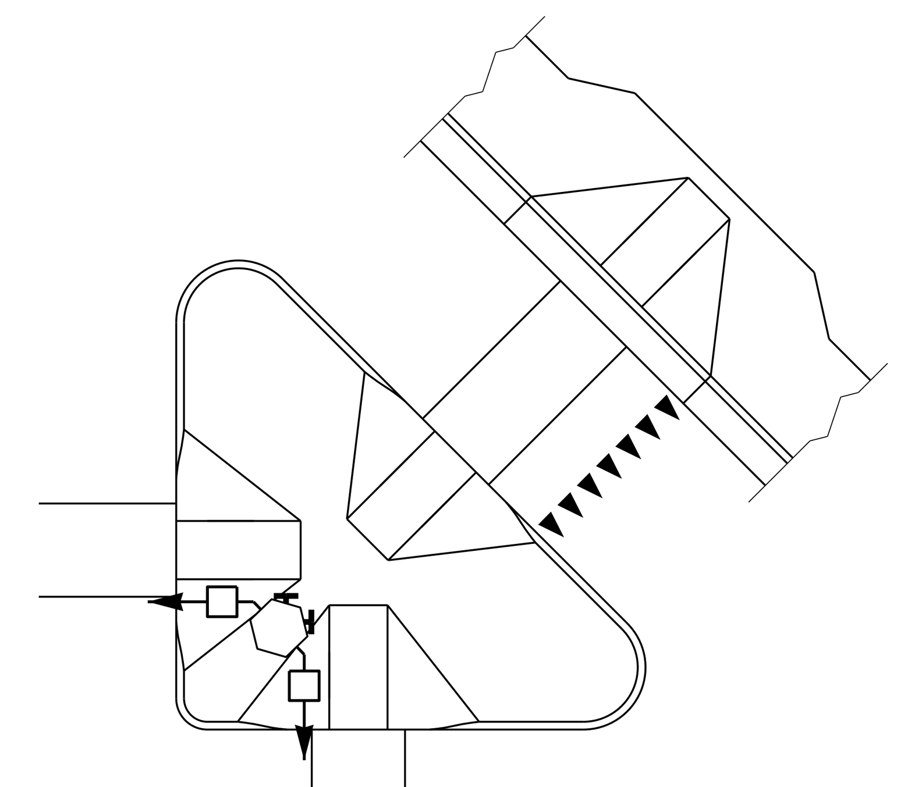
PUSHBUTTON PLACEMENT IN WIDE SIDEWALK (CORRESPONDING PUSHBUTTONS AND SIGNAL HEADS ON DIFFERENT PEDESTALS)

PUSHBUTTON PLACEMENT WITH SHARED TYPE II SIGNAL PEDESTAL AND TYPE I PUSHBUTTON POST

TRAFFIC ISLAND PUSHBUTTON LOCATIONS

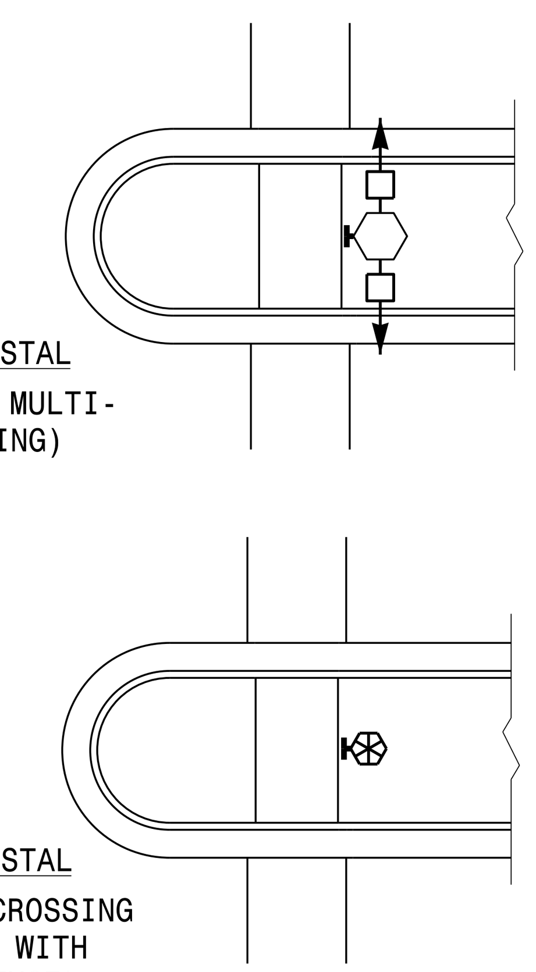


PUSHBUTTON PLACEMENT IN LARGE "PORK CHOP ISLAND" WITH SEPARATE PEDESTALS



PUSHBUTTON PLACEMENT IN SMALL "PORK CHOP ISLAND" WITH SHARED PEDESTAL

PUSHBUTTON PLACEMENT IN MEDIAN



TYPE II PEDESTAL
(FOR STAGED OR MULTI-PHASE CROSSING)

TYPE I PEDESTAL
(FOR COMPLETE CROSSING CURB TO CURB WITH OPTIONAL REFUGE)

LEGEND

PROPOSED

- Signal Pole
- Type I Pushbutton Post
- Type II Signal Pedestal
- Pushbutton & Sign
- Pedestrian Signal Head
- Curb Ramp
- Pushbutton Location Area

SHEET 3 OF 3
1705D01

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ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

SHEET 3 OF 3
1705D01

See Plate for Title

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

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 026486
ROBERT J. ZIEMBA

6/17/2014

SIGNATURE | DATE

26-AUG-2014 16:39
rziemba

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	W-5206AF	X-1

8/23/99

28-SEP-2014 16:31
H:\DDC\Projects\W-5206AF Cliffdale Rd at McPherson Church Rd_Cumberland Co\Roadway\xsc\W5206AF_Rdy_xpl_L.dgn
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PROJ. REFERENCE NO.	SHEET NO.
W-5206AF	X-2

PROJ. REFERENCE NO.	SHEET NO.
W-5206AF	X-3