Project No.	Sheet No.
HS–2003AC, HS–2003C, HS–2003I	SIG. 1.0

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

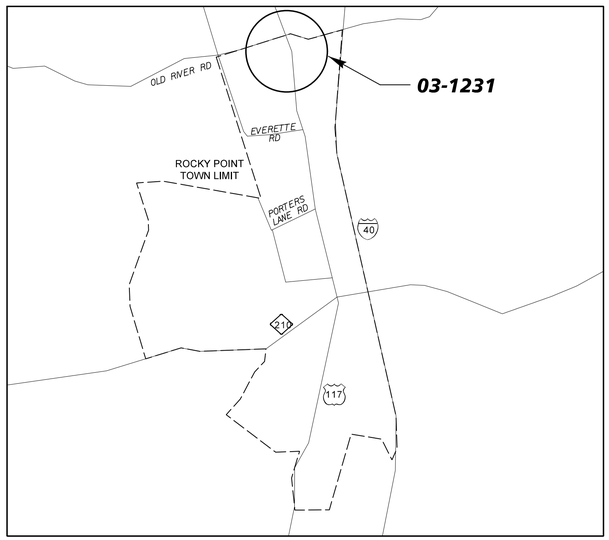
PENDER & DUPLIN COUNTY

LOCATIONS: US 117 AT SR 1441 (ASHTON ROAD) / SR 1411 (OLD RIVER ROAD) INTERSECTION
SR 1535 (LIDDELL ROAD) AT SR 1534 (DRUMMERSVILLE ROAD) INTERSECTION
NC 403 AT SR 1306 (BEAUTANCUS ROAD) INTERSECTION

TYPE OF WORK: TRAFFIC SIGNAL

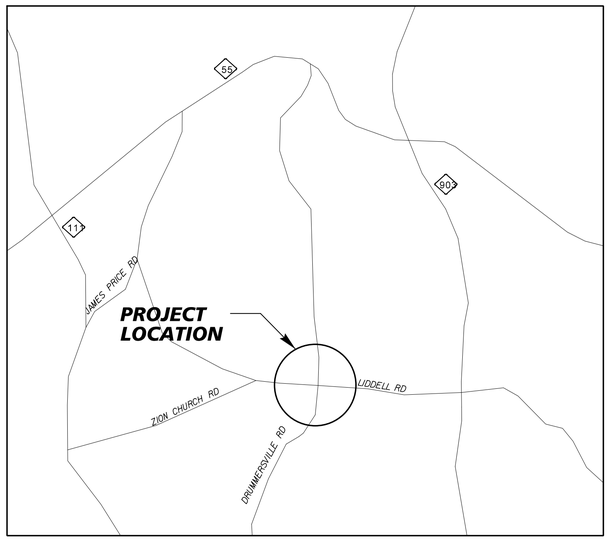
NC GRID NAD 83 – NA 2011

HS–2003AC Vicinity



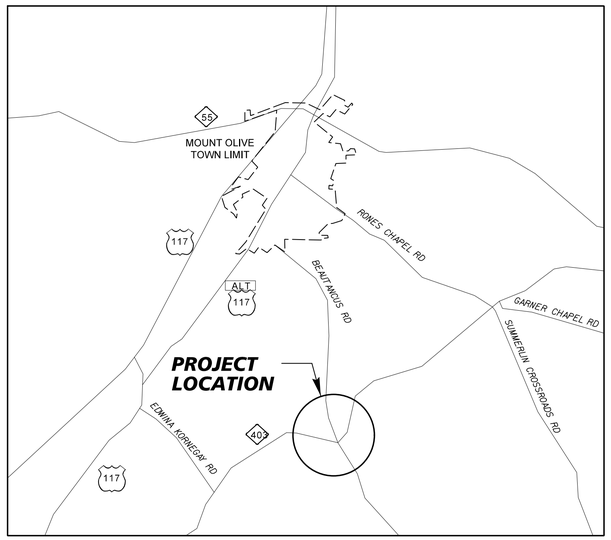
TOWN OF ROCKY POINT, PENDER COUNTY

HS–2003C Vicinity



TOWN OF LIDDELL, DUPLIN COUNTY

HS–2003I Vicinity



TOWN OF MOUNT OLIVE, DUPLIN COUNTY

Refer to Roadway Standard Drawings NCDOT" dated January 2024 and Standard Specifications for Roads and Structures" dated January 2024.

Index of Plans

Sheet #	TIP NO.	SIG. I.D.	Location/Description
Sig. 1.0	--------	--------	Title Sheet
Sig. 2.0 – 2.6	HS–2003AC	03–1231	US 117 at SR 1441 (Ashton Road) / SR 1411 (Old River Road)
PMP 3.0	HS–2003C	--------	SR 1535 (Liddell Road) at SR 1534 (Drummersville Road)
PMP 4.0	HS–2003I	--------	NC 403 at SR 1306 (Beautancus Road)
TMP 5.0	--------	--------	Traffic Management Plan
Sig. M1A – M8	--------	--------	Standard Metal Pole Details

NCDOT SIGNAL CONTACT:

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SIGNAL EQUIPMENT DESIGN ENGINEER

PLANS PREPARED BY:
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Kevin P. Baumann
TRAFFIC SIGNAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

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6/17/2024
SIGNATURE: P.E.

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

Project: HS–2003AC, HS–2003C & HS–2003I

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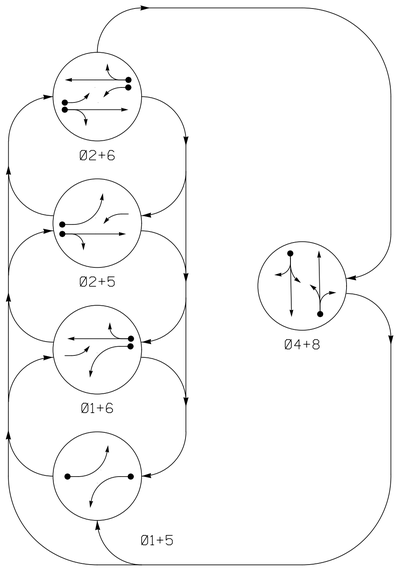
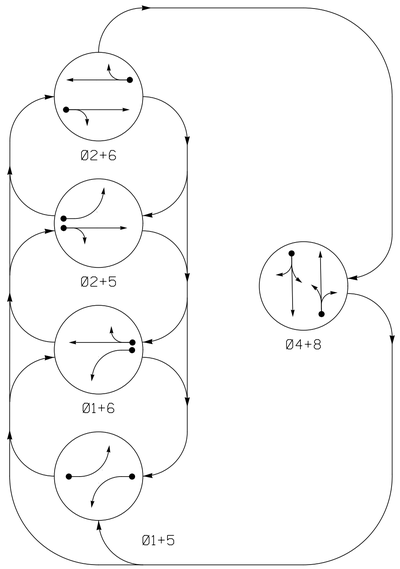
6/11/2024 9:20:04 AM Gabriella.Pierro

PROJECT REFERENCE NO.	SHEET NO.
HS-2003AC	Sig. 2.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	F Y	F Y	~~R~~	~~Y~~
21,22	R	R	G	G	R	Y
41,42,43	R	R	R	R	G	R
61,62	R	G	R	G	R	Y
51	←	F Y	←	F Y	~~R~~	~~Y~~
81,82,83	R	R	R	R	G	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~Y~~
21,22	R	R	G	G	R	Y
41,42,43	R	R	R	R	G	R
61,62	R	G	R	G	R	Y
51	←	~~R~~	←	~~R~~	~~R~~	~~Y~~
81,82,83	R	R	R	R	G	R

MAXTIME DETECTOR INSTALLATION CHART

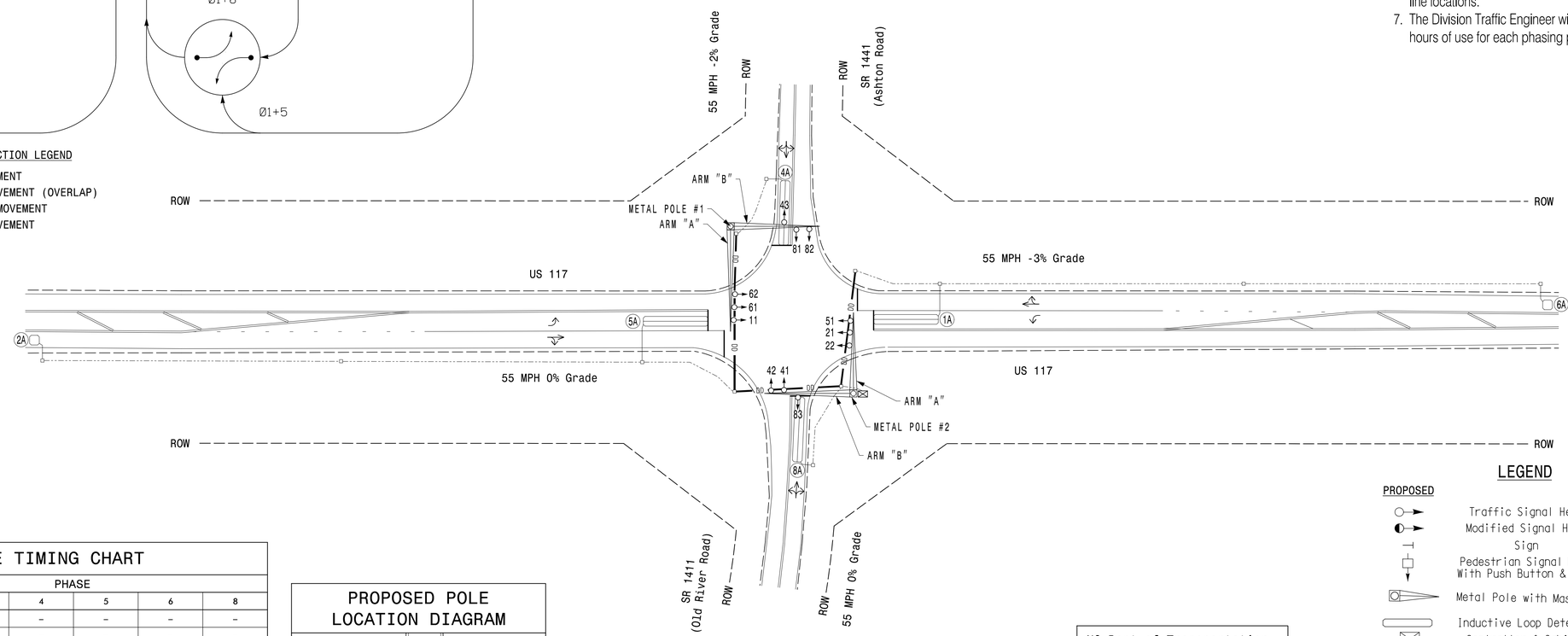
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	X	1	15.0*	-	X	-	X	-	X
					6#	3.0	-	X	-	X	X	X
2A	6X6	420	6	X	2	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	X	4	10.0	-	X	-	X	-	X
5A	6X40	0	2-4-2	X	5	15.0*	-	X	-	X	-	X
					2#	3.0	-	X	-	X	X	X
6A	6X6	420	5	X	6	-	-	X	X	X	-	X
8A	6X40	0	2-4-2	X	8	10.0	-	X	-	X	-	X

* Reduce Delay to 3 seconds during Alternate Phasing operation.
\# Disable Phase call for loop during Alternate Phasing operation.

5 Phase Fully Actuated (Isolated)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
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. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. See Pavement Marking Plan for proposed stop line locations.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.

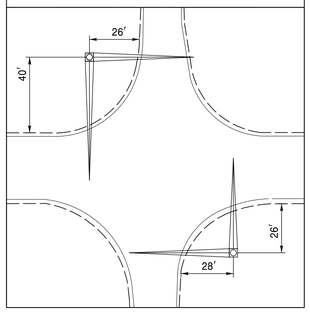


MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	–	–	–	–	–
Ped Clear *	–	–	–	–	–	–
Min Green	7	14	7	7	14	7
Passage *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	20	75	30	20	75	30
Yellow Change	3.0	5.5	5.4	3.0	5.5	5.2
Red Clear	2.1	1.0	1.0	2.1	1.0	1.0
Added Initial *	–	2.5	–	–	2.5	–
Maximum Initial *	–	46	–	–	46	–
Time Before Reduction *	–	15	–	–	15	–
Time To Reduce *	–	45	–	–	45	–
Minimum Gap	–	3.4	–	–	3.4	–
Advance Walk	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

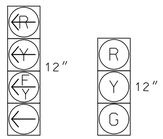
* These values may be field adjusted. Do not adjust Min Green and Passage times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

PROPOSED POLE LOCATION DIAGRAM



SIGNAL FACE I.D.

All Heads L.E.D.



11
51

21,22
41,42,43
61,62
81,82,83

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Metal Pole with Mastarm	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
DD	Directional Drill	N/A

NC Dept of Transportation
Division of Highways
Final Drawing Date: 4/30/2024
DocuSigned by: Zachary Little
ITS & Signals Unit

New Installation

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Prepared For: Transportation Mobility and Safety Division, Signal Design Section, NC DEPARTMENT OF TRANSPORTATION

US 117 at SR 1441 (Ashton Road) / SR 1411 (Old River Road)

Division 3 | Pender County | Rocky Point

PLAN DATE: July 2023 | REVIEWED BY: KP Baumann
PREPARED BY: MC Burke | REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: [signature] SIGNATURE 4/22/2024 DATE
SIG. INVENTORY NO. 03-1231

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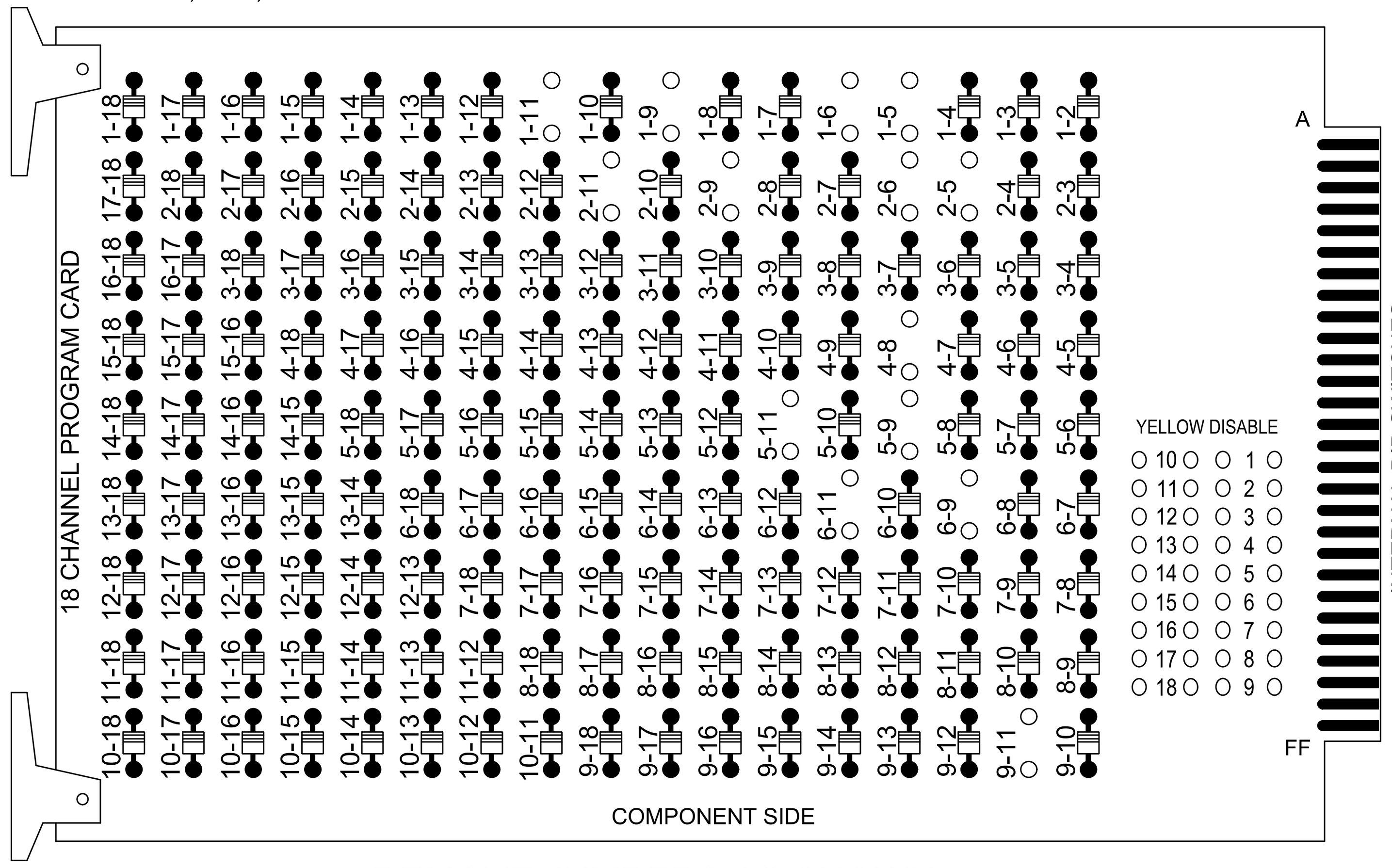
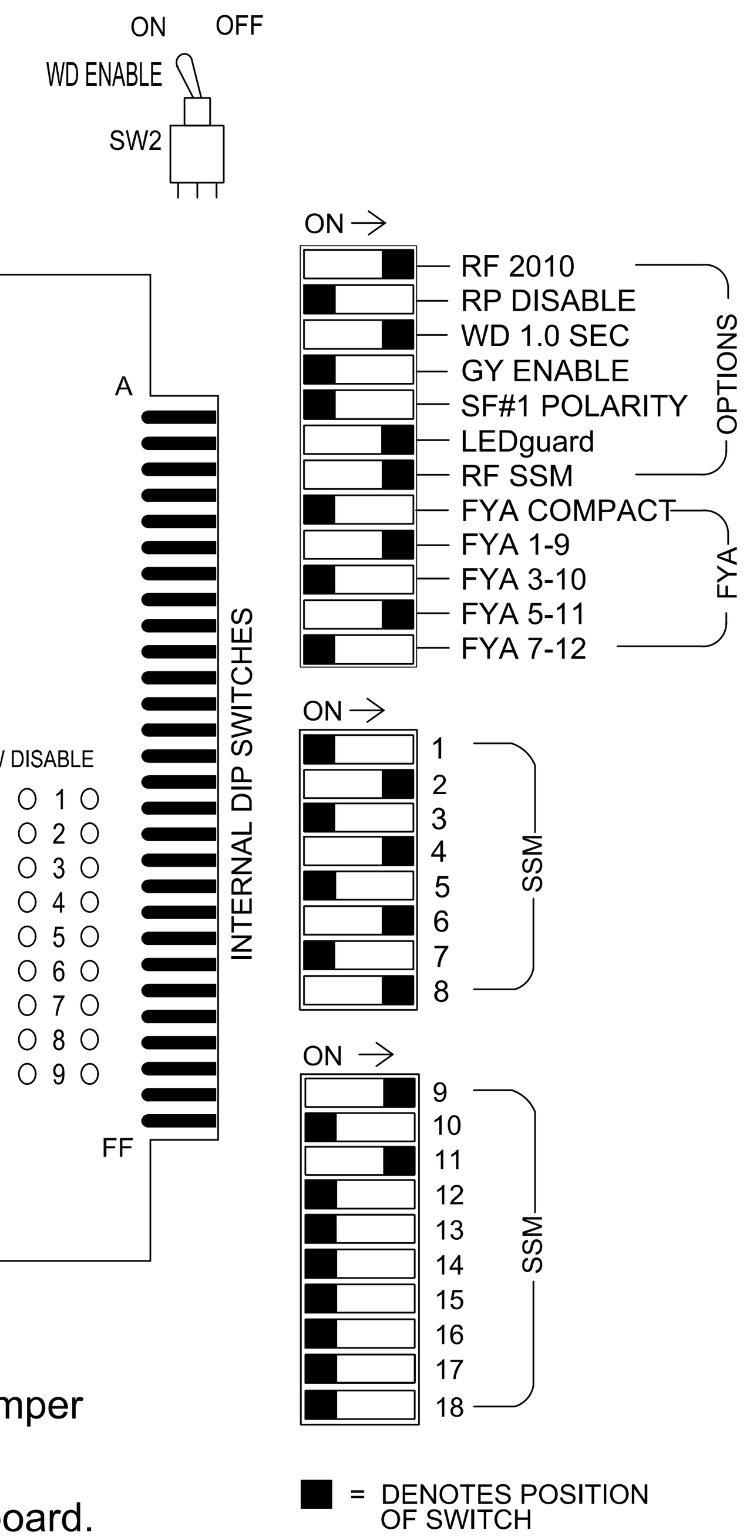
PROJECT REFERENCE NO.	SHEET NO.
HS-2003AC	Sig. 2.1

18 CHANNEL 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, 4-8, 5-9, 5-11, 6-9, 6-11, AND 9-11.





REMOVE JUMPERS AS SHOWN

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 the 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.

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 plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions...........................18 With Aux. Output File
Load Switches Used............................S1, S2, S5, S7, S8, S11, AUX S1, AUX S4
Phases Used.......................................1, 2, 4, 5, 6, 8
Overlap "1"..*
Overlap "2"..NOT USED
Overlap "3"..*
Overlap "4"..NOT USED

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21,22	NU	NU	41,42 43	NU	51	61,62	NU	NU	81,82 83	NU	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127						133											

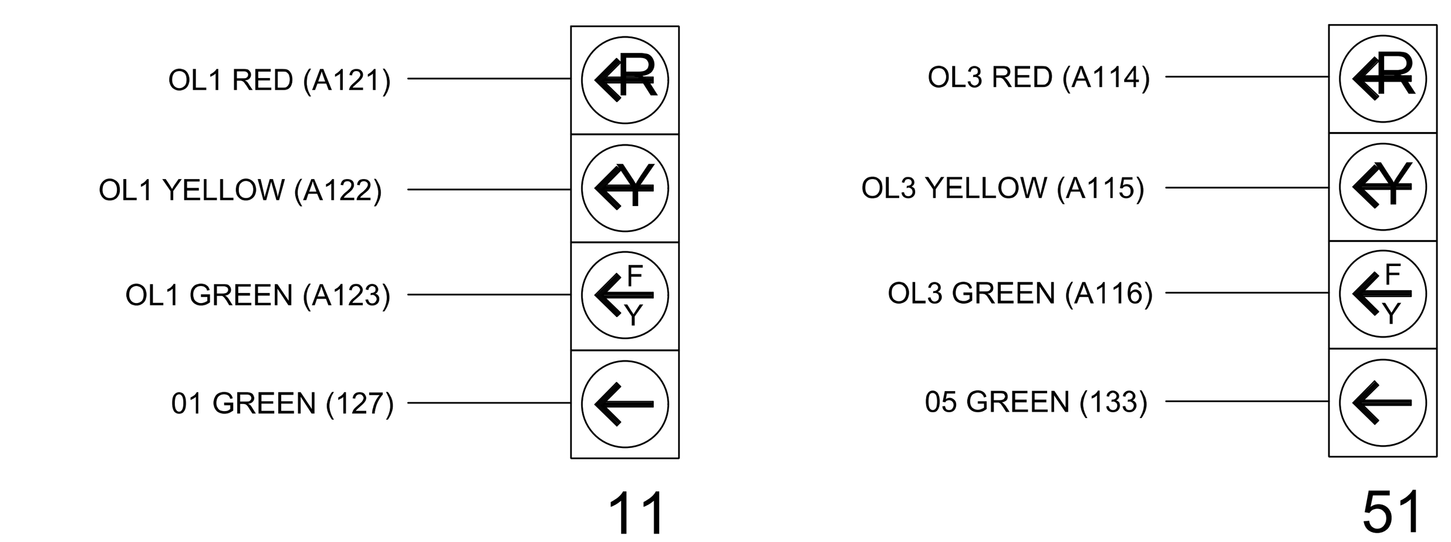
NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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 POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15.0		X		X	
				-	29 ★	6	3.0		X		X	X
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	10.0		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0		X		X	
				-	31 ★	2	3.0		X		X	X
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
8A	TB5-9,10	J6U	42	4	22	8	10.0		X		X	

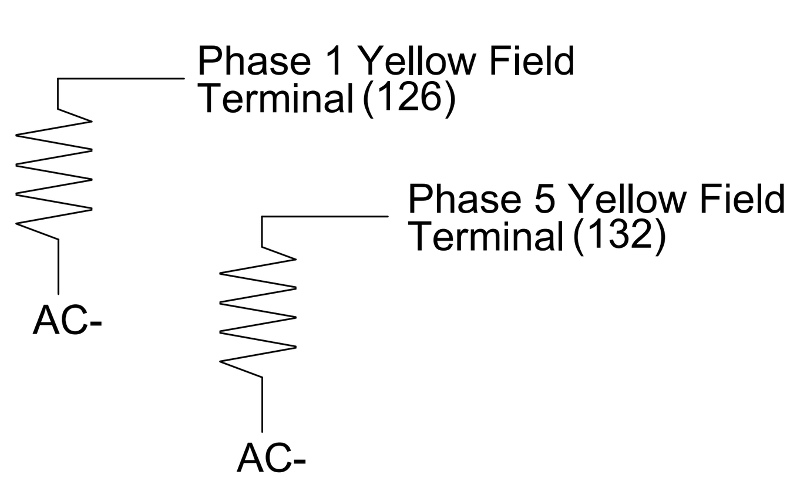
★For the detectors to work as shown on the signal design plan, see the Detector Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

ACCEPTABLE VALUES	
Value (ohms)	Wattage
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NC Dept of Transportation
Division of Highways
Final Drawing Date: 4/30/2024
DocuSigned by:
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1231
DESIGNED: JULY 2023
SEALED: 04/22/2024
REVISED: N/A

Electrical Detail - Sheet 1 of 3

PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
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Raleigh, NC 27601
(919) 677-2000

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared For:
750 N.Greenfield Pkwy,Garner,NC 27529

US 117
at
SR 1441 (Ashton Road) /
SR 1411 (Old River Road)

Division 3 Pender County Rocky Point

PLAN DATE: July 2023	REVIEWED BY: KP Baumann
PREPARED BY: MC Burke	REVIEWED BY:

REVISIONS	INIT.	DATE

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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
SIGNATURE 4/22/2024 DATE

SIG. INVENTORY NO. 03-1231

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MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	3
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	2	6
Modifier Phases	1	5
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel
Main Menu >Controller >Overlap >Overlap Parameters/Overlap Timings

Web Interface
Home >Controller >Overlap Configuration >Overlaps

In the table view of the web interface, right click on "Overlap" in the top left corner of the table. Copy the entire contents of Overlap Plan 1. Paste Overlap Plan 1 into Overlap Plan 2. Modify Overlap Plan 2 as shown below and save changes.

Overlap Plan 2

Overlap	1	3
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	-	-
Modifier Phases	1	5
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

← NOTICE INCLUDED PHASE

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 1A & 5A

Front Panel
Main Menu >Controller >Detector >Veh Det Plans

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

In the table view of web interface right click on "Detector" in the top left corner of the table. Copy the entire contents of Detector Plan 1. Paste Detector Plan 1 into Detector Plan 2. Modify Detector Plan 2 as shown below and save changes.

Plan 2

1A

Detector	Call Phase	Delay
1	1	3
29	0	3

5A

Detector	Call Phase	Delay
15	5	3
31	0	3

NC Dept of Transportation
Division of Highways
Final Drawing Date: 4/30/2024
DocuSigned by: Zachary Little
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1231
DESIGNED: JULY 2023
SEALED: 04/22/2024
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical Detail - Sheet 2 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 117
at
SR 1441 (Ashton Road) /
SR 1411 (Old River Road)

Division 3 Pender County Rocky Point

PLAN DATE: July 2023	REVIEWED BY: KP Baumann
PREPARED BY: MC Burke	REVIEWED BY:

REVISIONS	INIT.	DATE

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

PLANS PREPARED IN THE OFFICE OF:
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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: SIGNATURE 4/22/2024 DATE

SIG. INVENTORY NO. 03-1231

PROJECT REFERENCE NO.	SHEET NO.
HS-2003AC	Sig. 2.3

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

To run alternate phasing, select a Pattern that is programmed to run Overlap Plan 2 and Detector Plan 2.
A Pattern can be selected through the scheduler or manually by changing the Operational Mode.

PHASING	OVERLAP PLAN	VEH DET PLAN
ACTIVE PLAN REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PLAN REQUIRED TO RUN ALTERNATE PHASING	2	2

ALTERNATE PHASING CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN OVERLAP PLAN 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAP PLAN 2: Modifies overlap included phases for heads 11 and 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 3 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

* The Pattern number(s) are to be determined by the Division Traffic Engineer.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 4/30/2024
DocuSigned by: Zachary Little
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1231
DESIGNED: JULY 2023
SEALED: 04/22/2024
REVISED: N/A

Electrical Detail - Sheet 3 of 3

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PLANS PREPARED IN THE OFFICE OF:
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Raleigh, NC 27601
(919) 677-2000

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared For:
Transportation Mobility and Safety Division — ITS & Signals Management Section — Department of Transportation, State of North Carolina
750 N.Greenfield Pkwy,Garner,NC 27529

US 117
at
SR 1441 (Ashton Road) /
SR 1411 (Old River Road)

Division 3 | Pender County | Rocky Point

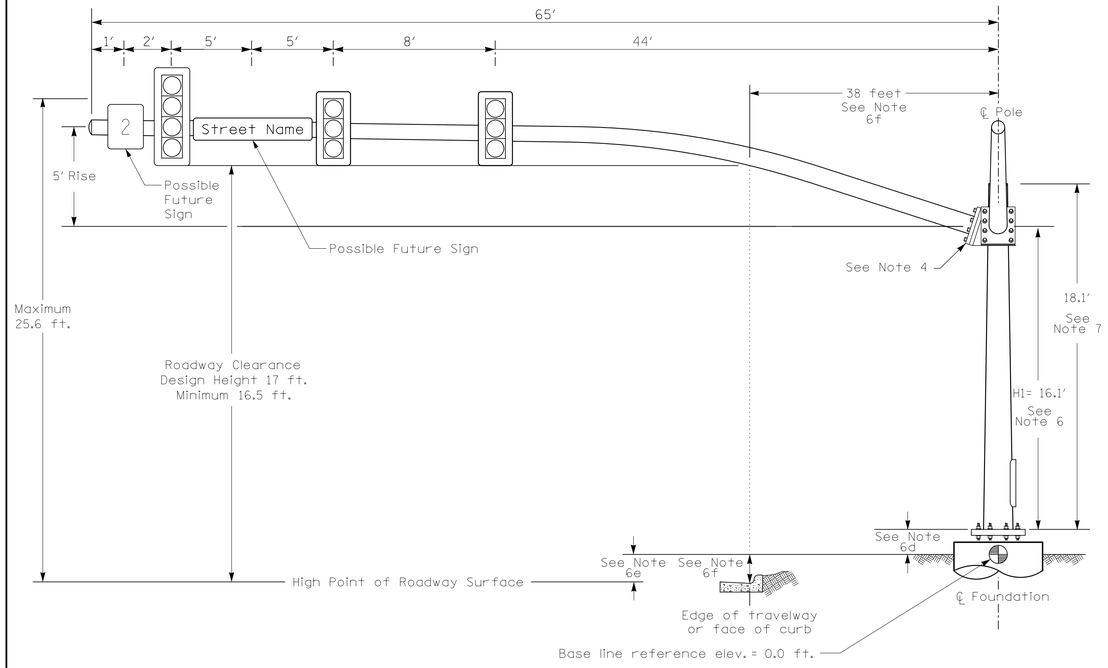
PLAN DATE: July 2023	REVIEWED BY: KP Baumann
PREPARED BY: MC Burke	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: SIGNATURE 4/22/2024 DATE
SIG. INVENTORY NO. 03-1231

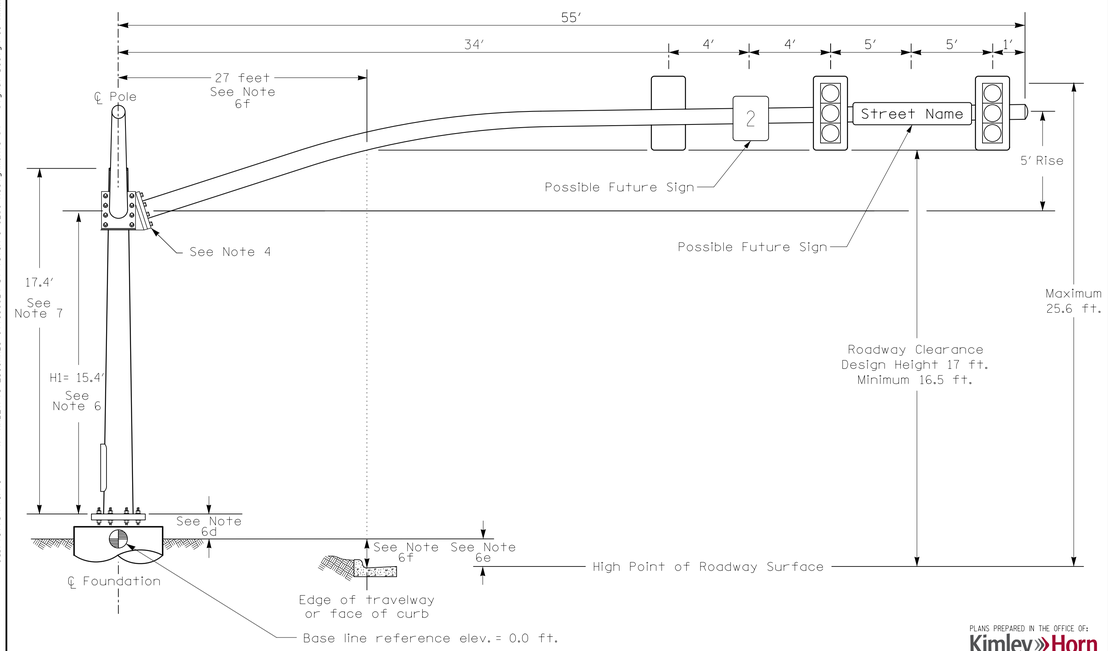
4/18/2024 10:00:26 AM Gabriella.Pierro K:\RAL_TPTO_SIGNALS\011036624 Division 3 GESC Assignments\S4 - Signal Design\03-XXXX-2024e3_US117atAshton.dgn

Design Loading for METAL POLE NO. 1, MAST ARM A



Elevation View @ 180°

Design Loading for METAL POLE NO. 1, MAST ARM B



Elevation View @ 270°

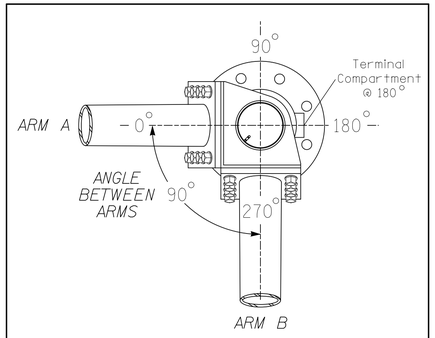
PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SPECIAL NOTE

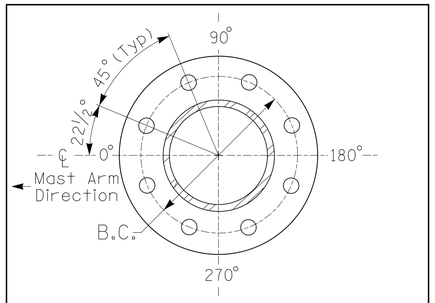
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+2.06 ft.	+1.40 ft.
Elevation difference at Edge of travelway or face of curb	+1.53 ft.	+1.33 ft.

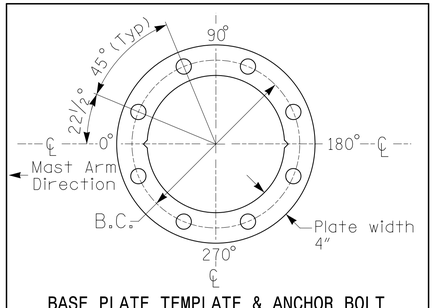


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
HS-2003AC	Sig. 2.4

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
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 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 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2024 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 force ratios that do not exceed 0.9.
4. 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.
5. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
6. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Nominal vertical rise in mast arm is 5 feet as measured from the centerline of the arm base to the centerline of the free end of the arm.
   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.
   f. Provide horizontal distance from the proposed centerline of the foundation to the edge of travelway. Refer to the Elevation Data Chart for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary to ensure that the roadway clearance is maintained at the edge of the travelway and to aid in the camber design of the arm.
7. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
8. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
9. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
10. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 4/30/2024
DocuSigned by: Zachary Little
ITS & Signals Unit

NCDOT Wind Zone 1 (150 mph)

Prepared For: Transportation Mobility and Safety Division — North Carolina Department of Transportation — Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 117
at
SR 1441 (Ashton Road) /
SR 1411 (Old River Road)

Division 3 | Pender County | Rocky Point

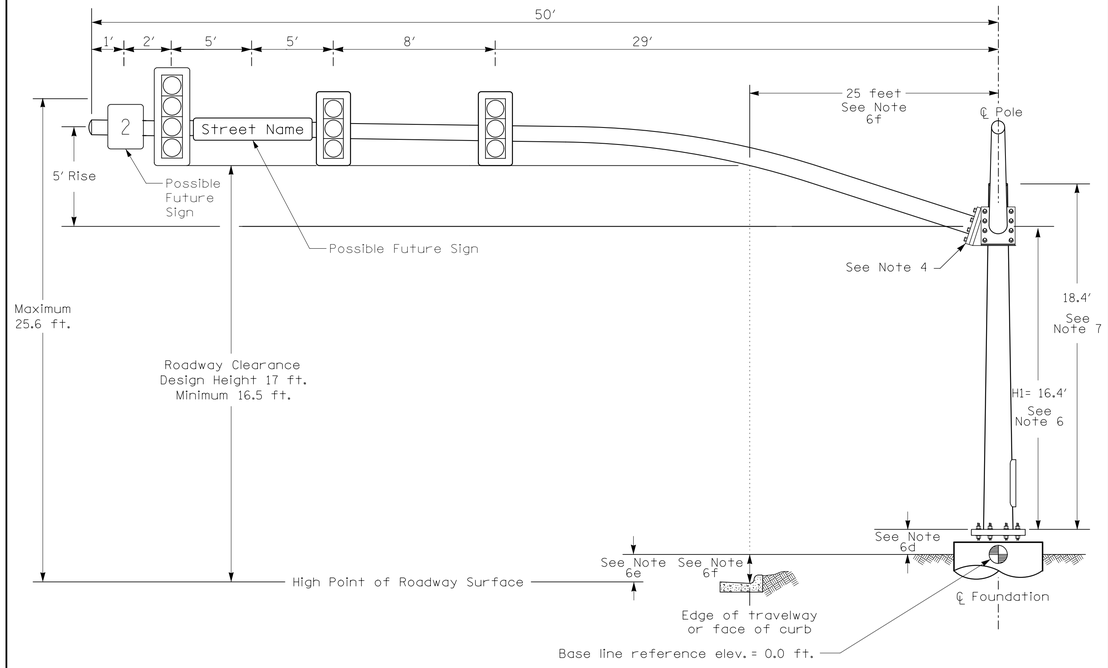
PLAN DATE: July 2023 | REVIEWED BY: KP Baumann
PREPARED BY: MC Burke | REVIEWED BY:

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

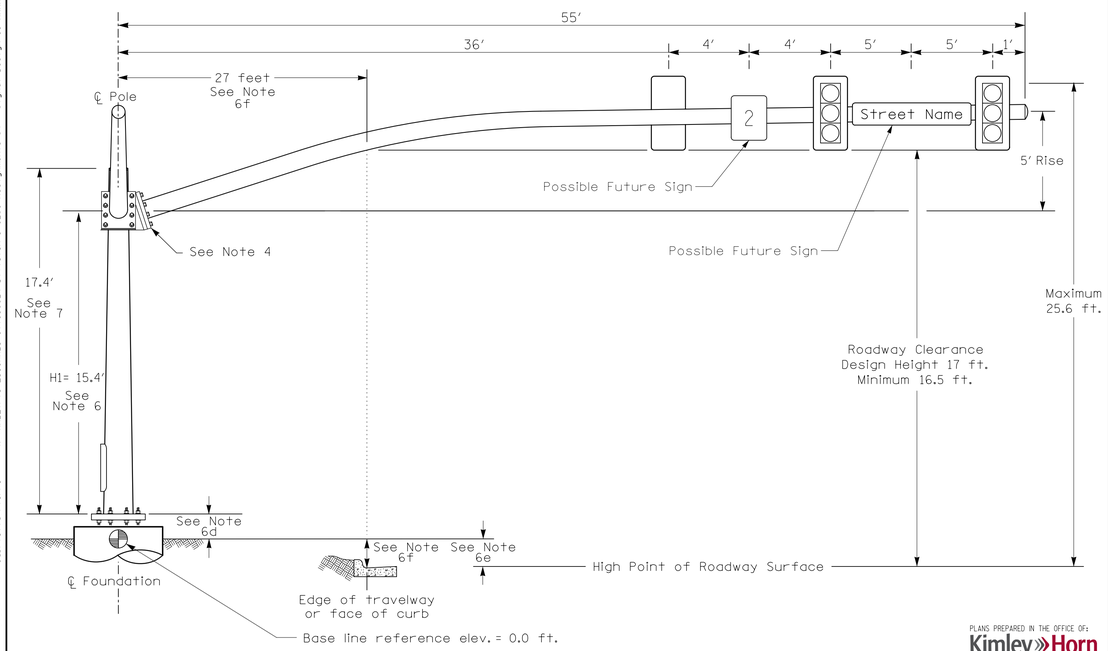
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: SIGNATURE 4/22/2024 DATE
SIG. INVENTORY NO. 03-1231

Design Loading for METAL POLE NO. 2, MAST ARM A



Elevation View @ 0°

Design Loading for METAL POLE NO. 2, MAST ARM B



Elevation View @ 90°

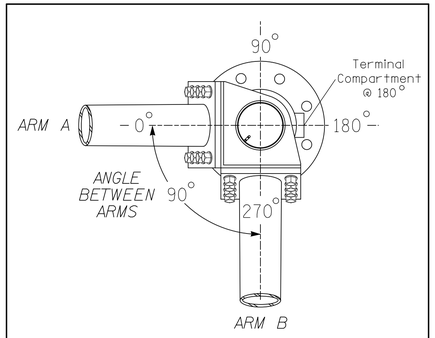
PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SPECIAL NOTE

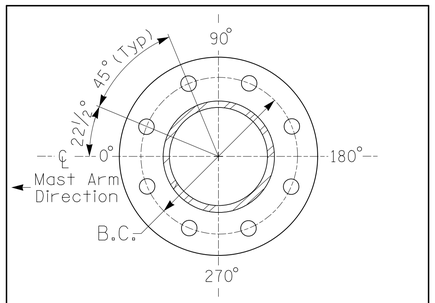
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+2.32 ft.	+1.33 ft.
Elevation difference at Edge of travelway or face of curb	+1.83 ft.	+1.27 ft.

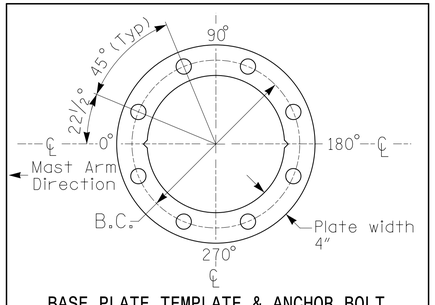


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

METAL POLE No. 2

PROJECT REFERENCE NO.	SHEET NO.
HS-2003AC	Sig. 2.5

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
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 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 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
   - The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
   - The 2024 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 force ratios that do not exceed 0.9.
4. 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.
5. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
6. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Nominal vertical rise in mast arm is 5 feet as measured from the centerline of the arm base to the centerline of the free end of the arm.
   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.
   f. Provide horizontal distance from the proposed centerline of the foundation to the edge of travelway. Refer to the Elevation Data Chart for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary to ensure that the roadway clearance is maintained at the edge of the travelway and to aid in the camber design of the arm.
7. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
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9. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
10. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 4/30/2024
DocuSigned by: Cristy Tuttle
ITS & Signals Unit

NCDOT Wind Zone 1 (150 mph)

Prepared For: Transportation Mobility and Safety Division — North Carolina Department of Transportation — Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 117
at
SR 1441 (Ashton Road) /
SR 1411 (Old River Road)

Division 3 | Pender County | Rocky Point

PLAN DATE: July 2023 | REVIEWED BY: KP Baumann
PREPARED BY: MC Burke | REVIEWED BY:

SCALE: 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN
DocuSigned by: [signature] SIGNATURE 4/22/2024 DATE
SIG. INVENTORY NO. 03-1231

PROJECT REFERENCE NO.	SHEET NO.
HS-2003AC	PMP 2.6

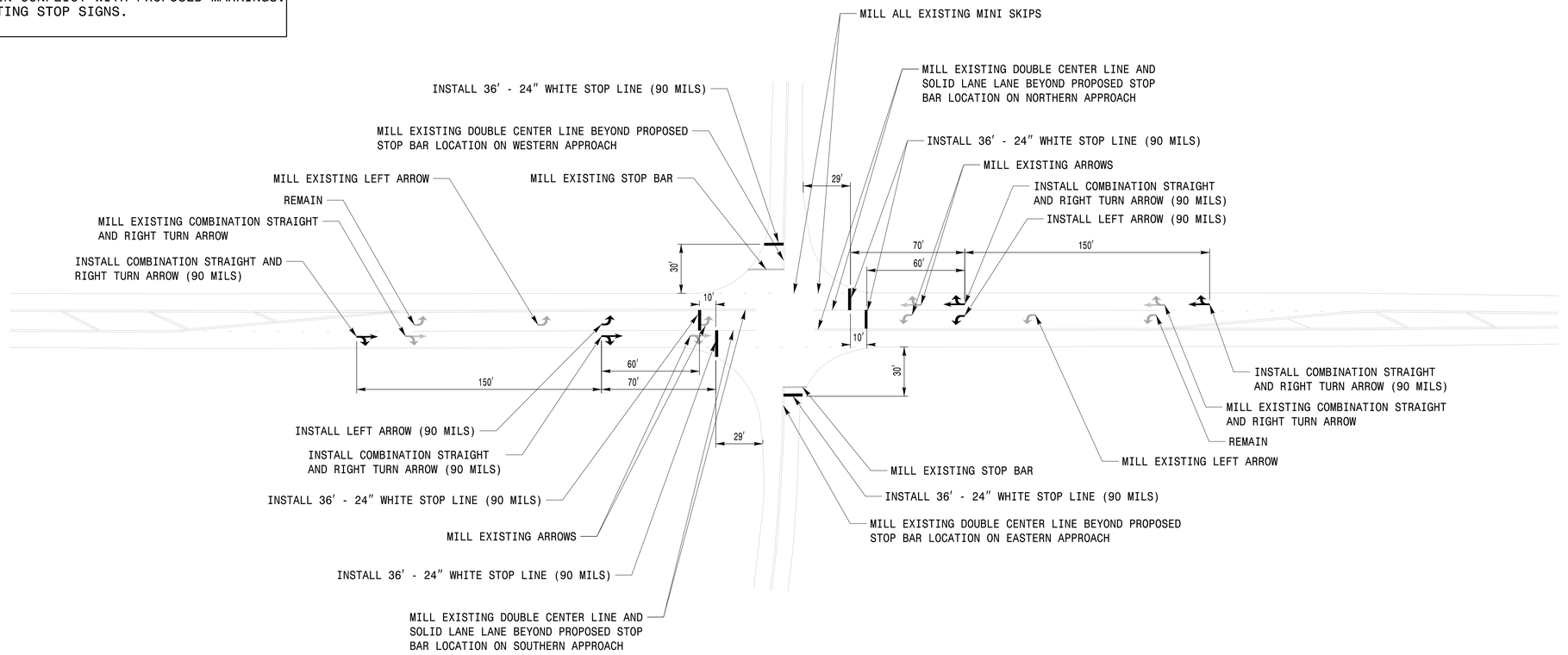
2024 ROADWAY STANDARD DRAWINGS AND STANDARD SPECIFICATIONS

✳ THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS"– ROADWAY DESIGN UNIT – N.C. DEPARTMENT OF TRANSPORTATION – RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NUMBER	DESCRIPTION
1205.01	PAVEMENT MARKINGS LINE TYPES
1205.02	PAVEMENT MARKINGS TWO-LANE AND MULTI-LANE ROADWAYS
1205.04	PAVEMENT MARKINGS AT SIGNALIZED INTERSECTIONS
1205.05	PAVEMENT MARKINGS AT TURN LANES
1205.08	PAVEMENT MARKINGS SYMBOLS AND WORD MESSAGES

PAVEMENT MARKING NOTES:

A. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.
B. CONTRACTOR SHALL MILL ANY EXISTING MARKINGS OR SYMBOLS IN CONFLICT WITH PROPOSED MARKINGS.
C. REMOVE EXISTING STOP SIGNS.



K:\NAL_TPTO_SIGNALS\W011036624 Division 3 QESC Assignments\54 - Signal Design\03-XXXX-2024pmp_US117atAshton.dgn
4/18/2024 11:01:34 AM GabrielloPierro

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Pavement Marking Plan

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

US 117
at
SR 1441 (Ashton Road) /
SR 1411 (Old River Road)

Division 3 | Pender County | Rocky Point

PLAN DATE: July 2023 | REVIEWED BY: BR Crawford
PREPARED BY: MC Burke | REVIEWED BY: KP Baumann

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 32606 BENJAMIN R CRAWFORD

DocuSigned by: Benjamin R. Crawford 4/22/2024
Section Supervisor DATE

SIG. INVENTORY NO. 03-1231

PROJECT REFERENCE NO.	SHEET NO.
HS-2003C	PMP 3.0

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.

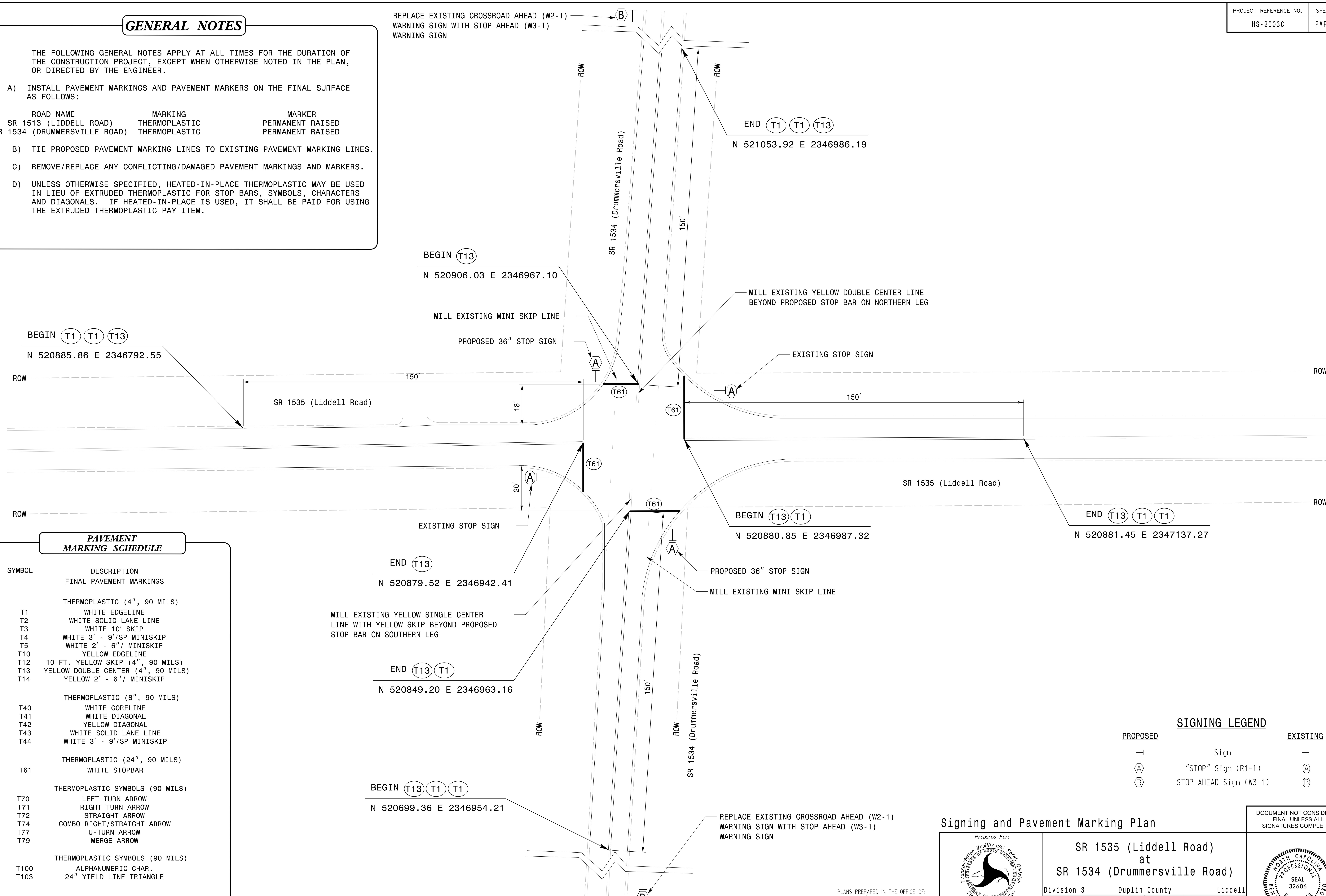
A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
SR 1513 (LIDDELL ROAD)	THERMOPLASTIC	PERMANENT RAISED
SR 1534 (DRUMMERSVILLE ROAD)	THERMOPLASTIC	PERMANENT RAISED

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

C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

D) UNLESS OTHERWISE SPECIFIED, HEATED-IN-PLACE THERMOPLASTIC MAY BE USED IN LIEU OF EXTRUDED THERMOPLASTIC FOR STOP BARS, SYMBOLS, CHARACTERS AND DIAGONALS. IF HEATED-IN-PLACE IS USED, IT SHALL BE PAID FOR USING THE EXTRUDED THERMOPLASTIC PAY ITEM.



PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
	FINAL PAVEMENT MARKINGS
	THERMOPLASTIC (4″, 90 MILS)
T1	WHITE EDGELINE
T2	WHITE SOLID LANE LINE
T3	WHITE 10′ SKIP
T4	WHITE 3′ - 9′/SP MINISKIP
T5	WHITE 2′ - 6″/ MINISKIP
T10	YELLOW EDGELINE
T12	10 FT. YELLOW SKIP (4″, 90 MILS)
T13	YELLOW DOUBLE CENTER (4″, 90 MILS)
T14	YELLOW 2′ - 6″/ MINISKIP
	THERMOPLASTIC (8″, 90 MILS)
T40	WHITE GORELINE
T41	WHITE DIAGONAL
T42	YELLOW DIAGONAL
T43	WHITE SOLID LANE LINE
T44	WHITE 3′ - 9′/SP MINISKIP
	THERMOPLASTIC (24″, 90 MILS)
T61	WHITE STOPBAR
	THERMOPLASTIC SYMBOLS (90 MILS)
T70	LEFT TURN ARROW
T71	RIGHT TURN ARROW
T72	STRAIGHT ARROW
T74	COMBO RIGHT/STRAIGHT ARROW
T77	U-TURN ARROW
T79	MERGE ARROW
	THERMOPLASTIC SYMBOLS (90 MILS)
T100	ALPHANUMERIC CHAR.
T103	24″ YIELD LINE TRIANGLE
	MARKERS
	PERMANENT RAISED
MA	YELLOW & YELLOW
MB	CRYSTAL & RED

SIGNING LEGEND

PROPOSED		EXISTING
⊣	Sign	⊣
A	"STOP" Sign (R1-1)	A
B	STOP AHEAD Sign (W3-1)	B

Signing and Pavement Marking Plan

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

PLANS PREPARED IN THE OFFICE OF: Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SCALE 0 20 1″=20′

N

SR 1535 (Liddell Road) at SR 1534 (Drummersville Road)

Division 3 Duplin County Liddell

PLAN DATE: July 2023	REVIEWED BY: BR Crawford
PREPARED BY: MC Burke	REVIEWED BY: KP Baumann

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN R. CRAWFORD

DocuSigned by: Benjamin R Crawford DC33D8CC684D426 — 6/17/2024
SIGNATURE DATE

SIG. INVENTORY NO.

6/11/2024 10:52:23 AM Gabriella.Pierro K:*RAL_TPTO*_SIGNALS*011036624 Division 3 GESC Assignments*S4 - Signal Design*0_Lidell_Drummersville_Concept.dgn

PROJECT REFERENCE NO.	SHEET NO.
HS-2003I	PMP 4.0

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.

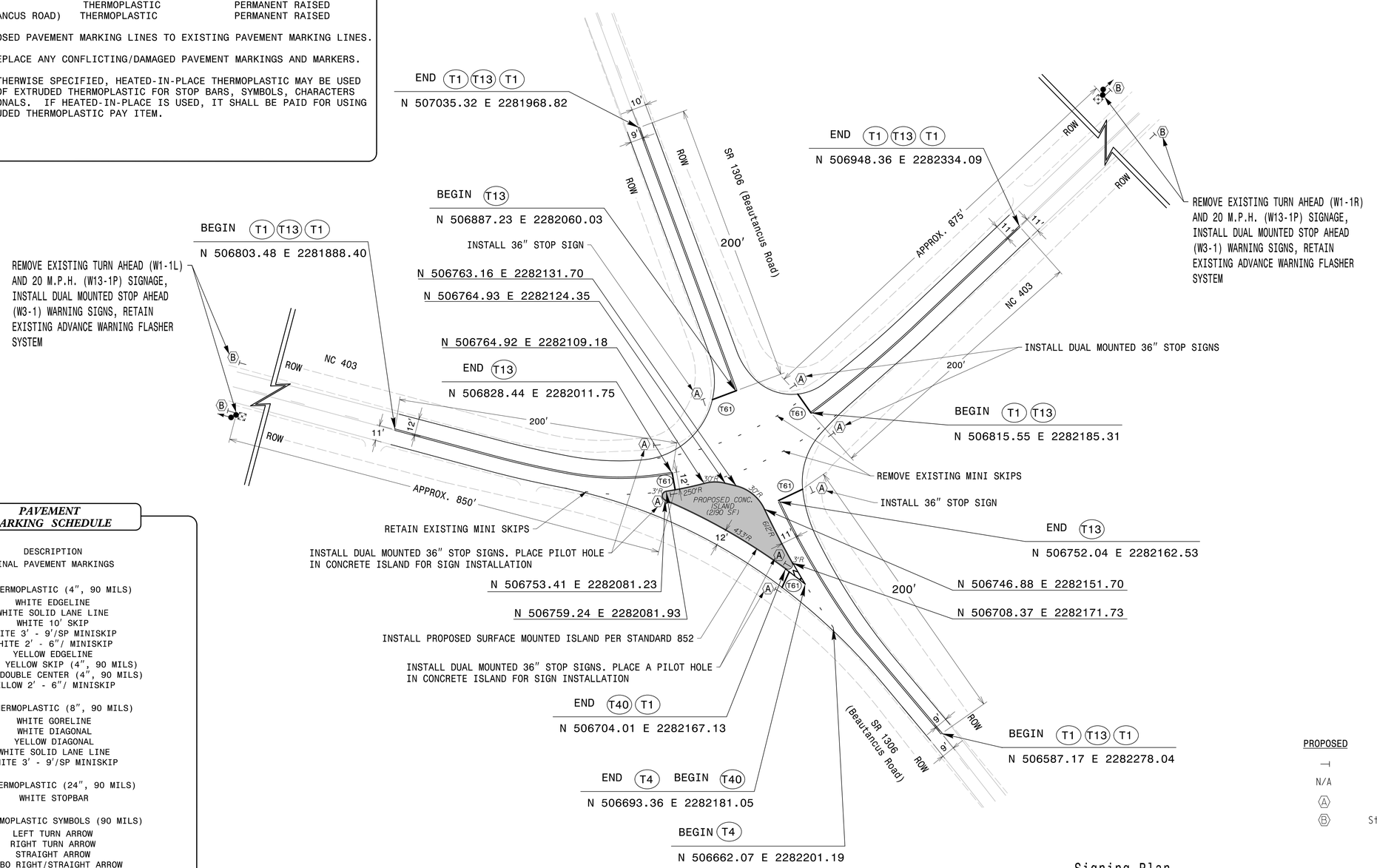
A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKER
NC 403	THERMOPLASTIC	PERMANENT RAISED
SR 1306 (BEAUTANCUS ROAD)	THERMOPLASTIC	PERMANENT RAISED

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

C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

D) UNLESS OTHERWISE SPECIFIED, HEATED-IN-PLACE THERMOPLASTIC MAY BE USED IN LIEU OF EXTRUDED THERMOPLASTIC FOR STOP BARS, SYMBOLS, CHARACTERS AND DIAGONALS. IF HEATED-IN-PLACE IS USED, IT SHALL BE PAID FOR USING THE EXTRUDED THERMOPLASTIC PAY ITEM.



PAVEMENT MARKING SCHEDULE

SYMBOL	DESCRIPTION
	FINAL PAVEMENT MARKINGS
	THERMOPLASTIC (4", 90 MILS)
T1	WHITE EDGELINE
T2	WHITE SOLID LANE LINE
T3	WHITE 10' SKIP
T4	WHITE 3' - 9'/SP MINISKIP
T5	WHITE 2' - 6"/ MINISKIP
T10	YELLOW EDGELINE
T12	10 FT. YELLOW SKIP (4", 90 MILS)
T13	YELLOW DOUBLE CENTER (4", 90 MILS)
T14	YELLOW 2' - 6"/ MINISKIP
	THERMOPLASTIC (8", 90 MILS)
T40	WHITE GORELINE
T41	WHITE DIAGONAL
T42	YELLOW DIAGONAL
T43	WHITE SOLID LANE LINE
T44	WHITE 3' - 9'/SP MINISKIP
	THERMOPLASTIC (24", 90 MILS)
T61	WHITE STOPBAR
	THERMOPLASTIC SYMBOLS (90 MILS)
T70	LEFT TURN ARROW
T71	RIGHT TURN ARROW
T72	STRAIGHT ARROW
T74	COMBO RIGHT/STRAIGHT ARROW
T77	U-TURN ARROW
T79	MERGE ARROW
	THERMOPLASTIC SYMBOLS (90 MILS)
T100	ALPHANUMERIC CHAR.
T103	24" YIELD LINE TRIANGLE
	MARKERS
	PERMANENT RAISED
MA	YELLOW & YELLOW
MB	CRYSTAL & RED

LEGEND

PROPOSED		EXISTING
⊣	Sign	⊣
N/A	Right of Way	———
Ⓐ	"STOP" Sign (R1-1)	Ⓐ
Ⓑ	Stop Ahead Sign (W3-1)	Ⓑ

Signing Plan

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

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

NC 403
at
SR 1306 (Beautancus Road)

Division 3 Duplin County Mount Olive

PLAN DATE: July 2023 REVIEWED BY: KP Baumann
PREPARED BY: MC Burke REVIEWED BY: BR Crawford

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 32606 BENJAMIN R. CRAWFORD

DocuSigned by: Benjamin R Crawford 6/17/2024
SIGNATURE DATE

SIG. INVENTORY NO.

6/11/2024 9:26:26 AM Gabriella.Pierro K:\NRAL_TPTO*_SIGNALS*01103624 Division 3 GESC Assignments\54 - Signal Design\NO_NC403atBeautancus_PMP.dgn

TRAFFIC NOTES

ALL TRAFFIC CONTROL SHALL CONFORM TO THE LATEST MUTCD AND 2024 NCDOT STANDARDS

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 RESTRICTIONS
NC 403 SR 1306 (BEAUTANCUS ROAD) US 117 SR 1441 (ASHTON ROAD) SR 1411 (OLD RIVER ROAD) SR 1534 (DRUMMERSVILLE ROAD) SR 1535 (LIDDELL ROAD)	MONDAY THROUGH FRIDAY FROM 6 AM TO 9 AM AND FROM 4 PM TO 7 PM

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

ROAD NAME

NC 403
SR 1306 (BEAUTANCUS ROAD)
US 117
SR 1441 (ASHTON ROAD)
SR 1411 (OLD RIVER ROAD)
SR 1534 (DRUMMERSVILLE ROAD)
SR 1535 (LIDDELL ROAD)

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 6:00 A.M. DECEMBER 31st TO 7:00 P.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 7:00 P.M. THE FOLLOWING TUESDAY.
3. FOR EASTER, BETWEEN THE HOURS OF 6:00 A.M. THURSDAY AND 7:00 P.M. MONDAY.
4. FOR MEMORIAL DAY, BETWEEN THE HOURS OF 6:00 A.M. FRIDAY TO 7:00 P.M. TUESDAY.
5. FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 6:00 A.M. THE DAY BEFORE INDEPENDENCE DAY AND 7:00 P.M. THE DAY AFTER INDEPENDENCE DAY.

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

C) DO NOT CLOSE ROADS AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTIONS
NC 403 SR 1306 (BEAUTANCUS ROAD) US 117 SR 1441 (ASHTON ROAD) SR 1411 (OLD RIVER ROAD) SR 1534 (DRUMMERSVILLE ROAD) SR 1535 (LIDDELL ROAD)	

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 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

J) 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.

K) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) 500 IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

TRAFFIC PATTERN ALTERATIONS

L) NOTIFY THE ENGINEER THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

M) 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.

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

O) INSTALL BLACK ON ORANGE "DIP" SIGNS (W8-2) AND/OR "BUMP" SIGNS (W8-1) 500 IN ADVANCE OF THE UNEVEN AREA, OR AS DIRECTED BY THE ENGINEER.

P) PROVIDE PERMANENT SIGNING.

TRAFFIC CONTROL DEVICES

Q) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT, 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

R) PLACE ADDITIONAL SETS OF THREE CHANNELIZING DEVICES DRUMS PERPENDICULAR TO THE EDGE OF TRAVELWAY ON 500 FT CENTERS WHEN UNOPENED LANES ARE CLOSED TO TRAFFIC.

PAVEMENT MARKINGS AND MARKERS

S) INSTALL PAVEMENT MARKINGS AS SHOWN ON PLAN SHEETS.

T) REFER TO SECTION 1205 OF THE NCDOT STANDARD SPECIFICATIONS FOR ROAD AND STRUCTURES DATED JANUARY 2024 FOR APPLICATION TIMES AND TEMPERATURE CONDITIONS FOR PAVEMENT MARKINGS.

U) PLACE AT LEAST TWO APPLICATIONS OF PAINT PAVEMENT MARKINGS ON THE FINAL WEARING SURFACE ON NEW ASPHALT PAVEMENT. PLACE ADDITIONAL APPLICATIONS OF PAINT UPON SUFFICIENT DRYING TIME, AS DETERMINED BY THE ENGINEER.

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

W) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

X) PLACE AT LEAST TWO APPLICATIONS OF PAINT ON NEW ASPHALT WITH TEMPORARY TRAFFIC PATTERNS WHICH WILL REMAIN IN PLACE OVER THREE (3) MONTHS. PLACE ADDITIONAL APPLICATIONS OF PAINT UPON SUFFICIENT DRYING TIME, AS DETERMINED BY THE ENGINEER.

Y) CONTRACTOR SHALL MAINTAIN ALL TEMPORARY PAINT PAVEMENT MARKINGS UNTIL COMPLETION OF THERMOPLASTIC PAVEMENT MARKING INSTALLATION.

Z) BEFORE SHIFTING TRAFFIC TO NEW LOCATIONS, CONTRACTOR SHALL REMOVE ANY MARKINGS WHICH CONFLICT WITH THE NEW TRAFFIC PATTERN(S).

MISCELLANEOUS

AA) CHANGES TO THE TRAFFIC CONTROL REQUIRE APPROVAL FROM NCDOT PRIOR TO COMMENCING FIELD OPERATIONS.

ADVANCE WARNING SIGNS

- USE FLUORESCENT ORANGE SHEETING (TYPE VII OR HIGHER) ON ALL ADVANCED WORK ZONE SIGNS.
- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK.
- ADVANCE WARNING SIGNS TO BE INSTALLED PER ROADWAY STANDARD DRAWING NO. 1101.01, 1101.02, 1101.04.
- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- USE 3 LB STEEL U-CHANNEL POST OR 4" X 4" WOOD POST FOR ALL WORK ZONE SIGNS. 3 LB STEEL U-CHANNEL POSTS MUST MEET THE REQUIREMENTS OF STANDARD SPECIFICATION SECTION 1094-1(B), MAY BE GALVANIZED STEEL, OR MAY BE PAINTED GREEN BY THE POST MANUFACTURER. SQUARE STEEL TUBING POSTS HAVING EQUIVALENT STRENGTH OF THE 3 LB STEEL U-CHANNEL POST ARE ALSO ACCEPTABLE FOR USE. ERECT SIGNS PER ROADWAY STANDARD DRAWING 1110.01. PAYMENT FOR WOOD POSTS, 3 LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATION "WORK ZONE SIGNS" SECTION 1110.
- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1110.01. REMOVE ENTIRE POST WHEN REMOVING SIGNS WITH SPLICED POSTS.
- DO NOT BACK BRACE SIGN SUPPORTS.

PROJECT REFERENCE NO.	SHEET NO.
HS-2003C, HS-2003AC, HS-2003I	TMP-5.0

PHASING NOTES

PHASE 1

STEP 1
THE CONTRACTOR SHALL PLACE ALL ADVANCE WARNING SIGNS PRIOR TO BEGINNING WORK ACCORDING TO NCDOT ROADWAY STANDARD DRAWING (RSD) NO. 1101.01. SIGNS SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED.

STEP 2
WHILE MAINTAINING EXISTING TRAFFIC AND USING NCDOT RSD 1101.02 FOR TEMPORARY LANE CLOSURES AS NEEDED, THE CONTRACTOR SHALL INSTALL THE PAINT VERSION OF THE FINAL PAVEMENT MARKINGS, REMOVE CONFLICTING MARKINGS AND SHIFT TRAFFIC ONTO PATTERN. TIE TEMPORARY MARKINGS TO EXISTING MARKINGS.

STEP 3
WHILE MAINTAINING EXISTING TRAFFIC AND USING NCDOT RSD 1101.02 FOR TEMPORARY LANE CLOSURES AS NEEDED, THE CONTRACTOR SHALL ERECT PROPSOED MASTARMS AND SIGNAL HEADS AND CONSTRUCT PROPOSED MONOLITHIC ISLAND AS SHOWN ON THE PLANS.

STEP 4
WHILE MAINTAINING EXISTING TRAFFIC AND USING NCDOT RSD 1101.02 FOR TEMPORARY LANE CLOSURES AS NEEDED, THE CONTRACTOR SHALL INSTALL THE FINAL PAVEMENT MARKINGS, REMOVE ALL TRAFFIC CONTROL DEVICES AND SIGNAGE, AND ACTIVATE THE NEW SIGNAL.

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW BOARDS
1130.01	DRUMS
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGING DEVICES
1180.01	SKINNY - DRUMS
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - DIVIDED AND UNDIVIDED ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.05	PAVEMENT MARKINGS - TURN LANES
1205.08	PAVEMENT MARKINGS - SYMBOLS AND WORD MESSAGES
1205.09	PAVEMENT MARKINGS - PAINTED ISLANDS

TRAFFIC MANAGEMENT PLAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

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

HS-2003C, HS-2003AC, and HS-2003I
Signal and Pavement Marking Installations
Division 3 Pender and Duplin County

PLAN DATE:	July 2023	REVIEWED BY:	KP Baumann
PREPARED BY:	GG Pierro	REVIEWED BY:	BR Crawford

SCALE: NOT TO SCALE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 32606 BENJAMIN R. CRAWFORD

Docusigned by: Benjamin R Crawford 5/7/2024
SIGNATURE DATE

SIG. INVENTORY NO.

PROJECT I.D.NO.	SHEET NO.
	Sig.M1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)

NCDOT METAL POLE STANDARDS

DIVISION 11
WIND ZONE 5 & 6

DIVISION 9
WIND ZONE 5

DIVISION 7
WIND ZONE 5

DIVISION 5
WIND ZONE 4 & 5

DIVISION 4
WIND ZONE 3 & 4

DIVISION 1
WIND ZONE 2, 3, 4 & 5

DIVISION 13
WIND ZONE 5 & 6

DIVISION 14
WIND ZONE 5 & 6

DIVISION 12
WIND ZONE 5

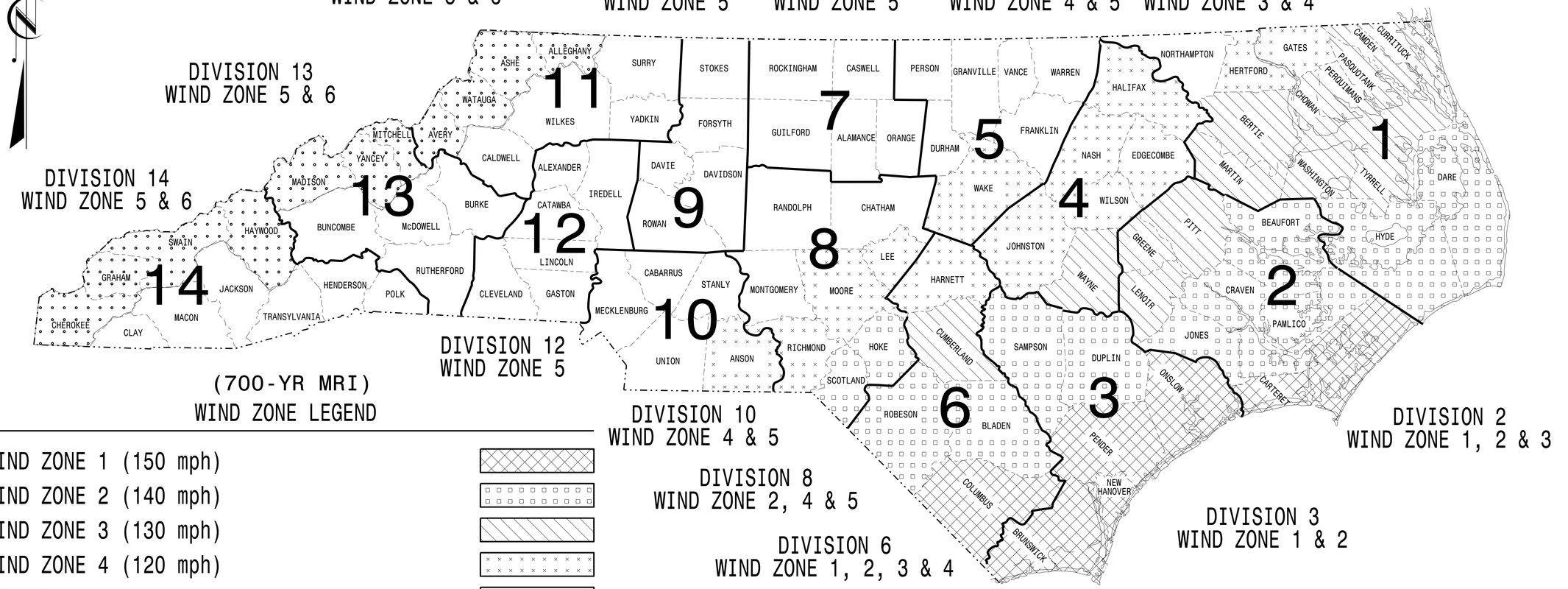
DIVISION 10
WIND ZONE 4 & 5

DIVISION 8
WIND ZONE 2, 4 & 5

DIVISION 6
WIND ZONE 1, 2, 3 & 4

DIVISION 2
WIND ZONE 1, 2 & 3

DIVISION 3
WIND ZONE 1 & 2



(700-YR MRI)
WIND ZONE LEGEND

WIND ZONE 1 (150 mph)	
WIND ZONE 2 (140 mph)	
WIND ZONE 3 (130 mph)	
WIND ZONE 4 (120 mph)	
WIND ZONE 5 (110 mph)	
WIND ZONE 6 (135 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
750 N.Greenfield Pkwy.
Garner, NC 27529

Designed in conformance with the latest 2020 Interim to the 1st Edition 2015

AASHTO LRFD

Standard Specifications for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS

DRAWING NUMBER	DESCRIPTION
Sig. M 1A	Statewide Wind Zone Map (700–yr MRI)
Sig. M 1B	Statewide Wind Zone Map (10–yr MRI)
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
Sig. M 9	Typical Fabrication Details–CCTV Camera Poles

MOBILITY AND SAFETY DIVISION – TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS UNIT

D.Y. ISHAK – STATE SIGNALS ENGINEER

K. DURIGON, P.E. – ITS AND SIGNALS STRUCTURAL ENGINEER

B. WALKER, P.E. – ITS AND SIGNALS STRUCTURAL ENGINEER

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

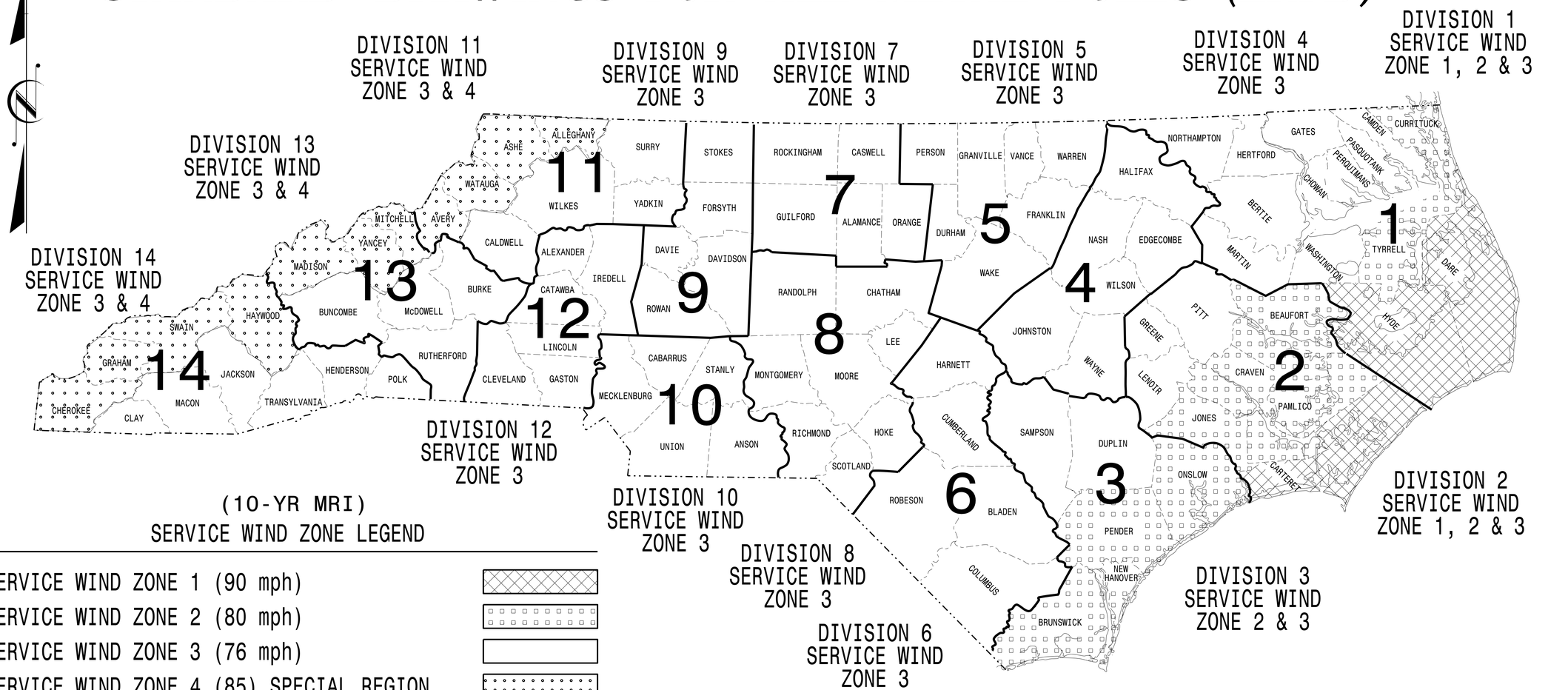
DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

PROJECT I.D.NO.	SHEET NO.
	Sig.M1B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR ALL METAL POLES (LRFD)

NCDOT METAL POLE STANDARDS



(10-YR MRI)
SERVICE WIND ZONE LEGEND

SERVICE WIND ZONE 1 (90 mph)	
SERVICE WIND ZONE 2 (80 mph)	
SERVICE WIND ZONE 3 (76 mph)	
SERVICE WIND ZONE 4 (85) SPECIAL REGION	

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

Prepared in the Offices of:

Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy.
Garner, NC 27529

Designed in conformance with the latest 2020 Interim to the 1st Edition 2015

AASHTO LRFD

Standard Specifications for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS

DRAWING NUMBER	DESCRIPTION
Sig. M 1A	Statewide Wind Zone Map (700–yr MRI)
Sig. M 1B	Statewide Wind Zone Map (10–yr MRI)
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
Sig. M 9	Typical Fabrication Details–CCTV Camera Poles

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION – TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS UNIT

D.Y. ISHAK – STATE SIGNALS ENGINEER

K. DURIGON, P.E. – ITS AND SIGNALS STRUCTURAL ENGINEER

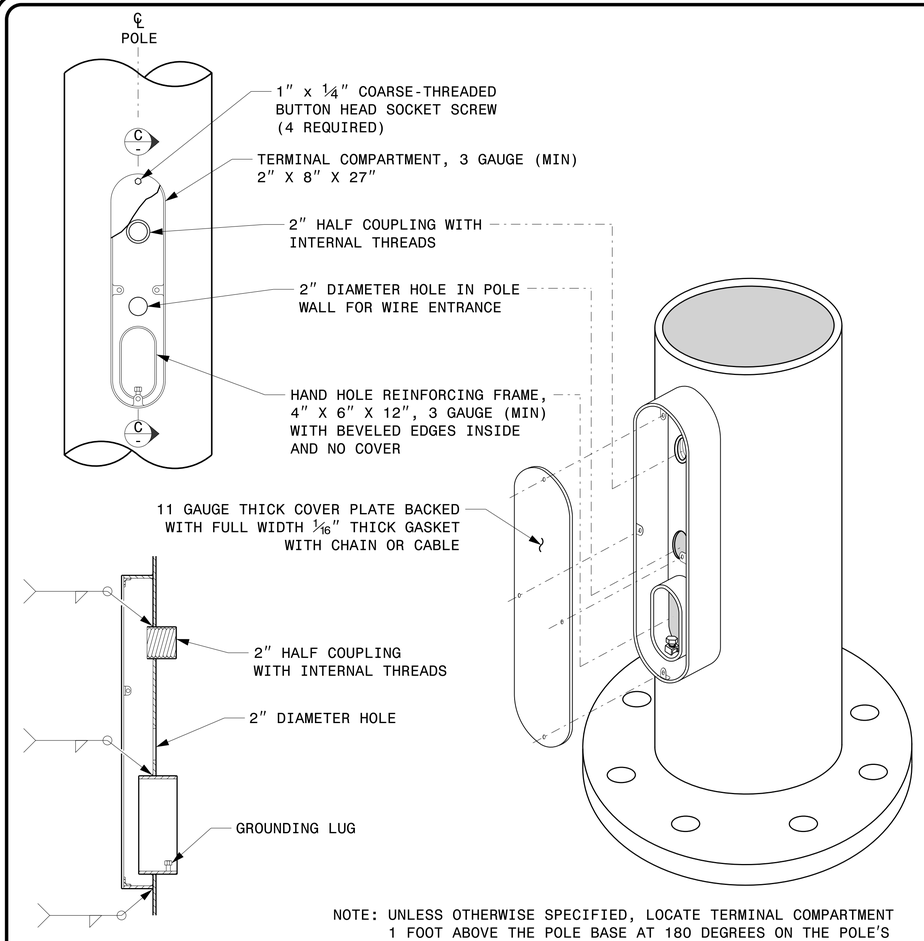
B. WALKER, P.E. – ITS AND SIGNALS STRUCTURAL ENGINEER

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...

09/21/2023
DATE



SECTION C-C

NOTE: UNLESS OTHERWISE SPECIFIED, LOCATE TERMINAL COMPARTMENT 1 FOOT ABOVE THE POLE BASE AT 180 DEGREES ON THE POLE'S RADIAL INDEX.

TERMINAL COMPARTMENT DETAIL

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

SHAFT I.D. TAG
(PROVIDE ON SHAFT OF STRAIN POLES
AND MAST ARM POLE SHAFT)

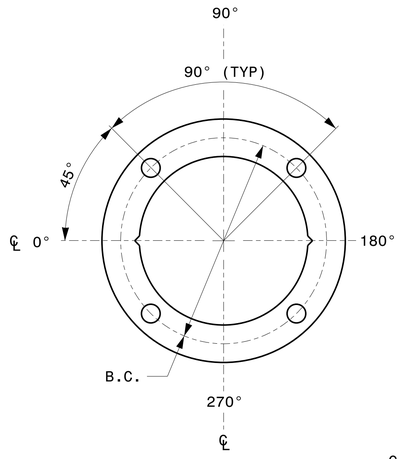
MFG _____ MFG. DATE: MM/YY
SECTION D/T/L/Y ----/----/----/----
NCDOT SIG. INV. NO. _ _ _ _ _ _ _ _
NCDOT POLE NO. _ _ _ _ _ _ _ _

ARM I.D. TAG
(PROVIDE ON EACH SECTION OF
A MULTI-SECTION MAST ARM)

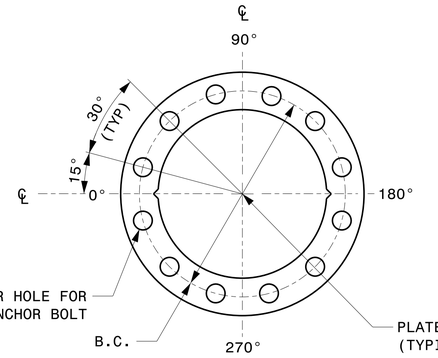
NOTES:

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 STANDARD DESIGN, INCLUDE CASE NUMBER IN ADDITION TO POLE NUMBER ON "NCDOT POLE NO." LINE.
5. SIGNAL INV. NUMBER AND POLE I.D. NUMBER. SEE DRAWING M3 AND M4 FOR MOUNTING POSITIONS OF I.D. TAGS.

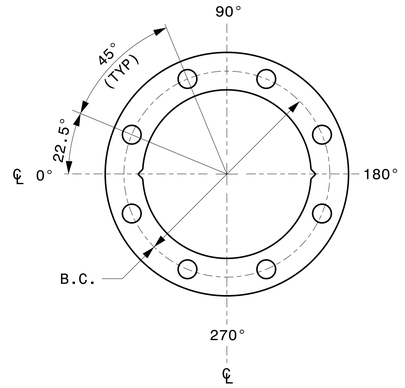
IDENTIFICATION TAG DETAILS



4 BOLT PATTERN



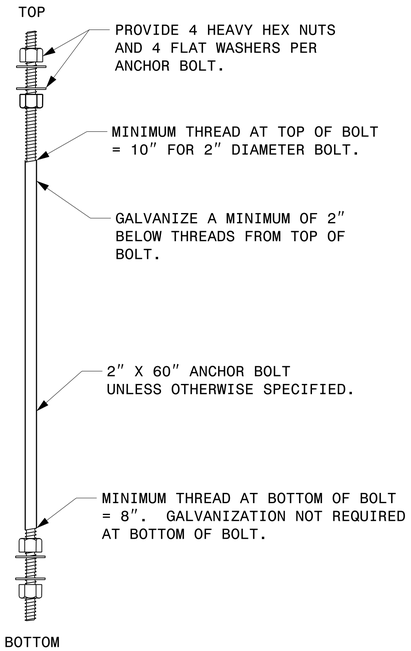
12 BOLT PATTERN



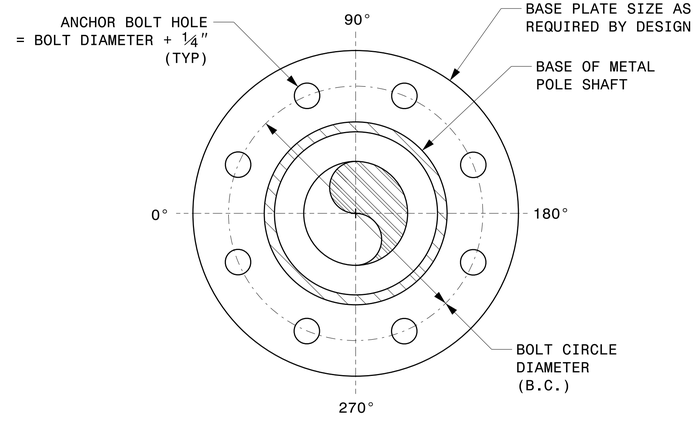
8 BOLT PATTERN

CONSTRUCT TEMPLATES AND PLATES FROM ¼″ (MIN) THICK STEEL. GALVANIZING IS NOT REQUIRED.

BASE PLATE TEMPLATE AND ANCHOR BOLT LOCK PLATE DETAILS



ANCHOR BOLT DETAIL



NOTE: BASE PLATE MAY BE CIRCULAR, OCTAGONAL, SQUARE OR RECTANGULAR IN SHAPE.

TYPICAL BASE PLATE DETAIL

PROJECT I.D. NO.	SHEET NO.
	Sig.M2

Fabrication Details – All Metal Poles

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

SCALE
0 NA
NONE

Typical Fabrication Details
For
All Metal Poles

PLAN DATE: SEPTEMBER 2023	DESIGNED BY: C.F.ANDREWS
PREPARED BY: K.C. DURIGON	REVIEWED BY: D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 036626
ENGINEER
KEVIN C. DURIGON

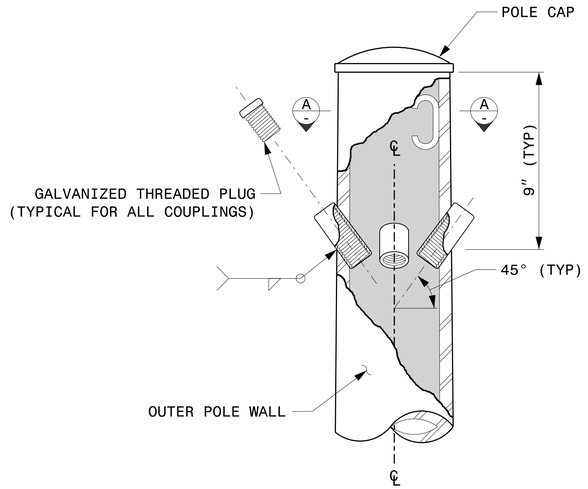
DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

PROJECT I.D. NO.	SHEET NO.
	Sig.M3

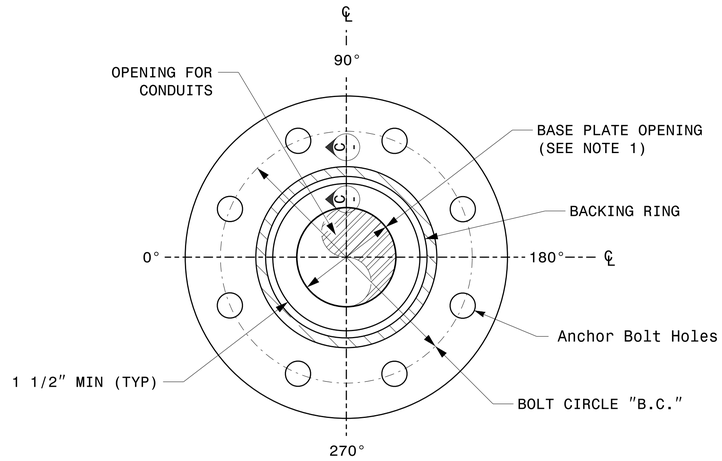
Fabrication Details – Strain Poles

NOTE:

1. OPENING IN POLE BASE PLATE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS 3½" BUT SHALL NOT BE LESS THAN 8½".

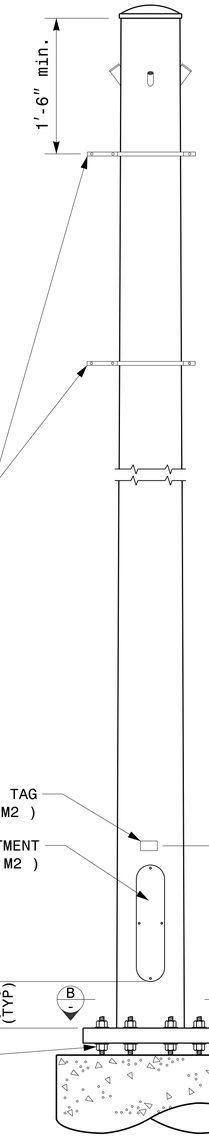


CABLE ENTRANCES AT TOP OF POLE

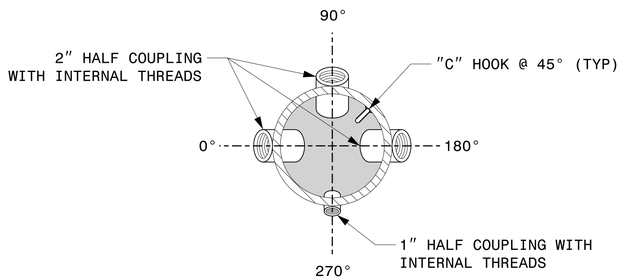


SECTION B-B

POLE BASE PLATE DETAILS
(8 AND 12 BOLT PATTERN)

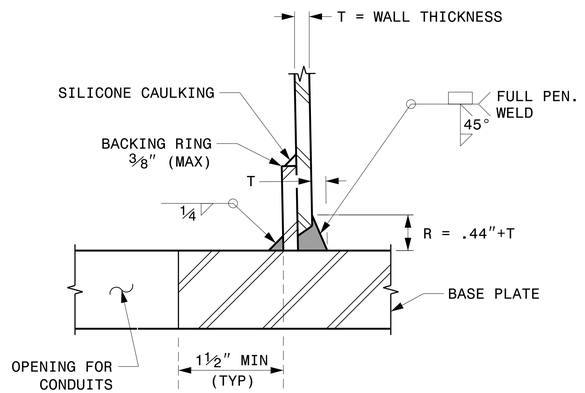


MONOTUBE STRAIN POLE



SECTION A-A

RADIAL ORIENTATION OF 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

SCALE
0 NA
NONE

Typical Fabrication Details
For
Strain Poles

PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	K.C. DURIGON
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
036626
ENGINEER
KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
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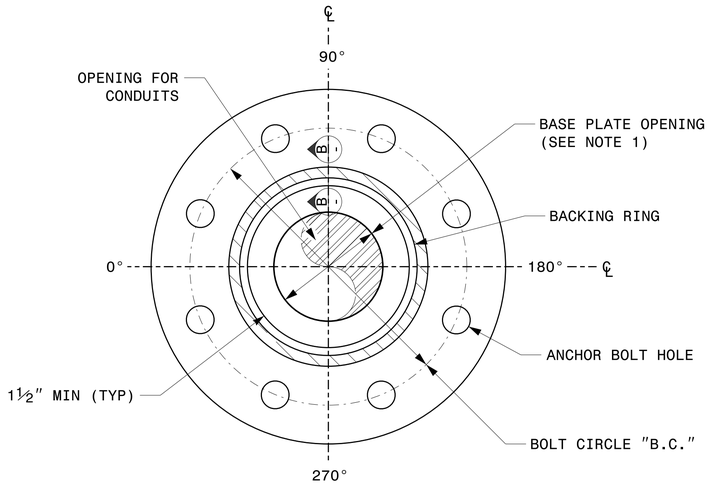
09/21/2023
DATE

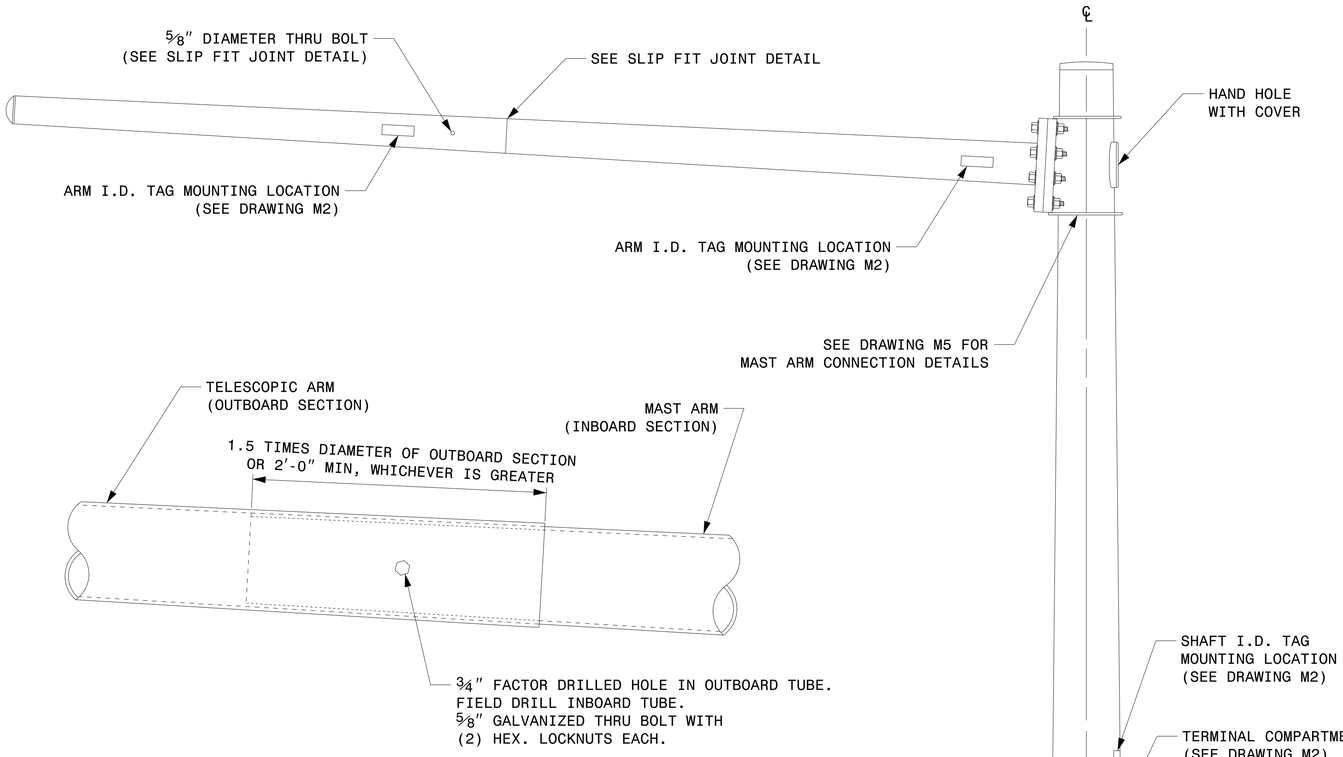
PROJECT I.D. NO.	SHEET NO.
	Sig.M4

NOTE:

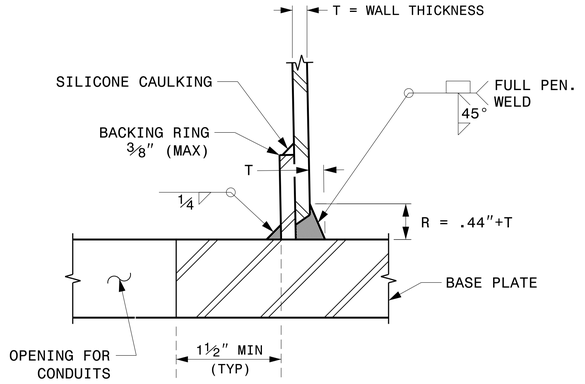
1. OPENING IN POLE BASE PLATE SHALL BE EQUAL TO POLE BASE INSIDE DIAMETER MINUS 3½" BUT SHALL NOT BE LESS THAN 8½".



SECTION A-A
POLE BASE PLATE DETAILS

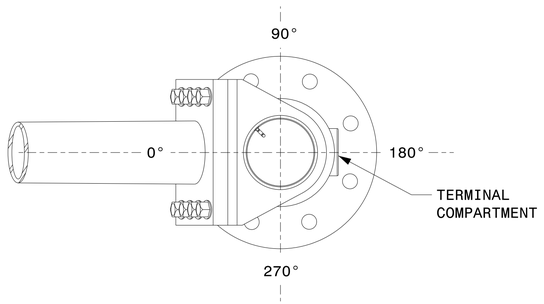


SLIP FIT JOINT DETAIL FOR MAST ARM



SECTION B-B
(POLE ATTACHMENT TO BASE PLATE)

FULL-PENETRATION GROOVE WELD DETAIL



MAST ARM RADIAL ORIENTATION

MAST ARM POLE

Fabrication Details – Mast Arm Poles

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

SCALE 0 NA NONE

Typical Fabrication Details For Mast Arm Poles

PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON
PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR

REVISIONS	INIT.	DATE

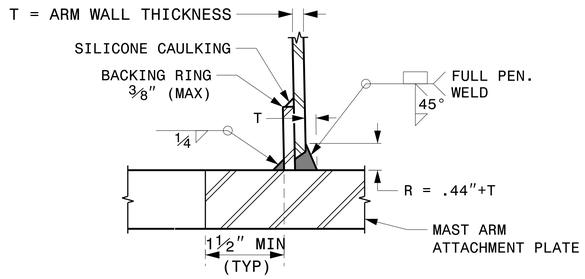
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

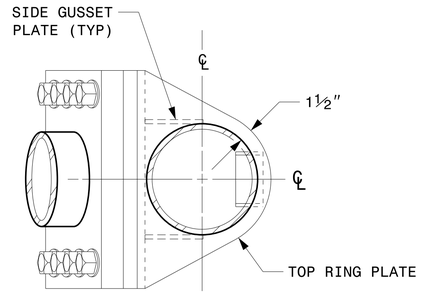
03-OCT-2023 12:25
S:*ITS\SIG\M*ITS\Signals\Signal Design Section\Structures\Drawings*2024 Metal Pole Std Drawings for LRFD*2024 Sig.M4 Std. Fabrication Details-Mast Arm Poles.dgn
kcdurigon

WELDED RING STIFFENED MAST ARM CONNECTION

PROJECT I.D. NO.	SHEET NO.
	Sig.M5



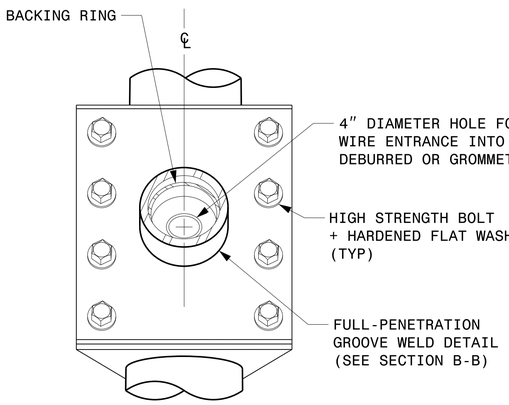
SECTION B-B
FULL-PENETRATION GROOVE WELD DETAIL



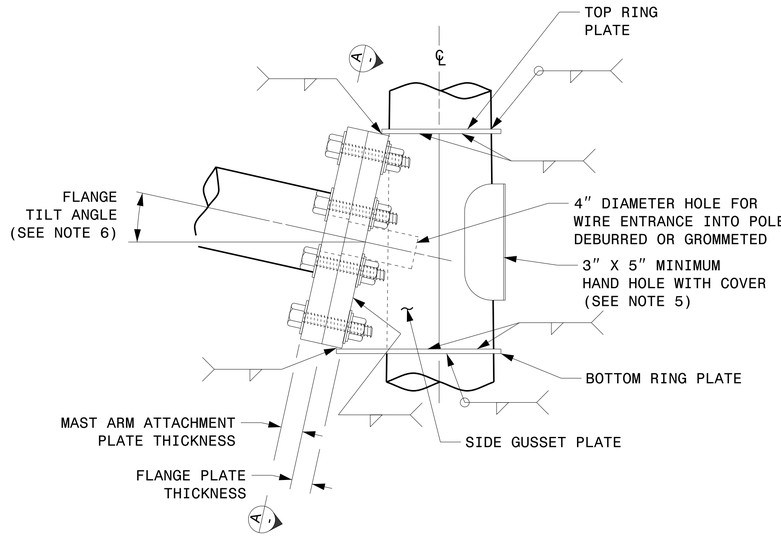
PLAN VIEW

NOTES:

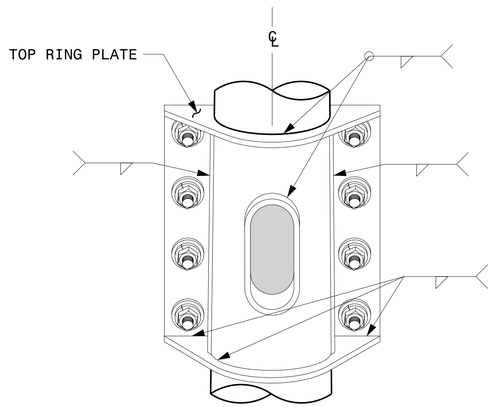
1. PROVIDE A PERMANENT MEANS OF IDENTIFICATION ABOVE THE MAST ARM TO INDICATE PROPER ATTACHMENT ORIENTATION OF THE MAST ARM.
2. DESIGNER WILL DETERMINE THE SIZE OF ALL STRUCTURAL COMPONENTS, PLATES, FASTENERS, AND WELDS SHOWN UNLESS THEY ARE ALREADY SPECIFIED.
3. FABRICATOR IS RESPONSIBLE FOR PROVIDING APPROPRIATE HOLES AT DRAINAGE POINTS TO DRAIN GALVANIZING MATERIALS.
4. FOR MINIMUM EDGE DISTANCE AND NOMINAL BOLT HOLE SIZE, FOLLOW THE LATEST AISC STEEL CONSTRUCTION MANUAL.
5. PROVIDE UPPER HANDHOLE AS NECESSARY WHEN SHAFT EXTENSIONS ARE REQUIRED FOR LUMINAIRE ARMS OR CAMERA. FOR POLES WITHOUT LUMINAIRES/CAMERA, WIRING CAN BE DONE THROUGH THE TOP OF POLE.
6. ALLOWABLE RANGE OF FLANGE TILT ANGLE WILL VARY FROM 0° TO AS REQUIRED.



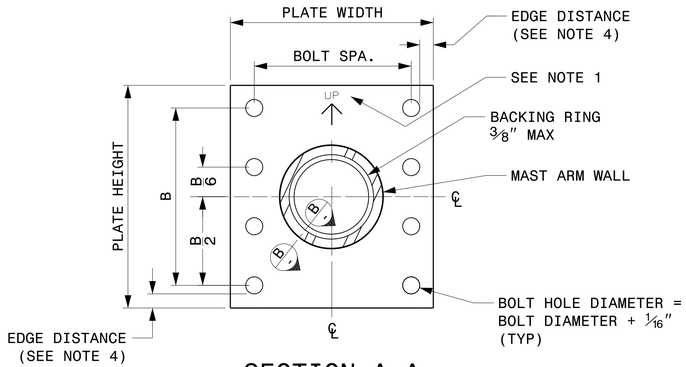
FRONT ELEVATION VIEW



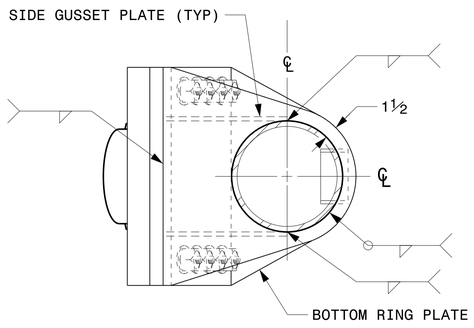
SIDE ELEVATION VIEW



BACK ELEVATION VIEW



SECTION A-A
MAST ARM ATTACHMENT PLATE



BOTTOM VIEW

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

SCALE
0 NA
NONE

Typical Fabrication Details
For
Mast Arm Connection To Pole

PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

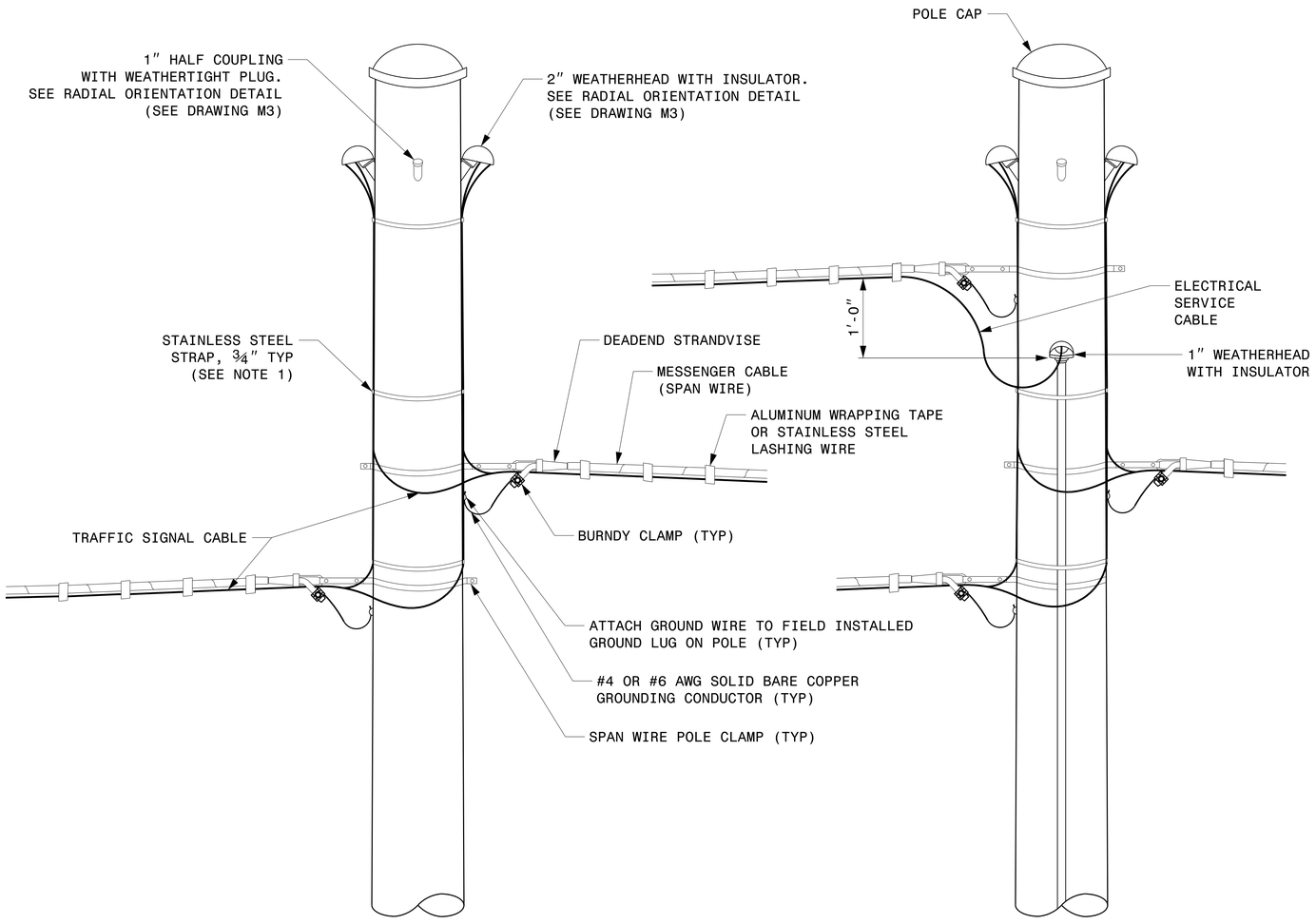
SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
036626
ENGINEER
KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
4B23DC79B3784DA...
09/21/2023
DATE

Fabrication Details – Mast Arm Connection

PROJECT I.D. NO.	SHEET NO.
	Sig.M6

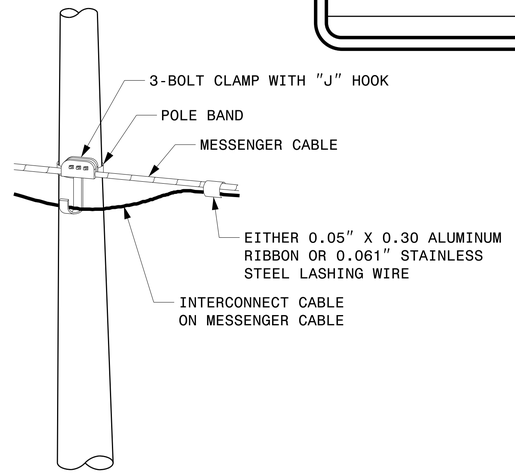
Fabrication Details – Strain Pole Attachments



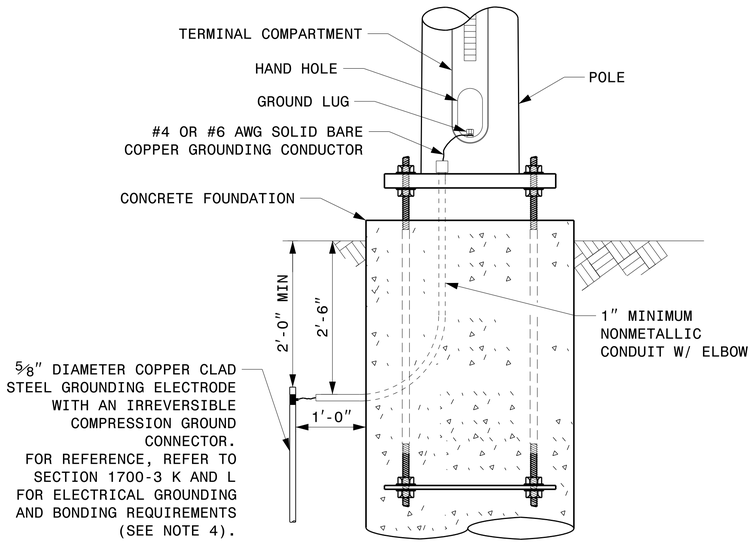
STRAIN POLE ATTACHMENTS

NOTES:

1. STRAP ALL SIGNAL CABLES TO THE SIDE OF THE POLE WITH ¾″ STAINLESS STEEL STRAPS WHEN THE DISTANCE BETWEEN SPAN WIRE ATTACHMENT CLAMP AND WEATHERHEADS EXCEEDS 3′-0″.
2. PROVIDE MINIMUM TWO SPAN WIRE 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 2024.



ATTACHMENT OF CABLE TO INTERMEDIATE METAL POLE



METAL POLE GROUNDING DETAIL FOR STRAIN POLE AND MAST ARM

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

SCALE
0 NA
NONE

Typical Fabrication Details
For
Strain Pole Attachments

PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by:
Kevin Durigon
SIGNATURE
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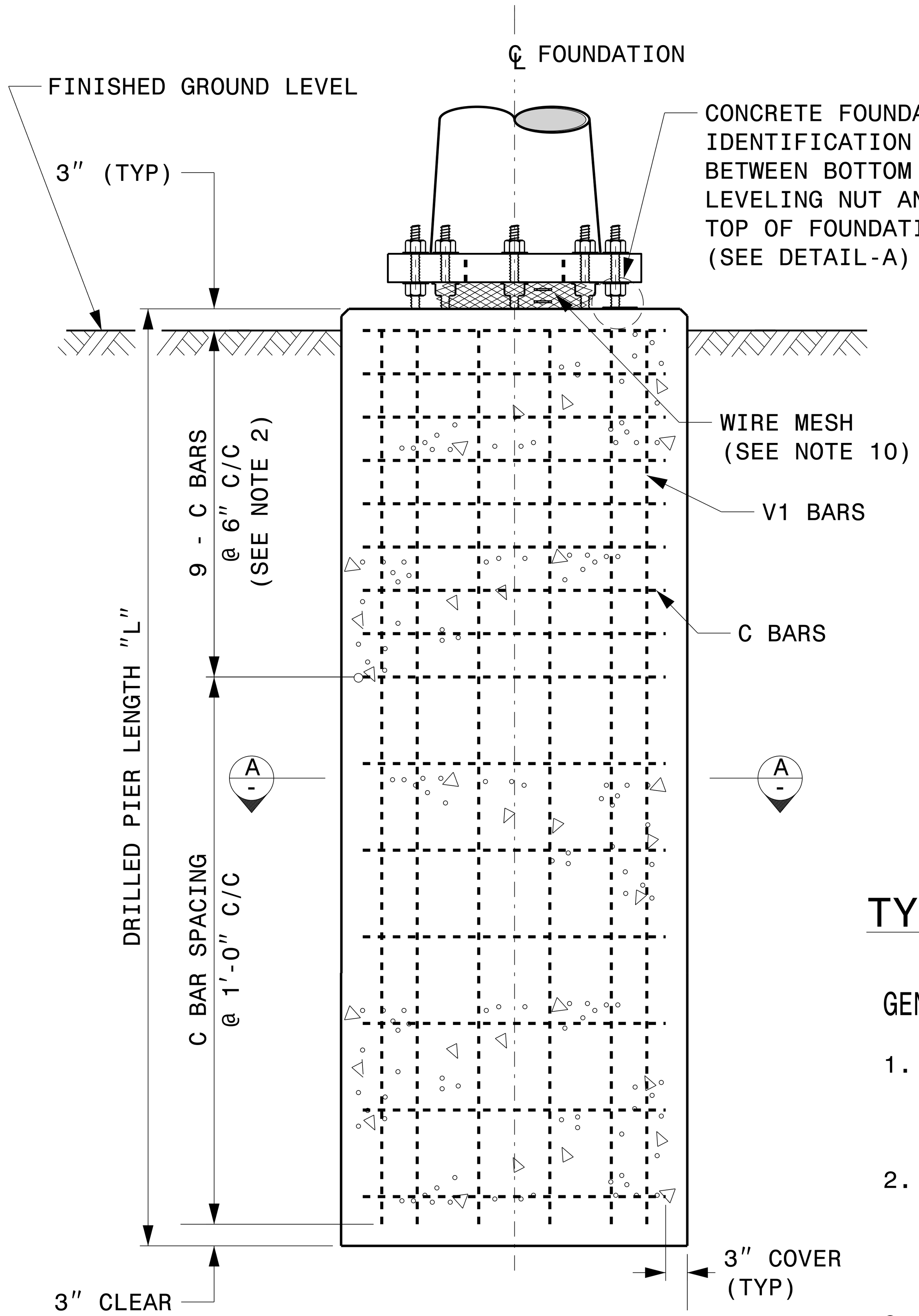
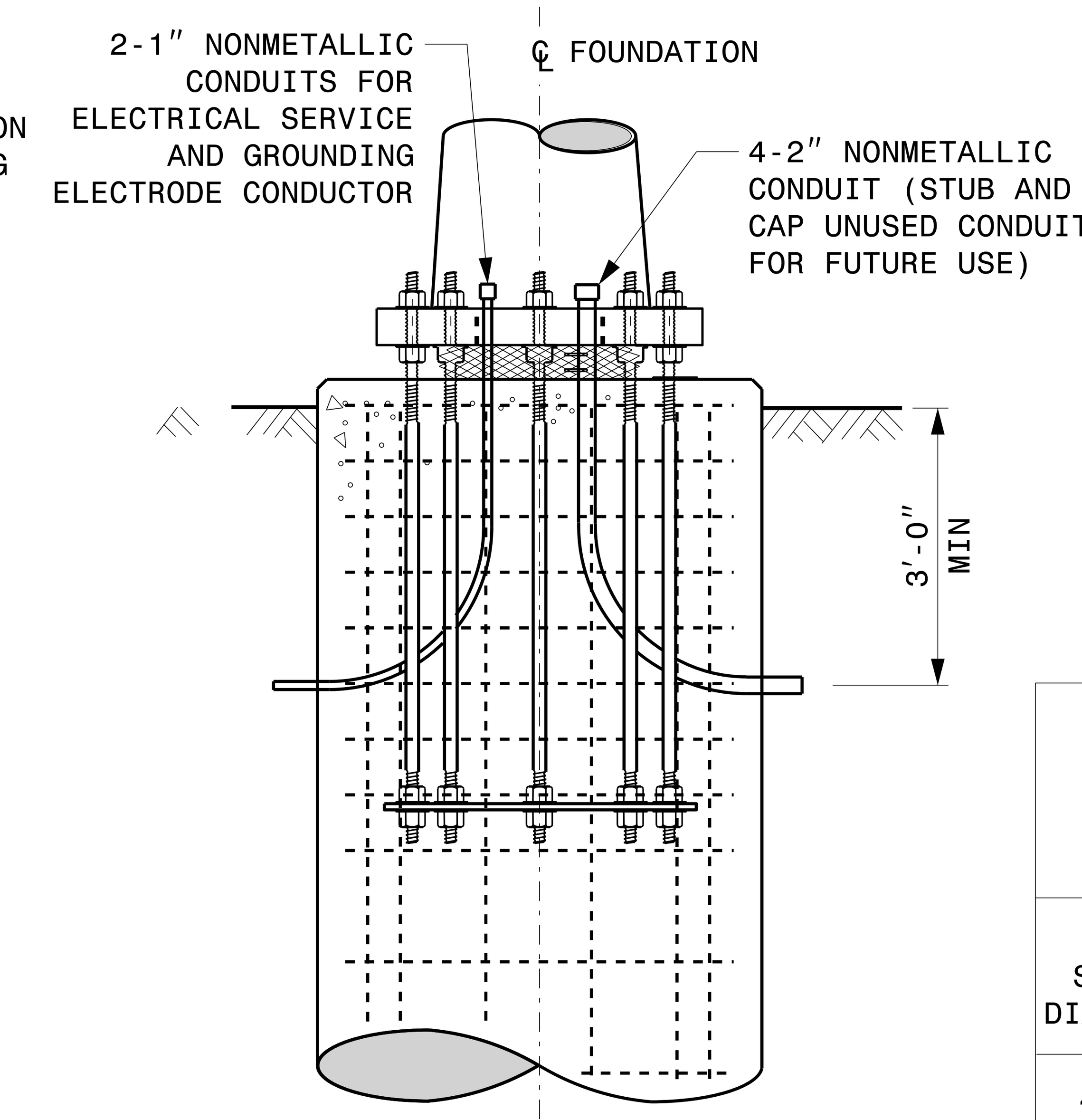
09/21/2023
DATE

PROJECT I.D. NO.	SHEET NO.
	Sig.M7

Construction Details – Foundations



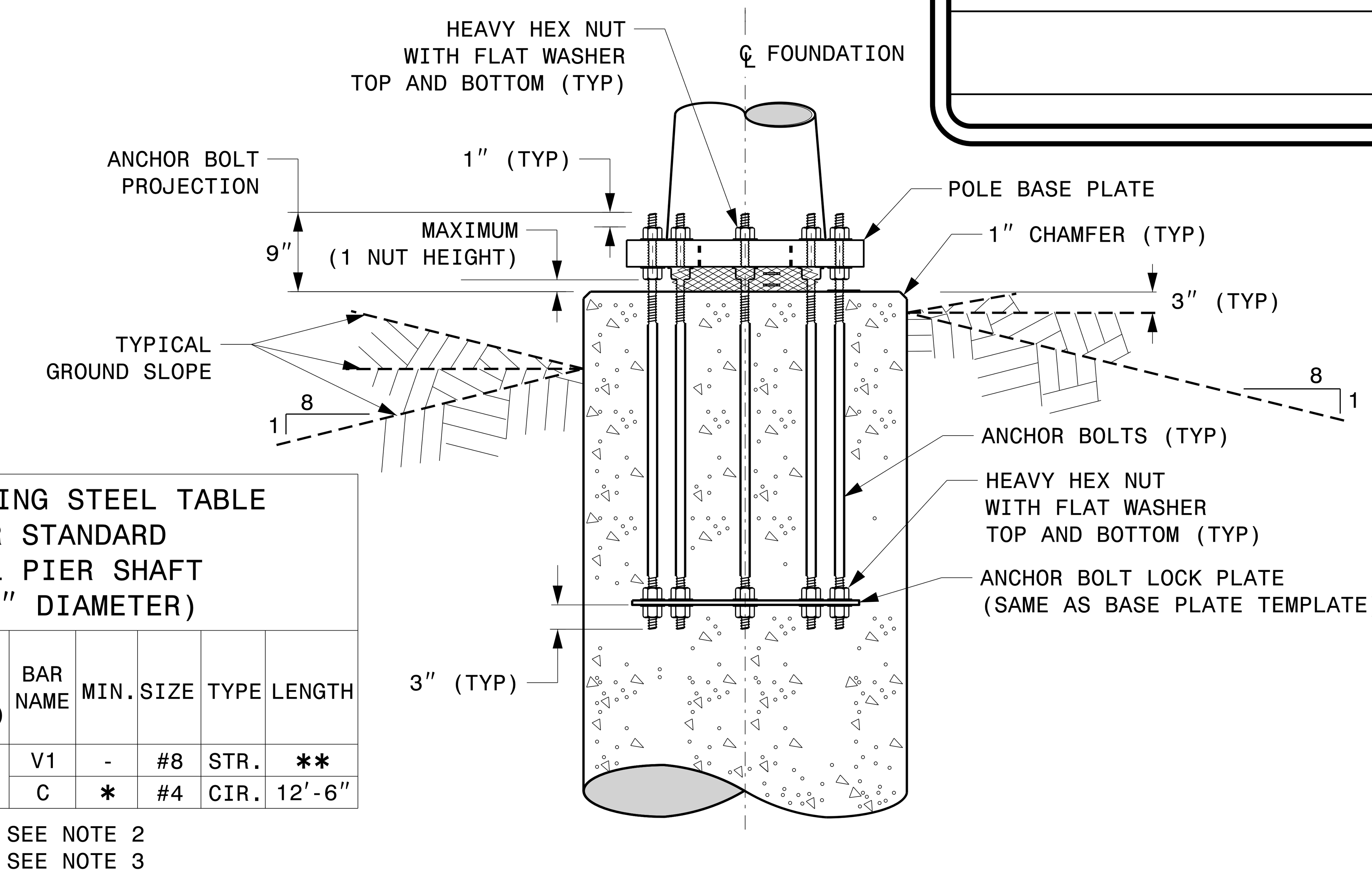
CONCRETE SHAFT ELEVATION



TYPICAL FOUNDATION CONDUIT DETAILS

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4′-0″ DIAMETER)						
"D" SHAFT DIAMETER	CONCRETE VOLUME (CU. YDS)	BAR NAME	MIN.	SIZE	TYPE	LENGTH
4′-0″	.465 X L	V1	-	#8	STR.	**
		C	*	#4	CIR.	12′-6″

* SEE NOTE 2
** SEE NOTE 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 2024 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

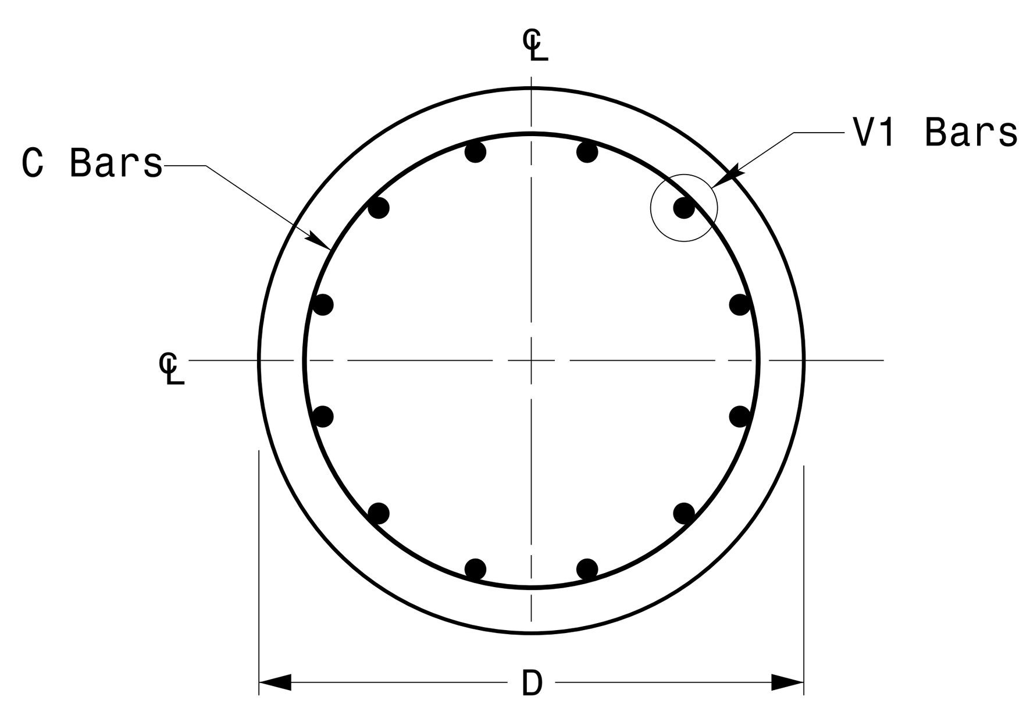
7. USE AIR ENTRAINED AA CONCRETE MIX WITH A COMPRESSION STRENGTH OF f′c=4500 psi (MIN) AFTER 28 DAYS.

8. USE ASTM A615 GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL. MAINTAIN AT LEAST 3″ COVER ON ALL REINFORCEMENT.

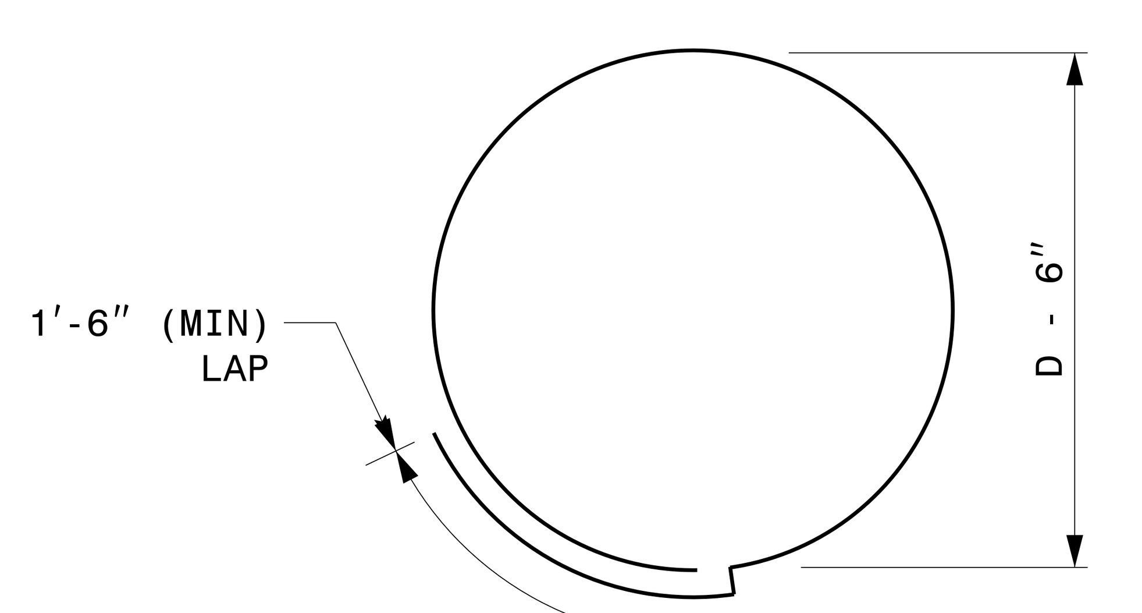
9. LOCATE IDENTIFICATION TAG ON TOP OF THE FOUNDATION, DIRECTLY ABOVE THE CONDUIT′S ENTRY POINT.

10. PROVIDE TWO LAYERS OF 4 MESH GALVANIZED WELDED 23 GAUGE (0.025) 6″ WIDE AROUND PIPES UNDER THE BASE PLATE AND SECURE IT WITH TIES IF NECESSARY.

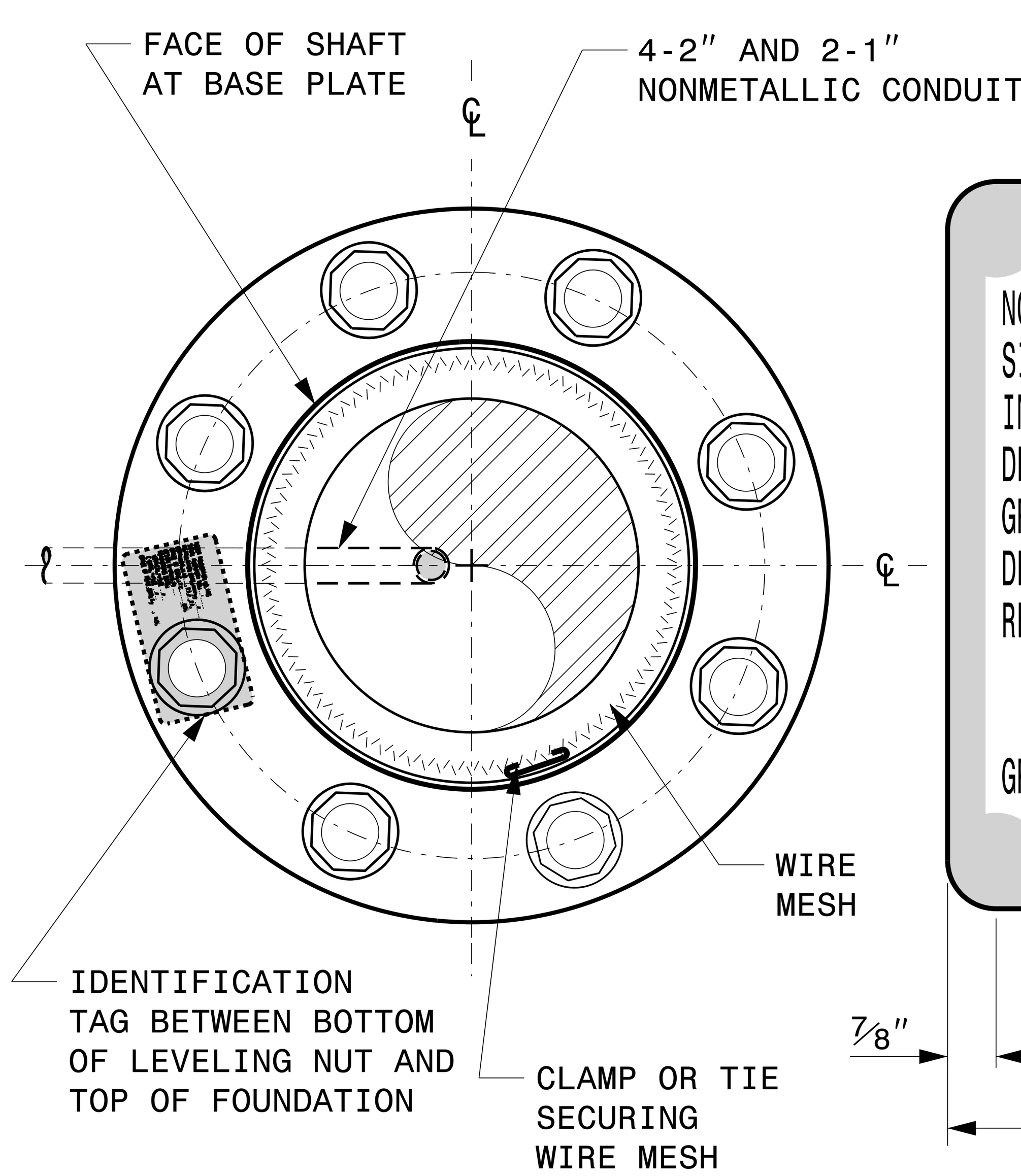
11. PREFERRED LOCATION FOR THE I.D. TAG IS AS SHOWN IN DETAIL-A: DIRECTLY ABOVE THE CONDUIT ENTERING THE FOUNDATION.



SECTION A-A

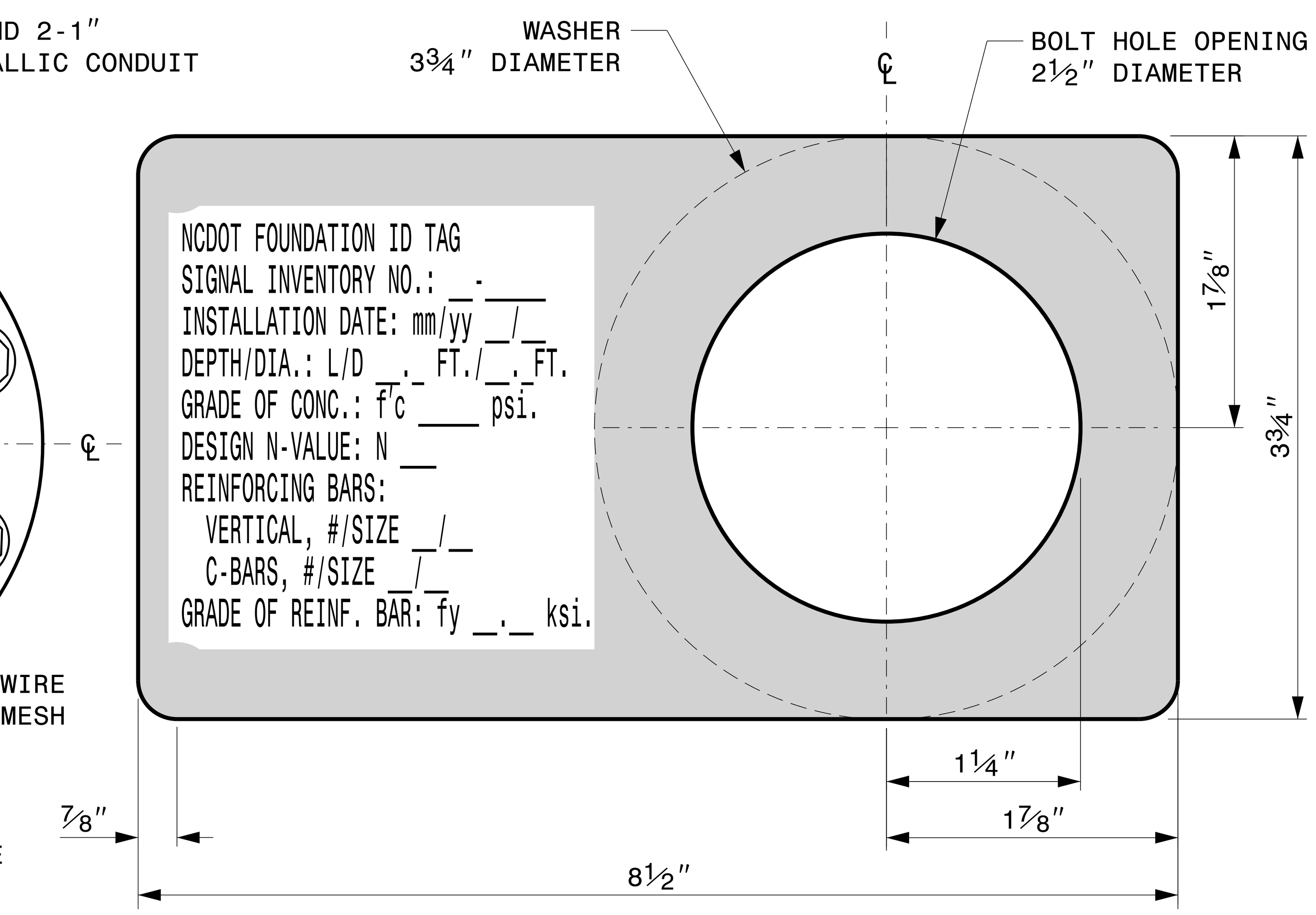


TYPICAL "C" BAR DETAIL



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

SCALE: 0 NA — NONE

Construction Details For Foundations

PLAN DATE:	SEPTEMBER 2023	DESIGNED BY:	K.C. DURIGON
PREPARED BY:	K.C. DURIGON	REVIEWED BY:	D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 036626 ENGINEER KEVIN C. DURIGON

DocuSigned by: Kevin Durigon
SIGNATURE
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09/21/2023
DATE

03-OCT-2023 12:45
S:*ITS&SU*ITS Signals*Signal Design Section*Structures*Drawings*2024 Metal Pole Std Drawings for LRFD*2024 Sig.M7 Std. Construction Details-Strain Poles.dgn
kcdurigon

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.)
S26L1	26	22	2	9	210	19.5	12.5	9	6.5	15.5	14.5	13	8	12	4	12
S26L2	26	23	2	10	240	19.5	12	9	6.5	15.5	14.5	13	8	12	4	12
S26L3	26	25	2	11	260	20.5	12	10	8	16	15	13	8	12	4	12
S30L1	30	22	2	9	230	19	11	9	7	15.5	14	12.5	8	12	4	12
S30L2	30	23	2	10	270	20	12	10	8	16	14.5	13	8	12	4	12
S30L3	30	25	2	11	290	21	12	10	8	17	15	13.5	8	12	4	12
S30H1	30	25	3	13	355	23	13	11	9	18	16.5	14.5	8	12	4	12
S30H2	30	29	3	15	405	25	14	11	9	19	17.5	15.5	8	14	4	12
S30H3	30	29	3	16	430	26	15	12	9	20	18	16	8	14	4	6
S35L1	35	22	3	8	260	19.5	12	10	8	15.5	14.5	13	8	12	4	12
S35L2	35	23	3	10	300	21	12	10	8	16.5	15	13.5	8	12	4	12
S35L3	35	25	3	10	320	21.5	13	10	8	17	15.5	14	8	12	4	12
S35H1	35	25	3	12	390	23.5	14	11	9	18	17	15	8	14	4	12
S35H2	35	29	4	14	460	26	15	12	9	20	18	16	8	14	4	6
S35H3	35	29	4	16	495	28.5	15	13.5	10	21.5	19	17	8	14	4	6

48″ DIAMETER FOUNDATION CONCRETE VOLUME (CUBIC YARDS) = (0.465) x DRILLED PIER LENGTH

GENERAL NOTES:

1. VALUES SHOWN IN THE ″REACTIONS AT THE POLE BASE″ COLUMN REPRESENT THE MINIMUM ACCEPTABLE CAPACITY ALLOWED FOR DESIGN USING A COMBINED FORCE RATIO (CFR) OF 1.00.
2. USE CHAIRS AND SPACERS TO MAINTAIN PROPER CLEARANCE.
3. FOR FOUNDATION, ALWAYS USE AIR-ENTRAINED 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 M1 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 MANUAL FOR DRILLED SHAFTS.

Standard Strain Pole Foundation – All Soil Conditions

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

SCALE 0 NA NONE

Standard Strain Pole Foundation for All Soil Conditions

PLAN DATE: SEPTEMBER 2023 DESIGNED BY: K.C. DURIGON
PREPARED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036626 KEVIN C. DURIGON

DocuSigned by: Kevin Durigon
4B23DC79B3784DA...
SIGNATURE 09/21/2023 DATE