TIP PROJECT: R–4463A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CRAVEN COUNTY

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-1.0

APPROVED: Brittany N Groome
DATE: 4/14/2025

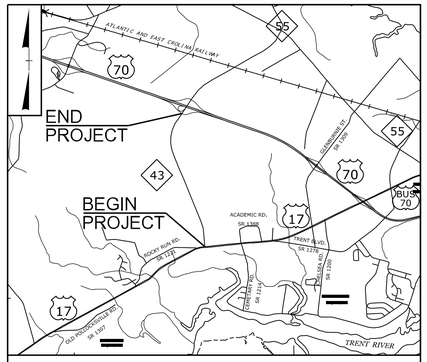
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

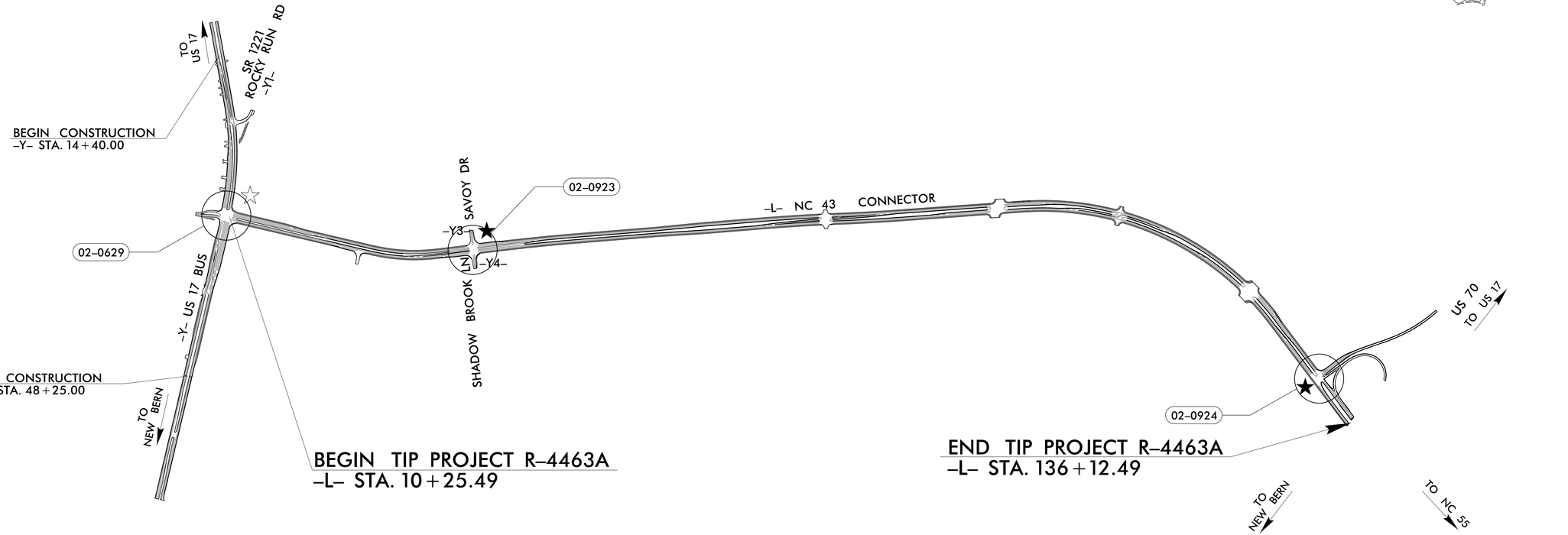
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOCATION: NC 43 CONNECTOR FROM US 70 TO US 17 BUSINESS
TYPE OF WORK: TRAFFIC SIGNAL AND COMMUNICATION DESIGN

NAD 83/NA 2011



VICINITY MAP



★ PROPOSED TRAFFIC SIGNAL

☆ EXISTING TRAFFIC SIGNAL

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

Plans Prepared By:

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8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. P–1524 (704) 549-4260

PLANS PREPARED BY:

Brittany N. Groome, P.E., PTOE, RSP1 – Project Engineer

Darren J. White – Design Engineer

Dana–Simone Griffith – Design Engineer

INDEX OF PLANS

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Sig. 1.0	–	Title Sheet
Sig. 2.0–2.3	02–0629T1	US 17 Bus. (Dr. M. L. King, Jr. Blvd.) at NC 43/Ben D. Quinn Elementary
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Sig. 4.0	02–0629T3	US 17 Bus. (Dr. M. L. King, Jr. Blvd.) at NC 43/Ben D. Quinn Elementary
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Sig. 6.0–6.6	02–0629	US 17 Bus. (Dr. M. L. King, Jr. Blvd.) at NC 43/Ben D. Quinn Elementary
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Sig. 8.0–8.4	02–0924	NC 43 at US 17 NB–US 70 EB Ramps
SCP 1–16	–	Signal Communication Plans

LEGEND

##–#### *SIGNAL INVENTORY NUMBER*

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

Zachary Little, P.E. – Eastern Region Signal Project Engineer

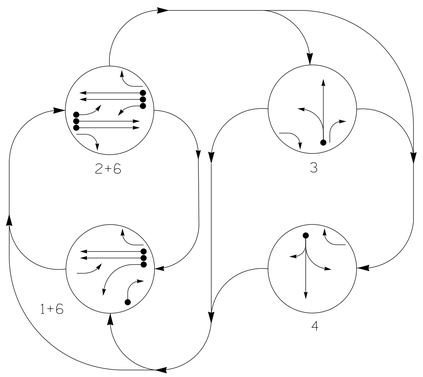
Gregg Green – Signal Communications Project Engineer

D. Todd Joyce, P.E. – Signal Equipment Design Review Engineer

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-2.0

4 Phase Fully Actuated US 17 Bus. (MLK Blvd) CLS D02-15_New Bern

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

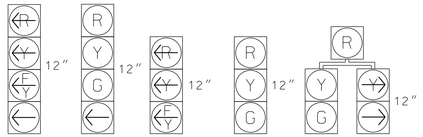
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 1+6	PHASE 2+6	PHASE 3	PHASE 4	FLASH
11	←	F Y	-R	-R	-R
21	F Y	F Y	-R	-R	-R
22	R	G	R	R	R
23	R	G	R/→	R	R
31	R	R	G/←	R	R
32	R/→	R	G	R	R
41	R	R	R	G/←	R
42	R	R	R	G	R
61	G	G	R	R	R
62	G	G	R	R/→	R

SIGNAL FACE I.D.

All Heads L.E.D.



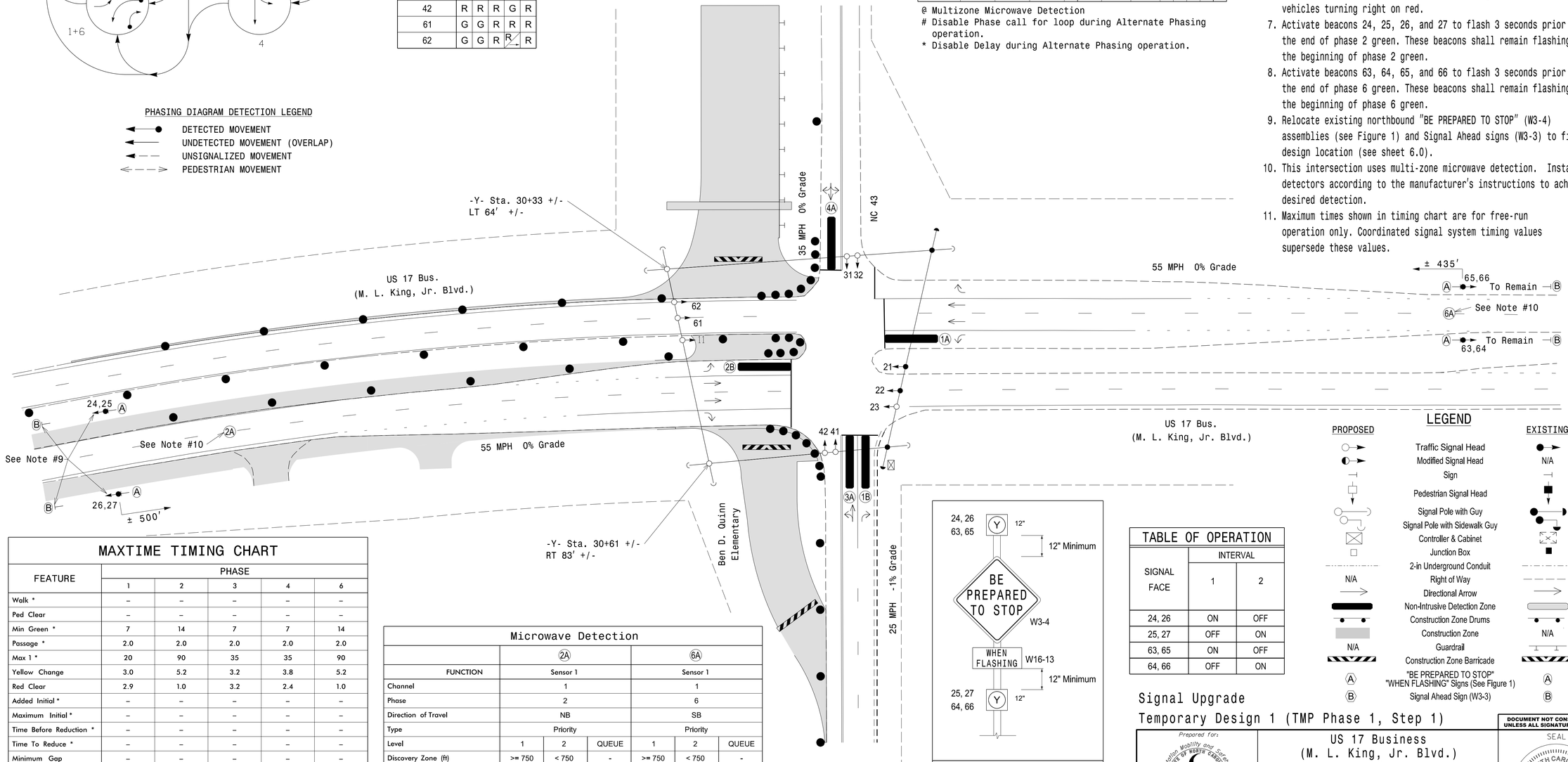
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
ZONE(S)	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	@	@	1	15.0*	-	X	-	X	-	@
					6#	-	-	X	-	X	-	@
1B	6X40	0	@	@	1	15.0	-	X	-	X	-	@
2B	6X40	0	@	@	2	-	-	X	-	X	-	@
3A	6X40	0	@	@	3	3.0	-	X	-	X	-	@
4A	6X40	0	@	@	4	5.0	-	X	-	X	-	@

@ Multizone Microwave Detection
# Disable Phase call for loop during Alternate Phasing operation.
* Disable Delay during Alternate Phasing operation.

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 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Activate beacons 24, 25, 26, and 27 to flash 3 seconds prior to the end of phase 2 green. These beacons shall remain flashing until the beginning of phase 2 green.
8. Activate beacons 63, 64, 65, and 66 to flash 3 seconds prior to the end of phase 6 green. These beacons shall remain flashing until the beginning of phase 6 green.
9. Relocate existing northbound "BE PREPARED TO STOP" (W3-4) assemblies (see Figure 1) and Signal Ahead signs (W3-3) to final design location (see sheet 6.0).
10. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve desired detection.
11. 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	■
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	———
→	Directional Arrow	→
▬	Non-Intrusive Detection Zone	▬
●●●	Construction Zone Drums	●●●
▒	Construction Zone	N/A
N/A	Guardrail	⊥⊥
▨	Construction Zone Barricade	▨
Ⓐ	"BE PREPARED TO STOP" "WHEN FLASHING" Signs (See Figure 1)	Ⓐ
Ⓑ	Signal Ahead Sign (W3-3)	Ⓑ

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	6
Walk *	–	–	–	–	–
Ped Clear	–	–	–	–	–
Min Green *	7	14	7	7	14
Passage *	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	35	35	90
Yellow Change	3.0	5.2	3.2	3.8	5.2
Red Clear	2.9	1.0	3.2	2.4	1.0
Added Initial *	–	–	–	–	–
Maximum Initial *	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–
Time To Reduce *	–	–	–	–	–
Minimum Gap	–	–	–	–	–
Advance Walk	–	–	–	–	–
Pre Clearance	–	3.0	–	–	3.0
Non Lock Detector	X	–	X	X	–
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL
Dual Entry	–	–	–	–	–

* 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.

Microwave Detection

	2A			6A		
FUNCTION	Sensor 1			Sensor 1		
Channel	1			1		
Phase	2			6		
Direction of Travel	NB			SB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	>= 750	< 750	-	>= 750	< 750	-
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed	Y	Y	Y	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-	2.5-10.0	2.5-6.5	-

FIGURE 1

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
24, 26	ON	OFF
25, 27	OFF	ON
63, 65	ON	OFF
64, 66	OFF	ON

Signal Upgrade
Temporary Design 1 (TMP Phase 1, Step 1)

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Prepared for:
Transportation Mobility and Safety Division
State of North Carolina
Department of Transportation
Traffic Engineering Branch
Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary

Division 2 Craven County New Bern

PLAN DATE:	April 2025	REVIEWED BY:	BN Groome
PREPARED BY:	DS Griffith	DRMP PROJ. NO.:	17359 (040)

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

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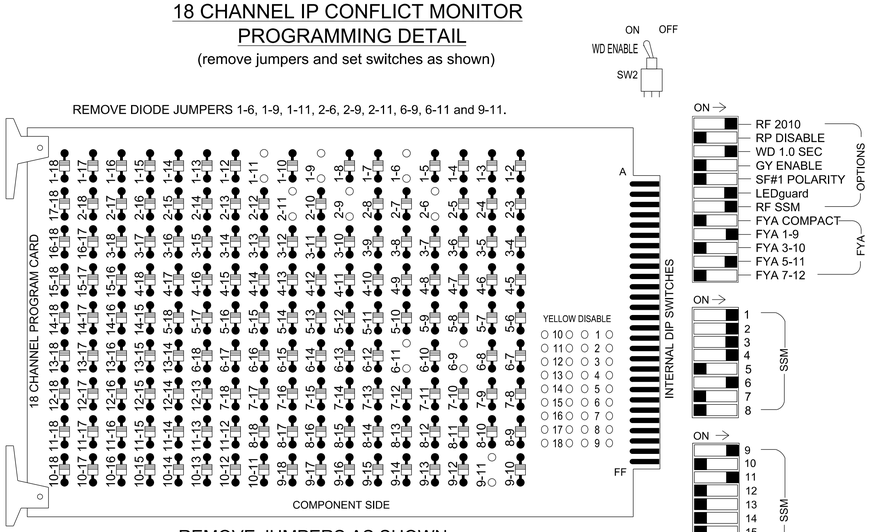
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by: Brittany N Groome 4/24/2025
DOCUSIGNED BY:
DATE

SIG. INVENTORY NO. 02-0629T1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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. Integrate monitor with Ethernet network in the cabinet.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L														ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L														

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

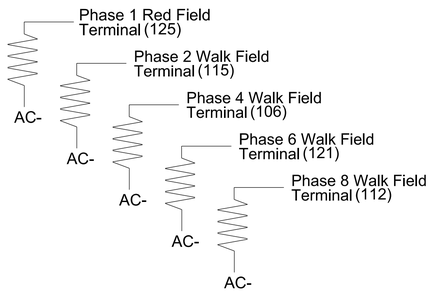
FS = FLASH SENSE
ST = STOP TIME

Note: ALL INPUT SLOTS TO REMAIN EMPTY.

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)



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. Program phase 2 and phase 6 for Advance Warning.
4. Program phase 2 and phase 6 for 3.0 seconds of Pre Clearance.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the US 17 Bus. (MLK Blvd) D02-15_New Bern System.

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, S3**, S4, S5, S6**, S8, S9**, S12**, AUX S1, AUX S4
Phases Used.....1, 2, 3, 4, 6
Overlap "1".....*
Overlap "2".....NOT USED
Overlap "3".....*
Overlap "4".....NOT USED

*See overlap programming detail on sheet 2
** Used for Advance Beacon Control only

SPECIAL DETECTOR NOTE

Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-2.1

SIGNAL HEAD HOOK-UP CHART

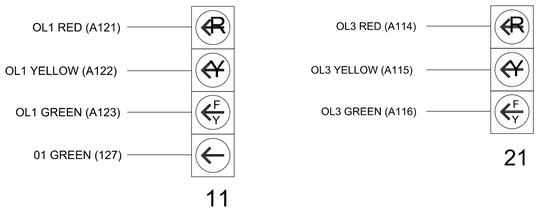
LOAD SWITCH NO.	S1	S2	S3		S4			S5			S6		S7	S8	S9		S10	S11	S12		AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13		3			4			14		5	6	15		7	8	16		9	10	17	11	12	18
PHASE	1	2	2 PED	ADVANCE BEACON	3			4			4 PED	ADVANCE BEACON	5	6	6 PED	ADVANCE BEACON	7	8	8 PED	ADVANCE BEACON	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	32	22,23	NU	24,26	23	31	32	41	42	62	NU	63,65	NU	61,62	NU	25,27	NU	NU	NU	64,66	11★	NU	NU	21★	NU	NU
RED		★	128				116	116	101	101					134											
YELLOW			129				117	117	102	102					135											
GREEN			130				118	118	103	103					136											
RED ARROW																					A121			A114		
YELLOW ARROW		126				117					102										A122			A115		
FLASHING YELLOW ARROW																					A123			A116		
GREEN ARROW	127	127				118	118		103		103															
✋				** 114								** 105				** 120				** 111						
🚶			*								*				*				*							

NU = Not Used

★ Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail this sheet.
** Advance Beacons will be wired to S2P-Y, S4P-Y, S6P-Y and S8P-Y. See wiring and programming detail on sheet 3.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0629T1-T4
DESIGNED: Apr 2025
SEALED: 4/24/2025
REVISED: N/A

Electrical Detail - Temporary Design 1-4 (TMP Phase 1, Step 1-4)
Sheet 1 of 3

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Plans Prepared By:
DRMP
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
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NC License No. F-1524 (704) 549-4260

Electrical and Programming Details For:

Prepared for the Offices of:
Transportation Mobility and Safety Division
State of North Carolina
Department of Transportation
Traffic Engineering & Safety Systems Branch
Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary

Division 2 Craven County New Bern

PLAN DATE:	April 2025	REVIEWED BY:	BN Groome
PREPARED BY:	DJ White	DRMP PROJ. NO.:	17359 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by: Brittany N Groome 4/24/2025
1E0934DE1094464... DATE

SIG. INVENTORY NO. 02-0629T1

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-2.2

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2		X		2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6		X	X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1		X	X	9
10	Overlap	2		X	X	10
11	Overlap	3		X		11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18
19	Adv. Warning Flasher	2				19
20	Adv. Warning Flasher	6				20

NOTICE ADV. WARNING FLASHER ASSIGNED TO CHANNEL 19

NOTICE ADV. WARNING FLASHER ASSIGNED TO CHANNEL 20

MAXTIME OUTPUT ASSIGNMENT PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >More >Advanced IO> Output Points

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >Output Points

IO Module 1

Output Point	Description	Input Control Type	Index
33	C1-35	Channel Green Walk Drive	19
34	C1-36	Channel Red Do Not Walk Drive	19
35	C1-37	Channel Green Walk Drive	20
36	C1-38	Channel Red Do Not Walk Drive	20

OUTPUT REFERENCE SCHEDULE

OUTPUT 33 = 2 PED Y
OUTPUT 34 = 6 PED Y
OUTPUT 35 = 4 PED Y
OUTPUT 36 = 8 PED Y

MAXTIME PHASE OPTIONS PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Phase >Phase Options
Select Plan 1

Web Interface
Home >Controller> Phase Configuration >Phase Option Plans
Select Phase Option Plan 1

Phase Option Plan 1

Phase	1	2	3	4	5	6	7	8
Enabled	X	X	X	X	-	X	-	-
Advanced Warning	-	X	-	-	-	X	-	-

NOTICE 'ADVANCED WARNING' ACTIVATED FOR PHASE 2 AND PHASE 6

OVERLAP PROGRAMMING

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	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu>Controller>Unit

Web Interface
Home>Controller>Unit

Start Up Parameters

Startup Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 02-0629T1-T4
DESIGNED: Apr 2025
SEALED: 4/24/2025
REVISED: N/A

Electrical Detail - Temporary Design 1-4 (TMP Phase 1, Step 1-4)
Sheet 2 of 3

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PREPARED BY:	DJ White	DRMP PROJ. NO.:	17359 (040)

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

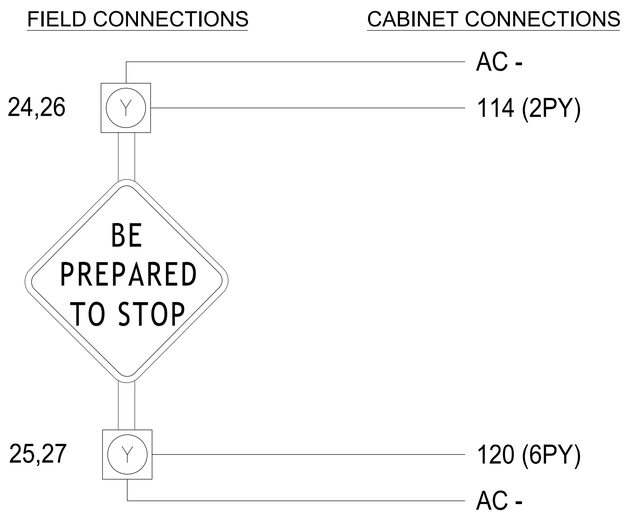
Signed by: Brittany N Groome 4/24/2025
1E09340E1094484... DATE

SIG. INVENTORY NO. 02-0629T1-T4

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-2.3

ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)

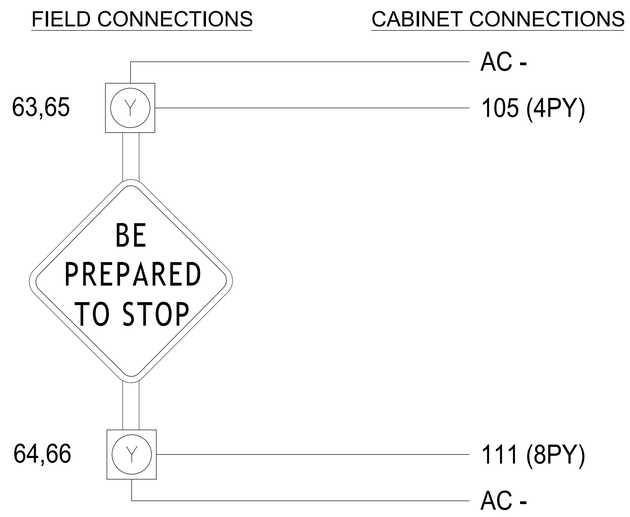


IMPORTANT

1. IF CONNECTED, REMOVE, TAPE AND LABEL CONFLICT MONITOR WIRE ATTACHED TO THE REAR OF TERMINAL 114 (2PY) AND TERMINAL 120 (6PY).
2. INSERT LOADSWITCHES IN THE OUTPUT FILE SLOTS S3 AND S9.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. PROGRAM THE CONTROLLER OUTPUT CHANNEL AND OUTPUT POINT CONFIGURATION AS SHOWN ON SHEET 2.
5. TO ACTIVATE ADVANCE BEACON OPERATION 3 SECONDS PRIOR TO THE END OF PHASE 2 GREEN, NAVIGATE TO THE PHASE TIMING PLANS TO PROGRAM A PRE CLEARANCE OF 3.0 SECONDS FOR PHASE 2.

ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)



IMPORTANT

1. IF CONNECTED, REMOVE, TAPE AND LABEL CONFLICT MONITOR WIRE ATTACHED TO THE REAR OF TERMINAL 105 (4PY) AND TERMINAL 111 (8PY).
2. INSERT LOADSWITCHES IN THE OUTPUT FILE SLOTS S6 AND S12.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. PROGRAM THE CONTROLLER OUTPUT CHANNEL AND OUTPUT POINT CONFIGURATION AS SHOWN ON SHEET 2.
5. TO ACTIVATE ADVANCE BEACON OPERATION 3 SECONDS PRIOR TO THE END OF PHASE 6 GREEN, NAVIGATE TO THE PHASE TIMING PLANS TO PROGRAM A PRE CLEARANCE OF 3.0 SECONDS FOR PHASE 6.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 02-0629T1-T4
DESIGNED: Apr 2025
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Electrical Detail - Temporary Design 1-4 (TMP Phase 1, Step 1-4)
Sheet 3 of 3

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8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

Electrical and Programming Details For:

Prepared for the Offices of:

Transportation Mobility and Safety Division
State of North Carolina
Department of Transportation
Traffic Engineering & Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary

Division 2 Craven County New Bern

PLAN DATE:	April 2025	REVIEWED BY:	BN Groome
PREPARED BY:	DJ White	DRMP PROJ. NO.:	17359 (040)

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

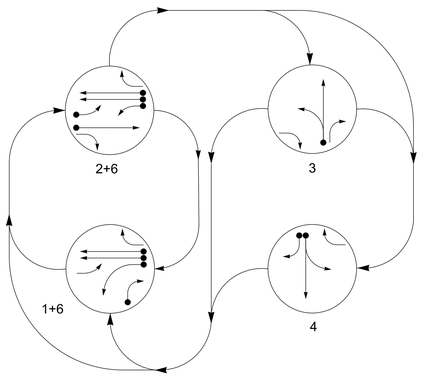
Signed by:
Brittany N Groome 4/24/2025
1E09340E1094484... DATE

SIG. INVENTORY NO. 02-0629T1-T4

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-3.0

4 Phase
Fully Actuated
US 17 Bus. (MLK Blvd) CLS
D02-15_New Bern

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

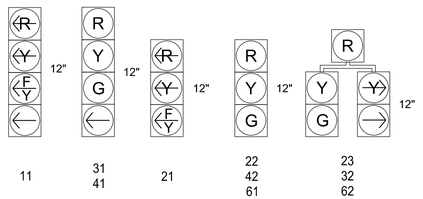
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 1+6	PHASE 2+6	PHASE 3	PHASE 4	FLASH
11	←	FY	-R	-R	-R
21	FY	FY	-R	-R	-R
22	R	G	R	R	R
23	R	G	R←	R	R
31	R	R	G←	R	R
32	R←	R	G	R	R
41	R	R	R	G←	R
42	R	R	R	G	R
61	G	G	R	R	R
62	G	G	R	R←	R

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
ZONE(S)	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	@	@	1	15.0*	-	X	-	X	-	@
					6#	-	-	X	-	X	-	@
1B	6X40	0	@	@	1	15.0	-	X	-	X	-	@
2B	6X40	0	@	@	2	-	-	X	-	X	-	@
3A	6X40	0	@	@	3	3.0	-	X	-	X	-	@
4A	6X40	0	@	@	4	3.0	-	X	-	X	-	@
4B	6X40	0	@	@	4	15.0	-	X	-	X	-	@

@ Multizone Microwave Detection
# Disable Phase call for loop during Alternate Phasing operation.
* Disable Delay during Alternate Phasing operation.

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 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Reposition existing signal heads 31, 32, 41, and 42.
7. Activate beacons 24, 25, 26, and 27 to flash 3 seconds prior to the end of phase 2 green. These beacons shall remain flashing until the beginning of phase 2 green.
8. Activate beacons 63, 64, 65, and 66 to flash 3 seconds prior to the end of phase 6 green. These beacons shall remain flashing until the beginning of phase 6 green.
9. Relocate existing southbound (right side of roadway) "BE PREPARED TO STOP" (W3-4) assembly (see Figure 1) and Signal Ahead sign (W3-3) to final design location (see sheet 6.0).
10. This intersection uses multi-zone microwave detection. Monitor and maintain detectors according to the manufacturer's instructions to achieve desired detection.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

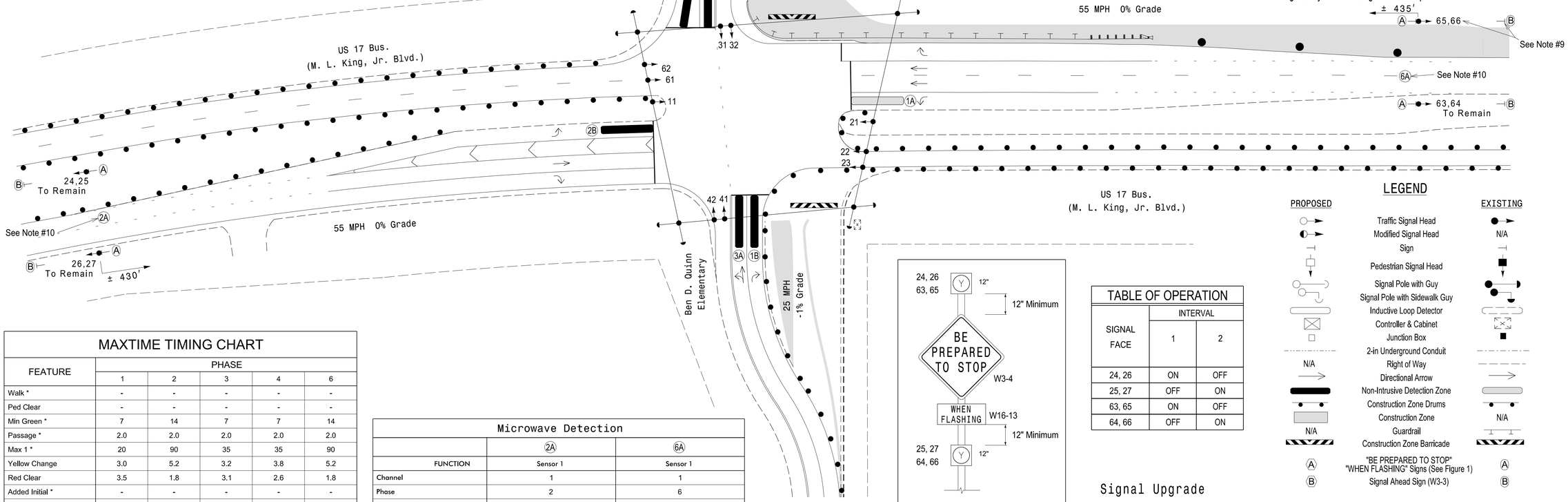


FIGURE 1

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
24, 26	ON	OFF
25, 27	OFF	ON
63, 65	ON	OFF
64, 66	OFF	ON

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	N/A
	Directional Arrow	
	Non-Intrusive Detection Zone	
	Construction Zone Drums	
	Construction Zone	N/A
N/A	Guardrail	
	Construction Zone Barricade	
A	"BE PREPARED TO STOP" "WHEN FLASHING" Signs (See Figure 1)	A
B	Signal Ahead Sign (W3-3)	B

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	6
Walk *	-	-	-	-	-
Ped Clear	-	-	-	-	-
Min Green *	7	14	7	7	14
Passage *	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	35	35	90
Yellow Change	3.0	5.2	3.2	3.8	5.2
Red Clear	3.5	1.8	3.1	2.6	1.8
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Advance Walk	-	-	-	-	-
Pre Clearance	–	3.0	–	–	3.0
Non Lock Detector	X	-	X	X	-
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-	-

* 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.

Microwave Detection

	2A			6A		
FUNCTION	Sensor 1			Sensor 1		
Channel	1			1		
Phase	2			6		
Direction of Travel	NB			SB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	>= 750	< 750	-	>= 750	< 750	-
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed	Y	Y	Y	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-	2.5-10.0	2.5-6.5	-

Signal Upgrade
Temporary Design 2 (TMP Phase 1, Step 2)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for: Transportation Mobility and Safety Division, North Carolina Department of Transportation, Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

Plans Prepared By:
DRMP
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary

Division 2 Craven County New Bern

PLAN DATE: April 2025 REVIEWED BY: BN Groome
PREPARED BY: DS Griffith DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

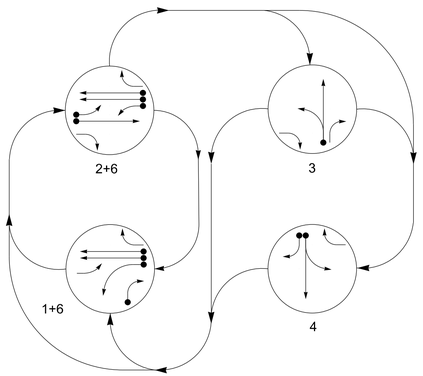
Signed by: Brittany N Groome 4/24/2025
DIGITALLY SIGNED BY BRITTANY N GROOME DATE

SIG. INVENTORY NO. 02-0629T2

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-4.0

4 Phase Fully Actuated US 17 Bus. (MLK Blvd) CLS D02-15_New Bern

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

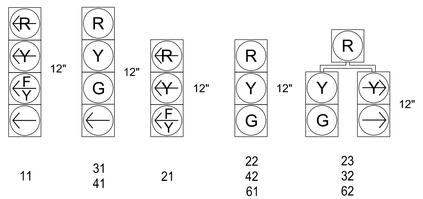
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 1+6	PHASE 2+6	PHASE 3	PHASE 4	FLASH
11	←	F Y	R	R	R
21	F Y	F Y	R	R	R
22	R	G	R	R	R
23	R	G	R →	R	R
31	R	R	G ←	R	R
32	R ↘	R	G	R	R
41	R	R	R	G ←	R
42	R	R	R	G	R
61	G	G	R	R	R
62	G	G	R	R ↘	R

SIGNAL FACE I.D.

All Heads L.E.D.



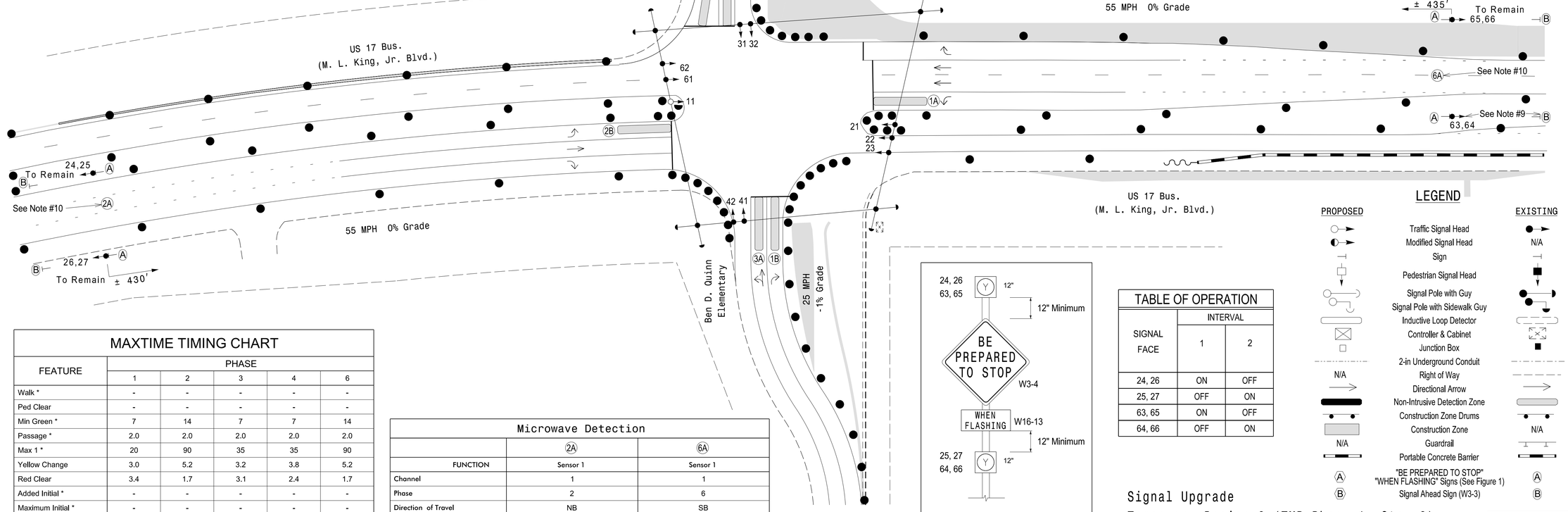
MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
ZONE(S)	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	@	@	1	15.0*	-	X	-	X	-	@
					6#	-	-	X	-	X	-	@
1B	6X40	0	@	@	1	15.0	-	X	-	X	-	@
2B	6X40	0	@	@	2	-	-	X	-	X	-	@
3A	6X40	0	@	@	3	3.0	-	X	-	X	-	@
4A	6X40	0	@	@	4	3.0	-	X	-	X	-	@
4B	6X40	0	@	@	4	15.0	-	X	-	X	-	@

@ Multizone Microwave Detection
# Disable Phase call for loop during Alternate Phasing operation.
* Disable Delay during Alternate Phasing operation.

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 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Reposition existing signal heads 21, 22, and 23.
7. Activate beacons 24, 25, 26, and 27 to flash 3 seconds prior to the end of phase 2 green. These beacons shall remain flashing until the beginning of phase 2 green.
8. Activate beacons 63, 64, 65, and 66 to flash 3 seconds prior to the end of phase 6 green. These beacons shall remain flashing until the beginning of phase 6 green.
9. Relocate existing southbound (left side of roadway) "BE PREPARED TO STOP" (W3-4) assembly (see Figure 1) and Signal Ahead sign (W3-3) to final design location (see sheet 6.0).
10. This intersection uses multi-zone microwave detection. Monitor and maintain detectors according to the manufacturer's instructions to achieve desired detection.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



MAXTIME TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 6
Walk *	-	-	-	-	-
Ped Clear	-	-	-	-	-
Min Green *	7	14	7	7	14
Passage *	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	35	35	90
Yellow Change	3.0	5.2	3.2	3.8	5.2
Red Clear	3.4	1.7	3.1	2.4	1.7
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Advance Walk	-	-	-	-	-
Pre Clearance	–	3.0	–	–	3.0
Non Lock Detector	X	-	X	X	-
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-	-

* 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.

Microwave Detection

	2A			6A		
FUNCTION	Sensor 1			Sensor 1		
Channel	1			1		
Phase	2			6		
Direction of Travel	NB			SB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	>= 750	< 750	-	>= 750	< 750	-
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed	Y	Y	Y	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-	2.5-10.0	2.5-6.5	-

FIGURE 1

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
24, 26	ON	OFF
25, 27	OFF	ON
63, 65	ON	OFF
64, 66	OFF	ON

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Non-Intrusive Detection Zone	
	Construction Zone Drums	
	Construction Zone	N/A
N/A	Guardrail	
	Portable Concrete Barrier	
A	"BE PREPARED TO STOP" "WHEN FLASHING" Signs (See Figure 1)	A
B	Signal Ahead Sign (W3-3)	B

Signal Upgrade
Temporary Design 3 (TMP Phase 1, Step 3)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Plans Prepared By:

DRMP

DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. P-1524 (704) 549-4260

Prepared for:

Transportation Mobility and Safety
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Design Section
1750 N.Greenfield Pkwy,Garner,NC 27529

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary

Division 2 Craven County New Bern

PLAN DATE: April 2025 REVIEWED BY: BN Groome
PREPARED BY: DS Griffith DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

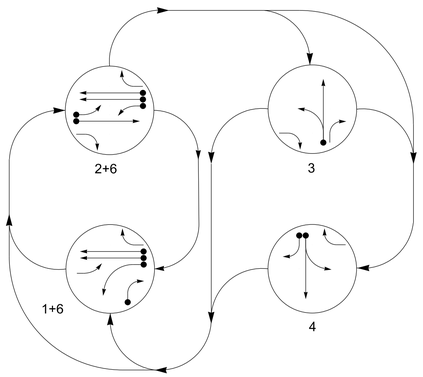
Signed by: Brittany N Groome 4/24/2025
DOCUSIGNED BY:
DATE

SIG. INVENTORY NO. 02-0629T3

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-5.0

4 Phase
Fully Actuated
US 17 Bus. (MLK Blvd) CLS
D02-15_New Bern

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

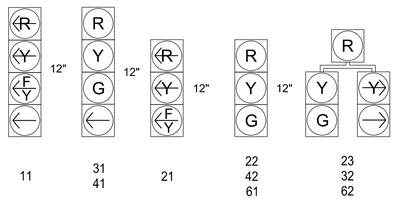
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 1+6	PHASE 2+6	PHASE 3	PHASE 4	FLASH
11	←	FY	-R	-R	-R
21	FY	FY	-R	-R	-R
22	R	G	R	R	R
23	R	G	R/←	R	R
31	R	R	G/←	R	R
32	R/←	R	G	R	R
41	R	R	R	G/←	R
42	R	R	R	G	R
61	G	G	R	R	R
62	G	G	R	R/←	R

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
ZONE(S)	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	@	@	1	15.0*	-	X	-	X	-	@
					6#	-	-	X	-	X	-	@
1B	6X40	0	@	@	1	15.0	-	X	-	X	-	@
2B	6X40	0	@	@	2	-	-	X	-	X	-	@
3A	6X40	0	@	@	3	3.0	-	X	-	X	-	@
4A	6X40	0	@	@	4	3.0	-	X	-	X	-	@
4B	6X40	0	@	@	4	15.0	-	X	-	X	-	@

@ Multizone Microwave Detection
# Disable Phase call for loop during Alternate Phasing operation.
* Disable Delay during Alternate Phasing operation.

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 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Reposition existing signal heads 22 and 23.
7. Activate beacons 24, 25, 26, and 27 to flash 3 seconds prior to the end of phase 2 green. These beacons shall remain flashing until the beginning of phase 2 green.
8. Activate beacons 63, 64, 65, and 66 to flash 3 seconds prior to the end of phase 6 green. These beacons shall remain flashing until the beginning of phase 6 green.
9. This intersection uses multi-zone microwave detection. Monitor and maintain detectors according to the manufacturer's instructions to achieve desired detection.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

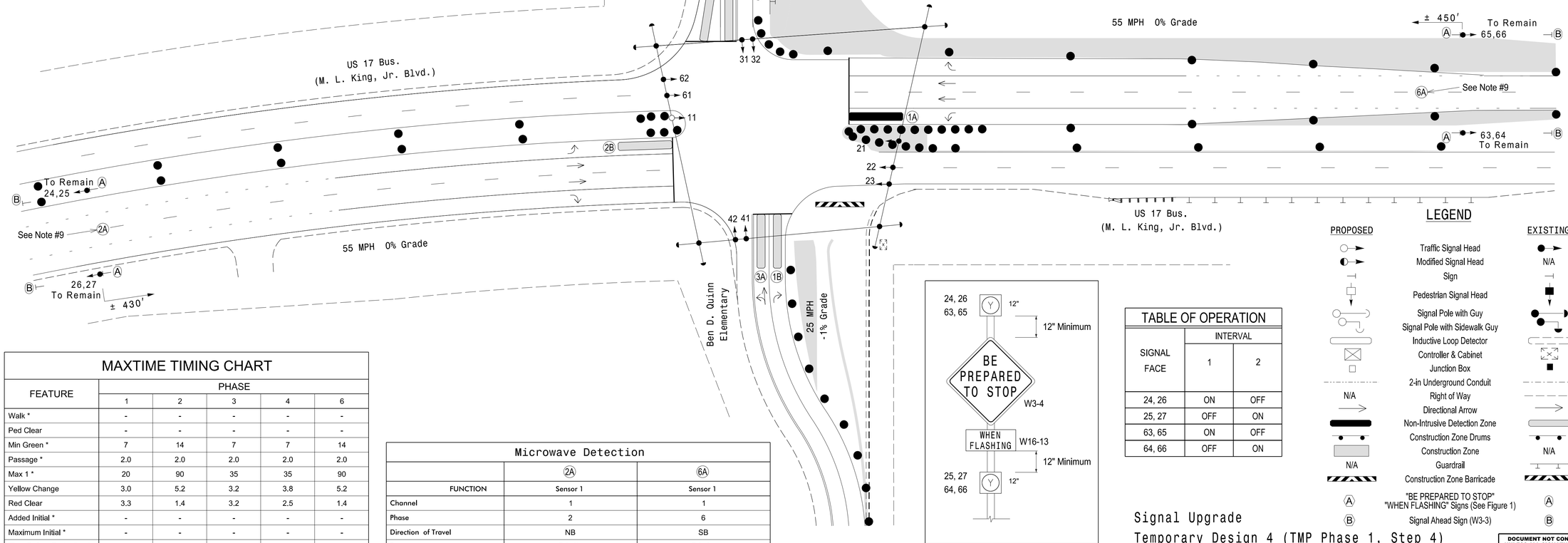


FIGURE 1

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
24, 26	ON	OFF
25, 27	OFF	ON
63, 65	ON	OFF
64, 66	OFF	ON

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Non-Intrusive Detection Zone	
	Construction Zone Drums	
	Construction Zone	N/A
N/A	Guardrail	
	Construction Zone Barricade	
A	"BE PREPARED TO STOP" "WHEN FLASHING" Signs (See Figure 1)	A
B	Signal Ahead Sign (W3-3)	B

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	6
Walk *	-	-	-	-	-
Ped Clear	-	-	-	-	-
Min Green *	7	14	7	7	14
Passage *	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	35	35	90
Yellow Change	3.0	5.2	3.2	3.8	5.2
Red Clear	3.3	1.4	3.2	2.5	1.4
Added Initial *	-	-	-	-	-
Maximum Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Advance Walk	-	-	-	-	-
Pre Clearance	–	3.0	–	–	3.0
Non Lock Detector	X	-	X	X	-
Vehicle Recall	-	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-	-

* 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.

Microwave Detection

FUNCTION	2A Sensor 1			6A Sensor 1		
Channel	1			1		
Phase	2			6		
Direction of Travel	NB			SB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	>= 750	< 750	-	>= 750	< 750	-
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed	Y	Y	Y	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-	2.5-10.0	2.5-6.5	-

Signal Upgrade
Temporary Design 4 (TMP Phase 1, Step 4)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Plans Prepared By:

DRMP

DRMP, Inc.
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Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

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

SCALE 0 40 1"=40'

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary

Division 2 Craven County New Bern

PLAN DATE: April 2025 REVIEWED BY: BN Groome
PREPARED BY: DS Griffith DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by: Brittany N Groome 4/24/2025
DATE

SIG. INVENTORY NO. 02-0629T4

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-6.0

6 Phase
Fully Actuated
US 17 Bus. (MLK Blvd) CLS
D02-15_New Bern

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. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Activate beacons 24, 25, 26, and 27 to flash 3 seconds prior to the end of phase 2 green. These beacons shall remain flashing until the beginning of phase 2 green.
7. Activate beacons 65, 66, 67, and 68 to flash 3 seconds prior to the end of phase 6 green. These beacons shall remain flashing until the beginning of phase 6 green.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.
9. This intersection uses multi-zone microwave detection. Monitor and maintain detectors according to the manufacturer's instructions to achieve desired detection
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

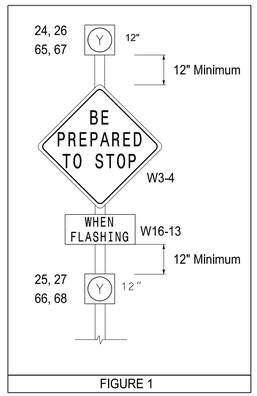
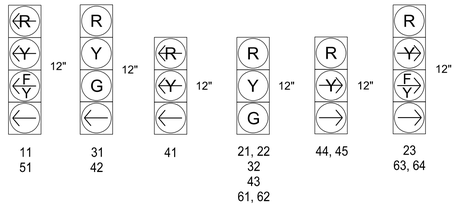


FIGURE 1

TABLE OF OPERATION		
SIGNAL FACE	INTERVAL 1	INTERVAL 2
24, 26	ON	OFF
25, 27	OFF	ON
65, 67	ON	OFF
66, 68	OFF	ON

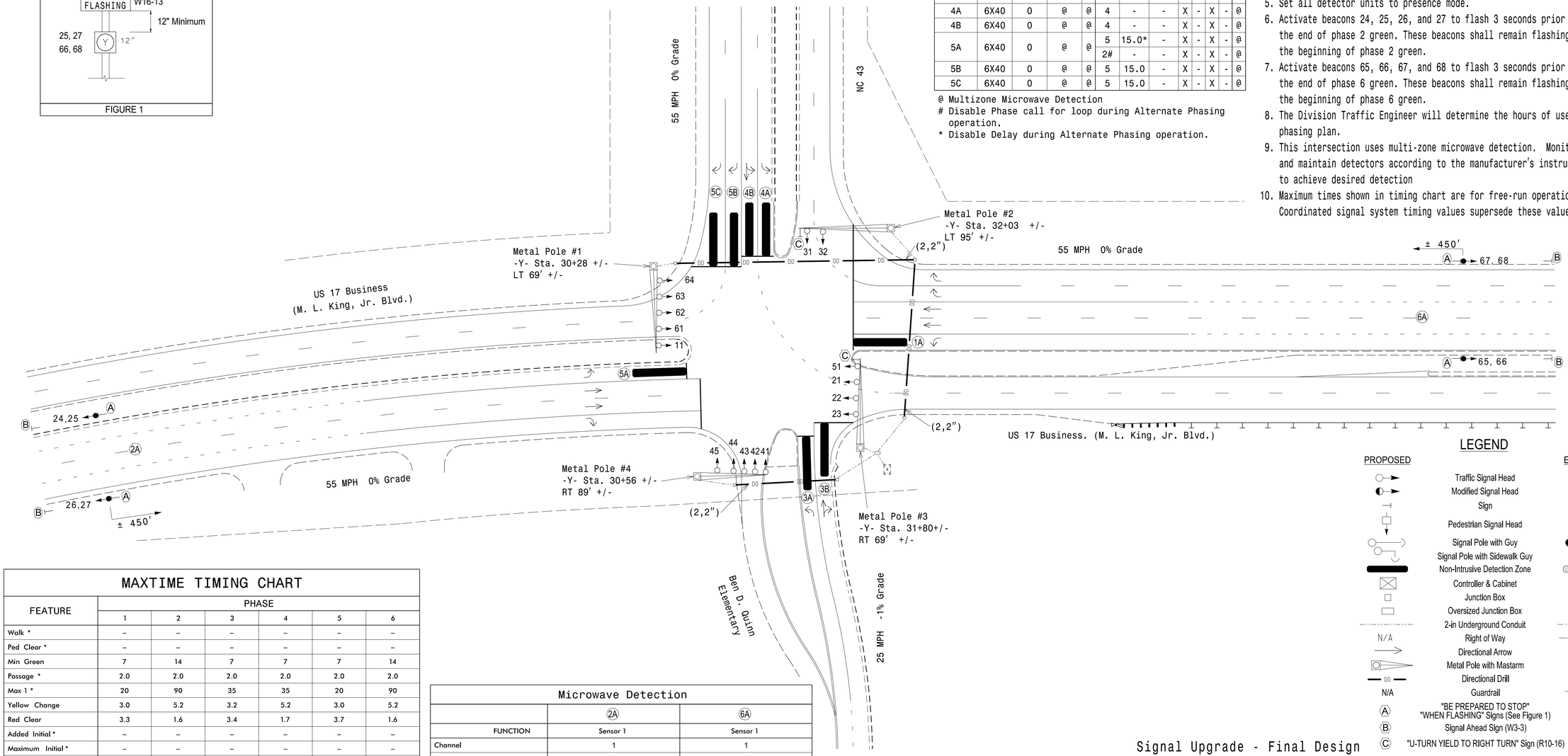
SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
ZONE(S)	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	@	@	1	15.0*	-	X	-	X	-	@
					6#	-	-	X	-	X	-	@
3A	6X40	0	@	@	3	-	-	X	-	X	-	@
3B	6X40	0	@	@	3	10.0	-	X	-	X	-	@
4A	6X40	0	@	@	4	-	-	X	-	X	-	@
4B	6X40	0	@	@	4	-	-	X	-	X	-	@
5A	6X40	0	@	@	5	15.0*	-	X	-	X	-	@
					2#	-	-	X	-	X	-	@
5B	6X40	0	@	@	5	15.0	-	X	-	X	-	@
5C	6X40	0	@	@	5	15.0	-	X	-	X	-	@

@ Multizone Microwave Detection
# Disable Phase call for loop during Alternate Phasing operation.
* Disable Delay during Alternate Phasing operation.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Non-Intrusive Detection Zone	
	Controller & Cabinet	
	Junction Box	
	Oversized Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
DD	Directional Drill	N/A
N/A	Guardrail	
A	"BE PREPARED TO STOP" "WHEN FLASHING" Signs (See Figure 1)	A
B	Signal Ahead Sign (W3-3)	B
C	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	C

MAXTIME TIMING CHART						
FEATURE	PHASE 1	2	3	4	5	6
Walk *	–	–	–	–	–	–
Ped Clear *	–	–	–	–	–	–
Min Green	7	14	7	7	7	14
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	20	90	35	35	20	90
Yellow Change	3.0	5.2	3.2	5.2	3.0	5.2
Red Clear	3.3	1.6	3.4	1.7	3.7	1.6
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	–
Pre Clearance	–	3.0	–	–	–	3.0
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 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.

Microwave Detection						
	2A			6A		
FUNCTION	Sensor 1			Sensor 1		
Channel	1			1		
Phase	2			6		
Direction of Travel	NB			SB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	>= 750	< 750	-	>= 750	< 750	-
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed	Y	Y	Y	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-	2.5-10.0	2.5-6.5	-

Plans Prepared By:

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Signal Upgrade - Final Design
Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SCALE 0 40 1"=40'

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary

Division 2 Craven County New Bern

PLAN DATE: April 2025 REVIEWED BY: BN Groome
PREPARED BY: DS Griffith DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

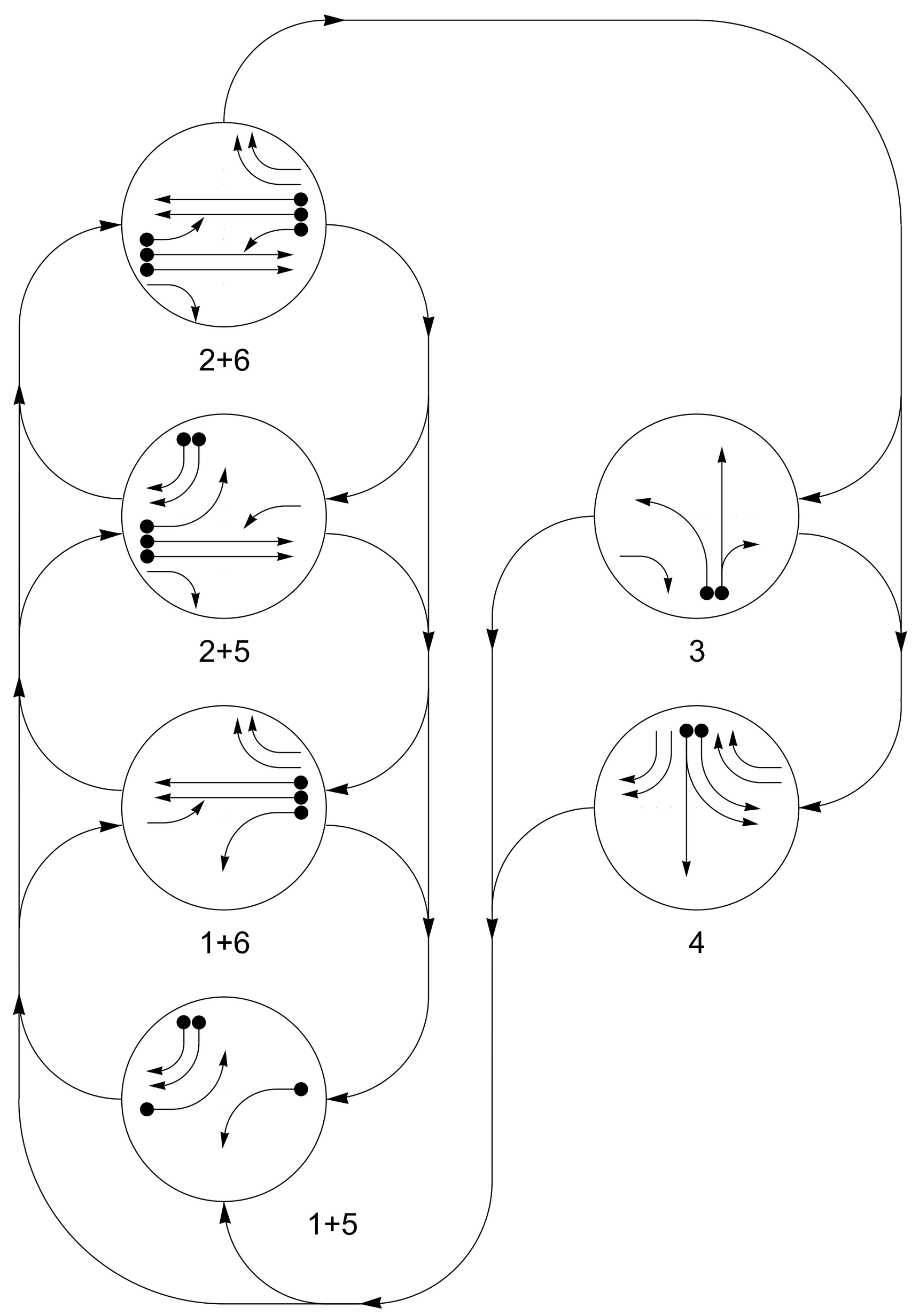
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by: Brittany N Groome 4/24/2025
DATE

SIG. INVENTORY NO. 02-0629

6 Phase
Fully Actuated
US 17 Bus. (MLK Blvd) CLS
D02-15_New Bern

DEFAULT PHASING DIAGRAM

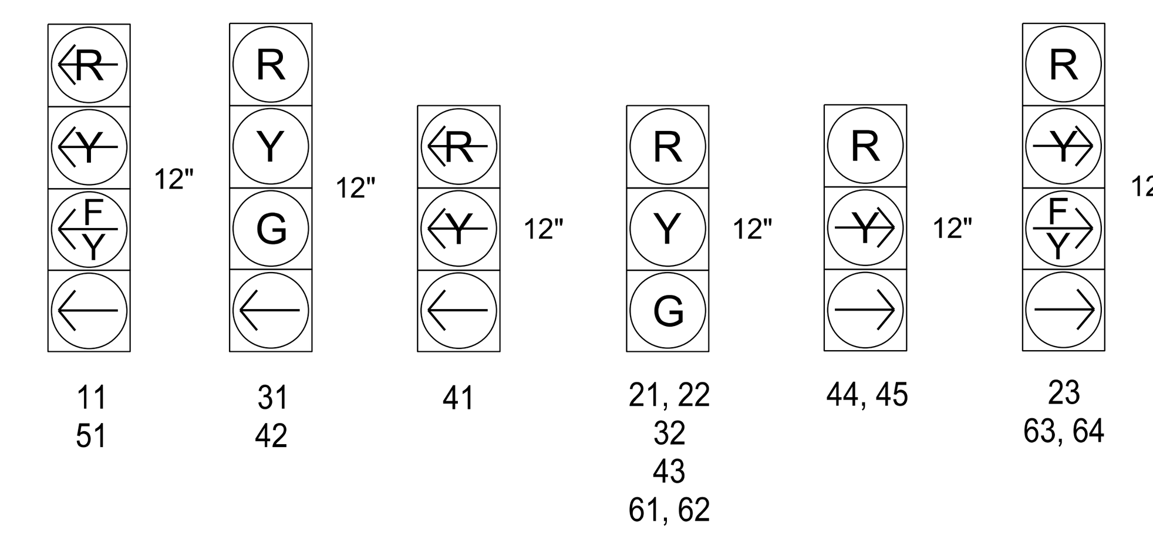


DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	3	4	FLASH
11	←	←	←F/Y	←F/Y	←R	←R	←R
21, 22	R	R	G	G	R	R	R
23	R	R	F/Y→	F/Y→	→	R	R
31	R	R	R	R	G←	R	R
32	R	R	R	R	G	R	R
41	←R	←R	←R	←R	←R	←	←R
42	R	R	R	R	R	G←	R
43	R	R	R	R	R	G	R
44, 45	→	R	→	R	R	→	R
51	←	←F/Y	←	←F/Y	←R	←R	←R
61, 62	R	G	R	G	R	R	R
63, 64	R	F/Y→	R	F/Y→	R	→	R

SIGNAL FACE I.D.

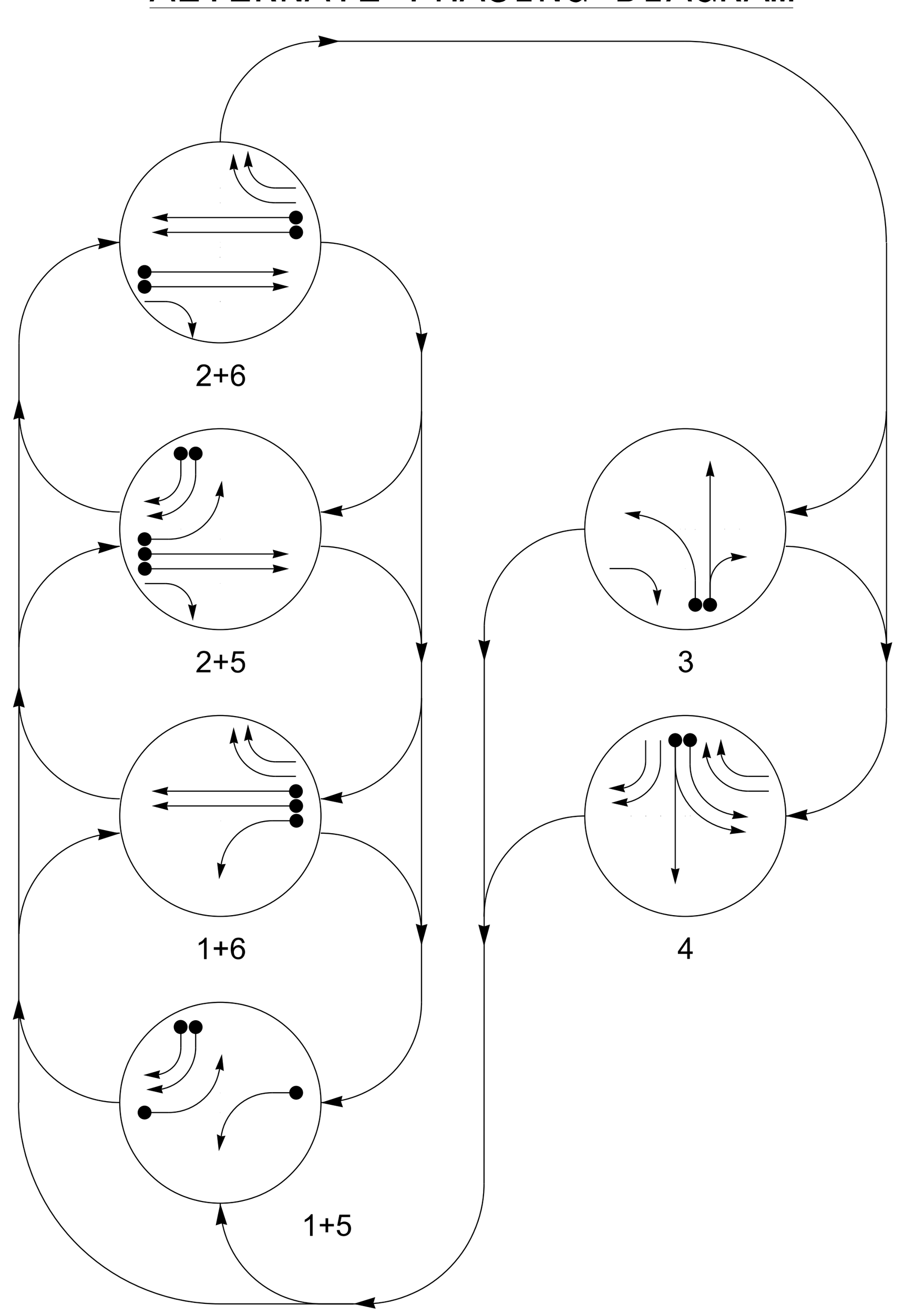
All Heads L.E.D.



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. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Activate beacons 24, 25, 26, and 27 to flash 3 seconds prior to the end of phase 2 green. These beacons shall remain flashing until the beginning of phase 2 green.
7. Activate beacons 65, 66, 67, and 68 to flash 3 seconds prior to the end of phase 6 green. These beacons shall remain flashing until the beginning of phase 6 green.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.
9. This intersection uses multi-zone microwave detection. Monitor and maintain detectors according to the manufacturer's instructions to achieve desired detection
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	3	4	FLASH
11	←	←	←R	←R	←R	←R	←R
21, 22	R	R	G	G	R	R	R
23	R	R	F/Y→	F/Y→	→	R	R
31	R	R	R	R	G←	R	R
32	R	R	R	R	G	R	R
41	←R	←R	←R	←R	←R	←	←R
42	R	R	R	R	R	G←	R
43	R	R	R	R	R	G	R
44, 45	→	R	→	R	R	→	R
51	←	←R	←	←R	←R	←R	←R
61, 62	R	G	R	G	R	R	R
63, 64	R	F/Y→	R	F/Y→	R	→	R

PHASING DIAGRAM DETECTION LEGEND

- ◄──● DETECTED MOVEMENT
- ◄──── UNDETECTED MOVEMENT (OVERLAP)
- ◄ ─ ─ UNSIGNALIZED MOVEMENT
- ◄─ ─ ─► PEDESTRIAN MOVEMENT

Signal Upgrade - Final Design
Sheet 2 of 2

Plans Prepared By:

DRMP

DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

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

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary

Division 2 Craven County New Bern

PLAN DATE:	April 2025	REVIEWED BY:	BN Groome
PREPARED BY:	DS Griffith	DRMP PROJ. NO.:	17359 (040)

N

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

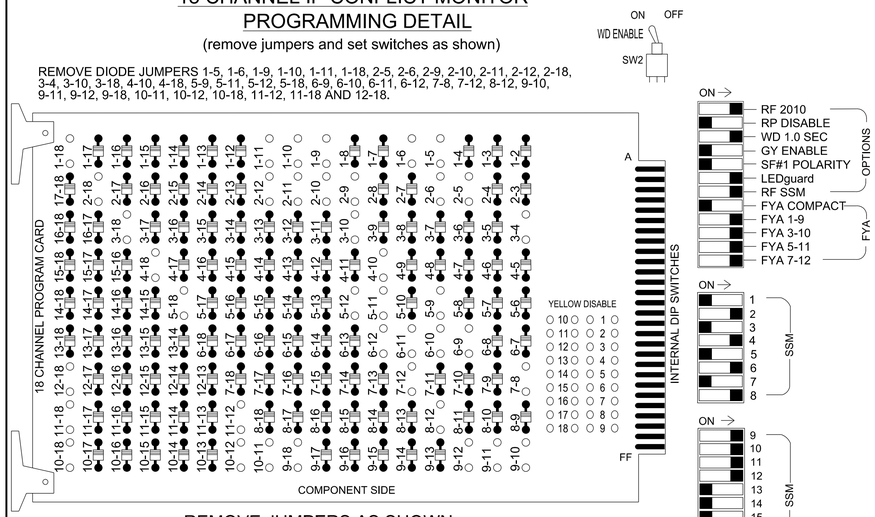
Signed by:
Brittany N Groome
1E09340E1094484...
4/24/2025
DATE

SIG. INVENTORY NO. 02-0629

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-10, 1-11, 1-18, 2-5, 2-6, 2-9, 2-10, 2-11, 2-12, 2-18, 3-4, 3-10, 3-18, 4-10, 4-18, 5-9, 5-11, 5-12, 5-18, 6-9, 6-10, 6-11, 6-12, 7-8, 7-12, 8-12, 9-10, 9-11, 9-12, 9-18, 10-11, 10-12, 10-18, 11-12, 11-18 AND 12-18.



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. Integrate monitor with Ethernet network in cabinet.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	1O	11	12	13	14
FILE "I"	U	ø1 1A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED													ST DC ISOLATOR
FILE "J"	U	ø5 5A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED													

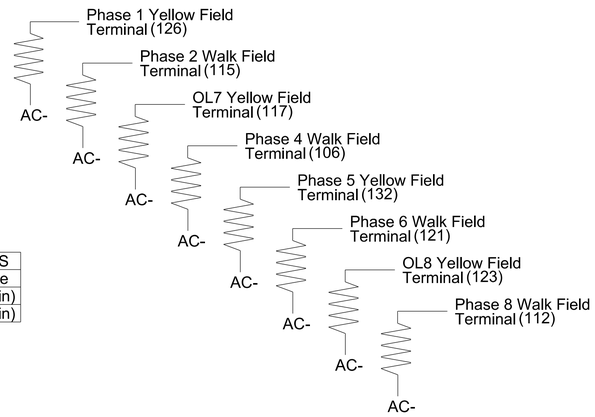
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

For Detection Zones 1A and 5A the equipment and slots reserved are typical for a NCDOT installation.

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)

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. Program phase 2 and phase 6 for Advance Warning.
4. Program phase 2 and phase 6 for 3.0 seconds of Pre Clearance.
5. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
6. The cabinet and controller are part of the US 17 Bus. (MLK Blvd) D02-15_New Bern System.

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, S3**, S4, S5, S6**, S7, S8, S9**, S10,S11, S12**, AUX S1, AUX S2, AUX S4, AUX S5, AUX S6
Phases Used.....1, 2, 3, 4, 5, 6
Overlap "1".....*
Overlap "2".....*
Overlap "3".....*
Overlap "4".....*
Overlap "5".....NOT USED
Overlap "6".....*
Overlap "7".....*
Overlap "8".....*
Overlap "9".....*

* See overlap programming detail on sheet 2
** Used for Advance Beacon Control only.

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			X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0		X		X	
				-	31 ★	2			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

SPECIAL DETECTOR NOTE

Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 02-0629
DESIGNED: Apr 2025
SEALED: 4/24/2025
REVISED: N/A

Plans Prepared By:
DRMP
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-6.2

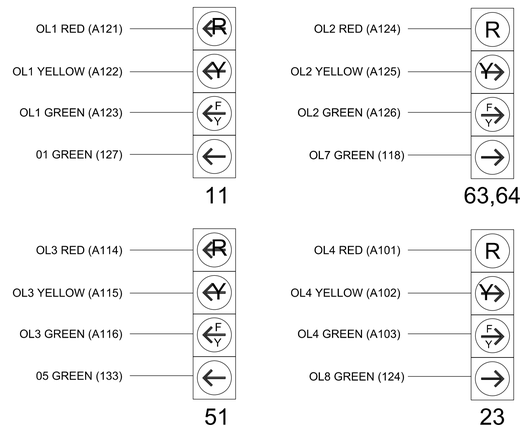
SIGNAL HEAD HOOK-UP CHART

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	ADVANCE BEACON	OL7	4			4 PED	ADVANCE BEACON	5	6	6 PED	ADVANCE BEACON	OL8	OL9		8 PED	ADVANCE BEACON	OL1	OL2	SPARE	OL3	OL4	OL6
SIGNAL HEAD NO.	11 ★	21,22	NU	24,26	63,64 ★	41	42	43	NU	65,67	51 ★	61,62	NU	25,27	23 ★	31	32	NU	66,68	11 ★	63,64 ★	NU	51 ★	23 ★	44,45
RED		128					101	101				134				107	107				124			A101	A104
YELLOW	*	129			*		102	102			*	135			*	108	108								
GREEN		130					103	103				136				109	109								
RED ARROW						101														A121			A114		
YELLOW ARROW						102														A122	A125		A115	A102	A105
FLASHING YELLOW ARROW																				A123	A126		A116	A103	
GREEN ARROW	127				118	103	103				133				124	109									A106
✋				** 114						** 105				** 120					** 111						
🚶			*						*				*					*							

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
★ See pictorial of head wiring in detail this sheet.
** Advance Beacons will be wired to S2P-Y, S4P-Y, S6P-Y and S8P-Y. See wiring and programming detail on sheet 3.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



Electrical Detail - Final Design
Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC DEPARTMENT OF TRANSPORTATION Transportation Mobility and Safety Division Traffic Engineering Branch Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary
Division 2 Craven County New Bern

PLAN DATE: April 2025	REVIEWED BY: BN Groome
PREPARED BY: DS Griffin	DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by: Brittany N Groome 4/24/2025
DOCUSIGNED BY: DATE

SIG. INVENTORY NO. 02-0629

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-6.3

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	2	3	4	6	7	8	9
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal	Normal	Normal
Included Phases	-	6	-	2	4,5	4	3	3
Modifier Phases	1	-	5	-	-	-	-	-
Modifier Overlaps	-	7	-	8	-	-	-	-
Trail Green	0	0	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

NOTICE
INCLUDED PHASES

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2		X		2
3	Overlap	7		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6		X	X	6
7	Overlap	8		X		7
8	Overlap	9		X	X	8
9	Overlap	1		X	X	9
10	Overlap	2		X	X	10
11	Overlap	3		X		11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18
19	Adv. Warning Flasher	2				19
20	Adv. Warning Flasher	6				20

NOTICE
OVERLAP 7
NOTICE
OVERLAP 8
NOTICE
OVERLAP 9
NOTICE
ADV. WARNING FLASHER ASSIGNED TO CHANNEL 19
NOTICE
ADV. WARNING FLASHER ASSIGNED TO CHANNEL 20

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	2	3	4	6	7	8	9
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	Normal	Normal	Normal
Included Phases	2	6	6	2	4,5	4	3	3
Modifier Phases	1	-	5	-	-	-	-	-
Modifier Overlaps	-	7	-	8	-	-	-	-
Trail Green	0	0	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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 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 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 02-0629
DESIGNED: Apr 2025
SEALED: 4/24/2025
REVISED: N/A

Electrical Detail - Final Design
Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Plans Prepared By:
DRMP
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC Transportation Mobility and Safety Division
Traffic Engineering Branch
Traffic Signals Management Section
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N.Greenfield Pkwy,Garner,NC 27529

US 17 Business
(M. L. King, Jr. Blvd.)
at
NC 43/Ben D. Quinn Elementary
Division 2 Craven County New Bern

PLAN DATE: April 2025	REVIEWED BY: BN Groome
PREPARED BY: DS Griffin	DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by: Brittany N Groome 4/24/2025
DESIGNER'S SIGNATURE DATE

SIG. INVENTORY NO. 02-0629

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-6.4

REMOVE SPECIAL DETECTOR NOTE

Remove microwave detection system for all vehicle detection.

MAXTIME PHASE OPTIONS PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Phase >Phase Options
Select Plan 1

Web Interface
Home >Controller> Phase Configuration >Phase Option Plans
Select Phase Option Plan 1

Phase Option Plan 1

Phase	1	2	3	4	5	6	7	8
Enabled	X	X	X	X	X	X	-	-
Advanced Warning	-	X	-	-	-	X	-	-

NOTICE 'ADVANCED WARNING' ACTIVATED FOR PHASE 2 AND PHASE 6

MAXTIME OUTPUT ASSIGNMENT PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >More >Advanced IO> Output Points

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >Output Points

IO Module 1

Output Point	Description	Input Control Type	Index
33	C1-35	Channel Green Walk Drive	19
34	C1-36	Channel Red Do Not Walk Drive	19
35	C1-37	Channel Green Walk Drive	20
36	C1-38	Channel Red Do Not Walk Drive	20

OUTPUT REFERENCE SCHEDULE
OUTPUT 33 = 2 PED Y
OUTPUT 34 = 6 PED Y
OUTPUT 35 = 4 PED Y
OUTPUT 36 = 8 PED Y

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

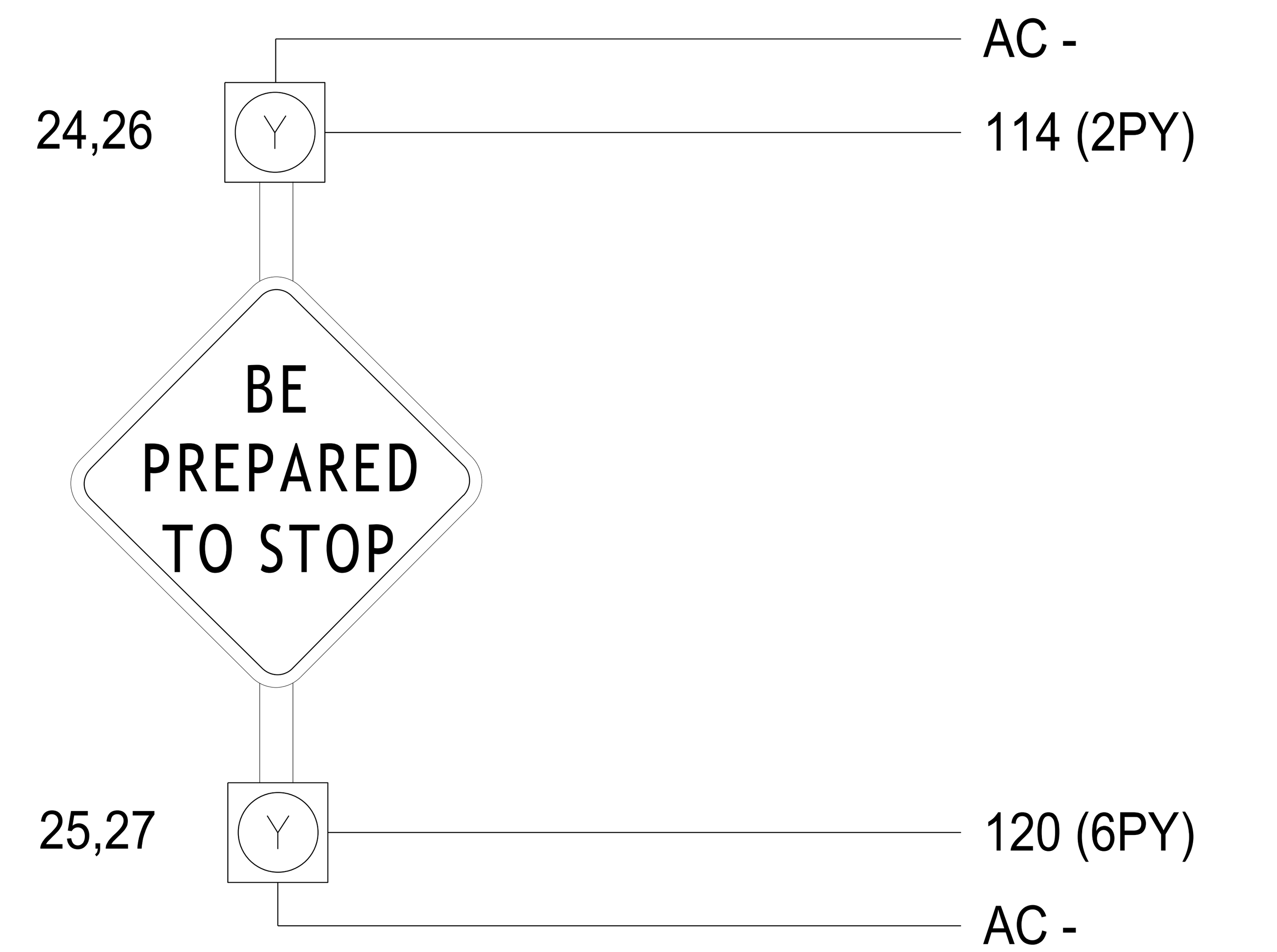
Detector	Call Phase	Delay
1	1	0.0
29	0	3.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	0	3.0

ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)

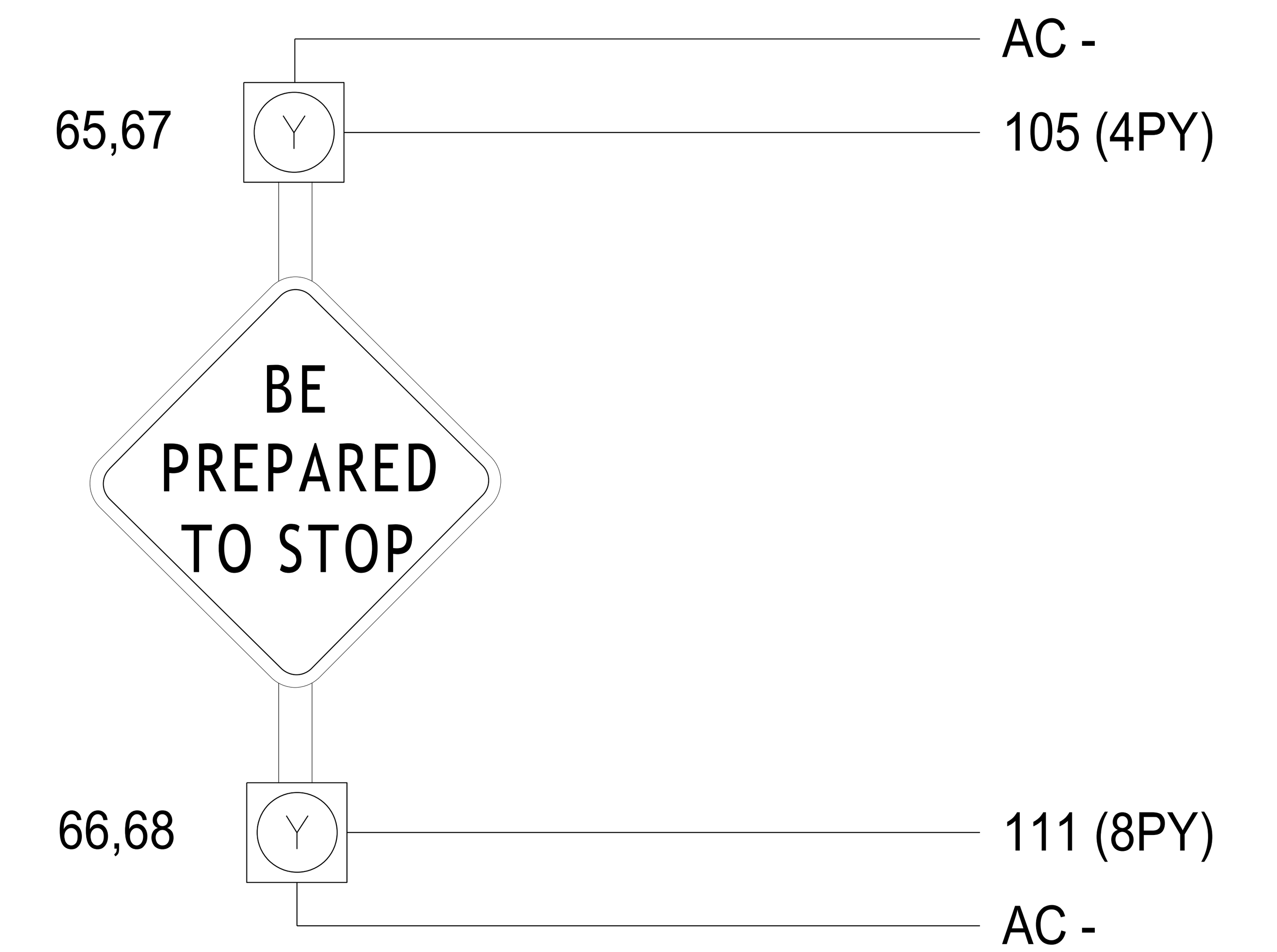


IMPORTANT

1. IF CONNECTED, REMOVE, TAPE AND LABEL CONFLICT MONITOR WIRE ATTACHED TO THE REAR OF TERMINAL 114 (2PY) AND TERMINAL 120 (6PY).
2. INSERT LOADSWITCHES IN THE OUTPUT FILE SLOTS S3 AND S9.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. PROGRAM THE CONTROLLER OUTPUT CHANNEL AND OUTPUT POINT CONFIGURATION AS SHOWN ON SHEETS 2 AND 3.
5. TO ACTIVATE ADVANCE BEACON OPERATION 3 SECONDS PRIOR TO THE END OF PHASE 2 GREEN, NAVIGATE TO THE PHASE TIMING PLANS TO PROGRAM A PRE CLEARANCE OF 3.0 SECONDS FOR PHASE 2.

ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)



IMPORTANT

1. IF CONNECTED, REMOVE, TAPE AND LABEL CONFLICT MONITOR WIRE ATTACHED TO THE REAR OF TERMINAL 105 (4PY) AND TERMINAL 111 (8PY).
2. INSERT LOADSWITCHES IN THE OUTPUT FILE SLOTS S6 AND S12.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. PROGRAM THE CONTROLLER OUTPUT CHANNEL AND OUTPUT POINT CONFIGURATION AS SHOWN ON SHEETS 2 AND 3.
5. TO ACTIVATE ADVANCE BEACON OPERATION 3 SECONDS PRIOR TO THE END OF PHASE 6 GREEN, NAVIGATE TO THE PHASE TIMING PLANS TO PROGRAM A PRE CLEARANCE OF 3.0 SECONDS FOR PHASE 6.

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.

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 and/or City Traffic Engineer.

Electrical Detail - Final Design
Sheet 3 of 3

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 02-0629
DESIGNED: Apr 2025
SEALED: 4/24/2025
REVISED: N/A

Plans Prepared By:
DRMP
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8210 University Executive Park Dr, Suite 220
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ELECTRICAL AND PROGRAMMING DETAILS FOR:

750 N.Greenfield Pkwy,Garner,NC 27529

US 17 Business
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Division 2 | Craven County | New Bern

PLAN DATE: April 2025	REVIEWED BY: BN Groome
PREPARED BY: DS Griffin	DRMP PROJ. NO: 17359 (040)

REVISIONS	INIT.	DATE

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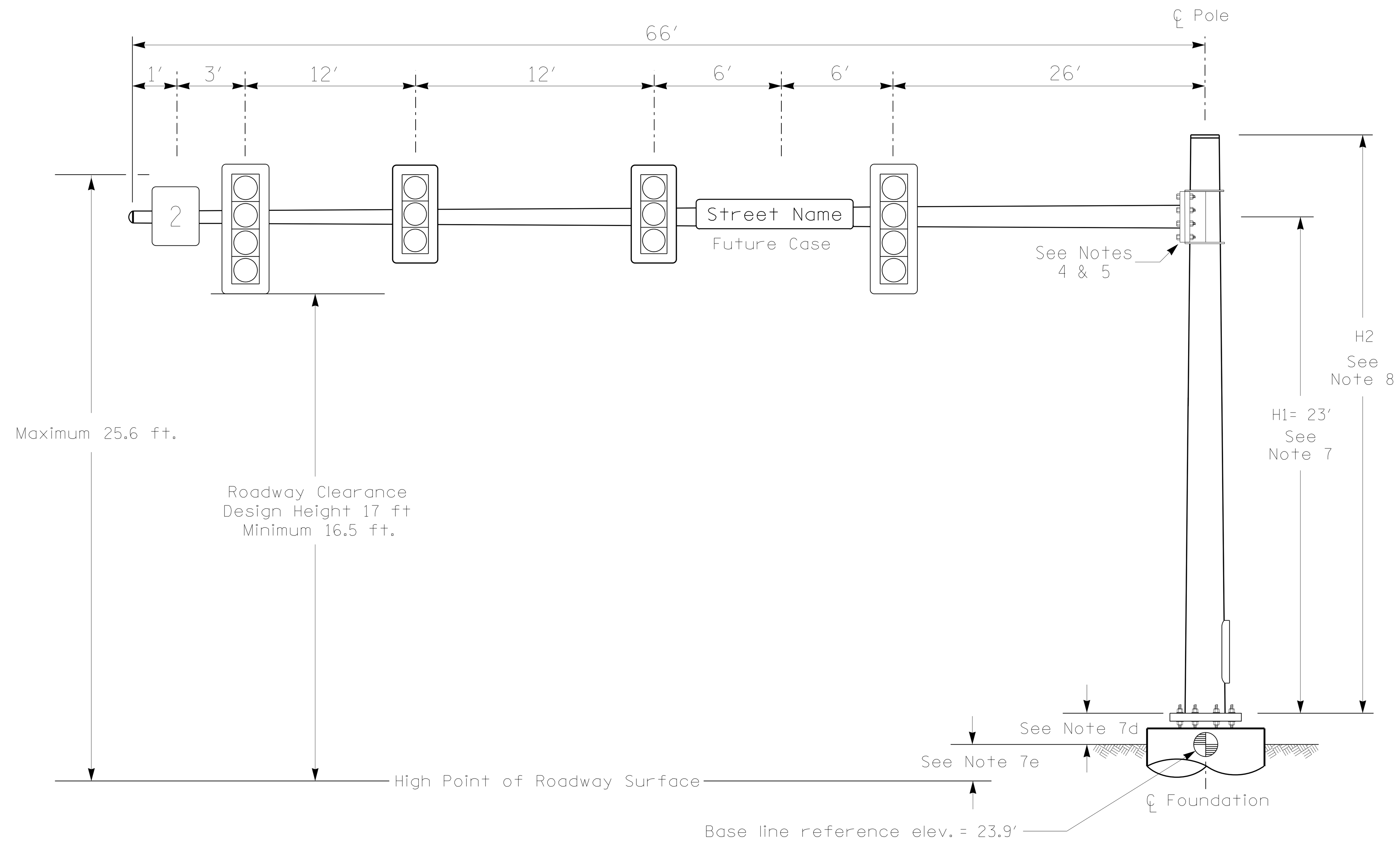
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by:
Brittany N Groome
1E09340E10944844...
4/24/2025
DATE

SIG. INVENTORY NO. 02-0629

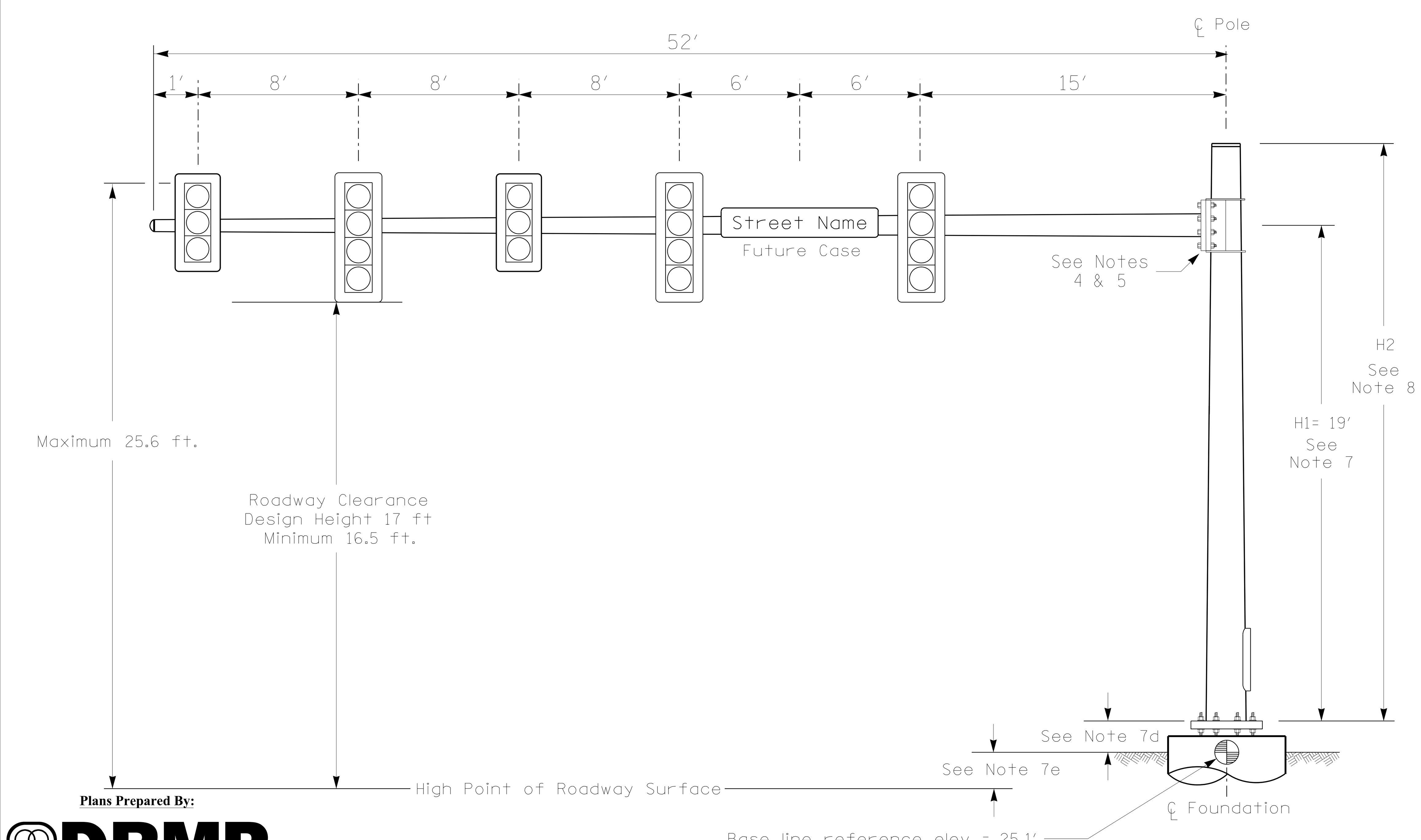
METAL POLE No. 3 and 4

Design Loading for METAL POLE NO. 3



Elevation View

Design Loading for METAL POLE NO. 4



Elevation View

Plans Prepared By:
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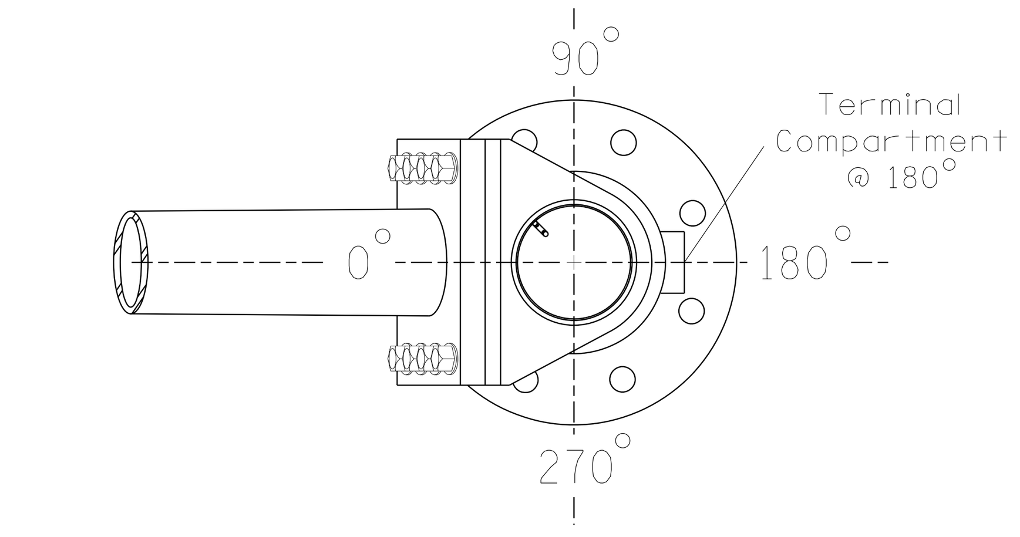
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

SPECIAL NOTE

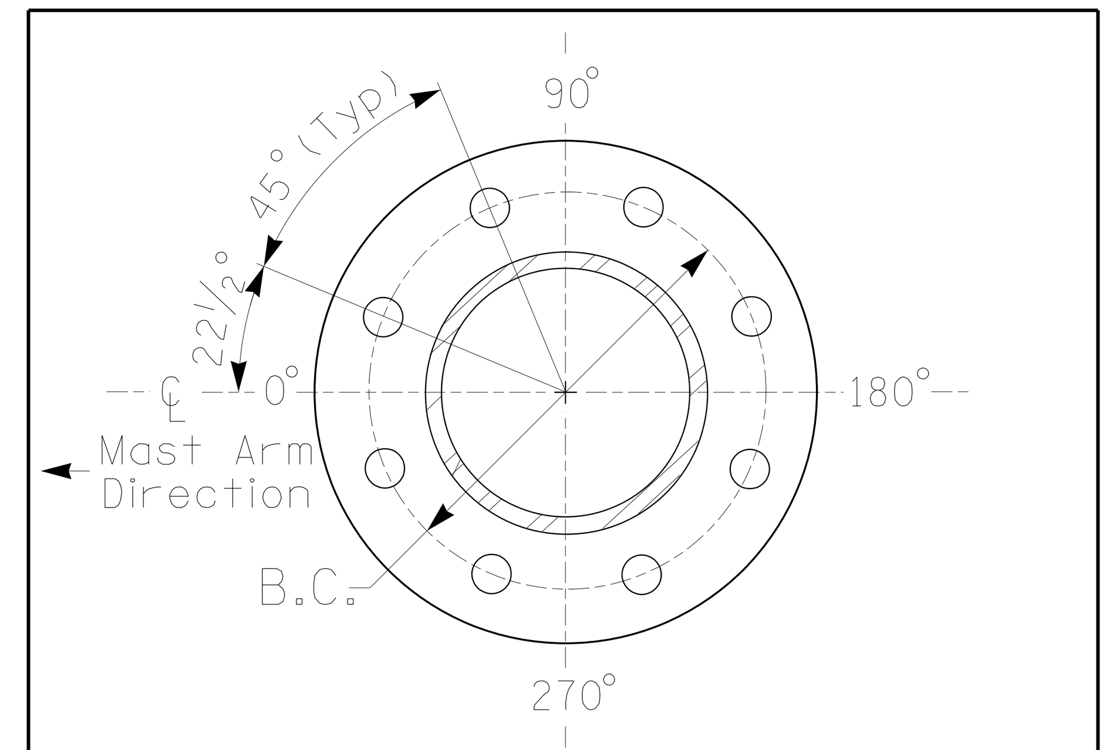
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 3	Pole 4
Baseline reference point at ℄ Foundation @ ground level	23.9 ft.	25.1 ft.
Elevation difference at High point of roadway surface	+3.2 ft.	+0.0 ft.
Elevation difference at Edge of travelway or face of curb	+2.3 ft.	+0.0 ft.

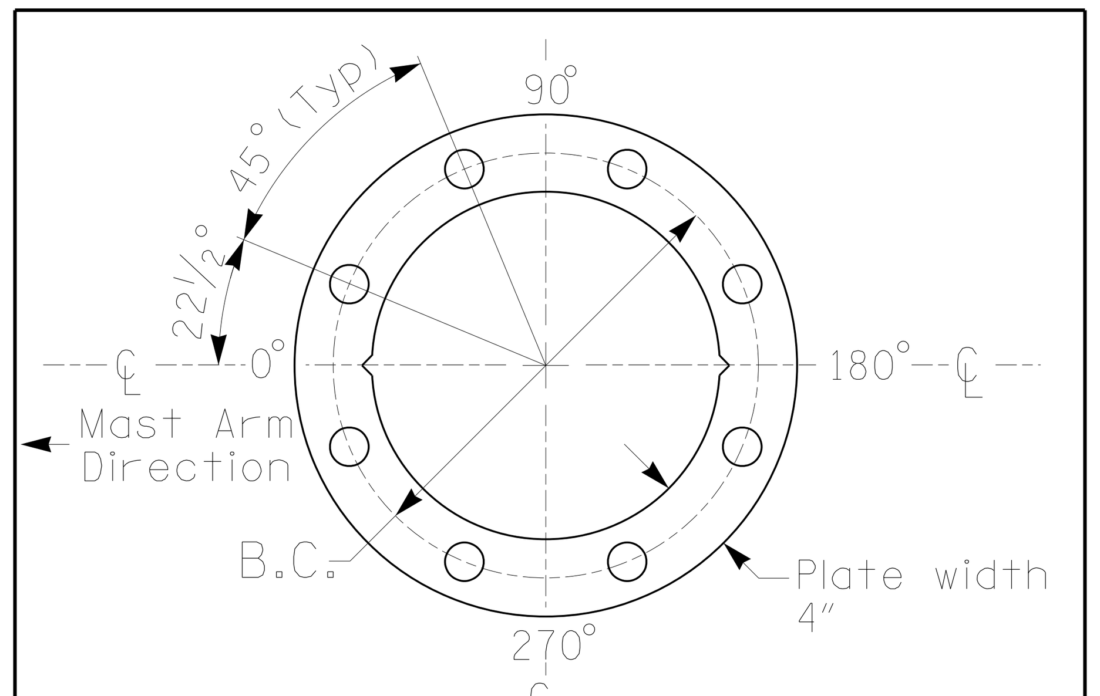


POLE RADIAL ORIENTATION



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
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0″W X 96.0″L	36 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. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (140 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17 Business
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at
NC 43/Ben D. Quinn Elementary

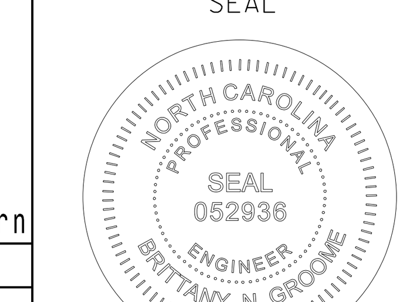
Division 2 — Craven County — New Bern

PLAN DATE:	April 2025	REVIEWED BY:	BN Groome
PREPARED BY:	DS Griffin	DRMP PROJ. NO.:	17359 (040)

SCALE: N/A

REVISIONS | INIT. | DATE

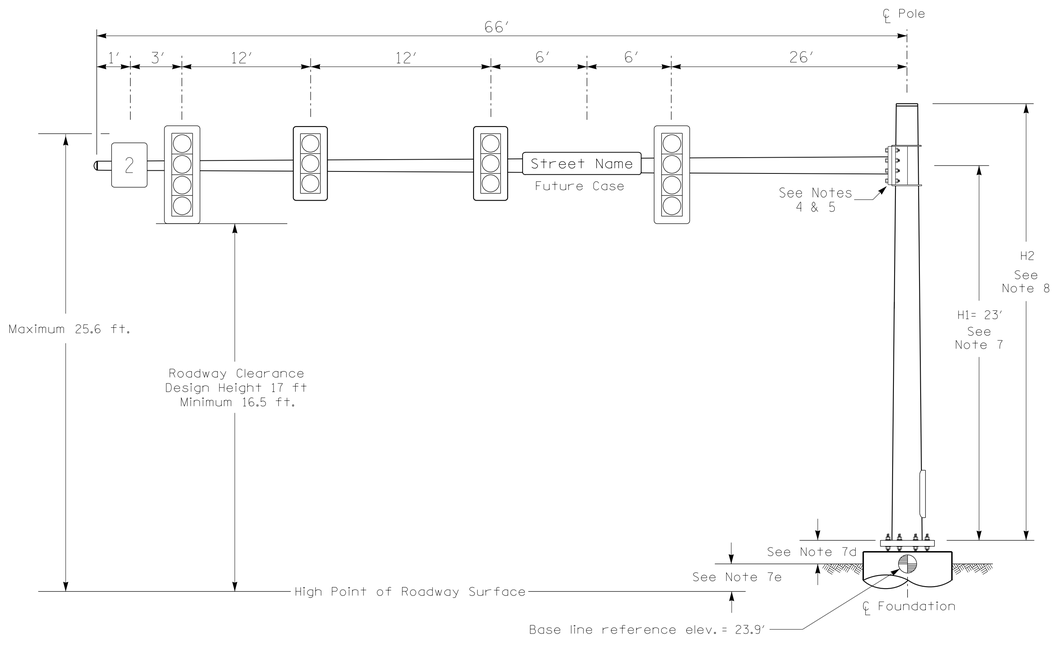
SEAL



Signed by: Brittany N Groome 4/24/2025

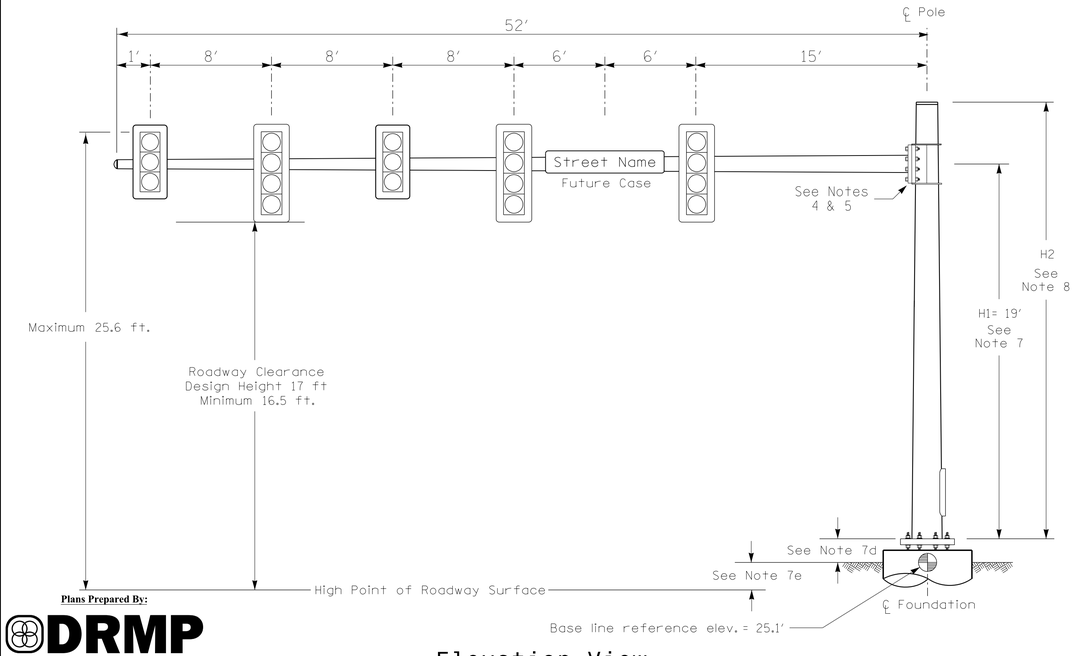
SIG. INVENTORY NO. 02-0629

Design Loading for METAL POLE NO. 3



Elevation View

Design Loading for METAL POLE NO. 4



Elevation View

Plans Prepared By:

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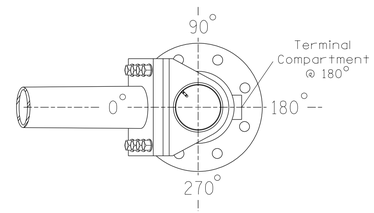
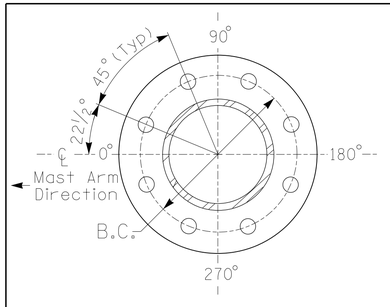
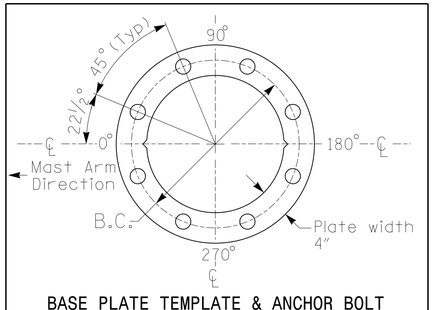


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

METAL POLE No. 3 and 4

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-6.6

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
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   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
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NCDOT Wind Zone 2 (140 mph)

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Prepared for: Transportation Mobility and Safety Division — State of North Carolina — Department of Transportation — Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

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at
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Division 2 Craven County New Bern

PLAN DATE:	April 2025	REVIEWED BY:	BN Groome
PREPARED BY:	DS Griffin	DRMP PROJ. NO.:	17359 (040)

SCALE: N/A

REVISIONS	INIT.	DATE

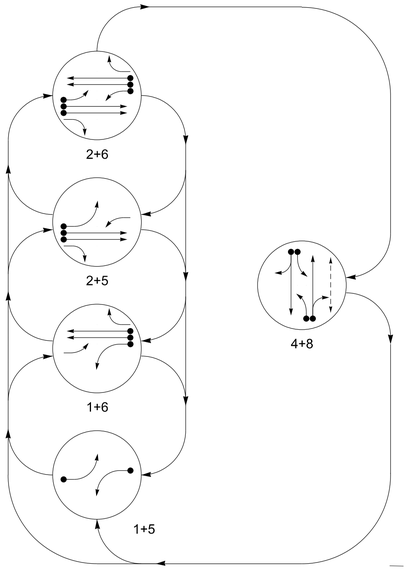
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by: Brittany N Groome 4/24/2025
1E0954AB7604484... DATE

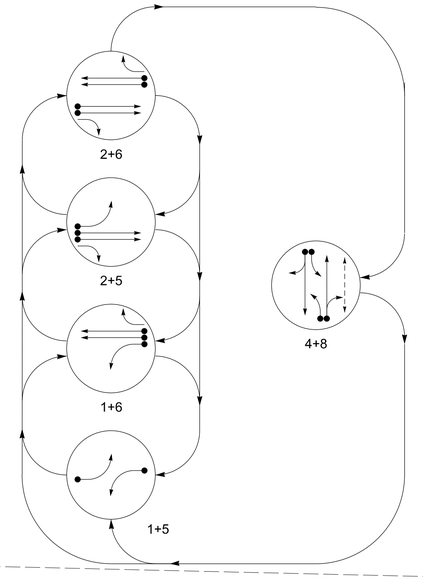
SIG. INVENTORY NO. 02-0629

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-7.0

DEFAULT PHASING DIAGRAM

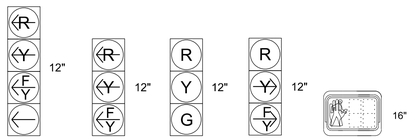


ALTERNATE PHASING DIAGRAM



SIGNAL FACE I.D.

All Heads L.E.D.



11
51

41
81

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

23
63

P81,P82

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
ZONE(S)	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	@	@	1	15.0*	-	X	-	X	-	@
					6#	-	-	X	-	X	-	@
4A	6X40	0	@	@	4	3.0	-	X	-	X	-	@
4B	6X40	0	@	@	4	10.0	-	X	-	X	-	@
4C	6X15	0	@	@	4	15.0	-	X	-	X	-	@
5A	6X40	0	@	@	5	15.0*	-	X	-	X	-	@
					2#	-	-	X	-	X	-	@
8A	6X40	0	@	@	8	3.0	-	X	-	X	-	@
8B	6X40	0	@	@	8	10.0	-	X	-	X	-	@
8C	6X15	0	@	@	8	15.0	-	X	-	X	-	@

@ Multizone Microwave Detection
# Disable Phase call for loop during Alternate Phasing operation.
* Disable Delay during Alternate Phasing operation.

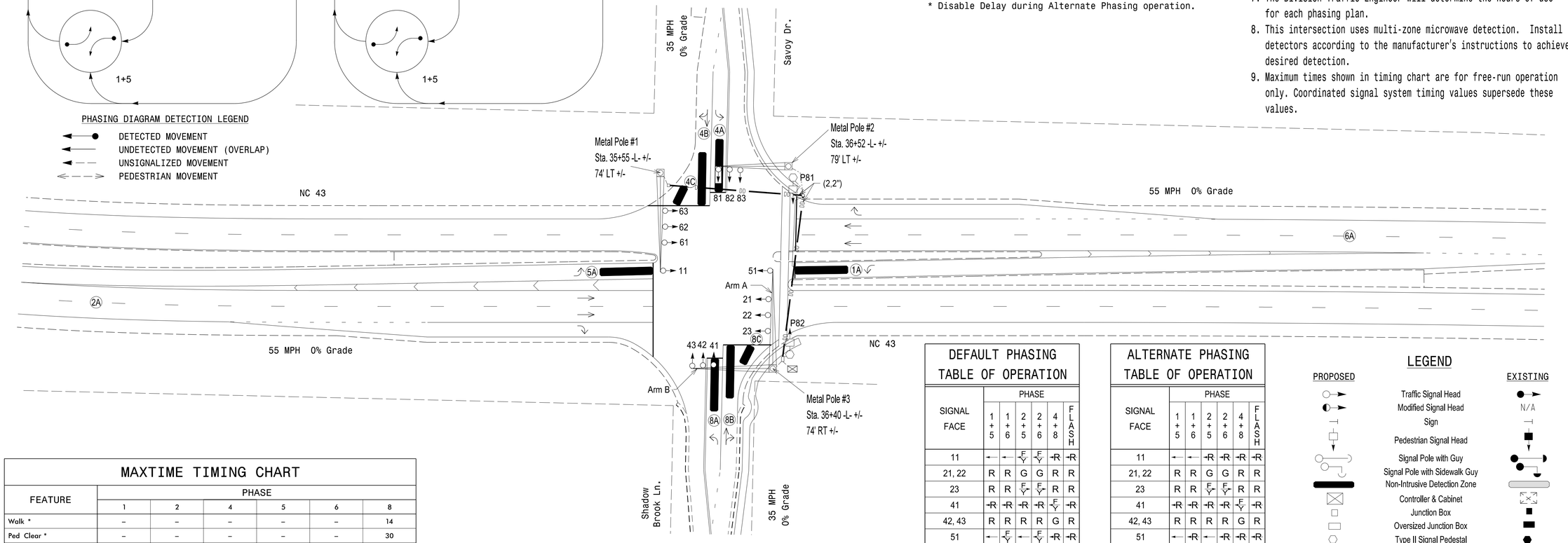
5 Phase
Fully Actuated
US 17 Bus. (MLK Blvd) CLS
D02-15_New Bern

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. Pavement markings are existing.
7. The Division Traffic Engineer will determine the hours of use for each phasing plan.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



MAXTIME TIMING CHART

FEATURE	PHASE					
	1	2	4	5	6	8
Walk *	–	–	–	–	–	14
Ped Clear *	–	–	–	–	–	30
Min Green	7	14	7	7	14	7
Passage *	2.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	15	90	30	15	90	45
Yellow Change	3.0	5.2	3.8	3.0	5.2	3.8
Red Clear	3.1	1.4	2.4	2.8	1.4	2.4
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	7
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 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.

Microwave Detection

	2A			6A		
FUNCTION	Sensor 1			Sensor 1		
Channel	1			1		
Phase	2			6		
Direction of Travel	NB			SB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	>= 750	< 750	-	>= 750	< 750	-
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed	Y	Y	Y	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-	2.5-10.0	2.5-6.5	-

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE							
	1+5	1+6	2+5	2+6	4+8	FLASH
11	←●	←—	F/Y	F/Y	R	R
21, 22	R	R	G	G	R	R
23	R	R	F/Y	F/Y	R	R
41	R	R	R	R	F/Y	R
42, 43	R	R	R	R	G	R
51	←●	F/Y	←—	F/Y	R	R
61, 62	R	G	R	G	R	R
63	R	F/Y	R	F/Y	R	R
81	R	R	R	R	F/Y	R
82, 83	R	R	R	R	G	R
P81, P82	DW	DW	DW	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE					
	1+5	1+6	2+5	2+6	4+8	FLASH
11	←●	←—	R	R	R	R
21, 22	R	R	G	G	R	R
23	R	R	F/Y	F/Y	R	R
41	R	R	R	R	F/Y	R
42, 43	R	R	R	R	G	R
51	←●	R	←—	R	R	R
61, 62	R	G	R	G	R	R
63	R	F/Y	R	F/Y	R	R
81	R	R	R	R	F/Y	R
82, 83	R	R	R	G	R	R
P81, P82	DW	DW	DW	DW	W	DRK

New Installation

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▼	Pedestrian Signal Head	■
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▬	Non-Intrusive Detection Zone	▬
⊠	Controller & Cabinet	⊡
□	Junction Box	■
▭	Oversized Junction Box	▬
⬡	Type II Signal Pedestal	⬢
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	—
→	Directional Arrow	→
⊡	Metal Pole with Mastarm	⊡
DD	Directional Drill	N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Plans Prepared By:

DRMP

DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

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

NC 43
at
Savoy Drive/Shadow Brook Lane

Division 2 Craven County New Bern

PLAN DATE:	April 2025	REVIEWED BY:	BN Groome
PREPARED BY:	DS Griffith	DRMP PROJ. NO.:	17359 (040)

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by: Brittany N Groome 4/24/2025
DOCUSIGNED BY:
DATE

SIG. INVENTORY NO. 02-0923

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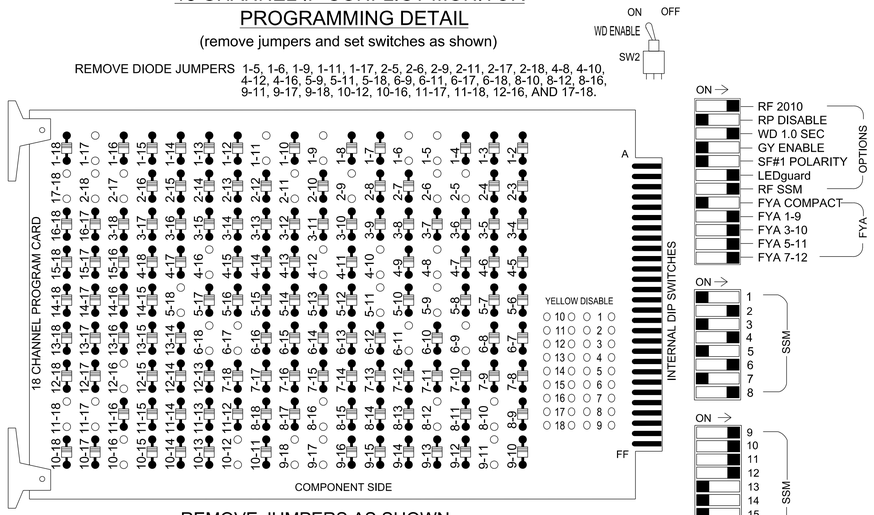
kjones AT CHA-KJONES

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-7.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-17, 2-5, 2-6, 2-9, 2-11, 2-17, 2-18, 4-8, 4-10, 4-12, 4-16, 5-9, 5-11, 5-18, 6-9, 6-11, 6-17, 6-18, 8-10, 8-12, 8-16, 9-11, 9-17, 9-18, 10-12, 10-16, 11-17, 11-18, 12-16, AND 17-18.



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. Integrate monitor with Ethernet network in cabinet.

INPUT FILE POSITION LAYOUT

(front view)

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

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

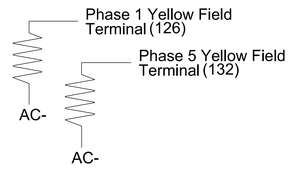
FS = FLASH SENSE
ST = STOP TIME

For Detection Zones 1A and 5A the equipment and slots reserved are typical for a NCDOT installation.

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)



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all 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.
5. The cabinet and controller are part of the US 17 Bus. (MLK Blvd) D02-15_New Bern System.

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, S12, AUX S1, AUX S2, AUX S3, AUX S4, AUX S5, AUX S6
Phases Used.....1, 2, 4, 5, 6, 8, 8PED
Overlap "1".....*
Overlap "2".....*
Overlap "3".....*
Overlap "4".....*
Overlap "5".....*
Overlap "6".....*

*See overlap programming detail on sheet 2

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			X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15.0		X		X	
				-	31 ★	2			X		X	
PED PUSH BUTTONS												
P81,P82	TB24-11,12	I13L	70	36	8	PED 8						

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.

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

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

SPECIAL DETECTOR NOTE

Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 02-0923
DESIGNED: Apr 2025
SEALED: 4/24/2025
REVISED: N/A

Plans Prepared By:

DRMP

DRMP, Inc.
8210 University Executive Park Dr. Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

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	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	★ 11	21,22	NU	NU	42,43	NU	★ 51	61,62	NU	NU	82,83	P81, P82	★ 11	★ 81	★ 63	★ 51	★ 41	★ 23
RED		128			101			134			107				A111			A104
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125	A112	A115	A102	A105
FLASHING YELLOW ARROW													A123	A126	A113	A116	A103	A106
GREEN ARROW	127						133											
✋												110						
🚶												112						

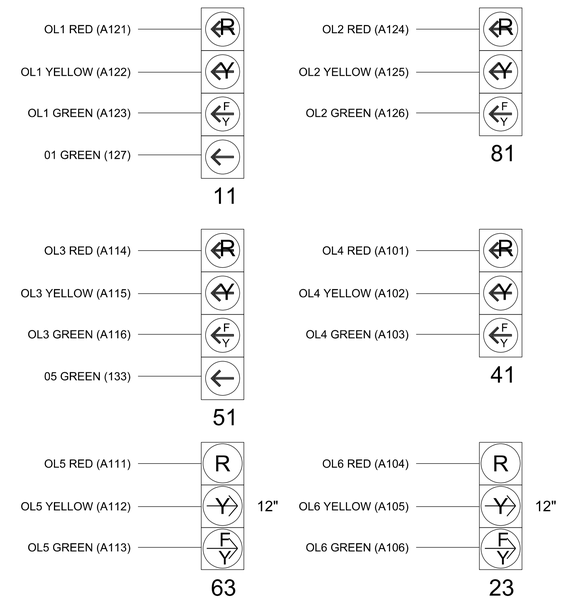
NU = Not Used

★ Denotes see pictorial of head wiring in detail below.

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



Electrical Detail Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 43
at
Savoy Drive/Shadow Brook Lane

Division 2 Craven County New Bern

PLAN DATE: April 2025 REVIEWED BY: BN Groome
PREPARED BY: DS Griffith DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by: Brittany N Groome 4/24/2025
DIGITALLY SIGNED BY BRITTANY N GROOME DATE

SIG. INVENTORY NO. 02-0923

NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-7.2

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	2	3	4	5	6
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4	6	8	6	2
Modifier Phases	1	-	5	-	-	-
Modifier Overlaps	-	-	-	-	-	-
Trail Green	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0

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 and/or City Traffic Engineer.

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu>Controller>Unit

Web Interface
Home>Controller>Unit

Start Up Parameters

Startup Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

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	0.0
29	0	3.0

5A

Detector	Call Phase	Delay
15	5	0.0
31	0	3.0

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 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 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

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	2	3	4	5	6
Type	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section	FYA 4 - Section
Included Phases	-	4	-	8	6	2
Modifier Phases	1	-	5	-	-	-
Modifier Overlaps	-	-	-	-	-	-
Trail Green	0	0	0	0	0	0
Trail Yellow	0.0	0.0	0.0	0.0	0.0	0.0
Trail Red	0.0	0.0	0.0	0.0	0.0	0.0

← NOTICE INCLUDED PHASES

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2		X		2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6		X	X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1		X	X	9
10	Overlap	2		X	X	10
11	Overlap	3		X		11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 02-0923
DESIGNED: Apr 2025
SEALED: 4/24/2025
REVISED: N/A

Electrical Detail Sheet 2 of 2

Plans Prepared By:
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
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NC License No. F-1524 (704) 549-4260

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 43
at
Savoy Drive/Shadow Brook Lane

Division 2 Craven County New Bern

PLAN DATE: April 2025	REVIEWED BY: BN Groome
PREPARED BY: DS Griffith	DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

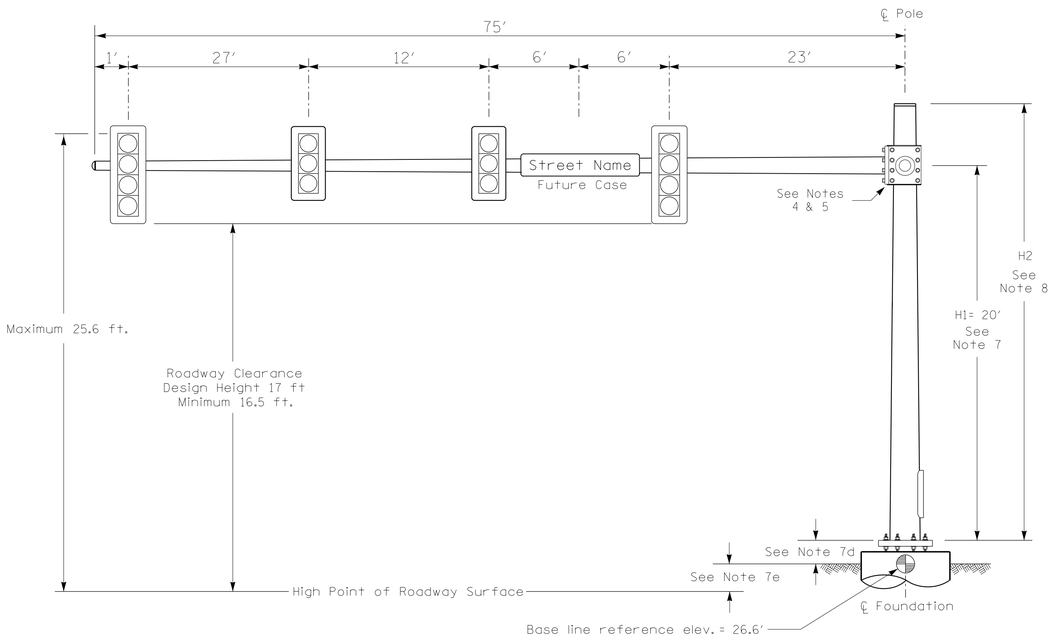
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

Signed by:
Brittany N Groome
1E09340E1094484...
4/24/2025
DATE

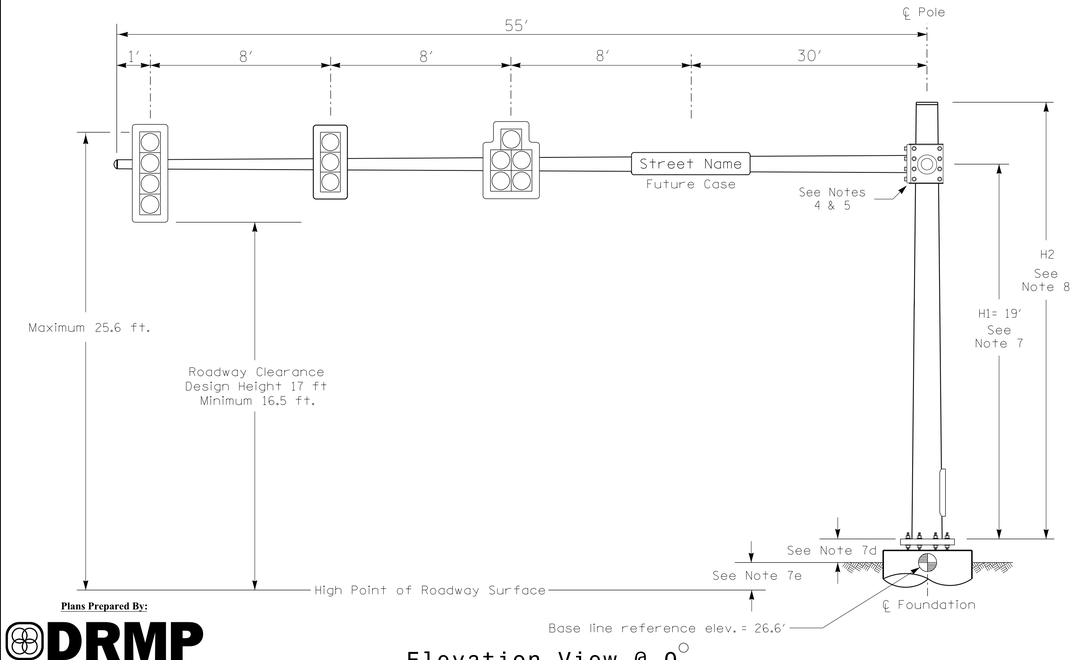
SIG. INVENTORY NO. 02-0923

Design Loading for METAL POLE NO. 1



Elevation View @ 270°

Design Loading for METAL POLE NO. 2



Elevation View @ 0°

Plans Prepared By:

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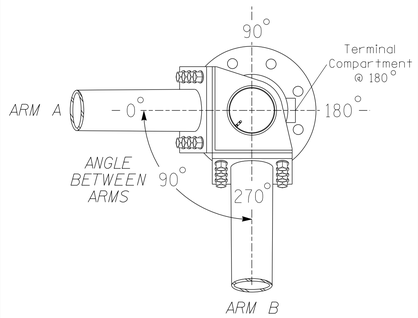
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

SPECIAL NOTE

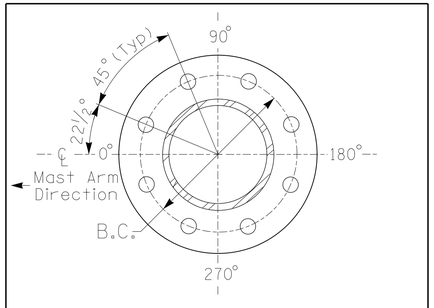
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at ℄ Foundation @ ground level	26.6 ft.	26.3 ft.
Elevation difference at High point of roadway surface	+6.5 ft.	+0.7 ft.
Elevation difference at Edge of travelway or face of curb	+4.1 ft.	-0.4 ft.

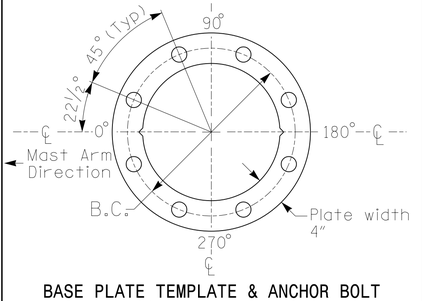


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

METAL POLE No. 1 and 2

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-7.3

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0" W X 56.0"L	103 LBS
	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

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. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (140 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 43
at
Savoy Drive/Shadow Brook Lane

Division 2 | Craven County | New Bern

PLAN DATE:	April 2025	REVIEWED BY:	BN Groome
PREPARED BY:	DS Griffith	DRMP PROJ. NO.:	17359 (040)

SCALE	REVISIONS	INIT.	DATE
N/A			

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

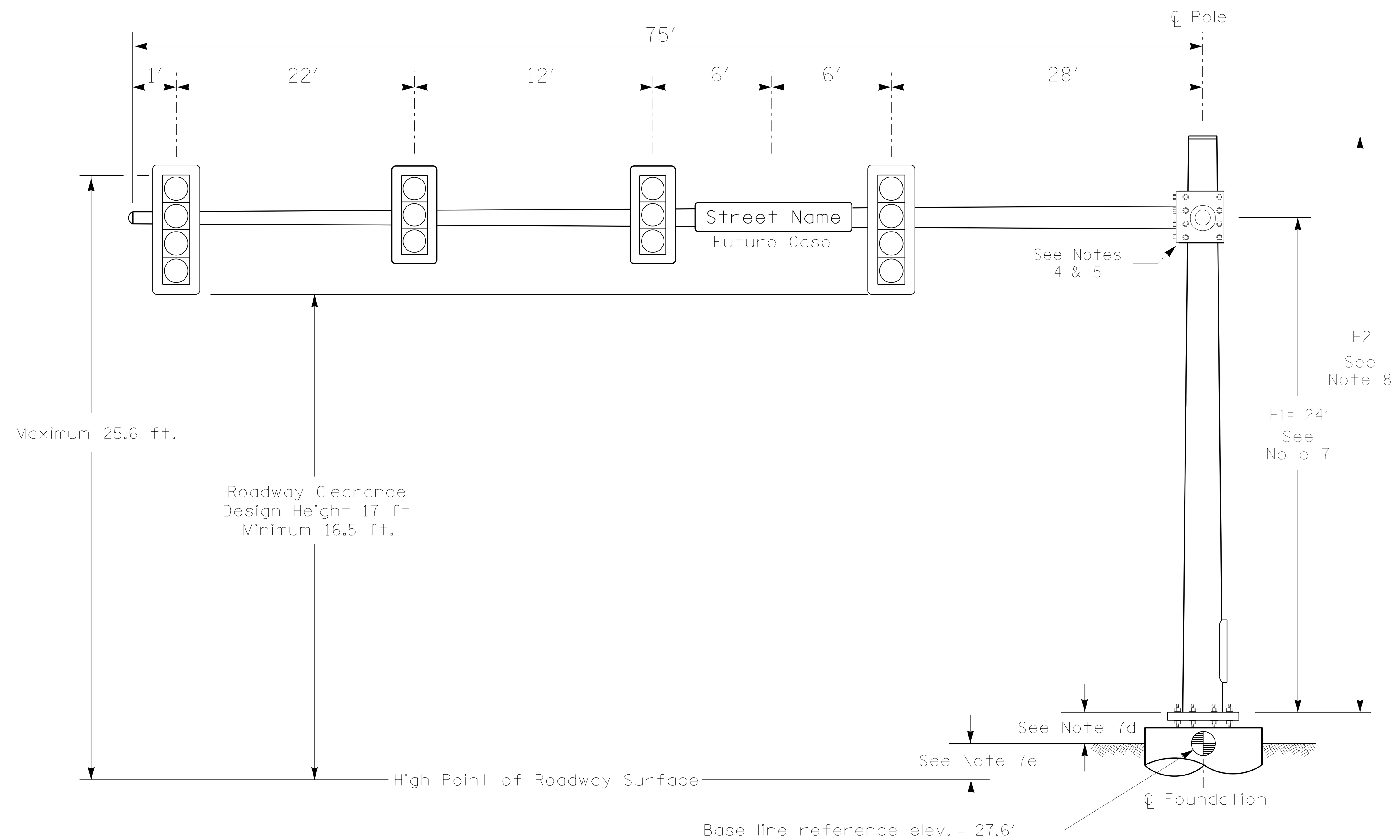
Signed by: Brittany N Groome 4/24/2025
1E0D940E5D0E4BA... DATE

SIG. INVENTORY NO. 02-0923

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-7.4

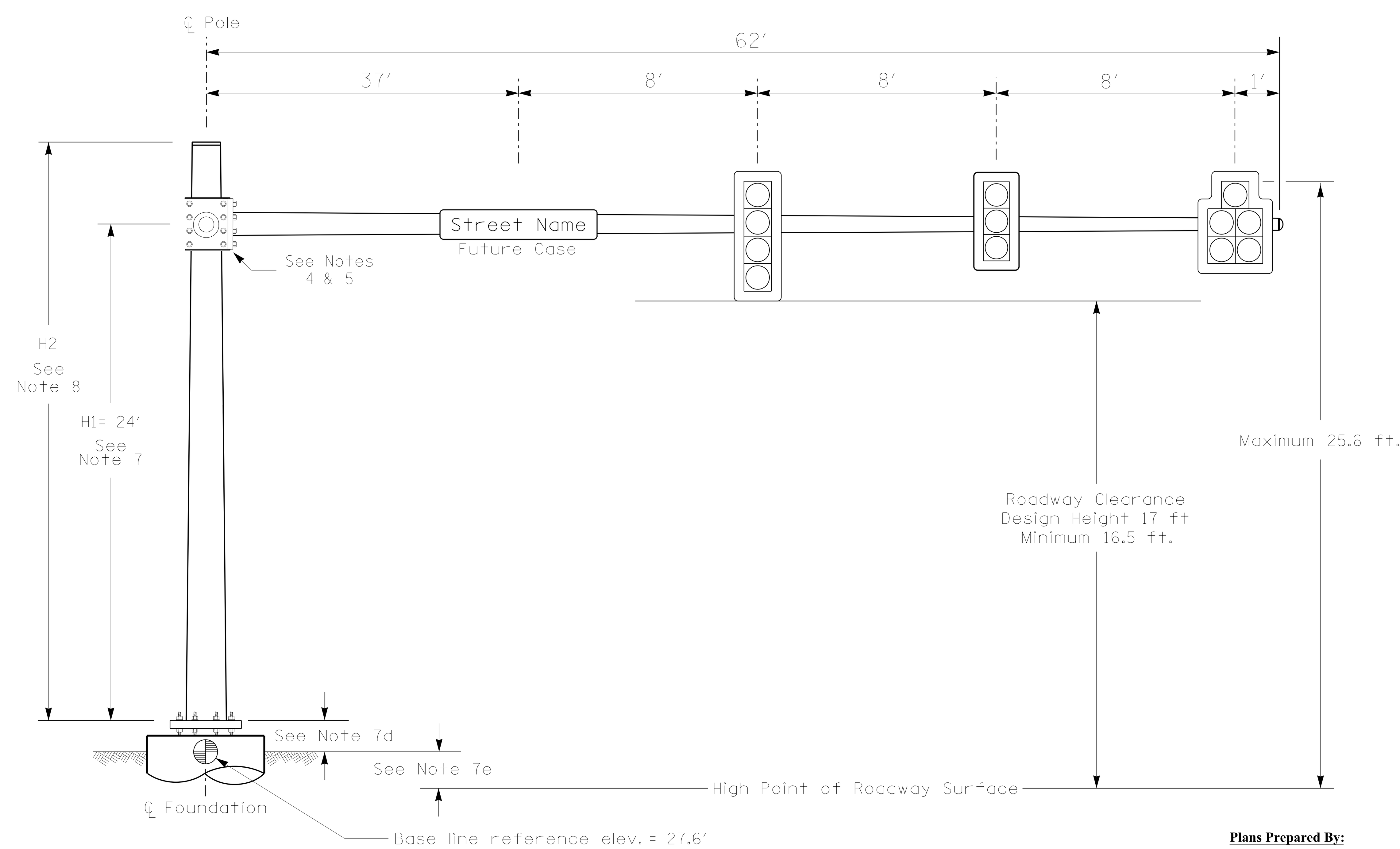
METAL POLE No. 3

Design Loading for METAL POLE NO. 3, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 3, MAST ARM B



Elevation View @ 0°

Plans Prepared By:

DRMP

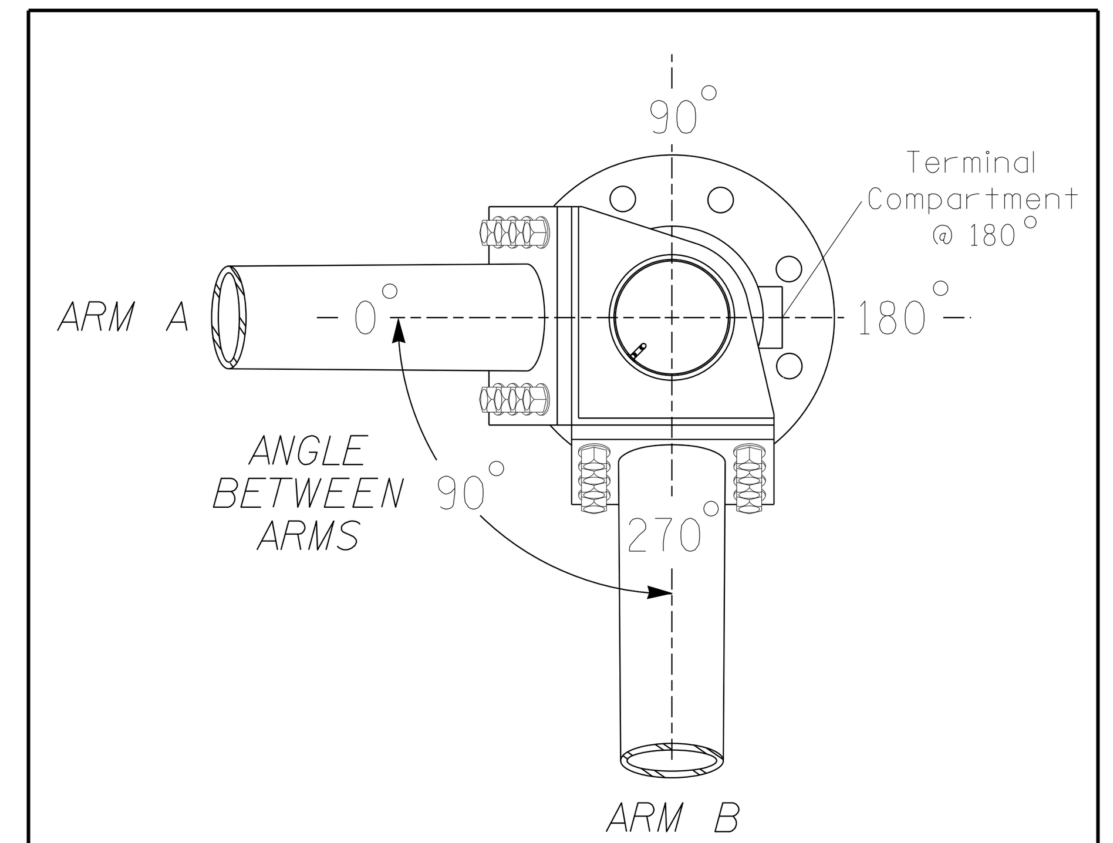
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

SPECIAL NOTE

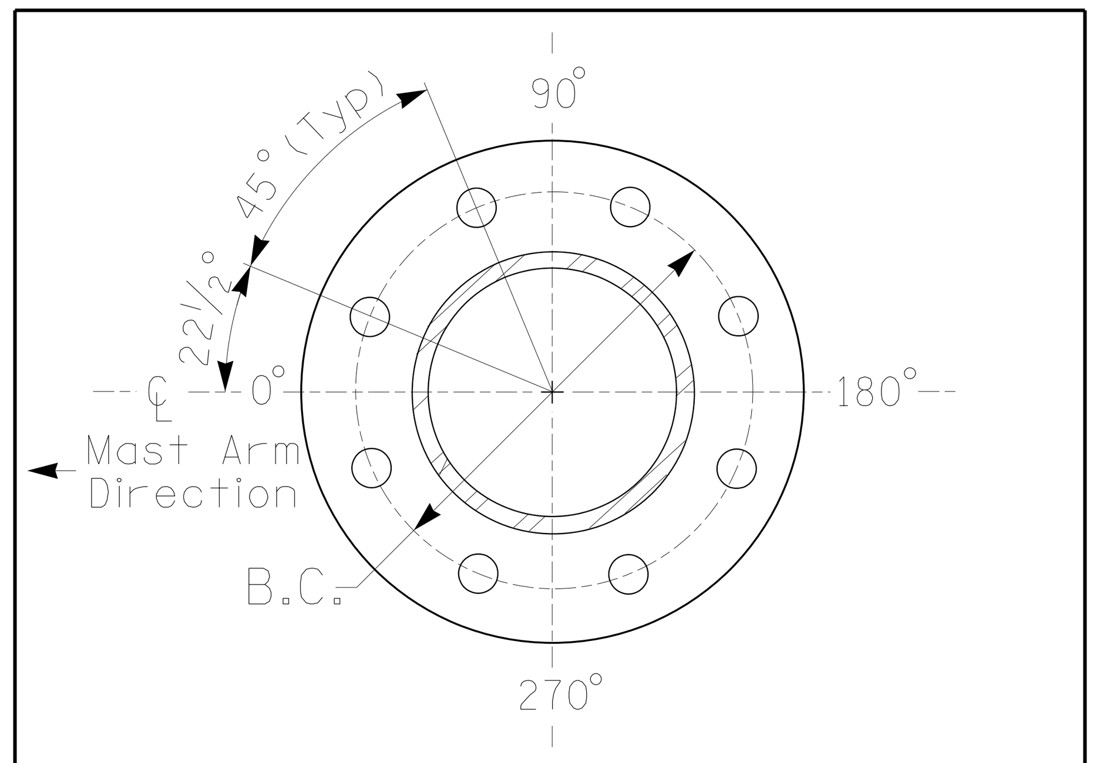
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at ℄ Foundation @ ground level	27.6 ft.	27.6 ft.
Elevation difference at High point of roadway surface	+5.1 ft.	+0.3 ft.
Elevation difference at Edge of travelway or face of curb	+2.7 ft.	-0.4 ft.

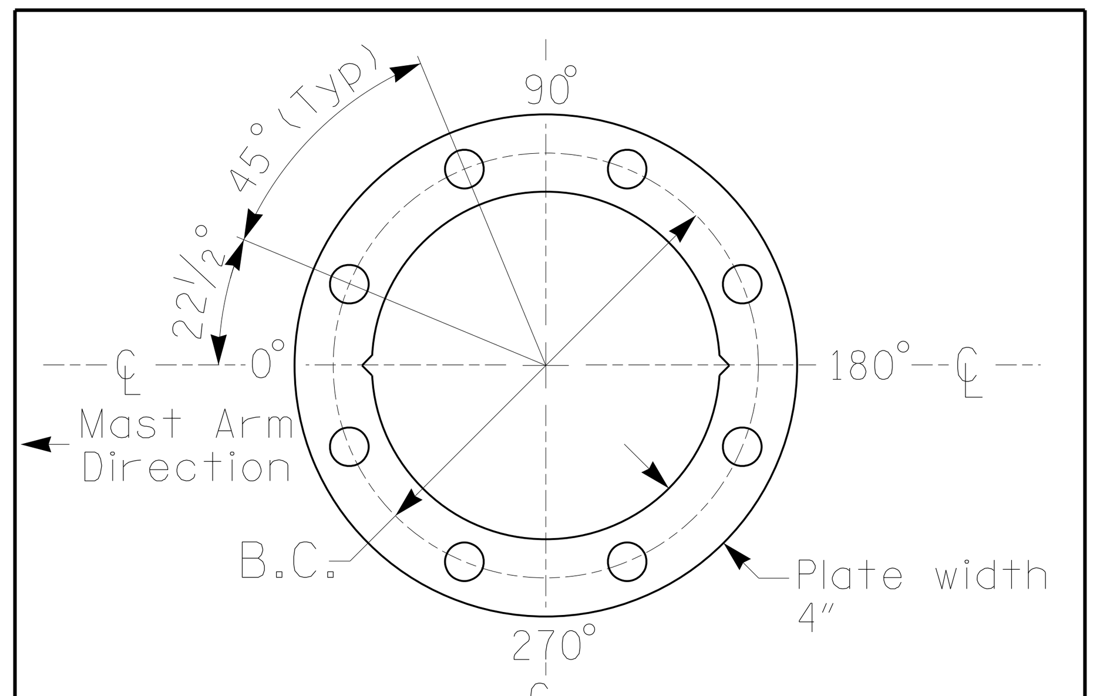


POLE RADIAL ORIENTATION



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″-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0″W X 56.0″L	103 LBS
	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

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. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (140 mph)

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

NC 43
at
Savoy Drive/Shadow Brook Lane

Division 2	Craven County		New Bern
PLAN DATE:	April 2025	REVIEWED BY:	BN Groome
PREPARED BY:	DS Griffith	DRMP PROJ. NO.:	17359 (040)

SCALE: N/A

REVISIONS | INIT. | DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N. GROOME

Signed by: Brittany N Groome 4/24/2025

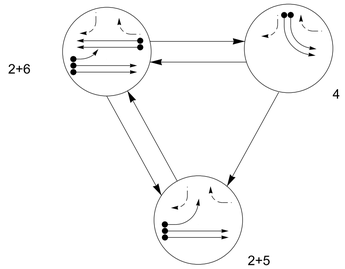
DATE

SIG. INVENTORY NO. 02-0923

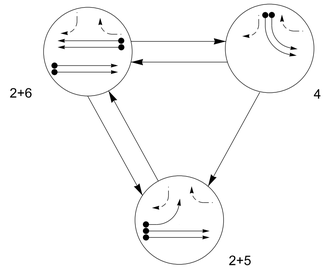
23-APR-2025 19:37
D:\Raleigh\Raleigh_RKA_Projects\2017 Projects\17359 R-4463A - Craven County, NC\Signal\04-Design\02-0923\02-0923_mp.dgn
klones AT DHA-KJONES

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-8.0

DEFAULT PHASING DIAGRAM

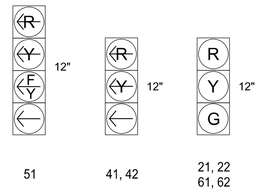


ALTERNATE PHASING DIAGRAM



SIGNAL FACE I.D.

All Heads L.E.D.



51 | 41, 42 | 21, 22, 61, 62

MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
ZONE(S)	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
4A	6X40	0	@	@	4	-	-	X	-	X	-	@
4B	6X40	0	@	@	4	-	-	X	-	X	-	@
5A	6X40	0	@	@	5	15.0*	-	X	-	X	-	@
					2#	-	-	X	-	X	-	@

@ Multizone Microwave Detection
# Disable Phase call for loop during Alternate Phasing operation.
* Disable Delay during Alternate Phasing operation.

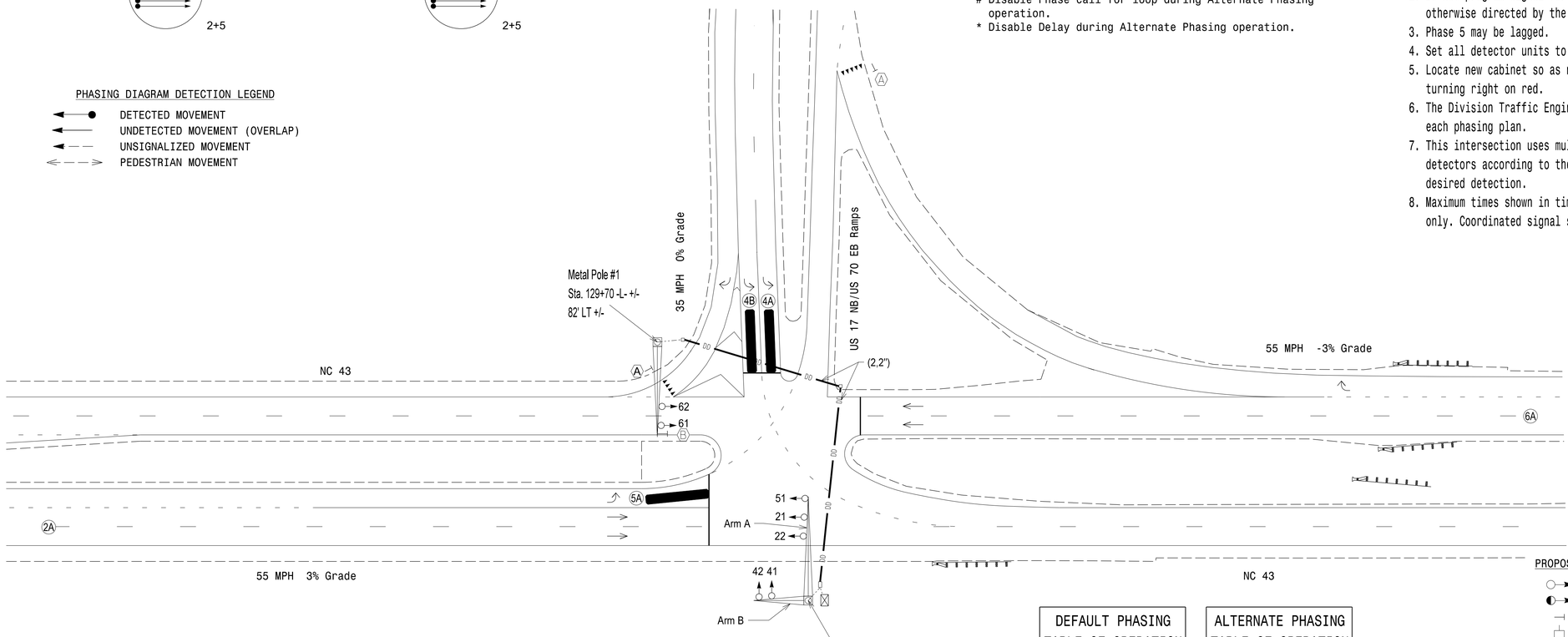
3 Phase
Fully Actuated
US 17 Bus. (MLK Blvd) CLS
D02-15_New Bern

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 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. The Division Traffic Engineer will determine the hours of use for each phasing plan.
7. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve desired detection.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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



MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	4	5	6
Walk *	–	–	–	–
Ped Clear *	–	–	–	–
Min Green	14	7	7	14
Passage *	2.0	2.0	2.0	2.0
Max 1 *	90	30	15	90
Yellow Change	5.5	3.0	3.0	5.5
Red Clear	1.2	3.6	3.1	1.2
Added Initial *	–	–	–	–
Maximum Initial *	–	–	–	–
Time Before Reduction *	–	–	–	–
Time To Reduce *	–	–	–	–
Minimum Gap	–	–	–	–
Advance Walk	–	–	–	–
Non Lock Detector	–	X	X	–
Vehicle Recall	MIN RECALL	–	–	MIN RECALL
Dual Entry	–	–	–	–

* 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.

Microwave Detection						
	2A			6A		
FUNCTION	Sensor 1			Sensor 1		
Channel	1			1		
Phase	2			6		
Direction of Travel	NB			SB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	>= 750	< 750	-	>= 750	< 750	-
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed	Y	Y	Y	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N	Y	Y	N
Estimated Time of Arrival (sec)	2.5-10.0	2.5-6.5	-	2.5-10.0	2.5-6.5	-

DEFAULT PHASING TABLE OF OPERATION				
SIGNAL FACE	PHASE			
	2+5	2+6	4	FLASH
21, 22	G	G	R	R
41, 42	~~R~~	~~R~~	~~R~~	~~R~~
51	~~R~~	F Y	~~R~~	~~R~~
61, 62	R	G	R	R

ALTERNATE PHASING TABLE OF OPERATION				
SIGNAL FACE	PHASE			
	2+5	2+6	4	FLASH
21, 22	G	G	R	R
41, 42	~~R~~	~~R~~	~~R~~	~~R~~
51	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	R

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Non-Intrusive Detection Zone	
	Controller & Cabinet	
	Junction Box	
	Oversized Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
DD	Directional Drill	N/A
A	"YIELD" Sign (R1-2)	A
B	"No U-Turn" Sign (R3-4)	B

New Installation

Plans Prepared By:
DRMP
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

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

NC 43
at
US 17 NB/US 70 EB Ramps

Division 2 Craven County New Bern

PLAN DATE: April 2025 REVIEWED BY: BN Groome
PREPARED BY: DS Griffith DRMP PROJ. NO.: 17359 (040)

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

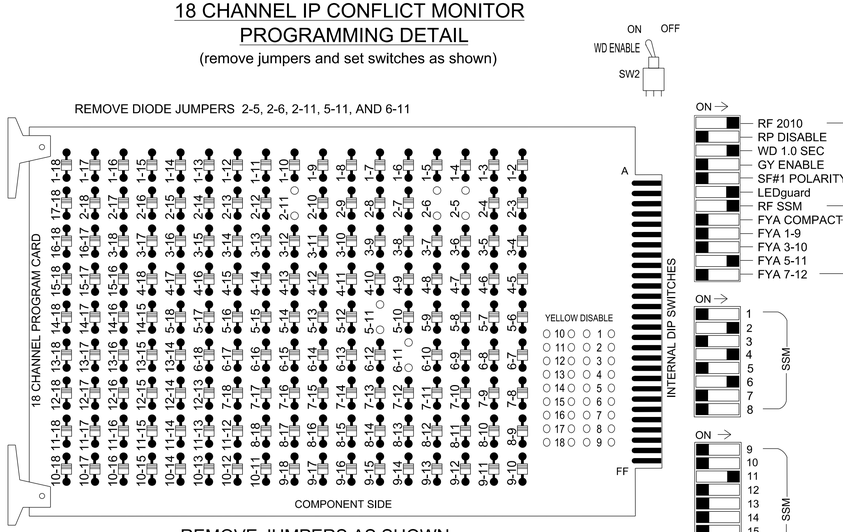
Signed by: Brittany N Groome 4/24/2025
DIGITALLY SIGNED BY BRITTANY N GROOME DATE

SIG. INVENTORY NO. 02-0924

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-8.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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. Integrate monitor with Ethernet network in cabinet.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the US 17 Bus. (MLK Blvd) D02-15_New Bern System.

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.....S2, S5, S7, S8, AUX S4
Phases Used.....2, 4, 5, 6
Overlap "1".....NOT USED
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.	NU	21,22	NU	NU	41,42	NU	51★	61,62	NU	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128						134										
YELLOW		129					*	135										
GREEN		130						136										
RED ARROW					101											A114		
YELLOW ARROW					102											A115		
FLASHING YELLOW ARROW																A116		
GREEN ARROW					103		133											
✋																		
🚶																		

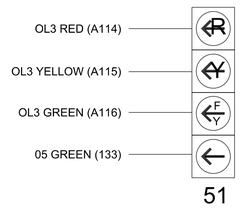
NU = Not Used

★ Denotes see pictorial of head wiring in detail below.

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

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

For Detection Zone 5A the equipment and slots reserved are typical for a NCDOT installation.

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
5A	TB3-1,2	J1U	55	17	15★	5	15.0		X		X	
				-	31★	2			X		X	

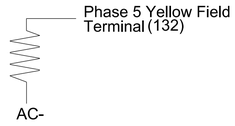
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



SPECIAL DETECTOR NOTE

Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

Plans Prepared By:

DRMP

DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 02-0924
DESIGNED: Apr 2025
SEALED: 4/24/2025
REVISED: N/A

Electrical Detail
Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 43
at
US 17 NB/US 70 EB Ramps

Division 2 Craven County New Bern

PLAN DATE: April 2025 REVIEWED BY: BN Groome
PREPARED BY: DS Griffith DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

SEAL

Signed by: Brittany N Groome 4/24/2025
DOCUSIGNED BY: DATE

SIG. INVENTORY NO. 02-0924

Transportation Mobility and Safety Division
NC DEPARTMENT OF TRANSPORTATION
Traffic Engineering Branch
Signals Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-8.2

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

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 and/or City Traffic Engineer.

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu>Controller>Unit

Web Interface
Home>Controller>Unit

Start Up Parameters

Startup Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

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

5A

Detector	Call Phase	Delay
15	5	0.0
31	0	3.0

OUTPUT CHANNEL CONFIGURATION

Front Panel
Main Menu >Controller >More>Channels>Channels Config

Web Interface
Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1		X	X	1
2	Phase Vehicle	2		X		2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6		X	X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1		X	X	9
10	Overlap	2		X	X	10
11	Overlap	3		X		11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	8				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18

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 2 AND VEHICLE DETECTOR PLAN 2 ACTIVATE TO CALL THE "ALTERNATE PHASING":

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

VEH DET PLAN 2: Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

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.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 02-0924
DESIGNED: Apr 2025
SEALED: 4/24/2025
REVISED: N/A

Electrical Detail
Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Plans Prepared By:

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC Department of Transportation Mobility and Safety Division Traffic Engineering Branch Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 43
at
US 17 NB/US 70 EB Ramps

Division 2 Craven County New Bern

PLAN DATE: April 2025	REVIEWED BY: BN Groome
PREPARED BY: DS Griffith	DRMP PROJ. NO.: 17359 (040)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME

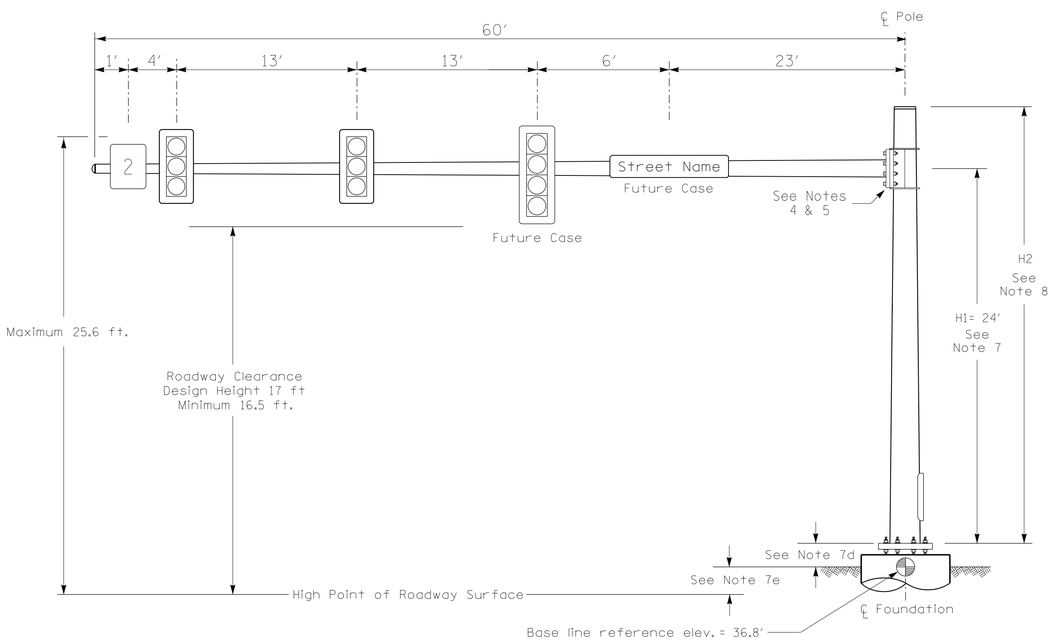
Signed by: Brittany N Groome 4/24/2025
BRITTANY N GROOME DATE

SIG. INVENTORY NO. 02-0924

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-8.3

Design Loading for METAL POLE NO. 1



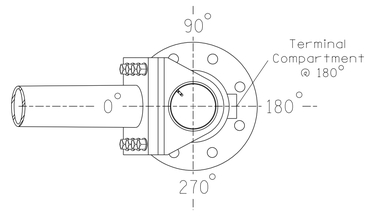
Elevation View

SPECIAL NOTE

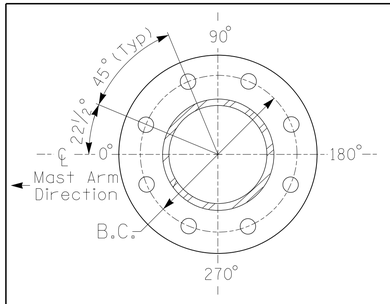
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at ℄ Foundation @ ground level	36.8 ft.	
Elevation difference at High point of roadway surface	+4.5 ft.	
Elevation difference at Edge of travelway or face of curb	-1.8 ft.	

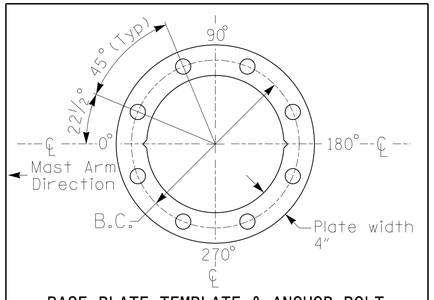


POLE RADIAL ORIENTATION



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"-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

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. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (140 mph)

Plans Prepared By:
DRMP
DRMP, Inc.
8210 University Executive Park Dr, Suite 220
Charlotte, NC 28262
NC License No. F-1524 (704) 549-4260

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 43
at
US 17 NB/US 70 EB Ramps

Division 2 | Craven County | New Bern

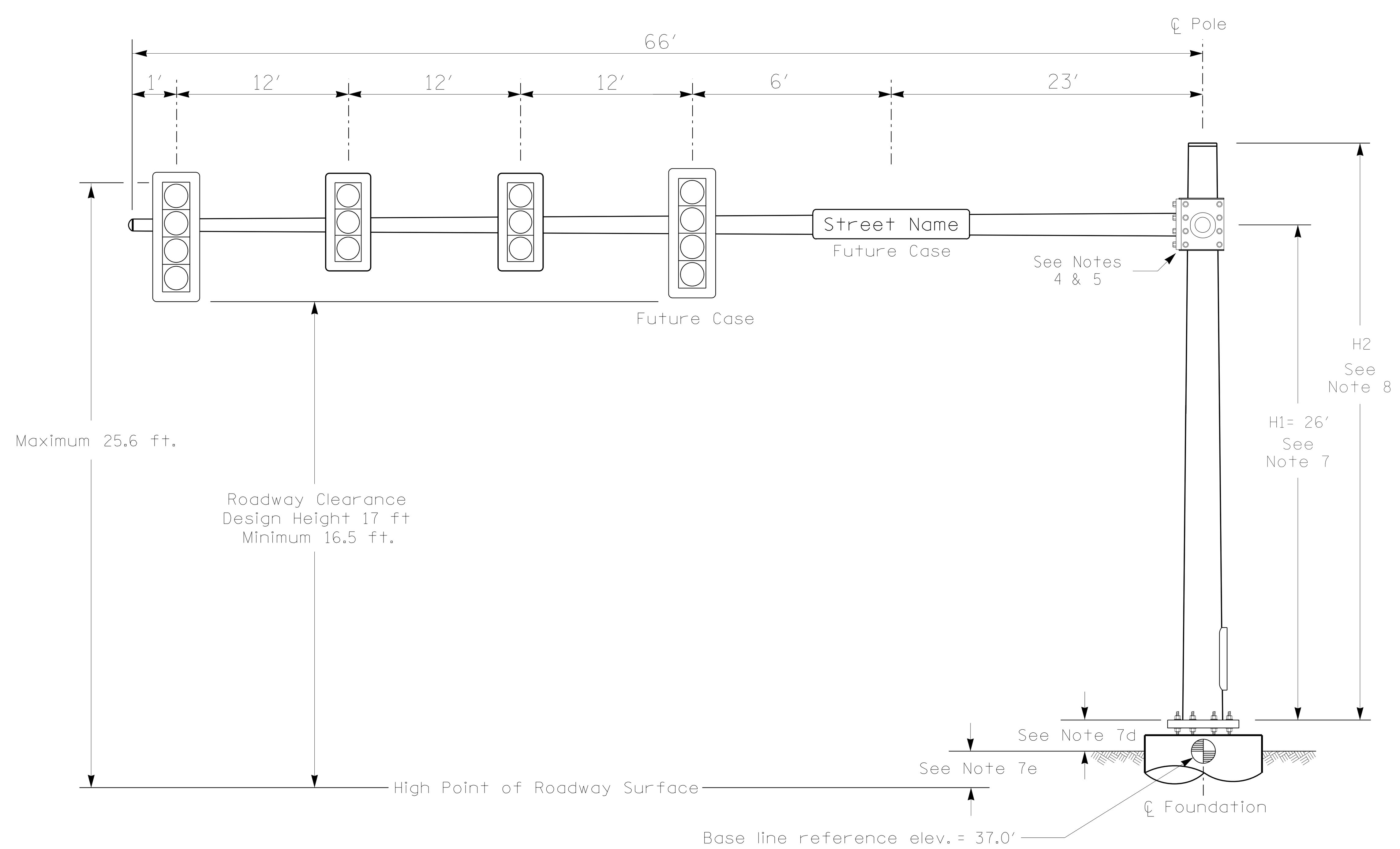
PLAN DATE: April 2025 | REVIEWED BY: BN Groome
PREPARED BY: DS Griffith | DRMP PROJ. NO.: 17359 (040)

SCALE: N/A

REVISIONS	INIT.	DATE

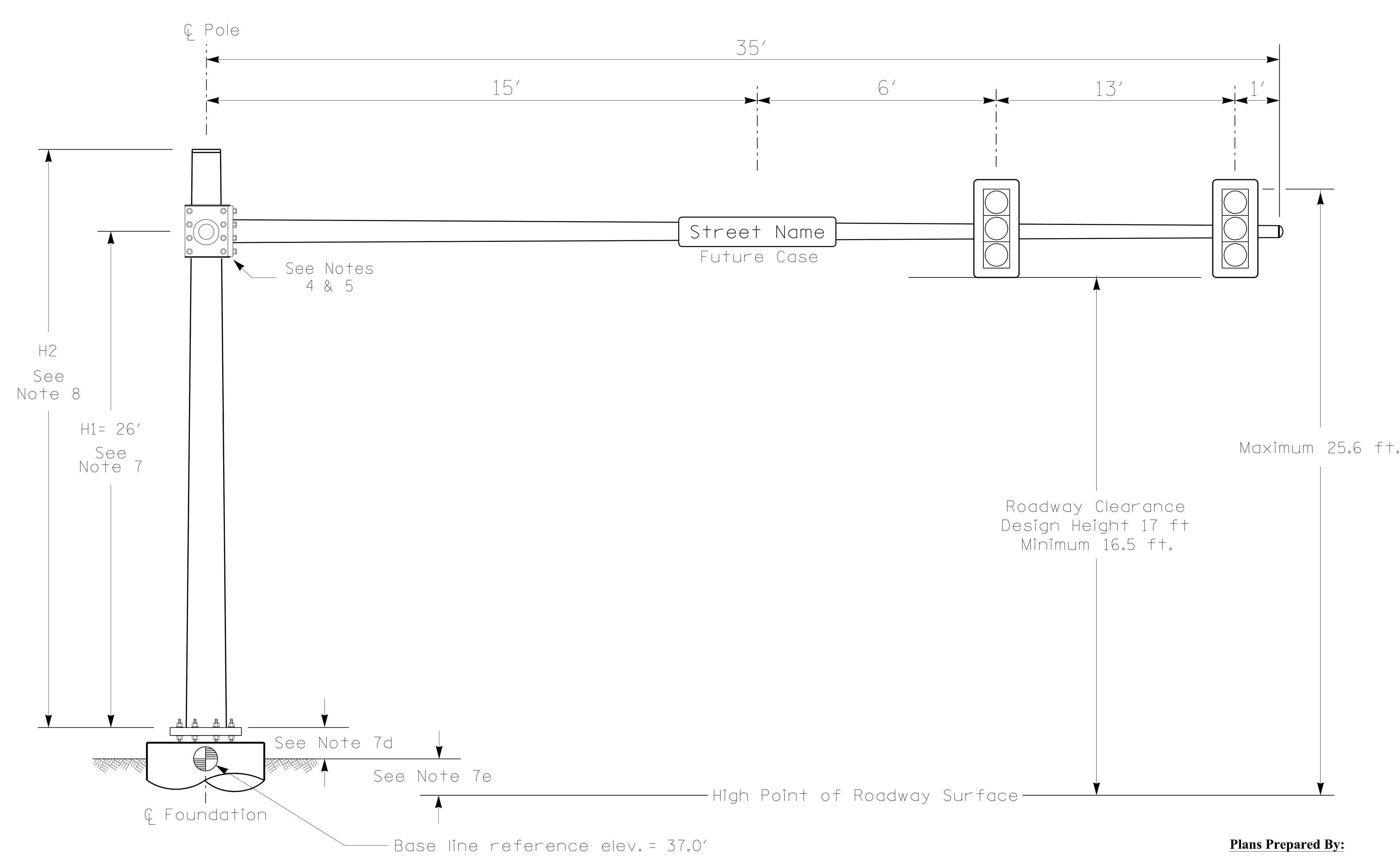
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 052936 ENGINEER BRITTANY N GROOME
Signed by: Brittany N Groome 4/24/2025
SIGNATURE DATE
SIG. INVENTORY NO. 02-0924

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



Elevation View @ 270°

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



Elevation View @ 0°

Plans Prepared By:

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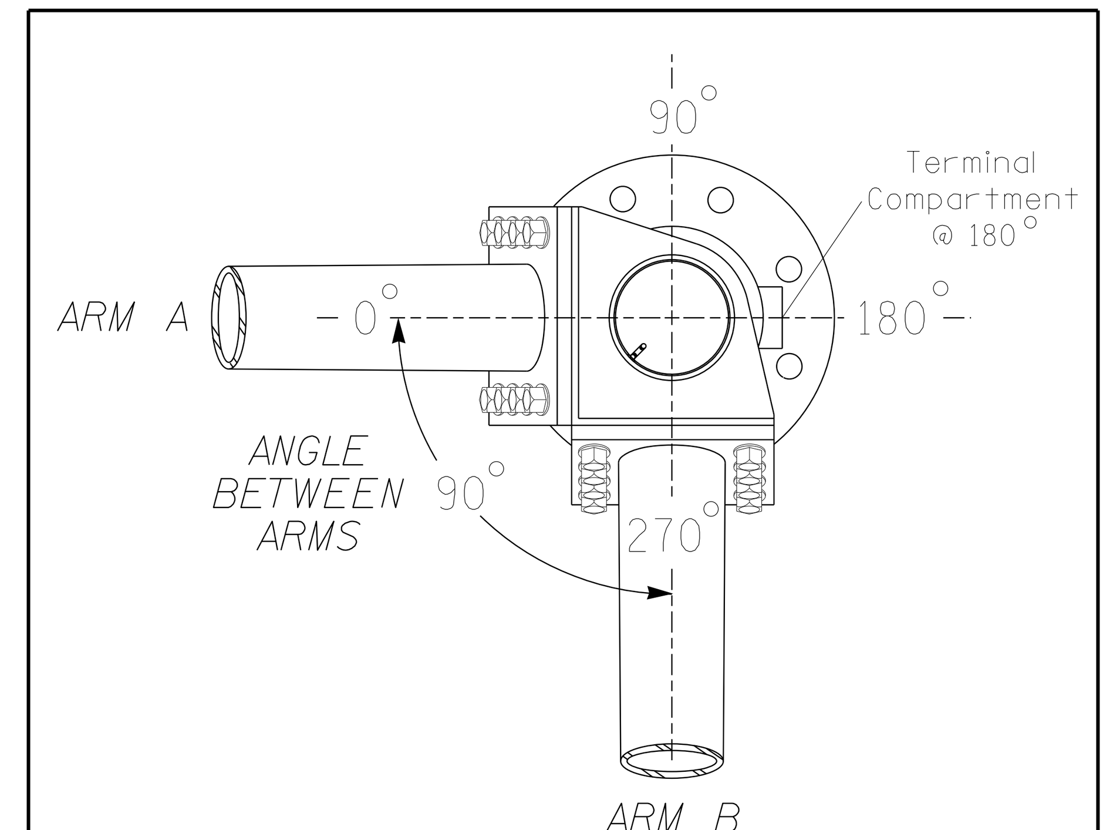
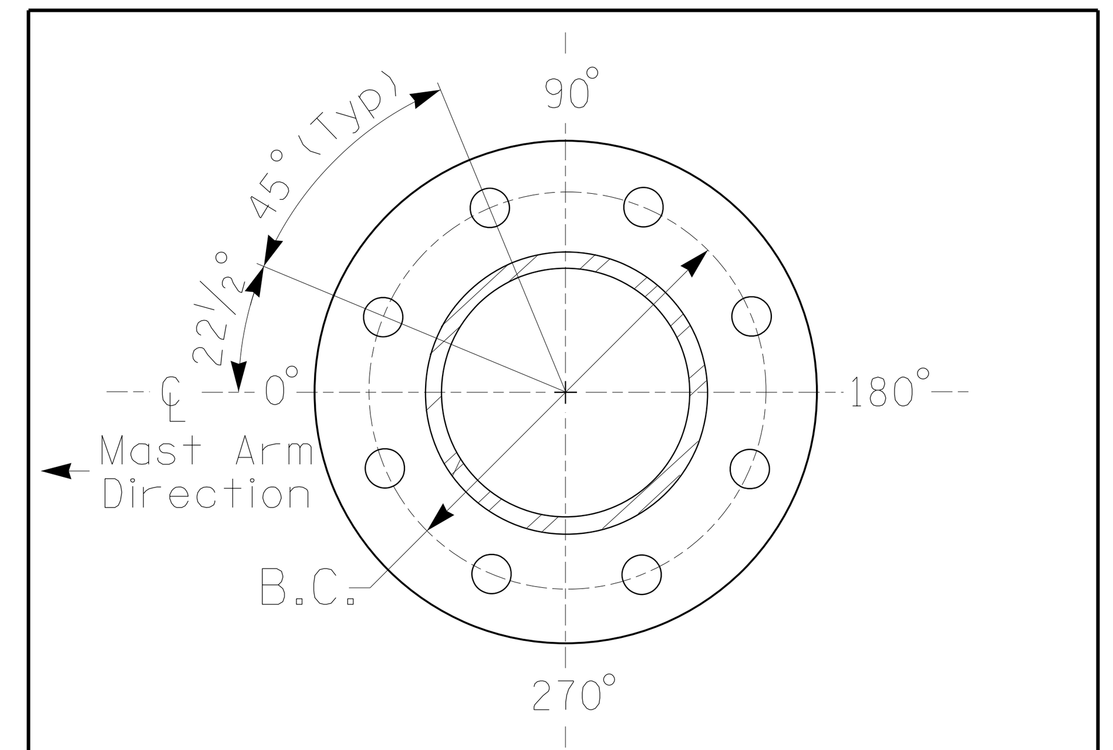
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at ℄ Foundation @ ground level	37.0 ft.	37.0 ft.
Elevation difference at High point of roadway surface	+6.9 ft.	0.0 ft.
Elevation difference at Edge of travelway or face of curb	+6.4 ft.	0.0 ft.

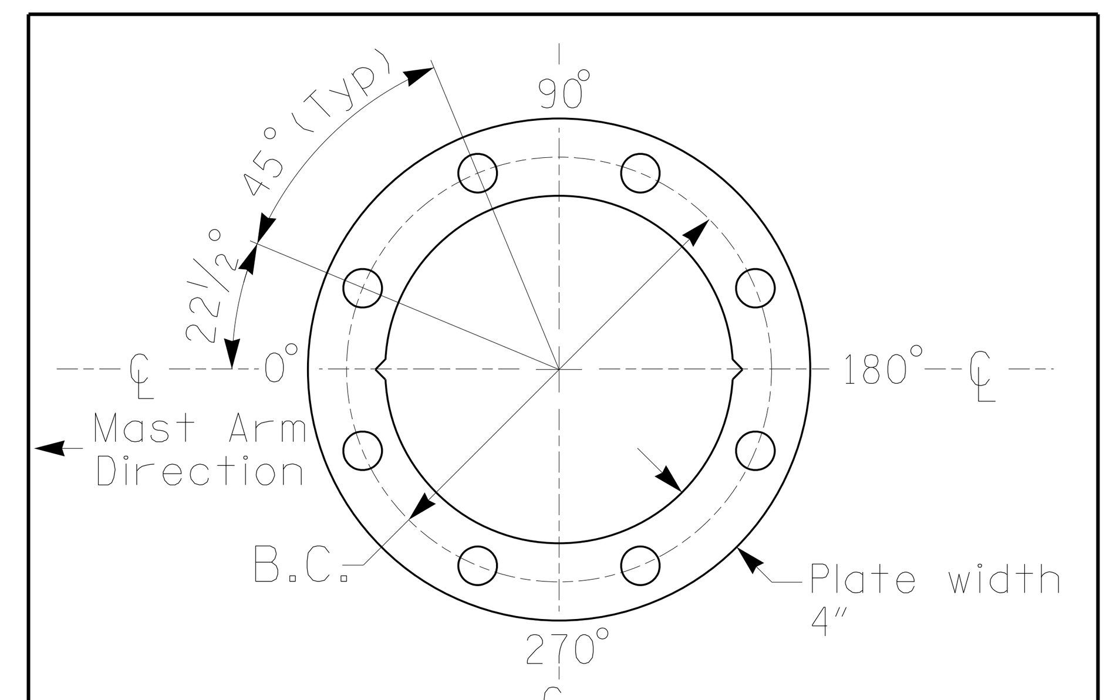


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

METAL POLE No. 2

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	Sig-8.4

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
(4-section signal head symbol)	RIGID MOUNTED SIGNAL HEAD 12″-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5″W X 66.0″L	74 LBS
(3-section signal head symbol)	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

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   d. The top of the pole base plate is 0.75 feet above the ground elevation.
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Transportation Mobility and Safety Division — State of North Carolina Department of Transportation — Signal Design Section
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Signed by: Brittany N Groome 1E09340E1094484... 4/24/2025
DATE

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