TIP Project: R-5857

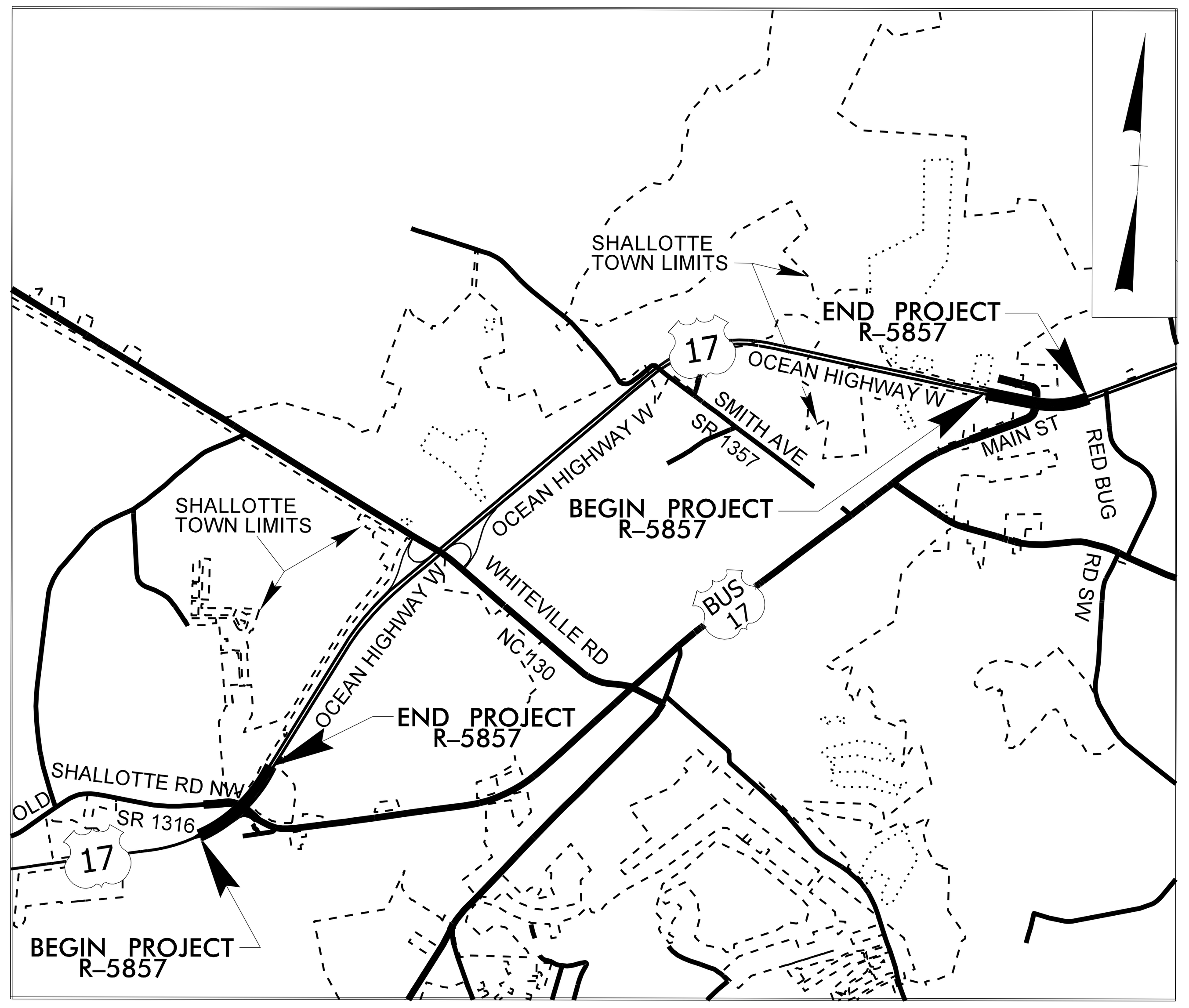
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

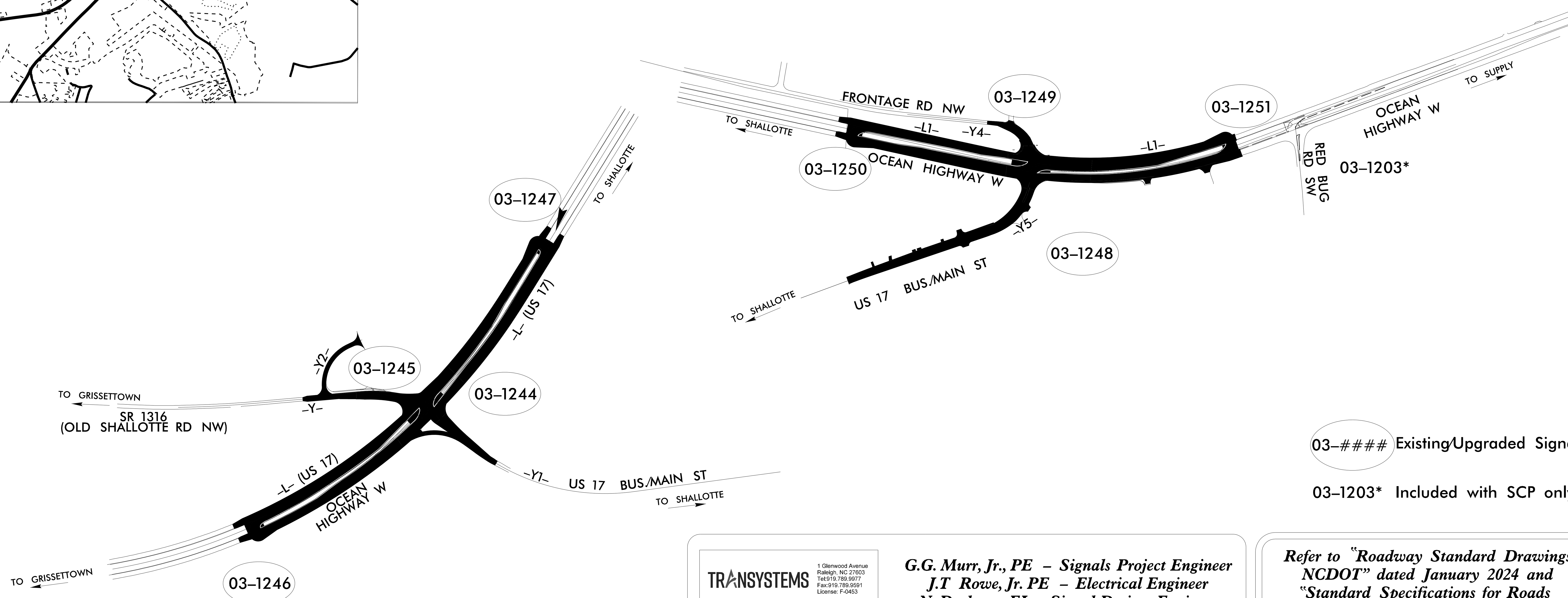
BRUNSWICK COUNTY

LOCATION: US 17 BUSINESS SOUTH OF SHALLOTTE AND US 17 BUSINESS NORTH OF SHALLOTTE. CONVERT INTERSECTIONS TO REDUCED CONFLICT INTERSECTIONS.

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS

Vicinity





03-#### Existing/Upgraded Signal

03-1203* Included with SCP only.

TRANSYSTEMS 1 Glenwood Avenue Raleigh, NC 27603 Tel:919.789.9977 Fax:919.789.9591 License: F-0453

G.G. Murr, Jr., PE – Signals Project Engineer
J.T Rowe, Jr. PE – Electrical Engineer
N. Degbotse, EI – Signal Design Engineer

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

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1.0	–	Title Sheet
Sig. 2.0–Sig. 5.3	03–1244	US 17 (Ocean Hwy W) at US 17 Bus (Main St)/SR 1316 (Old Shallotte Rd)
Sig. 6.0–Sig. 7.3	03–1245	US 17 SB (Ocean Hwy W) at SR 1316 (Old Shallotte Rd)
Sig. 8.0–Sig. 8.3	03–1246	US 17 NB (Ocean Hwy W) at U-Turn South of US 17 Bus./Old Shallotte Rd
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M1A–M9	–	NCDOT 2024 Metal Pole Standard Drawing Sheets
SCP1–SCP13	–	Signal Communication Plans

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

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Prepared in the Office of:
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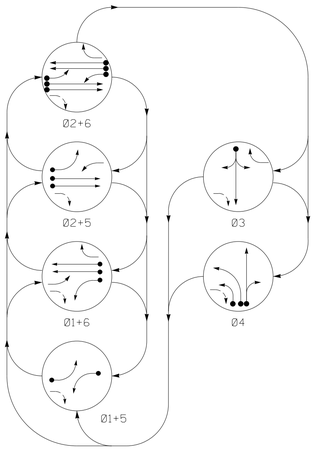
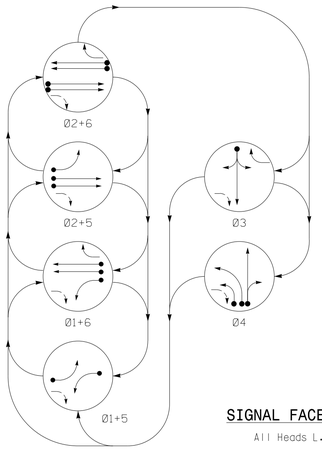
TRANSPORTATION MOBILITY AND SAFETY DIVISION
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
ITS and Signals Unit
750 N. Greenfield Parkway, Garner, NC 27529

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig 2.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



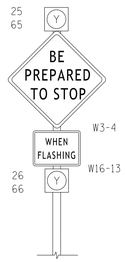
DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	F Y	F Y	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	R	R
31	R	R	R	R	G ←	R	R
32, 33	R	R	R	R	G	R	R
41, 42	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~
43, 44, 45	R	R	R	R	R	G	R
51	←	~~R~~ Y	←	F Y	~~R~~	~~R~~	~~R~~
61, 63	R	G	R	G	R	R	R
62	R	G	R	G	R ↗	R	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	R	R
31	R	R	R	R	G ←	R	R
32, 33	R	R	R	R	G	R	R
41, 42	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~
43, 44, 45	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61, 63	R	G	R	G	R ↗	R	R
62	R	G	R	G	R ↗	R	R

Figure 1



See notes 8 and 9

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	*	0	*	X	1	15**	-	X	-	X	-	*
					6#	-	-	X	-	X	-	*
3A	*	0	*	X	3	5	-	X	-	X	-	*
3B	*	0	*	X	3	15	-	X	-	X	-	*
4A	*	0	*	X	4	3	-	X	-	X	-	*
4B	*	0	*	X	4	-	-	X	-	X	-	*
4C	*	0	*	X	4	10	-	X	-	X	-	*
4D	*	0	*	X	4	15	-	X	-	X	-	*
5A	*	0	*	X	5	15**	-	X	-	X	-	*
					2#	-	-	X	-	X	-	*

* Multizone microwave detection zone
** Disable Delay During Alternate Phasing Operation
\# Disable phase call for loop(s) during Alternate Phasing Operation

PHASING DIAGRAM DETECTION LEGEND

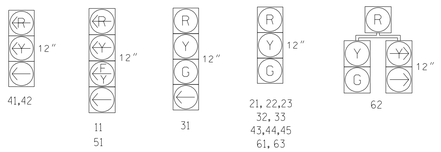
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

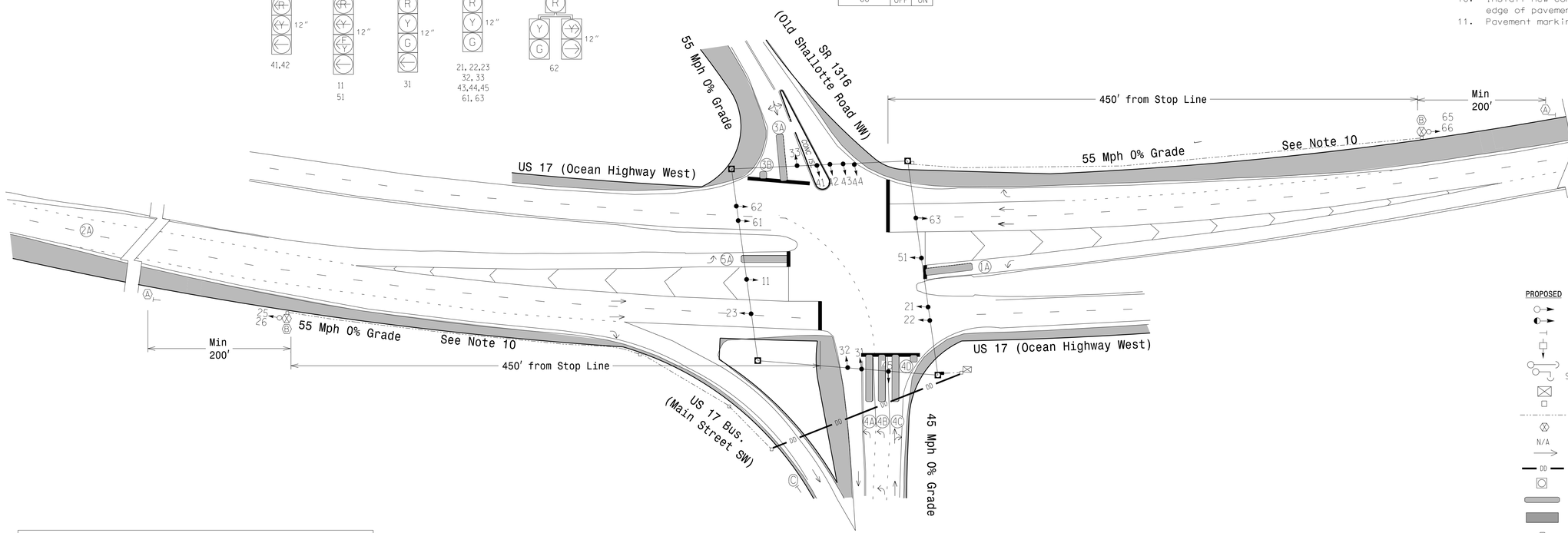
TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	2
25	ON	OFF
26	OFF	ON
65	ON	OFF
66	OFF	ON

SIGNAL FACE I.D.

All Heads L.E.D.





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	·-·-·
Ⓧ	TYPE III Signal Pedestal	⧓
N/A	Right of Way	N/A
→	Directional Arrow	→
DD	Directional Drill	N/A
◯	Metal Strain Pole	◘
▭	Detection Zone	▭
▭	Construction Zone	▭
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Walk *	–	–	–	–	–	–
Ped Clear	–	–	–	–	–	–
Min Green *	7	14	7	7	7	14
Passage *	3.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	45	90	25	25	15	90
Yellow Change	3.0	5.2	5.2	4.5	3.0	5.2
Red Clear	2.8	1.5	1.8	2.4	2.8	1.5
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	–	–	–	–	–	–

* 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.

ADVANCED MICROWAVE EXTENDED RANGE DETECTION

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

6 Phase
Fully Actuated
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "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. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
8. Activate flashers 3 seconds prior to end of phase 2 and/or phase 6 green.
9. Flash vertically-mounted beacons alternately.
10. Install new conduit as close as possible to edge of pavement.
11. Pavement markings are existing.

New Installation - Temporary Design 1 (TMP Phase 1)

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

US 17 (Ocean Highway West) at
US 17 Bus (Main Street SW) /
SR 1316 (Old Shallotte Rd NW)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr, Jr. 3/31/2025
AA6F5076CAB34CF...
SIG. INVENTORY NO. 03-1244T1

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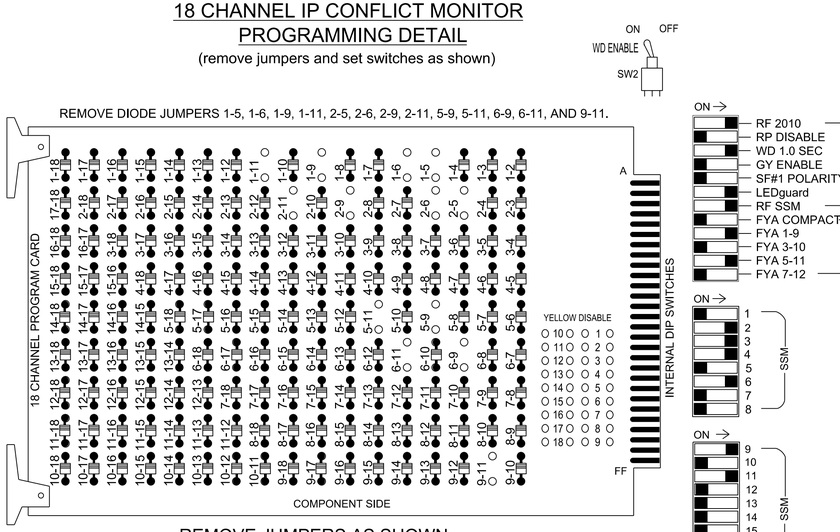
3/31/2025
R-5857_Sig 1.dgn
USER:ndegbotse

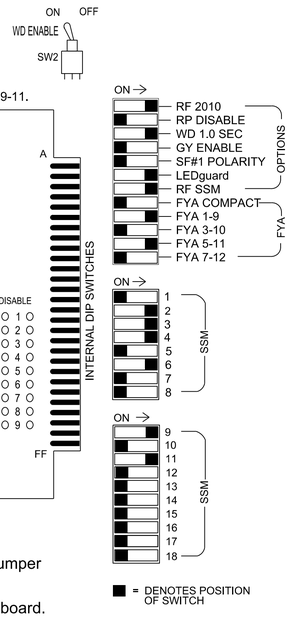
PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 2.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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. Program phases 2 and 6 for Advanced Warning.
4. Program phases 2 and 6 for 3.0 seconds 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.

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	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	11★	21,22, 23	NU	25	31	32,33	62	41,42	43,44, 45	NU	65	51★	61,62, 63	NU	26	NU	NU	NU	66	11★	NU	NU	51★	NU	NU
RED		128			116	116			101				134												
YELLOW	*	129			117	117			102			*	135												
GREEN		130			118	118			103				136												
RED ARROW								101												A121			A114		
YELLOW ARROW							117	102												A122			A115		
FLASHING YELLOW ARROW																				A123			A116		
GREEN ARROW	127				118		118	103				133													
🚶																									
PED YELLOW				** 114							** 105				** 120				** 111						
🚶			*							*				*				*							

NU = Not Used

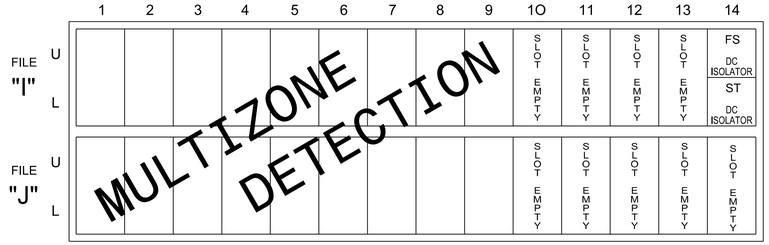
* Denotes install load resistor. See load resistor installation detail this sheet.

** Outputs have been reassigned for Advanced Beacons. See Sheet 3 for reassignment programming and wiring details.

★ See pictorial of head wiring in detail on this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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.

Alternate Phasing Programming on Sheet 2 assumes default MAXTIME detector assignments and layouts, as shown in the Input File Chart below.

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		X		X	
				-	29	6			X		X	
5A	TB3-1,2	J1U	55	17	15	5	15		X		X	
				-	31	2			X		X	

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

EQUIPMENT INFORMATION

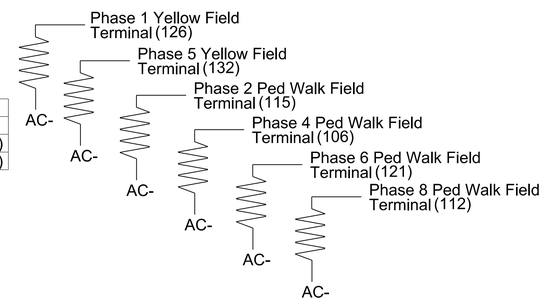
Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S3**,S4, S5, S6**, S7, S8, S9**, S12**, AUX S1, AUX S4
Phases Used.....1, 2, 3, 4, 5, 6
Overlap "1".....*
Overlap "2".....NOT USED
Overlap "3".....*
Overlap "4".....NOT USED

*See overlap programming detail on sheet 2
**Used for advance beacons only

LOAD RESISTOR INSTALLATION DETAIL

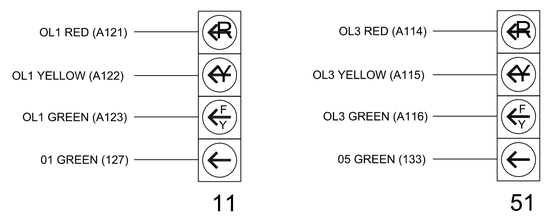
(install resistors as shown)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244T1
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

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Electrical Detail - Sheet 1 of 3

Electrical and Programming Details For:

US 17 (Ocean Highway West)
at
US 17 Bus (Main Street SW) /
SR 1316 (Old Shallotte Rd NW)

Division 3 Brunswick County Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Traffic Engineering & Signals Management Unit
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL
SEAL 008453
ENGINEER
JOHN T. ROWE IV
Signed by: John T. Rowe, Jr
DEFEB32009E7407
4-1-2025
DATE

SIG. INVENTORY NO. 03-1244T1

4/1/2025
03-1244T1_sm.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 2.2

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE CHANGES IN INCLUDED PHASE ROW

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
29	0	-

5A

Detector	Call Phase	Delay
15	5	0
31	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
NOTICE CHANNEL 2 FLASHES RED →	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
NOTICE CHANNEL 6 FLASHES RED →	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED →	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED →	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
PROGRAM CHANNELS 19 & 20 →	19	Adv. Warning Flasher	2				19
AS ADV. WARNING FLASHER →	20	Adv. Warning Flasher	6				20

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

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244T1
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

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Electrical and Programming Details For:

Prepared in the Offices of:
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering & Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 17 (Ocean Highway West)
at
US 17 Bus (Main Street SW) /
SR 1316 (Old Shallotte Rd NW)

Division 3 | Brunswick County | Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

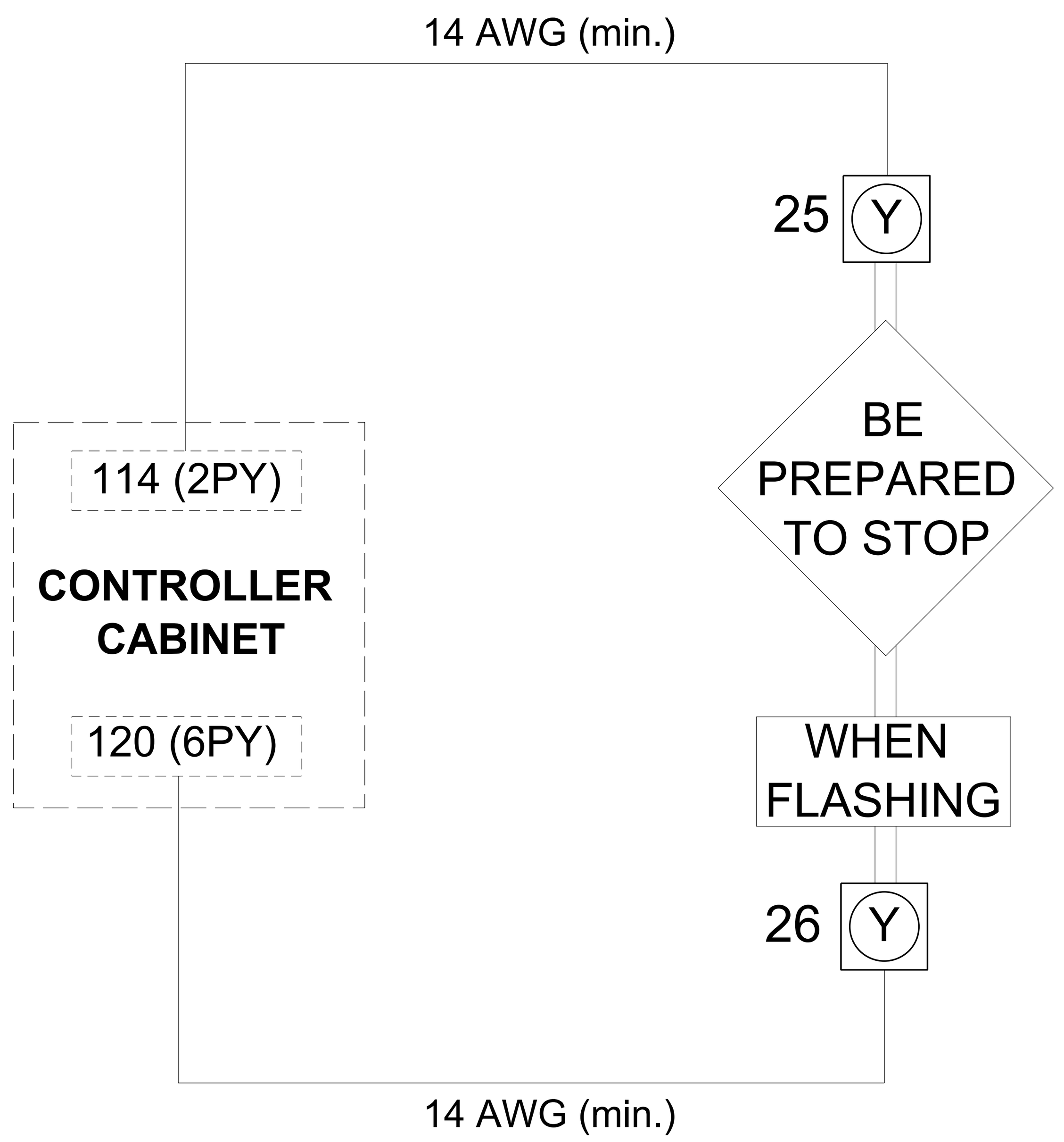
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.
Signed by: John T. Rowe, Jr. 4-1-2025
DATE
SIG. INVENTORY NO. 03-1244T1

4/1/2025
03-1244T1_sm_ele_2025xsy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 2.3

ADVANCE BEACON WIRING DETAIL

(wire flashers as shown below)

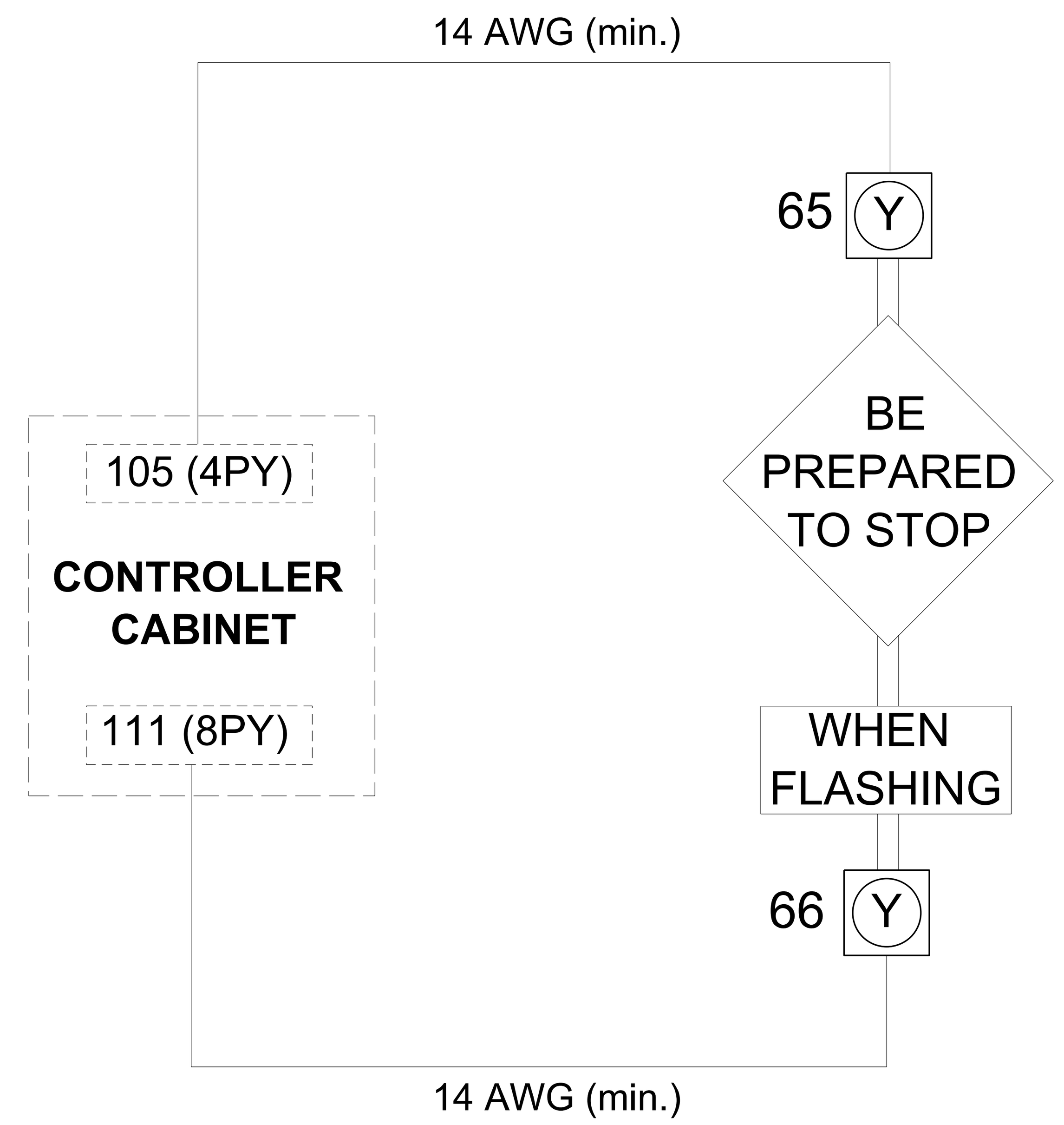


IMPORTANT

1. IF CONNECTED REMOVE, TAPE, AND LABEL CONFLICT MONITOR WIRE ATTACHED TO THE REAR OF TERMINAL 114 (2PY) AND TERMINAL 120 (6PY).
2. INSET LOADSWITCHES FOR S3 AND S9.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 33 AND 34 AS SHOWN ON THIS SHEET.

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. INSET LOADSWITCHES FOR S6 AND S12.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 35 AND 36 AS SHOWN ON THIS SHEET.

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

VEH DET PLAN 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

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

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 25, 26, 65, &66

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244T1
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

Electrical and Programming Details For:

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

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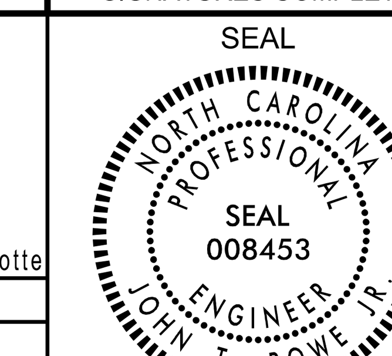
PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL



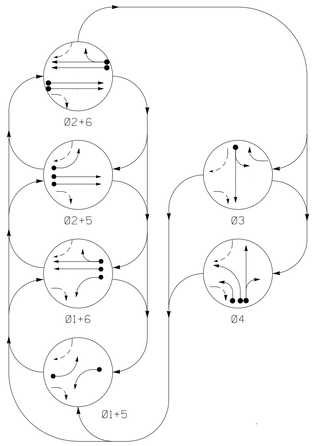
Signed by:
John T. Rowe. Jr
DEFE832009E7407...
4-1-2025
DATE

SIG. INVENTORY NO. 03-1244T1

4/1/2025
...*031244T1_sm_ele_2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 3.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

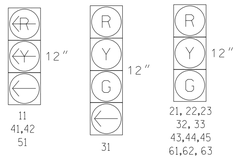
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	↚	↚	R̸	R̸	R̸	R̸	R̸
21, 22, 23	R	R	G	G	R	R	R
31	R	R	R	R	G	R	R
32, 33	R	R	R	R	G	R	R
41, 42	R̸	R̸	R̸	R̸	R̸	↚	R
43, 44, 45	R	R	R	R	R	G	R
51	↚	R̸	↚	R̸	R̸	R̸	R̸
61, 62, 63	R	G	R	G	R	R	R

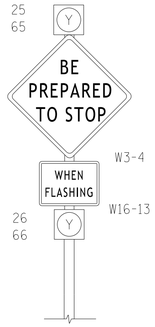
Figure 1

SIGNAL FACE I.D.

All Heads L.E.D.



See notes 7 and 8



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	*	0	*	X	1	-	-	X	-	X	-	*
3A	*	0	*	X	3	3	-	X	-	X	-	*
4A	*	0	*	-	4	3	-	X	-	X	-	*
4B	*	0	*	-	4	-	-	X	-	X	-	*
4C	*	0	*	-	4	10	-	X	-	X	-	*
4D	*	0	*	-	4	15	-	X	-	X	-	*
5A	*	0	*	X	5	-	-	X	-	X	-	*

* Multizone microwave detection zone

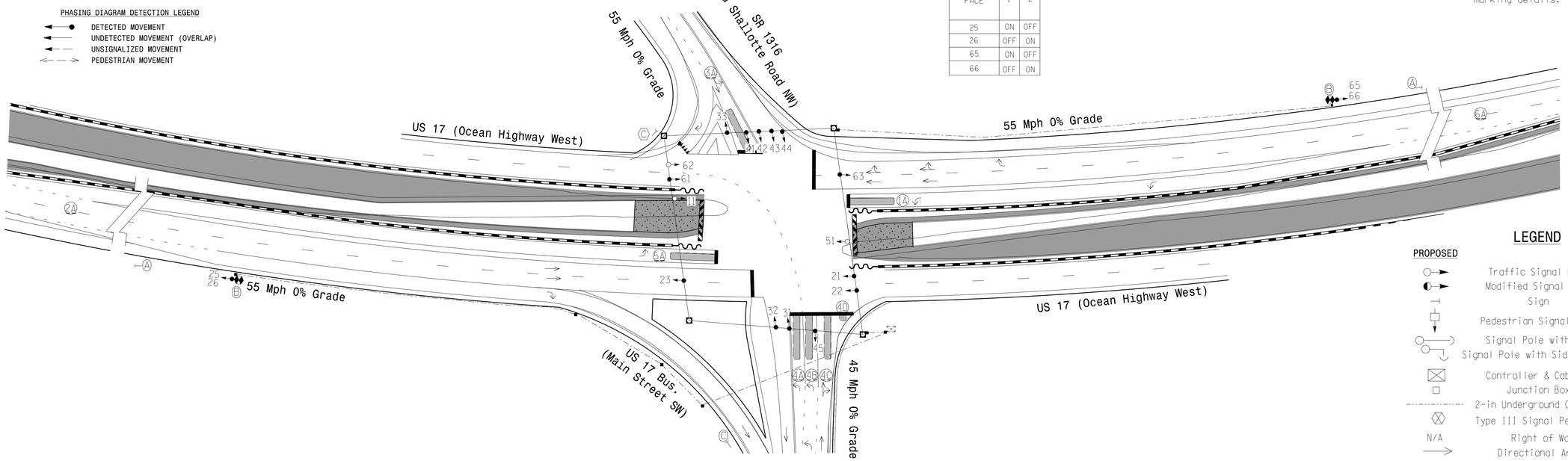
6 Phase
Fully Actuated
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024, "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by theEngineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal head 23, 61 and 63.
6. Set all detector units to presence mode.
7. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
8. Activate flashers 3 seconds prior to end of phase 2 and/or phase 6 green.
9. Flash vertically-mounted beacons alternately.
10. Refer to the TMP for temporary pavement marking details.

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	2
25	ON	OFF
26	OFF	ON
65	ON	OFF
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	●→ ●↓
⊠ □	Controller & Cabinet / Junction Box	⊠ ■
-----	2-in Underground Conduit	-----
⋈	Type III Signal Pedestal	◆◆
N/A	Right of Way	-----
→ DD	Directional Arrow / Directional Drill	→ N/A
◯	Metal Strain Pole	■
▭	Detection Zone	▭
▬	Construction Zone	▬
▬	Temporary Barrier	▬
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-13) (See Figure 1)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Walk *	–	–	–	–	–	–
Ped Clear	–	–	–	–	–	–
Min Green *	7	14	7	7	7	14
Passage *	3.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	45	90	25	25	15	90
Yellow Change	3.0	5.2	5.2	4.5	3.0	5.2
Red Clear	3.4	1.0	1.7	2.4	3.3	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	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.

ADVANCED MICROWAVE EXTEND RANGE DETECTION

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

Signal Upgrade- Temporary Design 2 (TMP Phase 3)

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SR 1316 (Old Shallotte Rd NW)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

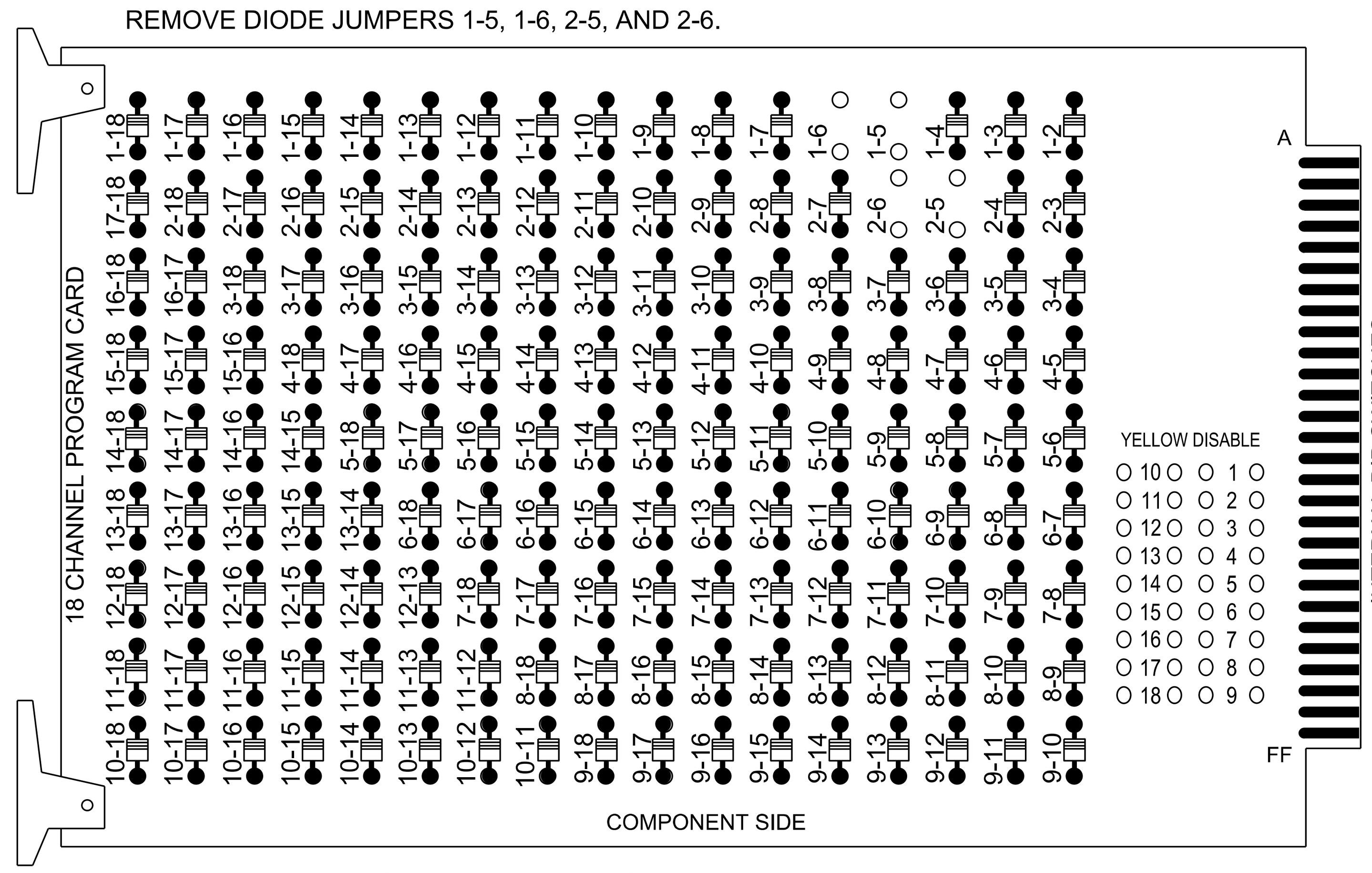
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
3/31/2025
SIG. INVENTORY NO. 03-12412

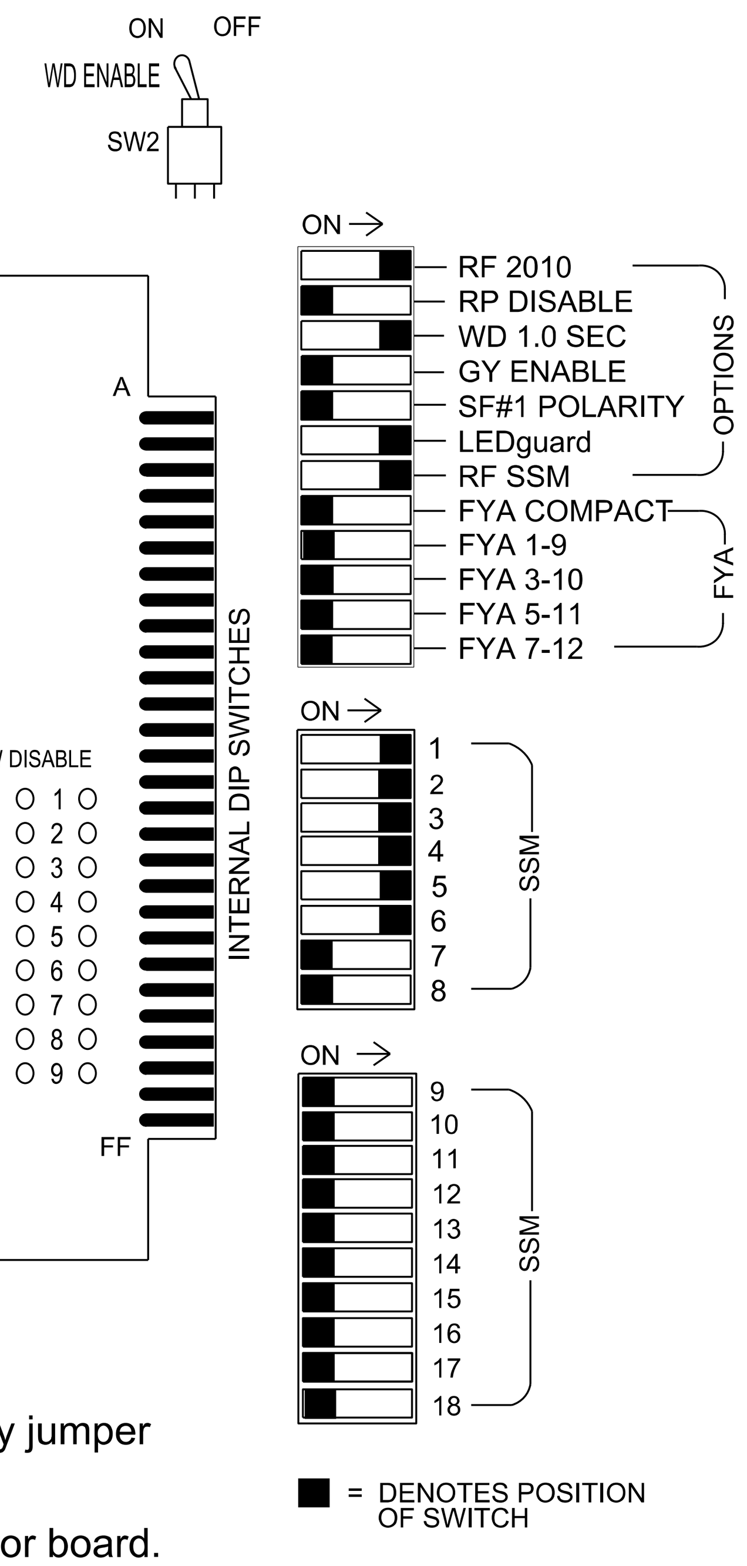
3/31/2025
...\Sig 2.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 3.1

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. Program phases 2 and 6 for Advanced Warning.
4. Program phases 2 and 6 for 3.0 seconds 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.

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	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	11	21,22, 23	NU	25	31	32,33	41,42	43,44, 45	NU	65	51	61,62, 63	NU	26	NU	NU	NU	66	NU	NU	NU	NU	NU	NU
RED		128			116	116		101				134												
YELLOW		129			117	117		102				135												
GREEN		130			118	118		103				136												
RED ARROW	125						101				131													
YELLOW ARROW	126						102				132													
GREEN ARROW	127				118		103				133													
(Don't Walk)																								
PED YELLOW				** 114						** 105				** 120				** 111						
(Walk)			*						*				*				*							

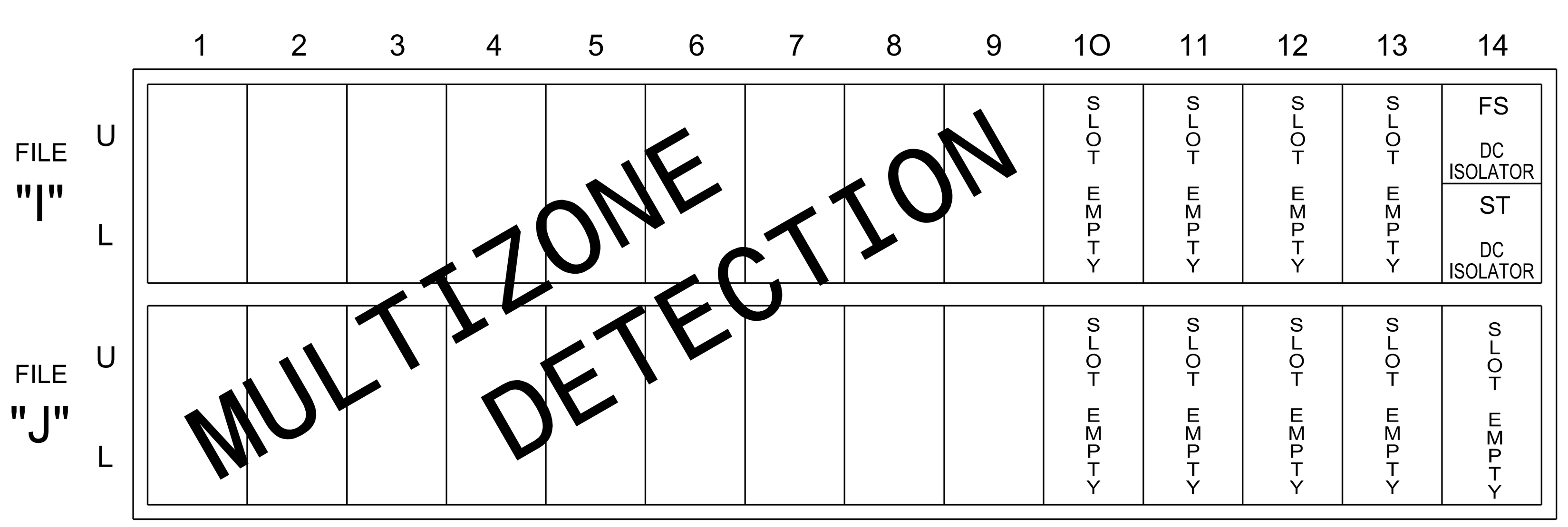
NU = Not Used

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

** Outputs have been reassigned for Advanced Beacons. See Sheet 2 for reassignment programming and wiring details.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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.

EQUIPMENT INFORMATION

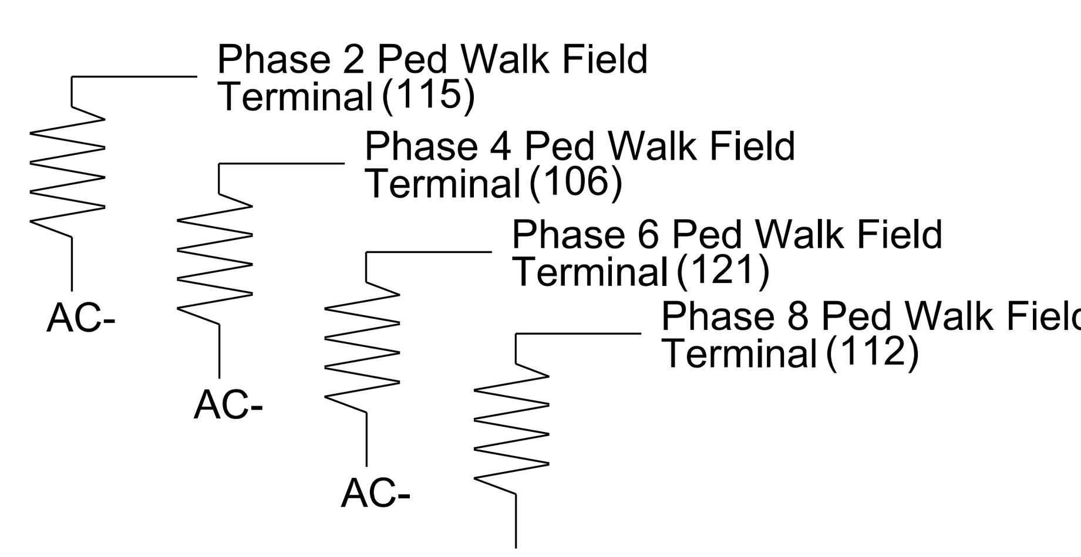
Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used...........................S1, S2, S3**,S4, S5, S6**, S7, S8, S9**, S12**
Phases Used.......................................1, 2, 3, 4, 5, 6
Overlap "1"..NOT USED
Overlap "2"..NOT USED
Overlap "3"..NOT USED
Overlap "4"..NOT USED
**Used for advance beacons only

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

Remove Load Resistors from terminals 126 and 132, if present.

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244T2
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

Electrical and Programming Details For:

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

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PREPARED BY: JT Rowe	REVIEWED BY:

REVISIONS	INIT.	DATE

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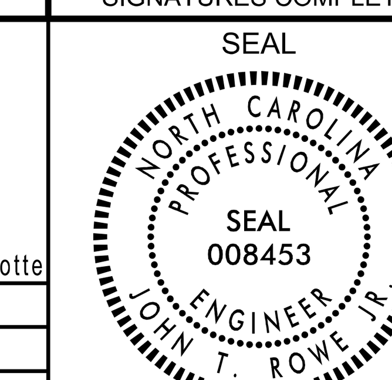
SEAL



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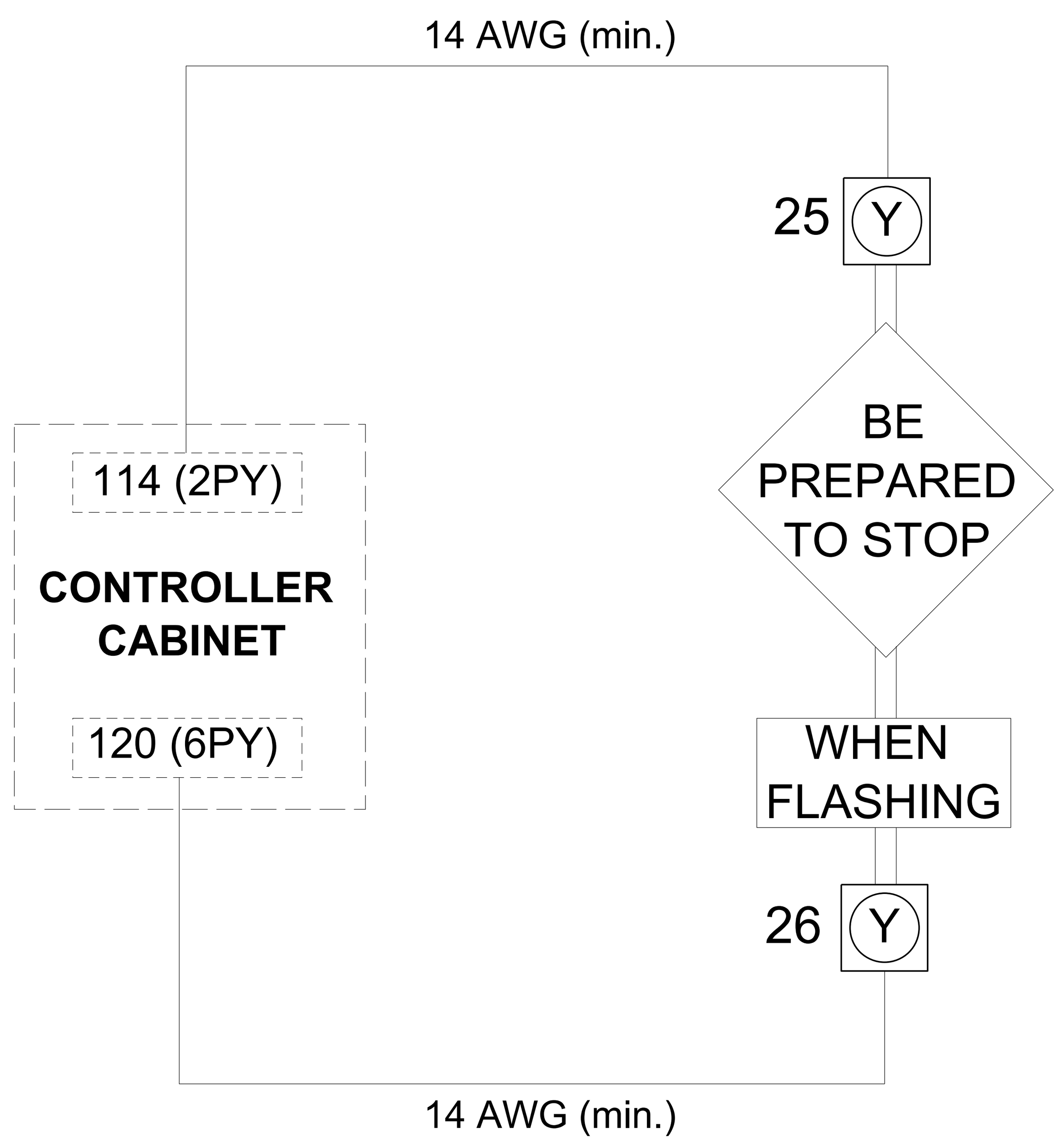

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OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 25, 26, 65, & 66

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
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34	C1-36	Channel Red Do Not Walk Driver	19
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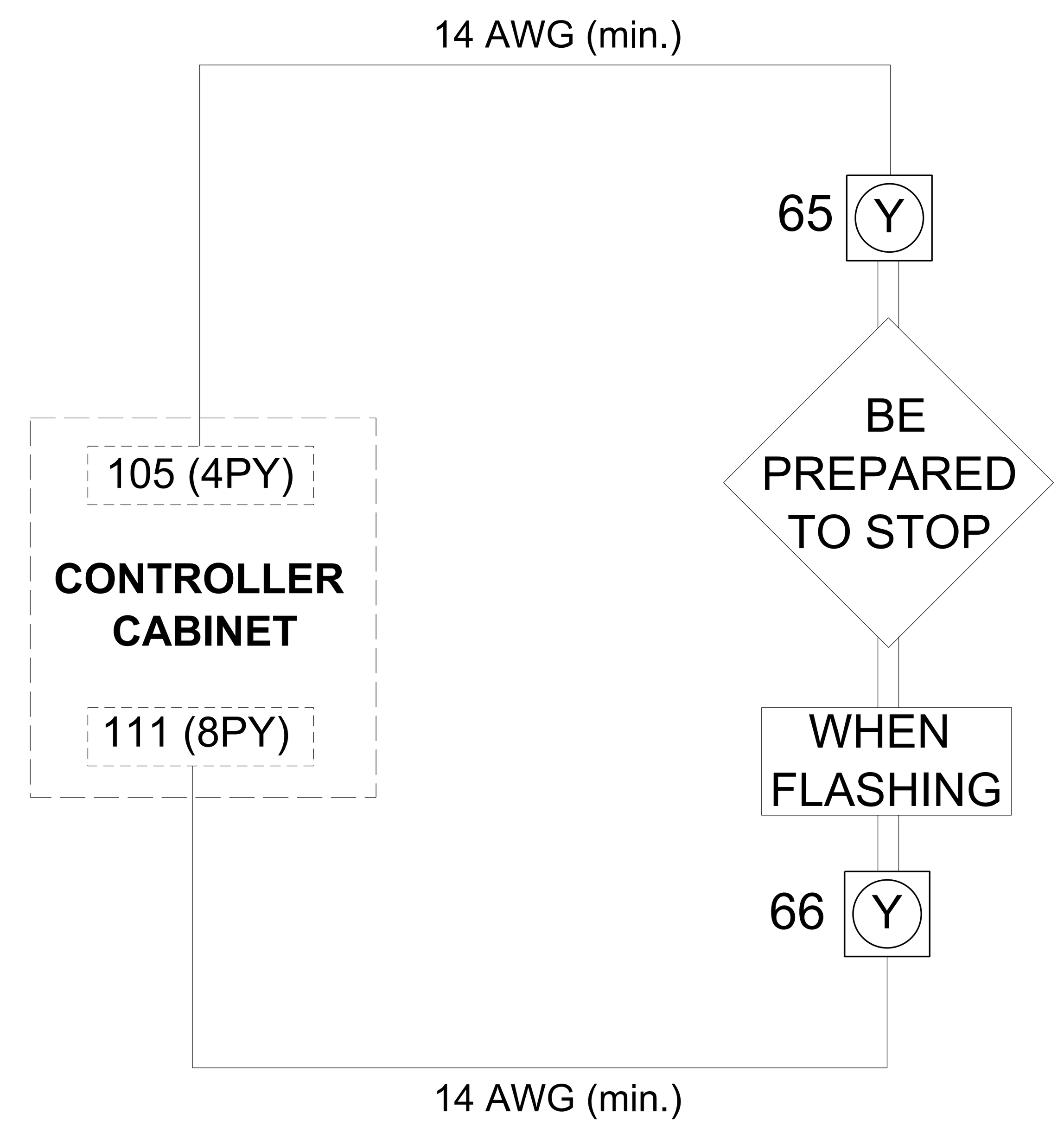

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2. INSET LOADSWITCHES FOR S6 AND S12.
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OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Note	Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
	1	Phase Vehicle	1		X	X	1
NOTICE CHANNEL 2 FLASHES RED →	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
NOTICE CHANNEL 6 FLASHES RED →	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED →	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED →	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
PROGRAM CHANNELS 19 & 20 →	19	Adv. Warning Flasher	2				19
AS ADV. WARNING FLASHER →	20	Adv. Warning Flasher	6				20

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244T2
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

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Prepared in the Offices of:
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PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

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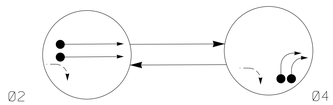
Signed by: John T. Rowe. Jr
DEFE832009E7407...
4-1-2025
DATE

SIG. INVENTORY NO. 03-1244T2

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 4.0

PHASING DIAGRAM

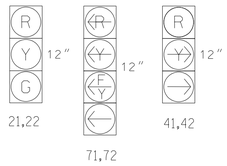


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

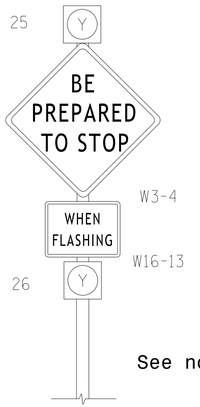
All Heads L.E.D.



See note 4

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø2	PHASE Ø4	PHASE FLASH
21,22	G	R	R
41,42	R	→	R

Figure 1



See notes 6 and 7

TABLE OF OPERATION		
SIGNAL FACE	INTERVAL 1	INTERVAL 2
25	ON	OFF
26	OFF	ON

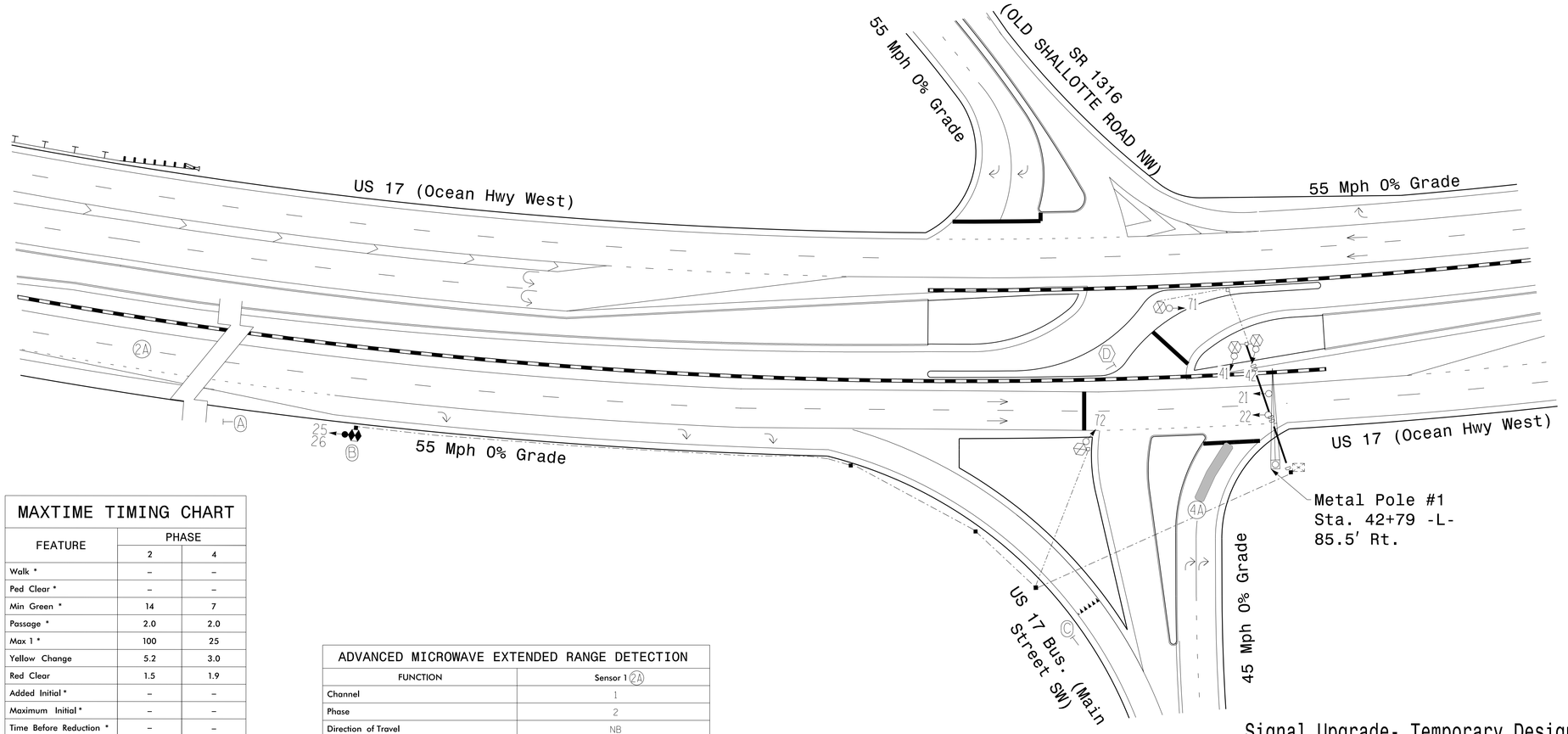
MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
4A	✳	0	✳	X	4	15	-	X	-	X	-	*

* Multizone microwave detection zone

2 Phase
Fully Actuated
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Disconnect and bag signal heads 71 and 72 during this phase of construction.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. Activate flashers 3 seconds prior to end of phase 2 green.
7. Flash vertically-mounted beacons alternately.
8. Refer to the Pavement Marking Plans for pavement marking details.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
	Pedestrian Signal Head With Push Button & Sign	
○—	Signal Pole with Guy	●—
○—	Signal Pole with Sidewalk Guy	●—
◇	Type III Signal Pedestal	◆◆
⊠	Controller & Cabinet	⊠
□	Junction Box	■
N/A	Curb Ramp	
·····	2-in Underground Conduit	·····
—DD—	Directional Drill	N/A
N/A	Right of Way	— — —
→	Directional Arrow	→
◁	Metal Pole with Mastarm	◁
▭	Detection Zone	▭
▬	Temporary Barrier	▬
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	No U-Turn Sign (R3-4)	Ⓓ

MAXTIME TIMING CHART		
FEATURE	PHASE 2	PHASE 4
Walk *	–	–
Ped Clear *	–	–
Min Green *	14	7
Passage *	2.0	2.0
Max 1 *	100	25
Yellow Change	5.2	3.0
Red Clear	1.5	1.9
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	–
Pre-Clearance	3.0	–
Non Lock Detector	–	X
Vehicle 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.

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

Signal Upgrade- Temporary Design 3 (TMP Phase 4)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17(Ocean Highway West) at US 17 Bus (Main St)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
3/31/2025
SIG. INVENTORY NO. 03-1244T3

TRANSYSTEMS
1 Glenwood Avenue
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Tel:919.789.9977
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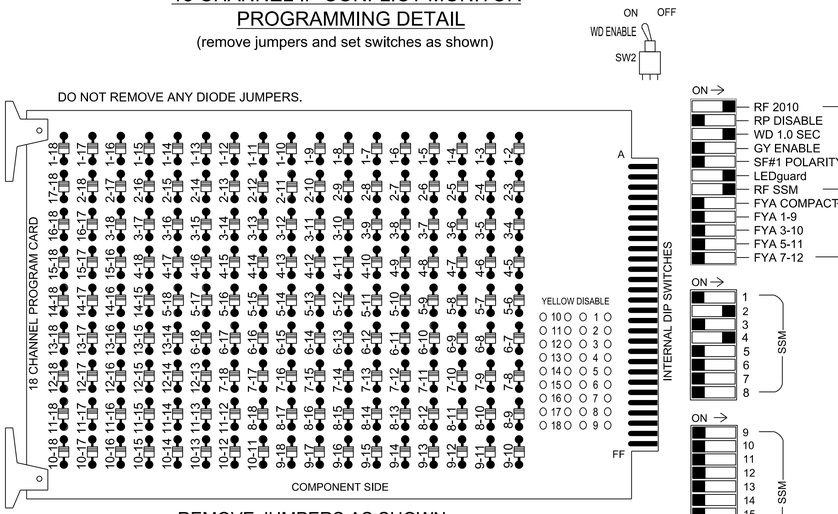
3/31/2025
R-5857_SIG_DSN_2.dgn
USER:ndegbotse

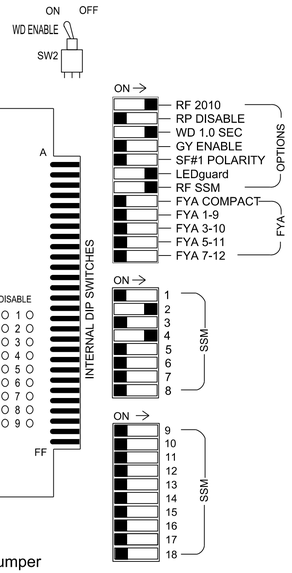
PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 4.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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.
3. Program phases 2 for Advanced Warning.
4. Program phases 2 for 3.0 seconds 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.

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	5	6	6 PED	ADVANCE BEACON	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	21,22	NU	25	NU	41,42	NU	NU	NU	NU	26	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128				101														
YELLOW		129																		
GREEN		130																		
RED ARROW																				
YELLOW ARROW						102														
GREEN ARROW						103														
✋																				
PED YELLOW				** 114							** 120									
🚶			*							*										

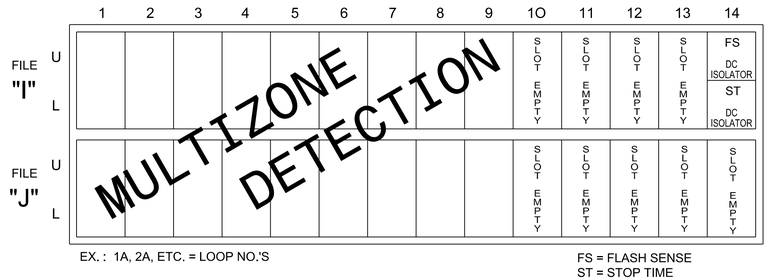
NU = Not Used

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

** Outputs have been reassigned for Advanced Beacons. See Sheet 2 for reassignment programming and wiring details.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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.

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, S3**, S5, S9**
Phases Used.....2, 4
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....NOT USED
Overlap "4".....NOT USED

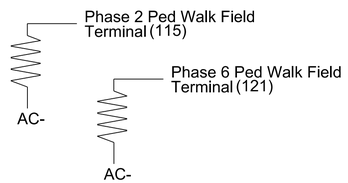
**Used for advance beacons only

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

Remove Load Resistors from terminals 106 and 112, if present.

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244T3
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSYSTEMS
1 Glenwood Avenue
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License: F-0453

Electrical and Programming Details For:

Prepared in the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

US 17 (Ocean Highway West)
at
US 17 Bus (Main Street)

Division 3	Brunswick County	Shallotte
PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.	
PREPARED BY: JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

Signed by: John T. Rowe, Jr. 4-1-2025
DIGITALLY SIGNED BY JOHN T. ROWE, JR. DATE

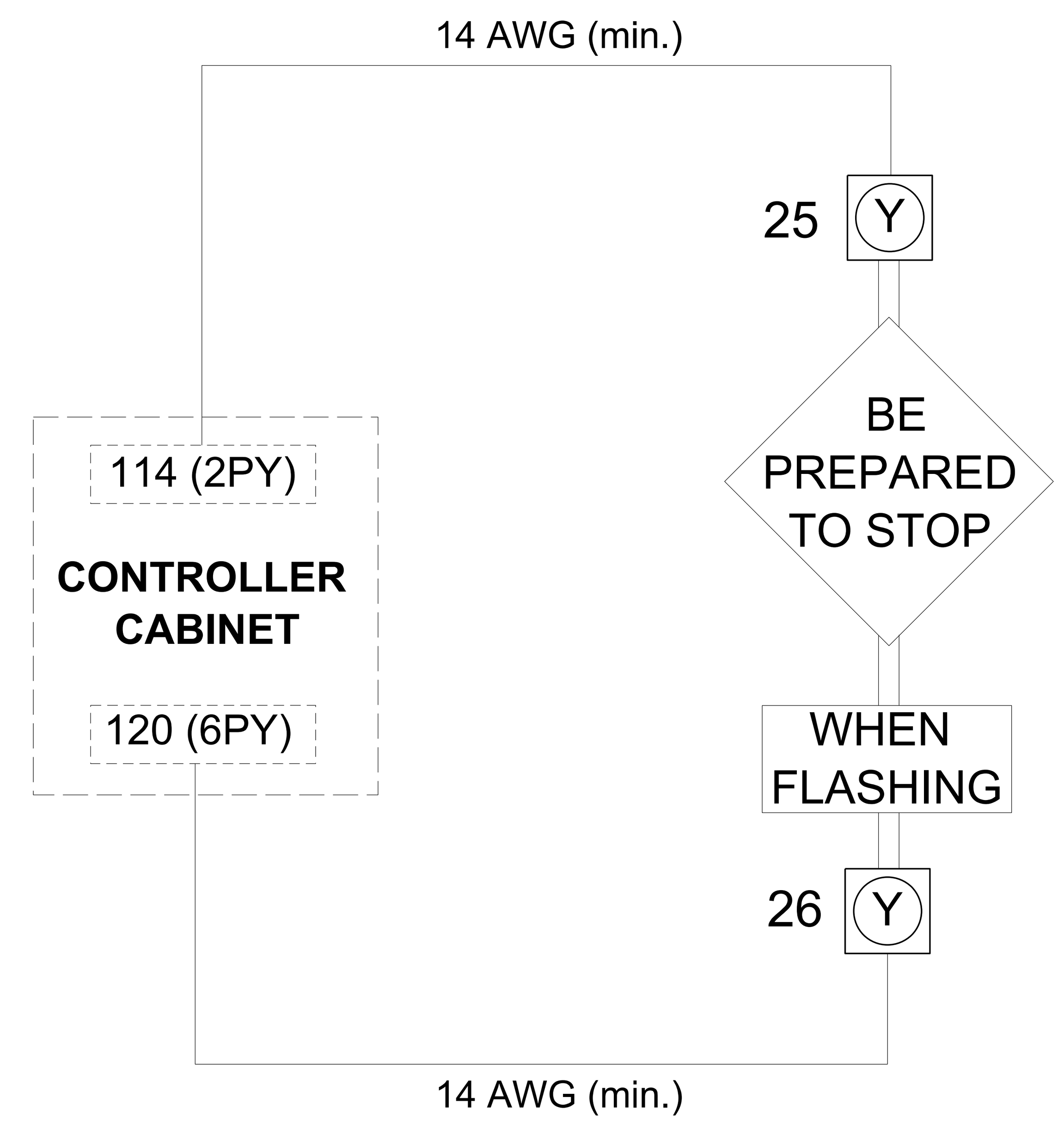
SIG. INVENTORY NO. 03-1244T3

4/1/2025
03-1244T3_smeie.2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 4.2

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 114 (2PY) AND TERMINAL 120 (6PY).
2. INSET LOADSWITCHES FOR S3 AND S9.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 33 AND 34 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 25 & 26

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Channel Green Walk Driver	19
34	C1-36	Channel Red Do Not Walk Driver	19

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Note	Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
	1	Phase Vehicle	1		X	X	1
NOTICE CHANNEL 2 FLASHES RED ➡	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
NOTICE CHANNEL 6 FLASHES RED ➡	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED ➡	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED ➡	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
PROGRAM CHANNEL 19 AS ADV. WARNING FLASHER ➡	19	Adv. Warning Flasher	2				19
	20	None	0				20

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244T3
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 17 (Ocean Highway West) at US 17 Bus (Main Street)

Division 3 | Brunswick County | Shallotte

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

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

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

Signed by:
John T. Rowe. Jr
DEFE832009E7407...
4-1-2025
DATE

SIG. INVENTORY NO. 03-1244T3

4/1/2025
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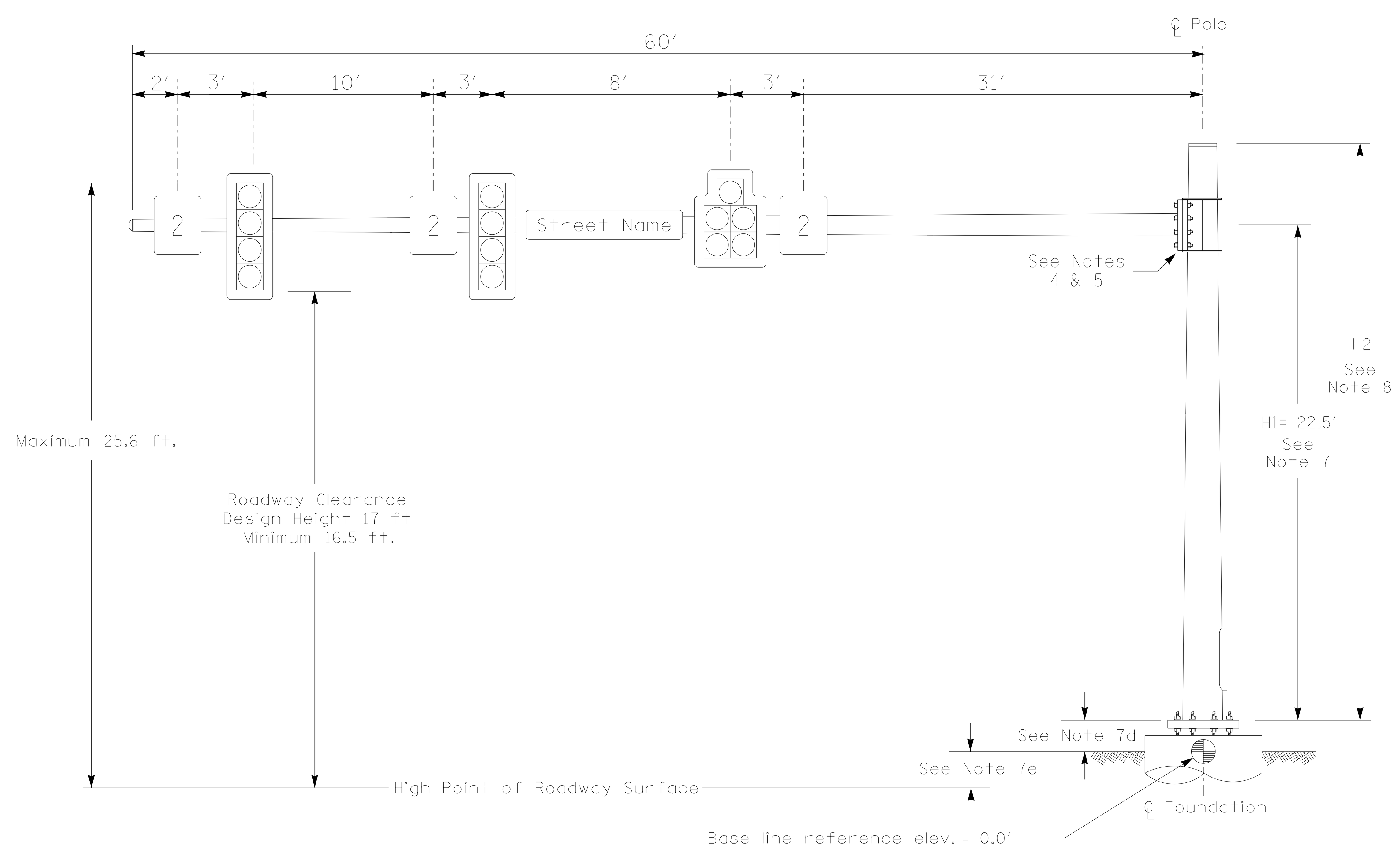
PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 4.3

METAL POLE No. 1

Design Loading for METAL POLE NO. 1 (03-1244)



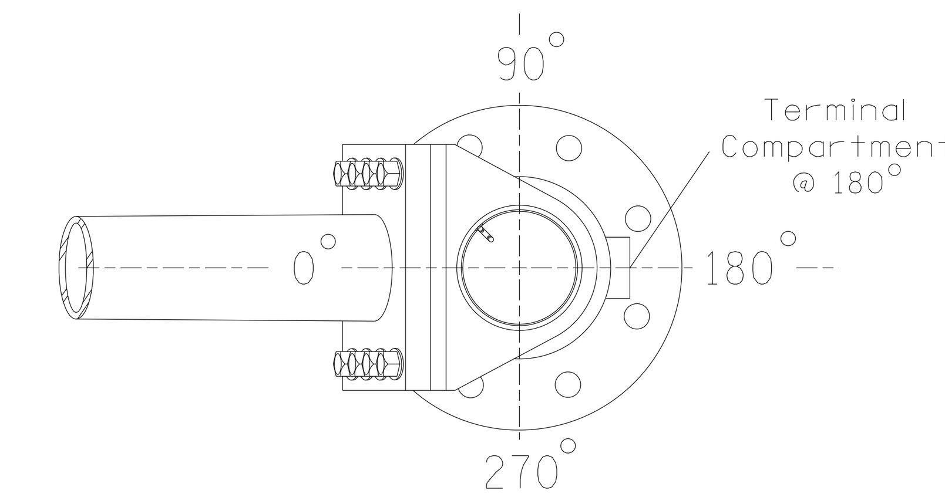
Elevation View

SPECIAL NOTE

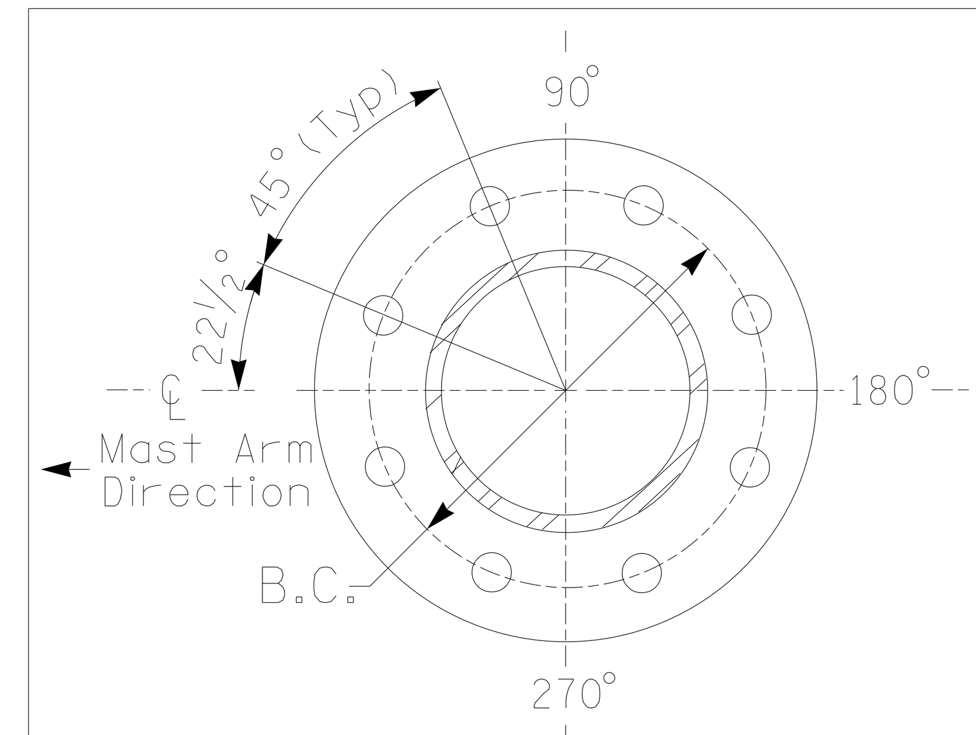
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+1.10 ft.	
Elevation difference at Edge of travelway or face of curb	+1.10 ft.	

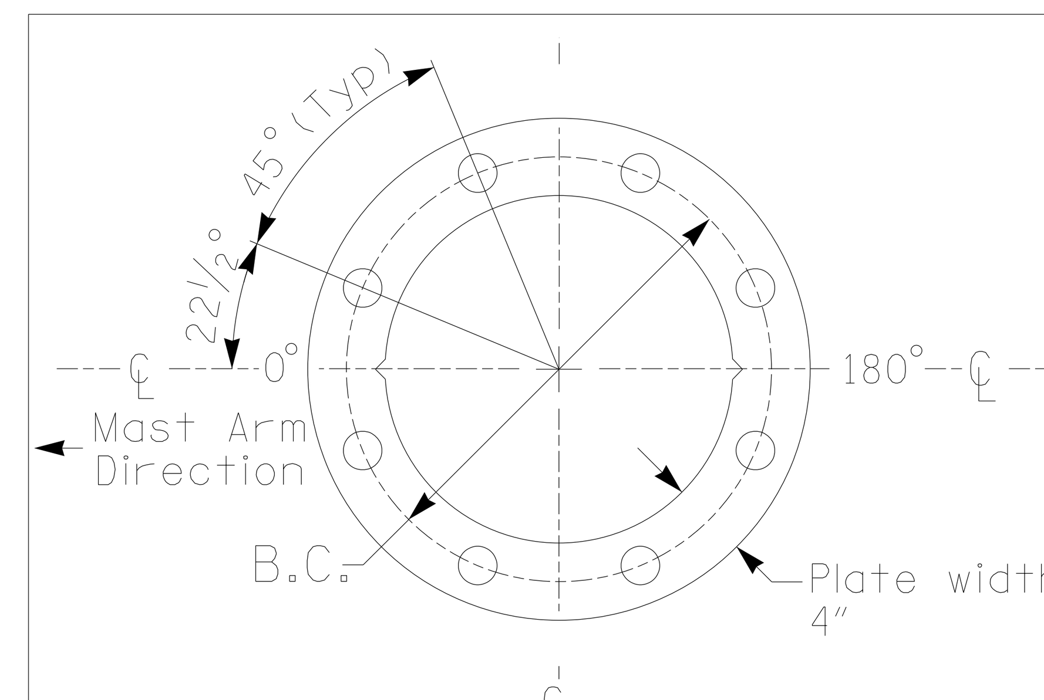


POLE RADIAL ORIENTATION



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
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 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 1 (150 mph)

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

US 17 (Ocean Highway W)
at
US 17 BUS (Main St)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 N/A
N/A

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER G. MURR, JR.

Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
3/31/2025

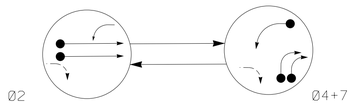
SIG. INVENTORY NO. 03-1244T3

3/31/2025
...\Loading Diagram,Single Mast Arm (NB).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 5.0

2 Phase
Fully Actuated
Signal Systems #:D03-38_Shallotte

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING DIAGRAM

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4+7	PHASE FLASH
21,22	G	R	R
41,42	R	→	R
71,72	~~F~~	←	~~R~~

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø4+7	PHASE FLASH
21,22	G	R	R
41,42	R	→	R
71,72	~~R~~	←	~~R~~

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND		CALL		NEW CARD
4A	✳	0	✳	-	4	15	-	X	-	X	-	*
7A	✳	0	✳	X	7	15**	-	X	-	X	-	*

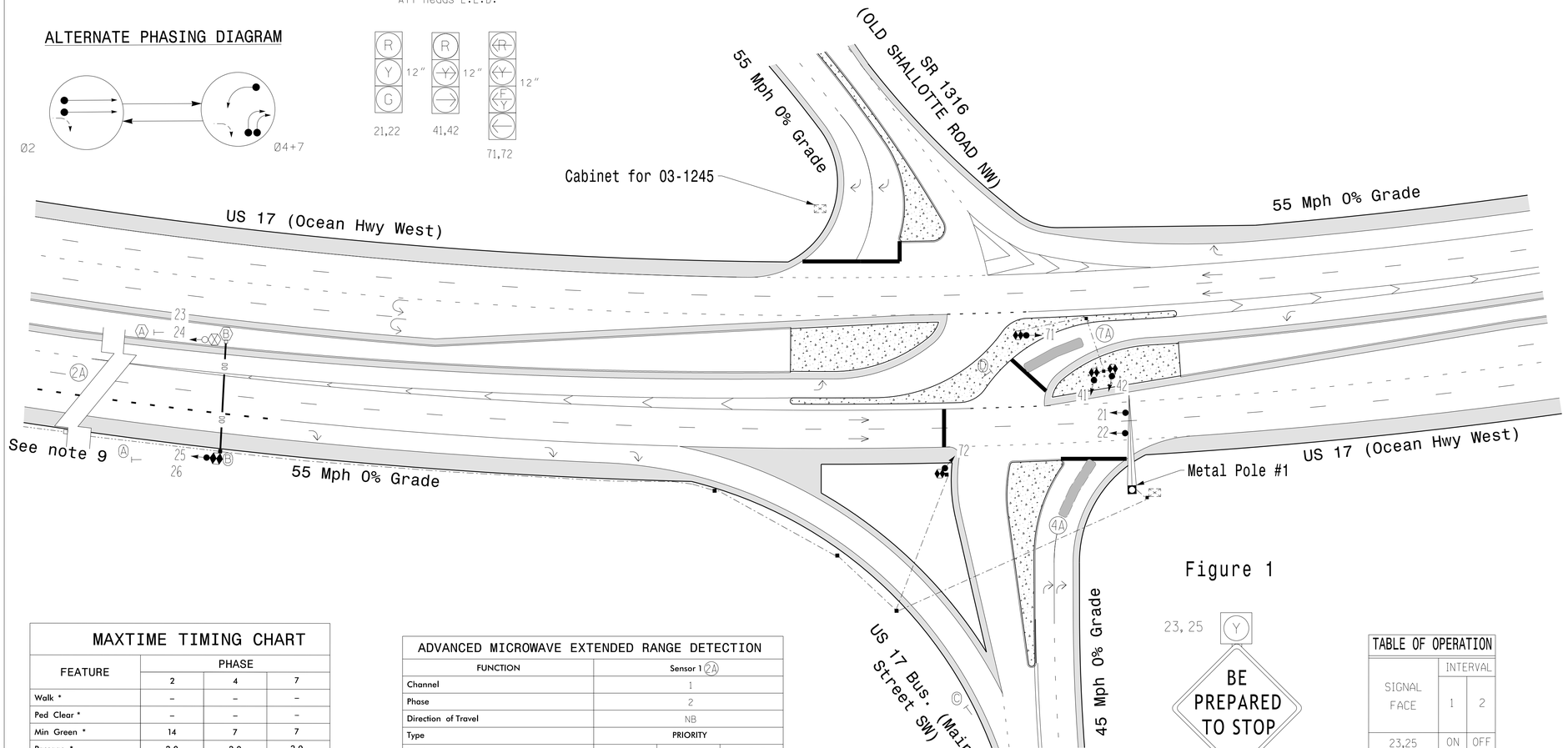
* Multizone microwave detection zone.
** Disable delay during alternate phasing operation

SIGNAL FACE I.D.

All Heads L.E.D.

NOTES

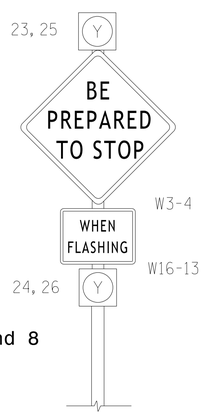
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. The Division Traffic Engineer will determine the hours of use for each phasing plan.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
7. Activate flashers 3 seconds prior to end of phase 2 green.
8. Flash vertically-mounted beacons alternately.
9. Install new conduit as close as possible to edge of pavement.
10. Refer to the Pavement Marking Plans for pavement marking details.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
○↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
⊗	Type III Signal Pedestal	◆◆
▭	Detection Zone	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
N/A	Curb Ramp	◢
·····	2-in Underground Conduit	·-·-·
—DD—	Directional Drill	N/A
N/A	Right of Way	— — — —
→	Directional Arrow	→
○	Metal Pole with Mastarm	□
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	No U-Turn Sign (R3-4)	Ⓓ

Figure 1



See notes 7 and 8

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
23,25	ON	OFF
24,26	OFF	ON

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 7
Walk *	–	–	–
Ped Clear *	–	–	–
Min Green *	14	7	7
Passage *	2.0	2.0	2.0
Max 1 *	100	25	25
Yellow Change	5.2	3.0	3.0
Red Clear	1.5	1.9	1.9
Added Initial *	–	–	–
Maximum Initial *	–	–	–
Time Before Reduction *	–	–	–
Time To Reduce *	–	–	–
Minimum Gap	–	–	–
Advance Walk	–	–	–
Pre-Clearance	3.0	–	–
Non Lock Detector	–	X	X
Vehicle 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.

ADVANCED MICROWAVE EXTENDED RANGE DETECTION

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

3/31/2025
R-5857_SIG_DSN_2.dgn
USER:nadegbotse

Signal Upgrade - Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17 (Ocean Highway W) at US 17 BUS (Main St)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 40 1"=40'

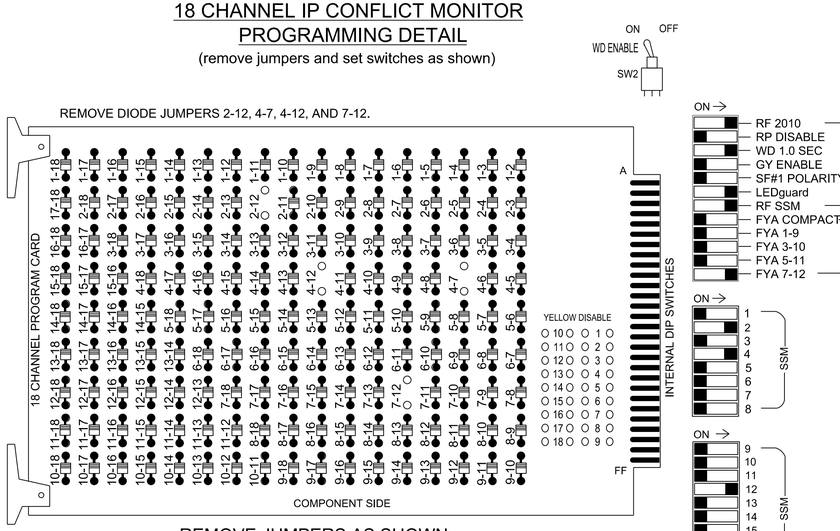
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER EUGENE G. MURR, JR.
Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
3/31/2025
SIG. INVENTORY NO. 03-1244

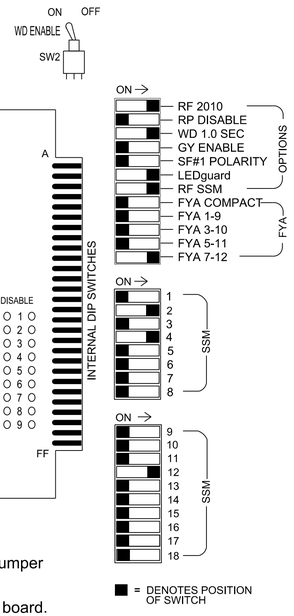
PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 5.1

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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 phases 4 and 7 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk.
4. Program phases 2 for Advanced Warning.
5. Program phases 2 for 3.0 seconds Pre Clearance.
6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
7. The cabinet and controller are part of the D03-38_Shallotte Signal System.

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	5	6	6 PED	ADVANCE BEACON	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	21,22	NU	23,25	NU	41,42	NU	NU	NU	NU	24,26	★★ 71,72	NU	NU	NU	NU	NU	NU	★★ 71,72	NU
RED	·	128	·	·	·	101	·	·	·	·	·	·	·	·	·	·	·	·	·	·
YELLOW	·	129	·	·	·	·	·	·	·	·	·	*	·	·	·	·	·	·	·	·
GREEN	·	130	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
RED ARROW	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	A101	·
YELLOW ARROW	·	·	·	·	·	102	·	·	·	·	·	·	·	·	·	·	·	·	A102	·
FLASHING YELLOW ARROW	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	A103	·
GREEN ARROW	·	·	·	·	·	103	·	·	·	·	·	124	·	·	·	·	·	·	·	·
✋	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
PED YELLOW	·	·	·	★★ 114	·	·	·	·	·	·	★★ 120	·	·	·	·	·	·	·	·	·
🚶	·	·	*	·	·	·	·	·	·	*	·	·	·	·	·	·	·	·	·	·

NU = Not Used

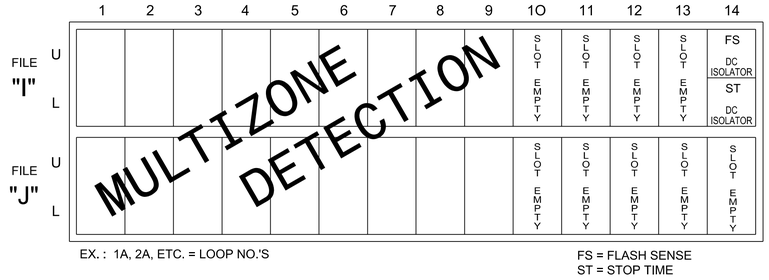
★ Denotes install load resistor. See load resistor installation detail this sheet.

★★ Outputs have been reassigned for Advanced Beacons. See Sheet 3 for reassignment programming and wiring details.

★ See pictorial of head wiring in detail on this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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.

Alternate Phasing Programming on Sheet 2 assumes default MAXTIME detector assignments and layouts, as shown in the Input File Chart below.

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
7A	TB5-5,6	J5U	57	19	21	7	15		X		X	

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

EQUIPMENT INFORMATION

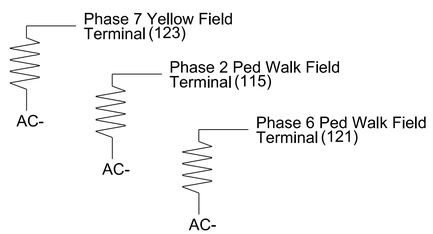
Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S2, S3**, S5, S9**, S10, AUX S5
Phases Used.....2, 4, 7
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....NOT USED
Overlap "4".....*

*See overlap programming detail on sheet 2
**Used for advance beacons only

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)



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

71,72

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared in 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 (Ocean Highway West)
at
US 17 Bus (Main Street)

Division 3 | Brunswick County | Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

Signed by: John T. Rowe, Jr. 4-1-2025
DEFE832009E7407 DATE

SIG. INVENTORY NO. 03-1244

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4/1/2025
03-1244_sm_ele_2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 5.2

OVERLAP PROGRAMMING 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
Type	Off	Off	Off	FYA 4 - Section
Included Phases				2
Modifier Phases				7
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	1	2	3	4
Type	Off	Off	Off	FYA 4 - Section
Included Phases				
Modifier Phases				7
Modifier Overlaps	-	-	-	-
Trail Green				0
Trail Yellow				0.0
Trail Red				0.0

NOTICE CHANGES IN INCLUDED PHASE ROW

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

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

	Detector	Call Phase	Delay
7A	21	7	0

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Note	Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
	1	Phase Vehicle	1		X	X	1
NOTICE CHANNEL 2 FLASHES RED	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
NOTICE CHANNEL 6 FLASHES RED	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED	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
PROGRAM CHANNEL 19 AS ADV. WARNING FLASHER	19	Adv. Warning Flasher	2				19
	20	None	0				20

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

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Electrical and Programming Details For:

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

US 17 (Ocean Highway West)
at
US 17 Bus (Main Street)

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe	REVIEWED BY:

REVISIONS	INIT.	DATE

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

Signed by: John T. Rowe. Jr
DEFE832009E7407...
4-1-2025
DATE

SIG. INVENTORY NO. 03-1244

4/1/2025
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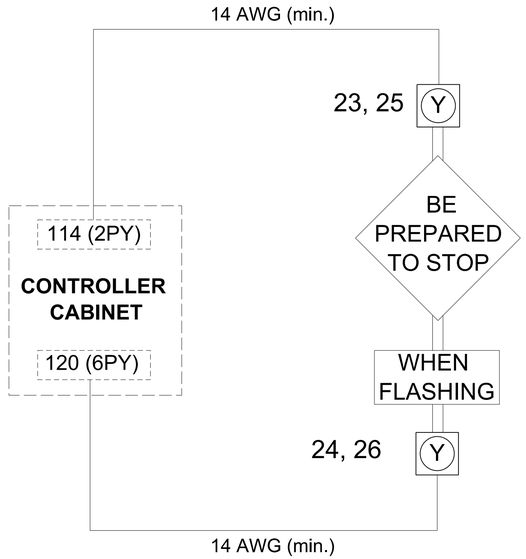
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 5.3

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. INSET LOADSWITCHES FOR S3 AND S9.

3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.

4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 33 AND 34 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 23, 24, 25, & 26

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Channel Green Walk Driver	19
34	C1-36	Channel Red Do Not Walk Driver	19

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 71 and 72 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7 call on loop 7A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1244
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

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Electrical and Programming Details For:

US 17 (Ocean Highway West) at US 17 Bus (Main Street)

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025 | REVIEWED BY: GG Murr, Jr.

PREPARED BY: JT Rowe | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE II

Signed by: John T. Rowe, Jr. 4-1-2025
DATE

SIG. INVENTORY NO. 03-1244

Prepared in the Offices of:
Transportation Mobility and Safety Division
NC Department of Transportation
Traffic Engineering Branch
Signals Management Section
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4/1/2025
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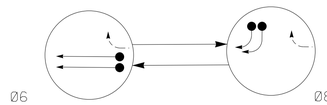
USER:defguit

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 6.0

2 Phase
Fully Actuated
Isolated

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø6	PHASE Ø8	FLASH
81,82	R	→	R
61,62	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.

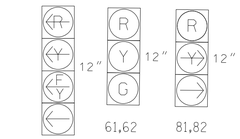
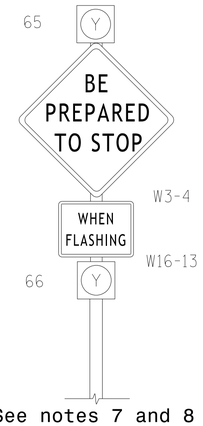


TABLE OF OPERATION		
SIGNAL FACE	INTERVAL 1	INTERVAL 2
65	ON	OFF
66	OFF	ON

Figure 1

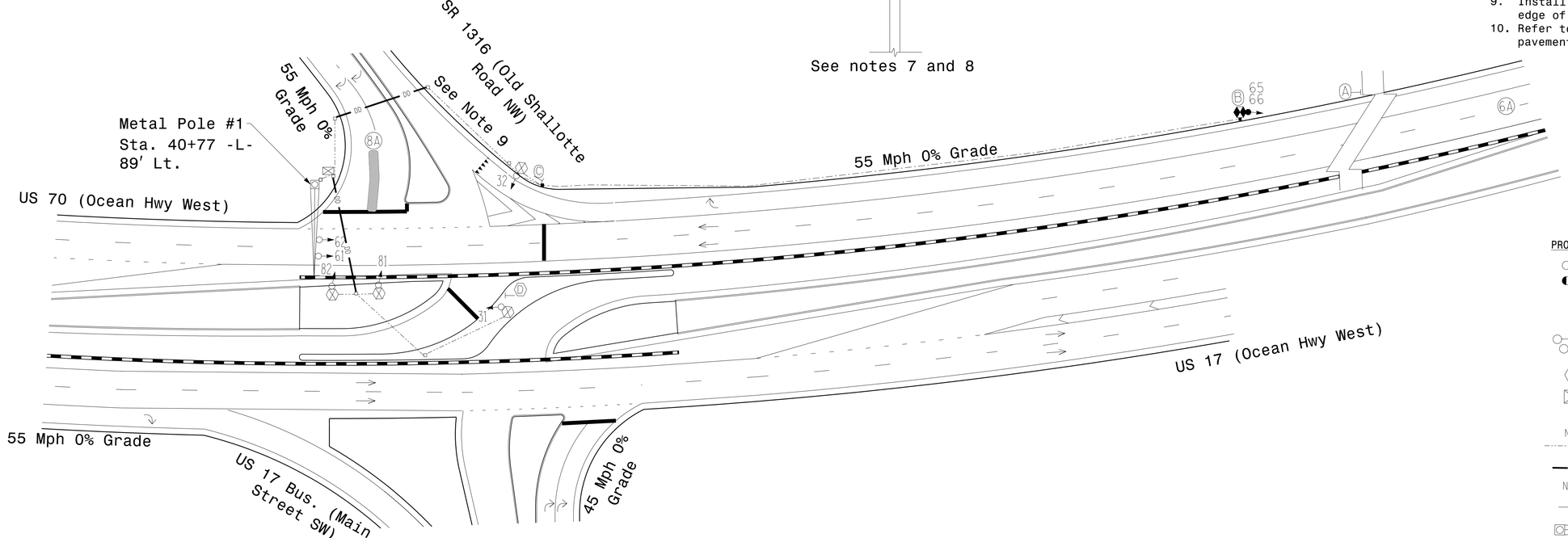


MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
8A	*	0	*	X	8	15	-	X	-	X	-	*

* Multizone microwave detection zone

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. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Disconnect and bag signal heads 31 and 32 during this phase of construction.
6. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Activate flashers 3 seconds prior to end of phase 6 green.
8. Flash vertically-mounted beacons alternately.
9. Install new conduit as close as possible to edge of pavement.
10. Refer to the Pavement Marking Plans for pavement marking details.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
	Pedestrian Signal Head With Push Button & Sign	■
○—	Signal Pole with Guy	●
○⌐	Signal Pole with Sidewalk Guy	●
ⓧ	Type III Signal Pedestal	◆◆
⊠	Controller & Cabinet	⊠
□	Junction Box	■
N/A	Curb Ramp	
----------	2-in Underground Conduit	----------
—DD—	Directional Drill	N/A
N/A	Right of Way	— — — —
→	Directional Arrow	→
	Metal Pole with Mastarm	
	Detection Zone	
	Temporary Barrier	
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	No U-Turn Sign (R3-4)	Ⓓ

MAXTIME TIMING CHART		
FEATURE	PHASE 6	PHASE 8
Walk *	–	–
Ped Clear *	–	–
Min Green *	14	7
Passage *	2.0	2.0
Max 1 *	100	25
Yellow Change	5.2	3.0
Red Clear	1.8	1.9
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	–
Pre-Clearance	3.0	–
Non Lock Detector	–	X
Vehicle 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.

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

New Installation-Temporary Design 1 (TMP Phase 4)

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Fax:919.789.9591
License: F-0453

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

US 17 (Ocean Highway W)
at SR 1316
(Old Shallotte Rd NW)

Division 3 Brunswick County Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	G. G. Murr, Jr.
PREPARED BY:	Nadia Degbotse	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
3/31/2025

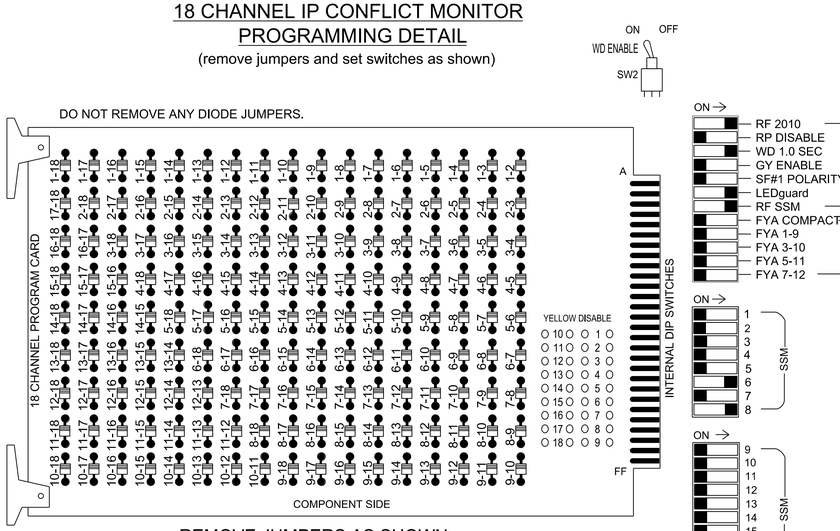
SIG. INVENTORY NO. 03-1245T1

3/31/2025
R-5857_Sig 3 MP-5857_SIG_DSN.dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 6.1

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 6 Green No Walk.
3. Program phases 6 for Advanced Warning.
4. Program phases 6 for 3.0 seconds 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.

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	ADVANCE BEACON	5	6	6 PED	7	8	8 PED	ADVANCE BEACON	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	NU	NU	NU	NU	NU	65	NU	61,62	NU	NU	81,82	NU	66	NU	NU	NU	NU	NU	NU
RED									134			107								
YELLOW									135											
GREEN									136											
RED ARROW																				
YELLOW ARROW												108								
GREEN ARROW												109								
PED YELLOW							** 105							** 111						
						*							*							

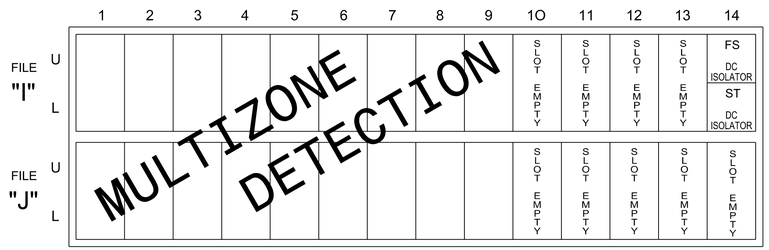
NU = Not Used

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

** Outputs have been reassigned for Advanced Beacons. See Sheet 2 for reassignment programming and wiring details.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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.

EQUIPMENT INFORMATION

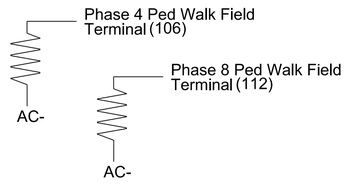
Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S6**, S8, S11, S12**
Phases Used.....6, 8
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....NOT USED
Overlap "4".....NOT USED

**Used for advance beacons only

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1245T1
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TRANSYSTEMS
1 Glenwood Avenue
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Fax:919.789.9591
License: F-0453

Electrical and Programming Details For:

Prepared in the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

US 17 (Ocean Highway W)
at
SR 1316 (Old Shallotte Rd NW)

Division 3	Brunswick County	Shallotte
PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.	
PREPARED BY: JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

Signed by: John T. Rowe Jr. 4-1-2025
DEE6832009E7407
DATE

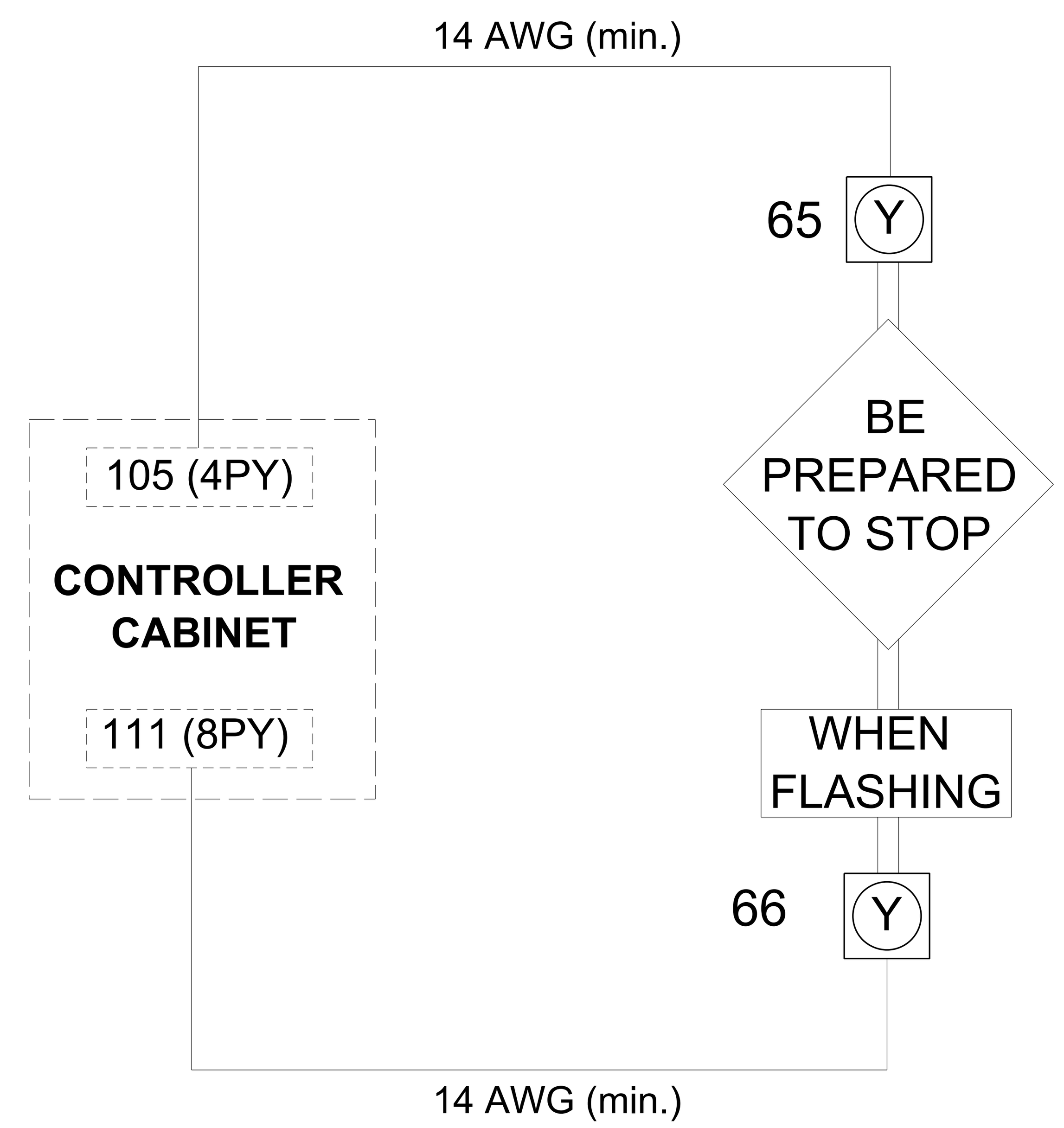
SIG. INVENTORY NO. 03-1245T1

4/1/2025
03-1245T1_sheet_2025xxyy.dgn
USER:dafoul

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 6.2

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. INSET LOADSWITCHES FOR S6 AND S12.

3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.

4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 35 AND 36 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 65 & 66

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
35	C1-37	Channel Green Walk Driver	20
36	C1-38	Channel Red Do Not Walk Driver	20

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
NOTICE CHANNEL 2 FLASHES RED ➡	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
NOTICE CHANNEL 6 FLASHES RED ➡	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED ➡	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED ➡	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
PROGRAM CHANNEL 20 AS	19	None	0				19
ADV. WARNING FLASHER ➡	20	Adv. Warning Flasher	6				20

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1245T1
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

TRANSYSTEMS
1 Glenwood Avenue
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License: F-0453

Electrical and Programming Details For:

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

US 17 (Ocean Highway W)
at
SR 1316 (Old Shallotte Rd NW)

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe	REVIEWED BY:

REVISIONS	INIT.	DATE

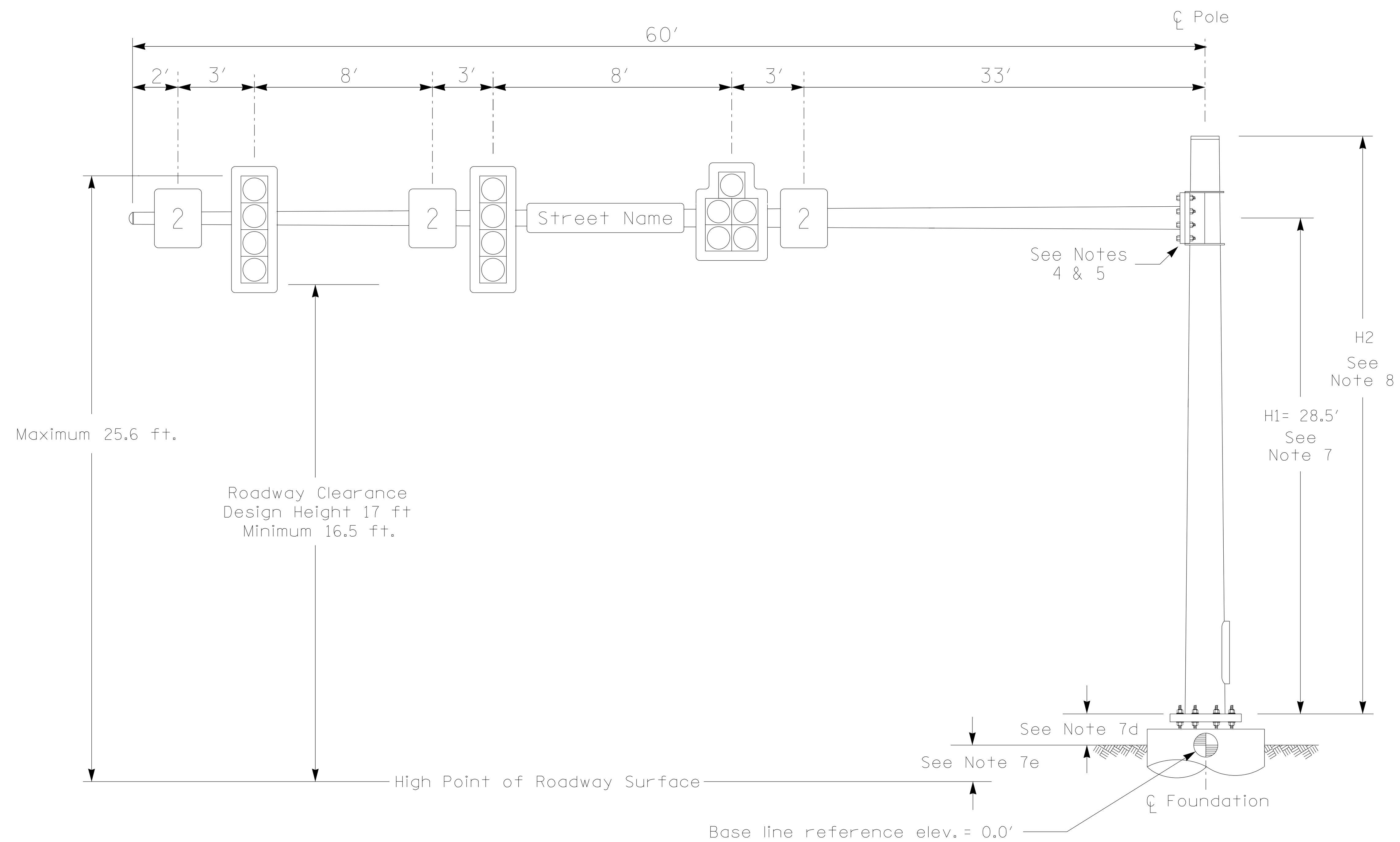
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

Signed by: John T. Rowe, Jr — 4-1-2025
DEFE832009E7407...
DATE

SIG. INVENTORY NO. 03-1245T1

Design Loading for METAL POLE NO. 1 (03-1245)



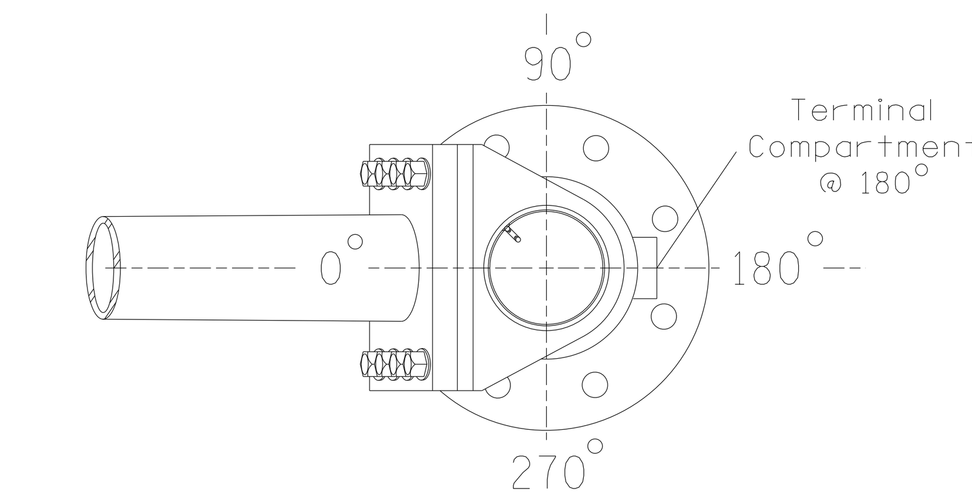
Elevation View

SPECIAL NOTE

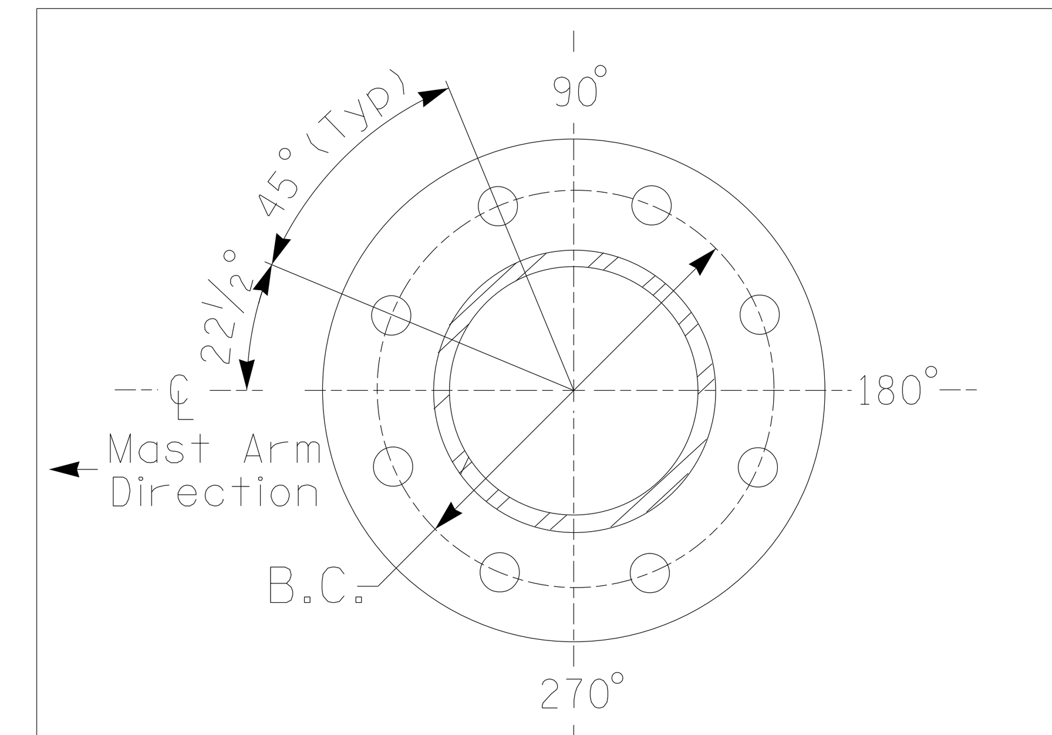
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+7.25 ft.	
Elevation difference at Edge of travelway or face of curb	+7.23 ft.	

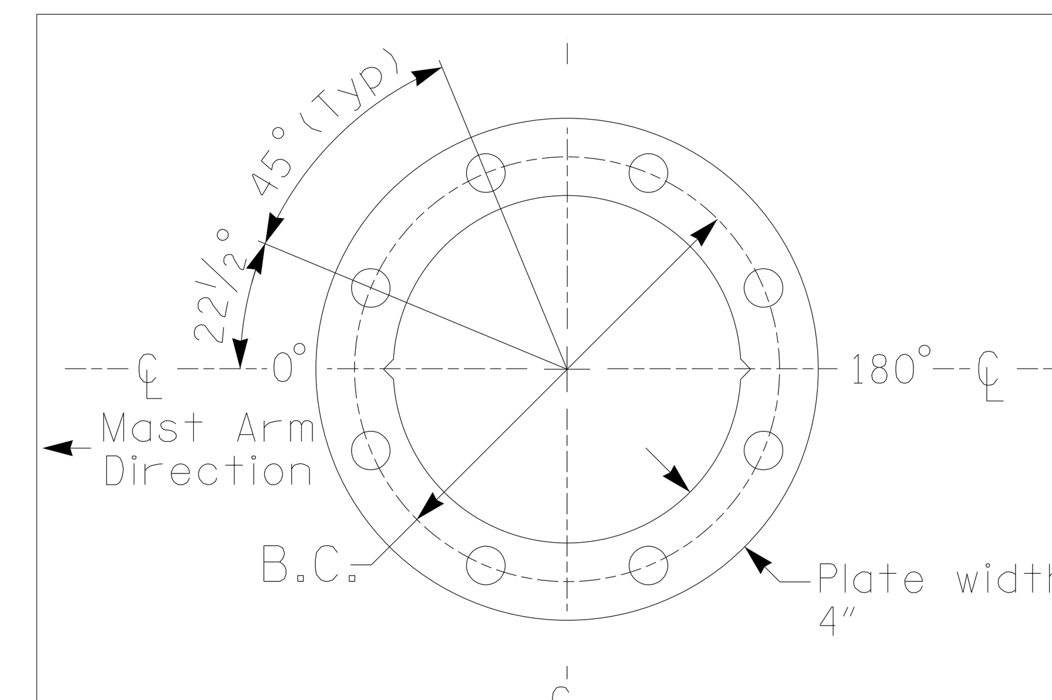


POLE RADIAL ORIENTATION



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

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 6.3

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
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0″W X 36.0″L	14 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 1 (150 mph)

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

SCALE 0 N/A
N/A

US 17 (Ocean Highway W)
at
SR 1316 (Old Shallotte Rd NW)

Division 3 Brunswick County Shallotte
PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr, Jr.
AA8F5076CAB34CF...
3/31/2025

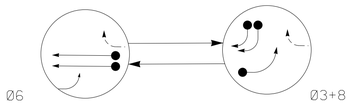
SIG. INVENTORY NO. 03-1245T1

3/31/2025
...\Loading Diagram,Single Mast Arm (SB).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 7.0

2 Phase Fully Actuated Signal Systems#:D03-38 Shallotte

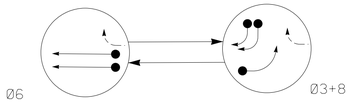
DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø3+8	PHASE FLASH
31,32	FY	R	R
61,62	G	R	R
81,82	R	R	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø6	PHASE Ø3+8	PHASE FLASH
31,32	R	R	R
61,62	G	R	R
81,82	R	R	R

SIGNAL FACE I.D.

All Heads L.E.D.

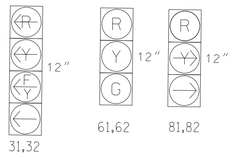
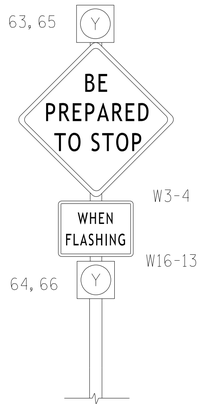


Figure 1



See notes 7 and 8

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	*	0	*	X	3	15**	-	X	-	X	-	*
8A	*	0	*	-	8	15	-	X	-	X	-	*

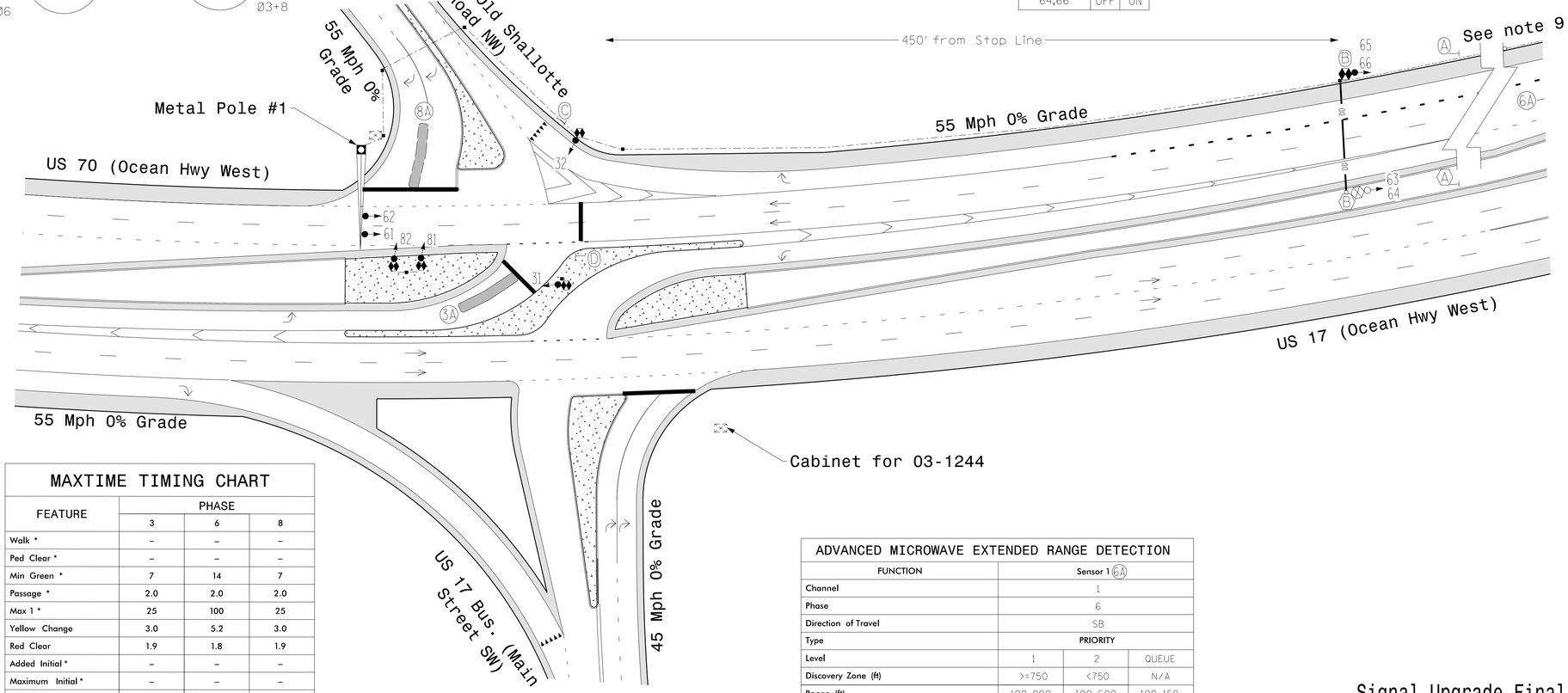
* Multizone microwave detection zone.
** Disable delay during alternate phasing operation

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
63,65	ON	OFF
64,66	OFF	ON

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. Set all detector units to presence mode.
4. The Division Traffic Engineer will determine the hours of use for each phasing plan.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
7. Activate flashers 3 seconds prior to end of phase 6 green.
8. Flash vertically-mounted beacons alternately.
9. Install new conduit as close as possible to edge of pavement.
10. Refer to the Pavement Marking Plans for pavement marking details.



MAXTIME TIMING CHART

FEATURE	PHASE 3	PHASE 6	PHASE 8
Walk *	–	–	–
Ped Clear *	–	–	–
Min Green *	7	14	7
Passage *	2.0	2.0	2.0
Max 1 *	25	100	25
Yellow Change	3.0	5.2	3.0
Red Clear	1.9	1.8	1.9
Added Initial *	–	–	–
Maximum Initial *	–	–	–
Time Before Reduction *	–	–	–
Time To Reduce *	–	–	–
Minimum Gap	–	–	–
Advance Walk	–	–	–
Pre-Clearance	–	3.0	–
Non Lock Detector	X	–	X
Vehicle 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.

ADVANCED MICROWAVE EXTENDED RANGE DETECTION

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

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Type III Signal Pedestal	
	Detection Zone	
	Controller & Cabinet	
	Junction Box	
N/A	Curb Ramp	
	2-in Underground Conduit	
DD	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
(A)	Signal Ahead Sign (W3-3)	(A)
(B)	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	(B)
(C)	"YIELD" Sign (R1-2)	(C)
(D)	No U-Turn Sign (R3-4)	(D)

Signal Upgrade-Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17 (Ocean Highway) at SR 1316 (Old Shallotte Rd NW)

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025 | REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse | REVIEWED BY:

SCALE 1"=40' (0 – 40)

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 3/31/2025

SIG. INVENTORY NO. 03-1245

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License: F-0453

3/31/2025
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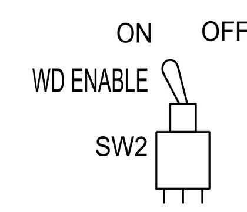
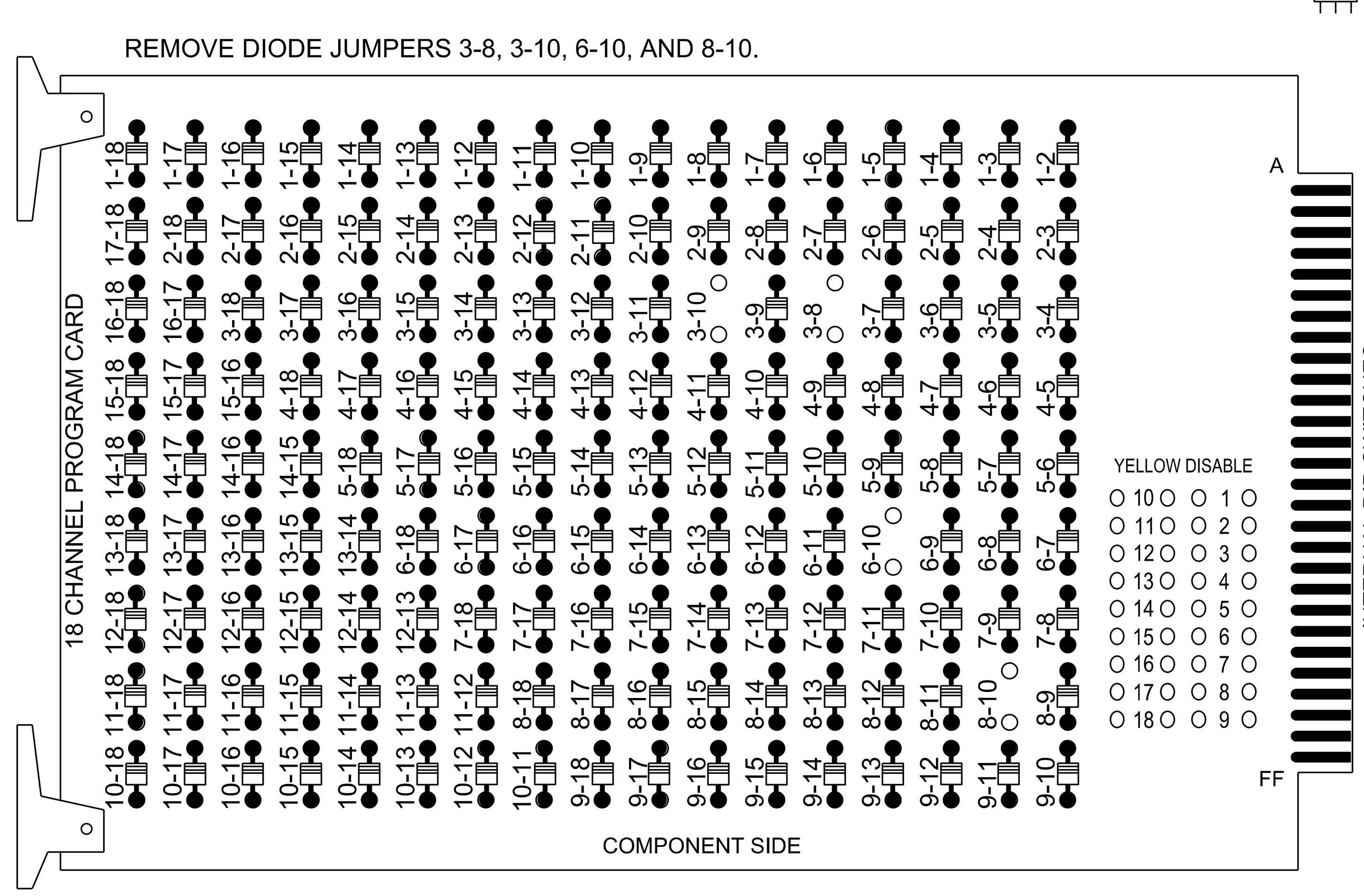
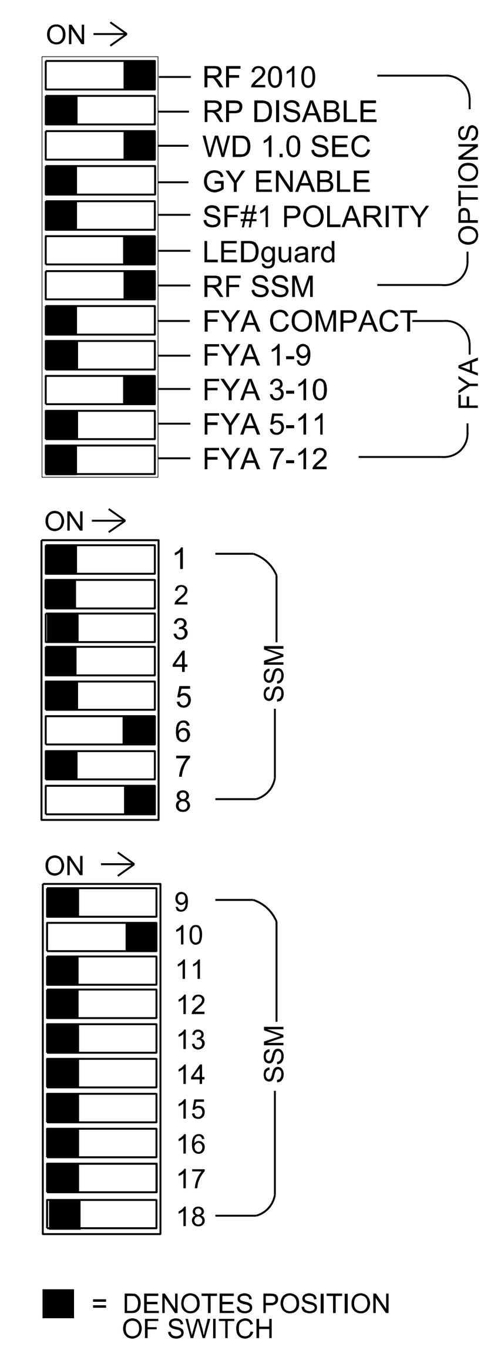
PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 7.1

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 phases 3 and 8 for Dual Entry.
3. Program controller to start up in phase 6 Green No Walk.
4. Program phases 6 for Advanced Warning.
5. Program phases 6 for 3.0 seconds Pre Clearance.
6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
7. The cabinet and controller are part of the D03-38_Shallotte Signal System.

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	ADVANCE BEACON	5	6	6 PED	7	8	8 PED	ADVANCE BEACON	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	NU	NU	★★ 31,32	NU	NU	63,65	NU	61,62	NU	NU	81,82	NU	64,66	NU	★★ 31,32	NU	NU	NU	NU
RED									134			107								
YELLOW				*					135											
GREEN									136											
RED ARROW																A124				
YELLOW ARROW												108				A125				
FLASHING YELLOW ARROW																A126				
GREEN ARROW				118								109								
(Don't Walk hand)																				
PED YELLOW							** 105							** 111						
(Walk)						*							*							

NU = Not Used

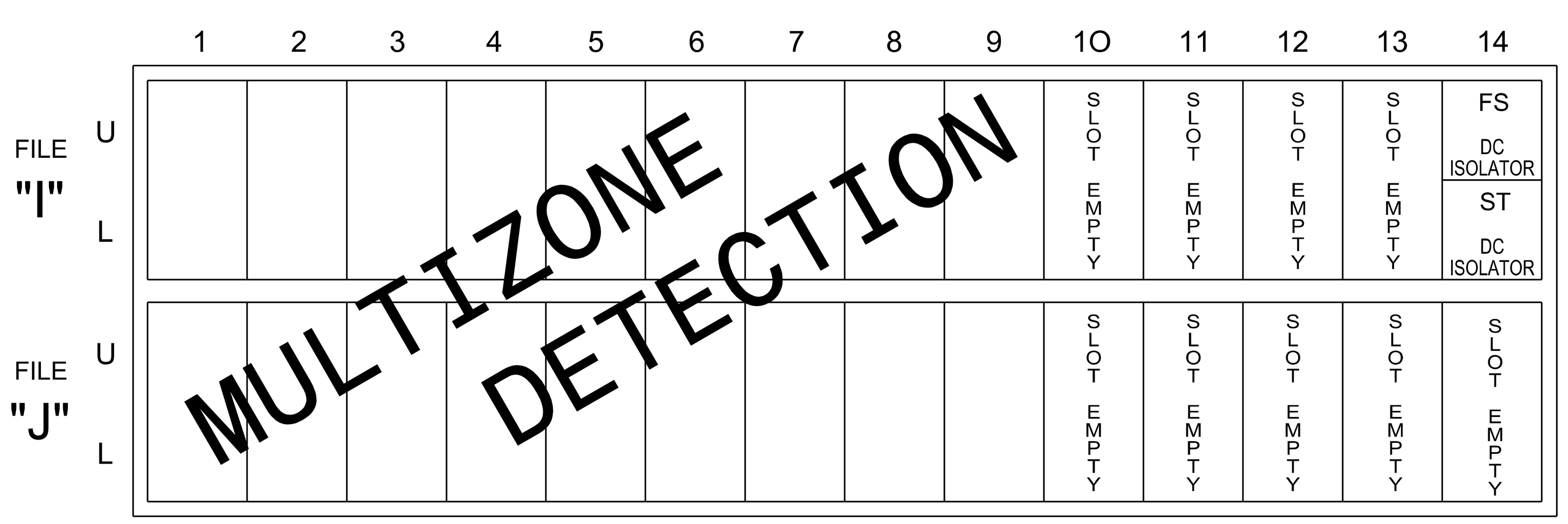
* Denotes install load resistor. See load resistor installation detail this sheet.

** Outputs have been reassigned for Advanced Beacons. See Sheet 3 for reassignment programming and wiring details.

★ See pictorial of head wiring in detail on this sheet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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.

Alternate Phasing Programming on Sheet 2 assumes default MAXTIME detector assignments and layouts, as shown in the Input File Chart below.

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
3A	TB4-5,6	I5U	58	20	7	3	15		X		X	

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

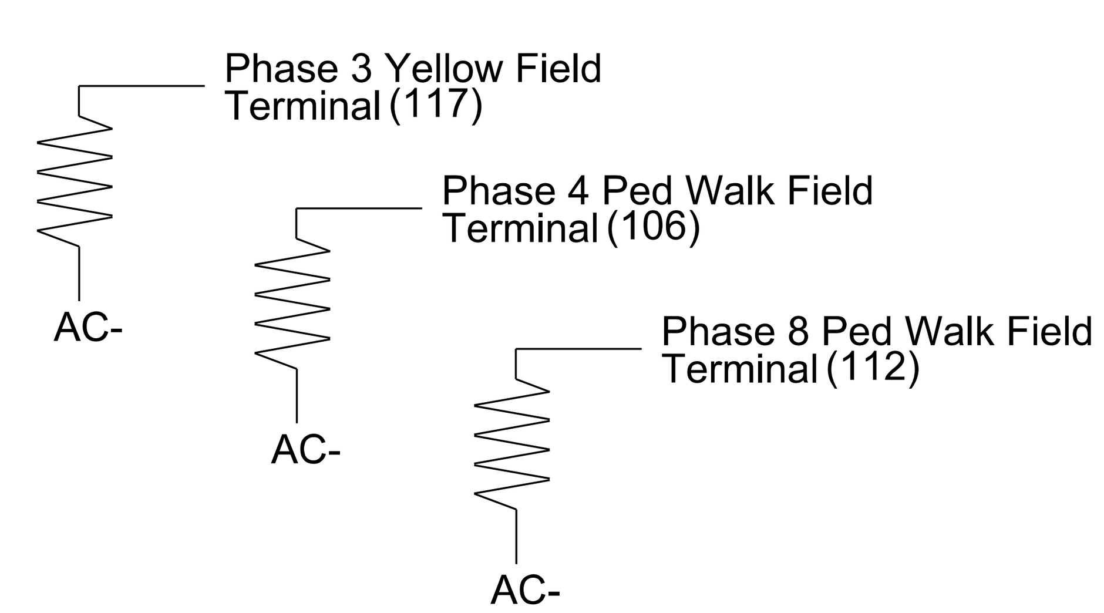
EQUIPMENT INFORMATION

Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used............................S4, S6**, S8, S11, S12**, AUX S2
Phases Used.......................................3, 6, 8
Overlap "1"..NOT USED
Overlap "2"..*
Overlap "3"..NOT USED
Overlap "4"..NOT USED
*See overlap programming detail on sheet 2
**Used for advance beacons only

LOAD RESISTOR INSTALLATION DETAIL

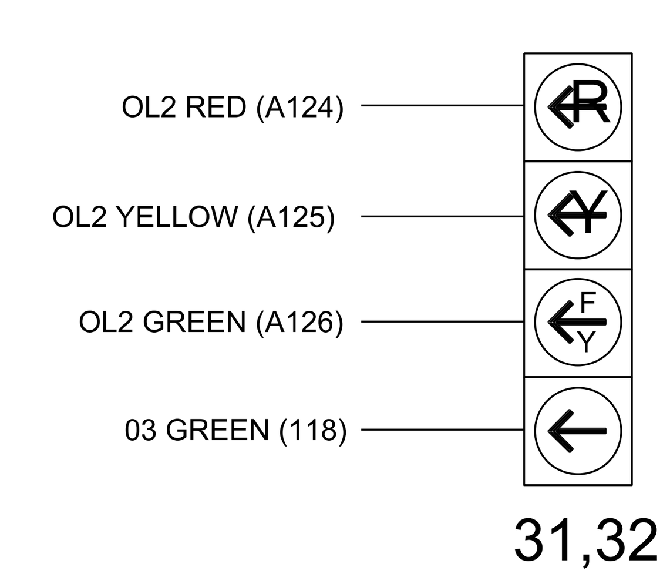
(install resistors as shown)

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1245
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical Detail - Sheet 1 of 3

Electrical and Programming Details For:

Prepared in the Offices of:

Transportation Mobility and Safety Division — ITS & Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 17 (Ocean Highway)
at
SR 1316 (Old Shallotte Rd NW)

Division 3 — Brunswick County — Shallotte

PLAN DATE: March 2025 — REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe — REVIEWED BY:

REVISIONS	INIT.	DATE

TRANSYSTEMS
1 Glenwood Avenue
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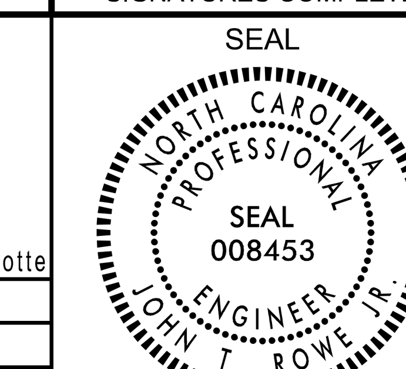
Fax:919.789.9591
License: F-0453

SEAL



Signed by: John T. Rowe, Jr. 4-1-2025
DATE

SIG. INVENTORY NO. 03-1245

4/7/2025 USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 7.2

OVERLAP PROGRAMMING 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
Type	Off	FYA 4-Section	Off	Off
Included Phases		6		
Modifier Phases		3		
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	1	2	3	4	
Type	Off	FYA 4-Section	Off	Off	
Included Phases					← NOTICE CHANGES IN INCLUDED PHASE ROW
Modifier Phases		3			
Modifier Overlaps	-	-	-		
Trail Green		0			
Trail Yellow		0.0			
Trail Red		0.0			

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A

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

	Detector	Call Phase	Delay
3A	7	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
NOTICE CHANNEL 2 FLASHES RED →	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
NOTICE CHANNEL 6 FLASHES RED →	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED →	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED →	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
PROGRAM CHANNEL 20 AS	19	None	0				19
ADV. WARNING FLASHER →	20	Adv. Warning Flasher	6				20

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

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1245
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 3

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TRANSYSTEMS
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License: F-0453

Electrical and Programming Details For:

Prepared in the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Traffic Engineering & Signals Management Unit
750 N. Greenfield Pkwy, Garner, NC 27529

US 17 (Ocean Highway)
at
SR 1316 (Old Shallotte Rd NW)

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025 | REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.
Signed by: John T. Rowe, Jr. 4-1-2025
DEFEB32009F7407 DATE

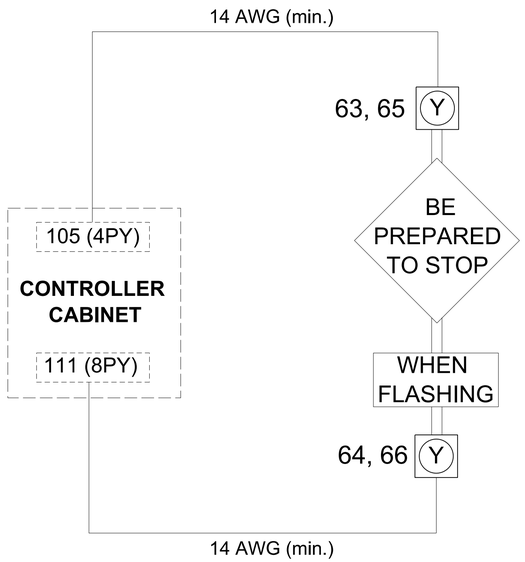
SIG. INVENTORY NO. 03-1245

4/1/2025
03-1245_sheets.2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 7.3

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 105 (4PY) AND TERMINAL 111 (8PY).

2. INSET LOADSWITCHES FOR S6 AND S12.

3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.

4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 35 AND 36 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 63, 64, 65, & 66

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
35	C1-37	Channel Green Walk Driver	20
36	C1-38	Channel Red Do Not Walk Driver	20

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases for heads 31and 32 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 3 call on loop 3A to 0 seconds.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1245
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 3 of 3

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TRANSYSTEMS
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License: F-0453

Electrical and Programming Details For:

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

US 17 (Ocean Highway)
at
SR 1316 (Old Shallotte Rd NW)

Division 3 | Brunswick County | Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

Signed by: John T. Rowe, Jr. 4-1-2025
DATE

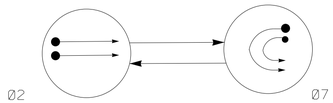
SIG. INVENTORY NO. 03-1245

4/1/2025
R5857_03-1245_sm_ele_2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 8.0

2 Phase
Fully Actuated
US 17 (Old Shallotte Rd)
Signal System #: D03-38_Shallotte

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2	PHASE Ø7	PHASE FLASH
21,22	G	R	R
71,72	(R)	↶	(R)

SIGNAL FACE I.D.

All Heads L.E.D.

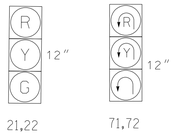
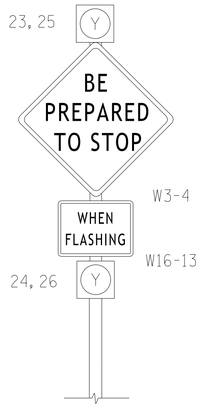


Figure 1



See notes 6 and 7

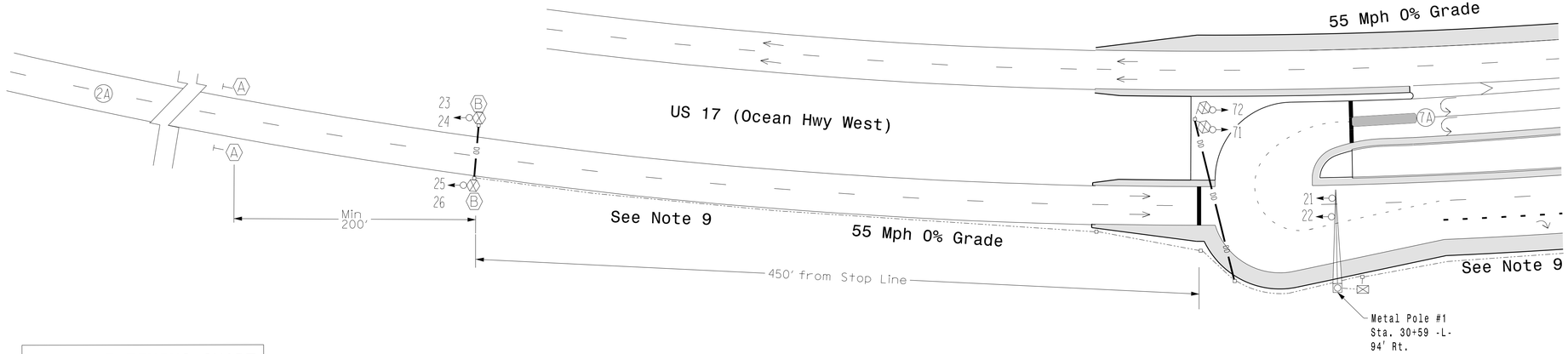
TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	INTERVAL 2
23,25	ON	OFF
24,26	OFF	ON

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
7A	✳	0	✳	X	7	-	-	X	-	X	-	*

* Multizone microwave detection zone.



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. Set all detector units to presence mode.
4. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
6. Activate flashers 3 seconds prior to end of phase 2 green.
7. Flash vertically-mounted beacons alternately.
8. Route conduit back to signal cabinet 03-1244 for electrical service drop.
9. Install new conduit as close as possible to edge of pavement.
10. Refer to the Pavement Marking Plans for pavement marking details.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Type III Signal Pedestal	
	Detection zone	
	Controller & Cabinet	
	Junction Box	
N/A	Curb Ramp	
	2-in Underground Conduit	
DD	Directional Drill	N/A
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
(A)	Signal Ahead Sign (W3-3)	(A)
(B)	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	(B)

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 7
Walk *	–	–
Ped Clear *	–	–
Min Green *	14	7
Passage *	2.0	2.0
Max 1 *	100	25
Yellow Change	5.2	3.0
Red Clear	1.2	4.6
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	–
Pre-Clearance	3.0	–
Non Lock Detector	–	X
Vehicle 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.

ADVANCED MICROWAVE EXTENDED RANGE DETECTION

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

New Installation

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

US 17 NB (Ocean Highway W) at U-Turn South of US 17 Bus/Old Shallotte Rd

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr Jr. 3/31/2025
AA6F5076CAB34CF...

SIG. INVENTORY NO. 03-1246

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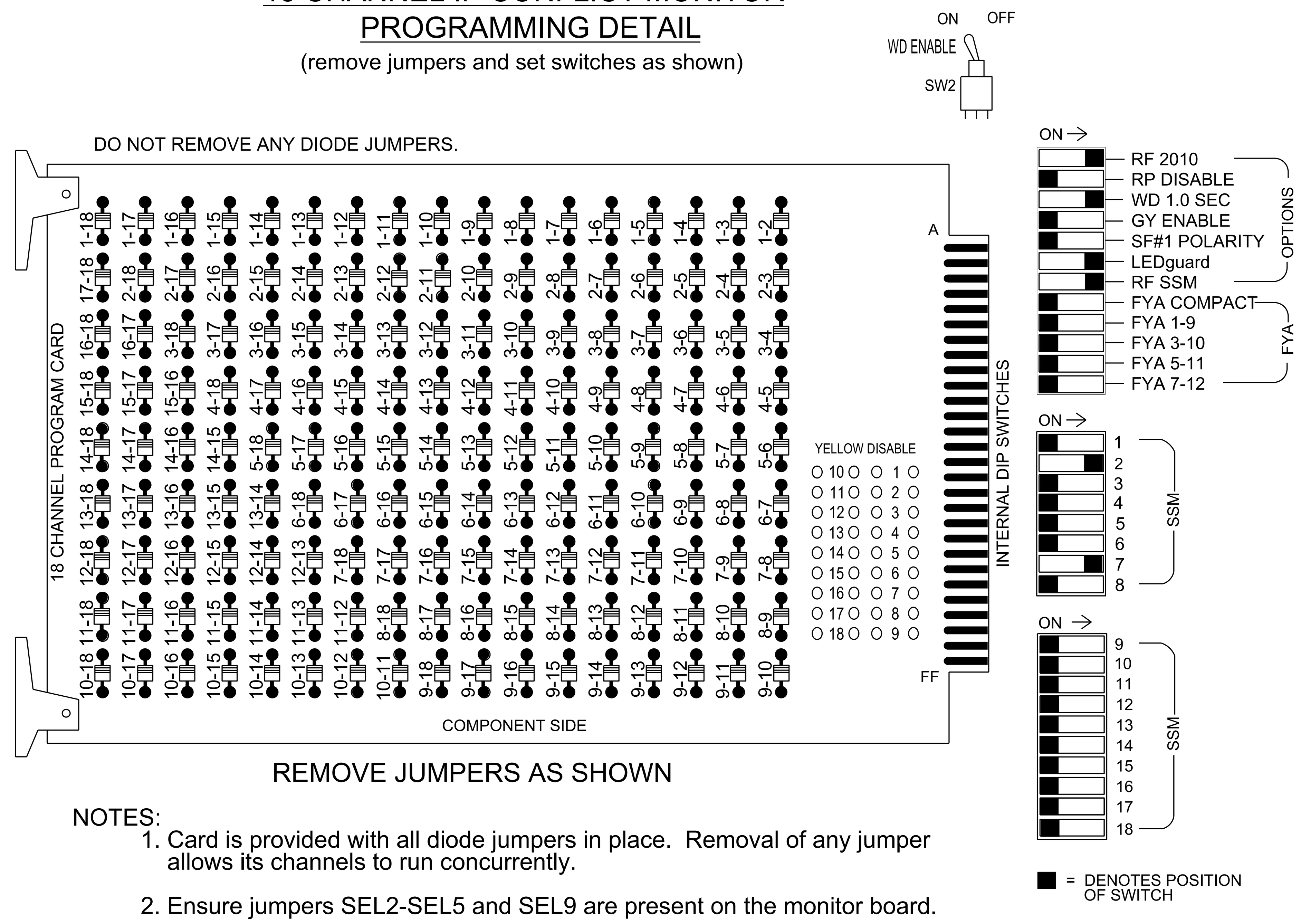
License: F-0453

3/31/2025
R-5857_SIG_DSN_3.dgn
USER:ndegbotse

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.
3. Program phases 2 for Advanced Warning.
4. Program phases 2 for 3.0 seconds 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 D03-38_Shallotte Signal System.

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 8.1

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	5	6	6 PED	ADVANCE BEACON	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	21,22	NU	23,25	NU	NU	NU	NU	NU	NU	24,26	71,72	NU	NU	NU	NU	NU	NU	NU	NU
RED		128																		
YELLOW		129																		
GREEN		130																		
RED ARROW												122								
YELLOW ARROW												123								
GREEN ARROW												124								
(Don't Walk hand)																				
PED YELLOW				** 114							** 120									
(Walk person)			*							*										

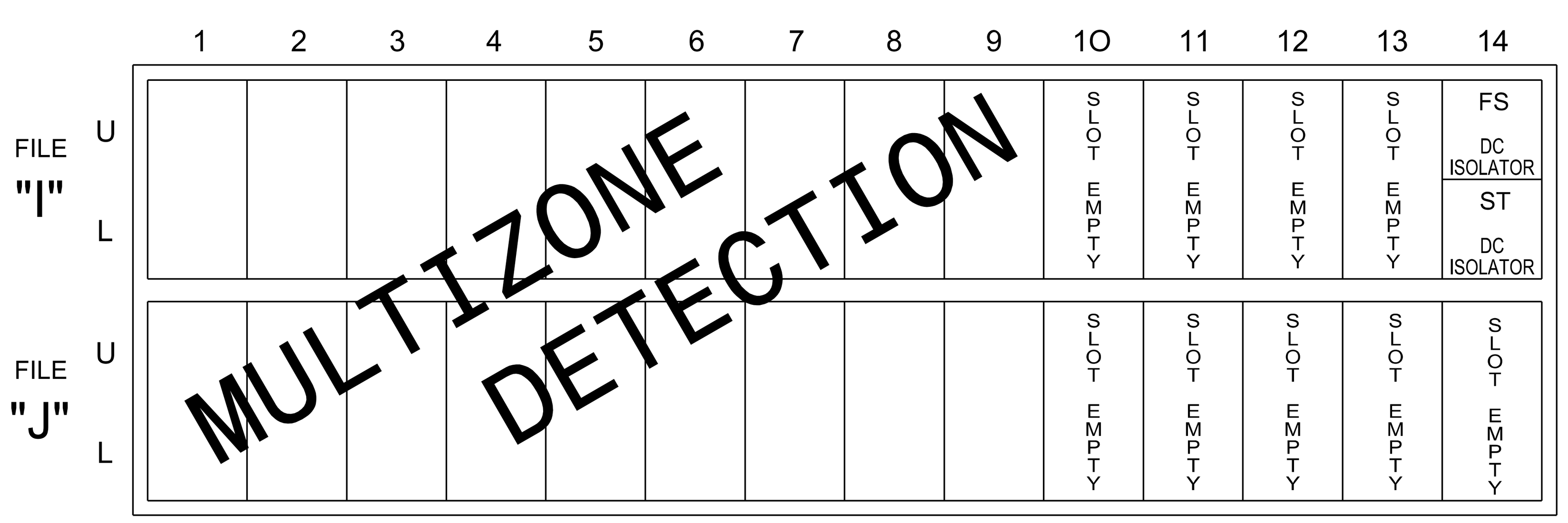
NU = Not Used

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

** Outputs have been reassigned for Advanced Beacons. See Sheet 2 for reassignment programming and wiring details.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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.

EQUIPMENT INFORMATION

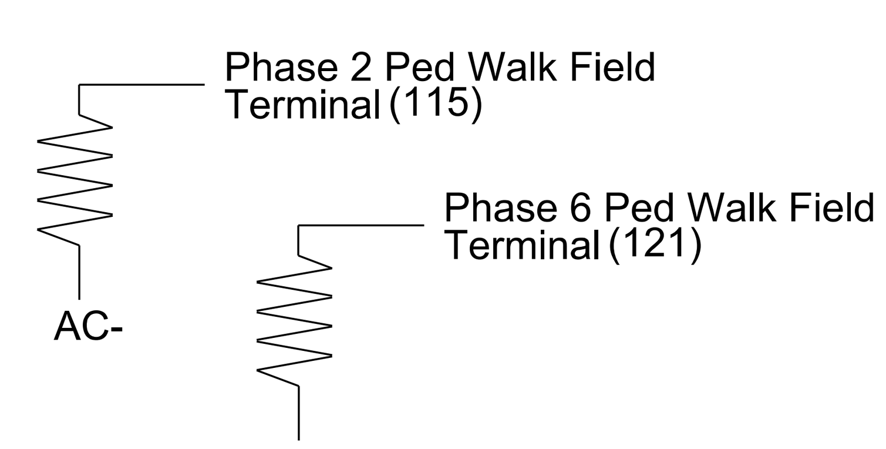
Controller..........2070LX
Cabinet..........332 w/ Aux
Software..........Q-Free MAXTIME
Cabinet Mount..........Base
Output File Positions..........18 With Aux. Output File
Load Switches Used..........S2, S3**, S9**, S10
Phases Used..........2, 7
Overlap "1"..........NOT USED
Overlap "2"..........NOT USED
Overlap "3"..........NOT USED
Overlap "4"..........NOT USED

**Used for advance beacons only

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1246
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

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Fax:919.789.9591
License: F-0453

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For:

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

US 17 NB (Ocean Highway West)
at
U-Turn South of US 17 Bus/
Old Shallotte Rd

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025 | REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe | REVIEWED BY:

REVISIONS | INIT. | DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

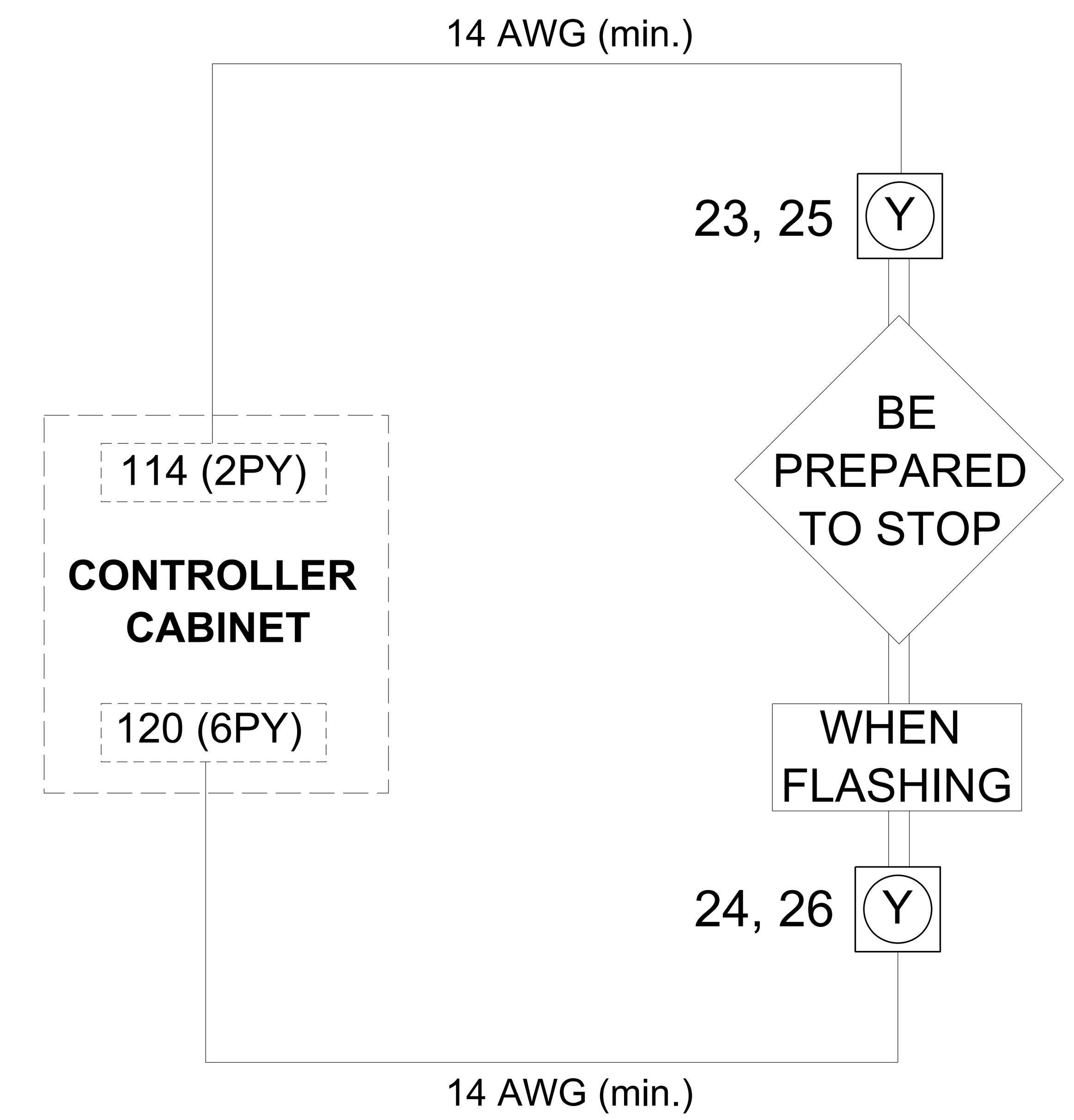
Signed by: John T. Rowe, Jr. 4-1-2025
DATE

SIG. INVENTORY NO. 03-1246

4/1/2025
..\61246_sm_ele_2025xxyy.dgn
USERdefault

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. INSET LOADSWITCHES FOR S3 AND S9.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 33 AND 34 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 23, 24, 25, & 26

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Channel Green Walk Driver	19
34	C1-36	Channel Red Do Not Walk Driver	19

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Note	Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
	1	Phase Vehicle	1		X	X	1
NOTICE CHANNEL 2 FLASHES RED	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
NOTICE CHANNEL 6 FLASHES RED	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED	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
PROGRAM CHANNEL 19 AS ADV. WARNING FLASHER	19	Adv. Warning Flasher	2				19
	20	None	0				20

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1246
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453

Electrical and Programming Details For:

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

US 17 NB (Ocean Highway West)
at
U-Trurn South of US 17 Bus/
Old Shallotte Rd

Division 3 | Brunswick County | Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

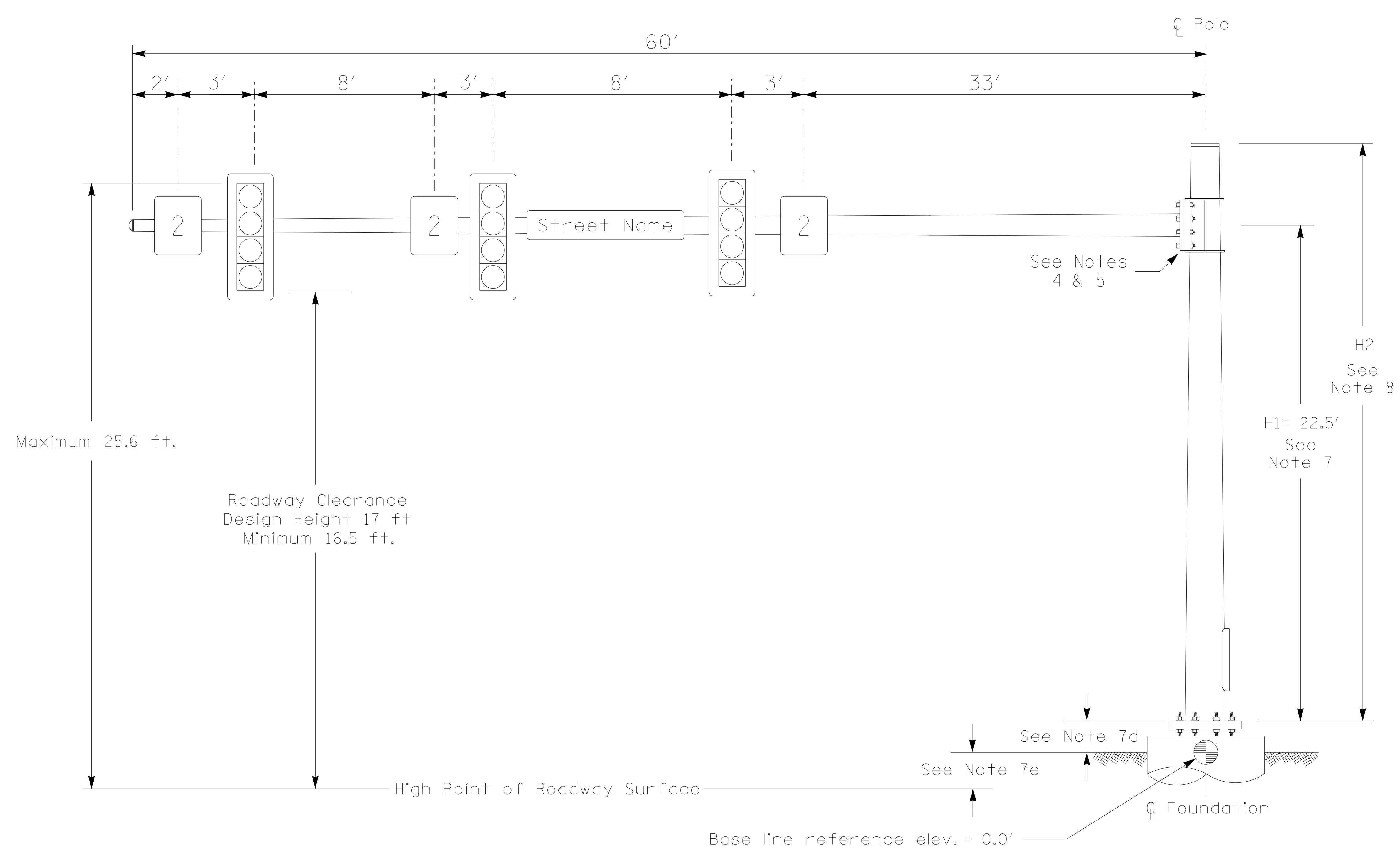
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

Signed by: John T. Rowe. Jr
DEFE832009E7407...
4-1-2025
DATE

SIG. INVENTORY NO. 03-1246

Design Loading for METAL POLE NO. 1 (03-1246)



Elevation View

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 8.3

SPECIAL NOTE

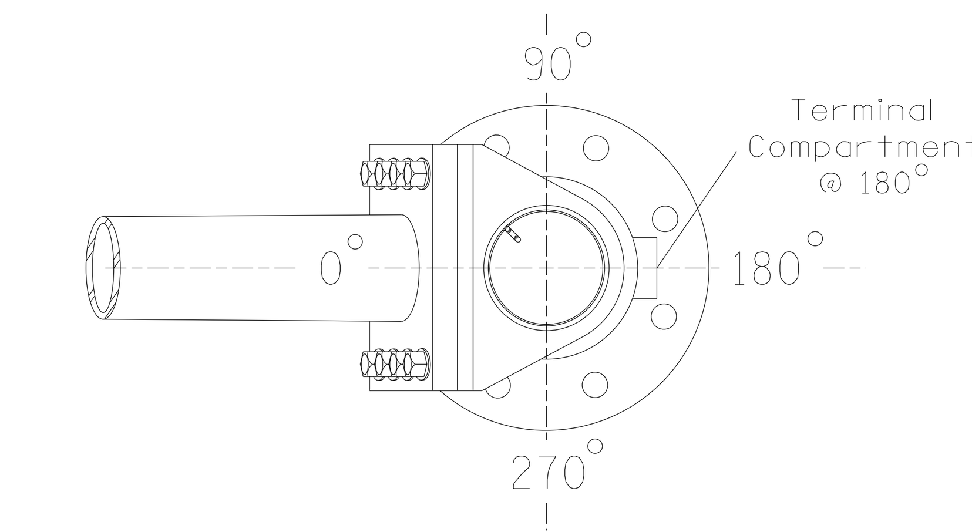
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

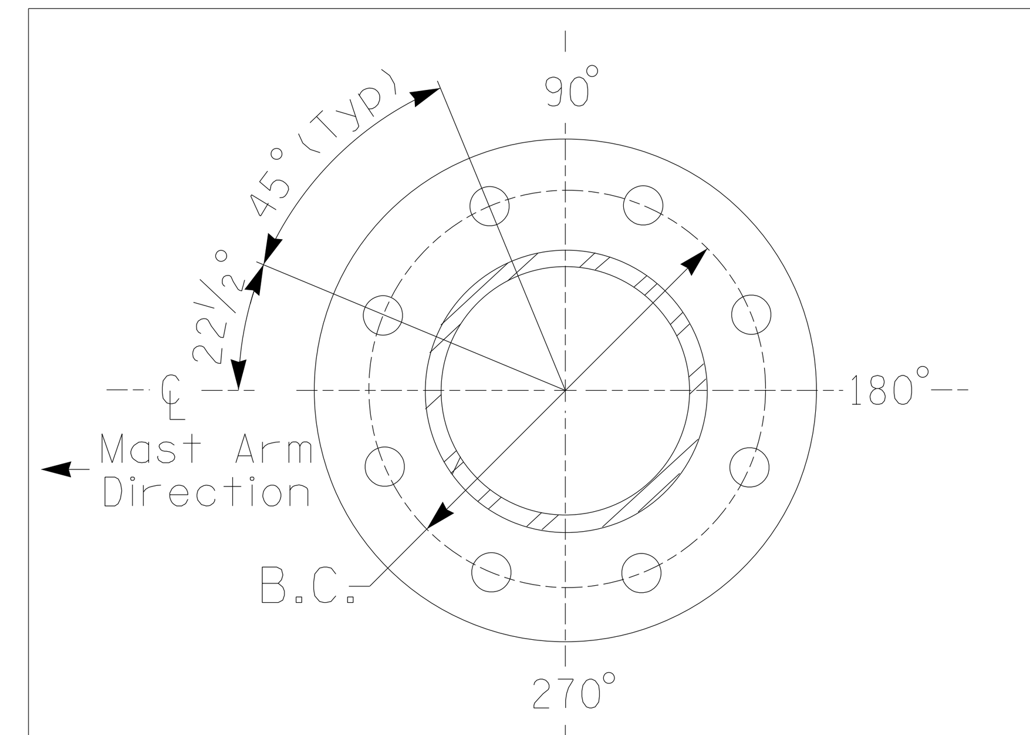
Elevation Differences for:	Pole 1	
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+1.01 ft.	
Elevation difference at Edge of travelway or face of curb	+1.01 ft.	

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
(signal head)	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5"W X 66.0"L	74 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS

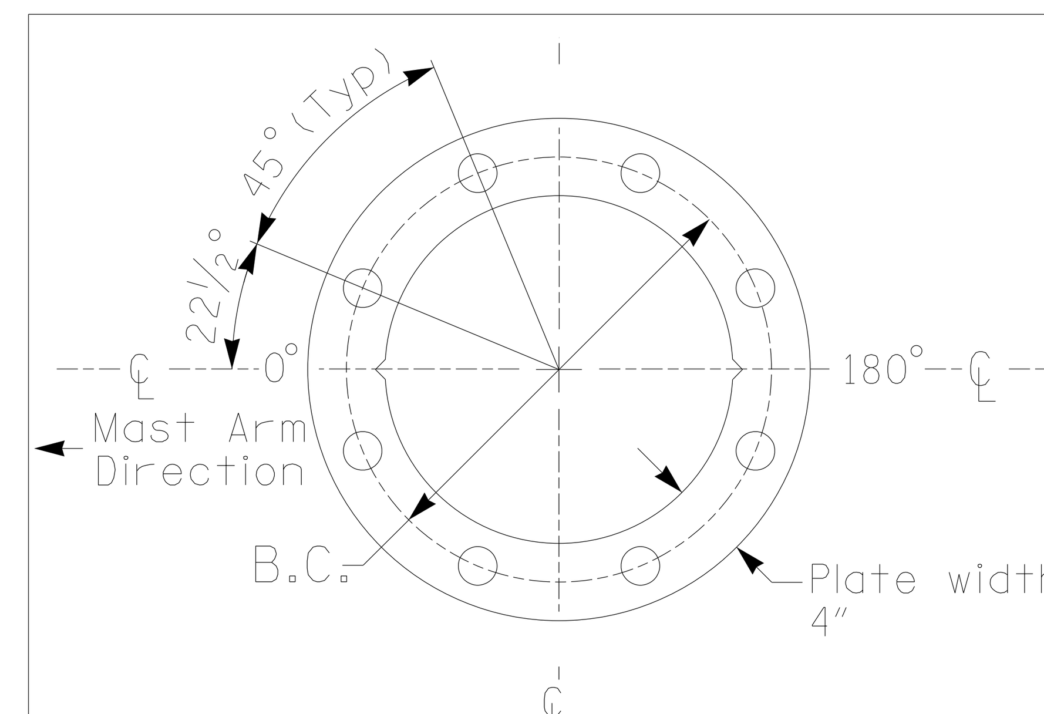


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

NOTES

DESIGN REFERENCE MATERIAL

1. Design the 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 1 (150 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of: Transportation Mobility and Safety Division, Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

US 17 NB (Ocean Highway W) at U-Turn South of US 17 Bus/ Old Shallotte Rd

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 N/A

N/A

REVISIONS INIT. DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr.

AA6F5076CAB34CF...

3/31/2025

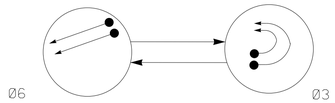
SIG. INVENTORY NO. 03-1246

3/31/2025
...\Loading Diagram_Single Mast Arm (SB).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 9.0

2 Phase
Fully Actuated
Signal System #: D03-38_Shallotte

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø6	PHASE Ø3	FLASH
31,32	(R)		(R)
61,62	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.

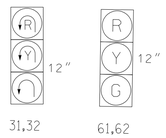
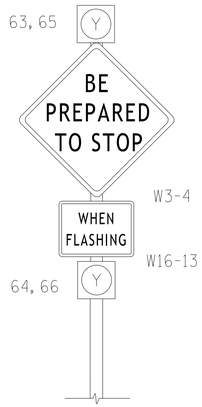


Figure 1



See notes 6 and 7.

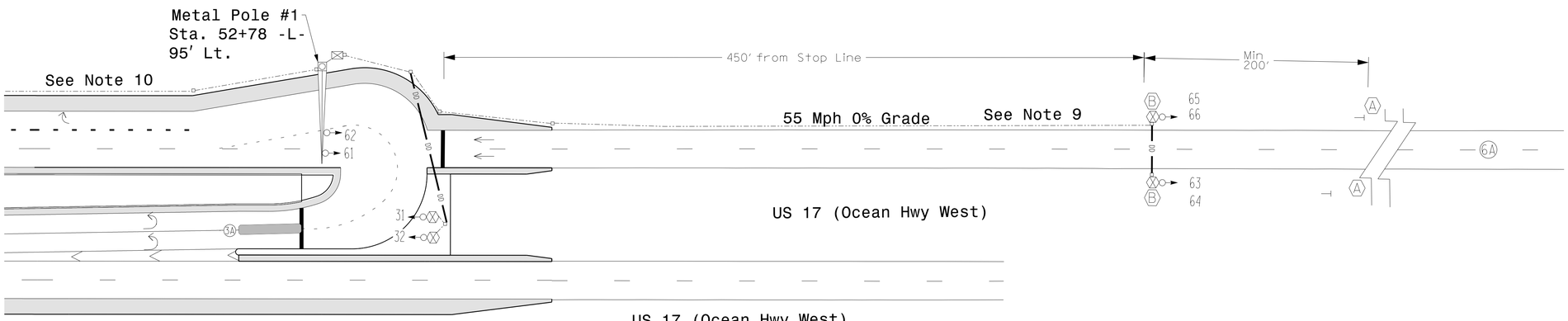
MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	✳	0	✳	X	3	-	-	X	-	X	-	*

* Multizone microwave detection zone.

TABLE OF OPERATION		
SIGNAL FACE	INTERVAL 1	INTERVAL 2
63,65	ON	OFF
64,66	OFF	ON

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. Set all detector units to presence mode.
4. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
6. Activate flashers 3 seconds prior to end of phase 6 green.
7. Flash vertically-mounted beacons alternately.
8. Route conduit back to signal cabinet 03-1245 for electrical service drop.
9. Install new conduit as close as possible to edge of pavement.
10. Refer to the Pavement Marking Plans for pavement marking details.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
↓□	Pedestrian Signal Head With Push Button & Sign	↓■
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
⊗	Type III Signal Pedestal	◆◆
▭	Detection Zone	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
N/A	Curb Ramp	◢
·····	2-in Underground Conduit	·····
—OD—	Directional Drill	N/A
N/A	Right of Way	— — — —
→	Directional Arrow	→
○◁	Metal Pole with Mastarm	○◁
(A)	Signal Ahead Sign (W3-3)	(A)
(B)	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	(B)

MAXTIME TIMING CHART		
FEATURE	PHASE 3	PHASE 6
Walk *	–	–
Ped Clear *	–	–
Min Green *	7	14
Passage *	2.0	2.0
Max 1 *	25	100
Yellow Change	3.0	5.2
Red Clear	5.6	1.2
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	–
Pre-Clearance	–	3.0
Non Lock Detector	X	–
Vehicle 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.

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

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for the Offices of:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section

US 17 SB (Ocean Highway W) at U-Turn North of US 17 Bus/(Old Shallotte Rd)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 3/31/2025

SIG. INVENTORY NO. 03-1247

TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

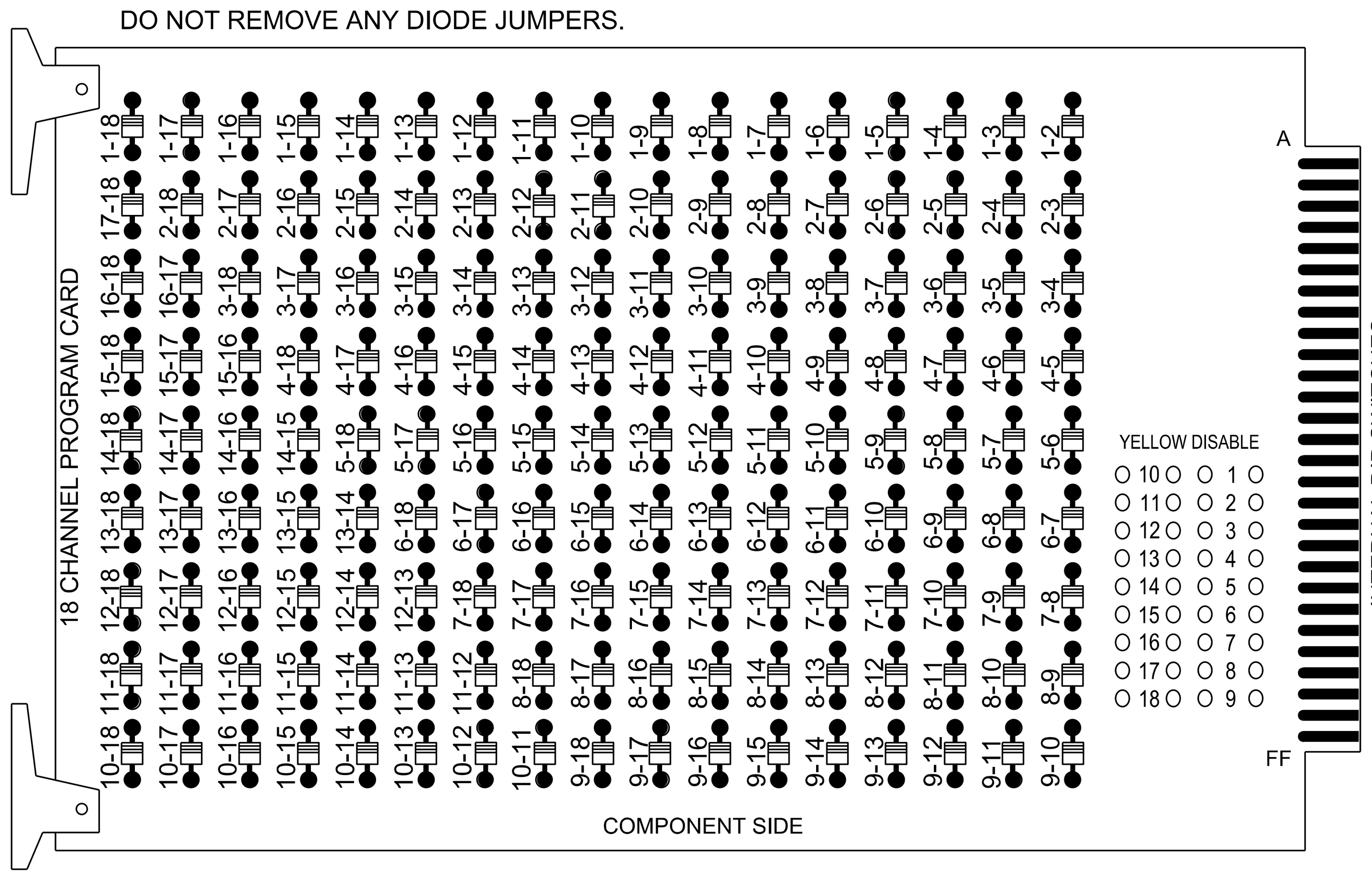
REVISIONS	INIT.	DATE

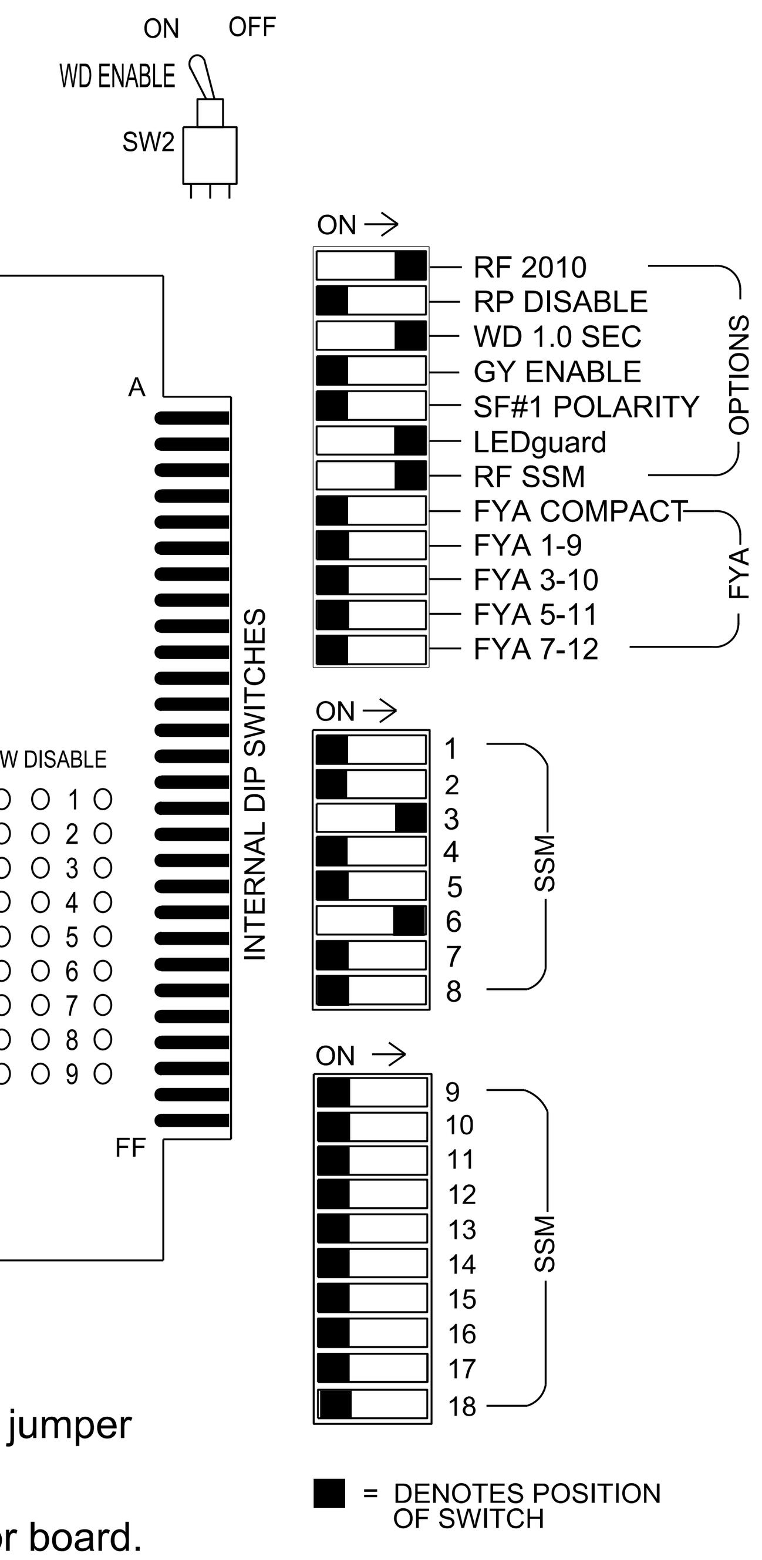
3/31/2025
R-5857_SIG_DSN_4.dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 9.1

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 6 Green No Walk.
3. Program phases 6 for Advanced Warning.
4. Program phases 6 for 3.0 seconds 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. This cabinet and controller are part of the D03-38_Shallotte Signal System.

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	ADVANCE BEACON	5	6	6 PED	7	8	8 PED	ADVANCE BEACON	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	NU	NU	31,32	NU	NU	63,65	NU	61,62	NU	NU	81,82	NU	64,66	NU	NU	NU	NU	NU	NU
RED									134											
YELLOW									135											
GREEN									136											
RED ARROW				116																
YELLOW ARROW				117																
GREEN ARROW				118																
(Don't Walk)																				
PED YELLOW							** 105							** 111						
(Walk)						*							*							

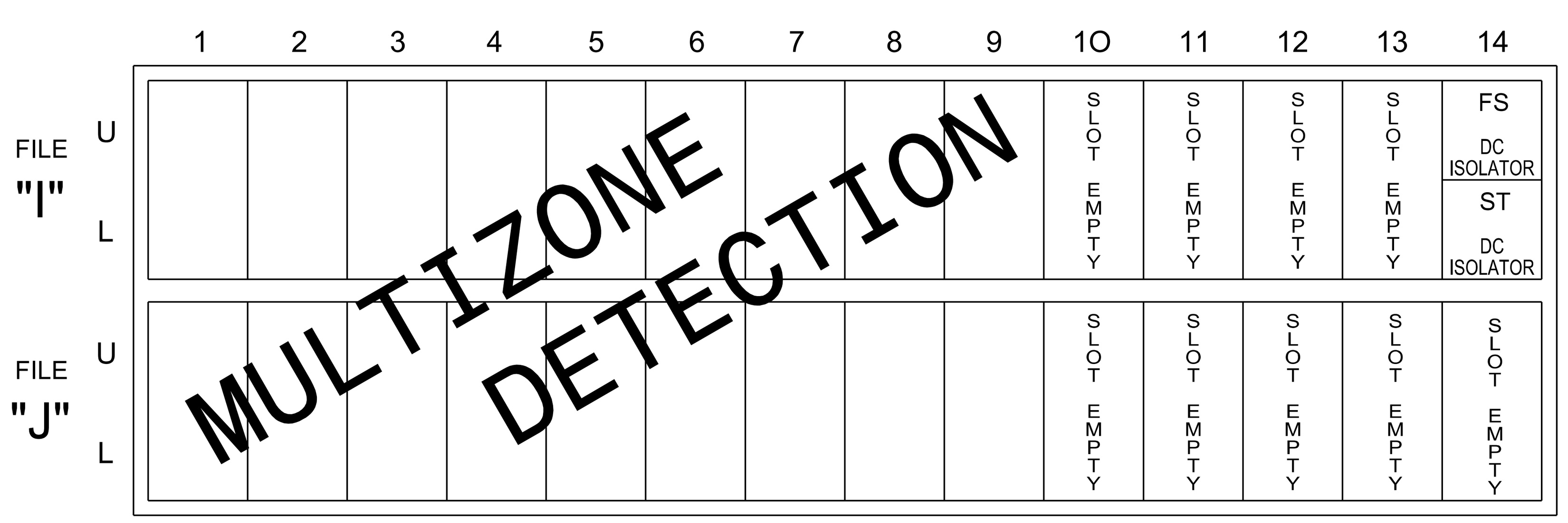
NU = Not Used

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

** Outputs have been reassigned for Advanced Beacons. See Sheet 2 for reassignment programming and wiring details.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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.

EQUIPMENT INFORMATION

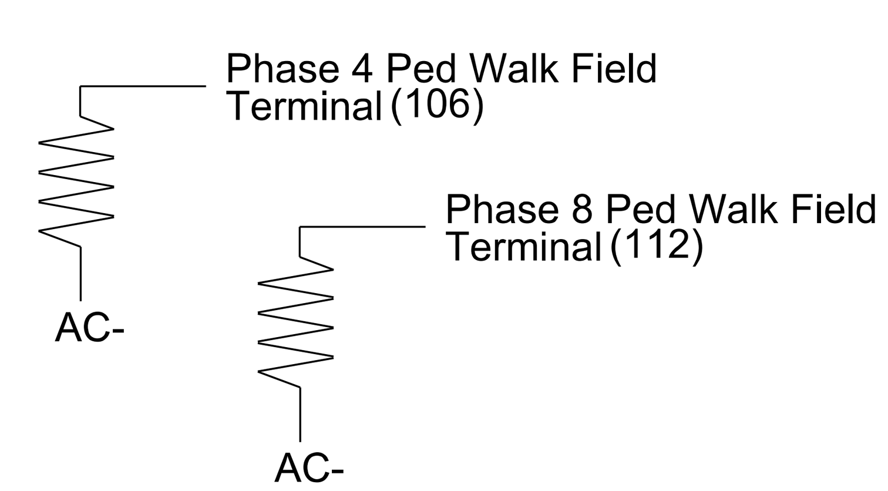
Controller..2070LX
Cabinet...332 w/ Aux
Software...Q-Free MAXTIME
Cabinet Mount....................................Base
Output File Positions..........................18 With Aux. Output File
Load Switches Used............................S4, S6**, S8, S12**
Phases Used.......................................3, 6
Overlap "1"..NOT USED
Overlap "2"..NOT USED
Overlap "3"..NOT USED
Overlap "4"..NOT USED

**Used for advance beacons only

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1247
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

TRANSYSTEMS
1 Glenwood Avenue
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License: F-0453

Electrical and Programming Details For:

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

US 17 SB (Ocean Highway W) at U-Turn North of US 17 Bus/ Old Shallotte Rd

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

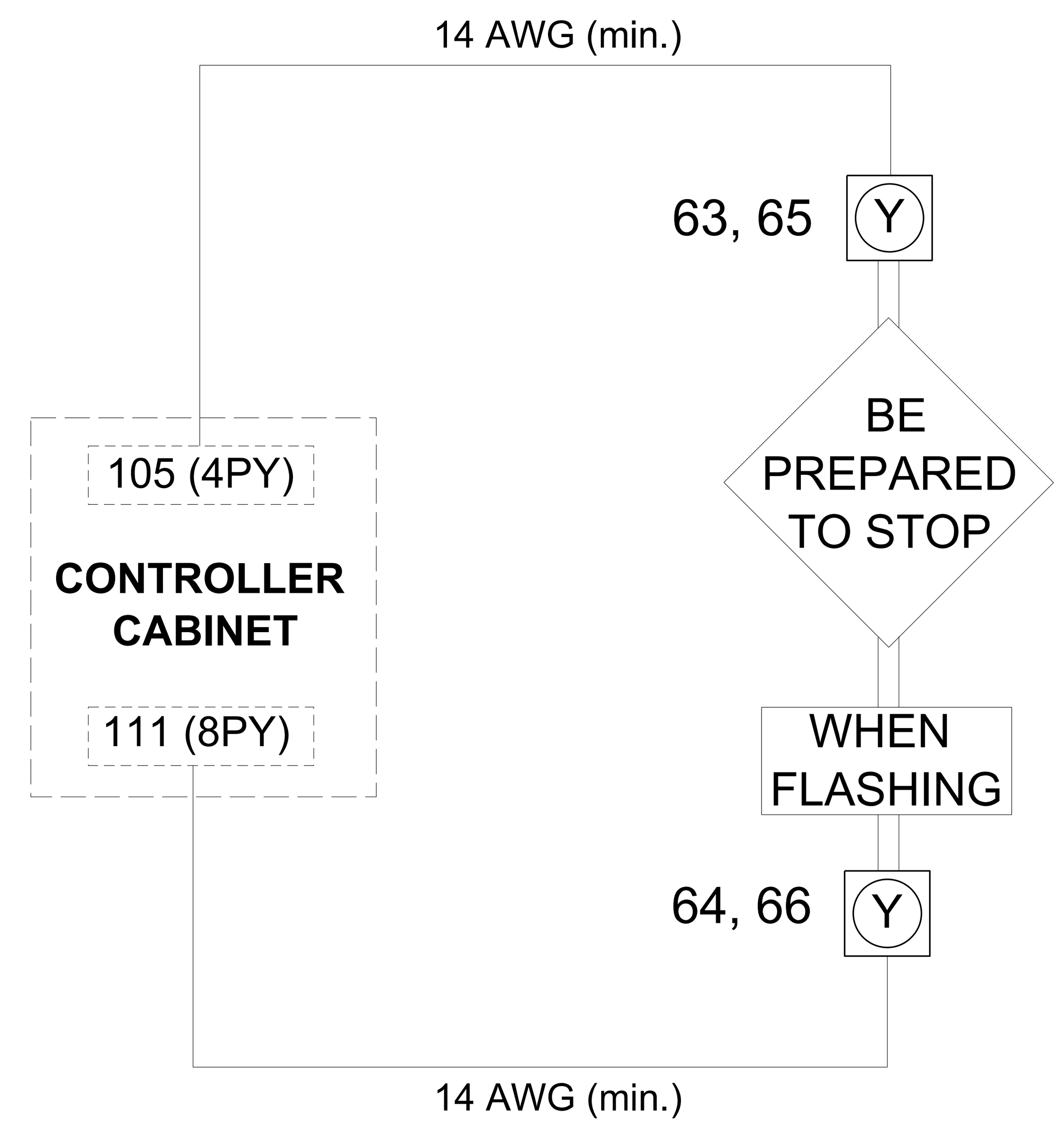
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE JR.
Signed by: John T. Rowe, Jr 4-1-2025
DATE

SIG. INVENTORY NO. 03-1247

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 9.2

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. INSET LOADSWITCHES FOR S6 AND S12.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 35 AND 36 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 63, 64, 65, & 66

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
35	C1-37	Channel Green Walk Driver	20
36	C1-38	Channel Red Do Not Walk Driver	20

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Note	Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
	1	Phase Vehicle	1		X	X	1
NOTICE CHANNEL 2 FLASHES RED	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
NOTICE CHANNEL 6 FLASHES RED	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED	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
PROGRAM CHANNEL 20 AS	19	None	0				19
ADV. WARNING FLASHER	20	Adv. Warning Flasher	6				20

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1247
DESIGNED: March 2025
SEALED: 3-31-2025
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Electrical Detail - Sheet 2 of 2

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U-Turn North of US 17 Bus/
Old Shallotte Rd

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

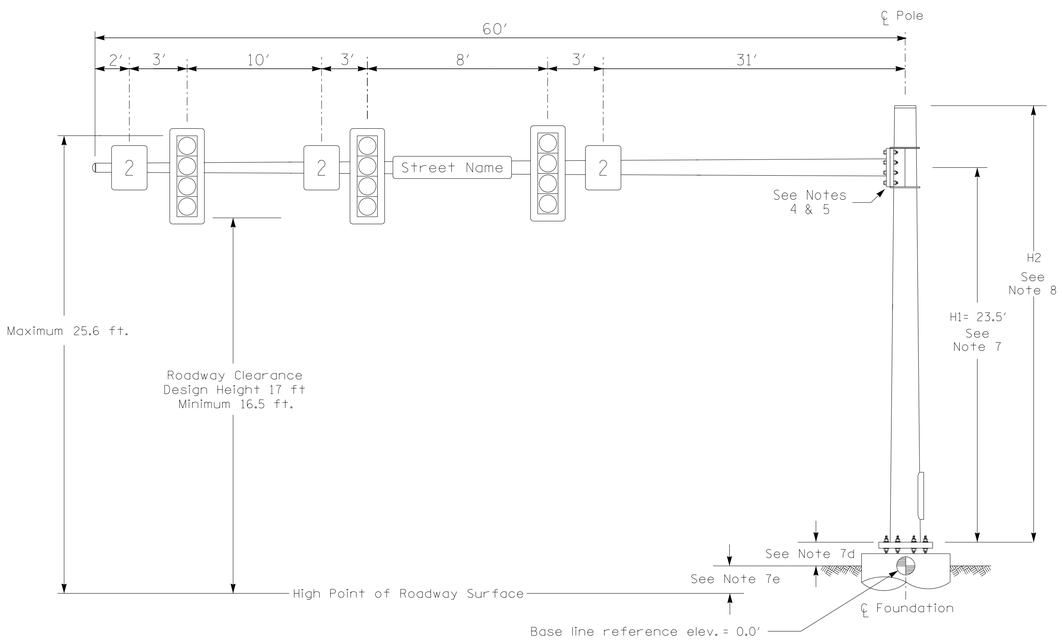
Signed by: John T. Rowe, Jr
DEEE832009E7407
4-1-2025
DATE

SIG. INVENTORY NO. 03-1247

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 9.3

Design Loading for METAL POLE NO. 1 (03-1247)



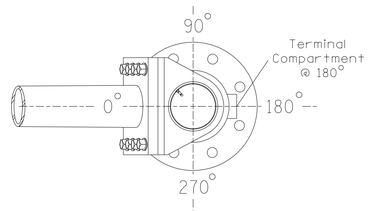
Elevation View

SPECIAL NOTE

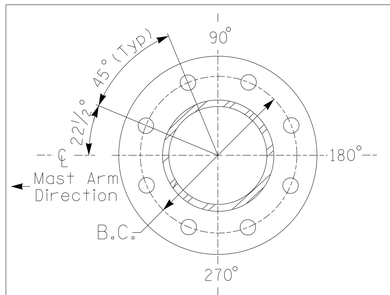
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at ⊕ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+2.23 ft.	
Elevation difference at Edge of travelway or face of curb	+0.98 ft.	

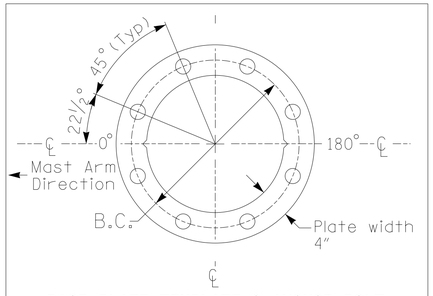


POLE RADIAL ORIENTATION



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
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0″ W X 36.0″L	14 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 1 (150 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17 SB (Ocean Highway W) at U-Turn North of US 17 Bus/(Old Shallotte Rd)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

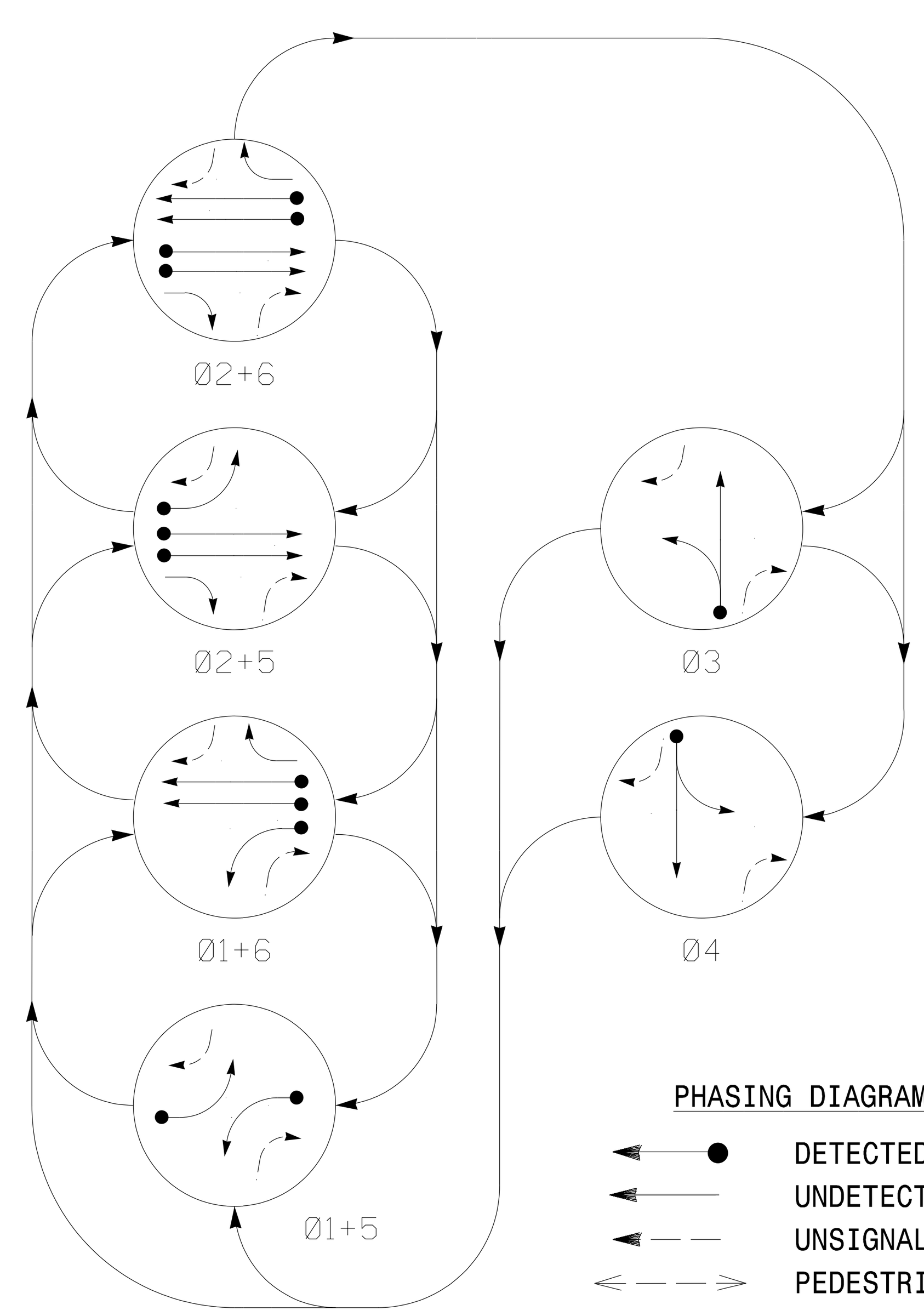
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr.
AA6F5076CAB34CF...
3/31/2025

SIG. INVENTORY NO. 03-1247

3/31/2025
I:\Workzone Diagrams\Single Mast Arm (NB).dgn
USER:ndegbotse

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

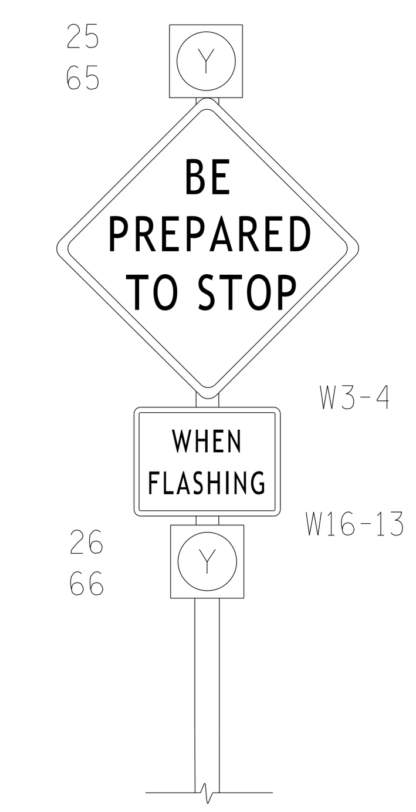
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	←R	←R	←R	←R	←R
21, 22	R	R	G	G	R	R	R
31	R	R	R	R	←G	R	R
32, 33	R	R	R	R	G	R	R
41	R	R	R	R	R	←G	R
42, 43	R	R	R	R	R	G	R
51	←	←R	←	←R	←R	←R	←R
61, 62	R	G	R	G	R	R	R

TABLE OF OPERATION

SIGNAL FACE	INTERVAL 1	2
25	ON	OFF
26	OFF	ON
65	ON	OFF
66	OFF	ON

Figure 1



See notes 8 and 9.

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	*	0	*	X	1	-	-	X	-	X	-	*
3A	*	0	*	X	3	3.0	-	X	-	X	-	*
4A	*	0	*	X	4	3.0	-	X	-	X	-	*
5A	*	0	*	X	5	-	-	X	-	X	-	*

* Multizone microwave detection zone

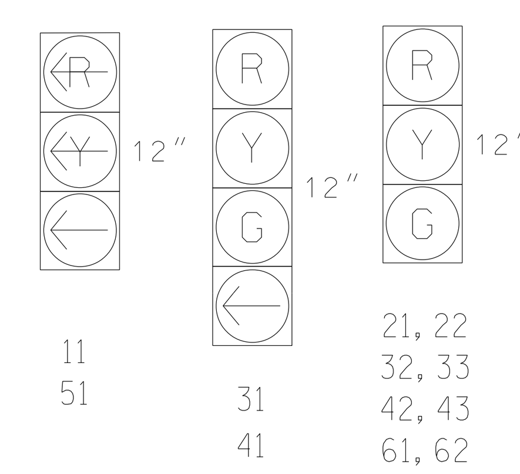
6 Phase
Fully Actuated
Isolated

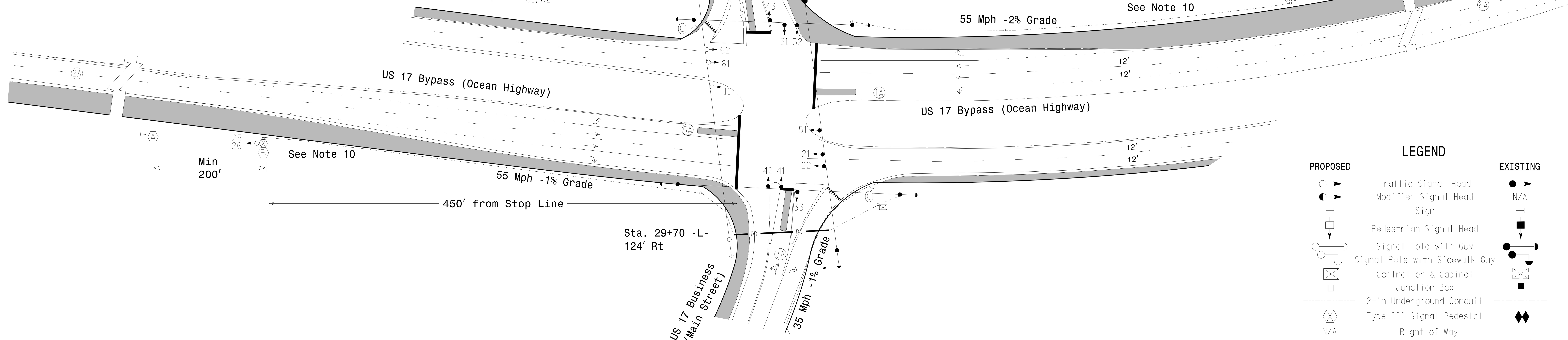
NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024. "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. Locate new cabinet so as not to obstruct sight ditance of vehicles turning right on red.
7. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
8. Activate flashers 3 seconds prior to end of phase 2 and/or phase 6 green.
9. Flash vertically-mounted beacons alternately.
10. Install new conduit as close as possible to edge of pavement.
11. Pavement markings are existing.

SIGNAL FACE I.D.

All Heads L.E.D.





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	
	Type III Signal Pedestal	
N/A	Right of Way	
	Directional Arrow	
	Directional Drill	N/A
	Detection Zone	
	Construction Zone	
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Walk *	–	–	–	–	–	–
Ped Clear	–	–	–	–	–	–
Min Green *	7	14	7	7	7	14
Passage *	3.0	2.0	2.0	2.0	2.0	2.0
Max 1 *	45	90	25	25	15	90
Yellow Change	3.0	5.4	3.9	3.9	3.0	5.4
Red Clear	3.3	1.0	2.8	2.9	3.2	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	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.

ADVANCED MICROWAVE EXTENDED RANGE DETECTION

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

New Installation - Temporary Design 1 (TMP Phase 1)

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

SCALE 0 50
1"=50'

US 17 Bypass (Ocean Highway W)
at US 17 Business (Main Street)/
Frontage Road NW

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025	REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr, Jr.
AA6F5076CAB34CF...
3/31/2025

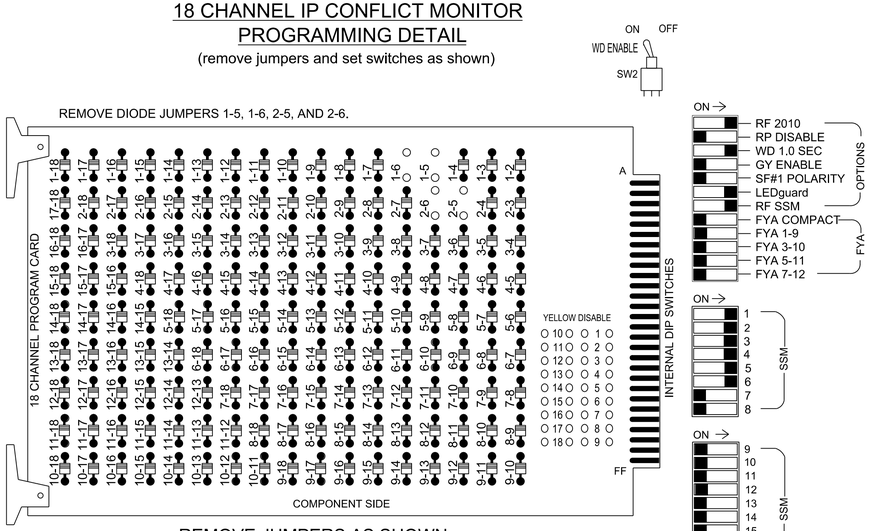
SIG. INVENTORY NO. 03-1248T1

3/31/2025
...\Temp Sig 1.dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.10.1

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. Program phases 2 and 6 for Advanced Warning.
4. Program phases 2 and 6 for 3.0 seconds 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.

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	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	11	21,22	NU	25	31	32,33	41	42,43	NU	65	51	61,62	NU	26	NU	NU	NU	66	NU	NU	NU	NU	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	125			·		·		·		·	131	·	·	·	·	·	·	·	·	·	·	·	·	·
YELLOW ARROW	126			·		·		·		·	132			·	·	·	·	·	·	·	·	·	·	·
GREEN ARROW	127			·	118	·	103	·		·	133	·	·	·	·	·	·	·	·	·	·	·	·	·
PED	·	·		·	·	·	·	·		·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
PED YELLOW	·	·		** 114	·	·	·	·		** 105	·	·	·	** 120	·	·	·	** 111	·	·	·	·	·	·
	·	·	*	·	·	·	·	·	*	·	·	·	*	·	·	·	*	·	·	·	·	·	·	·

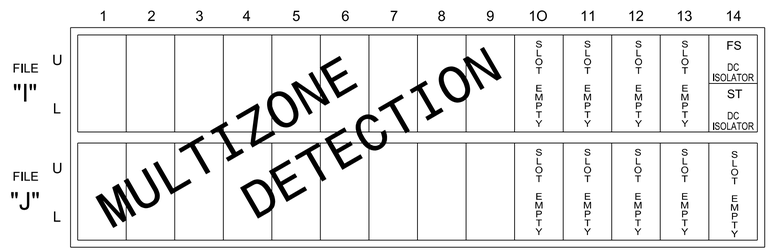
NU = Not Used

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

** Outputs have been reassigned for Advanced Beacons. See Sheet 2 for reassignment programming and wiring details.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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.

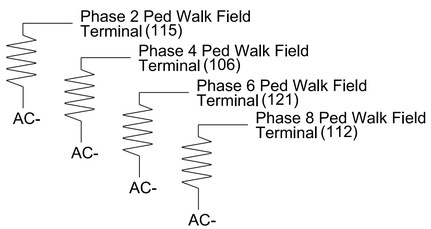
EQUIPMENT INFORMATION

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**, S12**
Phases Used.....1, 2, 3, 4, 5, 6
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....NOT USED
Overlap "4".....NOT USED
**Used for advance beacons only

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1248T1
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

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Electrical and Programming Details For:

Prepared in the Offices of:
N.C. Transportation Mobility and Safety Division
Traffic Engineering & Safety Systems Branch
Signals Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 17 Bypass (Ocean Highway W)
at
US 17 Bus (Main Street) / Frontage Road NW

Division 3 | Brunswick County | Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

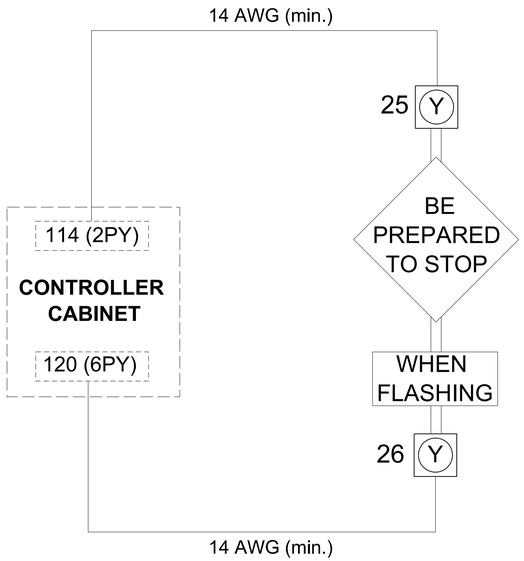
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE JR.
Signed by: John T. Rowe, Jr. 4-1-2025
DEFEB32009E7407
DATE
SIG. INVENTORY NO. 03-1248T1

4/1/2025
03-1248T1_smele_2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.10.2

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 114 (2PY) AND TERMINAL 120 (6PY).
2. INSET LOADSWITCHES FOR S3 AND S9.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 33 AND 34 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 25, 26, 65, & 66

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

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

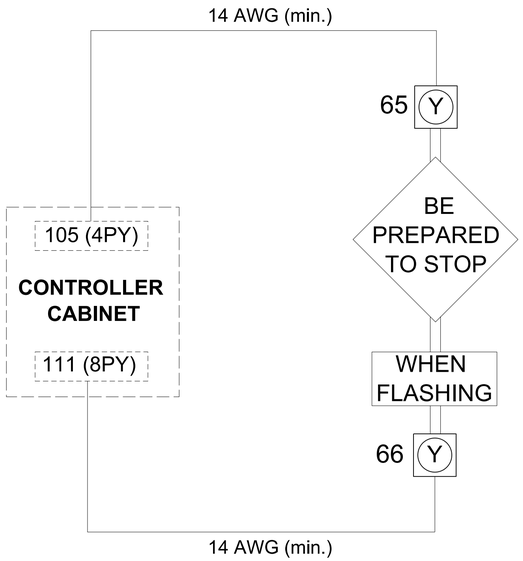
Modify IO Module 1 as shown below and save changes.

IO Module 1

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

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. INSET LOADSWITCHES FOR S6 AND S12.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 35 AND 36 AS SHOWN ON THIS SHEET.

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
NOTICE CHANNEL 2 FLASHES RED →	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
NOTICE CHANNEL 6 FLASHES RED →	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED →	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED →	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
PROGRAM CHANNELS 19 & 20 →	19	Adv. Warning Flasher	2				19
AS ADV. WARNING FLASHER →	20	Adv. Warning Flasher	6				20

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1248T1
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

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

US 17 Bypass (Ocean Highway W)
at
US 17 Bus (Main Street) /
Frontage Road NW

Division 3 | Brunswick County | Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

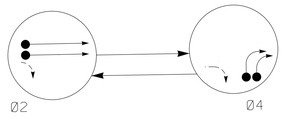
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 008453 JOHN T. ROWE JR.
Signed by: John T. Rowe, Jr. 4-1-2025
DATE
SIG. INVENTORY NO. 03-1248T1

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 11.0

2 Phase
Fully Actuated
Isolated

PHASING DIAGRAM

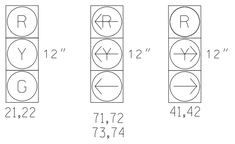


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.

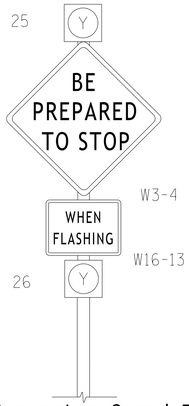


See note 4

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø2	PHASE Ø4	FLASH
21,22	G	R	R
41,42	R	→	R

TABLE OF OPERATION		
SIGNAL FACE	INTERVAL 1	INTERVAL 2
25	ON	OFF
26	OFF	ON

Figure 1



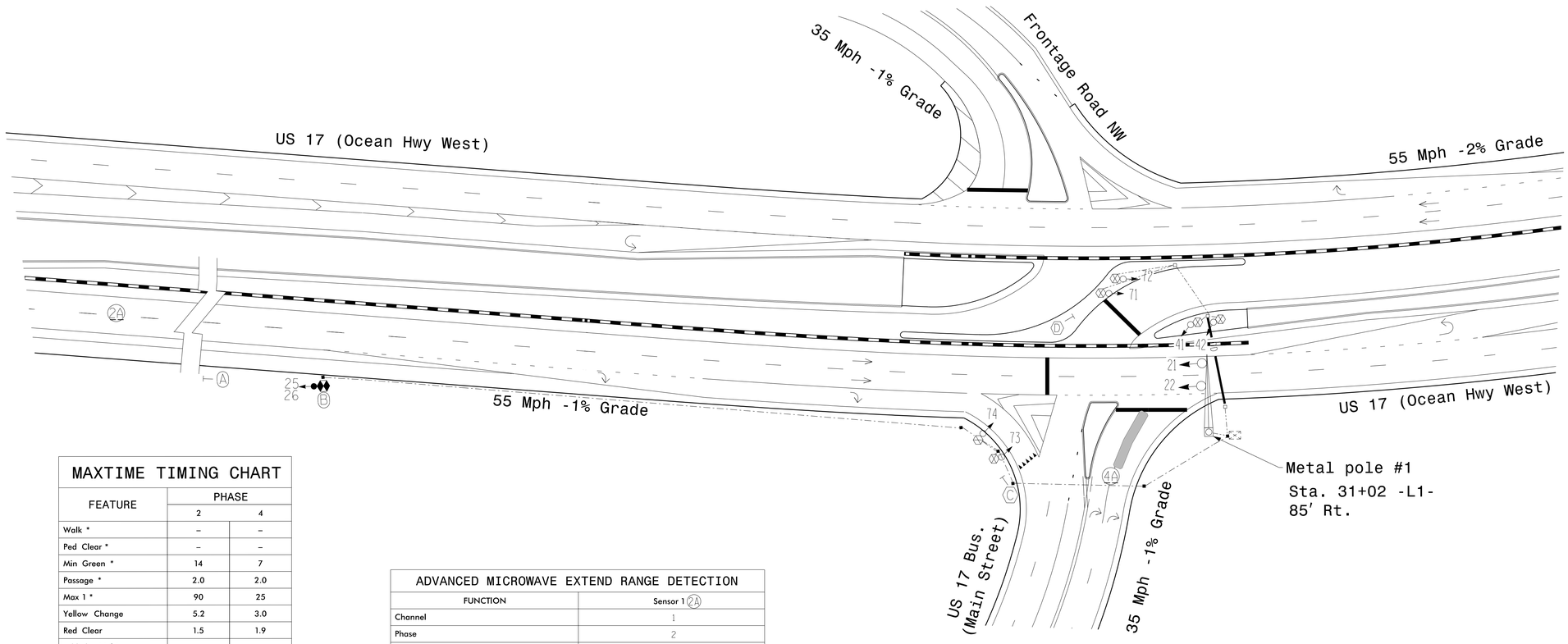
See notes 6 and 7

MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR						PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP		CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
4A	✳	0	✳	X		4	15	-	X	-	X	-	*

* Multizone microwave detection zone.

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. Set all detector units to presence mode.
4. Disconnect and bag signal heads 71,72,73 and 74 during this phase of construction.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. Activate flashers 3 seconds prior to end of phase 2 green.
7. Flash vertically-mounted beacons alternately.
8. Refer to the Pavement Marking Plans for pavement marking details.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
	Pedestrian Signal Head With Push Button & Sign	
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
Ⓧ	Type III Signal Pedestal	◆
⊠	Controller & Cabinet	⊠
□	Junction Box	■
N/A	Curb Ramp	
·····	2-in Underground Conduit	·····
—DD—	Directional Drill	N/A
N/A	Right of Way	— — —
→	Directional Arrow	→
	Metal Pole with Mastarm	
	Detection Zone	
	Temporary Barrier	
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	No U-Turn Sign (R3-4)	Ⓓ

MAXTIME TIMING CHART		
FEATURE	PHASE 2	PHASE 4
Walk *	–	–
Ped Clear *	–	–
Min Green *	14	7
Passage *	2.0	2.0
Max 1 *	90	25
Yellow Change	5.2	3.0
Red Clear	1.5	1.9
Added Initial *	–	–
Maximum Initial *	–	–
Time Before Reduction *	–	–
Time To Reduce *	–	–
Minimum Gap	–	–
Advance Walk	–	–
Pre-Clearance	3.0	–
Non Lock Detector	–	X
Vehicle 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.

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

Signal Upgrade- Temporary Design 2 (TMP Phase 4)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17 (Ocean Highway W)
at
US 17 Bus (Main St)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.

PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr. AA6F5076CAB34CF... 3/31/2025

SIG. INVENTORY NO. 03-124812

TRANSYSTEMS
1 Glenwood Avenue
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Tel:919.789.9977
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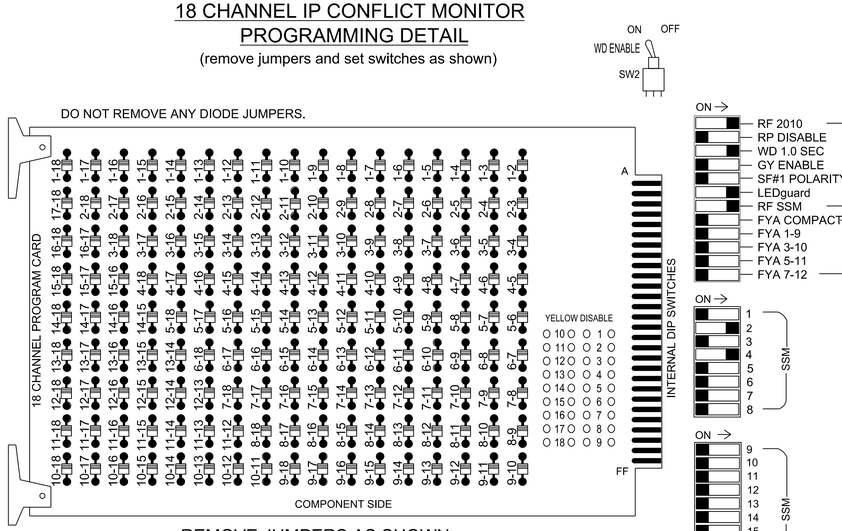
License: F-0453

3/31/2025
R-5857_SIG_DSN_2.dgn
USER:ndegbotse

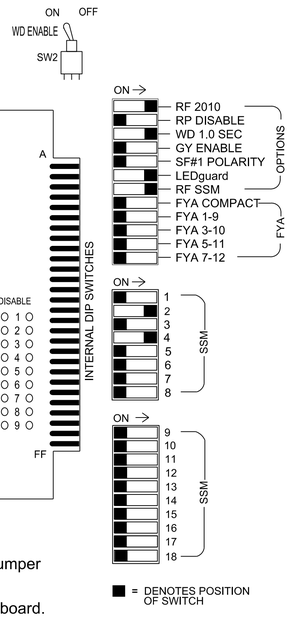
PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.11.1

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.
3. Program phases 2 for Advanced Warning.
4. Program phases 2 for 3.0 seconds 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.

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	5	6	6 PED	ADVANCE BEACON	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	21,22	NU	25	NU	41,42	NU	NU	NU	NU	26	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED		128				101														
YELLOW		129																		
GREEN		130																		
RED ARROW																				
YELLOW ARROW						102														
GREEN ARROW						103														
✋																				
PED YELLOW				** 114							** 120									
🚶			*							*										

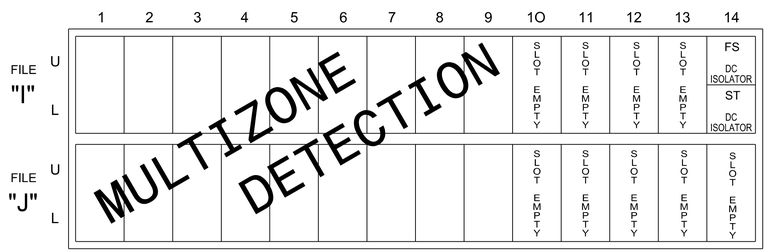
NU = Not Used

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

** Outputs have been reassigned for Advanced Beacons. See Sheet 2 for reassignment programming and wiring details.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

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.

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, S3**, S5, S9**
Phases Used.....2, 4
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....NOT USED
Overlap "4".....NOT USED

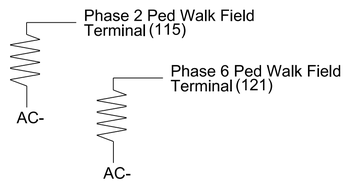
**Used for advance beacons only

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

Remove Load Resistors from terminals 106 and 112, if present.

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1248T2
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 17 (Ocean Highway West) at US 17 Bus (Main Street)

Division 3 | Brunswick County | Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

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

Signed by: John T. Rowe, Jr. 4-1-2025
DEEBA3200BE7407 DATE

SIG. INVENTORY NO. 03-1248T2

Prepared in the Offices of:

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

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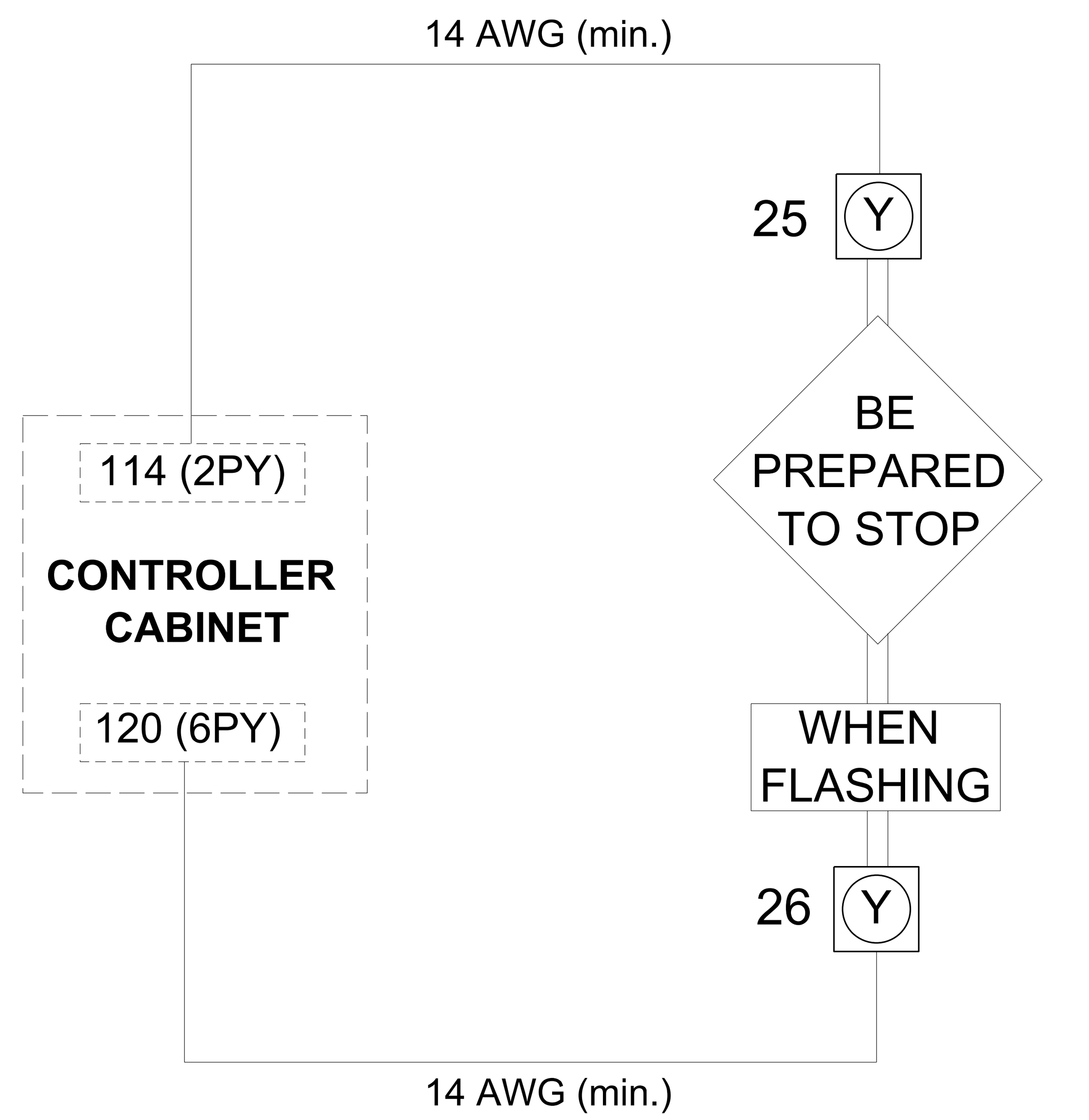
Fax:919.789.9591
License: F-0453

4/1/2025
03-1248T2_sm_ele_2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 11.2

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 114 (2PY) AND TERMINAL 120 (6PY).
2. INSET LOADSWITCHES FOR S3 AND S9.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 33 AND 34 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 25 & 26

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Channel Green Walk Driver	19
34	C1-36	Channel Red Do Not Walk Driver	19

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Note	Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
	1	Phase Vehicle	1		X	X	1
NOTICE CHANNEL 2 FLASHES RED →	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
NOTICE CHANNEL 6 FLASHES RED →	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED →	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED →	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
PROGRAM CHANNEL 19 AS ADV. WARNING FLASHER →	19	Adv. Warning Flasher	2				19
	20	None	0				20

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1248T2
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

TRANSYSTEMS
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License: F-0453

Electrical and Programming Details For:

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

US 17 (Ocean Highway West)
at
US 17 Bus (Main Street)

Division 3 | Brunswick County | Shallotte

PLAN DATE: March 2025	REVIEWED BY: GG Murr, Jr.
PREPARED BY: JT Rowe	REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

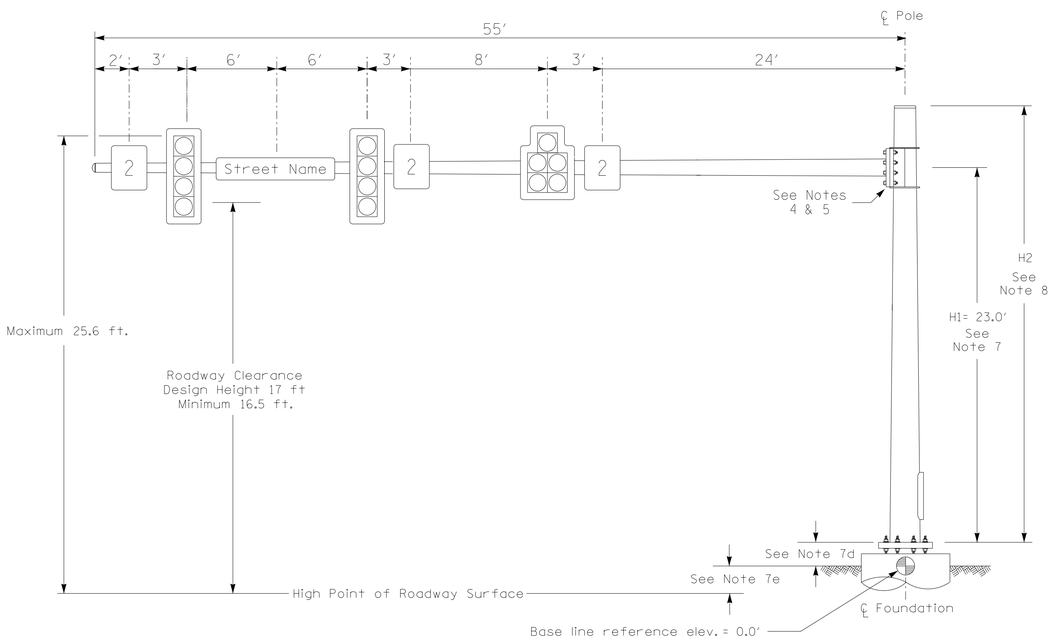
Signed by: John T. Rowe, Jr
DEFE832009E7407
4-1-2025
DATE

SIG. INVENTORY NO. 03-1248T2

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 11.3

Design Loading for METAL POLE NO. 1 (03-1248)



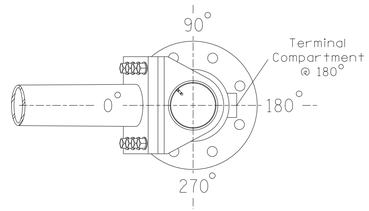
Elevation View

SPECIAL NOTE

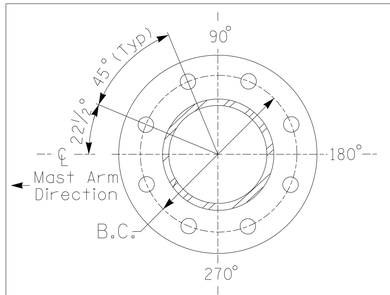
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+1.80 ft.	
Elevation difference at Edge of travelway or face of curb	+1.80 ft.	

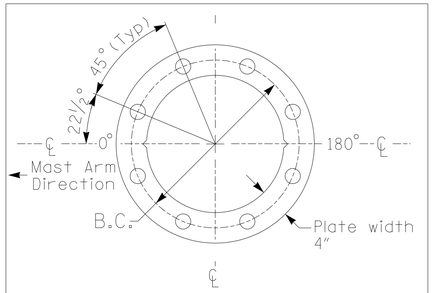


POLE RADIAL ORIENTATION



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
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 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 stress ratios that do not exceed 0.9.
4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
   b. Signal heads are rigidly mounted and vertically centered on the mast arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 1 (150 mph)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 17(Ocean Highway W)
at
US 17 BUS (Main St)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G.G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

Signed by: Gene G. Murr Jr. 3/31/2025
AA6F5076CAB34CF...

SIG. INVENTORY NO. 03-1248T2

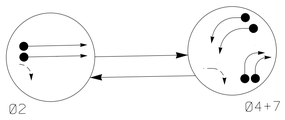
3/31/2025
• Working Diagram_Single Mast Arm (NB).dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig. 12.0

2 Phase
Fully Actuated

Signal System #: DO3-14_Shallotte

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.

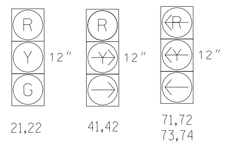
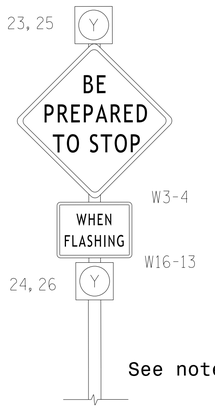


TABLE OF OPERATION			
	PHASE		
SIGNAL FACE	Ø2	Ø4+7	FLASH
21,22	G	R	R
41,42	R	→	R
71,72,73,74	~~R~~	~~←~~	~~R~~

TABLE OF OPERATION		
	INTERVAL	
SIGNAL FACE	1	2
23,25	ON	OFF
24,26	OFF	ON

Figure 1

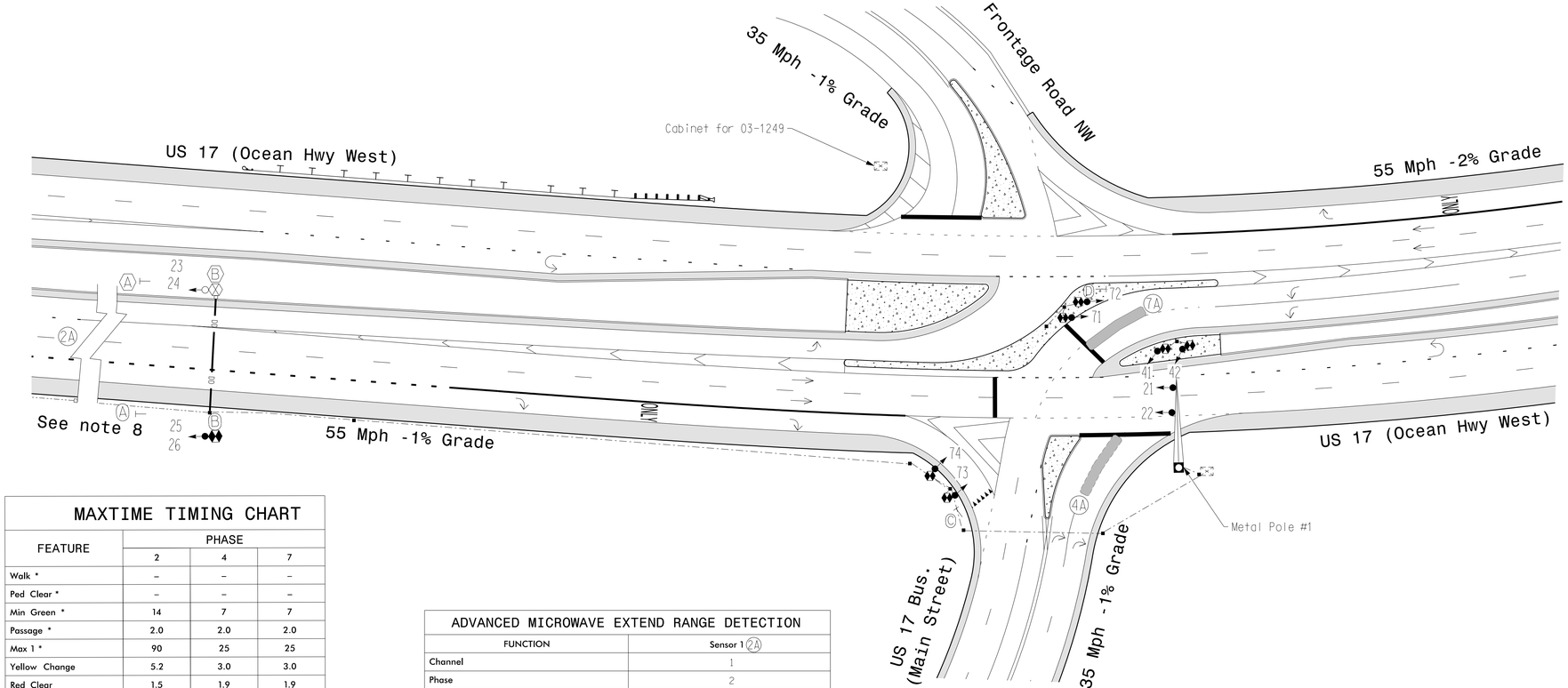


MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
4A	✳	0	✳	-	4	15	-	X	-	X	-	*
7A	✳	0	✳	X	7	-	-	X	-	X	-	*

* Multizone microwave detection zone.

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. Set all detector units to presence mode.
4. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. Activate flashers 3 seconds prior to end of phase 2 green.
7. Flash vertically-mounted beacons alternately.
8. Install new conduit as close as possible to edge of pavement.
9. Refer to the Pavement Marking Plans for pavement marking details.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
◇	Type III Signal Pedestal	◆
	Detection Zone	
	Controller & Cabinet	
□	Junction Box	■
N/A	Curb Ramp	
	2-in Underground Conduit	
DD	Directional Drill	N/A
N/A	Right of Way	
→	Directional Arrow	→
	Metal Pole with Mastarm	
Ⓐ	Signal Ahead Sign (W3-3)	Ⓐ
Ⓑ	"BE PREPARED TO STOP" Sign (W3-4) w/ "WHEN FLASHING" Plaque (W16-3) (See Figure 1)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ
Ⓓ	No U-Turn Sign (R3-4)	Ⓓ

MAXTIME TIMING CHART

FEATURE	PHASE		
	2	4	7
Walk *	–	–	–
Ped Clear *	–	–	–
Min Green *	14	7	7
Passage *	2.0	2.0	2.0
Max 1 *	90	25	25
Yellow Change	5.2	3.0	3.0
Red Clear	1.5	1.9	1.9
Added Initial *	–	–	–
Maximum Initial *	–	–	–
Time Before Reduction *	–	–	–
Time To Reduce *	–	–	–
Minimum Gap	–	–	–
Advance Walk	–	–	–
Pre-Clearance	3.0	–	–
Non Lock Detector	–	X	X
Vehicle 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.

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

Signal Upgrade - Final Design

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

US 17(Ocean Highway W)
at US 17 BUS (Main St)

Division 3 Brunswick County Shallotte

PLAN DATE: March 2025 REVIEWED BY: G. G. Murr, Jr.
PREPARED BY: Nadia Degbotse REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
Signed by: Gene G. Murr Jr.
AA6F5076CAB3AGF...
3/31/2025

SIG. INVENTORY NO. 03-1248

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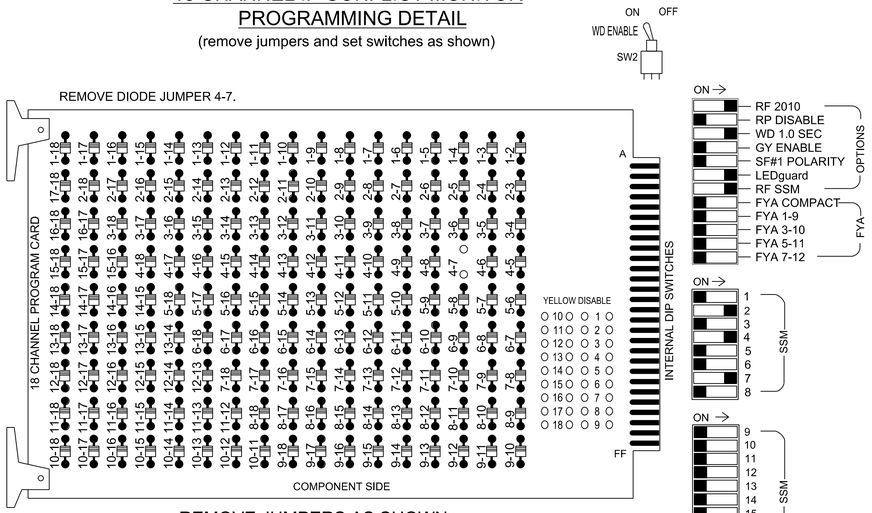
SCALE 0 40 1"=40'

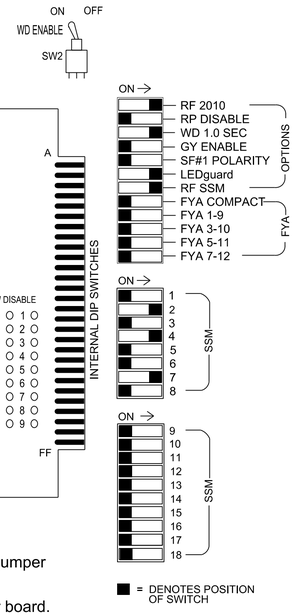
3/31/2025
WC-5857_SIG_DSN_2.dgn
USER:ndegbotse

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.12.1

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 phases 4 and 7 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk.
4. Program phases 2 for Advanced Warning.
5. Program phases 2 for 3.0 seconds Pre Clearance.
6. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
7. The cabinet and controller are part of the D03-14 Shallotte Signal System.

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	5	6	6 PED	ADVANCE BEACON	7	8	8 PED	OL1	OL2	OL5	OL3	OL4	OL6
SIGNAL HEAD NO.	NU	21,22	NU	23,25	NU	41,42	NU	NU	NU	NU	24,26	71,72, 73,74	NU	NU	NU	NU	NU	NU	NU	NU
RED		128				101														
YELLOW		129																		
GREEN		130																		
RED ARROW												122								
YELLOW ARROW						102						123								
GREEN ARROW						103						124								
PED				** 114							** 120									
YELLOW																				
			*							*										

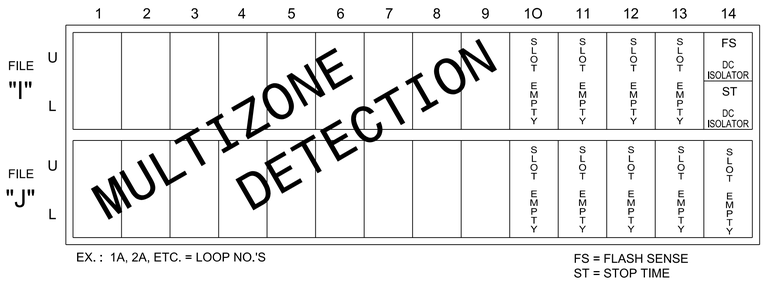
NU = Not Used

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

** Outputs have been reassigned for Advanced Beacons. See Sheet 2 for reassignment programming and wiring details.

INPUT FILE POSITION LAYOUT

(front view)



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.

EQUIPMENT INFORMATION

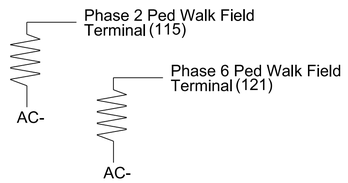
Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S2, S3**, S5, S9**, S10
Phases Used.....2, 4, 7
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....NOT USED
Overlap "4".....NOT USED

**Used for advance beacons only

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1248
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Electrical and Programming Details For:

Prepared in the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

US 17 (Ocean Highway West)
at
US 17 Bus (Main Street)

Division 3 | Brunswick County | Shallotte

PLAN DATE:	March 2025	REVIEWED BY:	GG Murr, Jr.
PREPARED BY:	JT Rowe	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
Signed by: John T. Rowe, Jr. 4-1-2025
DEFEB32009E7407
DATE

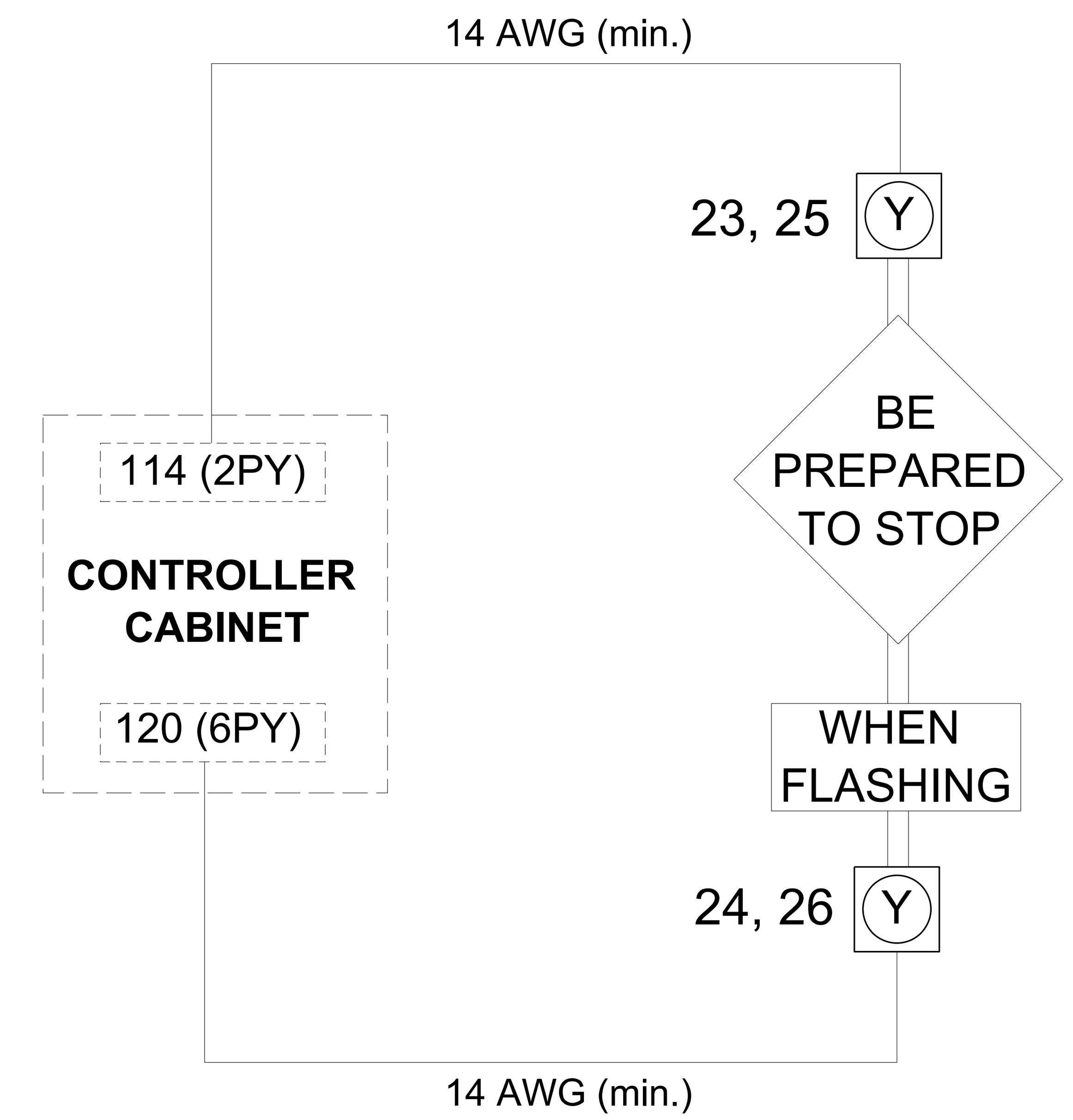
SIG. INVENTORY NO. 03-1248

4/1/2025
03-1248_sm_e1e_2025xxyy.dgn
USER:default

PROJECT REFERENCE NO.	SHEET NO.
R-5857	Sig.12.2

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 114 (2PY) AND TERMINAL 120 (6PY).
2. INSET LOADSWITCHES FOR S3 AND S9.
3. MAKE SURE LOAD RESISTORS ARE IN PLACE AS SHOWN IN LOAD RESISTOR INSTALLATION DETAIL ON SHEET 1.
4. TO ACTIVATE SIGN OPERATION AS INDICATED ON THE SIGNAL PLANS, REASSIGN OUTPUTS 33 AND 34 AS SHOWN ON THIS SHEET.

OUTPUT REMAPPING ASSIGNMENT FOR SIGNAL HEADS 23, 24, 25, & 26

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

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

Modify IO Module 1 as shown below and save changes.

IO Module 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Channel Green Walk Driver	19
34	C1-36	Channel Red Do Not Walk Driver	19

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Note	Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
	1	Phase Vehicle	1		X	X	1
NOTICE CHANNEL 2 FLASHES RED →	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
NOTICE CHANNEL 6 FLASHES RED →	6	Phase Vehicle	6		X	X	6
	7	Phase Vehicle	7		X		7
	8	Phase Vehicle	8		X	X	8
NOTICE CHANNEL 9 FLASHES RED →	9	Overlap	1		X	X	9
	10	Overlap	2		X	X	10
NOTICE CHANNEL 11 FLASHES RED →	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
PROGRAM CHANNEL 19 AS →	19	Adv. Warning Flasher	2				19
ADV. WARNING FLASHER	20	None	0				20

MAXTIME STARTUP AND SOFTWARE FLASH PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Unit

Web Interface
Home >Controller >Unit

Modify parameters as shown below and save changes.

Start Up Parameters

StartUp Clearance Hold
6

Unit Flash Parameters

All Red Flash Exit Time
6

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1248
DESIGNED: March 2025
SEALED: 3-31-2025
REVISED: N/A

Electrical Detail - Sheet 2 of 2

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