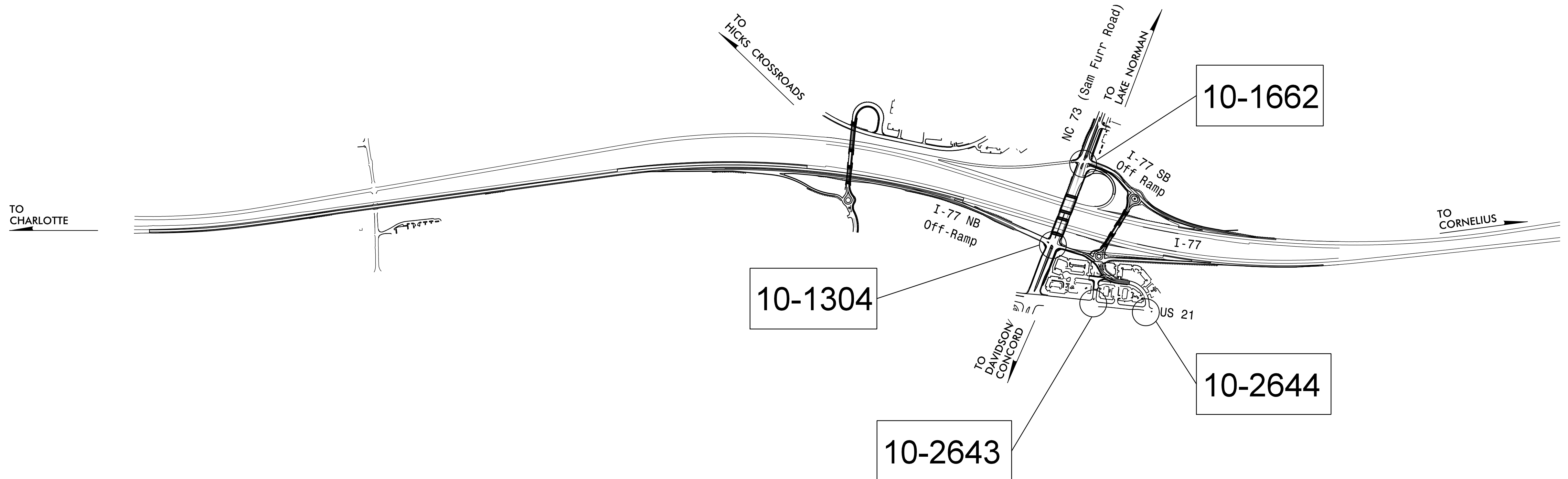


MECKLENBURG COUNTY

TYPE OF WORK: TRAFFIC SIGNALS AND CABLE ROUTING PLANS

<i>Project No.</i>	<i>Sheet No.</i>
<i>I-5715</i>	<i>Sig. 1.0</i>



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

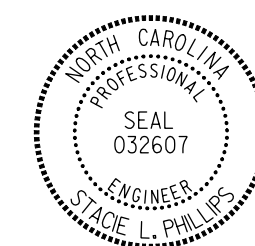
Index of Plans		
Sheet #	Reference #	Location/Description
Sig. 1.0	-----	Title Sheet
Sig. 2.0-7.4	10-1662	NC 73 (Sam Furr Road) at I-77 SB Ramp
Sig. 8.0-12.4	10-1304	NC 73 (Sam Furr Road) at I-77 NB Ramp
Sig.13.0-13.3	10-2643	US 21 (Statesville Road) at Glenhurst Lane
Sig.14.0-14.3	10-2644	US 21 (Statesville Road) at Caldwell Creek Drive
MIA-9	-----	Standard Metal Pole Details
SCP 1.0-5.0	-----	Wireless Communication Plans and Splice Details

Ryan W. Hough, P.E.
SIGNAL ITS ENGINEER

Kimley»Horn

421 Fayetteville Street, Suite 600
Raleigh, North Carolina 27601
PE NO. F-0102

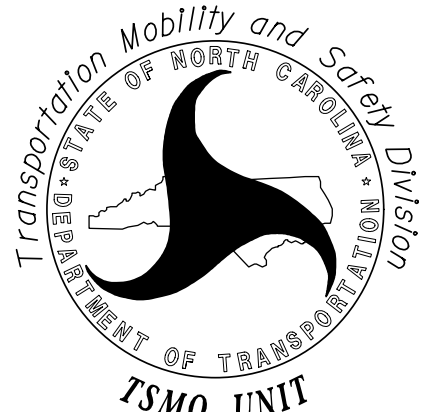
Stacie L. Phillips, P.E.
TRAFFIC SIGNAL ENGINEER



DocuSigned by:
SALPH
0C87A59ED60B43
SIGNATURE

6/22/2026
P.E.

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



750 N. Greenfield Parkway, Garner, NC 27529

PROJECT REFERENCE NO.	SHEET NO.
I-5715	8ig. 2.0

2 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Set all detector units to presence mode.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- See Roadway Traffic Control Plans for stopline locations.
- Install retroreflective backplates for all signal heads.

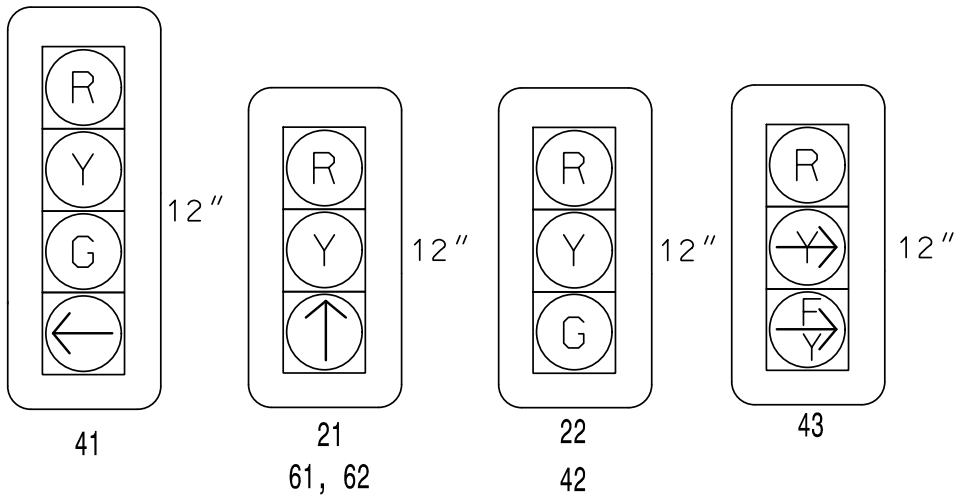
MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR ZONE				PROGRAMMING							
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	INITIAL ADDED	CALL	NEW CARD
2A*	6X6	300	*	X	2	-	-	X	-	X	-
4A*	6X40	0	*	X	4	-	-	X	-	X	-
4B*	6X40	0	*	X	4	15.0	-	X	-	X	-
6A*	6X40	300	*	X	6	-	-	X	-	X	-

* Multi-Zone Microwave Detection Zone

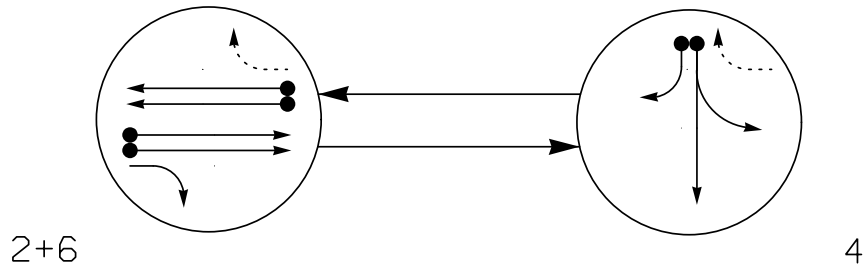
SIGNAL FACE	PHASE		
	2+6	4	FLASH
21	↑	R	R
22	G	R	R
41	R	G	R
42	R	G	R
43	R	Y	R
61, 62	↑	R	R

SIGNAL FACE I.D.

All Heads L.E.D.

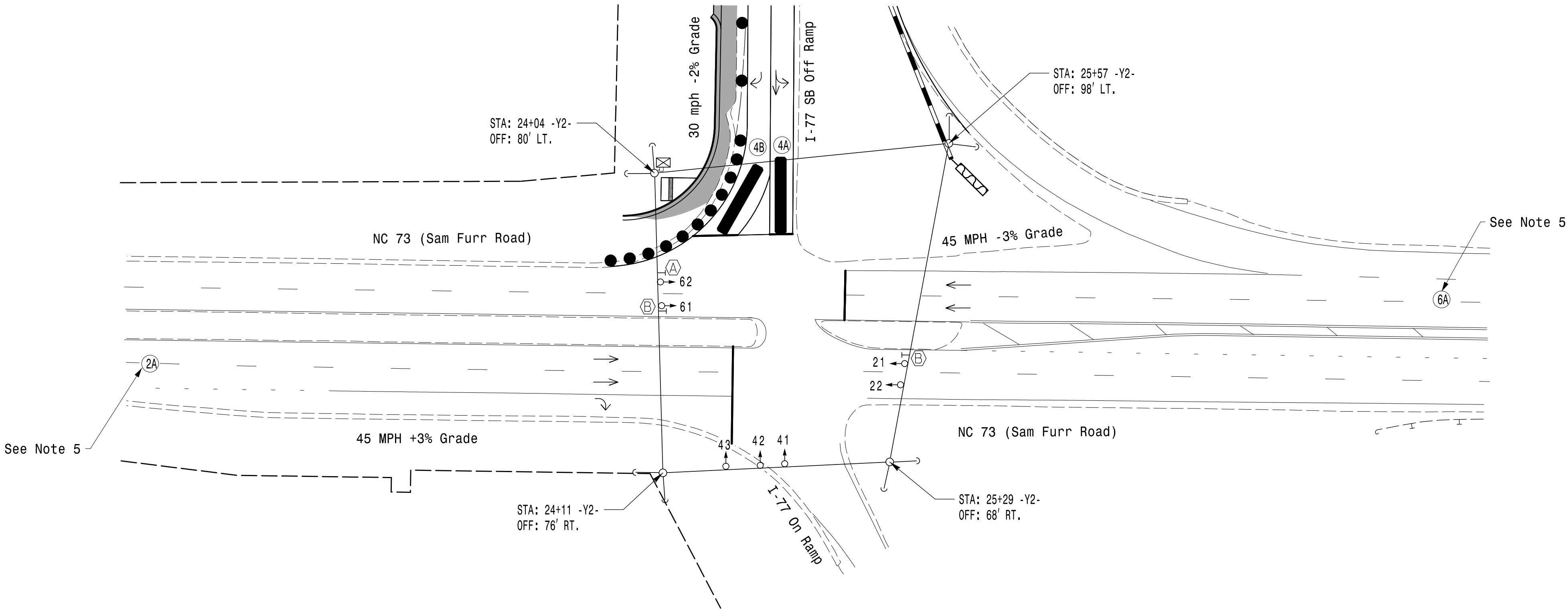


PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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



MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	4	6	
Walk *	-	-	-	
Ped Clear	-	-	-	
Min Green *	12	7	12	
Passage *	2.0	2.0	2.0	
Max I *	90	45	90	
Yellow Change	4.8	3.6	4.8	
Red Clear	1.4	2.2	1.4	
Added Initial *	-	-	-	
Maximum Initial *	-	-	-	
Time Before Reduction *	-	-	-	
Time To Reduce *	-	-	-	
Minimum Gap	-	-	-	
Advance Walk	-	-	-	
Non Lock Detector	-	X	-	
Vehicle Recall	MIN RECALL	-	MIN RECALL	
Dual Entry	-	-	-	

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

Microwave Detection

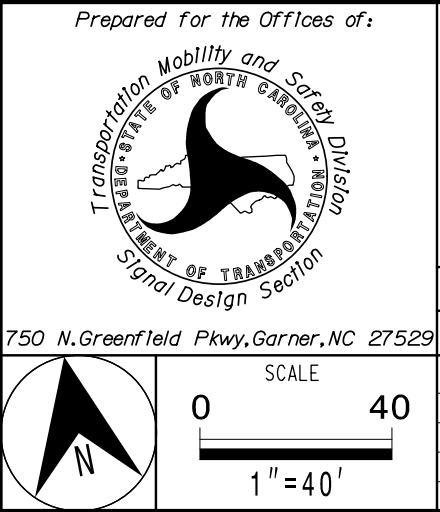
FUNCTION	Sensor 1 (2A)			Sensor 2 (6A)		
Channel	1			1		
Phase	2			6		
Direction of Travel	EB			WB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	> = 750	< 750	N/A	> = 750	< 750	N/A
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed	Y	Y	Y	Y	Y	Y
Speed Range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

LEGEND

PROPOSED	EXISTING

Signal Upgrade - Temporary Design 1
(TMP Phase 2)

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



NC 73 (Sam Furr Road) at I-77 SB Ramps			
Division 10 Mecklenburg County Huntersville		Division 10 Mecklenburg County Huntersville	
PLAN DATE: January 2026		REVIEWED BY: SL Phillips	
PREPARED BY: SP Pennington		REVIEWED BY:	
REVISIONS		INIT. DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	
DocuSigned by S. L. Phillips 03/27/2026 08:43 SIGNATURE DATE	
6/22/2026	
SIG. INVENTORY NO. 10-1662T1	

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME 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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTICE: FLASH RED

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

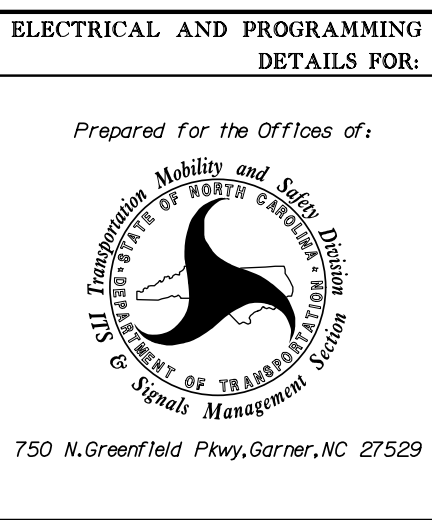
Overlap	4
Type	FYA 4 - Section
Included Phases	4
Modifier Phases	-
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1662T1
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Temporary Design 1
(TMP Phase 2)

Electrical Detail - Sheet 2 of 2

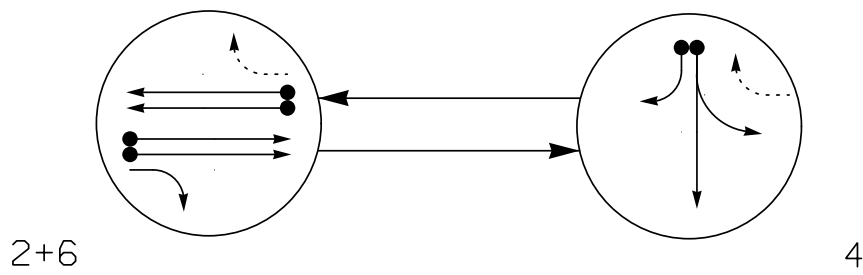
PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000



ELECTRICAL AND PROGRAMMING DETAILS FOR:	
Prepared for the Offices of:	
NC 73 (Sam Furr Road) at I-77 SB Ramps	
Division 10	Mecklenburg County Huntersville
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	
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6/22/2026	6/22/2026
DATE	
SIG. INVENTORY NO. 10-1662T1	

PHASING DIAGRAM



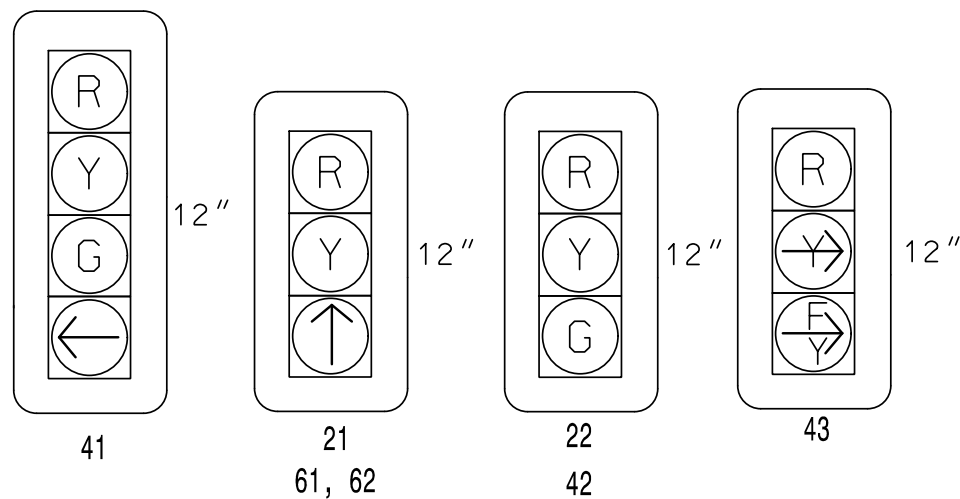
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	2 + 6	4	FLASH
21	↑	R	R
22	G	R	R
41	R	G	R
42	R	G	R
43	R	F	R
61, 62	↑	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



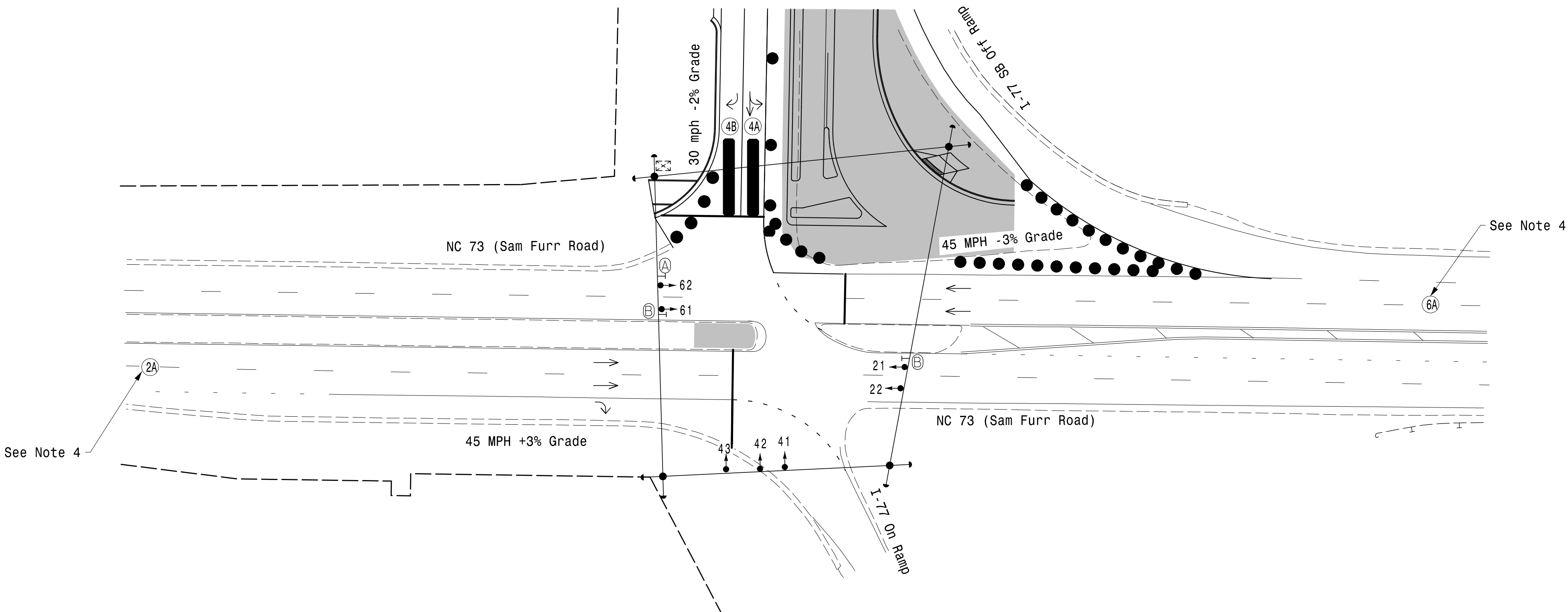
MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR ZONE				PROGRAMMING							NEW CARD
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND INITIAL	CALL ADDED	INITIAL GREEN	
2A*	6X6	300	*	-	2	-	-	X	-	X	-
4A*	6X40	0	*	X	4	-	-	X	-	X	-
4B*	6X40	0	*	X	4	15.0	-	X	-	X	-
6A*	6X40	300	*	-	6	-	-	X	-	X	-

* Multi-Zone Microwave Detection Zone

2 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- See Roadway Traffic Control Plans for stopline locations.
- All signal heads have retroreflective backplates.



MAXTIME TIMING CHART

FEATURE	PHASE		
	2	4	6
Walk *	-	-	-
Ped Clear	-	-	-
Min Green *	12	7	12
Passage *	2.0	2.0	2.0
Max I *	90	45	90
Yellow Change	4.8	3.6	4.8
Red Clear	1.4	2.5	1.4
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Advance Walk	-	-	-
Non Lock Detector	-	X	-
Vehicle Recall	MIN RECALL	-	MIN RECALL
Dual Entry	-	-	-

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

Microwave Detection

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

LEGEND

- | PROPOSED | EXISTING |
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Signal Upgrade - Temporary Design 2
(TMP Phase 3)

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

 750 N. Greenfield Pkwy, Garner, NC 27529 Prepared for the Offices of: TRANSPORTATION MOBILITY AND LOGISTICS DIVISION NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Design Section	NC 73 (Sam Furr Road) at I-77 SB Ramps		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	Division 10 Wecklenburg County Huntersville PLAN DATE: January 2026 PREPARED BY: SP Pennington REVISIONS	REVIEWED BY: SL Phillips REVIEWED BY:	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032607 SACIE L. PHILLIPS 6/22/2026 DATE SIG. INVENTORY NO. 10-1662T2

(remove jumpers and set switches as shown)

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

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.

FS = FLASH SENSE
ST = STOP TIME

Install a multi-zone 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.

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D10-43 Huntersville Signal System.

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

*See overlap programming detail on sheet 2

FILE J _____
SLOT 2 _____
LOWER _____

NU = Not Used

NU = Not Used
★ See pictorial of head wiring in detail this sheet.

43

Electrical Detail - Sheet 1 of 2

SIG. INVENTORY NO. 10-1662T2

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME 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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTICE: FLASH RED

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

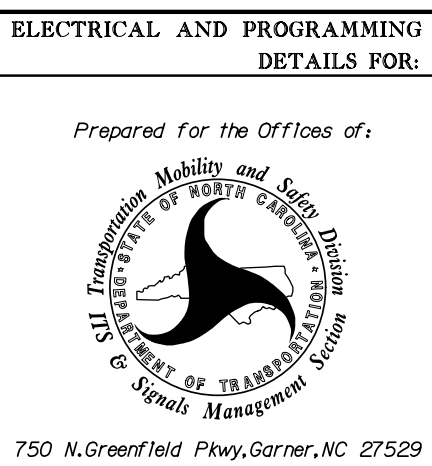
Overlap	4
Type	FYA 4 - Section
Included Phases	4
Modifier Phases	-
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1662T2
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Temporary Design 2
(TMP Phase 3)

Electrical Detail - Sheet 2 of 2

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



ELECTRICAL AND PROGRAMMING DETAILS FOR:	
Prepared for the Offices of:	
NC 73 (Sam Furr Road) at I-77 SB Ramps	
Division 10	Mecklenburg County Huntersville
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

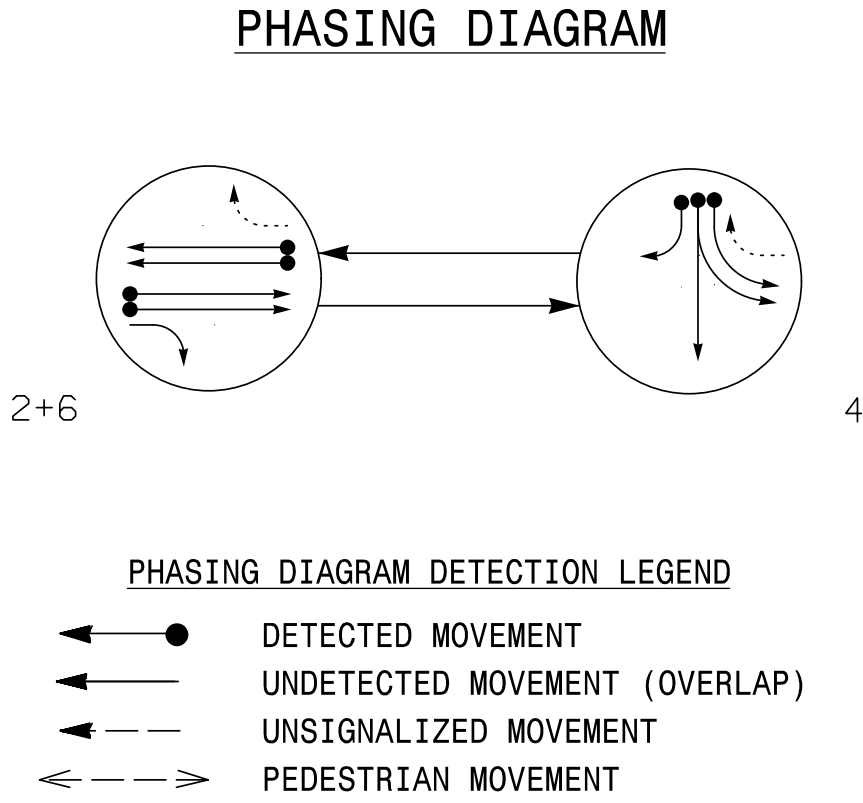
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	
DocuSign 6287A9B6D606B437	
6/22/2026	DATE
SIG. INVENTORY NO. 10-1662T2	

PROJECT REFERENCE NO.	SHEET NO.
I-5715	81g. 4.0

2 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

NOTES

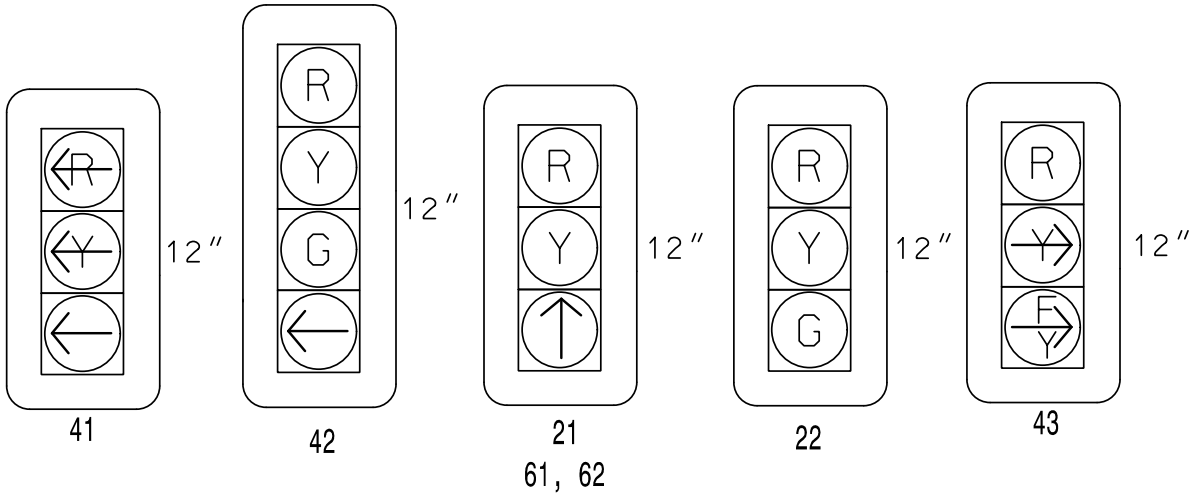
- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Reposition existing signal heads 61 and 62.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- See Roadway Traffic Control Plans for stopline locations.
- Relabel existing signal head 41 as 42.
- All existing signal heads have retroreflective backplates.
- Install retroreflective backplates for proposed signal head 41.



SIGNAL FACE	PHASE		
	2	4	6
21	↑	R	R
22	G	R	R
41	←	←	←
42	R	G	R
43	R	←	←
61, 62	↑	R	R

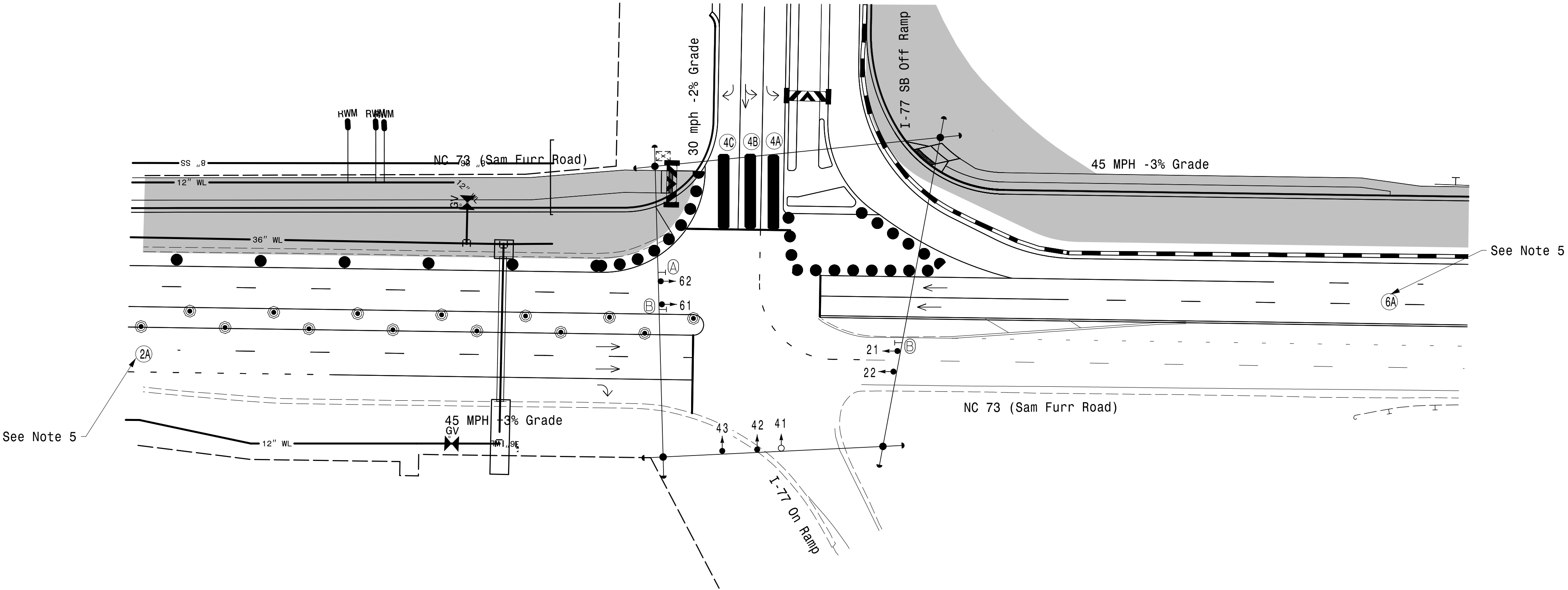
SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR ZONE					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	INITIAL ADDED	CALL	NEW CARD
2A*	6X6	300	*	-	2	-	-	X	-	X	-
4A*	6X40	0	*	-	4	-	-	X	-	X	-
4B*	6X40	0	*	-	4	-	-	X	-	X	-
4C*	6X40	0	*	X	4	15.0	-	X	-	X	-
6A*	6X40	300	*	-	6	-	-	X	-	X	-

* Multi-Zone Microwave Detection Zone



MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	4	6	
Walk *	-	-	-	
Ped Clear	-	-	-	
Min Green *	12	7	12	
Passage *	2.0	2.0	2.0	
Max l *	90	45	90	
Yellow Change	4.8	3.6	4.8	
Red Clear	1.3	2.2	1.3	
Added Initial *	-	-	-	
Maximum Initial *	-	-	-	
Time Before Reduction *	-	-	-	
Time To Reduce *	-	-	-	
Minimum Gap	-	-	-	
Advance Walk	-	-	-	
Non Lock Detector	-	X	-	
Vehicle Recall	MIN RECALL	-	MIN RECALL	
Dual Entry	-	-	-	

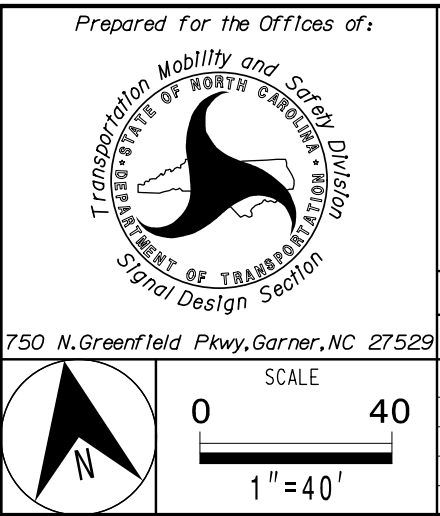
* These values may be field adjusted. Do not adjust Min Green and Passage times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

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

LEGEND	
PROPOSED	EXISTING

Signal Upgrade - Temporary Design 3
(TMP Phase 4)

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



NC 73 (Sam Furr Road) at I-77 SB Ramps			
Division 10 Mecklenburg County Huntersville		Division 10 Mecklenburg County Huntersville	
PLAN DATE: January 2026		REVIEWED BY: SL Phillips	
PREPARED BY: SP Pennington		REVIEWED BY:	
REVISIONS		INIT. DATE	

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SIGNATURE	DATE
SIG. INVENTORY NO.	10-166213

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME 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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTICE: FLASH RED

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1662T3
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Temporary Design 3
(TMP Phase 4)

Electrical Detail - Sheet 2 of 2

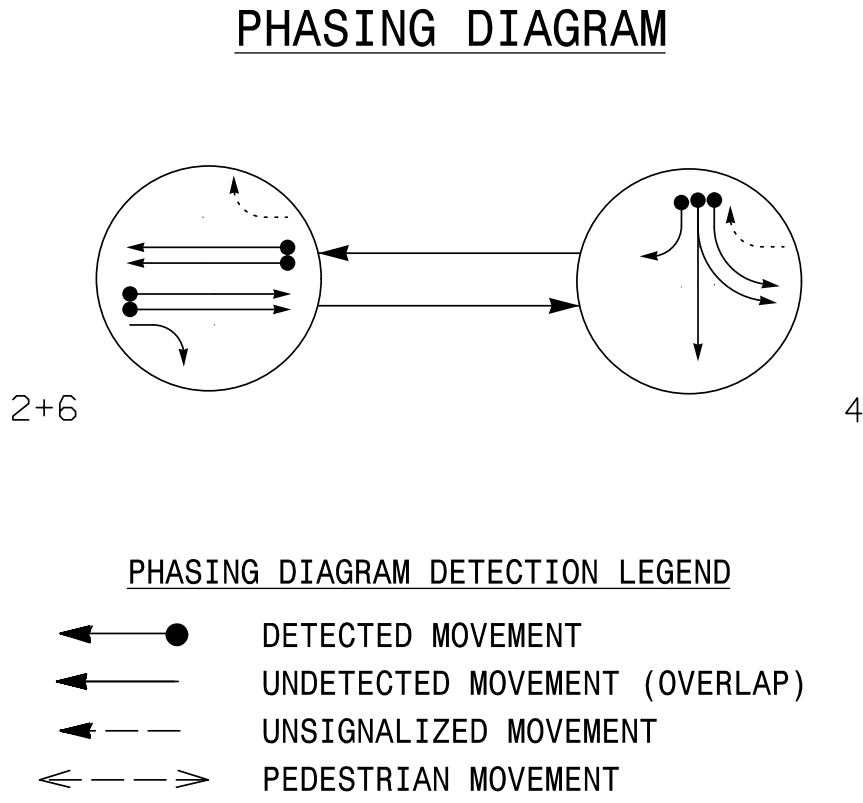
PLANS PREPARED IN THE OFFICE OF:
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NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000



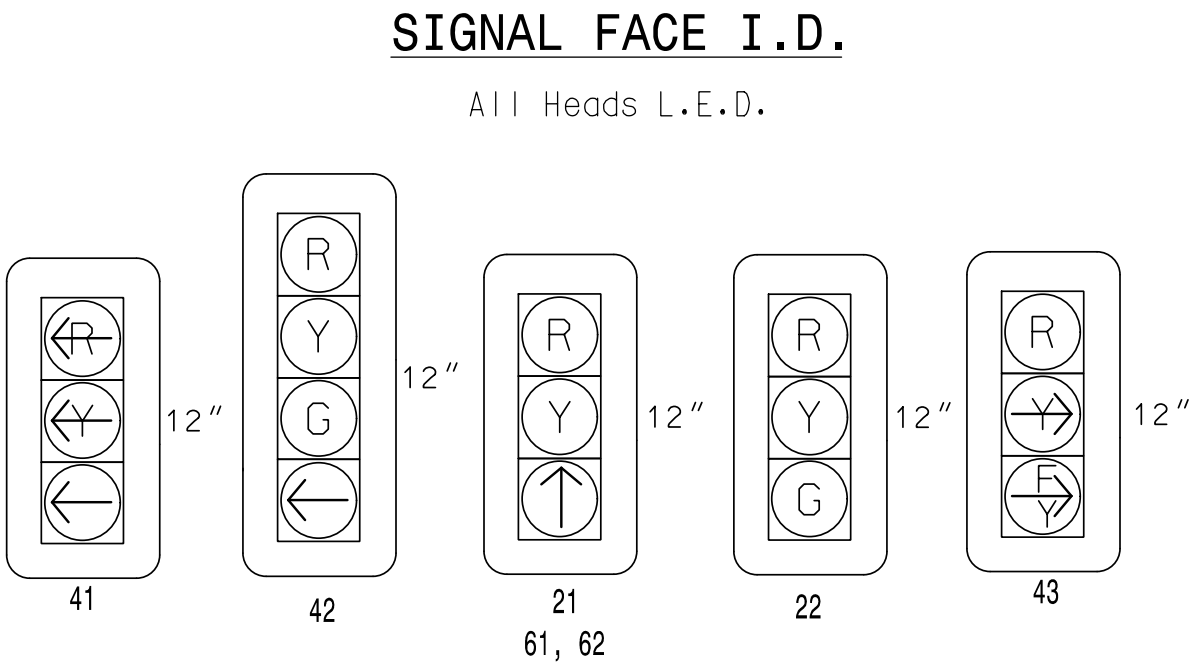
ELECTRICAL AND PROGRAMMING DETAILS FOR:	
Prepared for the Offices of:	
NC 73 (Sam Furr Road) at I-77 SB Ramps	
Division 10	Mecklenburg County Huntersville
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

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DocuSign Envelope ID: 5C87A58E-D66B-4937-8000-000000000000	
6/22/2026	DATE
SIG. INVENTORY NO. 10-1662T3	

PROJECT REFERENCE NO.	SHEET NO.
I-5715	510



SIGNAL FACE	PHASE		
	2+6	4	FLASH
21	↑	R	R
22	G	R	R
41	←	←	←
42	R	G	R
43	R	←	R
61, 62	↑	R	R



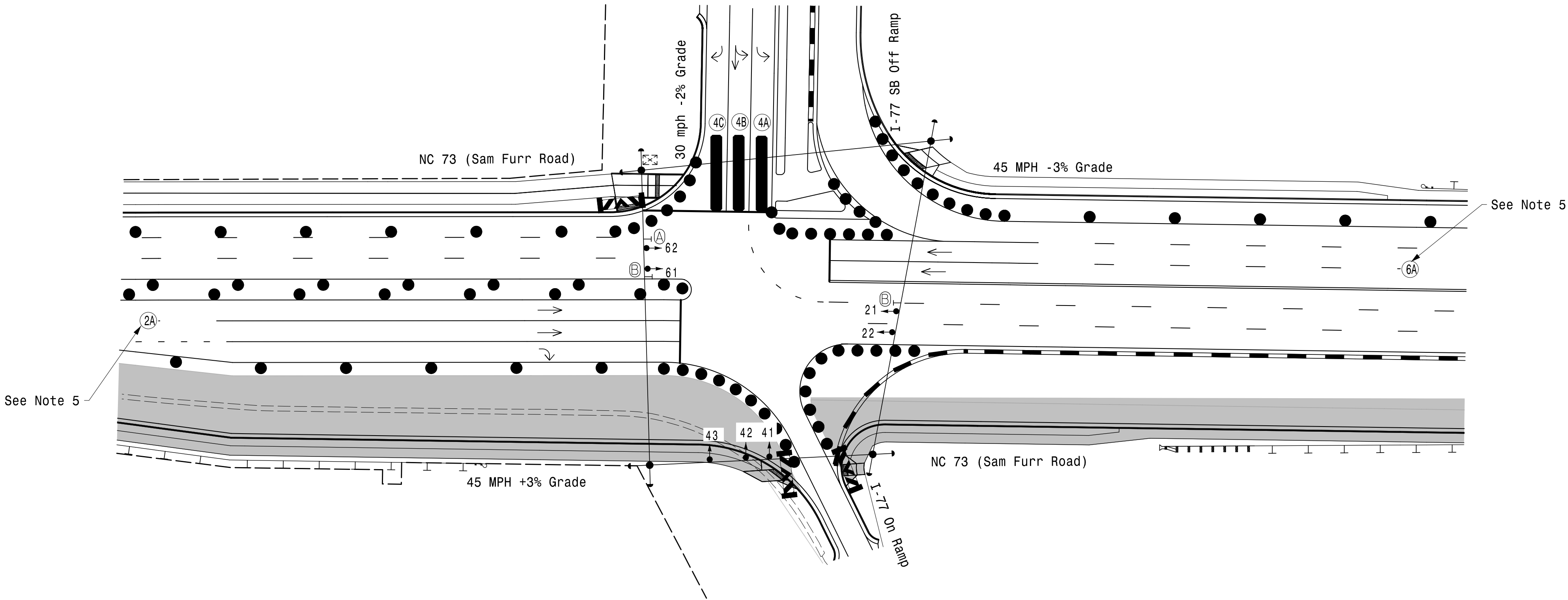
MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR ZONE					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	NEW CARD
2A*	6X6	300	*	-	2	-	-	X	-	X	-
4A*	6X40	0	*	-	4	-	-	X	-	X	-
4B*	6X40	0	*	-	4	-	-	X	-	X	-
4C*	6X40	0	*	X	4	15.0	-	X	-	X	-
6A*	6X40	300	*	-	6	-	-	X	-	X	-

* Multi-Zone Microwave Detection Zone

2 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Reposition existing signal heads 21, 22, 61, and 62.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- See Roadway Traffic Control Plans for stopline locations.
- All existing signal heads have retroreflective backplates.



MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	4	6	
Walk *	-	-	-	
Ped Clear	-	-	-	
Min Green *	12	7	12	
Passage *	2.0	2.0	2.0	
Max I *	90	45	90	
Yellow Change	4.8	3.6	4.8	
Red Clear	1.2	1.9	1.2	
Added Initial *	-	-	-	
Maximum Initial *	-	-	-	
Time Before Reduction *	-	-	-	
Time To Reduce *	-	-	-	
Minimum Gap	-	-	-	
Advance Walk	-	-	-	
Non Lock Detector	-	X	-	
Vehicle Recall	MIN RECALL	-	MIN RECALL	
Dual Entry	-	-	-	

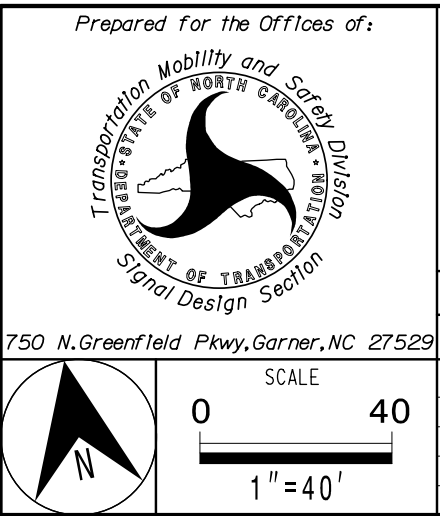
* These values may be field adjusted. Do not adjust Min Green and Passage times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

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

LEGEND	
PROPOSED	EXISTING

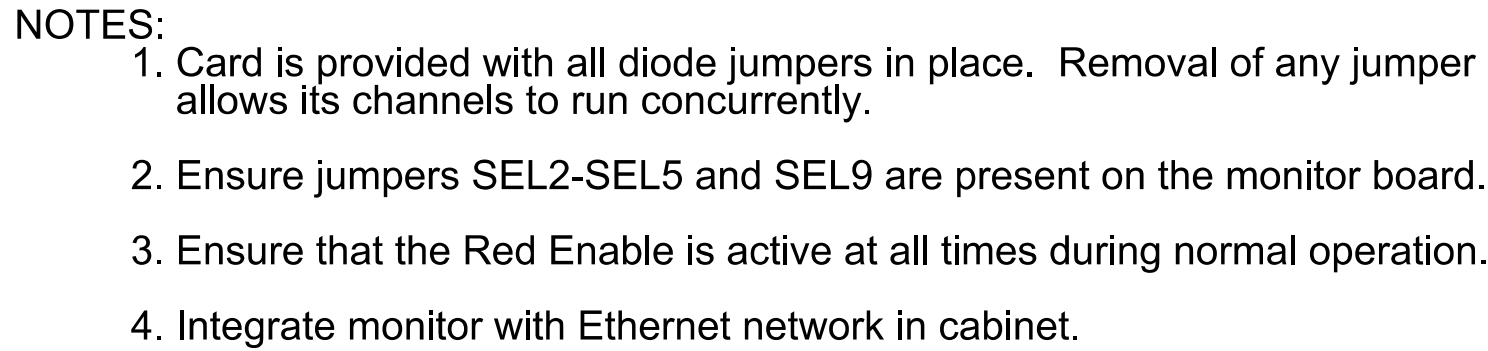
Signal Upgrade - Temporary Design 4
(TMP Phase 4a)

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



NC 73 (Sam Furr Road) at I-77 SB Ramps	
Division 10 Mecklenburg County	Huntersville
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	SEAL
SIGNATURE	DATE
	6/22/2026
SIG. INVENTORY NO.	10-166214



		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS
	L	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	DC ISOLATOR ST DC ISOLATOR
FILE "J"	U	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

Install a multi-zone 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.

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D10-43_Huntersville Signal System.

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

*See overlap programming detail on sheet 2

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
2A	-	-	-	*	38	2			X		X	
4A	-	-	-	*	44	4			X		X	
4B	-	-	-	*	45	4			X		X	
4C	-	-	-	*	46	4	15.0		X		X	
6A	-	-	-	*	54	6			X		X	

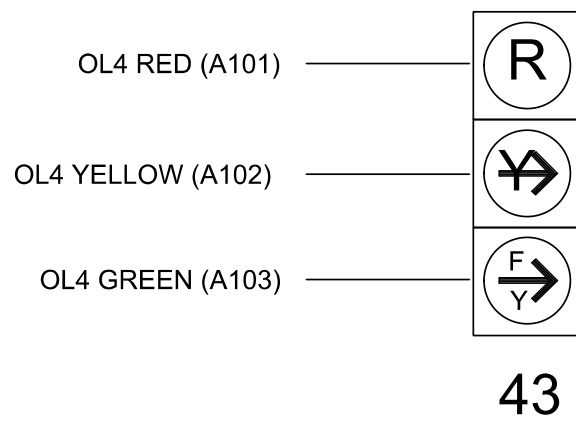
*For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet. INPUT FILE POSITION LEGEND: J2L

FILE J _____
SLOT 2 _____
LOWER _____

NU = Not Used

★ See pictorial of head wiring in detail this sheet.

(wire signal head as shown)



Signal Upgrade - Temporary Design 4
(TMP Phase 4a)
Electrical Detail - Sheet 1 of 2

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1662T4
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

ELECTRICAL AND PROGRAMMING DETAILS FOR:

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME 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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTICE: FLASH RED

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1662T4
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Temporary Design 4
(TMP Phase 4)

Electrical Detail - Sheet 2 of 2

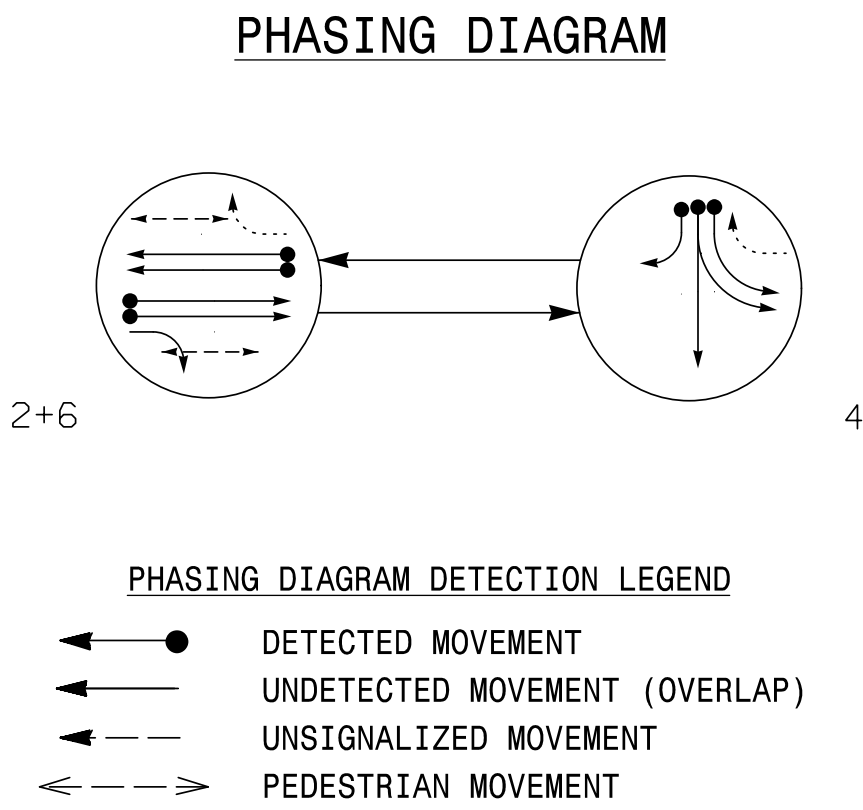
PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000



ELECTRICAL AND PROGRAMMING DETAILS FOR:	
Prepared for the Offices of:	
NC 73 (Sam Furr Road) at I-77 SB Ramps	
Division 10	Mecklenburg County Huntersville
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

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SIG. INVENTORY NO. 10-1662T4	

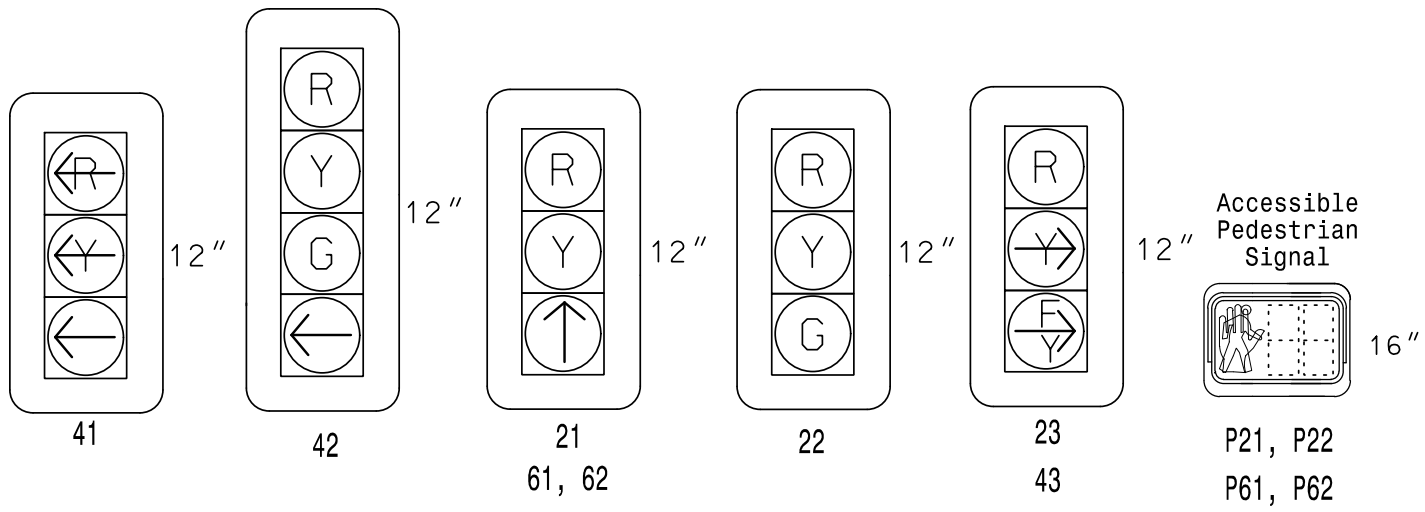
PROJECT REFERENCE NO.	SHEET NO.
I-5715	Fig. 6.0



SIGNAL FACE	PHASE		
	2+6	4	FLASH
21	↑	R	R
22	G	R	R
23	←	R	R
41	←	←	←
42	R	←	←
43	R	←	←
61, 62	↑	R	R
P21, P22	W	DW	DRK
P61, P62	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



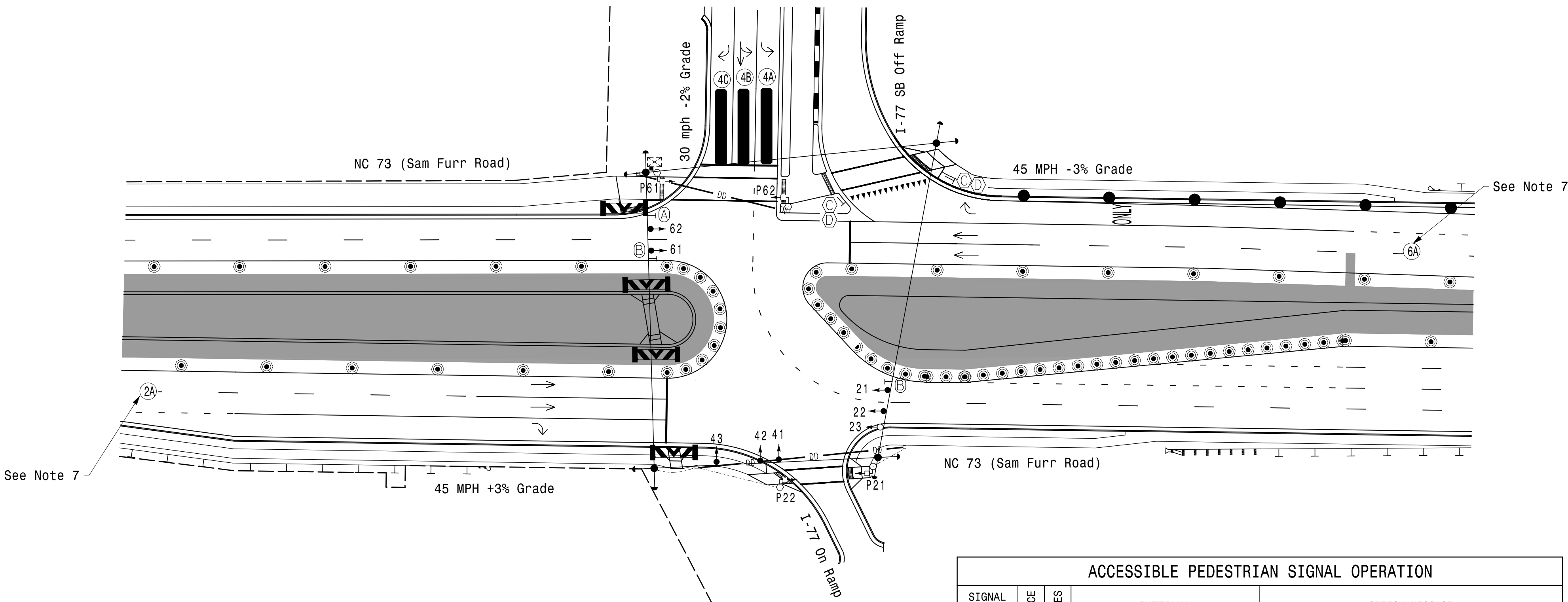
MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR ZONE					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	NEW CARD
2A*	6X6	300	*	-	2	-	-	X	-	X	-
4A*	6X40	0	*	-	4	-	-	X	-	X	-
4B*	6X40	0	*	-	4	-	-	X	-	X	-
4C*	6X40	0	*	X	4	15.0	-	X	-	X	-
6A*	6X40	300	*	-	6	-	-	X	-	X	-

* Multi-Zone Microwave Detection Zone

2 Phase Fully Actuated Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Reposition existing signal heads 21, 22, 61, and 62.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- To provide a leading pedestrian interval on phase 2, program FYA signal head 23 to delay for 5 seconds after the start of the phase 2 walk interval. See electrical details for programming.
- See Roadway Traffic Control Plans for stopline locations.
- All existing signal heads have retroreflective backplates.
- Install retroreflective backplates for proposed signal head 23.



MAXTIME TIMING CHART			
FEATURE	PHASE		
	2	4	6
Walk *	7	-	7
Ped Clear	5	-	11
Min Green *	12	7	12
Passage *	2.0	2.0	2.0
Max l *	90	45	90
Yellow Change	4.8	3.6	4.8
Red Clear	1.5	3.5	1.5
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Advance Walk	**	-	-
Non Lock Detector	-	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.

** See Note #9

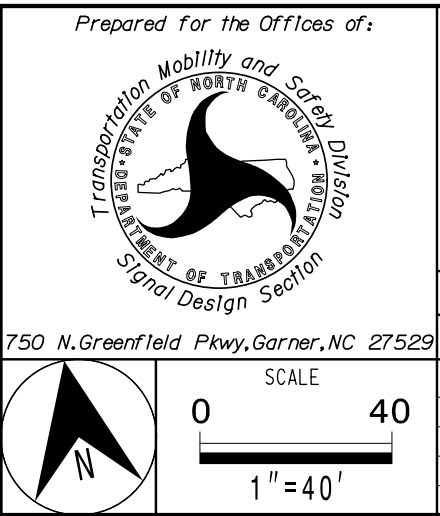
Microwave Detection						
FUNCTION	Sensor 1 (2A)			Sensor 2 (6A)		
Channel	1			1		
Phase	2			6		
Direction of Travel	EB			WB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	> =750	<750	N/A	> =750	<750	N/A
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION				
SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P21	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.
P22	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.

LEGEND	
PROPOSED	EXISTING

Signal Upgrade - Temporary Design 5 (TMP Phase 4b)

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



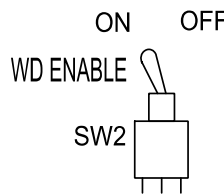
NC 73 (Sam Furr Road) at I-77 SB Ramps			
Division 10 Wecklenburg County Huntersville		Huntersville	
PLAN DATE: January 2026	REVIEWED BY: SL Phillips		
PREPARED BY: SP Pennington	REVIEWED BY:		
REVISIONS	INIT.	DATE	

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SEAL	SEAL
DocuSigned by: Stacie L. Phillips	6/22/2026
SIGNATURE	DATE
SIG. INVENTORY NO. 10-166215	

(remove jumpers and set switches as shown)

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-11, 2-13, 2-15, 4-12, 6-11, 6-13, 6-15, 11-13, 11-15, and 13-15



ON →

9 10 11 12 13 14 15 16 17 18

SSM

■ = DENOTES POSITION OF SWITCH

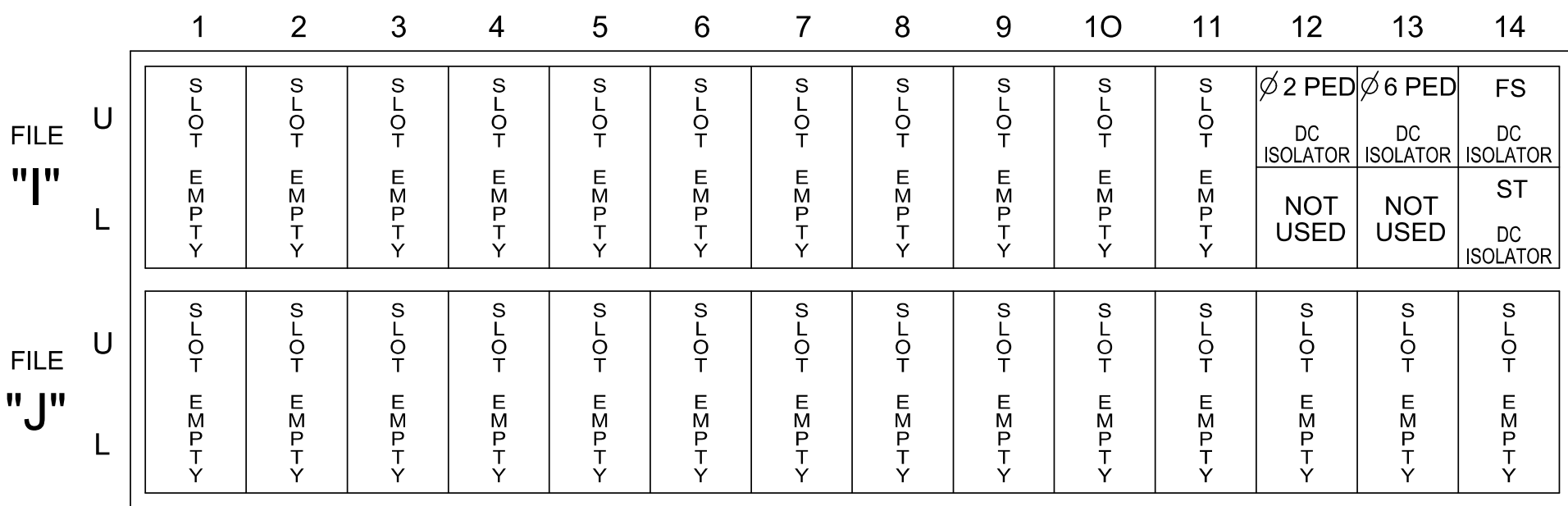
REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

Install a multi-zone 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.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D10-43 Huntersville Signal System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	-	-	-	*	38	2			X		X	
4A	-	-	-	*	44	4			X		X	
4B	-	-	-	*	45	4			X		X	
4C	-	-	-	*	46	4	15.0		X		X	
6A	-	-	-	*	54	6			X		X	
PED PUSH BUTTONS												
INPUT FILE POSITION LEGEND: J2L												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2	NOTE: INSTALL DC ISOLATORS					
P61,P62	TB8-7,9	I13U	68	34	6	PED 6				FILE J		

*For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet.

* SDLC NON-INTRUSIVE DETECTION CHART

	DETECTOR RACK #3		DETECTOR RACK #4	
Input Point	DET # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	NU	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	NU	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	NU
13	45	4B	61	NU
14	46	4C	62	NU
15	47	NU	63	NU
16	48	NU	64	NU

NU = Not Used

SIGNAL HEAD HOOK-UP CHART

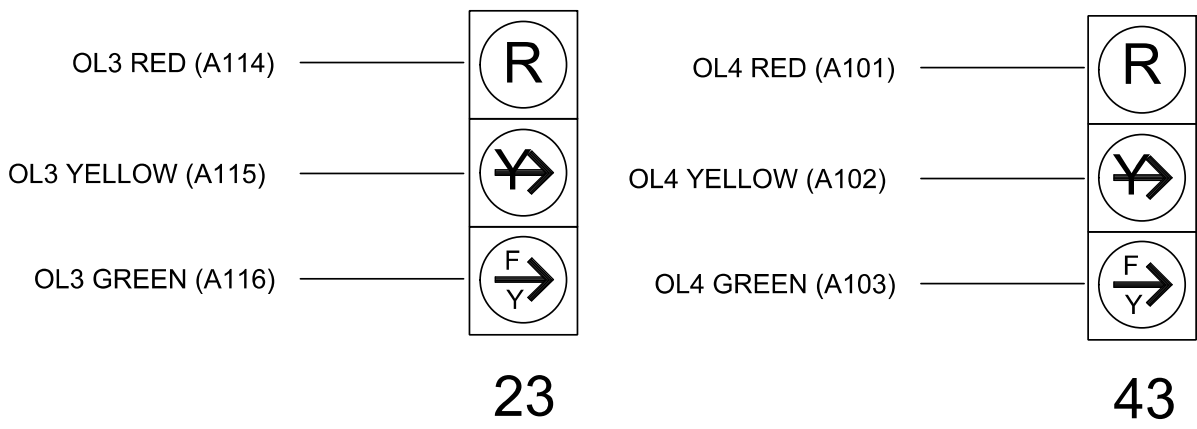
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22	P21, P22	NU	41	42	NU	NU	61,62	P61, P62	NU	NU	NU	NU	NU	23★	43★
RED	-	128	128	-	-	-	101	-	-	134	-	-	-	-	-	-	A114	A101
YELLOW	-	129	129	-	-	-	102	-	-	135	-	-	-	-	-	-	-	-
GREEN	-	-	130	-	-	-	103	-	-	-	-	-	-	-	-	-	-	-
RED ARROW	-	-	-	-	-	101	-	-	-	-	-	-	-	-	-	-	-	-
YELLOW ARROW	-	-	-	-	-	102	-	-	-	-	-	-	-	-	-	-	A115	A102
FLASHING YELLOW ARROW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	A116	A103
GREEN ARROW	-	130	-	-	-	103	103	-	-	136	-	-	-	-	-	-	-	-
	-	-	-	113	-	-	-	-	-	119	-	-	-	-	-	-	-	-
	-	-	-	115	-	-	-	-	-	121	-	-	-	-	-	-	-	-

NU = Not Used

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

Signal Upgrade - Temporary Design 5
(TMP Phase 4b)

Electrical Detail - Sheet 1 of 2

[illegible]

PROJECT REFERENCE NO.	SHEET NO.
I-5715	Sig 6.2

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME 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

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

- ☒ Disable TS2 Cabinet Alarms

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment.
Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTICE: FLASH RED

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	3	4
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0
FYA Ped Delay	5.0	0.0

← NOTICE FYA PED DELAY

Signal Upgrade - Temporary Design 5
(TMP Phase 4b)

Electrical Detail - Sheet 2 of 2

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



ELECTRICAL AND PROGRAMMING DETAILS FOR:			
NC 73 (Sam Furr Road) at I-77 SB Ramps			
Division 10	Mecklenburg County	Huntersville	
PLAN DATE:	January 2026	REVIEWED BY:	SL Phillips
PREPARED BY:	SP Pennington	REVIEWED BY:	
REVISIONS		INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	
DocuSigned by 	6/22/2026
SIG. INVENTORY NO.	10-1662T5

PROJECT REFERENCE NO.	SHEET NO.
I-5715	Fig. 7.0

2 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

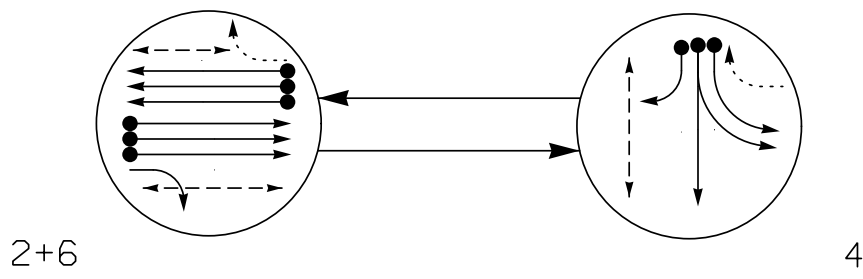
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DONT WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- See Roadway Pavement Marking Plans for stopline and crosswalk locations.
- To provide a leading pedestrian interval on phase 2, program FYA signal head 24 to delay for 5 seconds after the start of the phase 2 walk interval. See electrical details for programming.
- To provide a leading pedestrian interval on phase 4, program FYA signal heads 43 and 44 to delay for 5 seconds after the start of the phase 4 walk interval. See Electrical Details for programming.
- Install retroreflective backplates for all signal heads.
- All metal poles and pedestals shall be painted black as specified in the project special provisions

LEGEND

PROPOSED	EXISTING

PHASING DIAGRAM



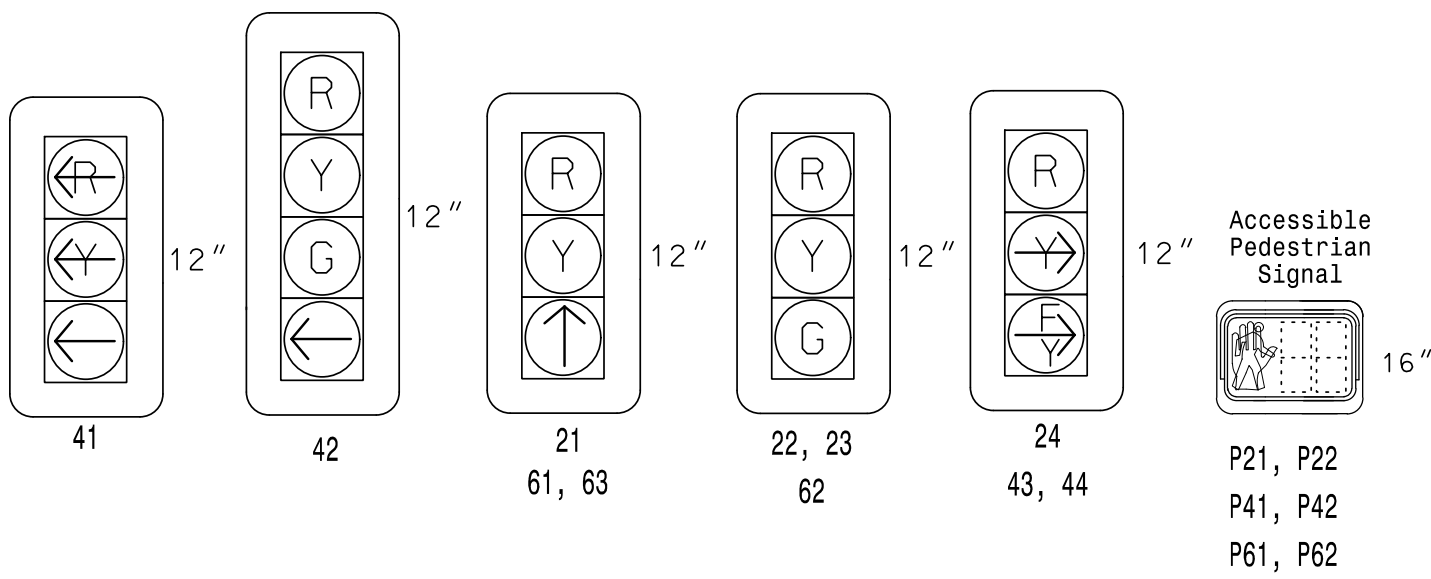
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	2+6	4	FLASH
21	↑	R	R
22, 23	G	R	R
24	↓	R	R
41	←	R	R
42	R	G	R
43, 44	R	↓	R
61, 63	↑	R	R
62	G	R	R
P21, P22	W	DW	DRK
P41, P42	DW	W	DRK
P61, P62	W	DW	DRK

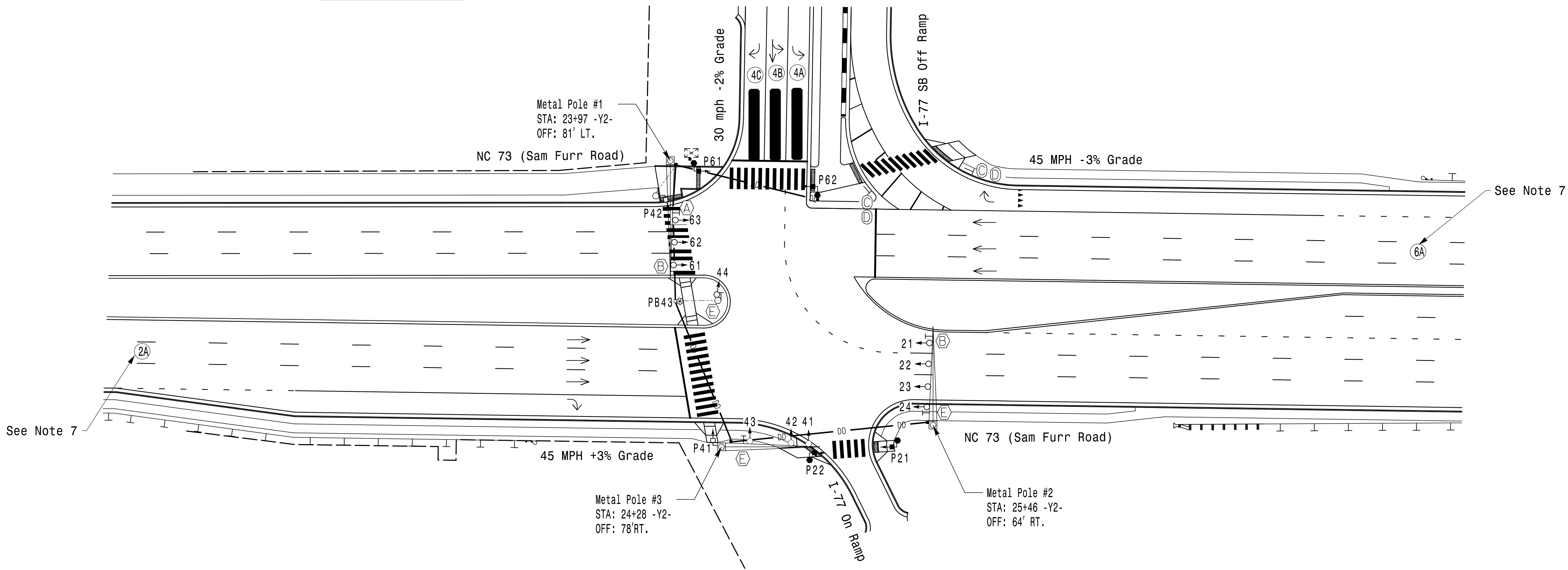
SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART										
DETECTOR ZONE					PROGRAMMING					
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL
2A*	6X6	300	*	-	2	-	-	X	-	X
4A*	6X40	0	*	-	4	-	-	X	-	X
4B*	6X40	0	*	-	4	-	-	X	-	X
4C*	6X40	0	*	-	4	15.0	-	X	-	X
6A*	6X40	300	*	-	6	-	-	X	-	X

* Multi-Zone Microwave Detection Zone



MAXTIME TIMING CHART

FEATURE	PHASE		
	2	4	6
Walk *	7	7	7
Ped Clear	5	32	11
Min Green *	12	7	12
Passage *	2.0	2.0	2.0
Max I *	90	45	90
Yellow Change	4.8	3.6	4.8
Red Clear	1.7	3.4	1.7
Added Initial *	-	-	-
Maximum Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Advance Walk	**	***	-
Non Lock Detector	-	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.

** See Note #10.

*** See Note #11

Microwave Detection

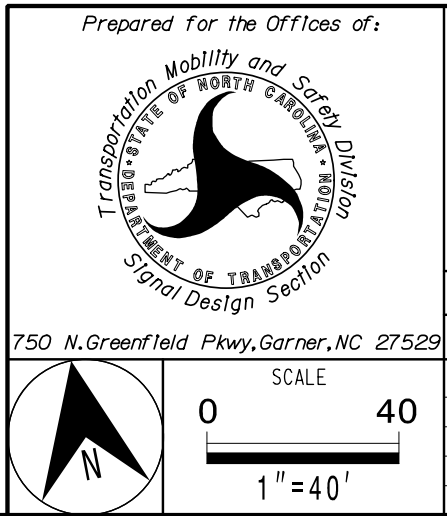
FUNCTION	Sensor 1 2A			Sensor 2 6A		
Channel	1			1		
Phase	2			6		
Direction of Travel	EB			WB		
Type	Priority			Priority		
Level	1	2	QUEUE	1	2	QUEUE
Discovery Zone (ft)	> =750	<750	N/A	> =750	<750	N/A
Range (ft)	900-100	600-100	150-100	900-100	600-100	150-100
Enable Speed	Y	Y	Y	Y	Y	Y
Speed Range (mph)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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P21	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.
P22	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.
P41	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Sam Furr.
P42	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Sam Furr.
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.

Signal Upgrade - Final Design

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



NC 73 (Sam Furr Road)
at
I-77 SB Ramps

Division 10 Mecklenburg County Huntersville
PLAN DATE: January 2026 REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL
DocuSigned by SAGE L. PHILLIPS 03/27/2026 09:43:47 SIGNATURE DATE SIG. INVENTORY NO. 10-1662

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

MAXTIME 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	Unit Flash Parameters
StartUp Clearance Hold	All Red Flash Exit Time
6	6

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options
☒ Disable TS2 Cabinet Alarms

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- 1. Install push buttons and APS equipment per manufacturer's instructions.
- 2. Provide a dedicated cable to each push button per manufacturer's instructions.
- 3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- 4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- 5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
- 6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
- 7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

OUTPUT CHANNEL CONFIGURATION

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

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

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

NOTICE: FLASH RED

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	3	4
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0
FYA Ped Delay	5.0	5.0

← NOTICE FYA PED DELAY

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1662
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 2

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

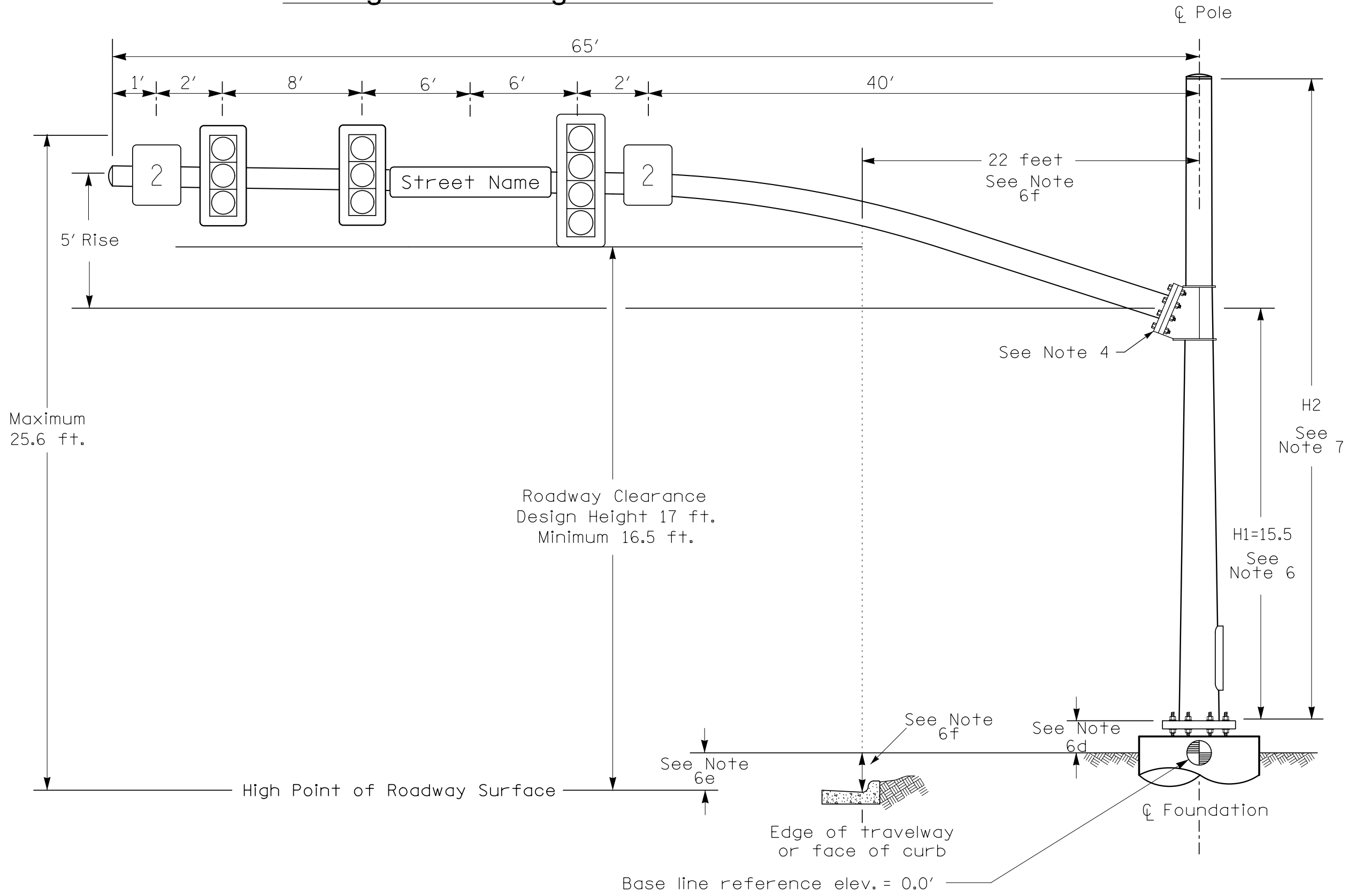


ELECTRICAL AND PROGRAMMING DETAILS FOR:			
NC 73 (Sam Furr Road) at I-77 SB Ramps			
Division 10	Mecklenburg County	Huntersville	
PLAN DATE:	January 2026	REVIEWED BY:	SL Phillips
PREPARED BY:	SP Pennington	REVIEWED BY:	
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	
DocuSign eSignature 30287A5B6D606B437	6/22/2026 DATE
SIG. INVENTORY NO.	10-1662

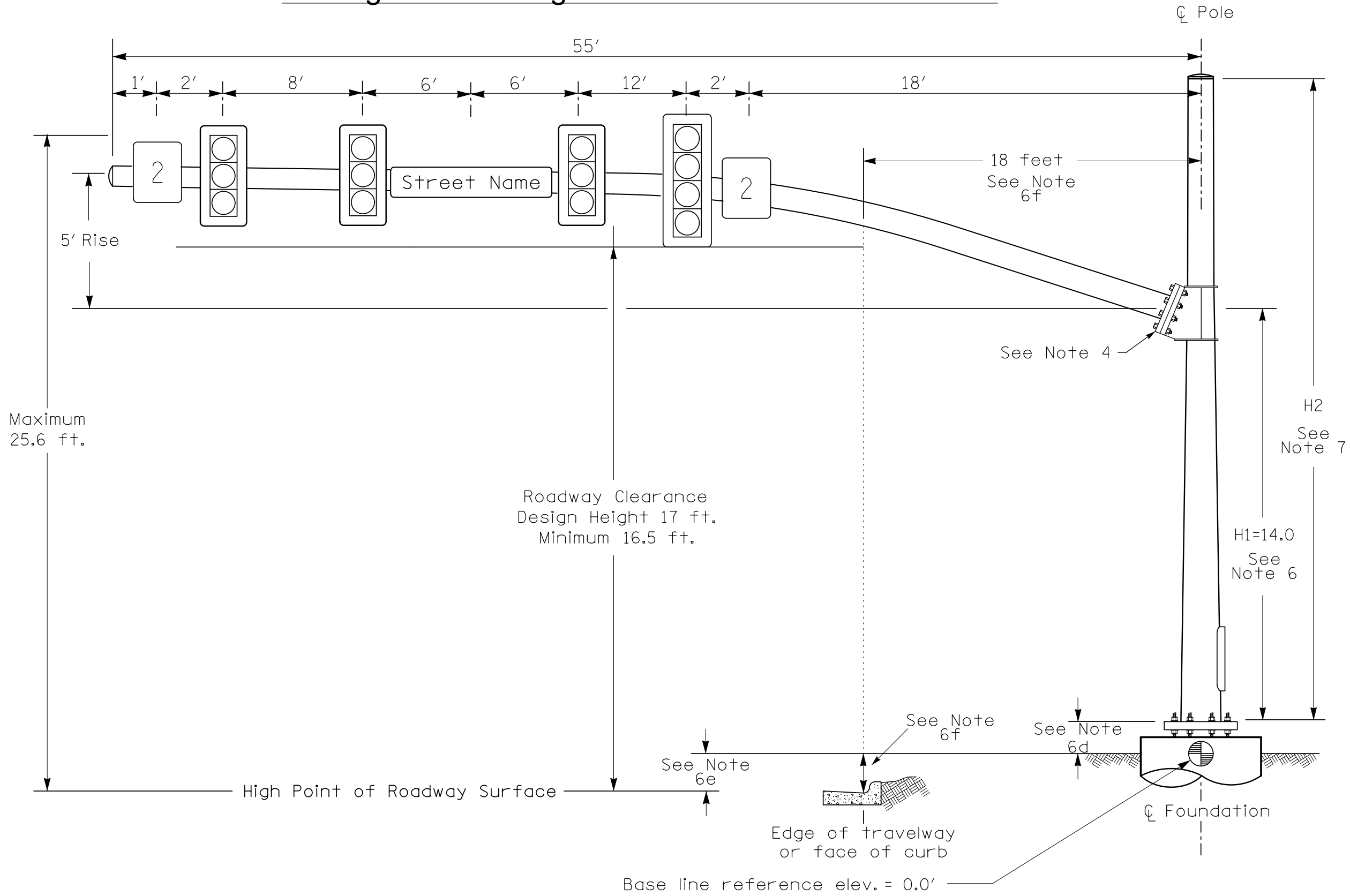
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Design Loading for METAL POLE NO. 1



Elevation View

Design Loading for METAL POLE NO. 2



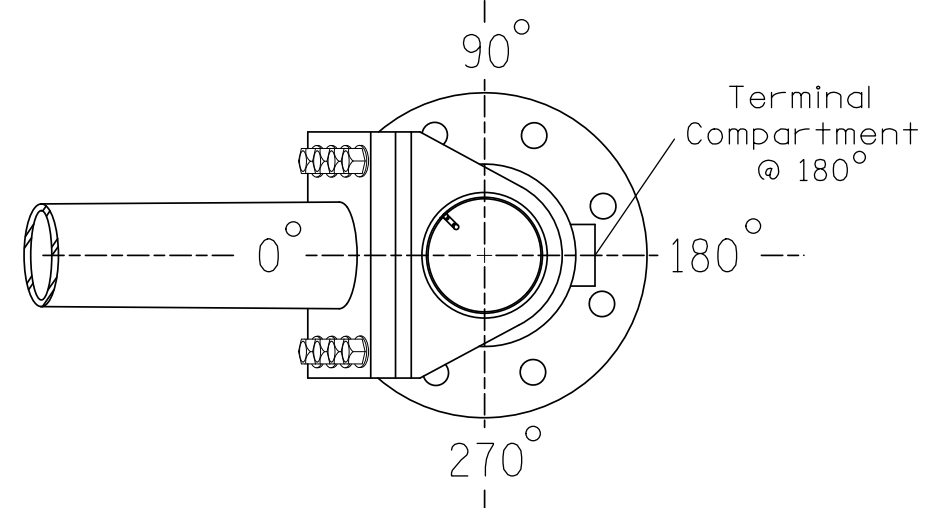
Elevation View

SPECIAL NOTE

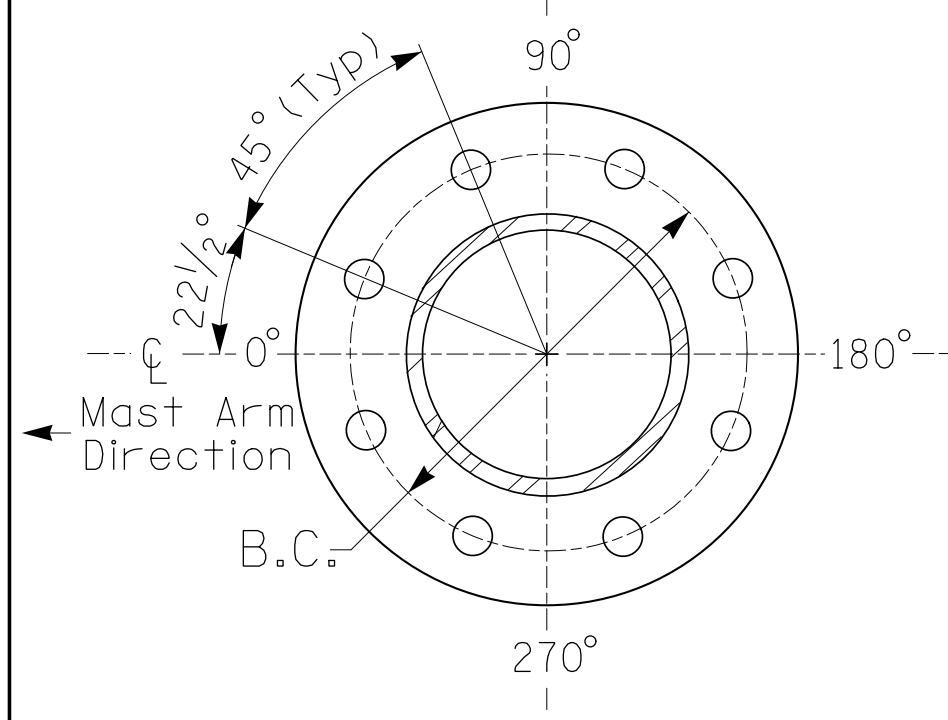
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+1.4 ft.	-0.3 ft.
Elevation difference at Edge of travelway or face of curb	+1.0 ft.	-0.7 ft.

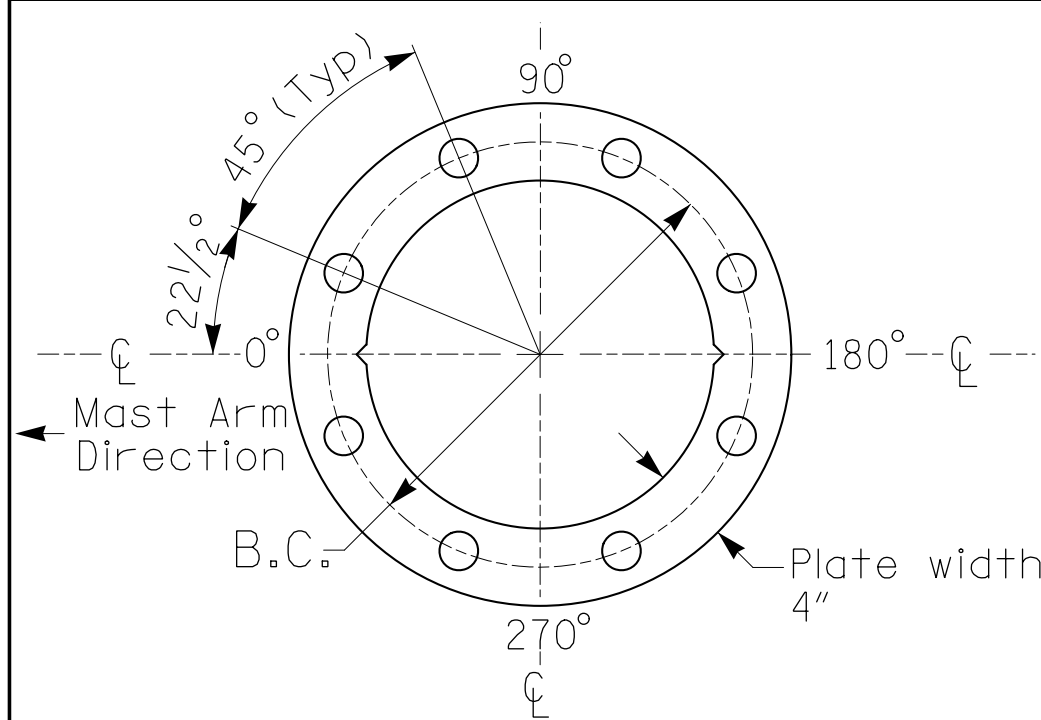


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



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

METAL POLE No. 1 and 2

PROJECT REFERENCE NO.	SHEET NO.
I-5715	Sig. 7.3

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5"W X 66.0"L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

- 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/TSMO-Design-Resources.aspx>

DESIGN REQUIREMENTS

- 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.
- Design all signal supports using force ratios that do not exceed 0.9.
- 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.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Nominal vertical rise in mast arm is 5 feet as measured from the centerline of the arm base to the centerline of the free end of the arm.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
 - Provide horizontal distance from the proposed centerline of the foundation to the edge of travelway. Refer to the Elevation Data Chart for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary to ensure that the roadway clearance is maintained at the edge of the travelway and to aid in the camber design of the arm.
- 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.
- 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.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

All metal poles and arms should be Jet Black in color as specified in the project special provisions.

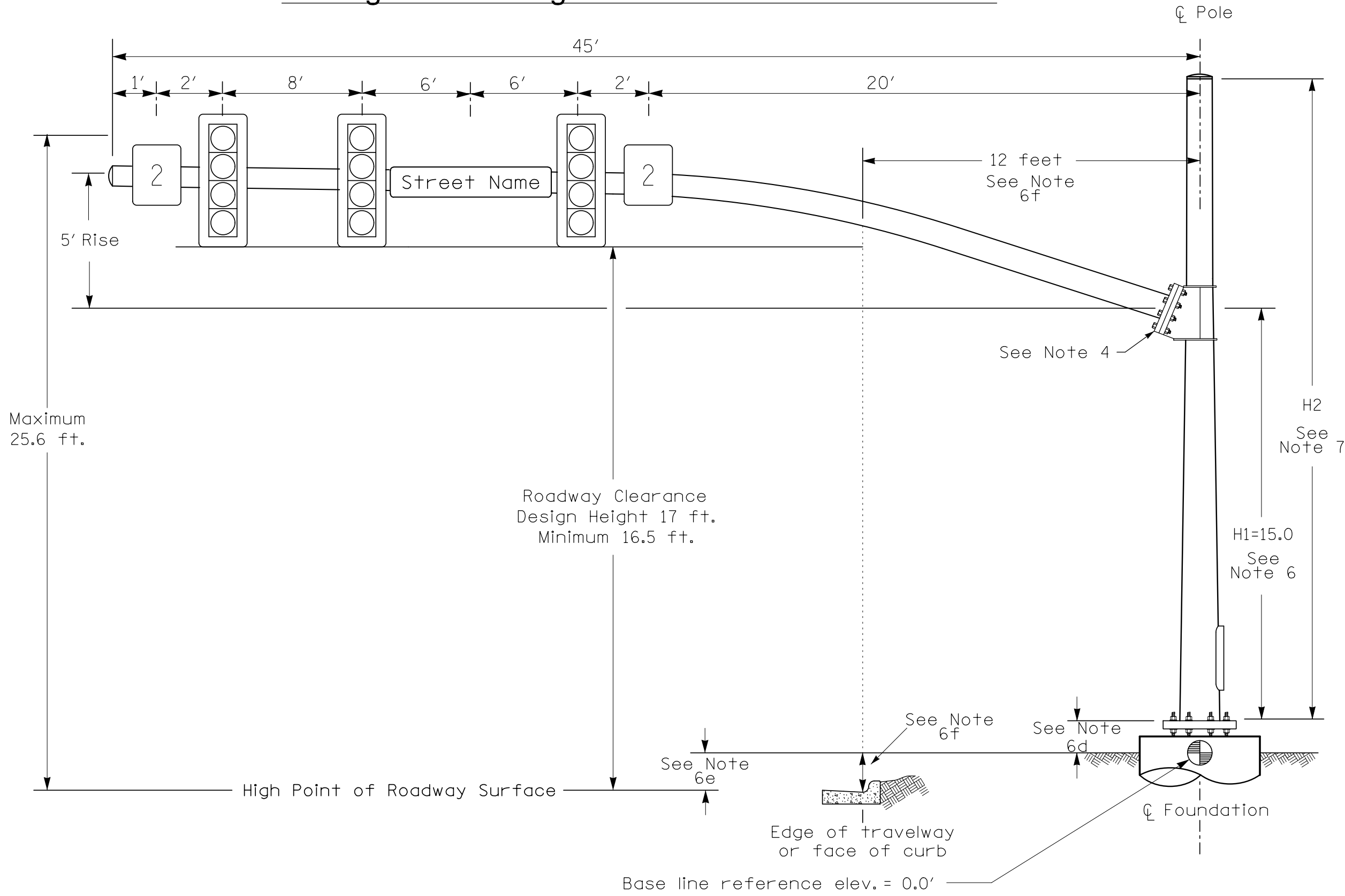
PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

NCDOT Wind Zone 5 (110 mph)

 750 N. Greenfield Pkwy, Garner, NC 27529 SCALE 0 N/A N/A	NC 73 (Sam Furr Road) at I-77 SB Ramp Division 10 Mecklenburg County Huntersville PLAN DATE: January 2026 REVIEWED BY: SL Phillips PREPARED BY: SP Pennington REVIEWED BY:		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032607 DATE 6/22/2026 SIG. INVENTORY NO. 10-1662
	REVISIONS	INIT.	DATE

6/22/2026 7:33:58 AM susan.pennington ***info@horn.com\\C:\CH\WPL_P\01036264 - I-5715-Signals\4 - Signal Design\2 10-1662-2026en.dgn

Design Loading for METAL POLE NO. 3



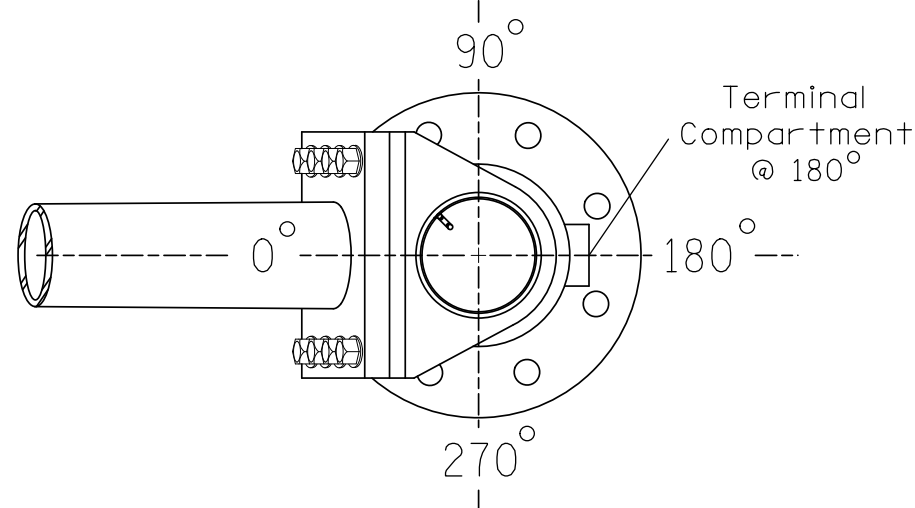
Elevation View

SPECIAL NOTE

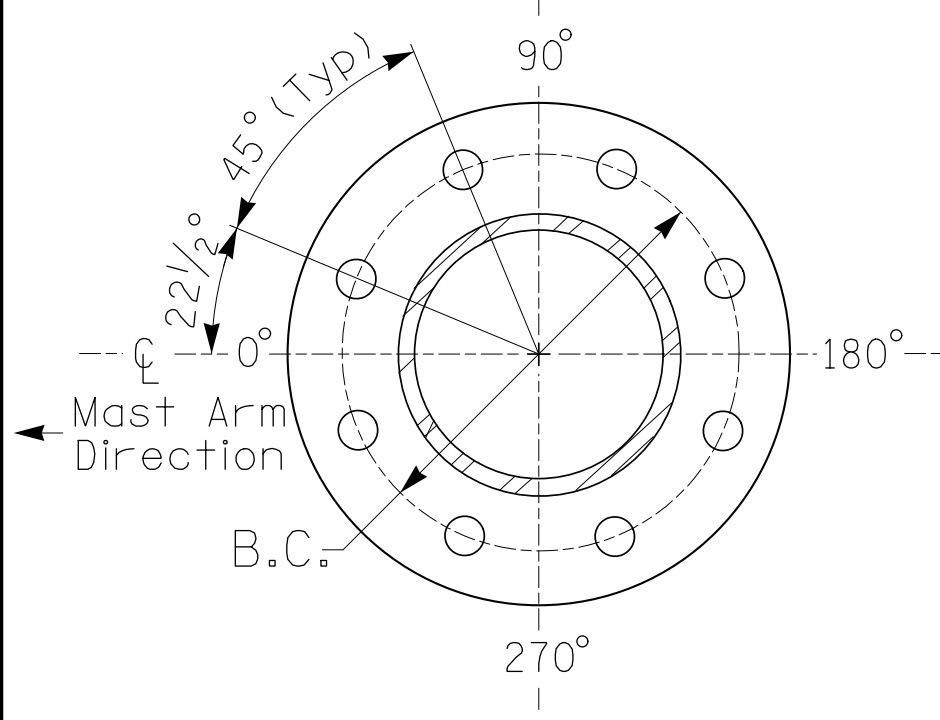
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 3	
Baseline reference point at Pole Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+0.6 ft.	
Elevation difference at Edge of travelway or face of curb	+0.1 ft.	

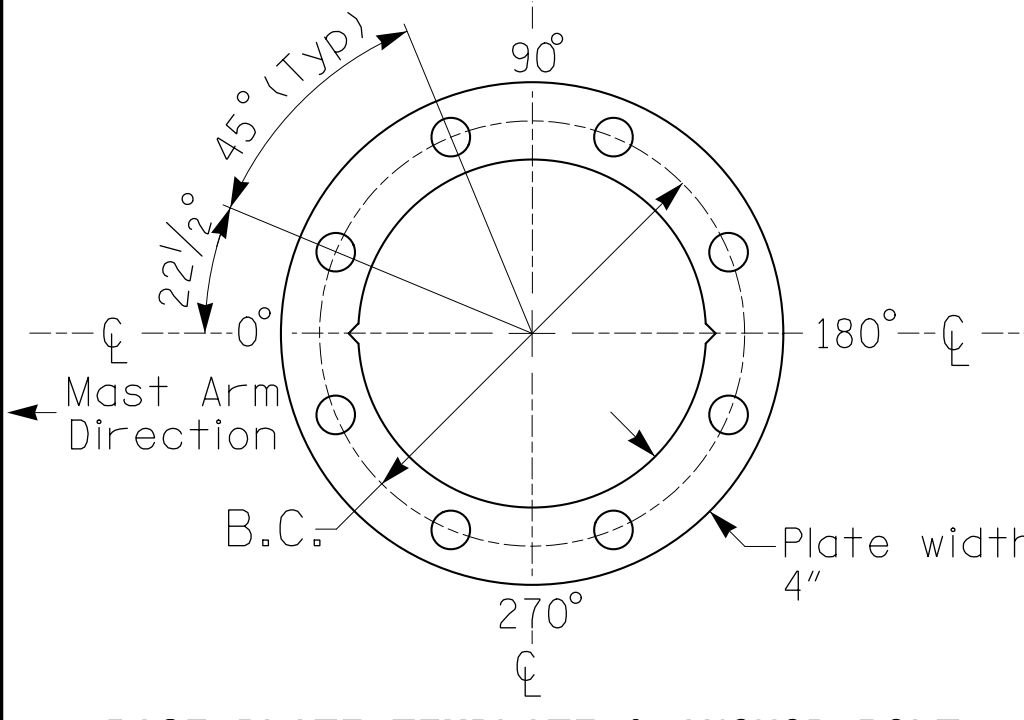


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



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

METAL POLE No. 3

PROJECT REFERENCE NO.	SHEET NO.
I-5715	Sig. 7.4

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5"W X 66.0"L	74 LBS
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5"W X 52.5"L	60 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0"W X 36.0"L	14 LBS
	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS

NOTES

DESIGN REFERENCE MATERIAL

- 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/TSMO-Design-Resources.aspx>

DESIGN REQUIREMENTS

- 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.
- Design all signal supports using force ratios that do not exceed 0.9.
- 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.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Nominal vertical rise in mast arm is 5 feet as measured from the centerline of the arm base to the centerline of the free end of the arm.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
 - Provide horizontal distance from the proposed centerline of the foundation to the edge of travelway. Refer to the Elevation Data Chart for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary to ensure that the roadway clearance is maintained at the edge of the travelway and to aid in the camber design of the arm.
- 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.
- 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.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

All metal poles and arms should be Jet Black in color as specified in the project special provisions.

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

NCDOT Wind Zone 5 (110 mph)

 750 N. Greenfield Pkwy, Garner, NC 27529 SCALE 0 N/A N/A	NC 73 (Sam Furr Road) at I-77 SB Ramp Division 10 Wecklenburg County Huntersville PLAN DATE: January 2026 REVIEWED BY: SL Phillips PREPARED BY: SP Pennington REVIEWED BY:		 DocuSigned by: SL Phillips 0C87A56E00B437 6/22/2026 DATE SIG. INVENTORY NO. 10-1662
	REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
I-5715	Sig. 8.0

PHASING DIAGRAM

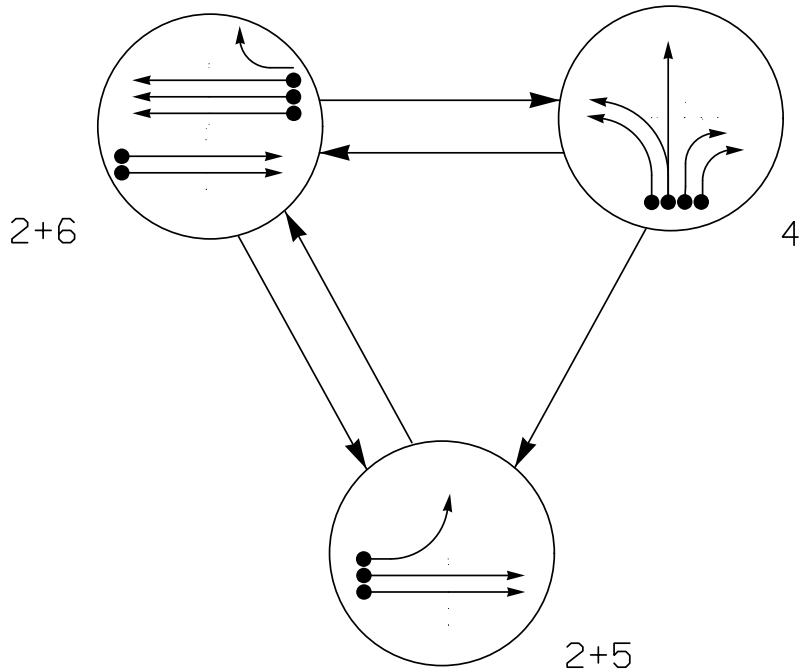
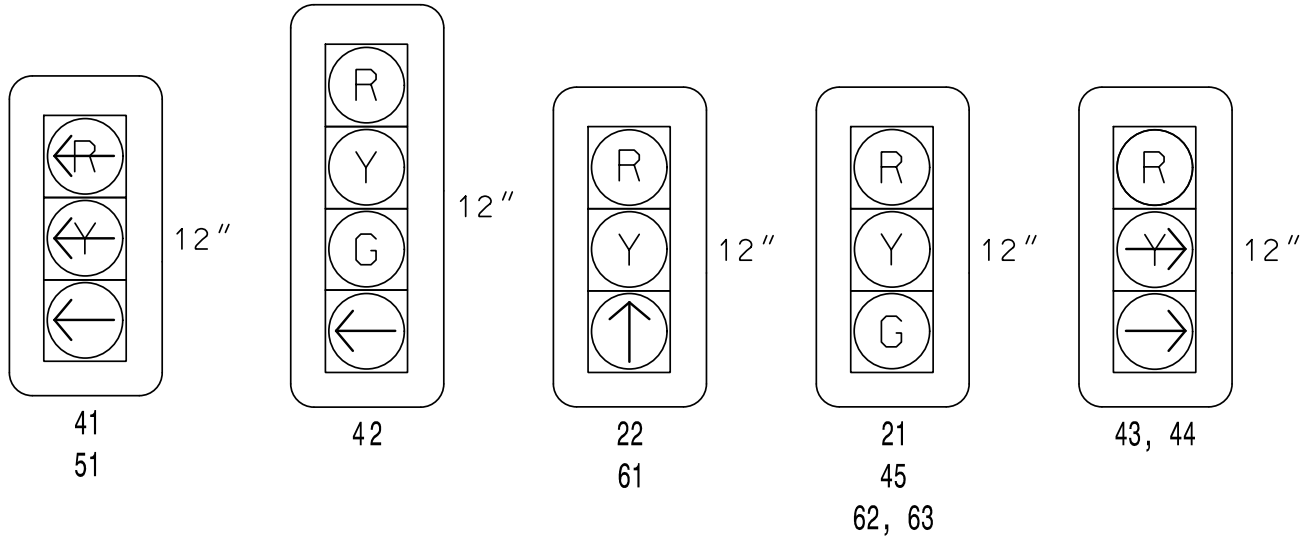


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	2+5	2+6	4	FL
21	G	G	R	R
22	↑	↑	R	R
41	←	←	←	←
42	R	R	G	R
43, 44	R	R	→	R
45	R	R	G	R
51	←	←	←	←
61	R	↑	R	R
62, 63	R	G	R	R

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP/ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A*	6X6	300	*	-	2	-	-	X	-	X	-
4A*	6X40	0	*	X	4	-	-	X	-	X	-
4B*	6X40	0	*	X	4	-	-	X	-	X	-
4C*	6X40	0	*	X	4	15.0	-	X	-	X	-
4D*	6X40	0	*	X	4	15.0	-	X	-	X	-
5A*	6X40	0	*	X	5	-	-	X	-	X	-
6A*	6X40	300	*	-	6	-	-	X	-	X	-

* Multi-Zone Microwave Detection Zone

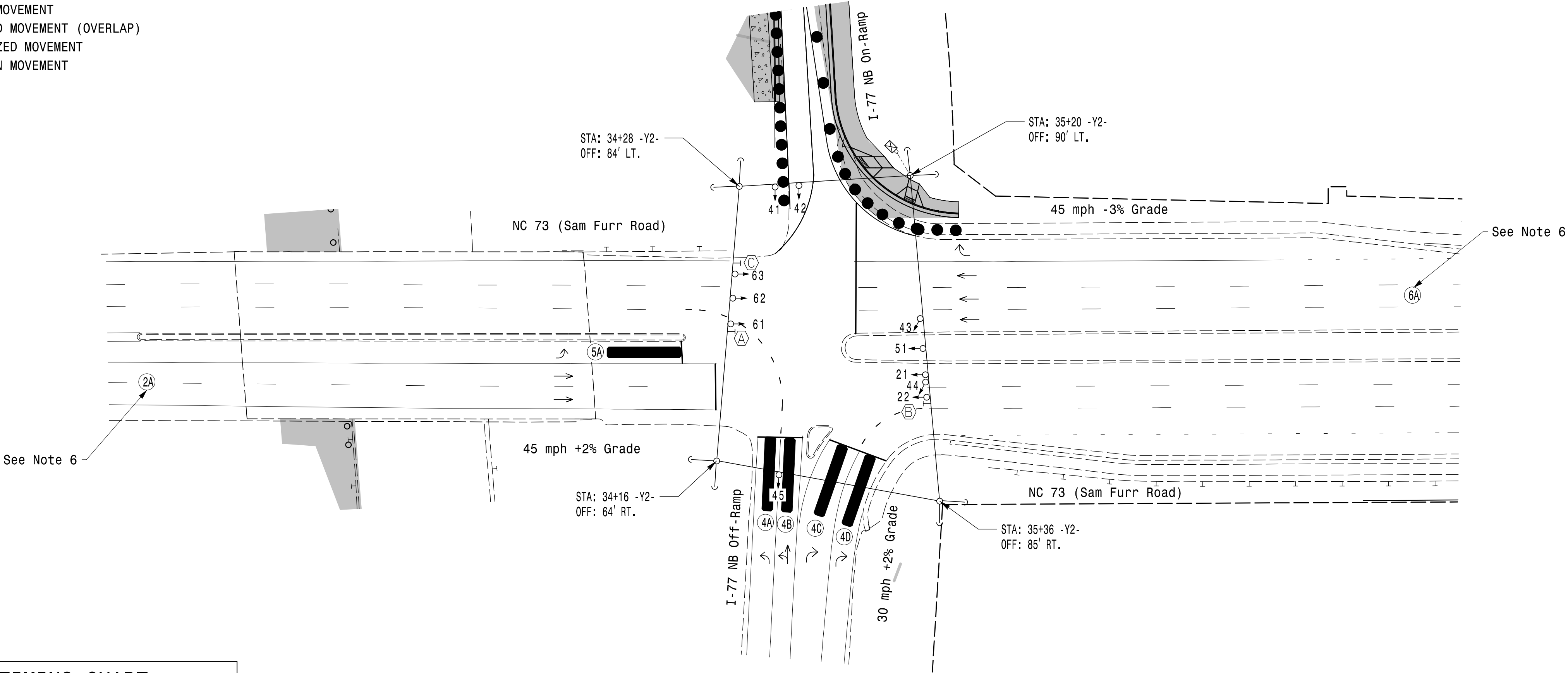
3 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- Install retroreflective backplates for all signal heads.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

- | PROPOSED | EXISTING |
|--|----------|
| Traffic Signal Head | N/A |
| Modified Signal Head | N/A |
| Sign | N/A |
| Pedestrian Signal Head With Push Button & Sign | N/A |
| Signal Pole with Guy | N/A |
| Signal Pole with Sidewalk Guy | N/A |
| Non-Intrusive Detection Zone | N/A |
| Controller & Cabinet | N/A |
| Junction Box | N/A |
| 2-in Underground Conduit | N/A |
| Right of Way | N/A |
| Guardrail | N/A |
| Directional Arrow | N/A |
| Curb Ramp | N/A |
| Construction Zone Drums | N/A |
| Construction Zone | N/A |
| No Left Turn Sign (R3-2) | N/A |
| No Right Turn Sign (R3-1) | N/A |
| Right Arrow "ONLY" Sign (R3-5R) | N/A |

MAXTIME TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Min Green *	12	7	7	12
Passage *	2.0	2.0	2.0	2.0
Max 1 *	90	30	15	60
Yellow Change	4.8	3.4	3.0	4.8
Red Clear	1.6	2.5	3.3	1.6
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	-	-	-
Non Lock Detector	-	X	X	-
Vehicle Recall	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-

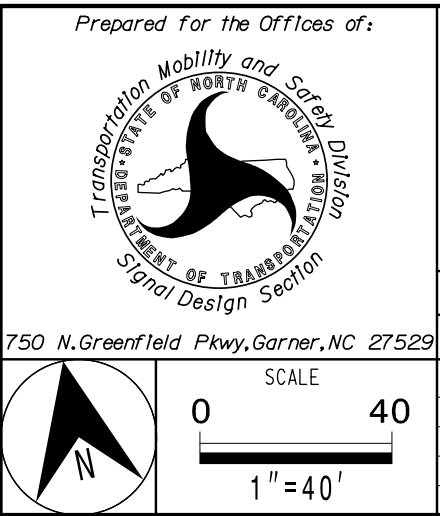
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Microwave Detection

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

Signal Upgrade - Temporary Design 1
(TMP Phases 2 and 3)

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

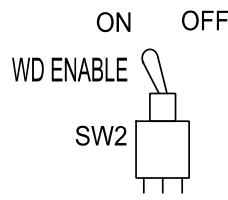


NC 73 (Sam Furr Road) at I-77 NB Ramp	
Division 10 Wecklenburg County	Huntersville
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	SEAL
SEAL 032607	SEAL 032607
DocuSigned by Stacie L. Phillips	DocuSigned by Stacie L. Phillips
SIGNATURE	SIGNATURE
DATE	DATE
SIG. INVENTORY NO.	10-130471

(remove jumpers and set switches as shown)

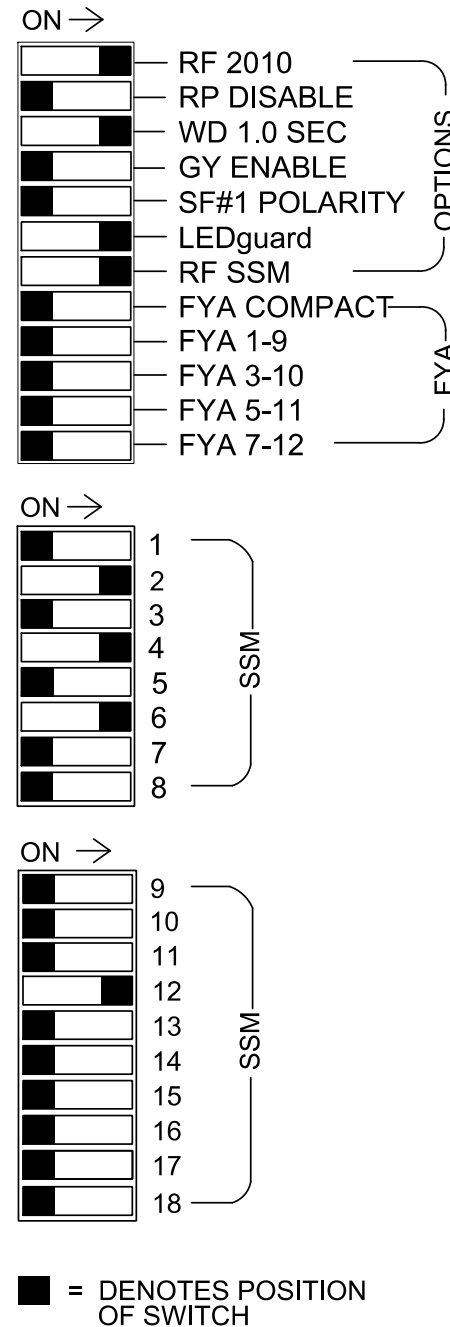
(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D10-43 Huntersville Signal System.

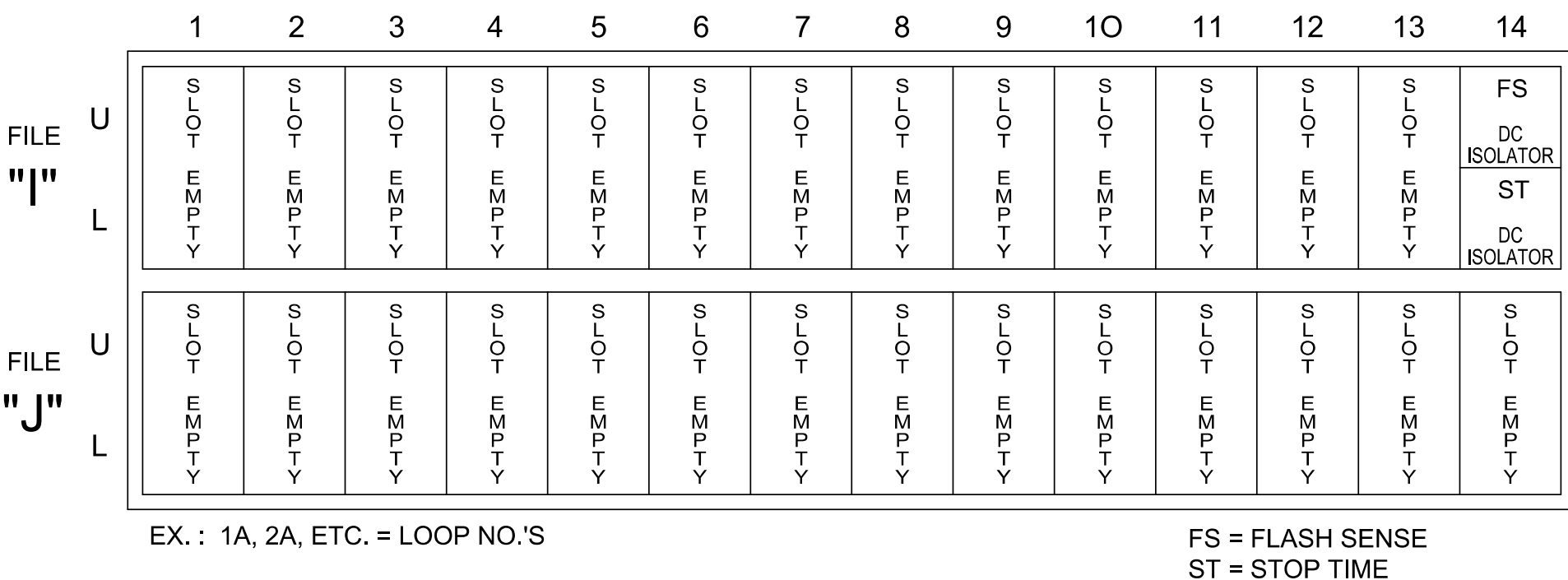
EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

INPUT FILE POSITION LAYOUT

(front view)



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
2A	-	-	-	*	38	2			X		X	
4A	-	-	-	*	44	4			X		X	
4B	-	-	-	*	45	4			X		X	
4C	-	-	-	*	46	4	15.0		X		X	
4D	-	-	-	*	47	4	15.0		X		X	
5A	-	-	-	*	35	5			X		X	
6A	-	-	-	*	54	6			X		X	

*For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet.

INPUT FILE POSITION LEGEND: J2L

FILE J _____
SLOT 2 _____
LOWER _____

* SDLC NON-INTRUSIVE
DETECTION CHART

	DETECTOR RACK #3		DETECTOR RACK #4	
Input Point	DET # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	5A	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	NU	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	NU
13	45	4B	61	NU
14	46	4C	62	NU
15	47	4D	63	NU
16	48	NU	64	NU

NU = Not Used

SIGNAL HEAD HOOK-UP CHART

[illegible]

NU = Not Used

FLASHER CIRCUIT MODIFICATION DETAIL

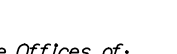
IN ORDER TO ENSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1304T1
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Temporary Design 1
(TMP Phase 2-3)
Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMING DETAILS FOR:	NC 73 (Sam Furr Road) at I-77 NB Ramps	SEAL 																														
Prepared for the Office of:																																
	Division 10 Mecklenburg County Huntersville																															
PLAN DATE: January 2006 REVIEWED BY: SL Phillips																																
PREPARED BY: SP Pennington REVIEWED BY:																																
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750 N. Greenfield Pkwy, Garner, NC 27529																																

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1304T1
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

MAXTIME OVERLAP PROGRAMMING DETAIL

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

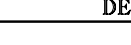
Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	4
Type	Normal
Included Phases	4
Modifier Phases	-
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

Signal Upgrade - Temporary Design 1
(TMP Phase 2-3)

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 	NC 73 (Sam Furr Road) at I-77 NB Ramps	
	Division 10 Mecklenburg County Huntersville	
	PLAN DATE: January 2026	REVIEWED BY: SL Phillips
	PREPARED BY: SP Pennington	REVIEWED BY:

 STATE OF NORTH CAROLINA Department of Transportation Signals Management		REVISIONS	INIT.	DATE
750 N.Greenfield Pkwy,Garner,NC 27529				

**DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED**

SEAL

SALPH
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DATE
SIG. INVENTORY NO. 10-1304T1

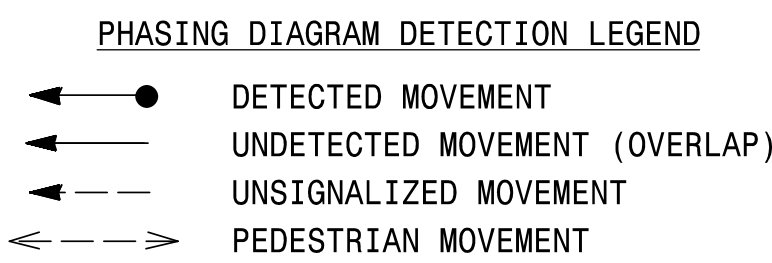
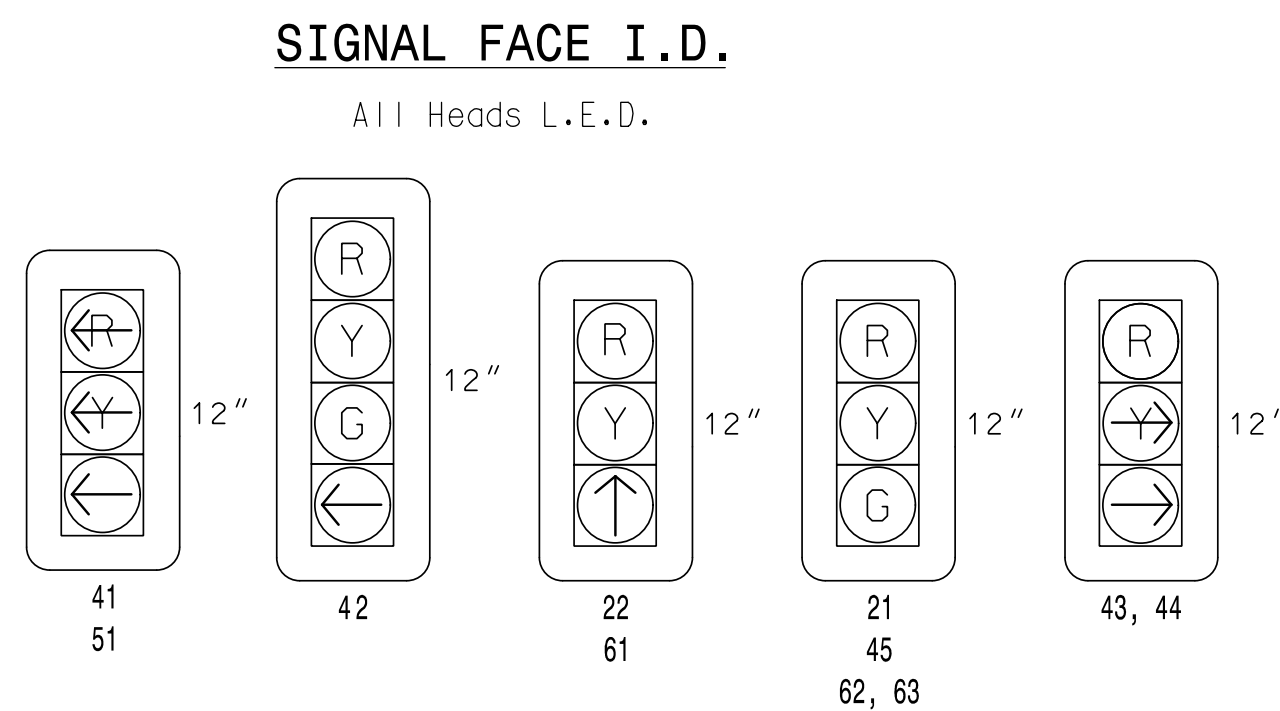


TABLE OF OPERATION				
SIGNAL FACE	PHASE			
	2 + 5	2 + 6	4	F L A S H
21	G	G	R	R
22	↑	↑	R	R
41	←R	←R	←	←R
42	R	R	G	R
43, 44	R	R	→	R
45	R	R	G	R
51	←	←R	←R	←R
61	R	↑	R	R
62, 63	R	G	R	R



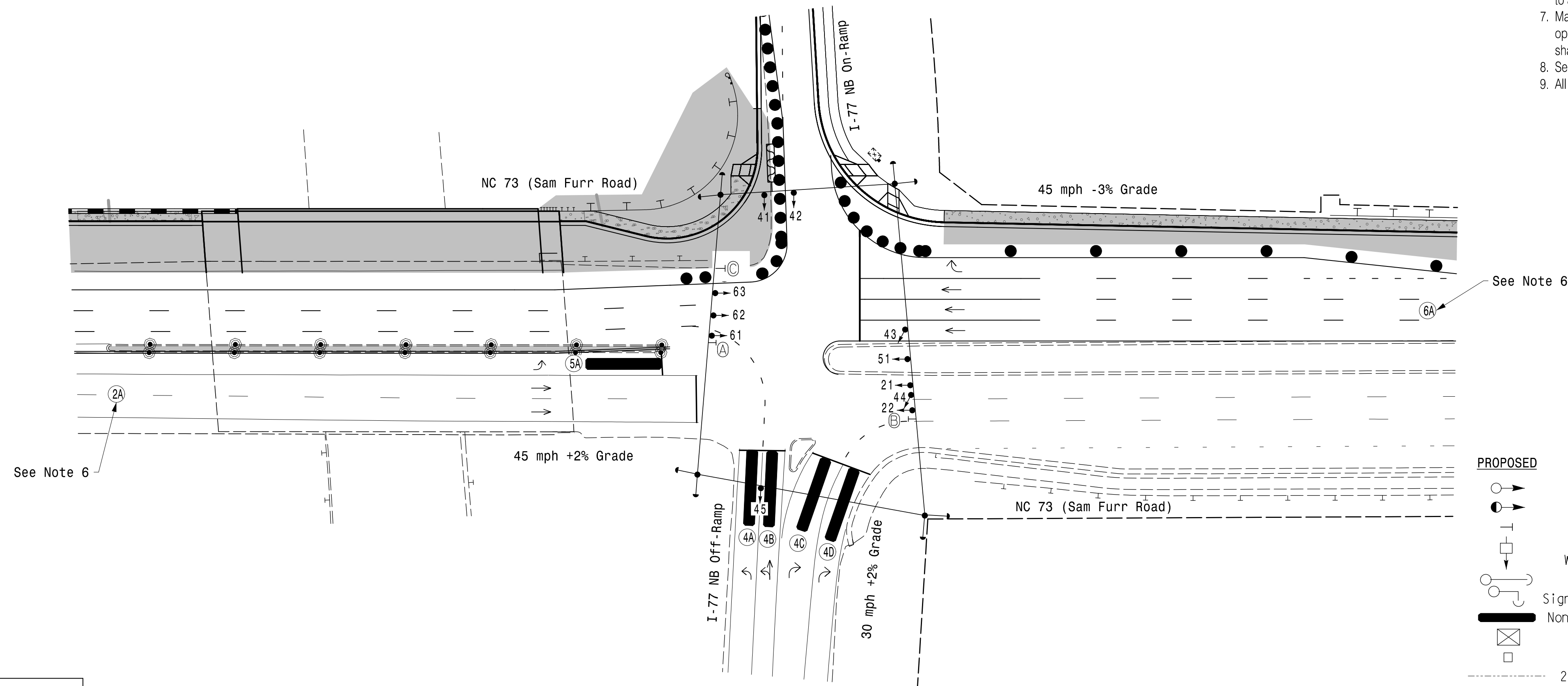
MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR ZONE					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A*	6X6	300	*	-	2	-	-	X	-	X	-
4A*	6X40	0	*	-	4	-	-	X	-	X	-
4B*	6X40	0	*	-	4	-	-	X	-	X	-
4C*	6X40	0	*	-	4	15.0	-	X	-	X	-
4D*	6X40	0	*	-	4	15.0	-	X	-	X	-
5A*	6X40	0	*	-	5	-	-	X	-	X	-
6A*	6X40	300	*	-	6	-	-	X	-	X	-

* Multi-Zone Microwave Detection Zone

3 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

NOTES

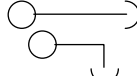
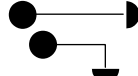
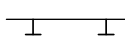
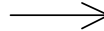
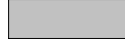
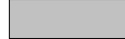
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Reposition existing signal heads 41, 42, 61, 62 and 63.
6. The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
8. See Roadway Traffic Control Plans for stopline locations.
9. All signal heads have Retroreflective backplates.



MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	4	5	6
Walk *	—	—	—	—
Ped Clear	—	—	—	—
Min Green *	12	7	7	12
Passage *	2.0	2.0	2.0	2.0
Max 1 *	90	30	15	60
Yellow Change	4.8	3.4	3.0	4.8
Red Clear	1.6	2.4	3.4	1.6
Added Initial *	—	—	—	—
Maximum Initial *	—	—	—	—
Time Before Reduction *	—	—	—	—
Time To Reduce *	—	—	—	—
Minimum Gap	—	—	—	—
Advance Walk	—	—	—	—
Non Lock Detector	—	X	X	—
Vehicle Recall	MIN RECALL	—	—	MIN RECALL
Dual Entry	—	—	—	—

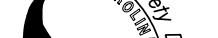
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

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

<u>PROPOSED</u>		<u>LEGEND</u>	<u>EXISTING</u>
	Traffic Signal Head		 N/A
	Modified Signal Head		N/A
	Pedestrian Signal Head		
	Signal Pole with Sidewalk Guy		
	Non-Intrusive Detection Zone		
	Controller & Cabinet		
	Junction Box		
	2-in Underground Conduit		
N/A	Right of Way		
N/A	Guardrail		
	Directional Arrow		
N/A	Curb Ramp		
	Construction Zone Drums		
	Construction Zone		
	No Left Turn Sign (R3-2)		
	No Right Turn Sign (R3-1)		
	Right Arrow "ONLY" Sign (R3-5R)		

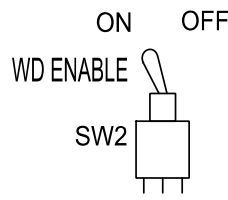
Signal Upgrade - Temporary Design 2
(TMP Phase 4)

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

Prepared For the Offices of:  TRANSPORTATION MOBILITY AND SAFETY DIVISION DEPARTMENT OF NORTH CAROLINA STATE DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529	NC 73 (Sam Furr Road) at I-77 NB Ramp	SEAL 																																	
Division 10 Mecklenburg County Huntersville																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">PLAN DATE: January 2026</td> <td style="width: 50%;">REVIEWED BY: SL Phillips</td> </tr> <tr> <td>PREPARED BY: SP Pennington</td> <td>REVIEWED BY:</td> </tr> </table>			PLAN DATE: January 2026	REVIEWED BY: SL Phillips	PREPARED BY: SP Pennington	REVIEWED BY:																													
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REVISIONS	INIT.	DATE																																	
 SCALE  0 40 1" = 40'	DocuSigned by  NCSTATE0003837 SIGNATURE DATE 6/22/2026 SIG. INVENTORY NO. 10-13047																																		

(remove jumpers and set switches as shown)

(remove jumpers and set switches as shown)



Bit	Label	Group
1	ON →	OPTIONS
2	RF 2010	
3	RP DISABLE	
4	WD 1.0 SEC	
5	GY ENABLE	
6	SF#1 POLARITY	
7	LEDguard	FPGA
8	RF SSM	
9	FYA COMPACT	
10	FYA 1-9	
11	FYA 3-10	
12	FYA 5-11	

ON →

1	ON
2	
3	
4	
5	
6	
7	
8	

SSM

■ = DENOTES POSITION OF SWITCH

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D10-43_Huntersville Signal System.

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

*See overlap programming detail on sheet 2

(front view)



FS = FLASH SENSE
ST = STOP TIME

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
2A	-	-	-	*	38	2			X		X	
4A	-	-	-	*	44	4			X		X	
4B	-	-	-	*	45	4			X		X	
4C	-	-	-	*	46	4	15.0		X		X	
4D	-	-	-	*	47	4	15.0		X		X	
5A	-	-	-	*	35	5			X		X	
6A	-	-	-	*	54	6			X		X	

*For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet.

INPUT FILE POSITION LEGEND: J2L

FILE J _____
SLOT 2 _____
LOWER _____

* SDLC NON-INTRUSIVE
DETECTION CHART

	DETECTOR RACK #3		DETECTOR RACK #4	
Input Point	DET # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	5A	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	NU	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	NU
13	45	4B	61	NU
14	46	4C	62	NU
15	47	4D	63	NU
16	48	NU	64	NU

NU = Not Used

[illegible]

NU = Not Used

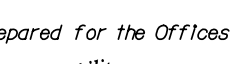
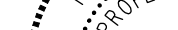
IN ORDER TO ENSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

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

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1304T2
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Temporary Design 2
(TMP Phase 4)
Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 73 (Sam Furr Road) at I-77 NB Ramps	SEAL 																																	
<i>Prepared for the Offices of:</i> 	Division 10 Mecklenburg County Huntersville																																		
	PLAN DATE: January 2026 REVIEWED BY: SL Phillips																																		
	PREPARED BY: SP Pennington REVIEWED BY:																																		
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REVISIONS	INIT.	DATE																																	
750 N.Greenfield Pkwy,Garner, NC 27529		6/22/2026 DATE																																	
		SIG. INVENTORY NO. 10-130472																																	

PROJECT REFERENCE NO.	SHEET NO.
I-5715	Sig 9.2

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	Unit Flash Parameters
StartUp Clearance Hold	All Red Flash Exit Time
6	6

MAXTIME OVERLAP PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	4
Type	Normal
Included Phases	4
Modifier Phases	-
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTICE: FLASH RED

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-1304T2
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Temporary Design 2
(TMP Phase 4)

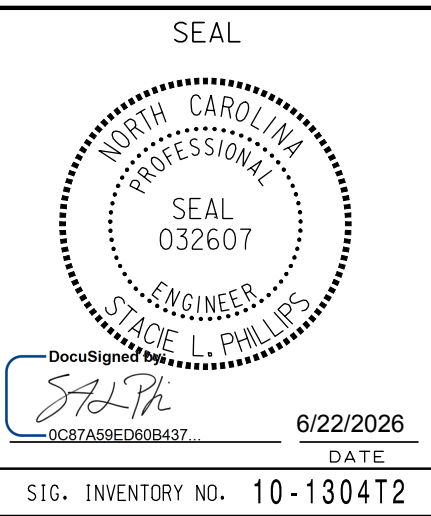
Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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



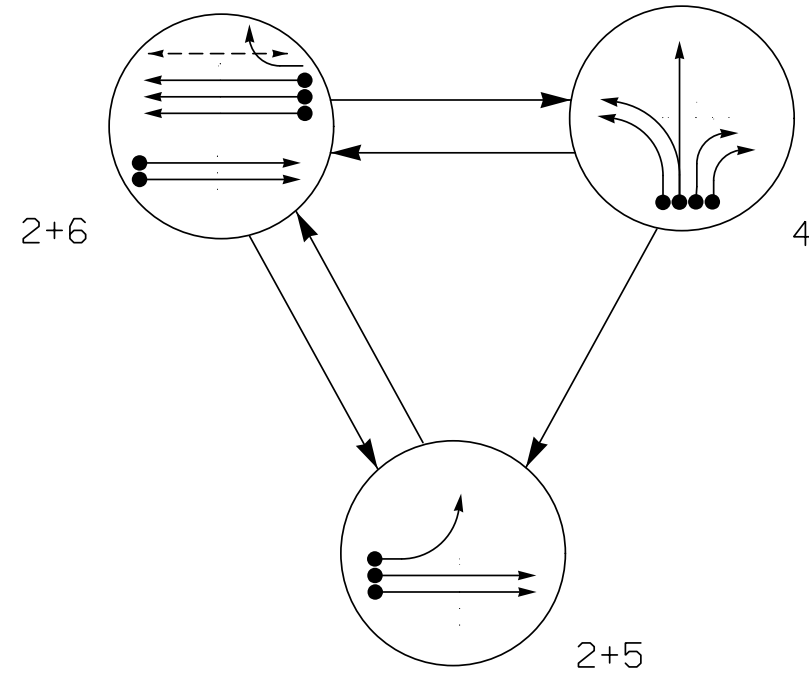
ELECTRICAL AND PROGRAMMING DETAILS FOR:			
Prepared for the Offices of:			
NC 73 (Sam Furr Road) at I-77 NB Ramps			
Division 10 Mecklenburg County Huntersville			
PLAN DATE: January 2026	REVIEWED BY: SL Phillips		
PREPARED BY: SP Pennington	REVIEWED BY:		
REVISIONS	INIT.	DATE	



SIG. INVENTORY NO. 10-1304T2

PROJECT REFERENCE NO.	SHEET NO.
I-5715	Sig. 10.0

PHASING DIAGRAM



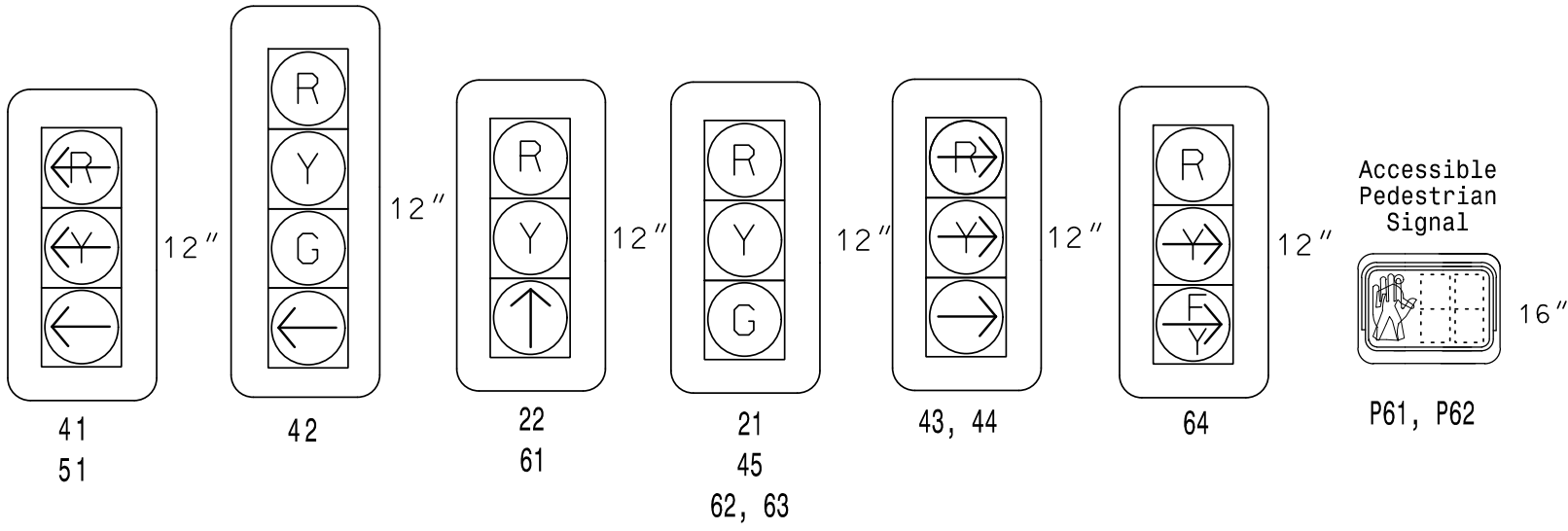
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE			
	2 + 5	2 + 6	4	FLASH
21	G	G	R	R
22	↑	↑	R	R
41	←	←	←	←
42	R	R	G	R
43, 44	←	←	←	←
45	R	R	G	R
51	←	←	←	←
61	R	↑	R	R
62, 63	R	G	R	R
64	R	←	R	R
P61, P62	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



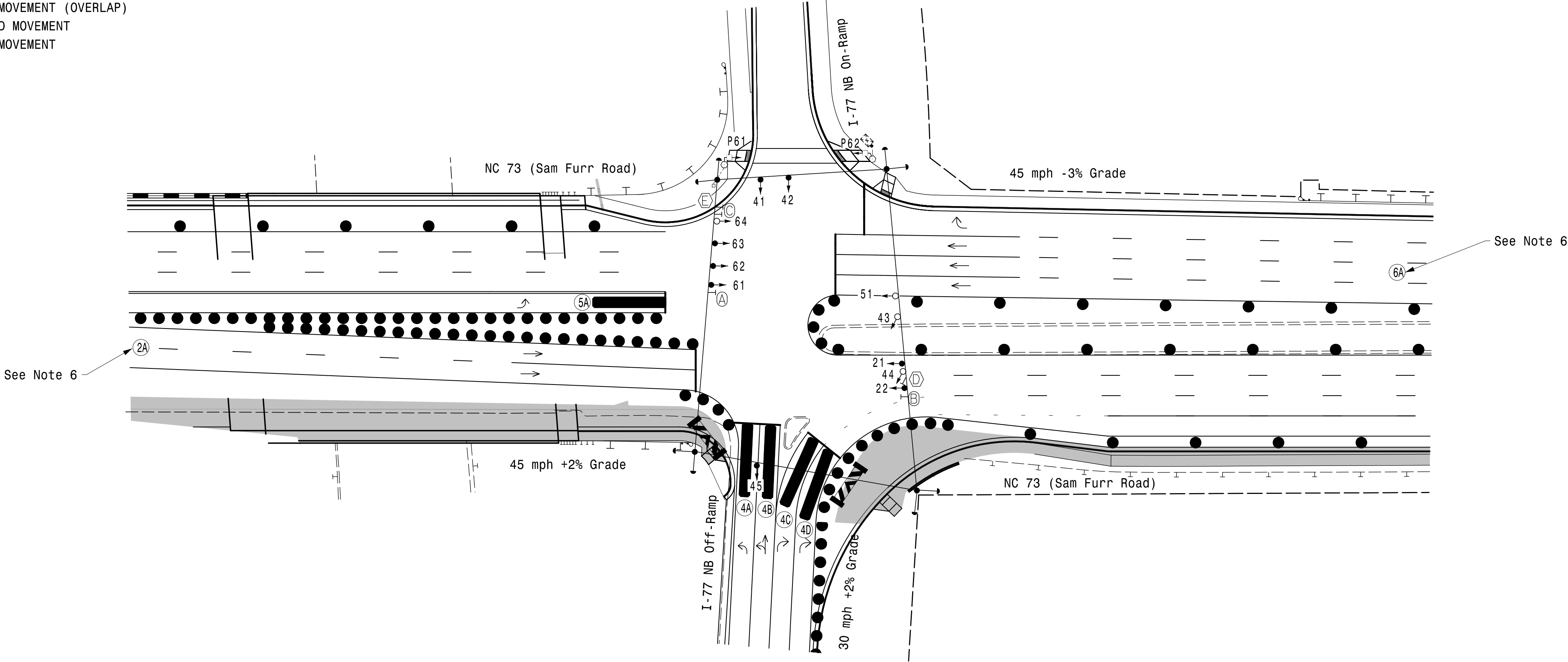
MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR ZONE					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	NEW CARD
2A*	6X6	300	*	-	2	-	-	X	-	X	-
4A*	6X40	0	*	-	4	-	-	X	-	X	-
4B*	6X40	0	*	-	4	-	-	X	-	X	-
4C*	6X40	0	*	-	4	-	-	X	-	X	-
4D*	6X40	0	*	-	4	-	-	X	-	X	-
5A*	6X40	0	*	-	5	3.0	-	X	-	X	-
6A*	6X40	300	*	-	6	-	-	X	-	X	-

* Multi-Zone Microwave Detection Zone

3 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Reposition existing signal heads 61, 62 and 63.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- To provide a leading pedestrian interval on phase 6, program FYA signal head 64 to delay for 7 seconds after the start of the phase 6 walk interval. See electrical details for programming.
- See Roadway Traffic Control Plans for stopline locations.
- Install retroreflective backplates for all signal heads.



MAXTIME TIMING CHART					
FEATURE	PHASE				
	2	4	5	6	
Walk *	-	-	-	-	7
Ped Clear	-	-	-	-	9
Min Green *	12	7	7	12	
Passage *	2.0	2.0	2.0	2.0	
Max 1 *	90	30	15	60	
Yellow Change	4.8	3.4	3.0	4.8	
Red Clear	1.6	2.9	3.3	1.6	
Added Initial *	-	-	-	-	
Maximum Initial *	-	-	-	-	
Time Before Reduction *	-	-	-	-	
Time To Reduce *	-	-	-	-	
Minimum Gap	-	-	-	-	
Advance Walk	-	-	-	-	**
Non Lock Detector	-	X	X	-	
Vehicle Recall	MIN RECALL	-	-	MIN RECALL	
Dual Entry	-	-	-	-	

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.
** See Note #11.

Microwave Detection

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

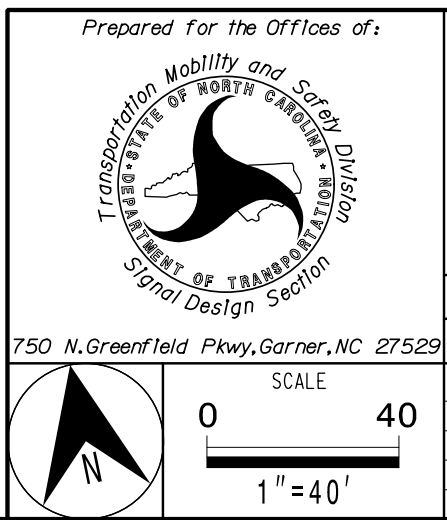
SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross I-77 Ramp.

LEGEND

PROPOSED	EXISTING

Signal Upgrade - Temporary Design 3
(TMP Phase 4a)

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

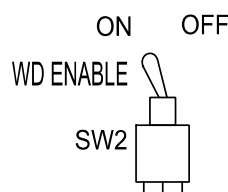


NC 73 (Sam Furr Road) at I-77 NB Ramp			
Division 10 Mecklenburg County Huntersville		REVIEWED BY: SL Phillips	
PLAN DATE: January 2026	REVIEWED BY: SP Pennington	REVIEWED BY:	
REVISIONS	INIT.	DATE	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	SEAL
DocuSigned by S. L. Phillips 03/27/2026 08:43	6/22/2026
SIGNATURE	DATE
SIG. INVENTORY NO.	10-1304T3

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-15, 4-12, 6-9, 6-15, and 9-15



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.

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D10-43 Huntersville Signal System.

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

*See overlap programming detail on sheet 2

NU = Not Used

★ See pictorial of head wiring in detail this sheet.

(wire signal head as shown)



(front view)



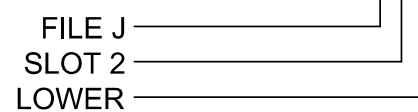
FS = FLASH SENSE
ST = STOP TIME

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
2A	-	-	-	*	38	2			X		X	
4A	-	-	-	*	44	4			X		X	
4B	-	-	-	*	45	4			X		X	
4C	-	-	-	*	46	4	-		X		X	
4D	-	-	-	*	47	4	-		X		X	
5A	-	-	-	*	35	5	3.0		X		X	
6A	-	-	-	*	54	6			X		X	
PED PUSH BUTTONS												
P61,P62	TB8-7,9	I13U	68	34	6	PED 6			NOTE:			

* For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet.

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

INPUT FILE POSITION LEGEND: J2L



	DETECTOR RACK #3		DETECTOR RACK #4	
Input Point	DET # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	5A	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	NU	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	NU
13	45	4B	61	NU
14	46	4C	62	NU
15	47	4D	63	NU
16	48	NU	64	NU

NU = Not Used

Install a multi-zone 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.

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

Signal Upgrade - Temporary Design 3
(TMP Phase 4a)
Electrical Detail - Sheet 1 of 2

**DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED**

SEAL

NC 73 (Sam Furr Road)
at
I-77 NB Ramps

Division 10 Mecklenburg County Huntersville

PLAN DATE:	January 2026	REVIEWED BY:	SI Phillips
------------	--------------	--------------	-------------

PREPARED BY: SP Pennington

REVISIONS

IT.	DATA
-----	------

6/22/2026

SIG. INVENTORY NO. 10-1304T3

SIG. INVENTORY

PLANS PREPARED IN THE OFFICE OF:

Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601

(919) 677-2000

6/22/2026 7:35:20 AM susan.pennington ***.imfey-horn.com\CL_CHL\CHL_PDU\011036264 - I-571\MSignal\954 - Signal Design\10-1304-2026e13.dgn

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	Unit Flash Parameters
StartUp Clearance Hold	All Red Flash Exit Time
6	6

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options
☒ Disable TS2 Cabinet Alarms

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

MAXTIME OVERLAP PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	4
Type	FYA 4 - Section	NORMAL
Included Phases	6	4
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0
FYA Ped Delay	7.0	0.0

← NOTICE FYA PED DELAY

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

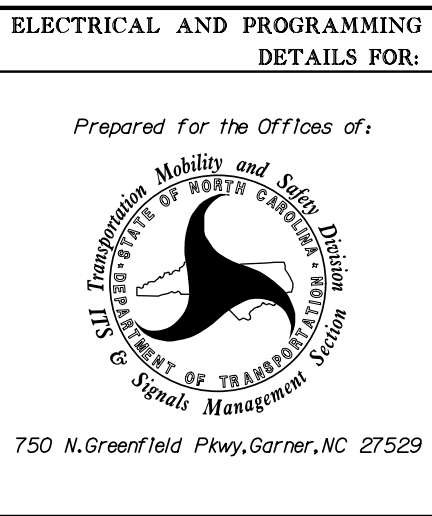
Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Phase Vehicle	1	-	X	X	1
2	Phase Vehicle	2	-	X	-	2
3	Phase Vehicle	3	-	X	X	3
4	Phase Vehicle	4	-	X	-	4
5	Phase Vehicle	5	-	X	-	5
6	Phase Vehicle	6	-	X	X	6
7	Phase Vehicle	7	-	X	-	7
8	Phase Vehicle	8	-	X	X	8
9	Overlap	1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

NOTICE: FLASH RED

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1304T3
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Temporary Design 3
(TMP Phase 4a)
Electrical Detail - Sheet 2 of 2

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

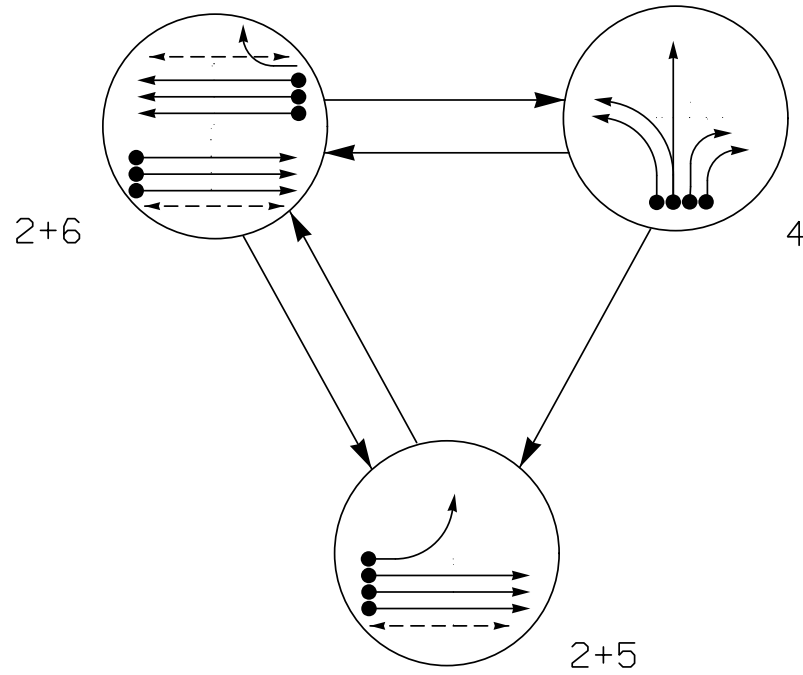


ELECTRICAL AND PROGRAMMING DETAILS FOR:			
NC 73 (Sam Furr Road) at I-77 NB Ramps			
Division 10	Mecklenburg County	Huntersville	
PLAN DATE:	January 2026	REVIEWED BY:	SL Phillips
PREPARED BY:	SP Pennington	REVIEWED BY:	
REVISIONS		INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	
DocuSign 10078758E0008437	6/22/2026 DATE
SIG. INVENTORY NO.	10-1304T3

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

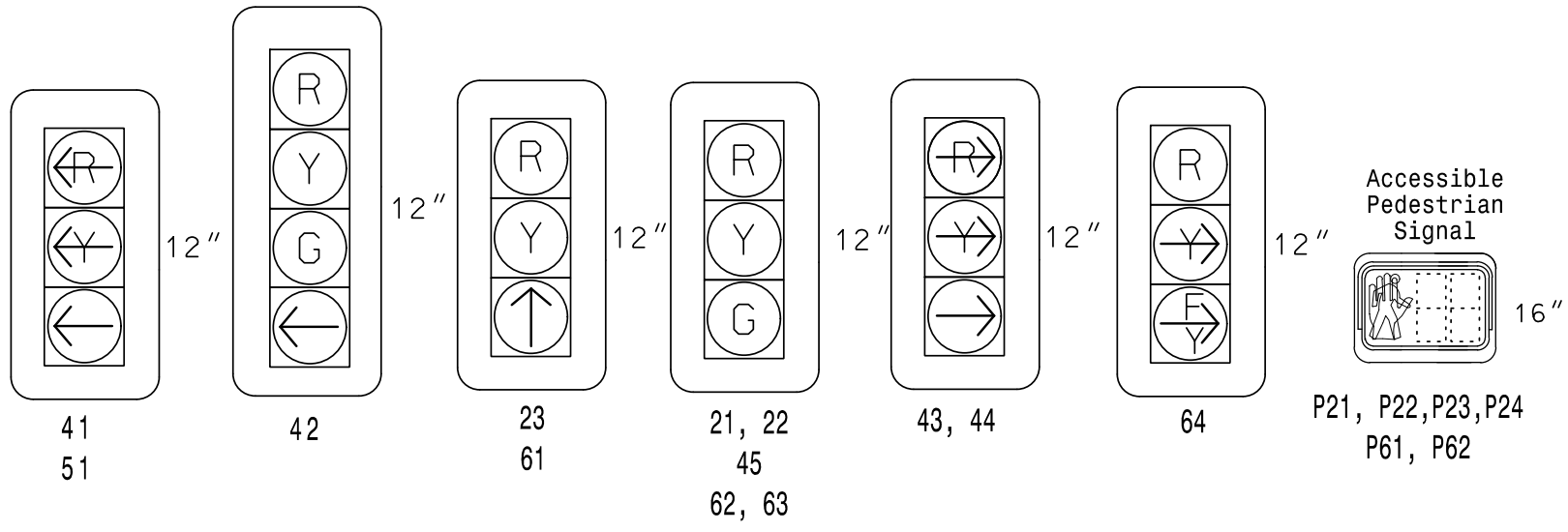
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	2 + 5	2 + 6	4	FLASH
21	G	G	R	R
22, 23	↑	↑	R	R
41	←	←	←	←
42	R	R	G	R
43, 44	←	←	←	←
45	R	R	G	R
51	←	←	←	←
61	R	↑	R	R
62, 63	R	G	R	R
64	R	↑	R	R
P21, P22, P23, P24	W	W	DW	DRK
P61, P62	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR ZONE					PROGRAMMING						
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A*	6X6	300	*	-	2	-	-	X	-	X	-
4A*	6X40	0	*	-	4	-	-	X	-	X	-
4B*	6X40	0	*	-	4	-	-	X	-	X	-
4C*	6X40	0	*	-	4	-	-	X	-	X	-
4D*	6X40	0	*	-	4	-	-	X	-	X	-
5A*	6X40	0	*	-	5	-	-	X	-	X	-
6A*	6X40	300	*	-	6	-	-	X	-	X	-

* Multi-Zone Microwave Detection Zone

3 Phase Fully Actuated Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Reposition existing signal heads 21, 23, 41, 42, 43, 44, and 51.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- To provide a leading pedestrian interval on phase 6, program FYA signal head 64 to delay for 7seconds after the start of the phase 6 walk interval. See electrical details for programming.
- See Roadway Traffic Control Plans for stopline locations.
- Renumber existing signal head 22 as 23.
- Install retroreflective backplates for all signal heads.

See Note 5

See Note 5

Microwave Detection

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

MAXTIME TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Walk *	7	-	-	7
Ped Clear	26	-	-	9
Min Green *	12	7	7	12
Passage *	2.0	2.0	2.0	2.0
Max 1 *	90	30	15	60
Yellow Change	4.8	3.4	3.0	4.8
Red Clear	2.2	3.4	4.1	2.2
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	-	-	**
Non Lock Detector	-	X	X	-
Vehicle Recall	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-

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

** See Note #11.

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

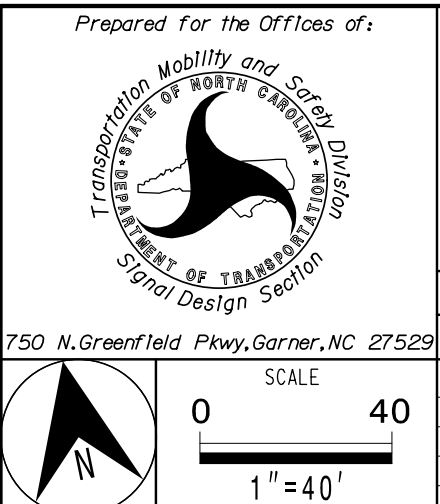
SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P21	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait.Wait to cross I-77 Ramp.
P22	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait.Wait to cross I-77 Ramp.
P23	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait.Wait to cross I-77 Ramp.
P24	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait.Wait to cross I-77 Ramp.
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait.Wait to cross I-77 Ramp.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait.Wait to cross I-77 Ramp.

LEGEND

- | PROPOSED | EXISTING |
|--|----------|
| Traffic Signal Head | N/A |
| Modified Signal Head | N/A |
| Sign | N/A |
| Pedestrian Signal Head With Push Button & Sign | N/A |
| Type I Pushbutton Post | N/A |
| Type II Signal Pedestal | N/A |
| Signal Pole with Guy | N/A |
| Signal Pole with Sidewalk Guy | N/A |
| Non-Intrusive Detection Zone | N/A |
| Controller & Cabinet | N/A |
| Junction Box | N/A |
| Directional Drill | N/A |
| 2-in Underground Conduit | N/A |
| Right of Way | N/A |
| Guardrail | N/A |
| Directional Arrow | N/A |
| Curb Ramp | N/A |
| Construction Zone Drums | N/A |
| Construction Zone | N/A |
| (A) No Left Turn Sign (R3-2) | (A) |
| (B) No Right Turn Sign (R3-1) | (B) |
| (C) Right Arrow "ONLY" Sign (R3-5R) | (C) |
| (D) "NO TURN ON RED" Sign (R10-11) | (D) |
| (E) "RIGHT TURN SIGNAL" Sign (R10-10R) | (E) |

Signal Upgrade - Temporary Design 4 (TMP Phase 4b)

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



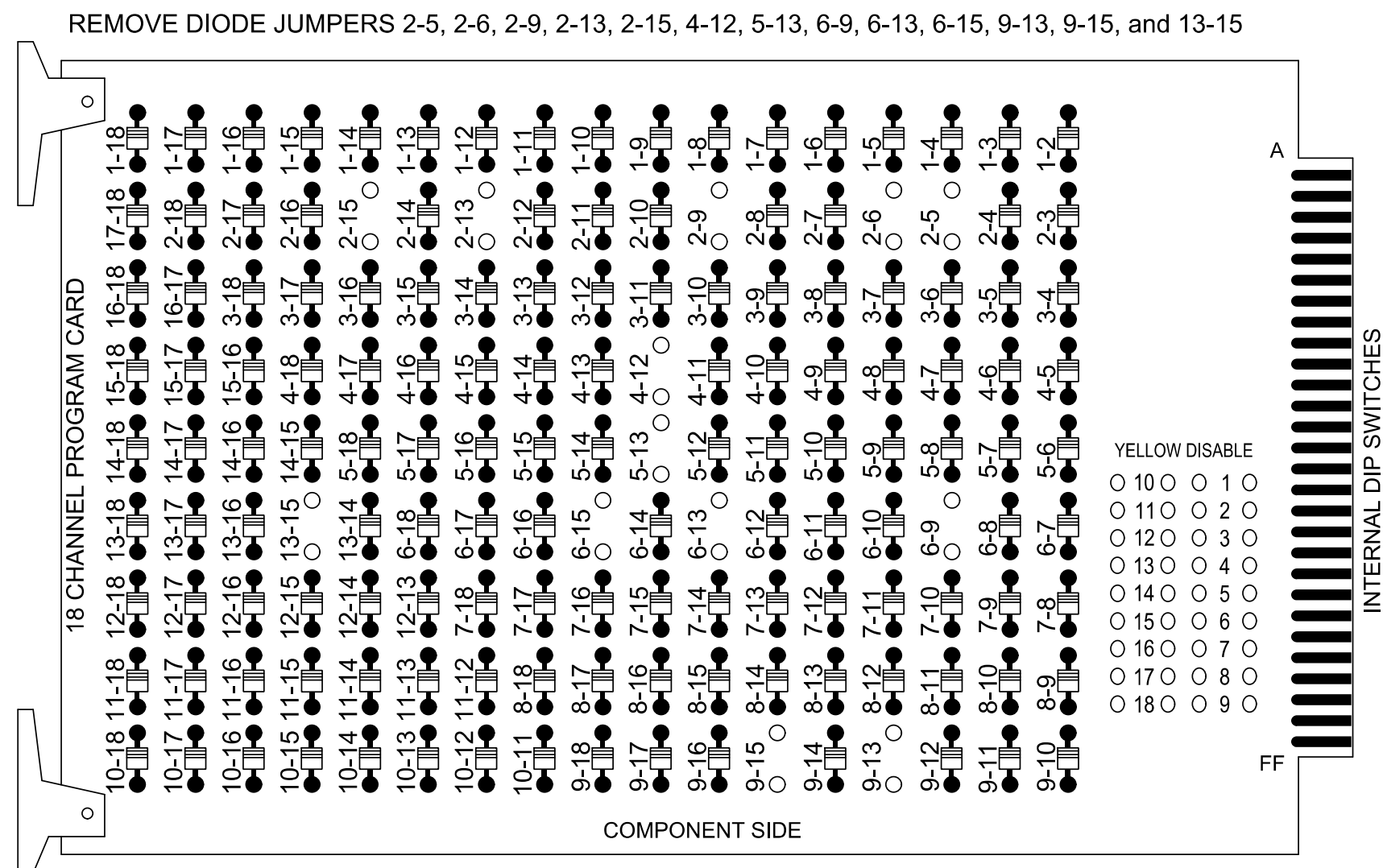
NC 73 (Sam Furr Road) at I-77 NB Ramp	
Division 10 Wecklenburg County	Huntersville
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	SEAL
SEAL 032607	SEAL 032607
ENGINEER S. L. PHILLIPS	ENGINEER S. L. PHILLIPS
SIGNATURE	SIGNATURE
DATE	DATE
SIG. INVENTORY NO.	10-1304T4

18 CHANNEL IP CONFLICT MONITOR

PROGRAMMING DETAIL

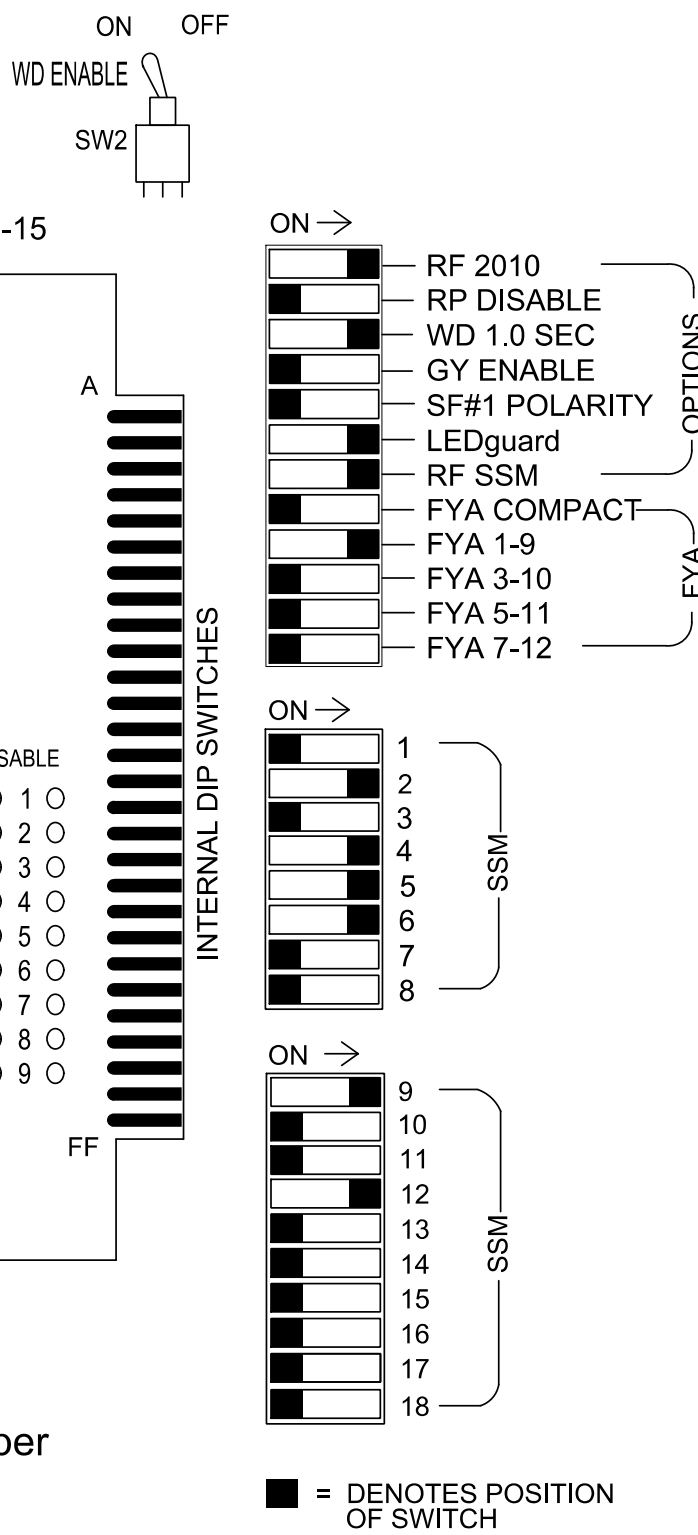
(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Integrate monitor with Ethernet network in cabinet.



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D10-43_Huntersville Signal System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	-	-	-	*	38	2			X		X	
4A	-	-	-	*	44	4			X		X	
4B	-	-	-	*	45	4			X		X	
4C	-	-	-	*	46	4	-		X		X	
4D	-	-	-	*	47	4	-		X		X	
5A	-	-	-	*	35	5			X		X	
6A	-	-	-	*	54	6			X		X	
PED PUSH BUTTONS												
P21,P22 P23,P24	TB8-4,6	I12U	67	33	2	PED 2				NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12 AND I13.		
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

*For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet

* SDLC NON-INTRUSIVE
DETECTION CHART

INPUT FILE POSITION LEGEND: J2L

	DETECTOR RACK #3		DETECTOR RACK #4	
Input Point	DET # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	5A	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	NU	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	NU
13	45	4B	61	NU
14	46	4C	62	NU
15	47	4D	63	NU
16	48	NU	64	NU

NU = Not Used

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	23	P21,P22 P23,P24	NU	41	42	45	NU	51	61	62,63	P61,P62	NU	NU	NU	64	NU
RED		128	128			101	101			134	134					A121		
YELLOW		129	129			102	102			135	135							
GREEN		130				103	103				136							
RED ARROW					101				131								A101	
YELLOW ARROW					102				132								A102	
FLASHING YELLOW ARROW														A123				
GREEN ARROW			130		103	103			133	136							A103	
				113								119						
				115								121						

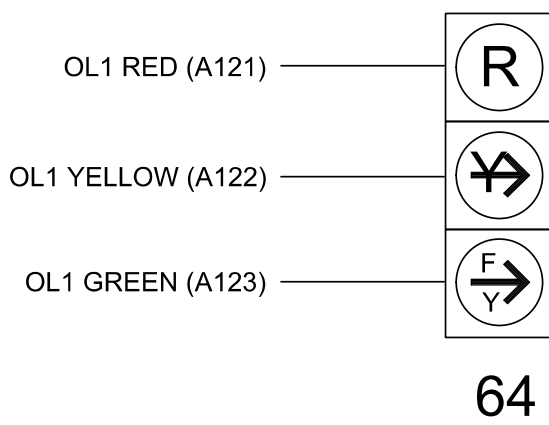
NU = Not Used

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

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



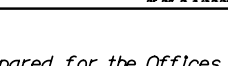
COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

SPECIAL DETECTOR NOTE

Install a multi-zone 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.

Signal Upgrade - Temporary Design 4
(TMP Phase 4b)
Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: <i>Prepared for the Offices of:</i>  750 N.Greenfield Pkwy,Garner,NC 27529	NC 73 (Sam Furr Road) at I-77 NB Ramps	SEAL  DocuSigned by:  6/22/2026 DATE																																	
<table style="width: 100%;"> <tr> <td colspan="2" style="text-align: center;">Division 10 Mecklenburg County Huntersville</td> </tr> <tr> <td style="width: 50%;">PLAN DATE: January 2026</td> <td style="width: 50%;">REVIEWED BY: SL Phillips</td> </tr> <tr> <td>PREPARED BY: SP Pennington</td> <td>REVIEWED BY:</td> </tr> </table>			Division 10 Mecklenburg County Huntersville		PLAN DATE: January 2026	REVIEWED BY: SL Phillips	PREPARED BY: SP Pennington	REVIEWED BY:																											
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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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTICE: FLASH RED

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options

☒ Disable TS2 Cabinet Alarms

MAXTIME OVERLAP PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	4
Type	FYA 4 - Section	Normal
Included Phases	6	4
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0
FYA Ped Delay	7.0	0.0

← NOTICE: FYA PED DELAY

PROJECT REFERENCE NO.	SHEET NO.
I-5715	Sig 11.2

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

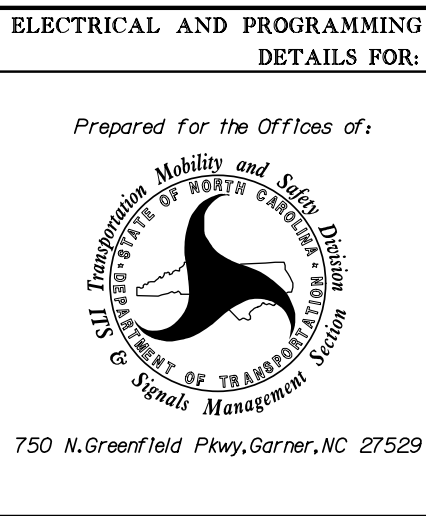
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1304T4
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Temporary Design 4
(TMP Phase 4b)

Electrical Detail - Sheet 2 of 2

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



ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 73 (Sam Furr Road) at I-77 NB Ramps		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
Prepared for the Offices of:		Division 10 Mecklenburg County Huntersville		SEAL	
PLAN DATE: January 2026		REVIEWED BY: SL Phillips		NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER SAUL L. PHILLIPS	
PREPARED BY: SP Pennington		REVIEWED BY:		DATE	
REVISIONS		INIT.		DATE	
				6/22/2026	
				DATE	
				SIG. INVENTORY NO. 10-1304T4	

PHASING DIAGRAM

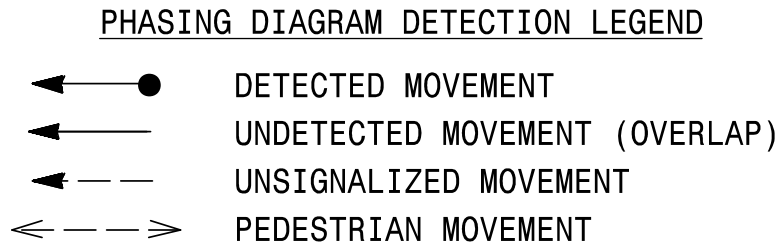
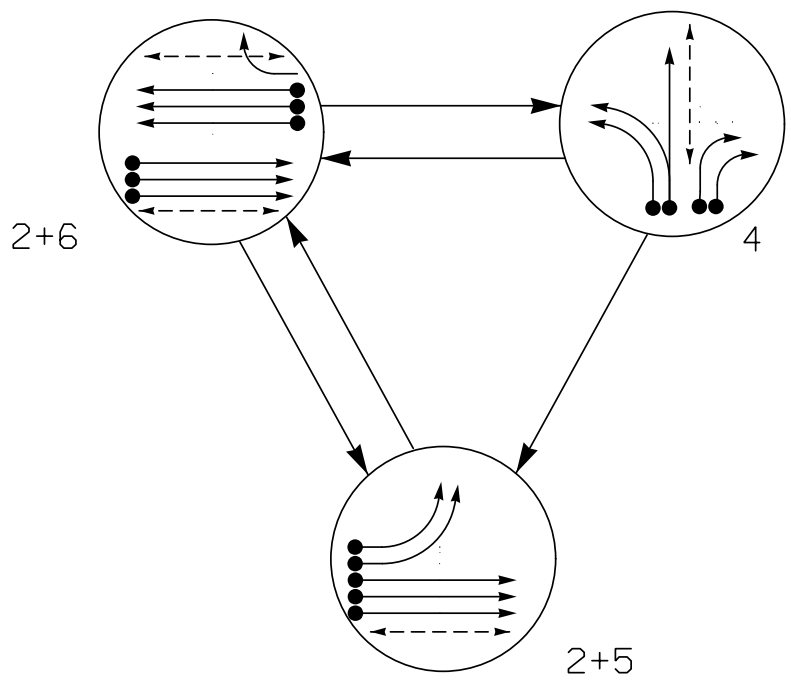
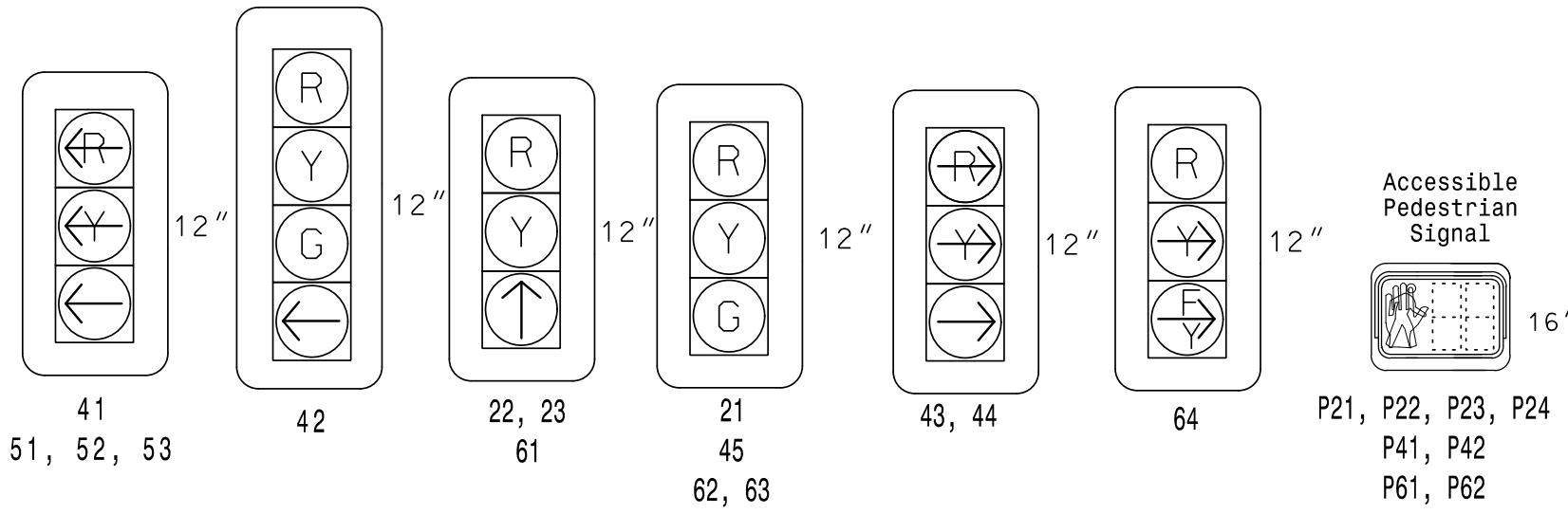


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	2+5	2+6	4	FLASH
21	G	G	R	R
22, 23	↑	↑	R	R
41	←	←	←	←
42	R	R	G	R
43, 44	←	←	←	←
45	R	R	G	R
51, 52, 53	←	←	←	←
61	R	↑	R	R
62, 63	R	G	R	R
64	R	↑	R	R
P21, P22, P23, P24	W	W	DW	DRK
P41, P42	DW	DW	W	DRK
P61, P62	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

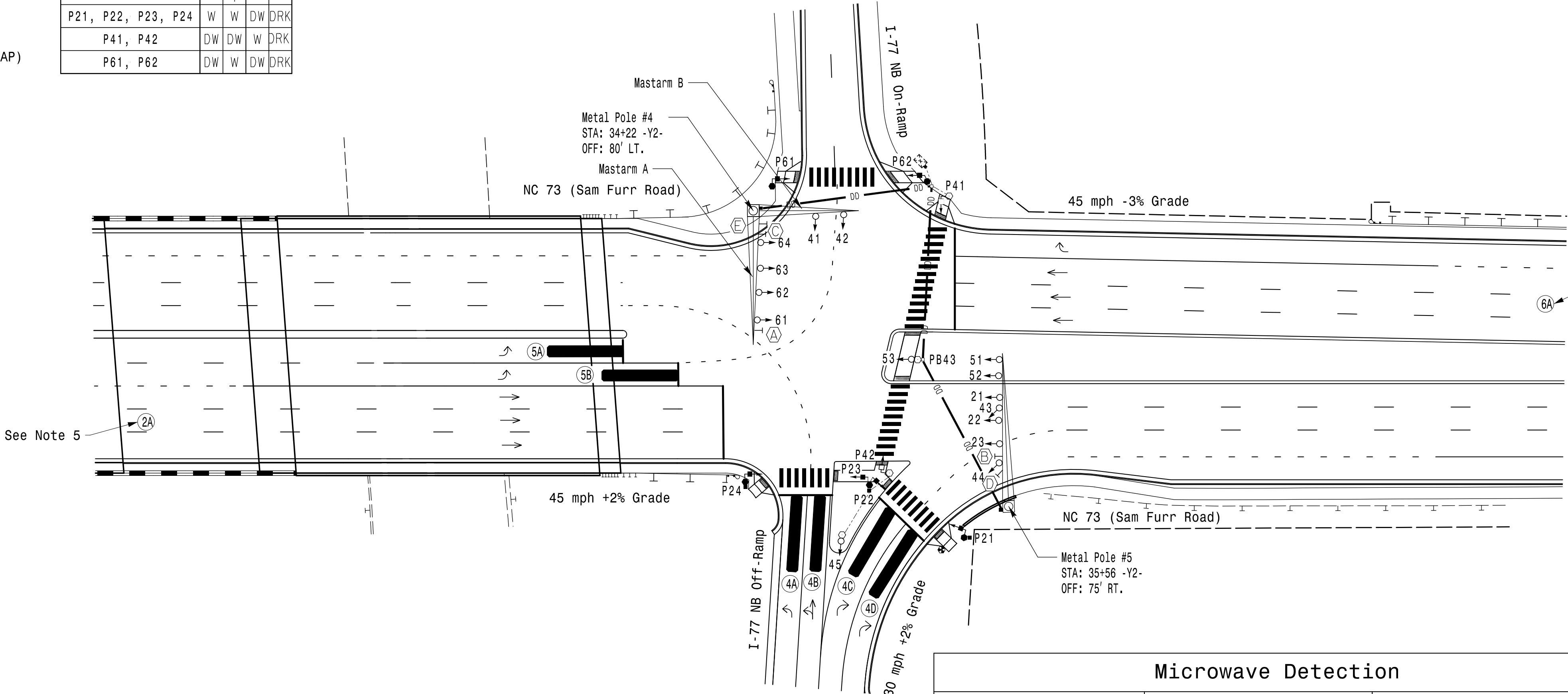
DETECTOR ZONE					PROGRAMMING					
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	NEW CARD
2A*	6X6	300	*	-	2	-	-	X	-	-
4A*	6X40	0	*	-	4	-	-	X	-	-
4B*	6X40	0	*	-	4	-	-	X	-	-
4C*	6X40	0	*	-	4	-	-	X	-	-
4D*	6X40	0	*	-	4	-	-	X	-	-
5A*	6X40	0	*	-	5	-	-	X	-	-
5B	6X40	0	*	-	5	-	-	X	-	-
6A*	6X40	300	*	-	6	-	-	X	-	-

* Multi-Zone Microwave Detection Zone

3 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- The intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
- To provide a leading pedestrian interval on phase 6, program FYA signal head 64 to delay for 7 seconds after the start of the phase 6 walk interval. See electrical details for programming.
- See Pavement Marking Plans for stopline locations.
- Install retroreflective backplates for all signal heads.
- All metal poles and pedestals shall be painted black as specified in the project special provisions



See Note 5

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	— N/A
— Sign	— N/A
↓ Pedestrian Signal Head With Push Button & Sign	↓ N/A
⊗ Type I Pushbutton Post	⊗ N/A
⊙ Type II Signal Pedestal	⊙ N/A
⊙ Metal Pole with Mastarm	⊙ N/A
▬ Non-Intrusive Detection Zone	▬ N/A
⊠ Controller & Cabinet	⊠ N/A
□ Junction Box	□ N/A
— Directional Drill	— N/A
--- 2-in Underground Conduit	--- N/A
N/A Right of Way	N/A Right of Way
N/A Guardrail	N/A Guardrail
→ Directional Arrow	→ N/A
N/A Curb Ramp	N/A Curb Ramp
Ⓐ No Left Turn Sign (R3-2)	Ⓐ N/A
Ⓑ No Right Turn Sign (R3-1)	Ⓑ N/A
Ⓒ "Turning Vehicles Yield to Pedestrians" Sign (R10-15R)	Ⓒ N/A
Ⓓ "NO TURN ON RED" Sign (R10-11)	Ⓓ N/A
Ⓔ "RIGHT TURN SIGNAL" Sign (R10-10R)	Ⓔ N/A

MAXTIME TIMING CHART				
FEATURE	PHASE			
	2	4	5	6
Walk *	7	7	-	7
Ped Clear	26	35	-	9
Min Green *	12	7	7	12
Passage *	2.0	2.0	2.0	2.0
Max 1 *	90	30	15	60
Yellow Change	4.8	3.4	3.0	4.8
Red Clear	1.5	3.4	3.9	1.5
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Advance Walk	-	-	-	**
Non Lock Detector	-	X	X	-
Vehicle Recall	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-

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

** See Note #10.

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

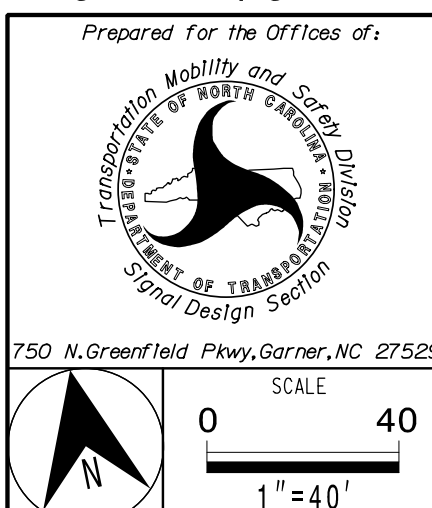
SIGNAL FACE	VOICE TONES	INTERVAL	SPEECH MESSAGE
P21	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross I-77 Ramp.
P22	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross I-77 Ramp.
P23	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross I-77 Ramp.
P24	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross I-77 Ramp.
P42	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Sam Furr.
P42	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Sam Furr.
P61	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross I-77 Ramp.
P62	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross I-77 Ramp.

Microwave Detection

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

Signal Upgrade - Final Design

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



NC 73 (Sam Furr Road) at I-77 NB Ramp	
Division 10 Wecklenburg County Huntersville	
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	
	
DocuSigned by 	6/22/2026
SIG. INVENTORY NO.	DATE
0C87A56ED00B437	10-1304

\\s01in1ey-horn.com\CL_Cht_WCHL_PJ0401036264 - I-5715Signal@S4 - Signal Design\12.1 10-1304-2026e.dgn

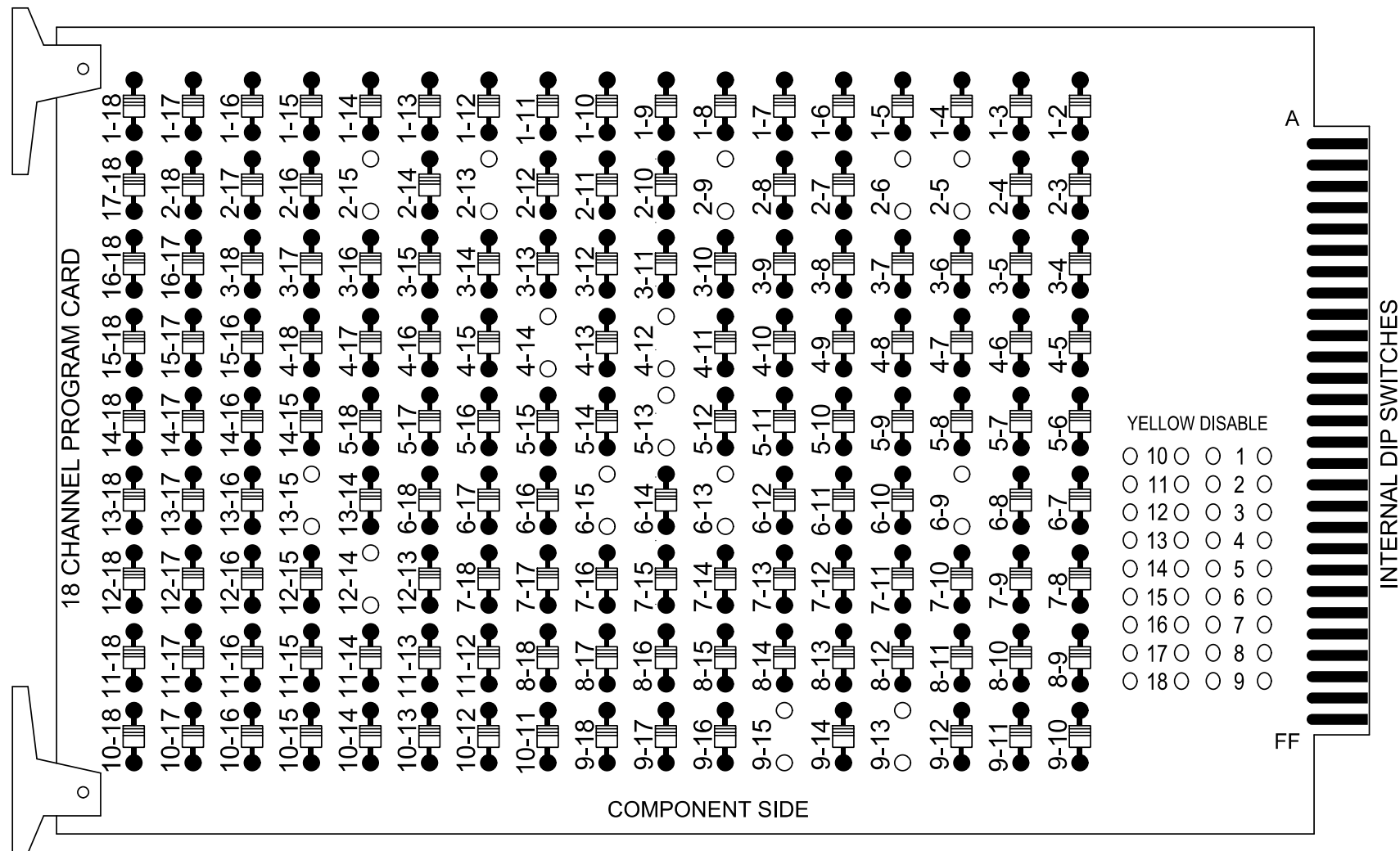
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18 CHANNEL IP CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

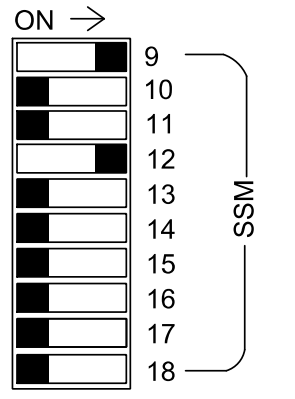
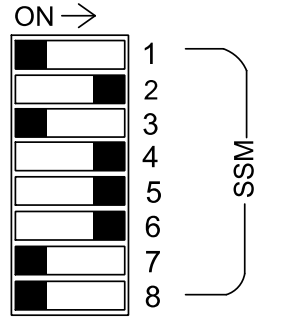
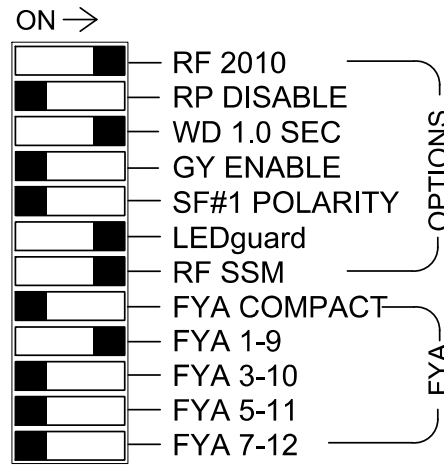
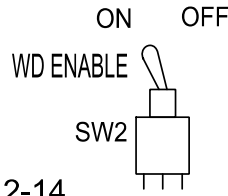
REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-13, 2-15, 4-12, 4-14, 5-13, 6-9. 6-13, 6-15, 9-13, 9-15, 12-14, and 13-15



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.



■ = DENOTES POSITION OF SWITCH

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the D10-43_Huntersville Signal System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	-	-	-	*	38	2			X		X	
4A	-	-	-	*	44	4			X		X	
4B	-	-	-	*	45	4			X		X	
4C	-	-	-	*	46	4			X		X	
4D	-	-	-	*	47	4			X		X	
5A	-	-	-	*	35	5			X		X	
5B	-	-	-	*	51	5			X		X	
6A	-	-	-	*	54	6			X		X	

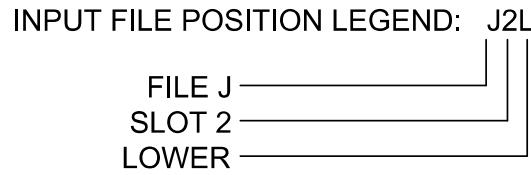
P21,P22,P23,P24	TB8-4,6	I12U	67	33	2	PED 2
P41,P42,PB43	TB8-5,6	I12L	69	35	4	PED 4
P61,P62	TB8-7,9	I13U	68	34	6	PED 6

* For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet.

SDLC NON-INTRUSIVE DETECTION CHART

	DETECTOR RACK #3		DETECTOR RACK #4	
Input Point	DET # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	5A	51	5B
4	36	NU	52	NU
5	37	NU	53	NU
6	38	2A	54	6A
7	39	NU	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
12	44	4A	60	NU
13	45	4B	61	NU
14	46	4C	62	NU
15	47	4D	63	NU
16	48	NU	64	NU

NU = Not Used



SIGNAL HEAD HOOK-UP CHART

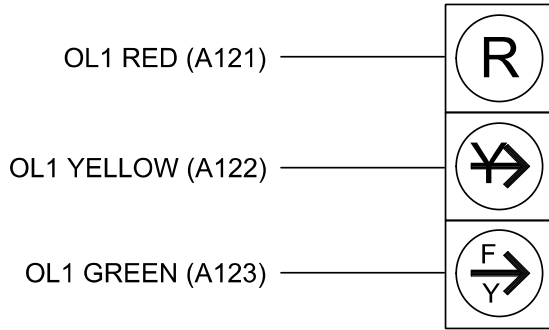
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22,23	P21,P22,P23,P24	NU	41	42	45	P41,P42	51,52,53	61	62,63	P61,P62	NU	NU	NU	43,44	NU
RED		128	128			101	101				134	134		A121				
YELLOW		129	129			102	102				135	135						
GREEN		130				103	103				136							
RED ARROW					101				131								A101	
YELLOW ARROW					102				132					A122			A102	
FLASHING YELLOW ARROW													A123					
GREEN ARROW			130		103	103			133	136							A103	
Hand icon				113				104					119					
Walking person icon				115				106					121					

NU = Not Used

★ See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



64

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

SPECIAL DETECTOR NOTE

Install a multi-zone 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.

Signal Upgrade - Final Design
Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared for the Offices of: 750 N.Greenfield Pkwy, Garner, NC 27529 (919) 677-2000		NC 73 (Sam Furr Road) at I-77 NB Ramps Division 10 Mecklenburg County Huntersville PLAN DATE: January 2026 PREPARED BY: SP Pennington REVIEWED BY: SL Phillips		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL 6/22/2026 DATE SIC. INVENTORY NO. 10-1304	
REVISIONS		INIT.		DATE	

6/22/2026 7:36:01 AM susan.pennington ***:imfey-horn.com\CL_CHL\CHL_PRL\01036264 - I-5715\Signal\954 - Signal Design\12.1 10-1304_2026e.dgn

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	Unit Flash Parameters
StartUp Clearance Hold	All Red Flash Exit Time
6	6

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTICE: FLASH RED

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options
☒ Disable TS2 Cabinet Alarms

MAXTIME OVERLAP PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	4
Type	FYA 4 - Section	Normal
Included Phases	6	4
Modifier Phases	-	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0
FYA Ped Delay	7.0	0.0

← NOTICE FYA PED DELAY

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

- Install push buttons and APS equipment per manufacturer's instructions.
- Provide a dedicated cable to each push button per manufacturer's instructions.
- If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
- Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
- Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
- An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
- A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 10-1304
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Signal Upgrade - Final Design
Electrical Detail - Sheet 2 of 2

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



ELECTRICAL AND PROGRAMMING DETAILS FOR:	
Prepared for the Offices of:	
NC 73 (Sam Furr Road) at I-77 NB Ramps	
Division 10	Mecklenburg County Huntersville
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSigned by
SPENCE L. PHILLIPS
0C87A9B6D606437

6/22/2026
DATE

SIG. INVENTORY NO. 10-1304

Elevation View @ 270°



Elevation View @ 0°



Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	ARM A	ARM B
Baseline reference point at  Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at  High point of roadway surface	+2.8 ft.	+1.6 ft.
Elevation difference at  Edge of travelway or face of curb	+1.2 ft.	+0.2 ft.



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



MAST ARM LOADING SCHEDULE

NOTES

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/TSMO-Design-Resources.aspx>

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using force ratios that do not exceed 0.9.
4. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate connection points.
5. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
6. The mast arm attachment height (H1) shown is based on the following design assumptions:
 - a. Nominal vertical rise in mast arm is 5 feet as measured from the centerline of the arm base to the centerline of the free end of the arm.
 - b. Signal heads are rigidly mounted and vertically centered on the mast arm.
 - c. The roadway clearance height for design is as shown in the elevation views.
 - d. The top of the pole base plate is 0.75 feet above the ground elevation.
 - e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
 - f. Provide horizontal distance from the proposed centerline of the foundation to the edge of travelway. Refer to the Elevation Data Chart for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary to ensure that the roadway clearance is maintained at the edge of the travelway and to aid in the camber design of the arm.
7. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
8. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
9. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
10. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

PLANS PREPARED IN THE OFFICE OF

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

NCDOT Wind Zone 5 (110 mph)

Prepared In The Offices of:

TRANSPORTATION MOBILITY AND SAFETY DIVISION

DEPARTMENT OF TRANSPORTATION

SYMBOL DESIGN SECTION



750 N.Greenfield Pkwy,Garner,NC 27529

NC 73 (Sam Furr Road)

at

I-77 NB Ramp

Division 10 Mecklenburg County Huntersville

PLAN DATE: January 2026

REVIEWED BY: SL Phillips

PREPARED BY: SP Pennington

REVIEWED BY:

SCALE

0

N/A

N/A

DocuSigned by:

10B7A0E0D0B437

6/22/2026

DATE

SIG. INVENTORY NO.

10-1304

SEAL

NORTH CAROLINA

PROFESSIONAL

SEAL

032607

ENGINEER

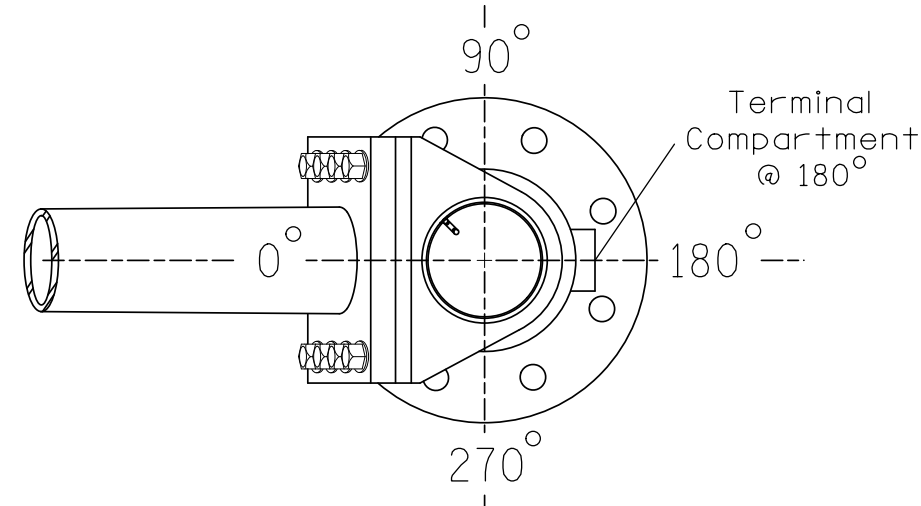
STATE OF N. CAROLINA

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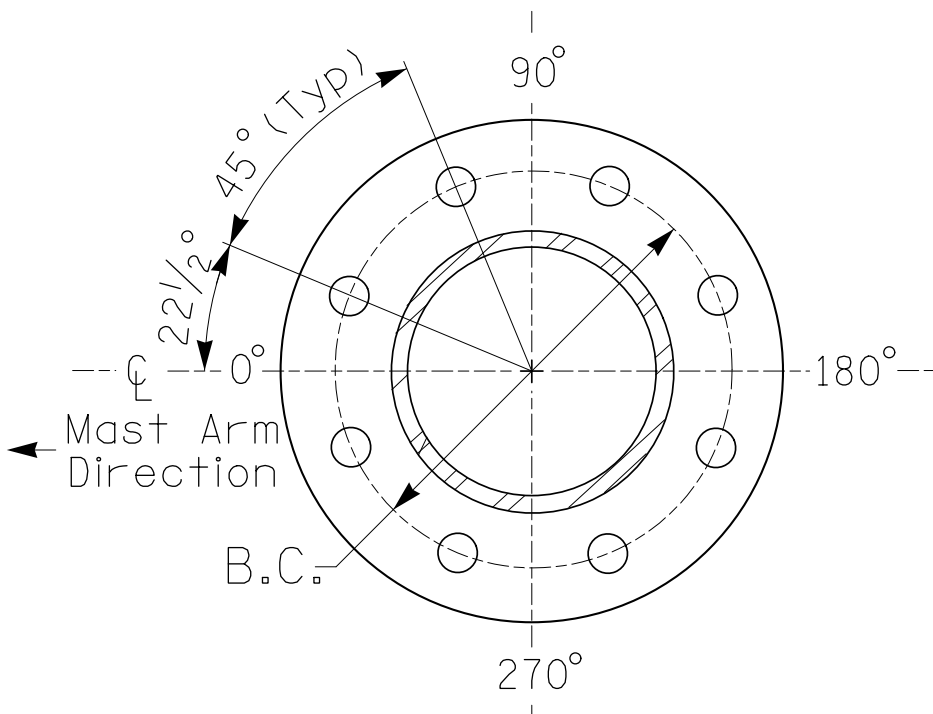
Elevation View

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 Differences for:		Pole 5
Baseline reference point at ℄ Foundation @ ground level		0.0 ft.
Elevation difference at High point of roadway surface		+2.9 ft.
Elevation difference at Edge of travelway or face of curb		+2.7 ft.

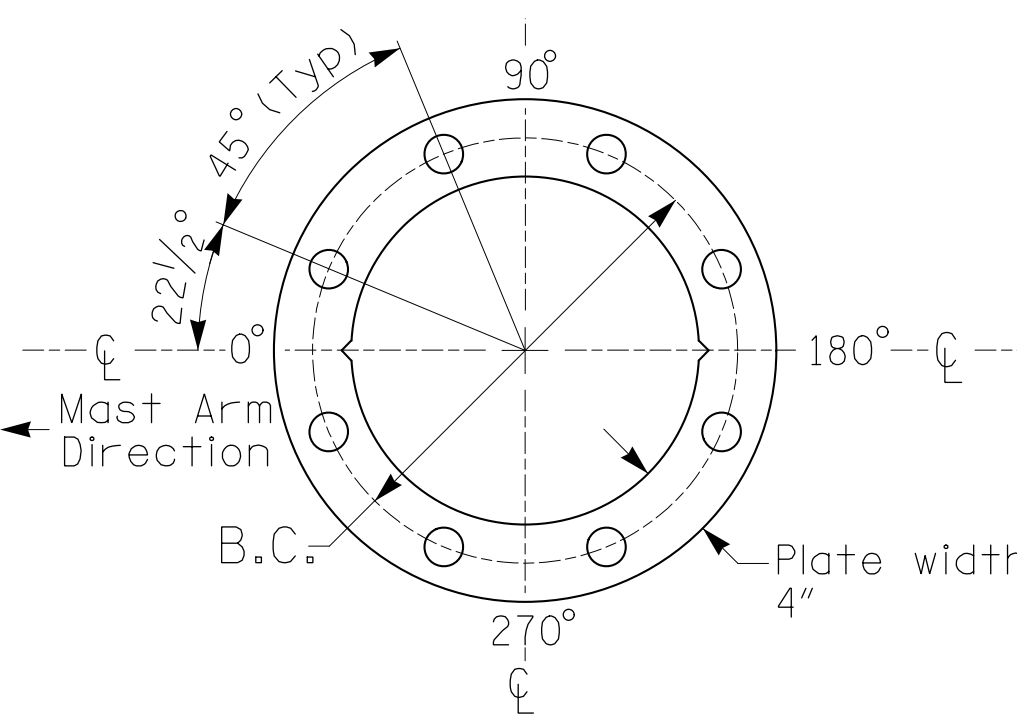


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



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

PROJECT REFERENCE NO.	SHEET NO.
I-5715	Sig. 12.4

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS
	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/TSMO-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.
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 - c. The roadway clearance height for design is as shown in the elevation views.
 - d. The top of the pole base plate is 0.75 feet above the ground elevation.
 - e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
 - f. Provide horizontal distance from the proposed centerline of the foundation to the edge of travelway. Refer to the Elevation Data Chart for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary to ensure that the roadway clearance is maintained at the edge of the travelway and to aid in the camber design of the arm.
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 10. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.
- PLANS PREPARED IN THE OFFICE

All metal poles and arms should be Jet Black in color as specified in the project special provisions.

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Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

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SEAL

NORTH CAROLINA
PROFESSIONAL
SEAL
032607
ENGINEER
STACIE L. PHILLIPS

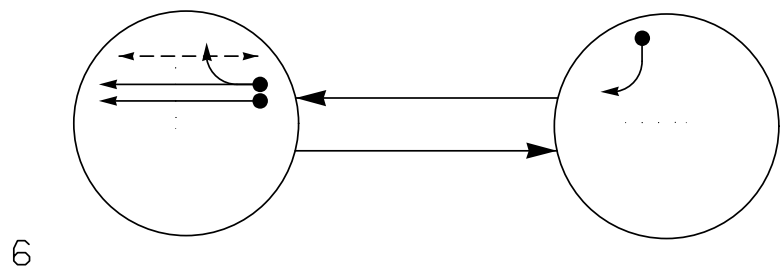
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6/22/2026
DATE
SIG. INVENTORY NO. 10-1304

NCDOT Wind Zone 5 (110 mph)

Prepared In The Office of:  TRANSPORTATION MOBILITY AND SAFETY DIVISION DEPARTMENT OF TRANSPORTATION STATE OF NORTH CAROLINA Signal Design Section	NC 73 (Sam Furr Road) at I-77 NB Ramp	SEAL 																																	
Division 10 Mecklenburg County Huntersville																																			
PLAN DATE: January 2026		REVIEWED BY: SL Phillips																																	
PREPARED BY: SP Pennington		REVIEWED BY:																																	
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750 N. Greenfield Pkwy, Garner, NC 27529																																			
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PROJECT REFERENCE NO.	SHEET NO.
I-5715	Sig. 13.0

PHASING DIAGRAM



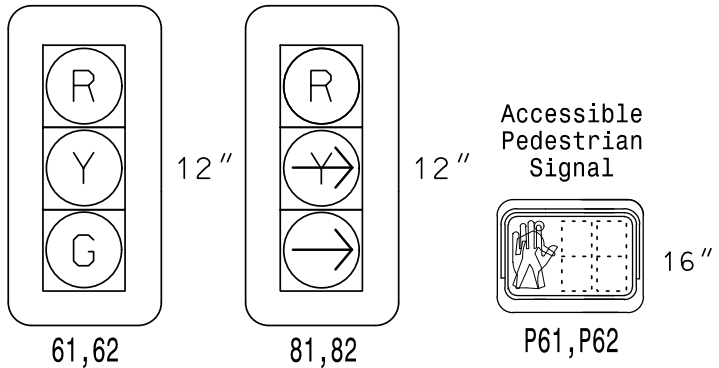
PHASING DIAGRAM DETECTION LEGEND

←●	DETECTED MOVEMENT
←	UNDETECTED MOVEMENT (OVERLAP)
←	UNSIGNALIZED MOVEMENT
←→	PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE		
	6	8	FLASH
61, 62	G	R	R
81, 82	R	→	R
P61, P62	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



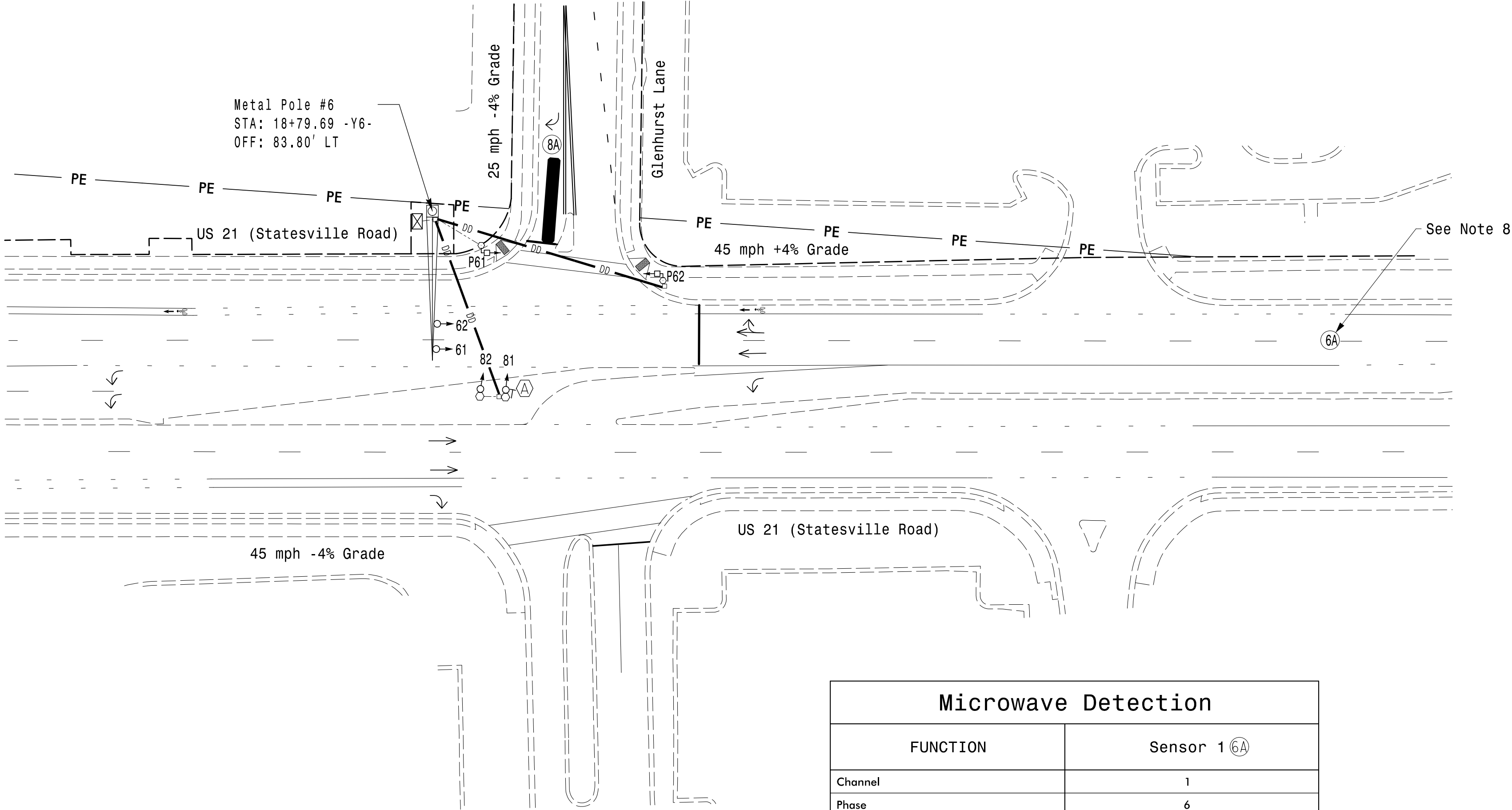
MAXTIME DETECTOR INSTALLATION CHART										
DETECTOR ZONE					PROGRAMMING					
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DURING GREEN	NEW CARD
6A*	6X6	0	*	X	6	-	-	X	-	X
8A*	6X40	0	*	X	8	15.0	-	X	-	X

* Multi-Zone Microwave Detection Zone

2 Phase
Fully Actuated
Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- See Pavement Marking Plans for Stopline and crosswalk locations.
- Install retroreflective backplates for all signal heads.
- All metal poles and pedestals shall be painted black as specified in the project special provisions



MAXTIME TIMING CHART

FEATURE	PHASE	
	6	8
Walk *	7	-
Ped Clear	13	-
Min Green *	12	7
Passage *	2.0	2.0
Max l *	90	30
Yellow Change	4.2	3.0
Red Clear	1.4	1.9
Added Initial *	-	-
Maximum Initial *	-	-
Time Before Reduction *	-	-
Time To Reduce *	-	-
Minimum Gap	-	-
Advance Walk	7	-
Non Lock Detector	-	X
Vehicle Recall	MIN RECALL	-
Dual Entry	-	-

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Glenhurst.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Glenhurst.

Microwave Detection

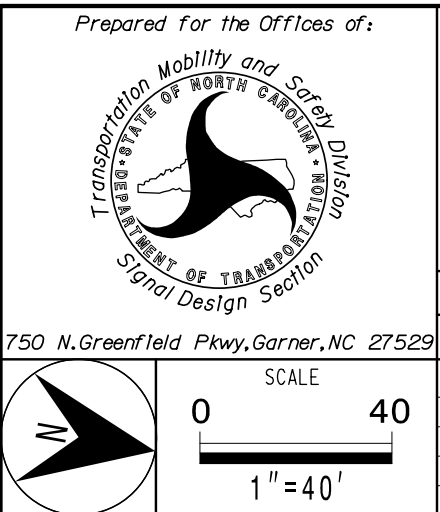
FUNCTION	Sensor 1 (6A)		
Channel	1		
Phase	6		
Direction of Travel	SB		
Type	Priority		
Level	1	2	QUEUE
Discovery Zone (ft)	> = 750	< 750	N/A
Range (ft)	900-100	600-100	150-100
Enable Speed	Y	Y	Y
Speed Range (mph)	35-100	35-100	1-35
Enable Estimated Time of Arrival	Y	Y	N
Estimated Time of Arrival (sec)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

LEGEND

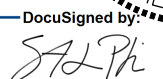
PROPOSED	EXISTING

New Installation

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Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

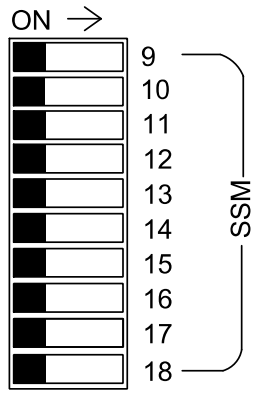
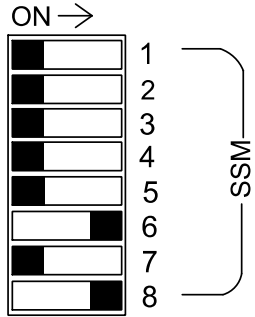
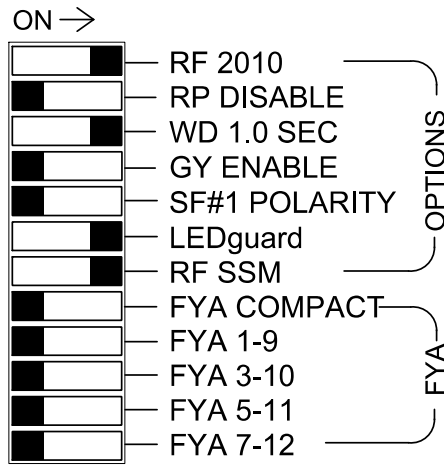
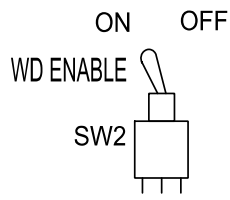


US 21 (Statesville Road) at Glenhurst Lane	
Division 10 Wecklenburg County Huntersville	
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

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SIG. INVENTORY NO.	10-2643

(remove jumper and set switches as shown)

(remove jumper and set switches as shown)



■ = DENOTES POSITION OF SWITCH

1. To prevent "flash-conflict" problems, insert red flash program blocks for all vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D10-43_Huntersville System.

Controller.....	2070LX
Cabinet.....	332 w/ Aux
Software.....	Q-Free MAXTIME
Cabinet Mount.....	Base
Output File Positions.....	18 With Aux. Output File
Load Switches Used.....	S8, S9, S11
Phases Used.....	6, 6PED, 8
Overlaps.....	NONE

[illegible]

NU = Not Used

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

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

Install a multi-zone 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.

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
6A	-	-	-	*	54	6			X		X	
8A	-	-	-	*	60	8	15.0		X		X	
PED PUSH BUTTONS P61,P62	TB8-7,9	I13U	68	34	6	PED 6	NOTE: INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.					

*For Input Point numbers, see SDLC NON-INTRUSIVE DETECTION CHART this sheet.

INPUT FILE POSITION LEGEND: J2L

FILE J _____
SLOT 2 _____
LOWER _____

	DETECTOR RACK #3		DETECTOR RACK #4	
Input Point	DET # (Index)	Detector Zone	Det # (Index)	Detector Zone
1	33	NU	49	NU
2	34	NU	50	NU
3	35	NU	51	NU
4	36	NU	52	NU
5	37	NU	53	NU
6	38	NU	54	6A
7	39	NU	55	NU
8	40	NU	56	NU
9	41	NU	57	NU
10	42	NU	58	NU
11	43	NU	59	NU
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14	46	NU	62	NU
15	47	NU	63	NU
16	48	NU	64	NU

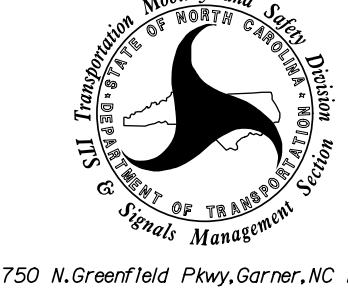
NU = Not Used

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

Electrical Details - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:



750 N.Greenfield Pkwy,Garner,NC 27529

US 21 (Statesville Road)
at
Glenhurst Lane

Division 10 Mecklenburg County Huntersville

PLAN DATE: January 2026	REVIEWED BY: SL Phillips
-------------------------	--------------------------

PREPARED BY: SP Pennington	REVIEWED BY:
----------------------------	--------------

REVISIONS	INIT.	DATE
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SALPHI
6/22

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SIG. INVENTORY NO. 10-2

SPECIAL DETECTION IO MODULE PROGRAMMING

The Enhanced Out of Pavement Detection requires adjustments to the IO Modules in use. Follow the programming instructions below to ensure desired operation.

Front Panel
Main Menu >Controller >More >Advanced IO >IO Modules

Web Interface
Home >Controller >Advanced IO >Cabinet Configuration >IO Modules

IO Module	Type	Fault Response
1	Caltrans 332	Default
2	TS2 DR3 BIU	Default
3	TS2 DR4 BIU	Default
4	TS2 MMU	Default

Advanced Cabinet Options
☒ Disable TS2 Cabinet Alarms

ACCESSIBLE PEDESTRIAN SIGNAL (APS)
INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.
6. An APS push button station that is designed to work without the need for interfacing with a pedestrian signal head shall be installed for applications where a push button is installed in a median without a pedestrian signal head.
7. A push button with a single tactile arrow that points in both directions of travel shall be installed if the median separates two parallel crosswalks.

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

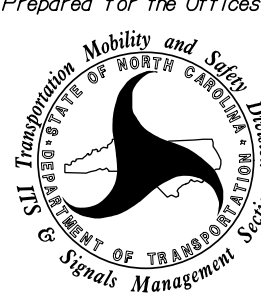
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THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2643
DESIGNED: January 2026
SEALED: 6/22/2026
REVISED: N/A

Electrical Details - Sheet 2 of 2

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Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared for the Offices of:

750 N.Greenfield Pkwy, Garner, NC 27529

US 21 (Statesville Road)
at
Glenhurst Lane

Division 10 Mecklenburg County Huntersville

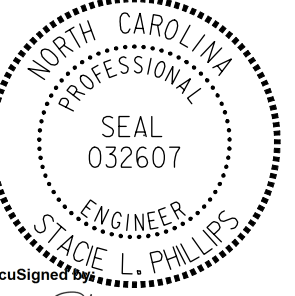
PLAN DATE: January 2026 REVIEWED BY: SL Phillips

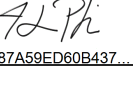
PREPARED BY: SP Pennington REVIEWED BY:

REVISIONS	INIT.	DATE

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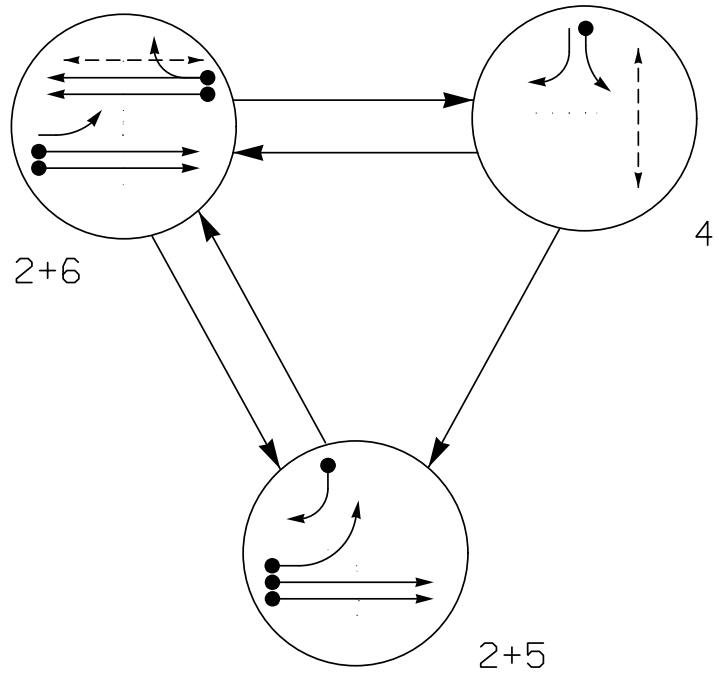

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032607
ENGINEER
STATE L. PHILLIPS


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6/22/2026
DATE

SIG. INVENTORY NO. 10-2643

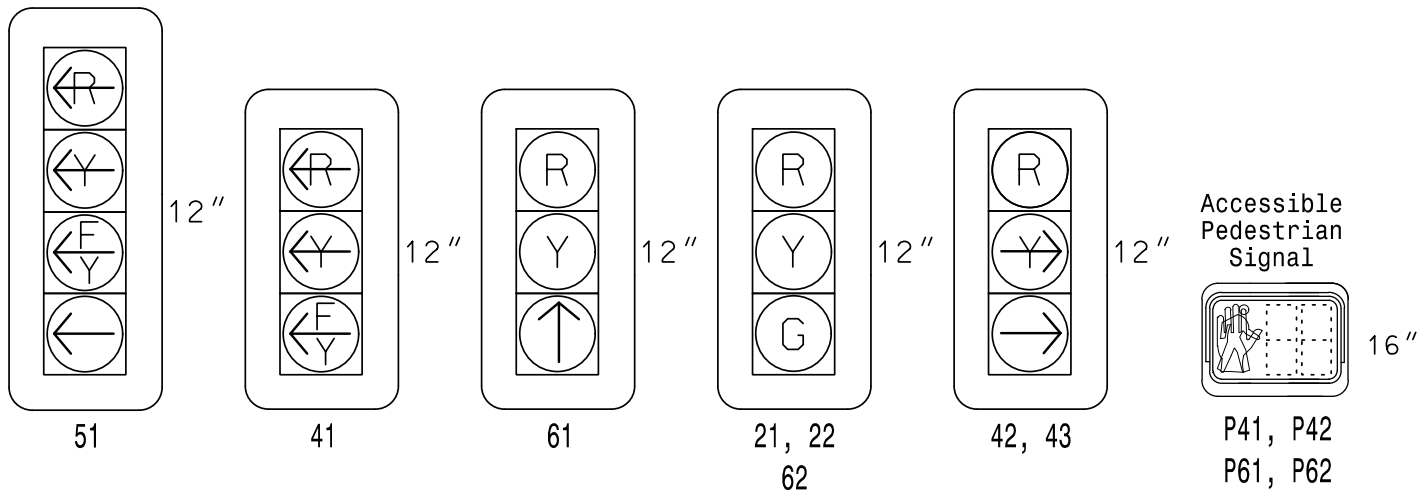
DEFAULT PHASING DIAGRAM



SIGNAL FACE	PHASE			
	2 + 5	2 + 6	4	FLASH
21, 22	G	G	R	R
41	←R	←R	←F	←R
42, 43	→	→	→	→
51	←	←F	←R	←R
61	R	↑	R	R
62	R	G	R	R
P41, P42	DW	DW	W	DRK
P61, P62	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR ZONE						PROGRAMMING					
ZONE	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW ZONE	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	INITIAL	CALL	NEW CARD
2A*	6X6	300	*	-	2	-	-	X	-	X	-
4A*	6X40	0	*	X	4	3.0	-	X	-	X	-
5A*	6X40	0	*	X	5	15.0**	-	X	-	X	-
5B*	6X40	0	*	X	2#	3.0	-	X	-	X	X
6A*	6X40	300	*	-	6	-	-	X	-	X	-

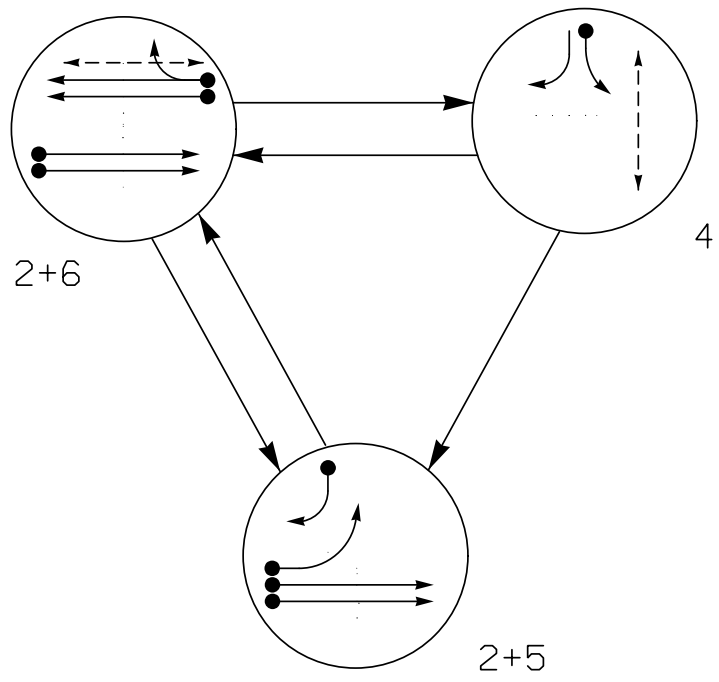
**Disable Delay During Alternate Phasing Operation.
Disable Phase Call for Loops During Alternate Phasing Operation.
* Multi-Zone Microwave Detection Zone

3 Phase
Fully Actuated w/ Alternate Phasing
Signal System #: D10-43_Huntersville

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features accessible pedestrian signals utilizing percussive tone walk indications and/or speech messages.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions.
- The City Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- See Pavement Marking Plans for Stopline and crosswalk locations.
- To provide a leading pedestrian interval on phase 4, program FYA signal head 41 to delay for 7 seconds after the start of the phase 4 walk interval. See Electrical Details for programming.
- Install retroreflective backplates for all signal heads.

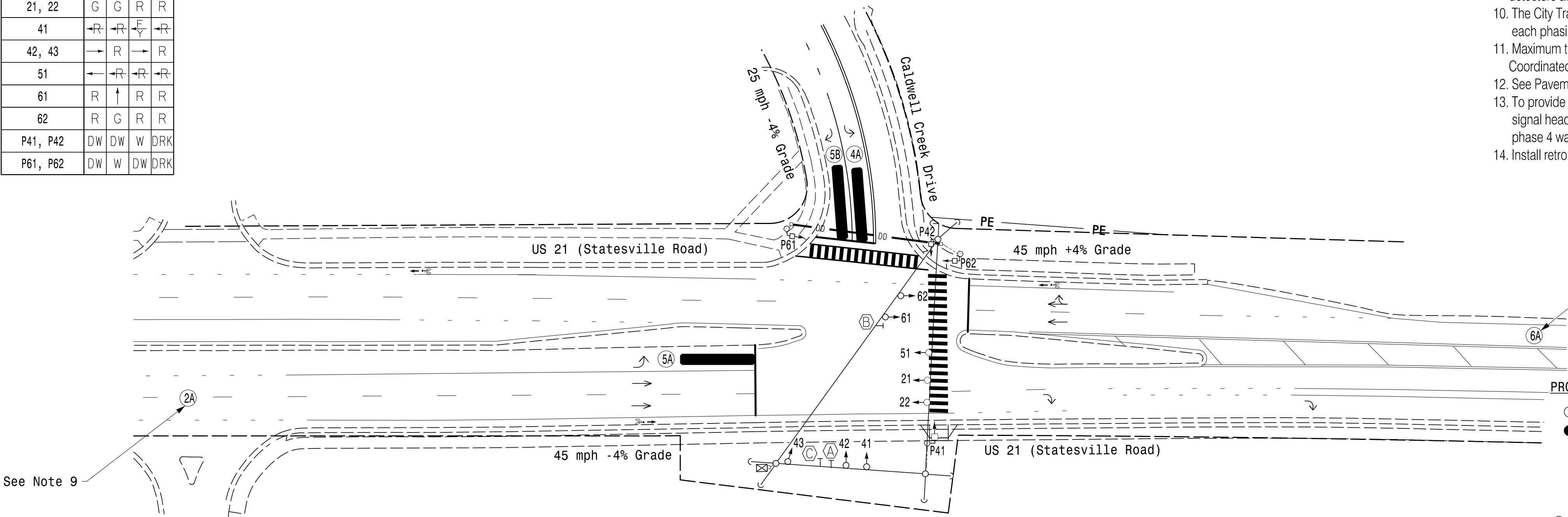
ALTERNATE PHASING DIAGRAM



SIGNAL FACE	PHASE			
	2 + 5	2 + 6	4	FLASH
21, 22	G	G	R	R
41	←R	←R	←F	←R
42, 43	→	→	→	→
51	←	←R	←R	←R
61	R	↑	R	R
62	R	G	R	R
P41, P42	DW	DW	W	DRK
P61, P62	DW	W	DW	DRK

PHASING DIAGRAM DETECTION LEGEND

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



See Note 9

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	■ → N/A
□ → Pedestrian Signal Head With Push Button & Sign	□ → N/A
○ → Type II Signal Pedestal	● → N/A
○ → Signal Pole with Guy	● → N/A
○ → Signal Pole with Sidewalk Guy	● → N/A
⊗ → Non-Intrusive Detection Zone	⊗ → N/A
□ → Controller & Cabinet	□ → N/A
□ → Junction Box	□ → N/A
--- 2-in Underground Conduit	--- N/A
--- Directional Drill	--- N/A
N/A Right of Way	N/A PE
N/A Permanent Easement	N/A PE
→ Directional Arrow	→ PE
N/A Curb Ramp	N/A
(A) "RIGHT TURN YIELD TO U-TURN" Sign (R10-30)	(A)
(B) No U-Turn Sign (R3-4)	(B)
(C) "RIGHT TURN SIGNAL" Sign (R10-10R)	(C)

MAXTIME TIMING CHART					
FEATURE	PHASE				
	2	4	5	6	
Walk *	-	7	-	7	
Ped Clear	-	22	-	16	
Min Green *	12	7	7	12	
Passage *	2.0	2.0	2.0	2.0	
Max 1 *	90	25	20	90	
Yellow Change	4.9	3.0	3.0	4.9	
Red Clear	1.5	2.8	3.2	1.5	
Added Initial *	-	-	-	-	
Maximum Initial *	-	-	-	-	
Time Before Reduction *	-	-	-	-	
Time To Reduce *	-	-	-	-	
Minimum Gap	-	-	-	-	
Advance Walk	-	**	-	7	
Non Lock Detector	-	X	X	-	
Vehicle Recall	MIN RECALL	-	-	MIN RECALL	
Dual Entry	-	-	-	-	

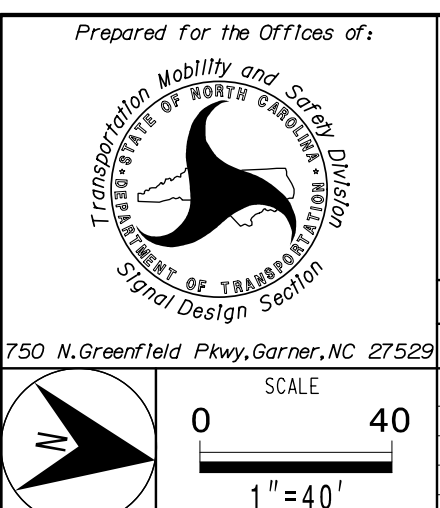
* These values may be field adjusted. Do not adjust Min Green and Passage times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.
** See Note #13.

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION				
SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P41	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Statesville.
P42	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Statesville.
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Caldwell Creek
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Caldwell Creek

New Installation

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



US 21 (Statesville Road) at Caldwell Creek Drive	
Division 10 Wecklenburg County	Huntersville
PLAN DATE: January 2026	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL	
	
DocuSign by  0044569204937	6/22/2026
SIGNATURE	DATE
SIG. INVENTORY NO.	10-2644