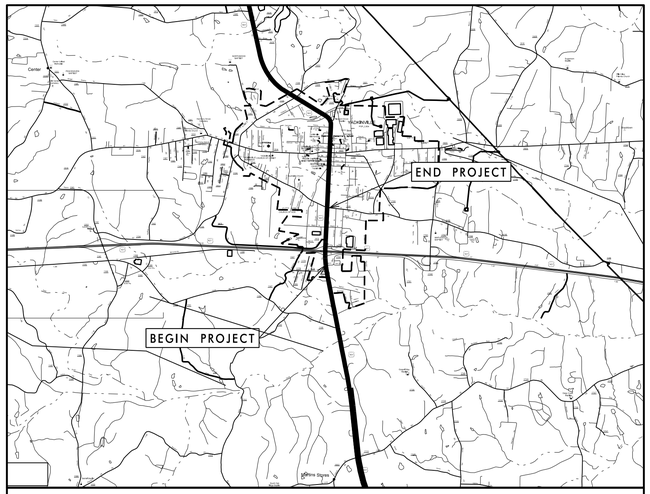
Project No.	Sheet No.
U–5809	Sig. 1.0

TIP PROJECT: U–5809

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

YADKIN COUNTY

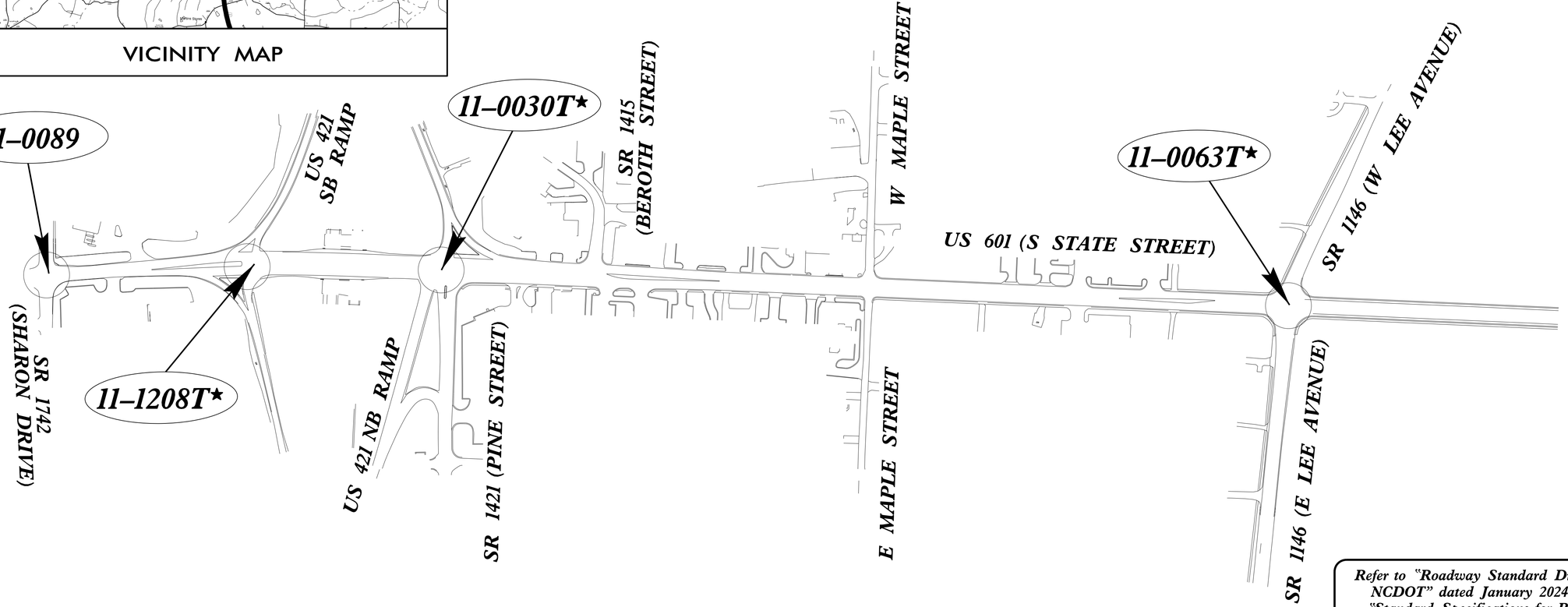


VICINITY MAP

LOCATION: *US 601 (S STATE STREET) IMPROVEMENTS*
FROM SR 1742 (SHARON DRIVE)
TO SR 1146 (LEE AVENUE)

TYPE OF WORK: *TRAFFIC SIGNALS*

NAD 83/NA 2011



★*Signal to be removed upon completion of TIP project*

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. 2.0–2.2	11–0089	US 601 (S. State Street) at SR 1742 (Sharon Drive) /Shopping Center Driveway
Sig. 3.0–3.2	11–1208T1	US 601 (S. State Street) at US 421 Southbound Ramp
Sig. 4.0–4.2	11–1208T2	US 601 (S. State Street) at US 421 Southbound Ramp
Sig. 5.0–5.1	11–0030T1	US 601 (S. State Street) at US 421 Northbound Ramps /Pine Street
Sig. 6.0–6.1	11–0030T2	US 601 (S. State Street) at US 421 Northbound Ramps /Pine Street
Sig. 7.0–7.2	11–0063T1	US 601 (S. State Street) at SR 1146 (Lee Avenue)
Sig. 8.0–8.2	11–0063T2	US 601 (S. State Street) at SR 1146 (Lee Avenue)

TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS

Contacts:

R. Nicholas Zinser, P.E. – Western Region Signals Engineer
D. Todd Joyce, P.E. – Signal Equipment Design Engineer

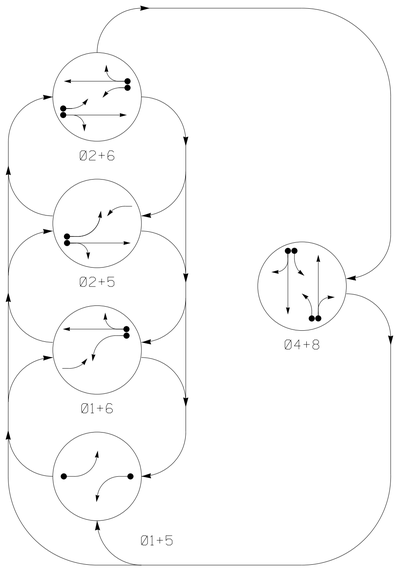
Prepared in the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY & SAFETY DIVISION

Transportation Mobility and Safety Division
TSMO UNIT

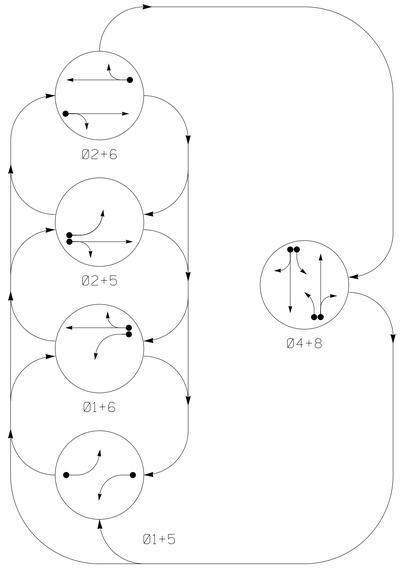
750 N. Greenfield Parkway, Garner, NC 27529

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig.2.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

DEFAULT PHASING TABLE OF OPERATION

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

ALTERNATE PHASING TABLE OF OPERATION

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

MAXTIME DETECTOR INSTALLATION CHART

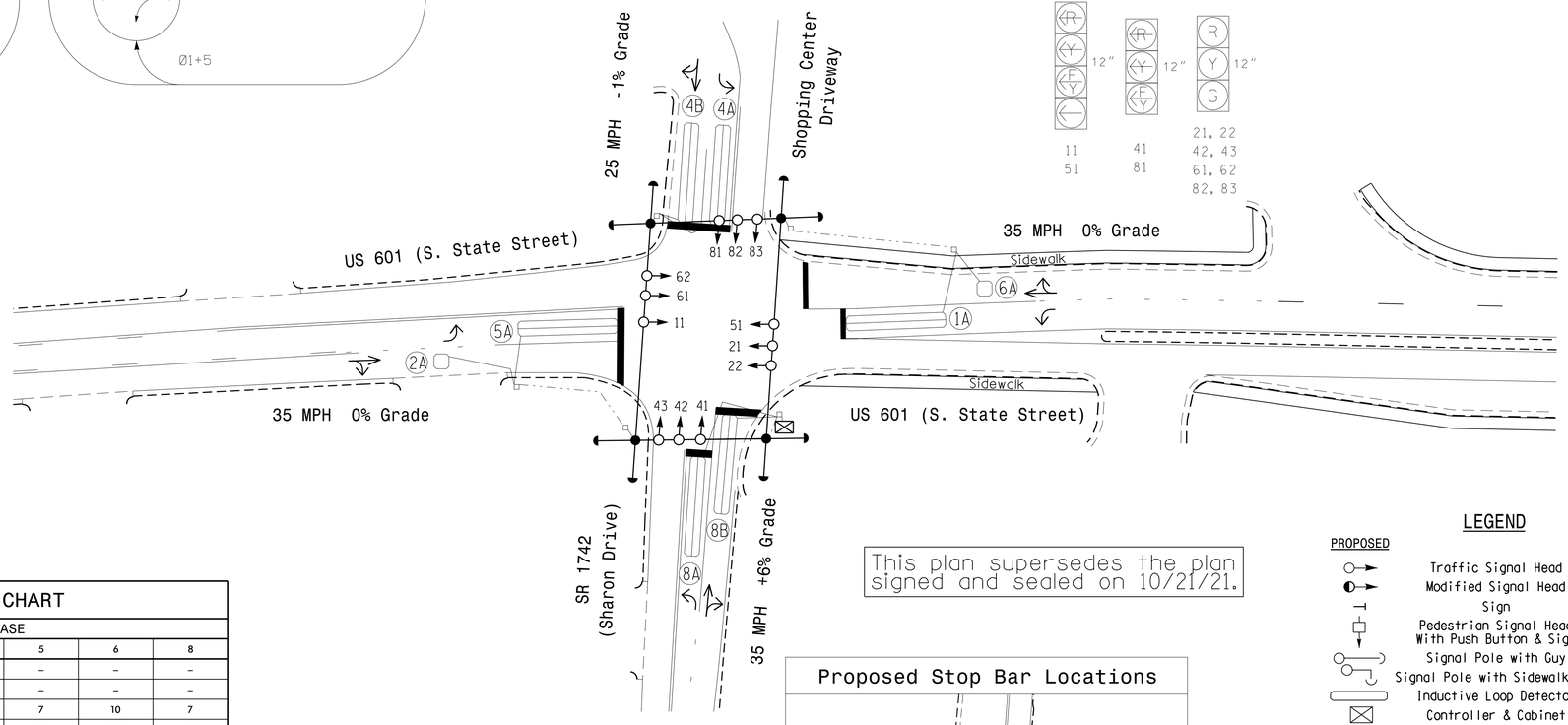
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	X	1	15.0*	-	X	-	X	-	X
					6#	-	-	X	-	X	-	X
2A	6X6	70	3	X	2	-	-	X	-	X	-	X
4A	6X40	0	2-4-2	X	4	3.0	-	X	-	X	-	X
4B	6X40	0	2-4-2	X	4	10.0	-	X	-	X	-	X
5A	6X40	0	2-4-2	X	5	15.0*	-	X	-	X	-	X
					2#	-	-	X	-	X	-	X
6A	6X6	70	4	X	6	-	-	X	-	X	-	X
8A	6X40	0	2-4-2	X	8	3.0	-	X	-	X	-	X
8B	6X40	0	2-4-2	X	8	10.0	-	X	-	X	-	X

* Reduce delay to 3 seconds during Alternate Phasing Operation.
\# Disable phase call for loop(s) during Alternate Phasing Operation.

5 Phase
Fully Actuated
w/ Alternate Phasing Operation
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning on red.
6. The Division Traffic Engineer will determine the hours of use for each phasing plan.

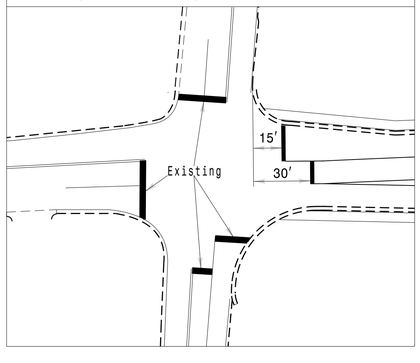


SIGNAL FACE I.D.

All Heads L.E.D.

This plan supersedes the plan signed and sealed on 10/21/21.

Proposed Stop Bar Locations



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊣□	Pedestrian Signal Head With Push Button & Sign	⊣■
○—	Signal Pole with Guy	●—
○—,	Signal Pole with Sidewalk Guy	●—,
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊡
□	Junction Box	■
-·-·-	2-in Underground Conduit	-·-·-
N/A	Right of Way	— — — —
→	Directional Arrow	→

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	–	–	–	–	–
Ped Clear *	–	–	–	–	–	–
Min Green *	7	10	7	7	10	7
Passage *	2.0	3.0	2.0	2.0	3.0	2.0
Max 1 *	15	30	20	15	30	20
Yellow Change	3.0	3.8	3.5	3.0	3.8	3.5
Red Clear	2.4	1.6	1.8	1.9	1.6	1.8
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 601 (S. State Street)
at
SR 1742 (Sharon Drive)/
Shopping Center Driveway

Division 11 Yadkin County Yadkinville

PLAN DATE:	August 2023	REVIEWED BY:	R.N. Zinser
PREPARED BY:	T.A. Kenion	REVIEWED BY:	

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R. Nicholas Zinser 11/14/2023
E13B9D7547724BF... DATE

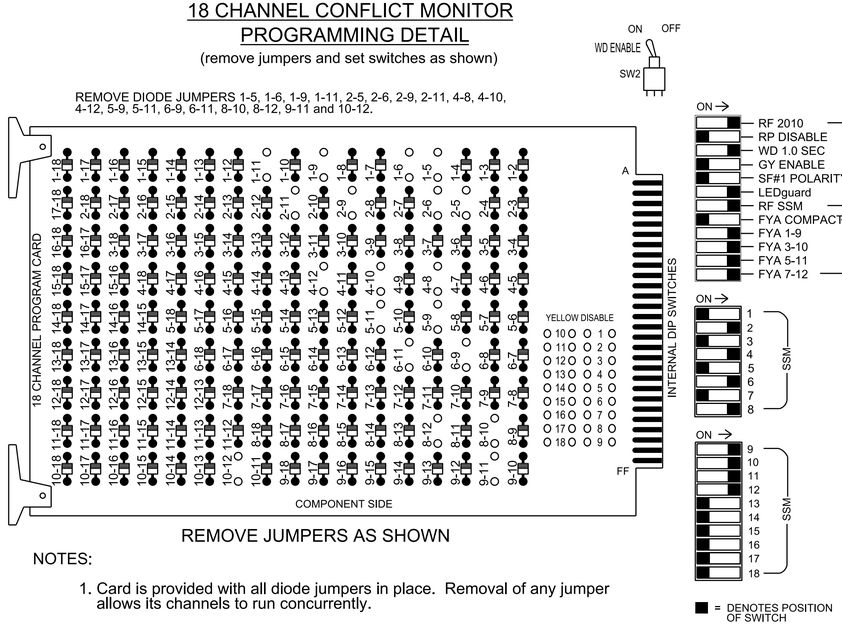
SIG. INVENTORY NO. II-0089

38536.16

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 2.1

18 CHANNEL 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....332 w/ Aux
Software.....Q-Free MAXTIME
Cabinet Mount.....Base
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S5, S7, S8, S11, AUX S1, AUX S2, AUX S4, AUX S5
Phases Used.....1, 2, 4, 5, 6, 8
Overlap "1".....*
Overlap "2".....*
Overlap "3".....*
Overlap "4".....*

*See overlap programming detail on sheet 2

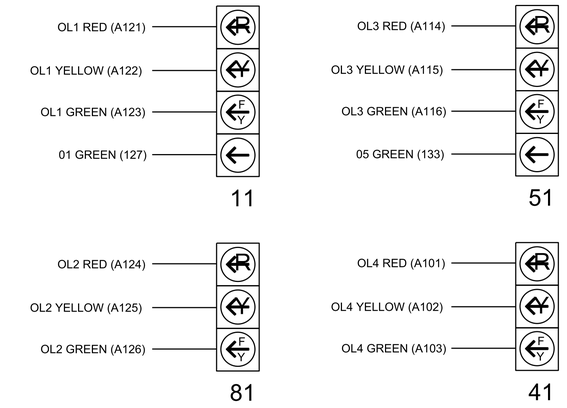
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	42,43	NU	51★	61,62	NU	NU	82,83	NU	11★	81★	NU	51★	41★	NU
RED		128			101			134			107							
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW													A121	A124		A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW	127						133											

NU = Not Used
*Denotes install load resistor. See load resistor installation detail this sheet.
★See pictorial of head wiring in detail this sheet.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 ★	1	15		X		X	
				-	29 ★	6			X		X	
2A	TB2-5,6	I2U	39	1	2	2			X		X	
4A	TB4-9,10	I6U	41	3	8	4	3		X		X	
4B	TB4-11,12	I6L	45	7	9	4	10		X		X	
5A	TB3-1,2	J1U	55	17	15 ★	5	15		X		X	
				-	31 ★	2			X		X	
6A	TB3-5,6	J2U	40	2	16	6			X		X	
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
8B	TB5-11,12	J6L	46	8	23	8	10		X		X	

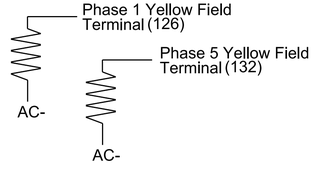
★ For the detectors to work as shown on the signal design plan, see the Vehicle Detector Setup Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



This Plan Supersedes Electrical Detail Sealed on 10/21/2021

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-0089
DESIGNED: August 2023
SEALED: 11/14/2023
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

US 601 (S. State Street)
at
SR 1742 (Sharon Drive)/
Shopping Center Driveway

Division 11 Yadkin County Yadkinville

PLAN DATE:	November 2023	REVIEWED BY:	
PREPARED BY:	Zarrar Zafar	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce 11/16/2023
A90CADFDBD4241D... DATE

SIG. INVENTORY NO. 11-0089

16-NOV-2023 10:25
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PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 2.2

MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

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

← NOTICE INCLUDED PHASE

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

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

Web Interface
Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

1A

Detector	Call Phase	Delay
1	1	3
29	0	-

5A

Detector	Call Phase	Delay
15	5	3
31	0	-

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

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

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

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

This Plan Supersedes Electrical Detail Sealed on 10/21/2021

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel
Main Menu >Controller >Coordination >Patterns

Web Interface
Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-0089
DESIGNED: August 2023
SEALED: 11/14/2023
REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

US 601 (S. State Street)
at
SR 1742 (Sharon Drive)/
Shopping Center Driveway

Division 11 Yadkin County Yadkinville

PLAN DATE:	November 2023	REVIEWED BY:	
PREPARED BY:	Zarrar Zafar	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by:
D. Todd Joyce 11/16/2023
A90CADFDBD4241D DATE

SIG. INVENTORY NO. 11-0089

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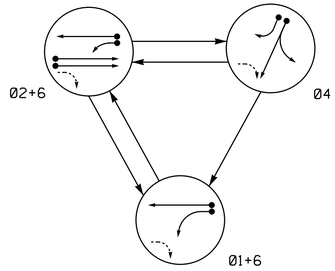
PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig.3.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

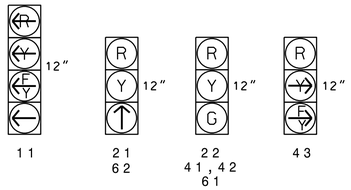
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04	FLASH
11	←	FY	R	Y
21	R	↑	R	Y
22	R	G	R	Y
41, 42	R	R	G	R
43	R	R	FY	R
61	G	G	R	Y
62	↑	↑	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

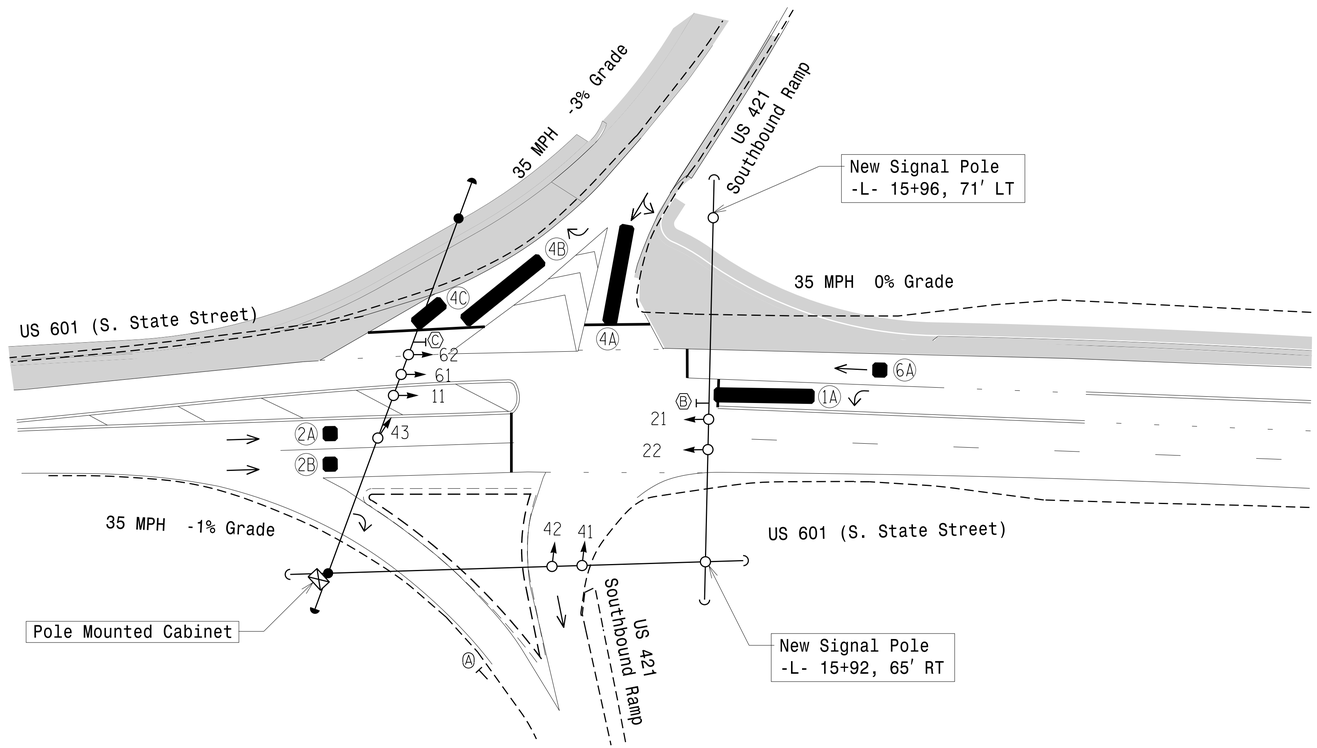
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A *	6X40	+5	*	*	1	15.0	-	X	-	X	-	X
					6	-	-	X	-	X	-	X
2A *	6X6	70	*	*	2	-	-	X	-	X	-	X
2B *	6X6	70	*	*	2	-	-	X	-	X	-	X
4A *	6X40	0	*	*	4	-	-	X	-	X	-	X
4B *	6X40	0	*	*	4	15.0	-	X	-	X	-	X
4C *	6X15	0	*	*	4	15.0	-	X	-	X	-	X
6A *	6X6	70	*	*	6	-	-	X	-	X	-	X

* Video Detection Zone

3 Phase
Fully Actuated
US 601 (Yadkinville) System 1 (TBC)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Program controller to operate using FYA compact mode.
6. Refer to Pavement Marking Plan for stop line locations.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Time Based system data: Controller Asset #: 1208.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▯↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊡
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	----------
→	Directional Arrow	→
▬	Video Detection Zone	▭
▭	Construction Zone	N/A
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No Left Turn Sign (R3-2)	Ⓑ
Ⓒ	No Right Turn Sign (R3-1)	Ⓒ
N/A	Guardrail	⊥⊥

MAXTIME TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6
Walk *	–	–	–	–
Ped Clear	–	–	–	–
Min Green *	7	10	7	10
Passage *	2.0	3.0	2.0	3.0
Max 1 *	15	60	30	60
Yellow Change	3.0	3.9	4.1	3.9
Red Clear	2.8	2.8	1.1	2.8
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 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.

This plan supersedes the plan signed and sealed on 11/14/23.

Signal Upgrade - Temporary Design 1 - Phase I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 601 (S. State Street)
at
US 421 Southbound Ramp

Division 11 Yadkin County Yadkinville

PLAN DATE: February 2024 REVIEWED BY: R.N. Zinser
PREPARED BY: T.A. Kenion REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R. Nicholas Zinser 03/04/2024
E138697347224AFC DATE

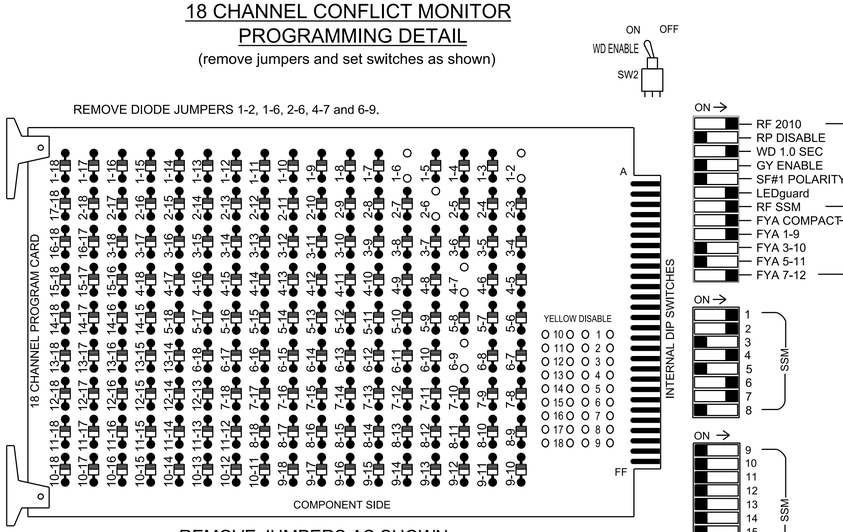
SIG. INVENTORY NO. 11-1208TI

35536.16

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 3.1

18 CHANNEL 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the US 601 (Yadkinville) System 1 (TBC).

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....12
Load Switches Used.....S1, S2, S3, S5, S8, S10
Phases Used.....1, 2, 4, 6
Overlap "1".....*
Overlap "2".....Not Used
Overlap "3".....Not Used
Overlap "4".....Not Used
Overlap "7".....*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2		S3		S4	S5	S6	S7	S8		S9	S10	S11	S12
CMU CHANNEL NO.	1	2		9	13	3	4	14	5	6		15	7	8	16
PHASE	OL1	2		1 GRN	2 PED	3	4	4 PED	5	6		6 PED	OL7	8	8 PED
SIGNAL HEAD NO.	11★	21	22	11★	NU	NU	41,42	NU	NU	61	62	NU	43	NU	NU
RED		128	128				101			134	134		122		
YELLOW		129	129				102			135	135				
GREEN			130				103			136					
RED ARROW	125														
YELLOW ARROW	126												123		
FLASHING YELLOW ARROW	127												124		
✋															
GREEN ARROW		130		114							136				
🚶					*										

NU = Not Used

★Denotes install load resistor. See load resistor installation detail this sheet.
★See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

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

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

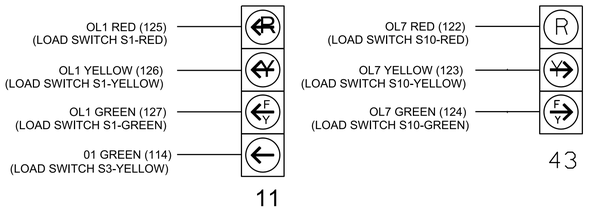
FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

Install a video 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.

FYA SIGNAL WIRING DETAIL

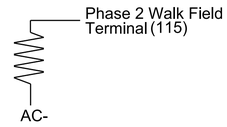
(wire signal head as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



This Plan Supersedes Electrical Detail Sealed on 11/16/2023

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1208T1
DESIGNED: February 2024
SEALED: 3/4/2024
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared in the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

US 601 (S. State Street)
at
US 421 Southbound Ramp

Division 11 | Yadkin County | Yadkinville

PLAN DATE: November 2023 | REVIEWED BY:
PREPARED BY: Zarrar Zafar | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce 03/06/2024
DATE

SIG. INVENTORY NO. 11-1208T1

05-MAR-2024 10:22
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PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 3.2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

NOTE: Phase Vehicle 1 Changed to Overlap 1

NOTE: Phase Vehicle 7 Changed to Overlap 7

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Overlap	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	Overlap	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

PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 2 PY (field term. 114) to Channel 9 Green (monitor pin 13).

Follow the instructions below to make the appropriate connections:

STEP 1: Fold down rear panel of output file.

STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).

STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

CMU-13 ———————————— 2PY (term. 114)

NOTE: Some cabinet manufacturers use keyed connectors to accomplish this wiring configuration. If connectors are used, fold down the rear panel of the output file and find the set of 3 keyed connectors and connect them as shown below:

1-2PY	1-CMU-13
2-4PY	2-CMU-16
3-6PY	3-CMU-R
4-8PY	4-CMU-U

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 11

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

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

IO Module 1

NOTICE OUTPUT POINT 33 CONTROL TYPE & INDEX REASSIGNMENT

Output Point	Descripton	Output Control Type	Index
33	C1-35	Phase Green	1
34	C1-36	Not Active	15
35	C1-37	Not Active	14
36	C1-38	Not Active	16

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	7
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4
Modifier Phases	1	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

This Plan Supersedes Electrical Detail Sealed on 11/16/2023

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1208T1
DESIGNED: February 2024
SEALED: 3/4/2024
REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

US 601 (S. State Street)
at
US 421 Southbound Ramp

Division 11 Yadkin County Yadkinville

PLAN DATE: November 2023 REVIEWED BY:
PREPARED BY: Zarrar Zafar REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by:
D. Todd Joyce 03/06/2024
A90CADFDBD4241D DATE

SIG. INVENTORY NO. 11-1208T1

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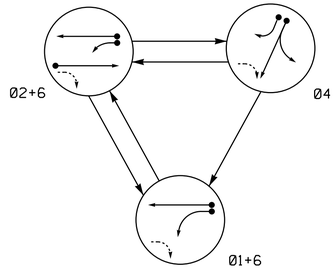
zzafar

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 4.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

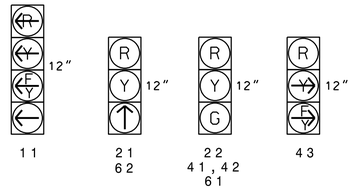
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	Ø2+6	Ø4	FLASH
11	←	FY	R	Y
21	R	↑	R	Y
22	R	G	R	Y
41, 42	R	R	G	R
43	R	R	FY	R
61	G	G	R	Y
62	↑	↑	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

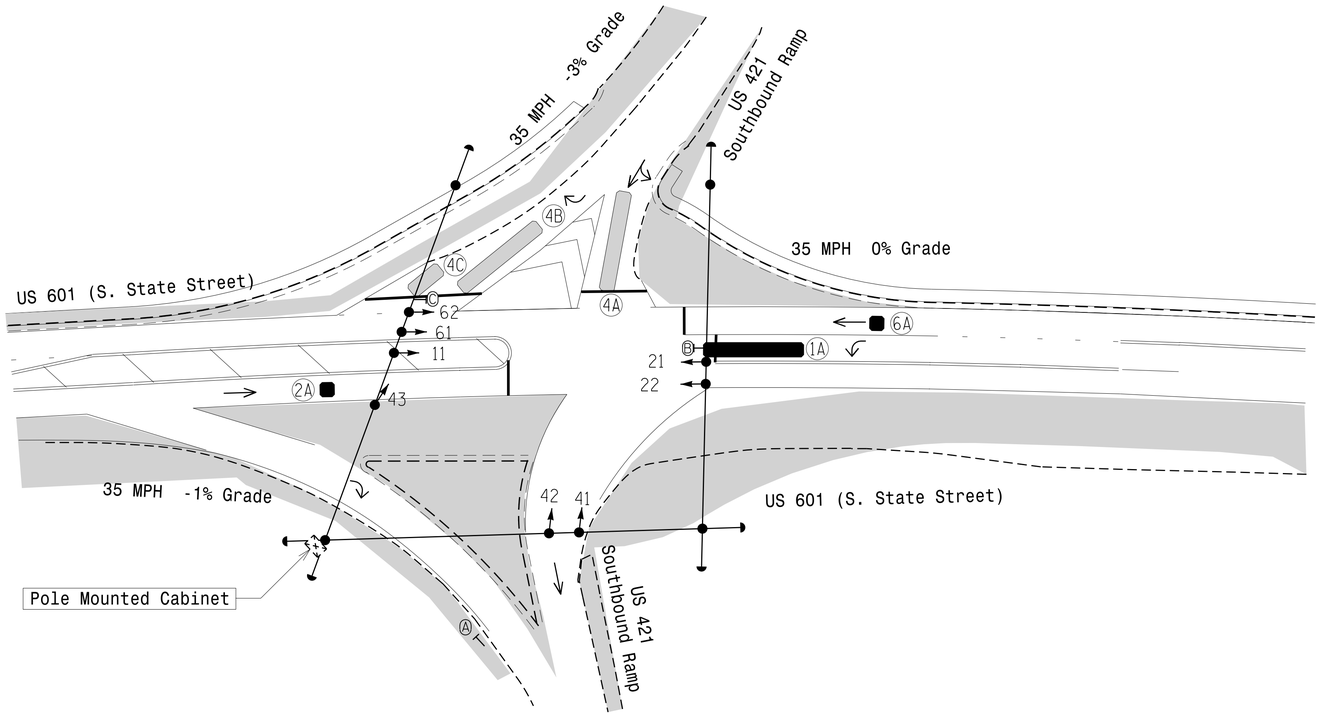
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A *	6X40	+5	*	*	1	15.0	-	X	-	X	-	-
					6	-	-	X	-	X	-	-
2A *	6X6	70	*	*	2	-	-	X	-	X	-	-
4A *	6X40	0	*	-	4	-	-	X	-	X	-	-
4B *	6X40	0	*	-	4	15.0	-	X	-	X	-	-
4C *	6X15	0	*	-	4	15.0	-	X	-	X	-	-
6A *	6X6	70	*	*	6	-	-	X	-	X	-	-

* Video Detection Zone

3 Phase
Fully Actuated
US 601 (Yadkinville) System 1 (TBC)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Program controller to operate using FYA compact mode.
6. Refer to Pavement Marking Plan for stop line locations.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Time Based system data: Controller Asset #: 1208.
10. Reposition existing signal heads numbered 21 and 22.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⛶
□	Junction Box	■
----	2-in Underground Conduit	----
N/A	Right of Way	----
→	Directional Arrow	→
▬	Video Detection Zone	▭
▭	Construction Zone	N/A
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ
Ⓑ	No Left Turn Sign (R3-2)	Ⓑ
N/A	Guardrail	⊥

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	6
Walk *	–	–	–	–
Ped Clear	–	–	–	–
Min Green *	7	10	7	10
Passage *	2.0	3.0	2.0	3.0
Max 1 *	15	60	30	60
Yellow Change	3.0	3.9	4.1	3.9
Red Clear	2.8	2.8	1.2	2.8
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 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.

Signal Upgrade - Temporary Design 2 - Phase II

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 601 (S. State Street) at US 421 Southbound Ramp

Division 11 Yadkin County Yadkinville

PLAN DATE: February 2024 REVIEWED BY: R.N. Zinser

PREPARED BY: T.A. Kenion REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R. Nicholas Zinser 03/04/2024
F1380873472248F DATE

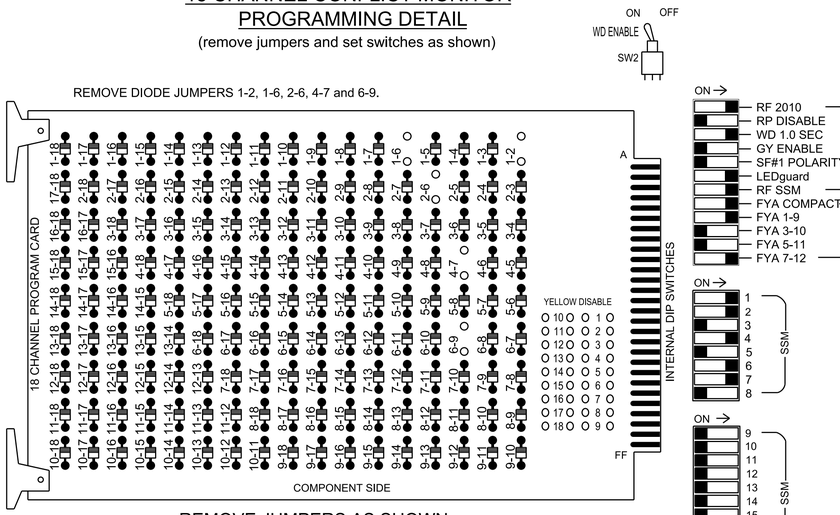
SIG. INVENTORY NO. II-1208T2

38556.16

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 4.1

18 CHANNEL 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the US 601 (Yadkinville) System 1 (TBC).

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....12
Load Switches Used.....S1, S2, S3, S5, S8, S10
Phases Used.....1, 2, 4, 6
Overlap "1".....*
Overlap "2".....Not Used
Overlap "3".....Not Used
Overlap "4".....Not Used
Overlap "7".....*

*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2		S3		S4	S5	S6	S7	S8		S9	S10	S11	S12
CMU CHANNEL NO.	1	2		9	13	3	4	14	5	6		15	7	8	16
PHASE	OL1	2		1 GRN	2 PED	3	4	4 PED	5	6		6 PED	OL7	8	8 PED
SIGNAL HEAD NO.	11★	21	22	11★	NU	NU	41,42	NU	NU	61	62	NU	43	NU	NU
RED		128	128				101			134	134		122		
YELLOW		129	129				102			135	135				
GREEN			130				103			136					
RED ARROW	125														
YELLOW ARROW	126												123		
FLASHING YELLOW ARROW	127												124		
✋															
GREEN ARROW		130		114							136				
🚶					*										

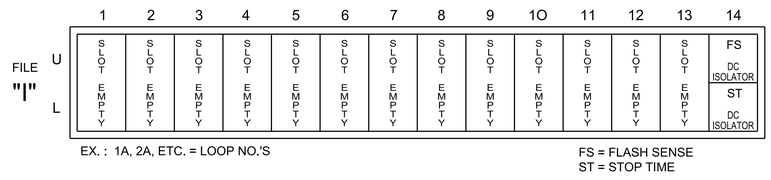
NU = Not Used

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

★See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

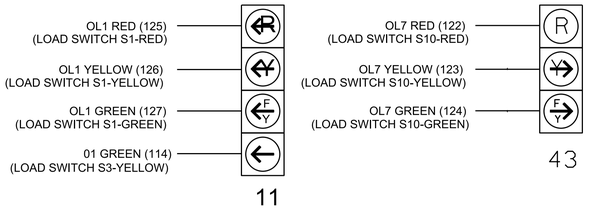


SPECIAL DETECTOR NOTE

Install a video 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.

FYA SIGNAL WIRING DETAIL

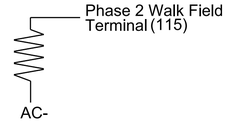
(wire signal head as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-1208T2
DESIGNED: February 2024
SEALED: 3/4/2024
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

US 601 (S. State Street) at US 421 Southbound Ramp

Division 11 | Yadkin County | Yadkinville

PLAN DATE: November 2023 | REVIEWED BY:

PREPARED BY: Zarrar Zafar | REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce 03/06/2024
A90CADFD8D424... DATE

SIG. INVENTORY NO. 11-1208T2

05-MAR-2024 10:32
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zzafar

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 4.2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Overlap	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	Overlap	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

NOTE: Phase Vehicle 1 Changed to Overlap 1

NOTE: Phase Vehicle 7 Changed to Overlap 7

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEAD 11

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

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

IO Module 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Phase Green	1
34	C1-36	Not Active	15
35	C1-37	Not Active	14
36	C1-38	Not Active	16

NOTICE OUTPUT POINT 33 CONTROL TYPE & INDEX REASSIGNMENT

PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 2 PY (field term. 114) to Channel 9 Green (monitor pin 13).

Follow the instructions below to make the appropriate connections:

STEP 1: Fold down rear panel of output file.

STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).

STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

CMU-13 ——————————— 2PY (term. 114)

NOTE: Some cabinet manufacturers use keyed connectors to accomplish this wiring configuration. If connectors are used, fold down the rear panel of the output file and find the set of 3 keyed connectors and connect them as shown below:

1-2PY	1-CMU-13
2-4PY	2-CMU-16
3-6PY	3-CMU-R
4-8PY	4-CMU-U

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	7
Type	FYA 4 - Section	FYA 4 - Section
Included Phases	2	4
Modifier Phases	1	-
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-1208T2
DESIGNED: February 2024
SEALED: 3/4/2024
REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared in the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

US 601 (S. State Street)
at
US 421 Southbound Ramp

Division 11 | Yadkin County | Yadkinville

PLAN DATE: November 2023 | REVIEWED BY:
PREPARED BY: Zarrar Zafar | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce 03/06/2024
A95CADFEB9D4241D... DATE

SIG. INVENTORY NO. 11-1208T2

05-MAR-2024 10:33
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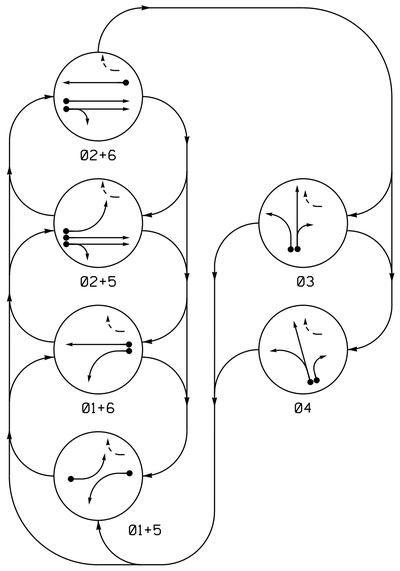
zzafar

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 5.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←̶	←̶	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	R	Y
31	R	R	R	R	G̲	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G̲	R
42	R	R	R	R	R	G	R
51	←̶	~~R~~	←̶	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

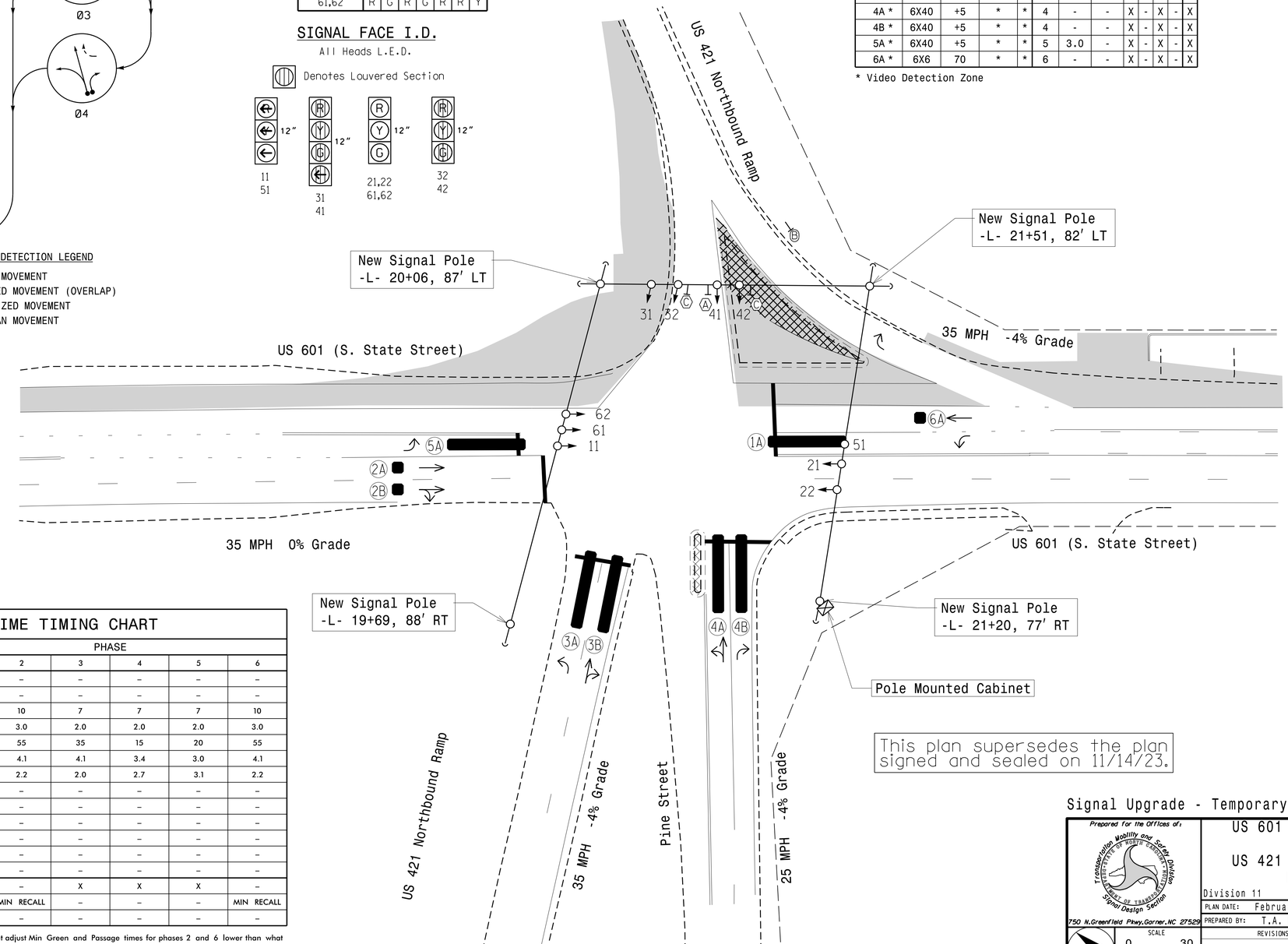
All Heads L.E.D.

Denotes Louvered Section

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A *	6X40	+5	*	*	1	-	-	X	-	X	-	X
2A *	6X6	70	*	*	2	-	-	X	-	X	-	X
2B *	6X6	70	*	*	2	-	-	X	-	X	-	X
3A *	6X40	+5	*	*	3	-	-	X	-	X	-	X
3B *	6X40	+5	*	*	3	-	-	X	-	X	-	X
4A *	6X40	+5	*	*	4	-	-	X	-	X	-	X
4B *	6X40	+5	*	*	4	-	-	X	-	X	-	X
5A *	6X40	+5	*	*	5	3.0	-	X	-	X	-	X
6A *	6X6	70	*	*	6	-	-	X	-	X	-	X

* Video Detection Zone



MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Walk *	–	–	–	–	–	–
Ped Clear	–	–	–	–	–	–
Min Green *	7	10	7	7	7	10
Passage *	2.0	3.0	2.0	2.0	2.0	3.0
Max 1 *	25	55	35	15	20	55
Yellow Change	3.0	4.1	4.1	3.4	3.0	4.1
Red Clear	2.1	2.2	2.0	2.7	3.1	2.2
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	X	–
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL
Dual Entry	–	–	–	–	–	–

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

6 Phase
Fully Actuated
(US 601 (Yadkinville) TBC-System 1)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Pavement markings are existing.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Closed loop system data: Controller Asset #0030.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊤	Sign	⊤
⊤□↓	Pedestrian Signal Head With Push Button & Sign	⊤■↓
○→	Signal Pole with Guy	●→
○→	Signal Pole with Sidewalk Guy	●→
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
-----	2-in Underground Conduit	-----
N/A	Right of Way	— — —
→	Directional Arrow	→
▬	Video Detection Zone	▭
▭	Construction Zone	N/A
Ⓐ	Combined Through and Left Arrow Sign (R3-6L)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	"NO TURN ON RED" Sign (R10-11)	Ⓒ

This plan supersedes the plan signed and sealed on 11/14/23.

Signal Upgrade - Temporary Design 1 - Phase I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 601 (S. State Street)
at
US 421 Northbound Ramps/
Pine Street

Division 11 Yadkin County Yadkinville

PLAN DATE: February 2024 REVIEWED BY: R.N. Zinser
PREPARED BY: T.A. Kenion REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R. Nicholas Zinser 03/04/2024
DATE

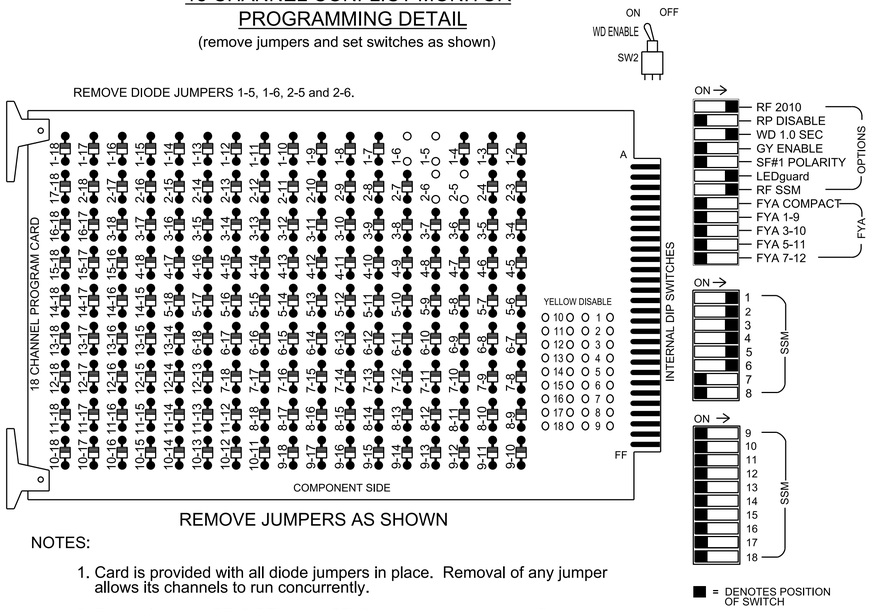
SIG. INVENTORY NO. 11-0030TI

38536.16

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 5.1

18 CHANNEL 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the US 601 (Yadkinville) TBC-System 1.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....12
Load Switches Used.....S1, S2, S4, S5, S7, S8
Phases Used.....1, 2, 3, 4, 5, 6
Overlaps.....None

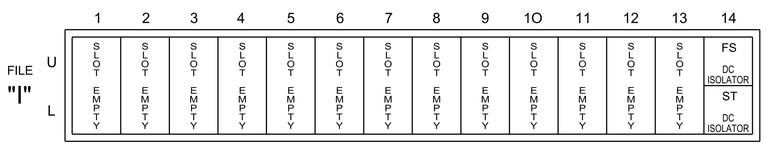
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21.22	NU	31	32	41	42	NU	51	61,62	NU	NU	NU	P81, P82
RED		128		116	116	101	101			134				
YELLOW		129		117	117	102	102			135				
GREEN		130		118	118	103	103			136				
RED ARROW	125								131					
YELLOW ARROW	126								132					
FLASHING YELLOW ARROW														
GREEN ARROW	127			118		103			133					

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

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

This Plan Supersedes Electrical Detail Sealed on 11/16/2023

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-0030T1
DESIGNED: February 2024
SEALED: 3/4/2024
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared in the Offices of:

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
ITS & Signals Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

US 601 (S. State Street)
at
US 421 Northbound Ramps/
Pine Street

Division 11 Yadkin County Yadkinville

PLAN DATE: February 2024	REVIEWED BY:
PREPARED BY: Zarrar Zafar	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by:
D. Todd Joyce 03/06/2024
A90CADFDBD4241D DATE

SIG. INVENTORY NO. 11-0030T1

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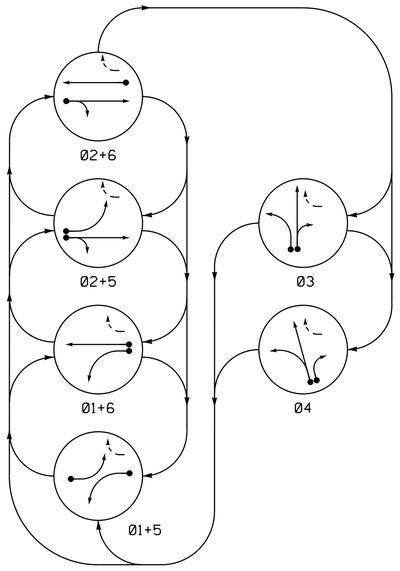
zzafar

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig.6.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03	04	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	R	Y
31	R	R	R	R	G	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	G	R
42	R	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R	Y

SIGNAL FACE I.D.

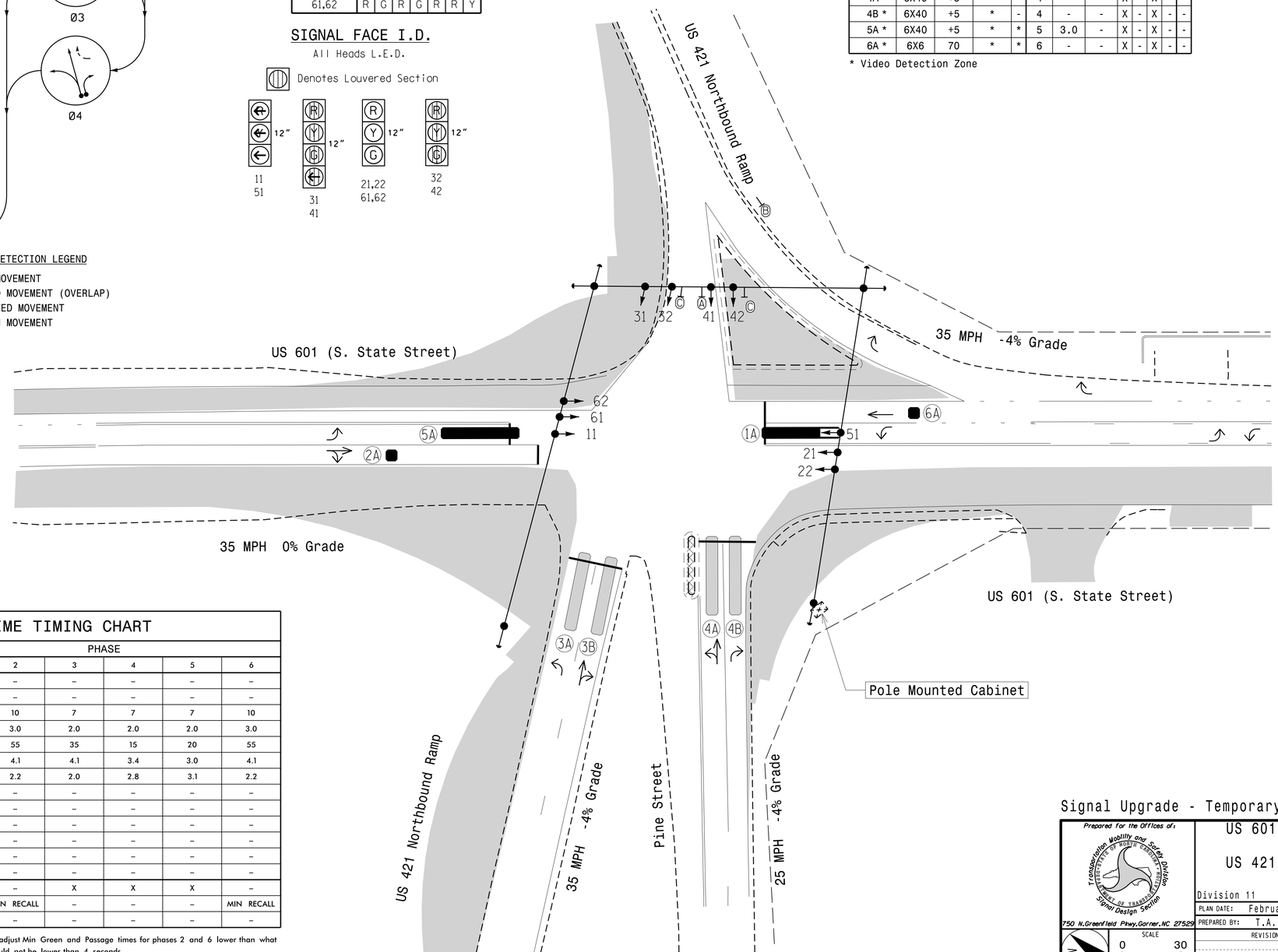
All Heads L.E.D.

Denotes Louvered Section

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A *	6X40	+5	*	*	1	-	-	X	-	X	-	-
2A *	6X6	70	*	*	2	-	-	X	-	X	-	-
3A *	6X40	+5	*	-	3	-	-	X	-	X	-	-
3B *	6X40	+5	*	-	3	-	-	X	-	X	-	-
4A *	6X40	+5	*	-	4	-	-	X	-	X	-	-
4B *	6X40	+5	*	-	4	-	-	X	-	X	-	-
5A *	6X40	+5	*	*	5	3.0	-	X	-	X	-	-
6A *	6X6	70	*	*	6	-	-	X	-	X	-	-

* Video Detection Zone



MAXTIME TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Walk *	–	–	–	–	–	–
Ped Clear	–	–	–	–	–	–
Min Green *	7	10	7	7	7	10
Passage *	2.0	3.0	2.0	2.0	2.0	3.0
Max 1 *	25	55	35	15	20	55
Yellow Change	3.0	4.1	4.1	3.4	3.0	4.1
Red Clear	2.1	2.2	2.0	2.8	3.1	2.2
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	X	–
Vehicle Recall	–	MIN RECALL	–	–	–	MIN RECALL
Dual Entry	–	–	–	–	–	–

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

38536.16

6 Phase Fully Actuated (US 601 (Yadkinville) TBC-System 1)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Reposition existing signal heads numbered 51, 21 and 22.
7. Reposition existing signal heads numbered 11, 61 and 62.
8. Refer to Pavement Marking Plan for stop line locations.
9. This intersection uses video detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Closed loop system data: Controller Asset #0030.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊣□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	— — —
→	Directional Arrow	→
▬	Video Detection Zone	▭
▒	Construction Zone	N/A
Ⓐ	Combined Through and Left Arrow Sign (R3-6L)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	"NO TURN ON RED" Sign (R10-11)	Ⓒ

Signal Upgrade - Temporary Design 2 - Phase II

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 601 (S. State Street) at US 421 Northbound Ramps/ Pine Street

Division 11 Yadkin County Yadkinville

PLAN DATE: February 2024 REVIEWED BY: R.N. Zinser

PREPARED BY: T.A. Kenion REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

DocuSigned by: R. Nicholas Zinser E13B897347F24BF... 03/04/2024 DATE

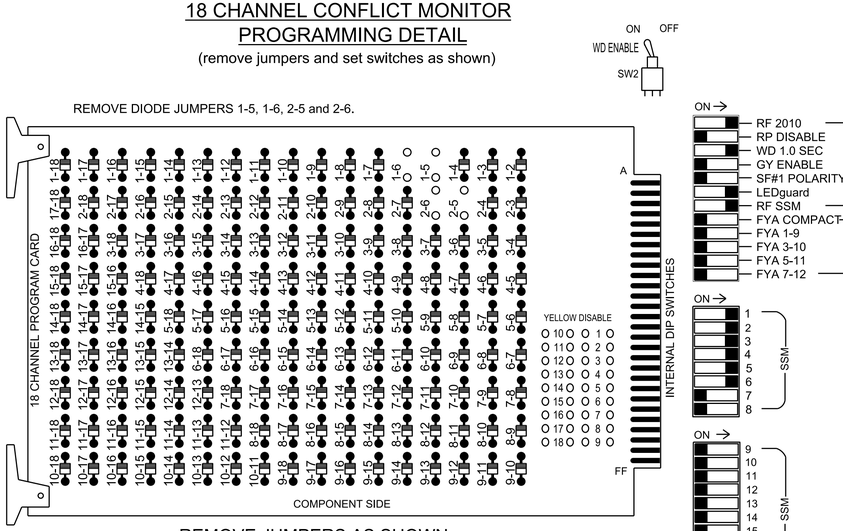
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

SIG. INVENTORY NO. II-0030T2

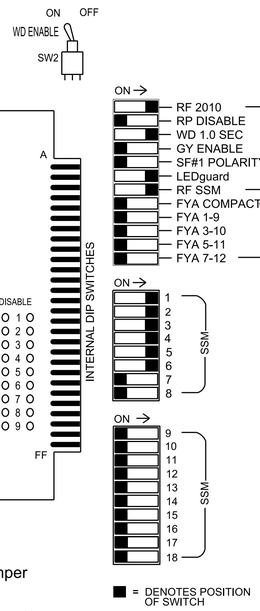
PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 6.1

18 CHANNEL 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the US 601 (Yadkinville) TBC-System 1.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....12
Load Switches Used.....S1, S2, S4, S5, S7, S8
Phases Used.....1, 2, 3, 4, 5, 6
Overlaps.....None

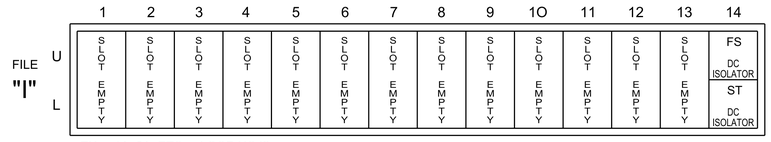
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4		S5		S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3		4		14	5	6	15	7	8	16
PHASE	1	2	2 PED	3		4		4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	32	41	42	NU	51	61,62	NU	NU	NU	P81, P82
RED		128		116	116	101	101			134				
YELLOW		129		117	117	102	102			135				
GREEN		130		118	118	103	103			136				
RED ARROW	125								131					
YELLOW ARROW	126								132					
FLASHING YELLOW ARROW														
GREEN ARROW	127			118		103			133					

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-0030T2
DESIGNED: February 2024
SEALED: 3/4/2024
REVISED: N/A

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

Prepared in the Offices of:

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

750 N. Greenfield Pkwy, Garner, NC 27529

US 601 (S. State Street)
at
US 421 Northbound Ramps/
Pine Street

Division 11 | Yadkin County | Yadkinville

PLAN DATE: February 2024 | REVIEWED BY:
PREPARED BY: Zarrar Zafar | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce 03/06/2024
A50CAD5D9D934A7D... DATE

SIG. INVENTORY NO. 11-0030T2

06-MAR-2024 10:50
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zzafar

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 7.0

PHASING DIAGRAM

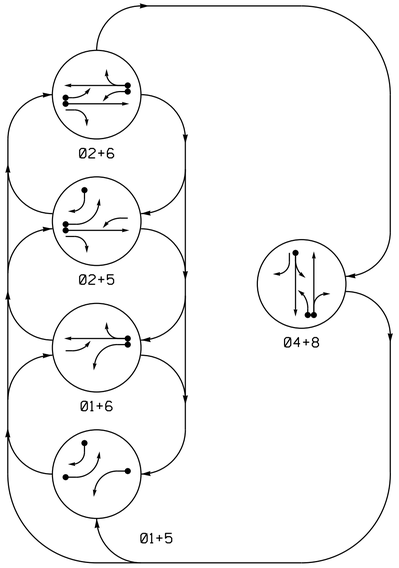
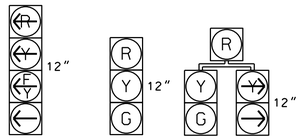


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←	←	F.Y.	F.Y.	~~R~~	~~Y~~
21, 22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R/←	R	R/←	R	G	R
51	←	F.Y.	←	F.Y.	~~R~~	~~Y~~
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A *	6X40	0	*	*	1	15.0	-	X	-	X	-	X
					6	-	-	X	-	X	-	X
2A *	6X6	70	*	*	2	-	-	X	-	X	-	X
4A *	6X40	0	*	*	4	3.0	-	X	-	X	-	X
5A *	6X40	0	*	*	5	15.0	-	X	-	X	-	X
					2	-	-	X	-	X	-	X
5B *	6X40	0	*	*	5	15.0	-	X	-	X	-	X
6A *	6X6	70	*	*	6	-	-	X	-	X	-	X
8A *	6X40	0	*	*	8	3.0	-	X	-	X	-	X
8B *	6X40	0	*	*	8	10.0	-	X	-	X	-	X

* Video Detection Zone

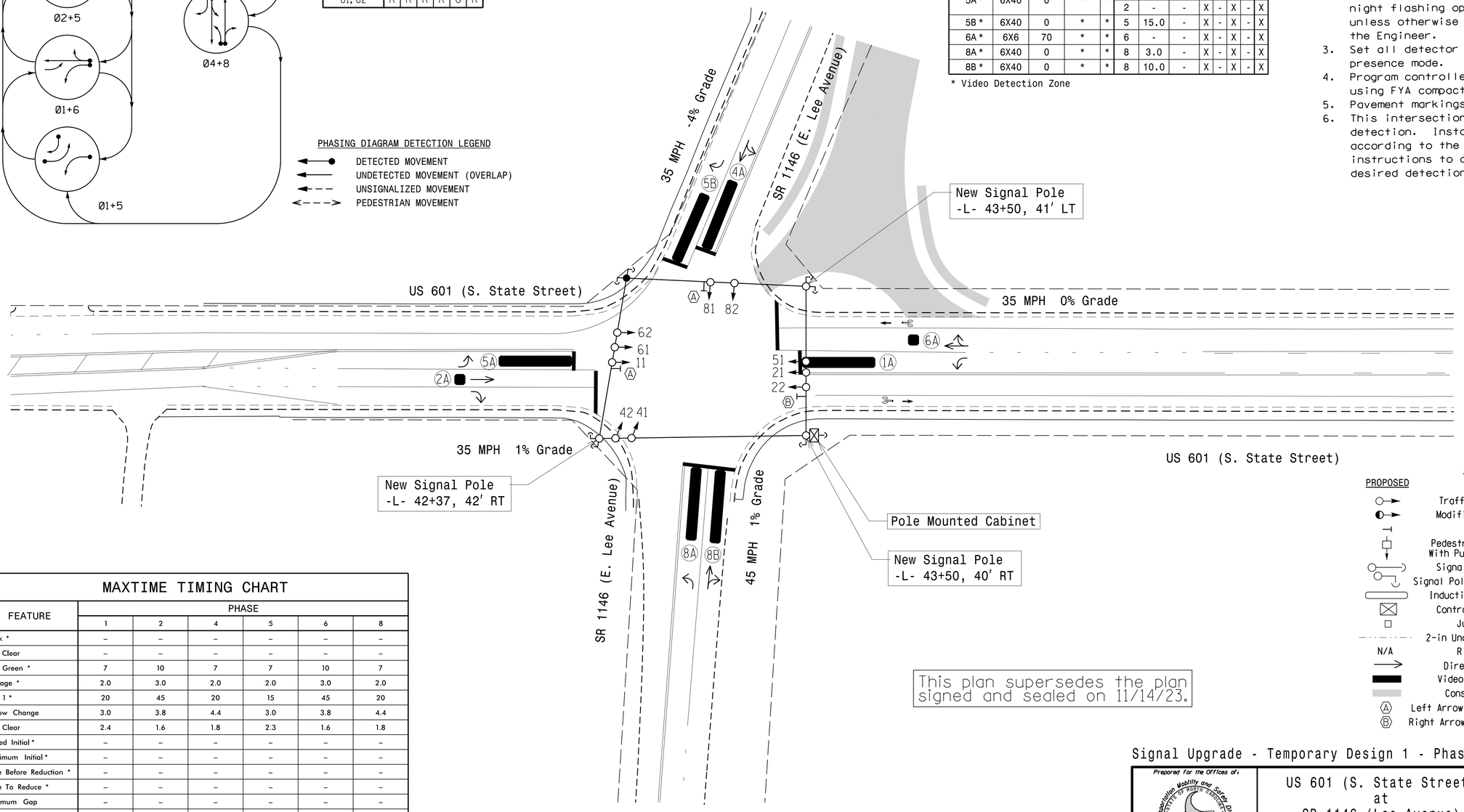
5 Phase
Fully Actuated
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Program controller to operate using FYA compact mode.
5. Pavement markings are existing.
6. This intersection uses video detection. Install detectors according to the manufacturer's instructions to acheive the desired detection.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
----	2-in Underground Conduit	----
N/A	Right of Way	----
→	Directional Arrow	→
▬	Video Detection Zone	▭
▭	Construction Zone	N/A
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	–	–	–	–	–
Ped Clear	–	–	–	–	–	–
Min Green *	7	10	7	7	10	7
Passage *	2.0	3.0	2.0	2.0	3.0	2.0
Max 1 *	20	45	20	15	45	20
Yellow Change	3.0	3.8	4.4	3.0	3.8	4.4
Red Clear	2.4	1.6	1.8	2.3	1.6	1.8
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

This plan supersedes the plan signed and sealed on 11/14/23.

Signal Upgrade - Temporary Design 1 - Phase I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 601 (S. State Street)
at
SR 1146 (Lee Avenue)

Division 11 Yadkin County Yadkinville

PLAN DATE: February 2024 REVIEWED BY: R.N. Zinser

PREPARED BY: T.A. Kenion REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R. Nicholas Zinser 03/04/2024
E1388073A7274BE... DATE

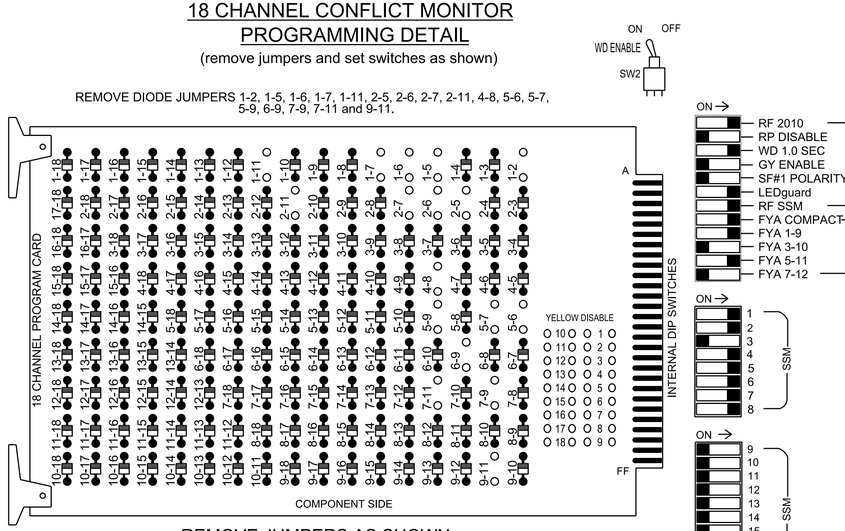
SIG. INVENTORY NO. 11-00631

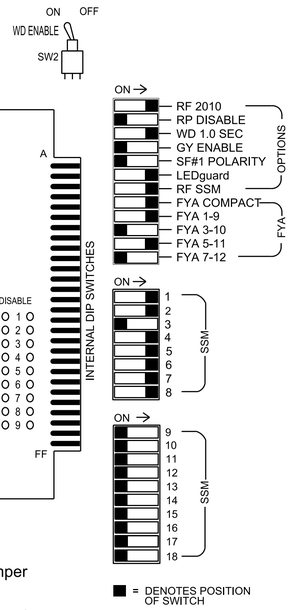
38536.16

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 7.1

18 CHANNEL 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S3, S5, S7, S8, S9, S10, S11
Phases Used.....1, 2, 4, 5, 6, 8
Overlap "1".....*
Overlap "2".....Not Used
Overlap "3".....*
Overlap "4".....Not Used
Overlap "7".....*

*See overlap programming detail on sheet 2

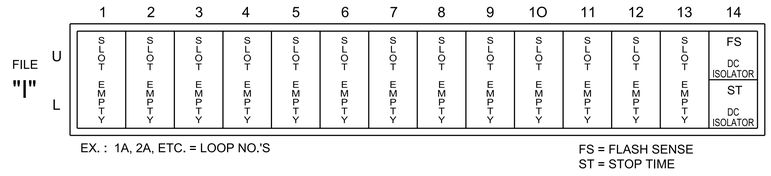
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3		S4	S5	S6	S7	S8	S9		S10	S11	S12
CMU CHANNEL NO.	1	2	9	13	3	4	14	5	6	11	15	7	8	16
PHASE	OL1	2	1 GRN	2 PED	3	4	4 PED	OL3	6	5 GRN	6 PED	OL7	8	8 PED
SIGNAL HEAD NO.	11★	21,22	11★	NU	NU	41,42	NU	51★	61,62	51★	NU	42	81,82	NU
RED		128				101			134			*	107	
YELLOW		129				102			135				108	
GREEN		130				103			136				109	
RED ARROW	125							131						
YELLOW ARROW	126							132				123		
FLASHING YELLOW ARROW	127							133						
GREEN ARROW			114							120		124		
				*							*			

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
★See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

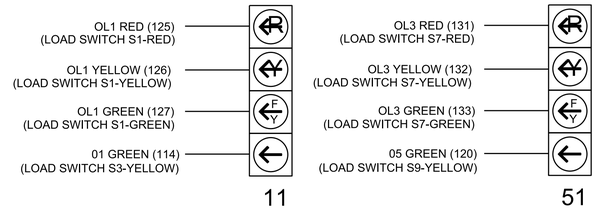


SPECIAL DETECTOR NOTE

Install a video 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.

FYA SIGNAL WIRING DETAIL

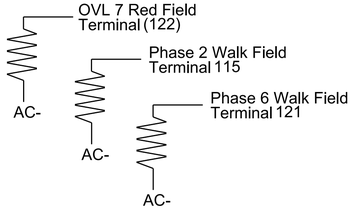
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



This Plan Supersedes Electrical Detail Sealed on 11/16/2023

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-0063T1
DESIGNED: February 2024
SEALED: 3/4/2024
REVISED: N/A

Electrical Detail - Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

US 601 (S. State Street)
at
SR 1146 (Lee Avenue)

Division 11 | Yadkin County | Yadkinville

PLAN DATE: February 2024	REVIEWED BY:
PREPARED BY: Zarrar Zafar	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce 03/06/2024
A90CAEFED9D4410... DATE

SIG. INVENTORY NO. 11-0063T1

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zzafar

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 7.2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

	Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
NOTE: Phase Vehicle 1 Changed to Overlap 1	1	Overlap	1	X		X	1
	2	Phase Vehicle	2	X			2
	3	Phase Vehicle	3		X	X	3
	4	Phase Vehicle	4		X		4
NOTE: Phase Vehicle 5 Changed to Overlap 3	5	Overlap	3	X			5
	6	Phase Vehicle	6	X		X	6
NOTE: Phase Vehicle 7 Changed to Overlap 7	7	Overlap	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

PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 2 PY (field term. 114) to Channel 9 Green (monitor pin 13), from 6 PY (field term. 120) to Channel 10 Green (monitor pin R).

Follow the instructions below to make the appropriate connections:

STEP 1: Fold down rear panel of output file.

STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).

STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

CMU-13 ———————————— 2PY (term. 114)

CMU-R ———————————— 6PY (term. 120)

NOTE: Some cabinet manufacturers use keyed connectors to accomplish this wiring configuration. If connectors are used, fold down the rear panel of the output file and find the set of 3 keyed connectors and connect them as shown below:

1-2PY	1-CMU-13
2-4PY	2-CMU-16
3-6PY	3-CMU-R
4-8PY	4-CMU-U

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEADS 11 & 51

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

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

IO Module 1

	Output Point	Descripton	Output Control Type	Index
NOTICE OUTPUT POINT 33 & 34 CONTROL TYPE & INDEX REASSIGNMENT	33	C1-35	Phase Green	1
	34	C1-36	Phase Green	5
	35	C1-37	Not Active	14
	36	C1-38	Not Active	16

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

This Plan Supersedes Electrical Detail Sealed on 11/16/2023

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 11-0063T1
DESIGNED: February 2024
SEALED: 3/4/2024
REVISED: N/A

Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

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

US 601 (S. State Street)
at
SR 1146 (Lee Avenue)

Division 11 Yadkin County Yadkinville

PLAN DATE:	February 2024	REVIEWED BY:	
PREPARED BY:	Zarrar Zafar	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by:
D. Todd Joyce 03/06/2024
A99CADFDBD4241D DATE

SIG. INVENTORY NO. 11-0063T1

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zzafar

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig.8.0

PHASING DIAGRAM

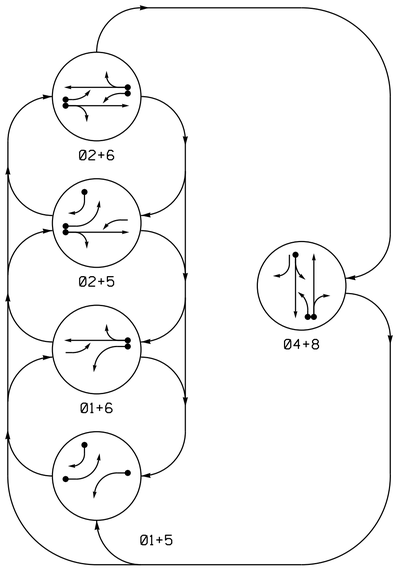
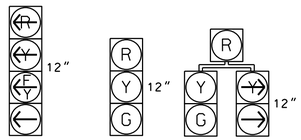


TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←	←	F Y	F Y	~~R~~	~~Y~~
21, 22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	←	F Y	←	F Y	~~R~~	~~Y~~
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A *	6X40	0	*	-	1	15.0	-	X	-	X	-	-
					6	-	-	X	-	X	-	-
2A *	6X6	70	*	*	2	-	-	X	-	X	-	-
4A *	6X40	0	*	-	4	3.0	-	X	-	X	-	-
5A *	6X40	0	*	*	5	15.0	-	X	-	X	-	-
					2	-	-	X	-	X	-	-
5B *	6X40	0	*	-	5	15.0	-	X	-	X	-	-
6A *	6X6	70	*	-	6	-	-	X	-	X	-	-
8A *	6X40	0	*	-	8	3.0	-	X	-	X	-	-
8B *	6X40	0	*	-	8	10.0	-	X	-	X	-	-

* Video Detection Zone

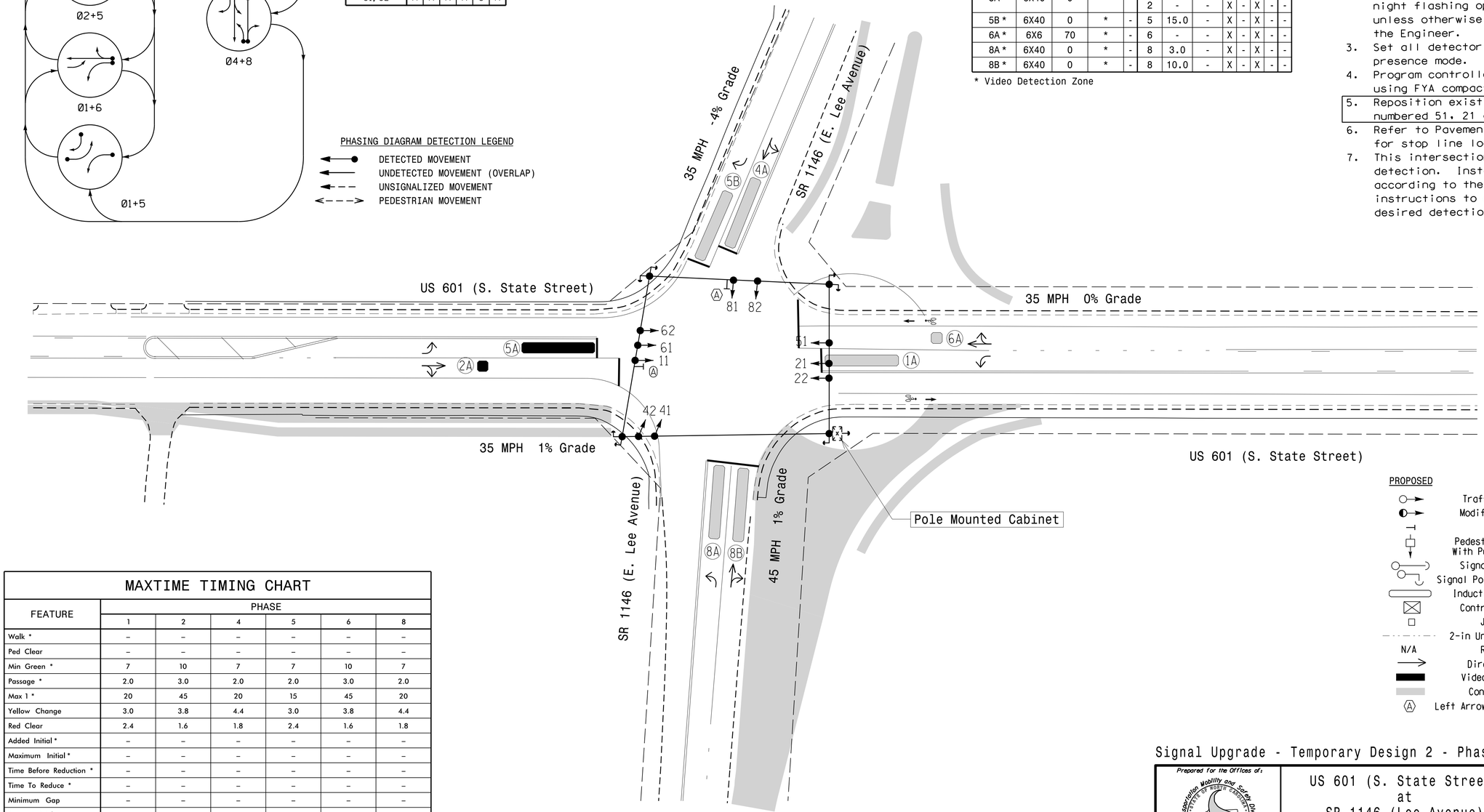
5 Phase
Fully Actuated
Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Program controller to operate using FYA compact mode.
5. Reposition existing signal heads numbered 51, 21 and 22.
6. Refer to Pavement Marking Plan for stop line locations.
7. This intersection uses video detection. Install detectors according to the manufacturer's instructions to acheive the desired detection.

PHASING DIAGRAM DETECTION LEGEND

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



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Video Detection Zone	
	Construction Zone	N/A
A	Left Arrow "ONLY" Sign (R3-5L)	A

MAXTIME TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Walk *	–	–	–	–	–	–
Ped Clear	–	–	–	–	–	–
Min Green *	7	10	7	7	10	7
Passage *	2.0	3.0	2.0	2.0	3.0	2.0
Max 1 *	20	45	20	15	45	20
Yellow Change	3.0	3.8	4.4	3.0	3.8	4.4
Red Clear	2.4	1.6	1.8	2.4	1.6	1.8
Added Initial *	–	–	–	–	–	–
Maximum Initial *	–	–	–	–	–	–
Time Before Reduction *	–	–	–	–	–	–
Time To Reduce *	–	–	–	–	–	–
Minimum Gap	–	–	–	–	–	–
Advance Walk	–	–	–	–	–	–
Non Lock Detector	X	–	X	X	–	X
Vehicle Recall	–	MIN RECALL	–	–	MIN RECALL	–
Dual Entry	–	–	X	–	–	X

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

Signal Upgrade - Temporary Design 2 - Phase II

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

US 601 (S. State Street)
at
SR 1146 (Lee Avenue)

Division 11 Yadkin County Yadkinville

PLAN DATE: February 2024 REVIEWED BY: R.N. Zinser

PREPARED BY: T.A. Kenion REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 043914 ENGINEER RICHARD N. ZINSER

DocuSigned by: R. Nicholas Zinser E13B8B2744774B5F... 03/04/2024

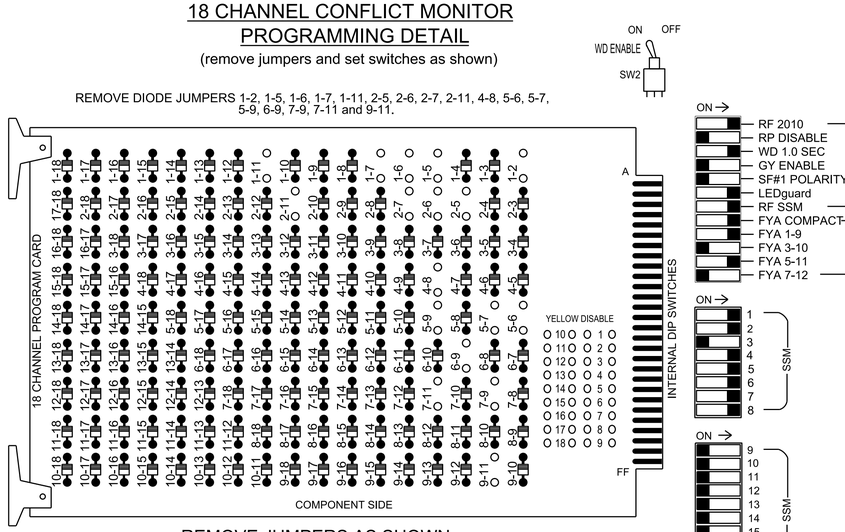
SIG. INVENTORY NO. 11-006312

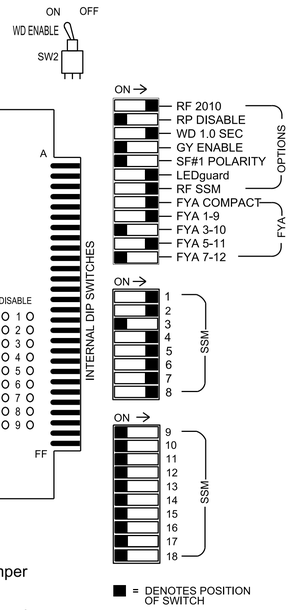
38536.16

PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 8.1

18 CHANNEL 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....18 With Aux. Output File
Load Switches Used.....S1, S2, S3, S5, S7, S8, S9, S10, S11
Phases Used.....1, 2, 4, 5, 6, 8
Overlap "1".....*
Overlap "2".....Not Used
Overlap "3".....*
Overlap "4".....Not Used
Overlap "7".....*

*See overlap programming detail on sheet 2

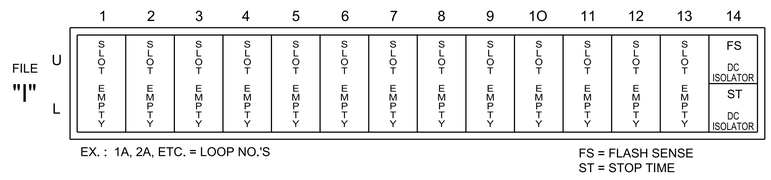
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3		S4	S5	S6	S7	S8	S9		S10	S11	S12
CMU CHANNEL NO.	1	2	9	13	3	4	14	5	6	11	15	7	8	16
PHASE	OL1	2	1 GRN	2 PED	3	4	4 PED	OL3	6	5 GRN	6 PED	OL7	8	8 PED
SIGNAL HEAD NO.	11★	21,22	11★	NU	NU	41,42	NU	51★	61,62	51★	NU	42	81,82	NU
RED		128				101			134			*	107	
YELLOW		129				102			135				108	
GREEN		130				103			136				109	
RED ARROW	125							131						
YELLOW ARROW	126							132				123		
FLASHING YELLOW ARROW	127							133						
GREEN ARROW			114							120		124		
				*							*			

NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
★See pictorial of head wiring in detail this sheet.

INPUT FILE POSITION LAYOUT

(front view)

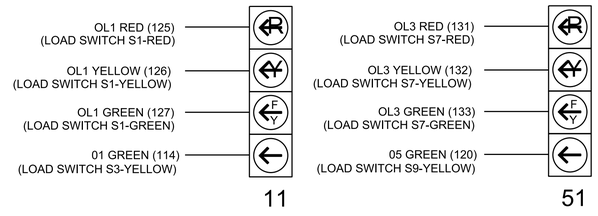


SPECIAL DETECTOR NOTE

Install a video 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.

FYA SIGNAL WIRING DETAIL

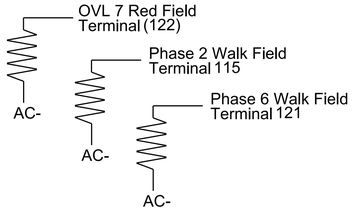
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 11-0063T2
DESIGNED: February 2024
SEALED: 3/4/2024
REVISED: N/A

Electrical Detail - Sheet 1 of 2

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Electrical and Programming Details For:

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

US 601 (S. State Street)
at
SR 1146 (Lee Avenue)

Division 11 | Yadkin County | Yadkinville

PLAN DATE:	February 2024	REVIEWED BY:	
PREPARED BY:	Zarrar Zafar	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce 03/06/2024
DATE

SIG. INVENTORY NO. 11-0063T2

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PROJECT REFERENCE NO.	SHEET NO.
U-5809	Sig. 8.2

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Channel	Control Type	Control Source	Flash Yellow	Flash Red	Flash Alt	MMU Channel
1	Overlap	1	X		X	1
2	Phase Vehicle	2	X			2
3	Phase Vehicle	3		X	X	3
4	Phase Vehicle	4		X		4
5	Overlap	3	X			5
6	Phase Vehicle	6	X		X	6
7	Overlap	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

NOTE: Phase Vehicle 1 Changed to Overlap 1
NOTE: Phase Vehicle 5 Changed to Overlap 3
NOTE: Phase Vehicle 7 Changed to Overlap 7

FYA SIGNAL OUTPUT REMAPPING ASSIGNMENT PROGRAMMING DETAIL FOR SIGNAL HEADS 11 & 51

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

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

IO Module 1

Output Point	Descripton	Output Control Type	Index
33	C1-35	Phase Green	1
34	C1-36	Phase Green	5
35	C1-37	Not Active	14
36	C1-38	Not Active	16

NOTICE OUTPUT POINT 33 & 34 CONTROL TYPE & INDEX REASSIGNMENT

PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 2 PY (field term. 114) to Channel 9 Green (monitor pin 13), from 6 PY (field term. 120) to Channel 10 Green (monitor pin R).

Follow the instructions below to make the appropriate connections:

STEP 1: Fold down rear panel of output file.

STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).

STEP 3: Find the conductors that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file as shown below:

CMU-13 ——— 2PY (term. 114)
CMU-R ——— 6PY (term. 120)

NOTE: Some cabinet manufacturers use keyed connectors to accomplish this wiring configuration. If connectors are used, fold down the rear panel of the output file and find the set of 3 keyed connectors and connect them as shown below:

1-2PY	1-CMU-13
2-4PY	2-CMU-16
3-6PY	3-CMU-R
4-8PY	4-CMU-U

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

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Electrical Detail - Sheet 2 of 2

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NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce 03/06/2024
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