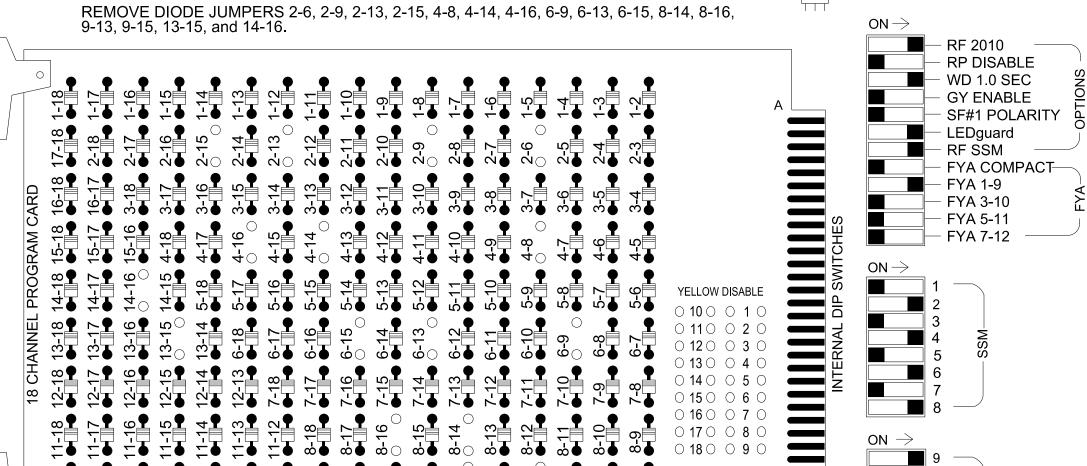


SIG. INVENTORY NO.

(remove jumpers and set switches as shown)

ON OFF WD ENABLE SW2



### REMOVE JUMPERS AS SHOWN

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

**COMPONENT SIDE** 

- 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.

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

## 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.
- 5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville

### SIGNAL HEAD HOOK-UP CHART S9 S10 S11 S12 AUX S1 AUX S2 AUX S3 AUX S4 AUX S5 AUX S6 SWITCH NO. CMU CHANNEL 15 7 8 16 9 10 17 11 12 18 13 | 3 | 4 | 14 | 5 | 6 PED 7 8 PED OL1 OL2 SPARE OL3 OL4 SPARE PHASE 128 | 128 RED 134 | 134 A121

R-2307B

Sig. 70.

129 129 135 | 135 YELLOW GREEN 13Ø 136 RED ARROW 1Ø1 107 YELLOW 102 108 ARROW GREEN 130 103 136 109 ARROW 104 119 113 110

NU = Not Used

115

★ See pictorial of head wiring in detail this sheet.

1Ø6

### **EQUIPMENT INFORMATION**

Controller... Cabinet..... ..332 w/ Aux ...Q-Free MAXTIME Software....

Cabinet Mount..... Base Output File Positions..

...18 With Aux. Output File ..S2, S3, S5, S6, S8, S9, S11, S12, AUX S1 Load Switches Used. ...2, 2PED, 4, 4PED, 6, 6PED, 8, 8PED Phases Used..

Overlap "1".... Overlap "2"..... ...NOT USED

...NOT USED Overlap "3"..... Overlap "4"..... ...NOT USED

\*See overlap programming detail on this sheet

## 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.

121

112

### INPUT FILE POSITION LAYOUT

(front view)

г	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	S	Ø 2	Ø 2	S I	S	Ø 4	S	S	S	S	S	Ø2 PED	Ø6 PED	FS
FILE U	Ö	2A	2C	Ö T	Ö	4 A	Ö	O T	Ō	Ö	O T	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
	E M P	Ø 2	NOT	E M P	E M P	Ø 4	E M P	E M P	E M P	E M P	E M P		Ø8 PED	
	T Y	2B	USED	T Y	T Y	4B	T Y	T Y	T	T	T	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
	S	Ø 6	Ø6	S	S	Ø 8	S	S	S	S	S	S	S	S
FILE U	OT	6A	60	O T	O T	8A	O T	O T	Ö T	O T	O T	D T	O T	O T
J	E M P	Ø 6	NOT	E M	E M p	Ø 8	E M	E M	E M	E M P	E M	E M	E M	E M
	T Y	6B	USED	T Y	T Y	8B	T Y	T Y	T Y	T Y	T Y	TY	T Y	T Y
	<u> </u>		UJLU	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y

### 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	TB2-5,6	I2U	39	1	2	2			Х	Χ	Х			
2B	TB2-7,8	I2L	43	5	3	2			Х	Х	Х			
2C	TB2-9,10	I3U	63	29	4	2			Х	Х	Х			
4A	TB4-9,10	I6U	41	3	8	4			Х		Х			
4B	TB4-11,12	I6L	45	7	9	4			Х		Х			
6A	TB3-5,6	J2U	40	2	16	6			X	Χ	Χ			
6B	TB3-7,8	J2L	44	6	17	6			X	Χ	Χ			
6C	TB3-9,10	J3U	64	30	18	6			X	Χ	Χ			
8A	TB5-9,10	J6U	42	4	22	8			Х		Х			
8B	TB5-11,12	J6L	46	8	23	8			X		Χ			
PED PUSH BUTTONS														
P21,P22	TB8-4,6	I12U	67	33	2	PED 2	NOTE: INPUT FILE POSITION LEGENI						ND: J2L	
P41,P42	TB8-5,6	I12L	69	35	4	PED 4	INSTALL DC ISOLATORS IN INPUT FILE SLOTS FILE J							
P61,P62	TB8-7,9	I13U	68	34	6	PED 6	IN INPUT FILE SLOTS FILE 3 SLOT 2 SLOT 2							
P81,P82	TB8-8,9	I13L	70	36	8	PED 8	LOWER							

### OVERLAP PROGRAMMING

Front Panel

11 

\_\_ 13

14

15

16

17 ∥ 18 −

= DENOTES POSITION OF SWITCH

FS = FLASH SENSE ST = STOP TIME

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1
Туре	FYA 4 - Section
Included Phases	2
Modifier Phases	-
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0
Disable Bridging	X

## **FYA SIGNAL WIRING DETAIL**

(wire signal heads as shown)

OL1 RED (A121) OL1 YELLOW (A122) OL1 GREEN (A123)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1330 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Final Design Electrical Detail

NC 150

Norman Station Boulevard/ Mooresville Festival

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE RMM/JPG

Jason Galloway 5/20/2024

**DOCUMENT NOT CONSIDERED FINAL** 

UNLESS ALL SIGNATURES COMPLETED

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672

ELECTRICAL AND PROGRAMMING

PREPARED BY:

REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

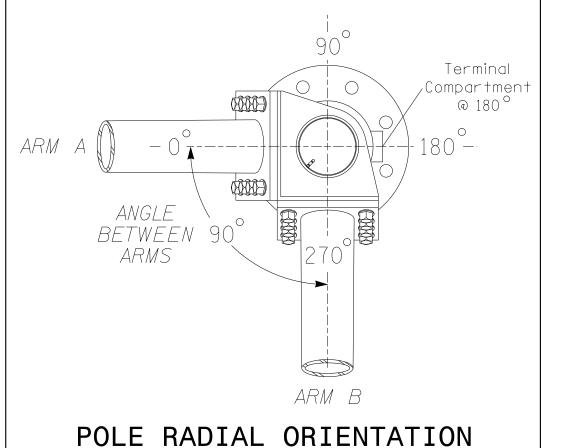
# Street Name See Notes 4 & 5 Н2 See Note 8 H1= 18.70′ Maximum 25.6 ft. See Note 7 Roadway Clearance Design Height 17 ft Minimum 16.5 ft. See Note 7d See Note 7e -High Point of Roadway Surface-G Foundation -Base line reference elev. = 880.38' Elevation View @ 270

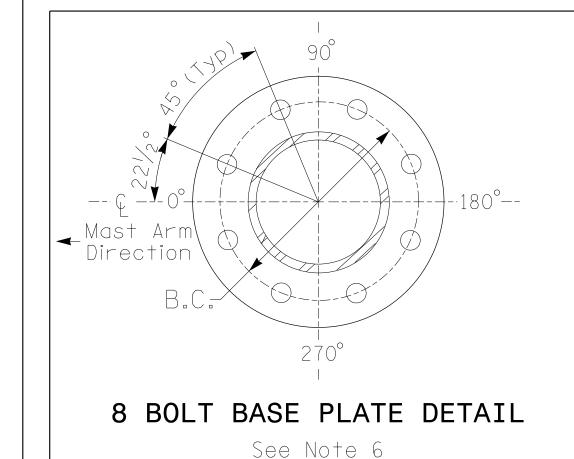
## SPECIAL NOTE

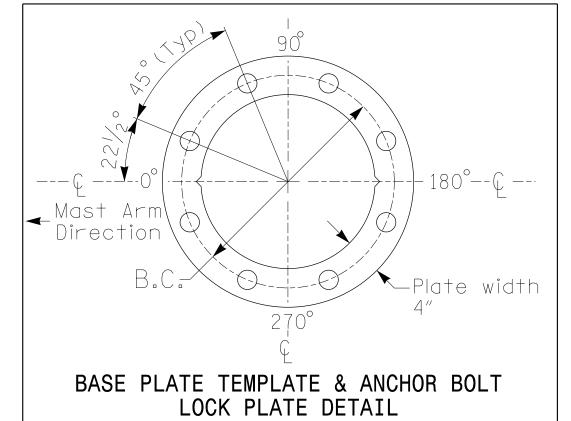
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

### Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at £ Foundation @ ground level	880.38 ft.	880.38 ft.
Elevation difference at High point of roadway surface	-0.38 ft.	-0.38 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.







For 8 Bolt Base Plate

METAL POLE No. 1

R-2307B Sig. 70.2

	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										
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0"L	14 LBS										
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS										

### **NOTES**

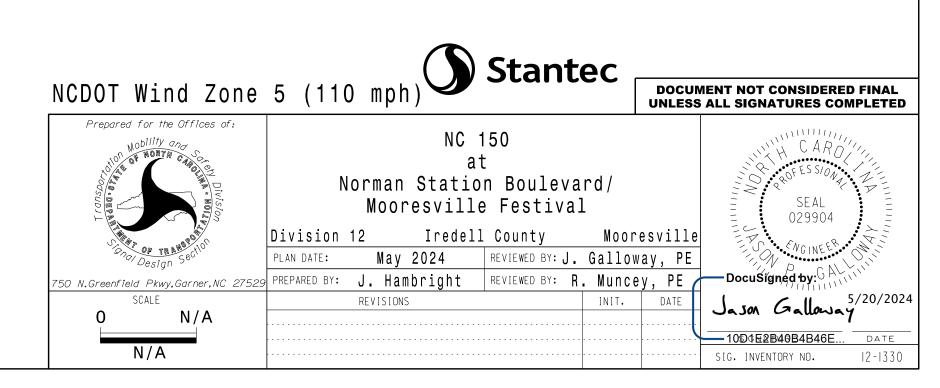
### DESIGN REFERENCE MATERIAL

- 1. Design the traffic signal structure and foundation in accordance with:
- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for
- Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions. • The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to
- the specifications can be found in the traffic signal project special provisions.

- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signal project plans and special provisions.
- The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

### DESIGN REQUIREMENTS

- 2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation. 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions: a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
- b. Signal heads are rigidly mounted and vertically centered on the mast arm.
- c. The roadway clearance height for design is as shown in the elevation views.
- d. The top of the pole base plate is 0.75 feet above the ground elevation.
- e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
- 8. The pole manufacturer will determine the total height (H2) of each pole using the following: Mast arm attachment height (H1) plus 10 feet.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- 11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.
- 12. Install the CCTV camera 2 feet below top of pole.
- 13. Install the weatherhead 1 foot below top of pole.



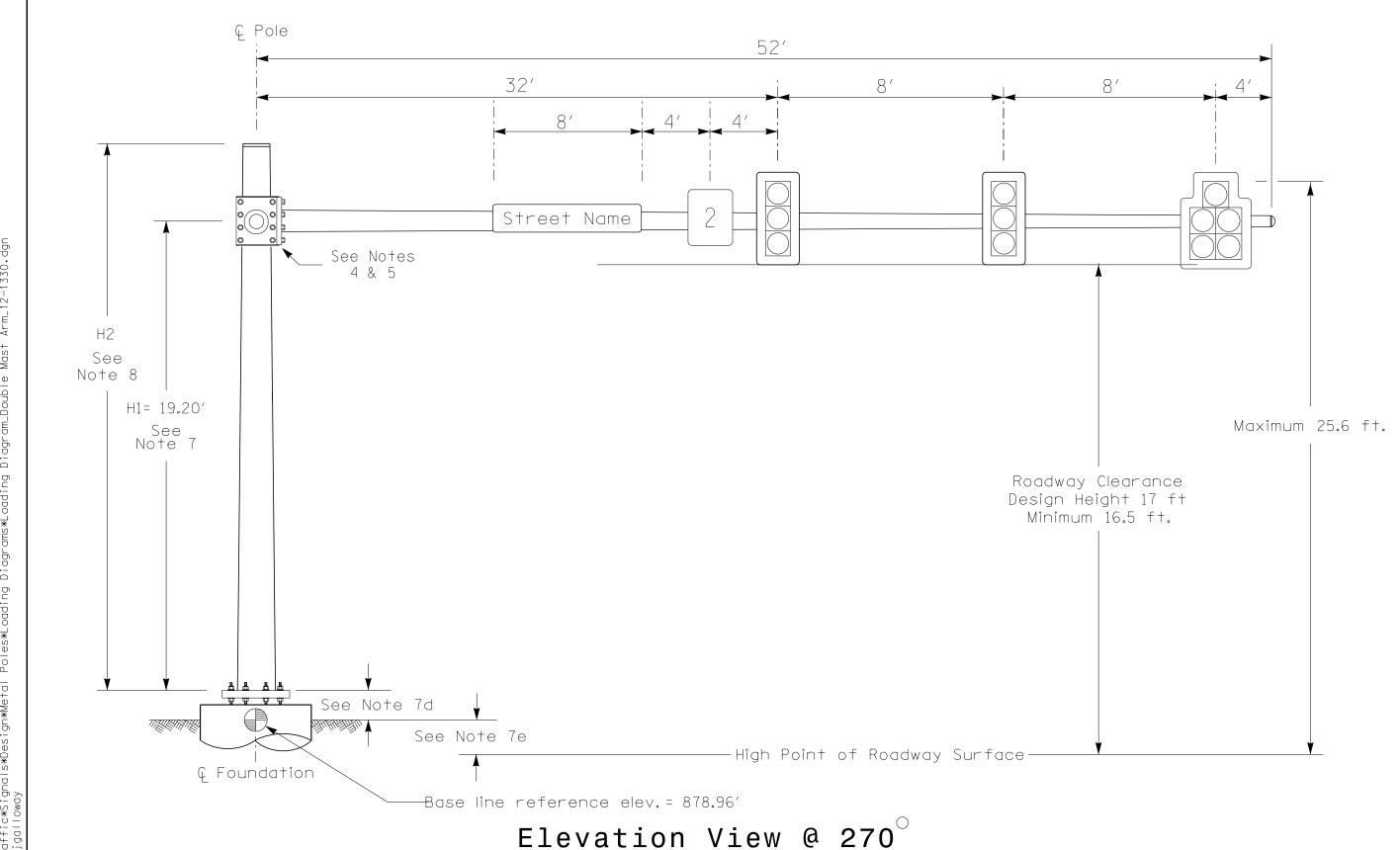
## Elevation View @ O

-High Point of Roadway Surface-

See Note 7e

Base line reference elev. = 878.96

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

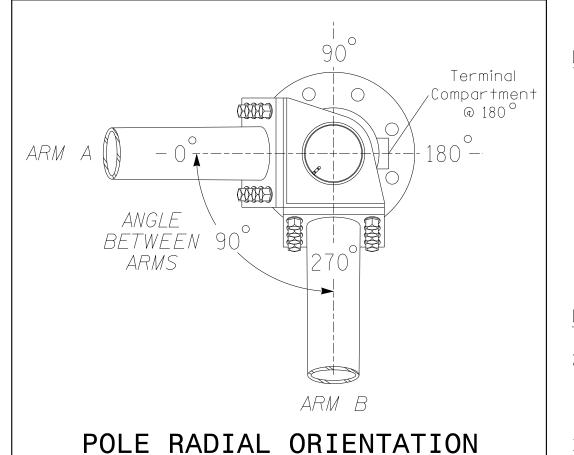


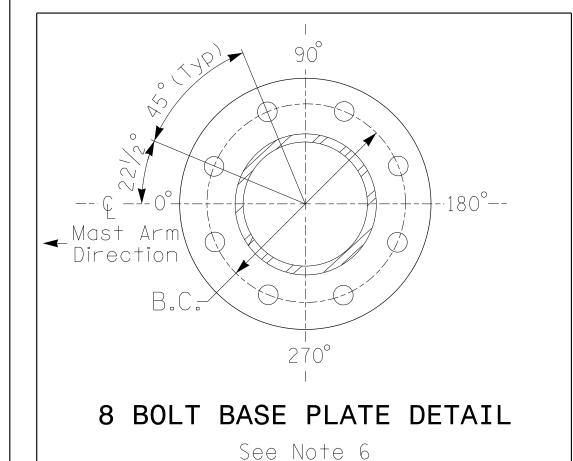
### SPECIAL NOTE

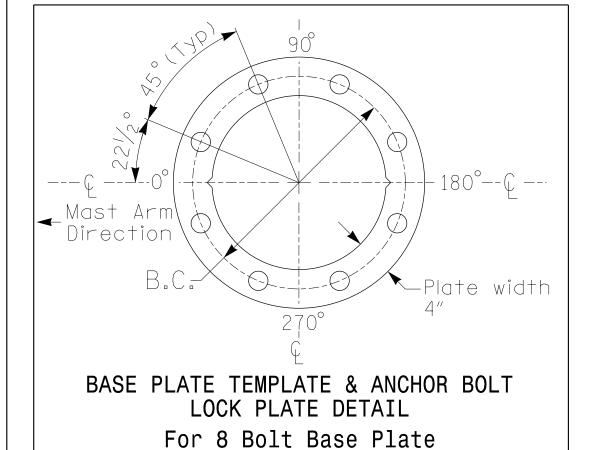
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

# Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at © Foundation @ ground level	878.96 ft.	878.96 ft.
Elevation difference at High point of roadway surface	+0.55 ft.	+0.13 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.







METAL POLE No. 2

R - 2307B	Sig. 70.
PROJECT REFERENCE NO.	SHEET NO

	MAST ARM LOADING SC	HEDU	LE				
LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT			
	RIGID MOUNTED SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE	16.3 S.F.	42.0"W X 56.0"L	103 LBS			
	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5″W X 52.5″L	60 LBS			
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0"L	14 LBS			
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS			

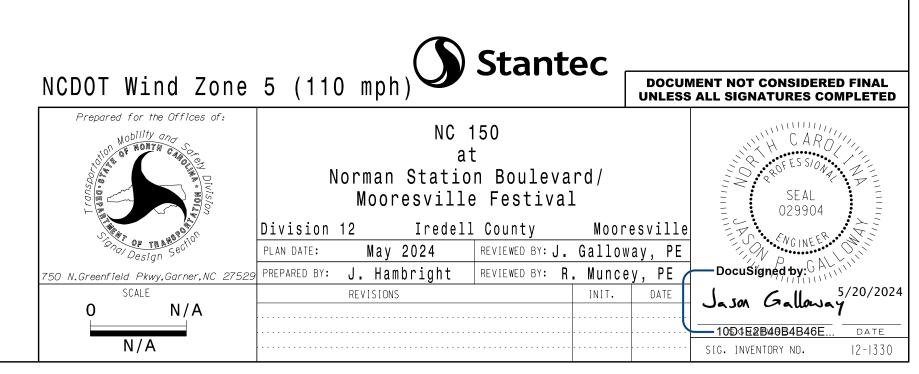
### **NOTES**

### DESIGN REFERENCE MATERIAL

- 1. Design the traffic signal structure and foundation in accordance with:
- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for
- Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signal project plans and special provisions.
- The NCDOT "Metal Pole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

### DESIGN REQUIREMENTS

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



## 2 Phase Fully Actuated w/ Alternate Phasing NC 150 D12-02 MOORESVILLE

## NOTES

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

LEGEND

Traffic Signal Head

Modified Signal Head

Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet

Junction Box

Right of Way Directional Arrow

Video Detection Area

Construction Zone

No Left Turn Sign (R3-2)

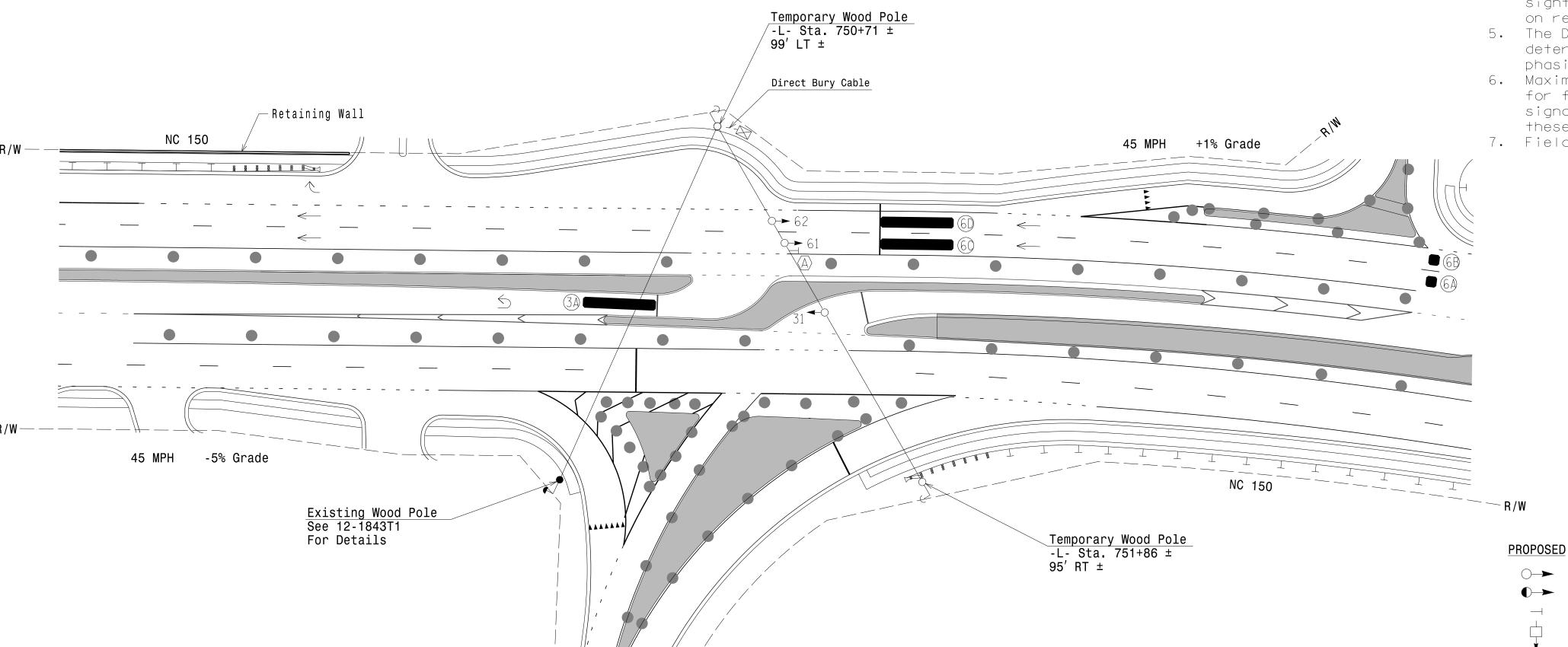
2-in Underground Conduit -----

- 6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- 7. Field adjust temporary poles as needed.

MAXTIME DETECTOR INSTALLATION CHART **DETECTOR** PROGRAMMING 이 CALL DELAY EXTEND 음 I SIZE FROM \_\_ ≥ | PHASE | TIME | TIME (FT) STOPBAR \* |\*| 3 |15.0**★**| - |X|-|X|-\* |\*| 6 | - | - | X | - | X | - | \* \* |\*| 6 | - | - | X|-|X|-|\* \* | \* | 6 | 5.0 | 2.0 | X | - | X | X | \* \* | \* | 6 | 5.0 | 2.0 | X | - | X | X | \*

\* Video Detection Area
Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas

★ Disable delay during Alternate Phasing Operation.



SIGNAL FACE I.D.

All Heads L.E.D.

ALTERNATE PHASING

TABLE OF OPERATION

SIGNAL

FACE

61

62

PHASE

DEFAULT PHASING

TABLE OF OPERATION

SIGNAL

FACE

62

PHASE

MAXTIME T	IMING	CHART		
FFATURE	PH	ASE		
FEATURE	3	6		
Walk *	_	_		
Ped Clear *	_	_		
Min Green	7	12		
Passage *	2.0	6.0		
Max 1 *	30	60		
Yellow Change	3.1	4.4		
Red Clear	4.7	1.6		
Added Initial *	_	-		
Maximum Initial *	_	_		
Time Before Reduction *	_	15		
Time To Reduce *	-	30		
Minimum Gap	_	3.0		
Advance Walk	_	_		
Non Lock Detector	Х	Х		
Vehicle Recall	_	MIN RECALL		
Dual Entry	_	_		

**DEFAULT** 

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

✓ DETECTED MOVEMENT

 $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

ALTERNATE

PHASING DIAGRAM

Ø3

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

New Installation Temporary Design 1 - TMP Phase III



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024

www.stantec.com

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50 N.Greenfield Pkwy,Garner,NC 2

1"=40'

NC 150 WB U-Turn for Consumer Square Western Entrance

N/A

•••

Division 12 Iredell County Mooresville

May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Hambright | REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

Jason Galloway 5/20/2024 SIG. INVENTORY NO. |2-|844T|

**EXISTING** 

**●**→

N/A

N/A

N/A

N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CARO

029904

# 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 Phase Not On 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 NC 150 D12-02\_Mooresville CLS.

	SIGNAL HEAD HOOK-UP CHART																		
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S	8	S9	S1Ø	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		7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	15	(	ò	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31	NU	NU	NU	61	62	NU	NU	NU	NU	NU	31	NU	NU	NU	NU
RED								134	134										
YELLOW				*				135	135										
GREEN									136										
RED ARROW															A124				
YELLOW ARROW															A125				
FLASHING YELLOW ARROW															A126				
GREEN ARROW				118				136											

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

## **EQUIPMENT INFORMATION**

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

\*See overlap programming detail on sheet 2

## INPUT FILE POSITION LAYOUT

(front view)

r	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file <sup>U</sup> "I" L	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EXPTY	Ø 3 3A NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	S L O T E M P T Y	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y
	EX.: 1	A, 2A, E	TC. = L	.00P N	D.'S						FS =	FLASH	SENS	E

18 CHANNEL IP CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

COMPONENT SIDE

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.

REMOVE JUMPERS AS SHOWN

4. Integrate monitor with Ethernet network in cabinet.

REMOVE DIODE JUMPERS 3-10 and 6-10.

ON

SW2

RP DISABLE ─ WD 1.0 SEC

> GY ENABLE — SF#1 POLARITY 📮

- FYA COMPACT-

LEDguard RF SSM

– FYA 1-9 ─ FYA 3-10

> ─ FYA 5-11 — FYA 7-12

12 \_\_\_\_ 13

14

16

18 —

WD ENABLE

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.

## INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
3A	TB4-5,6	I5U	58	20	7 *	3	15.0		Χ		Χ	

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

INPUT FILE POSITION LEGEND: J2L SLOT 2 LOWER

### SEQUENCE DETAIL

Front Panel Main Menu >Controller >Sequence & Phs Config>Sequences

Web Interface Home >Controller >Sequence

Sequence 1

Ring	Sequence Data	
1	6,a,3,b	
2		

LOAD RESISTOR INSTALLATION DETAIL

## THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1844T1

DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)

OL2 RED (A124) ---

OL2 YELLOW (A125) —

OL2 GREEN (A126) -

Ø3 GREEN (118) —

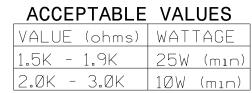
Temporary Design 1 - TMP Phase III Electrical Detail - Sheet 1 of 2

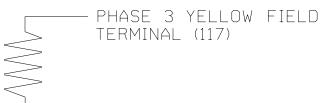
### DOCUMENT NOT CONSIDERED FINAL **UNLESS ALL SIGNATURES COMPLETED**

Jason Galloway 5/20/2024

SIG. INVENTORY NO. |2-|844T|

(install resistor as shown below)







Raleigh, NC 27606

License No. F-0672

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ELECTRICAL AND PROGRAMMING NC 150 WB Prepared for the Offices of: U-Turn for Consumer Square Western Entrance Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE REVIEWED BY: R Muncey, PE PREPARED BY: RMM/JPG REVISIONS INIT. DATE

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 head 31 to run protected turns only.

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

## MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

## MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector	Call Phase	Delay
7	3	0.0

## 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	2
Туре	FYA 4 - Section
Included Phases	6
Modifier Phases	3
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

## MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

## Overlap Plan 2

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о тологр т толт з	_	
Overlap	2	
Туре	FYA 4 - Section	
Included Phases	-	NOTICE INCLUDED PHASE
Modifier Phases	3	
Modifier Overlaps	-	
Trail Green	0	
Trail Yellow	0.0	
Trail Red	0.0	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1844T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III

Electrical Detail - Sheet 2 of 2 ELECTRICAL AND PROGRAMMING NC 150 WB

U-Turn for Consumer Square

Western Entrance Division 12 Iredell County Mooresville May 2024

REVIEWED BY: J Galloway, PE REVIEWED BY: R Muncey, PE PREPARED BY: RMM/JPG REVISIONS INIT. DATE

Jason Galloway 5/20/2024 SIG. INVENTORY NO. |2-1844T|

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3A

PROJECT REFERENCE NO. Sig. 72.0 R-2307B

2 Phase Fully Actuated w/ Alternate Phasing NC 150 D12-02 MOORESVILLE  $CL\overline{S}$ NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024 2. Do not program signal for late night

flashing operation unless otherwise

directed by the Engineer. 3. Set all detector units to presence mode.

4. The Division Traffic Engineer will determine the hours of use for each phasing plan.

5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

MAXTIME DETECTOR INSTALLATION CHART DETECTOR PROGRAMMING 의 call | DELAY | EXTEND | ; SIZE FROM (FT) STOPBAR ≥ PHASE TIME 6X40 0 2-4-2 X 3 15.0★ - X - X - X 5 X 6 -- | X | X | X | - | X 6X6 300 5 X 6 - - X X X - X 300 | 5 | X | 6 | - | - | X | X | X | - | X |

★ Disable delay during Alternate Phasing Operation.

62,63 ALTERNATE PHASING PHASING DIAGRAM DETECTION LEGEND TABLE OF OPERATION DETECTED MOVEMENT UNDETECTED MOVEMENT (OVERLAP) SIGNAL UNSIGNALIZED MOVEMENT  $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT FACE 61 62,63 — Retaining Wall NC 150 

ALTERNATE

PHASING DIAGRAM

Metal Pole #1 (Mast Arm = 60 ft.) -L- Sta. 751+12 ± 73' LT ± 45 MPH +1% Grade **>** 63 b→ 62

SIGNAL FACE I.D.

All Heads L.E.D.

62,63

DEFAULT PHASING

TABLE OF OPERATION

SIGNAL

FACE

61

PHASE

PHASE

MAXTIME T	IMING	CHART			
FEATURE	PHASE				
FEATURE	3	6			
Walk *	_	_			
Ped Clear *	_	_			
Min Green	7	12			
Passage *	2.0	6.0			
Max 1 *	15	60			
Yellow Change	3.1	4.4			
Red Clear	4.7	1.6			
Added Initial *	_	_			
Maximum Initial *	_	1.0			
Time Before Reduction *	_	34			
Time To Reduce *	_	15			
Minimum Gap	_	3.0			
Advance Walk	_	3			
Non Lock Detector	Х	_			
Vehicle Recall	_	MIN RECALL			
Dual Entry	_	_			

**DEFAULT** 

PHASING DIAGRAM

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

Traffic Signal Head Modified Signal Head 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 Metal Pole with Mastarm Directional Drill (#) x 2" Conduit N/A Type II Signal Pedestal No Left Turn Sign (R3-2)

LEGEND

**EXISTING** 

CARN

029904

New Installation - Final Design Stantec

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1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED NC 150 WB U-Turn for Consumer Square Western Entrance

**PROPOSED** 

|Division 12 | Iredell County | Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE 50 N.Greenfield Pkwy,Garner,NC 275 REVISIONS INIT. DATE

Jason Galloway 5/20/2024 SIG. INVENTORY NO.

## 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 Phase Not On 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 NC 150 D12-02\_Mooresville CLS.

### SIGNAL HEAD HOOK-UP CHART S9 S10 S11 S12 AUX S1 AUX S2 AUX S3 AUX AUX S5 AUX S5 S6 S1 | S2 | S3 | S4 | S5 | S6 | S7 CMU CHANNEL 15 7 8 16 9 10 17 11 12 18 1 2 13 3 4 14 5 7 8 8 OL1 OL2 SPARE OL3 OL4 SPARE 31 NU NU NU 61 62,63 NU NU NU NU NU 31 NU NU NU NU SIGNAL HEAD NO. 134 | 134 RED 135 | 135 YELLOW 136 GREEN RED ARROW A124 YELLOW A125 ARROW FLASHING YELLOW ARROW A126 GREEN ARROW

136

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

### **EQUIPMENT INFORMATION**

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

\*See overlap programming detail on sheet 2

## INPUT FILE POSITION LAYOUT

(front view)

18 CHANNEL IP CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

4. Integrate monitor with Ethernet network in cabinet.

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

TB3-5,6

TB3-9,10

see the Detector Programming Detail for

Alternate Phasing on sheet 2 of 2.

J3U | 64 | 30

\* For the detectors to work as shown on the signal design plan,

COMPONENT SIDE

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.

REMOVE JUMPERS AS SHOWN

REMOVE DIODE JUMPERS 3-10 and 6-10.

								(	,						
	,	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ILE	U	S L O T	S L O T	S L O T	S L O T	Ø 3 <b>3A</b>	S L O T	S L O T	SLOT L	S L O T	S L O T	S L O T	S L O T	S L O T	FS DC ISOLATOR
1"	L	E M P T Y	E M P T Y	E M P T Y	E M P T Y	NOT USED	E M P T Y	DC ISOLATOR							
ILE	U	S L O T	Ø 6 6A	∅ 6 <b>6C</b>	S L O T	S L O T	S L O T	S L O T	SLOT	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T
J"	L	E M P T Y	Ø 6 6B	NOT USED	E M P T Y										

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP INPUT PIN INPUT DETECTOR CALL DELAY EXTEND TERMINAL FILE POS. NO. POINT NO. PHASE TIME TIME

FS = FLASH SENSE ST = STOP TIME

ADDED

Χ

FILE J -

SLOT 2

**LOWER** 

INPUT FILE POSITION LEGEND: J2L

Χ

Χ

Χ

GREEN

ON

SW2

RF 2010

RP DISABLE ■ WD 1.0 SEC

GY ENABLE

LEDguard

- RF SSM

FYA 1-9 FYA 3-10

— FYA 7-12

12 13

14

16

= DENOTES POSITION OF SWITCH

- SF#1 POLARITY 📮

FYA COMPACT—

WD ENABLE

### SEQUENCE DETAIL

Front Panel Main Menu > Controller > Sequence & Phs Config > Sequences

Web Interface Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	6,a,3,b
2	

# OL2 YELLOW (A125) —

OL2 RED (A124) ---

OL2 GREEN (A126) -Ø3 GREEN (118) —

FYA SIGNAL WIRING DETAIL

(wire signal head as shown)

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1844 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

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

R-2307B

Sig. 72.

U-Turn for Consumer Square

Western Entrance

Mooresville May 2024 REVIEWED BY: J Galloway, PE

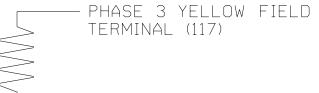
Jason Galloway 5/20/2024

SIG. INVENTORY NO. |2-1844

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES VALUE (ohms) | WATTAGE 1.5K - 1.9K | 25W (min) 2.0K - 3.0K | 10W (mın) |





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Final Design Electrical Detail - Sheet 1 of 2 ELECTRICAL AND PROGRAMMING NC 150 WB

Division 12 Iredell County

PREPARED BY: RMM/JPG REVIEWED BY: R Muncey, PE REVISIONS

INIT. DATE

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 head 31 to run protected turns only.

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

## MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan		
*	2	2		

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

## MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 3A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Detector Call Phase Delay

## 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	2
Туре	FYA 4 - Section
Included Phases	6
Modifier Phases	3
Modifier Overlaps	-
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0

## MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

## Overlap Plan 2

о тологр т толт з	_	
Overlap	2	
Туре	FYA 4 - Section	
Included Phases	-	NOTICE INCLUDED PHASE
Modifier Phases	3	
Modifier Overlaps	-	
Trail Green	0	
Trail Yellow	0.0	
Trail Red	0.0	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1844 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Final Design

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING NC 150 WB

REVISIONS

U-Turn for Consumer Square Western Entrance

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE REVIEWED BY: R Muncey, PE PREPARED BY: RMM/JPG

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INIT. DATE Jason Galloway 5/20/2024 SIG. INVENTORY NO. |2-1844

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**Elevation View** 

-High Point of Roadway Surface-

See Note 7d

C Foundation

See Note 7e

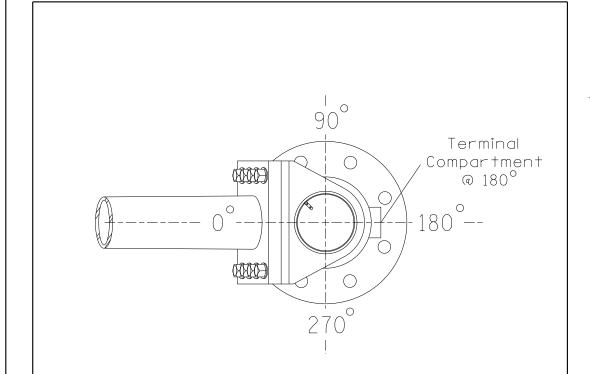
Base line reference elev. = 860.09'-

### SPECIAL NOTE

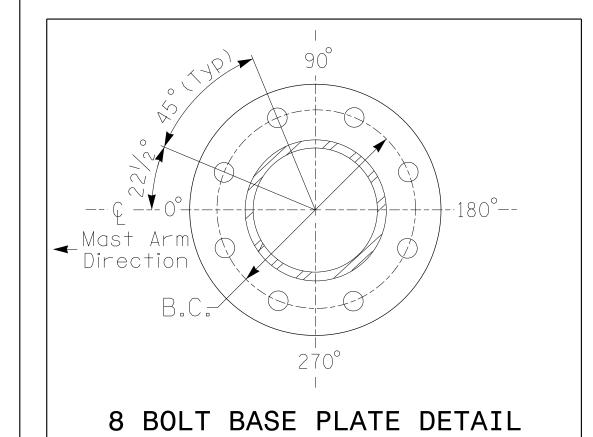
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

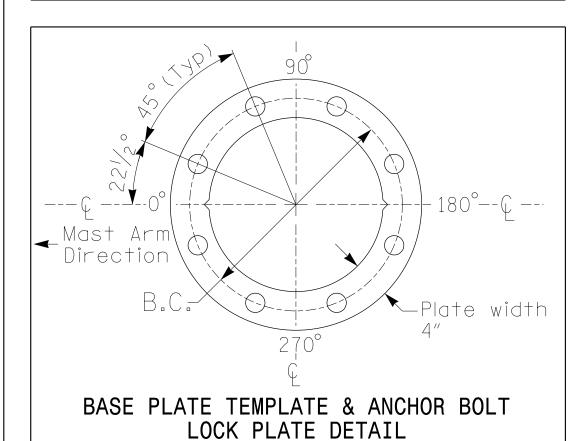
### Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at £ Foundation @ ground level	860.09 ft.	
Elevation difference at High point of roadway surface	-0.85 ft.	
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	



### POLE RADIAL ORIENTATION





For 8 Bolt Base Plate

See Note 6

METAL POLE No. 1

PROJECT REFERENCE NO. SHEET NO. R-2307B Sig. 72.3

	MAST ARM LOADING SC	HEDU	LE	
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
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0"L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS

### **NOTES**

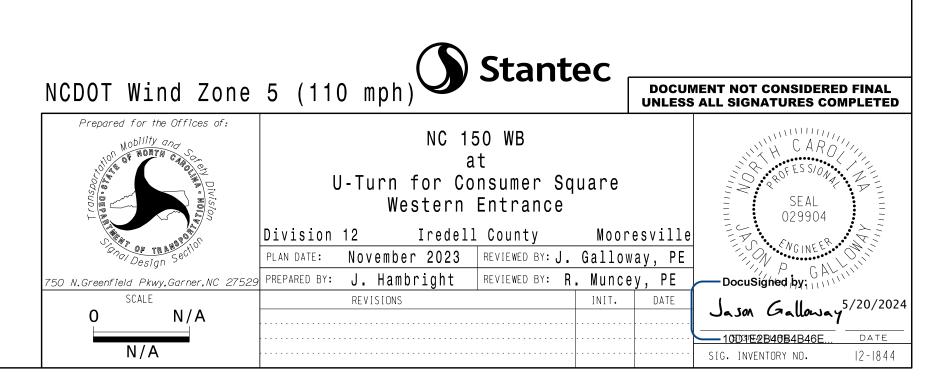
### DESIGN REFERENCE MATERIAL

- 1. Design the traffic signalstructure 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 signalproject plans and specialprovisions.
- The NCDOT "MetalPole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

### DESIGN REQUIREMENTS

- 2. Design the traffic signalstructure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- 6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions: a. Mast arm slope and deflection are not considered in determining the arm attachment
- height as they are assumed to offset each other.

  b. Signalheads 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 leveland the high point of the roadway.
- 8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
- Mast arm attachment height (H1) plus 2 feet, or
- H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- 11. The contractor is responsible for providing soilpenetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.



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# 2 Phase Fully Actuated w/ Alternate Phasing

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures"
- flashing operation unless otherwise
- 4. Locate new cabinet so as not to obstruct
- 5. The Division Traffic Engineer will determine the hours of use for each
- for free-run operation only. Coordinated signal system timing values supersede these values.

NC 150 D12-02 MOORESVILLE CLS **NOTES** 

dated January 2024. 2. Do not program signal for late night

directed by the Engineer. 3. Set all detector units to presence mode.

sight distance of vehicles turning right on red.

phasing plan. 6. Maximum times shown in timing chart are

7. Field adjust temporary poles as needed.

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 N/A Video Detection Area Construction Zone N/A N/A Drums No Left Turn Sign (R3-2)

"NO TURN ON RED" Sign (R10-11)

"YIELD" Sign (R1-2)

No U-Turn Sign (R3-4)

**LEGEND** 

**EXISTING** 

**DOCUMENT NOT CONSIDERED FINAL** 

UNLESS ALL SIGNATURES COMPLETED

CARN

029904

NC 150 EB Consumer Square Eastern Entrance

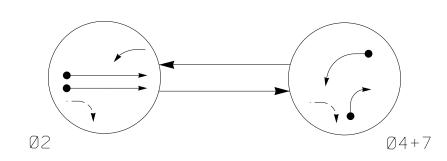
Division 12 Iredell County May 2024

**PROPOSED** 

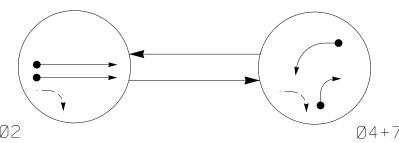
Mooresville REVIEWED BY: J Galloway, PE REVISIONS INIT. DATE

PREPARED BY: J Hambright | REVIEWED BY: R Muncey, PE 50 N.Greenfield Pkwy,Garner,NC 2 Jason Galloway 5/20/2024 1"=40' SIG. INVENTORY NO. |2-|843T|

## DEFAULT PHASING DIAGRAM



### ALTERNATE PHASING DIAGRAM



DEFAULT TABLE OF (		_	-
	P	'HAS	Е
SIGNAL FACE	Ø 2	Ø 4 + 7	FLASH
21	1	R	R
22	G	R	R
41,42	R	-	R
	F		

TABLE OF	0P	ER	ATI	ON
		Р	HAS	E
SIGNAL FACE		Ø 2	Ø 4 + 7	FLAST
21		1	R	R
22		G	R	R
41,42		R	-	R
71	4	R	-	<b>→</b>

ALTERNATE PHASING

	All Heads	s L.E.D.	
12" 71	R Y 12"	R Y 12" G 22	12" 41,42

SIGNAL FACE I.D.

71 <del>| F</del> | - | - R

PHASING DIAGRAM DETECTION LEGEND DETECTED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP) UNSIGNALIZED MOVEMENT

PEDESTRIAN MOVEMENT

-Retaining Wall NC 150 -4% Grade

Temporary Wood Pole

-L- Sta. 749+87 ± 95' RT ±

MAXTIME TIMING CHART

PHASE FEATURE Ped Clear \* \_ Min Green 12 7 6.0 2.0 2.0 Max 1 \* 60 30 4.9 3.0 Yellow Change 3.0 Red Clear 2.9 3.2 Added Initial \* Maximum Initial \* Time Before Reduction Time To Reduce \* Minimum Gap 3.0 Advance Walk Non Lock Detector Χ Χ Vehicle Recall MIN RECALL

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

Temporary Design 1 - TMP Phase III

New Installation

\Existing Wood Pole See 12-1844T1

For Details

MAXTIME DETECTOR INSTALLATION CHART

Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas

+2% Grade

★ Disable delay during Alternate Phasing Operation.

PROGRAMMING

| 이 CALL | DELAY | EXTEND PHASE TIME TIME

\* |\* 2 | - | - | X | - | X | - | \* \* |\* 2 | - | - |X| - |X| - |\*|

\* |\* 2 | 5.0 | 2.0 |X| - |X|X|\*

\* |\* 2 | 5.0 | 2.0 |X| - |X|X|\*

\* |\*| 4 | - | - |X|-|X|-|\*|

\* |\*| 7 |15.0**★**| - |X|-|X|-|\*|

DETECTOR

(FT) STOPBAR

6X40 0

\* Video Detection Area

7A

Existing Wood Pole
See 12-1844T1

For Details

DISTANCE

FROM

Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672

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**Dual Entry** 

2. Program phases 4 and 7 for Dual Entry.

- 3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville CLS.

### **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, S10, AUX S5
Phases Used	2, 4, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	*
•	

\*See overlap programming detail on sheet 2

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

## INPUT FILE POSITION LAYOUT

18 CHANNEL IP CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-12,4-7,4-12, and 7-12.

4. Integrate monitor with Ethernet network in cabinet.

COMPONENT SIDE

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.

REMOVE JUMPERS AS SHOWN

	(front view)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file <sup>U</sup> "I" L	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 7 7A NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	NJOH EMPHY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	EX.: 1	K.: 1A, 2A, ETC. = LOOP NO.'S									FS =	FLASH	SENS	E

## INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
7A	TB5-5.6	J5U	57	19	21 *	7	15.0		Х		Х	

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

INPUT FILE POSITION LEGEND: J2L SLOT 2 -LOWER -

ST = STOP TIME

ON OFF

- RF 2010 — - RP DISABLE

GY ENABLE

SF#1 POLARITY

FYA COMPACT—

─ WD 1.0 SEC

LEDguard

RF SSM

FYA 1-9

FYA 3-10 FYA 5-11

FYA 7-12

] 13

14

15 16

17 ີ 18 −

= DENOTES POSITION OF SWITCH

WD ENABLE

SW2

## 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)

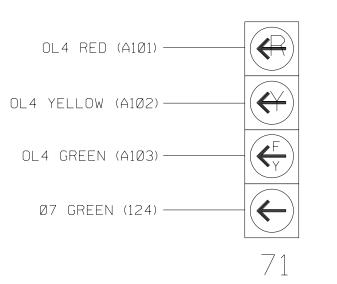
Phase 7 Yellow Field Terminal (123)

## 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)



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THE SIGNAL DESIGN: 12-1843T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING NC 150 EB Consumer Square

Eastern Entrance Division 12 Iredell County Mooresville

THIS ELECTRICAL DETAIL IS FOR

May 2024 REVIEWED BY: J Galloway, PE RMM/JPG REVIEWED BY: R Muncey, PE PREPARED BY: REVISIONS INIT. DATE

Jason Galloway 5/20/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. |2-|843T

Sig. 73.

R-2307B

LOAD SWITCH NO. S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 AUX AUX AUX AUX AUX S5 S6 CMU CHANNEL NO. 13 3 4 14 5 6 15 7 8 16 9 10 17 11 12 18 PHASE HEAD NO. 1Ø1 RED 128 | 128 YELLOW 129 | 129 GREEN 130 RED ARROW A1Ø1 YELLOW 102 A102 ARROW FLASHING YELLOW ARROW A1Ø3 GREEN 103 124

SIGNAL HEAD HOOK-UP CHART

NU = Not Used

ARROW

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

Stantec

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
	2	2

### ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for heads 71 to run protected turns only.

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

## MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern Veh Det Plan Overlap Plan

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

## MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Plan 2

Delay Detector Call Phase 21 0.0

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

## MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

## Overlap Plan 2

Trail Red

•		
Overlap	4	
Туре	FYA 4 - Section	
Included Phases	-	NOTICE INCLUDED PHAS
Modifier Phases	7	
Modifier Overlaps	-	
Trail Green	0	
Trail Yellow	0.0	

0.0

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1843T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING

NC 150 EB Consumer Square Eastern Entrance

Mooresville Division 12 Iredell County May 2024 REVIEWED BY: J Galloway, PE RMM/JPG REVIEWED BY: R Muncey, PE PREPARED BY: INIT. DATE

Jason Galloway 5/20/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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**Stantec** 

REVISIONS

SIG. INVENTORY NO. |2-1843T|

### 2 Phase Fully Actuated w/ Alternate Phasing NC 150 D12-02 MOORESVILLE $CL\overline{S}$

## NOTES

- 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
- 3. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- 4. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- 5. The Division Traffic Engineer will determine the hours of use for each phasing plan.
- 6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- 7. Pedestrian pedestals are conceptual and shown for reference only. See 2024 NCDOT Roadway Standard Drawings for push button location details.

LEGEND

Traffic Signal Head Modified Signal Head

Sign Pedestrian Signal Head

With Push Button & Sign

No U-Turn Sign (R3-4) (SEE FIGURE 1)

**EXISTING** 

N/A

N/A

**DOCUMENT NOT CONSIDERED FINAL** 

UNLESS ALL SIGNATURES COMPLETED

CARO

029904

MAXTIME DETECTOR INSTALLATION CHART DETECTOR PROGRAMMING DISTANCE SIZE | FROM TURNS STOPBAR ≥ PHASE TIME TIME 6X6 300 5 | X | 2 | - | - | X | X | X | 5 | X | 2 | - | - | X | X | X | - | X 6X6 300 5 | X | 2 | - | - | X | X | X | - | X | 0 | 2-4-2 | X | 4 | - | - | X | - | X 7A | 6X40 | 0 | 2-4-2 | X | 7 | ★15.0 | - | X | - | X | - | X |

45 MPH 2% Grade

NC 150

★ Disable delay during Alternate Phasing Operation.

DEFAULT PHASING ALTERNATE PHASING TABLE OF OPERATION TABLE OF OPERATION PHASE SIGNAL SIGNAL FACE FACE 22,23 22,23 41,42 41,42 P21,P22 P21**,**P22 P23**,**P24 P23**,**P24

PHASE

41,42

SIGNAL FACE I.D.

All Heads L.E.D.

Existing Pedestal
See 12-1844
For Details

Retaining Wall -NC 150 

-4% Grade

04+7

45 MPH

MAXTIME TIMING CHART PHASE **FEATURE** \_ Ped Clear \* Min Green 7 Passage 6.0 2.0 2.0 60 30 30 4.9 3.0 Yellow Change 3.0 2.7 3.4 Red Clear 2.8 Added Initial \* 34 Maximum Initial \* \_ Time Before Reduction 15 \_ Time To Reduce \* 30 \_ 3.0 Minimum Gap Advance Walk \_ Non Lock Detector Χ Χ

DEFAULT

PHASING DIAGRAM

ALTERNATE

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

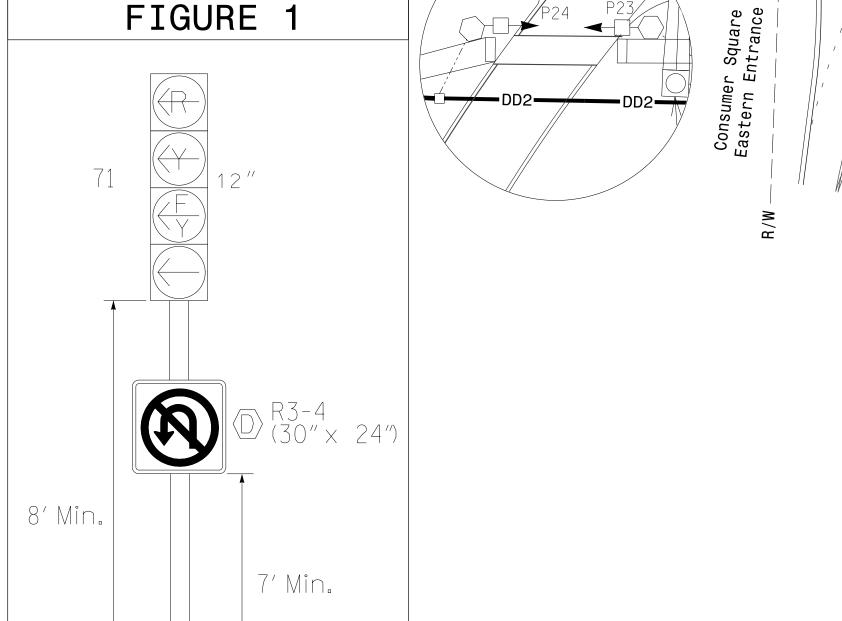
 $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

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

MIN RECALL



Metal Pole #2 (Mast Arm = 42 ft.) -L- Sta. 751+99 ± 90' RT ± Metal Pole #1 (Mast Arm = 65 ft.) -L- Sta. 750+92 ± 78' RT ±

22 **←**0

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 Metal Pole with Mastarm Directional Drill (#) x 2" Conduit ----- DD# -----Type II Signal Pedestal Oversized Junction Box No Left Turn Sign (R3-2) "NO TURN ON RED" Sign (R10-11) "YIELD" Sign (R1-2)

**PROPOSED** 

New Installation - Final Design Stantec Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300

Raleigh, NC 27606

Tel. (919) 851-6866

Fax. (919) 851-7024

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NC 150 EB

Consumer Square Eastern Entrance Iredell County

Division 12 Mooresville REVIEWED BY: J Galloway, PE May 2024

PREPARED BY: J Hambright | REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE Jason Galloway 5/20/2024 SIG. INVENTORY NO.

50 N.Greenfield Pkwy,Garner,NC 2 1"=40'

Vehicle Recall

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

ON OFF

- RF 2010 - RP DISABLE

■ WD 1.0 SEC

 LEDguard RF SSM

> - FYA 1-9 FYA 3-10

- FYA 5-11 ─ FYA 7-12

= DENOTES POSITION OF SWITCH

- GY ENABLE ☐ - SF#1 POLARITY ☐

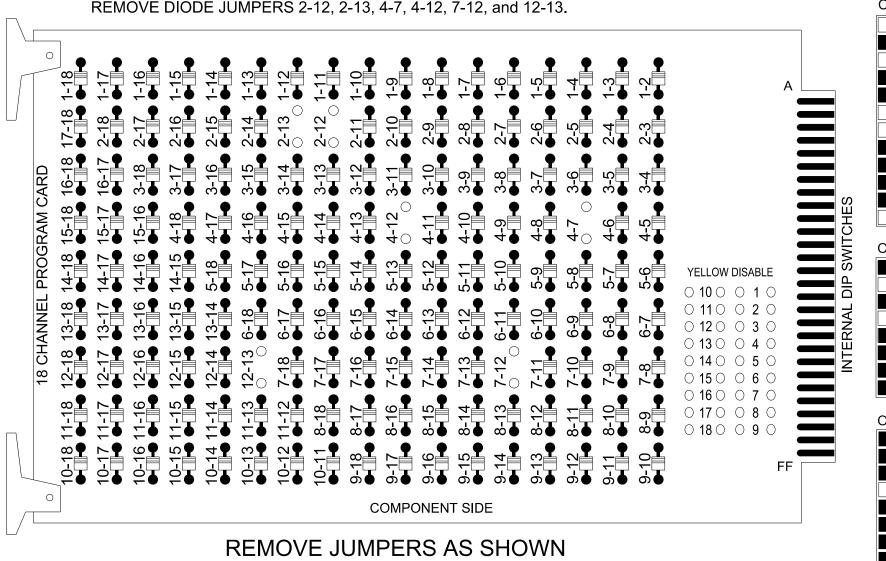
─ FYA COMPACT─

WD ENABLE \

SW2

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-12, 2-13, 4-7, 4-12, 7-12, and 12-13.



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.

INPUT FILE POSITION LAYOUT

INPUT FILE CONNECTION & PROGRAMMING CHART

INPUT PIN INPUT DETECTOR CALL DELAY EXTEND EXTEND ADDED INITIAL

21 \*

4. Integrate monitor with Ethernet network in cabinet.

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

TB5-5,6

Alternate Phasing on sheet 2 of 2.

7A

PED PUSH

TERMINAL FILE POS. NO. POINT

43

J5U | 57 | 19

### 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 7 for Dual Entry.
- 3. Program controller to start up in phase 2 Green No Walk and 6 Phase Not On.
- 4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville CLS.

## **EQUIPMENT INFORMATION**

\*See overlap programming details on sheet 2

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, S10, AUX S5
Phases Used	2, 2PED, 4, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	*

NU = Not Used

LOAD SWITCH NO.

CMU CHANNEL NO.

PHASE

SIGNAL HEAD NO.

RED

YELLOW

GREEN

RED ARROW

YELLOW

ARROW

FLASHING YELLOW ARROW

GREEN

ARROW

128 | 128 |

129 | 129 |

13Ø

13Ø

113

115

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

21 22,23 P21,P22 NU 41,42 NU NU NU NU NU

1Ø1

102

103

★ See pictorial of head wiring in detail this sheet.

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.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

### FYA SIGNAL WIRING DETAIL (wire signal heads as shown)

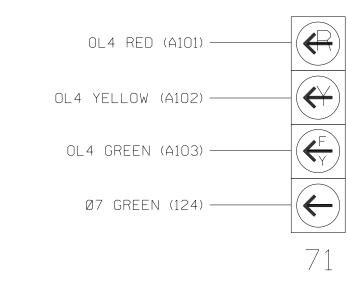
SIGNAL HEAD HOOK-UP CHART

 S3
 S4
 S5
 S6
 S7
 S8
 S9
 S10
 S11
 S12
 AUX S1
 AUX S2
 AUX S3
 AUX S5
 S6
 S6

13 3 4 14 5 6 15 7 8 16 9 10 17 11 12 18

124

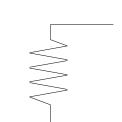
71 NU NU NU NU NU NU



## LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

E VALUES
Wattage
25W (min)
10W (min)



Phase 7 Yellow Field Terminal (123)

THE SIGNAL DESIGN: 12-1843 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

# Final Design

Electrical Detail - Sheet 1 of 2

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

R-2307B

Sig. 74.

A1Ø1

A1Ø2

ELECTRICAL AND PROGRAMMING

NC 150 EB SR 3290 (Rolling Hills Road)

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE RMM/JPG

THIS ELECTRICAL DETAIL IS FOR

Jason Galloway 5/20/2024

BUTTONS NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I12. | P21,P22,P23,P24 | TB8-4,6 | I12U | 67 | 33 | 2 | PED 2 \* For the detectors to work as shown on the signal design plan, see the Detector Programming Detail for

INPUT FILE POSITION LEGEND: J2L

Χ Χ

Χ

FS = FLASH SENSE ST = STOP TIME

> FILE J SLOT 2 LOWER

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PREPARED BY:

Division 12 REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

029904

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 head 71 to run protected turns only.

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

# MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

# MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOPS 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Plan 2

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.

Detector	Call Phase	Delay	
21	7	0.0	

# 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	4
Туре	FYA 4 - Section
Included Phases	2
Modifier Phases	7
Modifier Overlaps	
Trail Green	0
Trail Yellow	0.0
Trail Red	0.0
·	·

# MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

### Overlap Plan 2

•		
Overlap	4	
Туре	FYA 4 - Section	
Included Phases	1	NOTICE INCLUDED PHASE
Modifier Phases	7	
Modifier Overlaps	1	
Trail Green	0	
Trail Yellow	0.0	
Trail Red	0.0	

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1843

DESIGNED: MAY 2024

SEALED: 5/20/2024

REVISED: N/A

### Final Design

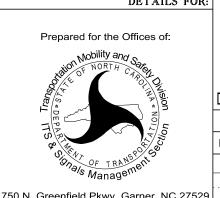
Electrical Detail - Sheet 2 of 2

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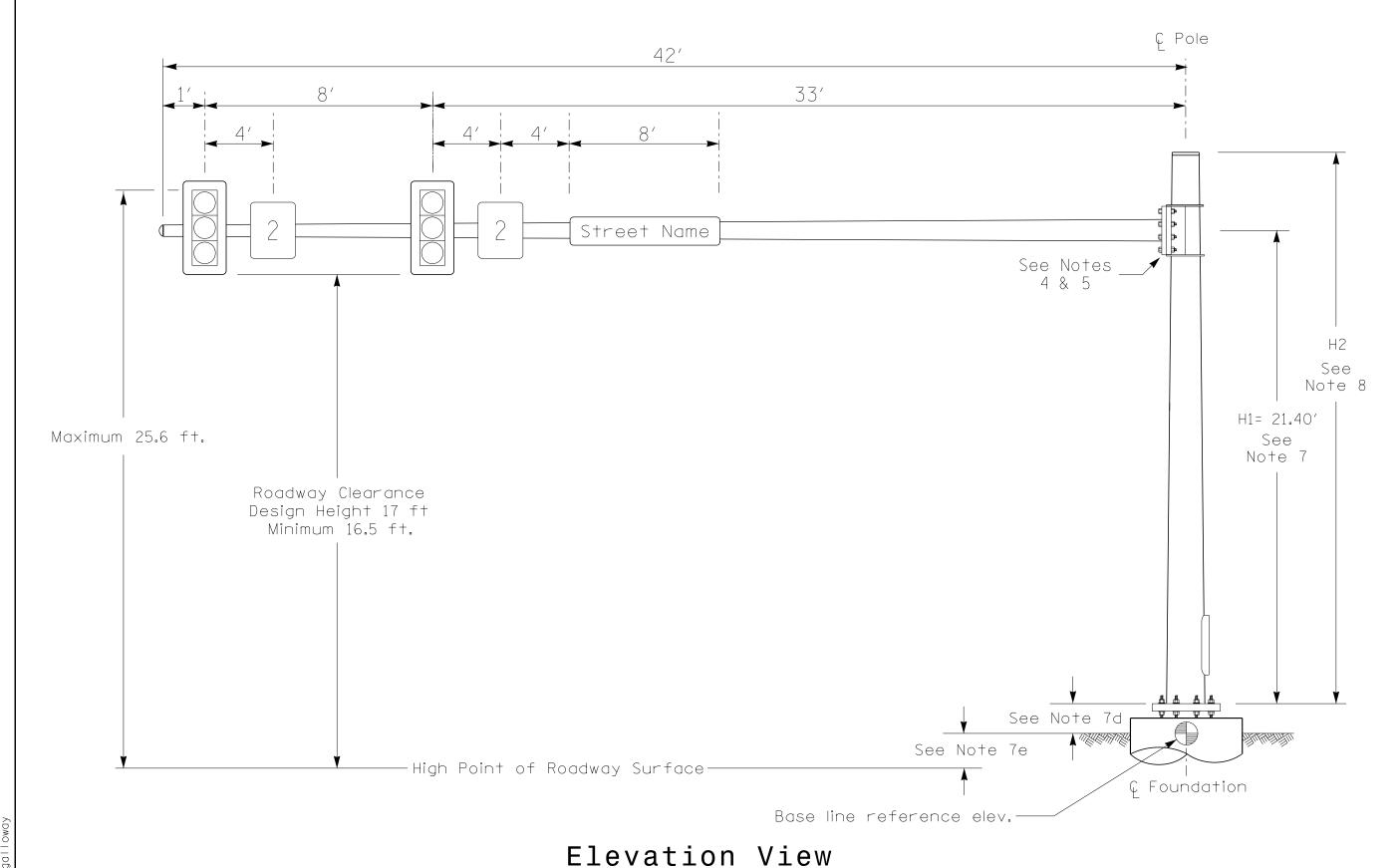


Prepared for the Offices of:

SR 3290 (Rolling Hills Road)

RMM/JPG REVIEWED BY: R Muncey, PE
REVISIONS INIT. DATE

# Design Loading for METAL POLE NO. 2

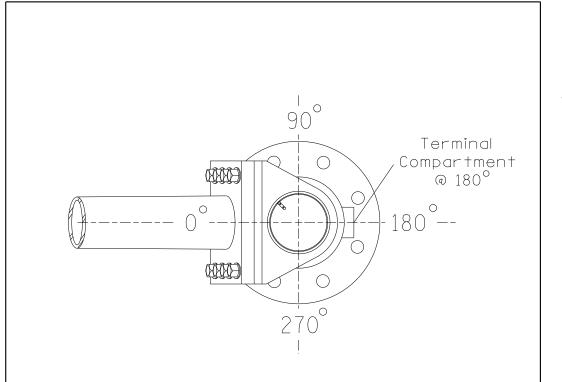


### SPECIAL NOTE

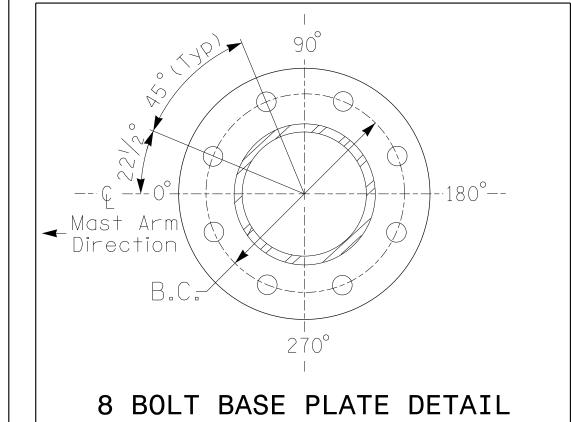
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

### Elevation Data for Mast Arm Attachment (H1)

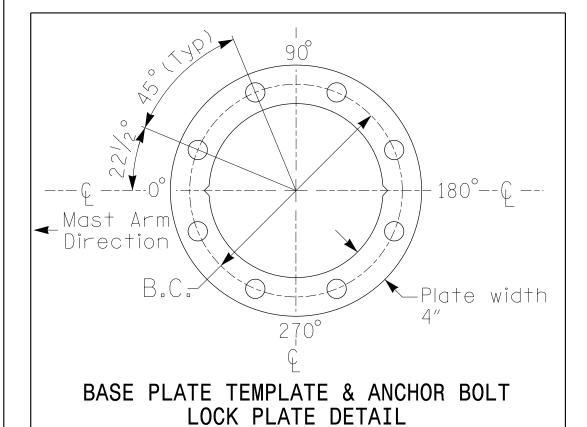
Baseline reference point at & 857.68 ft. 853.57 ft. © Foundation @ ground level	Elevation Differences for:	Pole 1	Pole 2
High point of roadway surface +1.49 +1. +2.34 +1.	· · · · · · · · · · · · · · · · · · ·	857.68 ft.	853.57 ft.
Elevation difference at +/-0.0 ft. +/-0.0 ft.	Elevation difference at High point of roadway surface	+1.49 ft.	+2.34 ft.
Edge of the verway of tees of early	Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.



### POLE RADIAL ORIENTATION



See Note 6



For 8 Bolt Base Plate

METAL POLE No. 1 and 2

R-2307B Sig 74.3

	MAST ARM LOADING SC	HEDU	LE	
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
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0"L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS

### NOTES

### DESIGN REFERENCE MATERIAL

- 1. Design the traffic signalstructure 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 signalproject specialprovisions.
- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signalproject plans and specialprovisions.
- The NCDOT "MetalPole Standards" located at the following NCDOT website:

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

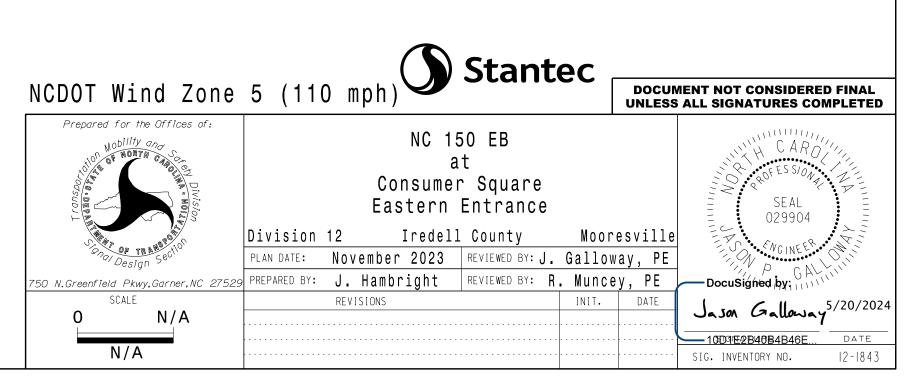
### DESIGN REQUIREMENTS

horizontal when fully loaded.

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 signalplans for the actualloads that will be applied at the time of the installation. 3. Design all signal supports using force ratios that do not exceed 0.9.

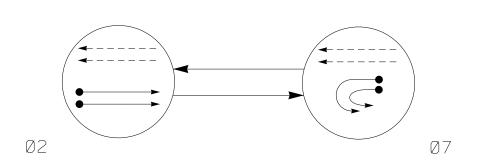
2. Design the traffic signal structure using the loading conditions shown in the elevation

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



PROJECT REFERENCE NO. Sig. 75.0 R-2307B

### PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

 $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

TABLE OF	0	PER	ATI	ON
		Р	HAS	E
SIGNAL FACE		Ø 2	Ø 7	FLAST
21		1	R	R
22		G	R	R
71,72		√R	<b>√</b>	√R

SIGNA	L FACE I	.D.
АІІ	Heads L.E.D.	
12"	P 12"	R Y 12" G 22

	MAXTI	ME DET	ECTOR	I	NSTA	LLAT	ON C	НА	RT			
	DET	ECTOR				PRC	GRAMM	IN	G			
L00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	*	*	2	_	-	Χ	_	Χ	-	*
2B	6X6	300	*	*	2	_	-	Χ	_	Χ	_	*
2C	6X40	0	*	*	2	5.0	2.0	Χ	-	Χ	Х	*
2D	6X40	0	*	*	2	5.0	2.0	Χ	_	Χ	Х	*
7A	6X40	0	*	*	7	_	-	Χ	_	Χ	-	*
7B	6X40	0	*	*	7	_	_	Х	_	Χ	_	*

\* Video Detection Area Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

## 2 Phase Fully Actuated NC 150 D12-02\_MOORESVILLE

### NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- 4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- 5. The cabinet should be designed to include an Auxiliary Output File for future use.
- 6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

Traffic Signal Head Modified Signal Head

Sign Pedestrian Signal Head With Push Button & Sign **EXISTING** 

N/A

Field adjust temporary poles as needed.

T <u>em</u>	nporary Wood Pole -L- Sta. 756+17 ± 74' LT ±	7.	0  V: F
NO 150	Retaining Wall	— Retaining Wall	
R/W P55.31 SPIME SET IN DMJ		45 MPH -4% Grade  R/W	
	72 72 71		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		5	
2A			
45 MPH -1% Grade	Direct Bury Cable	NC 150 R/W	
T <u>empora</u> -L- S	ary Wood Pole Sta. 756+26 ± 102′ RT ±		

MAXTIME T	IMING	CHART				
FEATURE	PHASE					
FEATURE	2	7				
Walk *	_	_				
Ped Clear *	_	_				
Min Green	12	7				
Passage *	6.0	2.0				
Max 1 *	60	30				
Yellow Change	4.6	3.0				
Red Clear	2.2	4.7				
Added Initial *	_	_				
Maximum Initial *	_	_				
Time Before Reduction *	15	_				
Time To Reduce *	30	_				
Minimum Gap	3.0	_				
Advance Walk	_	_				
Non Lock Detector	Х	Х				
Vehicle Recall	MIN RECALL	_				
Dual Entry	_	_				

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

	Cianal Dala with Con	
	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	
$\longrightarrow$	Directional Arrow	$\longrightarrow$
	Video Detection Area	N/A
	Construction Zone	N/A
$\bullet$	Drums	N/A
$\langle A \rangle$	No Left Turn Sign (R3-2)	$\bigcirc$

**PROPOSED** 

Temporary Design 1 - TMP Phase III

New Installation

Raleigh, NC 27606

Tel. (919) 851-6866

Fax. (919) 851-7024

License No. F-0672

www.stantec.com



1"=40'

NC 150 EB SR 1116 (Talbert Road) U-Turn

Division 12 Iredell County May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE 50 N.Greenfield Pkwy,Garner,NC 275 REVISIONS

029904 Mooresville INIT. DATE Jason Galloway 5/20/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. |2-1845T|

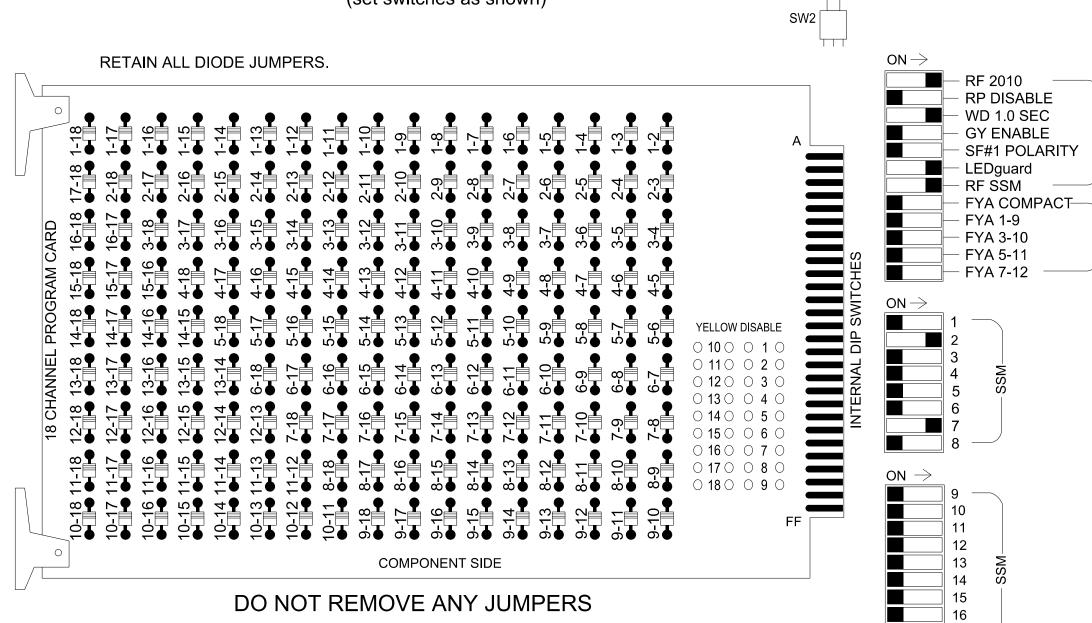
(set switches as shown)

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.



ON

18

= DENOTES POSITION OF SWITCH

WD ENABLE

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 Phase Not On.
- 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 NC 150 D12-02\_Mooresville CLS.

OJECT REFERENCE NO.	SHEET NO.
R-2307B	Sig. 75.1
	_

SIGNAL HEAD HOOK-UP CHART																		
LOAD Switch no.	S1	S2	S3	S4	S5	96	S7	S8	S9	S1Ø	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	0L2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	NU	NU	71,72	NU	NU	NU	NU	NU	NU	NU	NU
RED		128																
YELLOW		129																
GREEN		13Ø																
RED ARROW										122								
YELLOW ARROW										123								
GREEN ARROW										124								

NU = Not Used

### **EQUIPMENT INFORMATION**

Overlap "4".

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

...NOT USED

### SEQUENCE DETAIL

Front Panel

Main Menu >Controller >Sequence & Phs Config>Sequences

Web Interface

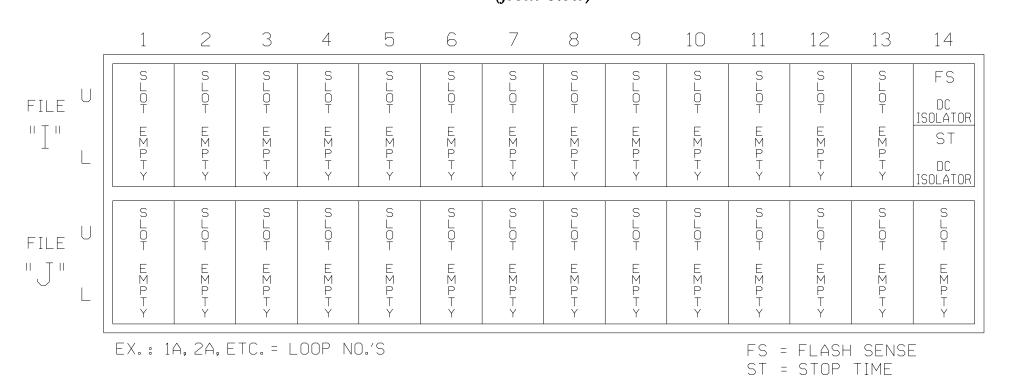
Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	2,a,7,b
2	

### 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: 12-1845T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III

DOCUMENT NOT CONSIDERED FINAL Electrical Detail **UNLESS ALL SIGNATURES COMPLETED** ELECTRICAL AND PROGRAMMING NC 150 EB

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1116 (Talbert Road) U-Turn

Iredell County Division 12 Mooresville May 2024 REVIEWED BY: J Galloway, PE REVIEWED BY: R Muncey, PE RMM/JPG

INIT. DATE Jason Galloway 5/20/2024

SIG. INVENTORY NO. |2-|845T

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Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672

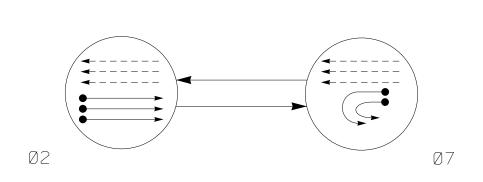
**Stantec** 

PLAN DATE: PREPARED BY: REVISIONS

PROJECT REFERENCE NO. | SHEET NO.

Sig. 76.0 R-2307B

### PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

 $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

TABLE OF C	PER	RAT]	ON				
	Р	PHASE					
SIGNAL FACE	Ø 2	Ø 7	FLASH				
21	<b>†</b>	R	R				
22,23	G	R	R				
71,72	√R	V	<b>√</b> R				

SIGNA	L FACE	I.D.	
АІІ	Heads L.E	E.D.	
12"	R 12"	(R) (Y) 12" (G) 22,23	,

MAXTIME DETECTOR INSTALLATION CHART												
	DET	ECTOR		PRC	GRAMM	ΙN	G					
L00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	4	Χ	2	-	-	Χ	Х	Χ	_	Χ
2B	6X6	300	4	Χ	2	-	-	Χ	Χ	Χ	-	Χ
2C	6X6	300	4	Χ	2	-	-	Χ	Х	Х	-	Χ
7A	6X40	0	2-4-2	Χ	7	-	_	Χ	-	Х	_	Χ
7B	6X40	0	2-4-2	Χ	7	-	_	Х	-	Х	_	Χ

## 2 Phase Fully Actuated NC 150 D12-02 MOORESVILLE

## NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless
- otherwise directed by the Engineer. 3. Set all detector units to presence mode.
- 4. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

**LEGEND** 

Traffic Signal Head

Modified Signal Head

Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box

Right of Way

Directional Arrow

Directional Drill (#) x 2" Conduit

Type II Signal Pedestal No Left Turn Sign (R3-2)

Metal Pole with Mastarm

2-in Underground Conduit -----

**EXISTING** 

N/A

 $\longrightarrow$ 

N/A

CARO

029904

NC 150  R/W  AC 45 MPH -1% Grade	Retaining Wall	Retaining Wall  45 MPH -4% Grade  R/W  NC 150
R/W (N	Metal Pole #1 ast Arm = 65 ft.) -L- Sta. 755+87 ± 76' RT ±	

MAXTIME T	IMING	CHART		
FFATURE	PH	HASE		
FEATURE	2	7		
Walk *	_	_		
Ped Clear *	_	_		
Min Green	12	7		
Passage *	6.0	2.0		
Max 1 *	60	30		
Yellow Change	4.6	3.0		
Red Clear	2.2	5.2		
Added Initial *	1.0	_		
Maximum Initial *	34	_		
Time Before Reduction *	15	_		
Time To Reduce *	30	_		
Minimum Gap	3.0	_		
Advance Walk	_	_		
Non Lock Detector	_	Х		
Vehicle Recall	MIN RECALL	_		
Dual Entry	_	_		

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 2 lower than what is shown.

New	Installation	-	Final	Design



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License No. F-0672



1"=40'

NC 150 EB SR 1116 (Talbert Road) U-Turn

**PROPOSED** 

 $\bigcirc$ 

Iredell County Division 12 Mooresville

May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE 50 N.Greenfield Pkwy,Garner,NC 275 REVISIONS INIT. DATE

Jason Galloway 5/20/2024 SIG. INVENTORY NO.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Min Green for all other phases should not be lower than 4 seconds.

# 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 Phase Not On.
- 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 NC 150 D12-02\_Mooresville CLS.

PROJECT REFERENCE NO.	SHEE	T NO.
R-2307B	Sig.	76.1

SIGNAL HEAD HOOK-UP CHART																			
LOAD SWITCH NO.	S1	S	2	S3	S4	S5	S6	S7	S8	S9	S1Ø	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1 2		2		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	0L2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22,23	NU	NU	NU	NU	NU	NU	NU	71,72	NU	NU	NU	NU	NU	NU	NU	NU
RED		128	128																
YELLOW		129	129																
GREEN			13Ø																
RED ARROW											122								
YELLOW ARROW											123								
GREEN ARROW		13Ø									124								

NU = Not Used

### **EQUIPMENT INFORMATION**

Overlap "4".....

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, S10
Phases Used	2, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED

## INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	S L O T E M P	Ø 2 2A Ø 2	Ø 2 2C	SLOT EXP	SLOT EM	SLOT EXP	SLOT EM	SLOH EM	S L O T E M	SLOT EM	SLOT EM	SLOT EM	SLOT EM	FS DC ISOLATOR
i L	P T Y	2B	NOT USED	P T Y	P T Y	P T Y	P T Y	P T Y	P T Y	P T Y	P T Y	P T Y	P T Y	DC ISOLATOR
FILE U	SLOT	S L O T	SLOT	S L O T	S L O T	Ø 7 7A	ø 7 7B	S L O T	S L O T	S L O T	S L O T	SLOT	S L O T	S L O T
"J"	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	NOT USED	NOT USED	E M P T Y						
EX.: 1A, 2A, ETC. = LOOP NO.'S FS = FLAS												FLASH	SENS	 E

18 CHANNEL IP CONFLICT MONITOR

(set switches as shown)

COMPONENT SIDE

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.

DO NOT REMOVE ANY JUMPERS

RETAIN ALL DIODE JUMPERS.

PROGRAMMING DETAIL

ON OFF

ST = STOP TIME

− RF 2010 − − RP DISABLE

GY ENABLE

- SF#1 POLARITY

- FYA COMPACT—

■ WD 1.0 SEC

■ LEDguard - RF ŠSM

> FYA 1-9 FYA 3-10 − FYA 5-11 — FYA 7-12

<sup>1</sup> 12 ] 13

14

] 16 \_\_\_\_ 17

= DENOTES POSITION OF SWITCH

WD ENABLE (

SW2

### INPUT FILE CONNECTION & PROGRAMMING CHART

..NOT USED

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	TB2-5,6	I2U	39	1	2	2			Х	Х	Х	
2B	TB2-7,8	I2L	43	5	3	2			Х	Х	Х	
2C	TB2-9,10	I3U	63	29	4	2			Х	Х	Х	
7A	TB5-5,6	J5U	57	19	21	7			Х		Х	
7B	TB5-9.10	J6U	42	4	22	7			X		Χ	

INPUT FILE POSITION LEGEND: J2L FILE J -SLOT 2 LOWER

### SEQUENCE DETAIL

Front Panel Main Menu >Controller >Sequence & Phs Config>Sequences

Web Interface

Home >Controller >Sequence

Sequence 1

Ring	Sequence Data
1	2,a,7,b
2	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1845 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Final Design Electrical Detail

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

Prepared for the Offices of:

NC 150 EB SR 1116 (Talbert Road) U-Turn

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE REVIEWED BY: R Muncey, PE PREPARED BY: RMM/JPG

REVISIONS

INIT. DATE Jason Galloway 5/20/2024

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

ELECTRICAL AND PROGRAMMING Stantec

750 N. Greenfield Pkwy, Garner, NC 27529

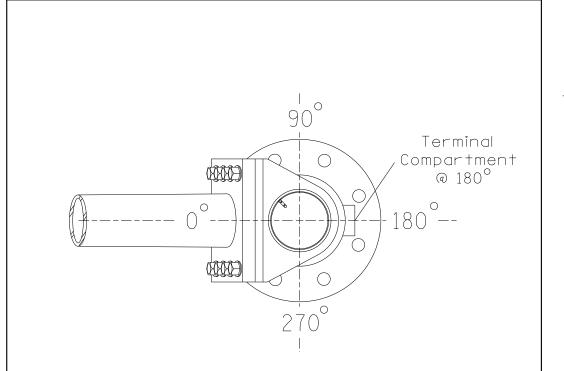
License No. F-0672

## SPECIAL NOTE

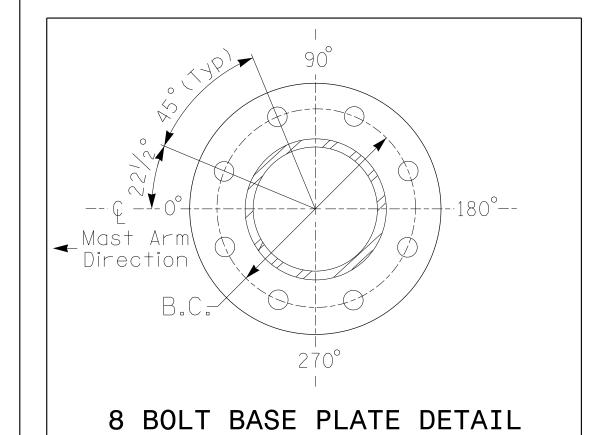
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

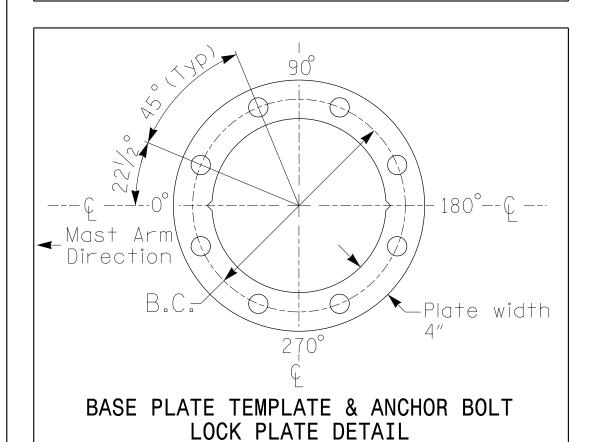
### Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at Ç Foundation @ ground level	852.40 ft.	
Elevation difference at High point of roadway surface	+0.89 ft.	
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	



### POLE RADIAL ORIENTATION





For 8 Bolt Base Plate

See Note 6

METAL POLE No. 1

PROJECT REFERENCE NO. SHEET NO. R-2307B Sig. 76.2

	MAST ARM LOADING SC	HEDU	LE	
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
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0"L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0"W X 96.0"L	36 LBS
	CCTV CAMERA ARM-MOUNTED	1.0 S.F.	11.0" W X 11.0" L	30 LBS

### **NOTES**

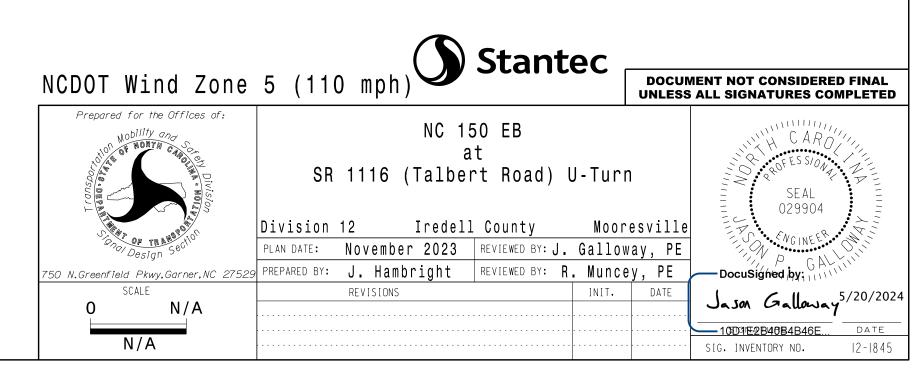
### DESIGN REFERENCE MATERIAL

- 1. Design the traffic signalstructure 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 signalproject plans and specialprovisions.
- The NCDOT "MetalPole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

### DESIGN REQUIREMENTS

- 2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- 6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions: a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
- b. Signalheads 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 leveland the high point of the roadway.
- 8. The pole manufacturer willdetermine the totalheight (H2) of each pole using the following:

  Mast arm attachment height (H1) plus 10 feet.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- 11. The contractor is responsible for providing soilpenetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.
- 12. Install the CCTV camera 2 feet below top of pole.
  13. Install the weatherhead 1 foot below top of pole.



	MAXT	IME TI	MING C	HART					
FEATURE	PHASE								
FEATURE	2	4	5	6	8				
Walk *	_	_	_	_	_				
Ped Clear *	-	_	_	-	_				
Min Green	12	7	7	12	7				
Passage *	6.0	2.0	2.0	6.0	2.0				
Max 1 *	90	35	15	0	35				
Yellow Change	4.5	3.3	3.0	4.5	3.1				
Red Clear	1.2	2.6	2.3	1.2	2.8				
Added Initial *	_	_	_	_	_				
Maximum Initial *	_	_	_	_	_				
Time Before Reduction *	15	_	_	15	_				
Time To Reduce *	30	_	_	30	_				
Minimum Gap	3.0	_	_	3.0	_				
Advance Walk	-	_	_	-	_				
Non Lock Detector	Х	Х	Х	Х	Х				
Vehicle Recall	MIN RECALL	_	_	MIN RECALL	_				
Dual Entry	_	Х	_	_	Х				

\* 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

Signal Upgrade Temporary Design 1 - TMP Phase I

Stantec

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801 Jones Franklin Road-Suite 300



50 N.Greenfield Pkwy,Garner,NC 2

1"=40'

# NC 150 Corporate Center Drive/

CarPros Entrance Iredell County

Division 12 Mooresville May 2024

REVIEWED BY: J Galloway, PE PREPARED BY: J Hambright | REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE Jason Galloway 5/20/2024

Video Detection Area

Construction Zone

Drums

N/A

N/A

N/A

SIG. INVENTORY NO. 12-1760T

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CARO

029904

be lower than 4 seconds

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

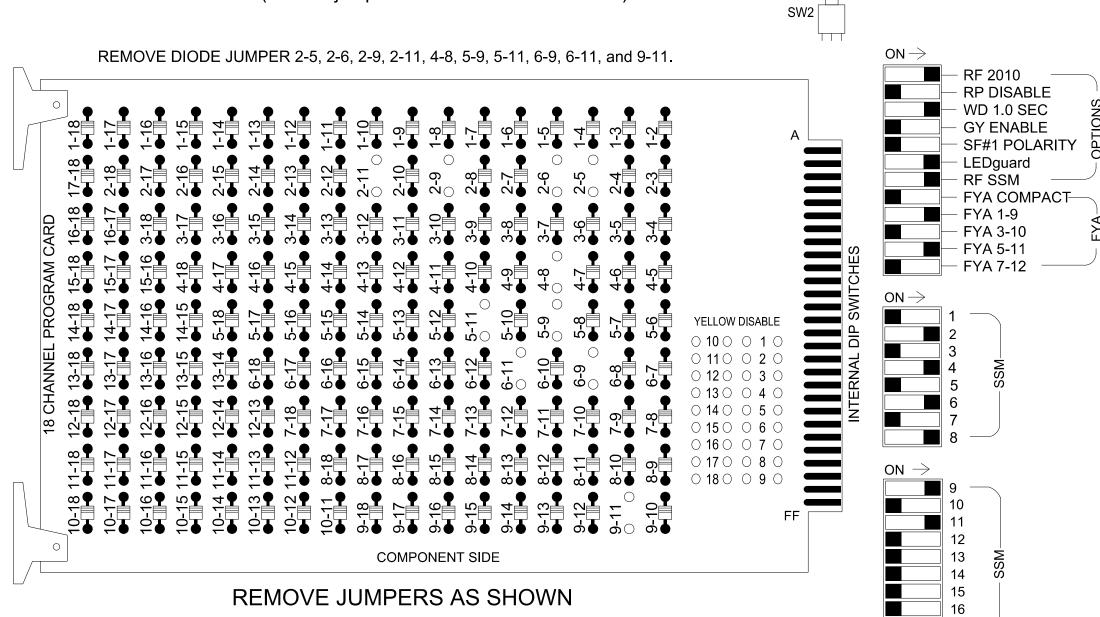
ON OFF

= DENOTES POSITION OF SWITCH

ST = STOP TIME

WD ENABLE

(remove jumper and set switches 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.

### 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.
- 5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville CLS.

### **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, S11, AUX S1,
	AUX S4
Phases Used	2, 4, 5, 6, 8
Overlap "1"	*
Overlap "2"	
Overlap "3"	*
Overlap "4"	NOT USED

\*See overlap programming detail on sheet 2

### R-2307B Sig. 77.

				SI	GNA	\L H	IEA	DΗ	00	K-U	IP C	НА	RT					
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			SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	<b>★</b> 51	62,63	NU	NU	81,82	NU	<b>6</b> 1★	NU	NU	<b>★</b> 51	NU	NU
RED		128		-	101		·	134	·		107	-						
YELLOW		129			102		*	135			108							
GREEN		130			103	·		136			109							
RED ARROW						·							A121			A114		
YELLOW ARROW						·							A122			A115		
FLASHING YELLOW ARROW	·					·				·		·	A123			A116		
GREEN ARROW							133											

### 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)												
	ſ	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE	U	S L O T	SLOT	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	FS DC ISOLATOR
" "	L	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	ST DC ISOLATOR
FILE	U	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T	S L OT	S L O T	S L O T	S L O T	S L O T	S L O T	S L O T
<b>"</b> J"	L	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y
	l	EX.: 1A, 2A, ETC. = LOOP NO.'S  FS = FLASH SENSE													

### INPUT FILE CONNECTION & PROGRAMMING CHART

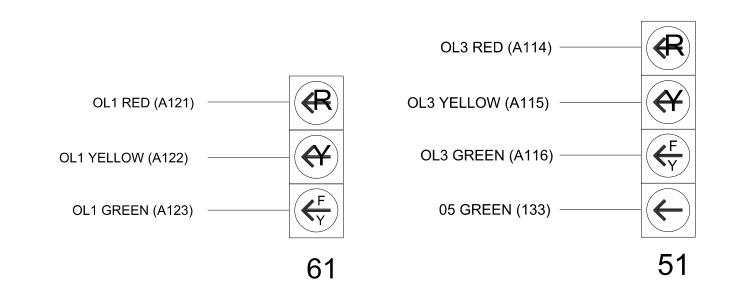
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
EA TD	TD2 4 2	J1U	55	17	15 *	5	15.0		Х		Х	
5A	TB3-1,2		55	-	31 *	2	3.0		Х		Х	

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

INPUT FILE POSITION LEGEND: J2L FILE J SLOT 2 LOWER

### FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1760T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

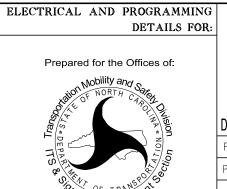
## **DETECTOR NOTE**

- For all loops 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.
- For loop 5A, detector card placement is typical for a NCDOT installation. Detection associated with these slots are compatible with the Vehicle Detector Programming located on sheet 2 of this electrical detail.

Temporary Design 1 - TMP Phase I Electrical Detail - Sheet 1 of 2



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750 N. Greenfield Pkwy, Garner, NC 27529

## NC 150 Corporate Center Drive/ CarPros Entrance

Division 12 Iredell County Mooresville

May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: D Waller, PE REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

029904 Jason Galloway 5/20/2024

SIG. INVENTORY NO. 12-1760T

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

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

Phase 5 Yellow Field Terminal (132)

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown)

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# R-2307B

# Sig. 77.2

## 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	3		
Туре	FYA 4 - Section	FYA 4 - Section		
Included Phases	2	6		
Modifier Phases	=	5		
Modifier Overlaps	1	ı		
Trail Green	0	0		
Trail Yellow	0.0	0.0		
Trail Red	0.0	0.0		

## MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

1 attern a arametere									
Pattern	Veh Det Plan	Overlap Plan							
*	2	2							

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

## 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

## MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

### Overlap Plan 2

Overlap	1	3	
Type	FYA 4 - Section	FYA 4 - Section	
Included Phases	2	<del>-</del>	NOTICE INCLUDED PHASE
Modifier Phases	=	5	
Modifier Overlaps		-	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	

## MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 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.

Delay

3.0

Detector Call Phase 31 0

### 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 head 51 to run protected turns only.

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

call on loop 5A to 3 seconds.

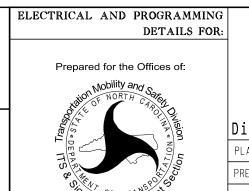
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1760T1 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 1 - TMP Phase I Electrical Detail - Sheet 2 of 2

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NC 150 Corporate Center Drive/ CarPros Entrance

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: D Waller, PE REVIEWED BY: R Muncey, PE

INIT. DATE Jason Galloway 5/20/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

PROJECT REFERENCE NO. Sig. 78.0 R-2307B

## 2 Phase Fully Actuated

NC 150 D12-02 MOORESVILLE CLS

## NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode. 4. Maximum times shown in timing chart are for free-run operation only. Coordinated
- signal system timing values supersede these values.
- Reposition existing signal heads numbered ± 61 & 62

LEGEND

Traffic Signal Head

Modified Signal Head

Sign

Pedestrian Signal Head With Push Button & Sign

Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector Controller & Cabinet Junction Box

> Right of Way Directional Arrow

Video Detection Area

Construction Zone

Drums

⟨A⟩ Right Arrow "ONLY" Sign (R3-5R) 
⟨A⟩

2-in Underground Conduit -----

**EXISTING** 

**●**→

N/A

 $\longrightarrow$ 

N/A

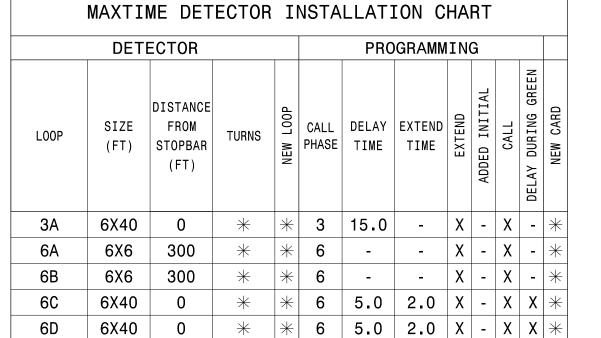
N/A

N/A

CARN

SIG. INVENTORY NO. 12-1760T

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



\* Video Detection Area Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas

R/W — —	Retaining Wall  NC 150		Corporate Center Dr  Corporate Center Dr  3A  25 MPH  28 Grade	Retaining Wall	45 MPH 0% Grade	4. Max for sig the 5. Rep # 6
			<b>→</b> 62	60		
			61			
	• • •	• • •	• •			
				$\begin{array}{cccccccccccccccccccccccccccccccccccc$		
R/W	45 MPH +3% Grade			- Retaining Wall	NC 150  Retaining Wa	─ R/W

SIGNAL FACE I.D.

All Heads L.E.D.

TABLE OF OPERATION

SIGNAL

FACE

31,32

61,62

PHASE

MAXTIME T	IMING	CHART				
FEATURE	PHASE					
FEATURE	3	6				
Walk *	_	-				
Ped Clear *	_	-				
Min Green	7	12				
Passage *	2.0	6.0				
Max 1 *	30	60				
Yellow Change	3.3	4.5				
Red Clear	1.4	1.9				
Added Initial *	_	_				
Maximum Initial *	_	_				
Time Before Reduction *	_	15				
Time To Reduce *	_	30				
Minimum Gap	_	3.0				
Advance Walk	_	_				
Non Lock Detector	х	Х				
Vehicle Recall	_	MIN RECALL				
Dual Entry	_	_				

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

 $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

Ø3

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 6 lower than what is shown. Min Signal Upgrade Temporary Design 2 - TMP Phase III

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NC 150 WB

1"=40'

Division PLAN DATE:

**PROPOSED** 

N/A

 $\bullet$   $\bullet$ 

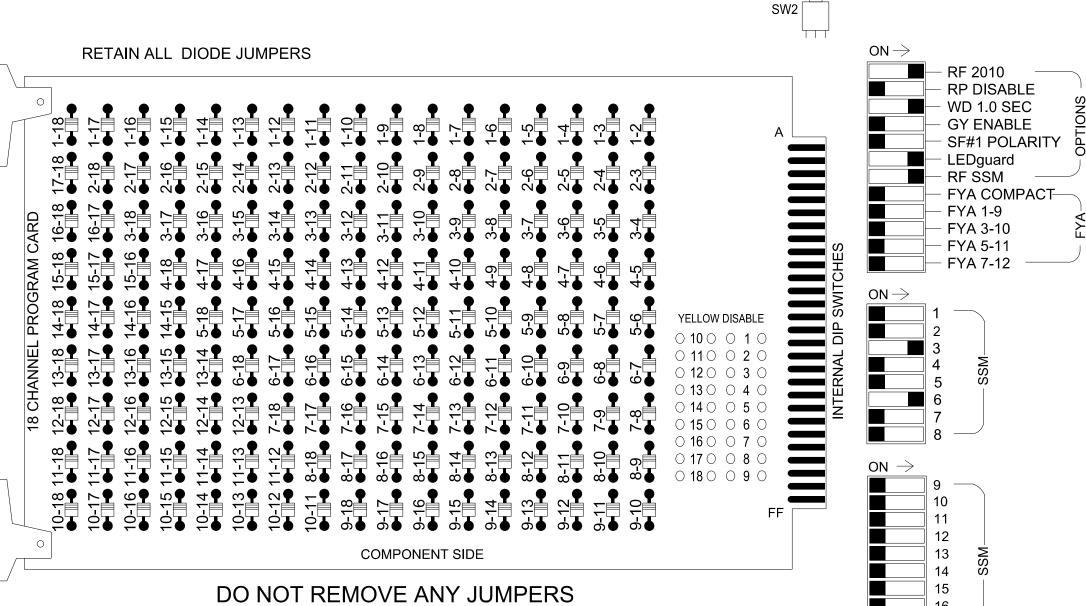
50 N.Greenfield Pkwy, Garner, NC 27529 PREPARED BY: ---- 10D1E2B40B4B46E...

at Corporate Ce	nter Di	rive		SEAL 029904
n 12 - Iredell	County	Moore	sville	
<b>May 2024</b>	REVIEWED BY: J	Gallowa	y, PE	] NGINE WAR
: J Hambright R	REVIEWED BY: R	Muncey	, PE	DocuSigned by:
REVISIONS		INIT.	DATE	5/20/2024
				Jason Galloway 5/20/2024

Green for all other phases should not be lower than 4 seconds.

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(set switches as shown)



ON OFF

= DENOTES POSITION OF SWITCH

WD ENABLE '

### 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. Return controller to Factory Defaults before programming per this electrical detail.
- 3. Program controller to start up in phase 2 Phase Not On and 6 Green No Walk.
- 4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville CLS.

### **EQUIPMENT INFORMATION**

Controller Cabinet Software	.332 w/ Aux
Cabinet Mount	
Output File Positions	.18 With Aux. Output File
Load Switches Used	.S4, S8
Phases Used	3, 6
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

R-2307B Sig. 78.

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	NU	NU	31,32	NU	NU	NU	61,62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED	÷			116				134	-					-		٠		
YELLOW					·			135										
GREEN					·	-		136										
RED ARROW											,							
YELLOW ARROW			·	117	·		·				·						÷	
GREEN ARROW	-			118		·			-	٠						٠		

NU = Not Used

# 1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

- 2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- 3. Ensure that the Red Enable is active at all times during normal operation.
- 4. Integrate monitor with Ethernet network in cabinet.

### INPUT FILE POSITION LAYOUT

(front view)

_	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	S L O T	SLOT	SLOT	SLOF L	S L OT	SLOT	S L OT	S LOT	S L O T	S L O T	S L O T	S L O T	S L O T	FS DC ISOLATOR
"1" _	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	ST DC ISOLATOR
file U	S L O T	S L O T	S L O T	SLOT	S L O T									
"J" L	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y
L	EX.: 1A, 2A, ETC. = LOOP NO.'S  FS = FLASH SENSE ST = STOP TIME										E			

## **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.

## LOAD RESISTOR INSTALLATION DETAIL (install resistor as shown) Phase 5 Yellow Field Terminal (132) ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K 25W (min) 2.0K - 3.0K 10W (min) REMOVE if present

### SEQUENCE DETAIL

Main Menu > Controller > Sequence & Phs Config > Sequences

Web Interface

Home >Controller >Sequence

Sequence 1

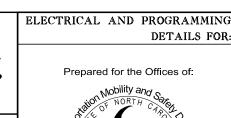
Ring	Sequence Data
1	6,a,3,b
2	

Temporary Design 2 - TMP Phase III Electrical Detail



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750 N. Greenfield Pkwy, Garner, NC 27529

# NC 150 WB Corporate Center Drive

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: D Waller, PE REVIEWED BY: R Muncey, PE

INIT. DATE

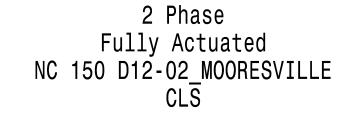
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029904

REVISIONS Jason Galloway 5/20/2024 SIG. INVENTORY NO. 12-1760 T2

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1760T2 DESIGNED: SEALED: 5/20/2024

REVISED: N/A



## 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
- 3. Set all detector units to presence mode.
- 4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- 5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- 6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- 7. Pedestrian pedestals are conceptual and shown for reference only. See 2024 NCDOT Roadway Standard Drawings for push button location details.

**LEGEND** 

Traffic Signal Head

Modified Signal Head

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

Right of Way Directional Arrow

Metal Strain Pole

Directional Drill (#) x 2" Conduit

Type II Signal Pedestal

Right Arrow "ONLY" Sign (R3-5R) (A)

**EXISTING** 

**-**

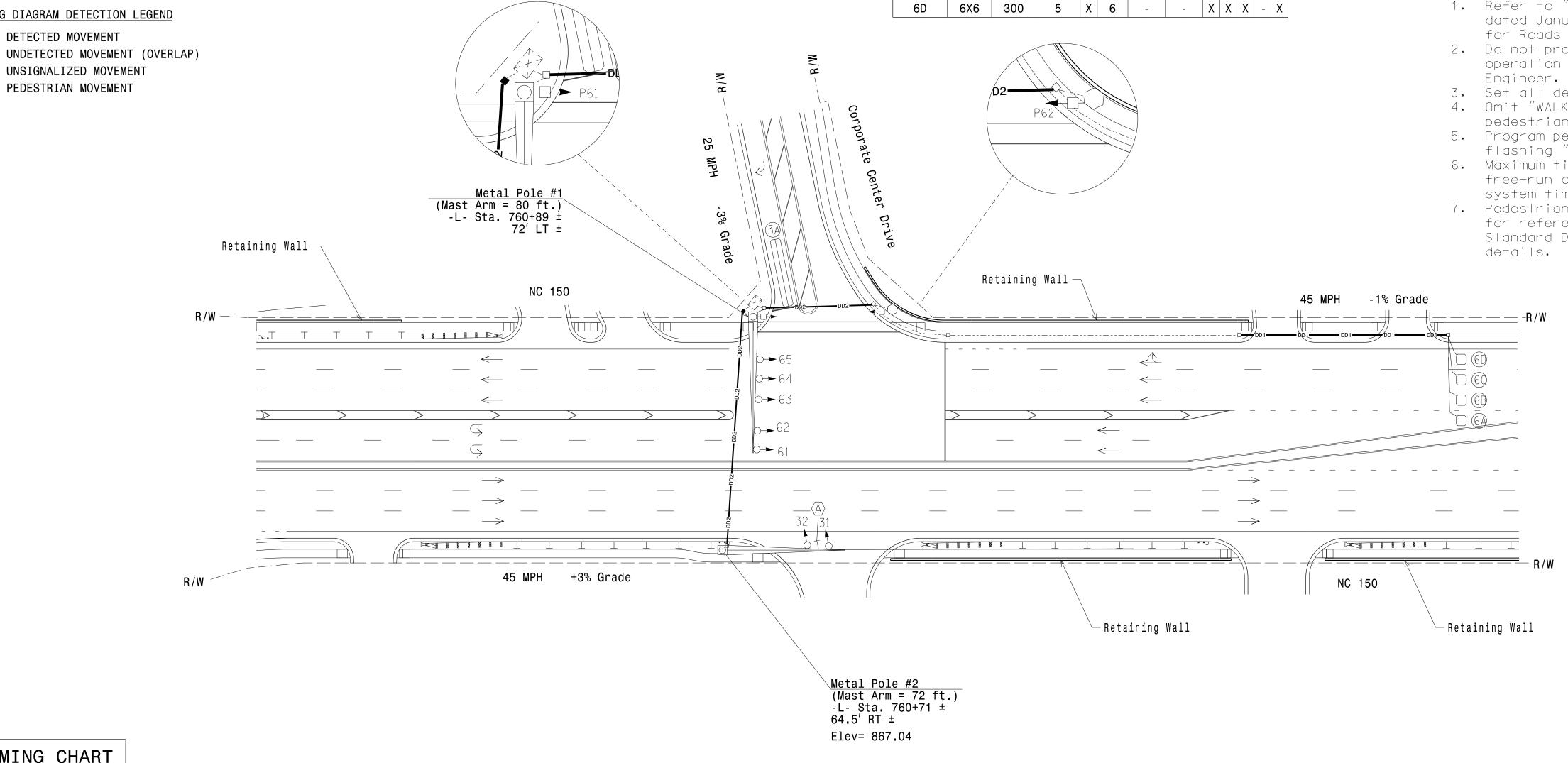
N/A

N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CARO

029904



SIGNAL FACE I.D.

All Heads L.E.D.

61,62,63

64,65

TABLE OF OPERATION

P61,P62 | W | DW | DRK

SIGNAL

FACE

31,32

PHASE

MAXTIME DETECTOR INSTALLATION CHART

DETECTOR

SIZE | FROM

(FT) STOPBAR

L00P

6A

DISTANCE

(FT)

PROGRAMMING

CALL DELAY EXTEND Q IN

5 | X | 6 | - | - | X | X | X | - | X

PHASE TIME TIME

6X40 0 2-4-2 X 3 15.0 - X - X - X

6X6 300 5 X 6 - - X X X - X

6X6 | 300 | 5 | X | 6 | - | - | X | X | X | - | X

MAXTIME T	IMING	CHART				
FEATURE	PHASE					
FEATURE	3	6				
Walk *	_	14				
Ped Clear *	_	17				
Min Green	7	12				
Passage *	2.0	6.0				
Max 1 *	30	60				
Yellow Change	3.3	4.6				
Red Clear	1.7	1.9				
Added Initial *	_	1.0				
Maximum Initial *	_	34				
Time Before Reduction *	_	15				
Time To Reduce *	_	30				
Minimum Gap	_	3.0				
Advance Walk	_	7				
Non Lock Detector	Х	_				
Vehicle Recall	_	MIN RECALL				
Dual Entry	_	_				

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

 $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

UNSIGNALIZED MOVEMENT

Ø3

Ø6

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

Signal Upgrade - Final Design

Stantec Consulting Services Inc.

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801 Jones Franklin Road-Suite 300



# NC 150 WB Corporate Center Drive

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

g PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE 50 N.Greenfield Pkwy,Garner,NC 27 REVISIONS INIT. DATE 1"=40'

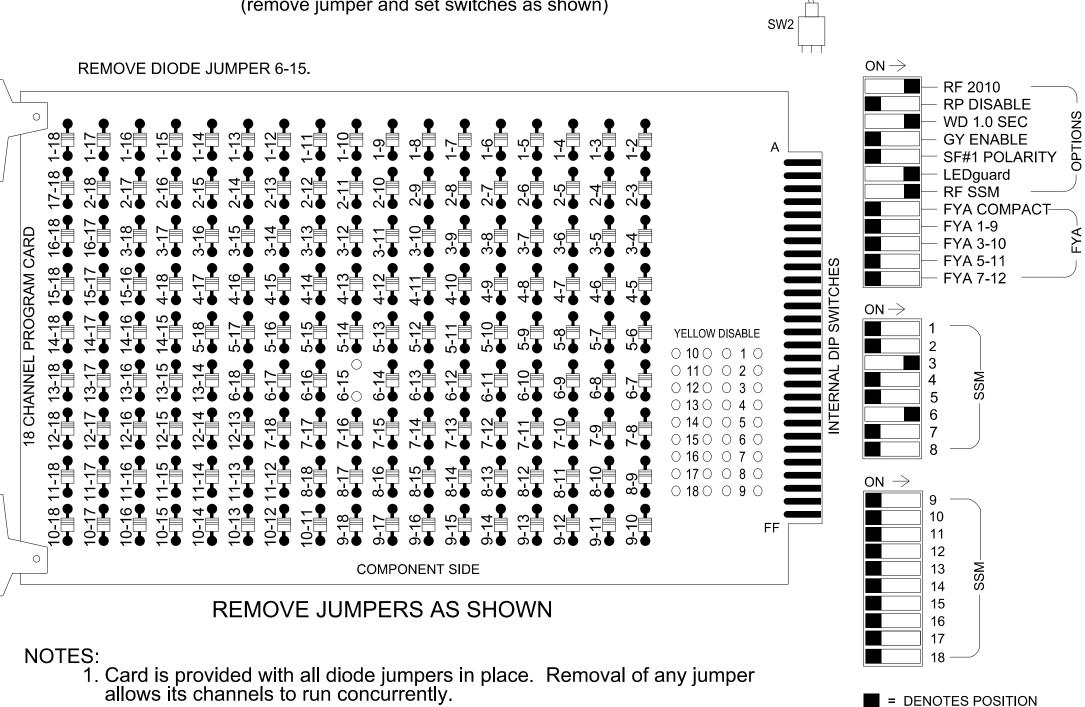
**PROPOSED** 

N/A

Jason Galloway 5/20/2024 SIG. INVENTORY NO.

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumper and set switches as shown)



### 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 Phase Not On and 6 Green 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 NC 150 D12-02\_Mooresville CLS.

## **EQUIPMENT INFORMATION**

Controller	
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S4, S8, S9
Phases Used	3, 6, 6PED
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

R-2307B Sig. 79.

	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	NU	NU	31,32	NU	NU	NU	61,62 63,64 65	P61, P62	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED				116				134										
YELLOW								135										
GREEN								136										
RED ARROW																		
YELLOW ARROW				117														
GREEN ARROW				118														
₩									119									
*									121									

NU = Not Used

### 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.

## INPUT FILE POSITION LAYOUT

(front view) 10 12 13 NOT USED FILE

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.

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

FS = FLASH SENSE ST = STOP TIME

= DENOTES POSITION OF SWITCH

ON OFF

WD ENABLE '

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
3A	TB4-9,10	I6U	41	3	8	3	15.0		Х		Х	
6A	TB3-5,6	J2U	40	2	16	6			Х	Х	Х	
6B	TB3-7,8	J2L	44	6	17	6			Х	Х	Х	
6C	TB3-9,10	J3U	64	30	18	6			Х	Х	Х	
6D	TB3-11,12	J3L	77	43	19	6			Х	Х	Х	
PED PUSH BUTTONS							NOTE:					
P61,P62	TB8-7,9	I13U	68	34	6	PED 6	INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.					

INPUT FILE POSITION LEGEND: J2L FILE J SLOT 2

LOWER

## SEQUENCE DETAIL

Front Panel

Main Menu >Controller >Sequence & Phs Config>Sequences

Web Interface

Home >Controller >Sequence

Sequence 1

Sequence Data 6,a,3,b

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1760 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Electrical Detail - Final Design



Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com

License No. F-0672



750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 WB Corporate Center Drive

REVISIONS

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: D Waller, PE REVIEWED BY: R Muncey, PE

INIT. DATE Jason Galloway 5/20/2024

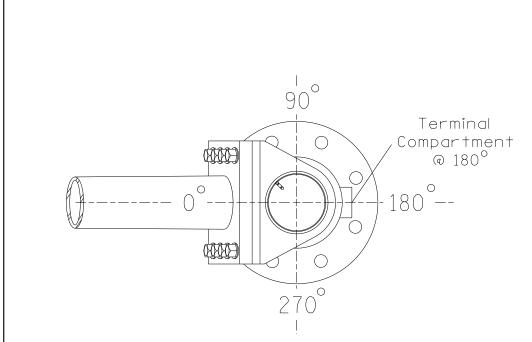
029904

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

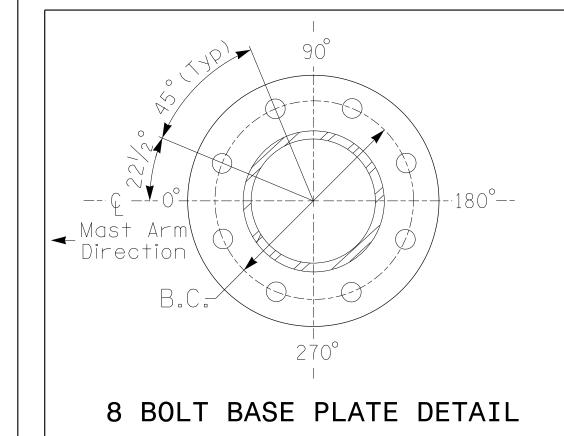
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available

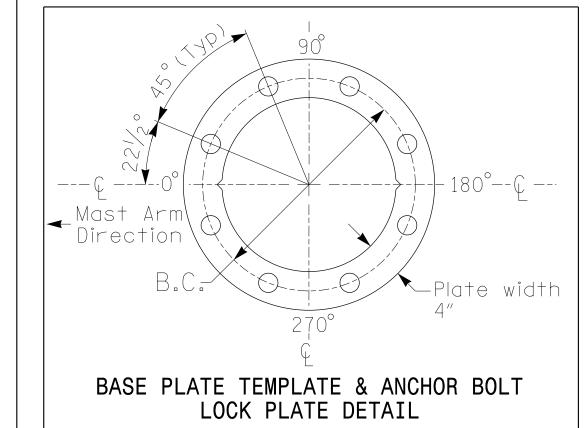
# Elevation Data for Mast Arm

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at © Foundation @ ground level	868.27 ft.	867.26 ft.
Elevation difference at High point of roadway surface	-0.20 ft.	+1.08 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.



### POLE RADIAL ORIENTATION





For 8 Bolt Base Plate

See Note 6

METAL POLE No. 1 and 2

R-2307B Sig. 79.2

	MAST ARM LOADING SC	HEDU	LE	
load <b>i</b> ng 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
	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5″W X 17.0″L	21 LBS
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0"L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS

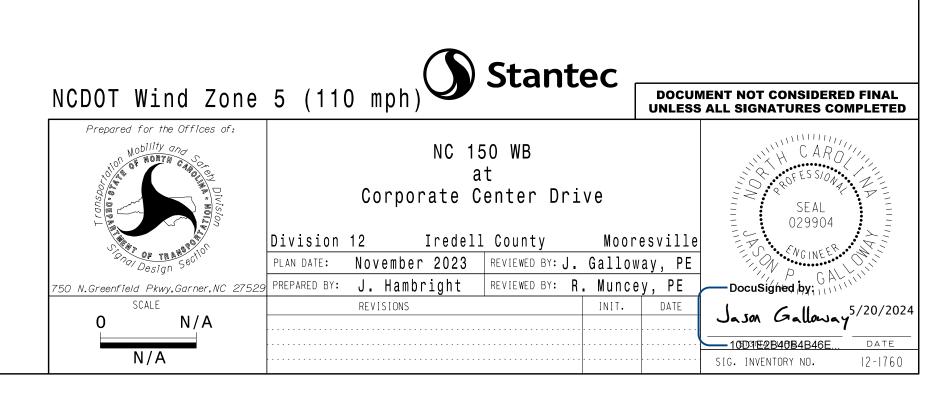
### NOTES

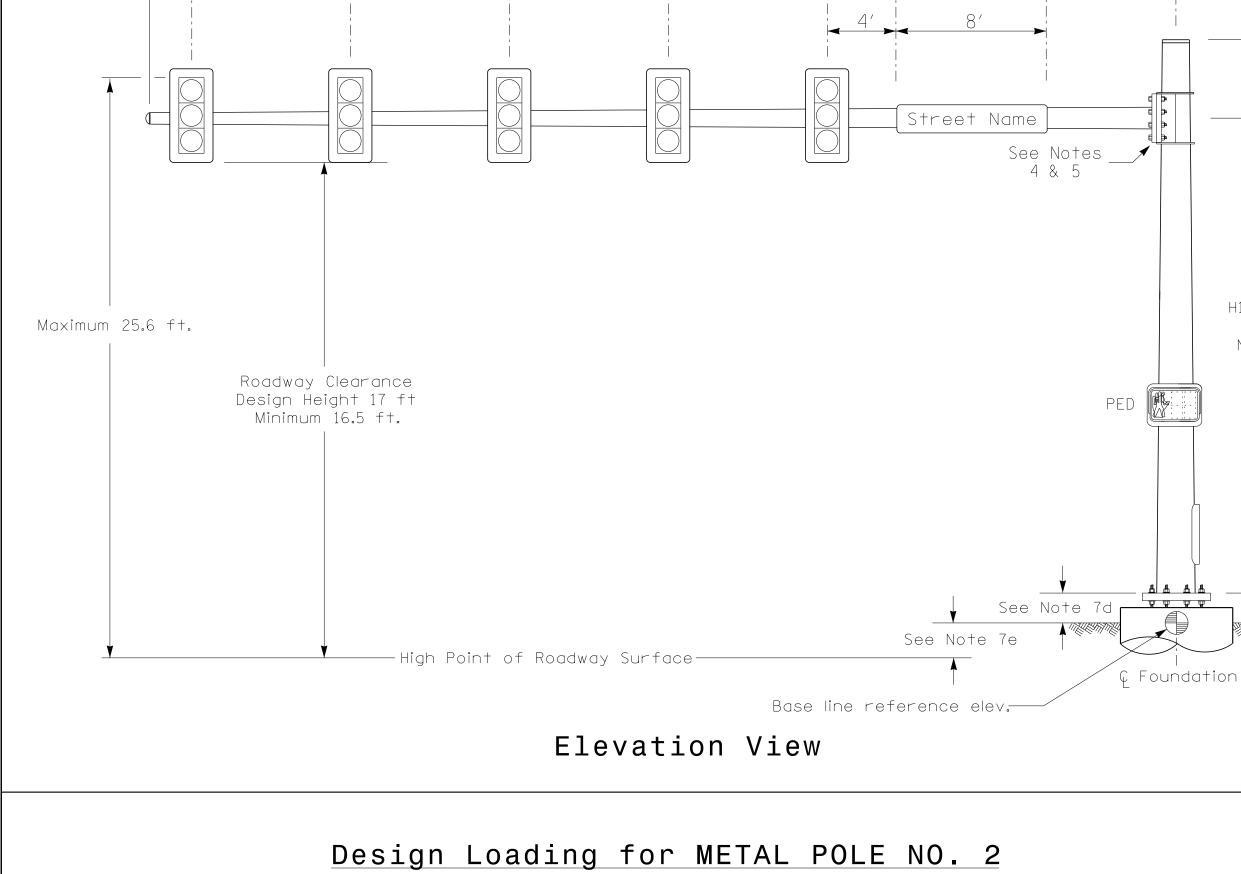
### DESIGN REFERENCE MATERIAL

- 1. Design the traffic signal structure and foundation in accordance with:
- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signalproject specialprovisions.
- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signalproject plans and specialprovisions.
- The NCDOT "MetalPole Standards" located at the following NCDOT website:
- https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

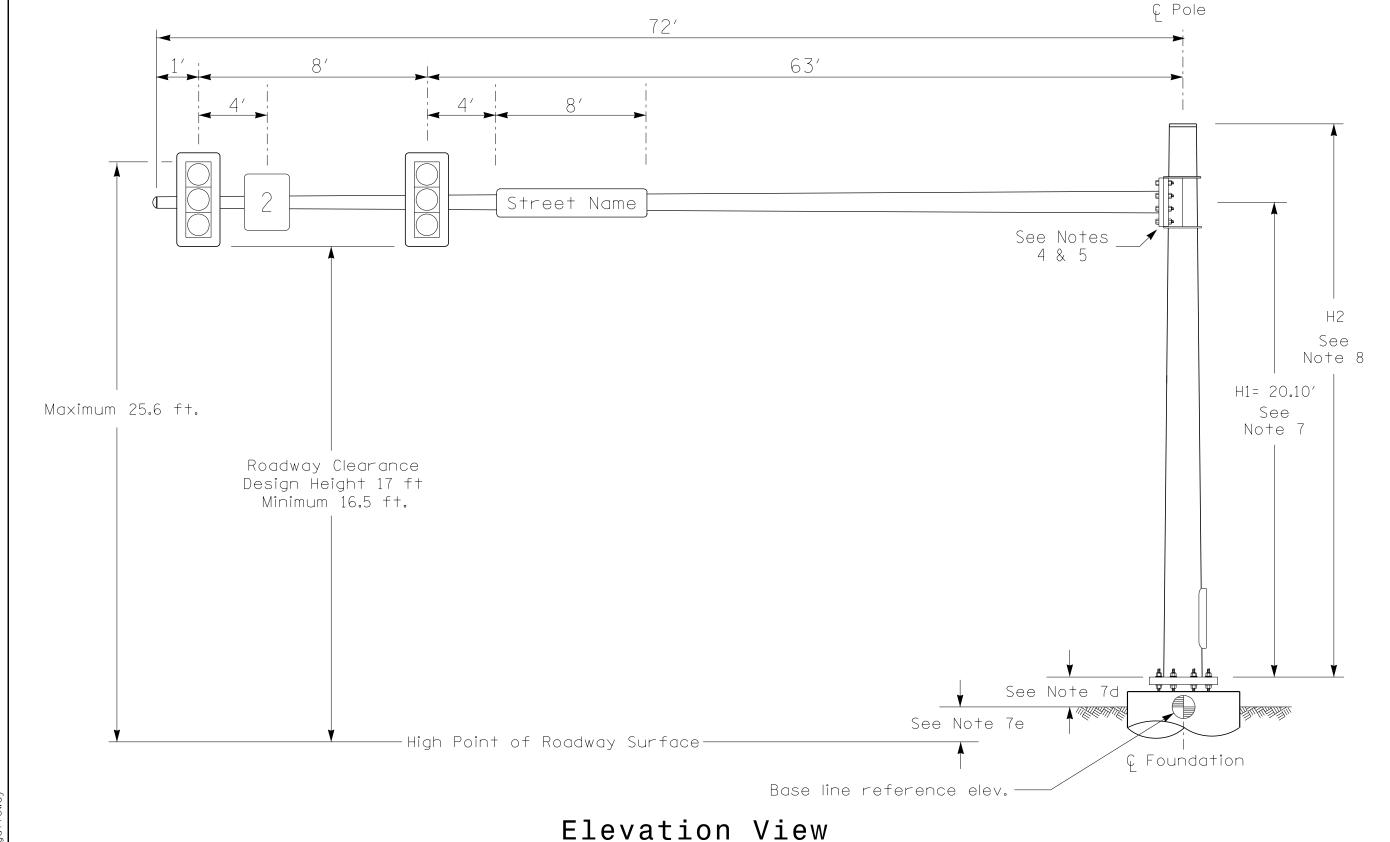
### DESIGN REQUIREMENTS

- 2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signalplans for the actualloads that will be applied at the time of the installation.
- 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- 6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions: a. Mast arm slope and deflection are not considered in determining the arm attachment
- height as they are assumed to offset each other. b. Signalheads 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 leveland the high point of the roadway.
- 8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
- Mast arm attachment height (H1) plus 2 feet, or
- H1 plus 1/2 of the totalheight of the mast arm attachment assembly plus 1 foot.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10.The contractor is responsible for verifying that the mast arm length shown willallow proper positioning of the signalheads over the roadway.
- 11. The contractor is responsible for providing soilpenetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.





Design Loading for METAL POLE NO. 1



project survey data.

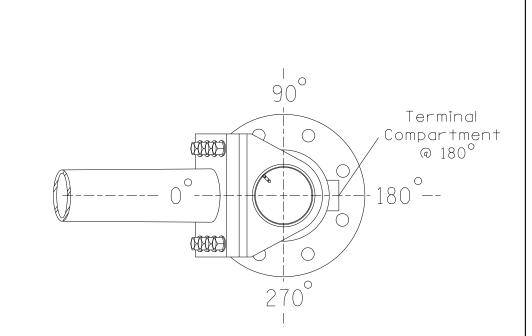
# Attachment (H1)

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at & Foundation @ ground level	868.27 ft.	867.26 ft.
Elevation difference at High point of roadway surface	-0.20 ft.	+1.08 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.

Н2 See Note 8

H1= 18.90'

Note -



DEFAULT PHASING DIAGRAM

02+5

01+6

 $\leftarrow$  - >

01+5

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

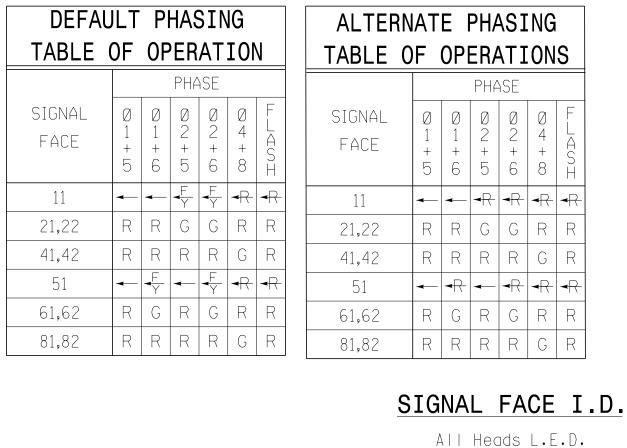
UNSIGNALIZED MOVEMENT

PEDESTRIAN MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

PROJECT REFERENCE NO. Sig. 80 0 R-2307B 5 Phase Fully Actuated w/ Alternate Phasing NC 150 D12-02\_MOORESVILLE  $CL\overline{S}$ NOTES 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024. 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer. 3. Phase 1 and/or phase 5 may be lagged. 4. Set all detector units to presence mode. 5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red. 6. The Division Traffic Engineer will determine the hours of use for each phasing plan. 7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values. 8. Field adjust temporary poles as needed. **LEGEND EXISTING PROPOSED** 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 Area N/A N/A Construction Zone Drums N/A DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED 029904

SIG. INVENTORY NO. |2-|33|T|



ALTERNATE PHASING DIAGRAM

04+8

Temporary Wood Pole -L- Sta. 769+24 ±

NC 150

102' LT ±

35

02+6

02+5

01+6

01+5

DISTANCE SIZE FROM L00P TURNS (FT) 6# 3.0 - X - X X \* \* |\* | 2 | - | - | X | - | X | - | \* 2B \* |\* | 2 | - | - | X | - | X | - | \* 20 \* |\* 2 | 5.0 | 2.0 |X| - |X|X|\*\* | \* | 2 | 5.0 | 2.0 | X | - | X | X | \* 2D 4A \* |\*| 4 | 3.0 | - |X|-|X|-|\* 4B \* |\*| 4 |10.0| - | X | - | X | - | \* 4C \* | \* | 4 | 15.0 | - | X | - | X | - | \* 5A 2# 3.0 | - | X | - | X | X | \* \* | \* | 6 | - | - | X | - | X | - | \* \* | \* | 6 | - | - | X | - | X | - | \* \* | \* | 6 | 5.0 | 2.0 | X | - | X | X | \* \* | \* | 6 | 5.0 | 2.0 | X | - | X | X | \*

#Disable Phase(s) call during Alternate Phasing Operation.

\*Reduce delay to 3 sec during Alternate Phasing Operation.

MAXTIME DETECTOR INSTALLATION CHART **DETECTOR** PROGRAMMING

| \* | \* | 8 | 10.0 | - | X | - | X | - | \* | \* Video Detection Area
Camera locations should be confirmed in the field
by the contractor in order to provide detection
of the areas indicated.

\* |\* 8 | 3.0 | X | - | X | - | \*

# 0% Grade Temporary Wood Pole -L- Sta. 770+16 ± 72' RT ± 8

Temporary Wood Pole -L- Sta. 770+98 ± 87' LT ±

45 MPH

- Retaining Wall

-1% Grade

MAXTIME TIMING CHART PHASE **FEATURE** 1 2 Ped Clear \* 7 Min Green 12 7 12 Passage \* 2.0 2.0 2.0 6.0 2.0 6.0 35 15 90 35 3.8 3.0 3.0 Yellow Change 4.1 4.6 2.1 2.3 Red Clear 1.3 1.8 2.4 1.3 Added Initial \* Maximum Initial \* 15 Time Before Reduction 30 Time To Reduce 30 \_ 3.0 3.0 Minimum Gap \_ Advance Walk Χ Non Lock Detector Vehicle Recall MIN RECALL MIN RECALL Dual Entry

Retaining Wall

is shown. Min Green for all other phases should not be lower than 4 seconds.

Stantec Stantec Consulting Services Inc.

Temporary Wood Pole -L- Sta. 771+63 ±

121' RT ±

Signal Upgrade

Raleigh, NC 27606

Tel. (919) 851-6866

Fax. (919) 851-7024 www.stantec.com

License No. F-0672

Temporary Design 1

801 Jones Franklin Road-Suite 300

- TMP Phase I

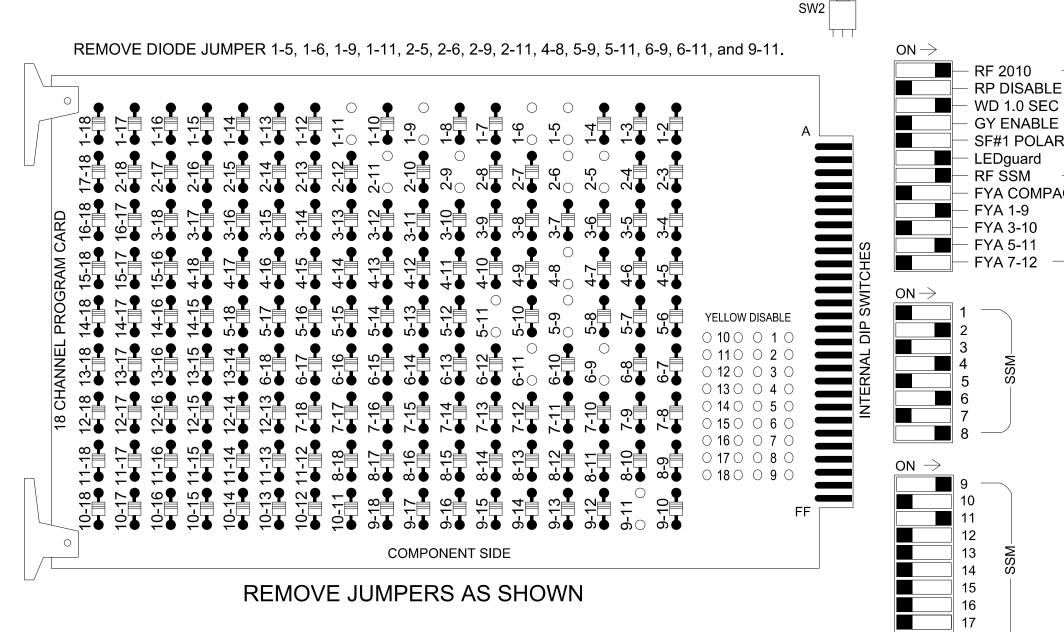
NC 150 WB SR 1116 (Talbert Road)

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE 50 N.Greenfield Pkwy,Garner,NC 2 REVISIONS INIT. DATE Jason Galloway 5/20/2024 1"=40'

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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.

### 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.
- 5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville CLS.

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

Overlap "4".....NOT USED

## **EQUIPMENT INFORMATION**

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

\*See overlap programming detail on sheet 2

### INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE	U L	Ø 1 1A NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y	S L O T E M P T Y	FS DC ISOLATOR ST DC ISOLATOR							
file "J"	U	Ø 5  5A  NOT USED	SLOT EMPTY	S L O T E M P T Y	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y	SLOT EMPTY	S L O T E M P T Y						
	,	EX.: 1A	•	C. = LOC	•		'	'	'	'	'	-	FLASH S		

### 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	TB2-1,2 I1U	1411	1411	1411	1411	I1U 56	18	1	1	15.0		X		Χ	
			30	-	29	6	3.0		X		X	X				
5.1	5A TB3-1,2 J1U 55	55	17	15	5	15.0		Х		Х						
5A		183-1,2	310	55	-	31	2	3.0		Х		Х	Х			

\* For the detectors to work as shown on the signal design plans, see the Vehicle Detector Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L

FILE J SLOT 2 LOWER

ST = STOP TIME

ON OFF

- RP DISABLE

- GY ENABLE

- RF SSM

- FYA 3-10

= DENOTES POSITION OF SWITCH

SF#1 POLARITY

FYA COMPACT—

WD ENABLE

### DETECTOR NOTE

- For all loops 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.
- For loops 1A and 5A, detector card placement is typical for a NCDOT installation. Detection associated with these slots are compatible with the Vehicle Detector Programming located on sheet 2 of this electrical detail.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1331T1 DESIGNED: MAY 2024 SEALED: N<sup>5</sup>/A<sup>0</sup>/2024 REVISED: N/A

### Temporary Design 1 - TMP Phase I Electrical Detail - Sheet 1 of 2

Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 WB SR 1116 (Talbert Road)

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: D Waller, PE REVIEWED BY: R Muncey, PE REVISIONS

INIT. DATE Jason Galloway 5/20/2024

DOCUMENT NOT CONSIDERED FINAL

**UNLESS ALL SIGNATURES COMPLETED** 

SIG. INVENTORY NO. |2-1331T

029904

LOAD RESISTOR INSTALLATION DETAIL (install resistors as shown)

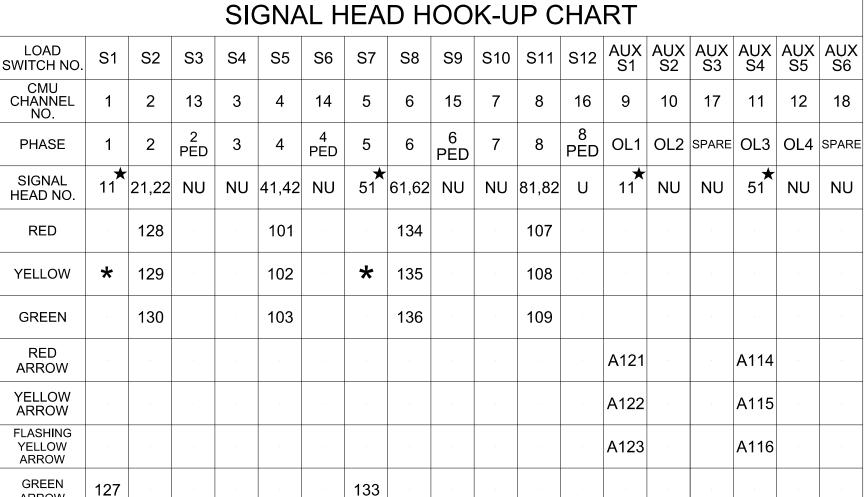
ACCEPTABLE VALUES Value (ohms) | Wattage 1.5K - 1.9K 25W (min)

Phase 5 Yellow Field Terminal (132)

Phase 1 Yellow Field

Terminal (126)

R-2307B Sig. 80



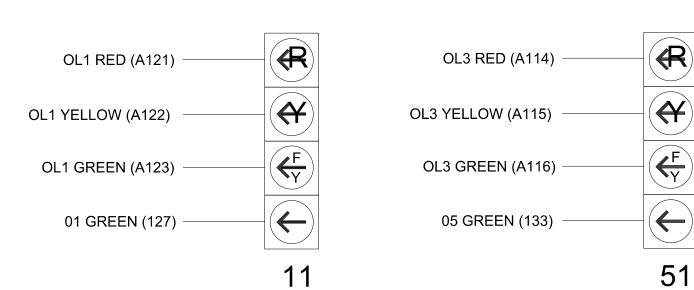
NU = Not Used

ARROW

- \* 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)



2.0K - 3.0K | 10W (min)

Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300

## MAXTIME OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

### Overlap Plan 1

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

## MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

· attorri ara	11101010	
Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

## 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

## MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

### Overlap Plan 2

Overlap	1	3	
Туре	FYA 4 - Section	FYA 4 - Section	
Included Phases	-	-	NOTICE INCLUDED PHASE
Modifier Phases	1	5	
Modifier Overlaps	-	-	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	

## 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	2
--------	---

	Detector	Call Phase	Delay
Α	1	1	3.0
	29	0	-

	Detector	Call Phase	Delay	
<b>\</b>	15	5	3.0	
	31	0	_	

### 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.

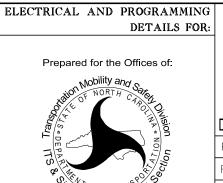
> > THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1331T1 DESIGNED: MAY 2024 SEALED: N5/40/2024 REVISED: N/A

Temporary Design 1 - TMP Phase I Electrical Detail - Sheet 2 of 2



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License No. F-0672

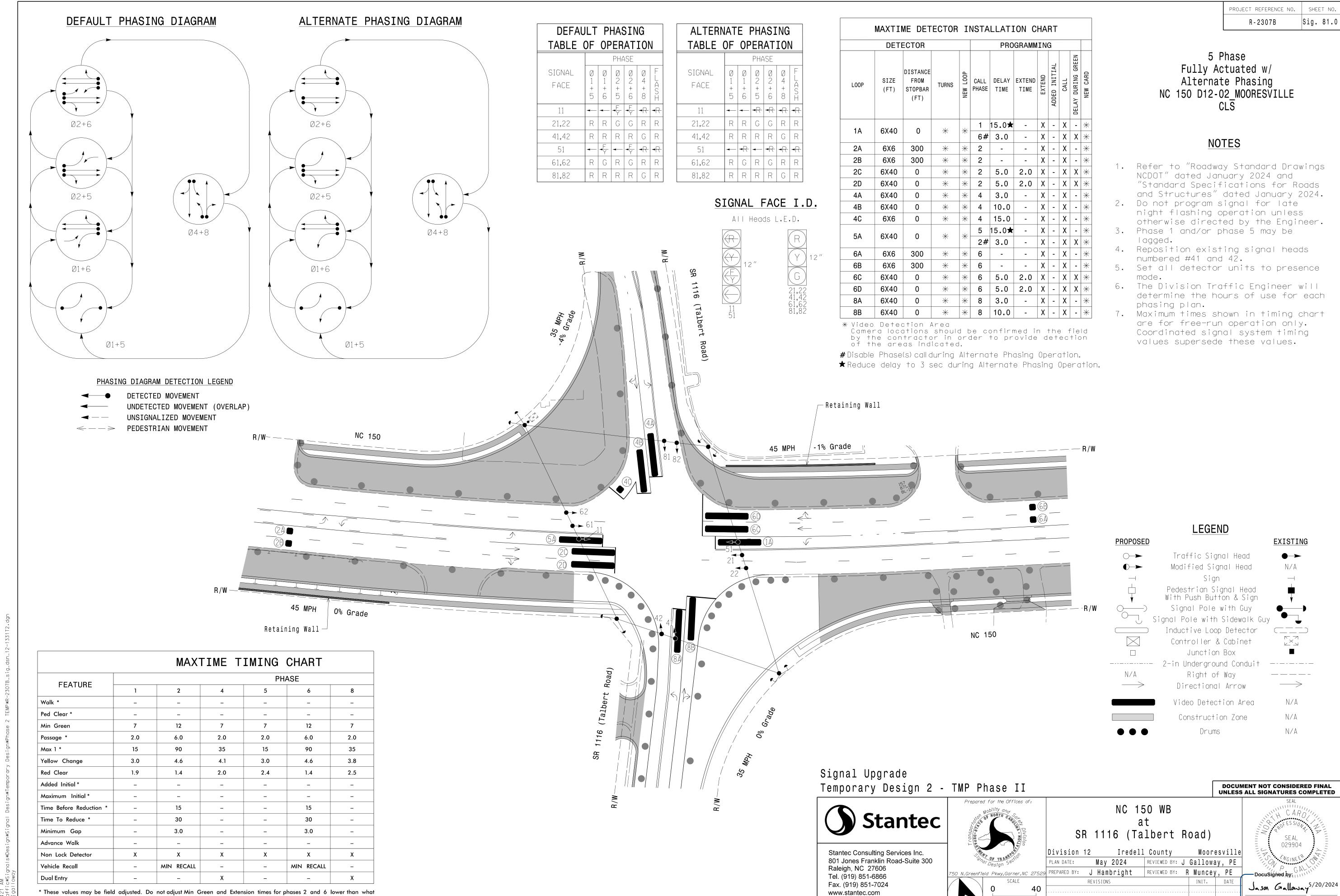


NC 150 WB SR 1116 (Talbert Road)

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: D Waller, PE REVIEWED BY: R Muncey, PE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS Jason Galloway 5/20/2024



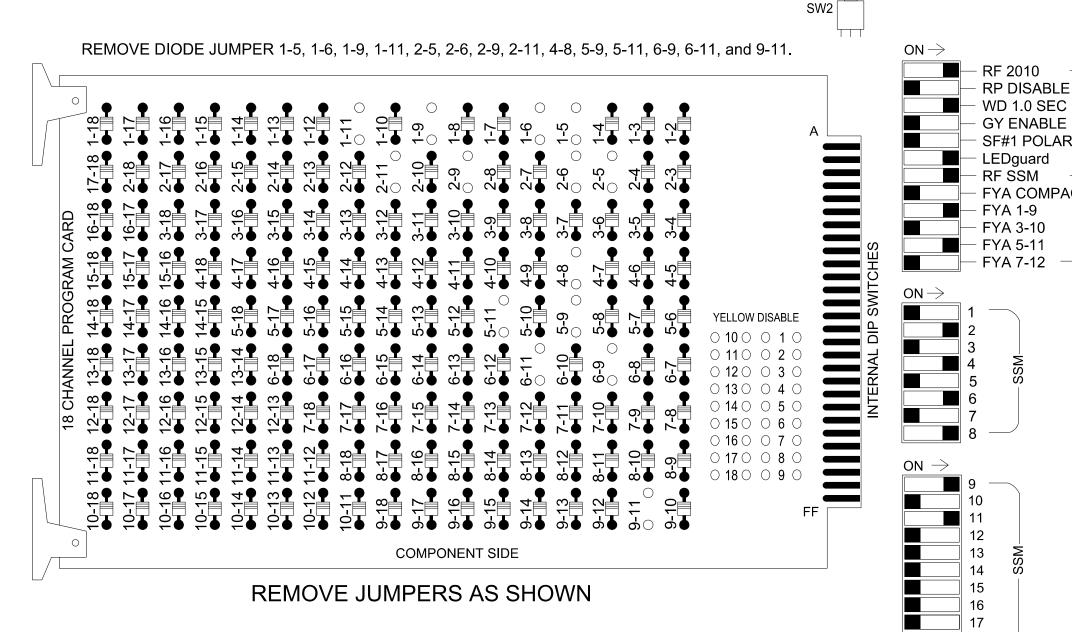
License No. F-0672

1"=40'

SIG. INVENTORY NO. |2-|33|T2

is shown. Min Green for all other phases should not be lower than 4 seconds.

(remove jumpers and set switches 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.

### 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
- 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

## **EQUIPMENT INFORMATION**

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

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

\*See overlap programming detail on sheet 2

### INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE	U L	Ø 1 1A NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y	S L O T E M P T Y	FS DC ISOLATOR ST DC ISOLATOR							
file "J"	U	Ø 5  5A  NOT USED	SLOT EMPTY	S L O T E M P T Y	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y	SLOT EMPTY	S L O T E M P T Y						
	,	EX.: 1A	•	C. = LOC	•		'	'	'	'	'	-	FLASH S		

### INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	
1A	TB2-1,2	I1U	56	18	1	1	15.0		X		Χ		
	102-1,2	110	30	-	29	6	3.0		X		X	X	
5A	TD2 1 2	J1U	55	17	15	5	15.0		Х		Х		
	103-1,2	TB3-1,2	163-1,2	310	00	-	31	2	3.0		Х		Х

\* For the detectors to work as shown on the signal design plans, see the Vehicle Detector Programming Detail for Alternate Phasing on sheet 2.

INPUT FILE POSITION LEGEND: J2L

FILE J SLOT 2 LOWER

ST = STOP TIME

ON OFF

- RP DISABLE

- GY ENABLE

- RF SSM

– FYA 1-9

13

= DENOTES POSITION OF SWITCH

FYA 3-10

SF#1 POLARITY

FYA COMPACT—

WD ENABLE

### DETECTOR NOTE

- For all loops 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.
- slots are compatible with the Vehicle Detector Programming located on sheet 2 of this electrical detail.

THE SIGNAL DESIGN: 12-1331T2 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

CMU CHANNEL NO.

PHASE

RED

YELLOW

GREEN

ARROW

YELLOW

**ARROW** FLASHING

YELLOW ARROW GREEN

ARROW

NU = Not Used

**\*** 129

OL1 RED (A121)

OL1 YELLOW (A122)

OL1 GREEN (A123)

01 GREEN (127)

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### Electrical Detail - Sheet 1 of 2 ELECTRICAL AND PROGRAMMING

Division 12

SR 1116 (Talbert Road)

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: D Waller, PE REVIEWED BY: R Muncey, PE

Jason Galloway 5/20/2024

NC 150 WB 029904 REVISIONS INIT. DATE

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

flash in accordance with the signal plan.

2. Program phases 4 and 8 for Dual Entry.

logging for all detectors used at this location.

5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville CLS.

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

...NOT USED

LOAD RESISTOR INSTALLATION DETAIL (install resistors as shown) Phase 1 Yellow Field Terminal (126) ACCEPTABLE VALUES Phase 5 Yellow Field Terminal (132) Value (ohms) | Wattage 1.5K - 1.9K 25W (min)

2.0K - 3.0K | 10W (min)

THIS ELECTRICAL DETAIL IS FOR

For loops 1A and 5A, detector card placement is typical for a NCDOT installation. Detection associated with these

Temporary Design 2 - TMP Phase II

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. |2-|33|T2

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

R-2307B

A114

A115

A116

SIGNAL HEAD HOOK-UP CHART

134

136

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

OL3 RED (A114)

OL3 YELLOW (A115)

OL3 GREEN (A116)

05 GREEN (133)

**\*** 135

133

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

(FY)

11

★ See pictorial of head wiring in detail this sheet

102

103

1 2  $\begin{vmatrix} 2 \\ PED \end{vmatrix}$  3 4  $\begin{vmatrix} 4 \\ PED \end{vmatrix}$  5 6  $\begin{vmatrix} 6 \\ PED \end{vmatrix}$  7 8  $\begin{vmatrix} 8 \\ PED \end{vmatrix}$  OL1 OL2 SPARE OL3 OL4 SPARE

11 21,22 NU NU 41,42 NU 51 61,62 NU NU 81,82 U 11 NU NU 51 NU NU

108

109

A121

A122

A123

 $\langle F \rangle$ 

Sig. 81.

### R-2307B Sig. 81.2

## 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	3
Туре	FYA 4 - Section	FYA 4 - Section
Included Phases	2	6
Modifier Phases	1	5
Modifier Overlaps	1	ı
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

## MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

attern arameters												
Pattern	Veh Det Plan	Overlap Plan										
*	2	2										

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

## 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

## MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

### Overlap Plan 2

Overlap	1	3	
Туре	FYA 4 - Section	FYA 4 - Section	
Included Phases	-	-	NOTICE INCLUDED PHASE
Modifier Phases	1	5	
Modifier Overlaps	=	=	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	
·			

## 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	2
--------	---

A	Detector	Call Phase	Delay
Α	1	1	3.0
	29	0	-

	Detector	Call Phase	Delay
4	15	5	3.0
	31	Λ	_

### 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.

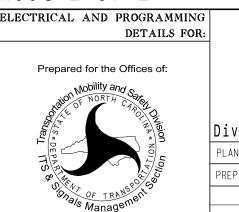
> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1331T2 DESIGNED: MAY 2024 SEALED: 5/20/2024 REVISED: N/A

Temporary Design 2 - TMP Phase II Electrical Detail - Sheet 2 of 2

Stantec

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NC 150 WB SR 1116 (Talbert Road)

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: D Waller, PE REVIEWED BY: R Muncey, PE REVISIONS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Jason Galloway 5/20/2024

PROJECT REFERENCE NO. Sig. 82.0 R-2307B

### 2 Phase Fully Actuated NC 150 D12-02\_MOORESVILLE $CL\overline{S}$

## NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- 4. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

**PROPOSED** 

N/A

LEGEND

Traffic Signal Head

Modified Signal Head

Sign

Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy Signal Pole with Sidewalk Guy Inductive Loop Detector

Controller & Cabinet

Junction Box

Right of Way

Directional Arrow

Video Detection Area

Construction Zone

"NO TURN ON RED" Sign (R10-11)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

029904

Drums

No Left Turn Sign (R3-2)

No U-Turn Sign (R3-4)

---- 2-in Underground Conduit

<u>EXISTING</u>

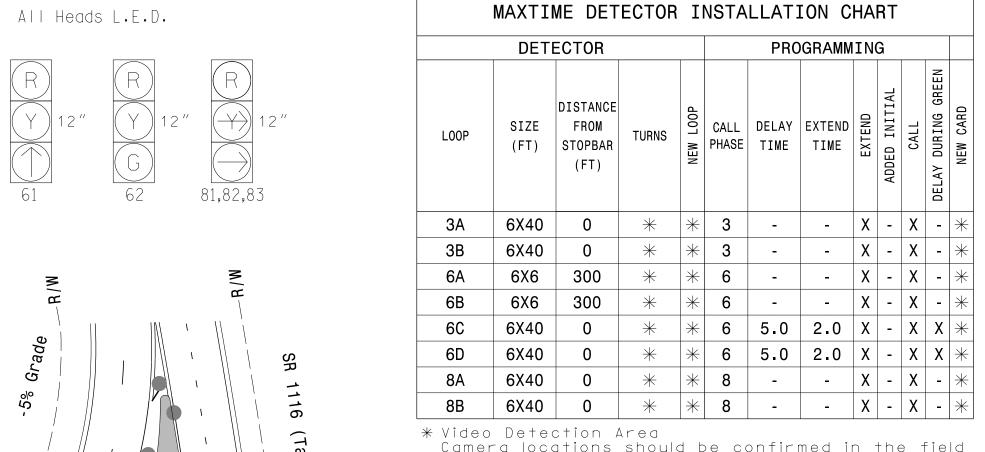
**—** 

N/A

N/A

N/A

N/A



/— Retaining Wall

Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.

SIGNAL FACE I.D.

TABLE OF OPERATION

SIGNAL

FACE

31,32

62

81,82,83

PHASE

GRF

R → F

Coordinate adjusting PM and -

45 MPH 0% Grade

Stop Bar location in referenced TMP plan

NC 150

Retaining Wall  $-\!\!\!/$ MAXTIME TIMING CHART PHASE 12 7 2.0 2.0 6.0 90 15 15 3.0 3.8 3.5 3.4 2.0 \_ \_ 30 3.0 \_ Χ Χ MIN RECALL

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

 $<\!\!--\!\!>$  PEDESTRIAN MOVEMENT

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

Green and Extension times for phase 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

**FEATURE** 

Ped Clear \*

Min Green

Red Clear

Added Initial \*

Maximum Initial \*

Time To Reduce \*

Minimum Gap

Advance Walk

Vehicle Recall

Non Lock Detector

Time Before Reduction \*

Yellow Change

Signal Upgrade Temporary Design 3 - TMP Phase III



45 MPH 0% Grade

NC 150 WB SR 1116 (Talbert Road)

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE Jason Galloway 5/20/2024 SIG. INVENTORY NO. |2-|33|T3

Raleigh, NC 27606 50 N.Greenfield Pkwy,Garner,NC 27 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672 1"=40'

801 Jones Franklin Road-Suite 300

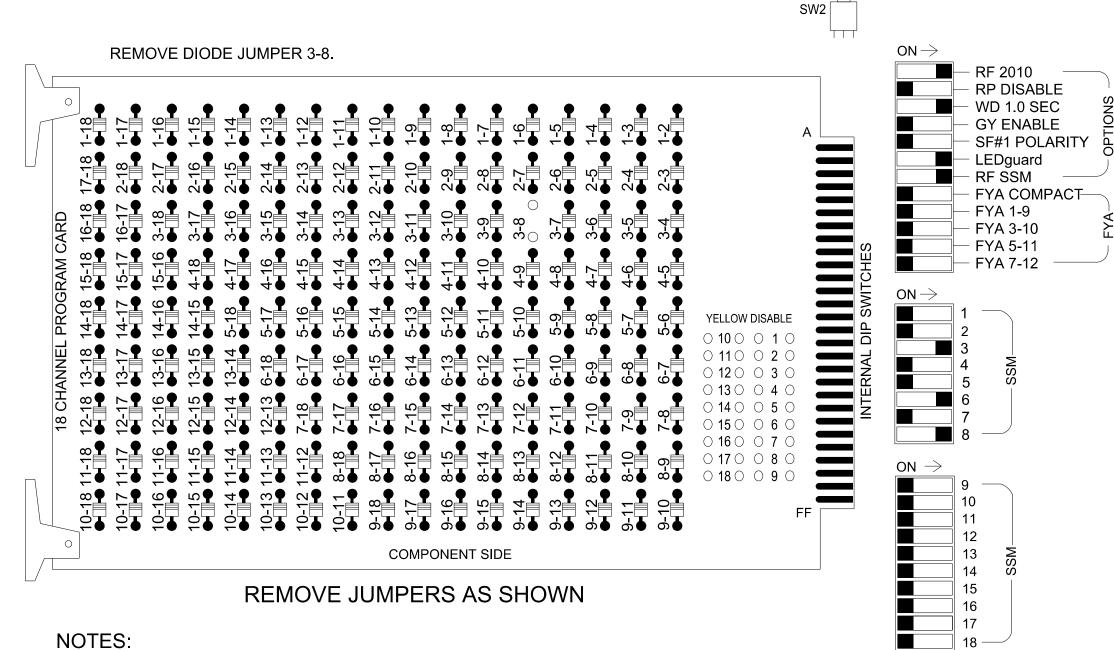
### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

ON OFF

= DENOTES POSITION OF SWITCH

WD ENABLE

(remove jumper and set switches as shown)



## 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. Return controller to Factory Defaults before programming per this electrical detail.
- 3. Program controller to start up in phase 2 Phase Not On and 6 Green No Walk.
- 4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville CLS.

### **EQUIPMENT INFORMATION**

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

R-2307B Sig. 82.

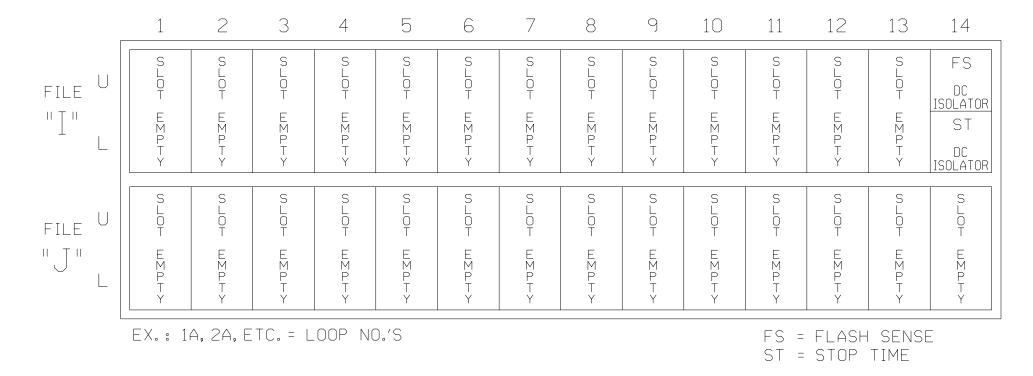
SIGNAL HEAD HOOK-UP CHART																			
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S	8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	(	6		7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6		6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31,32	NU	NU	NU	61	62	NU	NU	81,82 83	NU	NU	NU	NU	NU	NU	NU
RED	·	·		-	·			134	134	·		107	·		·		·		
YELLOW		·		·	٠	٠	-	135	135		٠						-		
GREEN									136										
RED ARROW	·			116								-							
YELLOW ARROW				117								108							
GREEN ARROW	·	·		118				136				109							

NU = Not Used

- 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)



## LOAD RESISTOR INSTALLATION DETAIL (install resistors as shown) Phase 1 Yellow Field Terminal (126) ACCEPTABLE VALUES Value (ohms) Wattage 1.5K - 1.9K 25W (min) Phase 5 Yellow Field Terminal (132) 2.0K - 3.0K 10W (min) REMOVE if present

### **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: 12-1331T3 DESIGNED: MAY 2024 SEALED: 5/20/2024

Temporary Design 3 - TMP Phase III Electrical Detail



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ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 WB SR 1116 (Talbert Road)

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: D Waller, PE REVIEWED BY: R Muncey, PE

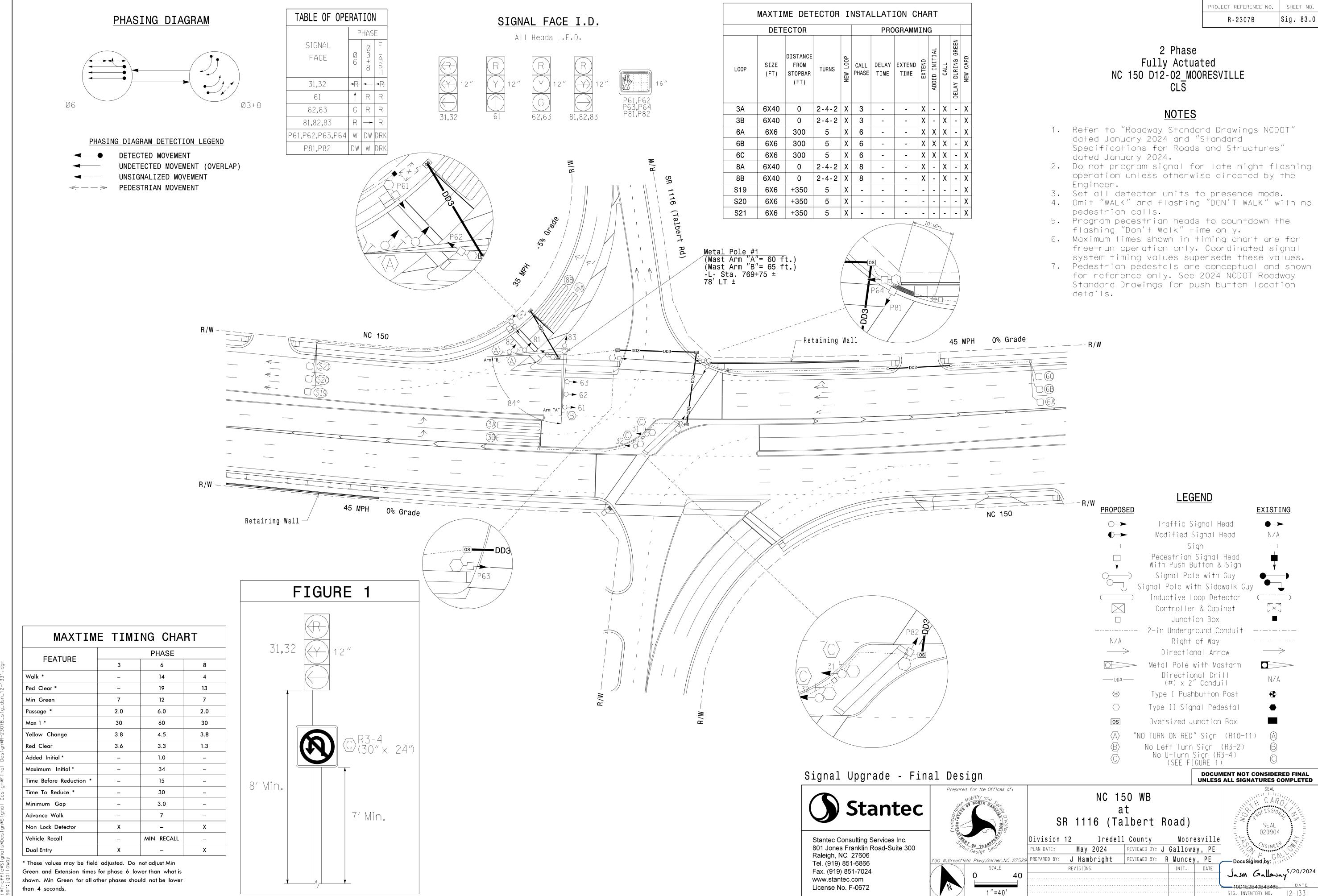
029904 REVISIONS INIT. DATE

Jason Galloway 5/20/2024

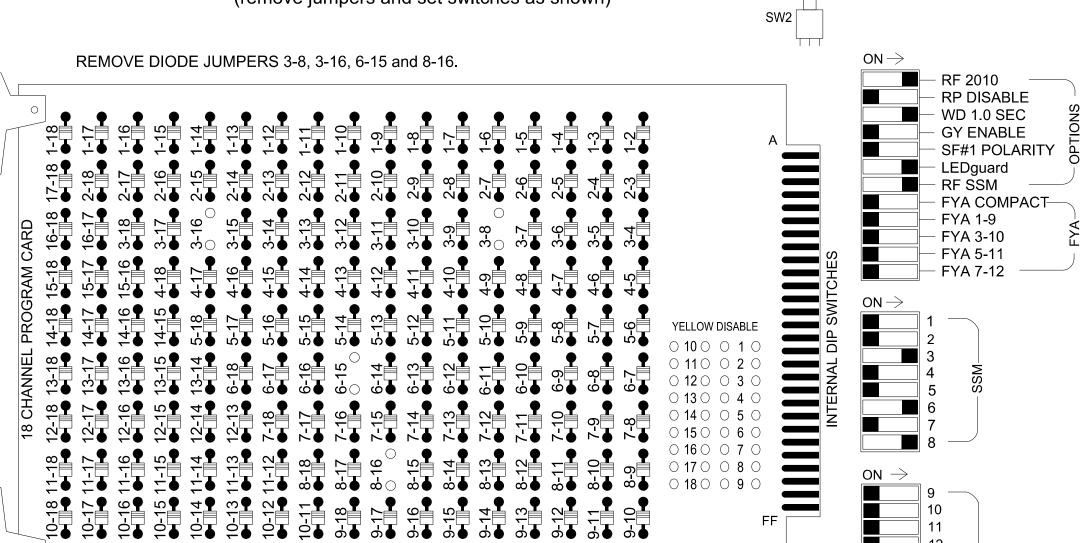
SIG. INVENTORY NO. |2-|33||73

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REVISED: N/A



\$\$\$\$\$\$\$YSDATE\$\$\$\$ 1:10:27 AM U:\*Traffic\*Signals\*Design\*Signo (remove jumpers and set switches as shown)



ON OFF

13

= DENOTES POSITION OF SWITCH

WD ENABLE '

### 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.

COMPONENT SIDE

- 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)						
	ſ	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE	U	S L O T	S L O T	S L O T	S L O T	Ø 3 <b>3A</b>	ø з <b>3В</b>	S L O T	S L O T	SYS. DET. S19	S L O T	S L O T	S L O T	Ø 6 PED  DC ISOLATOR	DC ISOLATOR
" "	L	E M P T Y	E M P T Y	E M P T Y	E M P T Y	NOT USED	NOT USED	E M P T Y	E M P T Y	SYS. DET. S20	E M P T Y	E M P T Y	E M P T Y	Ø 8 PED DC ISOLATOR	DC
FILE	U	S L O T	Ø 6 <b>6A</b>	Ø 6 <b>6C</b>	S L O T	SLOT	Ø 8 <b>8A</b>	S L O T	S L O T	SYS. DET. S21	S L O T	0 L O T	S L O T	НОП	SLOT
"J"	L	E M P T Y	∅ 6 <b>6B</b>	NOT USED	E M P T Y	E M P T Y	Ø 8 <b>8B</b>	E M P T Y	E M P T Y	NOT USED	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y
	Į	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
3A	TB4-5,6	I5U	58	20	7	3			Х		Х	
3B	TB4-9,10	I6U	41	3	8	3			Х		Х	
6A	TB3-5,6	J2U	40	2	16	6			Χ		Х	
6B	TB3-7,8	J2L	44	6	17	6			Χ		Х	
6C	TB3-9,10	J3U	64	30	18	6			Χ	Х	Х	
8A	TB5-9,10	J6U	42	4	22	8			Χ	Х	Х	
8B	TB5-11,12	J6L	46	8	23	8			Χ	Х	Х	
<b>*</b> S19	TB6-9,10	<b>19U</b>	60	22	13	SYS			Χ		Х	
<b>*</b> S20	TB6-11,12	I9L	62	24	14	SYS			Х		Х	
<b>*</b> S21	TB7-9,10	J9U	59	21	27	SYS			Χ		Х	
PED PUSH BUTTONS												,
P61,P62,P63,P64	TB8-7,9	I13U	68	34	6	PED 6	NOTE: INSTALL DC ISOLATORS					
P81,P82	TB8-8,9	I13L	70	36	8	PED 8	IN INPUT FILE SLOT I13.					

\*System detector only. Remove any assigned vehicle phase.

FILE J SLOT 2 LOWER

### 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 3 and 8 for Dual Entry.
- 3. Program controller to start up in phase 2 Phase Not On and 6 Green No Walk.
- 4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville CLS.

### **EQUIPMENT INFORMATION**

Controller	2070LX
Cabinet	332 w/ Aux
Software	Q-Free MAXTIME
Cabinet Mount	Base
Output File Positions	18 With Aux. Output File
Load Switches Used	S4, S8, S9, S11, S12
Phases Used	3, 6, 6PED, 8, 8PED
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

THIS ELECTRICAL DETAIL IS FOR

THE SIGNAL DESIGN: 12-1331

DESIGNED: MAY 2024

SEALED: 5/20/2024

REVISED: N/A

PROJECT REFERENCE NO. SHEET NO. R-2307B Sig. 83.

				S	IGN	IAL	ΗE	AD	HO	OK-	UP	CH	4RT	-					
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	5	88	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	NU	NU	31,32	NU	NU	NU	61	62,63	P61,P62 P63,P64	NU	81,82 83	P81, P82	NU	NU	NU	NU	NU	NU
RED								134	134			107							
YELLOW								135	135										
GREEN									136										
RED ARROW				116															
YELLOW ARROW				117								108							
GREEN ARROW				118				136				109							
*										119			110						
×										121			112						

NU = Not Used

### COUNTDOWN PEDESTRIAN SIGNAL OPERATION

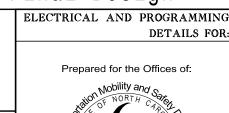
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

Electrical Detail - Final Design



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GRAMMING TAILS FOR:

NC 150 WB

at

SR 1116 (Talbert Road)

SEAL 029904

OCUSIGNEER

OCUSIGNEER

OCUSIGNEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INIT. DATE

Jason Galloway 5/20/2024

10D1E2B40B4B46E...

DATE

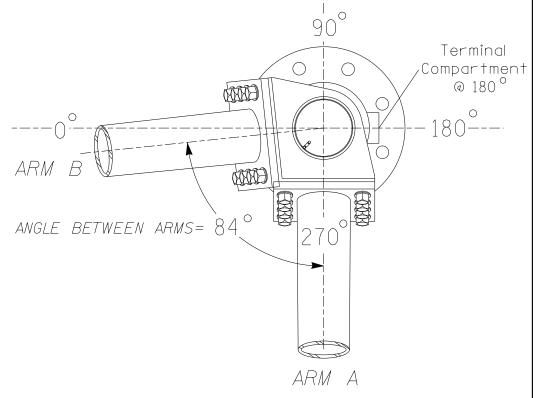
:jgalloway

## SPECIAL NOTE

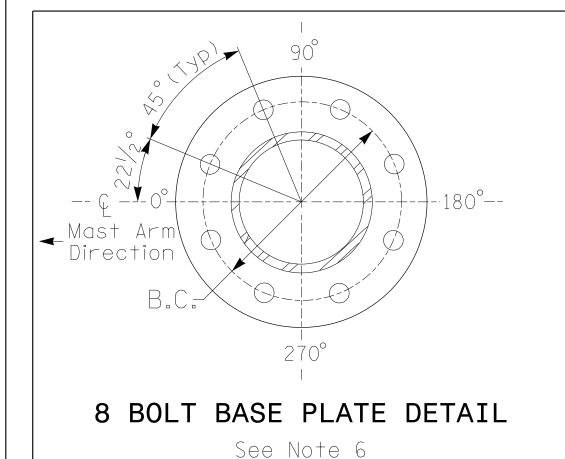
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

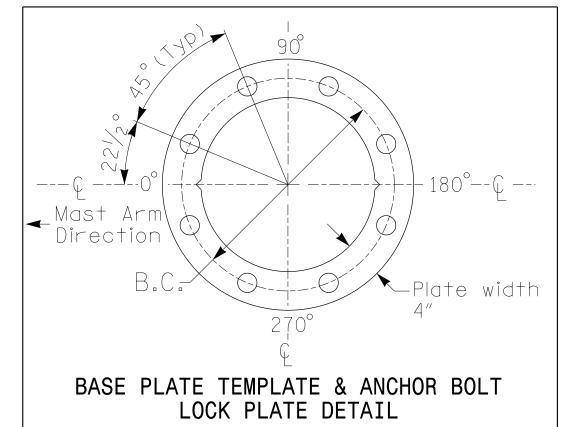
### Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at © Foundation @ ground level	869.77 ft.	872.24 ft.
Elevation difference at High point of roadway surface	+1.21 ft.	-0.59 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.



POLE RADIAL ORIENTATION





For 8 Bolt Base Plate

METAL POLE No. 1

PROJECT REFERENCE NO.	SHEET
R - 2307B	Sig 83

	MAST ARM LOADING SC	HEDU	LE	
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
2	SIGN RIGID MOUNTED	7.5 S.F.	30.0" W X 36.0" L	14 LBS
Street Name	STREET NAME SIGN RIGID MOUNTED	16.0 S.F.	24.0" W X 96.0"L	36 LBS
	CCTV CAMERA ARM-MOUNTED	1.0 S.F.	11.0″W X 11.0″L	30 LBS

### **NOTES**

### DESIGN REFERENCE MATERIAL

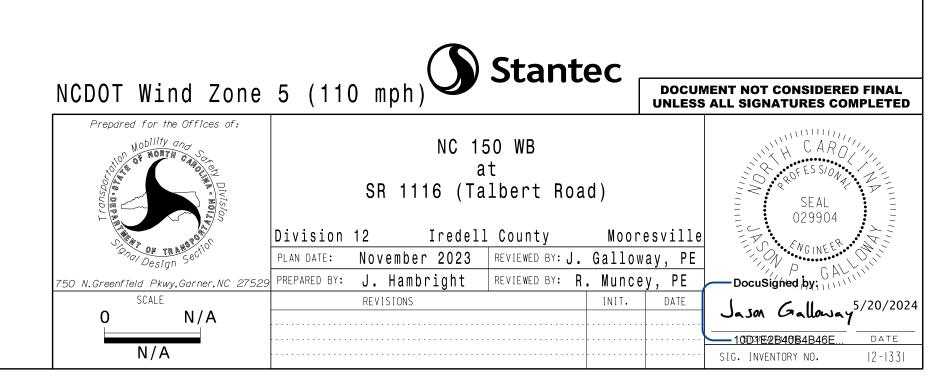
- 1. Design the traffic signal structure and foundation in accordance with:
- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for StructuralSupports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2024 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signalproject specialprovisions.
- The 2024 NCDOT Roadway Standard Drawings.
- The traffic signalproject plans and specialprovisions.
- The NCDOT "MetalPole Standards" located at the following NCDOT website: https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

### DESIGN REQUIREMENTS

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 signalplans for the actualloads that will be applied at the time of the installation.

2. Design the traffic signal structure using the loading conditions shown in the elevation

- 3. Design all signal supports using force ratios that do not exceed 0.9.
- 4. The camber design for the mast arm deflection should provide an appearance of a low pitched arch where the tip or the free end of the mast arm does not deflect below horizontal when fully loaded.
- 5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements.
- 6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- 7. The mast arm attachment height (H1) shown is based on the following design assumptions:
- a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
- b. Signalheads 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 leveland the high point of the roadway.
- 8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
- Mast arm attachment height (H1) plus 2 feet, or
- H1 plus 1/2 of the totalheight of the mast arm attachment assembly plus 1 foot.
- 9. If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 814-5000.
- 10.The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signalheads over the roadway.
- 11. The contractor is responsible for providing soilpenetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.



PROJECT REFERENCE NO. Sig. 84 0 R-2307B

## 2 Phase Fully Actuated NC 150 D12-02 MOORESVILLE

## NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode.
- 4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- 5. The cabinet should be designed to include an Auxiliary Output File for future use.
- 6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

LEGEND

Traffic Signal Head

Modified Signal Head 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

Right of Way

Directional Arrow

Directional Drill (#) x 2" Conduit

Type II Signal Pedestal

Video Detection Area

Construction Zone

"NO TURN ON RED" Sign (R10-11) 🛕

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CARO

029904

SIG. INVENTORY NO. |2-1846T

Drums

No Left Turn Sign (R3-2)

No U-Turn Sign (R3-4)

Metal Pole with Mastarm

**EXISTING** 

**—** 

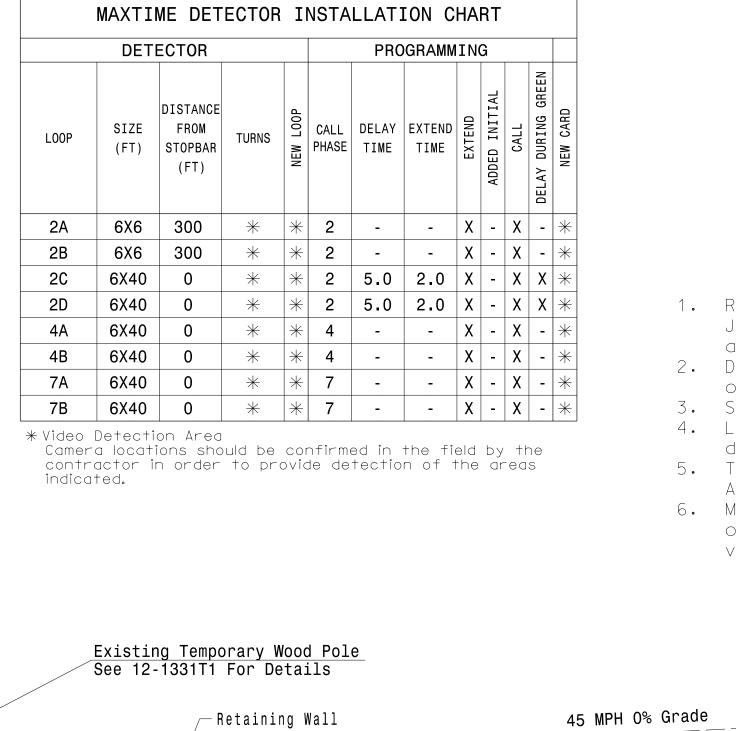
 $\longrightarrow$ 

N/A

N/A

N/A

N/A



	R/W-		No.			See 12-1331T1 For Details	
			NC 150				45 MPH 0% Grade — R/W
			2A		72 C		
	R/W—		45 MPH 0% Grade Retaining Wall			22 - O	→ — — — — — — — — — — — — — — — — — — —
				Existing Temporary Wood Pole See 12-1331T1 For Details	(Du S.	Temporary Wo -L- Sta. 771 99' RT ±	od Pole +96 ±
MAXTIM	E TIMING CHA	RT		SR 1			
FEATURE	PHASE  2 4	7 -			28 Hall		
Clear *		_			[		

SIGNAL FACE I.D.

All Heads L.E.D.

TABLE OF OPERATION

SIGNAL

FACE

22

41,42,43

71,72

PHASE

| R | → | R

New Installation Temporary Design 1 - TMP Phase III

Stantec

Stantec Consulting Services Inc.

Raleigh, NC 27606

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Fax. (919) 851-7024

License No. F-0672

www.stantec.com

801 Jones Franklin Road-Suite 300

50 N.Greenfield Pkwy,Garner,NC 27

1"=40'

NC 150 EB SR 1116 (Talbert Road)

Iredell County Mooresville REVIEWED BY: J Galloway, PE May 2024

g PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE Jason Galloway 5/20/2024

N/A

 $\longrightarrow$ 

—— DD# ——

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

Ped Clear \*

Min Green

Yellow Change

Added Initial \*

Maximum Initial \*

Time To Reduce

Minimum Gap

Time Before Reduction \*

Red Clear

Advance Walk \_ Non Lock Detector Χ Vehicle Recall \_

12

6.0

3.2

3.0

2.0

3.4

2.1

2.0

30

3.0

3.4

\_

\_

\_

\_

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

← − → PEDESTRIAN MOVEMENT

04+7

### 18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

ON

= DENOTES POSITION OF SWITCH

WD ENABLE

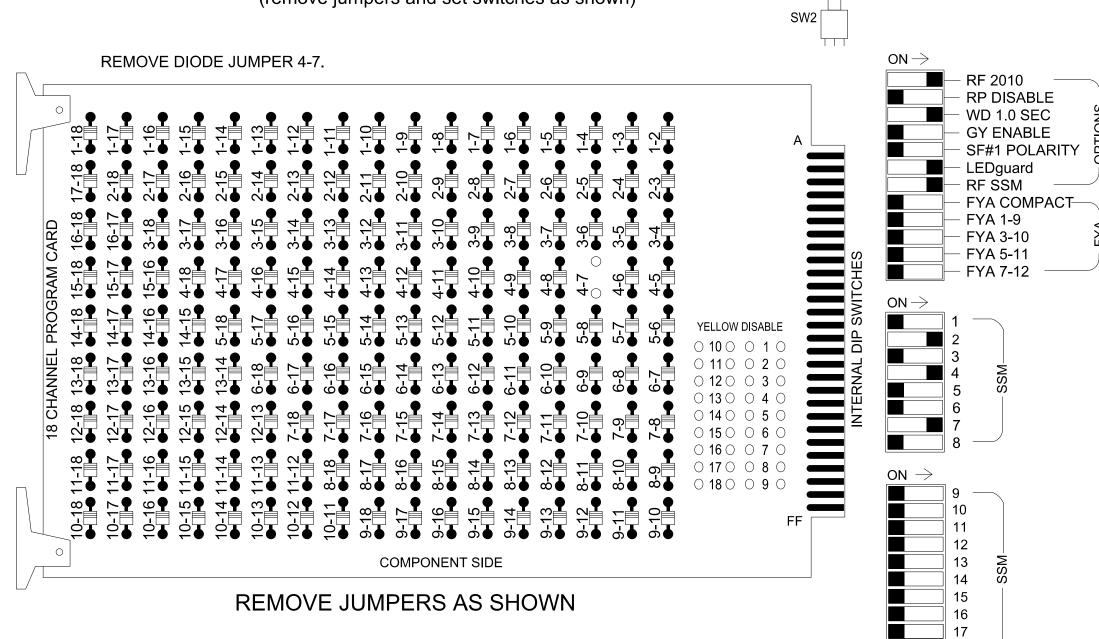
(remove jumpers and set switches as shown)

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.



### 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 7 for Dual Entry.
- 3. Program controller to start up in phase 2 Green No Walk and 6 Phase Not On.
- 4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 5. The cabinet and controller are part of the NC 150 D12-02\_Mooresville CLS.

### R-2307B Sig. 84.

					SI	GNA	L H	НЕА	D ł	H00	K-L	JP	CHA	٩RT	•				
LOAD Switch no.	S1	S	2	S3	S4	S5	S6	S7	S8	S9	S1Ø	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	á	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	41,42 43	NU	NU	NU	NU	71,72	NU	NU	NU	NU	NU	NU	NU	NU
RED		128	128			1Ø1													
YELLOW		129	129																
GREEN			130																
RED ARROW											122								
YELLOW ARROW						102					123								
GREEN ARROW		130				103					124								

NU = Not Used

## **EQUIPMENT INFORMATION**

Controller	2070LX
Cabinet	
Software	
Cabinet Mount	
Output File Positions	18 With Aux. Output File
Load Switches Used	S2, S5, S10
Phases Used	2, 4, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

### INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file <sup>U</sup> "I" .	SLOT EX	010H HZt	SLOH EMA	SLOT EMP	SLOT EXP	S L O T E M p	S L O T E M p	SLOT EXP	SLOT EMp	SLOT EMP	SLOT EXP	SLOT EMp	SLOT EMP	FS DC ISOLATOR ST
L	T Y	P T Y	P T Y	T Y	T Y	T Y	T Y	T Y	T Y	T Y	T Y	T Y	T Y	DC ISOLATOR
FILE U	SLOT	SLOT	SLOT	SLOT	SLOH	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
"J" L	E M P T Y	EMP+Y	E M P T Y	E M P T Y	EMPTY	E M P T Y	E M P T Y	E M P T Y	EMP+Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y
l	EX.: 1A, 2A, ETC. = LOOP NO.'S  FS = FLASH SENSE ST = STOP TIME													E

### 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: 12-1846T1 DESIGNED: MAY 2024 SEALED: 5/20/2024

Temporary Design 1 - TMP Phase III Electrical Detail

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

NC 150 EB SR 1116 (Talbert Road)

REVISED: N/A

Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PLAN DATE: REVIEWED BY: R Muncey, PE RMM/JPG

DOCUMENT NOT CONSIDERED FINAL

**UNLESS ALL SIGNATURES COMPLETED** 

PREPARED BY: REVISIONS INIT. DATE

Stantec

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750 N. Greenfield Pkwy, Garner, NC 27529

Jason Galloway 5/20/2024 SIG. INVENTORY NO. |2-1846T

PROJECT REFERENCE NO. Sig. 85.0 R-2307B

### 2 Phase Fully Actuated NC 150 D12-02\_MOORESVILLE $CL\overline{S}$

## 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
- 3. Set all detector units to presence mode.
- 4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- 5. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- 6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- 7. Pedestrian pedestals are conceptual and shown for reference only. See 2024 NCDOT Roadway Standard Drawings for push button location details.

LEGEND

Traffic Signal Head Modified Signal Head

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 Right of Way Directional Arrow

Metal Pole with Mastarm Directional Drill

(#) x 2" Conduit

Type II Signal Pedestal

Oversized Junction Box

"NO TURN ON RED" Sign (R10-11)

No Left Turn Sign (R3-2)

No U-Turn Sign (R3-4) SEE FIGURE 1

**EXISTING** 

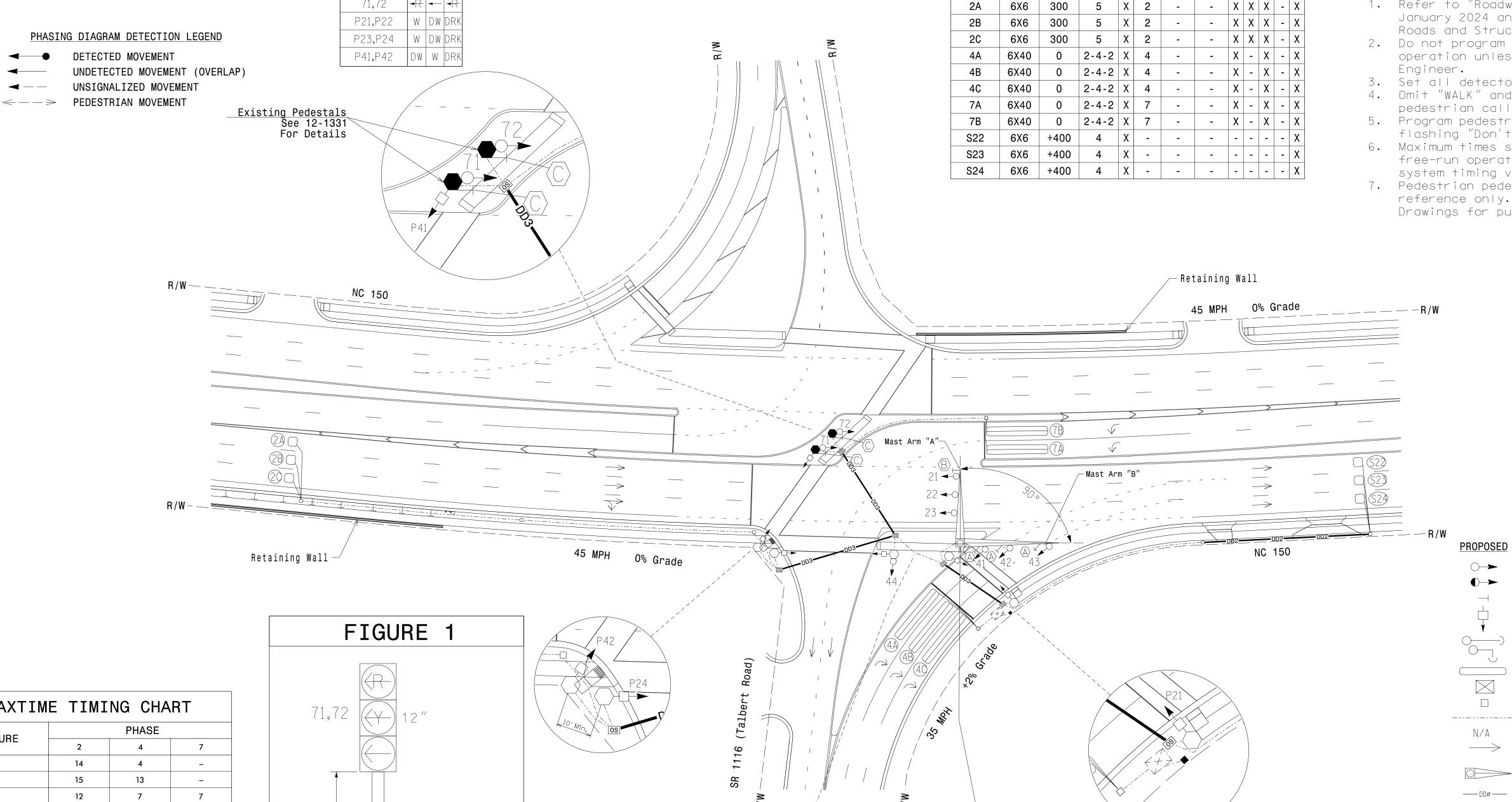
N/A

N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO.

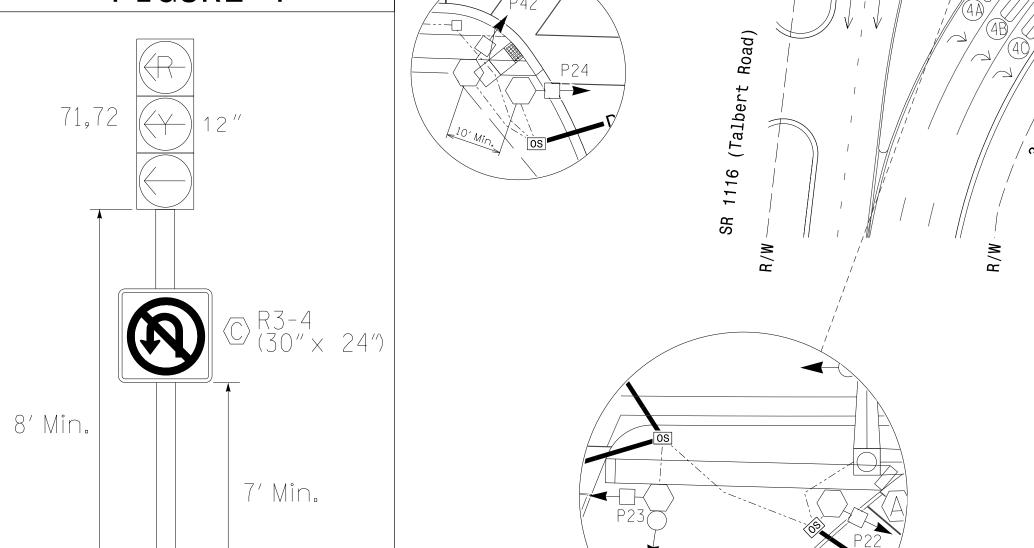
029904



MAXTIM	E TIMING CHART								
FEATURE		PHASE							
FEATURE	2	4	7						
Walk *	14	4	_						
Ped Clear *	15	13	_						
Min Green	12	7	7						
Passage *	6.0	2.0	2.0						
Max 1 *	60	30	30						
Yellow Change	4.5	3.4	3.0						
Red Clear	2.8	1.2	3.9						
Added Initial *	1.0	_	_						
Maximum Initial *	34	_	_						
Time Before Reduction *	15	_	_						
Time To Reduce *	30	_	_						
Minimum Gap	3.0	_	_						
Advance Walk	7	_	_						
Non Lock Detector	_	Х	Х						
Vehicle Recall	MIN RECALL	_	_						
Dual Entry	_	Х	Х						

PHASING DIAGRAM

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



SIGNAL FACE I.D.

All Heads L.E.D.

TABLE OF OPERATION

SIGNAL

FACE

22,23

41,42,43,44

71,72

New Installation - Final Design Stantec

Stantec Consulting Services Inc.

Raleigh, NC 27606

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801 Jones Franklin Road-Suite 300

Metal Pole #1 (Mast Arm "A"= 50 ft.) (Mast Arm "B"= 65 ft.)

-L- Sta. 771+44 ± 67' RT ±

MAXTIME DETECTOR INSTALLATION CHART

TURNS

PROGRAMMING

| O | CALL | DELAY | EXTEND | O | INI

≥ PHASE TIME TIME

DETECTOR

SIZE FROM

(FT) STOPBAR

NC 150 EB SR 1116 (Talbert Road)

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE Jason Galloway 5/20/2024

50 N.Greenfield Pkwy,Garner,NC 2

1"=40'