B PR

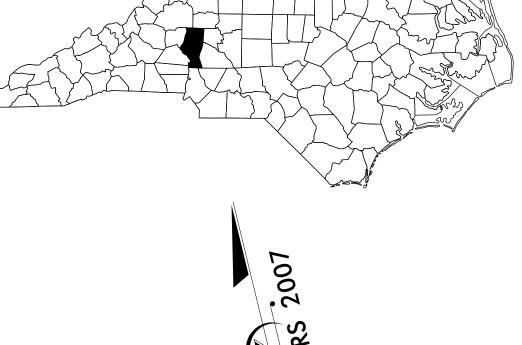
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

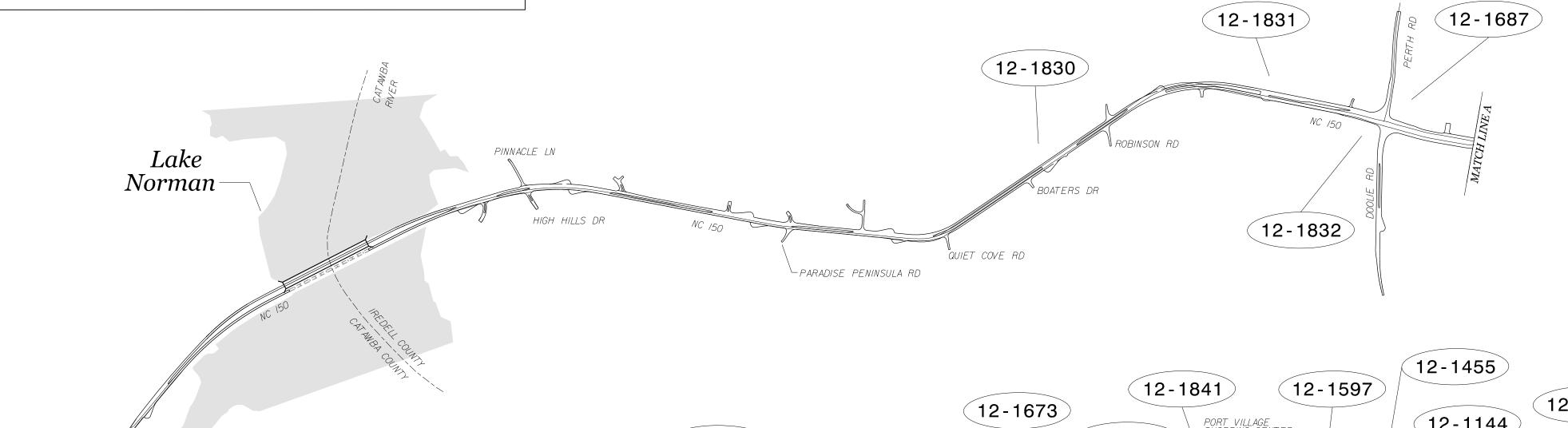
Project No. Sheet No. R-2307BSig. 1.0

CATAWBA & IREDELL COUNTIES

LOCATION: MOORESVILLE - NC 150 FROM SR 1840 (GREENWOOD RD) IN CATAWBA COUNTY TO US 21 IN IREDELL COUNTY

TYPE OF WORK: TRAFFIC SIGNALS





12-1851

ANTIQUITY LN -

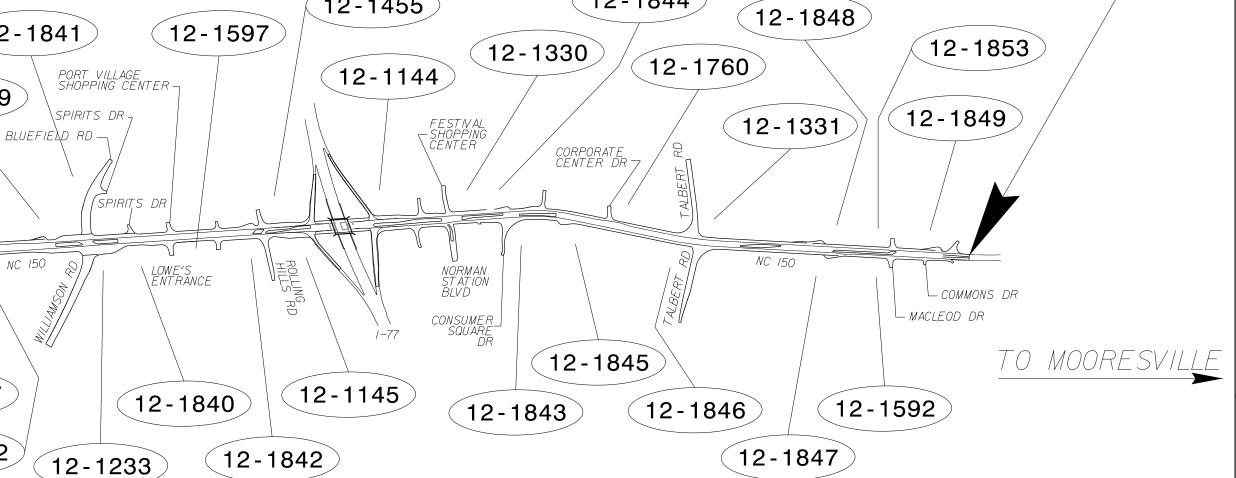
12-1836

12-1835

12-1838

[12-1670]

END TIP PROJECT R-2307B -L-STA.799+10.00



BEGIN TIP PROJECT R-2307B -L-POT 432+51.35

[12-1834]

END PROJECT

BEGIN PROJECT

VICINITY MAP

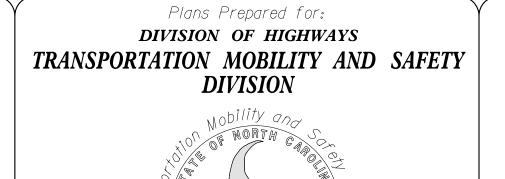
INTELLIGENT TRANSPORTATION AND SIGNALS UNIT Contacts:

12-1833

Richard N. Zinser, PE Signals Engineer, Western Region

Todd Joyce, PE Signal Equipment Design Engineer

Gregory Green Signal Communication Project Engineer



rsmo unit

750 N. Greenfield Parkway, Garner, NC 27529

[12-1837]

[12-1852<u>]</u>

12-1839

TARGET ENTRANCE -

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Betsy L. Watson, PE Deputy Regional Business Leader Regina Muncey, PE Senior Transportation Engineer Jason Galloway, PE

Senior Traffic Engineer James Hambright Senior Transportation Technician

Stantec

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

LEGEND XX-XXXX - SIGNAL INVENTORY NUMBER

R - 2307B
ROJECT REFERENCE NO.

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SIG-2.0 THRU SIG-2.3	12–1830T1	NC 150 EB AT SR 1396 (ROBINSON ROAD) U-TURN
SIG-3.0 THRU SIG-3.4	12–1830	NC 150 EB AT SR 1396 (ROBINSON ROAD) U-TURN
SIG-4.0 THRU SIG-4.1	12–1831T1	NC 150 EB AT SR 1303 (PERTH ROAD) U_TURN
SIG-5.0 THRU SIG-5.2	12–1831	NC 150 EB AT SR 1303 (PERTH ROAD) U-TURN
SIG-6.0 THRU SIG-6.2	12–1687T1	NC 150 AT SR 1303 (PERTH ROAD)/SR 1180 (DOOLIE ROAD)
SIG-7.0 THRU SIG-7.2	12–1687T2	NC 150 AT SR 1303 (PERTH ROAD)/SR 1180 (DOOLIE ROAD)
SIG-8.0 THRU SIG-8.1	12–1687T3	NC 150 WB AT SR 1303 (PERTH ROAD)
SIG-9.0 THRU SIG-9.2	12–1687	NC 150 WB AT SR 1303 (PERTH ROAD)
SIG-10.0 THRU SIG-10.1	12–1832T1	NC 150 EB AT SR 1180 (DOOLIE ROAD)
SIG-11.0 THRU SIG-11.2	12–1832	NC 150 EB AT SR 1180 (DOOLIE ROAD)
SIG-12.0 THRU SIG-12.1	12–1833T1	NC 150 WB AT SR 1180 (DOOLIE ROAD) U_TURN
SIG-13.0 THRU SIG-13.2	12–1833	NC 150 WB AT SR 1180 (DOOLIE ROAD) U_TURN
SIG-14.0 THRU SIG-14.1	12–1834T1	NC 150 EB AT WATER OAK DRIVE U_TURN
SIG-15.0 THRU SIG-15.2	12–1834	NC 150 EB AT WATER OAK DRIVE U_TURN
SIG-16.0 THRU SIG-16.1	12–1851T1	NC 150 WB AT U_TURN ACROSS FROM ANTIQUITY LANE
SIG-17.0 THRU SIG-17.2	12–1851	NC 150 WB AT U_TURN ACROSS FROM ANTIQUITY LANE
SIG-18.0 THRU SIG-18.3	12–1835T1	NC 150 EB AT SR 1304 (ERVIN ROAD) U_TURN
SIG-19.0 THRU SIG-19.4	12–1835	NC 150 EB AT SR 1304 (ERVIN ROAD) U-TURN
SIG-20.0 THRU SIG-20.3	12–1670T1	NC 150 AT SR 1304 (ERVIN ROAD)/MORRISON PLANTATION PARKWAY
SIG-21.0 THRU SIG-21.3	12–1670T2	NC 150 AT SR 1304 (ERVIN ROAD)/MORRISON PLANTATION PARKWAY
SIG-22.0 THRU SIG-22.1	12–1670T3	NC 150 EB AT MORRISON PLANTATION PARKWAY
SIG-23.0 THRU SIG-23.2	12–1670	NC 150 EB AT MORRISON PLANTATION PARKWAY
SIG-24.0 THRU SIG-24.2	12–1836T1	NC 150 WB AT SR 1304 (ERVIN ROAD)
SIG-25.0 THRU SIG-25.3	12–1836	NC 150 WB AT SR 1304 (ERVIN ROAD)
SIG-26.0 THRU SIG-26.1	12–1838T1	NC 150 WB AT MORRISON PLANTATION PARKWAY U-TURN
SIG-27.0 THRU SIG-27.2	12–1838	NC 150 WB AT MORRISON PLANTATION PARKWAY U-TURN
SIG-28.0 THRU SIG-28.1	12–1837T1	NC 150 EB AT TARGET U_TURN
SIG-29.0 THRU SIG-29.2	12–1837	NC 150 EB AT TARGET U_TURN
SIG-30.0 THRU SIG-30.2	12–1673T1	NC 150 AT MOORESVILLE CROSSING/TARGET ENTRANCE
SIG-31.0 THRU SIG-31.2	12–1673T2	NC 150 AT MOORESVILLE CROSSING/TARGET ENTRANCE
SIG-32.0 THRU SIG-32.2	12–1673T3	NC 150 AT MOORESVILLE CROSSING/TARGET ENTRANCE
SIG-33.0 THRU SIG-33.1	12–1673T4	NC 150 WB AT TARGET ENTRANCE
SIG-34.0 THRU SIG-34.2	12–1673	NC 150 WB AT TARGET ENTRANCE



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SCALE

Index of Sheets

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE INIT. DATE

Jason Galloway 5/20/2024 10D1E2B40B4B46E... SIG. INVENTORY NO.

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REVISIONS NOT TO

INDEX OF SHEETS

SIG-35.0 THRU SIG-35.1	12–1852T1	NC 150 EB AT MOORESVILLE CROSSING
SIG-36.0 THRU SIG-36.3	12–1852	NC 150 EB AT MOORESVILLE CROSSING
SIG-37.0 THRU SIG-37.1	12–1839T1	NC 150 WB AT MOORESVILLE CROSSING U_TURN/
		SR 1467 (BLUEFIELD ROAD) CFI CROSSOVER
SIG-38.0 THRU SIG-38.2	12–1839	NC 150 WB AT MOORESVILLE CROSSING U-TURN/
		SR 1467 (BLUEFIELD ROAD) CFI CROSSOVER
SIG-39.0 THRU SIG-39.2	12–1233T1	NC 150 AT SR 1467 (BLUEFIELD ROAD)/SR1109 (WILLIAMSON ROAD)
SIG-40.0 THRU SIG-40.2	12–1233T2	NC 150 AT SR 1474 (BLUEFIELD ROAD)/SR1109 (WILLIAMSON ROAD)
SIG-41.0 THRU SIG-41.2	12-1233T3	NC 150 AT SR 1467 (BLUEFIELD ROAD)/SR1109 (WILLIAMSON ROAD)
SIG-42.0 THRU SIG-42.1	12–1233T4	NC 150 AT SR 1467 (BLUEFIELD ROAD)/SR1109 (WILLIAMSON ROAD)
SIG-43.0 THRU SIG-43.4	12–1233	NC 150 AT SR 1467 (BLUEFIELD ROAD)/SR1109 (WILLIAMSON ROAD)
SIG-44.0 THRU SIG-44.1	12–1840T1	NC 150 EB AT SR 1109 (WILLIAMSON ROAD) CFI CROSSOVER
SIG-45.0 THRU SIG-45.2	12–1840	NC 150 EB AT SR 1109 (WILLIAMSON ROAD) CFI CROSSOVER
SIG-46.0 THRU SIG-46.2	12–1841T1	SR 1467 (BLUEFIELD ROAD) AT SPIRITS DRIVE
SIG-47.0 THRU SIG-47.2	12–1841	SR 1467 (BLUEFIELD ROAD) AT SPIRITS DRIVE
SIG-48.0 THRU SIG-48.2	12–1597T1	NC 150 AT LOWE'S MAIN ENTRANCE/PORT CITY SHOPPING CENTER
SIG-49.0 THRU SIG-49.2	12–1597T2	NC 150 AT LOWE'S MAIN ENTRANCE/PORT CITY SHOPPING CENTER
SIG-50.0 THRU SIG-50.2	12–1597T3	NC 150 AT LOWE'S MAIN ENTRANCE/PORT CITY SHOPPING CENTER
SIG-51.0 THRU SIG-51.2	12–1597T4	NC 150 AT LOWE'S MAIN ENTRANCE
SIG-52.0 THRU SIG-52.3	12–1597	NC 150 AT LOWE'S MAIN ENTRANCE
SIG-53.0 THRU SIG-53.1	12–1455T1	NC 150 AT SR 3290 (ROLLING HILLS ROAD)/REGENCY CENTER DRIVE
SIG-54.0 THRU SIG-54.1	12–1455T2	NC 150 AT SR 3290 (ROLLING HILLS ROAD)/REGENCY CENTER DRIVE
SIG-55.0 THRU SIG-55.1	12–1455T3	NC 150 WB AT LOWE'S U_TURN/REGENCY CENTER DRIVE
SIG-56.0 THRU SIG-56.2	12–1455	NC 150 WB AT LOWE'S U_TURN/REGENCY CENTER DRIVE
SIG-57.0 THRU SIG-57.2	12–1842T1	NC 150 EB AT SR 3290 (ROLLING HILLS ROAD)
SIG-58.0 THRU SIG-58.3	12–1842	NC 150 EB AT SR 3290 (ROLLING HILLS ROAD)
SIG-59.0 THRU SIG-59.1	12–1145T1	NC 150 AT I-77 SB RAMPS
SIG-60.0 THRU SIG-60.1	12–1145T2	NC 150 AT I-77 SB RAMPS
SIG-61.0 THRU SIG-61.1	12–1145T3	NC 150 AT I-77 SB RAMPS
SIG-62.0 THRU SIG-62.4	12–1145	NC 150 AT I-77 SB RAMPS
SIG-63.0 THRU SIG-63.2	12–1144T1	NC 150 AT I-77 NB RAMPS
SIG-64.0 THRU SIG-64.1	12–1144T2	NC 150 AT I-77 NB RAMPS
SIG-65.0 THRU SIG-65.1	12–1144T3	NC 150 AT I-77 NB RAMPS
SIG-66.0 THRU SIG-66.1	12–1144	NC 150 AT I-77 NB RAMPS
SIG-67.0 THRU SIG-67.1	12–1330T1	NC 150 AT NORMAN STATION BOULEVARD/MOORESVILLE FESTIVAL
SIG-68.0 THRU SIG-68.1	12–1330T2	NC 150 AT NORMAN STATION BOULEVARD/MOORESVILLE FESTIVAL



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REVISIONS INIT. DATE NOT TO SCALE

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SIG. INVENTORY NO.

R - 2307B	SIG-1.
ROJECT REFERENCE NO.	SHEET N

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SIG-69.0 THRU	SIG-69.1	12-1330T3	NC 150 AT NORMAN STATION BOULEVARD/MOORESVILLE FESTIVAL
SIG-70.0 THRU	SIG-70.3	12–1330	NC 150 AT NORMAN STATION BOULEVARD/MOORESVILLE FESTIVAL
SIG-71.0 THRU	SIG-71.2	12–1844T1	NC 150 WB AT U-TURN FOR CONSUMER SQUARE WESTERN ENTRANCE
SIG-72.0 THRU	SIG-72.3	12–1844	NC 150 WB AT U-TURN FOR CONSUMER SQUARE WESTERN ENTRANCE
SIG-73.0 THRU	SIG-73.2	12–1843T1	NC 150 EB AT CONSUMER SQUARE EASTERN ENTRANCE
SIG-74.0 THRU	SIG-74.3	12–1843	NC 150 EB AT CONSUMER SQUARE EASTERN ENTRANCE
SIG-75.0 THRU	SIG-75.1	12–1845T1	NC 150 EB AT SR 1116 (TALBERT ROAD) U-TURN
SIG-76.0 THRU	SIG-76.2	12–1845	NC 150 EB AT SR 1116 (TALBERT ROAD) U-TURN
SIG-77.0 THRU	SIG-77.2	12–1760T1	NC 150 AT CORPORATE CENTER DRIVE/CARPROS ENTRANCE
SIG-78.0 THRU	SIG-78.1	12-1760T2	NC 150 WB AT CORPORATE CENTER DRIVE
SIG-79.0 THRU	SIG-79.2	12–1760	NC 150 WB AT CORPORATE CENTER DRIVE
SIG-80.0 THRU	SIG-80.2	12–1331T1	NC 150 WB AT SR 1116 (TALBERT ROAD)
SIG-81.0 THRU	SIG-81.2	12–1331T2	NC 150 WB AT SR 1116 (TALBERT ROAD)
SIG-82.0 THRU	SIG-82.1	12–1331T3	NC 150 WB AT SR 1116 (TALBERT ROAD)
SIG-83.0 THRU	SIG-83.2	12–1331	NC 150 WB AT SR 1116 (TALBERT ROAD)
SIG-84.0 THRU	SIG-84.1	12–1846T1	NC 150 EB AT SR 1116 (TALBERT ROAD)
SIG-85.0 THRU	SIG-85.2	12–1846	NC 150 EB AT SR 1116 (TALBERT ROAD)
SIG-86.0 THRU	SIG-86.1	12–1848T1	NC 150 WB AT SR 1116 (TALBERT ROAD) U-TURN
SIG-87.0 THRU	SIG-87.2	12–1848	NC 150 WB AT SR 1116 (TALBERT ROAD) U-TURN
SIG-88.0 THRU	SIG-88.2	12–1847T1	NC 150 EB AT MACLEOD DRIVE U_TURN
SIG-89.0 THRU	SIG-89.3	12–1847	NC 150 EB AT MACLEOD DRIVE U_TURN
SIG-90.0 THRU	SIG-90.2	12–1592T1	NC 150 AT MACLEOD DRIVE
SIG-91.0 THRU	SIG-91.1	12–1592T2	NC 150 EB AT MACLEOD DRIVE
SIG-92.0 THRU	SIG-92.2	12–1592	NC 150 EB AT MACLEOD DRIVE
SIG-93.0 THRU	SIG-93.1	12–1853T1	NC 150 WB AT MACLEOD DRIVE
SIG-94.0 THRU	SIG-94.2	12–1853	NC 150 WB AT MACLEOD DRIVE
SIG-95.0 THRU	SIG-95.1	12–1849T1	NC 150 WB AT MACLEOD DRIVE U_TURN
SIG-96.0 THRU	SIG-96.2	12–1849	NC 150 WB AT MACLEOD DRIVE U_TURN
M1 THRU M10			STANDARD METAL POLE DRAWINGS



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Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: **J GH 28m 15 rp.ie.gl.hl.t** REVIEWED BY: **R Muncey, PE** INIT. DATE

Jason Galloway 5/20/2024

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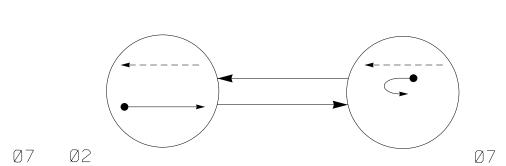
SCALE

SIG. INVENTORY NO.

Ø2

DEFAULT PHASING DIAGRAM

ALTERNATE PHASING DIAGRAM



PHASING	DIAGRAM	DETECTION	LEGEND	

DETECTED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

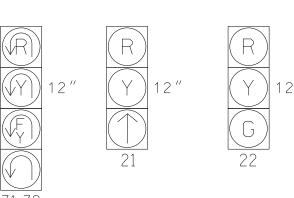
UNSIGNALIZED MOVEMENT $<\!\!\!<\!\!\!--\!\!\!>$ PEDESTRIAN MOVEMENT

DEFAULT TABLE OF (.
	Р	HAS	E
SIGNAL FACE	Ø 2	Ø 7	FLASH
21	1	R	R
22	G	R	R
71,72	√ FY		√R

ALTERNATE	PH	ASI	NG
TABLE OF ()PEF	RAT:	[ON
	Р	HAS	E
SIGNAL FACE	Ø 2	Ø 7	LUGOI
21	1	R	R
22	G	R	R
71,72	√ R)		₽R

SIGNAL FACE I.D.

All Heads L.E.D.



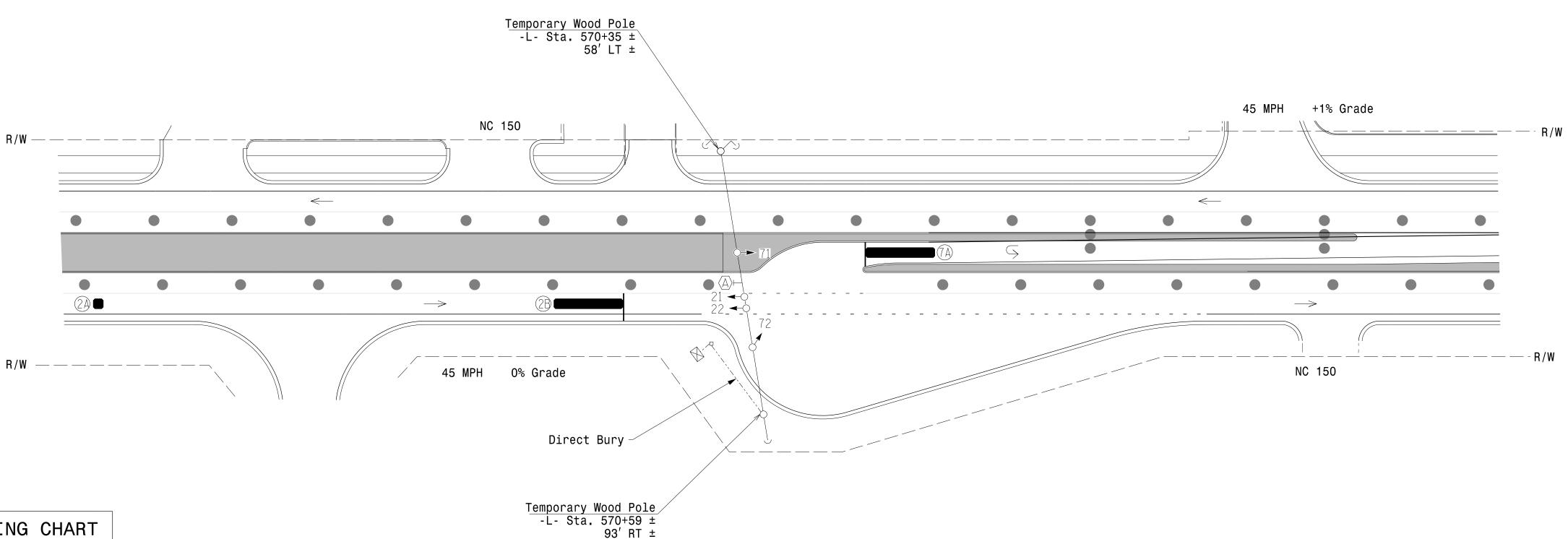
		MAXTI	ME DET	ECTOR	I	NSTA	LLAT]	ON C	HA	RT			
		DETI	ECTOR				PRO	GRAMM	IN	G			
L	.00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
	2A	6X6	300	*	*	2	-	-	Χ	-	Χ	-	*
	2B	6X40	0	*	*	2	5.0	2.0	Χ		Χ	Χ	*
	7A	6X40	0	*	*	7	15.0★	-	Χ	-	Χ	-	*

- * Video Detection Area
- Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated.
- ★ Disable delay during Alternate Phasing Operation.

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
- 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.
- 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 T	IMING	CHART
FEATURE	PH	ASE
FEATURE	2	7
Walk *	_	_
Ped Clear *	_	_
Min Green	12	7
Passage *	6.0	2.0
Max 1 *	60	30
Yellow Change	4.5	3.0
Red Clear	2.2	3.5
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. New Installation Temporary Design 1 - TMP Phase III

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801 Jones Franklin Road-Suite 300



1"=40'

NC 150 EB SR 1396 (Robinson Road) U-turn

PROPOSED

N/A

 \bullet

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

REVISIONS

g PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE INIT. DATE Jason Galloway 17/2024 SIG. INVENTORY NO. |2-|830T

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 No Left Turn Sign (R3-2)

2-in Underground Conduit -----

EXISTING

N/A

 \rightarrow

N/A

N/A

N/A

CARN

029904

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ON OFF

RF 2010

RP DISABLE

GY ENABLE

FYA 1-9

14 15

16

17

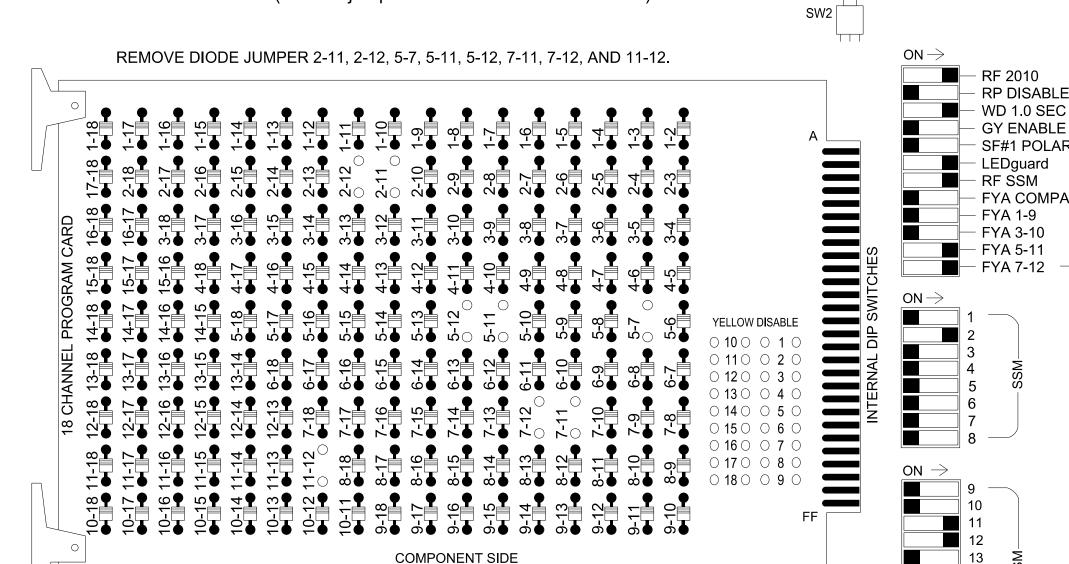
■ = DENOTES POSITION OF SWITCH

FYA 3-10

SF#1 POLARITY

FYA COMPACT—

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

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

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.

CMU CHANNEL NO. PHASE NU 21 22 NU NU NU NU 72 NU NU 71 NU NU NU NU NU SIGNAL HEAD NO RED 128 | 128 129 | 129 YELLOW 130 GREEN RED A114 A101 ARROW YELLOW A115 A102 ARROW FLASHING YELLOW ARROW A116 A1Ø3

SIGNAL HEAD HOOK-UP CHART

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

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

124

NU = Not Used

OL4 RED (A101) ---

OL4 YELLOW (A102) -

OL4 GREEN (A103) —

GREEN

ARROW

LOAD SWITCH NO.

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

133

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, S7, S10, AUX S4, AUX S5
Phases Used	2, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	*

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

- PHASE 7 (LDSW NO.S7)

YELLOW FIELD TERMINAL (132)

PHASE 7 (LDSW NO. S10)

YELLOW FIELD TERMINAL (123)

*See overlap programming detail on sheet 2

Overlap "4".....

ACCEPTABLE VALUES

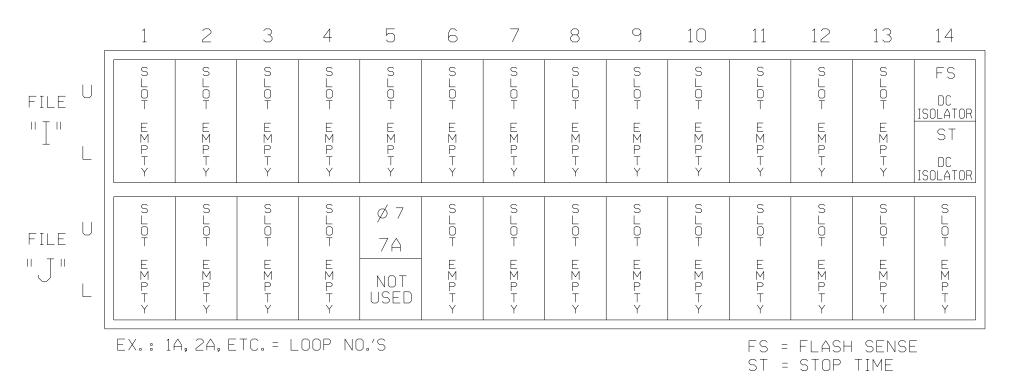
1.5K - 1.9K | 25W (min)

2.0K - 3.0K | 10W (min)

VALUE (ohms) WATTAGE

INPUT FILE POSITION LAYOUT

(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.		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		Χ		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 3.

INPUT FILE POSITION LEGEND: J2L

FILE J SLOT 2 **LOWER**

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1830T1 DESIGNED: MAY 2024 SEALED: 5/17/2024

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

OL3 RED (A114) ---

OL3 YELLOW (A115) -

OL3 GREEN (A116) —

Temporary Design 1 - TMP Phase III Electrical Detail - Sheet 1 of 3

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PROJECT REFERENCE NO.

R-2307B

Sig. 2.1

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 EB

REVISED: N/A

|SR 1396 (Robinson Road) U-turn Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE J Galloway REVIEWED BY: R Muncey, PE PREPARED BY: REVISIONS INIT. DATE

SEAL 029904

Jason Galloway 17/2024

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.

For Detection Zone 7A, the equipment placement is typical for a NCDOT installation. Inputs associated with this slot are compatible with alternate operation programming located on sheets 2 and 3 of this electrical detail.

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R-2307B Sig. 2.2

OUTPUT CHANNEL CONFIGURATION

Front Panel

Main Menu >Controller >More>Channels>Channels Config

Web Interface

17

18

Overlap

Overlap

Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

Control Type Control Source Flash Yellow Flash Red Channel Flash Alt MMU Channel Phase Vehicle Χ Χ Phase Vehicle Χ 2 Phase Vehicle Χ 4 Phase Vehicle NOTICE CONTROL SOURCE 7 ASSIGNED TO CHANNEL 5 Phase Vehicle Phase Vehicle Phase Vehicle 8 Phase Vehicle Overlap 10 10 Overlap 11 11 Overlap 12 Χ 12 Overlap 13 Phase Ped 2 13 14 14 Phase Ped 15 15 Phase Ped 16 Phase Ped

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

17

18

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.

Detector Call Phase Delay 7A

MAXTIME OVERLAP PROGRAMMING DEFAULT PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	3	4
Туре	FYA 4 - Section	FYA 4 - Section
ncluded Phases	2	2
Modifier Phases	7	7
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

•			
Overlap	3	4	
Туре	FYA 4 - Section	FYA 4 - Section	
Included Phases	-	-	NOTICE INCLUDED PHASE
Modifier Phases	7	7	
Modifier Overlaps	-	-	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1830T1 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III Electrical Detail - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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NC 150 EB SR 1396 (Robinson Road) U-turn

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

Jason Galloway 17/2024

029904

License No. F-0672

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for heads 71 and 72 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7

call on loop 7A to 0 seconds.

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	

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1830T1

DESIGNED: MAY 2024

SEALED: 5/17/2024

REVISED: N/A

Temporary Design 1 - TMP Phase III

Electrical Detail - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 150 EB

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

at | SR 1396 (Robinson Road) U-turn

Docusigned, by:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Jason Galloway 17/2024

10D1E2B40B4B46E... DATE

SIG. INVENTORY NO. 12-1830 TI

Stantec

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801 Jones Franklin Road-Suite 300

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M cwsignals*Design*Electrical Details

7:03 PM Traffic*Signal r:jgalloway

ic*Signals*Design |loway

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.

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

> Right of Way Directional Arrow

Metal Pole with Mastarm Directional Drill

(#) x 2" Conduit Type II Signal Pedestal No Left Turn Sign (R3-2)

---- 2-in Underground Conduit

SIGNAL FACE I.D. All Heads L.E.D.

ALTERNATE TABLE OF O			
SIGNAL FACE		HAS Ø 7	E FLASH
21	1	R	R

DEFAULT PHASING

TABLE OF OPERATION

SIGNAL

FACE

71,72

07

Metal Pole #1/ (Mast Arm = 50 ft.) -L- Sta. 570+31 ± 59' RT ±

ALTERNATE

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

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

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

ALTERNATE PHASING TABLE OF OPERATION									
	PHASE								
SIGNAL FACE	Ø 2	Ø 7	IODLT						
21	1	R	R						
22	G	R	R						
71,72	√ R)		√ R						

ALTERNATE TABLE OF C			
	P	HAS	E
SIGNAL FACE	Ø 2	Ø 7	FLAST
21	1	R	R
22	G	R	R
71,72	(R)	$\overline{\bigcap}$	√R

★ Disable delay during Alternate Phasing Operation.

DETECTOR

SIZE FROM (FT) STOPBAR

DISTANCE

MAXTIME DETECTOR INSTALLATION CHART

6X6 300 4 X 2 - - X X X - X

6X6 300 4 X 2 - - X X X - X

6X40 0 2-4-2 X 7 ★15.0 - X - X - X

PROGRAMMING

O CALL DELAY EXTEND ON IN IN SUPER

R/W — -	NC 150		— R/W
R/W —	002 002 45 MPH +1% Grade NC 1	50	— R/W
		<u>PROPOSED</u>	LEGEND

MAXTIME T	IMING	CHART		
FEATURE	PHA	ASE		
FEATURE	2	7		
Walk *	_	_		
Ped Clear *	_	_		
Min Green	12	7		
Passage *	6.0	2.0		
Max 1 *	60	30		
Yellow Change	4.4	3.0		
Red Clear	2.2	3.5		
Added Initial *	1.5	_		
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	_	_		

DEFAULT

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.

New Installation - Final Design **Stantec**

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NC 150 EB SR 1396 (Robinson Road) U-turn

 \bigcirc

N/A

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

g PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE 1"=40'

CARN 029904

EXISTING

—

N/A

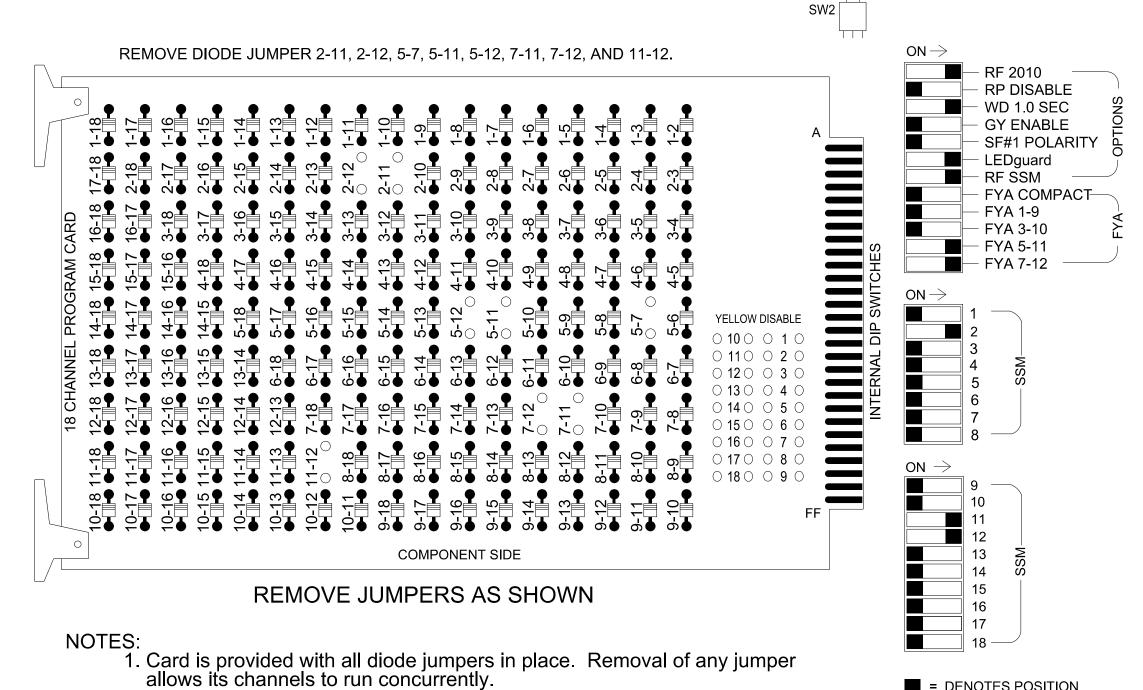
N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Jason Galloway 17/2024 SIG. INVENTORY NO. |2-1830

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



ON

= 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.

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, S7, S10, AUX S4, AUX S5
Phases Used	2, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	*
Overlap "4"	*

*See overlap programming detail on sheet 2

R-2307B Sig. 3.1

	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	13	3	4	14	5	6	15	7	8	16	9	1Ø	17	11	12	18
PHASE	1	2	2	2 PED	3	4	4 PED	7	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	NU	★ 72	NU	NU	71 ★	NU	NU	NU	NU	NU	72 ★	71 ★	NU
RED		128	128																
YELLOW		129	129					*			*								
GREEN			13Ø																
RED ARROW																	A114	A1Ø1	
YELLOW ARROW																	A115	A1Ø2	
FLASHING YELLOW ARROW																	A116	A1Ø3	
GREEN ARROW		130						133			124								

NU = Not Used

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

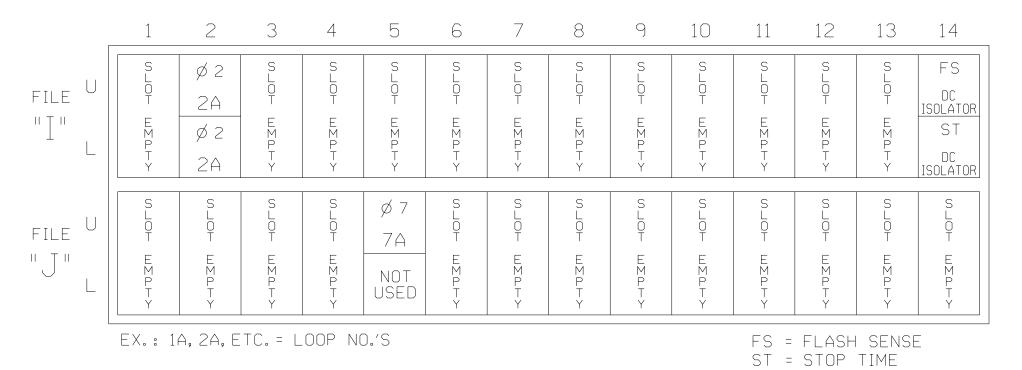
INPUT FILE POSITION LAYOUT

(front view)

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 CONNECTION & PROGRAMMING CHART

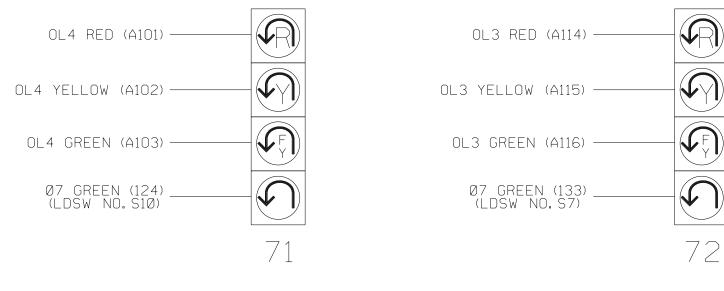
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.		DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A/S01	TB2-5,6	I2U	39	1	2	2			Х	Χ	Х	
2B/S02	TB2-7,8	I2L	43	5	3	2			Х	Χ	Х	
7A	TB5-5,6	J5U	57	19	21 *	7	15.0		Х		Х	

For the detectors to work as shown on the signal design plan, see the Detector Programming Detail for Alternate Phasing on sheet 2 of 3.

FILE J SLOT 2 LOWER

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1830

DESIGNED: MAY 2024

SEALED: 5/17/2024

REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

 VALUE (ohms)
 WATTAGE

 1.5K - 1.9K
 25W (min)

 2.ØK - 3.ØK
 1ØW (min)

PHASE 7 (LDSW NO.S7)
YELLOW FIELD TERMINAL (132)

PHASE 7 (LDSW NO.S10)
YELLOW FIELD TERMINAL (123)

ELECTRICAL AND PROGRAMMING

Final Design Electrical Detail - Sheet 1 of 3

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Nobility and Salar Salar

NC 150 EB at SR 1396 (Robinson Road) U-turn

Docusigned by:

4:29:21 PM U:*Traffic*Signals*Design*Electrica

PREPARED BY: J Galloway REVIEWED BY: R Muncey, PE

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

R-2307B Sig. 3.2

OUTPUT CHANNEL CONFIGURATION

Front Panel

Main Menu >Controller >More>Channels>Channels Config

Web Interface

Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

NOTICE CONTROL SOURCE 7 ASSIGNED TO CHANNEL 5

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

MAXTIME DETECTOR PROGRAMMING DETAIL FOR ALTERNATE PHASING LOOP 7A

Front Panel

Main Menu >Controller >Detector >Veh Det Plans

Web Interface

Home >Controller >Detector Configuration >Vehicle Detectors

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

Detector Call Phase Delay 7A

MAXTIME OVERLAP PROGRAMMING **DEFAULT PHASING**

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	3	4
Туре	FYA 4 - Section	FYA 4 - Section
Included Phases	2	2
Modifier Phases	7	7
Modifier Overlaps	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	3	4	
Туре	FYA 4 - Section	FYA 4 - Section	
Included Phases	-	-	NOTICE INCLUDED PHASE
Modifier Phases	7	7	
Modifier Overlaps	-	-	
Trail Green	0	0	
Trail Yellow	0.0	0.0	
Trail Red	0.0	0.0	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1830 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Final Design

Electrical Detail - Sheet 2 of 3

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NC 150 EB SR 1396 (Robinson Road) U-turn

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



R-2307B Sig. 3.3

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for heads 71 and 72 to run protected turns only.

VEH DET PLAN 2: Reduces delay time for phase 7

call on loop 7A to 0 seconds.

SEQUENCE DETAIL

Front Panel

Main Menu >Controller >Sequence & Phs Config>Sequences

Web Interface

Home >Controller >Sequence

Sequence 1

Rin	g	Sequence Data
1		2,a,7,b
2		

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1830

DESIGNED: MAY 2024

SEALED: 5/17/2024

REVISED: N/A



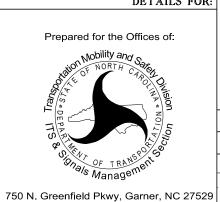
Electrical Detail - Sheet 3 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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License No. F-0672



SR 1396 (
Division 12
PLAN DATE: Ma
PREPARED BY: J G

SR 1396 (Robinson Road) U-turn

Division 12 Iredell County Mooresville

NC 150 EB



Jason Gallowasy 17/2024

10D1E2B40B4B46E.... 12-1830

4:29:30 rM U:*Traffic*Signals*Design*Elec†rical De†ails*Final Design≯ User:jgalloway Elevation View

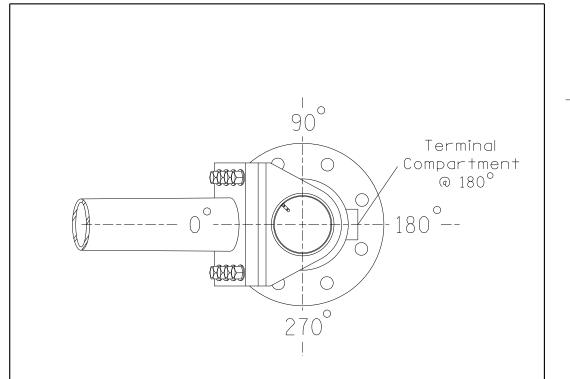
Base line reference elev. = 855.224

SPECIAL NOTE

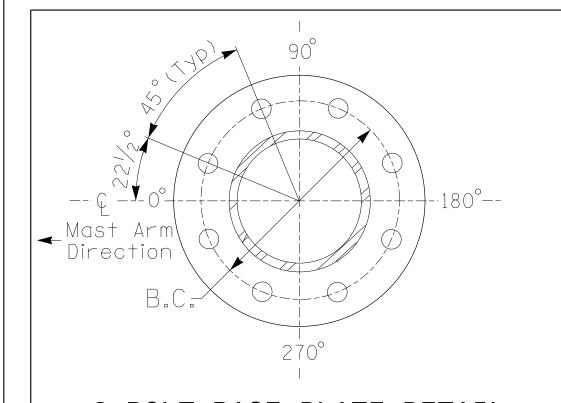
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at © Foundation @ ground level	855.22 ft.	
Elevation difference at High point of roadway surface	+3.45 ft.	
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	

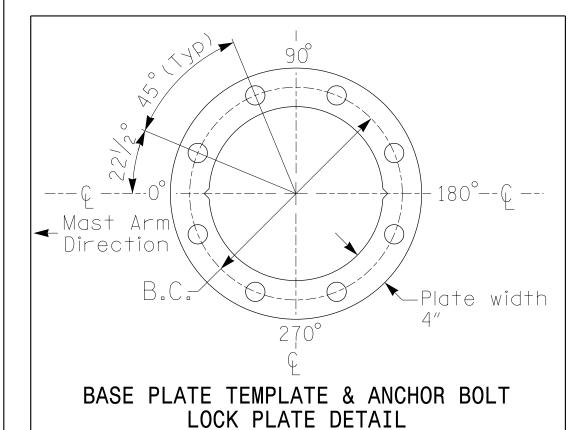


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



For 8 Bolt Base Plate

METAL POLE No. 1

R - 2307B	Sig. 3.
PROJECT REFERENCE NO.	SHEET NO

	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

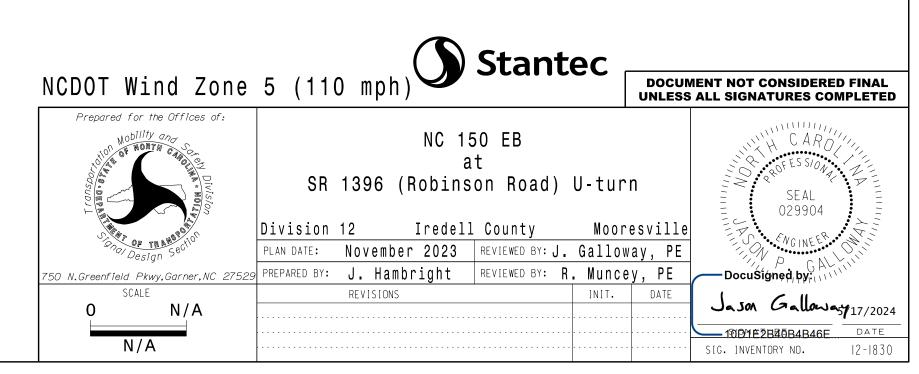
NOTES

DESIGN REFERENCE MATERIAL

- 1. Design the traffic 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 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. SHEET NO. Sig. 4.0 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. 7. Field adjust temporary poles as needed.

<u>EXISTING</u>

-

N/A

N/A

N/A

N/A

MAXTIME DETECTOR INSTALLATION CHART **DETECTOR** PROGRAMMING DISTANCE SIZE FROM 의 CALL DELAY EXTEND 温 및 TURNS STOPBAR ≥ PHASE TIME TIME 6X6 | 300 | * |*| 2 | - | - | X | - | X | - | * * |* 2 | 5.0 | 2.0 |X| - |X|X| * 6X40 | 0 | * | * | 7 | - | - | X | - | * |

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

		Temporary Wood Pole -L- Sta. 602+49 ± 76' LT ±	i f 6. M a C
R/W —	NC 150		
- - -			
-		-72 TB	
		71	
:		22	
R/W — –	45 MPH -2% Grade	Direct Bury Cable	NC 150
			<u>LE</u> <u>PROPOSED</u>

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	4.7	3.0		
Red Clear	2.0	4.9		
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	_		

* 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. New Installation Temporary Design 1 - TMP Phase III

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License No. F-0672



50 N.Greenfield Pkwy,Garner,NC 275

1"=40'

NC 150 EB SR 1303 (Perth Road) U-turn

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 Video Detection Area

Construction Zone

Drums No Left Turn Sign (R3-2)

 \bigcirc

N/A

 \bullet

REVISIONS

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

029904 INIT. DATE

Jason Galloway 17/2024 SIG. INVENTORY NO. |2-|83|T

CARN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

22 71,72

Temporary Wood Pole -L- Sta. 602+49 ± 88' RT ±

TABLE OF OPERATION

SIGNAL

FACE

PHASE

SIGNAL FACE I.D.

All Heads L.E.D.

Dual Entry

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

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

UNSIGNALIZED MOVEMENT

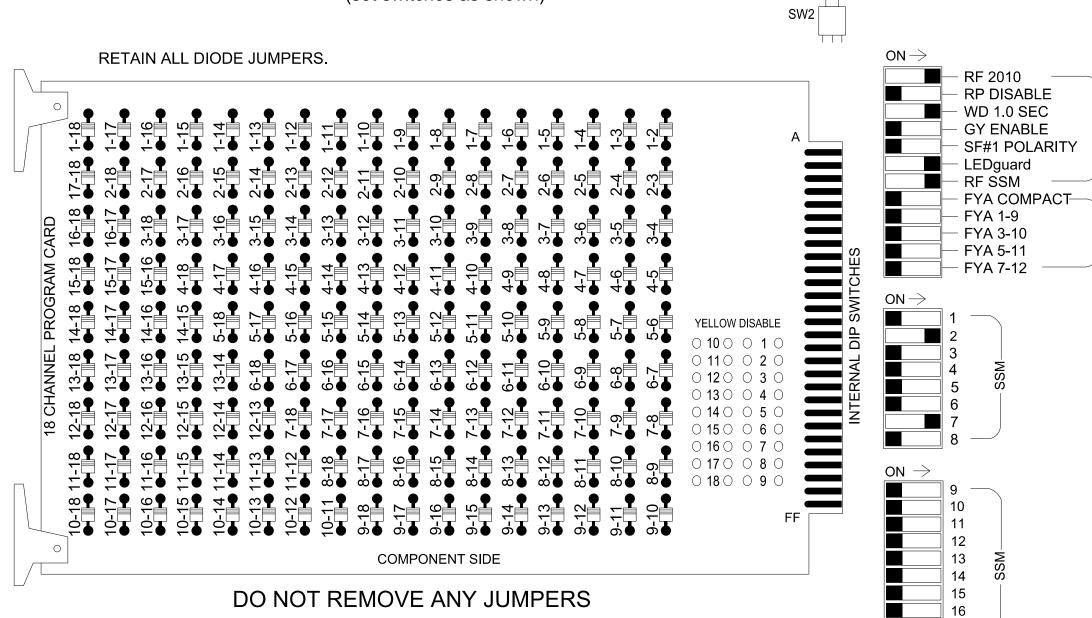
UNDETECTED MOVEMENT (OVERLAP)

ON OFF

___ 17 ___ 18 –

= DENOTES POSITION OF SWITCH

(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 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.

R-2307B Sig. 4.1	PROJECT REFERENCE NO.	SHEET NO.
	R - 2307B	Sig. 4.1

	SIGNAL HEAD HOOK-UP CHART																		
LOAD SWITCH NO.	S1	S	2	S3	S4	S5	S6	S7	S8	59	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	60	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL NU 21 22 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

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
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 ^U "I" L	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	%LOF EXPF>	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR						
FILE U	S LOT E M P T Y	S L O T E M P T Y	S LOT E M P T Y	SLOT EMPTY FST =		S T E M P T Y SENSI	S LOT E M P T Y							

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.

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: 12-1831T1 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III Electrical Detail

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

NC 150 EB

SR 1303 (Perth Road) U-Turn

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

Jason Galloway 17/2024

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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

Stantec

750 N. Greenfield Pkwy, Garner, NC 27529

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

Sig. 5.0 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.

system timing values supersede these values.

3. Set all detector units to presence mode. 4. Maximum times shown in timing chart are for free-run operation only. Coordinated signal

	MAXTI	ME DET	ECTOR	I	NSTA	LLAT]	ON C	HA	RT	
	DET	ECTOR				PRO	GRAMM	INC	G	
L00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	
2A	6X6	300	4	Χ	2	_	_	Χ	Х	7

- | X | X | X | - | X |

6X6 300 4 X 2 - - X X X - X

6X40 0 2-4-2 X 7 - X - X - X

7B 6X40 0 2-4-2 X 7 - X - X - X

PHASING DIAGRAM DETECTION LEGEND

PHASING DIAGRAM

DETECTED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

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

R/W ─	NC 150		45 MPH -1% Grade
n / W			
	— — — — — — — — — — — — — — — — — — —		
		72 71 71	<u> </u>
		21 - 0	
R/W - —	DD2 DD2 DD2 DD2		NC 150

SIGNAL FACE I.D.

All Heads L.E.D.

MAXTIME -	ΓIMING (CHART
	PHA	
FEATURE	2	7
Walk *	_	_
Ped Clear *	-	-
Min Green	12	7
Passage *	6.0	2.0
Max 1 *	4.7	3.0
Yellow Change Red Clear	2.0	4.9
Added Initial *	1.5	- -
Maximum Initial *	34	-
Time Before Reduction *	15	-
Time To Reduce *	30	-

MIN RECALL Stantec Consulting Services Inc. 801 Jones Franklin Road-Suite 300 * These values may be field adjusted. Do not adjust Min Green Raleigh, NC 27606 and Extension times for phase 2 lower than what is shown. Tel. (919) 851-6866 Min Green for all other phases should not be lower than 4 seconds. Fax. (919) 851-7024 www.stantec.com

TABLE OF OPERATION

SIGNAL

FACE

22

71,72

Metal Pole #1/ (Mast Arm = 50 ft.)

-L- Sta. 602+09 ± 64' RT ±

PHASE



50 N.Greenfield Pkwy,Garner,NC 275

1"=40'

Stantec

License No. F-0672

NC 150 EB SR 1303 (Perth Road) U-turn

> Division 12 Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: JGH@m8peght REVIEWED BY: R Muncey, PE

LEGEND

Traffic Signal Head

Modified Signal Head

Sign Pedestrian Signal Head With Push Button & Sign Signal Pole with Guy

PROPOSED

 \bigcirc

029904 INIT. DATE Jason Gallowasy 17/2024

<u>EXISTING</u>

-

N/A

N/A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CARN

SIG. INVENTORY NO. |2-183|

Time To Reduce *

Minimum Gap

Advance Walk

Vehicle Recall

Non Lock Detector

30

3.0

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.

ROJECT REFERENCE NO.	SHEET NO.
R - 2307B	Sig. 5.1

	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	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

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, S7
Phases Used	2, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

INPUT FILE POSITION LAYOUT

= DENOTES POSITION OF SWITCH

(front view)

2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

3. Ensure that the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

,	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file ^U "I" L	SLOT EMPTY	Ø 2 2A Ø 2 2B	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
file U "J" L	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EXPTY	Ø 7 7A NOT USED	Ø 7 7B NOT USED	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOF EXPFY	SLOT EXPTY	SLOT EXPTY	SLOT EXPTY
·	EX.: 1	A, 2A, E	TC. = L	FS = ST =		I SENS TIME	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
2A	TB2-5,6	I2U	39	1	2	2			Х	Х	Х	
2B	TB2-7,8	I2L	43	5	3	2			Х	Χ	Х	
7A	TB5-5,6	J5U	57	19	21	7			Х		Х	
7B	TB5-9 10	.16U	42	4	22	7			X		Х	

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: 12-1831 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Final Design Electrical Detail ELECTRICAL AND PROGRAMMING

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED NC 150 EB

Prepared for the Offices of: SR 1303 (Perth Road) U-Turn Division 12 Iredell County

Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: R M Muncey REVIEWED BY: R Muncey, PE

Jason Galloway 17/2024

029904

REVISIONS INIT. DATE 750 N. Greenfield Pkwy, Garner, NC 27529

Stantec

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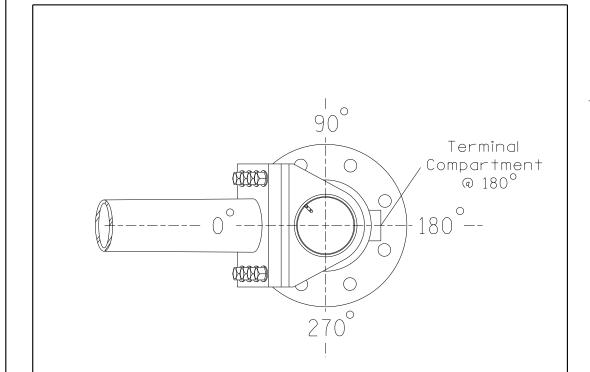
License No. F-0672

SPECIAL NOTE

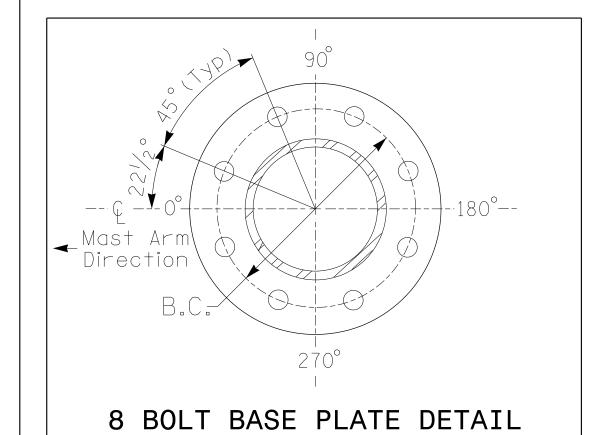
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

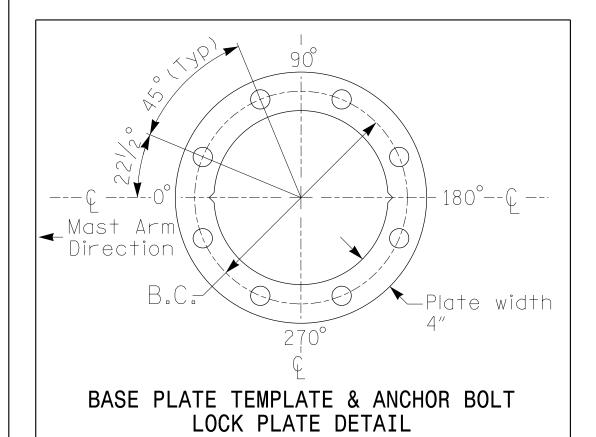
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at £ Foundation @ ground level	851.19 ft.	
Elevation difference at High point of roadway surface	+2.39 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. 5.2

	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

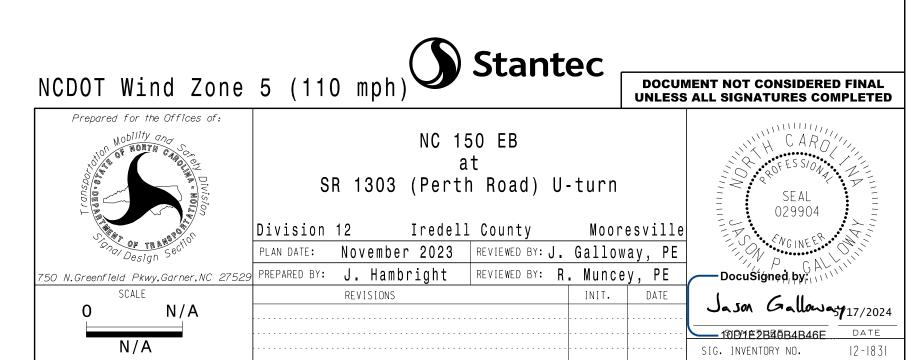
- 1. Design the traffic signalstructure and foundation in accordance with:
- The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
- The 2024 NCDOT "Standard Specifications for 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

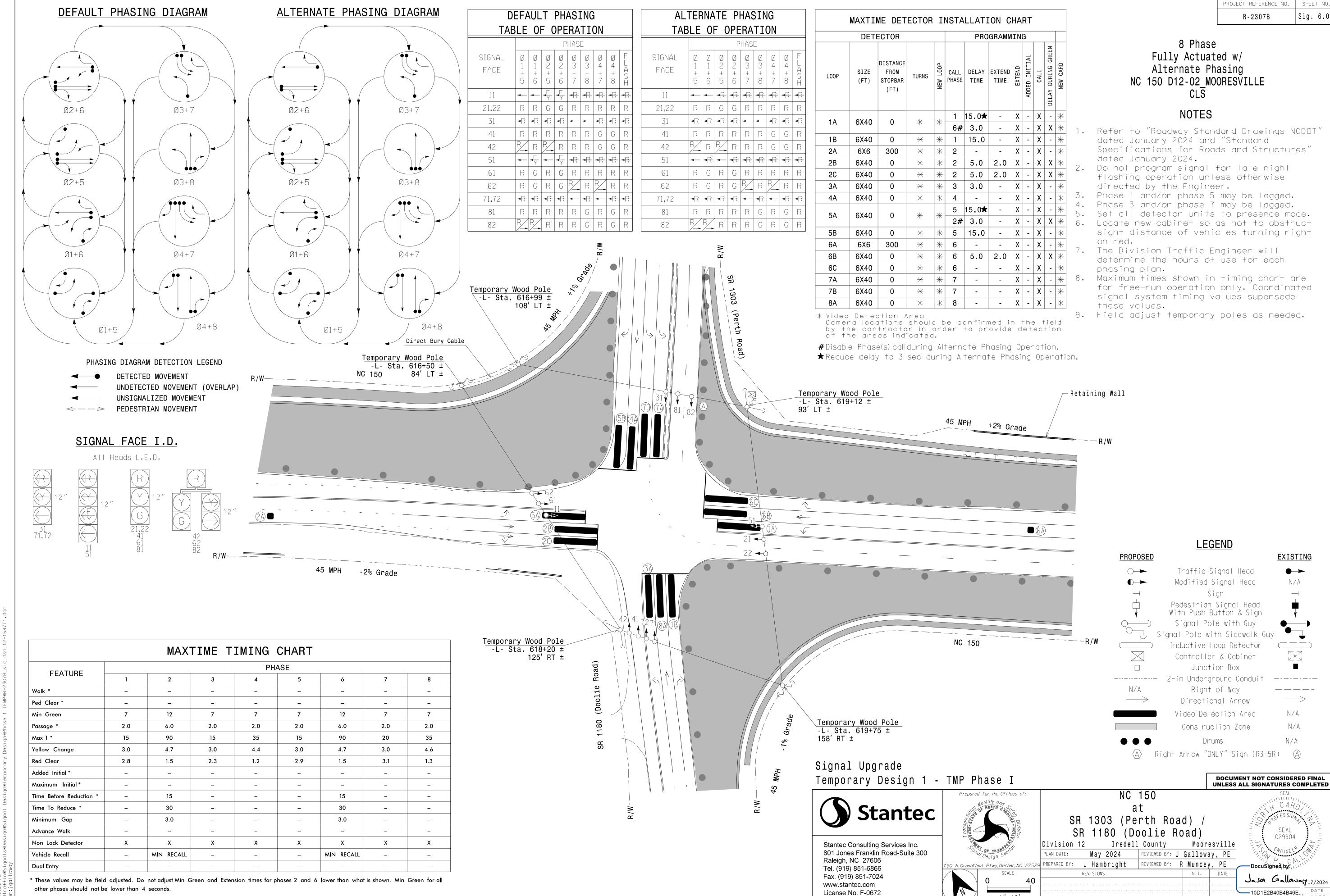
- 2. Design the traffic signalstructure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the 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 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 signalheads 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.



JINNGTOL TOTESHLOGGIIG DIGGEGENSHLOGGIIG DIGGEGENSTE MUST AFILLIZIOSI.GI



1"=40'

SIG. INVENTORY NO. |2-|687T

\$\$\$\$\$\$\$\$XSDATE\$\$\$\$ 4:36:26 PM ON OFF

- RP DISABLE

- GY ENABLE

– FYA 7-12

15

__ 18 *-*

= DENOTES POSITION OF SWITCH

SF#1 POLARITY

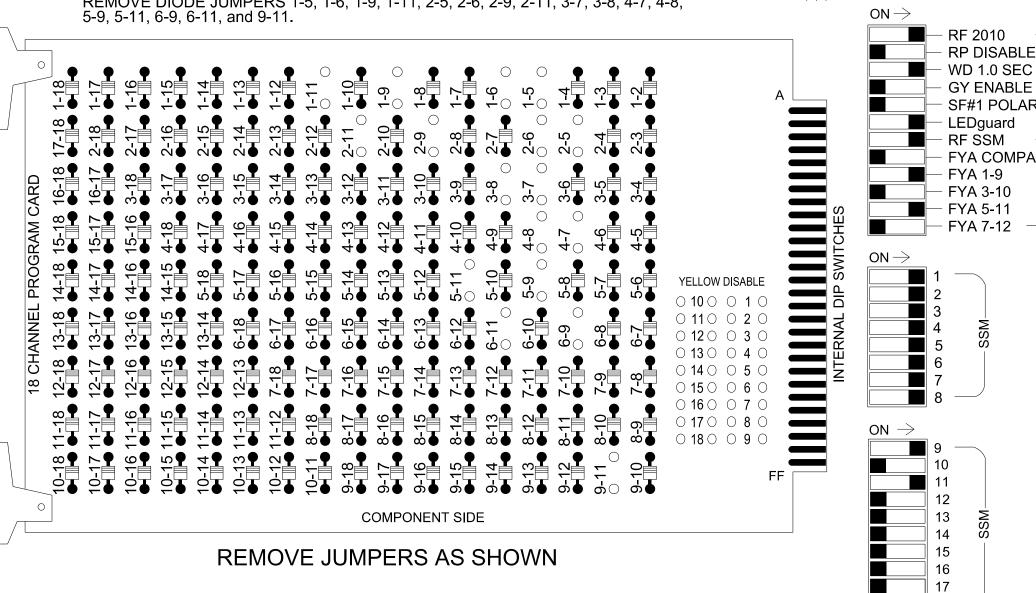
─ FYA COMPACT—

WD ENABLE

SW2

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 4-7, 4-8, 5-9, 5-11, 6-9, 6-11, and 9-11.



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

SIGNAL HEAD HOOK-UP CHART LOAD SWITCH NO. S2 | S3 | S4 | S5 | S6 | CMU CHANNEL NO. 2 | 13 | 3 | 4 | 14 | 8 8 OL1 OL2 SPARE OL3 OL4 SPARE PHASE 51 61,62 NU 62 71,72 81,82 NU SIGNAL HEAD NO. 82 | 21,22 | NU | 31 | 41,42 | NU | 42 | * 128 RED 129 102 YELLOW | 130 | 1Ø3 109 GREEN RED ARROW YELLOW 126 117 123 | 123 | | A115 | 132 ARROW FLASHING YELLOW ARROW GREEN 127 | 127 124 | 124 | 118 133 | 133 | ARROW

NU = Not Used

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

OL1 RED (A121) -

OL1 YELLOW (A122) —

OL1 GREEN (A123) ——

Ø1 GREEN (127) —

EQUIPMENT INFORMATION

Controller... ..2070LX ...332 w/ Aux Cabinet. ...Q-Free MAXTIME Software..... Cabinet Mount Output File Positions... ...18 With Aux. Output File Load Switches Used... ...S1, S2, S4, S5, S7, S8 S10, S11, AUX S1, AUX S41, 2, 3, 4, 5, 6, 7, 8 Phases Used. Overlap "1"...

Overlap "2".. ...NOT USED

Overlap "3"..... Overlap "4"..... ..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	Ø 1 1A	S L O T	S L O T	SLOT	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	FS DC ISOLATOR
"I"	NOT USED	E M P T Y	E M P T Y	ST DC ISOLATOR										
file U	Ø 5 5A	SLOT	SLOT	SLOT	S L O T	S L O T	S L O T	SLOT	SLOT	S L O T	S L O T	S L O T	S L O T	SLOT
"J" L	NOT USED	E M P T Y												
	EX.: 14	A, 2A, E	TC. = L	OOP NO).′S						FS = ST =		SENS TIME	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
1A	TB2-1,2	I1U	56	18	1 *	1	15.0		Х		Х	
IA	102-1,2	110	00	-	29 *	6	3.0		Х		Х	Х
5A	TD2 1 2	1411	55	17	115 *	5	15.0		Х		Х	
) JA	TB3-1,2	J1U	55	-	31 *	2	3.0		Х		Χ	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**

SPECIAL DETECTOR NOTE

Install a loop emulation 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 Detection Zones 1A and 5A, the equipment placement is typical for a NCDOT installation. Inputs associated wtih these slots are compatible with alternate operation programming located on the following sheets of this electrical detail.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1687T1 DESIGNED: MAY 2024 SEALED: 5/17/2024

REVISED: N/A

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

OL3 RED (A114) —

OL3 YELLOW (A115) —

OL3 GREEN (A116) ----

Ø5 GREEN (133) -

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

ELECTRICAL AND PROGRAMMING NC 150 Prepared for the Offices of: SR 1303 (Perth Road)/

SR 1180 (Doolie Road) Division 12 Iredell County

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

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

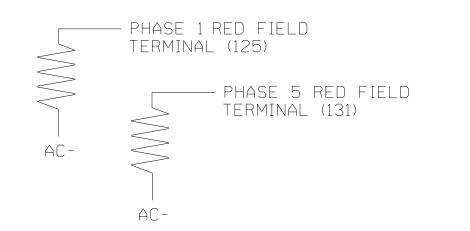
R-2307B

Sig 6 1

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

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



Stantec

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

PLAN DATE:

Mooresville

Jason Galloway 17/2024

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	-	-
Trail Green	0	0
Trail Yellow	0.0	0.0
Trail Red	0.0	0.0

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	3	
Туре	FYA 4 - Section	FYA 4 - Section	
ncluded Phases	-	-	NOTICE INCLUDED PHASE
Modifier Phases	1	5	
odifier 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
Detecto

1A

Detector	Call Phase	Delay
1	1	3.0
29	0	-

	Detector	Call Phase	Delay
Д	15	5	3.0
	31	0	-

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for heads 11 and 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A

and reduces delay time for phase 1 call on loop 1A to 3.0 seconds.

Disables phase 5 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 3.0 seconds.

MAXTIME ALTERNATE PHASING PATTERN PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Coordination >Patterns

Web Interface

) Stantec

Stantec Consulting Services Inc.

Home >Controller >Coordination >Patterns

Pattern Parameters

Pattern	Veh Det Plan	Overlap Plan
*	2	2

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 12-1687T1

DESIGNED: MAY 2024

SEALED: 5/17/2024

REVISED: N/A

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

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for the Offices of:

SR 1303 (Perth Road)/

SR 1303 (Perth Road)/

SR 1303 (Perth Road) /
SR 1180 (Doolie Road)
Division 12 Iredell County Moo

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

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

SEAL

O29904

SEAL

O29904

Docusigned, by:

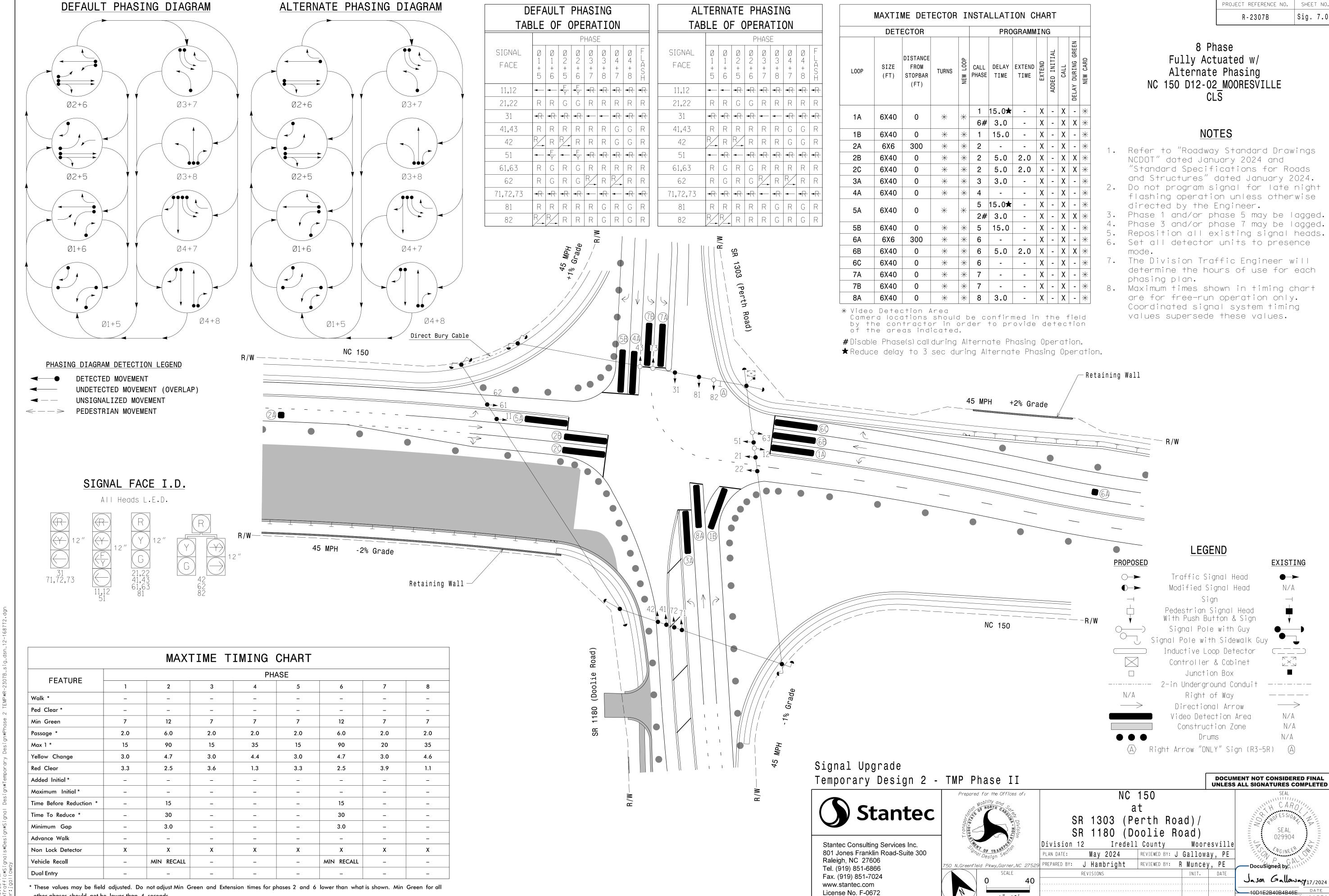
Jason Gallowasy 17/2024

R-2307B

Sig. 6.2

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To N. Greenfield Pkwy, Garner, NC 27529



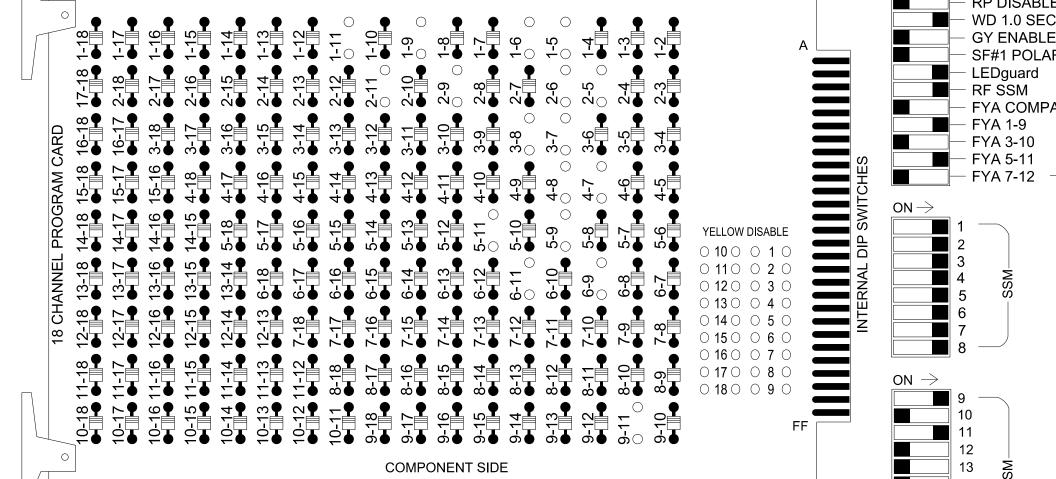
1"=40'

SIG. INVENTORY NO. |2-|687T

other phases should not be lower than 4 seconds.

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 3-7, 3-8, 4-7, 4-8, 5-9, 5-11, 6-9, 6-11, and 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

FILE

FILE

 $\parallel \int \parallel$

. 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.

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- 2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- 3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- 4. The cabinet and controller are part of the NC 150 D12-02 Mooresville CLS.

SIGNAL HEAD HOOK-UP CHART LOAD SWITCH NO. S8 S9 CMU CHANNEL 15 NO. 8 RED OL1 OL2 SPARE OL3 OL4 SPARE PHASE SIGNAL HEAD NO. 41,42, 43 NU 42 * 128 1Ø1 RED 134 129 102 1Ø8 YELLOW 135 1Ø3 136 109 130 GREEN RED ARROW 122 116 A121 A114 YELLOW ARROW 117 A115 126 132 123 | 123 FLASHING YELLOW ARROW GREEN ARROW 124 | 124 127 | 127 118 133 | 133

- 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 ...332 w/ Aux Cabinet. ...Q-Free MAXTIME Software.... Cabinet Mount Output File Positions... ...18 With Aux. Output File ..S1, S2, S4, S5, S7, S8 Load Switches Used... S10, S11, AUX S1, AUX S41, 2, 3, 4, 5, 6, 7, 8 Phases Used.

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

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

*See overlap programming detail on sheet 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ø 1 1A	S L O T	SLOT	SLOT	SLOT	SLOH	SLOT	SLOT	SLOT	S L O T	S L O T	S L O T	S L O T	FS DC ISOLATOR
NOT USED	E M P T Y	ST DC ISOLATOR											
ø 5 5A	S L O T	SLOT	S L O T	SLOT	SLOT	S L O T							
NOT USED	E M P T Y												

INPUT FILE POSITION LAYOUT

(front view)

FS	=	FLASH	SENSE
ST	=	STOP	TIME

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1 *	1	15.0		Х		Х	
IA IA	102-1,2	110	U 56	1	29 *	6	3.0		X		Χ	Х
5A	TB3-1,2	J1U	55	17	115 *	5	15.0		Х		Х	
JA	163-1,2	310	55	1	31 *	2	3.0		X		Χ	Χ

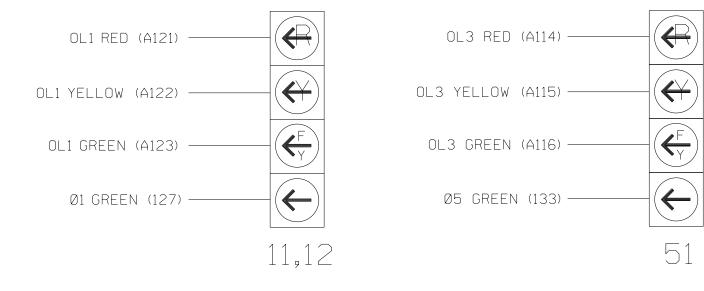
INPUT FILE CONNECTION & PROGRAMMING CHART

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: 12-1687T2 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Install a loop emulation detection system for vehicle detection.

ON

SW2

RP DISABLE

GY ENABLE

SF#1 POLARITY

- FYA COMPACT-

─ WD 1.0 SEC

LEDguard

RF SSM

- FYA 3-10

FYA 1-9

13

14

15

^{||} 16

= DENOTES POSITION OF SWITCH

WD ENABLE

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

SPECIAL DETECTOR NOTE

For Detection Zones 1A and 5A, the equipment placement is typical for a NCDOT installation. Inputs associated wtih these slots are compatible with alternate operation programming located on the following sheets of this electrical detail.

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

ELECTRICAL AND PROGRAMMING NC 150 SR 1303 (Perth Road)/ SR 1180 (Doolie Road)

Prepared for the Offices of: Division 12 Iredell County PREPARED BY: J Galloway REVIEWED BY: R Muncey, PE REVISIONS

Mooresville May 2024 REVIEWED BY: J Galloway, PE

INIT. DATE

Jason Galloway 17/2024

029904

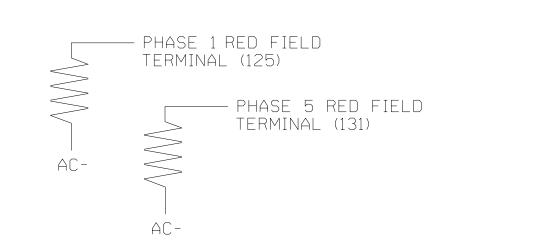
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UNLESS ALL SIGNATURES COMPLETED

R-2307B

Sig. 7

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



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Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

MAXTIME OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

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

Overlap Plan 2

Overlap	1	3	
Туре	FYA 4 - Section	FYA 4 - Section	
ncluded Phases	-	-	NOTICE INCLUDED PHASE
Modifier Phases	1	5	
odifier 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		
	Detector	Call Phase	Delay
1A	1	1	3.0
	29	0	-

	Detector	Call Phase	Delay
Д	15	5	3.0
	31	0	

MAXTIME ALTERNATE PHASING ACTIVATION DETAIL

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

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

ALTERNATE PHASING CHANGE SUMMARY

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

OVERLAP PLAN 2: Modifies overlap included phases

for heads 11 and 51 to run protected turns only.

VEH DET PLAN 2: Disables phase 6 call on loop 1A

and reduces delay time for phase 1 call on loop 1A to 3 seconds.

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

> THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1687T2 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

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

ELECTRICAL AND PROGRAMMING NC 150 SR 1303 (Perth Road)/ SR 1180 (Doolie Road)

Division 12 Iredell County Mooresville

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

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R-2307B

Sig. 7.2

Jason Galloway 17/2024

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750 N. Greenfield Pkwy, Garner, NC 27529

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. Reposition existing signal head number
- 4. Set all detector units to presence mode. 5. 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

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

Video Detection Area

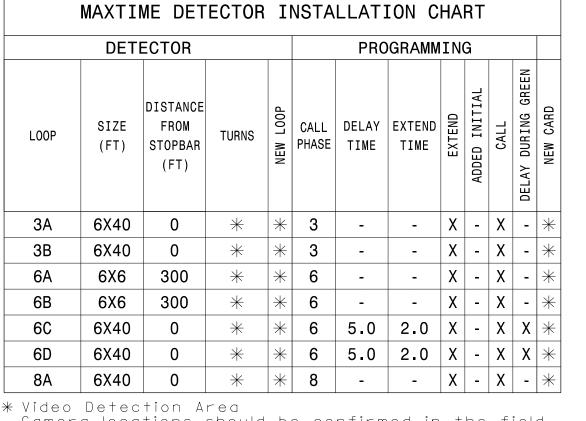
Construction Zone

Drums

No Left Turn Sign (R3-2) No U-Turn Sign (R3-4)

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

— Retaining Wall



* Video Detection Area Camera locations should be confirmed in the field by the contractor in order to provide detection of the areas indicated. Direct Bury Cable NC 150 45 MPH 45 MPH -2% Grade

SIGNAL FACE I.D.

All Heads L.E.D.

31,32,33

TABLE OF OPERATION

SIGNAL

FACE

31,32,33

62,63

81,82,83

PHASE

MAXTI	MAXTIME TIMING CHART					
FEATURE		PHASE				
FEATURE	3	6	8			
Walk *	_	_	_			
Ped Clear *	_	-	_			
Min Green	7	12	7			
Passage *	2.0	6.0	2.0			
Max 1 *	30	60	30			
Yellow Change	3.0	4.5	3.3			
Red Clear	4.0	3.8	2.4			
Added Initial *	_	-	_			
Maximum Initial *	_	-	_			
Time Before Reduction *	_	15	_			
Time To Reduce *	_	30	_			
Minimum Gap	_	3.0	_			
Advance Walk	_	_	_			
Non Lock Detector	х	Х	Х			
Vehicle Recall	_	MIN RECALL	_			
Dual Entry	х	_	Х			

PHASING DIAGRAM

PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

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

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

03+8

Signal Upgrade Temporary Design 3 - TMP Phase III

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1"=40'

NC 150

NC 150 WB SR 1303 (Perth Road)

<u>PROPOSED</u>

 \bigcirc

N/A

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 27 REVISIONS INIT. DATE

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SIG. INVENTORY NO. |2-|687T

EXISTING

●→

N/A

N/A

N/A

N/A

* 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.

12

] 13] 14

18 –

= DENOTES POSITION OF SWITCH

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

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

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

INPUT FILE POSITION LAYOUT

(front view)

COMPONENT SIDE

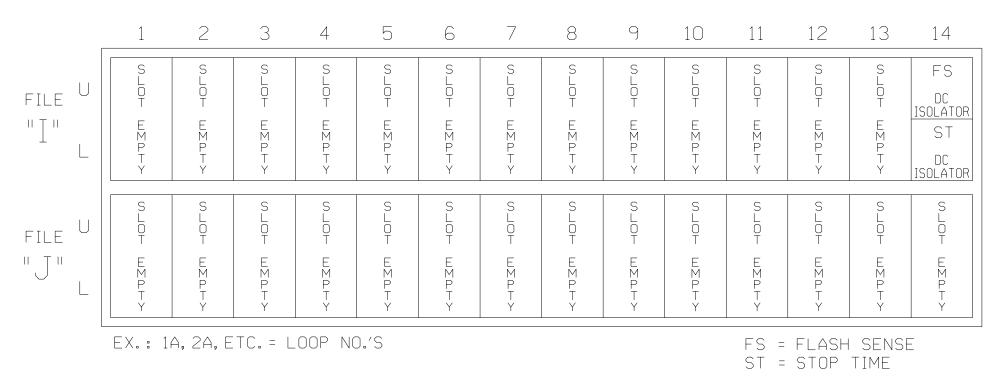
. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.

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 JUMPER AS SHOWN

4. Integrate monitor with Ethernet network in cabinet.



SPECIAL DETECTOR NOTE

Install a loop emulation 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.

Remove "Wired Inputs" from rear of input file to prevent unwanted calls to Phases 2 and 6.

R-2307B Sig. 8.1

	SIGNAL HEAD HOOK-UP CHART																		
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	C	58	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	(5	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, 33	NU	NU	NU	61	62,63	NU	NU	81,82 83	NU	NU	NU	NU	NU	NU	NU
RED								134	134			107							
YELLOW								135	135										
GREEN									136										
RED ARROW				116															
YELLOW ARROW				117								1Ø8							
GREEN ARROW				118				136				109							

NU = Not Used

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1687T3 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Temporary Design 3 - TMP Phase III Electrical Detail

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

NC 150 WB SR 1303 (Perth Road)

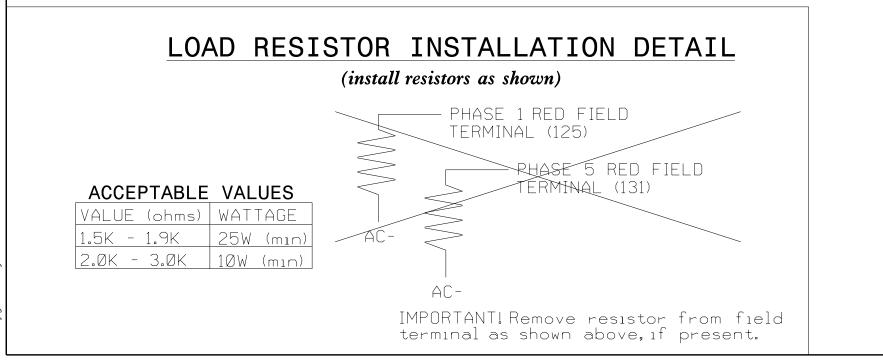
Iredell County Division 12 Mooresville May 2024 REVIEWED BY: J Galloway, PE J Galloway REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

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UNLESS ALL SIGNATURES COMPLETED

Jason Galloway 17/2024



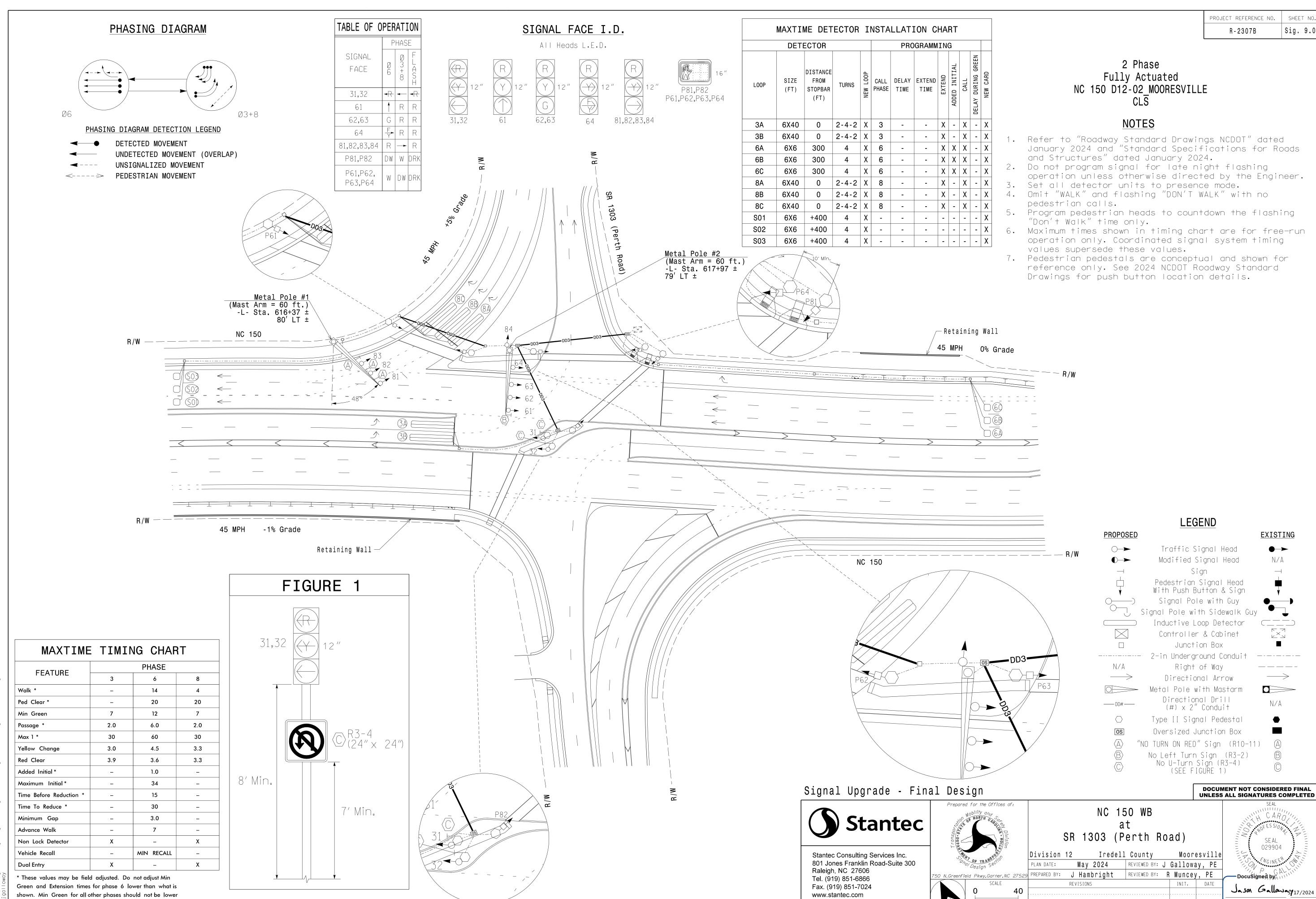
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1"=40'

SIG. INVENTORY NO.

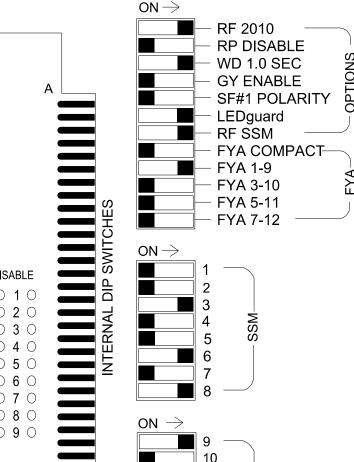
\$\$\$\$\$\$ YSDATE\$\$\$\$ 4:44:13 PM

than 4 seconds.

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPER 3-8, 3-16, 6-9, 6-15, 8-16, AND 9-15.

ON OFF WD ENABLE SW2



ST = STOP TIME

FILE J

SLOT 2

LOWER

12

] 13

= DENOTES POSITION OF SWITCH

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.

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.

SIGNAL HEAD HOOK-UP CHART S9 S10 S11 S12 AUX S1 AUX AUX AUX AUX S5 S6 S1 | S2 | S3 | S4 | S5 | S6 | S7 | CMU CHANNEL 15 7 8 16 9 10 17 11 12 18 7 8 8 OL1 OL2 SPARE OL3 OL4 SPARE RED 134 | 134 107 A121 YELLOW 135 | 135 GREEN RED 116 ARROW YELLOW A122 117 1Ø8 ARROW FLASHING YELLOW ARROW GREEN 136 109 118 ARROW 110

NU = Not Used

★ 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, S9, S11, S12, AUX S1
Phases Used	3, 6, 6PED, 8, 8PED
Overlap "1"	*
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

^{*} See Overlap Programming Sheet 2

COUNTDOWN PEDESTRIAN SIGNAL OPERATION Countdown Ped Signals are required to display timing only during

121

112

Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.1	S	S	S	S L	Ø 3	Ø 3	S	S L	SYS. DET.	S	S	S	Ø 6 PED	FS
FILE	ÖT	Ö	OT	ŌT	3A	3B	Ō	OT	S01	Ō	OT	Ö	DC ISOLATOR	DC ISOLATOR
"] "	E M P	E M P	E M P	E M P	NOT	NOT	E M P	E M P	SYS. DET.	E M P	E M P	E M P	Ø8 PED	ST
	T	T	T	T Y	USED	USED	T	T Y	S02	T Y	Ť	T	DC ISOLATOR	DC ISOLATOR
	S	Ø 6	Ø 6	S	S	Ø 8	Ø 8	S	SYS.	S	S	S	S	S
FILE U	OT	6A	6C	O T	OT	8A	8C	O T	DET. S03	0	O T	O T	O T	
	EMP	Ø 6	NOT	E M	E M P	Ø 8	NOT	E M P T Y	NOT	EMP+	E M P	E M	E M P	E M
	T Y	6B	USED	T Y	T Y	8B	USED	T Y	USED	T Y	T Y	T Y	T Y	T Y
l	EX.: 1	A, 2A, E	TC. = L	00P N	D.'S						FS =	FLASH	H 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
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			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	
8A	TB5-9,10	J6U	42	4	22	8			Х		Х	
8B	TB5-11,12	J6L	46	8	23	8			Х		Х	
8C	TB7-1,2	J7U	66	32	24	8			Х		Х	
* S01	TB6-9,10	I9U	60	22	13	SYS						
* S02	TB6-11,12	I9L	62	24	14	SYS						
* S03	TB7-9,10	J9U	59	21	27	SYS						
PED PUSH BUTTONS												
P61,P62	TB8-7,9	I13U	68	34	6	PED 6	NOTE:					
P81,P82	TB8-8,9	I13L	70	36	8	PED 8	NSTALL DC ISOLATORS IN INPUT FILE SLOT I13. INPUT FILE POSITION LEGEI					

*System detector only. Remove any assigned vehicle phase.

MAXTIME OVERLAP PROGRAMMING DETAIL

Front Panel

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

Web Interface

Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	
Туре	FYA 4 - Section	
ncluded Phases	6	
Modifier Phases	-	
lodifier Overlaps	-	
Trail Green	0	
Trail Yellow	0.0	
Trail Red	0.0	

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

OL1 RED	(A121)	R
L1 YELLOW	(A122)	
OL1 GREEN	(A123)	F

64

R-2307B

Sig. 9.1

Final Design Electrical Detail

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

NC 150 WB SR 1303 (Perth Road)

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

029904

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

Jason Galloway 17/2024

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1687 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

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

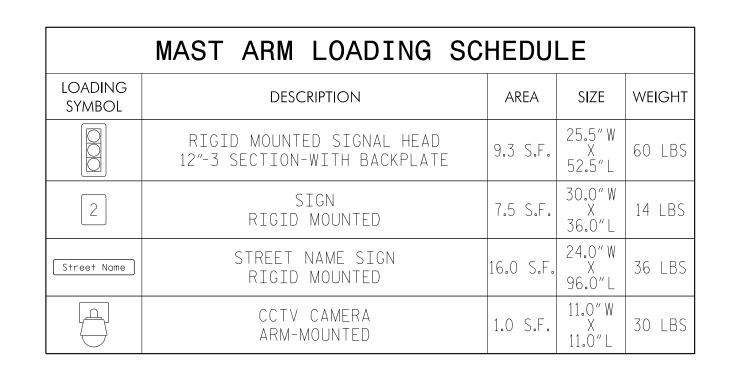
License No. F-0672

Maximum 25.6 ft.

Roadway Clearance Desian Heiaht 17 ft

Minimum 16.5 ft.





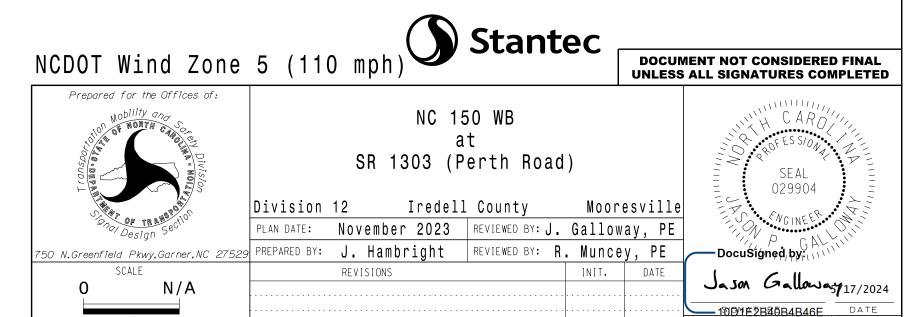
NOTES

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

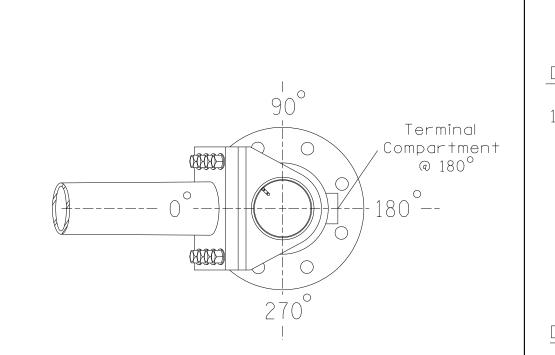
DESIGN REQUIREMENTS

- 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.
- If the pole assembly includes a CCTV camera, the total height of the pole (H2) will be the calculated value of the 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 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.

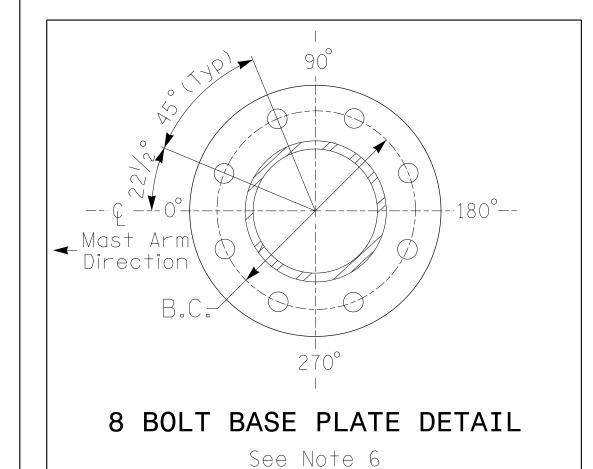


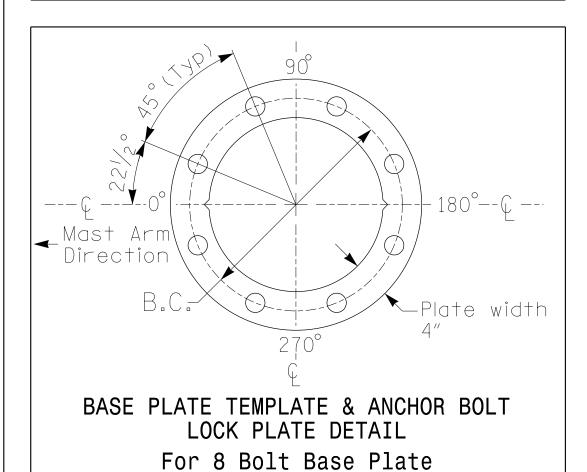
SIG. INVENTORY NO.

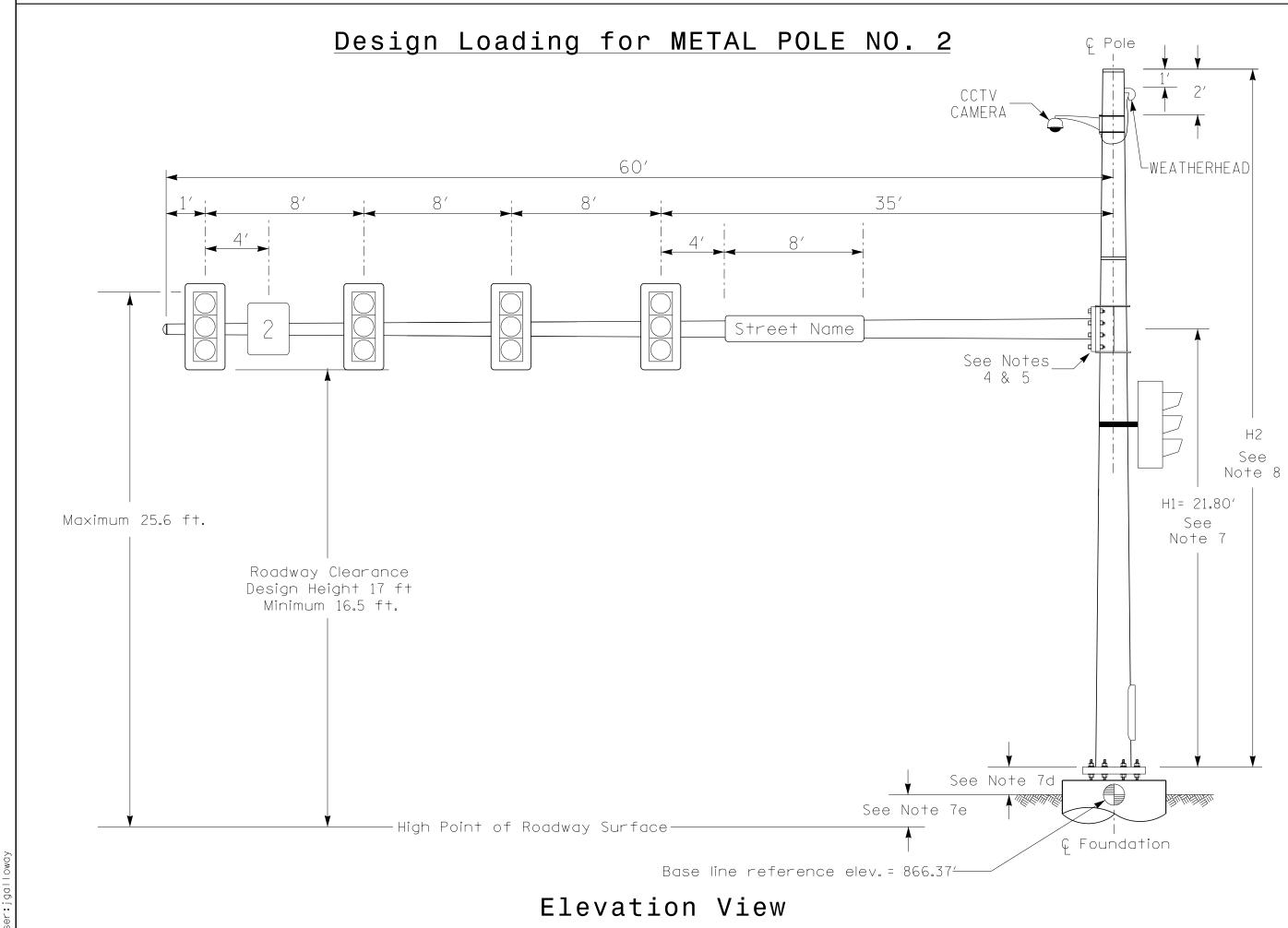
SPECIAL NOTE The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final Ç Pole shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data. Elevation Data for Mast Arm Attachment (H1) Elevation Differences for: Pole 1 Pole 2 See Notes _ Baseline reference point at 873.61 ft. 866.37 ft. © Foundation @ ground level Elevation difference at High point of roadway surface -0.37 ft. | + 2.77 ft, Н2 See Elevation difference at +/-0.0 ft. +/-0.0 ft. Note 8 Edge of travelway or face of curb H1= 18.70' Note -



POLE RADIAL ORIENTATION







Elevation View

-High Point of Roadway Surface-

Design Loading for METAL POLE NO. 1

Street Name

4 & 5

See Note 7d

CFoundation

See Note 7e

Base line reference elev. = 873.614

* 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.

50 N.Greenfield Pkwy,Garner,NC 2

1"=40'

Tel. (919) 851-6866

Fax. (919) 851-7024

License No. F-0672

www.stantec.com

PREPARED BY: J Hambright | REVIEWED BY: R Muncey, PE

REVISIONS

INIT. DATE

Jason Galloway 17/2024 SIG. INVENTORY NO. |2-1832T|

ON OFF

− RF 2010 − RP DISABLE

SF#1 POLARITY

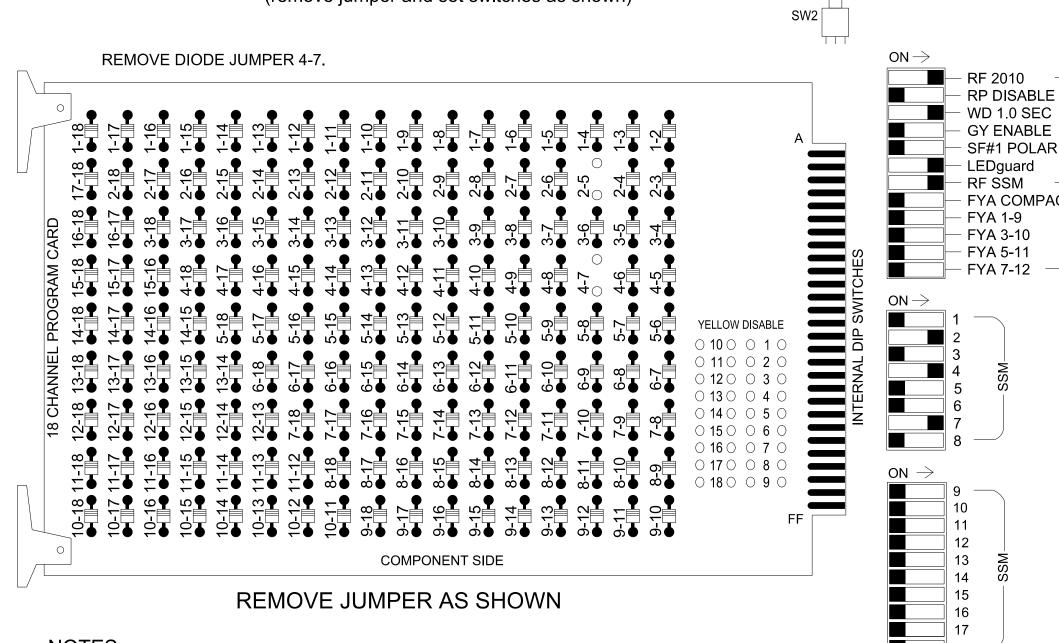
FYA COMPACT—

- FYA 1-9 FYA 3-10 FYA 5-11 FYA 7-12

= DENOTES POSITION OF SWITCH

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 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

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
Phases Used	2, 4, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

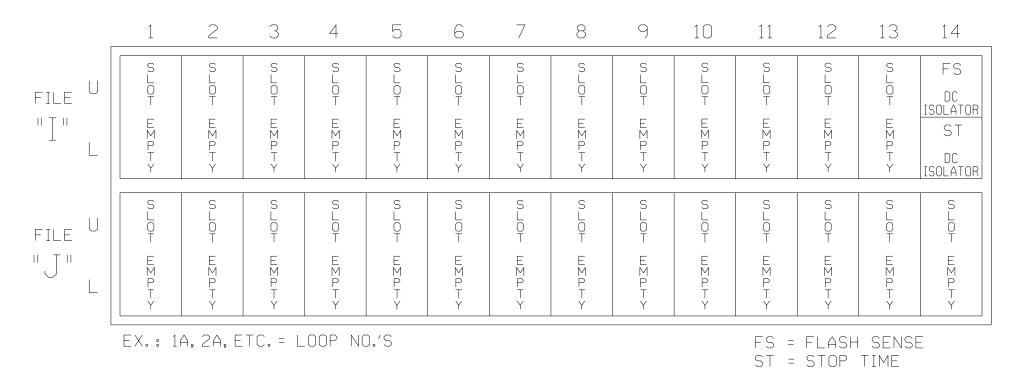
R-2307B Sig. 10.

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	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	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, 73	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

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.

> THE SIGNAL DESIGN: 12-1832T1 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Stantec

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

Prepared for the Offices of:

NC 150 EB SR 1180 (Doolie Road)

Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway REVIEWED BY: R Muncey, PE

INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR

Temporary Design 1 - TMP Phase III Electrical Detail ELECTRICAL AND PROGRAMMING

750 N. Greenfield Pkwy, Garner, NC 27529

Division 12 Iredell County REVISIONS

Jason Galloway 17/2024

801 Jones Franklin Road-Suite 300

50 N.Greenfield Pkwy,Garner,NC 2

1"=40'

Raleigh, NC 27606

Tel. (919) 851-6866

Fax. (919) 851-7024

www.stantec.com License No. F-0672 May 2024 REVIEWED BY: J Galloway, PE

INIT. DATE

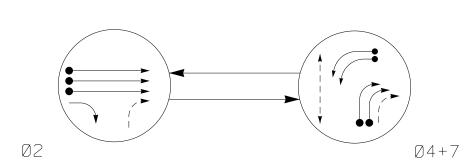
Jason Galloway 17/2024

SIG. INVENTORY NO. |2-1832

PREPARED BY: J Hambright | REVIEWED BY: R Muncey, PE

REVISIONS

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND DETECTED MOVEMENT UNDETECTED MOVEMENT (OVERLAP) UNSIGNALIZED MOVEMENT

PHASE SIGNAL FACE 22,23 41,42,43 71,72

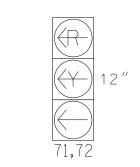
Existing Type II Pedestal -

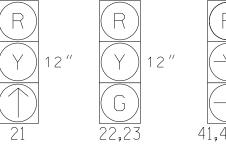
See 12-1687 Final

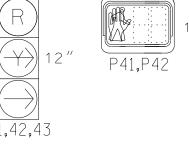
For Details

Retaining Wall-

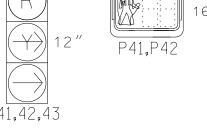
TABLE OF OPERATION

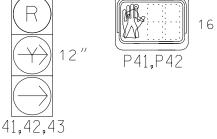










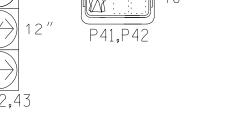








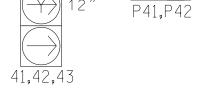




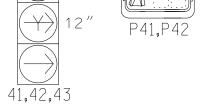




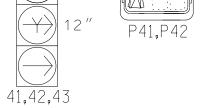














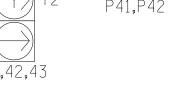








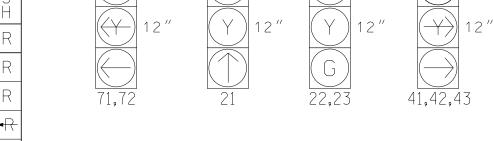


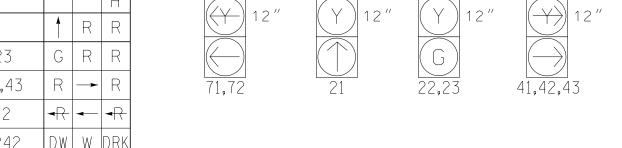


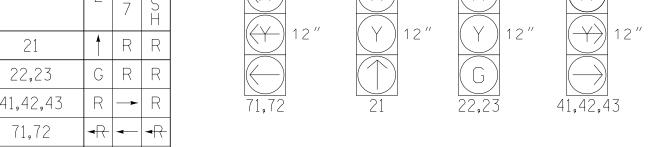


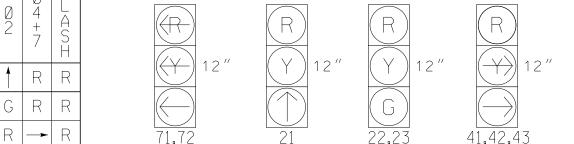


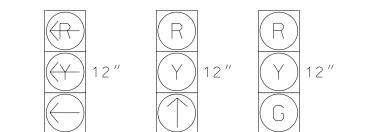


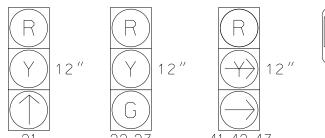




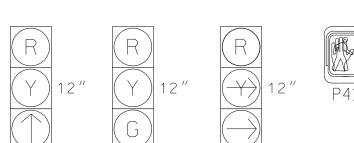


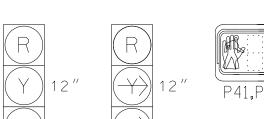


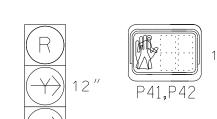




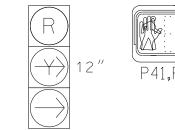
SIGNAL FACE I.D.

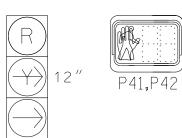


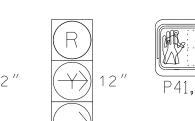


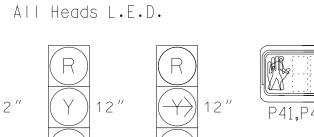


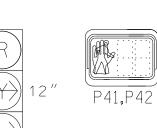


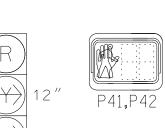


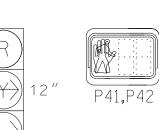


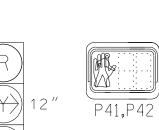


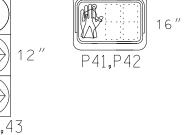


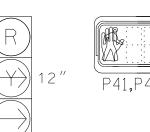








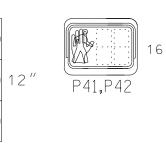


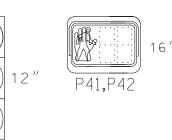


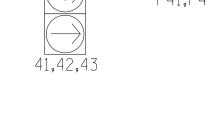






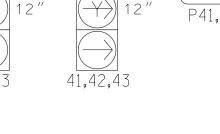




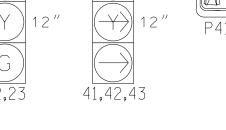


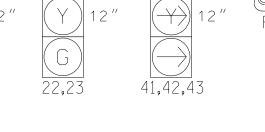


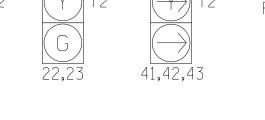










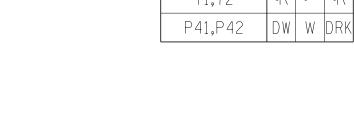












NC 150

-2% Grade

FIGURE 1

7' Min.

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



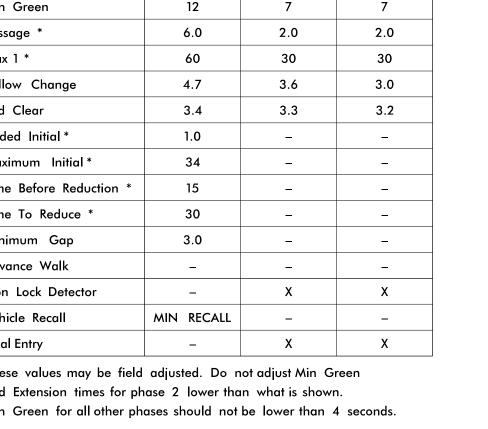
45 mph

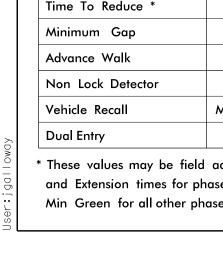
8′ Min.

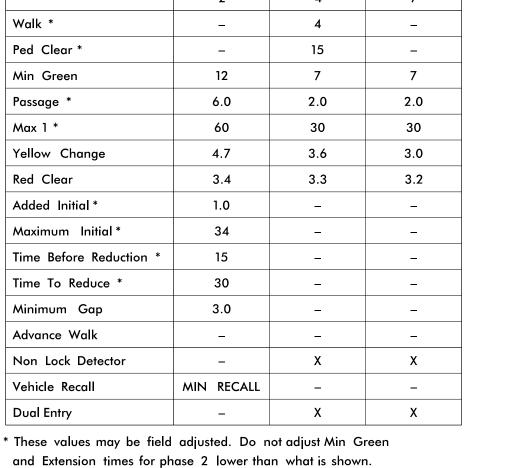


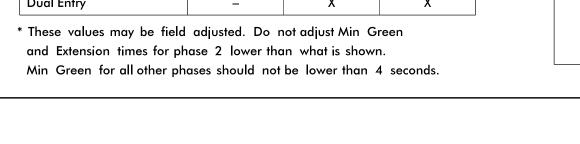
MAXTIME	IMIT E	NG CHA	RT
FEATURE		PHASE	
FEATURE	2	4	7
k	-	4	_
lear *	_	15	_
reen	12	7	7
e *	6.0	2.0	2.0
*	60	30	30
Change	4.7	3.6	3.0
lear	3.4	3.3	3.2
Initial *	1.0	_	_
um Initial *	34	_	_
Before Reduction *	15	_	_
To Reduce *	30	-	_

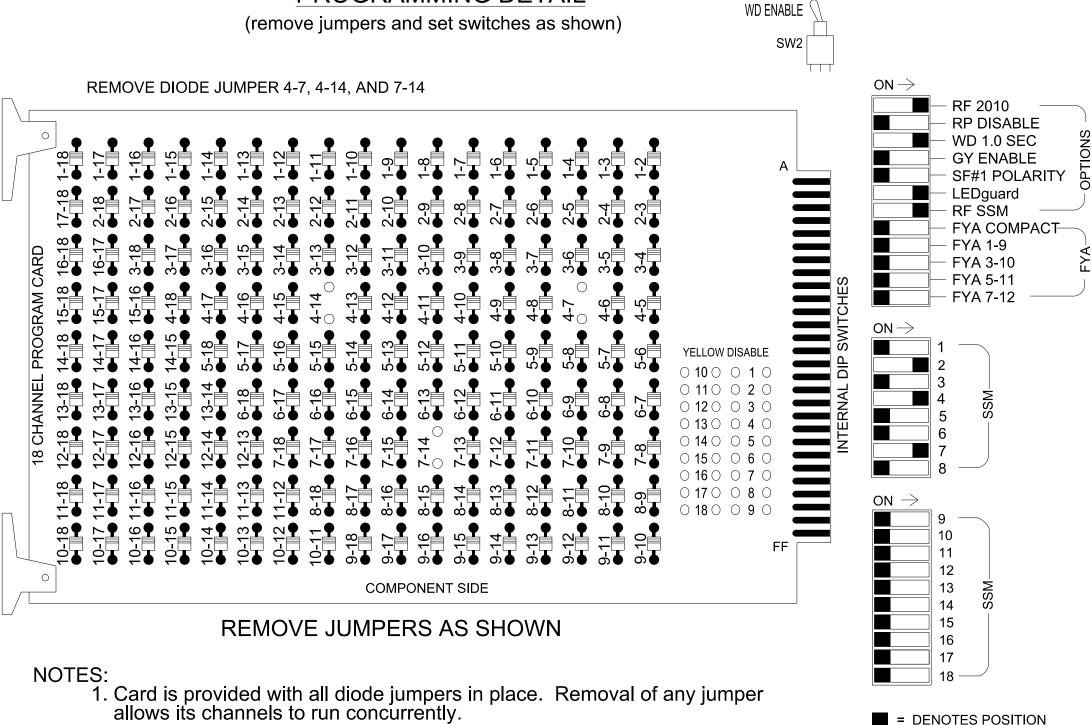
Red Cledi	0.4	3.5	J.2
Added Initial *	1.0	_	_
Maximum Initial *	34	_	_
Time Before Reduction *	15	_	_
Time To Reduce *	30	_	_
Minimum Gap	3.0	_	_
Advance Walk	_	_	_
Non Lock Detector	_	Х	Х
Vehicle Recall	MIN RECALL	_	_
Dual Entry	_	Х	Х
These values may be field and Extension times for ph Min Green for all other ph	ase 2 lower tha	ın what is showr	۱.











ON OFF

= DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

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.

ſ	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file ^U "I" _L	SLOT EMPTY	ø 2 2A ø 2 2B	Ø 2 2C NOT USED	SLOT EMPTY	SLOT EMPTY	Ø 4 4A Ø 4 4B	SLOF EXPFY	SLOT EXPTY	SYS. DET. SØ4 SYS. DET. SØ5	SLOF EXPFY	SLOT EXPTY	NOT USED Ø 4 PED DC ISOLATOR	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø 7 7A NOT USED	Ø 7 7B NOT USED	SLOH EXPHY	SLOT EXPTY	SYS. DET. SØ6 NOT USED	SLOH EXRHY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	EX.: 1	A, 2A, E	ETC. = LO	DOP NO			FS =	FLASH	SENS					

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	Χ	Χ	
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	
7A	TB5-5,6	J5U	57	19	21	7			Х		Х	
7B	TB5-9,10	J6U	42	4	22	7			Х		Х	
* S04	TB6-9,10	I9U	60	22	13	SYS						
* S05	TB6-11,12	I9L	62	24	14	SYS						
* S06	TB7-9,10	J9U	59	21	27	SYS						
PED PUSH BUTTONS												
P41 P42	TB8-5 6	I12I	69	35	4	PFD 4	NOTE:					

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 4 and 7 for Dual Entry.

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.

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, S6, S10
Phases Used	2, 4, 4PED, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

PROJECT REFERENCE NO. R-2307B Sig. 11.

SIGNAL HEAD HOOK-UP CHART																			
LOAD Switch no.	S1	C	\$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	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	22,23	NU	NU	41,42, 43	P41, P42	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						10/2					123								

124

NU = Not Used

GREEN ARROW

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

103

104

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.

Final Design Electrical Detail ELECTRICAL AND PROGRAMMING

NC 150 EB SR 1180 (Doolie Road)

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

INIT. DATE Jason Galloway 17/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1832 DESIGNED: MAY 2024 SEALED: 5/17/2024

REVISED: N/A

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

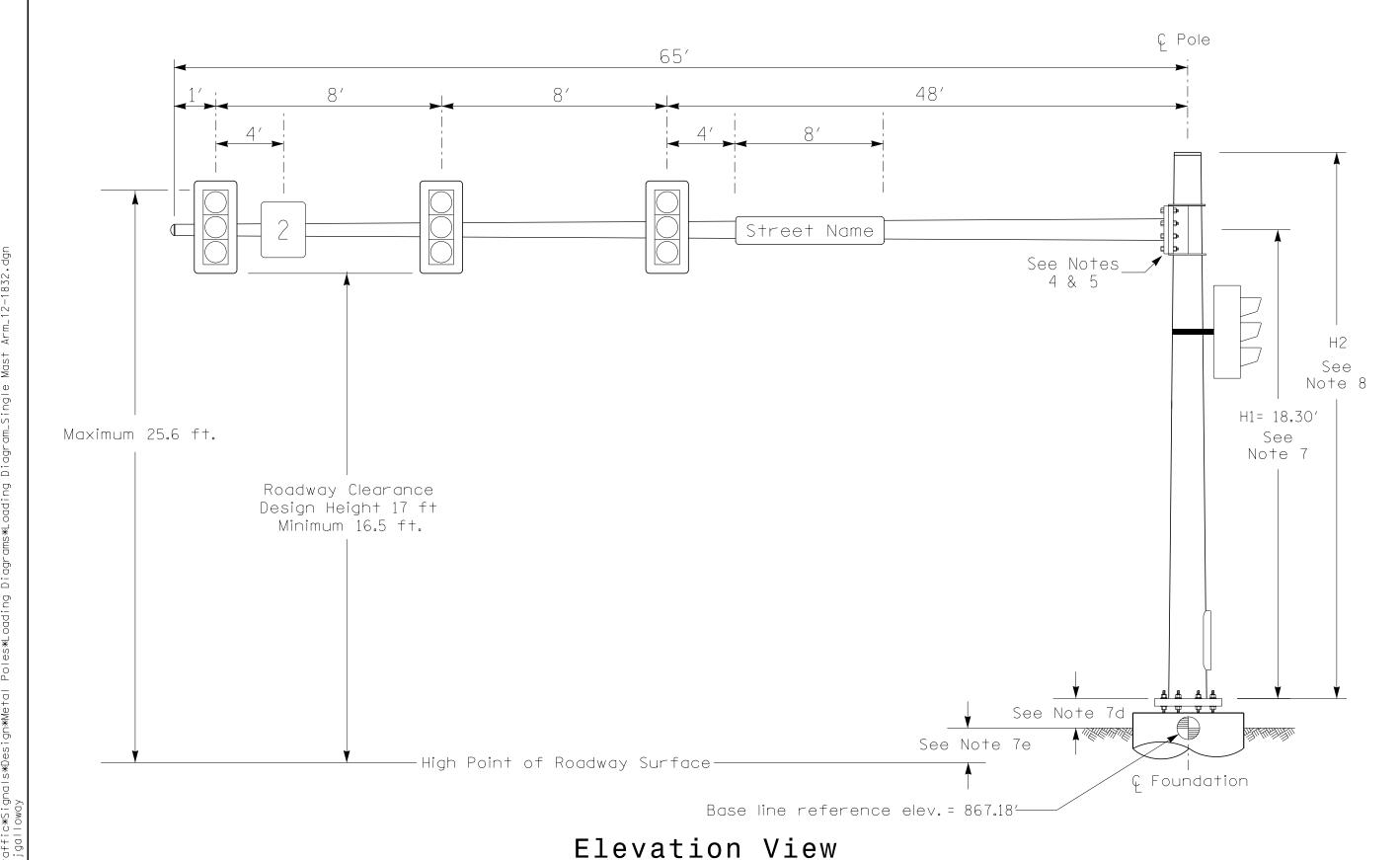
REVISIONS

*System detector only. Remove any assigned vehicle phase. INPUT FILE POSITION LEGEND: J2L

ST = STOP TIME

Design Loading for METAL POLE NO. 2

Elevation View

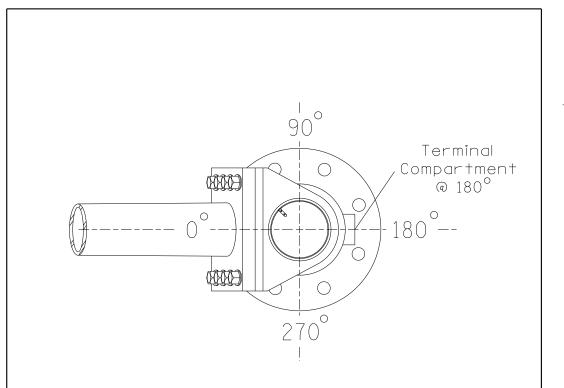


SPECIAL NOTE

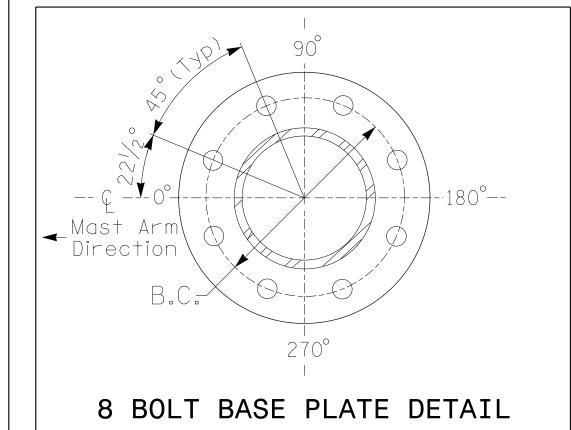
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

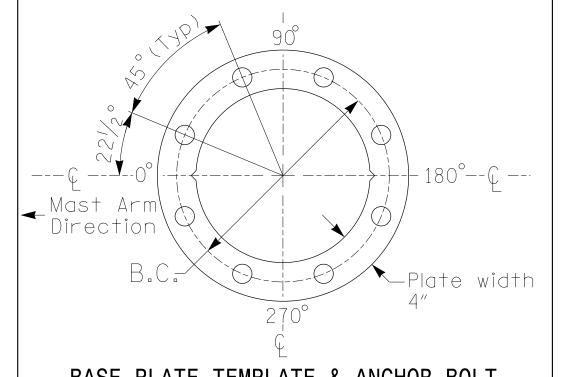
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	Pole 2
Baseline reference point at £ Foundation @ ground level	862.84	867.18 ft.
Elevation difference at High point of roadway surface	+4.26 ft.	-0.72 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.



POLE RADIAL ORIENTATION





See Note 6

BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

METAL POLE No. 1 and 2

PROJECT REFERENCE NO.	SHEET
R - 2307B	Sig. 1

	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

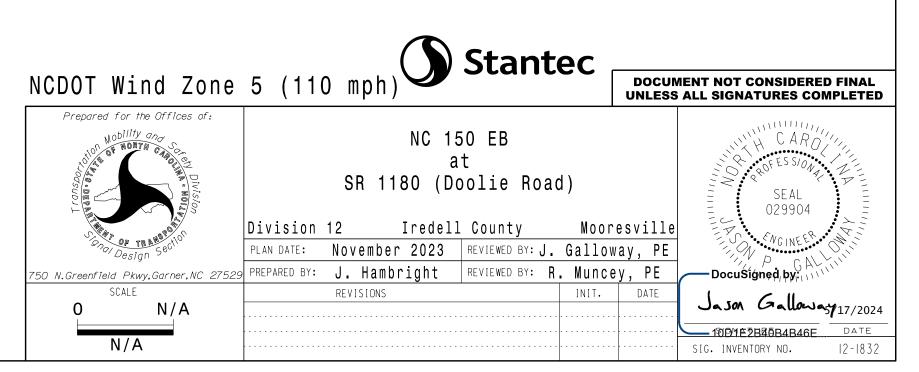
DESIGN REFERENCE MATERIAL

- 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

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

 b. Signal boads are rigidly mounted and vertically contared on the mast arm.
- 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 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. SHEET NO. Sig. 12.0 R-2307B

SIGNAL FACE I.D. PHASING DIAGRAM

16	Ø3

PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

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

TABLE OF	0	PERATION					
		Р	HAS	E			
SIGNAL FACE		Ø 60	Ø 3	FLAST			
31,32		R		√ R			
61			R	R			
62		G	R	R			

All Heads	L.E.D.	
12" 1,32	R Y 12"	R Y 12" G

MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR PROGRAMMING												
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
3A	6X40	0	*	*	3	-	-	Χ	-	Χ	-	*
3B	6X40	0	*	*	3	-	-	Χ	_	Χ	-	*
6A	6X6	300	*	*	6	-	-	Χ	_	Χ	-	*
6B	6X6	300	*	*	6	-	-	Χ	-	Χ	-	*
6C	6X40	0	*	*	6	5.0	2.0	Χ	-	Χ	Χ	*
6D	6X40	0	*	*	6	5.0	2.0	Χ	-	Χ	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

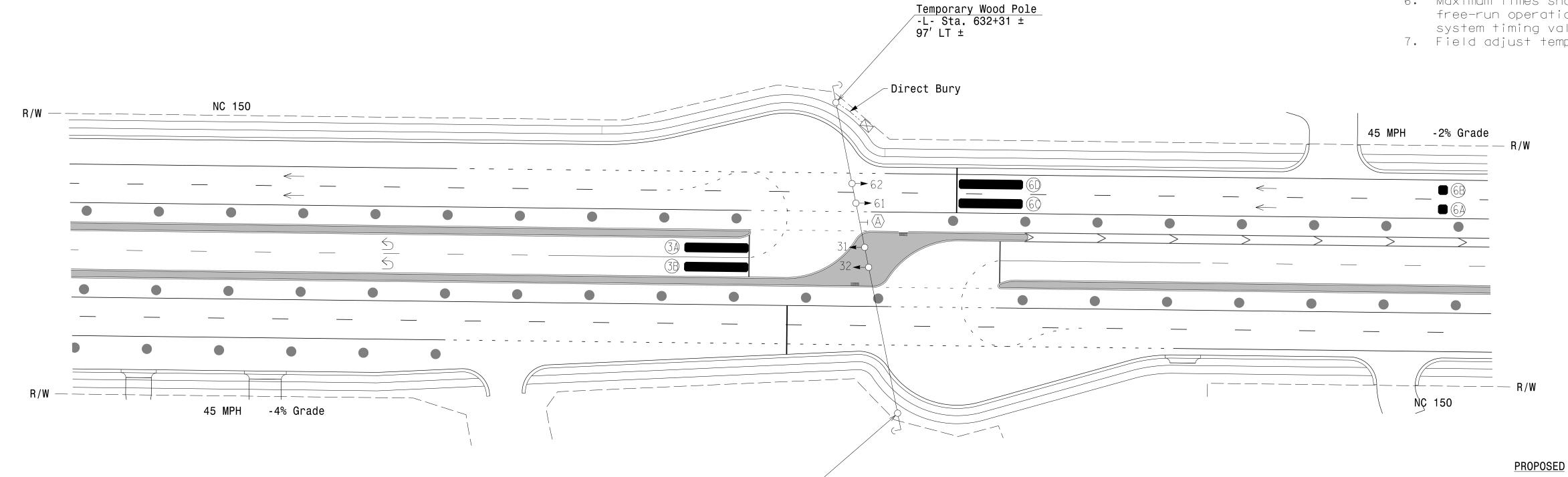
- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
- 2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- 3. Set all detector units to presence mode. 4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on
- 5. The cabinet should be designed to include an Auxiliary Output File for future use.

LEGEND

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

- 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.



Temporary Wood Pole -L- Sta. 632+72 ± 95' RT ±

MAXTIME T	IMING	CHART
FEATURE	PHA	ASE
FEATURE	3	6
Walk *	-	_
Ped Clear *	-	_
Min Green	7	12
Passage *	2.0	6.0
Max 1 *	30	60
Yellow Change	3.0	4.7
Red Clear	4.2	2.0
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 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

		Controller & Cabinet	× J
		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 \bullet	Drums	N/A
		No Left Turn Sign (R3-2)	
Now Inctallation			

1"=40'

New Installation Temporary Design 1 - TMP Phase III

Raleigh, NC 27606

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Fax. (919) 851-7024

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

NC 150 WB SR 1180 (Doolie Road) U-turn

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

 \bigcirc

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED 029904

EXISTING

Jason Galloway 17/2024 SIG. INVENTORY NO. 12-1833T1

DO NOT REMOVE ANY JUMPERS

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.

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.

PROJECT REFERENCE NO.	SHEET NO.
R - 2307B	Sig. 12.

SIGNAL HEAD HOOK-UP CHART																			
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S	8	59	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	(5	15	7	8	16	9	1Ø	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	(õ	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	N	NU	NU	31,32	NU	NU	NU	61	62	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU
RED								134	134										
YELLOW								135	135										
GREEN									136										
RED ARROW				116															
YELLOW ARROW				117															
GREEN ARROW				118				136											

NU = Not Used

EQUIPMENT INFORMATION

_ 13

16

= DENOTES POSITION OF SWITCH

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
Phases Used	,
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

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	

INPUT FILE POSITION LAYOUT

(front view)

_	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U	SLOT EMPTY	SLOT EXPTY	SLOT EZPTY	SLOT EMPTY	SLOT EZPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	S L O T E M P T Y	S L O T E M P T Y	SLOT EMPTY TC. = L	SLOT EMPTY	SLOT EMPTY).'S	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY FST =		SENSI	SLOT EMPTY

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: 12-1833T1 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED ELECTRICAL AND PROGRAMMING NC 150 WB

Prepared for the Offices of:

SR 1180 (Doolie Road) U-turn

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

Jason Galloway 17/2024

www.stantec.com

Stantec

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License No. F-0672

750 N. Greenfield Pkwy, Garner, NC 27529

PROJECT REFERENCE NO. SHEET NO. R-2307B Sig. 13.0

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. 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.

MAXTIME DETECTOR INSTALLATION CHART PROGRAMMING DETECTOR DISTANCE SIZE FROM S | CALL | DELAY | EXTEND | L00P (FT) | STOPBAR 0 | 2-4-2 | X | 3 | -6Y40 0 2 4 2 Y 3 - X - X - X - | X | X | X | - | X - | X | X | X | - | X

	P31,P32 DW W DRK		3B	6X40	0	2-4-2	X	3
			6A	6X6	300	4	X	6
PHASIN	G DIAGRAM DETECTION LEGEND		6B	6X6	300	4	Х	6
			6C	6X6	300	4	Х	6
← — — — — — — — — — — — — — — — — — — —	DETECTED MOVEMENT UNDETECTED MOVEMENT (OVERLAP) UNSIGNALIZED MOVEMENT PEDESTRIAN MOVEMENT Metal Pole #1 (Mast Arm = 73 ft.) -L- Sta. 632+40 ± 92' LT ±	200	P31				X	<u> </u>
R/W	NC 150							
		-1-						
		→ 63			€	-		
		\$ → 62	•		— €			
		61			— €	<u> </u>		
	\leftarrow	31		>		\rightarrow		<u> </u>
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$							
	32/	//						
				_				
		\ /				_		_
		/	· —	_		_		_

TABLE OF OPERATION

SIGNAL

FACE

31,32

61

PHASE

SIGNAL FACE I.D.

All Heads L.E.D.

MAXTIME T	IMING	CHART
FEATURE	PH	IASE
FEATURE	3	6
Walk *	4	_
Ped Clear *	9	_
Min Green	7	12
Passage *	2.0	6.0
Max 1 *	30	60
Yellow Change	3.0	4.7
Red Clear	5.2	2.0
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

PHASING DIAGRAM

Ø6

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.

\bigcirc	Traffic Signal H	ead •->	
()>	Modified Signal H	lead N/A	
\dashv	Sign	\dashv	
\	Pedestrian Signal With Push Button &		
<u> </u>	Signal Pole with	Guy	
S	ignal Pole with Side	walk Guy	
	Inductive Loop Det		
	Controller & Cab	inet ×	
	Junction Box		
	2-in Underground Co	onduit	_
N/A	Right of Way		_
\longrightarrow	Directional Arr	\sim	
	Metal Pole with Ma	starm 🔾	-
—— DD# ——	Directional Dri (#) x 2" Condu	i † N/A	
\bigcirc	Type II Signal Pec	lestal •	
OS	Oversized Junctio	n Box	
$\langle \overline{\mathbb{A}} \rangle$	No Left Turn Sign	(R3-2)	

LEGEND

EXISTING

New Installation - Final Design

801 Jones Franklin Road-Suite 300

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1"=40'

NC 150

45 MPH -2% Grade

NC 150 WB SR 1180 (Doolie Road) U-turn

PROPOSED

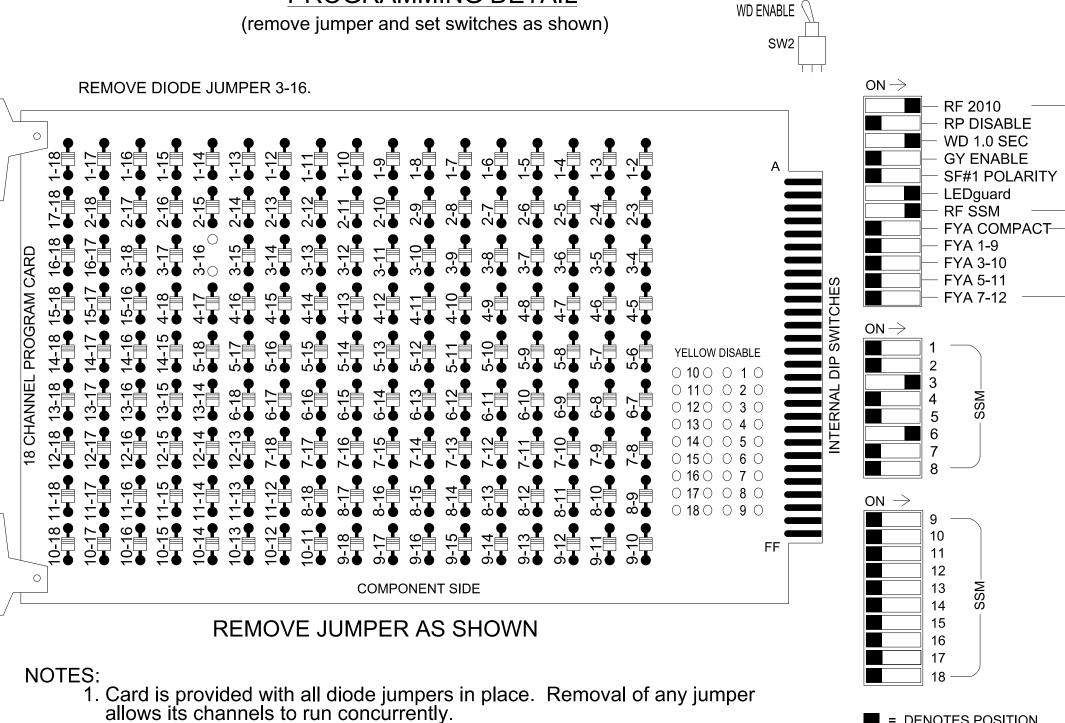
Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE 750 N.Greenfield Pkwy.Garner.NC 27529 PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE

REVISIONS

INIT. DATE Jason Galloway 17/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Dual Entry



ON

■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

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.

٦	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 3A	ø 3 3B	S L O T	S L O T E	S L O T	S L O T	S L O T	S L O T	NOT USED	FS DC ISOLATOR
	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	M P T Y	E M P T Y	E M P T Y	E M P T Y	E M P T Y	Ø3 PED DC ISOLATOR	ST DC ISOLATOR
FILE U	S L O T	Ø 6 6A	ø6 60	S L O T	SLOT	SLOT	S L O T	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" L	E M P T Y	ø 6 6B	NOT USED	E M P T Y	E M P T Y									
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			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	
PED PUSH BUTTONS												
P31,P32	TB8-8,9	I13L	70	36	8	PED 3	NOTE:					
								. DC ISOLAT T FILE SLOT				

INPUT FILE POSITION LEGEND: J2L

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 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	AU Sé
CMU CHANNEL NO.	1	2	13	3	4	14	5	(Ô	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	(0.)	6 PED	7	8	3 PED	OL1	OL2	SPARE	OL3	OL4	SPA
SIGNAL HEAD NO.	NU	NU	NU	31,32	NU	NU	NU	61	62,63	NU	NU	NU	P31, P32	NU	NU	NU	NU	NU	NI
RED								134	134										
YELLOW								135	135										
GREEN									136										
RED ARROW				116															
YELLOW ARROW				117															
GREEN ARROW				118				136											
₩													110						
Ķ													112						

NU = Not Used

EQUIPMENT INFORMATION

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

PED 3 PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Detector >Ped Det Plans

Web Interface

Home >Controller >Detector Configuration >Pedestrian Detector

Plan 1

	Detector	Descripton	Call Phase	Call Overlap
	2		2	0
IOTICE PHASE 3 PED	4		4	0
ASSIGNED TO	6		6	0
DETECTOR 8 PED	8		3	0

Front Panel

Main Menu >Controller >More>Channels>Channels Config

Web Interface

Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

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

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	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 12-1833 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

NOTICE PHASE 3 PED ASSIGNED TO CHANNEL 16

> Final Design Electrical Detail

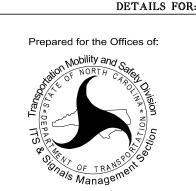
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R-2307B

Sig. 13.



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NC 150 WB SR 1180 (Doolie Road) U-Turn

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

Jason Galloway 17/2024

Elevation View

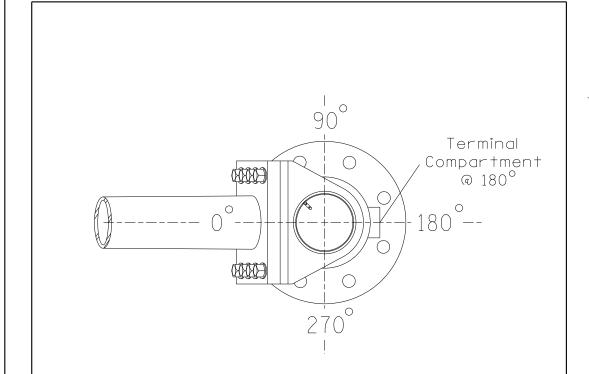
Base line reference elev. = 842.884

SPECIAL NOTE

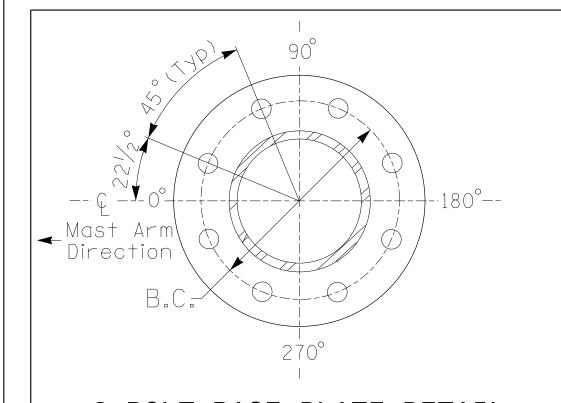
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at © Foundation @ ground level	842.88 ft.	
Elevation difference at High point of roadway surface	+4.62 ft.	
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	

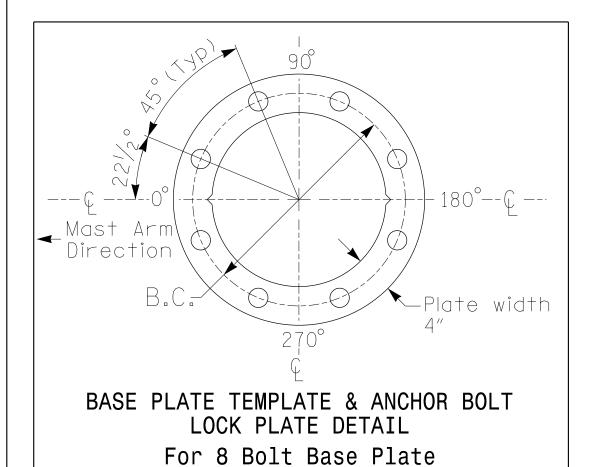


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



METAL POLE No. 1

R - 2307B	Sig. 13.
PROJECT REFERENCE NO.	SHEET NO

	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
	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

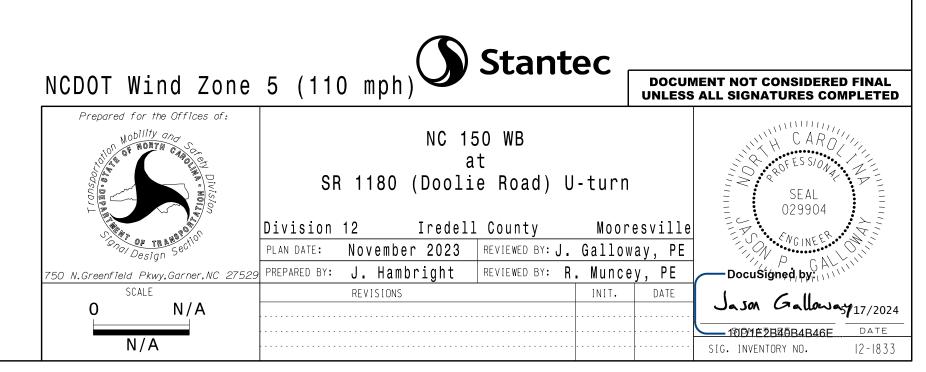
- 1. Design the traffic signal structure and foundation in accordance with: • The 1st Edition 2015 AASHTO LRFD "Standard Specifications for Structural Supports for
- Highway"Standard Specifications for Structural Supports for Highway • Signs, Luminaires, and Traffic Signals, including all of the latest 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 signal project plans and special provisions.
- 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. 3. Design all signal supports using force ratios that do not exceed 0.9.

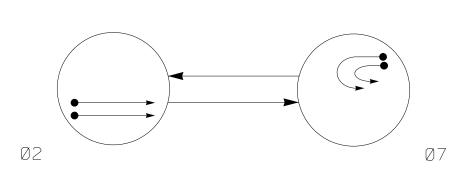
2. Design the traffic signal structure using the loading conditions shown in the elevation

- 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 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
- 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 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. | SHEET NO. Sig. 14.0 R-2307B

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

DETECTED MOVEMENT

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

TABLE OF	0	PER	ATI	ON			
	PHASE						
SIGNAL FACE		Ø 2	Ø 7	FLASH			
21		*	R	R			
22		G	R	R			
71.72		(R)		R			

SIGNA	L FACE	I.D.
АП	Heads L.E.	D .
12" 71,72	R 12"	R Y 12"

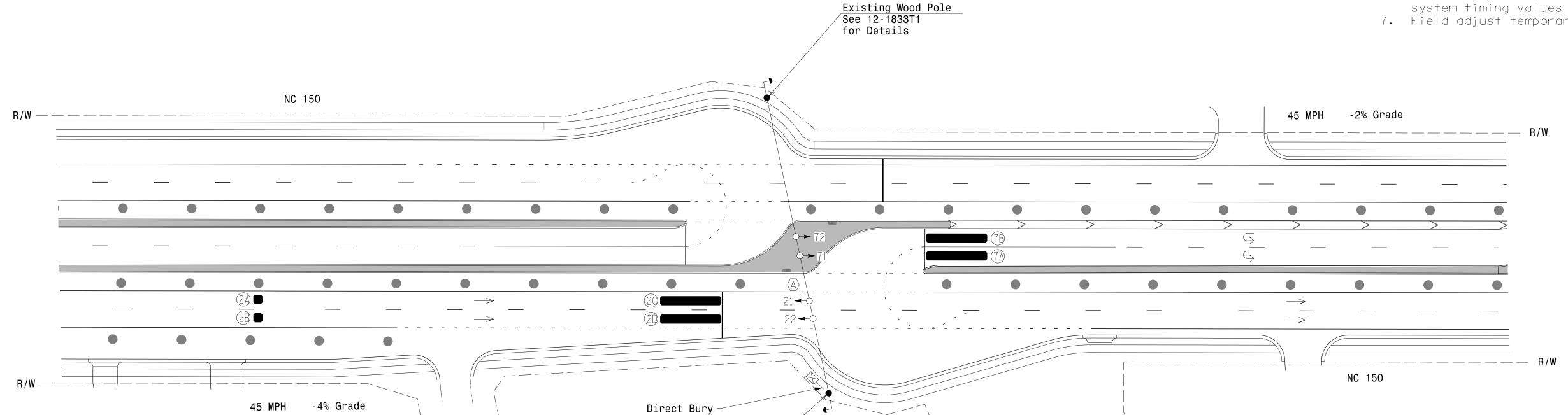
MAXTIME DETECTOR INSTALLATION CHART														
	DETI	ECTOR				PRC	GRAMM	IN	G					
L00P	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD		
2A	6X6	300	*	*	2	-	-	Χ	-	Χ	_	*		
2B	6X6	300	*	*	2	-	-	Χ	_	Χ	-	*		
2C	6X40	0	*	*	2	5.0	2.0	Χ	_	Χ	Χ	*		
2D	6X40	0	*	*	2	5.0	2.0	Χ	_	Χ	Χ	*		
7A	6X40	0	*	*	7	_	-	Χ	_	Χ	-	*		
7B	6X40	0	*	*	7	-	-	Χ	_	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.
- 7. Field adjust temporary poles as needed.



Existing Wood Pole See 12-1833T1

for Details

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	4.9	3.0						
Red Clear	2.1	3.9						
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	_	_						

* 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.

	<u> </u>	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 \bullet	Drums	N/A
	$\langle A \rangle$	No Left Turn Sign (R3-2)	A
New Installation			-

Temporary Design 1 - TMP Phase III

Raleigh, NC 27606

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50 N.Greenfield Pkwy,Garner,NC 275a

1"=40'

NC 150 EB Water Oak Drive U-turn

PROPOSED

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

REVISIONS

029904

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LEGEND

Traffic Signal Head Modified Signal Head

Sign

Pedestrian Signal Head With Push Button & Sign

> INIT. DATE Jason Galloway 17/2024 SIG. INVENTORY NO. |2-1834T

EXISTING

N/A

ON OFF

- RF 2010 RP DISABLE

■— WD 1.0 SEC

FYA 1-9 FYA 3-10 FYA 5-11 FYA 7-12

■ LEDguard

10

] 12 _ 13

] 15

ີ 16

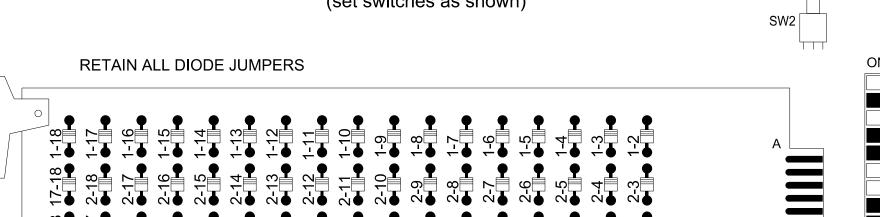
= DENOTES POSITION OF SWITCH

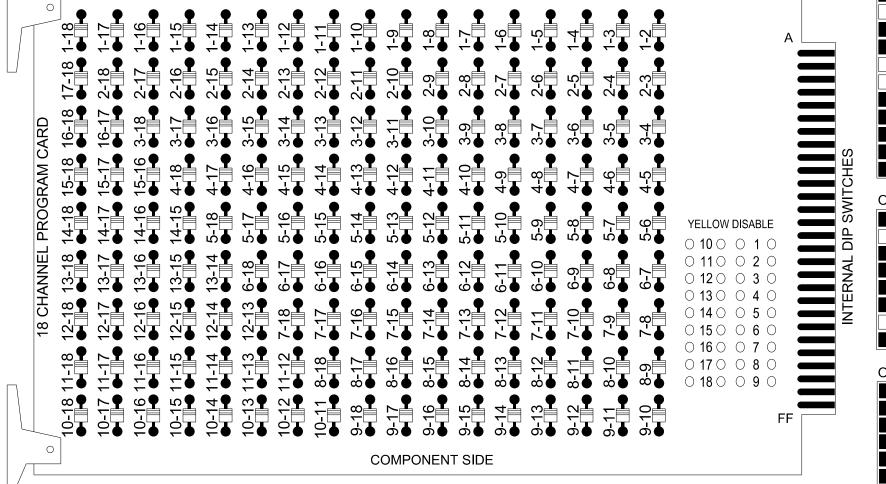
GY ENABLE SF#1 POLARITY

FYA COMPACT—

WD ENABLE

(set switches as shown)





DO NOT REMOVE ANY JUMPERS

- 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 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.

		N
R - 2307B	Sig. 1	4

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	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	,	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22	NU	NU	NU	NU	NU	NU	NU	71,72	NU	NU	NU	NU	NU	NU	NU	NU
RED		128	128																
YELLOW		129	129																
GREEN			130																
RED ARROW											122								
YELLOW ARROW											123								
GREEN ARROW		130									124								

NU = 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
Load Switches Used	S2, S10
Phases Used	2, 7
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	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)

,	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file ^U "I" L	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EXPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR ST DC ISOLATOR
FILE U	S L O T E M P T Y	SLOT EMPTY	S LOT EMPTY	S LOT E MPTY	SLOT EMPTY	SLOT EMPTY	S L O T E M P T Y	SLOT EMPTY						
·	EX.: 1	A, 2A, E	TC. = L	.00P N().′S						FS = ST =		SENS 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: 12-1834T1 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III Electrical Detail

ELECTRICAL AND PROGRAMMING Prepared for the Offices of:

NC 150 EB Water Oak Drive U-Turn

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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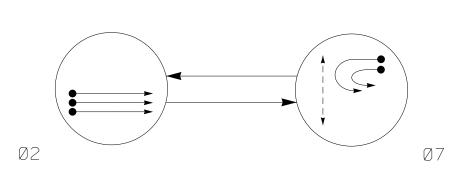
Stantec

REVISIONS 750 N. Greenfield Pkwy, Garner, NC 27529

INIT. DATE Jason Galloway 17/2024

Sig. 15.0

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	FLASI
21		†	R	R
22,23		G	R	R
71,72		√R	•	₽R
P71,P72		DW	W	DRK

S	IGNAL F	ACE I.	<u>).</u>
	All Head	s L.E.D.	
12" 71,72	12" 21	R Y 12" G 22,23	16" P71,P72

	MAXTI	ME DET	ECTOR	I	NSTA	LLAT	ON C	HA	RT			
	DETI	ECTOR				PRC	GRAMM	IN	G			
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	4	Χ	2	-	-	Χ	Χ	Χ	_	Х
2B	6X6	300	4	Χ	2	-	-	Χ	Χ	Χ	-	Х
2C	6X6	300	4	Χ	2	-	-	Χ	Χ	Χ	-	Х
7A	6X40	0	2-4-2	Χ	7	-	-	Χ	-	Χ	_	Х
7B	6X40	0	2-4-2	Χ	7	<u>-</u>	_	Χ	_	Χ	_	X

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
- 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

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

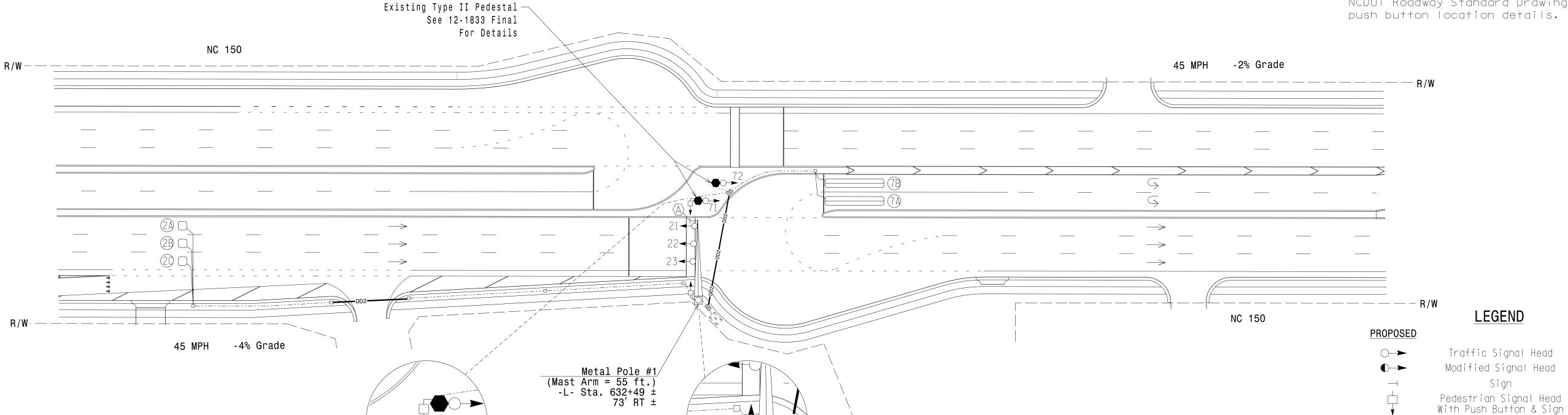
Metal Pole with Mastarm

Directional Drill (#) x 2" Conduit

Type II Signal Pedestal

Oversized Junction Box

No Left Turn Sign (R3-2)



MAXTIME T	IMING	CHART
FEATURE	PH	ASE
FEATURE	2	7
Walk *	_	4
Ped Clear *	_	10
Min Green	12	7
Passage *	6.0	2.0
Max 1 *	60	30
Yellow Change	4.9	3.0
Red Clear	2.1	4.4
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. Min Green for all other phases should not be lower than 4 seconds. New Installation - Final Design

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Tel. (919) 851-6866

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Mobility and	NC 150 EB
	aτ
Divisio	Water Oak Drive U-turn

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

N/A

REVISIONS INIT. DATE Jason Gallowasy 17/2024

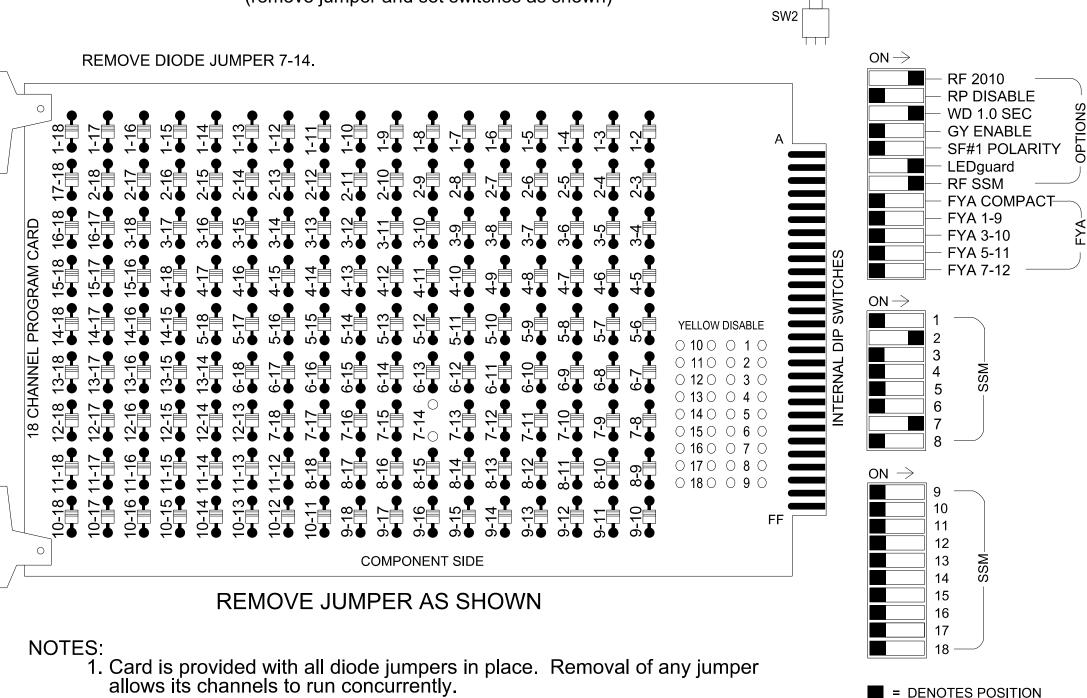
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SIG. INVENTORY NO.

<u>EXISTING</u>

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

(remove jumper and set switches as shown)



ON OFF

= DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.

3. Ensure that the Red Enable is active at all times during normal operation.

4. Integrate monitor with Ethernet network in cabinet.

-	1	2	3	4	5	6	7	8	9	10	11	12	13	14
- T U	SLO	Ø 2	Ø 2	S L O	S L O	SLOF	S L O	SLQ	S L O	SLO	S L O	NOT USED	S L Q	FS DC
file "I"	E M P	2A Ø 2	2C NOT	T E M	E M P	E M	T E M	T E M P	T E M	T E M P	l	Ø7PED	T E M P	ISOLATOR ST
L	P T Y	2B	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	DC ISOLATOR	P T Y	DC ISOLATOR
U	S L O	S L Q	S L O	SLOF	Ø 7	Ø 7	S L O	SLOF	SLOF	SLOF	S L Q	SLO	SLOF	SLOF
FILE	Т		T	ļ	7A	7B	Т	ļ	l	ļ		T	I	
"J" 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	EMPTY	EMPTY	EMPTY	E M P T Y	E M P T Y	E M P T Y	E M P T Y

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
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			Х		Х	
PED PUSH BUTTONS												
P71,P72	TB8-5,6	I12L	69	35	4	PED 7	NOTE:					
								. DC ISOLAT T FILE SLOT				

INPUT FILE POSITION LEGEND: J2L FILE J SLOT 2

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.

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, S6, S10
Phases Used	2, 7, 7PED
Overlap "1"	NOT USED
Overlap "2"	NOT USED
Overlap "3"	NOT USED
Overlap "4"	NOT USED

PROJECT REFERENCE NO. SHEET NO.

		R-2307B Sig. 15									
- UF	P C	HAF	RT								
S1Ø	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	_		
7	8	16	9	10	17	11	12	18			
7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE			

				S	IGN	IAL	HE	EAD	HC)OK	- UF	, C	HAF	RT					
LOAD SWITCH NO.	S1	C	\$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	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3	4	7 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21	22,23	NU	NU	NU	P71, P72	NU	NU	NU	71,72	NU	NU	NU	NU	NU	NU	NU	NU
RED		128	128																
YELLOW		129	129																
GREEN			130																
RED ARROW											122								
YELLOW ARROW											123								
GREEN ARROW		130									124								
₩							104												
Ķ							106												

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.

PED 7 PROGRAMMING DETAIL

Front Panel

Main Menu >Controller >Detector >Ped Det Plans

Web Interface

Home >Controller >Detector Configuration >Pedestrian Detector

Plan 1

NOTICE PHASE 7 PED	Detector	Descripton	Call Phase	Call Overlap
ASSIGNED TO	2		2	0
DETECTOR 4 PED	6		6	0
	8		8	0

SEQUENCE DETAIL

Front Panel

Main Menu >Controller >Sequence & Phs Config>Sequences

Web Interface

Home >Controller >Sequence

Sequence 1

<u>-</u>	
Ring	Sequence Data
1	2,a,7,b
2	

THE SIGNAL DESIGN: 12-1834 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Front Panel

Main Menu >Controller >More>Channels>Channels Config

Web Interface

Home >Controller >Advanced IO>Channels>Channels Configuration

Channel Configuration

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

Final Design Electrical Detail

ELECTRICAL AND PROGRAMMING NC 150 EB

Water Oak Drive U-Turn

Iredell County Mooresville May 2024 REVIEWED BY: J Galloway, PE PREPARED BY: J Galloway REVIEWED BY: R Muncey, PE REVISIONS INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Jason Galloway 17/2024

THIS ELECTRICAL DETAIL IS FOR

NOTICE PHASE 7 PED

ASSIGNED TO CHANNEL 14

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

Elevation View

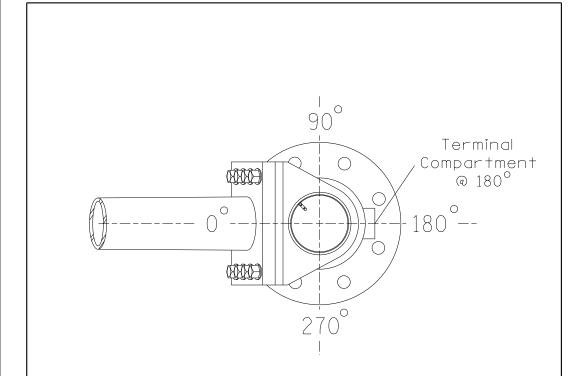
Base line reference elev. = 846.17

SPECIAL NOTE

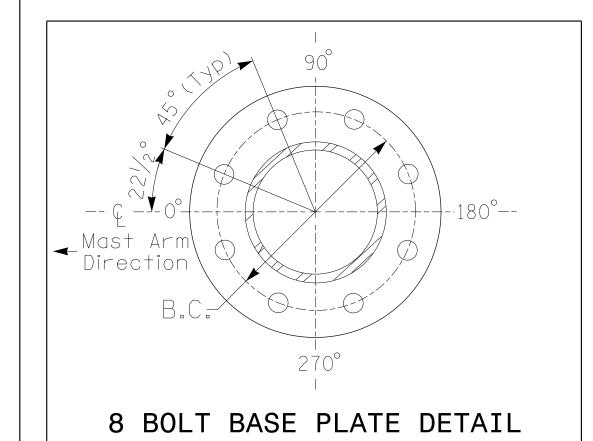
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

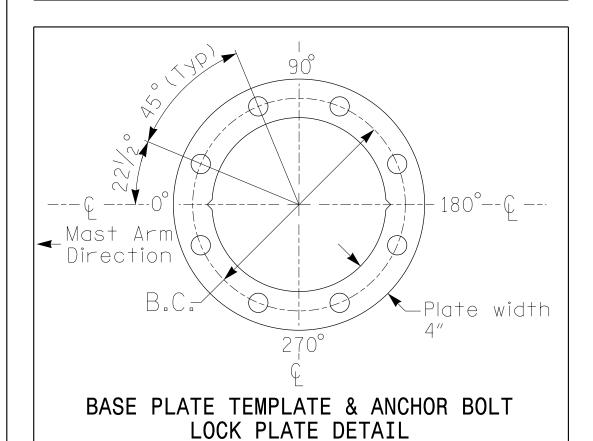
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	
Baseline reference point at (£ Foundation @ ground level	846.17 ft.	
Elevation difference at High point of roadway surface	+1.19 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. 15.2

	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
	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

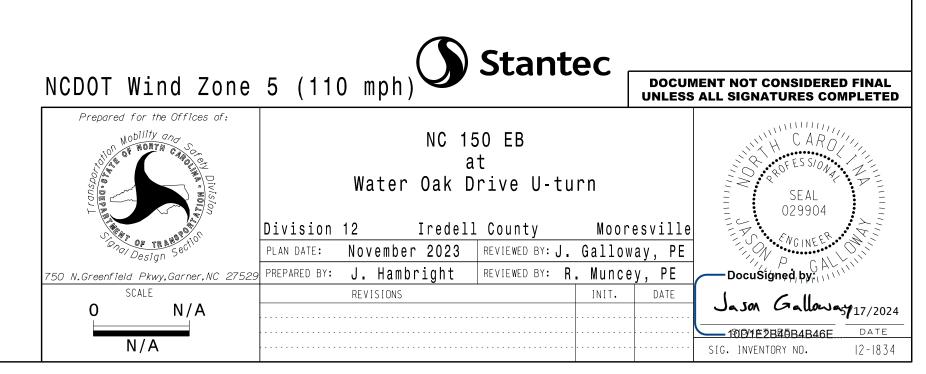
DESIGN REFERENCE MATERIAL

- 1. Design the traffic 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

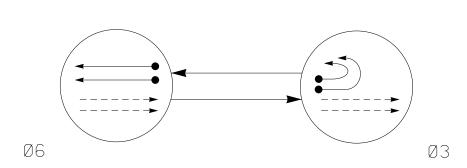
- 2. Design the traffic signalstructure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the 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 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. | SHEET NO. Sig. 16.0 R-2307B

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

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

UNSIGNALIZED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

TABLE OF	0	PER	ATI	ON
		Р	HAS	E
SIGNAL FACE		Ø 6	Ø _M	LJŒWI
31,32		√ R		√ R
61		†	R	R
62		G	R	R

SIGNAL F		
12" 31,32	R 12"	R Y 12" G 62

	MAXTI	ME DET	ECTOR	I	NSTA	LLAT	ON C	HA	RT			
	DETI	ECTOR				PRO	GRAMM	IN	G			
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	6X40	0	*	*	3	-	-	Χ	-	Χ	-	*
3B	6X40	0	*	*	3	-	-	Χ	-	Χ	-	*
6A	6X6	300	*	*	6	-	-	Χ	-	Χ	-	*
6B	6X6	300	*	*	6	-	-	Χ	-	Χ	_	*
6C	6X40	0	*	*	6	5.0	2.0	Χ	-	Χ	Χ	*
6D	6X40	0	*	*	6	5.0	- X - X - # - X - X - * - DELAY DURING *					

* 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 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 unlesss 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

LEGEND

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

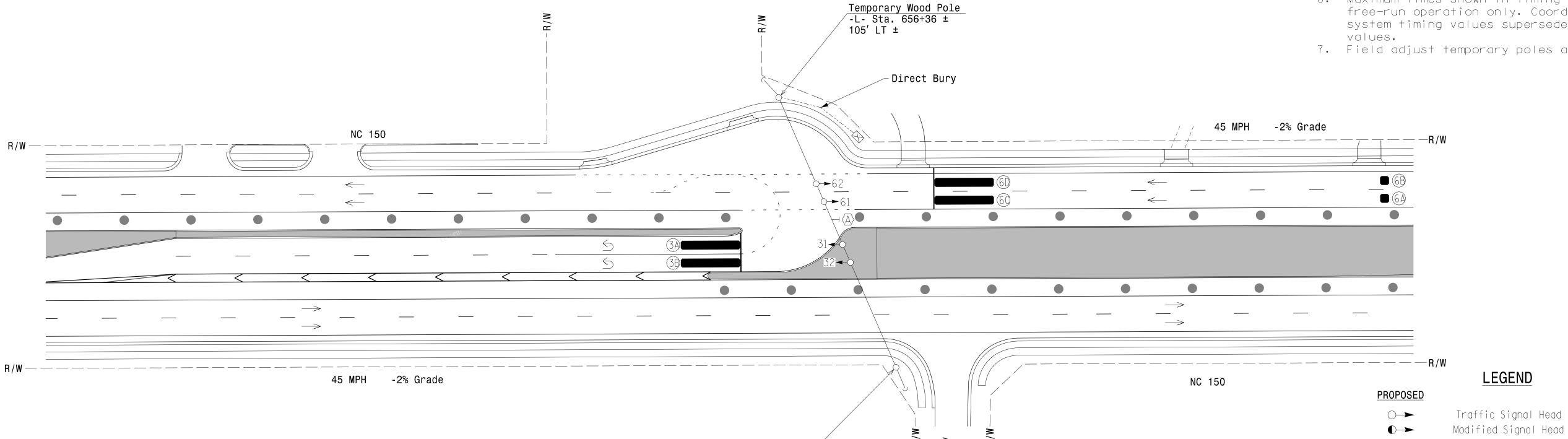
Video Detection Area

Construction Zone

Drums No Left Turn Sign (R3-2)

----- 2-in Underground Conduit

7. Field adjust temporary poles as needed.



Temporary Wood Pole -L- Sta. 657+14 ± 76′ RT ±

MAXTIME T	IMING	CHART
FEATURE	PHA	ASE
FEATURE	3	6
Walk *	_	_
Ped Clear *	_	_
Min Green	7	12
Passage *	2.0	6.0
Max 1 *	30	60
Yellow Change	3.0	4.7
Red Clear	4.1	2.0
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 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

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Raleigh, NC 27606

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Fax. (919) 851-7024

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801 Jones Franklin Road-Suite 300



NC 150 WB at U-turn across from Antiquity Lane

N/A

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

CARN 029904

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<u>EXISTING</u>

-

N/A

N/A

N/A

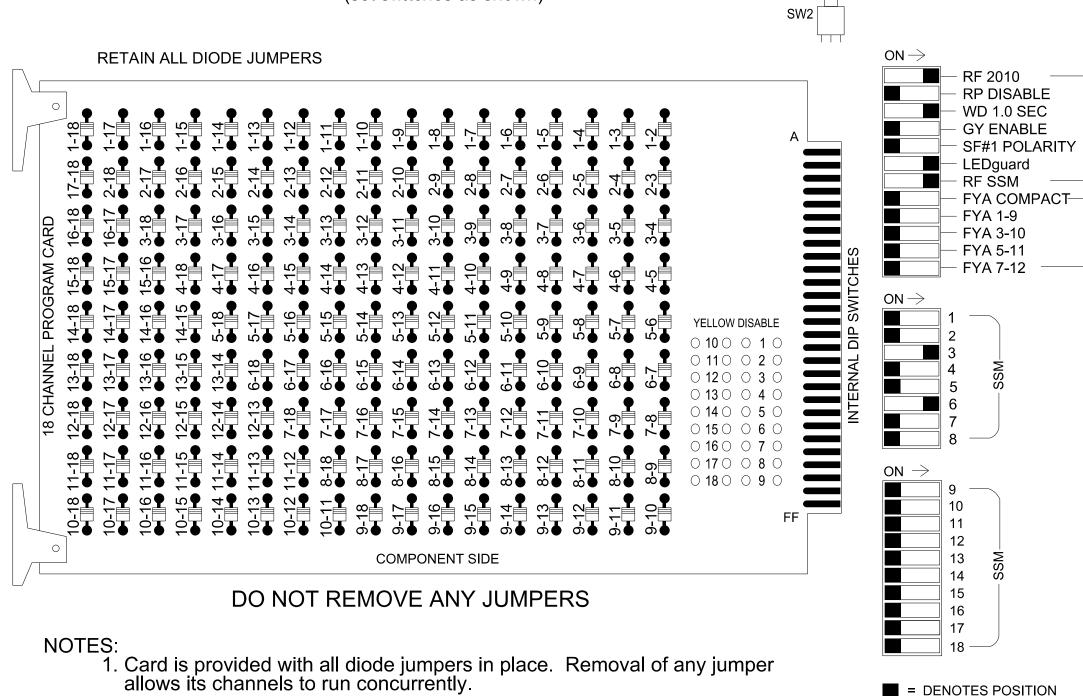
N/A

50 N.Greenfield Pkwy,Garner,NC 275 REVISIONS INIT. DATE Jason Galloway 17/2024 1"=40' SIG. INVENTORY NO. |2-185|T|

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

ON OFF

(set switches as shown)



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 controller to start up in phase 2 Phase Not On 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	(5	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	(5	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								134	134										
YELLOW								135	135										
GREEN	-								136										

NU = Not Used

ARROW

YELLOW

ARROW

GREEN

ARROW

EQUIPMENT INFORMATION

Controller	2070LX
Cabinet	
Software	Q-Free MAXTIME
Cabinet Mount	Base
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

SEQUENCE DETAIL

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

Web Interface Home >Controller >Sequence

Sequence 1

116

117

118

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

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
file U	SLOT	SLOT	S L O T	FS DC ISOLATOR										
"I" 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	ST DC ISOLATOR								
FILE U	SLOT	SLOF	SLOT	SLOF	SLOT	S L O T	SLOT	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
	E M P T Y													
EX.: 1A, 2A, ETC. = LOOP NO.'S										FLASH STOP	SENS 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: 12-1851T1 DESIGNED: MAY 2024 SEALED: 5/17/2024 REVISED: N/A

Temporary Design 1 - TMP Phase III

Electrical Detail ELECTRICAL AND PROGRAMMING

Prepared for the Offices of:

NC 150 WB at U-turn across from Antiquity Lane

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

Jason Galloway 17/2024

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Stantec

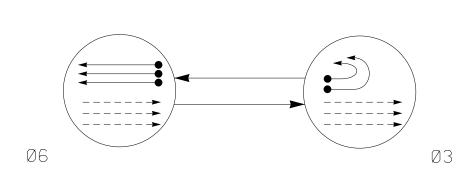
www.stantec.com 750 N. Greenfield Pkwy, Garner, NC 27529 R-2307B

Sig. 16 1

= DENOTES POSITION OF SWITCH

Sig. 17.0 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 6	Ø 3	FLASH
31,32		€R	√	√ R)
61		1	R	R
62,63		G	R	R

SIGNA	L FACE	I.D.
АІІ	Heads L.E.[).
12" 31,32	R Y 12"	R Y 12" 62,63

MAXTIME DETECTOR INSTALLATION CHART												
	DETI		PRC	GRAMM	IN	G						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
3A	6X40	0	2-4-2	Χ	3	-	-	Χ	-	Χ	-	Х
3B	6X40	0	2-4-2	Χ	3	-	-	Χ	-	Χ	-	Х
6A	6X6	300	4	Χ	6	-	-	Χ	Χ	Χ	_	Χ
6B	6X6	300	4	Χ	6	_	-	Χ	Χ	Χ	-	Х
6C	6X6	300	4	Χ	6	_	-	Χ	Χ	Χ	-	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.

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

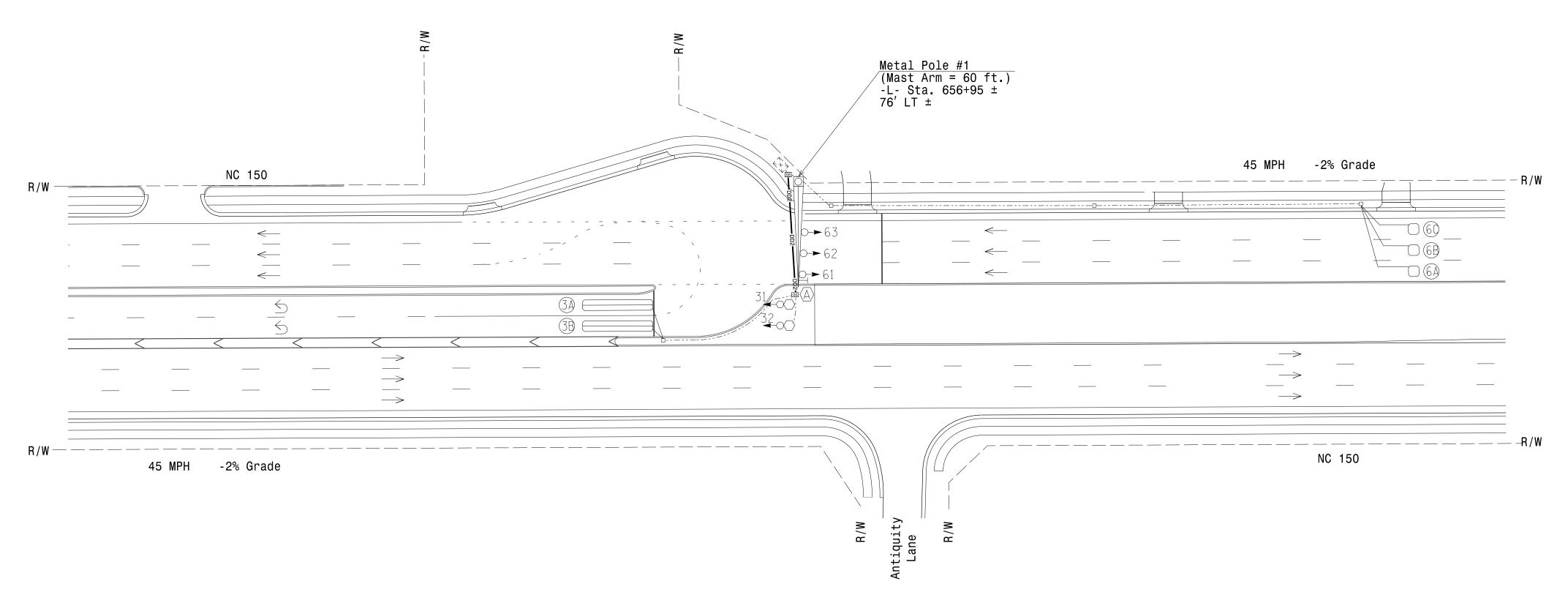
Directional Drill (#) x 2" Conduit

Type II Signal Pedestal

Oversized Junction Box

No Left Turn Sign (R3-2)

- 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.



MAXTIME 7	TIMING	CHART			
FEATURE	PHASE				
FEATURE	3	6			
Walk *	_	_			
Ped Clear *	_	-			
Min Green	7	12			
Passage *	2.0	6.0			
Max 1 *	30	60			
Yellow Change	3.0	4.7			
Red Clear	4.8	2.0			
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 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

New Installation - Fi	nal Design
-----------------------	------------



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50 N.Greenfield Pkwy,Garner,NC 2752

1"=40'

NC 150 WB at U-turn across from Antiquity Lane

Iredell County May 2024 REVIEWED BY: J Galloway, PE

PREPARED BY: J Hambright REVIEWED BY: R Muncey, PE INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED CARN 029904

EXISTING

N/A

N/A

Jason Galloway 17/2024