

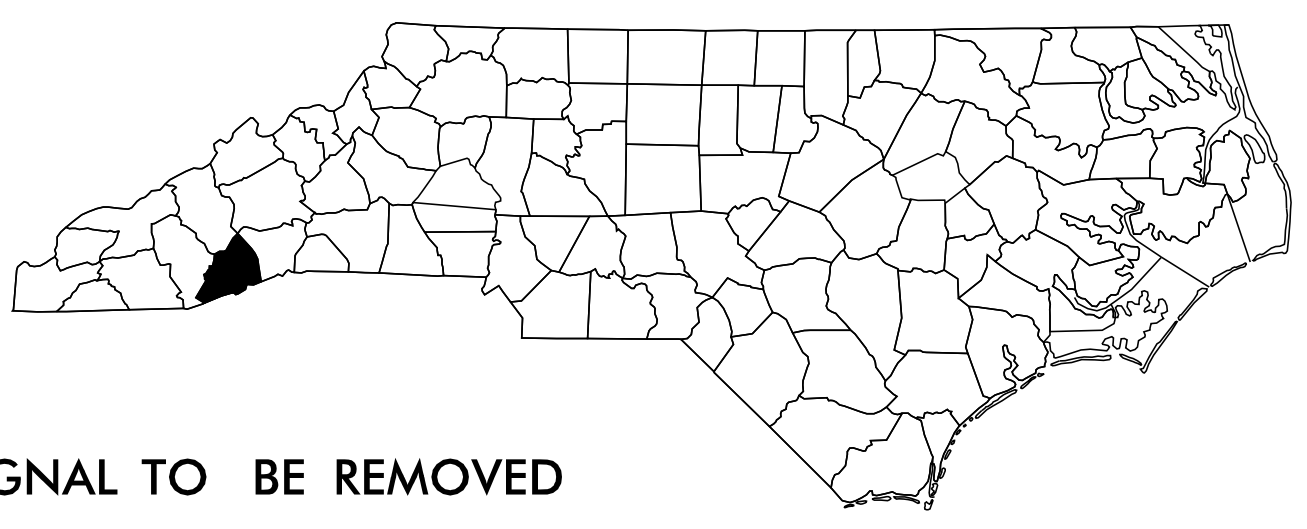
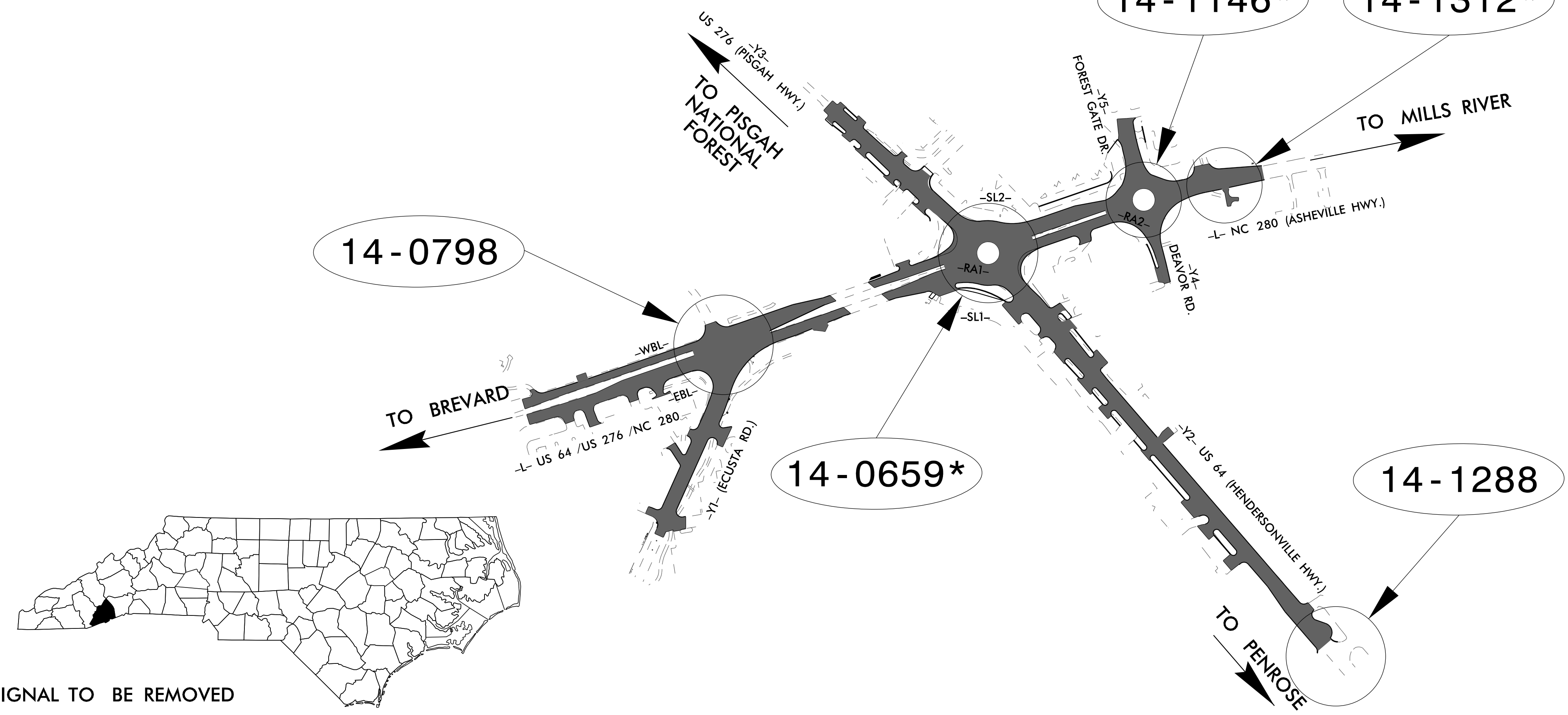
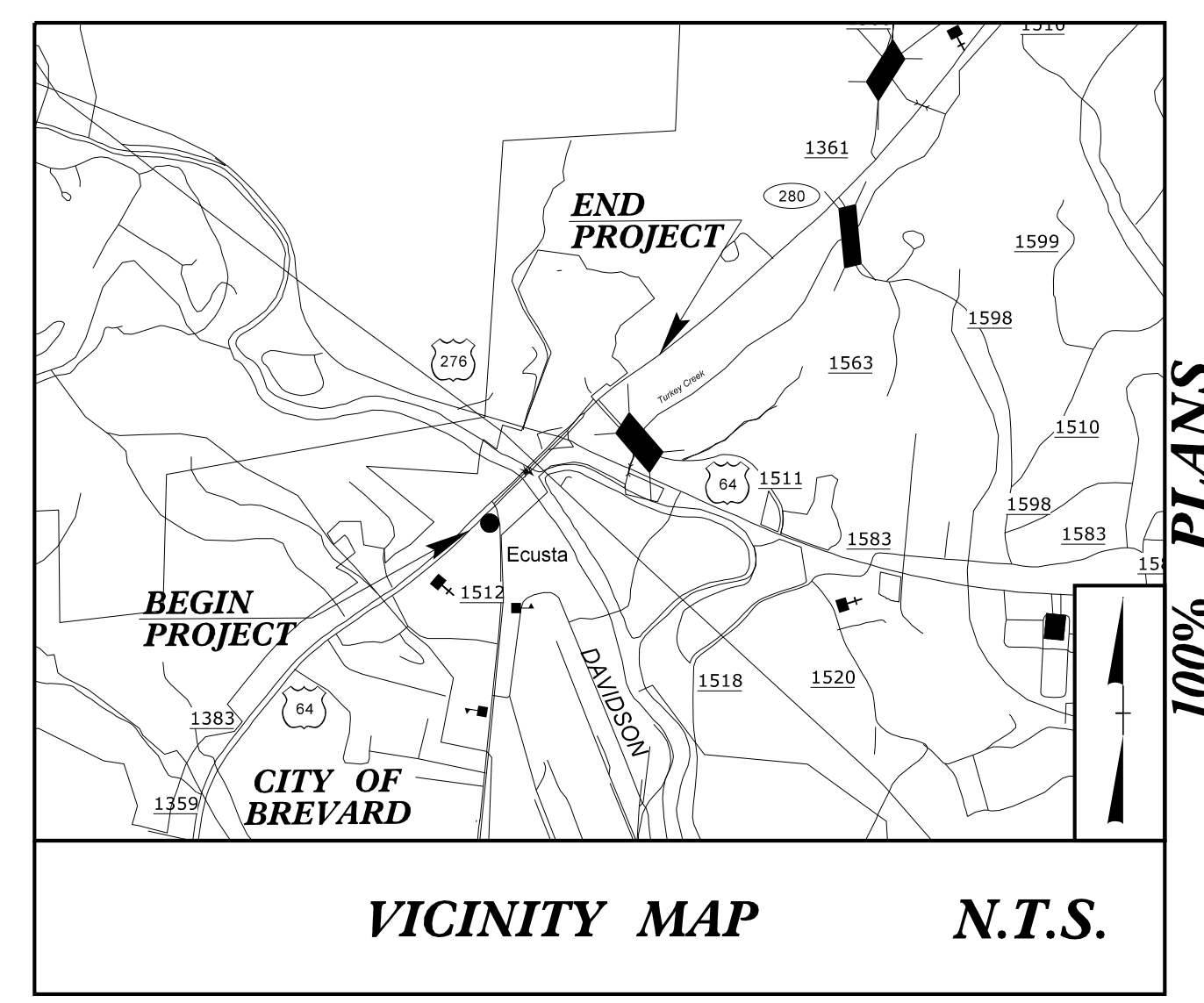
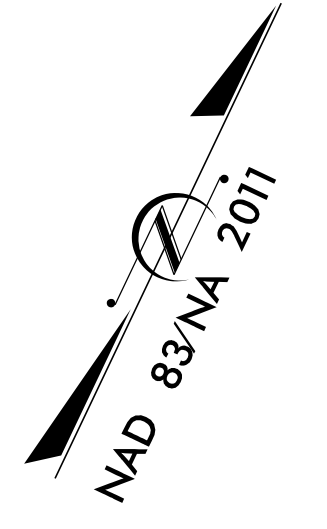
Project: R-5799

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSYLVANIA COUNTY

**LOCATION: INTERSECTIONS OF US 64, US 276 AND NC 280
CONSTRUCT INTERSECTION IMPROVEMENTS**

TYPE OF WORK: TRAFFIC SIGNALS



*SIGNAL TO BE REMOVED

Sheet #	Reference #	Index of Plans Location/Description
4/28/2023 S:\signdwg\com\files\Transportation\1030049021\1-R-5799_US 64-276 Intersection Design\Design\Traffic\Signals\Design\Plan Sheets\RS5799_sig_1-0_tsh.dgn		
14-0798 T1	14-0798 T1	US 64-276 / NC 280 (Asheville Highway) At SR 1512 (Ecusta Road)/Bank Driveway
14-0798 T2	14-0798 T2	US 64-276 / NC 280 (Asheville Highway) At SR 1512 (Ecusta Road)/Bank Driveway
14-0798 T3	14-0798 T3	US 64-276 / NC 280 (Asheville Highway) At SR 1512 (Ecusta Road)/Bank Driveway
14-0798 T4	14-0798 T4	US 64-276 / NC 280 (Asheville Highway) At SR 1512 (Ecusta Road)/Bank Driveway
14-0798 T5	14-0798 T5	US 64-276 / NC 280 (Asheville Highway) At SR 1512 (Ecusta Road)/Bank Driveway
14-0798 T6	14-0798 T6	US 64-276 / NC 280 (Asheville Highway) At SR 1512 (Ecusta Road)/Bank Driveway
14-0659 T1	14-0659 T1	US 64-276 / NC 280 (Asheville Highway) At SR 1512 (Ecusta Road)/Bank Driveway
14-0659 T2	14-0659 T2	US 64-276 / NC 280 (Asheville Highway) At SR 1512 (Ecusta Road)/Bank Driveway
14-1146 T1	14-5026	US 64-276 / NC 280 (Asheville Highway) At US 64 (Hendersonville Hwy) / US 276 (Pisgah Hwy)
14-1312 T1	14-5027	US 64-276 / NC 280 (Asheville Highway) At US 64 (Hendersonville Hwy) / US 276 (Pisgah Hwy)
14-1288	14-5028	US 64-276 / NC 280 (Asheville Highway) At US 64 (Hendersonville Hwy) / US 276 (Pisgah Hwy)
14-5027		NC 280 (Asheville Highway) At SR 1511 (Deavor Road) / Forest Gate Drive
14-1312 T1		NC 280 (Asheville Highway) At SR 1511 (Deavor Road) / Forest Gate Drive
14-1288		NC 280 (Asheville Highway) At Forest Gate Circle
14-5028		US 64 (Hendersonville Highway) At Ecusta Bypass / Store Entrance
MP1 - MP8	N/A	US 276 (Pisgah Highway) At Driveways
		Standard Drawings for All Metal Poles

NCDOT
INTELLIGENT TRANSPORTATION AND SIGNALS UNIT
 Contacts:

R. Nicholas Zinser, PE - Western Region Signals Engineer
D. Todd Joyce, PE - Signal Equipment Design Engineer

Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.

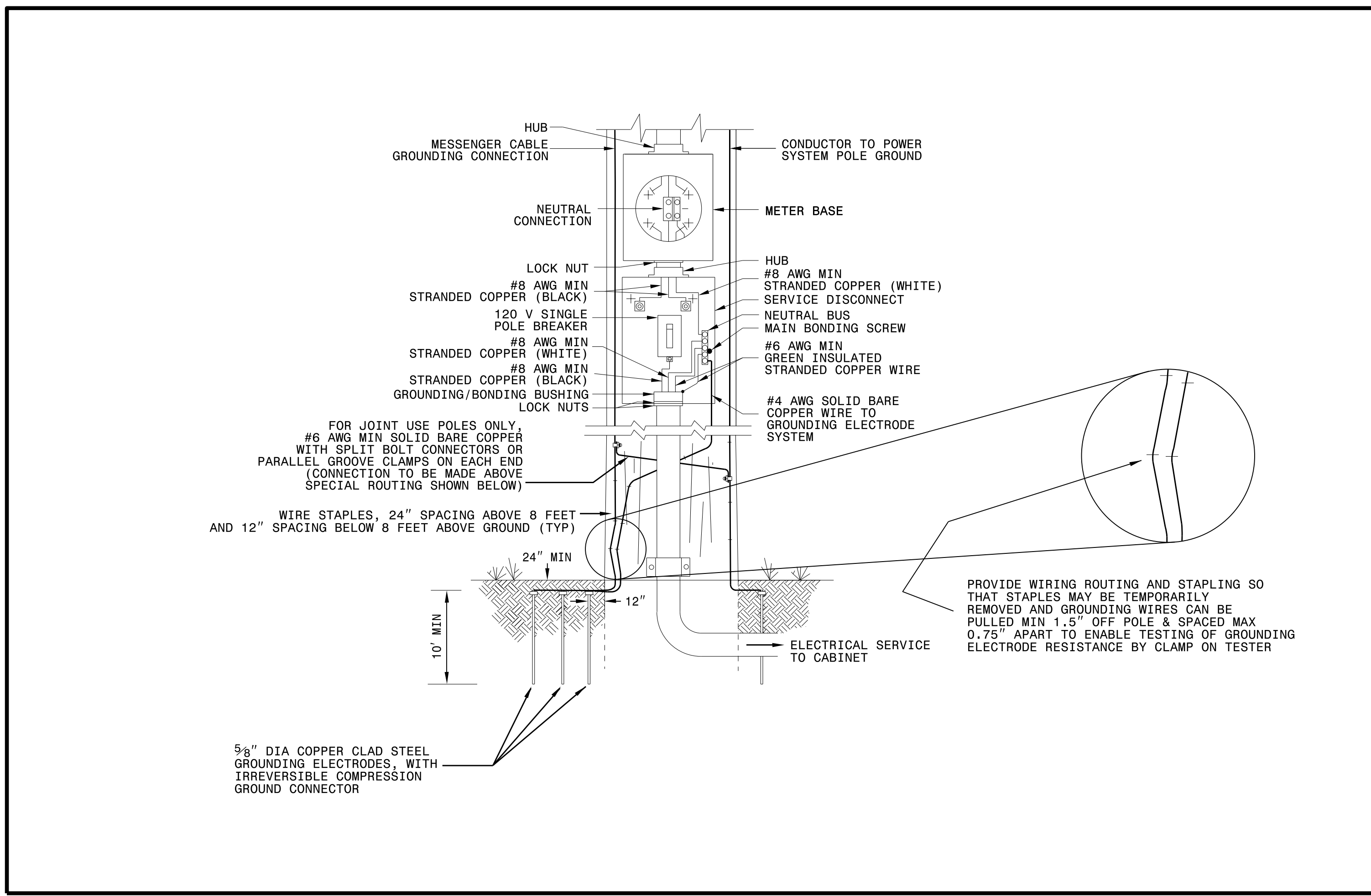
Prepared in the Office of:

RS&H
NC FIRM LICENSE NO. F-0493
 1510 SOUTH WOODLEIGH, SUITE 200
 CHARLOTTE, NC 28225
 (704) 552-9500

Prepared for the Offices of:

TRANSPORTATION MOBILITY AND SAFETY DIVISION
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 TSMO Unit

750 N. Greenfield Pkwy, Garner, NC 27529



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

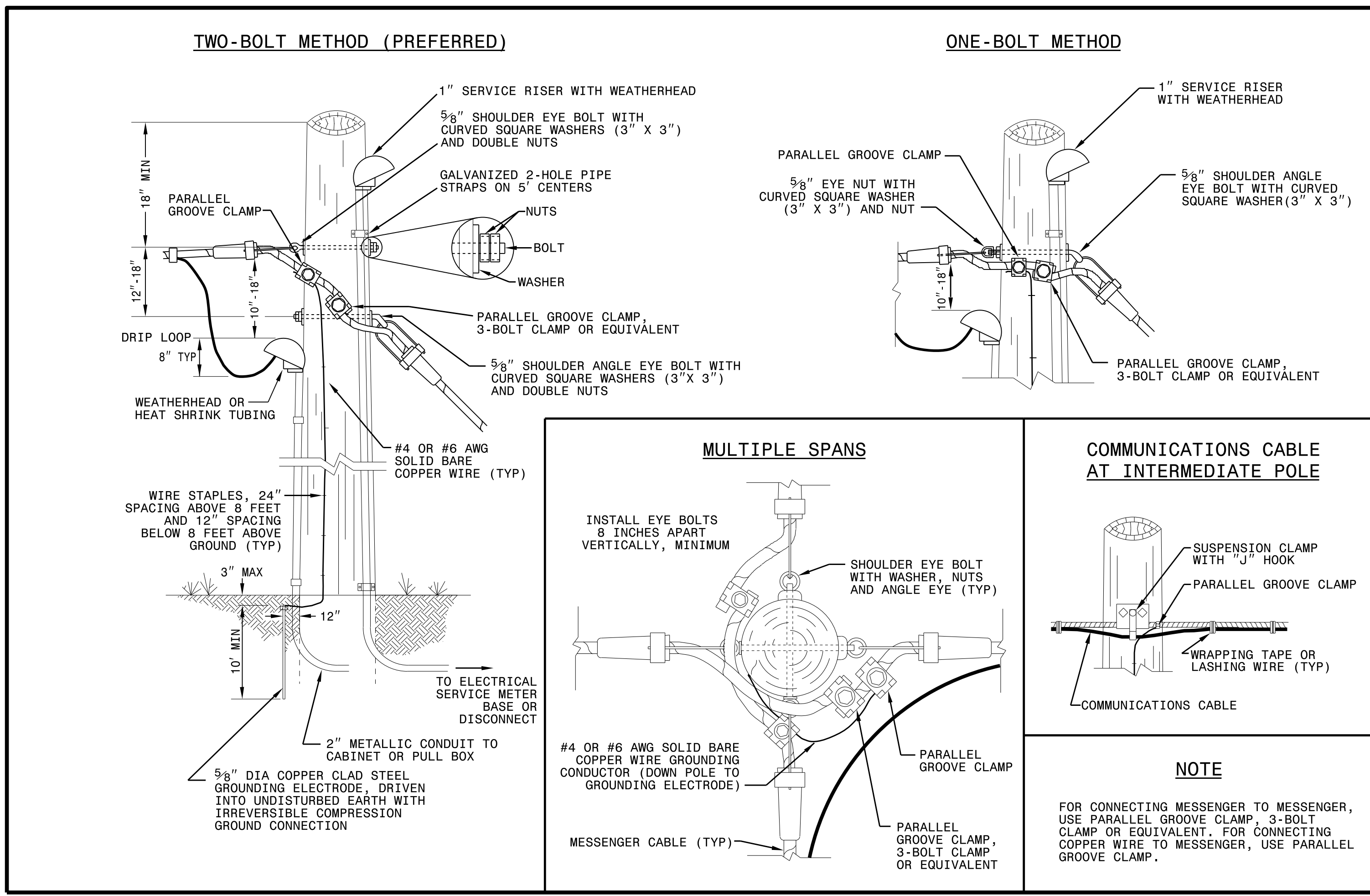
ENGLISH STANDARD DRAWING FOR

ELECTRICAL SERVICE GROUNDING

GROUNDING AND BONDING

SHEET 1 OF 1

1700D01



1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

WOOD POLES

METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1

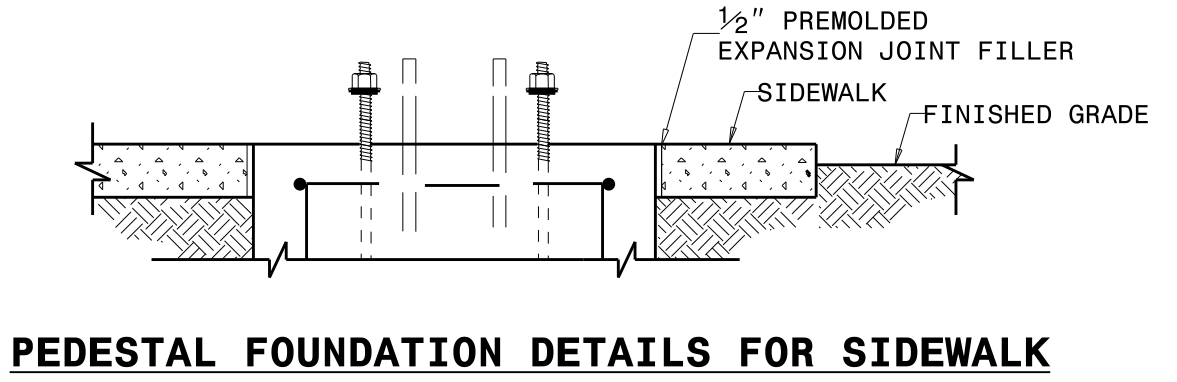
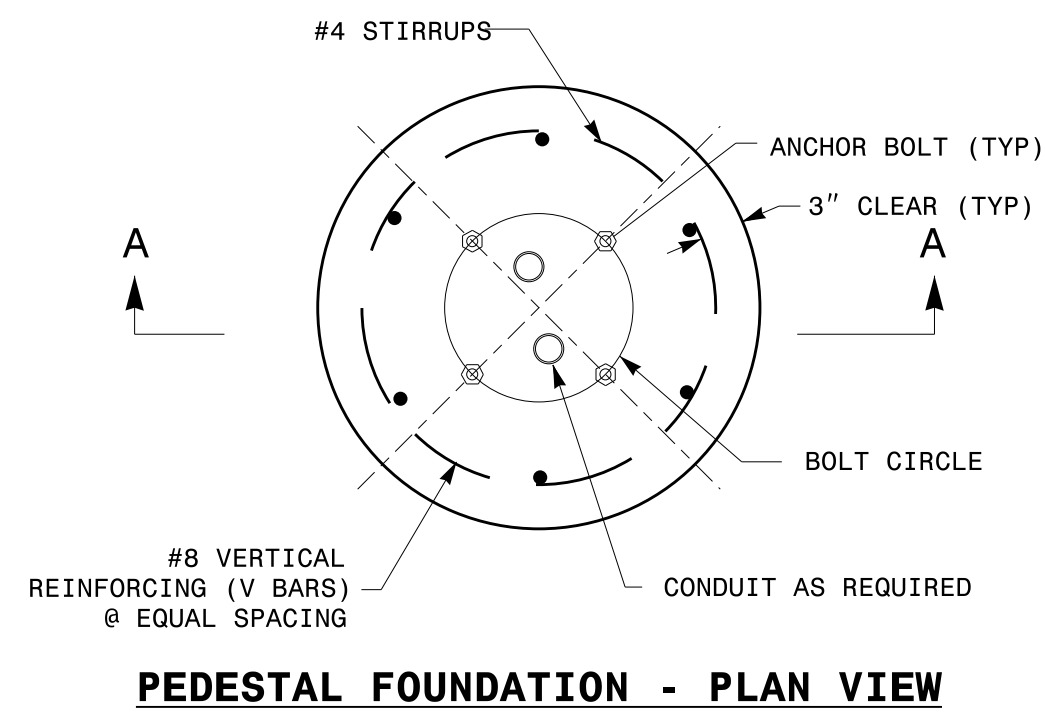
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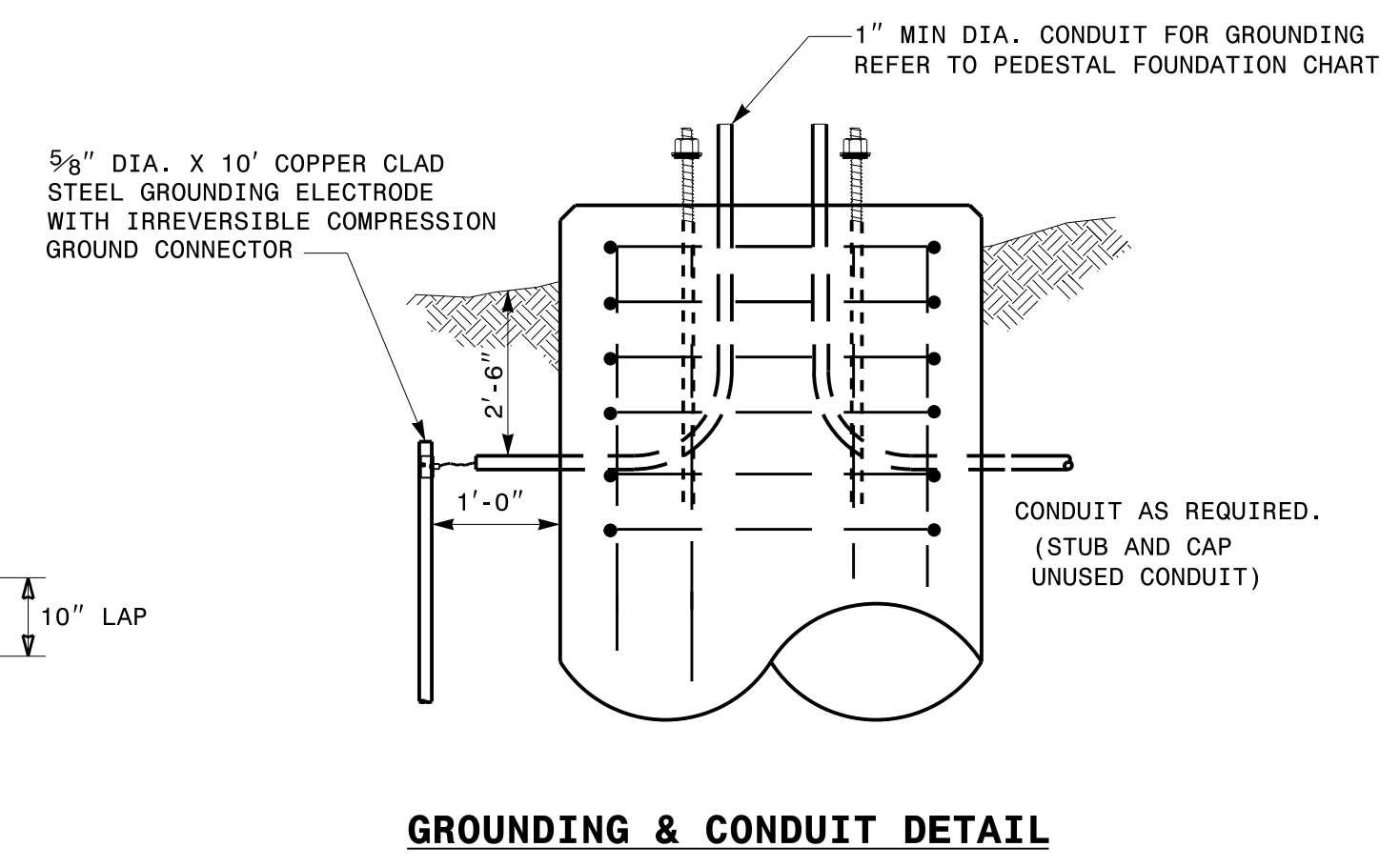
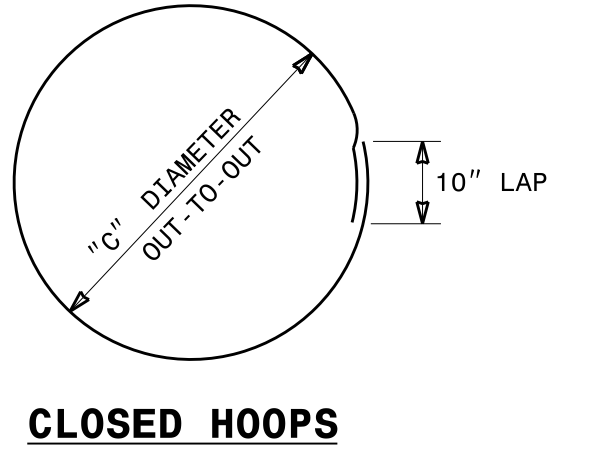
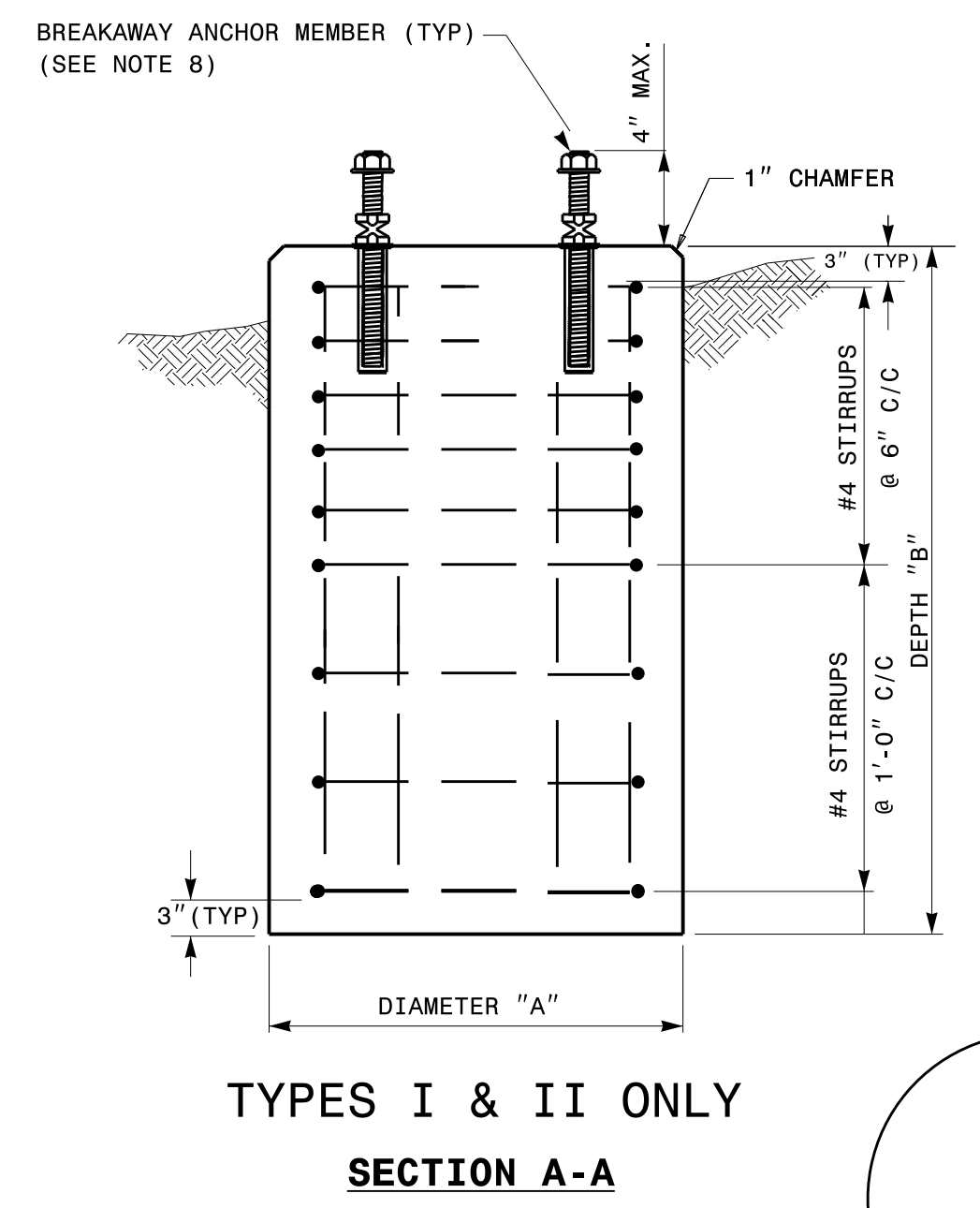
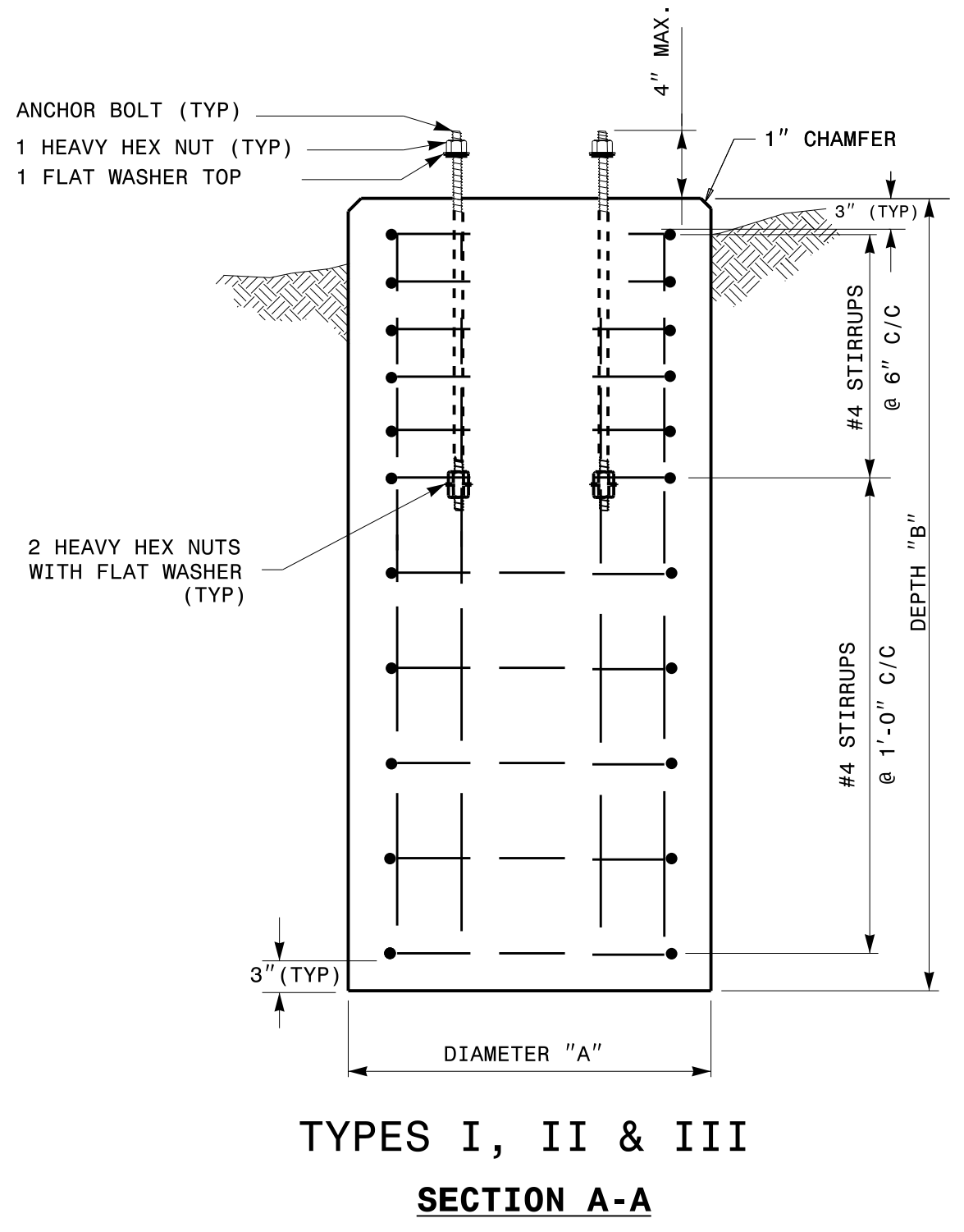
See Plate for Title

<p>Prepared in the Offices of:</p>	<p>SEAL</p>
<p>750 N. Greenfield Parkway Garner, NC 27529</p>	<p>DocuSigned by: <i>Mohd Aslami</i> 10/11/2017 DATE</p>

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- NOTES:**
- CAST FOUNDATION AGAINST UNDISTURBED SOIL WHEREVER CONDITIONS PERMIT. IN UNSTABLE SOIL, CAST-IN-PLACE TUBE FORMS ARE ALLOWED WITH APPROVAL.
 - COMPLY WITH APPLICABLE PROVISIONS OF SECTION 825 FOR CONCRETE CONSTRUCTION.
 - USE CLASS "A" CONCRETE THAT MEETS THE REQUIREMENTS OF SECTION 1000 WITH A COMPRESSION STRENGTH AT 28 DAYS OF $F'c = 3000$ PSI (MIN.).
 - USE ASTM GRADE 60 DEFORMED BARS FOR ALL REINFORCING STEEL.
 - GRADE IS ASSUMED TO BE (8H:1V) OR FLATTER. FOUNDATION SIZE AND DEPTHS ARE BASED ON THE FOLLOWING SOIL DESIGN PARAMETERS:
 - A. SANDY TYPE SOIL
 - B. NO GROUND WATER WITHIN 5'-0" OF SURFACE ELEVATION
 - C. WIND SPEED NOT TO EXCEED 140 MPH
 IF ACTUAL CONDITIONS VARY SUBSTANTIALLY FROM THOSE ASSUMED, THE FOUNDATION DEPTH MAY BE ADJUSTED. IN THIS CASE, CONTACT THE ENGINEER.
 - MAINTAIN AT LEAST 3" COVER ON ALL REINFORCEMENT.
 - ORIENT CONDUIT AS REQUIRED BY THE DESIGN OR AS DICTATED BY FIELD CONDITIONS.
 - USE ADHESIVE ANCHOR FOR THREADED COUPLING INSERT. FOR TYPE I MINIMUM DEPTH NECESSARY IS 0'-4 1/2" AND FOR TYPE II MINIMUM DEPTH NECESSARY IS 0'-6 5/8". FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS.



PEDESTAL FOUNDATION TYPE AND SIZE							
TYPE	PEDESTAL DESCRIPTION	SIZE			ANCHOR BOLT		INSTALL GROUNDING SYSTEM (YES/NO)
		DIAMETER "A" FT	DEPTH "B" FT	CONCRETE VOLUME CY	DIAMETER (MIN.) IN	LENGTH FT-IN	
I	PEDESTRIAN PUSHBUTTON	2'-0"	3'-6"	.41	1/2	1'-6"	NO
II	NORMAL-DUTY	2'-0"	5'-0"	.58	3/4	2'-0"	YES
III	HEAVY-DUTY	2'-6"	7'-0"	1.27	1	4'-0"	YES

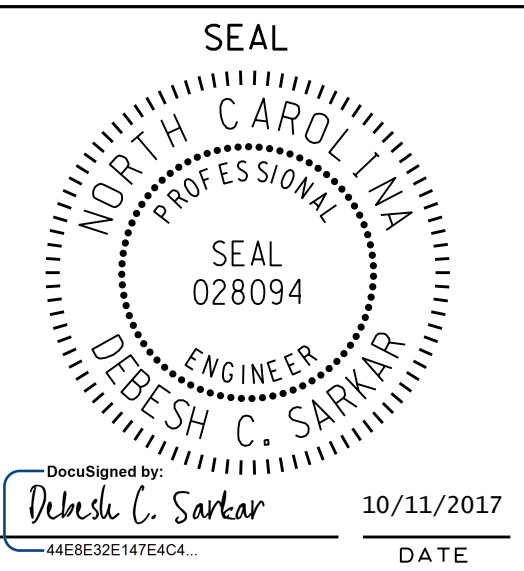
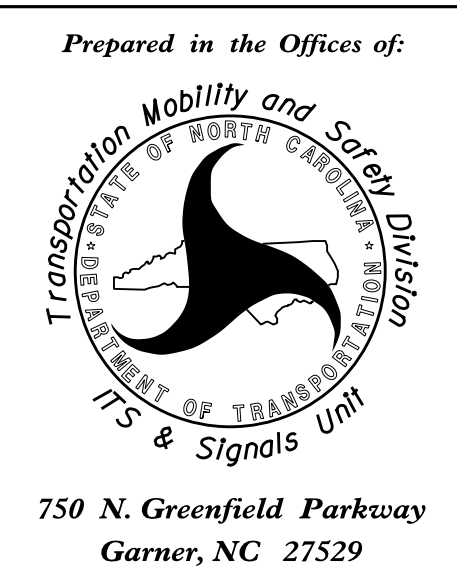
REINFORCING STEEL SCHEDULE												
TYPE	V-BAR				STIRRUP							
	SIZE #	QTY	LENGTH	WEIGHT LBS	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS
					VERTICAL ON 6" CENTERS	ON 12" CENTERS	TOTAL					
I	8	6	3'-0"	56	4	0	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	7'-2"	2'-0"	0'-10"	53	175

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
PEDESTALS
FOUNDATIONS

SHEET 1 OF 1
1743D01

See Plate for Title



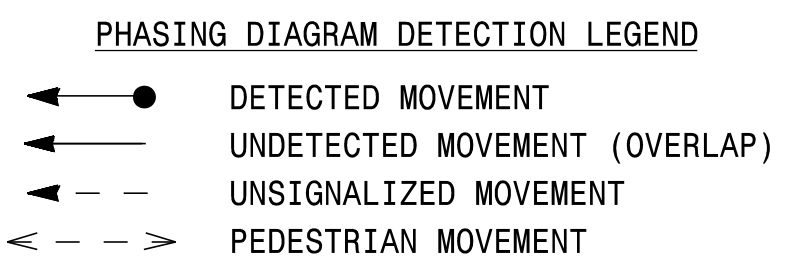
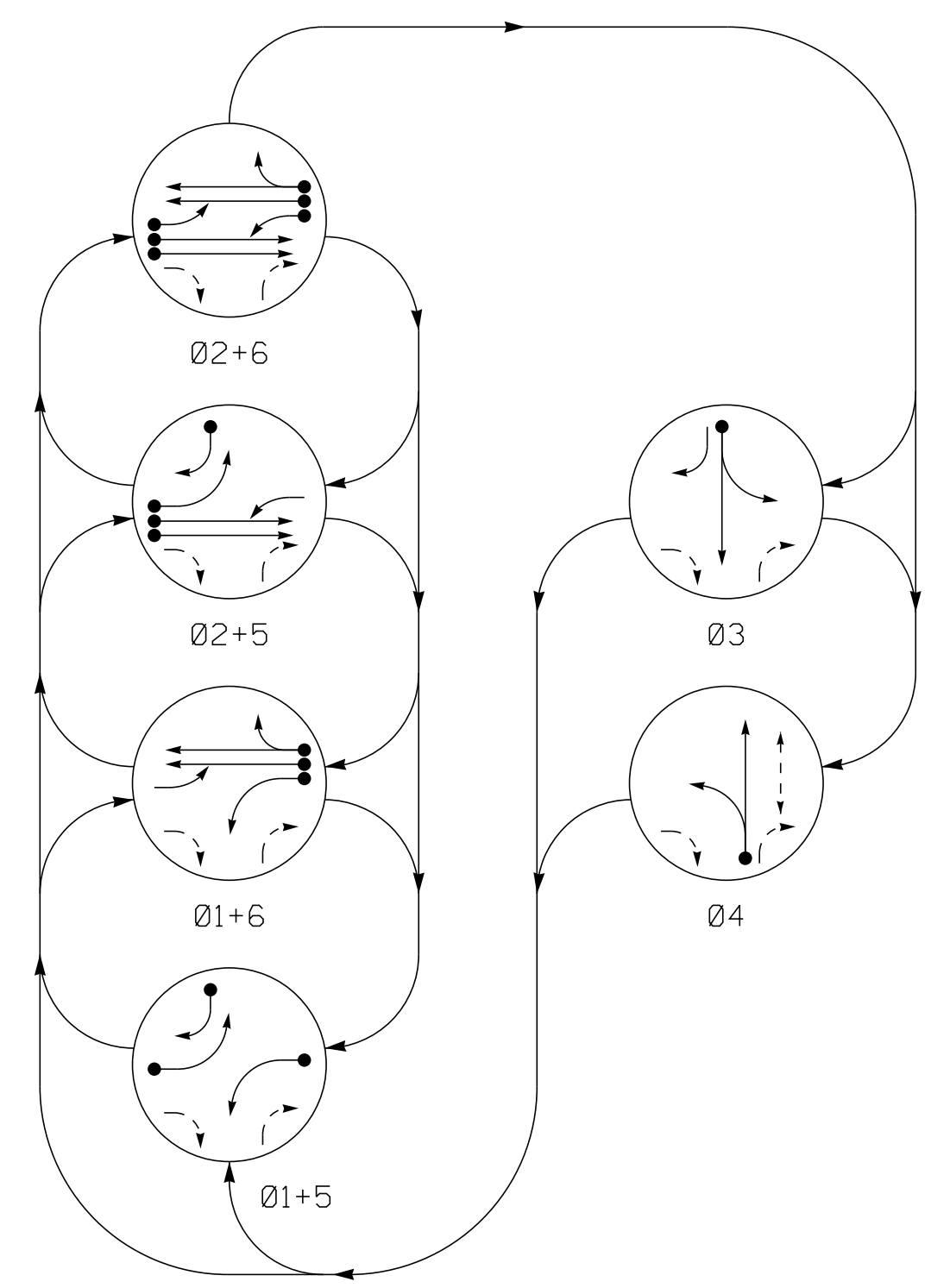
DOCUMENT NOT CONSIDERED
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750 N. Greenfield Parkway
Garner, NC 27529

10/11/2017
DATE

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PHASING DIAGRAM



SIGNAL FACE I.D.

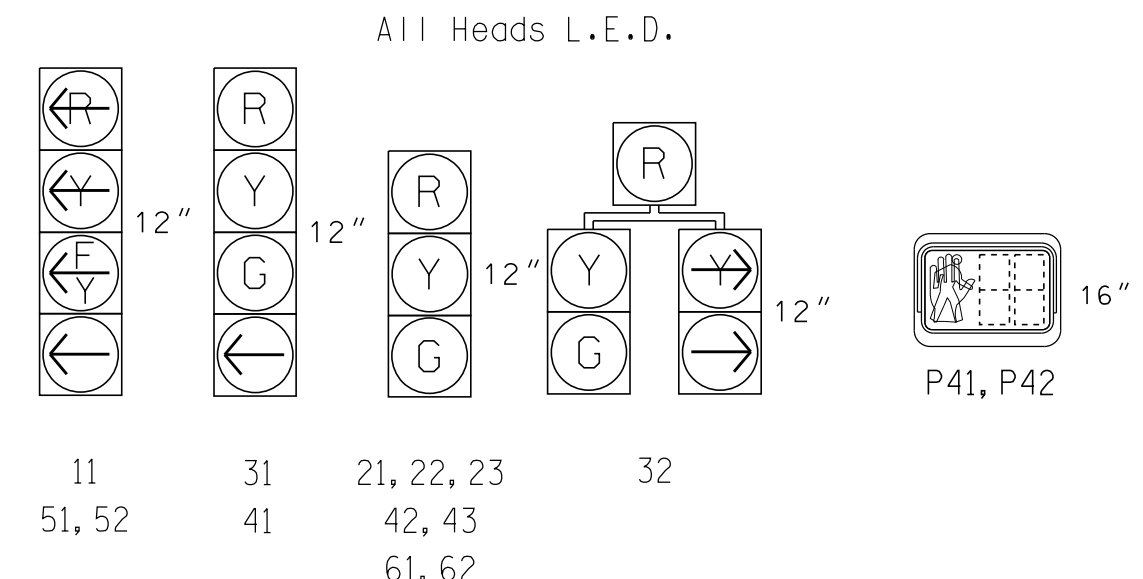


TABLE OF OPERATION

SIGNAL FACE	PHASE						L	R	Y	F
	01+5	01+6	02+5	02+6	03	04				
11	←	←	←	←	←	←	←	←	←	←
21, 22, 23	R	R	G	G	R	R	R	Y		
31	R	R	R	R	G	R	R			
32	R	R	R	R	G	R	R			
41	R	R	R	R	R	G	R			
42, 43	R	R	R	R	R	G	R			
51, 52	←	←	←	←	←	←	←	←	←	←
61, 62	R	G	R	G	R	R	Y			
P41, P42	DW	DW	DW	DW	DW	W	DRK			

MAXTIME DETECTOR INSTALLATION CHART

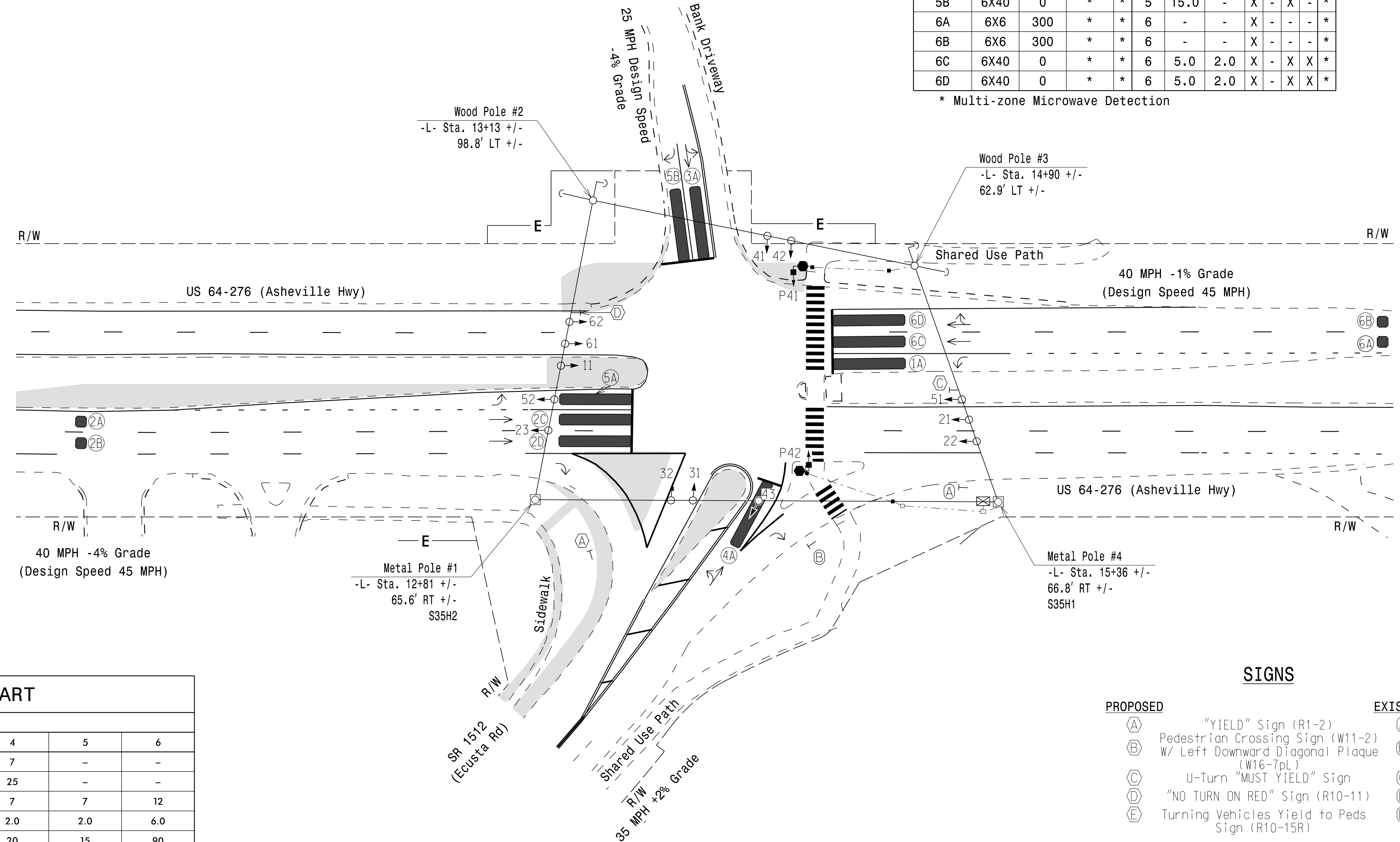
DETECTOR		PROGRAMMING									
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	*	*	1	15.0	-	X	X	X	*
2A	6X6	300	*	*	2	-	-	X	-	-	*
2B	6X6	300	*	*	2	-	-	X	-	-	*
2C	6X40	0	*	*	2	5.0	2.0	X	X	X	*
2D	6X40	0	*	*	2	5.0	2.0	X	X	X	*
3A	6X40	0	*	*	3	3.0	-	X	X	-	*
4A	6X40	0	*	*	4	-	-	X	X	-	*
5A	6X40	0	*	*	5	15.0	-	X	X	-	*
5B	6X40	0	*	*	2	3.0	-	X	X	-	*
6A	6X6	300	*	*	6	-	-	X	-	-	*
6B	6X6	300	*	*	6	-	-	X	-	-	*
6C	6X40	0	*	*	6	5.0	2.0	X	X	X	*
6D	6X40	0	*	*	6	5.0	2.0	X	X	X	*

* Multi-zone Microwave Detection

6 Phase Fully Actuated (Time Based Coordination)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Portions of high-visibility crosswalk and Detection Zone 4A not shown for clarity.
- See pavement marking plans for proposed stop bar locations.
- Install NCDOT-supplied cell modem. Request cell modem from Division Traffic Engineer eight weeks prior to deployment.

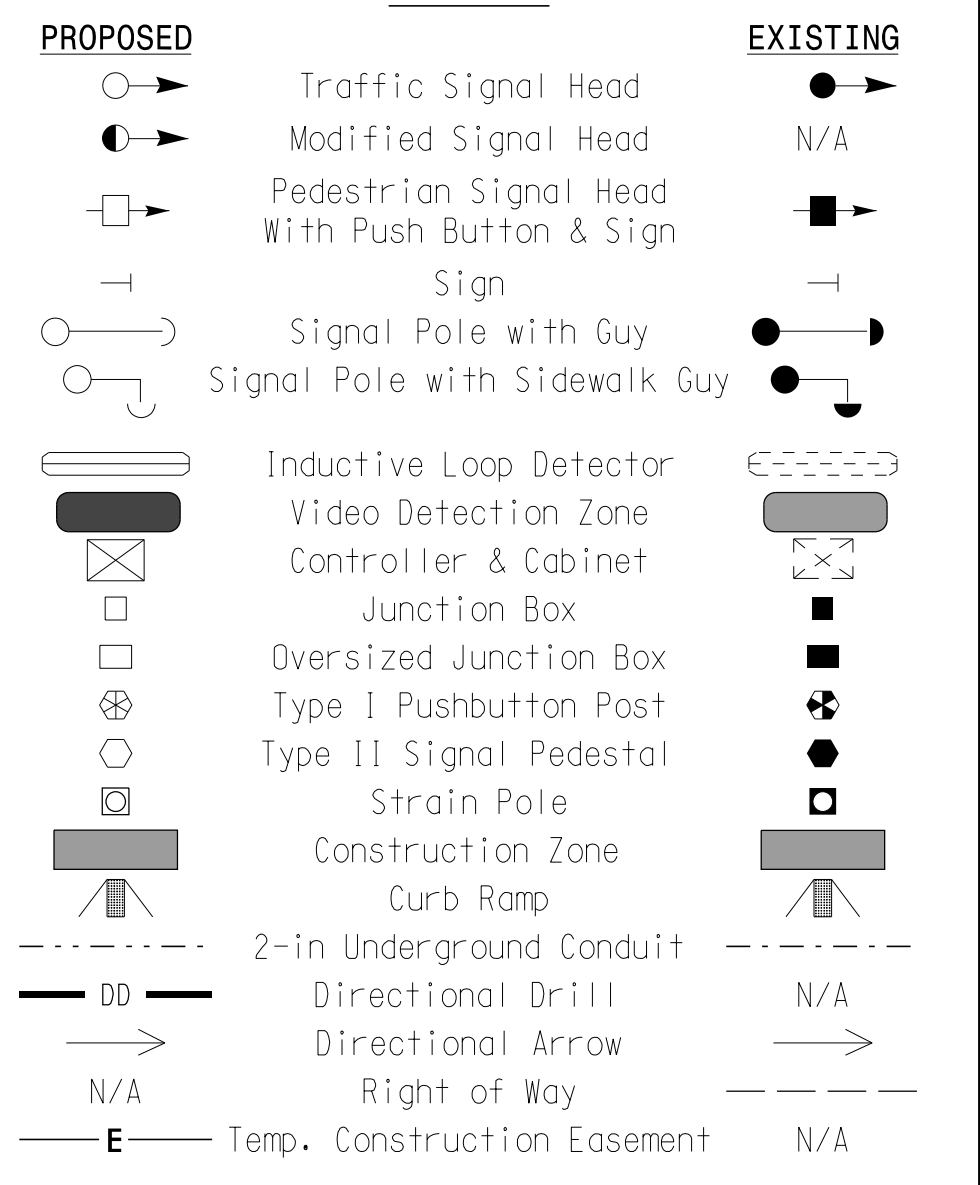


MAXTIME TIMING CHART

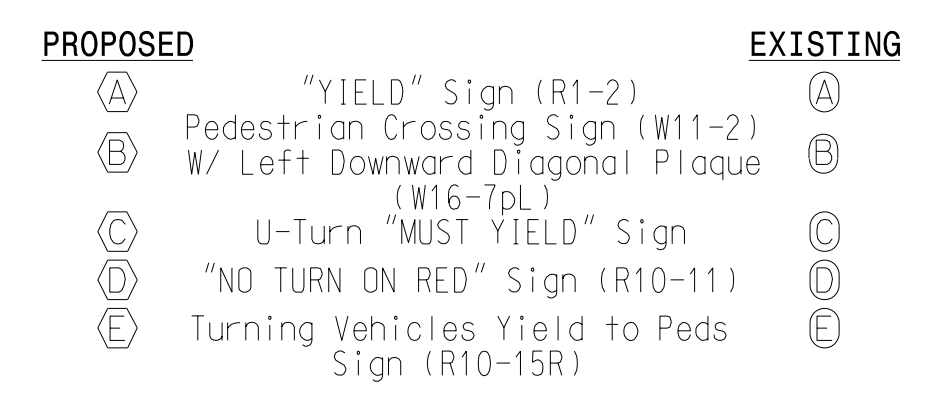
FEATURE	PHASE					
	1	2	3	4	5	6
Walk *	-	-	-	7	-	-
Ped Clear *	-	-	-	25	-	-
Min Green	7	12	7	7	7	12
Passage *	2.0	6.0	2.0	2.0	2.0	6.0
Max I *	25	90	15	20	15	90
Yellow Change	3.0	4.5	3.4	3.7	3.0	4.5
Red Clear	3.1	1.9	3.0	2.5	2.8	1.9
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-
Vehicle Recall	-	MIN. RECALL	-	-	-	MIN. RECALL
Dual Entry	-	-	-	-	-	-

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

LEGEND



SIGNS



Temporary Signal 1 - TCP Phase II Step 1

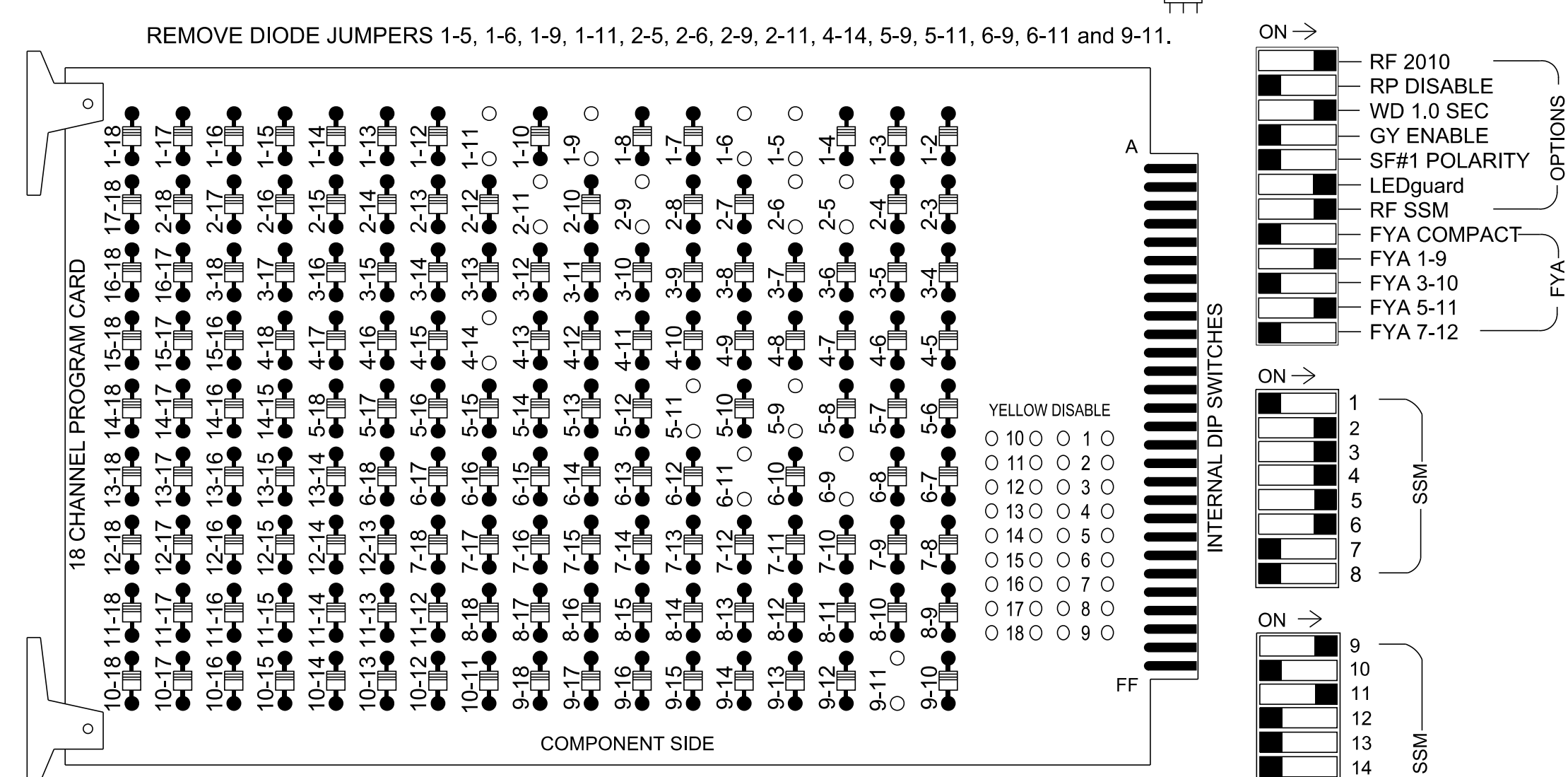
RS&H
NC FIRM LICENSE No: F-0493
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
(704) 752-0610

Prepared For the Offices of:	US 64-276 (Asheville Highway)		<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p> <p>SEAL</p> <p></p> <p>SEAL 029531</p> <p>DATE 4/28/2023</p>						
at	SR 1512 (Ecusta Road) / Bank Driveway								
Division 14 Transylvania County	Brevard								
PLAN DATE: April 2023	REVIEWED BY: S.G. Haynie		<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISIONS	INIT.	DATE			
REVISIONS	INIT.	DATE							
PREPARED BY: P. Koloski	REVIEWED BY: S.G. Haynie								
<p>1" = 40'</p>									

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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all 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 a Temporary Time Based Coordination System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

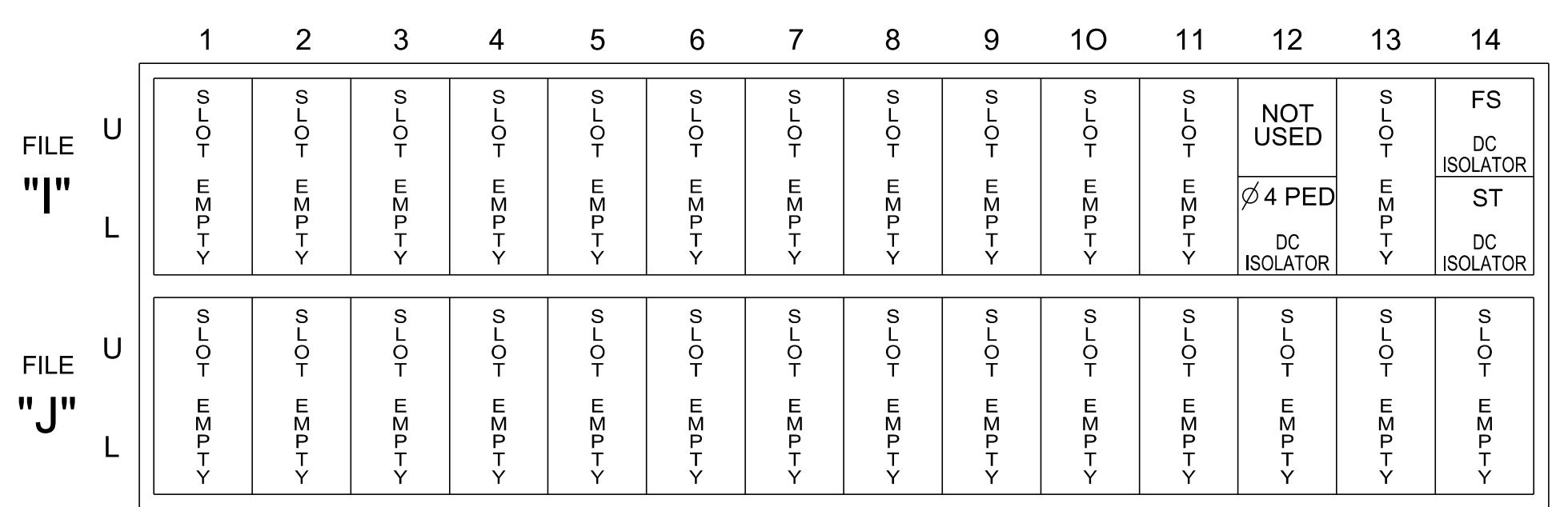
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11	21, 22, 23	NU	31	32	41, 42, 43	P41, P42	51, 52	32	61, 62	NU	NU	NU	11	NU	NU	51, 52	NU
RED		128		116	116	101	101	*		134								
YELLOW	*	129		117	117	102	102			135								
GREEN		130		118	118	103	103			136								
RED ARROW														A121				A114
YELLOW ARROW										132				A122				A115
FLASHING YELLOW ARROW														A123				A116
GREEN ARROW	127			118		103			133	133								
Hand icon									104									
Person icon									106									

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

INPUT FILE POSITION LAYOUT

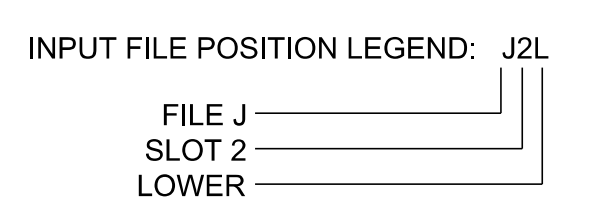
(front view)



EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

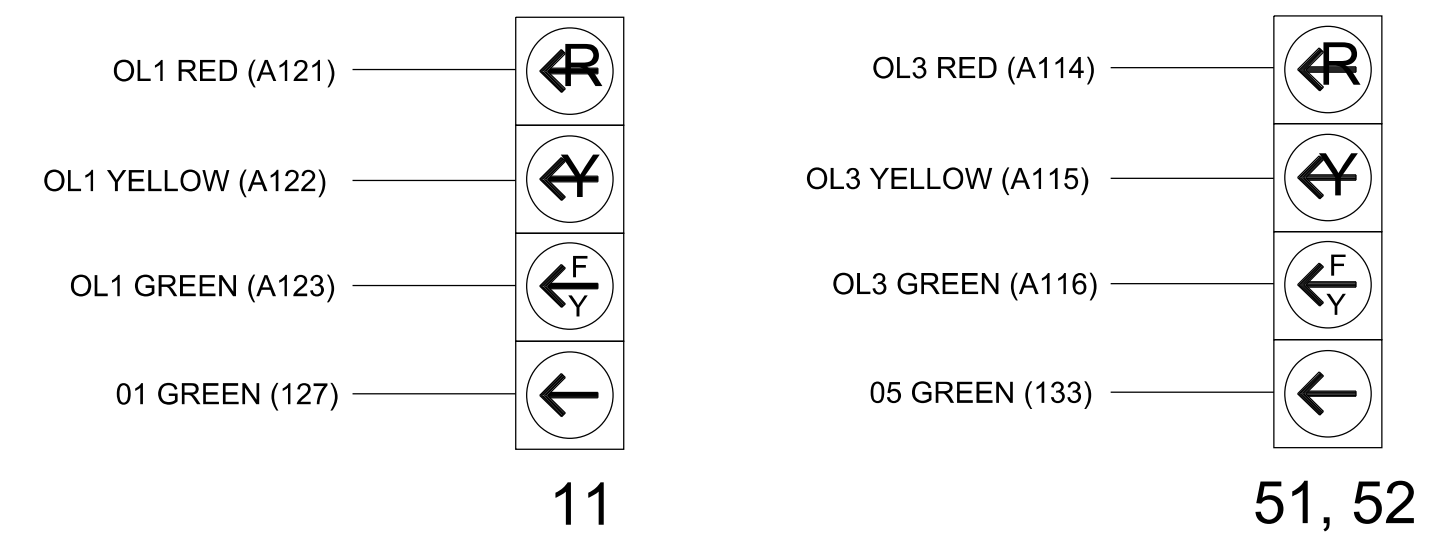
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						



NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOT I12.

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



SPECIAL DETECTOR NOTE

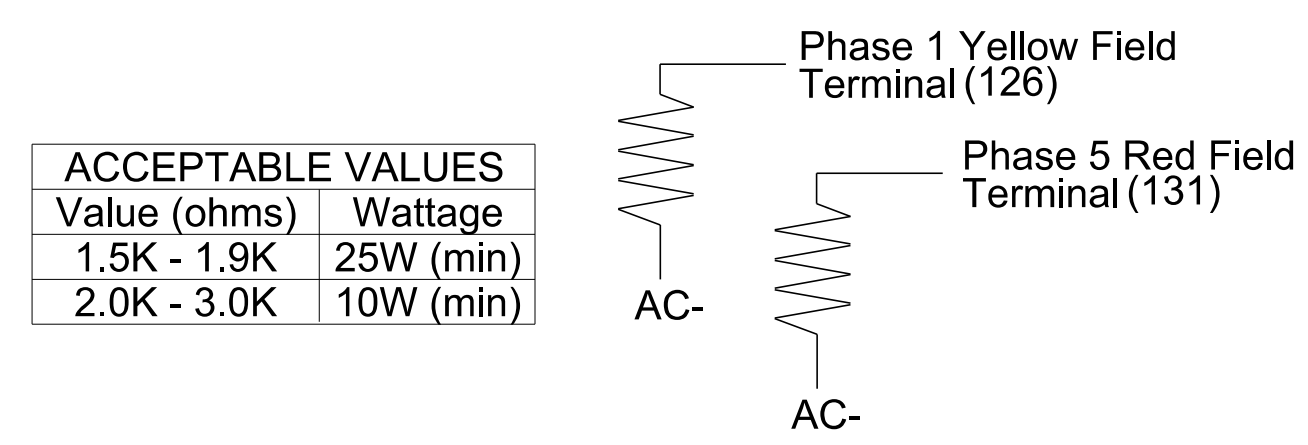
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0798T1
 DESIGNED: April 2023
 SEALED: April 28, 2023
 REVISED: _____

Temporary Signal 1 - TCP Phase II Step I
 Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: Prepared for the Offices of: NC FIRM LICENSE No: F-0493 1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 (704) 752-0610	US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL Steven G. Haynie 4/28/2023
	Division 14 PLAN DATE: April 2023 PREPARED BY: S.G. Haynie	Transylvania County Brevard REVIEWED BY: V. Kaiser REVIEWED BY: _____	

4/28/2023 4:18:34 PM ***rsandh.com***: \\rsandh.com\fileserver\101\ton\p4\03004902_L_R-5799_US_64-276_Intersec\Ton_Das\gn*Das\gn*Traff\c4\Sig\gn\18 Channel IP Conflict Monitor_Sig.psd, 2-1-140798T1.dwg

OVERLAP PROGRAMMING

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

Web Interface
 Home >Controller >Overlap Configuration >Overlaps



Overlap Plan 1

Overlap	1	3
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

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 14-0798T1
 DESIGNED: April 2023
 SEALED: April 28, 2023
 REVISED: _____

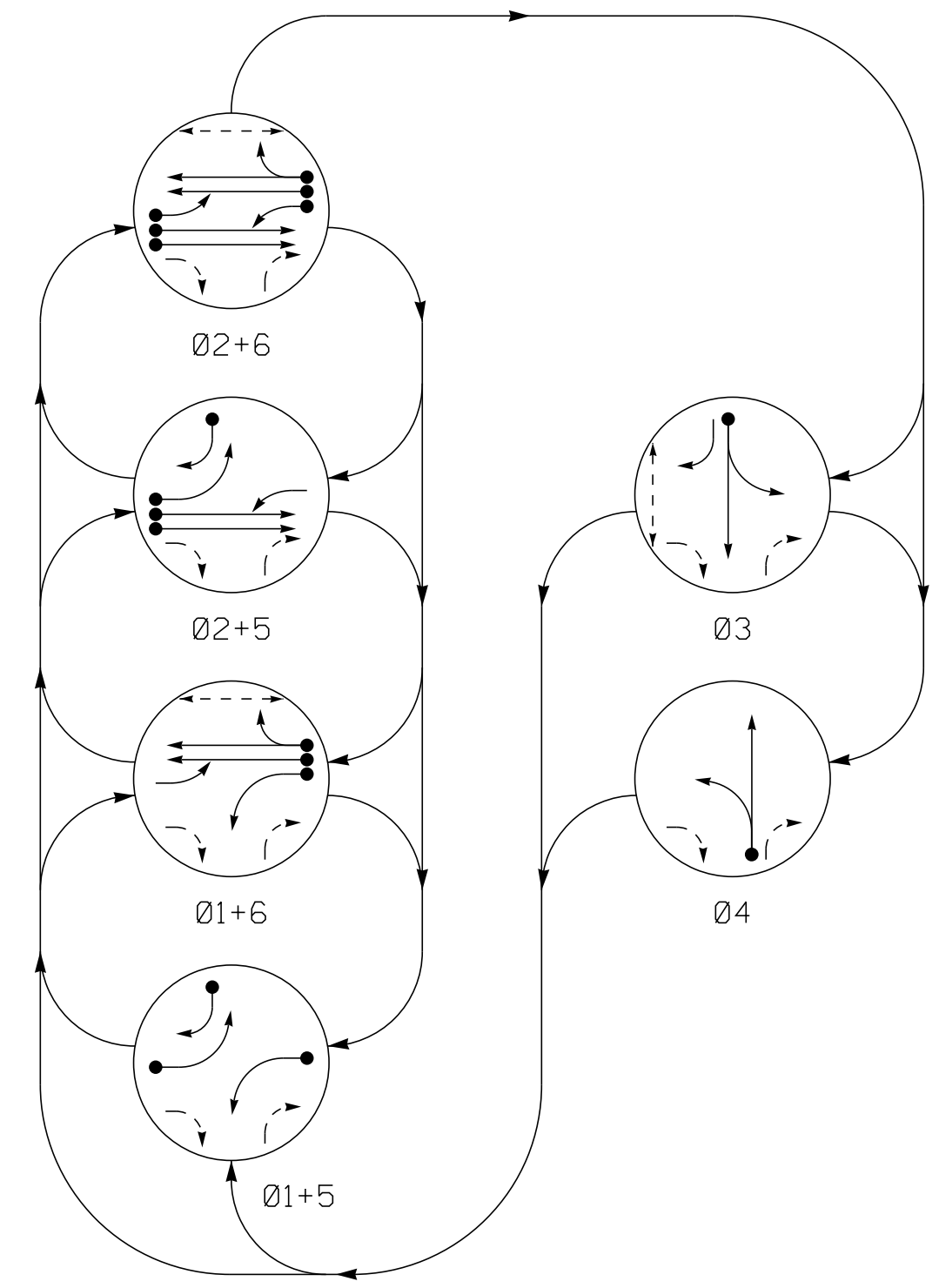
Temporary Signal 1 - TCP Phase II Step I
 Electrical Detail - Sheet 2 of 2

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

Electrical and Programming Details For:	US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway	SEAL 
Prepared for the Offices of: 	Division 14 Transylvania County Brevard PLAN DATE: April 2023 REVIEWED BY: V. Kaiser PREPARED BY: S.G. Haynie REVIEWED BY:	DocuSigned by: Steven G. Haynie 4/28/2023 0633DC9A8D4486 DATE
NC FIRM LICENSE No: F-0493 1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 (704) 752-0610	750 N. Greenfield Pkwy, Garner, NC 27529	REVISIONS INIT. DATE _____ _____ _____
SIG. INVENTORY NO. 14-0798T1		

4/28/2023 4:18:57 PM \\rsandh.com\mf:\ee\Transportation\PH\030049021_R-5799_US_64-276_Intersection_Details\gn\Das\gn\Traffic\cs\gn\Signal\gn\Plan_Sheets\w5799_s\g_psh_2-2_140798T1_e\lec.dgn

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

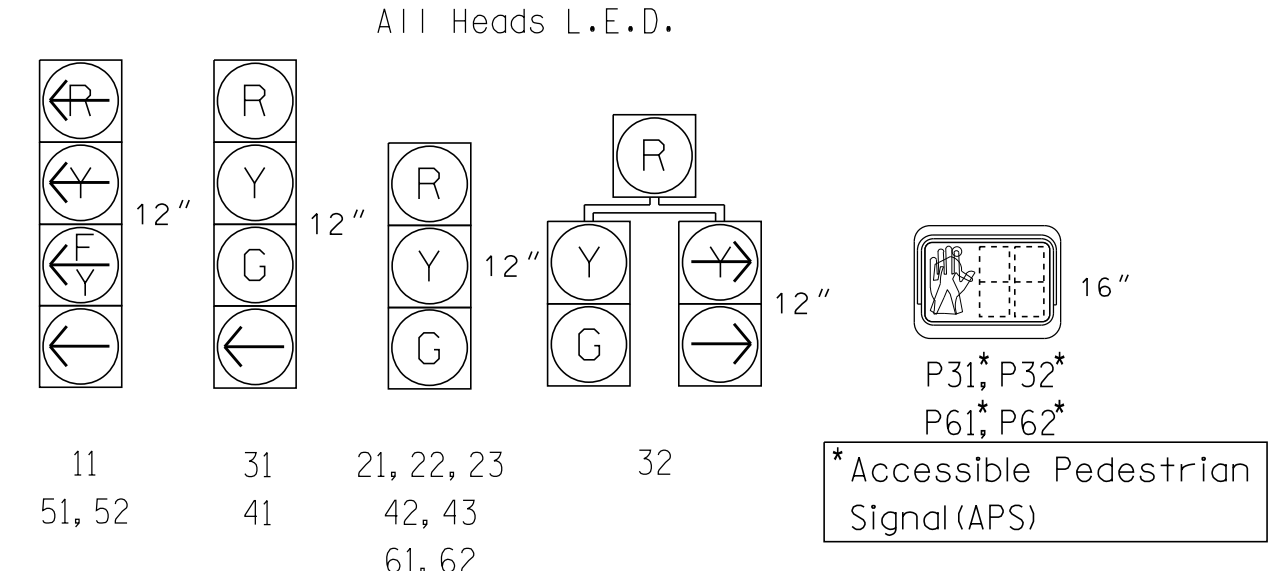


TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	←	→	←	→	←	→
21, 22, 23	R	R	G	G	R	Y
31	R	R	R	R	G	R
32	R	R	R	R	G	R
41	R	R	R	R	G	R
42, 43	R	R	R	R	G	R
51, 52	←	→	←	→	←	→
61, 62	R	G	R	G	R	Y
P31, P32	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK

MAXTIME DETECTOR INSTALLATION CHART

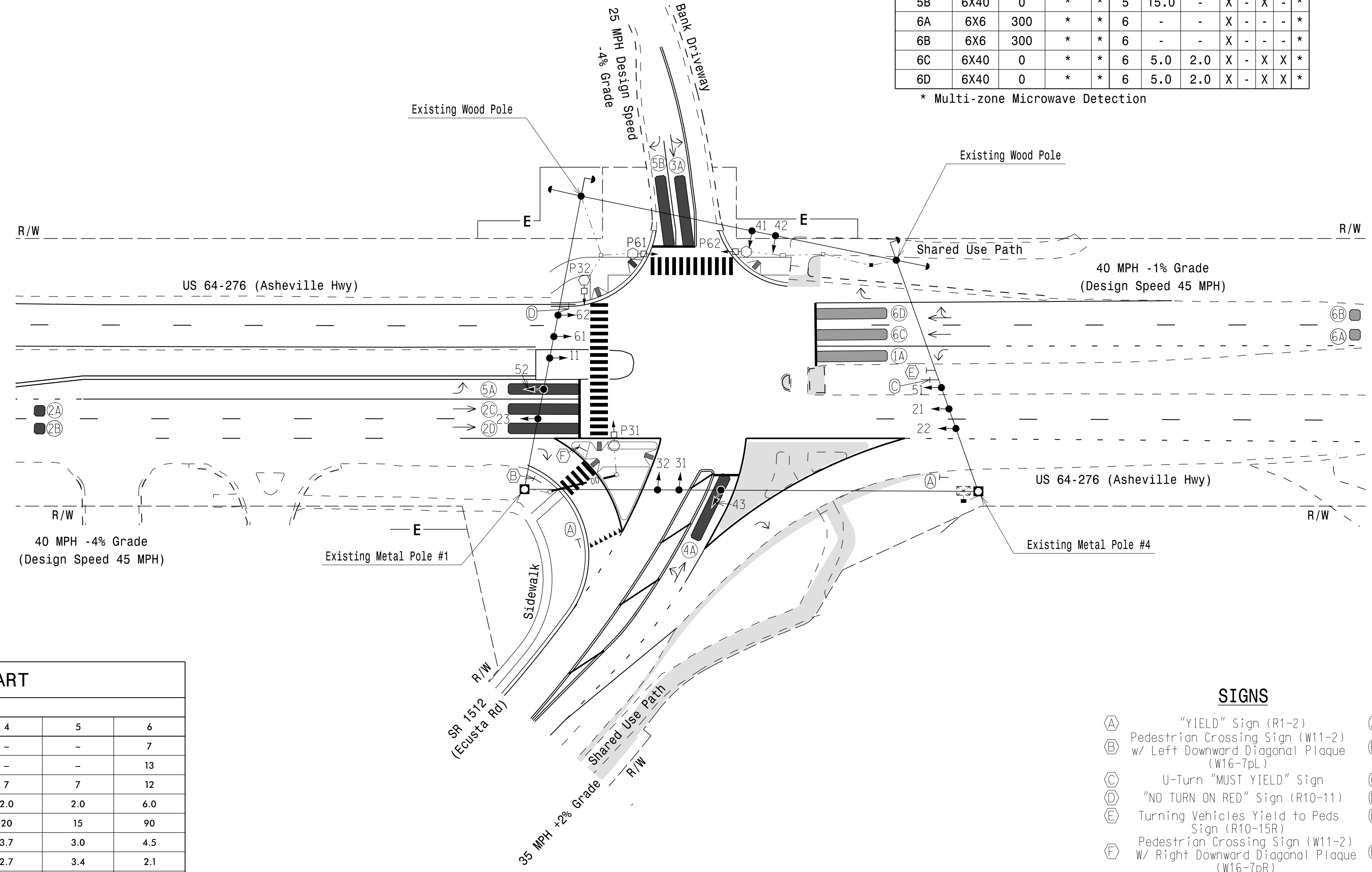
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	
1A	6X40	0	*	*	1	15.0	-	X	-	X	-	*
2A	6X6	300	*	*	2	-	-	X	-	-	-	*
2B	6X6	300	*	*	2	-	-	X	-	-	-	*
2C	6X40	0	*	*	2	5.0	2.0	X	-	X	X	*
2D	6X40	0	*	*	2	5.0	2.0	X	-	X	X	*
3A	6X40	0	*	*	3	3.0	-	X	-	X	-	*
4A	6X40	0	*	*	4	-	-	X	-	X	-	*
5A	6X40	0	*	*	5	15.0	-	X	-	X	-	*
5B	6X40	0	*	*	2	3.0	-	X	-	X	X	*
6A	6X6	300	*	*	6	-	-	X	-	-	-	*
6B	6X6	300	*	*	6	-	-	X	-	-	-	*
6C	6X40	0	*	*	6	5.0	2.0	X	-	X	X	*
6D	6X40	0	*	*	6	5.0	2.0	X	-	X	X	*

* Multi-zone Microwave Detection

6 Phase Fully Actuated (Time Based Coordination)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Reposition existing signal heads # 21, 22, 23, 41, 42, 43, 51, and 52.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Portions of detector zones 4A and 5A not shown for clarity.
- See pavement marking plans for proposed stop bar locations.
- Pedestrian push buttons P31, P32, P61 and P62 shall be Vibro-Tactile.
- All APS shall use "Rapid Tick" sound.



LEGEND

PROPOSED	EXISTING
○	●
○	N/A
□	■
+	+
○	●
○	●
▬	▬
⊠	⊠
□	■
⊗	⊗
○	●
⊠	⊠
▬	▬
▬	N/A
→	→
N/A	N/A
—E—	N/A

SIGNS

- (A) "YIELD" Sign (R1-2)
- (B) Pedestrian Crossing Sign (W11-2) w/ Left Downward Diagonal Plaque (W16-TpL)
- (C) U-Turn "MUST YIELD" Sign
- (D) "NO TURN ON RED" Sign (R10-11)
- (E) Turning Vehicles Yield to Peds Sign (R10-15R)
- (F) Pedestrian Crossing Sign (W11-2) w/ Right Downward Diagonal Plaque (W16-TpR)

MAXTIME TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Walk *	-	-	7	-	-	7
Ped Clear *	-	-	20	-	-	13
Min Green	7	12	7	7	7	12
Passage *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	25	90	15	20	15	90
Yellow Change	3.0	4.5	3.4	3.7	3.0	4.5
Red Clear	2.8	2.1	3.0	2.7	3.4	2.1
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-
Vehicle Recall	-	MIN. RECALL	-	-	-	MIN. RECALL
Dual Entry	-	-	-	-	-	-

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P31	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Asheville.
P32	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Asheville.
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Driveway.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Driveway.

Temporary Signal 2 - TCP Phase II Step 2

US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway

Division 14 Transylvania County Brevard

Prepared by: P. Koloski Reviewed by: S.G. Haynie

DATE: May 2023

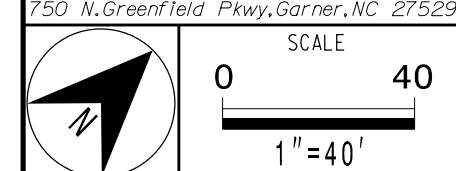
REVISIONS: INITI. DATE

SEAL: Steven G. Haynie 5/4/2023

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 10:57:05 AM

RS&H
 NC FIRM LICENSE No: F-0493
 1520 SOUTH BOULEVARD, SUITE 200
 CHARLOTTE, NC 28203
 (704) 752-0610



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEVEN G. HAYNIE

DocuSign ID: 8C90EBC1-5FD4-4085-9731-8E59F8511462

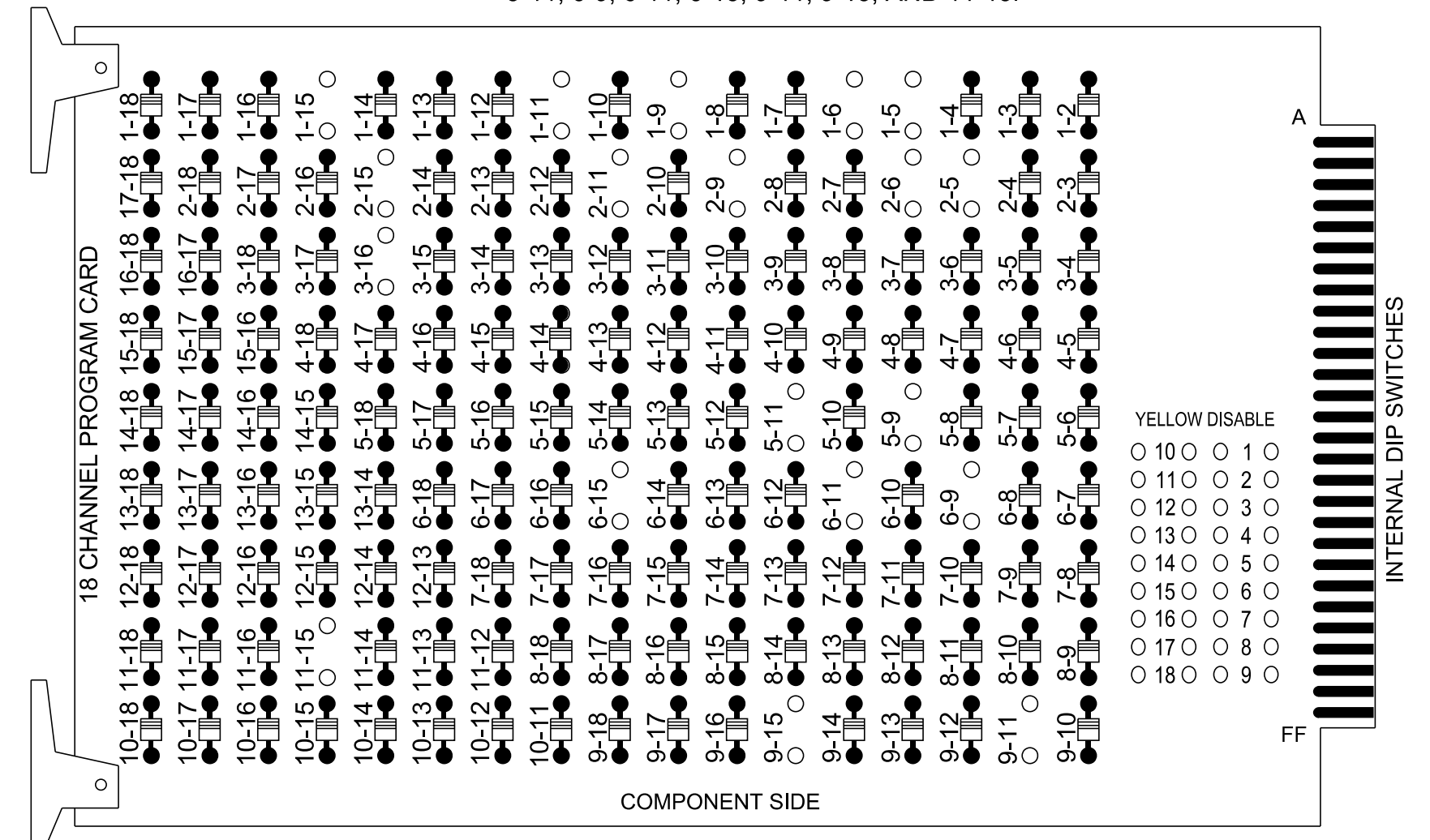
DATE: 5/4/2023

Signature Inventory No. 14-079872

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-15, 3-16, 5-9, 5-11, 6-9, 6-11, 6-15, 9-11, 9-15, AND 11-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- 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.
- Program controller to start up in phase 2 Green No Walk and 6 Green Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of a Temporary Time Based Coordination System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

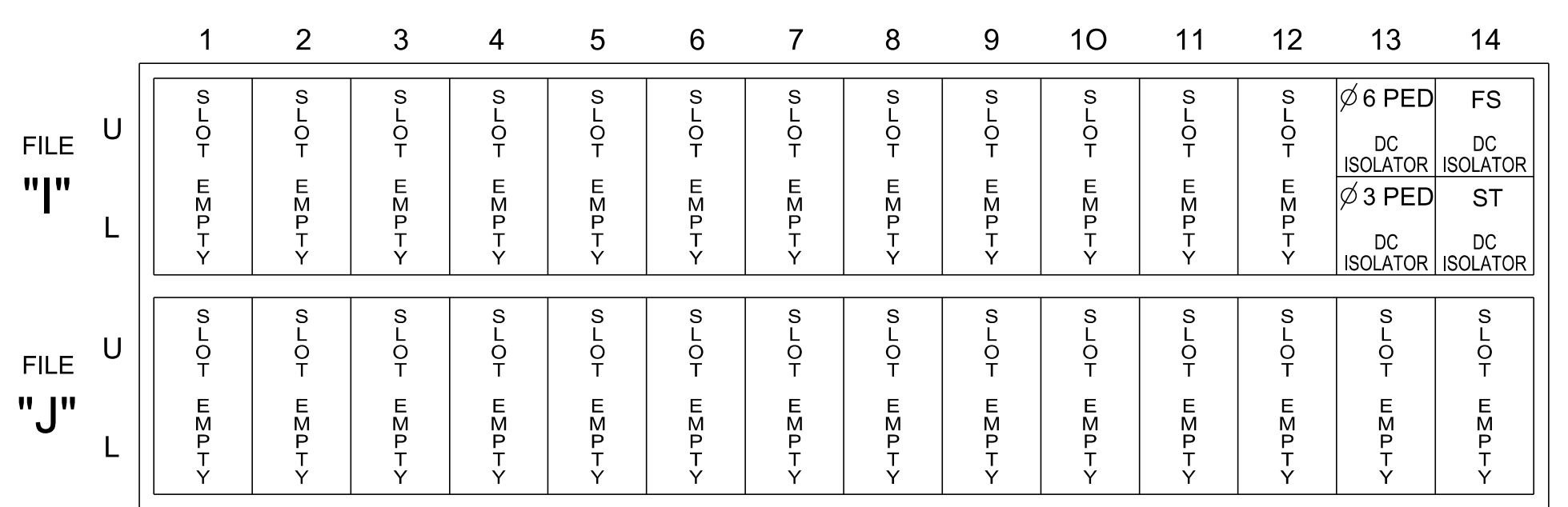
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	3 PED	OL1	OL2	SPARE	OL3	OL4	SPARE	
SIGNAL HEAD NO.	11	21, 22, 23	NU	31	32	41	42, 43	NU	51, 52	32	61, 62	P61, P62	NU	NU	P31, P32	11	NU	51, 52	NU
RED		128		116	116	101	101		*		134								
YELLOW	*	129		117	117	102	102				135								
GREEN		130		118	118	103	103				136								
RED ARROW																A121		A114	
YELLOW ARROW											132					A122		A115	
FLASHING YELLOW ARROW																A123		A116	
GREEN ARROW	127			118	103			133	133										
Hand icon																119		110	
Person icon																121		112	

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

INPUT FILE POSITION LAYOUT

(front view)

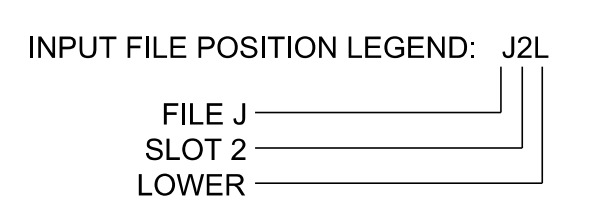


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

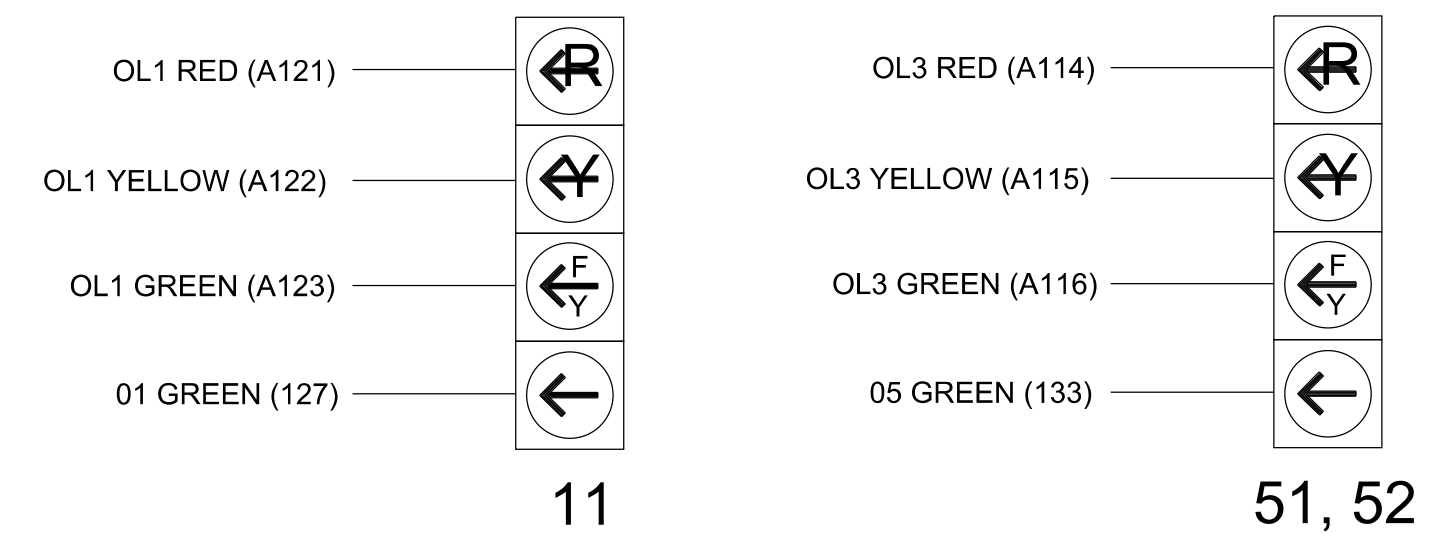
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
PED PUSH BUTTONS												
P31,P32	TB8-8,9	I13L	70	36	8	PED 3						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOT I13.



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



SPECIAL DETECTOR NOTE

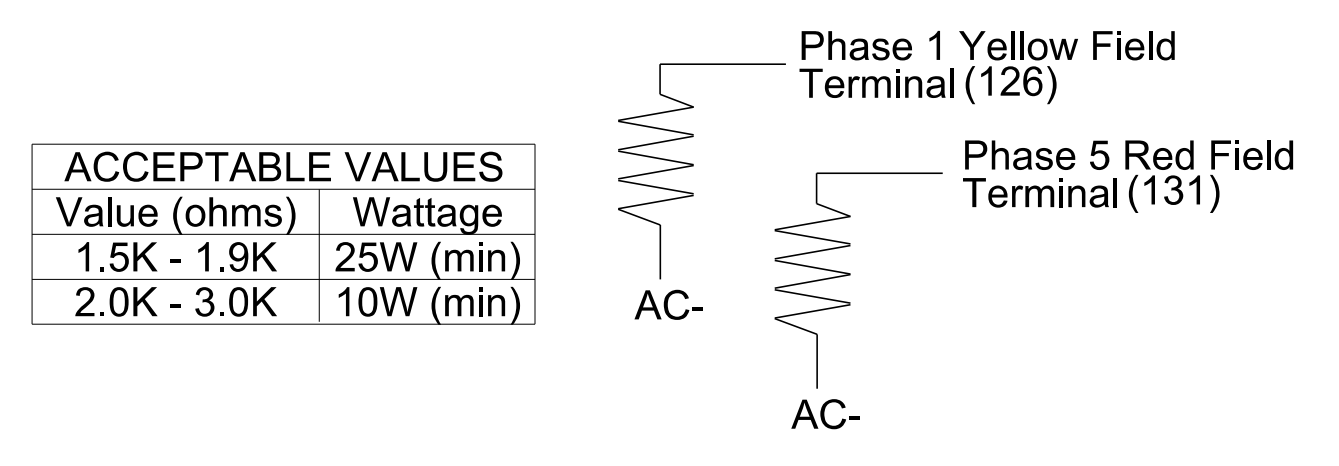
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0798T2
 DESIGNED: May 2023
 SEALED: May 4, 2023
 REVISED: _____

Temporary Signal 2 - TCP Phase II Step 2
 Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway

Prepared for the Offices of:

Division 14, Transylvania County, Brevard

PLAN DATE: May 2023 REVIEWED BY: V. Kaiser

PREPARED BY: S.G. Haynie REVIEWED BY:

REVISIONS: _____ INT. DATE: _____

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL:

DocuSigned by: Steven G. Haynie 5/4/2023

SIG. INVENTORY NO. 14-0798T2

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Overlap	1	3
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

NOTICE PHASE 3 PED
ASSIGNED TO
DETECTOR 8 PED →

PED 3 PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Detector Configuration >Pedestrian Detector

Plan 1

Detector	Description	Call Phase	Call Overlap
2		2	0
4		4	0
6		6	0
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	X	3
4	Phase Vehicle	4		X		4
5	Phase Vehicle	5		X		5
6	Phase Vehicle	6	X		X	6
7	Phase Vehicle	7		X		7
8	Phase Vehicle	8		X	X	8
9	Overlap	1	X		X	9
10	Overlap	2		X	X	10
11	Overlap	3	X			11
12	Overlap	4		X		12
13	Phase Ped	2				13
14	Phase Ped	4				14
15	Phase Ped	6				15
16	Phase Ped	3				16
17	Overlap	5		X	X	17
18	Overlap	6		X		18


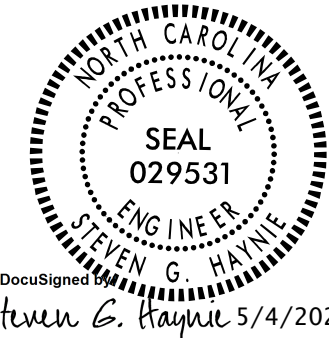
NOTICE PHASE 3 PED
ASSIGNED TO CHANNEL 16 →

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

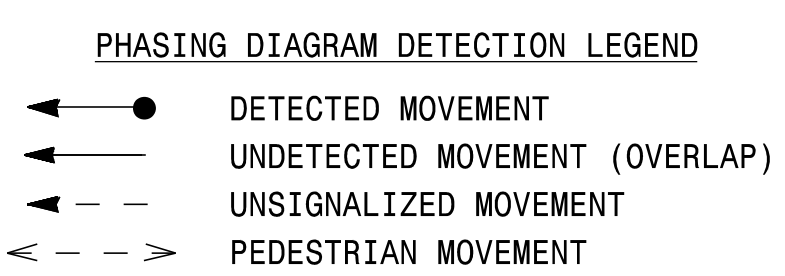
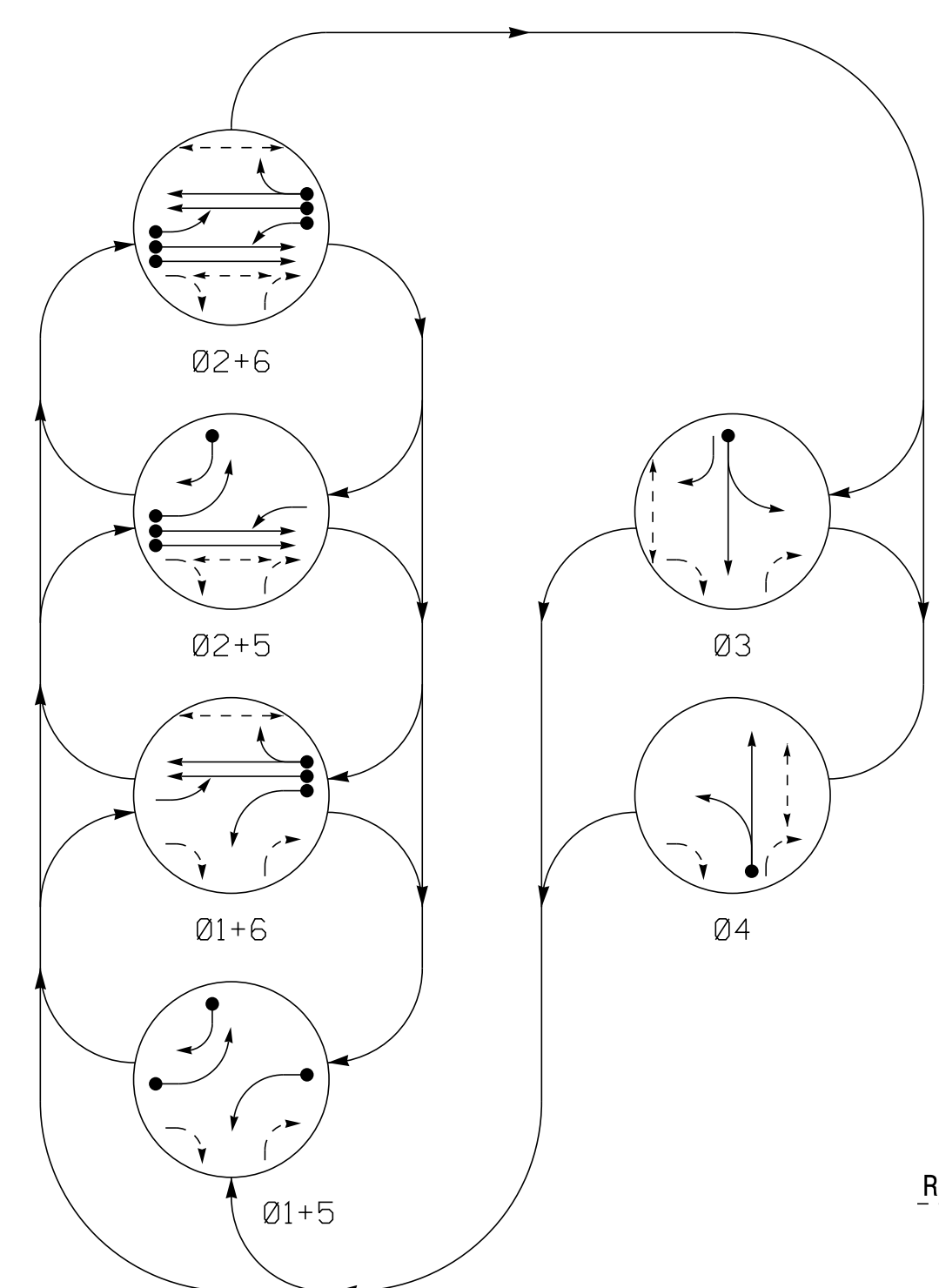
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-0798T2
DESIGNED: May 2023
SEALED: May 4, 2023
REVISED: _____

Temporary Signal 2 - TCP Phase II, Step 2
Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:	US 64-276 (Asheville Highway)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	at SR 1512 (Ecusta Road) / Bank Driveway		
Prepared for the Offices of: 	Division 14 PLAN DATE: May 2023 PREPARED BY: S.G. Haynie	Transylvania County REVIEWED BY: V. Kaiser REVIEWED BY:	SEAL  Steven G. Haynie 5/4/2023
750 N. Greenfield Pkwy, Garner, NC 27529	REVISIONS INIT. DATE	DATE	DATE SIG. INVENTORY NO. 14-0798T2



PHASING DIAGRAM



SIGNAL FACE I.D.

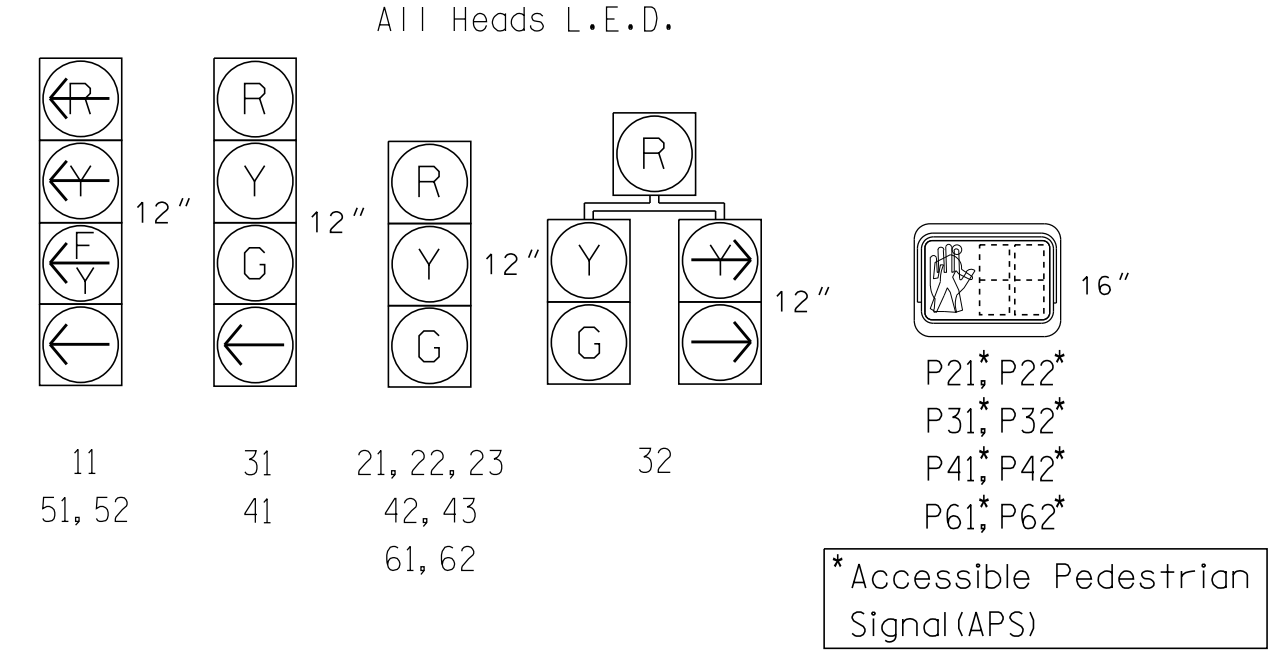


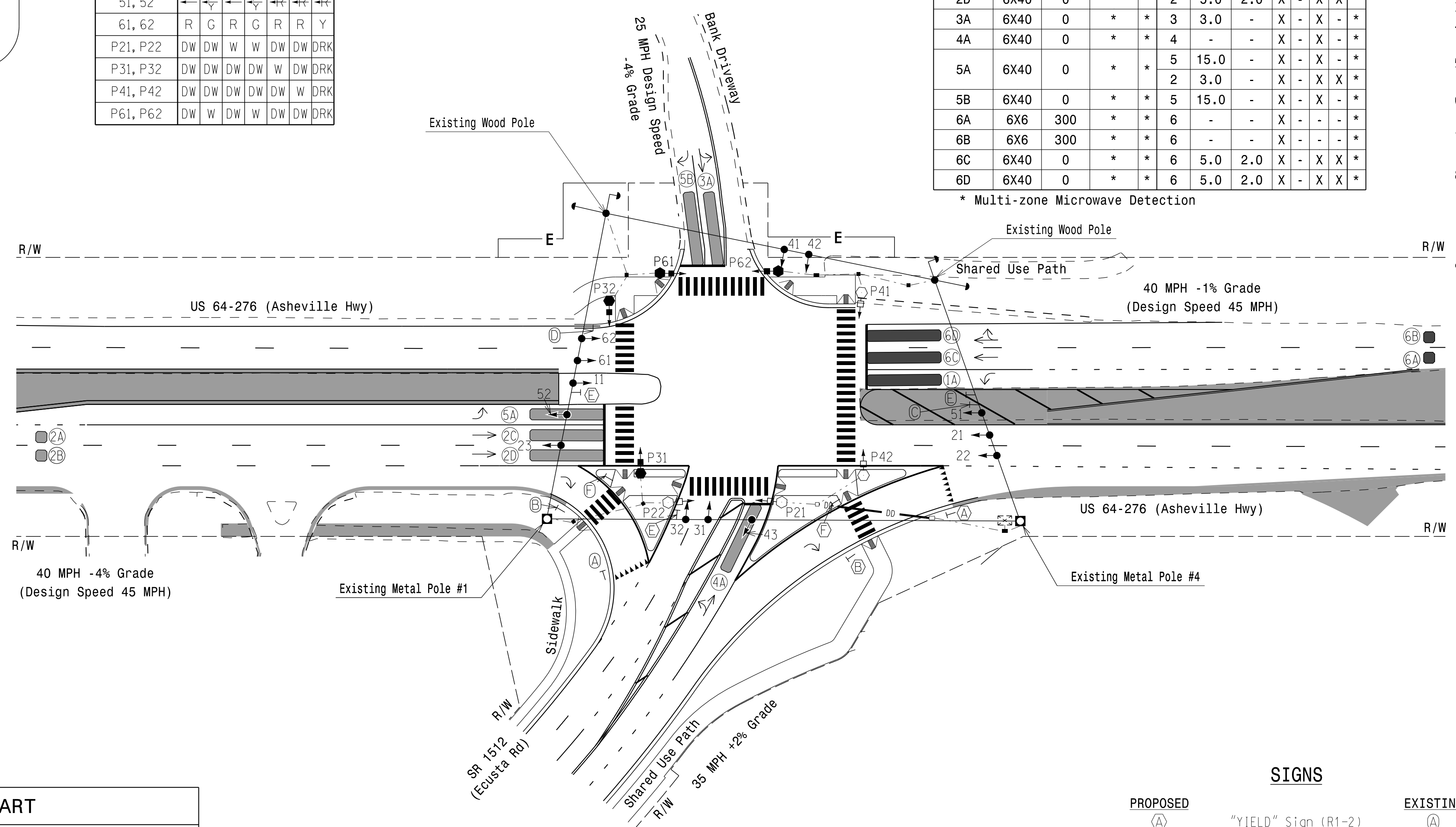
TABLE OF OPERATION table with columns for SIGNAL FACE and PHASE (01+5, 01+6, 02+5, 02+6, 03, 04, F, L, R, Y, G, R).

MAXTIME DETECTOR INSTALLATION CHART table with columns for LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, CALL PHASE, DELAY TIME, EXTEND TIME, EXTEND, ADDED INITIAL CALL, DELAY DURING GREEN, and NEW CARD.

6 Phase Fully Actuated (Time Based Coordination)

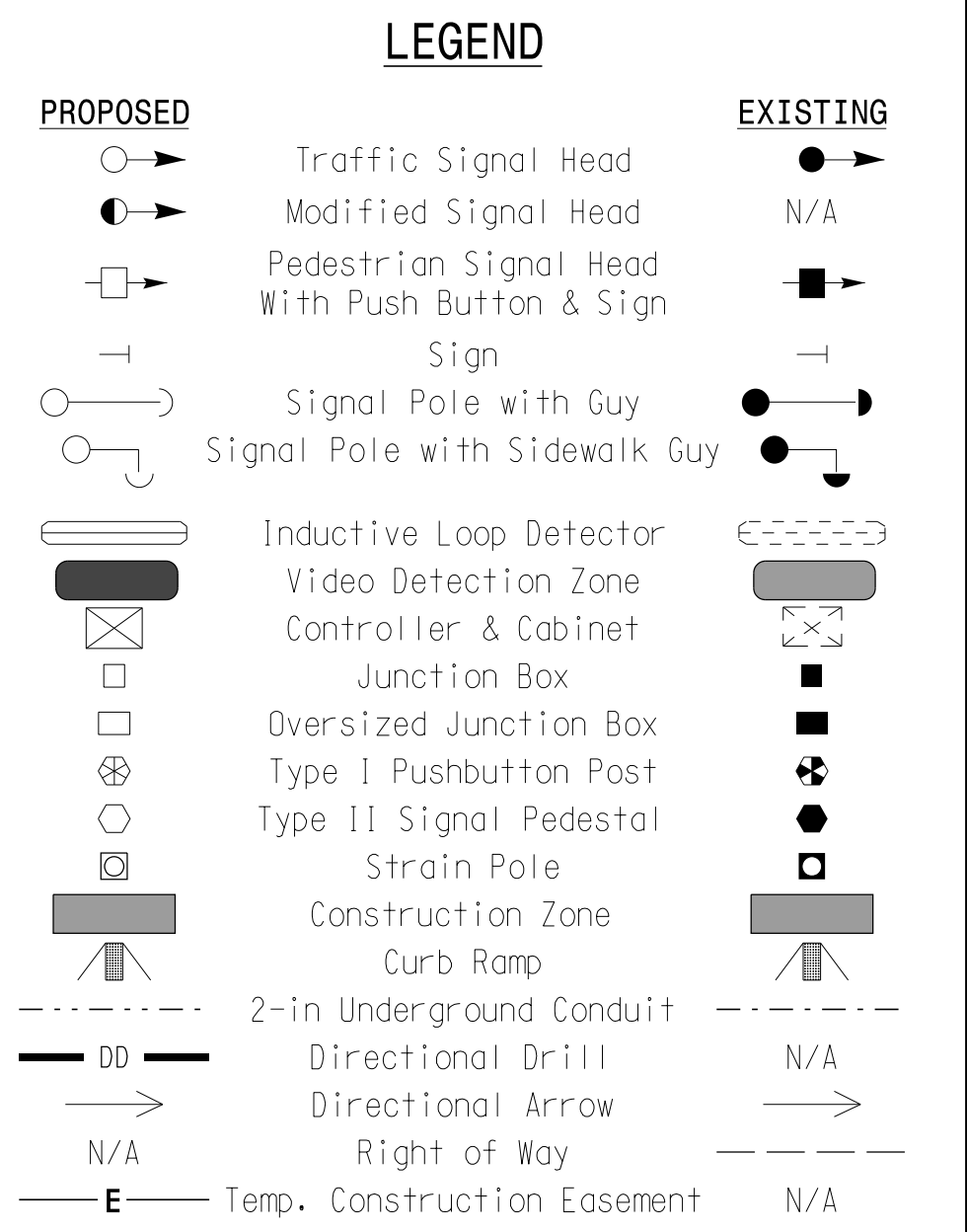
NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Portions of detector zones 4A and 5A not shown for clarity.
11. See pavement marking plans for proposed stop bar locations.
12. All edestrian push buttons shall be Vibro-Tactile.
13. All APS shall use "Rapid Tick" sound.



MAXTIME TIMING CHART table with columns for FEATURE and PHASE (1, 2, 3, 4, 5, 6).

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION table with columns for SIGNAL FACE, VOICE, TONES, INTERVAL, and SPEECH MESSAGE.



SIGNS

- PROPOSED: (A) "YIELD" Sign (R1-2), (B) Pedestrian Crossing Sign (W11-2) w/ Left Downward Diagonal Plaque (W16-7pL), (C) U-Turn "MUST YIELD" Sign, (D) "NO TURN ON RED" Sign (R10-11), (E) Turning Vehicles Yield to Peds Sign (R10-15R), (F) Pedestrian Crossing Sign (W11-2) w/ Right Downward Diagonal Plaque (W16-7pR).
EXISTING: (A) "YIELD" Sign (R1-2), (B) Pedestrian Crossing Sign (W11-2) w/ Left Downward Diagonal Plaque (W16-7pL), (C) U-Turn "MUST YIELD" Sign, (D) "NO TURN ON RED" Sign (R10-11), (E) Turning Vehicles Yield to Peds Sign (R10-15R), (F) Pedestrian Crossing Sign (W11-2) w/ Right Downward Diagonal Plaque (W16-7pR).

Temporary Signal 3 - TCP Phases III and IV

Project information block including logos for RS&H and Transylvania County, project name US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway, dates, and signatures.

4/28/2023 11:12:12 AM \\rsandh.com\h... 64-276 Intersection.Dwg:SignalTraffic:Signal:gnw:Plan_Sheets:W5799_Sig_Plan_4-0-14075813.dgn

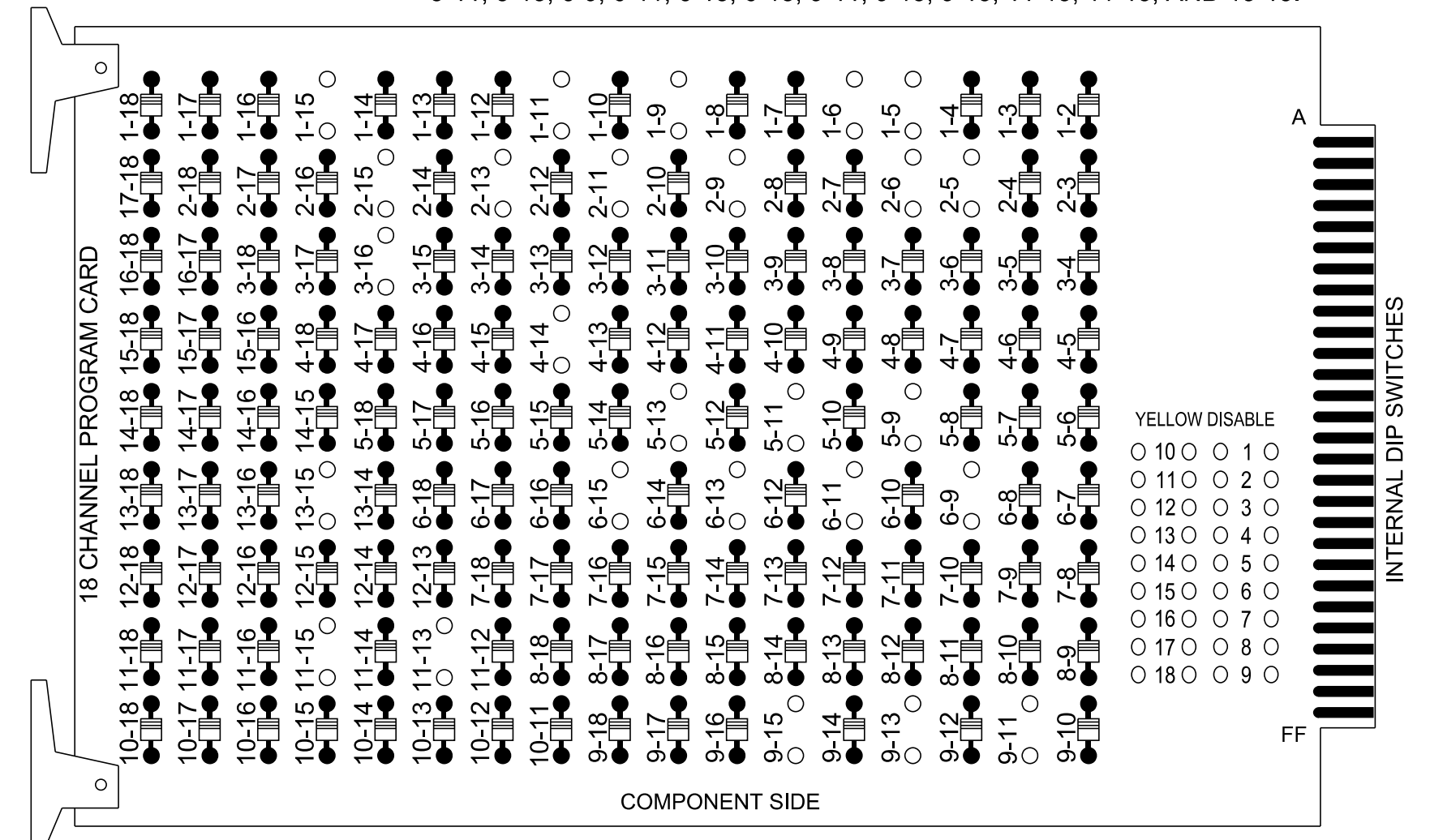
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED stamp with seal and signature of Steven G. Haynie dated 4/28/2023.

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-16, 4-14, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 9-11, 9-13, 9-15, 11-13, 11-15, AND 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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

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 Walk and 6 Green Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of a Temporary Time Based Coordination System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

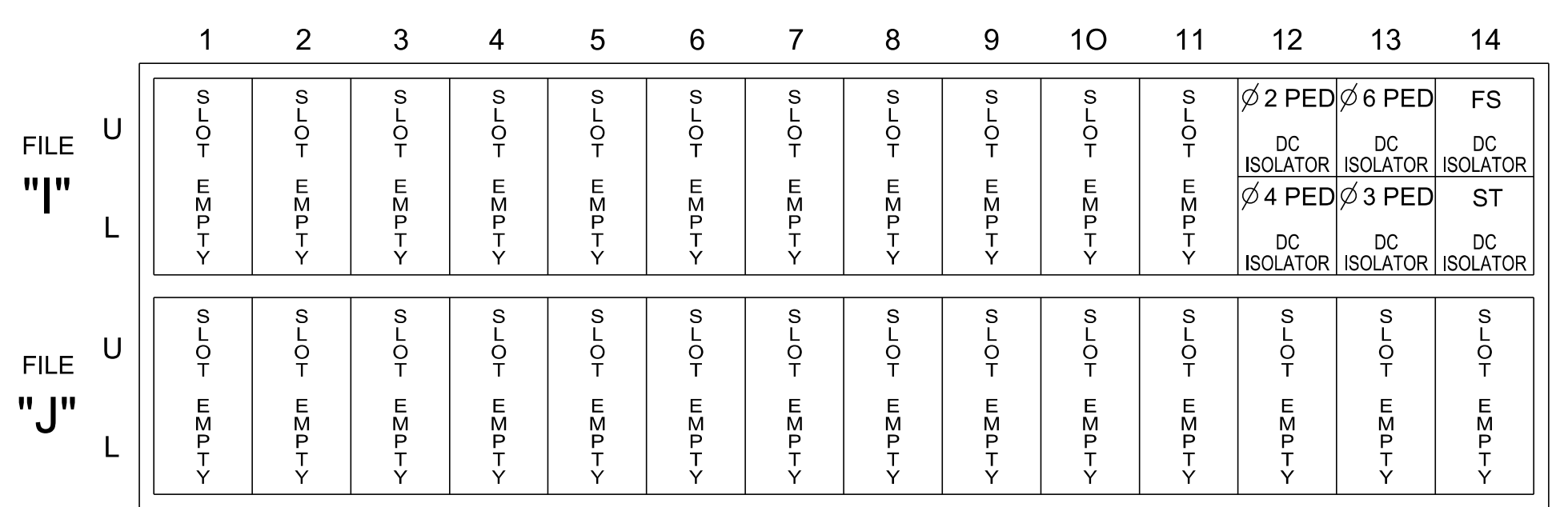
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6				
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18				
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	3 PED	OL1	OL2	SPARE	OL3	OL4	SPARE				
SIGNAL HEAD NO.	11	21, 22, 23	P21, P22	31	32	41, 42, 43	P41, P42	51, 52	32	61, 62	P61, P62	NU	NU	P31, P32	11	NU	NU	51, 52	NU			
RED		128		116	116	101	101	*		134												
YELLOW	*	129		117	117	102	102			135												
GREEN		130		118	118	103	103			136												
RED ARROW																			A121	A114		
YELLOW ARROW										132										A122	A115	
FLASHING YELLOW ARROW																				A123	A116	
GREEN ARROW	127			118	103		133	133														
Hand				113			104			119			110									
Walker				115			106			121			112									

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

INPUT FILE POSITION LAYOUT

(front view)

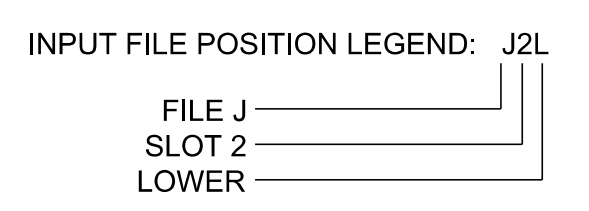


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

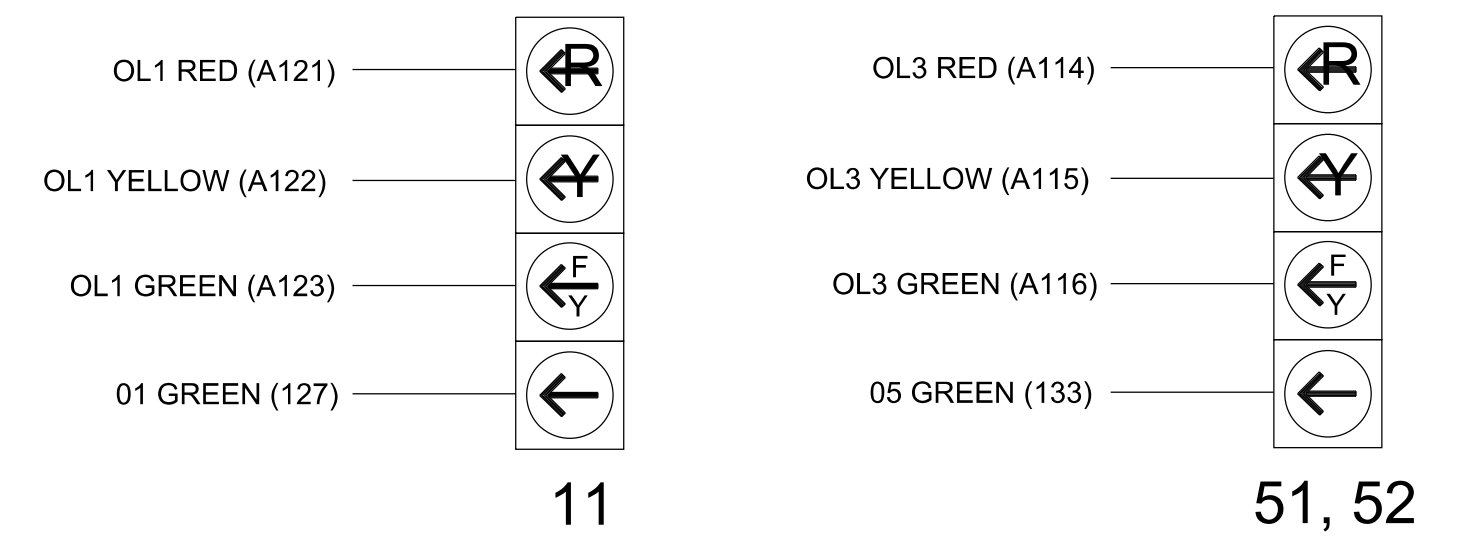
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P31,P32	TB8-8,9	I13L	70	36	8	PED 3						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

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



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



SPECIAL DETECTOR NOTE

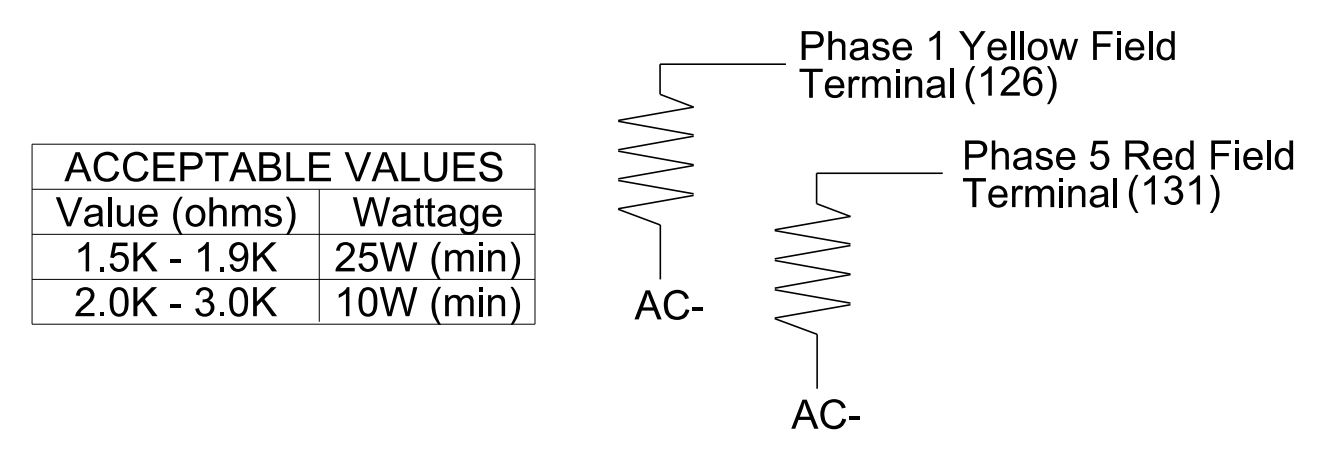
Install a multizone microwave detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer -approved mounting locations to accomplish the detection schemes shown on the Signal Design Plans.

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.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0798T3
 DESIGNED: April 2023
 SEALED: April 28, 2023
 REVISED: _____

Temporary Signal 3 - TCP Phases III and IV
 Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway

Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: V. Kaiser

PREPARED BY: S.G. Haynie REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

Prepared for the Offices of:

RS&H
 NC FIRM LICENSE No: F-0493
 1520 SOUTH BOULEVARD, SUITE 200
 CHARLOTTE, NC 28203
 (704) 752-0610

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

SEAL 029531

DocuSigned by: Steven G. Haynie 4/28/2023

SIG. INVENTORY NO. 14-0798T3

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 I:\eas\tr\consp\101\on\p4\030049021_R-5799_US_64-276_Intersec\1on_Das\gn\p4\030049021_R-5799_US_64-276_Intersec\1on_Sheets\w5799_sig_psh_4-1_140798T3.dwg

OVERLAP PROGRAMMING

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

Web Interface
Home > Controller > Overlap Configuration > Overlaps

Overlap Plan 1

Overlap	1	3
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

NOTICE PHASE 3 PED
ASSIGNED TO
DETECTOR 8 PED →

PED 3 PROGRAMMING DETAIL

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

Web Interface
Home > Controller > Detector Configuration > Pedestrian Detector

Plan 1

Detector	Description	Call Phase	Call Overlap
2		2	0
4		4	0
6		6	0
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	X	3
4	Phase Vehicle	4	.	X	.	4
5	Phase Vehicle	5	.	X	.	5
6	Phase Vehicle	6	X	.	X	6
7	Phase Vehicle	7	.	X	.	7
8	Phase Vehicle	8	.	X	X	8
9	Overlap	1	X	.	X	9
10	Overlap	2	.	X	X	10
11	Overlap	3	X	.	.	11
12	Overlap	4	.	X	.	12
13	Phase Ped	2	.	.	.	13
14	Phase Ped	4	.	.	.	14
15	Phase Ped	6	.	.	.	15
16	Phase Ped	3	.	.	.	16
17	Overlap	5	.	X	X	17
18	Overlap	6	.	X	.	18

NOTICE PHASE 3 PED
ASSIGNED TO CHANNEL 16 →

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

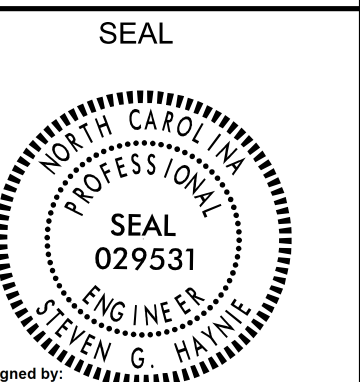
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-0798T3
DESIGNED: April 2023
SEALED: April 28, 2023
REVISED: _____



Temporary Signal 3 - TCP Phases III and IV
Electrical Detail - Sheet 2 of 2

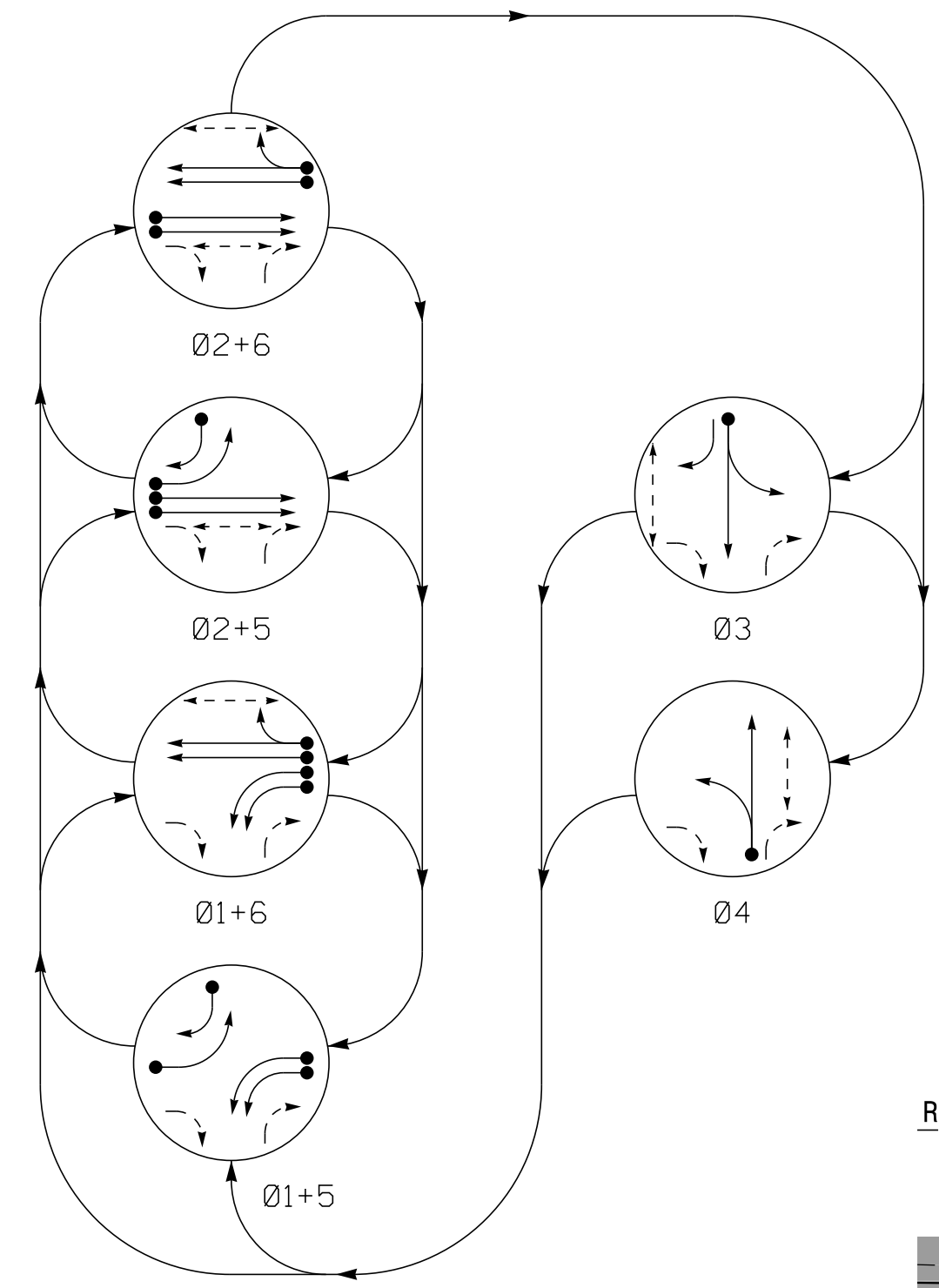
Electrical and Programming Details For:		US 64-276 (Asheville Highway)	
Prepared for the Offices of:		at	
		SR 1512 (Ecusta Road) / Bank Driveway	
Division 14	Transylvania County	Brevard	
PLAN DATE:	April 2023	REVIEWED BY:	V. Kaiser
PREPARED BY:	S.G. Haynie	REVIEWED BY:	
REVISIONS		INIT.	DATE
750 N. Greenfield Pkwy, Garner, NC 27529		DocuSigned by: Steven G. Haynie 4/28/2023	
Sealed: April 28, 2023		DATE	
		DATE	
		SIG. INVENTORY NO.	
		14-0798T3	

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



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PHASING DIAGRAM

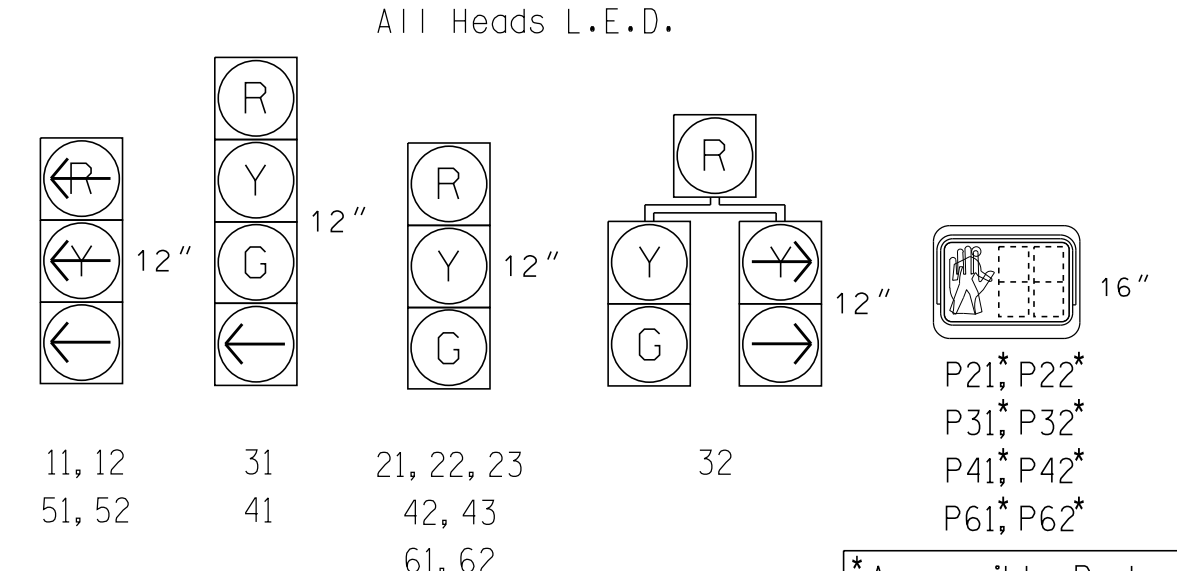


PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE						
	Ø 1 + 5	Ø 1 + 6	Ø 2 + 5	Ø 2 + 6	Ø 3	Ø 4	F
11, 12	←	←	←	←	←	←	←
21, 22, 23	R	R	G	G	R	R	Y
31	R	R	R	R	G	R	R
32	R	R	R	R	G	R	R
41	R	R	R	R	R	C	R
42, 43	R	R	R	R	G	R	R
51, 52	←	←	←	←	←	←	←
61, 62	R	G	R	G	R	R	Y
P21, P22	DW	DW	W	W	DW	DRK	DRK
P31, P32	DW	DW	DW	DW	W	DW	DRK
P41, P42	DW	DW	DW	DW	W	DRK	DRK
P61, P62	DW	W	DW	W	DW	DRK	DRK

SIGNAL FACE I.D.



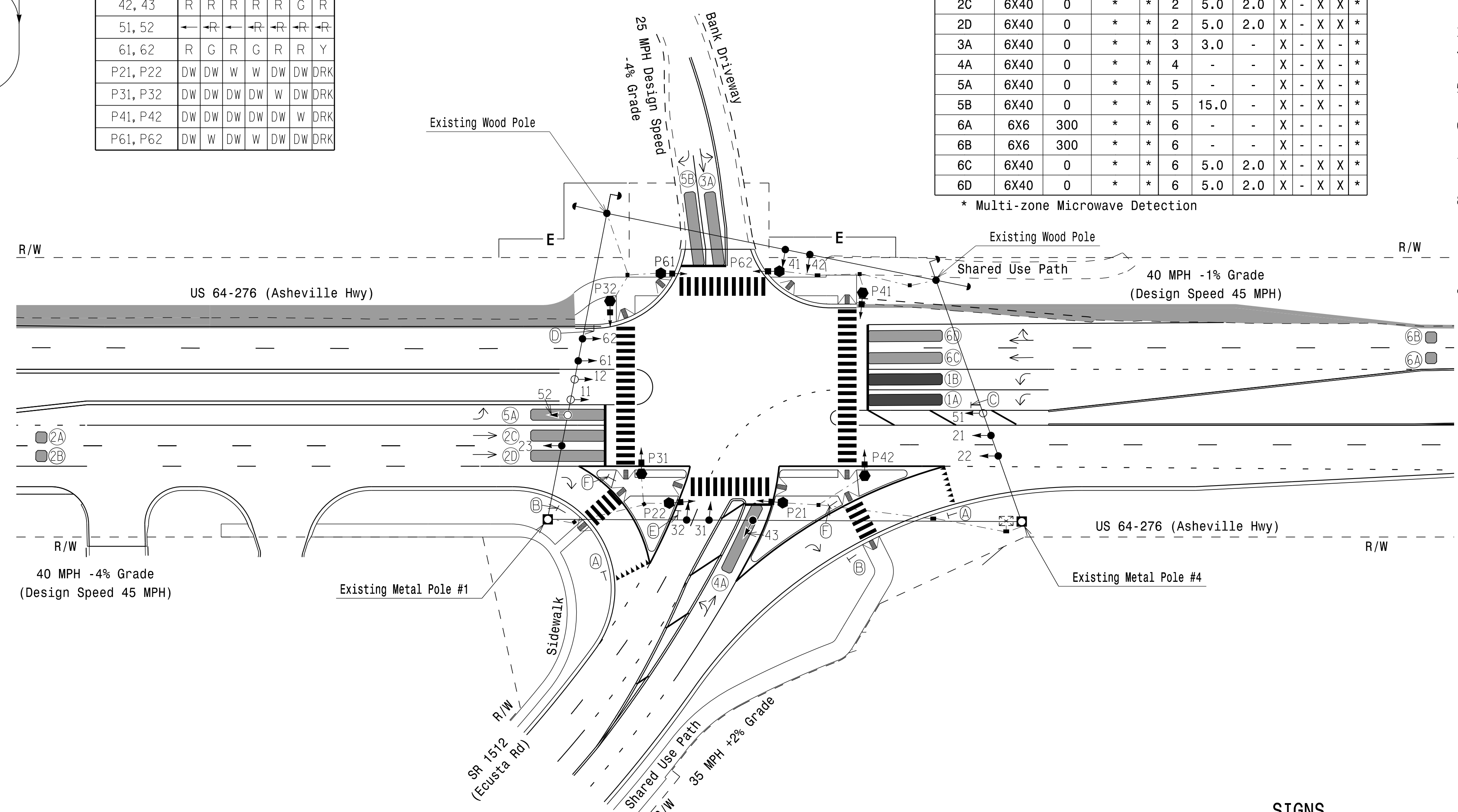
MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR							PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
1A	6X40	0	*	*	1	-	-	X	-	X	-	*
1B	6X40	0	*	*	1	-	-	X	-	X	-	*
2A	6X6	300	*	*	2	-	-	X	-	-	-	*
2B	6X6	300	*	*	2	-	-	X	-	-	-	*
2C	6X40	0	*	*	2	5.0	2.0	X	-	X	X	*
2D	6X40	0	*	*	2	5.0	2.0	X	-	X	X	*
3A	6X40	0	*	*	3	3.0	-	X	-	X	-	*
3B	6X40	0	*	*	3	3.0	-	X	-	X	-	*
4A	6X40	0	*	*	4	-	-	X	-	X	-	*
4B	6X40	0	*	*	4	-	-	X	-	X	-	*
5A	6X40	0	*	*	5	-	-	X	-	X	-	*
5B	6X40	0	*	*	5	15.0	-	X	-	X	-	*
6A	6X6	300	*	*	6	-	-	X	-	-	-	*
6B	6X6	300	*	*	6	-	-	X	-	-	-	*
6C	6X40	0	*	*	6	5.0	2.0	X	-	X	X	*
6D	6X40	0	*	*	6	5.0	2.0	X	-	X	X	*

* Multi-zone Microwave Detection

6 Phase Fully Actuated (Time Based Coordination)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Set all detector units to presence mode.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Portions of detector zones 4A and 5A not shown for clarity.
11. See pavement marking plans for proposed stop bar locations.
12. All edestrian push buttons shall be Vibro-Tactile.
13. All APS shall use "Rapid Tick" sound.



MAXTIME TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Walk *	-	7	7	7	-	7
Ped Clear *	-	10	20	21	-	13
Min Green	7	12	7	7	7	12
Passage *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	25	90	15	20	15	90
Yellow Change	3.0	4.5	3.4	3.7	3.0	4.5
Red Clear	3.3	2.2	3.1	2.7	3.3	2.2
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-
Vehicle Recall	-	MIN. RECALL	-	-	-	MIN. RECALL
Dual Entry	-	-	-	-	-	-

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P21	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Ecusta.
P22	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Ecusta.
P31	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Asheville.
P32	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Asheville.
P41	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Asheville.
P42	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Asheville.
P61	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Driveway.
P62	-	X	Walk	(Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk	Wait, Wait to cross Driveway.

LEGEND

- | | | | |
|--|---|--|------------------------------|
| | Proposed Traffic Signal Head | | Existing Traffic Signal Head |
| | Proposed Modified Signal Head | | N/A |
| | Proposed Pedestrian Signal Head With Push Button & Sign | | N/A |
| | Proposed Sign | | N/A |
| | Proposed Signal Pole with Guy | | N/A |
| | Proposed Signal Pole with Sidewalk Guy | | N/A |
| | Proposed Inductive Loop Detector | | N/A |
| | Proposed Video Detection Zone | | N/A |
| | Proposed Controller & Cabinet | | N/A |
| | Proposed Junction Box | | N/A |
| | Proposed Oversized Junction Box | | N/A |
| | Proposed Type I Pushbutton Post | | N/A |
| | Proposed Type II Signal Pedestal | | N/A |
| | Proposed Strain Pole | | N/A |
| | Proposed Construction Zone | | N/A |
| | Proposed Curb Ramp | | N/A |
| | Proposed 2-in Underground Conduit | | N/A |
| | Proposed Directional Drill | | N/A |
| | Proposed Directional Arrow | | N/A |
| | Proposed Right of Way | | N/A |
| | Proposed Temp. Construction Easement | | N/A |

SIGNS

- | | |
|---|---|
| (A) Proposed "YIELD" Sign (R1-2) | (A) Existing "YIELD" Sign (R1-2) |
| (B) Proposed Pedestrian Cross Sign (W11-2) w/ Left Downward Diagonal Plaque (W16-7pL) | (B) Existing Pedestrian Cross Sign (W11-2) w/ Left Downward Diagonal Plaque (W16-7pL) |
| (C) Proposed U-Turn "MUST YIELD" Sign | (C) Existing U-Turn "MUST YIELD" Sign |
| (D) Proposed "NO TURN ON RED" Sign (R10-11) | (D) Existing "NO TURN ON RED" Sign (R10-11) |
| (E) Proposed Turning Vehicles Yield to Peds Sign (R10-15R) | (E) Existing Turning Vehicles Yield to Peds Sign (R10-15R) |
| (F) Proposed Pedestrian Crossing Sign (W11-2) w/ Right Downward Diagonal Plaque (W16-7pR) | (F) Existing Pedestrian Crossing Sign (W11-2) w/ Right Downward Diagonal Plaque (W16-7pR) |

Temporary Signal 4 - TCP Phase V

US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway

Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: S.G. Haynie

PREPARED BY: P. Koloski REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSign
Steven G. Haynie 4/28/2023

DATE

Sig Inventory No. 14-0798T4

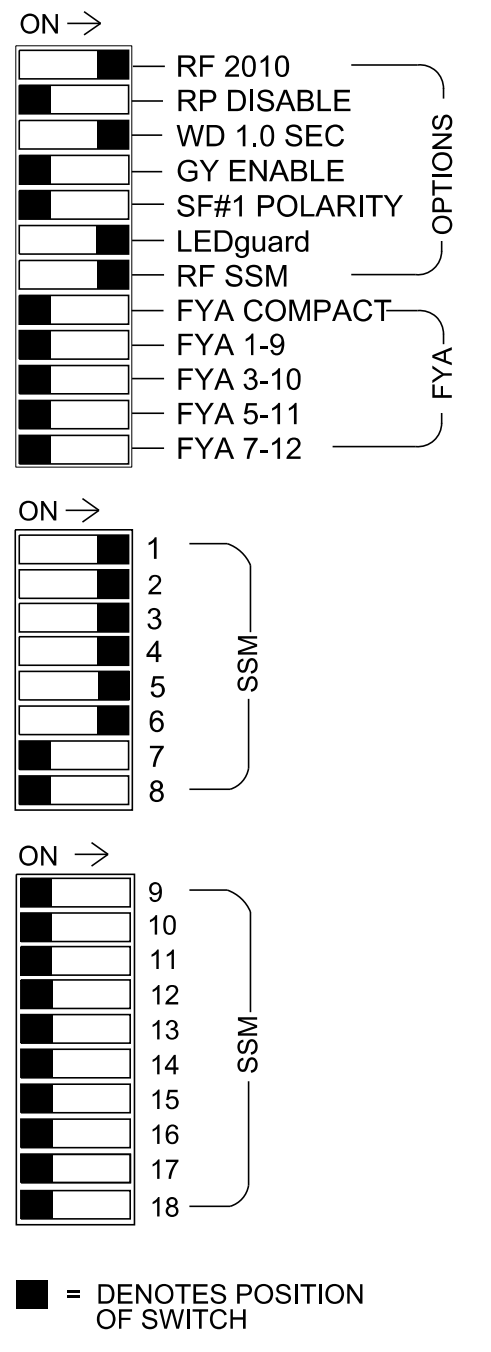
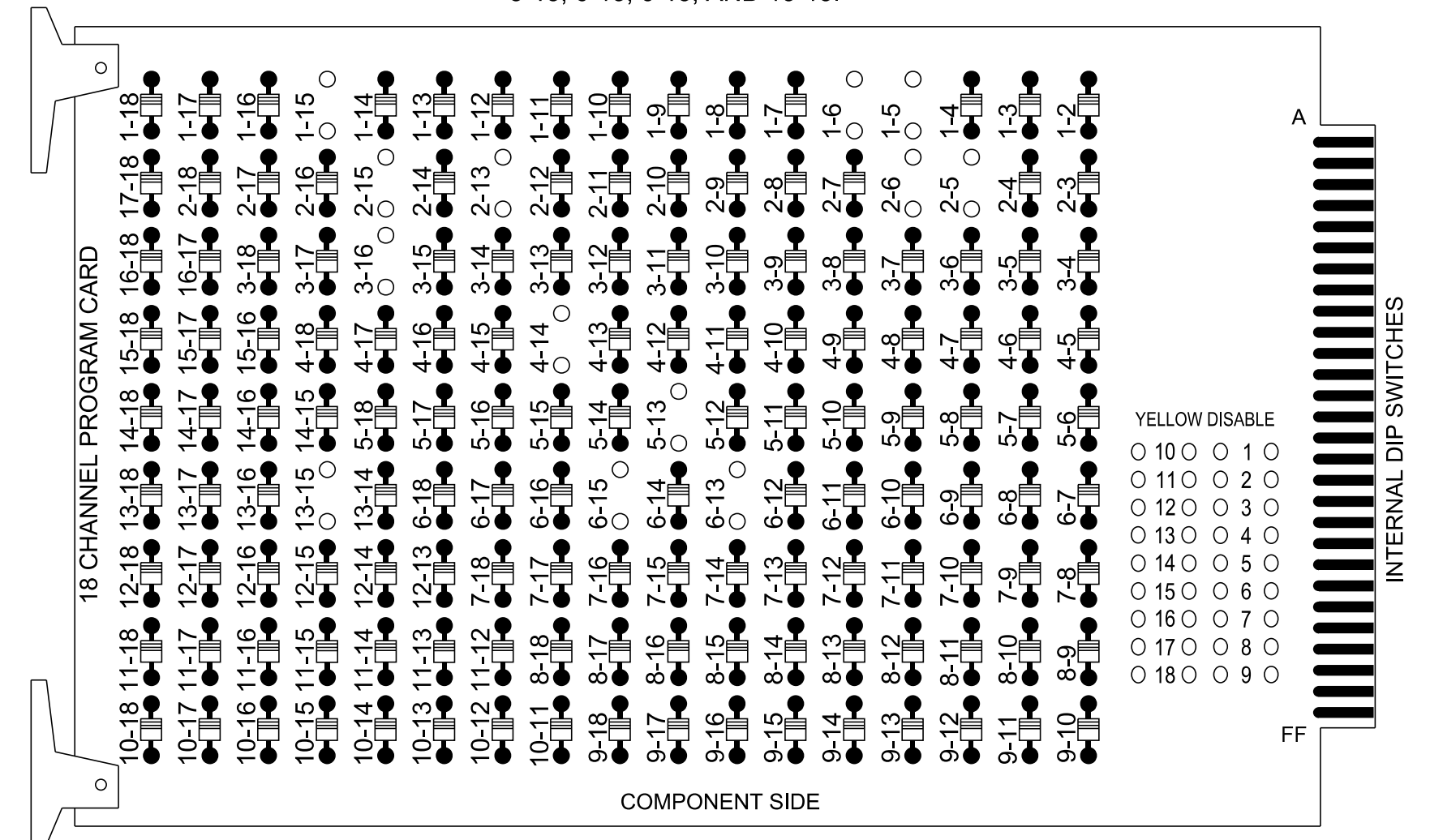
RS&H

NC FIRM LICENSE No: F-0493
1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 (704) 752-9610

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-16, 4-14, 5-13, 6-13, 6-15, AND 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
- 2. Return controller to Factory Defaults before programming per this electrical detail.
- 3. Program controller to start up in phase 2 Green Walk and 6 Green Walk.
- 4. If this signal will be managed by an ATMS software, enable controller and detectors used at this location.
- 5. The cabinet and controller are part of a Temporary Time Based Coordination System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S3, S4, S5, S6, S7, S8, S9, S12
 Phases Used.....1, 2, 2PED, 3, 3PED, 4, 4PED, 5, 6, 6PED
 Overlaps.....NONE

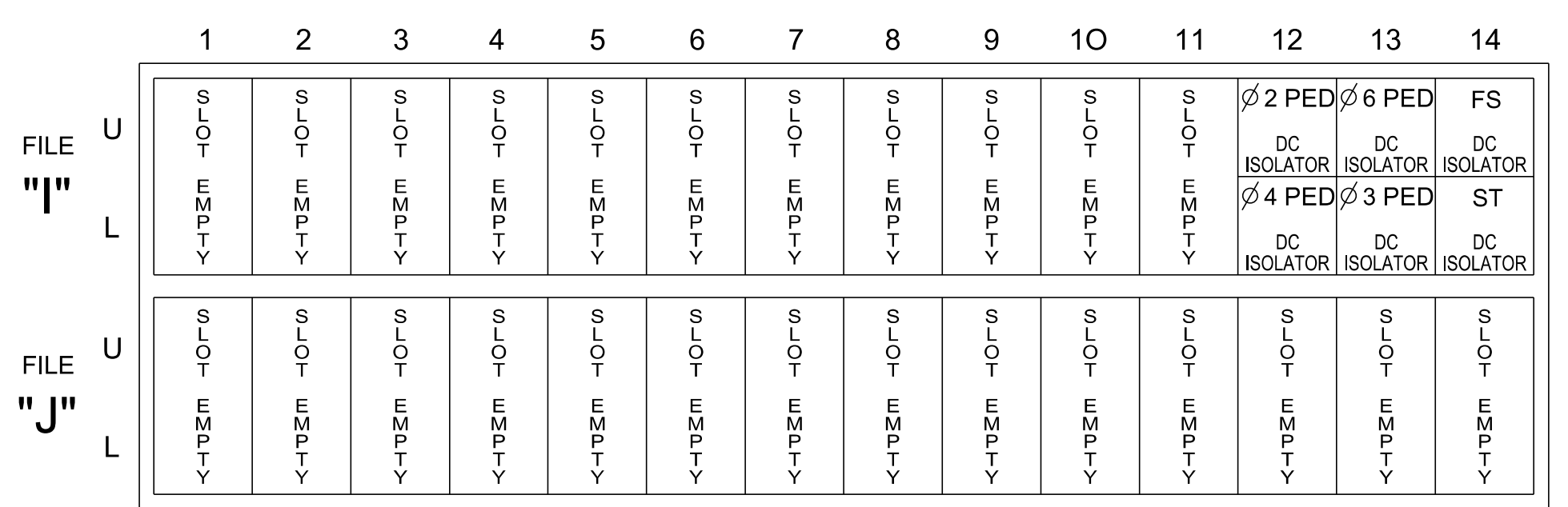
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	3 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	21, 22,23	P21, P22	31	32	41, 42,43	P41, P42	51,52	32	61,62	P61, P62	NU	NU	NU	NU	NU	NU	NU
RED	128			116	116	101	101			134								
YELLOW		129		117	117	102	102			135								
GREEN		130		118	118	103	103			136								
RED ARROW	125									131								
YELLOW ARROW	126									132	132							
FLASHING YELLOW ARROW																		
GREEN ARROW	127			118	103					133	133							
				113						104								110
				115						106								112

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

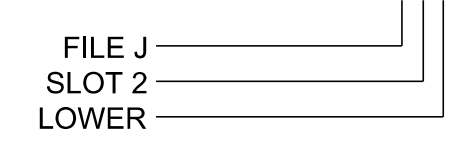
FS = FLASH SENSE
ST = STOP TIME

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
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P31,P32	TB8-8,9	I13L	70	36	8	PED 3						
P41,P42	TB8-5,6	I12L	69	35	4	PED 4						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

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

INPUT FILE POSITION LEGEND: J2L



SPECIAL DETECTOR NOTE

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

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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0798T4
DESIGNED: April 2023
SEALED: April 28, 2023
REVISED: _____

Temporary Signal 4 - TCP Phase V
Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway

Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: V. Kaiser

PREPARED BY: S.G. Haynie REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

DocuSigned by: Steven G. Haynie 4/28/2023

SEAL 029531

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 14-0798T4



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PED 3 PROGRAMMING DETAIL

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

Web Interface
Home > Controller > Detector Configuration > Pedestrian Detector

Plan 1

Detector	Description	Call Phase	Call Overlap
2		2	0
4		4	0
6		6	0
8		3	0

NOTICE PHASE 3 PED
ASSIGNED TO
DETECTOR 8 PED →

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

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

Channel Configuration

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

NOTICE PHASE 3 PED
ASSIGNED TO CHANNEL 16 →

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-0798T4
DESIGNED: April 2023
SEALED: April 28, 2023
REVISED: _____

Temporary Signal 4 - TCP Phase V
Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:	US 64-276 (Asheville Highway)
Prepared for the Offices of:	SR 1512 (Ecusta Road) / Bank Driveway
Division 14	Transylvania County Brevard
PLAN DATE: April 2023	REVIEWED BY: V. Kaiser
PREPARED BY: S.G. Haynie	REVIEWED BY:
REVISIONS	INIT. DATE
750 N. Greenfield Pkwy, Garner, NC 27529	DocuSigned by: Steven G. Haynie 4/28/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

SEAL
029531
ENGINEER
STEVEN G. HAYNIE

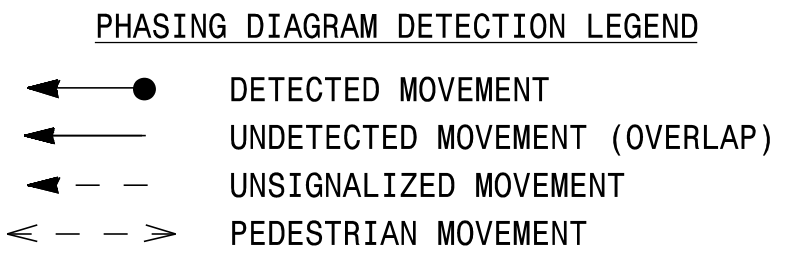
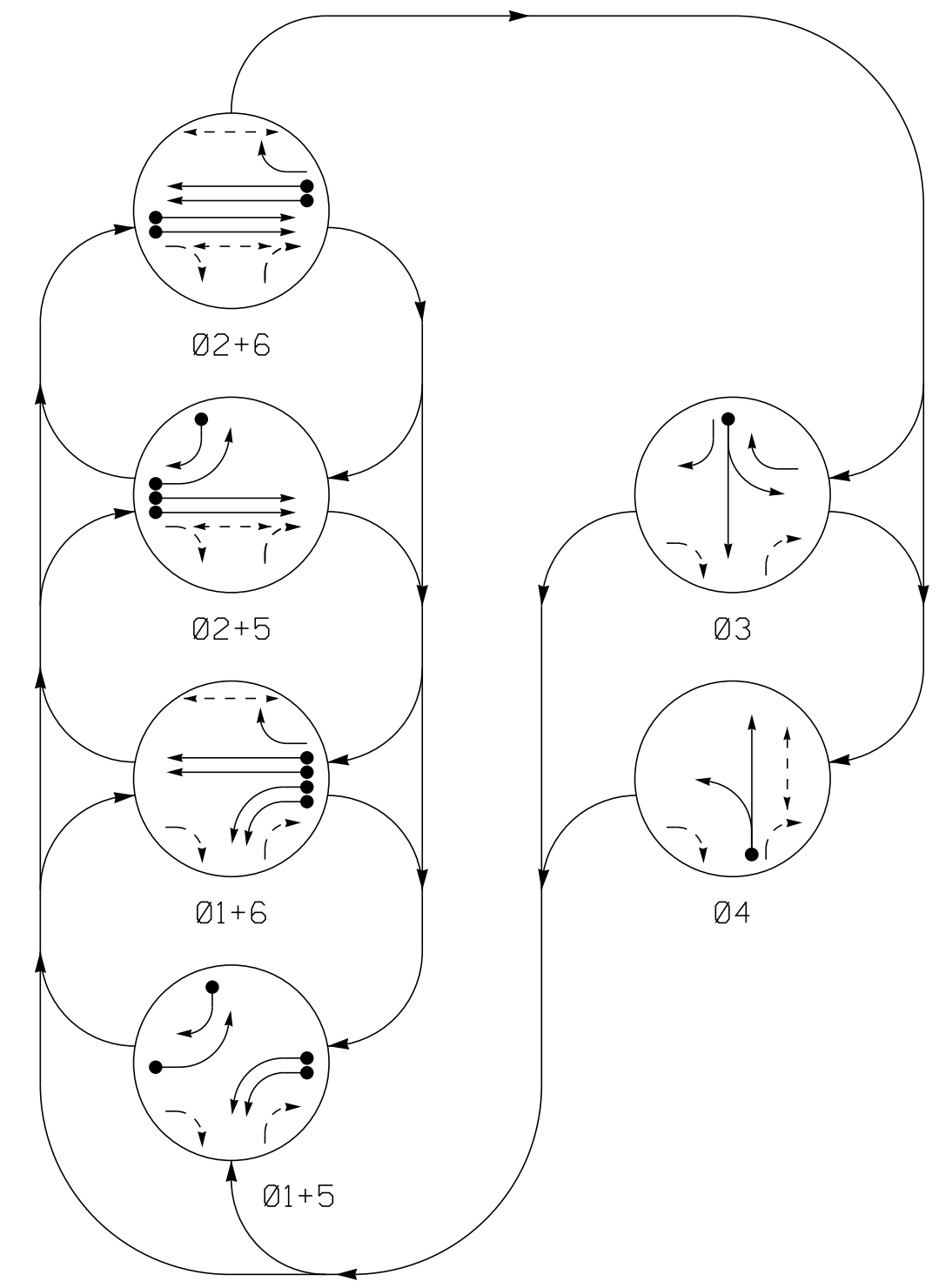
DATE: 4/28/2023

SIG. INVENTORY NO. 14-0798T4



4/28/2023 4:24:34 PM \\rsandh.com\mf:\ees\Transportation\14-0798T4\14-0798T4_Sig_Plan_5-2_140798T4_elec.dgn

PHASING DIAGRAM



SIGNAL FACE I.D.

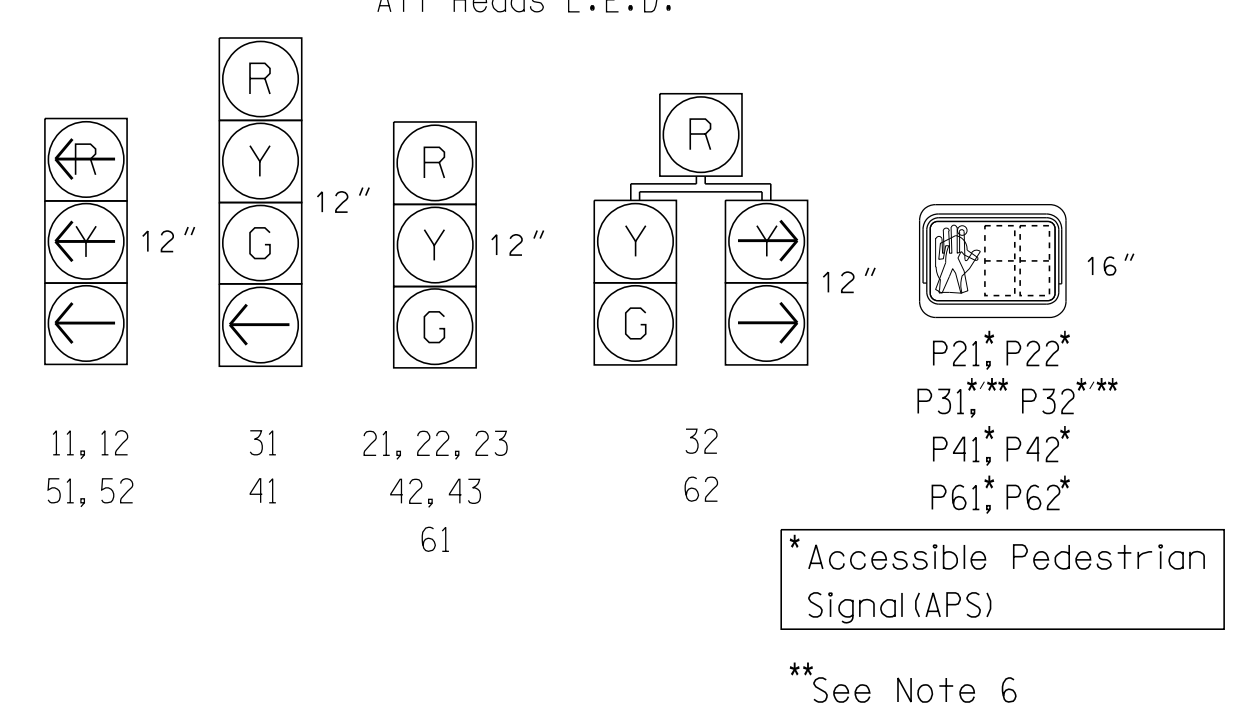


TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11, 12	←	←	←	←	←	←
21, 22, 23	R	R	G	G	R	Y
31	R	R	R	R	G	R
32	R	R	R	R	G	R
41	R	R	R	R	R	C
42, 43	R	R	R	R	R	G
51, 52	←	←	←	←	←	←
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y
P21, P22	DW	DW	W	W	DW	DRK
P31, P32*	DRK	DRK	DRK	DRK	DRK	DRK
P41, P42	DW	DW	DW	DW	W	DRK
P61, P62	DW	W	DW	W	DW	DRK

*See Note 6

MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING						
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL CALL	NEW CARD	
1A	6X40	0	*	*	1	-	-	X	-	X	-
1B	6X40	0	*	*	1	-	-	X	-	X	-
2A	6X6	300	*	*	2	-	-	X	-	-	-
2B	6X6	300	*	*	2	-	-	X	-	-	-
2C	6X40	0	*	*	2	5.0	2.0	X	-	X	X
2D	6X40	0	*	*	2	5.0	2.0	X	-	X	X
3A	6X40	0	*	*	3	3.0	-	X	-	X	-
4A	6X40	0	*	*	4	-	-	X	-	X	-
5A	6X40	0	*	*	5	-	-	X	-	X	-
5B	6X40	0	*	*	5	15.0	-	X	-	X	-
6A	6X6	300	*	*	6	-	-	X	-	-	-
6B	6X6	300	*	*	6	-	-	X	-	-	-
6C	6X40	0	*	*	6	5.0	2.0	X	-	X	X
6D	6X40	0	*	*	6	5.0	2.0	X	-	X	X

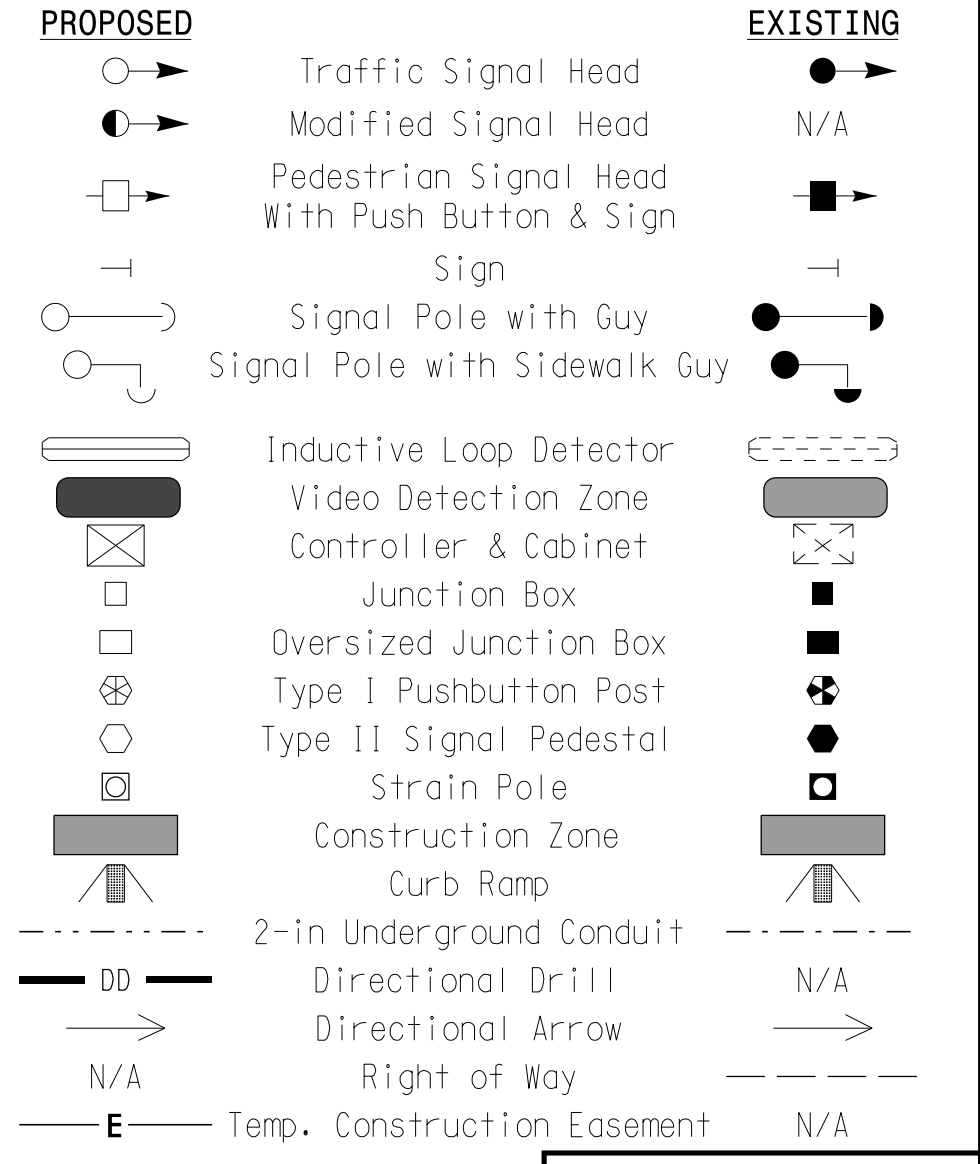
* Multi-zone Microwave Detection

6 Phase Fully Actuated (Time Based Coordination)

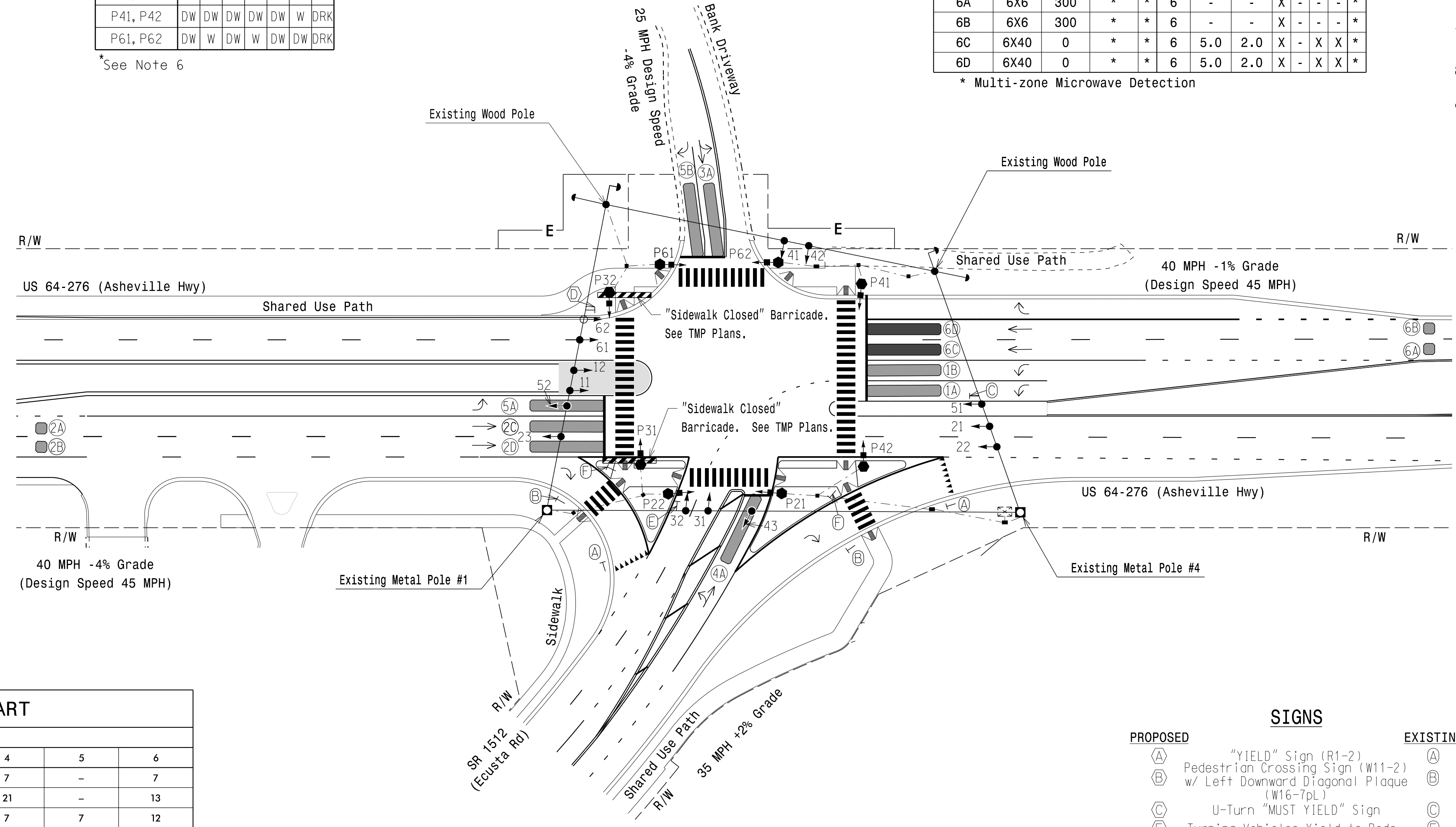
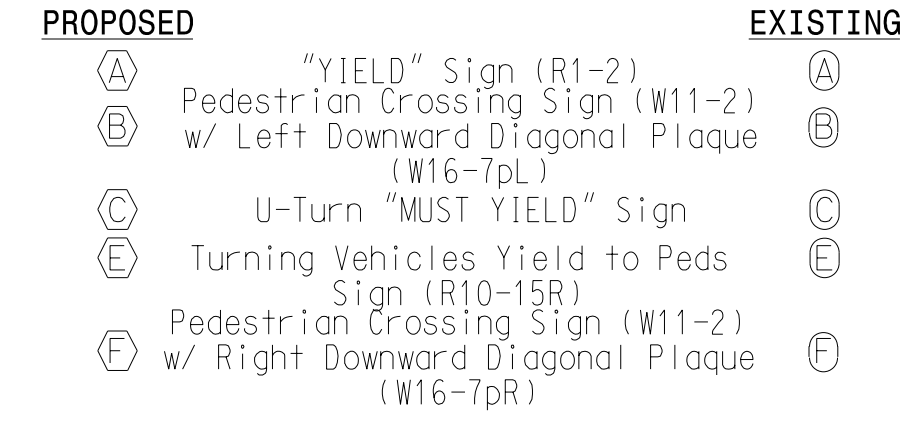
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Reposition existing signal head #61.
- Bag existing pedestrian heads P31 and P32 and temporarily disable associated pushbuttons.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Portions of detector zones 4A and 5A not shown for clarity.
- See pavement marking plans for proposed stop bar locations.
- All pedestrian push buttons shall be Vibro-Tactile.
- All APS shall use "Rapid Tick" sound.

LEGEND



SIGNS



MAXTIME TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Walk *	-	7	-	7	-	7
Ped Clear *	-	10	-	21	-	13
Min Green	7	12	7	7	7	12
Passage *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	25	90	15	20	15	90
Yellow Change	3.0	4.5	3.4	3.7	3.0	4.5
Red Clear	3.3	2.2	3.1	2.7	3.3	2.2
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-
Vehicle Recall	-	MIN. RECALL	-	-	-	MIN. RECALL
Dual Entry	-	-	-	-	-	-

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P21	-	X	Walk	(Percussive Tone)
P22	X	-	Flashing Don't Walk / Don't Walk	Wait, wait to cross Ecusta.
P41	-	X	Walk	(Percussive Tone)
P42	X	-	Flashing Don't Walk / Don't Walk	Wait, wait to cross Asheville.
P61	X	-	Flashing Don't Walk / Don't Walk	Wait, wait to cross Asheville.
P62	X	-	Flashing Don't Walk / Don't Walk	Wait, wait to cross Asheville.

Temporary Signal 5 - TCP Phase VI Step 1

US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway

Division 14 Transylvania County Brevard

Prepared by: P. Koloski Reviewed by: S.G. Haynie

DATE: May 2023

REVISIONS: INITI. DATE

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029531

DocuSign: Steven G. Haynie 5/4/2023

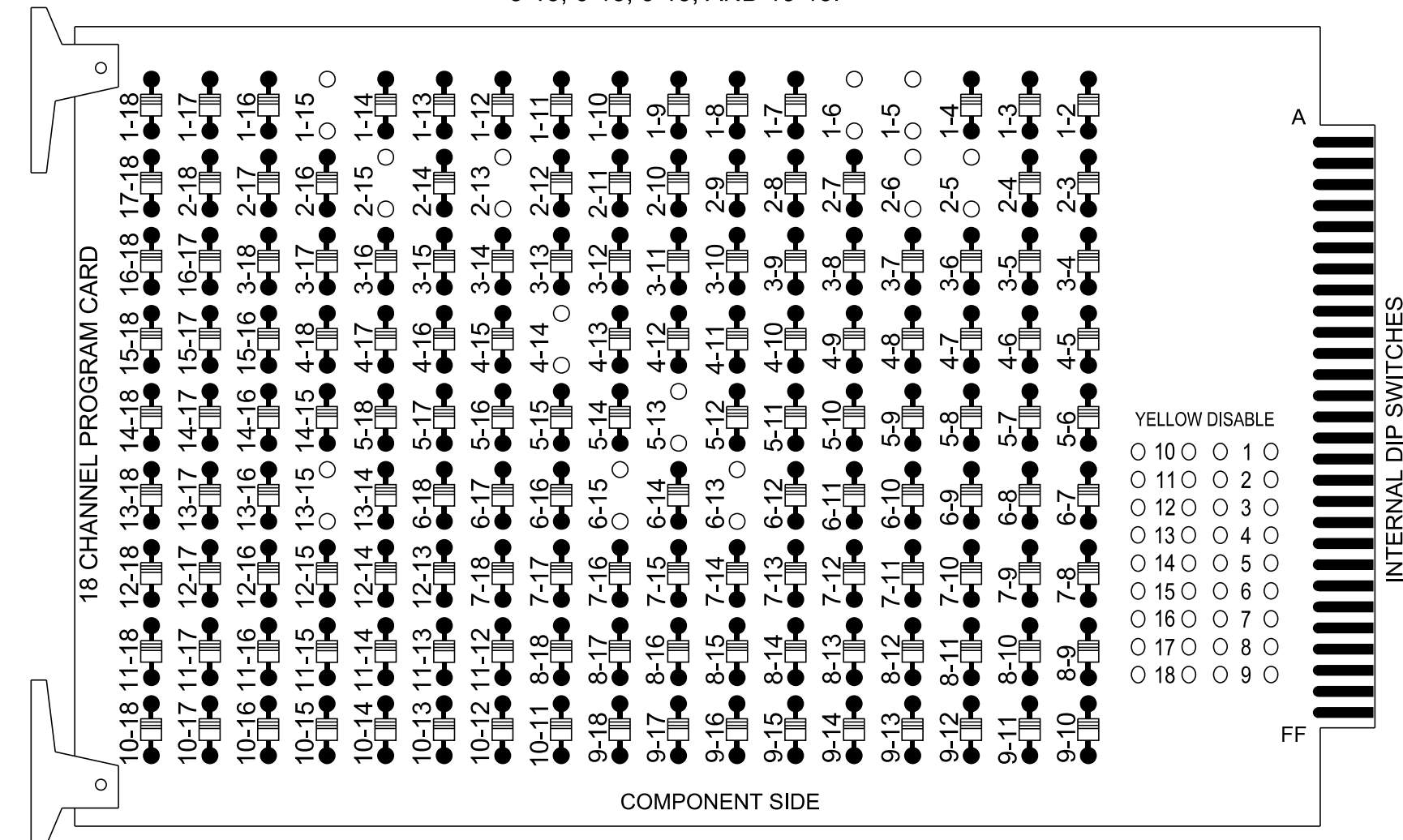
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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

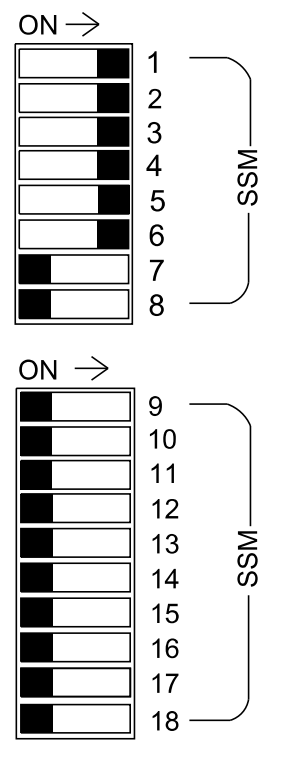
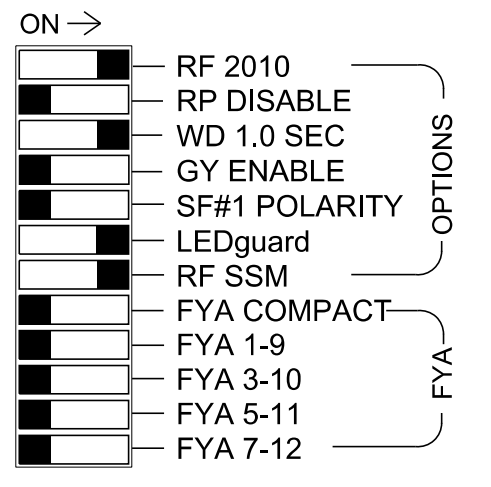
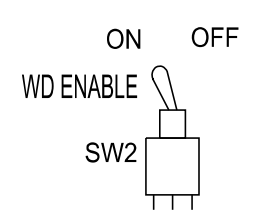
REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 4-14, 5-13, 6-13, 6-15, AND 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Return controller to Factory Defaults before programming per this electrical detail.
3. Program controller to start up in phase 2 Green Walk and 6 Green 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 a Temporary Time Based Coordination System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S3, S4, S5, S6, S7, S8, S9
 Phases Used.....1, 2, 2PED, 3, 4, 4PED, 5, 6, 6PED
 Overlaps.....NONE

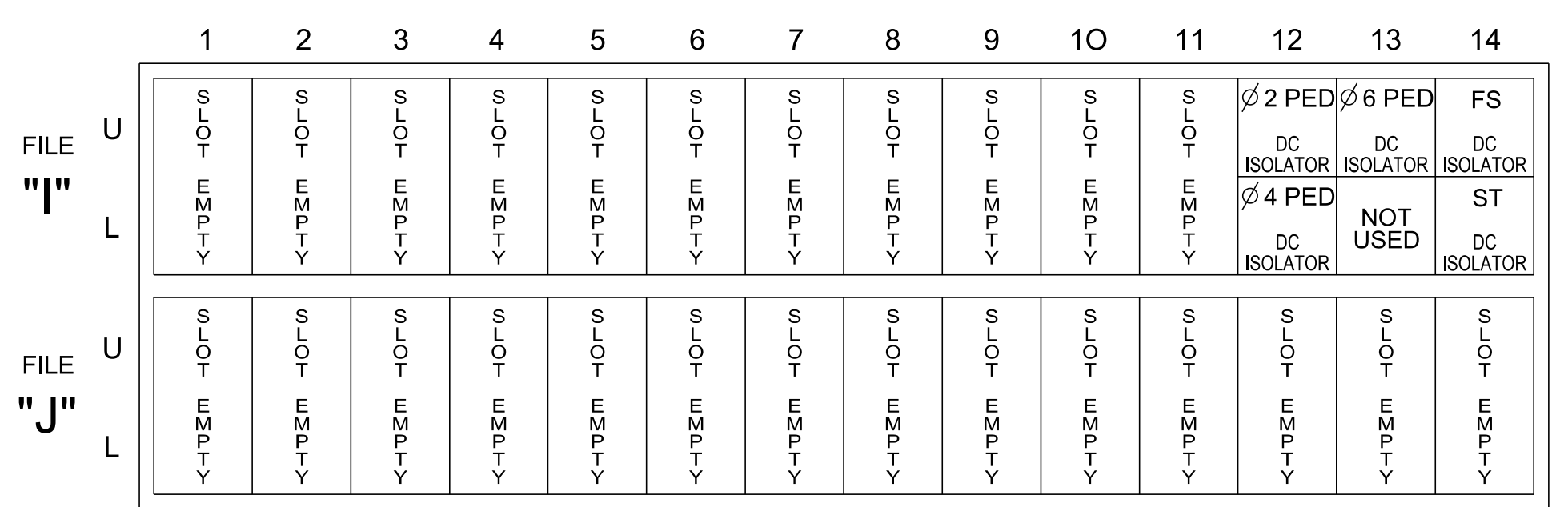
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	21, 22,23	P21, P22	31	32	62	41	42,43	P41, P42	51,52	32	61,62	P61, P62	NU	NU	NU	NU	NU
RED		128		116	116		101	101				134						
YELLOW		129		117	117		102	102				135						
GREEN		130		118	118		103	103				136						
RED ARROW	125											131						
YELLOW ARROW	126				117							132	132					
FLASHING YELLOW ARROW																		
GREEN ARROW	127			118	118	103						133	133					
Hand icon			113						104					119				
Walking person icon			115						106					121				

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

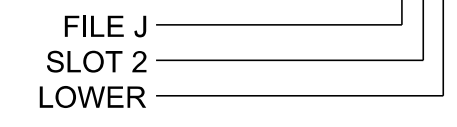
FS = FLASH SENSE
 ST = STOP TIME

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

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

INPUT FILE POSITION LEGEND: J2L



SPECIAL DETECTOR NOTE

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

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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0798T5
 DESIGNED: May 2023
 SEALED: May 4, 2023
 REVISED: _____

Temporary Signal 5 - TCP Phase VI Step 1
 Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: **US 64-276 (Asheville Highway)**

Prepared for the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

at
SR 1512 (Ecusta Road) / Bank Driveway

Division 14 Transylvania County Brevard

PLAN DATE: May 2023 REVIEWED BY: V. Kaiser

PREPARED BY: S.G. Haynie REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSigned by: **Steven G. Haynie** 5/4/2023

DATE: _____

SIG. INVENTORY NO. 14-0798T5




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**ACCESSIBLE PEDESTRIAN SIGNAL (APS)
INSTALLATION NOTES**

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

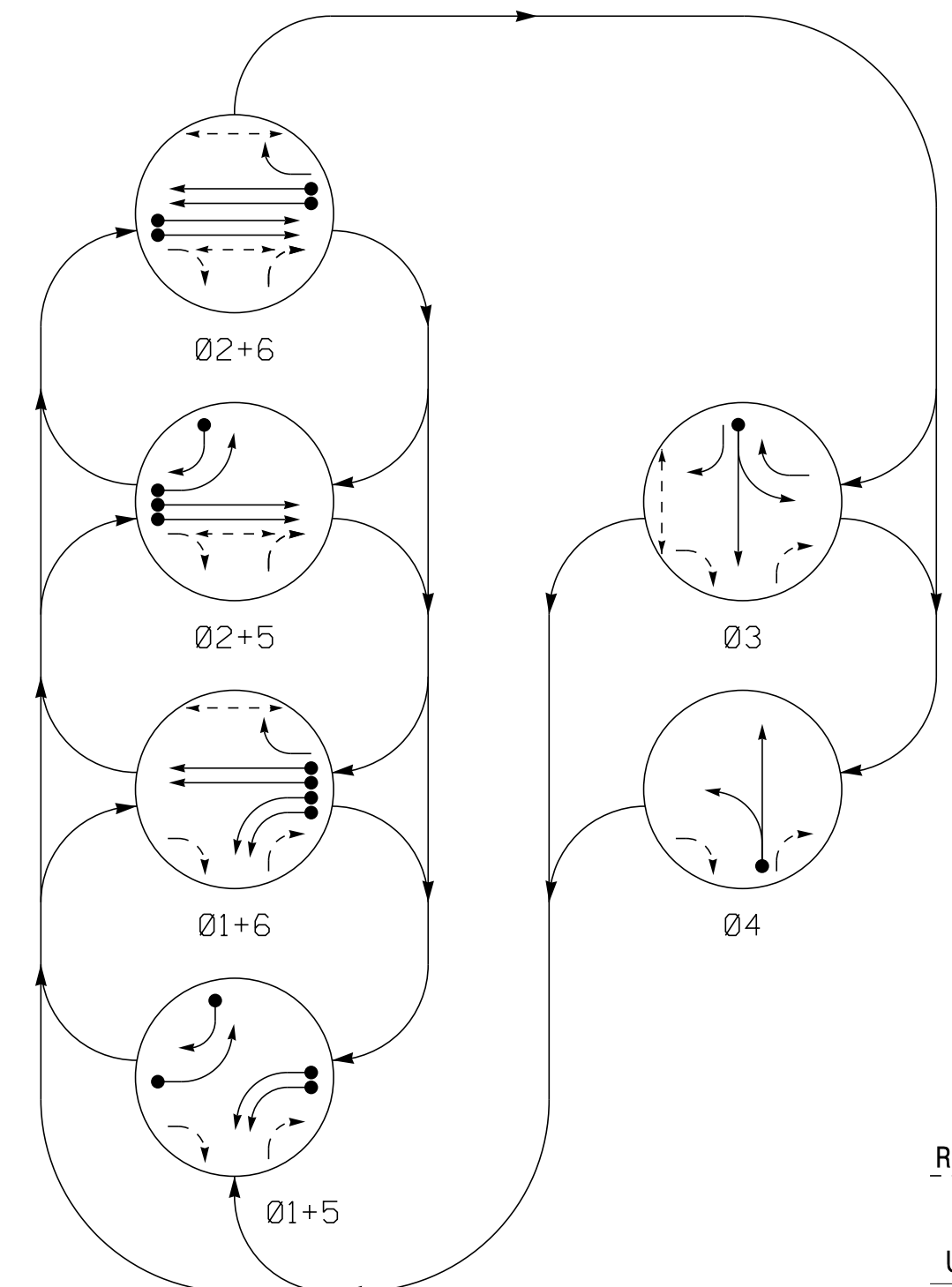
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-0798T5
DESIGNED: May 2023
SEALED: May 4, 2023
REVISED: _____

Temporary Signal 5 - TCP Phase VI, Step 1
Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:	US 64-276 (Asheville Highway)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
	at SR 1512 (Ecusta Road) / Bank Driveway			
	Division 14	Transylvania County		Brevard
	PLAN DATE: May 2023	REVIEWED BY: V. Kaiser		
PREPARED BY: S.G. Haynie	REVIEWED BY:		SEAL  SEVEN G. HAYNIE ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 029531	
REVISIONS	INIT.	DATE		
Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529			DocuSigned by: Steven G. Haynie 5/4/2023 _____ DATE _____ DATE	
 NC FIRM LICENSE No: F-0493 1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 (704) 752-0610			SIG. INVENTORY NO. 14 - 0798T5	

5/4/2023 8:47:07 AM R:\P\OFFICE\Projects\140798T5\140798T5.dgn
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PHASING DIAGRAM



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

SIGNAL FACE I.D.

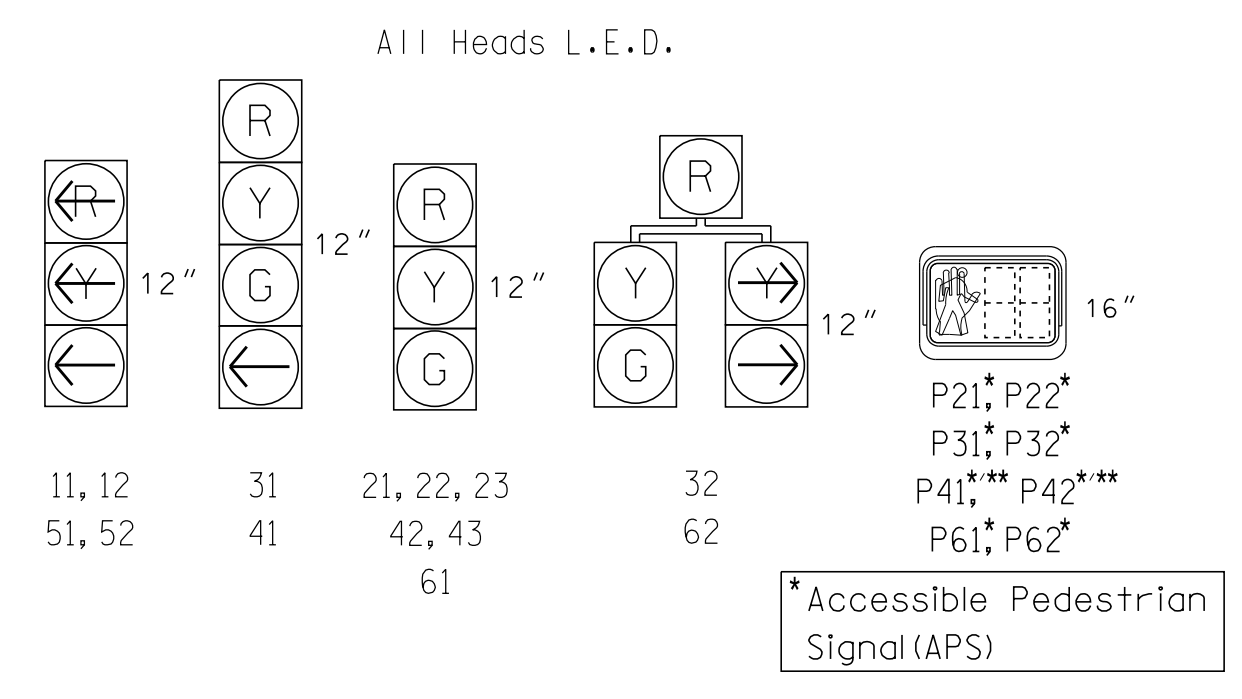


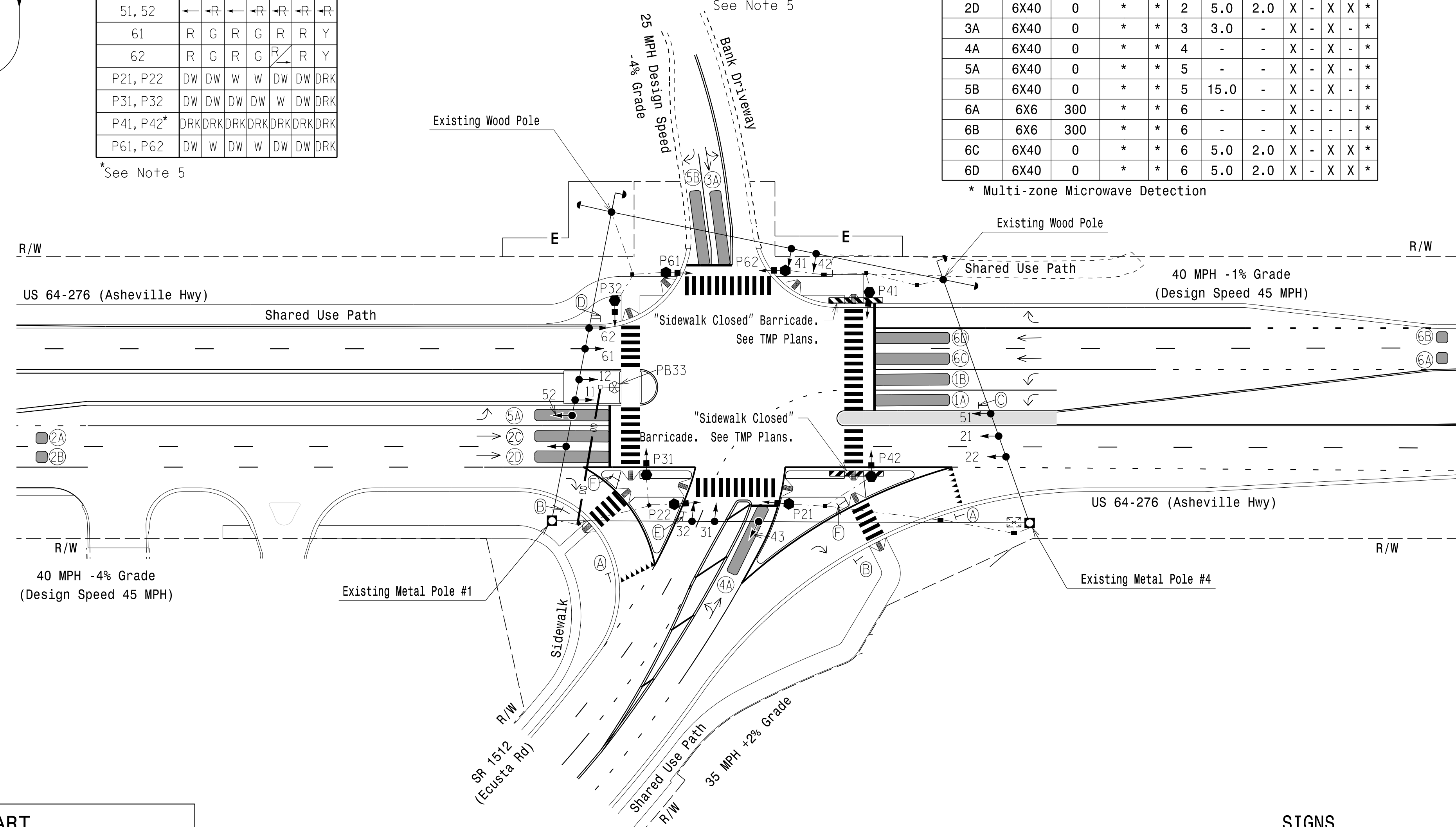
TABLE OF OPERATION table with columns for SIGNAL FACE and PHASE (01+5, 02+5, 03, 04, F) and rows for signal faces 11, 12, 31, 32, 41, 42, 43, 51, 52, 61, 62, and pedestrian faces P21, P22, P31, P32, P41, P42, P61, P62.

*See Note 5

MAXTIME DETECTOR INSTALLATION CHART table with columns for LOOP, SIZE, DISTANCE FROM STOPBAR, TURNS, NEW LOOP, CALL PHASE, DELAY TIME, EXTEND TIME, EXTEND, ADDED INITIAL, CALL, DELAY DURING GREEN, and NEW CARD.

6 Phase Fully Actuated (Time Based Coordination) NOTES

- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Bag existing pedestrian heads P41 and P42 and temporarily disable associated pushbuttons.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Portions of detector zones 4A and 5A not shown for clarity.
12. See pavement marking plans for proposed stop bar locations.
13. All edestrian push buttons shall be Vibro-Tactile.
14. All APS shall use "Rapid Tick" sound.



MAXTIME TIMING CHART

MAXTIME TIMING CHART table with columns for FEATURE and PHASE (1, 2, 3, 4, 5, 6) and rows for Walk, Ped Clear, Min Green, Passage, Max 1, Yellow Change, Red Clear, Added Initial, Maximum Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Advance Walk, Non Lock Detector, Vehicle Recall, and Dual Entry.

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION table with columns for SIGNAL FACE, VOICE, TONES, INTERVAL, and SPEECH MESSAGE.

LEGEND

LEGEND table with columns for PROPOSED and EXISTING, listing various traffic and pedestrian signal symbols.

SIGNS

SIGNS table with columns for PROPOSED and EXISTING, listing various traffic signs and their descriptions.

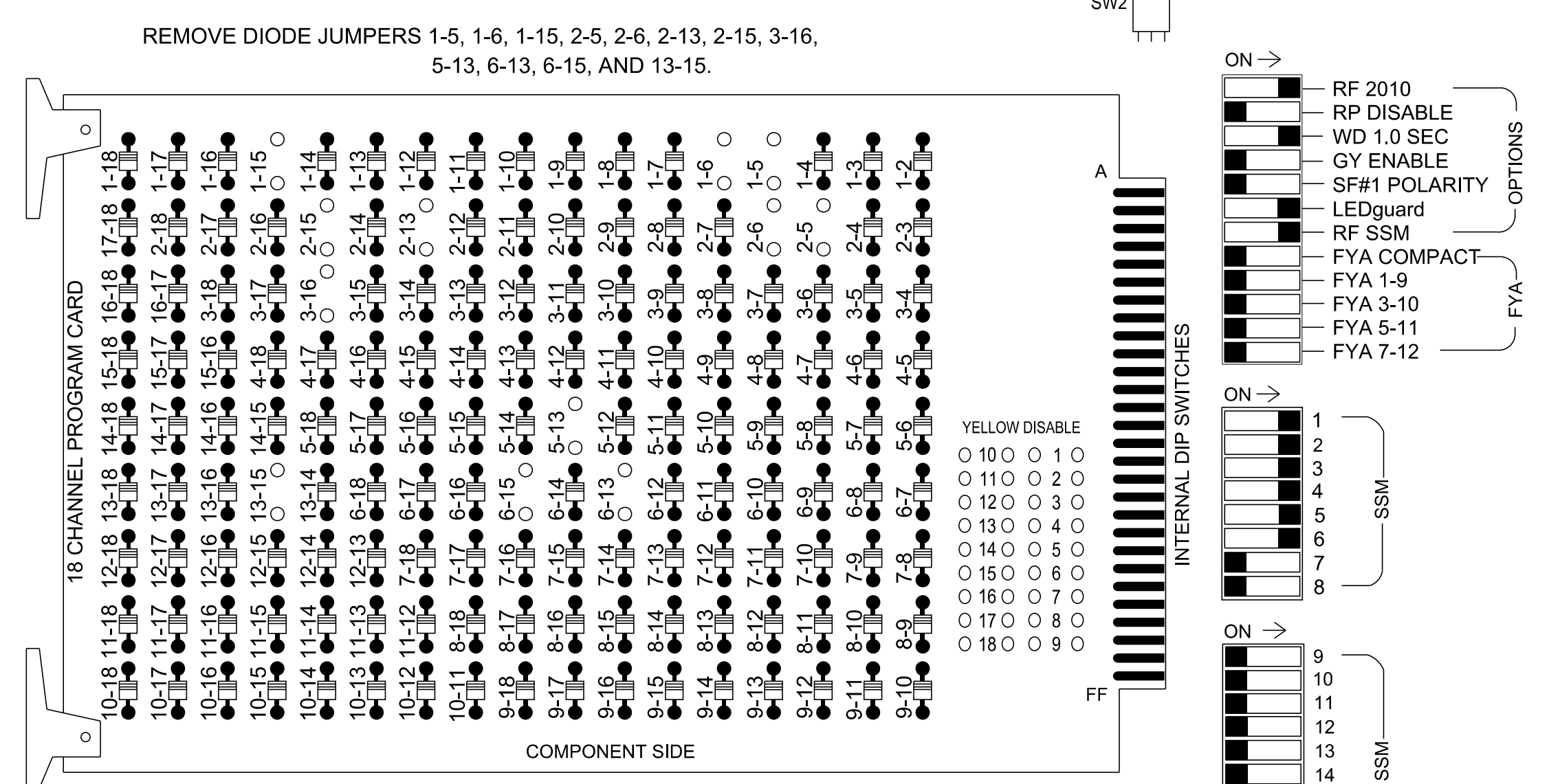
Temporary Signal 6 - TCP Phase VI Step 2

Project information block including logos for RS&H and Transylvania County, project title 'US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway', dates, and signatures.

5/4/2023 11:05:13 AM R:\PROJECTS\1512\Signal\Drawings\Signal Design Section\Sheet 7.0-1.dwg

18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all 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 Walk and 6 Green Walk.
3. If 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 a Temporary Time Based Coordination System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S3, S4, S5, S7, S8, S9, S12
 Phases Used.....1, 2, 2PED, 3, 3PED, 4, 5, 6, 6PED
 Overlaps.....NONE

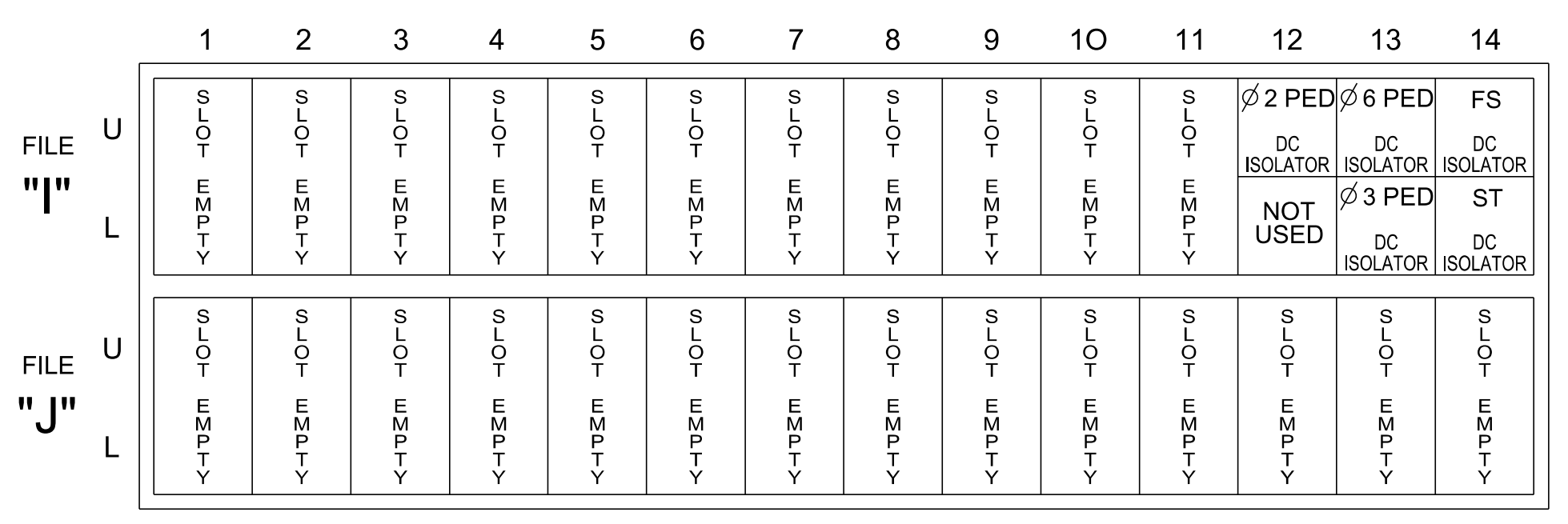
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	3 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11,12	21, 22,23	P21, P22	31	32	62	41	42,43	NU	51,52	32	61,62	P61, P62	NU	NU	P31, P32	NU	NU
RED		128		116	116		101	101					134					
YELLOW		129		117	117		102	102					135					
GREEN		130		118	118		103	103					136					
RED ARROW	125									131								
YELLOW ARROW	126				117					132	132							
FLASHING YELLOW ARROW																		
GREEN ARROW	127			118	118	103				133	133							
Hand icon			113										119				110	
Walking person icon			115										121				112	

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

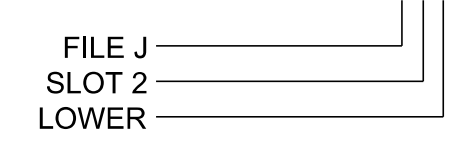
FS = FLASH SENSE
 ST = STOP TIME

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
PED PUSH BUTTONS												
P21,P22	TB8-4,6	I12U	67	33	2	PED 2						
P31,P32	TB8-8,9	I13L	70	36	8	PED 3						
P61,P62	TB8-7,9	I13U	68	34	6	PED 6						

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

INPUT FILE POSITION LEGEND: J2L



SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0798T6
 DESIGNED: May 2023
 SEALED: May 4, 2023
 REVISED: _____


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.

Temporary Signal 6 - TCP Phase VI, Step 2
 Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: **US 64-276 (Asheville Highway)**

Prepared for the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

at
SR 1512 (Ecusta Road) / Bank Driveway


Division 14 Transylvania County Brevard

PLAN DATE: May 2023 REVIEWED BY: V. Kaiser

PREPARED BY: S.G. Haynie REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL



DocuSigned by: **Steven G. Haynie** 5/4/2023

DATE: _____

SIG. INVENTORY NO. 14-0798T6

5/4/2023 8:41:00 AM C:\Users\jgwp\OneDrive\Documents\140798T6.dwg
 11:29:03 AM

PED 3 PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Detector Configuration >Pedestrian Detector

Plan 1

Detector	Description	Call Phase	Call Overlap
2		2	0
4		4	0
6		6	0
8		3	0

NOTICE PHASE 3 PED
ASSIGNED TO
DETECTOR 8 PED →

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

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

Channel Configuration

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

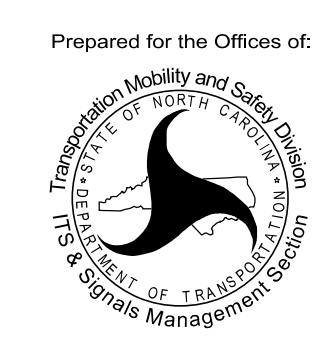
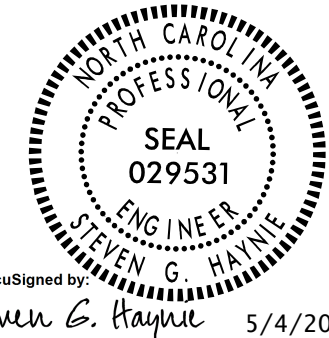

NOTICE PHASE 3 PED
ASSIGNED TO CHANNEL 16 →

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

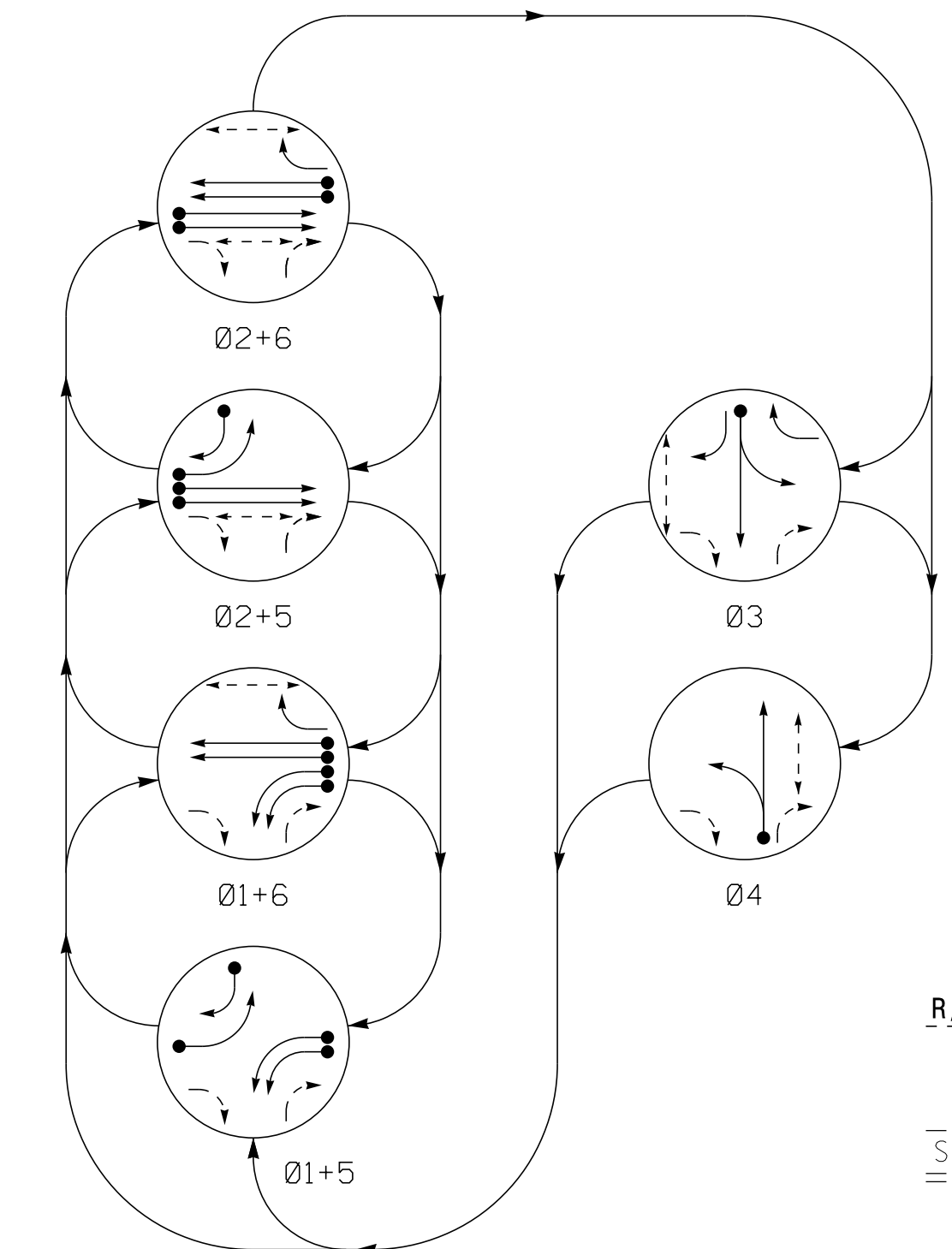
1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-0798T6
DESIGNED: May 2023
SEALED: May 4, 2023
REVISED: _____

Temporary Signal 6 - TCP Phase VI, Step 2
Electrical Detail - Sheet 2 of 2

Electrical and Programming Details For:	US 64-276 (Asheville Highway)		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
	at SR 1512 (Ecusta Road) / Bank Driveway		
Prepared for the Offices of: 	Division 14 PLAN DATE: May 2023 PREPARED BY: S.G. Haynie	Transylvania County REVIEWED BY: V. Kaiser REVIEWED BY:	SEAL  Steven G. Haynie DATE: 5/4/2023
750 N. Greenfield Pkwy, Garner, NC 27529  NC FIRM LICENSE No: F-0493 1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 (704) 752-0610	REVISIONS INIT. DATE	DATE	SIG. INVENTORY NO. 14-0798T6

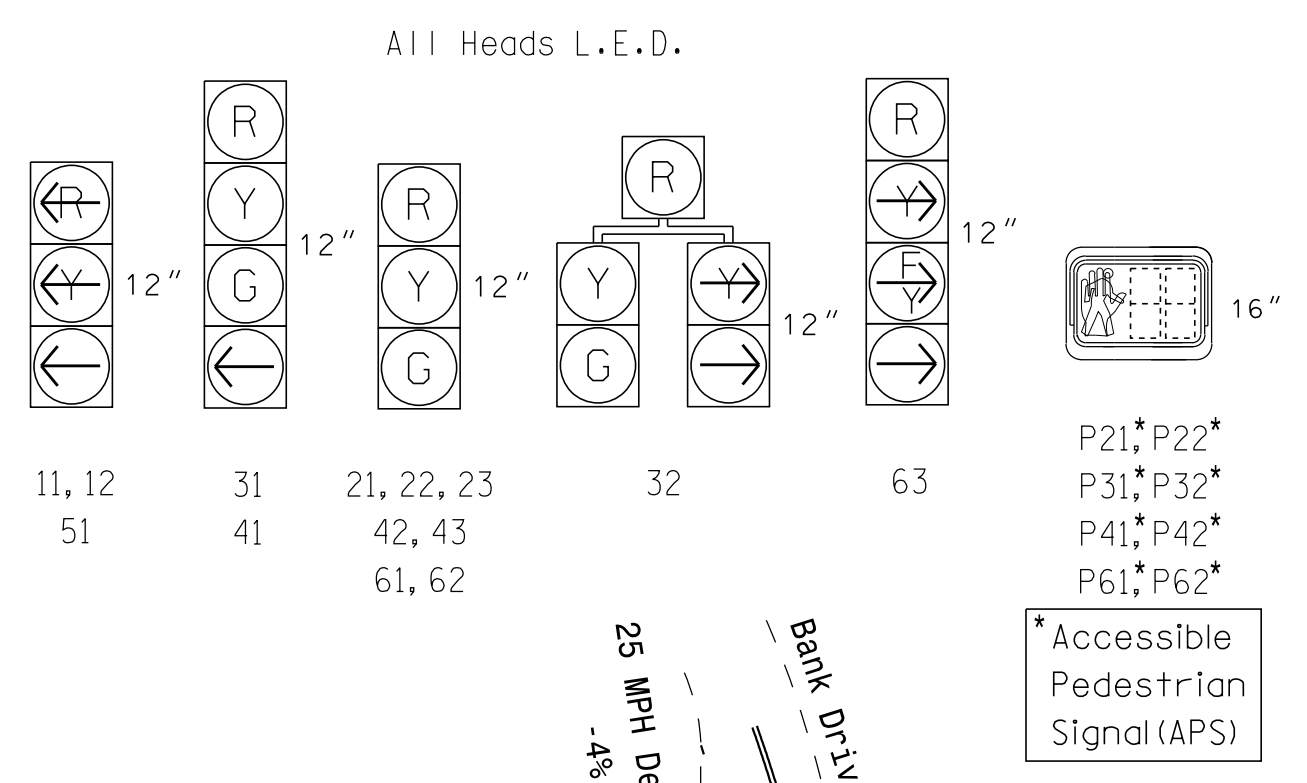
PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

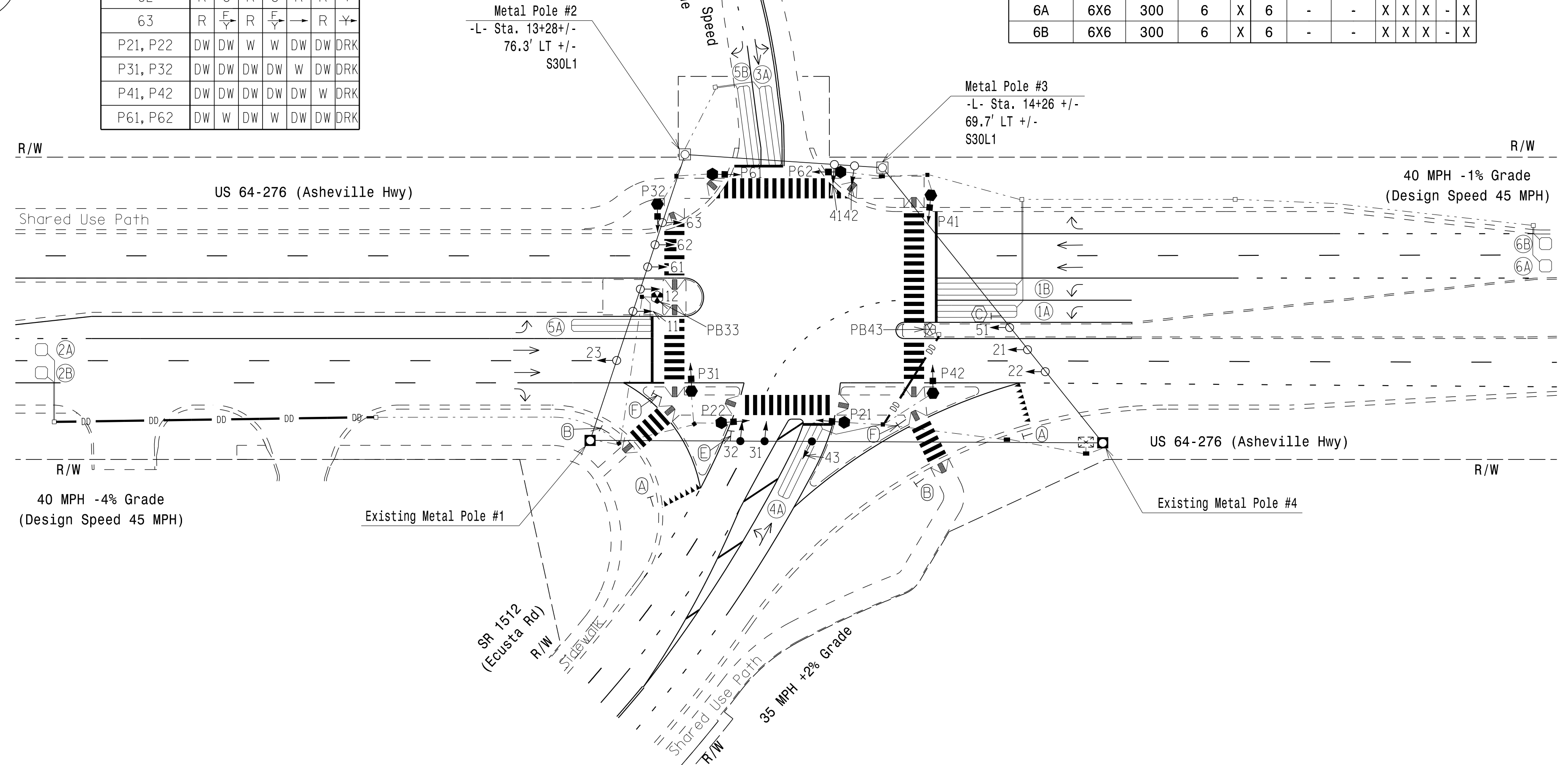


MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DURING GREEN	NEW CARD		
1A	6X40	0	2-4-2	X	1	-	-	X	X	X	-	X
1B	6X40	0	2-4-2	X	1	-	-	X	X	X	-	X
2A	6X6	300	6	X	2	-	-	X	X	X	-	X
2B	6X6	300	6	X	2	-	-	X	X	X	-	X
3A	6X40	0	2-4-2	X	3	3.0	-	X	X	X	-	X
4A	6X40	0	2-4-2	X	4	-	-	X	X	X	-	X
5A	6X40	0	2-4-2	X	5	-	-	X	X	X	-	X
5B	6X40	0	2-4-2	X	5	15.0	-	X	X	X	-	X
6A	6X6	300	6	X	6	-	-	X	X	X	-	X
6B	6X6	300	6	X	6	-	-	X	X	X	-	X

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	02+5	02+6	03	04	PEDEST
11, 12	←	←	←	←	←	←
21, 22, 23	R	R	G	G	R	R
31	R	R	R	R	G	R
32	R	R	R	R	G	R
41	R	R	R	R	G	R
42, 43	R	R	R	R	G	R
51	←	←	←	←	←	←
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y
63	R	G	R	G	R	Y
P21, P22	DW	DW	W	DW	DW	DRK
P31, P32	DW	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DRK

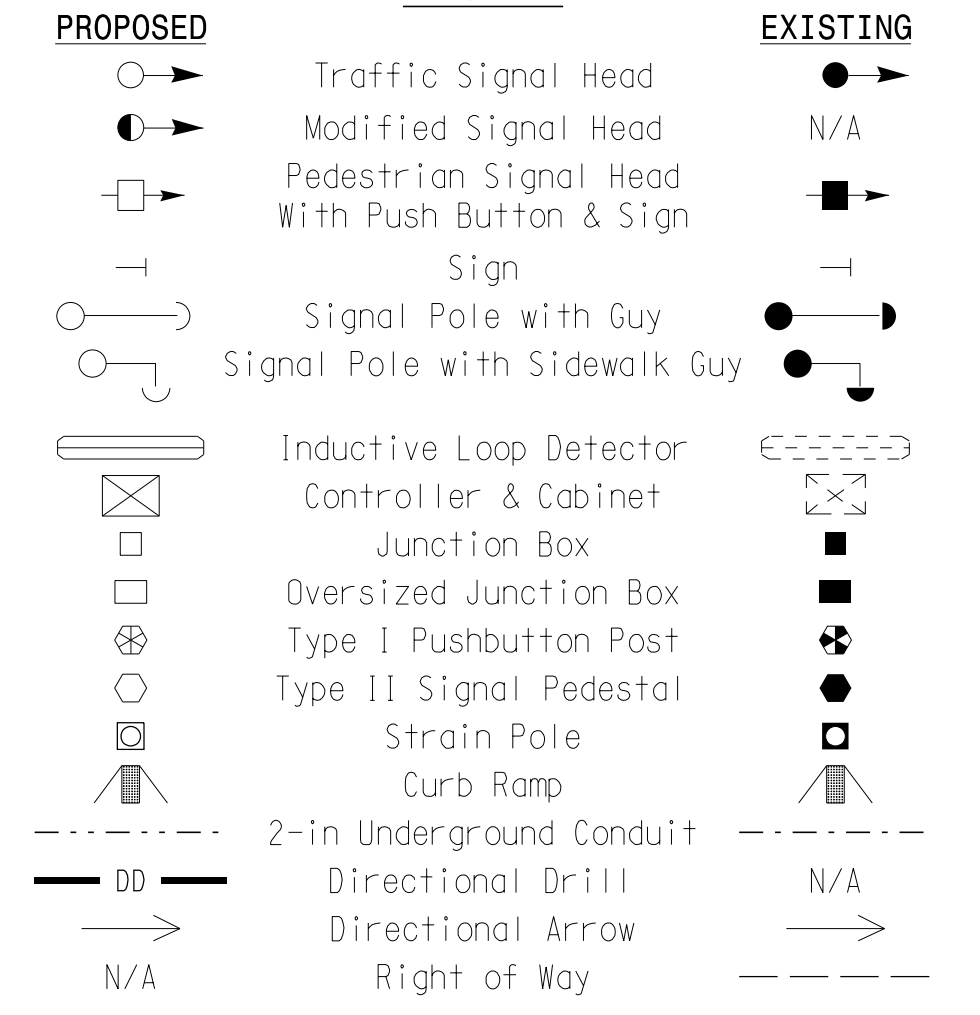


6 Phase Fully Actuated (Time Based Coordination)

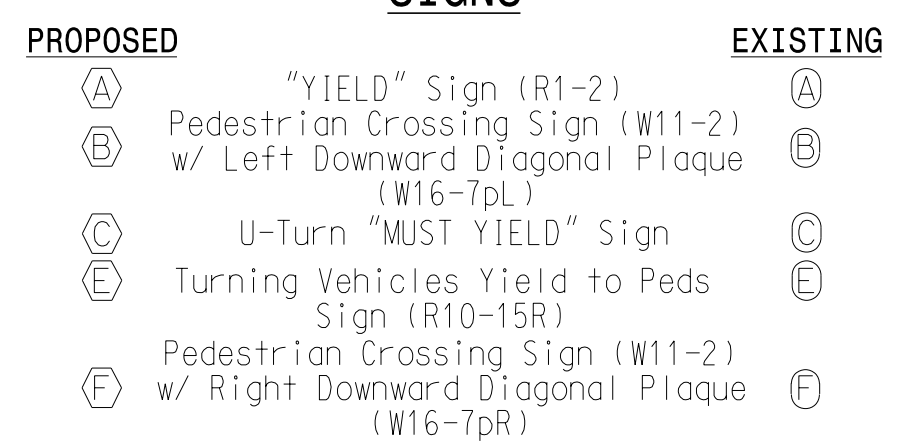
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 or phase 5 may be lagged.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Portions of high-visibility crosswalk not shown for clarity.
- See pavement marking plans for proposed stop bar locations.
- All pedestrian pushbuttons shall be Vibro-Tactile.
- All APS shall use "Rapid Tick" sound.

LEGEND



SIGNS



MAXTIME TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Walk *	-	7	7	7	-	7
Ped Clear *	-	10	20	21	-	13
Min Green	7	12	7	7	7	12
Passage *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	25	90	15	20	15	90
Yellow Change	3.0	4.5	3.4	3.7	3.0	4.5
Red Clear	3.3	2.2	3.1	2.7	3.3	2.2
Added Initial *	-	1.5	-	-	-	1.5
Maximum Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-
Vehicle Recall	-	MIN. RECALL	-	-	-	MIN. RECALL
Dual Entry	-	-	-	-	-	-

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

ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE TONES	INTERVAL	SPEECH MESSAGE
P21	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Ecusta.
P22	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Ecusta.
P31	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Asheville.
P32	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Asheville.
PB33	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Asheville.
P41	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Asheville.
P42	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Asheville.
PB43	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Asheville.
P61	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Driveway.
P62	- X	Walk	(Percussive Tone)
	X -	Flashing Don't Walk / Don't Walk	Wait. Wait to cross Driveway.

Final Signal Design

Prepared for the Offices of: **US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway**

Division 14 Transylvania County Brevard

PLAN DATE: May 2023 REVIEWED BY: S.G. Haynie

PREPARED BY: P. Koloski REVIEWED BY:

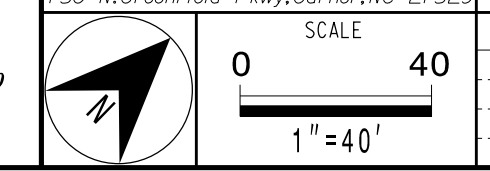
REVISIONS: _____

INIT. DATE

Signature: *Steven G. Haynie* 5/4/2023

Sig Inventory No. 14-0798

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

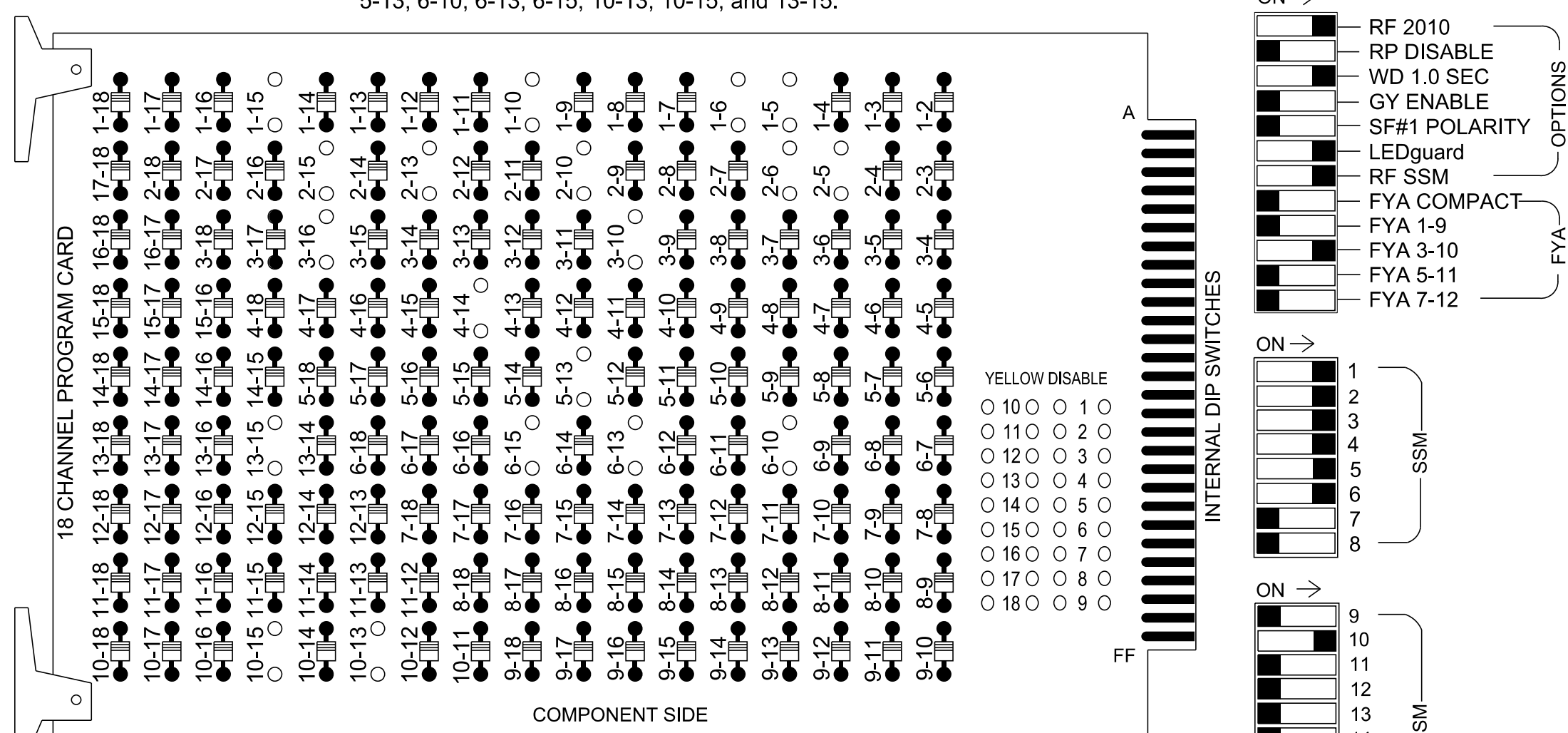


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18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-10, 1-15, 2-5, 2-6, 2-10, 2-13, 2-15, 3-10, 3-16, 4-14, 5-13, 6-10, 6-13, 6-15, 10-13, 10-15, and 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.

2. Return controller to Factory Defaults before programming per this electrical detail.

3. Program controller to start up in phase 2 Green Walk and 6 Green 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 a Time Based Coordination System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on sheet 2

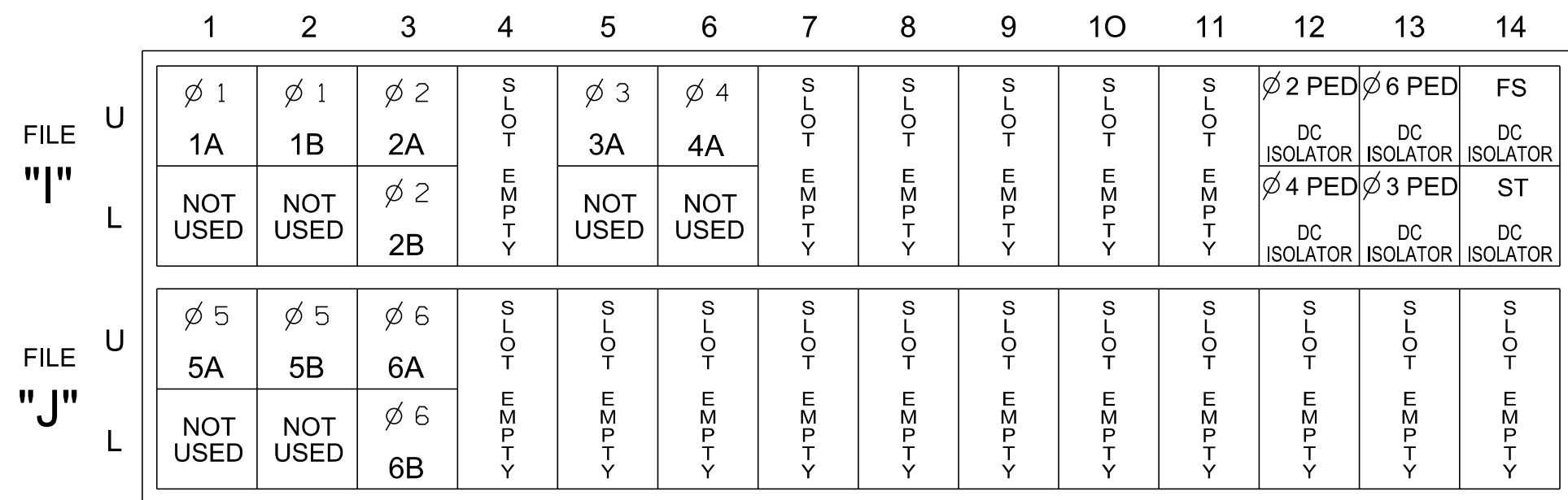
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6				
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18				
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	3 PED	OL1	OL2	SPARE	OL3	OL4	SPARE				
SIGNAL HEAD NO.	11,12	21, 22,23	P21, P22	31	32	63*	41	42,43	P41, P42	51	32	61,62	P61, P62	NU	NU	P31, P32	NU	63*	NU	NU	NU	NU
RED		128		116	116		101	101				134							A124			
YELLOW		129		117	117		102	102				135										
GREEN		130		118	118		103	103				136										
RED ARROW	125									131												
YELLOW ARROW	126									132	132								A125			
FLASHING YELLOW ARROW																			A126			
GREEN ARROW	127			118		118	103		133	133												
⚡									104				119									110
🚶									106				121									112

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

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

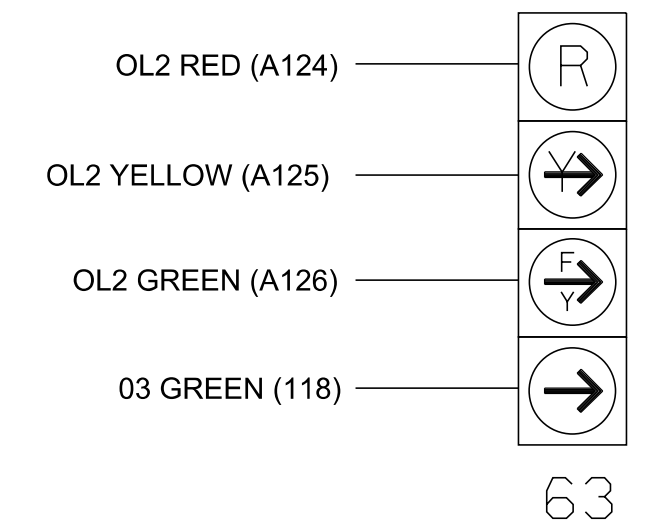
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1	---	---	X	-	X	-
1B	TB2-5,6	I2U	39	1	2	1	---	---	X	-	X	-
2A	TB2-9,10	I3U	63	29	4	2	---	---	X	X	X	-
2B	TB2-11,12	I3L	76	42	5	2	---	---	X	X	X	-
3A	TB4-5,6	I5U	58	20	7	3	3,0	---	X	-	X	-
4A	TB4-9,10	I6U	41	3	8	4	---	---	X	-	X	-
5A	TB3-1,2	J1U	55	17	15	5	---	---	X	-	X	-
5B	TB3-5,6	J2U	40	2	16	5	15,0	---	X	-	X	-
6A	TB3-9,10	J3U	64	30	18	6	---	---	X	X	X	-
6B	TB3-11,12	J3L	77	43	19	6	---	---	X	X	X	-

INPUT FILE POSITION LEGEND: J2L

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

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 14-0798
 DESIGNED: May 2023
 SEALED: May 4, 2023
 REVISED: N/A

Final Signal Design
 Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: **US 64-276 (Asheville Highway)**

at **SR 1512 (Ecusta Road) / Bank Driveway**

Division 14 Transylvania County Brevard

PLAN DATE: **May 2023** REVIEWED BY: **V. Kaiser**

PREPARED BY: **S.G. Haynie** REVIEWED BY:

REVISIONS: _____ INIT. DATE

750 N. Greenfield Pkwy, Gamer, NC 27529

RS&H
 NC FIRM LICENSE NO: F-0493
 1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 (704) 752-0610

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

STEVEN G. HAYNIE
 PROFESSIONAL ENGINEER
 No. 029531
 State of North Carolina

DocuSigned by: **Steven G. Haynie** 5/4/2023
 -06330CC8A504488- DATE
 SIG. INVENTORY NO. 14-0798

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.

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

PED 3 PROGRAMMING DETAIL

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

Web Interface
Home >Controller >Detector Configuration >Pedestrian Detector

Plan 1

NOTICE PHASE 3 PED
ASSIGNED TO
DETECTOR 8 PED →

Detector	Description	Call Phase	Call Overlap
2		2	0
4		4	0
6		6	0
8		3	0

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

OUTPUT CHANNEL CONFIGURATION

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

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


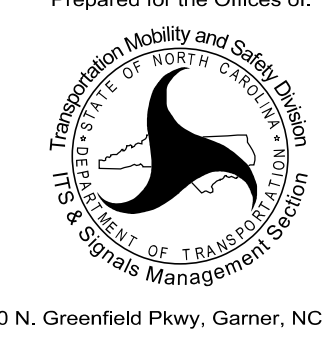
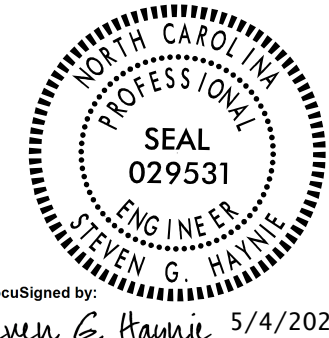
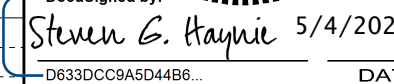
Channel Configuration

NOTICE PHASE 3 PED
ASSIGNED TO CHANNEL 16 →

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

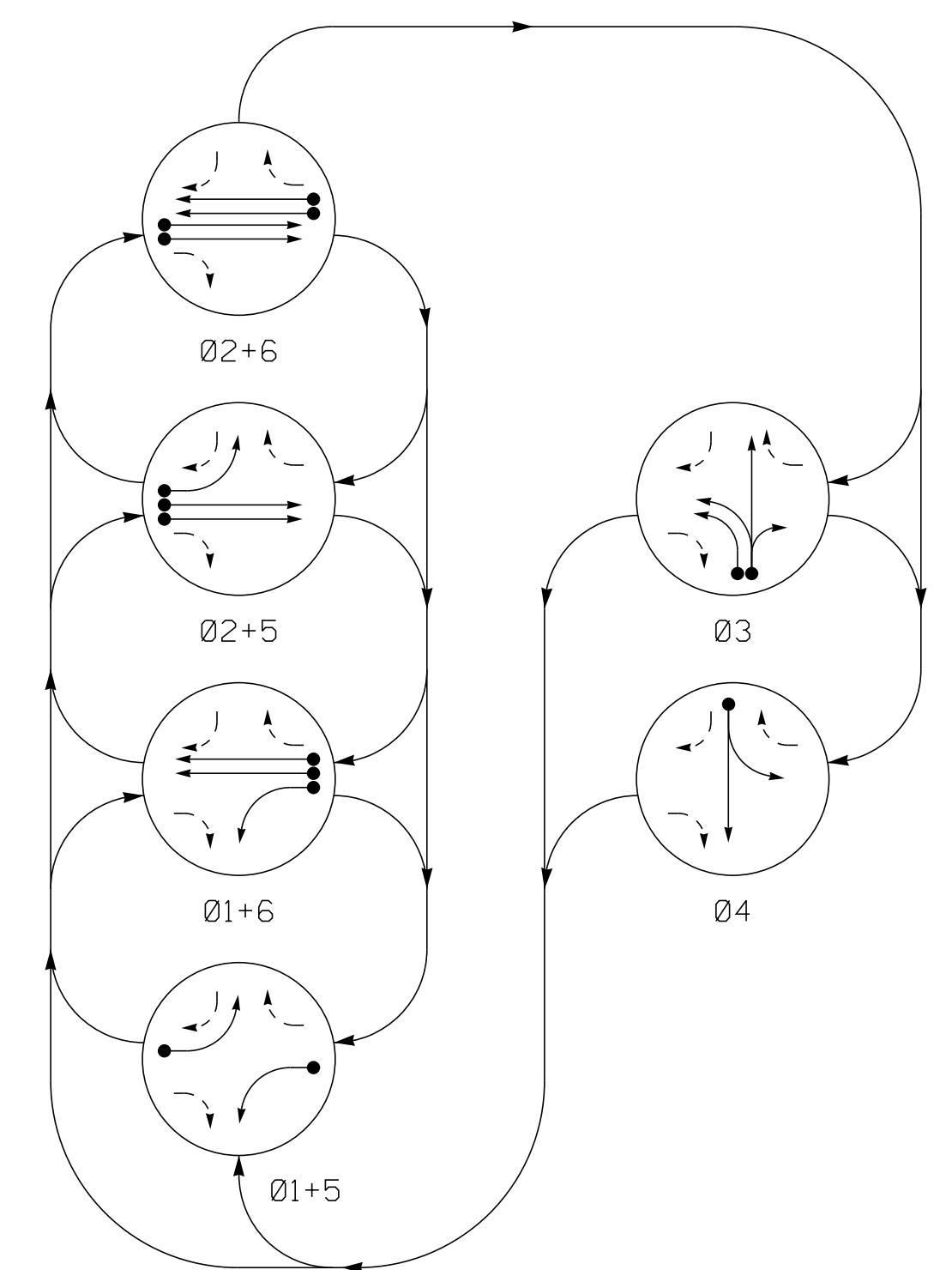
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-0798
DESIGNED: May 2023
SEALED: May 4, 2023
REVISED: N/A

Final Signal Design
Electrical Detail - Sheet 2 of 2

 NC FIRM LICENSE No: F-0493 1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 (704) 752-0610	Prepared for the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	Electrical and Programming Details For:	US 64-276 (Asheville Highway) at SR 1512 (Ecusta Road) / Bank Driveway	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
		Division 14 Transylvania County Brevard	SEAL  SEVEN G. HAYNIE ENGINEER	
		PLAN DATE: May 2023 REVIEWED BY: V. Kaiser PREPARED BY: S.G. Haynie REVIEWED BY:	REVISIONS INIT. DATE _____ _____ _____	
DocuSigned by: Steven G. Haynie 5/4/2023 		DATE: _____ SIG. INVENTORY NO. 14-0798	DATE: _____	

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PHASING DIAGRAM



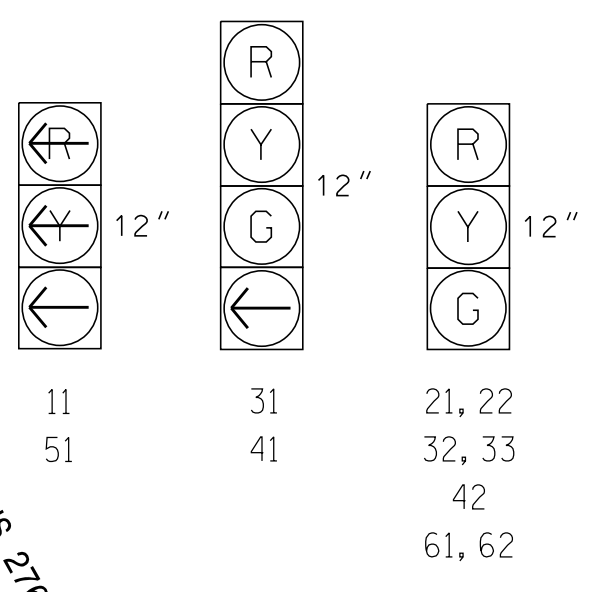
PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION table with columns for SIGNAL FACE and PHASE (Ø1+5, Ø2+5, Ø2+6, Ø3, Ø4, FLASH).

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART table with columns for LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, CALL PHASE, DELAY TIME, EXTEND TIME, EXTEND INITIAL, CALL, DELAY DURING GREEN, NEW CARD.

6 Phase Fully Actuated (Time Based Coordination)

NOTES

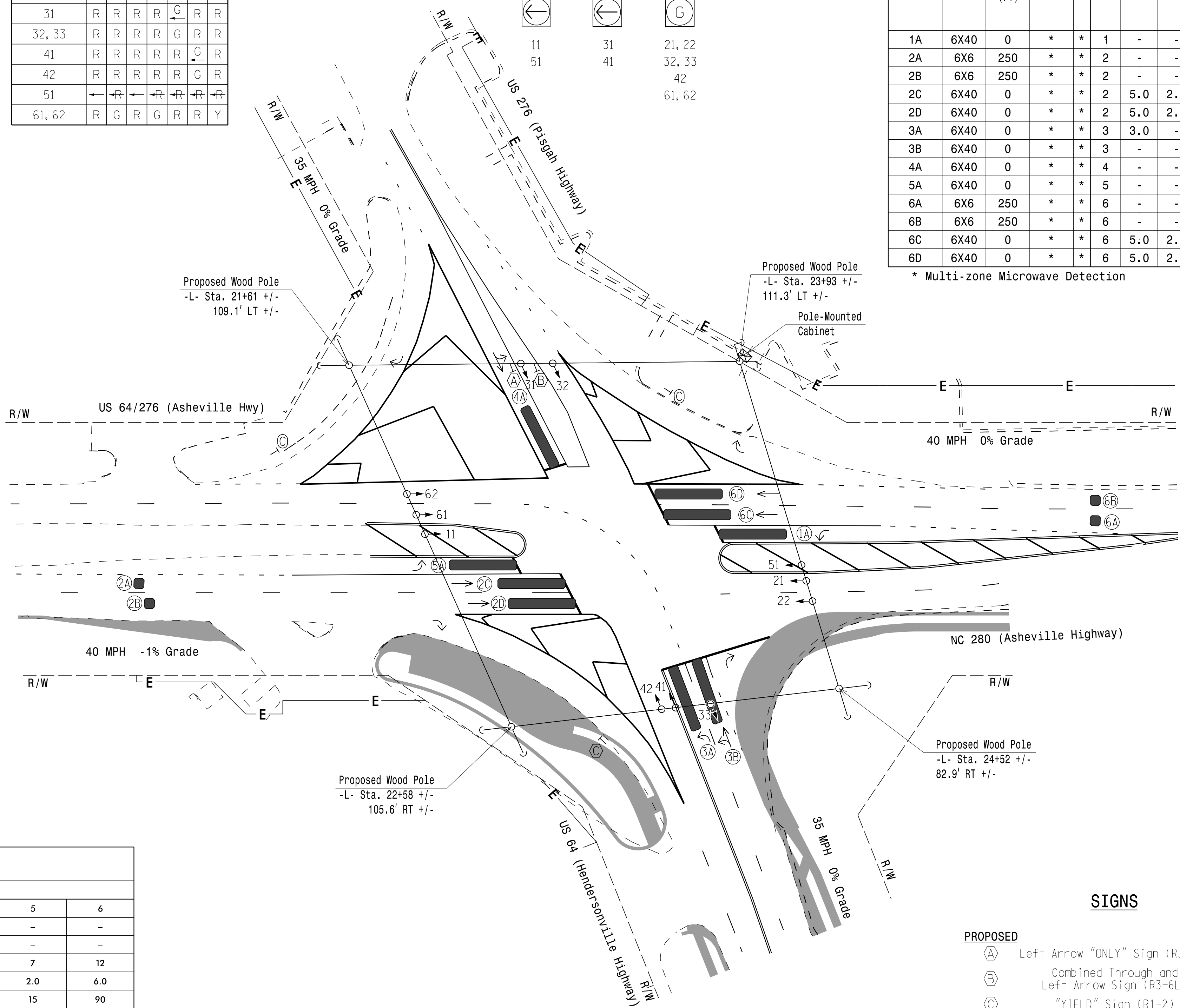
- 1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018...
2. Do not program signal for late night flashing operation...
3. Phase 1 and Phase 5 may be lagged.
4. The order of Phase 3 and Phase 4 may be reversed.
5. Locate new cabinet so as not to obstruct sight distance...
6. Set all detector units to presence mode.
7. See R-5799 TMP Phase IV for pavement markings.
8. This intersection uses multi-zone microwave detection.
9. Maximum times shown in timing chart are for free-run operation only.
10. Furnish and install GPS Unit.

LEGEND

- PROPOSED: Traffic Signal Head, Modified Signal Head, Pedestrian Signal Head, Signal Pole with Guy, Inductive Loop Detector, Video Detection Zone, Controller & Cabinet, Junction Box, Oversized Junction Box, Type I Pushbutton Post, Type II Signal Pedestal, Strain Pole, Construction Zone, Curb Ramp, 2-in Underground Conduit, Directional Drill, Directional Arrow, Right of Way, Temp. Construction Easement.
EXISTING: N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A, N/A.

SIGNS

- PROPOSED: (A) Left Arrow "ONLY" Sign (R3-5L), (B) Combined Through and Left Arrow Sign (R3-6L), (C) "YIELD" Sign (R1-2).
EXISTING: (A), (B), (C).



MAXTIME TIMING CHART table with columns for FEATURE and PHASE (1-6). Rows include Walk, Ped Clear, Min Green, Passage, Max I, Yellow Change, Red Clear, Added Initial, Maximum Initial, Time Before Reduction, Time To Reduce, Minimum Gap, Advance Walk, Non Lock Detector, Vehicle Recall, Dual Entry.

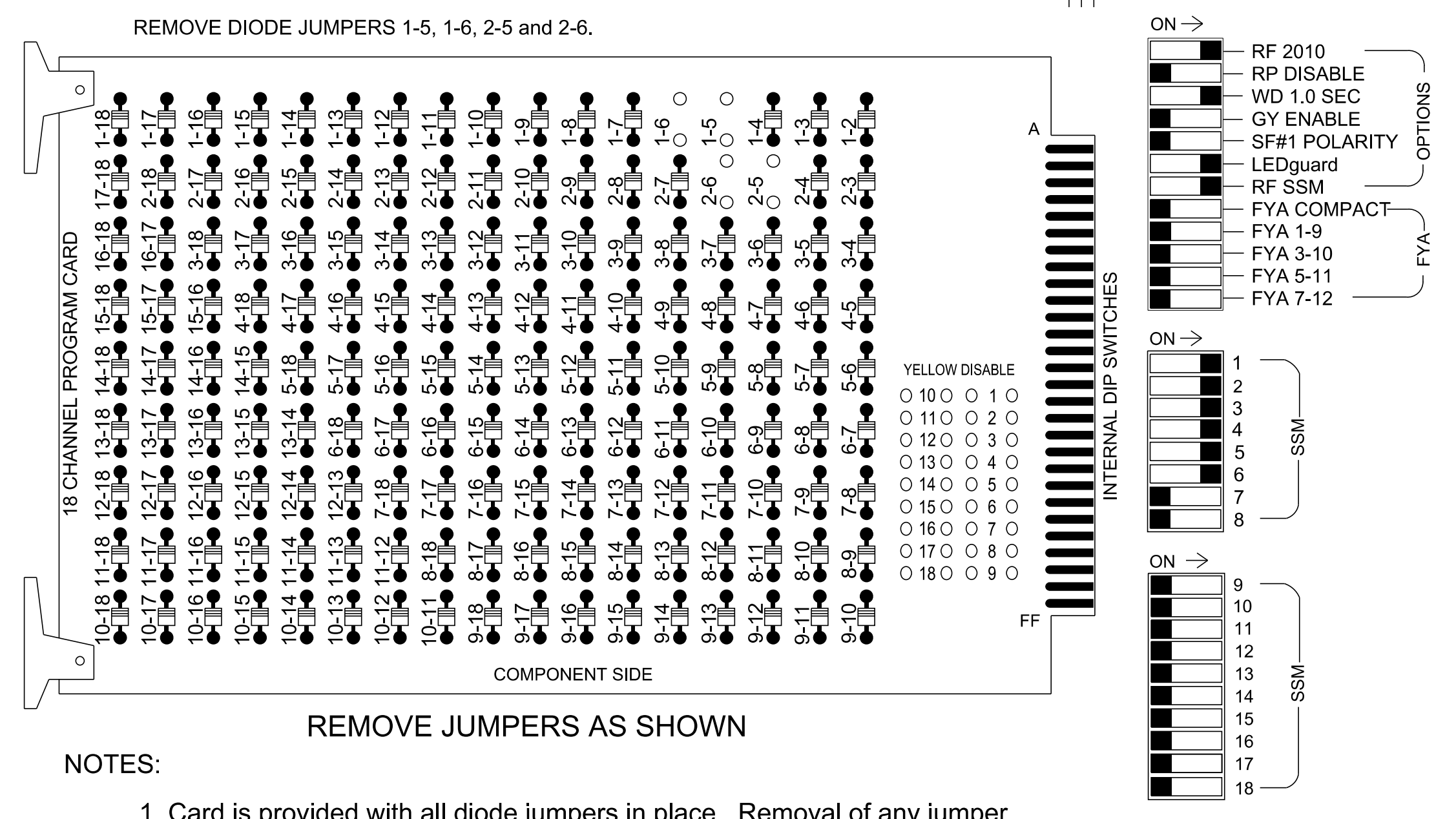
* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Temporary Signal 1 - TCP Phase IV. Includes project title, location (US 64 / NC 280), division (Transylvania County), plan date (April 2023), and professional engineer seal for Steven G. Haynie.

4/28/2023 5:33:12 PM \\rsandh.com\... 4030049021.R-5799.US 64-276 Intersection.Dwg

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

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

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....336
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Pole
 Output File Positions.....12
 Load Switches Used.....S1, S2, S4, S5, S7, S8
 Phases Used.....1, 2, 3, 4, 5, 6
 OverlapsNONE

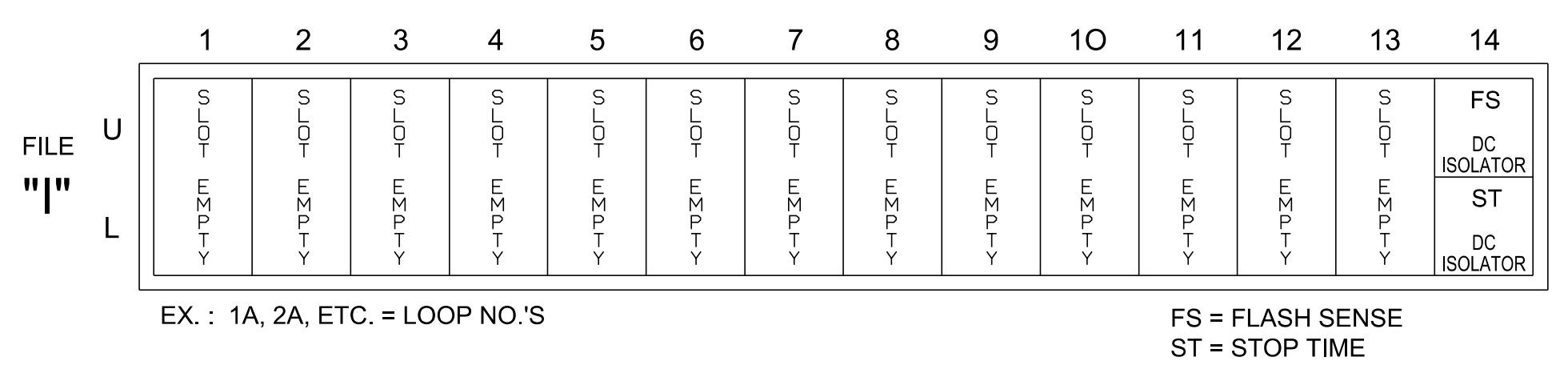
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	32,33	41	42	NU	51	61,62	NU	NU
RED	128		116	116	101	101			134			
YELLOW	129		117	117	102	102			135			
GREEN	130		118	118	103	103			136			
RED ARROW	125								131			
YELLOW ARROW	126								132			
GREEN ARROW	127		118		103				133			

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0659T1
 DESIGNED: April 2023
 SEALED: April 28, 2023
 REVISED: _____

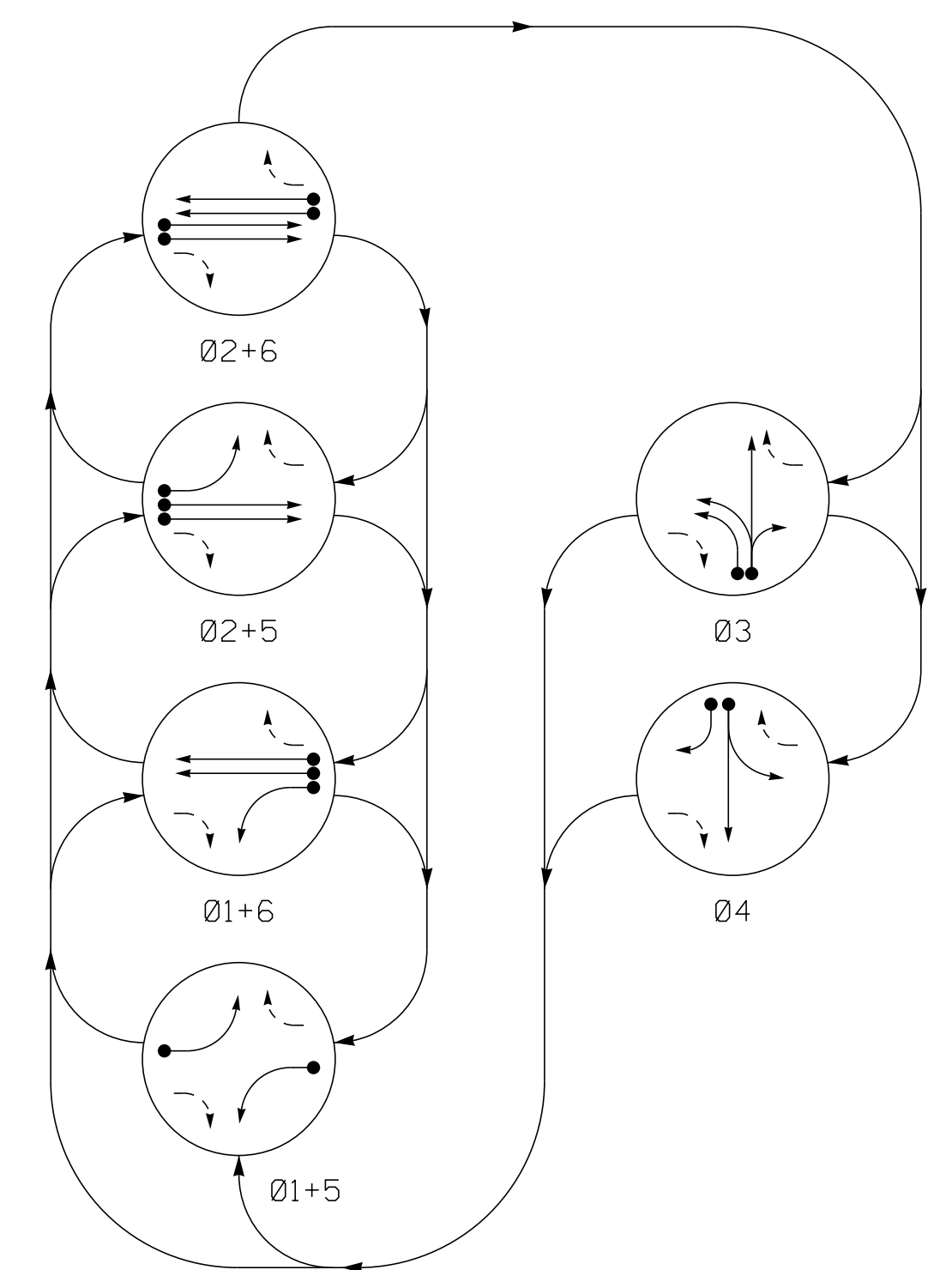
Temporary Signal 1 - TCP Phase IV Electrical Detail

Electrical and Programming Details For:	US 64-276 / NC 280 (Asheville Highway) at US 64 (Hendersonville Highway) / US 276 (Pisgah Highway)	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
Prepared for the Offices of:	Division 14 Transylvania County Brevard	SEAL
Plan Date:	April 2023	REVIEWED BY: V. Kaiser
Prepared By:	S.G. Haynie	REVIEWED BY:
REVISIONS	INIT.	DATE
750 N. Greenfield Pkwy, Garner, NC 27529		



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PHASING DIAGRAM



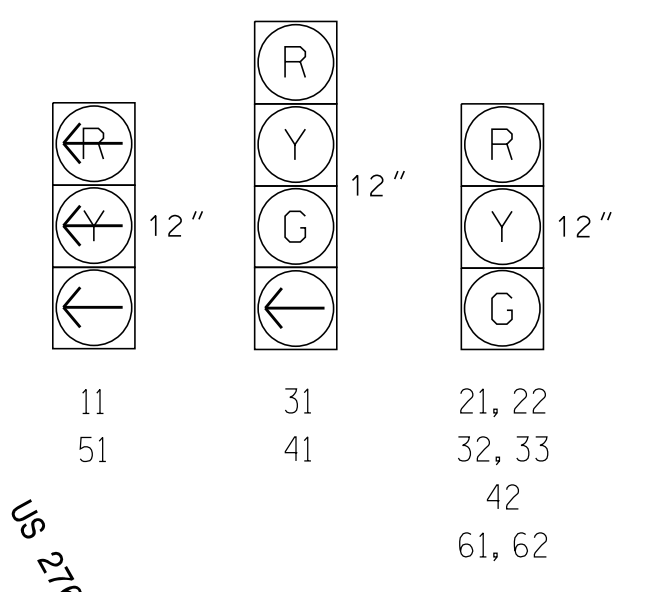
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE					
	Ø 1 1+5	Ø 1 1+6	Ø 2 2+5	Ø 2 2+6	Ø 3	Ø 4 FLASH
11	←	←	←	←	←	←
21, 22	R	R	G	G	R	Y
31	R	R	R	R	G	R
32, 33	R	R	R	R	G	R
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	←	←	←	←	←	←
61, 62	R	G	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

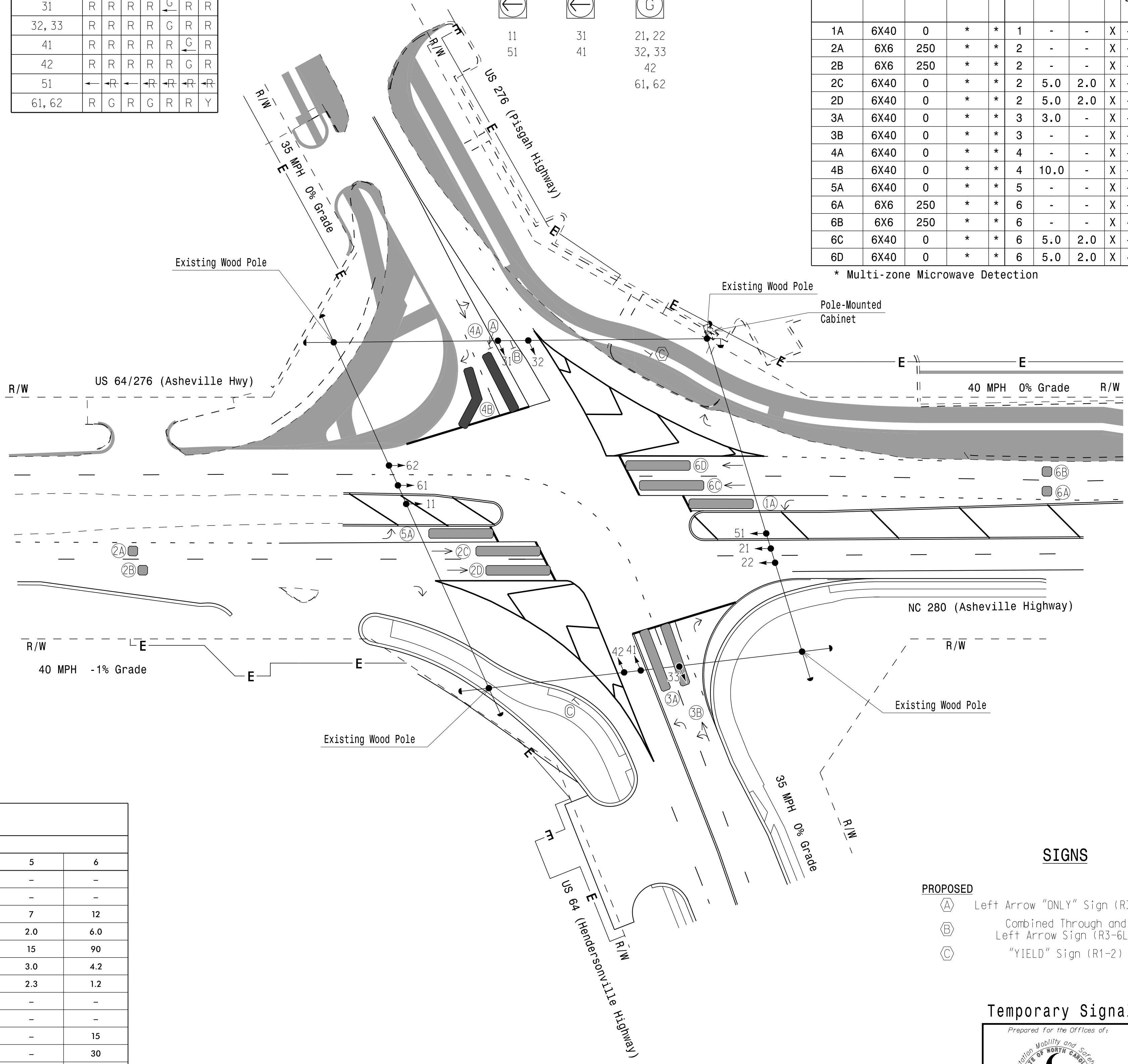
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING							
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DURING GREEN	NEW CARD		
1A	6X40	0	*	*	1	-	-	X	-	X	-	*
2A	6X6	250	*	*	2	-	-	X	-	-	-	*
2B	6X6	250	*	*	2	-	-	X	-	-	-	*
2C	6X40	0	*	*	2	5.0	2.0	X	-	X	X	*
2D	6X40	0	*	*	2	5.0	2.0	X	-	X	X	*
3A	6X40	0	*	*	3	3.0	-	X	-	X	-	*
3B	6X40	0	*	*	3	-	-	X	-	X	-	*
4A	6X40	0	*	*	4	-	-	X	-	X	-	*
4B	6X40	0	*	*	4	10.0	-	X	-	X	-	*
5A	6X40	0	*	*	5	-	-	X	-	X	-	*
6A	6X6	250	*	*	6	-	-	X	-	-	-	*
6B	6X6	250	*	*	6	-	-	X	-	-	-	*
6C	6X40	0	*	*	6	5.0	2.0	X	-	X	X	*
6D	6X40	0	*	*	6	5.0	2.0	X	-	X	X	*

* Multi-zone Microwave Detection

6 Phase Fully Actuated (Time Based Coordination)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and Phase 5 may be lagged.
- The order of Phase 3 and Phase 4 may be reversed.
- Reposition existing signal heads #22, 41, and 42.
- Set all detector units to presence mode.
- See R-5799 TMP Phase V for pavement markings.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



LEGEND

- | | | | |
|--|--|--|--|
| | PROPOSED Traffic Signal Head | | EXISTING Traffic Signal Head |
| | PROPOSED Modified Signal Head | | EXISTING Modified Signal Head |
| | PROPOSED Pedestrian Signal Head | | EXISTING Pedestrian Signal Head |
| | PROPOSED Sign with Guy | | EXISTING Sign with Guy |
| | PROPOSED Signal Pole with Sidewalk Guy | | EXISTING Signal Pole with Sidewalk Guy |
| | PROPOSED Inductive Loop Detector | | EXISTING Inductive Loop Detector |
| | PROPOSED Video Detection Zone | | EXISTING Video Detection Zone |
| | PROPOSED Controller & Cabinet | | EXISTING Controller & Cabinet |
| | PROPOSED Junction Box | | EXISTING Junction Box |
| | PROPOSED Oversized Junction Box | | EXISTING Oversized Junction Box |
| | PROPOSED Type I Pushbutton Post | | EXISTING Type I Pushbutton Post |
| | PROPOSED Type II Signal Pedestal | | EXISTING Type II Signal Pedestal |
| | PROPOSED Strain Pole | | EXISTING Strain Pole |
| | PROPOSED Construction Zone | | EXISTING Construction Zone |
| | PROPOSED Curb Ramp | | EXISTING Curb Ramp |
| | PROPOSED 2-in Underground Conduit | | EXISTING 2-in Underground Conduit |
| | PROPOSED Directional Drill | | EXISTING Directional Drill |
| | PROPOSED Directional Arrow | | EXISTING Directional Arrow |
| | PROPOSED Right of Way | | EXISTING Right of Way |
| | PROPOSED Temp. Construction Easement | | EXISTING Temp. Construction Easement |

SIGNS

- | | | | |
|--|---|--|---|
| | PROPOSED Left Arrow "ONLY" Sign (R3-5L) | | EXISTING Left Arrow "ONLY" Sign (R3-5L) |
| | PROPOSED Combined Through and Left Arrow Sign (R3-6L) | | EXISTING Combined Through and Left Arrow Sign (R3-6L) |
| | PROPOSED "YIELD" Sign (R1-2) | | EXISTING "YIELD" Sign (R1-2) |

MAXTIME TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Walk *	-	-	-	-	-	-
Ped Clear *	-	-	-	-	-	-
Min Green	7	12	7	7	7	12
Passage *	2.0	6.0	2.0	2.0	2.0	6.0
Max I *	15	90	25	35	15	90
Yellow Change	3.0	4.2	3.8	3.8	3.0	4.2
Red Clear	2.4	1.2	3.0	2.8	2.3	1.2
Added Initial *	-	-	-	-	-	-
Maximum Initial *	-	-	-	-	-	-
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Advance Walk	-	-	-	-	-	-
Non Lock Detector	X	-	X	X	X	-
Vehicle Recall	-	MIN. RECALL	-	-	-	MIN. RECALL
Dual Entry	-	-	-	-	-	-

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

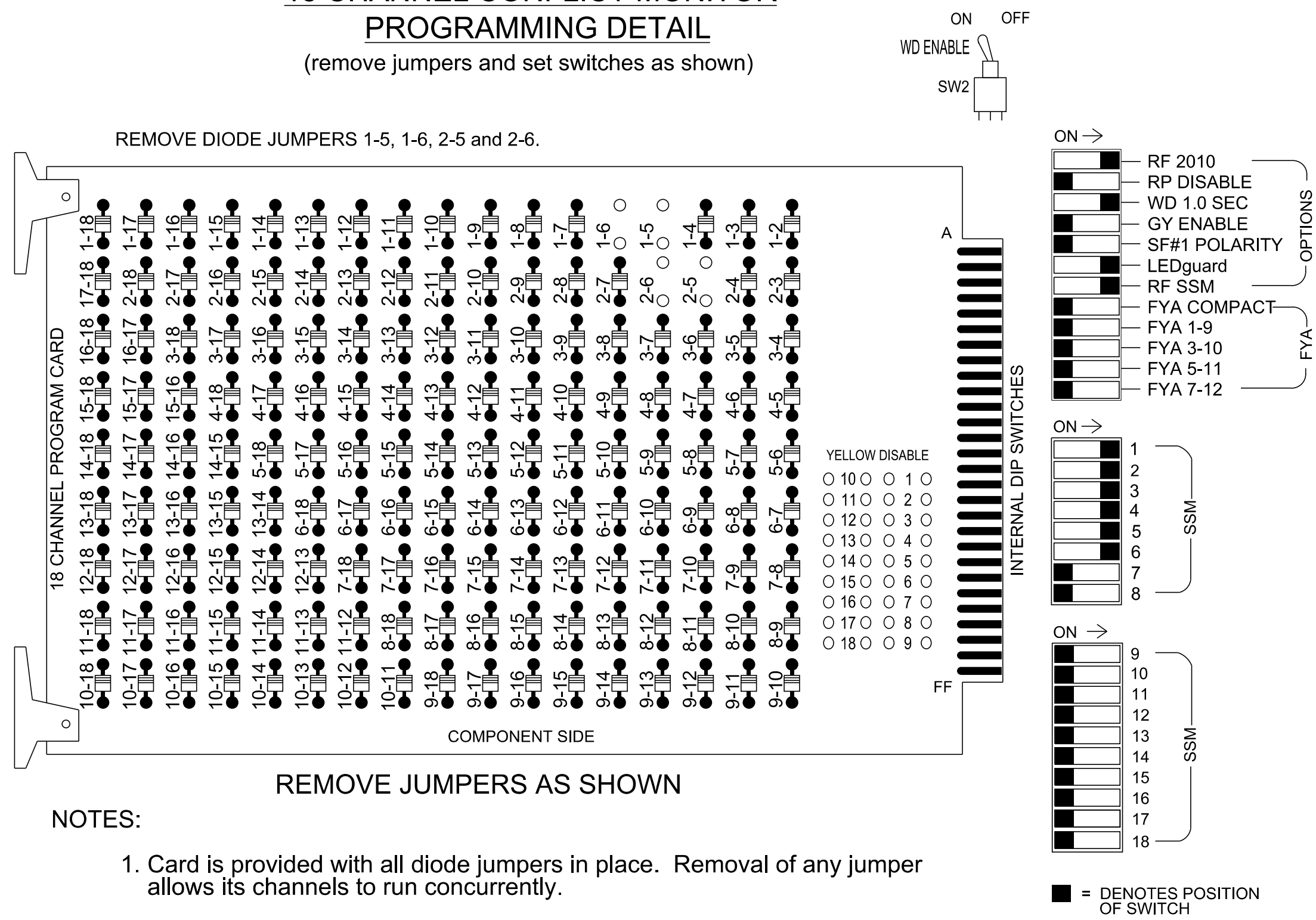
Temporary Signal 2 - TCP Phase V

 NC FIRM LICENSE No: F-0493 1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 (704) 752-0610	Prepared for the Offices of: US 64-276 / NC 280 (Asheville Highway)		SEAL SEVEN G. HAYNIE PROFESSIONAL ENGINEER No. 029531 State of North Carolina
	at US 64 (Hendersonville Highway) / US 276 (Pisgah Highway)		
Division 14 Transylvania County Brevard		PLAN DATE: April 2023 REVIEWED BY: S.G. Haynie	
PREPARED BY: P. Koloski		REVIEWED BY:	
REVISIONS		INIT. DATE	
SCALE 0 40 1"=40'		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
DocuSign Steven G. Haynie/28/2023		Sig Inventory No. 14-065972	

4/28/2023 5:33:01 PM \\rsandh.com\dfs\1\proj\41030049021_R-5799_US_64-276_Intersection_Design\Drawings\Signal\gnw\Plan_Sheets\W5799_Sig_Plan_10-0_14065972.dgn

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that the Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

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

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....336
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Pole
 Output File Positions.....12
 Load Switches Used.....S1, S2, S4, S5, S7, S8
 Phases Used.....1, 2, 3, 4, 5, 6
 OverlapsNONE

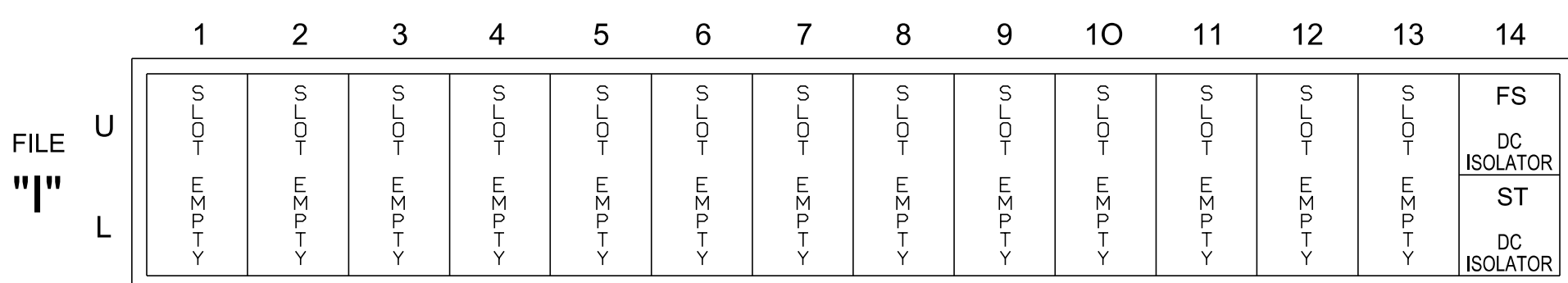
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	32,33	41	42	NU	51	61,62	NU	NU
RED		128		116	116	101	101			134		
YELLOW		129		117	117	102	102			135		
GREEN		130		118	118	103	103			136		
RED ARROW	125								131			
YELLOW ARROW	126								132			
GREEN ARROW	127			118		103			133			

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

SPECIAL DETECTOR NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0659T2
 DESIGNED: April 2023
 SEALED: April 28, 2023
 REVISED: _____

Temporary Signal 2 - TCP Phase V Electrical Detail

Electrical and Programming Details For: US 64-276 / NC 280 (Asheville Highway) at US 64 (Hendersonville Highway) / US 276 (Pisgah Highway)

Prepared for the Offices of: Transylvania County Brevard

Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: V. Kaiser

PREPARED BY: S.G. Haynie REVIEWED BY:

REVISIONS

INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

RS&H
 NC FIRM LICENSE No: F-0493
 1520 SOUTH BOULEVARD, SUITE 200
 CHARLOTTE, NC 28203
 (704) 752-0610

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

DocuSigned by:
 Steven G. Haynie 4/28/2023

SIG. INVENTORY NO. 14 - 0659T2

4/28/2023 1:53:37:28 PM ***rsandh.com***:lea:tr:nsppor:tot:lon:wp:4:03004302:R-5799_US_64-276_Intersection:On:Das:gn#P:lon:Sheets#w5799_s:lg:psn,10-1_140659T2.elec.dgn

Semi-Actuated Rectangular Rapid Flashing Beacon (RRFB)

ERECT RRFB ON TYPE II PEDESTAL
(STD. DWG. 1743.02) WITH SIGNS

W11-2 FYG
(36" x 36")

W16-7PL FYG
(18" x 30")

R10-25
(9" x 12")

FIGURE 1 - SIGN B

ERECT RRFB ON TYPE II PEDESTAL
(STD. DWG. 1743.02) WITH SIGNS

W11-2 FYG
(36" x 36")

W16-7PR FYG
(18" x 30")

R10-25
(9" x 12")

FIGURE 2 - SIGN C

ERECT RRFB ON TYPE II PEDESTAL
(STD. DWG. 1743.02) WITH SIGNS
(Dual-Sided)

W11-2 FYG
(36" x 36")

Note: Opposite side shall be configured the same

W16-7PR FYG
(18" x 30")

R10-25*
(9" x 12")

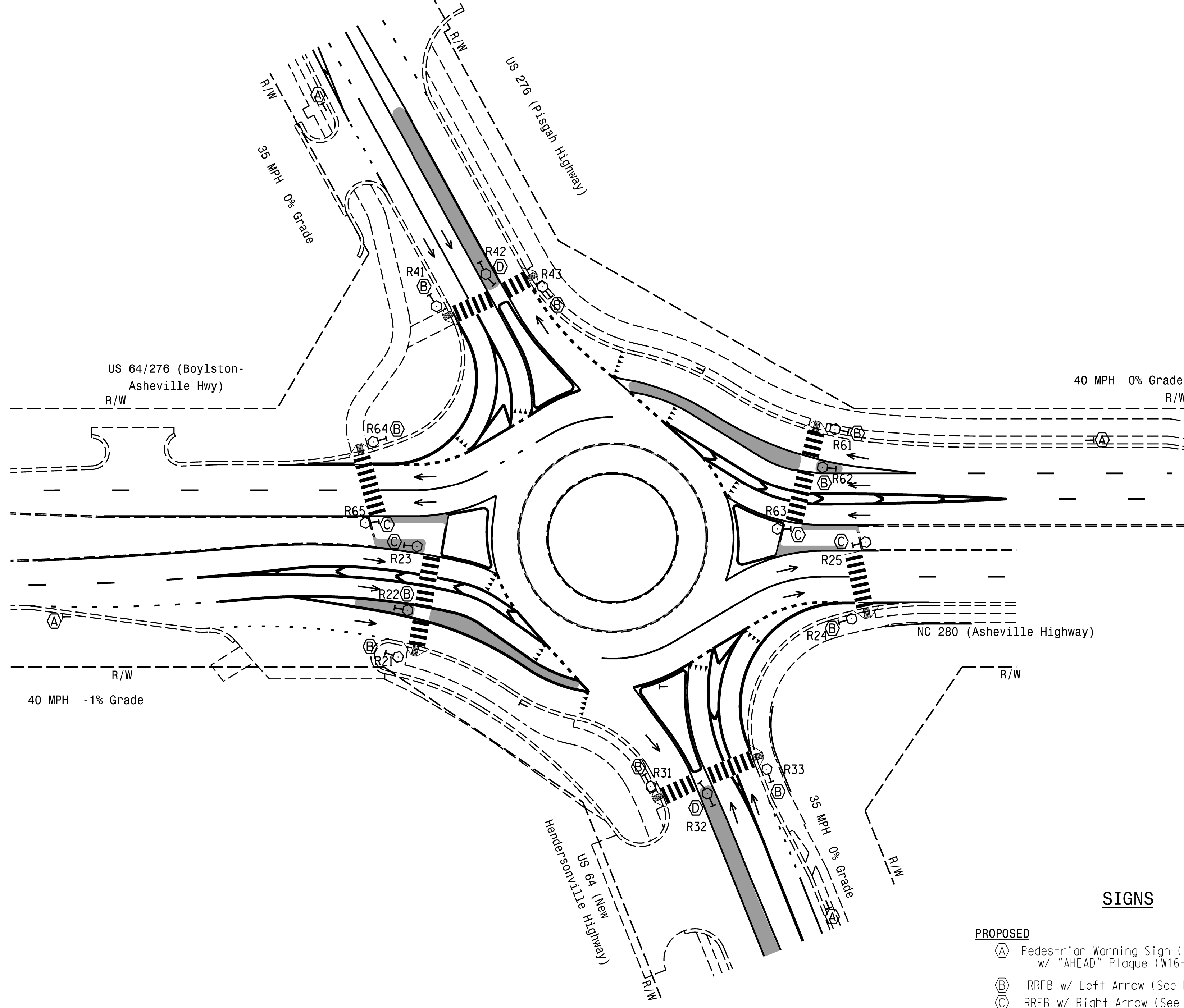
* R10-25 sign only required on side of pole with pushbutton and shall be oriented to be centered above the pushbutton.

FIGURE 4 - SIGN D

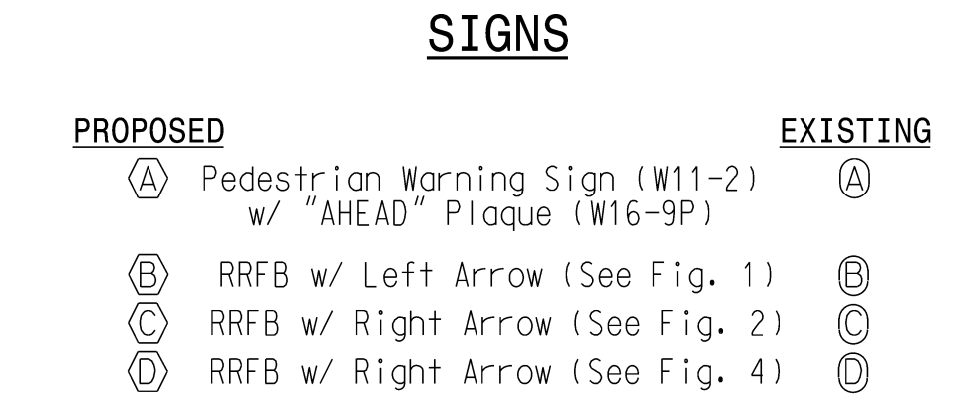
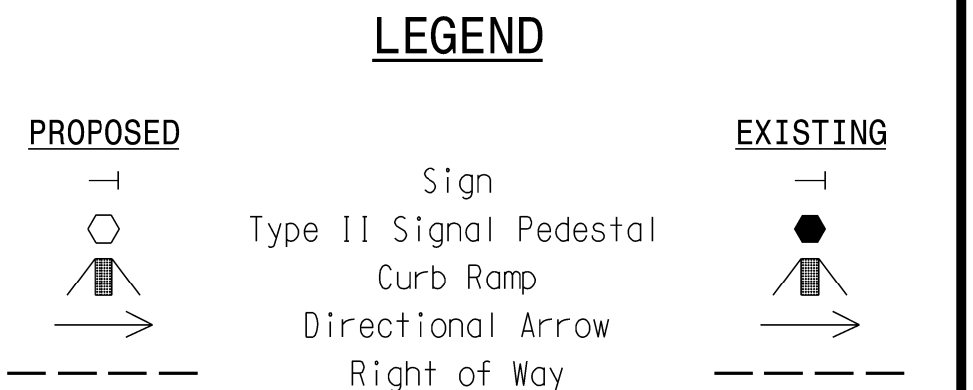
TIMING CHART

FEATURE	RRFB GROUP					
	R21/R22/R23	R24/R25	R31/R32/R33	R41/R42/R43	R61/R62/R63	R64/R65
RRFB Flash Time	23	17	23	21	23	19

- Notes:
- These values may be field adjusted. Do not adjust RRFB Flash times lower than what is shown.
 - R31/R32/R33 and R41/R42/R43 RRFB Flash time is intended to be sufficient time to cross from one side of the road to the other.



- NOTES**
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
 - Align the front face of the pedestrian push button assembly parallel with the crosswalk.
 - The distance to the pushbutton from the edge of the sidewalk should be no greater than 18".
 - The pay item for Rectangular Rapid Flashing Beacon (RRFB) shall include, but not be limited to the signs, pushbuttons, flashing beacons, solar panel, battery, controller assembly, and all incidentals related to the installation of the RRFB.



Pedestrian Crossings

NC 280 (Asheville Highway) / US 64-276 (Boylston-Asheville Highway) at US 64 (Hendersonville Highway) / US 276 (Pisgah Highway)

Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: S.G. Haynie

PREPARED BY: P. Koloski REVIEWED BY:

SCALE: 1"=40'

REVISIONS	INIT.	DATE
✓ Note Change	SGH	8/11/23

750 N. Greenfield Pkwy, Garner, NC 27524

RS&H
NC FIRM LICENSE No: F-0493
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
(704) 752-9610

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

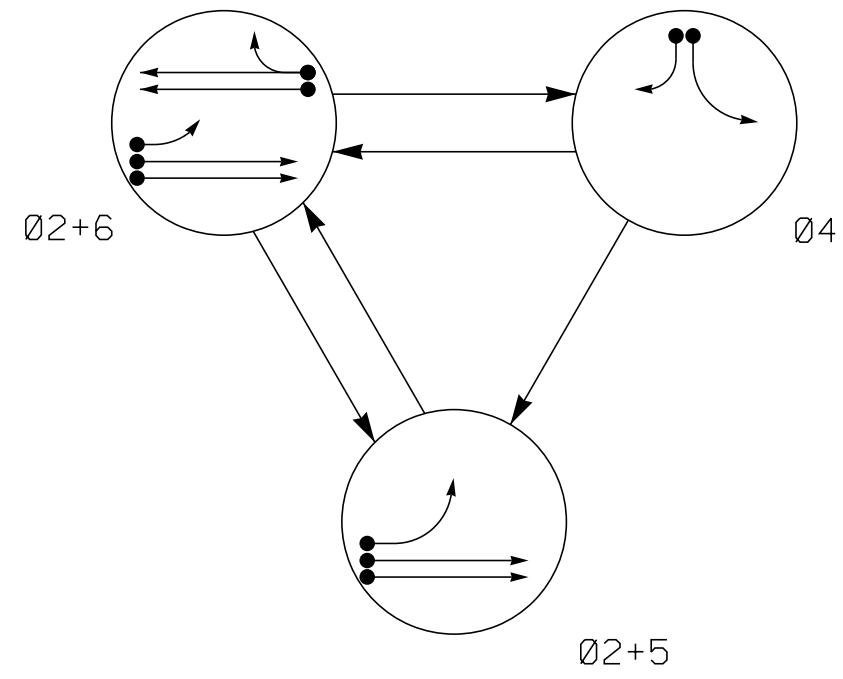
SEAL
SEVEN G. HAYNIE
PROFESSIONAL ENGINEER
No. 17574
STATE OF NORTH CAROLINA

Signature: *Steven G. Haynie* DATE: 4/28/2023

Sign Inventory No. 14-5026

8/1/2023 11:24:06 AM X:\proj\10300\09021_R-5799_US_64-276_Intersection_Design\09021\Drawings\06\11\01\145026.dgn

PHASING DIAGRAM



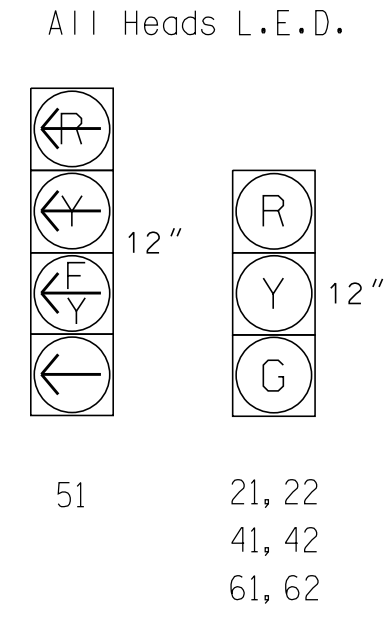
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT (arrow with black dot)
UNDETECTED MOVEMENT (OVERLAP) (arrow with grey dot)
UNSIGNALIZED MOVEMENT (dashed arrow)
PEDESTRIAN MOVEMENT (arrow with walking figure)

TABLE OF OPERATION

Table with 3 columns: SIGNAL FACE, PHASE (02+5, 04, FLASH), and corresponding signal colors (G, R, Y).

SIGNAL FACE I.D.

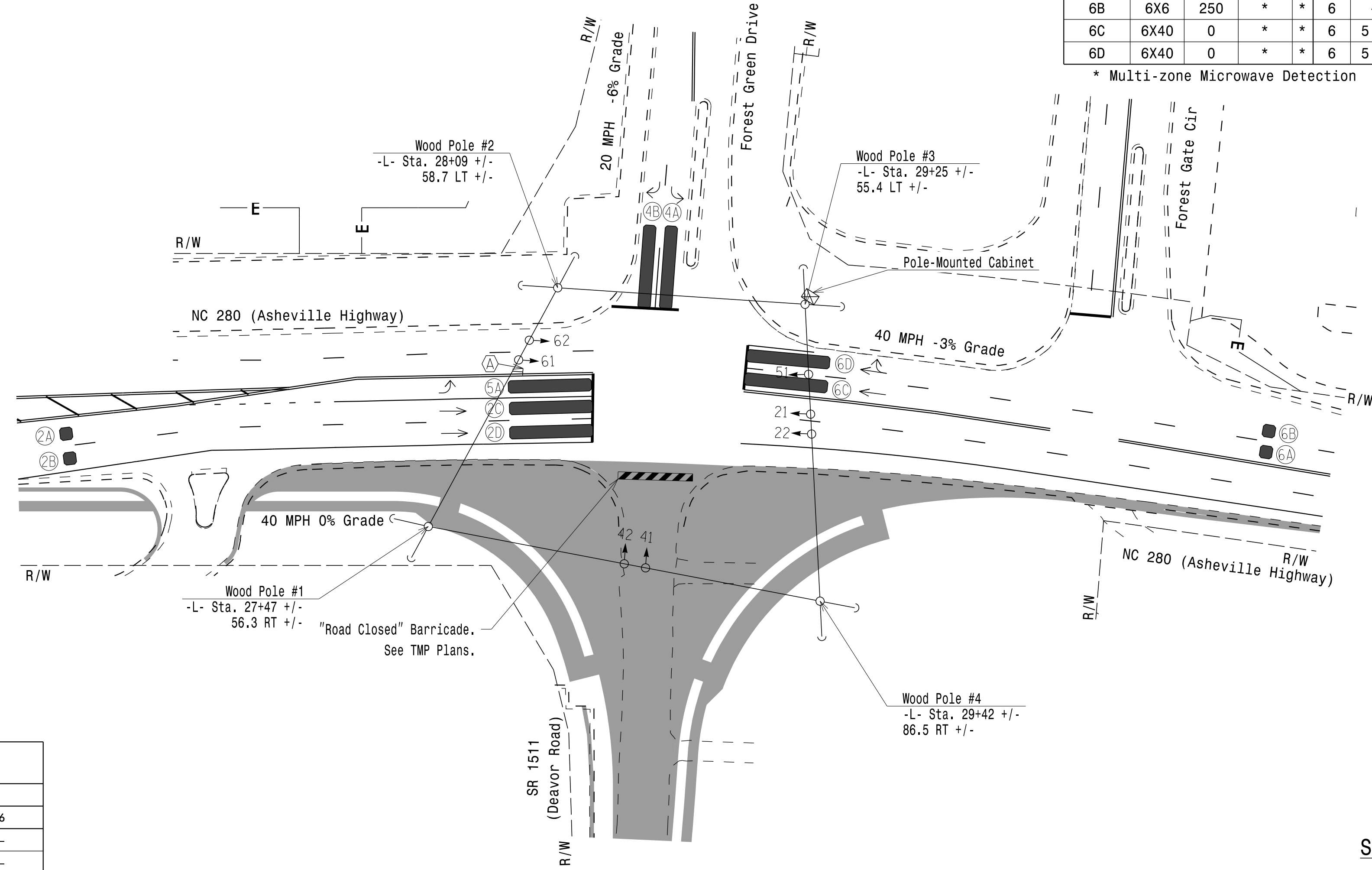


MAXTIME DETECTOR INSTALLATION CHART

Table with 10 columns: LOOP, SIZE (FT), DISTANCE FROM STOPBAR (FT), TURNS, NEW LOOP, CALL PHASE, DELAY TIME, EXTEND TIME, EXTEND INITIAL, CALL, DELAY DURING GREEN, NEW CARD. Includes data for loops 2A through 6D.

3 Phase Fully Actuated (Time Based Coordination) NOTES

- 10 numbered notes detailing installation and operation requirements, including references to NCDOT drawings and pavement markings.



MAXTIME TIMING CHART table with columns for FEATURE and PHASE (2, 4, 5, 6). Lists timing parameters like Walk, Ped Clear, Min Green, Passage, Max 1, Yellow Change, Red Clear, etc.

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

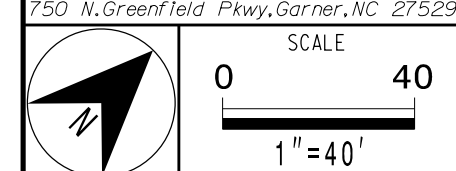
LEGEND

- LEGEND table with columns for PROPOSED and EXISTING. Lists symbols for Traffic Signal Head, Pedestrian Signal Head, Signal Pole, Detectors, Junction Boxes, Strain Poles, etc.

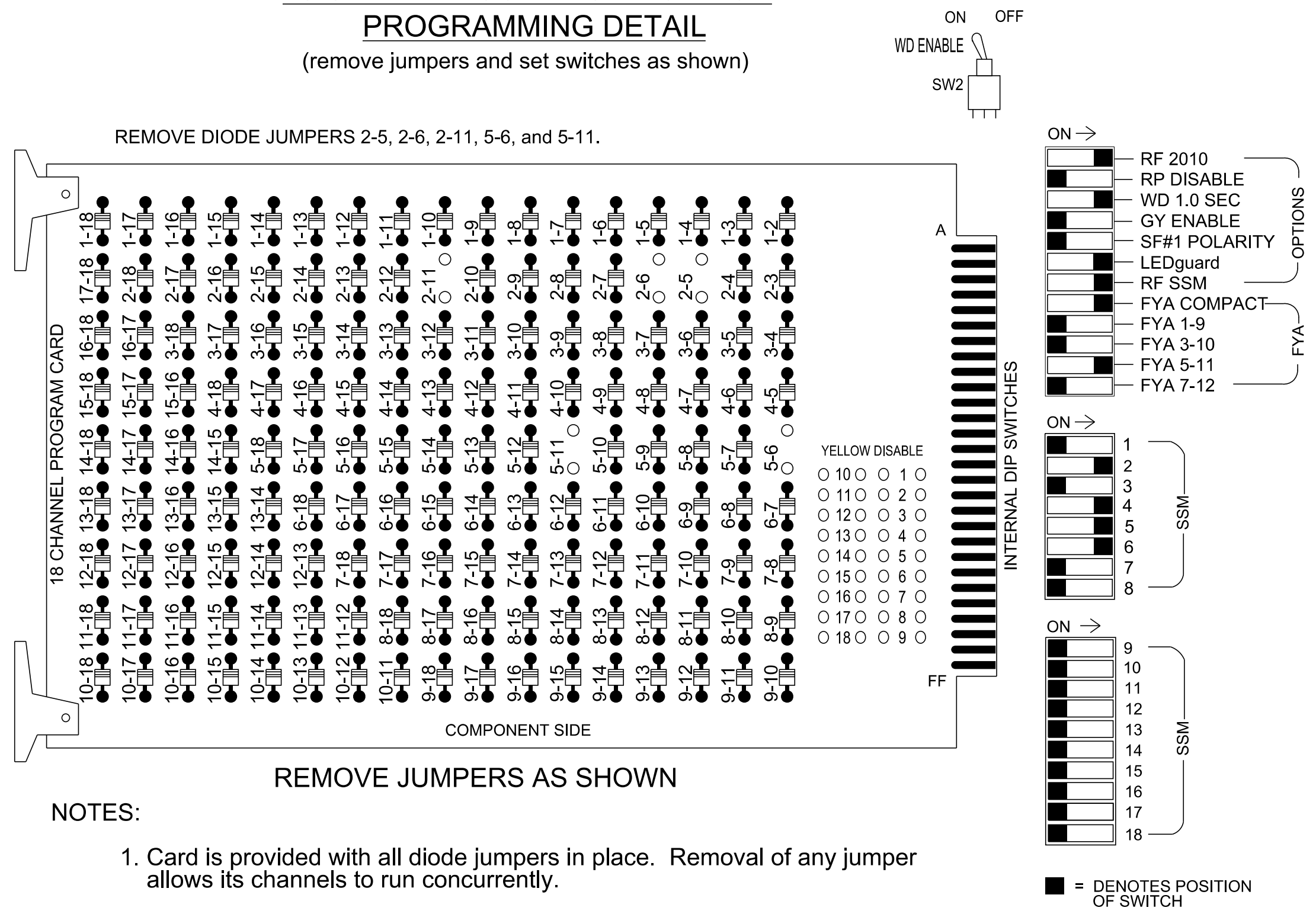
SIGNS

- SIGNS table listing symbols for No Left Turn Sign (R3-2), Directional Drill, Directional Arrow, Right of Way, and Temp. Construction Easement.

Project title block and stamps. Includes 'Temporary Signal 1 - TCP Phase IV', project location, division, plan date, and professional engineer seals and signatures.



18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)



NOTES

- 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.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of a temporary Time Based Coordination System.

SIGNAL HEAD HOOK-UP CHART

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

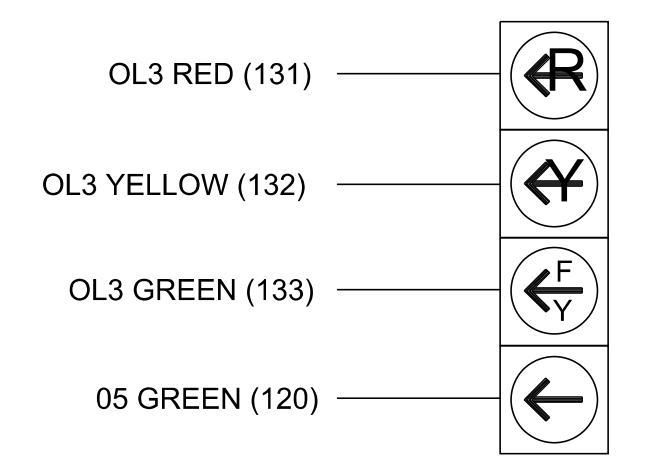
NU = Not Used
* Denotes install load resistor. See load resistor installation detail this sheet.
* See pictorial of head wiring in detail this sheet.

EQUIPMENT INFORMATION

Controller.....2070LX
Cabinet.....336
Software.....Q-Free MAXTIME
Cabinet Mount.....Pole
Output File Positions.....12
Load Switches Used.....S2, S5, S7, S8, S9
Phases Used.....2, 4, 5, 6
Overlap "1".....NOT USED
Overlap "2".....NOT USED
Overlap "3".....*
Overlap "4".....NOT USED

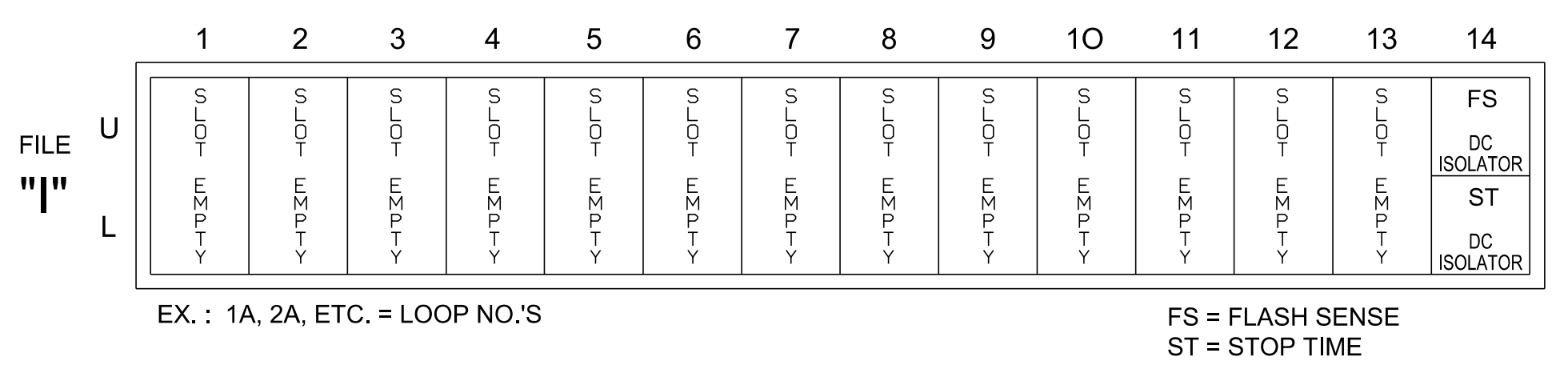
*See overlap programming detail on sheet 2

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)



51

INPUT FILE POSITION LAYOUT
(front view)



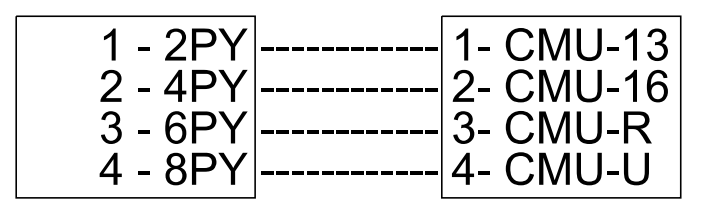
PED YELLOW CONFLICT MONITOR WIRING DETAIL
(make cabinet wiring changes as shown below)

In order to use FYA COMPACT mode with the 16 or 18 Channel Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 6 PY (field term. 120) to chan. 10 green (monitor pin R).

- Follow the instructions below to make appropriate connections:
- STEP 1: Fold down rear panel of output file.
 - STEP 2: Find unused wiring harness fom conflict monitor card edge connector (which should be tied and bundled together).
 - STEP 3: Find the connector that correspond to the following conflict monitor card edge pins and solder wire the the appropriate terminal on the rear of the output file shown below:

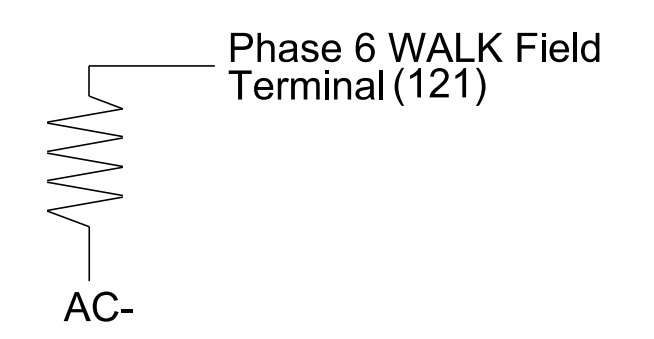
CMU-R -----6PY (term. 120)

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



LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)

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



SPECIAL DETECTOR NOTE

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

Temporary Signal 1 - TCP Phase IV
Electrical Detail Sheet 1 of 2

Electrical and Programming Details For: **NC 280 (Asheville Highway)**
at **SR 1511 (Deavor Road) / Forest Gate Drive**

Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: V. Kaiser
PREPARED BY: S.G. Haynie REVIEWED BY:

750 N. Greenfield Pkwy, Garner, NC 27529

DocuSigned by: **Steven G. Haynie** 4/28/2023

SEAL 029531

DocuSigned by: **Steven G. Haynie** 4/28/2023

SIG. INVENTORY NO. 14-1146T1

4/28/2023 4:33:49 PM ***rsandh.com*** file:///C:/temp/101/tonp/4/030049021_R-5799_US_64-276_Intersection_Design/4040as/sgn/raff/cd/sgn/sig.psm,12-1,14146T1_elec.dgn



OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps
Overlap Plan 1

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

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

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

NOTE CHANGE IN CONTROL TYPE AND SOURCE →

NOTE CHANGE IN CONTROL TYPE AND SOURCE →

RECONFIGURE OUTPUT PINS FOR COMPACT FYA

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

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

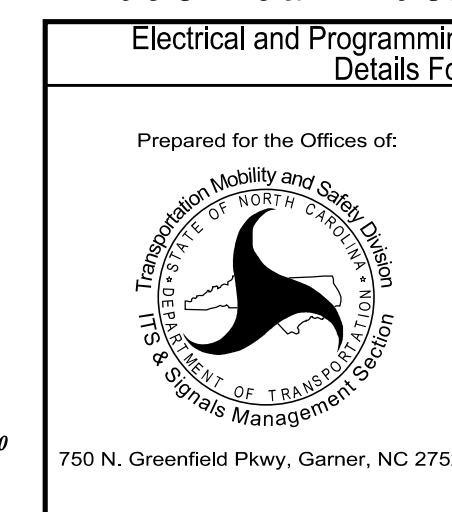
IO Module 1

Output Point	Description	Output Control Type	Index
34	C1-36	Phase Green	5

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 14-1146T1
DESIGNED: April 2023
SEALED: April 28, 2023
REVISED: _____



Temporary Signal 1 - TCP Phase IV
Electrical Detail Sheet 2 of 2

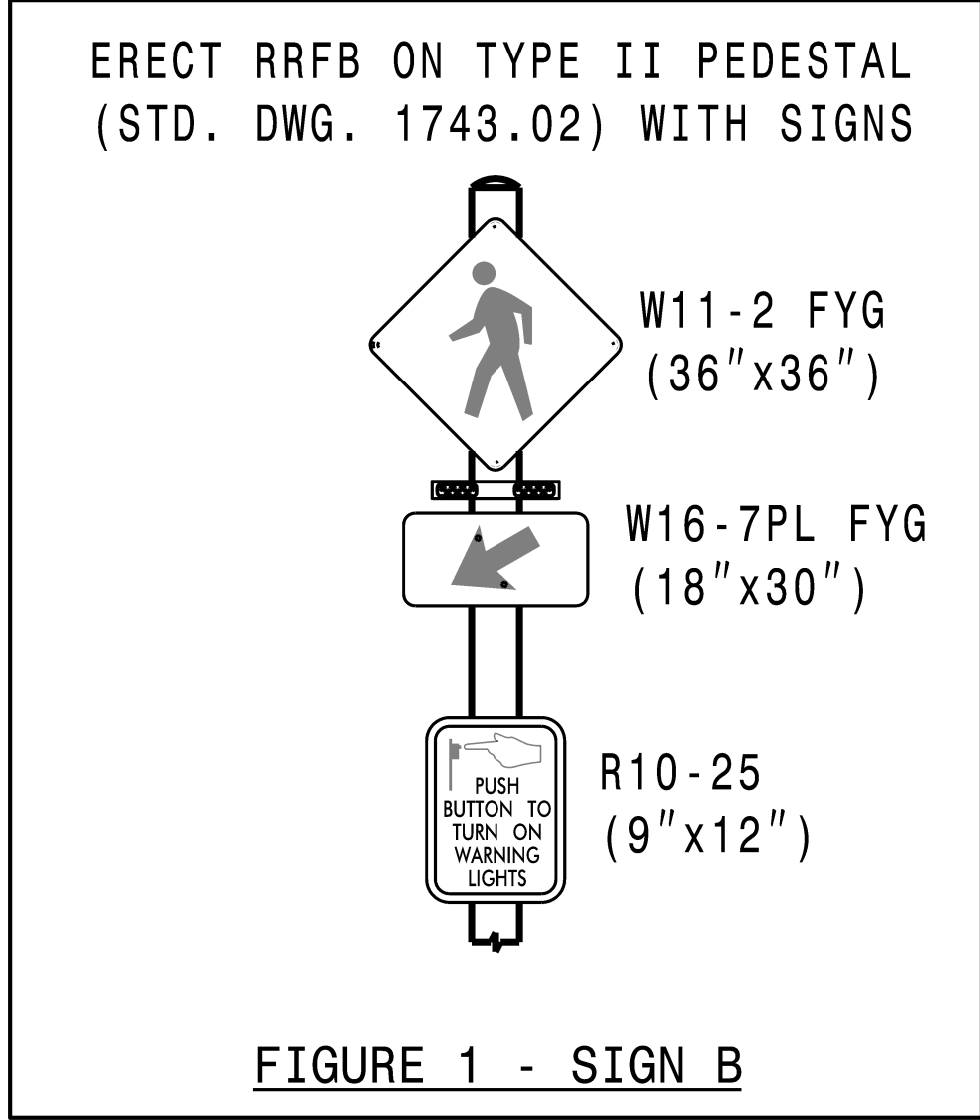


NC 280 (Asheville Highway)
at
SR 1511 (Deavor Road) /
Forest Gate Drive

Division 14	Transylvania County	Brevard
PLAN DATE: April 2023	REVIEWED BY: V. Kaiser	
PREPARED BY: S.G. Haynie	REVIEWED BY:	
REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

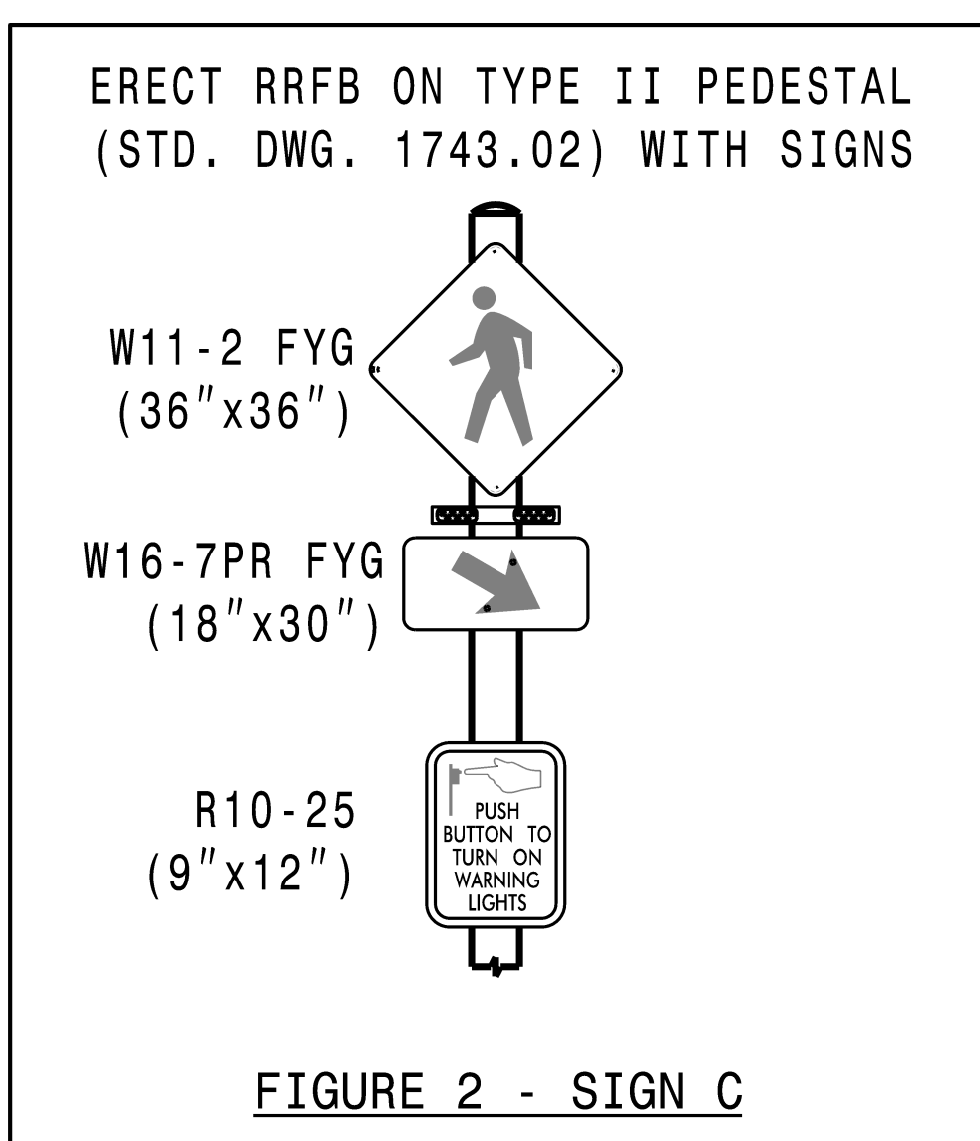
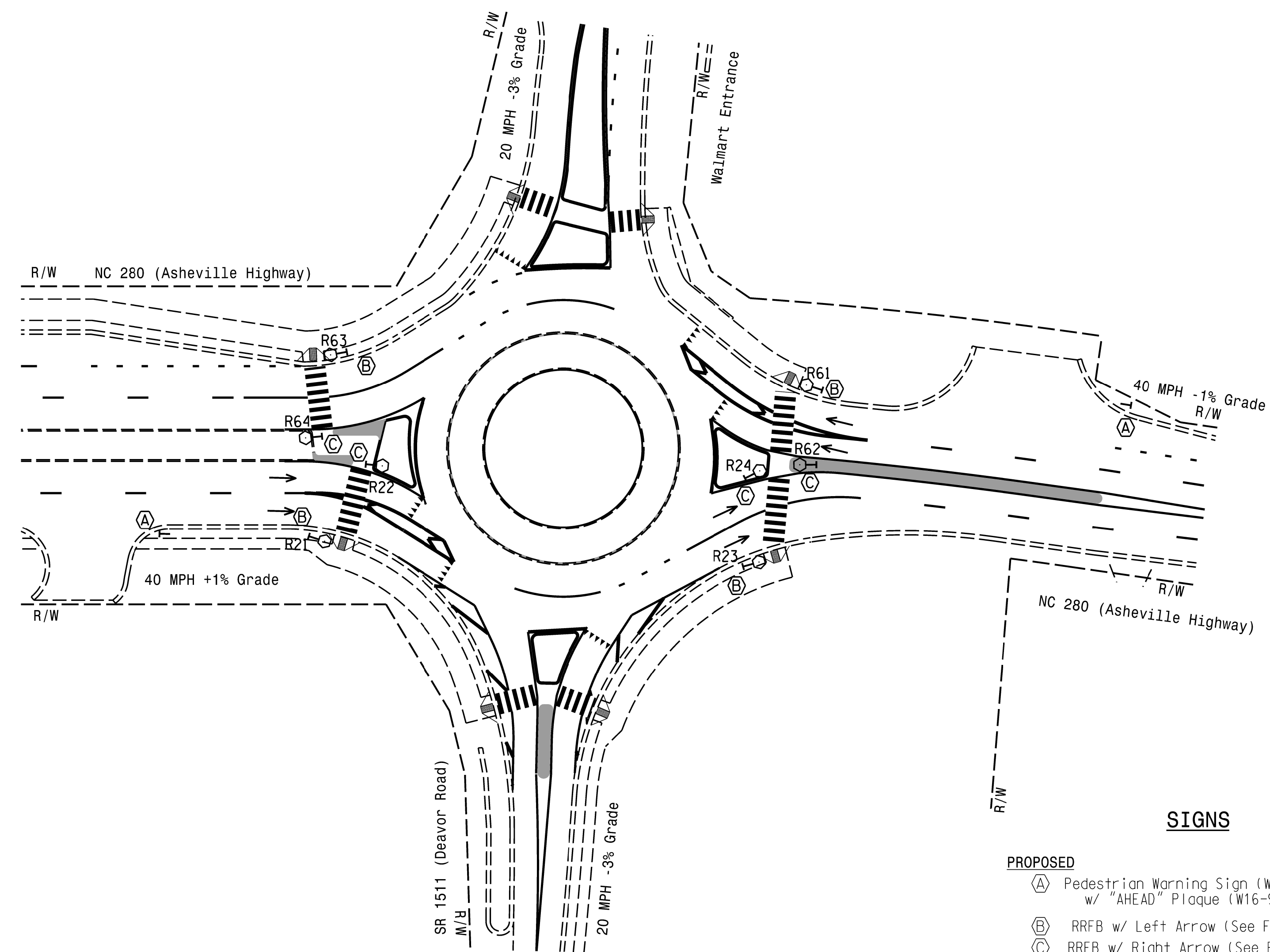
SEAL
DocuSigned by: Steven G. Haynie 4/28/2023
—D6330CC9A504486— DATE
SIG. INVENTORY NO. 14-1146T1



Semi-Actuated Rectangular Rapid Flashing Beacon (RRFB)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Align the front face of the pedestrian push button assemble parallel with the crosswalk.
3. The distance to the pushbutton from the edge of the sidewalk should be no greater than 18".
4. The pay item for Rectangular Rapid Flashing Beacon (RRFB) shall include, but not be limited to the signs, pushbuttons, flashing beacons, solar panel, battery, controller assembly, and all incidentals related to the installation of the RRFB.



SIGNS

- | | |
|--|-----------------|
| PROPOSED | EXISTING |
| (A) Pedestrian Warning Sign (W11-2) w/ "AHEAD" Plaque (W16-9P) | (A) |
| (B) RRFB w/ Left Arrow (See Fig. 1) | (B) |
| (C) RRFB w/ Right Arrow (See Fig. 2) | (C) |

LEGEND

- | | |
|-----------------------------|-----------------------------|
| PROPOSED | EXISTING |
| (A) Sign | (A) Sign |
| (B) Type II Signal Pedestal | (B) Type II Signal Pedestal |
| (C) Curb Ramp | (C) Curb Ramp |
| (D) Directional Arrow | (D) Directional Arrow |
| (E) Right of Way | (E) Right of Way |

FEATURE	RRFB GROUP			
	R21/R22	R23/R24	R61/R62	R63/R64
RRFB Flash Time	17	17	16	16

Notes:
1. These values may be field adjusted. Do not adjust RRFB Flash times lower than what is shown.

Pedestrian Crossings

	NC 280 at SR 1511 (Deavor Road) / Walmart Entrance		SEAL
	Division 14 Transylvania County Brevard PLAN DATE: April 2023 PREPARED BY: P. Koloski	REVIEWED BY: S.G. Haynie REVIEWED BY:	
SCALE 0 40 1"=40'		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL Steven G. Haynie DATE 4/28/2023 Sig Inventory No. 14-5027	

RS&H
 NC FIRM LICENSE No: F-0493
 1520 SOUTH BOULEVARD, SUITE 200
 CHARLOTTE, NC 28203
 (704) 752-0610

8/17/2023 11:25:08 AM X:\P\1030049021_R-5799_US_64-276_Intersection_Design\Design\Traffic\Signs\Design\Signs\Signs\13-0-145027.dgn

PHASING DIAGRAM

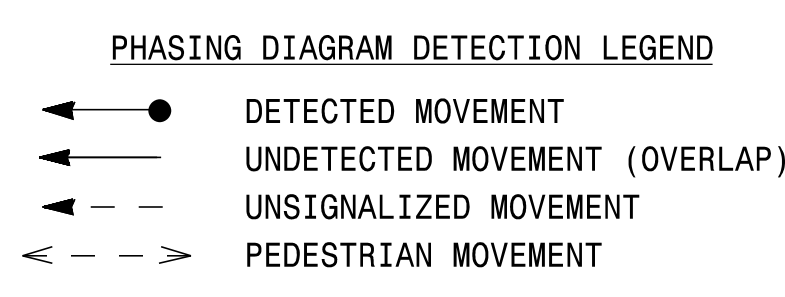
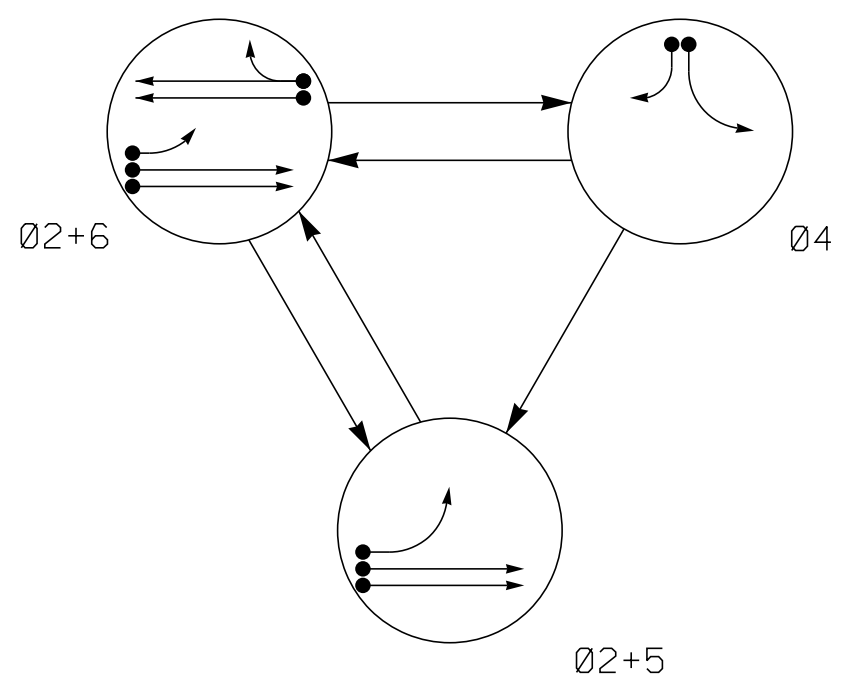
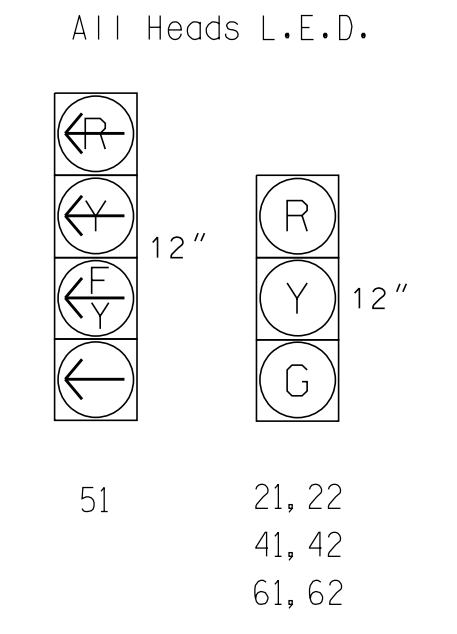


TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+6	02+5	04	FLASH
21, 22	G	G	R	Y
41, 42	R	R	G	R
51	←	←	←	←
61, 62	R	G	R	Y

SIGNAL FACE I.D.



MAXTIME DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING					NEW CARD
					CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND ADDED INITIAL	CALL DELAY DURING GREEN	
2A	6X6	250	*	*	2	-	-	X	-	*
2B	6X6	250	*	*	2	-	-	X	-	*
2C	6X40	0	*	*	2	5.0	2.0	X	X	*
2D	6X40	0	*	*	2	5.0	2.0	X	X	*
4A	6X40	0	*	*	4	3.0	-	X	-	*
4B	6X40	0	*	*	4	15.0	-	X	-	*
5A	6X40	0	*	*	5	15.0	-	X	-	*
6A	6X6	250	*	*	6	-	-	X	-	*
6B	6X6	250	*	*	6	-	-	X	-	*
6C	6X40	0	*	*	6	5.0	2.0	X	X	*
6D	6X40	0	*	*	6	5.0	2.0	X	X	*

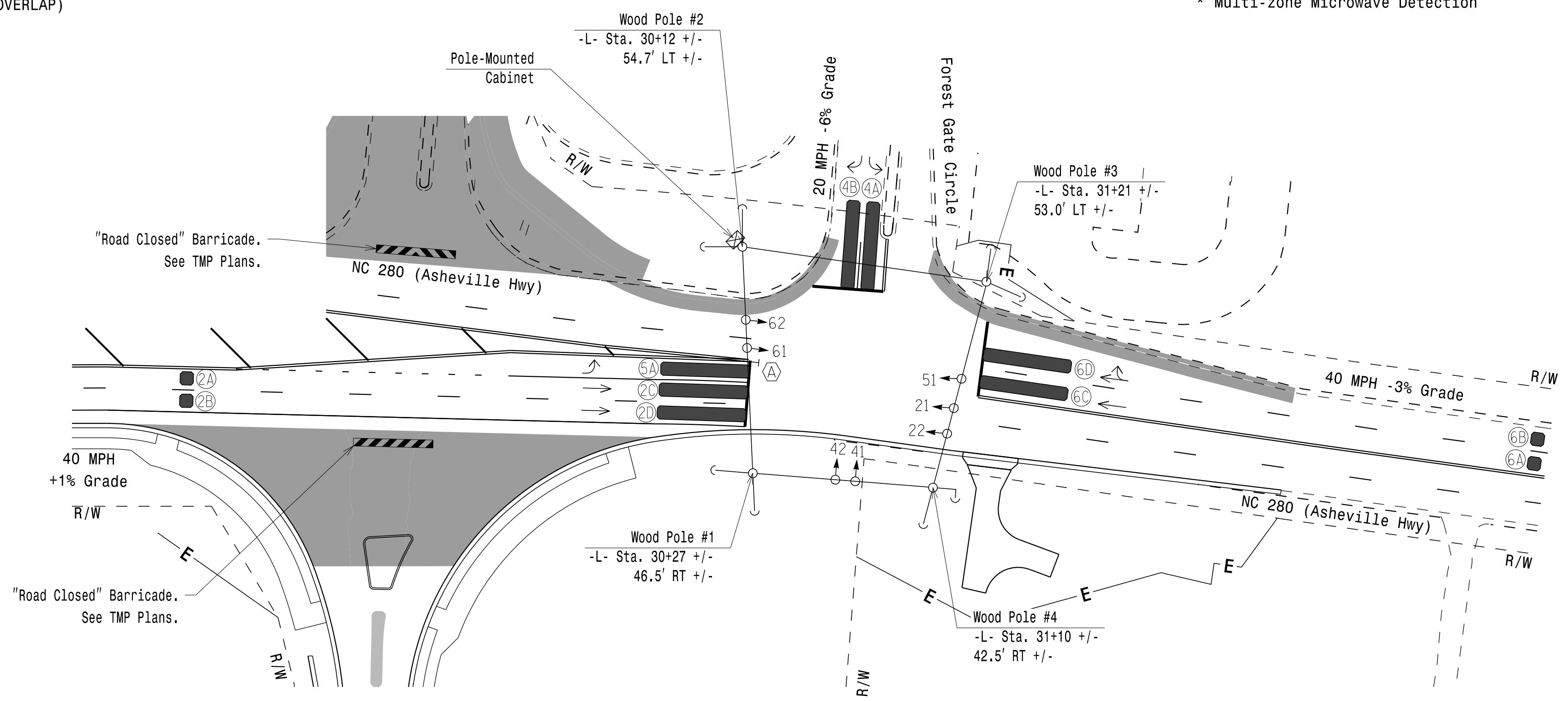
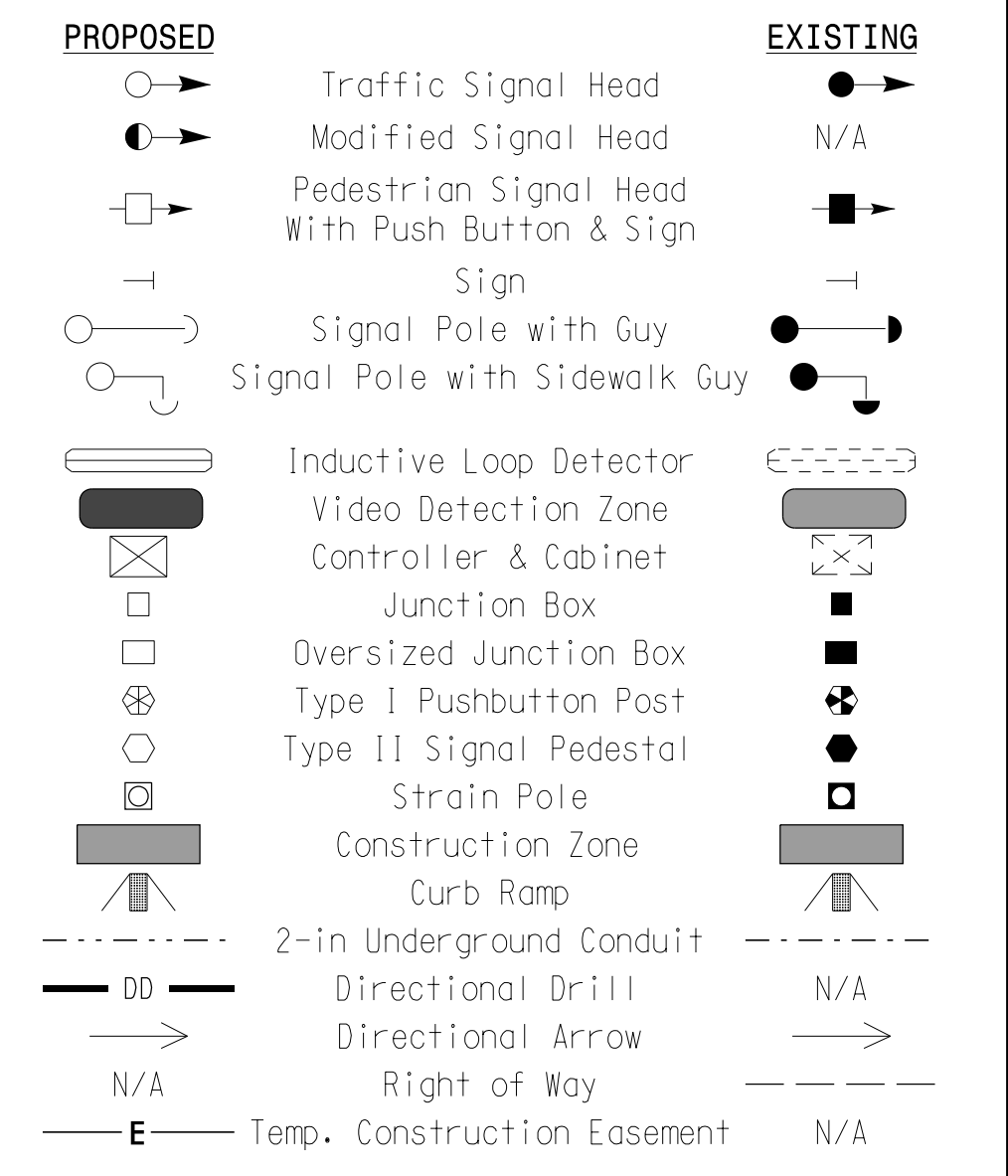
* Multi-zone Microwave Detection

3 Phase Fully Actuated (Time Based Coordination)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Program controller to operate using FYA compact mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- See R-5799 TMP Phase V for pavement markings.
- This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Furnish and install GPS Unit.

LEGEND



MAXTIME TIMING CHART

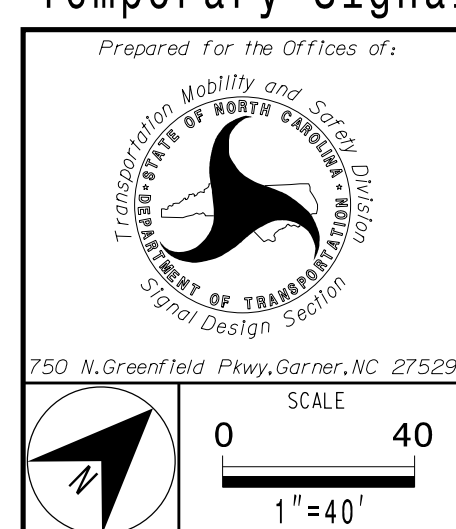
FEATURE	PHASE			
	2	4	5	6
Walk *	-	-	-	-
Ped Clear *	-	-	-	-
Min Green	12	7	7	12
Passage *	6.0	2.0	2.0	6.0
Max I *	90	25	15	90
Yellow Change	4.4	3.1	3.0	4.4
Red Clear	1.3	2.6	2.4	1.3
Added Initial *	-	-	-	-
Maximum Initial *	-	-	-	-
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Advance Walk	-	-	-	-
Non Lock Detector	-	X	X	-
Vehicle Recall	MIN. RECALL	-	-	MIN. RECALL
Dual Entry	-	-	-	-

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

SIGNS



Temporary Signal 1 - TCP Phase V
NC 280 (Asheville Highway) at Forest Gate Circle



Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: S.G. Haynie

PREPARED BY: P. Koloski REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

SEAL 029531

DocuSigned by: Steven G. Haynie 4/28/2023

DATE

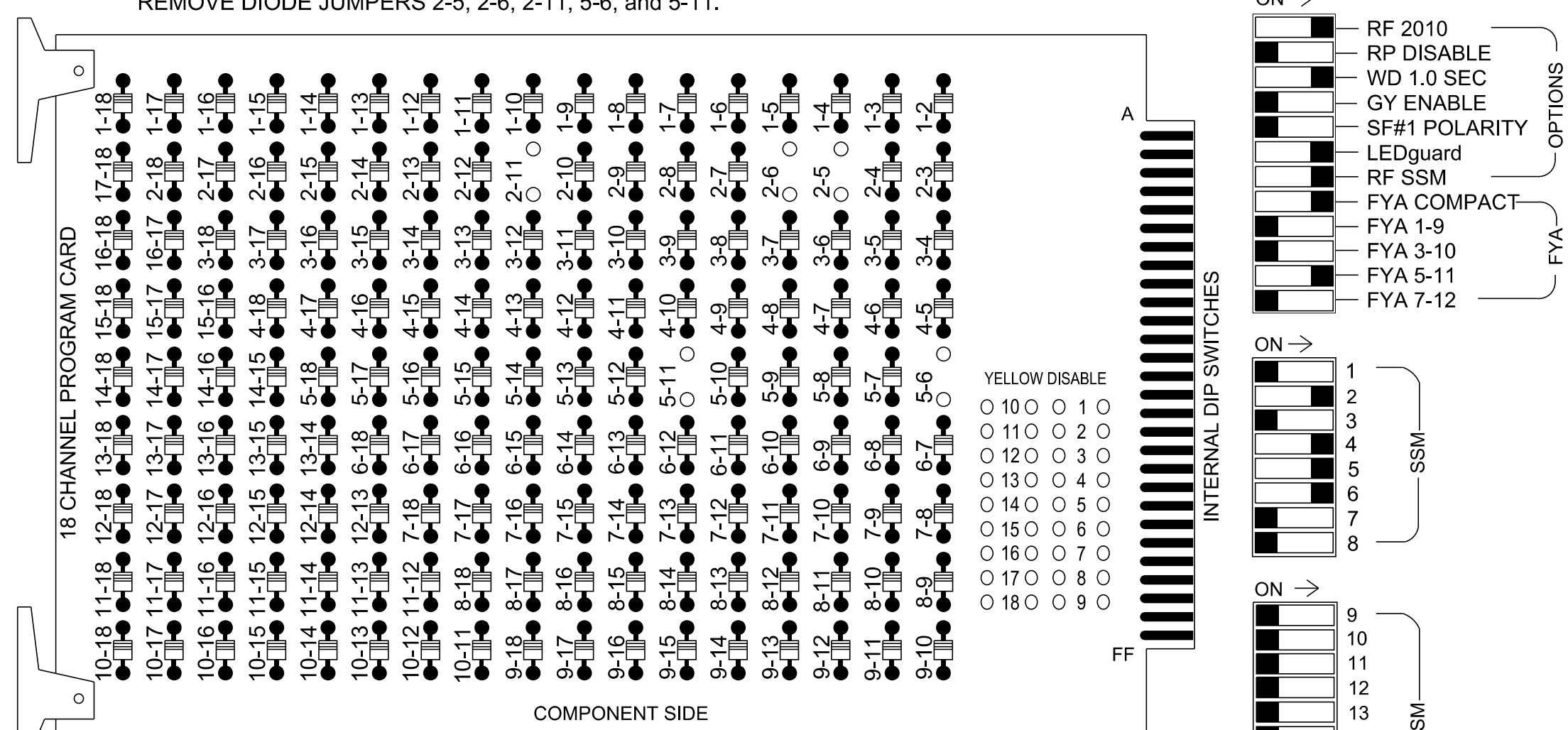
Sig Inventory No. 14-131211

4/28/2023 11:41:47 AM \\rsandh.com\file\14-131211\14-131211.dgn

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 5-6, and 5-11.



REMOVE JUMPERS AS SHOWN

NOTES:

- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
- Ensure that the Red Enable is active at all times during normal operation.
- Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.
- Special cabinet wiring is required to utilize FYA COMPACT mode. See Ped Yellow Conflict Monitor Wiring Detail on this sheet.
- Install jumper to SEL15 position.

NOTES

- 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.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of a temporary Time Based Coordination System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....336
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Pole
 Output File Positions.....12
 Load Switches Used.....S2, S5, S7, S8, S9
 Phases Used.....2, 4, 5, 6
 Overlap "1".....NOT USED
 Overlap "2".....NOT USED
 Overlap "3".....*
 Overlap "4".....NOT USED

*See overlap programming detail on sheet 2

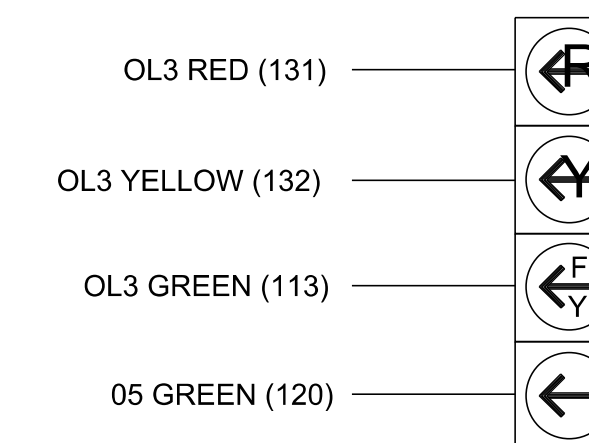
SIGNAL HEAD HOOK-UP CHART

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

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

FYA SIGNAL WIRING DETAIL

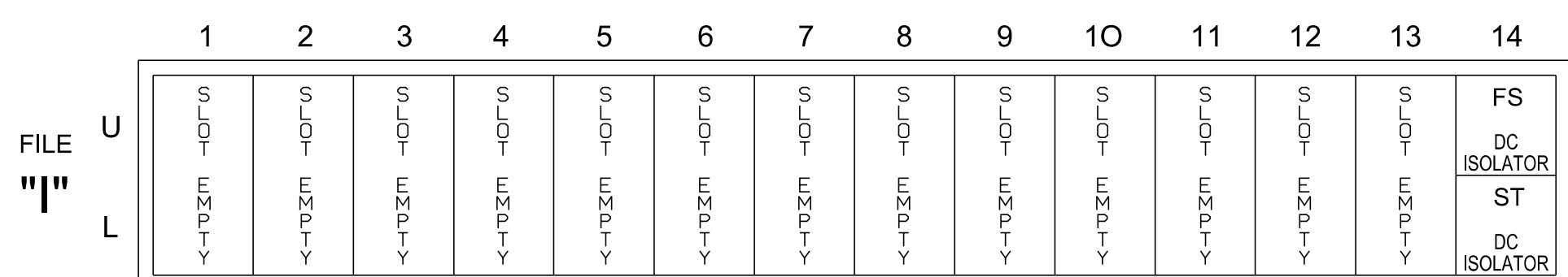
(wire signal heads as shown)



51

INPUT FILE POSITION LAYOUT

(front view)



SPECIAL DETECTOR NOTE

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

PED YELLOW CONFLICT MONITOR WIRING DETAIL

(make cabinet wiring changes as shown below)

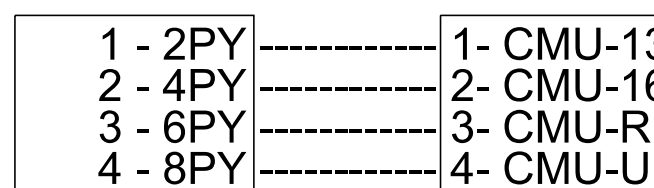
In order to use FYA COMPACT mode with the 16 or 18 Channel Monitor, the cabinet must be wired such that the (unused) Ped Yellow load switch outputs are wired to the conflict monitor as follows: From 6 PY (field term. 120) to chan. 10 green (monitor pin R).

Follow the instructions below to make appropriate connections:

- STEP 1: Fold down rear panel of output file.
 STEP 2: Find unused wiring harness from conflict monitor card edge connector (which should be tied and bundled together).
 STEP 3: Find the connector that correspond to the following conflict monitor card edge pins and solder wire to the appropriate terminal on the rear of the output file shown below:

CMU-R -----6PY (term. 120)

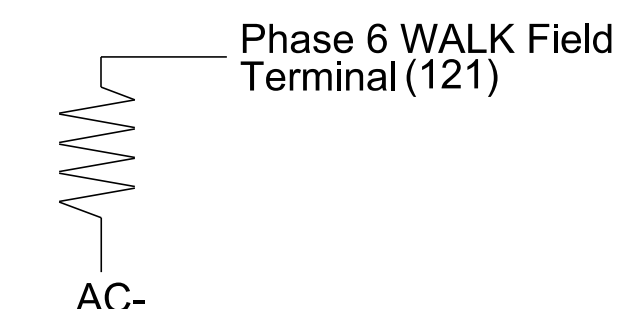
NOTE: Some cabinet manufacturers use keyed connectors to accomplish this wiring configuration. If connectors are used, fold down the rear panel of the output file and find the set of 3 keyed connectors and connect them as shown below:



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown)

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



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-13121T1
 DESIGNED: April 2023
 SEALED: April 28, 2023
 REVISED: _____

Temporary Signal 1 - TCP Phase V
 Electrical Detail Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:	NC 280 (Asheville Highway) at Forest Gate Circle	SEAL
Prepared for the Offices of:	Division 14 Transylvania County Brevard	
	PLAN DATE: April 2023 REVIEWED BY: V. Kaiser PREPARED BY: S.G. Haynie REVIEWED BY: REVISIONS: INIT. DATE:	
750 N. Greenfield Pkwy, Gamer, NC 27529		DocuSigned by: Steven G. Haynie 4/28/2023 786330CC9A5D448E DATE:
1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 (704) 752-0610		SIG. INVENTORY NO. 14-13121T1

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

Table with 2 columns: Overlap, Value. Rows include Type (FYA 4 - Section), Included Phases (6), Modifier Phases (5), Modifier Overlaps (-), Trail Green (0), Trail Yellow (0.0), Trail Red (0.0).

OUTPUT CHANNEL CONFIGURATION

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

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

Channel Configuration

Table with 7 columns: Channel, Control Type, Control Source, Flash Yellow, Flash Red, Flash Alt, MMU Channel. Contains 18 rows of channel configuration data.

NOTE CHANGE IN CONTROL TYPE AND SOURCE

NOTE CHANGE IN CONTROL TYPE AND SOURCE

RECONFIGURE OUTPUT PINS FOR COMPACT FYA

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

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

IO Module 1

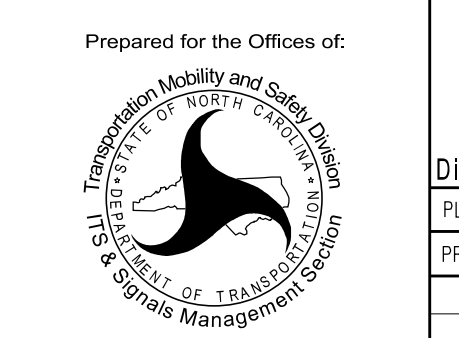
Table with 4 columns: Output Point, Description, Output Control Type, Index. Row 1: 34, C1-36, Phase Green, 5.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-1312T1 DESIGNED: April 2023 SEALED: April 28, 2023 REVISED:



Temporary Signal 1 - TCP Phase V Electrical Detail Sheet 2 of 2

Electrical and Programming Details For:



NC 280 (Asheville Highway) at Forest Gate Circle

Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: V. Kaiser

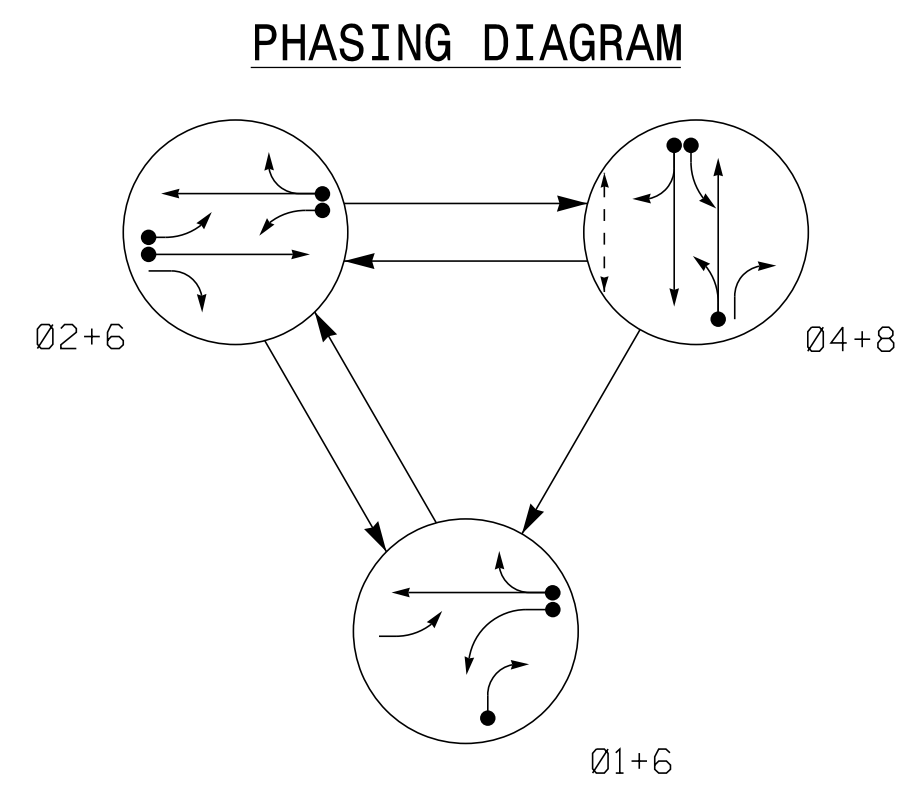
PREPARED BY: S.G. Haynie REVIEWED BY:

REVISIONS, INIT., DATE table

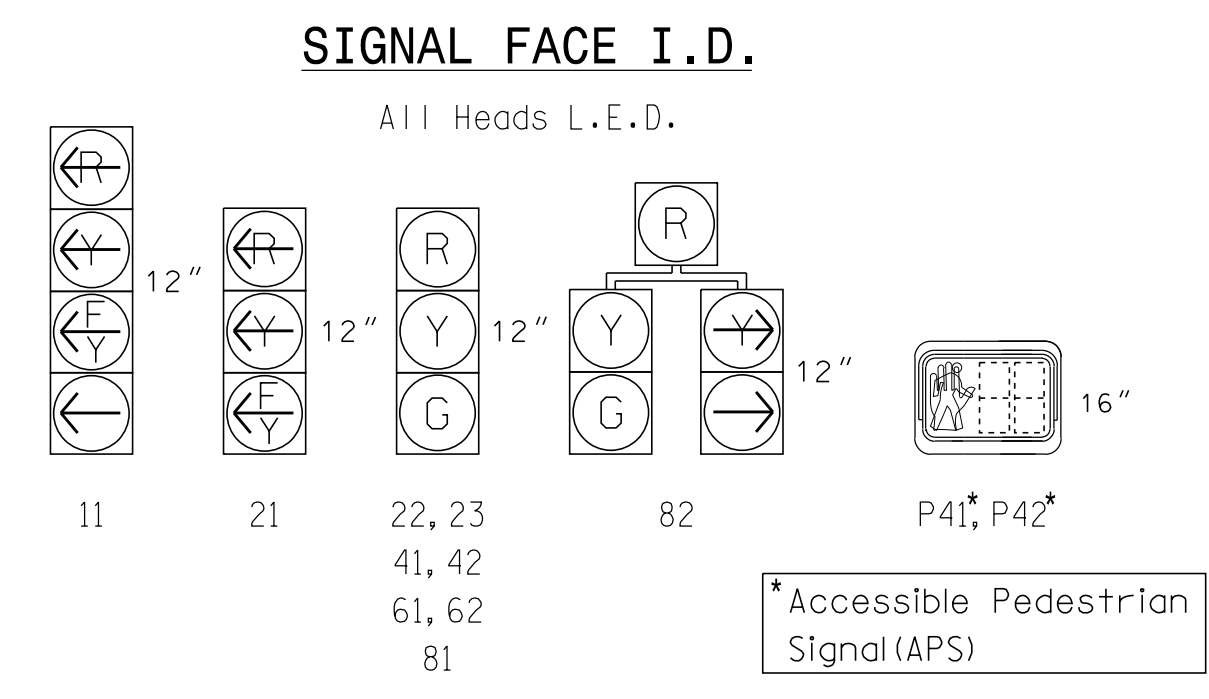
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional Engineer Seal for Steven G. Haynie, License No. 029531, dated 4/28/2023

4/28/2023 5:42:31 PM \\rsandh.com\mf:\es\Transportation\14-1312T1\14-1312T1_elec.dgn

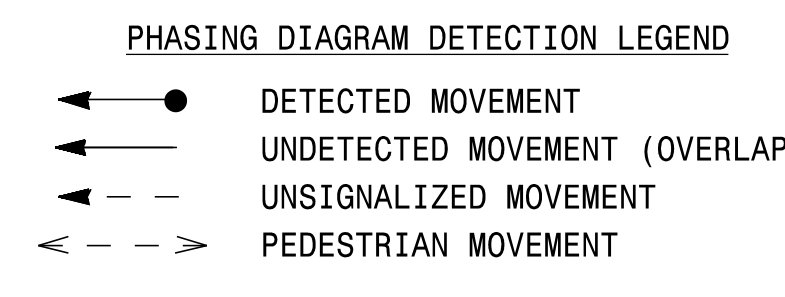


SIGNAL FACE	PHASE			
	Ø 1 + 6	Ø 2 + 6	Ø 4 + 8	F L S B
11	F	F	R	Y
21	F	F	R	Y
22, 23	R	G	R	Y
41, 42	R	G	R	Y
61, 62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R
P41, P42	DW	DW	W	DRK



MAXTIME DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL DELAY DURING GREEN	NEW CARD
1A	6X40	0	2-4-2	-	1	15.0	-	X	X	X	X
1B	6X40	0	*	-	1	15.0	-	X	X	X	*
2A	6X6	353	6	-	2	-	-	X	X	X	-
2B	6X40	0	2-4-2	-	2	3.0	-	X	X	X	X
4A	6X40	0	2-4-2	-	4	3.0	-	X	X	X	X
4B	6X40	0	2-4-2	-	4	10.0	-	X	X	X	X
4C	6X6	0	3	-	4	15.0	-	X	X	X	X
6A	6X6	355	6	-	6	-	-	X	X	X	X
8A	6X40	0	*	-	8	-	-	X	X	X	*

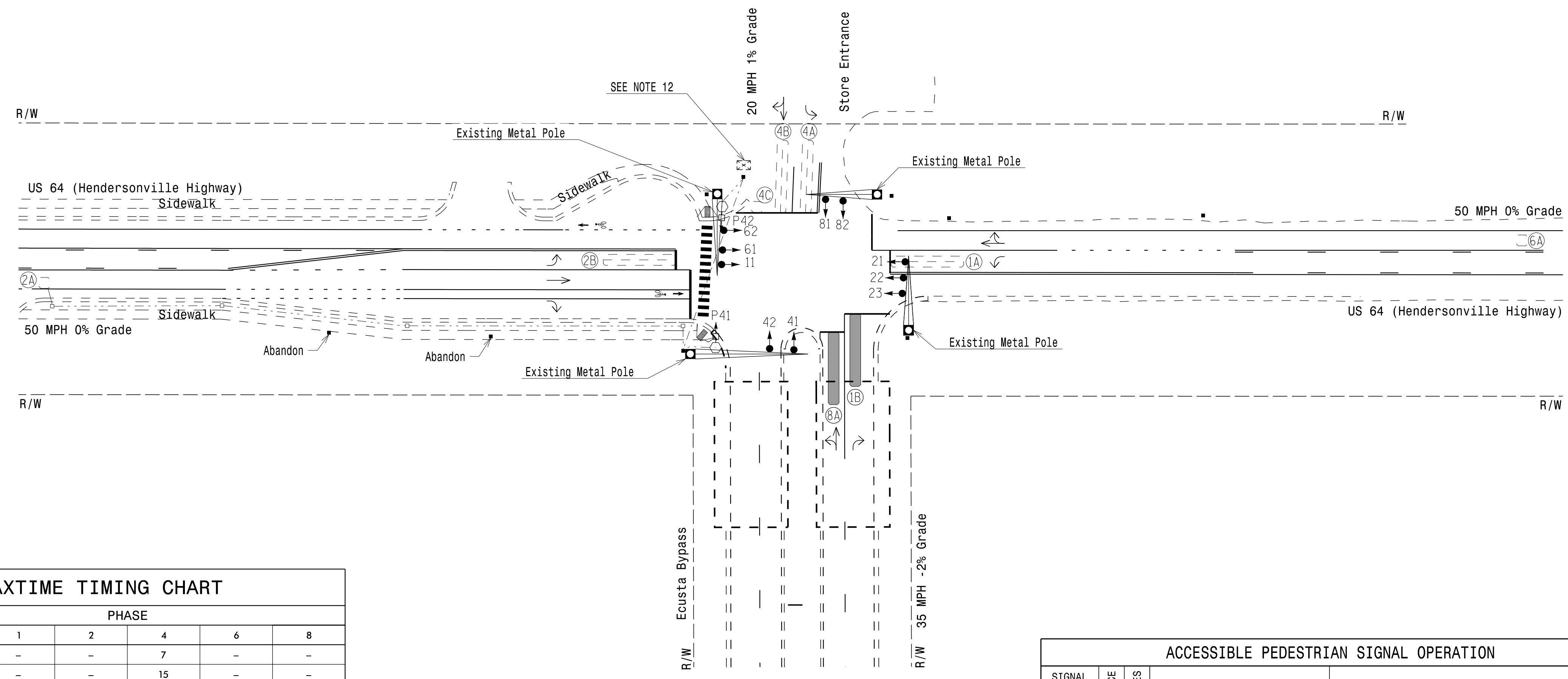
* Video Detection Zone



3 Phase Fully Actuated Isolated

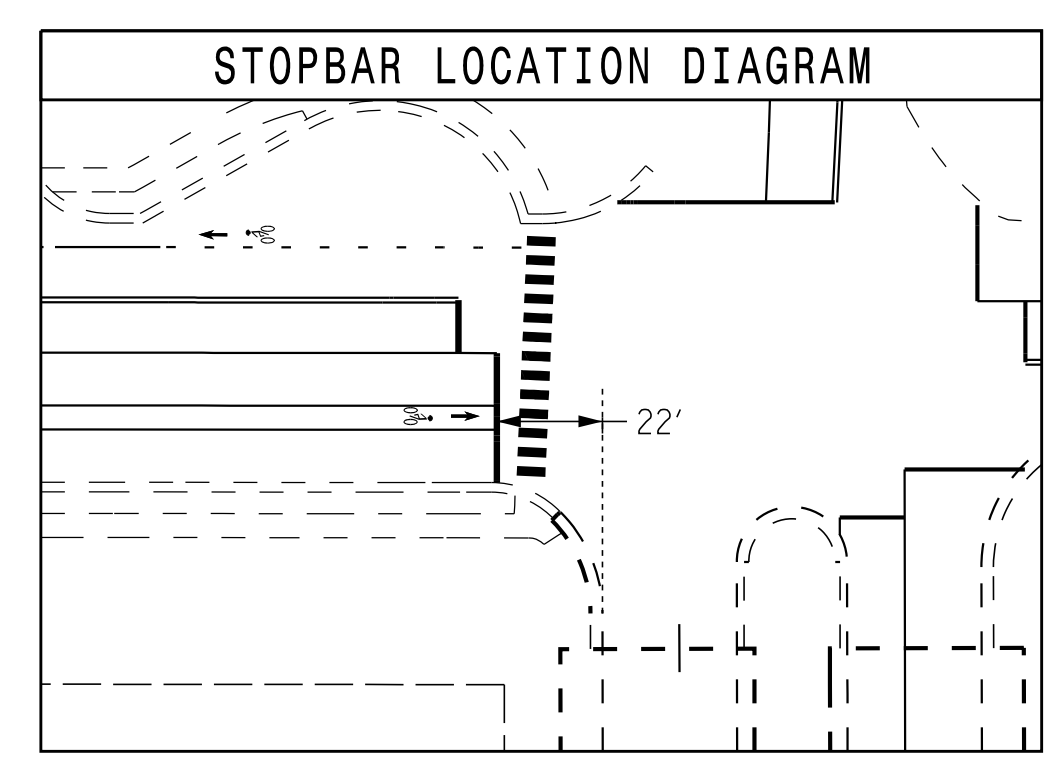
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Portions of high visibility crosswalk not shown for clarity.
- All pedestrian pushbuttons shall be Vibro-Tactile.
- All APS shall use "Rapid Tick" sound.
- Relocate eastbound approach stopbar as shown.
- Install new 2070 LX controller in existing signal cabinet.
- Install NCDOT-supplied cell modem. Request cell modem from Division Traffic Engineer eight weeks prior to deployment.

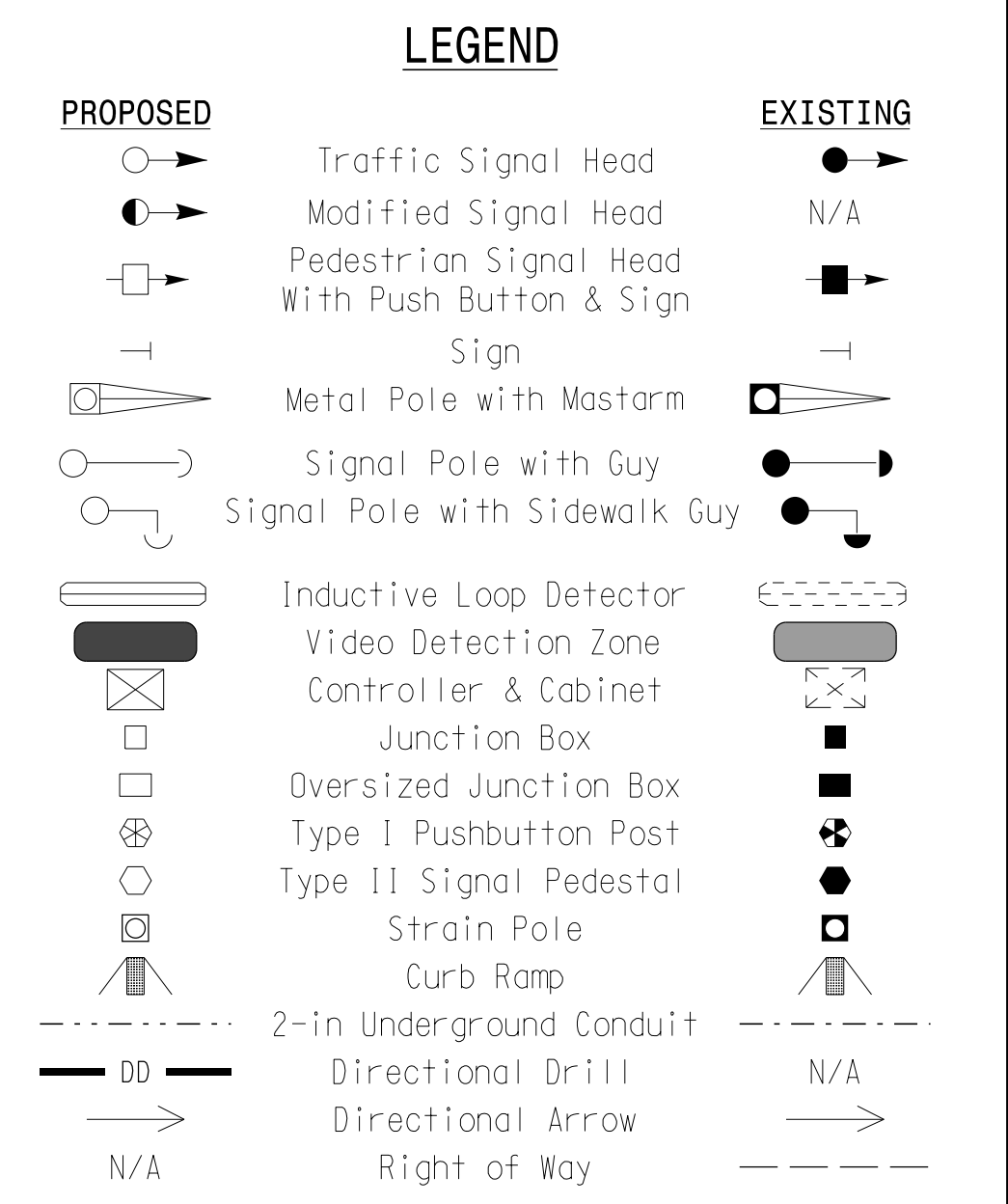


FEATURE	PHASE				
	1	2	4	6	8
Walk *	-	-	7	-	-
Ped Clear *	-	-	15	-	-
Min Green	7	14	7	14	7
Passage *	2.0	6.0	2.0	6.0	3.0
Max I *	15	90	20	90	20
Yellow Change	3.0	4.8	3.0	4.8	4.0
Red Clear	2.6	1.5	2.1	1.5	1.6
Added Initial *	-	2.5	-	2.5	-
Maximum Initial *	-	40	-	40	-
Time Before Reduction *	-	15	-	15	-
Time To Reduce *	-	30	-	30	-
Minimum Gap	-	3.0	-	3.0	-
Advance Walk	-	-	-	-	-
Non Lock Detector	X	-	X	-	X
Vehicle Recall	-	MIN. RECALL	-	MIN. RECALL	-
Dual Entry	-	-	X	-	X

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



ACCESSIBLE PEDESTRIAN SIGNAL OPERATION			
SIGNAL FACE	VOICE	TONES	SPEECH MESSAGE
P41	-	X	Walk (Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk (Wait, Wait to cross Hendersonville.)
P42	-	X	Walk (Percussive Tone)
	X	-	Flashing Don't Walk / Don't Walk (Wait, Wait to cross Hendersonville.)



Signal Upgrade

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

750 N. Greenfield Pkwy, Garner, NC 27526

SCALE: 1" = 40'

US 64 (Hendersonville Highway) at Ecusta Bypass / Store Entrance

Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: S.G. Haynie

PREPARED BY: P. Koloski REVIEWED BY:

REVISIONS	INIT.	DATE

DocuSigned by: Steven G. Haynie 4/28/2023

Signature: Steven G. Haynie, Professional Engineer, No. 029531

DocuSign Envelope ID: 08330202-8532-4482-9200-000000000000

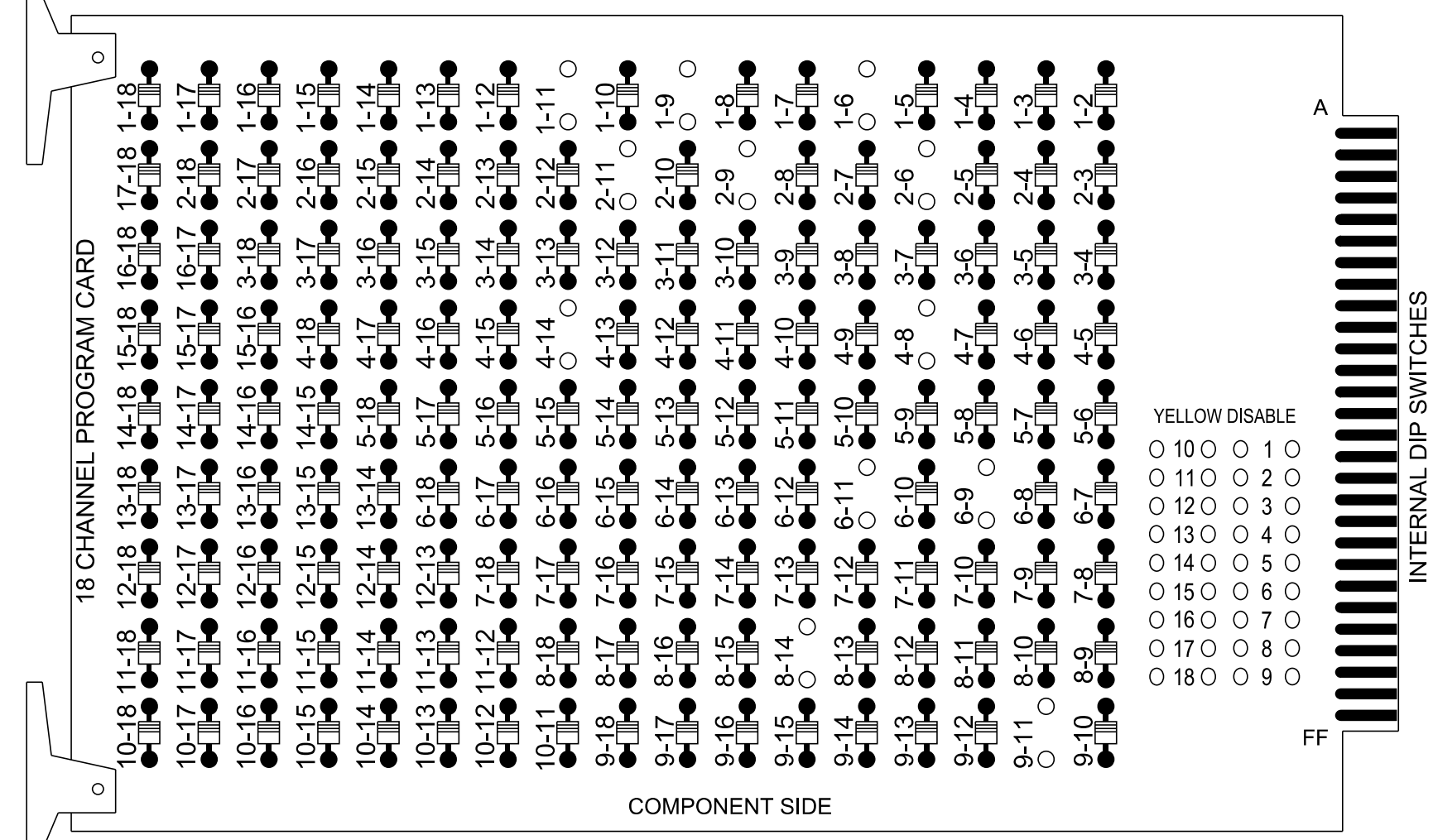
DocuSign Inventory No. 14-1288



4/28/2023 9:43:24 PM \\rsandh.com\file\1500\1030049021_R-5799_US_64-276_Intersection_Design\0405\gnw\Traffic\Signal\0405\gnw\Plan_Sheets\05799_sig_psh_15-0_141288.dgn

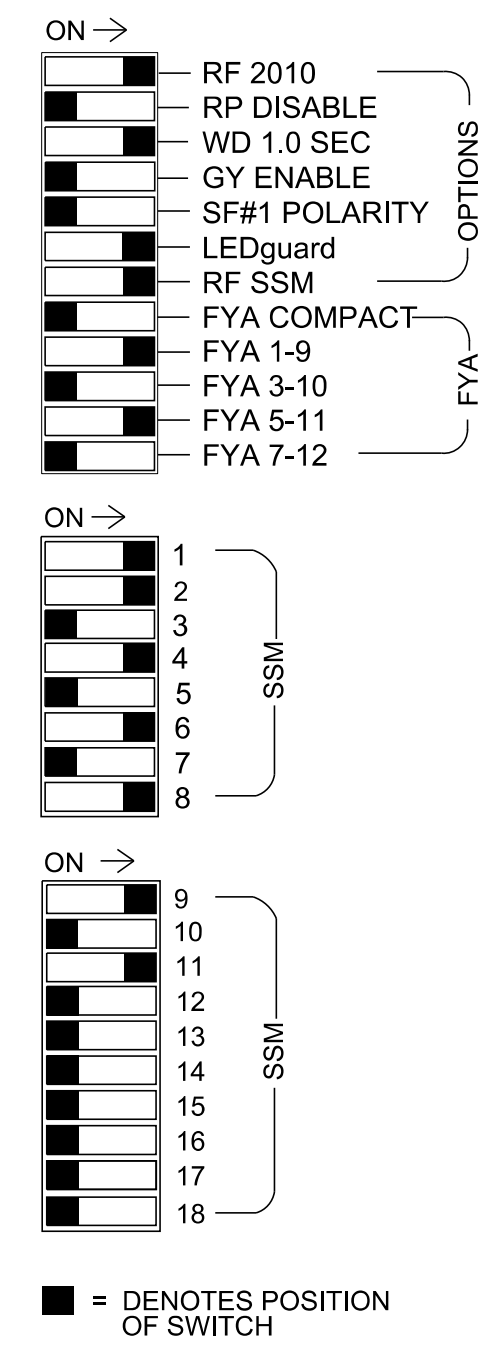
18 CHANNEL IP CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-6, 1-9, 1-11, 2-6, 2-9, 2-11, 4-8, 4-14, 6-9, 6-11, 8-14, AND 9-11.



REMOVE JUMPERS AS SHOWN

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



NOTES

- 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.
- Program phases 4 and 8 for Dual Entry.
- Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
- If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
- The cabinet and controller are part of a Time Based Coordination System.

EQUIPMENT INFORMATION

Controller.....2070LX
 Cabinet.....332 w/ Aux
 Software.....Q-Free MAXTIME
 Cabinet Mount.....Base
 Output File Positions.....18 With Aux. Output File
 Load Switches Used.....S1, S2, S5, S6, S8, S11, AUX S1, AUX S4
 Phases Used.....1, 2, 4, 4PED, 6, 8
 Overlap "1".....*
 Overlap "2".....NOT USED
 Overlap "3".....*
 Overlap "4".....NOT USED

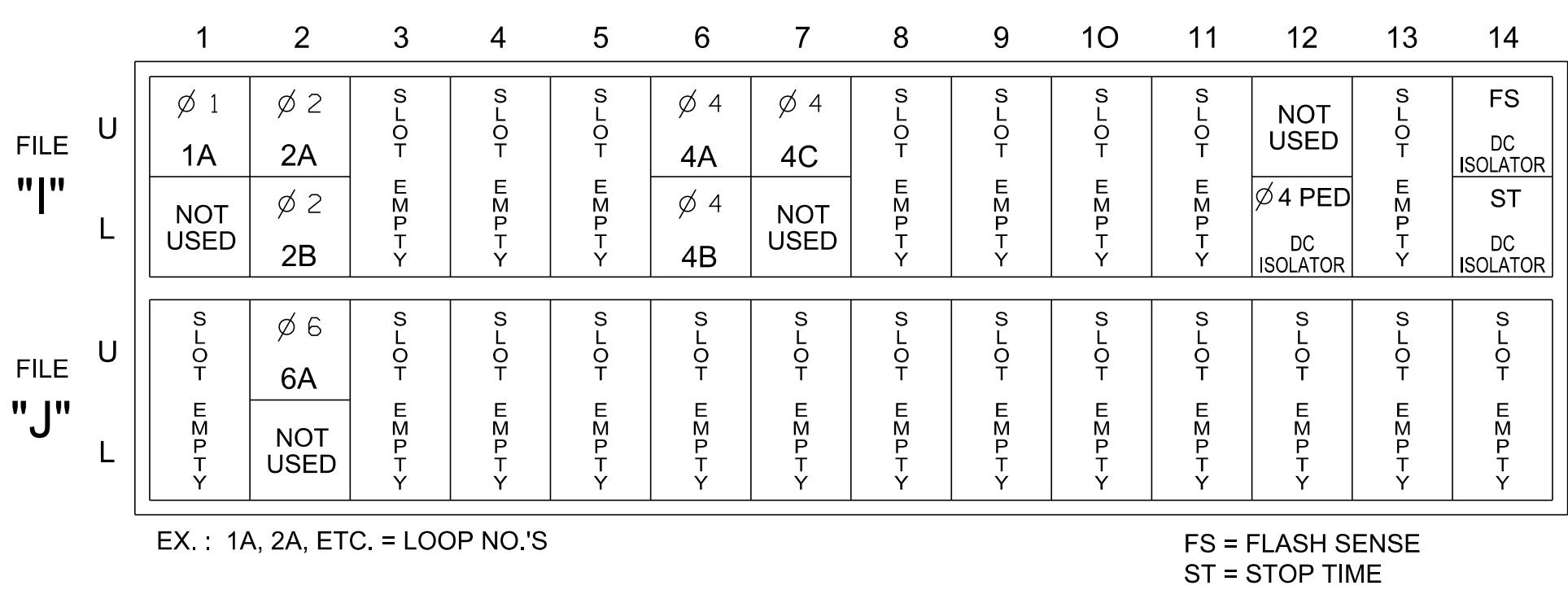
*See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	11*	82	22,23	NU	NU	41,42	P41, P42	NU	61,62	NU	NU	81,82	NU	11*	NU	NU	21*	NU
RED	*	128			101			134		107								
YELLOW		129			102			135		108								
GREEN		130			103			136		109								
RED ARROW													A121				A114	
YELLOW ARROW		126											A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW	127	127																
Hand icon							104											
Walking person icon							106											

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

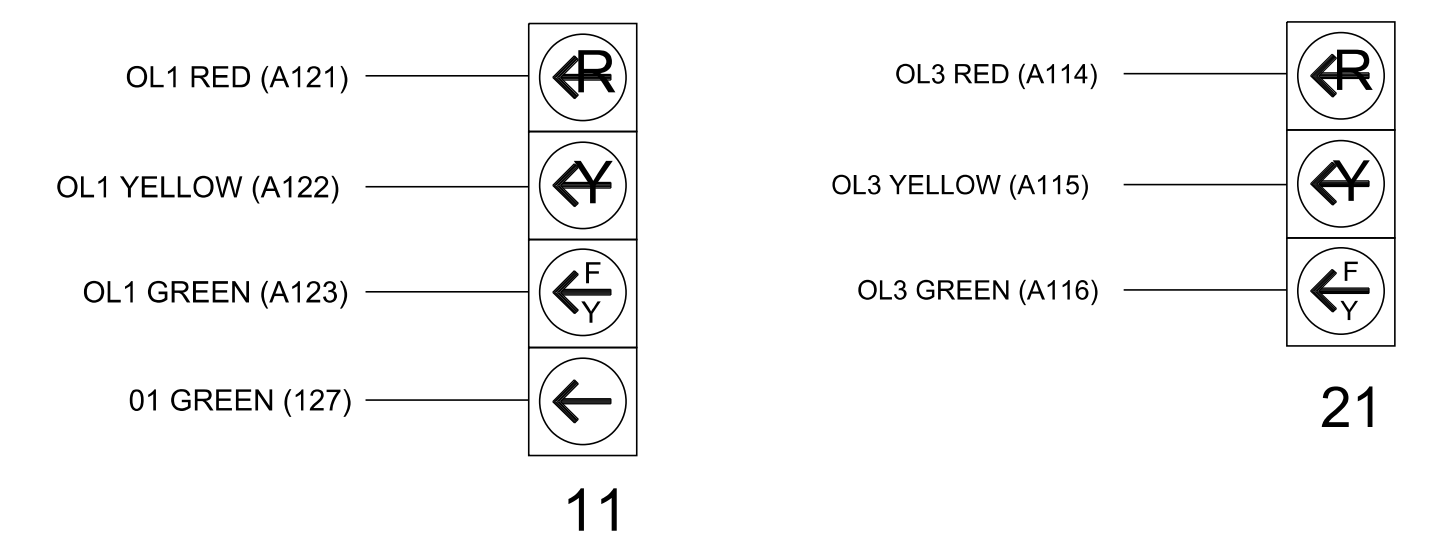
INPUT FILE POSITION LAYOUT
(front view)



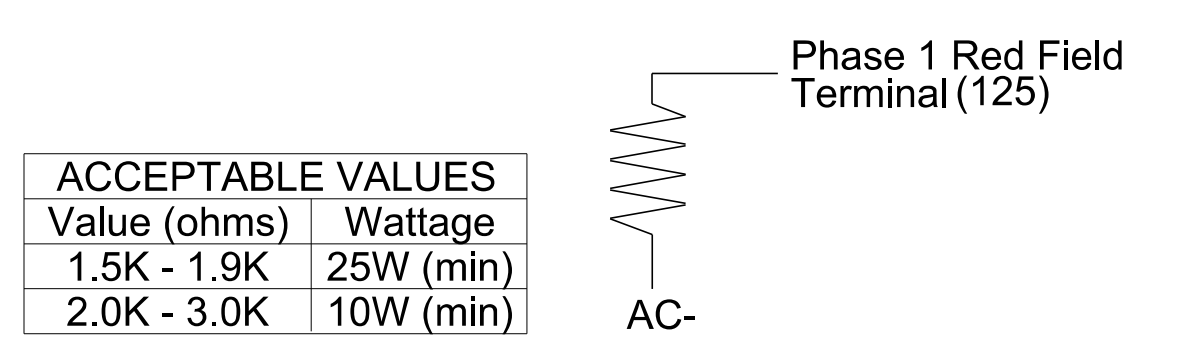
INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
1A	TB2-1,2	I1U	56	18	1	1	15	---	X	-	X	-
2A	TB2-5,6	I2U	39	-	29	6	3	---	X	X	X	X
2B	TB2-7,8	I2L	43	5	3	2	3	---	X	-	X	X
4A	TB4-9,10	I6U	41	3	8	4	3	---	X	-	X	-
4B	TB4-11,12	I6L	45	7	9	4	10	---	X	-	X	-
4C	TB6-1,2	I7U	65	31	10	4	15	---	X	-	X	-
6A	TB3-5,6	J2U	40	2	16	6	---	---	X	X	X	-
PED PUSH BUTTONS P41,P42	TB8-5,6	I12L	69	35	4	PED 4	---	---	---	---	---	---

FYA SIGNAL WIRING DETAIL
(wire signal heads as shown)



LOAD RESISTOR INSTALLATION DETAIL
(install resistors as shown)



SPECIAL DETECTOR NOTE

For loops 1B and 8A, 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.

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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-1288
 DESIGNED: April 2023
 SEALED: April 28, 2023
 REVISED: -

Electrical Detail - Sheet 1 of 2

Electrical and Programming Details For: **US 64 (Hendersonville Highway) at Ecusta Bypass/Store Entrance**

Prepared for the Offices of:

Division 14 Transylvania County Brevard

PLAN DATE: April 2023 REVIEWED BY: V. Kaiser

PREPARED BY: S.G. Haynie REVIEWED BY:

REVISIONS: _____ INIT. DATE _____

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL:

DocuSigned by: **Steven G. Haynie** 4/28/2023

SIG. INVENTORY NO. 14-1288