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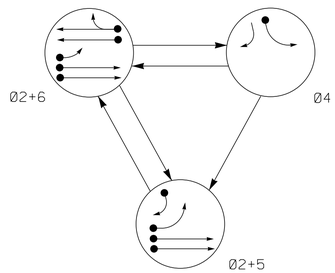
PROJECT REFERENCE NO.	SHEET NO.
HS-20040	Sig. 2.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

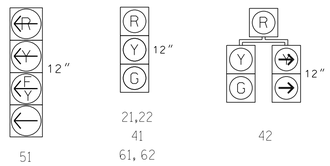
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

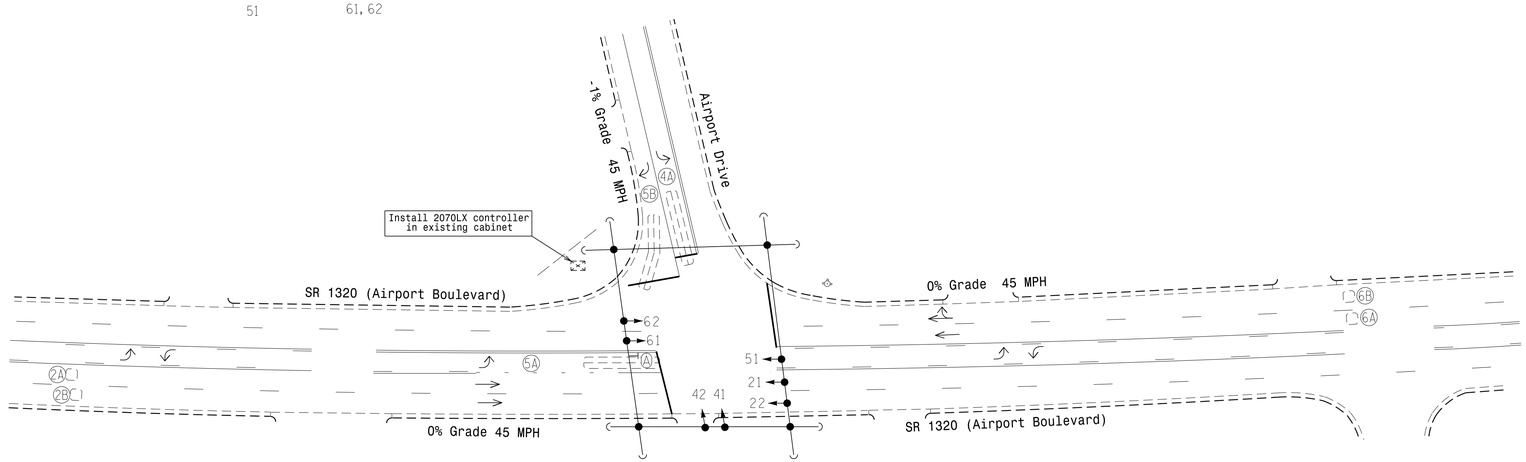
SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21,22	G	G	R	Y
41	R	R	G	R
42	R/→	R	G	R
51	←	←F	←R	←Y
61,62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



51 — 21,22 41 61,62 — 42



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
2A	6X6	300	EXISTING	-	2	-	-	X	X	X	-	-
2B	6X6	300	EXISTING	-	2	-	-	X	X	X	-	-
4A	6X40	+5	2-4-2	-	4	3	-	X	-	X	-	-
5A	6X40	+5	2-4-2	-	5	15	-	X	-	X	-	-
					2	3	-	X	-	X	X	-
5B	6X40	+5	2-4-2	-	5	15	-	X	-	X	-	-
6A	6X6	300	EXISTING	-	6	-	-	X	X	X	-	-
6B	6X6	300	EXISTING	-	6	-	-	X	X	X	-	-

3 Phase
Fully Actuated
D04-17 Wilson

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data: Controller Asset #: 0462

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Walk *	–	–	–	–
Ped Clear *	–	–	–	–
Min Green	12	7	7	12
Passage *	6.0	2.0	2.0	6.0
Max 1 *	90	30	20	90
Yellow Change	4.5	3.0	3.0	4.5
Red Clear	1.1	2.6	1.9	1.1
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	–
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

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○→	Signal Pole with Guy	●→
○↓	Signal Pole with Sidewalk Guy	●↓
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
-·-·-·-	2-in Underground Conduit	-·-·-·-
N/A	Right of Way	- - - - -
→	Directional Arrow	→
Ⓐ	"ONCOMING TRAFFIC MAY HAVE EXTENDED GREEN" Sign (W25-2)	Ⓐ

Signal Upgrade - Corr. File No.04-21-63601

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SR 1320 (Airport Boulevard) at Airport Drive

Division 4 Wilson County Wilson

PLAN DATE: August 2023 REVIEWED BY: ZML

PREPARED BY: KGP, Jr. REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

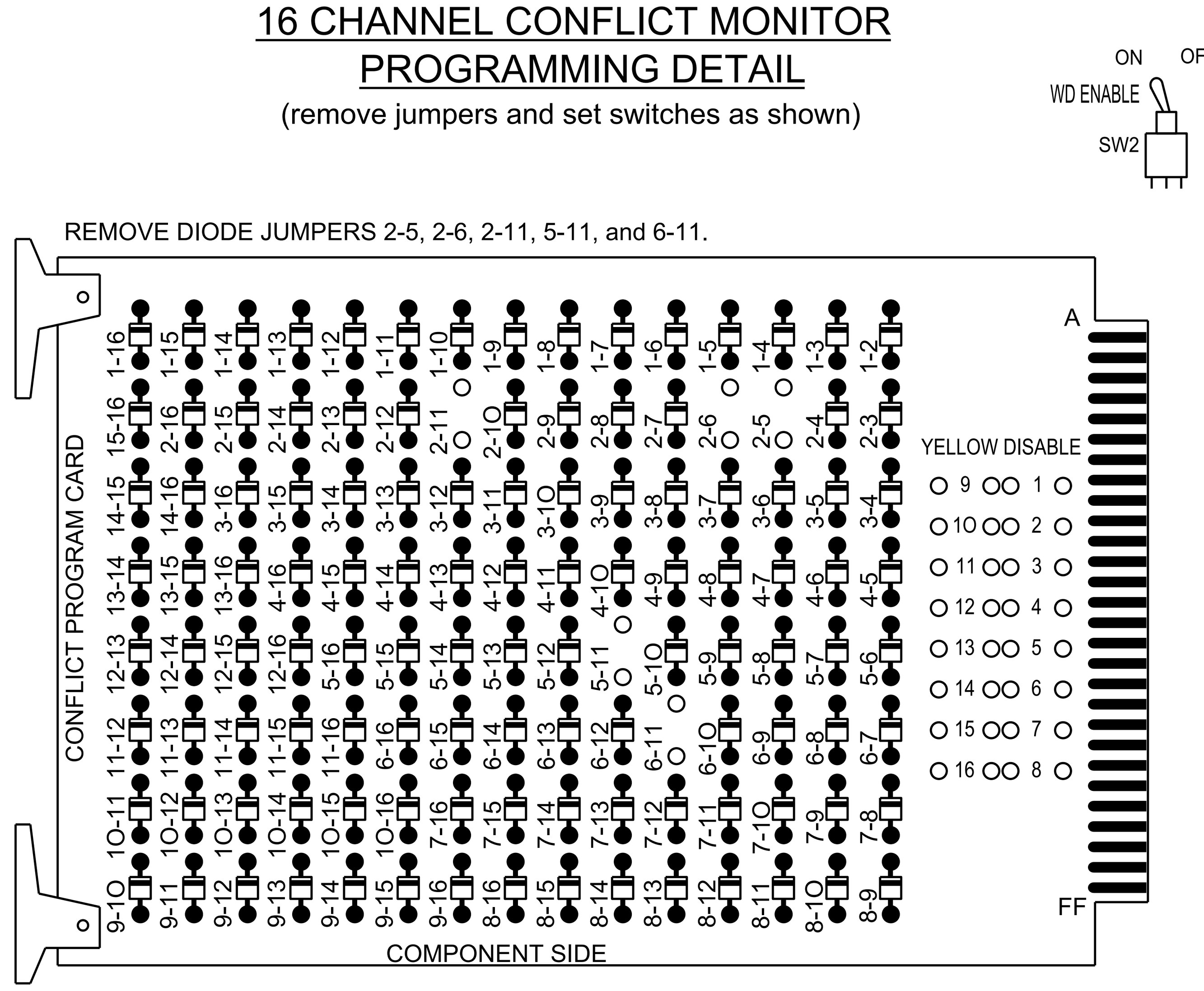
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER JAMARY M. LITTLE

DocuSigned by: Jamary Little 09/22/2023
0C21EFD04F5341F... DATE

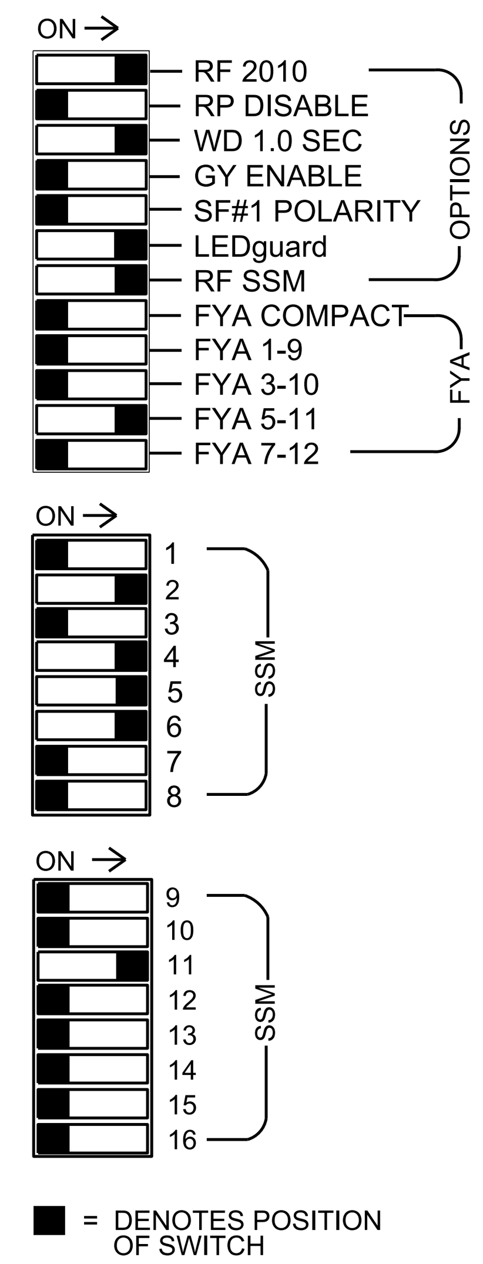
SIG. INVENTORY NO. 04-0462

16 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
3. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
4. The cabinet and controller are part of the D04-17 Wilson System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on this sheet.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
CMU CHANNEL NO.	1	2	13	3	4	14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	42	51★	61,62	NU	NU	NU	NU	NU	NU	NU	51★	NU	NU
RED		128			101		*		134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW																	A114		
YELLOW ARROW							132										A115		
FLASHING YELLOW ARROW																	A116		
GREEN ARROW							133	133											
(Don't Walk)																			
(Walk)																			

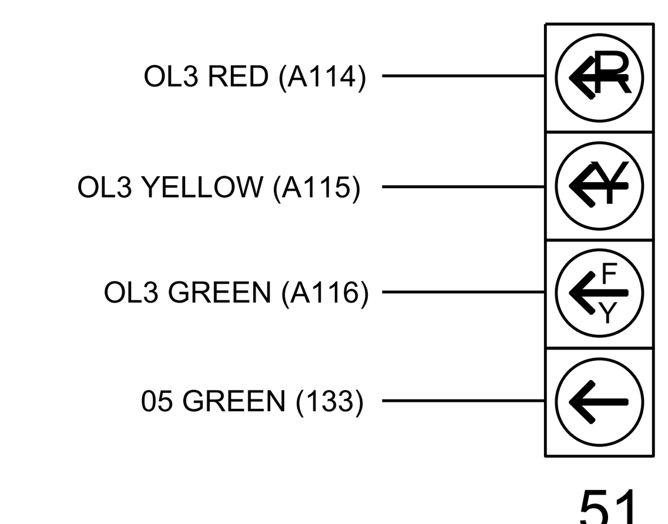
★See pictorial of head wiring in detail this sheet.

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

NU = Not Used

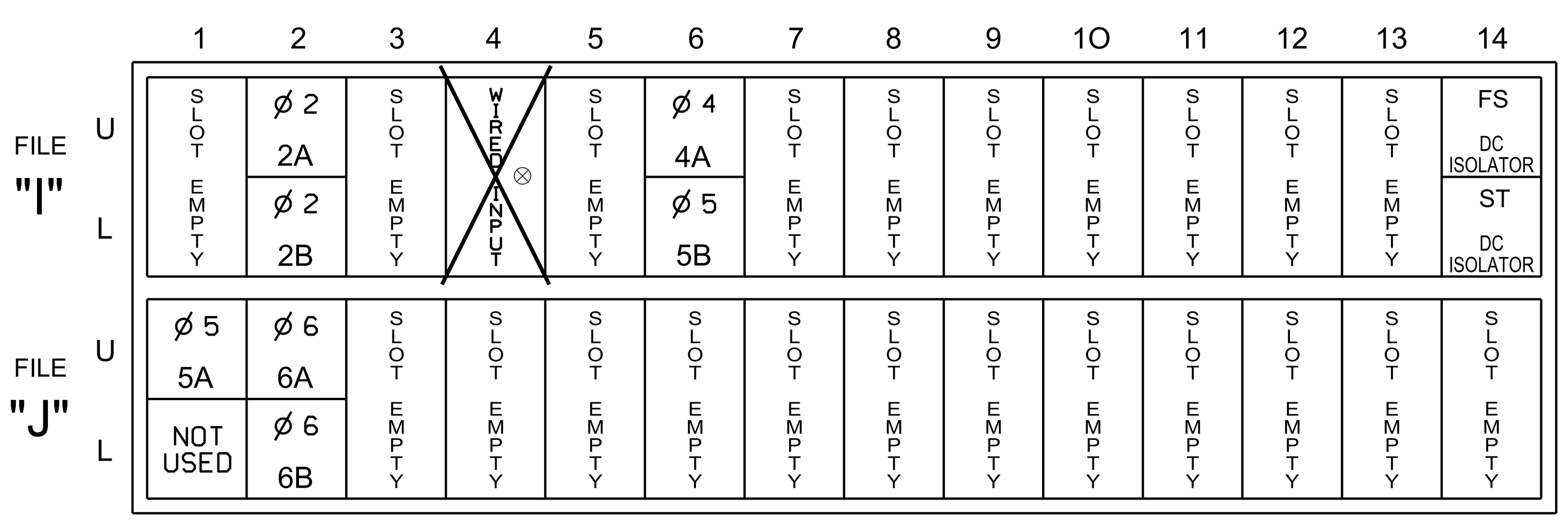
FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
ST = STOP TIME

NOTE: REMOVE EXISTING JUMPER ASSOCIATED WITH LOOP 5A FROM REAR OF INPUT FILE.

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
4A	TB4-9,10	I6U	41	3	8	4	3		X		X	
5A	TB3-1,2	J1U	55	17	15	5	15		X		X	
				-	31	2	3		X		X	X
5B	TB4-11,12	I6L	45	7	9	5	15		X		X	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

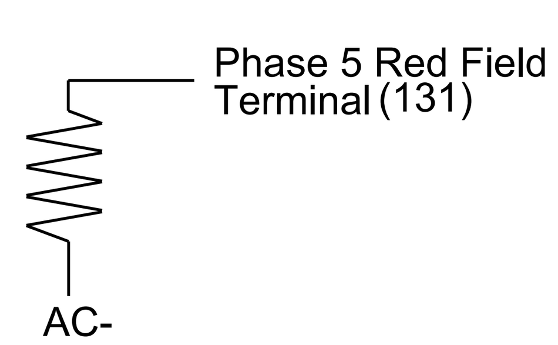
Overlap Plan 1

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

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: 04-0462
DESIGNED: August 2023
SEALED: 9/22/2023
REVISED:

Electrical Detail

Electrical and Programming Details For:

SR 1320 (Airport Boulevard)
at
Airport Drive

Division 4 Wilson County Wilson

PLAN DATE: October 2023 REVIEWED BY: DTJ

PREPARED BY: D.J. Craddock REVIEWED BY:

REVISIONS INIT. DATE

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

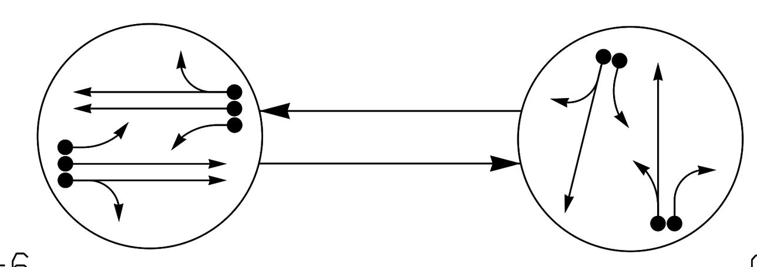
DocuSigned by: D. Todd Joyce 10/09/2023 DATE

SIG. INVENTORY NO. 04-0462

PROJECT REFERENCE NO.	SHEET NO.
HS-20040	Sig. 1.0

2 Phase
Fully Actuated
D04-17 Wilson

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

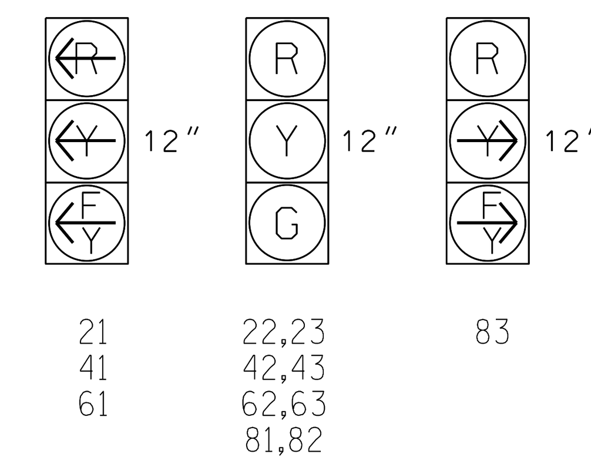
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21	← F/Y	←R	←Y
22,23	G	R	Y
41	←R	← F/Y	←R
42,43	R	G	R
61	← F/Y	←R	←Y
62,63	G	R	Y
81,82	R	G	R
83	R	F/Y →	R

SIGNAL FACE I.D.

All Heads L.E.D.

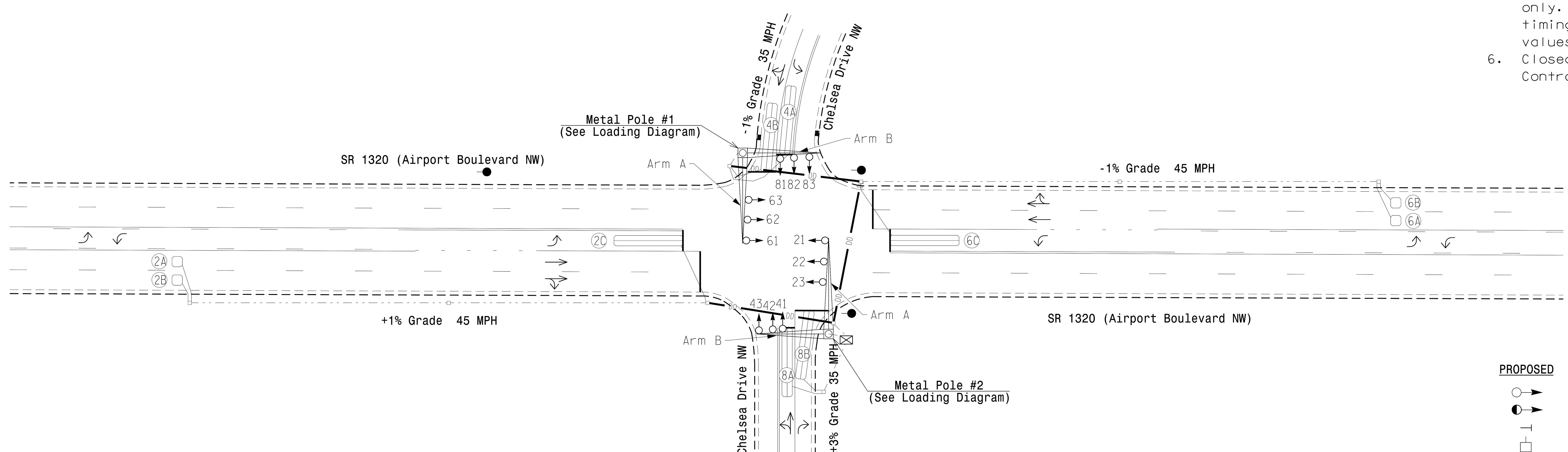


MAXTIME DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	5	X	2	-	-	X	X	X	-	X
2B	6X6	300	5	X	2	-	-	X	X	X	-	X
2C	6X40	0	2-4-2	X	2	3	-	X	-	X	X	X
4A	6X40	0	2-4-2	X	4	3	-	X	-	X	-	X
4B	6X40	0	2-4-2	X	4	10	-	X	-	X	-	X
6A	6X6	300	5	X	6	-	-	X	X	X	-	X
6B	6X6	300	5	X	6	-	-	X	X	X	-	X
6C	6X40	0	2-4-2	X	6	3	-	X	-	X	X	X
8A	6X40	0	2-4-2	X	8	3	-	X	-	X	-	X
8B	6X40	0	2-4-2	X	8	15	-	X	-	X	-	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
6. Closed loop system data: Controller Asset #: 1457.



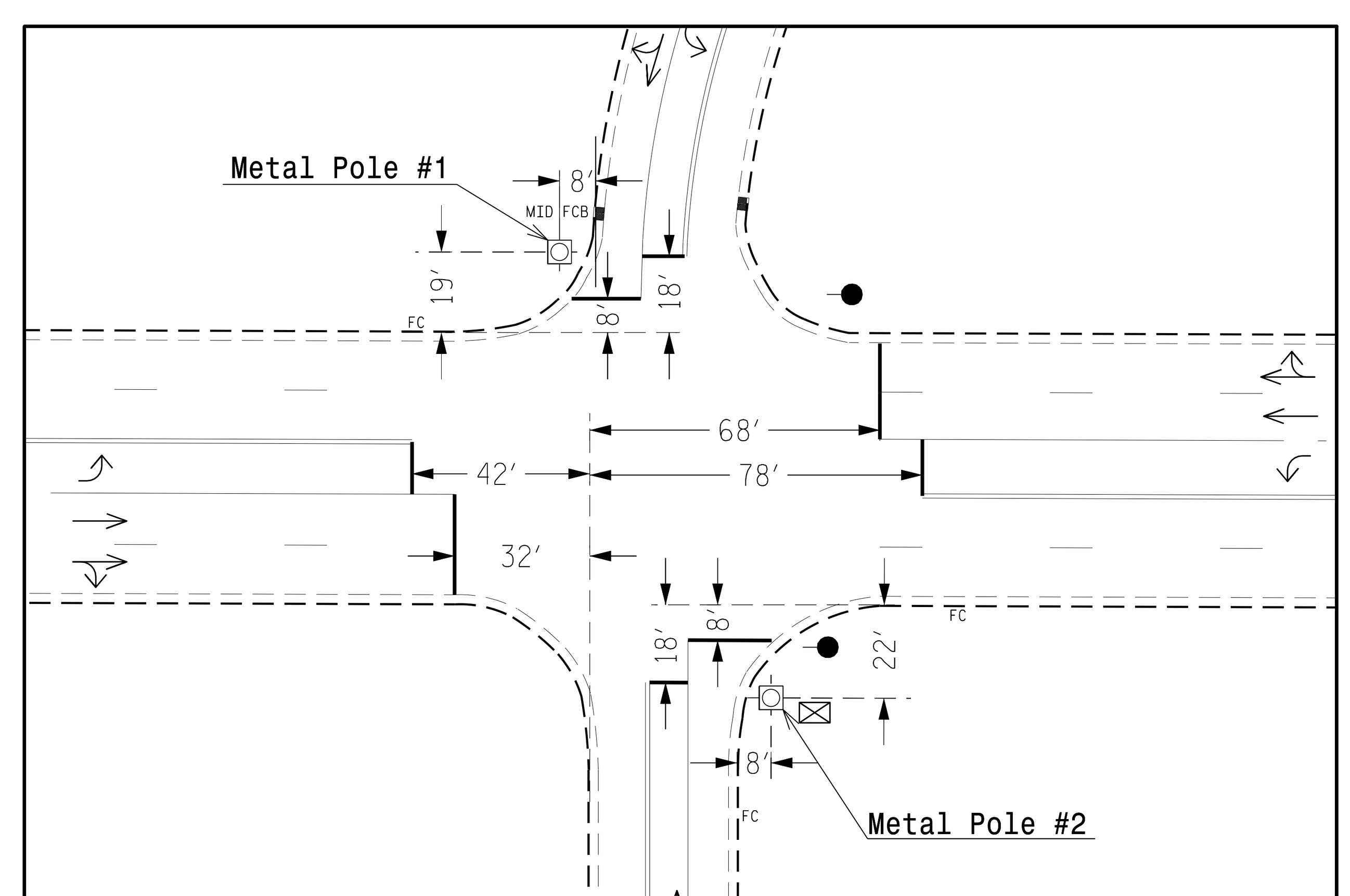
LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
N/A	Fire Hydrant	
N/A	Catch Basin	
N/A	Existing Power Pole	

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Walk *	–	–	–	–
Ped Clear *	–	–	–	–
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Max 1 *	90	30	90	30
Yellow Change	4.6	3.9	4.6	3.7
Red Clear	1.2	1.4	1.2	1.6
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
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.



Proposed Metal Pole and Stop Bar Locations

New Installation - Corr. File No. 04-21-63601

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

SR 1320
(Airport Boulevard NW)
at
Chelsea Drive NW

Division 4 Wilson County Wilson

PLAN DATE:	August 2023	REVIEWED BY:	ZML
PREPARED BY:	KGP, Jr.	REVIEWED BY:	

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

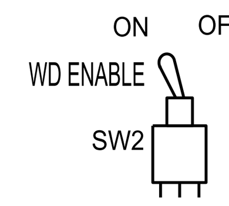
DocuSigned by: 09/22/2023
SIGNATURE DATE

SIG. INVENTORY NO. 04-1457

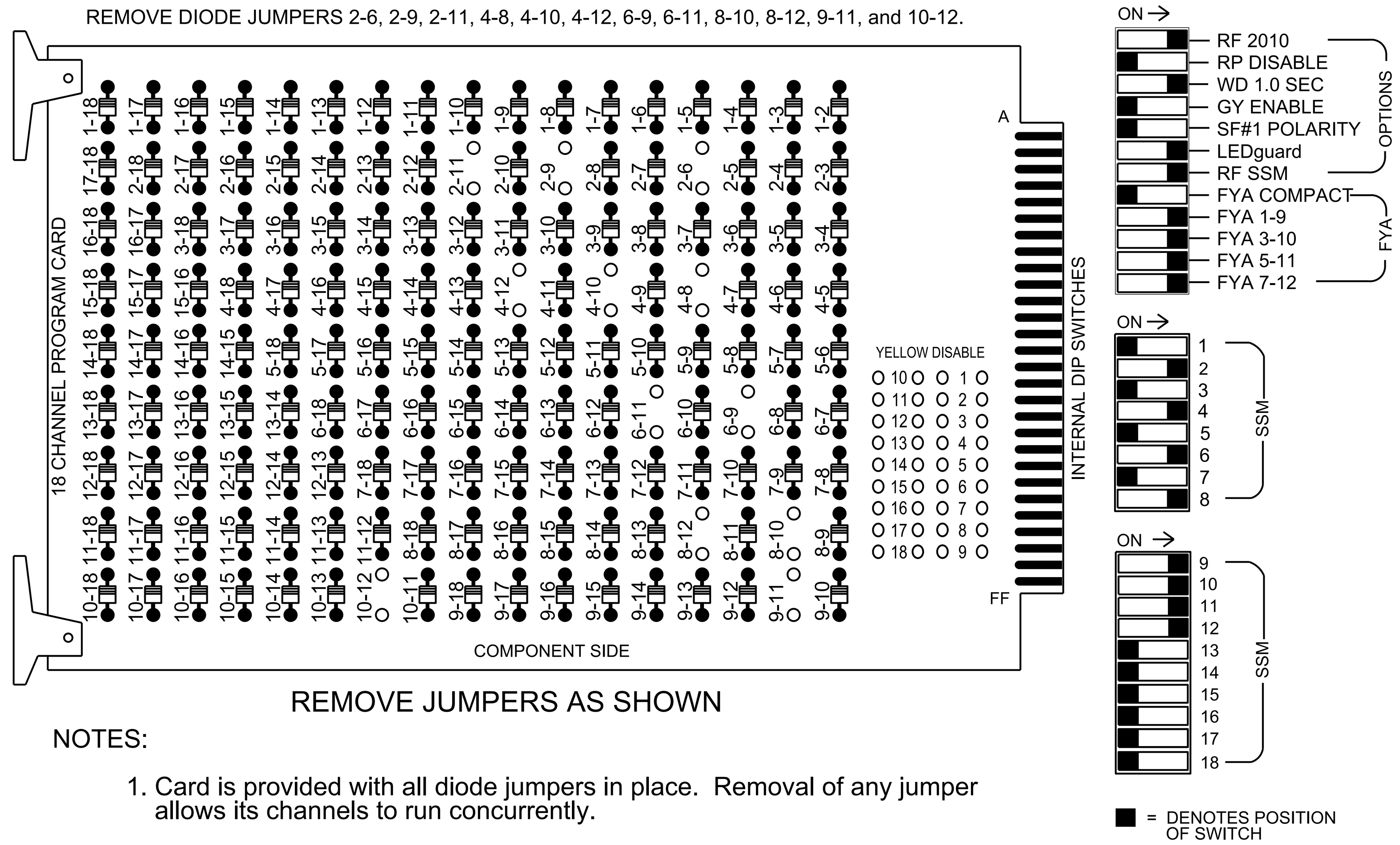
23-AUG-2023 08:54
S:*ITS&SU*ITS Signals*Signal Design Section*Eastern Region*Div-04*HS-20040*04-1457*041457_sig_dsn_20230525.dgn
kgpeedin

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 2-6, 2-9, 2-11, 4-8, 4-10, 4-12, 6-9, 6-11, 8-10, 8-12, 9-11, and 10-12.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
5. The cabinet and controller are part of the D04-17 Wilson System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on this sheet.

PROJECT REFERENCE NO.	SHEET NO.
HS-2004O	Sig. 1.1

SIGNAL HEAD HOOK-UP CHART

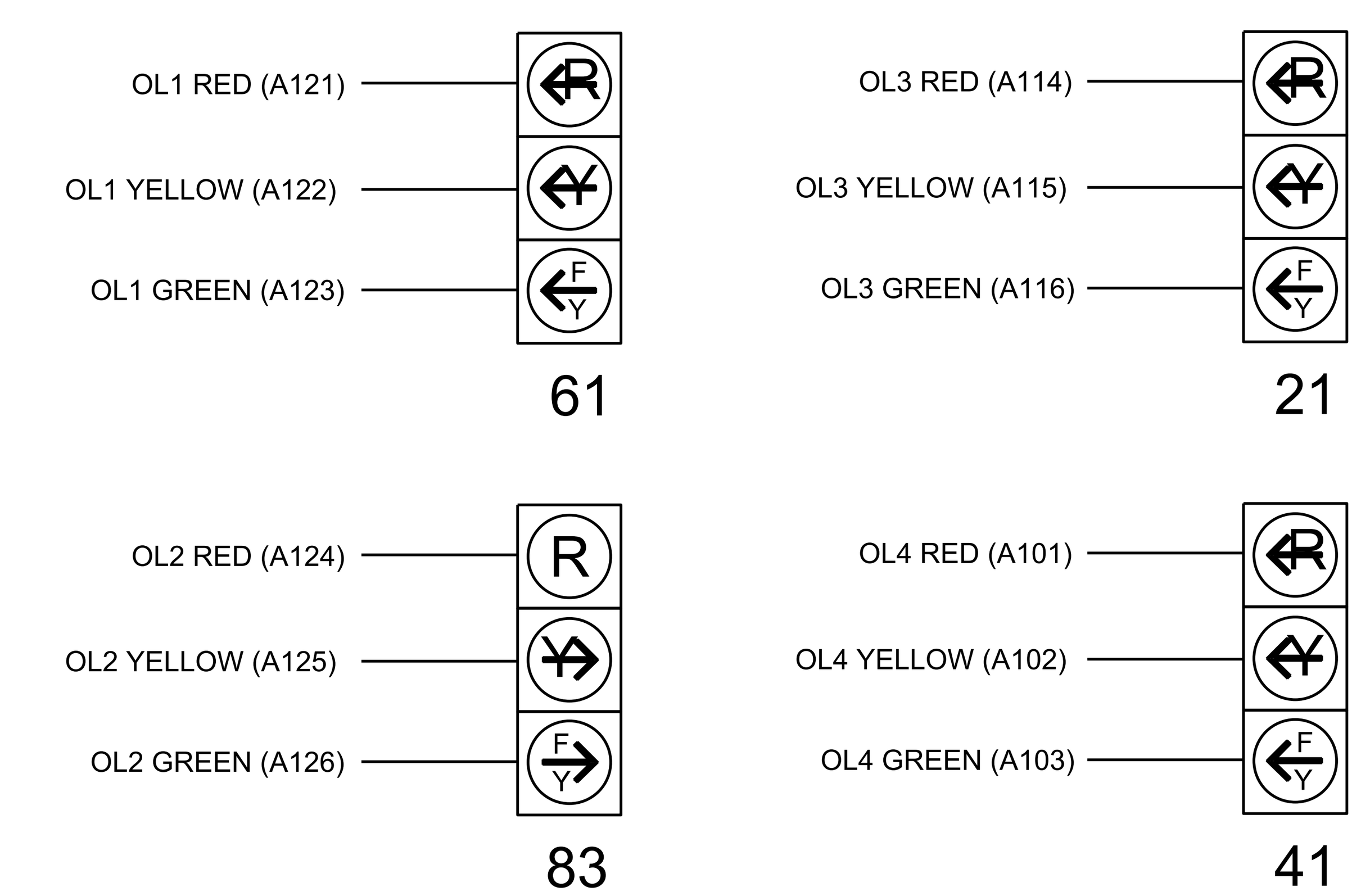
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	42,43	NU	NU	62,63	NU	NU	81,82	NU	61 ★	83 ★	NU	21 ★	41 ★	NU
RED		128			101			134			107			A124				
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114	A101	
YELLOW ARROW													A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123	A126		A116	A103	
GREEN ARROW																		
(hand)																		
(pedestrian)																		

★See pictorial of head wiring in detail this sheet.

NU = Not Used

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
2C	TB2-9,10	I3U	63	29	4	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	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
6C	TB3-9,10	J3U	64	30	18	6	3		X		X	X
8A	TB5-9,10	J6U	42	4	22	8	3		X		X	
8B	TB5-11,12	J6L	46	8	23	8	15		X		X	

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 04-1457
DESIGNED: August 2023
SEALED: 9/22/2023
REVISED:

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

SR 1320
(Airport Boulevard NW)
at
Chelsea Drive NW

Division 4 Wilson County Wilson

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

PLAN DATE: October 2023	REVIEWED BY: DTJ
PREPARED BY: D.J. Craddock	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

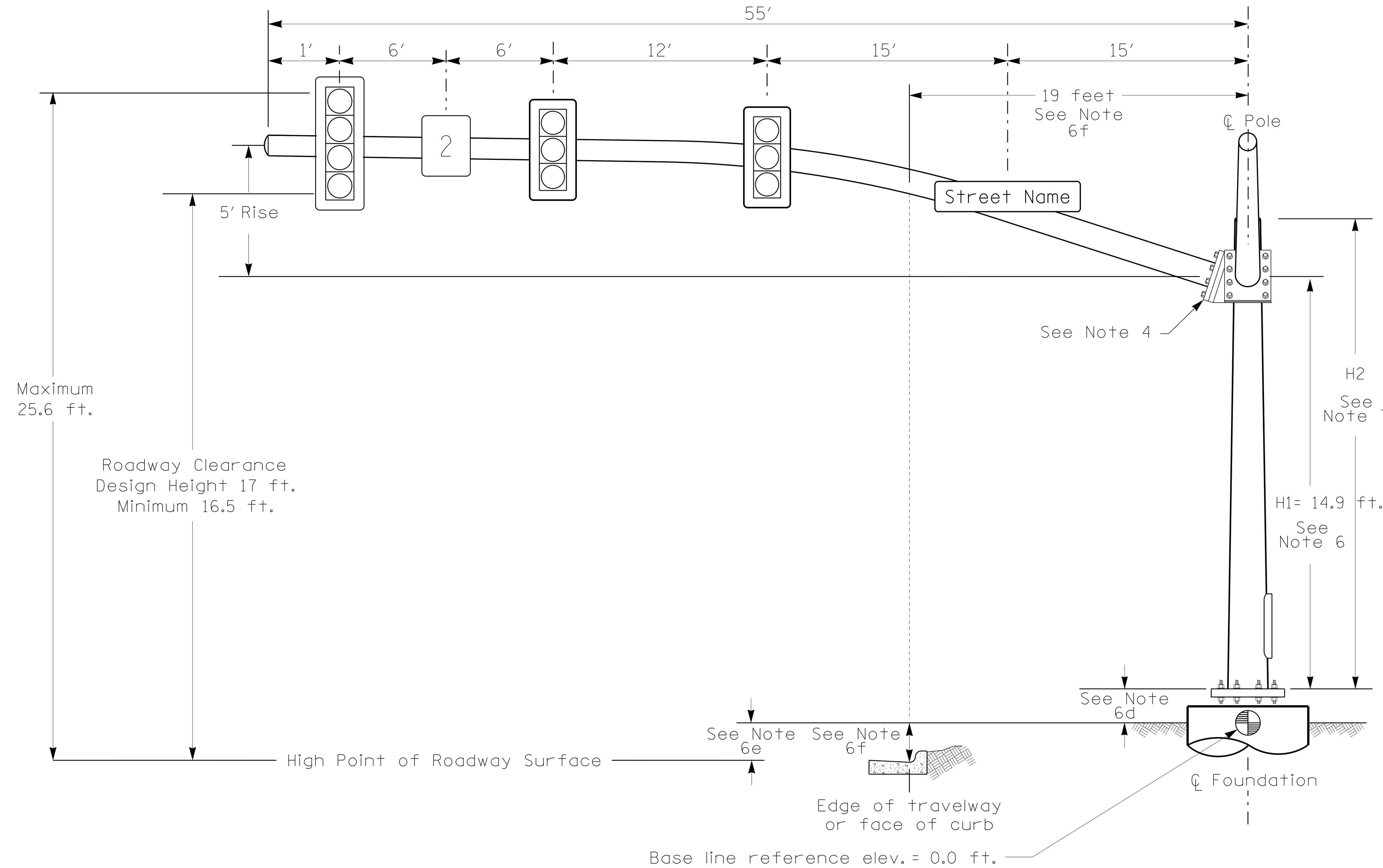
DocuSigned by: D. Todd Joyce 10/09/2023
A90CADFDBD4241D...
DATE

SIG. INVENTORY NO. 04-1457

09-OCT-2023 12:40
C:\Work_for_home\041457_sm_ele_20230531.dgn
djcraddock1

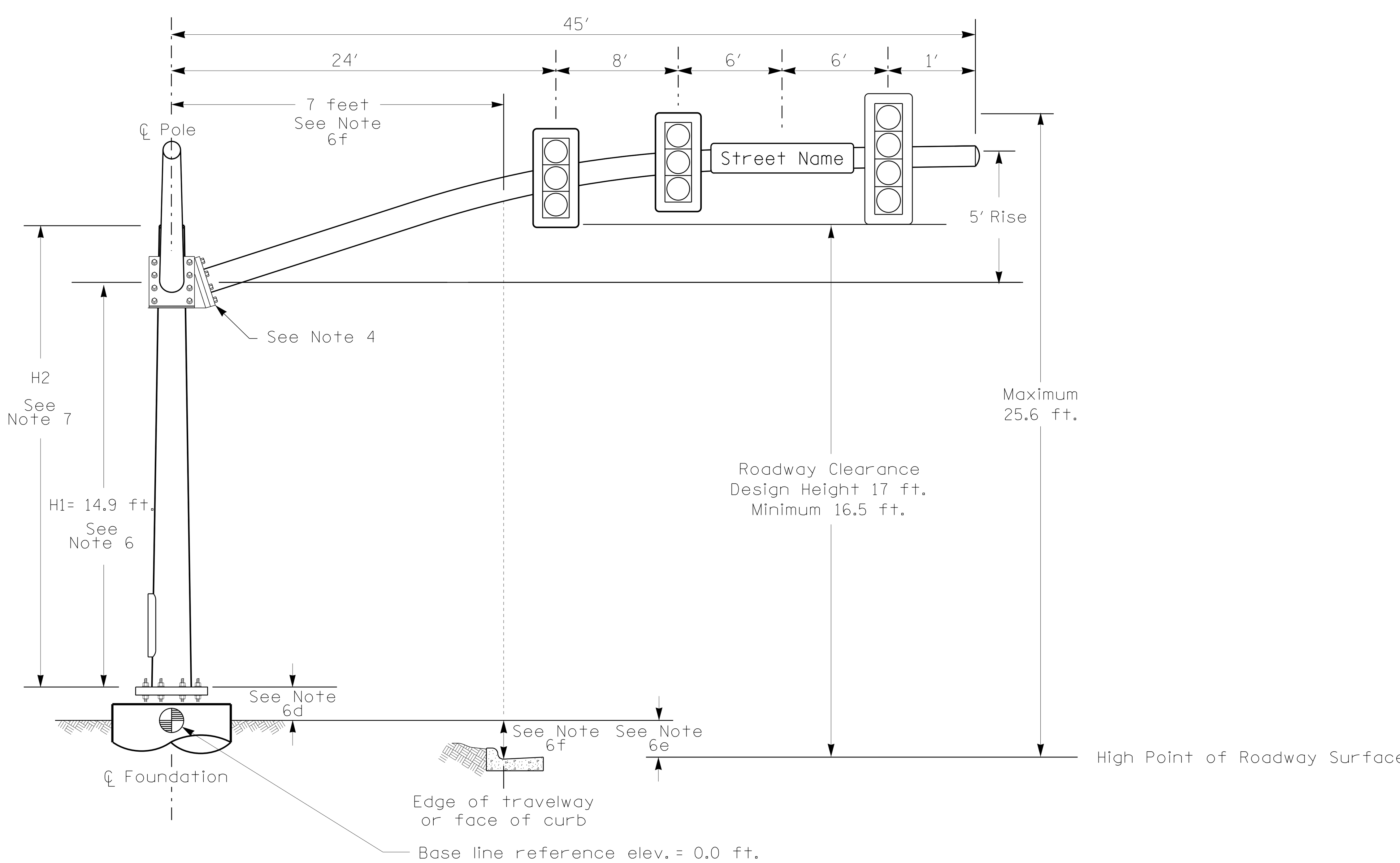
METAL POLE No. 1	PROJECT REFERENCE NO. HS-20040	SHEET NO. Sig.1.2

Design Loading for METAL POLE NO. 1, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 1, MAST ARM B



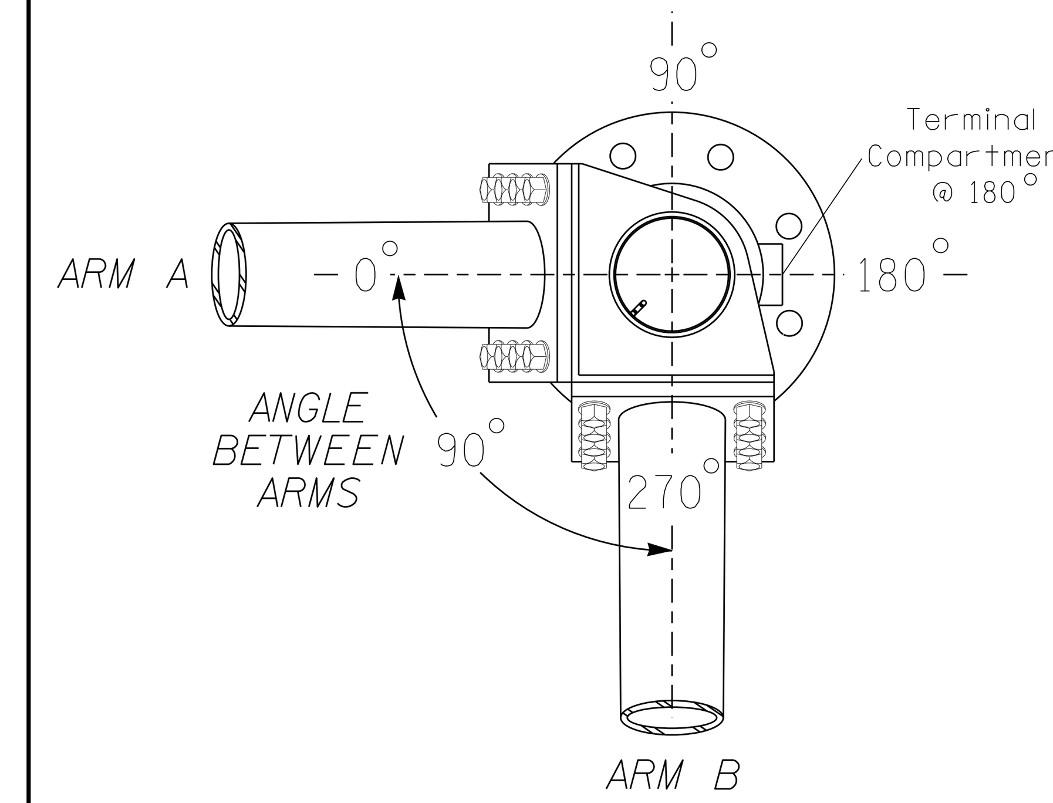
Elevation View @ 0°

SPECIAL NOTE

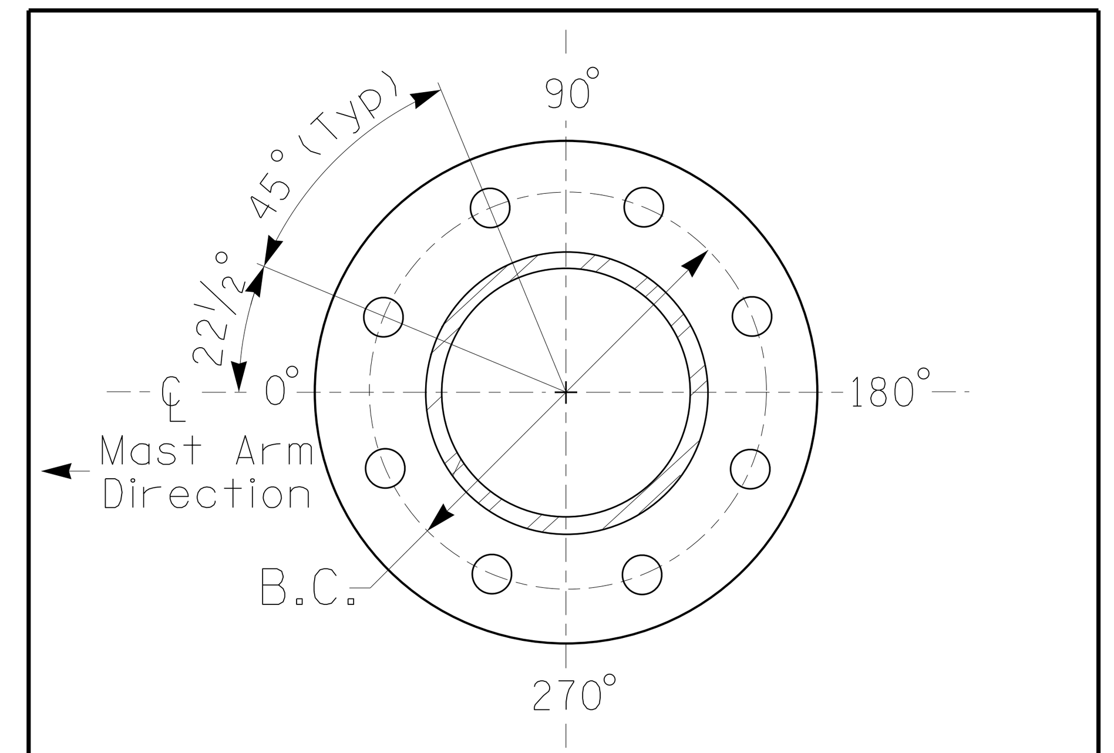
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.8 ft.	-0.2 ft.
Elevation difference at Edge of travelway or face of curb	-0.4 ft.	-0.8 ft.

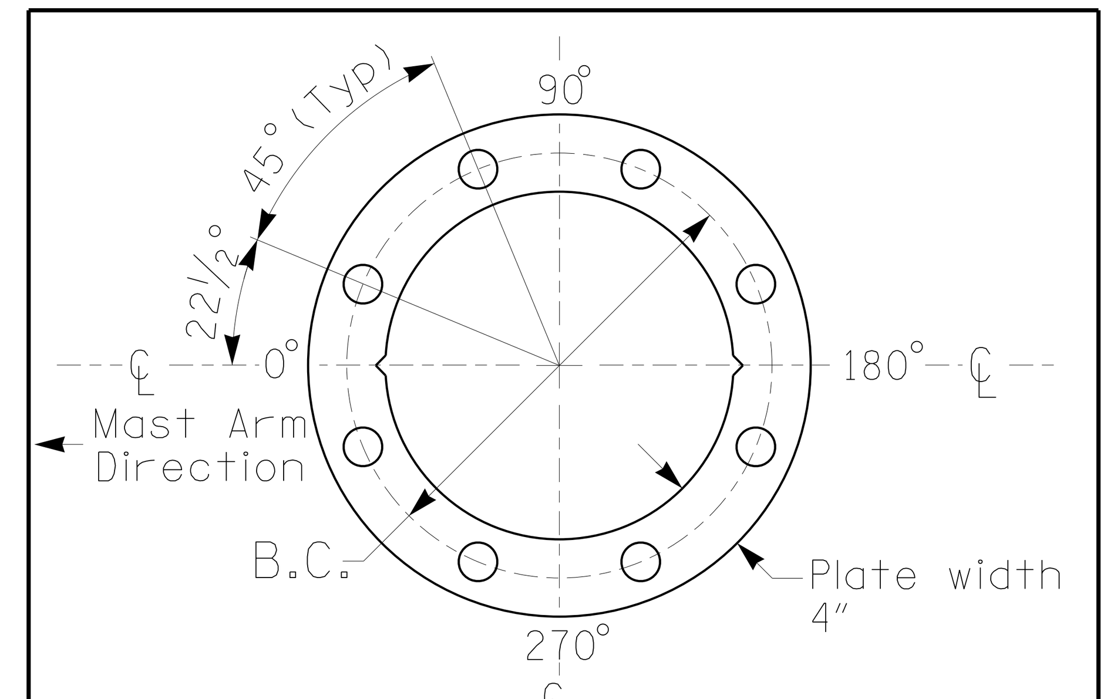


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

MAST ARM LOADING SCHEDULE

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

NOTES

DESIGN REFERENCE MATERIAL

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

DESIGN REQUIREMENTS

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

NCDOT Wind Zone 4 (120 mph)

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1320 (Airport Boulevard NW) at Chelsea Drive NW

Division 4 | Wilson County | Wilson

PLAN DATE: August 2023	REVIEWED BY: ZML
PREPARED BY: KGP, Jr.	REVIEWED BY:

SCALE 0 N/A

N/A

REVISIONS | INIT. | DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE

DocuSigned by: Zachary Little 10/27/2023

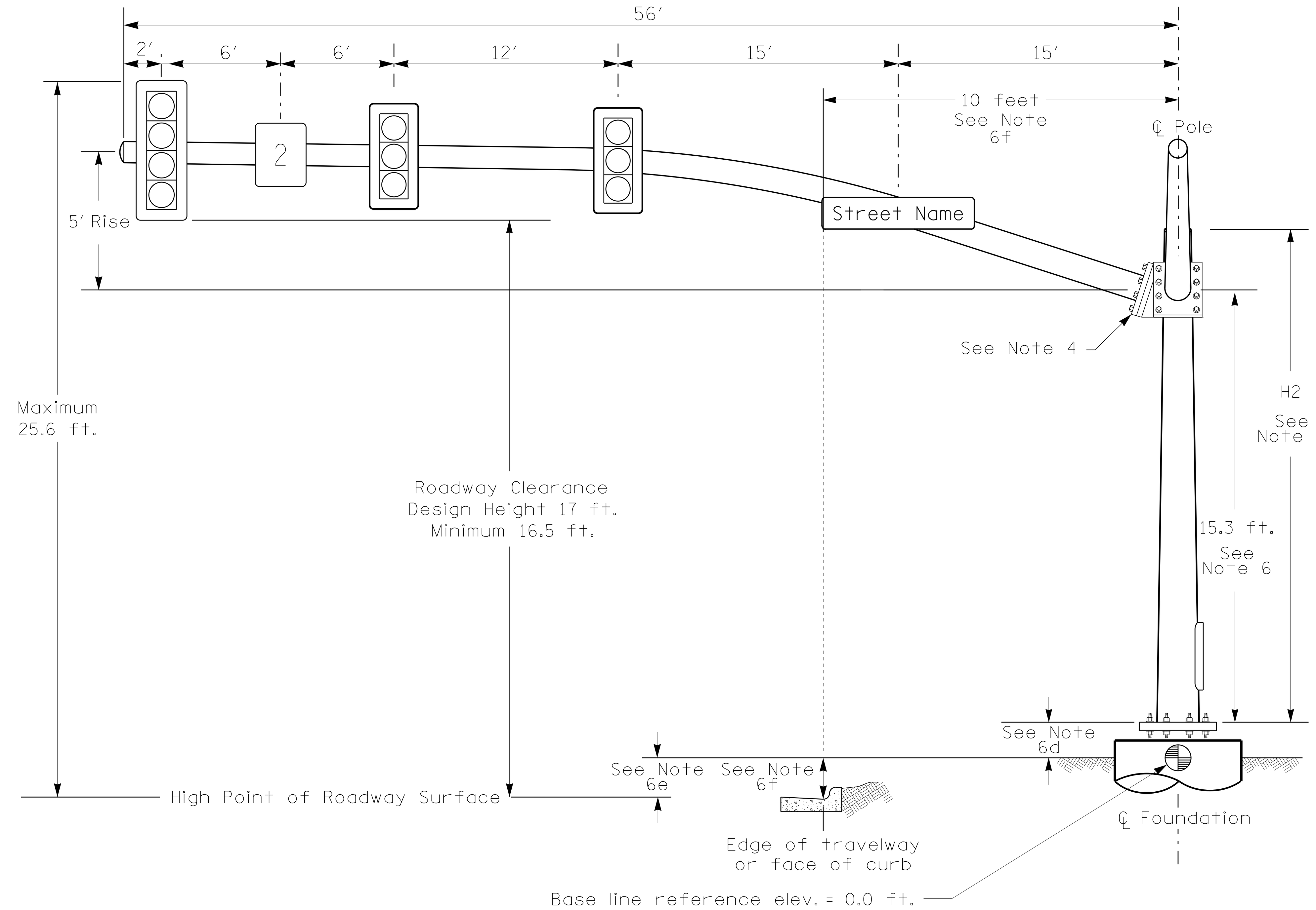
DATE

SIG. INVENTORY NO. 04-1457

27-OCT-2023 09:31
S:\ITS&SU\ITS Signals\Signal Design Section\Eastern Region\Div-04\HS-20040\04-1457\2024 spec drawings\041457_sig_m1_20230842024_spec.dgn
kgpedin

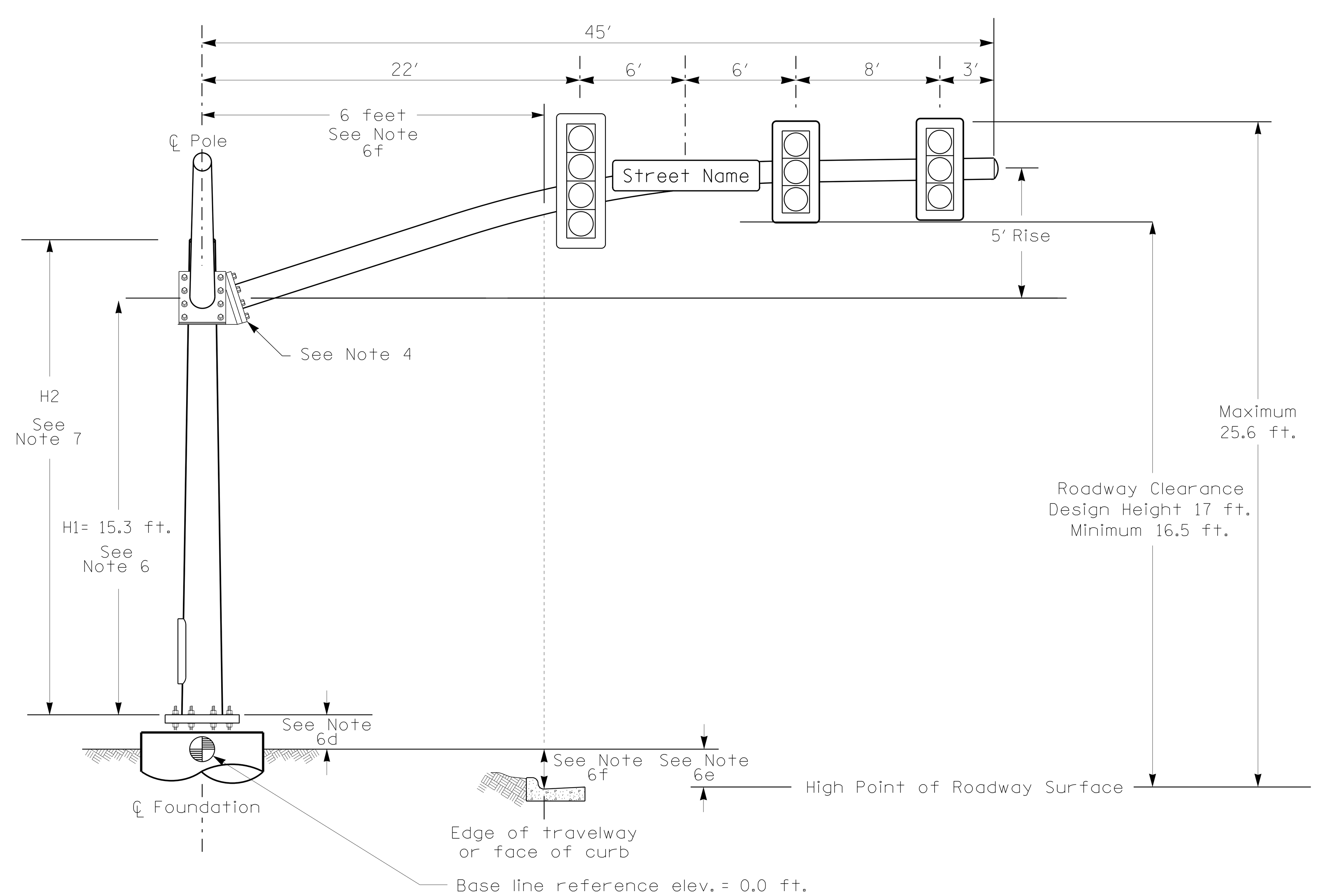
METAL POLE No. 2

Design Loading for METAL POLE NO. 2, MAST ARM A



Elevation View @ 270°

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



Elevation View @ 0°

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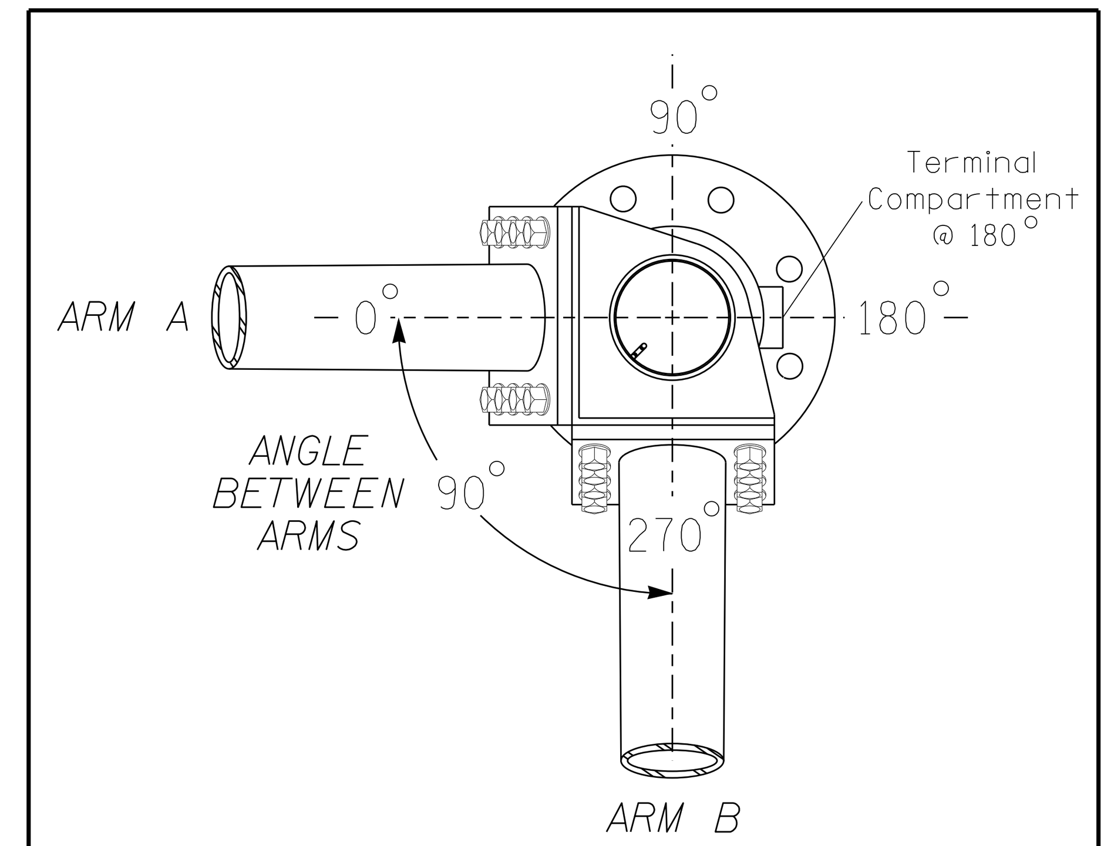
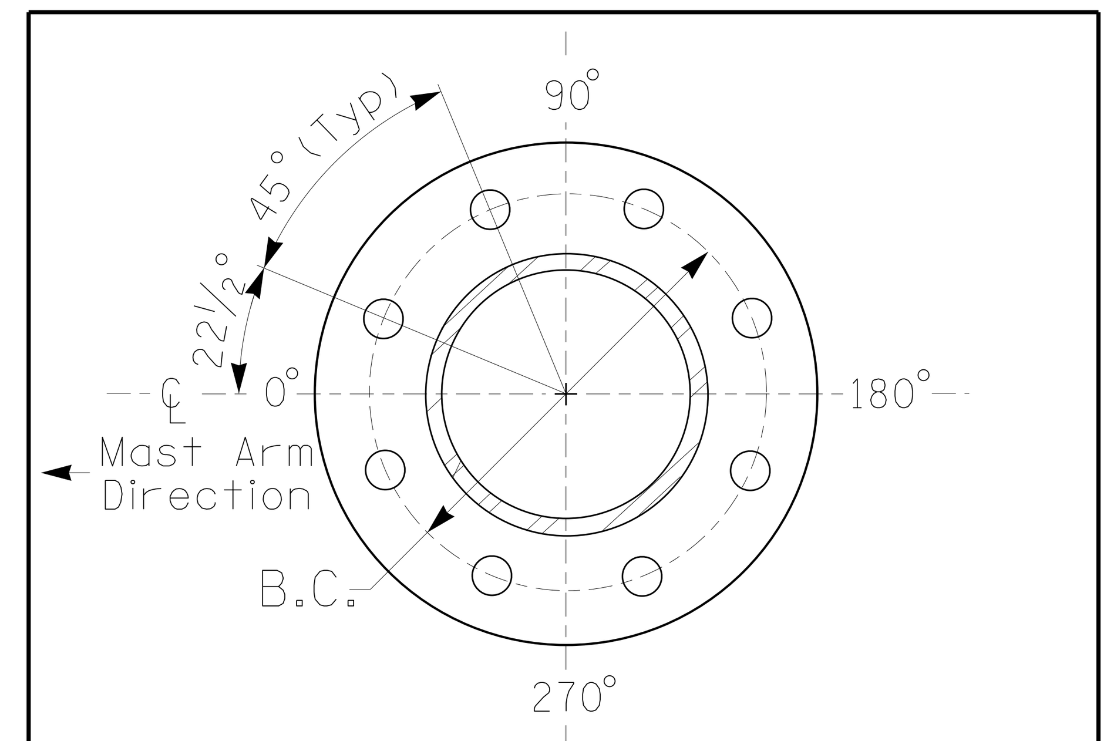
Elevation difference at Edge of travelway or face of curb	+0.7 ft.	-0.9 ft.

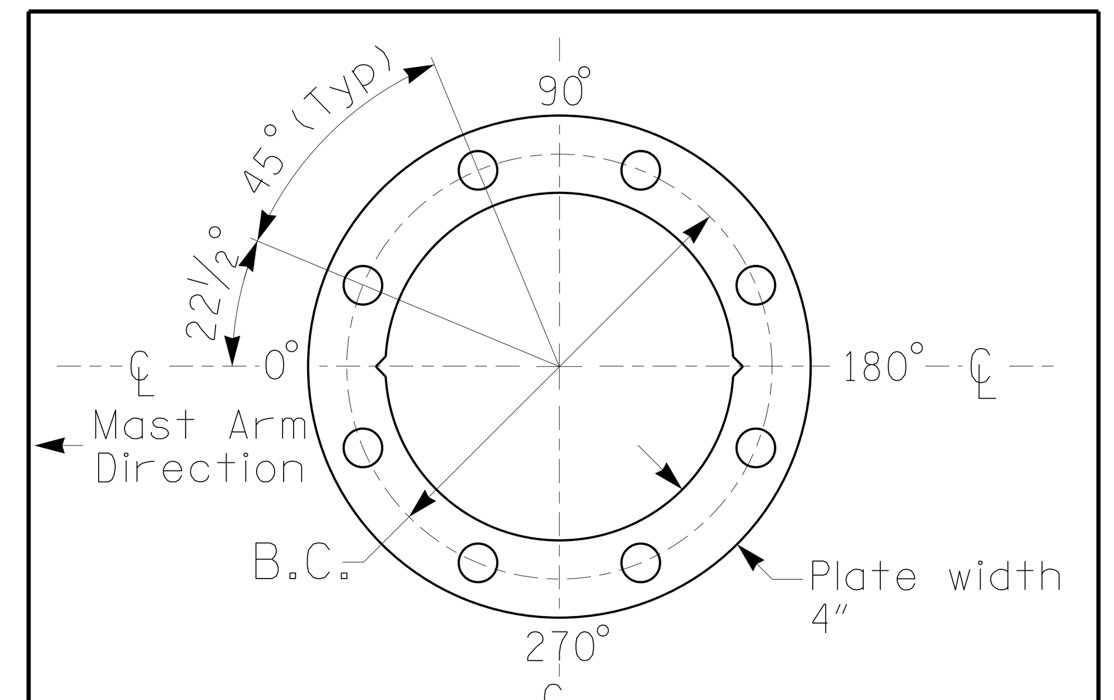


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



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

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
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   d. The top of the pole base plate is 0.75 feet above the ground elevation.
   e. Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
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11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (120 mph)

Prepared in the Offices of: Transportation Mobility and Safety Division, Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1320 (Airport Boulevard NW) at Chelsea Drive NW

Division 4 Wilson County Wilson

PLAN DATE: August 2023 REVIEWED BY: ZML

PREPARED BY: KGP, Jr. REVIEWED BY:

SCALE 0 N/A N/A

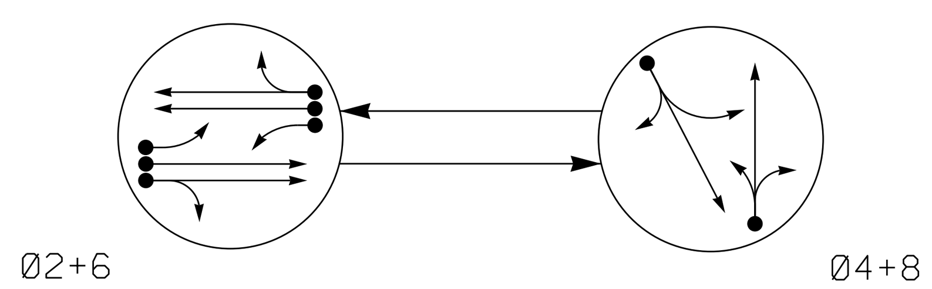
REVISIONS INIT. DATE

SEAL 030530 NORTH CAROLINA PROFESSIONAL ENGINEER ZACHARY M. LITTLE

DocuSigned by: Zachary Little 10/27/2023 DATE

SIG. INVENTORY NO. 04-1457

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

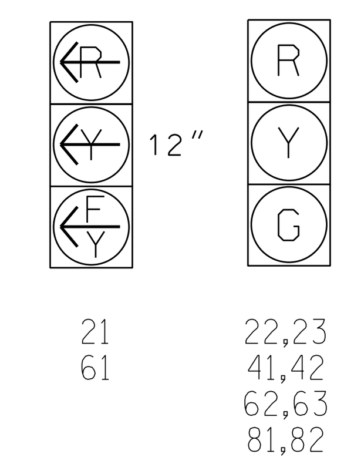
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21	←F/Y	←R	←Y
22,23	G	R	Y
41,42	R	G	R
61	←F/Y	←R	←Y
62,63	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



MAXTIME DETECTOR INSTALLATION CHART

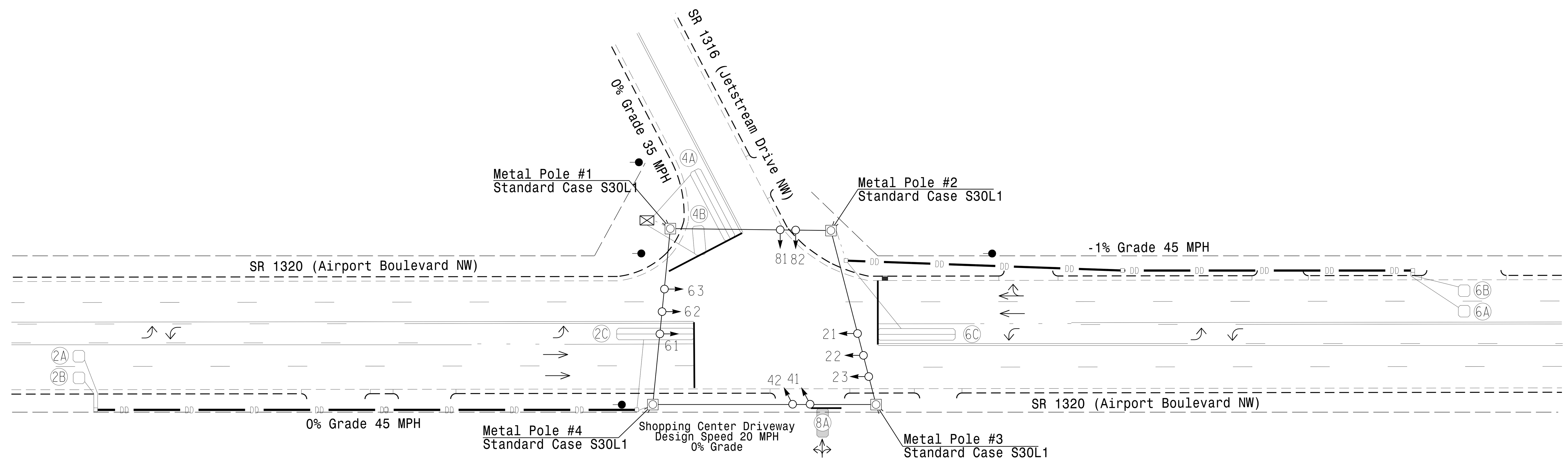
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
2A	6X6	300	5	X	2	-	-	X	X	X	-	X
2B	6X6	300	5	X	2	-	-	X	X	X	-	X
2C	6X40	0	2-4-2	X	2	3	-	X	-	X	X	X
4A	6X40	0	2-4-2	X	4	3	-	X	-	X	-	X
4B	6X15	0	2-4-2	X	4	10	-	X	-	X	-	X
6A	6X6	300	5	X	6	-	-	X	X	X	-	X
6B	6X6	300	5	X	6	-	-	X	X	X	-	X
6C	6X40	0	2-4-2	X	6	3	-	X	-	X	X	X
8A	6X15	0	*	X	8	5	-	X	-	X	-	X

* Multizone Microwave Detection

2 Phase
Fully Actuated
D04-17_Wilson

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2024 and "Standard Specifications for Roads and Structures" dated January 2024.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. This intersection uses multi-zone microwave detection. Install detectors according to the manufacturer's instructions to achieve the desired detection.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data: Controller Asset #: 1458.



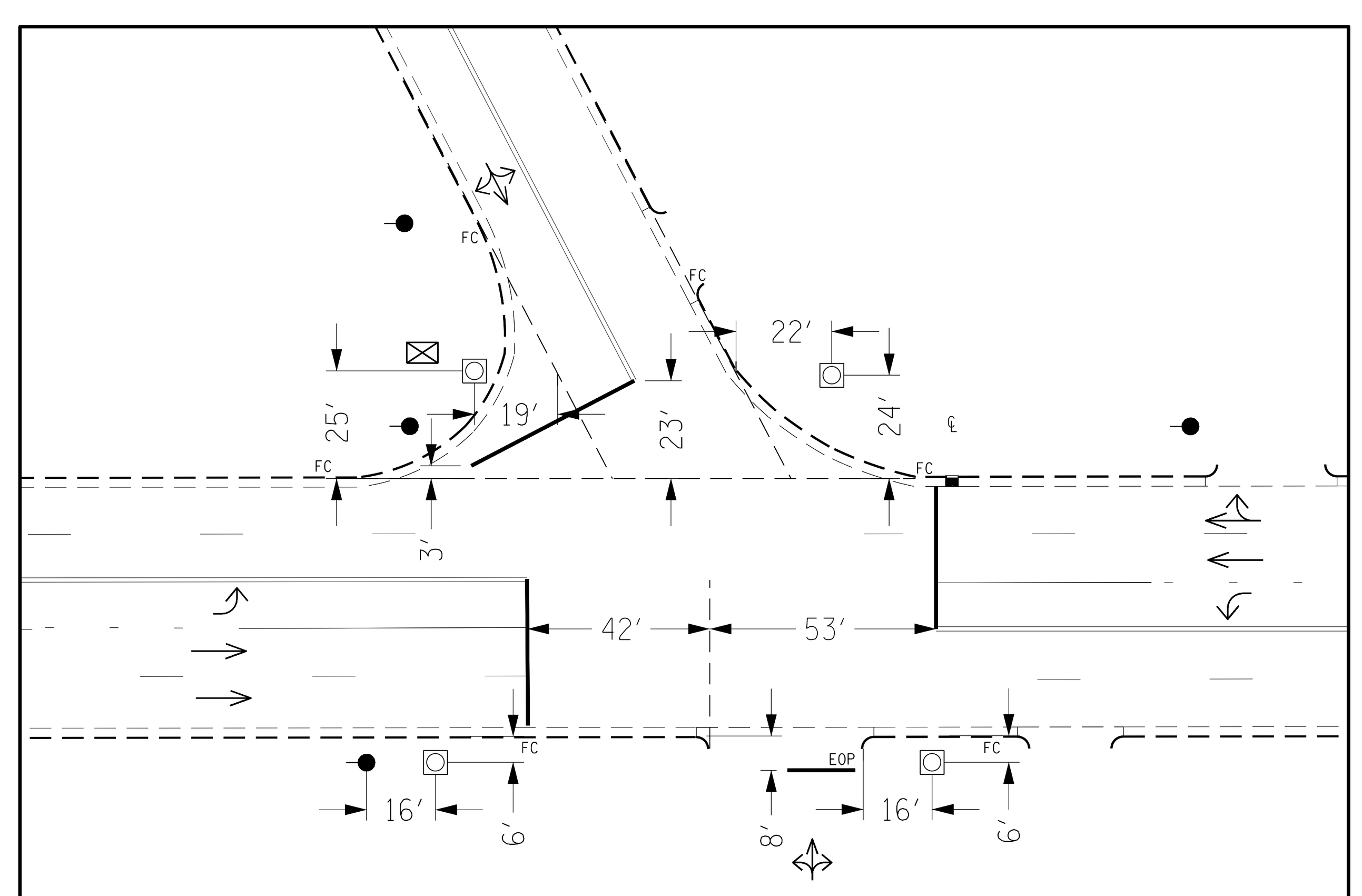
LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Strain Pole	
	Multizone Microwave Detection Zone	
N/A	Fire Hydrant	
N/A	Catch Basin	
N/A	Existing Power Pole	

MAXTIME TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Walk *	–	–	–	–
Ped Clear *	–	–	–	–
Min Green	12	7	12	7
Passage *	6.0	2.0	6.0	2.0
Max 1 *	90	30	90	30
Yellow Change	4.6	3.9	4.6	3.2
Red Clear	1.5	2.2	1.5	2.9
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
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 other phases should not be lower than 4 seconds.



Metal Pole and Stop Bar Locations

Signal Upgrade - Corr. File No.04-21-63601

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SR 1320 (Airport Boulevard NW)
at
SR 1316 (Jetstream Drive NW)

Division 4 | Wilson County | Wilson
PLAN DATE: August 2023 | REVIEWED BY: ZML
PREPARED BY: KGP, Jr. | REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS | INIT. | DATE

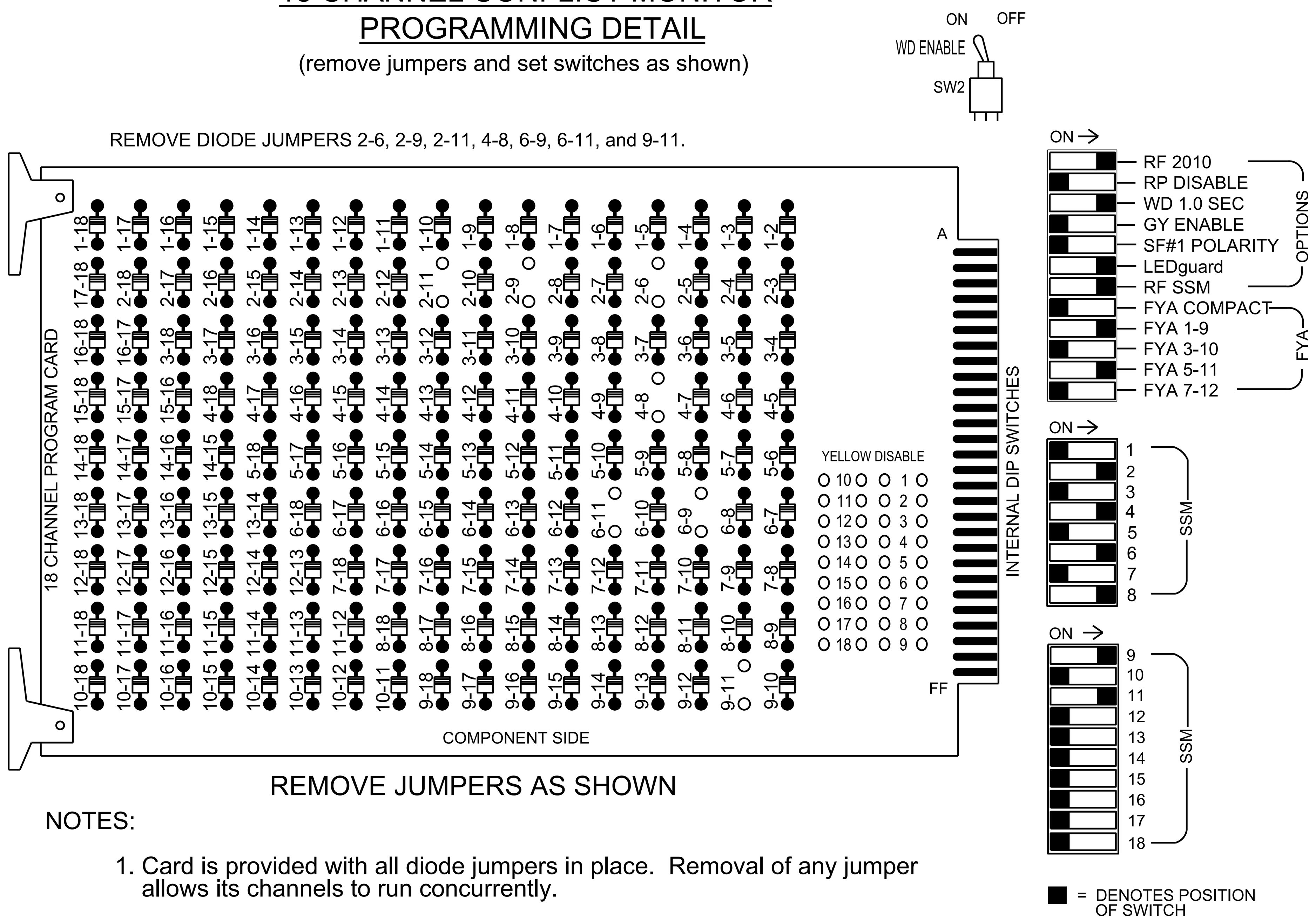
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE
DocuSigned by: Zachary Little 09/22/2023
DATE

SIG. INVENTORY NO. 04-1458

18 CHANNEL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-9, 2-11, 4-8, 6-9, 6-11, and 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the signal plan.
2. Program phases 4 and 8 for Dual Entry.
3. Program controller to start up in phase 2 Green No Walk and 6 Green No Walk.
4. If this signal will be managed by an ATMS software, enable controller and detector logging for all detectors used at this location.
5. The cabinet and controller are part of the D04-17 Wilson System.

EQUIPMENT INFORMATION

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

*See overlap programming detail on this sheet.

PROJECT REFERENCE NO.	SHEET NO.
HS-2004O	Sig. 3.1

SIGNAL HEAD HOOK-UP CHART

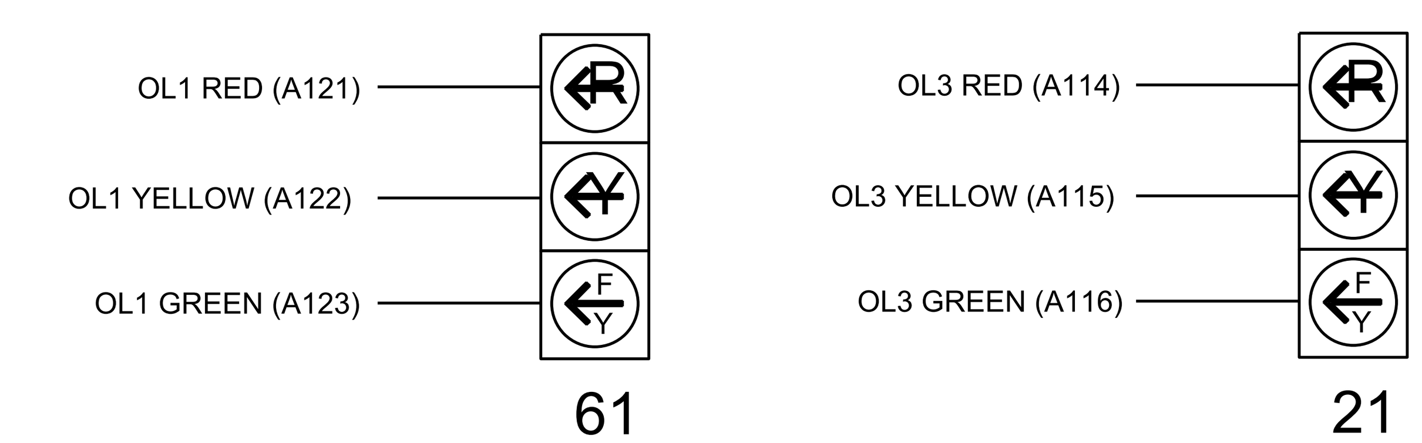
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OL1	OL2	SPARE	OL3	OL4	SPARE
SIGNAL HEAD NO.	NU	22,23	NU	NU	41,42	NU	NU	62,63	NU	NU	81,82	NU	61★	NU	NU	21★	NU	NU
RED		128			101			134			107							
YELLOW		129			102			135			108							
GREEN		130			103			136			109							
RED ARROW													A121			A114		
YELLOW ARROW													A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW																		
✋																		
🚶																		

★See pictorial of head wiring in detail this sheet.

NU = Not Used

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



INPUT FILE POSITION LAYOUT

(front view)

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

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT POINT	DETECTOR NO.	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN
2A	TB2-5,6	I2U	39	1	2	2			X	X	X	
2B	TB2-7,8	I2L	43	5	3	2			X	X	X	
2C	TB2-9,10	I3U	63	29	4	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	
6A	TB3-5,6	J2U	40	2	16	6			X	X	X	
6B	TB3-7,8	J2L	44	6	17	6			X	X	X	
6C	TB3-9,10	J3U	64	30	18	6	3		X		X	X

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

OVERLAP PROGRAMMING

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

Web Interface
Home >Controller >Overlap Configuration >Overlaps

Overlap Plan 1

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

SPECIAL DETECTOR NOTE

Install a multizone microwave detection system for vehicle detection on Loop 8A. 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: 04-1458
DESIGNED: August 2023
SEALED: 9/22/2023
REVISED:

Electrical Detail

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Electrical and Programming Details For:

SR 1320 (Airport Boulevard NW)
at
SR 1316 (Jetstream Drive NW)

Division 4 Wilson County Wilson

PLAN DATE: October 2023 REVIEWED BY: DTJ

PREPARED BY: D.J. Craddock REVIEWED BY:

REVISIONS INIT. DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 031001 ENGINEER D. TODD JOYCE

DocuSigned by: D. Todd Joyce 10/09/2023
DATE

SIG. INVENTORY NO. 04-1458