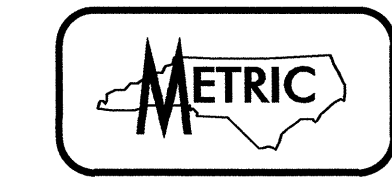


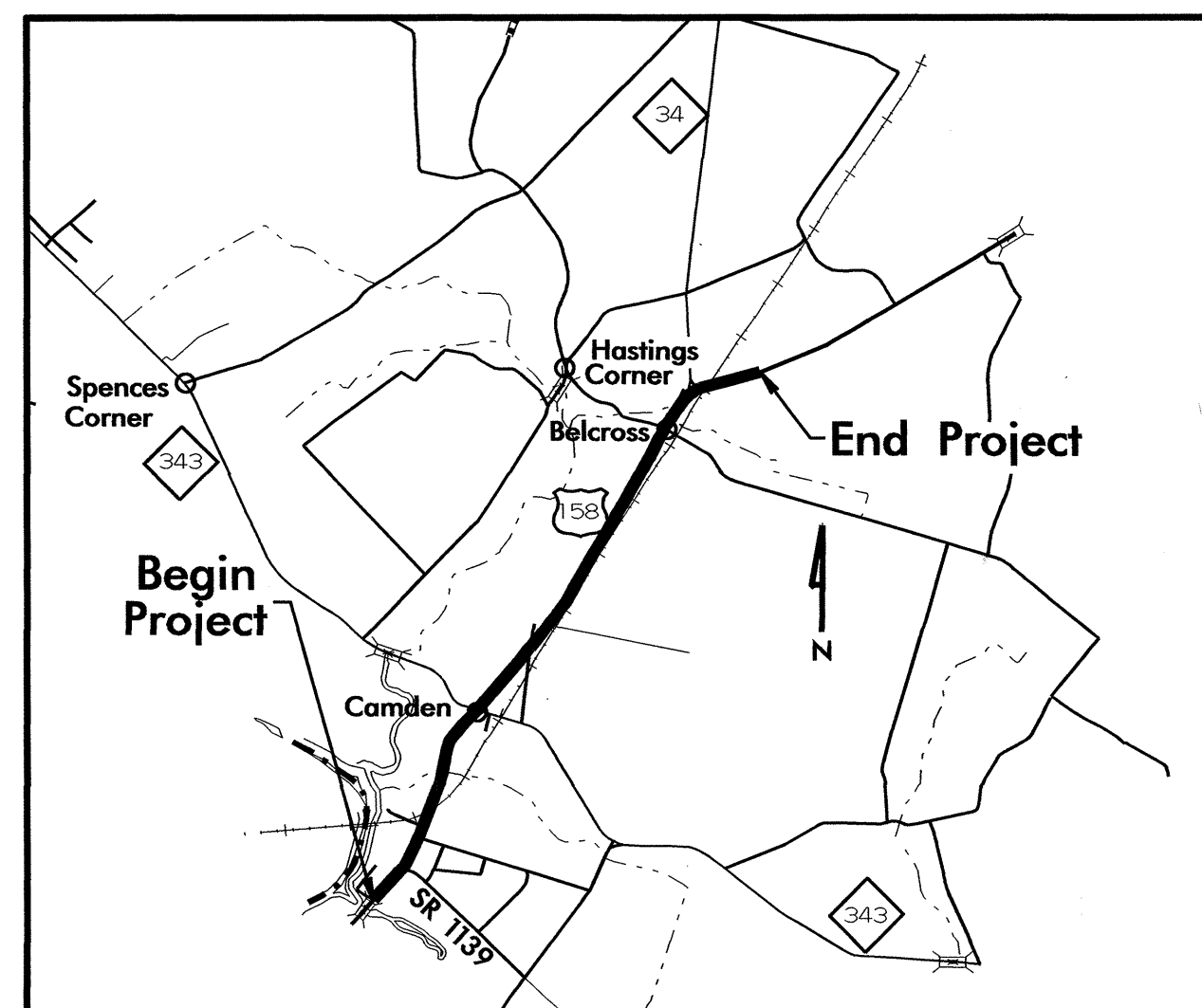
TIP PROJECT: R-2414B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

Project No.	Sheet No.
	Sig. 1



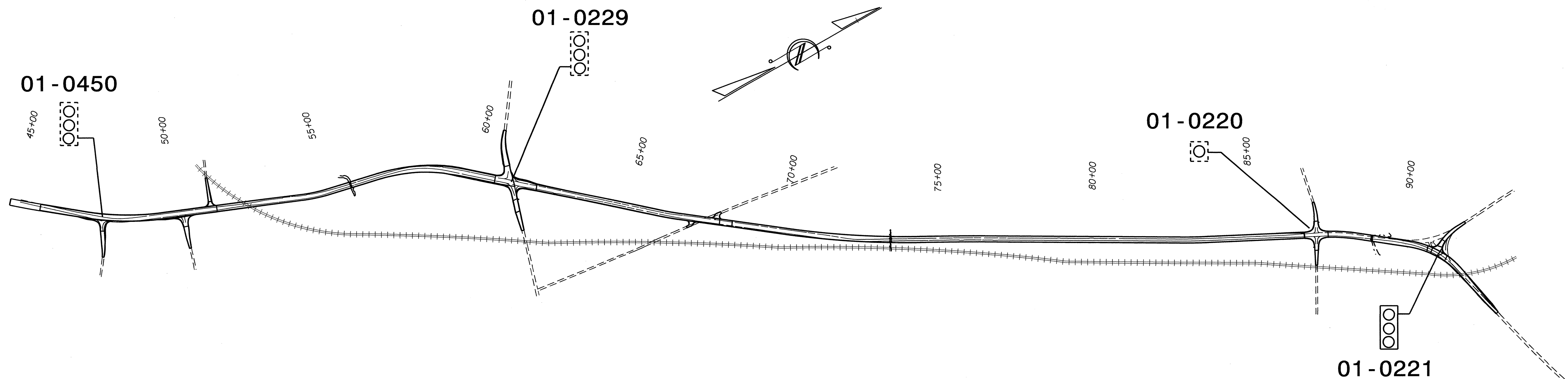
CAMDEN COUNTY



VICINITY MAP

LOCATION: US 158 - FROM NORTH OF SR 1257 (HAVENWOOD DRIVE) TO EAST OF NC 34 IN BELCROSS

TYPE OF WORK: SIGNALS

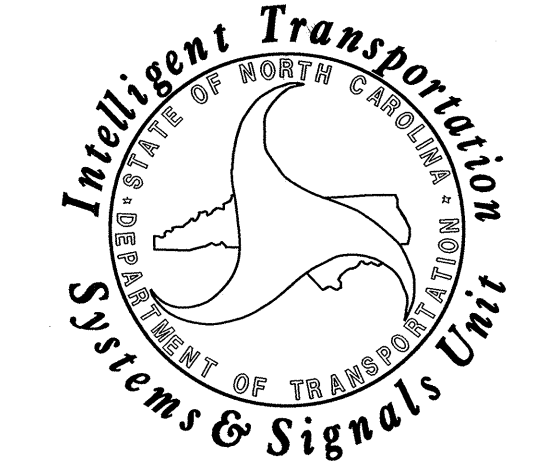


Sheet #	Reference #	Index of Plans Location/Description
Sig. 1		Title Sheet
Sig. 2-12	01-0450	US 158 at SR 1139 (Country Club Road)
Sig. 13-32	01-0229	US 158 at NC 343
Sig. 33-35	01-0220	US 158 at SR SR 1145 (Belcross Road/Lambs Road)
Sig. 36-43	01-0221	US 158 at NC 34
Sig. 44-48	NA	Standard Drawings for Metal Poles
Sig. 49-51	NA	Inductive Detection Loop Plate Drawings

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

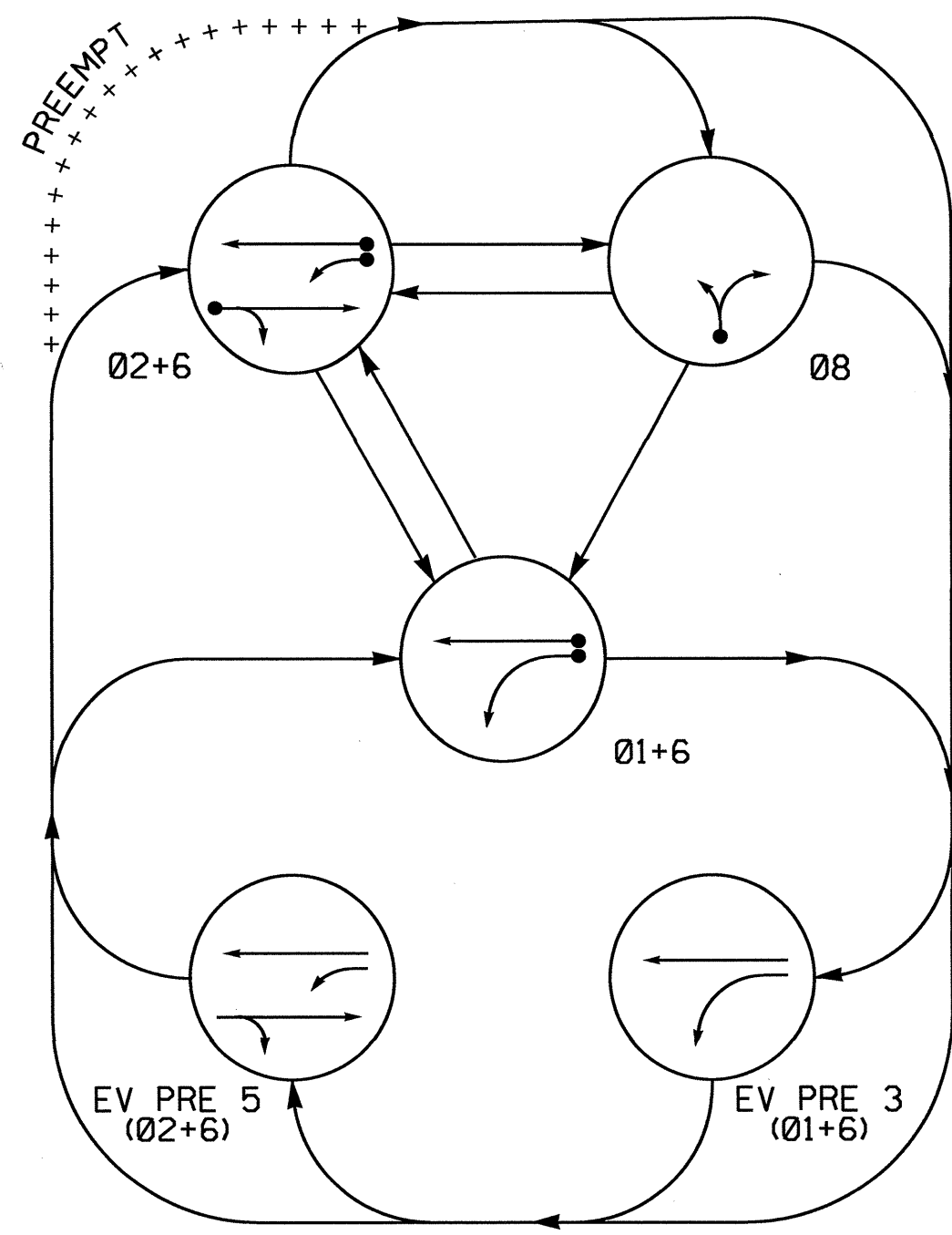
Contacts:
Jason Galloway, PE - East Region Signal Project Engineer
George Brown, PE - Signal Equipment Design Engineer

Prepared in the Offices of:
TRANSPORTATION MOBILITY AND SAFETY DIVISION



03_SEP_2010_16:37 S:\158\30\115 Signals\Workgroups\TIP Projects\R-2414B\Signals\Design\Titlesheet\R2414B_sig_tsh_20100907.dgn

PHASING DIAGRAM

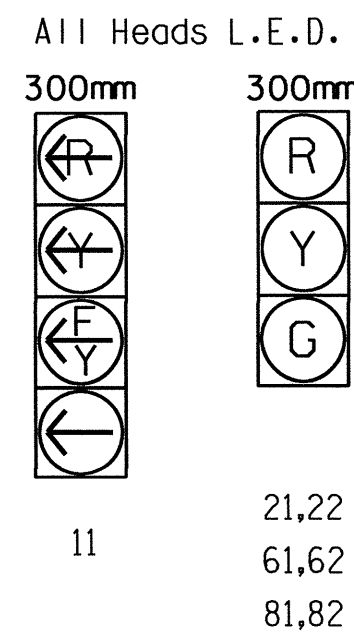


PHASING DIAGRAM DETECTION LEGEND

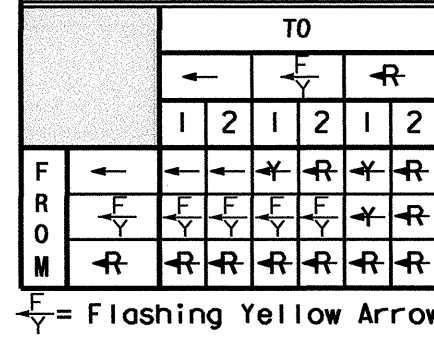
- ← ● → DETECTED MOVEMENT
- ← ○ → UNDETECTED MOVEMENT (OVERLAP)
- ← - - - → UNSIGNALIZED MOVEMENT
- ← - - - - - → PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE				
	Ø 1 + 6	Ø 2 + 6	Ø 8	P ER VE 3	P ER VE 5
11	←	←	←	←	←
21,22	R	G	R	R	G
61,62	G	G	R	G	G
81,82	R	R	G	R	R

SIGNAL FACE I.D.



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

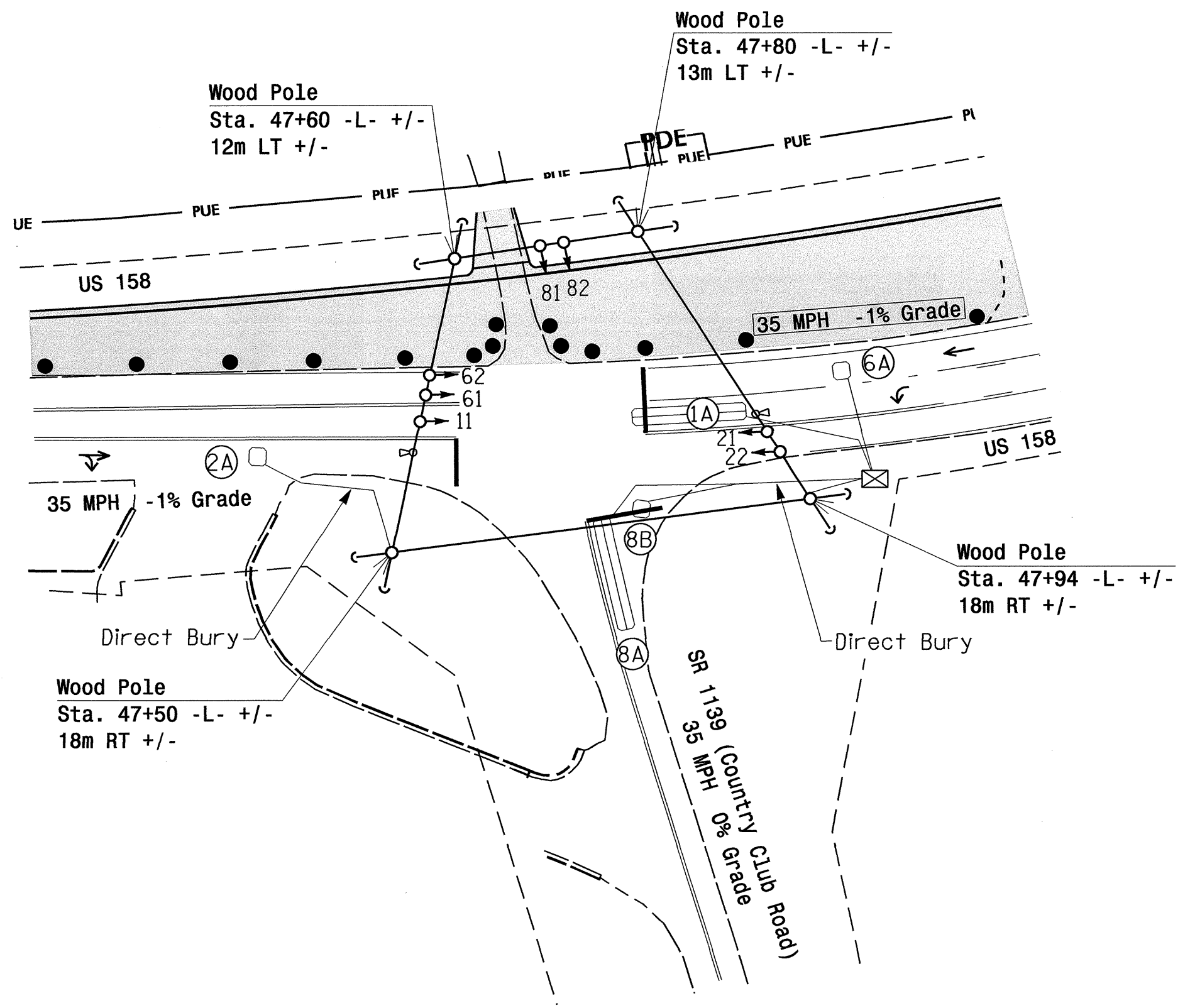


OASIS 2070L LOOP & DETECTOR INSTALLATION CHART												
LOOP	SIZE (M)	DISTANCE FROM STOPBAR (M)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY				
1A	1.8X12	+1.5	2-4-2	Y	1	Y	Y	-	-	15	-	Y
2A	1.8X1.8	20	4	Y	2	Y	Y	-	-	-	-	Y
6A	1.8X1.8	20	4	Y	6	Y	Y	-	-	-	-	Y
8A	1.8X12	0	2-4-2	Y	8	Y	Y	-	-	5	-	Y
8B	1.8X1.8	+1.5	4	Y	8	Y	Y	-	-	15	-	Y

3 Phase W/EV Preempt Fully Actuated Isolated

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- 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.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.



OASIS 2070L TIMING CHART				
FEATURE	PHASE			
	1	2	6	8
Min Green 1*	7	10	10	7
Extension 1*	2.0	3.0	3.0	2.0
Max Green 1*	15	60	60	25
Yellow Clearance	3.0	3.9	3.9	3.0
Red Clearance	1.2	1.3	1.3	2.0
Walk 1*	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation*	-	-	-	-
Max Variable Initial*	-	-	-	-
Time Before Reduction*	-	-	-	-
Time To Reduce*	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* 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.

OASIS 2070 EV PREEMPTION

FUNCTION	PRE 3	PRE 5
Interval 1 - Dwell Green	255	255
Interval 1 - Dwell Yellow	0.0*	0.0*
Interval 1 - Dwell Red	0.0*	0.0*
Interval 5 - Exit Green	0	0
Interval 5 - Yellow	0.0	0.0
Interval 5 - Red	0.0	0.0
Priority	MEDIUM	MEDIUM
Delay Time	0.0	0.0
Min Green Before Pre	1	1
Ped Clear Before Pre	0	0
Yellow Clear Before Pre	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*
Dwell Min Time	7	10
Enable Backup Protection	N	N
Ped Clear Through Yellow	N	N
Preempt Extend**	2	2

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

LEGEND

- | PROPOSED | EXISTING |
|--------------------------------------------------|--------------------------------------------------|
| ○ → Traffic Signal Head | ● → N/A |
| ○ → Modified Signal Head | ○ → N/A |
| ⊥ Sign | ⊥ Sign |
| ⊥ Pedestrian Signal Head With Push Button & Sign | ⊥ Pedestrian Signal Head With Push Button & Sign |
| ○ Signal Pole with Guy | ● Signal Pole with Guy |
| ○ Signal Pole with Sidewalk Guy | ● Signal Pole with Sidewalk Guy |
| □ Inductive Loop Detector | □ Inductive Loop Detector |
| □ Controller & Cabinet | □ Controller & Cabinet |
| □ Junction Box | □ Junction Box |
| --- 50mm Underground Conduit | --- 50mm Underground Conduit |
| N/A Right of Way with Marker | --- Right of Way with Marker |
| → Directional Arrow | → Directional Arrow |
| ○ Opticom Detector | ● Opticom Detector |
| ● Construction Zone Drums | ● Construction Zone Drums |

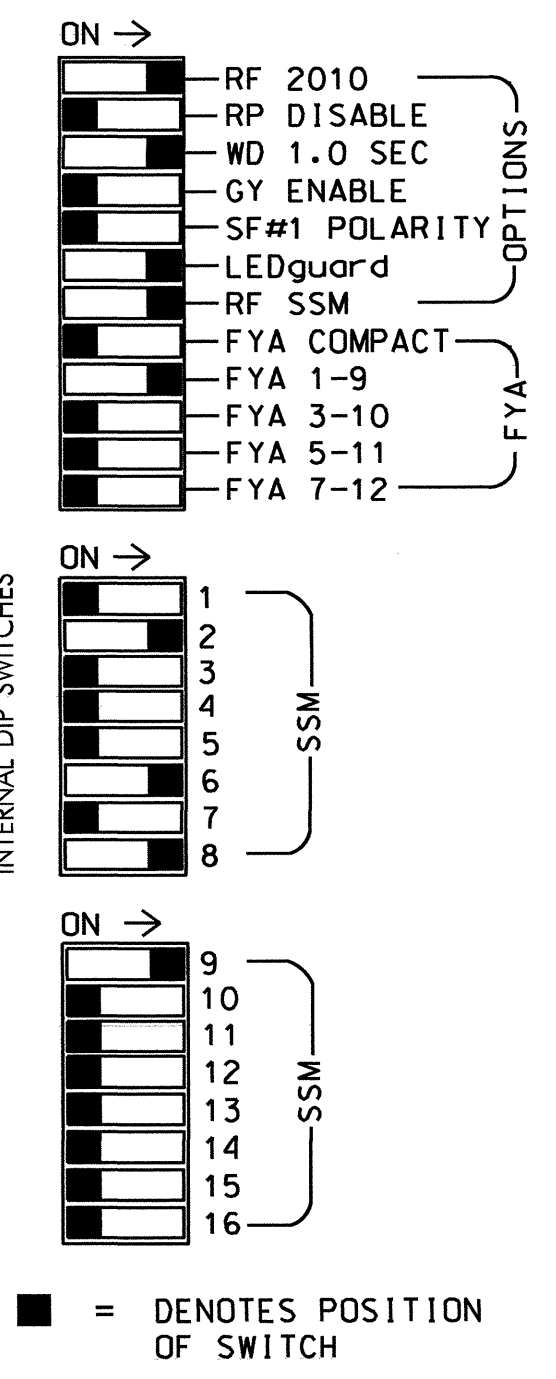
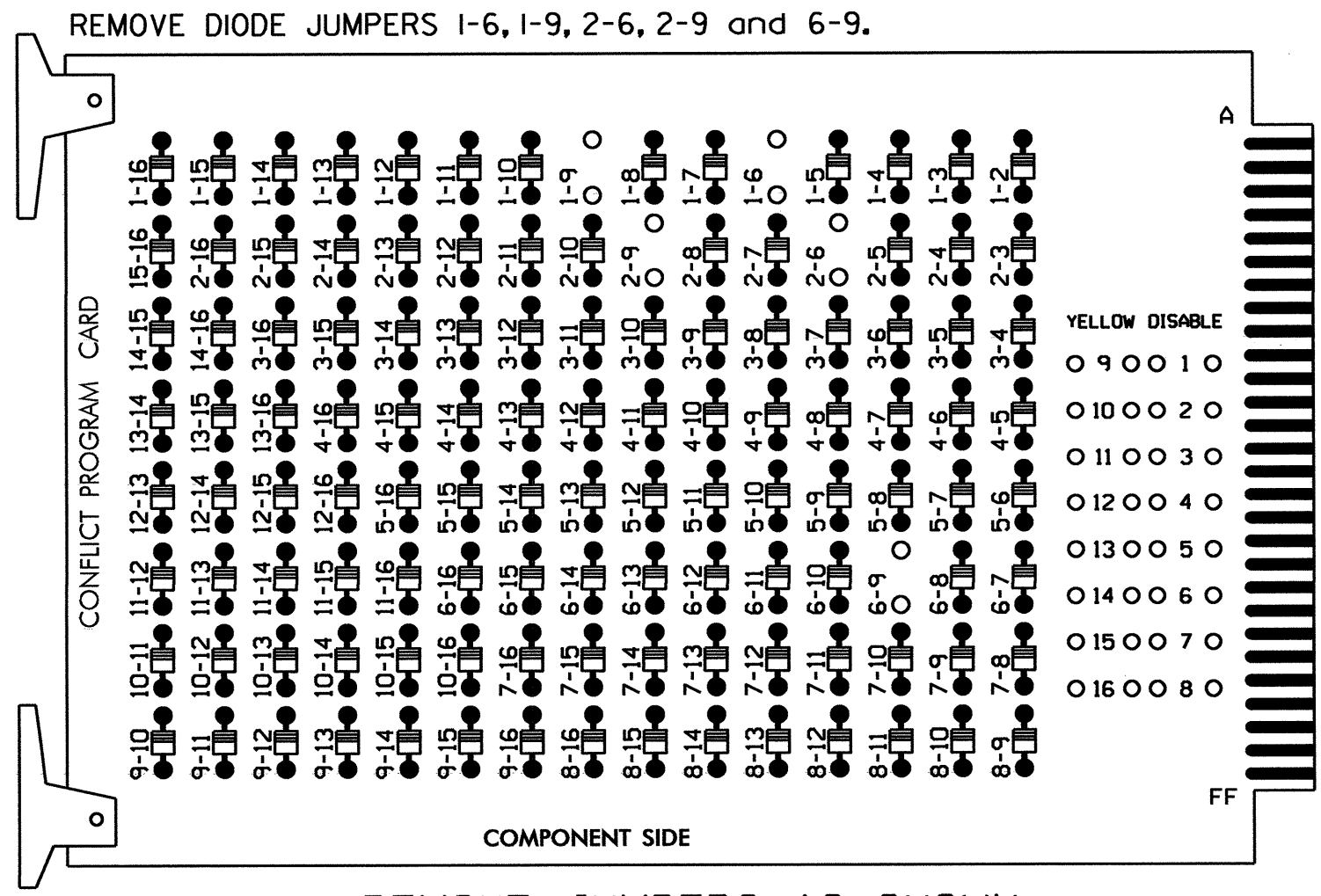
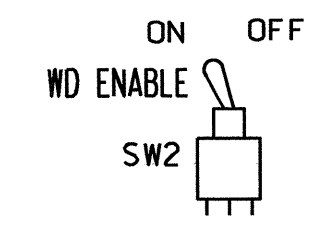
Signal Upgrade/Temp 1 Phase I

	US 158 At SR 1139 (Country Club Road)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29904 J. S. GALLOWAY
	Division 1 Camden County Camden	PREPARED BY: JPG REVIEWED BY:	
PLAN DATE: April 2010		REVIEWED BY:	
SCALE 5 0 10 500:1		REVISIONS INIT. DATE	
DATE: 8/19/10		DATE:	
SIG. INVENTORY NO. 01/0450T1		DATE:	

19-AUG-2010 10:22:45
 S:\AUG2010\15-3\Signal\work\Kgrcup\KIP- Proj\act\sig\48-2414B\sig\01\0450T1.dgn
 1:001 LOWEY

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

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 Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4,5,7,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S6,S8,S9
 PHASES USED.....1,2,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

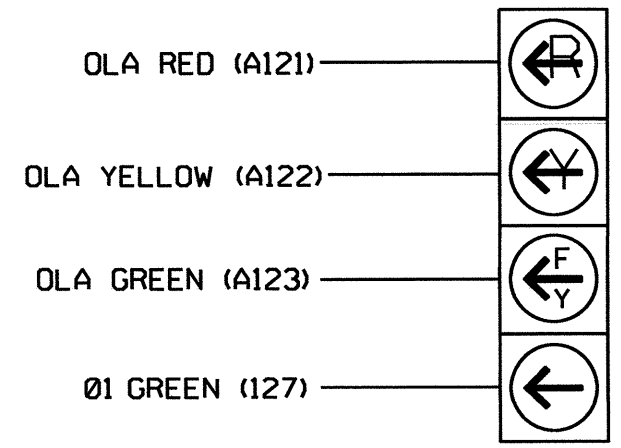
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11*	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11*	NU	NU	NU	NU	NU	
RED		128						134			107								
YELLOW	*	129						135			108								
GREEN		130						136			109								
RED ARROW																		A121	
YELLOW ARROW																			A122
FLASHING YELLOW ARROW																			A123
GREEN ARROW	127																		

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

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



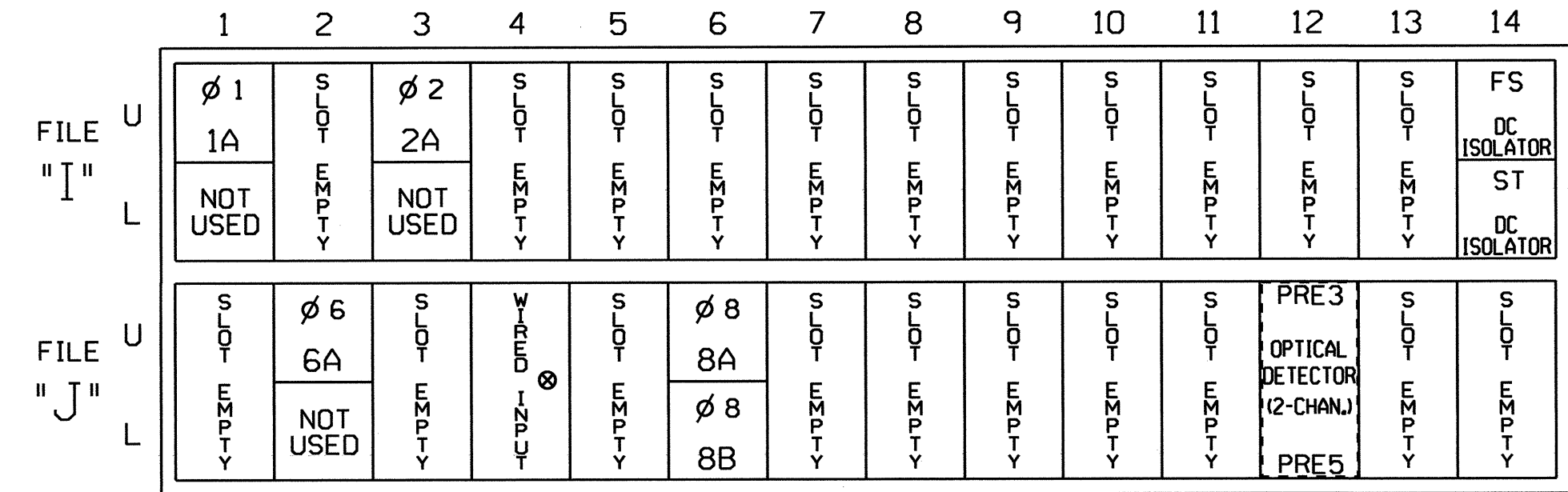
11

NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)



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

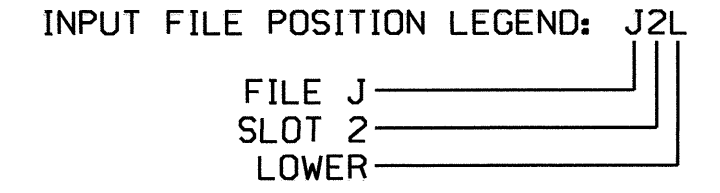
FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
		J4U	48	10	26	6	Y	Y			
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			5
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

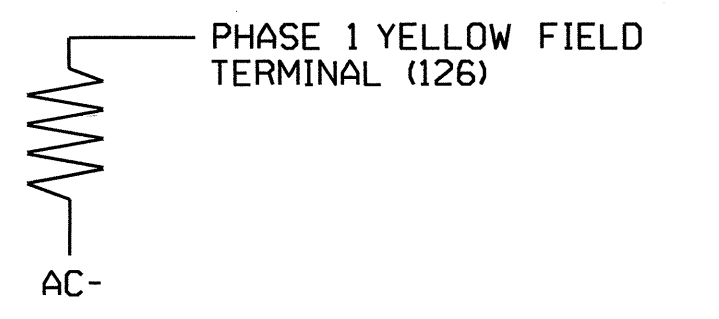
¹Add jumper from I1-W to J4-W, on rear of input file.



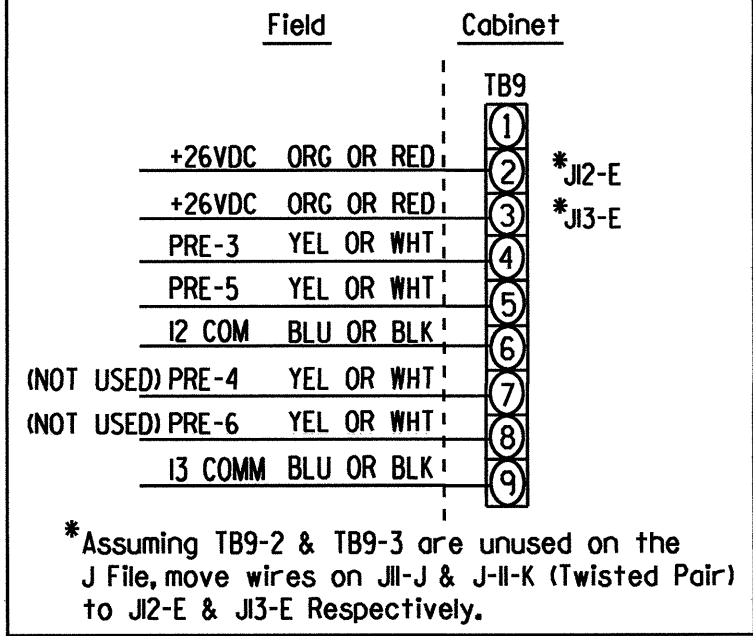
LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



OPTICOM FIELD WIRE DETAIL



*Assuming TB9-2 & TB9-3 are unused on the J File, move wires on J1-J & J11-K (Twisted Pair) to J12-E & J13-E respectively.

ELECTRICAL DETAIL - TEMP 1 - SHEET 1 OF 2

Prepared in the Offices of:

 Division 1
 US 158 at SR 1139 (Country Club Road)
 Camden County
 PLAN DATE: July 2010
 PREPARED BY: C. Strickland
 REVIEWED BY: T. J. J. J.
 DIVISION 1
 CAMDEN COUNTY
 ENGINEER
 SEAL 022013
 GEORGE C. BROWN
 SIGNATURE DATE
 SIG. INVENTORY NO. 01-0450T1

23-AUG-2010 11:35
 C:\p1\work\proj\2010\0450\sm.dwg
 User: jstrickland

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' as needed to advance to Preempts 3 and 5.

PREEMPTION #3	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS

OPTIONS

PRIORITY (Y/N TO SELECT)MED

DELAY TIMER (0-255 SEC)0

MIN GREEN BEFORE PRE (0= DEFAULT)....1

PED CLEAR BEFORE PRE (0= DEFAULT)....0

YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0*

RED CLEAR BEFORE PRE (0= DEFAULT)....0.0*

DWELL MIN TIMER (0-255 SEC)7

DWELL MAX TIMER (0=OFF,1-255MIN)0

DWELL HOLD-OVER TIMER (0-255)0

LATCH CALL?N

LINK TO NEXT PREEMPT?N

ENABLE BACKUP PROTECTION?N

HOLD CLEAR 1 PHASES DURING DELAY? ...N

FAST GREEN FLASH DWELL PHASES?N

PED CLEARANCE THROUGH YELLOW?N

INHIBIT OVERLAP GREEN EXTENSION?N

SERVICE DURING SOFTWARE FLASH?N

REST IN RED DURING DWELL INTERVAL? ..N

FLASH DWELL INTERVAL?N

ALLOW PEDS IN DWELL INTERVAL?N

RE-TIME DWELL INTERVAL?N

OVERLAPS: ABCDEFGHIJKLMNPO

DWELL INT FLASH YELLOW

OMIT OVERLAPS:

PRESS 'NEXT' TWICE

PREEMPTION #5	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS

OPTIONS

PRIORITY (Y/N TO SELECT)MED

DELAY TIMER (0-255 SEC)0

MIN GREEN BEFORE PRE (0= DEFAULT)....1

PED CLEAR BEFORE PRE (0= DEFAULT)....0

YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0*

RED CLEAR BEFORE PRE (0= DEFAULT)....0.0*

DWELL MIN TIMER (0-255 SEC)10

DWELL MAX TIMER (0=OFF,1-255MIN)0

DWELL HOLD-OVER TIMER (0-255)0

LATCH CALL?N

LINK TO NEXT PREEMPT?N

ENABLE BACKUP PROTECTION?N

HOLD CLEAR 1 PHASES DURING DELAY? ...N

FAST GREEN FLASH DWELL PHASES?N

PED CLEARANCE THROUGH YELLOW?N

INHIBIT OVERLAP GREEN EXTENSION?N

SERVICE DURING SOFTWARE FLASH?N

REST IN RED DURING DWELL INTERVAL? ..N

FLASH DWELL INTERVAL?N

ALLOW PEDS IN DWELL INTERVAL?N

RE-TIME DWELL INTERVAL?N

OVERLAPS: ABCDEFGHIJKLMNPO

DWELL INT FLASH YELLOW

OMIT OVERLAPS:

PROGRAMMING COMPLETE

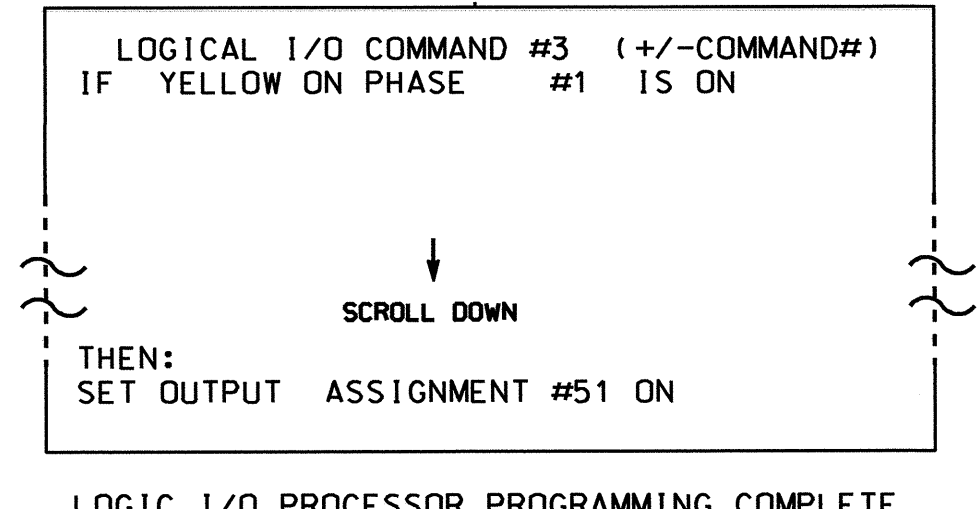
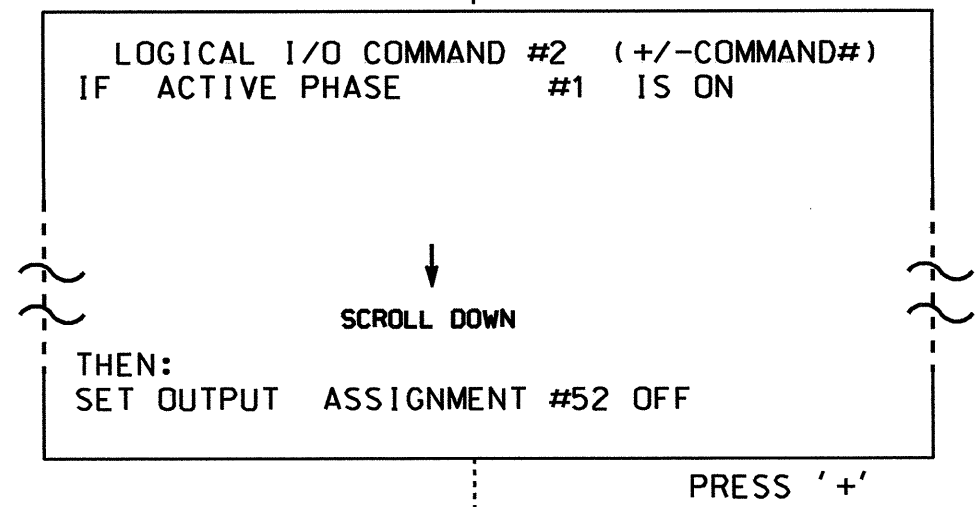
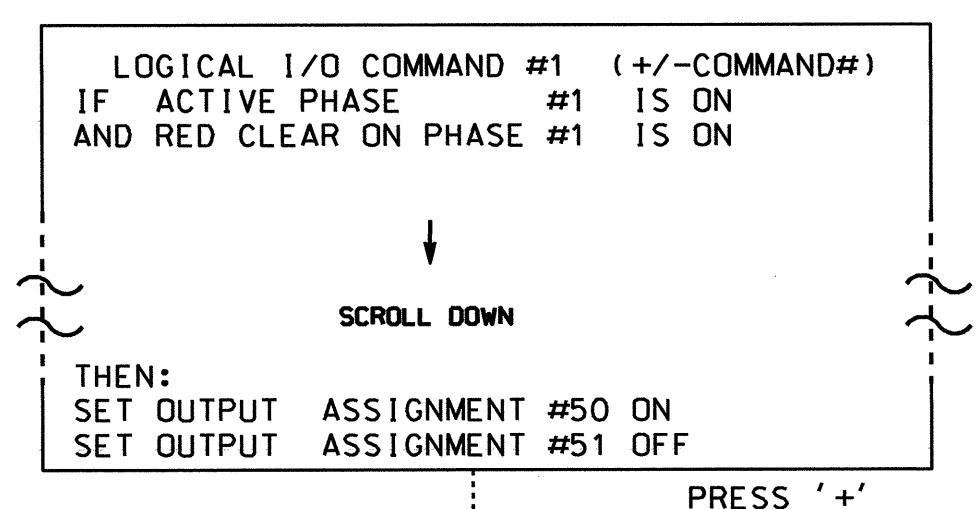
* TIME DEFAULTS TO TIME USED BY PHASE DURING NORMAL OPERATION

NOTE!
PROGRAM EXTEND TIME ON ALL 'OPTICOM' DETECTOR UNITS FOR 2 SEC.

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS

PHASE: 12345678910111213141516

VEH OVL PARENTS: XX

VEH OVL NOT VEH:

VEH OVL NOT PED:

VEH OVL GRN EXT:

STARTUP COLOR: - RED - YELLOW - GREEN

FLASH COLORS: - RED - YELLOW X GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)

FLASH YELLOW IN CONTROLLER FLASH?...Y

GREEN EXTENSION (0-255 SEC).....0

YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0

RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0

OUTPUT AS PHASE # (0=NONE, 1-16)....0

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0450T1
DESIGNED: April 2010
SEALED: 08/19/10
REVISED:

ELECTRICAL DETAIL - TEMP 1 - SHEET 2 OF 2

Prepared in the Offices of:

750 N. Grantfield Pkwy, Garner, NC 27529

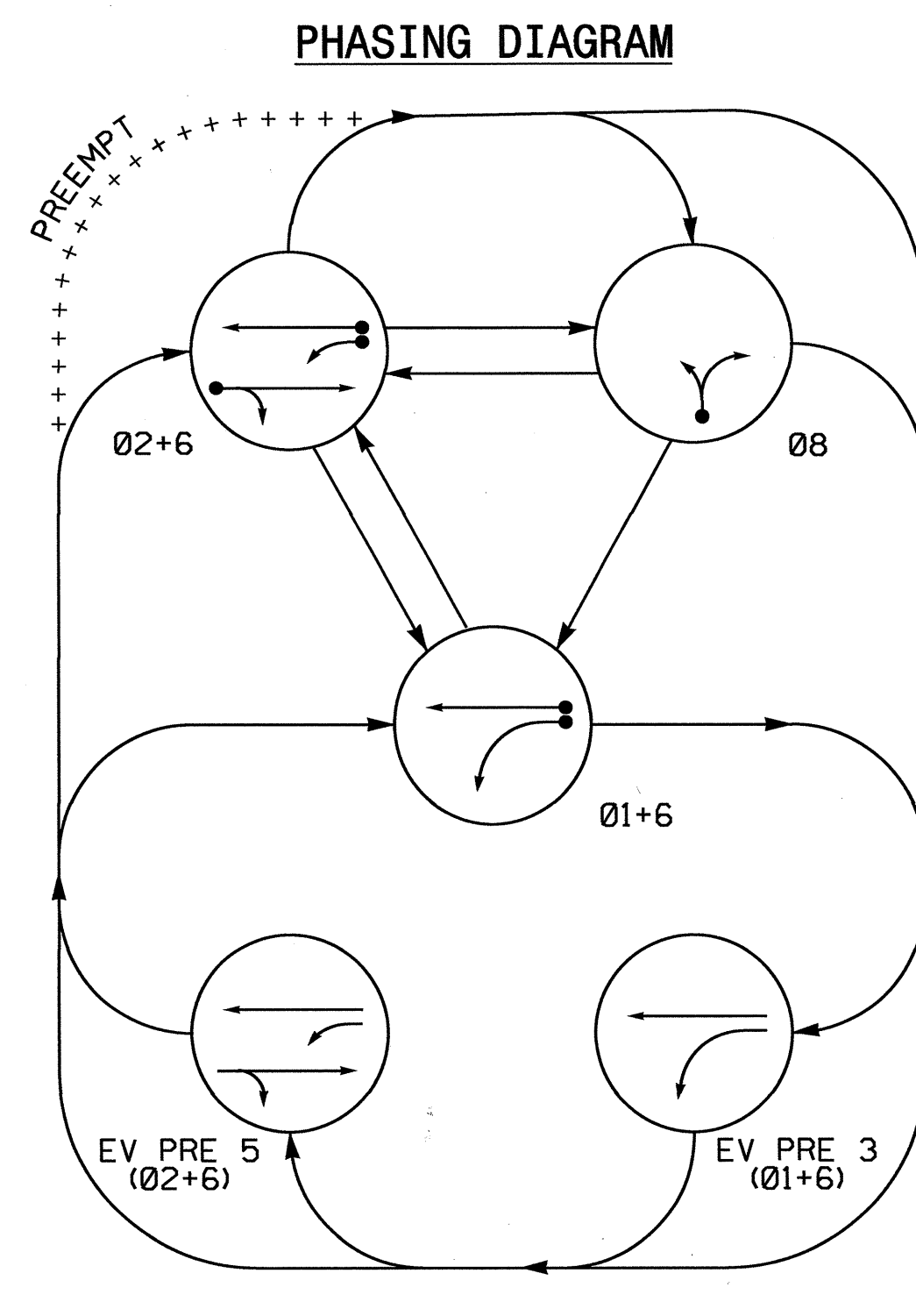
US 158 at SR 1139 (Country Club Road)		
Division 1	Camden County	
PLAN DATE: July 2010	REVIEWED BY: T. Sygel	
PREPARED BY: C. Strickland	REVIEWED BY:	
REVISIONS	INIT.	DATE

SEAL

Signature: George C. Brown
Date: 8/25/10

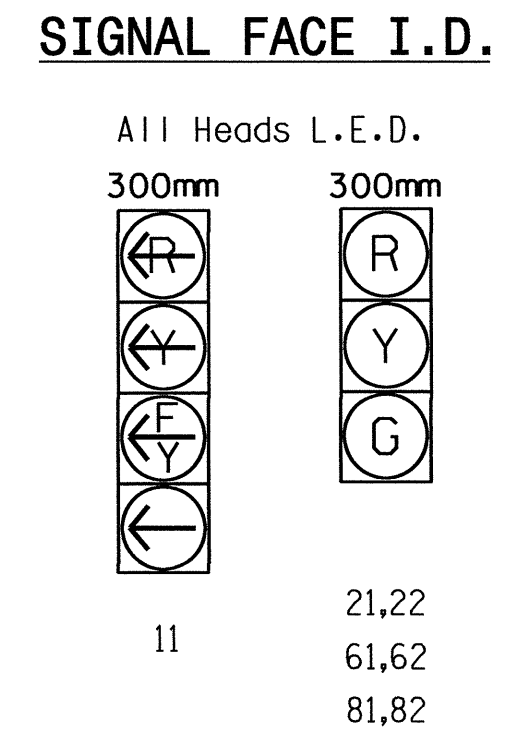
SIG. INVENTORY NO. 01-0450T1

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PHASING DIAGRAM DETECTION LEGEND
 ● → DETECTED MOVEMENT
 ○ → UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 - - - PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE				
	01+6	02+6	08	PERVE 3	PERVE 5
11	-	-	-	-	-
21,22	R	G	R	R	G
61,62	G	G	R	G	G
81,82	R	R	G	R	R



TO	CLEARANCE			
	1	2	1	2
→	←	←	←	←
←	→	→	→	→
↔	↔	↔	↔	↔

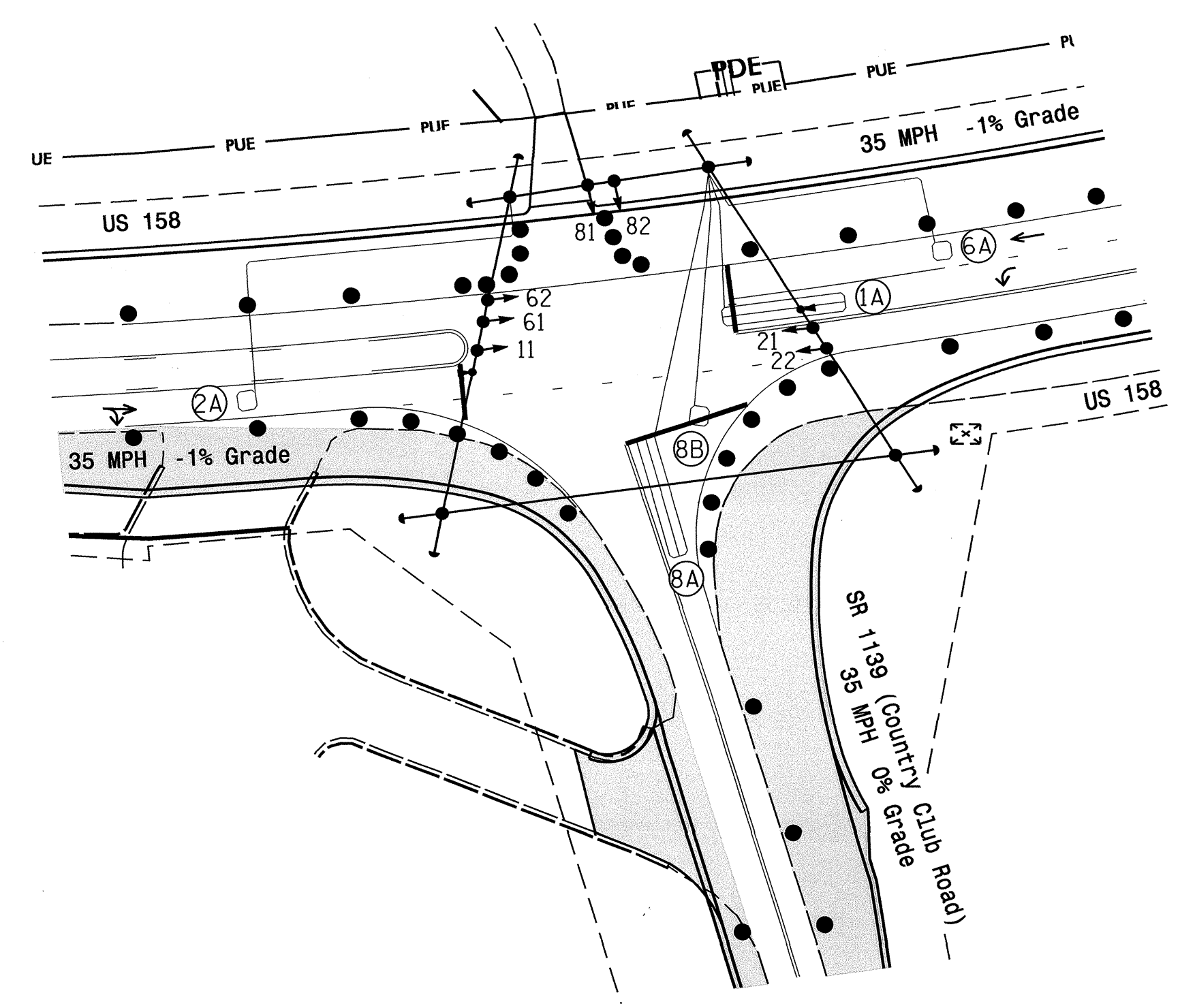
↔ = Flashing Yellow Arrow

LOOP	SIZE (M)	DISTANCE FROM STOPBAR (M)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY		
1A	1.8x12	+1.5	2-4-2	Y	1	Y	Y	-	15	-
2A	1.8x1.8	20	4	Y	2	Y	Y	-	-	-
6A	1.8x1.8	20	4	Y	6	Y	Y	-	-	-
8A	1.8x12	0	2-4-2	Y	8	Y	Y	-	5	-
8B	1.8x1.8	+1.5	4	Y	8	Y	Y	-	15	-

3 Phase W/EV Preempt Fully Actuated Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.

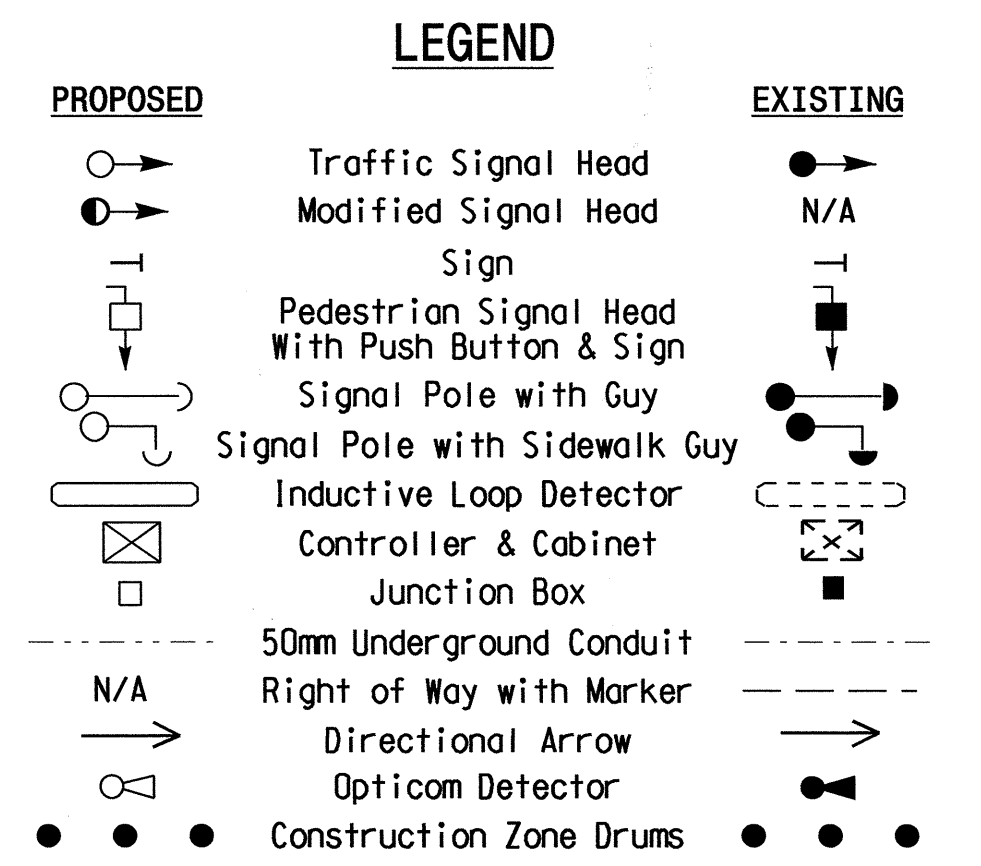


FEATURE	PHASE			
	1	2	6	8
Min Green 1 *	7	10	10	7
Extension 1 *	2.0	3.0	3.0	2.0
Max Green 1 *	15	60	60	25
Yellow Clearance	3.0	3.9	3.9	3.0
Red Clearance	1.7	1.8	1.8	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	YELLOW	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* 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.

FUNCTION	PRE 3	PRE 5
Interval 1 - Dwell Green	255	255
Interval 1 - Dwell Yellow	0.0*	0.0*
Interval 1 - Dwell Red	0.0*	0.0*
Interval 5 - Exit Green	0	0
Interval 5 - Yellow	0.0	0.0
Interval 5 - Red	0.0	0.0
Priority	MEDIUM	MEDIUM
Delay Time	0.0	0.0
Min Green Before Pre	1	1
Ped Clear Before Pre	0	0
Yellow Clear Before Pre	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*
Dwell Min Time	7	10
Enable Backup Protection	N	N
Ped Clear Through Yellow	N	N
Preempt Extend**	2	2

* Time defaults to time used for phase during normal operation
 ** Program Timing on Optical Detection Unit



Signal Upgrade/Temp 2 Phases II and III

US 158 At SR 1139 (Country Club Road)

Division 1 Camden County Camden

PLAN DATE: April 2010 REVIEWED BY:

PREPARED BY: JPG REVIEWED BY:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 5 0 10 500:1

REVISIONS

INIT. DATE

SIGNATURE P. GALLAGHER

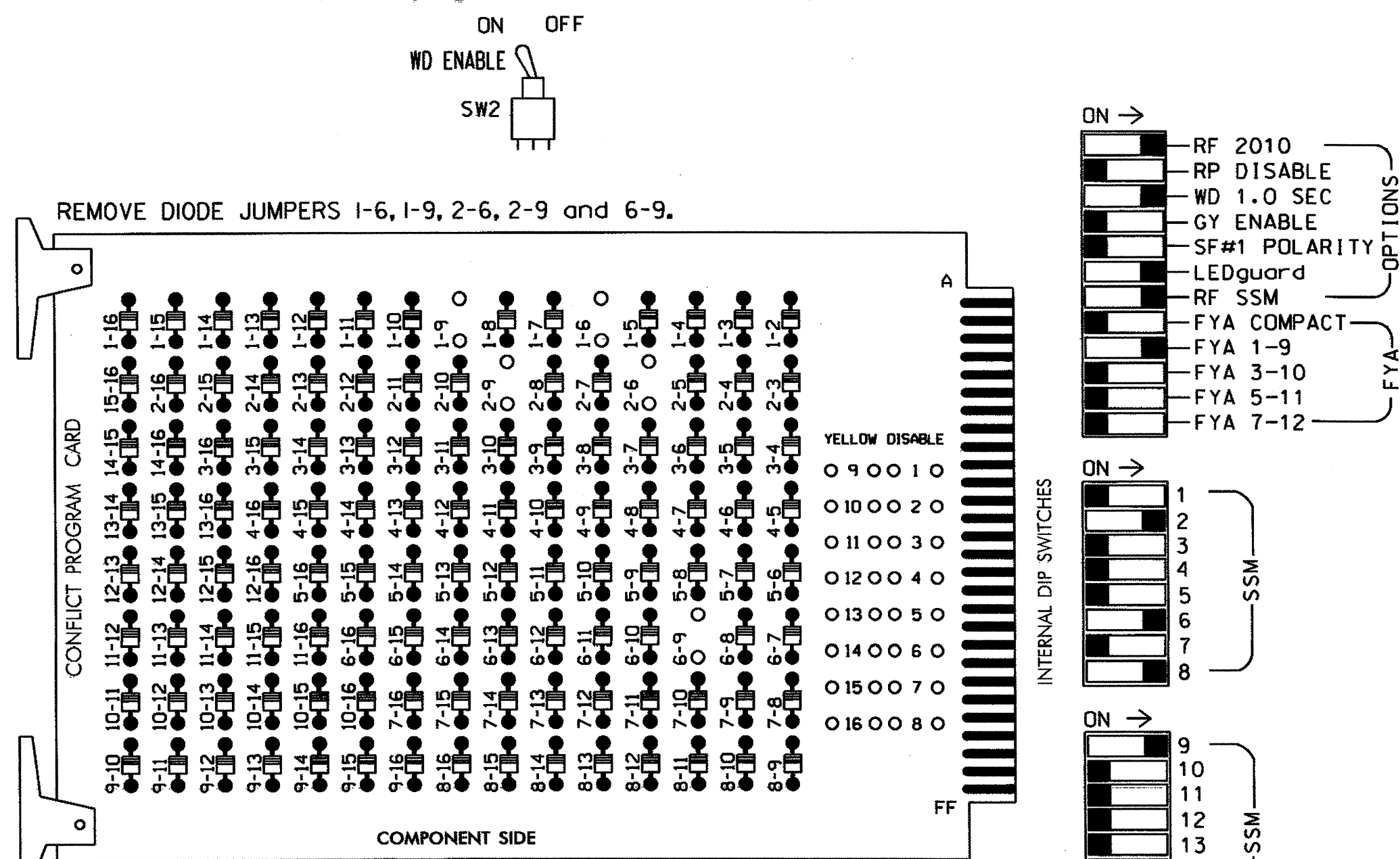
DATE 8/19/10

STC. INVENTORY NO. 01-045072

19-AUG-2010 10:31 S:\P15451\MTS_S1\p01\swork\cadd\TIP_Proj\cadd\48-2414B\48-2414B\48-2414B\01-045072-2-51.qxd...2010madd.dgn

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

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 Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4, 5,7,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	9	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11*	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	81,82	NU	11*	NU	NU	NU	NU	NU	
RED		128						134			107								
YELLOW	*	129						135			108								
GREEN		130						136			109								
RED ARROW														A121					
YELLOW ARROW														A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW	127																		

NU = Not Used

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

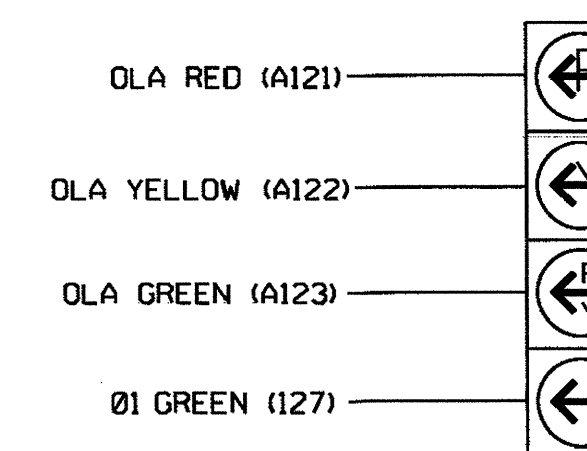
★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S6,S8,S9
 PHASES USED.....1,2,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT USED

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



11

NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

FILE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	S	∅ 2	S	-	-	-	-	-	-	-	-	-	FS
I	1A	S	2A	S	-	-	-	-	-	-	-	-	-	DC ISOLATOR
L	NOT USED	←	NOT USED	←	←	←	←	←	←	←	←	←	←	ST
U	S	∅ 6	S	-	-	∅ 8	S	-	-	-	-	PRE 3	S	S
J	←	6A	←	←	←	8A	←	←	←	←	←	OPTICAL DETECTOR (2-CHAN)	←	←
L	←	NOT USED	←	←	←	8B	←	←	←	←	←	PRE 5	←	←

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

FS = FLASH SENSE
 ST = STOP TIME

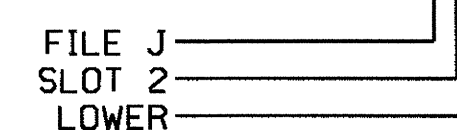
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y			
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			5
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

¹Add jumper from I1-W to J4-W, on rear of input file.

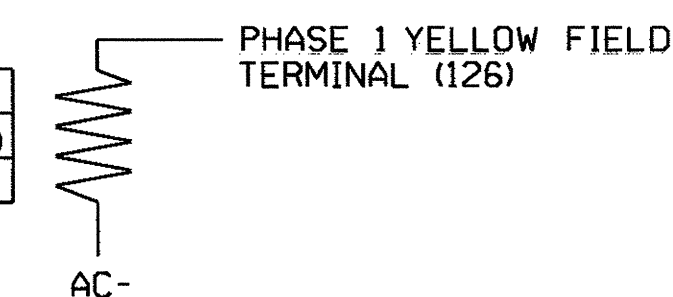
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



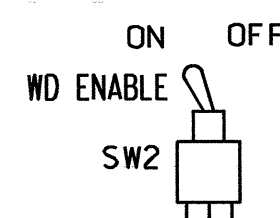
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0450T2
 DESIGNED: April 2010
 SEALED: 08/19/10
 REVISED:

ELECTRICAL DETAIL - TEMP 2 - SHEET 1 OF 2

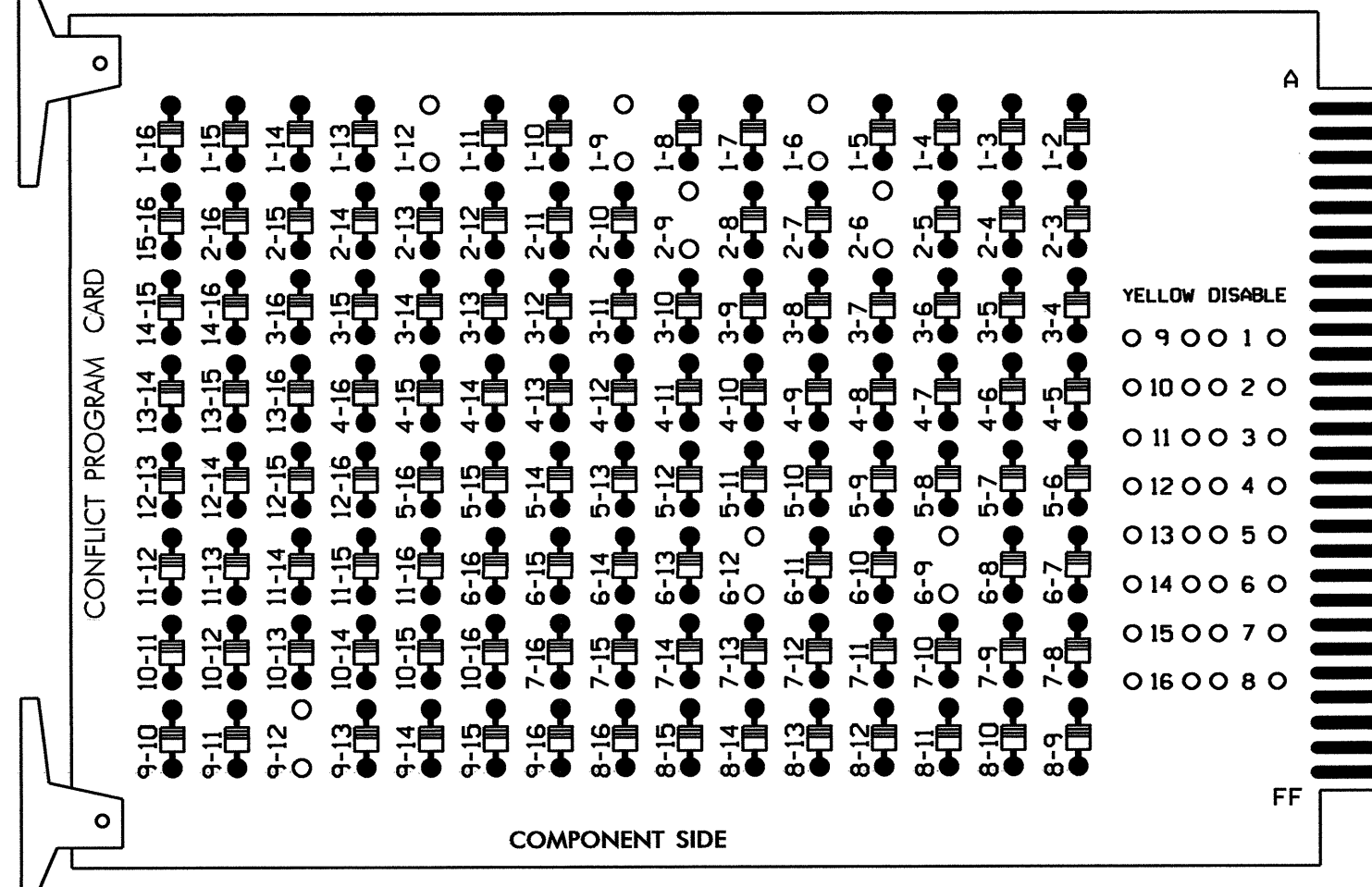
	US 158 at SR 1139 (Country Club Road)		
	Division 1 PLAN DATE: July 2010 PREPARED BY: C. Strickland	Camden County REVIEWED BY: T. J. [Signature] REVIEWED BY:	

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



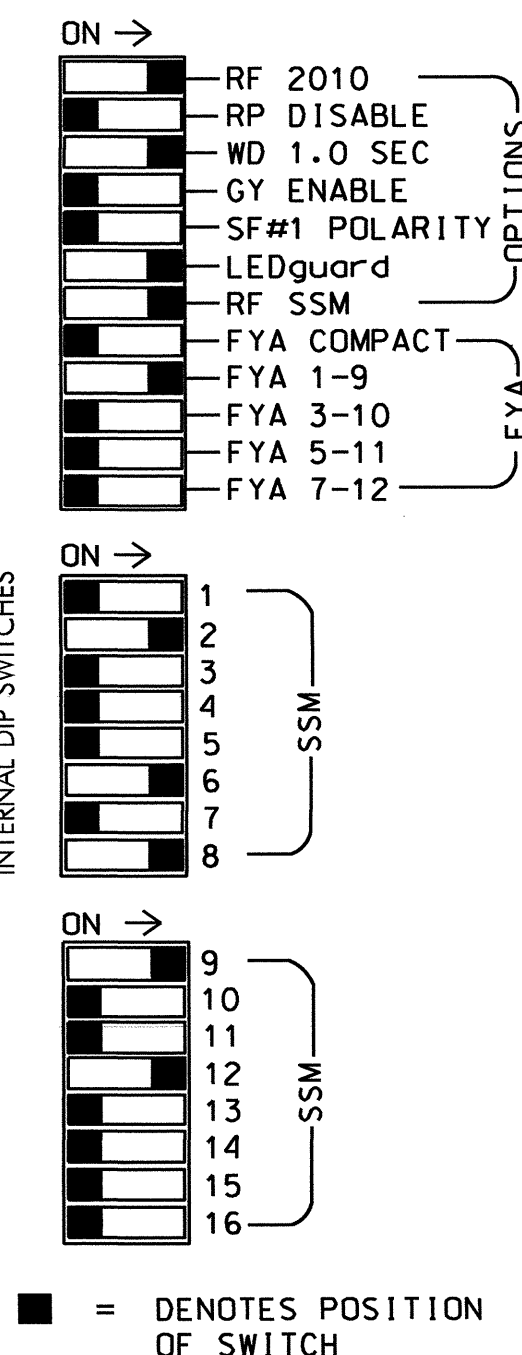
REMOVE DIODE JUMPERS 1-6, 1-9, 1-12, 2-6, 2-9, 6-9, 6-12 and 9-12.



REMOVE JUMPERS AS SHOWN

NOTES:

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



■ = DENOTES POSITION OF SWITCH

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 Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,4, 5,7,10,11,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S6,S8,S9,S13
 PHASES USED.....1,2,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....1

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	9	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11*	21,22	NU	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU	11*	NU	NU	NU	82	NU
RED		128						134			107							*	
YELLOW	*	129						135			108								
GREEN		130						136			109								
RED ARROW															A121				
YELLOW ARROW											108				A122				A102
FLASHING YELLOW ARROW															A123				
GREEN ARROW	127										109								A103

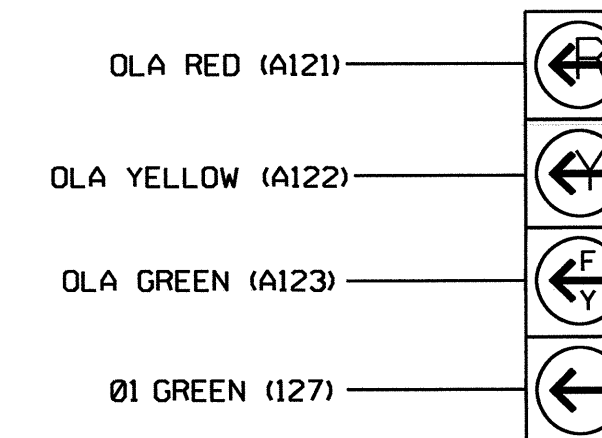
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



11

NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	Ø 1	Ø 1	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2
L	1A	1B	2A	2B	2C	2D	2E	2F	2G	2H	2I	2J	2K	2L
U	NOT USED	NOT USED	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2	Ø 2
L	6A	6B	6C	6D	6E	6F	6G	6H	6I	6J	6K	6L	6M	6N
	6A	6B	6C	6D	6E	6F	6G	6H	6I	6J	6K	6L	6M	6N

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

FS = FLASH SENSE
 ST = STOP TIME

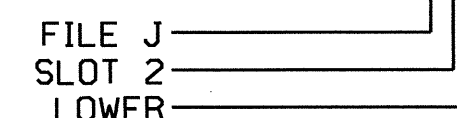
⊗ Wired Input - Do not populate slot with detector cord

INPUT FILE CONNECTION & PROGRAMMING CHART

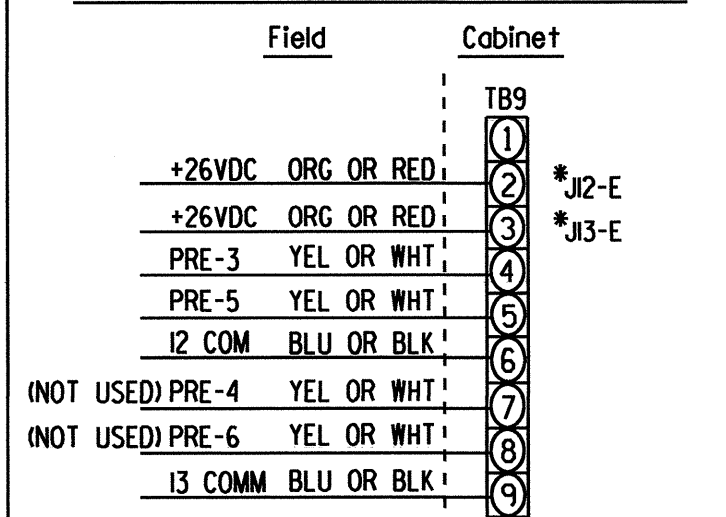
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
		J4U	48	10	26	6	Y	Y	Y		3
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
2B	TB2-11,12	I3L	76	38	42	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

¹Add jumper from I1-W to J4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



OPTICOM FIELD WIRE DETAIL

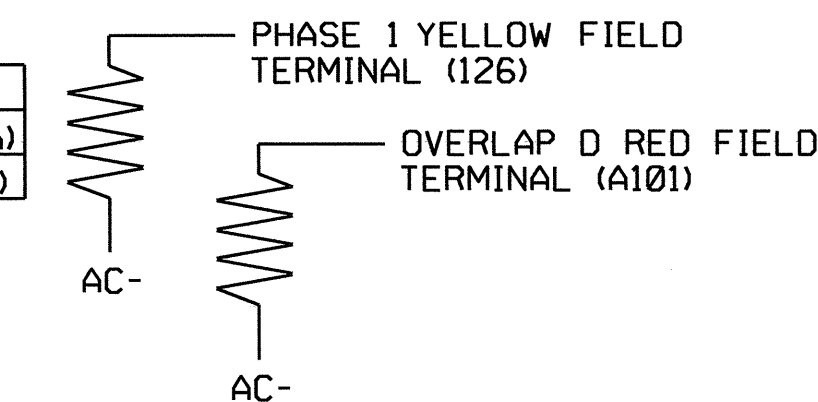


* Assuming TB9-2 & TB9-3 are unused on the J File, move wires on J11-J & J11-K (Twisted Pair) to J12-E & J13-E respectively.

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0450
 DESIGNED: April 2010
 SEALED: 08/19/10
 REVISED:

ELECTRICAL DETAIL - FINAL - SHEET 1 OF 2

Electrical and Programming Details For:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 158 at SR 1139 (Country Club Road)

Division 1 Camden County Camden

PLAN DATE: July 2010 REVIEWED BY: T. J. J...

PREPARED BY: C. Strickland REVIEWED BY: T. J. J...

REVISIONS	INIT.	DATE

SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

SIGNATURE DATE

SIG. INVENTORY NO. 01-0450

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' as needed to advance to Preempts 3 and 5.

PREEMPTION #3	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

- EXIT CALLS
- OPTIONS
- PRIORITY (Y/N TO SELECT)MED
 - DELAY TIMER (0-255 SEC)0
 - MIN GREEN BEFORE PRE (0= DEFAULT)....1
 - PED CLEAR BEFORE PRE (0= DEFAULT)....0
 - YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0*
 - RED CLEAR BEFORE PRE (0= DEFAULT)....0.0*
 - DWELL MIN TIMER (0-255 SEC)7
 - DWELL MAX TIMER (0=OFF,1-255MIN)0
 - DWELL HOLD-OVER TIMER (0-255)0
 - LATCH CALL?N
 - LINK TO NEXT PREEMPT?N
 - ENABLE BACKUP PROTECTION?N
 - HOLD CLEAR 1 PHASES DURING DELAY? ...N
 - FAST GREEN FLASH DWELL PHASES?N
 - PED CLEARANCE THROUGH YELLOW?N
 - INHIBIT OVERLAP GREEN EXTENSION? ...N
 - SERVICE DURING SOFTWARE FLASH?N
 - REST IN RED DURING DWELL INTERVAL? ..N
 - FLASH DWELL INTERVAL?N
 - ALLOW PEDS IN DWELL INTERVAL?N
 - RE-TIME DWELL INTERVAL?N
 - OVERLAPS: ABCDEFGHIJKLMNPO
 - DWELL INT FLASH YELLOW X
 - OMIT OVERLAPS:

PRESS 'NEXT' TWICE

* TIME DEFAULTS TO TIME USED BY PHASE DURING NORMAL OPERATION

NOTE!
PROGRAM EXTEND TIME ON ALL 'OPTICOM' DETECTOR UNITS FOR 2 SEC.

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

↓

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).....0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0

← NOTICE GREEN FLASH

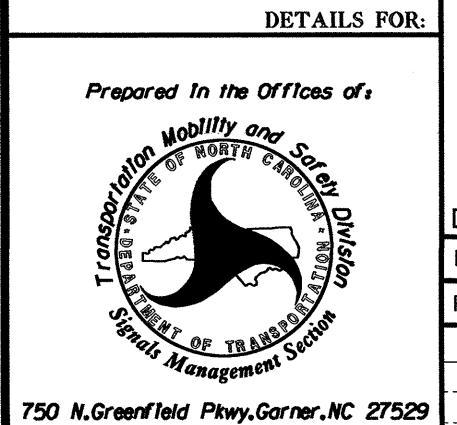
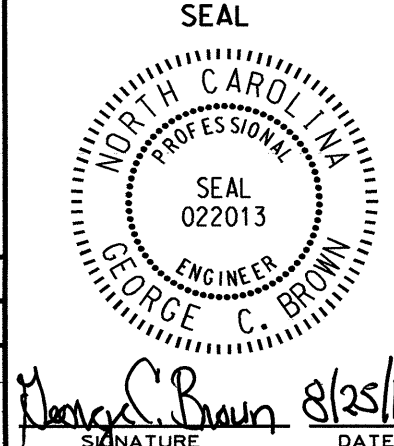
PRESS '+' THREE TIMES

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: _ RED _ YELLOW _ GREEN
FLASH COLORS: _ RED _ YELLOW _ GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).....0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0

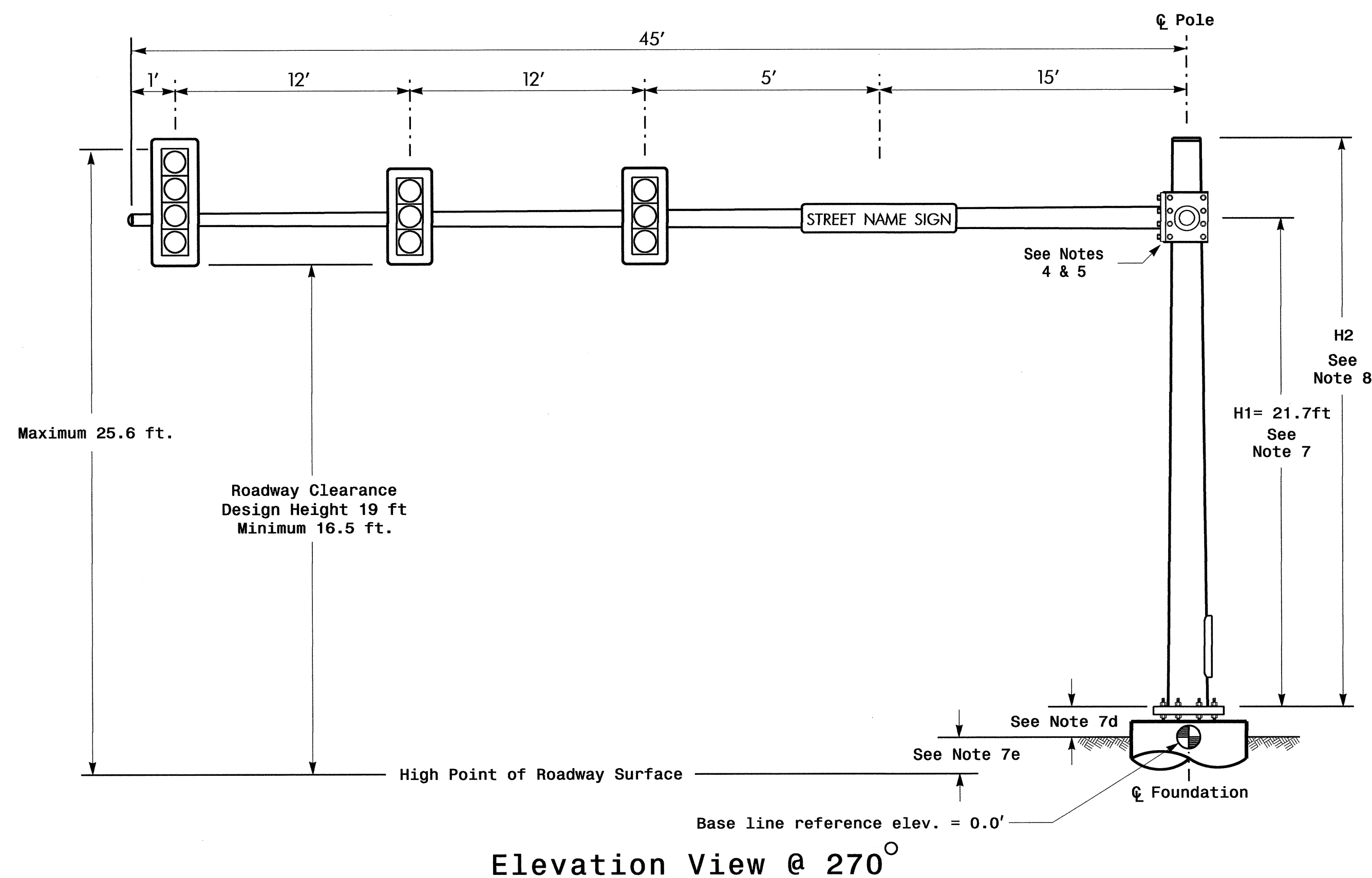
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0450
DESIGNED: April 2010
SEALED: 08/19/10
REVISED:

ELECTRICAL DETAIL - FINAL - SHEET 2 OF 2

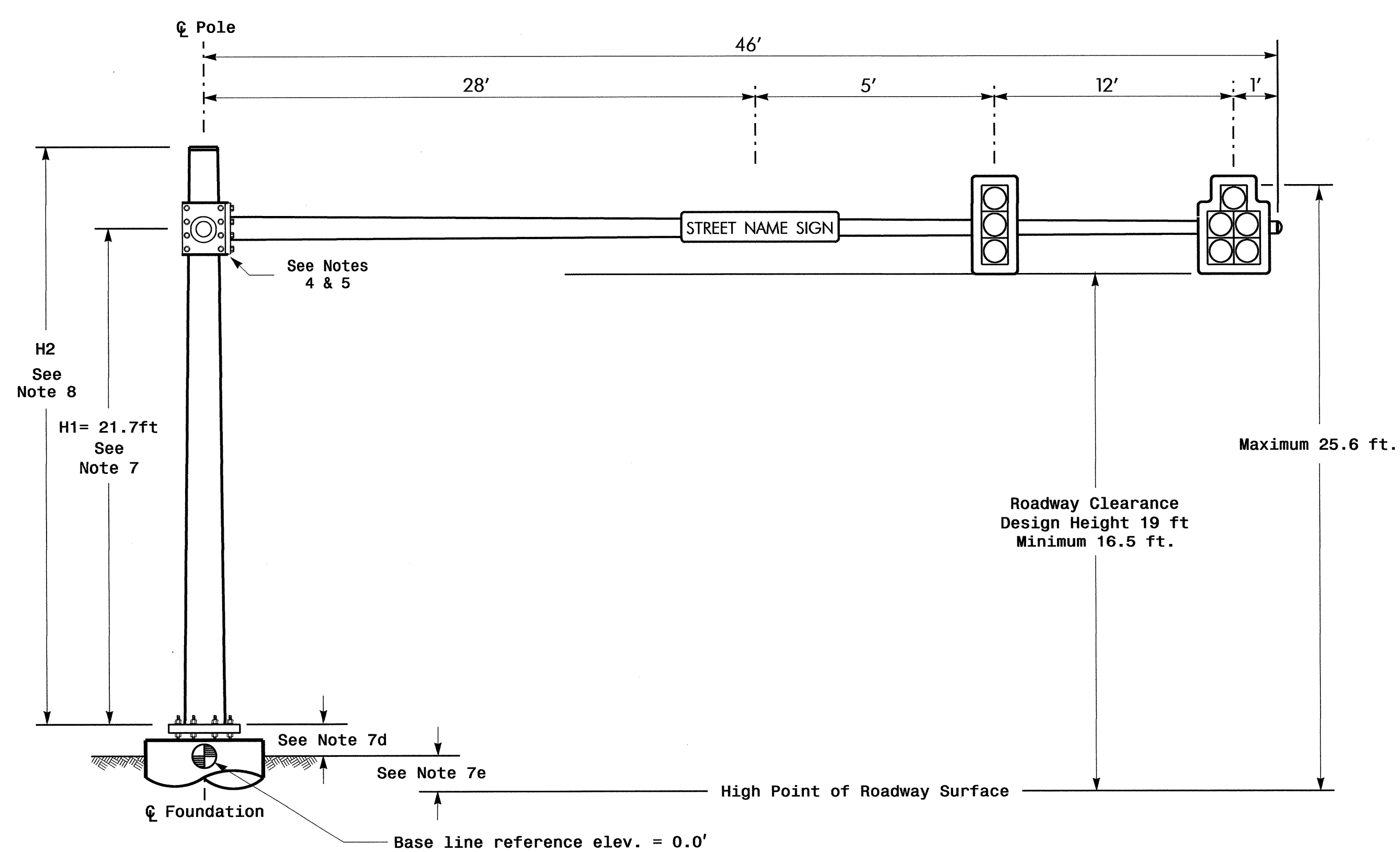
 <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>US 158 at SR 1139 (Country Club Road)</p>			
	<p>Division 1 Camden County Camden</p>	<p>PLAN DATE: July 2010 REVIEWED BY: T. Szal</p>		<p>INIT. DATE</p>
	<p>PREPARED BY: C. Strickland REVIEWED BY:</p>	<p>REVISIONS</p>		<p>SIGNATURE DATE</p>

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



Elevation View @ 270°

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

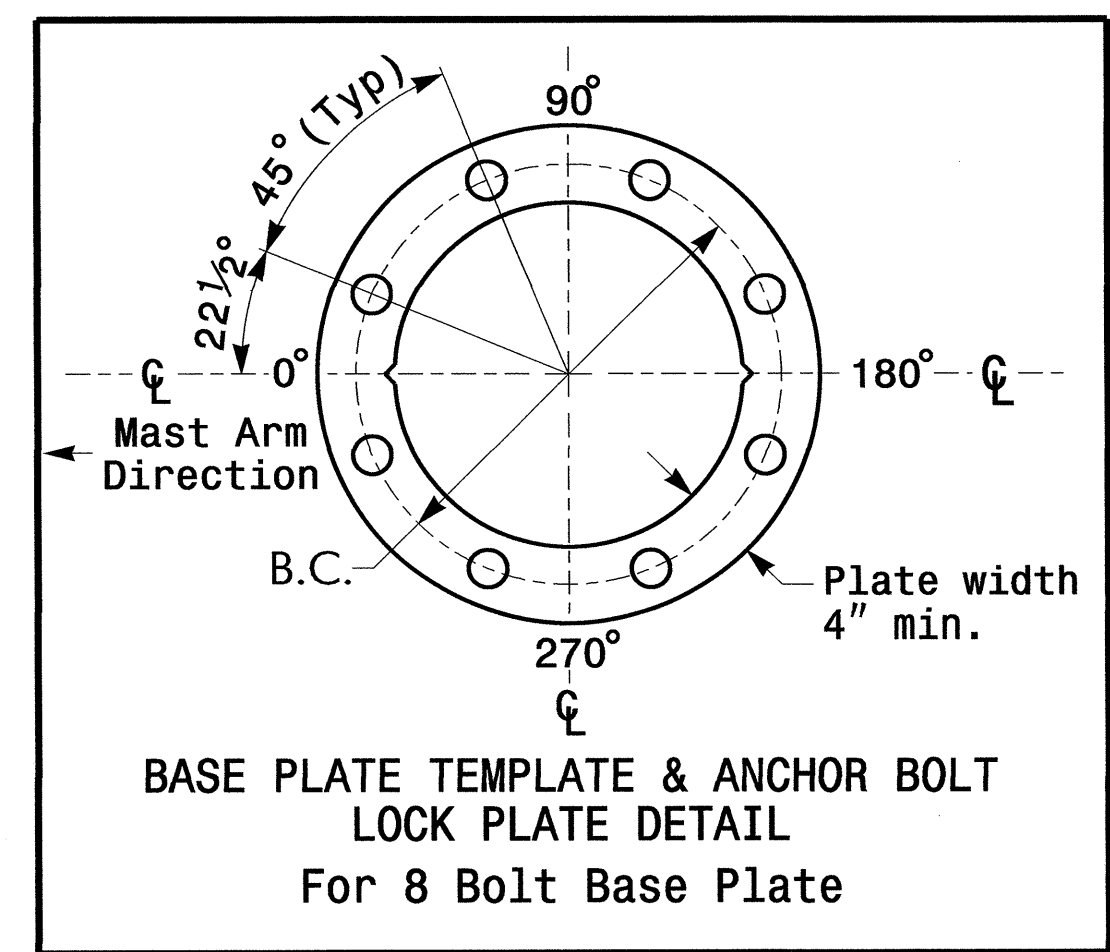
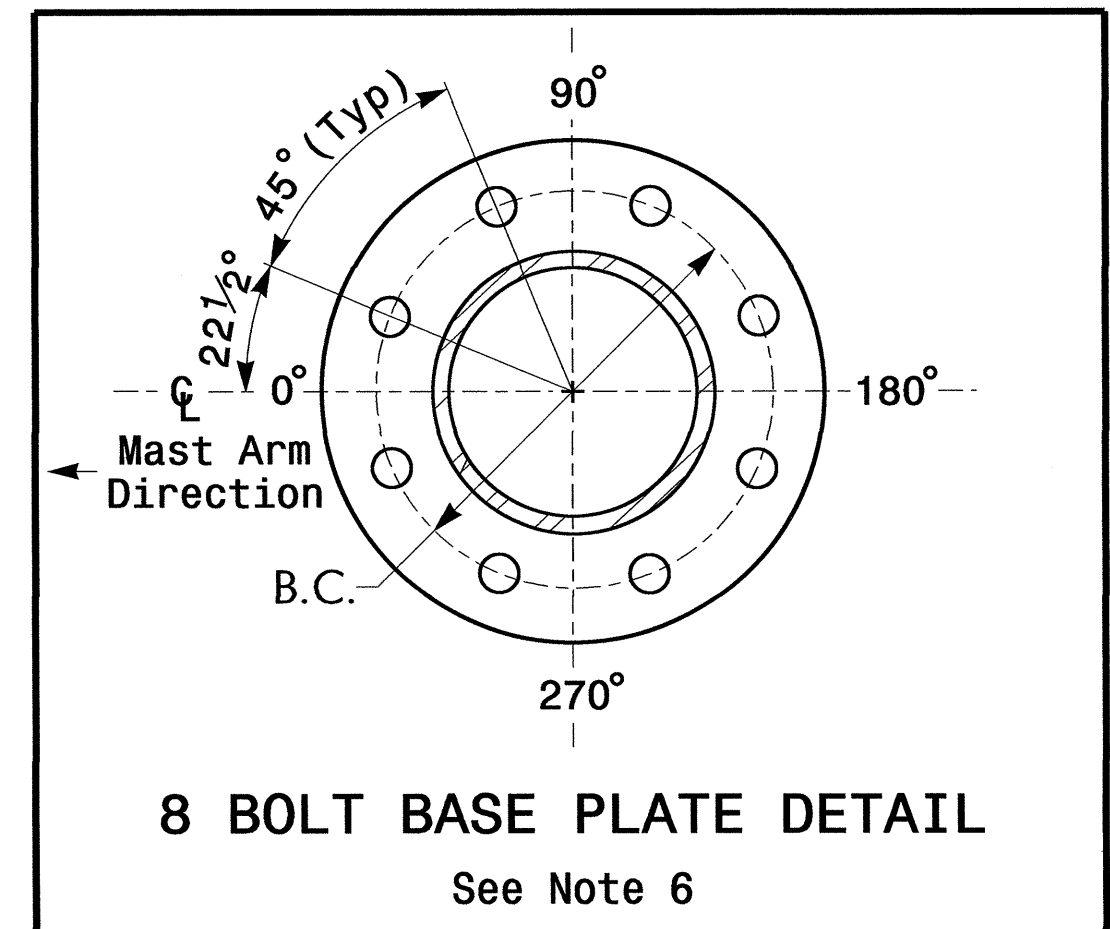
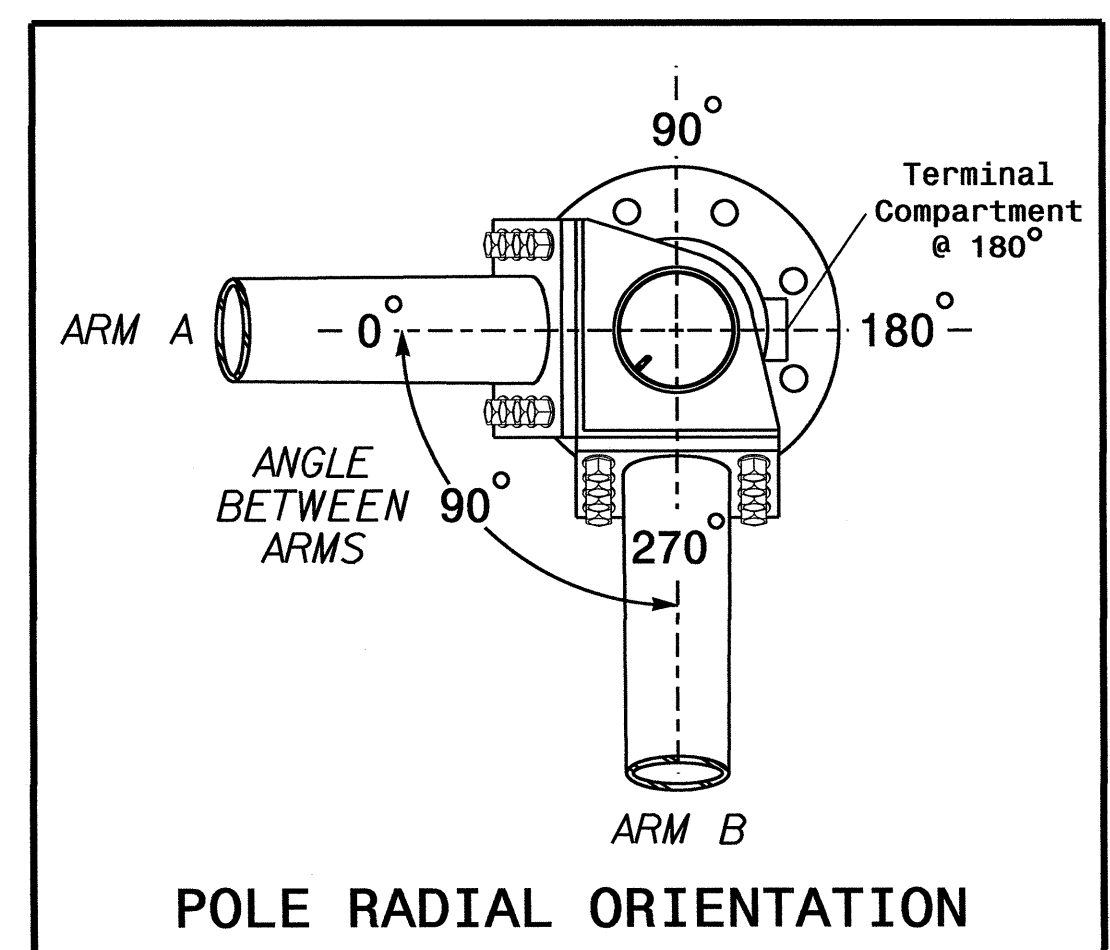


Elevation View @ 0°

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 ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.7 ft.	+0.7 ft.
Elevation difference at Edge of travelway or face of curb	NA	NA



MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Symbol]	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
[Symbol]	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
[Symbol]	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
[Symbol]	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
[Symbol]	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

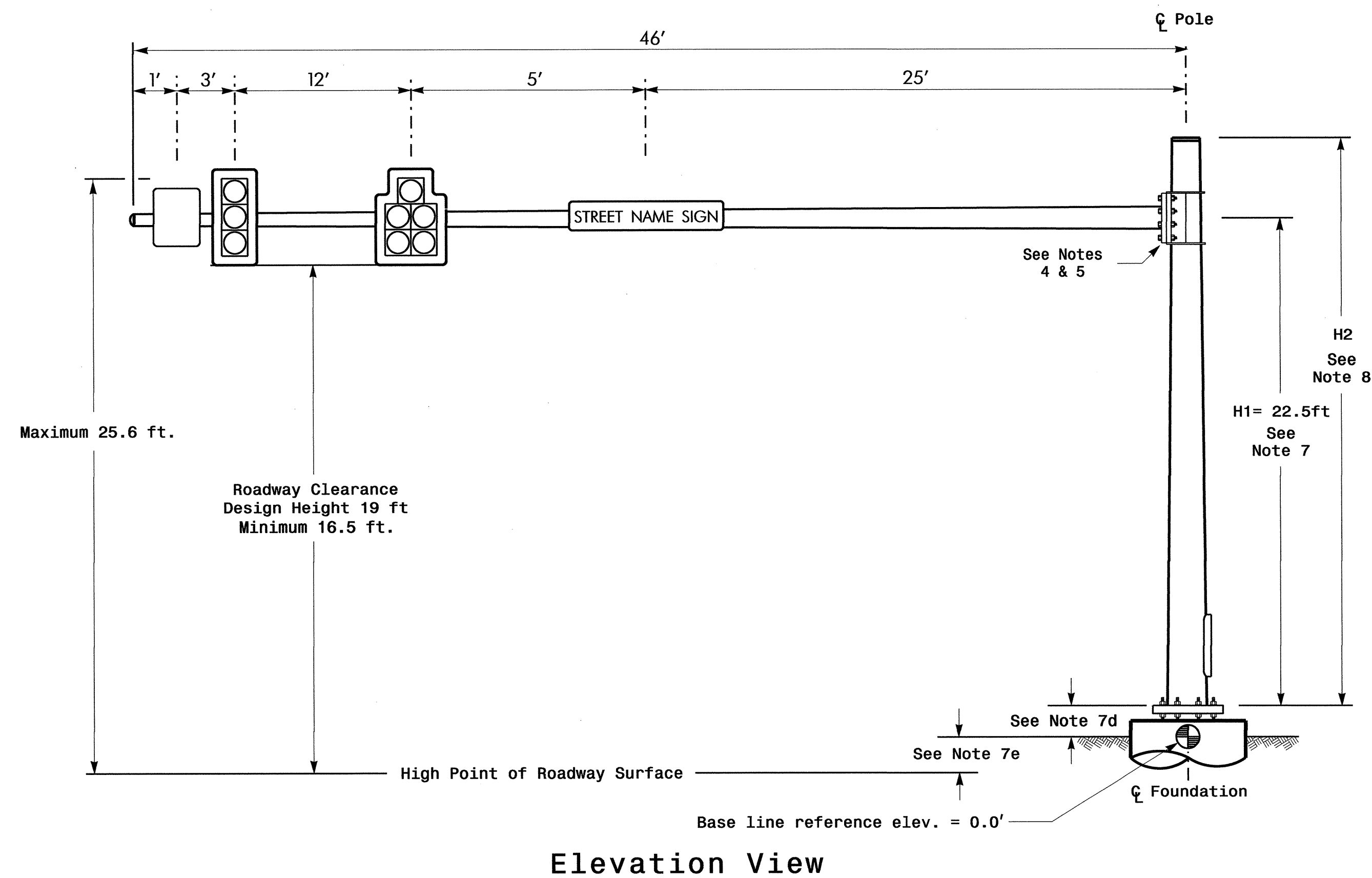
- NOTES**
- Design Reference Material**
- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>
 - Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
 - Design all signal supports using stress ratios that do not exceed 0.9.
 - The camber design for 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.
 - A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
 - Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
 - The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
 - The pole manufacturer will determine the total height (H2) of the 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.
 - 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
 - The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
 - 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 2 (130 mph)

Prepared in the Offices of:
 Transportation Utility and Safety Division
 NORTH CAROLINA PROFESSIONAL ENGINEERS AND SURVEYORS
 SEAL 29904
 US 158 At SR 1139 (Country Club Road)
 Division 1 Camden County Camden
 PLAN DATE: May 2010 REVIEWED BY: PLA
 PREPARED BY: JPG REVIEWED BY:
 SCALE: 0 N/A
 REVISIONS: INIT. DATE
 SIGNATURE: DATE: 9/3/10
 SIG. INVENTORY NO. 011-0450

02-SEP-2010 14:29
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 Jgalilowy

Design Loading for METAL POLE NO. 2



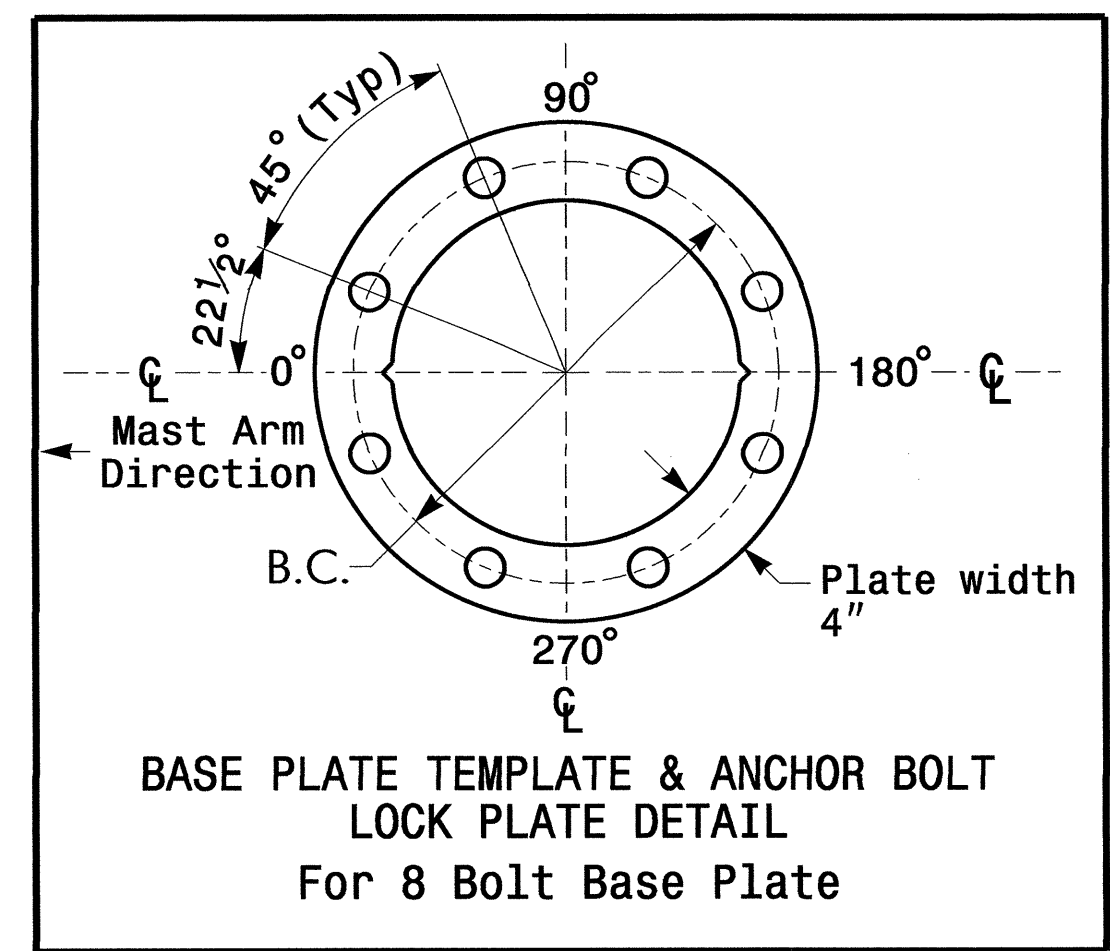
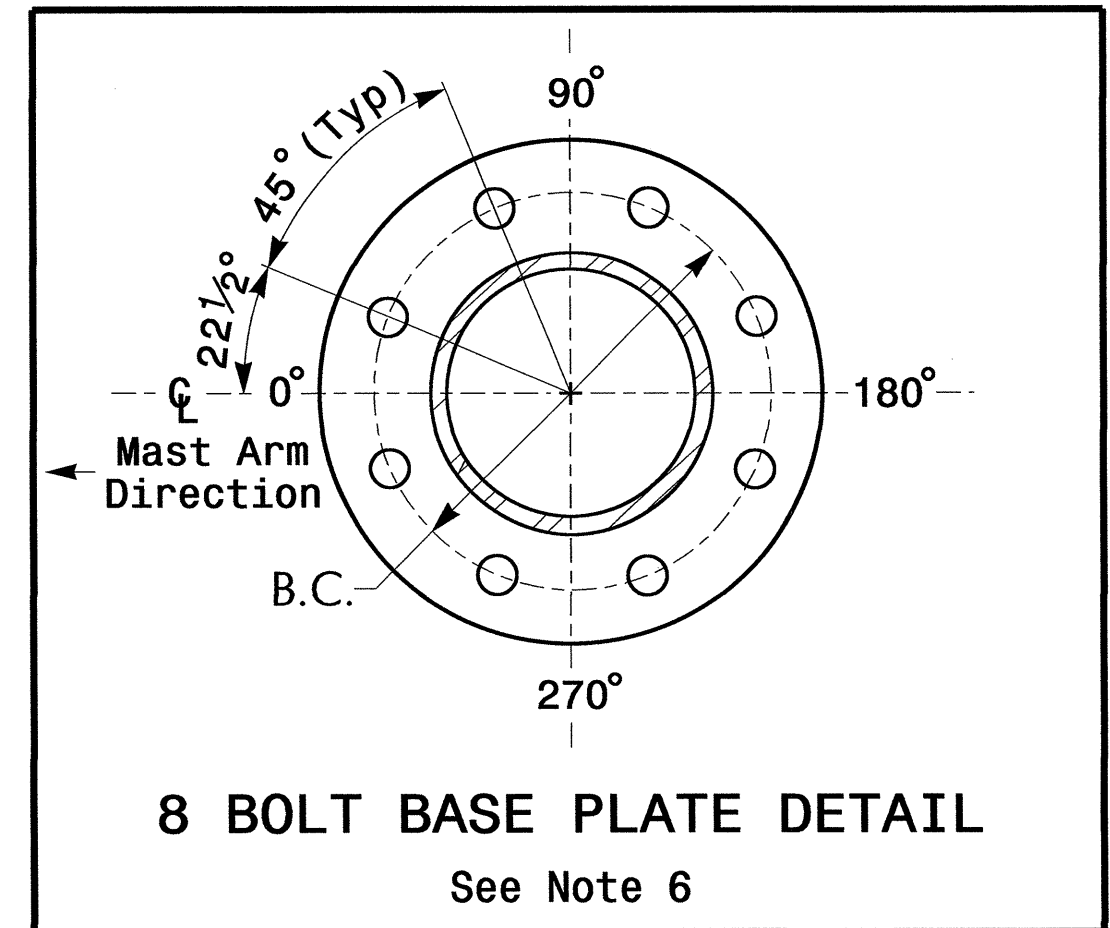
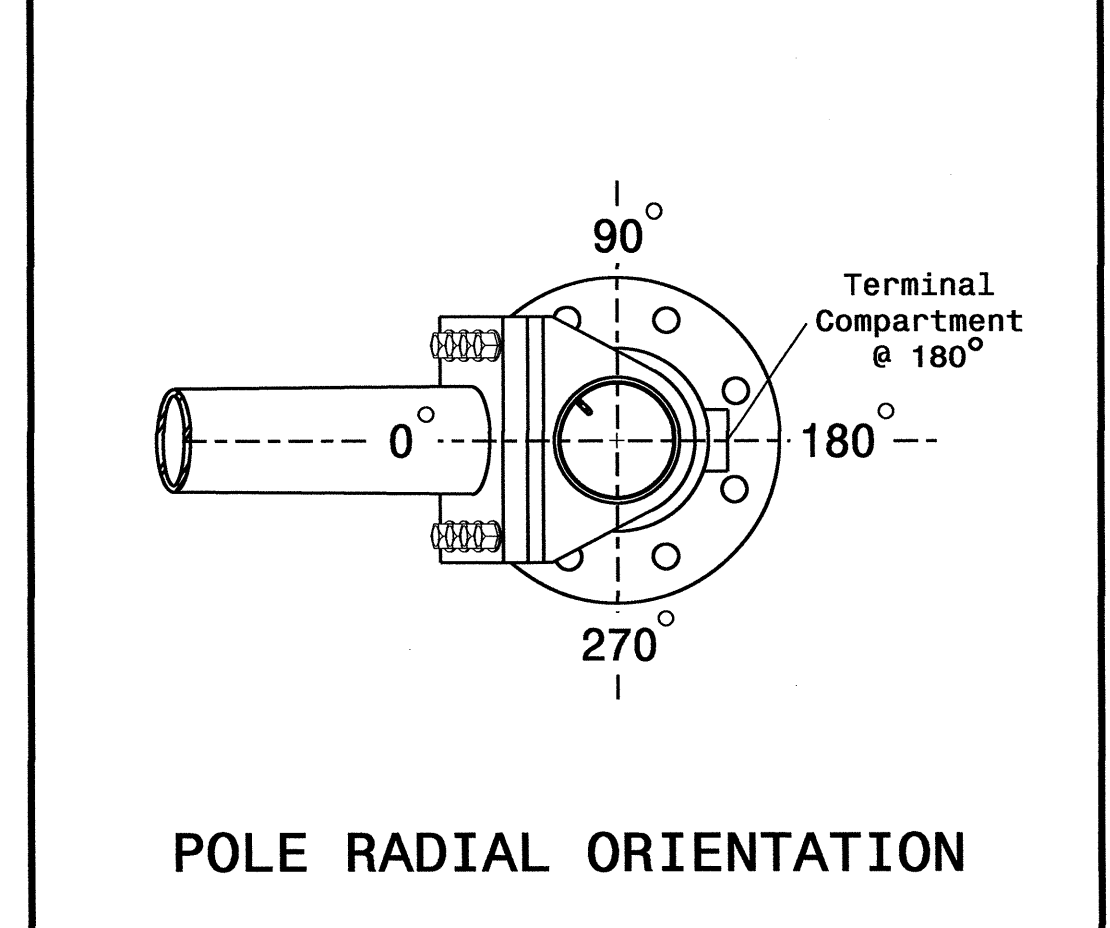
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 2	
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	
Elevation difference at High point of roadway surface	+1.9 ft.	
Elevation difference at Edge of travelway or face of curb	NA	

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS



NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for 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.
- 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.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- 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.
- 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

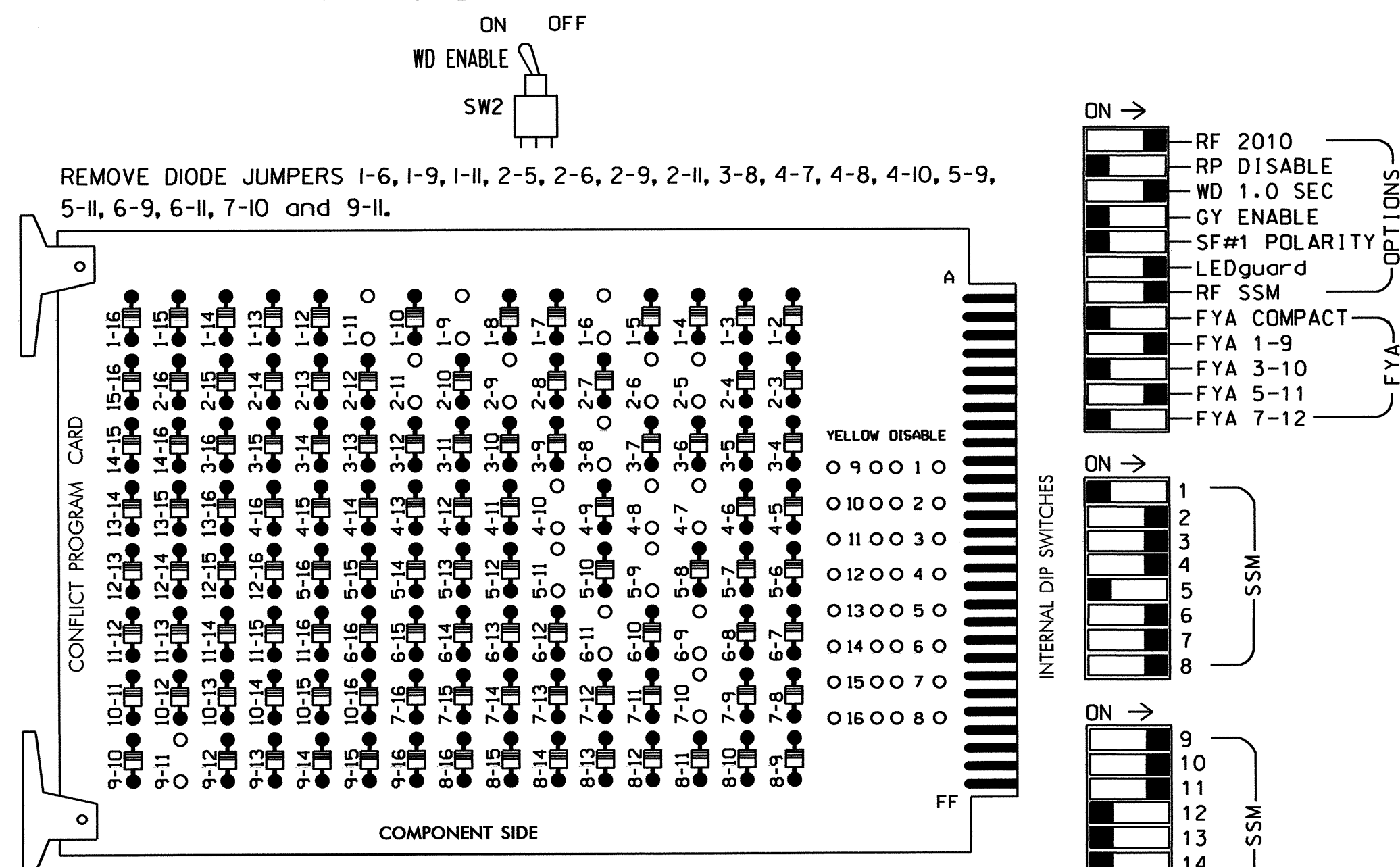
NCDOT Wind Zone 2 (130 mph)

<p>Prepared in the Offices of: Transportation Mobility and Safety Division STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27529</p>	US 158 At SR 1139 (Country Club Road)			
	Division 1	Camden County		Camden
	PLAN DATE: May 2010	REVIEWED BY: PLA		
	PREPARED BY: JPG	REVIEWED BY:		
SCALE: 0 N/A	REVISIONS:	INIT. DATE		
			SIGNATURE: DATE: 9/3/10 SIG. INVENTORY NO.: 01-0450	

09-SEP-2010 14:30 S:\TSS\1175-151\signal\work\pdp\w\p\proj\cts\48-241-4B\MS\gms\gms1\sm01-0450.dwg Jgg/lwcy

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

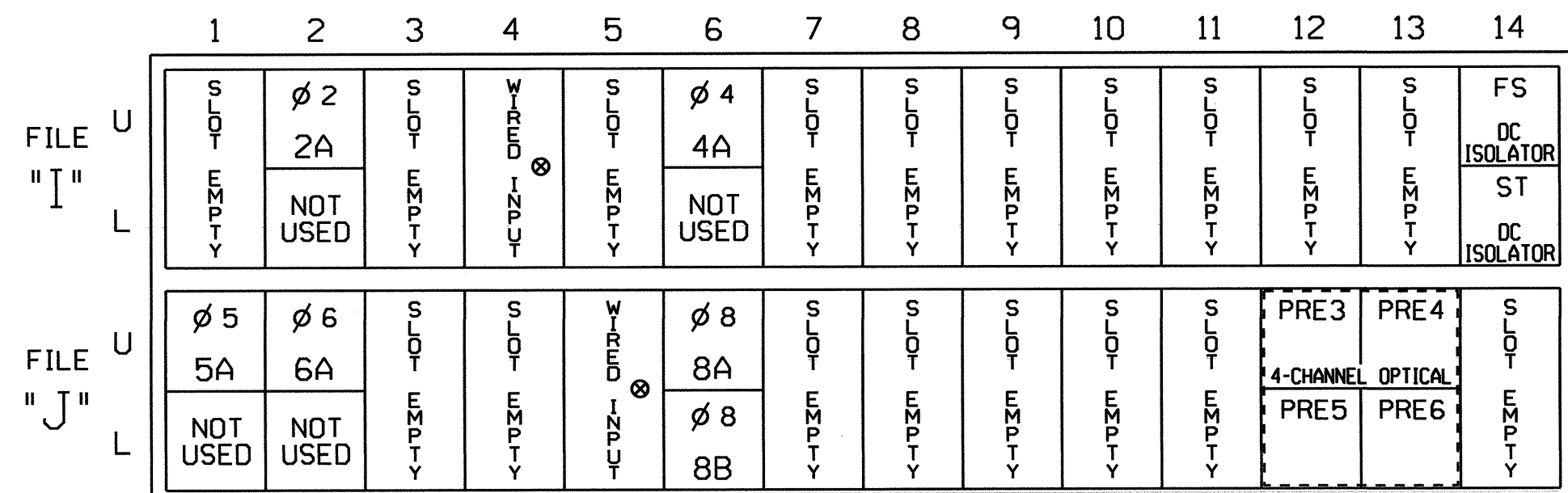


NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)

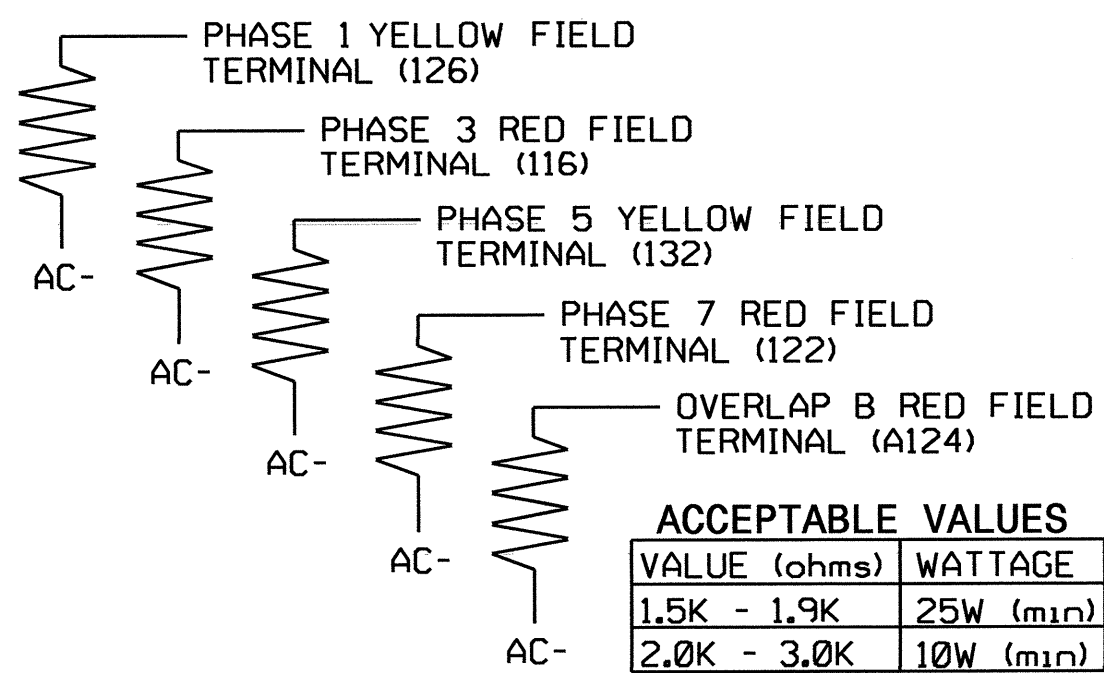


EX.: 1A, 2A, ETC. = LOOP NO.'S

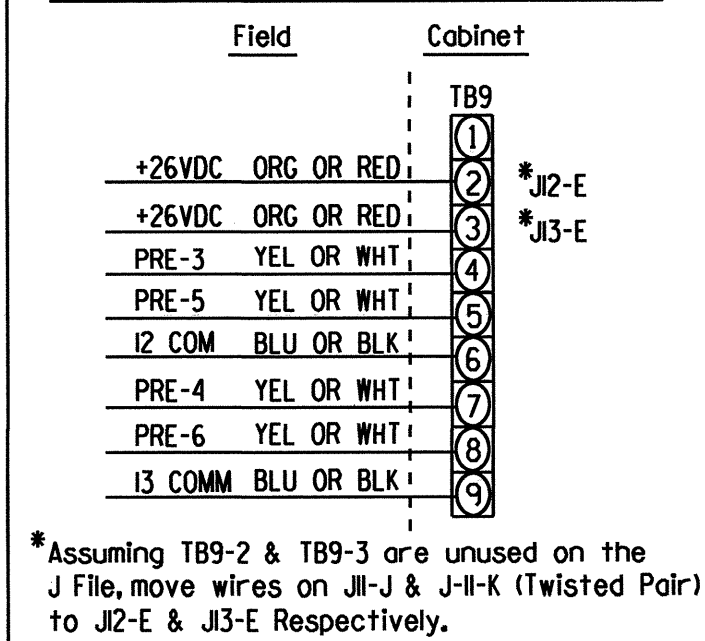
FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

LOAD RESISTOR INSTALLATION DETAIL



OPTICOM FIELD WIRE DETAIL



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 Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,5, 12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

PREEMPT ONLY PHASE OMIT NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phases 1 and 3 for 'Omit Phase' and Phases 2, 4, 5, 6, 7 and 8 for 'Startup Calls'. This is to prevent Phases 1 and 3 from being served when not in Preempt.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S12
PHASES USED.....*1,2,*3,4,5,6,7,8
OVERLAP "A".....1+2
OVERLAP "B".....7
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

*PHASES 1 AND 3 USED IN PREEMPT SEQUENCE ONLY

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A ¹	-	J5U	57	19	7	7	Y	Y			15
	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

¹Add jumper from I6-F to J5-F, on rear of input file.

²Add jumper from J1-W to I4-W, on rear of input file.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	PED	3	4	PED	5	6	PED	7	8	PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61*	21,22	NU	81	41,42	NU	51*	62,63	NU	41	81,82	NU	61*	63	NU	51*	NU	NU
RED		128		*	101			134		*	107			*				
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW														A121			A114	
YELLOW ARROW					117						123			A122	A125		A115	
FLASHING YELLOW ARROW														A123			A116	
GREEN ARROW	127				118			133			124			A126				

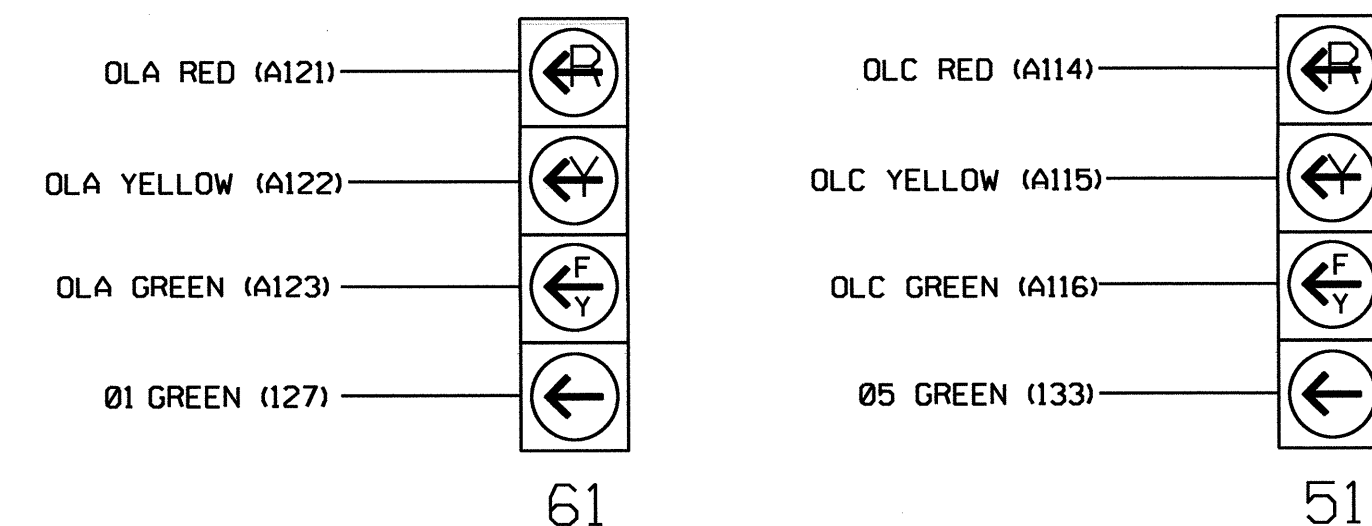
NU = Not Used

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

* See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 3 for programming instructions.

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Function 1.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

DYNAMIC/BACKUP CONTROL FUNCTION #01
OVERLAPS: ABCDEFGHIJKLMNPO
IF OVERLAPS ARE ACTIVE :
OR PHASES: 12345678910111213141516
IF PHASES ARE ON: X
OMIT PHASES: X
CALL PHASES: X

BACKUP PROTECTION PROGRAMMING COMPLETE

ELECTRICAL DETAIL - TEMP 1 - SHEET 1 OF 3

Electrical and Programming Details For:

Prepared in the Offices of:

US 158 at 343

Division 1 Camden County Camden

PLAN DATE: July 2010 REVIEWED BY: T. J. J...

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS INIT. DATE

750 N. Greenfield Phry, Garner, NC 27529

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229T1
DESIGNED: March 2010
SEALED: 08/19/10
REVISED:

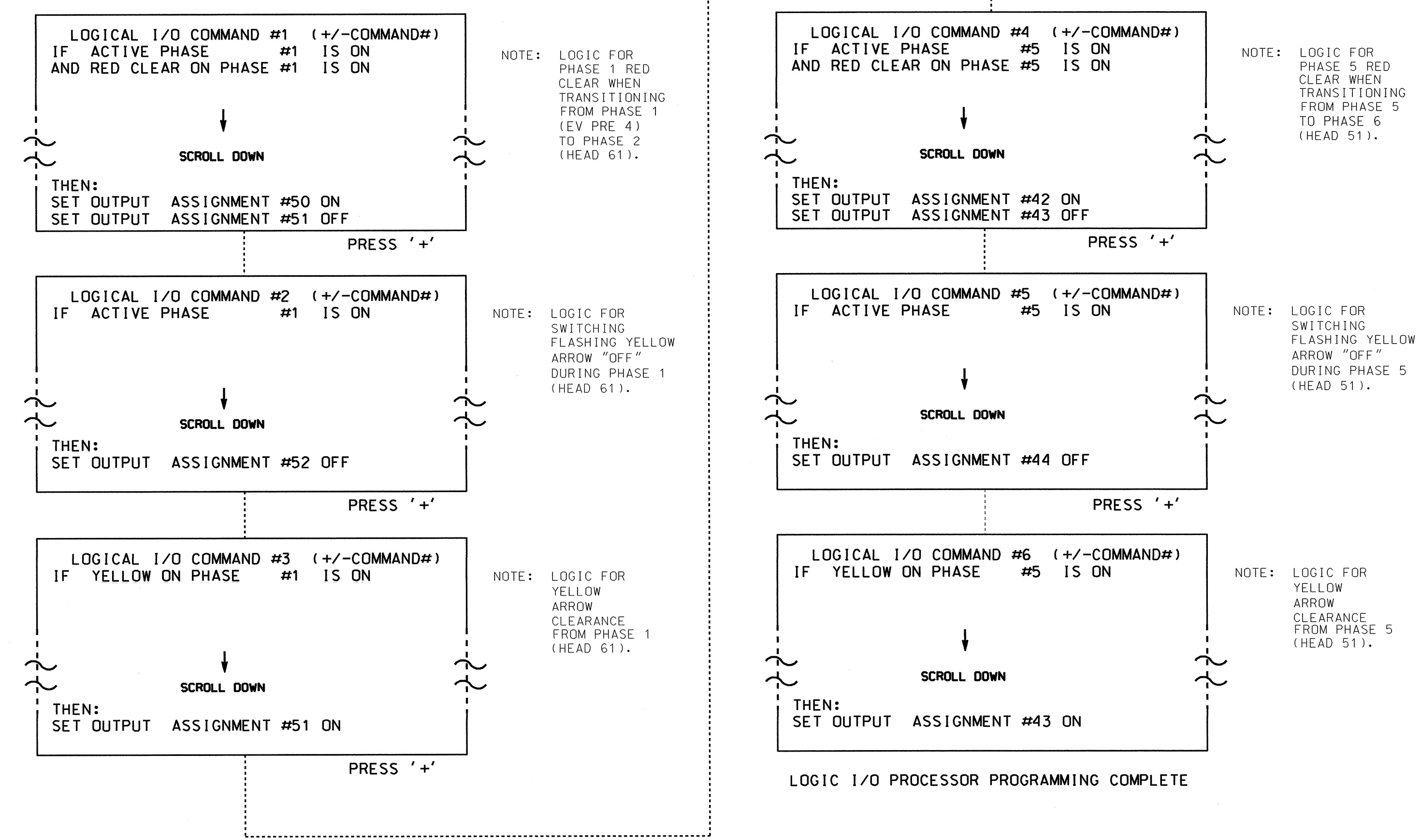
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

SIG. INVENTORY NO. 01-0229T1

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS), SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE	
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green
OUTPUT 50 =	Overlap A Red
OUTPUT 51 =	Overlap A Yellow
OUTPUT 52 =	Overlap A Green

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

- FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
 PHASE: :12345678910111213141516
 VEH OVL PARENTS: :XX
 VEH OVL NOT VEH: :
 VEH OVL NOT PED: :
 VEH OVL GRN EXT: :
 STARTUP COLOR: - RED - YELLOW - GREEN
 FLASH COLORS: - RED - YELLOW X GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 GREEN EXTENSION (0-255 SEC)...0.0
 YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
 RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
 PHASE: :12345678910111213141516
 VEH OVL PARENTS: :X
 VEH OVL NOT VEH: :
 VEH OVL NOT PED: :
 VEH OVL GRN EXT: :
 STARTUP COLOR: - RED - YELLOW - GREEN
 FLASH COLORS: - RED - YELLOW - GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...N
 GREEN EXTENSION (0-255 SEC)...0.0
 YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
 RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
 PHASE: :12345678910111213141516
 VEH OVL PARENTS: :XX
 VEH OVL NOT VEH: :
 VEH OVL NOT PED: :
 VEH OVL GRN EXT: :
 STARTUP COLOR: - RED - YELLOW - GREEN
 FLASH COLORS: - RED - YELLOW X GREEN
 SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
 FLASH YELLOW IN CONTROLLER FLASH?...Y
 GREEN EXTENSION (0-255 SEC)...0.0
 YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
 RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
 OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 01-0229T1
 DESIGNED: March 2010
 SEALED: 08/19/10
 REVISED:

ELECTRICAL DETAIL - TEMP 1 - SHEET 2 OF 3

	<p>US 158 at NC 343</p>	<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN</p>						
	<p>Division 1 Camden County Camden</p>	<p>PLAN DATE: July 2010 REVIEWED BY: T. J. [Signature]</p>	<p>PREPARED BY: C. Strickland REVIEWED BY: [Signature]</p>					
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REVISIONS	INIT.	DATE						

24-AUG-2010 08:05 24-AUG-2010 08:05 C:\Program Files\Autodesk\InRoads\Projects\01-0229\01-0229.dgn

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' as needed to advance to Preempts 3, 4, 5 and 6.

PREEMPTION #3	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0-OFF,1-255MIN) ...	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #4	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 3.9 1.9	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0-OFF,1-255MIN) ...	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #5	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0-OFF,1-255MIN) ...	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	Y
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	X
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #6	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 3.8 1.8	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0-OFF,1-255MIN) ...	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	Y
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

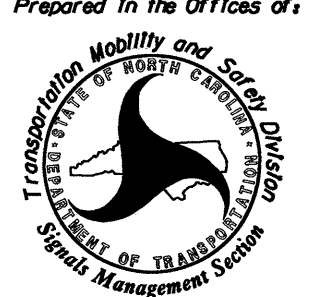
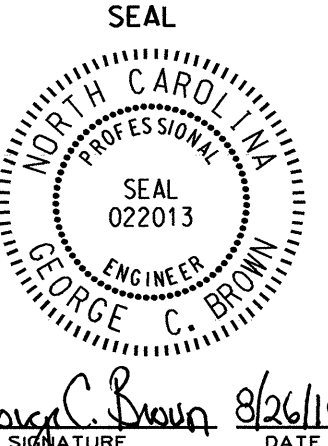
PROGRAMMING COMPLETE

* TIME DEFAULTS TO TIME USED BY PHASE DURING NORMAL OPERATION

NOTE!
PROGRAM EXTEND TIME ON ALL 'OPTICOM' DETECTOR UNITS FOR 2 SEC.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229T1
DESIGNED: March 2010
SEALED: 08/19/10
REVISED:

ELECTRICAL DETAIL - TEMP 1 - SHEET 3 OF 3

	Prepared in the Offices of: US 158 at NC 343 Camden County Camden		
	Division 1 PLAN DATE: July 2010 PREPARED BY: C. Strickland	REVIEWED BY: T. Syle REVIEWED BY:	
REVISIONS			INIT. DATE

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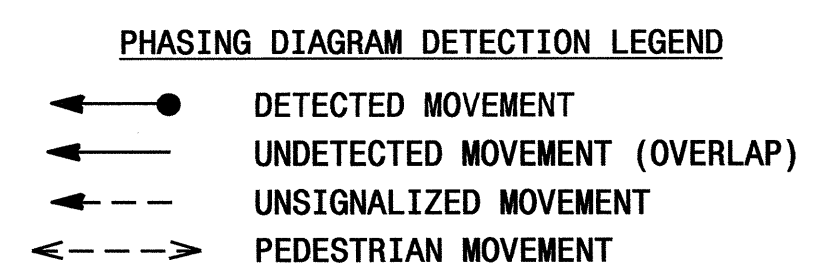
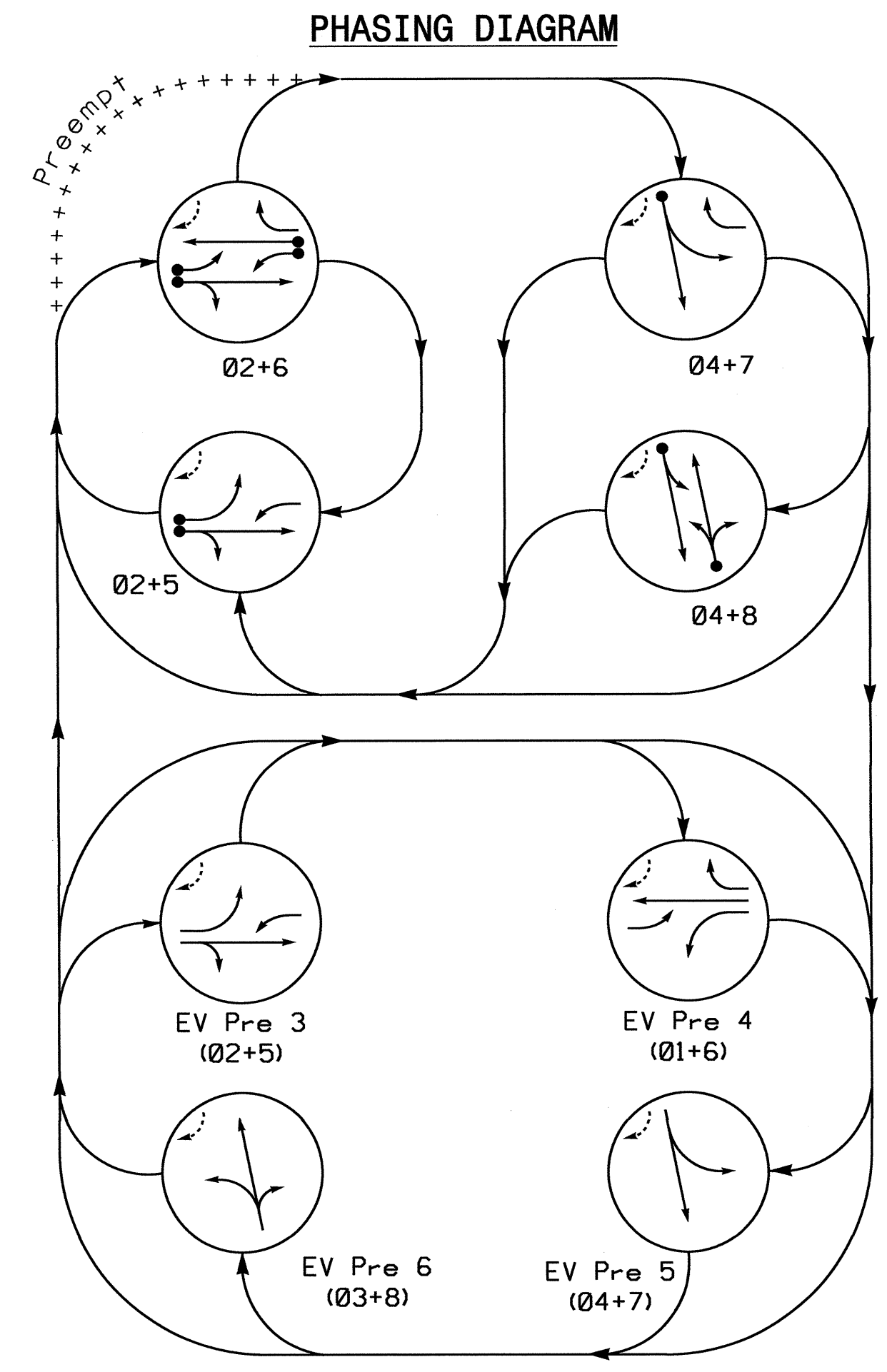
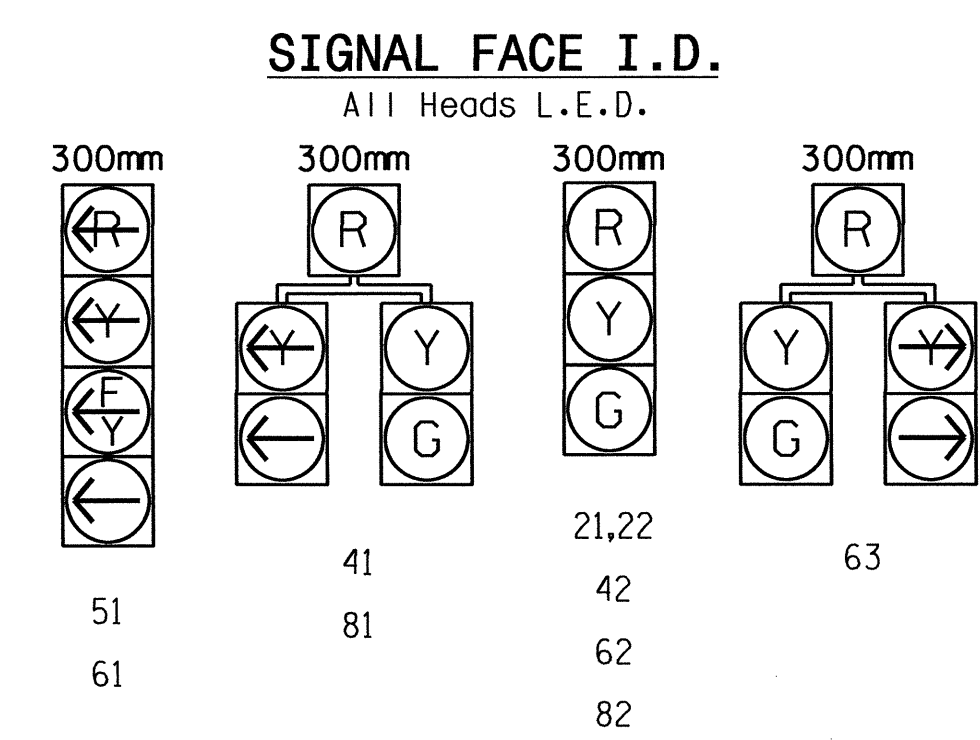


TABLE OF OPERATION

SIGNAL FACE	PHASE										
	02+5	02+6	04+7	04+8	PErVe3	PErVe4	PErVe5	PErVe6	FLASH		
21,22	G	G	R	R	G	R	R	R	Y		
41	R	R	G	G	R	R	G	R	R		
42	R	R	G	G	R	R	G	R	R		
51	Y	Y	R	R	Y	Y	R	R	Y		
61	Y	Y	R	R	Y	Y	R	R	Y		
62	R	G	R	R	R	G	R	R	Y		
63	R	G	R	R	R	G	R	R	Y		
81	R	R	R	G	R	R	R	G	R		
82	R	R	R	G	R	R	R	G	R		



OASIS 2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (M)	TURNS	DISTANCE FROM STOPBAR (M)	DETECTOR PROGRAMMING							
				PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD	
2A	1.8X1.8	4	20	Y	2	Y	Y	-	-	-	-
4A	1.8X1.2	2-4-2	0	-	7	Y	Y	-	-	15	-
5A	1.8X1.2	2-4-2	0	Y	5	Y	Y	-	-	15	-
6A	1.8X1.8	4	20	Y	6	Y	Y	-	-	-	-
8A	1.8X1.2	2-4-2	0	-	8	Y	Y	-	-	3	-
8B	1.8X1.8	4	0	-	8	Y	Y	-	-	15	-

4 Phase W/EV Preemption Fully Actuated Isolated

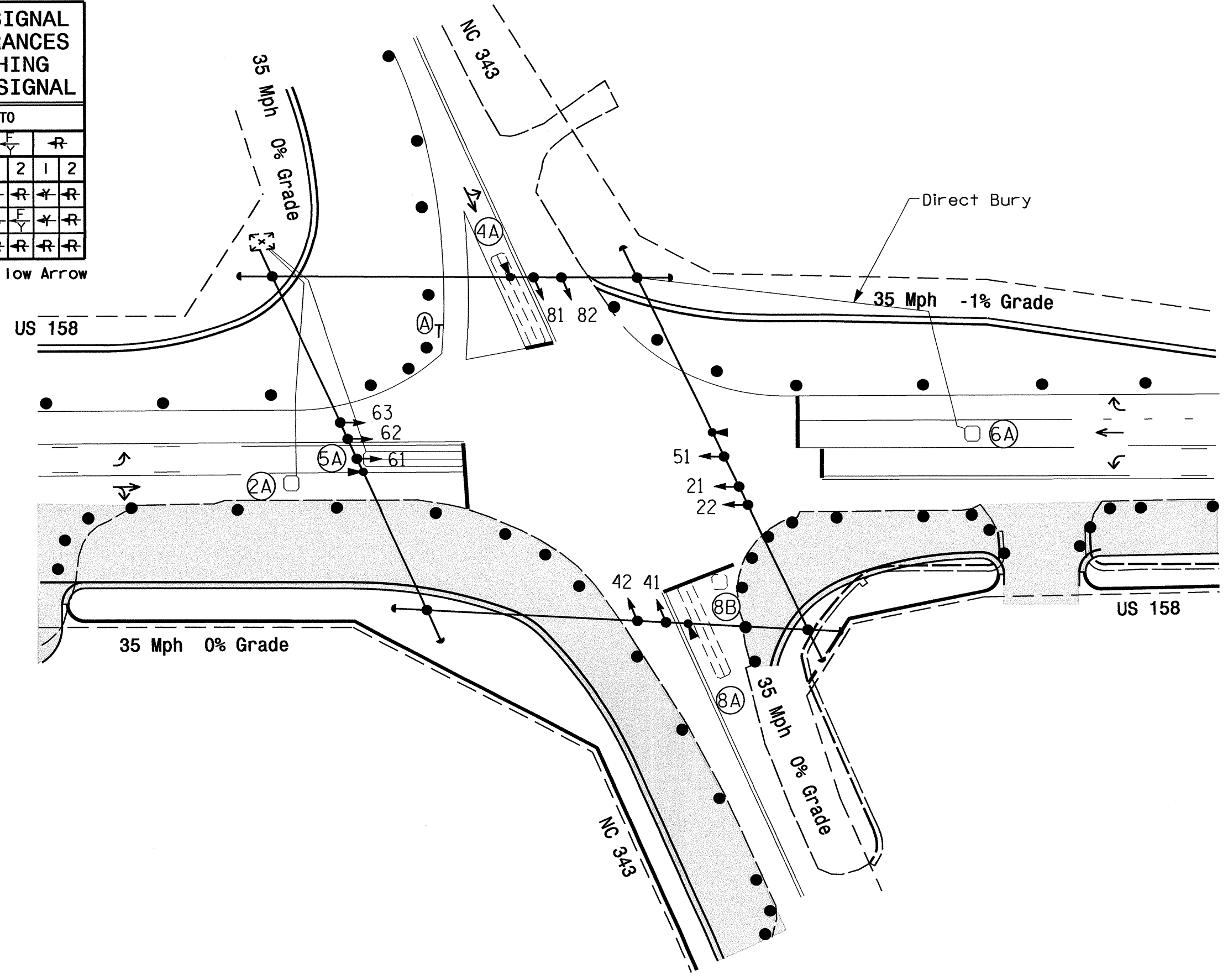
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Omit phase 7 during phase 8 on.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO			
	1	2	1	2
F	→	→	→	→
R	→	→	→	→
Y	→	→	→	→
FL	→	→	→	→

FL = Flashing Yellow Arrow



OASIS 2070L TIMING CHART

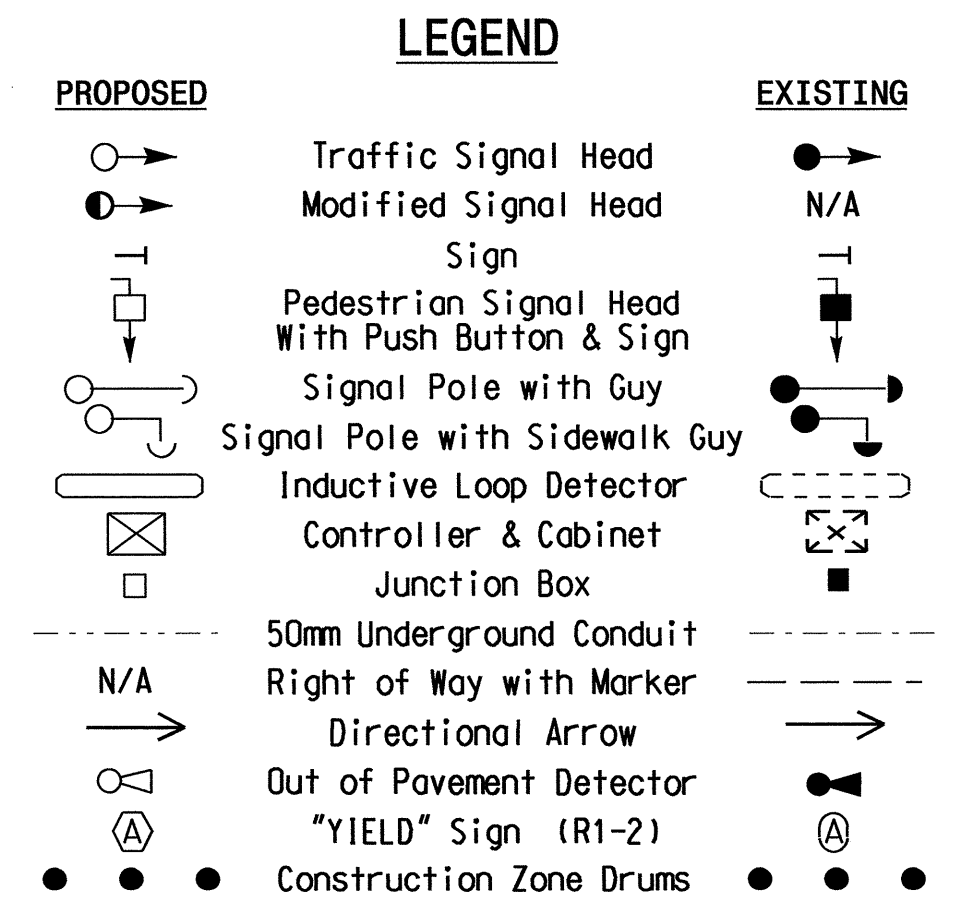
FEATURE	PHASE					
	2	4	5	6	7	8
Min Green 1*	10	7	7	10	7	7
Extension 1*	3.0	2.0	2.0	3.0	2.0	2.0
Max Green 1*	45	35	20	45	35	35
Yellow Clearance	3.9	3.8	3.0	3.9	3.0	3.8
Red Clearance	1.9	2.0	1.9	1.9	2.8	1.8
Walk 1*	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation*	-	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-	-
Time To Reduce*	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-	-
Dual Entry	-	ON	-	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

* 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.

OASIS 2070 EV PREEMPTION

FUNCTION	PRE 3	PRE 4	PRE 5	PRE 6
Interval 1 - Dwell Green	255	255	255	255
Interval 1 - Dwell Yellow	0.0*	3.9	0.0*	3.8
Interval 1 - Dwell Red	0.0*	1.9	0.0*	1.8
Interval 5 - Exit Green	0	0	0	0
Interval 5 - Yellow	0.0	0.0	0.0	0.0
Interval 5 - Red	0.0	0.0	0.0	0.0
Priority	Medium	Medium	Medium	Medium
Delay Time	0.0	0.0	0.0	0.0
Min Green Before Pre	1	1	1	1
Ped Clear Before Pre	0	0	0	0
Yellow Clear Before Pre	0.0*	0.0*	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*	0.0*	0.0*
Dwell Min Time	7	7	7	7
Enable Backup Protection	N	N	Y	Y
Ped Clear Through Yellow	N	N	N	N
Preempt Extend**	2	2	2	2
Omit Overlaps	-	-	B	-

** Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit



Signal Upgrade/Temp 2 Phase II

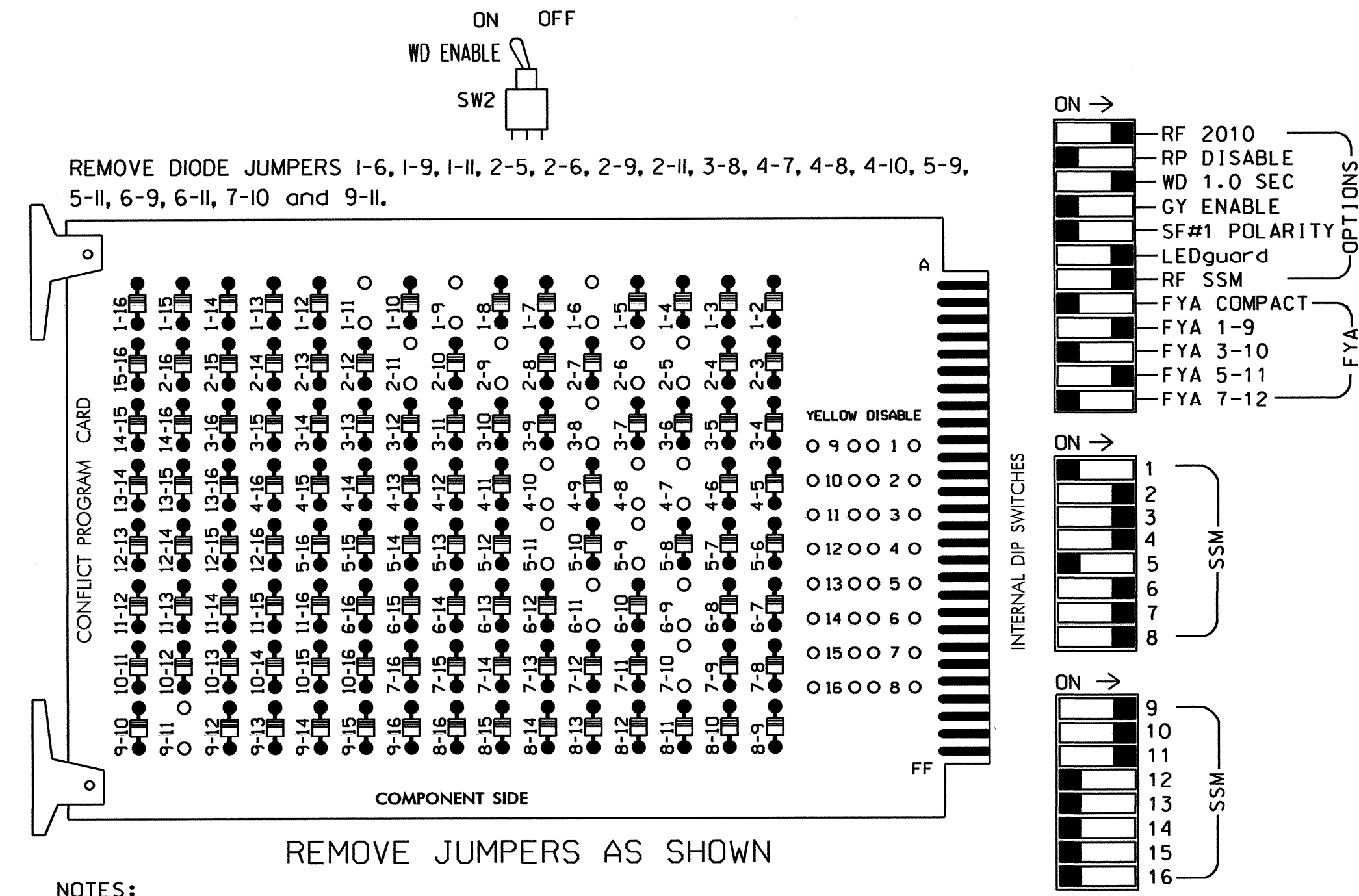
Prepared in the Offices of:

US 158 At NC 343
 Division 1 Camden County Camden
 PLAN DATE: March 2010 REVIEWED BY:
 PREPARED BY: JPG REVIEWED BY:
 SCALE: 5 0 10
 500:1
 REVISIONS: INIT. DATE
 SIGNATURE: DATE
 STG. INVENTORY NO. 01-0229T2

19-AUG-2010 11:38
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 1:001 (LOW)

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

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 Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,5, 12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

PREEMPT ONLY PHASE OMIT NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phases 1 and 3 for 'Omit Phase' and Phases 2, 4, 5, 6, 7 and 8 for 'Startup Calls'. This is to prevent Phases 1 and 3 from being served when not in Preempt.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S12
 PHASES USED.....*1,2,*3,4,5,6,7,8
 OVERLAP "A".....1+2
 OVERLAP "B".....7
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

*PHASES 1 AND 3 USED IN PREEMPT SEQUENCE ONLY

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61*	21,22	NU	81	41,42	NU	51*	62,63	NU	41	81,82	NU	61*	63	NU	51*	NU	NU
RED		128		*	101			134		*	107			*				
YELLOW	*	129			102		*	135			108							
GREEN		130			103			136			109							
RED ARROW																A121		A114
YELLOW ARROW					117						123					A122	A125	A115
FLASHING YELLOW ARROW																A123		A116
GREEN ARROW	127				118			133			124					A126		

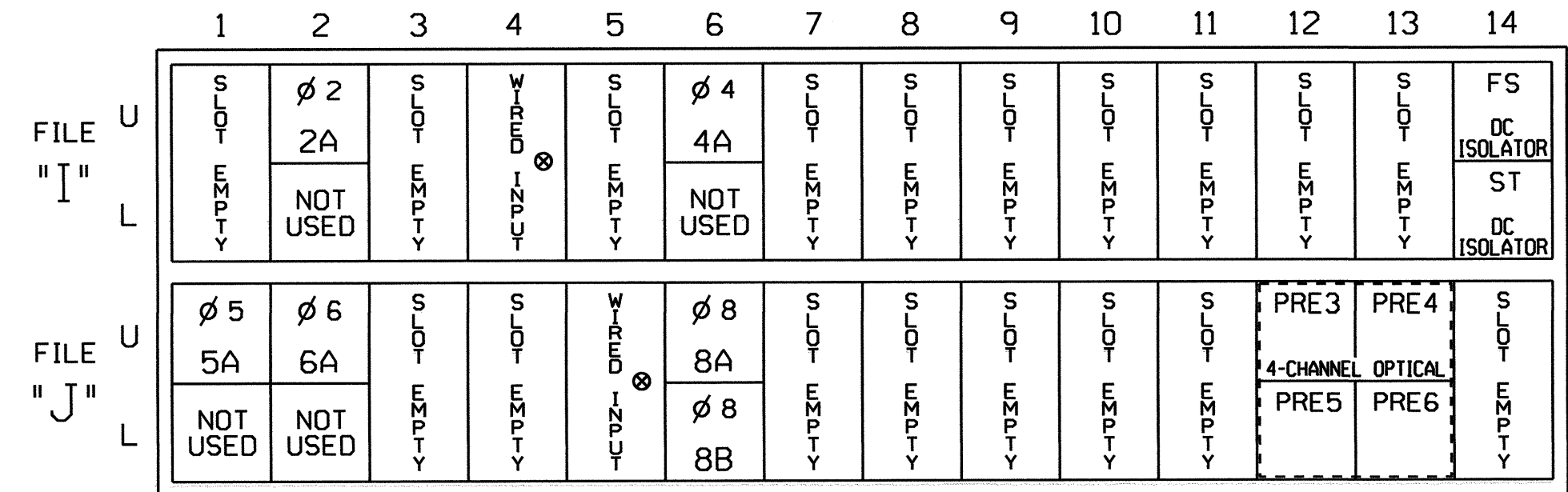
NU = Not Used

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

★ See pictorial of head wiring in detail below.

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

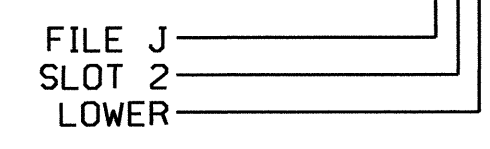
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A ¹	-	J5U	57	19	7	7	Y	Y			15
	TB4-9,10	I6U	41	3	4	4	Y	Y			3
5A ²	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9	22	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

- Add jumper from I6-F to J5-F, on rear of input file.
- Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L

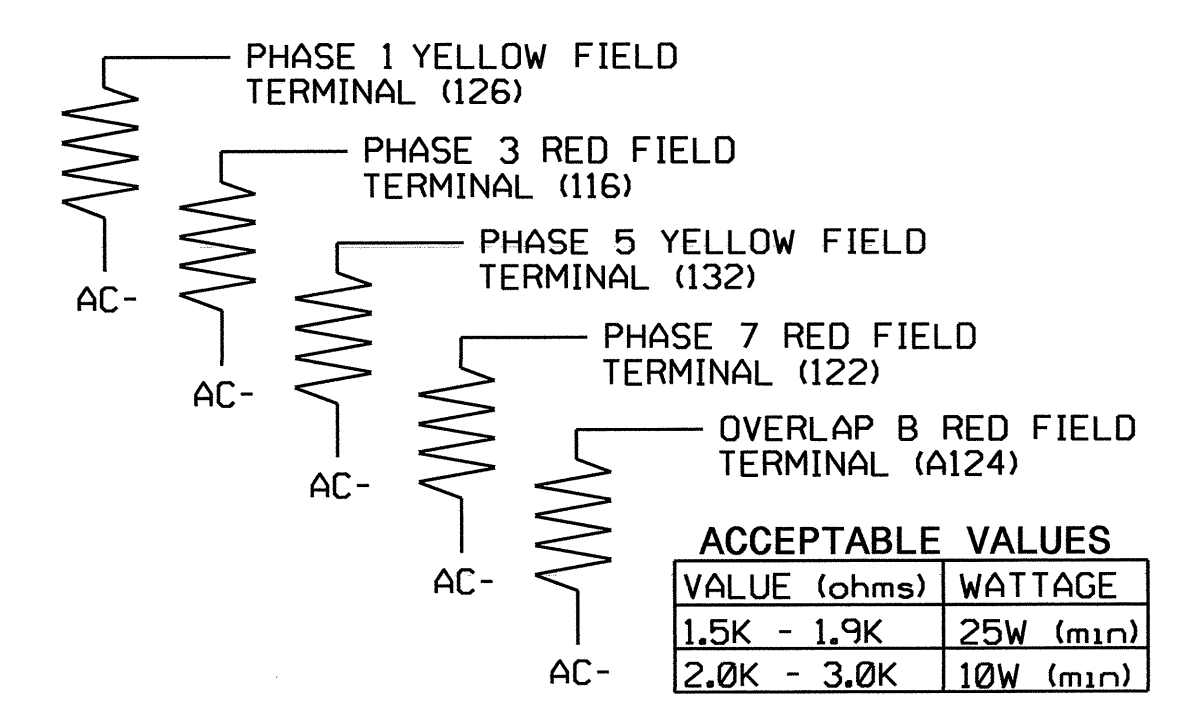


OPTICOM FIELD WIRE DETAIL

Field	Cabinet
+26VDC ORG OR RED	TB9 (1)
+26VDC ORG OR RED	TB9 (2) *J2-E
PRE-3 YEL OR WHT	TB9 (3) *J3-E
PRE-5 YEL OR WHT	TB9 (4)
I2 COM BLU OR BLK	TB9 (5)
PRE-4 YEL OR WHT	TB9 (6)
PRE-6 YEL OR WHT	TB9 (7)
I3 COM BLU OR BLK	TB9 (8)
	TB9 (9)

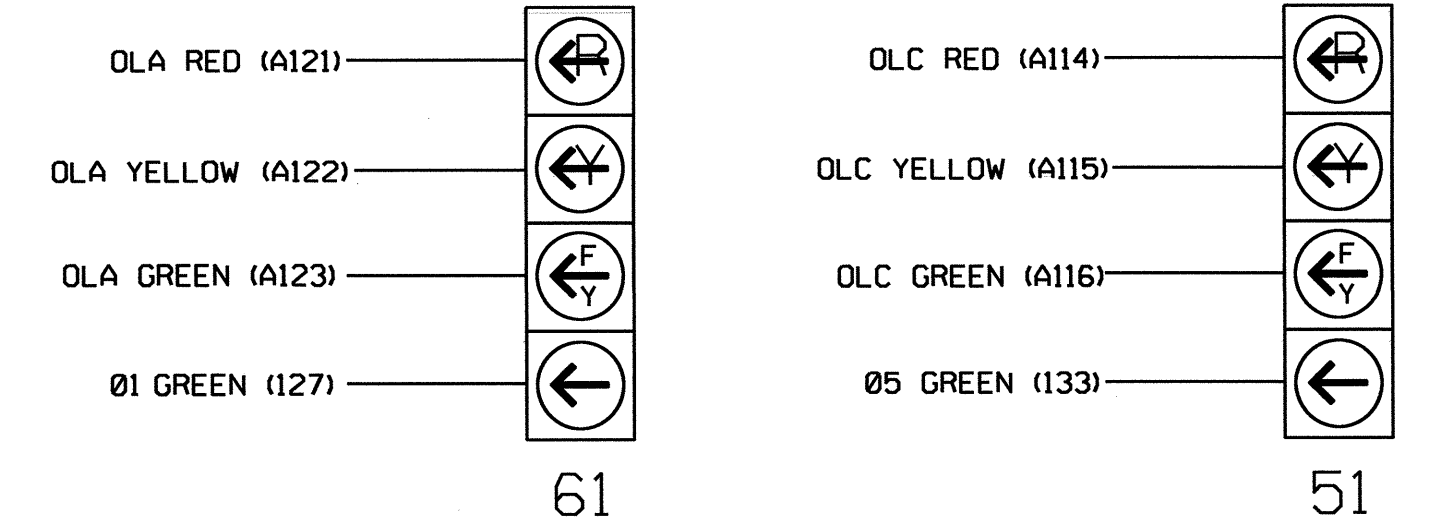
* Assuming TB9-2 & TB9-3 are unused on the J File, move wires on J1-J & J11-K (Twisted Pair) to J2-E & J3-E respectively.

LOAD RESISTOR INSTALLATION DETAIL



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

- The sequence display for this signal requires special logic programming. See sheet 2 of 3 for programming instructions.

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Function 1.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

DYNAMIC/BACKUP CONTROL FUNCTION #01
 OVERLAPS: ABCDEFGHIJKLMNP
 IF OVERLAPS ARE ACTIVE :
 OR PHASES: 12345678910111213141516
 IF PHASES ARE ON : X
 OMIT PHASES : X
 CALL PHASES : X

BACKUP PROTECTION PROGRAMMING COMPLETE

ELECTRICAL DETAIL - TEMP 2 - SHEET 1 OF 3

Electrical and Programming Details For:

Prepared in the Offices of:

US 158 at NC 343

Division 1 Camden County Camden

PLAN DATE: July 2010 REVIEWED BY: T. J. J...

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS: INIT. DATE

Signature: George C. Brown

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER GEORGE C. BROWN

750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. 01-0229T2

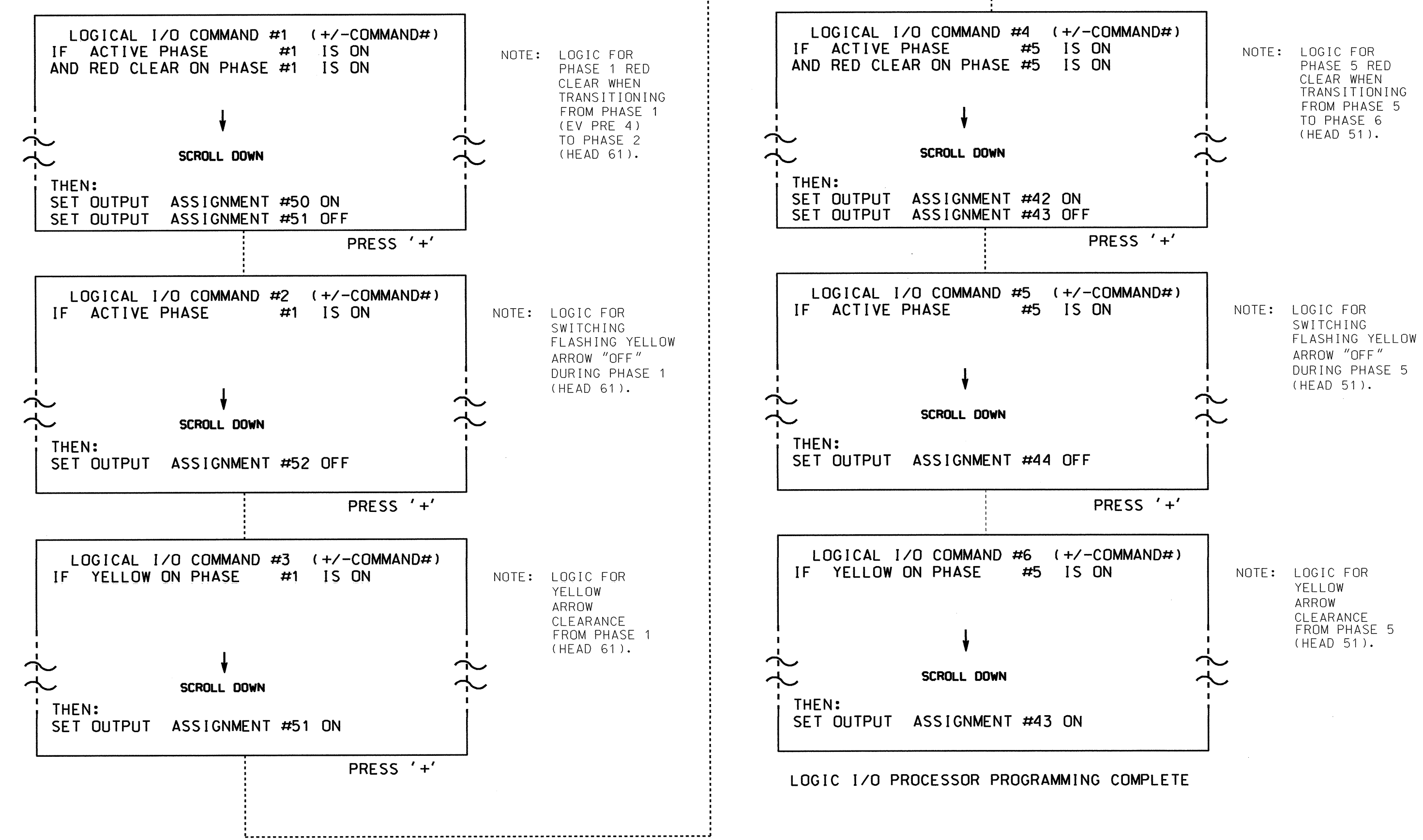
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229T2
 DESIGNED: March 2010
 SEALED: 08/19/10
 REVISED:

24-AUG-2010 09:22 Signal\work\poc\sig\1\mank\tr\ck\end\010229_sml.e (e.xxx.dgn)

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

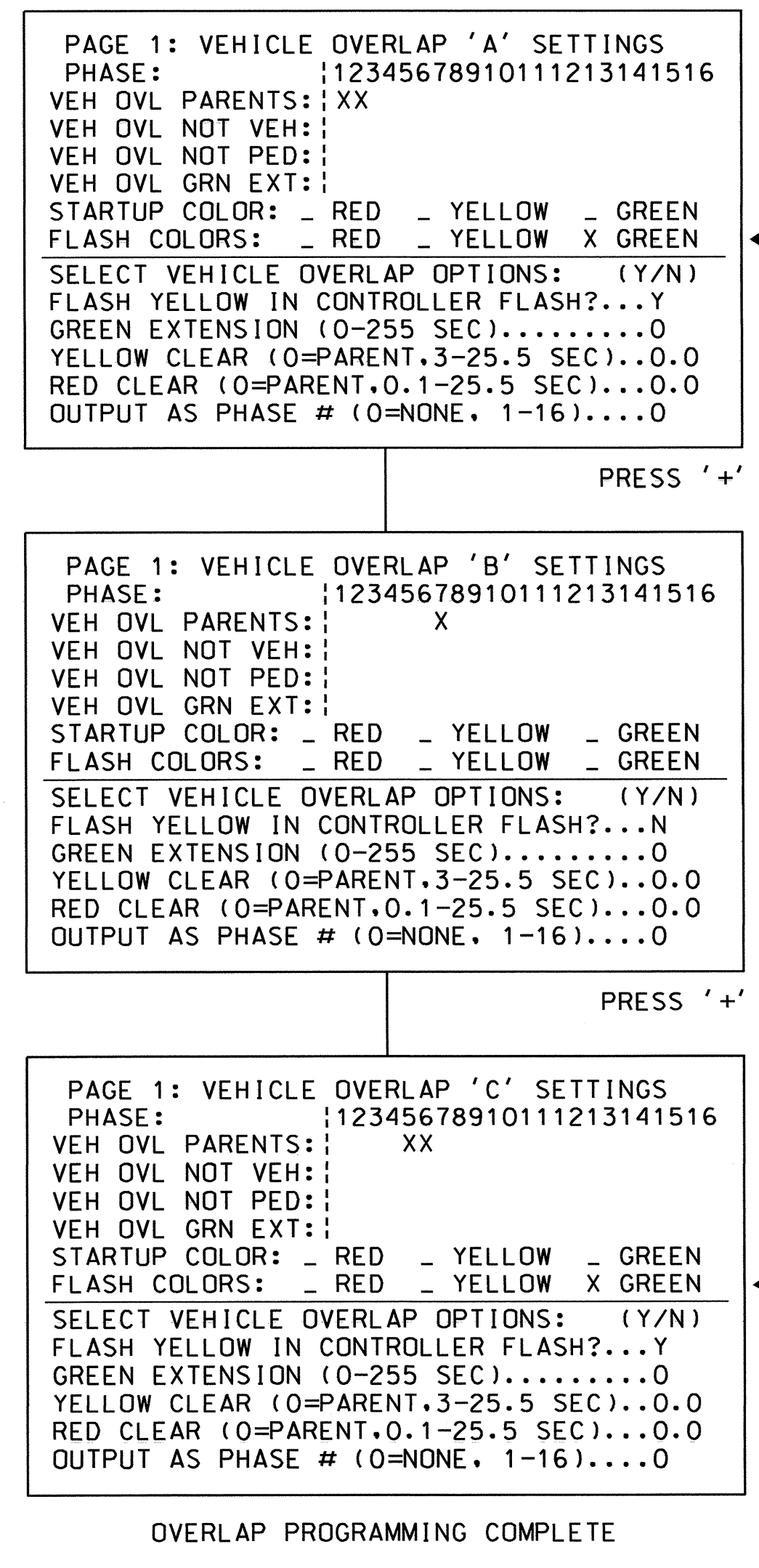
1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS), SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



OUTPUT REFERENCE SCHEDULE	
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green
OUTPUT 50 =	Overlap A Red
OUTPUT 51 =	Overlap A Yellow
OUTPUT 52 =	Overlap A Green

OVERLAP PROGRAMMING DETAIL (program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 01-0229T2
DESIGNED: March 2010
SEALED: 08/19/10
REVISED:

ELECTRICAL DETAIL - TEMP 2 - SHEET 2 OF 3

	<p>US 158 at NC 343</p>	<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN</p>					
	<p>Division 1 Camden County Camden</p> <p>PLAN DATE: July 2010 REVIEWED BY: T. Vogel</p> <p>PREPARED BY: C. Strickland REVIEWED BY:</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <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					
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Signature: <i>George C. Brown</i> / 8/26/10 DATE</p>	<p>SIG. INVENTORY NO. 01-0229T2</p>					

24-AUG-2010 09:22:22 Signal Management Section 01-0229T2.dgn

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' as needed to advance to Preempts 3, 4, 5 and 6.

PREEMPTION #3	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN)	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY?	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION?	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMN
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #4	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 3.9* 1.9*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN)	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY?	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION?	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMN
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #5	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN)	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	Y
HOLD CLEAR 1 PHASES DURING DELAY?	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION?	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMN
DWELL INT FLASH YELLOW	X
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #6	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 3.8 1.8	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN)	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	Y
HOLD CLEAR 1 PHASES DURING DELAY?	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION?	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMN
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	


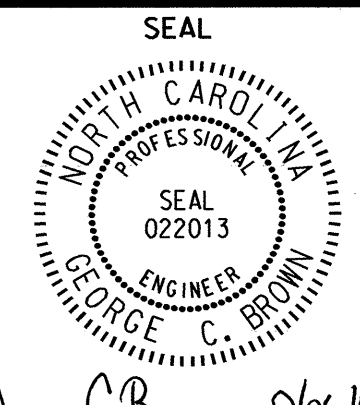
PROGRAMMING COMPLETE

* TIME DEFAULTS TO TIME USED BY PHASE DURING NORMAL OPERATION

NOTE!
PROGRAM EXTEND TIME ON ALL 'OPTICOM' DETECTOR UNITS FOR 2 SEC.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229T2
DESIGNED: March 2010
SEALED: 08/19/10
REVISED:

ELECTRICAL DETAIL - TEMP 2 - SHEET 3 OF 3

	Prepared in the Offices of: US 158 at NC 343 Camden County Camden		
	Division 1 PLAN DATE: July 2010 PREPARED BY: C. Strickland	REVIEWED BY: T. Joyce REVIEWED BY:	
	REVISIONS INIT. DATE	SIGNATURE: <i>George C. Brown</i> DATE: 8/26/10	
	750 N. Greenfield Pkwy, Garner, NC 27529 SIG. INVENTORY NO. 01-0229T2		

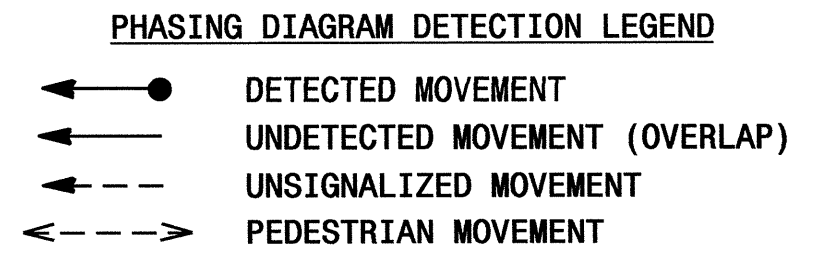
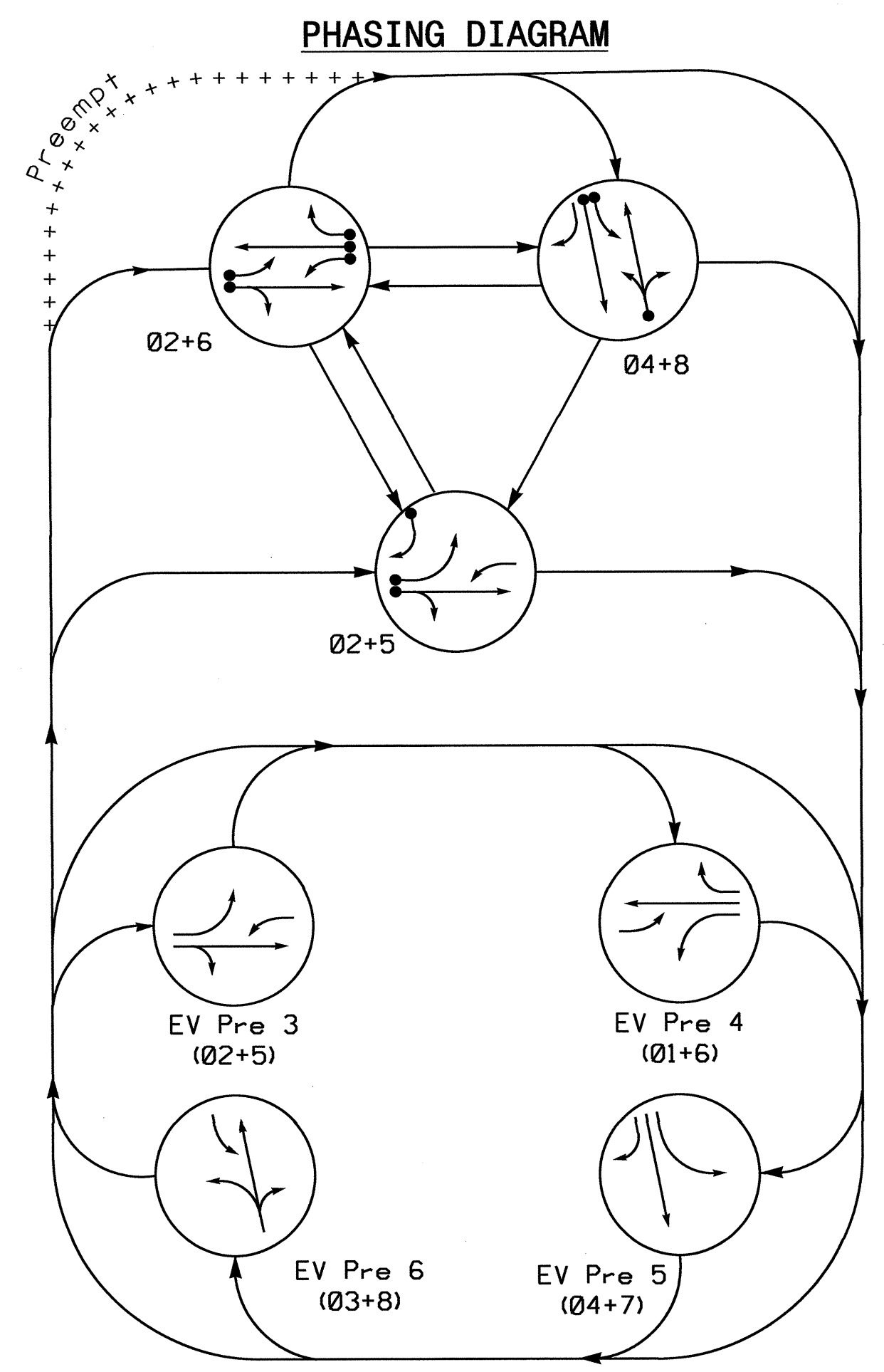
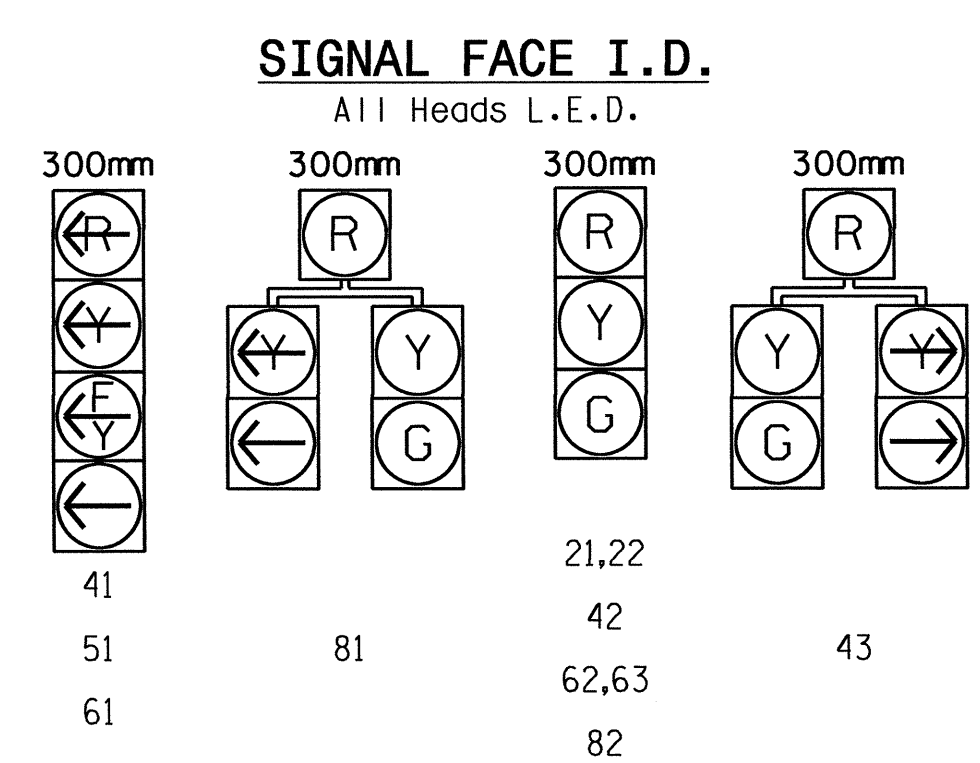


TABLE OF OPERATION

SIGNAL FACE	PHASE							
	02+5	02+6	04+8	04+7	05+6	05+7	06+8	FLASH
21,22	G	G	R	R	R	R	Y	
41	R	R	Y	Y	Y	Y	R	
42	R	R	G	R	G	R	R	
43	R	R	G	R	G	R	R	
51	Y	Y	Y	Y	Y	Y	Y	
61	Y	Y	Y	Y	Y	Y	Y	
62,63	R	G	R	R	G	R	Y	
81	R	R	G	R	R	R	G	
82	R	R	G	R	R	R	G	



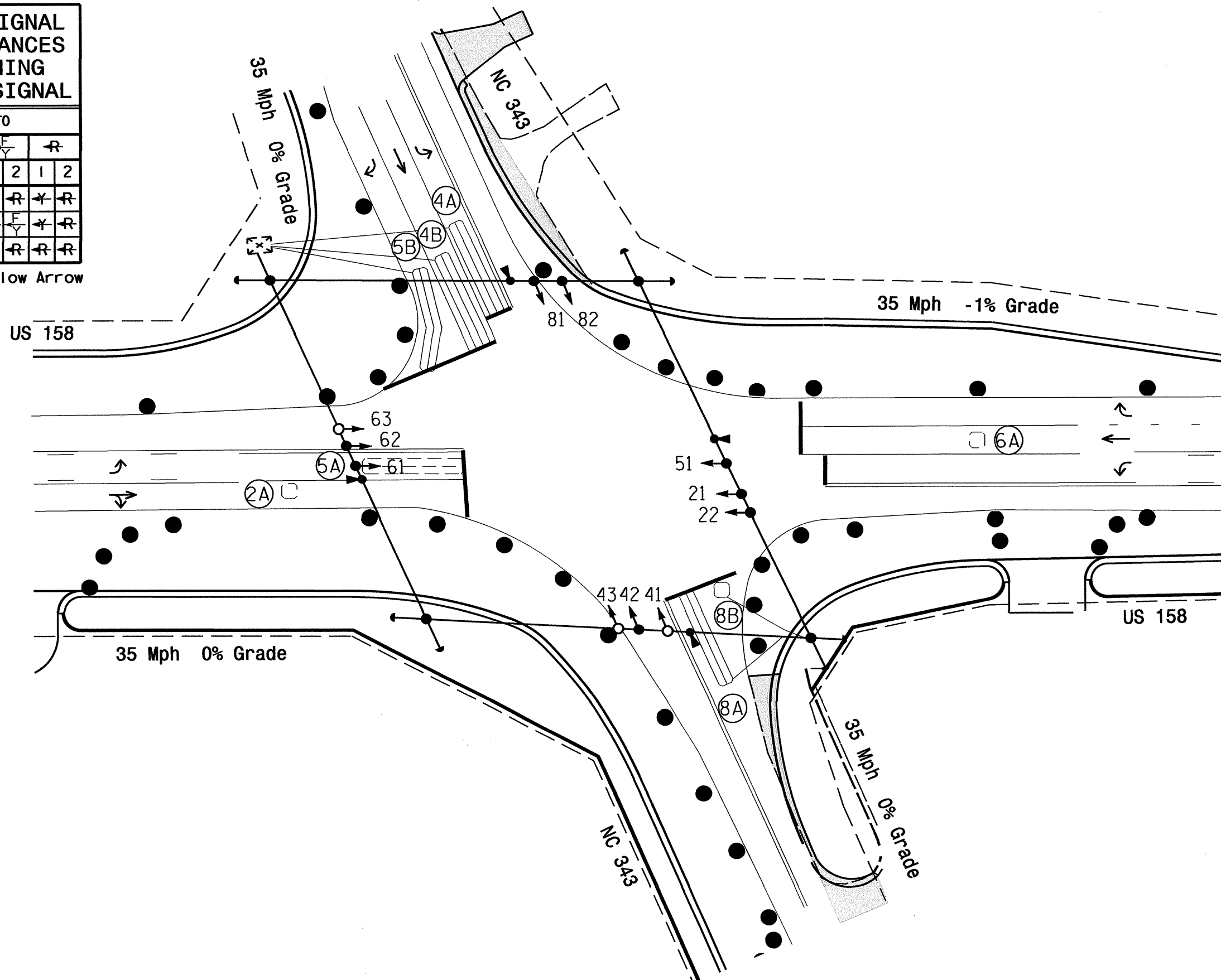
OASIS 2070L LOOP & DETECTOR INSTALLATION

LOOP	INDUCTIVE LOOPS				DETECTOR PROGRAMMING							
	SIZE (M)	TURNS	DISTANCE FROM STOPBAR (M)	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
2A	1.8X1.8	4	20	-	2	Y	Y	-	-	-	-	-
4A	1.8X1.2	2-4-2	0	Y	4	Y	Y	-	-	3	-	-
4B	1.8X1.2	2-4-2	0	Y	4	Y	Y	-	-	-	-	-
5A	1.8X1.2	2-4-2	0	-	5	Y	Y	-	-	15	-	-
5B	1.8X1.2	2-4-2	0	Y	5	Y	Y	-	-	15	-	-
6A	1.8X1.8	4	20	-	6	Y	Y	-	-	-	-	-
8A	1.8X1.2	2-4-2	0	Y	8	Y	Y	-	-	3	-	-
8B	1.8X1.8	4	0	Y	8	Y	Y	-	-	15	-	-

STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO			
	1	2	1	2
1	+	+	+	+
2	+	+	+	+
1	+	+	+	+
2	+	+	+	+

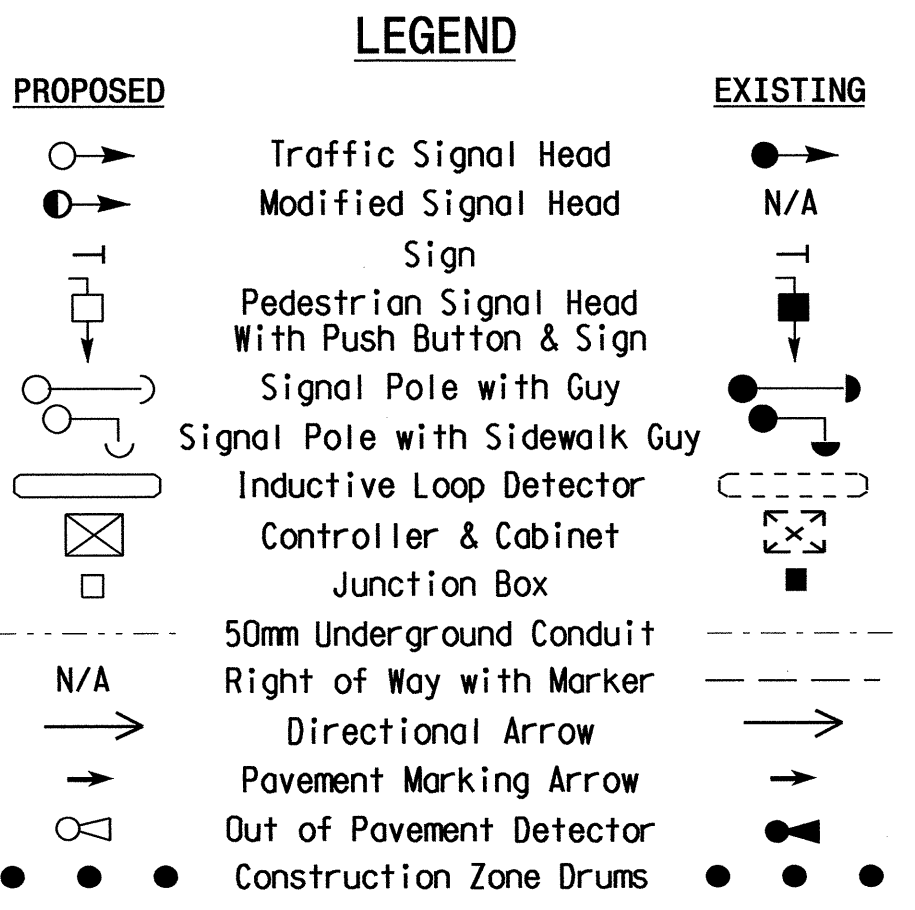
⚡ = Flashing Yellow Arrow



4 Phase W/EV Preemption Fully Actuated Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
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. Reposition signal head number 41.
6. This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.



OASIS 2070L TIMING CHART

FEATURE	PHASE				
	2	4	5	6	8
Min Green 1*	10	7	7	10	7
Extension 1*	3.0	2.0	2.0	3.0	2.0
Max Green 1*	45	35	20	45	35
Yellow Clearance	3.9	3.8	3.0	3.9	3.8
Red Clearance	2.5	2.4	1.6	2.5	2.4
Walk 1*	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation*	-	-	-	-	-
Max Variable Initial*	-	-	-	-	-
Time Before Reduction*	-	-	-	-	-
Time To Reduce*	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

OASIS 2070 EV PREEMPTION

FUNCTION	PRE 3	PRE 4	PRE 5	PRE 6
Interval 1 - Dwell Green	255	255	255	255
Interval 1 - Dwell Yellow	0.0*	3.9	3.8	3.8
Interval 1 - Dwell Red	0.0*	2.5	2.4	2.4
Interval 5 - Exit Green	0	0	0	0
Interval 5 - Yellow	0.0	0.0	0.0	0.0
Interval 5 - Red	0.0	0.0	0.0	0.0
Priority	Medium	Medium	Medium	Medium
Delay Time	0.0	0.0	0.0	0.0
Min Green Before Pre	1	1	1	1
Ped Clear Before Pre	0	0	0	0
Yellow Clear Before Pre	0.0*	0.0*	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*	0.0*	0.0*
Dwell Min Time	7	7	7	7
Enable Backup Protection	N	N	Y	N
Ped Clear Through Yellow	N	N	N	N
Preempt Extend**	2	2	2	2
Omit Overlaps	B	-	-	-

* 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.

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

Signal Upgrade/Temp 3 Phase III

Prepared in the Office of:

US 158 At NC 343

Division 1 Camden County Camden

PLAN DATE: March 2010 REVIEWED BY: [Signature]

PREPARED BY: JPG REVIEWED BY: [Signature]

SCALE: 500:1

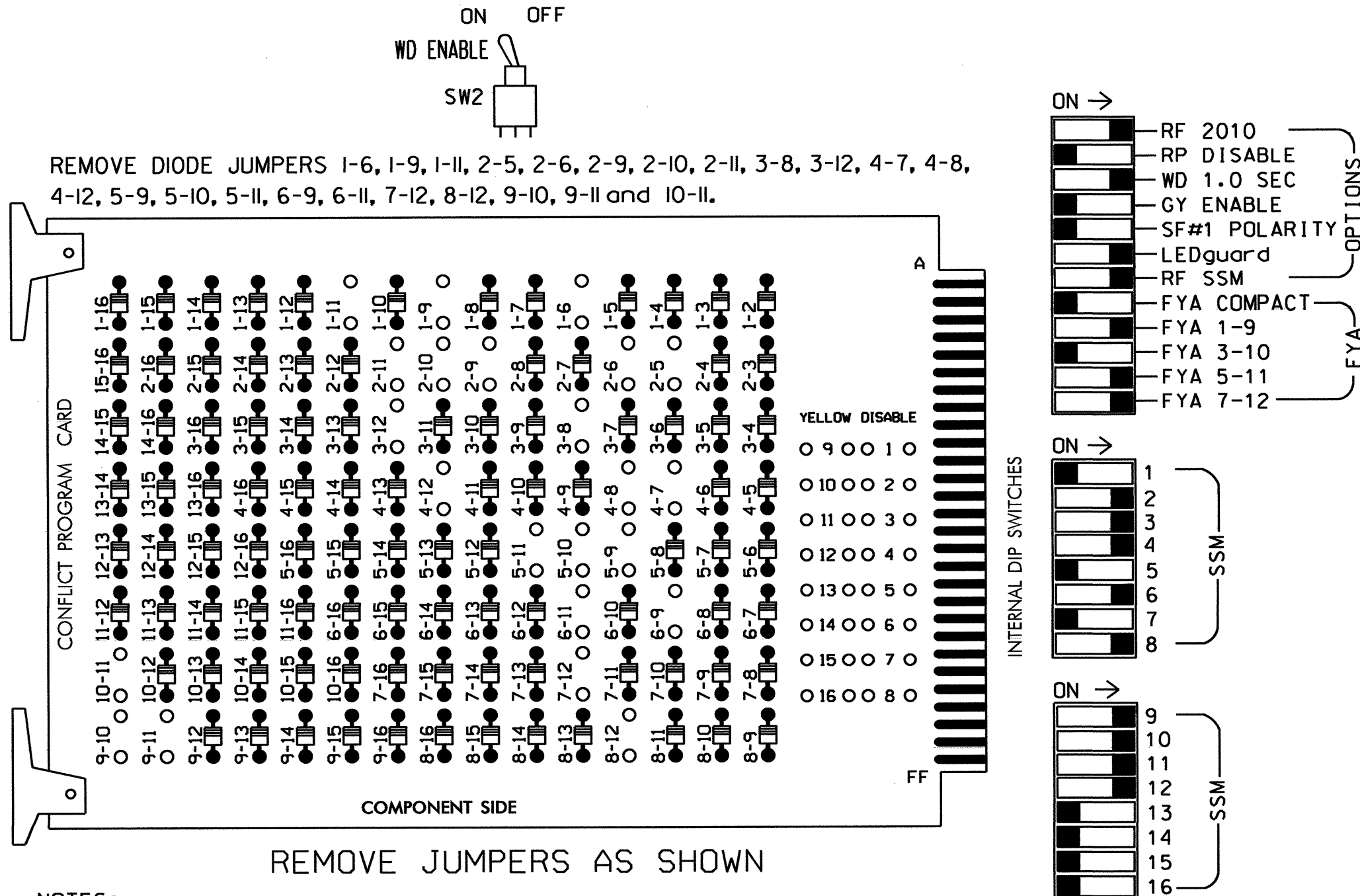
8/10/10

SIG. INVENTORY NO. 01-022973

01-SEP-2010 12:04 S:\TSS\AS\TSS\Sig\01\work\kg\01\p\proj\cts\w-2414B\61\gao\1\01\022973-1\ca_dsn_2010mdd.dgn

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



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

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 Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,5,7,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phases 4 and 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

PREEMPT ONLY PHASE OMIT NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phases 1, 3 and 7 for 'Omit Phase' and Phases 2, 4, 5, 6, and 8 for 'Startup Calls'. This is to prevent Phases 1, 3 and 7 from being served when not in Preempt.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S10,S12,S13
 PHASES USED.....*1,2,*3,4,5,6,*7,8
 OVERLAP "A".....1+2+5
 OVERLAP "B".....5
 OVERLAP "C".....5+6
 OVERLAP "D".....7+8

*PHASES 1, 3 AND 7 USED IN PREEMPT SEQUENCE ONLY

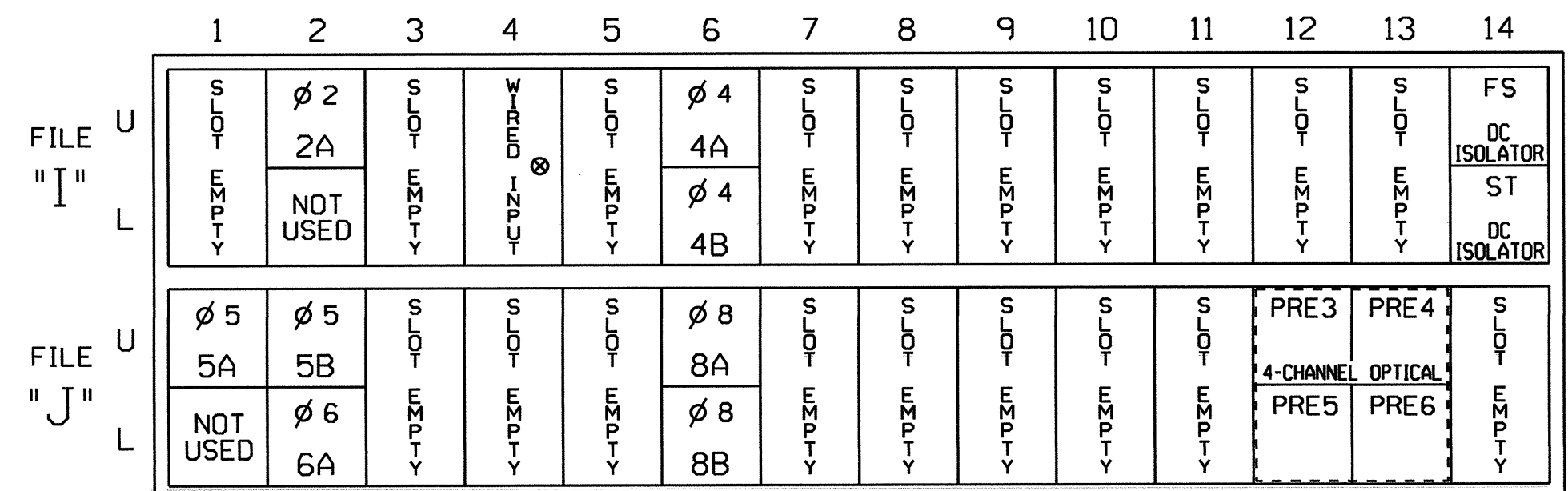
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14		
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE		
SIGNAL HEAD NO.	61*	21,22	NU	81	42,43	NU	51*	62,63	NU	41*	81,82	NU	61*	43	NU	51*	41*	NU		
RED		128		*	101			134			107			*						
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			A116	A103
GREEN ARROW	127				118			133			124					A126				

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

INPUT FILE POSITION LAYOUT

(front view)



INPUT FILE CONNECTION & PROGRAMMING CHART

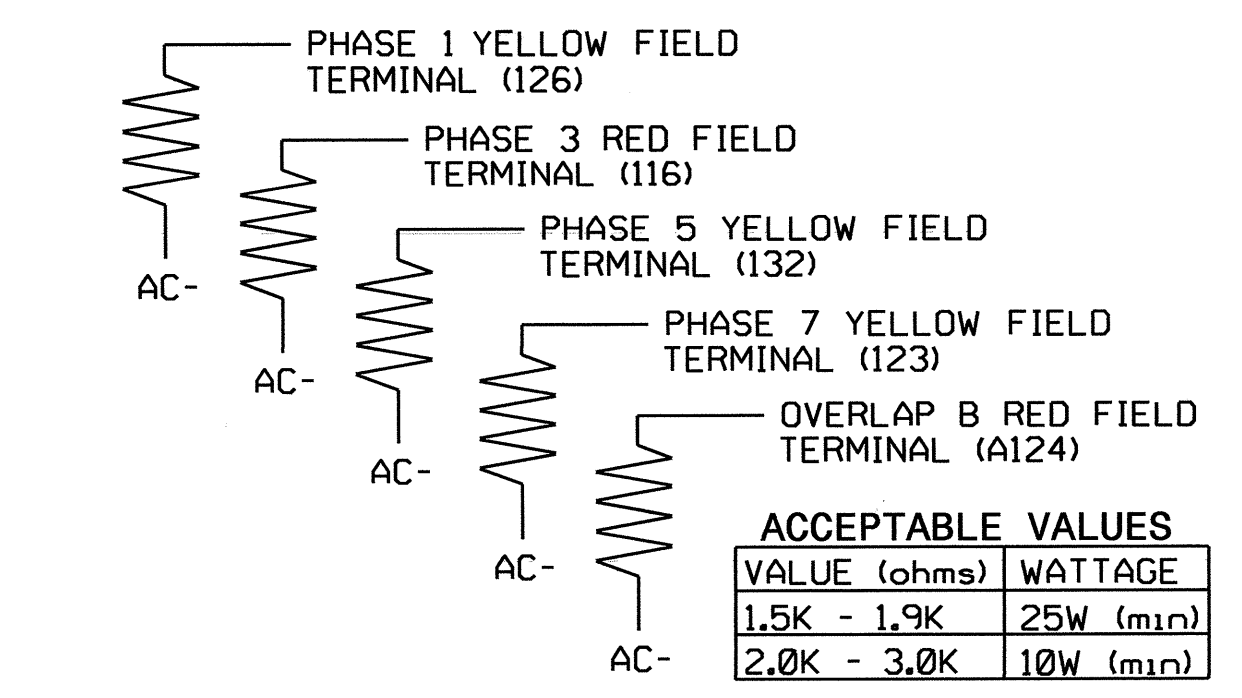
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			15
		I4U	47	9	22	2	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-7,8	J2L	44	6	16	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15

¹Add jumper from J1-W to 14-W, on rear of input file.
 ! IMPORTANT: Remove jumper from 16-F to J5-F, on rear of input file.

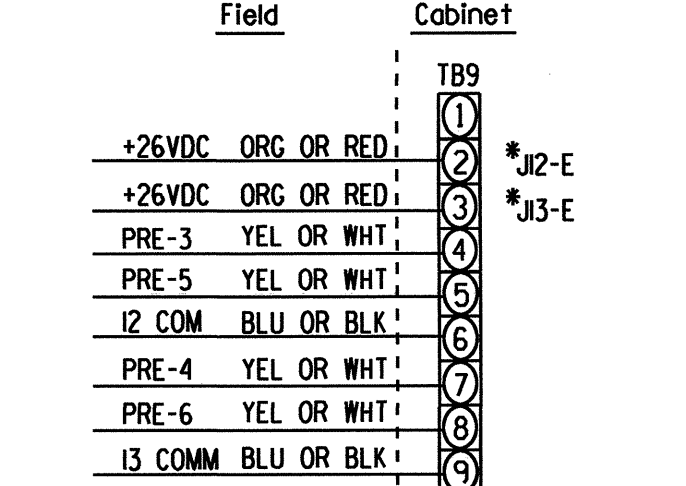
INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

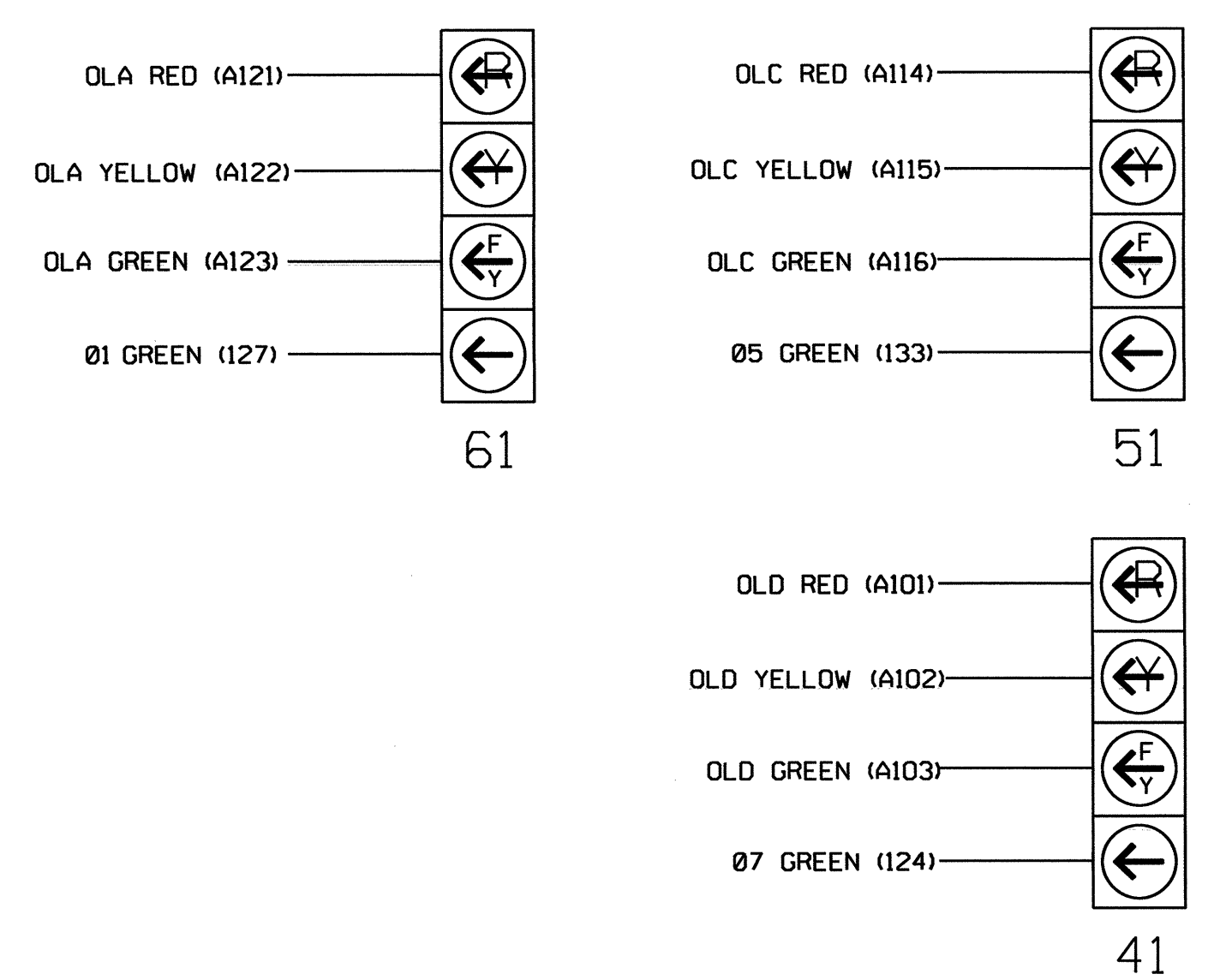


OPTICOM FIELD WIRE DETAIL



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE
 1. The sequence display for these signals require special logic programming. See sheet 2 of 3 for programming instructions.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229T3
 DESIGNED: March 2010
 SEALED: 08/19/10
 REVISED:

ELECTRICAL DETAIL - TEMP 3 - SHEET 1 OF 3

Division 1 Camden County Camden

US 158 at NC 343

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

PLAN DATE: July 2010
 PREPARED BY: C. Strickland

REVIEWED BY: T. J. [Signature]
 REVIEWED BY:

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 GEORGE C. BROWN
 SEAL 022013

REVISIONS

NO.	INIT.	DATE

Signature: George C. Brown 8/27/10
 DATE: 8/27/10
 SEAL

24-AUG-2010, 11:11:55
 S:\TSS\ASSETS\Sig\opt\swm\kg\cupa\sig\MonKStrickland\010229_sml.ele.xxx.dgn
 G:\STRICKLAND

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7, 8 AND 9.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 (EV PRE 4) TO PHASE 2 (HEAD 61).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 61).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 61).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #7 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 (EV PRE 5) TO PHASE 8 (HEAD 41).

LOGICAL I/O COMMAND #8 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 41).

LOGICAL I/O COMMAND #9 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 41).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE
USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 39	=	Overlap D Red
OUTPUT 40	=	Overlap D Yellow
OUTPUT 41	=	Overlap D Green
OUTPUT 42	=	Overlap C Red
OUTPUT 43	=	Overlap C Yellow
OUTPUT 44	=	Overlap C Green
OUTPUT 50	=	Overlap A Red
OUTPUT 51	=	Overlap A Yellow
OUTPUT 52	=	Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+'

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

NOTICE GREEN FLASH

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

DYNAMIC BACK-UP CONTROL PROGRAMMING

(program controller as shown below)

- From Main Menu press '2' (Phase Control), then '1' (Phase Control Functions). Scroll to the bottom of the menu and enable Dynamic/Backup Control Function 1.
- From Phase Control Functions Menu press '2' (Dynamic/Backup Control Functions).

DYNAMIC/BACKUP CONTROL FUNCTION #01
OVERLAPS: ABCDEFGHIJKLMNPO
IF OVERLAPS ARE ACTIVE :
OR PHASES: 12345678910111213141516
IF PHASES ARE ON : X
OMIT PHASES : X
CALL PHASES : X

BACKUP PROTECTION PROGRAMMING COMPLETE

! IMPORTANT: Disable Dynamic/Backup Control Function 1.

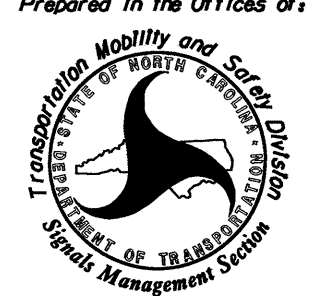
FLASHER CIRCUIT MODIFICATION DETAIL

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

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

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

ELECTRICAL DETAIL - TEMP 3 - SHEET 2 OF 3

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 158 at NC 343	
Division 1	Camden County
PLAN DATE: July 2010	REVIEWED BY: T. J. [Signature]
PREPARED BY: C. Strickland	REVIEWED BY:
REVISIONS	INIT. DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 022013
GEOURGE C. BROWN
[Signature]
DATE 8/27/10
SIG. INVENTORY NO. 01-0229T3

24-AUG-2010 11:20
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0229T3.dgn

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' as needed to advance to Preempts 3, 4, 5 and 6.

PREEMPTION #3	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)....	1
PED CLEAR BEFORE PRE (0= DEFAULT)....	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)....	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN)	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	X
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #4	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 3.9 2.5	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)....	1
PED CLEAR BEFORE PRE (0= DEFAULT)....	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)....	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN)	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #5	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 3.8 2.4	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)....	1
PED CLEAR BEFORE PRE (0= DEFAULT)....	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)....	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN)	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #6	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 3.8 2.4	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)....	1
PED CLEAR BEFORE PRE (0= DEFAULT)....	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)....	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN)	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	N
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

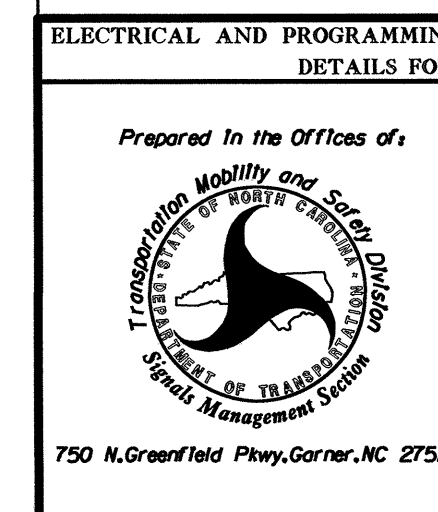
PROGRAMMING COMPLETE

* TIME DEFAULTS TO TIME USED BY PHASE DURING NORMAL OPERATION

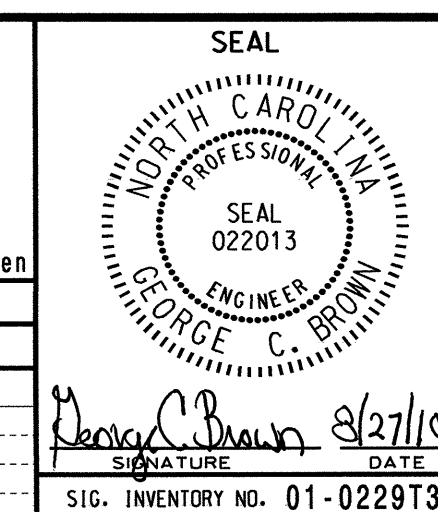
NOTE!
PROGRAM EXTEND TIME ON ALL 'OPTICOM' DETECTOR UNITS FOR 2 SEC.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229T3
DESIGNED: March 2010
SEALED: 08/19/10
REVISED:

ELECTRICAL DETAIL - TEMP 3 - SHEET 3 OF 3

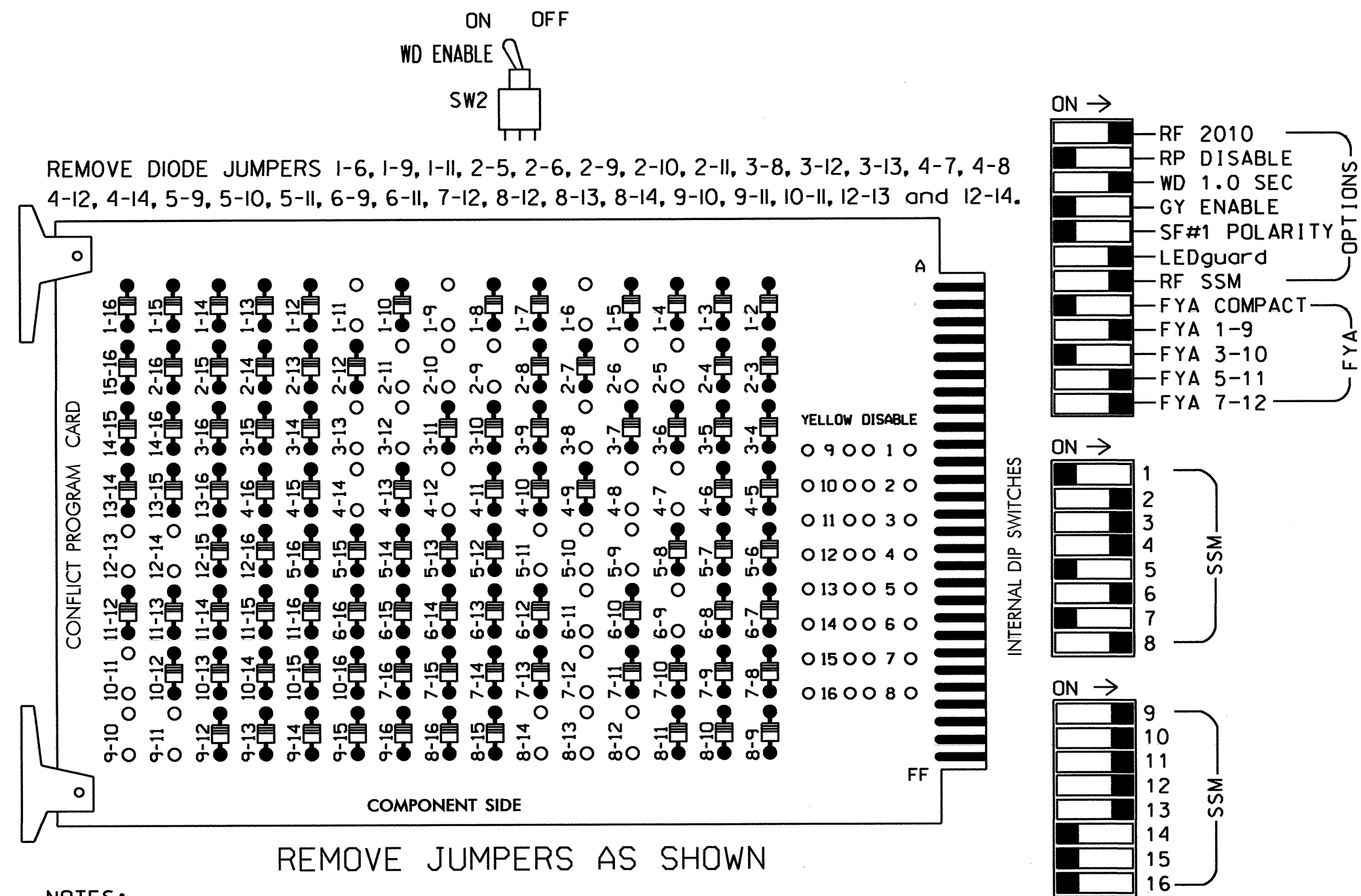


US 158 at NC 343	
Division 1	Camden County
Camden	Camden
PLAN DATE: July 2010	REVIEWED BY: T. Jope
PREPARED BY: C. Strickland	REVIEWED BY:
REVISIONS	INIT. DATE



EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



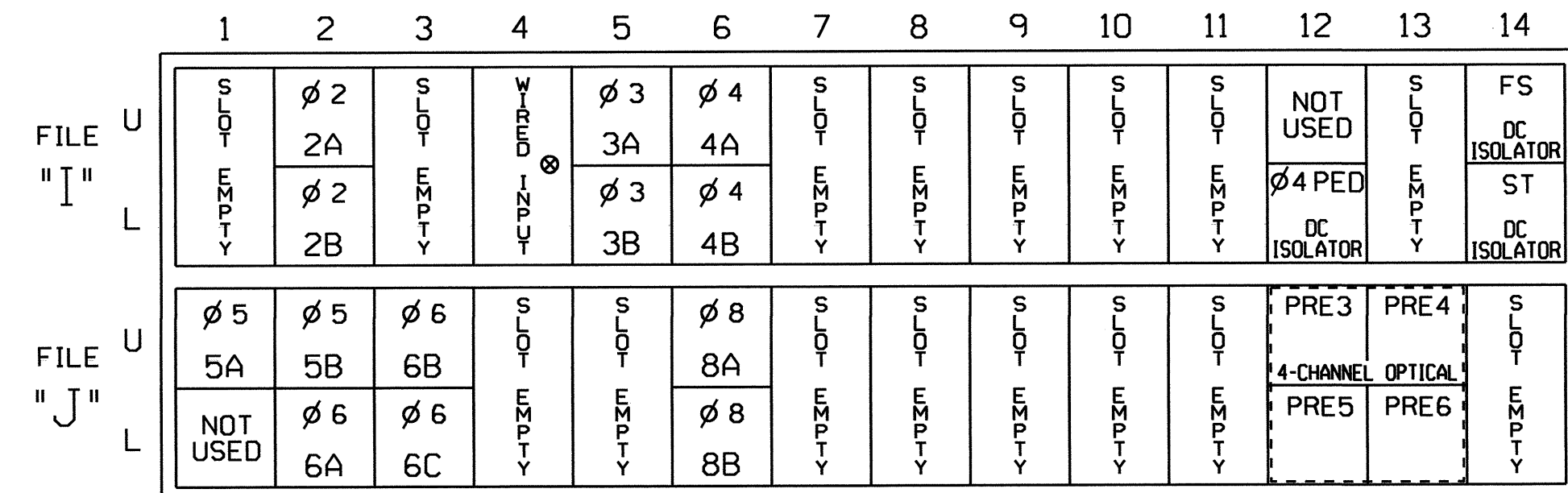
REMOVE JUMPERS AS SHOWN

NOTES:

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

INPUT FILE POSITION LAYOUT

(front view)

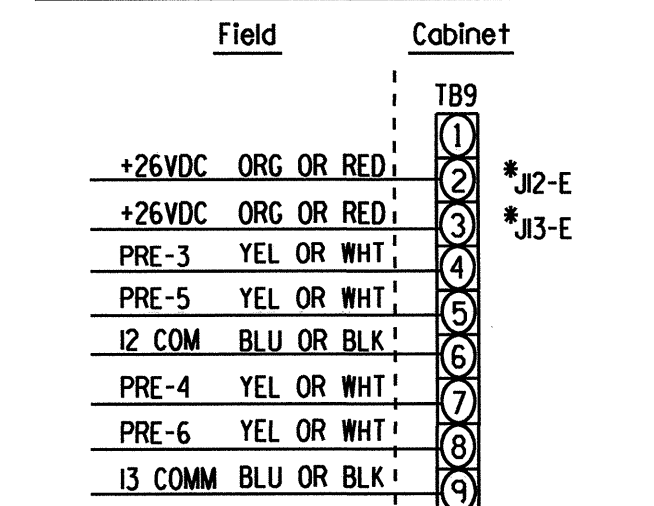


EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

OPTICOM FIELD WIRE DETAIL



*Assuming TB9-2 & TB9-3 are unused on the J File, move wires on J1-J & J1-K (Twisted Pair) to J2-E & J3-E respectively.

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 Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,5, 7,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Program phase 8 for Dual Entry.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phase 4 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.

PREEMPT ONLY PHASE OMIT NOTE

(program controller as shown below)

From Main Menu press '2' (Phase Control). Then '1' (Phase Control Functions). Program Phases 1 and 7 for 'Omit Phase' and Phases 2, 3, 4, 5, 6, and 8 for 'Startup Calls'. This is to prevent Phases 1 and 7 from being served when not in Preempt.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S7,S8,S9,
 S10,S12,S13
 PHASES USED.....*1,2,3,4,4 PED,5,6,*7,8
 OVERLAP "A".....1+2+5
 OVERLAP "B".....5
 OVERLAP "C".....5+6
 OVERLAP "D".....3+7+8
 OVERLAP "E".....3

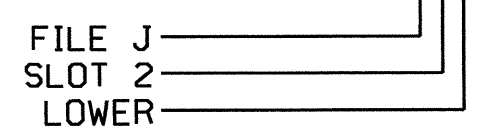
*PHASES 1 AND 7 USED IN PREEMPT SEQUENCE ONLY

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-7,8	I5L	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			15
		I4U	47	9	22	2	Y	Y	Y		3
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
6A	TB3-7,8	J2L	44	6	16	6	Y	Y			
6B	TB3-9,10	J3U	64	26	36	6	Y	Y			
6C	TB3-11,12	J3L	77	39	46	6	Y	Y	Y		3
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			3
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			15
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	31	PED 4	4 PED					

¹Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



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.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	OLE	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	61*	21,22	22*	31,32	42,43	P41, P42	51*	62,63	NU	41*	81,82	NU	61*	43	NU	51*	41*	NU
RED		128	*		101			134			107			*				
YELLOW	*	129	**		102		*	135		*	108							
GREEN		130			103			136			109							
RED ARROW					116								A121			A114	A101	
YELLOW ARROW				114	117								A122	A125		A115	A102	
FLASHING YELLOW ARROW													A123			A116	A103	
GREEN ARROW	127		115	118			133			124				A126				
Hand icon							104											
Foot icon							106											

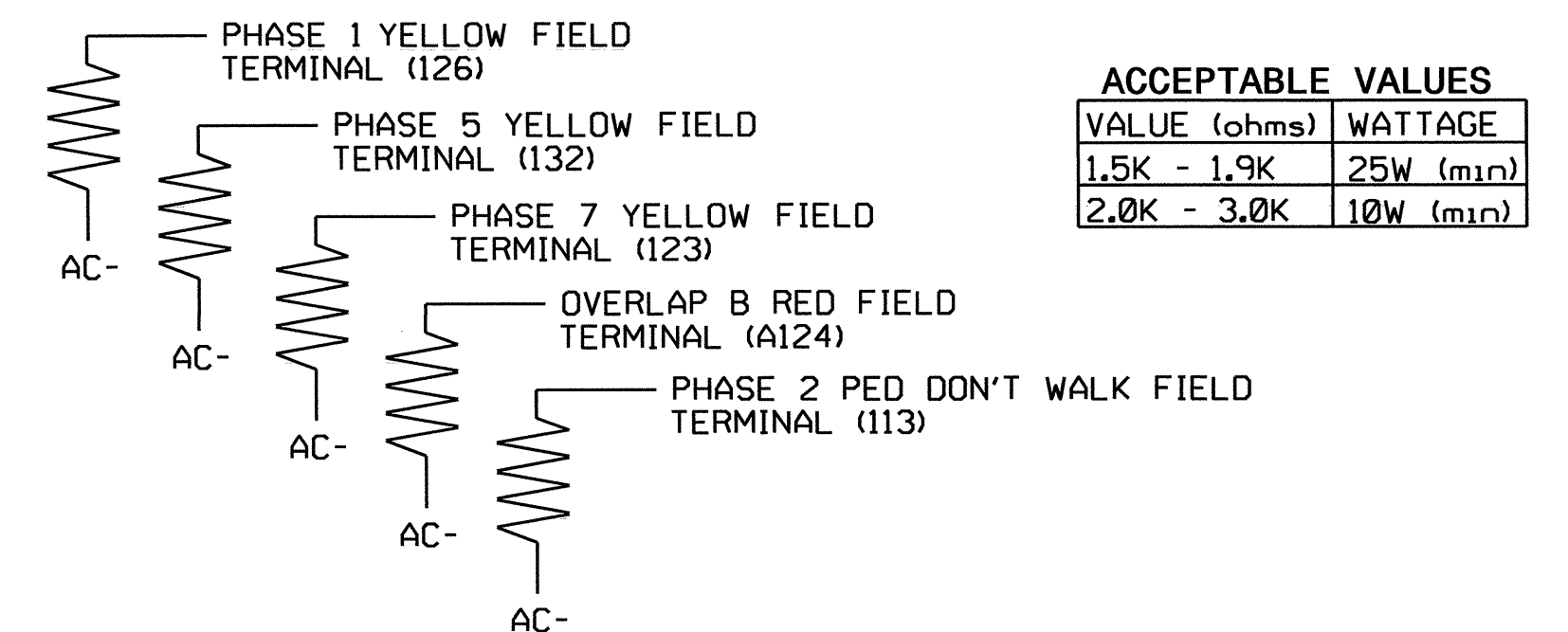
NU = Not Used

* Denotes install load resistor. See Load Resistor Installation Detail this sheet.

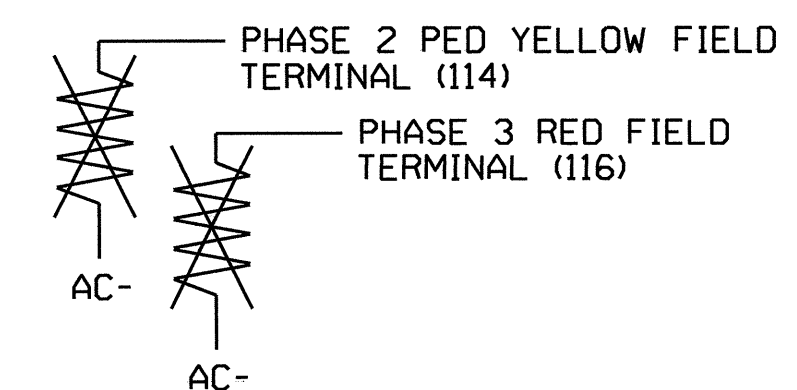
** If present, remove existing load resistor. See Load Resistor Removal Detail this sheet.

* See pictorial of head wiring on detail sheet 2 of 5.

LOAD RESISTOR INSTALLATION DETAIL



LOAD RESISTOR REMOVAL DETAIL



NOTE: If present, remove existing load resistor.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229
 DESIGNED: March 2010
 SEALED: 08/26/10
 REVISED:

ELECTRICAL DETAIL - FINAL - SHEET 1 OF 5

Prepared in the Office of:

 TRANSPORTATION MOBILITY AND SAFETY
 DIVISION OF TRANSPORTATION
 SIGNAL MANAGEMENT SECTION
 750 N. Greenfield Pkwy, Garner, NC 27529

US 158 at NC 343
 Division 1
 Camden County
 Camden

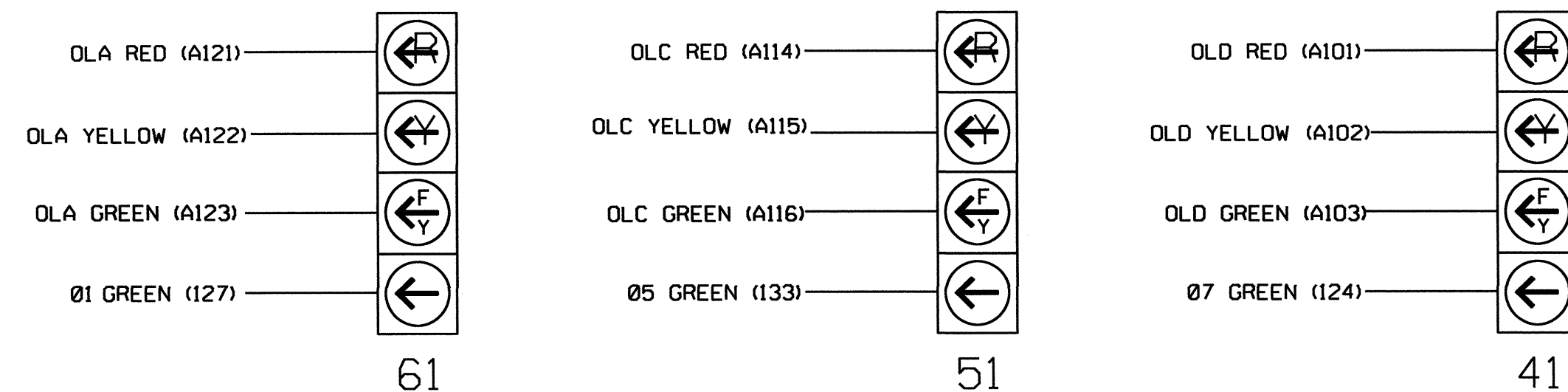
PLAN DATE: July 2010
 REVIEWED BY: T. J. J...
 PREPARED BY: C. Strickland
 REVIEWED BY:

REVISIONS: INIT. DATE

SEAL
 NORTH CAROLINA
 PROFESSIONAL ENGINEER
 SEAL 022013
 GORGE C. BROWN
 DATE
 SIGNATURE
 DATE
 SIG. INVENTORY NO. 01-0229

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

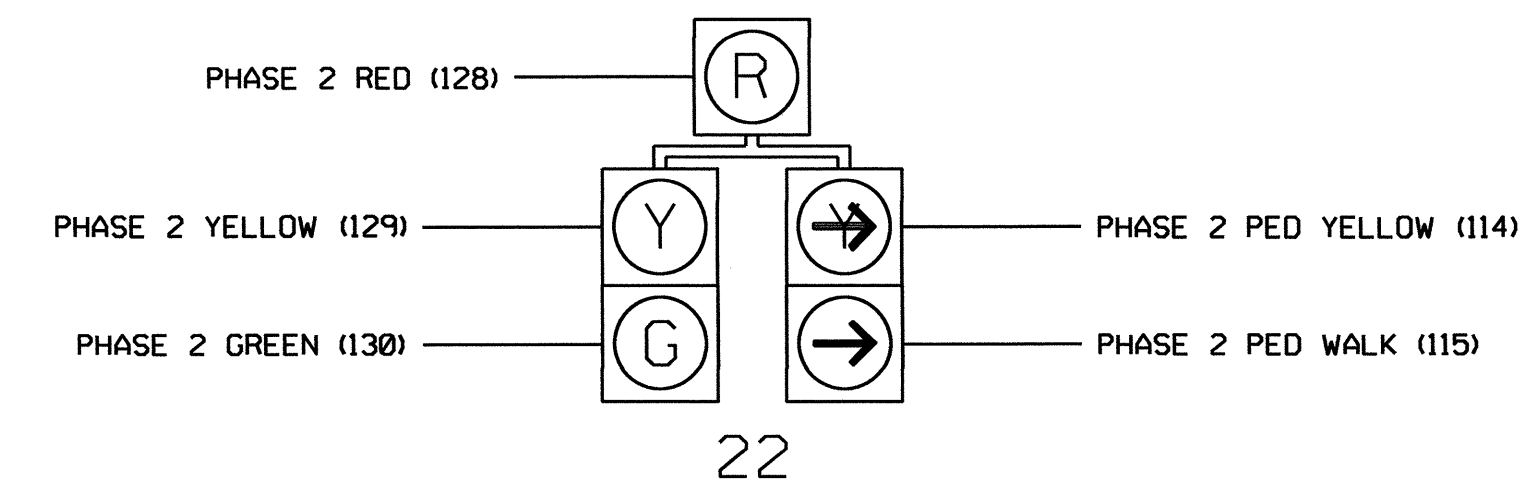
(wire signal heads as shown)



NOTE

1. The sequence display for these signals require special logic programming. See sheet 4 of 5 for programming instructions.

OVERLAP 'E' (SIGNAL HEAD 22) WIRING DETAIL



NOTE:

1. See 'Overlap E (Signal Head 22) Wiring & Programming Instructions' notes on this sheet.

OVERLAP 'E' (SIGNAL HEAD 22) WIRING & PROGRAMMING INSTRUCTIONS

1. Install load switch in slot 'S2P'. (See 'Signal Head Hook-up Chart' on sheet 1).
2. If present, remove existing factory-installed load resistor from Ped Yellow field terminal 114.
3. Ensure installation of load resistor on 2 Ped Don't Walk field terminal 113. (See 'Load Resistor Installation Detail' sheet 1 of 5).
4. Add a jumper wire from rear of the card edge connector of the conflict monitor from pin 8 (channel 13 yellow) to signal head field terminal 114 (S2P yellow).
(channel 13 yellow) pin 8 ----- field terminal 114 (S2P yellow)
5. Ensure Output Assignments for Overlap 'E' are programmed as shown in details sheet 3 of 5.
6. Ensure Overlap 'E' is programmed as shown on Overlap programming Detail sheet 4 of 5.
7. Ensure PRE6 (EVP 6) is programmed to omit Overlap 'E'. (See 'Emergency Vehicle Preemption Programming Detail' sheet 5 of 5).

FLASHER CIRCUIT MODIFICATION DETAIL

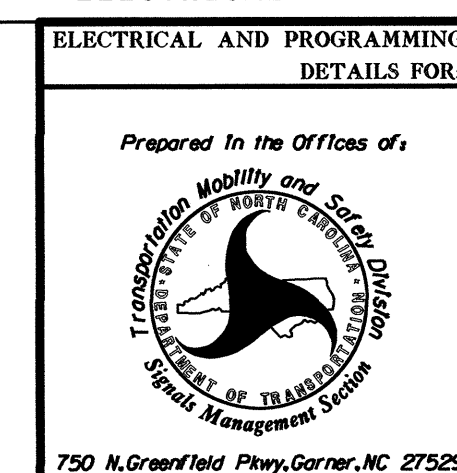
IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

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.

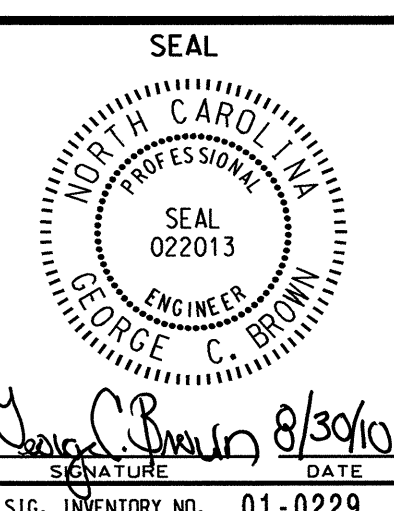
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

ELECTRICAL DETAIL - FINAL - SHEET 2 OF 5

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229
DESIGNED: March 2010
SEALED: 08/26/10
REVISED:



US 158 at NC 343	
Division 1 Camden County Camden	Camden
PLAN DATE: July 2010	REVIEWED BY: T. Jyp
PREPARED BY: C. Strickland	REVIEWED BY:
REVISIONS	INIT. DATE



SIG. INVENTORY NO. 01-0229

"2 PED" to OVERLAP "E" OUTPUT ASSIGNMENT PROGRAMMING DETAIL *(program controller as shown below)*

- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS).
- WITH CURSOR IN "OUTPUT ASSIGNMENT #" FIELD, USE + KEY TO FIND THE OUTPUT ASSIGNMENT NUMBER 9, AS SHOWN BELOW.
- PROGRAM CONTROLLER AS SHOWN:

```

PAGE:1 C1 PIN:10 PEDESTRIAN PHASE
OUTPUT ASSIGNMENT #.....9
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID, 1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

EXISTING DEFAULT ENTRY

```

PAGE:1 C1 PIN:10 PEDESTRIAN PHASE
SELECT VEHICLE OVERLAP (A=1, P=16)...5
SELECT COLOR (O=RED,1=YEL,2=GRN)...0
    
```

WHEN A "Y" IS ENTERED FOR "VEHICLE OVERLAP" THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS ENTER AFTER ENTERING DATA, THEN ESC.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS "VEHICLE OVERLAP" AS SHOWN BELOW:

```

PAGE:1 C1 PIN:10 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....9
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID, 1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

VEHICLE OVERLAP E (RED) LOAD SWITCH S2P

- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS).
- WITH CURSOR IN "OUTPUT ASSIGNMENT #" FIELD, USE + KEY TO FIND THE OUTPUT ASSIGNMENT NUMBER 10, AS SHOWN BELOW.
- PROGRAM CONTROLLER AS SHOWN:

```

PAGE:1 C1 PIN:11 PEDESTRIAN PHASE
OUTPUT ASSIGNMENT #.....10
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID, 1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

EXISTING DEFAULT ENTRY

```

PAGE:1 C1 PIN:11 PEDESTRIAN PHASE
SELECT VEHICLE OVERLAP (A=1, P=16)...5
SELECT COLOR (O=RED,1=YEL,2=GRN)...2
    
```

WHEN A "Y" IS ENTERED FOR "VEHICLE OVERLAP" THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS ENTER AFTER ENTERING DATA, THEN ESC.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS "VEHICLE OVERLAP" AS SHOWN BELOW:

```

PAGE:1 C1 PIN:11 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....10
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID, 1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

VEHICLE OVERLAP E (GREEN) LOAD SWITCH S2P

- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS).
- WITH CURSOR IN "OUTPUT ASSIGNMENT #" FIELD, USE + KEY TO FIND THE OUTPUT ASSIGNMENT NUMBER 33, AS SHOWN BELOW.
- PROGRAM CONTROLLER AS SHOWN:

```

PAGE:1 C1 PIN:35 NOT ENABLED
OUTPUT ASSIGNMENT #.....33
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID, 1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....Y
VEHICLE PHASE.....Y
PEDESTRIAN PHASE.....Y
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....Y
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

EXISTING DEFAULT ENTRY

```

PAGE:1 C1 PIN:35 NOT ENABLED
SELECT VEHICLE OVERLAP (A=1, P=16)...5
SELECT COLOR (O=RED,1=YEL,2=GRN)...1
    
```

WHEN A "Y" IS ENTERED FOR "VEHICLE OVERLAP" THE SCREEN SHOWN ABOVE WILL APPEAR. ENTER DATA AS SHOWN. PRESS ENTER AFTER ENTERING DATA, THEN ESC.

DISPLAY WILL NOW SHOW THE SPECIFIED OUTPUT ASSIGNED AS "VEHICLE OVERLAP" AS SHOWN BELOW:

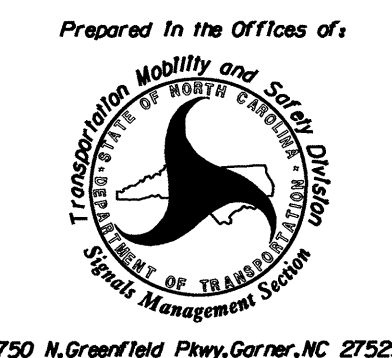
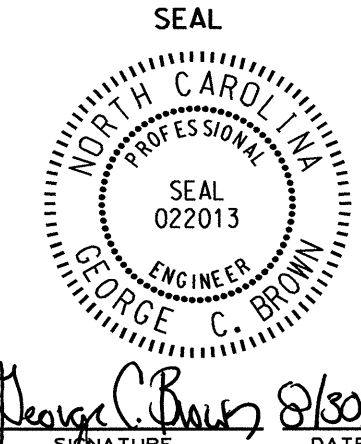
```

PAGE:1 C1 PIN:35 VEHICLE OVERLAP
OUTPUT ASSIGNMENT #.....33
FREQUENCY (O=DEFAULT) (0-25.5 HZ)...0.0
DUTY CYCLE (O=DEFAULT) (0 - 100%)...0
MODE (O=SOLID, 1=FLASH).....0
SELECT ASSIGNMENT:
NOT ENABLED.....
VEHICLE PHASE.....
PEDESTRIAN PHASE.....
VEHICLE OVERLAP.....Y
PEDESTRIAN OVERLAP.....
WATCHDOG.....
DETECTOR RESET.....
ADVANCE BEACON.....
OUT OF PHASE FLASHER.....
CONTROLLER FLASH.....
RUN FREE.....
RESERVED.....
PREEMPT.....
SOFT PREEMPT.....
ANY PREEMPT.....
COORDINATION PLAN.....
OFFSET.....
PHASE CHECK.....
PHASE ON.....
PHASE NEXT.....
    
```

VEHICLE OVERLAP E (YELLOW) LOAD SWITCH S2P

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229
DESIGNED: March 2010
SEALED: 08/26/10
REVISED:

ELECTRICAL DETAIL - FINAL - SHEET 3 OF 5

	<p>US 158 at NC 343</p> <p>Division 1 Camden County Camden</p> <p>PLANNED BY: March 2010 REVIEWED BY: <i>T. Jager</i></p> <p>PREPARED BY: C. Strickland REVIEWED BY:</p>	<p>SEAL</p> 										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE							<p><i>George C. Brown</i></p> <p>_____ SIGNATURE DATE</p> <p>SIG. INVENTORY NO. 01-0229</p>	
REVISIONS	INIT.	DATE										

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, 6, 7, 8 AND 9.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON
AND RED CLEAR ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #50 ON
SET OUTPUT ASSIGNMENT #51 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 (EV PRE 4) TO PHASE 2 (HEAD 61).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #52 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 61).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #1 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #51 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 61).

LOGICAL I/O COMMAND #4 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #5 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #6 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #7 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON
AND RED CLEAR ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #39 ON
SET OUTPUT ASSIGNMENT #40 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 (EV PRE 5) TO PHASE 8 (HEAD 41).

LOGICAL I/O COMMAND #8 (+/-COMMAND#)
IF ACTIVE PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #41 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 41).

LOGICAL I/O COMMAND #9 (+/-COMMAND#)
IF YELLOW ON PHASE #7 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #40 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 41).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE	
USE TO INTERPRET LOGIC PROCESSOR	
OUTPUT 39 =	Overlap D Red
OUTPUT 40 =	Overlap D Yellow
OUTPUT 41 =	Overlap D Green
OUTPUT 42 =	Overlap C Red
OUTPUT 43 =	Overlap C Yellow
OUTPUT 44 =	Overlap C Green
OUTPUT 50 =	Overlap A Red
OUTPUT 51 =	Overlap A Yellow
OUTPUT 52 =	Overlap A Green

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

- FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: :XX X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : X XX
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

← NOTICE GREEN FLASH

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'E' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: : X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

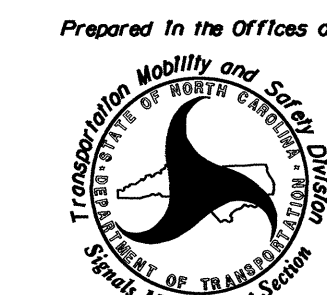
OVERLAP PROGRAMMING COMPLETE

ELECTRICAL DETAIL - FINAL - SHEET 4 OF 5

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 01-0229
DESIGNED: March 2010
SEALED: 08/26/10
REVISED:

ELECTRICAL AND PROGRAMMING DETAILS FOR:

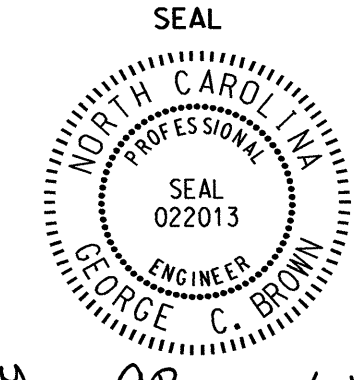
Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

US 158 at NC 343	
Division 1	Camden County
PLANNED BY: July 2010	REVIEWED BY: T. J. J...
PREPARED BY: C. Strickland	REVIEWED BY:
REVISIONS	INIT. DATE

SEAL



GEORGE C. BROWN
ENGINEER
022013

SIGNATURE: *George C. Brown* DATE: _____

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' as needed to advance to Preempts 3, 4, 5 and 6.

PREEMPTION #3	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN) ...	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	Y
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	X

PRESS 'NEXT'

PREEMPTION #4	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 4.9 1.8	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN) ...	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	Y
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #5	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 3.8 3.1	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN) ...	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	Y
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	

PRESS 'NEXT'

PREEMPTION #6	SETTINGS (NEXT:1-10)
INTERVAL/TIMING	CLEAR/DWELL PHASES
GRN YEL RED	12345678910111213141516
1 255 0.0* 0.0*	X X
2 0 0.0 0.0	
3 0 0.0 0.0	
4 0 0.0 0.0	
5 0 0.0 0.0	

EXIT CALLS	OPTIONS
PRIORITY (Y/N TO SELECT)	MED
DELAY TIMER (0-255 SEC)	0
MIN GREEN BEFORE PRE (0= DEFAULT)...	1
PED CLEAR BEFORE PRE (0= DEFAULT)...	0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)...	0.0*
DWELL MIN TIMER (0-255 SEC)	7
DWELL MAX TIMER (0=OFF,1-255MIN) ...	0
DWELL HOLD-OVER TIMER (0-255)	0
LATCH CALL?	N
LINK TO NEXT PREEMPT?	N
ENABLE BACKUP PROTECTION?	N
HOLD CLEAR 1 PHASES DURING DELAY? ..	N
FAST GREEN FLASH DWELL PHASES?	N
PED CLEARANCE THROUGH YELLOW?	Y
INHIBIT OVERLAP GREEN EXTENSION? ..	N
SERVICE DURING SOFTWARE FLASH?	N
REST IN RED DURING DWELL INTERVAL? ..	N
FLASH DWELL INTERVAL?	N
ALLOW PDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	
OMIT OVERLAPS:	X



PROGRAMMING COMPLETE

* TIME DEFAULTS TO TIME USED BY PHASE DURING NORMAL OPERATION

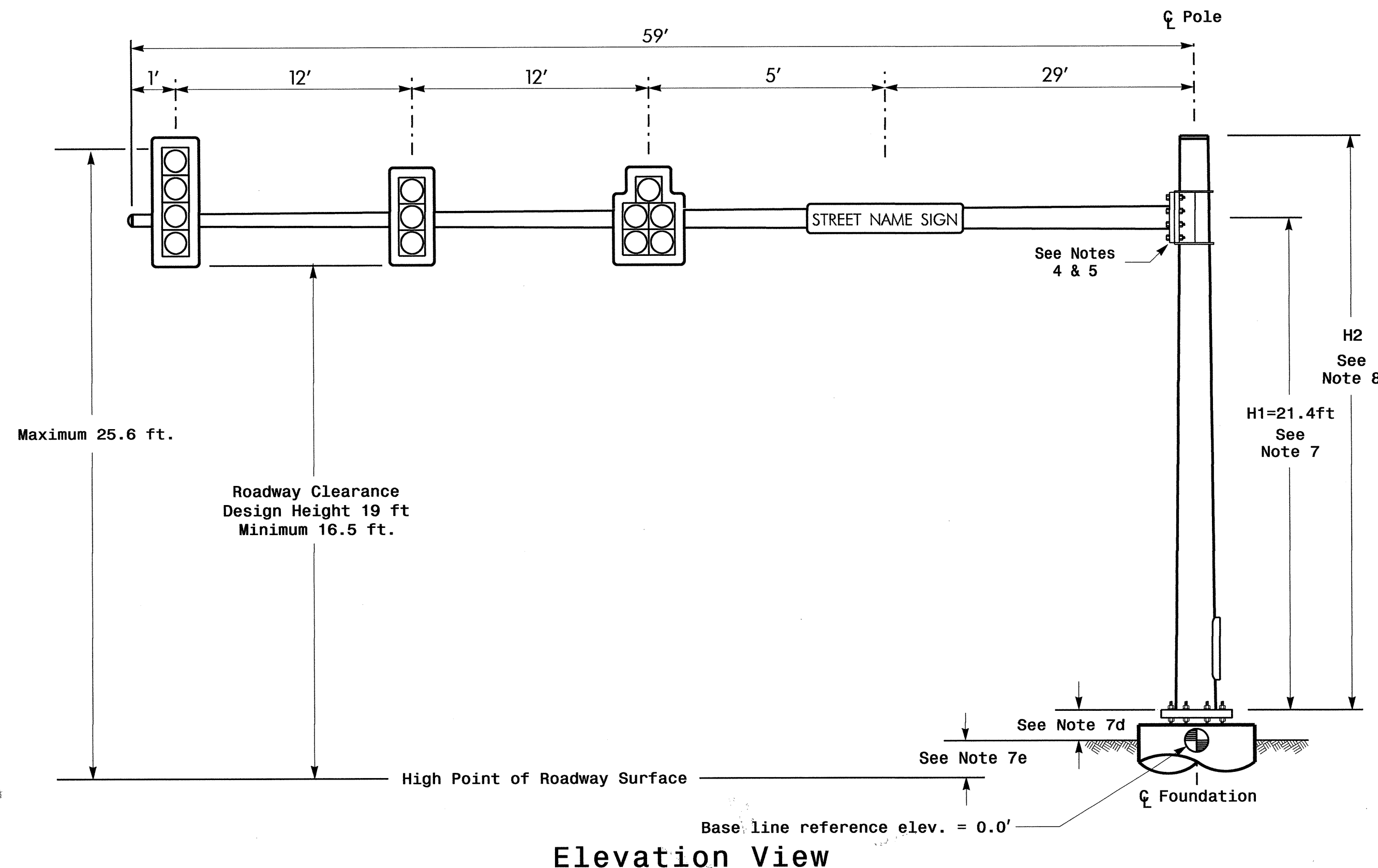
NOTE!
PROGRAM EXTEND TIME ON ALL 'OPTICOM' DETECTOR UNITS FOR 2 SEC.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0229
DESIGNED: March 2010
SEALED: 08/26/10
REVISED:

ELECTRICAL DETAIL - FINAL - SHEET 5 OF 5

	US 158 at NC 343		
	Division 1 PLAN DATE: July 2010 PREPARED BY: C. Strickland	Reviewed By: T. Joffe REVIEWED BY:	
REVISIONS INIT. DATE	INIT. DATE	INIT. DATE	SIGNATURE: <i>George C. Brown</i> DATE:
750 N. Greenfield Pkwy, Garner, NC 27529			SIG. INVENTORY NO. 01-0229

Design Loading for METAL POLE NO. 3



Elevation View

SPECIAL NOTE

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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 3	Pole 4
Baseline reference point at Φ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.4 ft.	+0.4 ft.
Elevation difference at Edge of travelway or face of curb	NA	NA

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

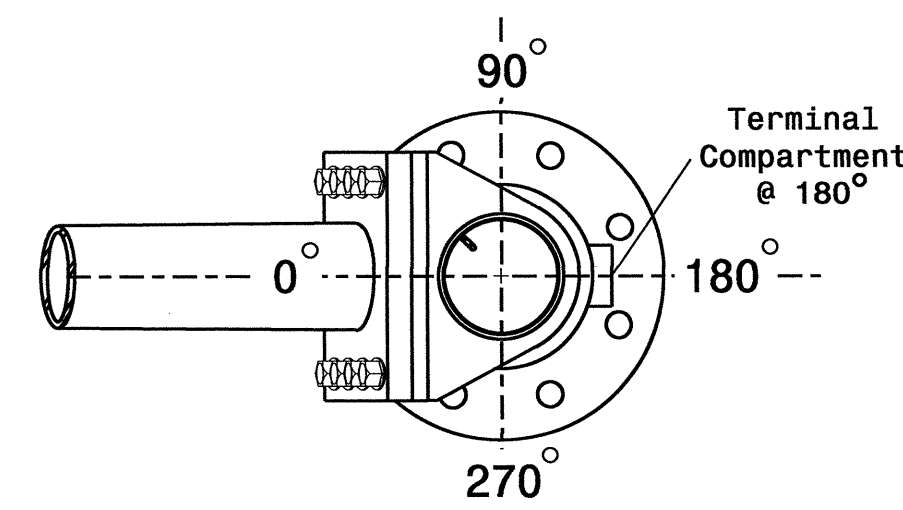
NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

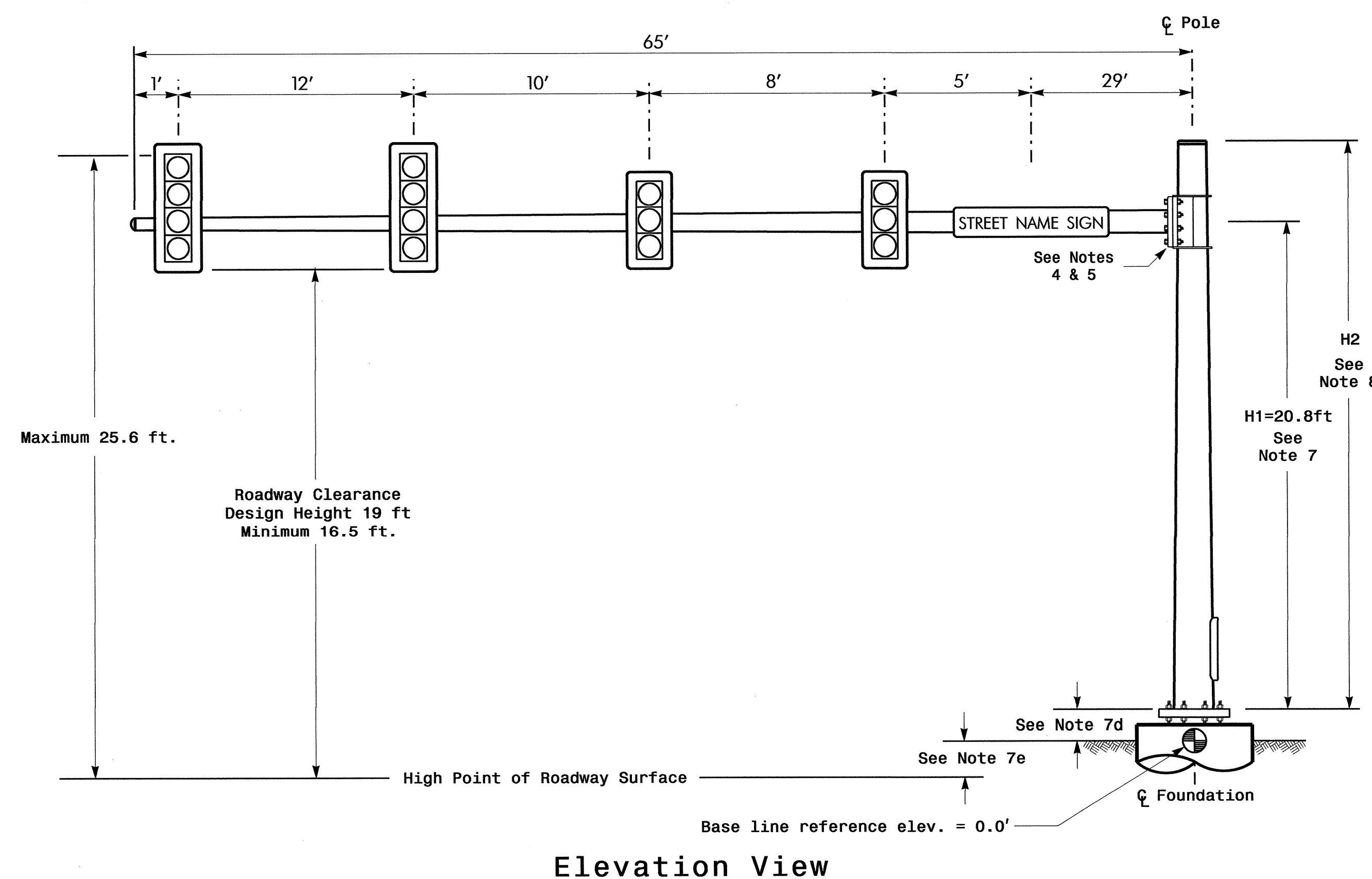
Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for 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.
- 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.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- 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.
- 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

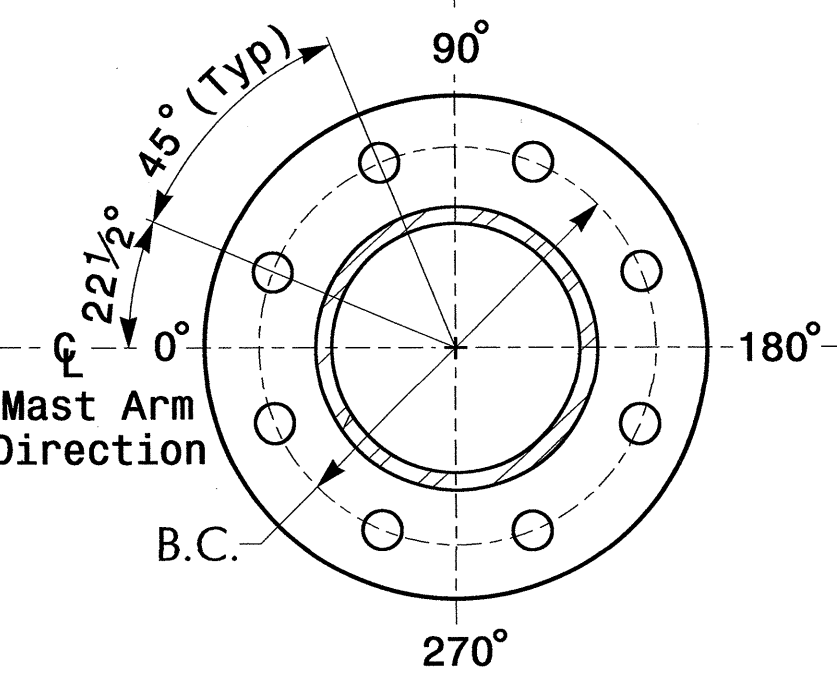


POLE RADIAL ORIENTATION

Design Loading for METAL POLE NO. 4

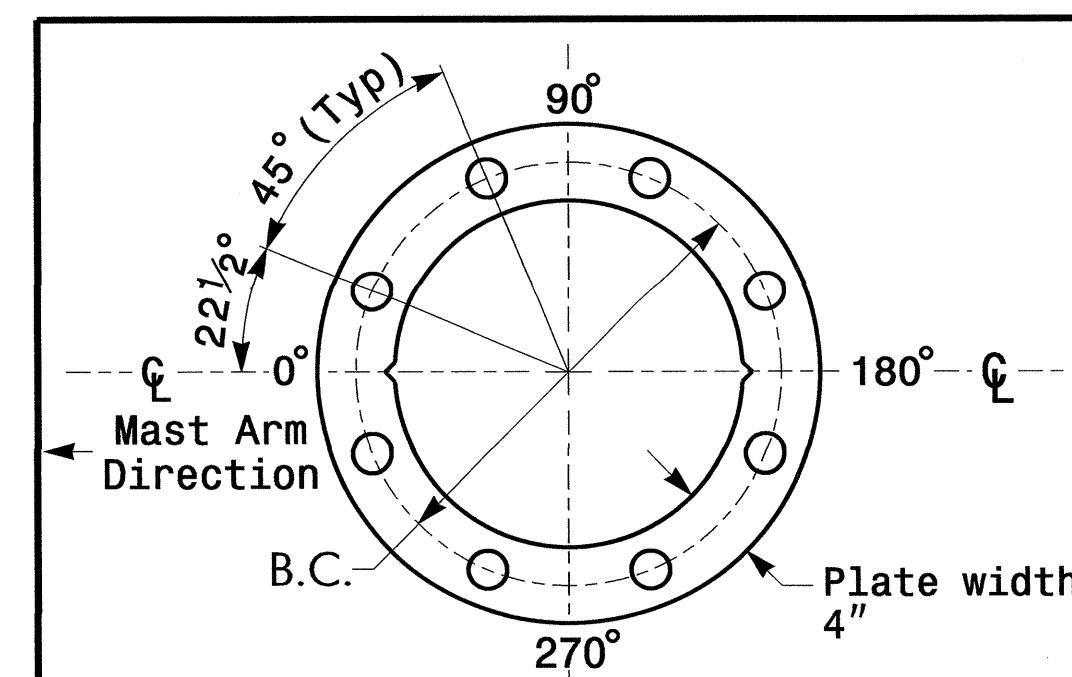


Elevation View



8 BOLT BASE PLATE DETAIL

See Note 6



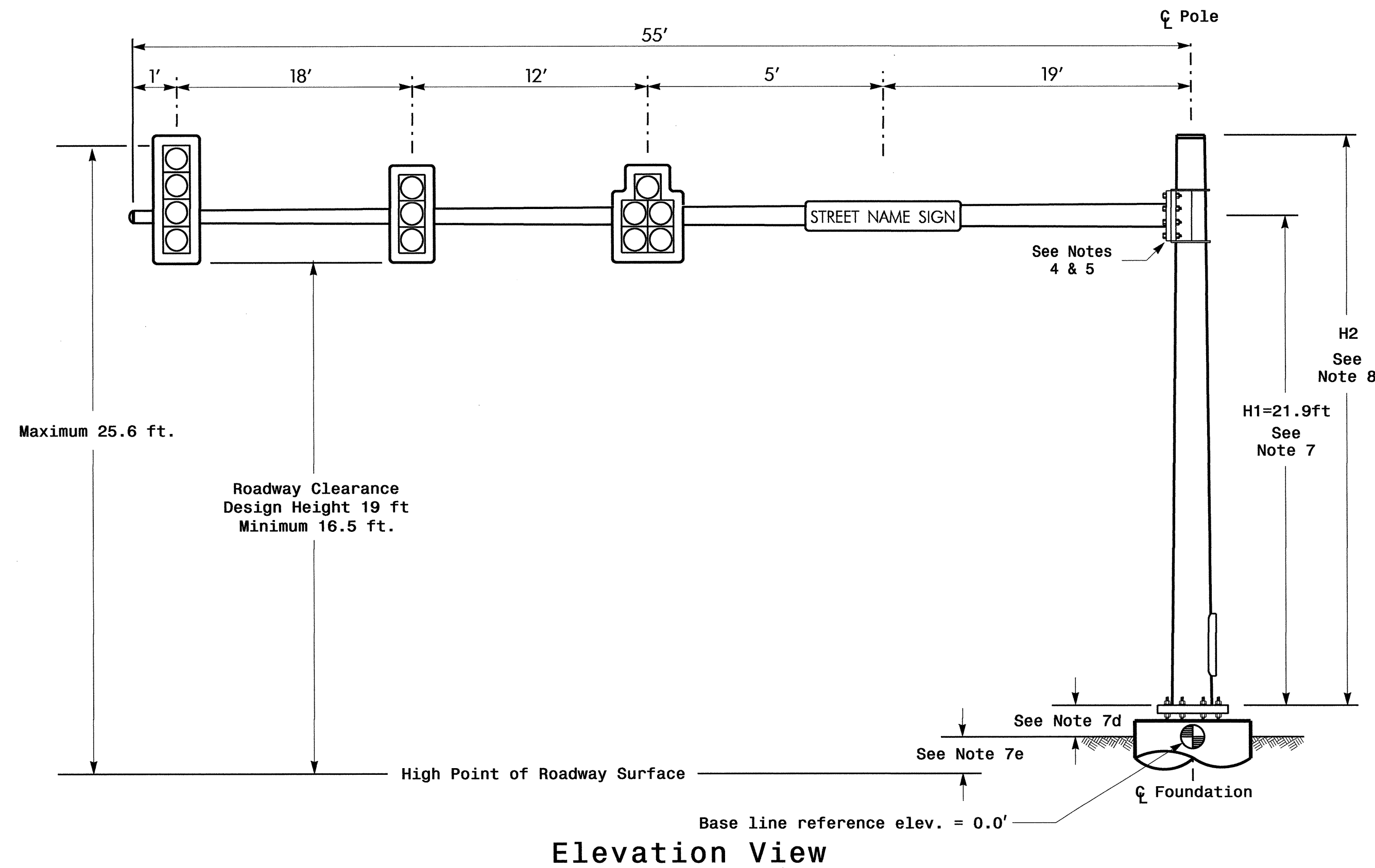
BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL
For 8 Bolt Base Plate

NCDOT Wind Zone 2 (130 mph)

	US 158 At NC 343	
	Division 1 PLAN DATE: May 2010	Camden County REVIEWED BY: PLA
	PREPARED BY: JPG	REVIEWED BY:
SCALE 0 N/A	REVISIONS	INIT. DATE
DATE: 9/3/10		DATE
SIG. INVENTORY NO. 01-0229		

03-SEP-2010 14:23
S:\ITS\AS\MTS_S1\proj\343\2414B\1\plan\343\sig\m3\343_2010mdd.dgn
J.Pal Lowy

Design Loading for METAL POLE NO. 5



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.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 5	Pole 6
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.9 ft.	+1.1 ft.
Elevation difference at Edge of travelway or face of curb	NA	NA

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

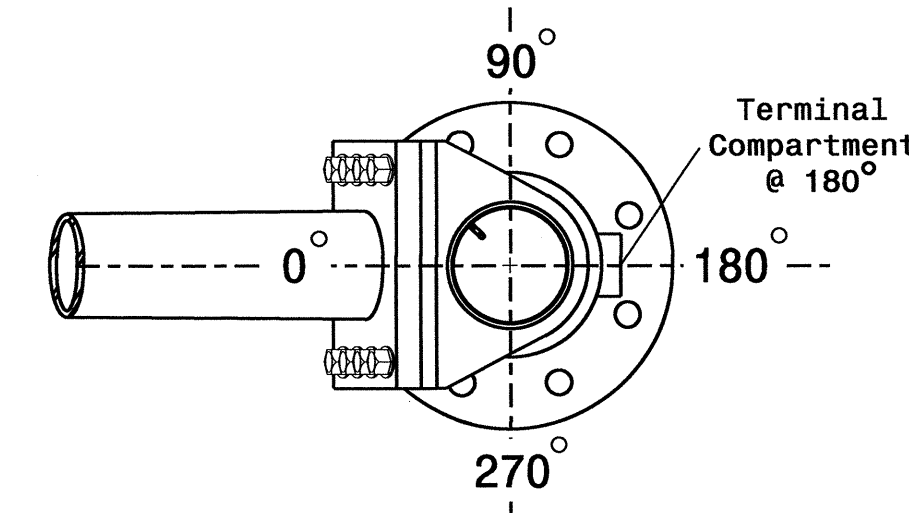
NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

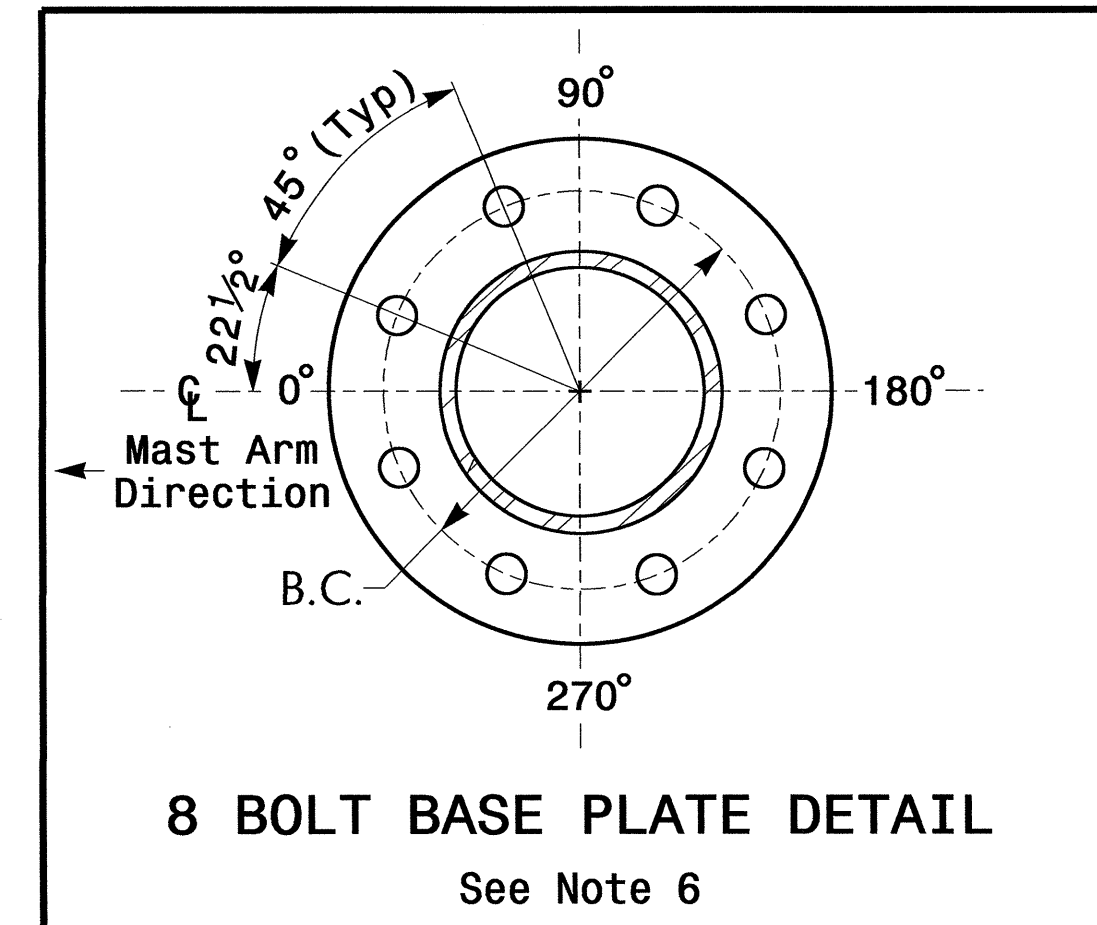
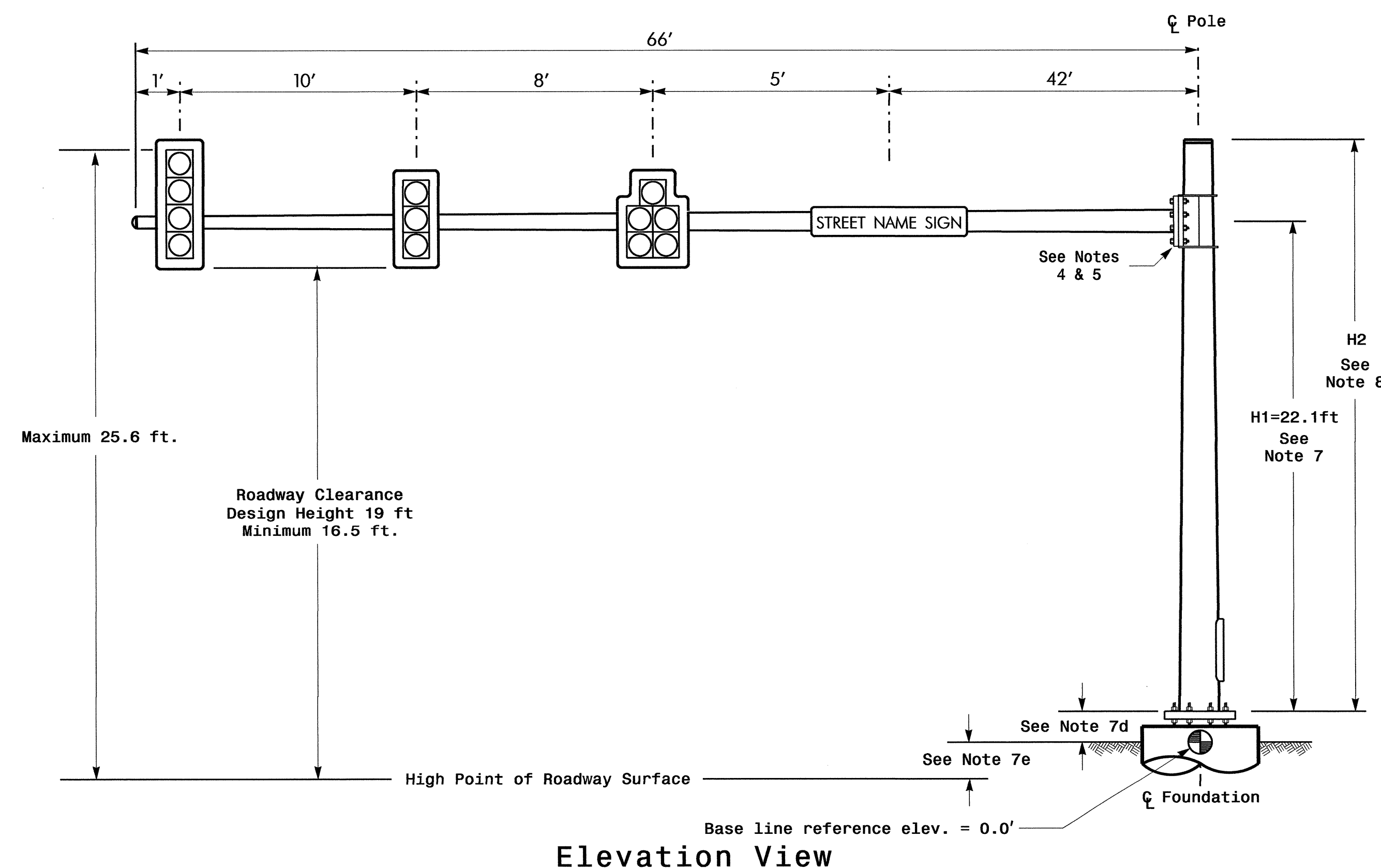
Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for 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.
- 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.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- 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.
- 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

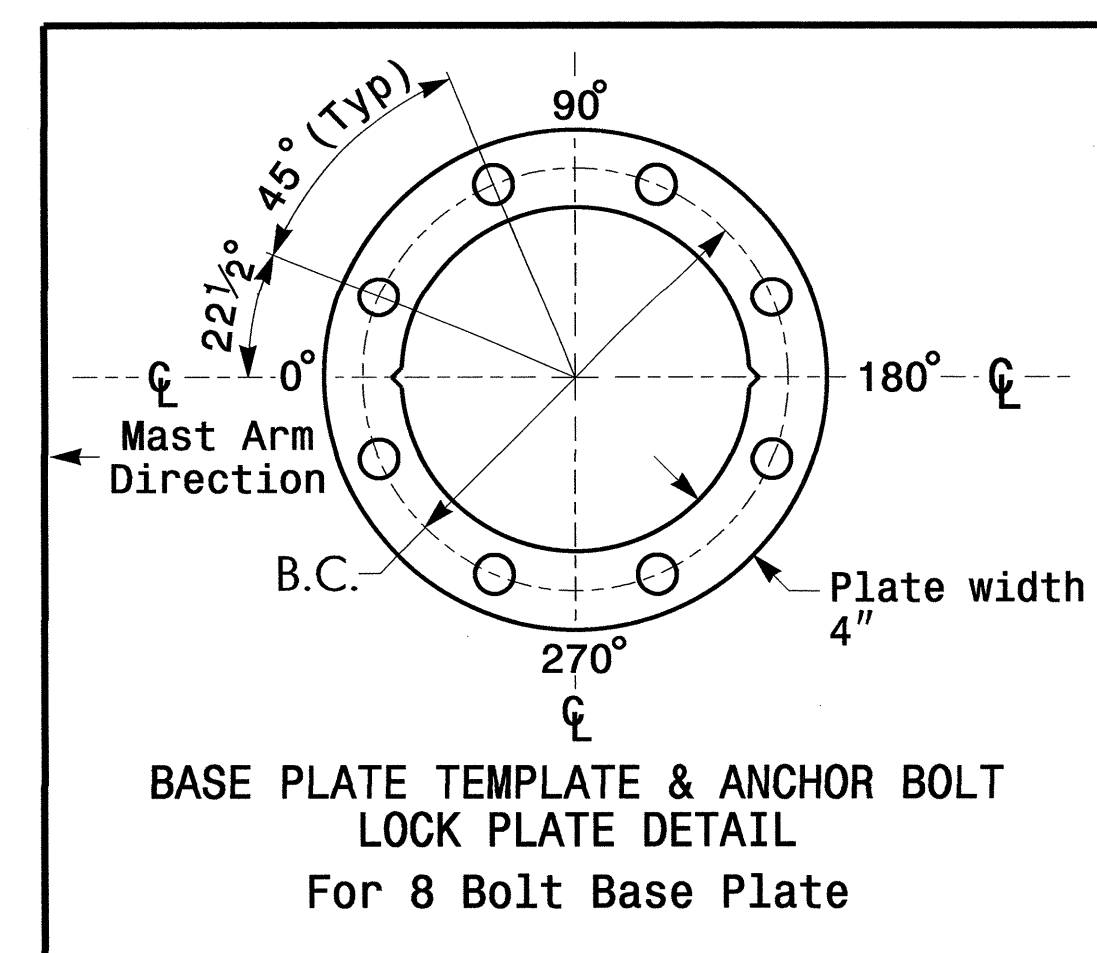


POLE RADIAL ORIENTATION

Design Loading for METAL POLE NO. 6



8 BOLT BASE PLATE DETAIL See Note 6



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

NCDOT Wind Zone 2 (130 mph)

Prepared In the Offices of:

US 158
At
NC 343

Division 1 Camden County Camden
PLAN DATE: May 2010 REVIEWED BY: PLA
PREPARED BY: JPG REVIEWED BY:
SCALE: 0 N/A
REVISIONS: INIT. DATE
SIGNATURE: 9/3/10
SIC. INVENTORY NO. 01-0229

09-SEP-2010 14:24 S:\TSS\JMT\S1\gnol\work\kg\cups\TIP_Proj\act\sa\2414B\MS1\gnol\sa\01-0229\010229.s1.q_03456_2010mdd.dgn Jgo Lowmy

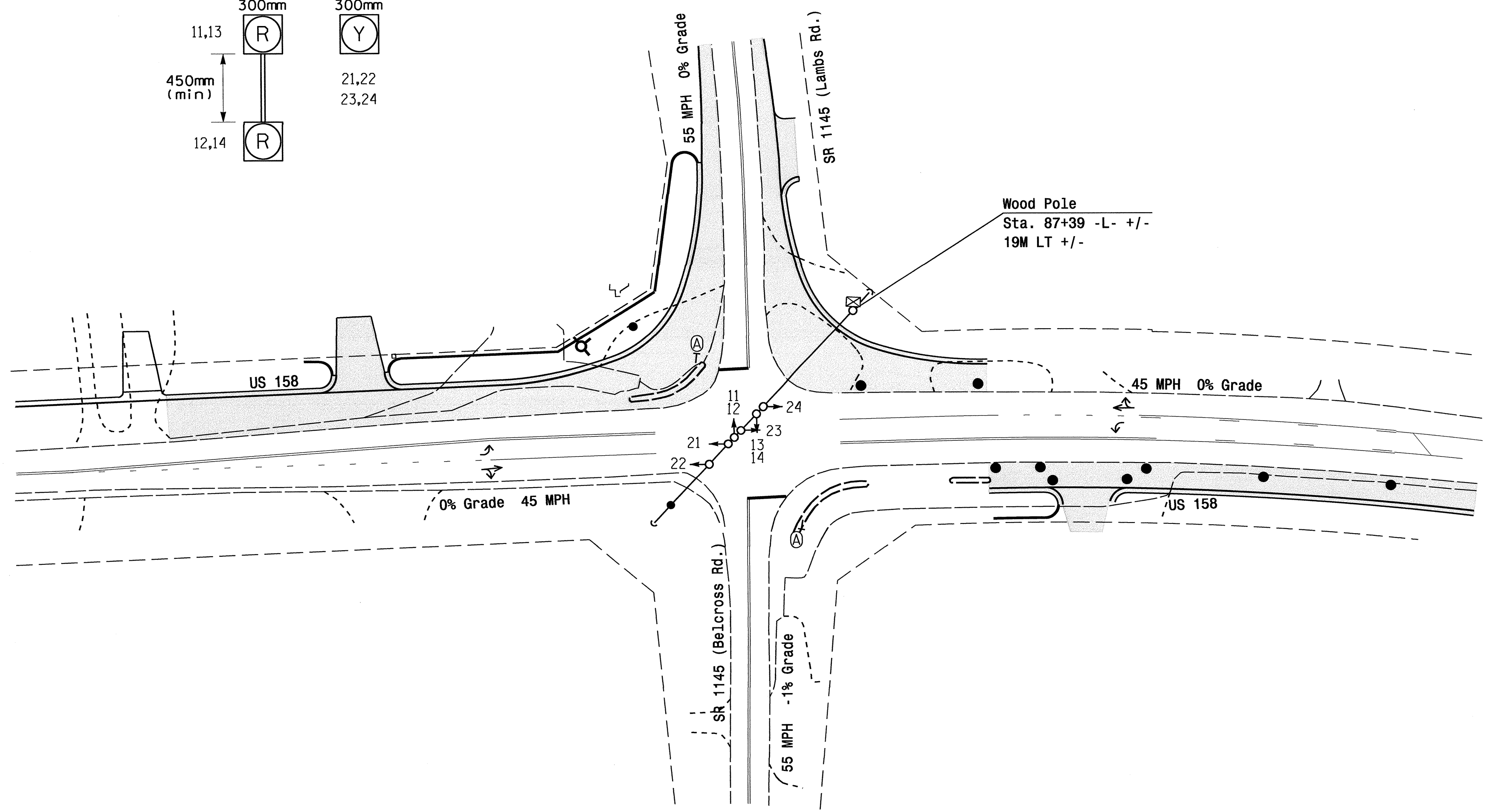
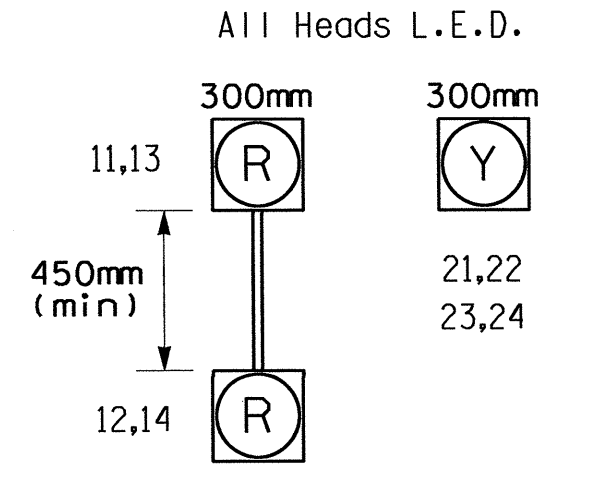
SIGNAL FACE	INTERVAL	
	1	2
11,13	ON	OFF
12,14	OFF	ON
21,22	ON	OFF
23,24	OFF	ON

Flasher

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Flash vertically mounted heads alternately.
3. Flash horizontally mounted heads concurrently.

SIGNAL FACE I.D.



LEGEND

PROPOSED	EXISTING

Signal Upgrade/Temp 1 Phase I

	US 158 At SR 1145 (Belcross Road)/(Lambs Road)		
	Division 1 Camden County Belcross		
PLAN DATE: April 2010	REVIEWED BY: PLA	PREPARED BY: JPG	
REVISIONS		INIT.	DATE
		SIGNATURE: <i>[Signature]</i> DATE: 9/10	
SIG. INVENTORY NO. 01-022011			

01-SEP-2010 15:42
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 Jpg Lowy

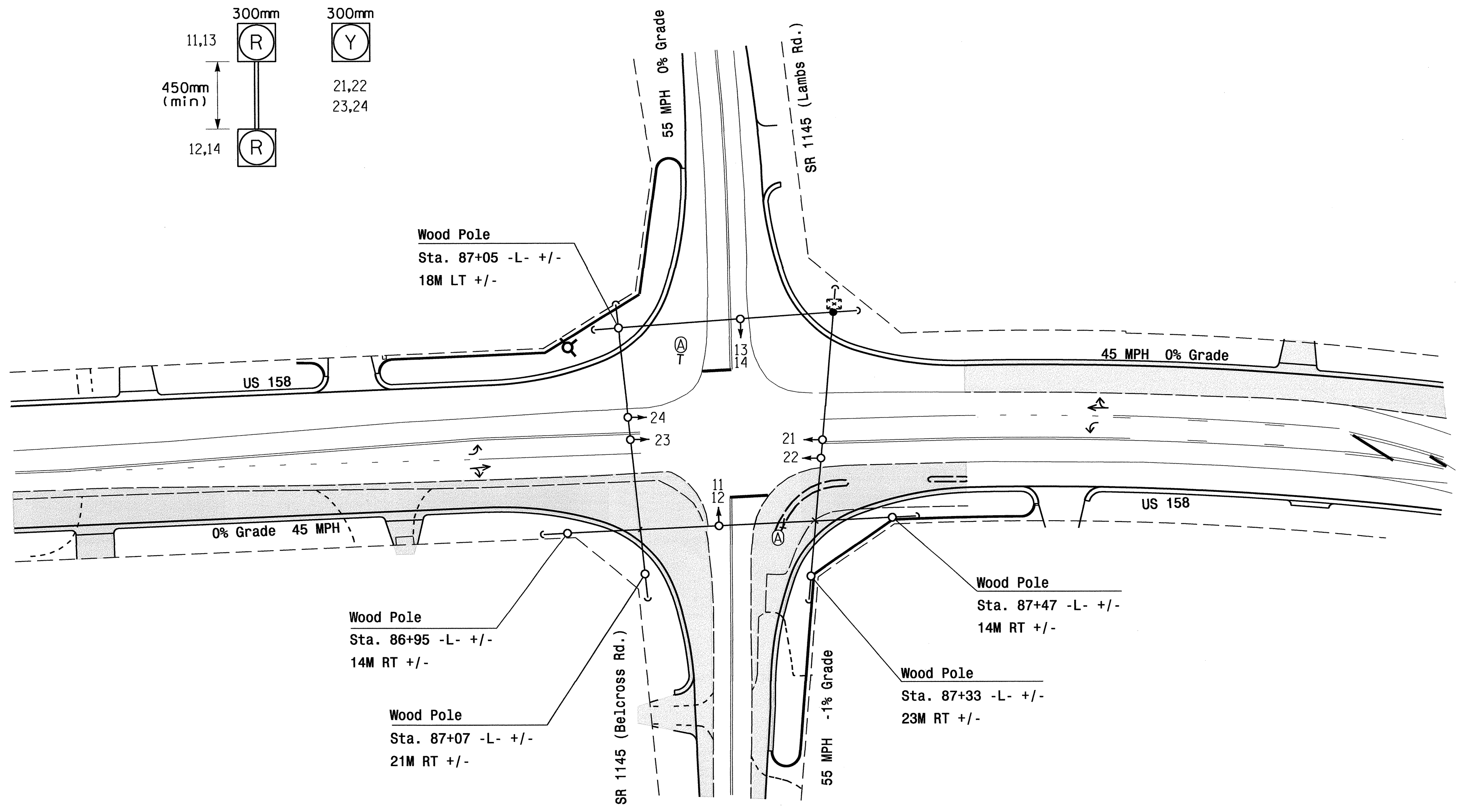
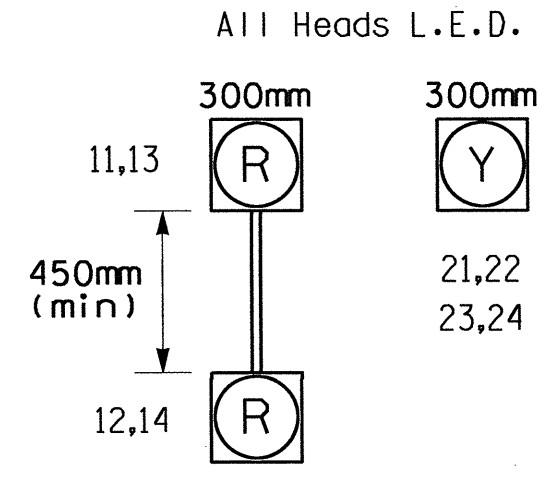
SIGNAL FACE	INTERVAL	
	1	2
11,13	ON	OFF
12,14	OFF	ON
21,22	ON	OFF
23,24	OFF	ON

Flasher

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Flash vertically mounted heads alternately.
3. Flash horizontally mounted heads concurrently.

SIGNAL FACE I.D.



LEGEND

PROPOSED	EXISTING

Signal Upgrade/Temp 2 Phase II & III

750 N. Greenfield Pkwy, Garner, NC 27529

US 158
At
SR 1145
(Belcross Road)/(Lambs Road)

Division 1 Camden County Belcross

PLAN DATE: April 2010 REVIEWED BY: PLA

PREPARED BY: JPG REVIEWED BY:

SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL 29904
V. STON P. GALLON

SCALE 5 0 10
500:1

REVISIONS	INIT.	DATE

SIGNATURE: DATE: 9/2/10
SIG. INVENTORY NO. 01-0220T2

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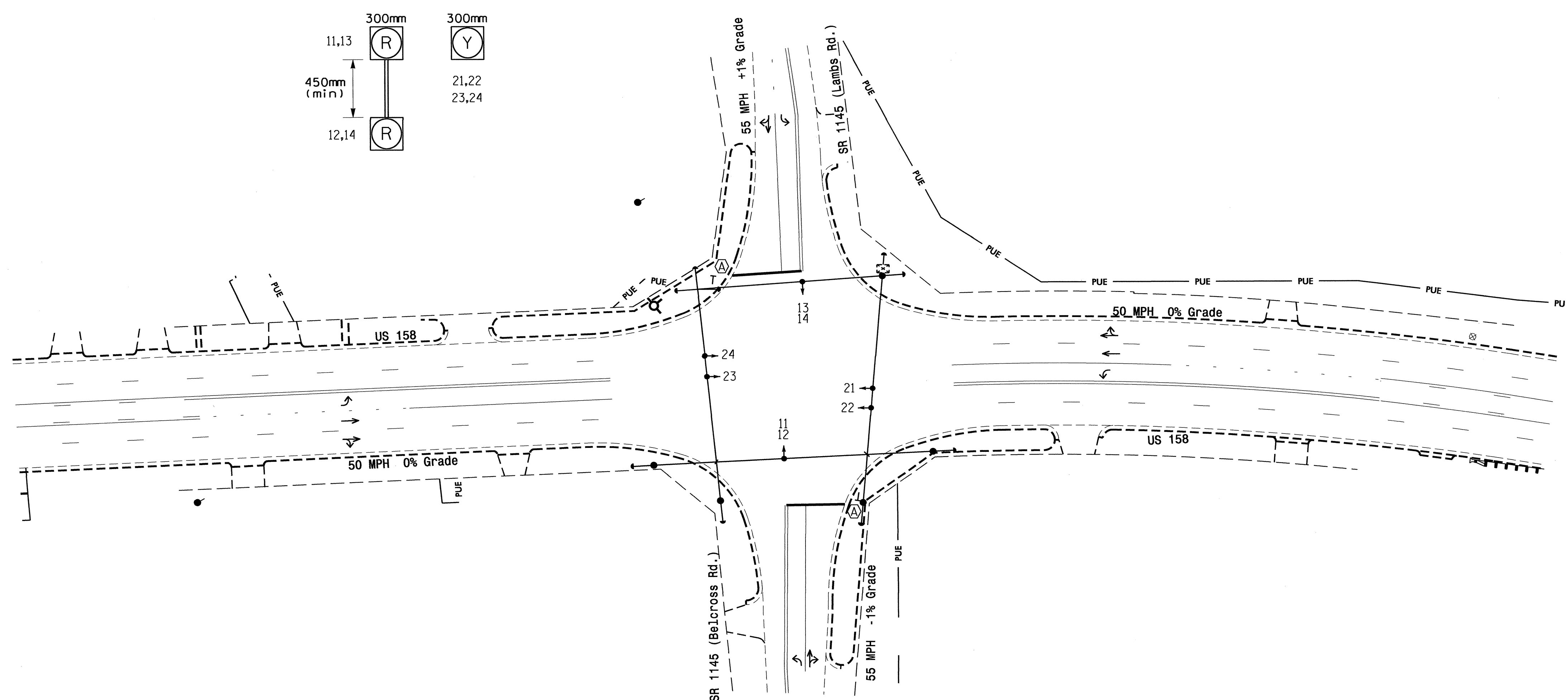
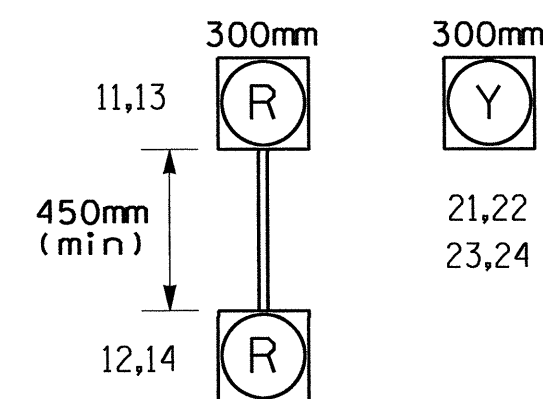


TABLE OF OPERATION

SIGNAL FACE	INTERVAL	
	1	2
11,13	ON	OFF
12,14	OFF	ON
21,22	ON	OFF
23,24	OFF	ON

SIGNAL FACE I.D.

All Heads L.E.D.



Flasher

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Flash vertically mounted heads alternately.
3. Flash horizontally mounted heads concurrently.

LEGEND

PROPOSED	EXISTING
	N/A
N/A	

Signal Upgrade/Final

	US 158 At SR 1145 (Belcross Road)/(Lamb's Road)	SEAL NORTH CAROLINA STATE ENGINEER 29904 P. GALLAWAY
	Division 1 Camden County Belcross	
PLAN DATE: April 2010	REVIEWED BY: PLA	
PREPARED BY: JPG	REVIEWED BY:	
SCALE: 500:1	REVISIONS:	INIT. DATE
		DATE: 9/2/10
		SIG. INVENTORY NO. 01-0220

01-SEP-2010 15:43
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Jgal.lawdy

PHASING DIAGRAM

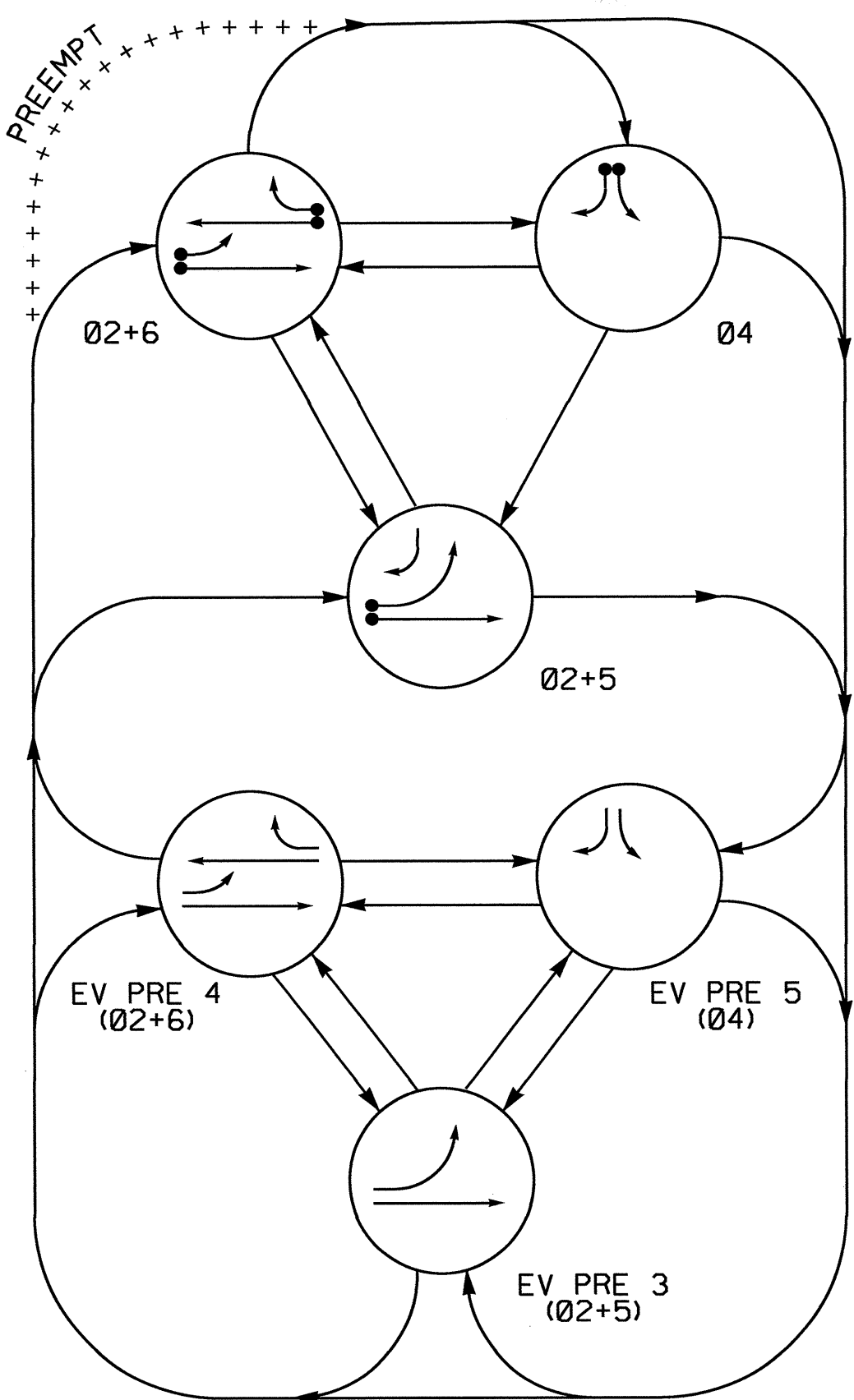
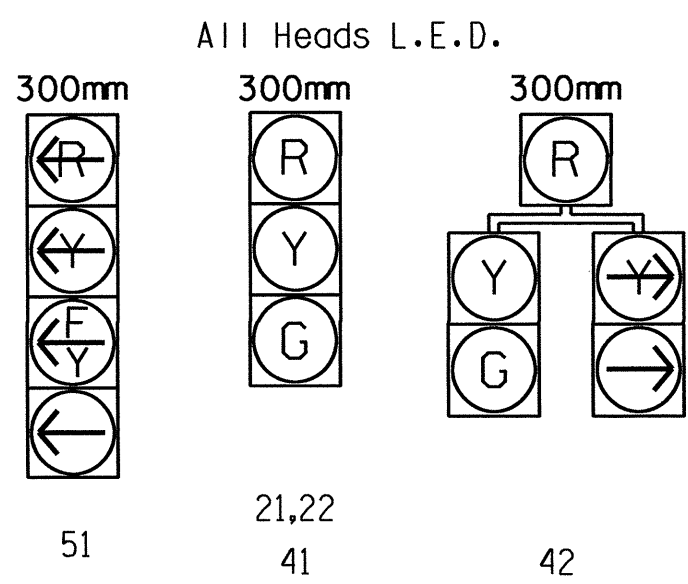


TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø 2 + 5	Ø 2 + 6	Ø 4	P ERVE 3	P ERVE 4	P ERVE 5
21,22	G	G	R	G	G	R
41	R	R	G	R	R	G
42	R	R	G	R	R	G
51	-	-	-	-	-	-
61,62	R	G	R	R	G	R

SIGNAL FACE I.D.



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

	TO					
	1	2	1	2	1	2
FROM	←	←	←	←	←	←
FROM	←	←	←	←	←	←
FROM	←	←	←	←	←	←
FROM	←	←	←	←	←	←

← = Flashing Yellow Arrow

2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (M)	TURNS	DISTANCE FROM STOPBAR (M)	DETECTOR PROGRAMMING								
				PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD	
2A	1.8X1.8	5	90	Y	2	Y	Y	-	-	-	-	Y
4A	1.8X12	2-4-2	0	Y	4	Y	Y	-	-	-	3	Y
4B	1.8X12	2-4-2	0	Y	4	Y	Y	-	-	-	15	Y
5A	1.8X12	2-4-2	0	Y	5	Y	Y	-	-	-	15	Y
6A	1.8X1.8	5	90	Y	6	Y	Y	-	-	-	-	Y

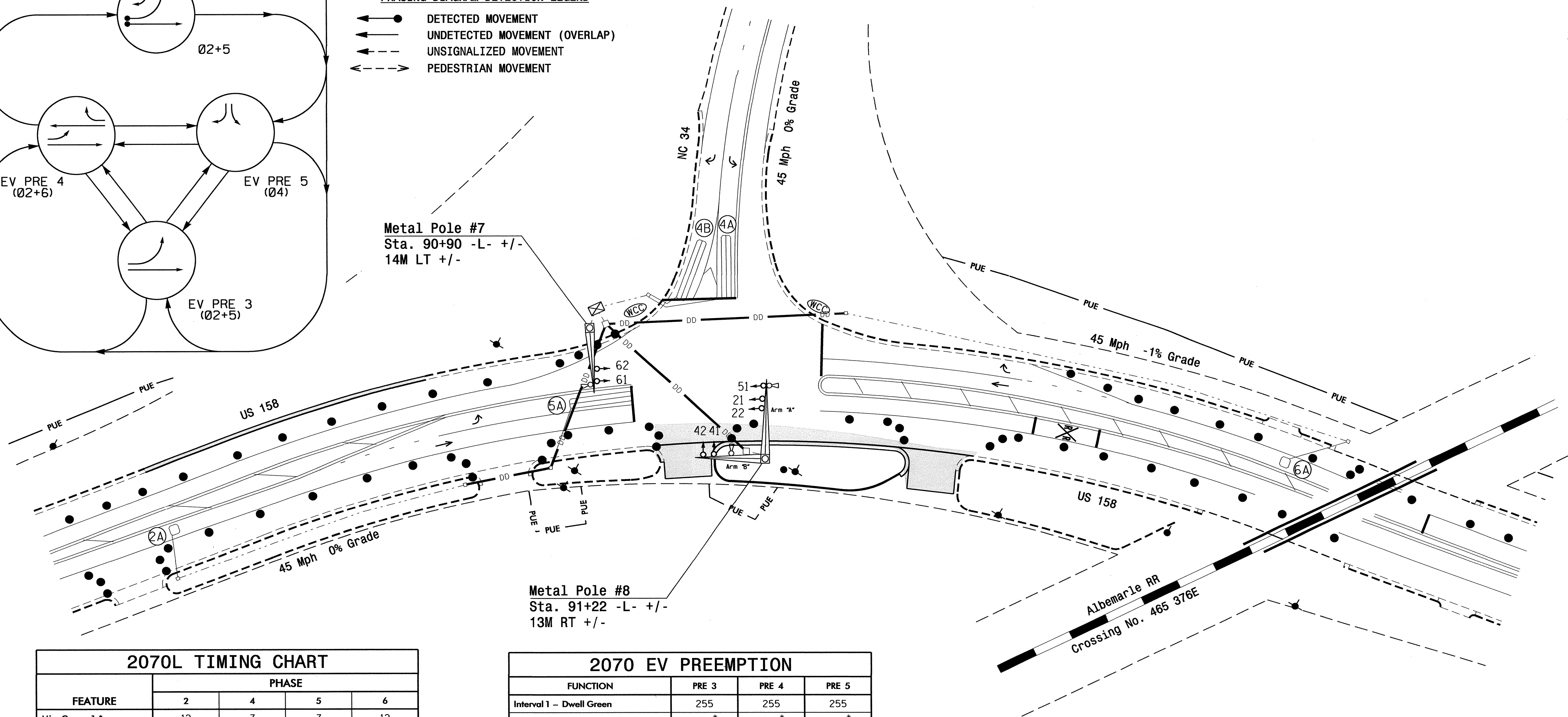
3 Phase Fully Actuated Isolated

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- 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.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.

PHASING DIAGRAM DETECTION LEGEND

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



2070L TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green 1*	12	7	7	12
Extension 1*	6.0	2.0	2.0	6.0
Max Green 1*	90	15	25	90
Yellow Clearance	4.6	3.0	3.0	4.6
Red Clearance	1.5	2.3	2.8	1.5
Walk 1*	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation*	2.5	-	-	2.5
Max Variable Initial*	34	-	-	34
Time Before Reduction*	15	-	-	15
Time To Reduce*	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* 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.

2070 EV PREEMPTION

FUNCTION	PRE 3	PRE 4	PRE 5
Interval 1 - Dwell Green	255	255	255
Interval 1 - Dwell Yellow	0.0*	0.0*	0.0*
Interval 1 - Dwell Red	0.0*	0.0*	0.0*
Interval 5 - Exit Green	0	0	0
Interval 5 - Yellow	0.0	0.0	0.0
Interval 5 - Red	0.0	0.0	0.0
Priority	MEDIUM	MEDIUM	MEDIUM
Delay Time	0.0	0.0	0.0
Min Green Before Pre	1	1	1
Ped Clear Before Pre	0	0	0
Yellow Clear Before Pre	0.0*	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*	0.0*
Dwell Min Time	7	12	7
Enable Backup Protection	N	N	N
Ped Clear Through Yellow	N	N	N
Preempt Extend**	2	2	2
Omit Overlaps	B	-	-

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

LEGEND

PROPOSED	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	N/A
N/A	N/A

New Installation/Temp 1

	<p>US 158 At NC 34</p>		<p>SEAL 29904</p>	
	<p>Division 1 Camden County Belcross</p>	<p>PREPARED BY: JPG</p>		<p>REVIEWED BY: JPG</p>
	<p>PLAN DATE: March 2010</p>	<p>REVISIONS</p>		<p>INIT. DATE</p>

750 N. Greenfield Place, Garner, NC 27529

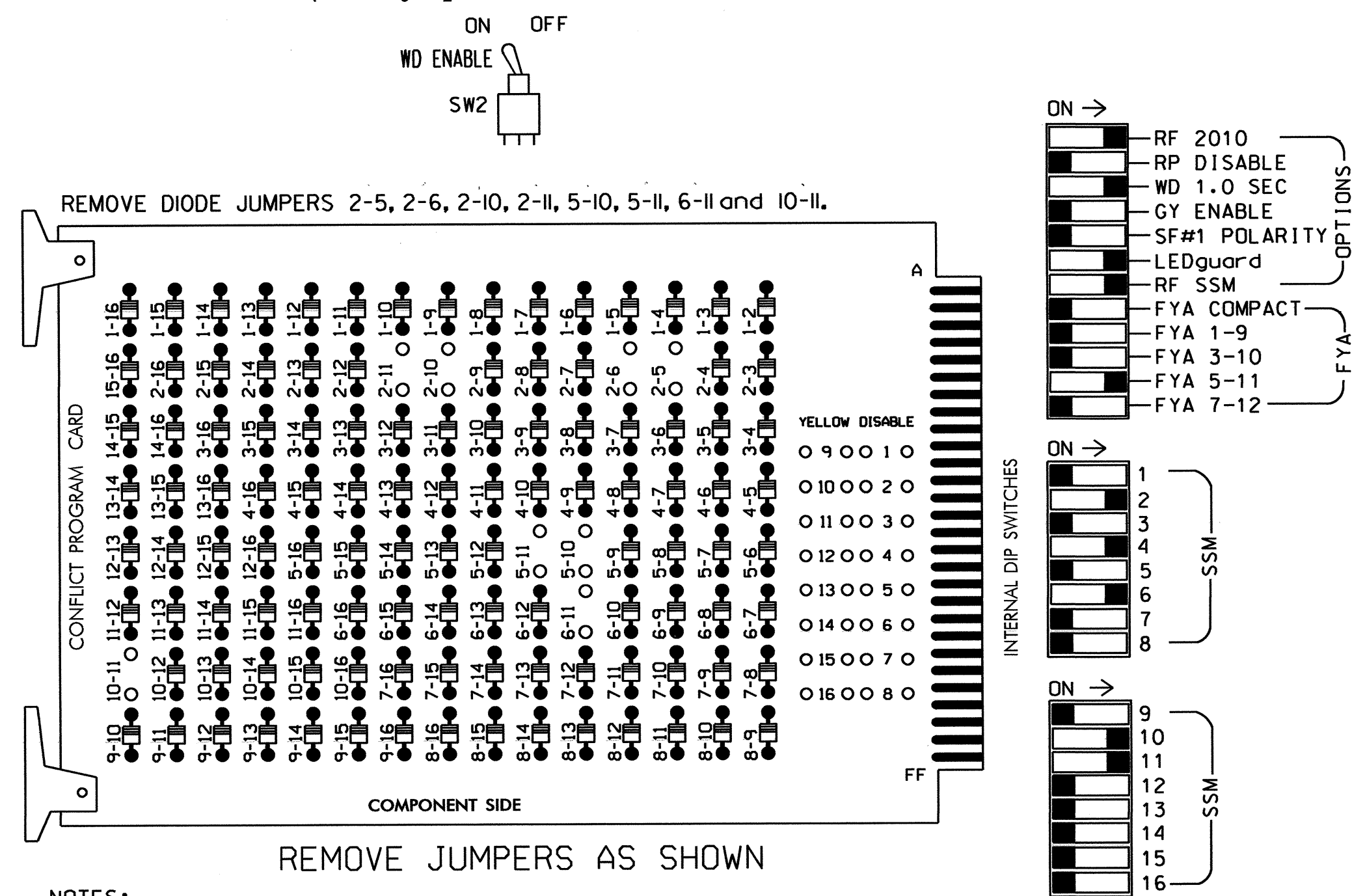
SCALE: 500:1

SIGNATURE: [Signature] DATE: 8/24/10

SIG. INVENTORY NO. 01-022111

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



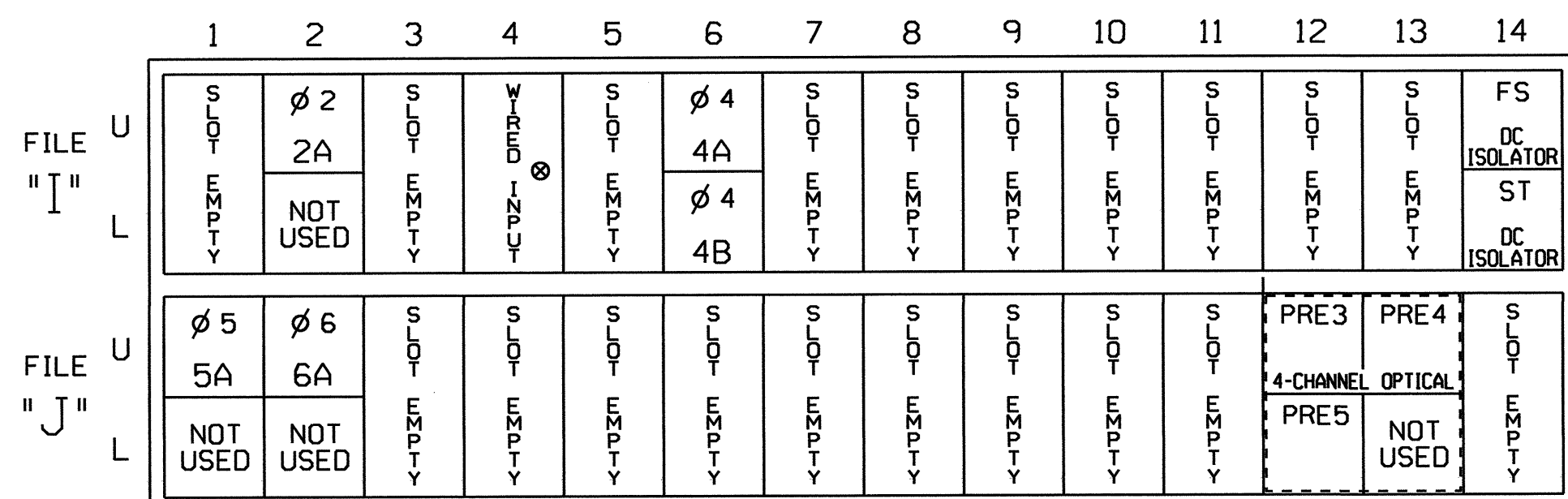
NOTES:

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

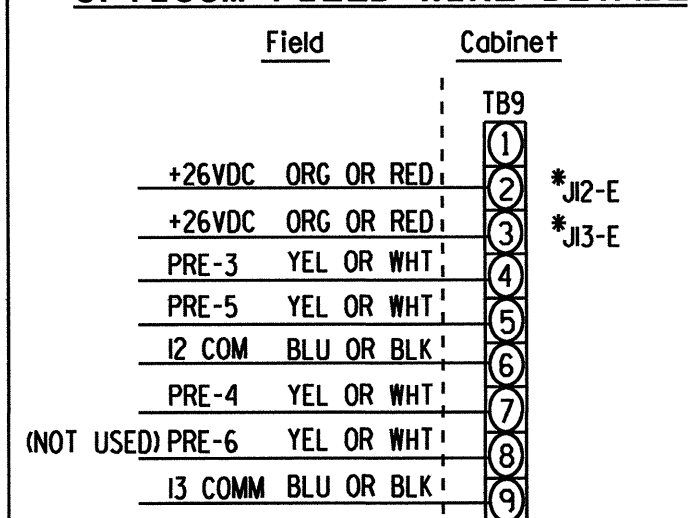
REMOVE JUMPERS AS SHOWN

INPUT FILE POSITION LAYOUT

(front view)



OPTICOM FIELD WIRE DETAIL



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 Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 7,8,9,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
CABINET.....332 /W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S4,S5,S6,S10,S12
PHASES USED.....2,4,5,6
OVERLAP "A".....NOT USED
OVERLAP "B".....5
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51*	61,62	NU	NU	NU	NU	NU	42	NU	51*	NU	NU
RED		128			101			134						*				
YELLOW		129			102		*	135										
GREEN		130			103			136										
RED ARROW																		A114
YELLOW ARROW																		A125
FLASHING YELLOW ARROW																		A116
GREEN ARROW								133						A126				

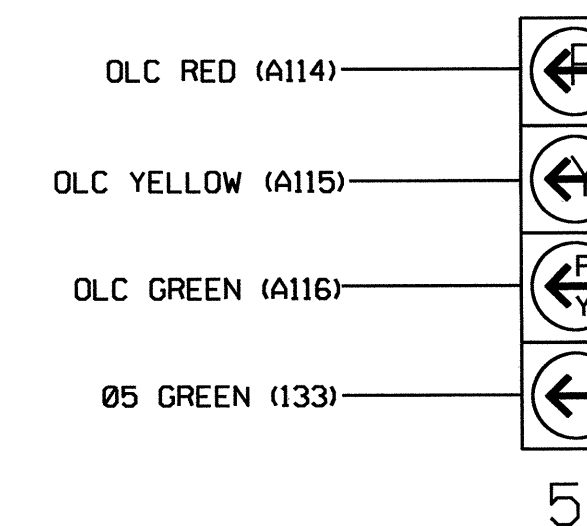
NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



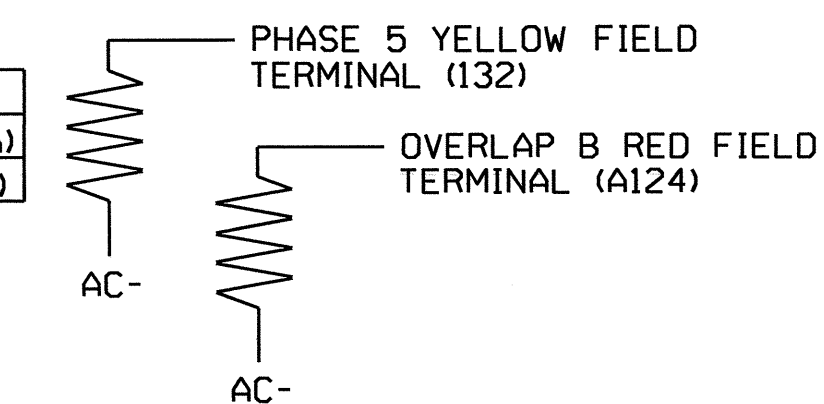
NOTE

- The sequence display for signal head 51 requires special logic programming. See sheet 2 of 2 for programming instructions.

LOAD RESISTOR INSTALLATION DETAIL

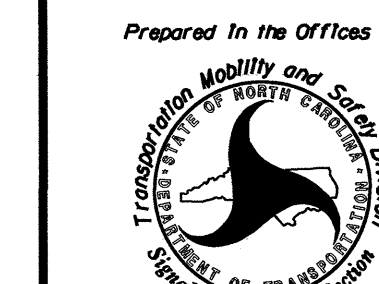
(install resistors as shown below)

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

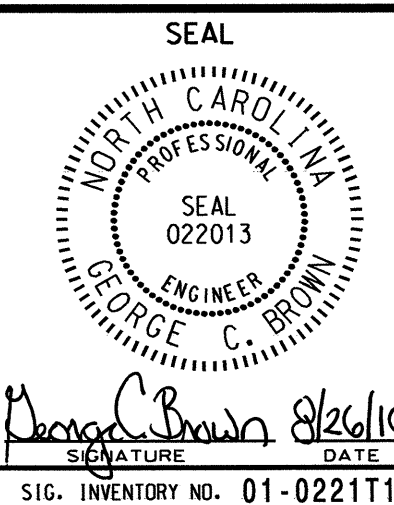


ELECTRICAL DETAIL - TEMP 1 - SHEET 1 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:



Prepared in the Office of:		US 158 at NC 34	
Division 1		Camden County Belcross	
PLAN DATE: August 2010	REVIEWED BY: T. Joyce		
PREPARED BY: C. Strickland	REVIEWED BY:		
REVISIONS	INIT.	DATE	



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0221T1
DESIGNED: March 2010
SEALED: 08/24/10
REVISED:

**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' as needed to advance to Preempts 3, 4 and 5.

PREEMPTION #3 SETTINGS (NEXT:1-10)
INTERVAL/TIMING CLEAR/DWELL PHASES
GRN YEL RED 12345678910111213141516
1 255 0.0* 0.0* X X
2 0 0.0 0.0
3 0 0.0 0.0
4 0 0.0 0.0
5 0 0.0 0.0

EXIT CALLS
OPTIONS
PRIORITY (Y/N TO SELECT)MED
DELAY TIMER (0-255 SEC)0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0*
DWELL MIN TIMER (0-255 SEC)7
DWELL MAX TIMER (0=OFF.1-255MIN)0
DWELL HOLD-OVER TIMER (0-255)0
LATCH CALL?N
LINK TO NEXT PREEMPT?N
ENABLE BACKUP PROTECTION?N
HOLD CLEAR 1 PHASES DURING DELAY? ..N
FAST GREEN FLASH DWELL PHASES?N
PED CLEARANCE THROUGH YELLOW?N
INHIBIT OVERLAP GREEN EXTENSION? ..N
SERVICE DURING SOFTWARE FLASH?N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL?N
ALLOW PEDS IN DWELL INTERVAL?N
RE-TIME DWELL INTERVAL?N
OVERLAPS: ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW
OMIT OVERLAPS: X

PRESS 'NEXT'

PREEMPTION #4 SETTINGS (NEXT:1-10)
INTERVAL/TIMING CLEAR/DWELL PHASES
GRN YEL RED 12345678910111213141516
1 255 0.0* 0.0* X X
2 0 0.0 0.0
3 0 0.0 0.0
4 0 0.0 0.0
5 0 0.0 0.0

EXIT CALLS
OPTIONS
PRIORITY (Y/N TO SELECT)MED
DELAY TIMER (0-255 SEC)0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0*
DWELL MIN TIMER (0-255 SEC)12
DWELL MAX TIMER (0=OFF.1-255MIN)0
DWELL HOLD-OVER TIMER (0-255)0
LATCH CALL?N
LINK TO NEXT PREEMPT?N
ENABLE BACKUP PROTECTION?N
HOLD CLEAR 1 PHASES DURING DELAY? ..N
FAST GREEN FLASH DWELL PHASES?N
PED CLEARANCE THROUGH YELLOW?N
INHIBIT OVERLAP GREEN EXTENSION? ..N
SERVICE DURING SOFTWARE FLASH?N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL?N
ALLOW PEDS IN DWELL INTERVAL?N
RE-TIME DWELL INTERVAL?N
OVERLAPS: ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW
OMIT OVERLAPS:

PRESS 'NEXT'

PREEMPTION #5 SETTINGS (NEXT:1-10)
INTERVAL/TIMING CLEAR/DWELL PHASES
GRN YEL RED 12345678910111213141516
1 255 0.0* 0.0* X
2 0 0.0 0.0
3 0 0.0 0.0
4 0 0.0 0.0
5 0 0.0 0.0

EXIT CALLS
OPTIONS
PRIORITY (Y/N TO SELECT)MED
DELAY TIMER (0-255 SEC)0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT).0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0*
DWELL MIN TIMER (0-255 SEC)7
DWELL MAX TIMER (0=OFF.1-255MIN)0
DWELL HOLD-OVER TIMER (0-255)0
LATCH CALL?N
LINK TO NEXT PREEMPT?N
ENABLE BACKUP PROTECTION?N
HOLD CLEAR 1 PHASES DURING DELAY? ..N
FAST GREEN FLASH DWELL PHASES?N
PED CLEARANCE THROUGH YELLOW?N
INHIBIT OVERLAP GREEN EXTENSION? ..N
SERVICE DURING SOFTWARE FLASH?N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL?N
ALLOW PEDS IN DWELL INTERVAL?N
RE-TIME DWELL INTERVAL?N
OVERLAPS: ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW
OMIT OVERLAPS:

PROGRAMMING COMPLETE

* TIME DEFAULTS TO TIME USED BY PHASE DURING NORMAL OPERATION

NOTE!

PROGRAM EXTEND TIME ON ALL 'OPTICOM' DETECTOR UNITS FOR 2 SEC.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' OR '-' TO POSITION ON OVERLAP B

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).....0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).....0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0

OVERLAP PROGRAMMING COMPLETE

← NOTICE GREEN FLASH

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0221T1
DESIGNED: March 2010
SEALED: 08/24/10
REVISED:

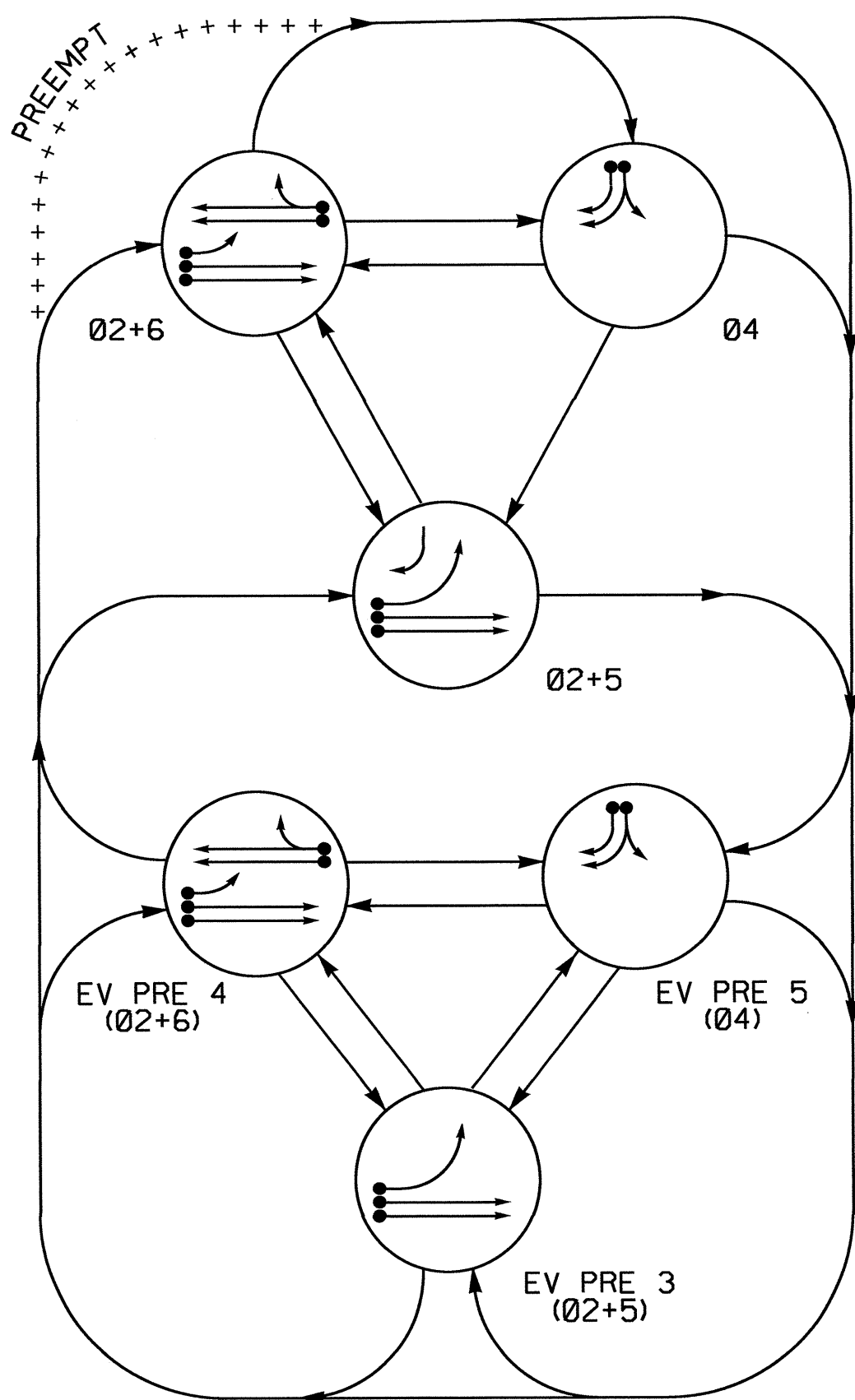
ELECTRICAL DETAIL - TEMP 1 - SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared in the Offices of:
TRANSPORTATION MOBILITY AND SAFETY DIVISION
STATE OF NORTH CAROLINA
Signal Management Section
750 N. Greenfield Pkwy, Garner, NC 27529

US 158 at NC 34
Division 1 Camden County Belcross
PLAN DATE: August 2010 REVIEWED BY: T. Jaffe
PREPARED BY: C. Strickland REVIEWED BY:
REVISIONS INIT. DATE

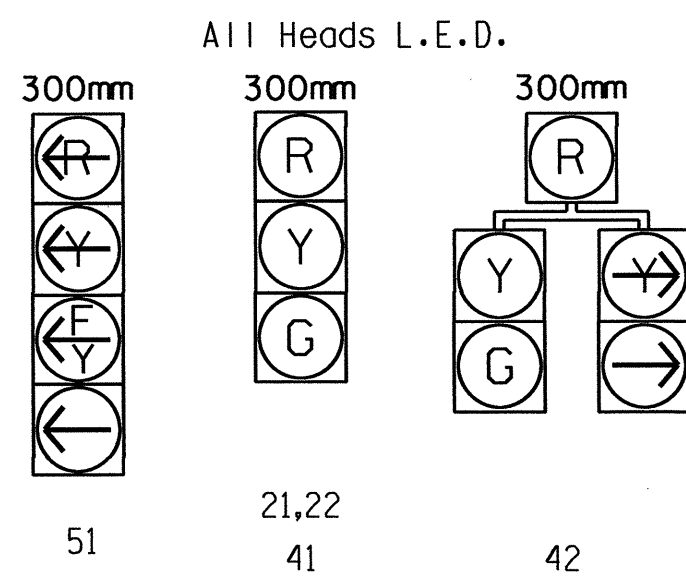
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 022013
G. GEORGE C. BROWN
Signature: [Signature] DATE: 8/26/10
SIG. INVENTORY NO. 01-0221T1

PHASING DIAGRAM

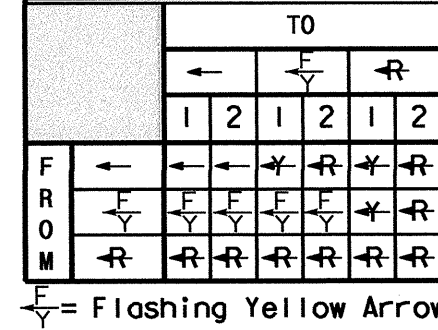


SIGNAL FACE	PHASE					
	02+5	02+4	04	PREVE 3	PREVE 4	PREVE 5
21,22	G	G	R	G	G	Y
41	R	R	G	R	R	G
42	R	R	G	R	R	G
51	Y	Y	R	Y	Y	R
61,62	R	G	R	R	G	Y

SIGNAL FACE I.D.



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL



Y = Flashing Yellow Arrow

OASIS 2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (M)	TURNS	DISTANCE FROM STOPBAR (M)	DETECTOR PROGRAMMING							
				PHASE	CALLING	EXTENSION	FULL TIME DELAY	SYSTEM LOOP	STRETCH TIME	DELAY TIME	NEW CARD
2A	1.8X1.8	5	110	Y	2	Y	Y	-	-	-	-
2B	1.8X1.8	5	110	Y	2	Y	Y	-	-	-	-
4A	1.8X12	2-4-2	0	-	4	Y	Y	-	-	-	3
4B	1.8X12	2-4-2	0	-	4	Y	Y	-	-	-	15
5A	1.8X12	2-4-2	0	-	5	Y	Y	-	-	-	15
6A	1.8X1.8	5	99	Y	6	Y	Y	-	-	-	3
6B	1.8X1.8	5	99	Y	6	Y	Y	-	-	-	-

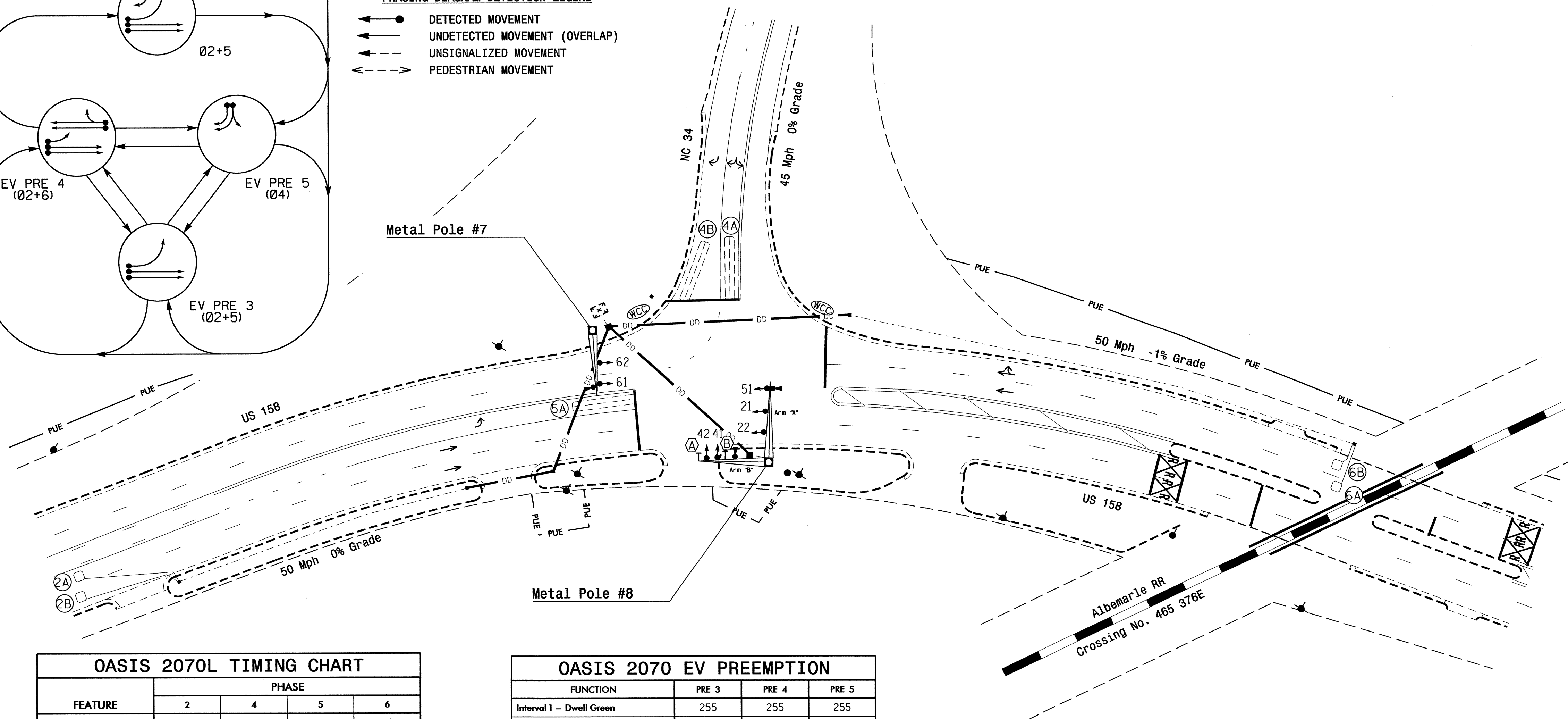
3 Phase Fully Actuated Isolated

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- 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.
- Reposition existing signal heads numbered 21,22,61, and 62.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.

PHASING DIAGRAM DETECTION LEGEND

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



OASIS 2070L TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green 1 *	14	7	7	14
Extension 1 *	6.0	2.0	2.0	6.0
Max Green 1 *	90	15	25	90
Yellow Clearance	4.6	3.0	3.0	4.6
Red Clearance	1.5	2.3	2.8	1.5
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	1.5	-	-	1.5
Max Variable Initial *	40	-	-	37
Time Before Reduction *	15	-	-	15
Time To Reduce *	45	-	-	45
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

* 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.

OASIS 2070 EV PREEMPTION

FUNCTION	PRE 3	PRE 4	PRE 5
Interval 1 - Dwell Green	255	255	255
Interval 1 - Dwell Yellow	0.0*	0.0*	0.0*
Interval 1 - Dwell Red	0.0*	0.0*	0.0*
Interval 5 - Exit Green	0	0	0
Interval 5 - Yellow	0.0	0.0	0.0
Interval 5 - Red	0.0	0.0	0.0
Priority	MEDIUM	MEDIUM	MEDIUM
Delay Time	0.0	0.0	0.0
Min Green Before Pre	1	1	1
Ped Clear Before Pre	0	0	0
Yellow Clear Before Pre	0.0*	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*	0.0*
Dwell Min Time	7	14	7
Enable Backup Protection	N	N	N
Ped Clear Through Yellow	N	N	N
Preempt Extend**	2	2	2
Orbit Overlaps	B	-	-

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

LEGEND

- | | | | |
|--|------------------------------------------|--|------------------------------|
| | PROPOSED Traffic Signal Head | | EXISTING Traffic Signal Head |
| | PROPOSED Modified Signal Head | | EXISTING N/A |
| | PROPOSED Pedestrian Signal Head | | EXISTING N/A |
| | PROPOSED Signal Pole with Guy | | EXISTING |
| | PROPOSED Signal Pole with Sidewalk Guy | | EXISTING |
| | PROPOSED Inductive Loop Detector | | EXISTING |
| | PROPOSED Controller & Cabinet | | EXISTING |
| | PROPOSED Junction Box | | EXISTING |
| | PROPOSED Over-sized Junction Box | | EXISTING |
| | PROPOSED 50mm Underground Conduit | | EXISTING |
| | PROPOSED Right of Way with Marker | | EXISTING |
| | PROPOSED Directional Arrow | | EXISTING |
| | PROPOSED Railroad Tracks | | EXISTING |
| | PROPOSED Directional Drill | | EXISTING |
| | PROPOSED Metal Pole with Mastarm | | EXISTING |
| | PROPOSED Out of Pavement Detector | | EXISTING |
| | PROPOSED Right Arrow "ONLY" Sign (R3-5R) | | EXISTING |
| | PROPOSED Dual Turn Arrows Sign | | EXISTING |

Signal Upgrade/Final

Prepared in the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

US 158 At NC 34

Division 1 Camden County Belcross
 PLAN DATE: March 2010 REVIEWED BY: PLA
 PREPARED BY: JPG REVIEWED BY:

SCALE 5 0 10
500:1

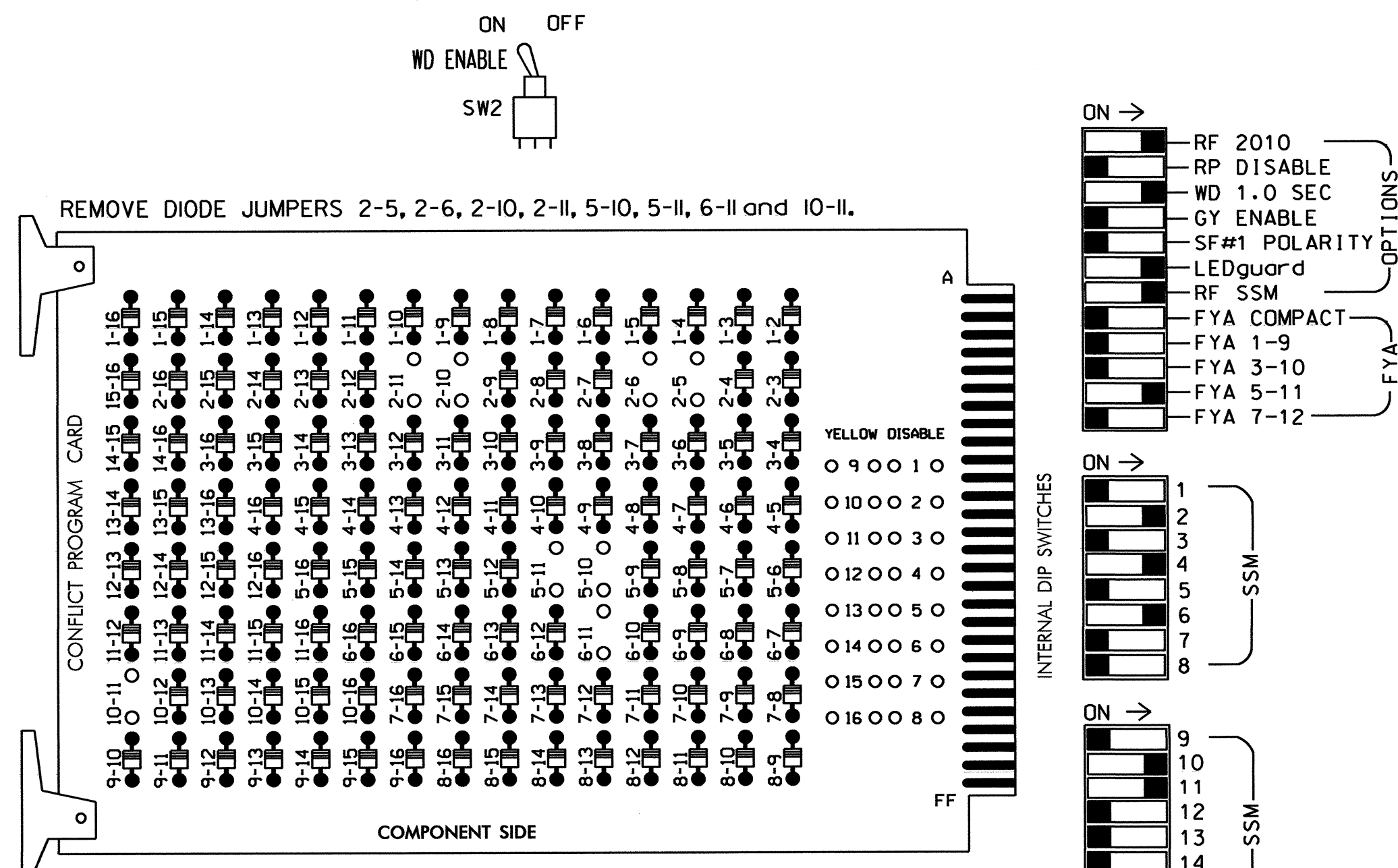
P. Gallaway 8/24/10
 DATE

SIG. INVENTORY NO. 01-0221

01-0221-2010-10:53:55 O:\gis\work\project\2414B\GIS\plan\0221_51.dwg, 2010mdd.dgn

EDI MODEL 2010ECL-NC 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 Plans.
- Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 1,3,5, 7,8,9,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
- Enable Simultaneous Gap-Out for all phases.
- Program phases 2 and 6 for Variable Initial and Gap Reduction.
- Program phases 2 and 6 for Start Up In Green.
- Program phases 2 and 6 for Yellow Flash.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	51*	61,62	NU	NU	NU	NU	NU	42	NU	51*	NU	NU
RED		128			101			134						*				
YELLOW		129			102		*	135										
GREEN		130			103			136										
RED ARROW																		A114
YELLOW ARROW																		A125
FLASHING YELLOW ARROW																		A116
GREEN ARROW							133							A126				

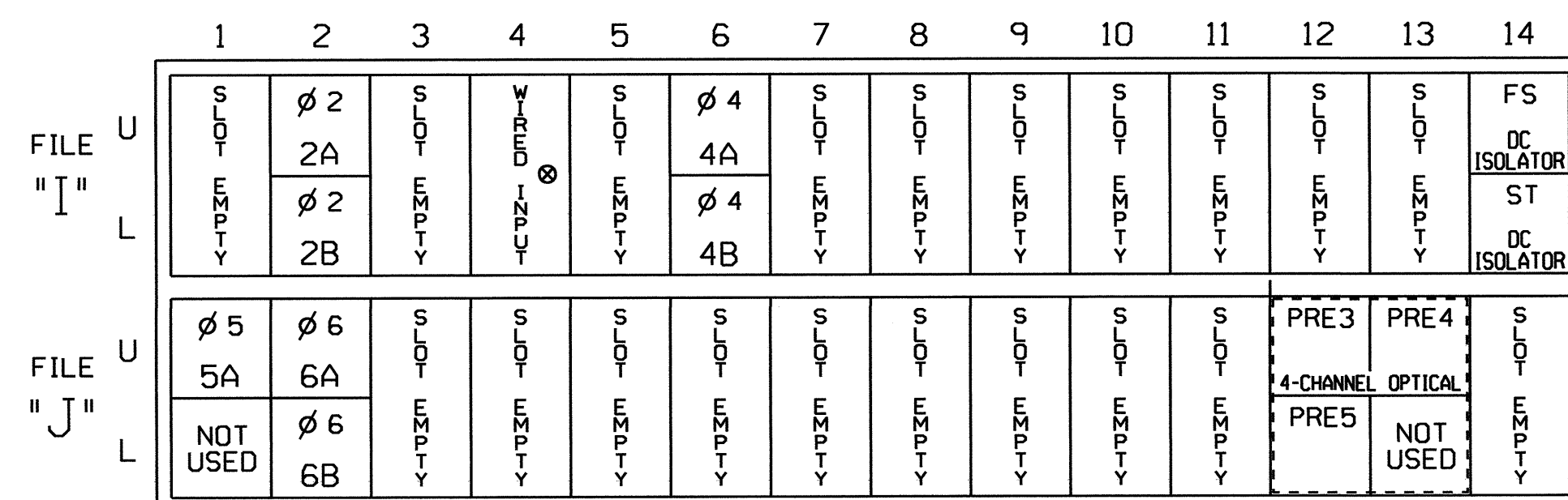
NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of head wiring in detail below.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S2,S4,S5,S6,S10,S12
 PHASES USED.....2,4,5,6
 OVERLAP "A".....NOT USED
 OVERLAP "B".....5
 OVERLAP "C".....5+6
 OVERLAP "D".....NOT USED

INPUT FILE POSITION LAYOUT

(front view)



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

FS = FLASH SENSE
 ST = STOP TIME

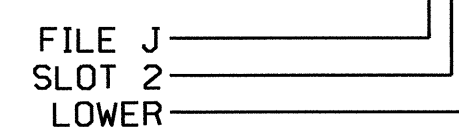
⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			15
5A ¹	TB3-1,2	J1U	55	17	5	5	Y	Y			15
		I4U	47	9	22	2	Y	Y	Y		3
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			

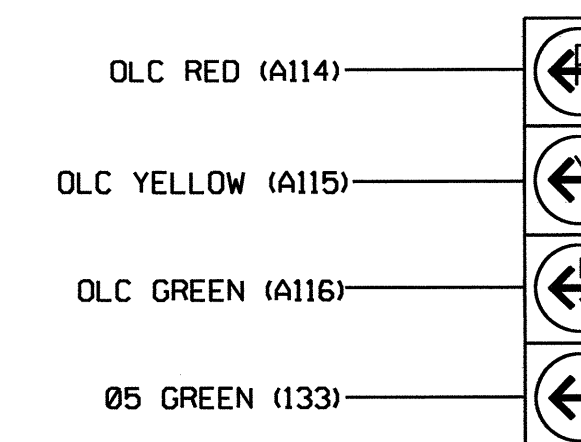
¹Add jumper from J1-W to I4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



51

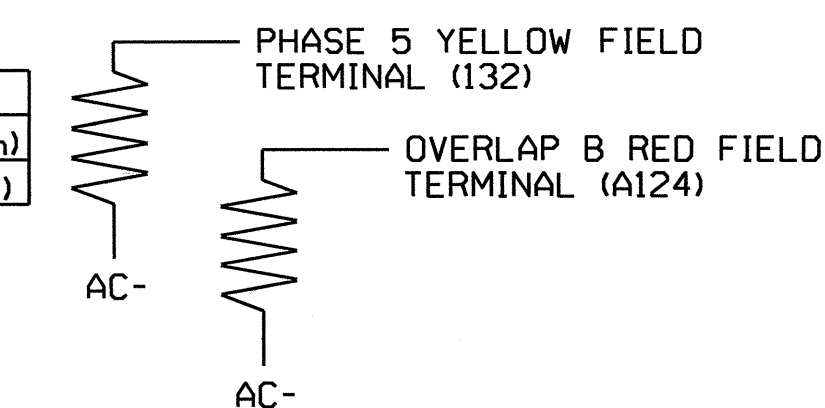
NOTE

- The sequence display for signal head 51 requires special logic programming. See sheet 2 of 2 for programming instructions.

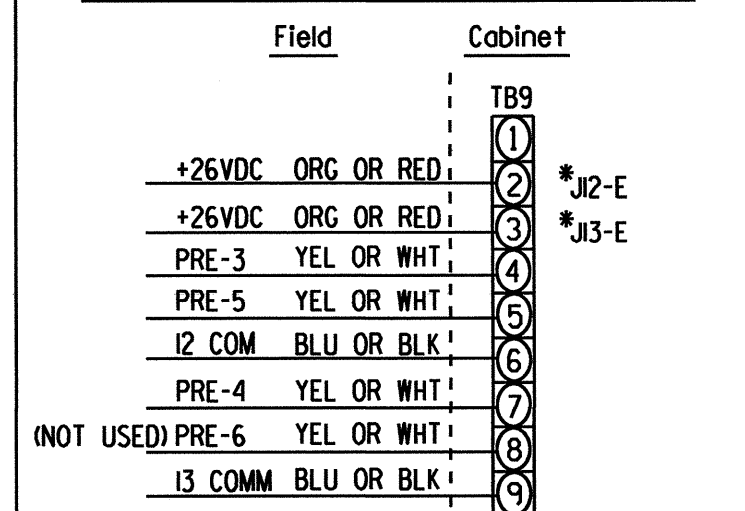
LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



OPTICOM FIELD WIRE DETAIL



*Assuming TB9-2 & TB9-3 are unused on the J file, move wires on J1-J & J1-K (Twisted Pair) to J2-E & J3-E respectively.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0221
 DESIGNED: March 2010
 SEALED: 08/24/10
 REVISED:

ELECTRICAL DETAIL - FINAL - SHEET 1 OF 2

Electrical and Programming Details For:

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

US 158 at NC 34

Division 1 Camden County Belcross

PLAN DATE: August 2010 REVIEWED BY: T. Jope

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

George C. Brown 8/26/10

SIGNATURE DATE

SIG. INVENTORY NO. 01-0221

**LOGICAL I/O PROCESSOR PROGRAMMING DETAIL
TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE**

(program controller as shown below)

- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

LOGICAL I/O COMMAND #1 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON
AND RED CLEAR ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #42 ON
SET OUTPUT ASSIGNMENT #43 OFF

↓
PRESS '+'

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

LOGICAL I/O COMMAND #2 (+/-COMMAND#)
IF ACTIVE PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #44 OFF

↓
PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

LOGICAL I/O COMMAND #3 (+/-COMMAND#)
IF YELLOW ON PHASE #5 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #43 ON

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green

EMERGENCY VEHICLE PREEMPTION PROGRAMMING DETAIL

(program controller as shown below)

From Main Menu press 'A' (Preemption), then '1' (Standard Preemptions). Press 'NEXT' as needed to advance to Preempts 3, 4 and 5.

PREEMPTION #3 SETTINGS (NEXT:1-10)
INTERVAL/TIMING CLEAR/DWELL PHASES
GRN YEL RED 12345678910111213141516
1 255 0.0*0.0* X X
2 0 0.0 0.0
3 0 0.0 0.0
4 0 0.0 0.0
5 0 0.0 0.0

EXIT CALLS

OPTIONS
PRIORITY (Y/N TO SELECT)MED
DELAY TIMER (0-255 SEC)0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0*
DWELL MIN TIMER (0-255 SEC)7
DWELL MAX TIMER (0=OFF,1-255MIN)0
DWELL HOLD-OVER TIMER (0-255)0
LATCH CALL?N
LINK TO NEXT PREEMPT?N
ENABLE BACKUP PROTECTION?N
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES?N
PED CLEARANCE THROUGH YELLOW?N
INHIBIT OVERLAP GREEN EXTENSION? ...N
SERVICE DURING SOFTWARE FLASH?N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL?N
ALLOW PDS IN DWELL INTERVAL?N
RE-TIME DWELL INTERVAL?N
OVERLAPS: ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW
OMIT OVERLAPS: X

PRESS 'NEXT'

* TIME DEFAULTS TO TIME USED BY PHASE DURING NORMAL OPERATION

NOTE!

PROGRAM EXTEND TIME ON ALL 'OPTICOM' DETECTOR UNITS FOR 2 SEC.

PREEMPTION #4 SETTINGS (NEXT:1-10)
INTERVAL/TIMING CLEAR/DWELL PHASES
GRN YEL RED 12345678910111213141516
1 255 0.0*0.0* X X
2 0 0.0 0.0
3 0 0.0 0.0
4 0 0.0 0.0
5 0 0.0 0.0

EXIT CALLS

OPTIONS
PRIORITY (Y/N TO SELECT)MED
DELAY TIMER (0-255 SEC)0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0*
DWELL MIN TIMER (0-255 SEC)14
DWELL MAX TIMER (0=OFF,1-255MIN)0
DWELL HOLD-OVER TIMER (0-255)0
LATCH CALL?N
LINK TO NEXT PREEMPT?N
ENABLE BACKUP PROTECTION?N
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES?N
PED CLEARANCE THROUGH YELLOW?N
INHIBIT OVERLAP GREEN EXTENSION? ...N
SERVICE DURING SOFTWARE FLASH?N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL?N
ALLOW PDS IN DWELL INTERVAL?N
RE-TIME DWELL INTERVAL?N
OVERLAPS: ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW
OMIT OVERLAPS:

PRESS 'NEXT'

PREEMPTION #5 SETTINGS (NEXT:1-10)
INTERVAL/TIMING CLEAR/DWELL PHASES
GRN YEL RED 12345678910111213141516
1 255 0.0*0.0* X
2 0 0.0 0.0
3 0 0.0 0.0
4 0 0.0 0.0
5 0 0.0 0.0

EXIT CALLS

OPTIONS
PRIORITY (Y/N TO SELECT)MED
DELAY TIMER (0-255 SEC)0
MIN GREEN BEFORE PRE (0= DEFAULT)....1
PED CLEAR BEFORE PRE (0= DEFAULT)....0
YELLOW CLEAR BEFORE PRE (0= DEFAULT)0.0*
RED CLEAR BEFORE PRE (0= DEFAULT)....0.0*
DWELL MIN TIMER (0-255 SEC)7
DWELL MAX TIMER (0=OFF,1-255MIN)0
DWELL HOLD-OVER TIMER (0-255)0
LATCH CALL?N
LINK TO NEXT PREEMPT?N
ENABLE BACKUP PROTECTION?N
HOLD CLEAR 1 PHASES DURING DELAY? ...N
FAST GREEN FLASH DWELL PHASES?N
PED CLEARANCE THROUGH YELLOW?N
INHIBIT OVERLAP GREEN EXTENSION? ...N
SERVICE DURING SOFTWARE FLASH?N
REST IN RED DURING DWELL INTERVAL? ..N
FLASH DWELL INTERVAL?N
ALLOW PDS IN DWELL INTERVAL?N
RE-TIME DWELL INTERVAL?N
OVERLAPS: ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW
OMIT OVERLAPS:

PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS 'B' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

PRESS '+' OR '-' TO POSITION ON OVERLAP B

PAGE 1: VEHICLE OVERLAP 'B' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: X
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC).....0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE: 12345678910111213141516
VEH OVL PARENTS: XX
VEH OVL NOT VEH:
VEH OVL NOT PED:
VEH OVL GRN EXT:
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).....0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)...0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0

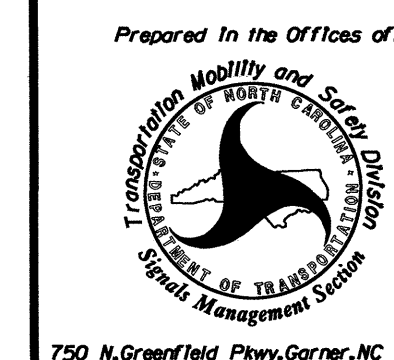
OVERLAP PROGRAMMING COMPLETE

← NOTICE GREEN FLASH

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 01-0221
DESIGNED: March 2010
SEALED: 08/24/10
REVISED:

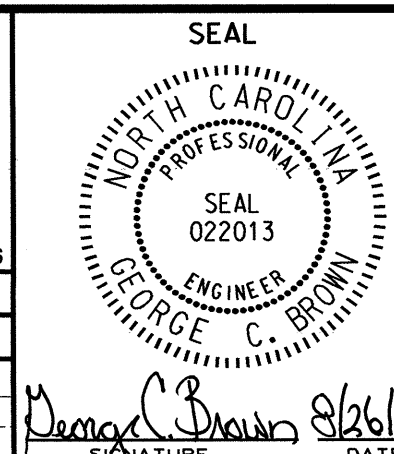
ELECTRICAL DETAIL - FINAL - SHEET 2 OF 2

ELECTRICAL AND PROGRAMMING DETAILS FOR:



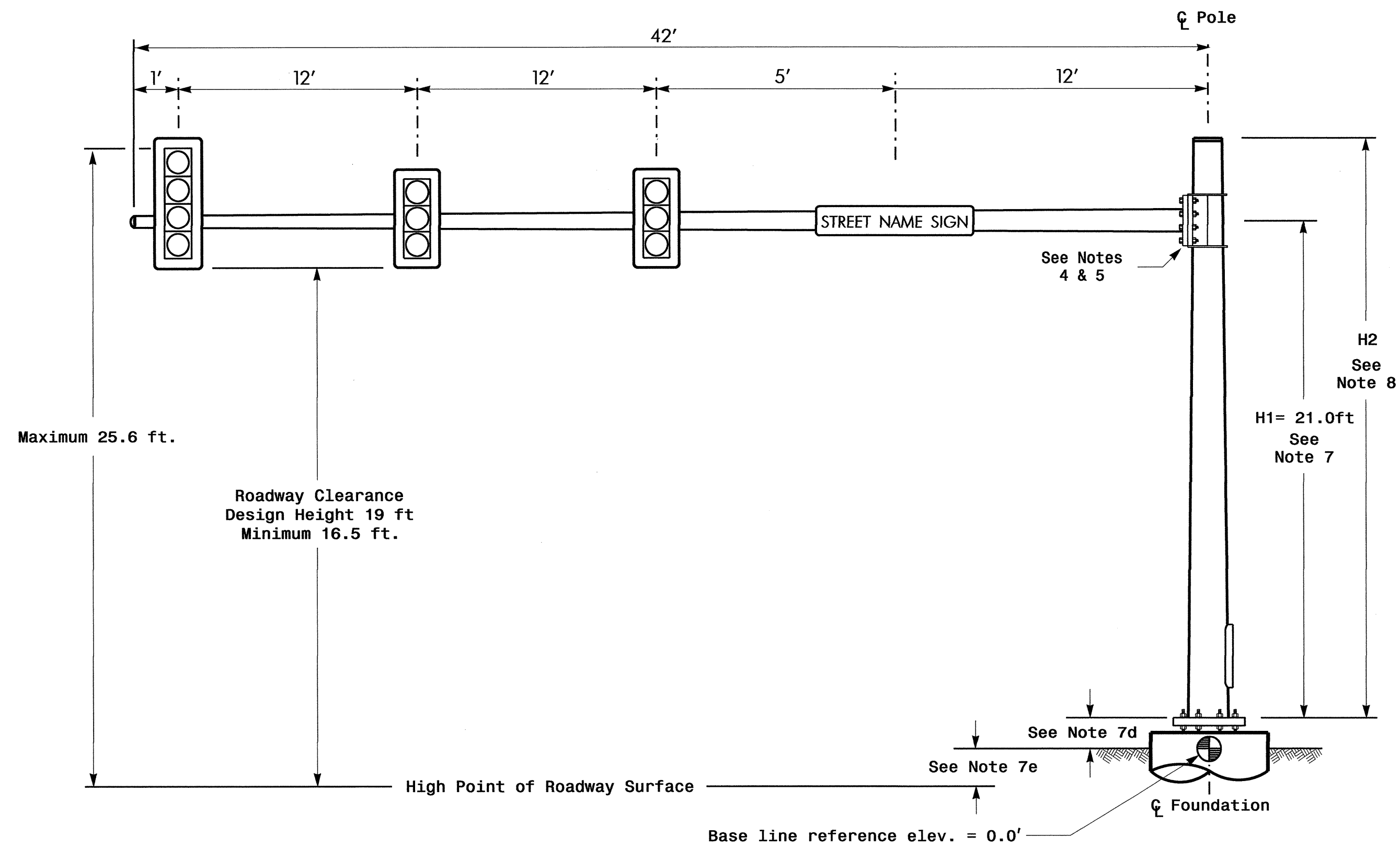
750 N. Greenfield Pkwy, Garner, NC 27529

Division 1		Camden County		Belcross	
PLAN DATE: August 2010	REVIEWED BY: T. Jaffe				
PREPARED BY: C. Strickland	REVIEWED BY:				
REVISIONS	INIT.	DATE			



SIG. INVENTORY NO. 01-0221

Design Loading for METAL POLE NO. 7

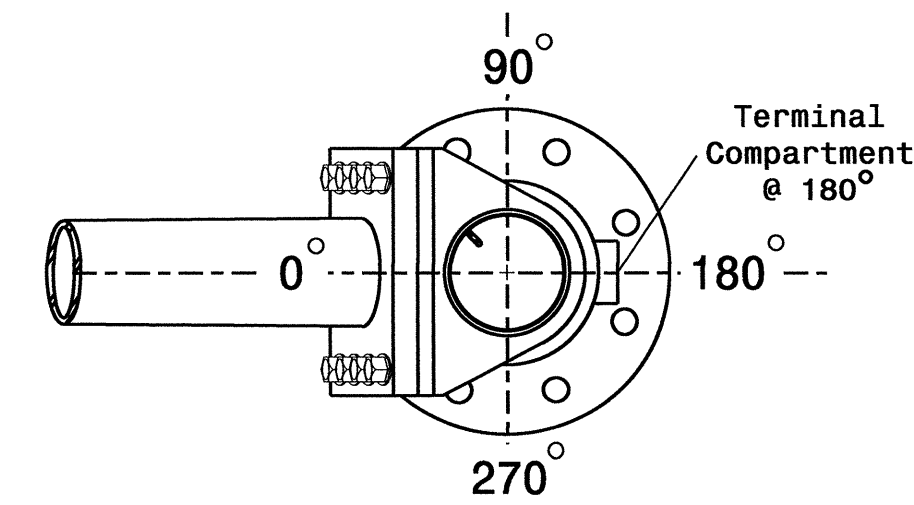


Elevation View

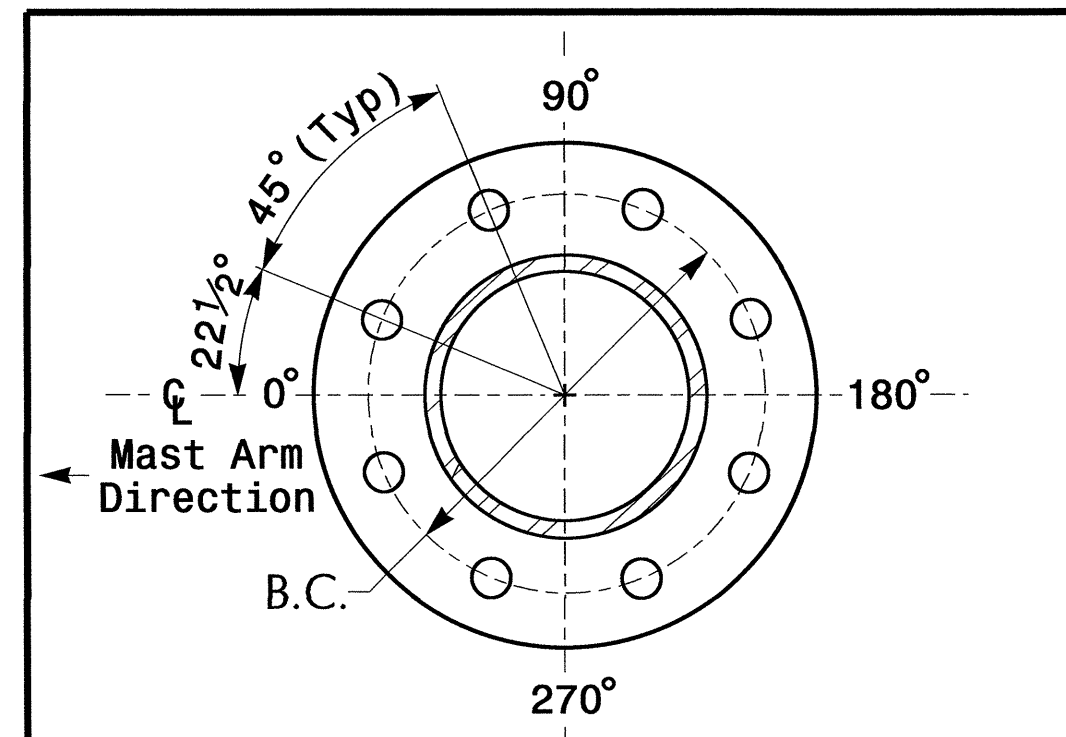
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

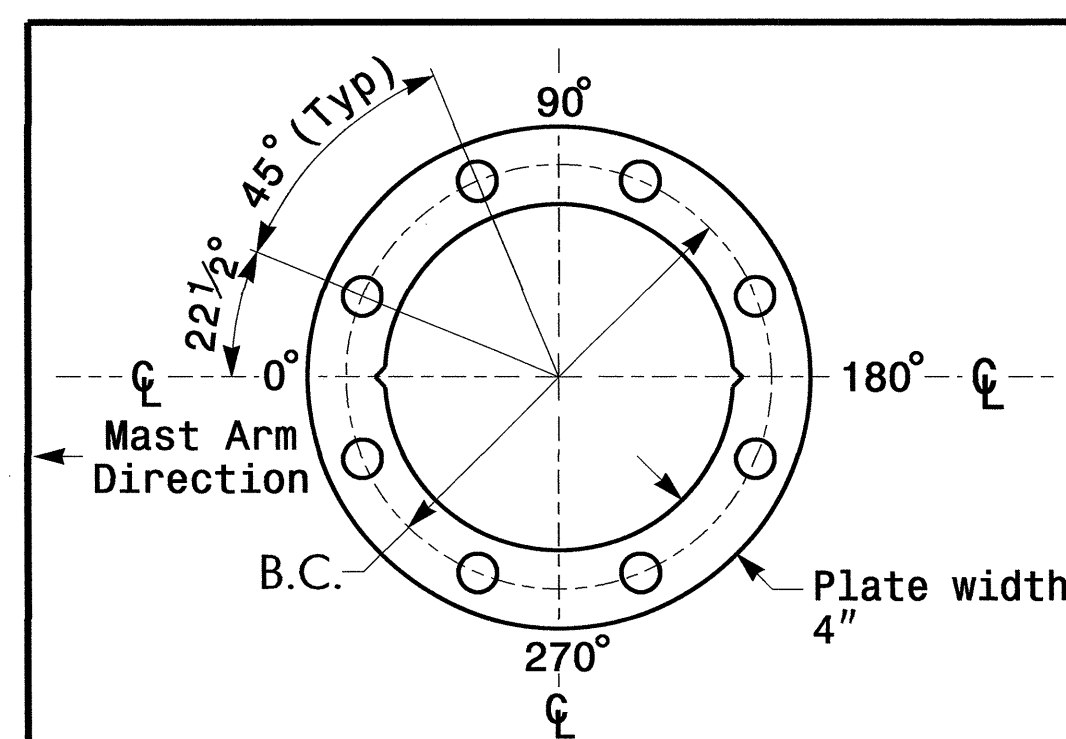
Elevation Differences for:	Pole 7
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+/- 0.0ft.
Elevation difference at Edge of travelway or face of curb	NA



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

Design Requirements

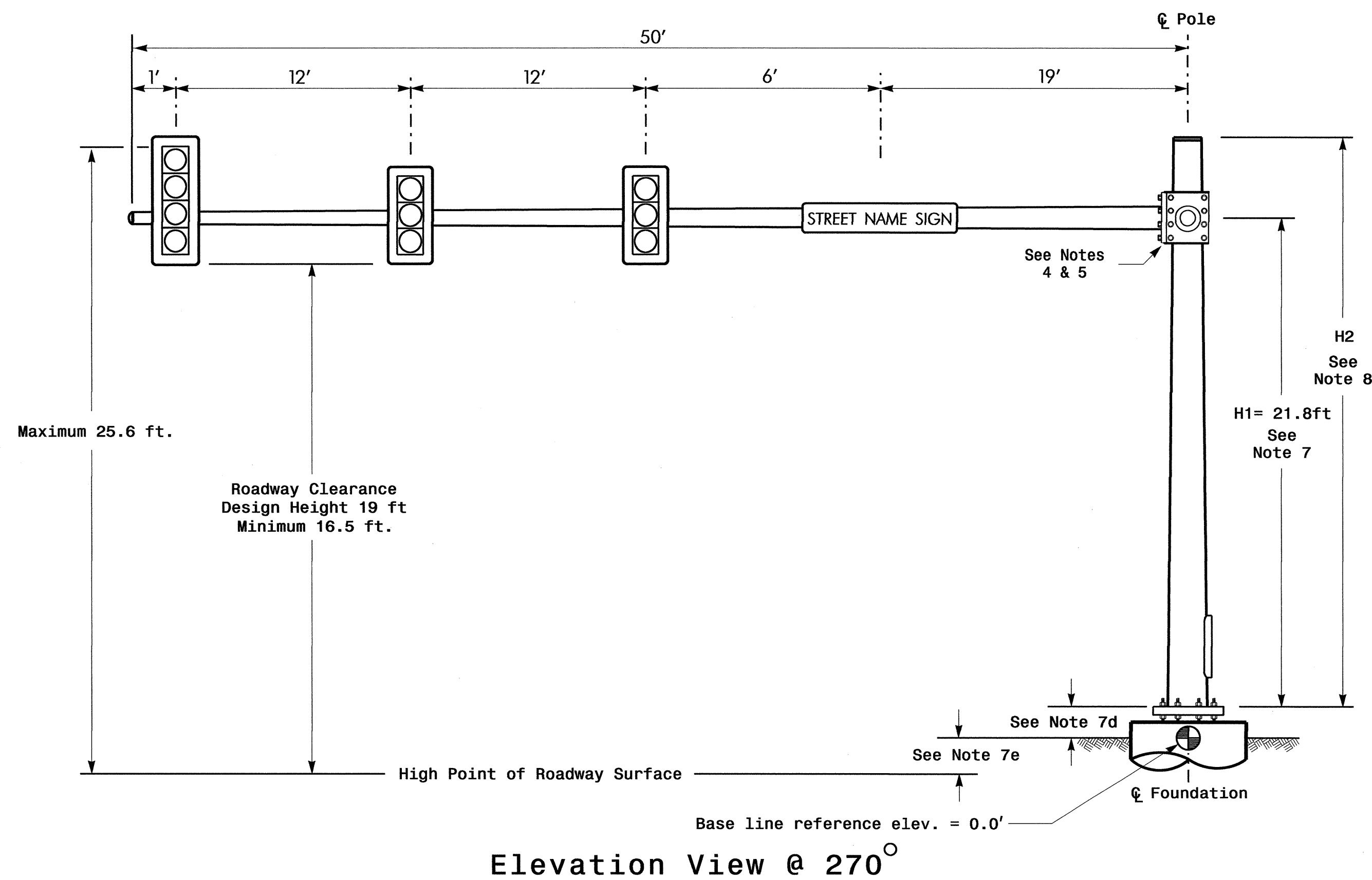
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for 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.
- 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.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- 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.
- 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- 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 2 (130 mph)

Prepared in the Offices of:

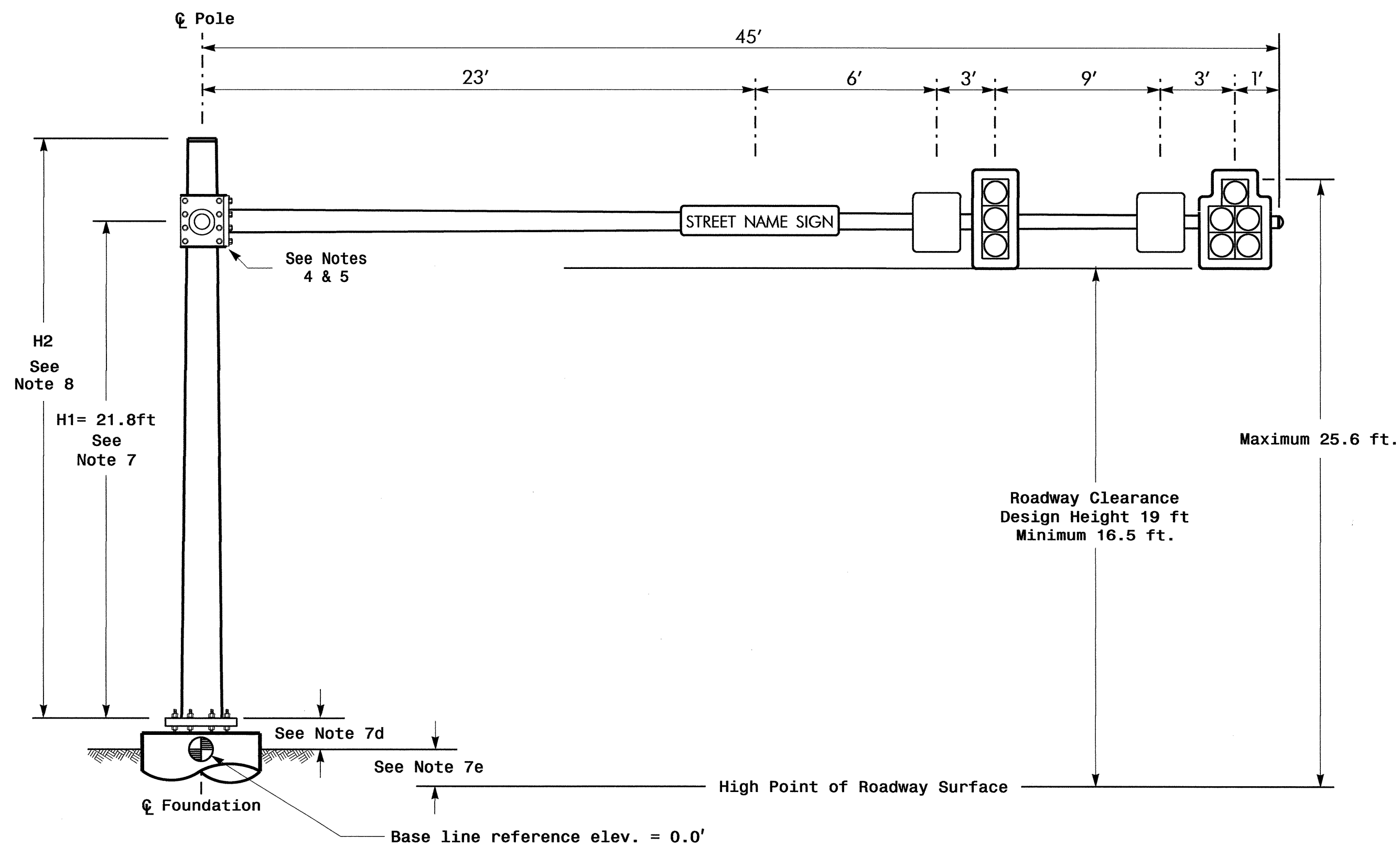
 US 158 At NC 34
 Division 1 Camden County Belcross
 PLAN DATE: May 2010 REVIEWED BY: PLA
 PREPARED BY: JPG REVIEWED BY:
 SCALE: 0 N/A
 REVISIONS: N/A
 INIT. DATE
 SIGNATURE:
 DATE: 9/3/10
 SEAL: 29904
 SEAL: 29904
 SIG. INVENTORY NO. 01-0221

Design Loading for METAL POLE NO. 8, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 8, MAST ARM B



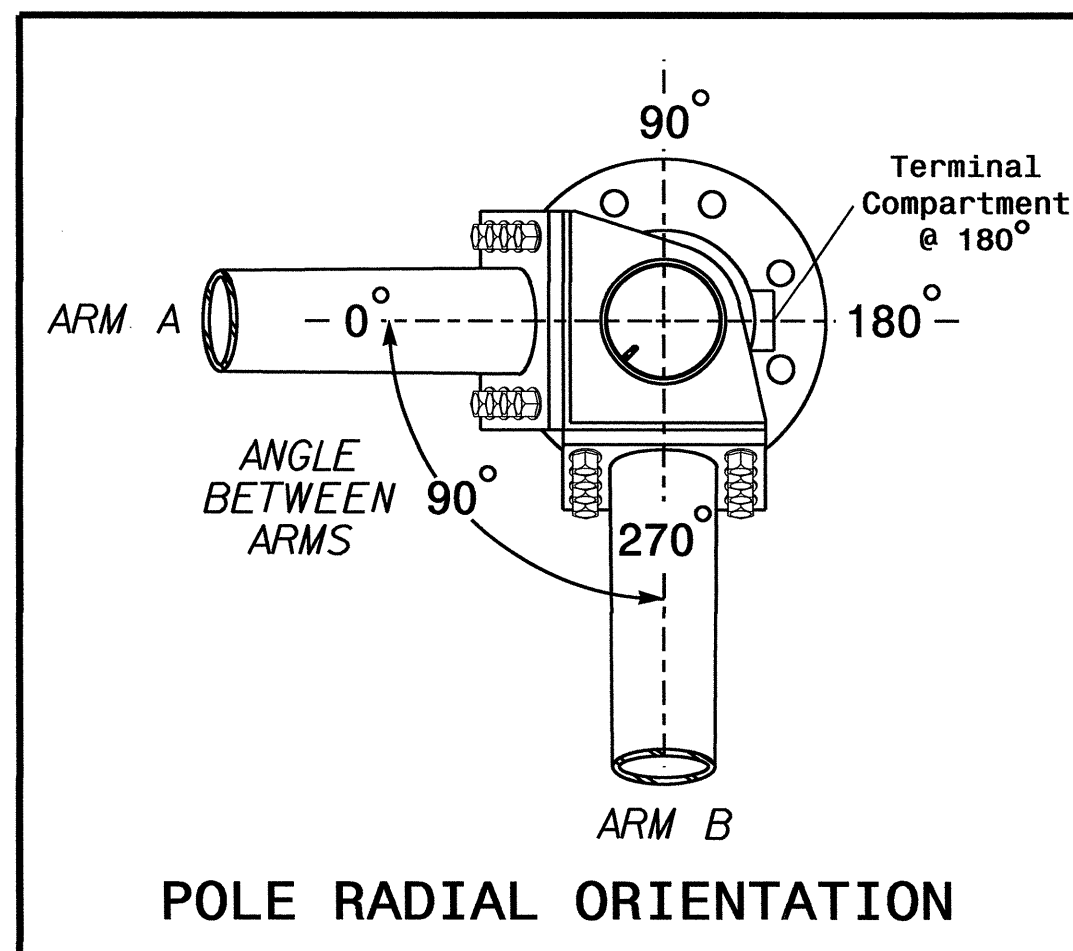
Elevation View @ 0°

SPECIAL NOTE

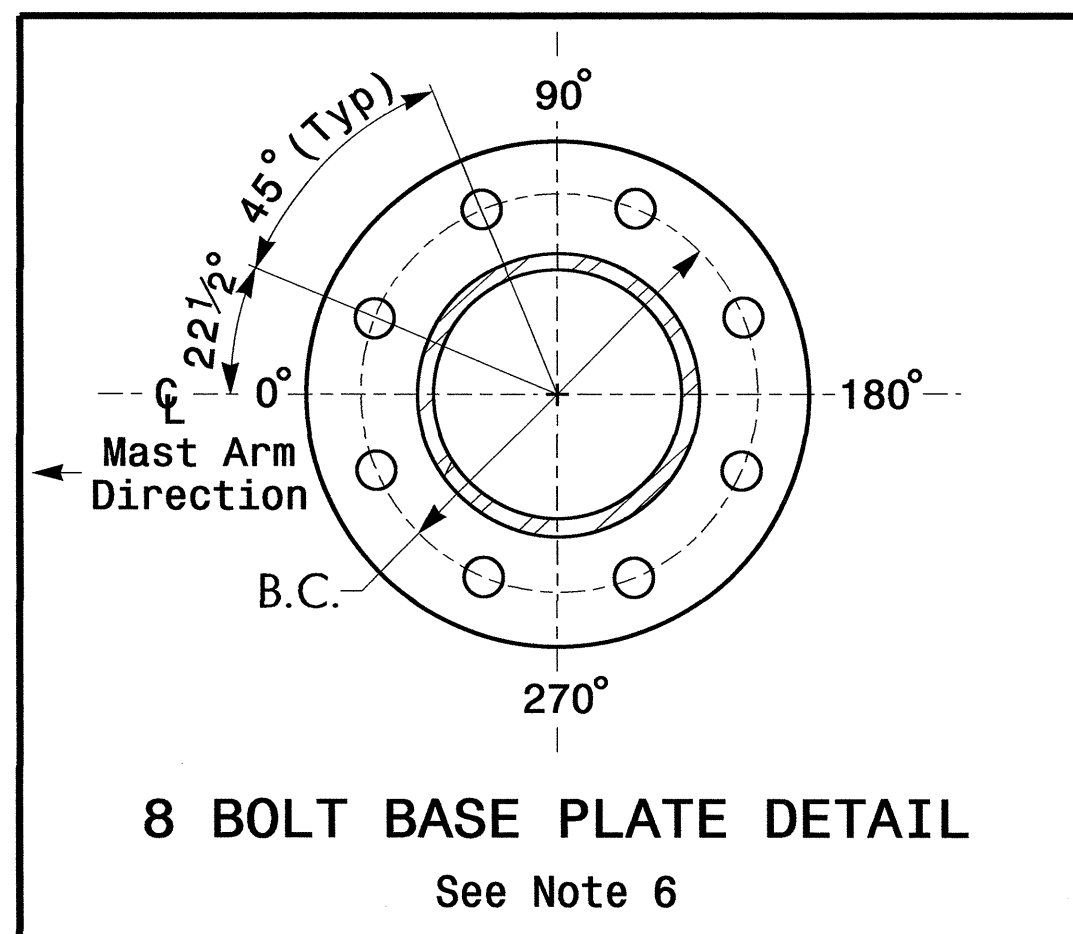
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

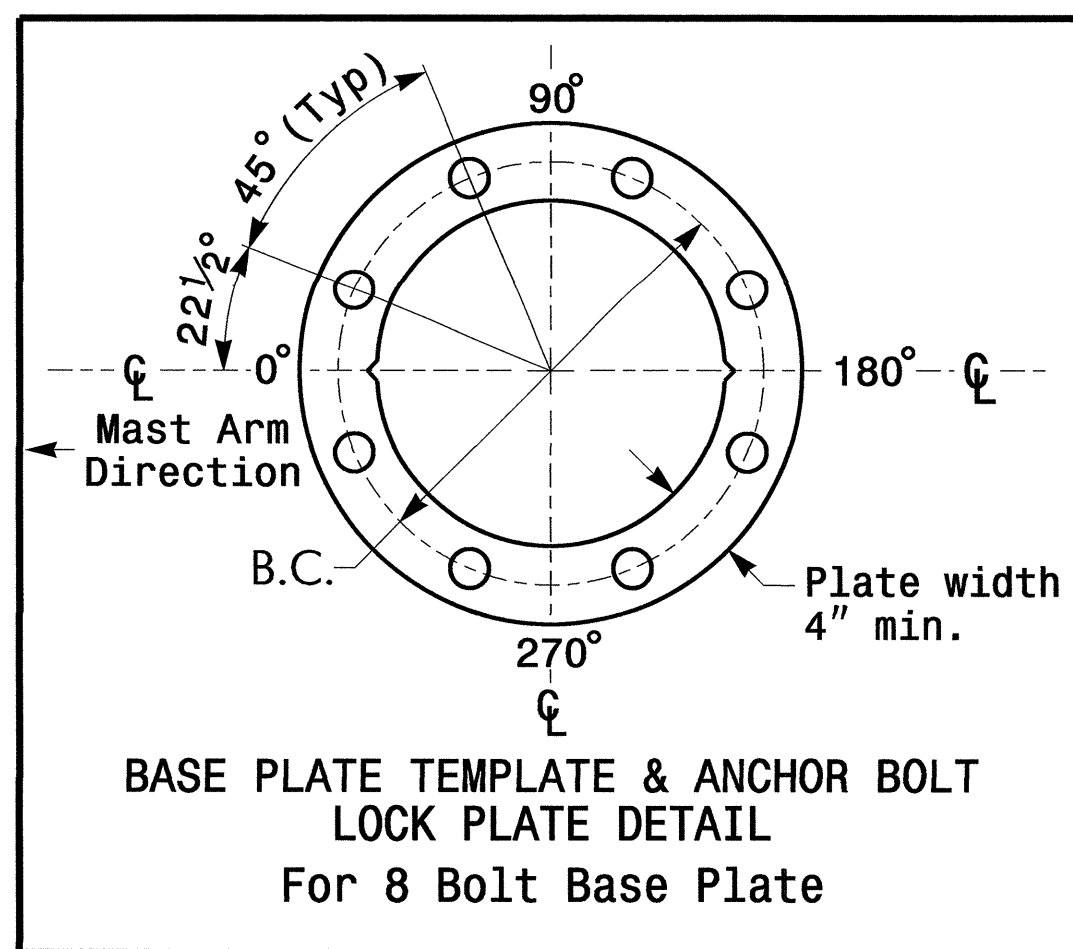
Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.8 ft.	+0.8 ft.
Elevation difference at Edge of travelway or face of curb	NA	NA



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-5 SECTION-WITH BACKPLATE AND ASTRO-BRAC	16.3 S.F.	42.0" W X 56.0" L	103 LBS
	SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE AND ASTRO-BRAC	11.5 S.F.	25.5" W X 66.0" L	74 LBS
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	5.0 S.F.	24.0" W X 30.0" L	11 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
 - The 4th Edition 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2006 NCDOT "Standard Specifications for Roads and Structures". The latest addenda to these specifications can be found in the traffic signal project special provisions.
 - The 2006 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <http://www.ncdot.org/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

Design Requirements

- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- The camber design for 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.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is .75 feet above the ground elevation.
 - Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
- The pole manufacturer will determine the total height (H2) of the 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.
- 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 Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

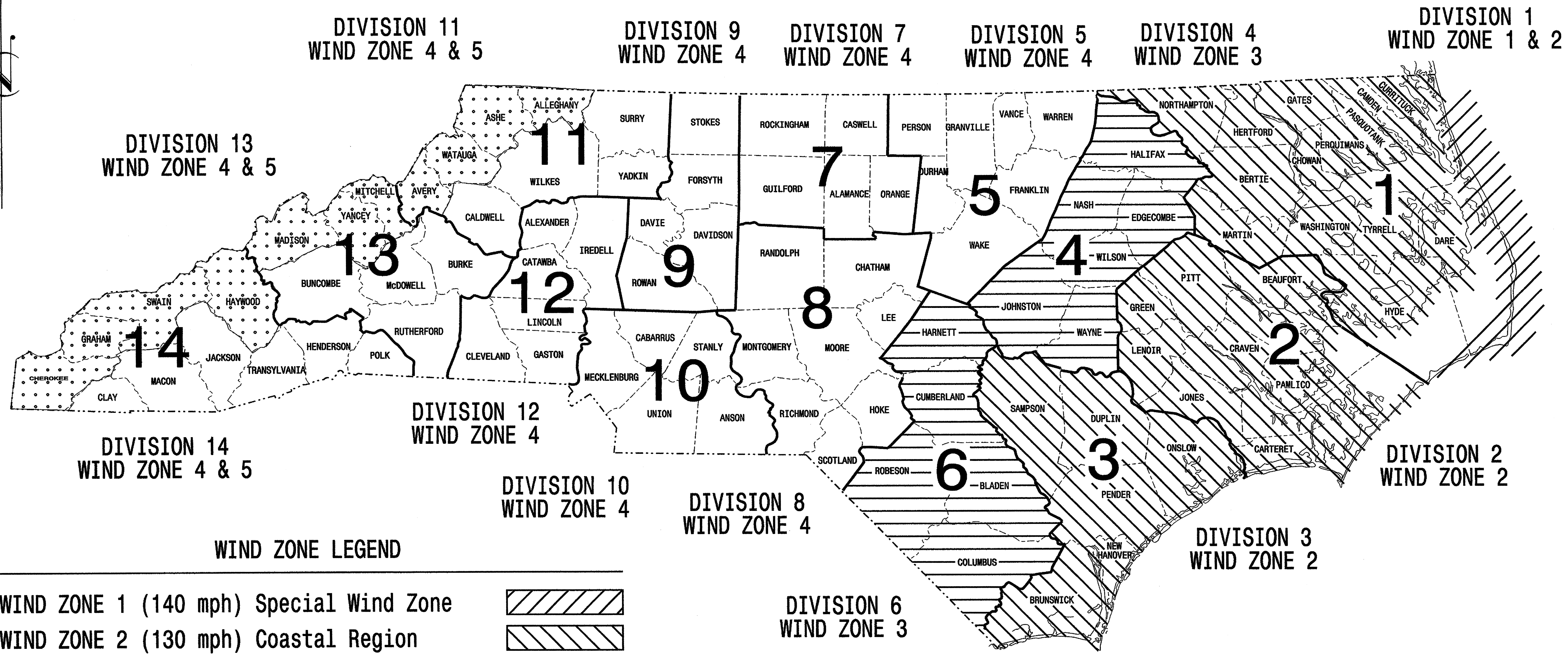
NCDOT Wind Zone 2 (130 mph)

	Prepared in the Offices of: US 158 At NC 34		
	Division 1 PLAN DATE: May 2010 PREPARED BY: JPG SCALE: N/A	Camden County REVIEWED BY: PLA REVIEWED BY:	

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	R-2414B	Sig. 44
F.A. PROJ. NO.	M 1	
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES



WIND ZONE LEGEND

WIND ZONE 1 (140 mph) Special Wind Zone		
WIND ZONE 2 (130 mph) Coastal Region		
WIND ZONE 3 (110 mph) Eastern Region		
WIND ZONE 4 (90 mph) Central & Mtn. Region		
WIND ZONE 5 (120 mph) Special Wind Zone		

<http://www.ncdot.org/doh/preconstruct/traffic/ITS/ws/mpoles/poles.html>

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

Designed in conformance
with the
2002 Interim to the
4th Edition 2001
AASHTO
Standard Specifications for
Structural Supports for
Highway Signs, Luminaires,
and Traffic Signals

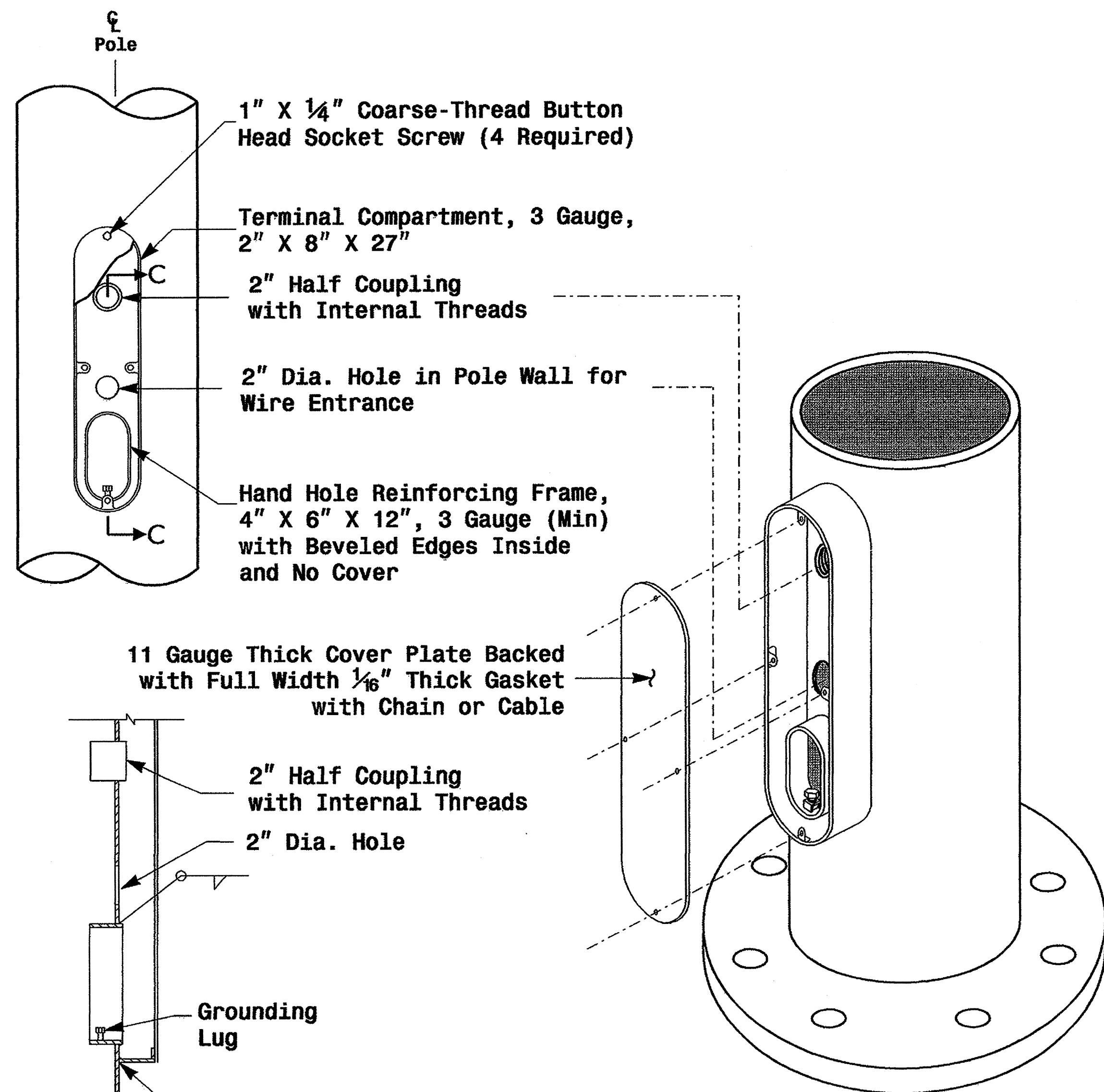
INDEX OF PLANS	
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

NCDOT CONTACTS:
MOBILITY AND SAFETY DIVISION - ITS and SIGNALS UNIT

G. A. Fuller, P.E. - State ITS and Signals Engineer
 G. G. Murr, Jr., P.E. - State Signals Engineer
 D. C. Sarkar, P.E. - ITS and Signals Senior Structural Engineer
 C. F. Andrews, Jr. - ITS and Signals Structural Project Engineer
 M. Aslam - ITS and Signals Structural Project Engineer
 N. Bitting, P.E. - ITS and Signals Structural Project Engineer

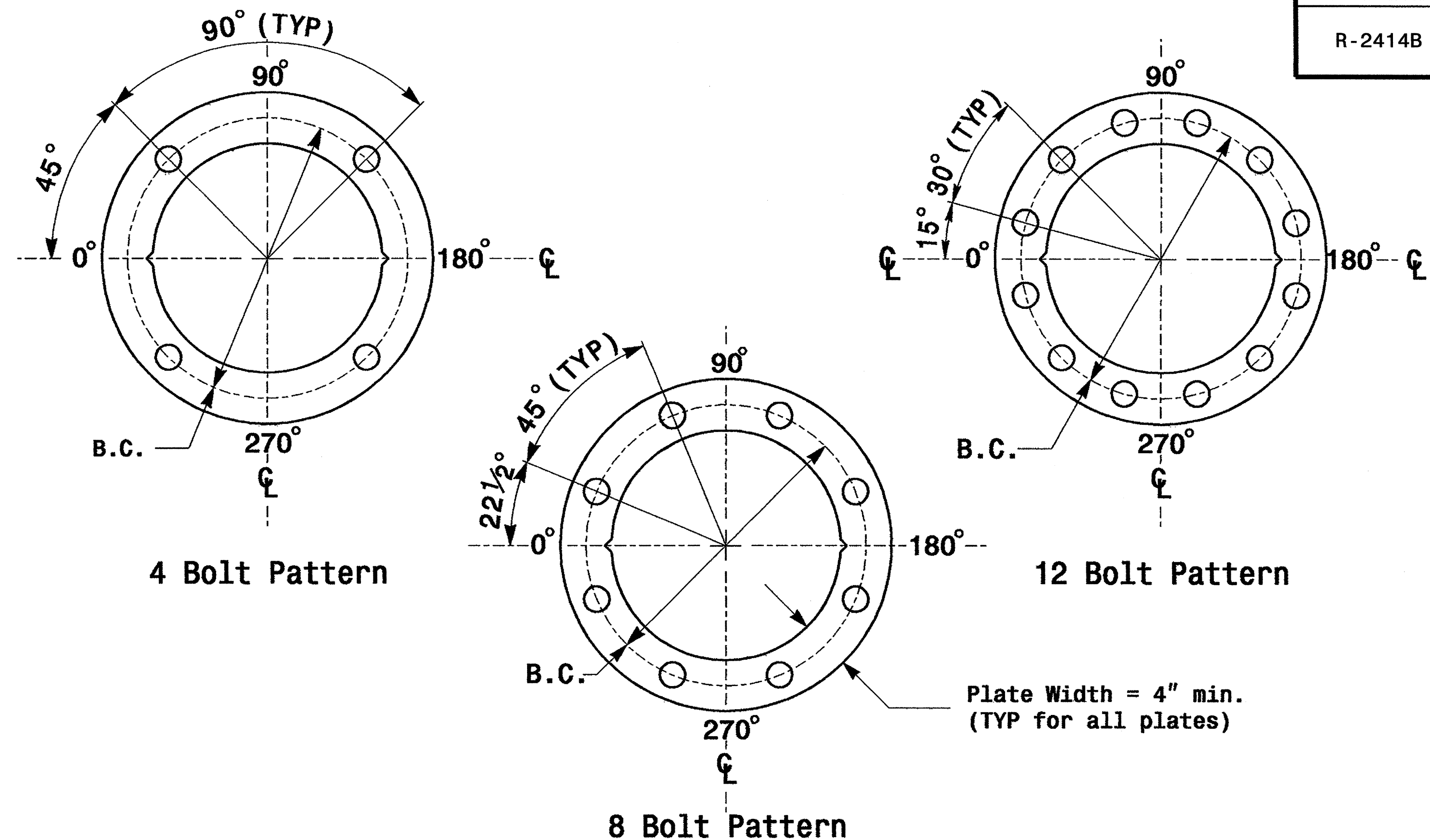
SEAL

D. Sarkar 7.21.2009
 SIGNATURE DATE



Note: Unless otherwise specified, locate Terminal Compartment 1 foot above the pole base plate at 180 degrees on the pole's radial index.

Terminal Compartment Detail



Construct Templates and Plates from 1/4" min. thick Steel. Galvanizing is not required.
Base Plate Template and Anchor Bolt Lock Plate Details

MFG _____	MFG. DATE: MM/YY _____
SHAFT D/T/L/Y _____	
ARM-A D/T/L/Y _____	
ARM-B D/T/L/Y _____	
A.B. DIA./B.C./L/Y _____	
NCDOT STANDARD _____	

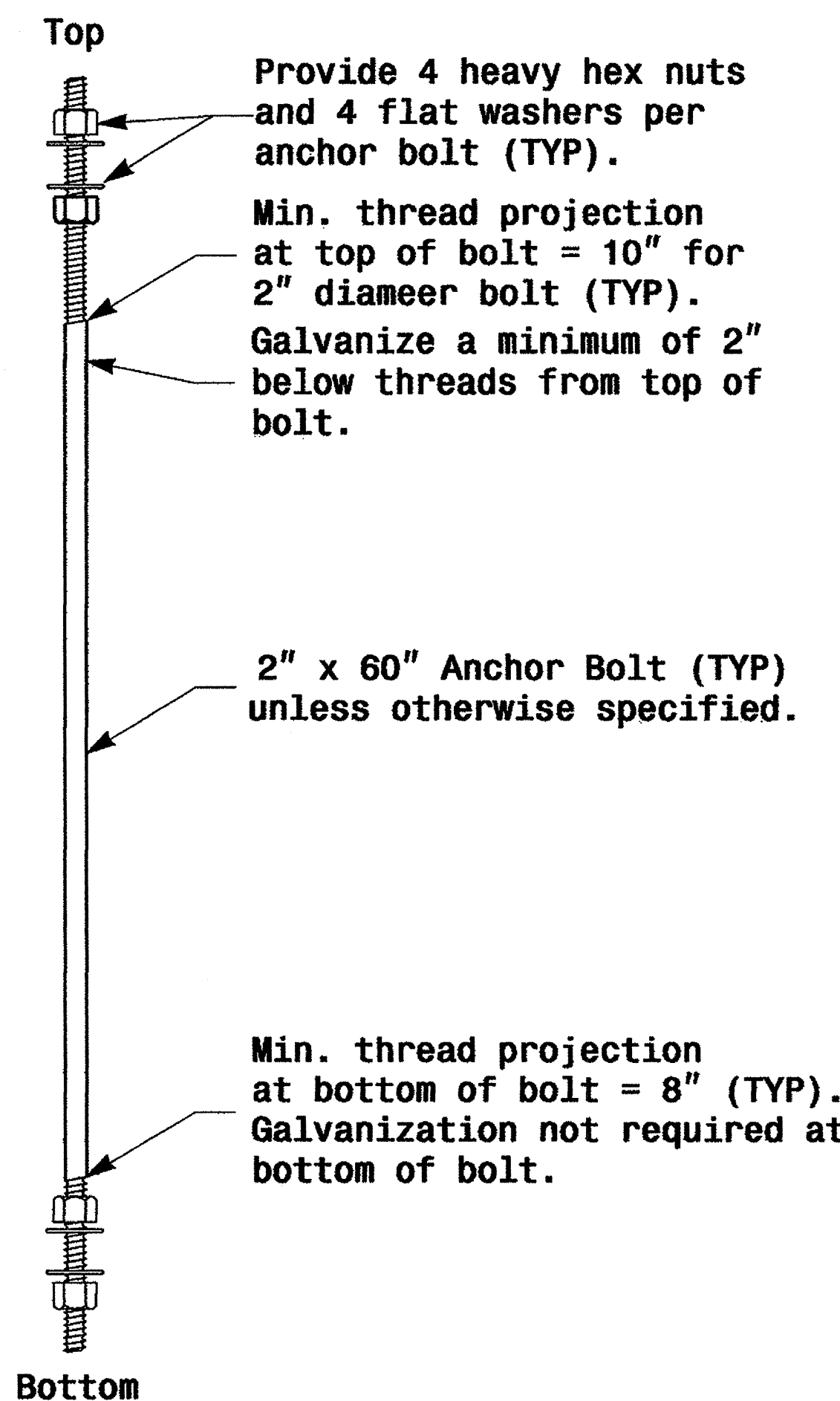
Shaft I.D. Tag
 (Provide on Strain Poles and Mast Arm Poles)

- Notes:
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
 - 2) A.B. = Anchor Bolt
 - 3) B.C. = Bolt Circle of Anchor Bolts
 - 4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
 - 5) See drawing M4 for mounting positions of I.D. tags.

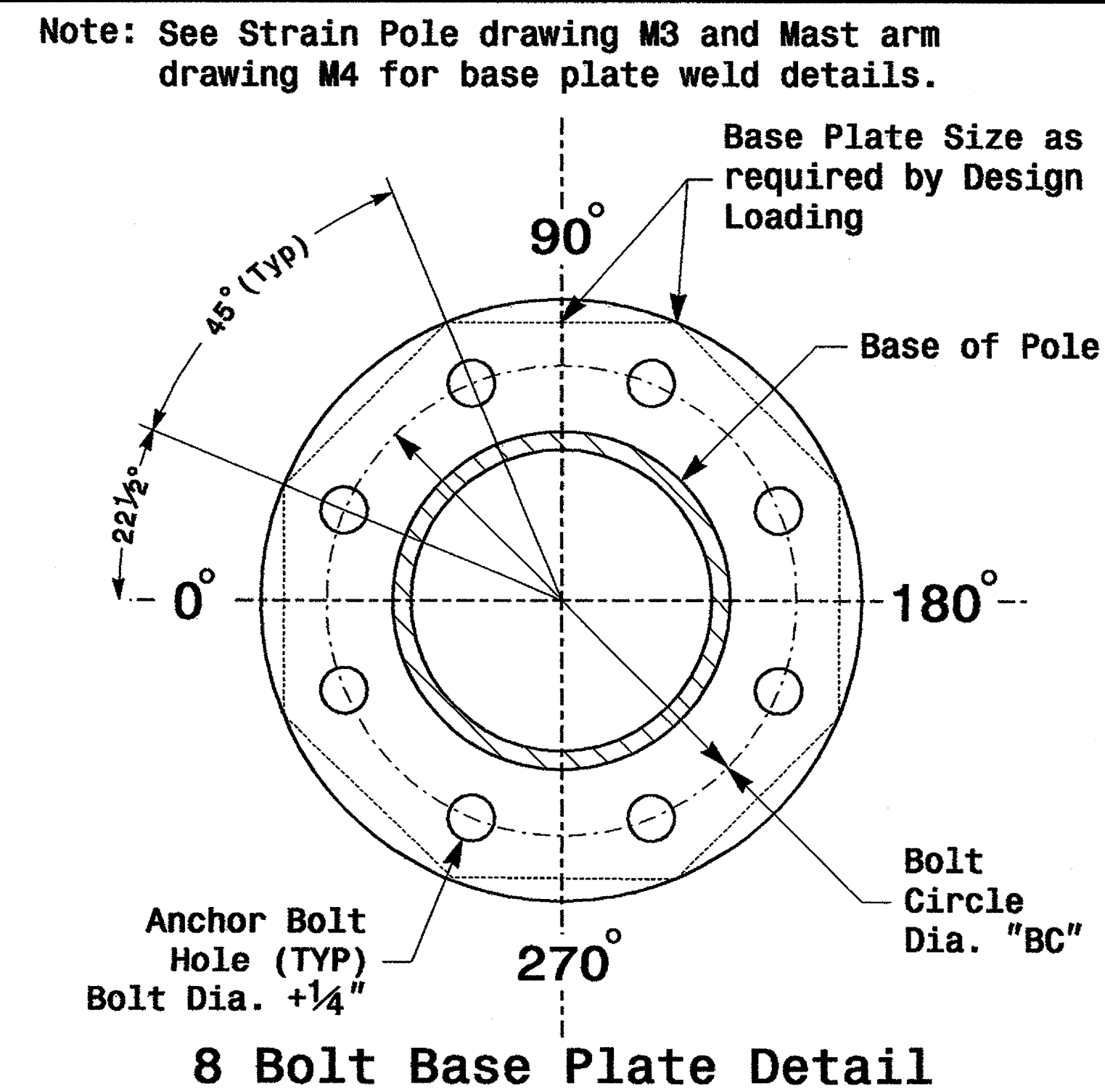
Identification Tag Details

MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	
NCDOT STANDARD _____	

Arm I.D. Tag
 (Provide on each section of a multi-section mast arm)



Anchor Bolt Detail



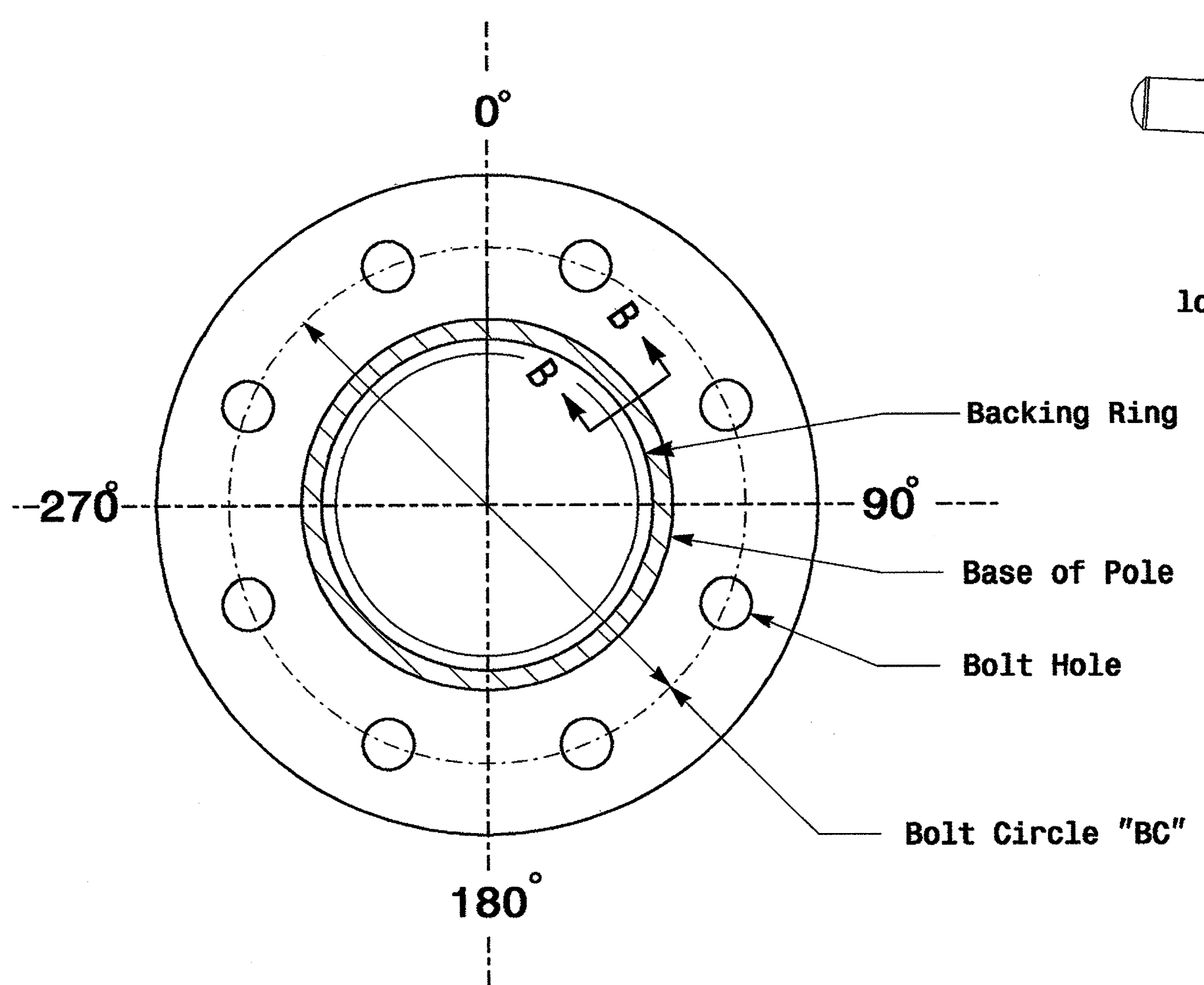
8 Bolt Base Plate Detail

	Typical Fabrication Details Common To All Metal Poles		SEAL INDIAN H. CAROLINA PROFESSIONAL ENGINEER DEBESH C. SARKAR 028094 9.2.2005 DATE SIG. INVENTORY NO.
	PREPARED BY: P.L. Alexander REVISIONS: _____ SCALE: 0 NA NONE	MAY DATE: May 2005 REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito	

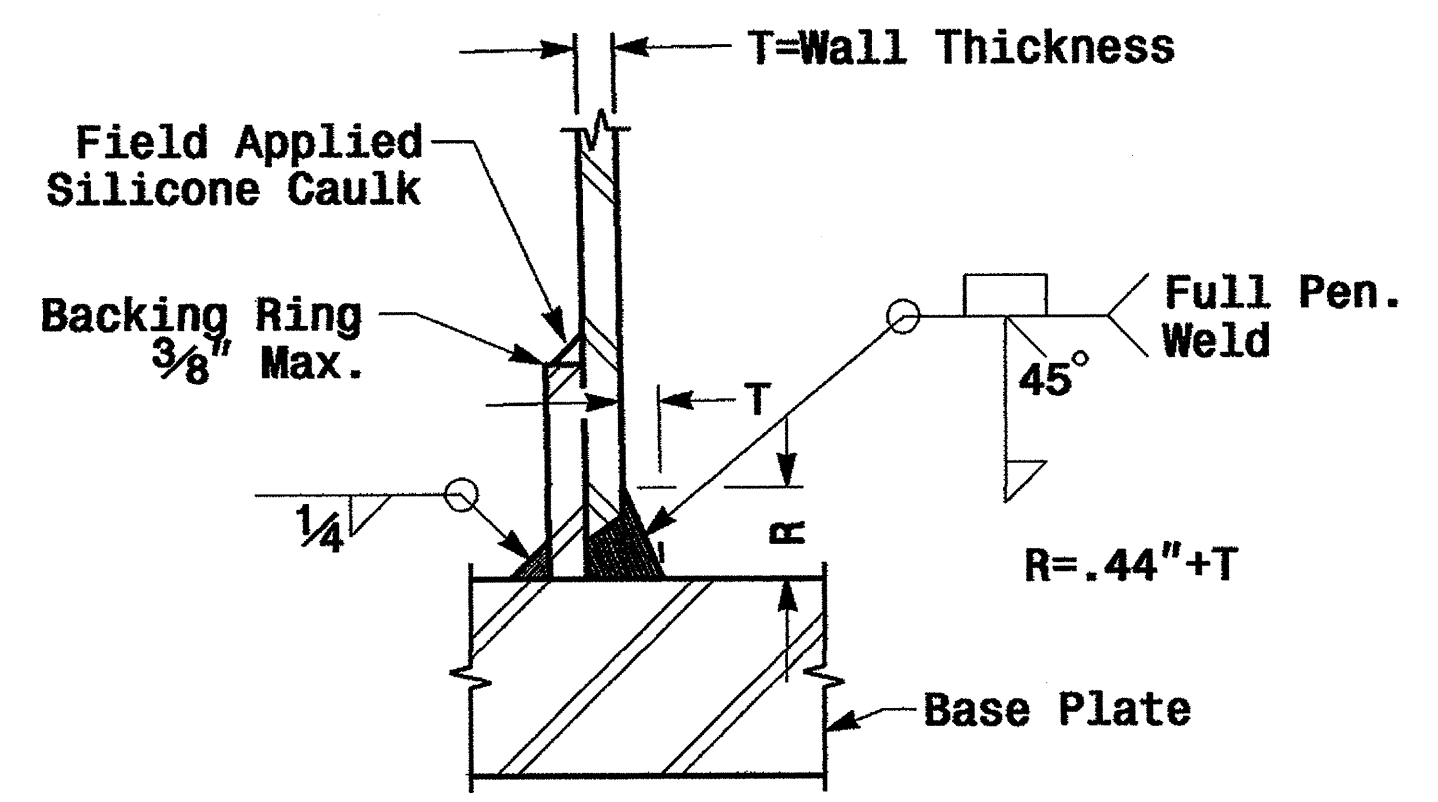
Fabrication Details - All Poles

01-SEP-2005 18:22 D:\2004 Metal Pole Standards\2004.m2 thru m5.dgn

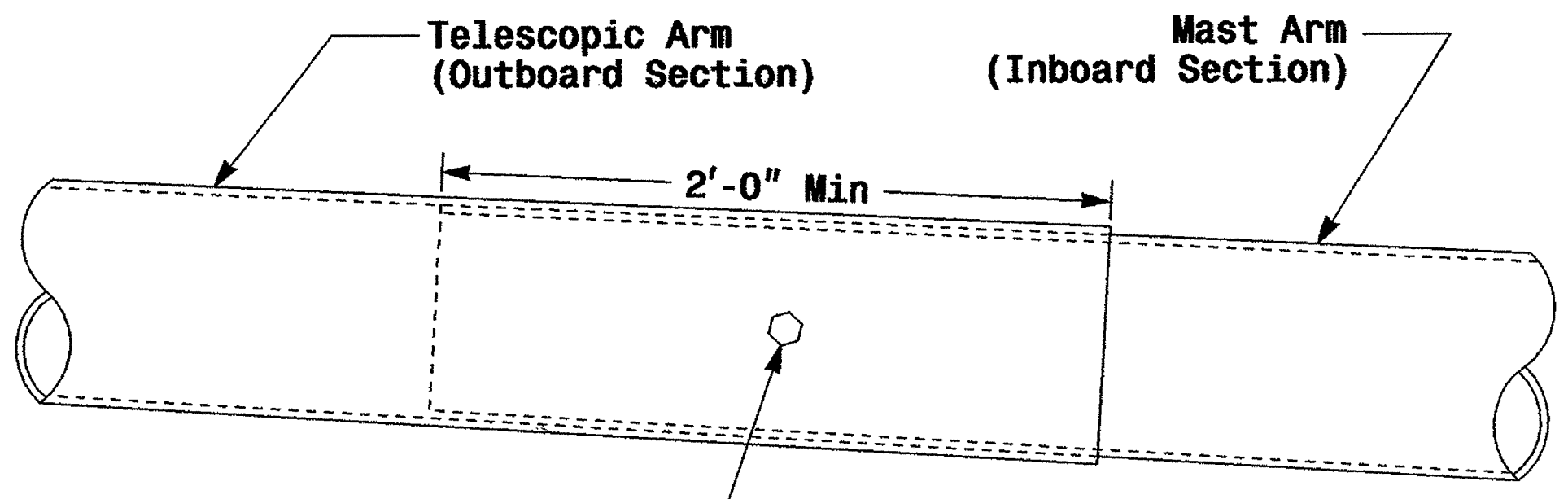
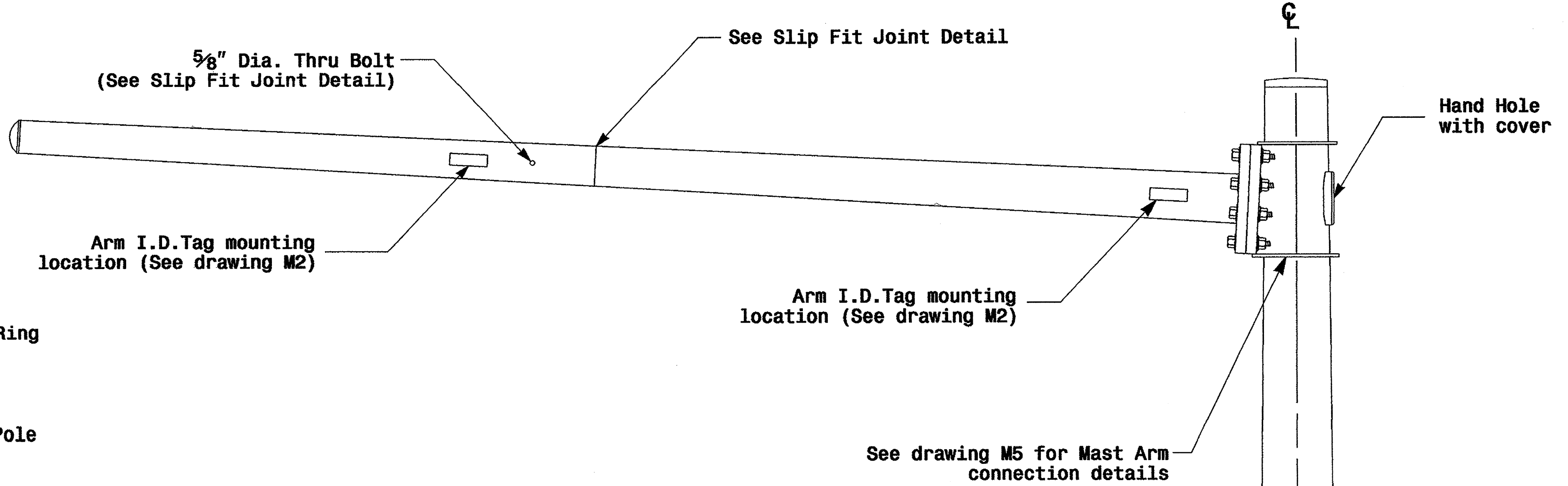
Fabrication Details - Mast Arm Poles



Section A-A
(See drawing M 2)
Pole Base Plate

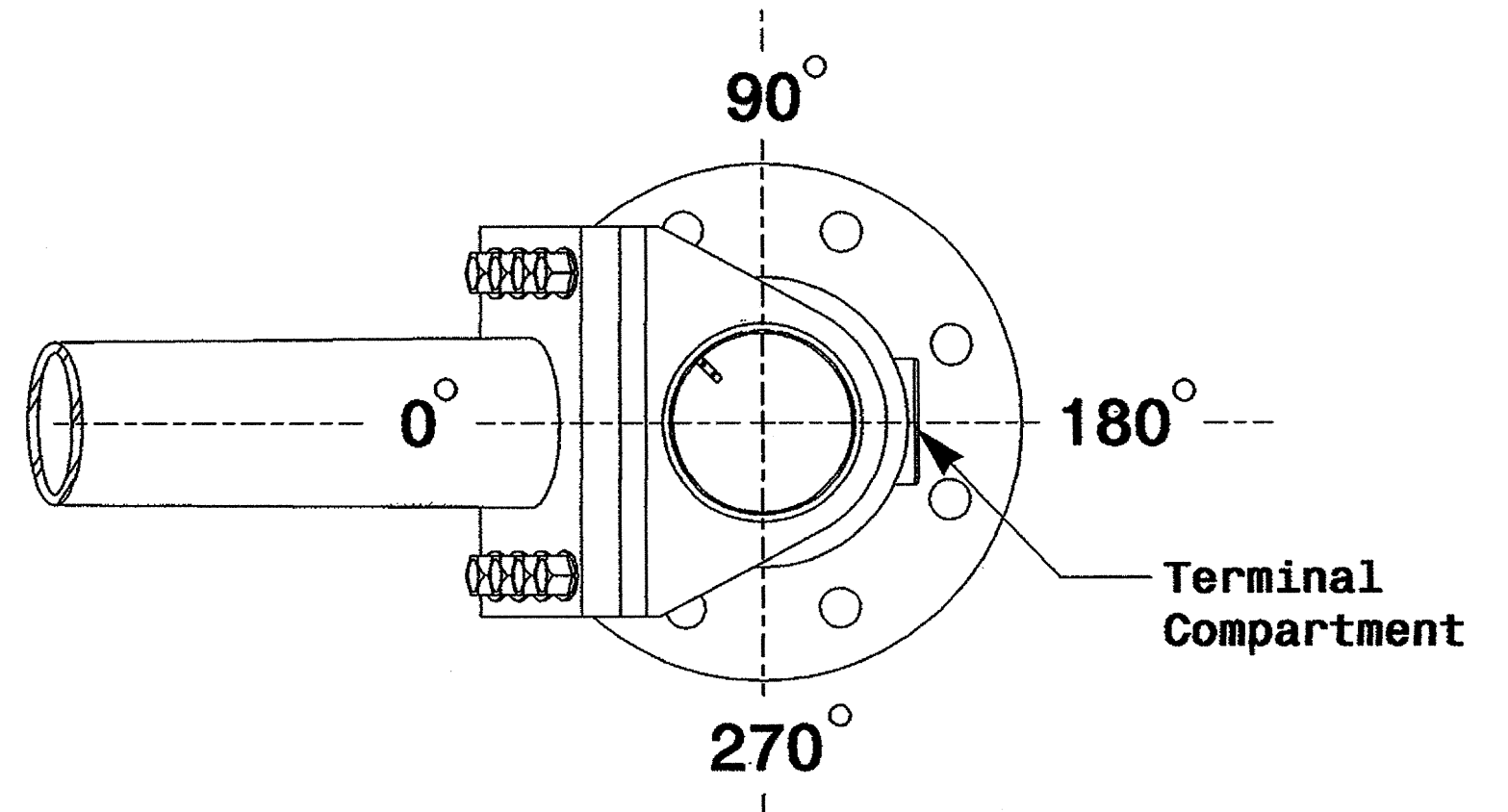


Section B-B
(Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail

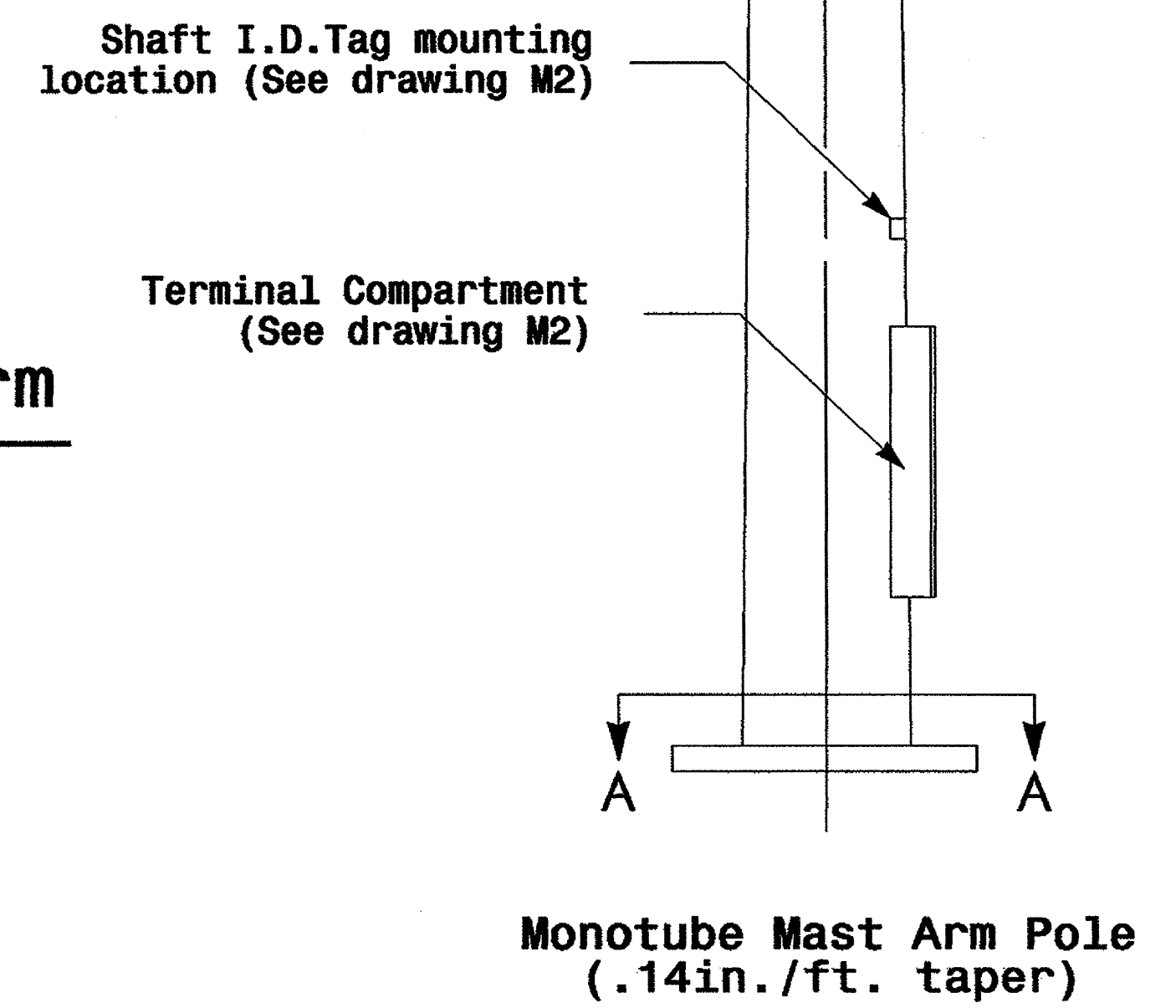


3/4" Factory Drilled Hole in Outboard Tube. Field Drill Inboard Tube. 5/8" Galvanized Thru Stud with (2) Hex. Locknuts Ea.

Slip Fit Joint Detail for Mast Arm



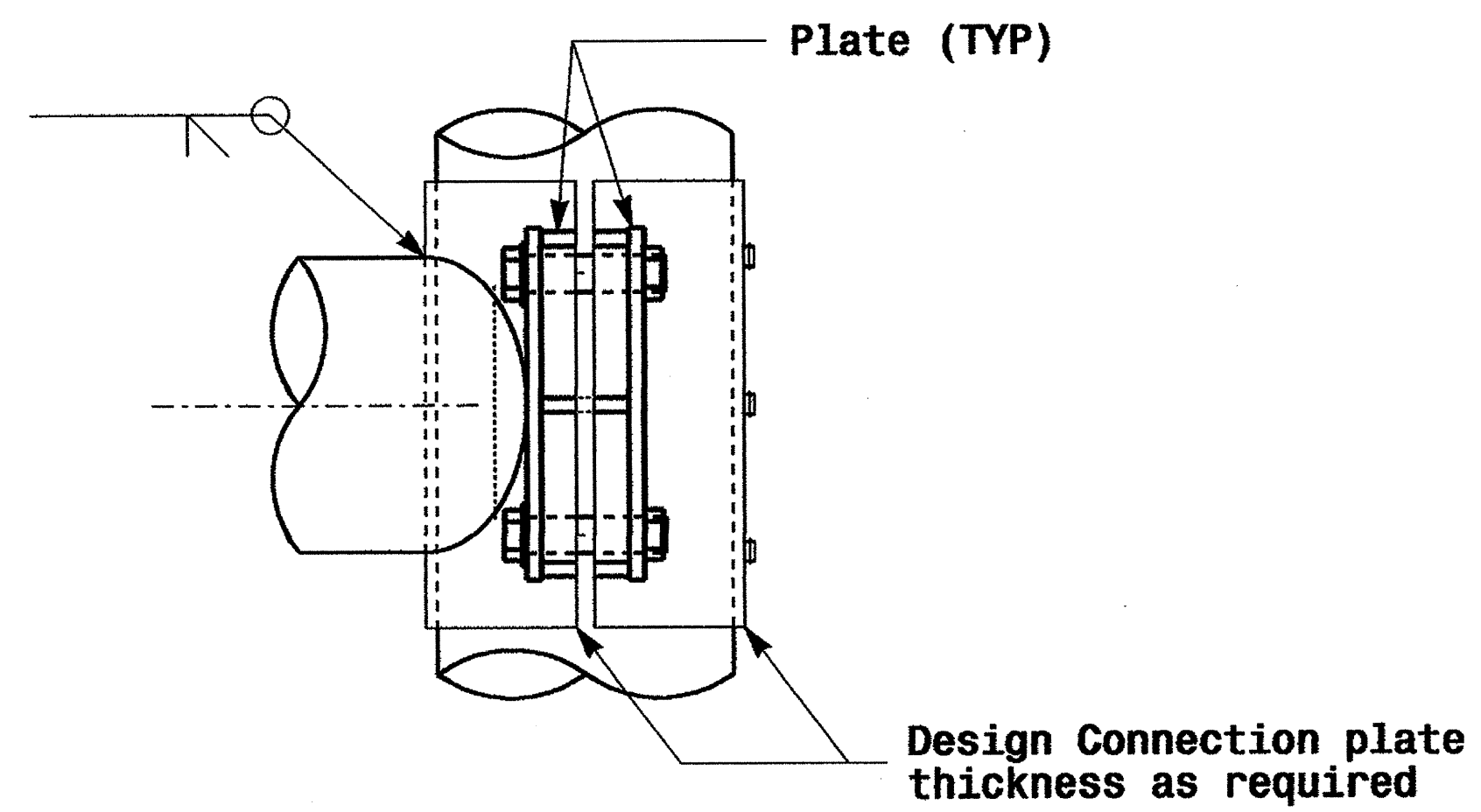
Mast Arm Radial Orientation



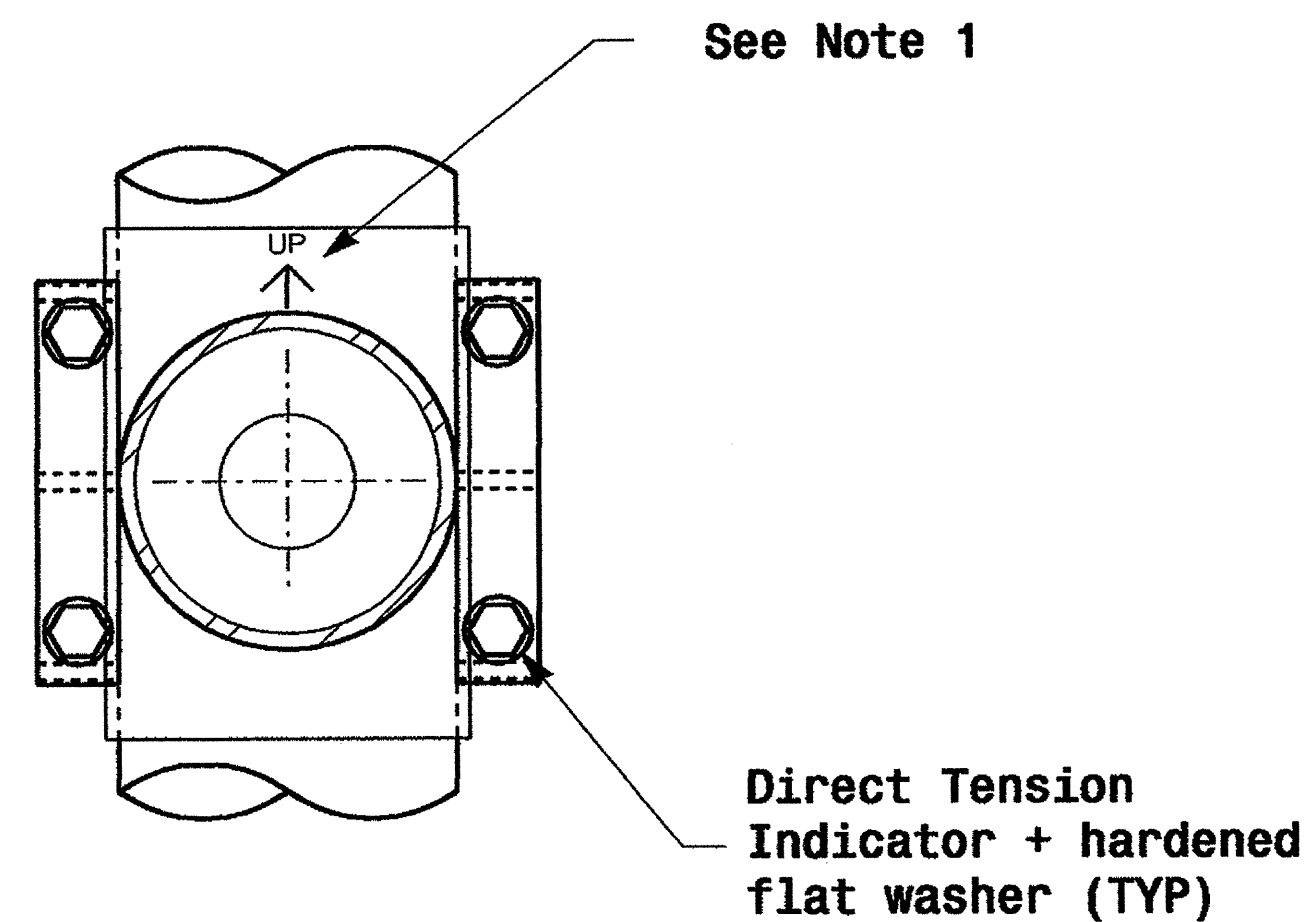
	Typical Fabrication Details for Mast Arm Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito	
REVISIONS: _____ INIT.: _____ DATE: _____		SIGNATURE: <i>P.L. Alexander</i> DATE: 9.2.2005	SIG. INVENTORY NO.: _____

01-SEP-2005 14:08
ar:peop:lee-unl:hpw:gr:groups:004:metal:pole:et:standard:004:ml-dgn

Adjustable Clamp Type Bolted Mast Arm Connection

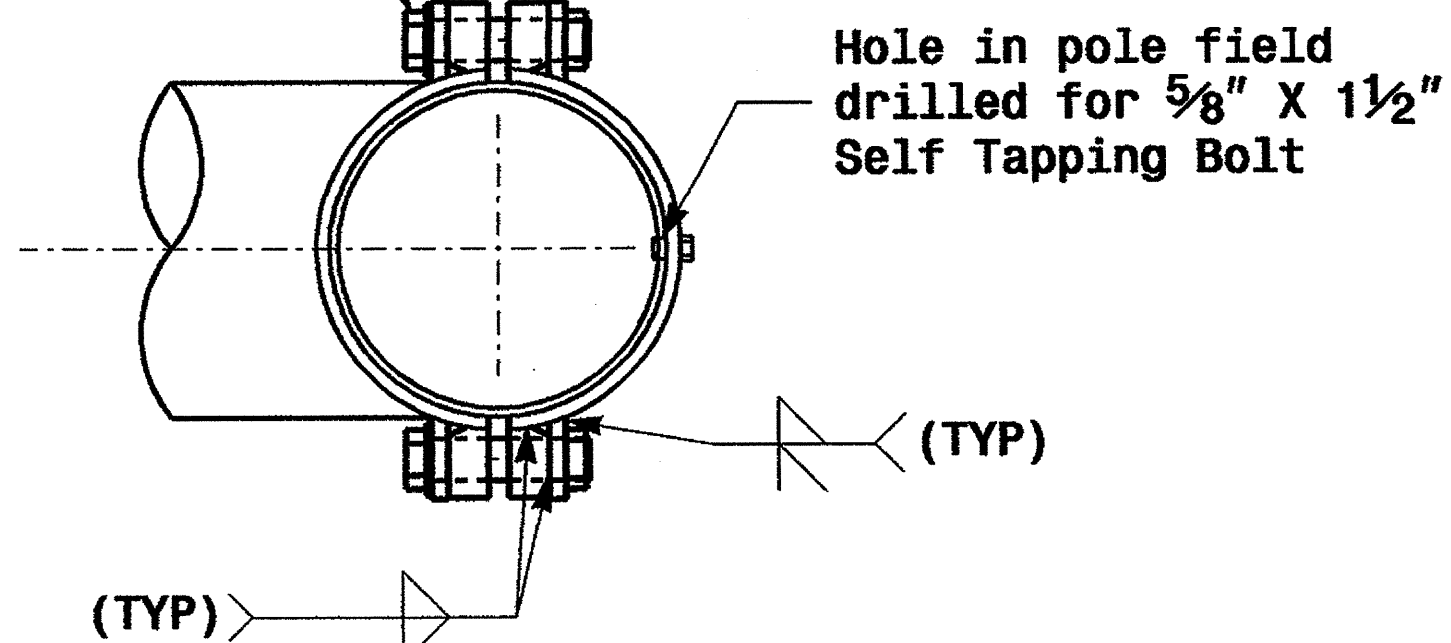


Side Elevation View



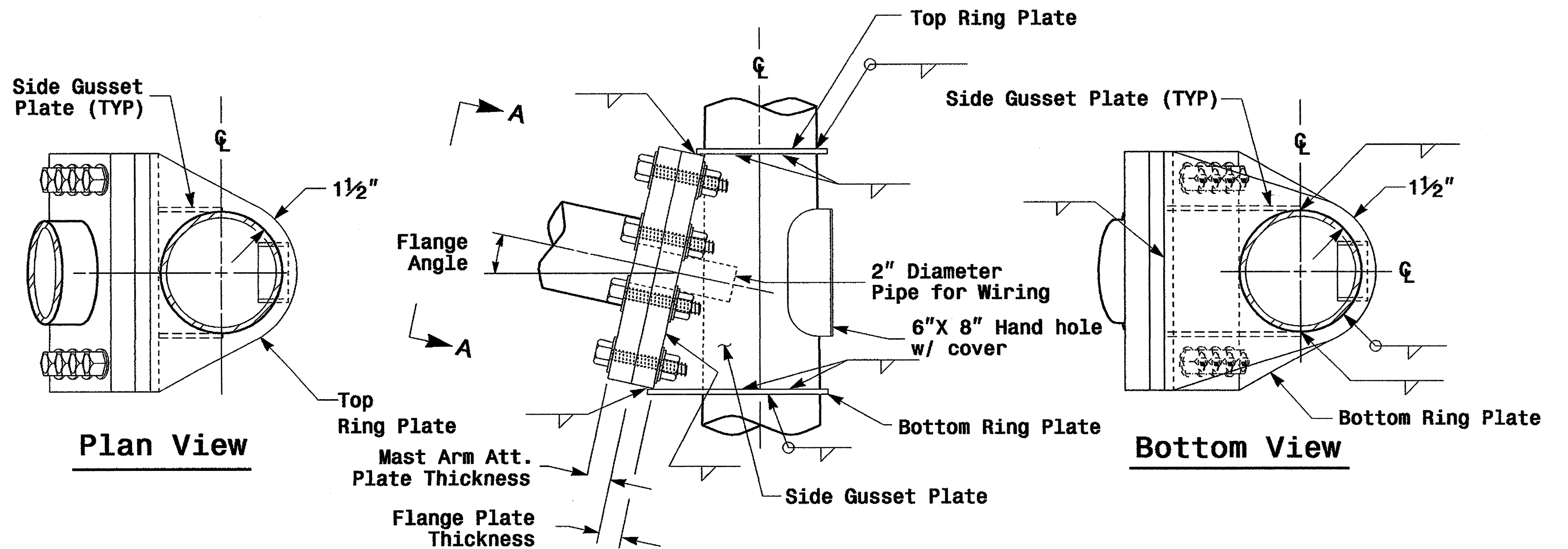
Front Elevation View

(4) - Size "E" Hex Head Bolts with (1) Hex Nuts & Washers

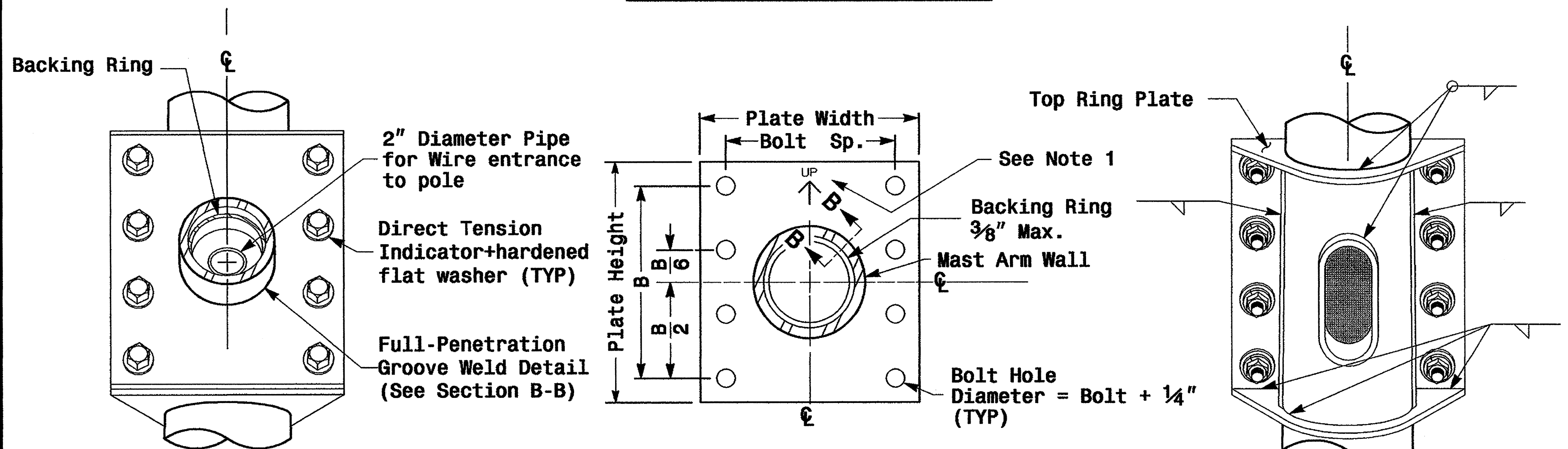


Plan View

Welded Ring Stiffened Mast Arm Connection



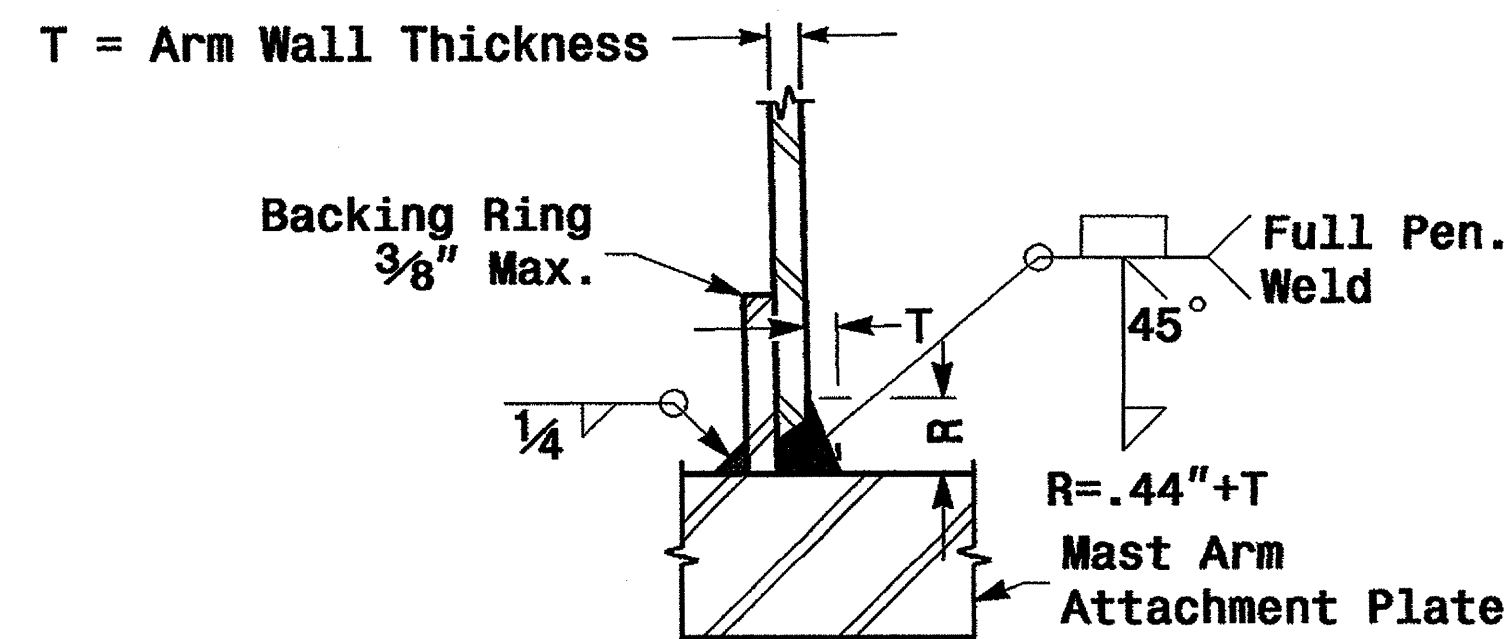
Side Elevation View



Front Elevation View

Mast Arm Attachment Plate

Back Elevation View



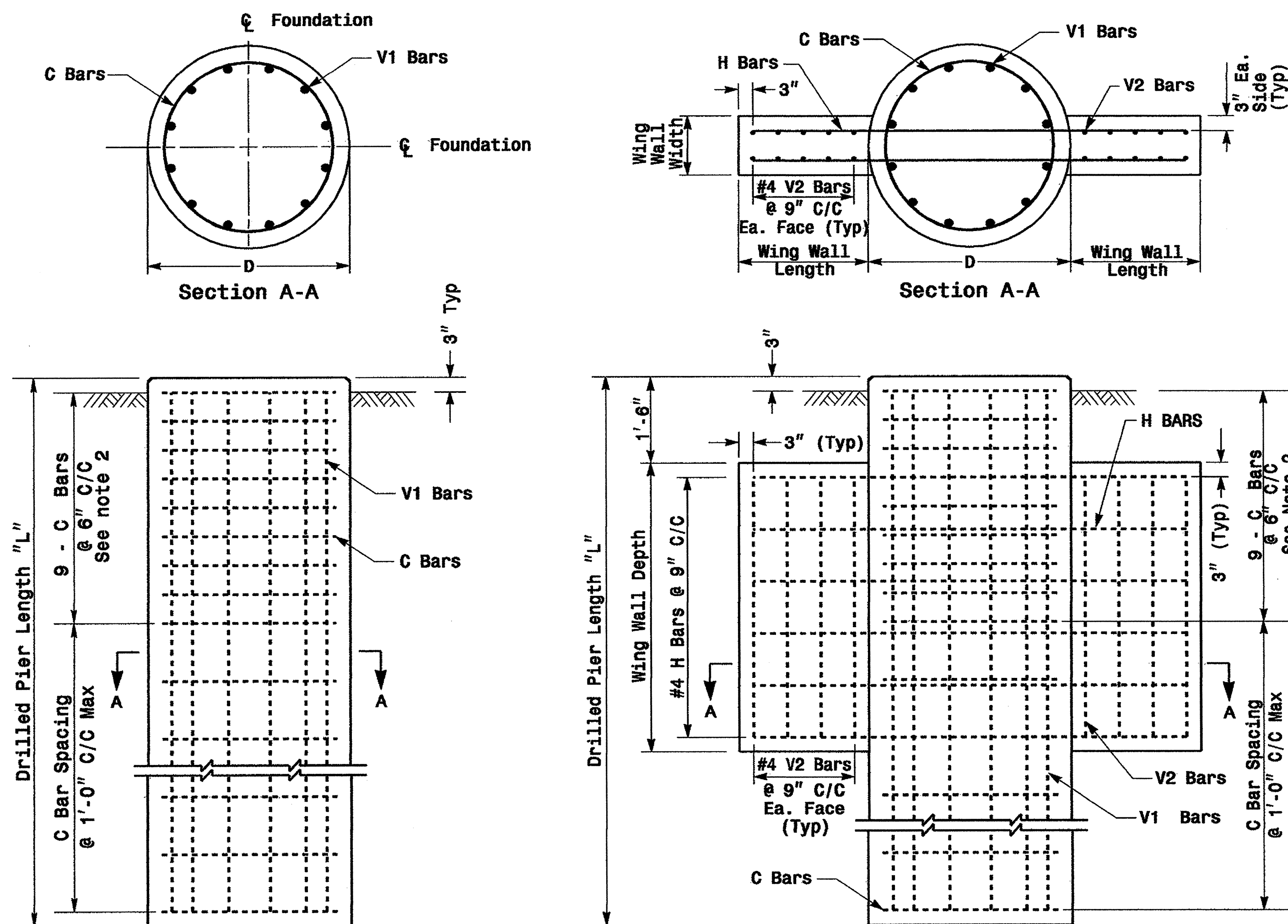
Section B-B Full-Penetration Groove Weld Detail

Notes:

1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Designer is responsible for providing appropriate drainage points.

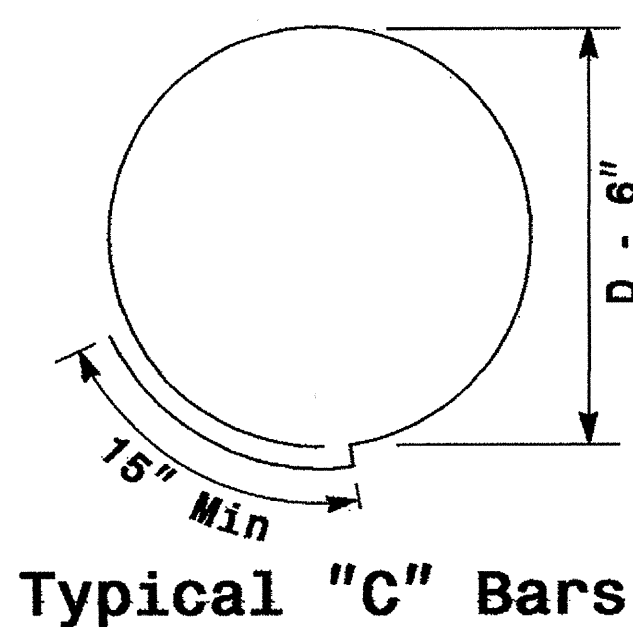
	<p>Fabrication Details For Mast Arm Connection To Pole</p>		
	<p>PLANNED BY: P.L. Alexander</p>	<p>REVIEWED BY: A.M. Esposito</p>	
<p>SCALE: NONE</p>	<p>REVISIONS:</p>	<p>INITIALS:</p>	<p>DATE:</p>

Reinforcing Steel Bars



Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* See Note No. 1
** See Note No. 3



Typical "C" Bars

Wing Wall Type	Drill Pier Shaft Dia. (in.)	Reinforcing Steel				
		Bar Name	No.	Size	Type	Length
TYPE 1	42"	V1	9	#8	STR.	**
		V2	12	#4	STR.	2'-6"
		H	8	#4	STR.	6'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	42"	V1	9	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-0"
		C	*	#4	CIR.	10'-9"
TYPE 2	48"	V1	12	#8	STR.	**
		V2	16	#4	STR.	4'-6"
		H	12	#4	STR.	9'-6"
		C	*	#4	CIR.	12'-6"

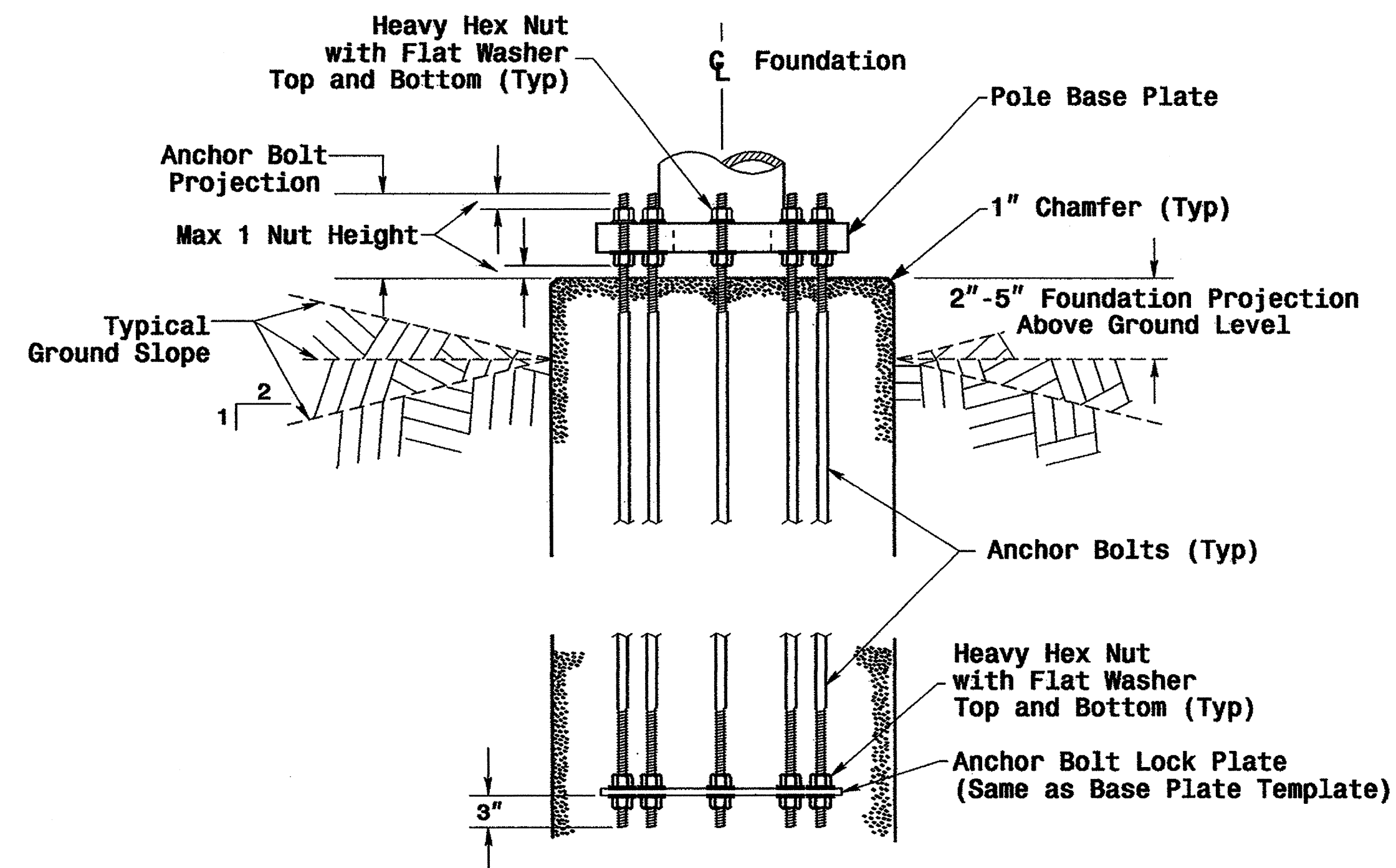
* See Note No. 1
** See Note No. 3

Wing Wall Type	Wing Wall Length (Ft.)	Wing Wall Width (Ft.)	Wing Wall Depth (Ft.)	Concrete Volume (Cu. Yds.)
TYPE 1	1'-6"	1'-0"	3'-0"	.4
TYPE 2	3'-0"	1'-0"	5'-0"	1.2

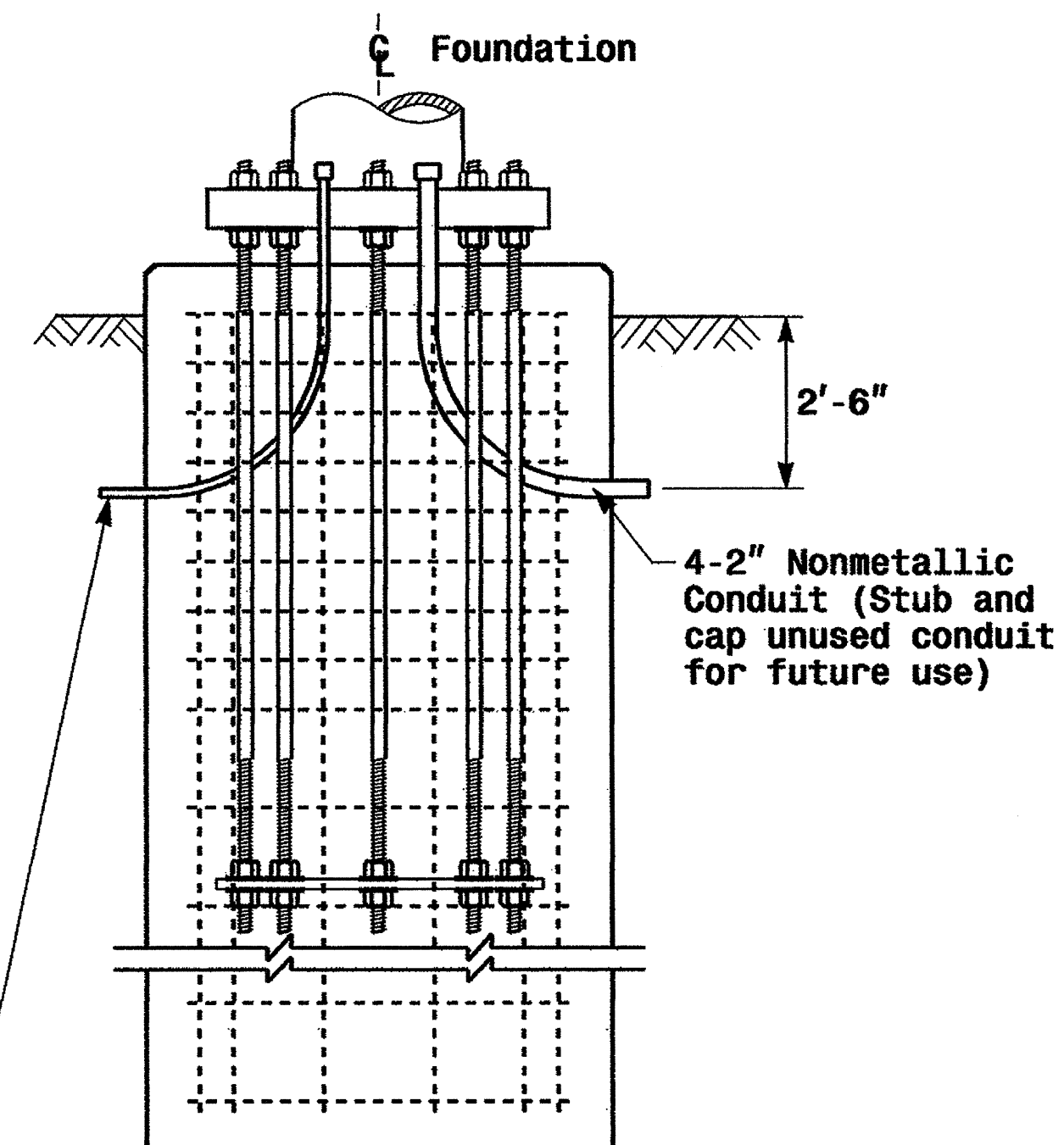
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



2-1" Nonmetallic Conduits for Electrical Service and Grounding Electrode Conductor

Notes

- The number of C-bars is based on foundation depth. For standard foundations, see sheet M 8.
- Circular tie reinforcing rings may be vertically adjusted by +/- 3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
- The length of V1-bars is based on foundation depth. For standard foundations, see sheet M 8.
- The quantities for steel and concrete shown in the Wing Wall Details Chart reflect the amount of material for 1 pair of wing walls (2 wing walls per drilled pier shaft.)

	Construction Details Foundations		
	PREPARED BY: C.F. ANDREWS REVISIONS: _____ SCALE: 0 NA NONE	MAY 2005 REVIEWED BY: P.L. ALEXANDER REVIEWED BY: A.M. ESPOSITO	

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

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

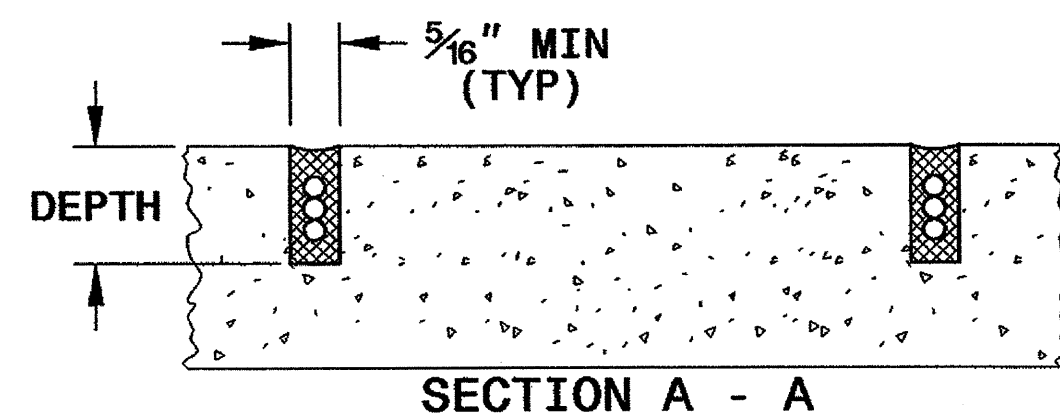
SHEET 1 OF 3
1725D01

CONVENTIONAL 4-SIDED LOOP

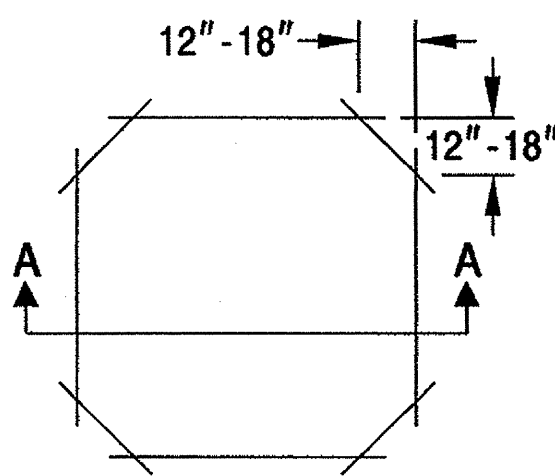
SAW CUT OPTIONS

SAW SLOT DEPTH CHART

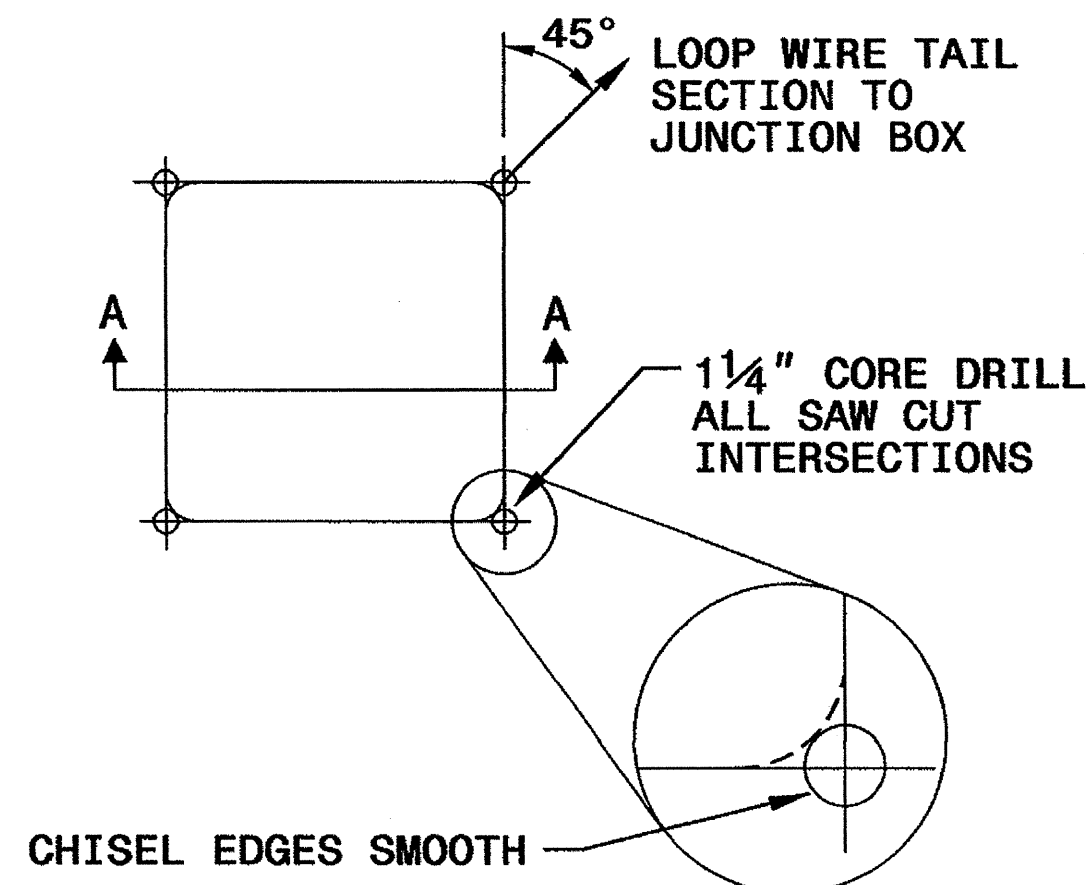
DEPTH (IN)	NO. OF WIRE TURNS				
	2	3	4	5	6
CONCRETE	2.0	2.0	2.5	2.5	3.0
ASPHALT	2.0	2.5	3.0	3.0	3.0



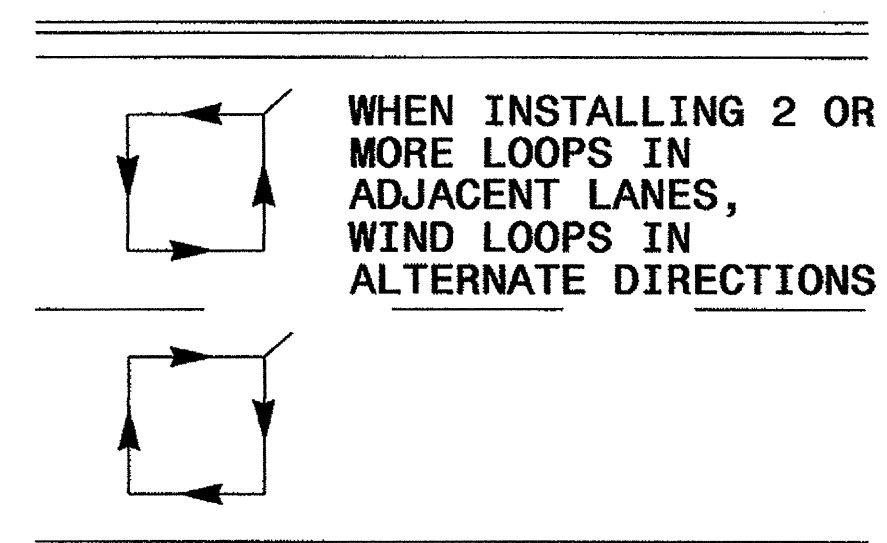
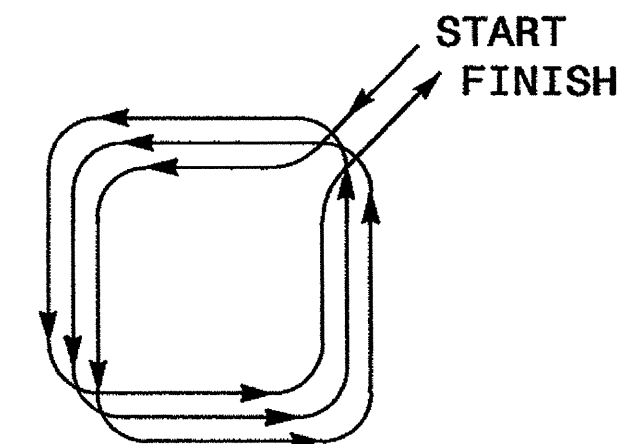
OPTION 1



OPTION 2 (POOR PAVEMENT)



LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE



CORRECT WAY TO TWIST WIRE



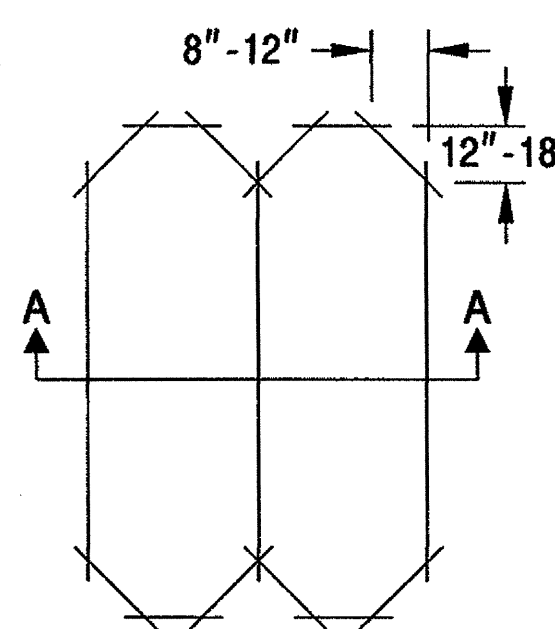
NOTES

1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

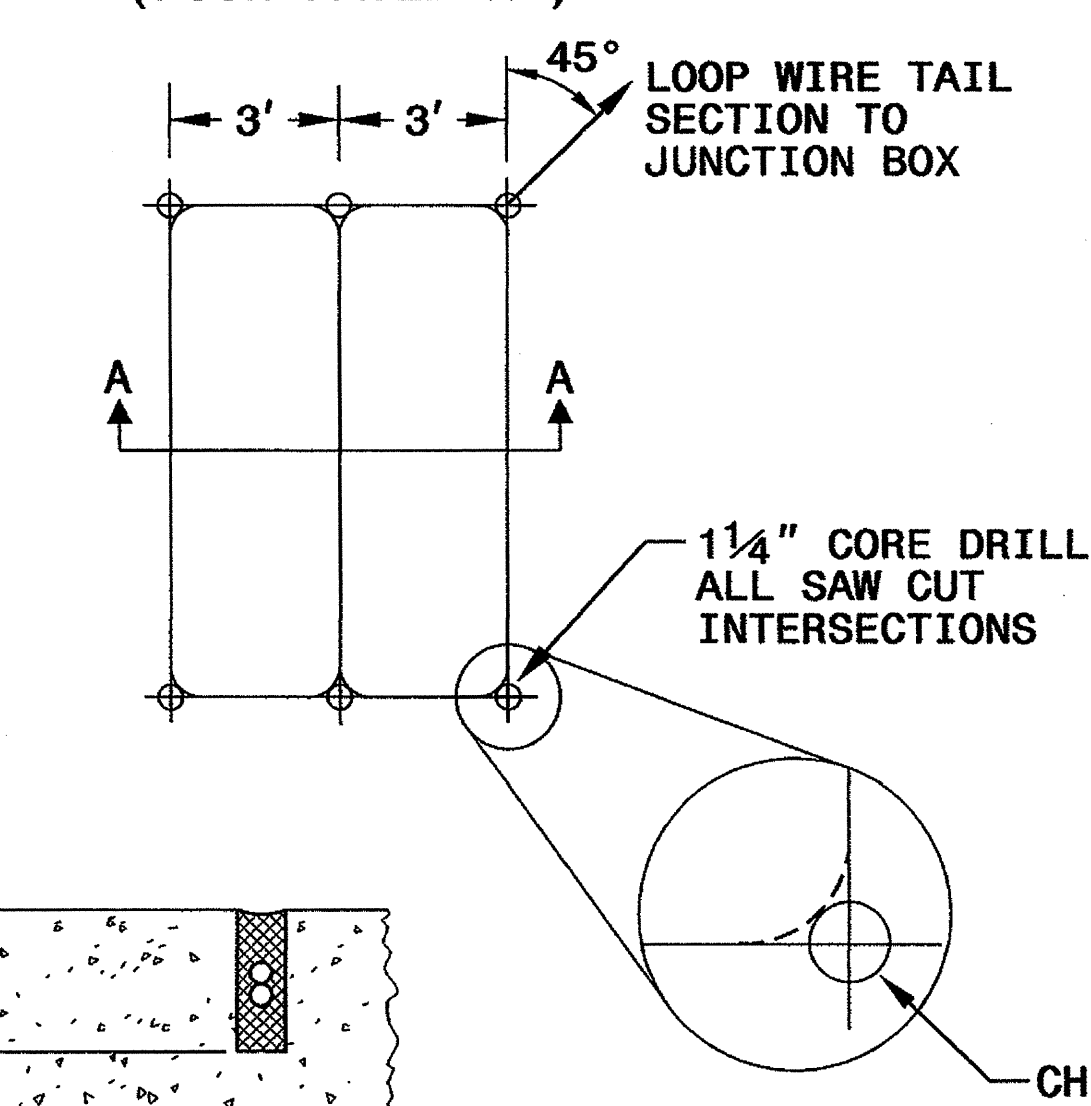
QUADRUPOLE LOOP

SAW CUT OPTIONS

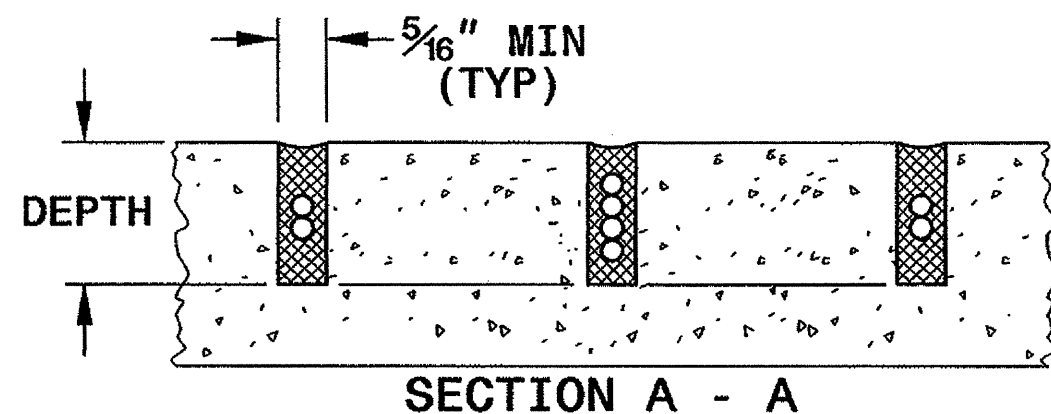
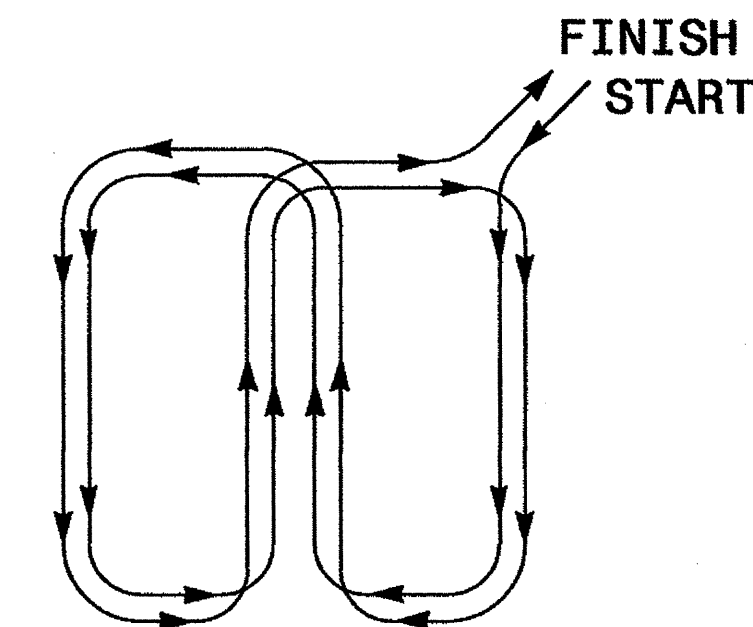
OPTION 1



OPTION 2 (POOR PAVEMENT)



LOOP WINDING METHOD



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

STATE OF NORTH CAROLINA
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RALEIGH, N.C.

11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS

SHEET 1 OF 3
1725D01

See Plate for Title



750 N. Greenfield Parkway
Garner, NC 27529



Milton I. Dean 11/24/08
SIGNATURE DATE

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

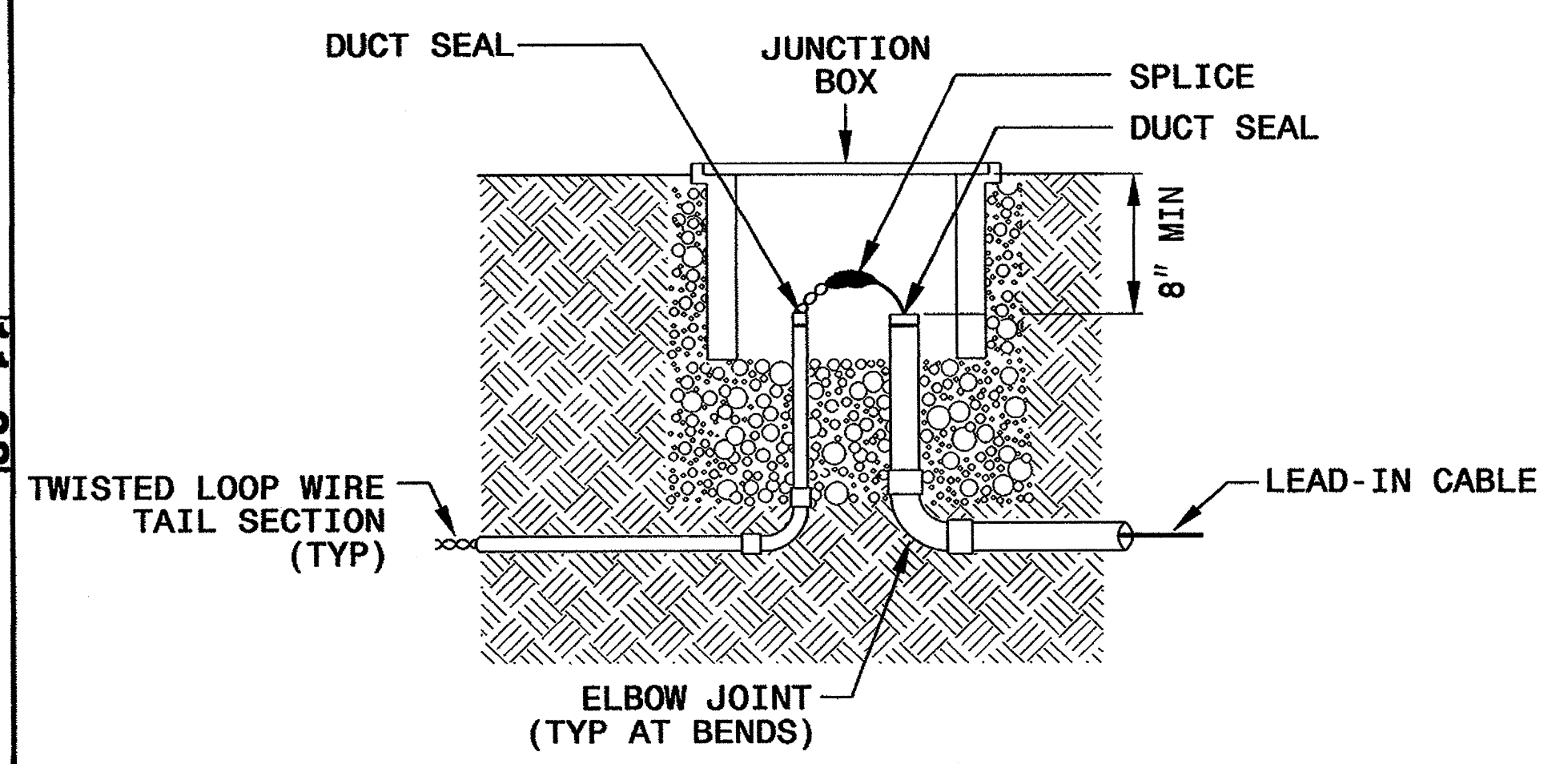
11-08

ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
 LOOP WIRE DETAILS

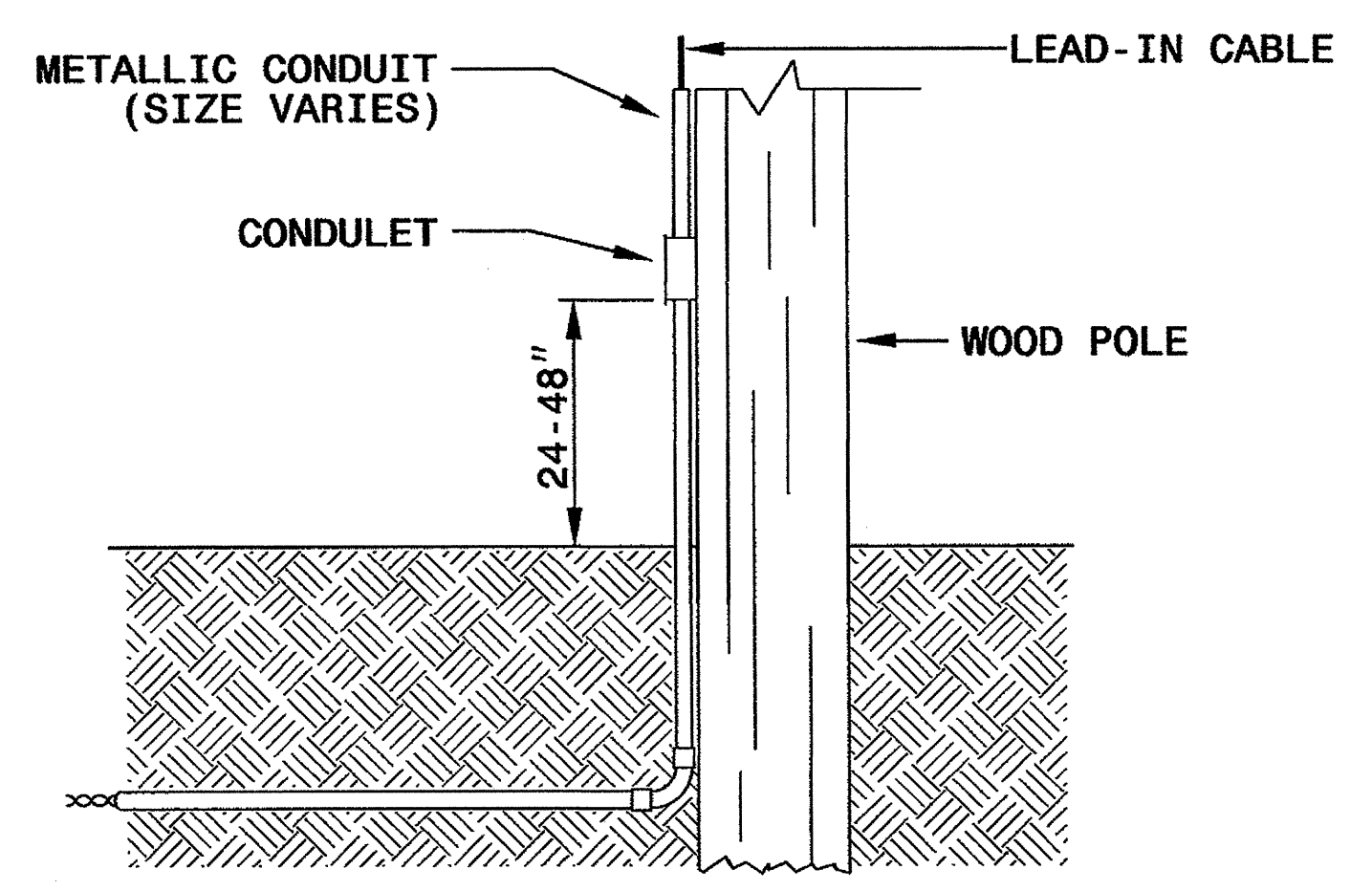
SHEET 2 OF 3
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

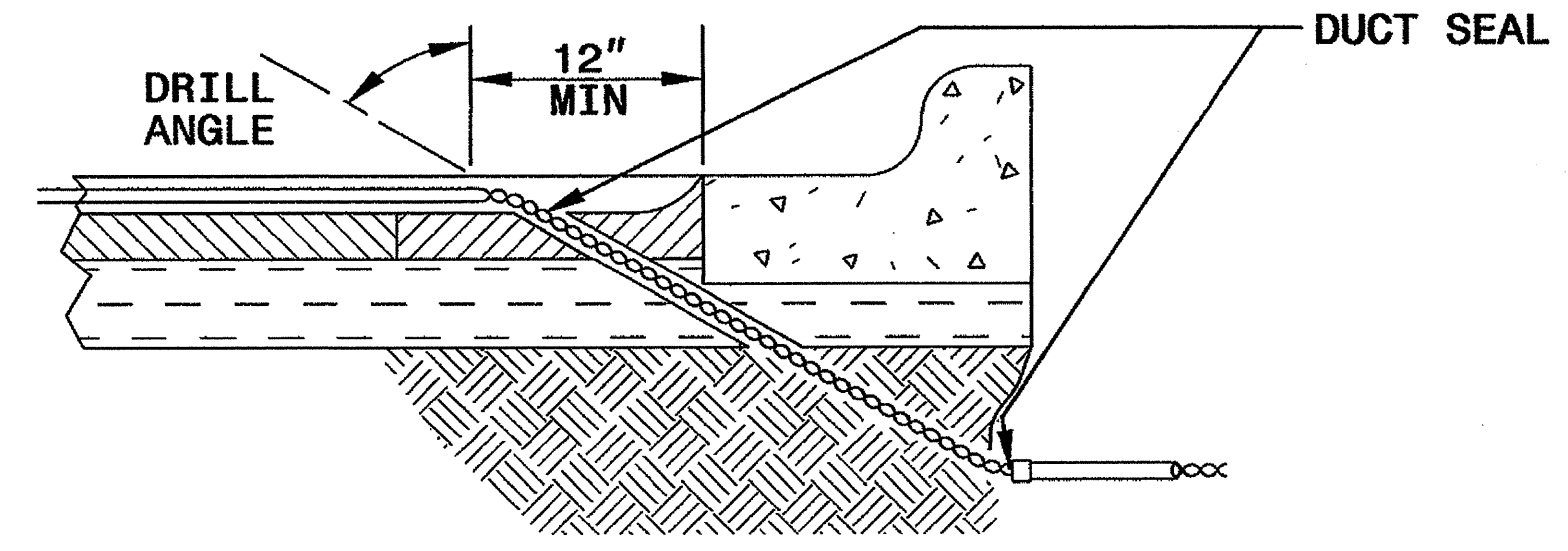


NOTE

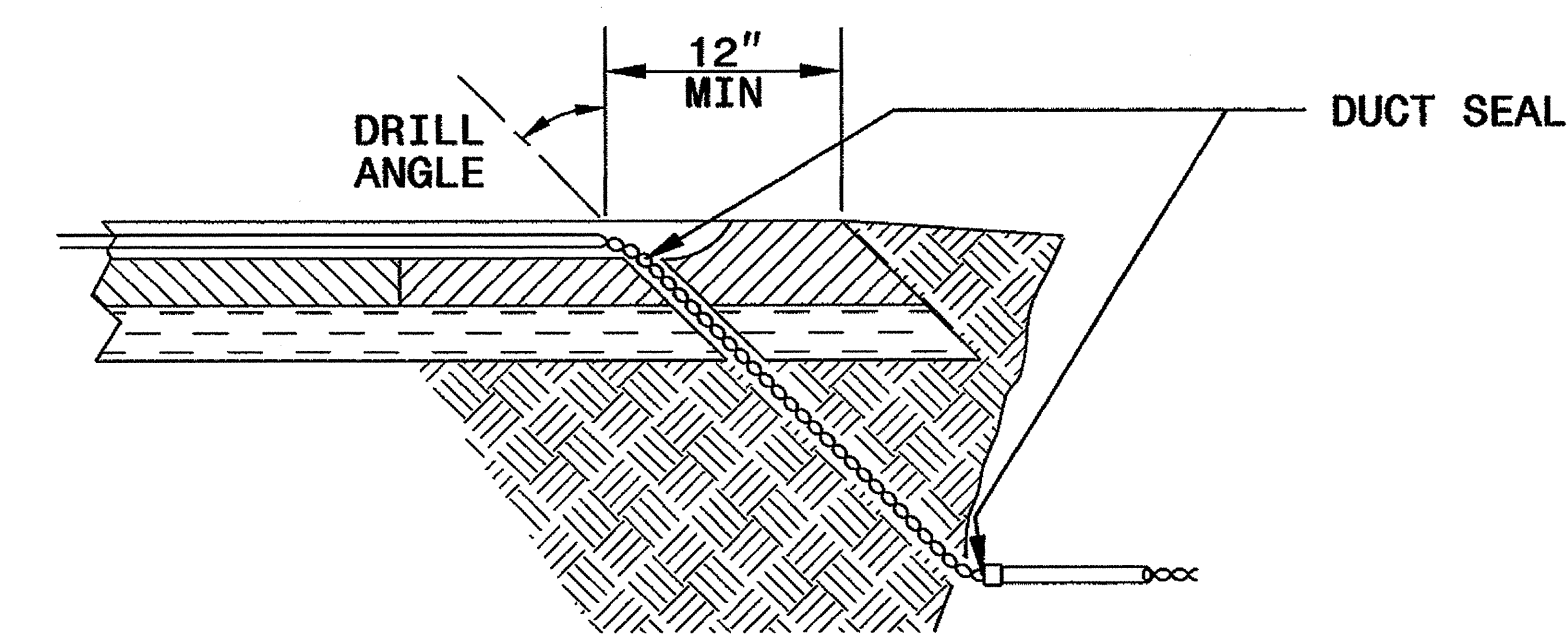
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

- DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
- TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
- BEFORE SEALING LOOPS, INSTALL DUCT SEAL WHERE LOOP WIRE TAIL SECTION LEAVES SAW CUT IN PAVEMENT AND AT ENTRANCE OF CONDUIT TO JUNCTION BOX.

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ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
 LOOP WIRE DETAILS

SHEET 2 OF 3
1725D01

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

Milton I. Dean 11/24/08
SIGNATURE DATE

24-1001-2008 08/28
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 20111118

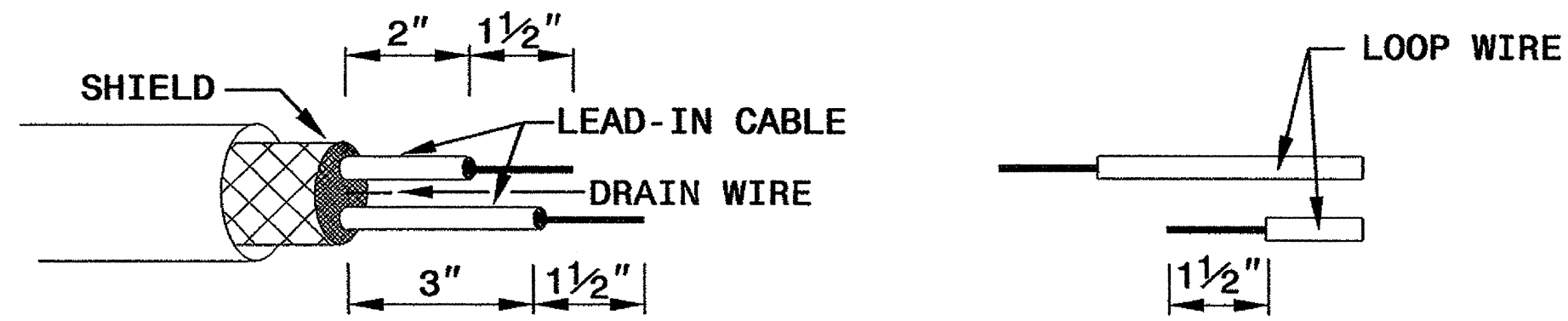
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

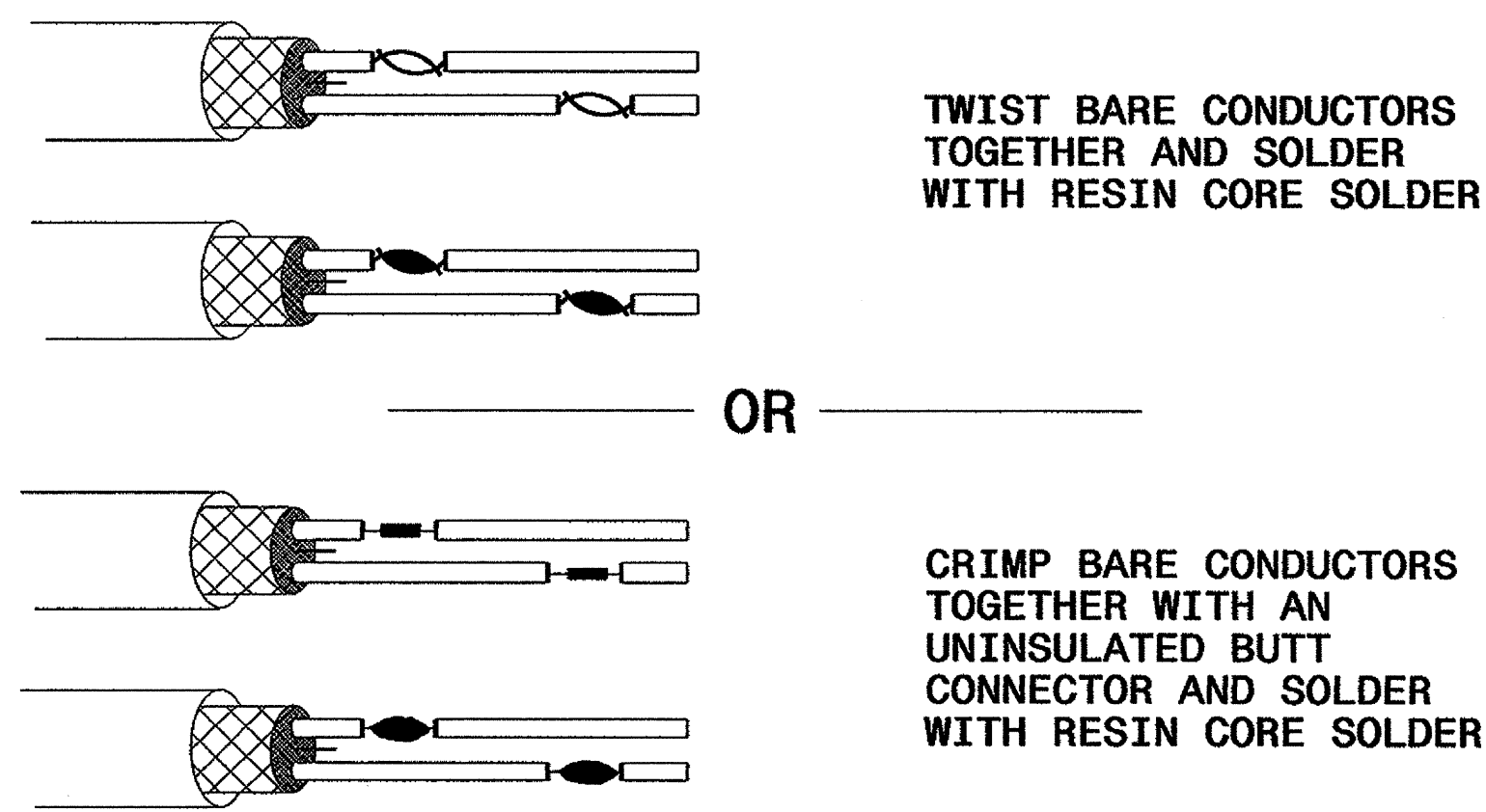
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE



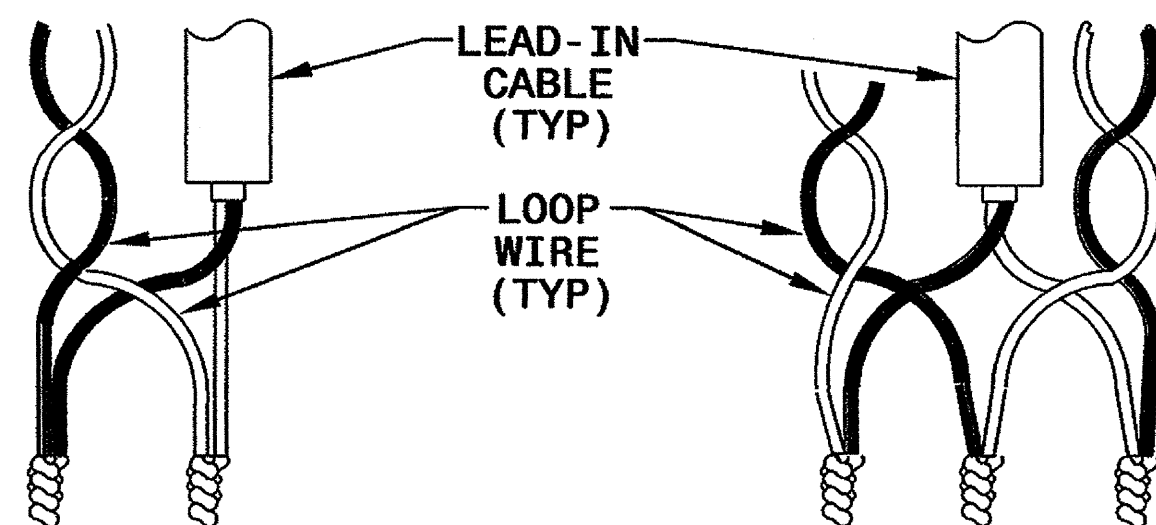
STEP 2. CONNECT AND SOLDER



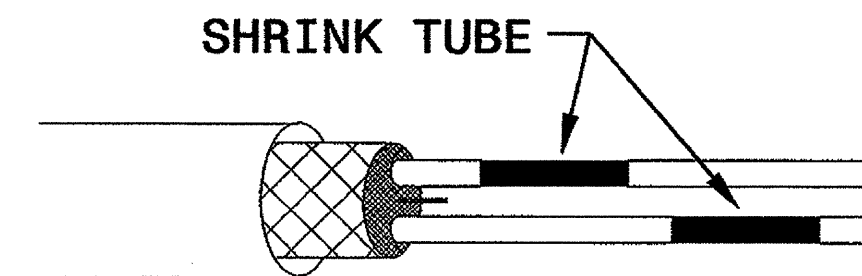
BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS

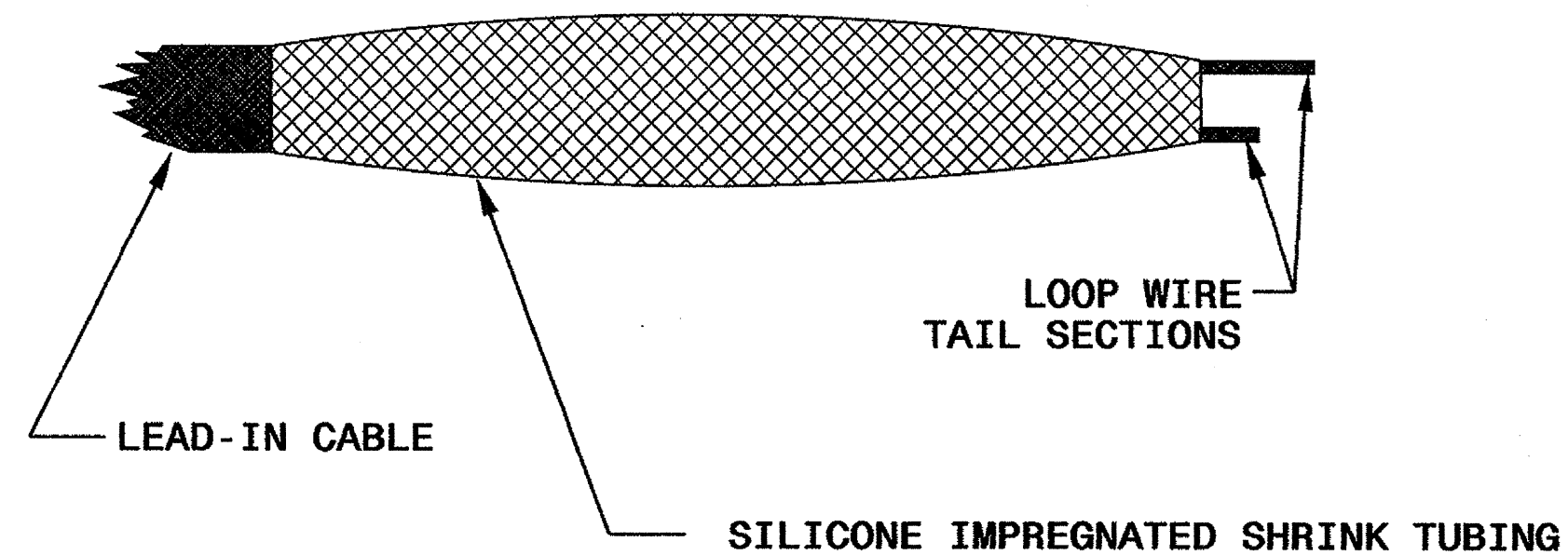
SINGLE CONNECTION SERIES CONNECTION



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



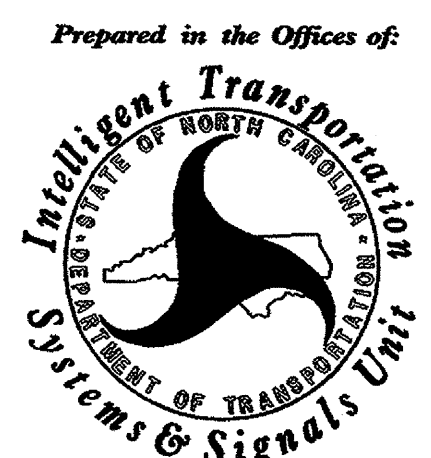
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

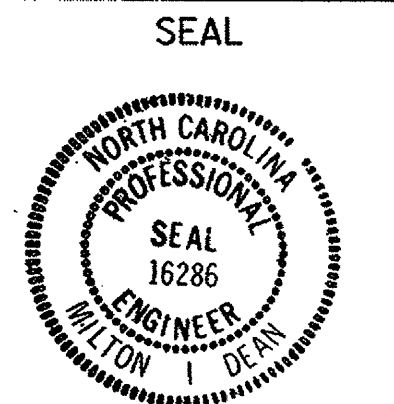
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

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750 N. Greenfield Parkway
Garner, NC 27529



Milton Dean 11/24/08
SIGNATURE DATE