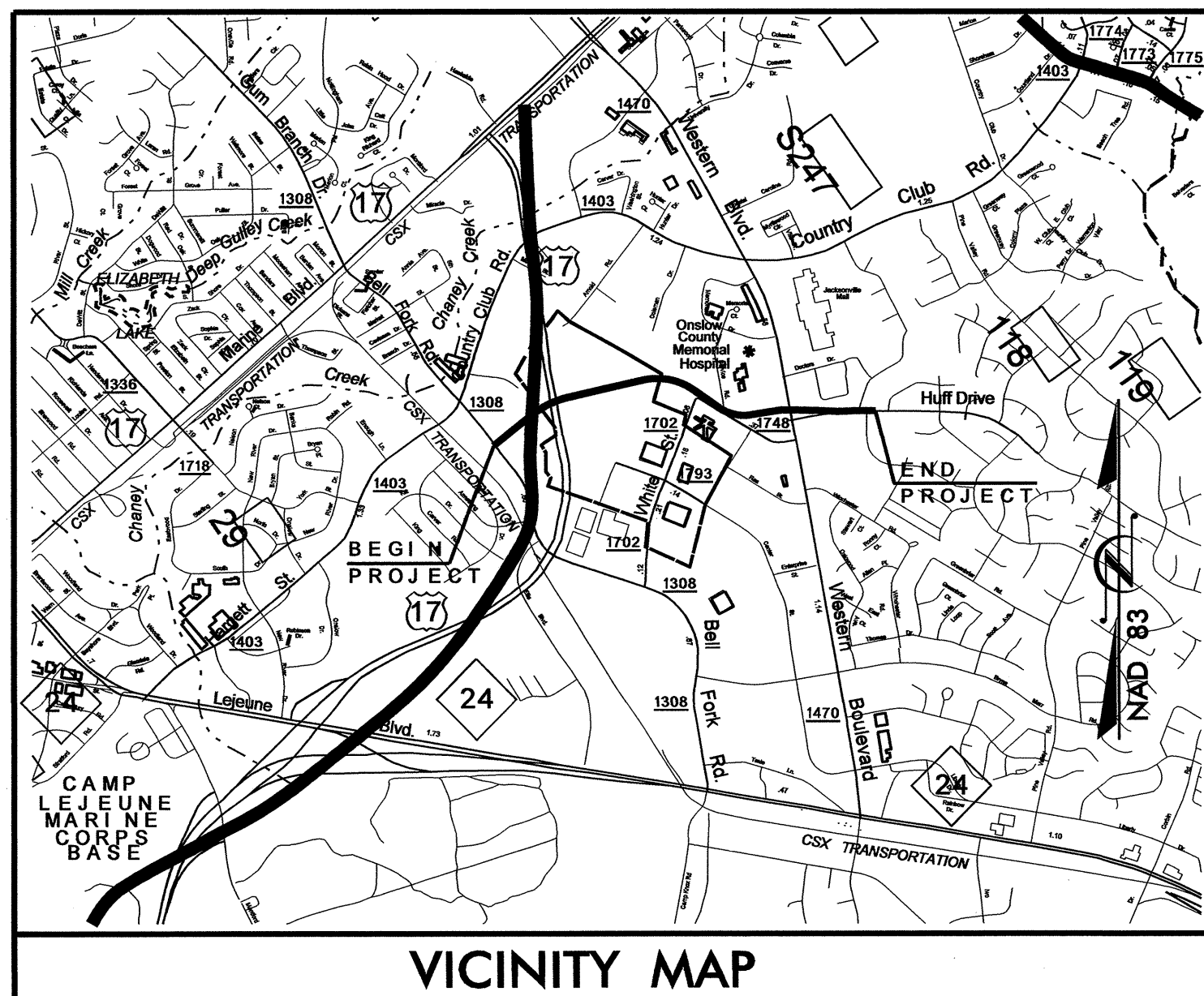


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

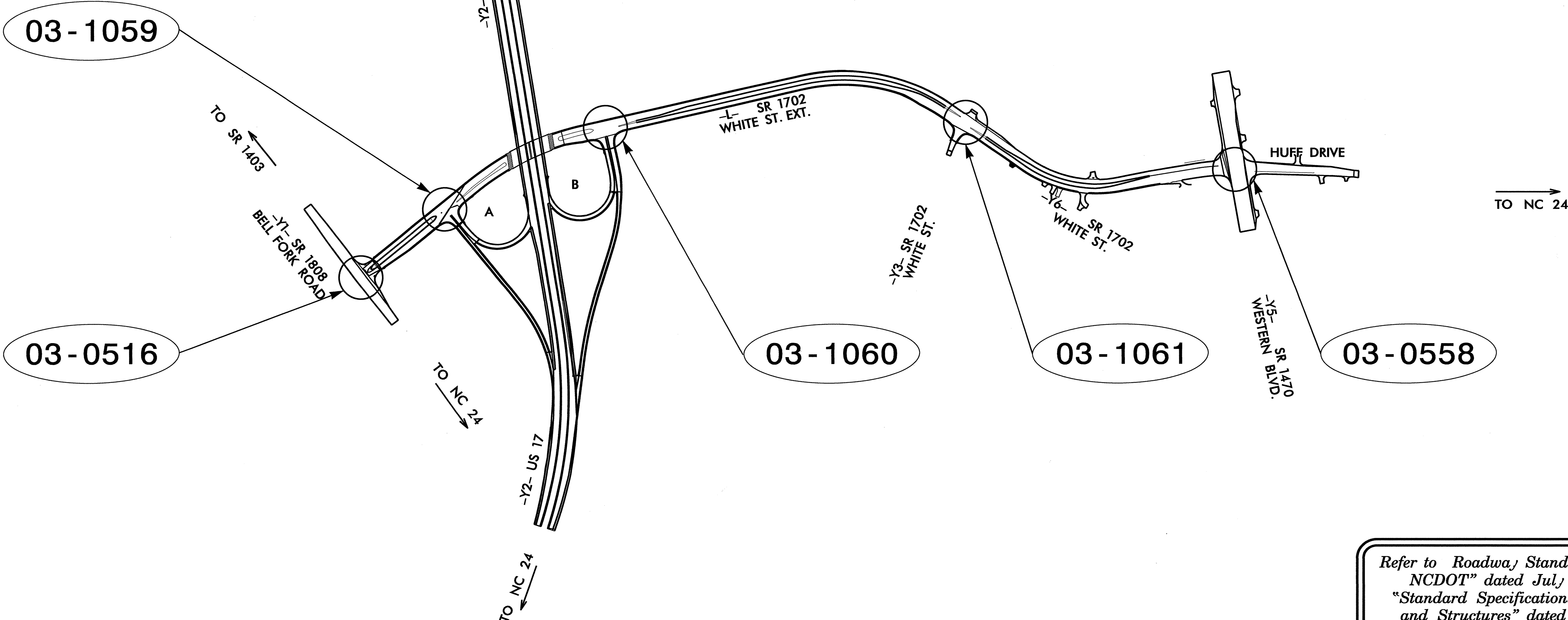
ONSLOW COUNTY

LOCATION: SR 1702 (WHITE STREET EXTENSION) FROM SR 1308 (BELL FORK ROAD) TO SR 1470 (WESTERN BOULEVARD)

TYPE OF WORK: SIGNALS



VICINITY MAP



TIP PROJECT: U-4007A

Refer to Roadway Standard Drawings NCDOT dated Jul, 2006 and "Standard Specifications for Roads and Structures" dated Jul, 2006.

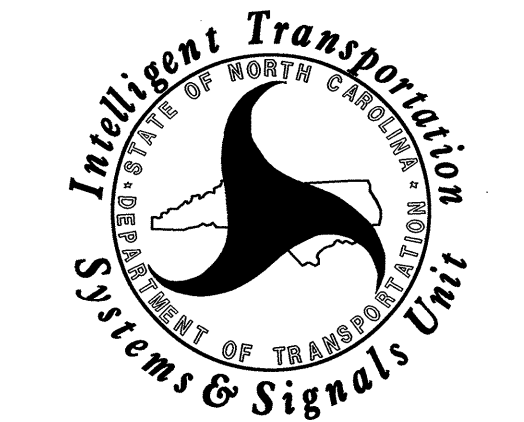
Sheet #	Reference #	Location/Description
Sig. 1		Title Sheet
Sig. 2-17	03-0516	SR 1308 (Bell Fork Road) at White Street Extension
Sig. 18-28	03-1059	White Street Extension at US 17 SB Ramp/Loop A
Sig. 29-40	03-1060	White Street Extension at US 17 NB Ramp/Loop B
Sig. 41-53	03-1061	White Street Extension at SR 1702 (White Street)
Sig. 41-53	03-0558 T1&Final	SR 1470 (Western Boulevard) at Huff Drive
Sig. 54-60	N/A	Communication and Conduit Routing Plans
Sig. 61-63	N/A	Metal Poles Mast Arm Typicals
Sig. 69-71	N/A	Inductive Detection Loops Details

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

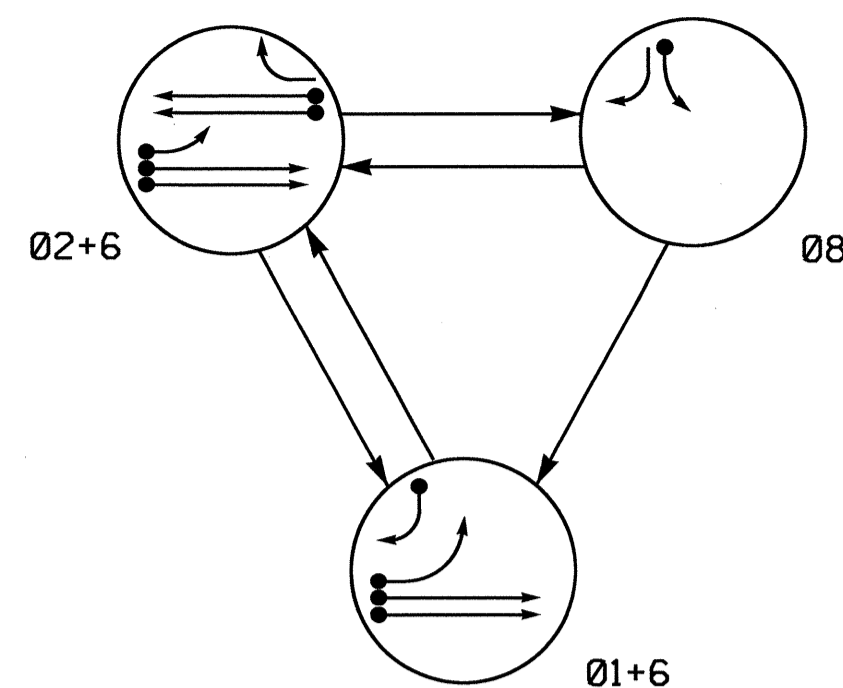
- Pamela L. Alexander, PE - Eastern Region Signals Engineer
- George C. Brown, PE - Signal Equipment Design Engineer
- Greg Fuller, PE - State ITS and Signals Engineer

Prepared In the Office of:
DIVISION OF HIGHWAYS
TRANSPORTATION MOBILITY AND SAFETY
BRANCH



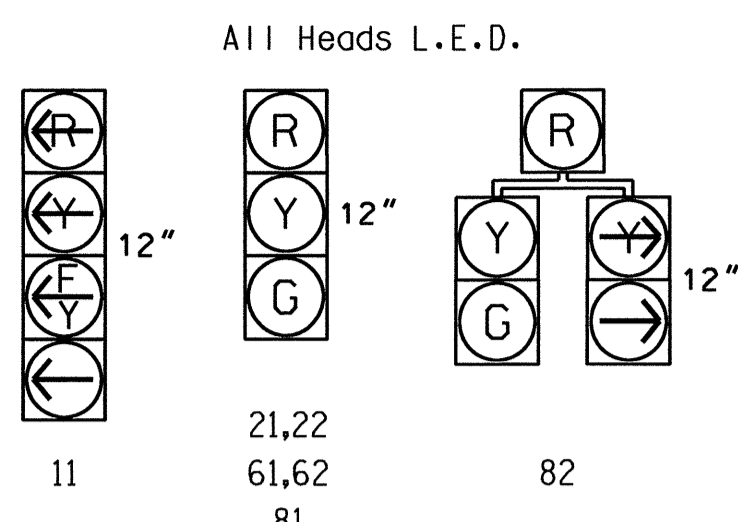
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PHASING DIAGRAM



SIGNAL FACE	PHASE			
	01+6	02+6	08	11
11	←	←	←	←
21,22	R	G	R	Y
61,62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

SIGNAL FACE I.D.



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

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

Y = Flashing Yellow Arrow

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	STRETCH TIME			DELAY TIME
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15	-	Y
1B	6X40	0	2-4-2	Y	6	Y	Y	-	-	-	Y
2A,2B	6X6	70	4	Y	1	Y	Y	-	-	-	Y
6A,6B	6X6	70	4	Y	6	Y	Y	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	Y

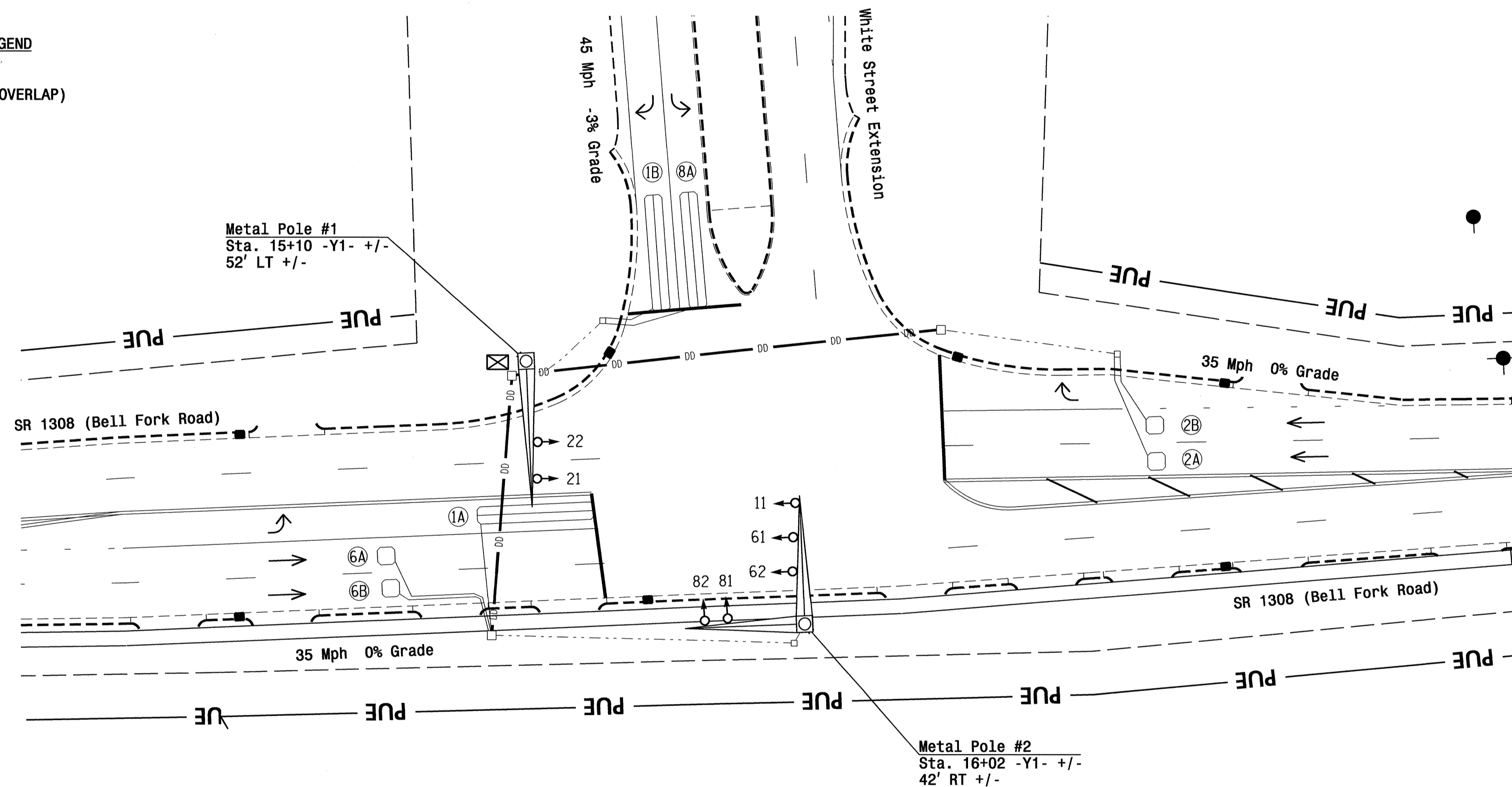
3 Phase Fully Actuated Jacksonville City Signal System

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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Controller Asset #0516.

PHASING DIAGRAM DETECTION LEGEND

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



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 *	20	45	45	20
Yellow Clearance	3.0	3.8	3.8	3.0
Red Clearance	2.9	2.1	2.1	3.3
Red Revert	0.0	0.0	0.0	0.0
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.

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	○ → N/A
⊥ Sign	⊥ N/A
⊥ Pedestrian Signal Head With Push Button & Sign	⊥ N/A
○ Signal Pole with Guy	● Signal Pole with Sidewalk Guy
□ Inductive Loop Detector	□ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Junction Box
□ Junction Box	□ Junction Box
- - - 2-in Underground Conduit	- - - 2-in Underground Conduit
N/A Right of Way	- - - Right of Way
→ Directional Arrow	→ Directional Arrow
⊠ Metal Pole with Mastarm	⊠ Metal Pole with Mastarm
- - - Directional Drill	- - - Directional Drill

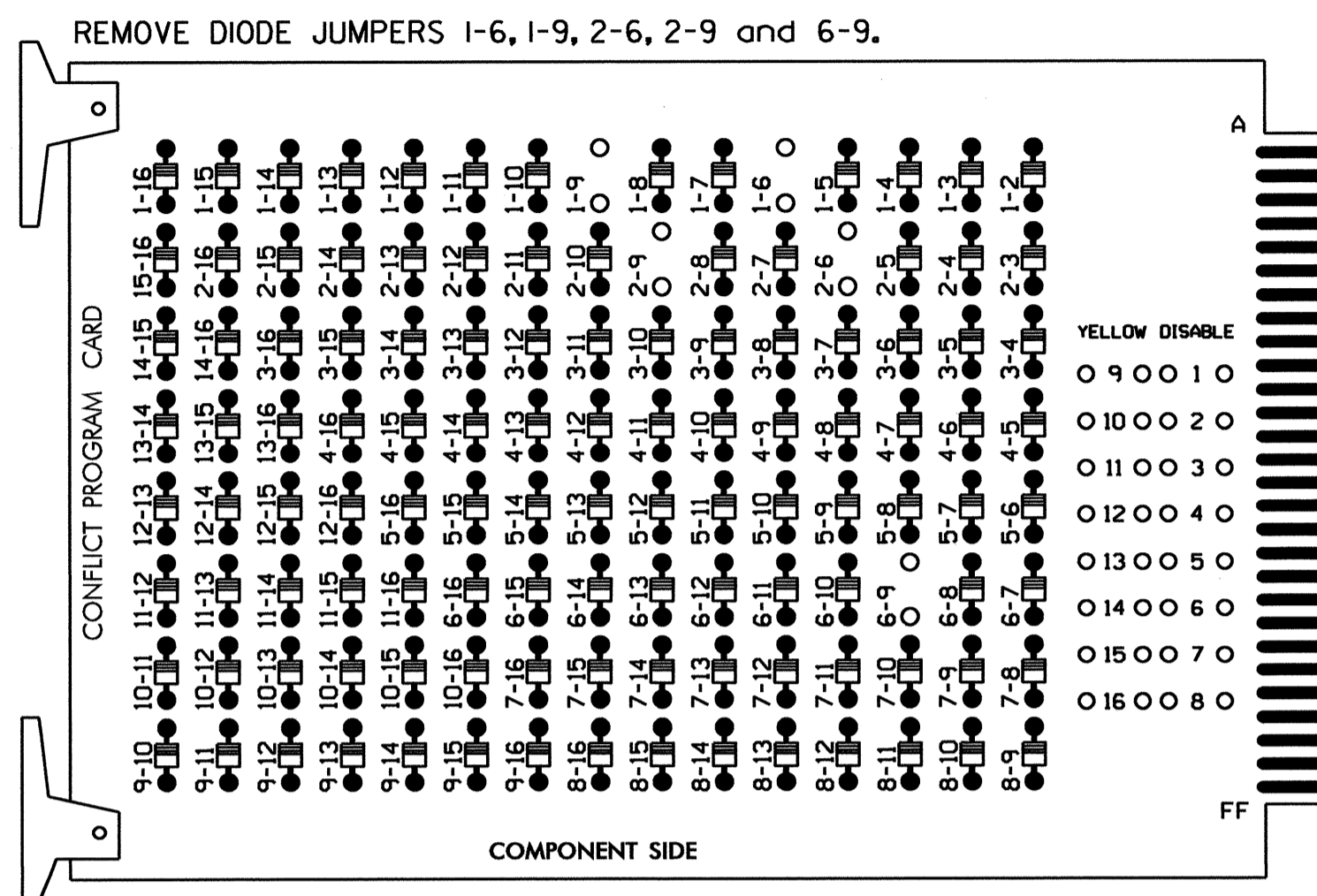
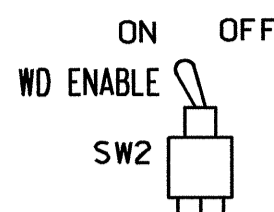
New Installation

Prepared in the Office of:
SR 1308 (Bell Fork Road) At White Street Extension
 Division 3 Onslow County Jacksonville
 PLAN DATE: January 2011 REVIEWED BY: JPG
 PREPARED BY: IOU/JPG REVIEWED BY: [Signature]
 SCALE: 1"=30'
 REVISIONS: [Table]
 INIT. DATE: [Table]
 SEAL: [Professional Engineer Seal]
 SIG. INVENTORY NO. 03-0516

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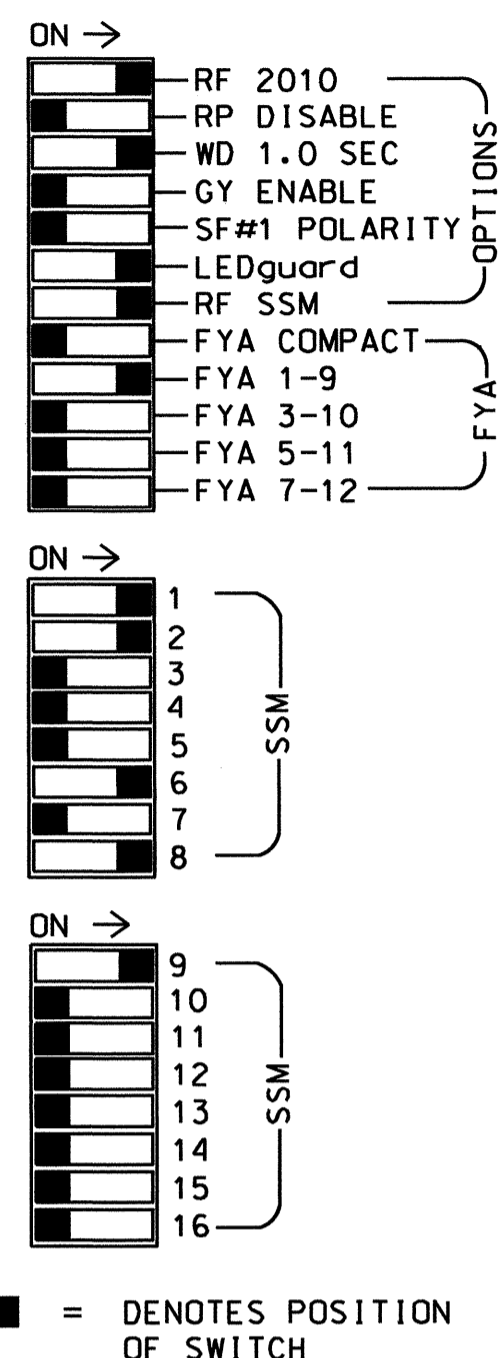
EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. 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 3,4, 5,7,10,11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Start Up In Green.
5. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
6. The cabinet and controller are part of the Jacksonville City Signal System.

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*	82	21,22	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		126																A122
FLASHING YELLOW ARROW																		A123
GREEN ARROW	127	127																

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)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 1	∅ 2	S	S	S	S	S	S	S	S	S	S	FS
L	1A	1B	2A,2B	∅ 6	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	DC ISOLATOR
U	NOT USED	NOT USED	6A,6B	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	∅ 8	DC ISOLATOR
L	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6

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

FS = FLASH SENSE
 ST = STOP TIME

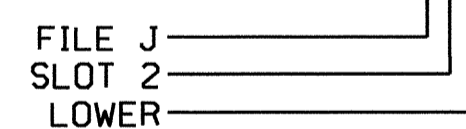
⊗ Wired Input - Do not populate slot with detector card

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
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
2A,2B	TB2-9,10	I3U	63	25	32	2	Y	Y			
6A,6B	TB2-11,12	I3L	76	38	42	6	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			

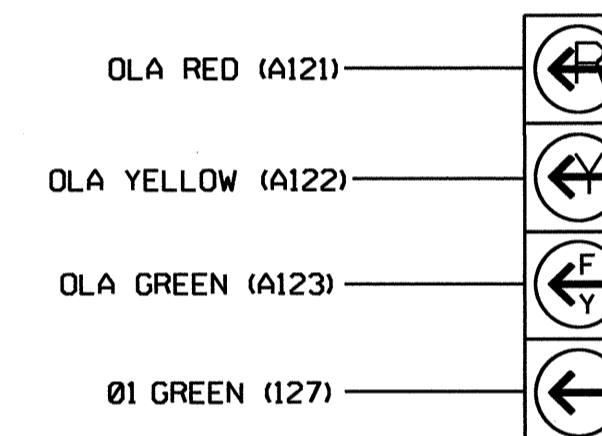
¹Add jumper from I1-W to J4-W, on rear of input file.

INPUT FILE POSITION LEGEND: J2L



4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



11

NOTE

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

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0516
 DESIGNED: January 2011
 SEALED: 01/28/11
 REVISED:

LOAD RESISTOR INSTALLATION DETAIL

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

NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

ELECTRICAL DETAIL SHEET 1 OF 2

Prepared In the Office of:
 Transportation Mobility and Safety
 Division 3
 Onslow County
 Jacksonville

SR 1308 (Bell Fork Road) at White Street Extension

PLAN DATE: February 2011
 PREPARED BY: C. Strickland
 REVIEWED BY: T. Siga

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN

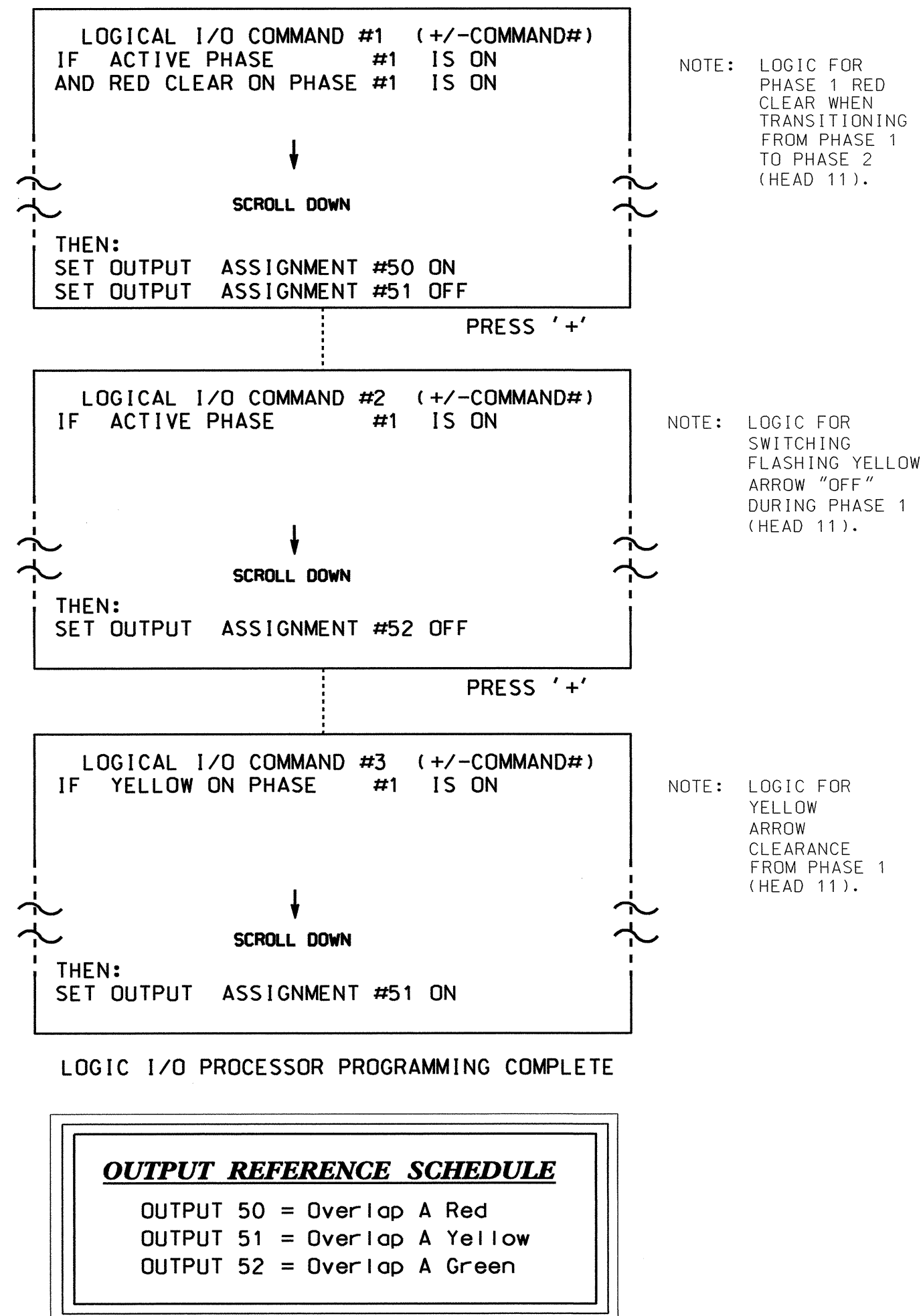
750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. 03-0516

**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).



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
  
```

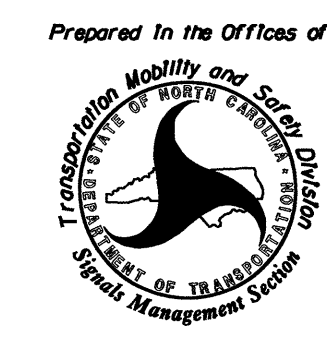
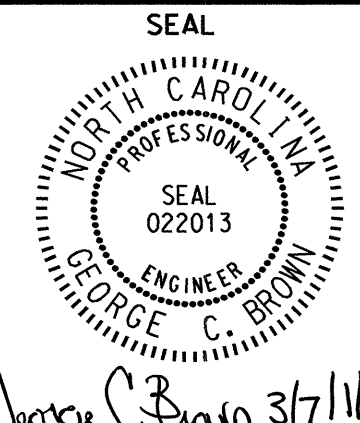
← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 03-0516
 DESIGNED: January 2011
 SEALED: 01/28/11
 REVISED:

04-MAR-2011 10:46 S:\ITSAS\DMT5\SIGNAL\sig\kgr\outputs\lg\MainStrickland\030516_sml.e16.xxx.dgn

ELECTRICAL DETAIL SHEET 2 OF 2

Prepared In the Office of:  750 N. Grantfield Pkwy, Garner, NC 27529	SR 1308 (Bell Fork Road) at White Street Extension		SEAL  SIGNATURE: <i>George C. Brown</i> 3/7/11 DATE						
	Division 3 Onslow County Jacksonville	PREPARED BY: C. Strickland REVIEWED BY: <i>T. Japp</i>		PLAN DATE: February 2011 REVIEWED BY:					
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REVISIONS	INIT.	DATE							

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

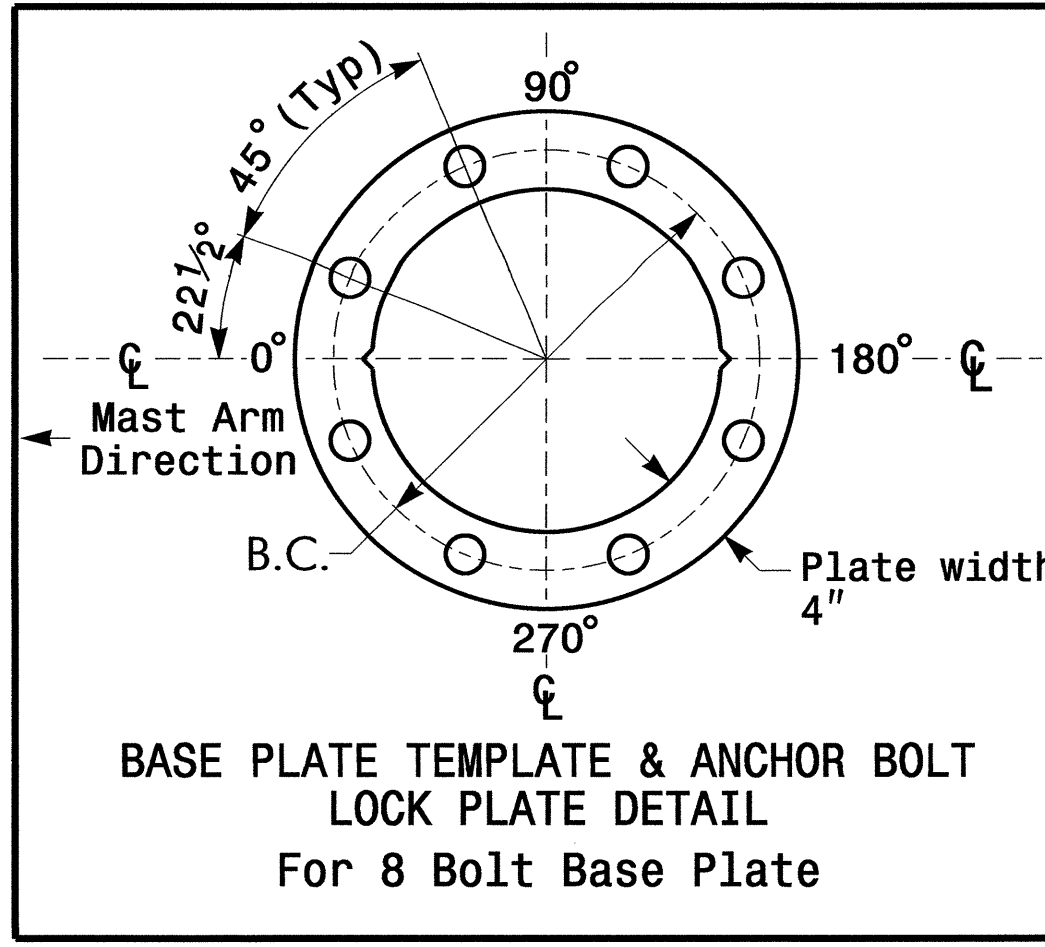
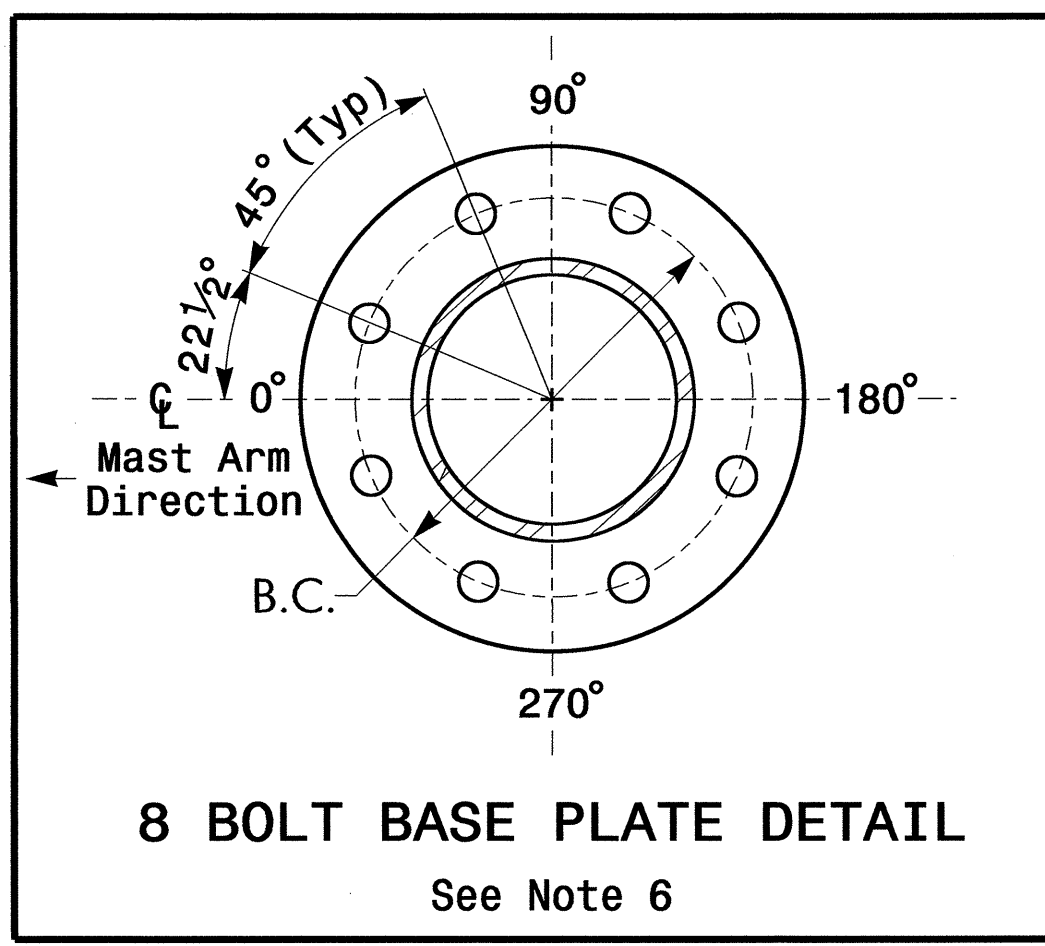
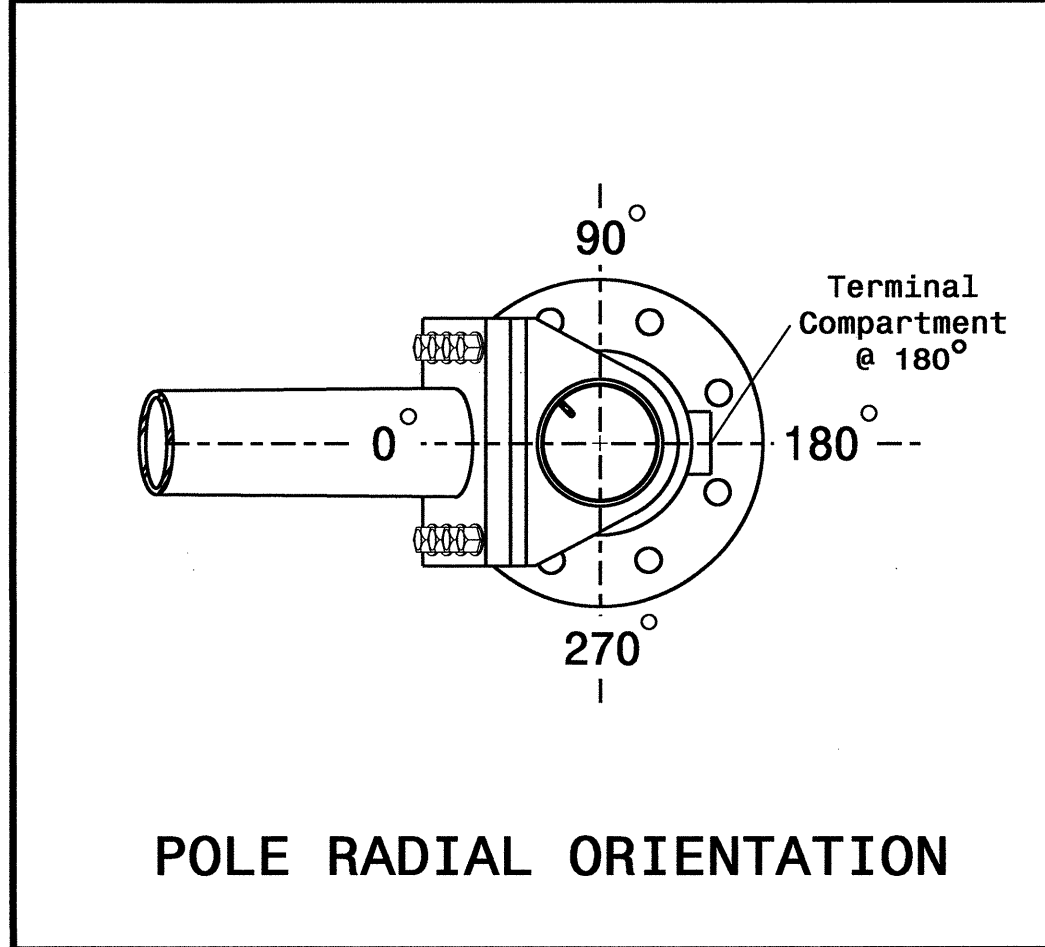
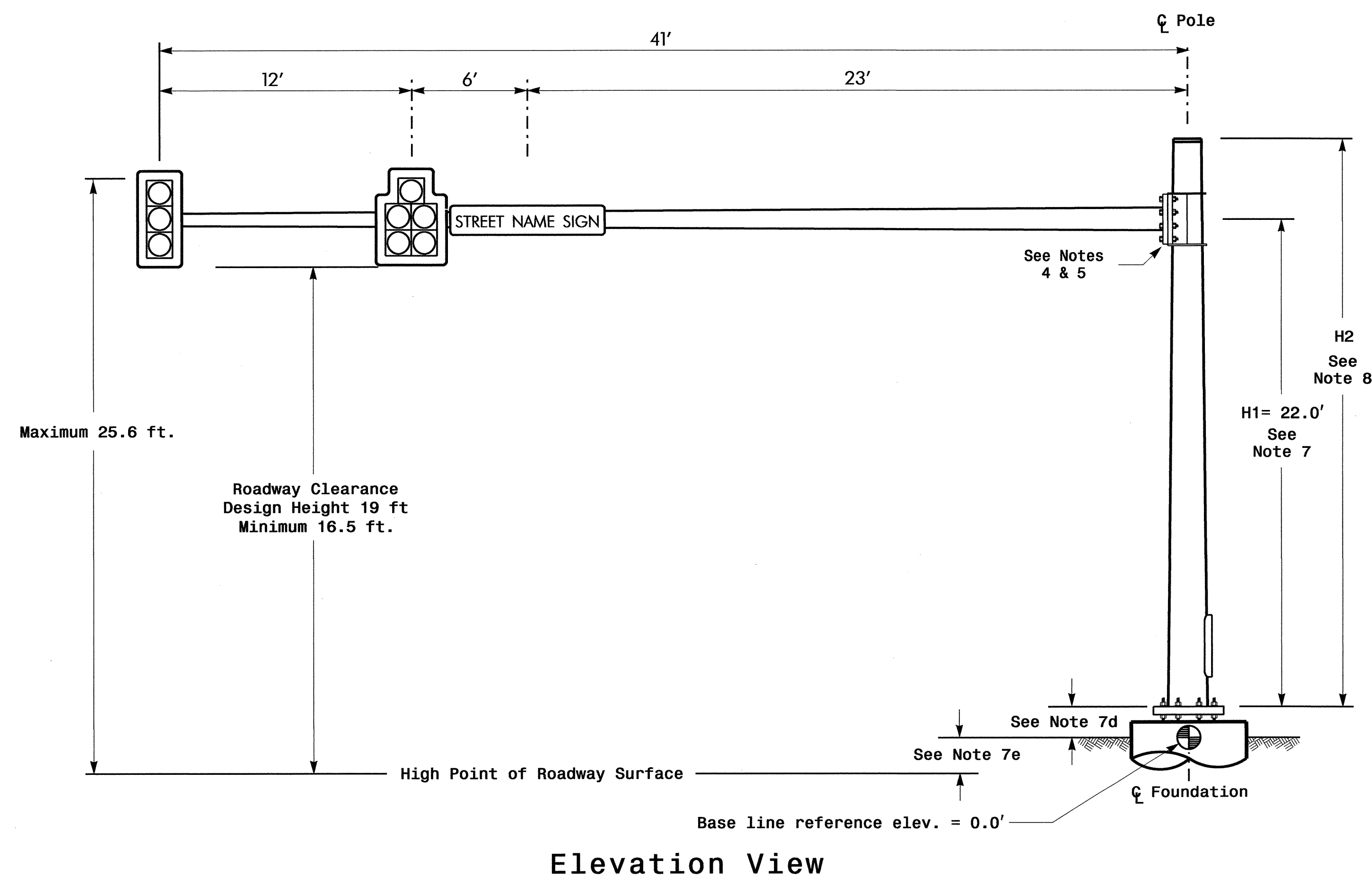
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+1.0 ft.
Elevation difference at Edge of travelway or face of curb	N/A

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"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

Design Loading for METAL POLE NO. 1



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.

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.

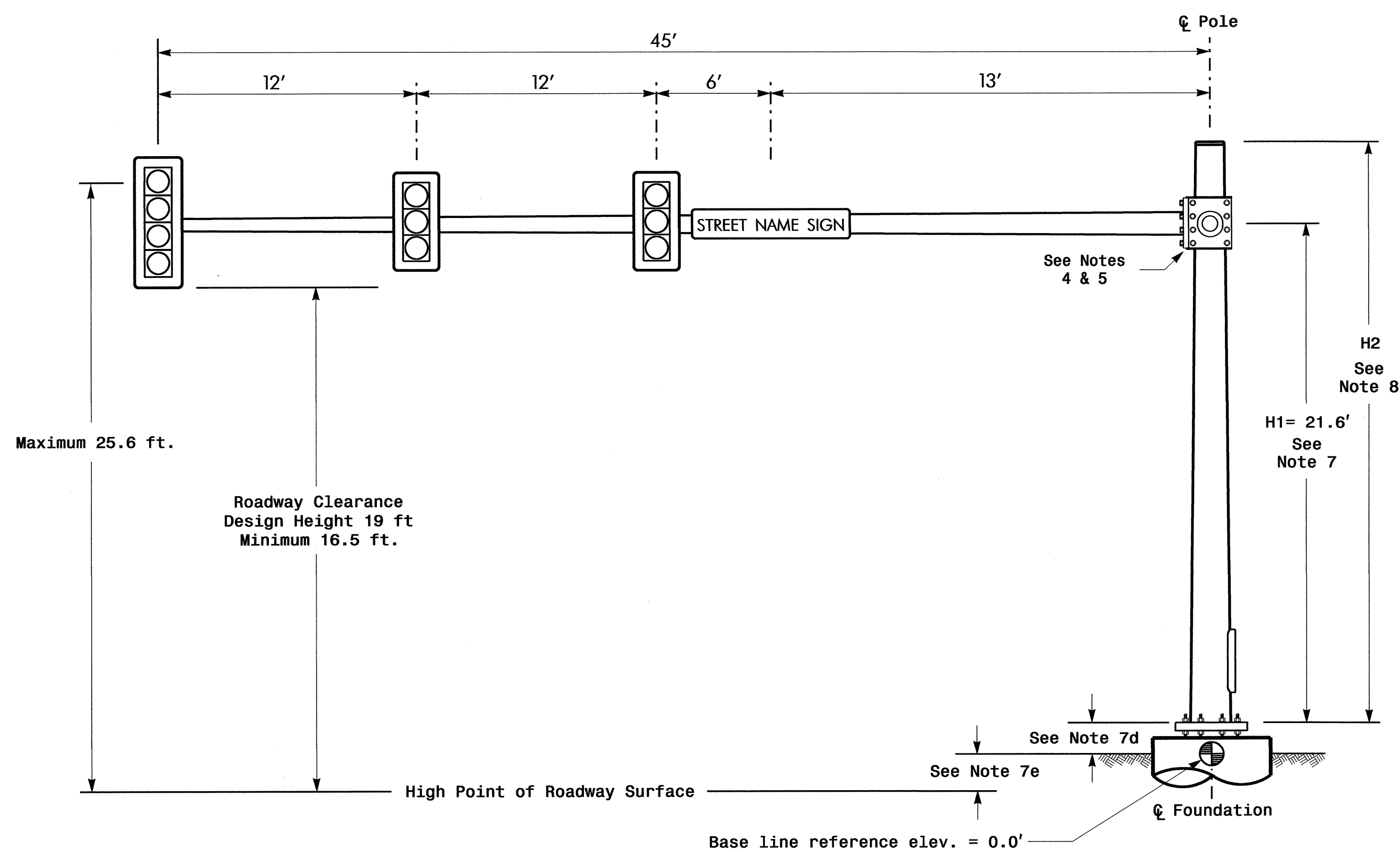
NOTES

NCDOT Wind Zone 2 (130 mph)

	SR 1308 (Bell Fork Road) At White Street Extension		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER JASON R. GALLOWAY 29904 3/24/11
	Division 3 Onslow County Jacksonville PLAN DATE: February 2011 REVIEWED BY: JPG PREPARED BY: IOU REVIEWED BY:	SCALE: 0 N/A REVISIONS: _____ DATE: _____ INIT.: _____ DATE: _____	
750 N. Greenfield Pkwy, Garner, NC 27529			SIG. INVENTORY NO. 03-0516

23-MAR-2011 09:30
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10:00:00 AM

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



Elevation View @ 270°

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

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.6 ft.	+0.6 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

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
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

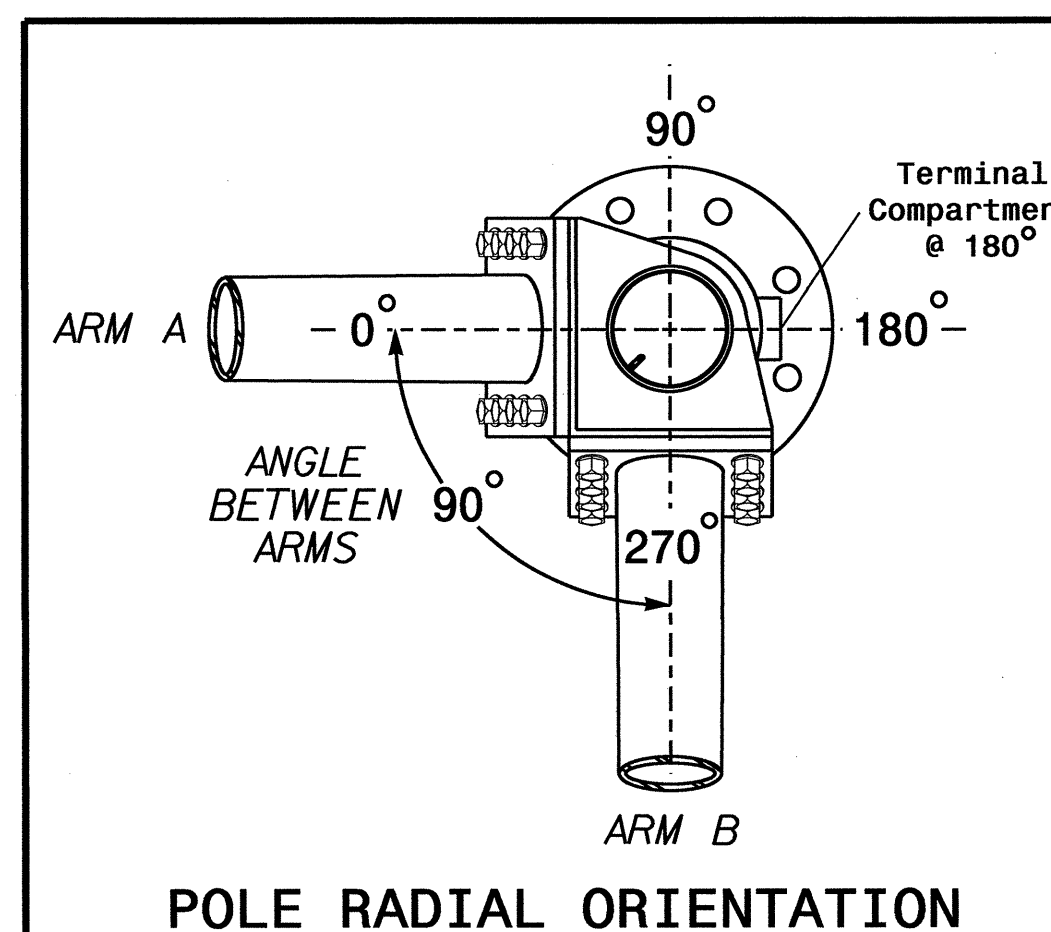
NOTES

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.

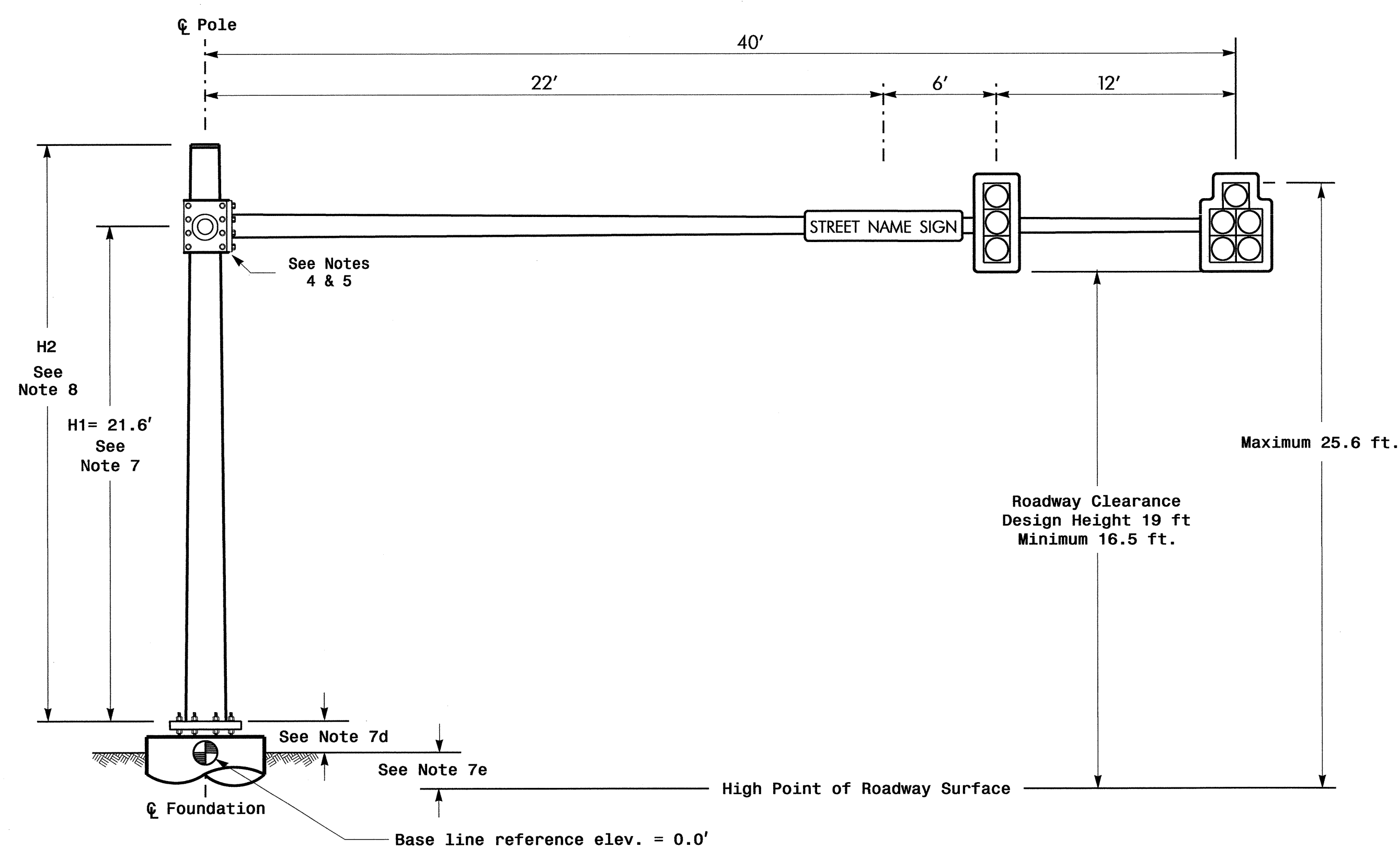
Design Requirements

- 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.

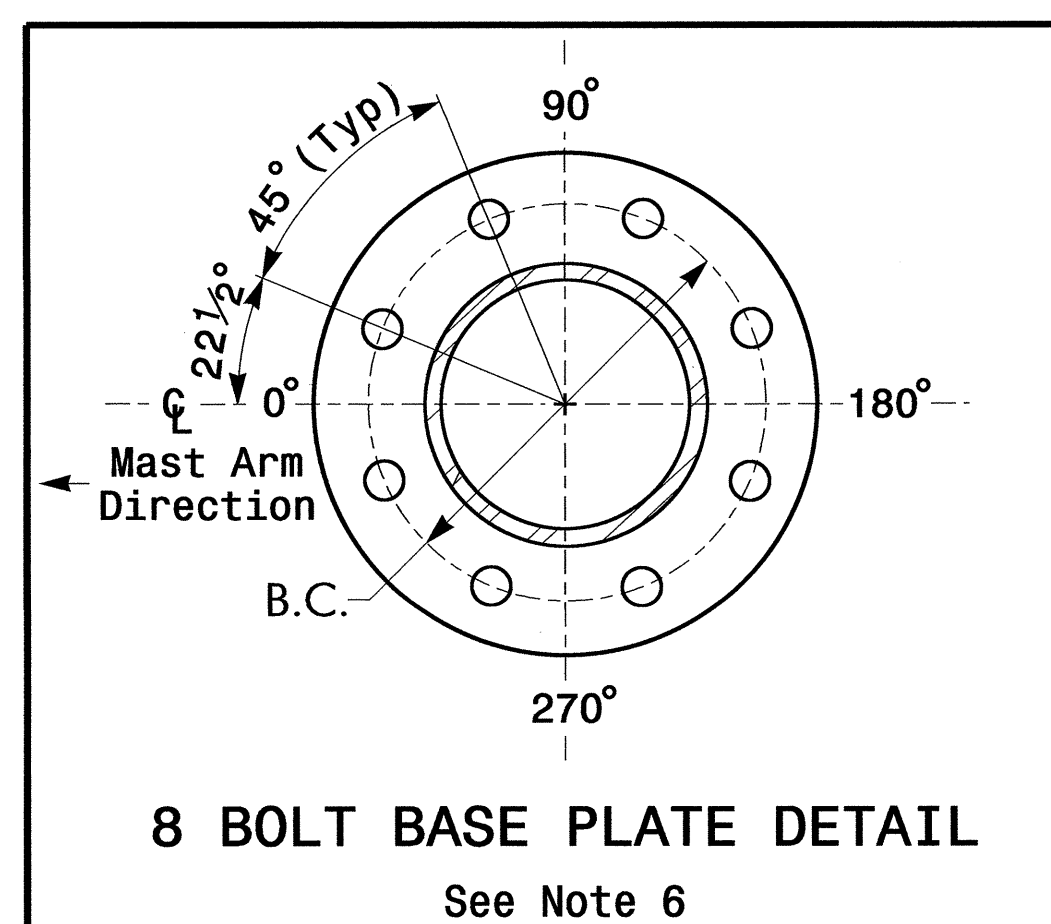


POLE RADIAL ORIENTATION

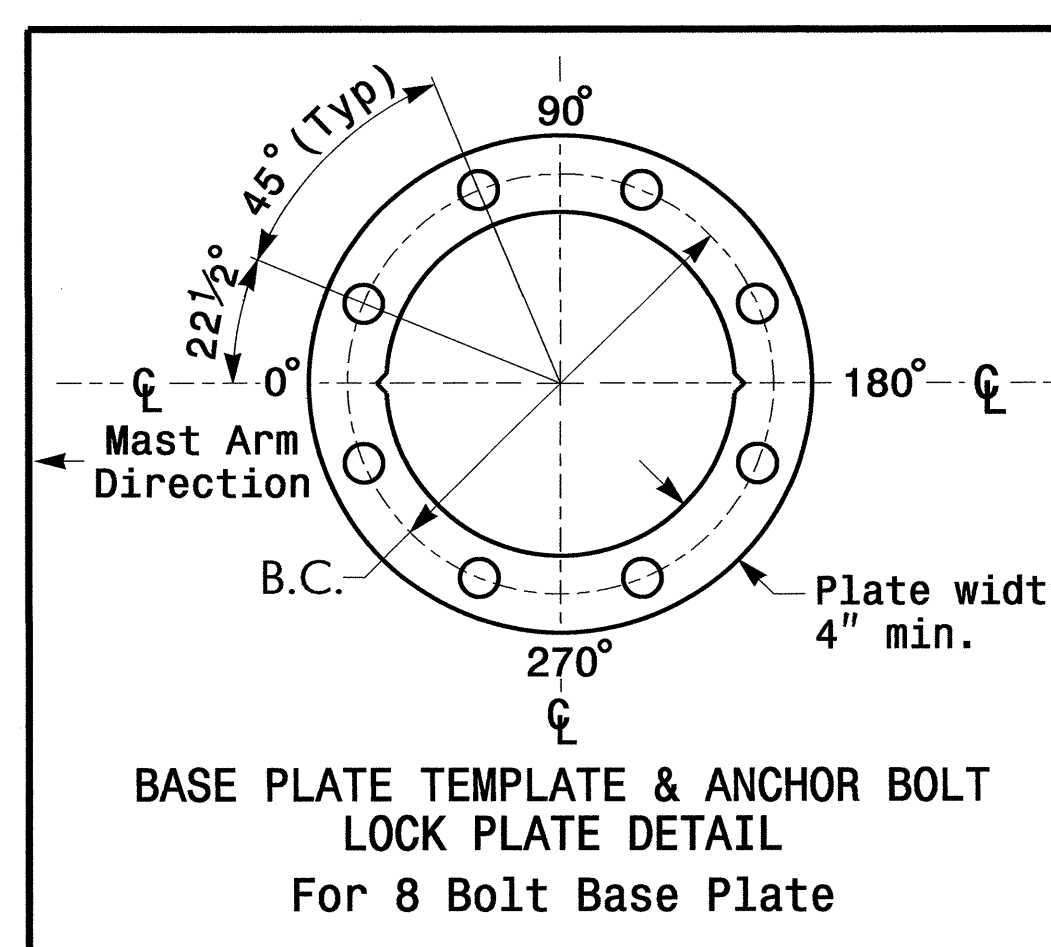
Design Loading for METAL POLE NO. 2, MAST ARM B



Elevation View @ 0°



8 BOLT BASE PLATE DETAIL
See Note 6

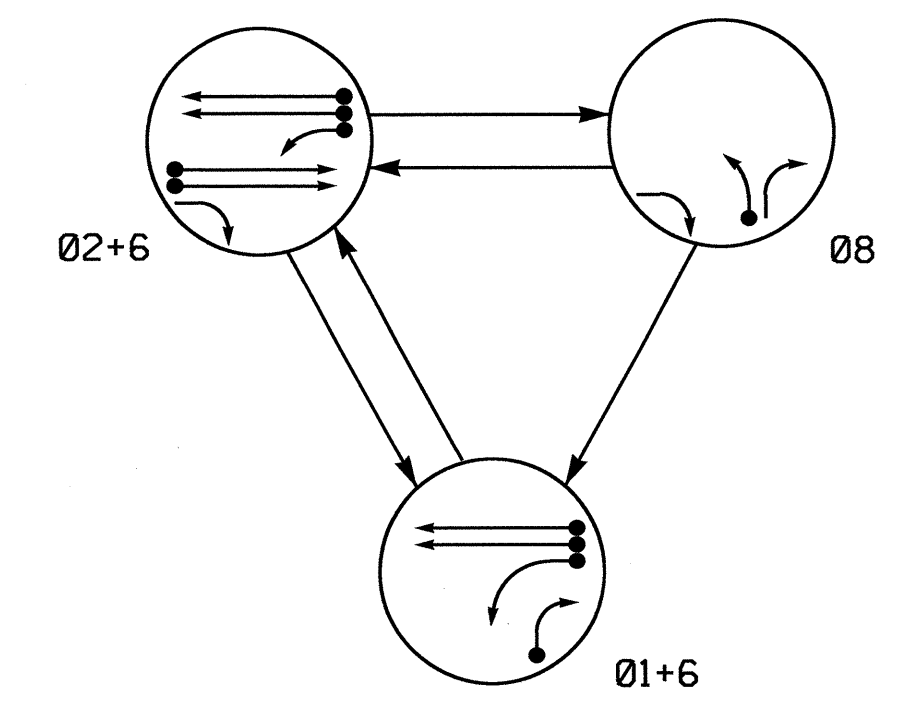


BASE PLATE TEMPLATE & ANCHOR BOLT
LOCK PLATE DETAIL
For 8 Bolt Base Plate

NCDOT Wind Zone 2 (130 mph)

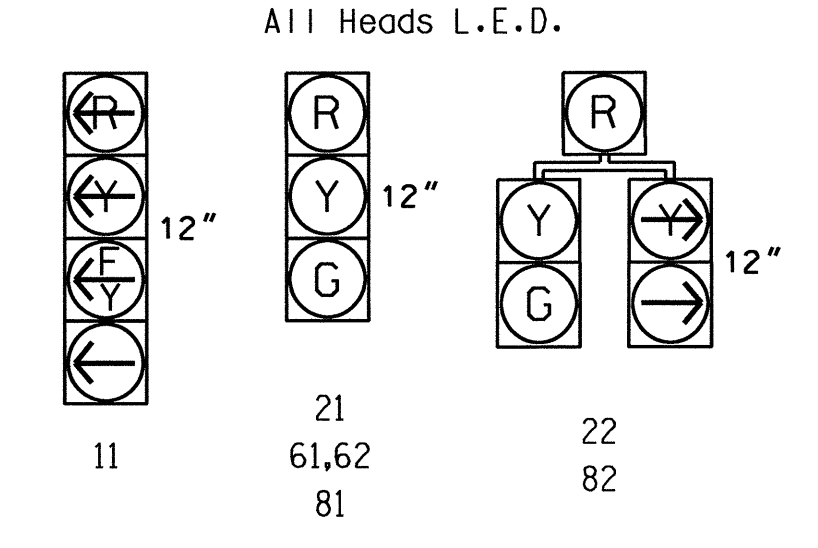
	SR 1308 (Bell Fork Road) At White Street Extension		
	Division 3 Onslow County Jacksonville PLAN DATE: February 2011 REVIEWED BY: JPG	PREPARED BY: IOU REVIEWED BY:	
SCALE: 0 N/A N/A	REVISIONS	IMIT. DATE	DATE: 3/24/11 SIGNATURE: [Signature] SIG. INVENTORY NO. 03-0516

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	01+6	02+6	08	LEGEND
11	←	←	←	←
21	R	G	R	Y
22	R	G	R	Y
61,62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

SIGNAL FACE I.D.



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

	TO			
	←	←	←	←
FROM	←	←	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←

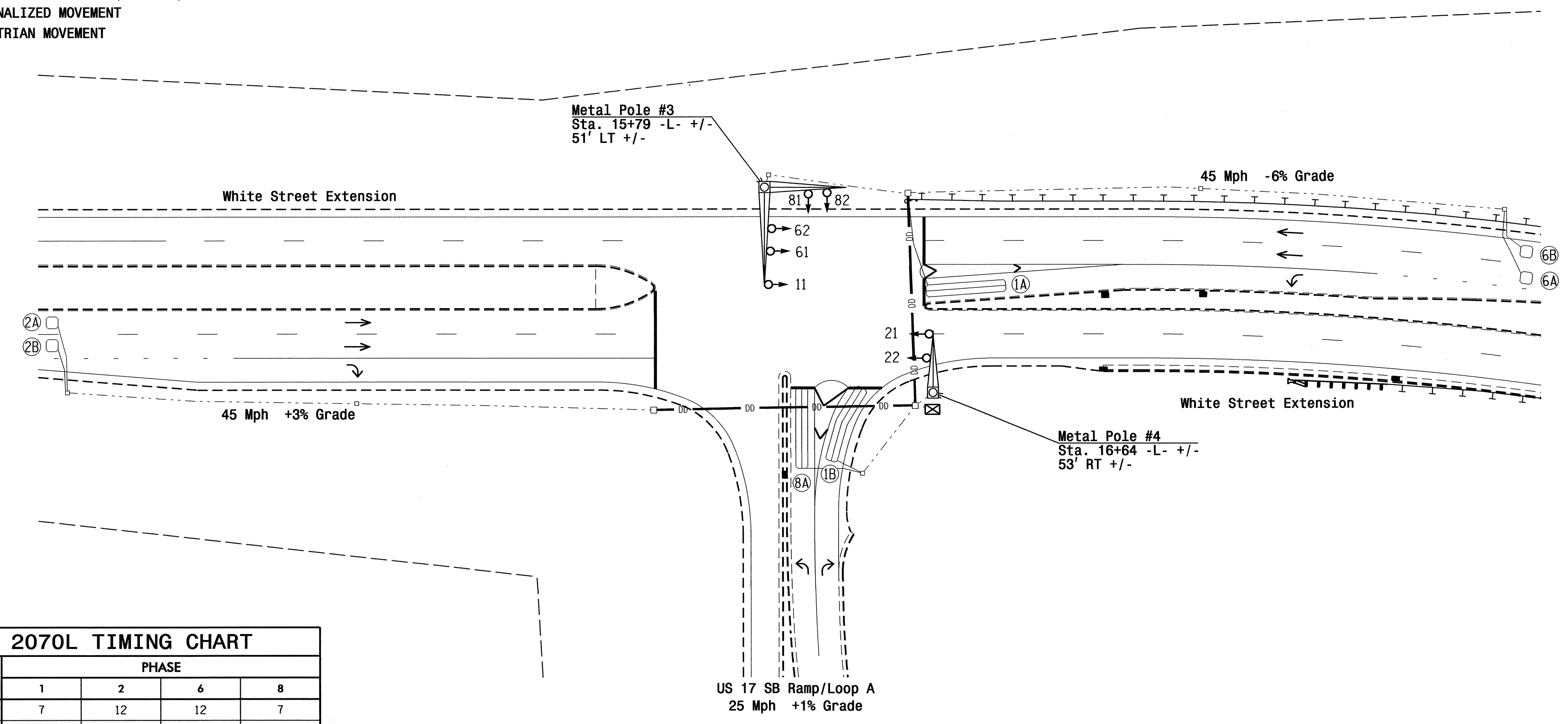
← = Flashing Yellow Arrow

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15	-	Y
1B	6X40	0	2-4-2	Y	1	Y	Y	-	3	-	Y
2A	6X6	300	4	Y	2	Y	Y	-	-	-	Y
2B	6X6	300	4	Y	2	Y	Y	-	-	-	Y
6A	6X6	300	4	Y	6	Y	Y	-	-	-	Y
6B	6X6	300	4	Y	6	Y	Y	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	Y

PHASING DIAGRAM DETECTION LEGEND

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



FEATURE	PHASE			
	1	2	6	8
Min Green 1 *	7	12	12	7
Extension 1 *	2.0	6.0	6.0	2.0
Max Green 1 *	20	90	90	20
Yellow Clearance	3.0	5.1	5.1	3.0
Red Clearance	3.2	1.8	1.8	2.4
Red Revert	0.0	0.0	0.0	0.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	1.5	1.5	-
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.

3 Phase Fully Actuated Jacksonville City Signal System

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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Controller Asset #1059.

LEGEND

- | PROPOSED | EXISTING |
|--|-----------------------------------|
| ○ → Traffic Signal Head | ● → N/A |
| ● → Modified Signal Head | — Sign |
| □ → Pedestrian Signal Head With Push Button & Sign | □ → Signal Pole with Guy |
| □ → Signal Pole with Guy | □ → Signal Pole with Sidewalk Guy |
| □ → Inductive Loop Detector | □ → Controller & Cabinet |
| □ → Junction Box | □ → Junction Box |
| □ → 2-in Underground Conduit | □ → 2-in Underground Conduit |
| — N/A → Right of Way | — N/A → Right of Way |
| → → Directional Arrow | → → Directional Arrow |
| □ → Metal Pole with Mastarm | □ → Metal Pole with Mastarm |
| — ○ — → Directional Drill | — ○ — → Directional Drill |

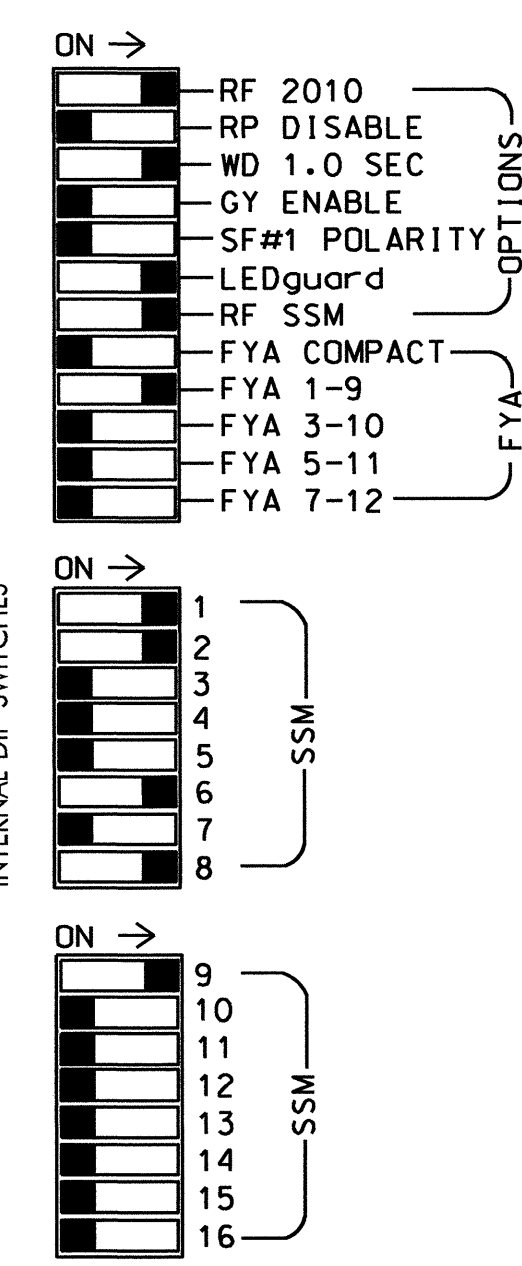
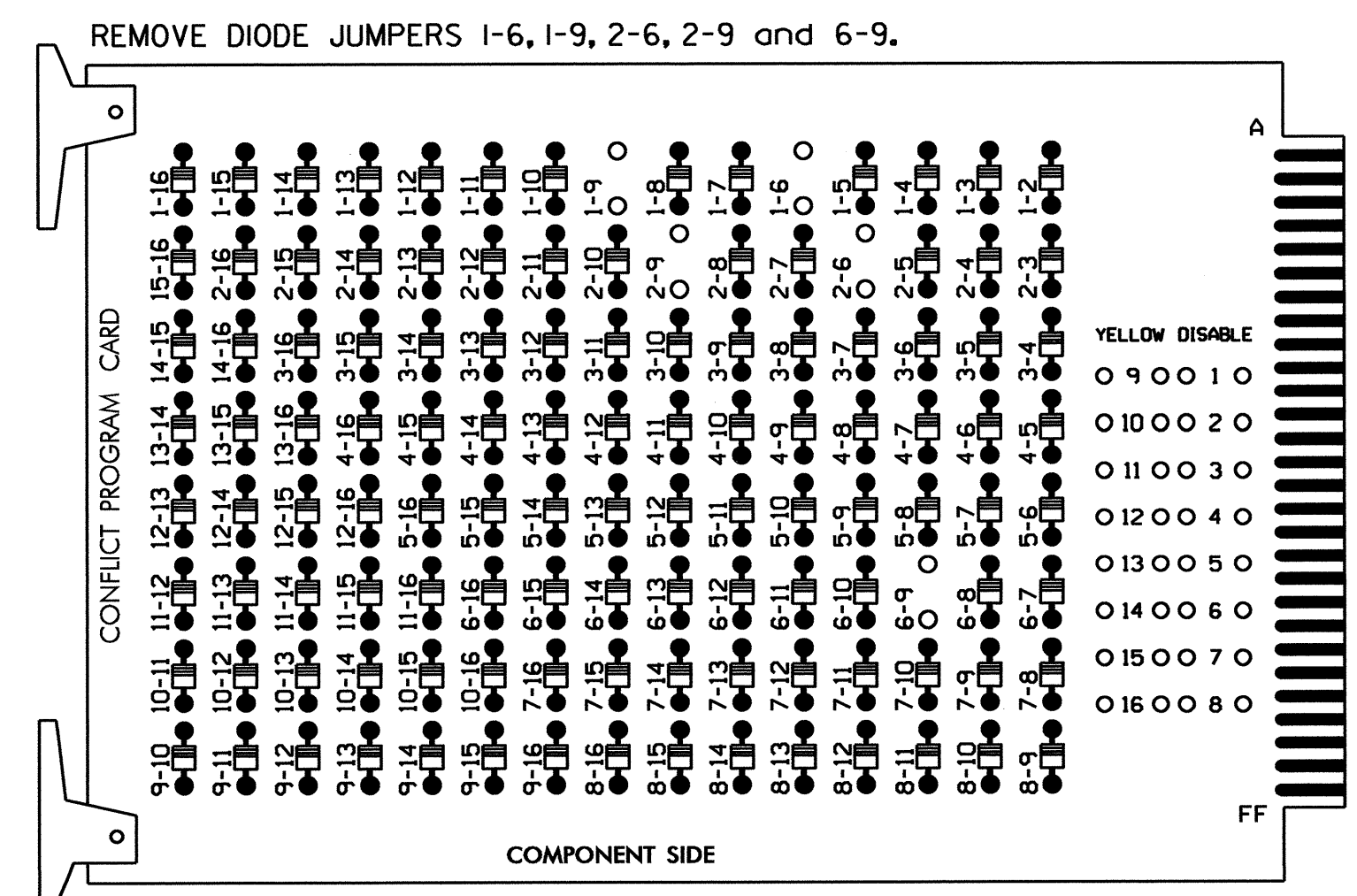
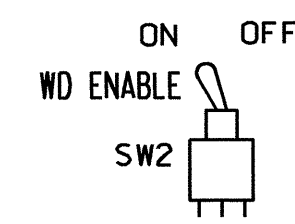
New Installation

	White Street Extension At US 17 SB Ramp/Loop A		
	Division 3 Onslow County Jacksonville PLAN DATE: January 2011 REVIEWED BY: JPG PREPARED BY: IOU/JPG REVIEWED BY:	SEAL 29904 ENGINEER J. GALLAWAY DATE: 4/28/11 SIG. INVENTORY NO. 03-1059	

03-MAR-2011 13:46
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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 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 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.
 - The cabinet and controller are part of the Jacksonville City Signal System.

SIGNAL HEAD HOOK-UP CHART

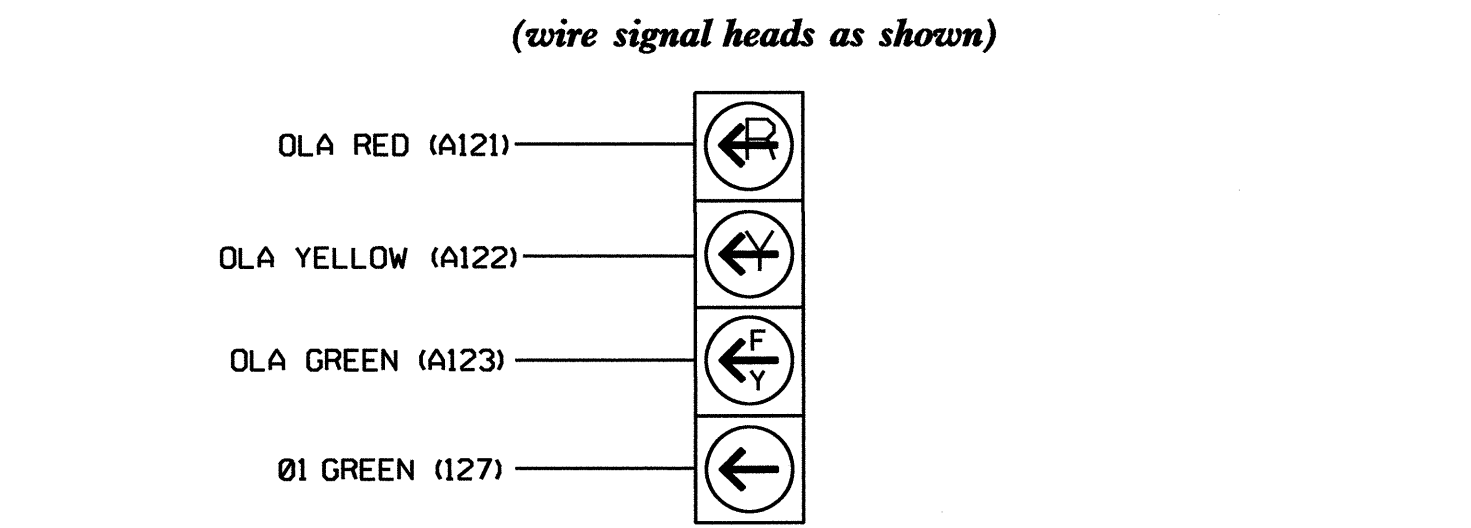
LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11*	82	21,22	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU	11*	NU	NU	NU	NU
RED		*	128					134			107							
YELLOW			129					135			108							
GREEN			130					136			109							
RED ARROW																		A121
YELLOW ARROW		126																A122
FLASHING YELLOW ARROW																		A123
GREEN ARROW	127	127									109							

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

EQUIPMENT INFORMATION

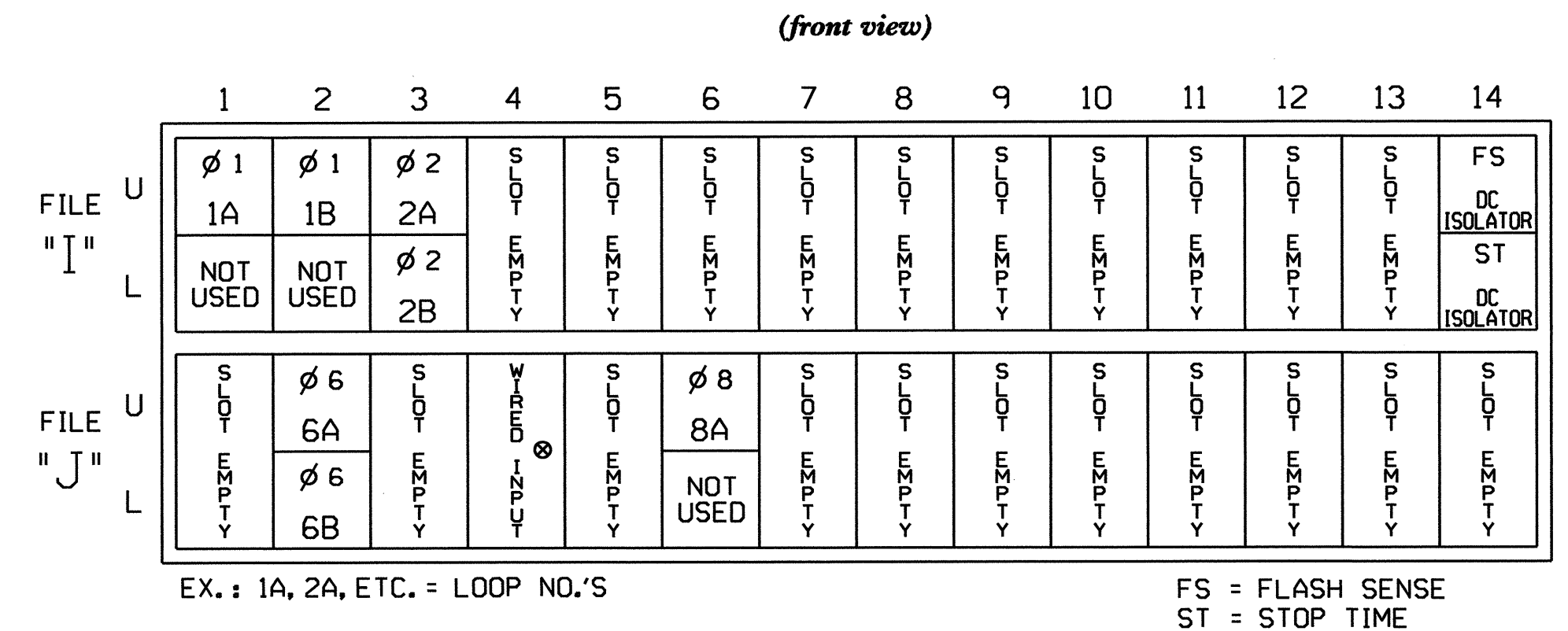
CONTROLLER.....2070L
 CABINET.....332 /W/ AUX
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
 LOAD SWITCHES USED.....S1,S2,S6,S8,S9
 PHASES USED.....1,2,6,8
 OVERLAP "A".....1+2
 OVERLAP "B".....NOT USED
 OVERLAP "C".....NOT USED
 OVERLAP "D".....NOT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

4 SECTION FYA PPLT SIGNAL WIRING DETAIL



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

INPUT FILE POSITION LAYOUT

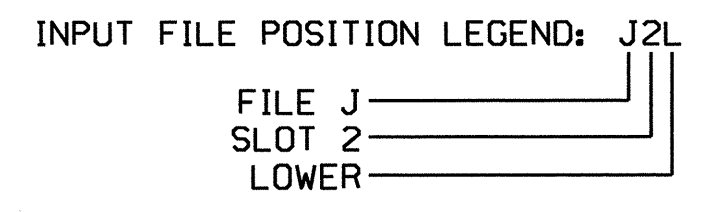


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 ⊗ Wired Input - Do not populate slot with detector card

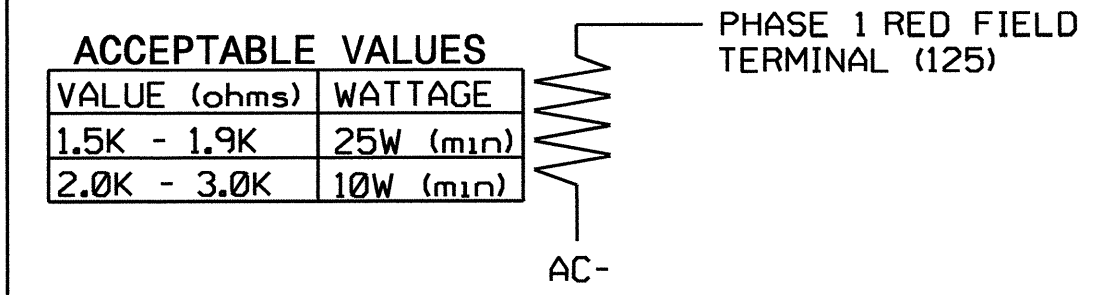
INPUT FILE CONNECTION & PROGRAMMING CHART

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	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			

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



LOAD RESISTOR INSTALLATION DETAIL



NOTE: The purpose of this resistor is to load the channel red monitor input in order for the Signal Sequence Monitor to use the full signal sequence monitoring capability on channels that do not use the red display in the field.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1059
 DESIGNED: January 2011
 SEALED: 01/28/11
 REVISED:

ELECTRICAL DETAIL SHEET 1 OF 2

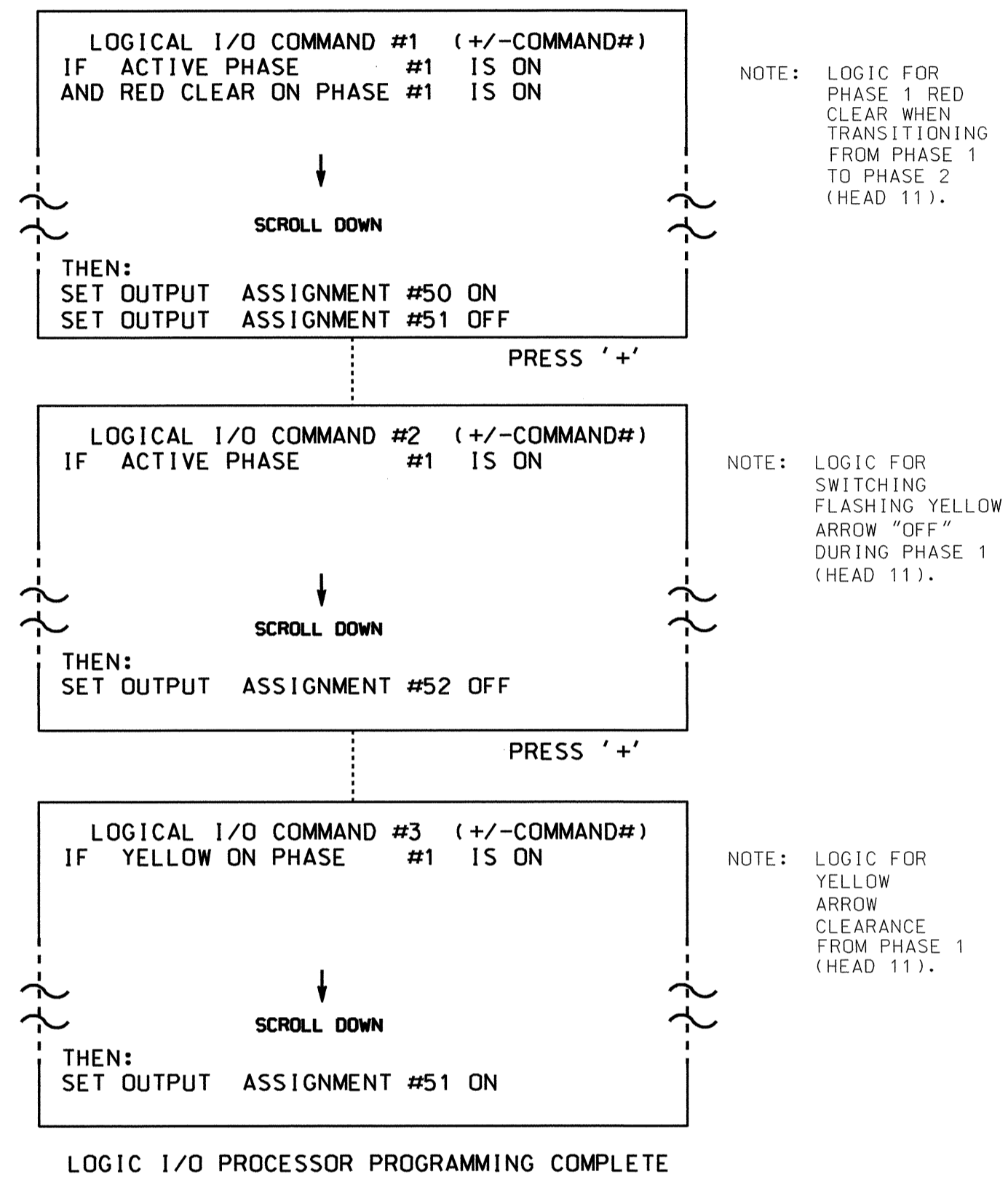
	Prepared In the Office of: Division 3 Onslow County Jacksonville		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	White Street Extension at US 17 SB Ramp/Loop A		
PLAN DATE: February 2011 PREPARED BY: C. Strickland	REVIEWED BY: T. Sigmund REVIEWED BY:	DATE:	SIGNATURE: <i>C. Strickland</i> DATE:
REVISIONS:		INIT. DATE	SIG. INVENTORY NO. 03-1059

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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).



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).

```


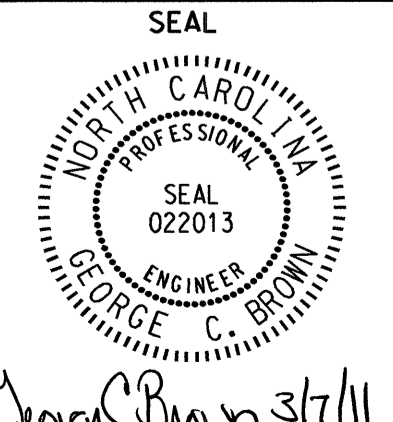
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:           12345678910111213141516
VEH OVL PARENTS:|XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR:  _ RED _ YELLOW _ GREEN
FLASH COLORS:  _ RED _ YELLOW X GREEN
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
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

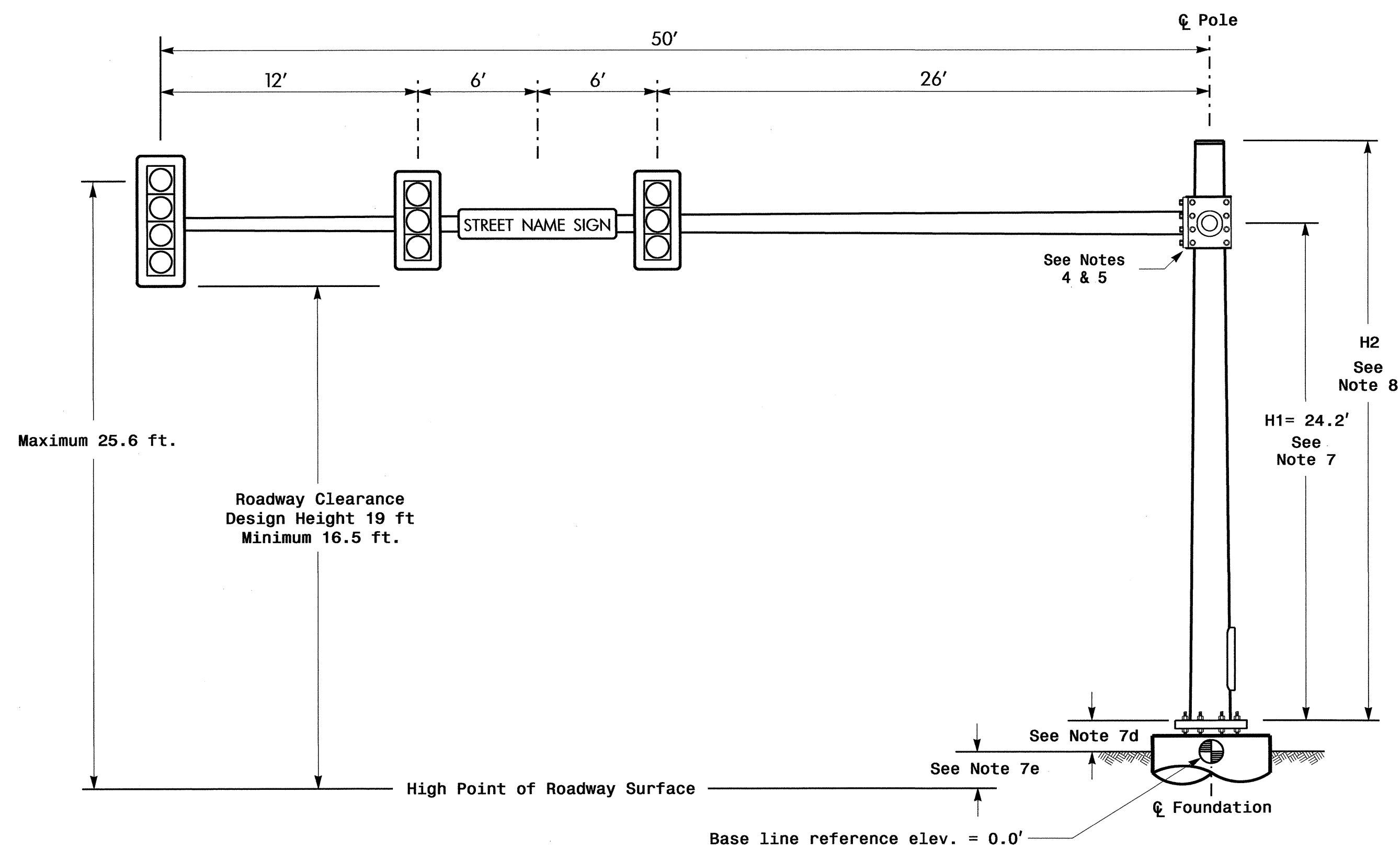
OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-1059
DESIGNED: January 2011
SEALED: 01/28/11
REVISED:

04-MAR-2011 11:08 S:\ITSAS\UNIT5\SIGNAL\swkr\groups\sig\Mon\Strickland\031059_sml.eia.xxx.dgn

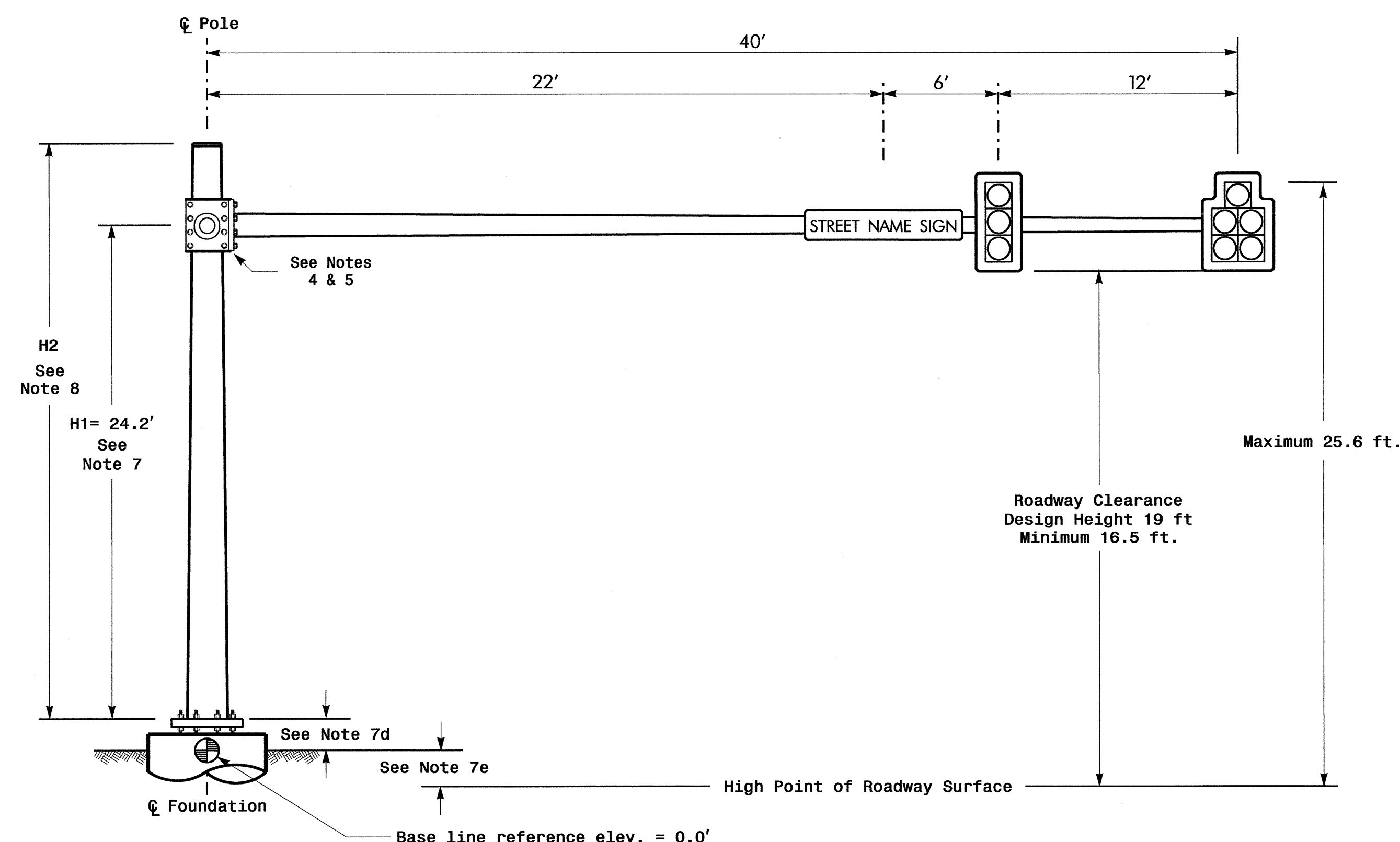
ELECTRICAL DETAIL SHEET 2 OF 2							
	<p style="text-align: center;">White Street Extension at US 17 SB Ramp/Loop A</p> <p>Division 3 Onslow County Jacksonville</p> <p>PLAN DATE: February 2011 REVIEWED BY: T. J. J.</p> <p>PREPARED BY: C. Strickland REVIEWED BY:</p> <table border="1" style="width: 100%; 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>SEAL</p> <p>North Carolina Professional Engineer</p> <p>022013</p> <p>GEORGE C. BROWN</p> <p>Signature: <i>George C. Brown</i> Date: 3/11</p> <p>SIG. INVENTORY NO. 03-1059</p>						

Design Loading for METAL POLE NO. 3, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 3, MAST ARM B

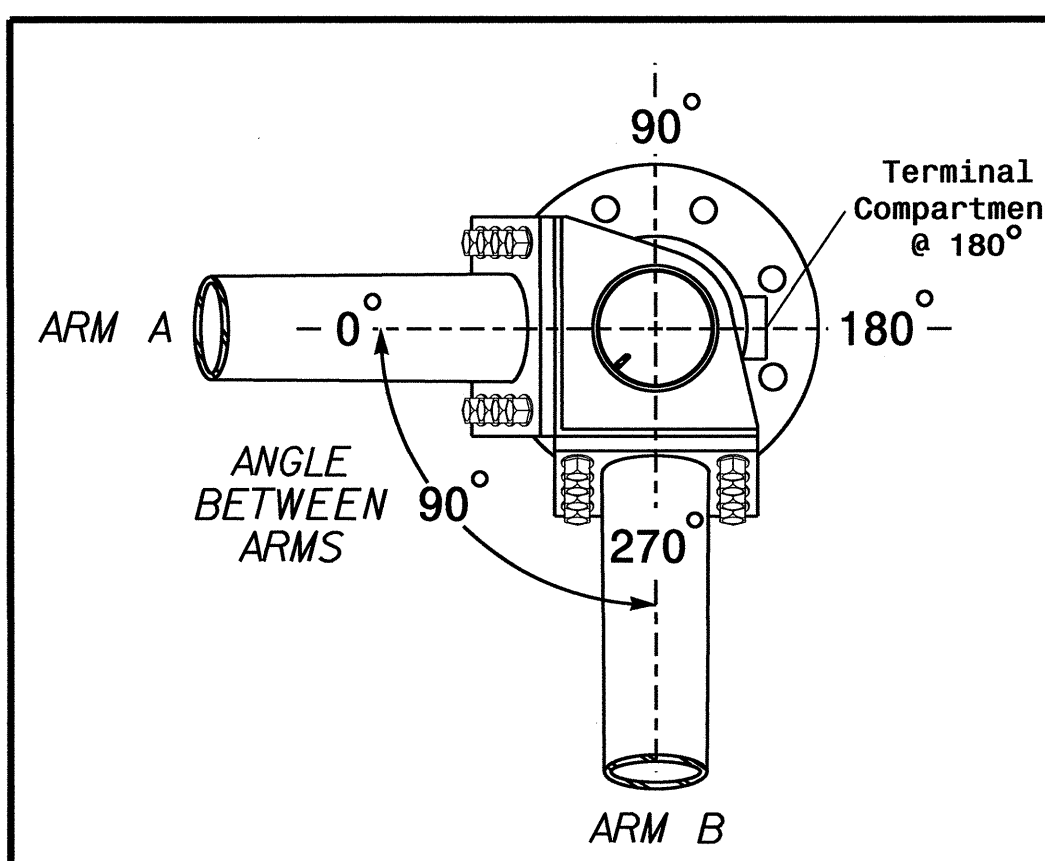


Elevation View @ 0°

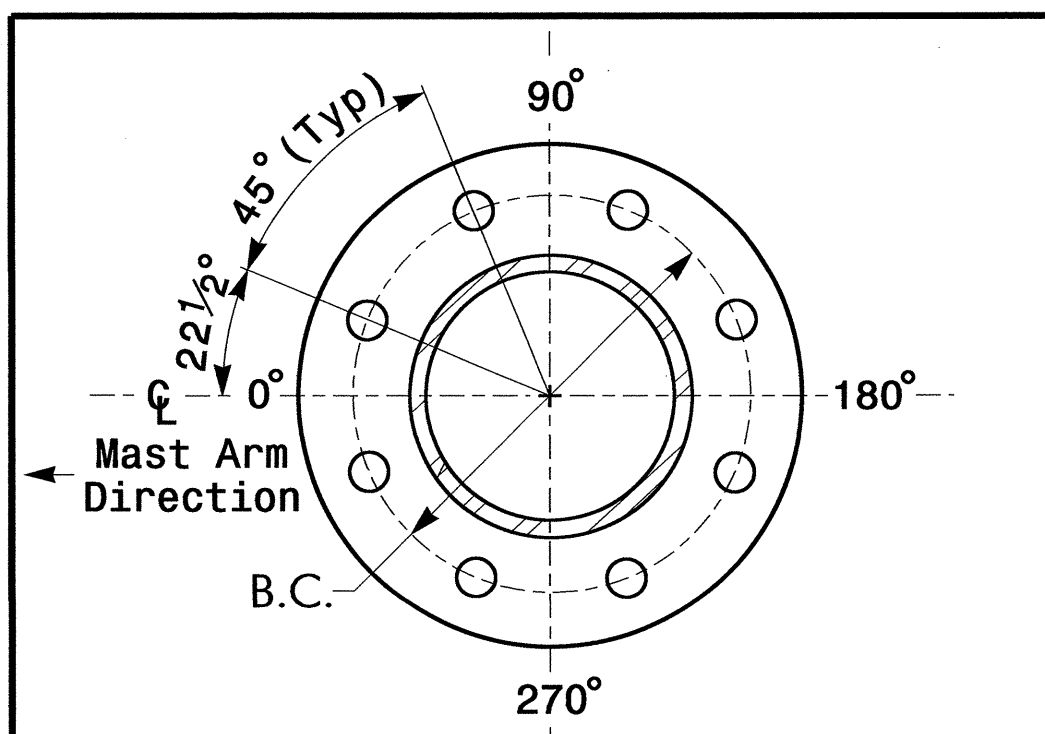
SPECIAL NOTE
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project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

Elevation Data for Mast Arm Attachment (H1)

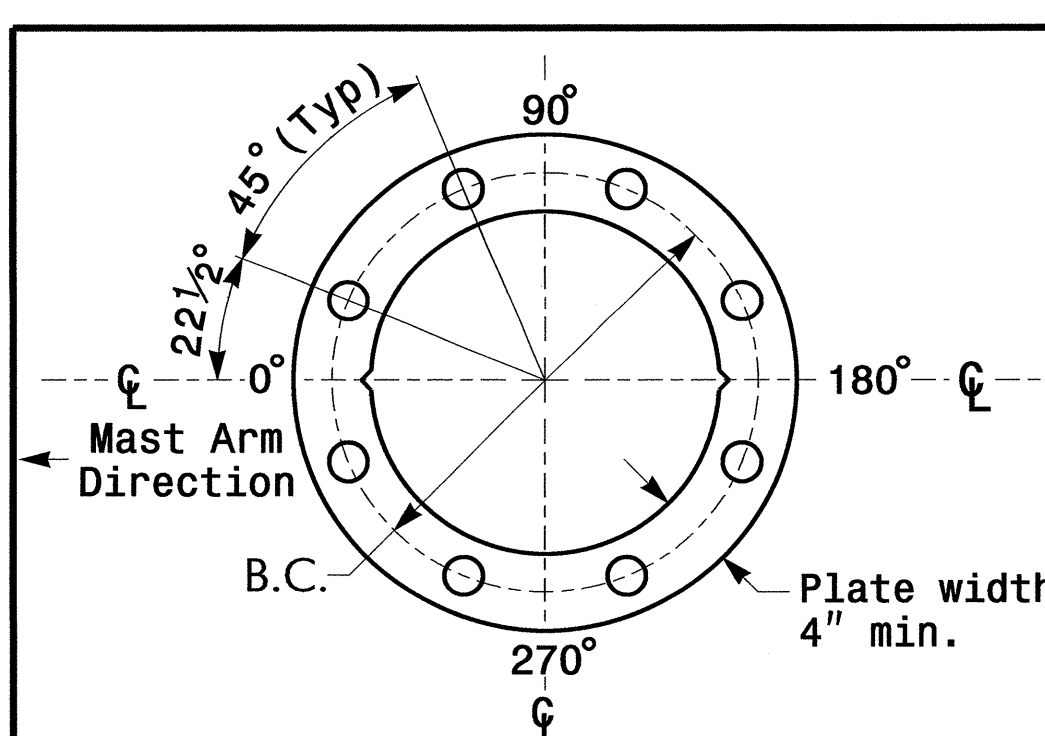
Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+3.2 ft.	+3.2 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



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

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]	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.
- 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)

	<p>White Street Extension At US 17 SB Ramp/Loop A</p>		
	<p>Division 3 Onslow County Jacksonville</p>	<p>PREPARED BY: IOU REVIEWED BY: JPG</p>	
	<p>SCALE: 0 N/A</p>	<p>REVISIONS: INIT. DATE</p>	

Sig. Inventory No. 03-1059

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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.

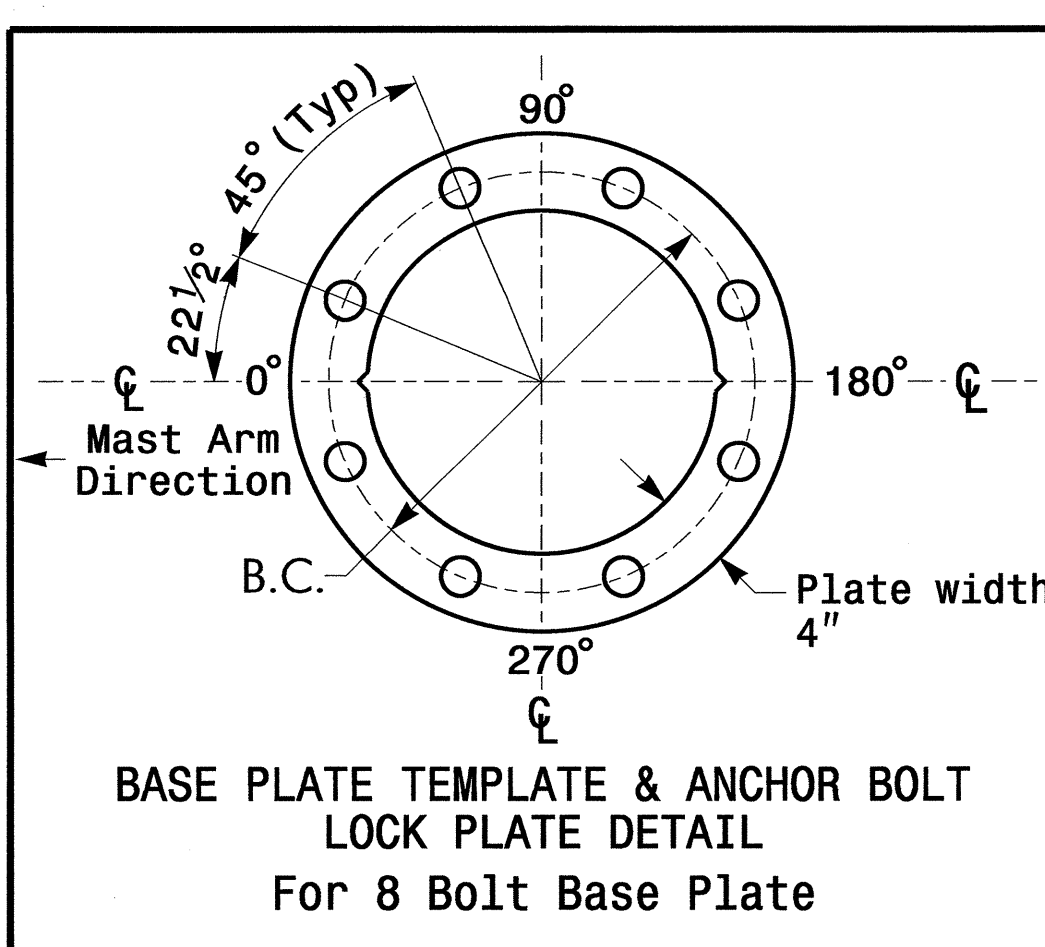
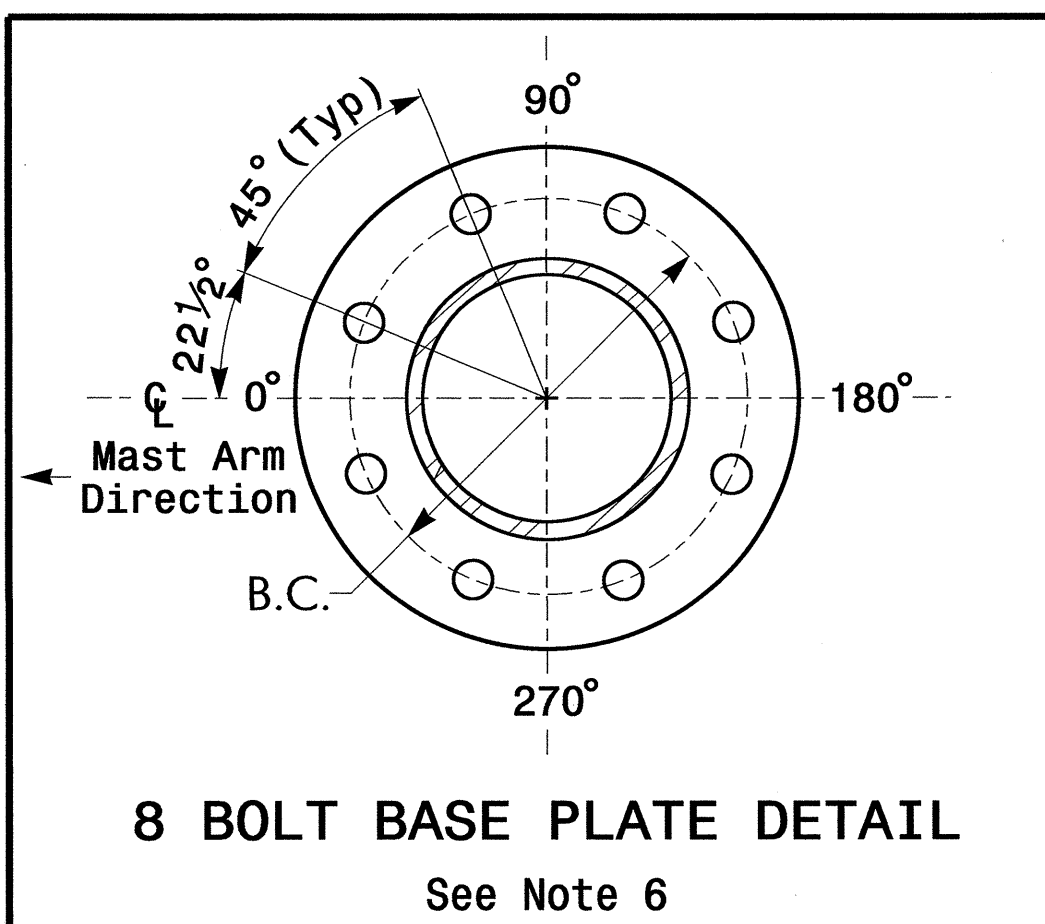
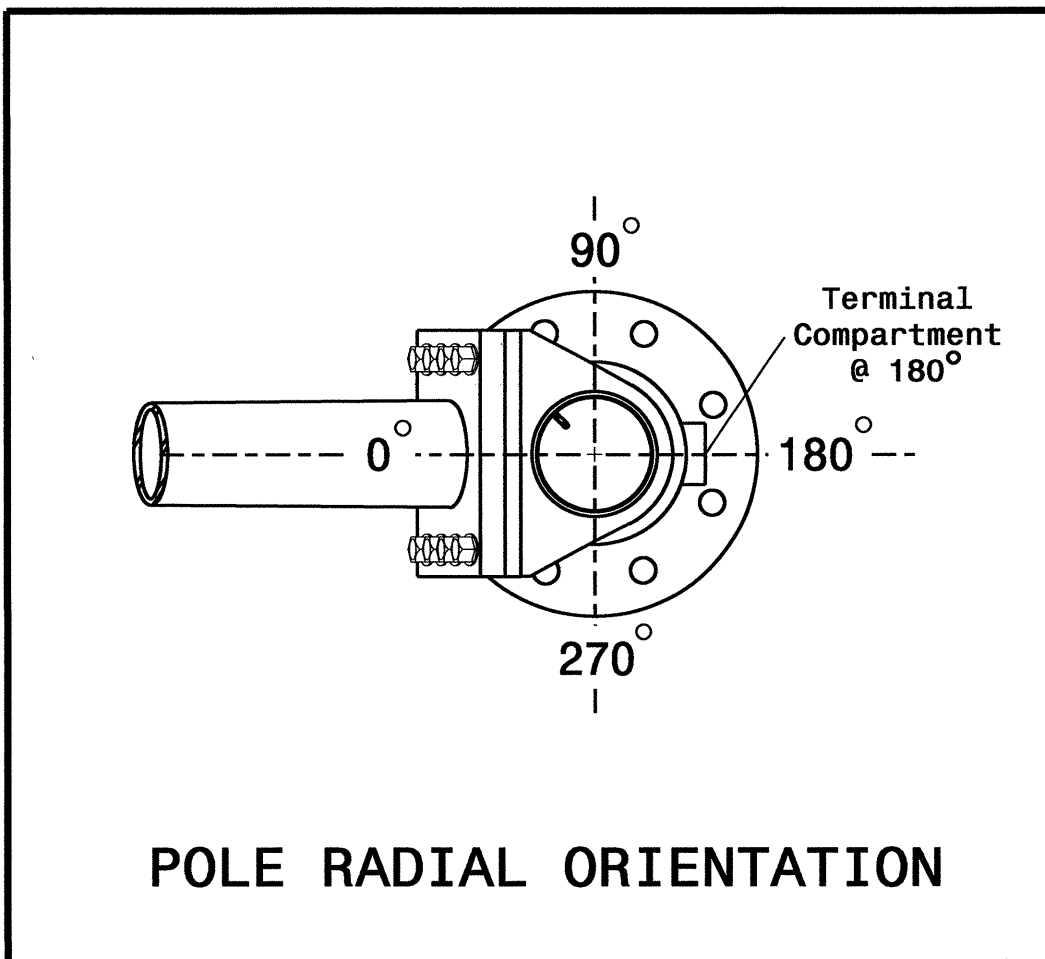
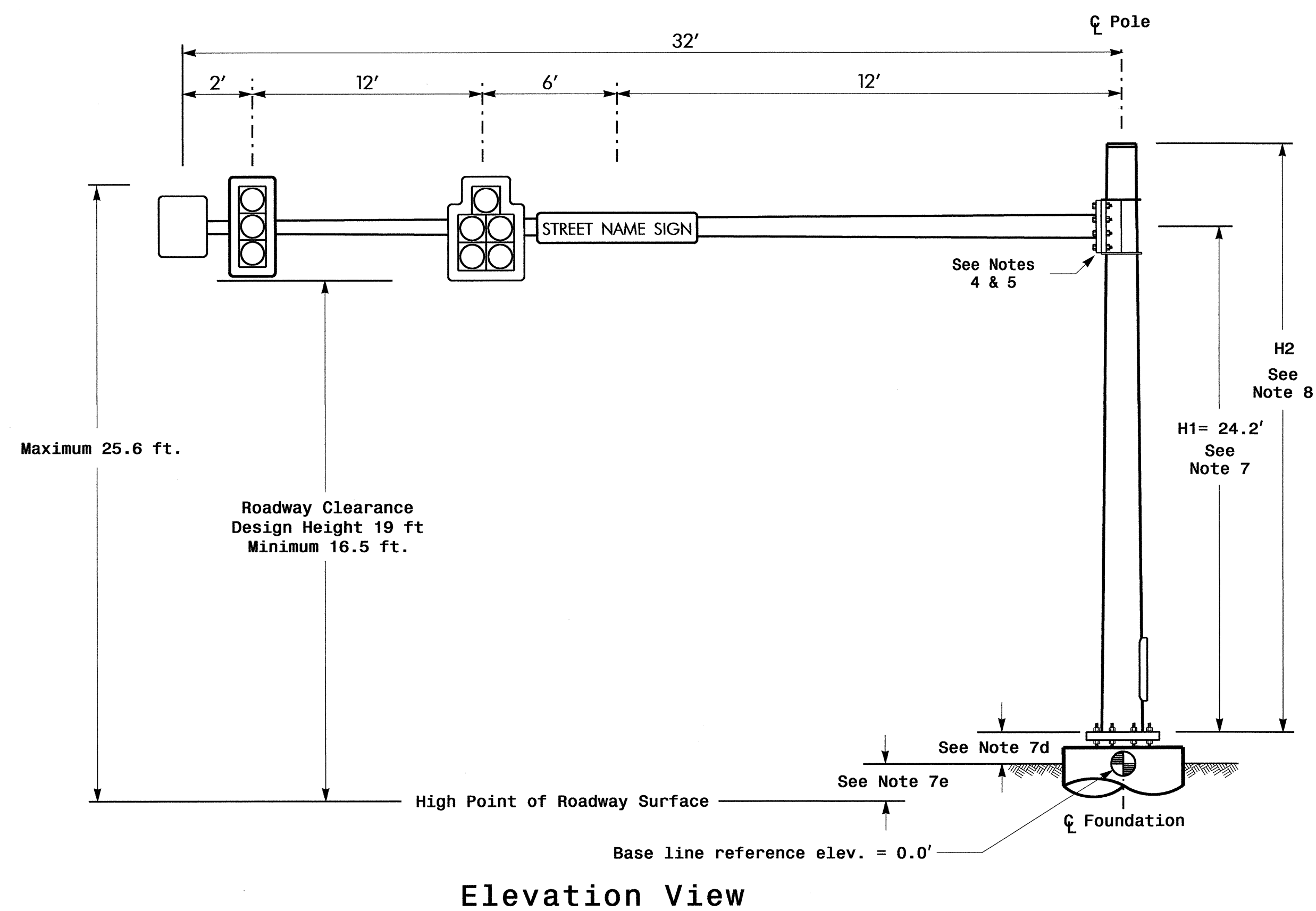
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 4
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+3.2 ft.
Elevation difference at Edge of travelway or face of curb	N/A

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"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	7.5 S.F.	30.0" W X 36.0" L	14 LBS

Design Loading for METAL POLE NO. 4



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.

Design Requirements

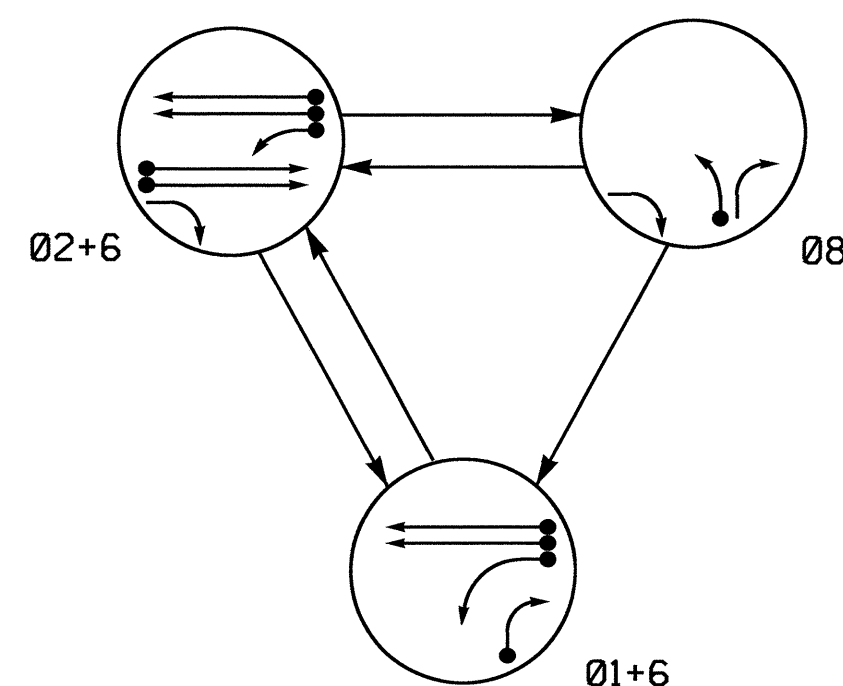
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the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

NOTES

NCDOT Wind Zone 2 (130 mph)

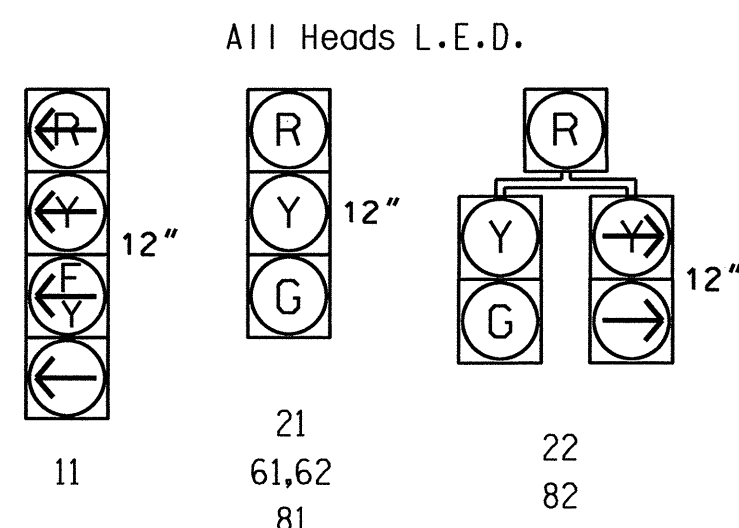
	Prepared in the Offices of: White Street Extension At US 17 SB Ramp/Loop A		SEAL
	Division 3 Onslow County Jacksonville PLAN DATE: February 2011 REVIEWED BY: JPG	PREPARED BY: IOU REVIEWED BY:	
REVISIONS:		INIT. DATE	SIGNATURE: DATE: 3/24/11 SIG. INVENTORY NO. 03-1059

PHASING DIAGRAM

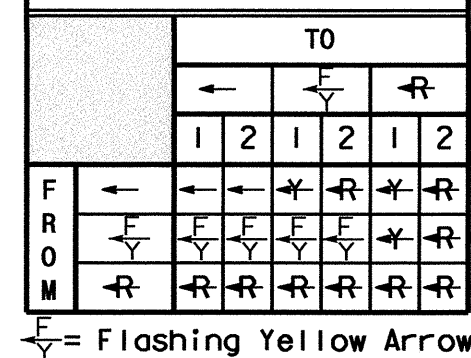


SIGNAL FACE	PHASE			
	01+6	02+6	08	FLIGHT
11	←	←	←	←
21	R	G	R	Y
22	R	G	R	Y
61,62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R

SIGNAL FACE I.D.



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL



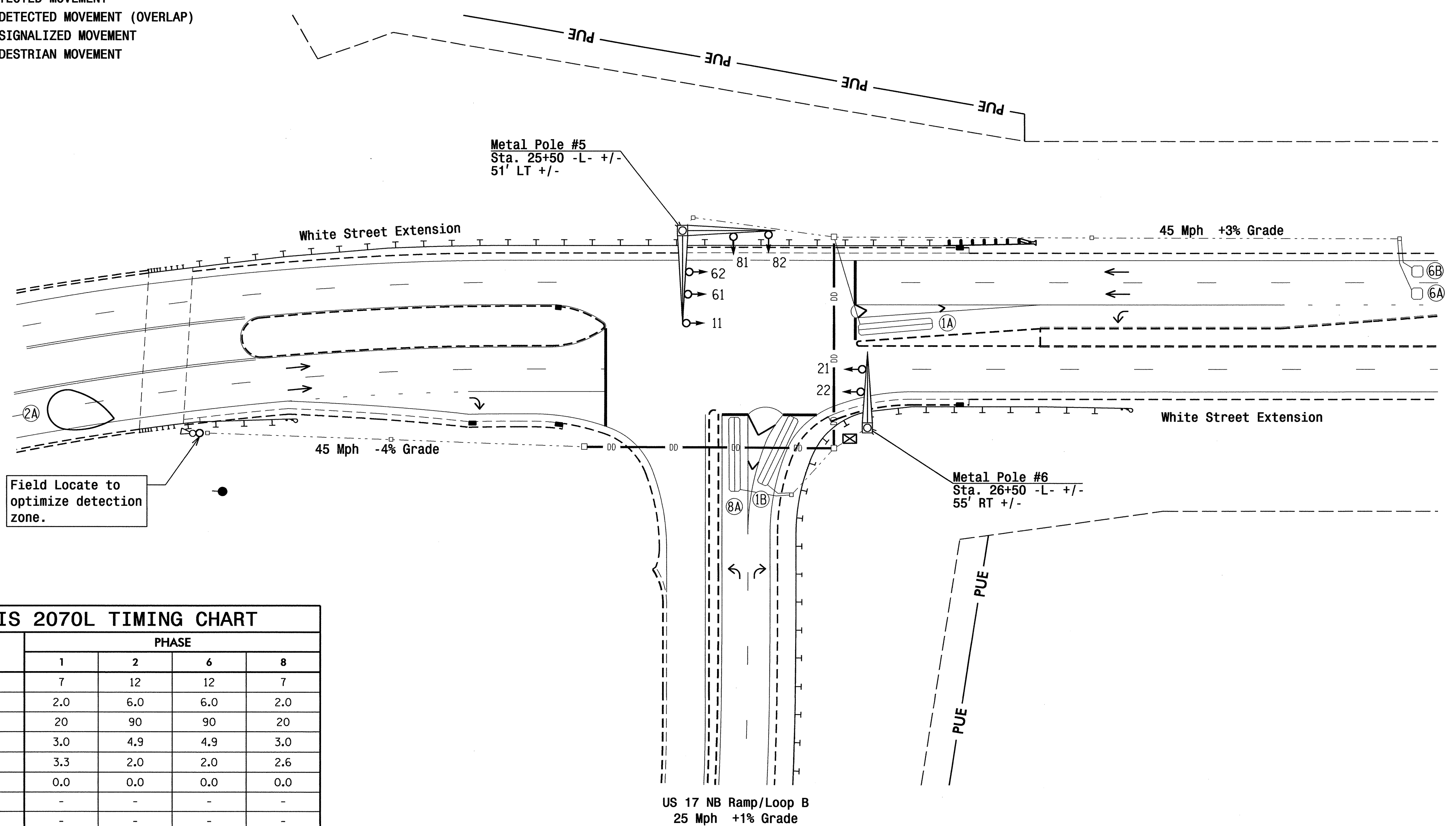
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	STRETCH TIME			DELAY TIME
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15	-	Y
1B	6X40	0	2-4-2	Y	1	Y	Y	-	15	-	Y
2A*	*	300	4	Y	2	Y	Y	-	-	-	Y
6A	6X6	300	4	Y	6	Y	Y	-	-	-	Y
6B	6X6	300	4	Y	6	Y	Y	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	Y

* Microwave Detection Zone

PHASING DIAGRAM DETECTION LEGEND

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



Field Locate to optimize detection zone.

FEATURE	PHASE			
	1	2	6	8
Min Green 1*	7	12	12	7
Extension 1*	2.0	6.0	6.0	2.0
Max Green 1*	20	90	90	20
Yellow Clearance	3.0	4.9	4.9	3.0
Red Clearance	3.3	2.0	2.0	2.6
Red Revert	0.0	0.0	0.0	0.0
Walk 1*	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation*	-	2.0	1.5	-
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.

3 Phase Fully Actuated Jacksonville City Signal System

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. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Controller Asset #1060.

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 Signal Pole with Sidewalk Guy |
| | PROPOSED Inductive Loop Detector | | EXISTING Inductive Loop Detector |
| | PROPOSED Controller & Cabinet | | EXISTING Junction Box |
| | PROPOSED 2-in Underground Conduit | | EXISTING 2-in Underground Conduit |
| | PROPOSED Right of Way | | EXISTING Right of Way |
| | PROPOSED Directional Arrow | | EXISTING Directional Arrow |
| | PROPOSED Metal Pole with Mastarm | | EXISTING Metal Pole with Mastarm |
| | PROPOSED Directional Drill | | EXISTING N/A |
| | PROPOSED Microwave Detector | | EXISTING Microwave Detector |

New Installation

White Street Extension At US 17 NB Ramp/Loop B

Division 3 Onslow County Jacksonville

PLAN DATE: January 2011 REVIEWED BY: JPG

PREPARED BY: IOU/JPG REVIEWED BY:

SEAL

29904

DATE

1/22/11

SIG. INVENTORY NO. 03-1060

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 1"=40'

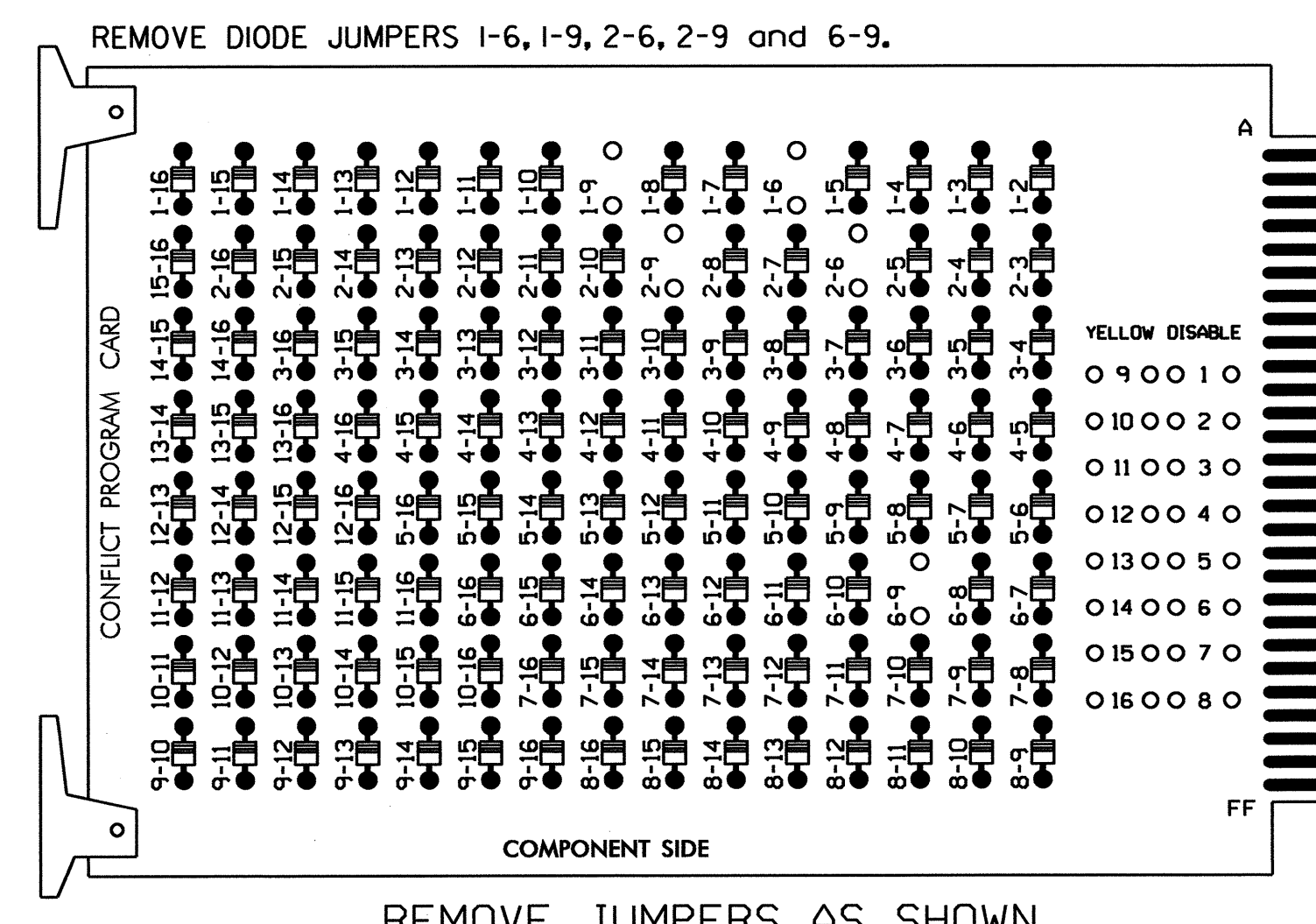
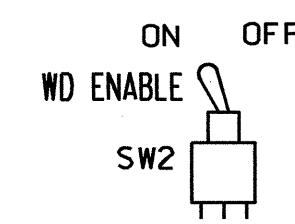
REVISIONS: _____

INIT.	DATE

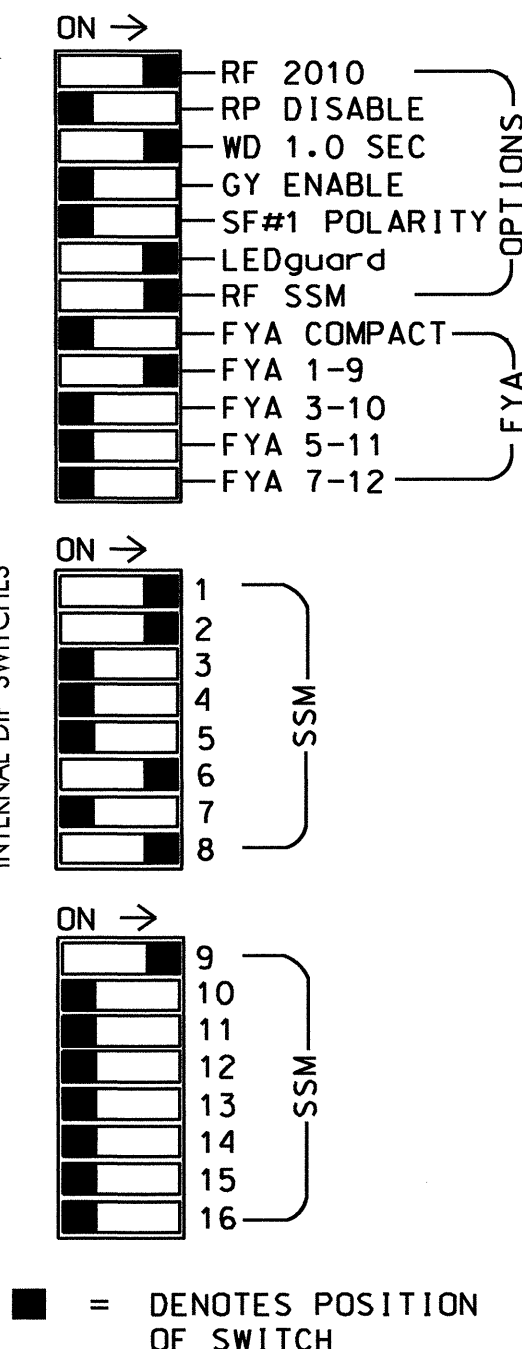
02-MAR-2011 13:37
 R:\proj\off\c651\proj\sig\03-1060\031060_s1\gdsn_2011madd.dgn
 jgallaway

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 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 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.
- The cabinet and controller are part of the Jacksonville City Signal System.

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

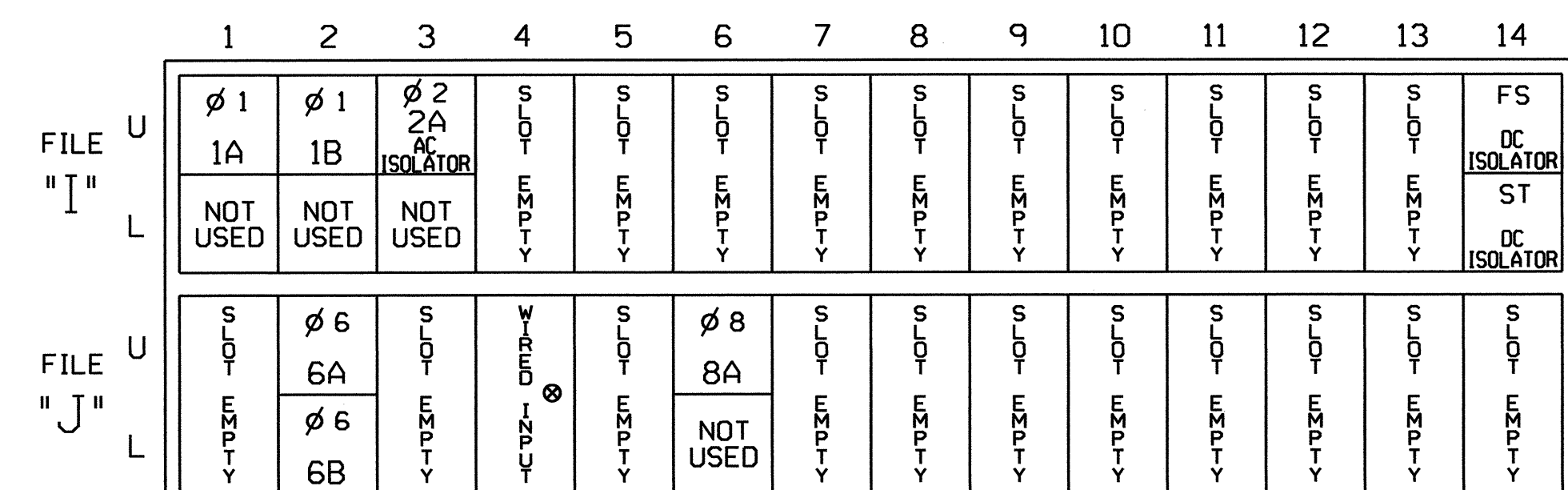
SIGNAL HEAD HOOK-UP CHART

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*	82	21,22	NU	NU	NU	NU	61,62	NU	NU	22	81,82	NU	11*	NU	NU	NU	NU
RED	*	128						134			107							
YELLOW		129						135			108							
GREEN		130						136			109							
RED ARROW														A121				
YELLOW ARROW	126													A122				
FLASHING YELLOW ARROW														A123				
GREEN ARROW	127	127									109							

NU = Not Used
 * Denotes install load resistor. See load resistor installation detail this sheet.
 ★ See pictorial of signal head wiring detail sheet 2 of 2.

INPUT FILE POSITION LAYOUT

(front view)

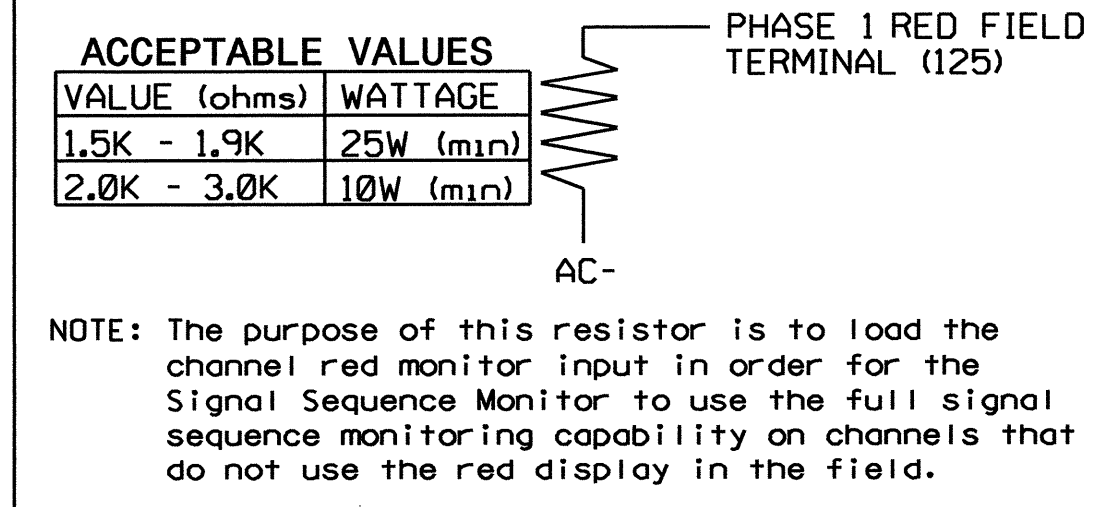


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME
 ⊗ Wired Input - Do not populate slot with detector card

NOTE: INSTALL MODEL 252 AC ISOLATOR IN SLOT I3 FOR USE WITH MICROWAVE DETECTOR. SEE MICROWAVE DETECTOR WIRING THIS SHEET.

IMPORTANT: For proper operation of the microwave detector, remove surge protection from TB2-9 and TB2-10. A DIRECT SHORT WILL OCCUR IF THIS IS NOT DONE. Tie TB2-10 to AC neutral.

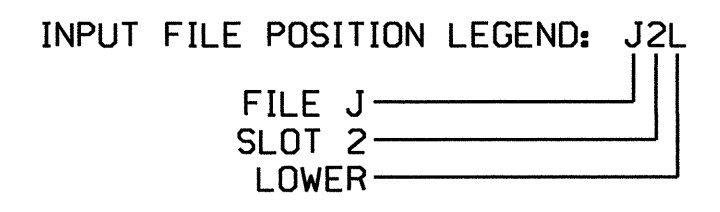
LOAD RESISTOR INSTALLATION DETAIL



INPUT FILE CONNECTION & PROGRAMMING CHART

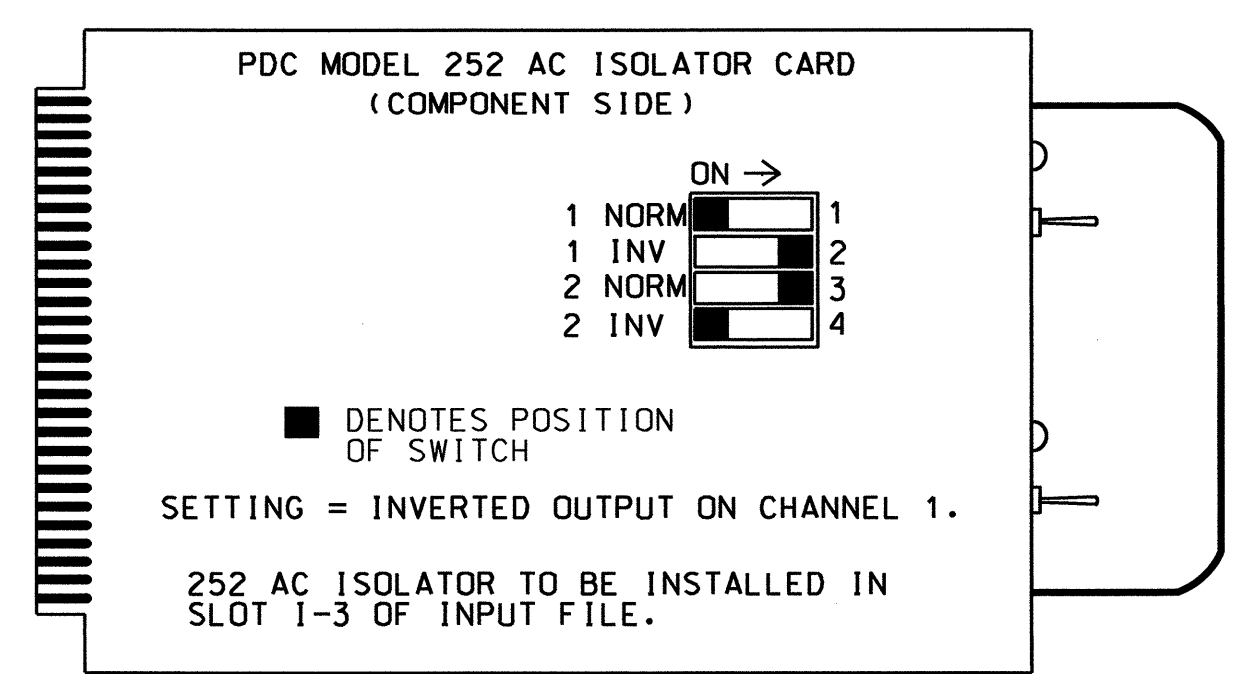
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10	26	6	Y	Y	Y		3
1B	TB2-5,6	I2U	39	1	2	1	Y	Y			15
* 2A	TB2-9,10	I3U	63	25	32	2	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y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

¹Add jumper from I1-W to J4-W, on rear of input file.
 * Microwave Detector (see wiring detail this page)



MICROWAVE DETECTOR AC ISOLATOR (MODEL 252) OUTPUT PROGRAMMING DETAIL

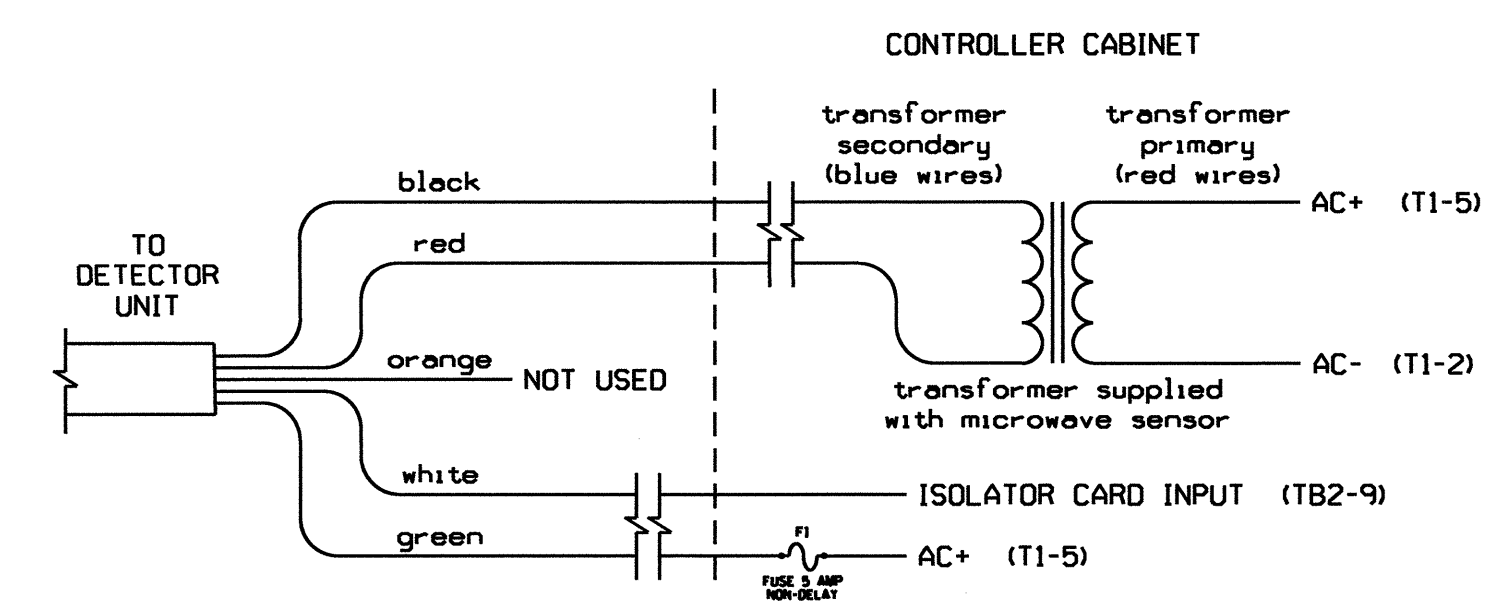
(set DIP switches as shown below)



NOTE: IF ANOTHER MANUFACTURER TYPE OF AC ISOLATOR IS USED, OUTPUT PROGRAMMING IS LIKELY NOT TO EQUATE TO THAT SHOWN ABOVE.

MICROWAVE DETECTOR WIRING DETAIL

(wire as shown)



TC26B WIRE LIST

COLOR	FUNCTION
black	12V to 24V AC/DC (no polarity)
red	12V to 24V AC/DC (no polarity)
orange	Output Relay Normally Open
white	Output Relay Normally Closed
green	Output Relay Common

- NOTES:
- Sensor is a Microwave Sensors, Inc. Model TC-26B microwave motion detector mounted on poles as indicated on the Signal Design Plans.
 - Configure AC isolator card to place call upon removal of AC+ from the input.
 - Important: For proper operation of the microwave detector, remove surge protection from TB2-9 and TB2-10. Tie TB2-10 to AC neutral.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1060
 DESIGNED: January 2011
 SEALED: 01/28/11
 REVISED:

ELECTRICAL DETAIL SHEET 1 OF 2

White Street Extension at US 17 NB Ramp/Loop B

Division 3 Onslow County Jacksonville

PLANNED BY: February 2011 REVIEWED BY: T. J. [Signature]

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS: INIT. DATE

750 N. Greenfield Pkwy, Garner, NC 27529

SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER GEORGE C. BROWN

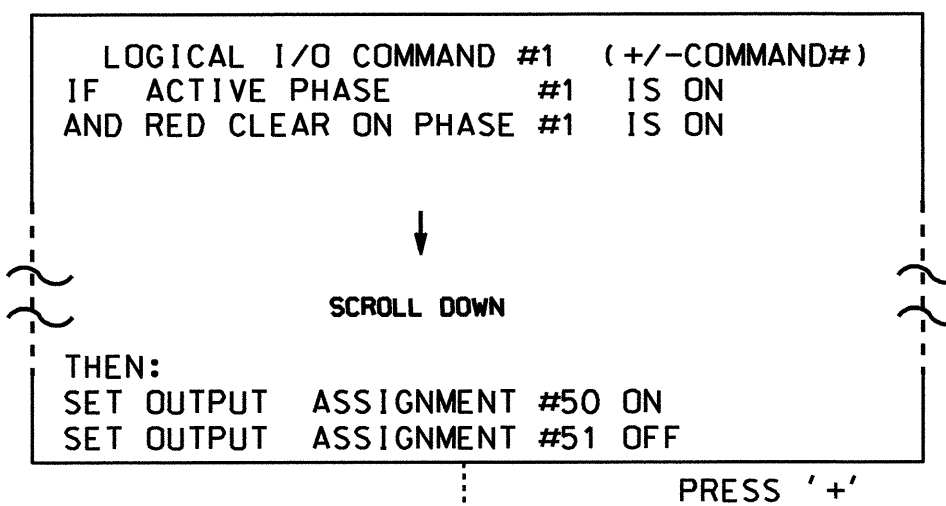
SIGNATURE: [Signature] DATE: 3/7/11

SIG. INVENTORY NO. 03-1060

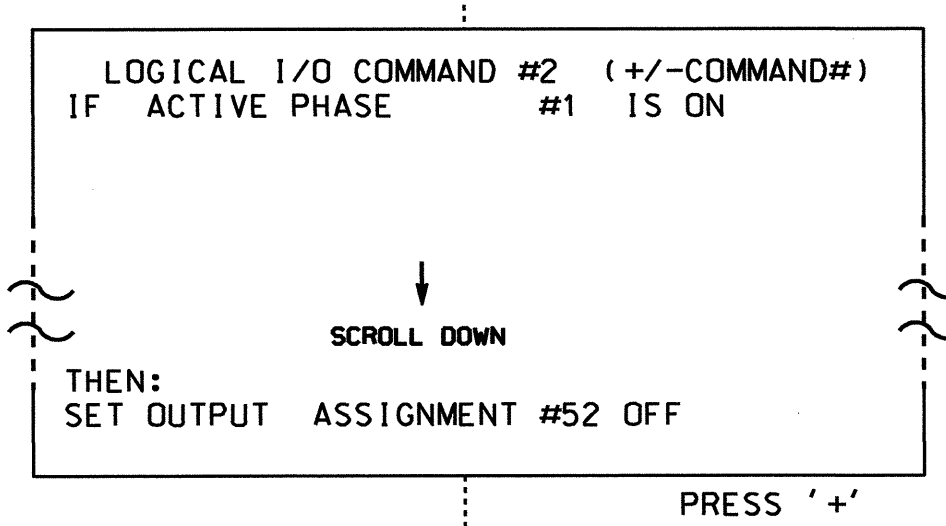
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

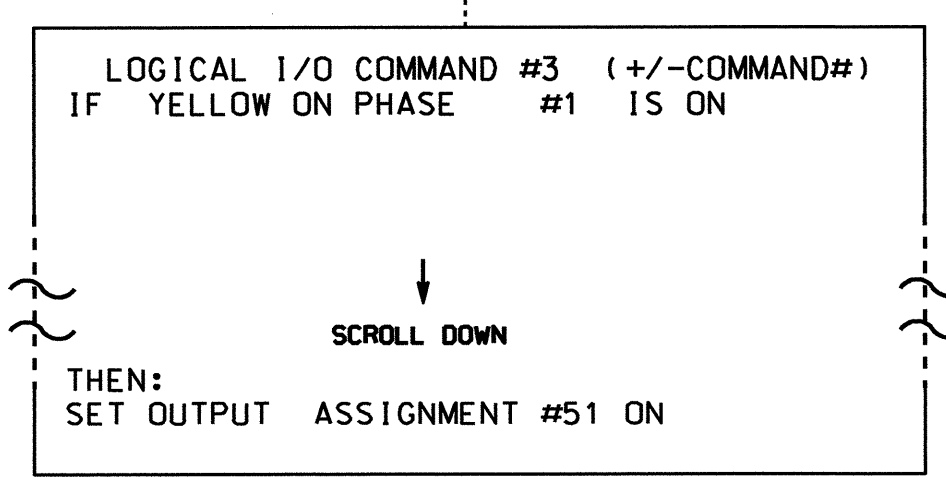
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



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



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



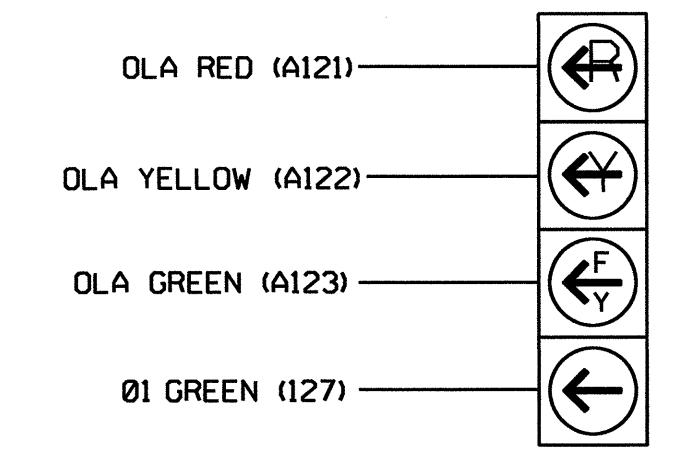
NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

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

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal heads as shown)



11

NOTE

1. The sequence display for this signal requires special logic programming. See this sheet for programming instructions.

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: 03-1060
DESIGNED: January 2011
SEALED: 01/28/11
REVISED:

03-1060-2011-11-14-8
S:\PROJECTS\UNITS 51\plan\work\groups\sig\Main\strickland\amd\031060_sml.ele.xxx.dgn
cestrick

ELECTRICAL DETAIL SHEET 2 OF 2

	White Street Extension at US 17 NB Ramp/Loop B		
	Division 3 Onslow County Jacksonville	PREPARED BY: C. Strickland REVIEWED BY: T. V. J.	
REVISIONS	INIT.	DATE	SIGNATURE: <i>George C. Brown</i> DATE: 3/7/11
SIG. INVENTORY NO. 03-1060			

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.

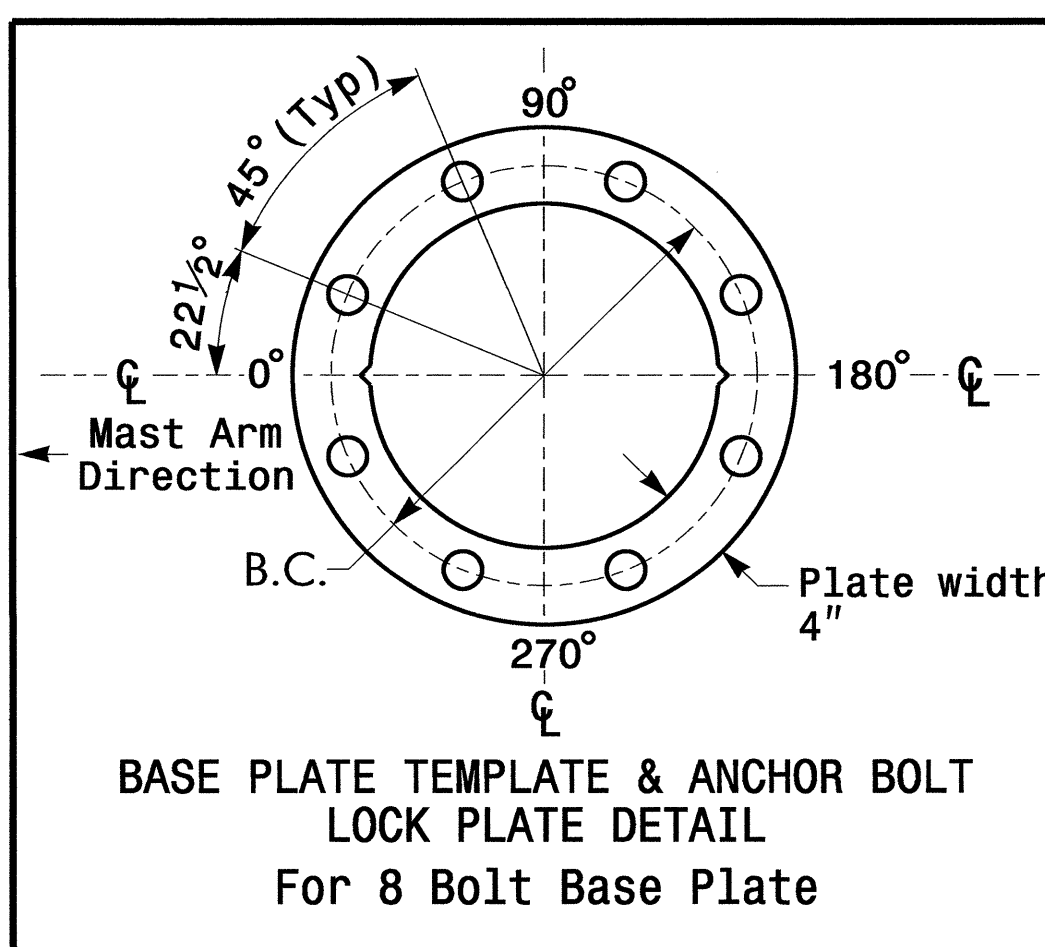
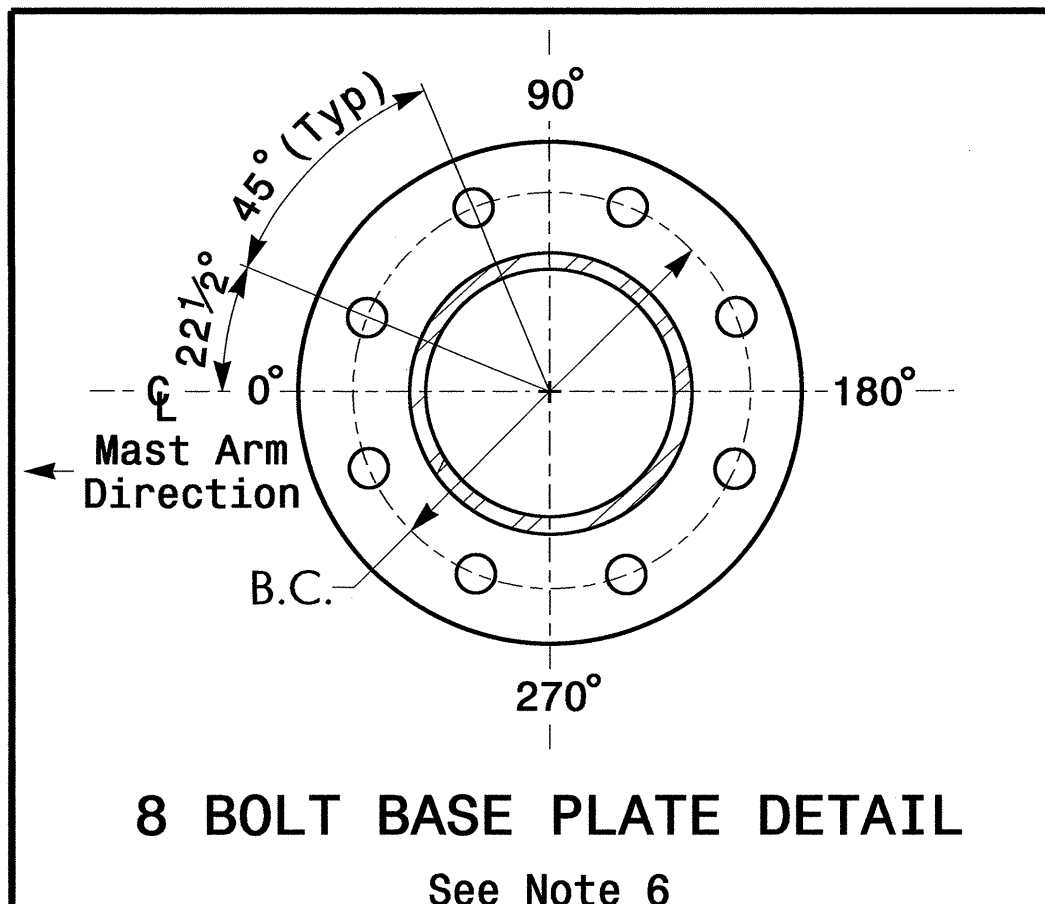
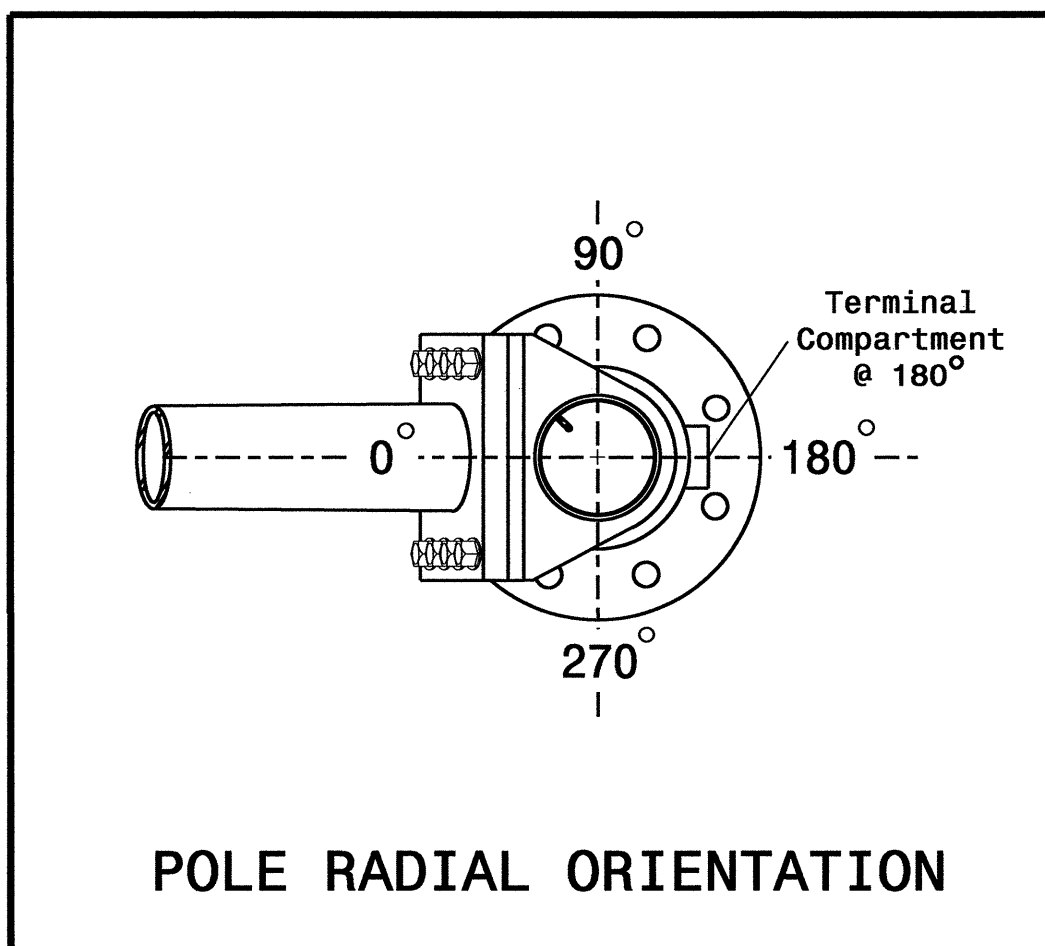
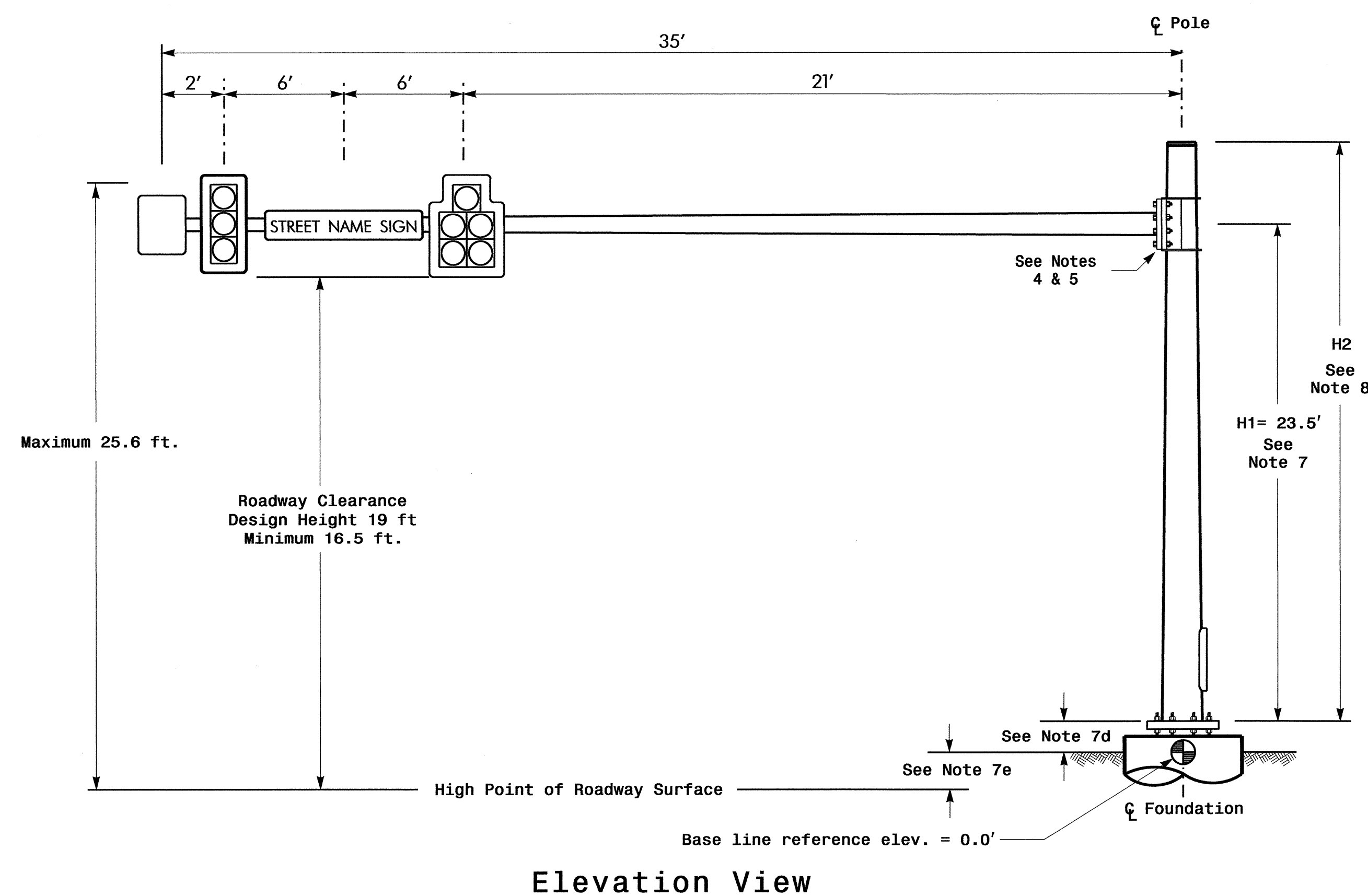
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 6
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.
Elevation difference at High point of roadway surface	+2.5 ft.
Elevation difference at Edge of travelway or face of curb	N/A

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"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	7.5 S.F.	30.0" W X 36.0" L	14 LBS

Design Loading for METAL POLE NO. 6



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.

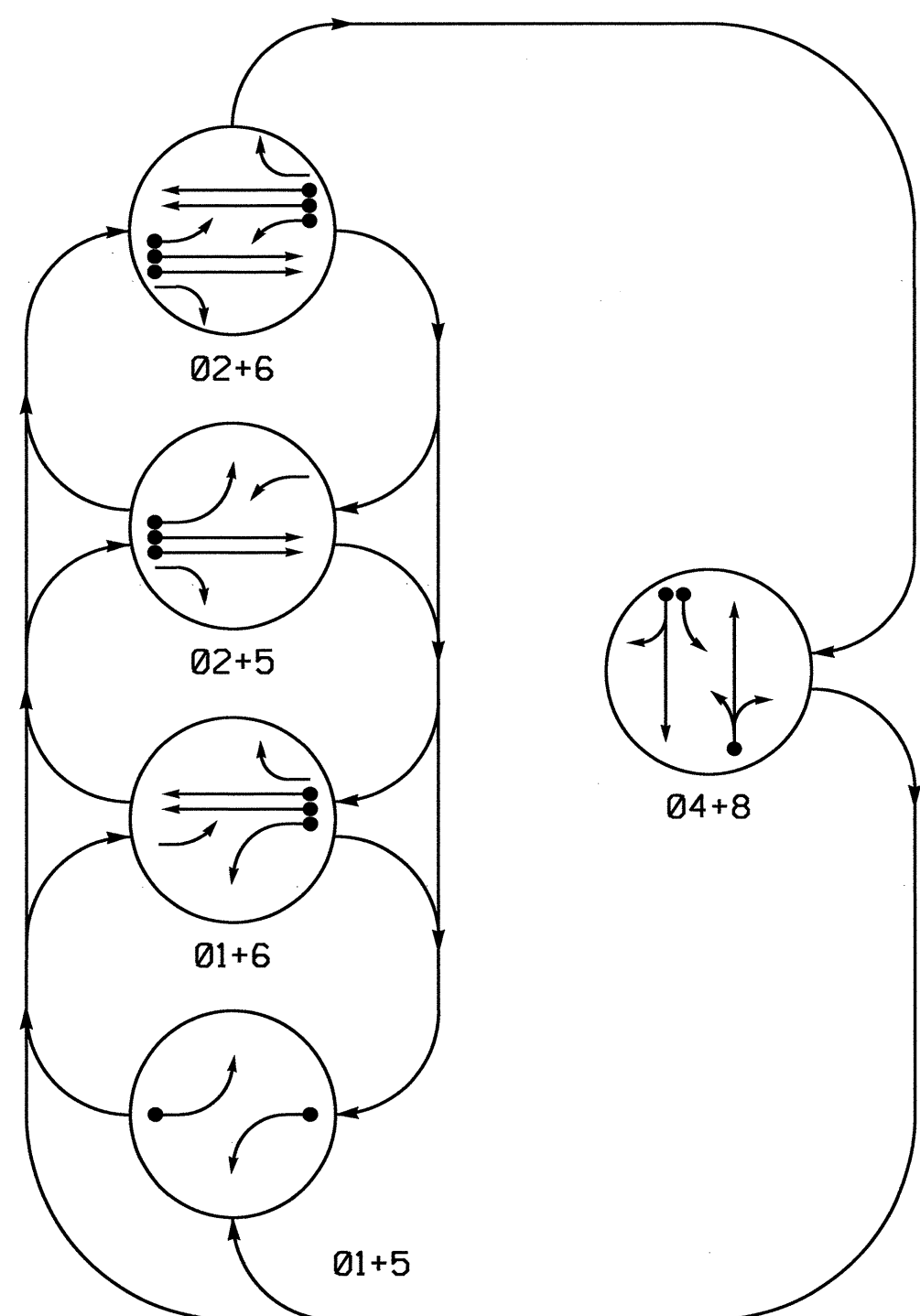
Design Requirements

- 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: White Street Extension At US 17 NB Ramp/Loop B		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER J. GALBRAITH No. 29904 3/24/11 DATE
	Division 3 Onslow County Jacksonville PLAN DATE: February 2011 REVIEWED BY: JPG PREPARED BY: IOU REVIEWED BY:	SCALE 0 N/A N/A	

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

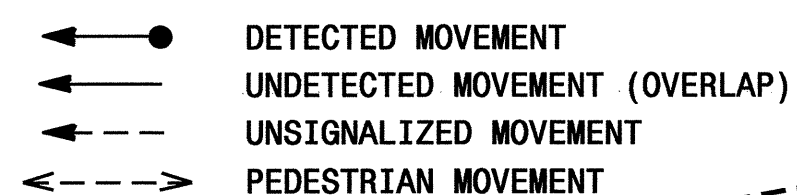
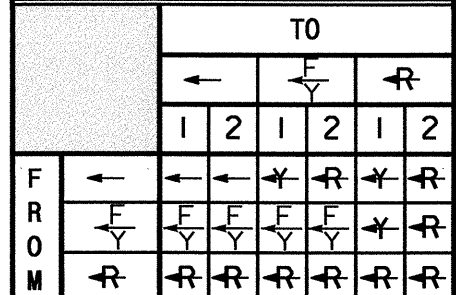


TABLE OF OPERATION

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	04+8	F L
11	R	R	G	G	R	Y
21, 22	R	R	G	G	R	Y
41, 42	R	R	G	G	R	Y
51	R	R	G	G	R	Y
61, 62	R	R	G	G	R	Y
81, 82	R	R	G	G	R	Y

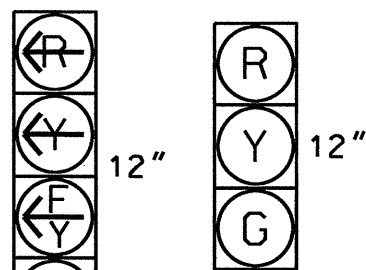
STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL



F = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.



11
51

21, 22
41, 42
61, 62
81, 82

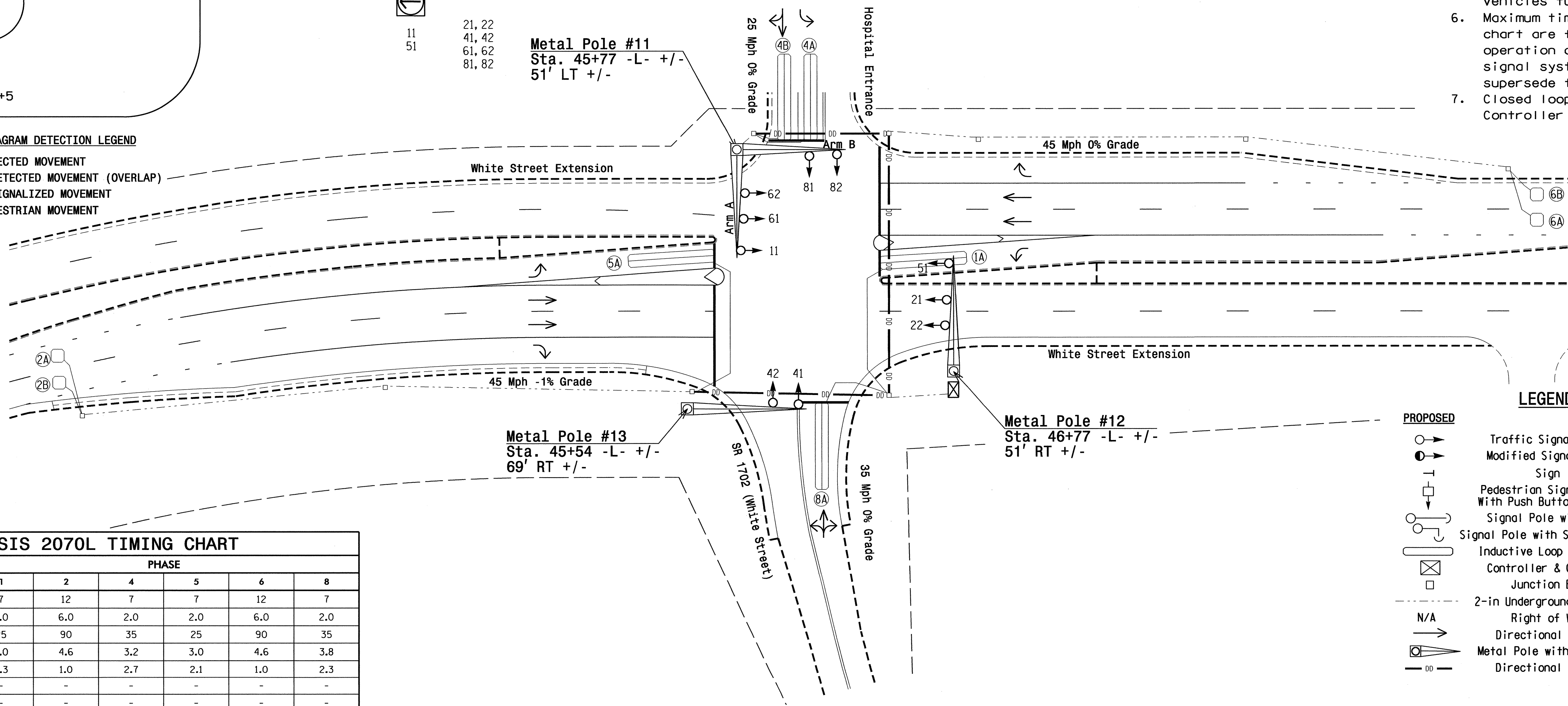
OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
2A	6X6	300	4	Y	2	Y	Y	-	-	-	-	Y
2B	6X6	300	4	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	4	Y	4	Y	Y	-	-	3	-	Y
4B	6X40	0	4	Y	4	Y	Y	-	-	10	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	Y
6A	6X6	300	4	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	300	4	Y	6	Y	Y	-	-	-	-	Y
8A	6X40	0	4	Y	8	Y	Y	-	-	5	-	Y

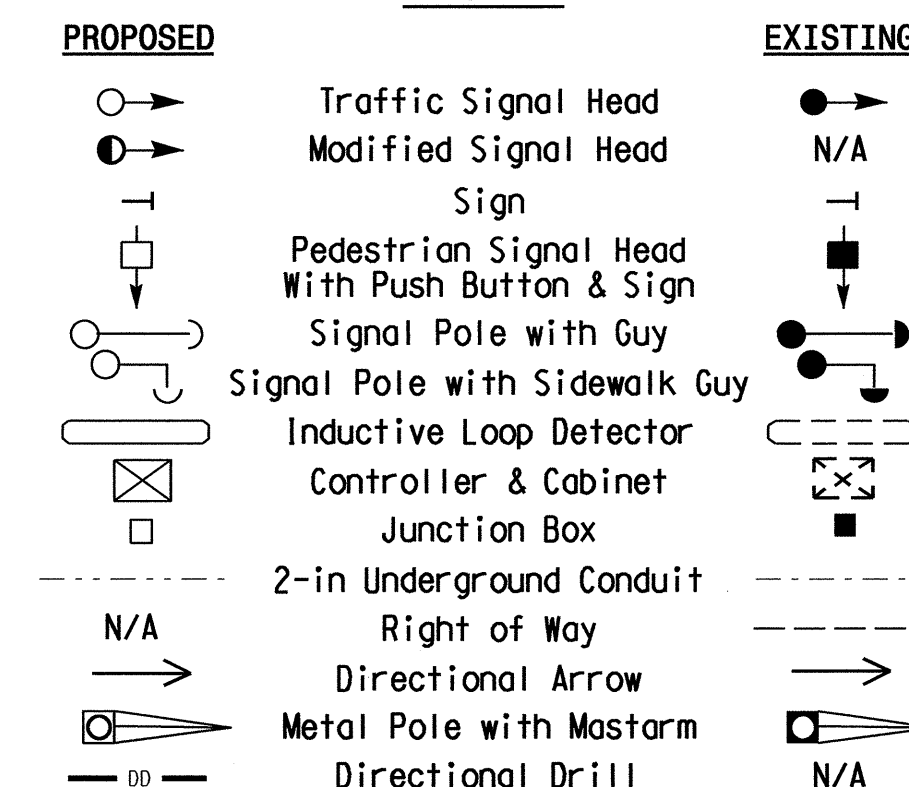
5 Phase Fully Actuated Jacksonville City Signal System

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 and/or 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.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #1061.



LEGEND



OASIS 2070L TIMING CHART

FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	25	90	35	25	90	35
Yellow Clearance	3.0	4.6	3.2	3.0	4.6	3.8
Red Clearance	2.3	1.0	2.7	2.1	1.0	2.3
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
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	-	-	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.

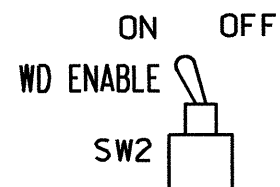
When erecting mastarm poles and foundations, maintain the OSHA minimum equipment approach distance to Progress Energy's transmission lines on the south side of the intersection.

New Installation

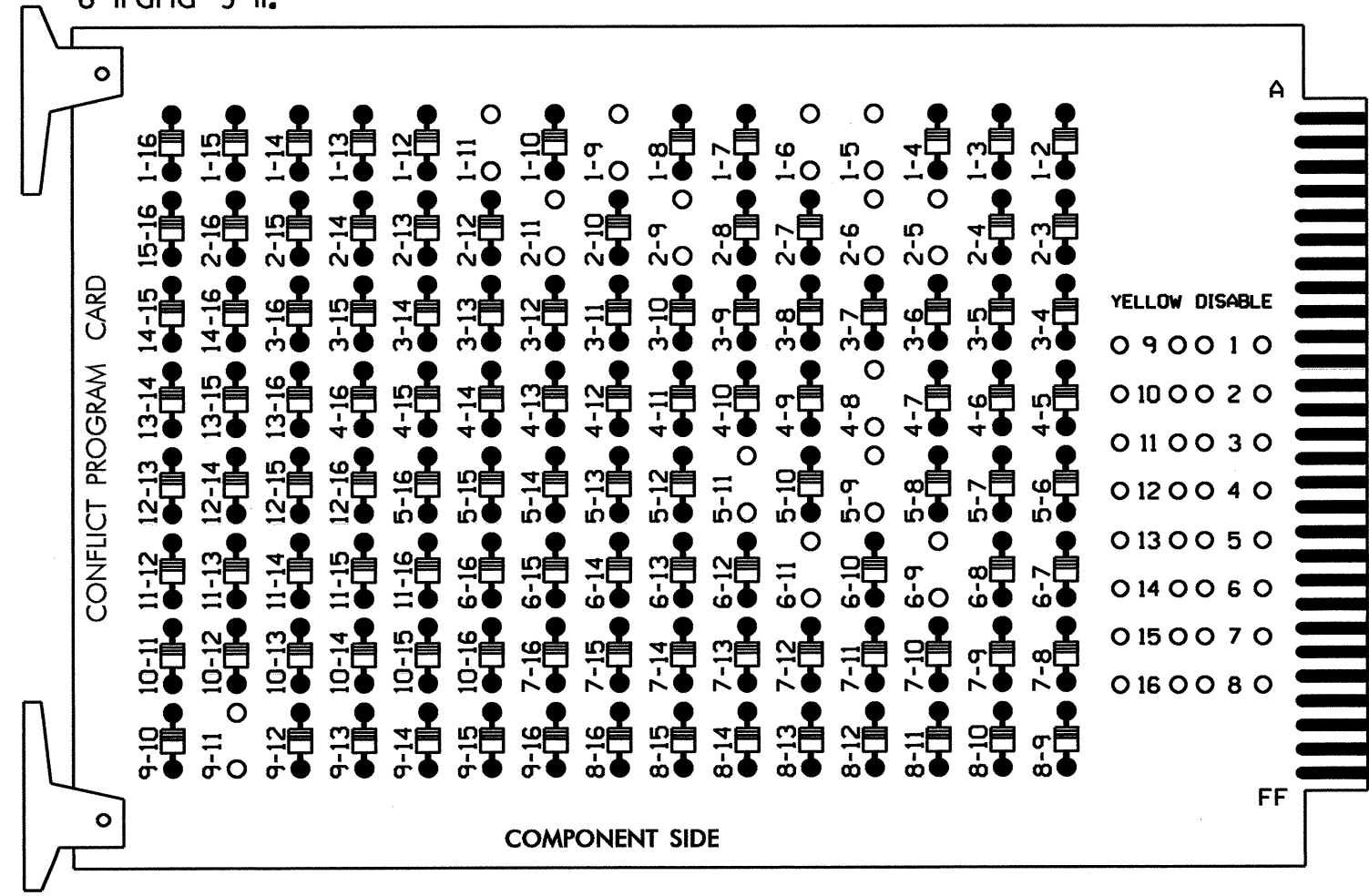
Prepared in the Offices of:
Transportation Quality and Safety Division
Division 3 Onslow County Jacksonville
SR 1702 (White Street)
Division 3 Onslow County Jacksonville
PLAN DATE: February 2011 REVIEWED BY:
PREPARED BY: I. O. UMOZURIKE REVIEWED BY:
SCALE 0 30
1"=30'
REVISIONS INIT. DATE
DATE 3/3/11
SIG. INVENTORY NO. 03-1061

**EDI MODEL 2010ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL**

(remove jumpers and set switches as shown)



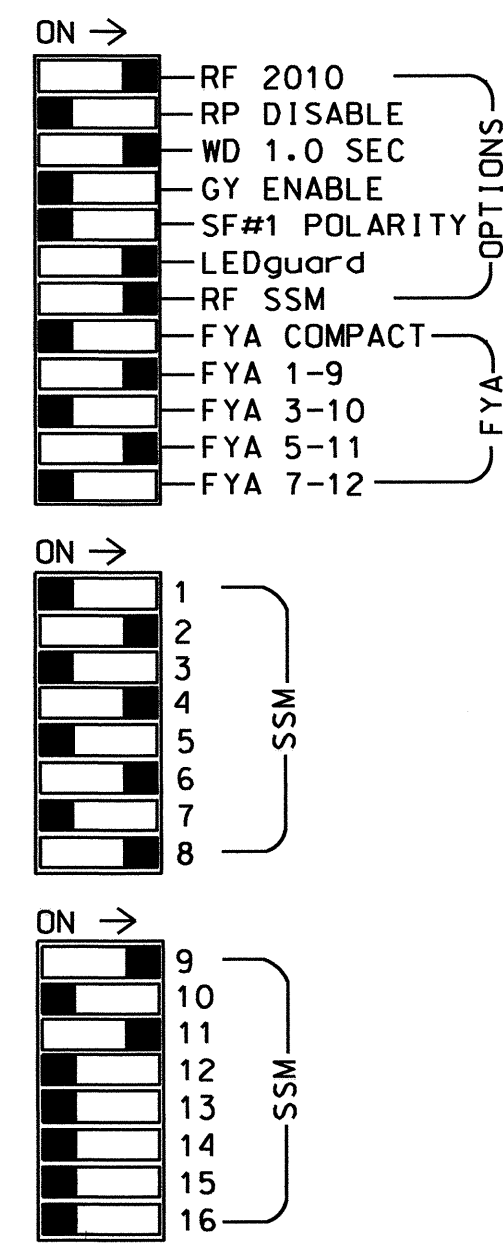
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 4-8, 5-9, 5-11, 6-9, 6-11 and 9-11.



REMOVE JUMPERS AS SHOWN

NOTES:

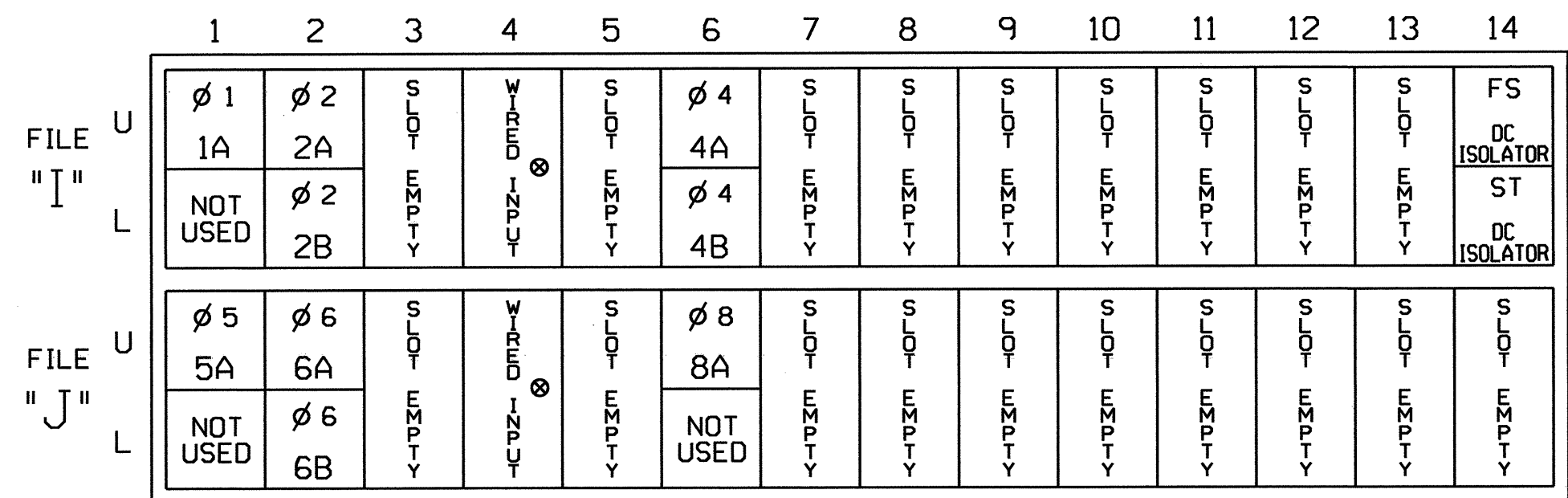
- Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
- Make sure jumpers SEL2-SEL5 are present on the monitor board.



■ = DENOTES POSITION OF SWITCH

INPUT FILE POSITION LAYOUT

(front view)

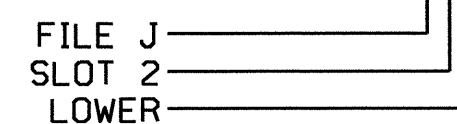


EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE POSITION LEGEND: J2L



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 1,3,5,7,10,12,13,14,15 & 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 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.
- The cabinet and controller are part of the Jacksonville City Signal System.

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,S4,S5,S6,S8,S9,S12
PHASES USED.....1,2,4,5,6,8
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

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
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			10
5A ²	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			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			5

¹Add jumper from I1-W to J4-W, 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	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	41,42	NU	51*	61,62	NU	NU	81,82	NU	11*	NU	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														A122			A115	
FLASHING YELLOW ARROW														A123			A116	
GREEN ARROW	127							133										

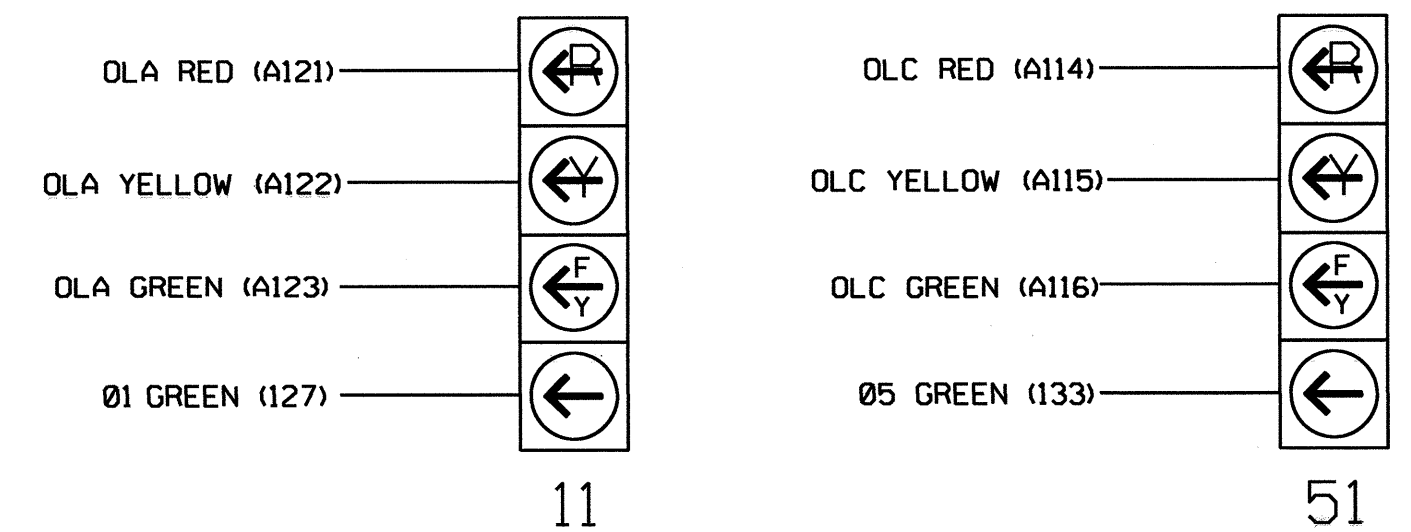
NU = Not Used

* 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)

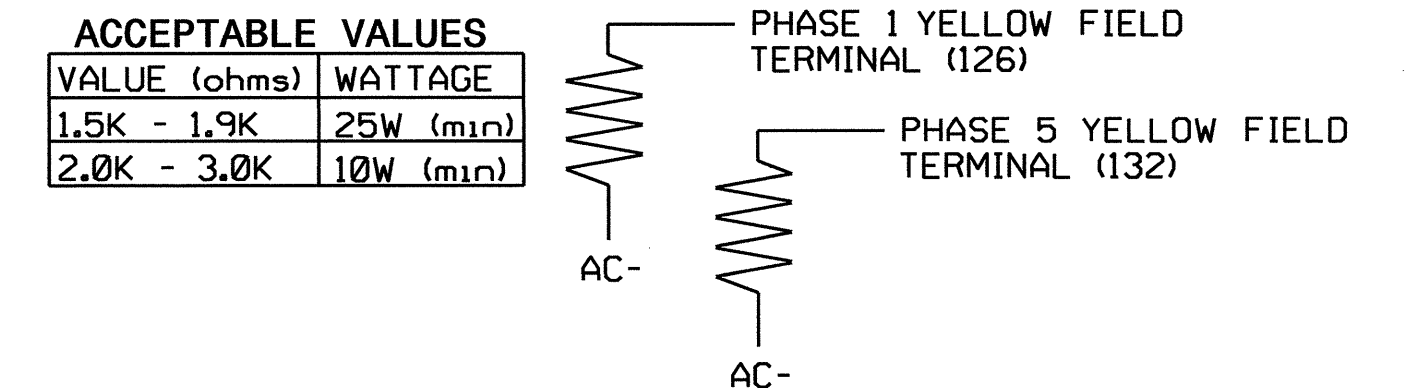


NOTE

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

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



ELECTRICAL DETAIL SHEET 1 OF 2

Prepared In the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

White Street Extension at SR 1702 (White Street)

Division 3 Onslow County Jacksonville

PLAN DATE: March 2011 REVIEWED BY: T. J. J. J.

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS: INIT. DATE

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN
 SIGNATURE: George C. Brown DATE: 3/9/11
 SIG. INVENTORY NO. 03-1061

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-1061
 DESIGNED: February 2011
 SEALED: 03/03/11
 REVISED:

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).

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

PRESS '+'

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

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).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

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).

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

← NOTICE GREEN FLASH

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

PRESS '+' TWICE

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

← NOTICE GREEN FLASH

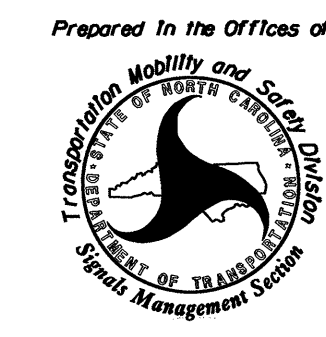
SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC)...0.0
YELLOW CLEAR (0=PARENT.3-25.5 SEC)...0.0
RED CLEAR (0=PARENT.0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)...0

OVERLAP PROGRAMMING COMPLETE

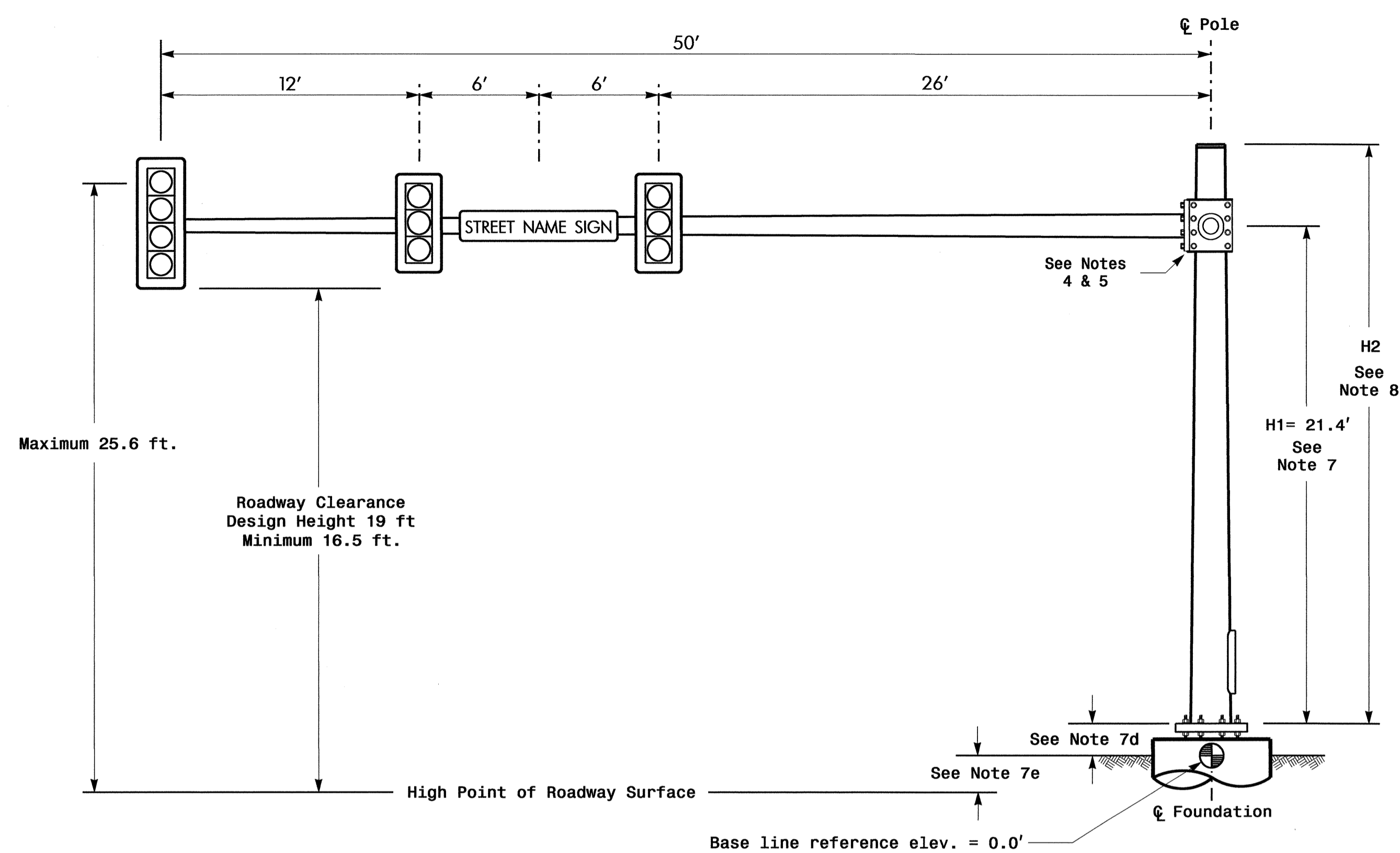
THIS ELECTRICAL DESIGN IS FOR
THE SIGNAL DESIGN: 03-1061
DESIGNED: February 2011
SEALED: 03/03/11
REVISED:

03-1061-2011-14-00
S:\TSS\UM\TSS\Signal\sigmgr\groups\Sig_Mgmt\Trk\cmd\031061_sm_e\c_xxx.dgn
6/8/11 1:41:03

ELECTRICAL DETAIL SHEET 2 OF 2

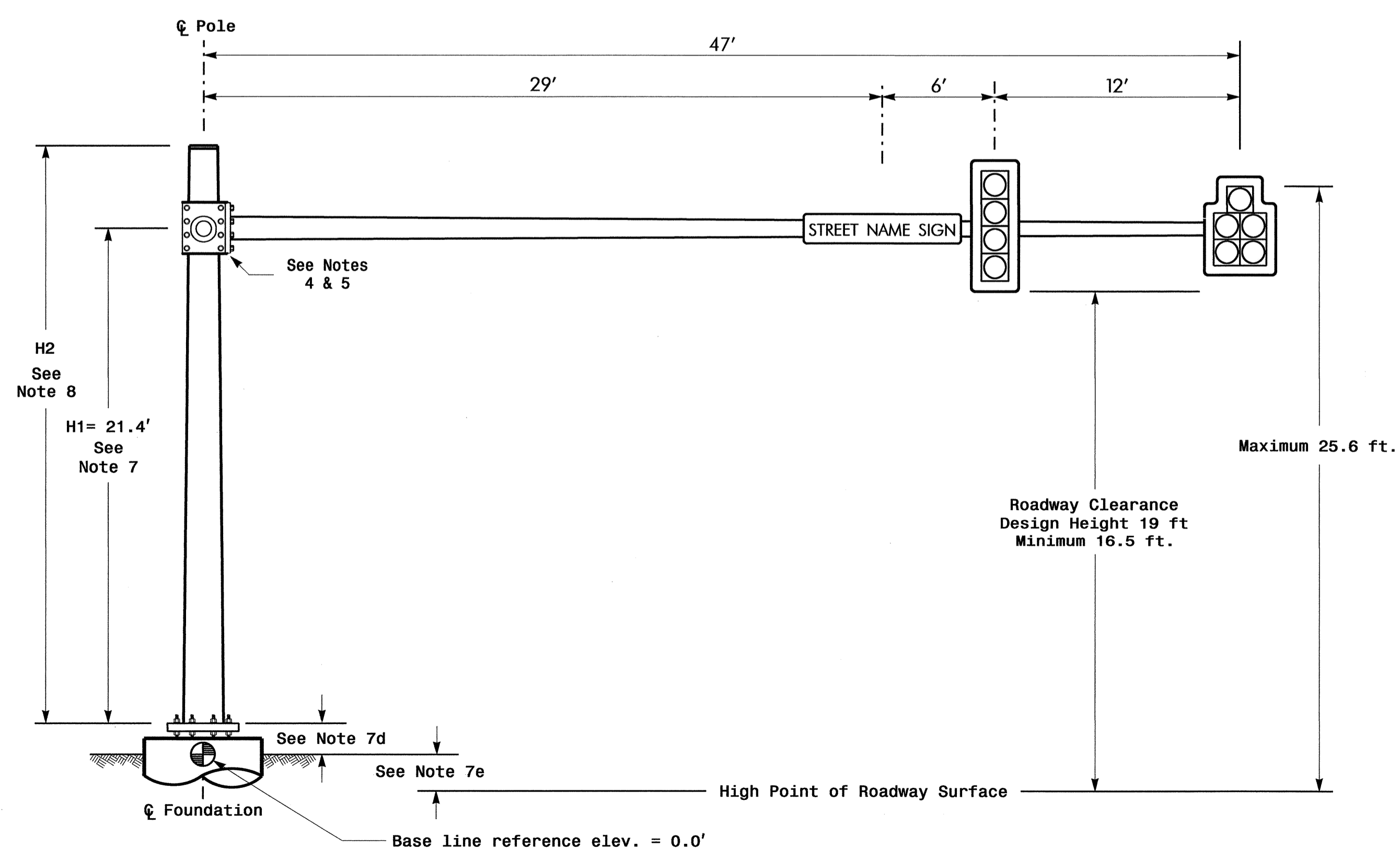
ELECTRICAL AND PROGRAMMING DETAILS FOR:	White Street Extension at SR 1702 (White Street)	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN									
Prepared In the Office of:  750 N. Grant Field Pkwy, Garner, NC 27529	Division 3 Onslow County Jacksonville PLAN DATE: March 2011 REVIEWED BY: T. J. J. PREPARED BY: C. Strickland REVIEWED BY:	SIGNATURE: <i>George C. Brown</i> DATE: 3/11 SIG. INVENTORY NO. 03-1061									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">REVISIONS</th> <th style="width: 25%;">INIT.</th> <th style="width: 25%;">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						
REVISIONS	INIT.	DATE									

Design Loading for METAL POLE NO. 11, MAST ARM A



Elevation View @ 270°

Design Loading for METAL POLE NO. 11, MAST ARM B



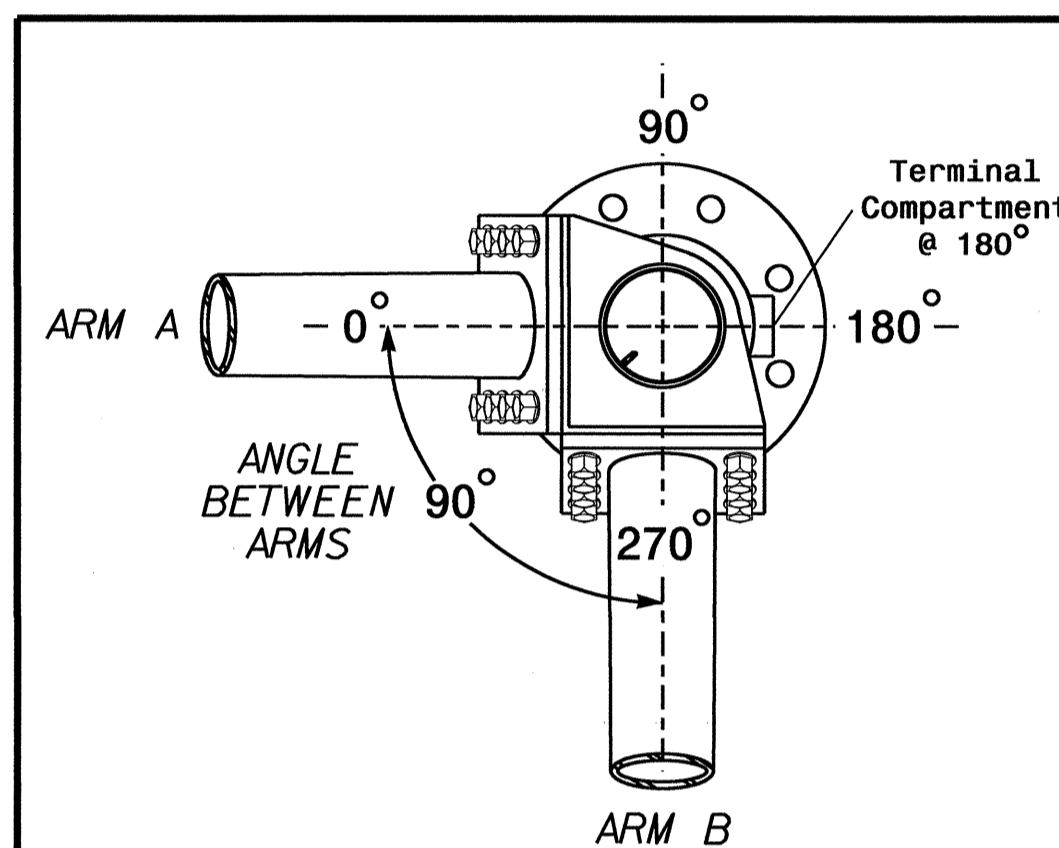
Elevation View @ 0°

SPECIAL NOTE

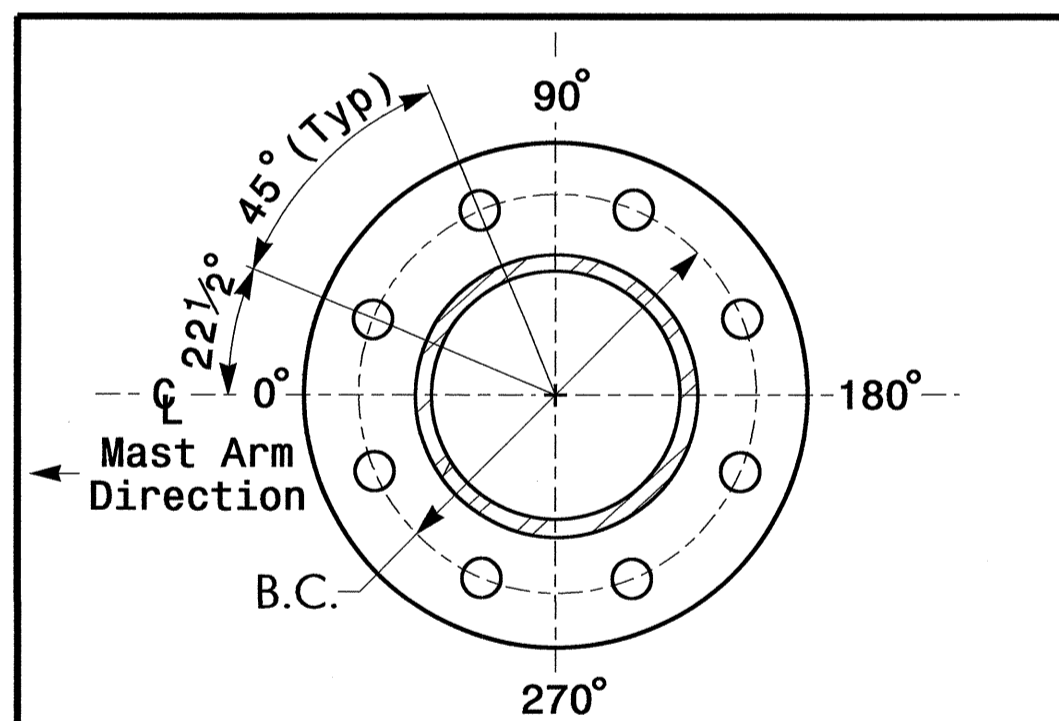
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

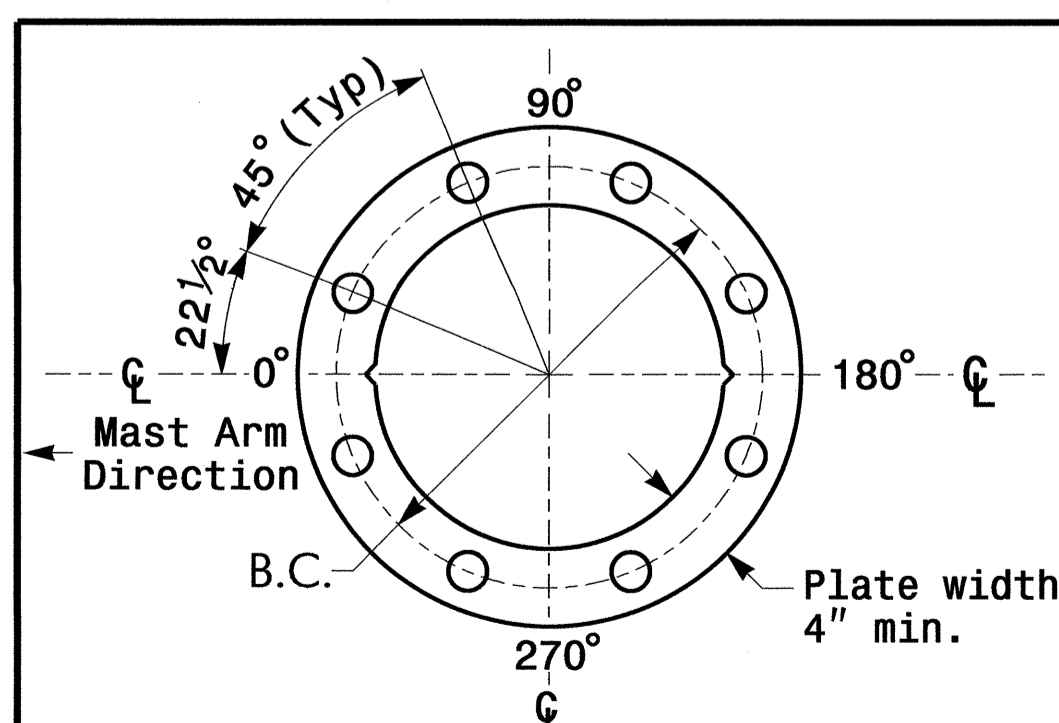
Elevation Differences for:	Arm "A"	Arm "B"
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.4 ft.	+0.4 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL
See Note 6



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

METAL POLE No. 11

PROJECT REFERENCE NO. U-4007A SHEET NO. 11 OF 20

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
	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

1. 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.

Design Requirements

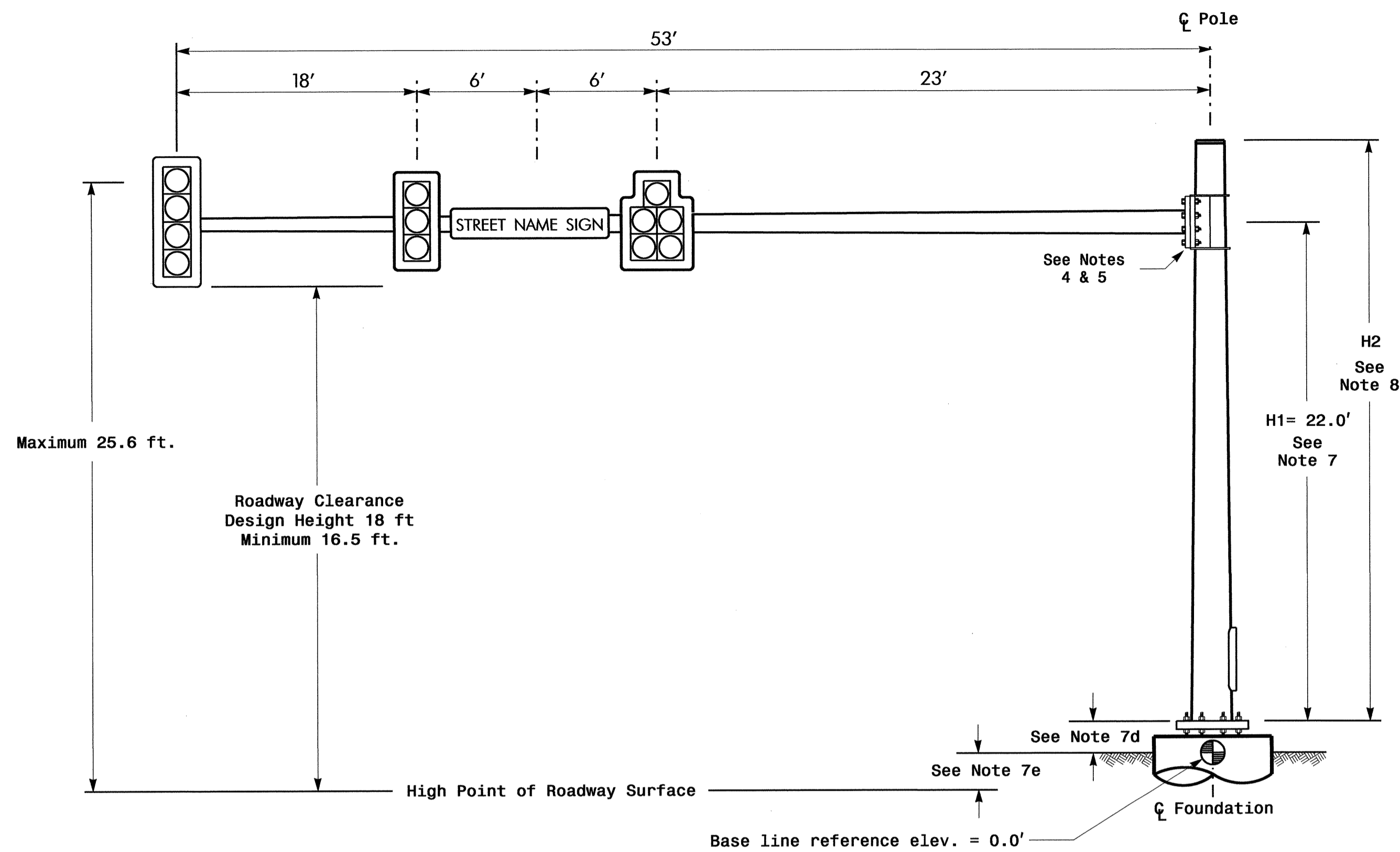
2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Design all signal supports using stress ratios that do not exceed 0.9.
4. 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.
5. A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate arm connection points.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
 - a. Mast arm slope and deflection are not considered in determining the arm attachment height as they are assumed to offset each other.
 - b. Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
 - c. The roadway clearance height for design is as shown in the elevation views.
 - d. The top of the pole base plate is .75 feet above the ground elevation.
 - e. Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
8. 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.
9. If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 773-2800.
10. The contractor is responsible for verifying that the mast arm lengths shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 2 (130 mph)

	Prepared In the Offices of: White Street Extension At SR 1702 (White Street)	
	Division 3 Onslow County Jacksonville PLAN DATE: February 2011 PREPARED BY: IOU	REVIEWED BY: JPG REVIEWED BY:
SCALE: N/A 	REVISIONS INIT. DATE	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER J.P. GALLAWAY 29904 SIGNATURE: DATE: 3/24/11 SIG. INVENTORY NO. 03-1061

23-MAR-2011 09:50
\\nas1\eng\jgallaway\proj\11031001\mod\ub\le.dgn
1:1000

Design Loading for METAL POLE NO. 12



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 12	Pole 13
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+2.0 ft.	-1.6 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

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
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS

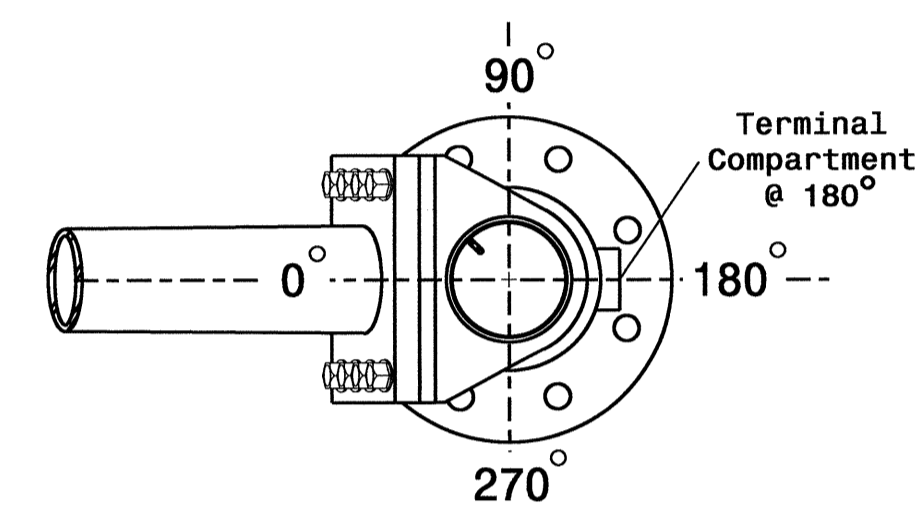
NOTES

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.

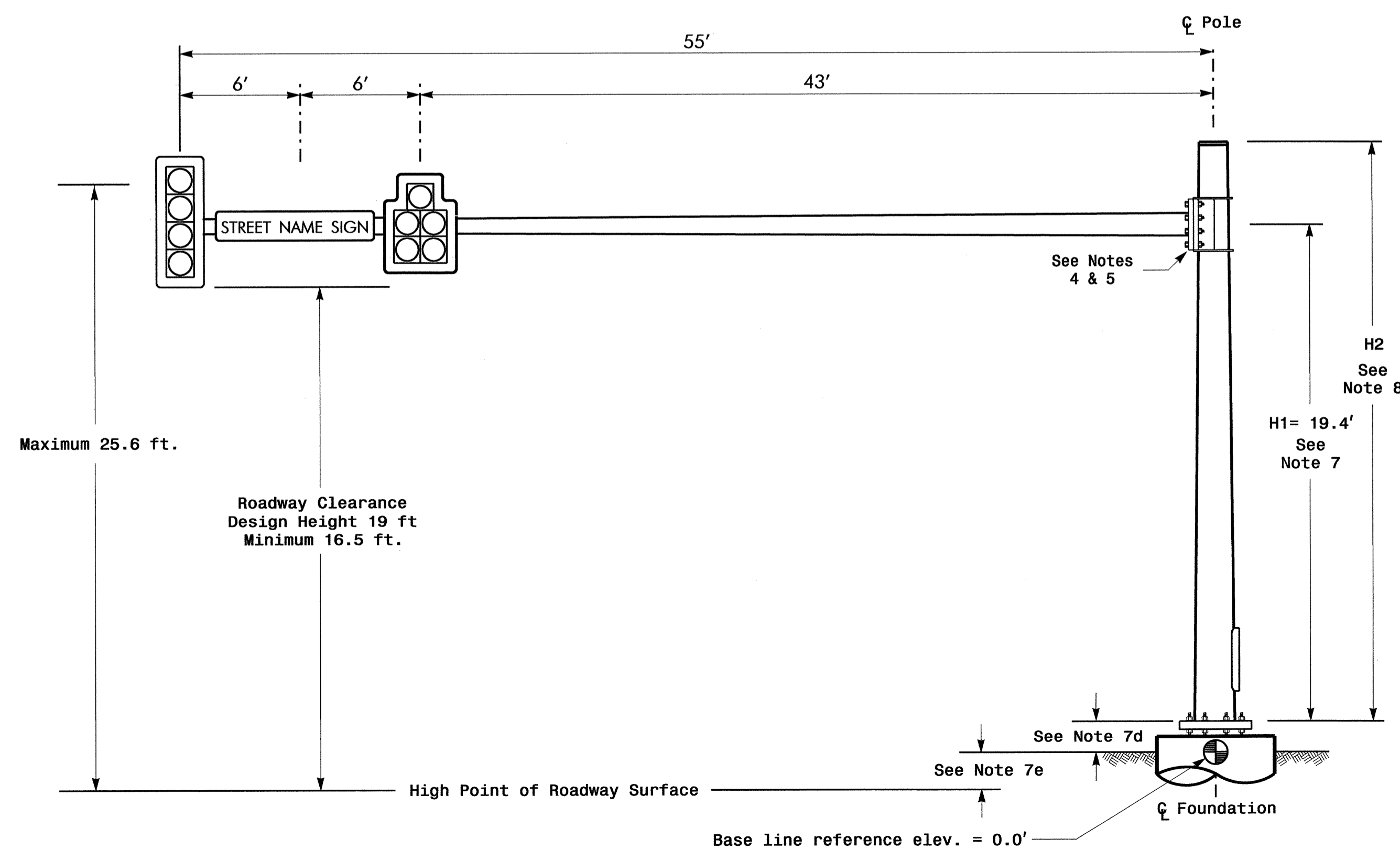
Design Requirements

- 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.

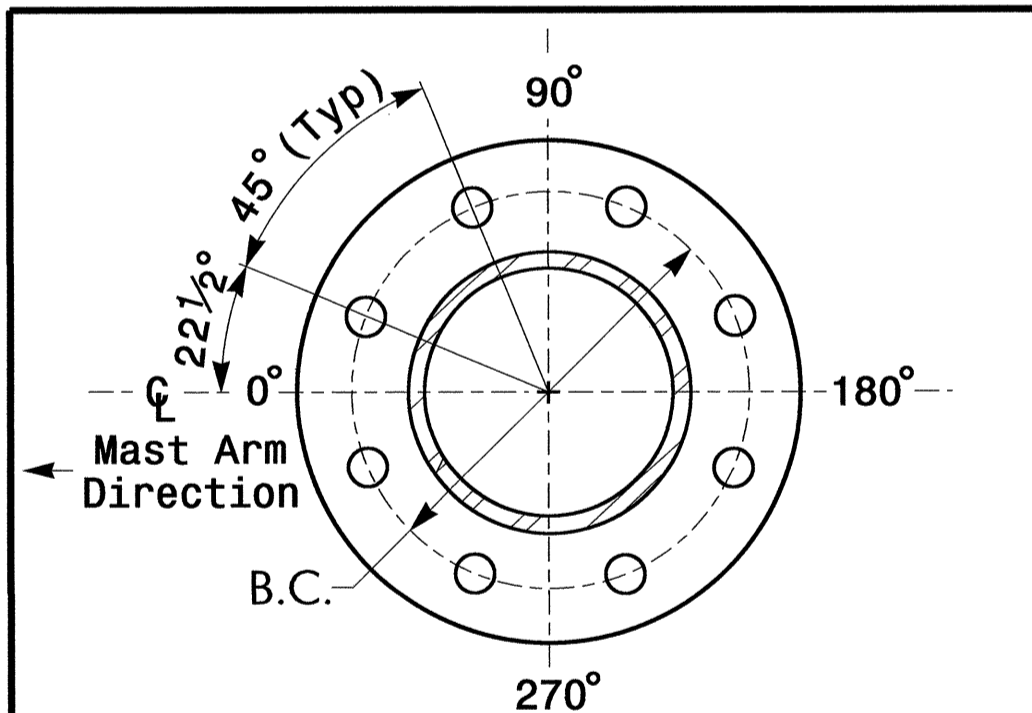


POLE RADIAL ORIENTATION

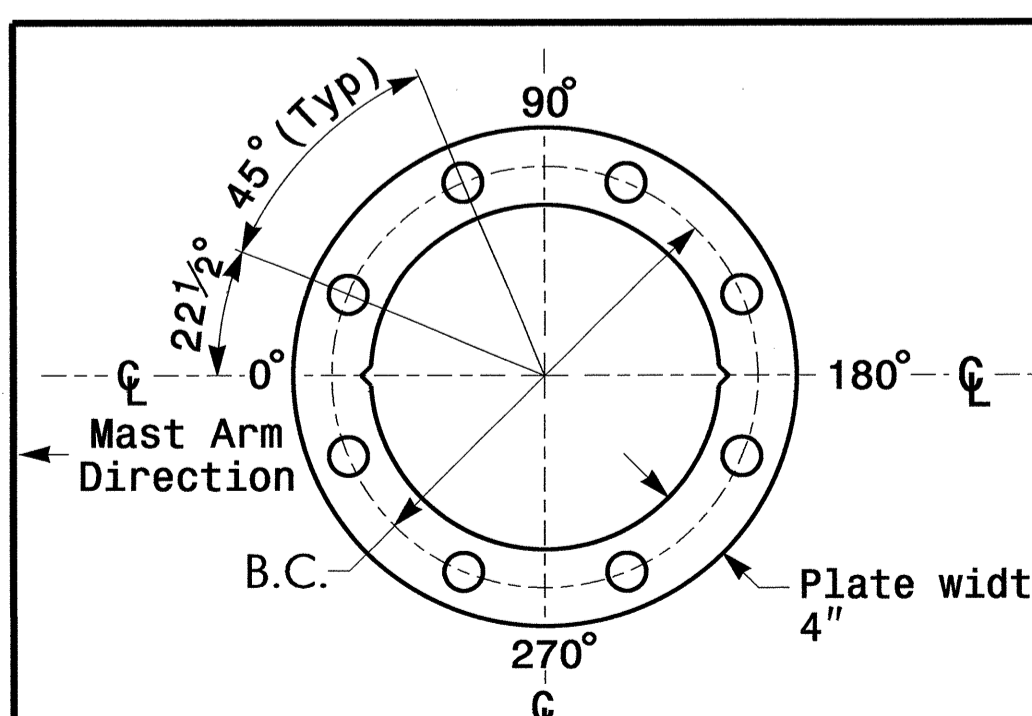
Design Loading for METAL POLE NO. 13



Elevation View



8 BOLT BASE PLATE DETAIL
See Note 6

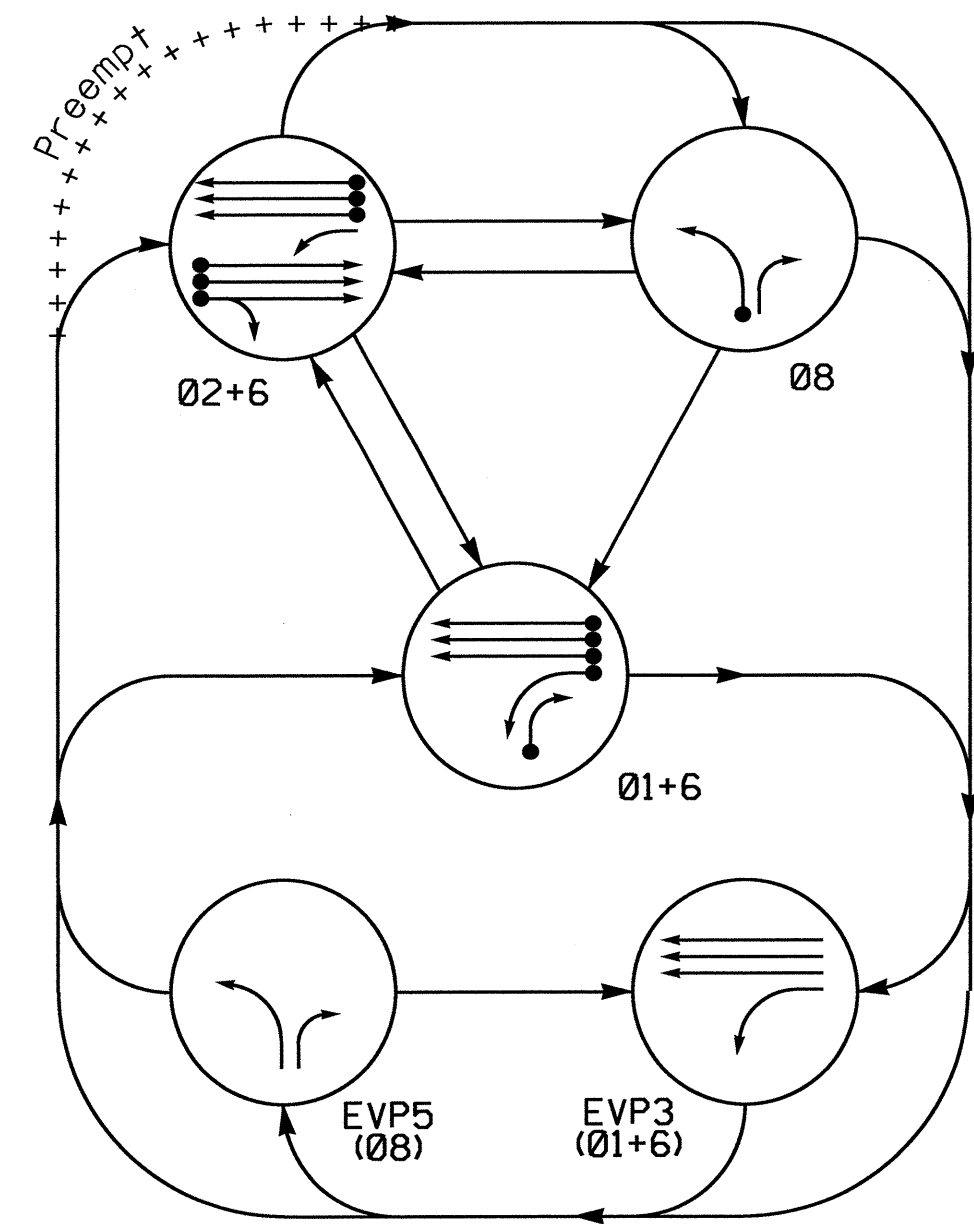


BASE PLATE TEMPLATE & ANCHOR BOLT
LOCK PLATE DETAIL
For 8 Bolt Base Plate

NCDOT Wind Zone 2 (130 mph)

	Prepared In the Offices of: White Street Extension At SR 1702 (White Street)		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER J. P. GALLOWAY No. 29904 3/24/11
	Division 3 Onslow County Jacksonville PLAN DATE: January 2011 REVIEWED BY: J. P. Galloway PREPARED BY: I. O. Umzurike REVIEWED BY:	SCALE 0 N/A N/A	
REVISIONS INIT. DATE			
SIG. INVENTORY No. 03-1061			

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

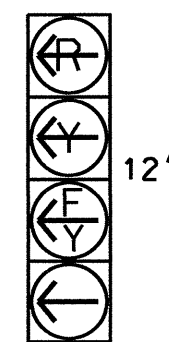
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE					
	01+6	02+6	08	EVP3	EVP5	EVP3
11	R	G	R	R	R	Y
21,22	R	G	R	R	R	Y
61, 62	G	G	R	G	R	Y
81	R	R	G	R	G	R
82	R	R	G	R	G	R

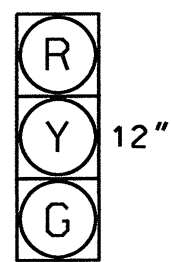
STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

FROM	TO			
	1	2	1	2
F	Y	Y	Y	Y
R	Y	Y	Y	Y
M	Y	Y	Y	Y

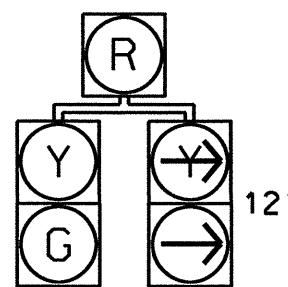
F = Flashing Yellow Arrow



11



21, 22
61, 62
81



82

SIGNAL FACE I.D.

All Heads L.E.D.

OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

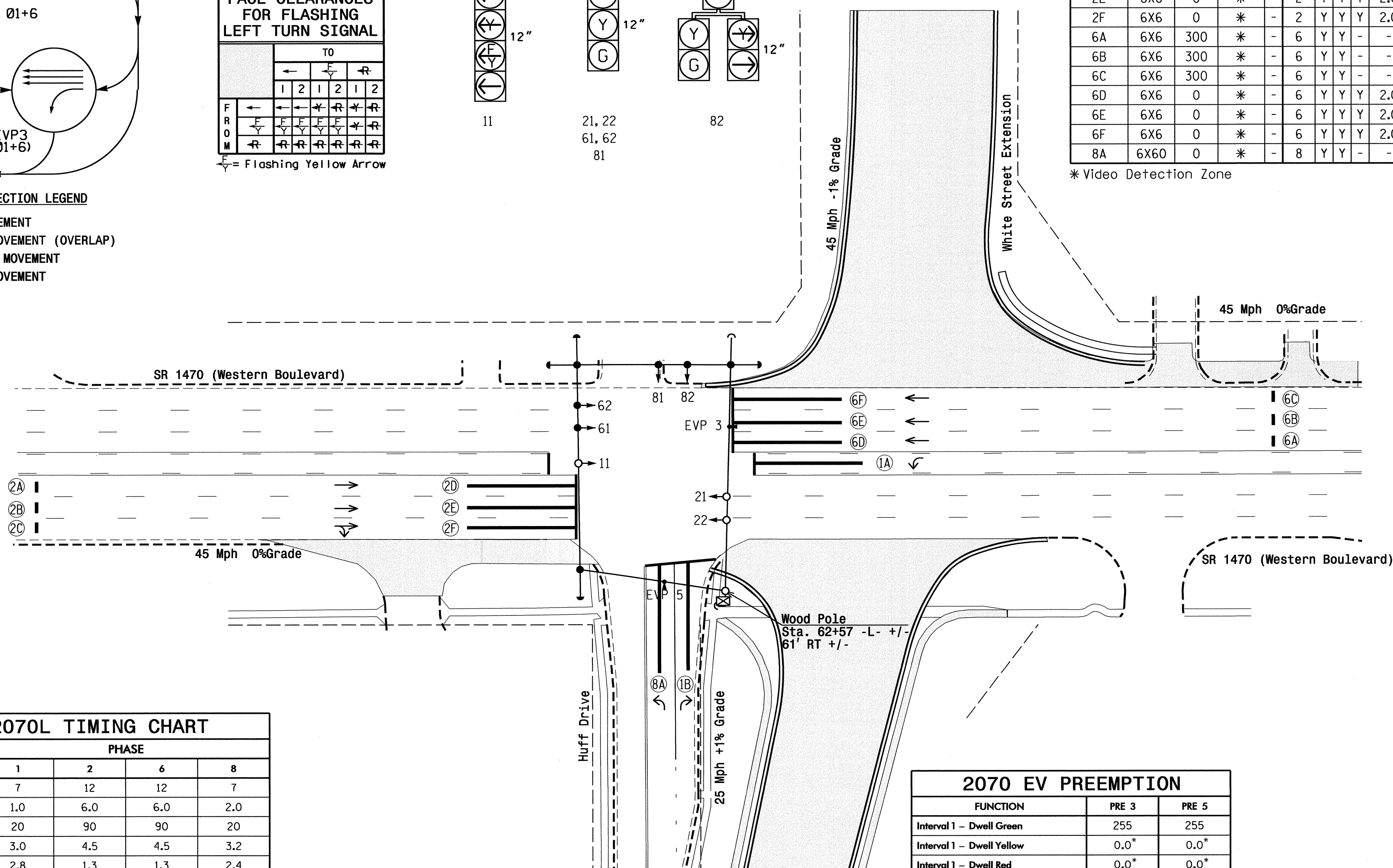
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME			
1A	6X40	0	*	-	1	Y	Y	-	-	15	-	*
1B	6X60	0	*	-	1	Y	Y	-	-	15	-	*
2A	6X6	300	*	-	2	Y	Y	-	-	-	-	*
2B	6X6	300	*	-	2	Y	Y	-	-	-	-	*
2C	6X6	300	*	-	2	Y	Y	-	-	-	-	*
2D	6X6	0	*	-	2	Y	Y	Y	2.0	5.0	-	*
2E	6X6	0	*	-	2	Y	Y	Y	2.0	5.0	-	*
2F	6X6	0	*	-	2	Y	Y	Y	2.0	5.0	-	*
6A	6X6	300	*	-	6	Y	Y	-	-	-	-	*
6B	6X6	300	*	-	6	Y	Y	-	-	-	-	*
6C	6X6	300	*	-	6	Y	Y	-	-	-	-	*
6D	6X6	0	*	-	6	Y	Y	Y	2.0	5.0	-	*
6E	6X6	0	*	-	6	Y	Y	Y	2.0	5.0	-	*
6F	6X6	0	*	-	6	Y	Y	Y	2.0	5.0	-	*
8A	6X60	0	*	-	8	Y	Y	-	-	3	-	*

* Video Detection Zone

3 Phase Fully Actuated W/ EVP Jacksonville City Signal System

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.
- Relocate existing Optical Preemption Detectors and Optical Preemption Phase Selector.
- 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.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #0558.



OASIS 2070L TIMING CHART

FEATURE	PHASE			
	1	2	6	8
Min Green 1 *	7	12	12	7
Extension 1 *	1.0	6.0	6.0	2.0
Max Green 1 *	20	90	90	20
Yellow Clearance	3.0	4.5	4.5	3.2
Red Clearance	2.8	1.3	1.3	2.4
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
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 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
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	12	7
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 Traffic Signal Head | | EXISTING Traffic Signal Head |
| | PROPOSED Modified Signal Head | | EXISTING Modified Signal Head |
| | PROPOSED Pedestrian Signal Head | | EXISTING Pedestrian Signal Head |
| | PROPOSED Signal Pole with Guy | | EXISTING Signal Pole with Guy |
| | PROPOSED Inductive Loop Detector | | EXISTING Inductive Loop Detector |
| | PROPOSED Controller & Cabinet | | EXISTING Controller & Cabinet |
| | PROPOSED Junction Box | | EXISTING Junction Box |
| | PROPOSED 2-in Underground Conduit | | EXISTING 2-in Underground Conduit |
| | PROPOSED Right of Way | | EXISTING Right of Way |
| | PROPOSED Directional Arrow | | EXISTING Directional Arrow |
| | PROPOSED Video Detection Area | | EXISTING Video Detection Area |
| | PROPOSED Construction Zone | | EXISTING Construction Zone |
| | PROPOSED Optical Detector | | EXISTING Optical Detector |

Signal Upgrade Temp 1 Phase I

SR 1470 (Western Boulevard) at Huff Drive

Division 3 Onslow County Jacksonville

PLAN DATE: January 2011 REVIEWED BY:

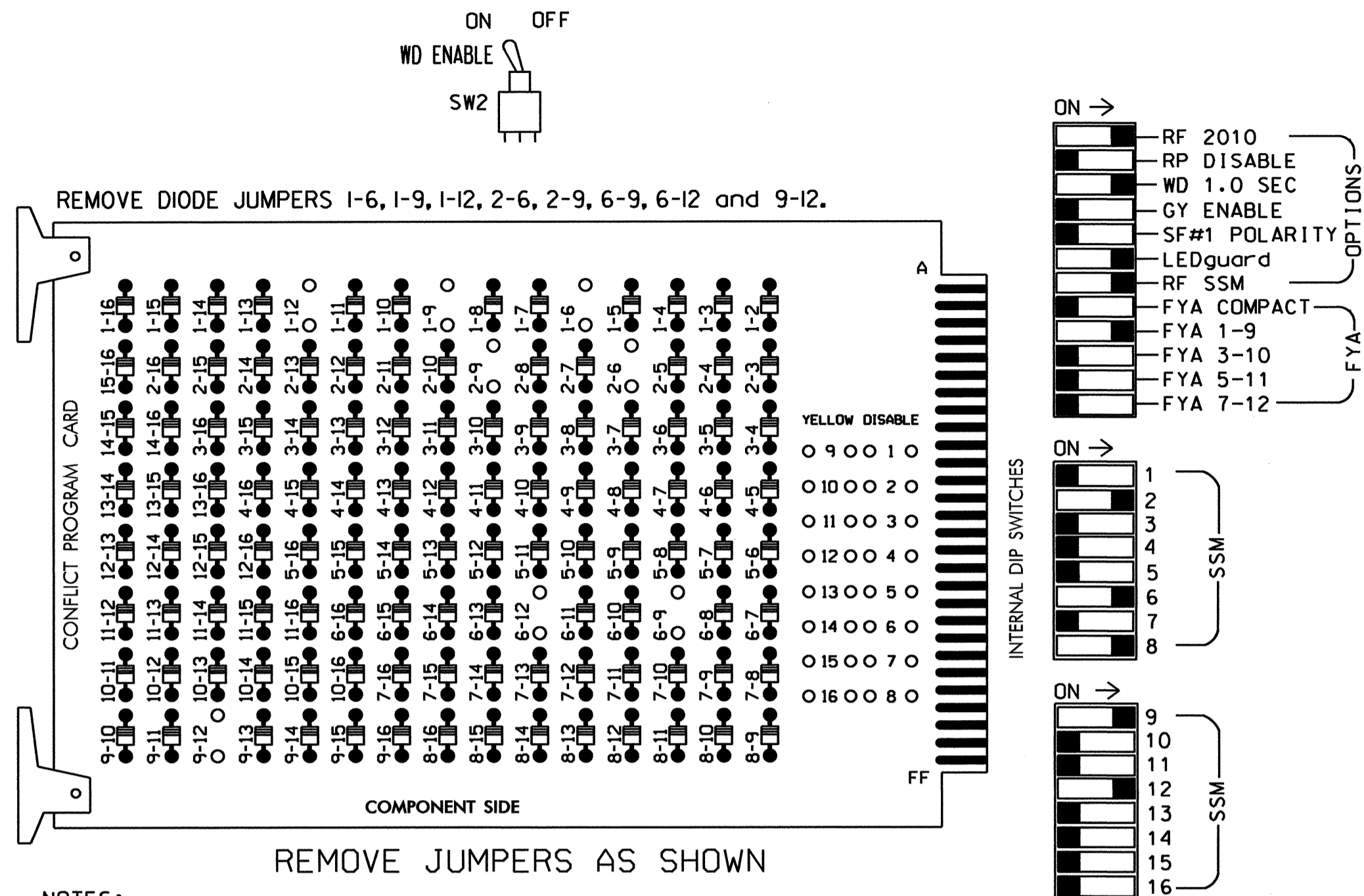
PREPARED BY: REVIEWED BY:

SCALE: 1"=40'

DATE: 2/7/11

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

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

- NOTES**
1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
 2. 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.
 3. Enable Simultaneous Gap-Out for all phases.
 4. Program phases 2 and 6 for Gap Reduction.
 5. Program phases 2 and 6 for Start Up In Green.
 6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
 7. The cabinet and controller are part of the Jacksonville City Signal System.

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

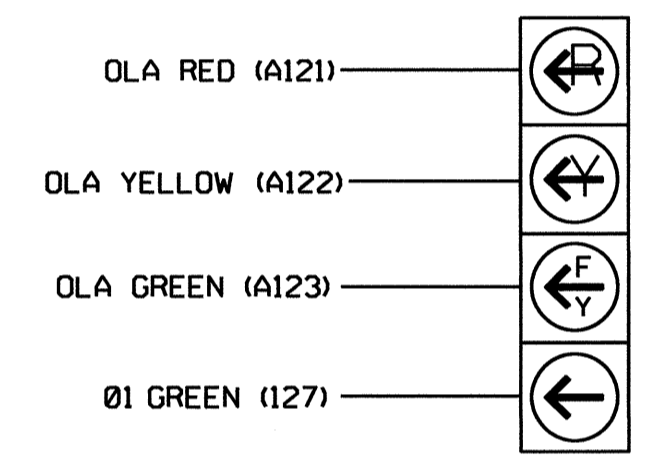
SIGNAL HEAD HOOK-UP CHART

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	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	82	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																		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)

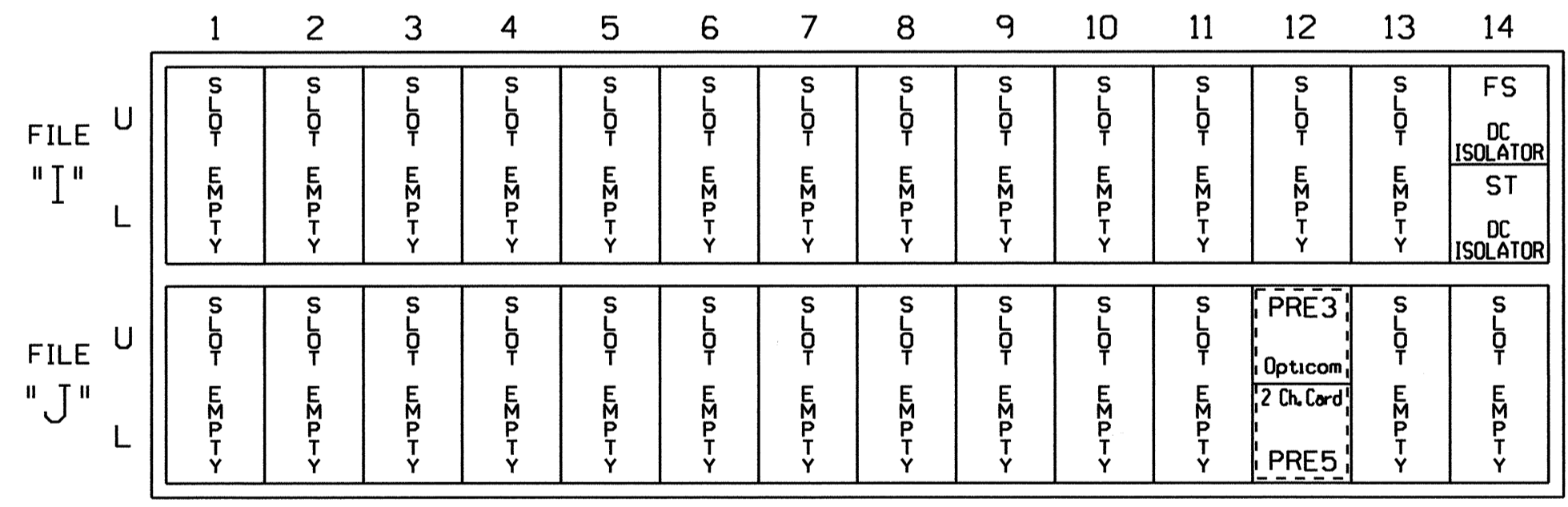


NOTE

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

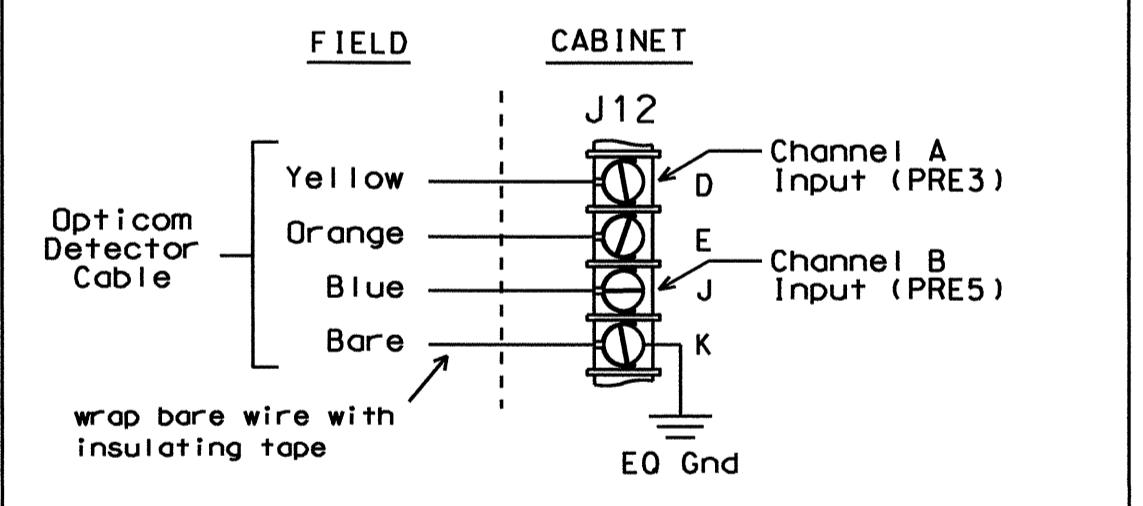
INPUT FILE POSITION LAYOUT

(front view)



TYPICAL OPTICOM FIELD WIRE DETAIL

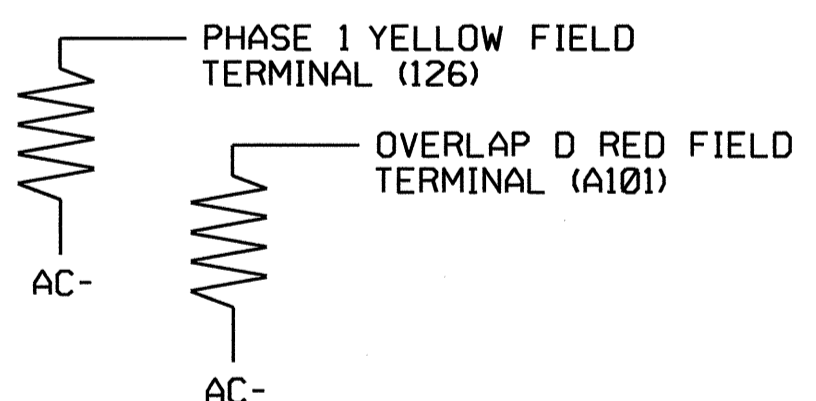
(input file, rear view)



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

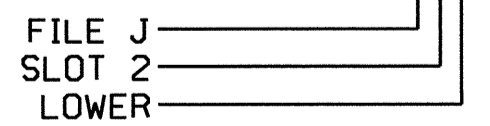
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



SPECIAL DETECTOR NOTE

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

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0558 T1
 DESIGNED: January 2011
 SEALED: 02/07/11
 REVISED:

ELECTRICAL DETAIL TEMP 1 - SHEET 1 OF 2

Prepared In the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

Division 3 Onslow County Jacksonville
 PLAN DATE: February 2011 REVIEWED BY: T. J. J.
 PREPARED BY: C. Strickland REVIEWED BY:

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 022013
 GEORGE C. BROWN
 SIGNATURE DATE 3/8/11

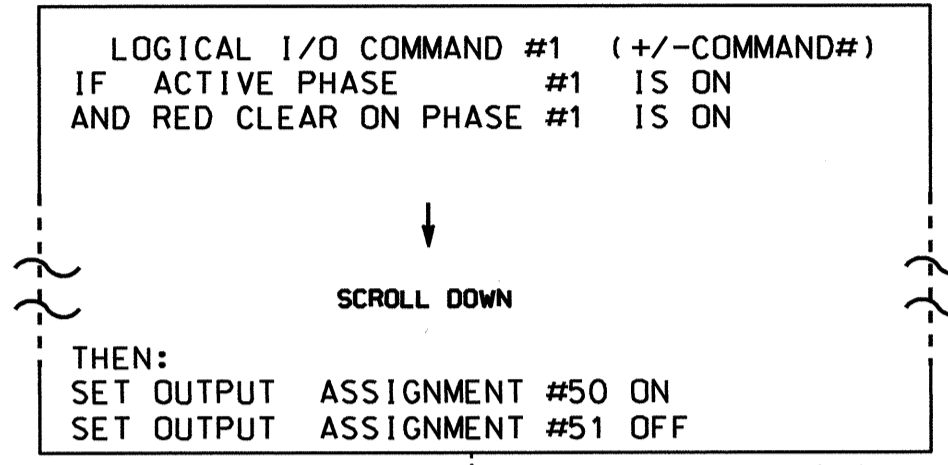
SIG. INVENTORY NO. 03-0558 T1

07-MAR-2011 07:46 S:\ITS\ASMTS\Signal\smc\kgr\oups\sig_mon\sr11.cad and 030558_sm.e la_xxx.dgn

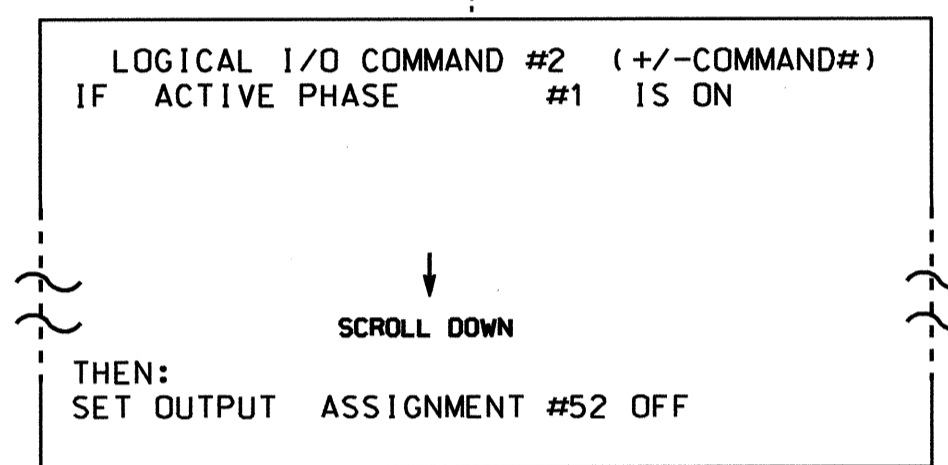
LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

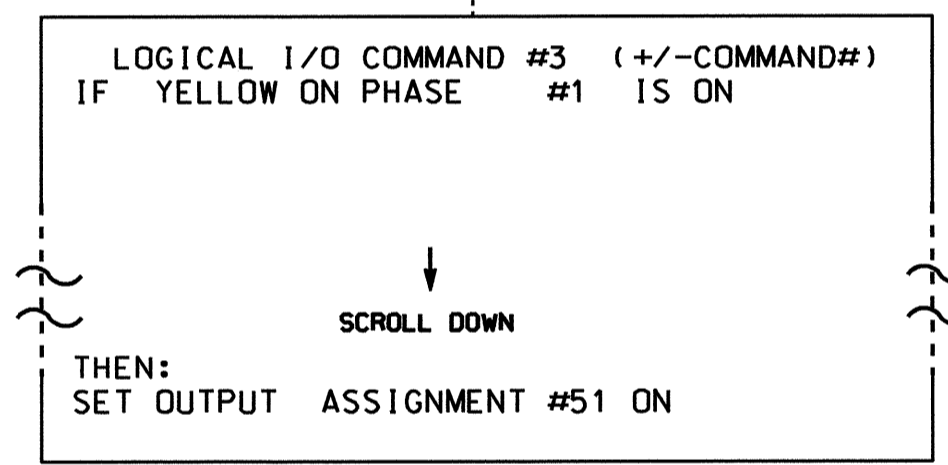
- FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2 AND 3.
- FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).



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



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



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

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.

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
 RED CLEAR BEFORE PRE (0= DEFAULT)....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 X
 OMIT OVERLAPS: X

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

Program extend time on optical detector unit for 2.0 seconds.

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

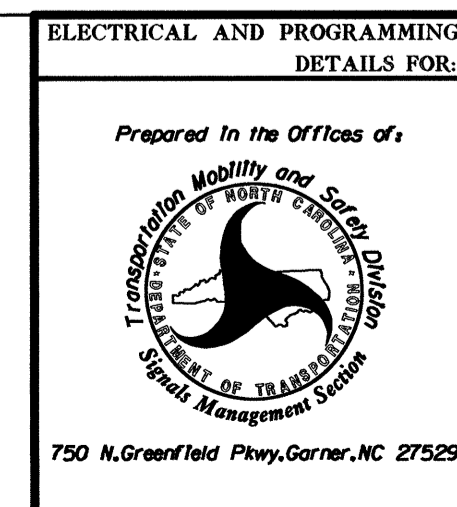
PHASE: 12345678910111213141516
 VEH OVL PARENTS: :X
 VEH OVL NOT VEH: :
 VEH OVL NOT PED: :
 VEH OVL GRN EXT: :
 STARTUP COLOR: - RED - YELLOW - GREEN
 FLASH COLORS: - RED - YELLOW - GREEN

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

ELECTRICAL DETAIL TEMP 1 - SHEET 2 of 2

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0558 T1
 DESIGNED: January 2011
 SEALED: 02/07/11
 REVISED:



SR 1470 (Western Boulevard) at Huff Drive

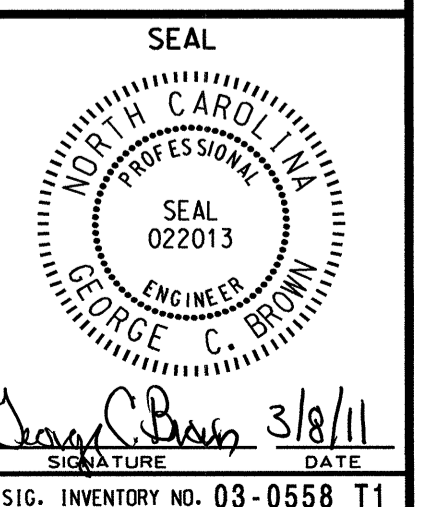
Division 3 Onslow County Jacksonville

PLAN DATE: February 2011 REVIEWED BY: T. J. [Signature]

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SIGNATURE: [Signature] DATE: 3/8/11



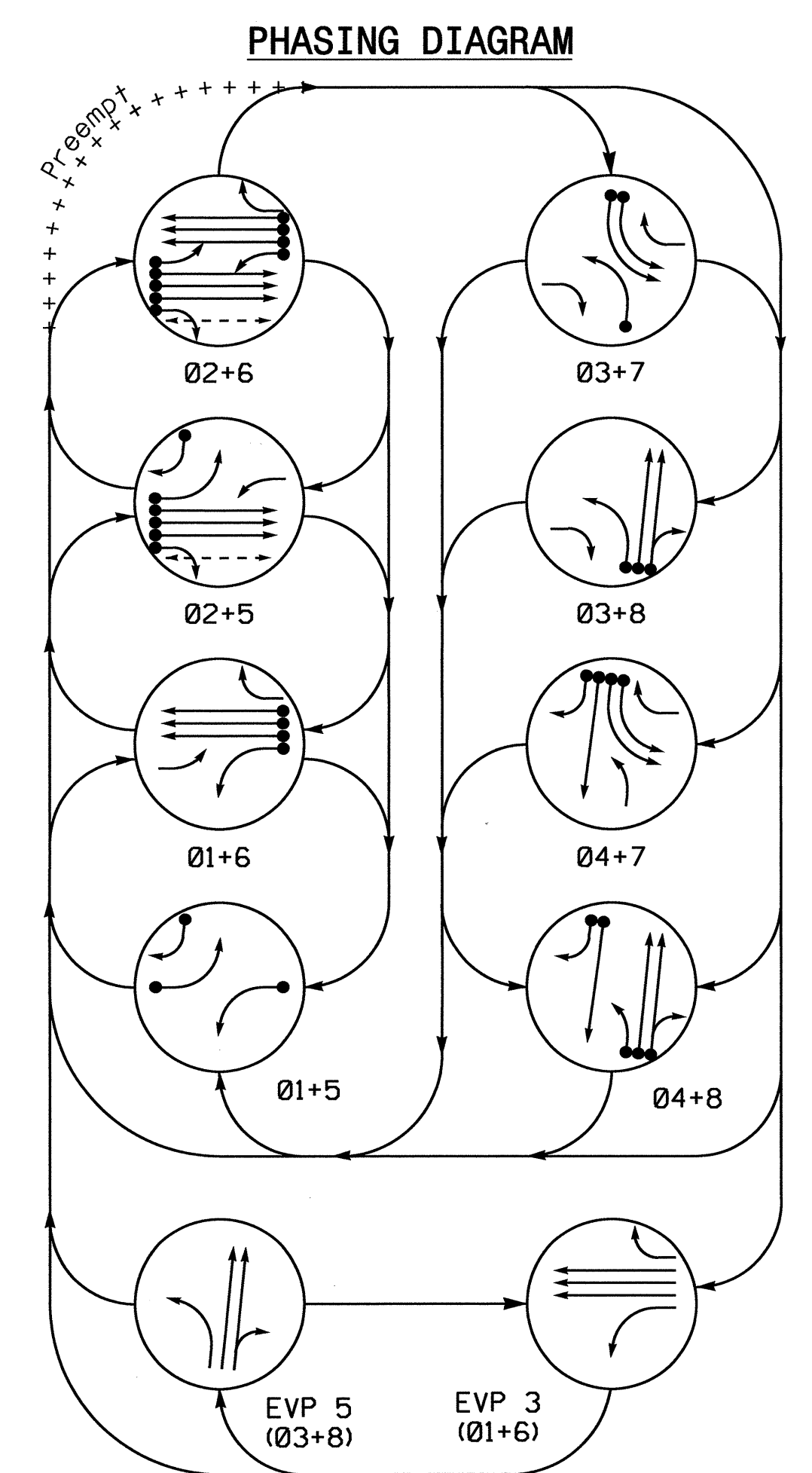
03-0558-2011-10-25 S:\TSS\11\TSS-51\p01\swork\coups\sig_Mon\6\F1\ckl\and\030558_sml.ea_re_vxx-dgn

8 Phase Fully Actuated W/ EVP Jacksonville City Signal System

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 and/or phase 5 may be lagged.
- Phase 3 and/or phase 7 may be lagged.
- Relocate existing Optical Preemption Detectors.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #0558.

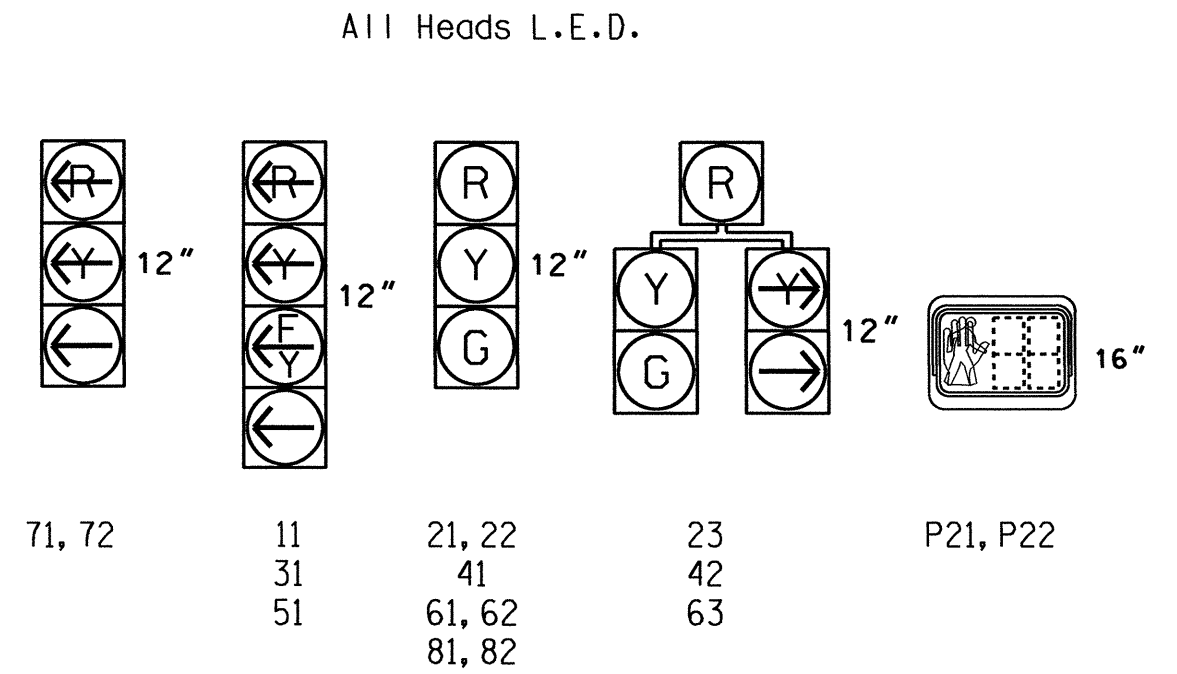
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING						
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15	-	Y
2A	6X6	300	4	Y	2	Y	Y	-	-	-	Y
2B	6X6	300	4	Y	2	Y	Y	-	-	-	Y
2C	6X6	300	4	Y	2	Y	Y	-	-	-	Y
3A	6X40	0	2-4-2	Y	3	Y	Y	-	15	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	15	-	Y
5B	6X6	0	2-4-2	Y	5	Y	Y	-	15	-	Y
6A	6X6	300	4	Y	6	Y	Y	-	-	-	Y
6B	6X6	300	4	Y	6	Y	Y	-	-	-	Y
6C	6X6	300	4	Y	6	Y	Y	-	-	-	Y
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	Y
7B	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	Y
8B	6X40	0	2-4-2	Y	8	Y	Y	-	10	-	Y
S01	6X6	+190	4	Y	-	-	-	-	-	Y	Y
S02	6X6	+190	4	Y	-	-	-	-	-	Y	Y
S03	6X6	+190	4	Y	-	-	-	-	-	Y	Y
S04	6X6	+190	4	Y	-	-	-	-	-	Y	Y
S05	6X6	+190	4	Y	-	-	-	-	-	Y	Y
S06	6X6	+190	4	Y	-	-	-	-	-	Y	Y



SIGNAL FACE	PHASE							
	01+5	02+5	03+5	04+5	01+6	02+6	03+6	04+6
11	←	←	←	←	←	←	←	←
21, 22	R	R	G	G	R	R	R	R
23	R	R	G	G	R	R	R	R
31	←	←	←	←	←	←	←	←
41	R	R	R	R	R	G	G	R
42	R	R	R	R	R	G	G	R
51	←	←	←	←	←	←	←	←
61, 62	R	G	R	G	R	R	R	G
63	R	G	R	G	R	R	R	G
71, 72	←	←	←	←	←	←	←	←
81, 82	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DRK

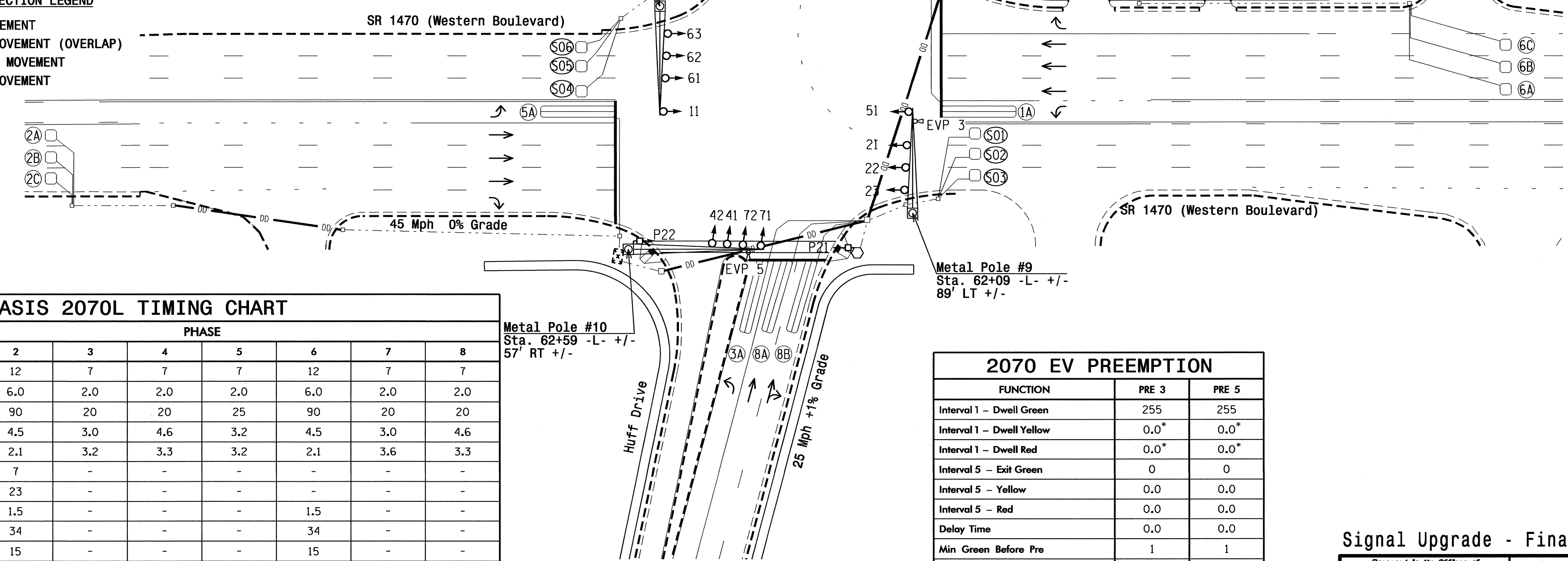
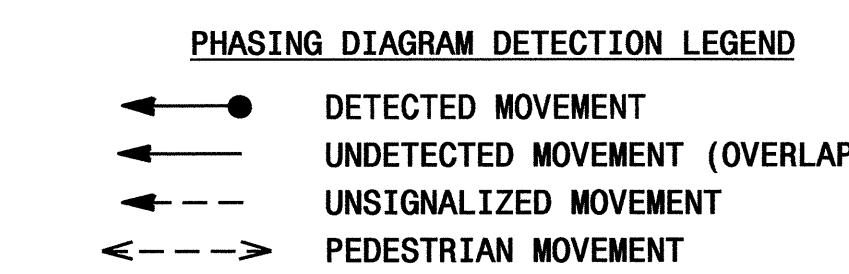
W - Walk
DW - Don't Walk
DRK - Dark

SIGNAL FACE I.D.



TO	FROM			
	1	2	1	2
←	←	←	←	←
→	→	→	→	→
↔	↔	↔	↔	↔
↔	↔	↔	↔	↔

↔ = Flashing Yellow Arrow



OASIS 2070L TIMING CHART

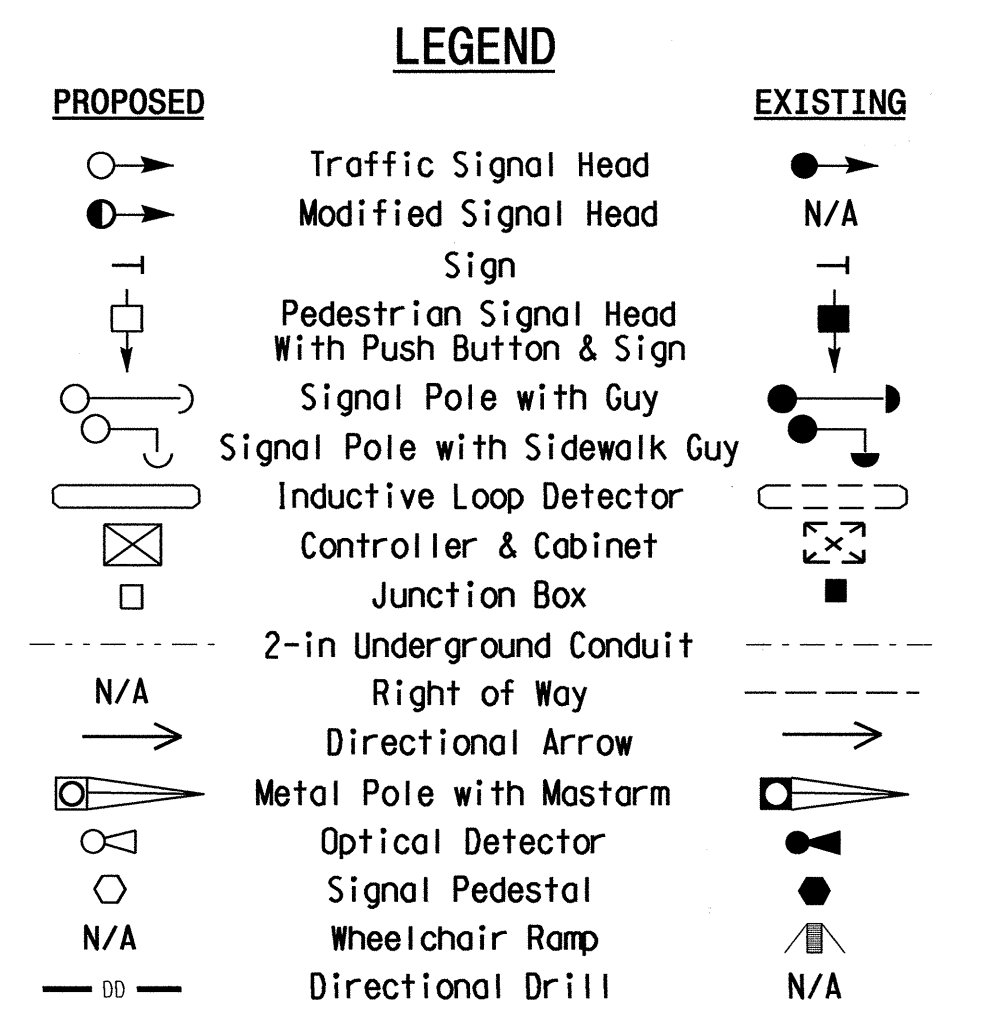
FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	7	12	7	7	7	12	7	7
Extension 1*	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1*	20	90	20	20	25	90	20	20
Yellow Clearance	3.2	4.5	3.0	4.6	3.2	4.5	3.0	4.6
Red Clearance	3.4	2.1	3.2	3.3	3.2	2.1	3.6	3.3
Walk 1*	-	7	-	-	-	-	-	-
Don't Walk 1	-	23	-	-	-	-	-	-
Seconds Per Actuation*	-	1.5	-	-	-	1.5	-	-
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	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 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
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	12	7
Enable Backup Protection	N	N
Ped Clear Through Yellow	Y	Y
Preempt Extend**	2	2

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

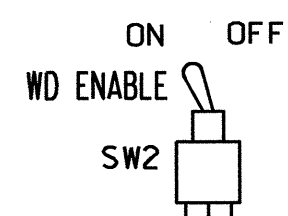


Signal Upgrade - Final

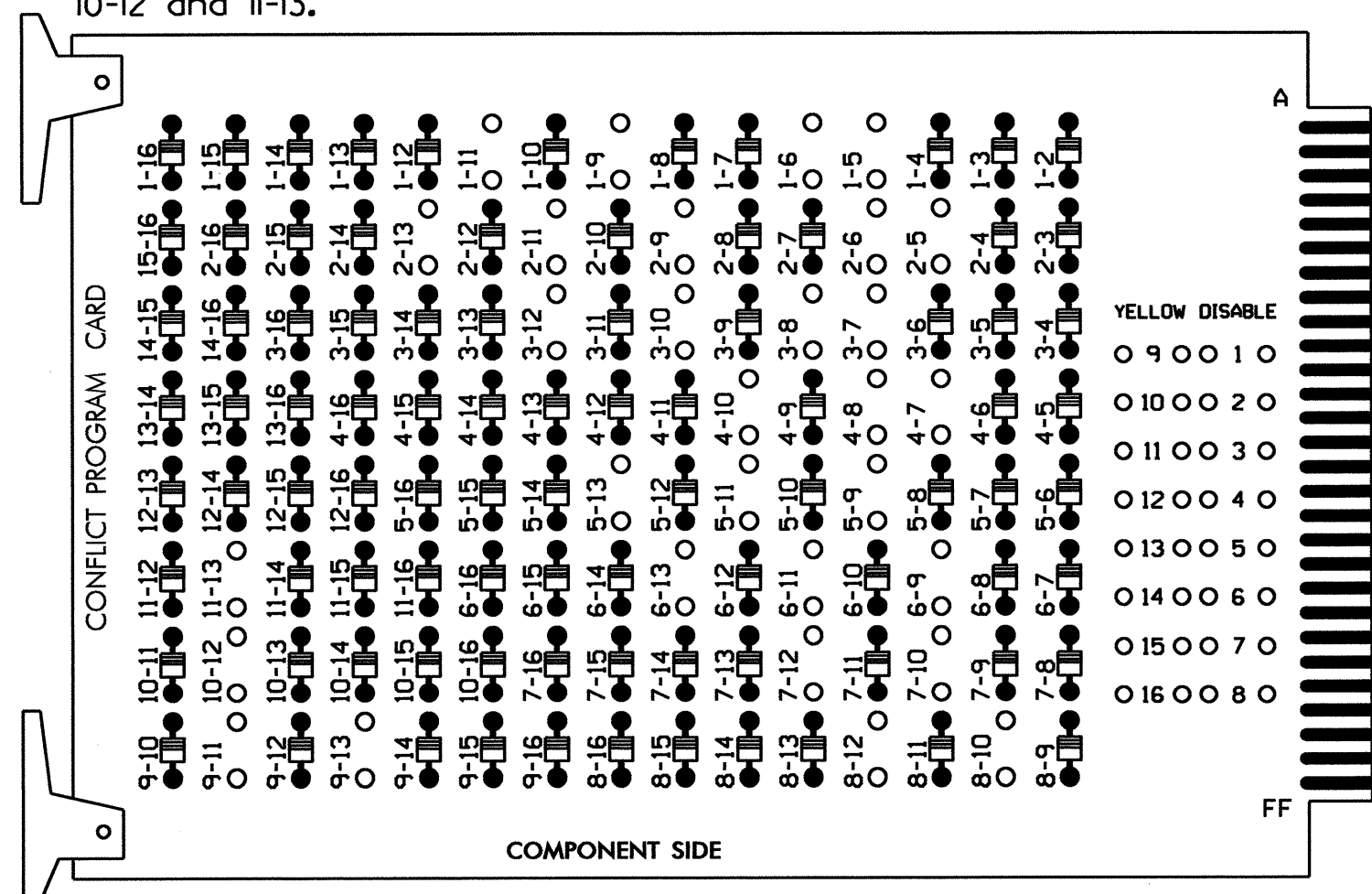
Prepared in the Offices of:
SR 1470 (Western Boulevard) at Huff Drive/White Street Extension
 Division 3 Onslow County Jacksonville
 PLAN DATE: January 2011 REVIEWED BY: J. P. Galloway
 PREPARED BY: I. O. Umozurike REVIEWED BY:
 REVISIONS: _____ INIT. DATE
 SCALE: 1"=40'
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29904
 SIGNATURE: J. P. Galloway DATE: 2/8/11
 SIG. INVENTORY NO. 03-0558F

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



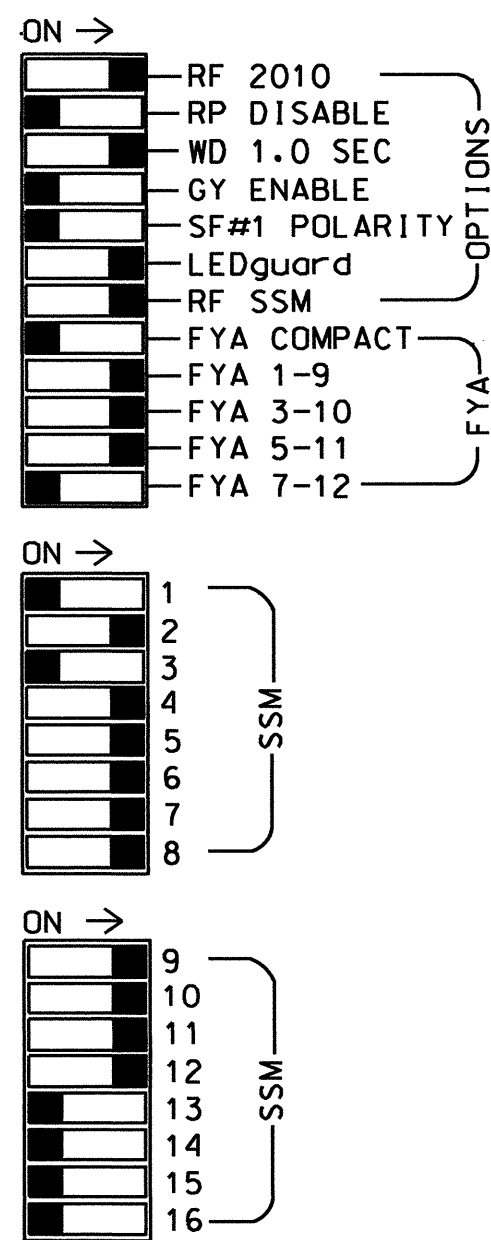
REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 2-13, 3-7, 3-8, 3-10, 3-12, 4-7, 4-8, 4-10, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 7-10, 7-12, 8-10, 8-12, 9-11, 9-13, 10-12 and 11-13.



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, 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 phase 2 for 'STARTUP PED CALL'.
- Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
- The cabinet and controller are part of the Jacksonville City Signal System.

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,S5,S6,S7,S8,S9,
 S10,S12,S13
 PHASES USED.....1,2,3,4,5,6,7,8
 OVERLAP "A".....1+2
 OVERLAP "B".....3+4
 OVERLAP "C".....5+6
 OVERLAP "D".....3

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	10	11	12	13	14		
SIGNAL HEAD NO.	11	21, 22,23	P21, P22	31	41,42	NU	42	51	61, 62,63	NU	63	71,72	81,82	NU	11	31	NU	51	23	NU
RED		128			101		*		134				107						*	
YELLOW	*	129		*	102				135				108							
GREEN		130			103				136				109							
RED ARROW													122		A121	A124		A114		
YELLOW ARROW									132			123	123		A122	A125		A115	A102	
FLASHING YELLOW ARROW															A123	A126		A116		
GREEN ARROW	127			118			133	133			124	124							A103	
Hand				113																
Person				115																

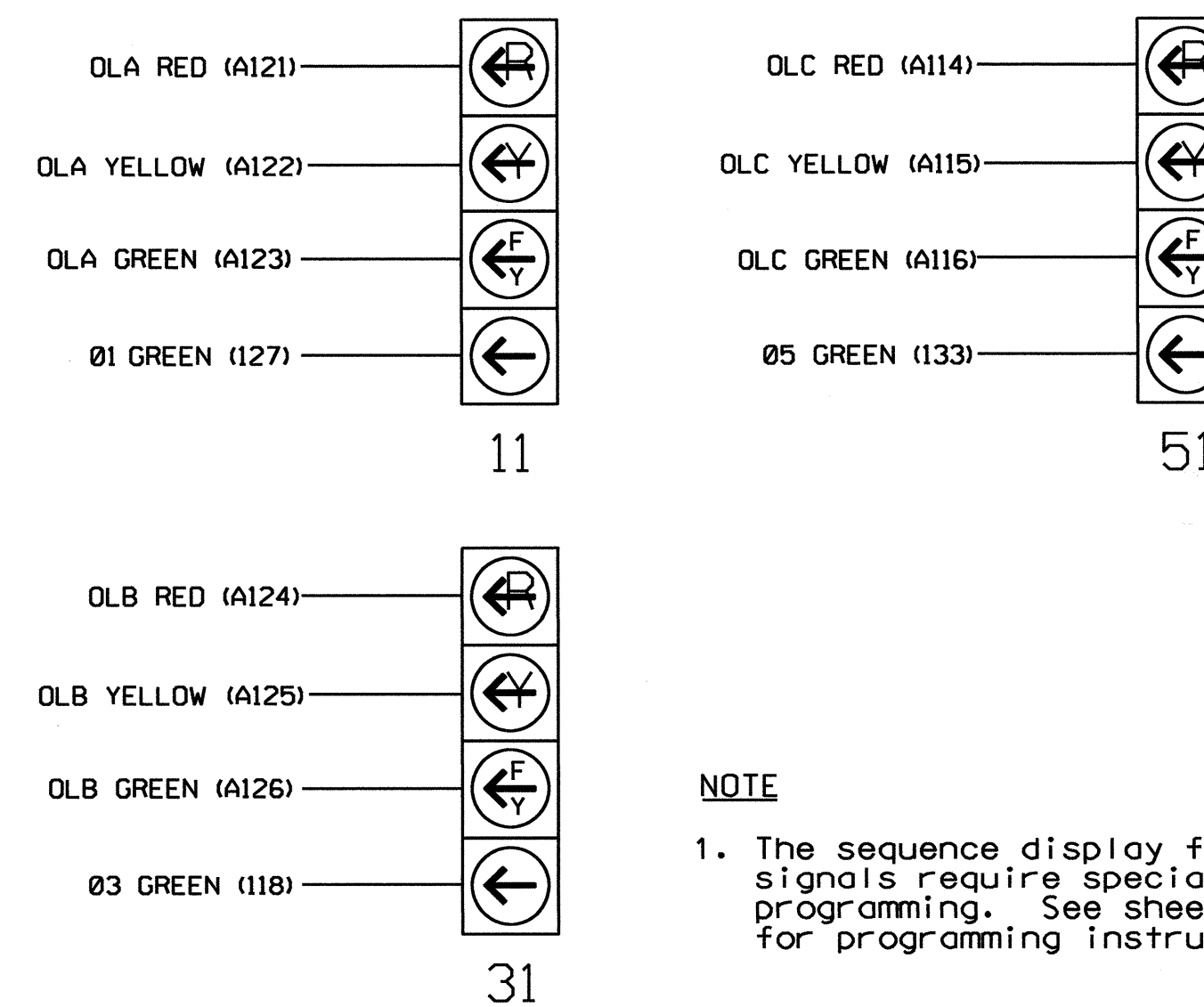
NU = Not Used

* Denotes install load resistor. See load resistor installation detail sheet 3 of 3.

★ See pictorial of head wiring in detail below.

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.

INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	∅ 1	∅ 2	∅ 2	∅ 3	∅ 4	SYS. DET. S01	SYS. DET. S03	SYS. DET. S04	∅ 2 PED	FS	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
L	NOT USED	∅ 2	NOT USED	NOT USED	NOT USED	SYS. DET. S02	SYS. DET. S04	SYS. DET. S06	NOT USED	ST	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR	DC ISOLATOR
U	∅ 5	∅ 5	∅ 6	∅ 7	∅ 7	∅ 8	SYS. DET. S05	SYS. DET. S06	PRE3	Opticom 2 Ch. Card	PRE5	PRE5	PRE5	PRE5
L	NOT USED	∅ 6	∅ 6	NOT USED	NOT USED	∅ 8	SYS. DET. S06	SYS. DET. S06	PRE5	Opticom 2 Ch. Card	PRE5	PRE5	PRE5	PRE5

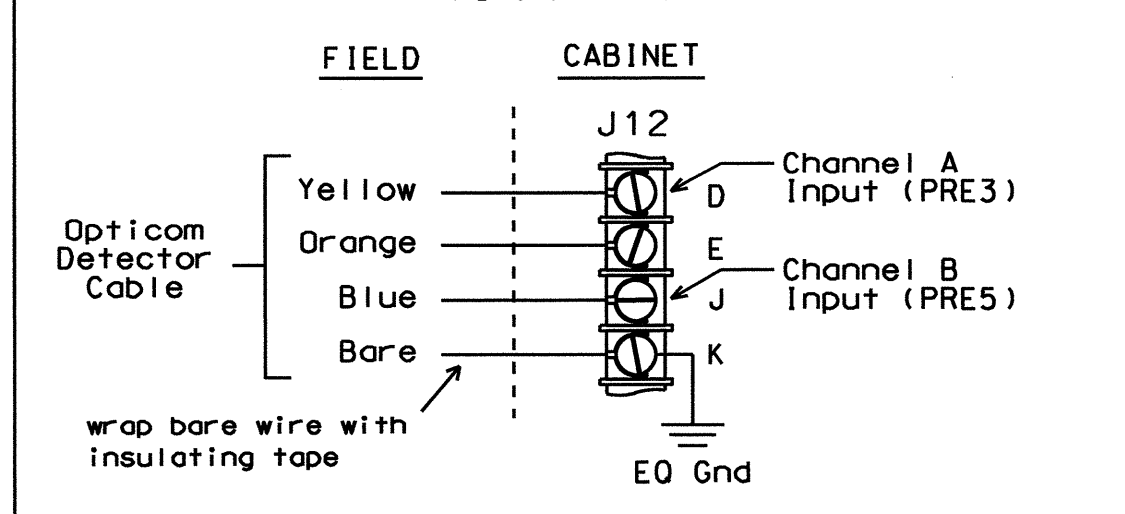
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

TYPICAL OPTICOM FIELD WIRE DETAIL

(input file, rear view)



INPUT FILE CONNECTION & PROGRAMMING CHART

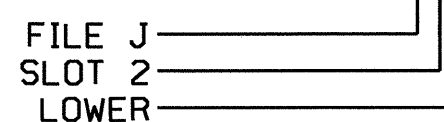
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A ¹	TB2-1,2	I1U	56	18	1	1	Y	Y			15
2A	TB2-5,6	J4U	48	10	26	6	Y	Y	Y		3
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
2C	TB2-9,10	I3U	63	25	32	2	Y	Y			
3A ²	TB4-5,6	I5U	58	20	3	3	Y	Y			15
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
5A ³	TB3-1,2	J1U	55	17	5	5	Y	Y			15
5B	TB3-5,6	J2U	40	2	6	5	Y	Y	Y		3
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			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB5-9,10	J6U	42	4	8	7	Y	Y			
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			
8B	TB7-3,4	J7L	79	41	48	8	Y	Y			10
*S01	TB6-1,2	I7U	65	27	34	SYS					
*S02	TB6-3,4	I7L	78	40	44	SYS					
*S03	TB6-9,10	I9U	60	22	11	SYS					
*S04	TB6-11,12	I9L	62	24	13	SYS					
*S05	TB7-9,10	J9U	59	21	15	SYS					
*S06	TB7-11,12	J9L	61	23	17	SYS					
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	29		PED 2		2 PED			

NOTE: INSTALL DC ISOLATORS IN INPUT FILE SLOTS I12.

* System detector only. Remove the vehicle phase assigned to this detector in the default programming.

- Add jumper from I1-W to J4-W. on rear of input file.
- Add jumper from I5-W to J8-W. on rear of input file.
- Add 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.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0558
 DESIGNED: January 2011
 SEALED: 02/08/11
 REVISED:

ELECTRICAL DETAIL SHEET 1 OF 3

	ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1470 (Western Boulevard) at Huff Drive/White Street Extension		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER GEORGE C. BROWN 022013 3/8/11
	Division 3 PLAN DATE: February 2011 PREPARED BY: C. Strickland	Onslow County REVIEWED BY: T. J. [Signature] REVIEWED BY: [Signature]	

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 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

PRESS '+'

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

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 #3 IS ON
AND RED CLEAR ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #47 ON
SET OUTPUT ASSIGNMENT #48 OFF

PRESS '+'

NOTE: LOGIC FOR PHASE 3 RED CLEAR WHEN TRANSITIONING FROM PHASE 3 TO PHASE 4 (HEAD 31).

LOGICAL I/O COMMAND #8 (+/-COMMAND#)
IF ACTIVE PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #49 OFF

PRESS '+'

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 3 (HEAD 31).

LOGICAL I/O COMMAND #9 (+/-COMMAND#)
IF YELLOW ON PHASE #3 IS ON

↓
SCROLL DOWN

THEN:
SET OUTPUT ASSIGNMENT #48 ON

PRESS '+'

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 3 (HEAD 31).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 47 = Overlap B Red
OUTPUT 48 = Overlap B Yellow
OUTPUT 49 = Overlap B 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
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW X GREEN

← NOTICE GREEN FLASH

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

PRESS '+'

PAGE 1: VEHICLE OVERLAP 'B' 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

← NOTICE GREEN FLASH

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

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

← NOTICE GREEN FLASH

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

PRESS '+'

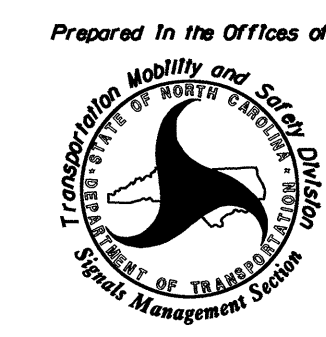
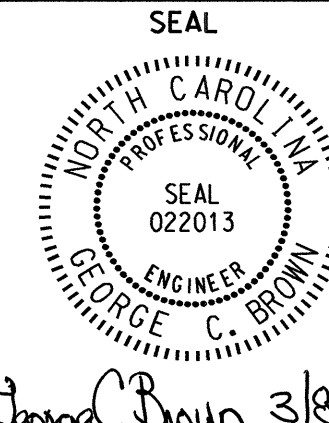
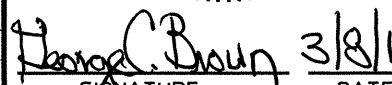
PAGE 1: VEHICLE OVERLAP 'D' SETTINGS
PHASE: :12345678910111213141516
VEH OVL PARENTS: :X
VEH OVL NOT VEH: :
VEH OVL NOT PED: :
VEH OVL GRN EXT: :
STARTUP COLOR: - RED - YELLOW - GREEN
FLASH COLORS: - RED - YELLOW - GREEN

SELECT VEHICLE OVERLAP OPTIONS: (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...N
GREEN EXTENSION (0-255 SEC)...0.0
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: 03-0558
DESIGNED: January 2011
SEALED: 02/08/11
REVISED:

ELECTRICAL DETAIL SHEET 2 OF 3

<p>Prepared In the Offices of:</p>  <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>SR 1470 (Western Boulevard) at Huff Drive/White Street Extension</p> <p>Division 3 Onslow County Jacksonville</p> <p>PLANNED BY: February 2011 REVIEWED BY: T. Sipe</p> <p>PREPARED BY: C. Strickland REVIEWED BY:</p>	<p>SEAL</p>  <p>ENGINEER GEORGE C. BROWN</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				<p style="text-align: right;">  SIGNATURE DATE </p>
REVISIONS	INIT.	DATE						
<p style="text-align: right;">SIG. INVENTORY NO. 03-0558</p>								

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)	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?	Y
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

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?	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 PEDS IN DWELL INTERVAL?	N
RE-TIME DWELL INTERVAL?	N
OVERLAPS:	ABCDEFGHIJKLMNPO
DWELL INT FLASH YELLOW	X
OMIT OVERLAPS:	

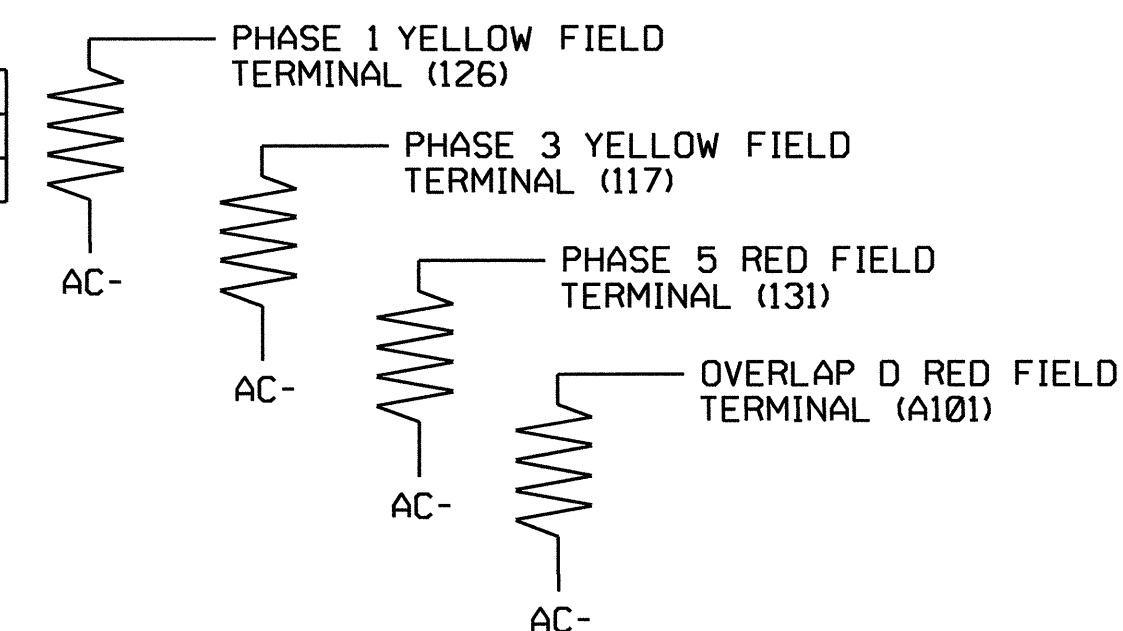
PROGRAMMING COMPLETE

Program extend time on optical detector unit for 2.0 seconds.

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)



FLASHER CIRCUIT MODIFICATION DETAIL

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

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

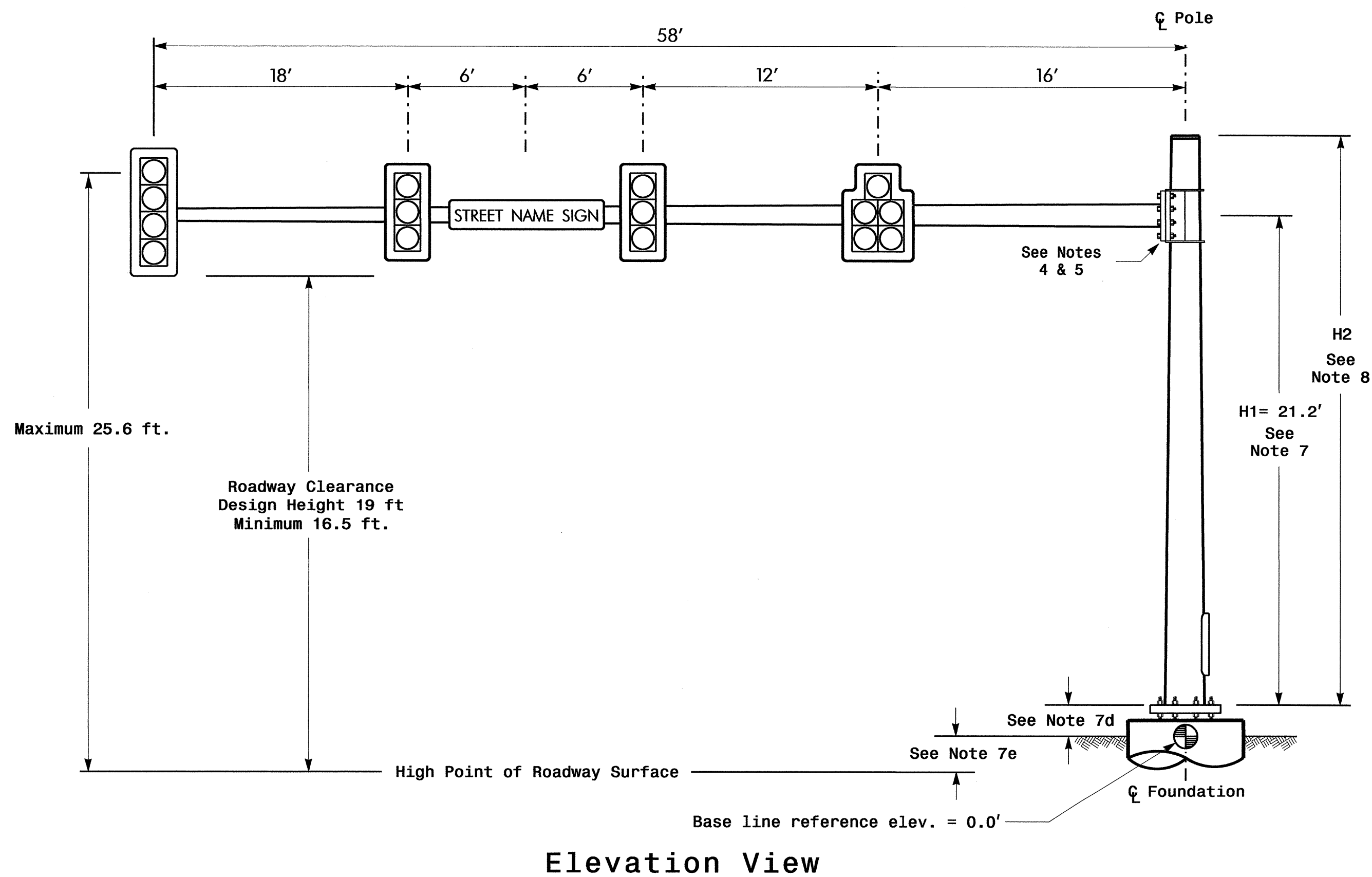
THE CHANGES LISTED ABOVE TIES ALL PHASES AND OVERLAPS TO FLASHER UNIT 1.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 03-0558
 DESIGNED: January 2011
 SEALED: 02/08/11
 REVISED:

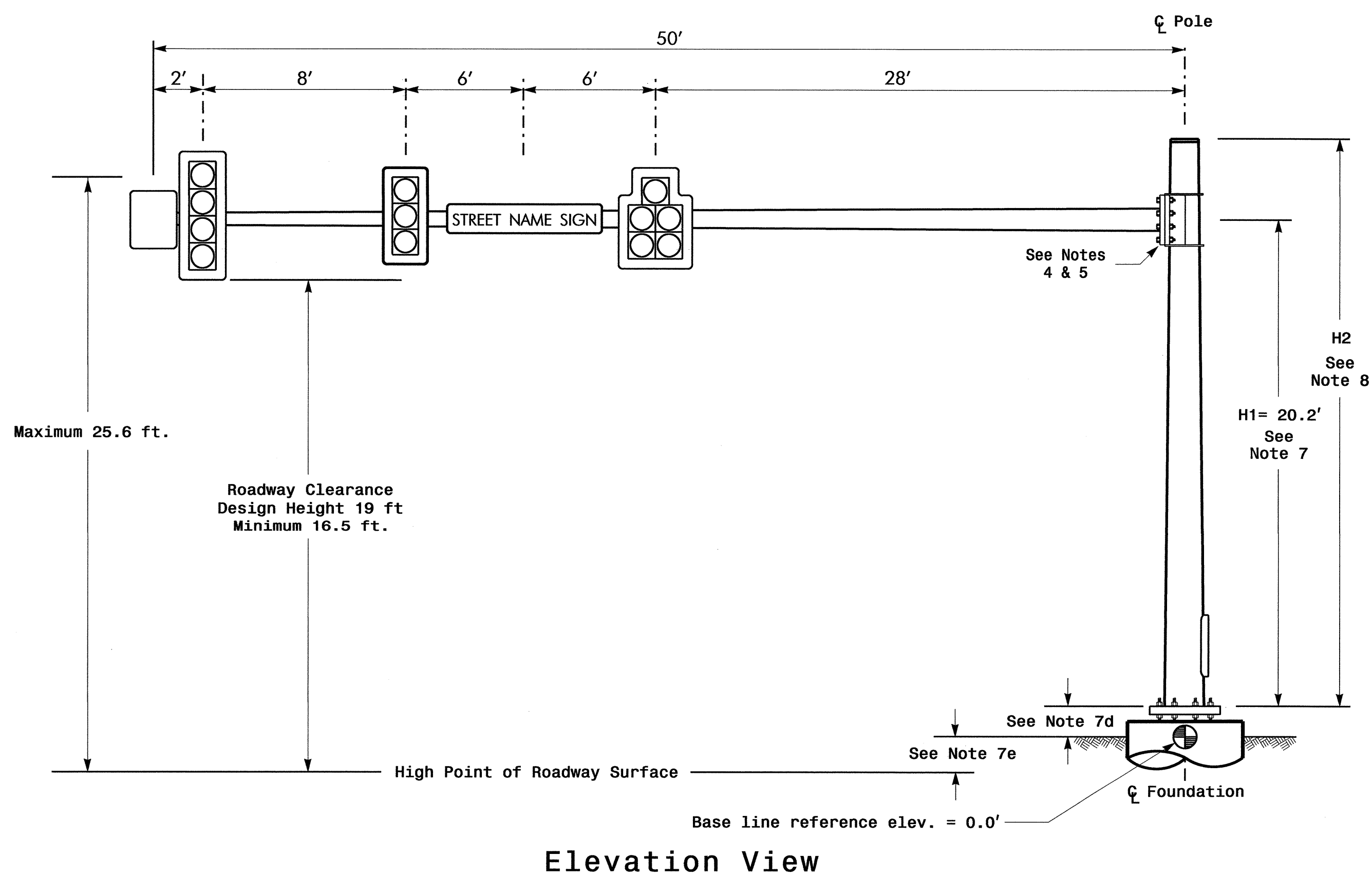
ELECTRICAL DETAIL SHEET 3 OF 3

	DETAILS FOR: SR 1470 (Western Boulevard) at Huff Drive/White Street Extension		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
	Division 3 PLAN DATE: February 2011 PREPARED BY: C. Strickland	Onslow County REVIEWED BY: T. Lynn REVIEWED BY:	
REVISIONS:			SIG. INVENTORY NO. 03-0558

Design Loading for METAL POLE NO. 7



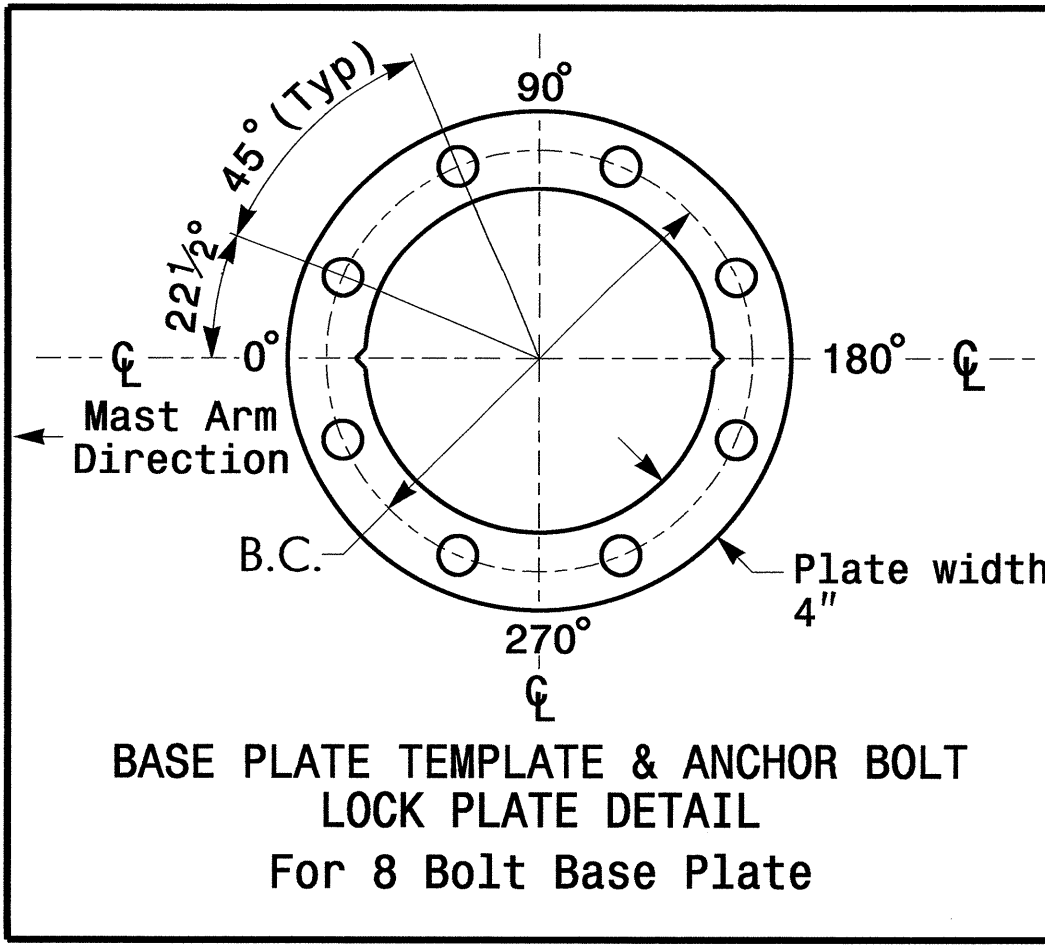
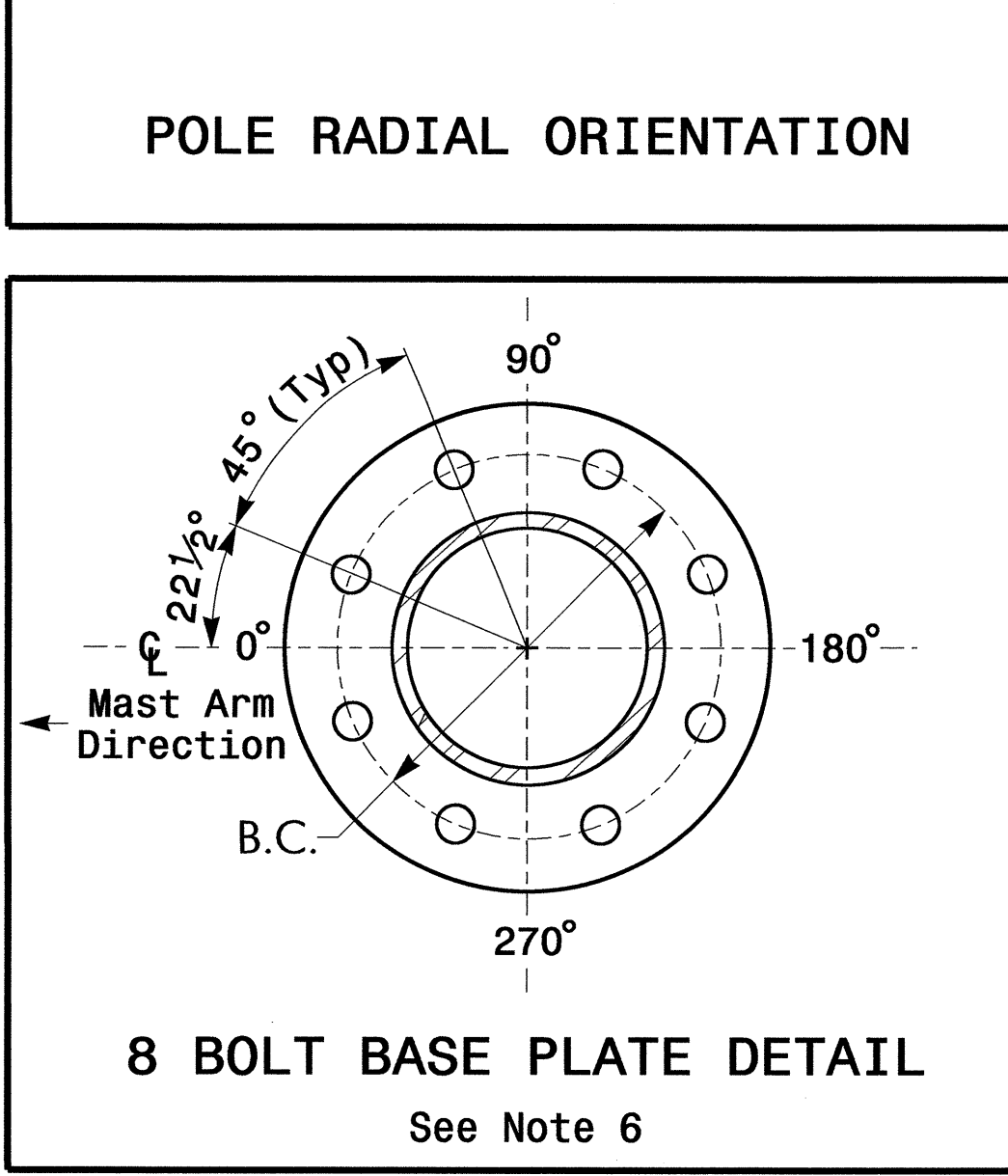
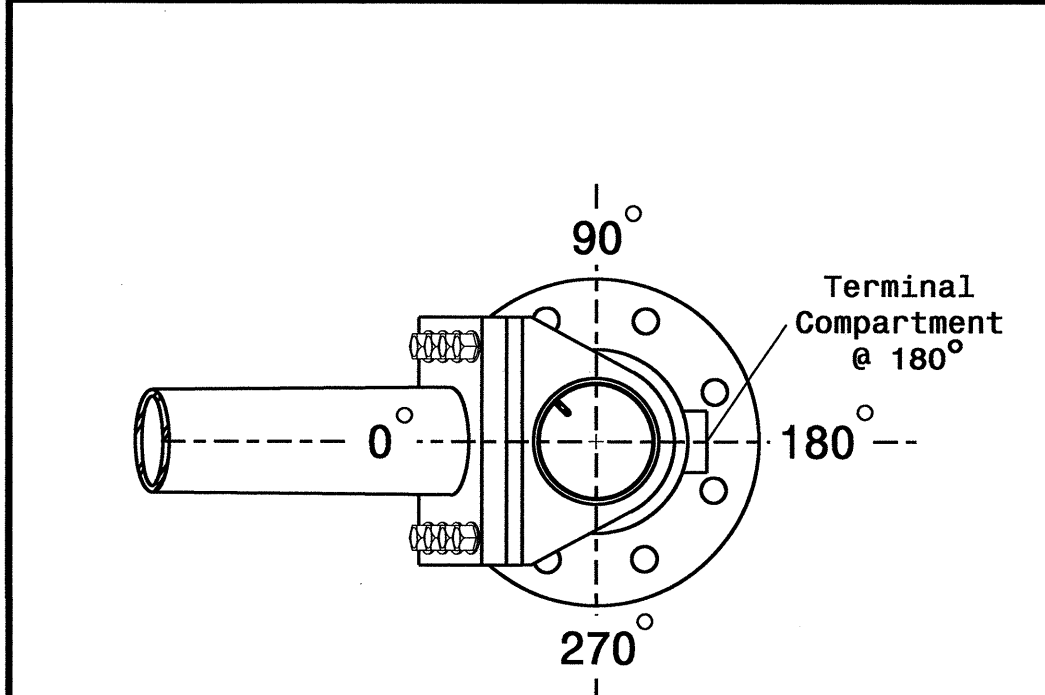
Design Loading for METAL POLE NO. 8



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	Pole 8
Baseline reference point at ϕ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.2 ft.	-0.8 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A



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]	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
[Symbol]	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	7.5 S.F.	30.0" W X 36.0" L	14 LBS

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.

Design Requirements

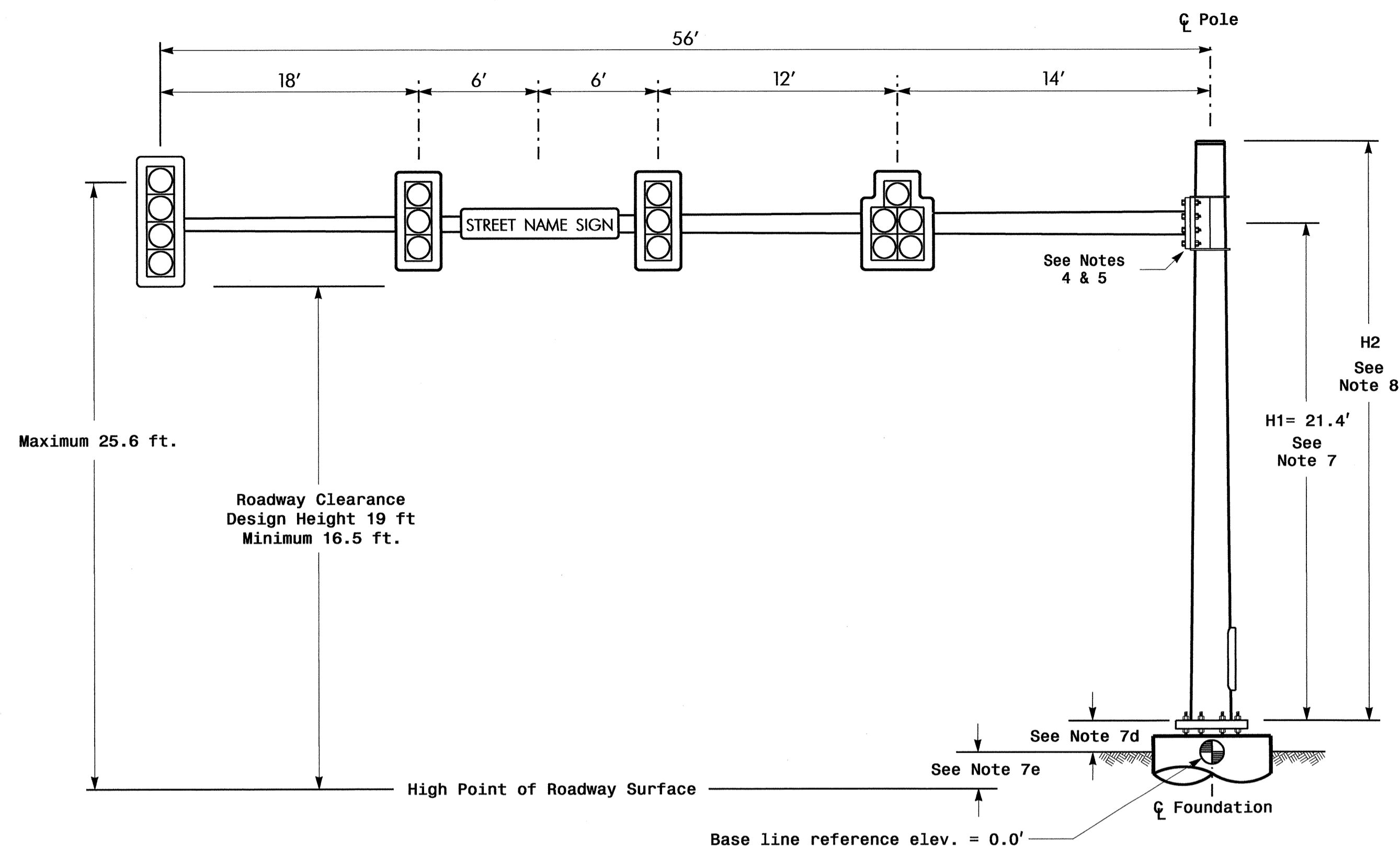
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the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

23-MAR-2011 09:42 P:\mrcoff\ckf\gnd\c406es\cm45\cm45-0558as.mpl.e.dgn

	SR 1470 (Western Boulevard) at Huff Drive/White Street Extension		SEAL
	Division 3 Onslow County Jacksonville		SEAL 29904
	PLAN DATE: January 2011	REVIEWED BY: J. P. Galloway	DATE
	PREPARED BY: I. O. Umozurike	REVIEWED BY:	DATE
SCALE: 0 N/A	REVISIONS		INIT. DATE
SIGNATURE			DATE
SIG. INVENTORY NO. 03-0558			

Design Loading for METAL POLE NO. 9

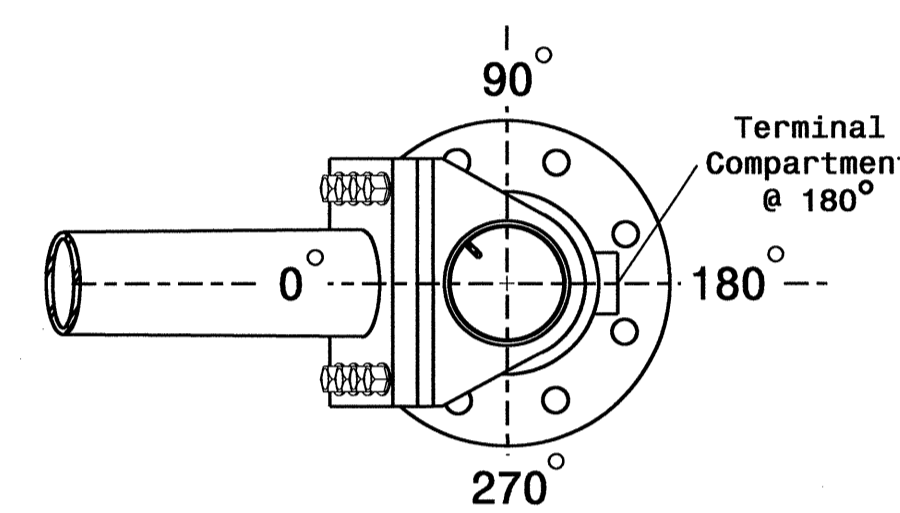


Elevation View

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.

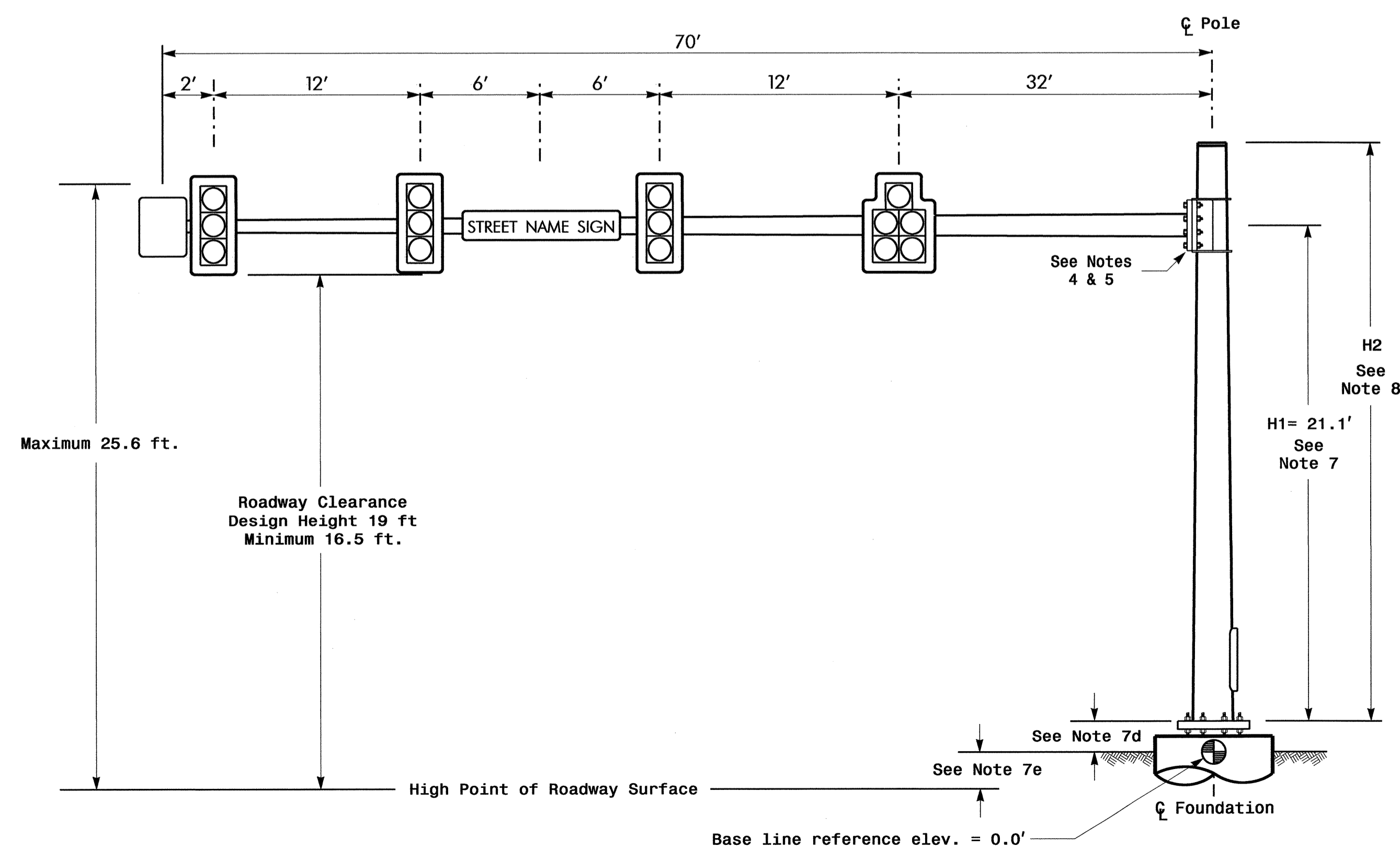
Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 9	Pole 10
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	+0.4 ft.	+0.1 ft.
Elevation difference at Edge of travelway or face of curb	N/A	N/A

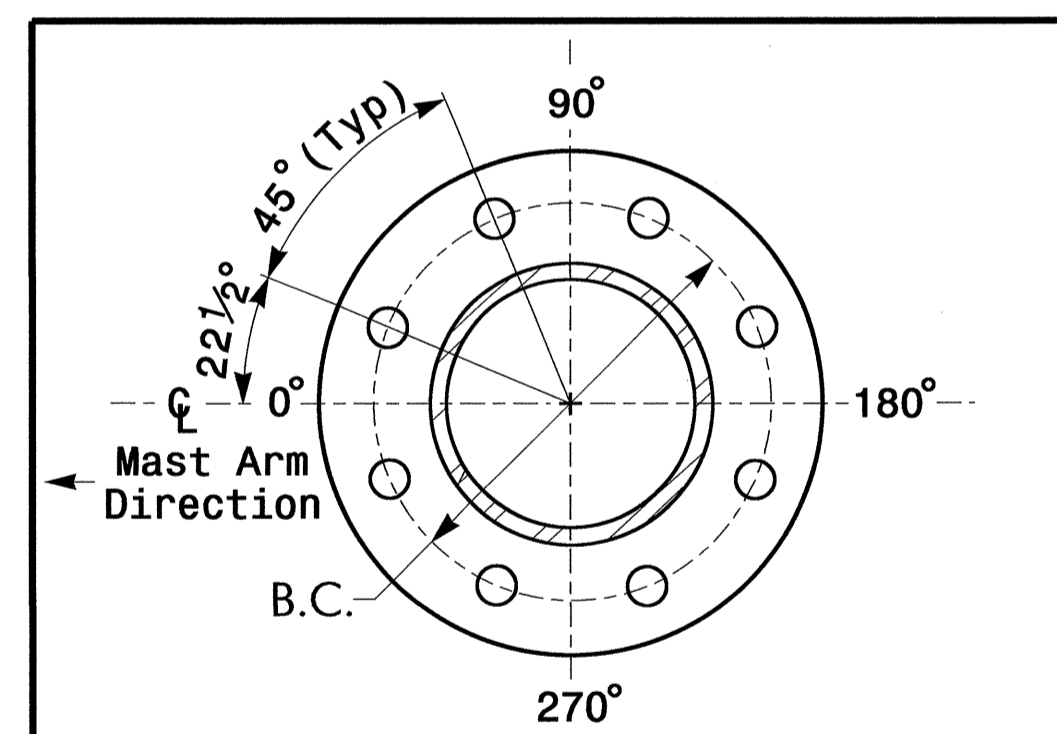


POLE RADIAL ORIENTATION

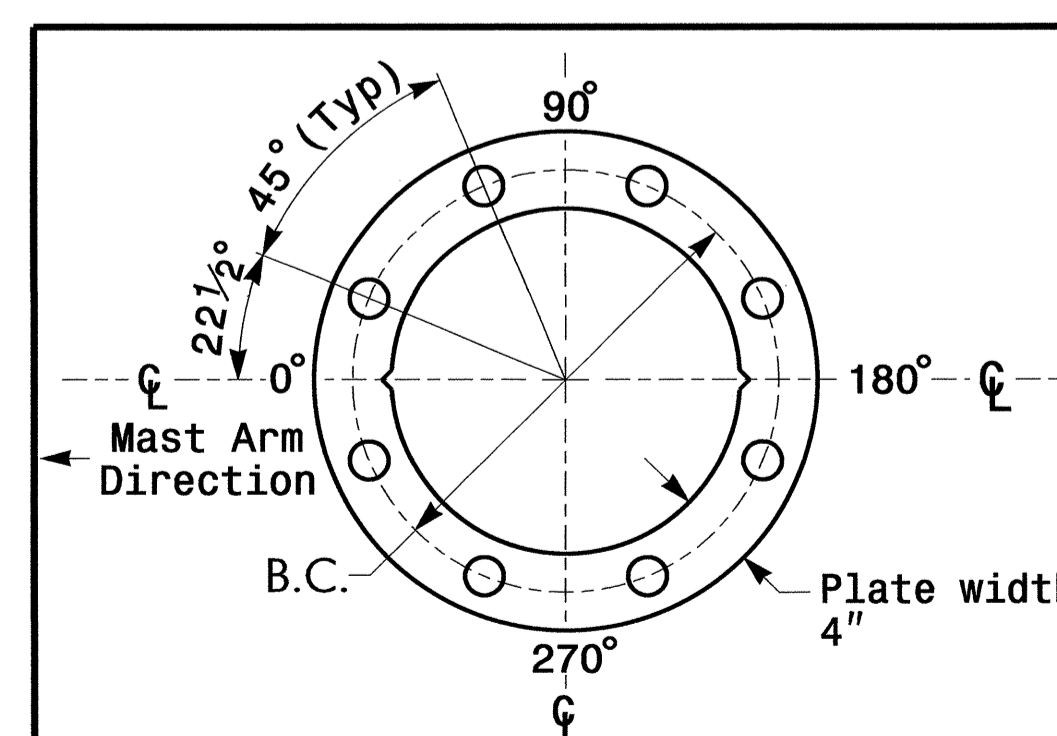
Design Loading for METAL POLE NO. 10



Elevation View



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
	STREET NAME SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	12.0 S.F.	18.0" W X 96.0" L	27 LBS
	SIGN RIGID MOUNTED WITH ASTRO-SIGN-BRAC	7.5 S.F.	30.0" W X 36.0" L	14 LBS

NOTES

Design Reference Material

- Design the traffic signal structure and foundation in accordance with:
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 - 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.
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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)

	SR 1470 (Western Boulevard) at Huff Drive/White Street Extension		SEAL
	Division 3 Onslow County Jacksonville PLAN DATE: January 2011 REVIEWED BY: J. P. Galloway	PREPARED BY: I. O. Umozurike REVIEWED BY:	
SCALE 0 N/A N/A	REVISIONS	INIT. DATE	DATE 3/24/11
SIG. INVENTORY NO. 03-0558			DATE

- 1 INSTALL REA, PE - 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL REA, PE - 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 3 INSTALL REA, PE - 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 4 INSTALL SMFO CABLE
- 5 INSTALL MMFO CABLE
- 6 INSTALL FIBER OPTIC DROP CABLE
- 7 INSTALL TRACER WIRE
- 8 TRENCH
- 9 INSTALL PVC CONDUIT
- 10 INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11 INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12 INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
- 13 INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
- 14 INSTALL POLYETHYLENE CONDUIT
- 15 DIRECTIONAL DRILL CONDUIT
- 16 BORE AND JACK CONDUIT
- 17 INSTALL CABLE(S) IN EXISTING CONDUIT
- 18 INSTALL CABLE(S) IN NEW CONDUIT
- 19 INSTALL CABLE(S) IN EXISTING RISER
- 20 INSTALL CABLE(S) IN NEW RISER
- 21 INSTALL CABLE(S) IN EXISTING CONDUIT STUB-OUTS
- 22 INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23 INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 24 INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
- 25 INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26 TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 27 INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
- 28 INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPlice CABLE IN CABINET
- 29 INSTALL UNDERGROUND SPlice ENCLOSURE
- 30 INSTALL AERIAL SPlice ENCLOSURE
- 31 INSTALL POLE MOUNTED SPlice CABINET
- 32 INSTALL BASE MOUNTED SPlice CABINET
- 33 REMOVE EXISTING SPlice CABINET

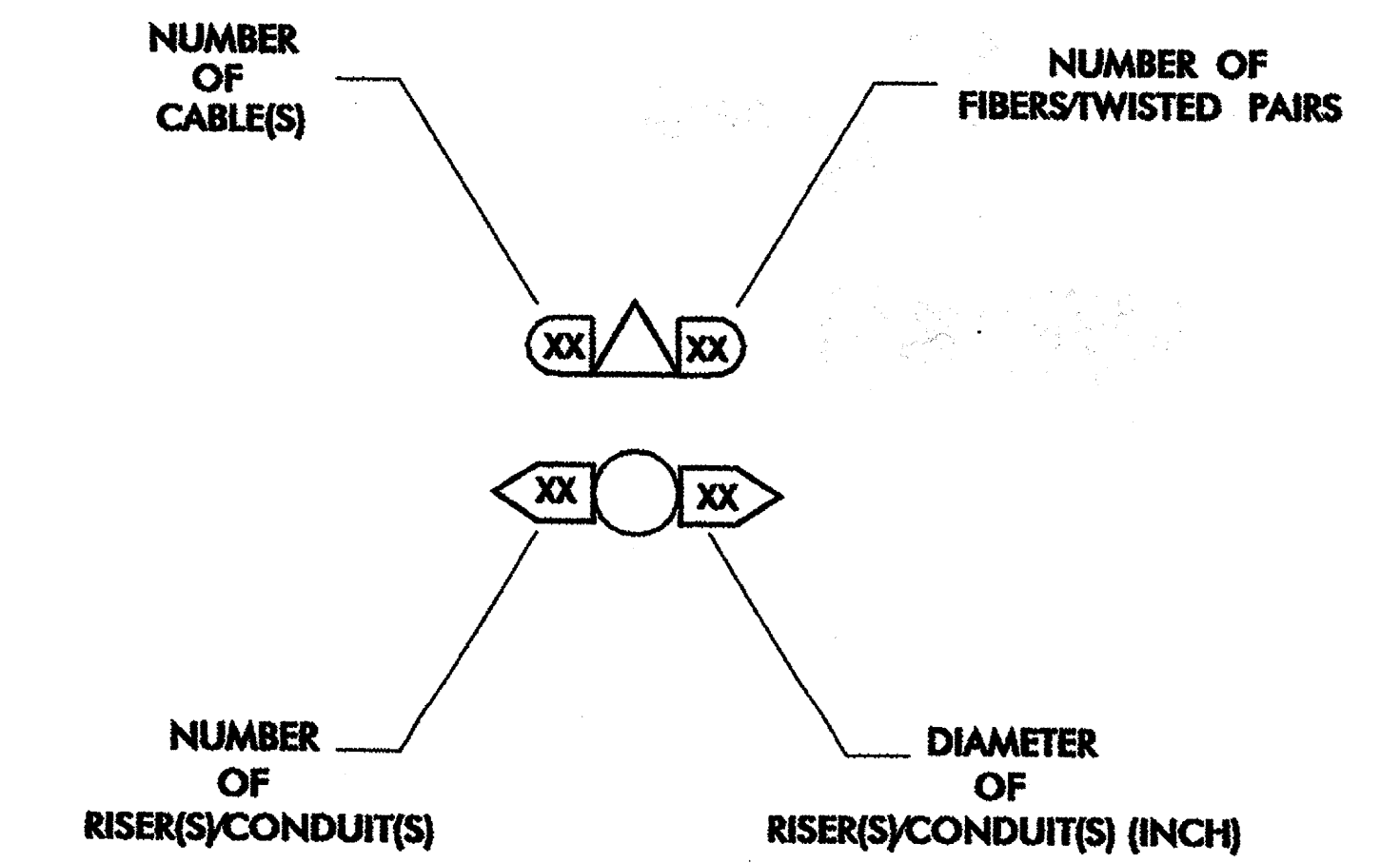
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL WOOD POLE
- 43 REMOVE EXISTING WOOD POLE
- 44 INSTALL AERIAL GUY ASSEMBLY
- 45 INSTALL STANDARD GUY ASSEMBLY
- 46 INSTALL SIDEWALK GUY ASSEMBLY
- 47 INSTALL MESSENGER CABLE
- 48 REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
- 49 REMOVE EXISTING MESSENGER CABLE
- 50 INSTALL TELEPHONE SERVICE
- 51 INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52 INSTALL DELINEATOR MARKER
- 53 STORE 20 FEET OF COMMUNICATIONS CABLE
- 54 LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 55 LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56 LASH CABLE(S) TO NEW MESSENGER CABLE
- 57 MODIFY EXISTING ELECTRICAL SERVICE
- 58 INSTALL NEW ELECTRICAL SERVICE

LEGEND

- FO NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI EXISTING COMMUNICATIONS CABLE
- REM EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD NEW DIRECTIONAL DRILLED CONDUIT
- B&J NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- AERIAL SPlice ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CONTROLLER AND CABINET
- EXISTING SPlice CABINET
- NEW SPlice CABINET
- SP SIGNAL POLE
- XX-XXXX SIGNAL INVENTORY NUMBER

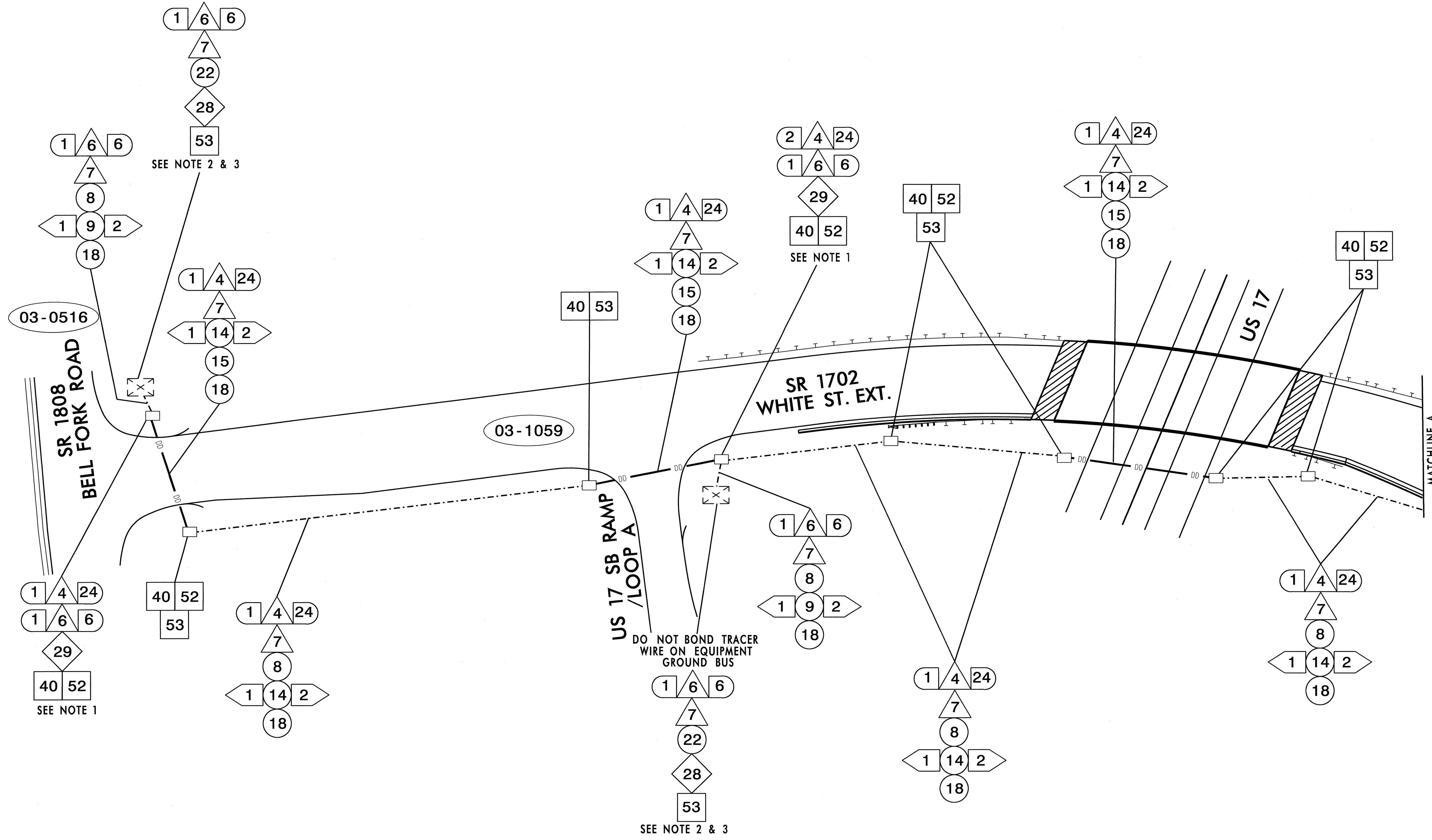
CONSTRUCTION NOTE SYMBOLOGY KEY

- XX INDICATES NUMBER OF CABLES, LOOPS, ETC.
- XX INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- XX INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- XX INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



	CONSTRUCTION NOTES		SEAL
	PLAN DATE:	REVIEWED BY:	
PREPARED BY:	REVIEWED BY: G. A. FULLER	INIT.	DATE
SCALE	REVISIONS	INIT.	DATE
Signature: <i>Gregory A. Fuller</i> 10/31/02 DATE			SEAL GREGORY A. FULLER ENGINEER LICENSE NO. 023919

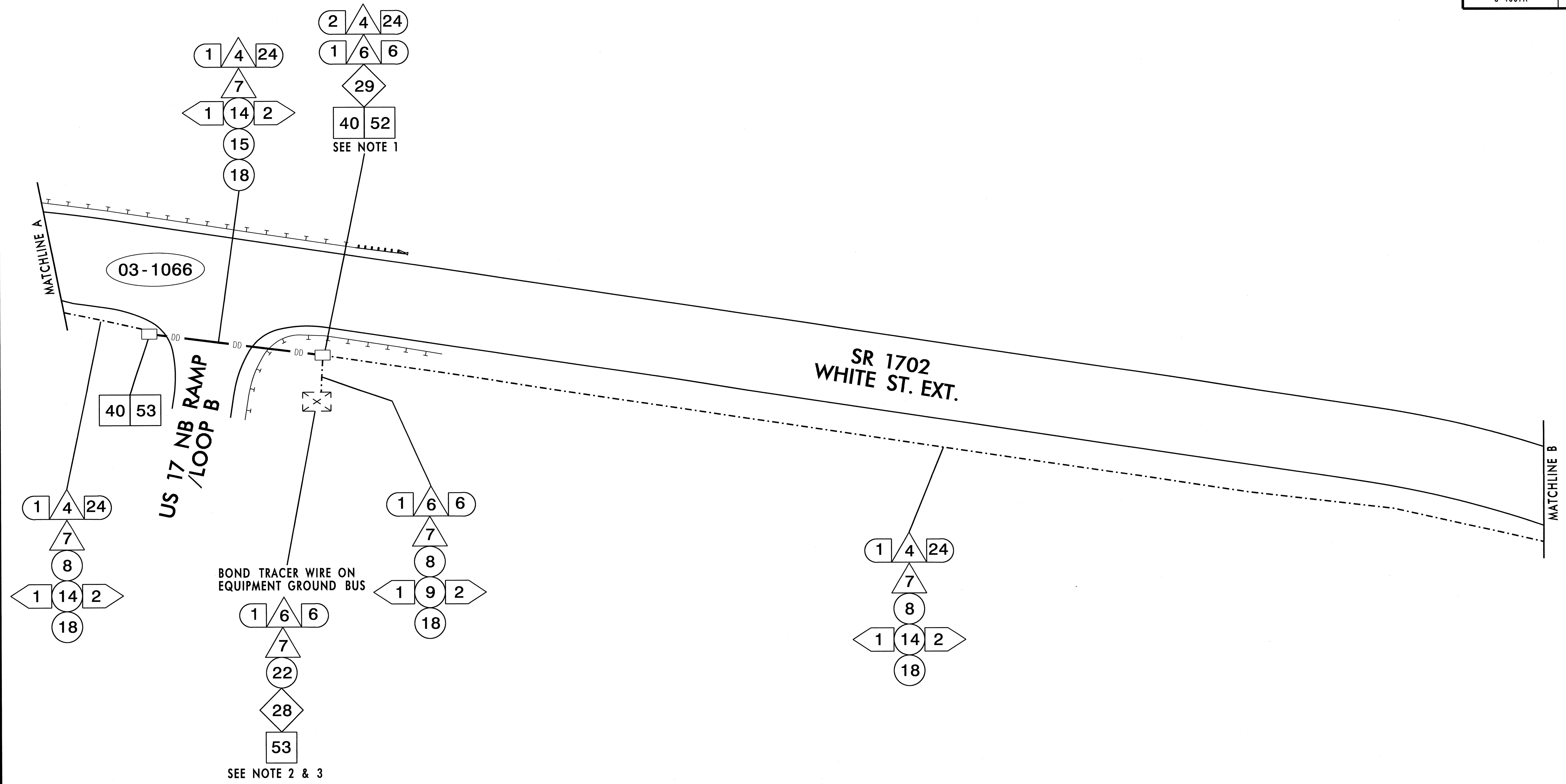
BOND TRACER WIRE ON EQUIPMENT GROUND BUS



NOTES:

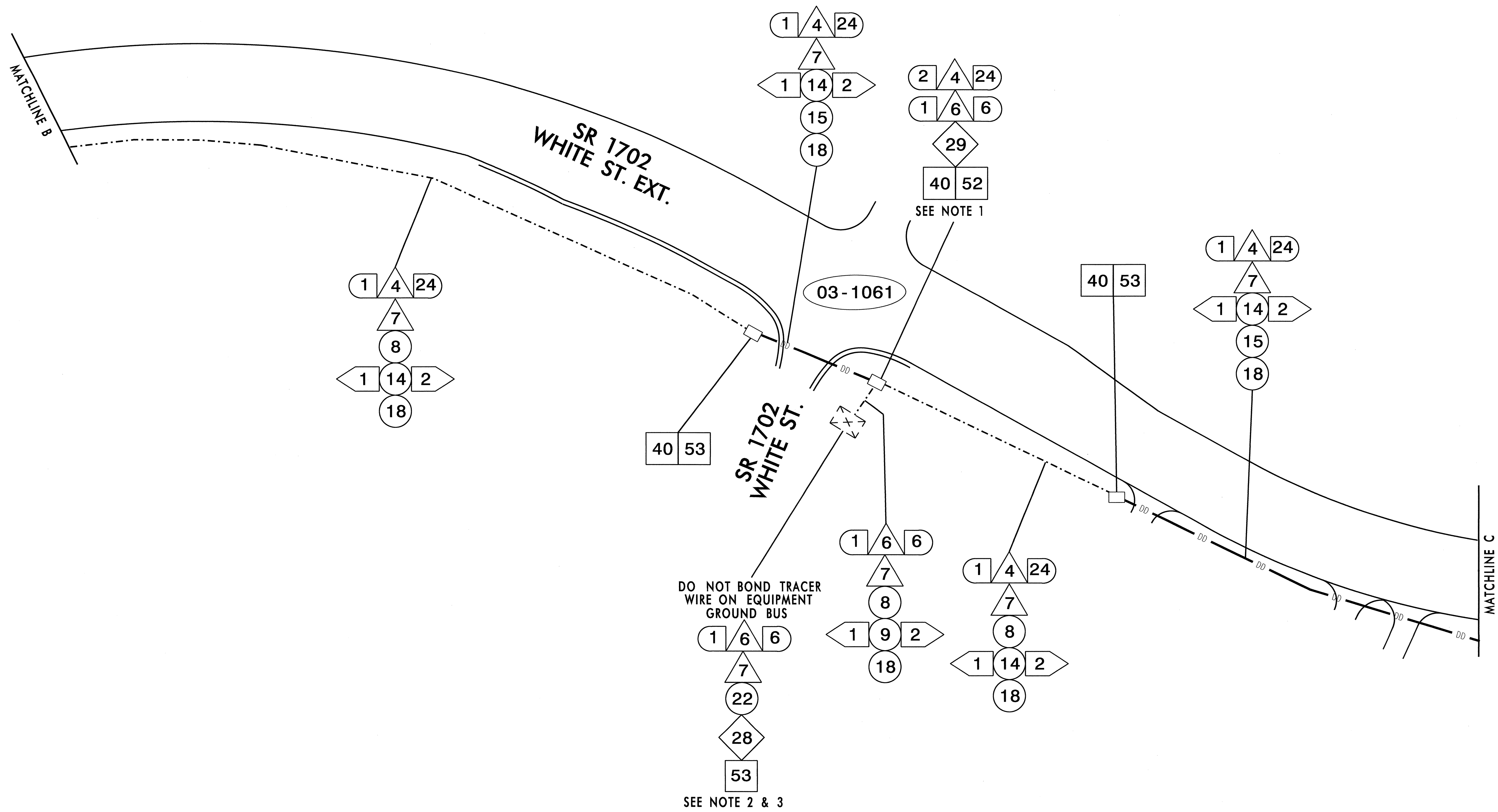
1. STORE 60' OF SPARE FIBER OPTIC CABLE.
2. SEAL ALL CONDUITS ENTERING CABINET BASES.
3. FIELD ETHERNET SWITCH AND JUMPERS TO BE PROVIDED BY OTHERS.

<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>CONDUIT AND CABLE ROUTING PLAN ALONG WHITE STREET EXT. FROM BELL FORK RD. TO WESTERN BLVD.</p>		<p>SEAL</p> <p>DATE: 3/22/11</p>
	<p>PLANNED BY: HEIDI T. BERGGREN</p>		
	<p>REVIEWED BY: G.A. FULLER, PE</p>		
	<p>DATE: MARCH 2011</p>		
<p>SCALE</p> <p>0</p>	<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>



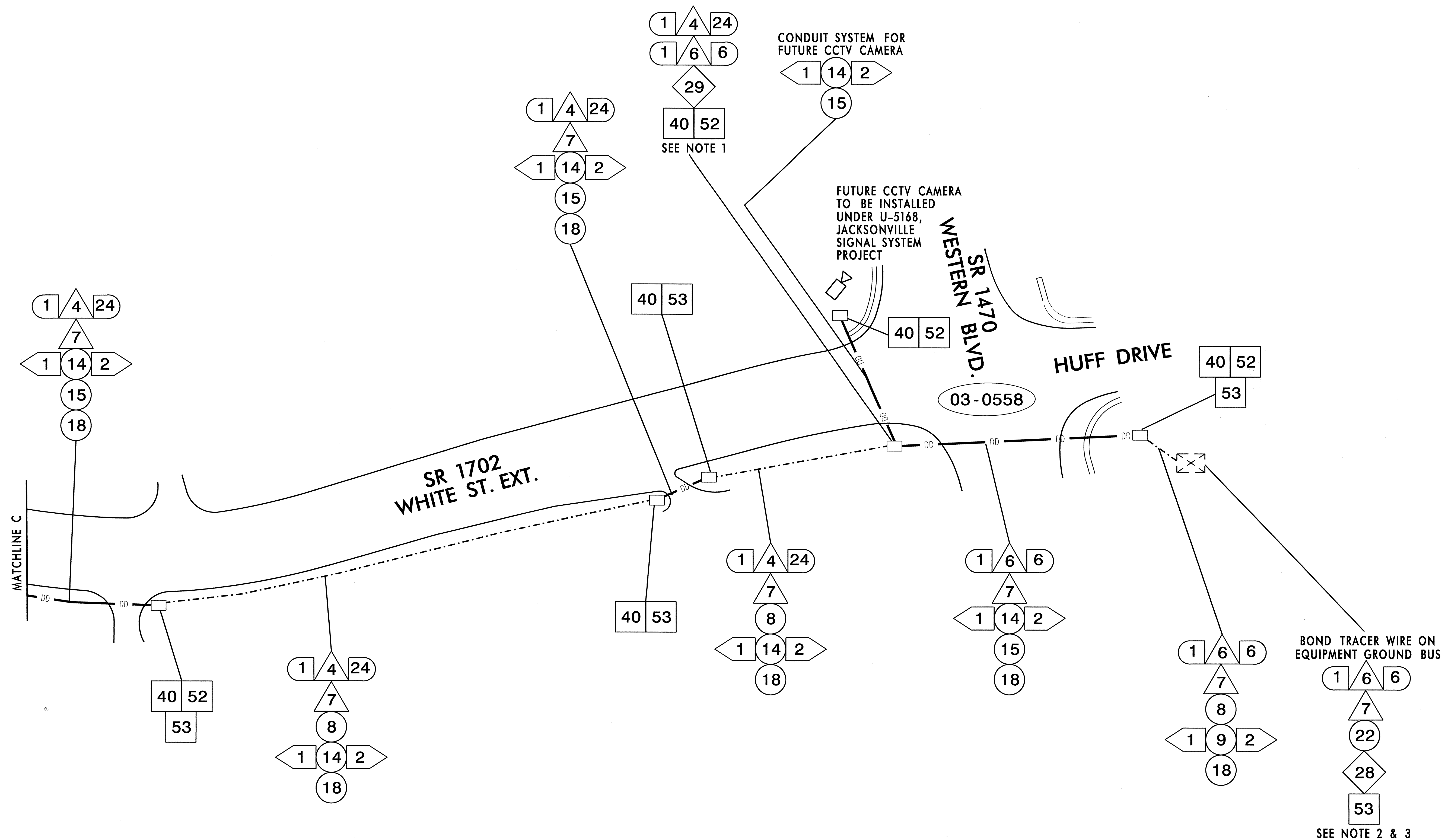
- NOTES:
1. STORE 60' OF SPARE FIBER OPTIC CABLE.
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	CONDUIT AND CABLE ROUTING PLAN ALONG WHITE STREET EXT. FROM BELL FORK RD. TO WESTERN BLVD. DIVISION 3 ONSLOW CO. JACKSONVILLE		
	PLAN DATE: MARCH 2011 PREPARED BY: HEIDI T. BERGGREN	REVIEWED BY: I. N. AVERY REVIEWED BY: G. A. FULLER, PE	
750 N. Greenfield Pkwy., Cary, NC 27529		Signature: <i>Gregory A. Fuller</i> 3/24/11 DATE: _____ CADD Filename: _____	



- NOTES:
1. STORE 60' OF SPARE FIBER OPTIC CABLE.
 2. SEAL ALL CONDUITS ENTERING CABINET BASES.
 3. FIELD ETHERNET SWITCH AND JUMPERS TO BE PROVIDED BY OTHERS.

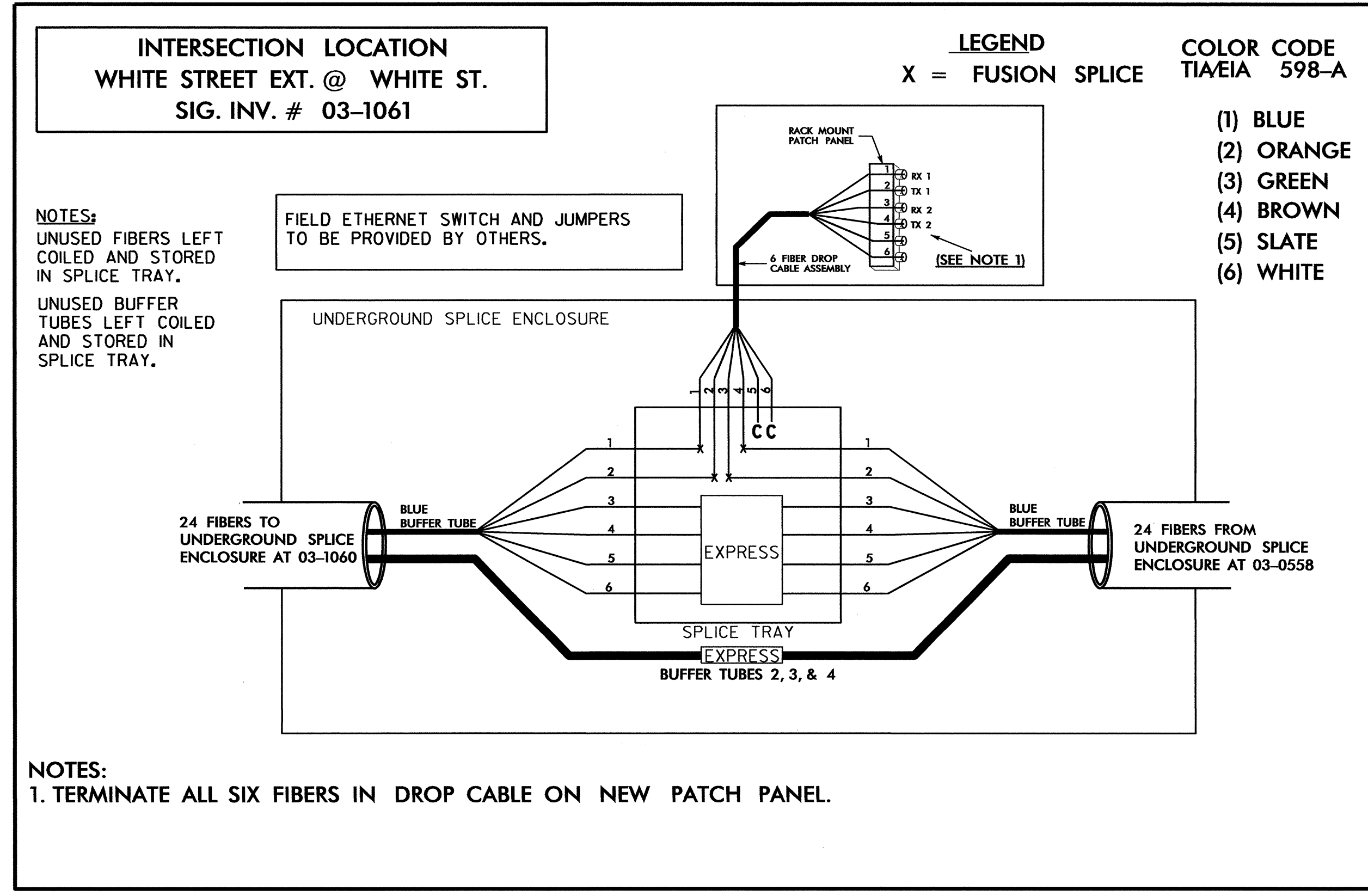
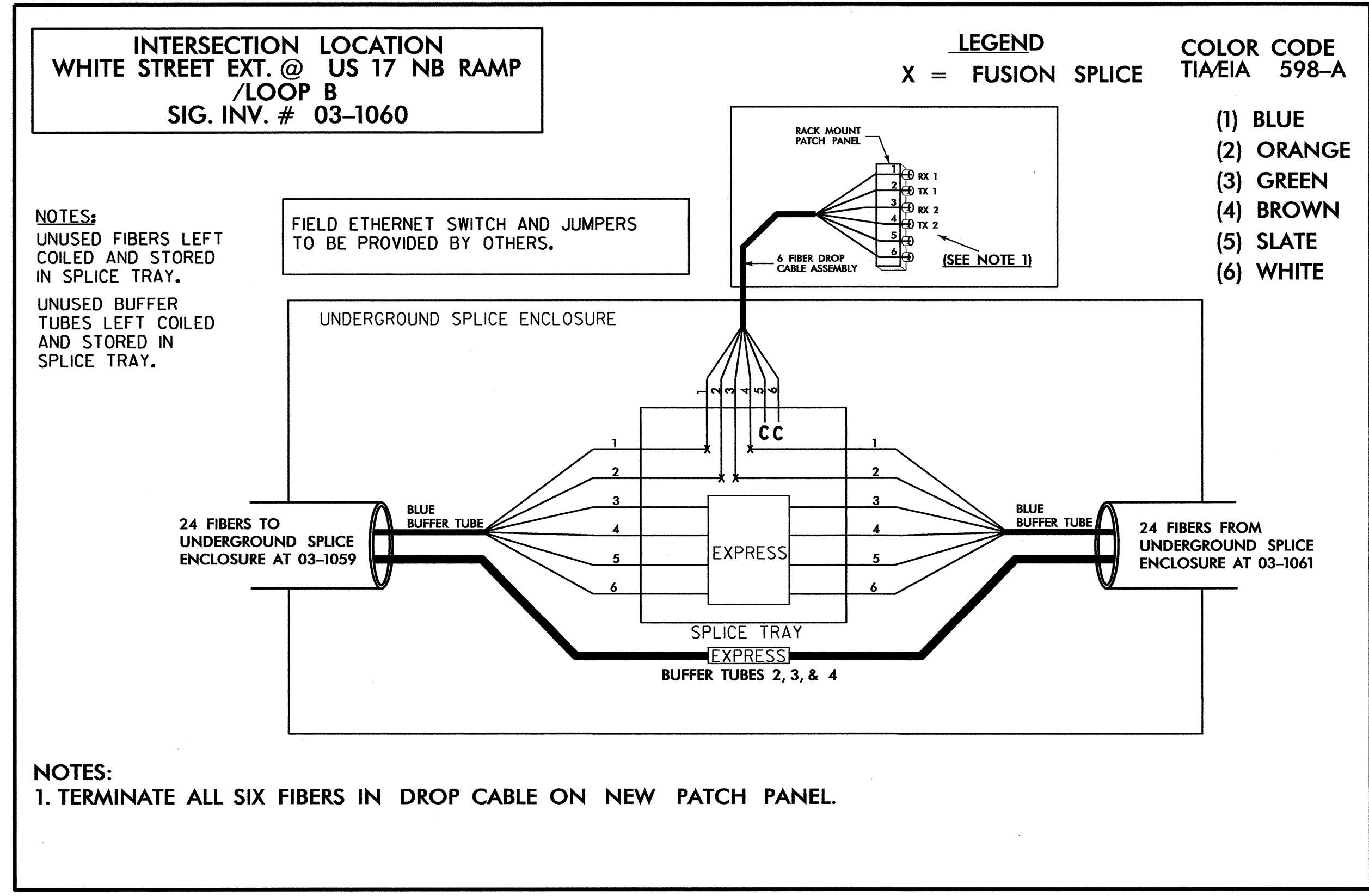
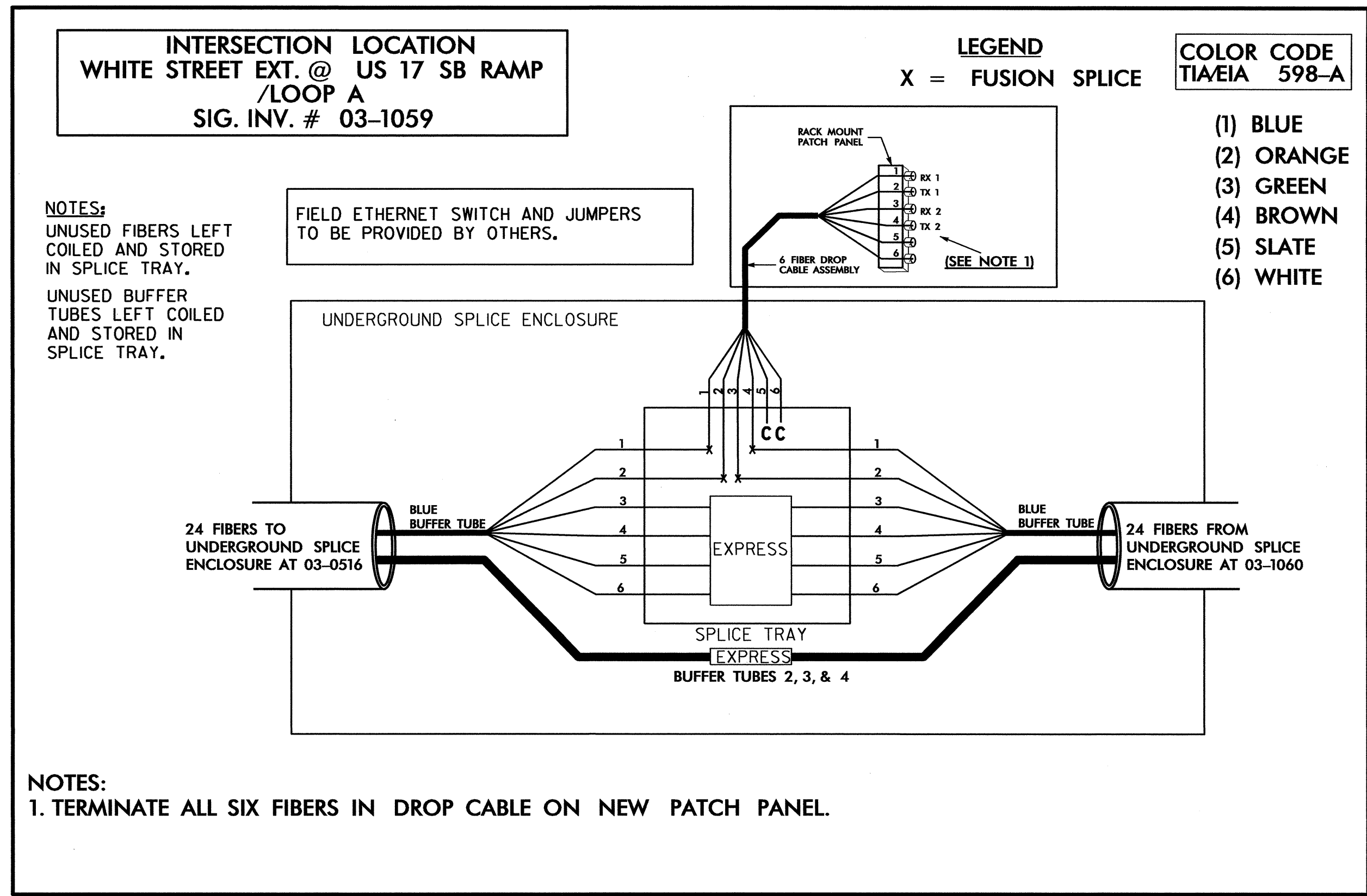
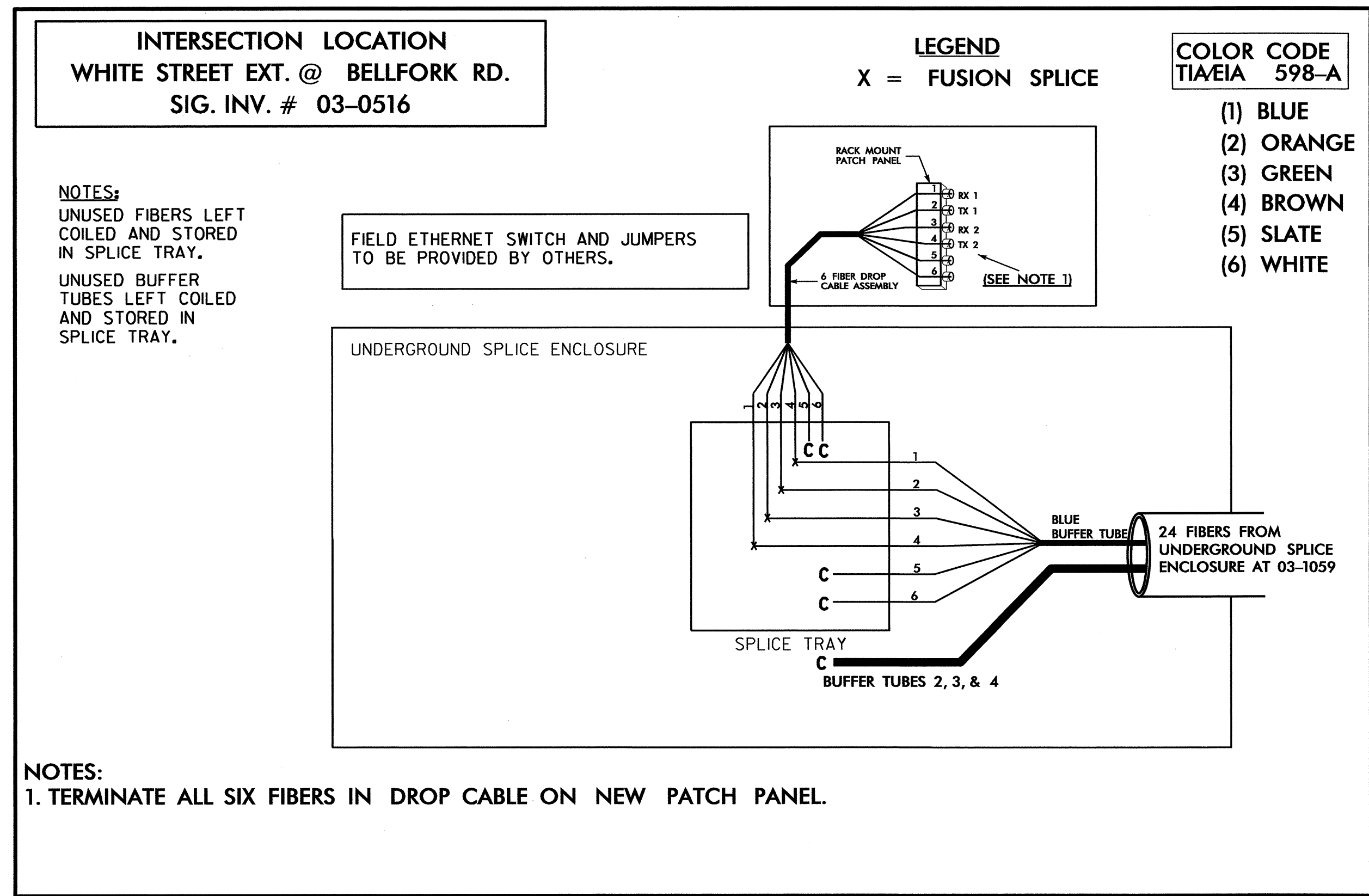
<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>CONDUIT AND CABLE ROUTING PLAN ALONG WHITE STREET EXT. FROM BELL FORK RD. TO WESTERN BLVD.</p>			
	<p>DIVISION 3 ONSLOW CO. JACKSONVILLE</p>			
	<p>PLAN DATE: MARCH 2011</p>	<p>REVIEWED BY: I.N. AVERY</p>		
	<p>PREPARED BY: HEIDI T. BERGGREN</p>	<p>REVIEWED BY: G.A. FULLER, PE</p>		
<p>SCALE 0</p>	<p>REVISIONS</p>	<p>INIT. DATE</p>	<p>SEAL</p>	
<p>Signature: <i>Gregory A. Fuller</i> 3/22/11 DATE</p>			<p>CADD File name:</p>	



- NOTES:
1. STORE 60' OF SPARE FIBER OPTIC CABLE.
 2. SEAL ALL CONDUITS ENTERING CABINET BASES.
 3. FIELD ETHERNET SWITCH AND JUMPERS TO BE PROVIDED BY OTHERS.

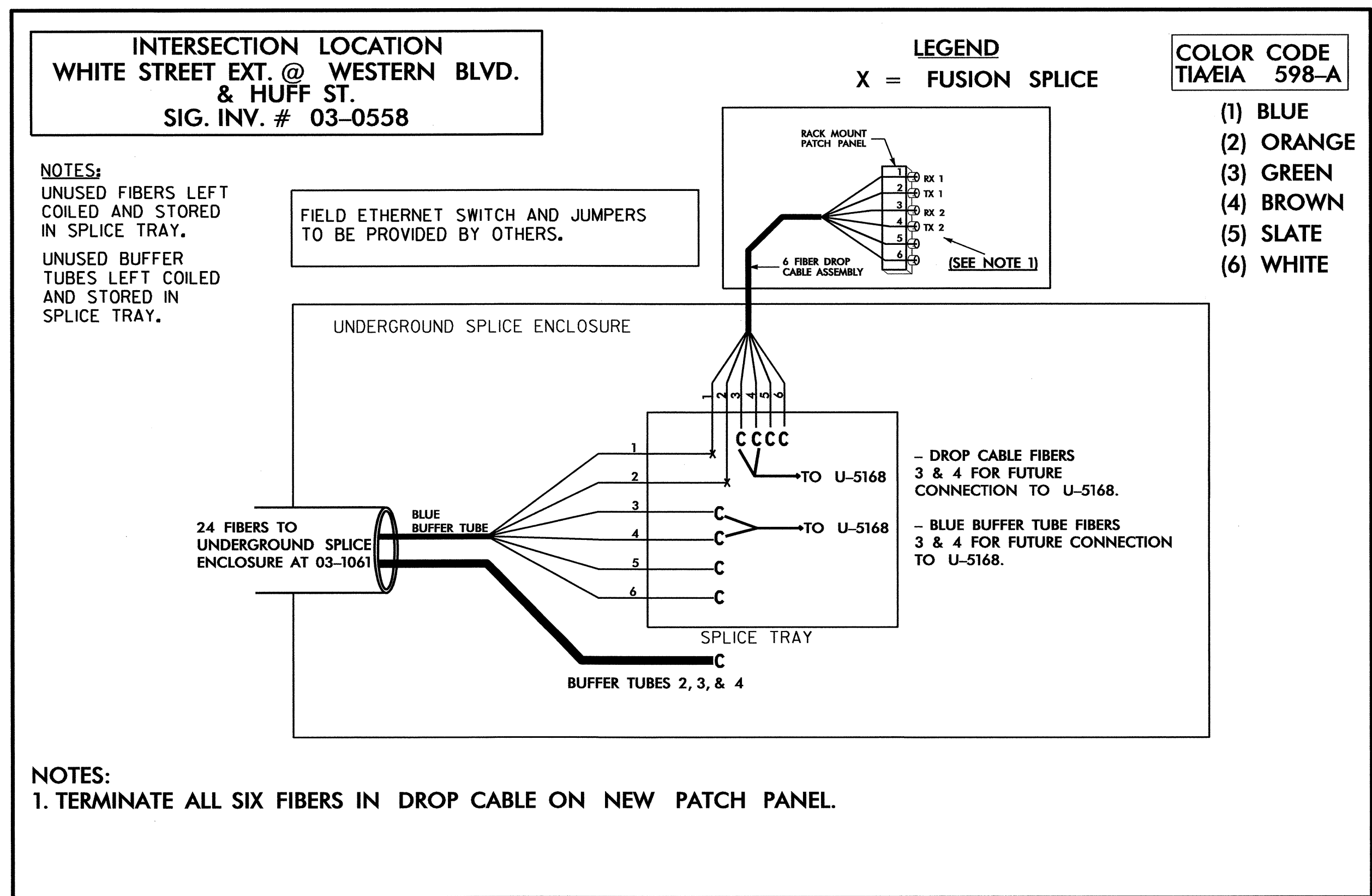
	Prepared in the Offices of: Heidi T. Berggren Professional Engineer License No. 023919		SEAL
	CONDUIT AND CABLE ROUTING PLAN ALONG WHITE STREET EXT. FROM BELL FORK RD. TO WESTERN BLVD. DIVISION 3 ONSLOW CO. JACKSONVILLE		
750 N. Greenfield Pkwy., Garner, NC 27529	PLAN DATE: MARCH 2011 PREPARED BY: HEIDI T. BERGGREN	REVIEWED BY: I.N. AVERY REVIEWED BY: G.A. FULLER, PE	REVISIONS INIT. DATE
SCALE 	REVISIONS INIT. DATE		SIGNATURE 3/22/11 DATE

FIBER OPTIC CABLE



<p>Prepared in the Offices of:</p> <p>122 N. McDowell St., Raleigh, NC 27603</p>	<p>SPLICE DETAIL WHITE STREET EXTENSION</p> <p>DIVISION: 3 ONSLOW JACKSONVILLE</p> <p>PLAN DATE: MARCH 2011 REVIEWED BY: I. N. AVERY</p> <p>PREPARED BY: HEIDI T. BERGGREN REVIEWED BY: G. A. FULLER, PE</p>	<p>SEAL</p>								
<p>SCALE</p> <p>0</p> <p>N/A</p>	<p>REVISIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	DATE	INIT.	DATE					<p>SIGNATURE</p> <p><i>Gregory A. Fuller</i> 3-22-11</p> <p>DATE</p>
NO.	DATE	INIT.	DATE							

FIBER OPTIC CABLE

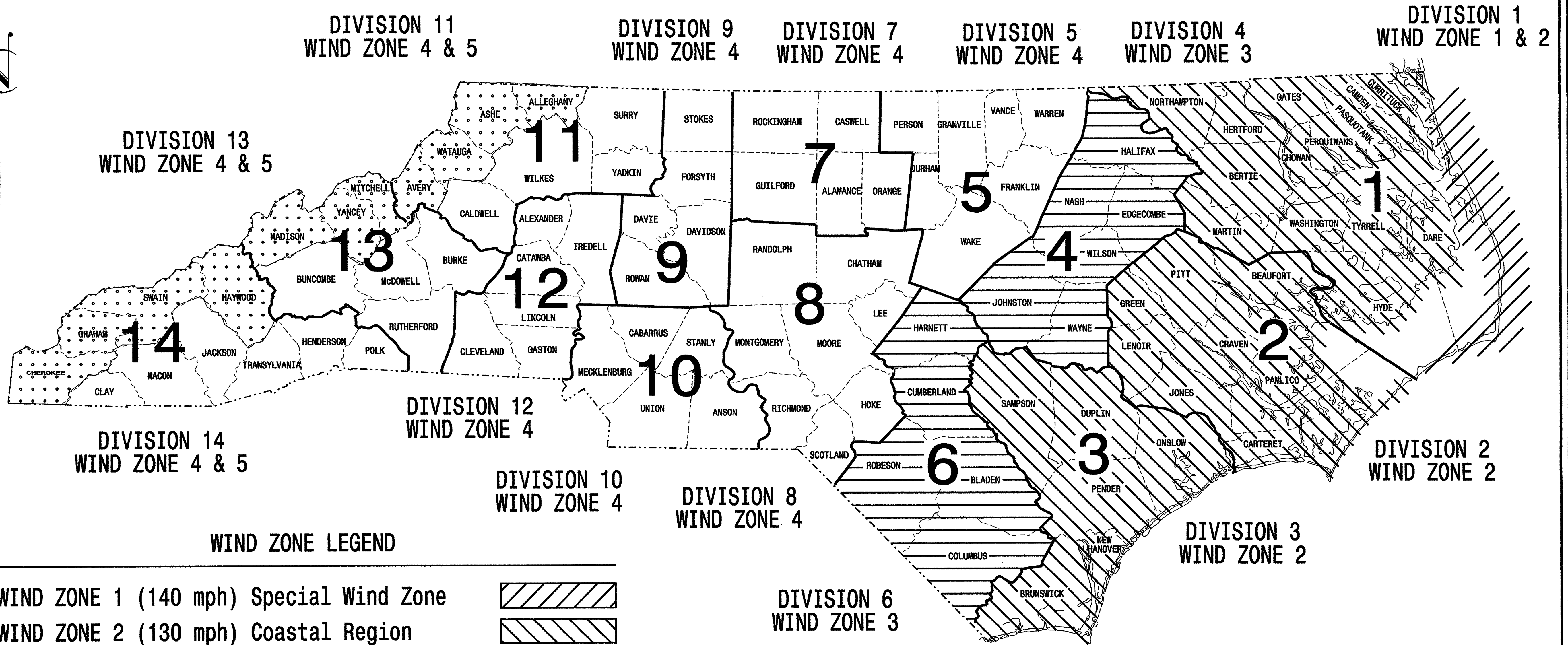


<p style="font-size: small;">Prepared in the Office of:</p> <p style="font-size: x-small;">122 N. McDowell St., Raleigh, NC 27603</p>	<p>SPLICE DETAIL WHITE STREET EXTENSION</p> <p>DIVISION: 3 ONSLOW JACKSONVILLE</p> <p>PLAN DATE: MARCH 2011 REVIEWED BY: I. N. AVERY</p> <p>PREPARED BY: HEIDI T. BERGGREN REVIEWED BY: G. A. FULLER, PE</p>	<p>SEAL</p>									
<p>SCALE</p> <p>0</p> <p>N/A</p>	<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <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>SIGNATURE: <i>Gregory A. Fuller</i> DATE: 3-22-11</p> <p style="font-size: x-small;">CADD File Name: _____</p>
REVISIONS	INIT.	DATE									

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	PROJECT NO.	SHEET NO.
N.C.	U-4007A	Sig. 38
F.A. PROJ. NO.		M 1
PROJECT ID. NO.		

STANDARD DRAWINGS FOR METAL POLES

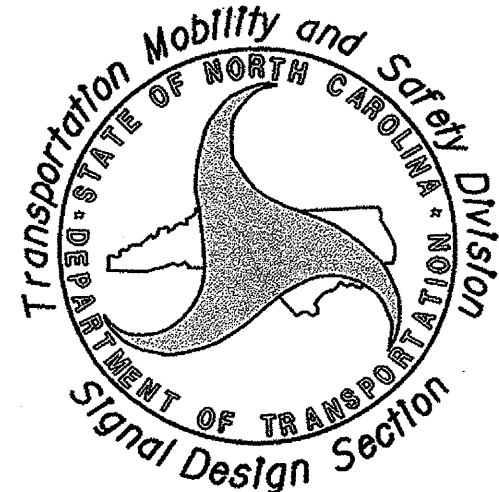


WIND ZONE LEGEND

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/ITSS/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

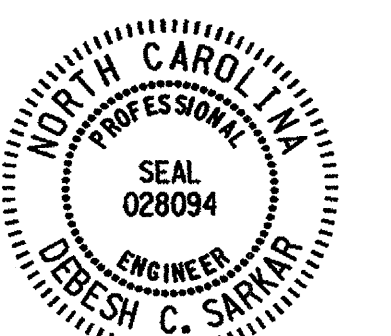
DRAWING NUMBER	DESCRIPTION
M 1	Title Sheet
M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8	Standard Strain Poles

NCDOT CONTACTS:

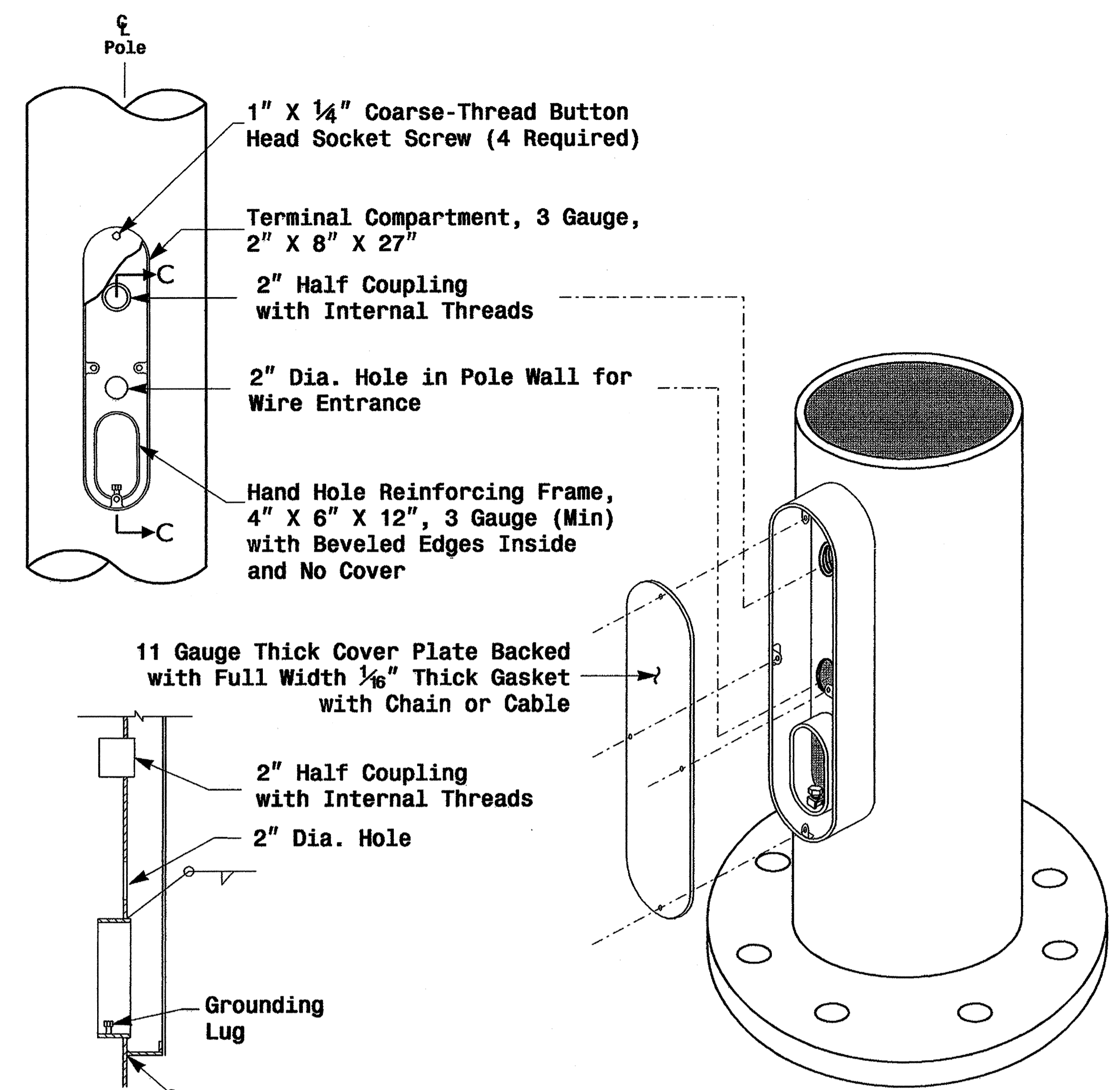
MOBILITY AND SAFETY DIVISION - ITS and SIGNALS UNIT

- 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

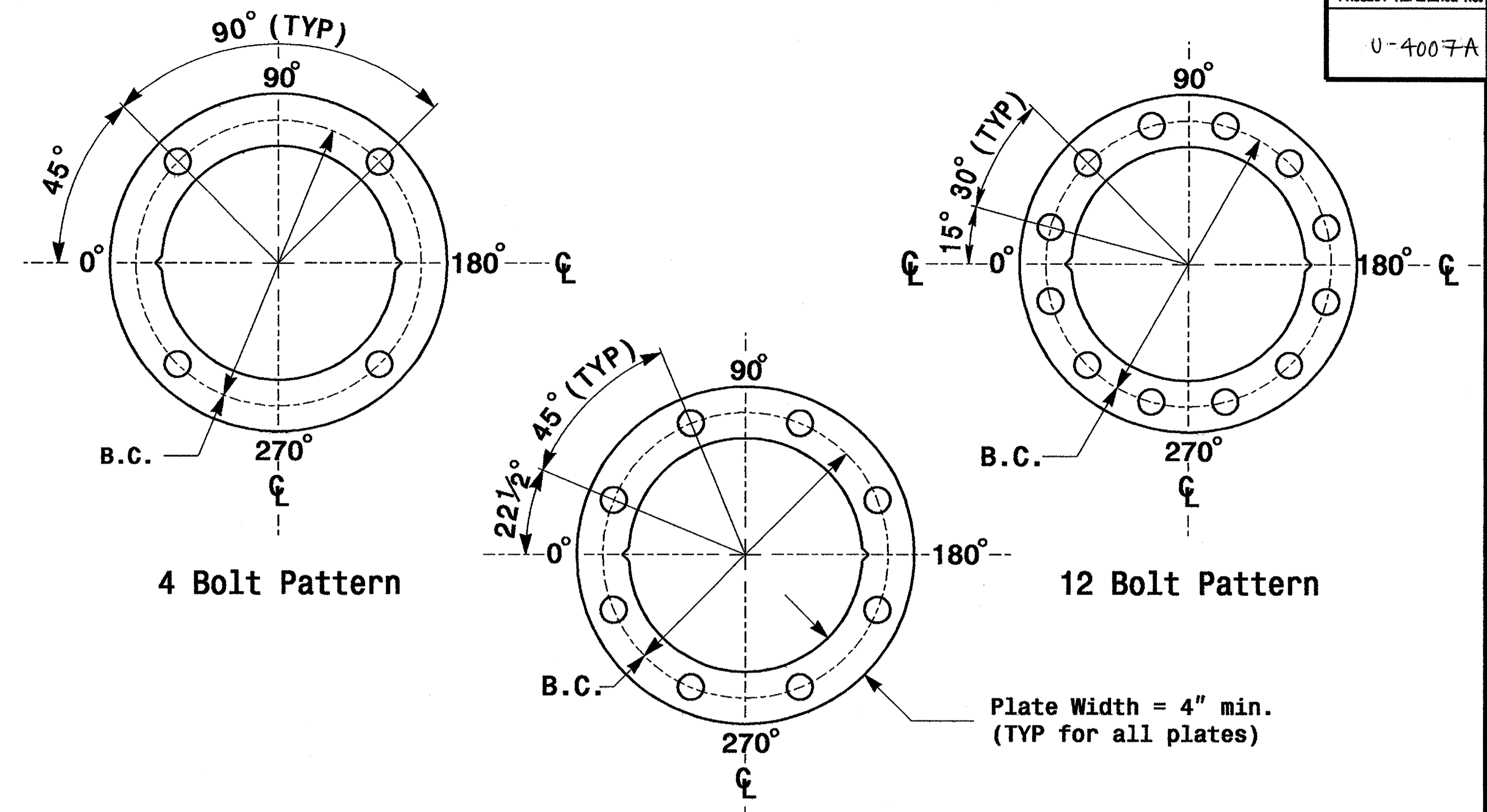


D. Sarkar 7.26.2009
SIGNATURE DATE



Section C-C 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 _____	

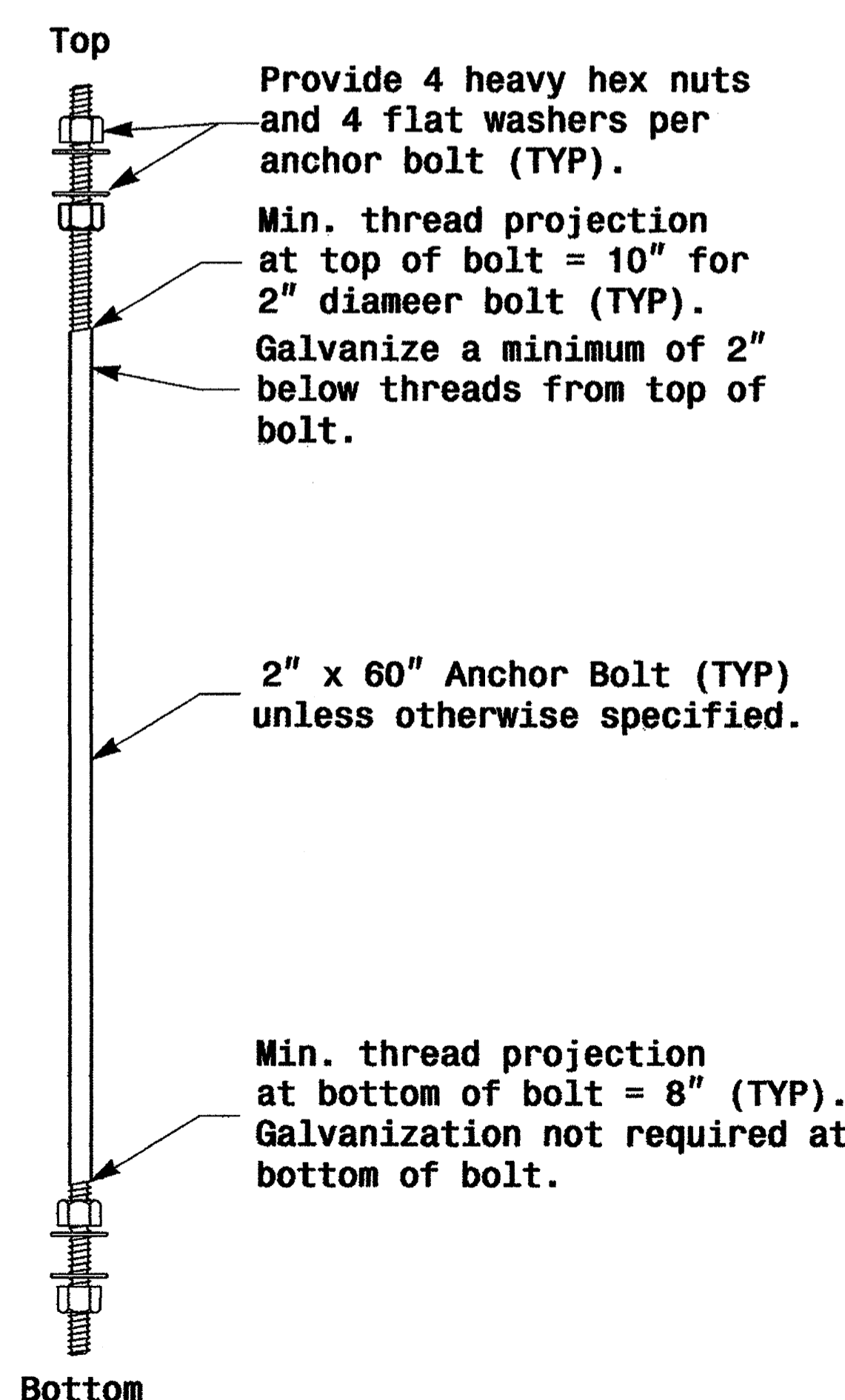
MFG _____	MFG. DATE: MM/YY _____
SECTION D/T/L/Y _____	
NCDOT STANDARD _____	

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

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

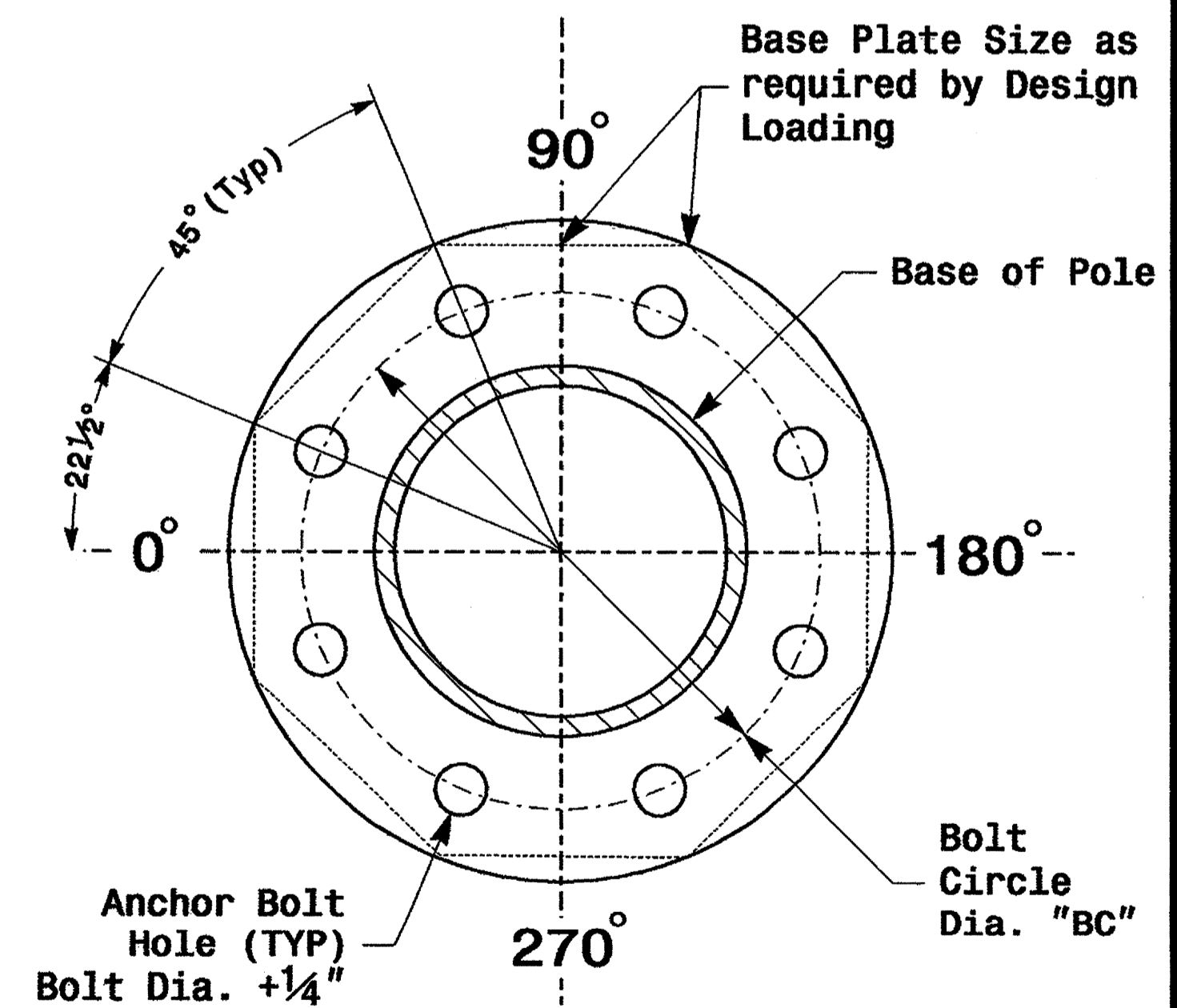
- Notes:
- 1) D= Diameter, T= Thickness, L= Length, Y= Yield Strength
 - 2) A.B. = Anchor Bolt
 - 3) B.C. = Bolt Circle of Anchor Bolts
 - 4) If Custom Design, use "NCDOT STANDARD" line for plan pole I.D.
 - 5) See drawing M4 for mounting positions of I.D. tags.

Identification Tag Details



Anchor Bolt Detail

Note: See Strain Pole drawing M3 and Mast arm drawing M4 for base plate weld details.

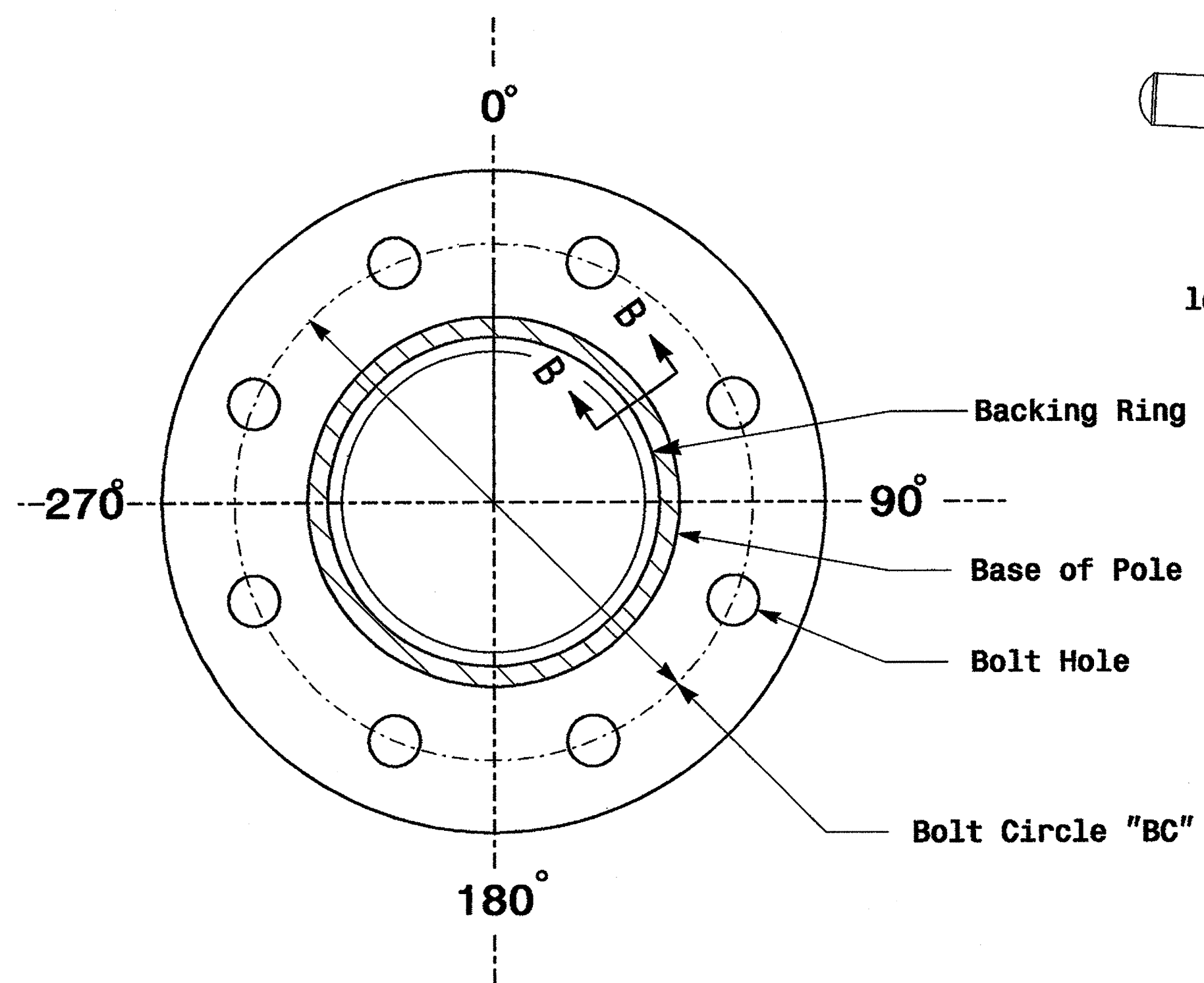


8 Bolt Base Plate Detail

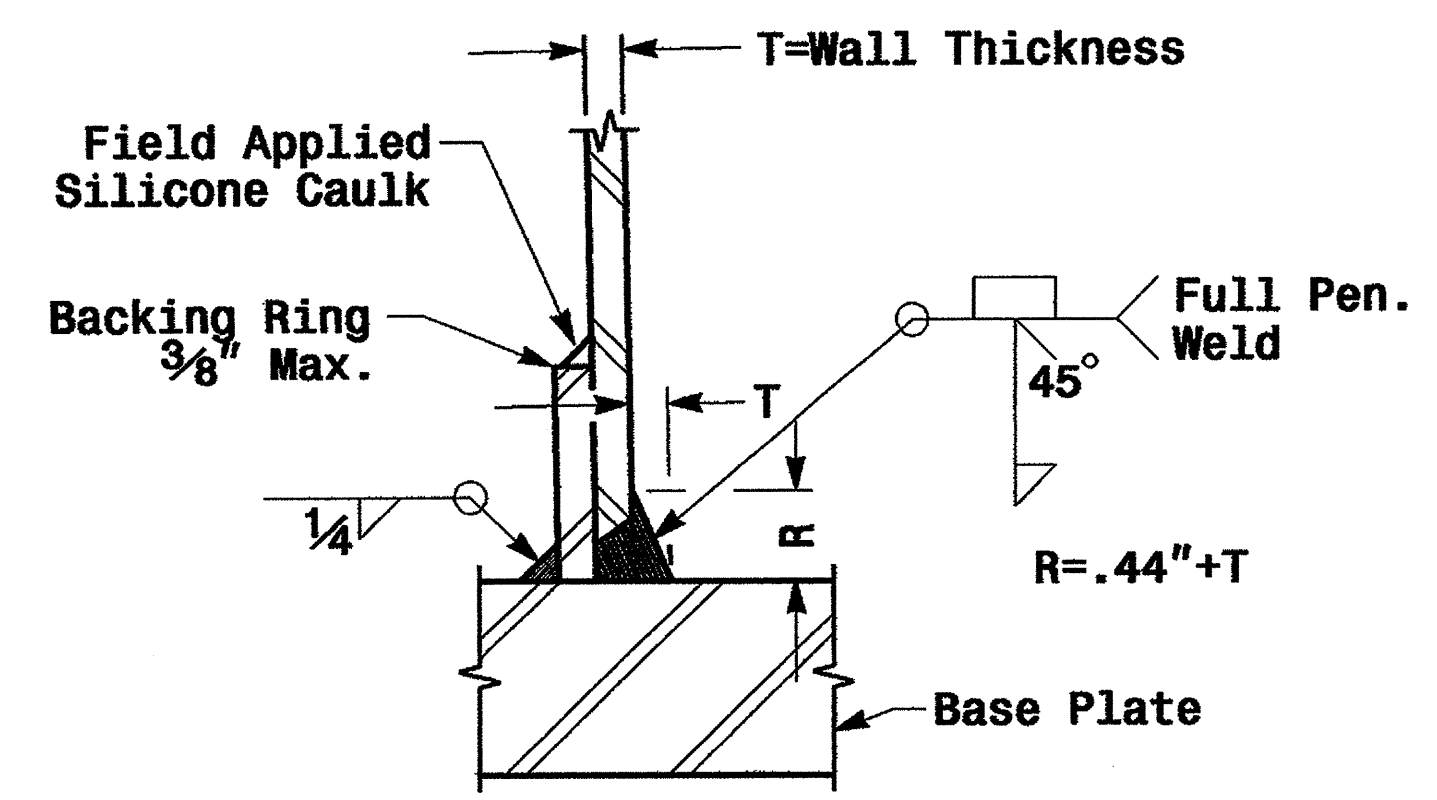
	Typical Fabrication Details Common To All Metal Poles		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander SCALE: 0 NA NONE	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito REVISIONS: _____ INIT. DATE: _____	

Fabrication Details - All Poles

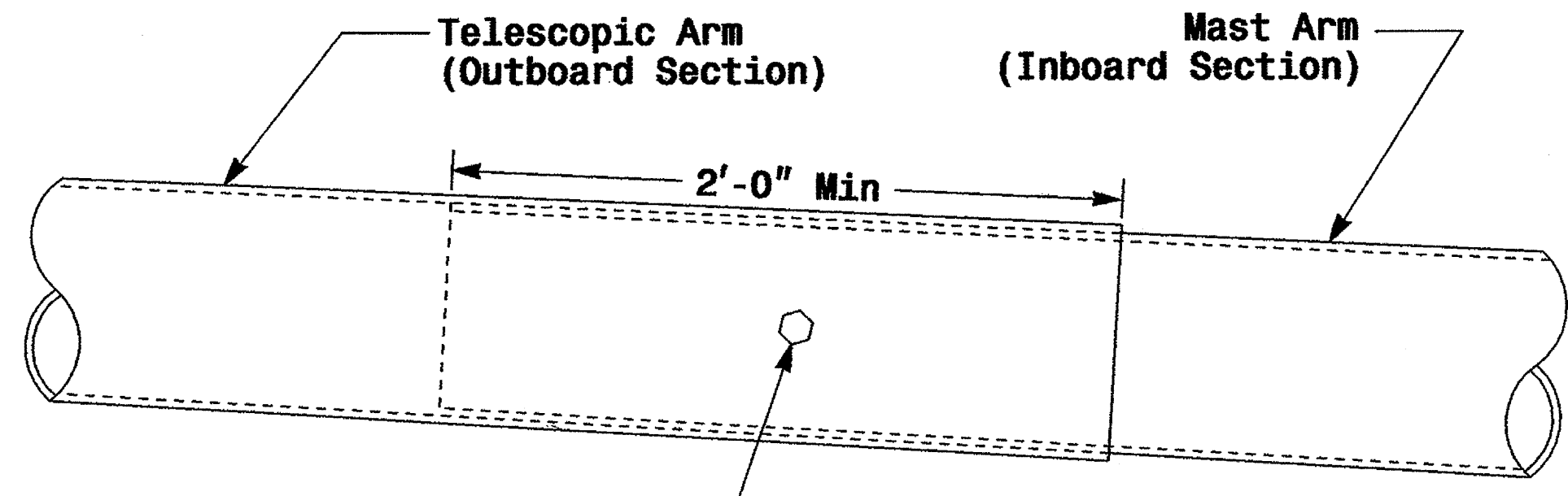
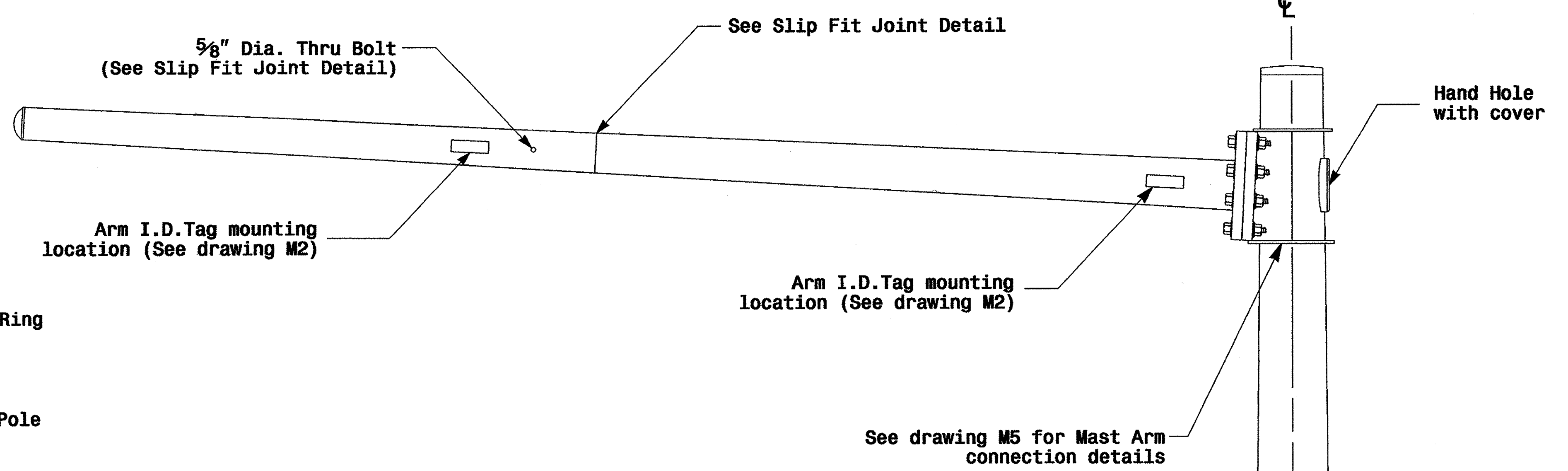
01-SEP-2005 18:22 D:\2004_Metal Pole Standard\as04.m2 thru m5.dgn c:\andrews



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

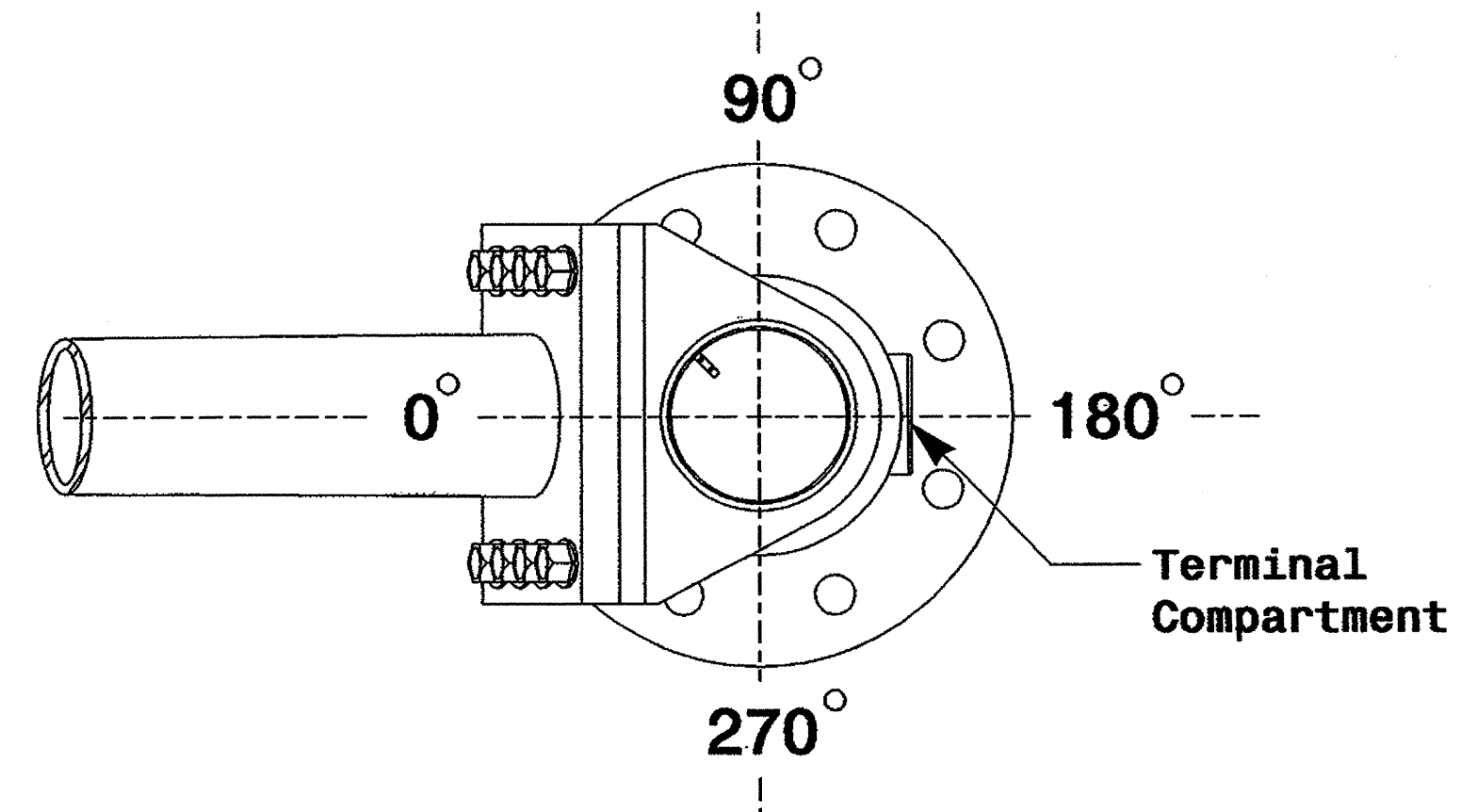


Section B-B
 (Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail

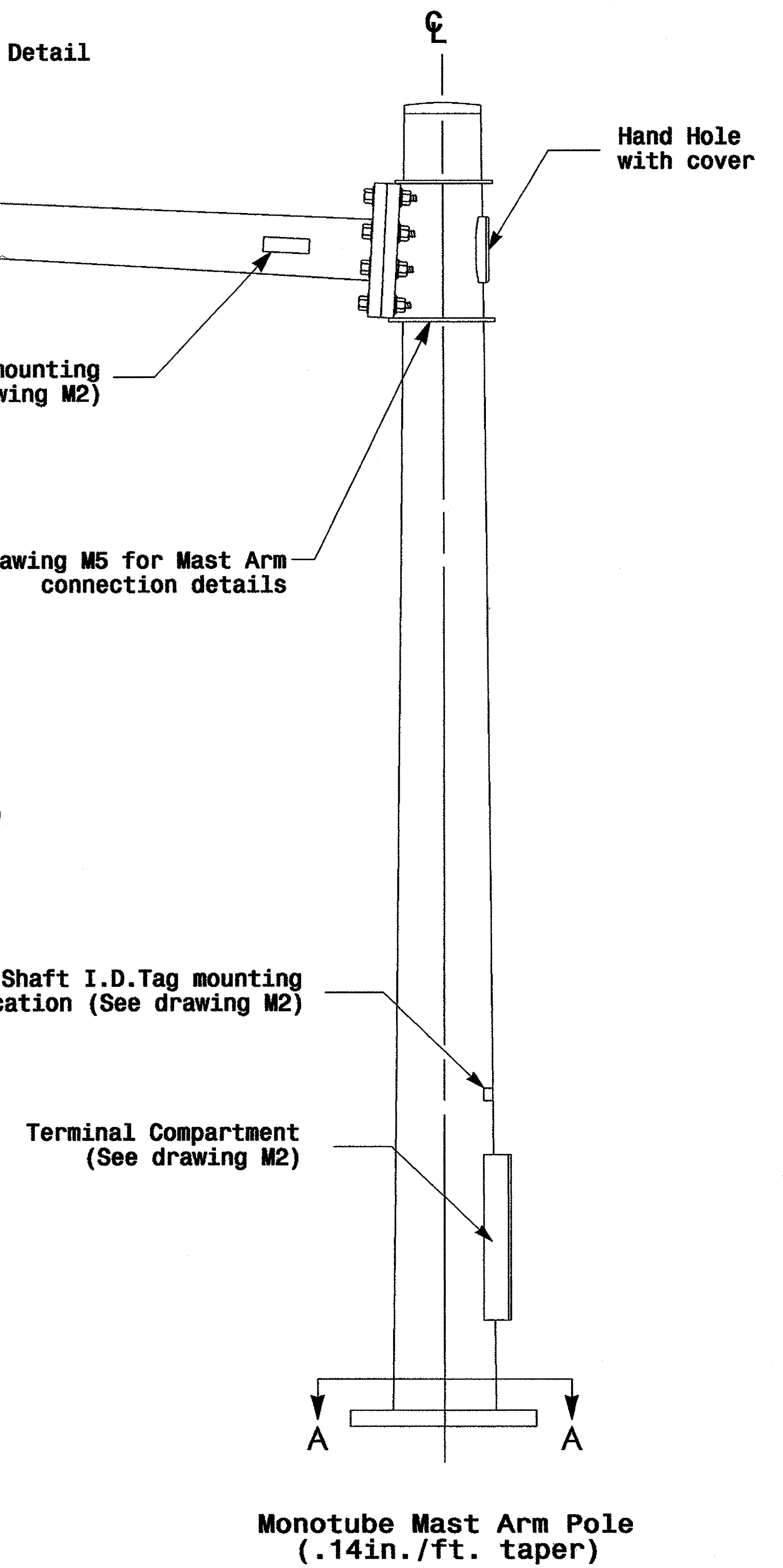


3/4" Factory Drilled Hole in Outboard Tube. Field Drill Inboard Tube.
 5/8" Galvanized Thru Stud with (2) Hex. Locknuts Ea.

Slip Fit Joint Detail for Mast Arm



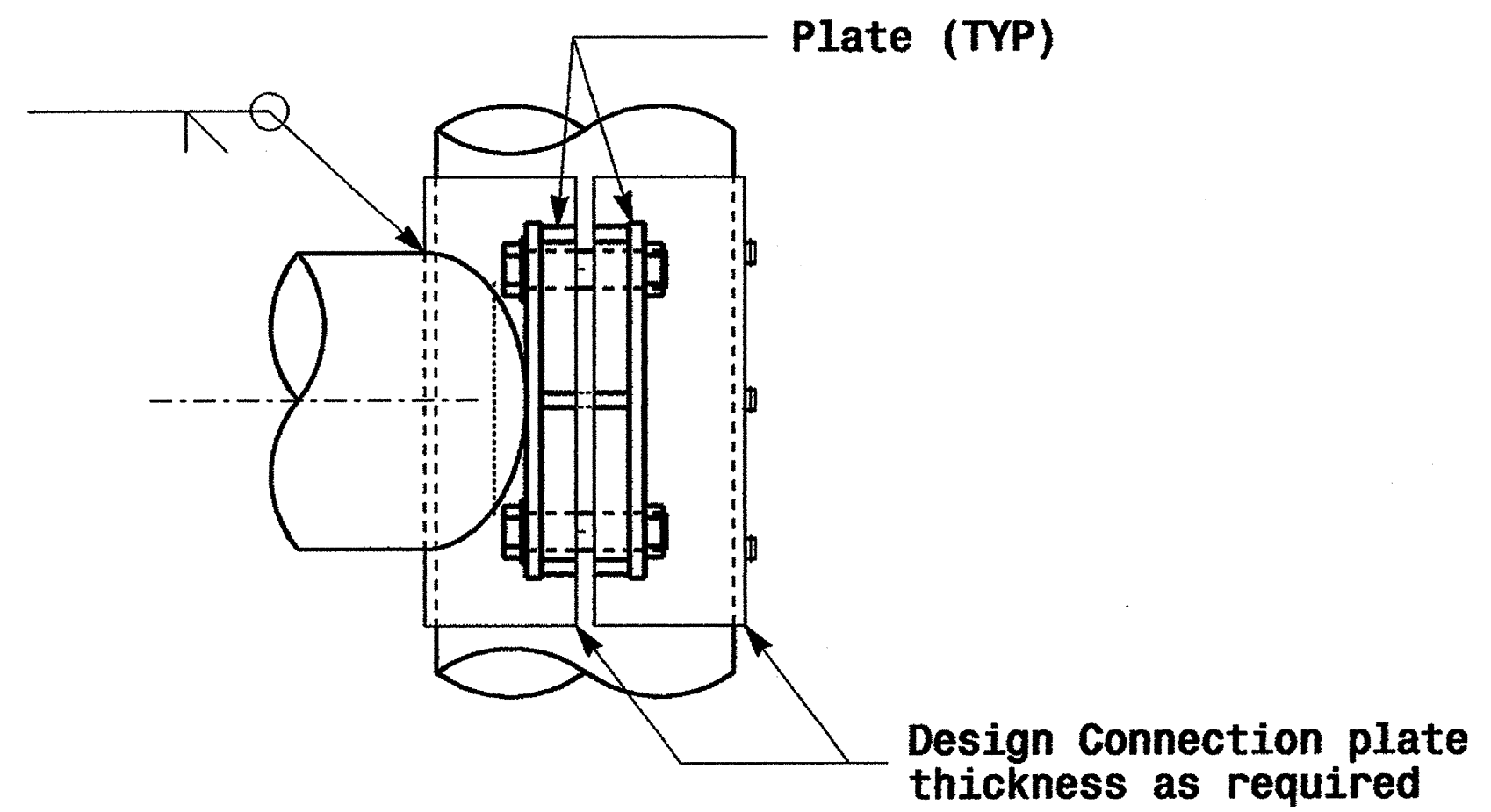
Mast Arm Radial Orientation



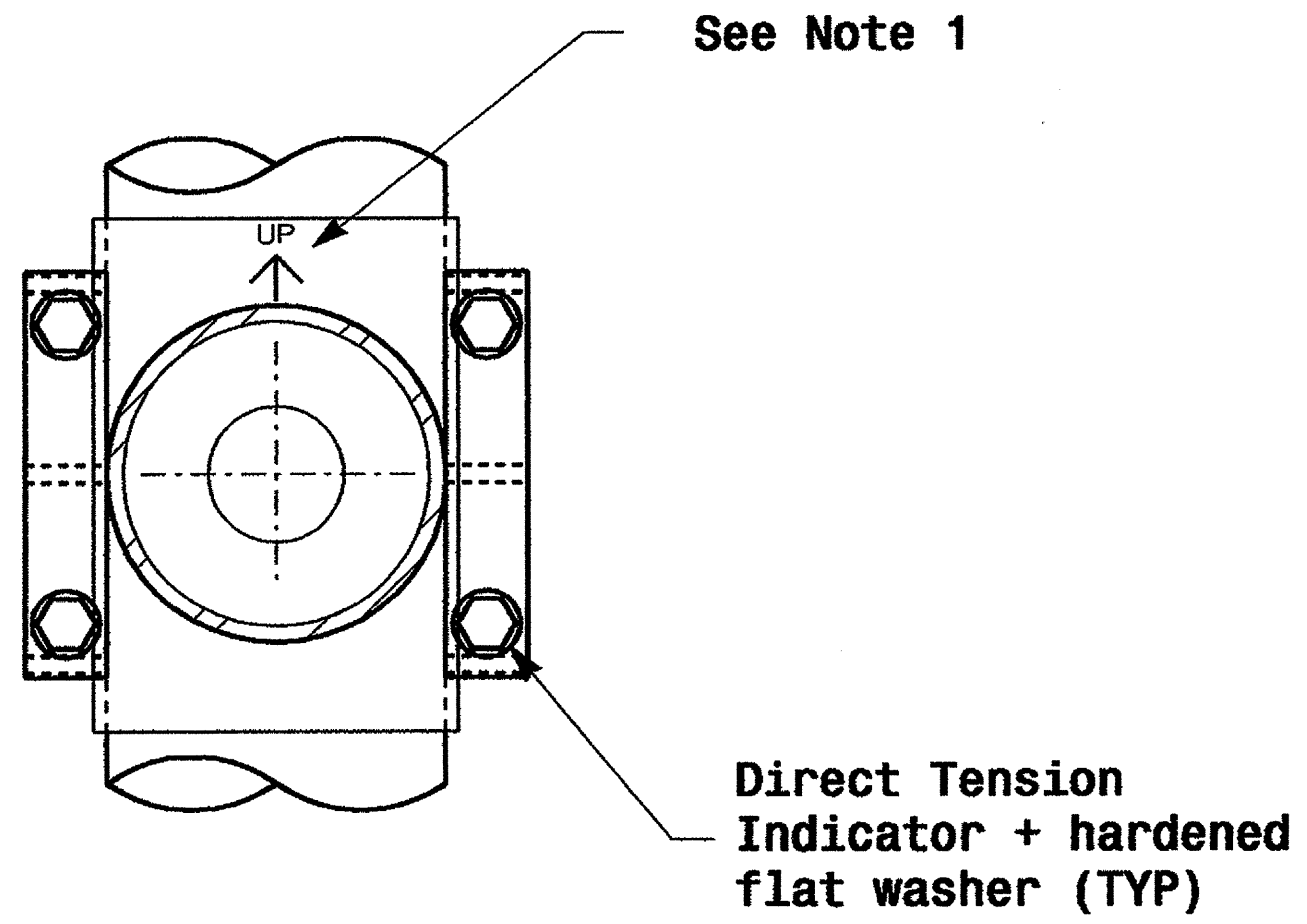
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 w:\p\expl\ee-un\1\rev\kg\groups\2004\metal pole st\stndrds\2004 m1.dgn
 pdl alexander

	Typical Fabrication Details for Mast Arm Poles	
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander SCALE: NONE	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito REVISIONS: _____ INIT. DATE: _____
222 N. McDowell St., Raleigh, NC 27603		SEAL 9.2.2005 DATE SIG. INVENTORY NO.

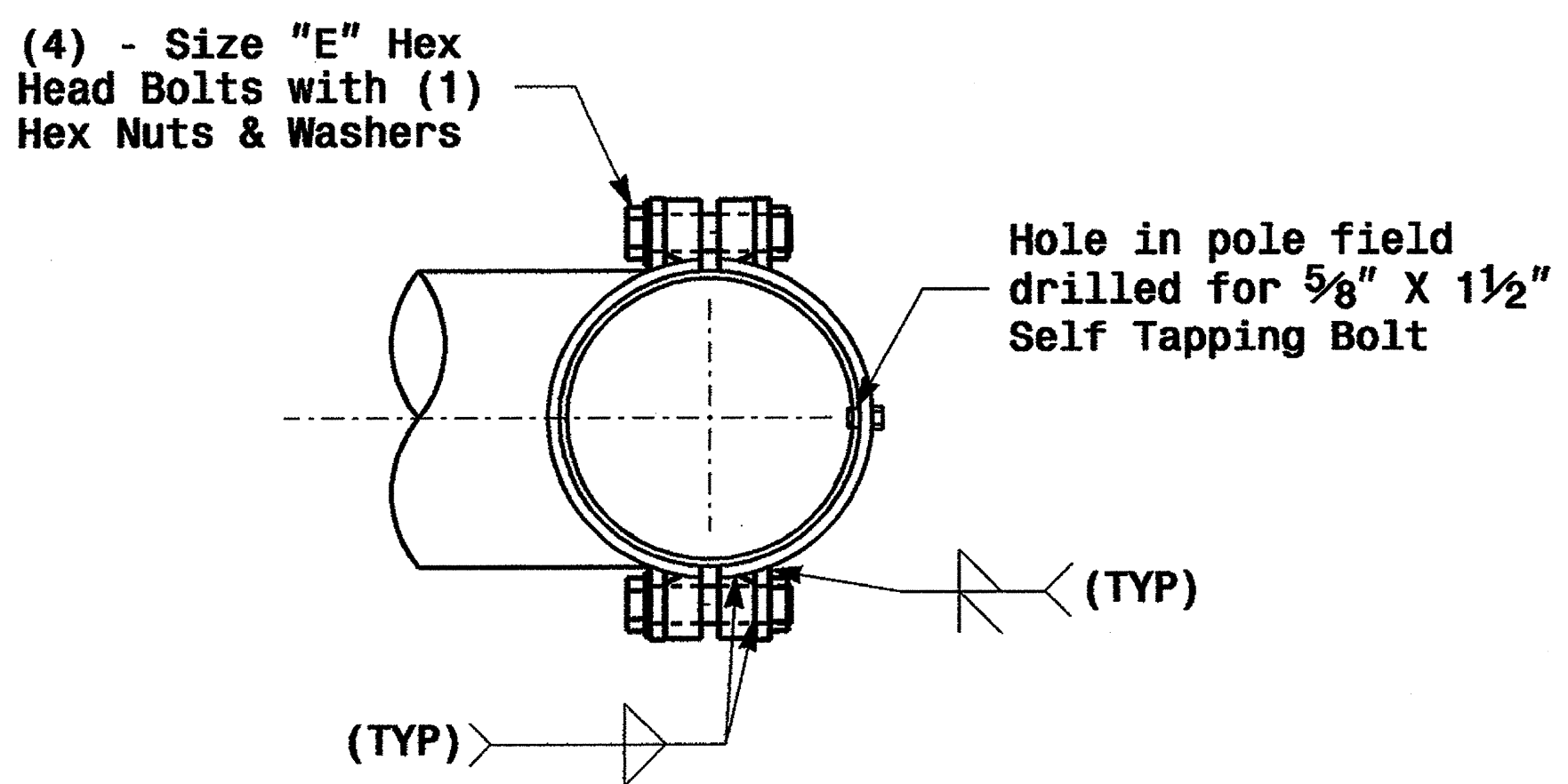
Adjustable Clamp Type Bolted Mast Arm Connection



Side Elevation View

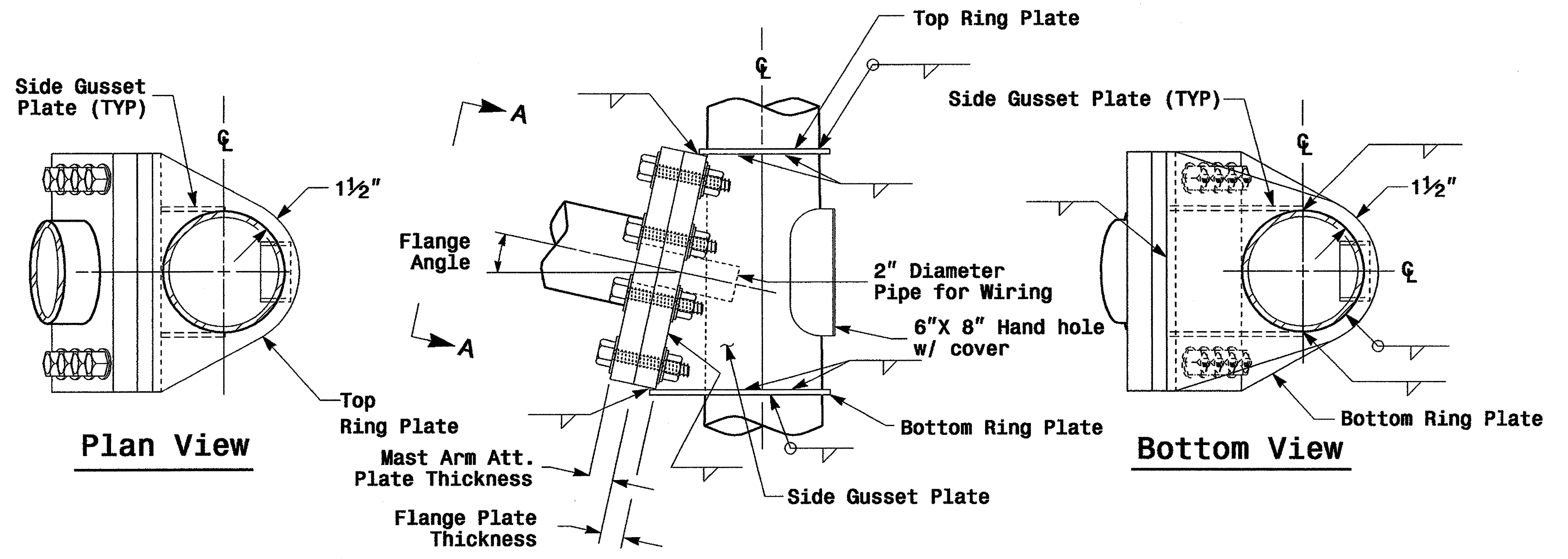


Front Elevation View



Plan View

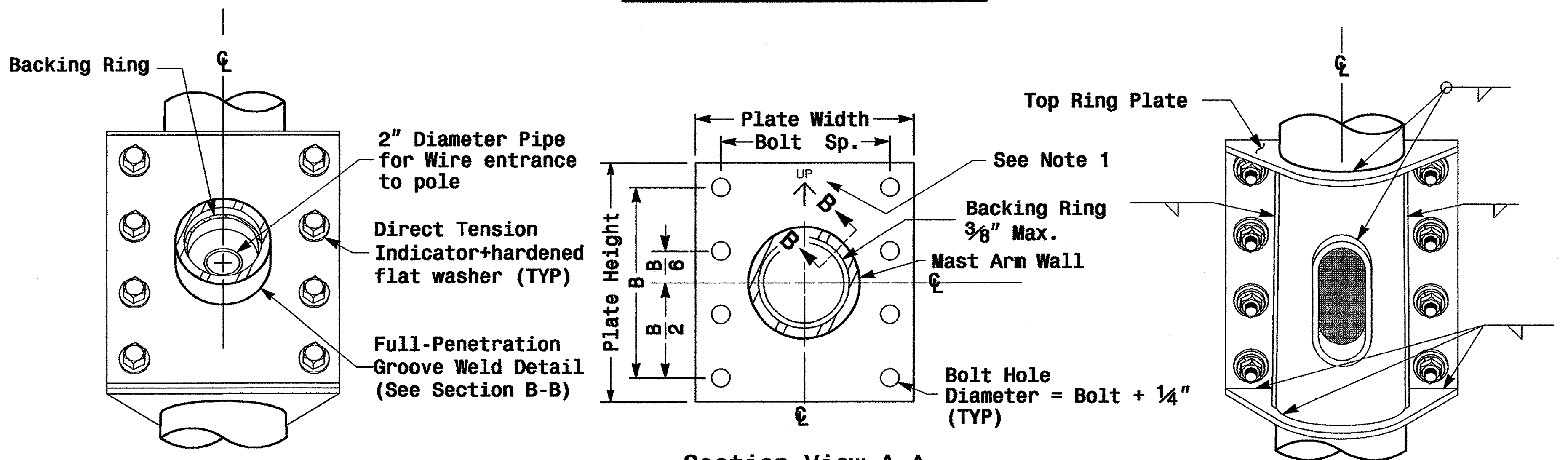
Welded Ring Stiffened Mast Arm Connection



Plan View

Side Elevation View

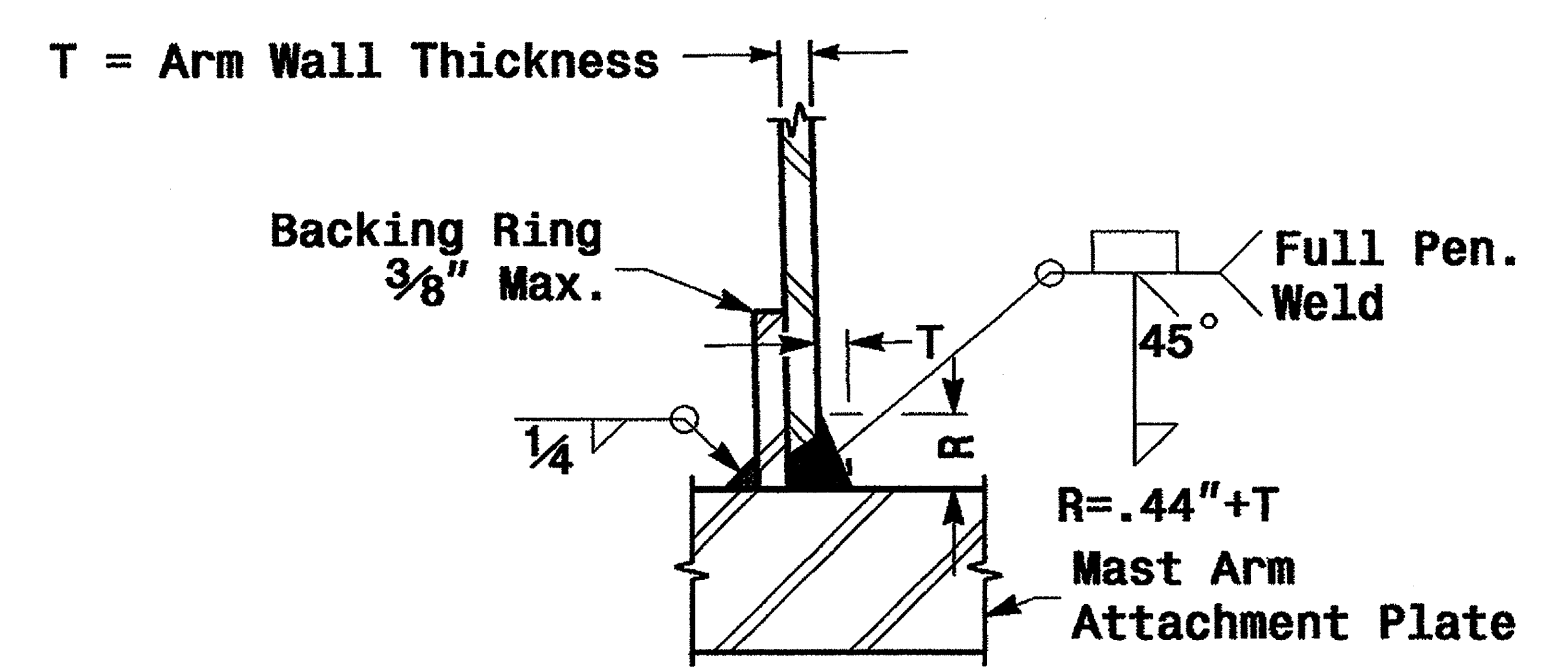
Bottom View



Front Elevation View

Mast Arm Attachment Plate

Back Elevation View



Section B-B
Full-Penetration Groove Weld Detail

Notes:

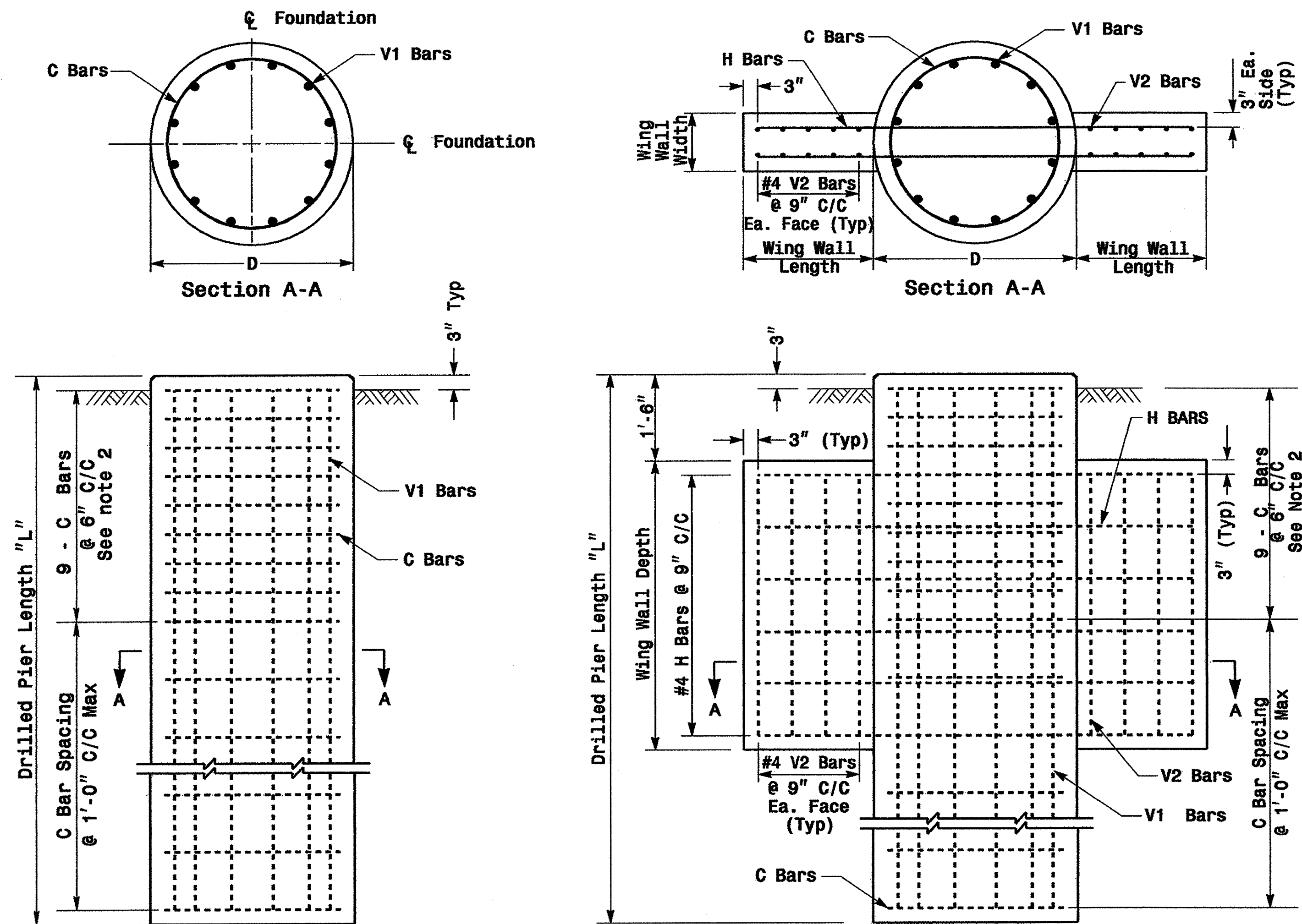
1. Provide a permanent means of identification above the mast arm to indicate proper attachment orientation of the mast arm.
2. Designer will determine the size of all structural components, plates, fasteners, and welds shown unless they are already specified.
3. Designer is responsible for providing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

	Fabrication Details For Mast Arm Connection To Pole		
	PLAN DATE: May 2005 PREPARED BY: P.L. Alexander SCALE: NA NONE	REVIEWED BY: C.F. Andrews REVIEWED BY: A.M. Esposito REVISIONS: _____ INIT. DATE	

01-SEP-2005 14:11
 v:\p001\p001\workgroups\004_metal_pole_etc\std\ds004_m5.dgn
 P.L. Alexander

Fabrication Details - Mast Arm Poles

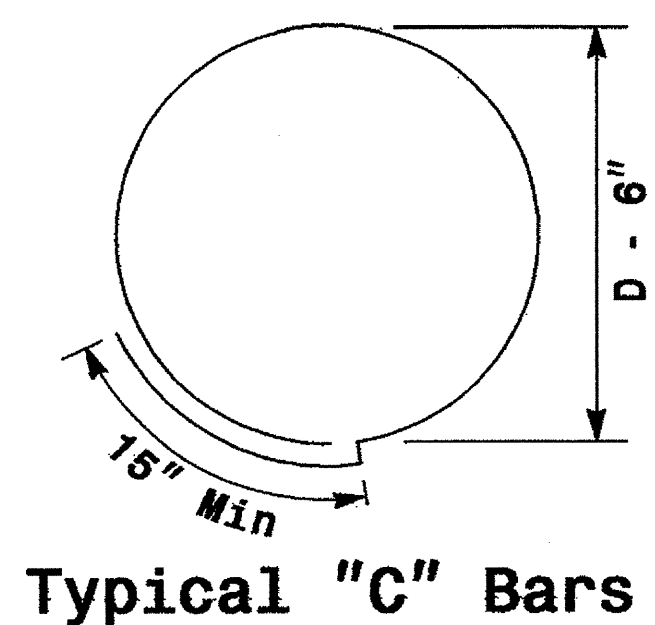
Reinforcing Steel Bars



REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (42" & 48" DIAMETER)

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

REINFORCING STEEL TABLE FOR STANDARD 42" and 48" DRILL PIER SHAFT WITH TYPE 1 AND TYPE 2 WING WALLS

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

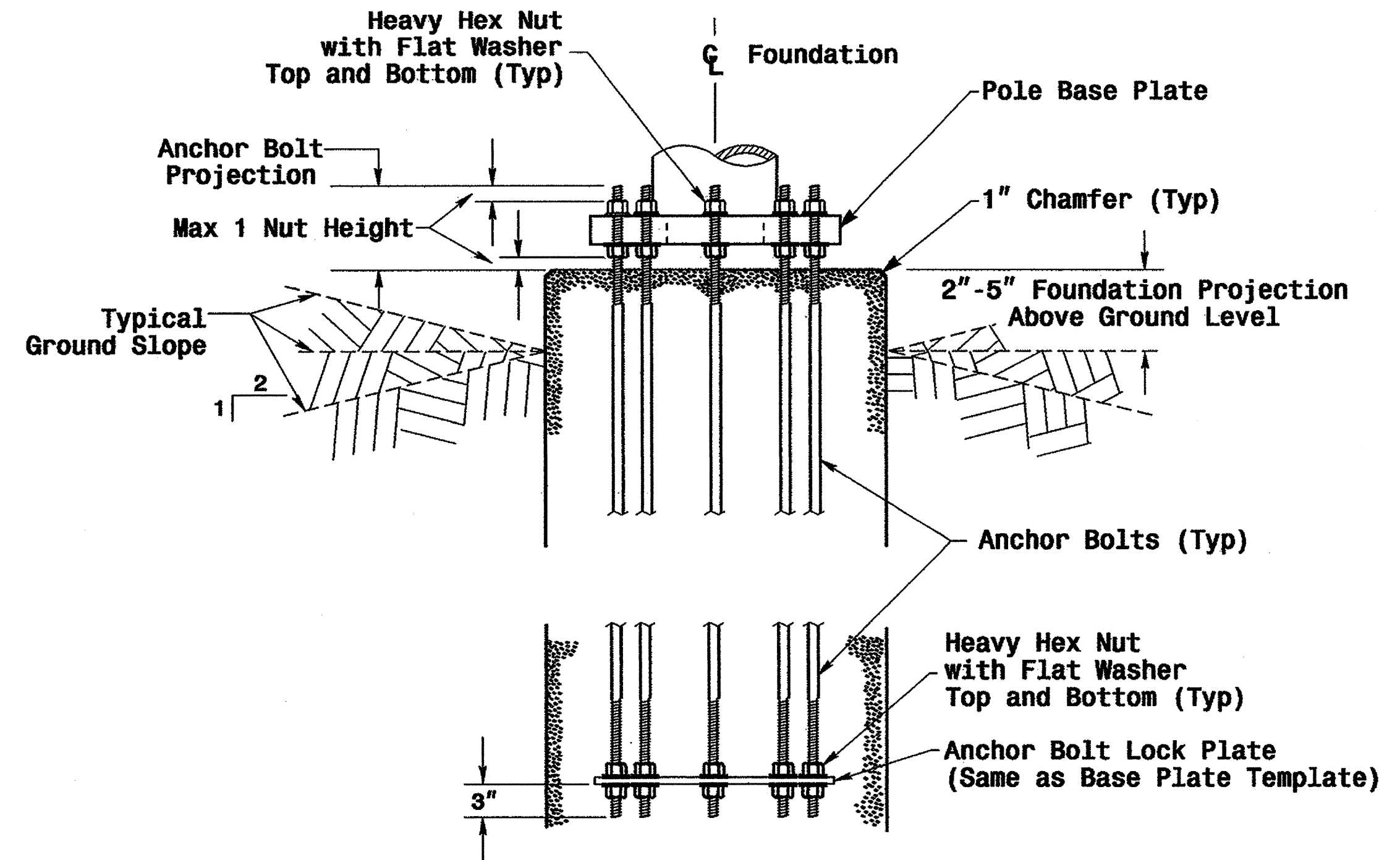
WING WALL DETAILS

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

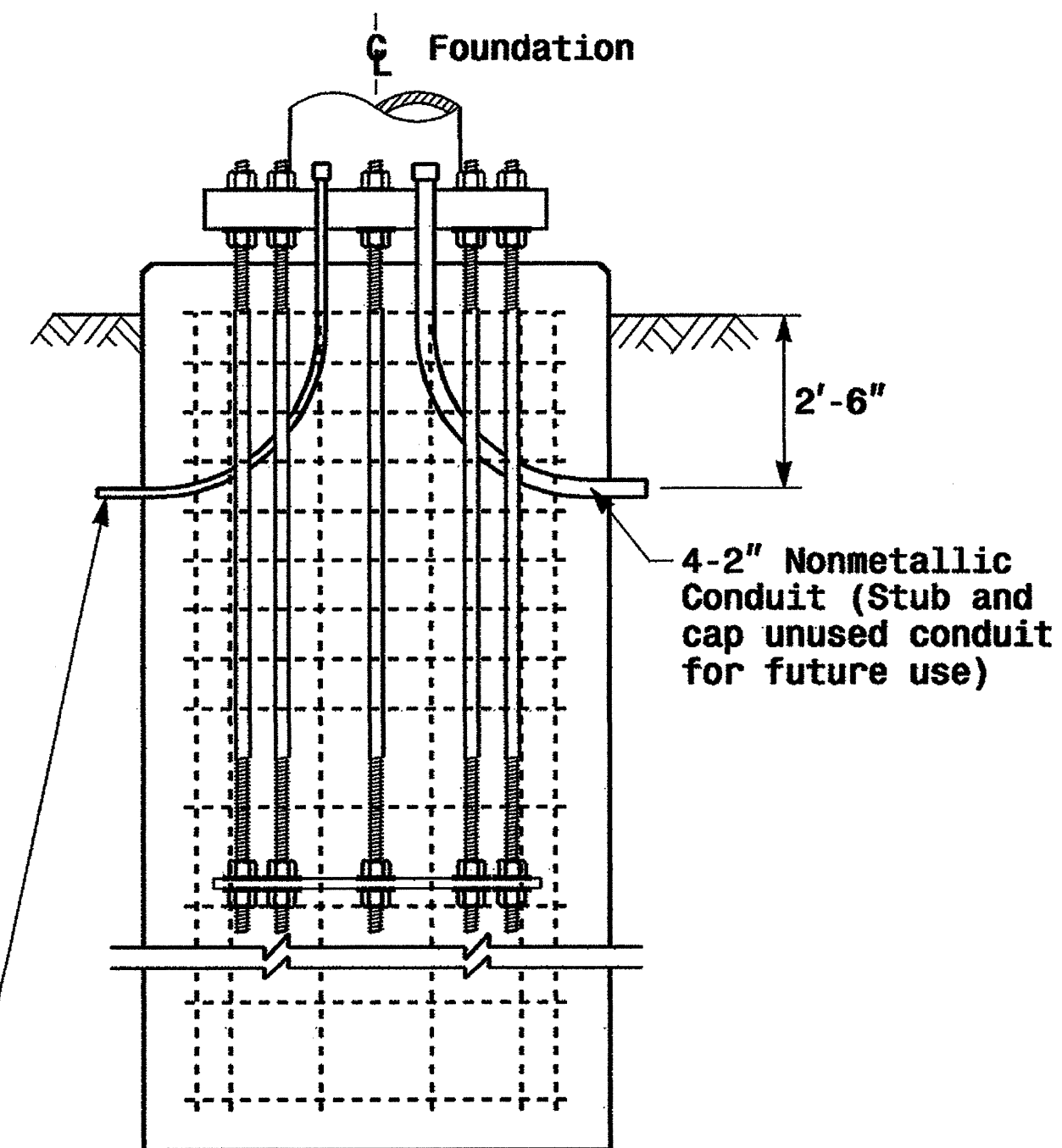
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



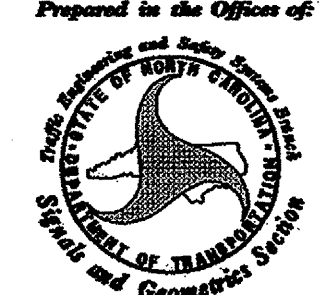
2-1" Nonmetallic Conduits for Electrical Service and Grounding Electrode Conductor

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

01-SEP-2005 11:48 v:\peopl\es-un\l\workgroups\2004\meral\pole\standards\sig42\04 ar.dgn pal alexander

Prepared in the Office of:

Construction Details Foundations
 PLAN DATE: May 2005 REVIEWED BY: P.L. ALEXANDER
 PREPARED BY: C.F. ANDREWS REVIEWED BY: A.M. ESPOSITO
 SCALE: NONE
 SIGNATURE: *D. Sarkar* 9.2.2005
 DATE: 9.2.2005
 SIG. INVENTORY NO.

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

11-08

INDUCTIVE DETECTION LOOPS
ENGLISH DETAIL DRAWING FOR

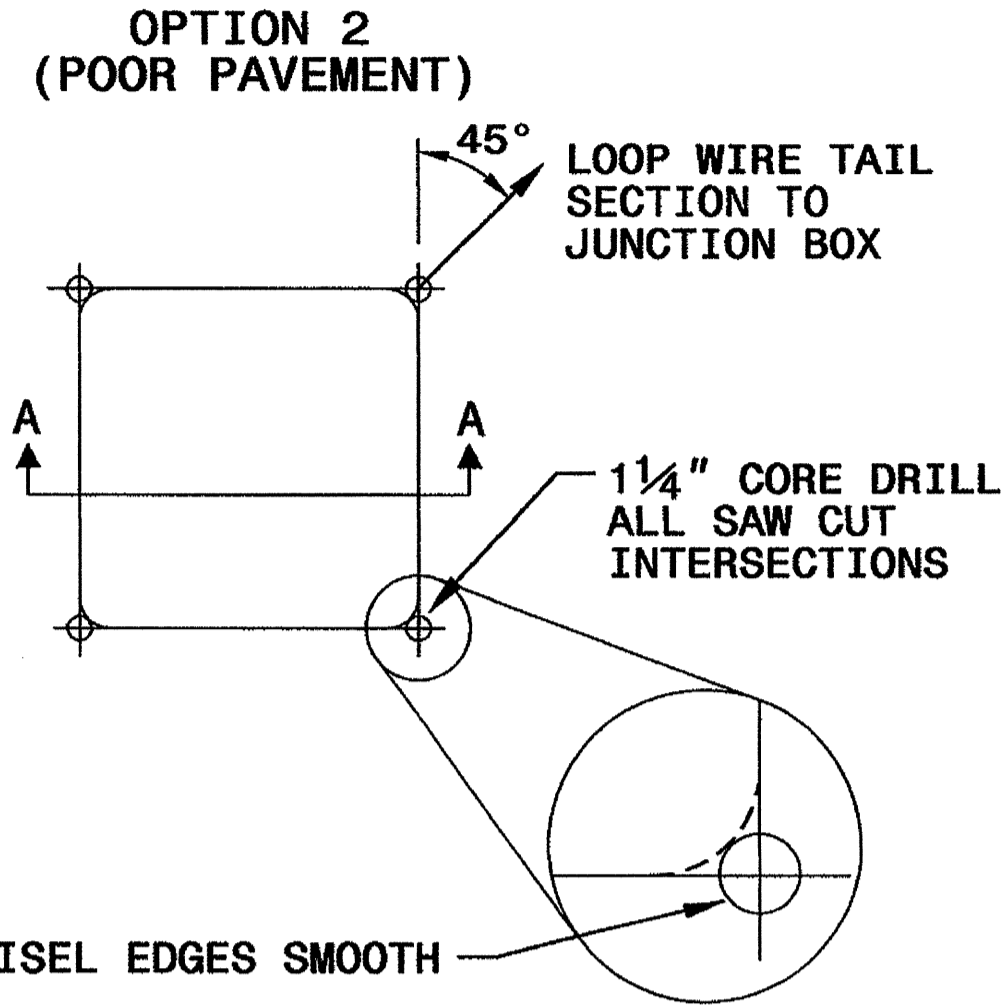
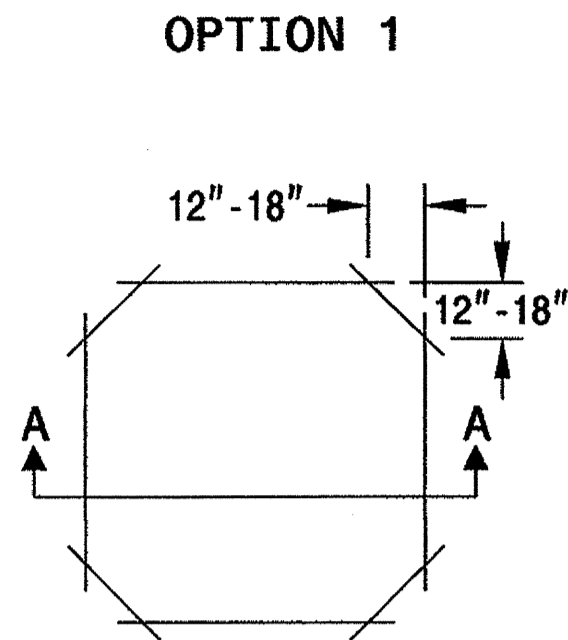
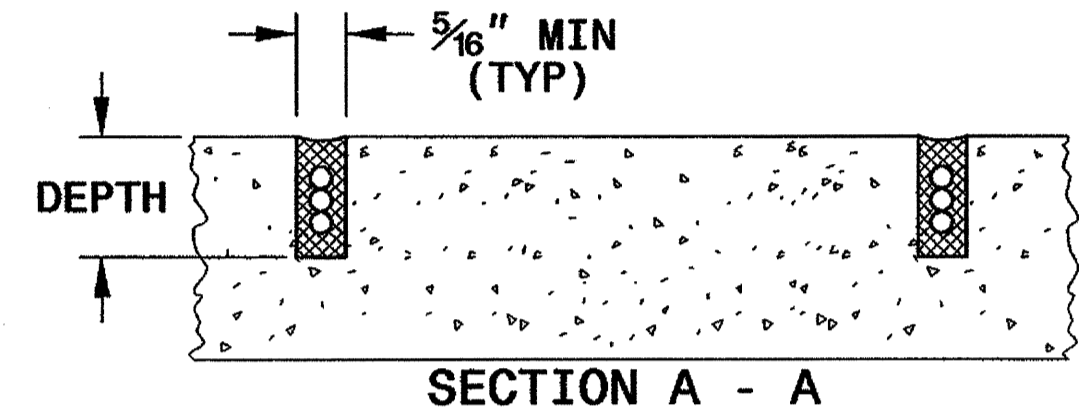
SHEET 1 OF 3
1725D01

CONVENTIONAL 4-SIDED LOOP

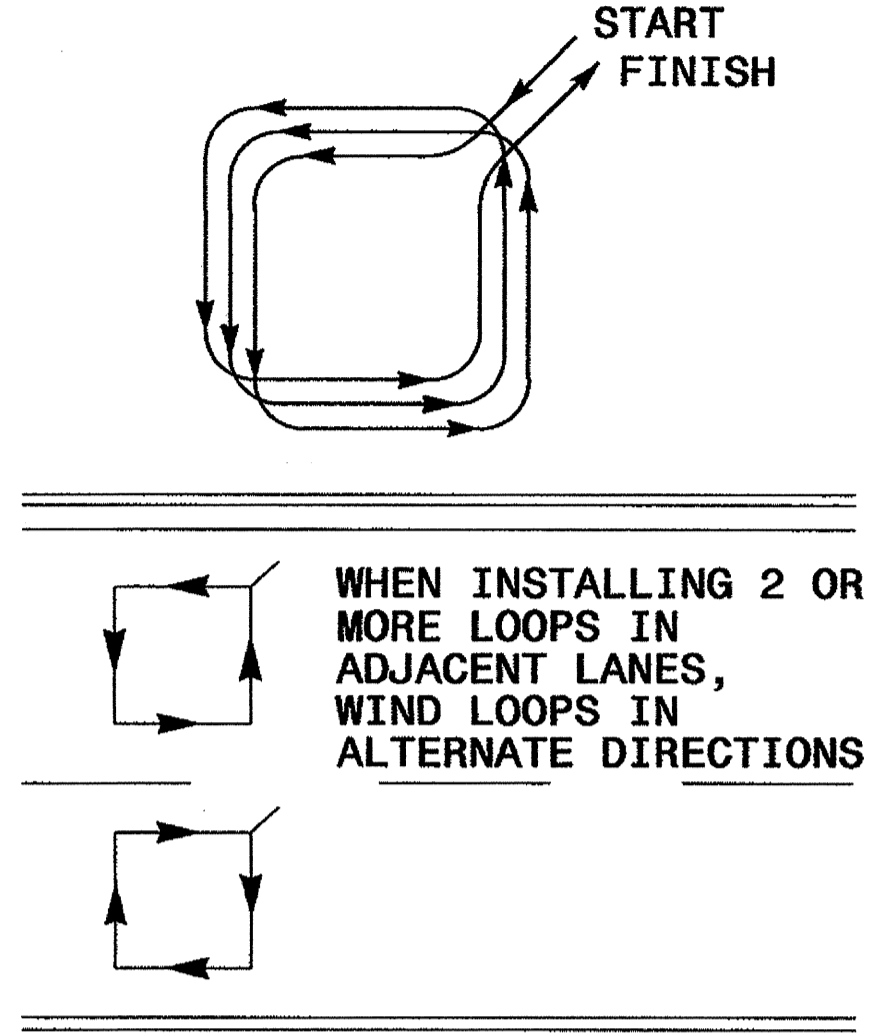
SAW CUT OPTIONS

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

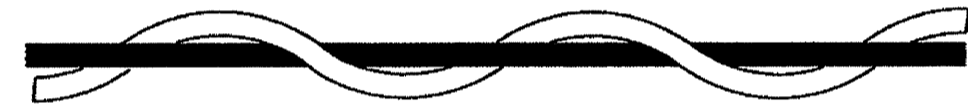


LOOP WINDING METHOD



LOOP WIRE TWISTING METHOD

INCORRECT WAY TO TWIST WIRE



CORRECT WAY TO TWIST WIRE

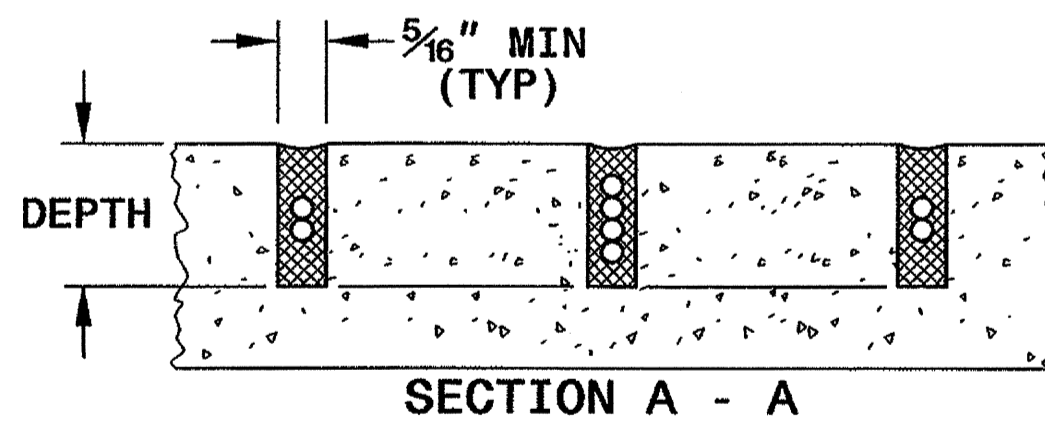
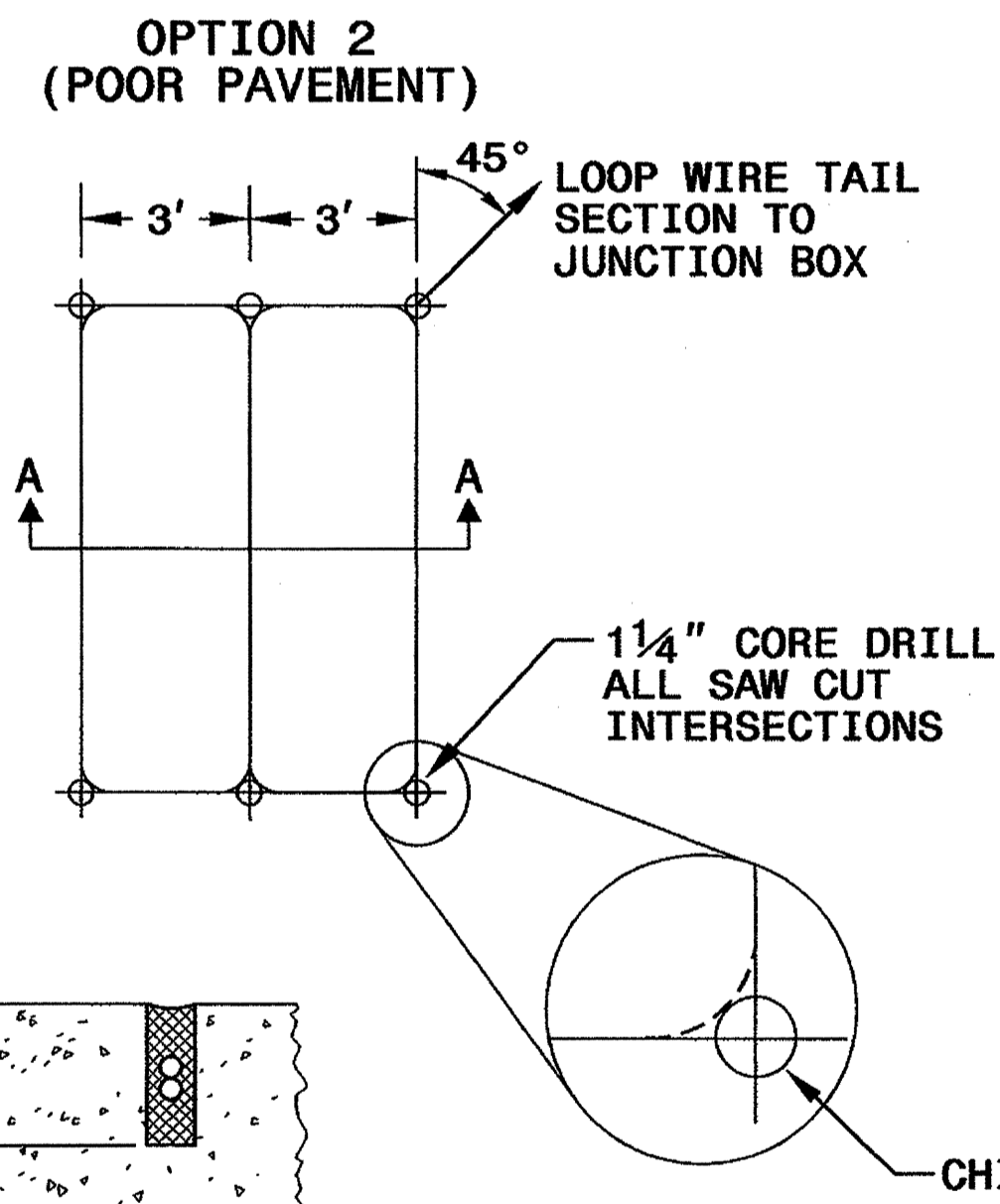
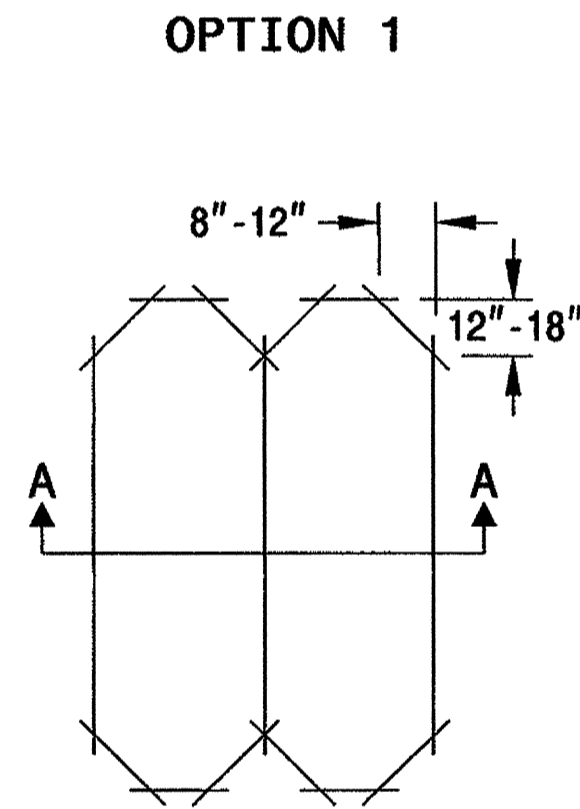


NOTES

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.

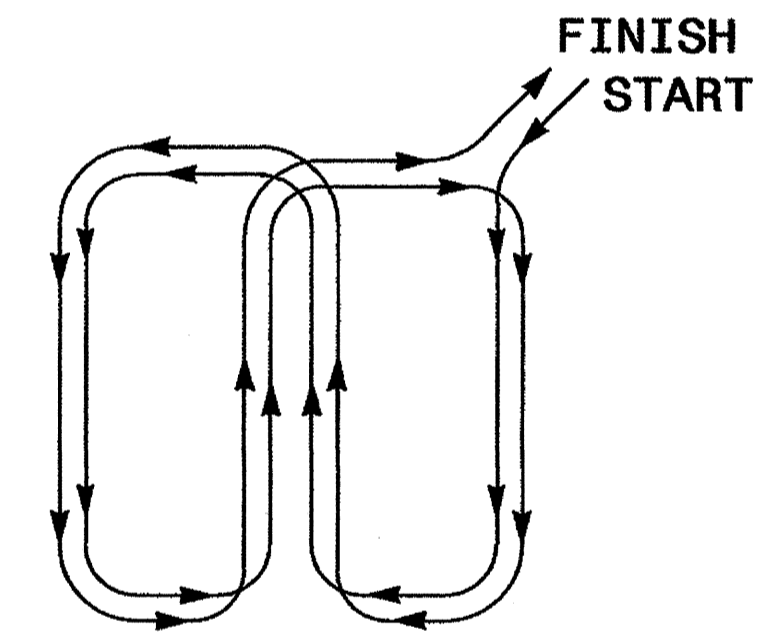
QUADRUPOLE LOOP

SAW CUT OPTIONS



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

LOOP WINDING METHOD



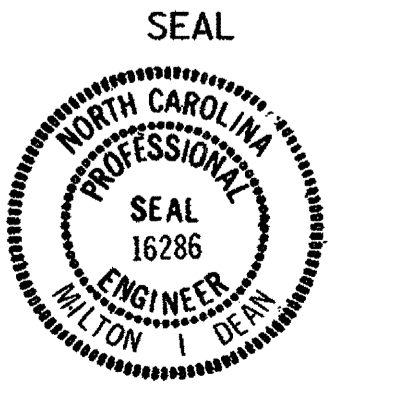
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

INDUCTIVE DETECTION LOOPS
ENGLISH DETAIL DRAWING FOR

SHEET 1 OF 3
1725D01

See Plate for Title



SIGNATURE: Wilton Dean DATE: 4/24/08

24-NOV-2008 09:28 d:\work\files\standard plate sheets\172501_1.mxd\2307.dgn zml title

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

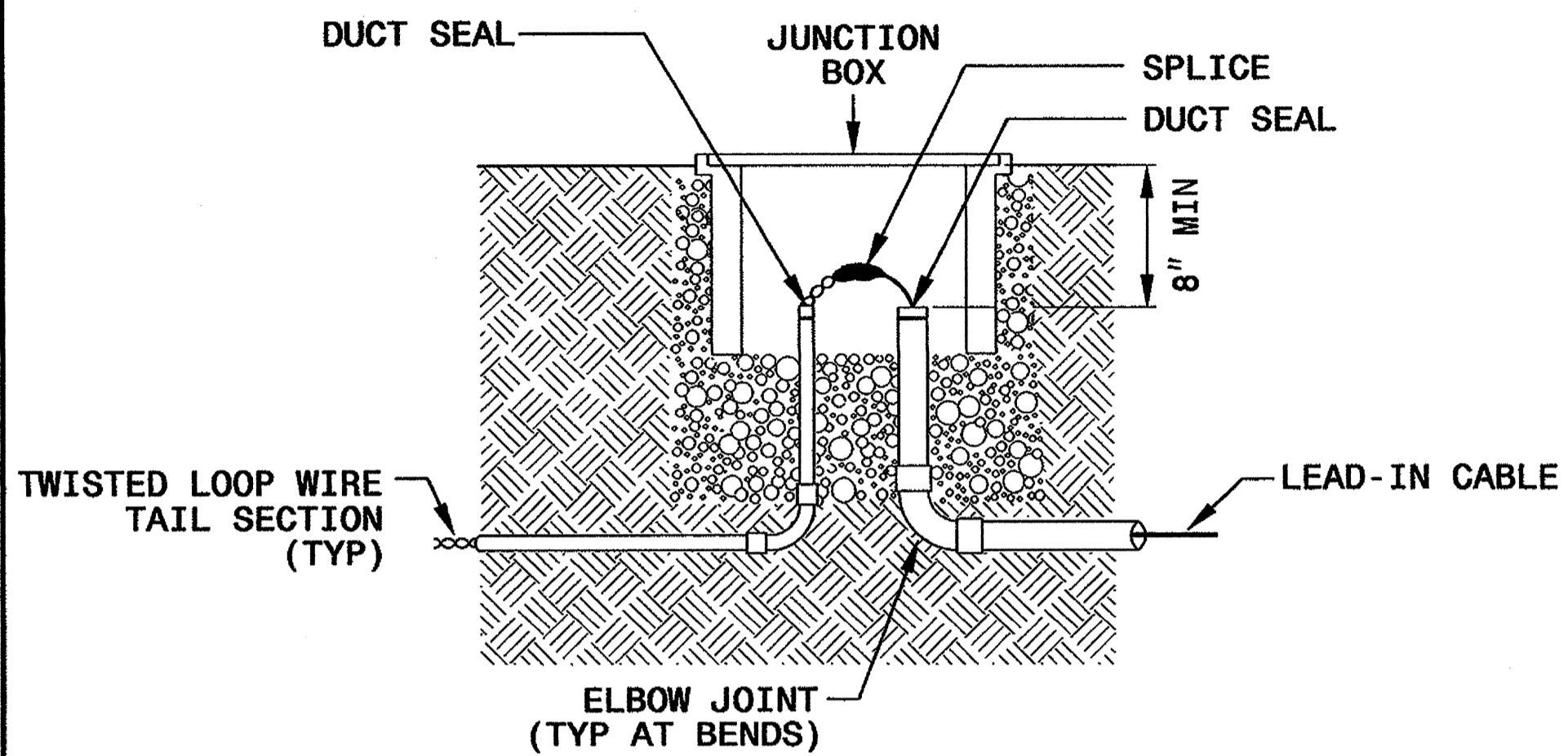
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ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
LOOP WIRE DETAILS

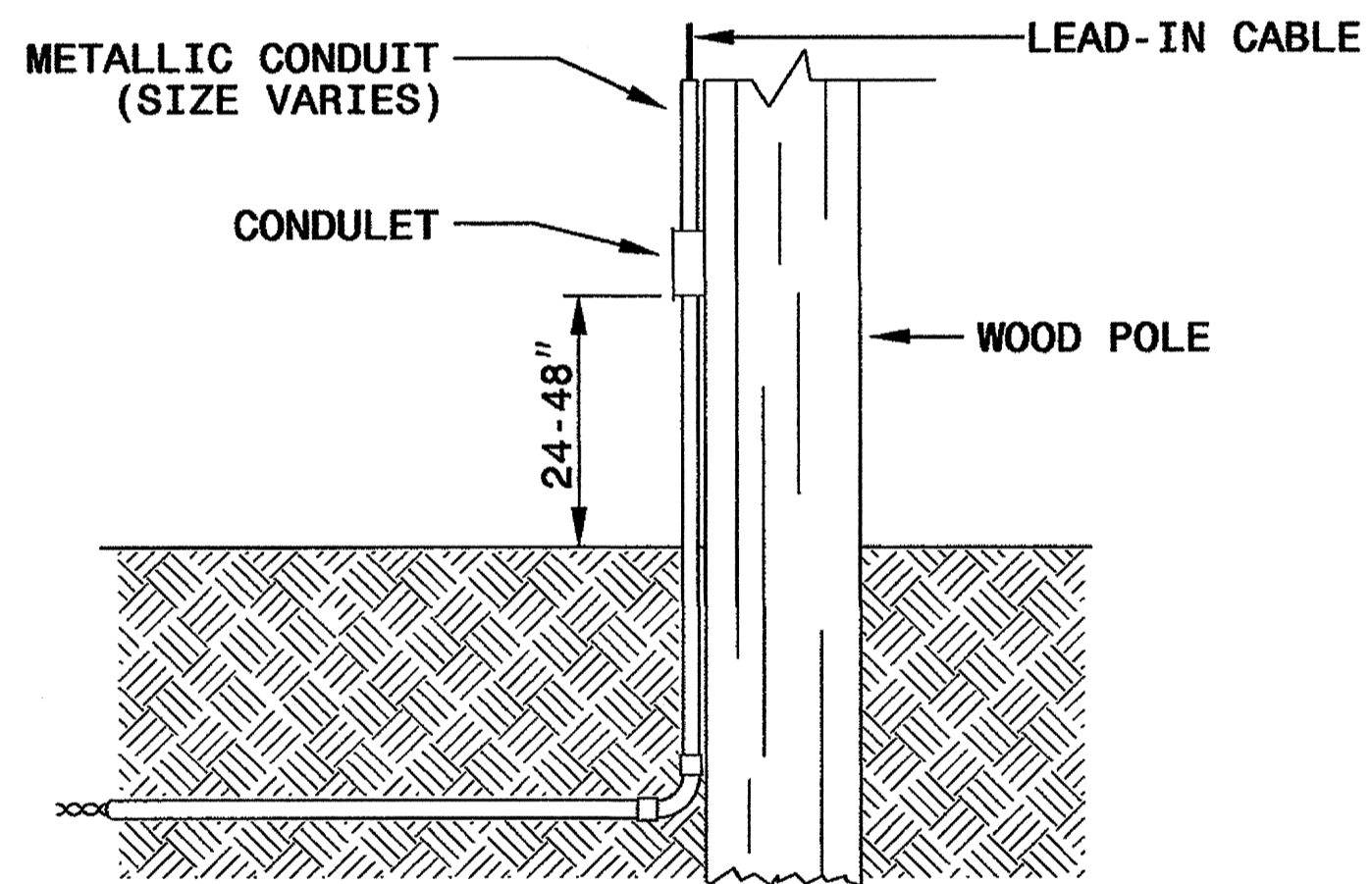
SHEET 2 OF 3
1725D01

LOOP WIRE SPLICE POINT DETAILS

LOOP WIRE AT JUNCTION BOX



LOOP WIRE AT POLE

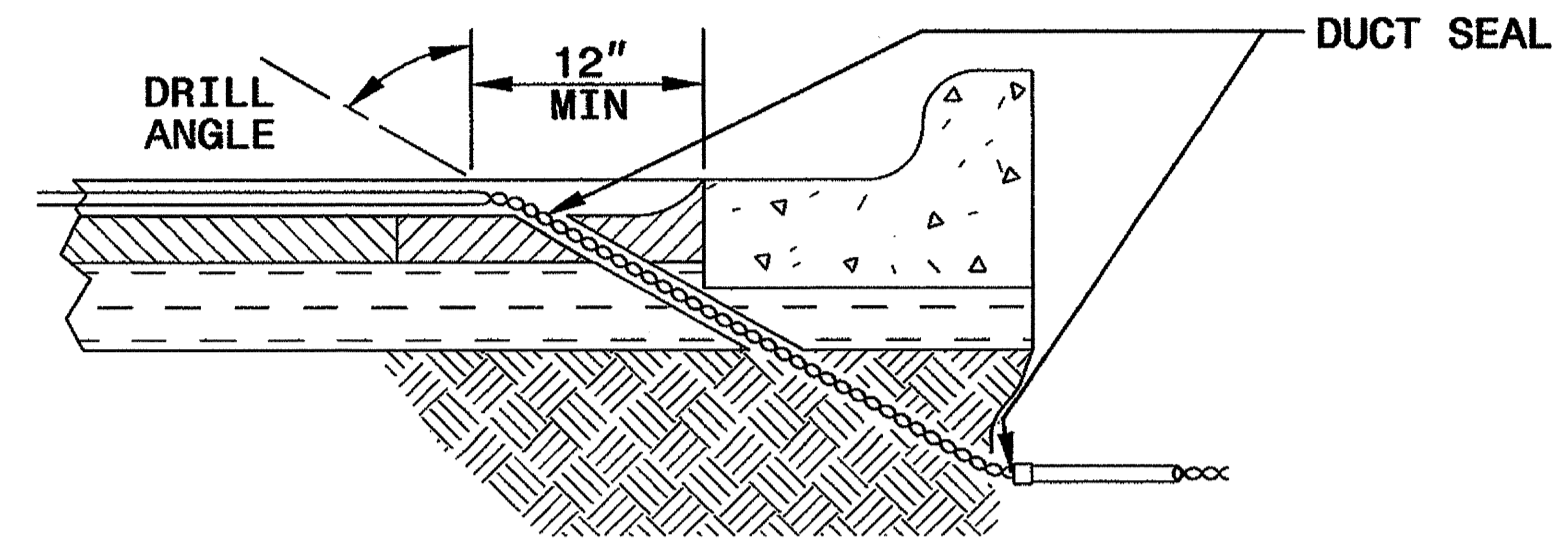


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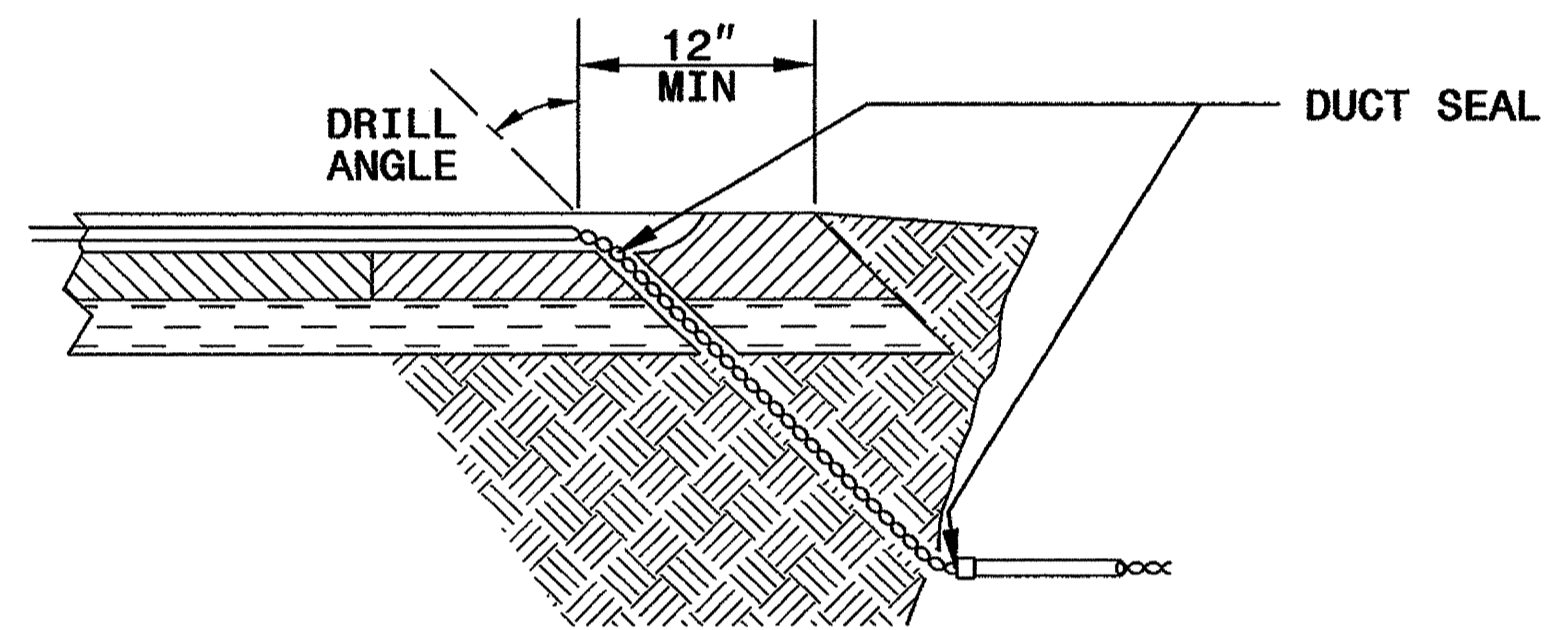
SPLICE ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

LOOP WIRE PAVEMENT EDGE DETAILS

LOOP WIRE AT CURB & GUTTER SECTION



LOOP WIRE AT PAVEMENT SECTION



NOTES

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

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

11-08

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 A. Dean 11/24/08
SIGNATURE DATE

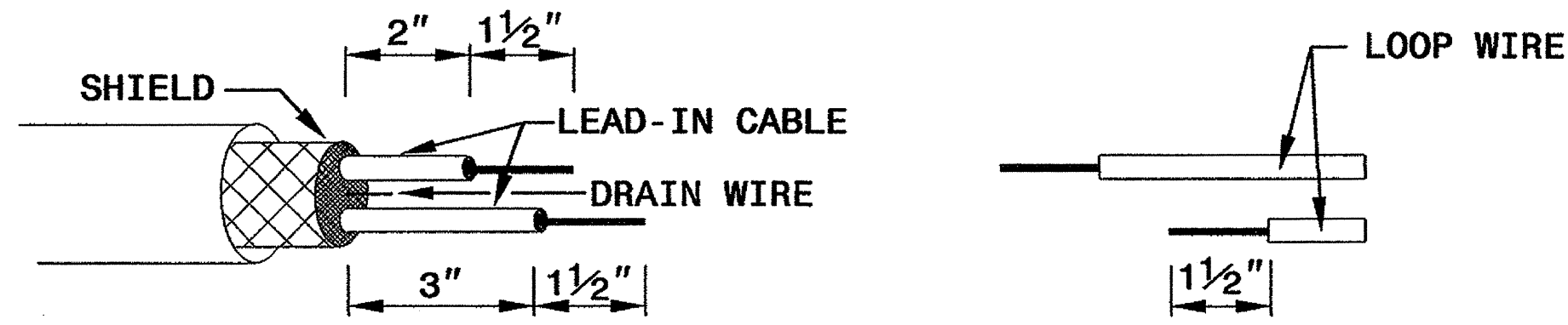
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

11-08

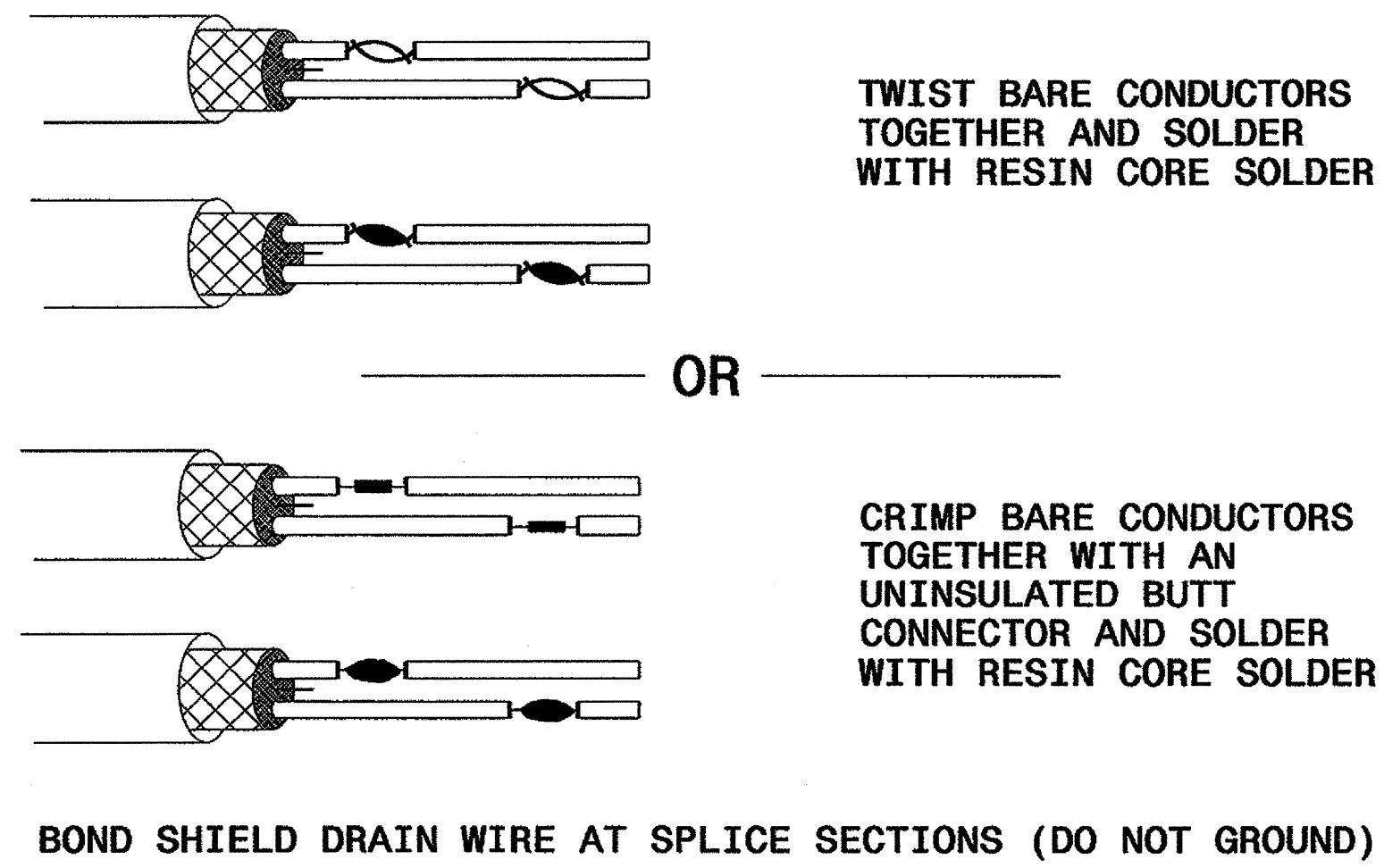
ENGLISH DETAIL DRAWING FOR
INDUCTIVE DETECTION LOOPS
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3
1725D01

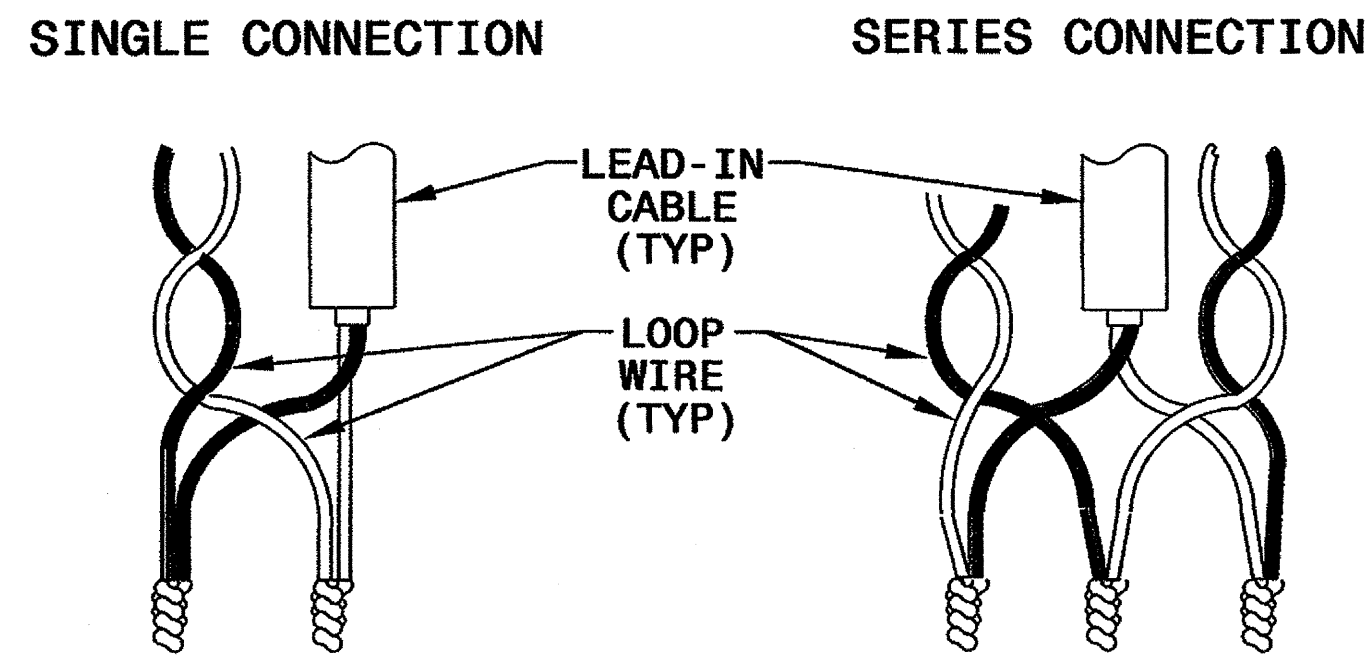
STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE



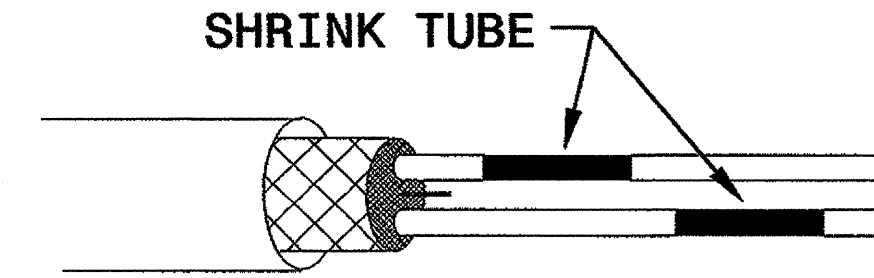
STEP 2. CONNECT AND SOLDER



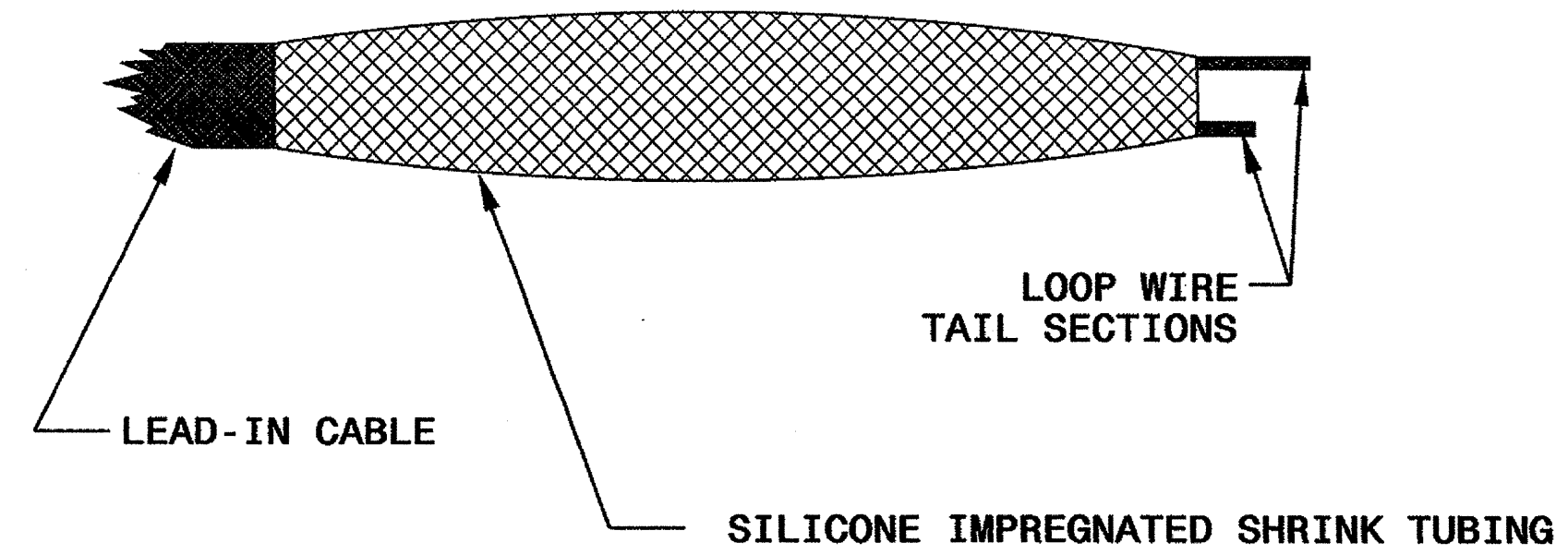
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS



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

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-nov-2008 09:36
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