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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

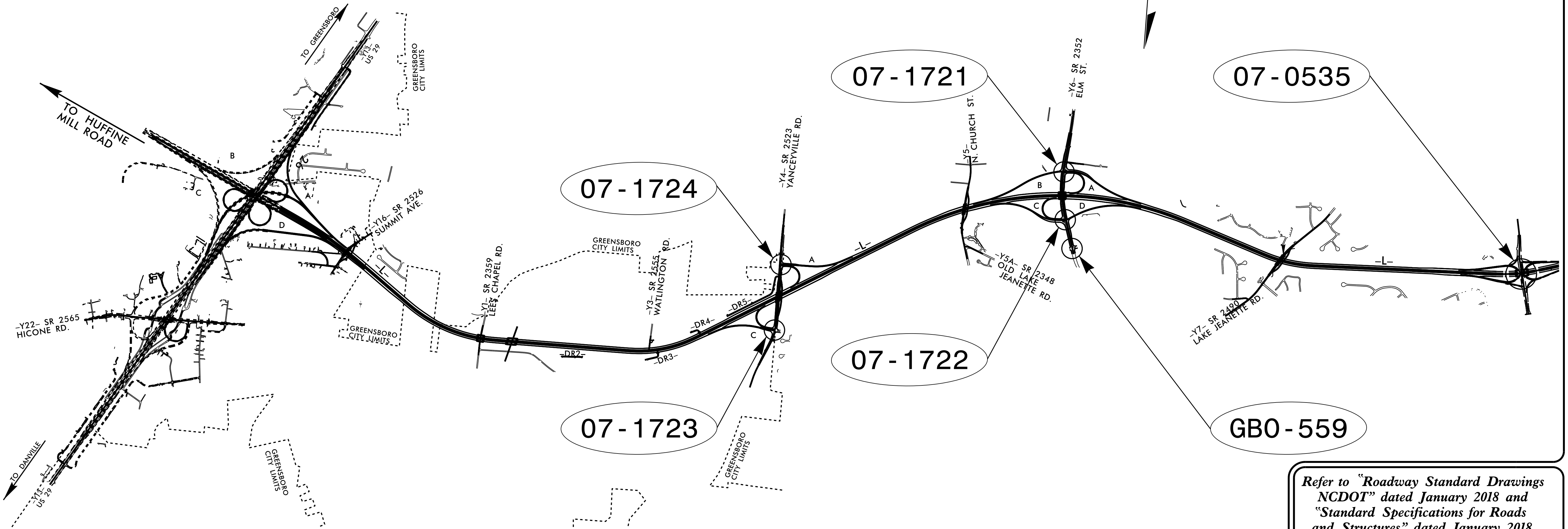
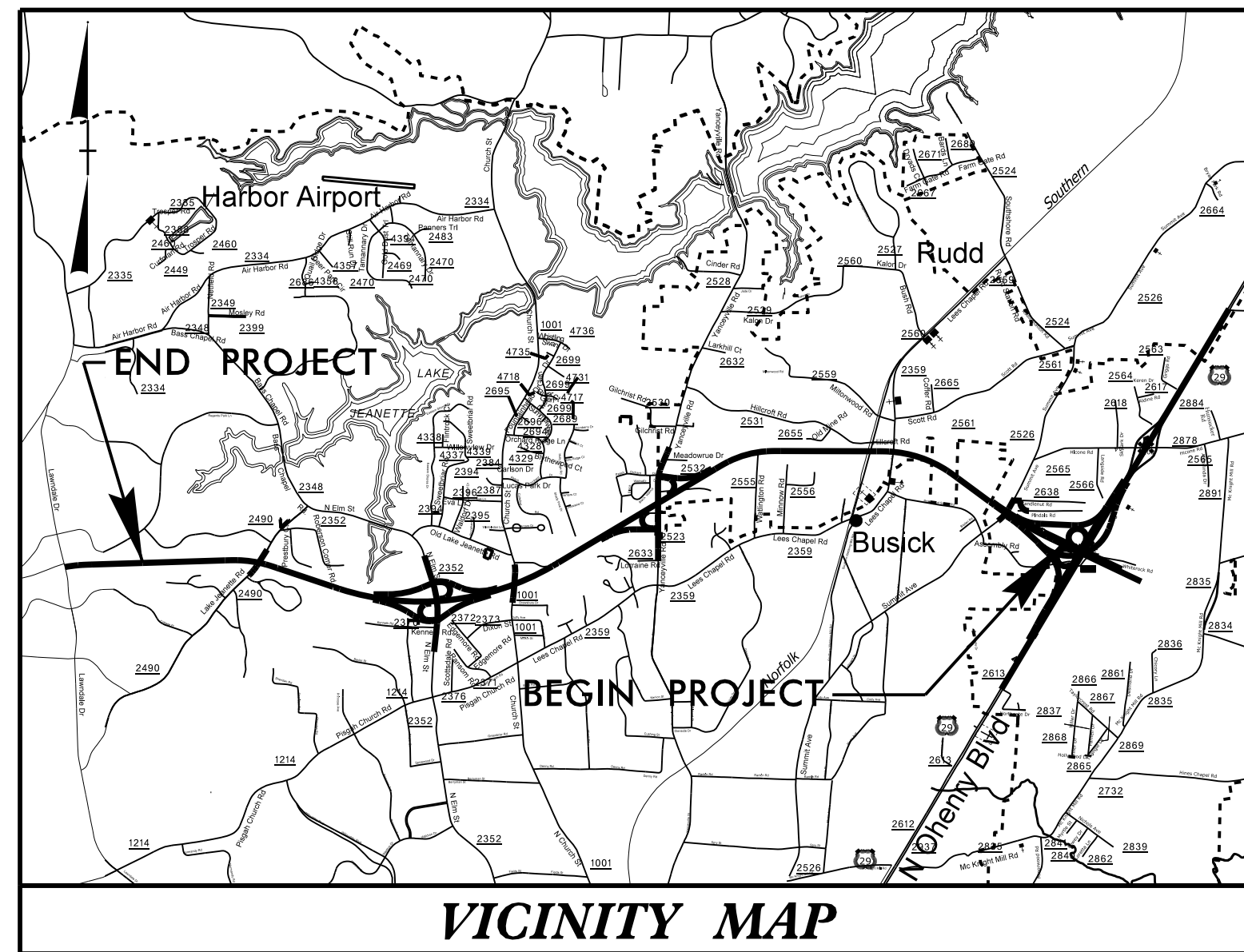
GUILFORD COUNTY

LOCATION: I-840 (GREENSBORO LOOP) FROM US 29 NORTH
OF GREENSBORO TO EAST OF LAWNDALE DRIVE

TYPE OF WORK: TRAFFIC SIGNALS AND SIGNAL COMMUNICATIONS

TIP PROJECT: U-2525C

CONTRACT: C204096



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

Sheet #	Reference #	Location/Description
Sig. 1	-----	Title Sheet
Sig. 2.0-2.3	07-1723	SR 2523 (Yanceyville Street) at I-840 WB Ramps and Peach Orchard Drive
Sig. 3.0-3.3	07-1724	SR 2523 (Yanceyville Street) at I-840 EB Ramps
Sig. 4.0-4.2	07-1721	N. Elm Street at I-840 EB Ramps
Sig. 5.0-5.2	07-1722	N. Elm Street at I-840 WB Ramps
Sig. 6.0-6.2	07-0535	Lawndale Drive at I-840 Ramps
Sig. 7.0-10.3	GBO-559	N. Elm Street at United Health Care and Lake Jeanette Office Park
Sig. 11.0-11.1	N/A	Standard Plate Sheets
MI-M8	N/A	Standard Drawing For Metal Poles
SCP 1-23	N/A	Signal Communication Plans

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

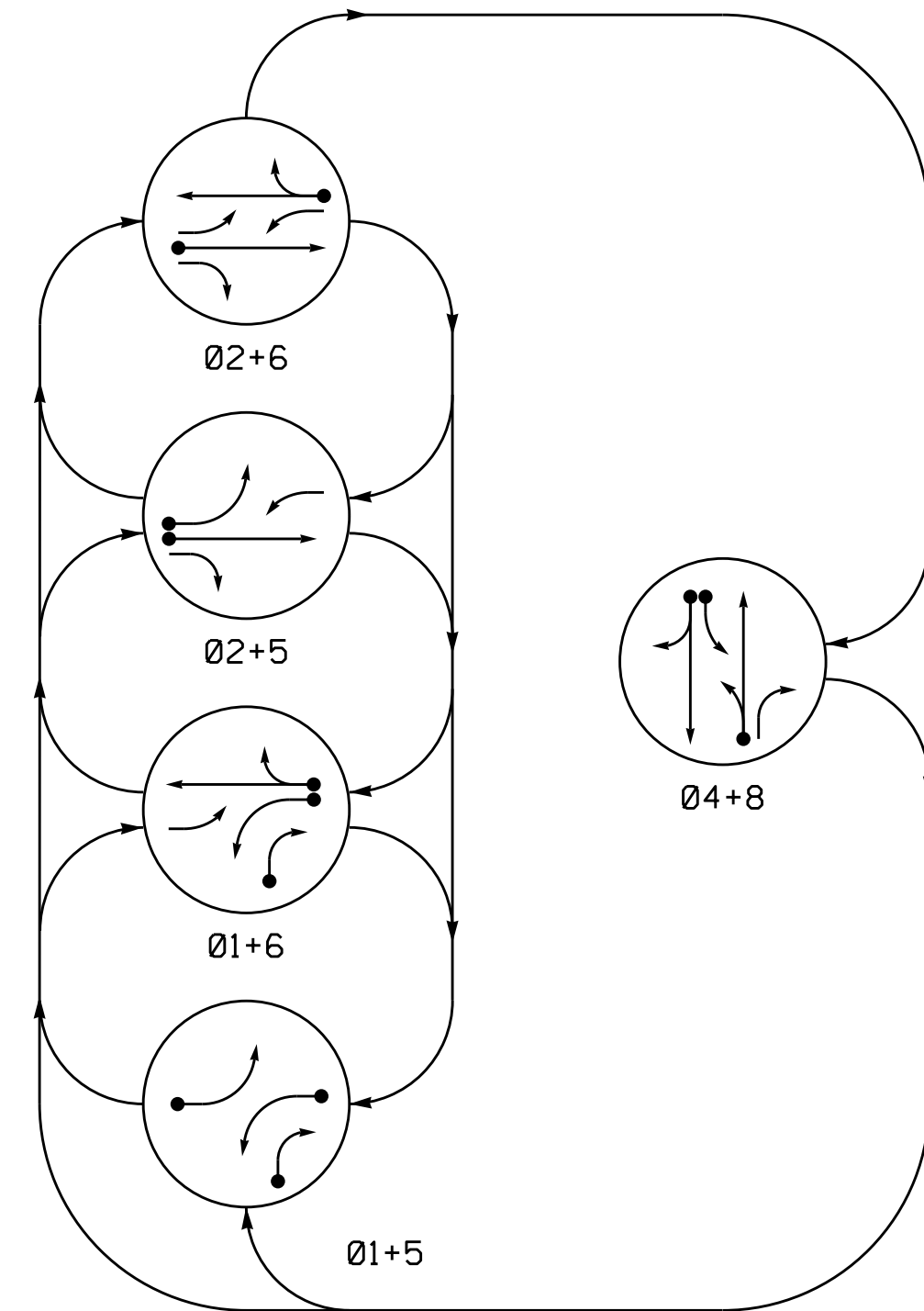
Robert J. Ziembra, PE - Central Region Signals Engineer
D. Todd Joyce, PE - Signal Equipment Design Engineer
I. Neil Avery - Signal Communications Project Engineer

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

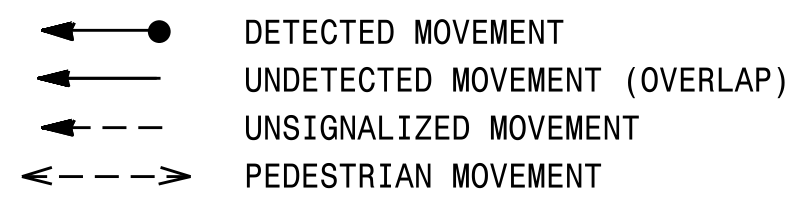
750 N. Greenfield Parkway, Garner, NC 27529

07-NOV-2017 12:03
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PHASING DIAGRAM

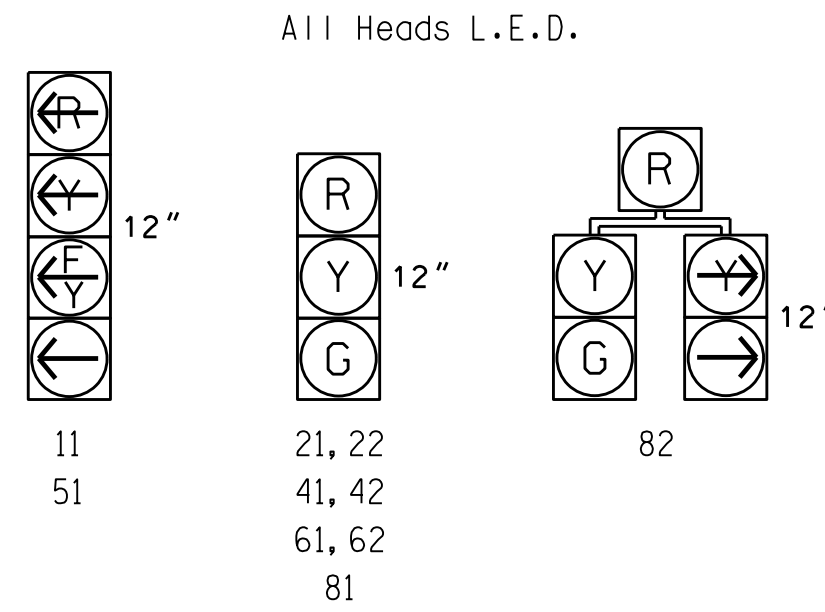


PHASING DIAGRAM DETECTION LEGEND



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

SIGNAL FACE I.D.

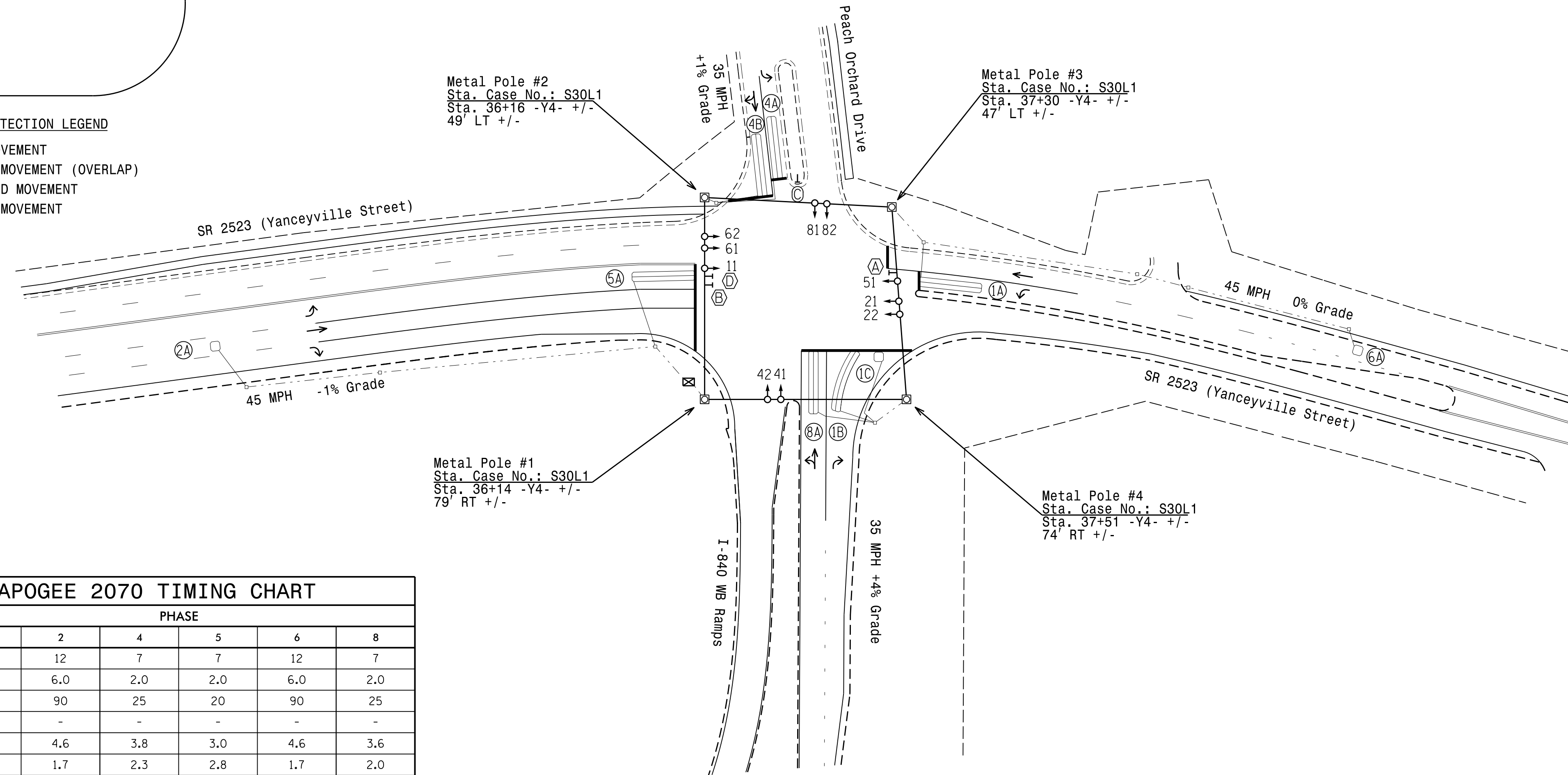


LOOP	SIZE (FT)	INDUCTIVE LOOPS			DETECTOR PROGRAMMING							
		DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	-	15	-	X	X	-	X
1B	6X40	0	2-4-2	X	1	-	15	-	X	X	-	X
1C	6X40	0	4	X	1	-	15	-	X	X	-	X
2A	6X6	300	4	X	2	-	-	-	X	X	X	X
4A	6X40	0	2-4-2	X	4	-	-	-	X	X	-	X
4B	6X40	0	2-4-2	X	4	-	-	-	X	X	-	X
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	X
6A	6X6	300	4	X	6	-	-	-	X	X	X	X
8A	6X40	0	2-4-2	X	8	-	-	-	X	X	-	X

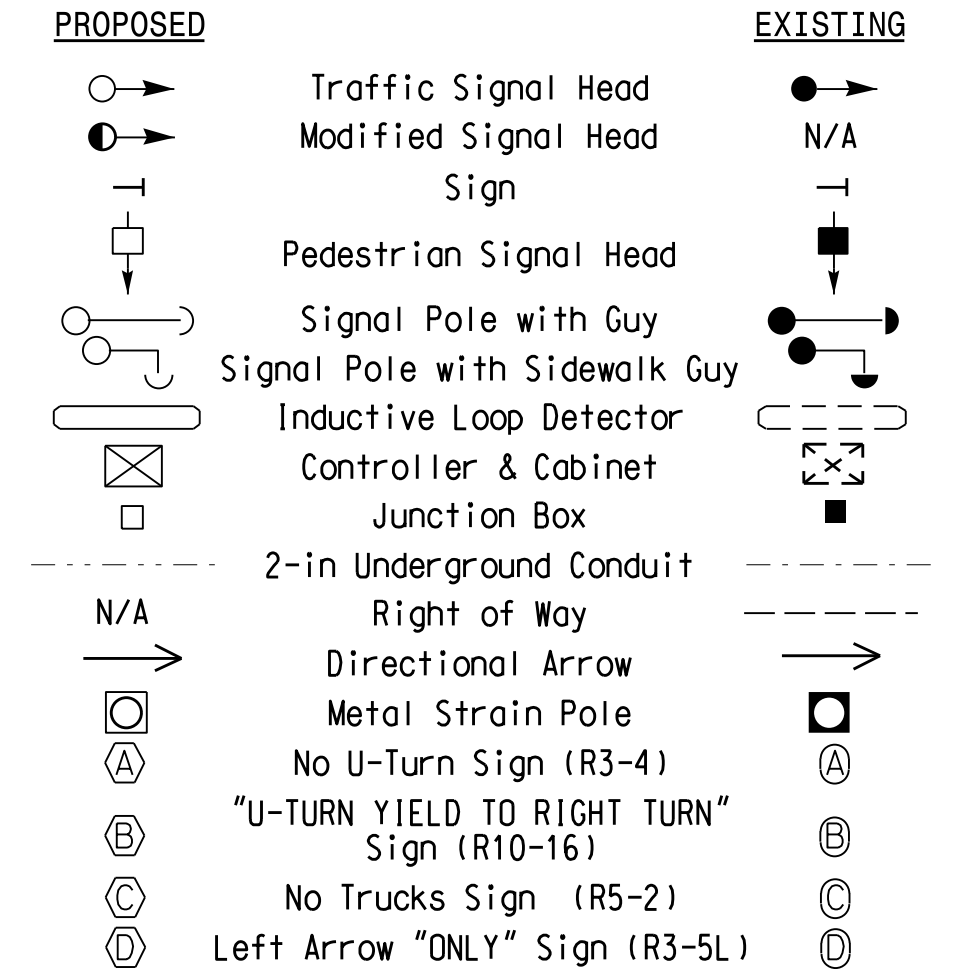
5 Phase Fully Actuated (Greensboro Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/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.



LEGEND



FEATURE	PHASE						
	1	2	4	5	6	8	
Min Green *	7	12	7	7	12	7	
Gap, Extension *	2.0	6.0	2.0	2.0	6.0	2.0	
Maximum Green 1 *	20	90	25	20	90	25	
Maximum Green 2 *	-	-	-	-	-	-	
Yellow Clear	3.0	4.6	3.8	3.0	4.6	3.6	
Red Clear	3.2	1.7	2.3	2.8	1.7	2.0	
Walk *	-	-	-	-	-	-	
Pedestrian Clear	-	-	-	-	-	-	
Added Initial *	-	2.5	-	-	2.5	-	
Maximum Initial *	-	34	-	-	34	-	
Time Before Reduction *	-	15	-	-	15	-	
Time To Reduce *	-	30	-	-	30	-	
Minimum Gap	-	3.0	-	-	3.0	-	
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-	
Lock Calls	NO	YES	NO	NO	YES	NO	
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.

New Installation

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 2523 (Yanceyville Street)
at
I-840 WB Ramps
and Peach Orchard Drive

Division 7 Guilford County Greensboro

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: I. O. Umzurike REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

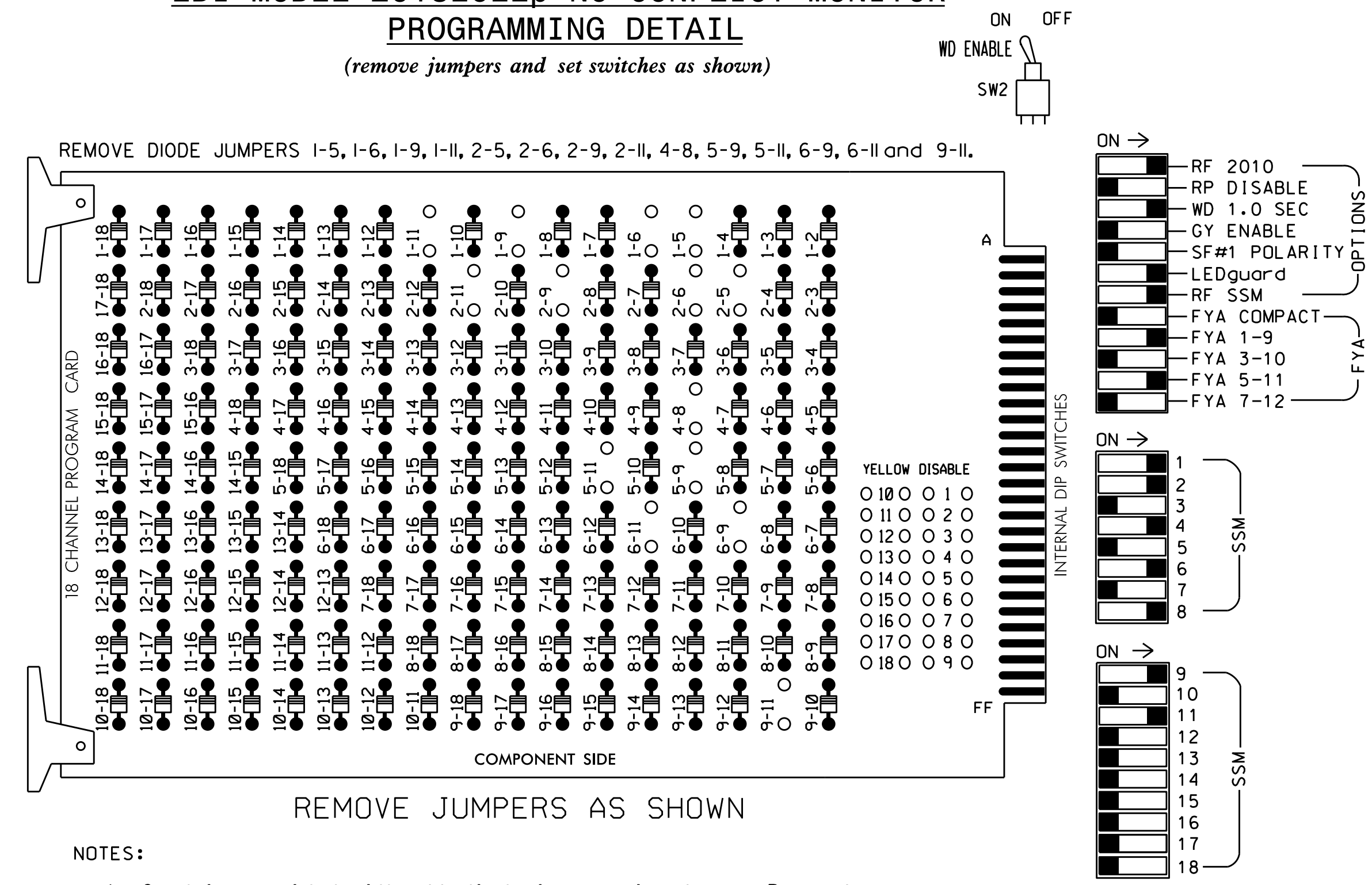
SEAL

10/24/2017

EDI MODEL 2018EClip-NC CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = 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.
- Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
- Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
- Program phases 2 and 6 for Start Up In Green.
- Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
- Ensure "Local Flash Start" feature is set to "DRK".
- Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

```
FROM MAIN MENU->1->8->7 (I/O LOGIC) Result Src.Fcn TimeOp Time
1208 = 01208 DLY 1
```
- Program phases 4 and 8 for Dual Entry.
- The cabinet and controller are part of the City of Greensboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332 W/ AUX
 SOFTWARE.....NAZTEC APOGEE
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S1,S2,S5,S7,S8,S11,AUX S1, AUX S4
 PHASES USED.....1,2,4,5,6,8
 OVERLAP A.....*
 OVERLAP B.....NOT USED
 OVERLAP C.....*
 OVERLAP D.....NOT USED
 * See Overlap Programming Detail Sheet 2.

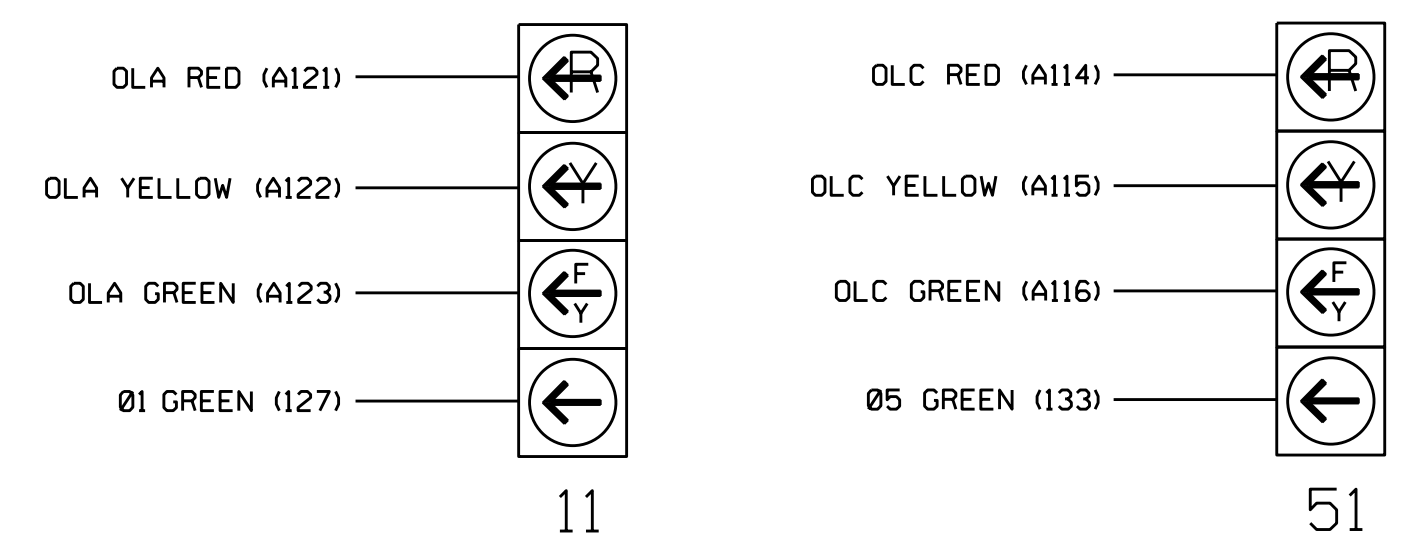
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11*	82	21,22	NU	NU	41,42	NU	51*	61,62	NU	NU	81,82	NU	11*	NU	NU	51*	NU
RED		*	128			101			134			107						
YELLOW			129			102		*	135			108						
GREEN			130			103			136			109						
RED ARROW													A121				A114	
YELLOW ARROW			126										A122				A115	
FLASHING YELLOW ARROW													A123				A116	
GREEN ARROW	127	127							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)



INPUT FILE POSITION LAYOUT

(front view)

FILE	U	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	Ø 1	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	Ø 9	Ø 10	Ø 11	Ø 12	Ø 13	FS
L	1A	1B	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	DC ISOLATOR
U	NOT USED	Ø 1	NOT USED	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	Ø 9	Ø 10	Ø 11	Ø 12	Ø 13	ST
L	1C	1C	2C	3C	4C	5C	6C	7C	8C	9C	10C	11C	12C	13C	DC ISOLATOR

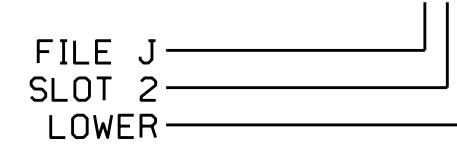
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

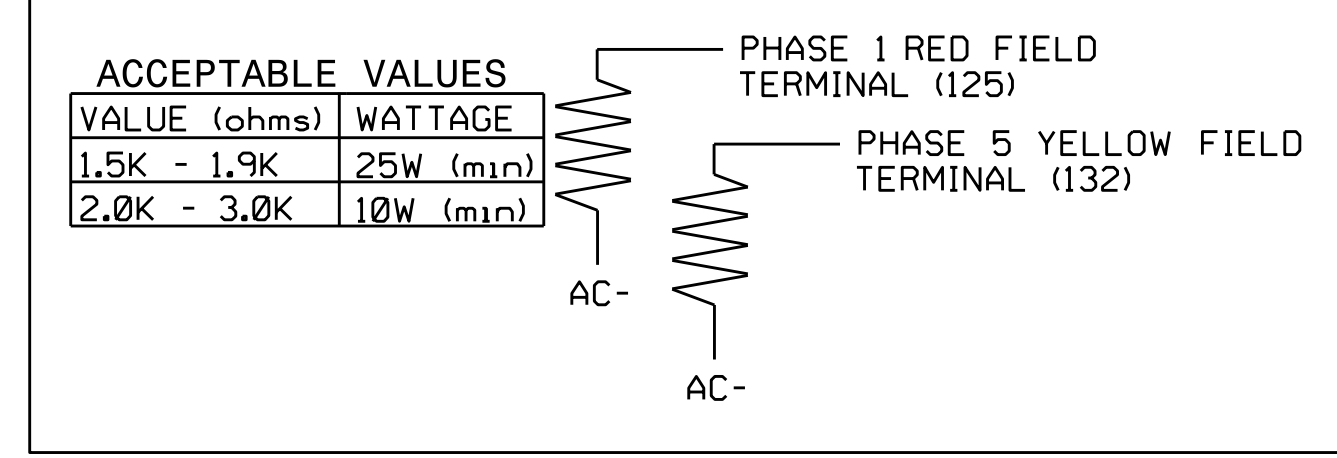
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
1A	TB2-1,2	11U	56	1	1		15		X	X	
1B	TB2-5,6	12U	39	2	1		15		X	X	
1C	TB2-7,8	12L	43	3	1		15		X	X	
2A	TB2-9,10	13U	63	4	2				X	X	X
4A	TB4-9,10	16U	41	8	4				X	X	
4B	TB4-11,12	16L	45	9	4				X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
6A	TB3-5,6	J2U	40	16	6				X	X	X
8A	TB5-9,10	J6U	42	22	8				X	X	

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)



Electrical Detail - Sheet 1 of 3

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1723
 DESIGNED: September 2017
 SEALED: 10/24/2017
 REVISED:

Electrical AND PROGRAMMING DETAILS FOR: SR 2523 (Yanceyville Street) at I-840 WB Ramps and Peach Orchard Drive

Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS: _____ INIT. DATE

DocuSigned by: D. Todd Joyce 10/30/2017

750 N. Greenfield Pkwy, Garner, NC 27529

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

PROFESSIONAL ENGINEER SEAL 031001

DATE: 10/30/2017

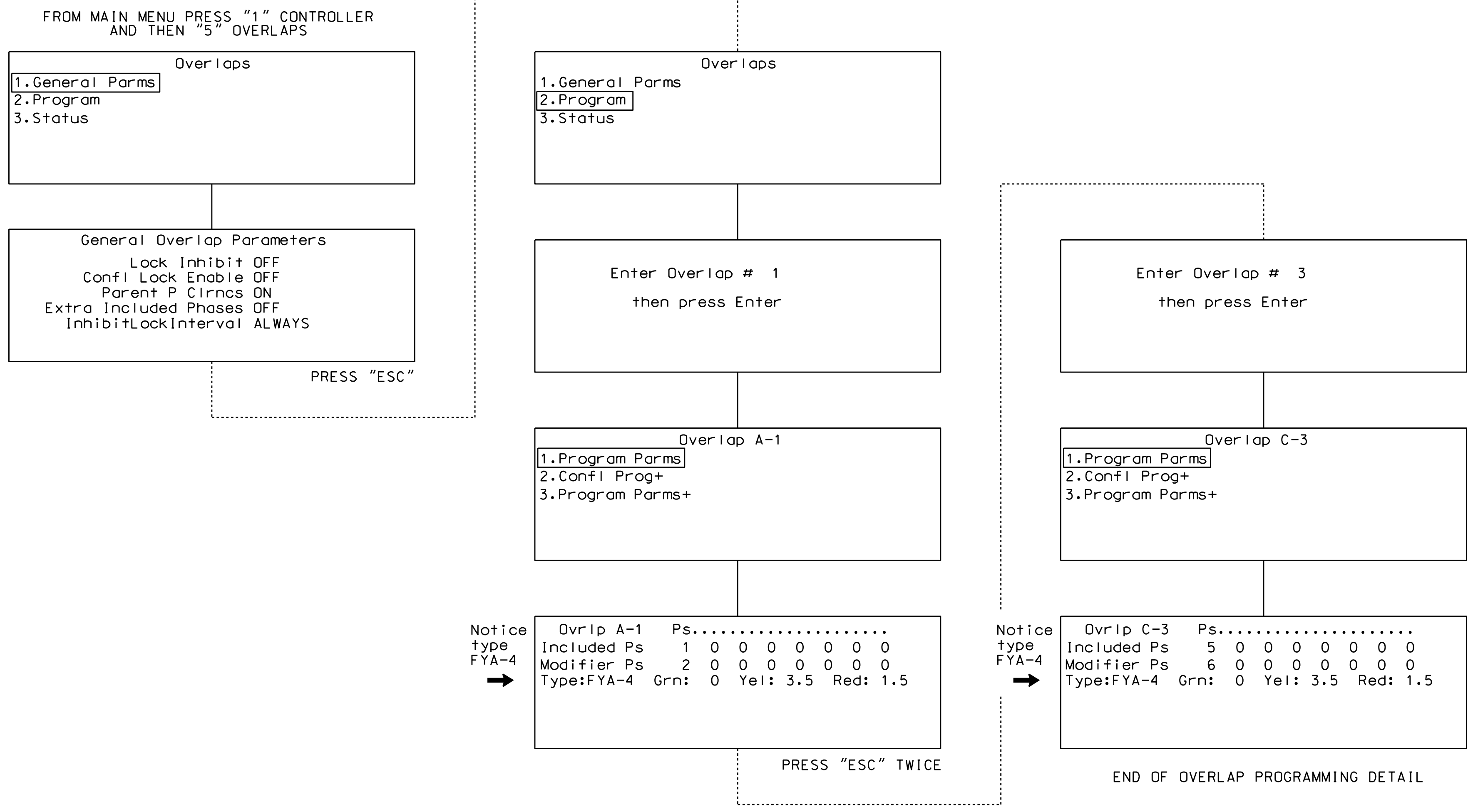
SIG. INVENTORY NO. 07-1723

27-001-2017 11:16 S:\IT\AS\115\Sigs\Signal\work\hgr\ouas\g\Map\511\ck\lanc011723_sml.e_xxv.dgn

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A and C*

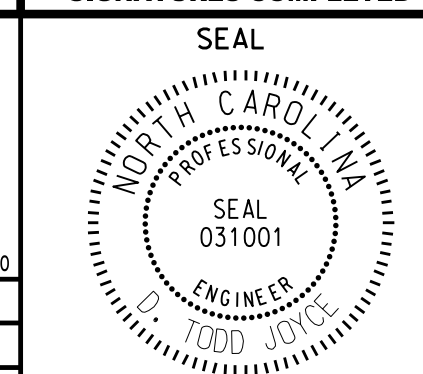
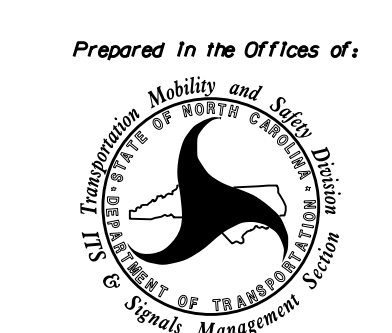

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.



27-007-2017 11:17
 C:\IT\ASIS\TIS\Sigal\work\groups\Sig_Maps\Strickland\071723_sme.e_xxv.dgn
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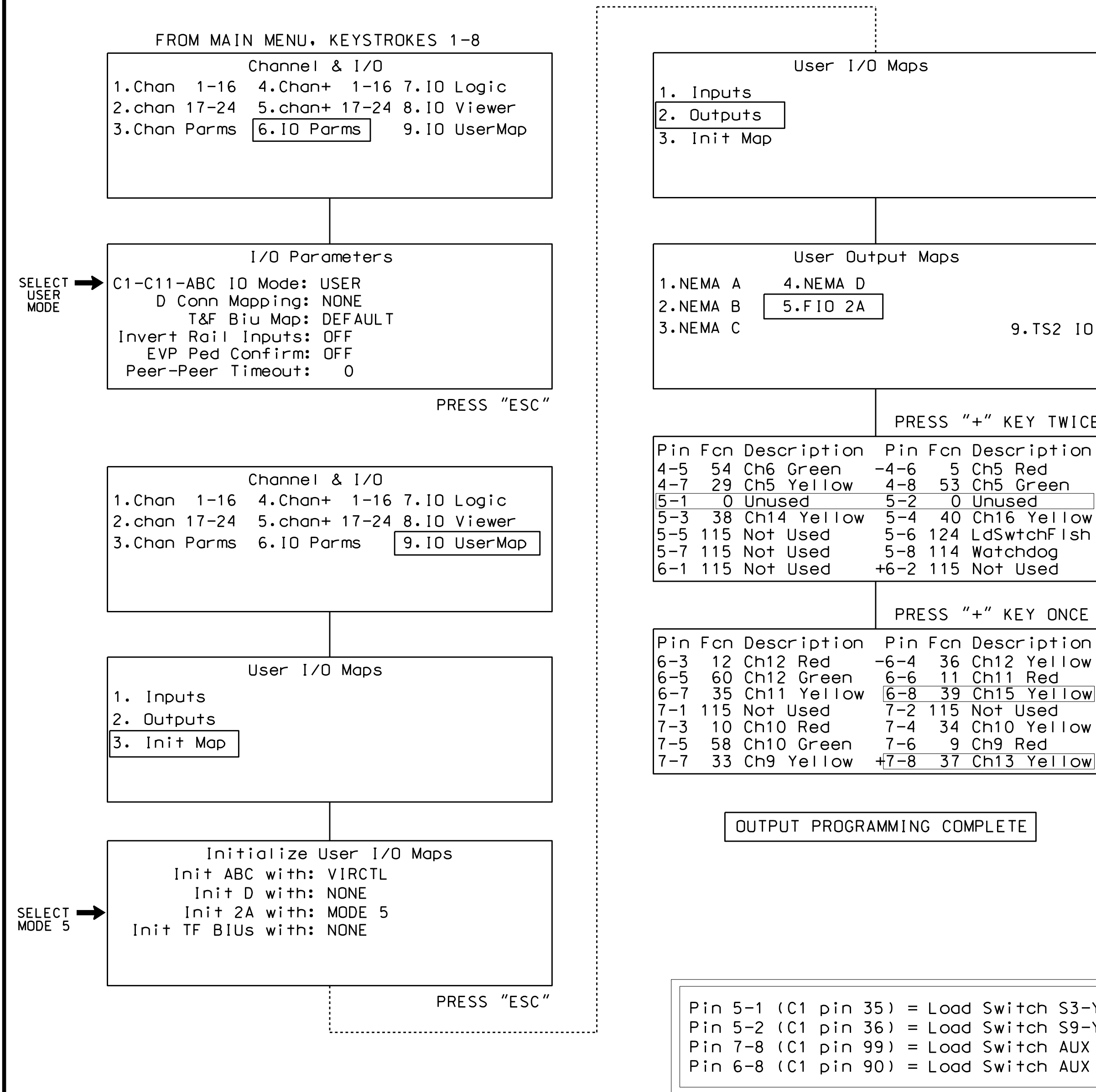
THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: 07-1723
 DESIGNED: September 2017
 SEALED: 10/24/2017
 REVISED:

Electrical Detail - Sheet 2 of 3		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 2523 (Yanceyville Street) at I-840 WB Ramps and Peach Orchard Drive	SEAL 
Prepared In the Offices of: 	Division 7 Guilford County Greensboro PLAN DATE: October 2017 REVIEWED BY: T. Joyce PREPARED BY: C. Strickland REVIEWED BY:	Documented by:  10/30/2017 DATE
750 N. Greenfield Pkwy, Garner, NC 27529		SIG. INVENTORY NO. 07-1723

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

- Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
- The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.



! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

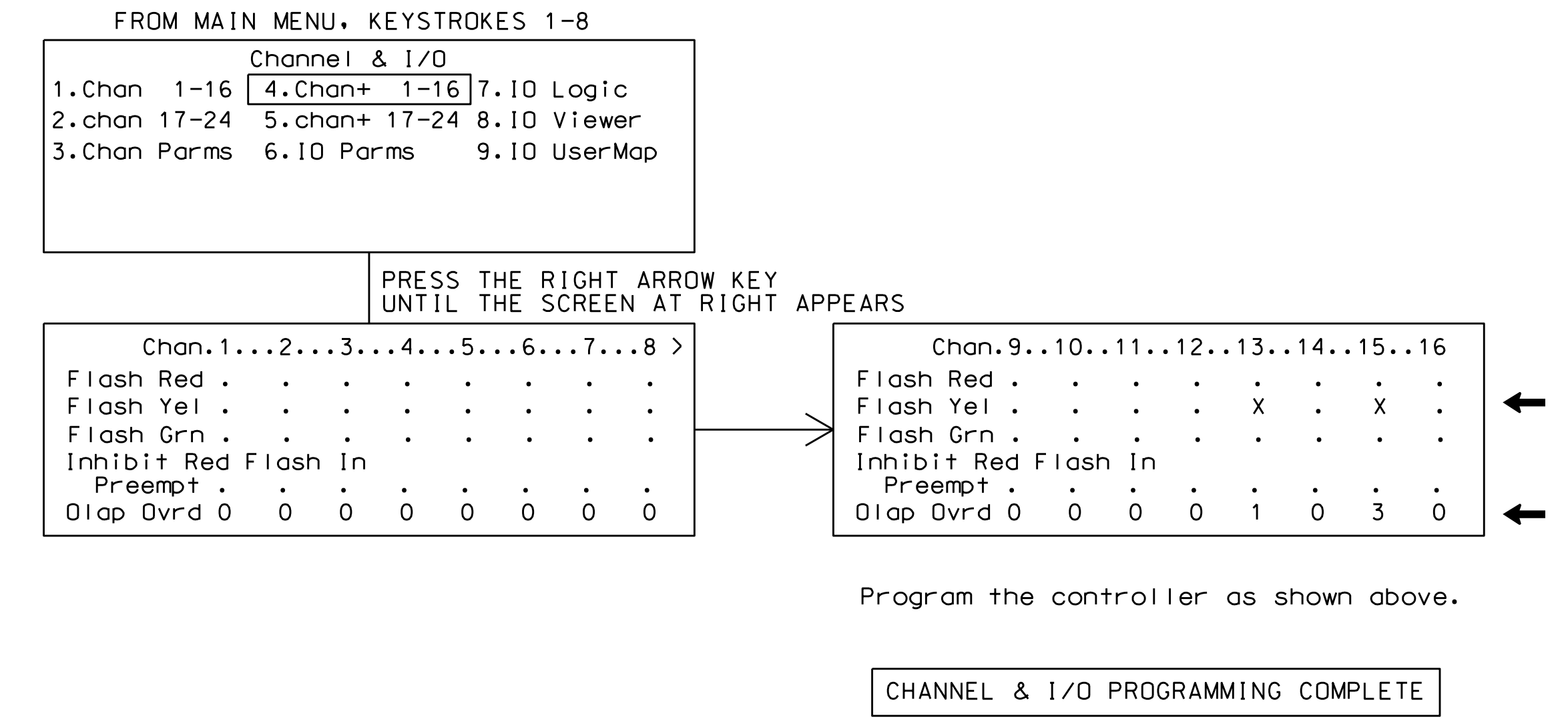
NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.



Programming notes:

Pin	Default Fcn Description	Change To: Fcn Description
5-1	37 Ch13 Yellow....	0 Unused
5-2	39 Ch15 Yellow....	0 Unused

Programming notes:

Pin	Default Fcn Description	Change To: Fcn Description
7-8	57 Ch9 Green	37 Ch13 Yellow
6-8	59 Ch11 Green	39 Ch15 Yellow

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

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 cbsr\ckland

Electrical Detail - Sheet 3 of 3

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1723
 DESIGNED: September 2017
 SEALED: 10/24/2017
 REVISED:

SR 2523 (Yanceyville Street) at I-840 WB Ramps and Peach Orchard Drive

Division 7 Guilford County Greensboro

PLANNED BY: C. Strickland REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

DocuSigned by: D. Todd Joyce 10/30/2017

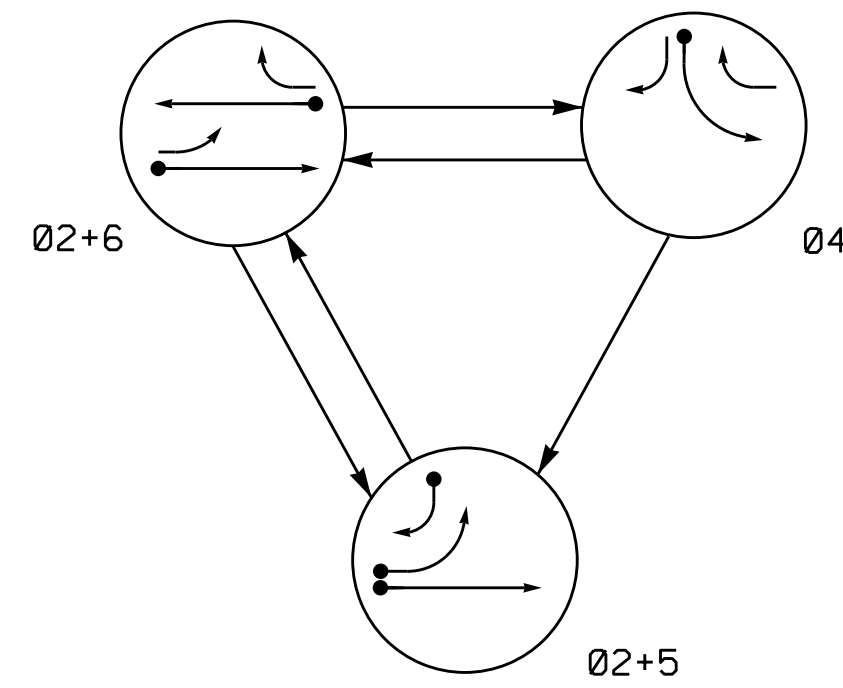
750 N. Greenfield Pkwy, Garner, NC 27529

SEAL
 PROFESSIONAL ENGINEER
 SEAL 031001
 TODD JOYCE

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SIG. INVENTORY NO. 07-1723

PHASING DIAGRAM



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

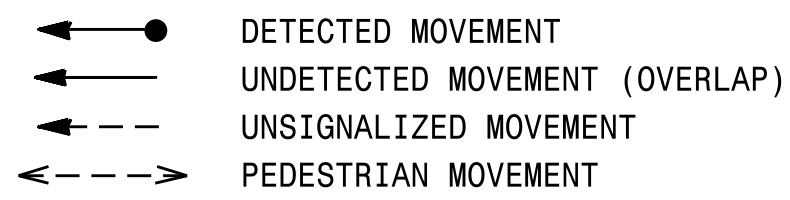
LOOP & DETECTOR UNIT INSTALLATION CHART												
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER												
INDUCTIVE LOOPS						DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING EXTENSION	ADDED INIT.	LOOP SYSTEM	NEW CARD
2A	6X6	300	4	X	2	-	-	-	X	X	X	-
4A	6X40	0	2-4-2	X	4	-	-	-	X	X	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-
5B	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-
6A	6X6	300	4	X	6	-	-	-	X	X	X	-

3 Phase Fully Actuated (Greensboro Signal System)

NOTES

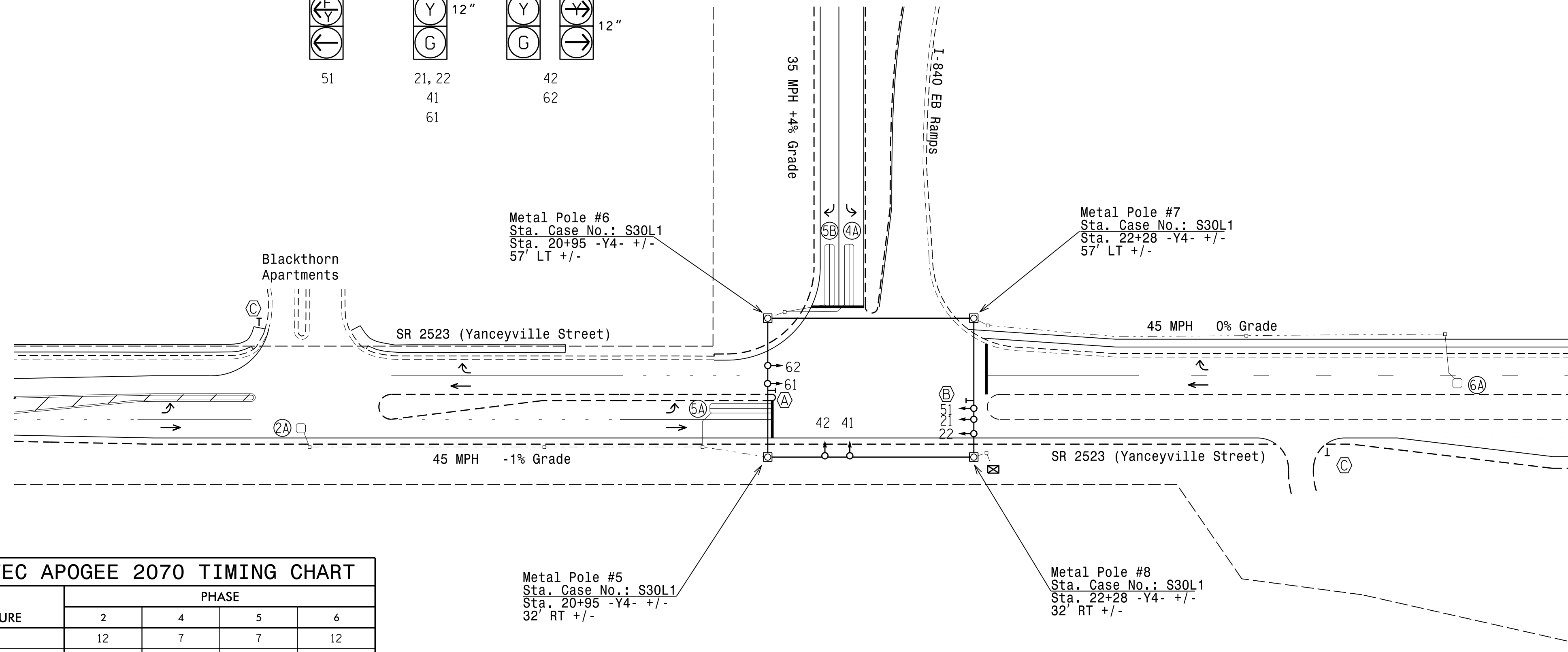
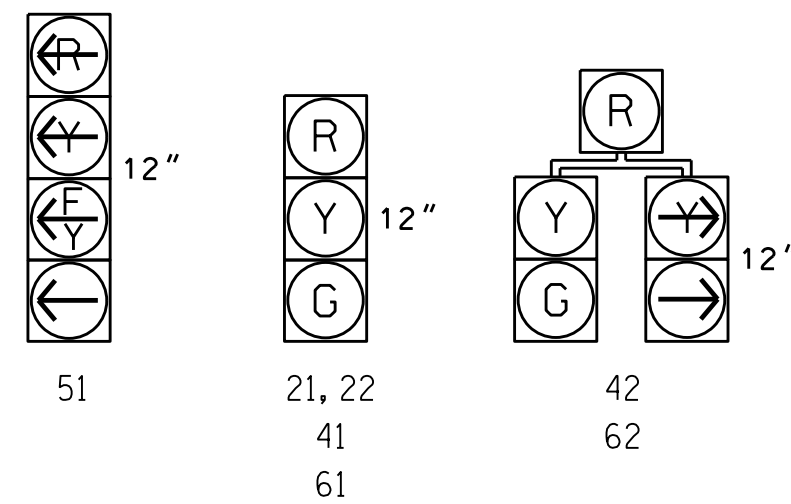
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence 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.

PHASING DIAGRAM DETECTION LEGEND



SIGNAL FACE I.D.

All Heads L.E.D.



FEATURE	PHASE			
	2	4	5	6
Min Green *	12	7	7	12
Gap, Extension *	6.0	2.0	2.0	6.0
Maximum Green 1 *	90	25	20	90
Maximum Green 2 *	-	-	-	-
Yellow Clear	4.6	3.0	3.0	4.6
Red Clear	1.7	2.9	2.8	1.7
Walk *	-	-	-	-
Pedestrian Clear	-	-	-	-
Added Initial *	2.5	-	-	2.5
Maximum Initial *	34	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
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
○ →	● →
● →	N/A
⊥	⊥
○ ⊥	● ⊥
○ ⊥	● ⊥
⊠	⊠
⊠	⊠
N/A	→
→	→
○	○
⊠	⊠
⊠	⊠
⊠	⊠

New Installation

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SR 2523 (Yanceyville Street) at I-840 EB Ramps

Division 7 Guilford County Greensboro

PLAN DATE: August 2017 REVIEWED BY:

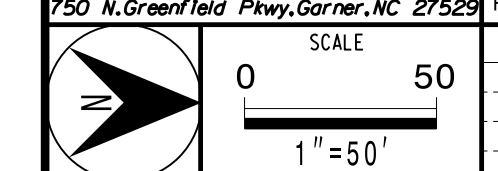
PREPARED BY: I. O. Umozurike REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

10/24/2017

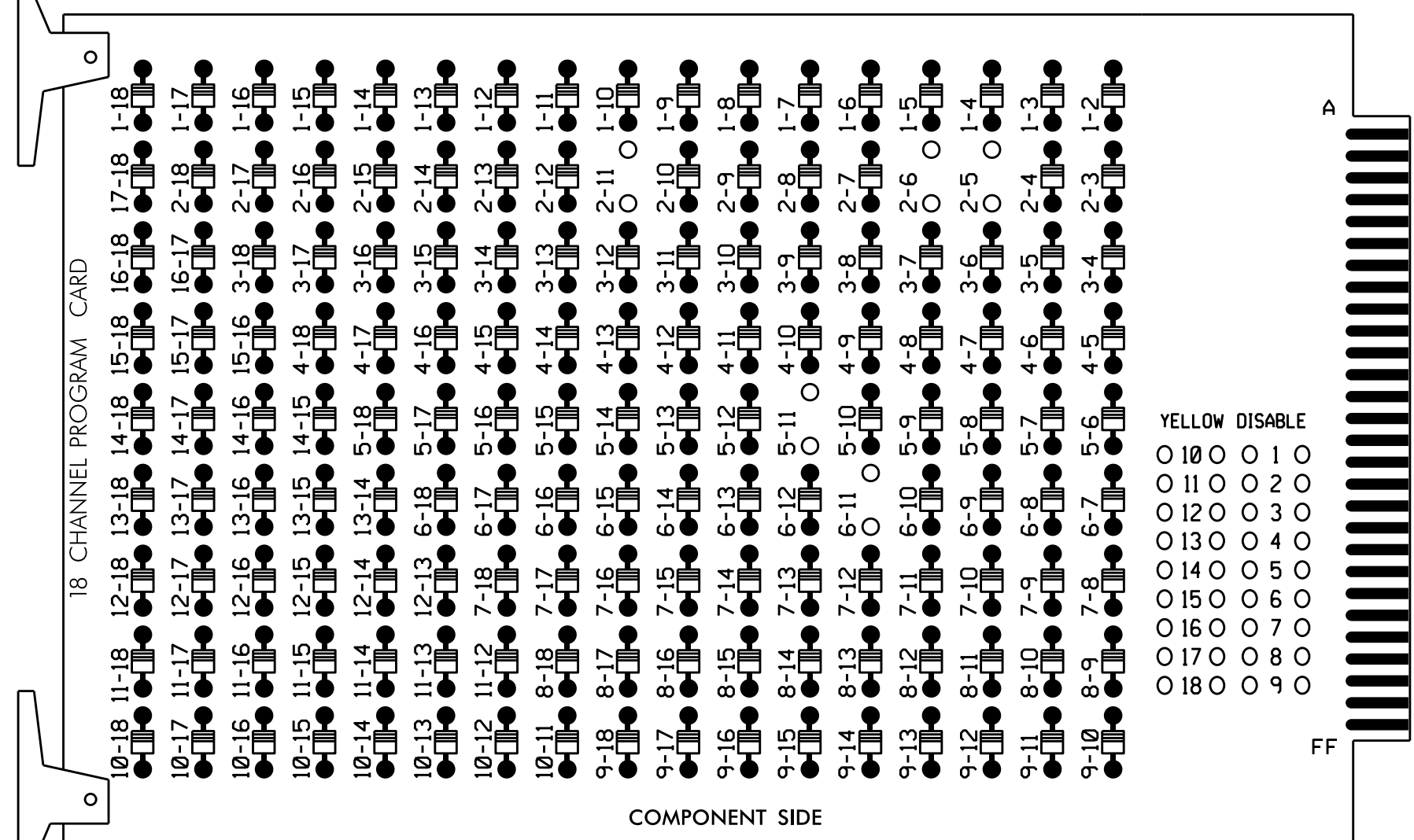
SIG. INVENTORY NO. 07-1724



EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

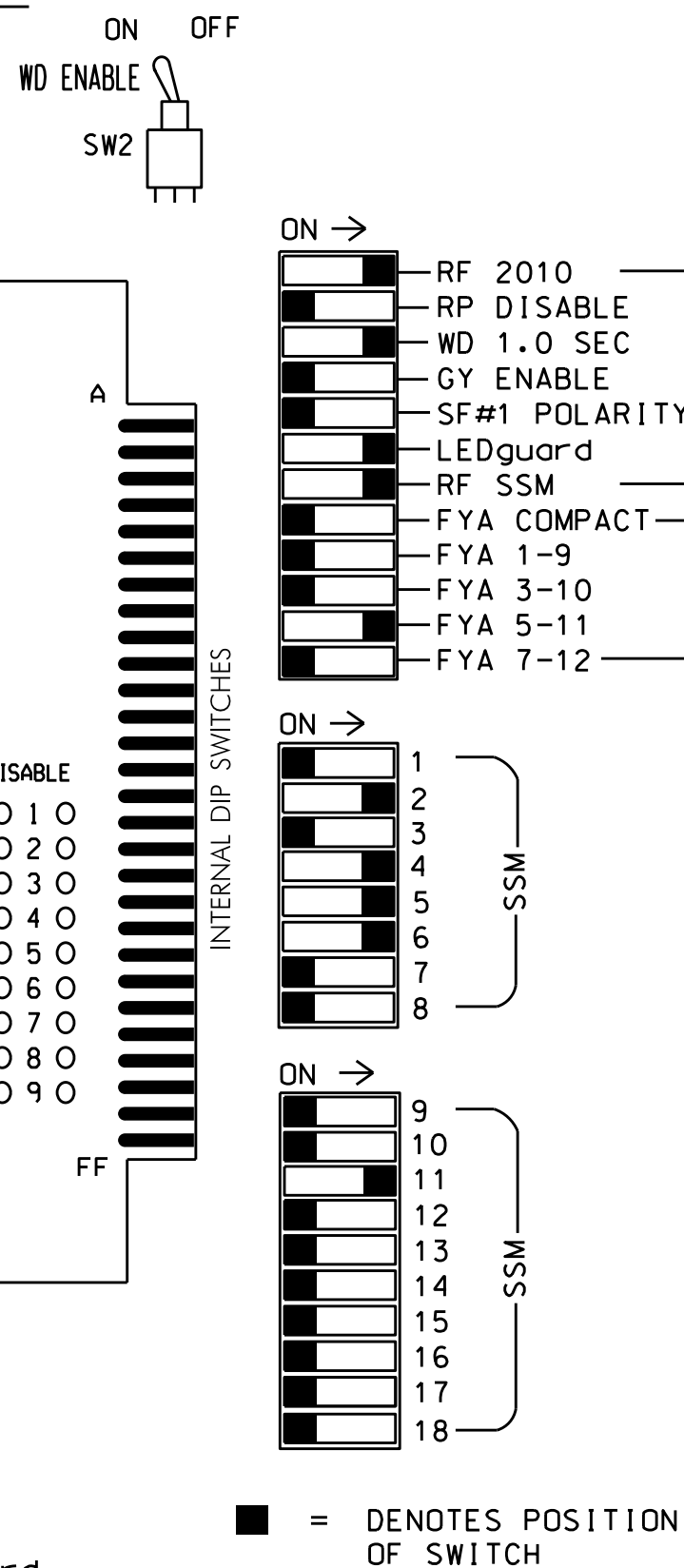
REMOVE DIODE JUMPERS 2-5, 2-6, 2-11, 5-11 and 6-11.



REMOVE JUMPERS AS SHOWN

NOTES:

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



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
- Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
- Program phases 2 and 6 for Start Up In Green.
- Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
- Ensure "Local Flash Start" feature is set to "DRK".
- Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:
FROM MAIN MENU->1->8->7 (I/O LOGIC)

Result	Src.Fcn	TimeOp	Time
1208	= 01208	DLY	1
- The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	62	NU	42	51*	61,62	NU	NU	NU	NU	NU	51*	NU	NU	
RED	128				101			*		134									
YELLOW	129				102					135									
GREEN	130				103					136									
RED ARROW																		A114	
YELLOW ARROW						102		132											A115
FLASHING YELLOW ARROW																			A116
GREEN ARROW						103		133	133										

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

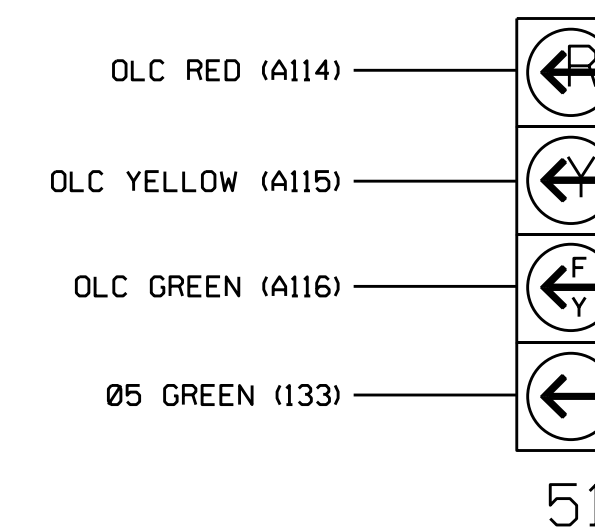
EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S7,S8,AUX S4
PHASES USED.....2,4,5,6
OVERLAP A.....NOT USED
OVERLAP B.....NOT USED
OVERLAP C.....*
OVERLAP D.....NOT USED

* See Overlap Programming Detail Sheet 2.

4 SECTION FYA PPLT SIGNAL WIRING DETAIL

(wire signal head as shown)



INPUT FILE POSITION LAYOUT

(front view)

FILE "I"	1	2	3	4	5	6	7	8	9	10	11	12	13	14	FS DC ISOLATOR
U	∅ 2	2A	∅ 3	∅ 4	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	ST DC ISOLATOR
L	NOT USED														
FILE "J"	1	2	3	4	5	6	7	8	9	10	11	12	13	14	FS DC ISOLATOR
U	∅ 5	∅ 6	∅ 7	∅ 8	∅ 9	∅ 10	∅ 11	∅ 12	∅ 13	∅ 14	∅ 15	∅ 16	∅ 17	∅ 18	ST DC ISOLATOR
L	NOT USED	NOT USED													

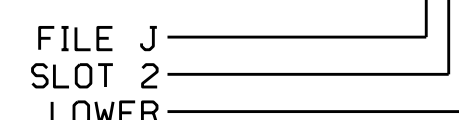
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

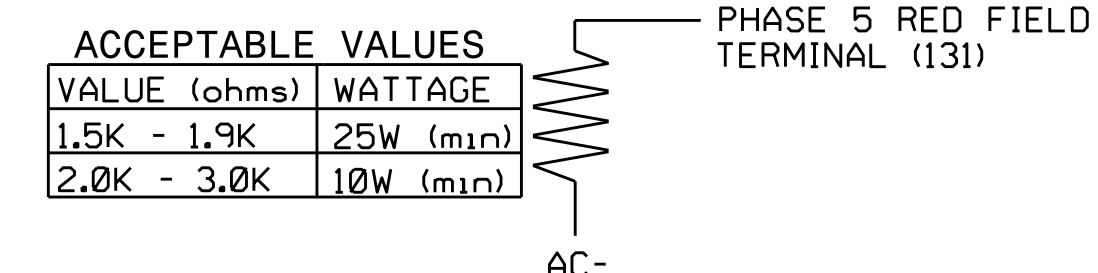
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A	TB2-5,6	I2U	39	2	2				X	X	X
4A	TB4-9,10	I6U	41	8	4				X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB4-11,12	I6L	45	9	5		15		X	X	
6A	TB3-5,6	J2U	40	16	6				X	X	X

INPUT FILE POSITION LEGEND: J2L



LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)



Electrical Detail - Sheet 1 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	SR 2523 (Yanceyville Street) at I-840 EB Ramps		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL D. Todd Joyce
	Division 7 PLAN DATE: October 2017 PREPARED BY: C. Strickland	Guilford County REVIEWED BY: T. Joyce REVIEWED BY:	

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1724
DESIGNED: August 2017
SEALED: 10/24/2017
REVISED:

27-007-2017 11:39
S:\IT\ASIS\115\Sigmod\work\hgr\oups\sig Mod\strickland\011724_Sm.ele.xxx.dgn
C:\Users\strickland

OVERLAP PROGRAMMING DETAIL FOR OVERLAP C*

(program controller as shown below)

* NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

Overlaps

1. General Parm

2. Program

3. Status

General Overlap Parameters

Lock Inhibit OFF

Conf Lock Enable OFF

Parent P Cirncs ON

Extra Included Phases OFF

InhibitLockInterval ALWAYS

PRESS "ESC"

Overlaps

1. General Parm

2. Program

3. Status

Enter Overlap # 3
then press Enter

Overlap C-3

1. Program Parm

2. Conf Prog+

3. Program Parm+

Notice
type
FYA-4
→

Ovrtp C-3	Ps.....	
Included Ps	5	0 0 0 0 0 0 0 0
Modifier Ps	6	0 0 0 0 0 0 0 0
Type: FYA-4	Grn:	0 Yel: 3.5 Red: 1.5

END OF OVERLAP PROGRAMMING DETAIL

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-1724
DESIGNED: August 2017
SEALED: 10/24/2017
REVISED:

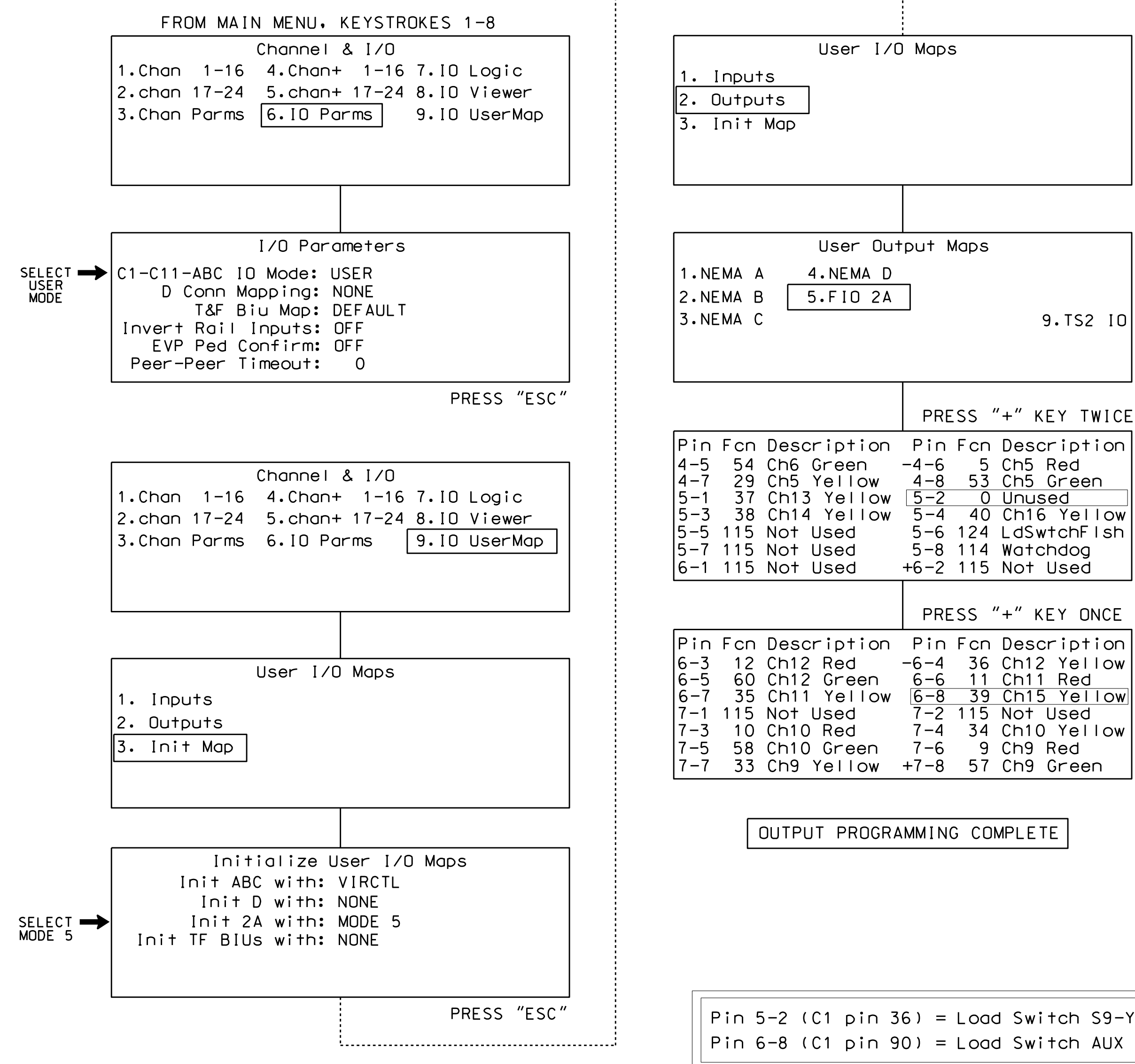
27-007-2017 11:40
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Electrical Detail - Sheet 2 of 3		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED						
<div style="border: 1px solid black; padding: 2px;"> <p style="font-size: 8px;">ELECTRICAL AND PROGRAMMING DETAILS FOR:</p> <p style="font-size: 8px;">Prepared In the Offices of:</p> <p style="font-size: 8px;">750 N. Greenfield Pkwy, Garner, NC 27529</p> </div>	<p style="font-size: 12px;">SR 2523 (Yanceyville Street) at I-840 EB Ramps</p> <p style="font-size: 8px;">Division 7 Guilford County Greensboro</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; font-size: 8px;">PLAN DATE: October 2017</td> <td style="width: 50%; font-size: 8px;">REVIEWED BY: T. Joyce</td> </tr> <tr> <td style="font-size: 8px;">PREPARED BY: C. Strickland</td> <td style="font-size: 8px;">REVIEWED BY:</td> </tr> </table>	PLAN DATE: October 2017	REVIEWED BY: T. Joyce	PREPARED BY: C. Strickland	REVIEWED BY:	<div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: 60px; margin: 0 auto;"> <p style="font-size: 8px;">SEAL</p> <p style="font-size: 8px;">NORTH CAROLINA PROFESSIONAL ENGINEER</p> <p style="font-size: 8px;">SEAL 031001</p> <p style="font-size: 8px;">TODD JOYCE</p> </div>		
PLAN DATE: October 2017	REVIEWED BY: T. Joyce							
PREPARED BY: C. Strickland	REVIEWED BY:							
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%; font-size: 8px;">REVISIONS</td> <td style="width: 10%; font-size: 8px;">INIT.</td> <td style="width: 10%; font-size: 8px;">DATE</td> </tr> <tr> <td style="height: 20px;"> </td> <td> </td> <td> </td> </tr> </table>		REVISIONS	INIT.	DATE				<p style="font-size: 8px;">DocuSigned by: <i>T. Todd Joyce</i> 10/30/2017</p> <p style="font-size: 8px;">ARB/CAD/FDR/04241D DATE</p> <p style="font-size: 8px;">SIG. INVENTORY NO. 07-1724</p>
REVISIONS	INIT.	DATE						

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.



! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

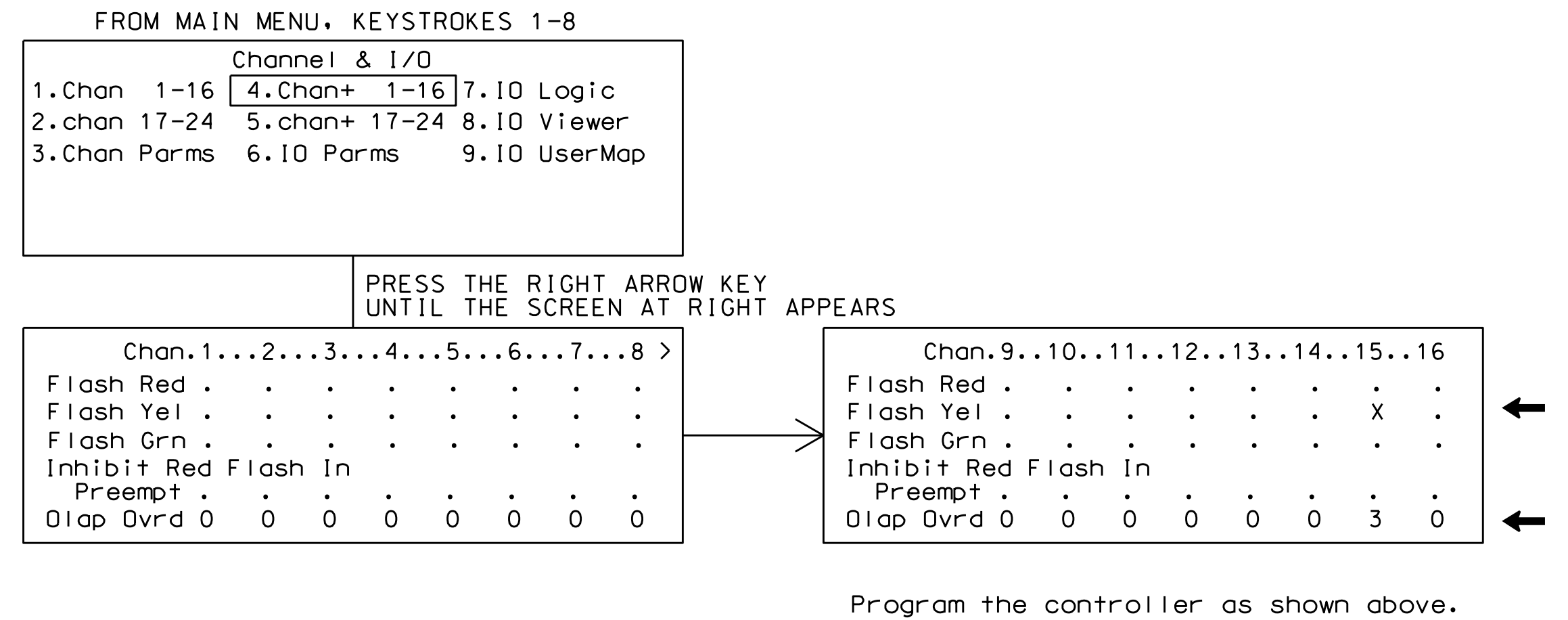
NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.



Programming notes:

Default	Change To:
Pin Fcn Description	Fcn Description
5-2 39 Ch15 Yellow....	0 Unused

Programming notes:

Default	Change To:
Pin Fcn Description	Fcn Description
6-8 59 Ch11 Green	39 Ch15 Yellow

Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1724
 DESIGNED: August 2017
 SEALED: 10/24/2017
 REVISED:

Electrical Detail - Sheet 3 of 3

Prepared In the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

SR 2523 (Yanceyville Street) at I-840 EB Ramps

Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by: D. Todd Joyce 10/30/2017

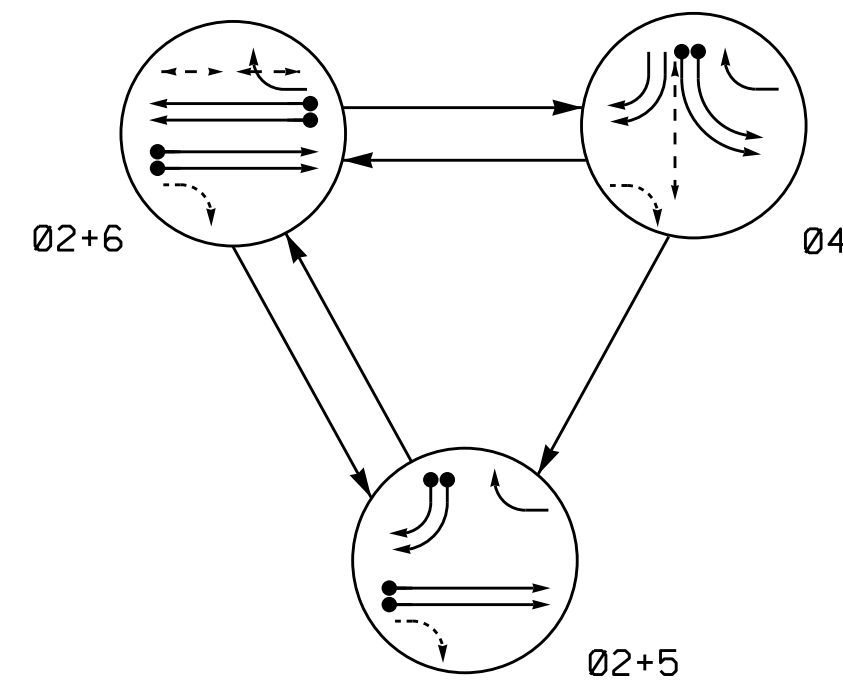
SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 031001
 TODD JOYCE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. 07-1724

07-001-2017 11:41
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 cbsr\ckland

PHASING DIAGRAM



SIGNAL FACE	PHASE			
	0 2 + 6	0 4	F L S H	Y
21, 22	G	G	R	Y
41, 42	R	R	L	R
51, 52, 53	-	R	-	R
61	R	G	R	Y
62	R	G	R	Y
P41, P42	DW	DW	W	DRK
P61, P62	DW	W	DW	DRK
P63, P64	DW	W	DW	DRK

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

LOOP & DETECTOR UNIT INSTALLATION CHART													
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER													
INDUCTIVE LOOPS					DETECTOR PROGRAMMING								
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	250	5	X	2	-	-	-	X	X	X	-	X
2B	6X6	250	5	X	2	-	-	-	X	X	X	-	X
4A	6X40	0	2-4-2	X	4	-	-	-	X	X	-	-	X
4B	6X40	0	2-4-2	X	4	-	-	-	X	X	-	-	X
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	X
5B	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	X
6A	6X6	250	5	X	6	-	-	-	X	X	X	-	X
6B	6X6	250	5	X	6	-	-	-	X	X	X	-	X

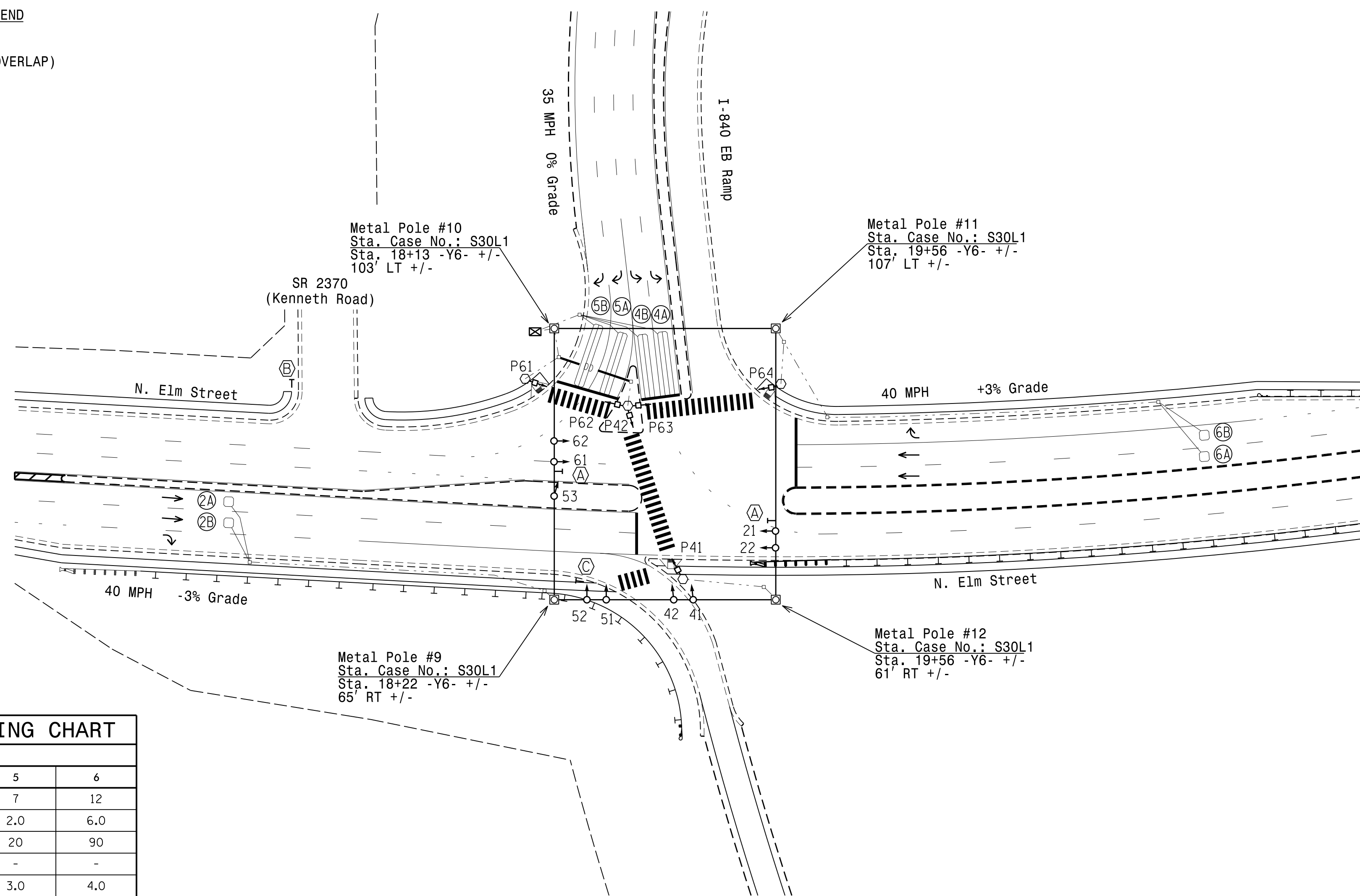
3 Phase Fully Actuated (Greensboro Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pedestrian pedestals are conceptual and shown for reference only. See sheets P1-P3 for pushbutton location details.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

PHASING DIAGRAM DETECTION LEGEND

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

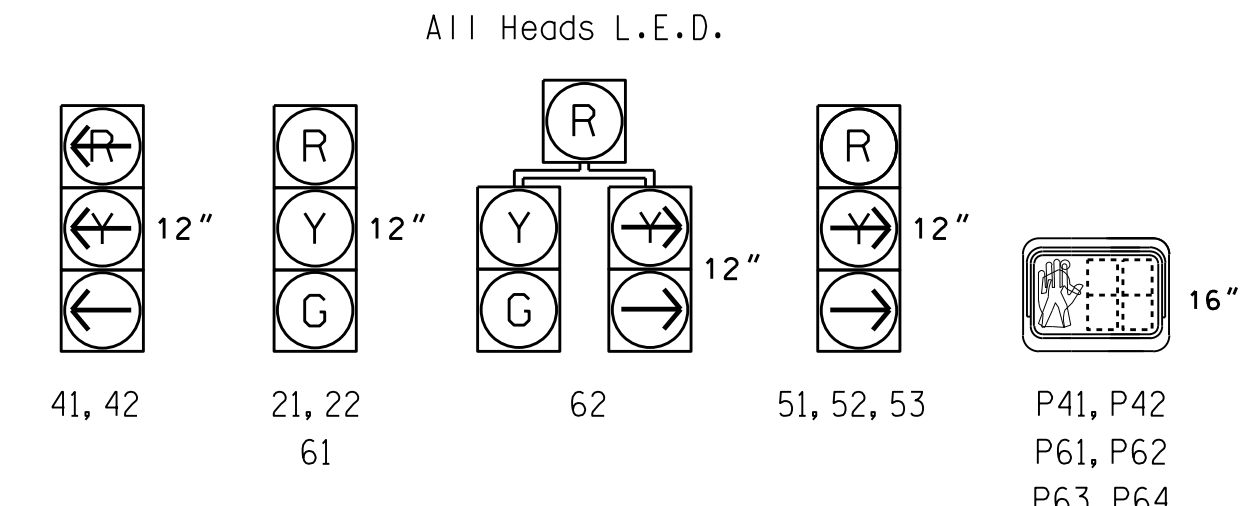


FEATURE	PHASE			
	2	4	5	6
Min Green *	12	7	7	12
Gap, Extension *	6.0	2.0	2.0	6.0
Maximum Green 1 *	90	30	20	90
Maximum Green 2 *	-	-	-	-
Yellow Clear	4.4	3.0	3.0	4.0
Red Clear	1.6	3.7	1.9	2.8
Walk *	-	7	-	7
Pedestrian Clear	-	20	-	19
Added Initial *	2.0	-	-	2.0
Maximum Initial *	29	-	-	29
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.0	-	-	3.0
Recall Mode	MIN RECALL	-	-	MIN RECALL
Lock Calls	YES	NO	NO	YES
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.

PROPOSED	EXISTING
	N/A

SIGNAL FACE I.D.



New Installation

750 N. Greenfield Pkwy, Garner, NC 27529

0 SCALE 1"=50'

N. Elm Street at I-840 EB Ramps

Division 7 Guilford County Greensboro

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: I. O. Umzurike REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

ROBERT J. ZIEMBA

10/24/2017

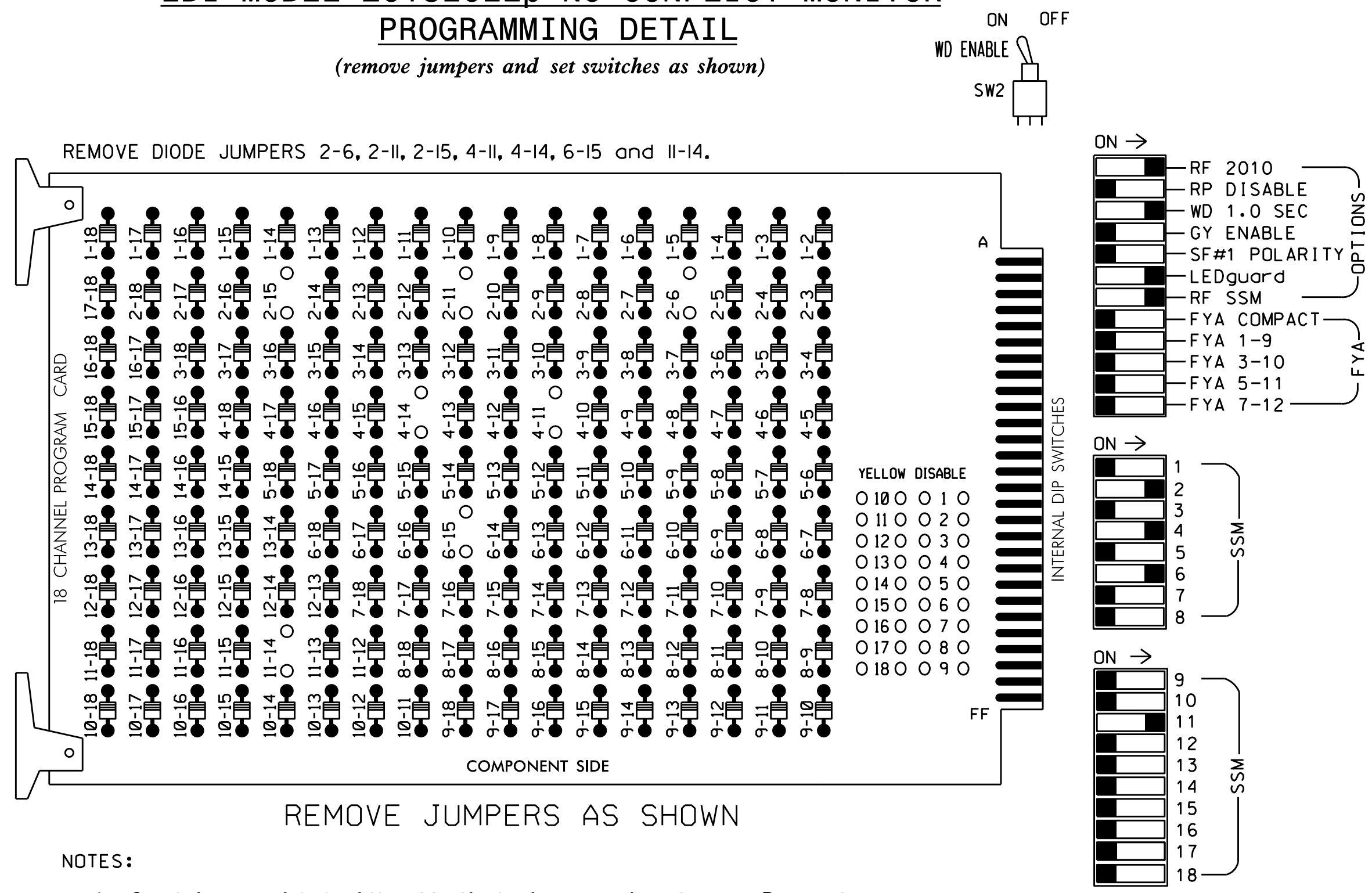
DATE

SIG. INVENTORY NO. 07-1721

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EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
- Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
- Program phase 2 for Start Up In Green and phase 6 for Start Up In Walk.
- Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
- Ensure "Local Flash Start" feature is set to "DRK".
- Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

```
FROM MAIN MENU->1->8->7 (I/O LOGIC) Result Src.Fcn TimeOp Time
1208 = 01208 DLY 1
```
- The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CNU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	P41, P42	NC	61,62	P61,P62, P63,P64	NU	NU	NU	NU	NU	NU	51, 52,53	62	NU	NU
RED		128							134							A114			
YELLOW		129							135										
GREEN		130							136										
RED ARROW						101													
YELLOW ARROW						102										A115	A115		
GREEN ARROW						103										A116	A116		
Hand								104		119									
Person																			

NU = Not Used
NC = No Connection

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332 W/ AUX
 SOFTWARE.....NAZTEC APOGEE
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S2,S5,S6,S8,S9,AUX S4
 PHASES USED.....2,4,4 PED,*5,6,6 PED
 OVERLAP A.....NOT USED
 OVERLAP B.....NOT USED
 OVERLAP C.....4+5
 OVERLAP D.....NOT USED
 * Phase used for timing purposes only.

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.

INPUT FILE POSITION LAYOUT

(front view)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE U	∅ 2	∅ 2	∅ 2	∅ 2	∅ 4	∅ 5	∅ 4	∅ 5	∅ 4	∅ 5	∅ 4	∅ 5	∅ 4	∅ 5
FILE L	2A	2B			4A	5A	4B	5B						
FILE U	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6	∅ 6
FILE L	6A	6B												

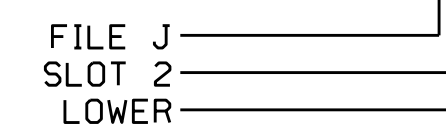
EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A	TB2-5,6	I2U	39	2	2				X	X	X
2B	TB2-7,8	I2L	43	3	2				X	X	X
4A	TB4-9,10	I6U	41	8	4				X	X	
4B	TB4-11,12	I6L	45	9	4				X	X	
5A	TB6-1,2	I7U	65	10	5		15		X	X	
5B	TB6-3,4	I7L	78	11	5		15		X	X	
6A	TB3-5,6	J2U	40	16	6				X	X	X
6B	TB3-7,8	J2L	44	17	6				X	X	X
PED PUSH BUTTONS											
P41,P42	TB8-5,6	I12L	69	PED 4	4 PED						
P61,P62, P63,P64	TB8-7,9	I13U	68	PED 6	6 PED						

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

INPUT FILE POSITION LEGEND: J2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1721
 DESIGNED: September 2017
 SEALED: 10/24/2017
 REVISED:

Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	N. Elm Street at I-840 EB Ramps		SEAL SEAL 031001 ENGINEER TODD JOYCE	
	Division 7	Guilford County		Greensboro
	PLAN DATE: October 2017	REVIEWED BY: T. Joyce		
	PREPARED BY: C. Strickland	REVIEWED BY:		
	REVISIONS	INIT.	DATE	

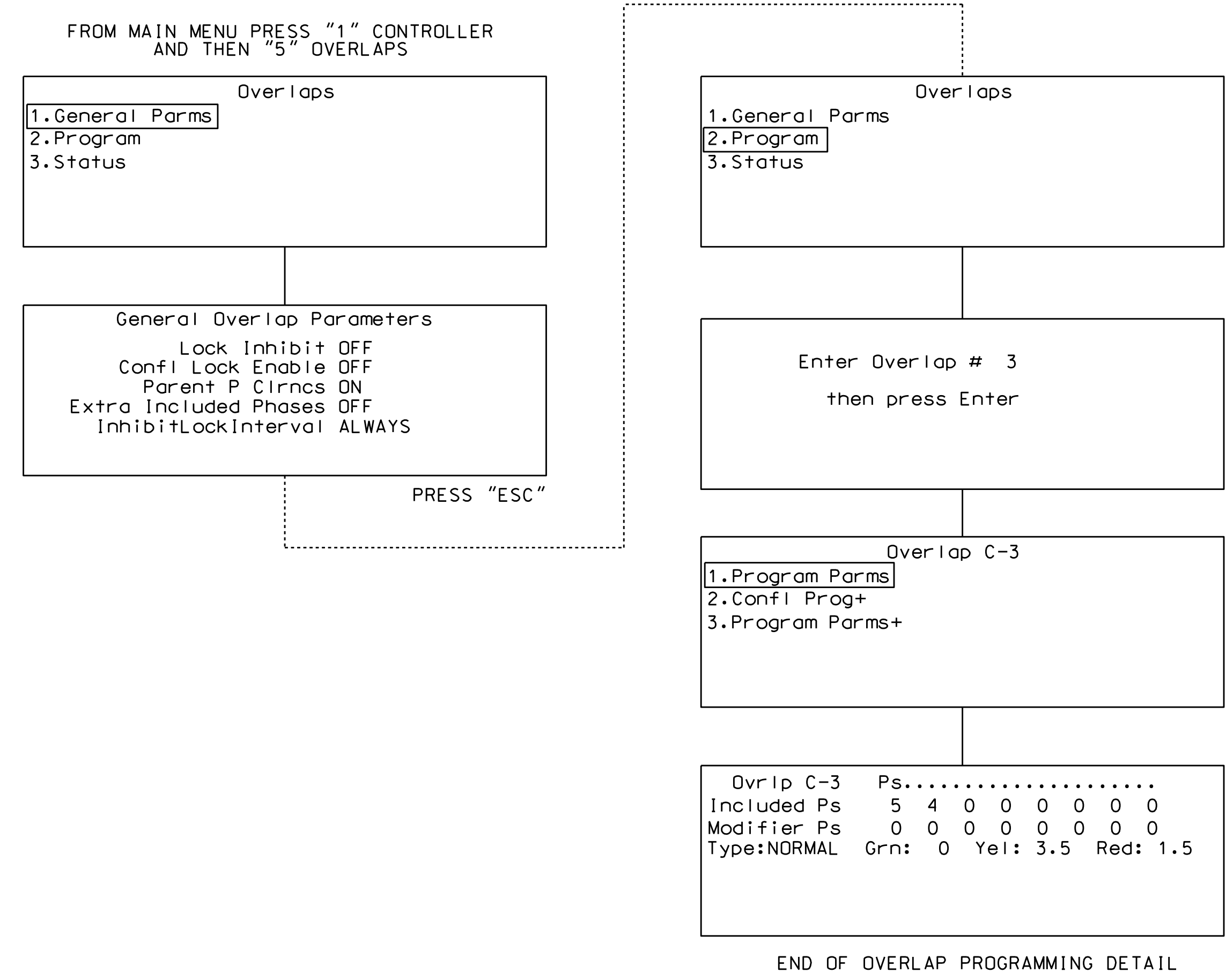
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

27-007-2017_08-16
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 C:\Users\ckland

OVERLAP PROGRAMMING DETAIL FOR OVERLAP C*

(program controller as shown below)

*NOTE FOR OVERLAP C: Use Default values for Overlap 'PLUS' programming details.



FLASHER CIRCUIT MODIFICATION DETAIL

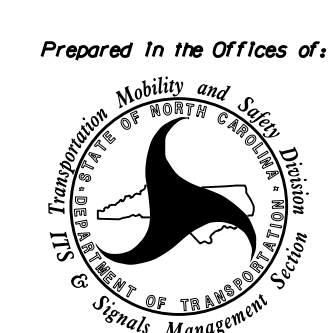
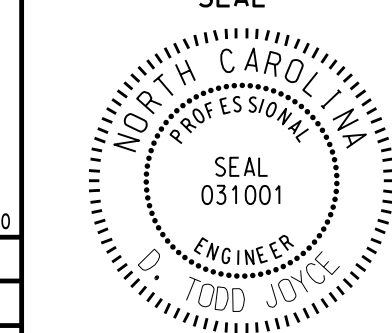
IN ORDER TO INSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

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.

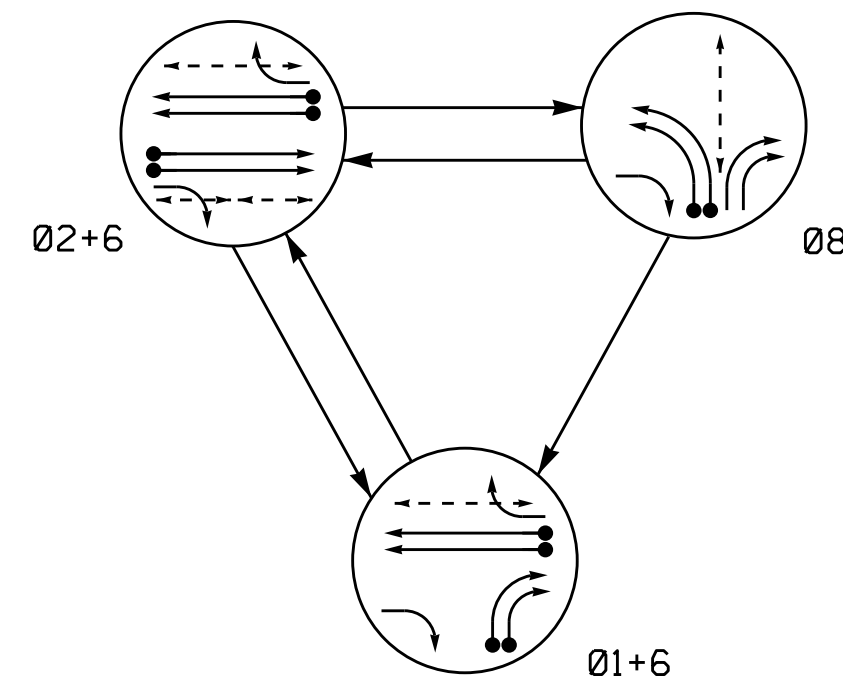
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1721
DESIGNED: September 2017
SEALED: 10/24/2017
REVISED:

Electrical Detail - Sheet 2 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	N. Elm Street at I-840 EB Ramps		SEAL  SEAL 031001 ENGINEER TODD JOYCE
	Division 7 Guilford County Greensboro PLAN DATE: October 2017 REVIEWED BY: T. Joyce PREPARED BY: C. Strickland REVIEWED BY:	Documented by: <i>T. Todd Joyce</i> 10/30/2017 DATE SIG. INVENTORY NO. 07-1721	

27-007-2017_08-18
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 cbsr\ckland

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	01+6	02+6	08	F
11, 12, 13	→	R	→	R
21	R	G	R	Y
22	R	G	R	Y
61, 62	G	G	R	Y
63	←	←	R	←
81, 82	←	←	←	←
P21, P22	DW	W	DW	DRK
P23, P24	DW	W	DW	DRK
P61, P62	W	W	DW	DRK
P81, P82	DW	DW	W	DRK

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

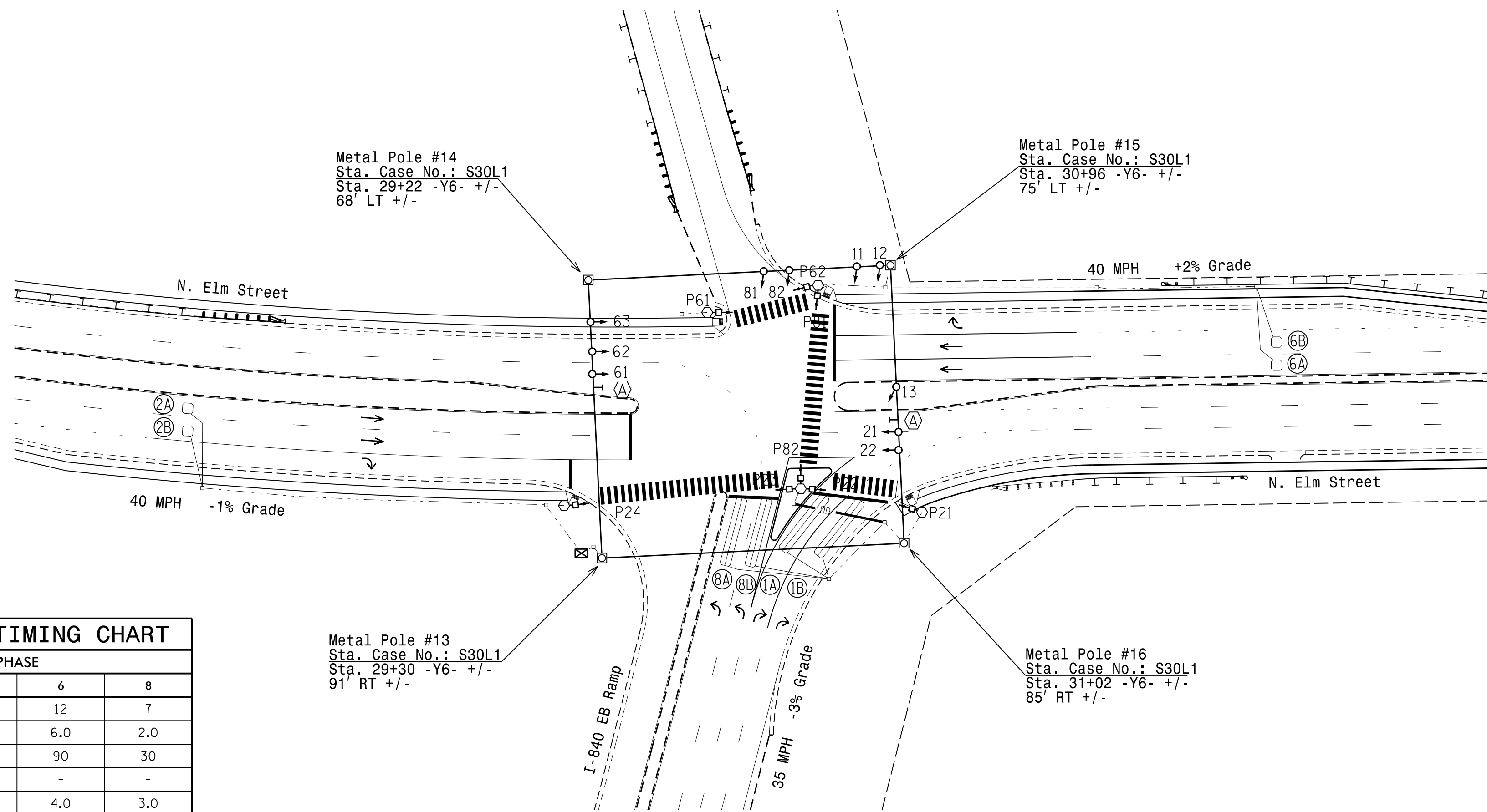
LOOP & DETECTOR UNIT INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	-	15	-	X	X	-	X
1B	6X40	0	2-4-2	X	1	-	15	-	X	X	-	X
2A	6X6	250	5	X	2	-	-	-	X	X	-	X
2B	6X6	250	5	X	2	-	-	-	X	X	-	X
6A	6X6	250	5	X	6	-	-	-	X	X	-	X
6B	6X6	250	5	X	6	-	-	-	X	X	-	X
8A	6X40	0	2-4-2	X	8	-	-	-	X	X	-	X
8B	6X40	0	2-4-2	X	8	-	-	-	X	X	-	X

3 Phase Fully Actuated (Greensboro Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pedestrian pedestals are conceptual and shown for reference only. See sheets P1-P3 for pushbutton location details.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



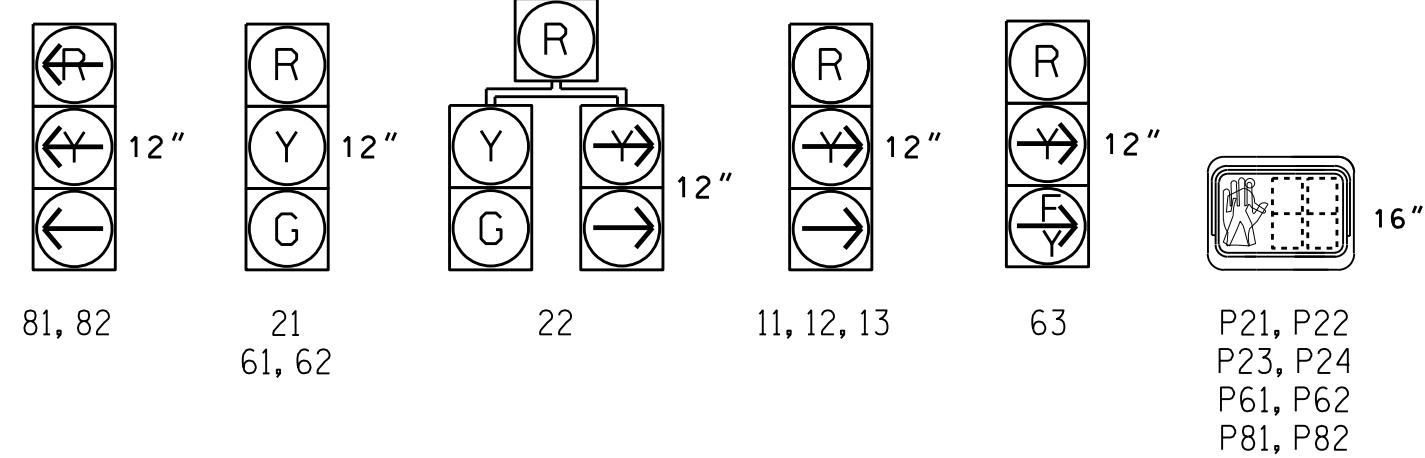
NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE			
	1	2	6	8
Min Green *	7	12	12	7
Gap, Extension *	2.0	6.0	6.0	2.0
Maximum Green 1 *	30	90	90	30
Maximum Green 2 *	-	-	-	-
Yellow Clear	3.0	4.2	4.0	3.0
Red Clear	2.4	2.9	1.2	2.9
Walk *	-	7	7	7
Pedestrian Clear	-	29	15	25
Added Initial *	-	2.0	2.0	-
Maximum Initial *	-	29	29	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	30	30	-
Minimum Gap	-	3.0	3.0	-
Recall Mode	-	MIN RECALL	MIN RECALL	-
Lock Calls	NO	YES	YES	NO
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.

SIGNAL FACE I.D.

All Heads L.E.D.



PROPOSED	EXISTING
○ → Traffic Signal Head	● → Traffic Signal Head
○ → Modified Signal Head	N/A
○ → Sign	N/A
○ → Pedestrian Signal Head With Push Button & Sign	○ → Pedestrian Signal Head
○ → Signal Pole with Guy	○ → Signal Pole with Guy
○ → Signal Pole with Sidewalk Guy	○ → Signal Pole with Sidewalk Guy
○ → Inductive Loop Detector	○ → Inductive Loop Detector
○ → Controller & Cabinet	○ → Controller & Cabinet
○ → Junction Box	○ → Junction Box
○ → 2-in Underground Conduit	○ → 2-in Underground Conduit
N/A → Right of Way	○ → Right of Way
N/A → Directional Arrow	○ → Directional Arrow
N/A → Guardrail	○ → Guardrail
N/A → Curb Ramp	○ → Curb Ramp
○ → Metal Strain Pole	○ → Metal Strain Pole
○ → Directional Drill	N/A
○ → No U-Turn/No Left Turn Sign (R3-18)	○ → No U-Turn/No Left Turn Sign (R3-18)

New Installation

Prepared in the Offices of:
 Transportation Mobility and Safety Solutions
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 Signal Design Section

750 N. Greenfield Pkwy, Garner, NC 27529

N. Elm Street at I-840 WB Ramps

Division 7 Guilford County Greensboro

PLAN DATE: September 2017 REVIEWED BY:

PREPARED BY: I. O. Umzurike REVIEWED BY:

REVISIONS

NO.	INIT.	DATE

SCALE: 1" = 50'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL: ROBERT J. ZIEMBA, PROFESSIONAL ENGINEER, SEAL 026486

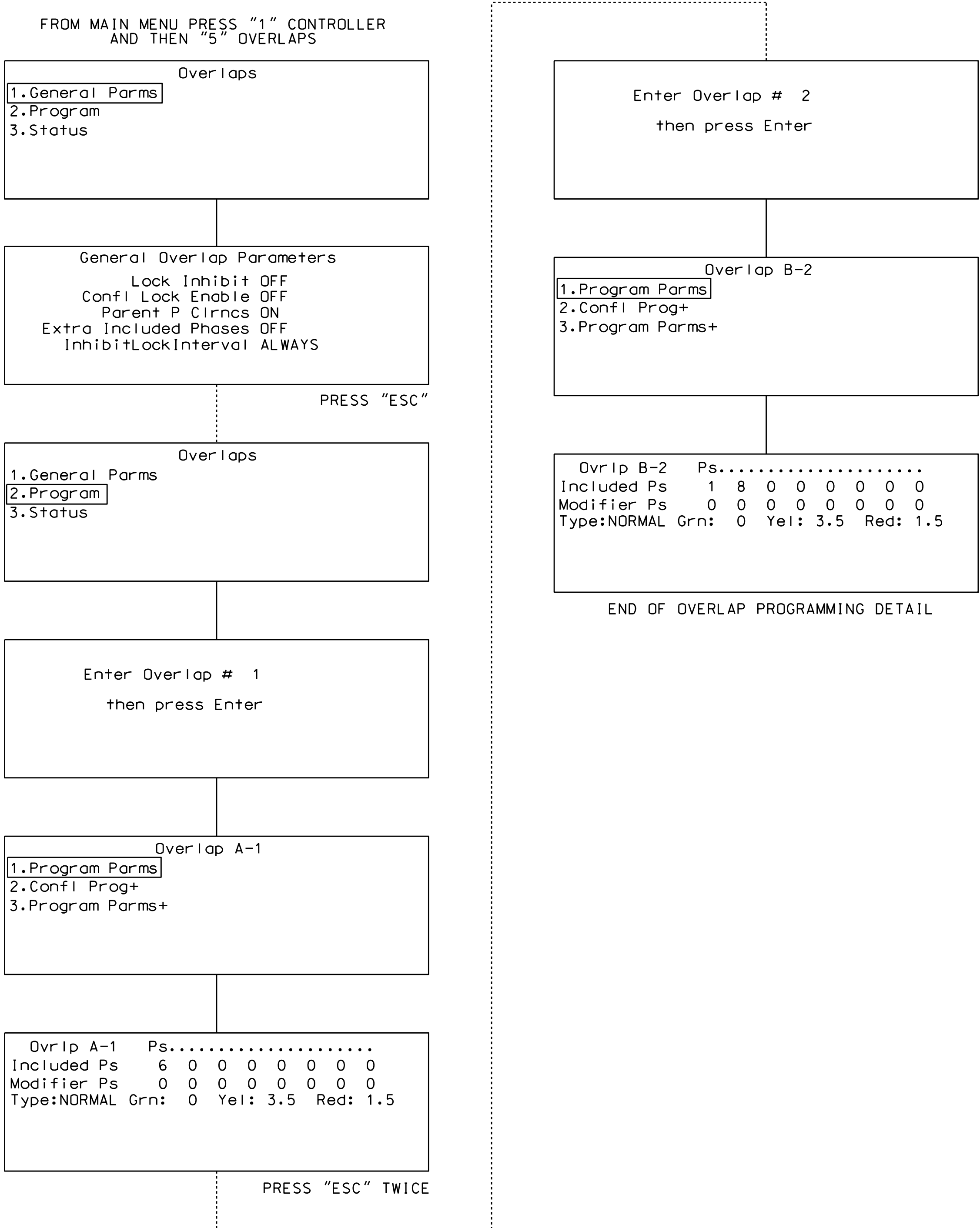
DATE: 10/24/2017

SIG. INVENTORY NO. 07-1722

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A and B*

(program controller as shown below)

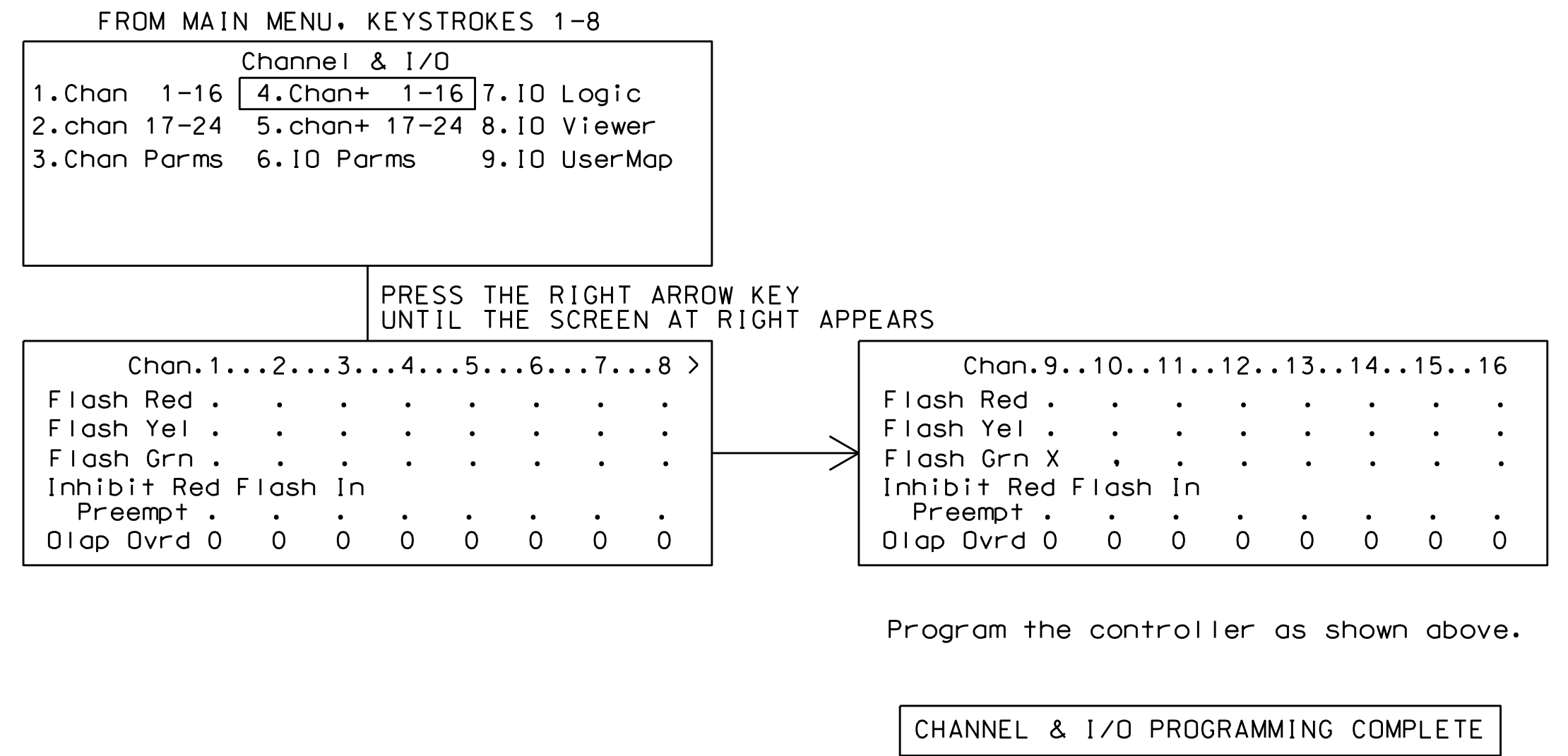
*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.



CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash.



FLASHER CIRCUIT MODIFICATION DETAIL

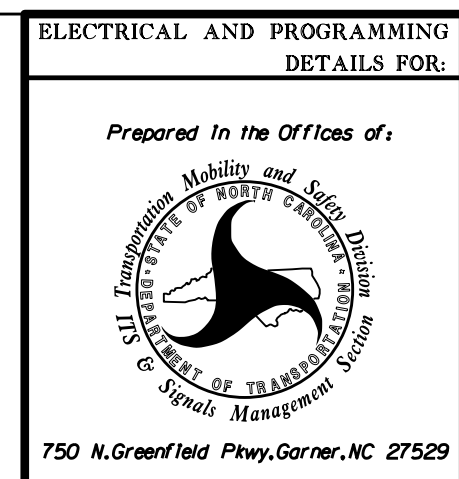
IN ORDER TO ENSURE THAT SIGNALS FLASH CONCURRENTLY ON THE SAME APPROACH, MAKE THE FOLLOWING FLASHER CIRCUIT CHANGES:

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.

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THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-1722
DESIGNED: September 2017
SEALED: 10/24/2017
REVISED:



Electrical Detail - Sheet 2 of 2

N. Elm Street at I-840 WB Ramps	
Division 7	Guilford County
PLAN DATE: October 2017	REVIEWED BY: T. Joyce
PREPARED BY: C. Strickland	REVIEWED BY:
REVISIONS	INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

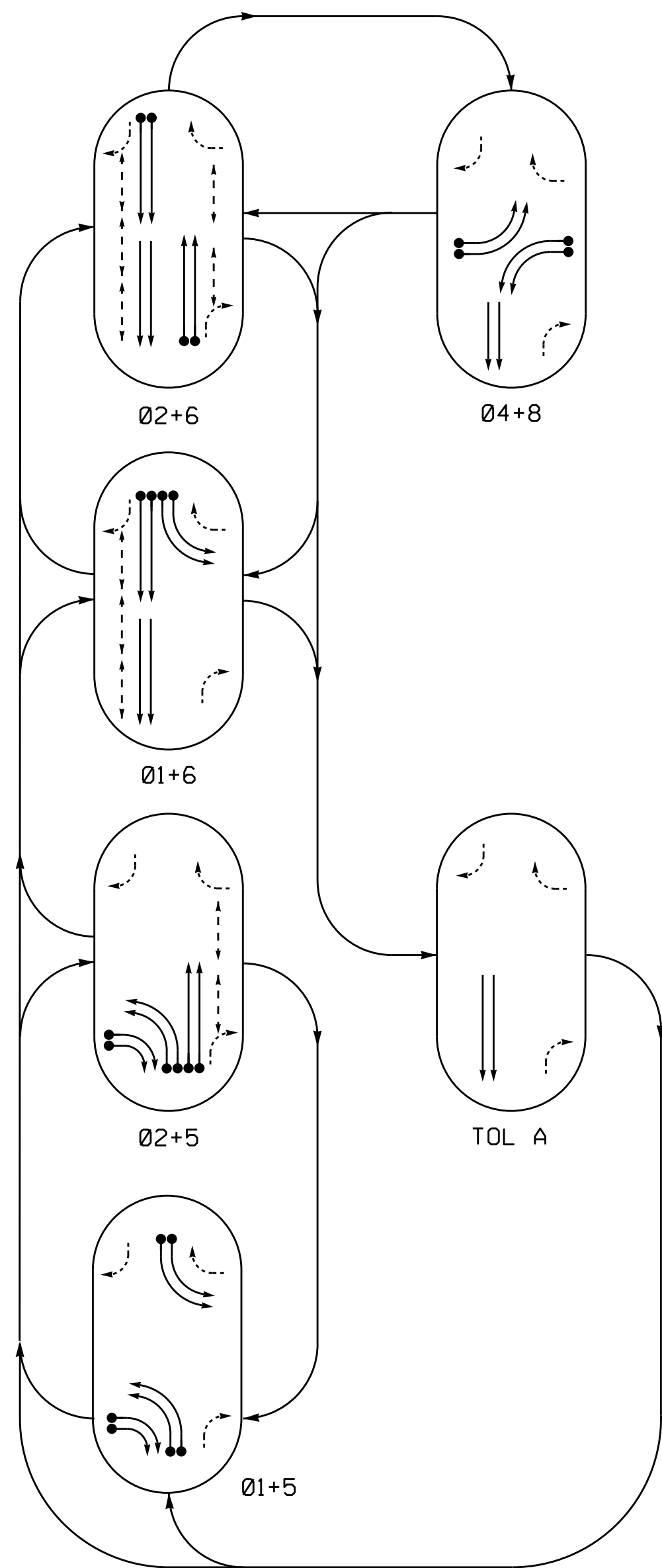
SEAL

TODD JOYCE
PROFESSIONAL ENGINEER
031001

Declassified by: T. Todd Joyce 10/30/2017
DATE

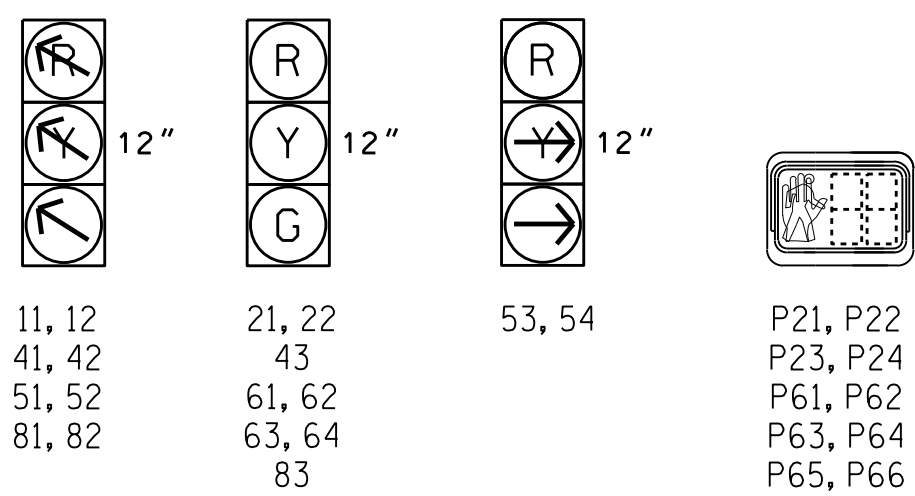
SIG. INVENTORY NO. 07-1722

PHASING DIAGRAM



SIGNAL FACE I.D.

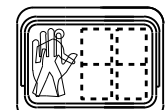
All Heads L.E.D.



11, 12
41, 42
51, 52
81, 82

21, 22
43
61, 62
63, 64
83

53, 54



P21, P22
P23, P24
P61, P62
P63, P64
P65, P66

LOOP & DETECTOR UNIT INSTALLATION CHART
NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING								
					PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	X	1	-	-	-	X	X	-	-	X
1B	6X40	0	2-4-2	X	1	-	-	-	X	X	-	-	X
2A	6X6	300	5	-	2	-	-	-	X	X	X	-	-
2B	6X6	300	5	-	2	-	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	-	-	-	X	X	-	-	-
4B	6X40	0	2-4-2	-	4	-	-	-	X	X	-	-	-
5A	6X40	0	2-4-2	-	5	-	-	-	X	X	-	-	-
5B	6X40	0	2-4-2	-	5	-	-	-	X	X	-	-	-
5C	6X40	0	2-4-2	-	5	-	15	-	X	X	-	-	-
5D	6X40	0	2-4-2	-	5	-	15	-	X	X	-	-	-
6A	6X6	300	5	-	6	-	-	-	X	X	X	-	-
6B	6X6	300	5	-	6	-	-	-	X	X	X	-	-
8A	6X40	0	2-4-2	X	8	-	-	-	X	X	-	-	X
8B	6X40	0	2-4-2	X	8	-	-	-	X	X	-	-	X

5 Phase Fully Actuated (Greensboro Signal System)

NOTES

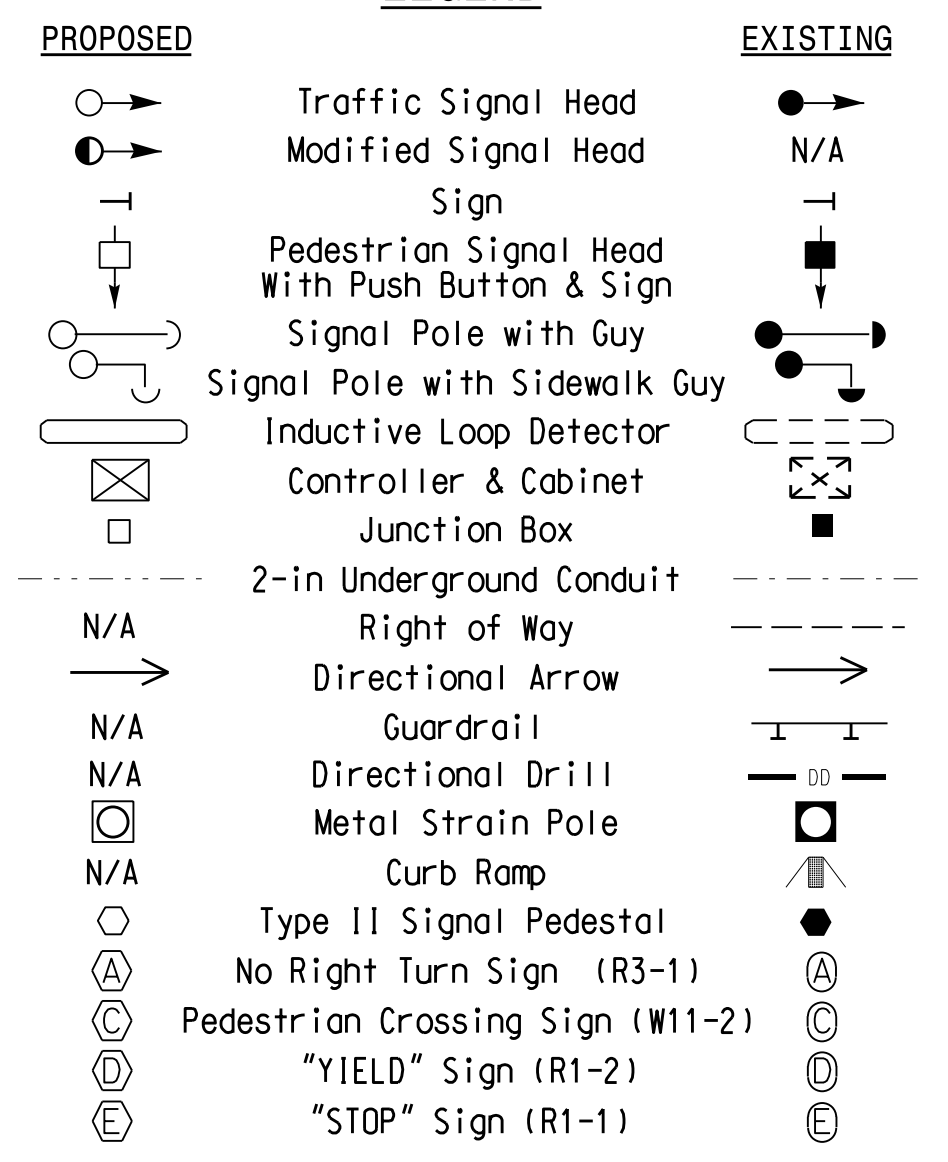
- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or Phase 5 may be lagged.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Pedestrian pedestals are conceptual and shown for reference only. See sheets P1-P3 for pushbutton location details.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

TABLE OF OPERATION

SIGNAL FACE	PHASE							
	Ø1	Ø2	Ø4	Ø5	TOL	A	Ø8	Ø6
11, 12	/	/	/	/	/	/	/	/
21, 22	R	G	R	G	R	R	Y	
41, 42	/	/	/	/	/	/	/	/
43	R	R	R	R	G	R	R	
51, 52	/	/	/	/	/	/	/	/
53, 54	-	-	R	R	R	R	R	
61, 62	R	R	G	G	R	R	Y	
63, 64	R	R	G	G	G	G	Y	
81, 82	/	/	/	/	/	/	/	/
83	R	R	R	R	G	R	R	
P21, P22	DW	W	DW	W	DW	DW	DRK	
P23, P24	DW	W	DW	W	DW	DW	DRK	
P61, P62	DW	DW	W	W	DW	DW	DRK	
P63, P64	DW	DW	W	W	DW	DW	DRK	
P65, P66	DW	DW	W	W	DW	DW	DRK	

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

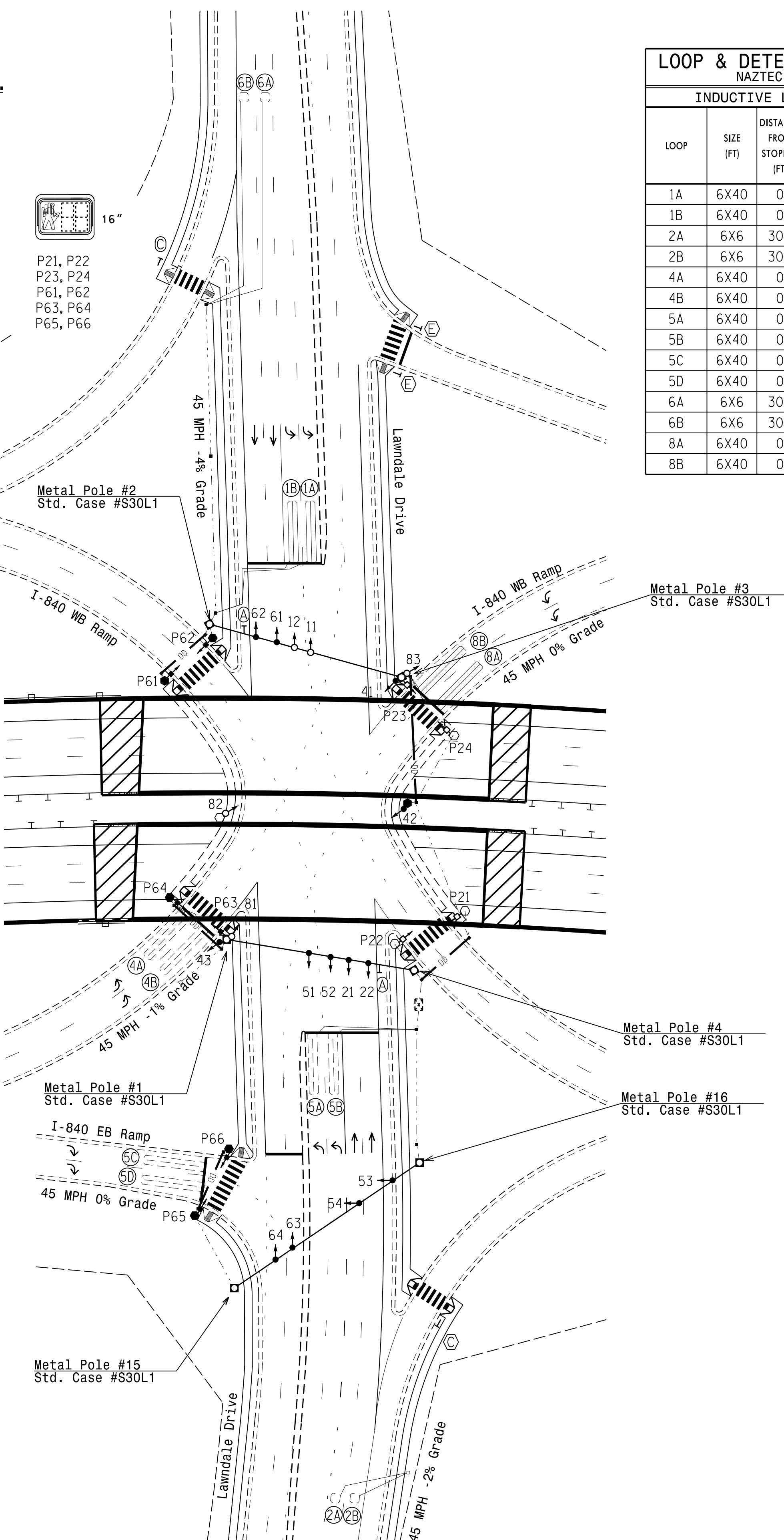
LEGEND



NAZTEC APOGEE 2070 TIMING CHART

FEATURE	PHASE						
	1	2	4	5	6	8	TOL A
Min Green *	7	12	7	7	12	7	4
Gap, Extension *	2.0	6.0	2.0	2.0	6.0	2.0	
Maximum Green 1 *	15	90	30	15	90	30	
Maximum Green 2 *	-	-	-	-	-	-	
Yellow Clear	3.4	4.7	3.2	3.3	4.9	3.2	4.3
Red Clear	5.0	3.2	3.9	5.0	3.3	3.9	1.0
Walk *	-	7	-	-	7	-	
Pedestrian Clear	-	7	-	-	7	-	
Added Initial *	-	1.5	-	-	1.5	-	
Maximum Initial *	-	34	-	-	34	-	
Time Before Reduction *	-	15	-	-	15	-	
Time To Reduce *	-	30	-	-	30	-	
Minimum Gap	-	3.0	-	-	3.0	-	
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-	
Lock Calls	NO	YES	NO	NO	YES	NO	
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.



Signal Upgrade

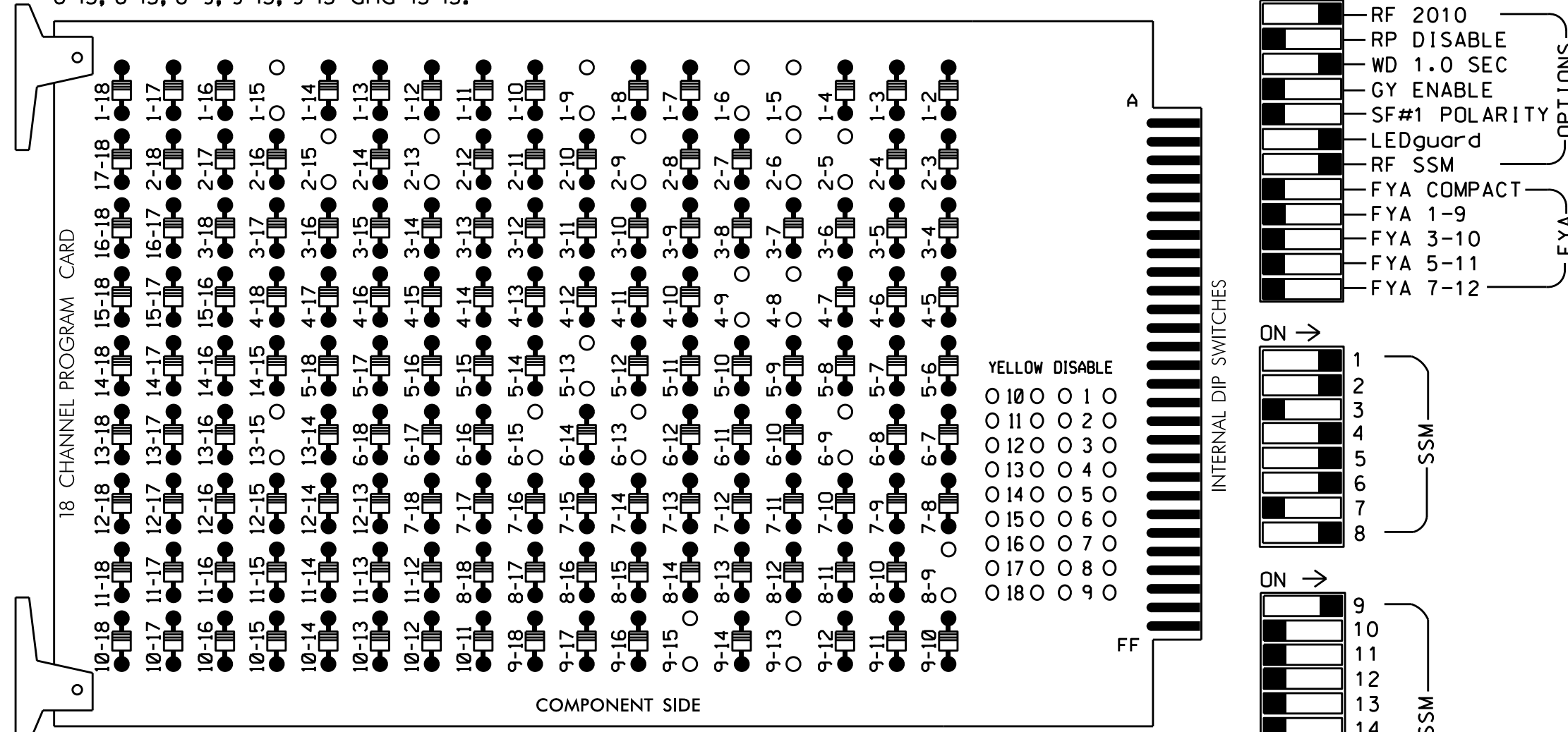
Prepared in the Offices of:

Lawndale Drive at I-840 Ramps
 Division 7 Guilford County Greensboro
 PLAN DATE: August 2017 REVIEWED BY:
 PREPARED BY: I. O. Umozurike REVIEWED BY:
 SCALE: 1" = 50'
 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
 DATE: 10/24/2017
 SIG. INVENTORY NO. 07-0535

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EDI MODEL 2018EClip-NC CONFLICT MONITOR PROGRAMMING DETAIL
(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-15, 2-5, 2-6, 2-9, 2-13, 2-15, 4-8, 4-9, 5-13, 6-9, 6-13, 6-15, 8-9, 9-13, 9-15 and 13-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = 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.
- Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
- Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
- Program phases 2 and 6 for Start Up In Walk.
- Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
- Ensure "Local Flash Start" feature is set to "DRK".
- Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:
FROM MAIN MENU->1->8->7 (I/O LOGIC) Result Src.Fcn TimeOp Time
I208 = 0I208 DLY 1
- Program phases 4 and 8 for Dual Entry.
- The cabinet and controller are part of the City of Greensboro Signal System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6	
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18	
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE	
SIGNAL HEAD NO.	11,12	21,22	P21,P22 P23,P24	NU	41,42	43	NU	51,52	53,54	61,62	P61,P62 P63,P64 P65,P66	NU	81,82	83	NU	63,64	NU	NU	NU
RED		128			101			131	134			107	A121						
YELLOW		129			102			135				108	A122						
GREEN		130			103			136				109	A123						
RED ARROW	125				101			131				107							
YELLOW ARROW	126				102			132	132			108							
GREEN ARROW	127				103			133	133			109							
Hand				113									119						
Walking				115									121						

NU = Not Used

EQUIPMENT INFORMATION

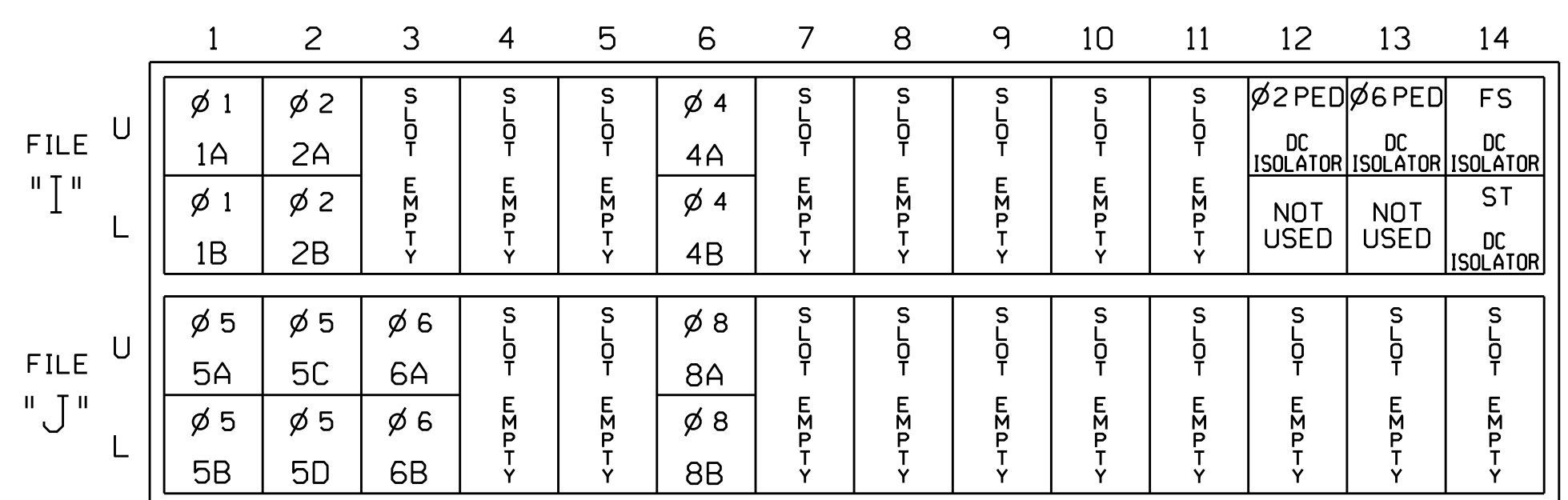
CONTROLLER.....2070
 CABINET.....332 W/ AUX
 SOFTWARE.....NAZTEC APOGEE
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S1,S2,S3,S5,S7,S8,S9,S11,AUX S1
 PHASES USED.....1,2,2 PED,4,5,6,6 PED,8
 OVERLAP A.....6+8
 OVERLAP B.....NOT USED
 OVERLAP C.....NOT USED
 OVERLAP D.....NOT USED

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)



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

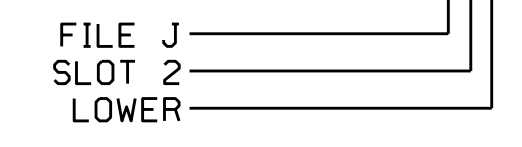
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
1A	TB2-1,2	I1U	56	1	1				X	X	
1B	TB2-3,4	I1L	56	1	1				X	X	
2A	TB2-5,6	I2U	39	2	2				X	X	X
2B	TB2-7,8	I2L	43	3	2				X	X	X
4A	TB4-9,10	I6U	41	8	4				X	X	
4B	TB4-11,12	I6L	45	9	4				X	X	
5A	TB3-1,2	J1U	55	15	5				X	X	
5B	TB3-3,4	J1L	55	15	5				X	X	
5C	TB3-5,6	J2U	40	16	5		15		X	X	
5D	TB3-7,8	J2L	44	17	5		15		X	X	
6A	TB3-9,10	J3U	64	18	6				X	X	X
6B	TB3-11,12	J3L	77	19	6				X	X	X
8A	TB5-9,10	J6U	42	22	8				X	X	
8B	TB5-11,12	J6L	46	23	8				X	X	
PED PUSH BUTTONS											
P21,P22	TB8-4,6	I12U	67	PED 2	2 PED						
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED						

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

INPUT FILE POSITION LEGEND: J2L



Electrical Detail - Sheet 1 of 2

ELECTRICAL AND PROGRAMMING DETAILS FOR: Lawndale Drive at I-840 Ramps

Prepared In the Offices of:

Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS: _____ INIT. DATE

DocuSign by: 11/1/2017

SIG. INVENTORY NO. 07-0535

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0535
 DESIGNED: August 2017
 SEALED: 10/24/2017
 REVISED:

01-1004-2017_07-16
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C:\Users\cstrickland

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

Overlaps
1.General Parm
2.Program
3.Status

Enter Overlap # 1
then press Enter

Overlap A-1
1.Program Parm
2.Confl Prog+
3.Program Parm+

OvrIp A-1 Ps.....
Included Ps 6 8 0 0 0 0 0 0
Modifier Ps 0 0 0 0 0 0 0 0
Type:NORMAL Grn: 4 Yel: 4.3 Red: 1.0

Note Grn,
Yel, Red
values for
Timed
Overlap A

PRESS "ESC"

Overlap A-1
1.Program Parm
2.Confl Prog+
3.Program Parm+

OvrIp A-1 Ps.....
Confl Ps 0 0 0 0 0 0 0 0
Confl OvrIps 0 0 0 0 0 0 0 0
Confl Peds 0 0 0 0 0 0 0 0

PRESS "ESC"

Overlap A-1
1.Program Parm
2.Confl Prog+
3.Program Parm+

OvrIp A-1
Leading Green OFF FYA MCE Disable OFF
Transit Input 0 FYA Skip Red OFF
FYA Delay Time 0 FYA AfterPreempt OFF
PedCallClear OFF FYA Ext Overlap 0
PedClearTime 0 FYA ImmedReturn OFF
GreenExtInh 0 0 0 0 0 0 0 0

PRESS "ESC" TWICE

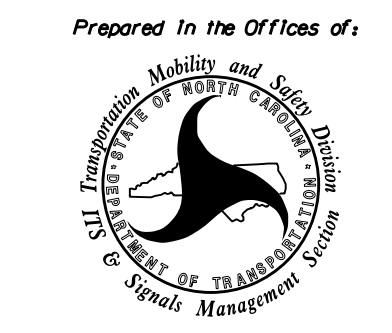
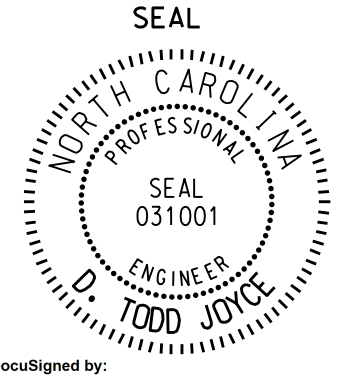
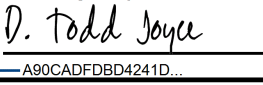
Overlaps
1.General Parm
2.Program
3.Status

General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Cirncs OFF
Extra Included Phases OFF
InhibitLockInterval ALWAYS

OVERLAP PROGRAMMING COMPLETE

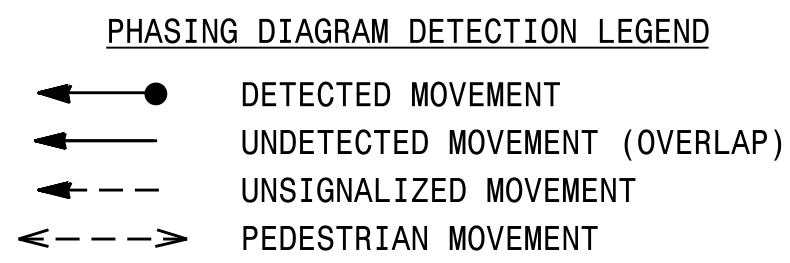
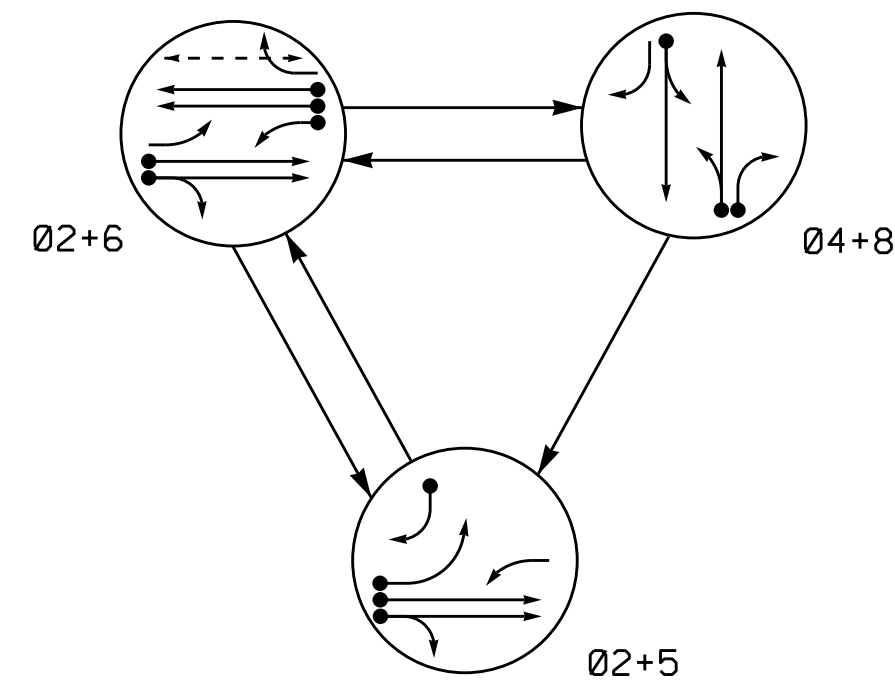
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0535
DESIGNED: August 2017
SEALED: 10/24/2017
REVISED:

Electrical Detail - Sheet 2 of 2

 Prepared In the Offices of: Guilford County Department of Transportation and Public Works 750 N. Greenfield Pkwy, Garner, NC 27529	DETAILS FOR: Lawndale Drive at I-840 Ramps		
	Division 7 PLAN DATE: October 2017 PREPARED BY: C. Strickland	Guilford County GREENSBORO REVIEWED BY: T. Joyce REVIEWED BY:	
REVISIONS		INIT. DATE	DocuSigned by:  11/1/2017 DATE
SIG. INVENTORY NO. 07-0535		DATE	

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PHASING DIAGRAM

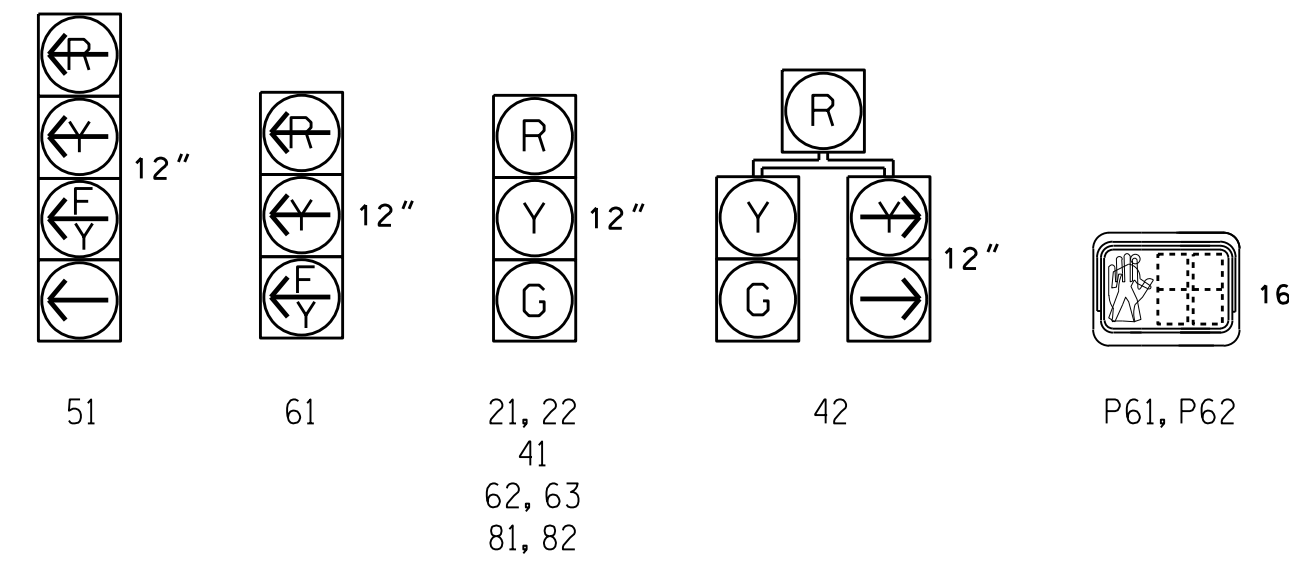


SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	F	F	FR	FR
61	F	F	FR	FR
62, 63	R	G	R	Y
81, 82	R	R	G	R
P61, P62	DW	W	DW	DRK

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

SIGNAL FACE I.D.

All Heads L.E.D.



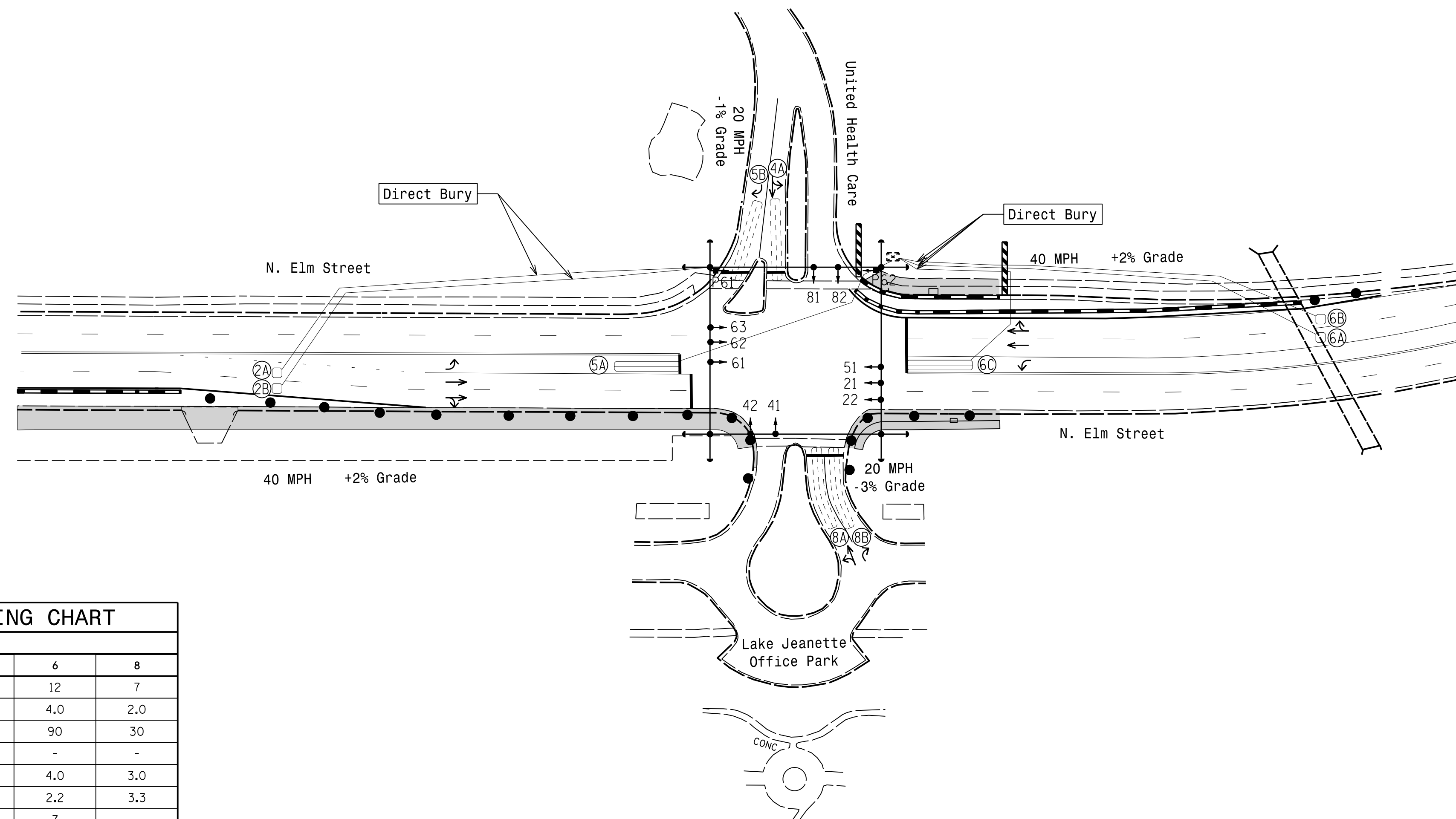
LOOP & DETECTOR UNIT INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING								
					PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	250	4	X	2	-	-	-	X	X	X	-	-
2B	6X6	250	4	X	2	-	-	-	X	X	X	-	-
4A	6X50	+5	2-4-2	-	4	-	-	-	X	X	-	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-	-
5B	6X50	+5	2-4-2	-	5	-	15	-	X	X	-	-	-
6A	6X6	250	4	X	6	-	-	-	X	X	X	-	-
6B	6X6	250	4	X	6	-	-	-	X	X	X	-	-
6C	6X40	0	2-4-2	X	6	-	-	-	X	X	-	-	-
8A	6X50	+5	2-4-2	-	8	-	-	-	X	X	-	-	-
8B	6X50	+5	2-4-2	-	8	-	10	-	X	X	-	-	-

3 Phase Fully Actuated (Greensboro Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Re-number existing phases, loops, and signal heads as shown.
- 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.
- Pedestrian pedestals are conceptual and shown for reference only. See sheets P1-P3 for pushbutton location details.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



FEATURE	PHASE				
	2	4	5	6	8
Min Green *	12	7	7	12	7
Gap, Extension *	4.0	2.0	2.0	4.0	2.0
Maximum Green 1 *	90	30	30	90	30
Maximum Green 2 *	-	-	-	-	-
Yellow Clear	4.0	3.0	3.0	4.0	3.0
Red Clear	2.2	3.3	3.2	2.2	3.3
Walk *	-	-	-	7	-
Pedestrian Clear	-	-	-	23	-
Added Initial *	2.0	-	-	2.0	-
Maximum Initial *	29	-	-	29	-
Time Before Reduction *	15	-	-	15	-
Time To Reduce *	30	-	-	30	-
Minimum Gap	3.0	-	-	3.0	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Lock Calls	YES	NO	NO	YES	NO
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	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.

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
○ → Modified Signal Head	○ → N/A
○ → Sign	○ → N/A
○ → Pedestrian Signal Head	○ → N/A
○ → Signal Pole with Push Button & Sign	○ → N/A
○ → Signal Pole with Guy	○ → N/A
○ → Signal Pole with Sidewalk Guy	○ → N/A
○ → Inductive Loop Detector	○ → N/A
○ → Controller & Cabinet	○ → N/A
○ → Junction Box	○ → N/A
○ → 2-in Underground Conduit	○ → N/A
○ → Right of Way	○ → N/A
○ → Directional Arrow	○ → N/A
○ → Construction Zone Drums	○ → N/A
○ → Construction Zone	○ → N/A
○ → Guardrail	○ → N/A

Signal Upgrade Temporary Design 1 (TMP Phase I)

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

N. Elm Street at United Health Care and Lake Jeanette Office Park

Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY: I. O. Umozurike

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

10/31/2017

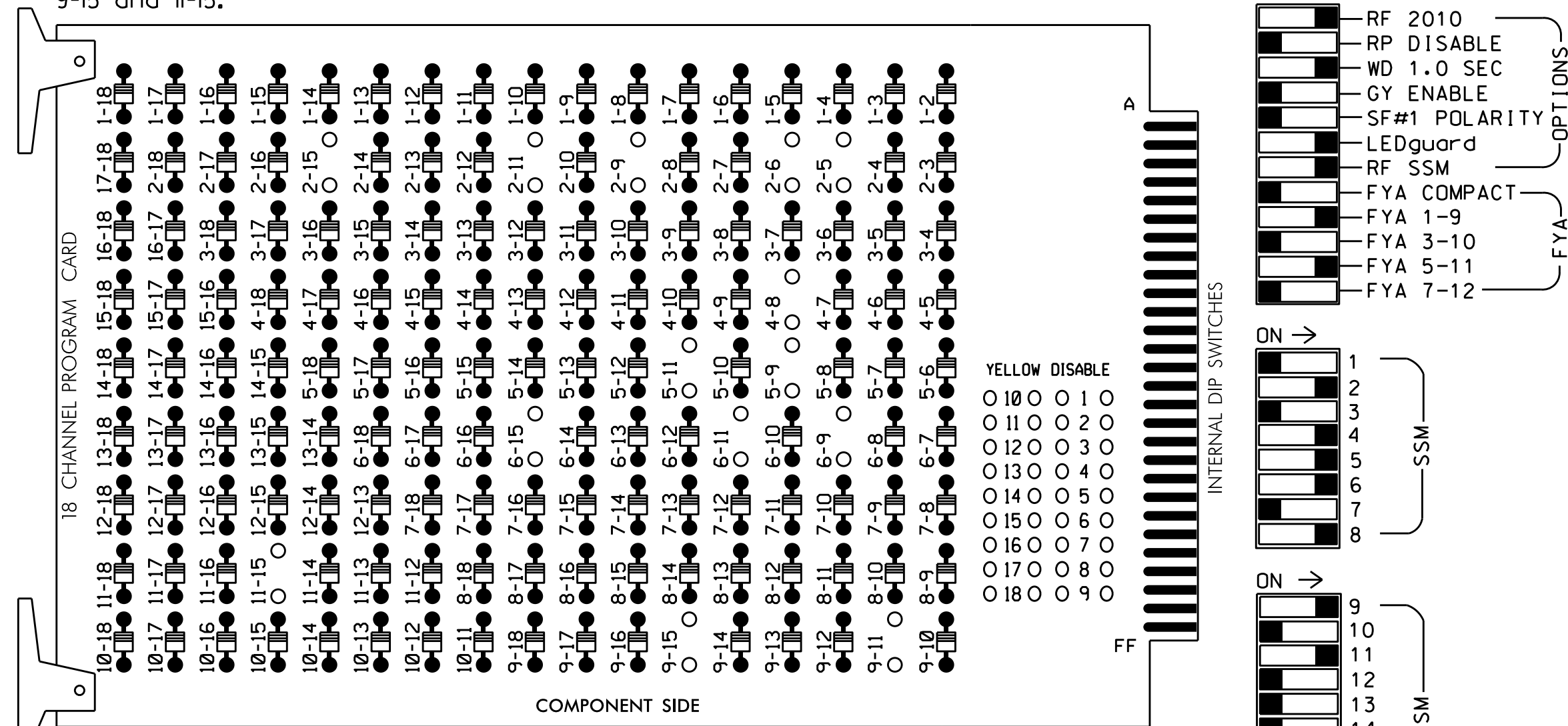
SIG. INVENTORY NO. GBO-559T1

EDI MODEL 2018EClip-NC CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 2-15, 4-8, 5-9, 5-11, 6-9, 6-11, 6-15, 9-11, 9-15 and 11-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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

NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS. This initialization should be done prior to programming controller.
- Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6). Then set "Init 2A" to MODE 5 (MM 1-8-9-3).
- Program phase 2 for Start Up In Green and phase 6 for Start Up In Walk.
- Program "Start Up Flash" for 0 sec. The conflict monitor will govern start-up flash time.
- Ensure "Local Flash Start" feature is set to "DRK".
- Program controller to provide a 1 second delay on the Flash Sense/Local Flash input. Use the following logic statement to provide this functionality:

```
FROM MAIN MENU->1->8->7 (I/O LOGIC)
Result Src.Fcn  } TimeOp Time
1208 = 01208    } DLY 1
```
- Program phases 4 and 8 for Dual Entry.
- The cabinet and controller are part of the City of Greensboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
 CABINET.....332 W/ AUX
 SOFTWARE.....NAZTEC APOGEE
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
 LOAD SWITCHES USED.....S2,S5,S7,S8,S9,S11,AUX S1, AUX S4
 PHASES USED.....2,4,5,6,6 PED,8
 OVERLAP A.....*
 OVERLAP B.....NOT USED
 OVERLAP C.....NOT USED
 OVERLAP D.....NOT USED
 * See Overlap Programming Detail Sheet 2.

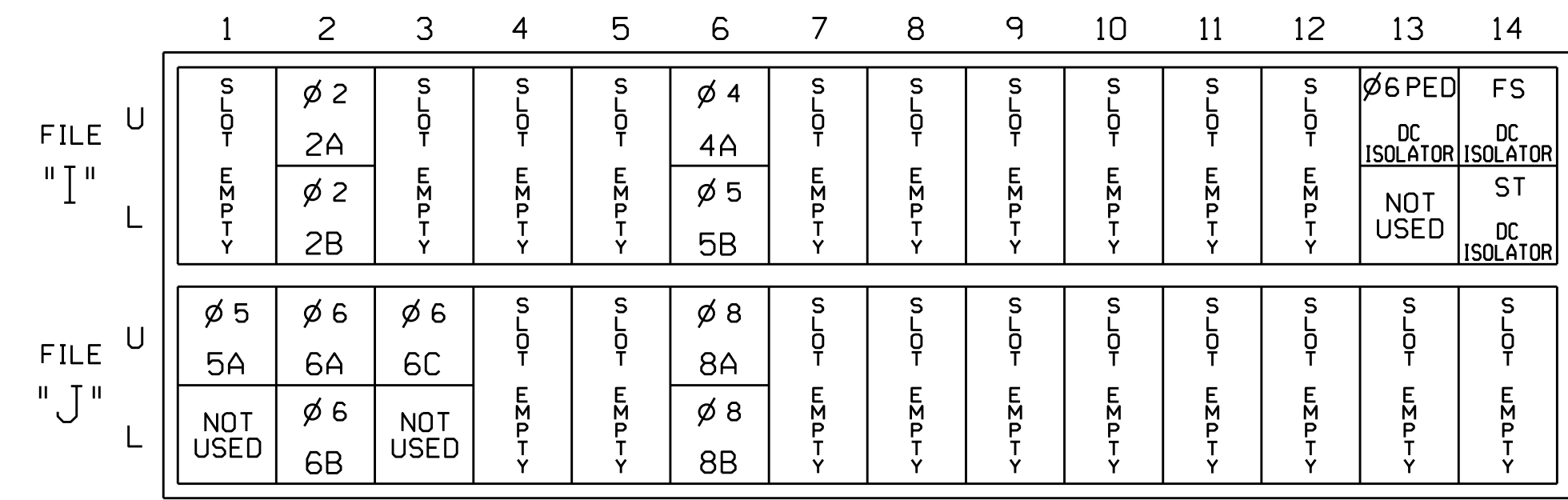
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	NU	42	51	62,63	P61, P62	NU	81,82	NU	61	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									132							A122		A115
FLASHING YELLOW ARROW																A123		A116
GREEN ARROW									133	133								
Hand													119					
Walking																		121

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

(from view)

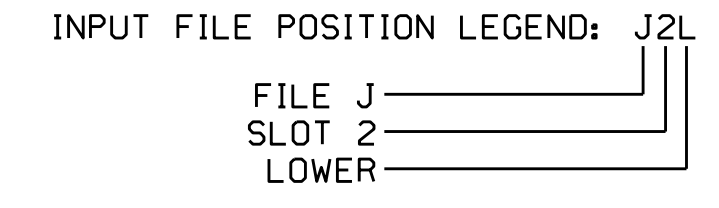


EX.: 1A, 2A, ETC. = LOOP NO.'S
 FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

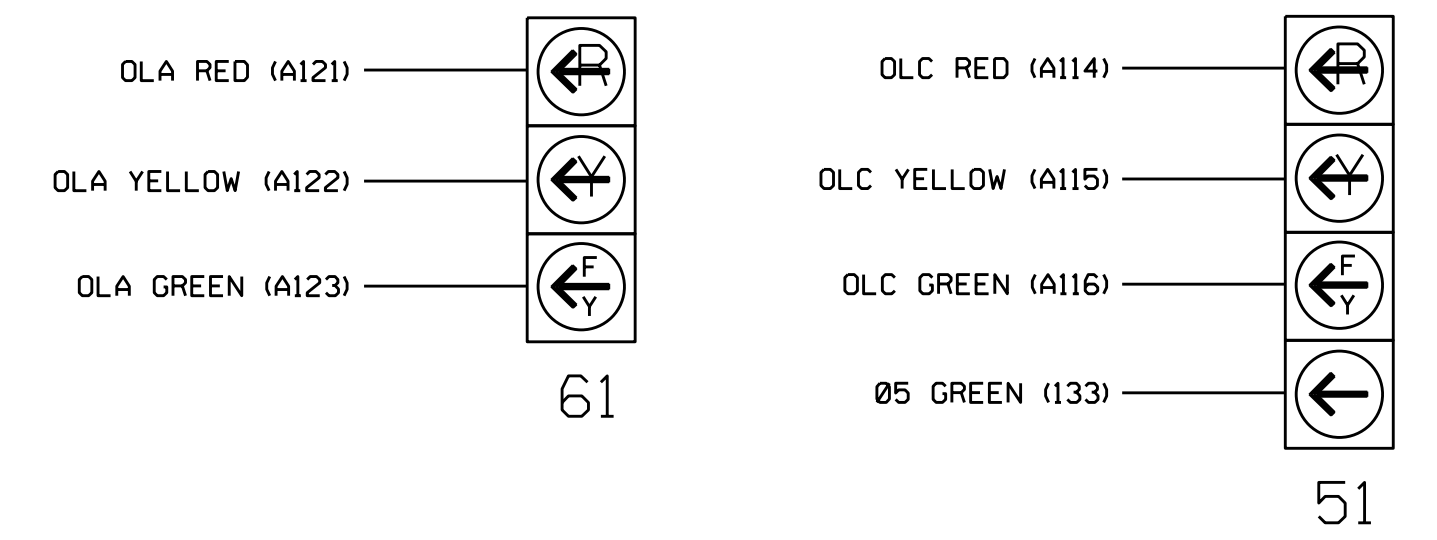
LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	CALL PHASE	SWITCH	DELAY TIME	EXTEND TIME	CALL	EXTEND	ADDED INIT.
2A	TB2-5,6	I2U	39	2	2				X	X	X
2B	TB2-7,8	I2L	43	3	2				X	X	X
4A	TB4-9,10	I6U	41	8	4				X	X	
5A	TB3-1,2	J1U	55	15	5		15		X	X	
5B	TB4-11,12	I6L	45	9	5		15		X	X	
6A	TB3-5,6	J2U	40	16	6				X	X	X
6B	TB3-7,8	J2L	44	17	6				X	X	X
6C	TB3-9,10	J3U	64	18	6				X	X	
8A	TB5-9,10	J6U	42	22	8				X	X	
8B	TB5-11,12	J6L	46	23	8		10		X	X	
PED PUSH BUTTONS											
P61,P62	TB8-7,9	I13U	68	PED 6	6 PED						

NOTE:
 INSTALL DC ISOLATORS IN INPUT FILE SLOT 113.



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

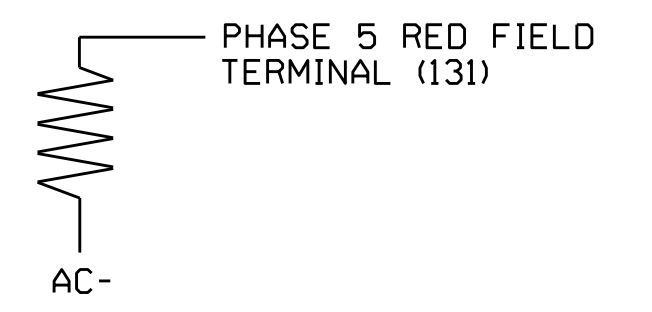
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-559T1
 DESIGNED: October 2017
 SEALED: 10/31/2017
 REVISED:

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

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



Electrical Detail - Temp 1 - Sheet 1 of 3

Prepared In the Offices of:
 GULF TRANSPORTATION MOBILITY AND SAFETY DISTRICT
 DIVISION OF TRANSPORTATION AND SIGNAL MANAGEMENT SYSTEMS

750 N. Greenfield Pkwy, Garner, NC 27529

DETAILS FOR: N. Elm Street at United Health Care and Lake Jeanette Office Park

PLAN DATE: October 2017 REVIEWED BY: T. Joyce
 PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS: INIT. DATE

DocuSigned by: D. Todd Joyce 11/2/2017
 SEAL: SEAL 031001
 SEAL: SEAL 031001
 SEAL: SEAL 031001

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIG. INVENTORY NO. GBO-559T1

C:\1-NOV-2017 14:50
 C:\NITS\ASIS\NITS_Signal\work\hgr\oups\51g_Maps\Strickland\hgr\oups\559_sml\el_xxx.dgn
 C:\NITS\ASIS\NITS_Signal\work\hgr\oups\51g_Maps\Strickland\hgr\oups\559_sml\el_xxx.dgn
 C:\NITS\ASIS\NITS_Signal\work\hgr\oups\51g_Maps\Strickland\hgr\oups\559_sml\el_xxx.dgn

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A AND C*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```

Overlaps
1.General Parm
2.Program
3.Status
    
```

Enter Overlap # 1
then press Enter

```

Overlap A-1
1.Program Parm
2.Confl Prog+
3.Program Parm+
    
```

```

OvrIp A-1  Ps.....
Included Ps  2 0 0 0 0 0 0 0
Modifier Ps  0 0 0 0 0 0 0 0
Type:NORMAL Grn: 0 Yel: 3.5 Red: 1.5
    
```

Enter Overlap # 3
then press Enter

```

Overlap C-3
1.Program Parm
2.Confl Prog+
3.Program Parm+
    
```

```

OvrIp C-3  Ps.....
Included Ps  5 0 0 0 0 0 0 0
Modifier Ps  6 0 0 0 0 0 0 0
Type:FYA-4 Grn: 0 Yel: 3.5 Red: 1.5
    
```

Notice type FYA-4 →

PRESS "ESC" TWICE

PRESS "ESC" THREE TIMES

```

Overlaps
1.General Parm
2.Program
3.Status
    
```

General Overlap Parameters

```

Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Clnes ON
Extra Included Phases OFF
InhibitLockInterval ALWAYS
    
```

OVERLAP PROGRAMMING COMPLETE

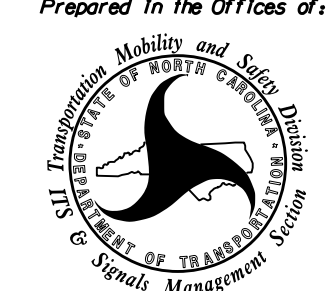
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THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: GBO-559T1
DESIGNED: October 2017
SEALED: 10/31/2017
REVISED:

Electrical Detail - Temp 1 - Sheet 2 of 3

Electrical AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

N. Elm Street
at
United Health Care and
Lake Jeanette Office Park

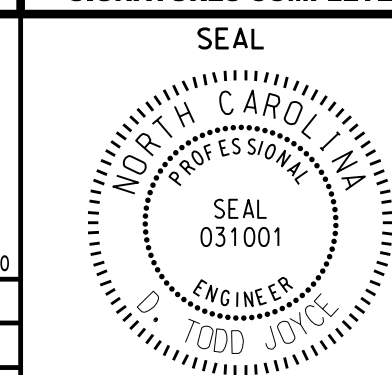
Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



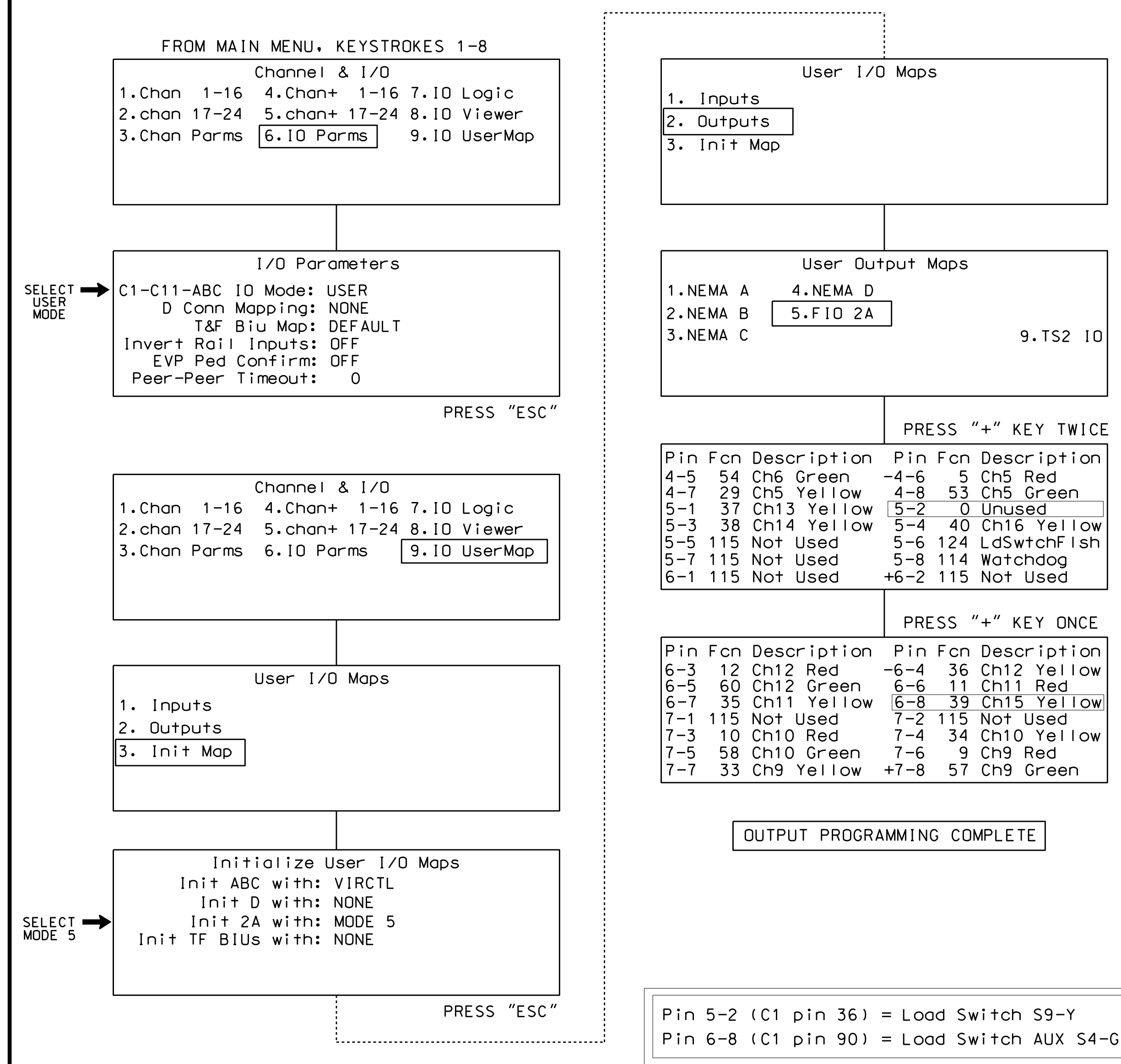
DocuSigned by:
T. Todd Joyce 11/2/2017

ASOCAD\FB024241D DATE

SIG. INVENTORY NO. GBO-559T1

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL (program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.



User I/O Maps

1. Inputs
2. Outputs
3. Init Map

User Output Maps

1.NEMA A 4.NEMA D
2.NEMA B 5.FIO 2A
3.NEMA C 9.TS2 IO

PRESS "+" KEY TWICE

Pin	Fcn	Description	Pin	Fcn	Description
4-5	54	Ch6 Green	-4-6	5	Ch5 Red
4-7	29	Ch5 Yellow	4-8	53	Ch5 Green
5-1	37	Ch13 Yellow	5-2	0	Unused
5-3	38	Ch14 Yellow	5-4	40	Ch16 Yellow
5-5	115	Not Used	5-6	124	LdSwrchFlsh
5-7	115	Not Used	5-8	114	Watchdog
6-1	115	Not Used	+6-2	115	Not Used

PRESS "+" KEY ONCE

Pin	Fcn	Description	Pin	Fcn	Description
6-3	12	Ch12 Red	-6-4	36	Ch12 Yellow
6-5	60	Ch12 Green	6-6	11	Ch11 Red
6-7	35	Ch11 Yellow	6-8	39	Ch15 Yellow
7-1	115	Not Used	7-2	115	Not Used
7-3	10	Ch10 Red	7-4	34	Ch10 Yellow
7-5	58	Ch10 Green	7-6	9	Ch9 Red
7-7	33	Ch9 Yellow	+7-8	57	Ch9 Green

Pin 5-2 (C1 pin 36) = Load Switch S9-Y
Pin 6-8 (C1 pin 90) = Load Switch AUX S4-G

! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

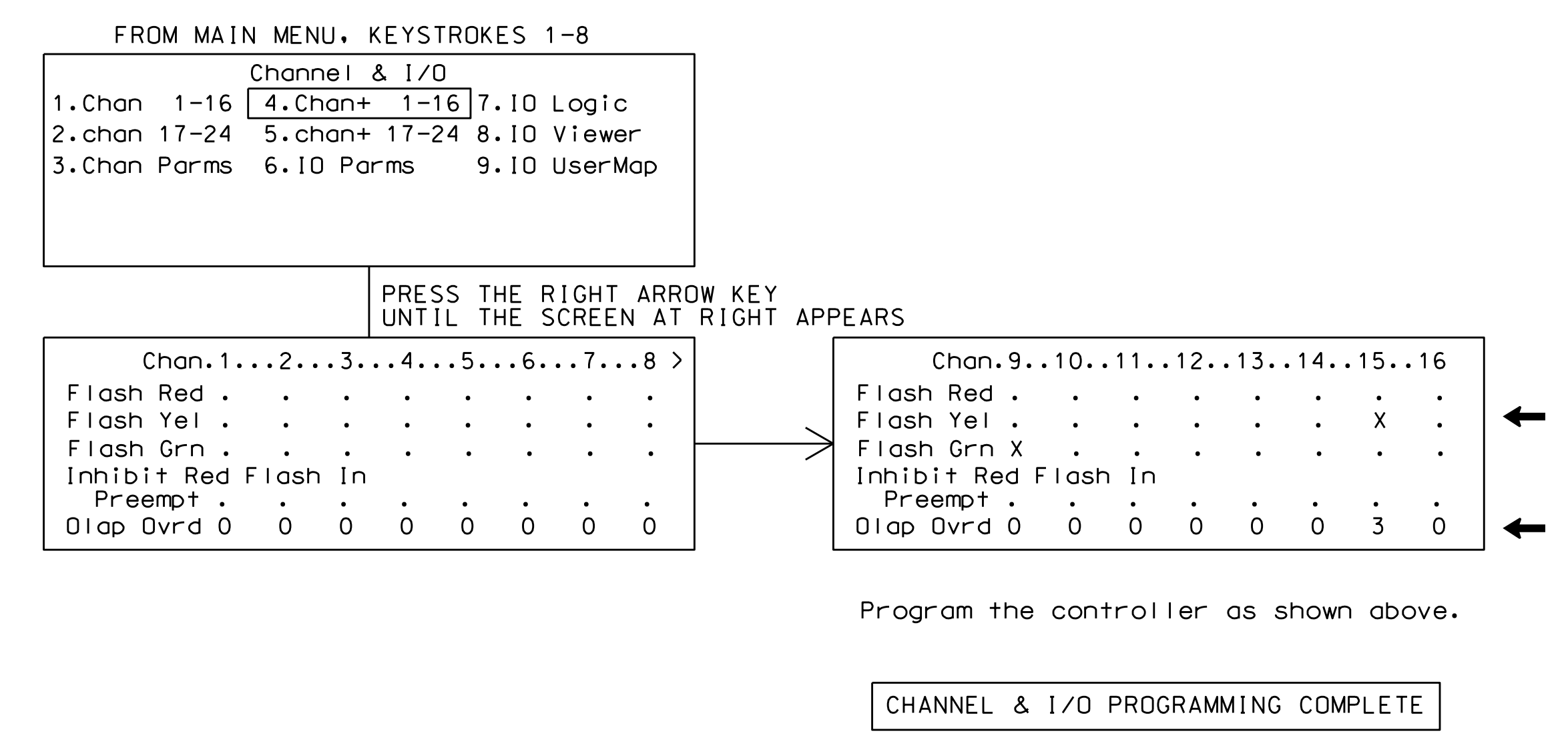
NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.



Programming notes:

Pin	Default	Change To:
5-2	39 Ch15 Yellow....	0 Unused

Programming notes:

Pin	Default	Change To:
6-8	59 Ch11 Green	39 Ch15 Yellow

NOTE

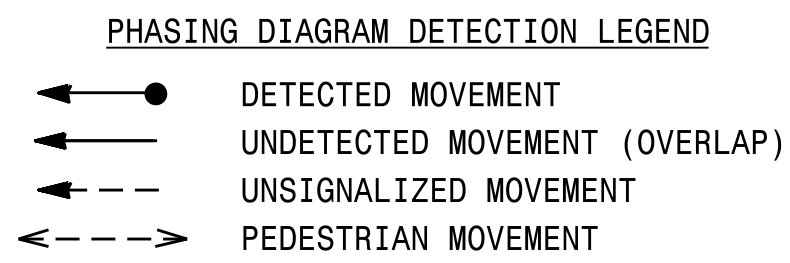
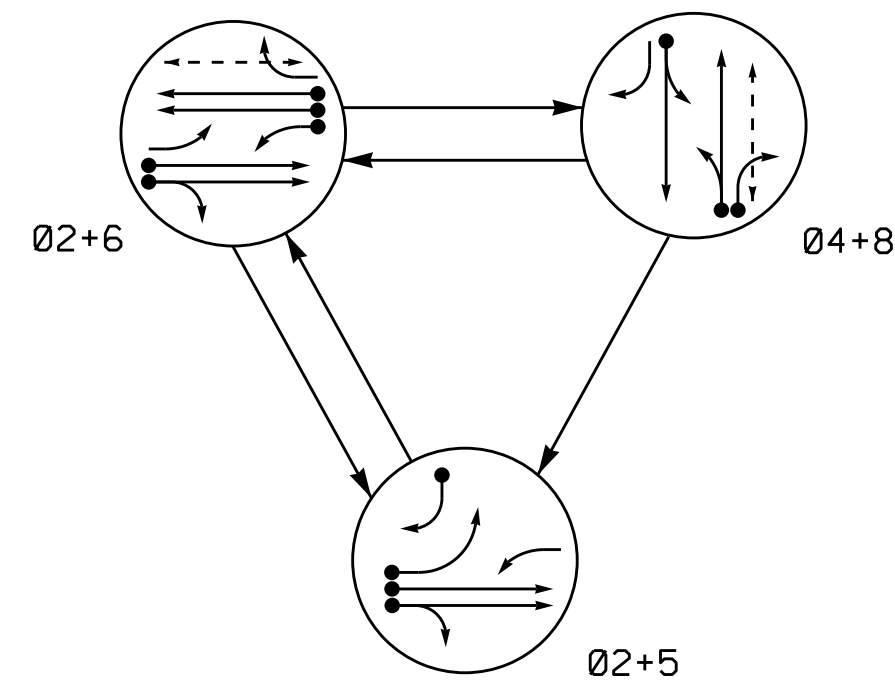
Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

G:\1100-2017 1-152
S:\1100\2017\1-152
Signal\work\hgr\dsp\sig Map\str\ck\and\pbo-559_sim\el_xxx.dgn
C:\STR\ckland

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: GBO-559T1
DESIGNED: October 2017
SEALED: 10/31/2017
REVISED:

Electrical Detail - Temp 1 - Sheet 3 of 3		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
<p>Electrical and Programming Details For:</p> <p style="text-align: center;">N. Elm Street at United Health Care and Lake Jeanette Office Park</p>	<p>Prepared in the Offices of:</p> <p style="text-align: center;">T. J. Strickland Professional Engineer No. 031001</p>	<p>SEAL</p> <p style="text-align: center;">SEAL 031001 ENGINEER TODD JOYCE</p>
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Division 7 Guilford County Greensboro</p> <p>PLAN DATE: October 2017 REVIEWED BY: T. Joyce</p> <p>PREPARED BY: C. Strickland REVIEWED BY:</p>	<p>DocuSigned by: D. Todd Joyce 11/2/2017</p> <p>ASOCAD\FB042410 DATE</p> <p>SIG. INVENTORY NO. GBO-559T1</p>

PHASING DIAGRAM

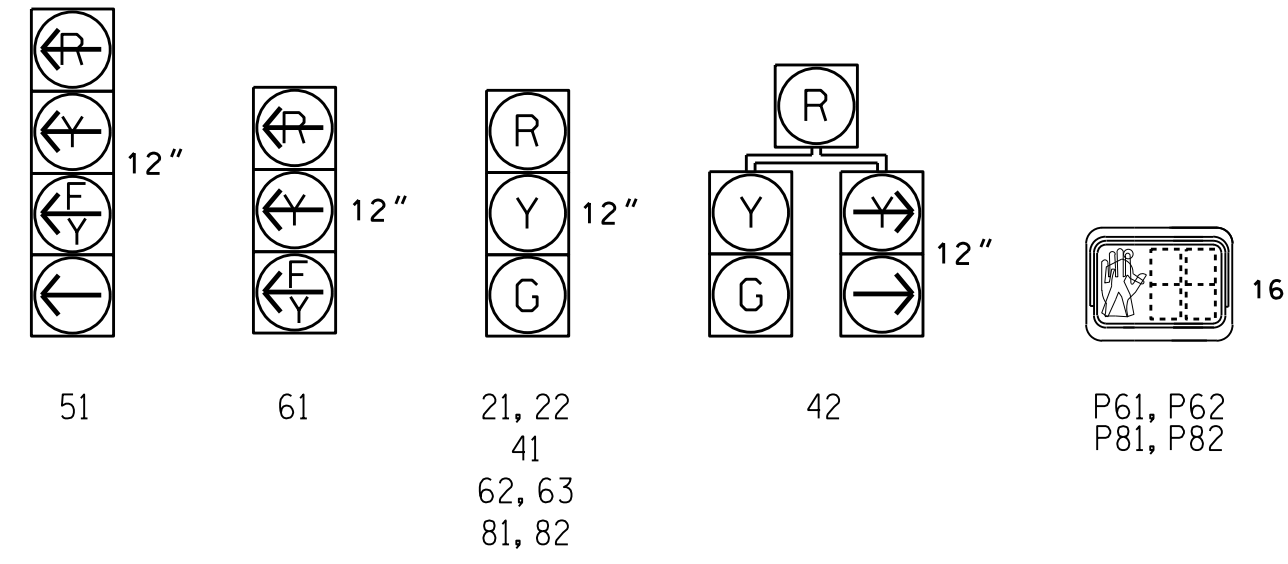


SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	F	F	R	R
61	F	F	R	R
62, 63	R	G	R	Y
81, 82	R	R	G	R
P61, P62	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK

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

SIGNAL FACE I.D.

All Heads L.E.D.



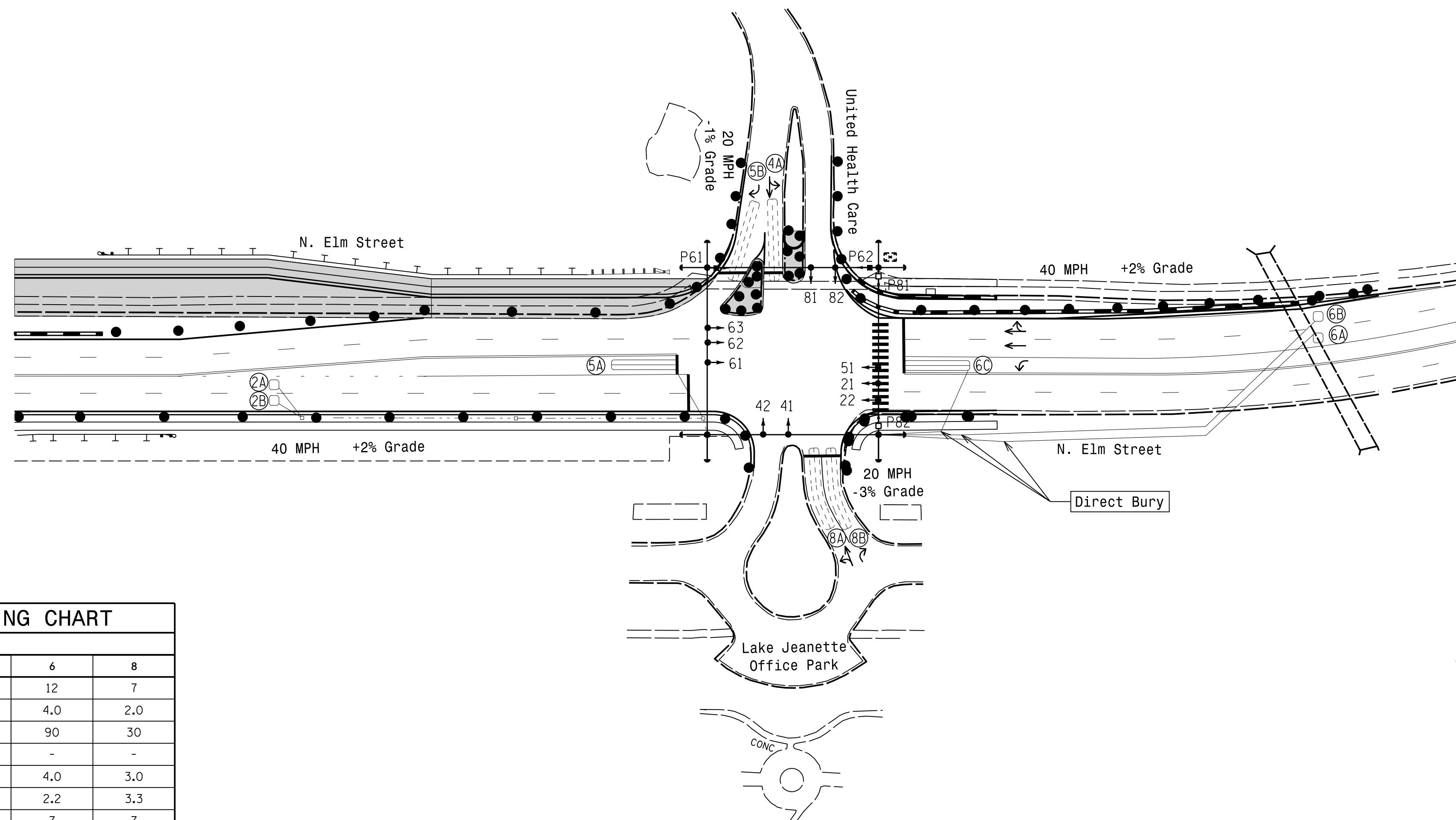
LOOP & DETECTOR UNIT INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	250	4	X	2	-	-	-	X	X	X	-
2B	6X6	250	4	X	2	-	-	-	X	X	X	-
4A	6X50	+5	2-4-2	-	4	-	-	-	X	X	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-
5B	6X50	+5	2-4-2	-	5	-	15	-	X	X	-	-
6A	6X6	250	4	X	6	-	-	-	X	X	X	-
6B	6X6	250	4	X	6	-	-	-	X	X	X	-
6C	6X40	0	2-4-2	X	6	-	-	-	X	X	-	-
8A	6X50	+5	2-4-2	-	8	-	-	-	X	X	-	-
8B	6X50	+5	2-4-2	-	8	-	10	-	X	X	-	-

3 Phase Fully Actuated (Greensboro Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Reposition existing signal heads 21, 22, 51, 61, 62, and 63.
- 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.
- Pedestrian pedestals are conceptual and shown for reference only. See sheets P1-P3 for pushbutton location details.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



FEATURE	PHASE				
	2	4	5	6	8
Min Green *	12	7	7	12	7
Gap, Extension *	4.0	2.0	2.0	4.0	2.0
Maximum Green 1 *	90	30	30	90	30
Maximum Green 2 *	-	-	-	-	-
Yellow Clear	4.0	3.0	3.0	4.0	3.0
Red Clear	2.2	3.3	3.2	2.2	3.3
Walk *	-	-	-	7	7
Pedestrian Clear	-	-	-	23	13
Added Initial *	2.0	-	-	2.0	-
Maximum Initial *	29	-	-	29	-
Time Before Reduction *	15	-	-	15	-
Time To Reduce *	30	-	-	30	-
Minimum Gap	3.0	-	-	3.0	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Lock Calls	YES	NO	NO	YES	NO
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	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.

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	○ → N/A
○ → Signal Pole with Sidewalk Guy	○ → N/A
○ → Inductive Loop Detector	○ → N/A
○ → Controller & Cabinet	○ → N/A
○ → Junction Box	○ → N/A
○ → 2-in Underground Conduit	○ → N/A
○ → Right of Way	○ → N/A
○ → Directional Arrow	○ → N/A
○ → Construction Zone Drums	○ → N/A
○ → Construction Zone	○ → N/A
○ → Guardrail	○ → N/A

Signal Upgrade Temporary Design 2 (TMP Phase II)

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

N. Elm Street at Lake Jeanette Office Park

Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY:

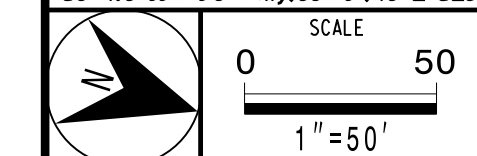
PREPARED BY: I. O. Umozurike REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL

10/31/2017

SIG. INVENTORY NO. GB0-559T2



REVISIONS	INIT.	DATE

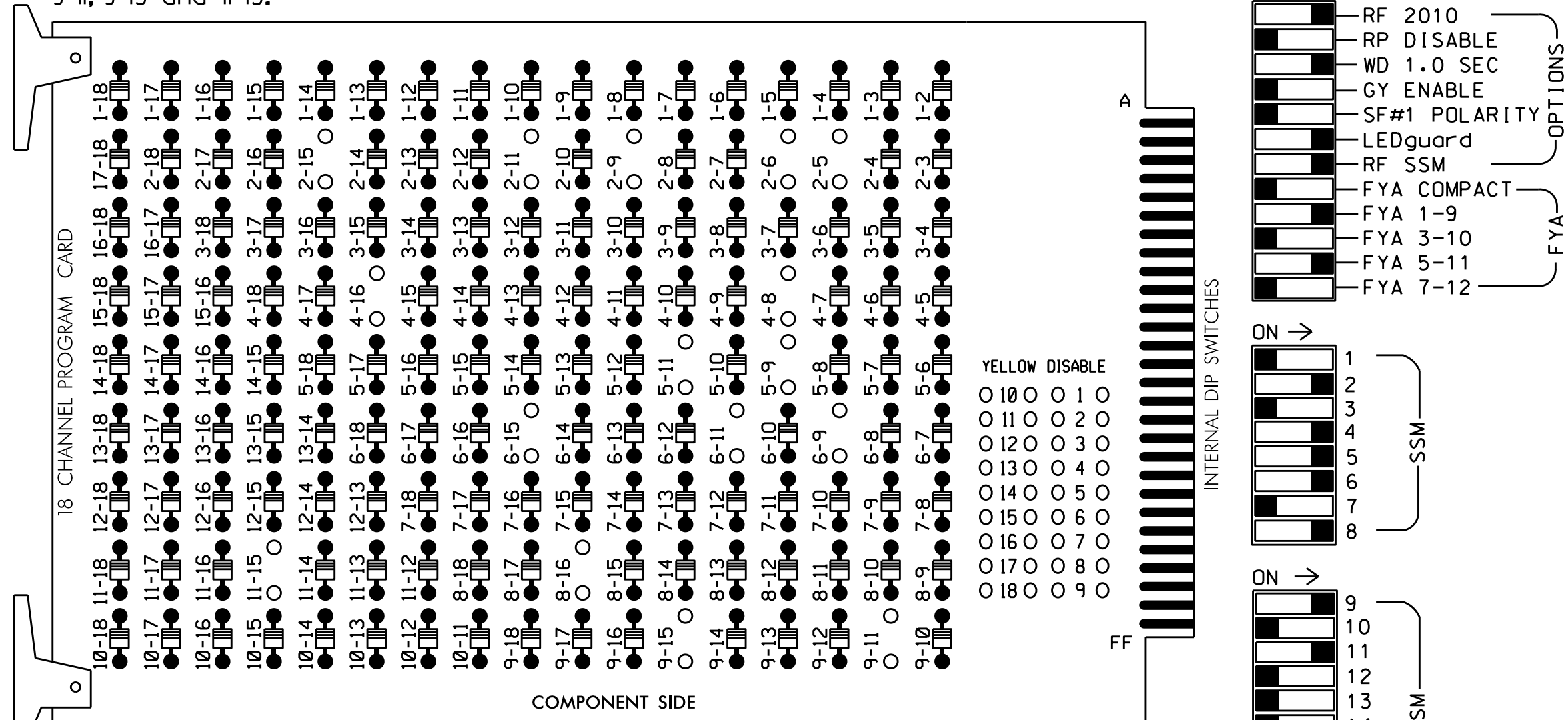
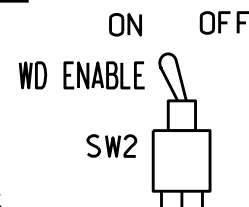
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 10/31/17 10:31:11 am
 czl:emba

EDI MODEL 2018EClip-NC CONFLICT MONITOR

PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-5, 2-6, 2-9, 2-11, 2-15, 4-8, 4-16, 5-9, 5-11, 6-9, 6-11, 6-15, 8-16, 9-11, 9-15 and 11-15.



REMOVE JUMPERS AS SHOWN

NOTES:

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

■ = DENOTES POSITION OF SWITCH

NOTES

- 1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file.
2. Initialize database in Naztec 2070 local software (Apogee) as FULL-CALTRANS.
3. Initialize I/O "C1-C11-ABC IO Mode" to USER (MM 1-8-6).
4. Program phase 2 for Start Up In Green and phase 6 for Start Up In Walk.
5. Program "Start Up Flash" for 0 sec.
6. Ensure "Local Flash Start" feature is set to "DRK".
7. Program controller to provide a 1 second delay on the Flash Sense/Local Flash input.
8. Program phases 4 and 8 for Dual Entry.
9. The cabinet and controller are part of the City of Greensboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....NAZTEC APOGEE
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S2,S5,S7,S8,S9,S11,S12,AUX S1,AUX S4
PHASES USED.....2,4,5,6,6 PED,8,8 PED
OVERLAP A.....*
OVERLAP B.....NOT USED
OVERLAP C.....NOT USED
OVERLAP D.....NOT USED
* See Overlap Programming Detail Sheet 2.

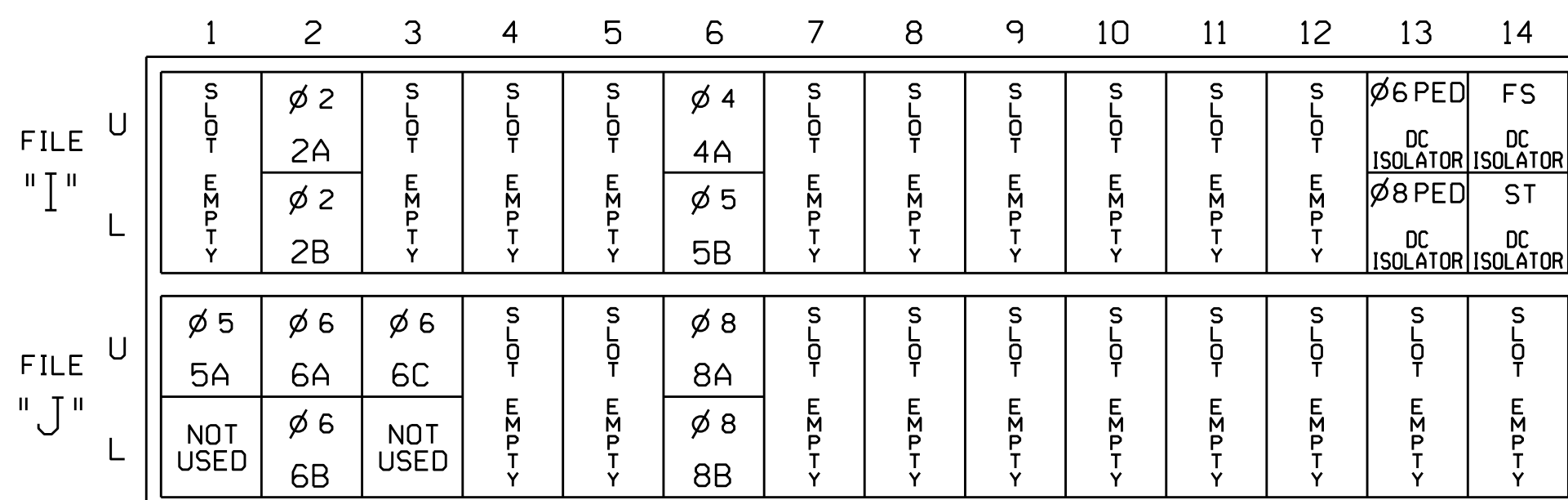
SIGNAL HEAD HOOK-UP CHART

Table with columns for Load Switch No. (S1-S6), Signal Head No. (NU, 21,22, 41,42, 42, 51, 62,63, 66, 81,82, 61), and various auxiliary signal headers (AUX S1-S6, OLA, OLB, OLC, OLD, SPARE).

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

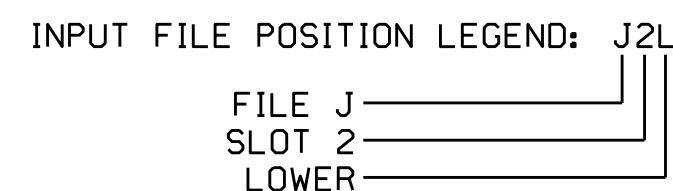
(from view)



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

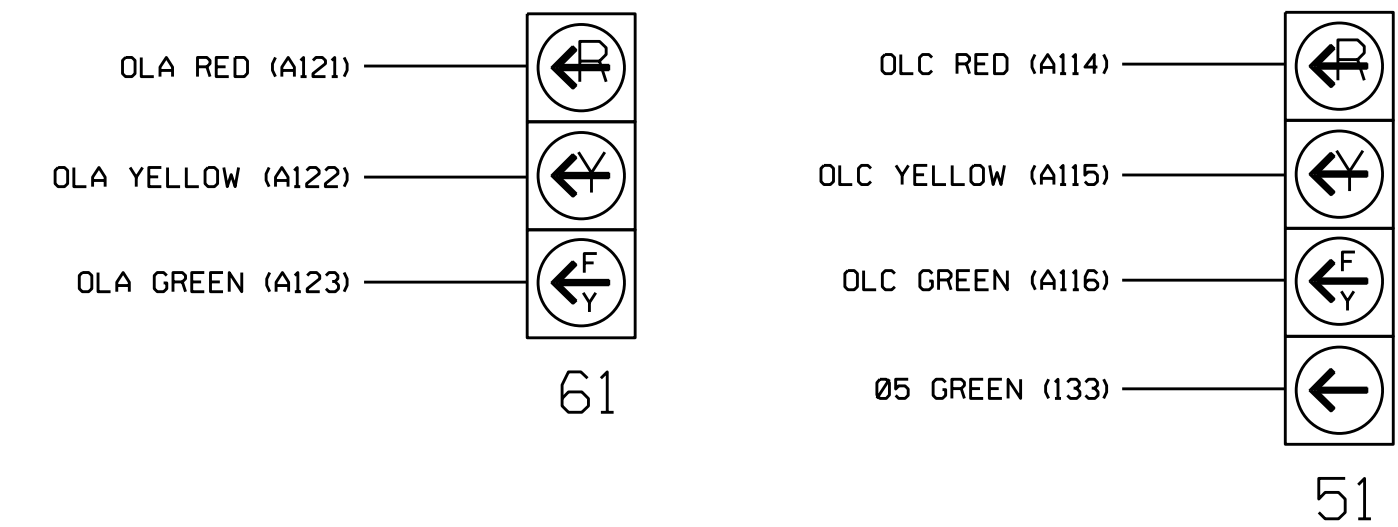
INPUT FILE CONNECTION & PROGRAMMING CHART

Table with columns: LOOP NO., LOOP TERMINAL, INPUT FILE POS., PIN NO., DETECTOR NO., CALL PHASE, SWITCH, DELAY TIME, EXTEND TIME, CALL, EXTEND, ADDED INIT. Includes notes on DC isolators for PED 6 and PED 8.



FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

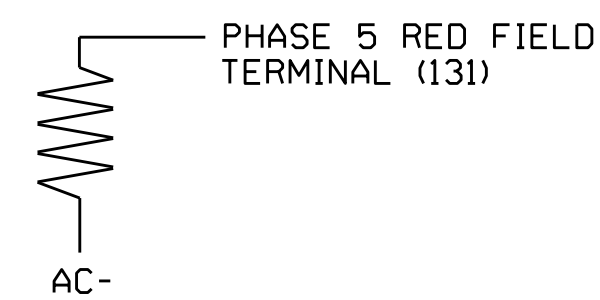
Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-559T2
DESIGNED: October 2017
SEALED: 10/31/2017
REVISED:

LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

Table with columns: VALUE (ohms), WATTAGE. Values: 1.5K - 1.9K (25W min), 2.0K - 3.0K (10W min).



Electrical Detail - Temp 2 - Sheet 1 of 3

Professional Engineer seal for C. Strickland, License No. 17529.

United Health Care and Lake Jeanette Office Park details including plan date (October 2017) and reviewed by (T. Joyce).

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Professional Engineer seal for D. Todd Joyce, License No. 112/2017.

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A AND C*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```

Overlaps
1.General Parm
2.Program
3.Status
    
```

Enter Overlap # 1
then press Enter

```

Overlap A-1
1.Program Parm
2.Confl Prog+
3.Program Parm+
    
```

```

OvrIp A-1 Ps.....
Included Ps 2 0 0 0 0 0 0 0
Modifier Ps 0 0 0 0 0 0 0 0
Type:NORMAL Grn: 0 Yel: 3.5 Red: 1.5
    
```

Enter Overlap # 3
then press Enter

```

Overlap C-3
1.Program Parm
2.Confl Prog+
3.Program Parm+
    
```

```

OvrIp C-3 Ps.....
Included Ps 5 0 0 0 0 0 0 0
Modifier Ps 6 0 0 0 0 0 0 0
Type:FYA-4 Grn: 0 Yel: 3.5 Red: 1.5
    
```

Notice type FYA-4 →

PRESS "ESC" TWICE

PRESS "ESC" THREE TIMES

```

Overlaps
1.General Parm
2.Program
3.Status
    
```

General Overlap Parameters

Lock Inhibit OFF
 Confl Lock Enable OFF
 Parent P Clnrcs ON
 Extra Included Phases OFF
 InhibitLockInterval ALWAYS

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR
 THE SIGNAL DESIGN: GBO-559T2
 DESIGNED: October 2017
 SEALED: 10/31/2017
 REVISED:

Electrical Detail - Temp 2 - Sheet 2 of 3

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING
 DETAILS FOR:

Prepared In the Offices of:



750 N. Greenfield Pkwy, Garner, NC 27529

N. Elm Street
 at
 United Health Care and
 Lake Jeanette Office Park

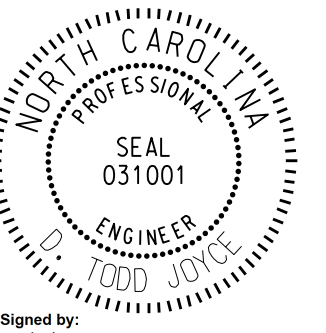
Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL



DocuSigned by:
 T. Todd Joyce 11/2/2017

AROCADFD8241D DATE

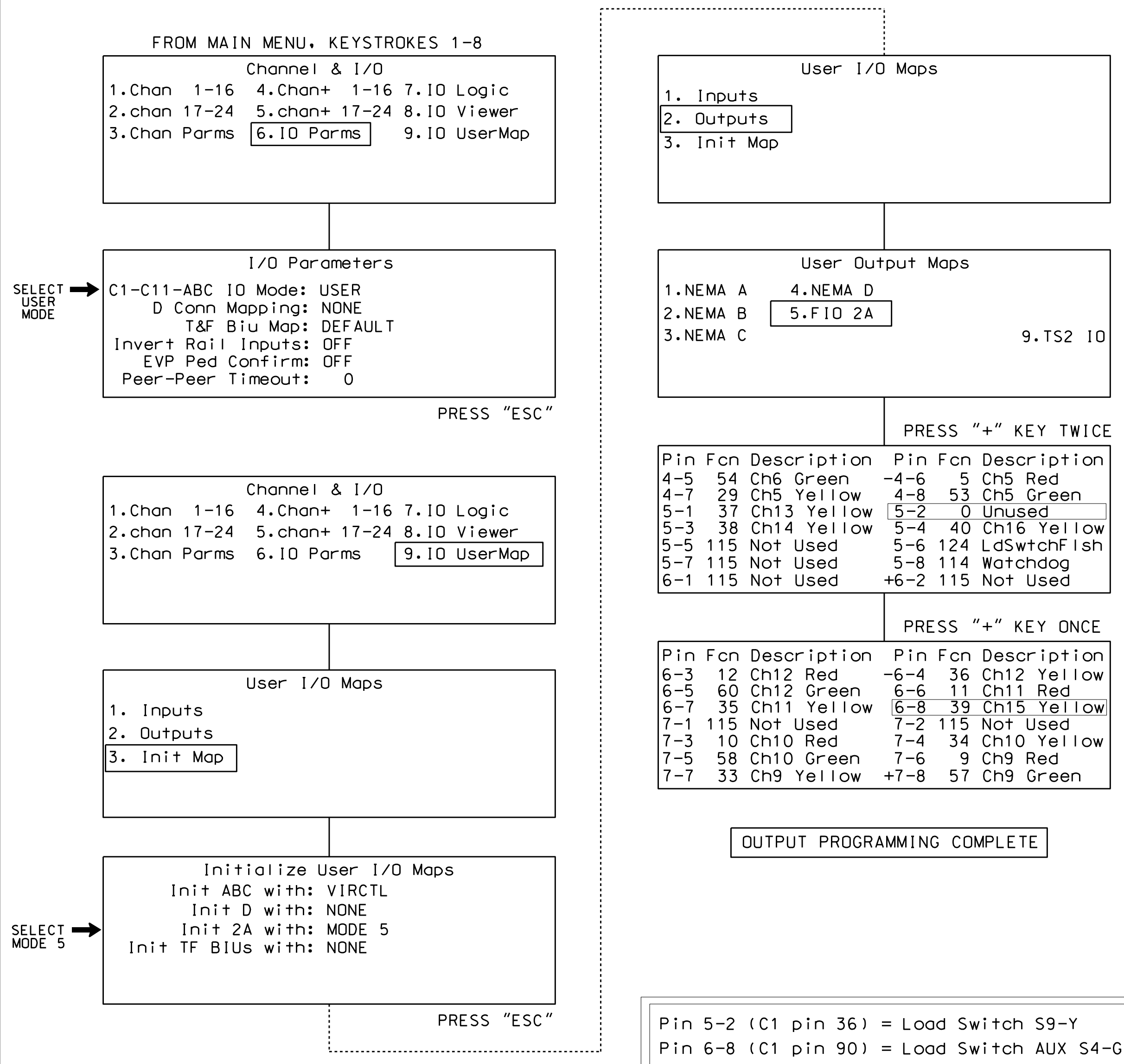
SIG. INVENTORY NO. GBO-559T2

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4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.



! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

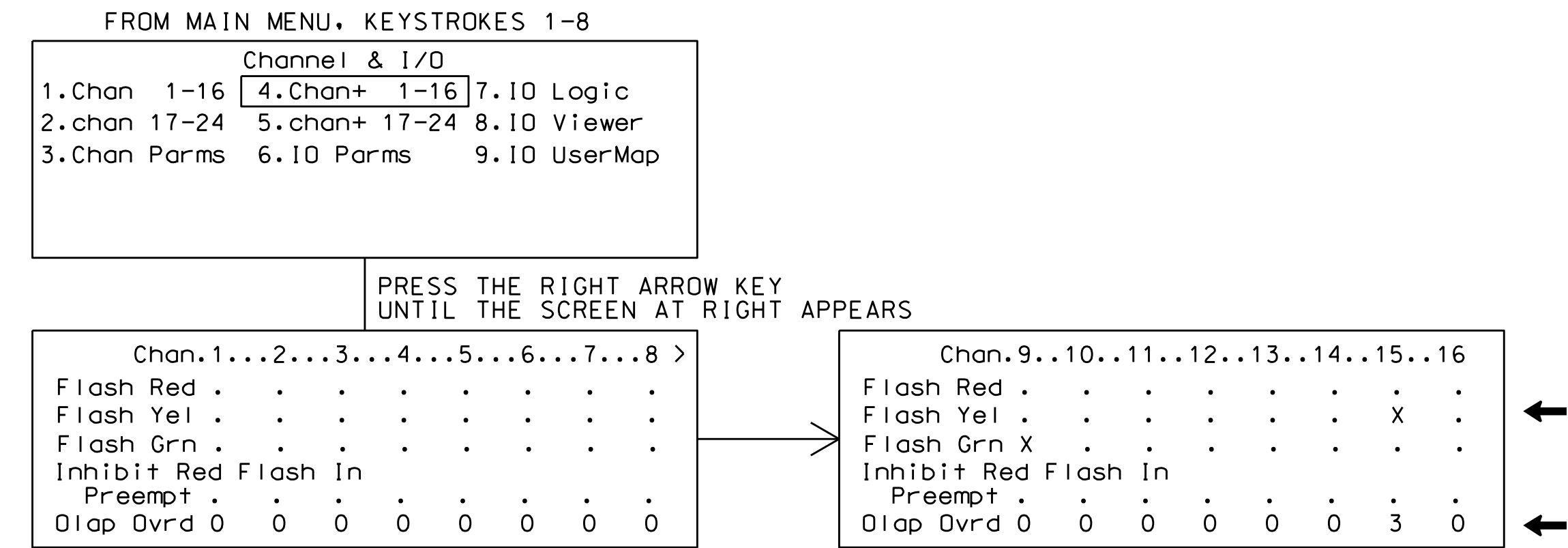
NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.



Program the controller as shown above.

CHANNEL & I/O PROGRAMMING COMPLETE

Programming notes:

Pin	Default Fcn Description	Change To: Fcn Description
5-2	39 Ch15 Yellow....	0 Unused

Programming notes:

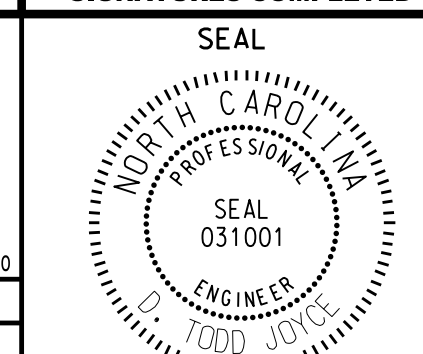
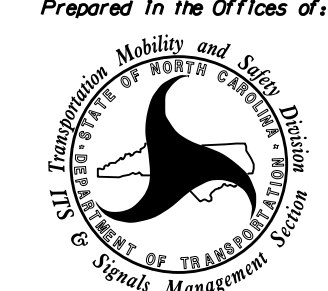
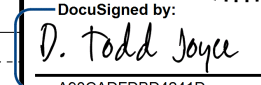
Pin	Default Fcn Description	Change To: Fcn Description
6-8	59 Ch11 Green	39 Ch15 Yellow

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

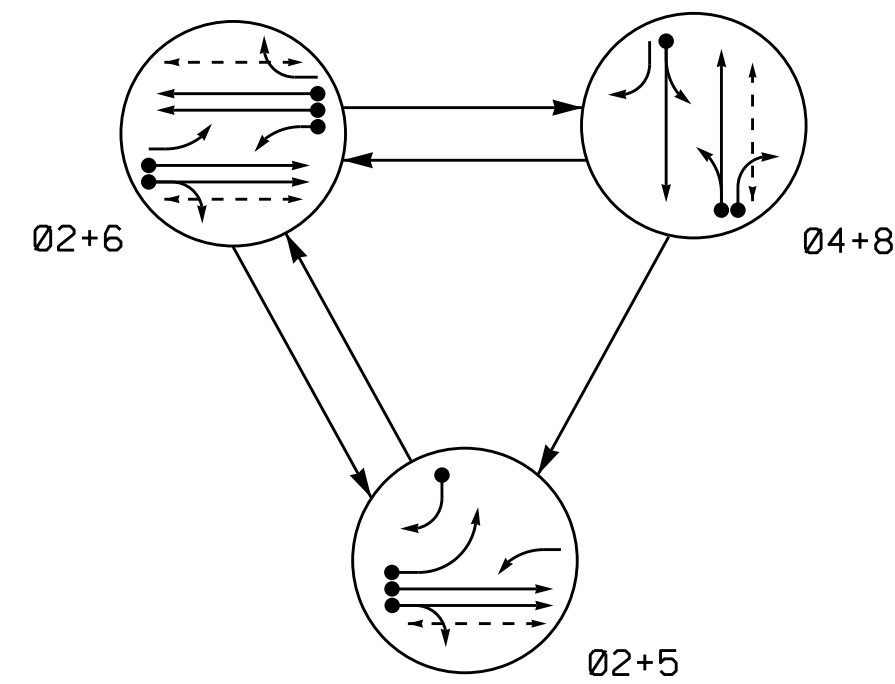
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-559T2
DESIGNED: October 2017
SEALED: 10/31/2017
REVISED:

Electrical Detail - Temp 2 - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:	N. Elm Street at United Health Care and Lake Jeanette Office Park	SEAL 
Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	Division 7 Guilford County Greensboro PLAN DATE: October 2017 REVIEWED BY: T. Joyce PREPARED BY: C. Strickland REVIEWED BY:	DocuSigned by:  11/2/2017 SIG. INVENTORY NO. GBO-559T2

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 cbsstrickland

PHASING DIAGRAM



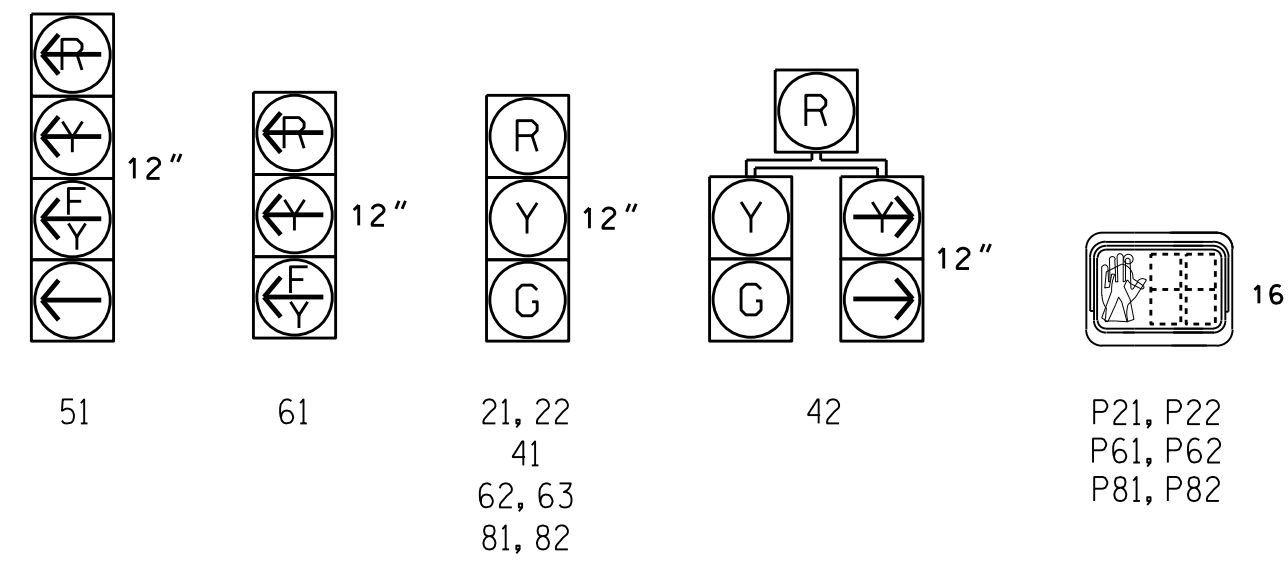
PHASING DIAGRAM DETECTION LEGEND
 ● DETECTED MOVEMENT
 ○ UNDETECTED MOVEMENT (OVERLAP)
 - - - UNSIGNALIZED MOVEMENT
 - - - PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	F	F	R	R
61	F	F	R	R
62, 63	R	G	R	Y
81, 82	R	R	G	R
P21, P22	W	W	DW	DRK
P61, P62	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK

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

SIGNAL FACE I.D.

All Heads L.E.D.



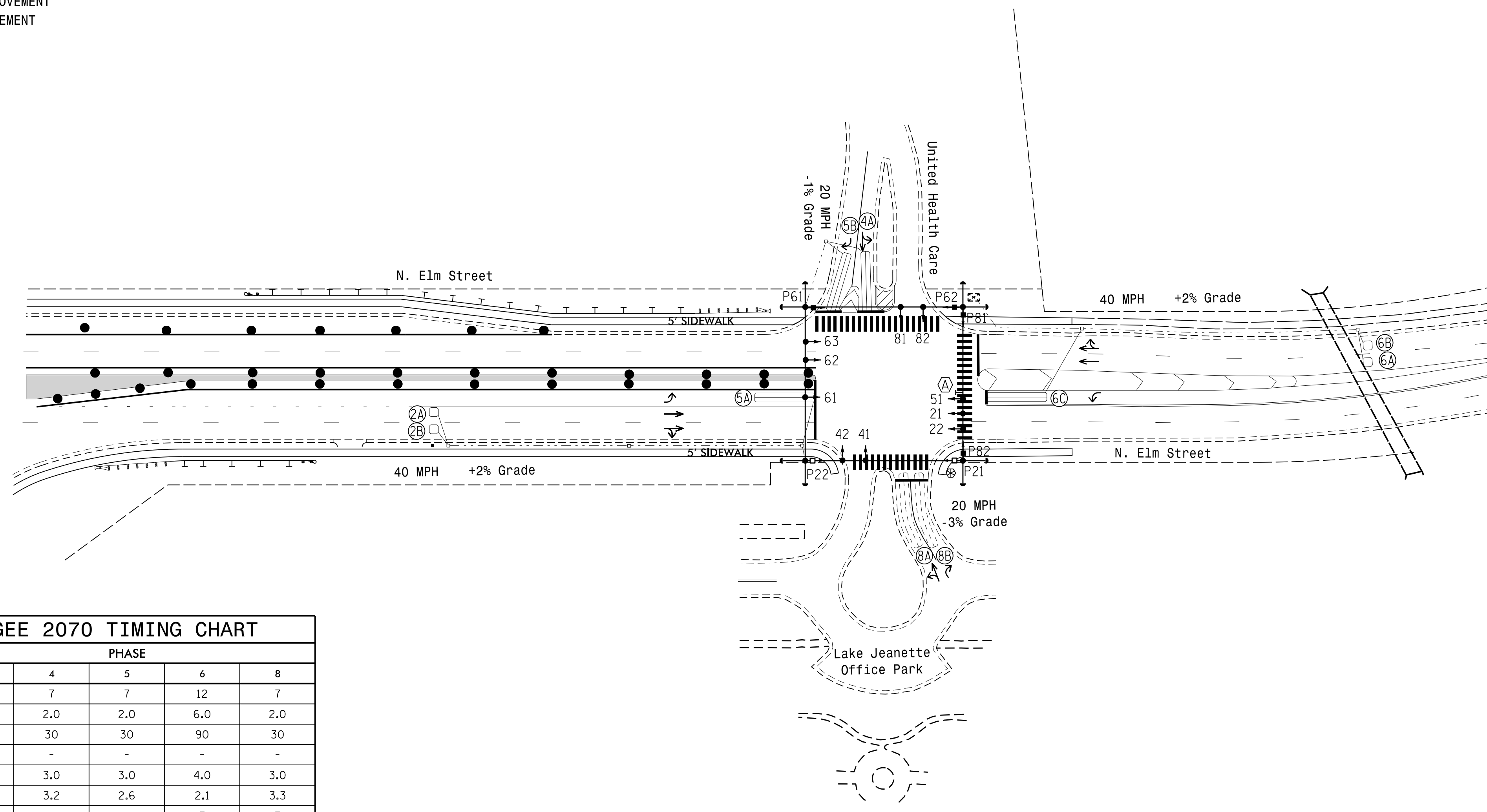
LOOP & DETECTOR UNIT INSTALLATION CHART
 NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING							
					PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP
2A	6X6	250	4	X	2	-	-	-	X	X	X	-
2B	6X6	250	4	X	2	-	-	-	X	X	X	-
4A	6X40	0	2-4-2	X	4	-	-	-	X	X	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-
5B	6X40	0	2-4-2	X	5	-	15	-	X	X	-	-
6A	6X6	250	4	X	6	-	-	-	X	X	X	-
6B	6X6	250	4	X	6	-	-	-	X	X	X	-
6C	6X40	0	2-4-2	X	6	-	-	-	X	X	-	-
8A	6X50	+5	2-4-2	-	8	-	-	-	X	X	-	-
8B	6X50	+5	2-4-2	-	8	-	10	-	X	X	-	-

3 Phase Fully Actuated (Greensboro Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Reposition existing signal heads numbered 21, 22, 51, 61, 62, and 63.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



NAZTEC APOGEE 2070 TIMING CHART

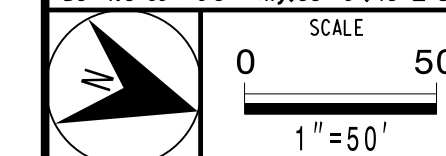
FEATURE	PHASE				
	2	4	5	6	8
Min Green *	12	7	7	12	7
Gap, Extension *	6.0	2.0	2.0	6.0	2.0
Maximum Green 1 *	90	30	30	90	30
Maximum Green 2 *	-	-	-	-	-
Yellow Clear	4.0	3.0	3.0	4.0	3.0
Red Clear	2.1	3.2	2.6	2.1	3.3
Walk *	7	-	-	7	7
Pedestrian Clear	11	-	-	25	18
Added Initial *	2.0	-	-	2.0	-
Maximum Initial *	29	-	-	29	-
Time Before Reduction *	15	-	-	15	-
Time To Reduce *	30	-	-	30	-
Minimum Gap	3.0	-	-	3.0	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Lock Calls	YES	NO	NO	YES	NO
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	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.

PROPOSED	LEGEND	EXISTING
○	Traffic Signal Head	●
○	Modified Signal Head	N/A
○	Signal	○
○	Pedestrian Signal Head With Push Button & Sign	○
○	Signal Pole with Guy	○
○	Signal Pole with Sidewalk Guy	○
○	Inductive Loop Detector	○
○	Controller & Cabinet	○
○	Junction Box	○
○	2-in Underground Conduit	○
N/A	Right of Way	○
○	Directional Arrow	○
○	Type I Pushbutton Post	○
○	Construction Zone Drums	○
○	Construction Zone	○
N/A	Guardrail	○
○	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	○

Signal Upgrade
 Temporary Design 3 (TMP Phase III)

	N. Elm Street at United Health Care and Lake Jeanette Office Park		SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486 ROBERT J. ZIEBBA
	Division 7 Guilford County Greensboro		
Prepared in the Offices of: Transportation Mobility and Safety Solutions STREET OF EXCELLENCE Signal Design Section 750 N. Greenfield Pkwy, Garner, NC 27529	PLAN DATE: October 2017 PREPARED BY: I. O. Umozurike	REVIEWED BY: REVIEWED BY:	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED DATE: 10/31/2017 SIG. INVENTORY NO. GB0-559T3



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OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A AND C*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER AND THEN "5" OVERLAPS

```

Overlap
1.General Parm
2.Program
3.Status
    
```

```

Enter Overlap # 1
then press Enter
    
```

```

Overlap A-1
1.Program Parm
2.Confl Prog+
3.Program Parm+
    
```

```

OvrIp A-1 Ps.....
Included Ps 2 0 0 0 0 0 0 0
Modifier Ps 0 0 0 0 0 0 0 0
Type:NORMAL Grn: 0 Yel: 3.5 Red: 1.5
    
```

PRESS "ESC" TWICE

```

Enter Overlap # 3
then press Enter
    
```

```

Overlap C-3
1.Program Parm
2.Confl Prog+
3.Program Parm+
    
```

```

OvrIp C-3 Ps.....
Included Ps 5 0 0 0 0 0 0 0
Modifier Ps 6 0 0 0 0 0 0 0
Type:FYA-4 Grn: 0 Yel: 3.5 Red: 1.5
    
```

PRESS "ESC" THREE TIMES

Notice type FYA-4 →

```

Overlap
1.General Parm
2.Program
3.Status
    
```

```

General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Cirnc ON
Extra Included Phases OFF
InhibitLockInterval ALWAYS
    
```

OVERLAP PROGRAMMING COMPLETE

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-559T3
 DESIGNED: October 2017
 SEALED: 10/31/2017
 REVISED:

Electrical Detail - Temp 3 - Sheet 2 of 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

N. Elm Street
 at
 United Health Care and
 Lake Jeanette Office Park

Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL

DocuSigned by:
 T. Todd Joyce 11/2/2017

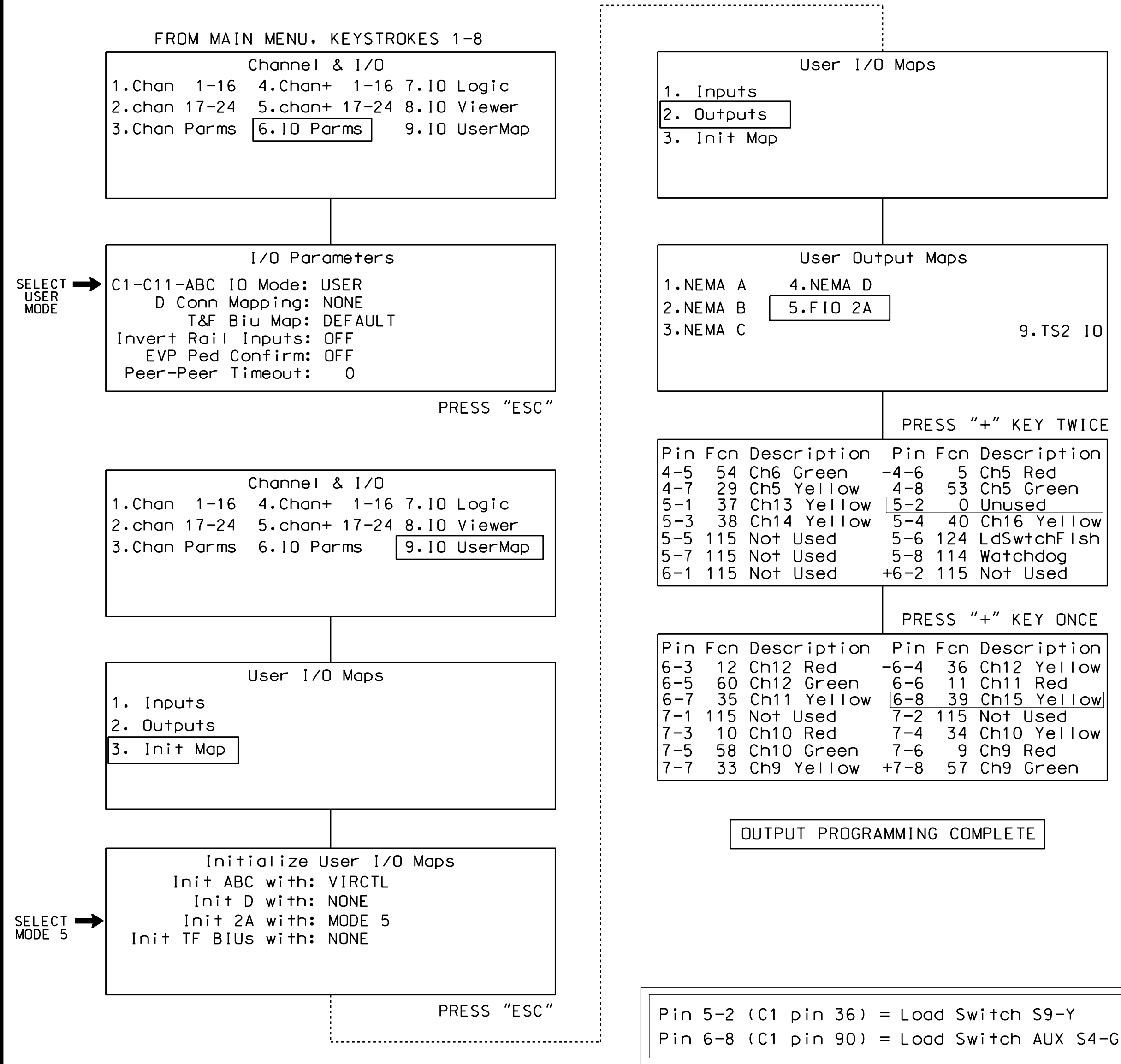
SIG. INVENTORY NO. GBO-559T3

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 cbsr\ckland

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

- Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu. key strokes 1-7.
- The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.



! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

NOTE

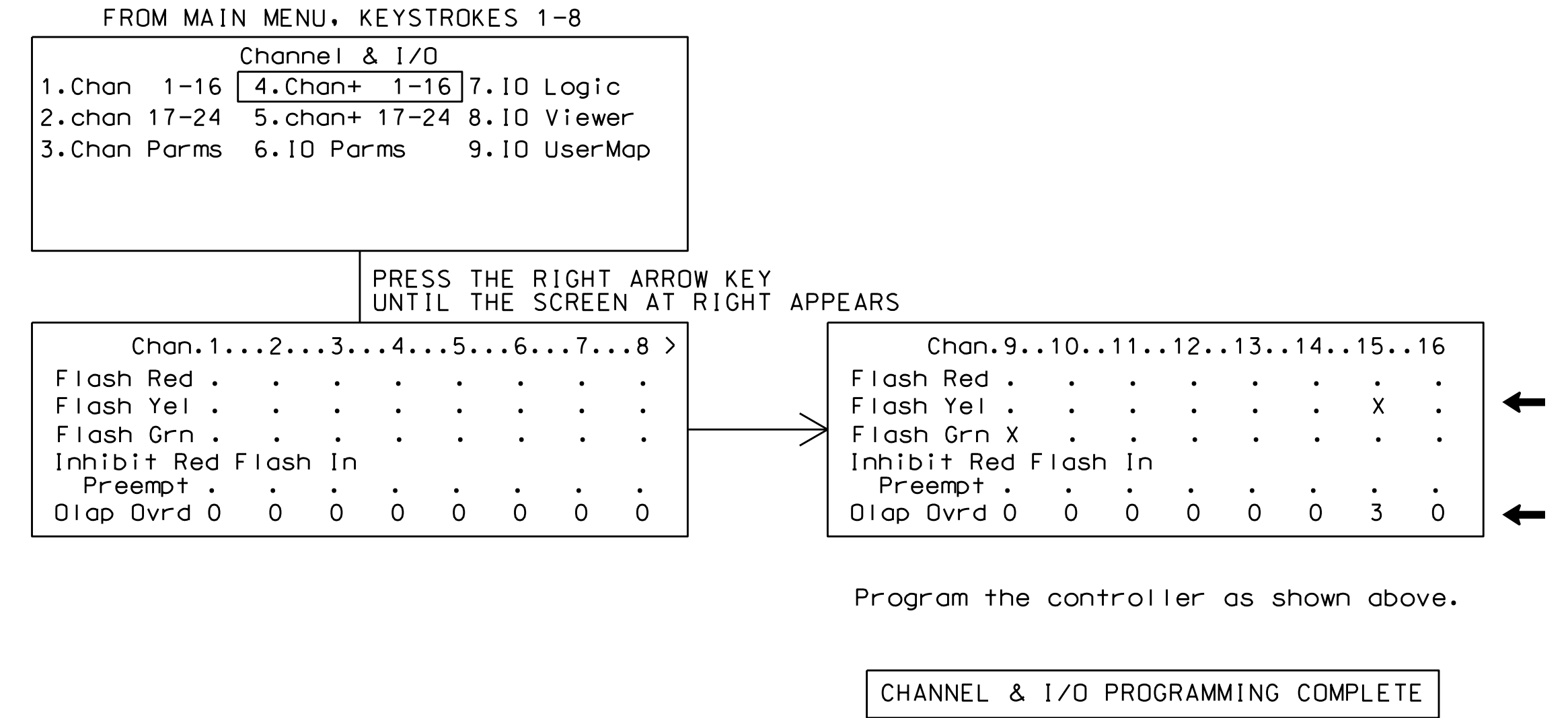
I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL

FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.



Programming notes:

Pin	Default Fcn Description	Change To: Fcn Description
5-2	39 Ch15 Yellow....	0 Unused

Programming notes:

Pin	Default Fcn Description	Change To: Fcn Description
6-8	59 Ch11 Green	39 Ch15 Yellow

NOTE

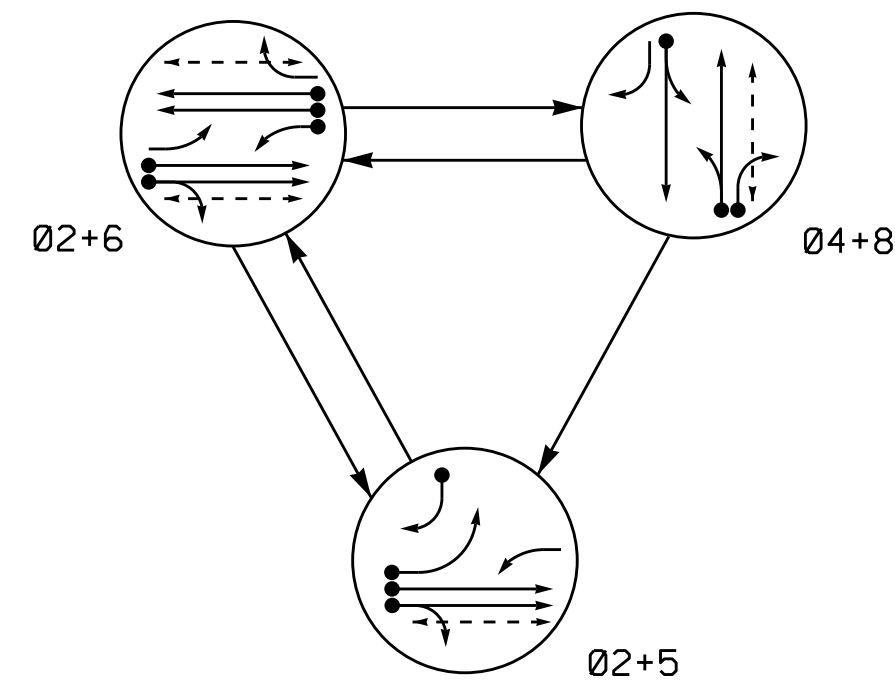
Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: GBO-559T3
DESIGNED: October 2017
SEALED: 10/31/2017
REVISED:

Electrical Detail - Temp 3 - Sheet 3 of 3

ELECTRICAL AND PROGRAMMING DETAILS FOR:	N. Elm Street at United Health Care and Lake Jeanette Office Park		SEAL 	
	Division 7 PLAN DATE: October 2017 PREPARED BY: C. Strickland	Guilford County GREENSBORO REVIEWED BY: T. Joyce		DocuSigned by: <i>Todd Joyce</i> 11/2/2017 DATE
	REVISIONS			SIG. INVENTORY NO. GBO-559T3

PHASING DIAGRAM



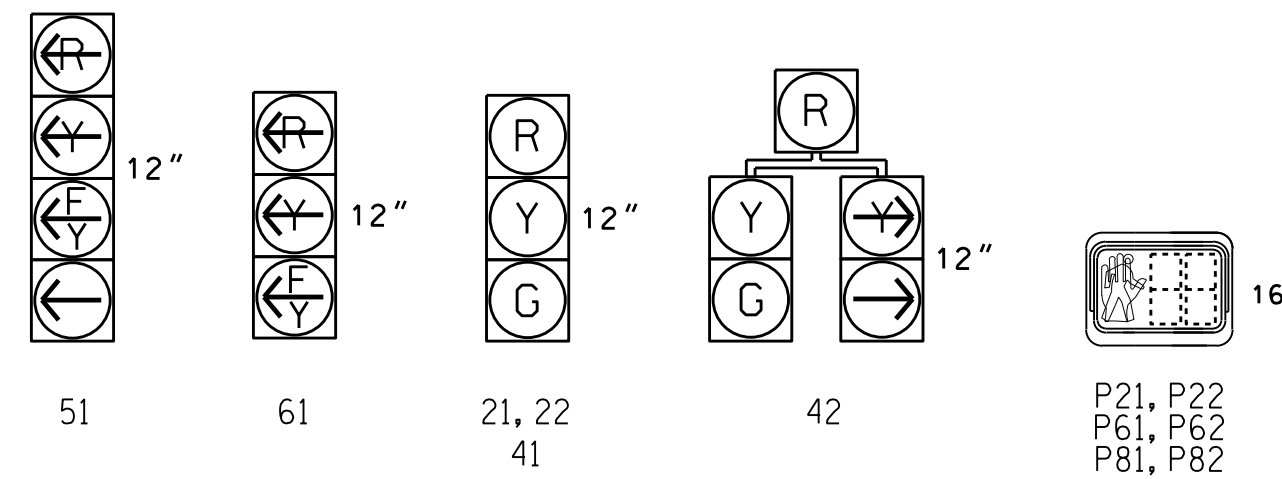
PHASING DIAGRAM DETECTION LEGEND
 ● → DETECTED MOVEMENT
 ○ → UNDETECTED MOVEMENT (OVERLAP)
 - - - → UNSIGNALIZED MOVEMENT
 ⚡ → PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE			
	02+5	02+6	04+8	FLASH
21, 22	G	G	R	Y
41	R	R	G	R
42	R	R	G	R
51	F	F	R	R
61	F	F	R	R
62, 63	R	G	R	Y
81, 82	R	R	G	R
P21, P22	W	W	DW	DRK
P61, P62	DW	W	DW	DRK
P81, P82	DW	DW	W	DRK

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

SIGNAL FACE I.D.

All Heads L.E.D.



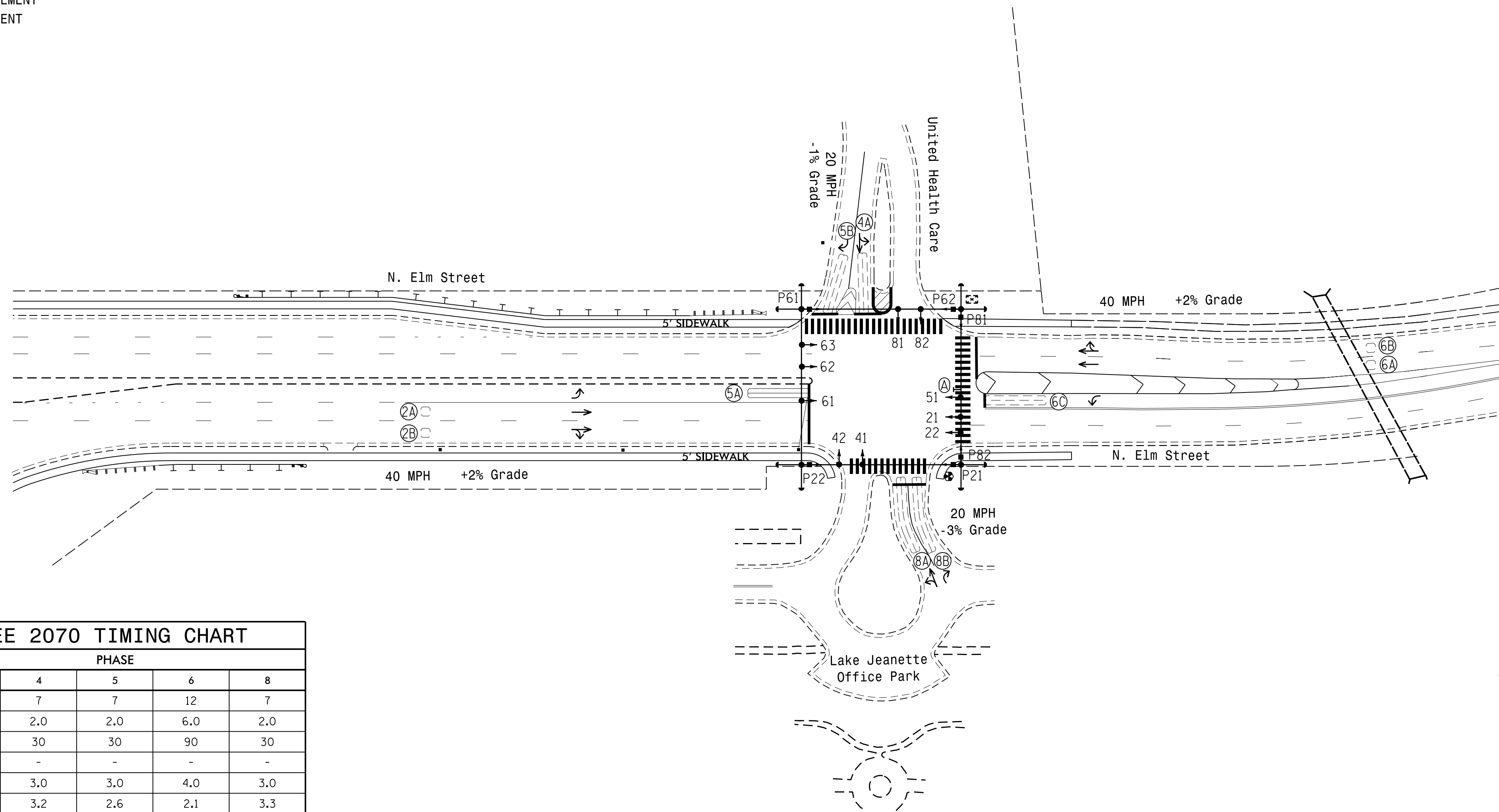
LOOP & DETECTOR UNIT INSTALLATION CHART
 NAZTEC APOGEE SOFTWARE 2070 CONTROLLER

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING								
					PHASE	SWITCH (PHASE)	DELAY TIME	STRETCH TIME	CALLING	EXTENSION	ADDED INIT.	SYSTEM LOOP	NEW CARD
2A	6X6	250	4	-	2	-	-	-	X	X	X	-	-
2B	6X6	250	4	-	2	-	-	-	X	X	X	-	-
4A	6X40	0	2-4-2	-	4	-	-	-	X	X	X	-	-
5A	6X40	0	2-4-2	X	5	-	15	-	X	X	X	-	-
5B	6X40	0	2-4-2	-	5	-	15	-	X	X	X	-	-
6A	6X6	250	4	-	6	-	-	-	X	X	X	-	-
6B	6X6	250	4	-	6	-	-	-	X	X	X	-	-
6C	6X40	0	2-4-2	-	6	-	-	-	X	X	X	-	-
8A	6X50	+5	2-4-2	-	8	-	-	-	X	X	X	-	-
8B	6X50	+5	2-4-2	-	8	-	10	-	X	X	X	-	-

3 Phase Fully Actuated (Greensboro Signal System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Reposition existing signal heads numbered 21, 22, and 52.
- Set all detector units to presence mode.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



FEATURE	PHASE				
	2	4	5	6	8
Min Green *	12	7	7	12	7
Gap, Extension *	6.0	2.0	2.0	6.0	2.0
Maximum Green 1 *	90	30	30	90	30
Maximum Green 2 *	-	-	-	-	-
Yellow Clear	4.0	3.0	3.0	4.0	3.0
Red Clear	2.1	3.2	2.6	2.1	3.3
Walk *	7	-	-	7	7
Pedestrian Clear	13	-	-	25	18
Added Initial *	2.0	-	-	2.0	-
Maximum Initial *	29	-	-	29	-
Time Before Reduction *	15	-	-	15	-
Time To Reduce *	30	-	-	30	-
Minimum Gap	3.0	-	-	3.0	-
Recall Mode	MIN RECALL	-	-	MIN RECALL	-
Lock Calls	YES	NO	NO	YES	NO
Dual Entry	-	ON	-	-	ON
Simultaneous Gap	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.

PROPOSED		EXISTING	
○ →	Traffic Signal Head	● →	N/A
○ →	Modified Signal Head	○ →	N/A
⚡	Pedestrian Signal Head	⚡	N/A
⚡	Signal Pole with Guy	⚡	N/A
⚡	Signal Pole with Sidewalk Guy	⚡	N/A
⊠	Inductive Loop Detector	⊠	N/A
⊠	Controller & Cabinet	⊠	N/A
⊠	Junction Box	⊠	N/A
- - -	2-in Underground Conduit	- - -	N/A
N/A	Right of Way	- - -	N/A
→	Directional Arrow	→	N/A
⊕	Type I Pushbutton Post	⊕	N/A
N/A	Guardrail	- - -	N/A
⊕	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	⊕	N/A

Signal Upgrade - Final Design

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

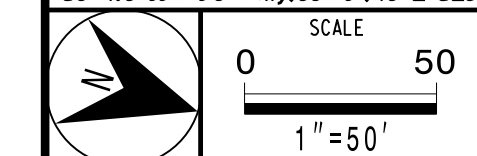
N. Elm Street
 at
United Health Care and Lake Jeanette Office Park
 Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY: I. O. Umozurike

REVISIONS: _____ INIT. DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 ROBERT J. ZIEMBA
 026486
 10/31/2017



21-001-2017_16-46
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 czl:emba

OVERLAP PROGRAMMING DETAIL FOR OVERLAPS A AND C*

(program controller as shown below)

*NOTE FOR ALL OVERLAPS: Use Default values for Overlap 'PLUS' programming details.

FROM MAIN MENU PRESS "1" CONTROLLER
AND THEN "5" OVERLAPS

Overlaps
1.General Parm
2.Program
3.Status

Enter Overlap # 1
then press Enter

Overlap A-1
1.Program Parm
2.Confl Prog+
3.Program Parm+

Ovr1p A-1 Ps.....
Included Ps 2 0 0 0 0 0 0 0
Modifier Ps 0 0 0 0 0 0 0 0
Type:NORMAL Grn: 0 Yel: 3.5 Red: 1.5

PRESS "ESC" TWICE

Enter Overlap # 3
then press Enter

Overlap C-3
1.Program Parm
2.Confl Prog+
3.Program Parm+

Ovr1p C-3 Ps.....
Included Ps 5 0 0 0 0 0 0 0
Modifier Ps 6 0 0 0 0 0 0 0
Type:FYA-4 Grn: 0 Yel: 3.5 Red: 1.5

PRESS "ESC" THREE TIMES

Notice
type
FYA-4 →

Overlaps
1.General Parm
2.Program
3.Status

General Overlap Parameters
Lock Inhibit OFF
Confl Lock Enable OFF
Parent P Cirnc ON
Extra Included Phases OFF
InhibitLockInterval ALWAYS

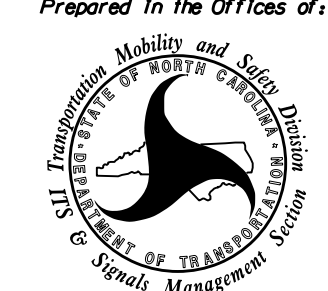
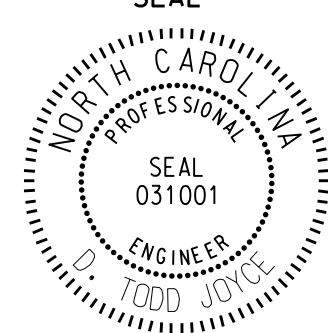
OVERLAP PROGRAMMING COMPLETE

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cestrickland

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: GBO-559
DESIGNED: October 2017
SEALED: 10/31/2017
REVISED:

Electrical Detail - Sheet 2 of 3

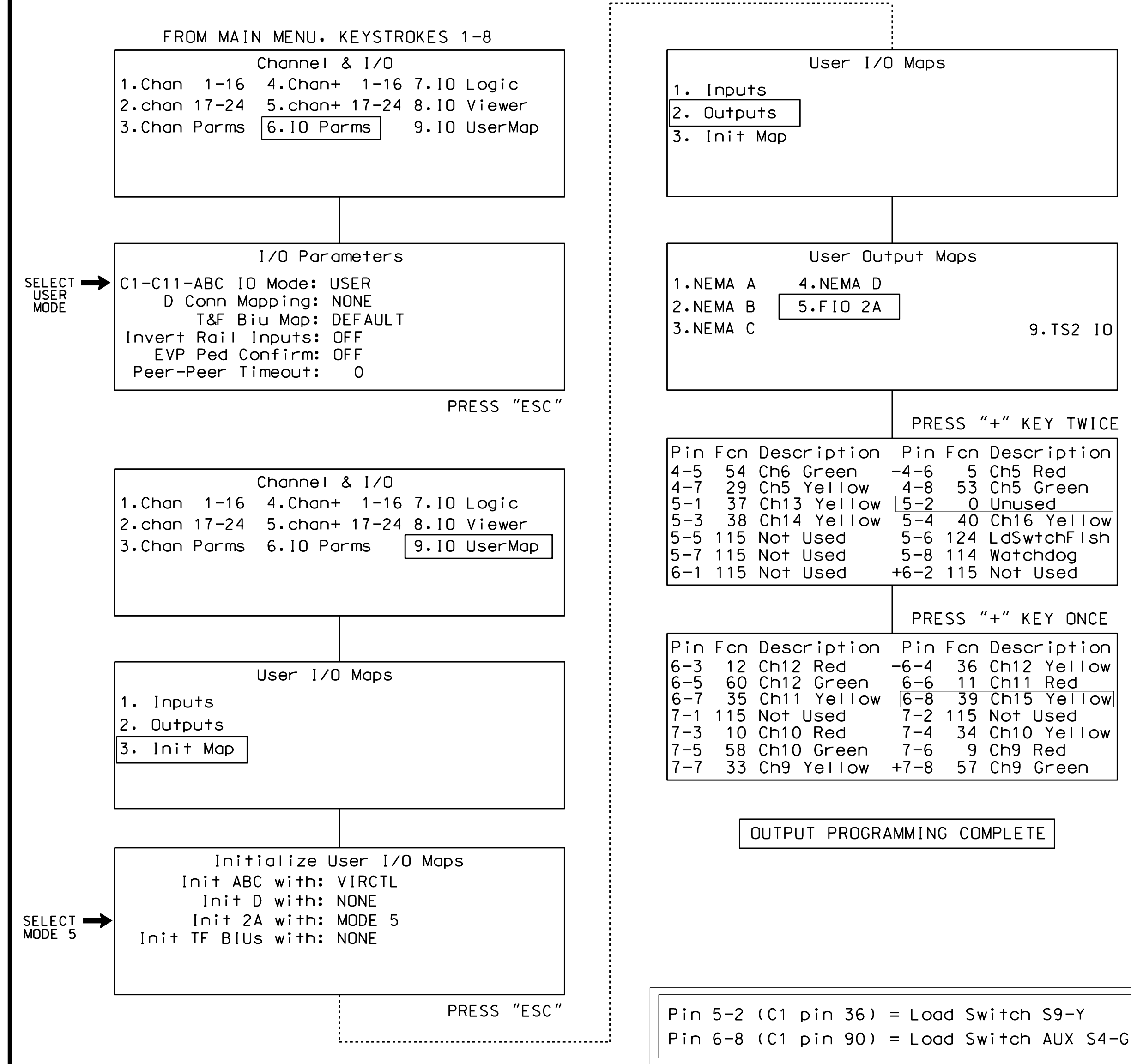
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FINAL UNLESS ALL
SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	N. Elm Street at United Health Care and Lake Jeanette Office Park		SEAL  SEAL 031001 ENGINEER TODD JOYCE
	Division 7 PLAN DATE: October 2017 PREPARED BY: C. Strickland	Guilford County Greensboro REVIEWED BY: T. Joyce REVIEWED BY:	

4-SECTION PPLT FYA OUTPUT PROGRAMMING DETAIL

(program controller as shown below)

1. Before proceeding with output programming, be sure to switch the "RUN ENABLE STATUS" to "OFF". The "RUN ENABLE STATUS" setting is located from Main Menu, key strokes 1-7.
2. The Flashing Yellow Arrow in a 4-section PPLT FYA head is controlled by a normally unused PED Yellow output. This programming takes a specific PED Yellow output and remaps it to the appropriate Overlap Green output.



! Press the "*" key to return to Main Menu. Now go back to "RUN-ENABLE STATUS" and switch to "ON".

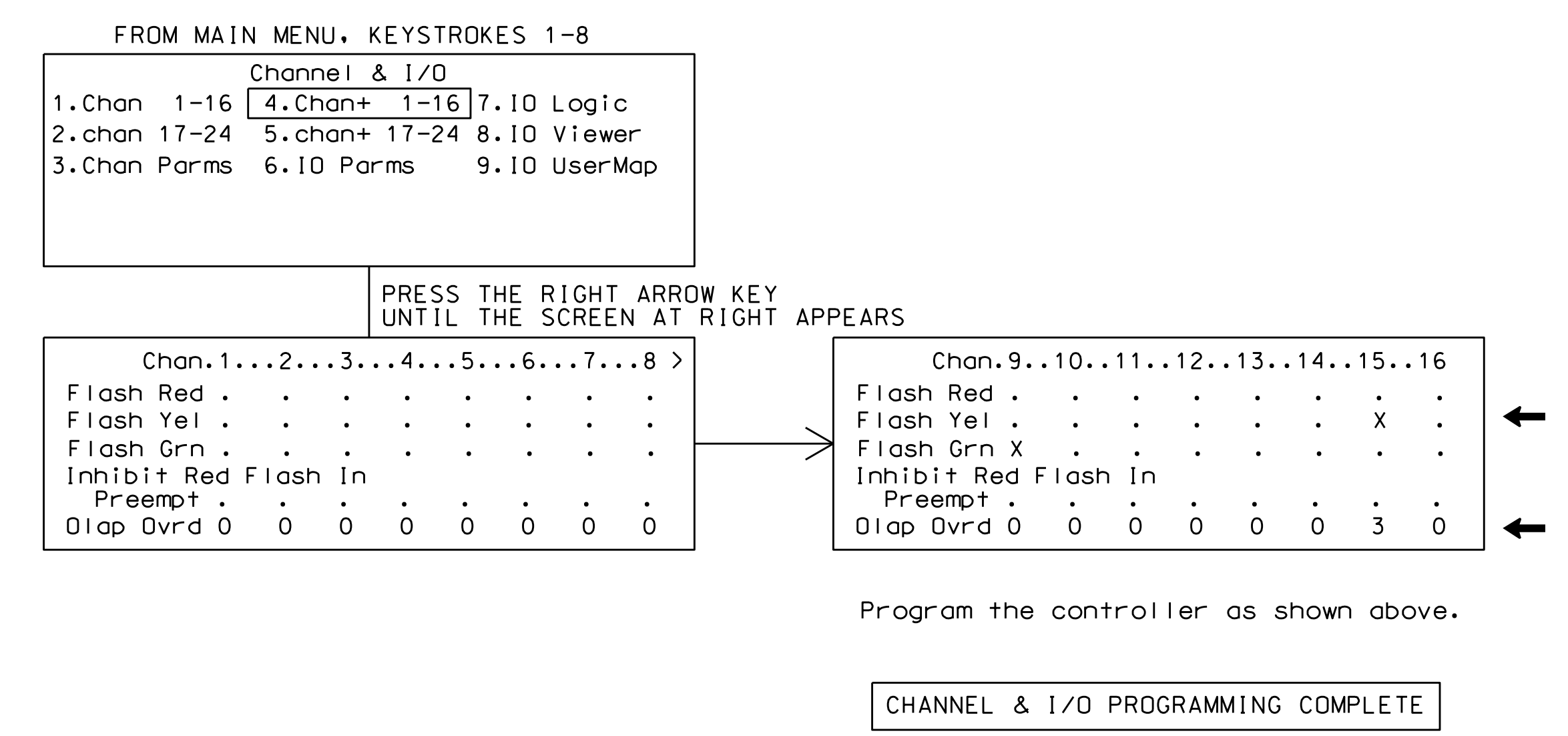
NOTE

I/O re-programming is necessary for proper FYA operation. See Channel & I/O Programming Detail For FYA Operation on this sheet.

CHANNEL & I/O PROGRAMMING DETAIL FOR FYA OPERATION

(program controller as shown below)

This programming takes the output that drives a Flashing Yellow Arrow and makes it flash. It also specifies which overlap is to be overridden for the FYA to display properly.



Programming notes:

Pin	Default Fcn Description	Change To: Fcn Description
5-2	39 Ch15 Yellow....	0 Unused

Programming notes:

Pin	Default Fcn Description	Change To: Fcn Description
6-8	59 Ch11 Green	39 Ch15 Yellow

NOTE

Output re-mapping is necessary for proper FYA operation. See the 4-Section PPLT FYA Output Programming Detail on this sheet.

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THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: GBO-559
DESIGNED: October 2017
SEALED: 10/31/2017
REVISED:

Electrical Detail - Sheet 3 of 3

Prepared In the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

N. Elm Street
at
United Health Care and
Lake Jeanette Office Park

Division 7 Guilford County Greensboro

PLAN DATE: October 2017 REVIEWED BY: T. Joyce

PREPARED BY: C. Strickland REVIEWED BY:

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

SEAL

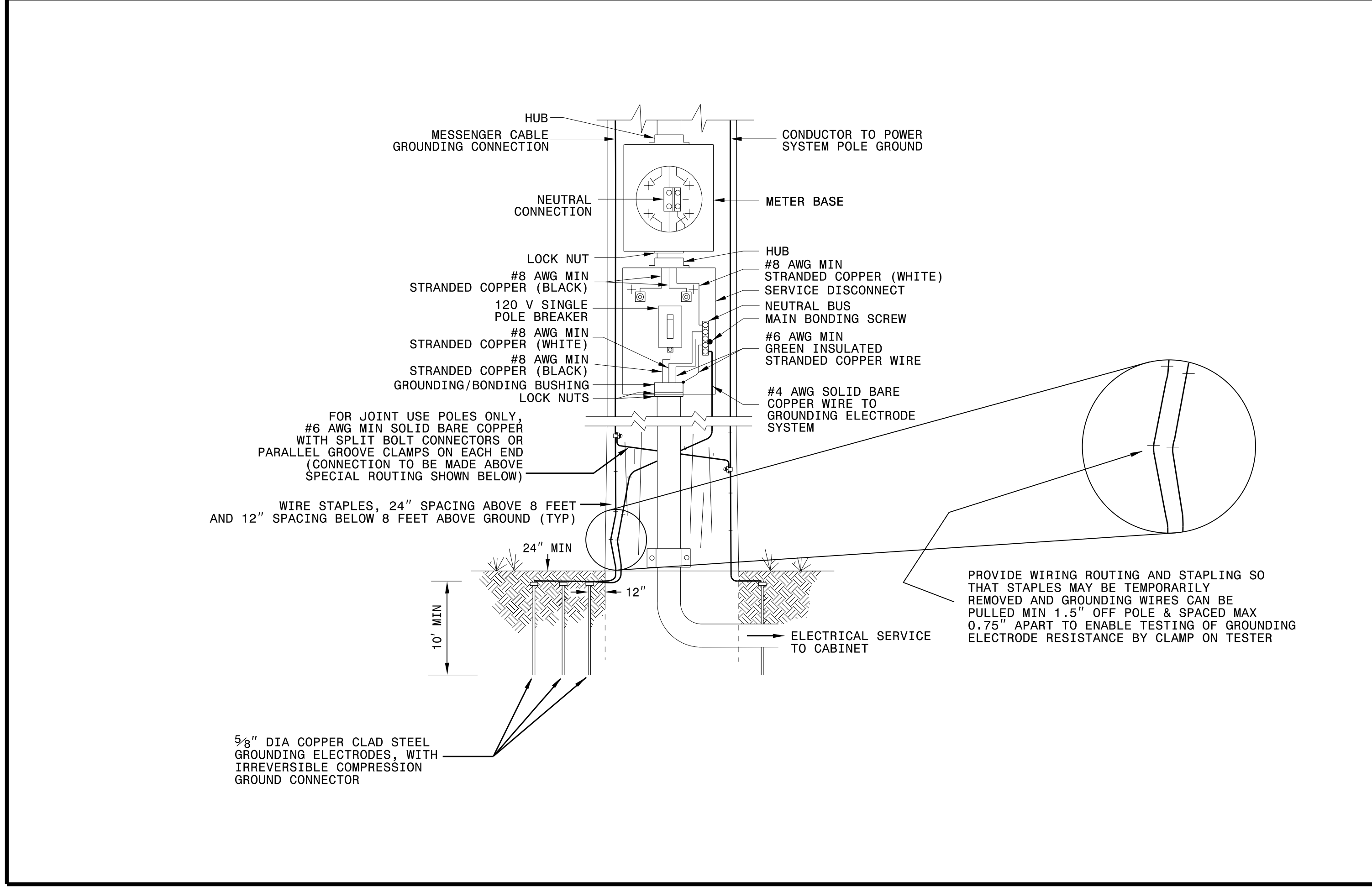
DocuSigned by:
T. Todd Joyce 11/2/2017

SIG. INVENTORY NO. GBO-559

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

ENGLISH STANDARD DRAWING FOR
ELECTRICAL SERVICE GROUNDING
GROUNDING AND BONDING

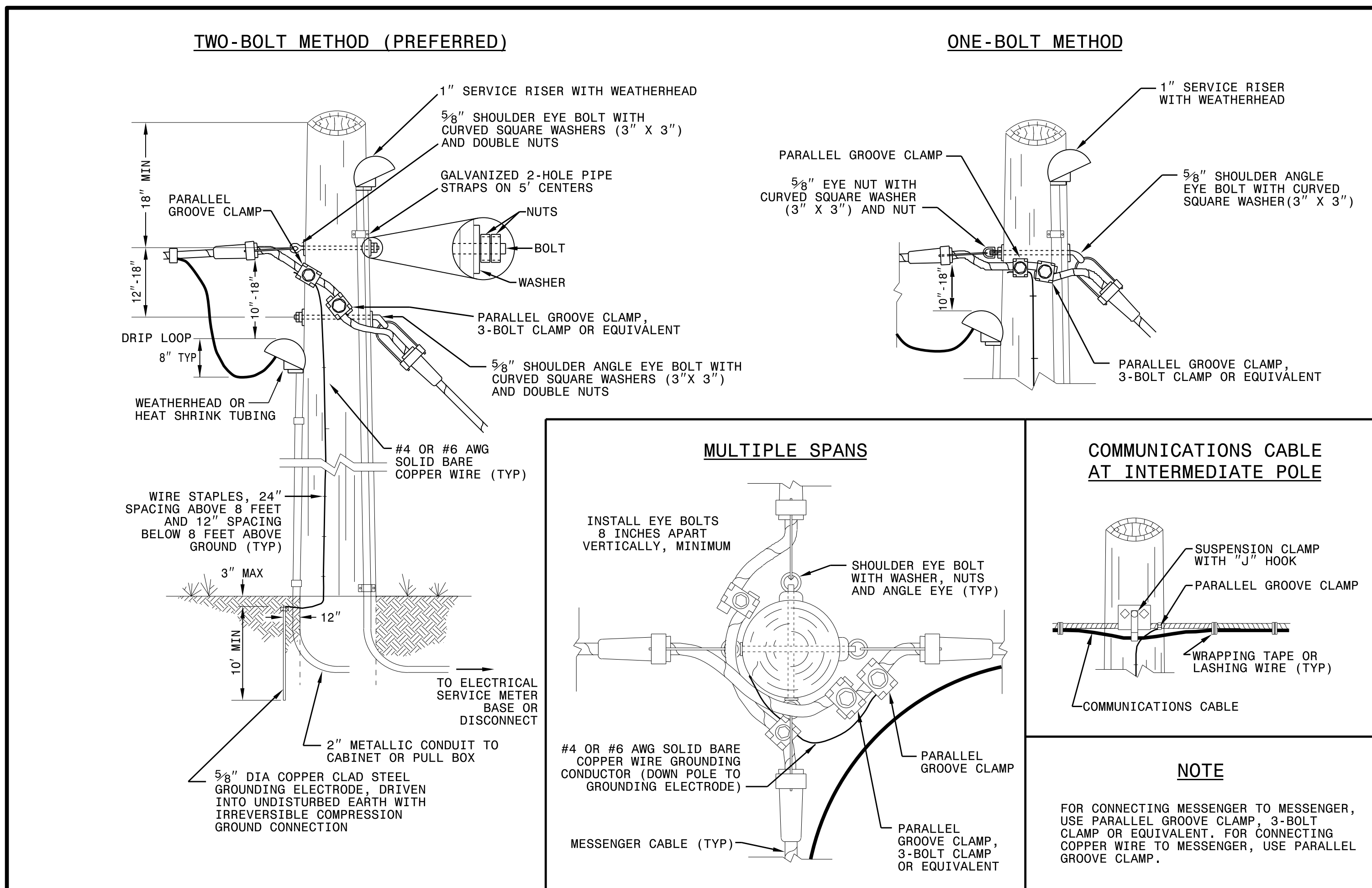
SHEET 1 OF 1
1700D01



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

ENGLISH STANDARD DRAWING FOR
WOOD POLES
METHODS OF ATTACHMENT AND GROUNDING

SHEET 1 OF 1
1720D01

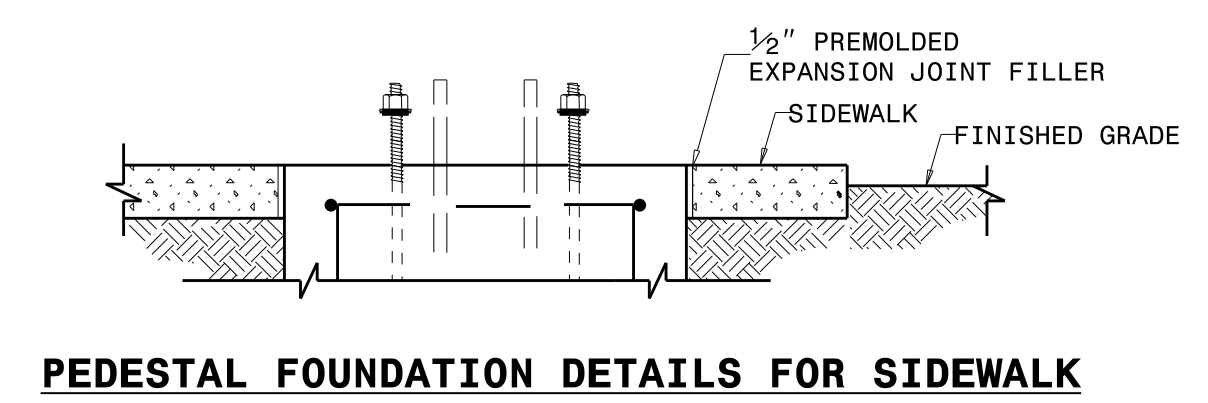
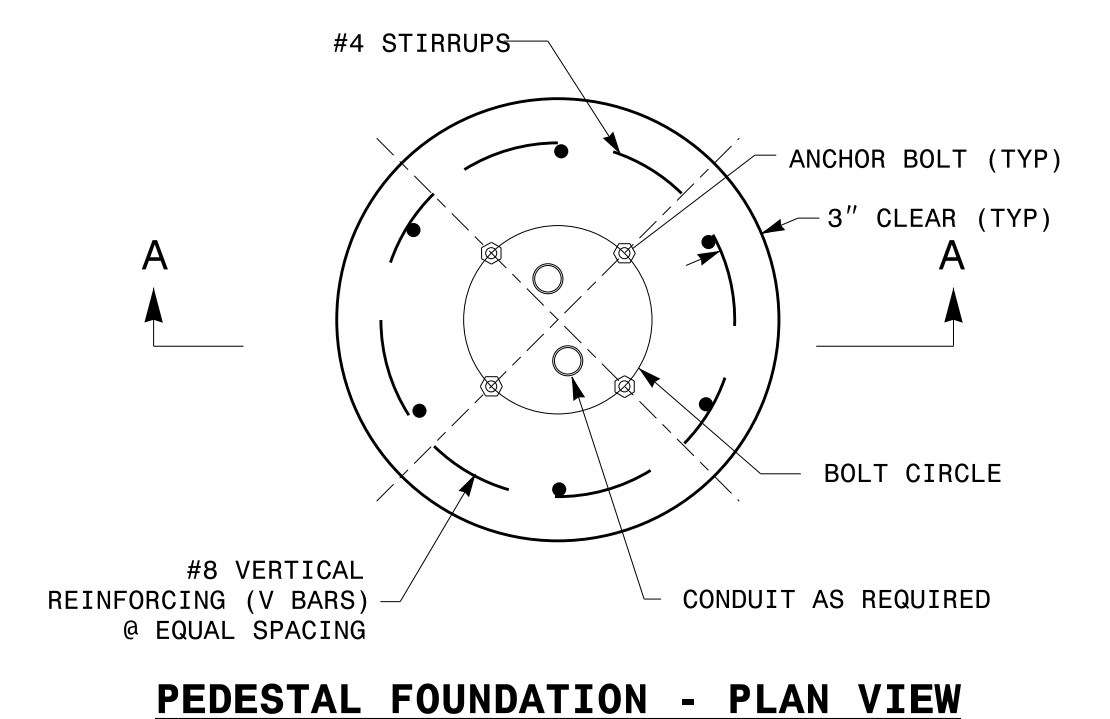


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SIGNATURES COMPLETED

See Plate for Title

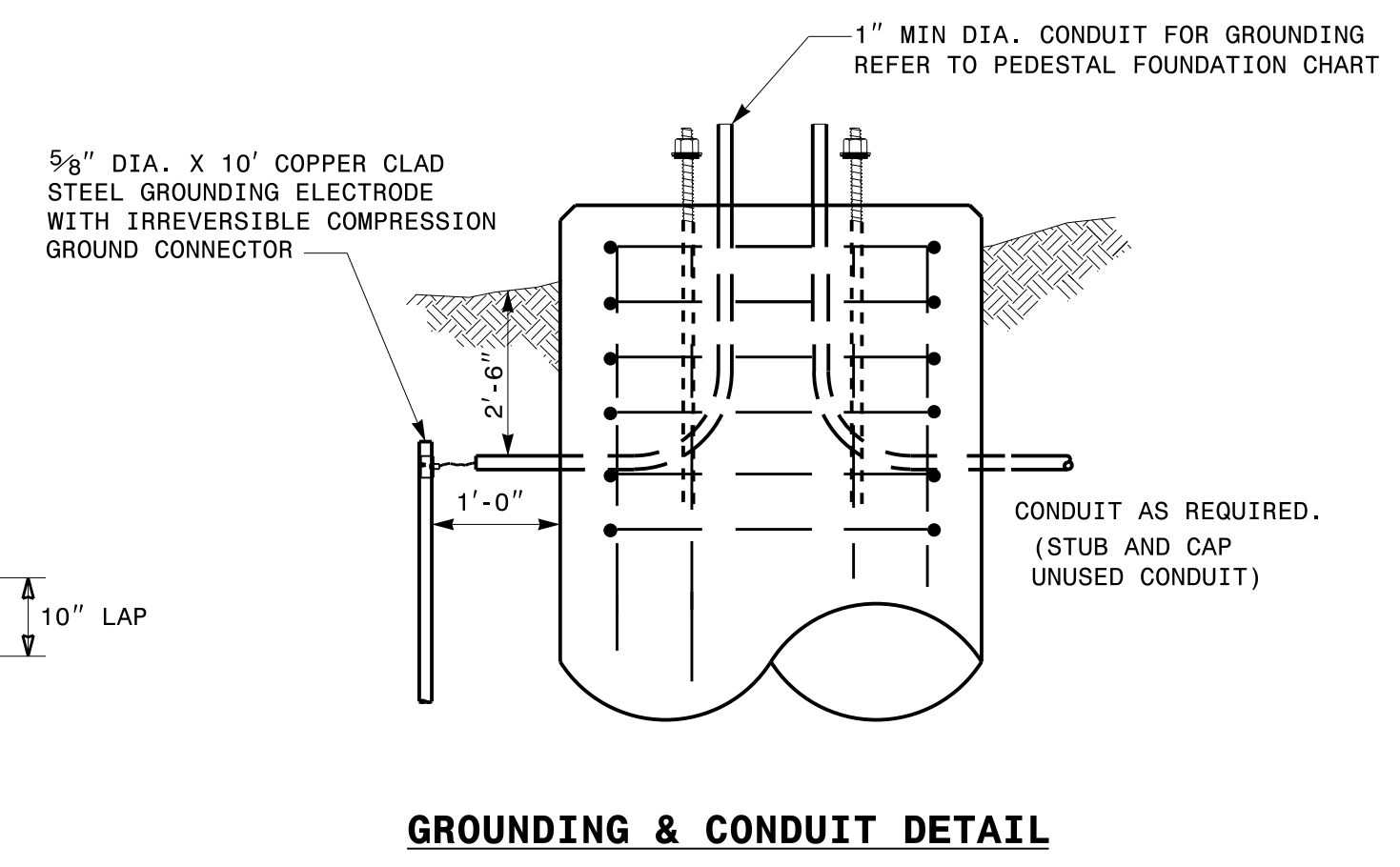
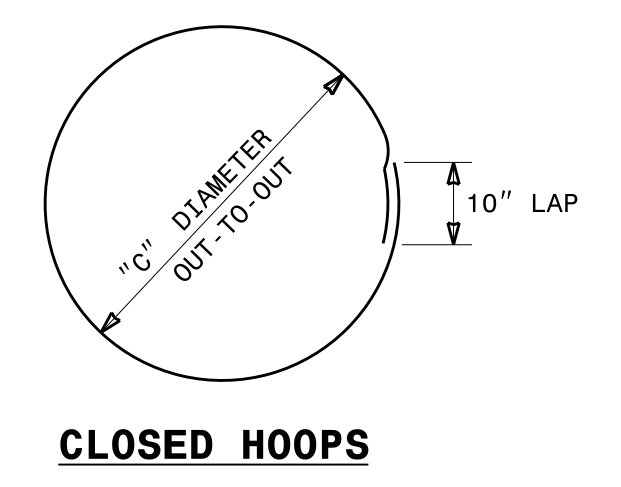
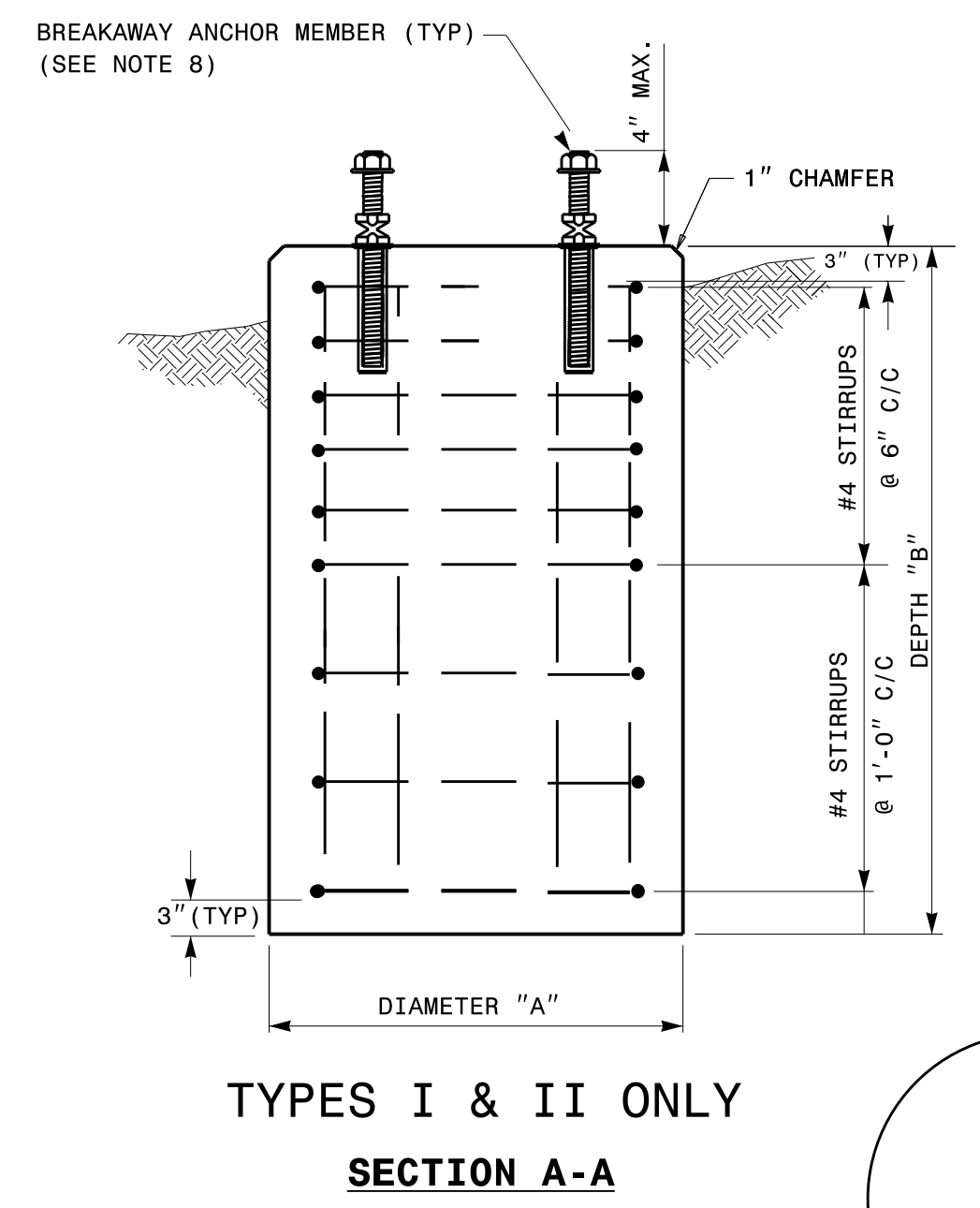
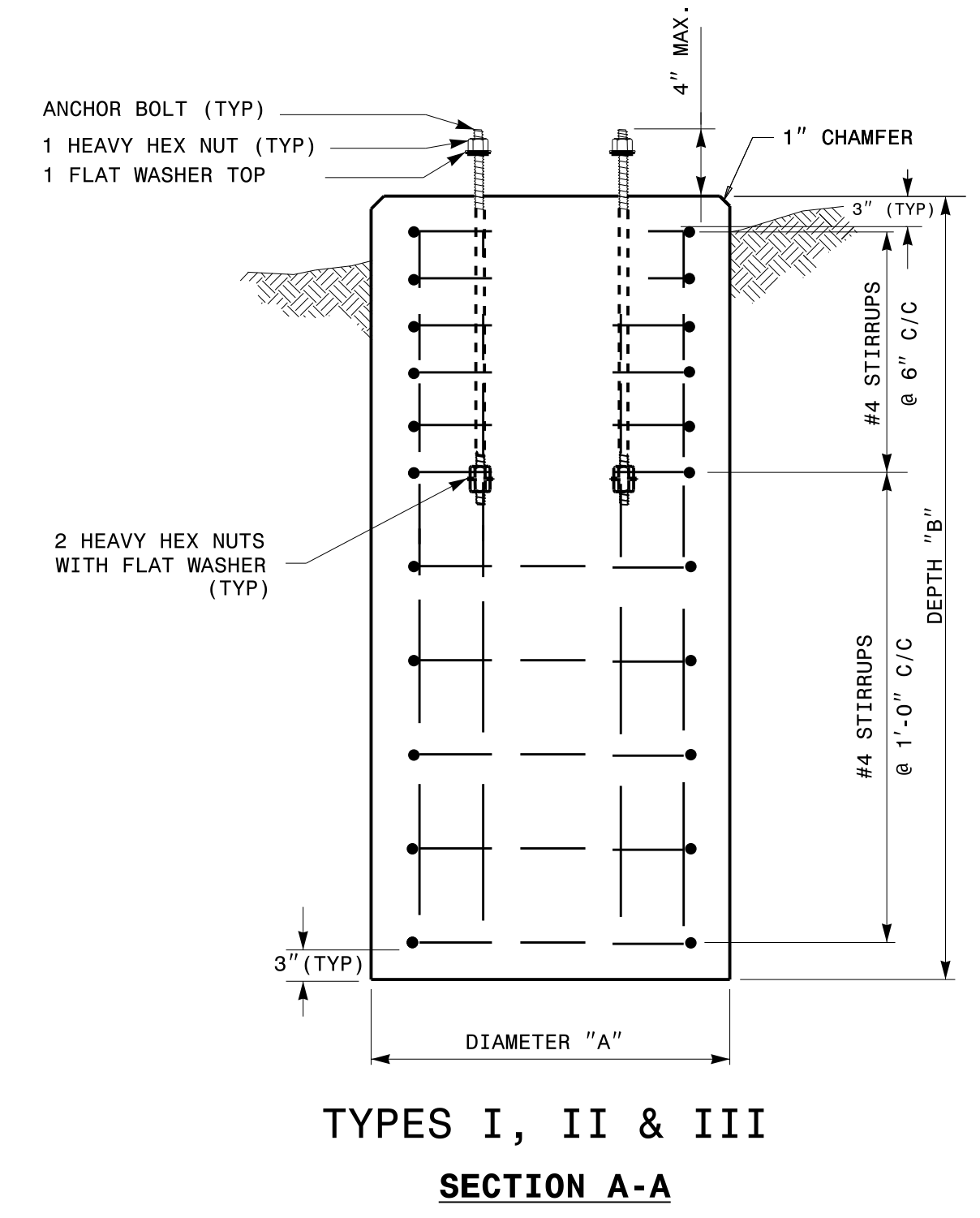
<p>Prepared in the Offices of:</p> <p>750 N. Greenfield Parkway Garner, NC 27529</p>	<p>SEAL</p> <p>DocuSigned by: Mohd Aslami</p> <p>10/11/2017 DATE</p>
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NOTES:

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



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

REINFORCING STEEL SCHEDULE													
TYPE	V-BAR				STIRRUP								
	SIZE #	QTY	LENGTH	WEIGHT LBS	SIZE #	QUANTITY			LENGTH	DIAMETER "C" FT	OVERLAP MIN.	WEIGHT LBS	TOTAL STEEL WEIGHT LBS
						VERTICAL SPACING ON 6" CENTERS	ON 12" CENTERS	TOTAL					
I	8	6	3'-0"	56	4	0	4	4	5'-7"	1'-6"	0'-10"	15	71
II	8	6	4'-6"	86	4	5	3	8	5'-7"	1'-6"	0'-10"	30	116
III	8	6	6'-6"	122	4	7	4	11	7'-2"	2'-0"	0'-10"	53	175

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

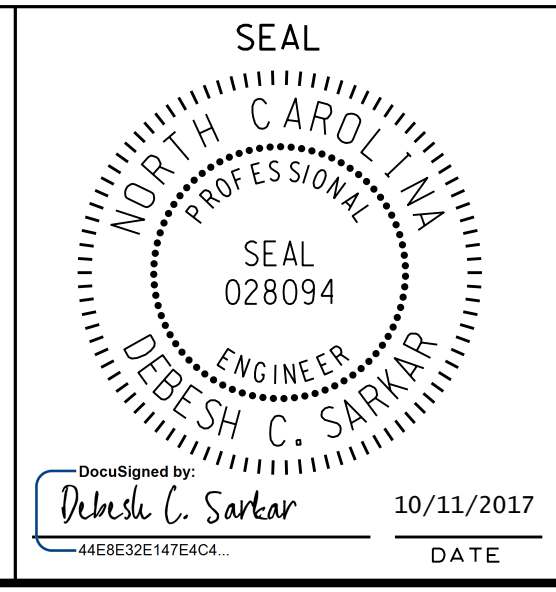
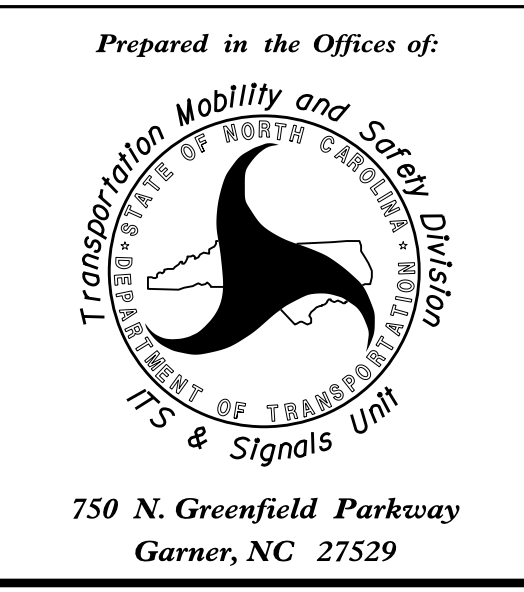
ENGLISH STANDARD DRAWING FOR
PEDESTALS
 FOUNDATIONS

SHEET 1 OF 1
1743D01

11-10-2017 08:03
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FINAL UNLESS ALL
SIGNATURES COMPLETED

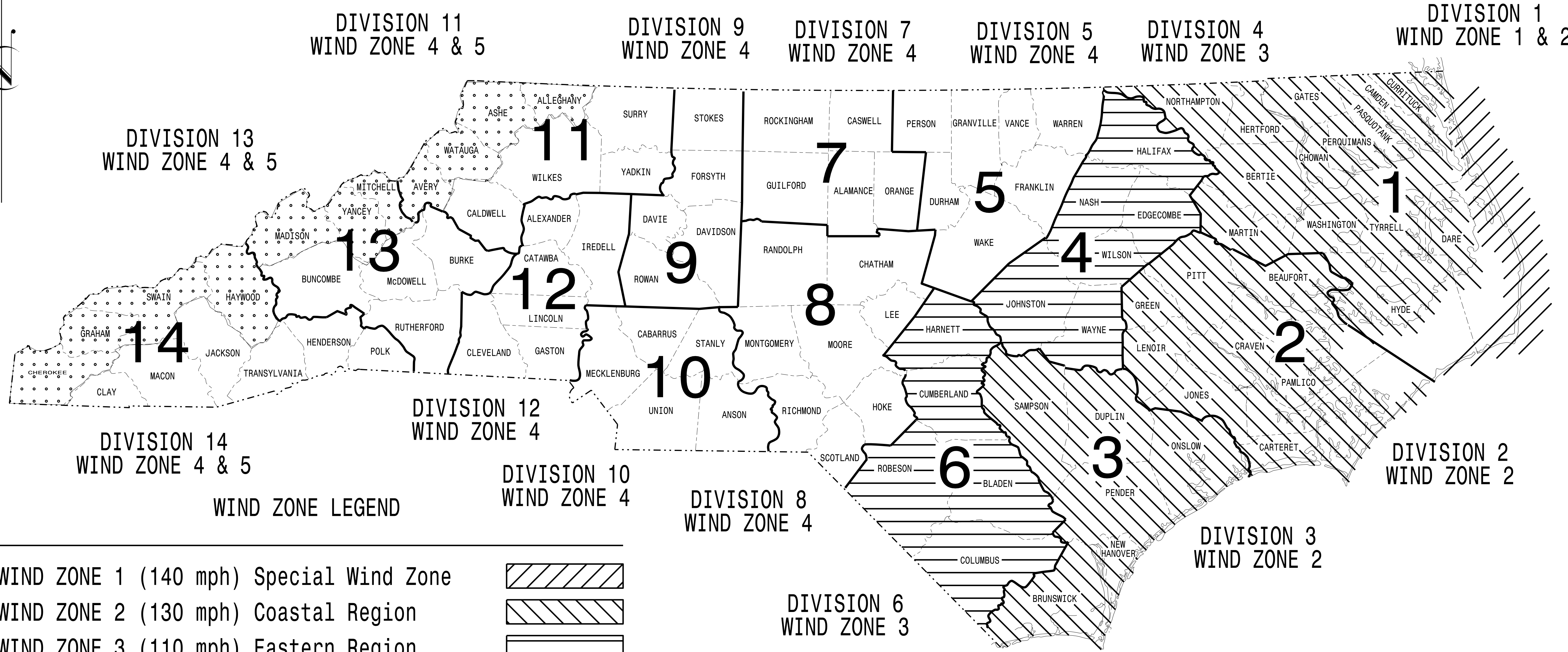
See Plate for Title



STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT I.D. NO. U-2525C	SHEET NO. Sig.M1
-----------------------------	---------------------

STANDARD DRAWINGS FOR ALL 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	

<https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

Prepared In the Offices of:

750 N. Greenfield Pkwy.
Garner, NC 27529

Designed in conformance with the latest 2015 Interim to the 6th Edition 2013

AASHTO

Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

INDEX OF PLANS

DRAWING NUMBER	DESCRIPTION
Sig. M 1	Statewide Wind Zone Map
Sig. M 2	Typical Fabrication Details-All Metal Poles
Sig. M 3	Typical Fabrication Details-Strain Poles
Sig. M 4	Typical Fabrication Details-Mast Arm Poles
Sig. M 5	Typical Fabrication Details-Mast Arm Connection
Sig. M 6	Typical Fabrication Details-Strain Pole Attachments
Sig. M 7	Construction Details-Foundations
Sig. M 8	Standard Strain Pole Foundation-All Soil Conditions

NCDOT CONTACTS:

MOBILITY AND SAFETY DIVISION - ITS AND SIGNALS UNIT

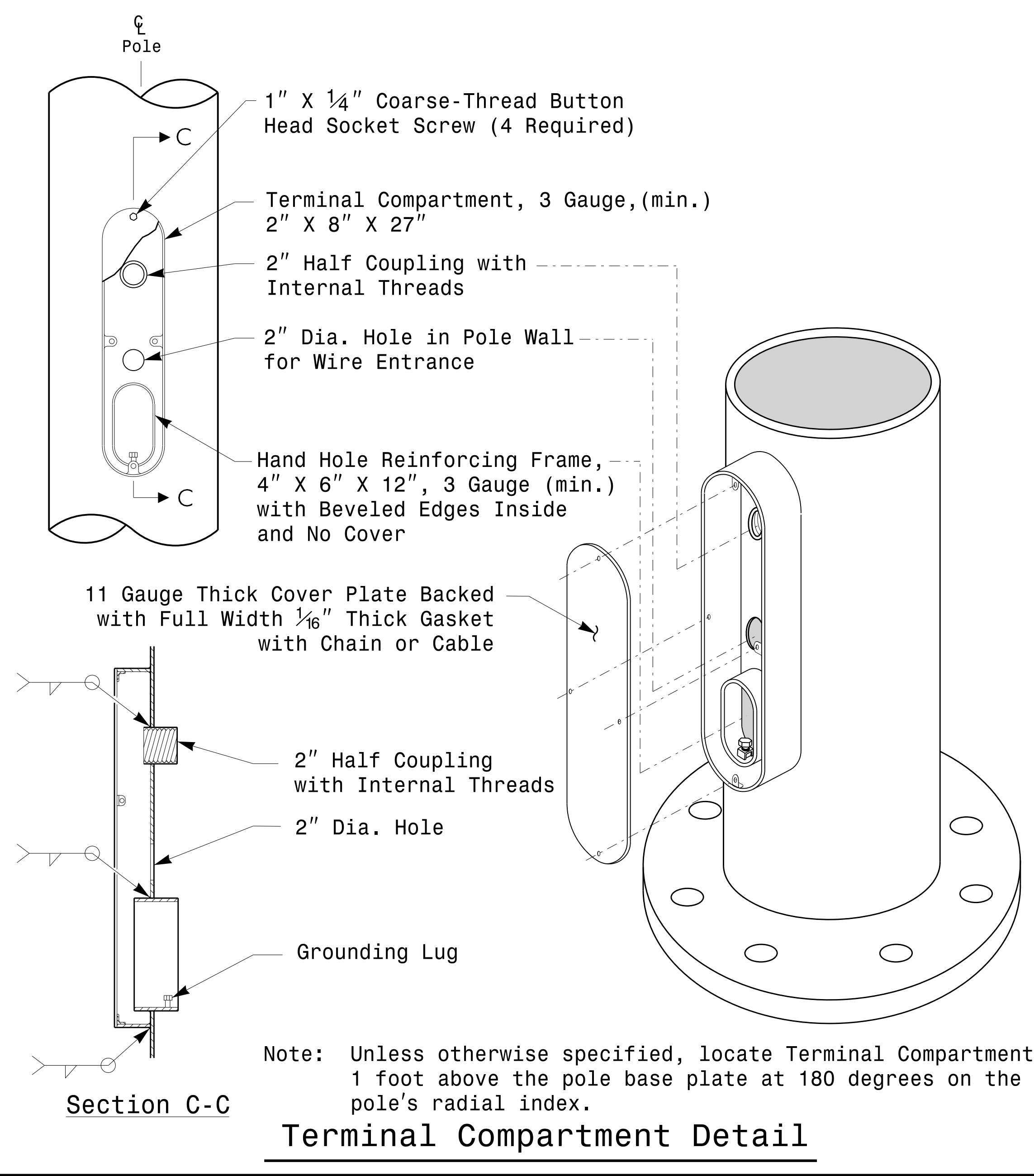
M.M. MCDIARMID, P.E. - STATE ITS AND SIGNALS ENGINEER

J.P. GALLOWAY, P.E. - STATE SIGNALS ENGINEER

D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER

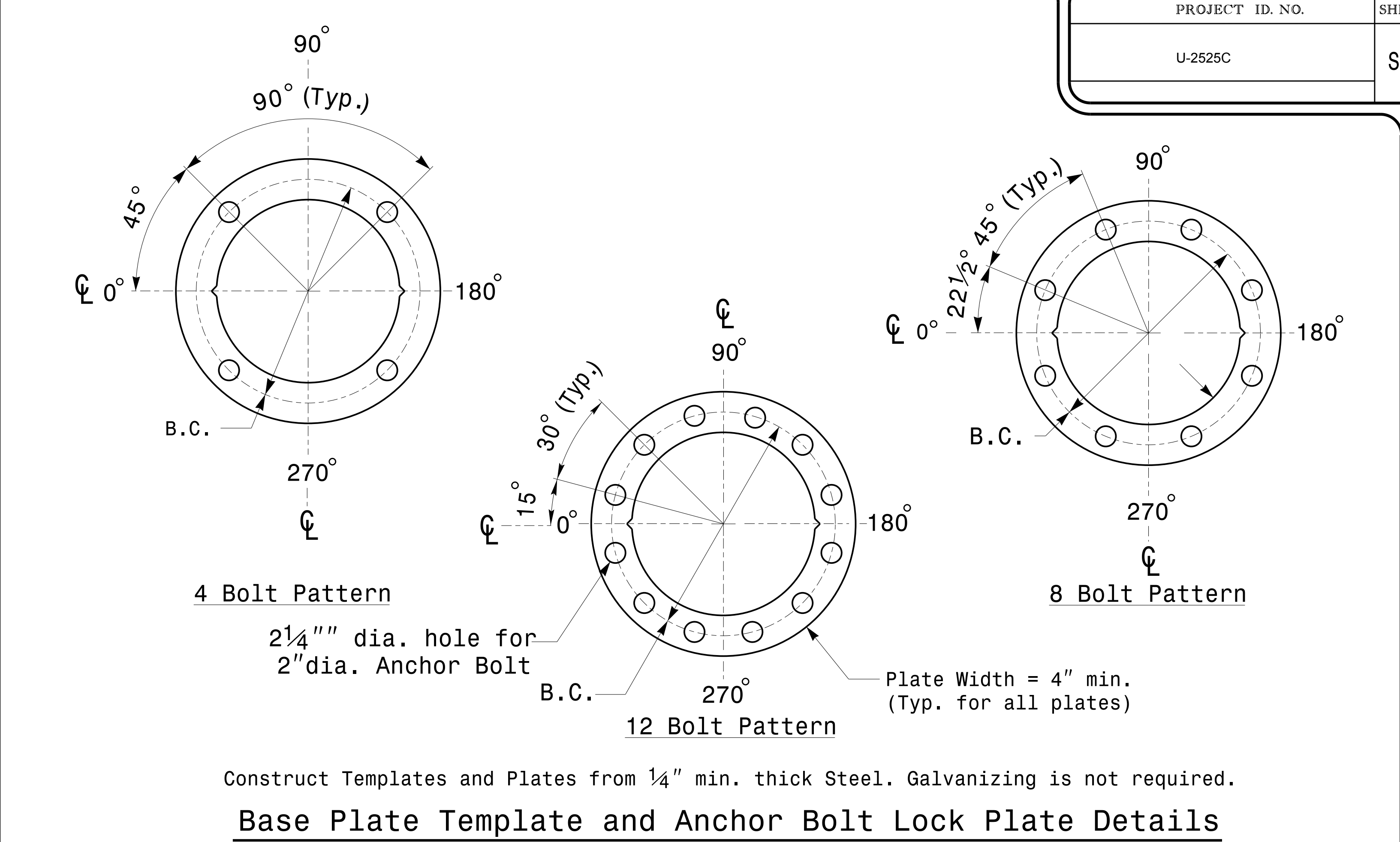
SEAL

DocuSigned by:
Debesh C. Sarkar
DATE: 10/11/2017



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

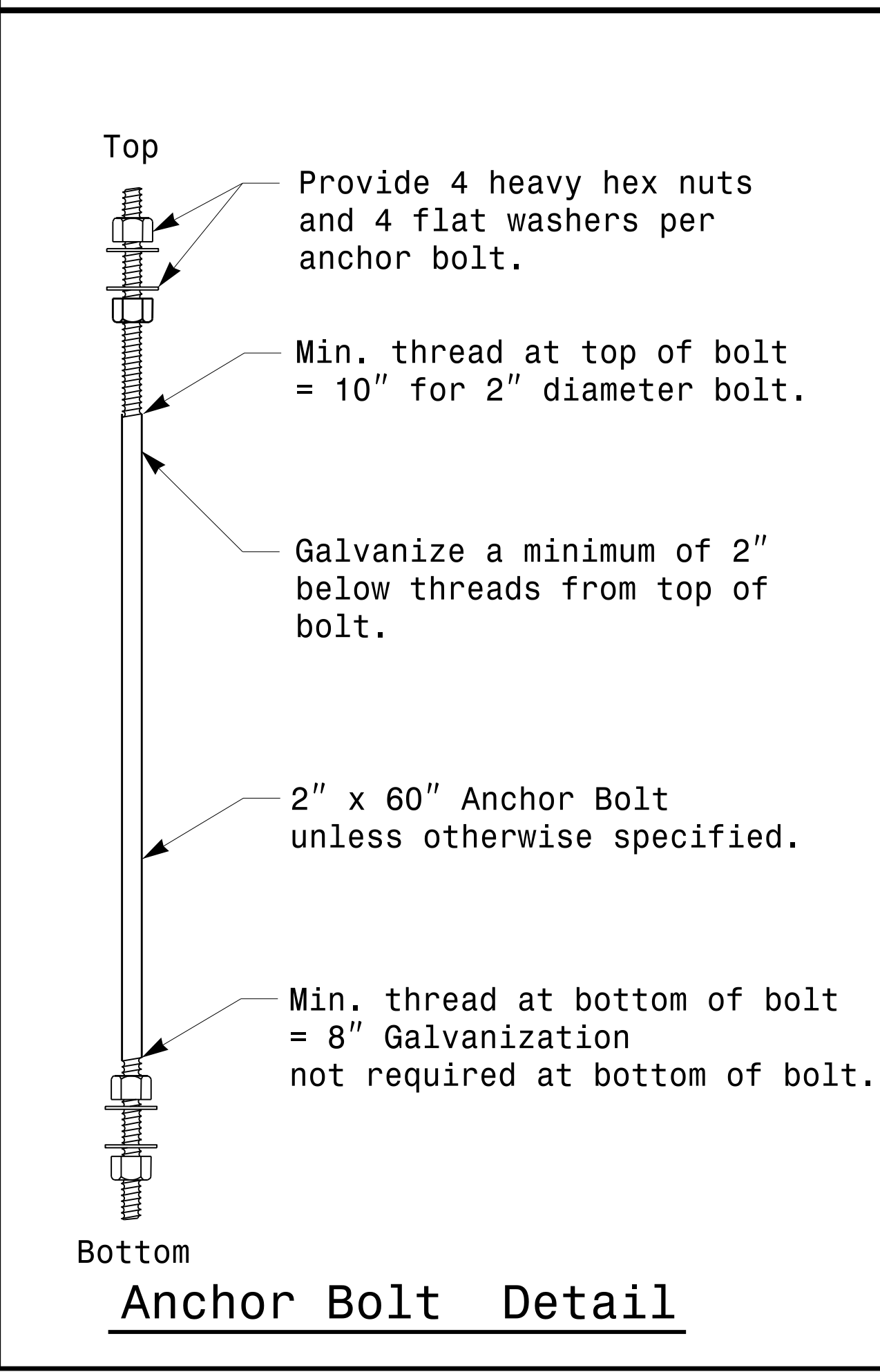
MFG _____ MFG. DATE: MM/YY	MFG _____ MFG. DATE:MM/YY
SHAFT D/T/L/Y _____	SECTION D/T/L/Y _____
ARM-A D/T/L/Y _____	NCDOT SIG. INV. NO. _____
ARM-B D/T/L/Y _____	NCDOT POLE NO. _____
A.B. DIA./B.C./L/Y _____	
NCDOT SIG. INV. NO. _____	
NCDOT POLE NO. _____	

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

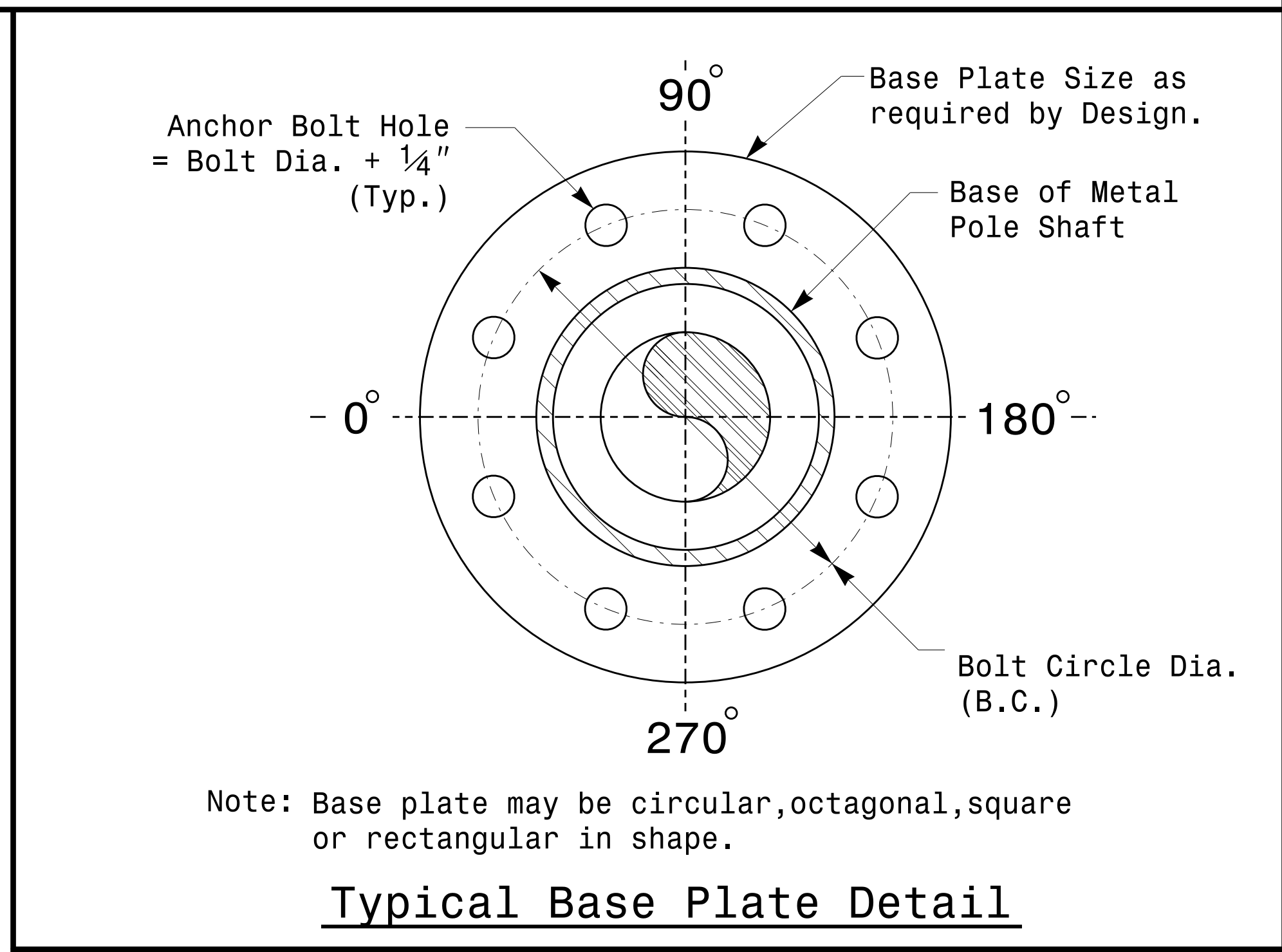
Arm I.D. Tag
(Provide on each section of a multi-section mast arm.)

- 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 Signal Inv. Number and pole I.D. number
 - 5) See drawing M3 and M4 for mounting positions of I.D. tags.

Identification Tag Details



Anchor Bolt Detail



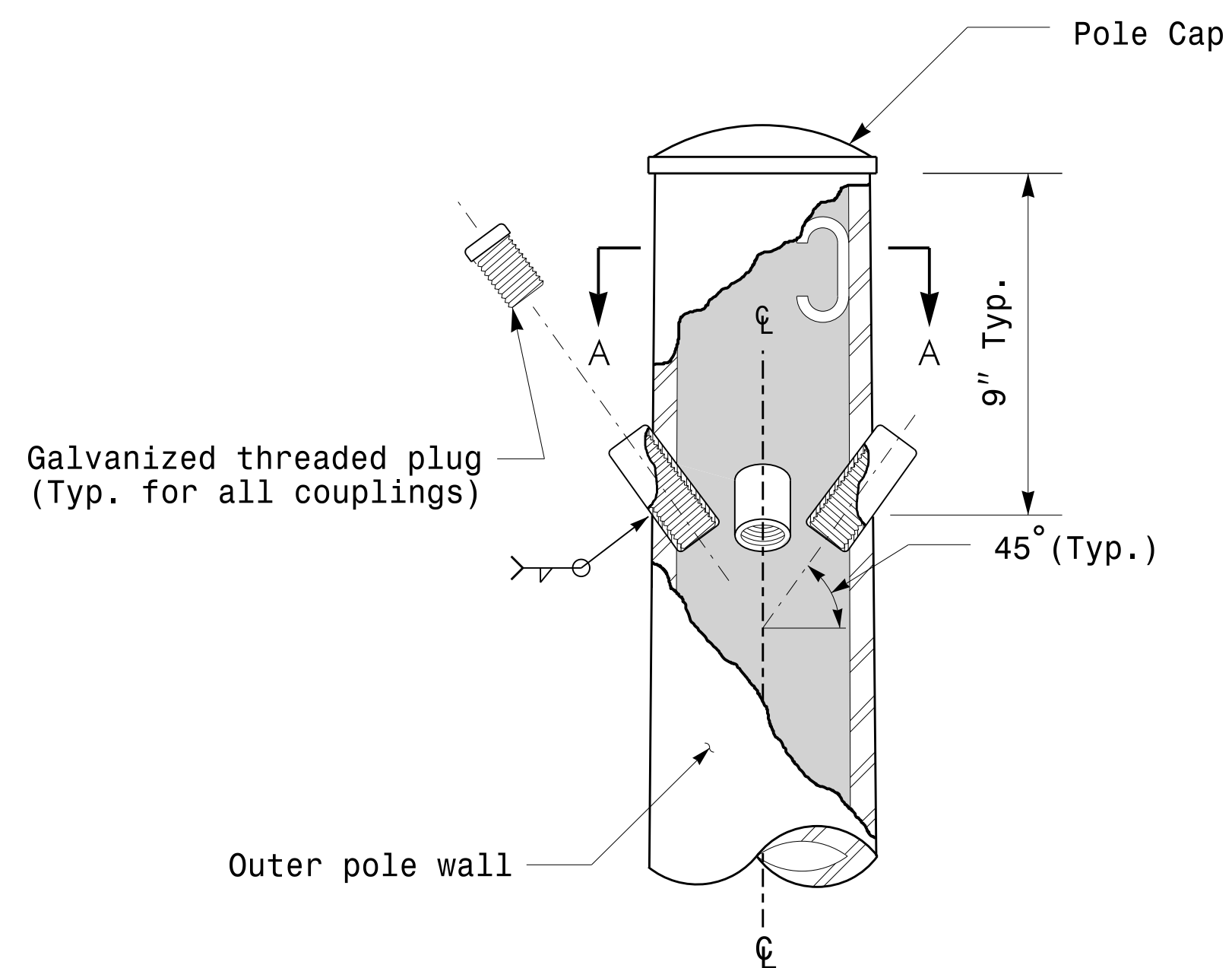
Note: Base plate may be circular, octagonal, square or rectangular in shape.

Typical Base Plate Detail

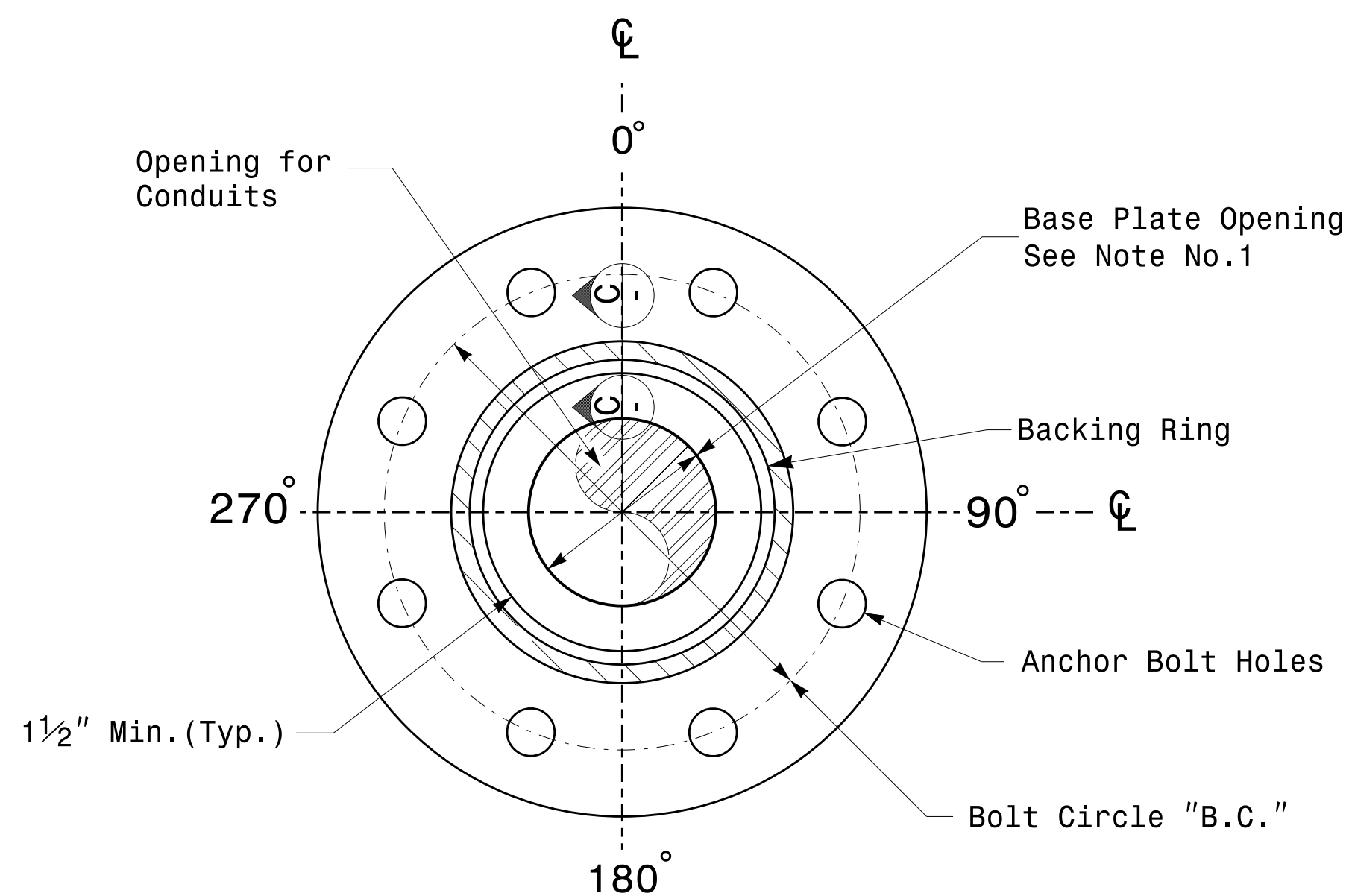
	Typical Fabrication Details For All Metal Poles		
	PLAN DATE: OCTOBER 2017 DESIGNED BY: C.F. ANDREWS	PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	
SCALE: NONE	REVISIONS:	INITI:	DATE:
750 N. Greenfield Pkwy, Garner, NC 27529		DocuSign by: <i>Dibesh C. Sarkar</i> 10/11/2017	

11-01-2017 08:30 135604115 Signal&Sign Design Section Eastern Region\MS Sheets\2016\2014 Sig.M2 Std. Fabrication Detail\15-411 Poles.dgn

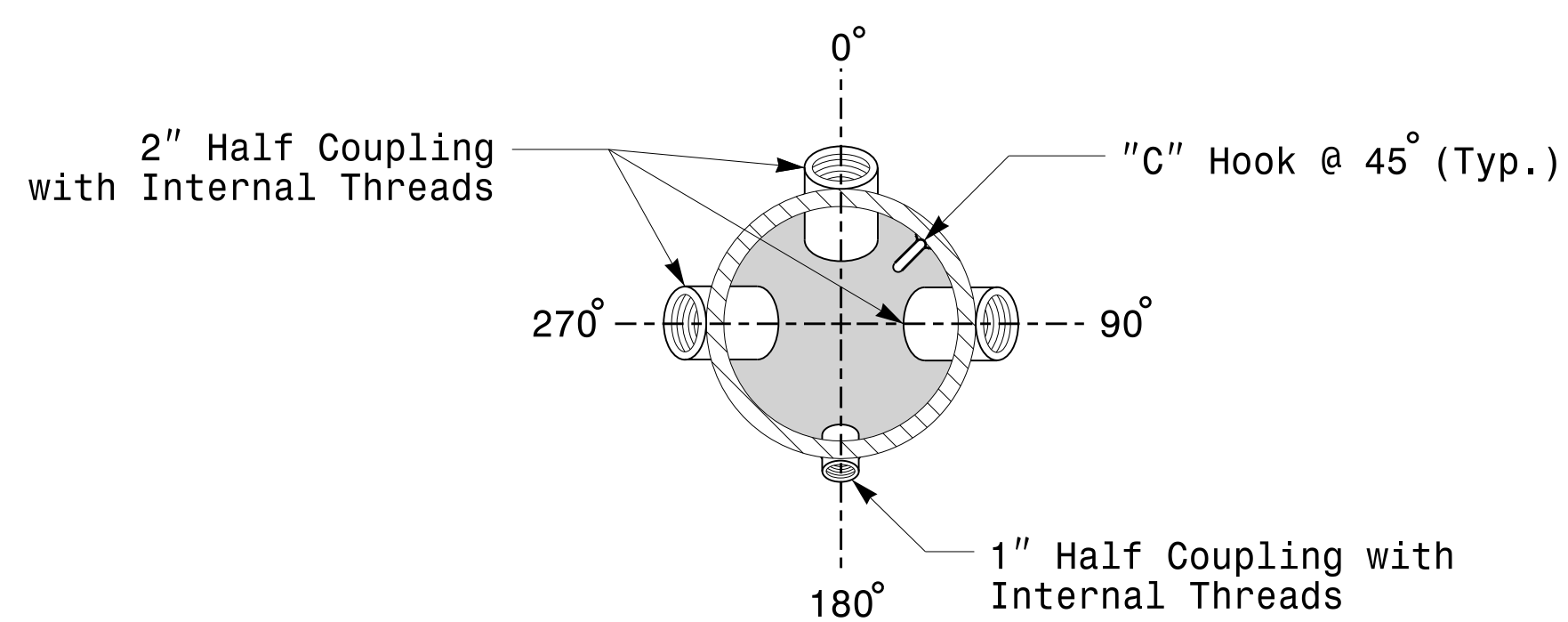
Note:
 1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



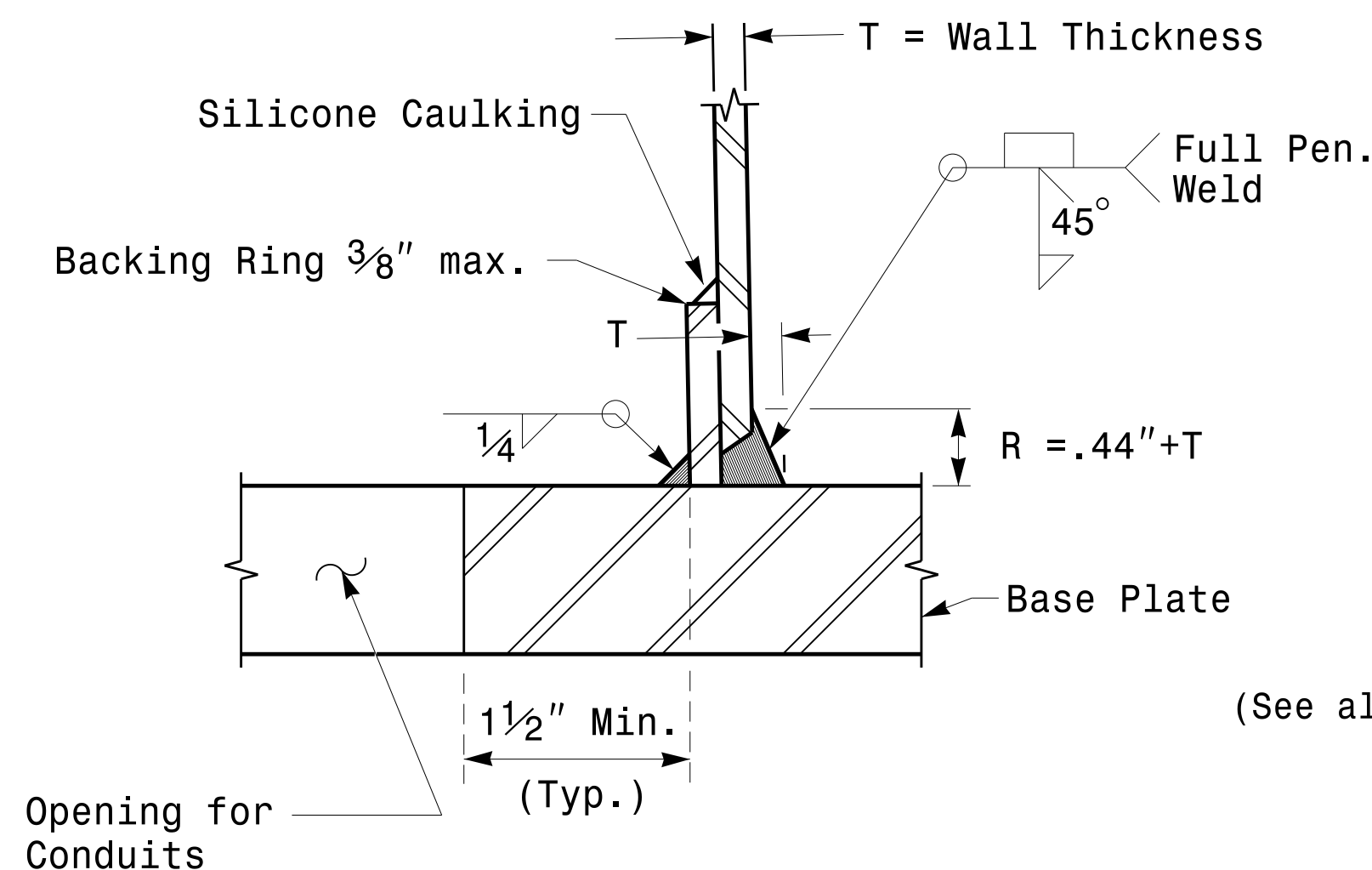
Cable Entrances at Top of Pole



Section B-B
Pole Base Plate Details
(8 and 12 Bolt Pattern)

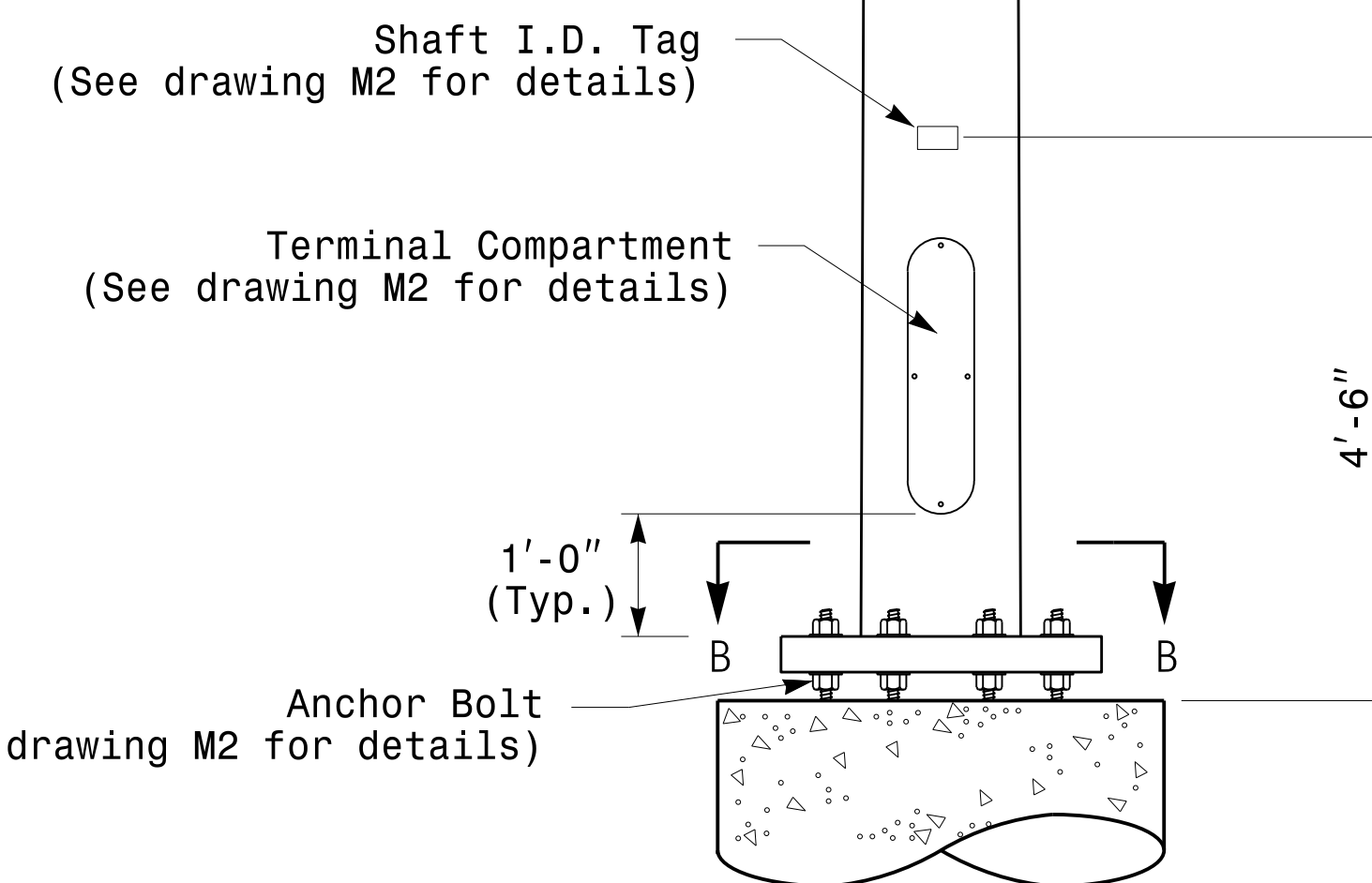


Section A-A
Radial Orientation for Factory Installed
Accessories at Top of Pole



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

2 Cable Clamps designed for variable attachment heights from 1'-6" to 5'-0" below the top of the pole.



Monotube Strain Pole

Prepared in the Offices of:

 750 N. Greenleaf Pkwy, Garner, NC 27529

SCALE: 0 NA NONE

Typical Fabrication Details For Strain Poles

PLAN DATE: OCTOBER 2017	DESIGNED BY: K.C. DURIGON
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

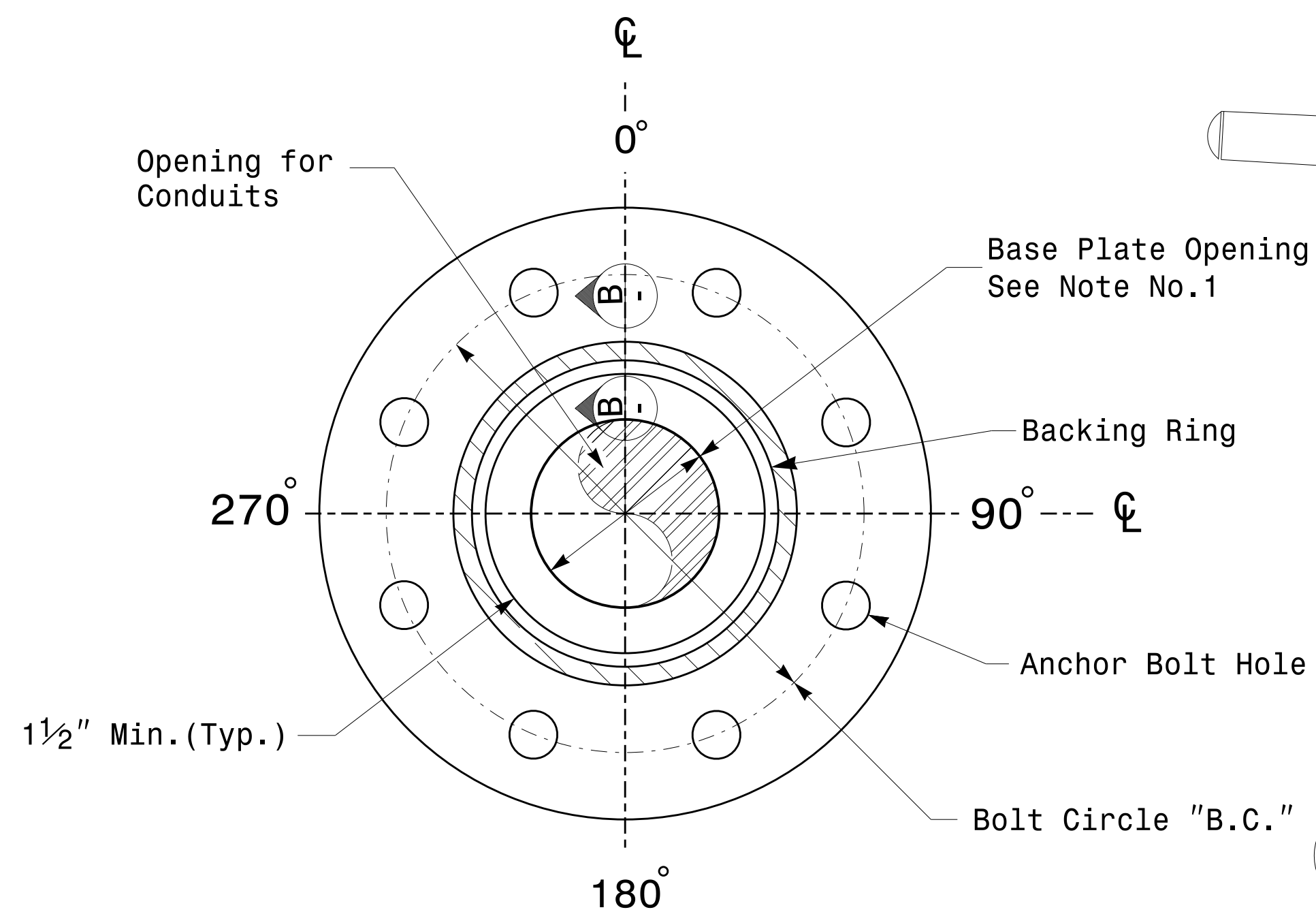
SEAL

DocuSigned by:
 Debesh C. Sarkar
 44EB87816FA4F49E

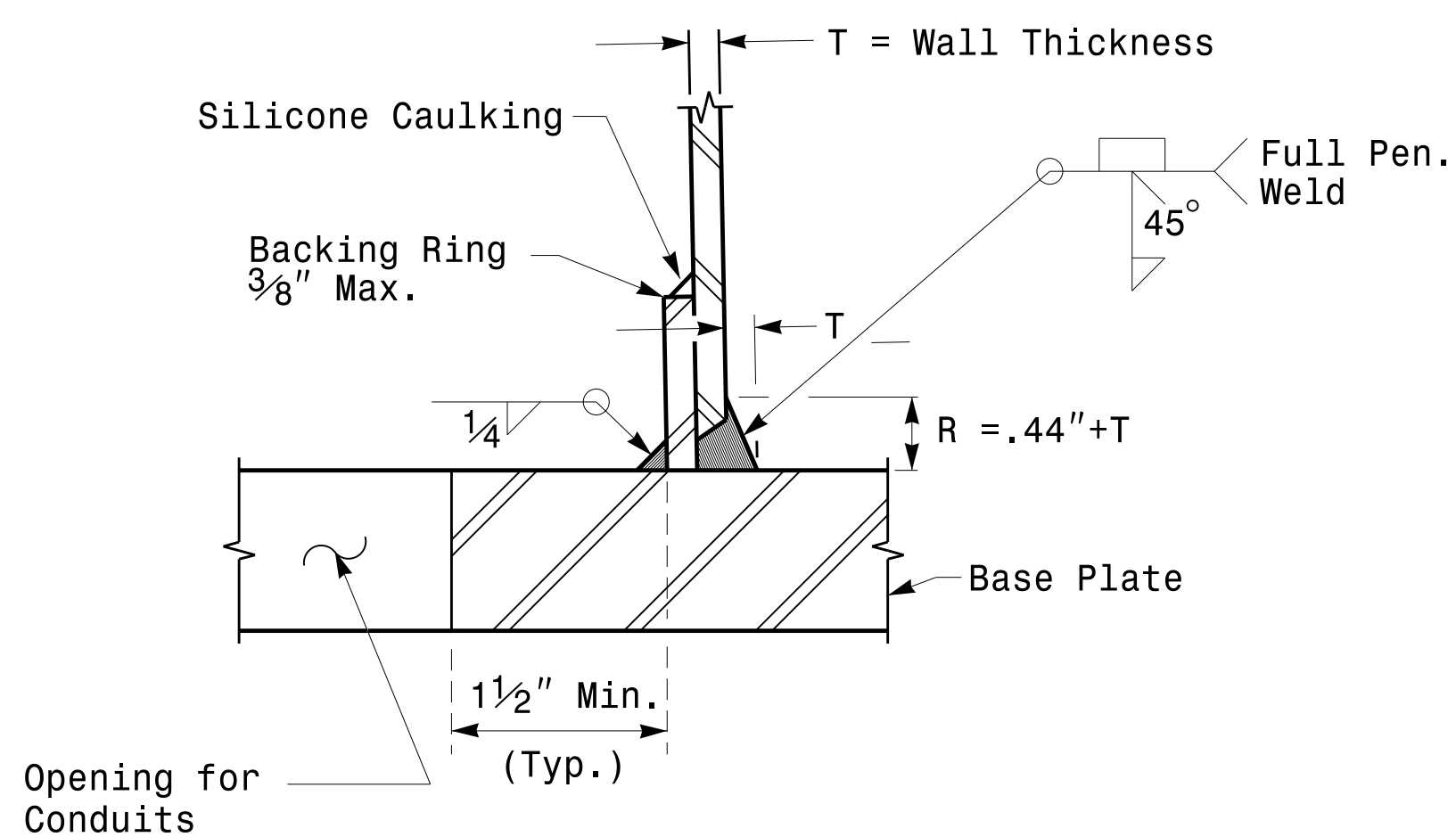
10/11/2017
 DATE

Fabrication Details – Strain Poles

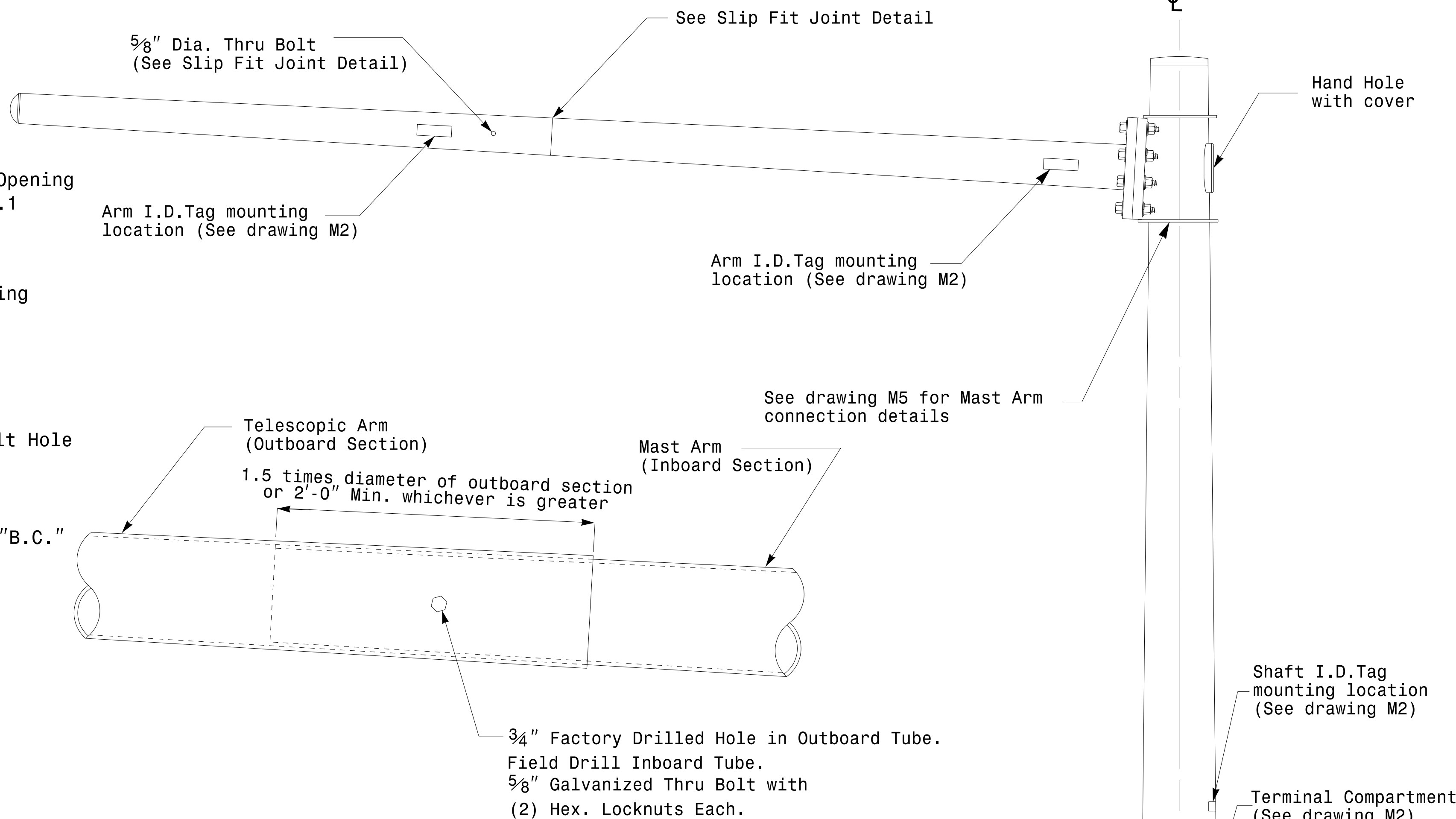
Note:
1. Opening in pole base plate shall be equal to pole base inside diameter minus 3 1/2" but shall not be less than 8 1/2".



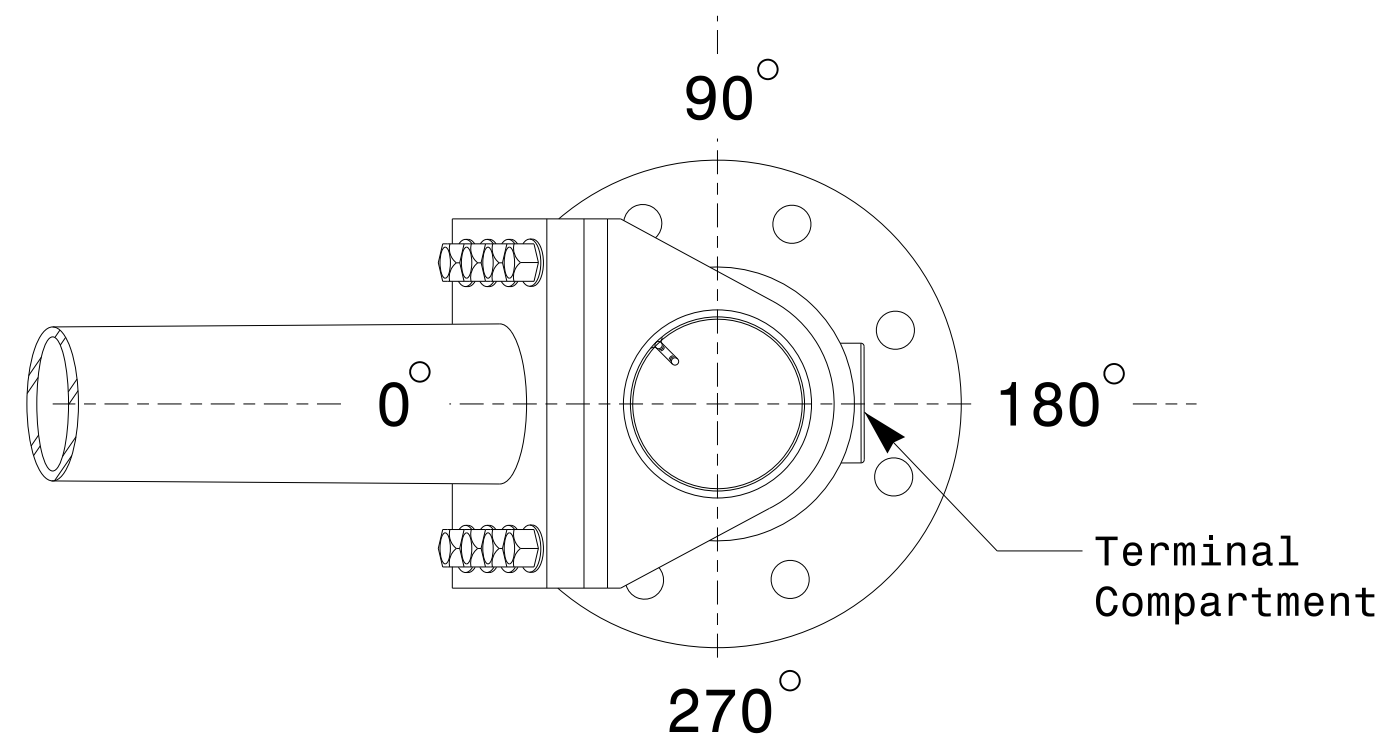
Section A-A
Pole Base Plate Details



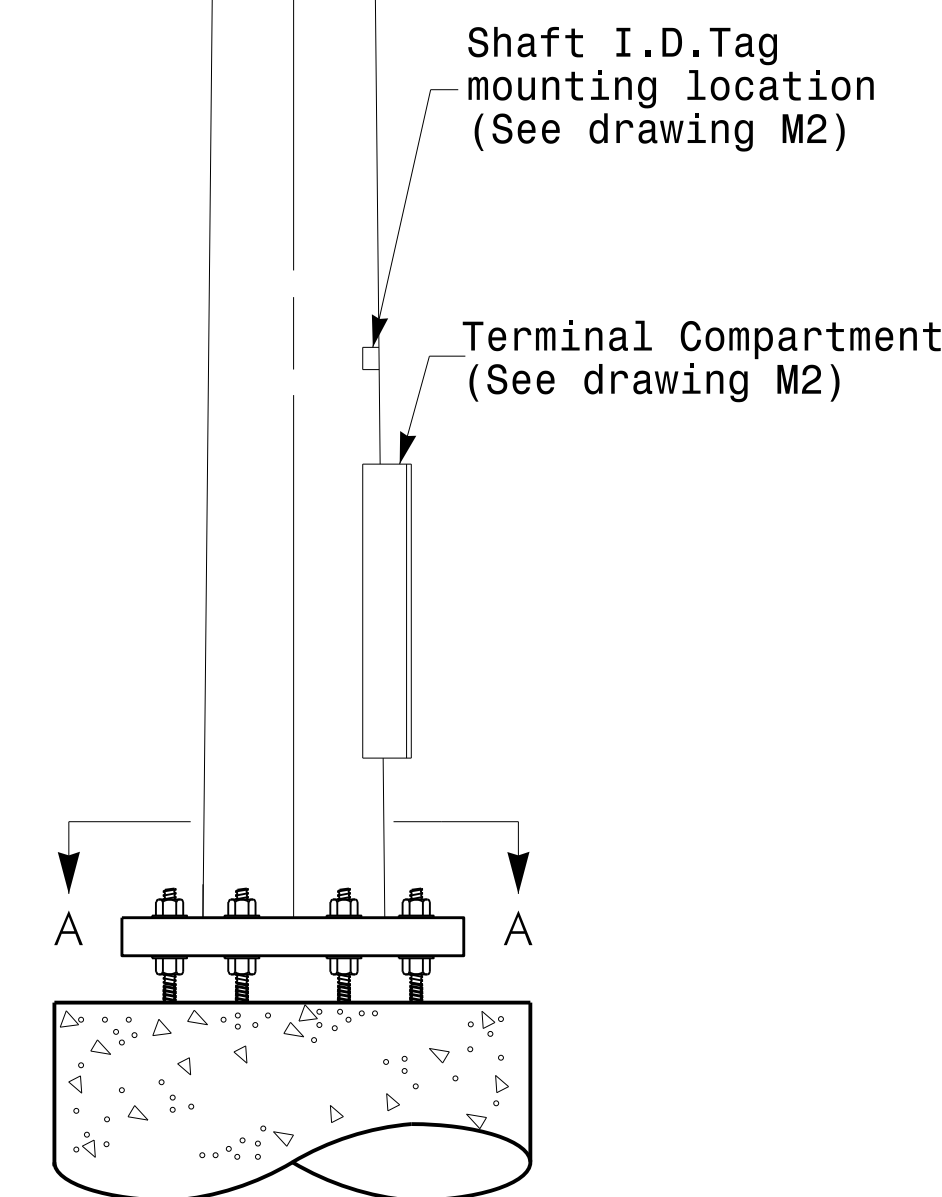
Section B-B
(Pole Attachment to Base Plate)
Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation



Mast Arm Pole

<p>Prepared in the Offices of:</p> <p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>Typical Fabrication Details For Mast Arm Poles</p>		<p>SEAL</p>
	<p>PLAN DATE: OCTOBER 2017</p> <p>DESIGNED BY: K.C. DURIGON</p> <p>PREPARED BY: N. BITTING</p> <p>REVIEWED BY: D.C. SARKAR</p>	<p>REVISIONS</p> <p>INIT.</p> <p>DATE</p>	
<p>SCALE</p> <p>0 NA</p> <p>NONE</p>			

Fabrication Details - Mast Arm Poles

11-OCT-2017 08:33 136504115 Signal&Signal Design Section Eastern Region\m4 Sheets\2016\2014 Sig.M4 Std. Fabrication Detail-Mast Arm Poles.dgn

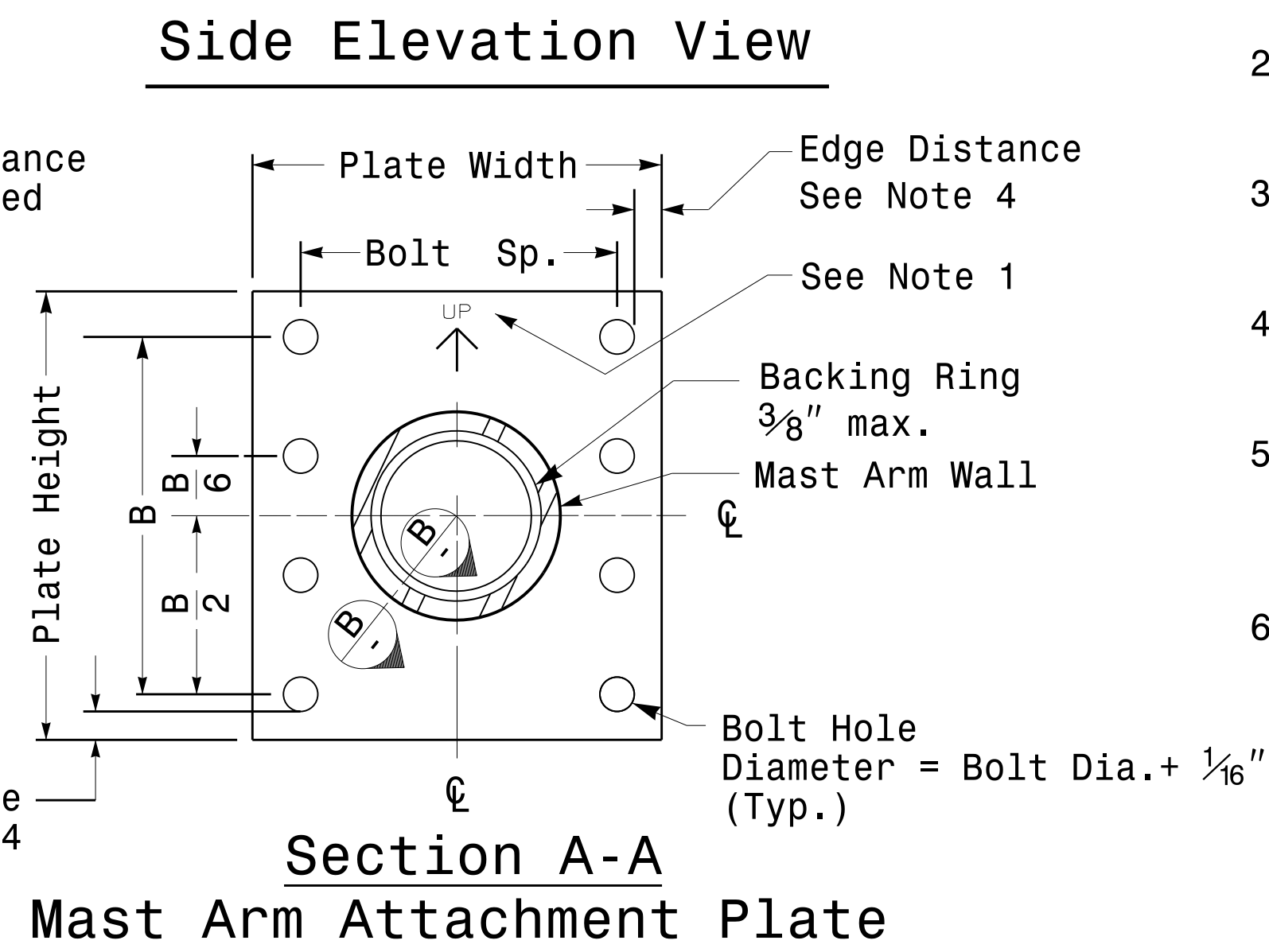
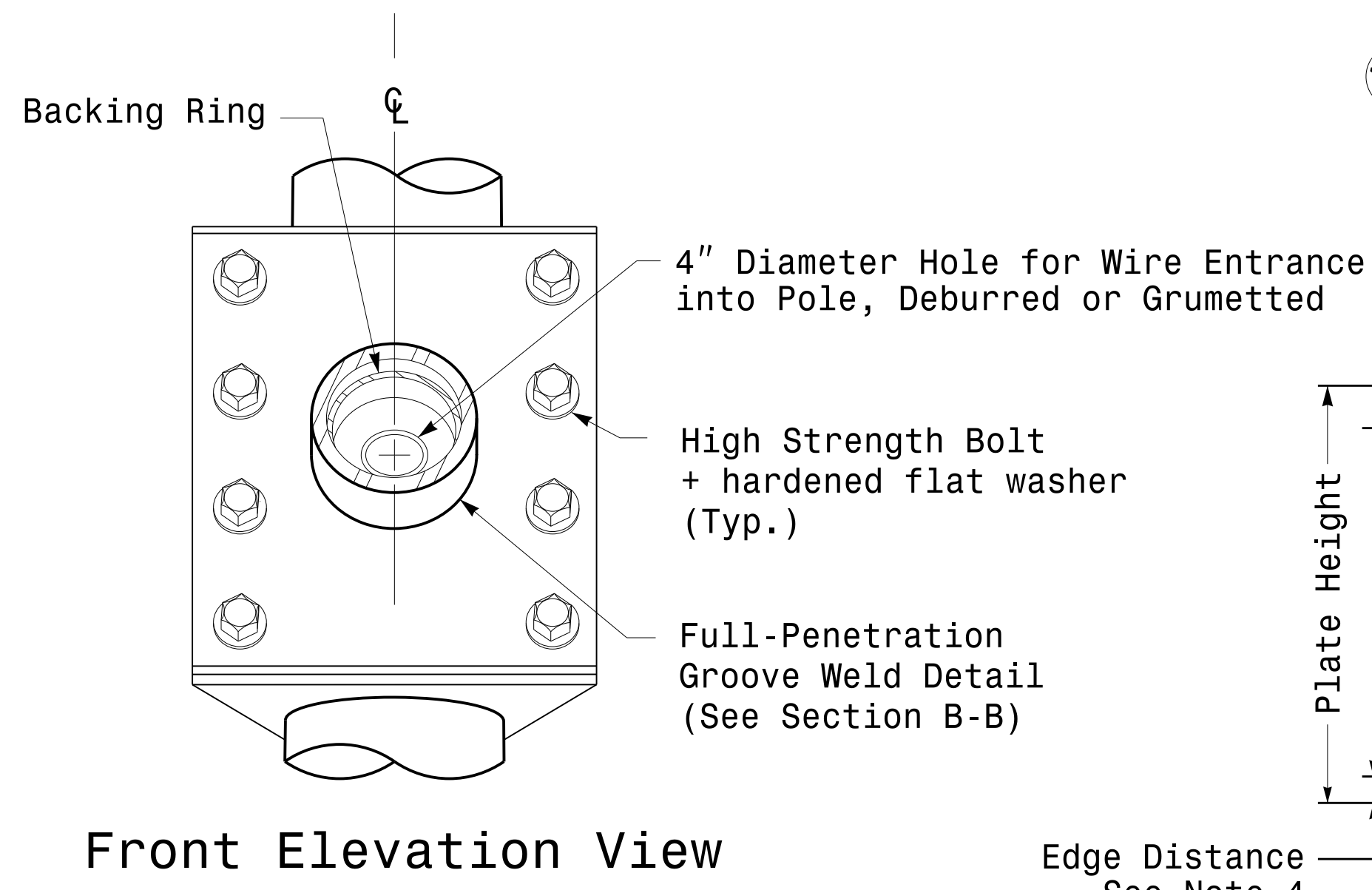
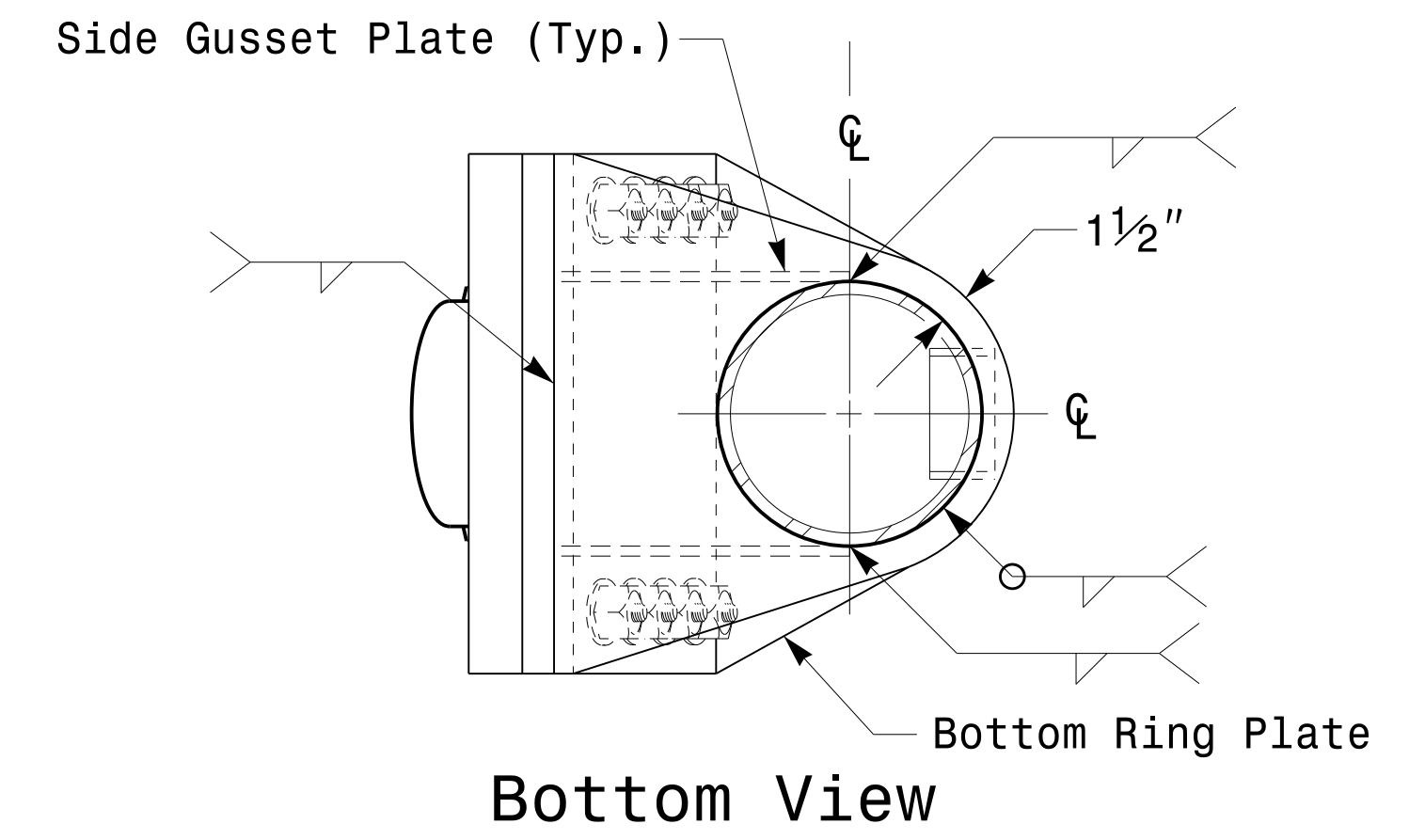
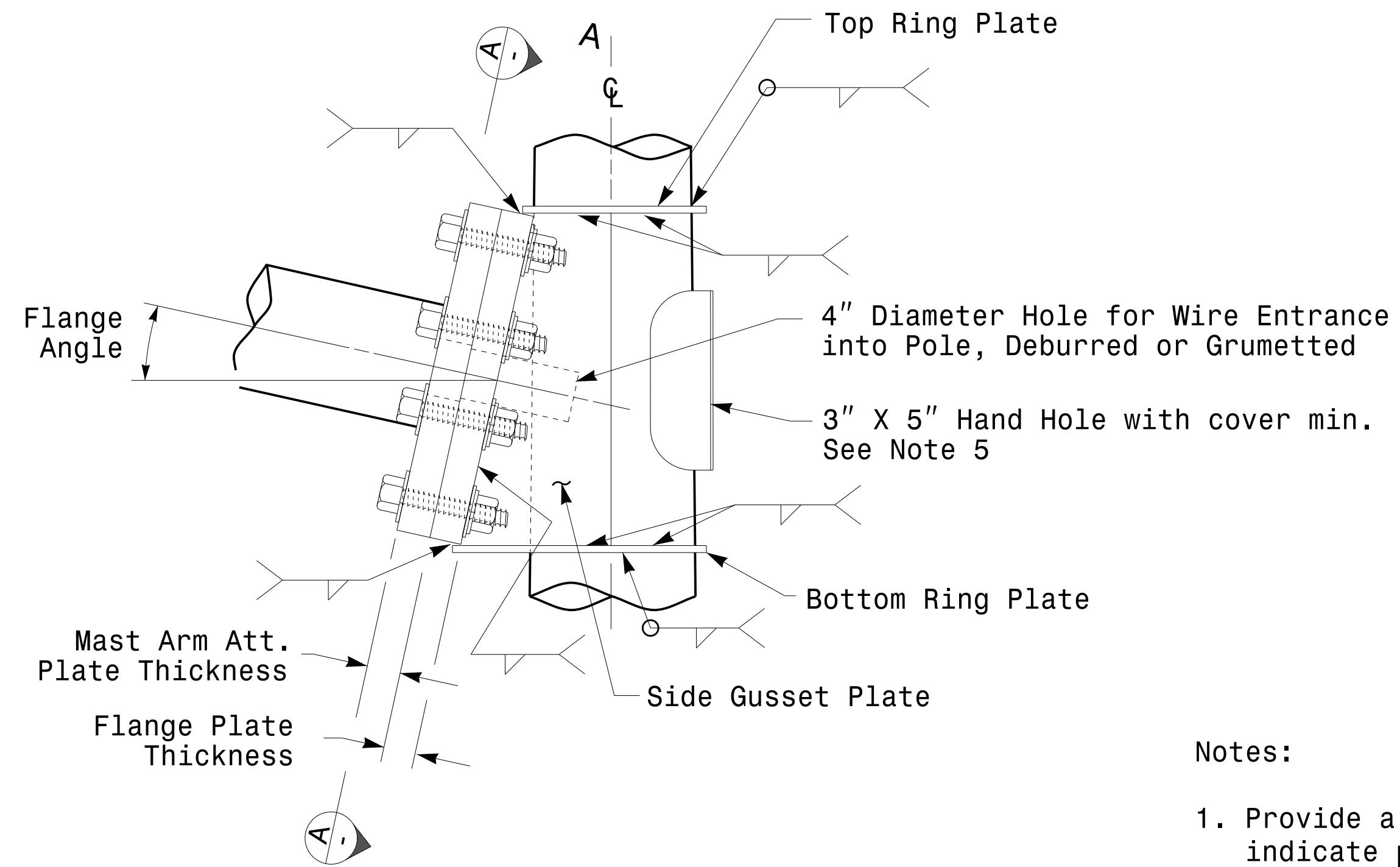
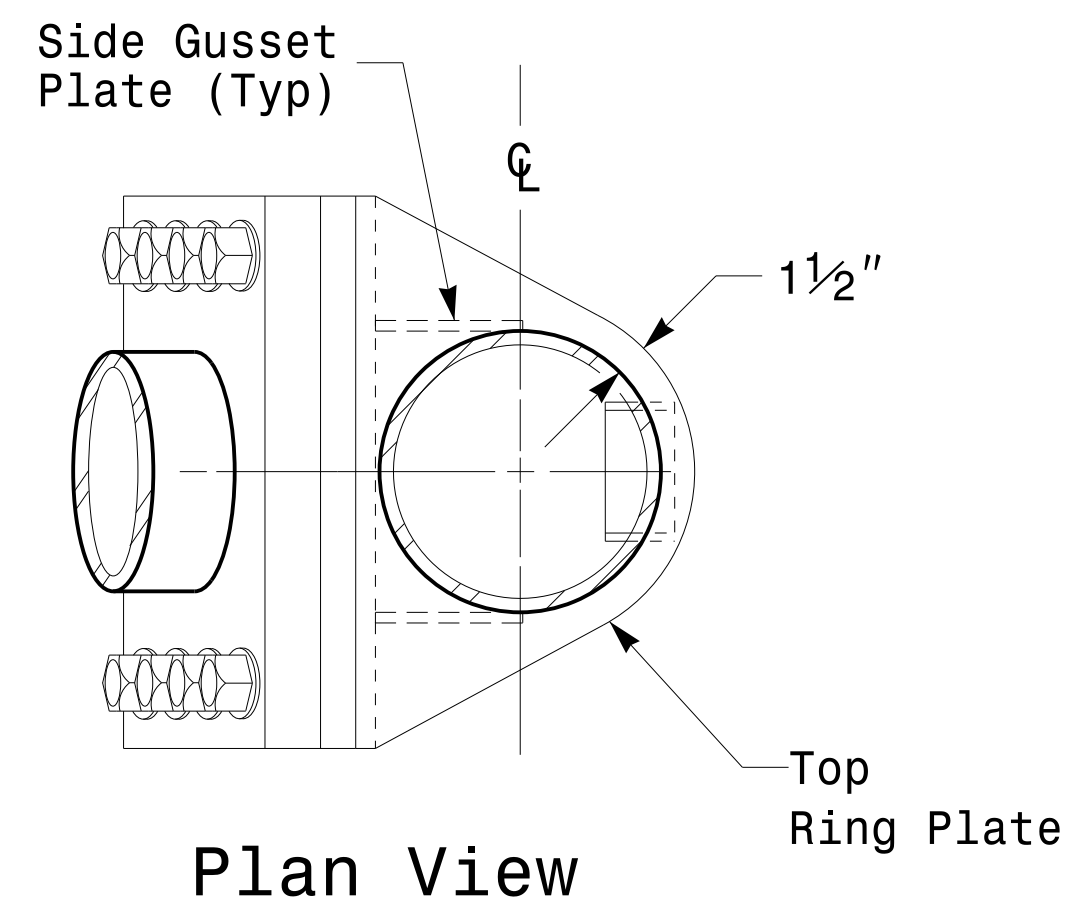
Welded Ring Stiffened Mast Arm Connection

PROJECT ID. NO.

SHEET NO.

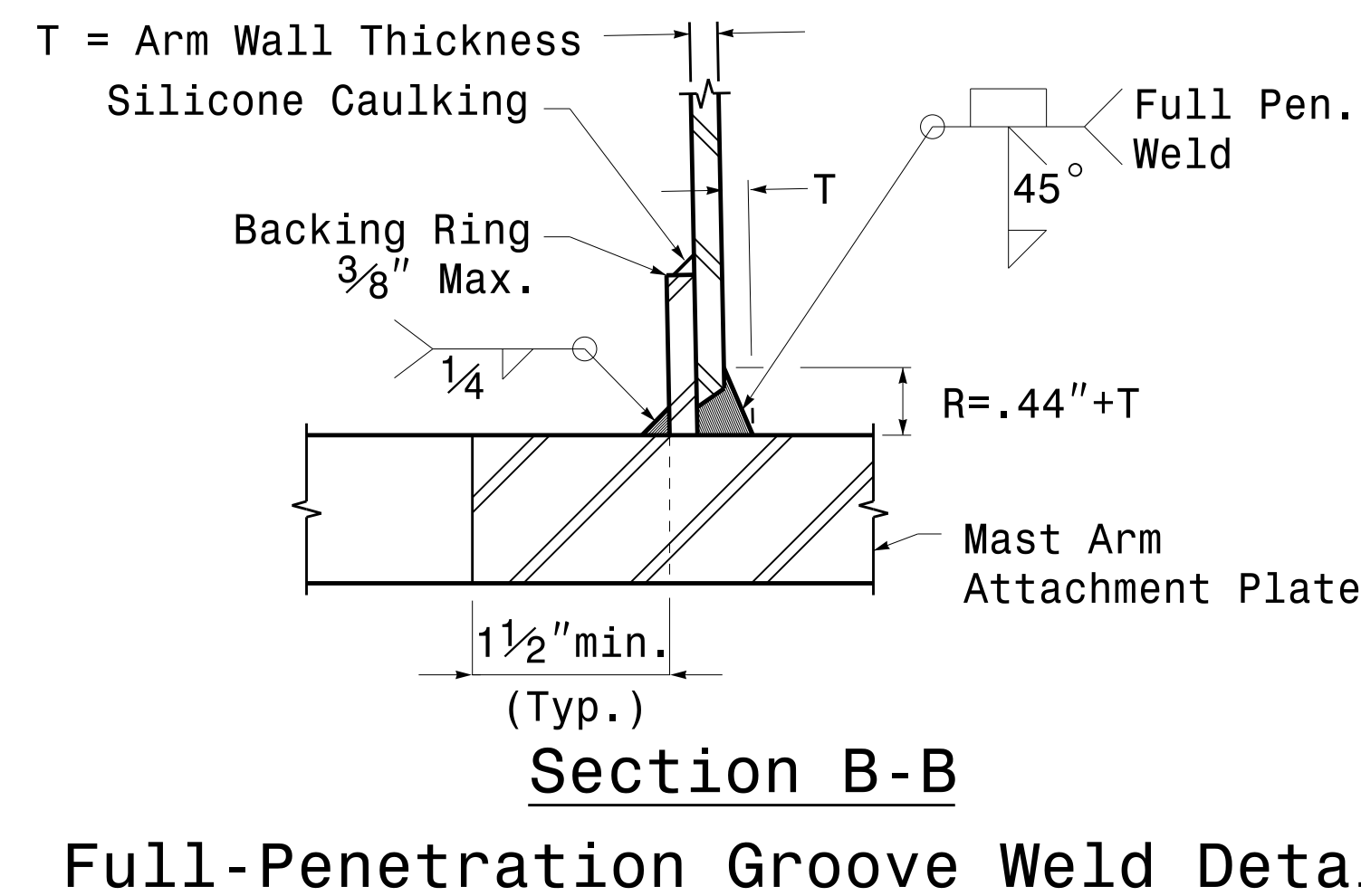
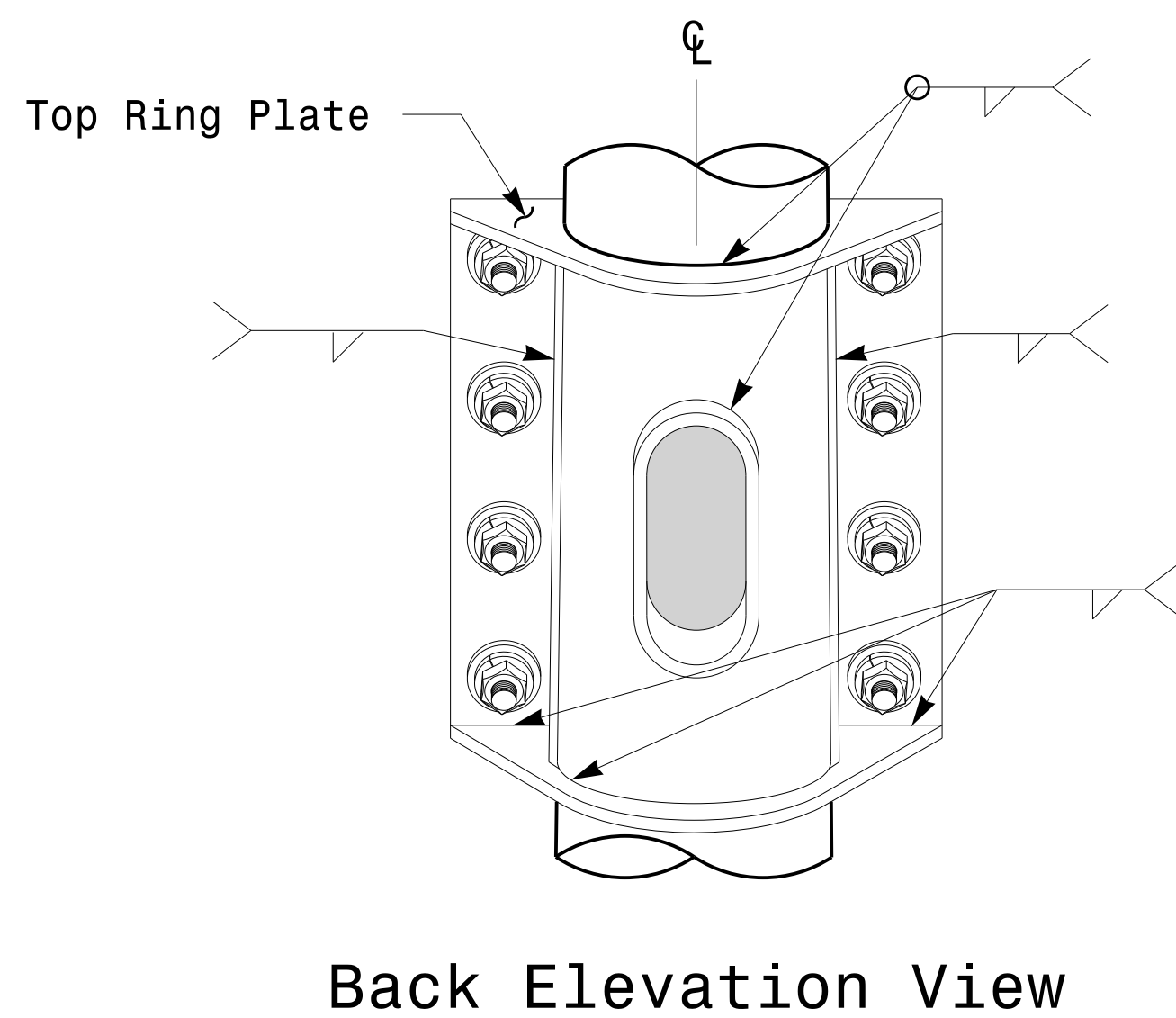
U-2525C

Sig.M5



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. Fabricator is responsible for providing appropriate holes at drainage points to drain galvanizing materials.
4. For minimum edge distance follow AISC Table J3.4 and J3.5. For nominal bolt hole size use Table J3.3.
5. Provide upper handhole as necessary when shaft extensions are required for luminaire arms or camera. For poles without luminaires/camera, wiring can be done through the top of pole.
6. Allowable range of flange tilt angle will vary from 0° to as required.



Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE: 0 NA NONE

Typical Fabrication Details For Mast Arm Connection To Pole	
PLAN DATE: OCTOBER 2017	DESIGNED BY: C.F. ANDREWS
PREPARED BY: N. BITTING	REVIEWED BY: D.C. SARKAR
REVISIONS	INIT. DATE

SEAL

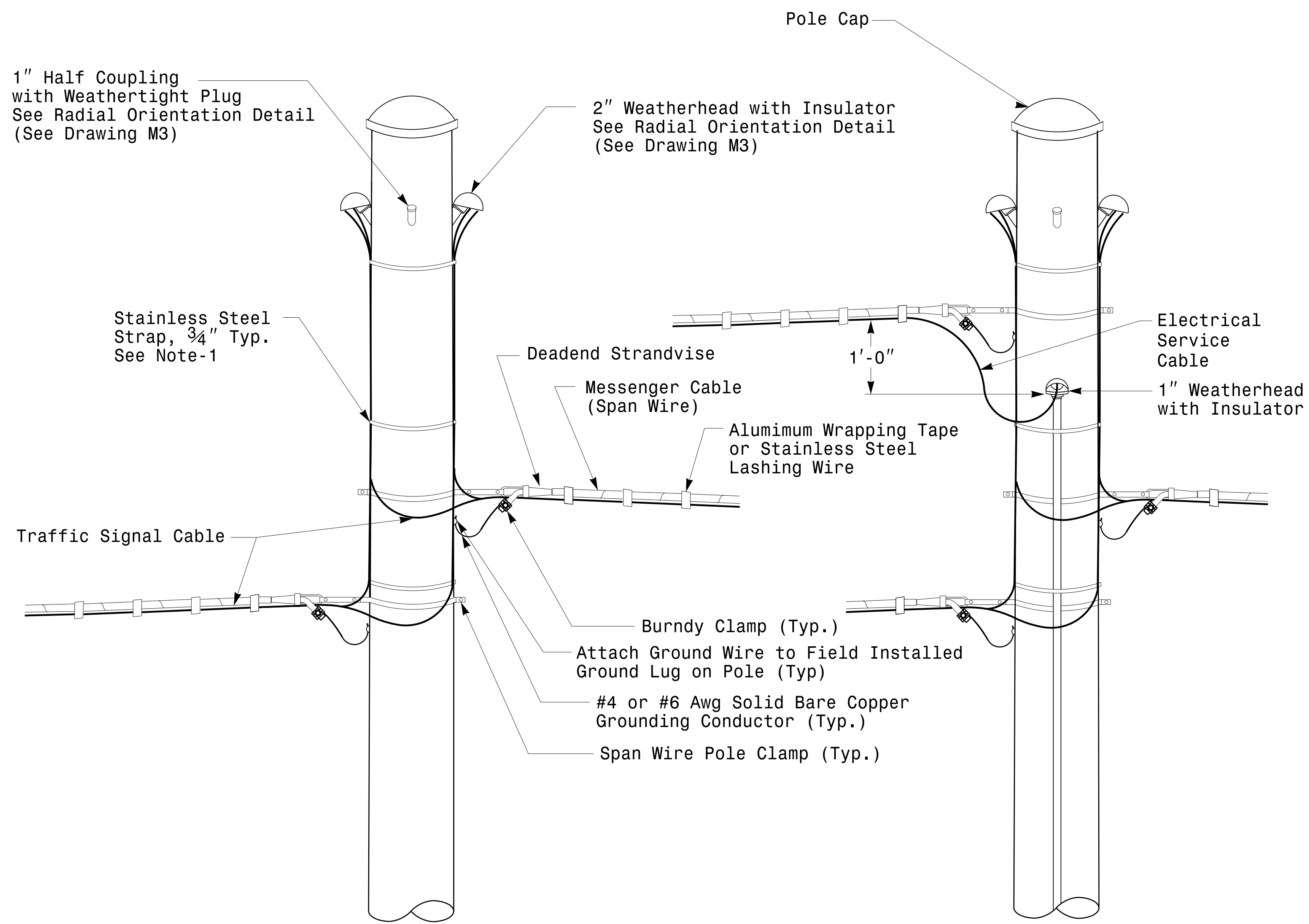
Designed by: Debesh C. Sarkar

10/11/2017

DATE

Fabrication Details - Mast Arm Connection

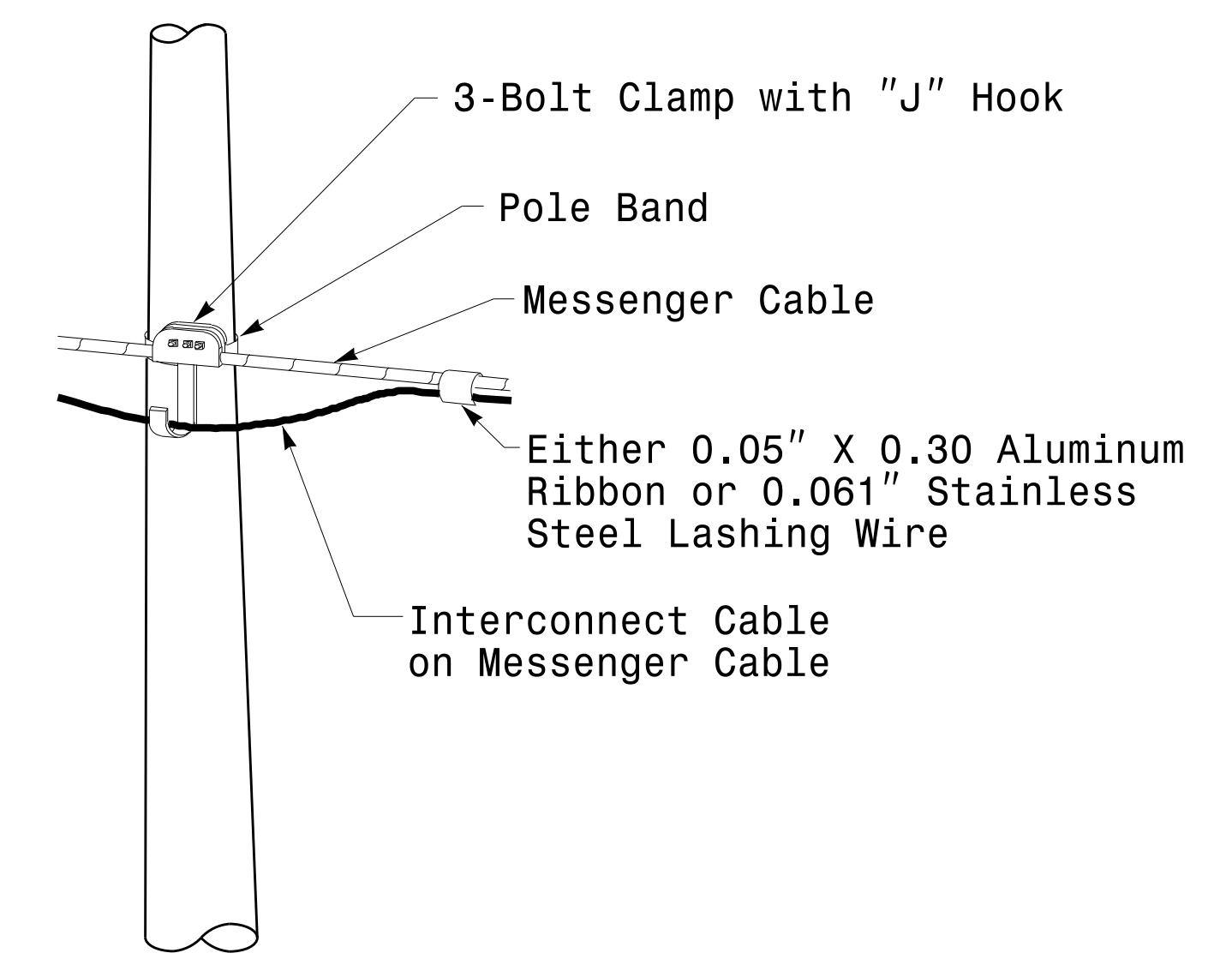
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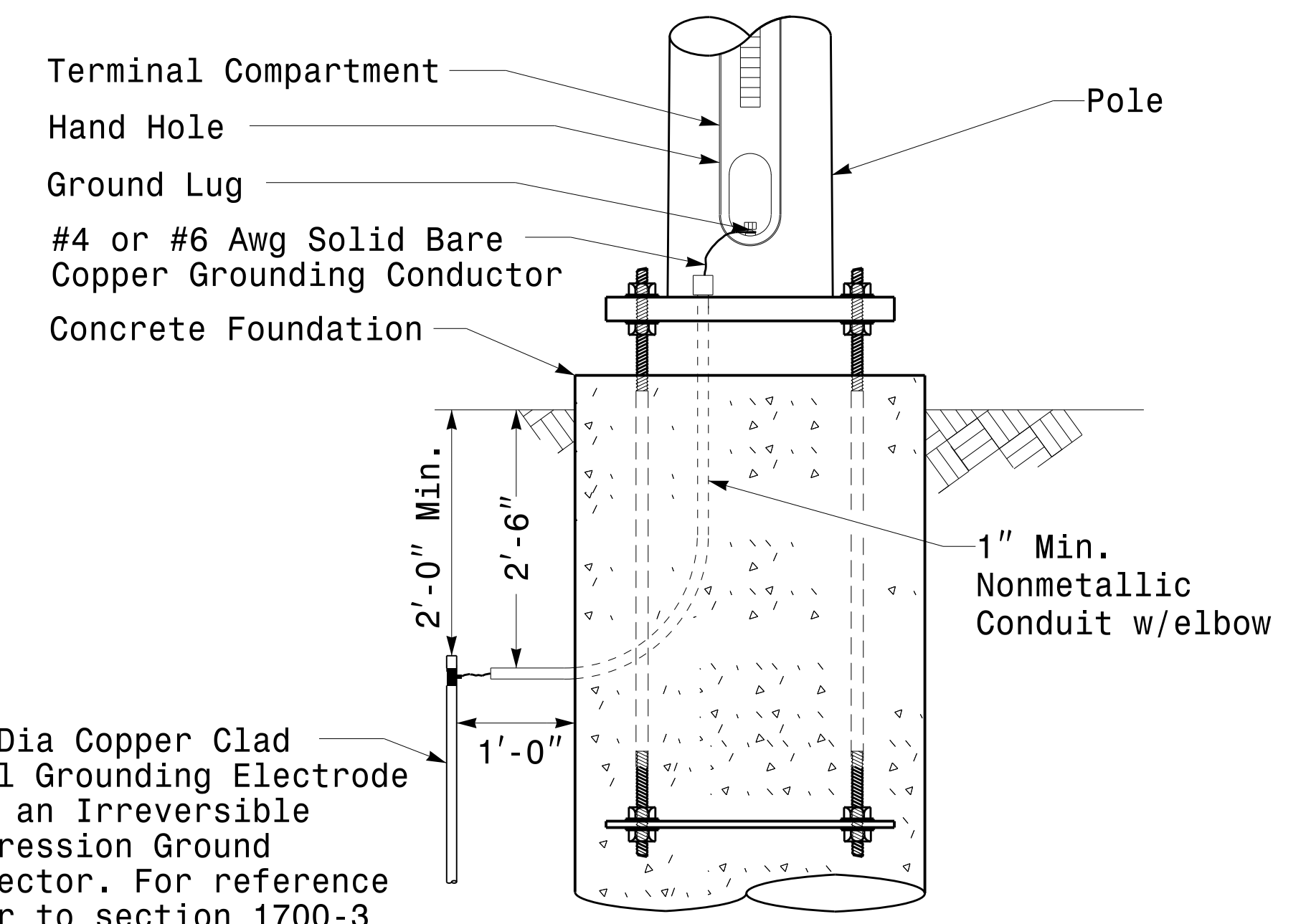
Strain Pole Attachments

NOTE:

1. Strap all signal cables to the side of the pole with 3/4" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 3'-0".
2. Provide minimum two spanwire pole clamps per pole.
3. It is prohibited to attach two span wires at one pole clamp.
4. For general requirements refer to NCDOT Standard Specifications for Roadway and Structures, January 2018.



Attachment of Cable to Intermediate Metal Pole



5/8" Dia Copper Clad Steel Grounding Electrode with an Irreversible Compression Ground Connector. For reference refer to section 1700-3 K and L for electrical grounding and bonding requirements, See Note 4.

Metal Pole Grounding Detail For Strain Pole and Mast Arm

Prepared in the Offices of:

750 N. Greenfield Pkwy, Garner, NC 27529

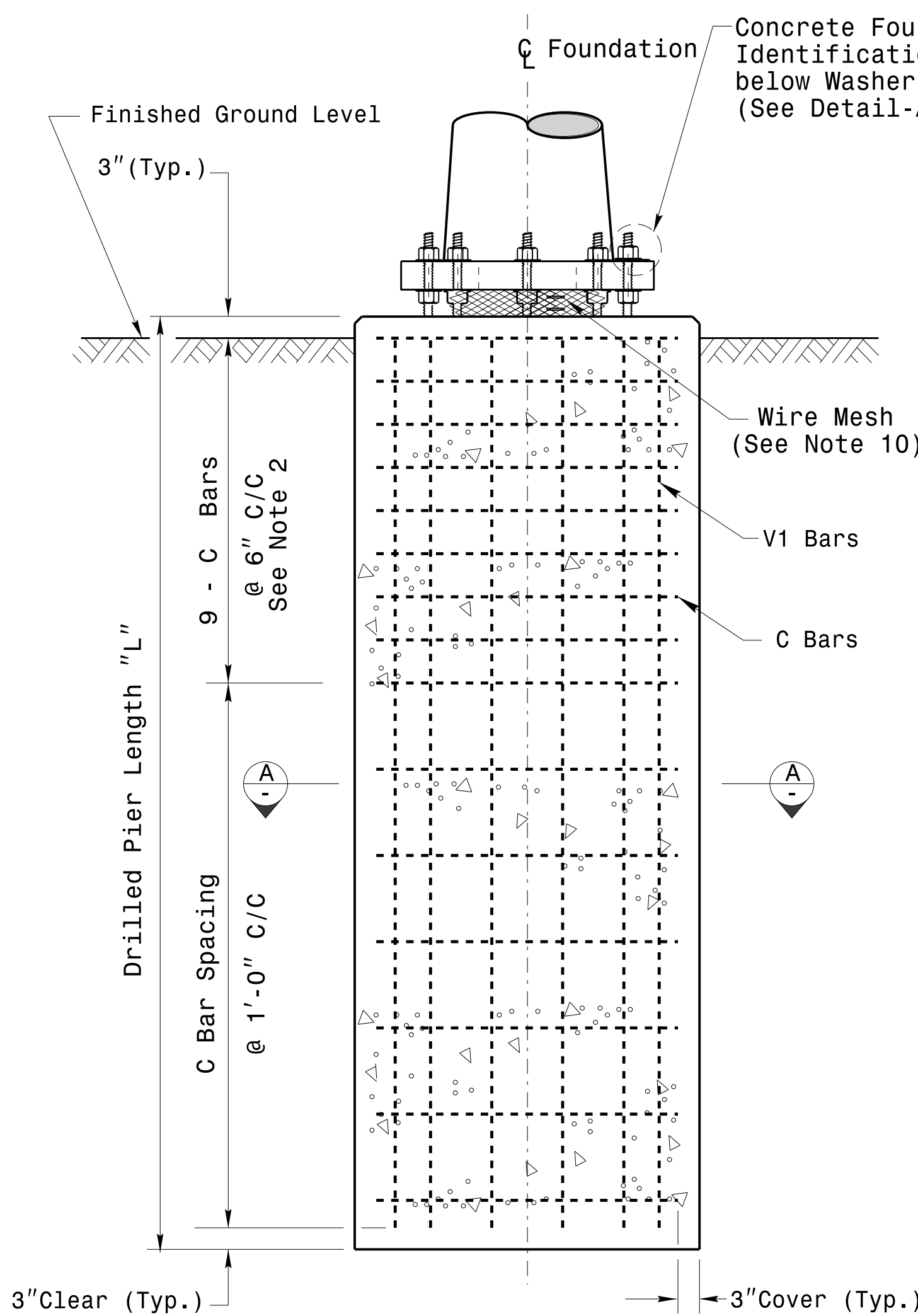
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Typical Fabrication Details For Strain Pole Attachments			
PLAN DATE:	OCTOBER 2017	DESIGNED BY:	C.F. ANDREWS
PREPARED BY:	N. BITTING	REVIEWED BY:	D.C. SARKAR
REVISIONS	INIT.	DATE	

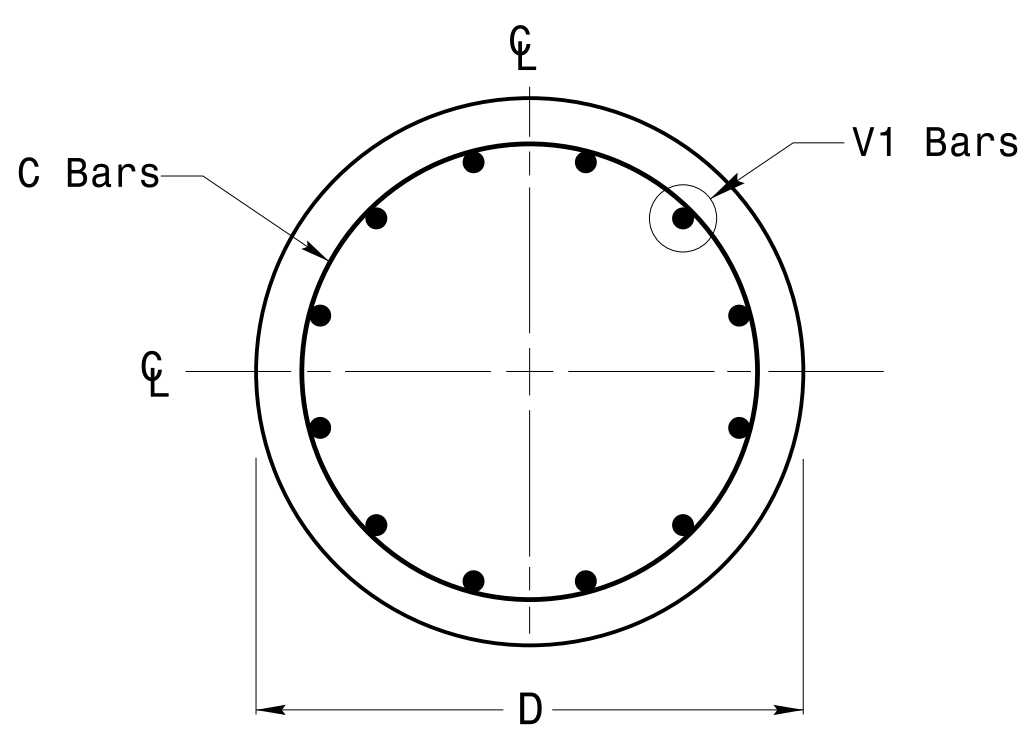
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DocuSigned by: D. C. SARKAR
DATE: 10/11/2017

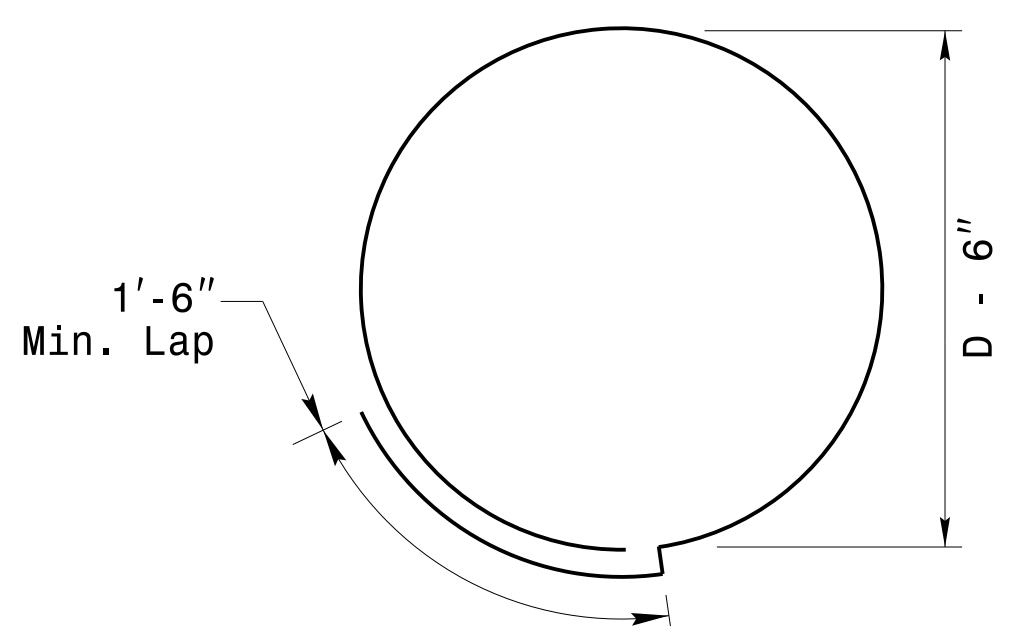
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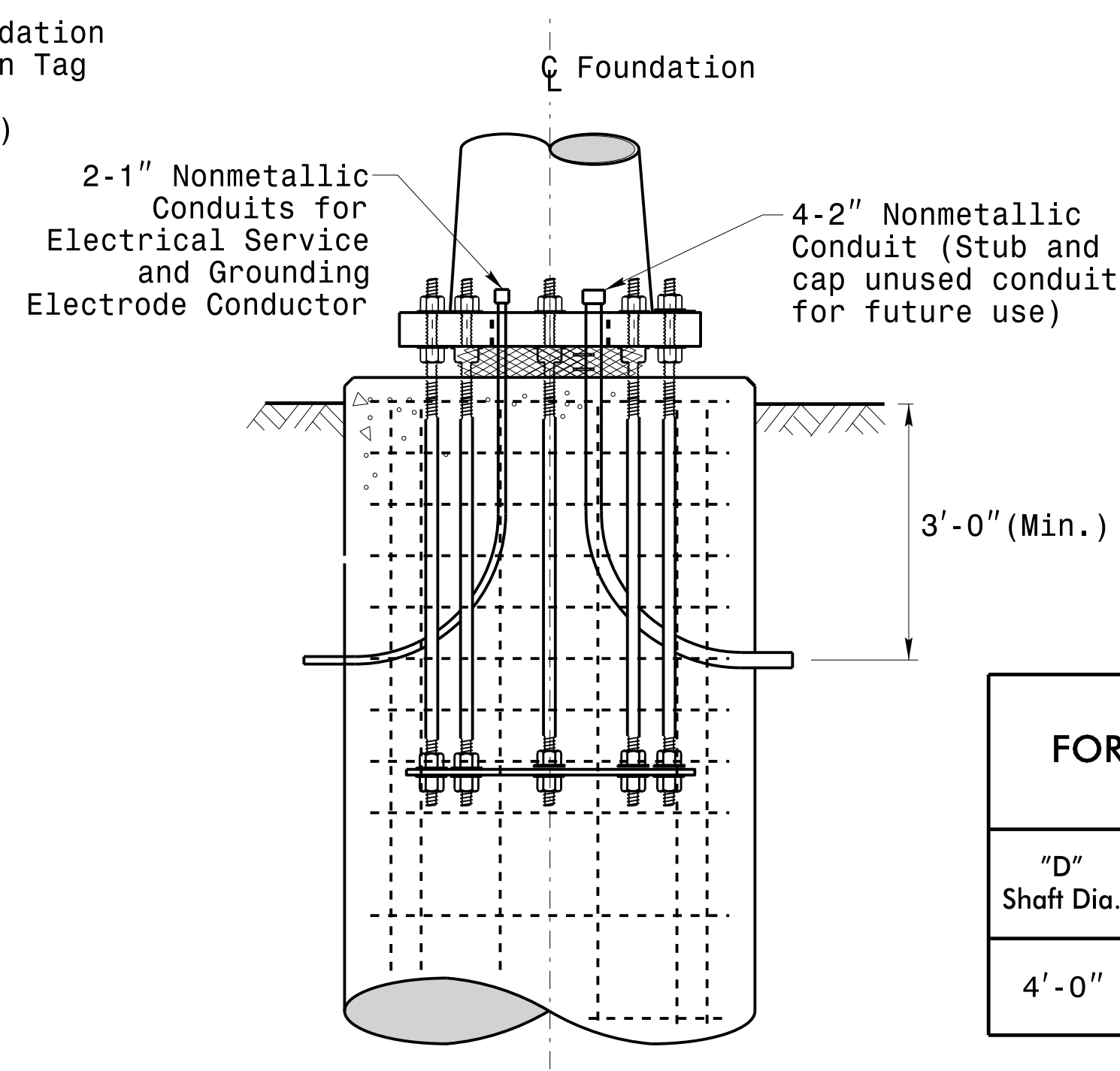
Concrete Shaft Elevation



Section A-A



Typical "C" Bar Detail



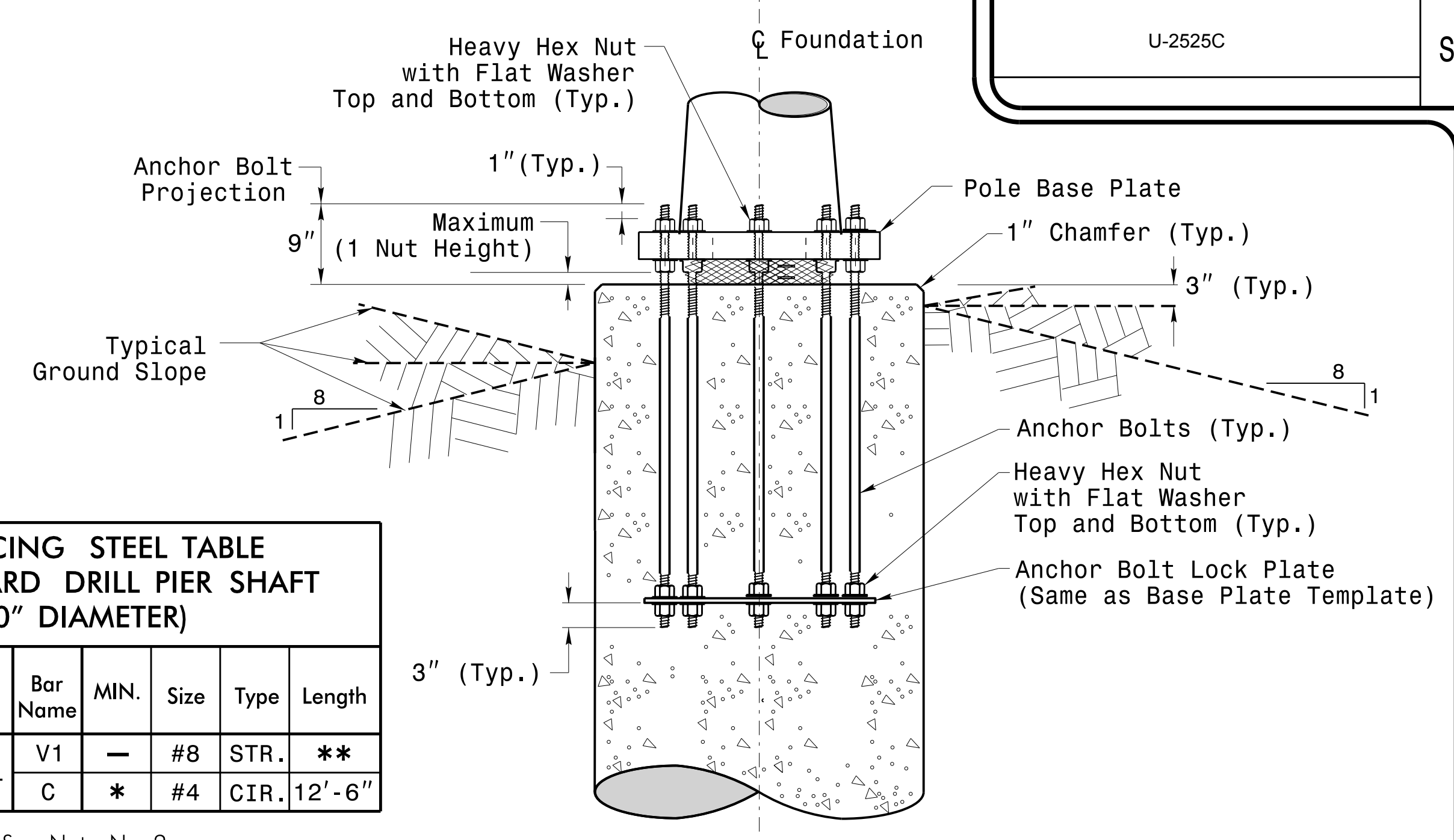
Typical Foundation Conduit Details

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4'-0" DIAMETER)						
"D" Shaft Dia.	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
4'-0"	.465 x L	V1	-	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* See Note No. 2
 ** See Note No. 3

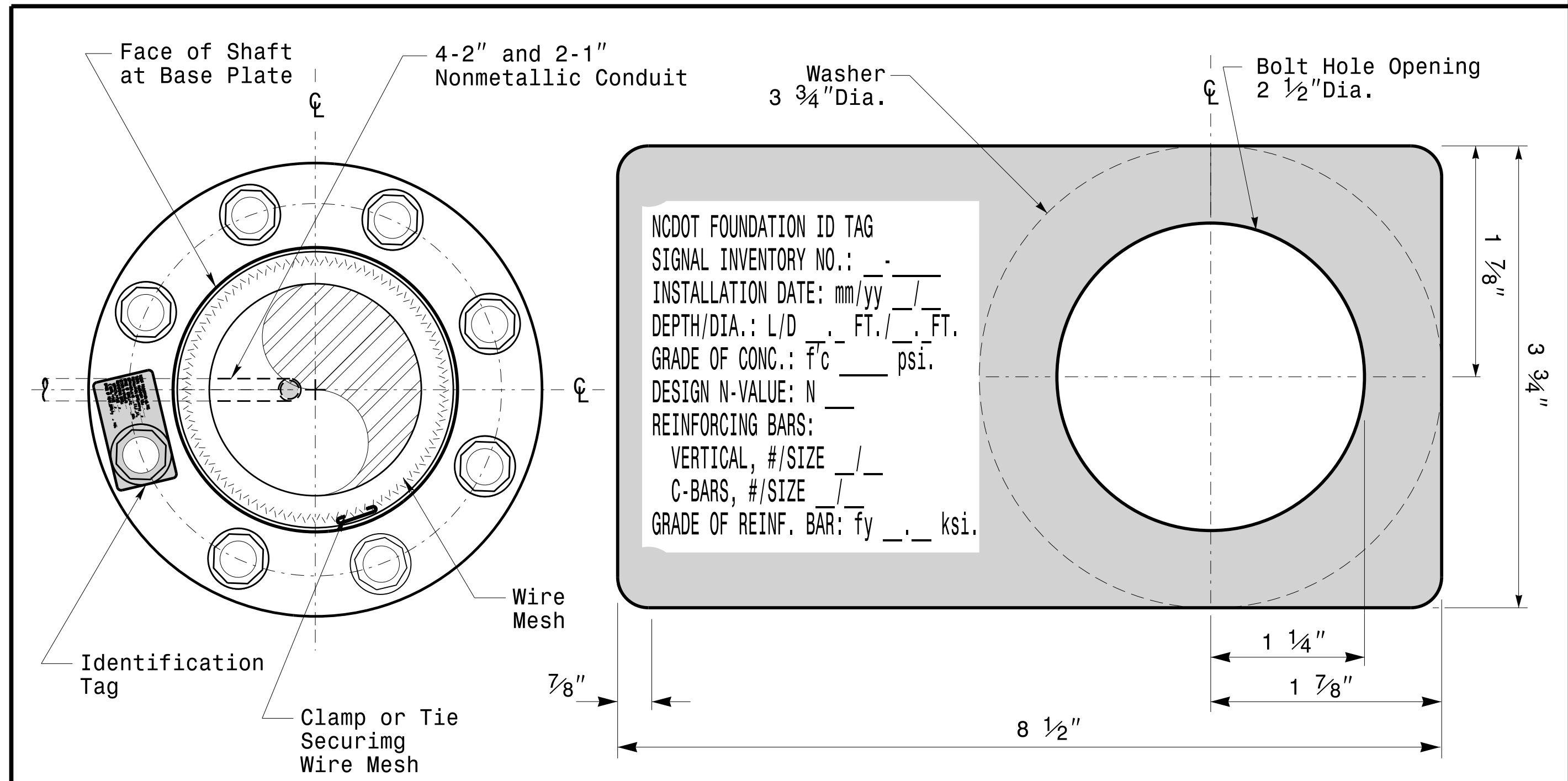
General Notes:

- If actual subsurface conditions differ significantly from boring data contact the Engineer before excavating or placing concrete.
- 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.
- For standard foundations, see sheet Sig. M8 for details. Vertical reinforcing bars (V1) may be horizontally adjusted by +/- 3" to facilitate the installation of electrical conduit entering into the cage.
- Provide 2" to 5" foundation projection above ground level depending on the ground slope.
- Unless otherwise shown, foundation designs are based on non-sloping level ground surfaces with slope ratios of 8:1 (H:V) or flatter. If actual ground line slopes are steeper contact the Engineer before excavating or placing concrete.
- Construct foundations in accordance with NCDOT Standard Provisions SP09 R005- Foundations and Anchor Rod Assemblies for Metal Poles. All applicable 2018 NCDOT Standard Specifications are referenced in this provision. Refer to the NCDOT Resources/Specifications page located on the Connect NCDOT website.
[https://connect.ncdot.gov/resources/Specifications and Special Provisions.aspx](https://connect.ncdot.gov/resources/Specifications%20and%20Special%20Provisions.aspx)
- Use air entrained AA concrete mix with a compression strength of $f'c=4500$ psi.(min.) after 28 days.
- Use ASTM A615 grade 60 deformed bars for all reinforcing steel. Maintain at least 3" cover on all reinforcement.
- Locate the Identification Tag on the top of the base plate, directly above the conduit's entry point.
- Provide two layers of galvanized welded 23 gauge (0.25) 6" wide 4 mesh wire around pipes under the base plate and secure it with ties if necessary.
- Preferred location for the I.D. Tag is as shown in Detail-A; directly above the conduit entering the foundation.



Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Concrete Foundation Identification Tag Details

Detail-A

D = Diameter
 L = Length/Depth
 mm = Month
 yy = Year

	<p>Construction Details For Foundations</p>			
	<p>PLAN DATE: OCTOBER 2018</p>	<p>DESIGNED BY: C.B. COGDILL</p>		<p>10/11/2017</p>
	<p>PREPARED BY: N. BITTING</p>	<p>REVIEWED BY: D.C. SARKAR</p>		
<p>SCALE: NONE</p>	<p>REV. NO. 1</p>	<p>COMMENTS: Revised Foundation Tag Details</p>	<p>INIT. N.B.</p>	<p>DATE: 5/11/2015</p>

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 PLOT: 11/11/2017 10:11:17 AM

Construction Details - Foundations

SOIL CONDITION

PROJECT ID. NO. U-2525C	SHEET NO. Sig.M8
----------------------------	---------------------

		STANDARD STRAIN POLES					STANDARD FOUNDATIONS 48" Diameter Drilled Pier Length (L) - Feet							Reinforcement				
		Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Reactions at the Pole Base			Clay				Sand			Longitudinal		Stirrups	
					Axial (kip)	Shear (kip)	Moment (ft-kip)	Medium N-Value 4-8	Stiff N-Value 9-15	Very Stiff N-Value 16-30	Hard N-Value >30	Loose N-Value 4-10	Medium N-Value 11-30	Dense N-Value >30	Bar Size (#)	Quantity (ea.)	Bar Size (#)	Spacing (in.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	19	13	10	8	17	14.5	12.5	8	12	4	12
		S30L3	30	25	2	11	300	19.5	13.5	10	8	17.5	15	13	8	14	4	12
		S35L3	35	25	3	11	320	20	13.5	10.5	8	17.5	15	13	8	14	4	12
	HEAVY	S30H3	30	29	3	16	450	24.5	16	12	9	21	17.5	15	8	16	4	6
		S35H3	35	29	4	16	515	26	17	12.5	9.5	22	18.5	16	8	16	4	6
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	16	11.5	8.5	8	15	12.5	11	8	12	4	12
		S30L1	30	22	2	8	205	16.5	11.5	9	8	15	13	11.5	8	12	4	12
		S35L1	35	22	3	8	230	17	12	9	8	15.5	13.5	11.5	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	20.5	13.5	10.5	8	18	15	13.5	8	16	4	6
		S35H1	35	25	4	12	350	21	14	10.5	8.5	18.5	15.5	13.5	8	16	4	6
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	18	12.5	9.5	8	16.5	14	12	8	12	4	12
		S30L2	30	23	2	10	270	18.5	12.5	10	8	16.5	14	12.5	8	12	4	12
		S35L2	35	23	3	10	300	19.5	13	10	8	17	14.5	13	8	12	4	12
	HEAVY	S30H2	30	29	3	15	415	23	15.5	11.5	9	20	17	14.5	8	16	4	6
		S35H2	35	29	4	15	475	25	16.5	12	9.5	21	17.5	15.5	8	16	4	6

General Notes:


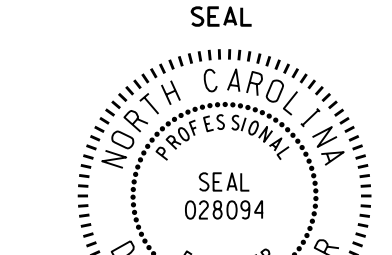

1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Use chairs and spacers to maintain proper clearance.
3. For foundation, always use air-entrain concrete mix.

Foundation Selection:

1. Perform a standard penetration test at each proposed foundation site to determine "N" value.
2. Select the appropriate wind zone from M 1 drawing.
3. Select the soil type (Clay or Sand) that best describes the soil characteristics.
4. Get the appropriate standard pole case number from the plans or from the Engineer.
5. Select the appropriate column under "Standard Foundations" based on soil type and "N" value. Select the appropriate row based on the pole load case.
6. The foundation depth is the value shown in the "Standard Foundations" category where the column and the row intersect.
7. Use Construction Procedures and Design Methods prescribed by FHWA-NHI-10-016 for Reference Drilled Shafts.

Standard Strain Pole Foundation-All Soil Condition

48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Drilled Pier Length

	Standard Strain Pole Foundation for All Soil Conditions		
	PLAN DATE: OCTOBER 2017 DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING REVIEWED BY: D.C. SARKAR	REVISIONS Changed "Foundation Depth" to "Drilled Pier Length" in Conc. Egn. N.B. DATE: 7/12/2015	
Prepared In the Office of: 		750 N. Greenfield Pkwy, Garner, NC 27529	

11-002-2017-08-10
S:\112525C\15 Signal\Signal Design Section\Eastern Region\M Sheets\2016\2014 Sig.M8 Std. Strain Pole Found.-Saturated Soil -Cond1110n.dgn
mz:insgr

- 1 INSTALL REA, PE - 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2 INSTALL COAX CABLE
- 3 INSTALL ETHERNET 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 MODIFY EXISTING INTERCONNECT CENTER /SPLICE ENCLOSURE
- 27 INSTALL NEW FIBER OPTIC TRANSCEIVER
- 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

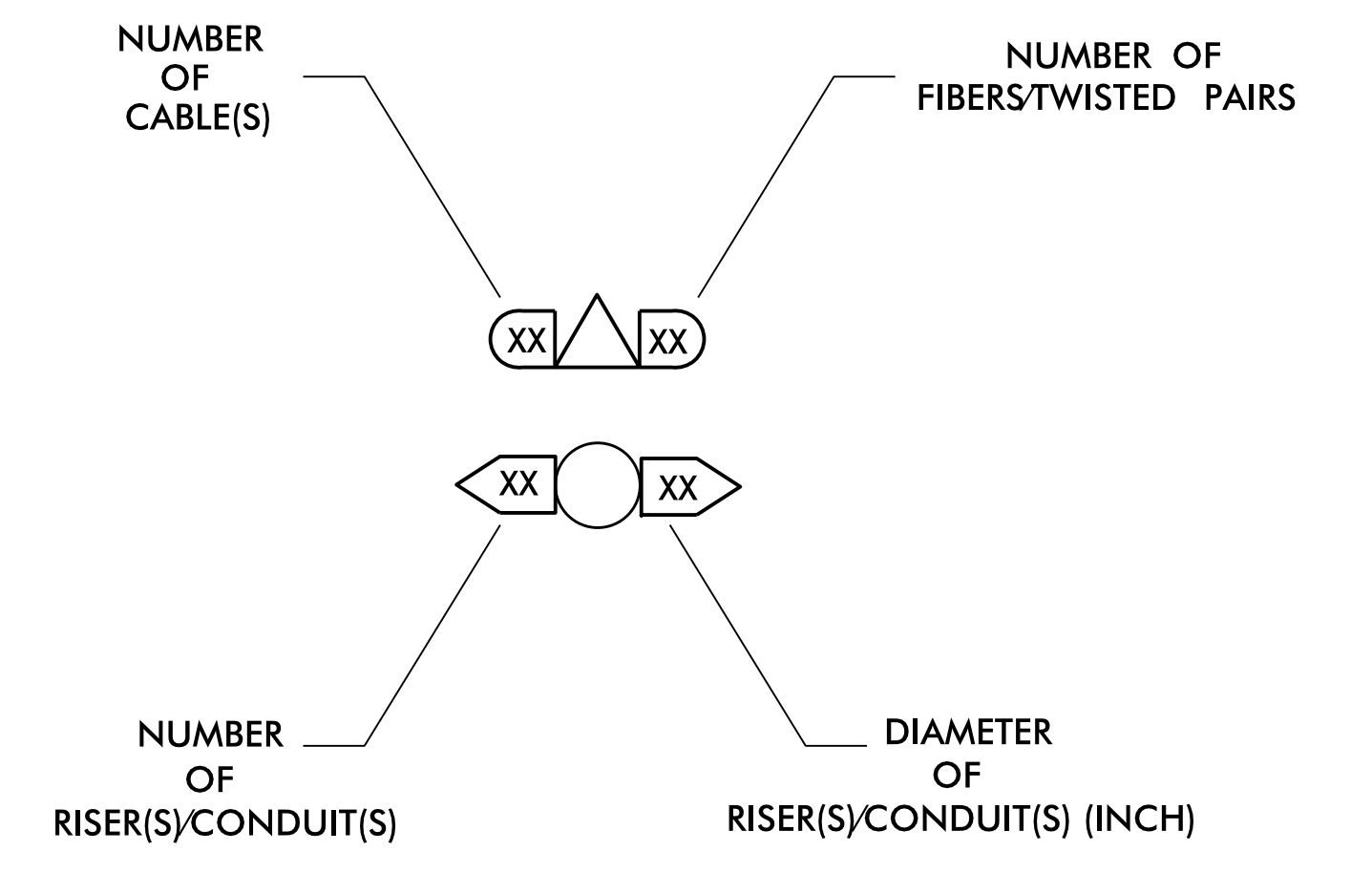
- 34 INSTALL CABINET FOUNDATION
- 35 REMOVE EXISTING CABINET FOUNDATION
- 36 INSTALL CCTV CAMERA ASSEMBLY
- 37 INSTALL CCTV CAMERA WOOD POLE
- 38 INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39 INSTALL JUNCTION BOX
- 40 INSTALL OVERSIZED JUNCTION BOX
- 41 REMOVE EXISTING JUNCTION BOX
- 42 INSTALL 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
- 59 INSTALL NEW FIELD ETHERNET SWITCH
- 60 BOND TRACER WIRE TO EQUIPMENT GROUND BUS
- 61 DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS
- 62 BOND RISER AND MESSENGER CABLE TO POLE GROUND

LEGEND

	NEW FIBER OPTIC COMMUNICATIONS CABLE
	NEW TWISTED PAIR COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE
	EXISTING COMMUNICATIONS CABLE TO BE REMOVED
	NEW AERIAL GUY ASSEMBLY
	NEW CONDUIT
	EXISTING CONDUIT
	NEW DIRECTIONAL DRILLED CONDUIT
	NEW BORED AND JACKED CONDUIT
	CCTV WIRELESS ACCESS POINT
	YAGI ANTENNA
	NEW JUNCTION BOX
	EXISTING JUNCTION BOX
	NEW WOOD POLE
	EXISTING WOOD POLE
	AERIAL SPLICE ENCLOSURE
	NEW METAL POLE
	EXISTING METAL POLE
	CCTV ASSEMBLY
	NEW STANDARD GUY ASSEMBLY
	NEW SIDEWALK GUY ASSEMBLY
	EXISTING CABLE STORAGE RACK (SNOW SHOE)
	NEW CABLE STORAGE RACKS (SNOW SHOES)
	EXISTING CONTROLLER AND CABINET
	EXISTING SPLICE CABINET
	NEW SPLICE CABINET
	SIGNAL POLE
	SIGNAL INVENTORY NUMBER

CONSTRUCTION NOTE SYMBOLOGY KEY

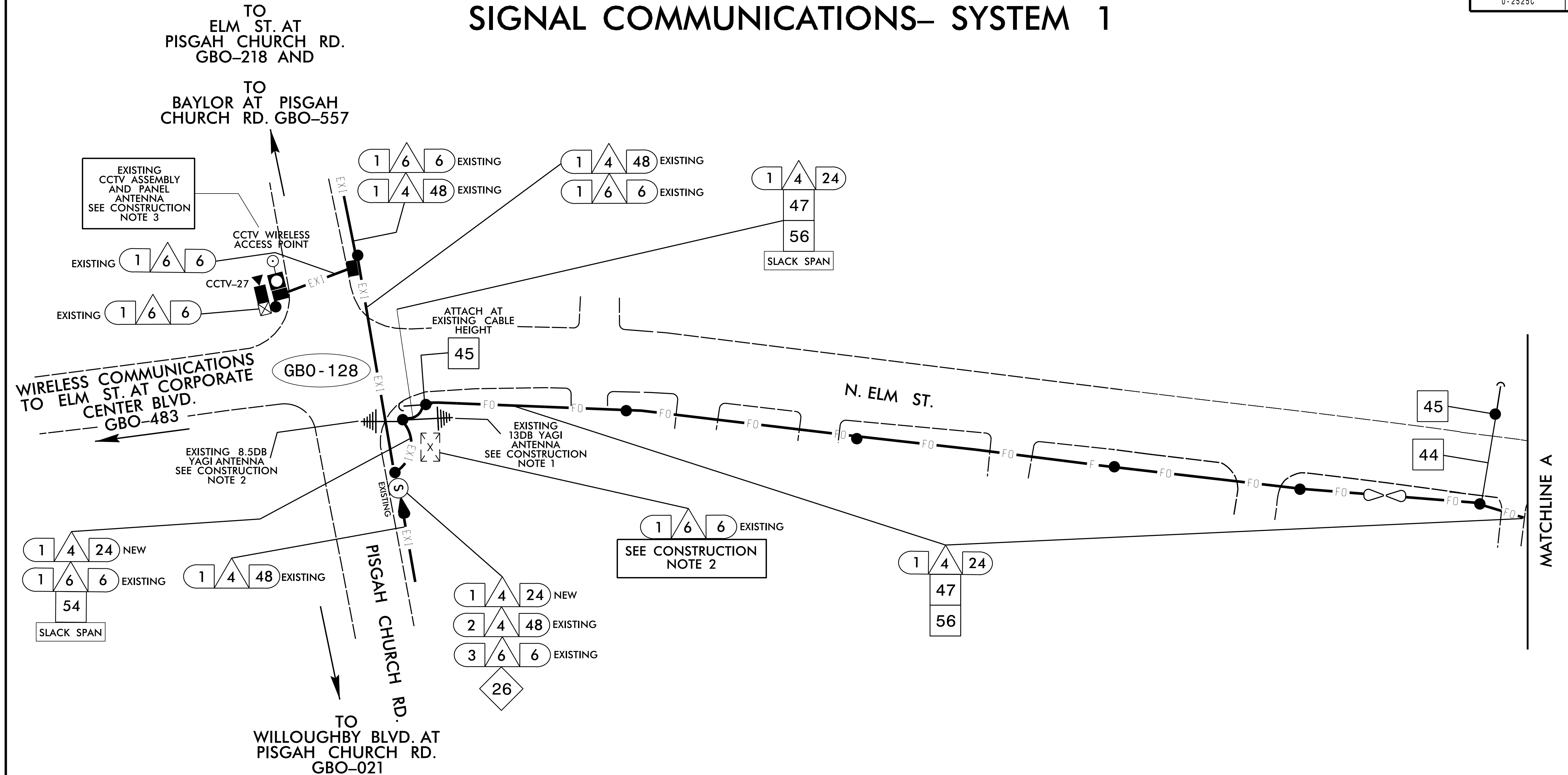
- INDICATES NUMBER OF CABLES, LOOPS, ETC.
- INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>CONSTRUCTION NOTES</p>		<p>SEAL</p>
	<p>DIVISION 07 GUILFORD CO. GREENSBORO</p> <p>PLAN DATE: OCTOBER 2017 REVIEWED BY: <i>N. Avery</i></p> <p>PREPARED BY: H. T. BERGGREN</p>	<p>REVISIONS</p> <p>INIT. DATE</p>	

SIGNAL COMMUNICATIONS- SYSTEM 1



GENERAL NOTES:

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM COMMUNICATIONS CABLE, CONTACT THE CITY OF GREENSBORO SIGNAL SYSTEM COORDINATOR, DALE MCCRAW, AT (336) 552-5984 TO ARRANGE FOR THE CITY OF GREENSBORO TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE CITY SIGNAL SYSTEM COORDINATOR AFTER ALL WORK HAS BEEN PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) ALL ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

CONSTRUCTION NOTES:

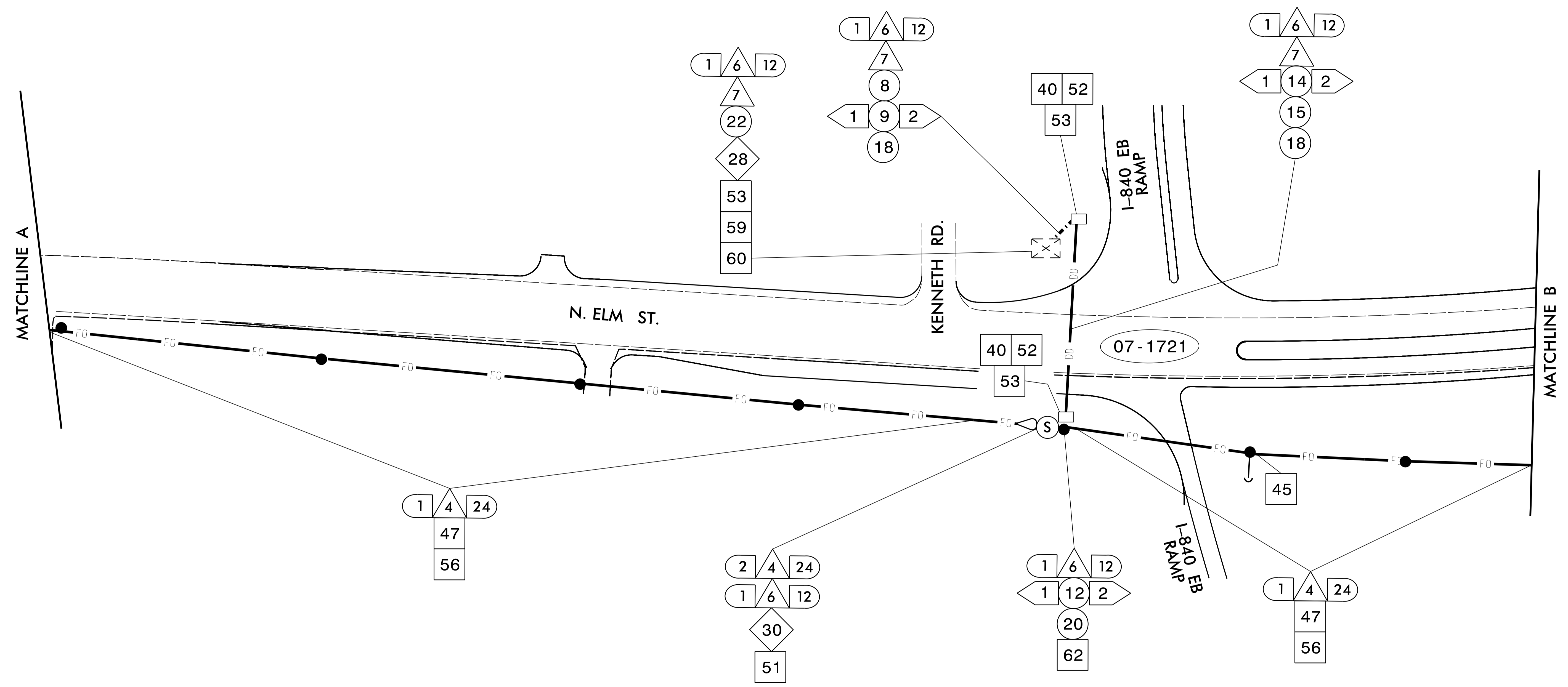
- 1) REMOVE EXISTING 13DB YAGI ANTENNA AND MAKE ARRANGEMENTS WITH THE CITY SIGNAL SYSTEM COORDINATOR, DALE MCCRAW (336) 552-5984, FOR DELIVERY OF THE WIRELESS ANTENNA TO THE CITY TRANSPORTATION YARD LOCATED AT 401 PATTON AVENUE IN GREENSBORO.
- 2) DO NOT REMOVE THE 8.5DB YAGI ANTENNA, THE MASTER RADIO, NOR THE ETHERNET SWITCH.
- 3) DO NOT REMOVE THE CCTV ASSEMBLY, THE PANEL ANTENNA, NOR THE CITY NETWORK EQUIPMENT.

TMP PHASE 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	COMMUNICATIONS CABLE ROUTING PLANS	
	DIVISION 07 GUILFORD CO. GREENSBORO	REVIEWED BY: <i>N. Avery</i>
	PLAN DATE: OCTOBER 2017	REVIEWED BY: 99F5044CBED3443
PREPARED BY: H. T. BERGGREN	REVISIONS	INIT. DATE
SCALE: 1" = 50'	DATE: 10/23/2017	

SIGNAL COMMUNICATIONS- SYSTEM 1



GENERAL NOTES:

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM COMMUNICATIONS CABLE, CONTACT THE CITY OF GREENSBORO SIGNAL SYSTEM COORDINATOR, DALE MCCRAW, AT (336) 552-5984 TO ARRANGE FOR THE CITY OF GREENSBORO TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE CITY SIGNAL SYSTEM COORDINATOR AFTER ALL WORK HAS BEEN PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

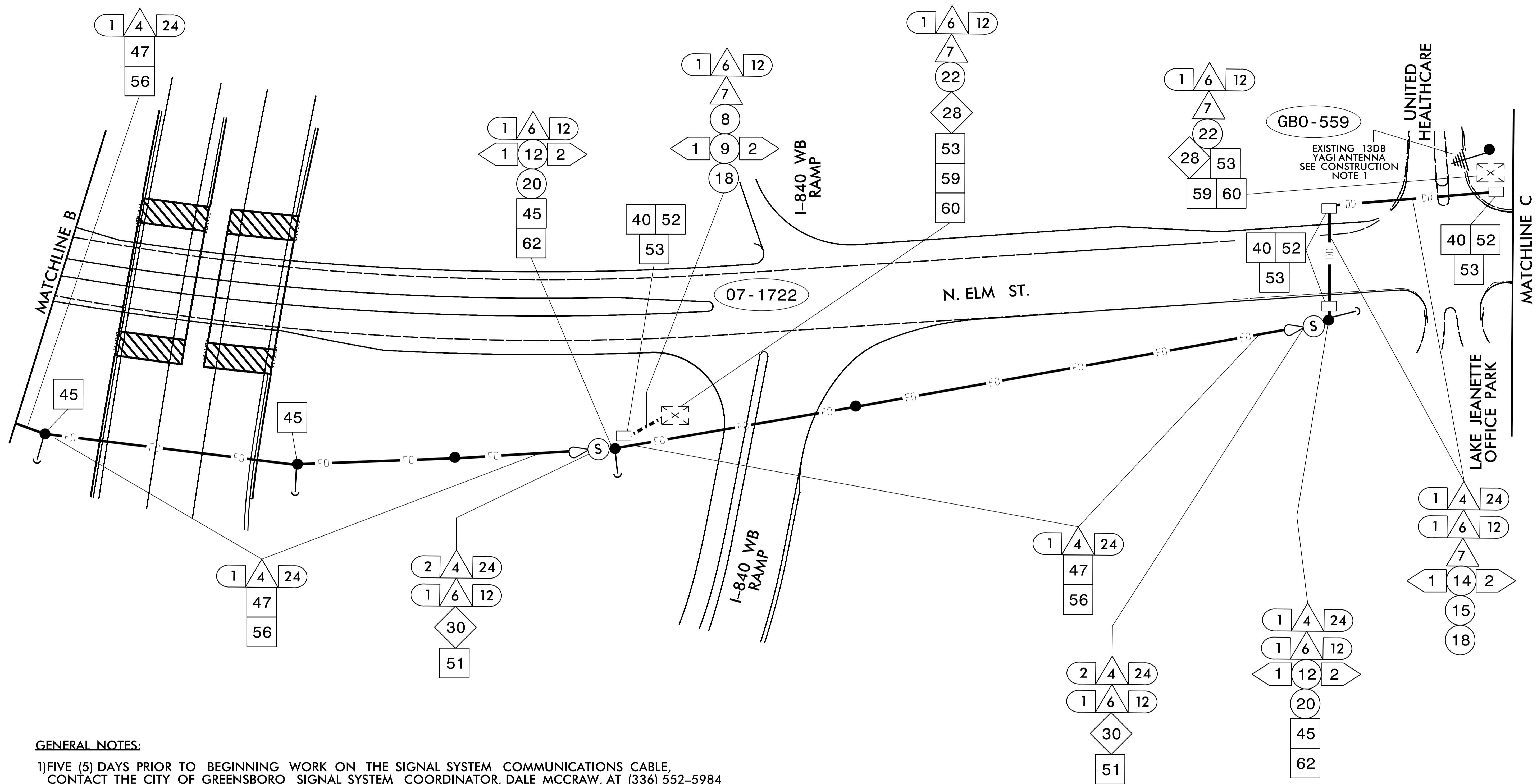
2) ALL ATTACHMENT POINTS ARE 40" BELOW POWER, FRONT SIDE OF POLE, UNLESS OTHERWISE NOTED.

TMP PHASE 1

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

	<p>COMMUNICATIONS CABLE ROUTING PLANS</p>	
	<p>DIVISION 07 GUILFORD CO.</p>	
<p>PLAN DATE: OCTOBER 2017</p>		<p>REVIEWED BY: <i>N. Avery</i></p>
<p>PREPARED BY: H. T. BERGGREN</p>		<p>REVIEWED BY: 09F50H4CBED3443</p>
<p>REVISIONS</p>		<p>INIT. DATE</p>
<p>SCALE</p> <p>0 1' = 50'</p>		<p>DocuSigned by: <i>Mohammad A. Aslam</i> 10/23/2017</p>

SIGNAL COMMUNICATIONS- SYSTEM 1



GENERAL NOTES:

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM COMMUNICATIONS CABLE, CONTACT THE CITY OF GREENSBORO SIGNAL SYSTEM COORDINATOR, DALE MCCRAW, AT (336) 552-5984 TO ARRANGE FOR THE CITY OF GREENSBORO TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE CITY SIGNAL SYSTEM COORDINATOR AFTER ALL WORK HAS BEEN PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

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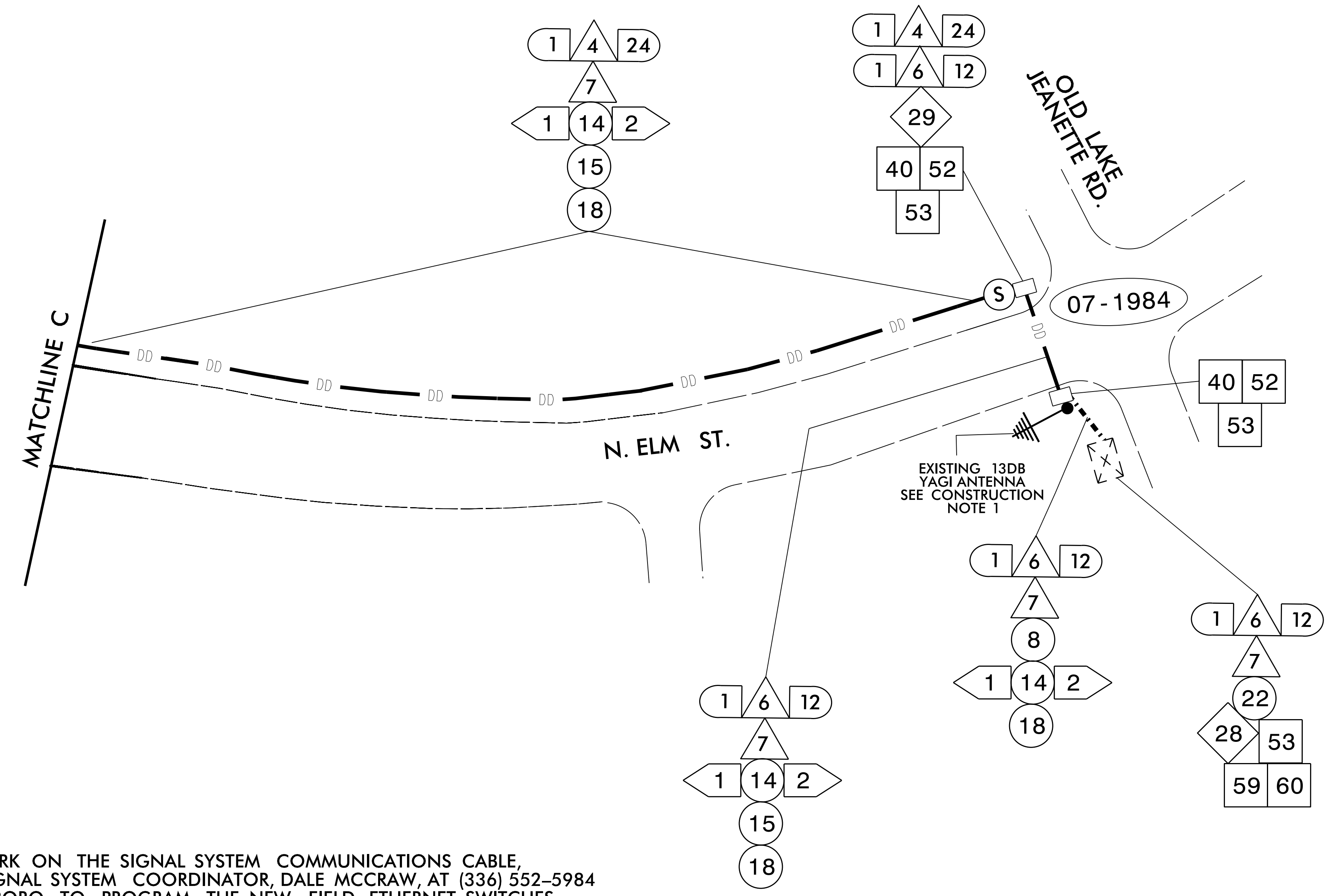
1) REMOVE EXISTING 13DB YAGI ANTENNA, EXISTING RADIO, AND ASSOCIATED EQUIPMENT AND MAKE ARRANGEMENTS WITH THE CITY SIGNAL SYSTEM COORDINATOR, DALE MCCRAW (336) 552-5984, FOR DELIVERY TO THE CITY TRANSPORTATION YARD, LOCATED AT 401 PATTON AVENUE IN GREENSBORO.

TMP PHASE 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

	COMMUNICATIONS CABLE ROUTING PLANS DIVISION 07 GUILFORD CO.		
	PLAN DATE: OCTOBER 2017 PREPARED BY: H. T. BERGGREN	REVIEWED BY: <i>N. Avery</i> REVIEWED BY: 09F50H4CBED3443	
SCALE: 1" = 50' 		DATE: 10/23/2017	

SIGNAL COMMUNICATIONS- SYSTEM 1



GENERAL NOTES:

1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM COMMUNICATIONS CABLE, CONTACT THE CITY OF GREENSBORO SIGNAL SYSTEM COORDINATOR, DALE MCCRAW, AT (336) 552-5984 TO ARRANGE FOR THE CITY OF GREENSBORO TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE CITY SIGNAL SYSTEM COORDINATOR AFTER ALL WORK HAS BEEN PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

CONSTRUCTION NOTE:

1) REMOVE EXISTING 13DB YAGI ANTENNA, EXISTING RADIO, AND ASSOCIATED EQUIPMENT AND MAKE ARRANGEMENTS WITH THE CITY SIGNAL SYSTEM COORDINATOR, DALE MCCRAW (336) 552-5984, FOR DELIVERY TO THE CITY TRANSPORTATION YARD, LOCATED AT 401 PATTON AVENUE IN GREENSBORO.

TMP PHASE 1

**DOCUMENT NOT CONSIDERED FINAL
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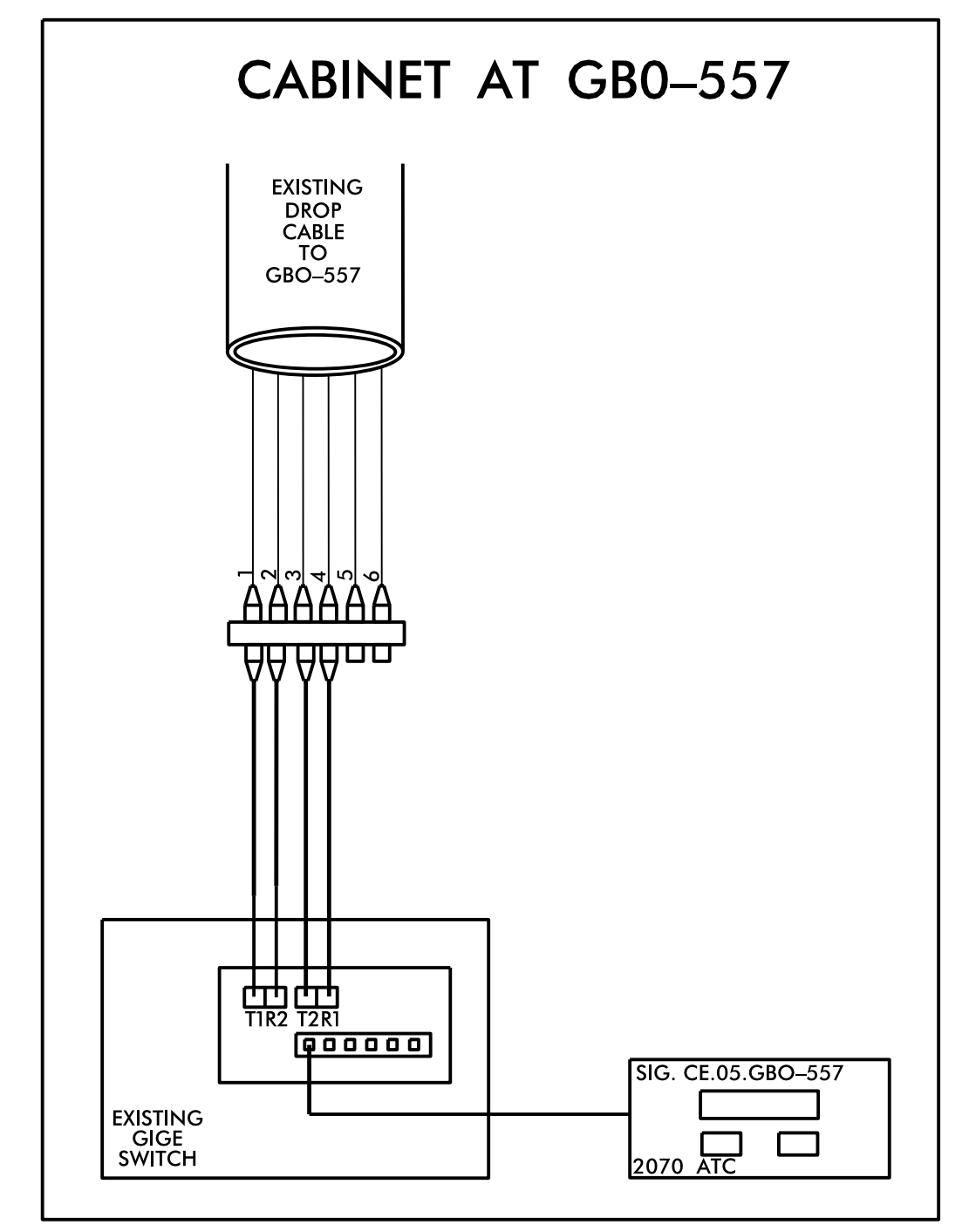
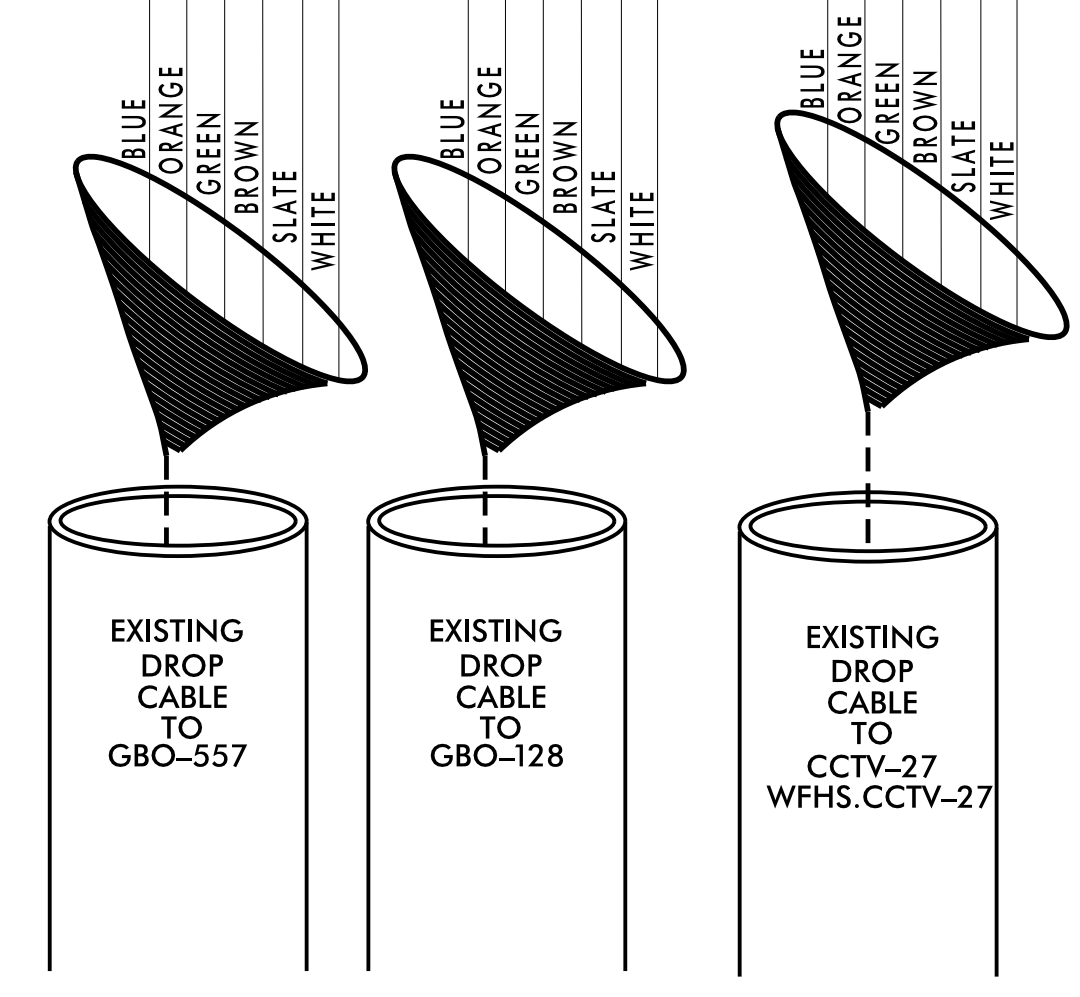
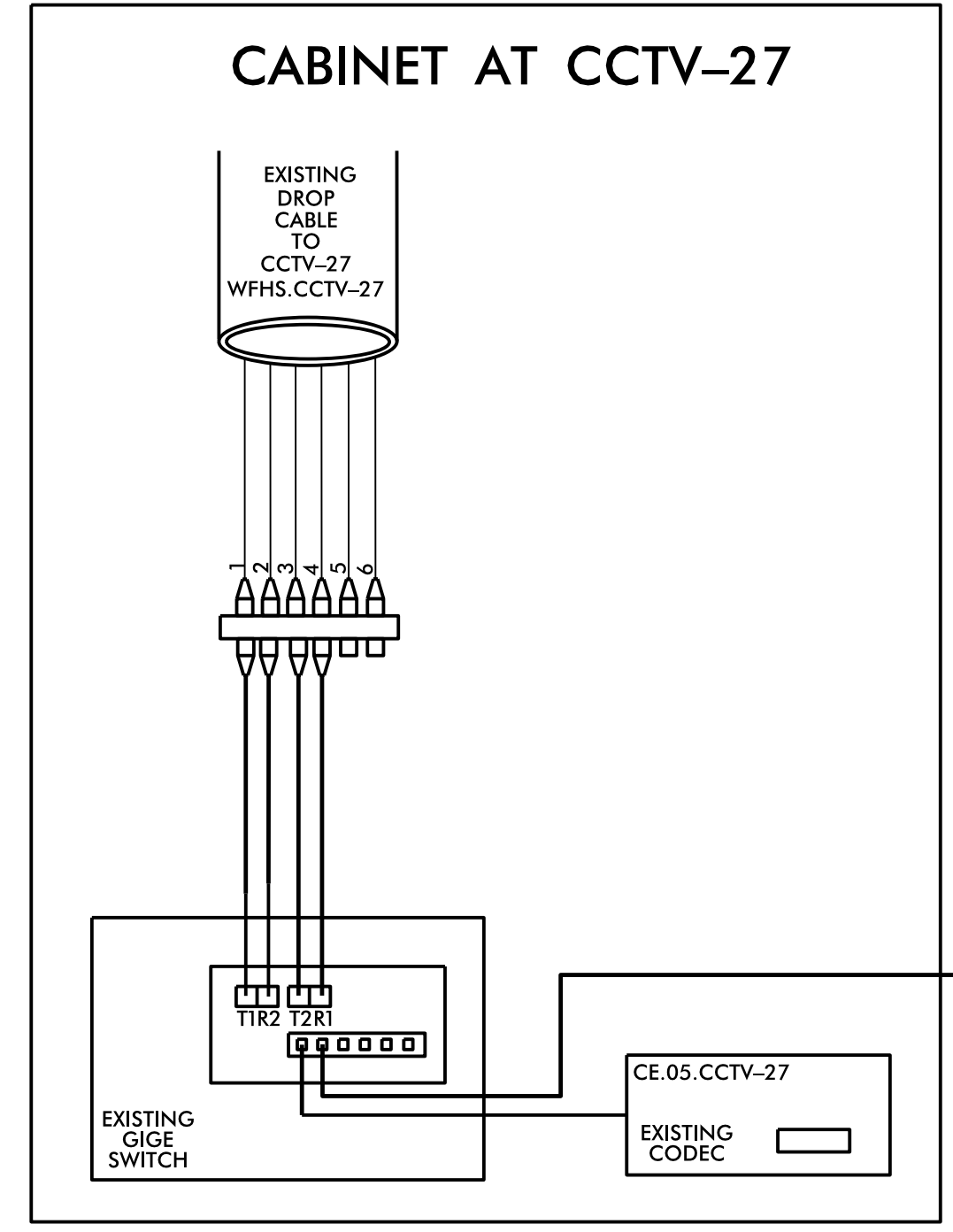
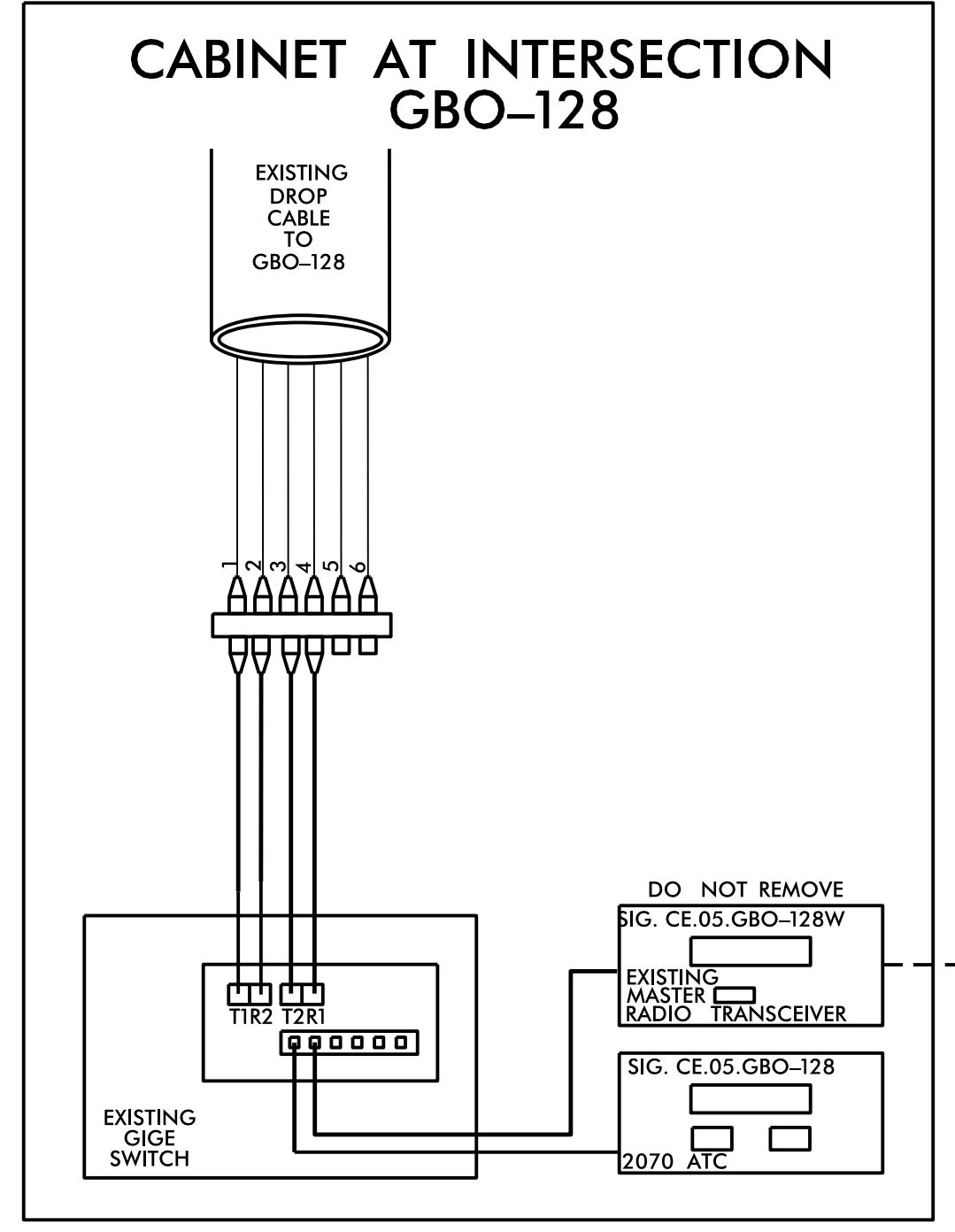
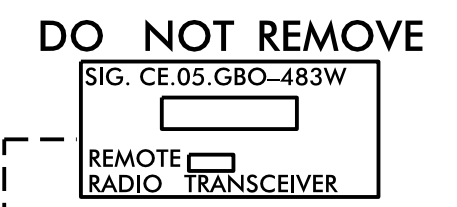
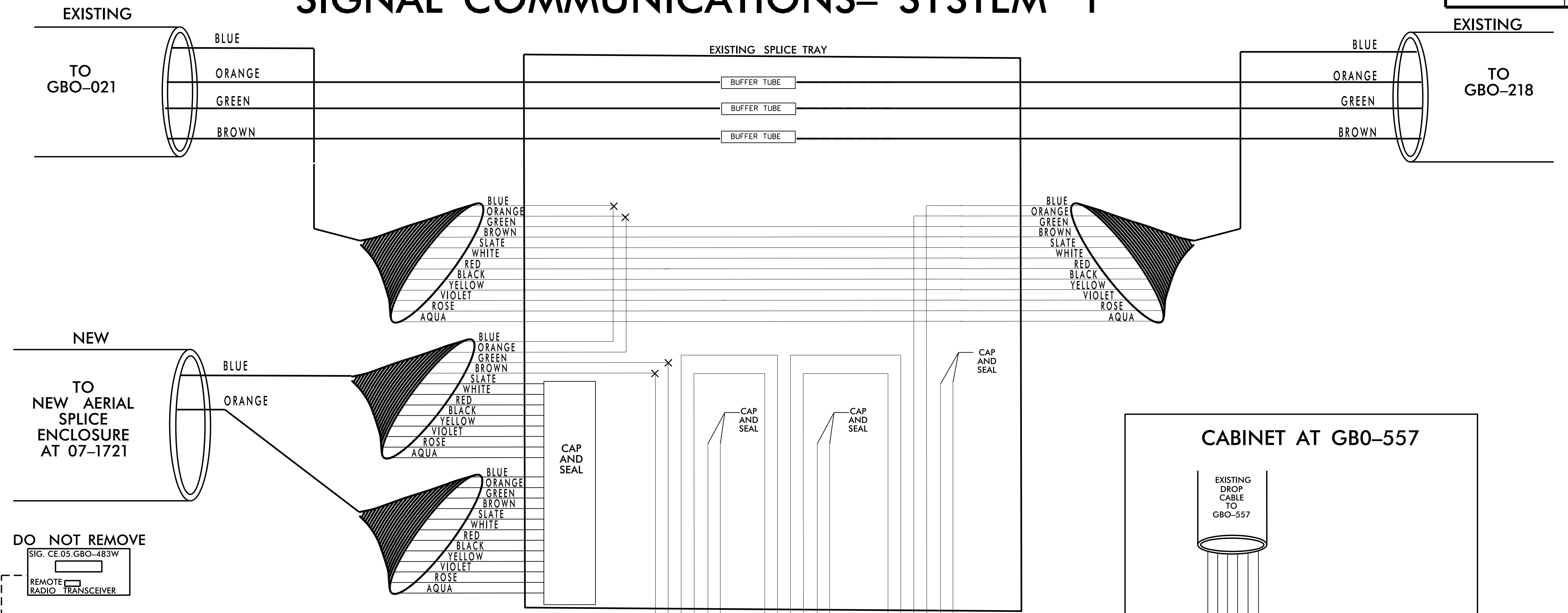
<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>COMMUNICATIONS CABLE ROUTING PLANS</p> <p>DIVISION 07 GUILFORD CO. GREENSBORO</p> <p>PLAN DATE: OCTOBER 2017 REVIEWED BY: <i>N. Avery</i></p> <p>PREPARED BY: H. T. BERGGREN REVIEWED BY: 99F5046CBED3443</p>		<p>SEAL</p> <p>10/23/2017</p>					
	<p>SCALE</p> <p>1" = 50'</p>	<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	INIT.	DATE		
REVISIONS	INIT.	DATE						

MODIFY SPLICE ENCLOSURE

EXISTING AERIAL SPLICE ENCLOSURE AT GBO-128

NOTE: 1. UNLESS OTHERWISE NOTED, CAP AND STORE UNUSED FIBERS.

SIGNAL COMMUNICATIONS- SYSTEM 1



LEGEND

COLOR CODE TIA/EIA 598-A		X - FUSION SPLICE INDIVIDUAL FIBER
(1) BLUE	(7) RED	
(2) ORANGE	(8) BLACK	BUFFER TUBE SPLICE OR EXPRESS ENTIRE BUFFER TUBE AS NOTED
(3) GREEN	(9) YELLOW	
(4) BROWN	(10) VIOLET	
(5) SLATE	(11) ROSE	
(6) WHITE	(12) AQUA	

NOTES:

- FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM COMMUNICATIONS CABLE, CONTACT THE CITY OF GREENSBORO SIGNAL SYSTEM COORDINATOR, DALE MCCRAW, AT (336) 552-5984 TO ARRANGE FOR THE CITY OF GREENSBORO TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE CITY SIGNAL SYSTEM COORDINATOR AFTER ALL WORK HAS BEEN PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.
- CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING: REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

- SPLICE LOCATION
- DATE
- COMPANY NAME
- NAME OF INDIVIDUAL PERFORMING THE SPLICING

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

TMP PHASE 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>DIVISION 07 GUILFORD CO. GREENSBORO</p> <p>PLAN DATE: OCTOBER 2017 REVIEWED BY: <i>N. Avery</i></p> <p>PREPARED BY: H. T. BERGGREN REVIEWED BY: <i>99F5094CBED3443</i></p>		<p>SEAL</p>					
	<p>SCALE: 0 N/A</p>	<p>SPLICE DETAILS</p> <table border="1"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>		REVISIONS	INIT.	DATE		
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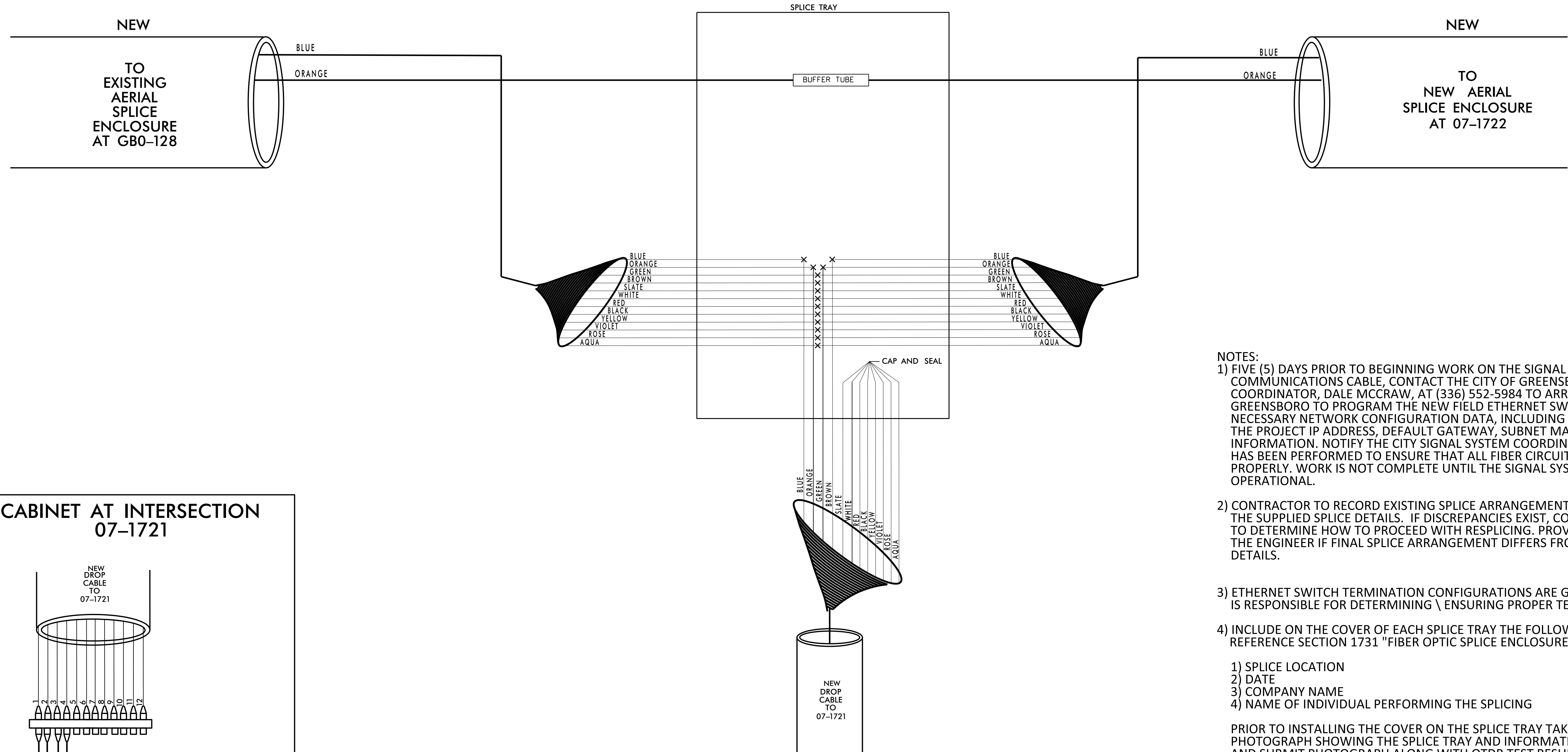
SIGNAL COMMUNICATIONS- SYSTEM 1

NEW AERIAL SPLICE ENCLOSURE AT 07-1721

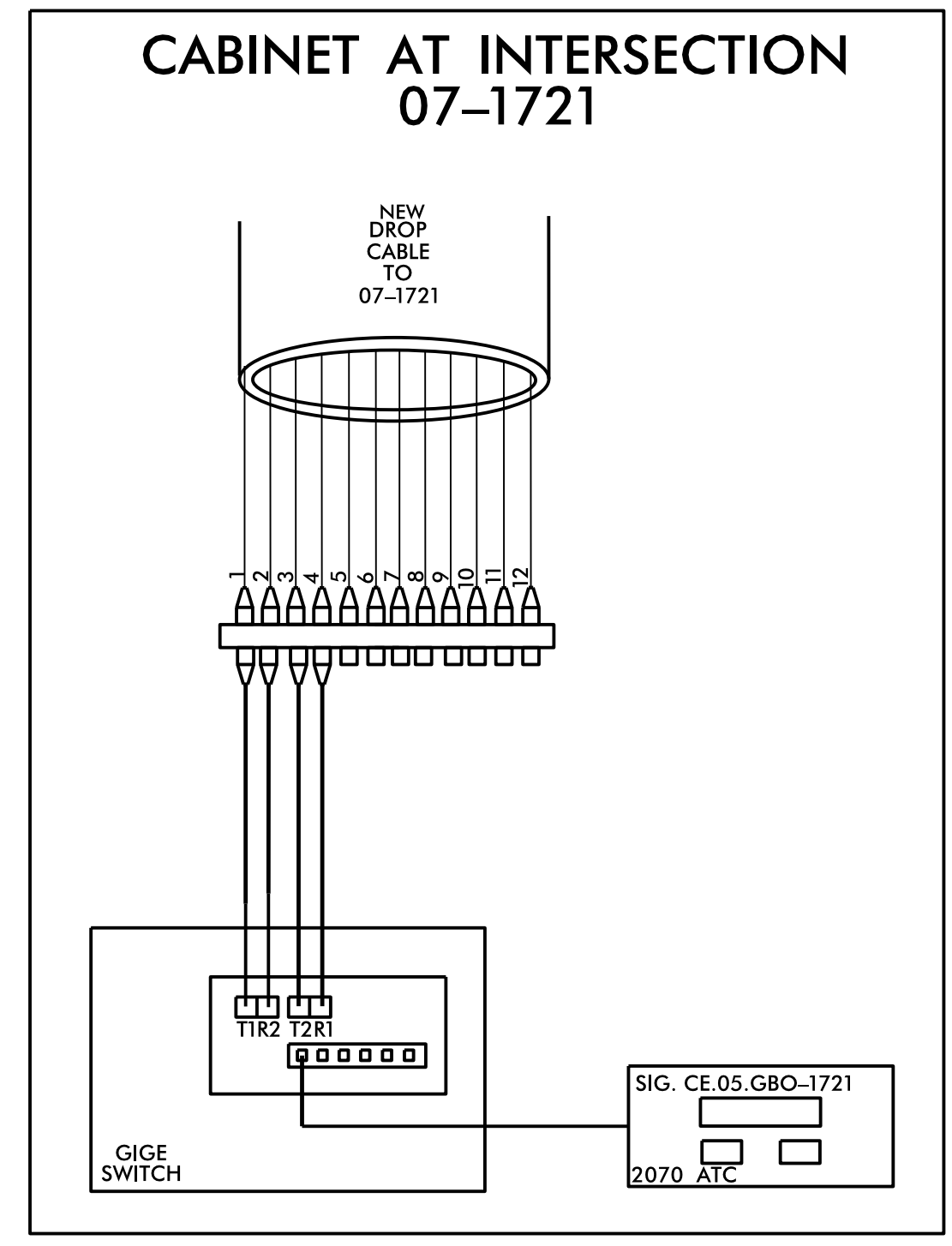
NOTE:
1. UNLESS OTHERWISE NOTED, CAP AND STORE UNUSED FIBERS.

LEGEND

COLOR CODE TIA/EIA 598-A		
(1) BLUE	(7) RED	X - FUSION SPLICE INDIVIDUAL FIBER
(2) ORANGE	(8) BLACK	
(3) GREEN	(9) YELLOW	[BUFFER TUBE] SPLICE OR EXPRESS ENTIRE BUFFER TUBE AS NOTED
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- NOTES:**
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 - 2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.
 - 3) ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.
 - 4) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING:
 - 1) SPLICE LOCATION
 - 2) DATE
 - 3) COMPANY NAME
 - 4) NAME OF INDIVIDUAL PERFORMING THE SPLICING
- PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1-4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.



TMP PHASE 1

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<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>SPLICE DETAILS</p>		<p>SEAL</p>
	<p>DIVISION 07 GUILFORD CO. GREENSBORO</p> <p>PLAN DATE: OCTOBER 2017</p> <p>PREPARED BY: H. T. BERGGREN</p>	<p>REVIEWED BY: N. Avery</p> <p>REVIEWED BY: 985094CBED3443</p>	
<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>	<p>10/23/2017</p>

SIGNAL COMMUNICATIONS- SYSTEM 1

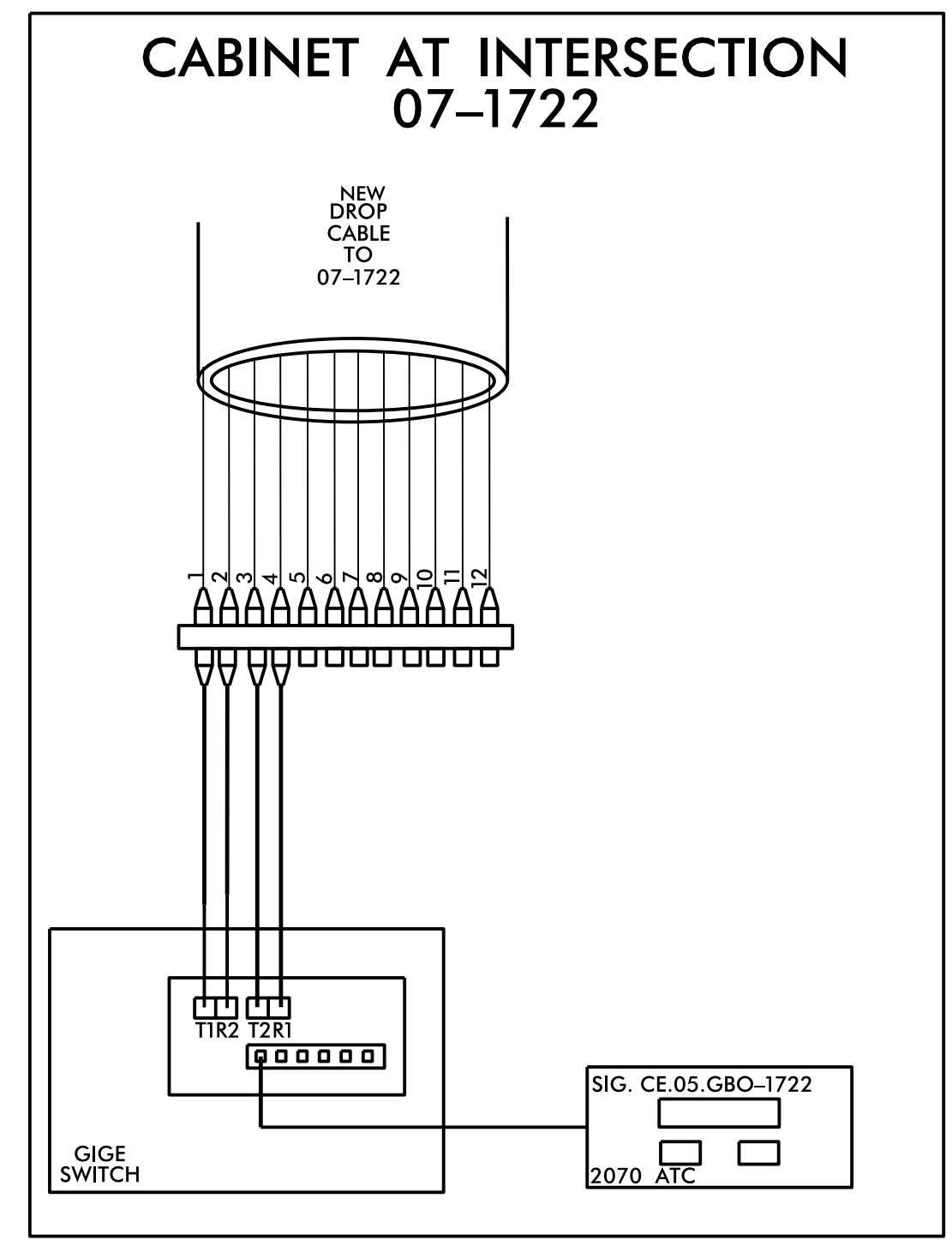
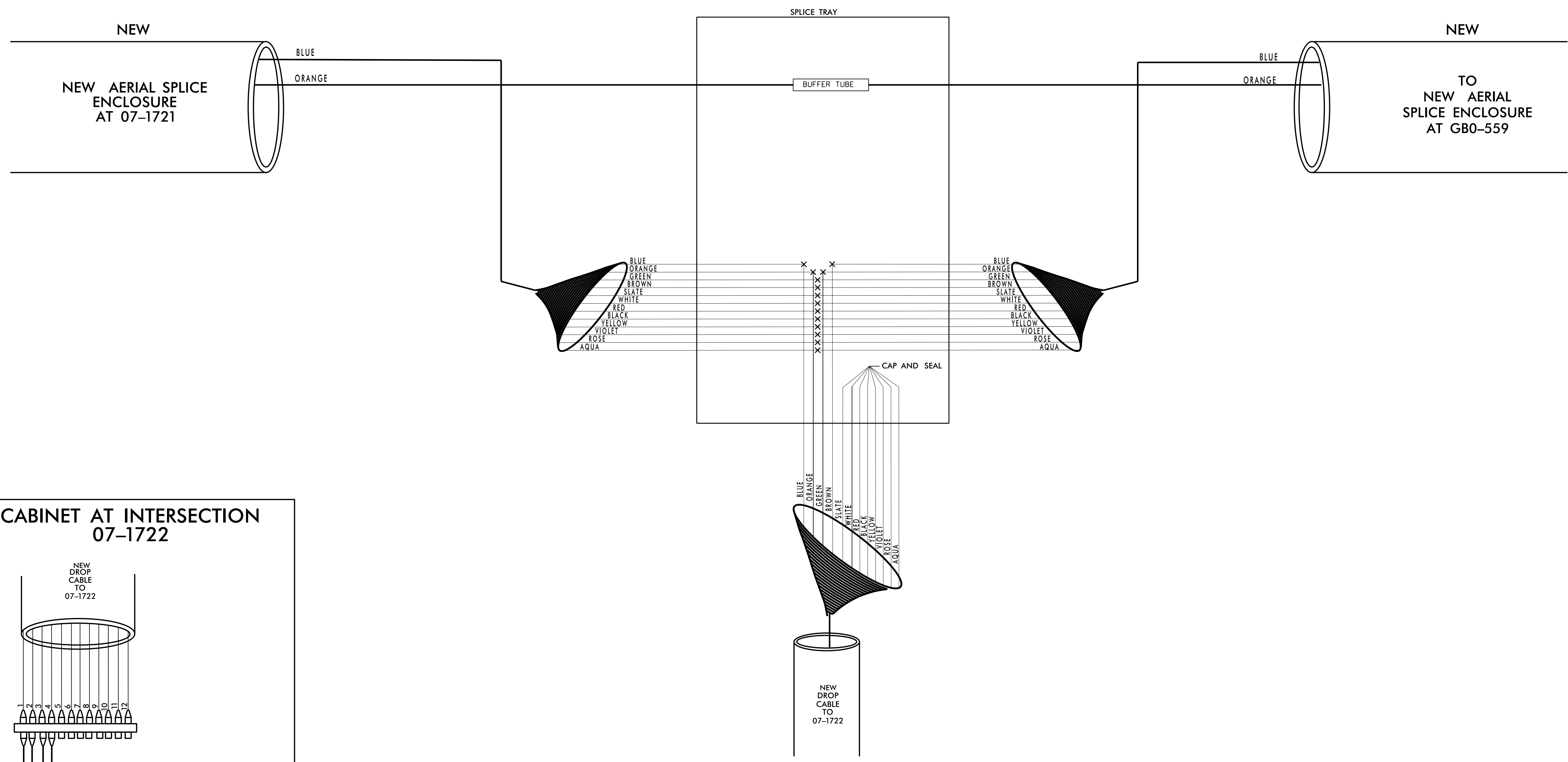
NEW AERIAL SPLICE ENCLOSURE AT 07-1722

NOTE:
1. UNLESS OTHERWISE NOTED, CAP AND STORE UNUSED FIBERS.

LEGEND

COLOR CODE
TIA/EIA 598-A

(1) BLUE	(7) RED	X - FUSION SPLICE INDIVIDUAL FIBER
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TMP PHASE 1

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<p>750 N. Greenfield Pkwy., Garner, NC 27529</p>	<p>SPLICE DETAILS</p>		<p>SEAL</p>
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