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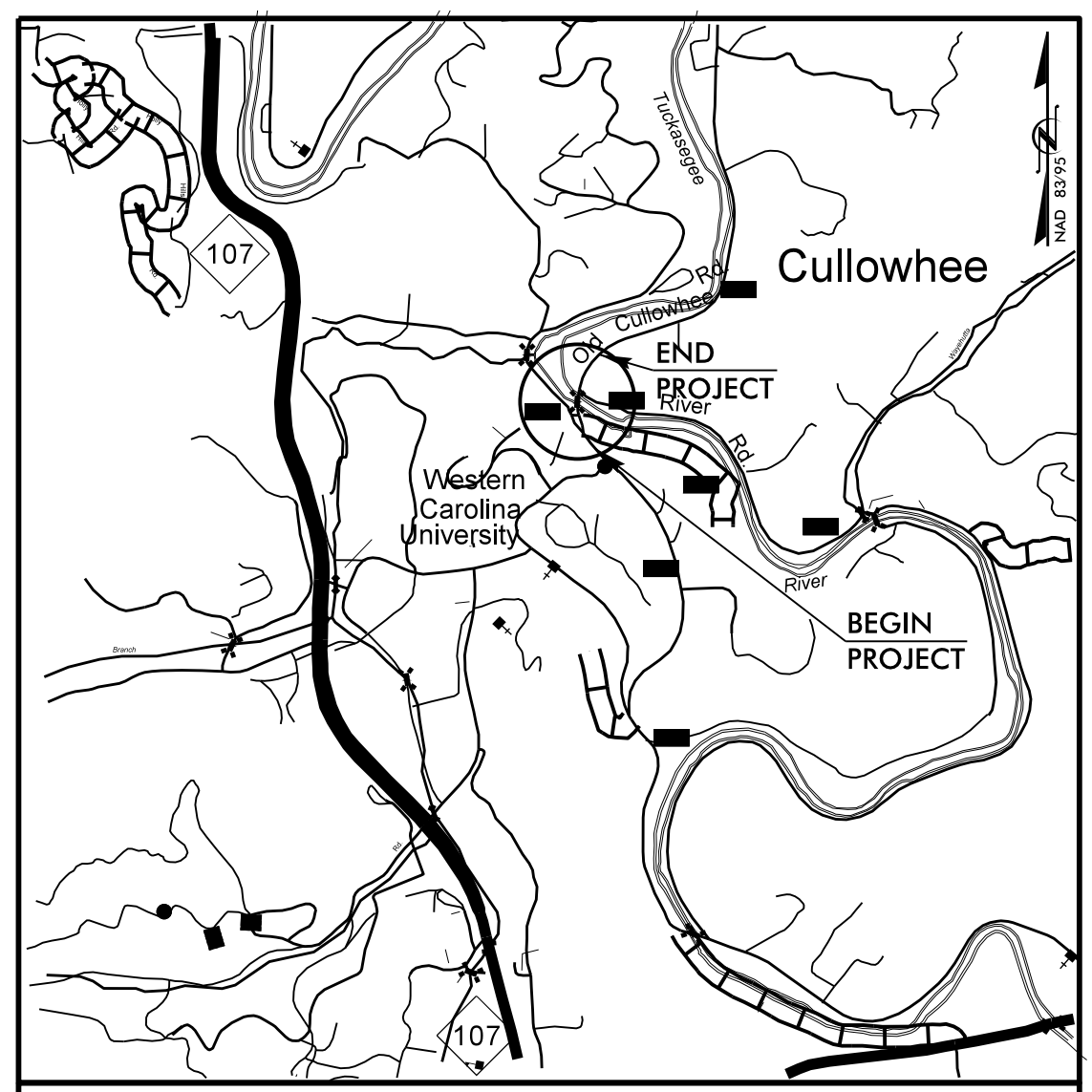
Project: B-4159

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

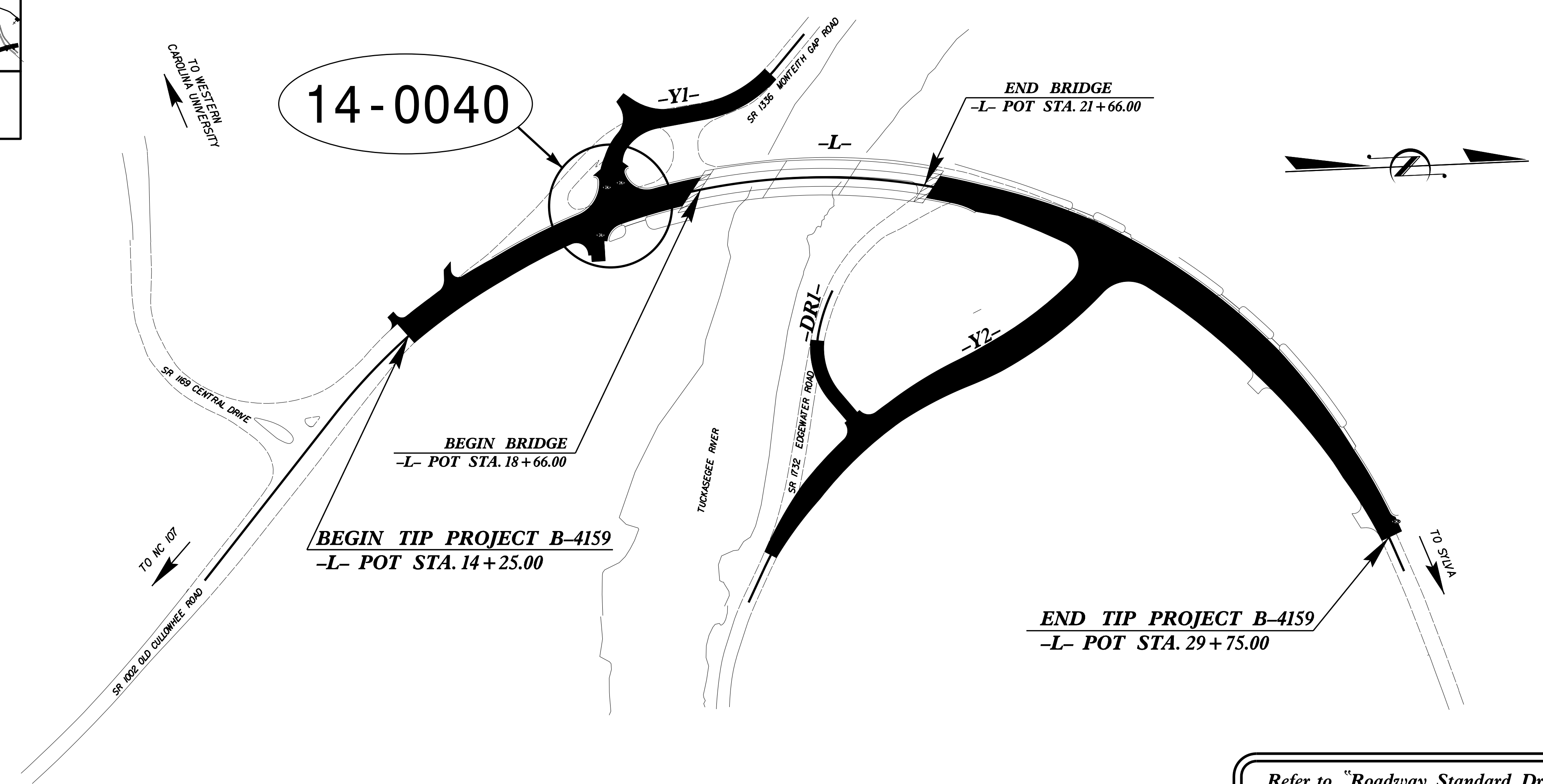
JACKSON COUNTY

**LOCATION: BRIDGE NO 108 OVER THE TUCKASEGEE RIVER
ON SR 1002 (OLD CULLOWHEE RD.)**

TYPE OF WORK: TRAFFIC SIGNALS



VICINITY MAP SHOWING
LOCATION OF PROJECT B-4159



Refer to "Roadway Standard Drawings
NCDOT" dated January 2012 and
"Standard Specifications for Roads
and Structures" dated January 2012.

Index of Plans		
Sheet #	Reference #	Location/Description
Sig.1.0	B-4159	Title Sheet
Sig.2.0-2.1	14-0040 T1	SR 1002 (Old Cullowhee Road) at SR 1336 (Monteith Gap Road) /SR 1733 (Casey Road) Temporary-1
Sig.3.0-3.1	14-0040 T2	SR 1002 (Old Cullowhee Road) at SR 1336 (Monteith Gap Road) /SR 1733 (Casey Road) Temporary-2
Sig.4.0-4.3	14-0040	SR 1002 (Old Cullowhee Road) at SR 1336 (Monteith Gap Road) /SR 1733 (Casey Road) Final design
Sig.M1-M9	MP Standards	Standard Drawings for Metal Poles
Sig. P1-P3	PP Standards	Pedestrian Pushbutton Standards

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT
Contacts:

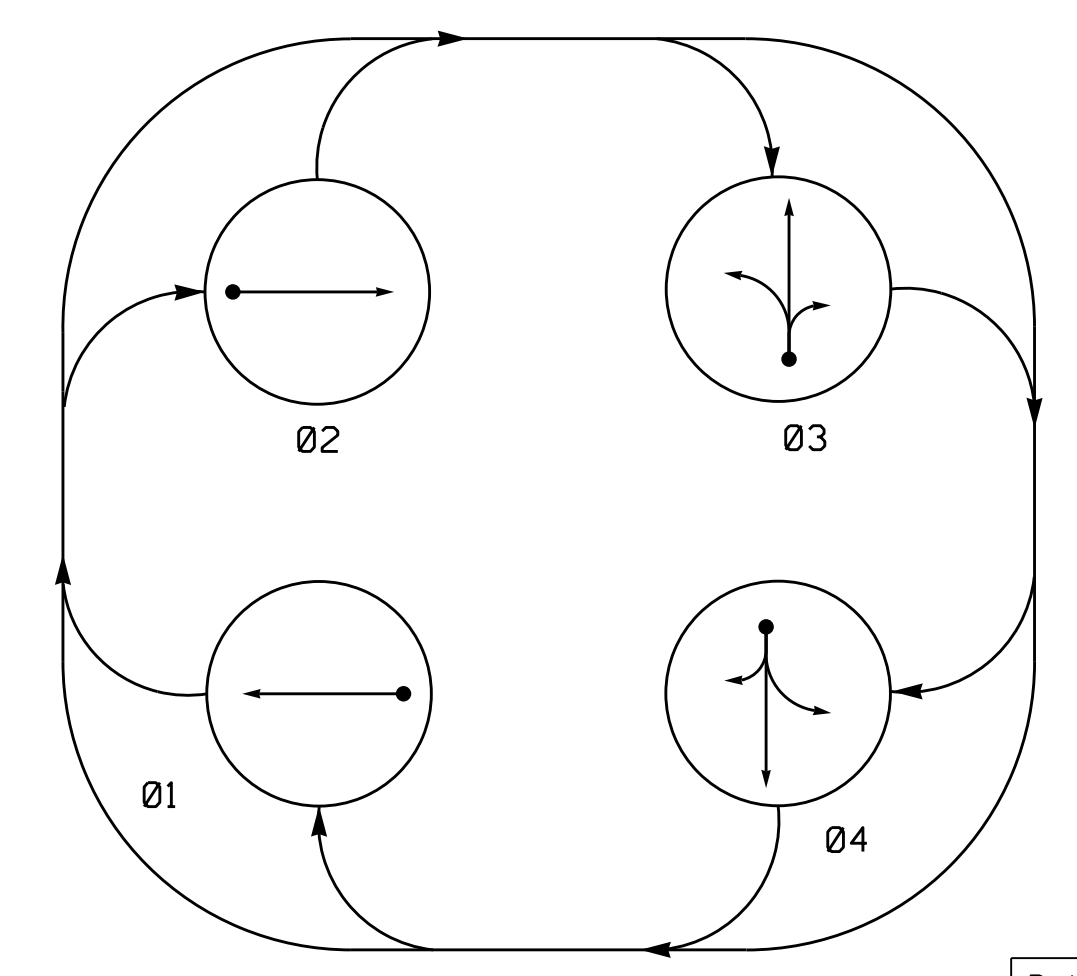
Timothy J. Williams, PE, Western Region Signals Engineer
John T. Rowe, Jr., PE, Signal Equipment Design Engineer

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

750 N. Greenfield Parkway, Garner, NC 27529

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

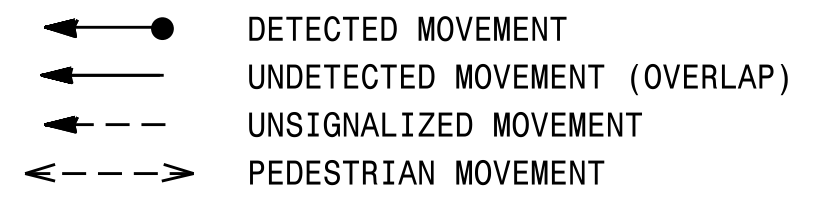
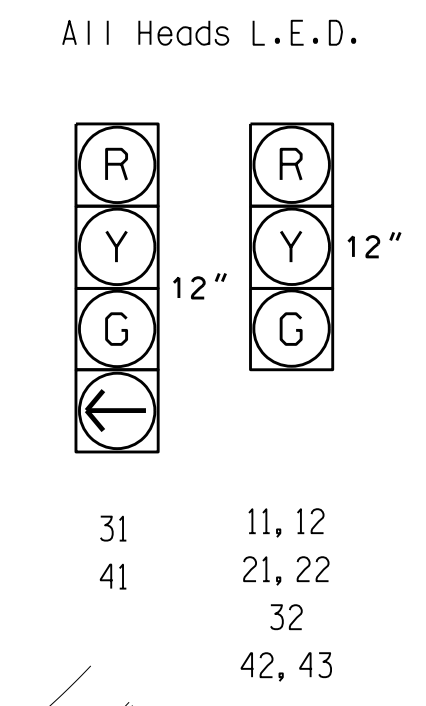


TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø 1	Ø 2	Ø 3	Ø 4	FLTS
11, 12	G	R	R	R	R
21, 22	R	G	R	R	R
31	R	R	G	R	R
32	R	R	G	R	R
41	R	R	R	G	R
42, 43	R	R	R	G	R

SIGNAL FACE I.D.



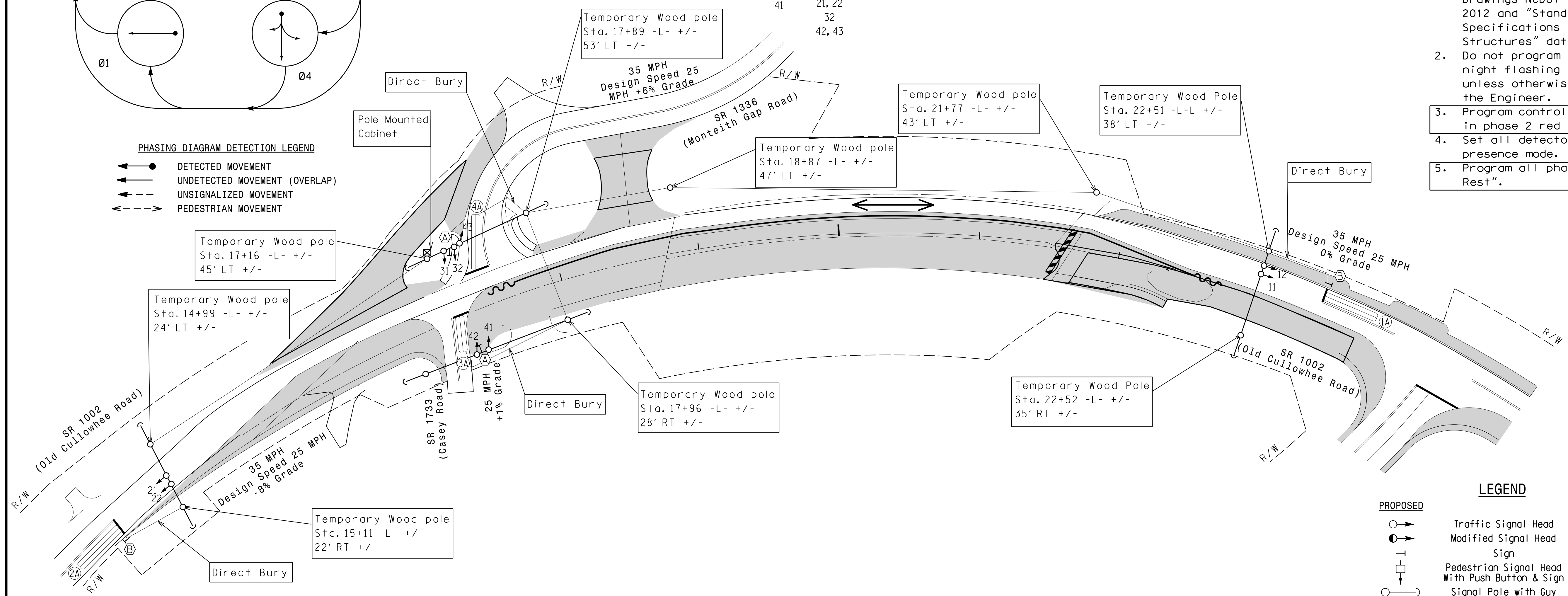
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-	Y
2A	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
3A	6X25	0	2-4-2	Y	3	Y	Y	-	-	3	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	3	-	Y

4 Phase Fully Actuated Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Program controller to start up in phase 2 red clearance.
4. Set all detector units to presence mode.
5. Program all phases for "Red Rest".

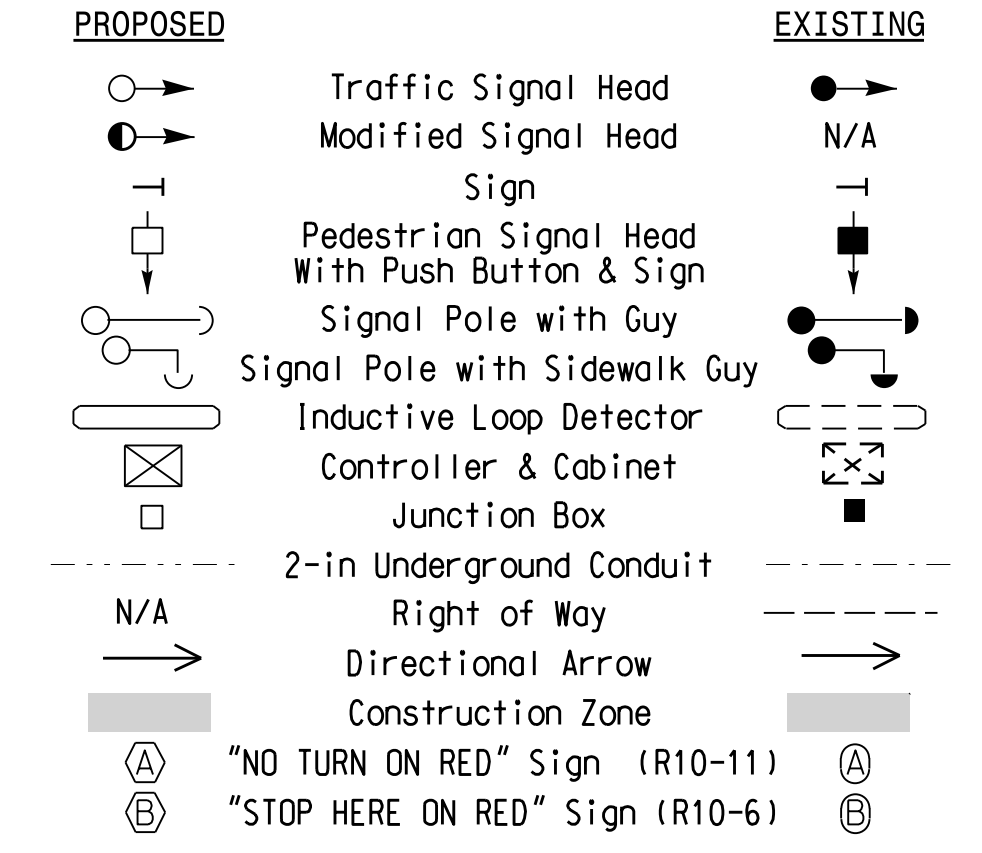


OASIS 2070 TIMING CHART

FEATURE	PHASE			
	1	2	3	4
Min Green 1 *	10	10	10	10
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	45	45	20	30
Yellow Clearance	3.2	3.7	3.1	3.0
Red Clearance	25.0	25.0	18.0	17.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	-	-	-
Vehicle Call Memory	YELLOW	YELLOW	YELLOW	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND



New Installation - Temporary design (TCP-Phase II)

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1002 (Old Cullowhee Road)
at
SR 1336 (Monteith Gap Road) /
SR 1733 (Casey Road)

Division 14 Jackson County Cullowhee

PLAN DATE: July 2014 REVIEWED BY: T. Williams

PREPARED BY: M. Mahbooba REVIEWED BY:

SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
24393
T. J. WILLIAMS

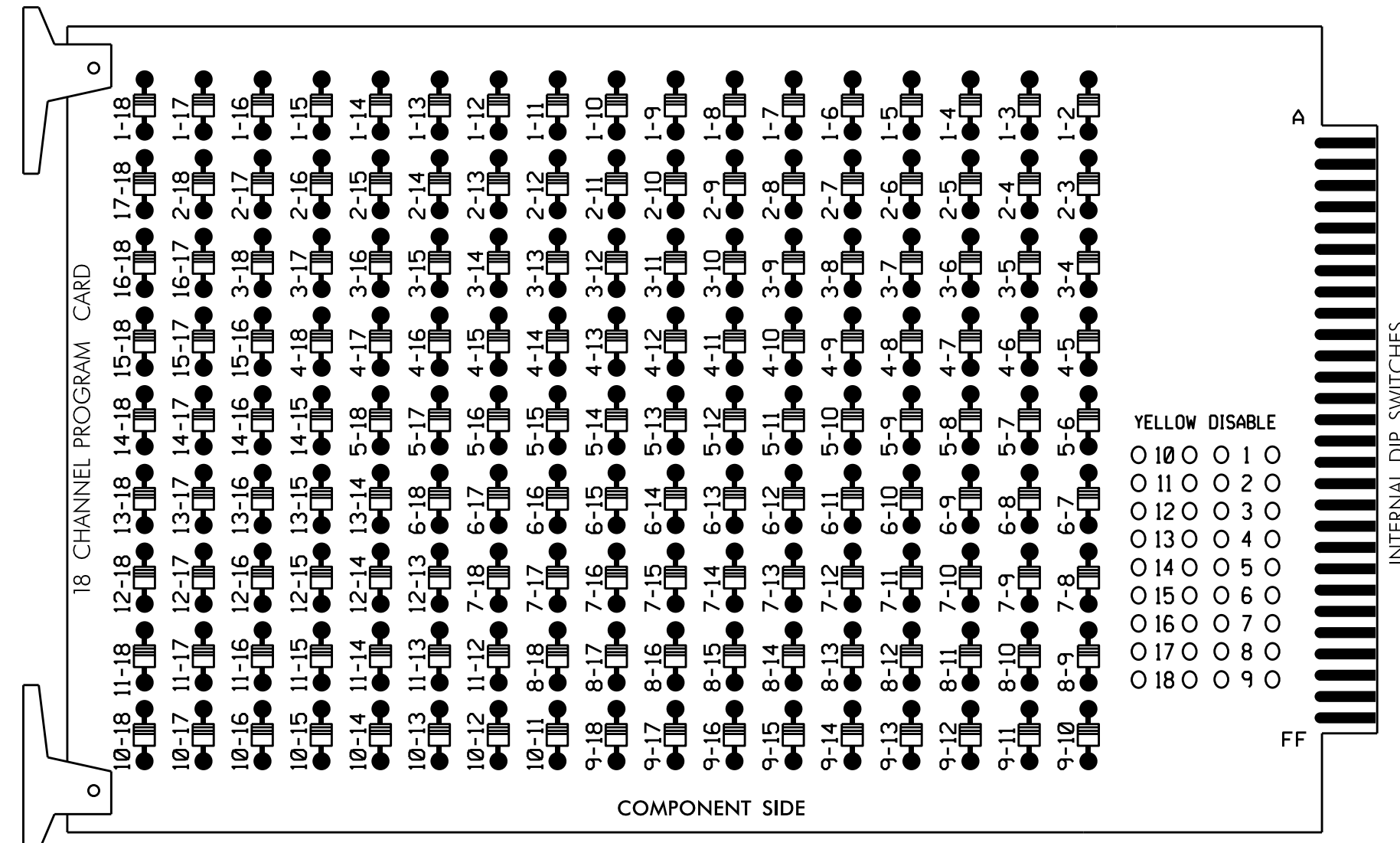
7/30/2014

SIG. INVENTORY NO. 14-0040 TI

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EDI MODEL 2018ECL-NC CONFLICT MONITOR
PROGRAMMING DETAIL
(set switches as shown)

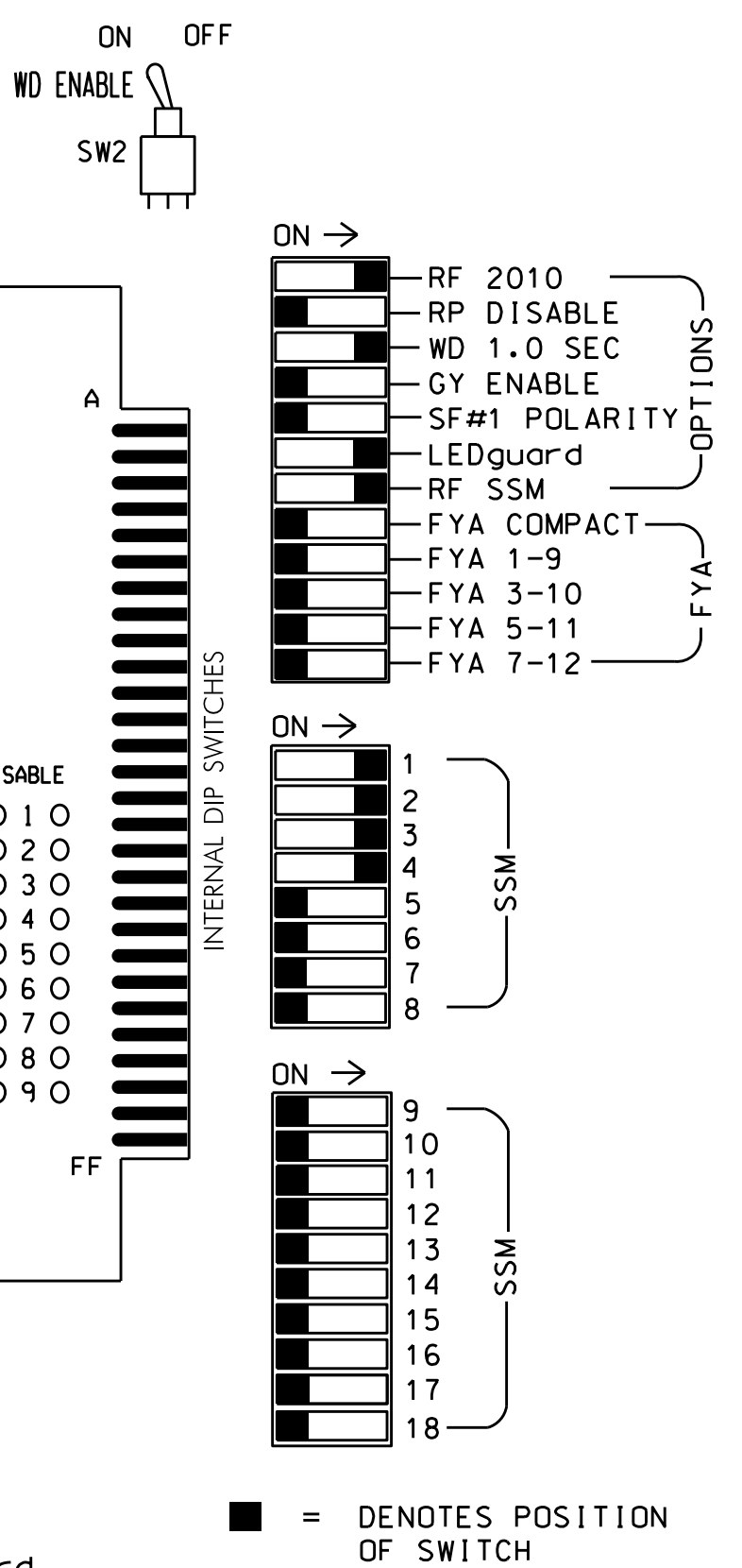
DO NOT REMOVE ANY DIODE JUMPERS.



DO NOT REMOVE ANY DIODE JUMPERS

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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.



NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 1, 2, 3, and 4 for Red Rest.
4. Program phase 2 for Start Up Red Clear.
5. Program phase 2 for First Phases.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S4,S5
 PHASES USED.....1,2,3,4
 OVERLAPS.....NONE

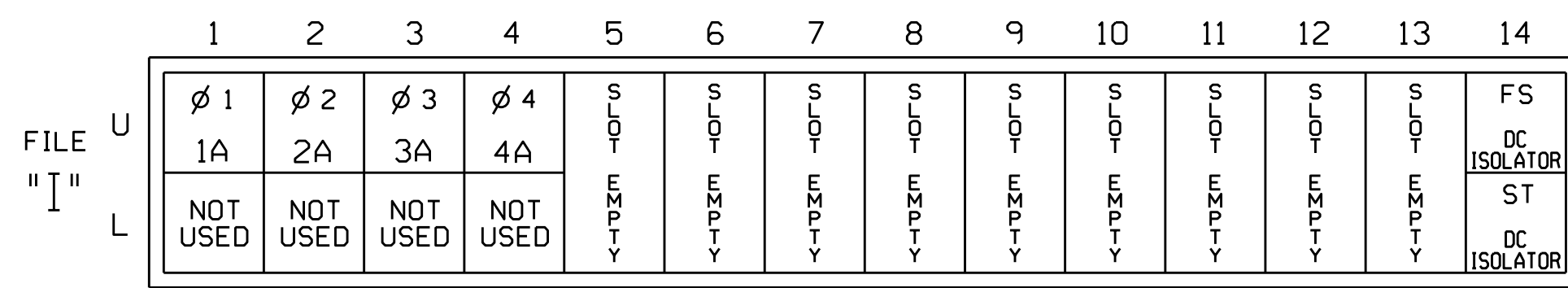
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11,12	21,22	NU	31	32	41	42,43	NU	NU	NU	NU	NU
RED	125	128		116	116	101	101					
YELLOW	126	129		117	117	102	102					
GREEN	127	130		118	118	103	103					
RED ARROW												
YELLOW ARROW												
GREEN ARROW				118		103						

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



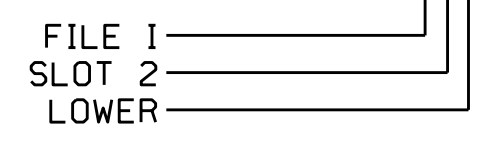
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB21-1,2	11U	56	18	1	1	Y	Y			
2A	TB21-3,4	12U	39	1	2	2	Y	Y			
3A	TB21-5,6	13U	58	20	3	3	Y	Y			3
4A	TB21-7,8	14U	41	3	4	4	Y	Y			3

INPUT FILE POSITION LEGEND: I2L



THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0040T1
 DESIGNED: July 2014
 SEALED: 7/30/2014
 REVISED: N/A

Electrical Detail (New Installation) - Temporary Design (TCP - Phase II)

Prepared In the Offices of:

 750 N. Greenfield Pkwy, Garner, NC 27529

ELECTRICAL AND PROGRAMMING DETAILS FOR: SR 1002 (Old Cullowhee Road) at SR 1336 (Monteith Gap Road) / SR 1733 (Casey Road)

Division 14 Jackson County as Cullowhee

PLAN DATE: July 2014 REVIEWED BY: JTR
 PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

Seal: JOHN T. ROWE, JR., PROFESSIONAL ENGINEER, SEAL 008453

DocuSigned by: John T. Rowe, Jr. 7/31/2014
 641D6C145EE4F5 DATE

SIG. INVENTORY NO. 14-0040T1

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PHASING DIAGRAM

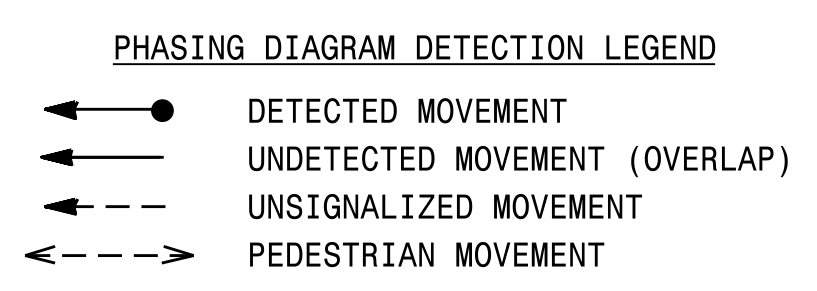
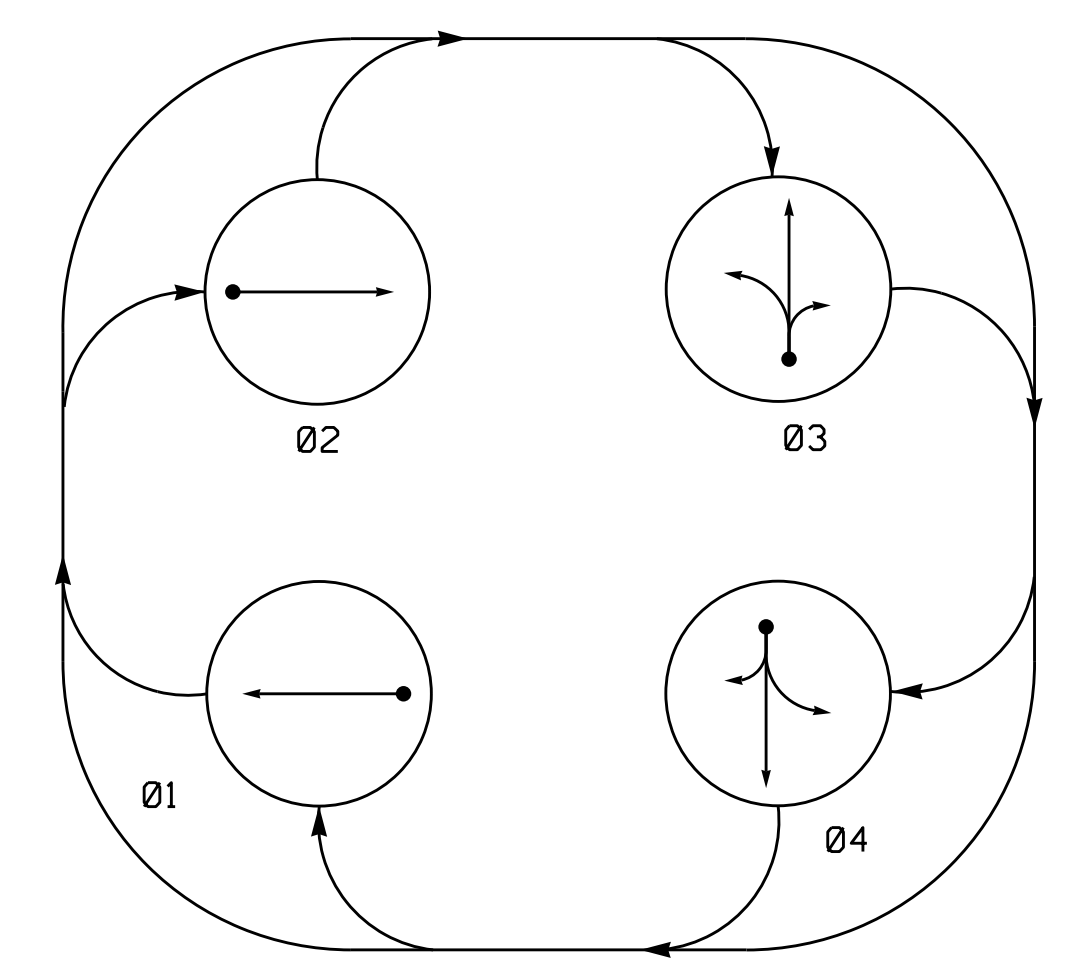
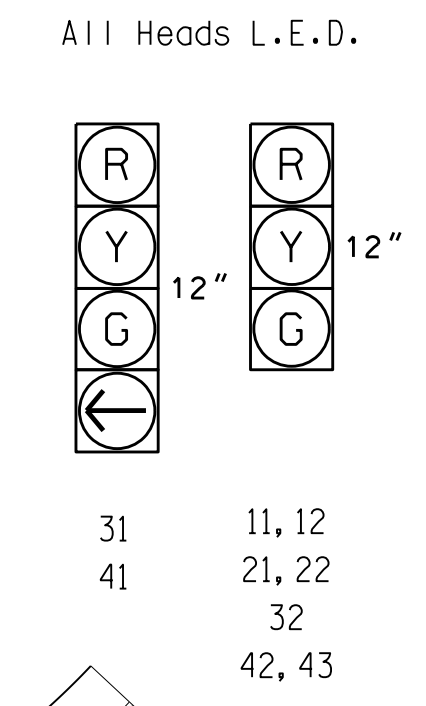


TABLE OF OPERATION

SIGNAL FACE	PHASE				
	01	02	03	04	FLASH
11, 12	G	R	R	R	R
21, 22	R	G	R	R	R
31	R	R	G	R	R
32	R	R	R	G	R
41	R	R	R	G	R
42, 43	R	R	R	G	R

SIGNAL FACE I.D.



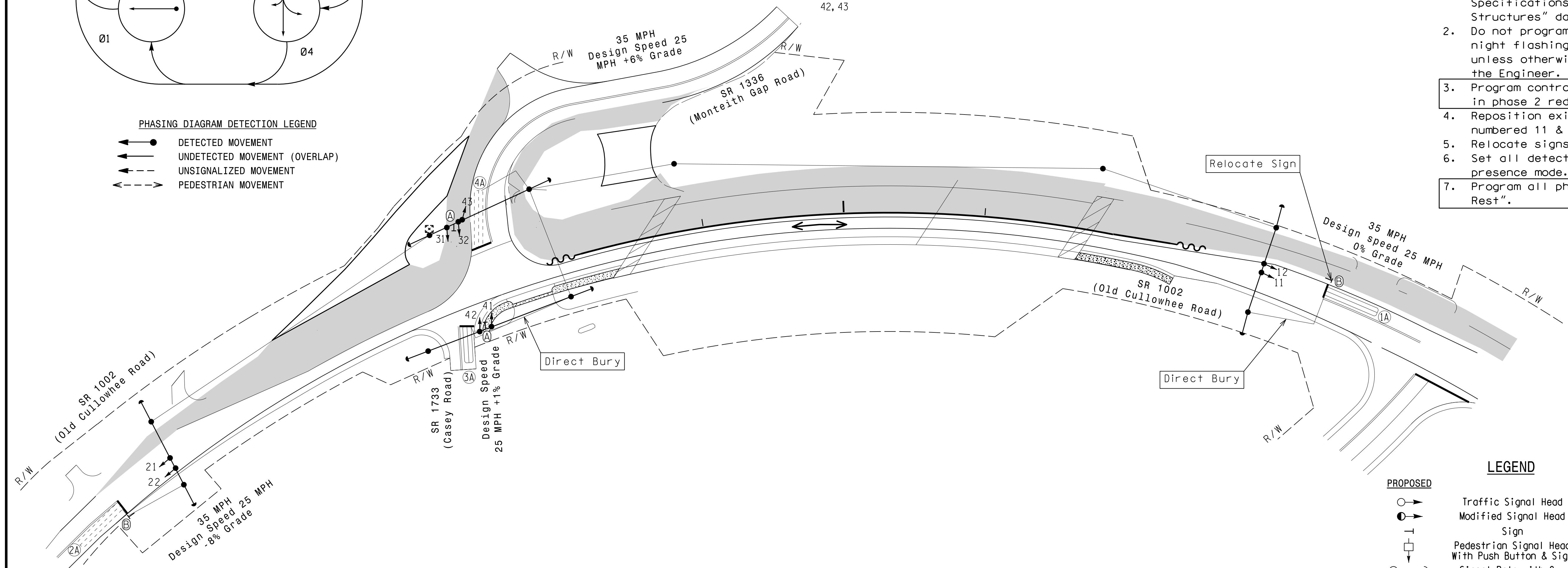
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				NEW LOOP	PHASE	CALLING EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD		
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-	-
2A	6X40	0	2-4-2	-	2	Y	Y	-	-	-	-	-
3A	6X25	0	2-4-2	Y	3	Y	Y	-	-	3	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	3	-	-

4 Phase Fully Actuated Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Program controller to start up in phase 2 red clearance.
4. Reposition existing signal heads numbered 11 & 12.
5. Relocate signs "B" as needed.
6. Set all detector units to presence mode.
7. Program all phases for "Red Rest".

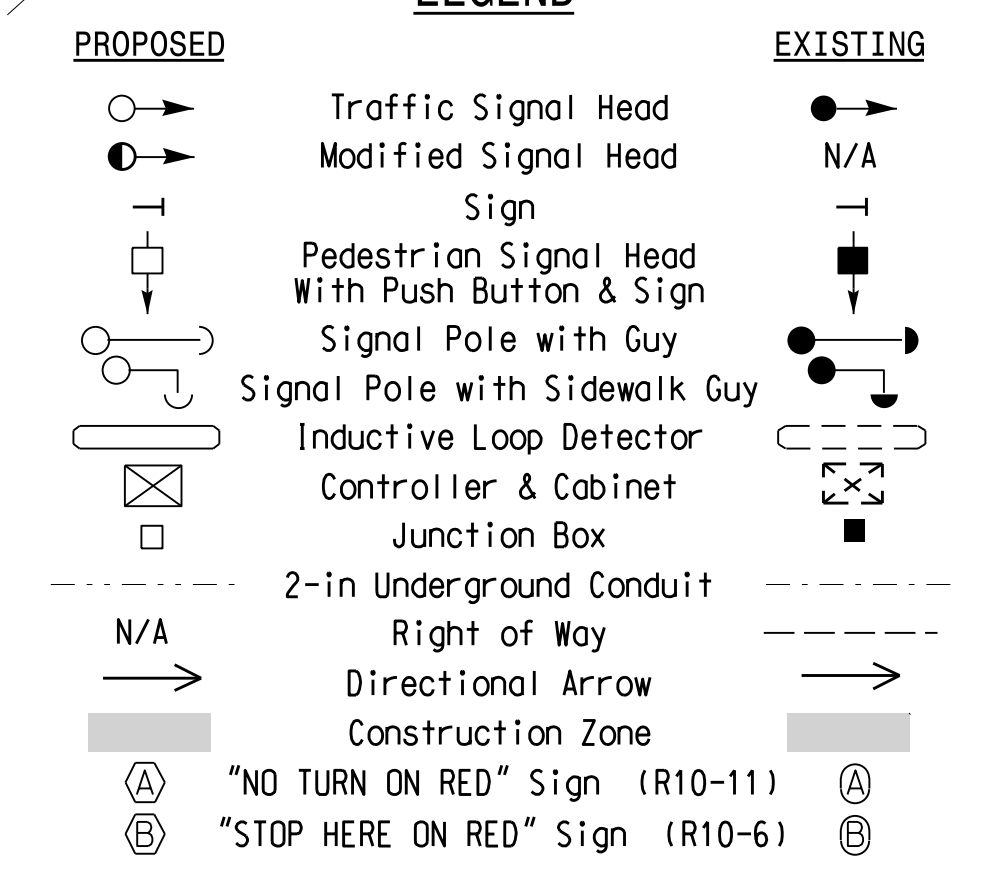


OASIS 2070 TIMING CHART

FEATURE	PHASE			
	1	2	3	4
Min Green 1 *	10	10	10	10
Extension 1 *	3.0	3.0	3.0	3.0
Max Green 1 *	45	45	20	30
Yellow Clearance	3.2	3.7	3.0	3.1
Red Clearance	25.0	25.0	18.0	17.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	-	-	-
Vehicle Call Memory	YELLOW	YELLOW	YELLOW	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND



Signal Upgrade - Temporary Design (TCP-Phase III)

750 N. Greenfield Pkwy, Garner, NC 27529

SR 1002 (Old Cullowhee Road) at SR 1336 (Monteith Gap Road) / SR 1733 (Casey Road)

Division 14 Jackson County Cullowhee

PLAN DATE: July 2014 REVIEWED BY: T. Williams

PREPARED BY: M. Mahbooba REVIEWED BY:

SEAL

TWOOTHY J. WILLIAMS

ENGINEER

24393

7/30/2014

SIG. INVENTORY NO. 14-0040 T2

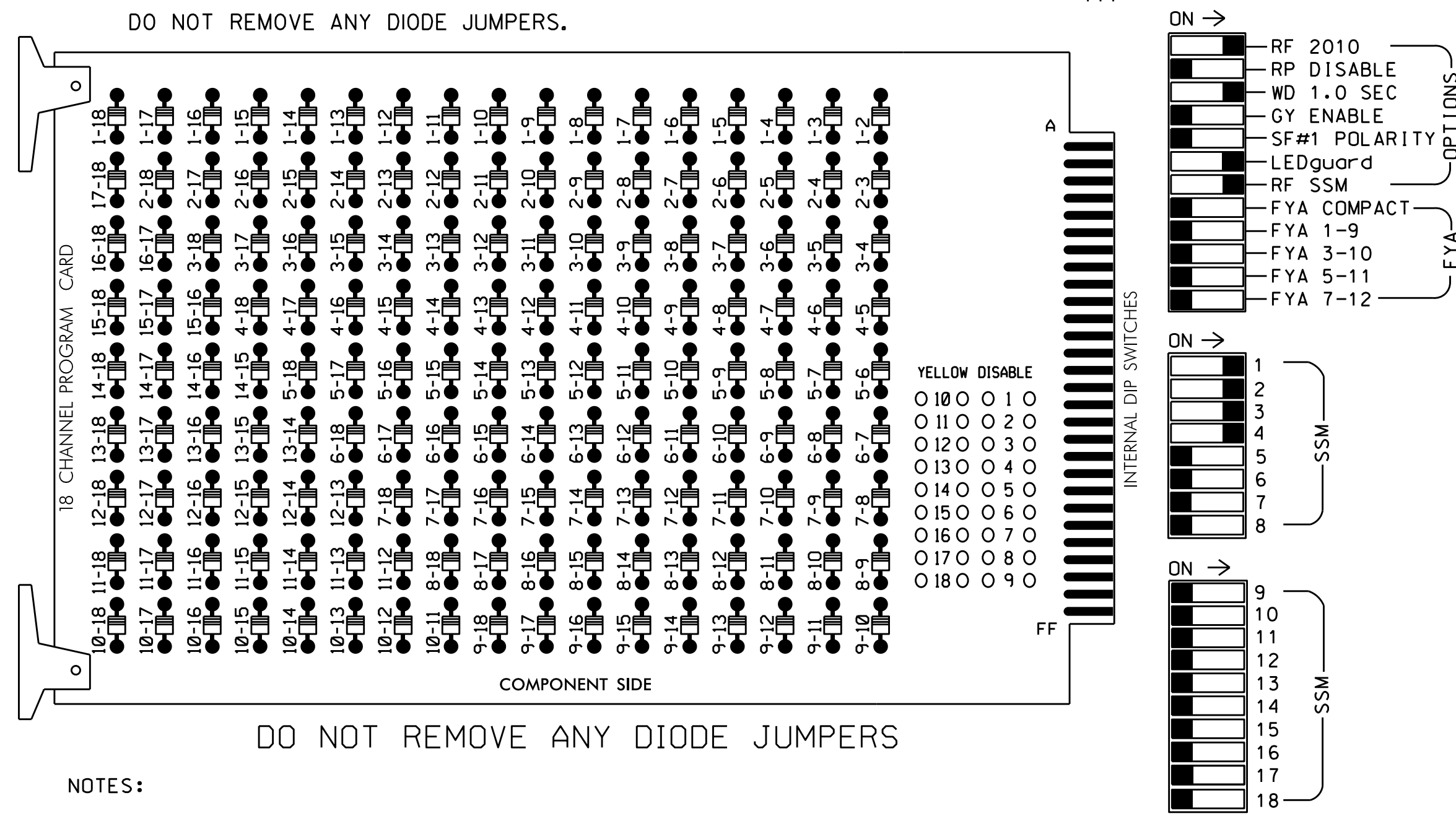
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1" = 40'

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EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(set switches as shown)



NOTES:

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

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 1, 2, 3, and 4 for Red Rest.
4. Program phase 2 for Start Up Red Clear.
5. Program phase 2 for First Phases.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11,12	21,22	NU	31	32	41	42,43	NU	NU	NU	NU	NU
RED	125	128		116	116	101	101					
YELLOW	126	129		117	117	102	102					
GREEN	127	130		118	118	103	103					
RED ARROW												
YELLOW ARROW												
GREEN ARROW				118		103						

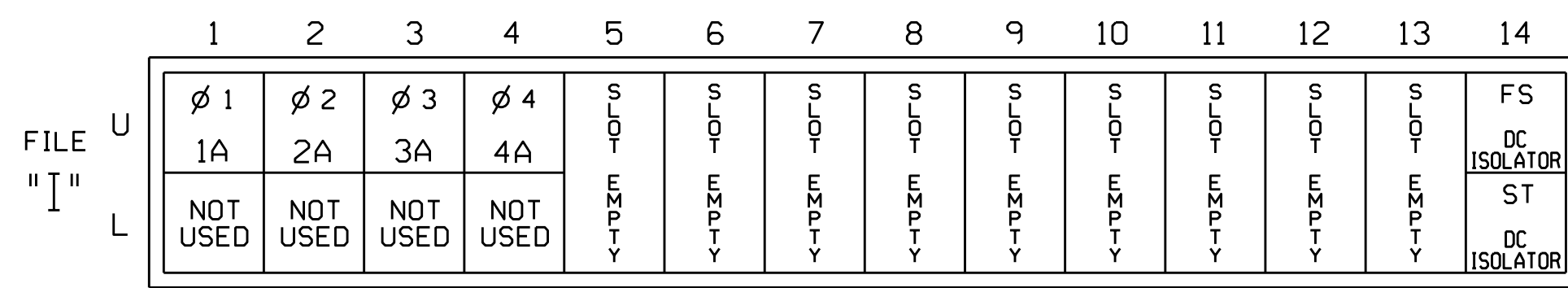
NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....336
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....POLE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S1,S2,S4,S5
 PHASES USED.....1,2,3,4
 OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)



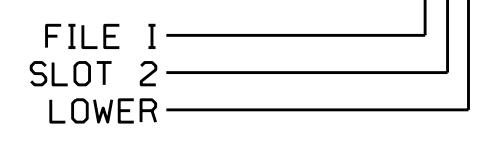
EX. : 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB21-1,2	11U	56	18	1	1	Y	Y			
2A	TB21-3,4	12U	39	1	2	2	Y	Y			
3A	TB21-5,6	13U	58	20	3	3	Y	Y			3
4A	TB21-7,8	14U	41	3	4	4	Y	Y			3

INPUT FILE POSITION LEGEND: I2L



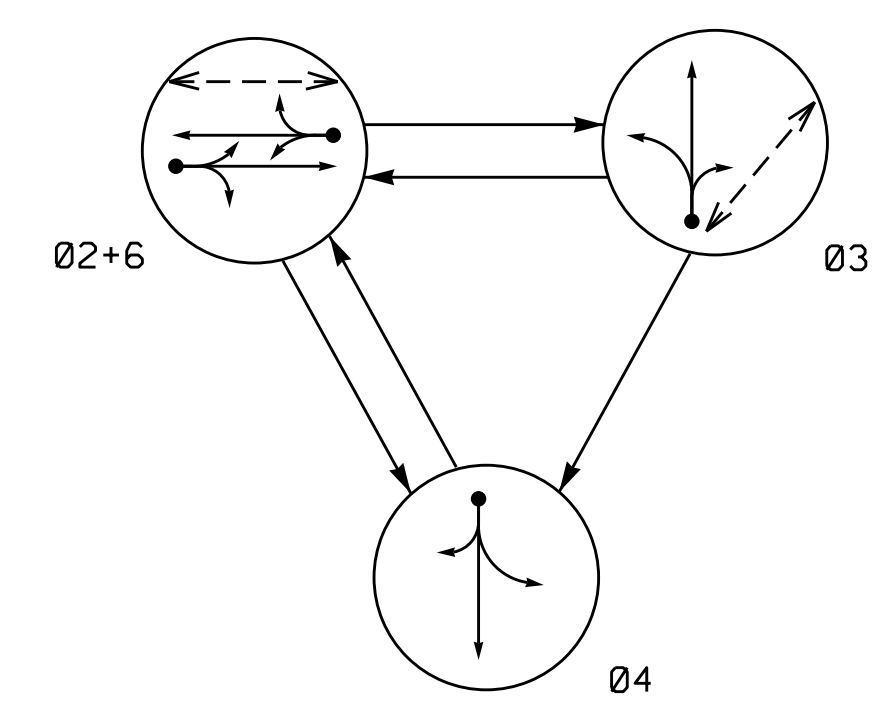
THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0040T2
 DESIGNED: July 2014
 SEALED: 7/30/2014
 REVISED: N/A

Electrical Detail (Signal Upgrade) - Temporary Design (TCP - Phase III)

Prepared In the Offices of: JOHN T. ROWE, JR. ENGINEER	ELECTRICAL AND PROGRAMMING DETAILS FOR:	SR 1002 (Old Cullowhee Road) at SR 1336 (Monteith Gap Road) / SR 1733 (Casey Road)	SEAL
	Division 14 Jackson County ds Cullowhee	PLAN DATE: July 2014 REVIEWED BY: JTR	PREPARED BY: S. Armstrong REVIEWED BY:
750 N. Greenfield Pkwy, Garner, NC 27529	REVISIONS	INIT. DATE	DocuSigned by: John T. Rowe, Jr. 7/31/2014 SIG. INVENTORY NO. 14-0040T2

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PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

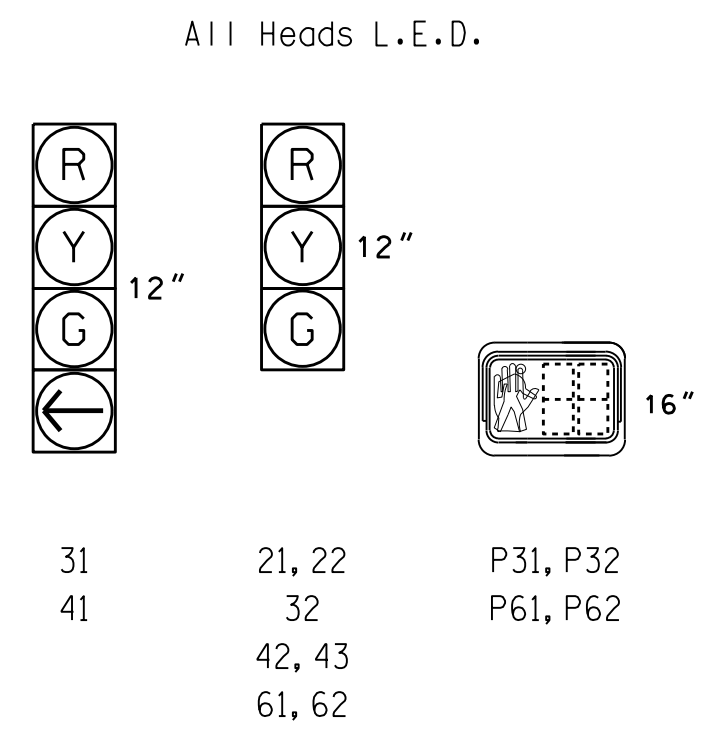
- ➔ DETECTED MOVEMENT
- ➔ UNDETECTED MOVEMENT (OVERLAP)
- ➔ UNSIGNALIZED MOVEMENT
- ➔ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	Ø 2+6	Ø 3	Ø 4	FLHS
21, 22	G	R	R	Y
31	R	G	R	R
32	R	G	R	R
41	R	R	G	R
42, 43	R	R	G	R
61, 62	G	R	R	Y
P31, P32	DW	W	DW	DRK
P61, P62	W	DW	DW	DRK

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

SIGNAL FACE I.D.



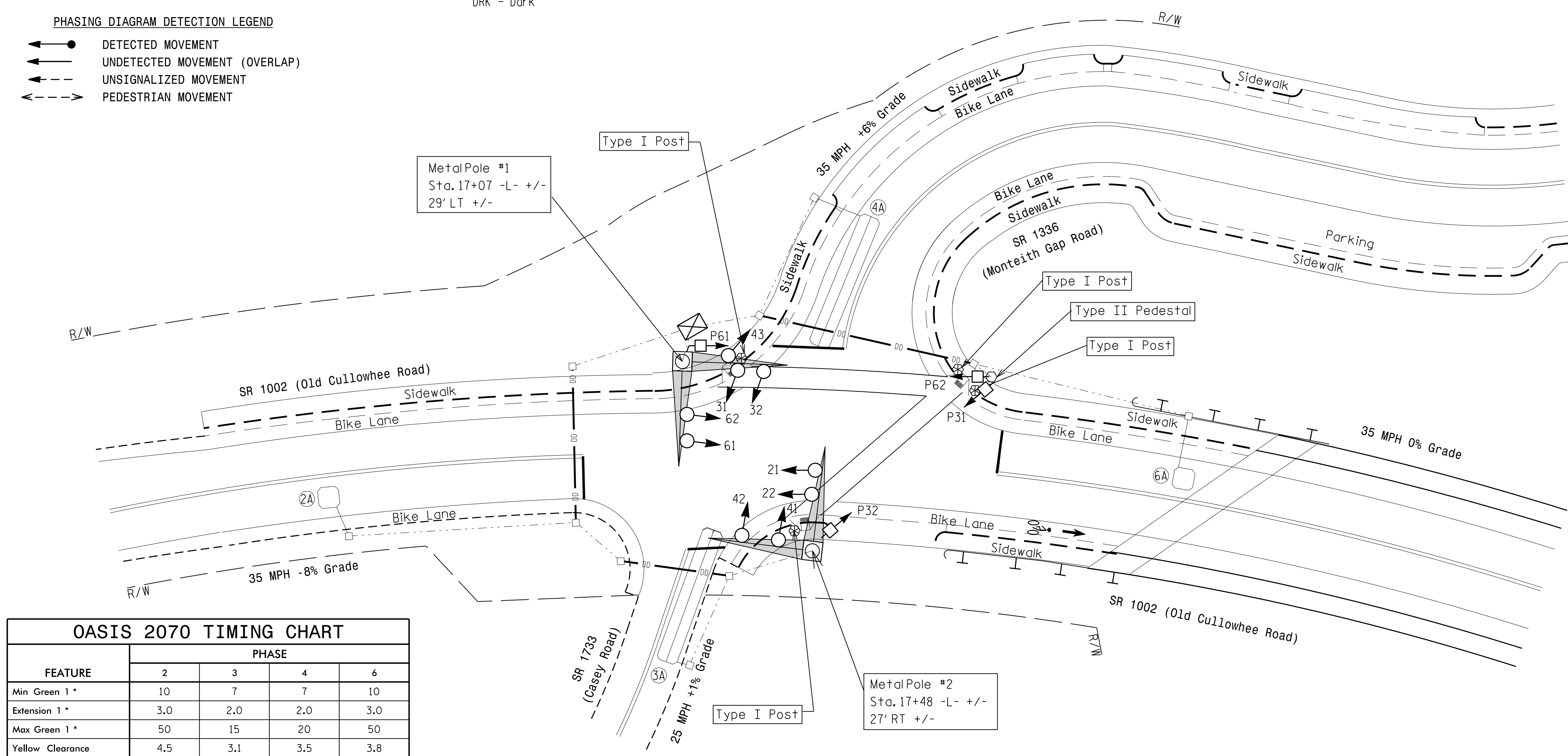
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD		
2A	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
3A	6X40	+5	2-4-2	Y	3	Y	Y	-	-	-	10	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	10	-
6A	6X6	50	4	Y	6	Y	Y	-	-	-	-	-

3 Phase Fully Actuated Isolated

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- The order of phase 3 and phase 4 may be reversed.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.



OASIS 2070 TIMING CHART

FEATURE	PHASE			
	2	3	4	6
Min Green 1 *	10	7	7	10
Extension 1 *	3.0	2.0	2.0	3.0
Max Green 1 *	50	15	20	50
Yellow Clearance	4.5	3.1	3.5	3.8
Red Clearance	1.6	1.8	1.2	2.3
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	7	-	7
Don't Walk 1	-	13	-	15
Seconds Per Actuation *	-	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

LEGEND

- | PROPOSED | EXISTING |
|--|----------------------------|
| ○➔ Traffic Signal Head | ●➔ N/A |
| ●➔ Modified Signal Head | ➔ N/A |
| ➔ Sign | ➔ N/A |
| ➔ Pedestrian Signal Head With Push Button & Sign | ➔ N/A |
| ➔ Signal Pole with Guy | ➔ N/A |
| ➔ Signal Pole with Sidewalk Guy | ➔ N/A |
| ⊠ Inductive Loop Detector | ⊠ Inductive Loop Detector |
| ⊠ Controller & Cabinet | ⊠ Junction Box |
| ⊠ 2-in Underground Conduit | ⊠ 2-in Underground Conduit |
| N/A Right of Way | ⊠ Right of Way |
| ➔ Directional Arrow | ➔ Directional Arrow |
| ➔ Directional Drill | N/A |
| N/A Guardrail | ⊠ Guardrail |
| ➔ Metal Pole with Mastarm | ➔ Metal Pole with Mastarm |
| ➔ Directional Drill | N/A |
| ⊗ Type I Pushbutton Post | ⊗ Type I Pushbutton Post |
| ○ Type II Signal Pedestal | ● Type II Signal Pedestal |

New Installation - Final design

SR 1002 (Old Cullowhee Road)
at
SR 1336 (Monteith Gap Road) /
SR 1733 (Casey Road)

Division 14 Jackson County Cullowhee

PLAN DATE: November 2014 REVIEWED BY: T. Williams

PREPARED BY: M. Mahbooba REVIEWED BY:

SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
24393
T. J. WILLIAMS

11/10/2014
DATE

SIG. INVENTORY NO. 14-0040

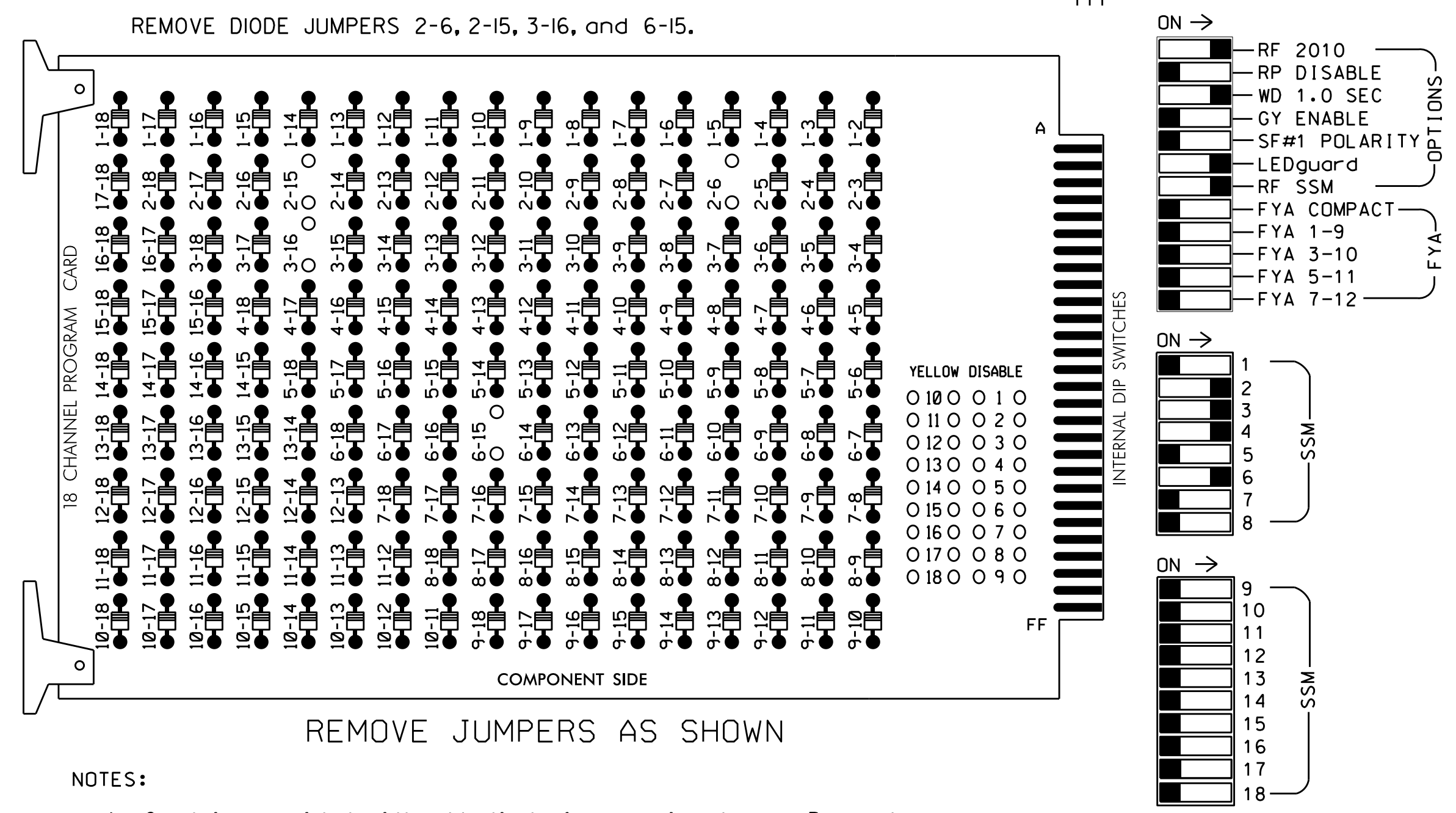
750 N. Greenfield Pkwy, Garner, NC 27529

SCALE 0 20
1"=20'

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 mmb00000

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. 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. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phases 2 and 6 for Start Up In Green.
4. Program phases 3 and 6 for 'STARTUP PED CALL'.
5. Program phases 2 and 6 for Yellow Flash.

EQUIPMENT INFORMATION

CONTROLLER.....2070L
 CABINET.....332
 SOFTWARE.....ECONOLITE OASIS
 CABINET MOUNT.....BASE
 OUTPUT FILE POSITIONS...12
 LOAD SWITCHES USED.....S2,S4,S5,S8,S9,S12
 PHASES USED.....2,3,3PED,4,6,6PED
 OVERLAPS.....NONE

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

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

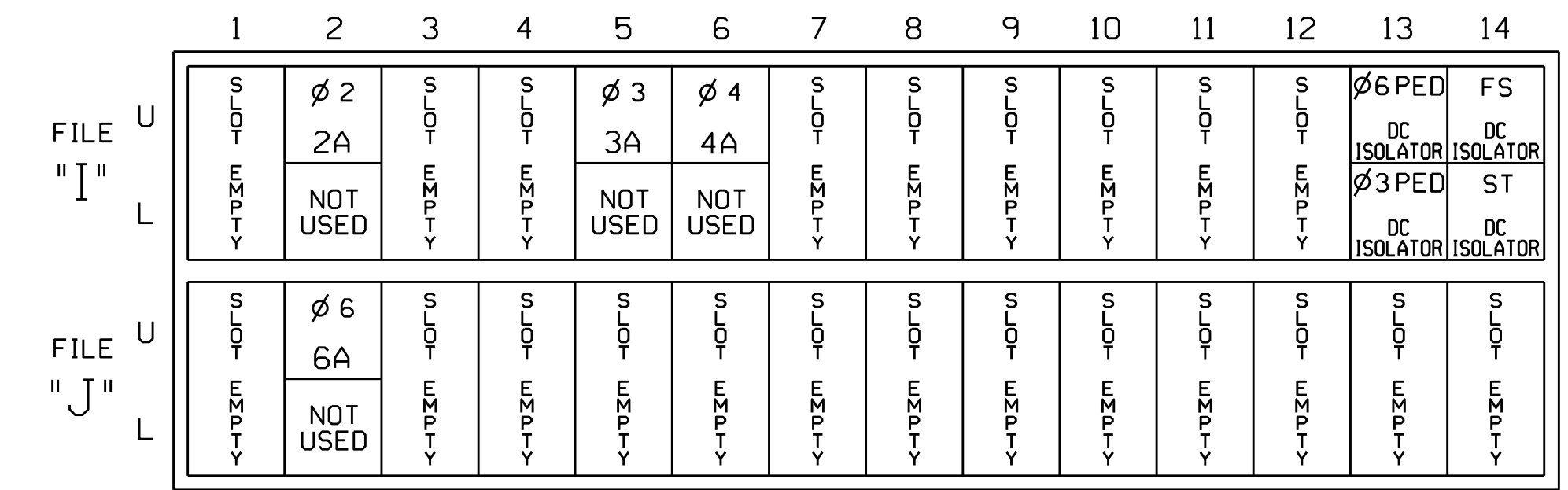
SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12		
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16		
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	3 PED		
SIGNAL HEAD NO.	NU	21,22	NU	31	32	41	42,43	NU	NU	61,62	P61, P62	NU	NU	P31, P32
RED		128		116	116	101	101			134				
YELLOW		129		117	117	102	102			135				
GREEN		130		118	118	103	103			136				
RED ARROW														
YELLOW ARROW														
GREEN ARROW				118		103								
										119				110
										121				112

NU = Not Used

INPUT FILE POSITION LAYOUT

(front view)



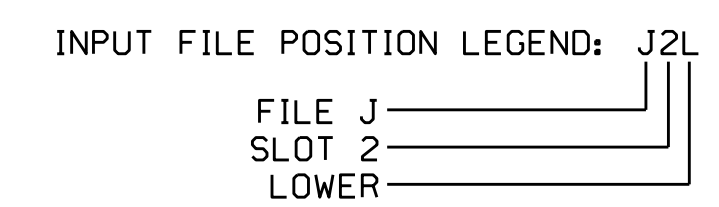
EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
 ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			10
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			10
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
PED PUSH BUTTONS											
P31,P32	TB8-8,9	I13L	70	32	PED 8	3 PED					
P61,P62	TB8-7,9	I13U	68	30	PED 6	6 PED					

NOTE:
 INSTALL DC ISOLATOR IN INPUT FILE SLOT I13.



PED 3 PROGRAMMING DETAIL

(program controller as shown below)

CHANGING OUTPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '6' (OUTPUTS), THEN '1' (OUTPUT ASSIGNMENTS)
2. ENTER 17 (PHASE 8 DW) FOR OUTPUT ASSIGNMENT #.
3. SCROLL DOWN TO 'PEDESTRIAN PHASE' AND ENTER 'Y' REGARDLESS OF DEFAULT PROGRAMMING
4. ENTER '3' FOR 'SELECT PEDESTRIAN PHASE'. NO CHANGE NEEDED FOR 'SELECT COLOR'
5. BACKUP TO 'OUTPUT ASSIGNMENTS AND SETTINGS MENU:' BY PRESSING THE 'ESC' BUTTON ON KEYBOARD.
6. SELECT '1' (OUTPUT ASSIGNMENTS)
7. ENTER 18 (PHASE 8 W) FOR OUTPUT ASSIGNMENT #.
8. REPEAT STEPS # 3 AND # 4.

CHANGING INPUT ASSIGNMENTS

1. FROM MAIN MENU SELECT '7' (DETECTORS), THEN '2' (PEDESTRIAN DETECTOR ASSIGNMENTS)
2. CYCLE TO PED DETECTOR #8 BY REPEATEDLY DEPRESSING '+' KEY
3. MODIFY PHASE ASSIGNED TO PED DETECTOR # 8 FROM PHASE 8 TO PHASE 3

PROGRAMMING COMPLETE

Electrical Detail (new installation) - Final Design

Electrical and Programming Details For: SR 1002 (Old Cullowhee Road) at SR 1336 (Monteith Gap Road) / SR 1733 (Casey Road)

Division 14 Jackson County, NC Cullowhee

PLAN DATE: November 2014 REVIEWED BY: JTR

PREPARED BY: S. Armstrong REVIEWED BY:

REVISIONS INIT. DATE

DocuSigned by: John T. Rowe, Jr. 11/14/2014

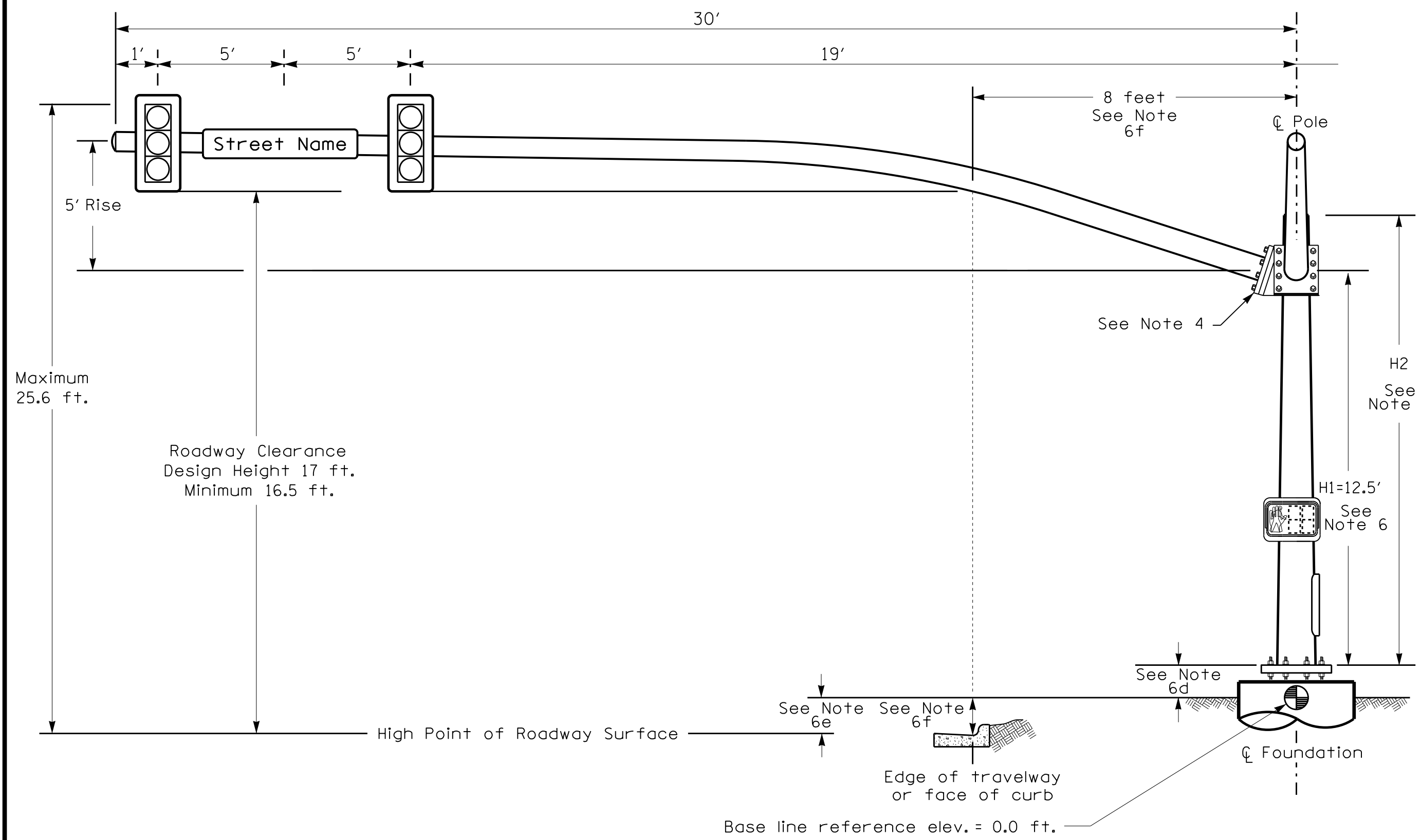
750 N. Greenfield Pkwy, Garner, NC 27529

SIG. INVENTORY NO. 14-0040

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 14-0040
 DESIGNED: November 2014
 SEALED: 11/10/2014
 REVISED: N/A

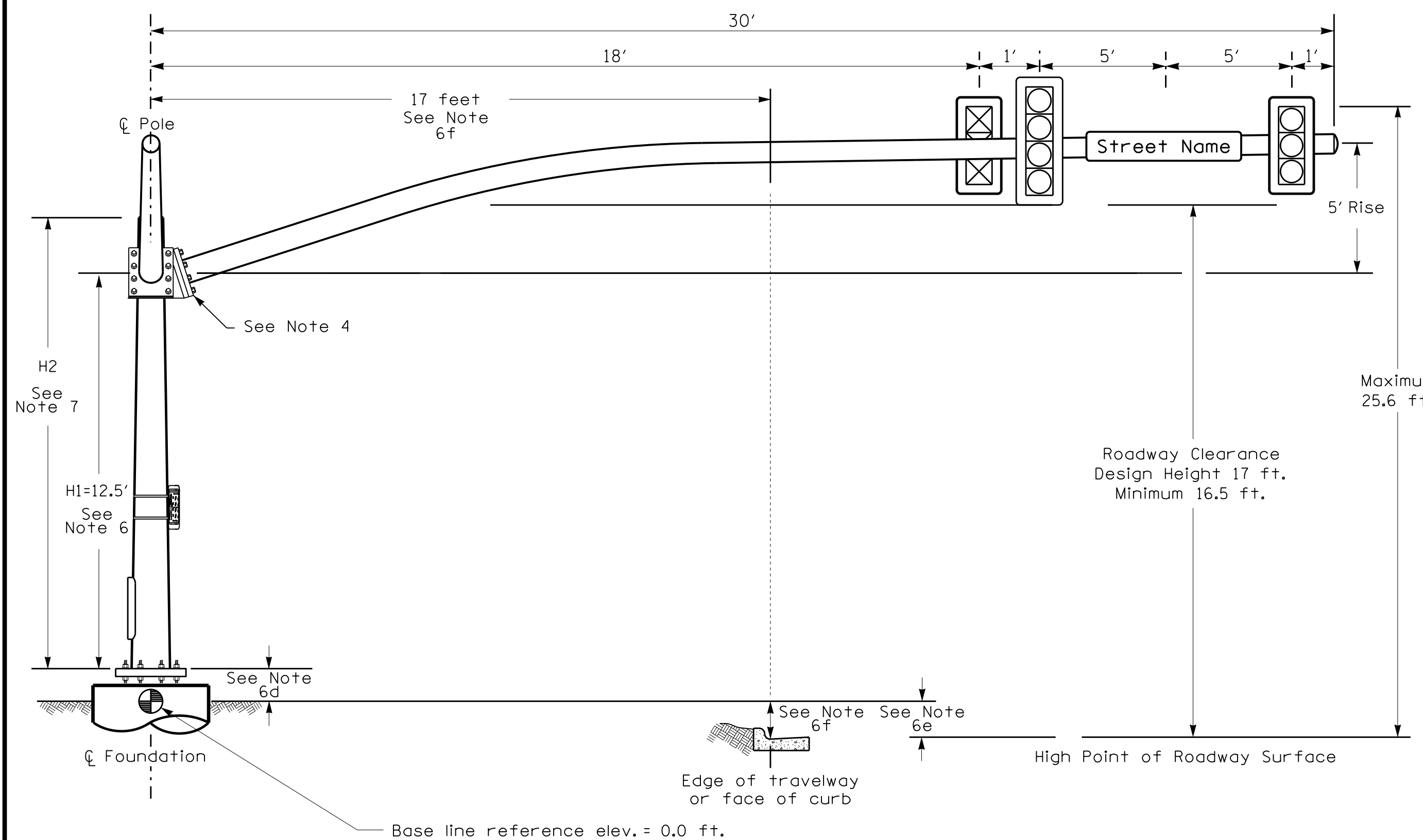
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Design Loading for METAL POLE NO. 1, MAST ARM A



Elevation View @ 270°

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



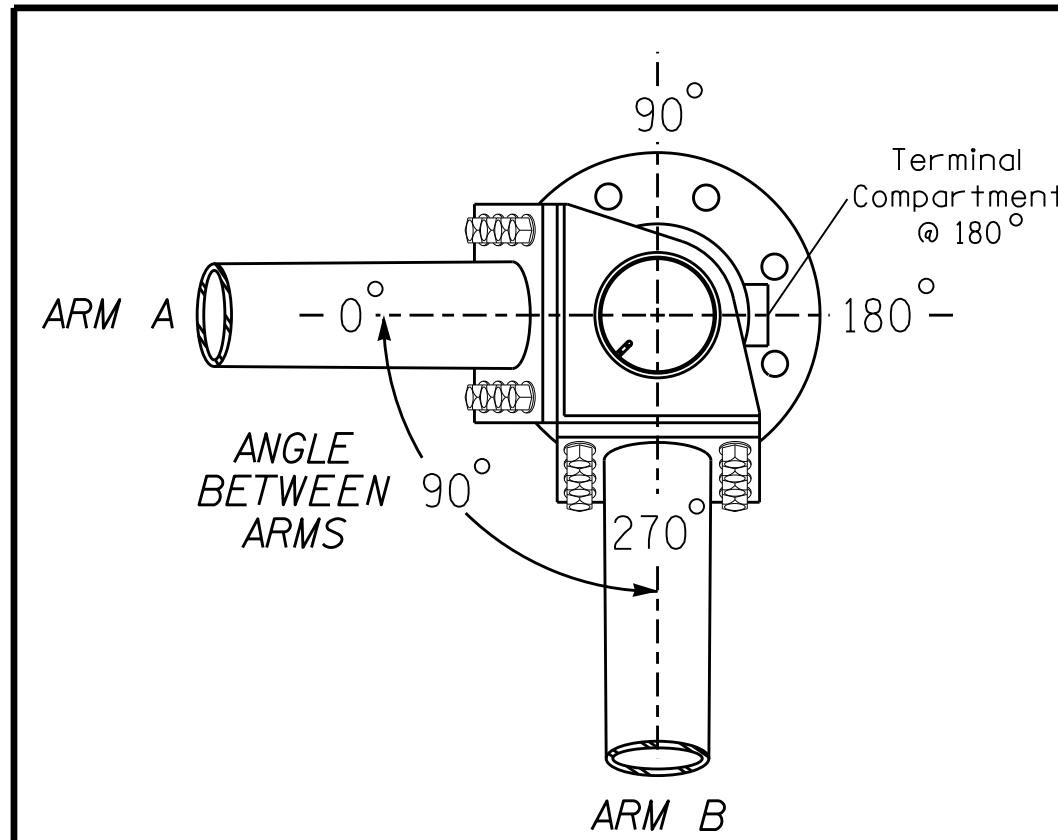
Elevation View @ 0°

SPECIAL NOTE

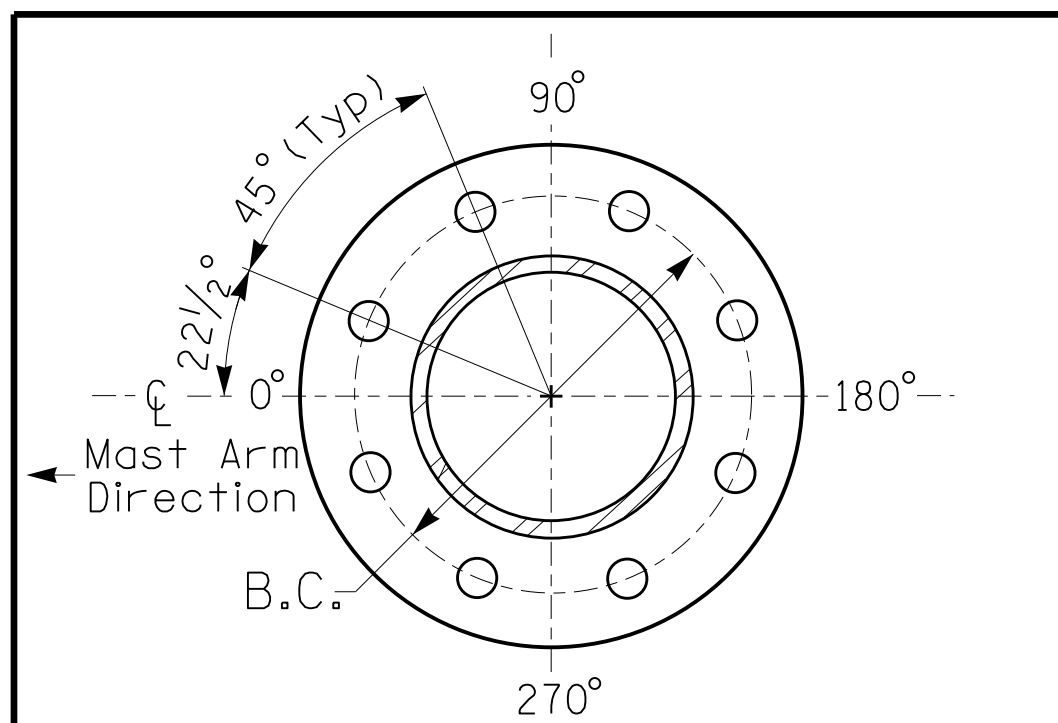
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Arm A	Arm B
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-2.5 ft.	-5.5 ft.
Elevation difference at Edge of travelway or face of curb	-0.6 ft.	-5.5 ft.

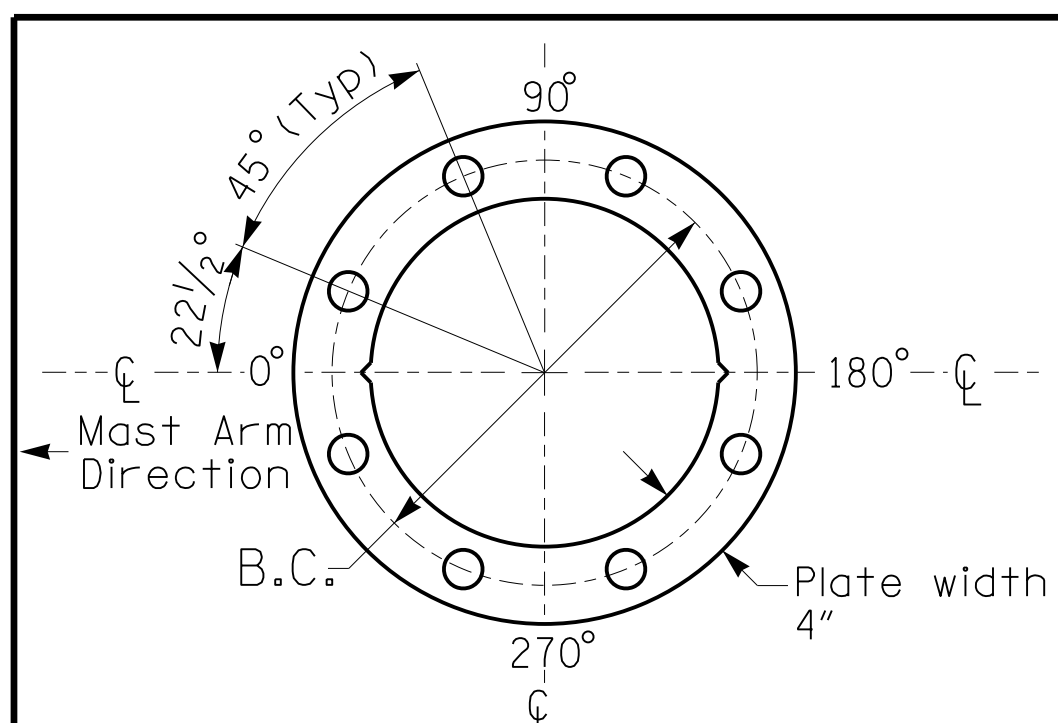


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 5



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

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE	9.3 S.F.	25.5" W X 52.5" L	60 LBS
[Symbol]	RIGID MOUNTED SIGNAL HEAD 12"-4 SECTION-WITH BACKPLATE	11.5 S.F.	25.5" W X 66.0" L	74 LBS
[Symbol]	STREET NAME SIGN RIGID MOUNTED	12.0 S.F.	18.0" W X 96.0" L	27 LBS
[Symbol]	PEDESTRIAN SIGNAL HEAD WITH MOUNTING HARDWARE	2.2 S.F.	18.5" W X 17.0" L	21 LBS

NOTES

DESIGN REFERENCE MATERIAL

- Design the traffic signal structure and foundation in accordance with:
 - The 5th Edition 2009 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.
 - The 2012 NCDOT "Standard Specifications for Roads and Structures." The latest addenda to the specifications can be found in the traffic signal project special provisions.
 - The 2012 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

DESIGN REQUIREMENTS

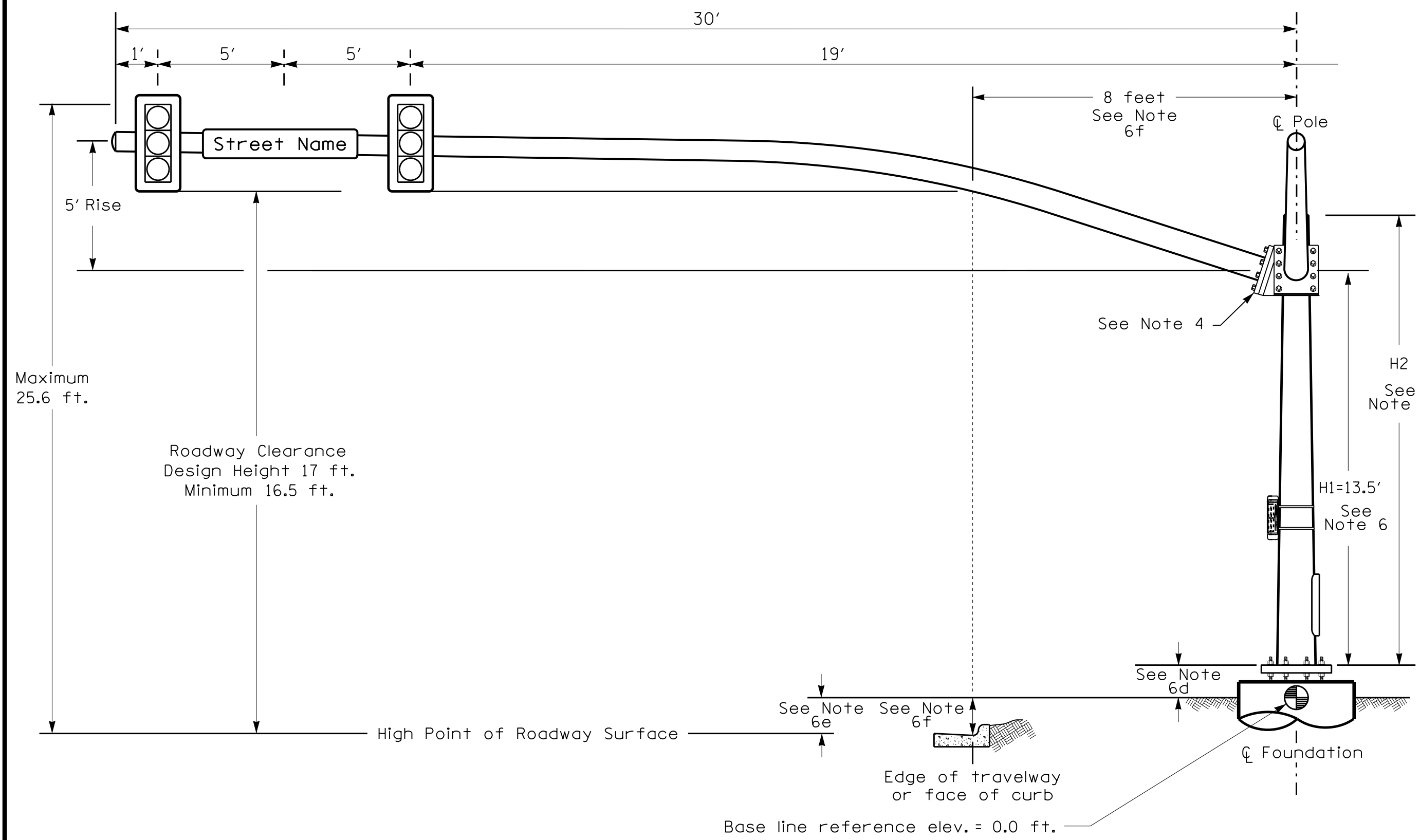
- Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
- Design all signal supports using stress ratios that do not exceed 0.9.
- A clamp-type bolted mast arm-to-pole connection may be used instead of the welded ring stiffened box connection shown as long as the connection meets all of the design requirements. This requires staggering the connections. Use elevation data for each arm to determine appropriate connection points.
- Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
- The mast arm attachment height (H1) shown is based on the following design assumptions:
 - Nominal vertical rise in mast arm is 5 feet as measured from the centerline of the arm base to the centerline of the free end of the arm.
 - Signal heads are rigidly mounted and vertically centered on the mast arm.
 - The roadway clearance height for design is as shown in the elevation views.
 - The top of the pole base plate is 0.75 feet above the ground elevation.
 - Refer to the Elevation Data Chart for the elevation differences between the proposed foundation ground level and the high point of the roadway.
 - Provide horizontal distance from the proposed centerline of the foundation to the edge of travelway. Refer to the Elevation Data Chart for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary to ensure that the roadway clearance is maintained at the edge of the travelway and to aid in the camber design of the arm.
- The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
 - Mast arm attachment height (H1) plus 2 feet, or
 - H1 plus 1/2 of the total height of the mast arm attachment assembly plus 1 foot.
- If pole location adjustments are required, the contractor must gain approval from the Engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signal Design Section Senior Structural Engineer for assistance at (919) 773-2800.
- The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)

	SR 2002 (Old Cullowhee Road) at SR 1336 (Monteith Gap Road) / SR 1733 (Casey Road)		SEAL THOMAS H. CARROLL PROFESSIONAL ENGINEER SEAL 024393 THOMAS J. WILLIAMS
	Division 14 PLAN DATE: August 2014 PREPARED BY: M. Mahbooba	Cullowhee REVIEWED BY: T. Williams REVIEWED BY:	
SCALE 0 N/A N/A	REVISIONS INIT. DATE	DATE 8/27/2014	SIG. INVENTORY NO. 14-0040

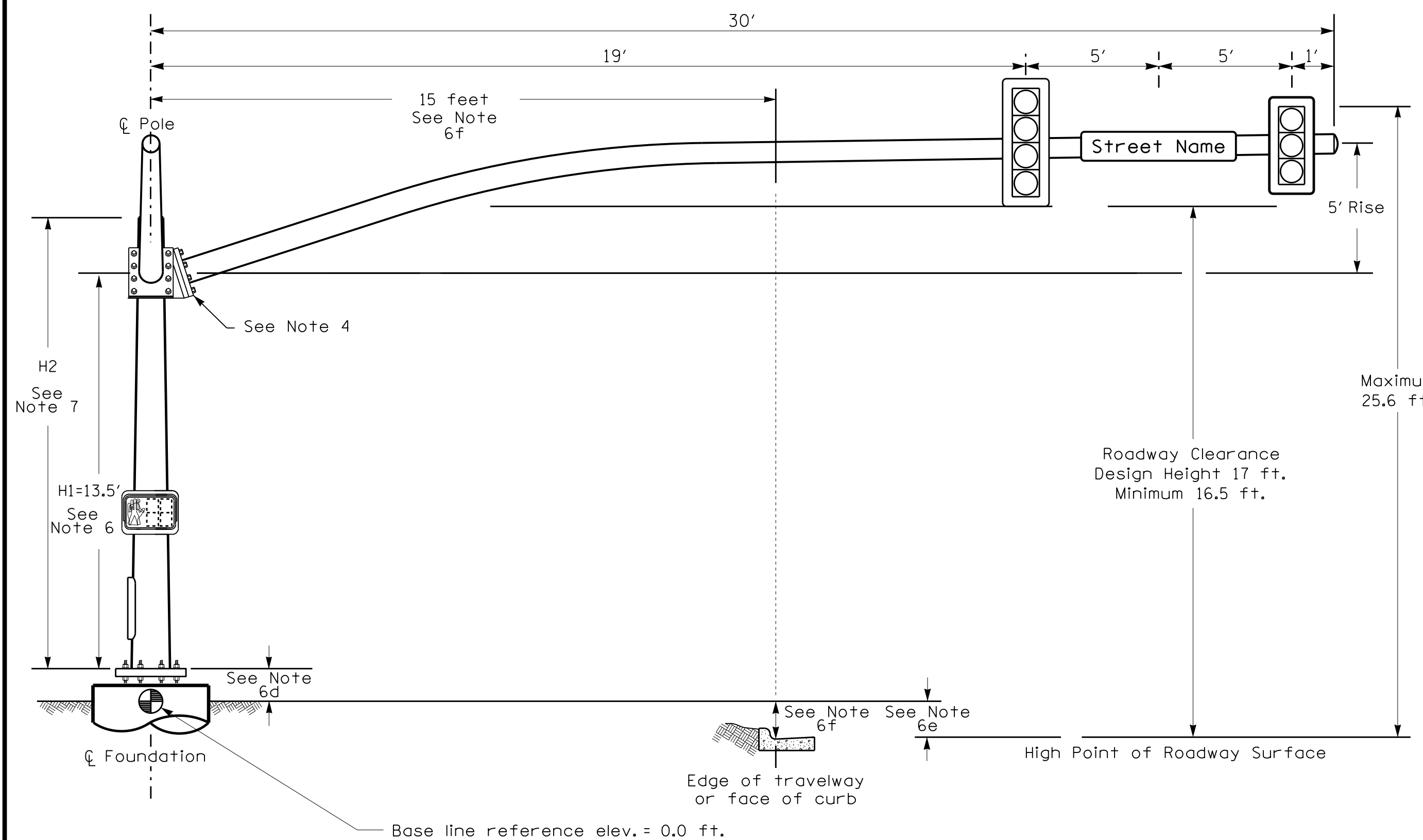
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Design Loading for METAL POLE NO. 2, MAST ARM A



Elevation View @ 270°

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



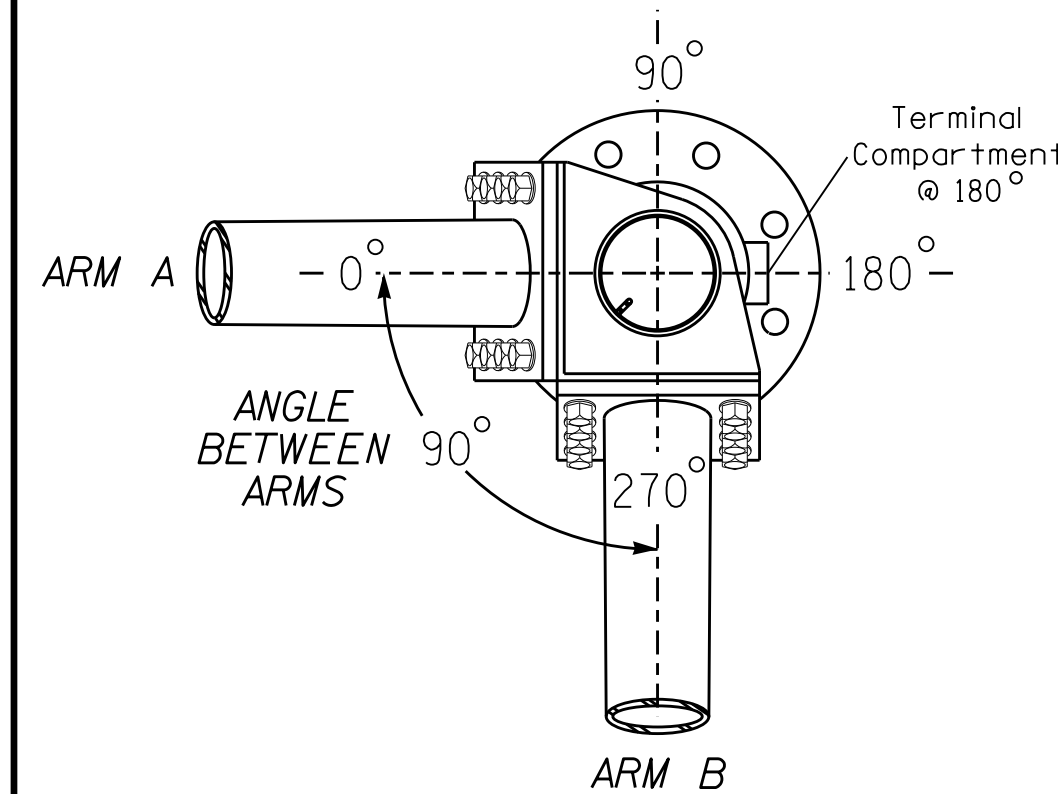
Elevation View @ 0°

SPECIAL NOTE

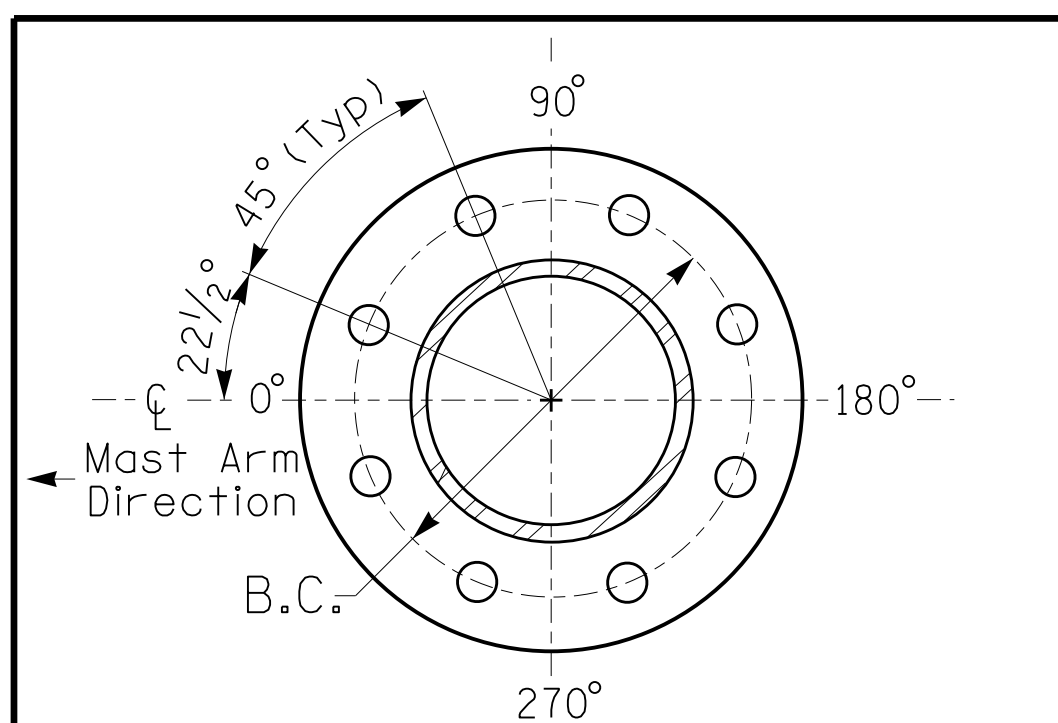
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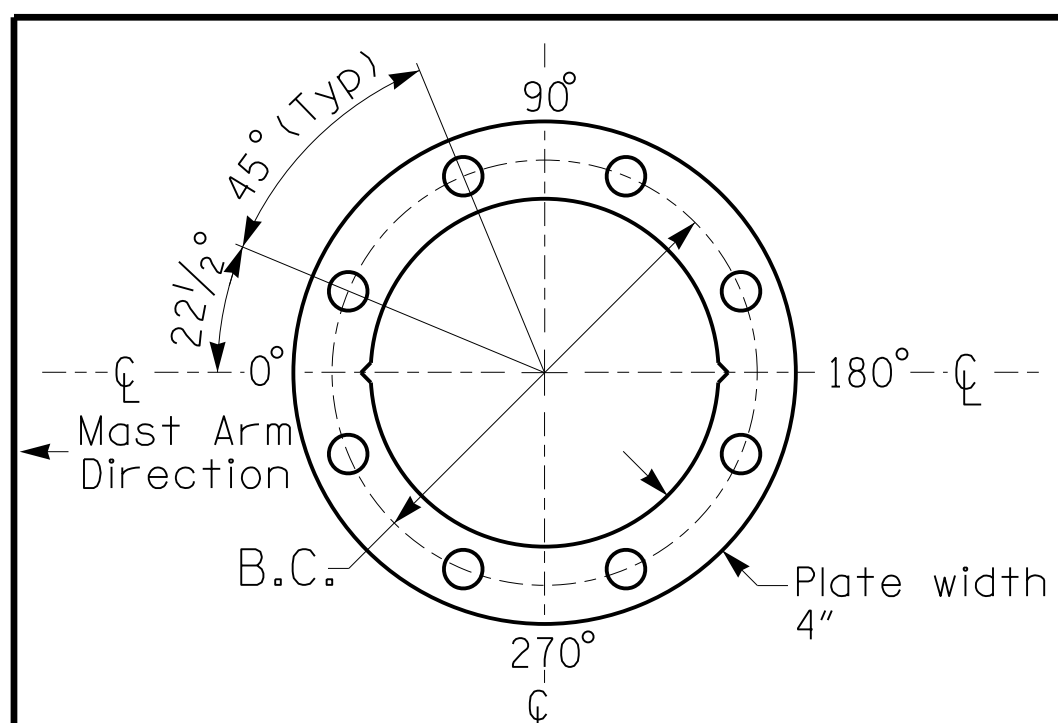
Elevation Differences for:	Arm A	Arm B
Baseline reference point at Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-2.7 ft.	-0.8 ft.
Elevation difference at Edge of travelway or face of curb	-0.8 ft.	-0.8 ft.



POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL



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

METAL POLE No. 2

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
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 - The 2012 NCDOT Roadway Standard Drawings.
 - The traffic signal project plans and special provisions.
 - The NCDOT "Metal Pole Standards" located at the following NCDOT website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>

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- The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

NCDOT Wind Zone 4 (90 mph)

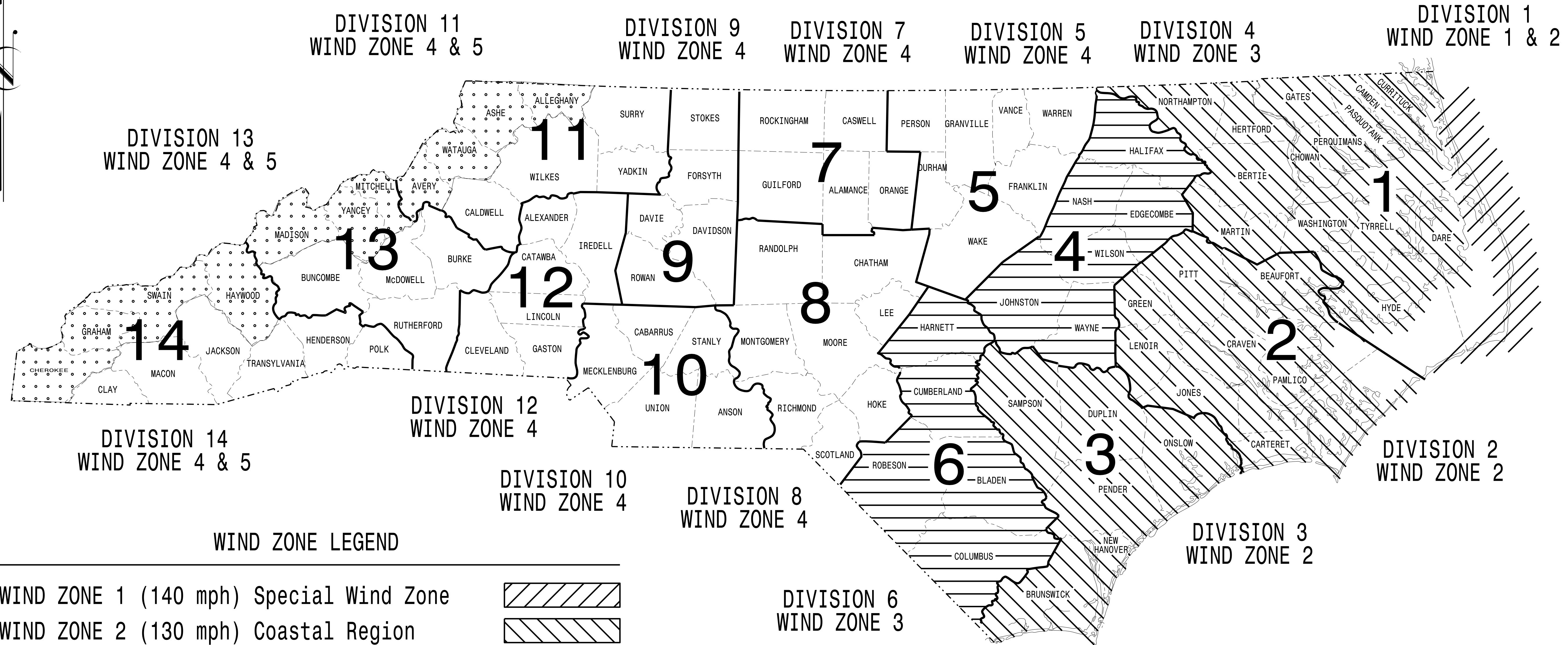
<p>Prepared in the Offices of: TRANSPORTATION MOBILITY AND SAFETY DIVISION STATE OF NORTH CAROLINA SIGNAL DESIGN SECTION 750 N. Greenfield Pkwy, Garner, NC 27529</p>	SR 2002 (Old Cullowhee Road) at SR 1336 (Monteith Gap Road) / SR 1733 (Casey Road) Division 14 Jackson County Cullowhee PLAN DATE: August 2014 REVIEWED BY: T. Williams PREPARED BY: M. Mahbooba REVIEWED BY:		SEAL T. Williams 8/27/2014 DATE	
	SCALE 0 N/A N/A	REVISIONS INIT. DATE		SIG. INVENTORY NO. 14-0040
	NCDOT Wind Zone 4 (90 mph)			

NCDOT METAL POLE STANDARDS

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

PROJECT NO. B-4159	SHEET NO. Sig. M1
-----------------------	----------------------

STANDARD DRAWINGS FOR METAL POLES



WIND ZONE LEGEND

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

<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
 2012 Interim to the
 5th Edition 2009
AASHTO
 Standard Specifications for
 Structural Supports for
 Highway Signs, Luminaires,
 and Traffic Signals

INDEX OF PLANS

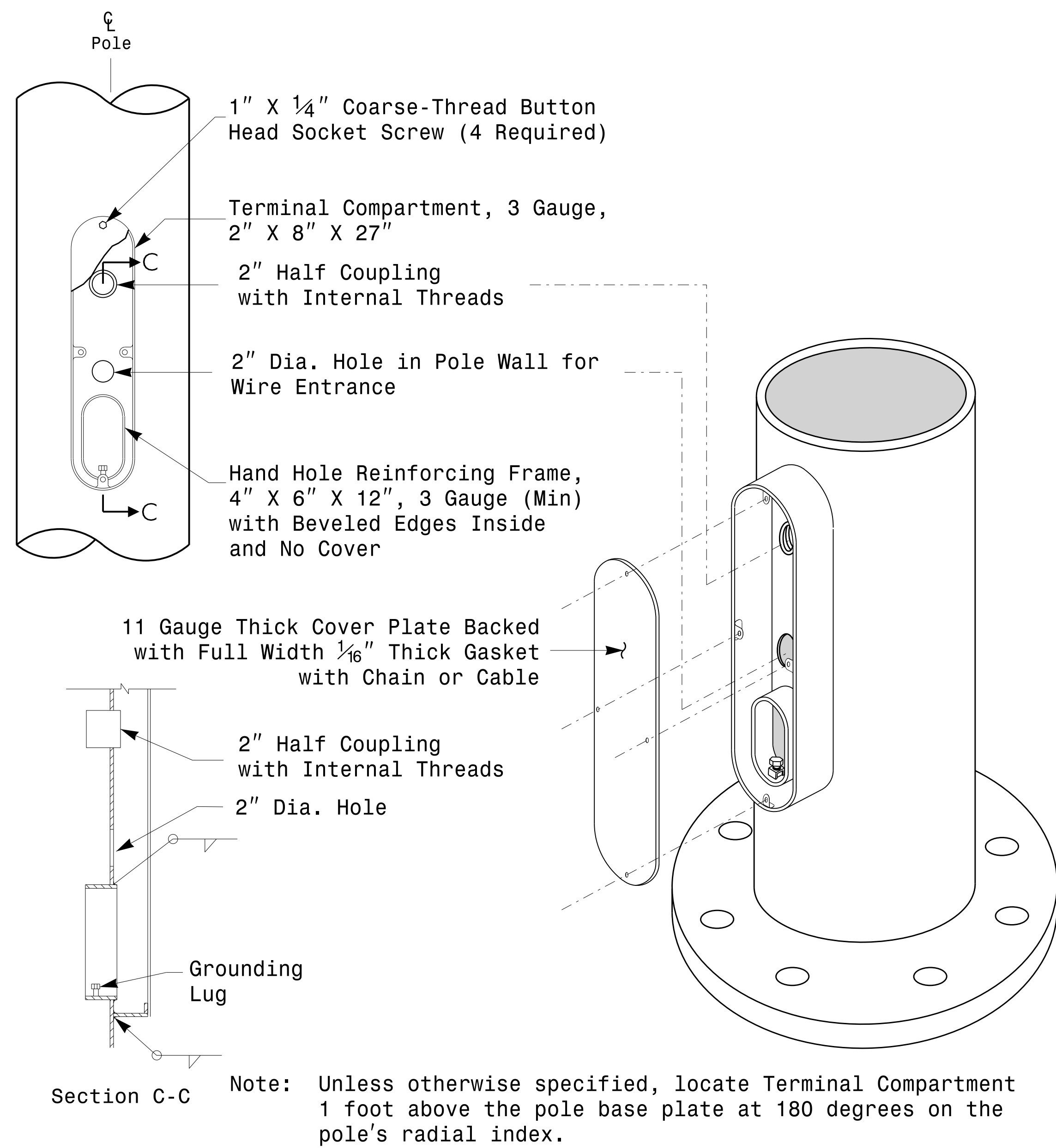
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M 2	Fabrication Details - All Poles
M 3	Fabrication Details - Strain Poles
M 4,5	Fabrication Details - Mast Arm Poles
M 6	Construction Details - Strain Poles
M 7	Construction Details - Foundations
M 8,9	Standard Strain Pole Foundations

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

G. A. FULLER, P.E. - STATE ITS AND SIGNALS ENGINEER
G. G. MURR, JR., P.E. - STATE SIGNALS ENGINEER
D.C. SARKAR, P.E. - ITS AND SIGNALS SENIOR STRUCTURAL ENGINEER
C.F. ANDREWS - ITS AND SIGNALS JOURNEY STRUCTURAL ENGINEER

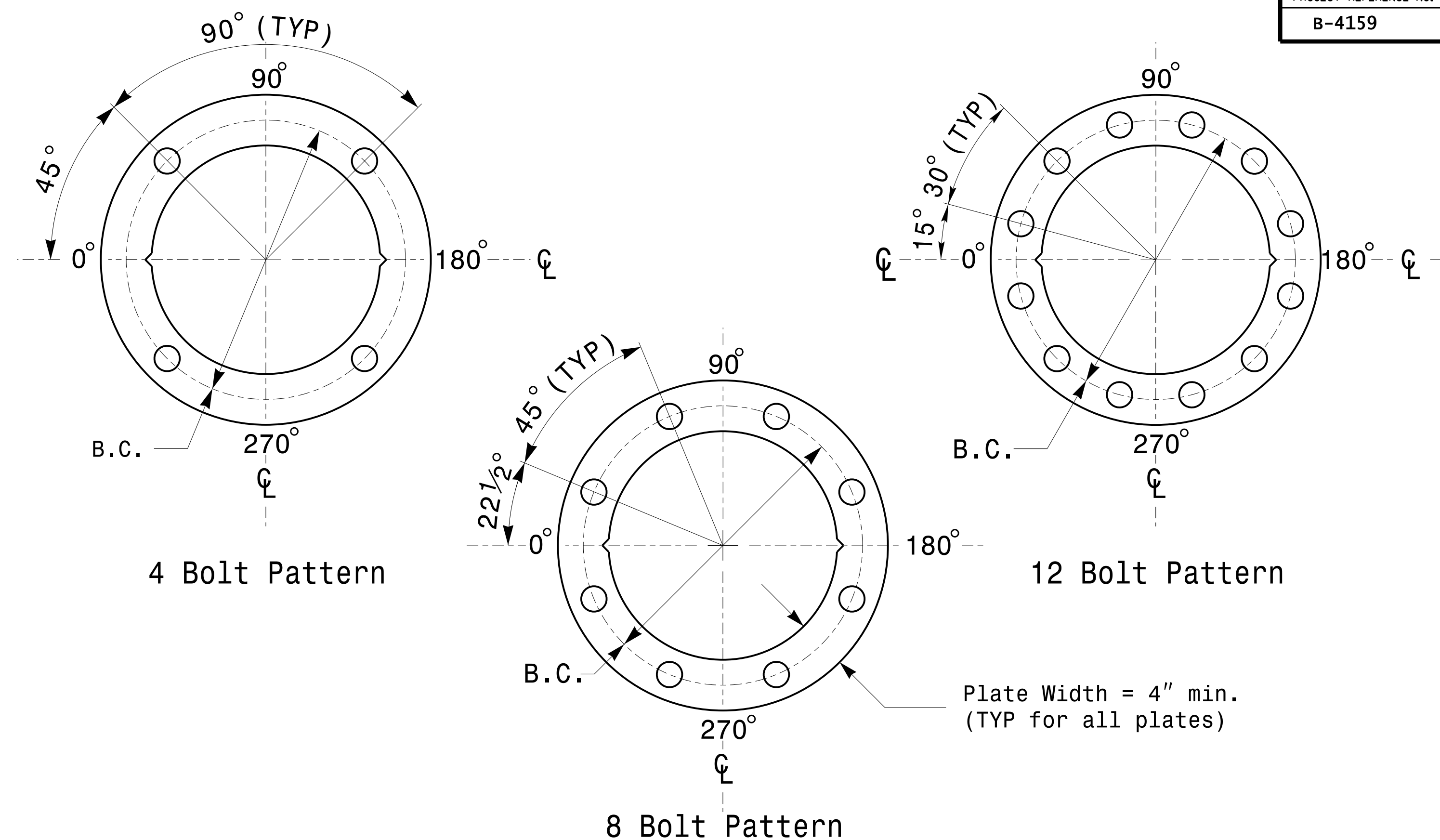
SEAL

Designed by: *Debesh C. Sarkar*
 DATE: 8/26/2014



Terminal Compartment Detail

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



Base Plate Template and Anchor Bolt Lock Plate Details

Construct Templates and Plates from 1/4 inch min. thick Steel. Galvanizing is not required.

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

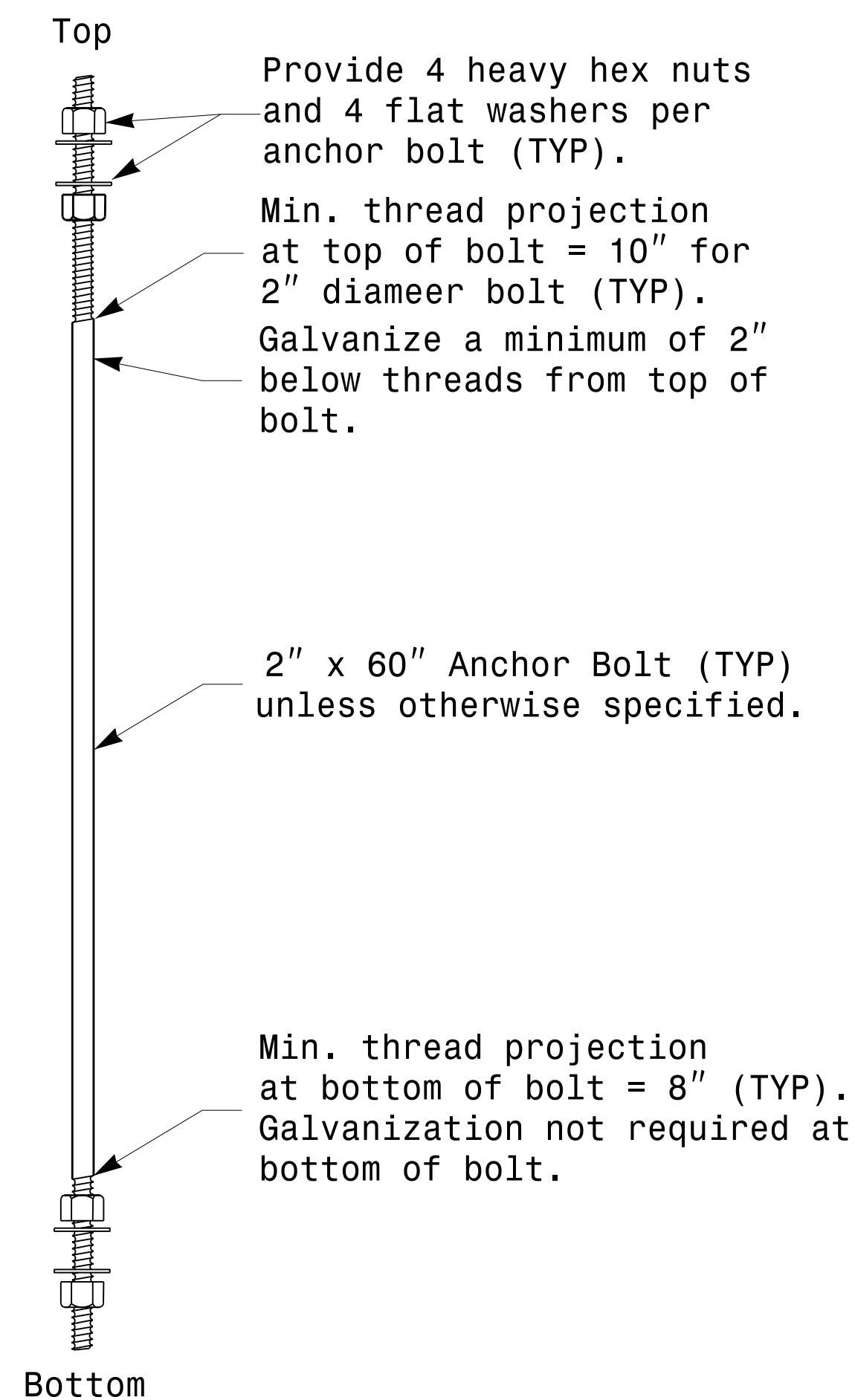
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

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

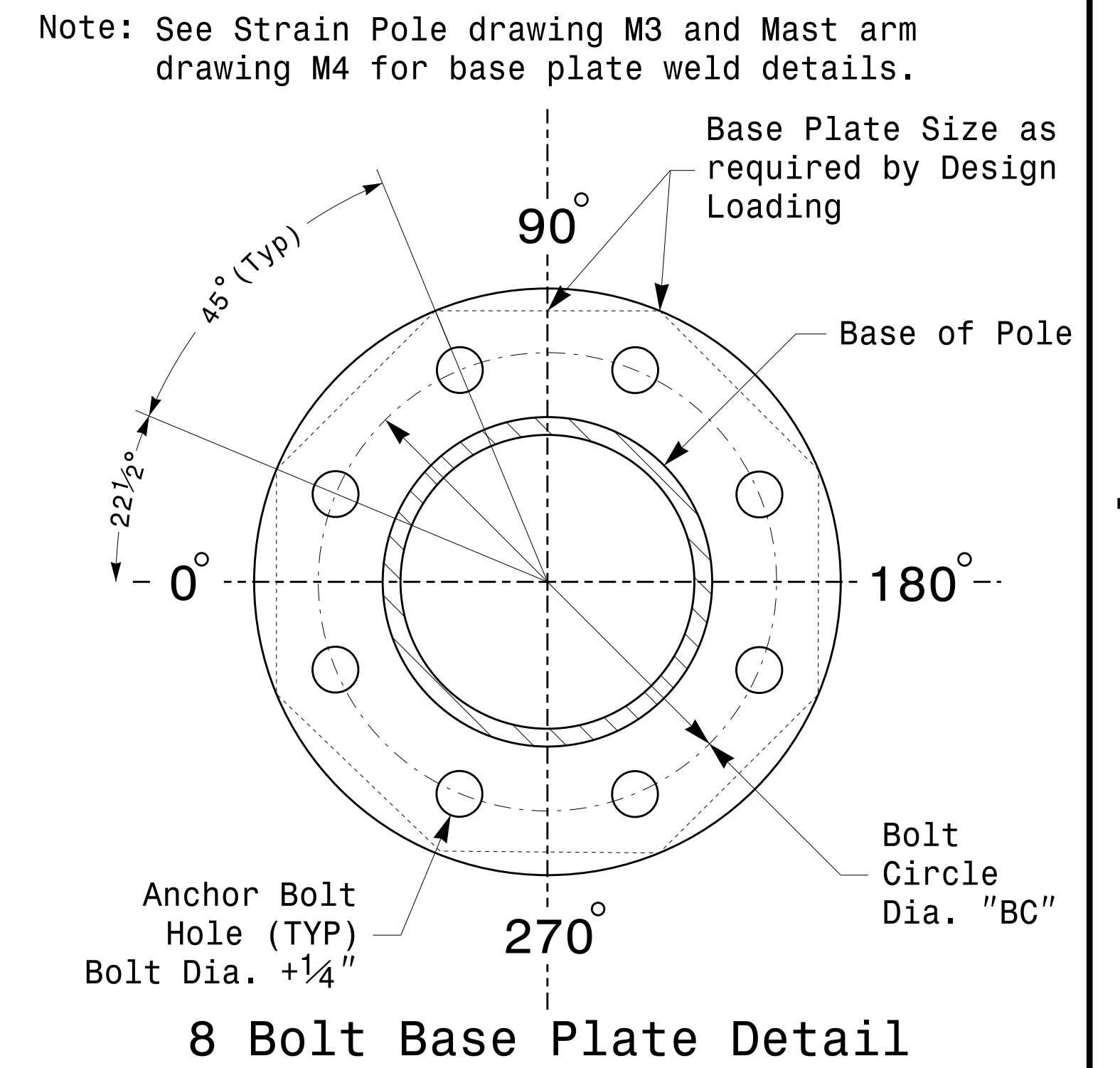
Identification Tag Details

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

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



Anchor Bolt Detail

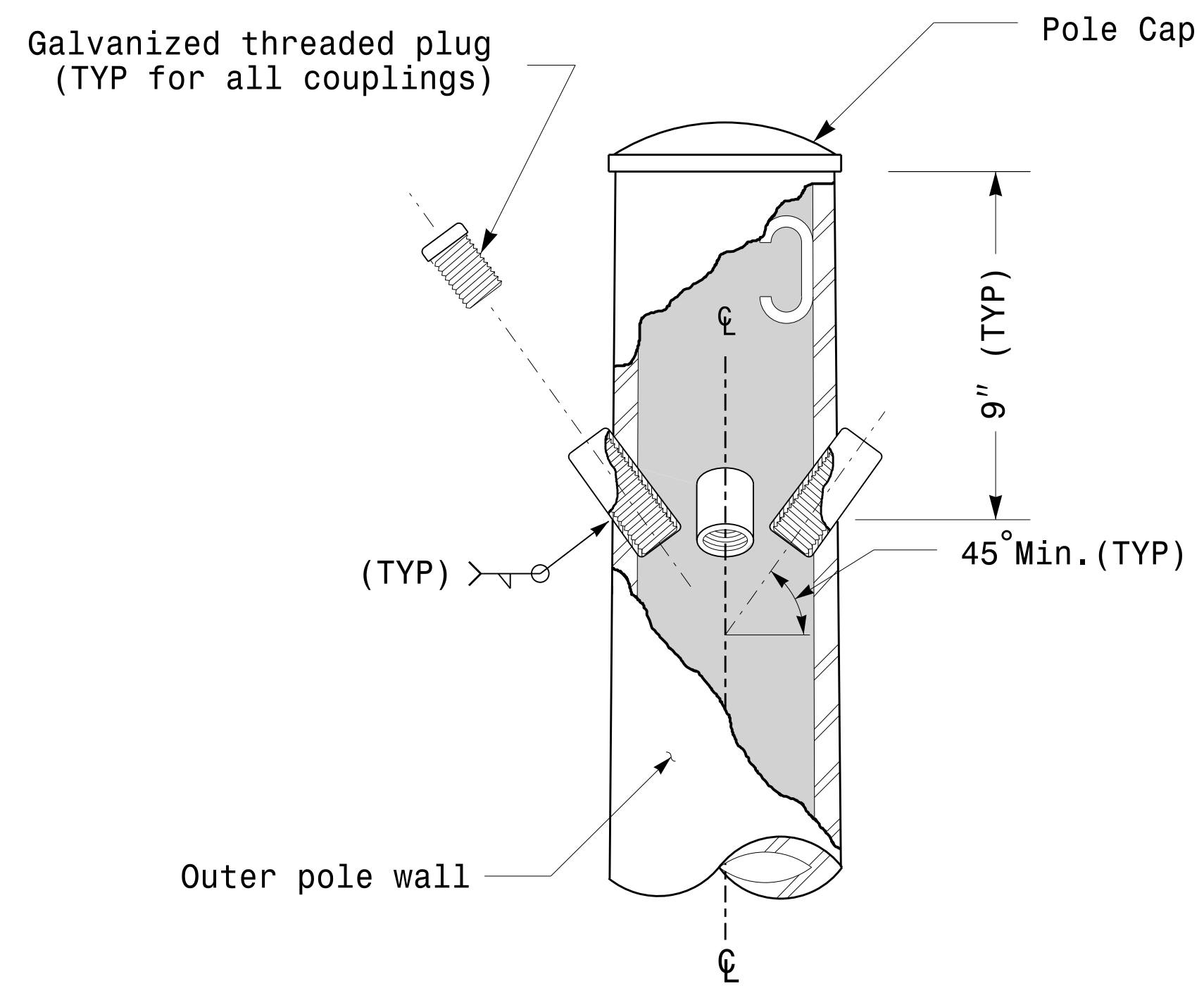


8 Bolt Base Plate Detail

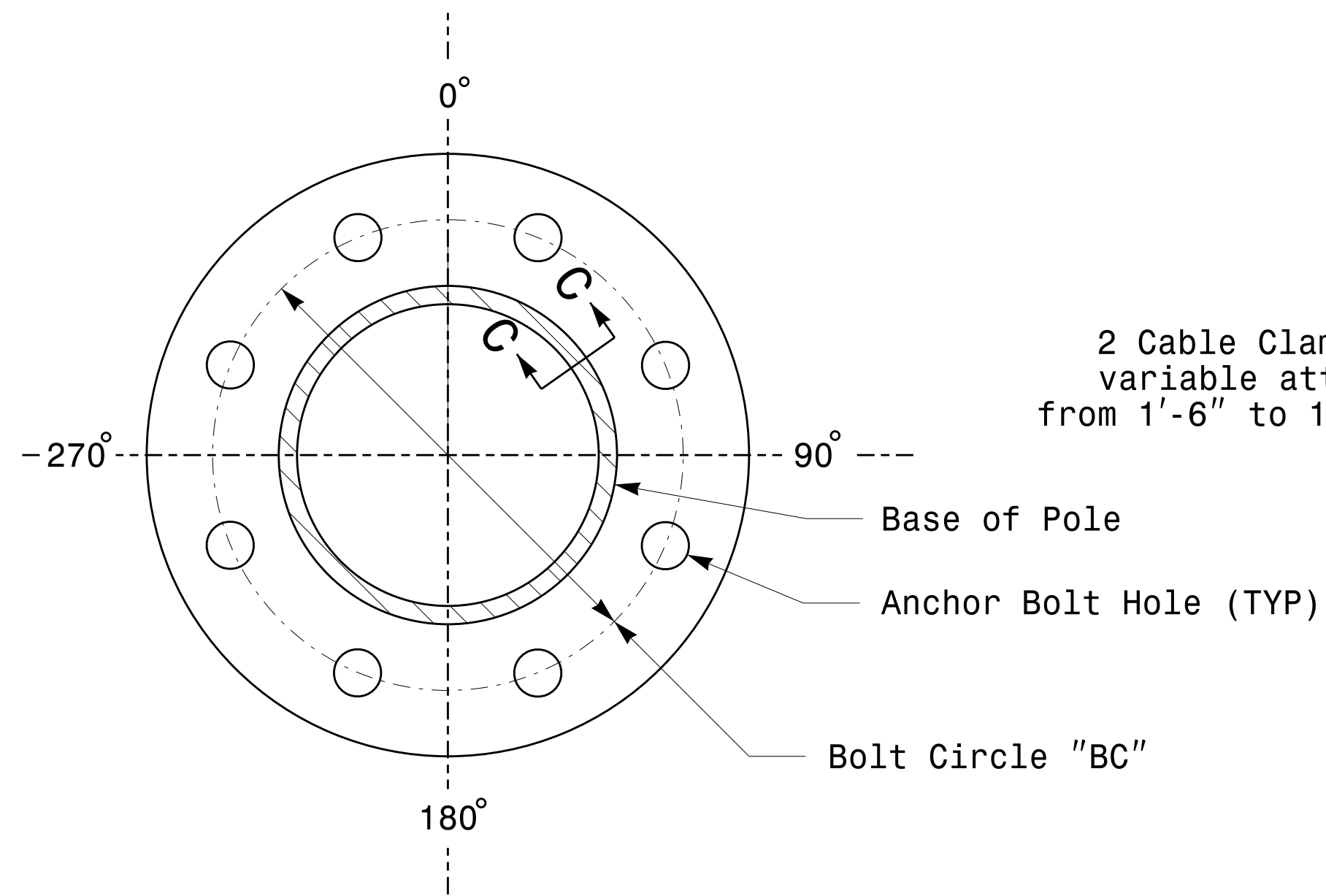
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	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	REVISIONS: _____ INIT. DATE _____	SIG. INVENTORY NO. _____	

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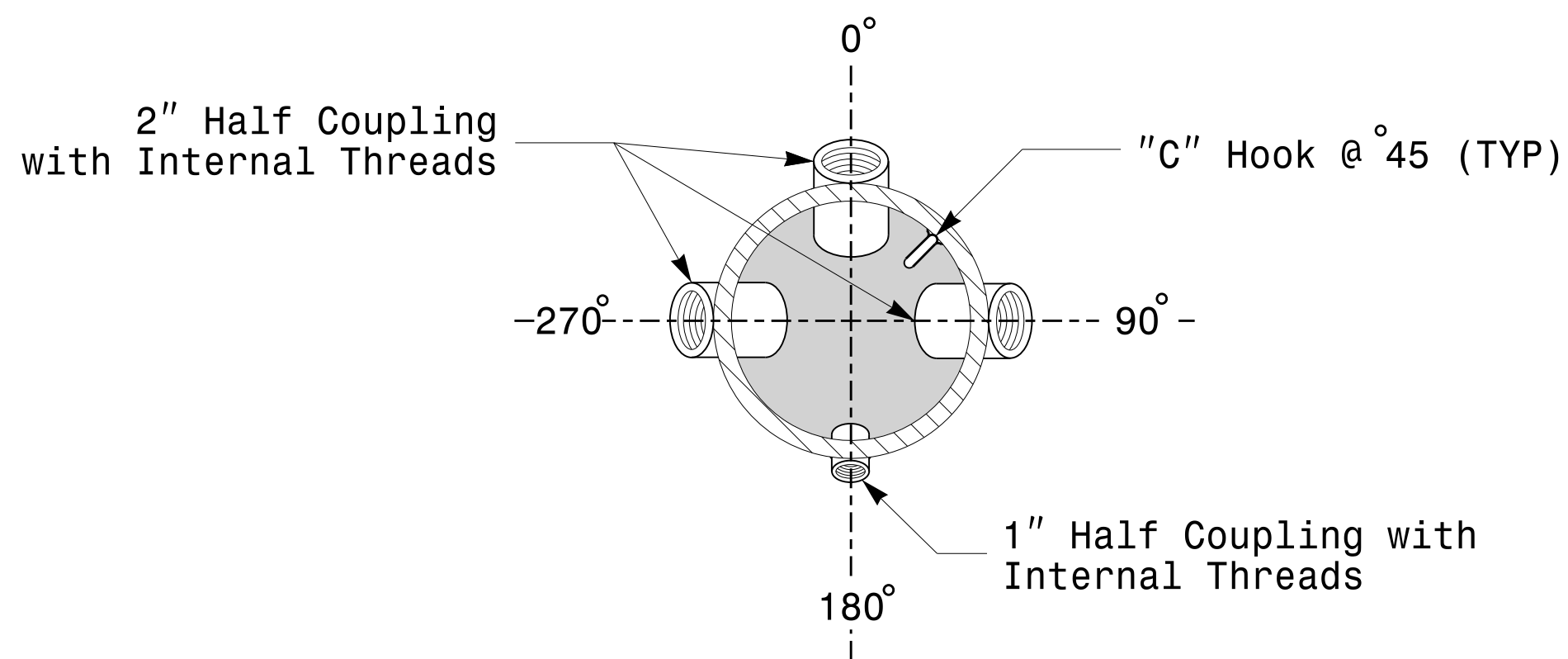
Fabrication Details – All Poles



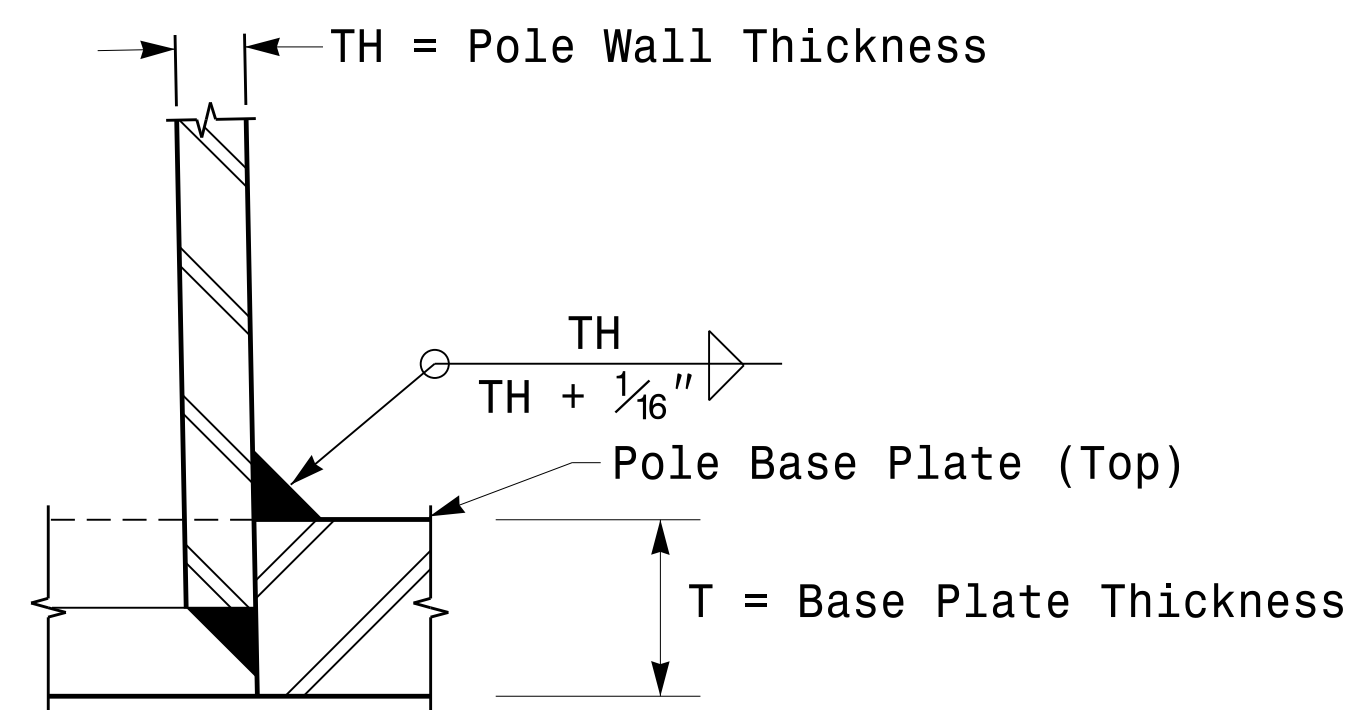
Cable Entrances at Top of Pole



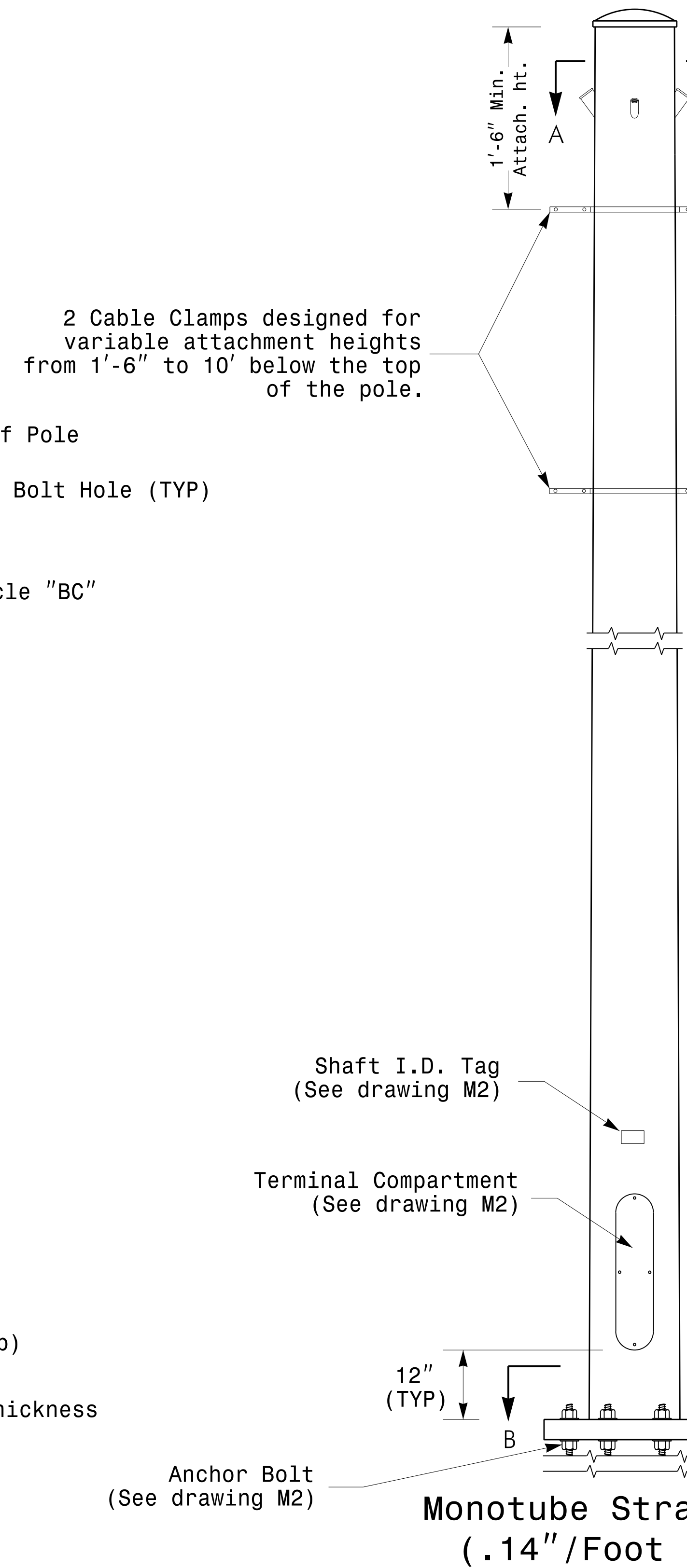
Section B-B
Pole Base Plate
(See drawing M2)



Radial Orientation for Factory Installed
Accessories at Top of Pole



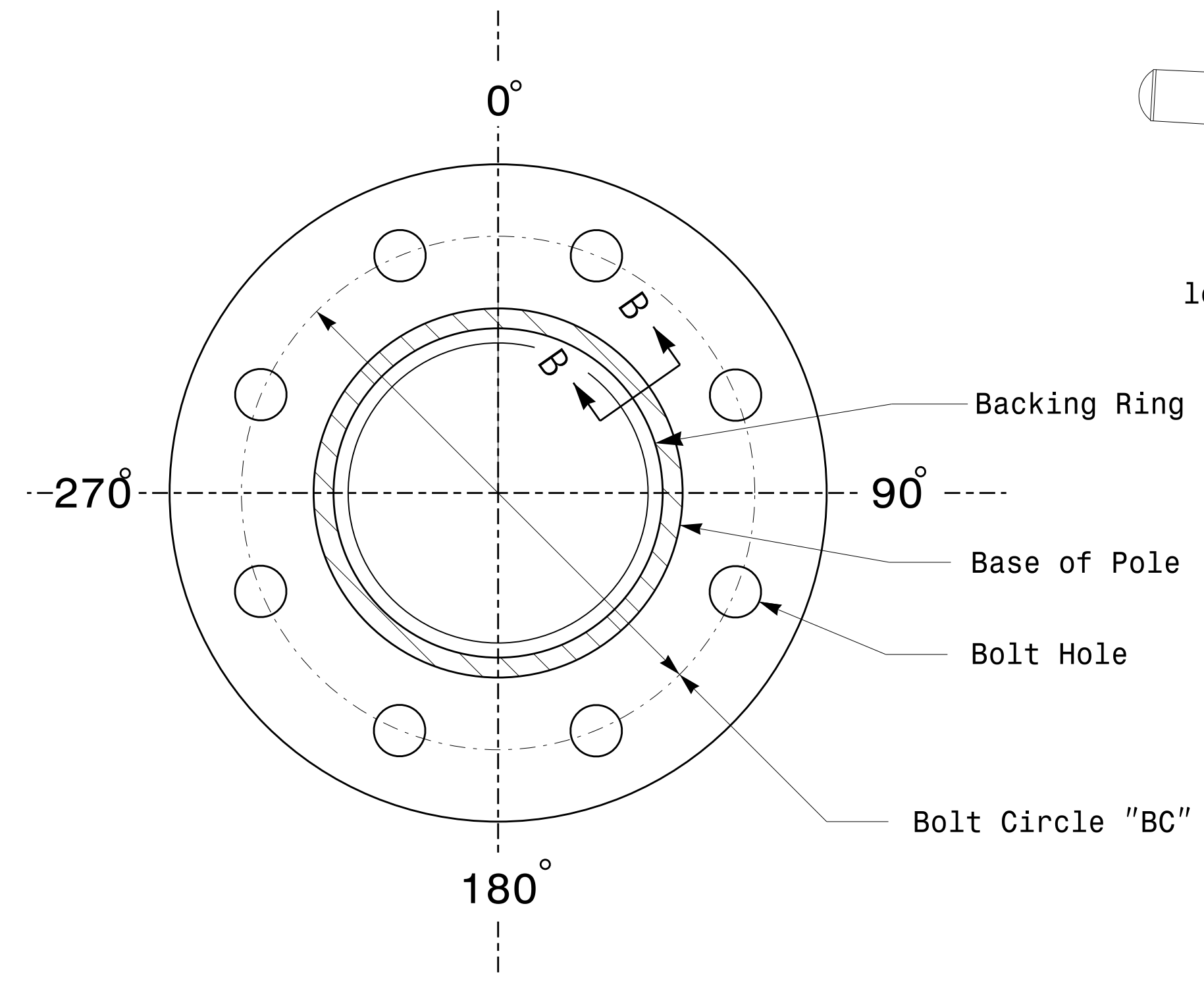
Socket Connection Weld Detail



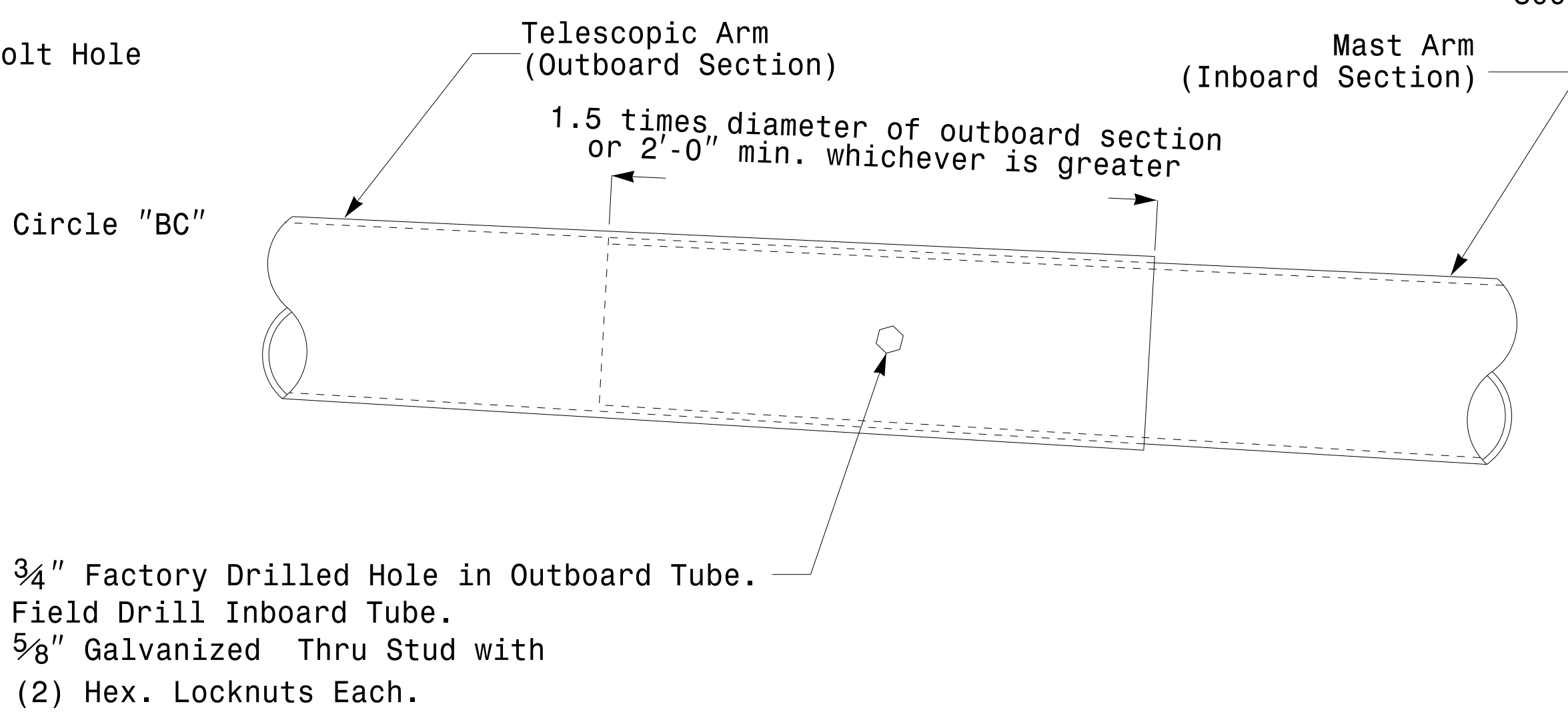
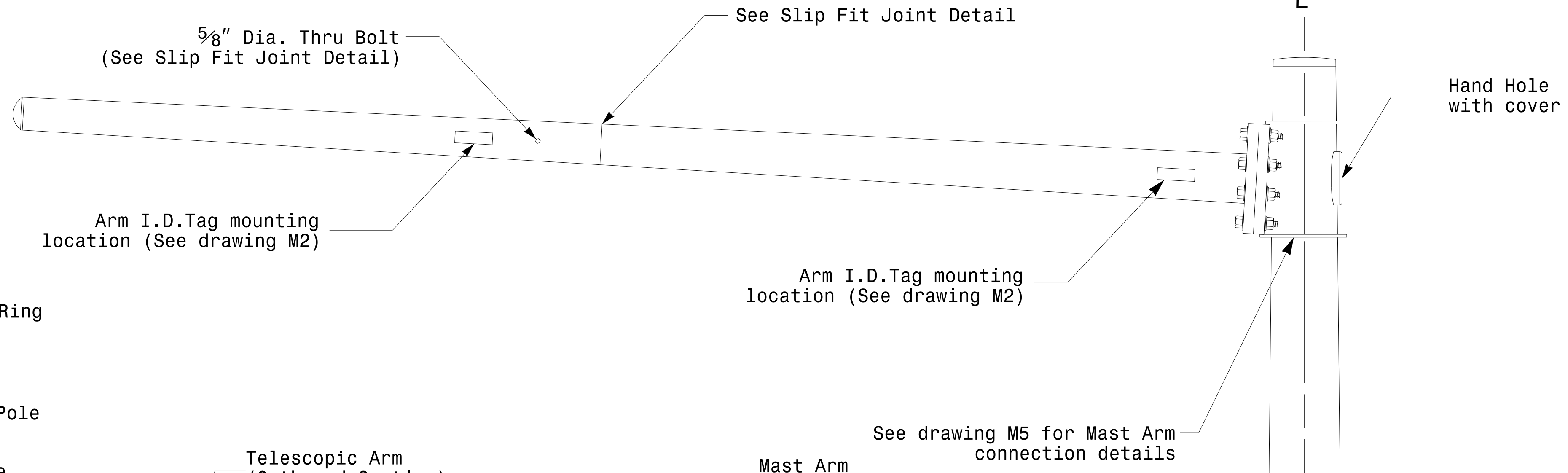
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	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
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 Top of Pole

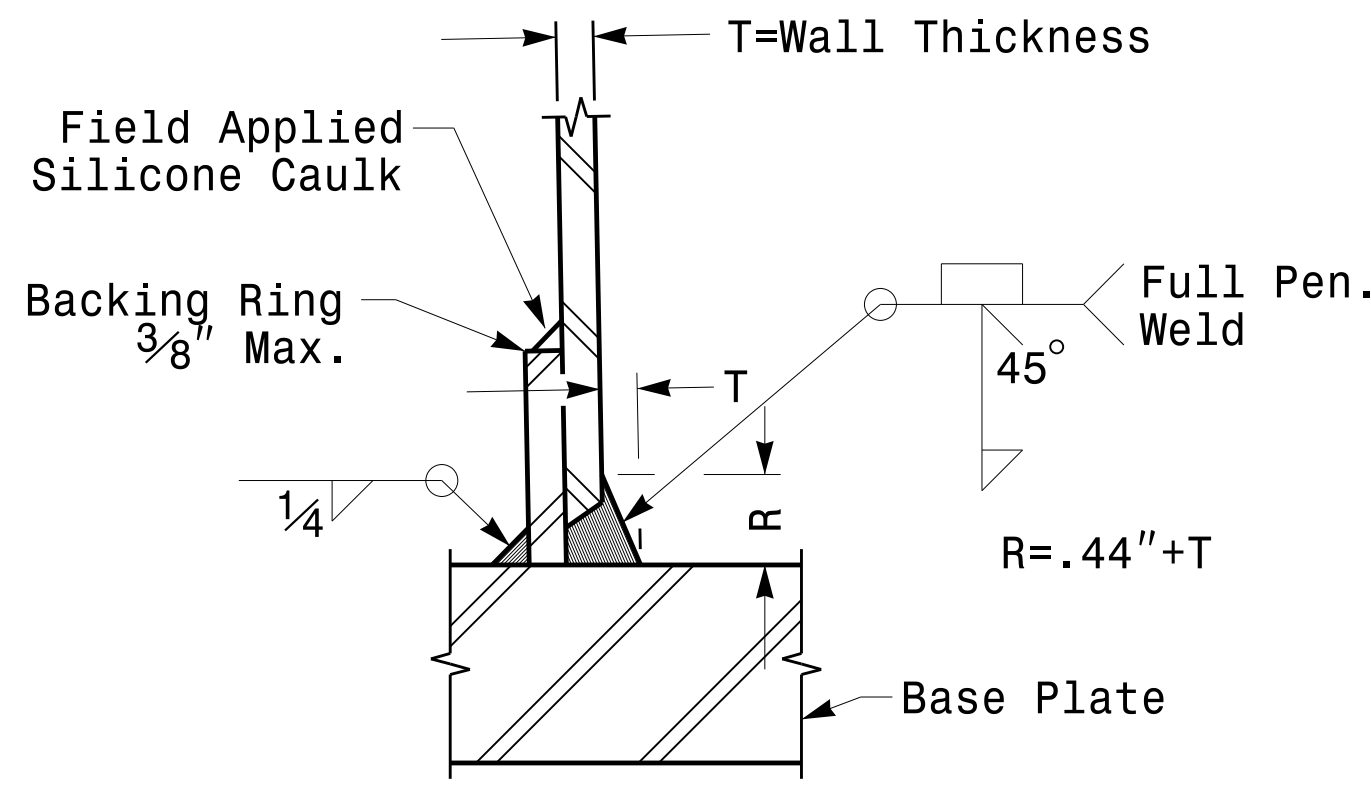
Fabrication Details – Strain Poles



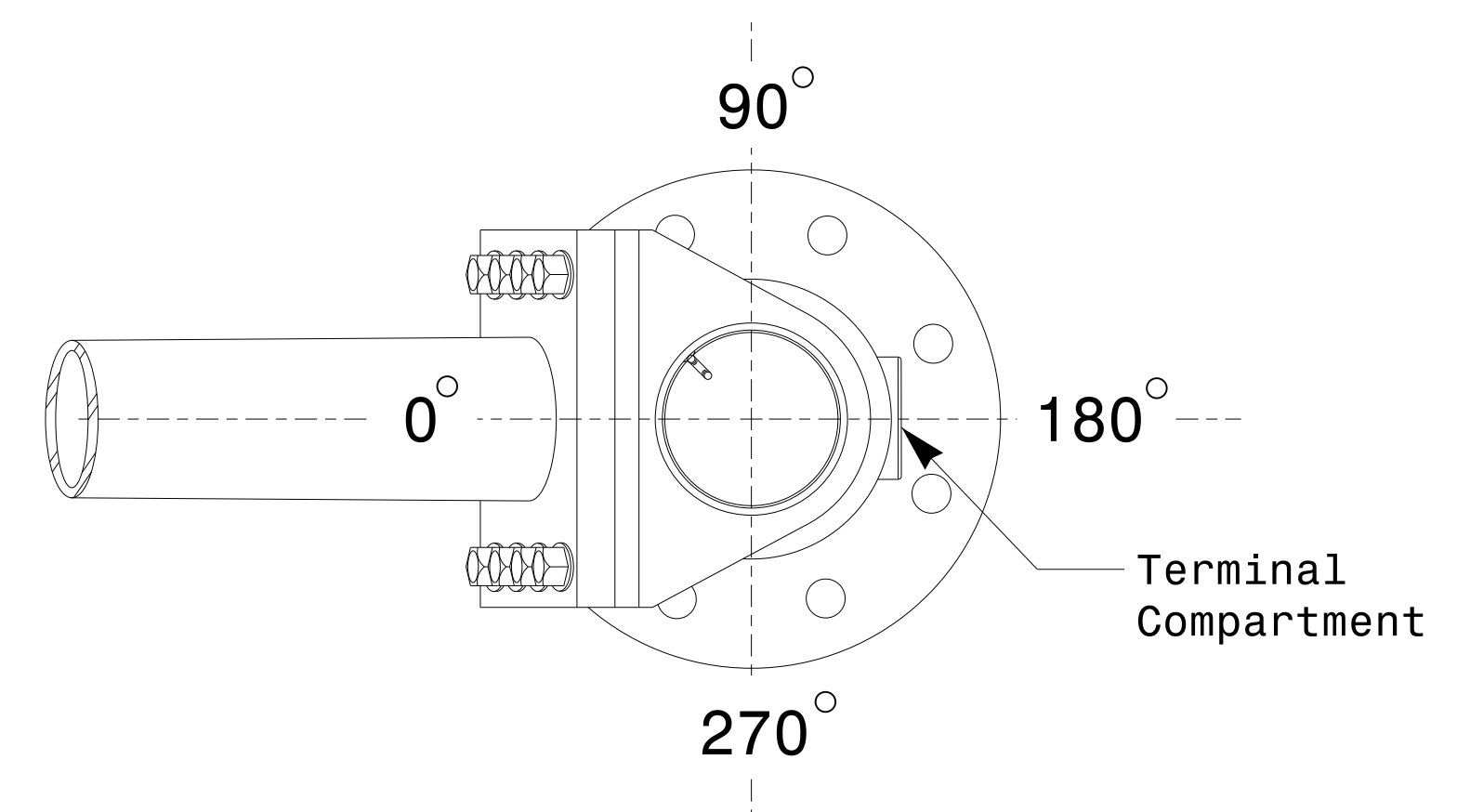
Section A-A
(See drawing M 2)
Pole Base Plate



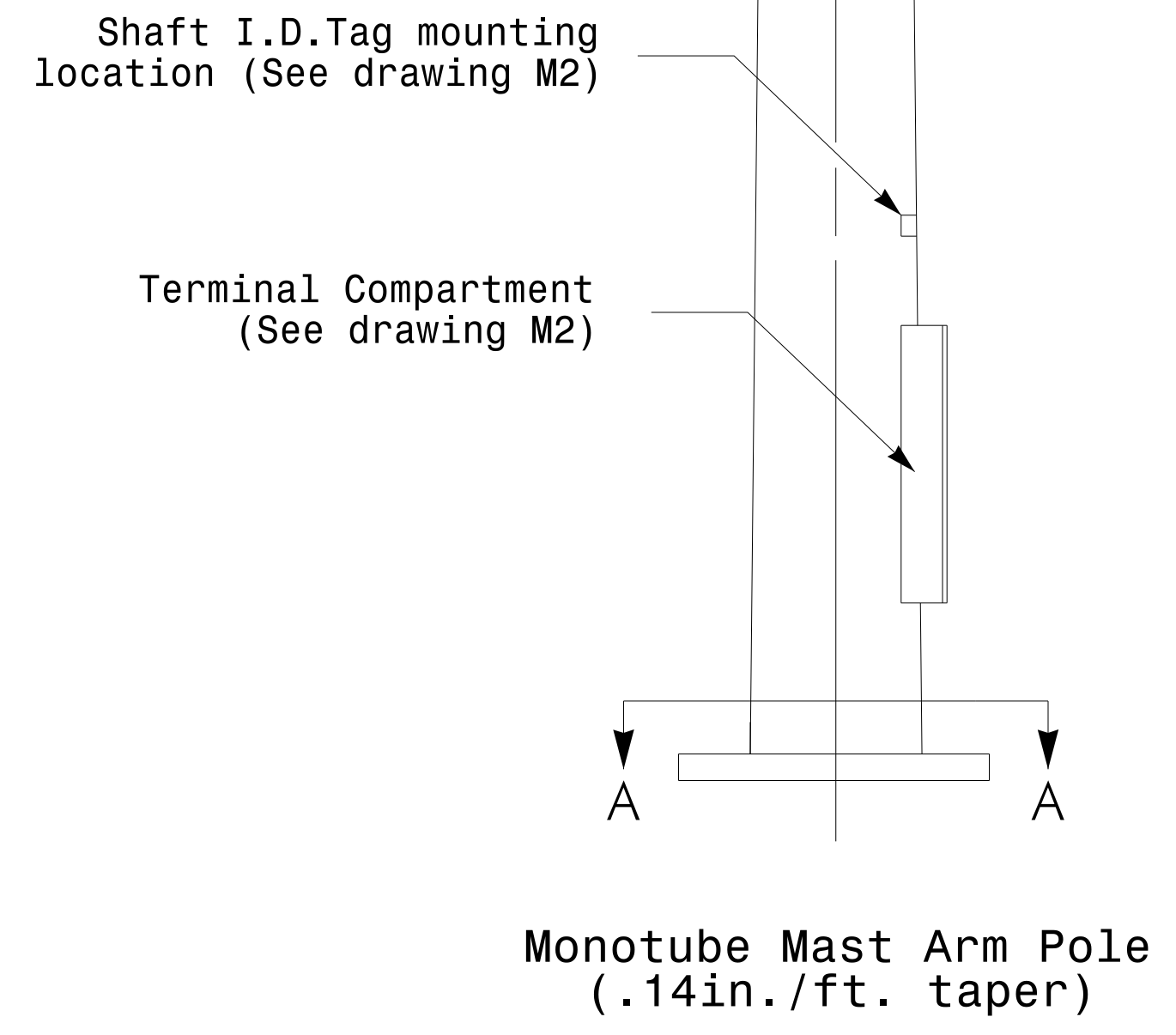
Slip Fit Joint Detail for Mast Arm



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



Mast Arm Radial Orientation



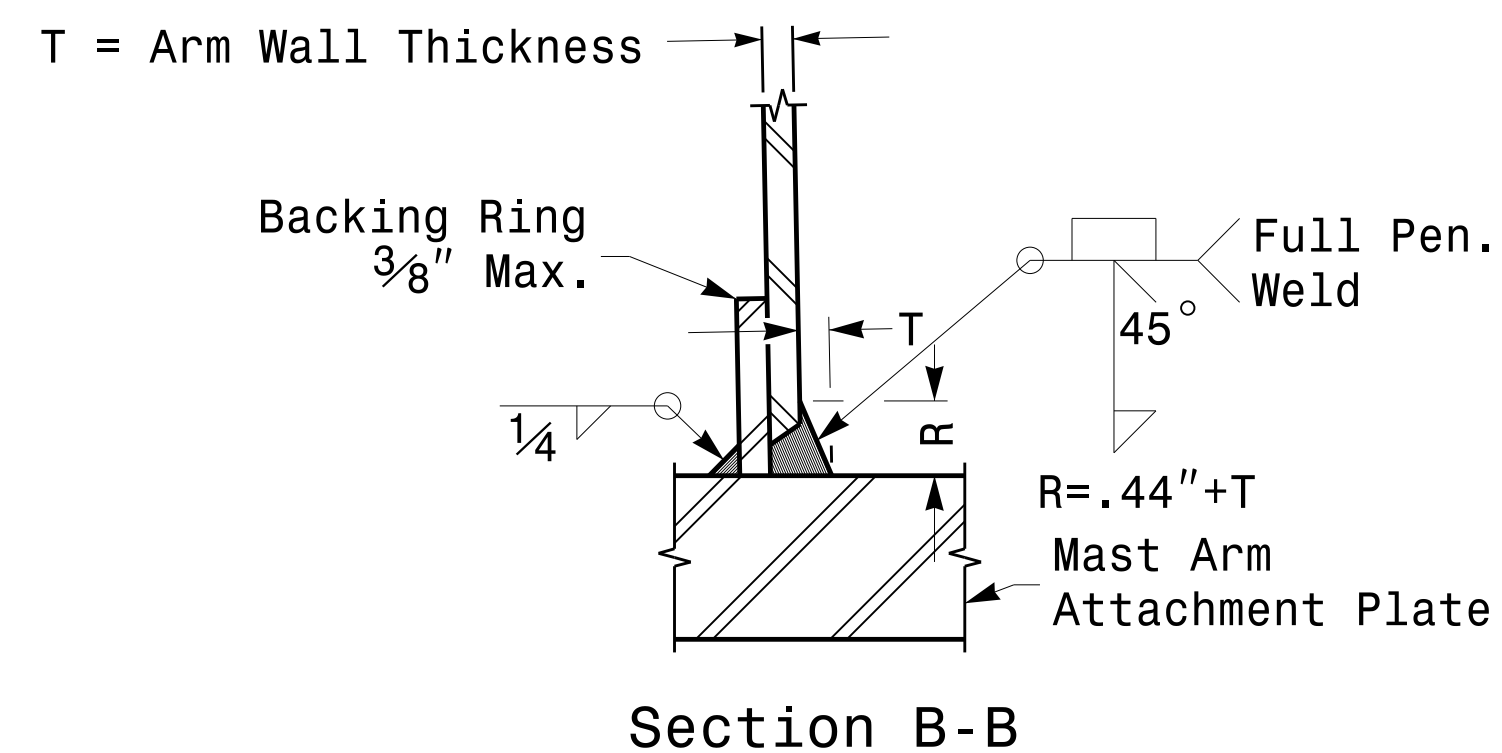
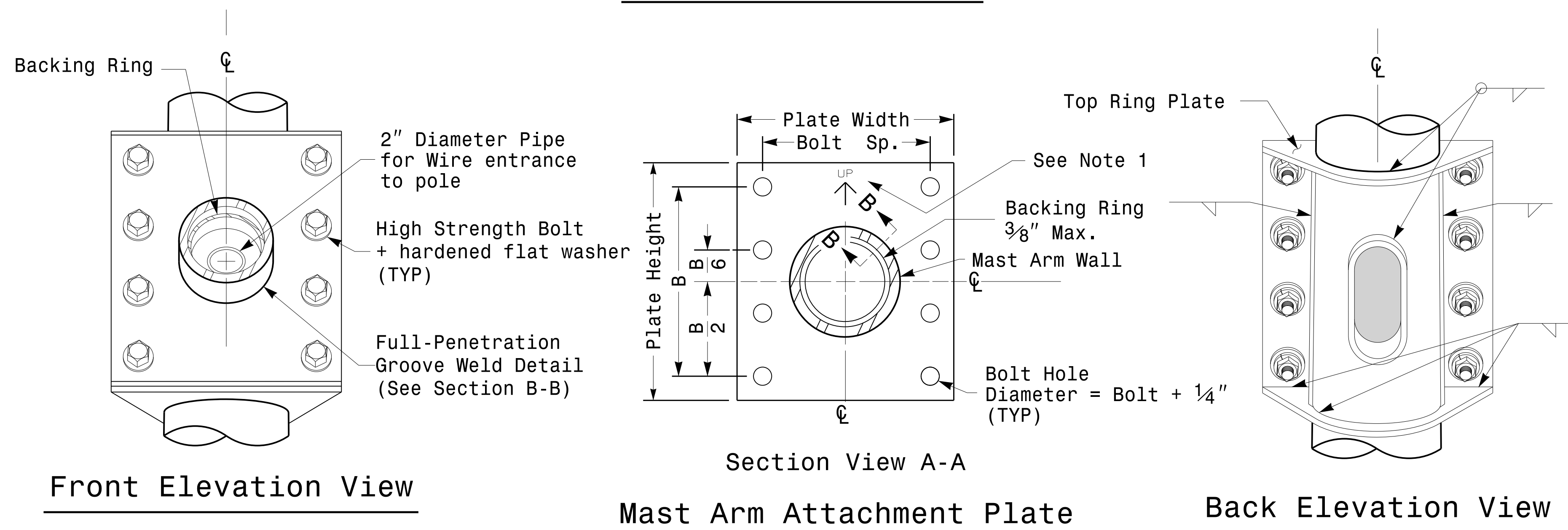
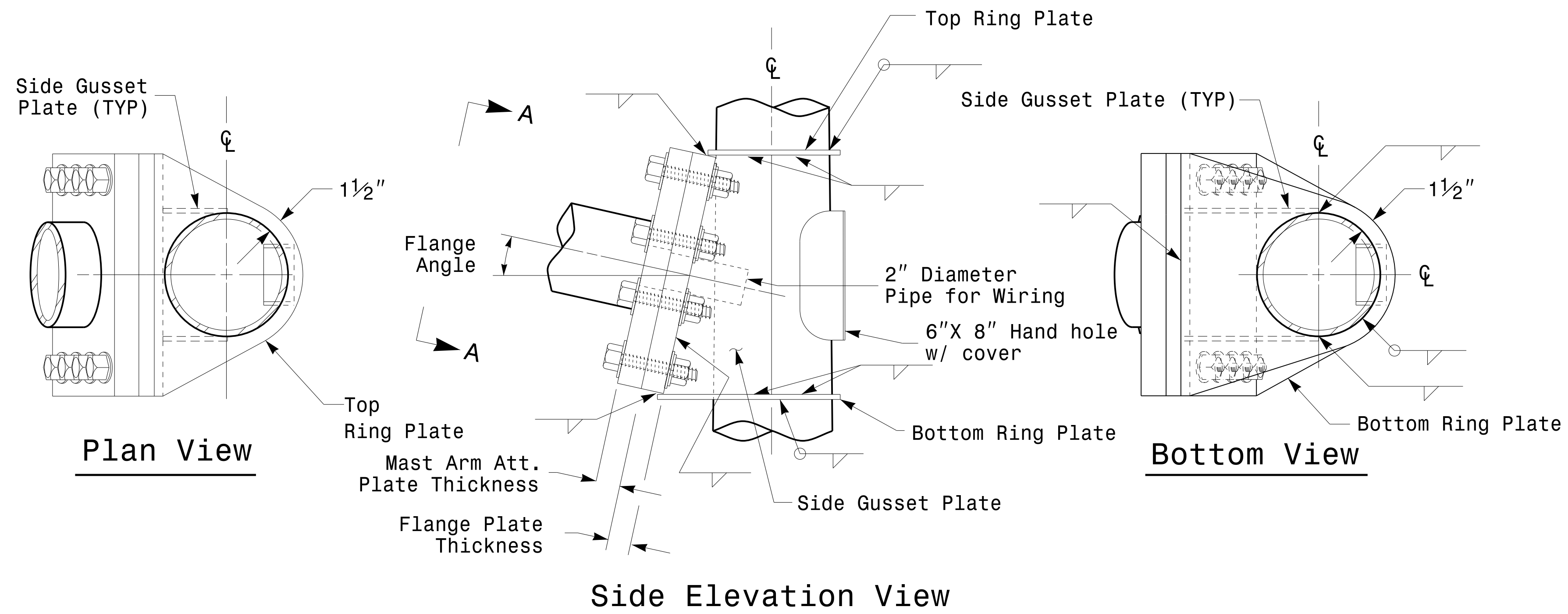
Monotube Mast Arm Pole
(.14in./ft. taper)

	Typical Fabrication Details for Mast Arm Poles		
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	REVISIONS:	INIT. DATE:	SIG. INVENTORY NO.:

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Fabrication Details – Mast Arm Poles

Welded Ring Stiffened Mast Arm Connection



Full-Penetration Groove Weld Detail

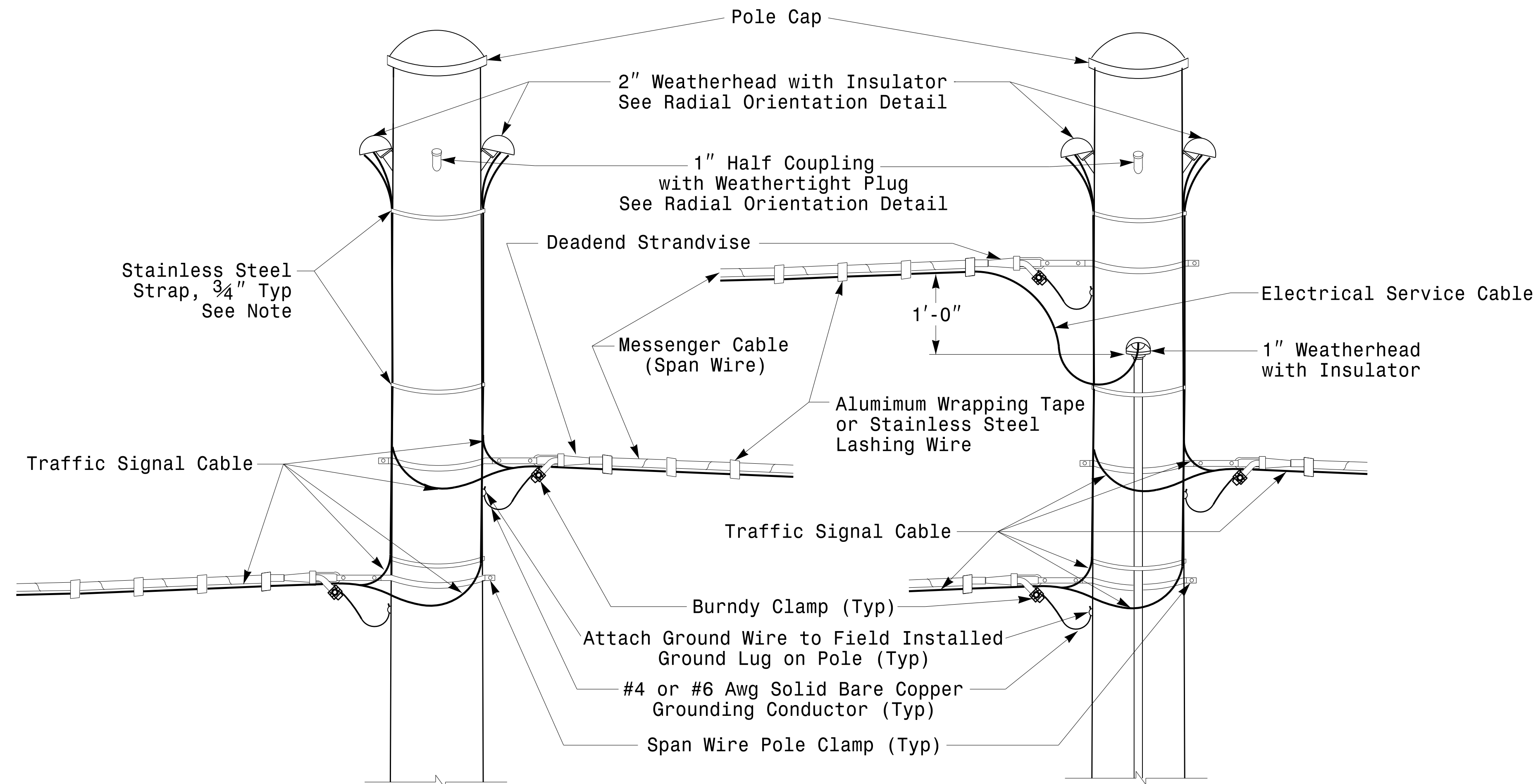
Notes:

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

	Fabrication Details For Mast Arm Connection To Pole		
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE		DocuSign by: D. C. SARKAR 8/26/2014 44EBE32E147E4C4 DATE	

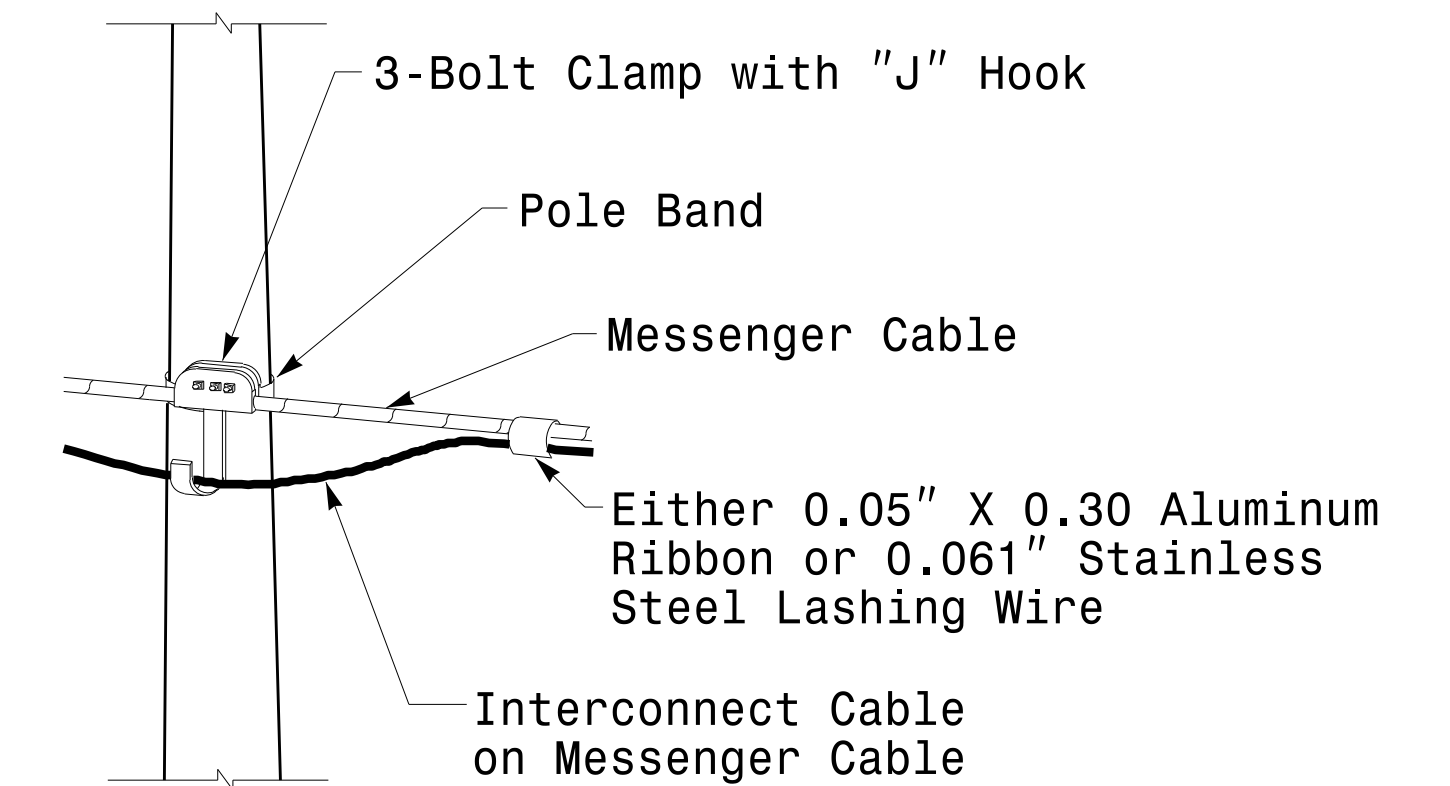
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Fabrication Details – Mast Arm Poles

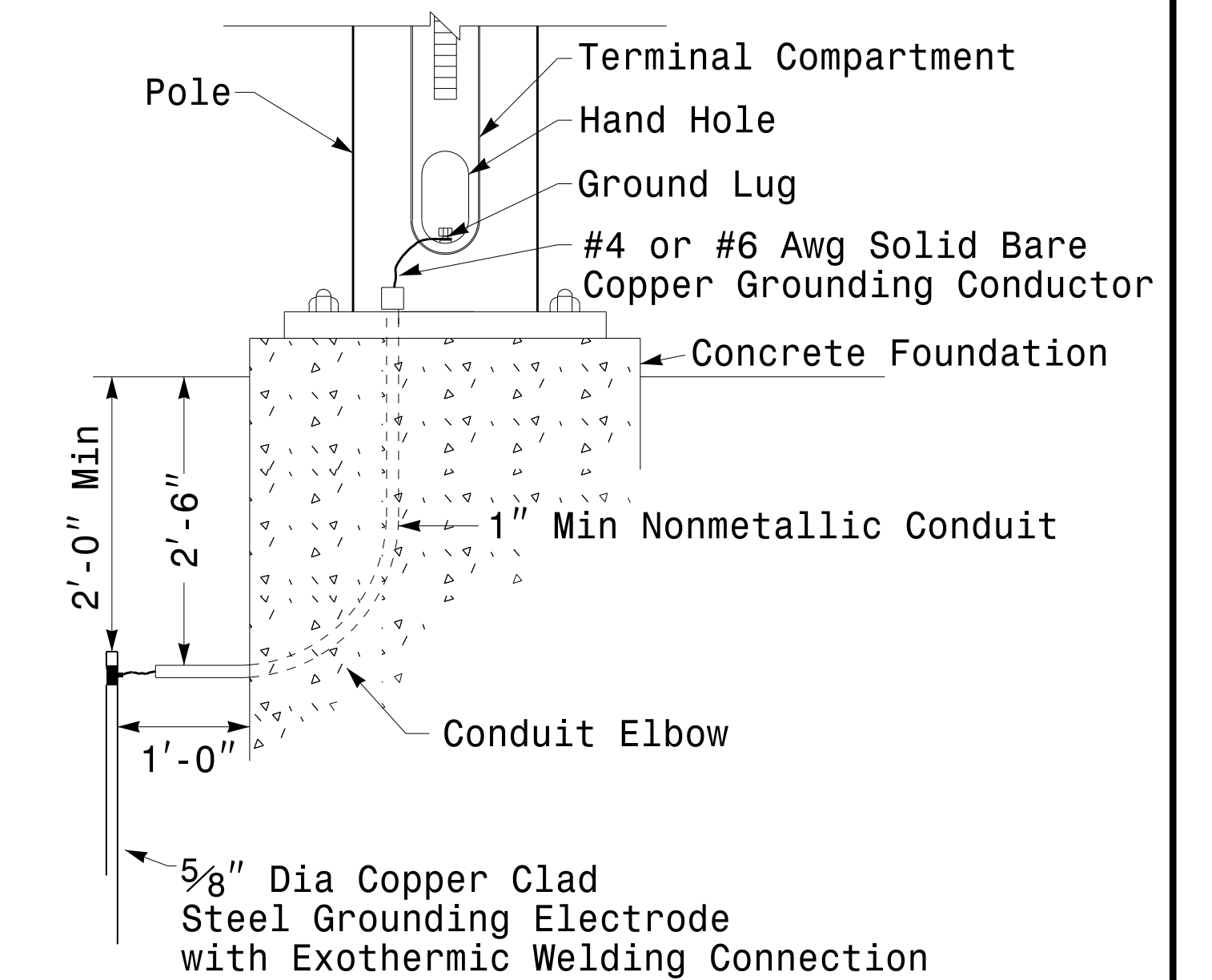


Strain Pole Attachments

Note: 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 36"



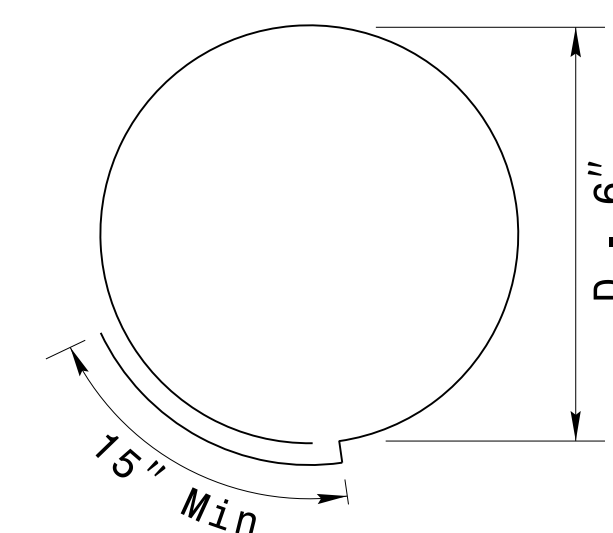
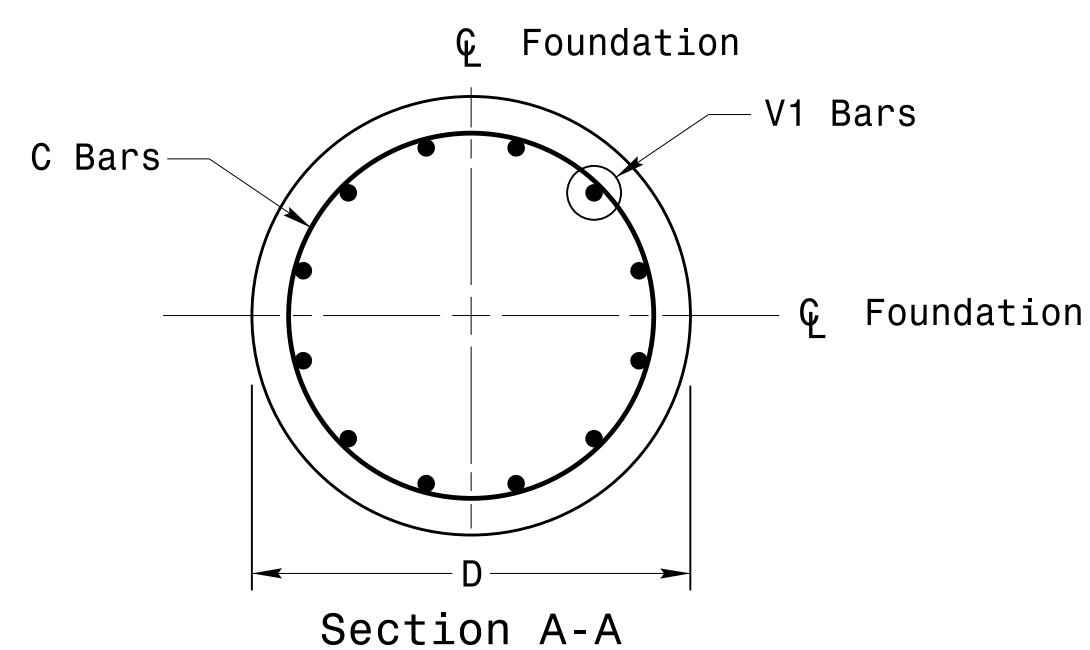
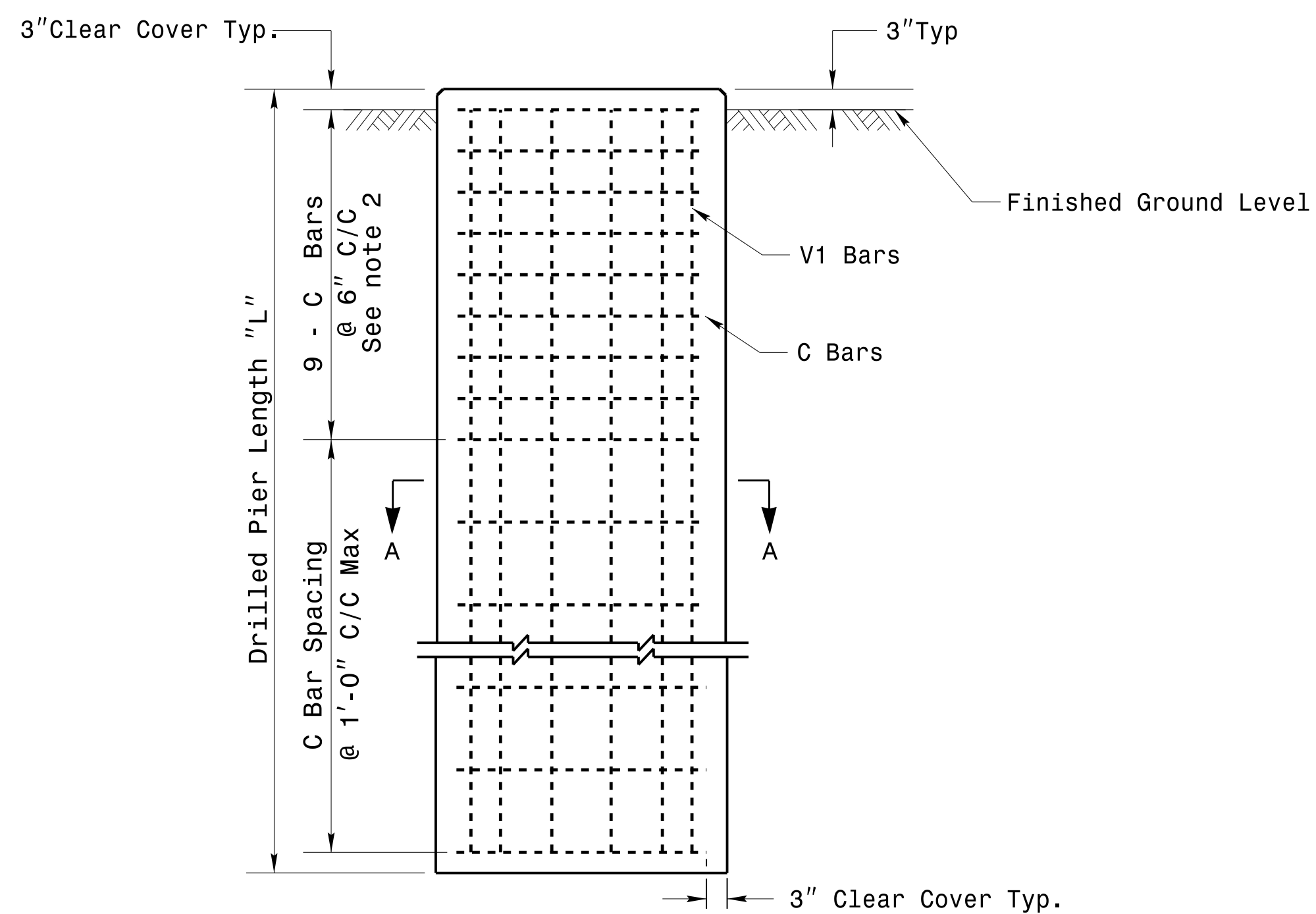
Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail

	Construction Details Strain Poles		
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	REVIEWED BY: C.F. ANDREWS REVIEWED BY: D.C. SARKAR	
SCALE: 0 NA NONE	REVISIONS:	INIT. DATE:	SIG. INVENTORY NO.:

Reinforcing Steel Bars



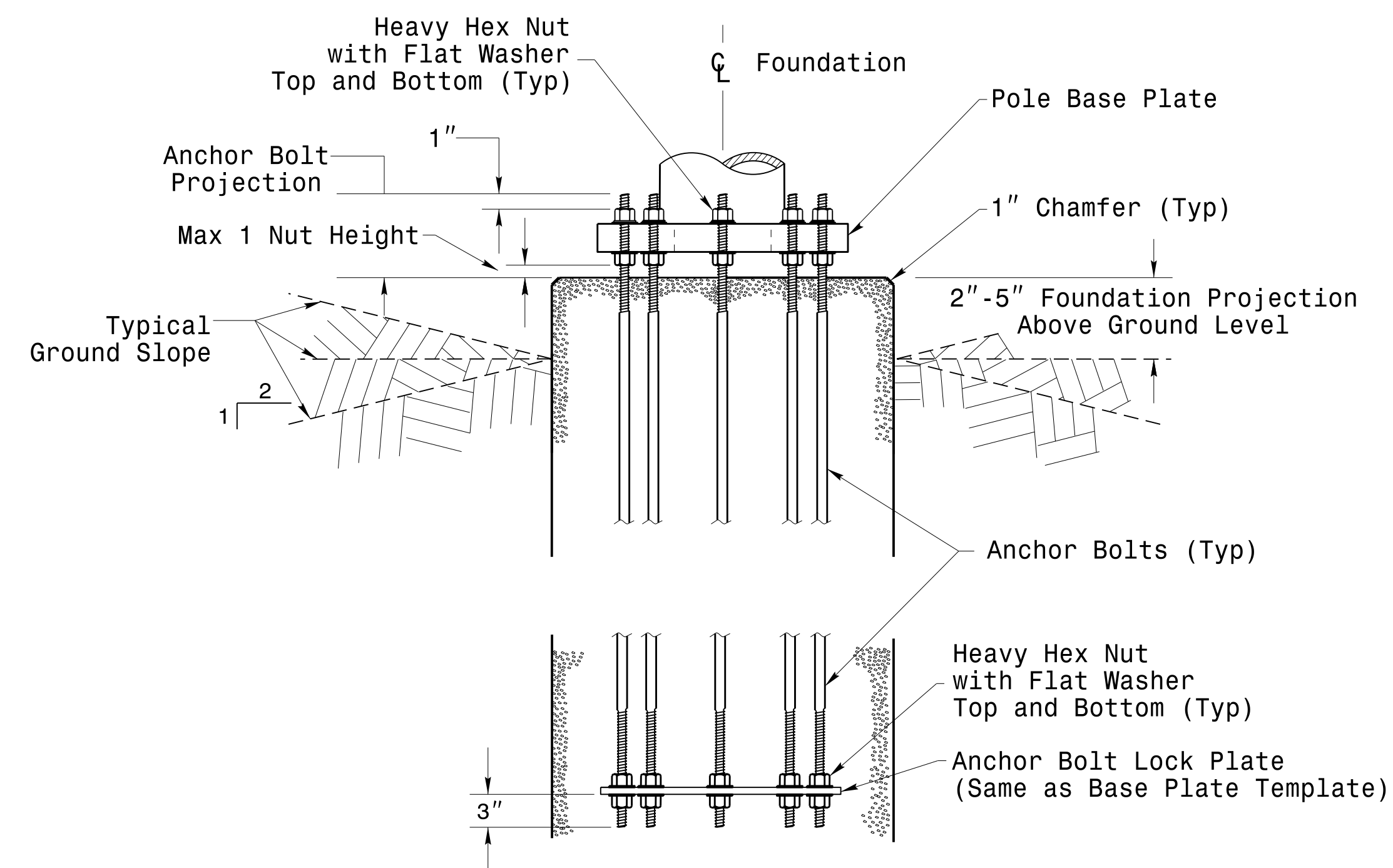
Typical "C" Bars

REINFORCING STEEL TABLE FOR STANDARD DRILL PIER SHAFT (4'-0" DIAMETER)						
Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	MIN.	Size	Type	Length
48"	.465 x L	V1	***	#8	STR.	**
		C	*	#4	CIR.	12'-6"

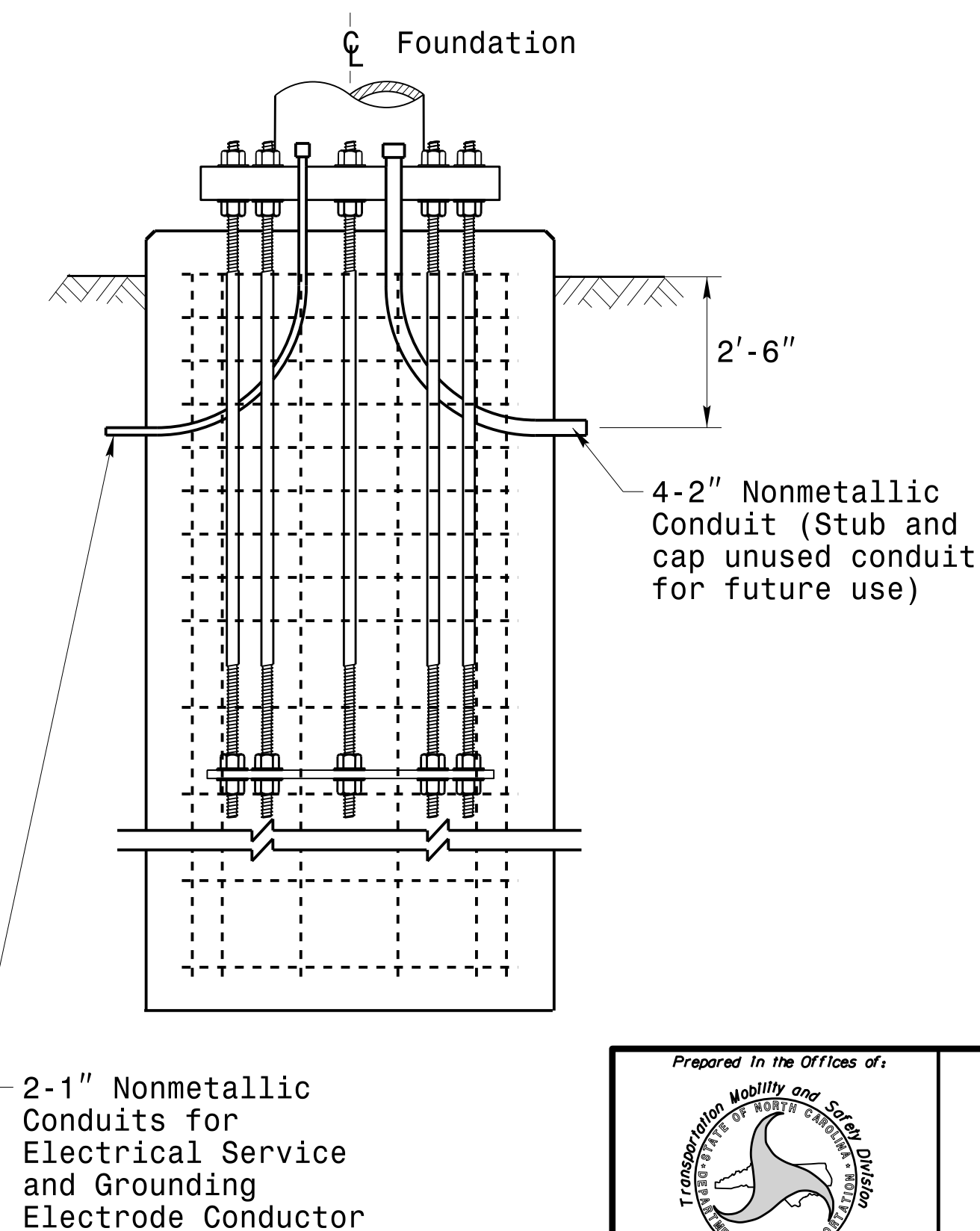
* See Note No. 1
 ** See Note No. 3
 *** See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



Notes

- The number of C-bars is based on foundation depth and/or as required. For standard foundations, see sheets M 8 and M 9 for details.
- Circular tie reinforcing rings may be vertically adjusted by +/- 3" at a depth between 2'-0" and 3'-0" to facilitate the installation of electrical conduit entering in the cage.
- The length of V1-bars is based on foundation depth. For standard foundations, see sheets M 8 and M 9 for details. Vertical reinforcing bars (V1) may be horizontally adjusted by +/- 3" to facilitate the installation of electrical conduit entering into the cage.
- Provide vertical reinforcement as required per design. See sheets M 8 and M9 for details.

	Construction Details Foundations	
	PLAN DATE: AUGUST 2013 PREPARED BY: N. BITTING	DESIGNED BY: K.C. DURIGON REVIEWED BY: D.C. SARKAR
SCALE: 0 NA NONE	REVISIONS: _____ INITI.: _____ DATE: _____	DocuSign by: <i>Dinesh C. Sarkar</i> 8/26/2014 DATE: _____ SIG. INVENTORY NO. _____

SATURATED SOIL CONDITION

		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	Bar Size (#)	Spacing (in.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	19	13	9	8	17	14.5	12.5	8	13	4	12
		S30L3	30	25	2	11	300	20	13.5	9	8	17.5	15	13	8	14	4	12
		S35L3	35	25	3	11	320	20	13.5	9.5	8	17.5	15	13	8	15	4	12
	HEAVY	S30H3	30	29	3	16	450	24.5	17	13	11	21	17.5	15	8	18	4	12
		S35H3	35	29	4	16	515	26	17.5	12	8.5	22	18.5	16	8	20	4	12
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	18	12.5	8.5	8	16.5	14	12	8	13	4	12
		S30L2	30	23	2	10	270	19	12.5	9	8	16.5	14	12.5	8	13	4	12
		S35L2	35	23	3	10	300	19.5	13	9	8	17	14.5	13	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	25.5	15.5	11	8	20	17	14.5	8	17	4	12
		S35H2	35	29	4	15	475	25	16.5	11.5	8	21	17.5	15.5	8	19	4	12
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	18	12.5	8.5	8	16.5	14	12	8	13	4	12
		S30L2	30	23	2	10	270	19	12.5	9	8	16.5	14	12.5	8	13	4	12
		S35L2	35	23	3	10	300	19.5	13	9	8	17	14.5	13	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	25.5	15.5	11	8	20	17	14.5	8	17	4	12
		S35H2	35	29	4	15	475	25	16.5	11.5	8	21	17.5	15.5	8	19	4	12
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	16	11	8	8	15	12.5	11	8	12	4	12
		S30L1	30	22	2	8	205	16.5	11.5	8	8	15	13	11.5	8	12	4	12
		S35L1	35	22	3	8	230	17	12	8	8	15.5	13.5	11.5	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	20.5	14	9.5	8	18	15	13.5	8	15	4	12
		S35H1	35	25	4	12	350	21	14.5	10	8	18.5	15.5	13.5	8	16	4	12
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	18	12.5	8.5	8	16.5	14	12	8	13	4	12
		S30L2	30	23	2	10	270	19	12.5	9	8	16.5	14	12.5	8	13	4	12
		S35L2	35	23	3	10	300	19.5	13	9	8	17	14.5	13	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	25.5	15.5	11	8	20	17	14.5	8	17	4	12
		S35H2	35	29	4	15	475	25	16.5	11.5	8	21	17.5	15.5	8	19	4	12

Fabrication Design 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. Min. base plate thickness (T) is 2.0 inches.

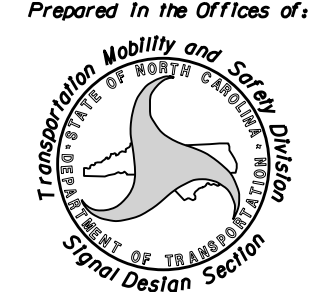
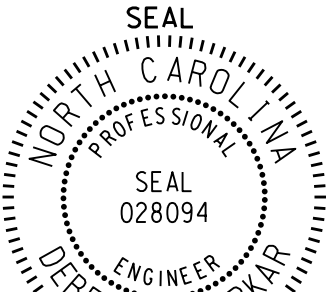
Foundation Selection:

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 in the chart based on soil type and "N" value. Select the appropriate row based on the pole load case.
The foundation depth is the value where the column and the row intersect.
6. Reference Drilled Shafts: Construction Procedures and Design Methods, FHWA -IF-99-025

- S30H1 - Hard Clay-Stirrup Spacing: 6 in. c/c
- S30H2 - Hard Clay-Stirrup Spacing: 6 in. c/c
- S30H3 - Hard Clay-Stirrup Spacing: 6 in. c/c
- Dense Sand-Stirrup Spacing: 6 in. c/c
- S35H1 - Hard Clay - Stirrup Spacing: 6 in. c/c
- S35H2 - Very Stiff Clay-Stirrup Spacing: 6 in. c/c
- Hard Clay- Stirrup Spacing: 6 in. c/c
- Dense Sand- Stirrup Spacing: 6 in. c/c
- S35H3 - Very Stiff Clay-Stirrup Spacing: 6 in. c/c
- Dense Sand-Stirrup Spacing: 6 in. c/c

48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Foundation Depth

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	<p>Standard Strain Pole Foundation for Saturated Soil Condition</p> <p>PLAN DATE: SEPTEMBER 2013 DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING REVIEWED BY: D. SARKAR</p>							
<p>SCALE: 0 NA</p> <p>None</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>REVISIONS</th> <th>INIT.</th> <th>DATE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISIONS	INIT.	DATE				<p>DocuSigned by: Deborah C. Sarkar, 2/26/2014 44EBE32E147E4C4...</p>
REVISIONS	INIT.	DATE						

Standard Strain Pole Foundation - Saturated Soil Condition

DRY SOIL CONDITION

		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	Bar Size (#)	Spacing (in.)
WIND ZONE 1	LIGHT	S26L3	26	25	2	11	270	18	12.5	9	8	14.5	11	10	8	13	4	12
		S30L3	30	25	2	11	300	18.5	13	9	8	15	11.5	10	8	14	4	12
		S35L3	35	25	3	11	320	19	13.5	9.5	8	15	11.5	10.5	8	15	4	12
	HEAVY	S30H3	30	29	3	16	450	23	16	11	8	17.5	13.5	11.5	8	18	4	12
		S35H3	35	29	4	16	515	24.5	16.5	12	8.5	18.5	14	12	8	20	4	12
WIND ZONE 2	LIGHT	S26L2	26	23	2	10	245	17	12	8.5	8	14	11	9.5	8	13	4	12
		S30L2	30	23	2	10	270	18	12.5	8.5	8	14.5	11	10	8	13	4	12
		S35L2	35	23	3	10	300	18.5	13	9	8	14.5	11.5	10	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	22	15	10.5	8	17	13	11.5	8	17	4	12
		S35H2	35	29	4	15	475	23.5	16	11.5	8	18	13.5	12	8	19	4	12
WIND ZONE 3	LIGHT	S26L2	26	23	2	10	245	17	12	8.5	8	14	11	9.5	8	13	4	12
		S30L2	30	23	2	10	270	18	12.5	8.5	8	14.5	11	10	8	13	4	12
		S35L2	35	23	3	10	300	18.5	13	9	8	14.5	11.5	10	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	22	15	10.5	8	17	13	11.5	8	17	4	12
		S35H2	35	29	4	15	475	23.5	16	11.5	8	18	13.5	12	8	19	4	12
WIND ZONE 4	LIGHT	S26L1	26	22	2	8	190	15.5	10.5	8	8	13	10	9	8	12	4	12
		S30L1	30	22	2	8	205	15.5	11	8	8	13	10	9	8	12	4	12
		S35L1	35	22	3	8	230	16.5	11.5	8	8	13.5	10.5	9	8	12	4	12
	HEAVY	S30H1	30	25	3	12	320	19.5	13.5	9.5	8	15	12	10.5	8	15	4	12
		S35H1	35	25	4	12	350	20	14	10	8	15.5	12	10.5	8	15	4	12
WIND ZONE 5	LIGHT	S26L2	26	23	2	10	245	17	12	8.5	8	14	11	9.5	8	13	4	12
		S30L2	30	23	2	10	270	18	12.5	8.5	8	14.5	11	10	8	13	4	12
		S35L2	35	23	3	10	300	18.5	13	9	8	14.5	11.5	10	8	14	4	12
	HEAVY	S30H2	30	29	3	15	415	22	15	10.5	8	17	13	11.5	8	17	4	12
		S35H2	35	29	4	15	475	23.5	16	11.5	8	18	13.5	12	8	19	4	12

Fabrication Design Notes:


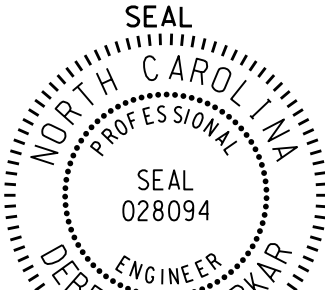
1. Values shown in the "Reactions at the Pole Base" column represent the minimum acceptable capacity allowed for design using a design CSR of 1.00.
2. Min. base plate thickness (T) is 2.0 inches.

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.
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6. Reference Drilled Shafts: Construction Procedures and Design Methods, FHWA -IF-99-025

- S30H1 - Hard Clay-Stirrup Spacing: 6 in. c/c
- Dense Sand-Stirrup Spacing: 6 in. c/c
- S30H2 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c
- Hard Clay: Stirrup Spacing: 6 in. c/c
- Medium Clay: Stirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c
- S30H3 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c
- Hard Clay: Stirrup Spacing: 6 in. c/c
- Medium Clay: Stirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c
- S35H1 - Hard Clay: tirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c
- S35H2 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c
- Hard Clay: Stirrup Spacing: 6 in. c/c
- Medium Clay: Stirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c
- S35H3 - Very Stiff Clay: Stirrup Spacing: 6 in. c/c
- Hard Clay: Stirrup Spacing: 6 in. c/c
- Medium Clay: Stirrup Spacing: 6 in. c/c
- Dense Sand: Stirrup Spacing: 6 in. c/c

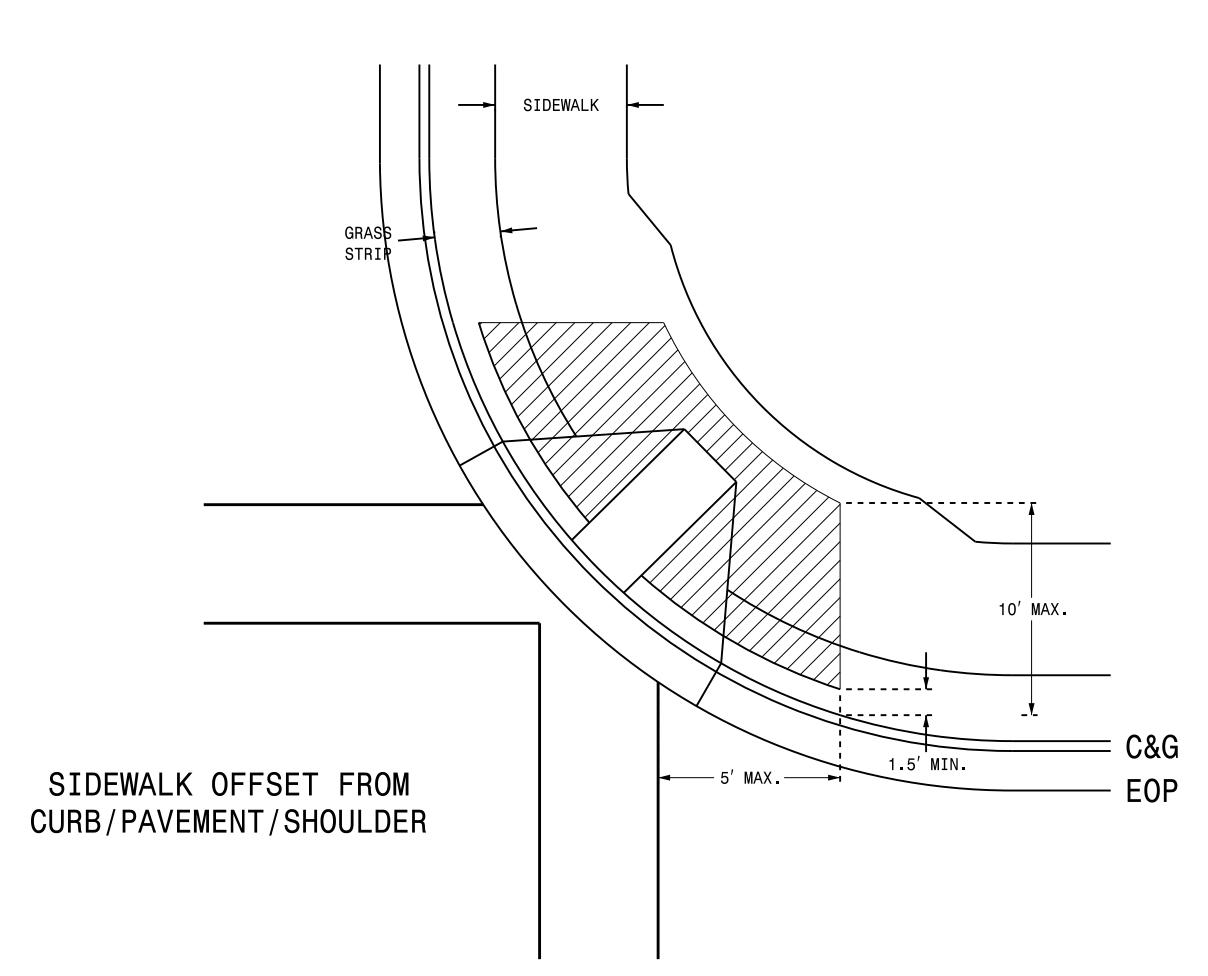
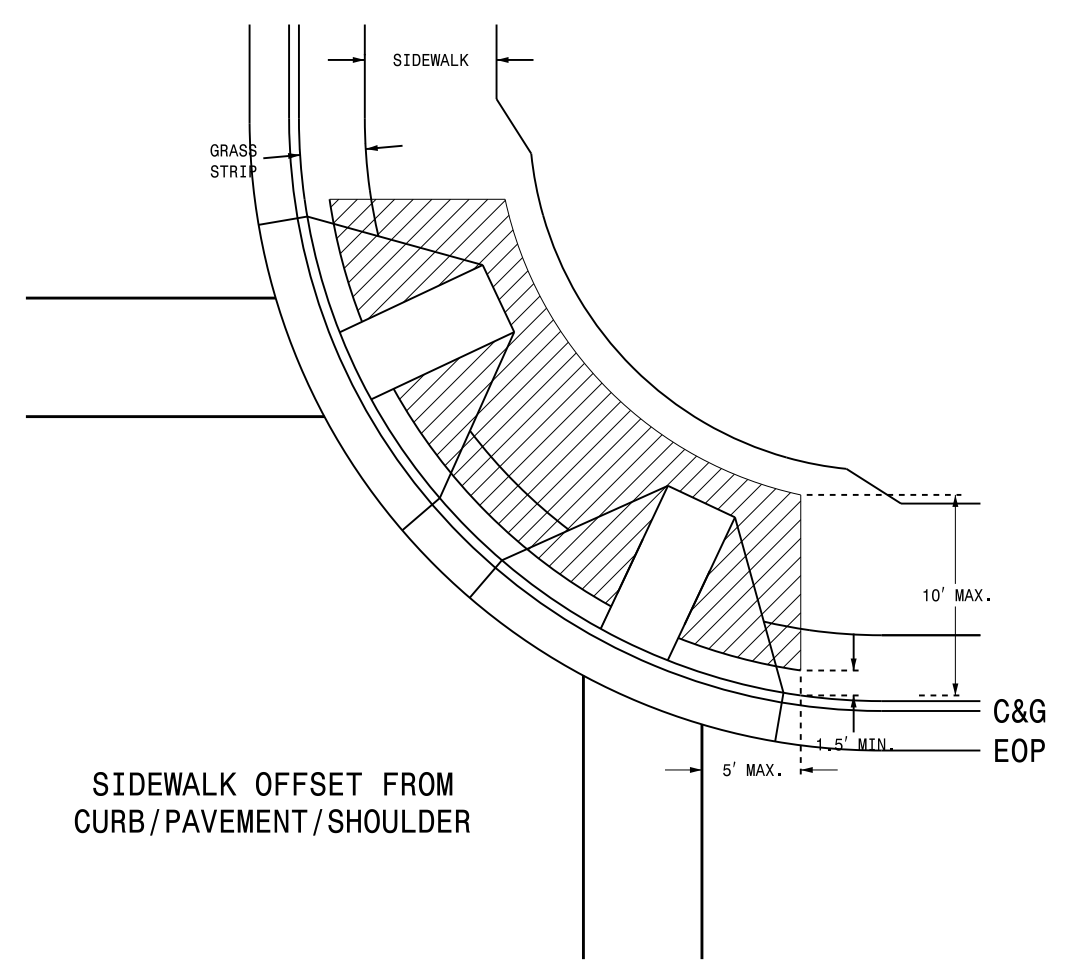
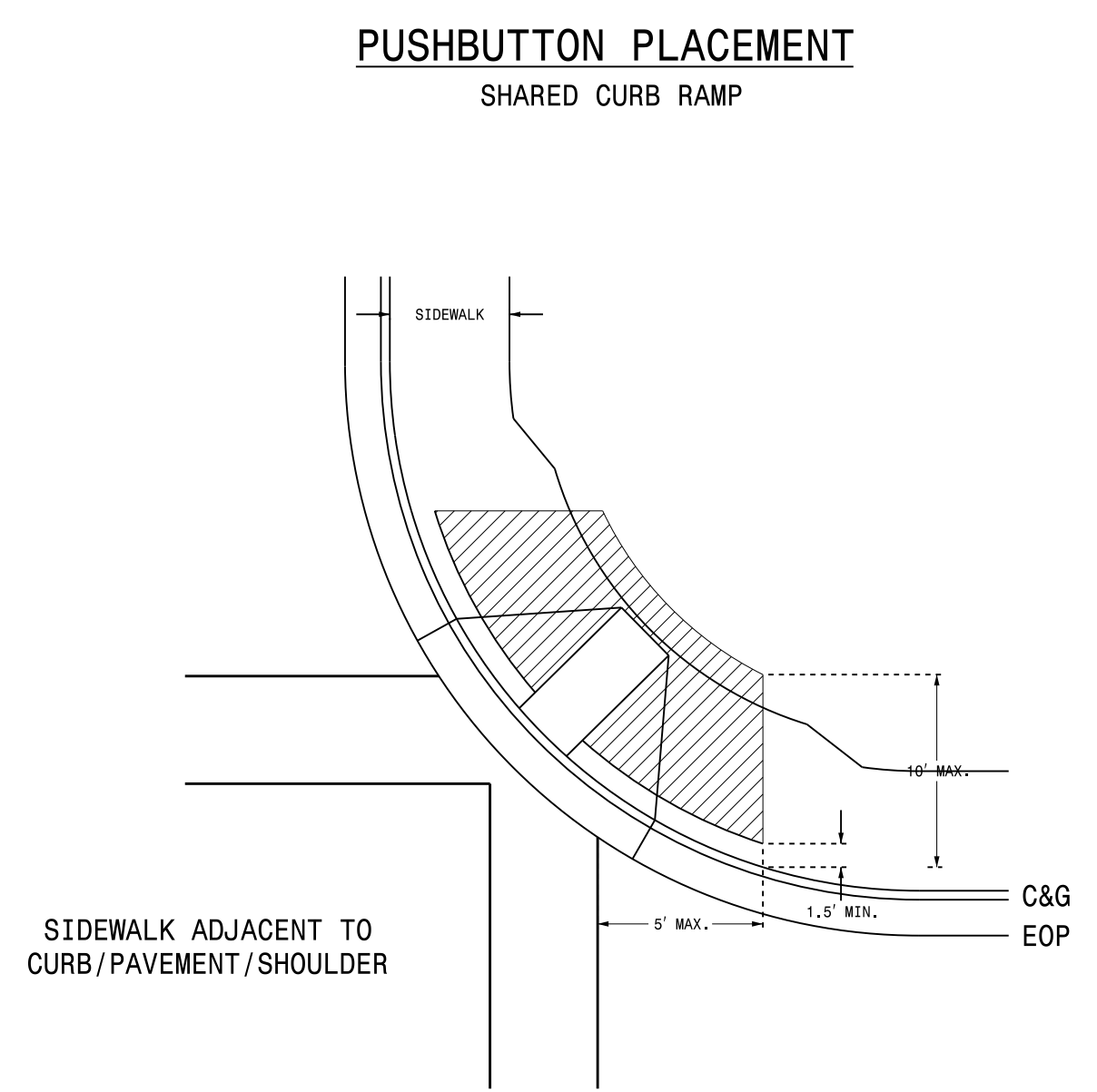
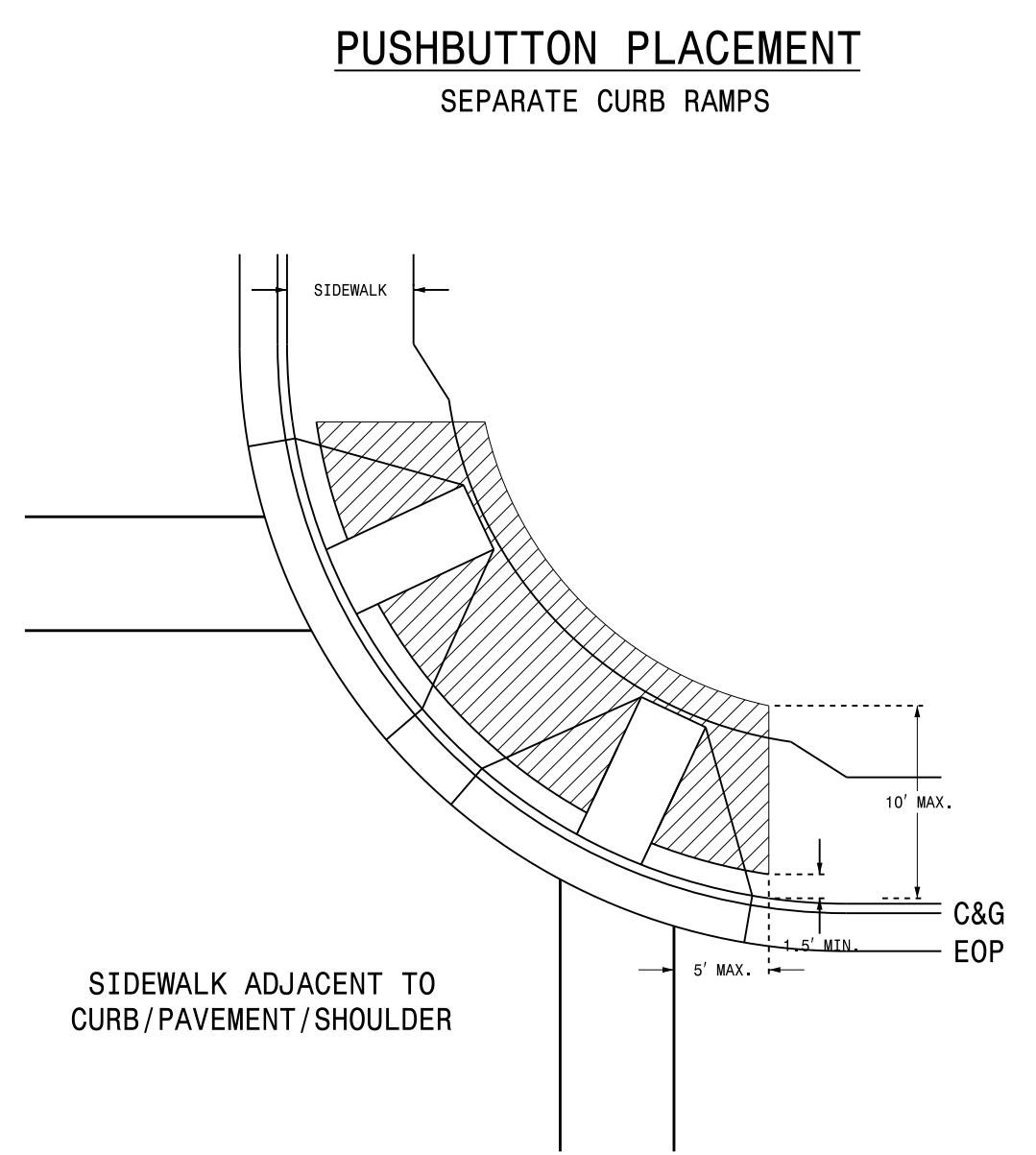
48" Dia. Foundations Concrete Volume (cubic yards) = (0.465) x Foundation Depth

	<p>Standard Strain Pole Foundation for Dry Soil Condition</p> <p>PLAN DATE: SEPTEMBER 2013 DESIGNED BY: C.B. COGDILL PREPARED BY: N. BITTING REVIEWED BY: D. SARKAR</p>	
SCALE: 0 NA None	REVISIONS: INIT. DATE	DocuSigned by: Deborah C. Sarkar 3/26/2014 44EBE32E147E4C4

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

ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
 PLACEMENT DETAIL

SHEET 1 OF 3
1705D01



- NOTES**
1. Pushbutton pedestals should not be located further than 10 feet from the edge of curb, shoulder, or pavement.
 2. The face of the pushbutton should be parallel to the applicable crosswalk.
 3. Separate pushbuttons used on the same corner should be separated by a distance of at least 10 feet.
 4. Pushbuttons shall be installed adjacent to a level surface with a maximum reach distance of 10 inches.
 5. Maintain 4 feet of clearance around pedestal if located in sidewalk.
 6. Refer to section 1705 of the 2012 NCDOT Roadway Standard Drawings for Pushbutton Assembly details.
 7. Refer to section 1743 of the 2012 NCDOT Roadway Standard Drawings for Pedestal details.
 8. Contact Division Traffic Engineer for pushbutton location approval prior to installation.
 9. Curb ramps are for symbolic use only and may not reflect actual design or field conditions.

PROPOSED	LEGEND
	Signal Pole
	Type I Pushbutton Post
	Type II Signal Pedestal
	Pushbutton & Sign
	Pedestrian Signal Head
	Curb Ramp
	Pushbutton Location Area

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

ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
 PLACEMENT DETAIL

SHEET 1 OF 3
1705D01

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway
Garner, NC 27529

SEAL

DocuSigned by:

 18084828744604

SIGNATURE DATE 6/17/2014

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

ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

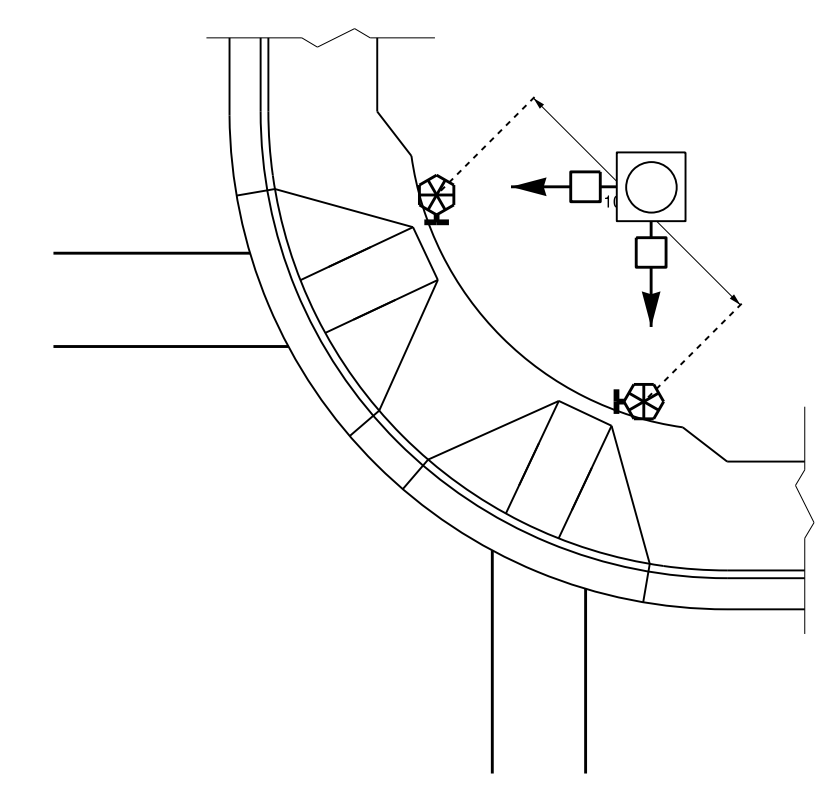
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STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

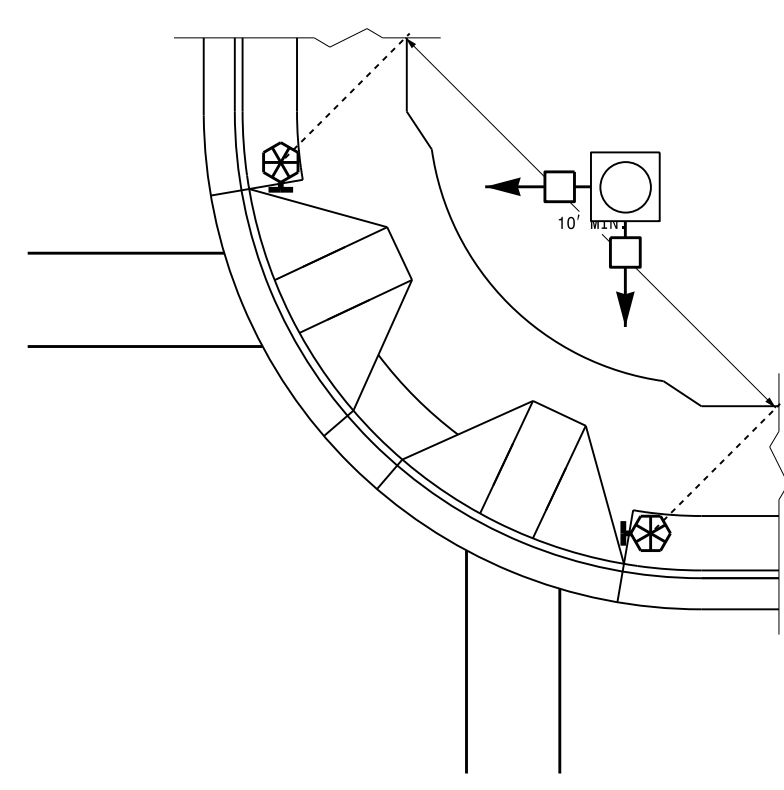
ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

SHEET 2 OF 3
1705D01

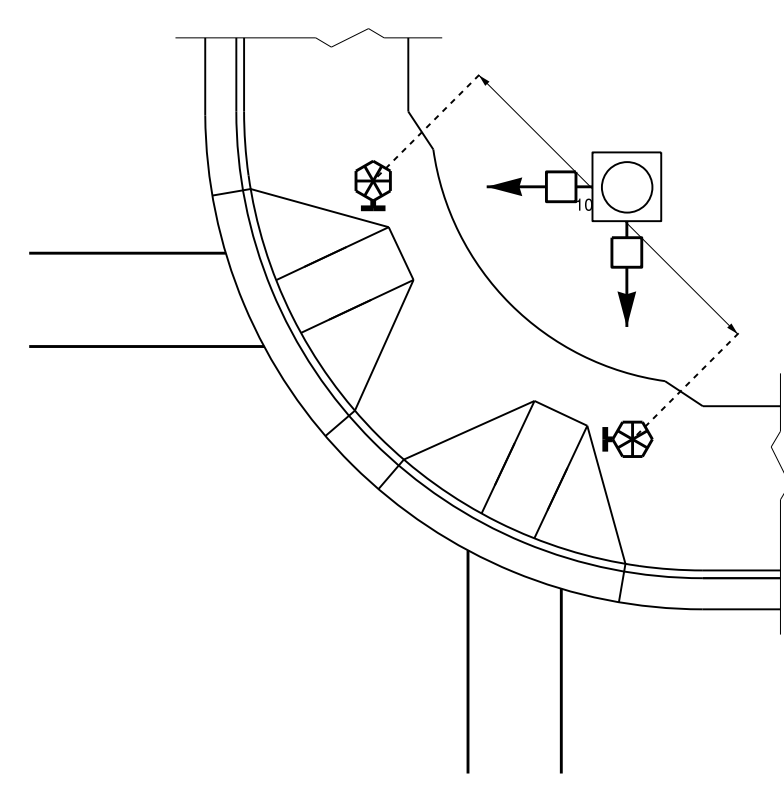
TYPICAL PUSHBUTTON LOCATIONS (CASE I)
SEPARATE CURB RAMPS W/ TYPE I PEDESTALS



BACK OF SIDEWALK IS WITHIN 10' OF CURB OR PAVEMENT/SHOULDER

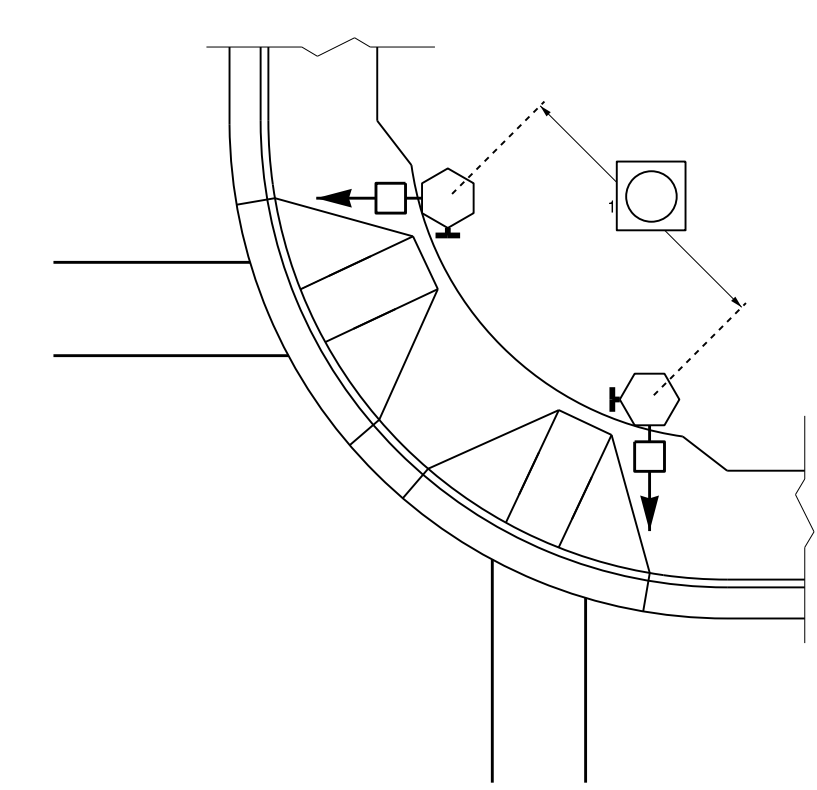


GRASS STRIP PLACEMENT IF BACK OF SIDEWALK EXCEEDS 10' FROM CURB OR PAVEMENT/SHOULDER

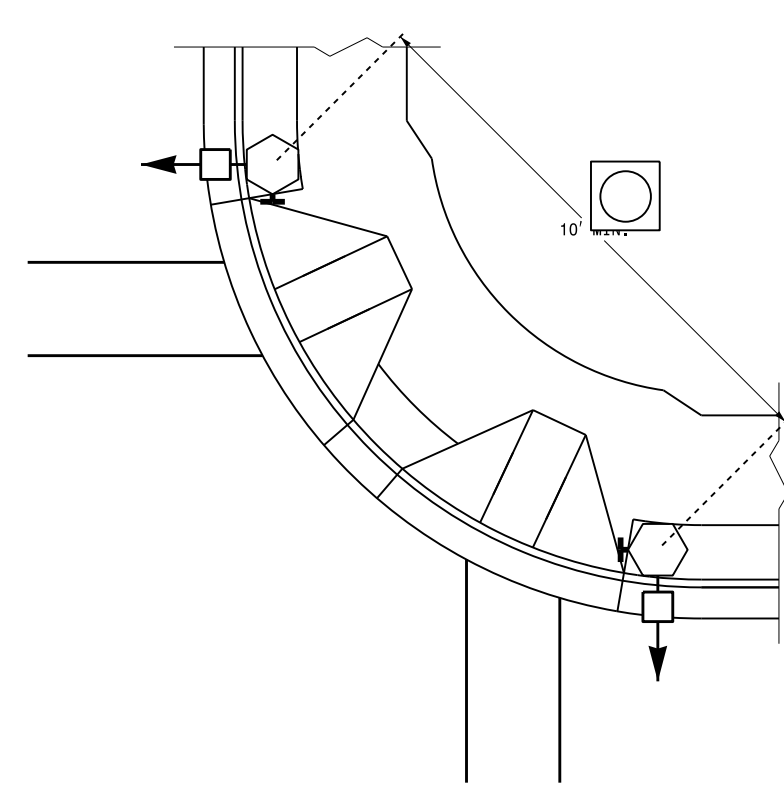


PUSHBUTTON PLACEMENT IN WIDE SIDEWALK

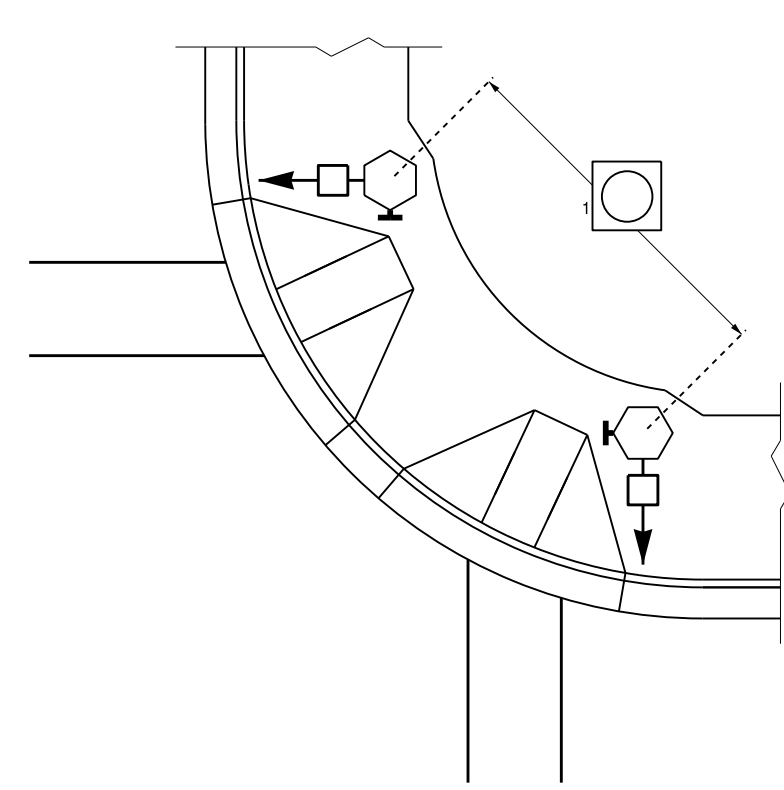
TYPICAL PUSHBUTTON LOCATIONS (CASE II)
SEPARATE CURB RAMPS W/ TYPE II PEDESTALS



BACK OF SIDEWALK IS WITHIN 10' OF CURB OR PAVEMENT/SHOULDER



GRASS STRIP PLACEMENT IF BACK OF SIDEWALK EXCEEDS 10' FROM CURB OR PAVEMENT/SHOULDER



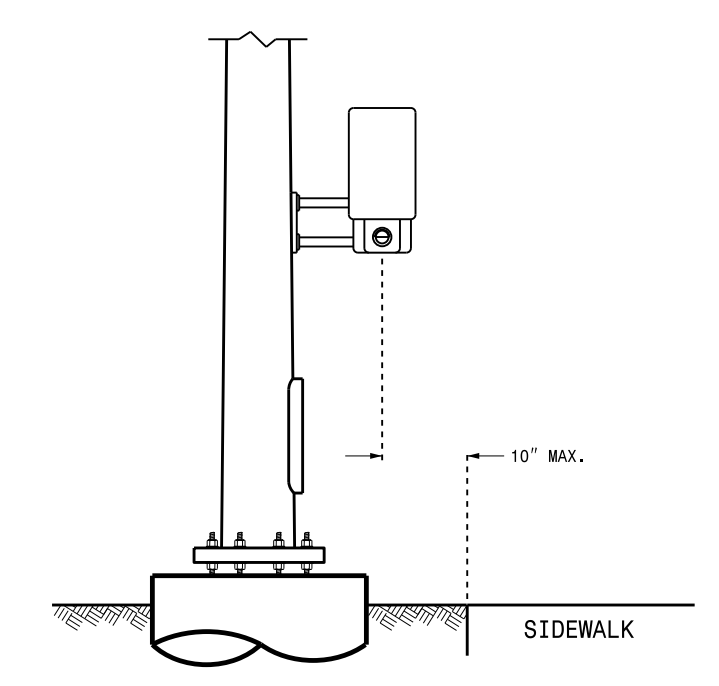
PUSHBUTTON PLACEMENT IN WIDE SIDEWALK

PROPOSED

- Signal Pole
- Type I Pushbutton Post
- Type II Signal Pedestal
- Pushbutton & Sign
- Pedestrian Signal Head
- Curb Ramp
- Pushbutton Location Area

LEGEND

OPTIONAL PUSHBUTTON EXTENSION
FACE OF PUSHBUTTON PARALLEL TO APPLICABLE CROSSWALK



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Prepared in the Offices of:

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SEAL

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Robert J. Ziemba
188B486274464

SIGNATURE DATE

6/17/2014

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

06-14

ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

SHEET 3 OF 3
1705D01

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

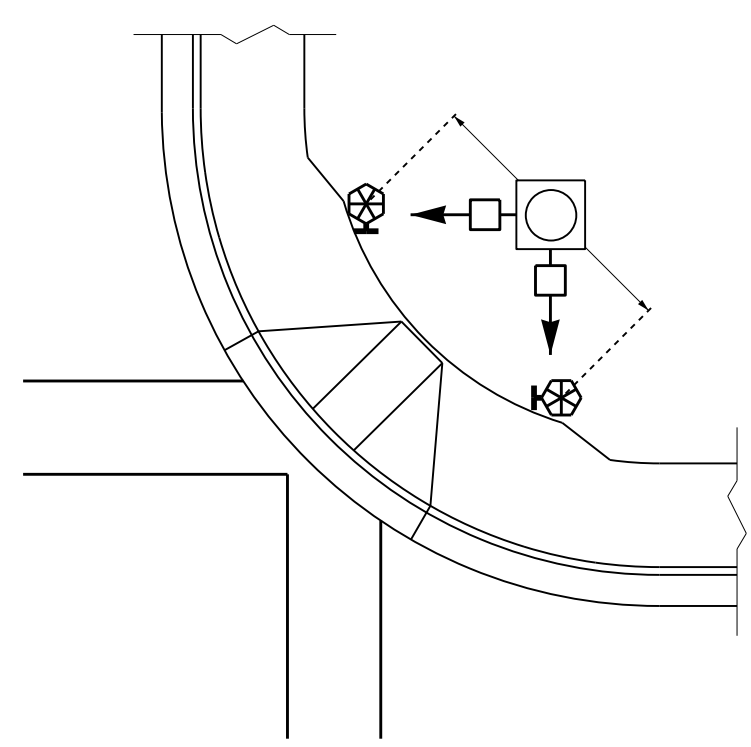
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ENGLISH DETAIL DRAWING FOR
PEDESTRIAN PUSHBUTTON LOCATIONS
PLACEMENT DETAIL

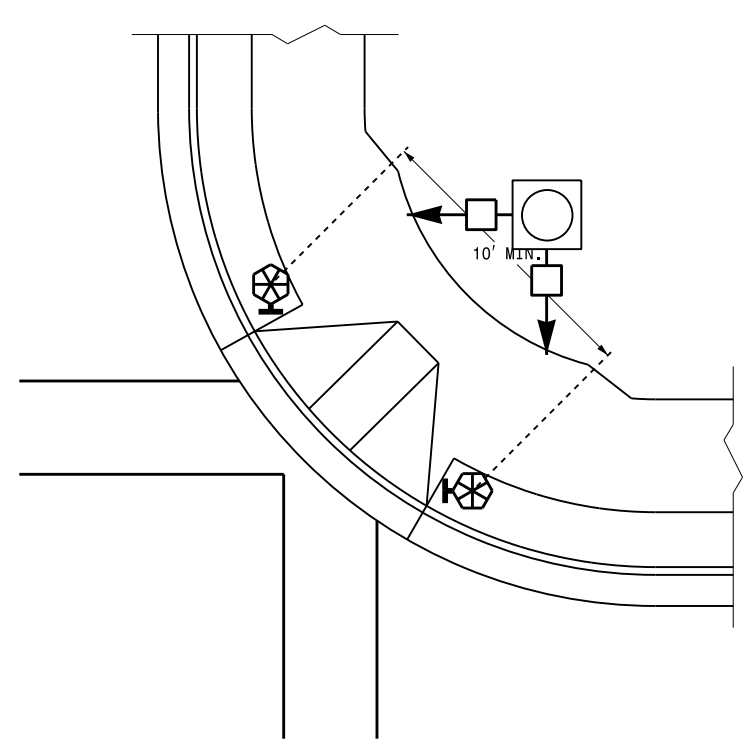
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TYPICAL PUSHBUTTON LOCATIONS (CASE III)

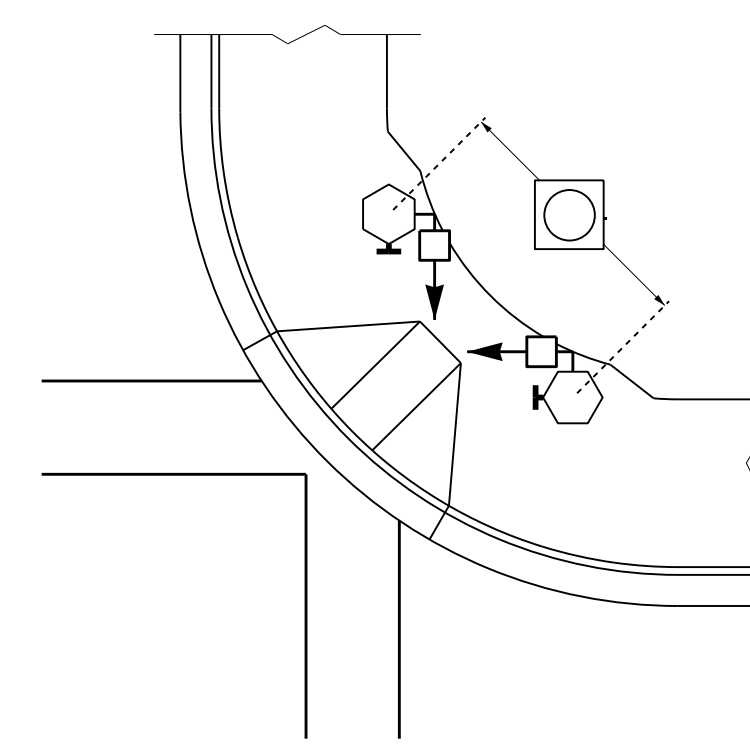
SHARED CURB RAMPS



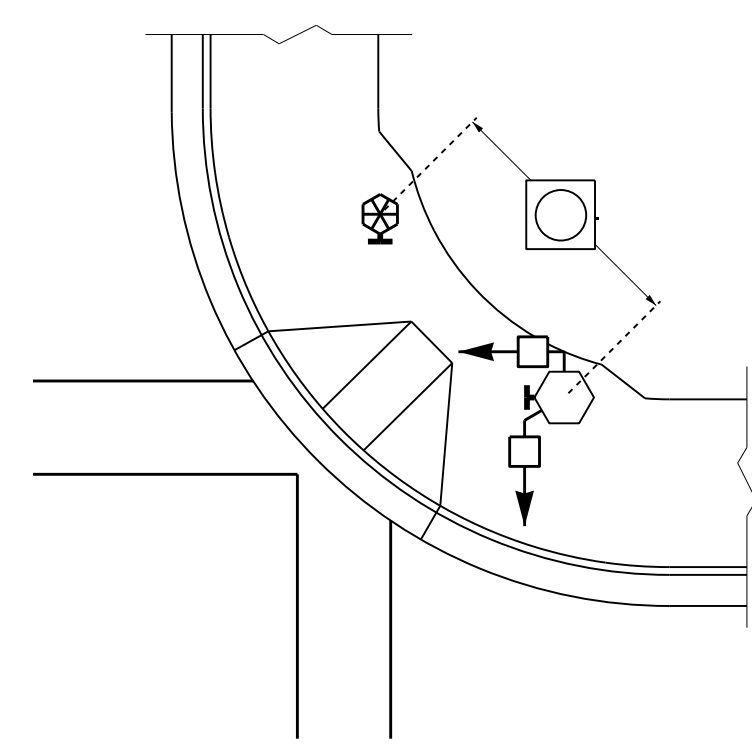
BACK OF SIDEWALK IS WITHIN 10' OF CURB OR PAVEMENT/SHOULDER



GRASS STRIP PLACEMENT IF BACK OF SIDEWALK EXCEEDS 10' FROM CURB OR PAVEMENT/SHOULDER

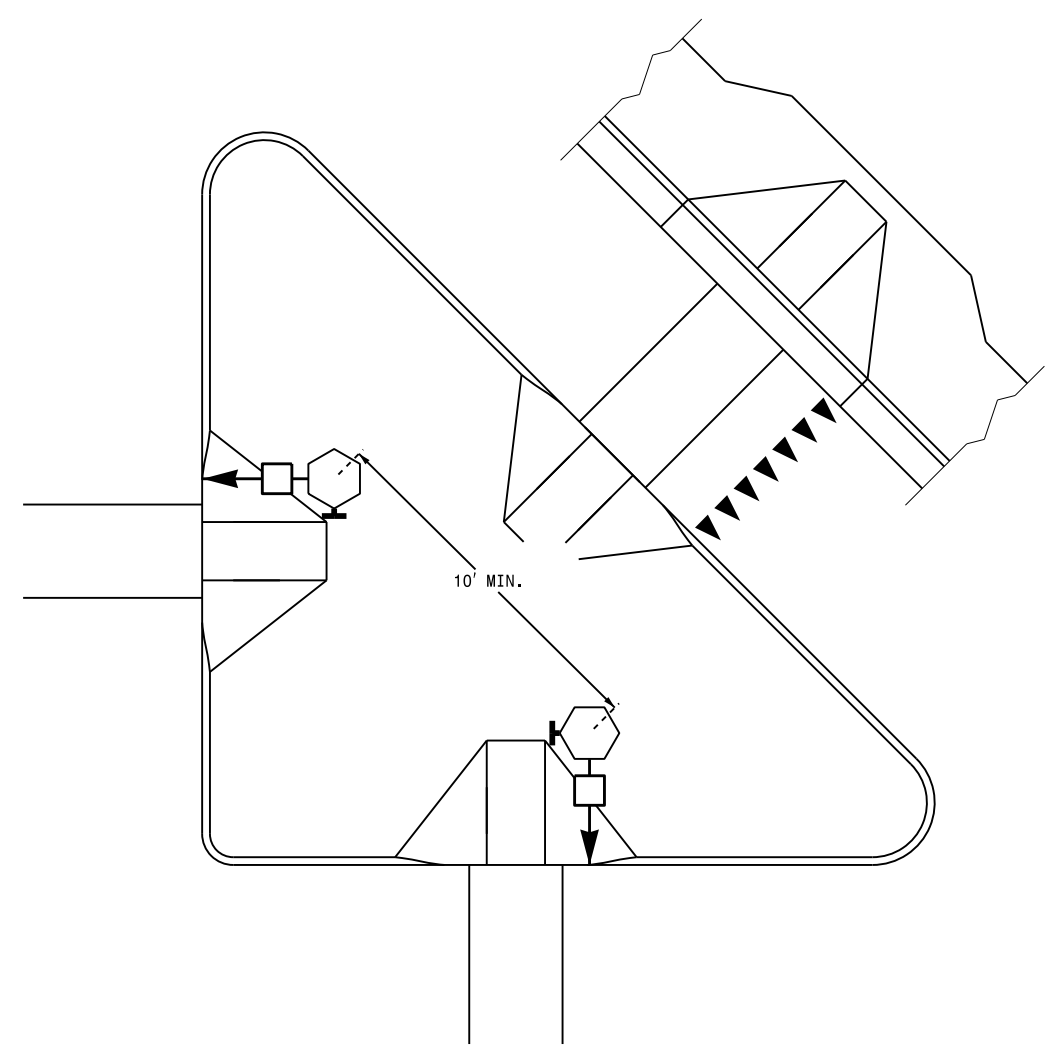


PUSHBUTTON PLACEMENT IN WIDE SIDEWALK (CORRESPONDING PUSHBUTTONS AND SIGNAL HEADS ON DIFFERENT PEDESTALS)

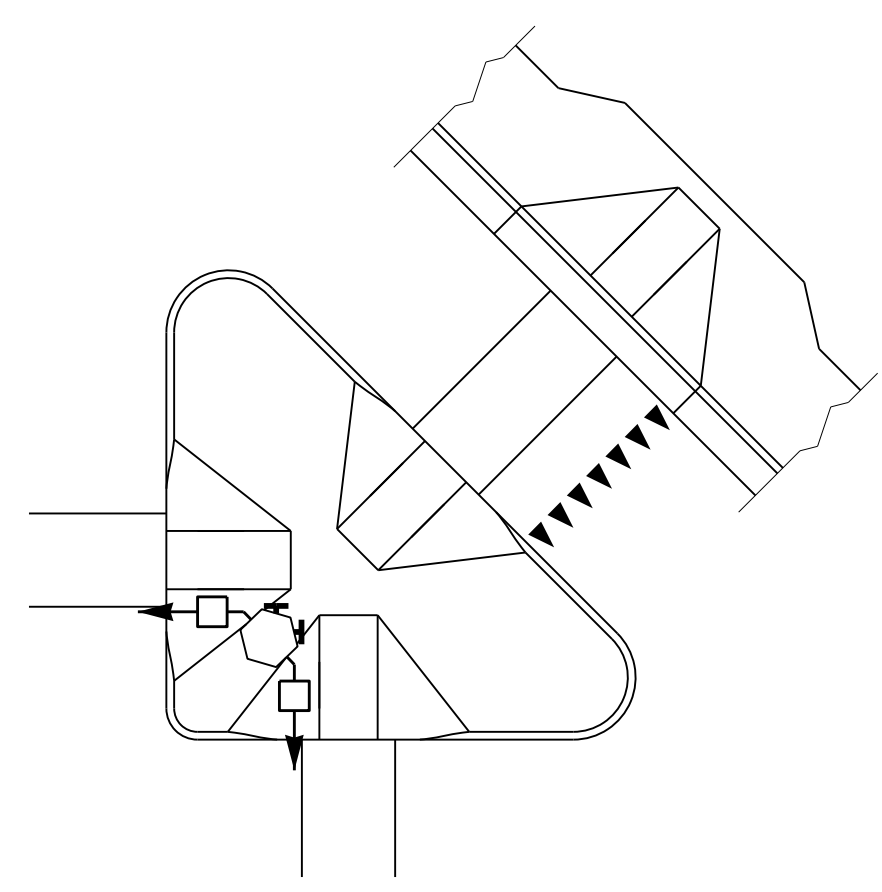


PUSHBUTTON PLACEMENT WITH SHARED TYPE II SIGNAL PEDESTAL AND TYPE I PUSHBUTTON POST

TRAFFIC ISLAND PUSHBUTTON LOCATIONS



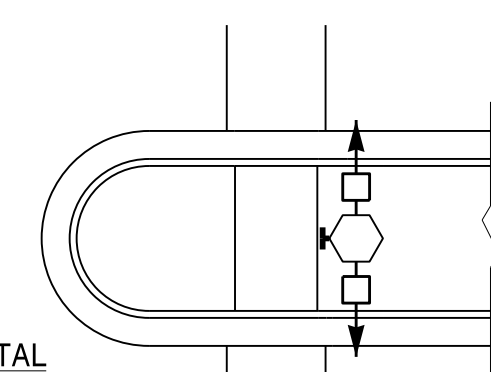
PUSHBUTTON PLACEMENT IN LARGE "PORK CHOP ISLAND" WITH SEPARATE PEDESTALS



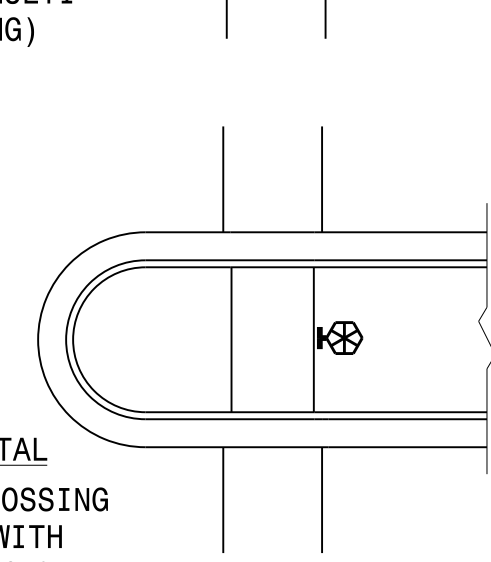
PUSHBUTTON PLACEMENT IN SMALL "PORK CHOP ISLAND" WITH SHARED PEDESTAL

PUSHBUTTON PLACEMENT IN MEDIAN

TYPE II PEDESTAL (FOR STAGED OR MULTI-PHASE CROSSING)



TYPE I PEDESTAL (FOR COMPLETE CROSSING CURB TO CURB WITH OPTIONAL REFUGE)



PROPOSED

	Signal Pole
	Type I Pushbutton Post
	Type II Signal Pedestal
	Pushbutton & Sign
	Pedestrian Signal Head
	Curb Ramp
	Pushbutton Location Area

LEGEND

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