Project No.	Sheet No.
R-2904	Sig. 1

Project: R-2904

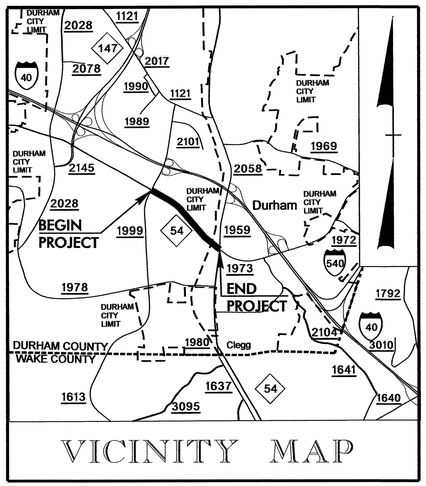
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DURHAM COUNTY

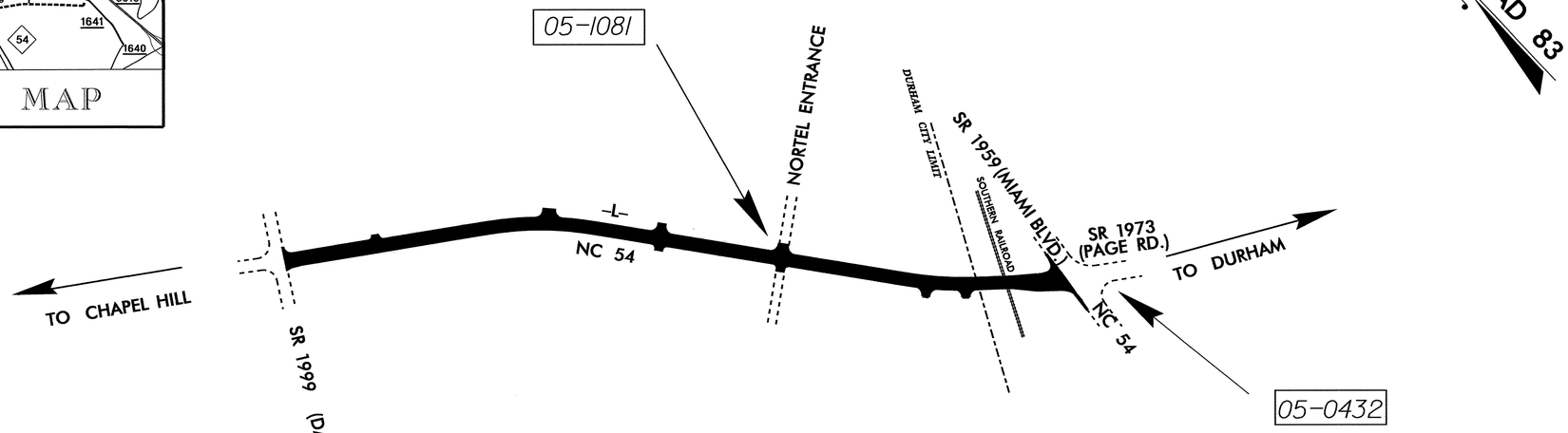
LOCATION: NC 54 FROM SR 1999 (DAVIS DRIVE) TO SR 1959 (MIAMI BLVD.)

TYPE OF WORK: TRAFFIC SIGNALS & COMMUNICATIONS CABLE

Vicinity



VICINITY MAP



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

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1	--------	Title Sheet
Sig. 2-11	05-1081	NC 54 AT NORTAL ENTRANCES
Sig. 12-19	05-0432	NC 54/SR 1959 (S. MIAMI BLVD.) AT NC 54/SR 1974 (N. SLATER ROAD)
Sig. 20-27	--------	METAL POLE DETAILS
Sig. 28-35	--------	CABLE ROUTING PLANS

INTELLIGENT TRANSPORTATION SYSTEMS & SIGNALS UNIT

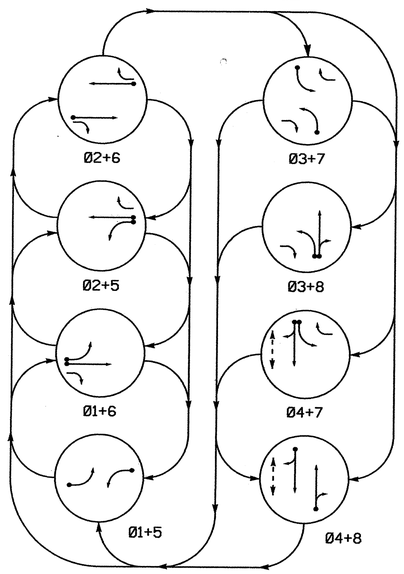
Contacts:

D. Y. Ishak – Signals and Geometrics Contracts Engineer
G. C. Brown, PE – Signal Equipment Design Engineer
G. G. Murr, Jr., PE – Intelligent Transportation Systems Engineer

Prepared in the Office of:
DIVISION OF HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

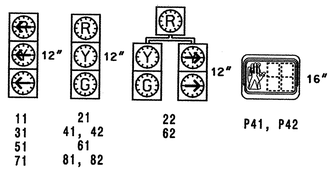
TABLE OF OPERATION

SIGNAL FACE	PHASE								
	Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH*
11	←	←	↛	↛	↛	↛	↛	↛	↛
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/	R	R/	R	Y
31	↛	↛	↛	↛	←	←	↛	↛	↛
41, 42	R	R	R	R	R	R	G	G	R
51	←	↛	←	↛	↛	↛	↛	↛	↛
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/	R/	R	R	Y
71	↛	↛	↛	↛	←	↛	←	↛	↛
81, 82	R	R	R	R	R	G	R	G	R
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

* SEE NOTE #2

SIGNAL FACE I.D.

Denotes L.E.D.



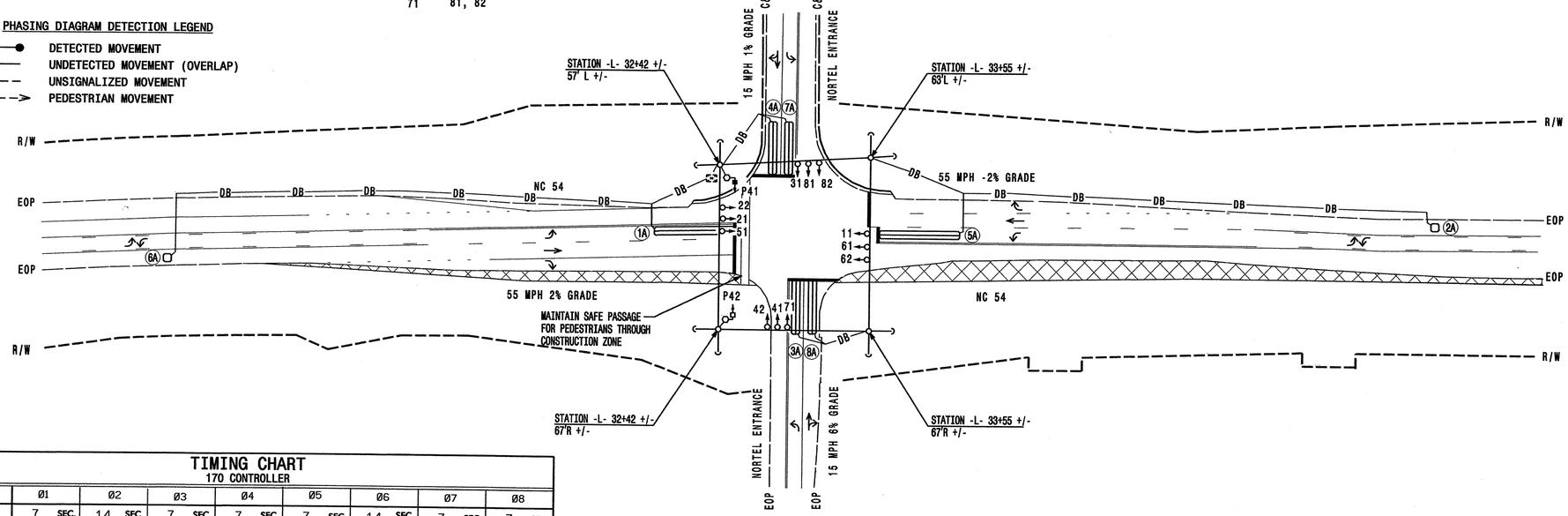
LOOP & DETECTOR UNIT INSTALLATION CHART
170 CONTROLLER AND CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		ATTRIBUTES										STATUS	
									1	2	3	4	5	6	7	8				
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY (STRETCH)	FULL TIME DESIGNATION	PEDESTRIAN CALL	RESERVED	COUNT	EXTENSION	TYPE 3	CALLING	ALTERNATE	SYSTEM LOOPS	NEW	EXISTING
1A	6X60	2-4-2	0	X	-	1	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2A	6X6	6	420	X	-	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	10 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
5A	6X60	2-4-2	0	X	-	5	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6A	6X6	6	420	X	-	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	10 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
P41,P42	-	-	-	X	-	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	-	X

8 PHASE FULLY ACTUATED (ISOLATED)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Pavement markings are existing.
4. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
5. Program pedstrain heads to countdown the flashing "Don't Walk" time only.
6. Set all detector units to presence mode.
7. Use over-length wood poles for 2 poles right of center. Field adjust all pole locations, with engineer's approval, to avoid utility conflicts.
8. Omit "Walk" and flashing "Don't Walk" with no pedstrain calls.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Pedestrian Signal Pedestal	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
DB	Direct Bury	N/A
	Right of Way with Marker	
	Directional Arrow	
	Pavement Marking Arrow	
	Construction Zone Drums	N/A
	Construction Zone	N/A

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM INITIAL	7 SEC.	14 SEC.	7 SEC.	7 SEC.	7 SEC.	14 SEC.	7 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	5.4 SEC.	3.0 SEC.	3.0 SEC.	3.0 SEC.	5.0 SEC.	3.0 SEC.	3.0 SEC.
RED CLEARANCE	2.1 SEC.	1.2 SEC.	2.8 SEC.	3.3 SEC.	2.8 SEC.	1.0 SEC.	3.3 SEC.	3.0 SEC.
MAXIMUM LIMIT	20 SEC.	90 SEC.	20 SEC.	40 SEC.	20 SEC.	90 SEC.	20 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	NONE	VEH. RECALL	NONE	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	NONE	YELLOW LOCK	NONE	NONE
DOUBLE ENTRY	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
WALK	- SEC.	- SEC.	- SEC.	7 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	- SEC.	- SEC.	17 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ADD PER VEHICLE	- SEC.	2.5 SEC.	- SEC.	- SEC.	- SEC.	2.5 SEC.	- SEC.	- SEC.
MAXIMUM INITIAL	- SEC.	46 SEC.	- SEC.	- SEC.	- SEC.	46 SEC.	- SEC.	- SEC.
MAXIMUM GAP	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.
REDUCE 0.1 SEC EVERY	- SEC.	1.5 SEC.	- SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.	- SEC.
MINIMUM GAP	1.0 SEC.	3.4 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	3.4 SEC.	1.0 SEC.	1.0 SEC.

$FILE$

$DATE$

SIGNAL UPGRADE - TEMPORARY DESIGN ONE

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 50' 1"=50'

NC 54
AT
NORTEL ENTRANCES

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE:	April 2006	REVIEWED BY:	Zachary Little
PREPARED BY:	L. Blount	REVIEWED BY:	Doumit Ishak

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA
PROFESSIONAL ENGINEER
RICHARD E. MULLINAX
SEAL 22027
21 April 06

SIGNATURE DATE

SIG. INVENTORY NO. 05-1081T1

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 3

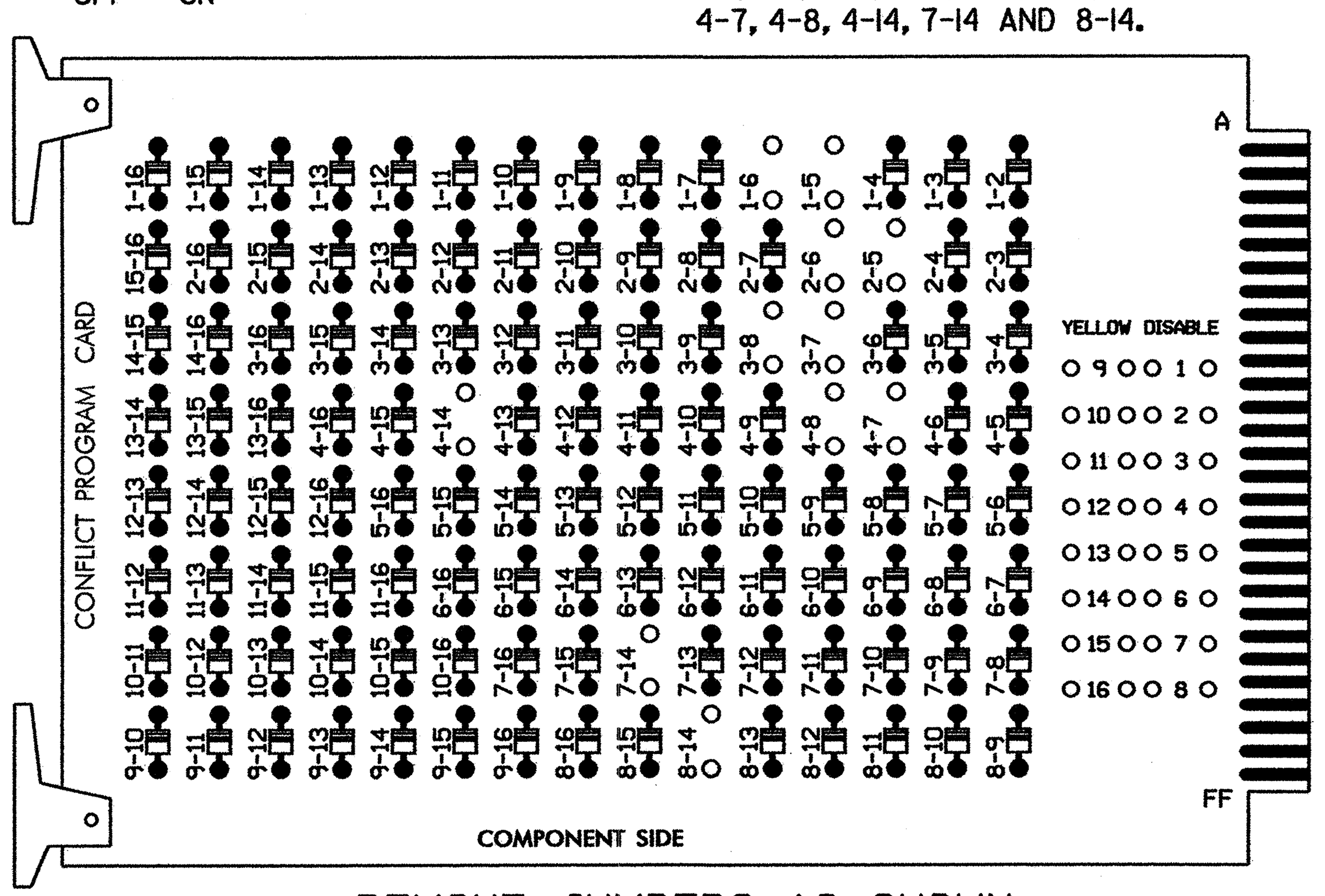
EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

WD ENABLE

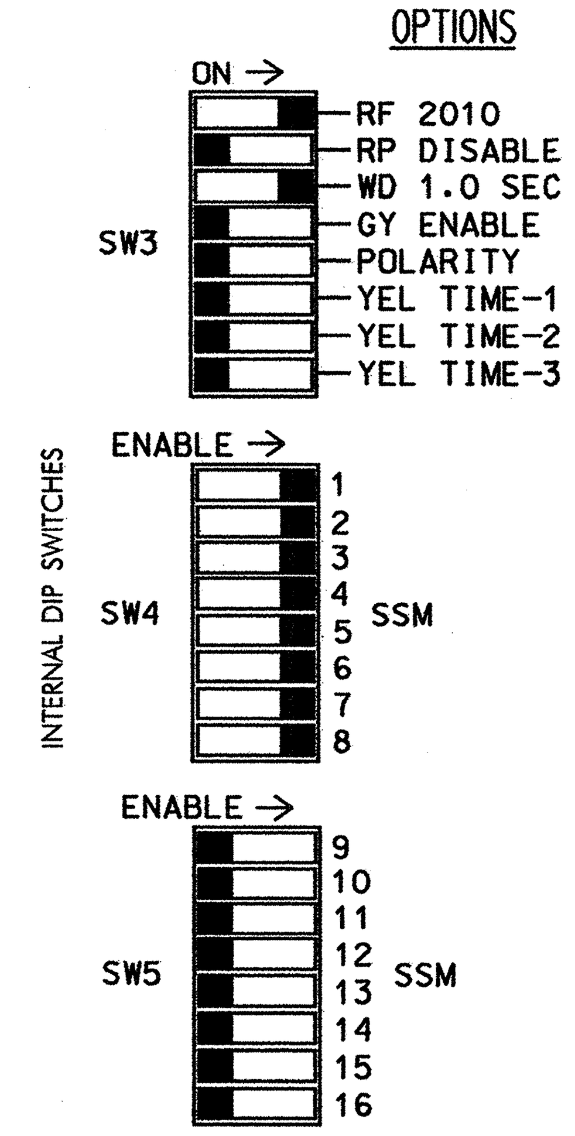
SW2 OFF ON

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 4-7, 4-8, 4-14, 7-14 AND 8-14.



REMOVE JUMPERS AS SHOWN

OPTIONS



■ = DENOTES POSITION OF SWITCH

NOTES:

1. CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
2. MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 9,10, 11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.

EQUIPMENT INFORMATION

*CONTROLLER..............McCAIN TRAFFIC TYPE 170E
*CABINET ....McCAIN TRAFFIC MODEL 332 (DWG.NO.M30117)
SOFTWARE ....BI TRANS 233NC2
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S1,S2,S3,S4,S4P,S5,S6,S7,S8
PHASES USED.............1,2,3,4,5,6,7,8,4PED
OVERLAPS................NONE

EXISTING TO REMAIN IN USE*

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4	S4P	S5	S6	S6P	S7		S8	S8P
PHASE	1	2	2 PED	3		4	4 PED	5	6	6 PED	7		8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	62	41,42	P41, P42	51	61,62	NU	22	71	81,82	NU
GREEN		130				103			136				109	
YELLOW		129				102			135				108	
RED		128				101			134				107	
RED ARROW	125			116				131				122		
YELLOW ARROW	126			117	117			132			123	123		
GREEN ARROW	127			118	118			133			124	124		
* (WALK)							106							
* (DON'T WALK)							104							

NU = NOT USED

*SEE 'COUNTDOWN PEDESTRIAN SIGNAL OPERATION' NOTE

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.

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN 4P OUTPUT AT KEYPAD INPUT E/125+F+7=ø4.

INPUT FILE POSITION LAYOUT

(front view)

FILE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	ø1 1A	ø2 2A	SLOT	SLOT	ø3 3A	ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	NOT USED	SLOT	FS DC ISOLATOR
	L	NOT USED	NOT USED	EMPTY	EMPTY	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ø4 PED DC ISOLATOR	EMPTY	ST DC ISOLATOR
FILE "J"	U	ø5 5A	ø6 6A	SLOT	SLOT	ø7 7A	ø8 8A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	NOT USED	NOT USED	EMPTY	EMPTY	NOT USED	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
1A	TB2-1,2	I1U	1	56	5 7	1
2A	TB2-5,6	I2U	2	39	4 5 7	2
3A	TB4-5,6	I5U	3	58	5 7	3
4A	TB4-9,10	I6U	4	41	5 7	4
5A	TB3-1,2	J1U	5	55	5 7	5
6A	TB3-5,6	J2U	6	40	4 5 7	6
7A	TB5-5,6	J5U	7	57	5 7	7
8A	TB5-9,10	J6U	8	42	5 7	8
PED PUSH BUTTONS						
P41, P42	TB8-5,6	I12L	9	69	2	4

NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

INPUT FILE POSITION LEGEND: J2L

FILE J
SLOT 2
LOWER

DETECTOR ATTRIBUTES LEGEND:

1-FULL TIME DELAY
2-PED CALL
3-RESERVED
4-COUNTING
5-EXTENSION
6-TYPE 3
7-CALLING
8-ALTERNATE

THIS ELECTRICAL DETAIL IS FOR THE TEMPORARY SIGNAL DESIGN: 05-1081T1
DESIGNED: APRIL 2006
SEALED: 27 APRIL 2006
REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED JULY 2004 AND SEALED 7/30/04

TEMPORARY DESIGN ONE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signals Management Section, Department of Transportation, State of North Carolina

122 N. McDowell St., Raleigh, NC 27603

NC 54
at
NORTEL ENTRANCES

DIVISION 05 DURHAM COUNTY DURHAM
PLAN DATE: APRIL 2006 REVIEWED BY: T. Joyce
PREPARED BY: F.E. RUSS REVIEWED BY:

REVISIONS INIT. DATE

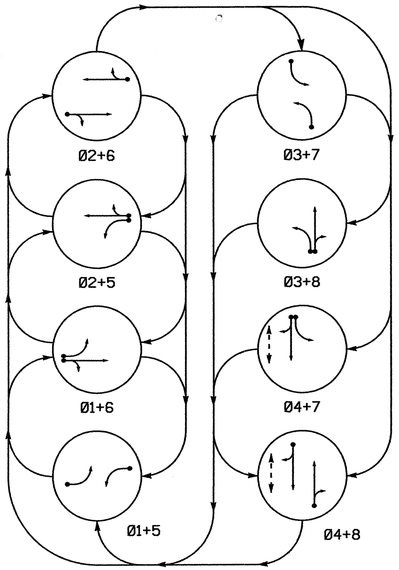
SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN

George C. Brown 5/3/06
SIGNATURE DATE

SIG. INVENTORY NO. 05-1081T1

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

SIGNAL FACE	PHASE 0 1 +5	0 1 +6	0 2 +5	0 2 +6	0 3 +7	0 3 +8	0 4 +7	0 4 +8	F* LASH
11	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

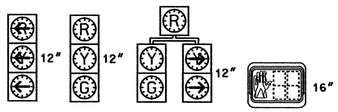
* SEE NOTE #2

LOOP & DETECTOR UNIT INSTALLATION CHART
170 CONTROLLER AND CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		ATTRIBUTES 1	2	3	4	5	6	7	8	LOOPS	STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY (STRETCH)	FULL TIME (STICK)	PEDESTRIAN CALL	RESERVED	COUNT	EXTENSION	TYPE 3	CALLING	ALTERNATE	SYSTEM	NEW	EXISTING
1A	6X60	2-4-2	0	X	-	1	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2A	6X6	6	420	X	-	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	10 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
5A	6X60	2-4-2	0	X	-	5	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6A	6X6	6	420	X	-	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
P41,P42	-	-	-	X	-	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	-	X

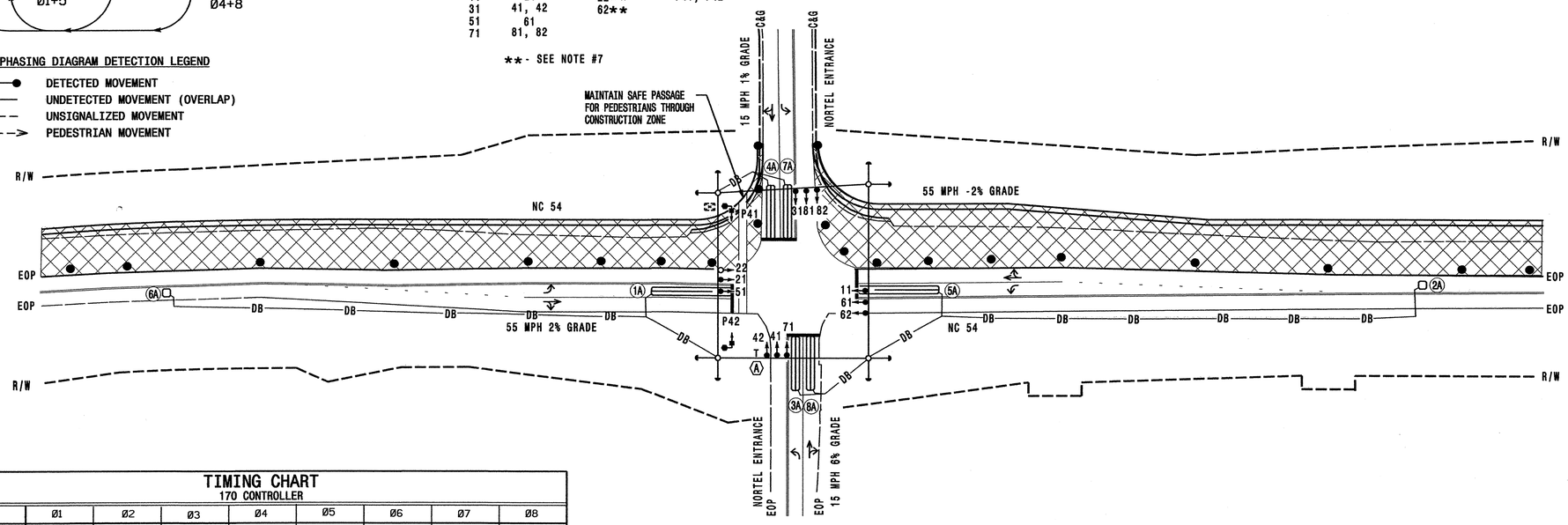
SIGNAL FACE I.D.

Denotes L.E.D.



11, 31, 51, 71 — 21, 41, 42, 61, 81, 82 — 22** 62** — P41, P42

** - SEE NOTE #7



TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM INITIAL	7 SEC.	14 SEC.	7 SEC.	7 SEC.	7 SEC.	14 SEC.	7 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	5.4 SEC.	3.0 SEC.	3.0 SEC.	3.0 SEC.	5.0 SEC.	3.0 SEC.	3.0 SEC.
RED CLEARANCE	1.9 SEC.	1.1 SEC.	2.8 SEC.	2.8 SEC.	2.1 SEC.	1.0 SEC.	2.5 SEC.	2.5 SEC.
MAXIMUM LIMIT	20 SEC.	90 SEC.	20 SEC.	40 SEC.	20 SEC.	90 SEC.	20 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	NONE	VEH. RECALL	NONE	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	NONE	YELLOW LOCK	NONE	NONE
DOUBLE ENTRY	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
WALK	– SEC.	– SEC.	– SEC.	7 SEC.	– SEC.	– SEC.	– SEC.	– SEC.
FLASHING DON'T WALK	– SEC.	– SEC.	– SEC.	19 SEC.	– SEC.	– SEC.	– SEC.	– SEC.
TYPE 3 LIMIT	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.
ALTERNATE EXTENSION	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.
ADD PER VEHICLE	– SEC.	2.5 SEC.	– SEC.	– SEC.	– SEC.	2.5 SEC.	– SEC.	– SEC.
MAXIMUM INITIAL	– SEC.	46 SEC.	– SEC.	– SEC.	– SEC.	46 SEC.	– SEC.	– SEC.
MAXIMUM GAP	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.
REDUCE 0.1 SEC EVERY	– SEC.	1.5 SEC.	– SEC.	– SEC.	– SEC.	1.5 SEC.	– SEC.	– SEC.
MINIMUM GAP	1.0 SEC.	3.4 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	3.4 SEC.	1.0 SEC.	1.0 SEC.

8 PHASE
FULLY ACTUATED
(ISOLATED)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads numbered # 11, 21, 51 and 61.
4. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
5. Program pedstrain heads to countdown the flashing "Don't Walk" time only.
6. Set all detector units to presence mode.
7. De-energize and bag arrow signal faces on heads 22 and 62.
8. Omit "Walk" and flashing "Don't Walk" with no pedstrain calls.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Pedestrian Signal Pedestal	
	Signal Pole with Guy	
	Signal Pole With Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
DB	Direct Bury	N/A
	Right of Way with Marker	
	Directional Arrow	
	Pavement Marking Arrow	
	Construction Zone Drums	N/A
	Construction Zone	N/A
Ⓐ	"NO TURN ON RED" Sign (R10-11)	Ⓐ

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

SIGNAL UPGRADE - TEMPORARY DESIGN TWO

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 50' 1"=50'

NC 54
AT
NORTEL ENTRANCES

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE: April 2006 REVIEWED BY: Zachary Little

PREPARED BY: L. Blount REVIEWED BY: Doumit Ishak

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22027 JOHN E. MULLINAX
27 April 2006

SIGNATURE DATE

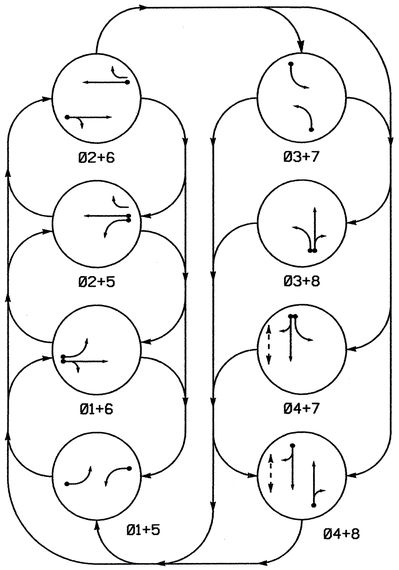
SIG. INVENTORY NO. 05-1081T2

$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 5

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

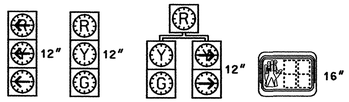
SIGNAL FACE	PHASE 01+05	01+06	02+05	02+06	03+07	03+08	04+07	04+08	FLASH*
11	←	←	↛	↛	↛	↛	↛	↛	↛
21, 22	R	R	G	G	R	R	R	R	Y
31	↛	↛	↛	↛	←	←	↛	↛	↛
41, 42	R	R	R	R	R	R	G	G	R
51	←	↛	←	↛	↛	↛	↛	↛	↛
61, 62	R	G	R	G	R	R	R	R	Y
71	↛	↛	↛	↛	←	↛	←	↛	↛
81, 82	R	R	R	R	R	G	R	G	R
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

* SEE NOTE #2

SIGNAL FACE I.D.

Denotes L.E.D.

** SEE NOTE #7



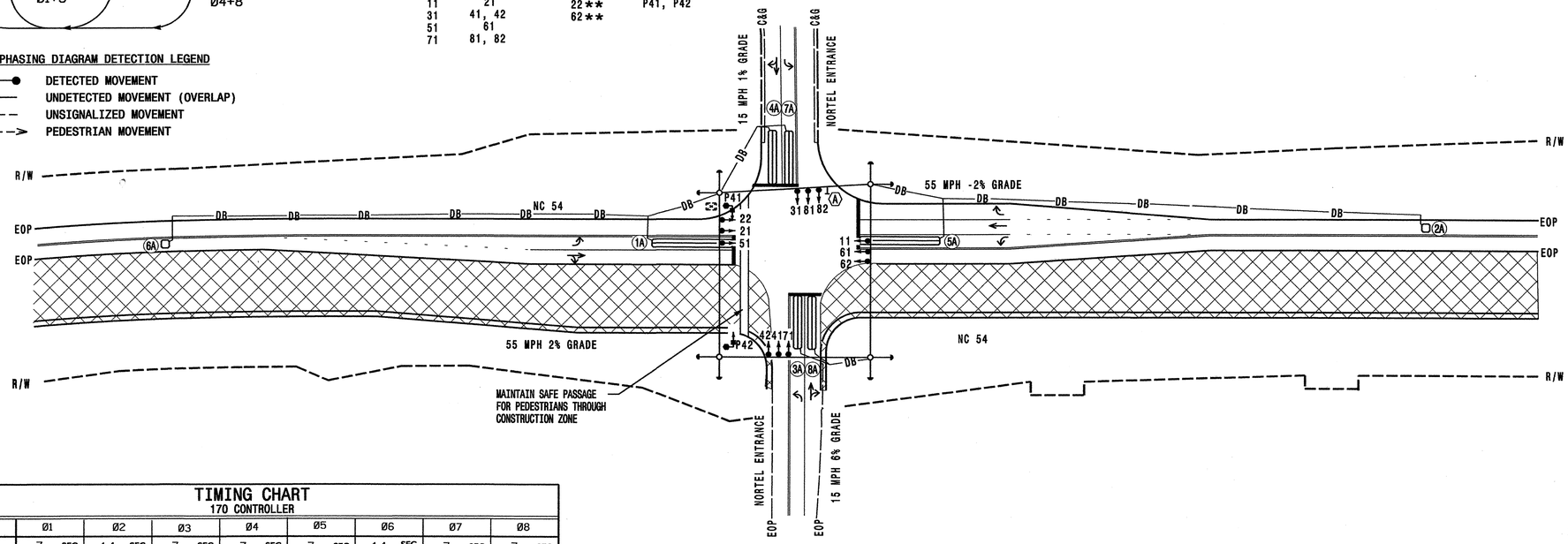
LOOP & DETECTOR UNIT INSTALLATION CHART
170 CONTROLLER AND CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		ATTRIBUTES									LOOPS	STATUS	
									1	2	3	4	5	6	7	8				
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY (STRETCH)	FULL TIME DELAY	PEDESTRIAN CALL	RESERVED	COUNT	EXTENSION	TYPE 3	CALLING	ALTERNATE	SYSTEM	NEW	EXISTING
1A	6X60	2-4-2	0	X	-	1	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2A	6X6	6	420	X	-	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	10 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
5A	6X60	2-4-2	0	X	-	5	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6A	6X6	6	420	X	-	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
P41,P42	-	-	-	X	-	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	-	X

8 PHASE FULLY ACTUATED (ISOLATED)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads numbered 11, 21, 22, 51 61 and 62.
4. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Set all detector units to presence mode.
7. De-energize and bag arrow signal faces on heads 22 and 62.
8. Program pedstrain heads to countdown the flashing "Don't Walk" time only.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▯↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Pedestrian Signal Pedestal	●
○	Signal Pole with Guy	●
○↴	Signal Pole with Sidewalk Guy	●↴
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊡
□	Junction Box	■
----	2-in Underground Conduit	----
—DB—	Direct Bury	N/A
—▲—	Right of Way with Marker	—△—
→	Directional Arrow	→
→	Pavement Marking Arrow	→
● ● ●	Construction Zone Drums	N/A
⊠	Construction Zone	N/A
Ⓐ	"NO TURN ON RED" Sign (R10-11)	Ⓐ

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM INITIAL	7 SEC.	14 SEC.	7 SEC.	7 SEC.	7 SEC.	14 SEC.	7 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	5.4 SEC.	3.0 SEC.	3.0 SEC.	3.0 SEC.	5.0 SEC.	3.0 SEC.	3.0 SEC.
RED CLEARANCE	2.1 SEC.	1.1 SEC.	3.0 SEC.	3.0 SEC.	2.1 SEC.	1.0 SEC.	2.8 SEC.	3.0 SEC.
MAXIMUM LIMIT	20 SEC.	90 SEC.	20 SEC.	40 SEC.	20 SEC.	90 SEC.	20 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	NONE	VEH. RECALL	NONE	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	NONE	YELLOW LOCK	NONE	NONE
DOUBLE ENTRY	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
WALK	- SEC.	- SEC.	- SEC.	7 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	- SEC.	- SEC.	24 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ADD PER VEHICLE	- SEC.	2.5 SEC.	- SEC.	- SEC.	- SEC.	2.5 SEC.	- SEC.	- SEC.
MAXIMUM INITIAL	- SEC.	46 SEC.	- SEC.	- SEC.	- SEC.	46 SEC.	- SEC.	- SEC.
MAXIMUM GAP	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.
REDUCE 0.1 SEC EVERY	- SEC.	1.5 SEC.	- SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.	- SEC.
MINIMUM GAP	1.0 SEC.	3.4 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	3.4 SEC.	1.0 SEC.	1.0 SEC.

$FILES

$DATES

SIGNAL UPGRADE - TEMPORARY DESIGN THREE

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 50' 1"=50'

NC 54
AT
NORTEL ENTRANCES

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE:	April 2006	REVIEWED BY:	Zachary Little
PREPARED BY:	L. Blount	REVIEWED BY:	Doumit Ishak

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32027 ENGINEER RAYMOND E. MULLINAX
27 April 2006

SIGNATURE DATE

SIG. INVENTORY NO. 05-1081T3

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 6

! -----> NO CHANGES FROM TEMPORARY ONE

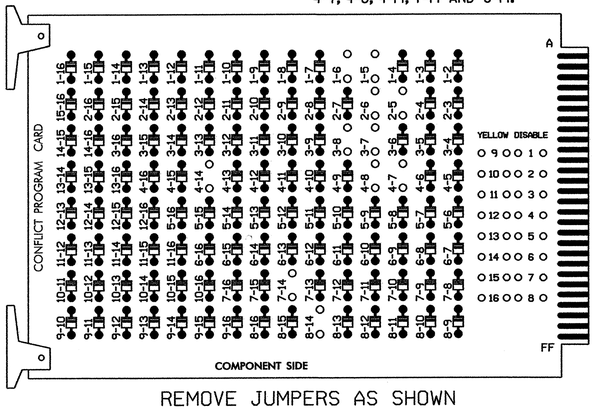
EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

WD ENABLE

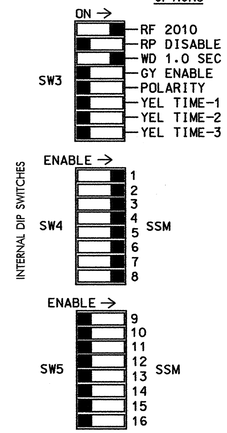
SW2 OFF ON

REMOVE DIODE JUMPERS 1-5, 1-6, 2-5, 2-6, 3-7, 3-8, 4-7, 4-8, 4-14, 7-14 AND 8-14.



REMOVE JUMPERS AS SHOWN

OPTIONS



■ = DENOTES POSITION OF SWITCH

NOTES:

1. CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
2. MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 9,10, 11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4	S4P	S5	S6	S6P	S7		S8	S8P
PHASE	1	2	2 PED	3		4	4 PED	5	6	6 PED	7		8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	62	41,42	P41, P42	51	61,62	NU	22	71	81,82	NU
GREEN		130				103			136				109	
YELLOW		129				102			135				108	
RED		128				101			134				107	
RED ARROW	125			116				131				122		
YELLOW ARROW	126			117				132				123		
GREEN ARROW	127			118				133				124		
*							106							
*							104							

NU = NOT USED

RIGHT-TURN ARROW SECTIONS OF HEADS 22 AND 62 WILL BE BAGGED AND NOT USED DURING TEMPORARY DESIGNS TWO AND THREE. DISCONNECT, COIL AND TAPE FIELD TERMINAL WIRES FOR THESE SECTIONS. LEAVE FOR FUTURE RE-CONNECTION.

*SEE 'COUNTDOWN PEDESTRIAN SIGNAL OPERATION' NOTE

EQUIPMENT INFORMATION

*CONTROLLER.....McCAIN TRAFFIC TYPE 170E
*CABINET .....McCAIN TRAFFIC MODEL 332 (DWG.NO.M30117)
SOFTWARE .....BI TRANS 233NC2
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S4P,S5,S6,S7,S8
PHASES USED.....1,2,3,4,5,6,7,8,4PED
OVERLAPS.....NONE

EXISTING TO REMAIN IN USE*

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.

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN 4P OUTPUT AT KEYPAD INPUT E/125+F+7=ø4.

! -----> NO CHANGES FROM TEMPORARY ONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	ø1 1A	ø2 2A	SLOT EMPTY	SLOT EMPTY	ø3 3A	ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED			NOT USED	NOT USED						ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	ø5 5A	ø6 6A	SLOT EMPTY	SLOT EMPTY	ø7 7A	ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED			NOT USED	NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

! -----> NO CHANGES FROM TEMPORARY ONE

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
1A	TB2-1,2	I1U	1	56	5 7	1
2A	TB2-5,6	I2U	2	39	4 5 7	2
3A	TB4-5,6	I5U	3	58	5 7	3
4A	TB4-9,10	I6U	4	41	5 7	4
5A	TB3-1,2	J1U	5	55	5 7	5
6A	TB3-5,6	J2U	6	40	4 5 7	6
7A	TB5-5,6	J5U	7	57	5 7	7
8A	TB5-9,10	J6U	8	42	5 7	8
PED PUSH BUTTONS						
P41, P42	TB8-5,6	I12L	9	69	2	4

NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

INPUT FILE POSITION LEGEND: J2L
- FILE J
- SLOT 2
- LOWER

DETECTOR ATTRIBUTES LEGEND:
1-FULL TIME DELAY
2-PED CALL
3-RESERVED
4-COUNTING
5-EXTENSION
6-TYPE 3
7-CALLING
8-ALTERNATE

THIS ELECTRICAL DETAIL IS FOR THE TEMPORARY SIGNAL DESIGNS: 05-1081T2, 05-1081T3
DESIGNED: APRIL 2006
SEALED: 27 APRIL 2006
REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED JULY 2004 AND SEALED 7/30/04

TEMPORARY DESIGN TWO
TEMPORARY DESIGN THREE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54
at
NORTEL ENTRANCES

DIVISION 05 DURHAM COUNTY DURHAM

PLAN DATE: APRIL 2006 REVIEWED BY: T. Joyce
PREPARED BY: F.E. RUSS REVIEWED BY:

REVISIONS	INIT.	DATE

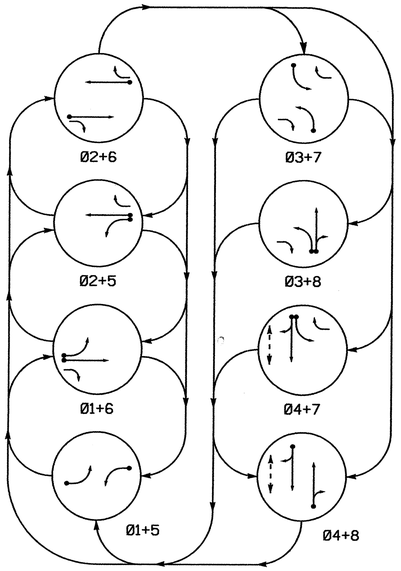
Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 5/3/06
SIGNATURE DATE
SIG. INV. NO. 05-1081T2,T3

02-MAY-2006 08:47
u:\#drawings\1700wgs\051081_sm.ele_200605xx.dgn
feruss

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 7

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

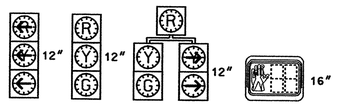
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH*
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/←	R	R/←	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/←	R/←	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	←	~~R~~
81, 82	R	R	R	R	R	G	R	G	R
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

* SEE NOTE #2

SIGNAL FACE I.D.

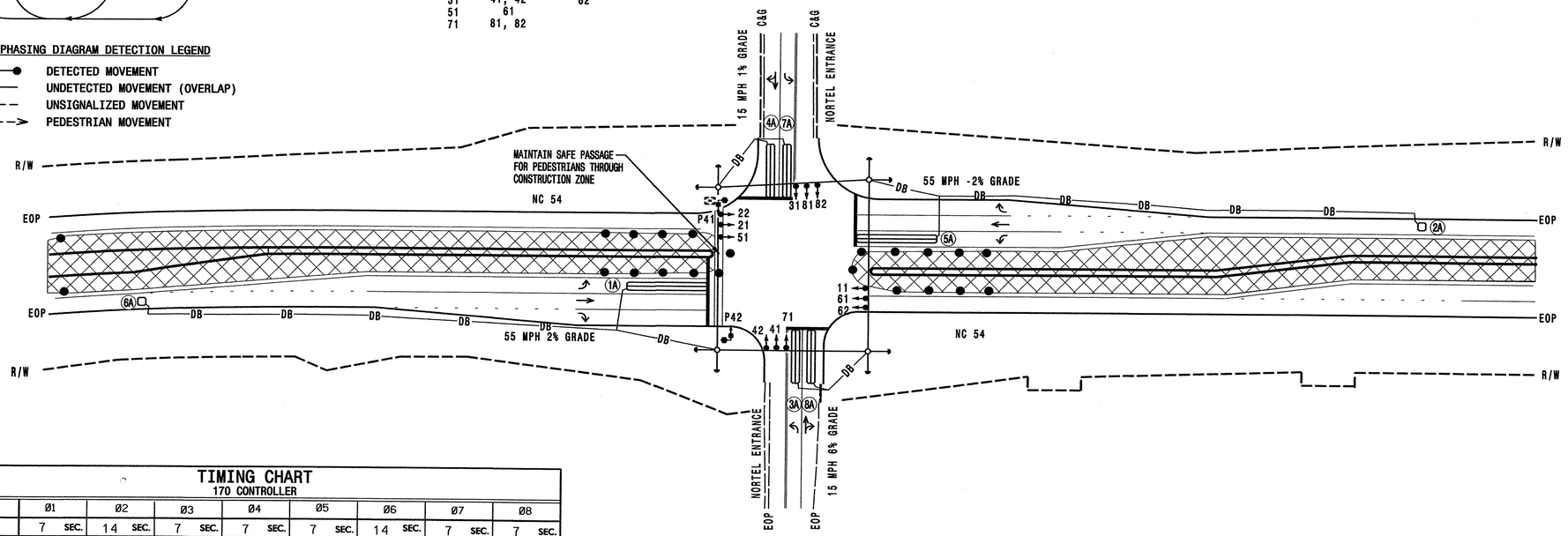
Denotes L.E.D.



11, 31, 51, 71 — 21, 41, 42, 61, 81, 82 — 22, 62 — P41, P42

LOOP & DETECTOR UNIT INSTALLATION CHART
170 CONTROLLER AND CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		ATTRIBUTES										STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY (STRETCH)	1 FULL TIME DELAY	2 PEDESTRIAN CALL	3 RESERVED	4 COUNT	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	SYSTEM LOOPS	NEW	EXISTING
1A	6X60	2-4-2	0	X	-	1	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2A	6X6	6	420	X	-	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4A	6X40	2-4-2	0	X	-	4	10 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
5A	6X60	2-4-2	0	X	-	5	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6A	6X6	6	420	X	-	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	10 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
P41,P42	-	-	-	X	-	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	-	X



TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM INITIAL	7 SEC.	14 SEC.	7 SEC.	7 SEC.	7 SEC.	14 SEC.	7 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	5.4 SEC.	3.0 SEC.	3.0 SEC.	3.0 SEC.	5.0 SEC.	3.0 SEC.	3.0 SEC.
RED CLEARANCE	3.2 SEC.	1.3 SEC.	3.8 SEC.	3.7 SEC.	3.1 SEC.	1.2 SEC.	3.5 SEC.	3.7 SEC.
MAXIMUM LIMIT	20 SEC.	90 SEC.	20 SEC.	40 SEC.	20 SEC.	90 SEC.	20 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	NONE	VEH. RECALL	NONE	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	NONE	YELLOW LOCK	NONE	NONE
DOUBLE ENTRY	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
WALK	- SEC.	- SEC.	- SEC.	7 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	- SEC.	- SEC.	19 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ADD PER VEHICLE	- SEC.	2.5 SEC.	- SEC.	- SEC.	- SEC.	2.5 SEC.	- SEC.	- SEC.
MAXIMUM INITIAL	- SEC.	46 SEC.	- SEC.	- SEC.	- SEC.	46 SEC.	- SEC.	- SEC.
MAXIMUM GAP	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.
REDUCE 0.1 SEC EVERY	- SEC.	1.5 SEC.	- SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.	- SEC.
MINIMUM GAP	1.0 SEC.	3.4 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	3.4 SEC.	1.0 SEC.	1.0 SEC.

8 PHASE
FULLY ACTUATED
(ISOLATED)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads numbered 11, 21, 51 and 61.
4. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Set all detector units to presence mode.
7. Program pedestrain heads to countdwon the flashing "Don't Walk" time only.

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Pedestrian Signal Pedestal	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
DB	Direct Bury	N/A
	Right of Way with Marker	
	Directional Arrow	
	Pavement Marking Arrow	
	Construction Zone Drums	N/A
	Construction Zone	N/A

SIGNAL UPGRADE - TEMPORARY DESIGN FOUR

NC 54
AT
NORTEL ENTRANCES

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE: April 2006 REVIEWED BY: Zachary Little

PREPARED BY: L. Blount REVIEWED BY: Doumit Ishak

REVISIONS | INIT. | DATE

SCALE 0 50' 1"=50'

Traffic Engineering and Safety Systems Branch
NCDEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDonald St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27025 RICHARD E. MOLINAUX
SIGNATURE DATE
SIG. INVENTORY NO. 05-1081T4

$FILES
$DATES

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 8

! -----> SAME AS TEMPORARY ONE

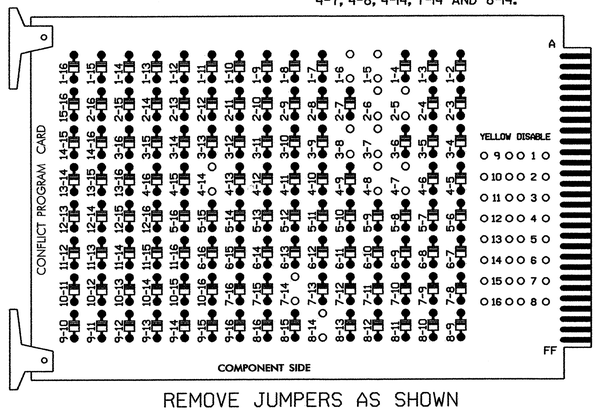
EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

WD ENABLE

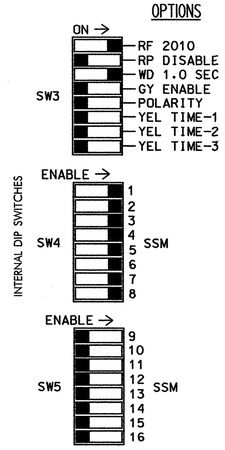
SW2 OFF ON

REMOVE DIODE JUMPERS I-5, I-6, 2-5, 2-6, 3-7, 3-8, 4-7, 4-8, 4-14, 7-14 AND 8-14.



REMOVE JUMPERS AS SHOWN

OPTIONS



■ = DENOTES POSITION OF SWITCH

NOTES:

1. CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
2. MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 9,10, 11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4	S4P	S5	S6	S6P	S7		S8	S8P
PHASE	1	2	2 PED	3		4	4 PED	5	6	6 PED	7		8	8 PED
SIGNAL HEAD NO.	11	21,22	NU	31	62	41,42	P41, P42	51	61,62	NU	22	71	81,82	NU
GREEN		130				103			136				109	
YELLOW		129				102			135				108	
RED		128				101			134				107	
RED ARROW	125			116				131				122		
YELLOW ARROW	126			117	117			132			123	123		
GREEN ARROW	127			118	118			133			124	124		
* 🚶							106							
✋							104							

NU = NOT USED

RE-CONNECT FIELD TERMINAL WIRES FOR RIGHT-TURN ARROW SECTIONS OF HEADS 22 AND 62 SAME AS DURING TEMPORARY DESIGN ONE. THESE SECTIONS WILL BE USED DURING THIS TEMPORARY DESIGN FOUR.

*SEE 'COUNTDOWN PEDESTRIAN SIGNAL OPERATION' NOTE

EQUIPMENT INFORMATION

*CONTROLLER.....McCAIN TRAFFIC TYPE 170E
*CABINET .....McCAIN TRAFFIC MODEL 332 (DWG.NO.M30117)
SOFTWARE .....BI TRANS 233NC2
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S3,S4,S4P,S5,S6,S7,S8
PHASES USED.....1,2,3,4,5,6,7,8,4PED
OVERLAPS.....NONE

EXISTING TO REMAIN IN USE*

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.

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN 4P OUTPUT AT KEYPAD INPUT E/125+F+7=Ø4.

! -----> SAME AS TEMPORARY ONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	Ø3 3A	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	NOT USED	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	NOT USED			NOT USED	NOT USED						Ø4 PED DC ISOLATOR		ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	SLOT EMPTY	SLOT EMPTY	Ø7 7A	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	NOT USED			NOT USED	NOT USED								

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

FS = FLASH SENSE
ST = STOP TIME

! -----> SAME AS TEMPORARY ONE

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
1A	TB2-1,2	I1U	1	56	5 7	1
2A	TB2-5,6	I2U	2	39	4 5 7	2
3A	TB4-5,6	I5U	3	58	5 7	3
4A	TB4-9,10	I6U	4	41	5 7	4
5A	TB3-1,2	J1U	5	55	5 7	5
6A	TB3-5,6	J2U	6	40	4 5 7	6
7A	TB5-5,6	J5U	7	57	5 7	7
8A	TB5-9,10	J6U	8	42	5 7	8
PED PUSH BUTTONS						
P41, P42	TB8-5,6	I12L	9	69	2	4

NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

DETECTOR ATTRIBUTES LEGEND:
1-FULL TIME DELAY
2-PED CALL
3-RESERVED
4-COUNTING
5-EXTENSION
6-TYPE 3
7-CALLING
8-ALTERNATE

THIS ELECTRICAL DETAIL IS FOR THE TEMPORARY SIGNAL DESIGN: 05-1081T4
DESIGNED: APRIL 2006
SEALED: 27 APRIL 2006
REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED JULY 2004 AND SEALED 7/30/04

TEMPORARY DESIGN FOUR

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54
at
NORTEL ENTRANCES

DIVISION 05 DURHAM COUNTY DURHAM
PLAN DATE: APRIL 2006 REVIEWED BY: T. Igoe
PREPARED BY: F.E. RUSS REVIEWED BY:

REVISIONS	INIT.	DATE

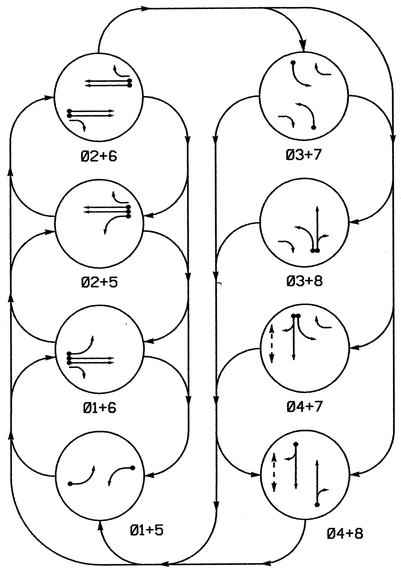
Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 5/3/06
SIGNATURE DATE
SIG. INVENTORY NO. 05-1081T4

02-MAY-2006 08:50
U:\#DFGwings\#TOdwgs\#051081_sm_ele_200605xx.dgn
default

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 9

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

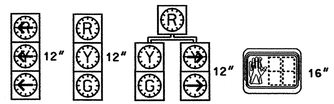
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	*FLASH
11	←	←	R	R	R	R	R	R	R
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/	R/	R	R	Y
31	R	R	R	R	←	←	R	R	R
41, 42	R	R	R	R	R	R	G	G	R
51	←	R	←	R	R	R	R	R	R
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R/	R	R/	R	Y
71	R	R	R	R	←	R	←	R	R
81, 82	R	R	R	R	R	G	R	G	R
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK

* SEE NOTE #2

SIGNAL FACE I.D.

Denotes L.E.D.



11
31
51
71

21
41, 42
61
81, 82

22
62

P41, P42

LOOP & DETECTOR UNIT INSTALLATION CHART
170 CONTROLLER AND CABINET

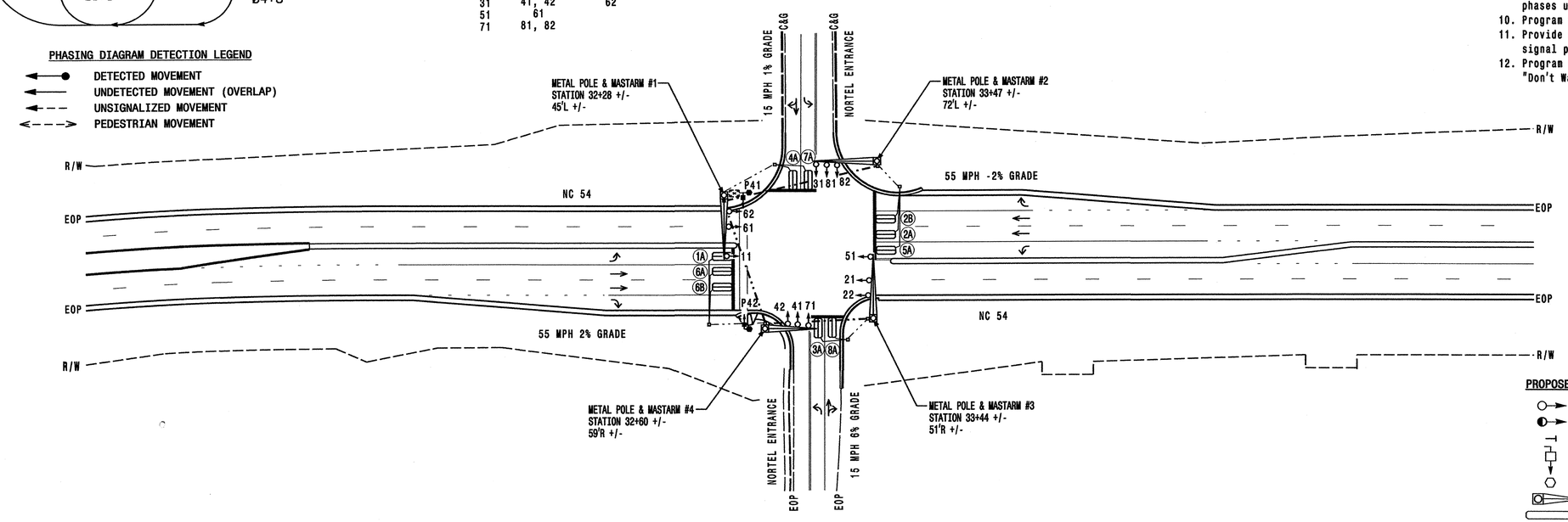
INDUCTIVE LOOPS						DETECTOR PROGRAMMING															
							TIMING		ATTRIBUTES										STATUS	
LOOP NO.	SIZE (Ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY (STRETCH)	1 FULL TIME DET.	2 PEDESTRIAN CALL	3 RESERVED	4 COUNT	5 EXTENSION	6 TYPE B	7 CALLING	8 ALTERNATE	SYSTEM LOOPS	NEW	EXISTING
1A	6X15	2-4-2	0	X	-	1	3* SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2A	6X15	2-4-2	0	X	-	2	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2B	6X15	2-4-2	0	X	-	2	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
3A	6X15	2-4-2	0	X	-	3	3* SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4A	6X15	2-4-2	0	X	-	4	10* SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
5A	6X15	2-4-2	0	X	-	5	3* SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6A	6X15	2-4-2	0	X	-	6	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6B	6X15	2-4-2	0	X	-	6	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
7A	6X15	2-4-2	0	X	-	7	3* SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8A	6X15	2-4-2	0	X	-	8	10* SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
P41,P42	-	-	-	-	X	-	- SEC.	- SEC.	-	X	-	-	X	-	X	-	-	-	X

* PROGRAM DELAY IN CONTROLLER, NOT IN DETECTOR.

8 PHASE
FULLY ACTUATED
(DURHAM SIGNAL SYSTEM)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Install backplates for all signal heads.
4. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
6. During coordination, phase 1 or phase 5 may be lagged.
7. Omit "Walk" and flashing "Don't Walk" with no pedstrain calls.
8. Set all detector units to presence mode.
9. Set Phase Bank 3 Maximum Limit to 250 seconds for phases used.
10. Program for SCATS traffic adaptive operation.
11. Provide separate electrical service for luminaires on signal poles.
12. Program pedstrain heads to countdown the flashing "Don't Walk" time only.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Pedestrian Signal Pedestal	⬢
○▷	Metal Pole with Mastarm	○▷
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	Direction Drill Conduit	·-·-·
·-·-·	2-in Underground Conduit	·-·-·
▲	Right of Way with Marker	▲
→	Directional Arrow	→
→	Pavement Marking Arrow	→

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM INITIAL	7 SEC.	14 SEC.	7 SEC.	7 SEC.	7 SEC.	14 SEC.	7 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	5.4 SEC.	3.0 SEC.	3.0 SEC.	3.0 SEC.	5.0 SEC.	3.0 SEC.	3.0 SEC.
RED CLEARANCE	2.9 SEC.	1.3 SEC.	3.5 SEC.	3.7 SEC.	2.6 SEC.	1.2 SEC.	3.1 SEC.	3.7 SEC.
MAXIMUM LIMIT	20 SEC.	90 SEC.	20 SEC.	40 SEC.	20 SEC.	90 SEC.	20 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	NONE	VEH. RECALL	NONE	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	NONE	YELLOW LOCK	NONE	NONE
DOUBLE ENTRY	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
WALK	- SEC.	- SEC.	- SEC.	7 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	- SEC.	- SEC.	19 SEC.	- SEC.	- SEC.	- SEC.	- SEC.

SIGNAL UPGRADE - FINAL DESIGN

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering and Safety Systems Section
122 N. McDowell St., Raleigh, NC 27603

NC 54
AT
NORTEL ENTRANCES

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE:	April 2006	REVIEWED BY:	Zachary Little
PREPARED BY:	L. Blount	REVIEWED BY:	Doumit Ishak

SCALE 0 50' 1"=50'

REVISIONS	INIT.	DATE

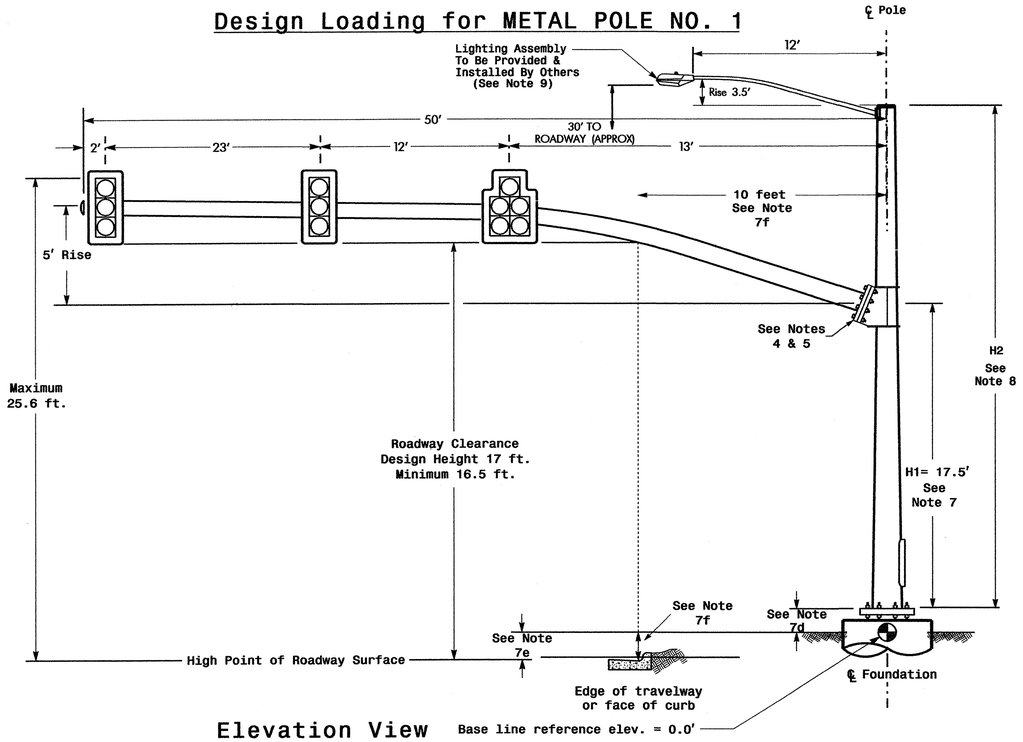
SEAL
NORTH CAROLINA
PROFESSIONAL SEAL 029231 ENGINEER
RICHARD E. MULLINAX
27 April 06

SIGNATURE DATE

SIG. INVENTORY NO. 05-1081

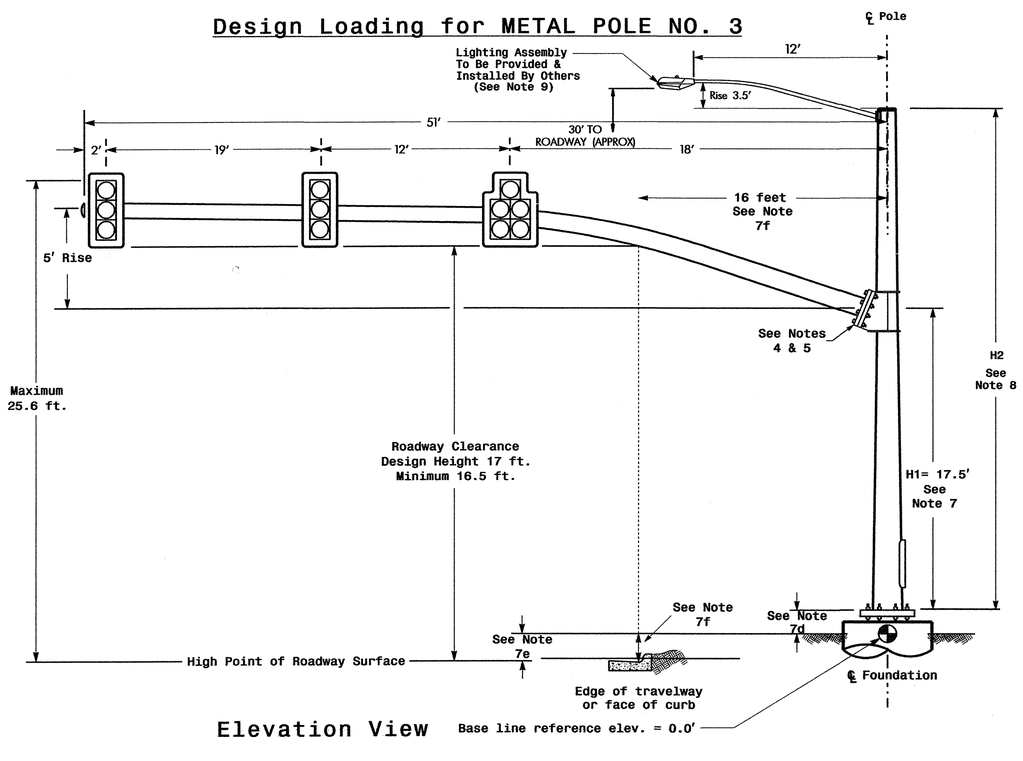
$FILE$
$DATE$

Design Loading for METAL POLE NO. 1



Elevation View

Design Loading for METAL POLE NO. 3



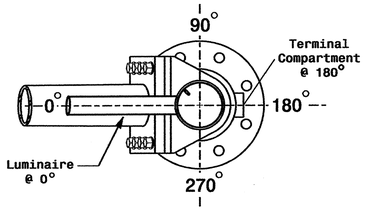
Elevation View

SPECIAL NOTE

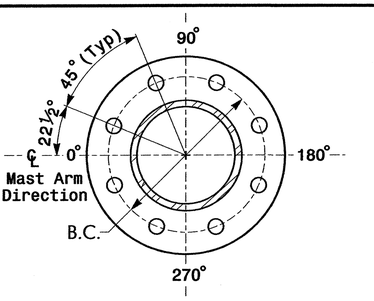
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 1	Pole 3
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-1.6 ft.	-1.6 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.

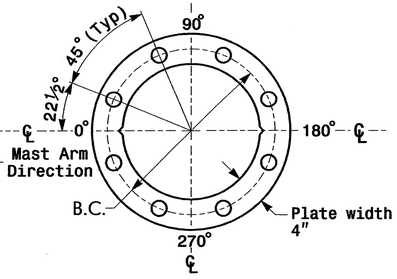


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



BASE PLATE TEMPLATE & ANCHOR BOLT LOCK PLATE DETAIL

For 8 Bolt Base Plate

METAL POLE No. 1 and 3

PROJECT REFERENCE NO.	SHEET NO.
R-2904	Sig.10

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12″–5 SECTION–WITH BACKPLATE AND ASTRO–BRAC	16.3 S.F.	42.0″ W X 56.0″ L	103 LBS
	SIGNAL HEAD 12″–3 SECTION–WITH BACKPLATE AND ASTRO–BRAC	9.3 S.F.	25.5″ W X 52.5″ L	60 LBS
	LUMINAIRE OVX DROP PRISMATIC REFRACTOR	EPA 0.87 S.F.	13.25″ W X 26.25″ L	35 LBS

NOTES

Design Reference Material

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

Design Requirements

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Maximum allowable CSR for all signal supports is 0.9.
4. 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.
5. The arm-to-pole attachment is a high strength connection. Use Direct Tension Indicators (ASTM F959) for each bolt.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. 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.
   b. Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is .75 feet above the ground elevation.
   e. Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
   f. Provide horizontal distance from proposed centerline of foundation to edge of travelway. Refer to the Elevation Data chart above for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary when arched arms are specified to ensure that the roadway clearance is maintained at the edge of the travelway and to assist in the camber design of the mast arm.
8. The pole manufacturer will determine the total height (H2) of each pole based on the luminaire height requirement of 30 feet.
9. Design the luminaire support arm using design dimensions as shown on elevation views. Refer to the Radial Orientation Detail for attachment to the signal pole. Design arm end for a nominal 2 inch slip fit socket connection for light assembly.
10. If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 733-3915.
11. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
12. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

NCDOT Wind Zone 4 (90 mph)

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

SCALE: 0 N/A — N/A

NC 54
at
Nortel Entrances

Division 5 Durham County Durham

PLAN DATE:	April 2006	REVIEWED BY:	Zachary Little
PREPARED BY:	L. Blount	REVIEWED BY:	Doumit Ishak

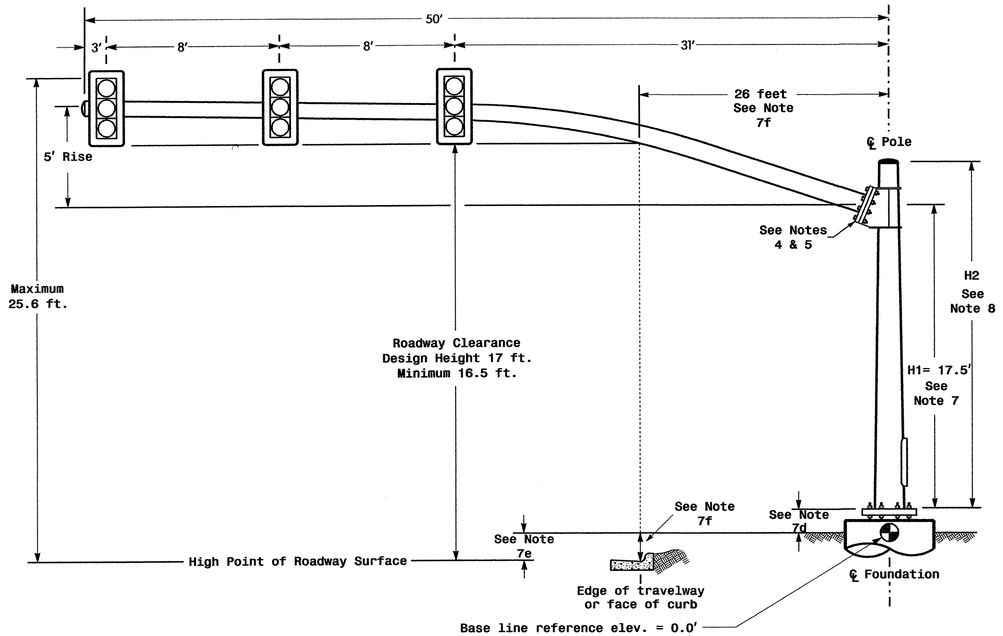
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 22027 ENGINEER BRIAN E. MULLINAX
28 APRIL 2006
SIGNATURE DATE

SIG. INVENTORY NO. 05-1081

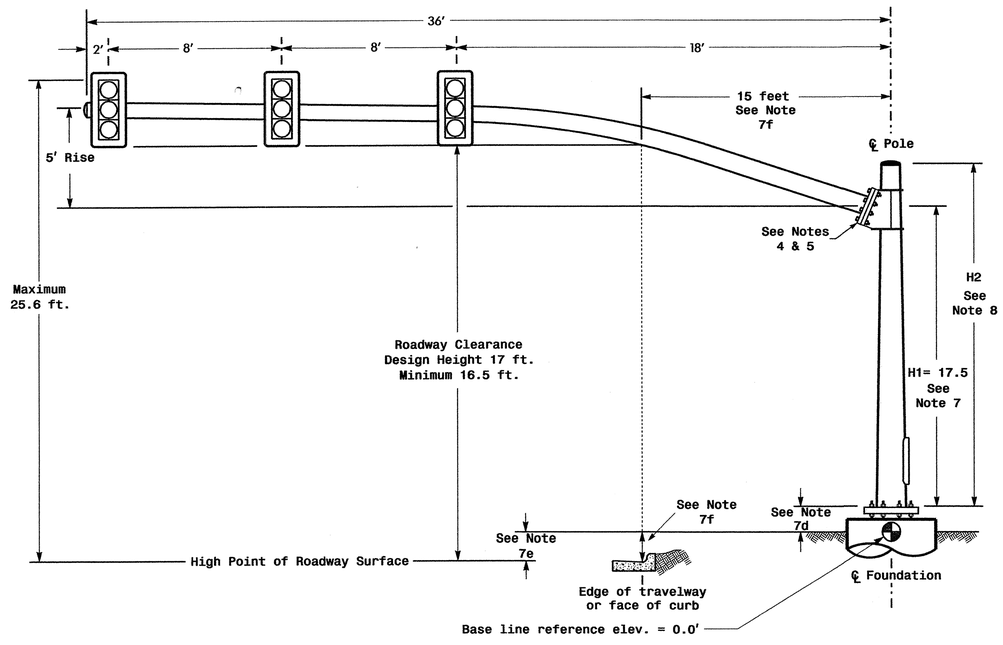
11-APR-2006 16:38
s:\rtg\signals\workgroups\rtp projects\w-2904\signals\05108l_sig_dsn_20040719.dgn
cpyjoiner

Design Loading for METAL POLE NO. 2



ELEVATION VIEW

Design Loading for METAL POLE NO. 4



Elevation View

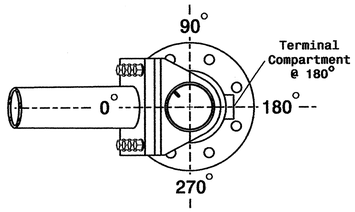
11-APR-2006 11:43
st#ts_signals#workgroups#tip projects#r-2904#signals#M51081_sig_dsn_20040719.dgn
ENTRANCE

SPECIAL NOTE

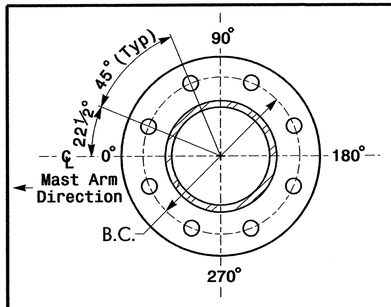
The contractor is responsible for verifying that the mast arm attachment height (H1) will provide the "Design Height" clearance from the roadway before submitting final shop drawings for approval. Verify elevation data below which was obtained by field measurement or from available project survey data.

Elevation Data for Mast Arm Attachment (H1)

Elevation Differences for:	Pole 2	Pole 4
Baseline reference point at ℄ Foundation @ ground level	0.0 ft.	0.0 ft.
Elevation difference at High point of roadway surface	-1.0 ft.	-1.0 ft.
Elevation difference at Edge of travelway or face of curb	+/-0.0 ft.	+/-0.0 ft.

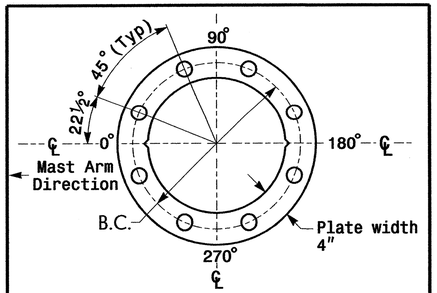


POLE RADIAL ORIENTATION



8 BOLT BASE PLATE DETAIL

See Note 6



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

METAL POLE No. 2 and 4

PROJECT REFERENCE NO.	SHEET NO.
R-2904	Sig.11

MAST ARM LOADING SCHEDULE

LOADING SYMBOL	DESCRIPTION	AREA	SIZE	WEIGHT
	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE AND ASTRO-BRAC	9.3 S.F.	25.5" W X 52.5" L	60 LBS

NOTES

Design Reference Material

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

Design Requirements

2. Design the traffic signal structure using the loading conditions shown in the elevation views. These are anticipated worst case "Design loads" and may not represent the actual loads that will be applied at the time of the installation. The contractor should refer to the traffic signal plans for the actual loads that will be applied at the time of the installation.
3. Maximum allowable CSR for all signal supports is 0.9.
4. 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.
5. The arm-to-pole attachment is a high strength connection. Use Direct Tension Indicators (ASTM F959) for each bolt.
6. Design base plate with 8 anchor bolt holes. Provide 2 inch x 60 inch anchor bolts.
7. The mast arm attachment height (H1) shown is based on the following design assumptions:
   a. 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.
   b. Signal heads attached to the mast arm are rigid mounted and vertically centered on the arm.
   c. The roadway clearance height for design is as shown in the elevation views.
   d. The top of the pole base plate is .75 feet above the ground elevation.
   e. Refer to the Elevation Data chart for elevation differences between the proposed foundation ground level and the high point on the roadway.
   f. Provide horizontal distance from proposed centerline of foundation to edge of travelway. Refer to the Elevation Data chart above for elevation difference between the proposed foundation ground level and the edge of travelway. This information is necessary when arched arms are specified to ensure that the roadway clearance is maintained at the edge of the travelway and to assist in the camber design of the mast arm.
8. The pole manufacturer will determine the total height (H2) of each pole using the greater of the following:
   - Mast arm attachment height (H1) plus 2 feet, or
   - H1 plus ½ of the total height of the mast arm attachment assembly plus 1 foot.
9. If pole location adjustments are required, the contractor must gain approval from the engineer as this may affect the mast arm lengths and arm attachment heights. The contractor may contact the Signals & Geometrics Structural Engineer for assistance at (919) 733-3915.
10. The contractor is responsible for verifying that the mast arm length shown will allow proper positioning of the signal heads over the roadway.
11. The contractor is responsible for providing soil penetration testing data (SPT) to the pole manufacturer so site specific foundations can be designed.

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

NCDOT Wind Zone 4 (90 mph)

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

NC 54
at
Nortel Entrances

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE:	April 2006	REVIEWED BY:	Zachary Little
PREPARED BY:	L. Blount	REVIEWED BY:	Doumit Ishak

SCALE 0 N/A N/A

REVISIONS	INIT.	DATE

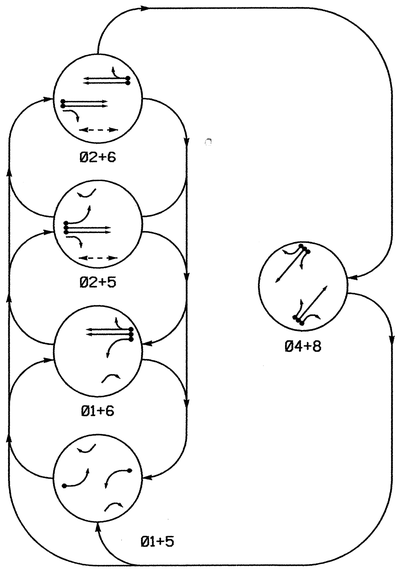
SEAL 22027 ENGINEER ROBERT E. MULLINAX 28 APRIL 2006

SIGNATURE DATE

SIG. INVENTORY NO. 05-1081

VIDEO DETECTION	PROJECT REFERENCE NO.	SHEET NO.
	R-2904	SIG. 1 2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

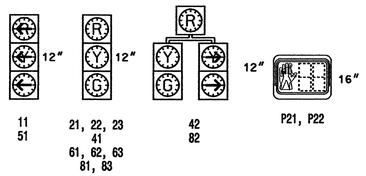
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH*
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R/←	R	R/←	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	Y
81, 83	R	R	R	R	G	R
82	R/←	R/←	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK

*SEE NOTE #2

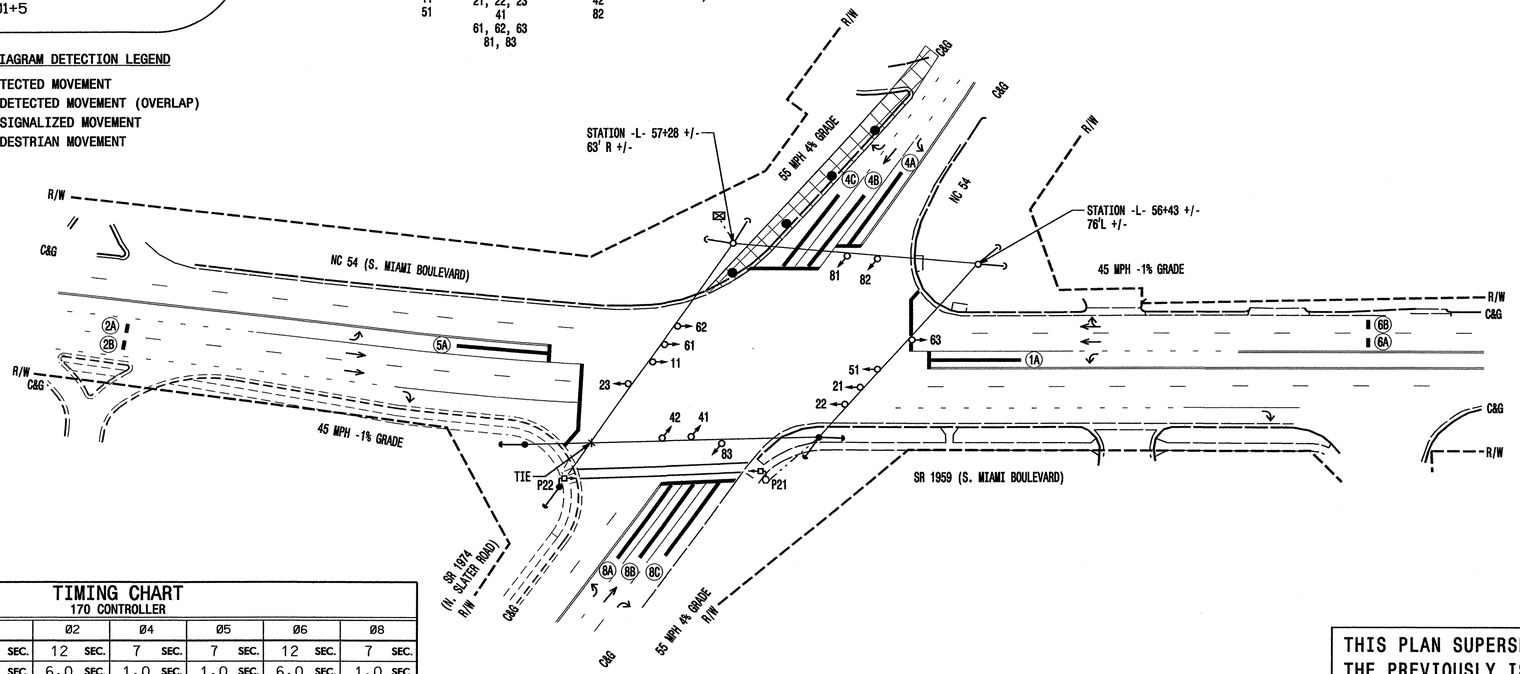
SIGNAL FACE I.D.

Denotes L.E.D.



VIDEO ZONE DETECTION CHART
170 CONTROLLER AND CABINET

DECTECTON ZONES			DETECTOR PROGRAMMING													
				TIMING		ATTRIBUTES								LOOPS	STATUS	
ZONE NO.	SIZE (ft)	DIST. FROM STOPBAR (ft)	NEMA PHASE	DELAY	CARRY (STRETCH)	1 FULL TIME DELAY	2 PEDESTRIAN CALL	3 RESERVED	4 COUNT	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	SYSTEM	NEW	EXISTING
1A	6X60	0	1	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
2A	6X6	300	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	X	-
2B	6X6	300	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	X	-
4A	6X60	0	4	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
4B	6X60	0	4	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
4C	6X60	0	4	15 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
5A	6X60	0	5	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
6A	6X6	300	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	X	-
6B	6X6	300	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	X	-
8A	6X60	0	8	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
8B	6X60	0	8	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
8C	6X60	0	8	15 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
P21,P22	N/A	N\A	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	X	-



TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø4	Ø5	Ø6	Ø8
MINIMUM INITIAL	7 SEC.	12 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.	6.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.6 SEC.	4.8 SEC.	3.0 SEC.	4.6 SEC.	4.8 SEC.
RED CLEARANCE	4.7 SEC.	2.4 SEC.	2.1 SEC.	4.7 SEC.	2.1 SEC.	1.8 SEC.
MAXIMUM LIMIT	30 SEC.	90 SEC.	40 SEC.	30 SEC.	90 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	VEH. RECALL	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	YELLOW LOCK	NONE
DOUBLE ENTRY	OFF	OFF	ON	OFF	OFF	ON
WALK	- SEC.	7 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	25 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ADD PER VEHICLE	- SEC.	1.5 SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.
MAXIMUM INITIAL	- SEC.	34 SEC.	- SEC.	- SEC.	34 SEC.	- SEC.
MAXIMUM GAP	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.	7.0 SEC.	1.0 SEC.
REDUCE 0.1 SEC EVERY	- SEC.	1.5 SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.
MINIMUM GAP	1.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	3.0 SEC.	1.0 SEC.

5 PHASE FULLY ACTUATED (ISOLATED)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Pavement markings are existing.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Program all timing information into phase bank 1, 2 and 3 unless otherwise noted.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Set all detection zones to presence mode.
8. A video detection system is in use at this location. The contractor shall locate cameras and modify the detection zone locations per manufacturer's instructions to accomplish the detection scheme shown.
9. Program pedstrain heads to countdown the flashing "Don't Walk" time only.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Pedestrian Signal Pedestal	⬢
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▬	Video Detection Area	▬
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
▲	Right of Way with Marker	-△-
→	Directional Arrow	→
→	Pavement Marking Arrow	→
● ● ●	Construction Zone Drums	N/A
⊠⊠	Construction Zone	N/A

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

SIGNAL UPGRADE - TEMPORARY DESIGN ONE

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

NC 54/SR 1959 (S. MIAMI BLVD.) AT NC 54/SR 1974 (N. SLATER ROAD)

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE: April 2006 REVIEWED BY: Zachary Little

PREPARED BY: L. Blount REVIEWED BY: Doumit Ishak

SCALE 0 50' 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 22027 ENGINEER RICHARD MOLINAX
SIGNATURE DATE 21 APRIL 2006

SIG. INVENTORY NO. 05-0432T1

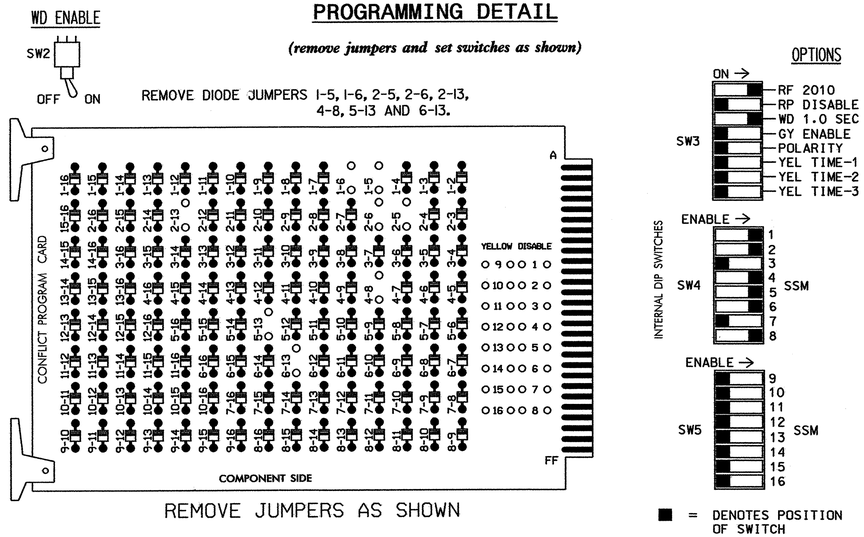
$FILES

$DATES

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 13

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

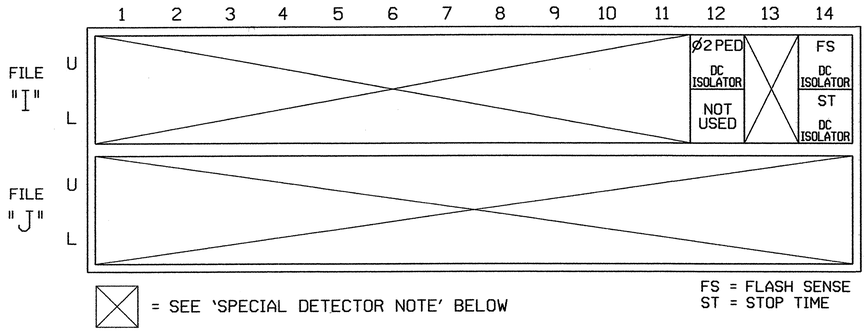
■ = DENOTES POSITION OF SWITCH

NOTES:

1. CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
2. MAKE SURE JUMPERS SEL1–SEL5 ARE PRESENT ON THE MONITOR BOARD.

INPUT FILE POSITION LAYOUT

(front view)



= SEE 'SPECIAL DETECTOR NOTE' BELOW

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

A VIDEO DETECTION SYSTEM IS EXISTING AND IN USE AT THIS SIGNAL INSTALLATION. THIS CONTRACTOR IS RESPONSIBLE FOR THE LOCATION OF CAMERAS AND MODIFICATION OF DETECTION ZONES (PER VIDEO EQUIPMENT MANUFACTURER'S INSTRUCTIONS) TO ACCOMPLISH THE DETECTION SCHEMES SHOWN IN VIDEO ZONE DETECTION CHART ON THE SIGNAL DESIGN PLAN.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 3,7,9, 10,11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DOUBLE ENTRY.
7. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED McCAIN 170E
CABINET .....CONTRACTOR SUPPLIED McCAIN 332
SOFTWARE .....BI TRANS 233NC2
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S4,S5,S6,S8
PHASES USED.....1,2,4,5,6,8,2PED
OVERLAPS.....NONE

PEDESTRIAN PUSH-BUTTON CONNECTION & PROGRAMMING

PED PUSH BUTTONS	TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
P21, P22	TB8-4,6	I12U	--	67	2	2

INPUT FILE POSITION LEGEND: I12U
- FILE I
- SLOT 12
- UPPER

DETECTOR ATTRIBUTES LEGEND:
1-FULL TIME DELAY
2-PED CALL
3-RESERVED
4-COUNTING
5-EXTENSION
6-TYPE 3
7-CALLING
8-ALTERNATE

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.

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P
PHASE	1		2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	82	21,22, 23	P21, P22	NU	41,42	NU	42	51	61,62, 63	NU	NU	81,82, 83	NU
GREEN			130			103				136			109	
YELLOW			129			102				135			108	
RED			128			101				134			107	
RED ARROW	125								131					
YELLOW ARROW	126	126						132	132					
GREEN ARROW	127	127						133	133					
*				115										
				113										

NU = NOT USED

*SEE 'COUNTDOWN PEDESTRIAN SIGNAL OPERATION' NOTE

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN 2P OUTPUT AT KEYPAD INPUT E/125+F+5=Ø2.

THIS ELECTRICAL DETAIL IS FOR THE TEMPORARY SIGNAL DESIGN: 05-0432T1
DESIGNED: APRIL 2006
SEALED: 27 APRIL 2006
REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED JULY 2004 AND SEALED 7/30/04

TEMPORARY DESIGN ONE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54/SR 1959 (S. MIAMI BLVD.) at NC 54/SR 1974 (N. SLATER ROAD)

DIVISION 05 DURHAM COUNTY DURHAM

PLAN DATE: APRIL 2006 REVIEWED BY: T. Joyce

PREPARED BY: F.E. RUSS REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, North Carolina Department of Transportation, Signal Management Section
1122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN

George C. Brown 5/4/06
SIGNATURE DATE

SIG. INVENTORY NO. 05-0432T1

02-MAY-2006 09:05
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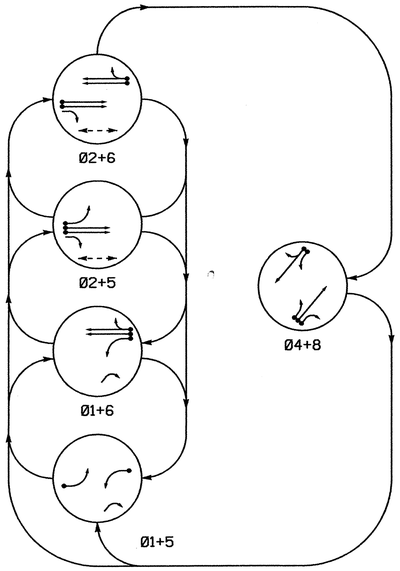
fergus

VIDEO DETECTION	PROJECT REFERENCE NO.	SHEET NO.
	R-2904	SIG 4

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

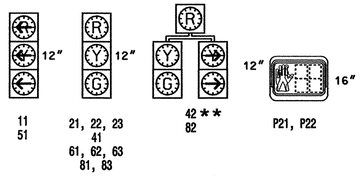
SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	*FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	Y
81, 83	R	R	R	R	G	R
82	R/←	R/←	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK

*SEE NOTE #2

SIGNAL FACE I.D.

Denotes L.E.D.

**SEE NOTE #8



VIDEO ZONE DETECTION CHART
170 CONTROLLER AND CABINET

DECTECTON ZONES			DETECTOR PROGRAMMING													
				TIMING		ATTRIBUTES									STATUS	
ZONE NO.	SIZE (ft)	DIST. FROM STOPBAR (ft)	NEMA PHASE	DELAY	CARRY (STRETCH)	1 FULL TIME DELAY	2 PEDESTRIAN CALLING	3 RESERVED	4 COUNT	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	SYSTEM LOOPS	NEW	EXISTING
1A	6X60	0	1	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2A	6X6	300	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
2B	6X6	300	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
4A	6X60	0	4	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4B	10X60	0	4	10 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
5A	6X60	0	5	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6A	6X6	300	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
6B	6X6	300	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
8A	6X60	0	8	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8B	6X60	0	8	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8C	6X60	0	8	15 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
P21,P22	N/A	N\A	8	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-		X

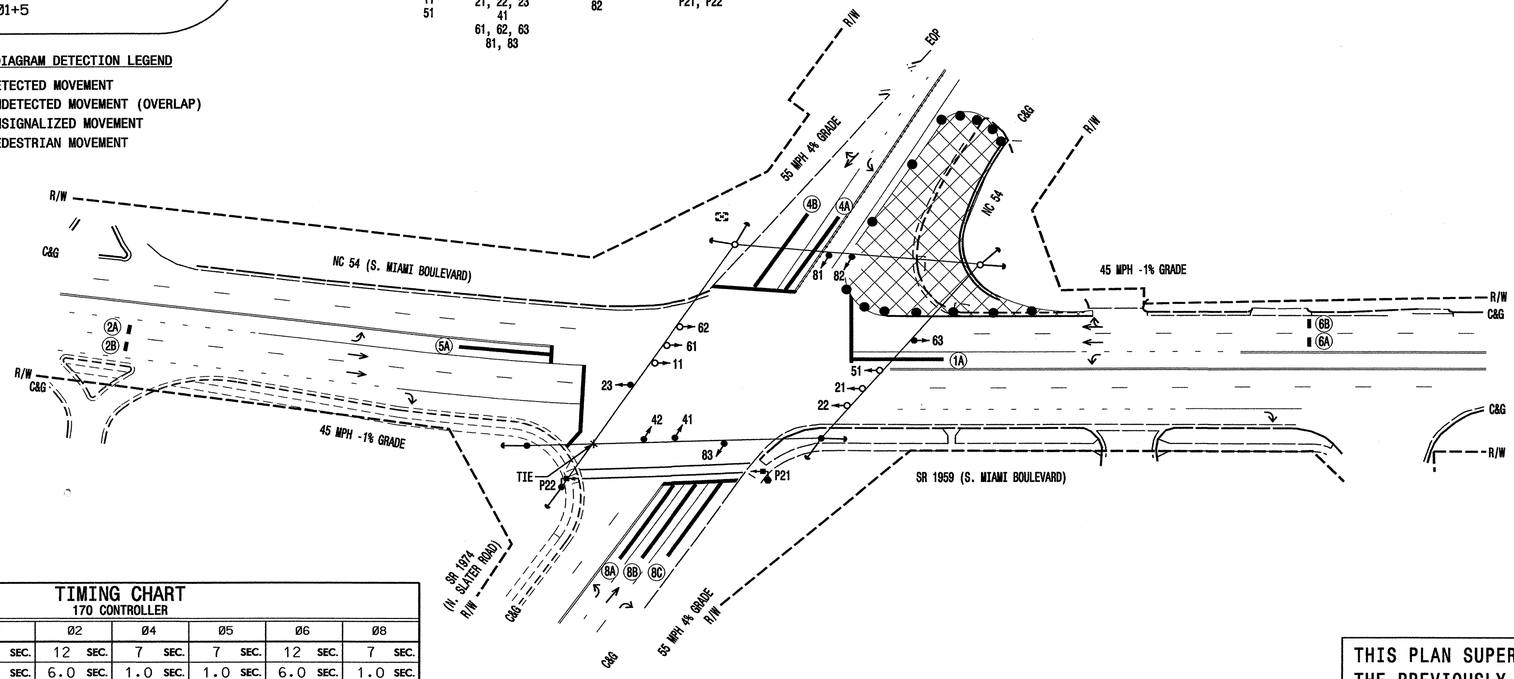
5 PHASE FULLY ACTUATED (ISOLATED)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal head number 41, 42, 81 and 82.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
6. Set all detection zones to presence mode.
7. A video detection system is in use at this location. The contractor shall locate cameras and modify the detection zone locations per manufacturer's instructions to accomplish the detection scheme shown.

**8. De-energize and bag arrow signal faces on head 42.

9. Program pedstrain heads to countdown the flashing "Don't Walk" time only.



TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø4	Ø5	Ø6	Ø8
MINIMUM INITIAL	7 SEC.	12 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.	6.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.6 SEC.	4.8 SEC.	3.0 SEC.	4.6 SEC.	4.8 SEC.
RED CLEARANCE	3.9 SEC.	2.1 SEC.	1.8 SEC.	4.3 SEC.	1.7 SEC.	1.7 SEC.
MAXIMUM LIMIT	30 SEC.	90 SEC.	40 SEC.	30 SEC.	90 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	VEH. RECALL	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	YELLOW LOCK	NONE
DOUBLE ENTRY	OFF	OFF	ON	OFF	OFF	ON
WALK	– SEC.	7 SEC.	– SEC.	– SEC.	– SEC.	– SEC.
FLASHING DON'T WALK	– SEC.	25 SEC.	– SEC.	– SEC.	– SEC.	– SEC.
TYPE 3 LIMIT	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.
ALTERNATE EXTENSION	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.
ADD PER VEHICLE	– SEC.	1.5 SEC.	– SEC.	– SEC.	1.5 SEC.	– SEC.
MAXIMUM INITIAL	– SEC.	34 SEC.	– SEC.	– SEC.	34 SEC.	– SEC.
MAXIMUM GAP	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.	7.0 SEC.	1.0 SEC.
REDUCE 0.1 SEC EVERY	– SEC.	1.5 SEC.	– SEC.	– SEC.	1.5 SEC.	– SEC.
MINIMUM GAP	1.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	3.0 SEC.	1.0 SEC.

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Pedestrian Signal Pedestal	⬢
○→	Signal Pole with Guy	●→
○↓	Signal Pole with Sidewalk Guy	●↓
▬	Video Detection Area	▬
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
▲	Right of Way with Marker	△
→	Directional Arrow	→
→	Pavement Marking Arrow	→
● ● ●	Construction Zone Drums	N/A
⊠⊠	Construction Zone	N/A

SIGNAL UPGRADE - TEMPORARY DESIGN TWO

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

NC 54/SR 1959 (S. MIAMI BLVD.)
AT
NC 54/SR 1974 (N. SLATER ROAD)

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE: April 2006 REVIEWED BY: Zachary Little
PREPARED BY: L. Blount REVIEWED BY: Doumit Ishak

SCALE 0 50' 1"=50'

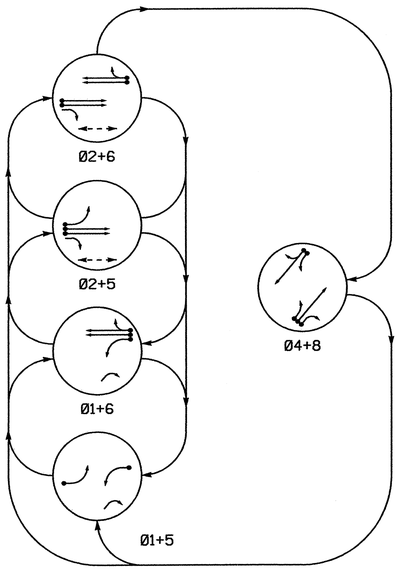
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 20402 ENGINEER PEDRO E. MULINAZ
27 APRIL 2006
SIGNATURE DATE
SIG. INVENTORY NO. 05-0432T2

$FILES
$DATES

VIDEO DETECTION	PROJECT REFERENCE NO.	SHEET NO.
	R-2904	SIG.15

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

TABLE OF OPERATION

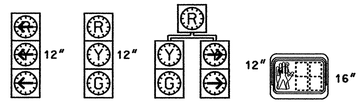
SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	*FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	R	Y	
41,42	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	Y
81, 83	R	R	R	R	G	R
82	R/←	R/←	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK

* SEE NOTE #2

SIGNAL FACE I.D.

Denotes L.E.D.

** SEE NOTE #8



11
51

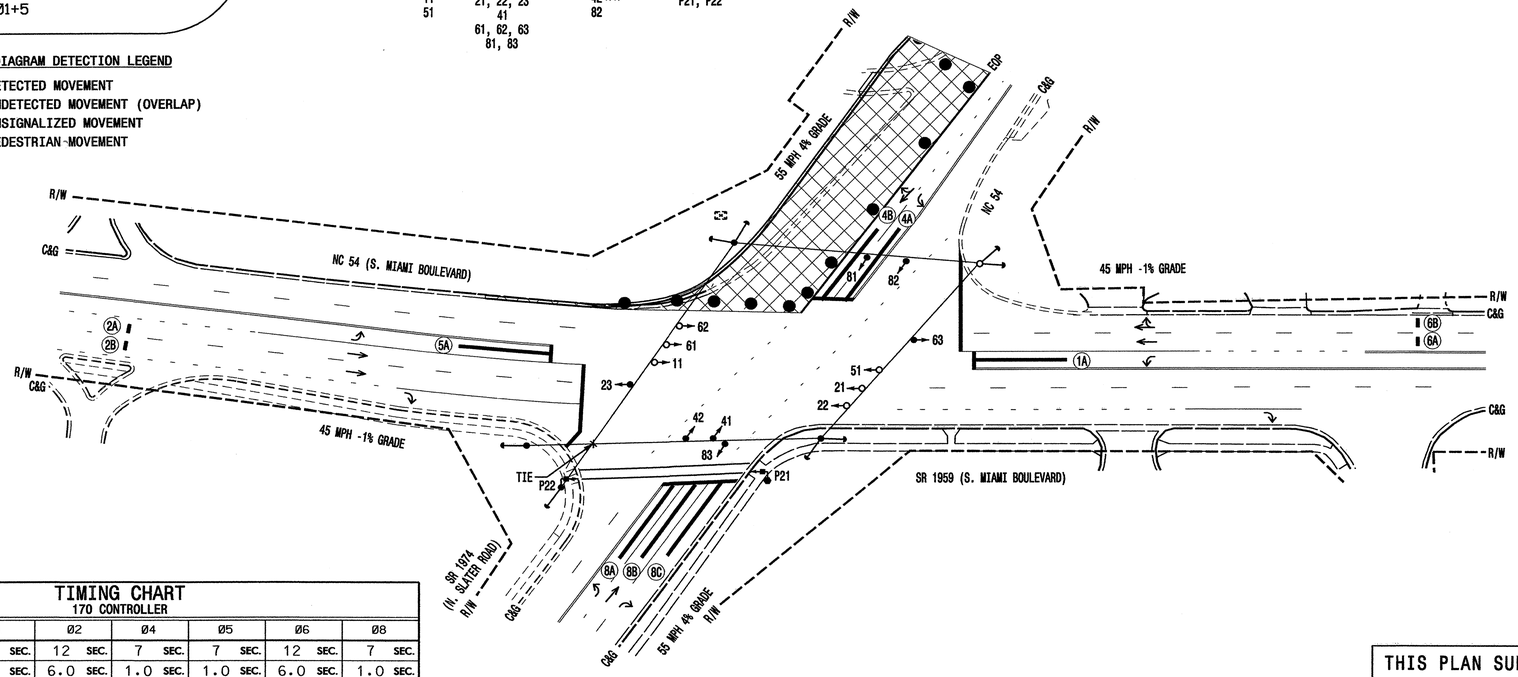
21, 22, 23
41
61, 62, 63
81, 83

42**
82

P21, P22

VIDEO ZONE DETECTION CHART
170 CONTROLLER AND CABINET

DECTECTON ZONES			DETECTOR PROGRAMMING															
				TIMING		ATTRIBUTES									LOOPS	STATUS	
ZONE NO.	SIZE (ft)	DIST. FROM STOPBAR (ft)	NEMA PHASE	DELAY	CARRY (STRETCH)	1 FULL TIME DELAY	2 PEDESTRIAN CALL	3 RESERVED	4 COUNT	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	SYSTEM	NEW	EXISTING
1A	6X60	0	1	3 SEC.	- SEC.	-	-	-	-	X	X	-	X	-	-	-	X
2A	6X6	300	2	- SEC.	- SEC.	-	-	-	X	X	X	-	X	-	-	-	X
2B	6X6	300	2	- SEC.	- SEC.	-	-	-	X	X	X	-	X	-	-	-	X
4A	6X60	0	4	- SEC.	- SEC.	-	-	-	-	X	X	-	X	-	-	-	X
4B	6X60	0	4	10 SEC.	- SEC.	-	-	-	-	X	X	-	X	-	-	-	X
5A	6X60	0	5	3 SEC.	- SEC.	-	-	-	-	X	X	-	X	-	-	-	X
6A	6X6	300	6	- SEC.	- SEC.	-	-	-	X	X	X	-	X	-	-	-	X
6B	6X6	300	6	- SEC.	- SEC.	-	-	-	X	X	X	-	X	-	-	-	X
8A	6X60	0	8	- SEC.	- SEC.	-	-	-	-	X	X	-	X	-	-	-	X
8B	6X60	0	8	- SEC.	- SEC.	-	-	-	-	X	X	-	X	-	-	-	X
8C	6X60	0	8	15 SEC.	- SEC.	-	-	-	-	X	X	-	X	-	-	-	X
P21,P22	N/A	N\A	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	-	-	X



TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø4	Ø5	Ø6	Ø8
MINIMUM INITIAL	7 SEC.	12 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.	6.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.6 SEC.	4.8 SEC.	3.0 SEC.	4.6 SEC.	4.8 SEC.
RED CLEARANCE	5.1 SEC.	2.4 SEC.	2.0 SEC.	5.0 SEC.	1.9 SEC.	2.0 SEC.
MAXIMUM LIMIT	30 SEC.	90 SEC.	40 SEC.	30 SEC.	90 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	VEH. RECALL	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	YELLOW LOCK	NONE
DOUBLE ENTRY	OFF	OFF	ON	OFF	OFF	ON
WALK	- SEC.	7 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	25 SEC.	- SEC.	- SEC.	- SEC.	- SEC.
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ADD PER VEHICLE	- SEC.	1.5 SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.
MAXIMUM INITIAL	- SEC.	34 SEC.	- SEC.	- SEC.	34 SEC.	- SEC.
MAXIMUM GAP	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.	7.0 SEC.	1.0 SEC.
REDUCE 0.1 SEC EVERY	- SEC.	1.5 SEC.	- SEC.	- SEC.	1.5 SEC.	- SEC.
MINIMUM GAP	1.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	3.0 SEC.	1.0 SEC.

5 PHASE
FULLY ACTUATED
(ISOLATED)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal head number 41, 42, 81 and 82.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
6. Set all detection zones to presence mode.
7. A video detection system is in use at this location. The contractor shall locate cameras and modify the detection zone locations per manufacturer's instructions to accomplish the detection scheme shown.
8. De-energize and bag arrow signal face on head 42.
9. Program pedstrain heads to countdown the flashing "Don't Walk" time only.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Pedestrian Signal Pedestal	●
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▬	Video Detection Area	▬
⊠	Controller & Cabinet	▣
□	Junction Box	■
····	2-in Underground Conduit	····
——▲——	Right of Way with Marker	——△——
→	Directional Arrow	→
→	Pavement Marking Arrow	→
● ● ●	Construction Zone Drums	N/A
⊠⊠⊠	Construction Zone	N/A

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

SIGNAL UPGRADE - TEMPORARY DESIGN THREE

Traffic Engineering and Safety Systems Branch
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal and Geometrics Section
122 N. McDonell St., Raleigh, NC 27603

NC 54/SR 1959 (S. MIAMI BLVD.)
AT
NC 54/SR 1974 (N. SLATER ROAD)

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE:	April 2006	REVIEWED BY:	Zachary Little
PREPARED BY:	L. Blount	REVIEWED BY:	Doumit Ishak

REVISIONS	INIT.	DATE

SCALE 0 50' 1"=50'

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
032027
ENGINEER
RICHARD E. MULLINAX
27 APRIL 2006

SIGNATURE DATE

SIG. INVENTORY NO. 05-0432T3

$FILE$

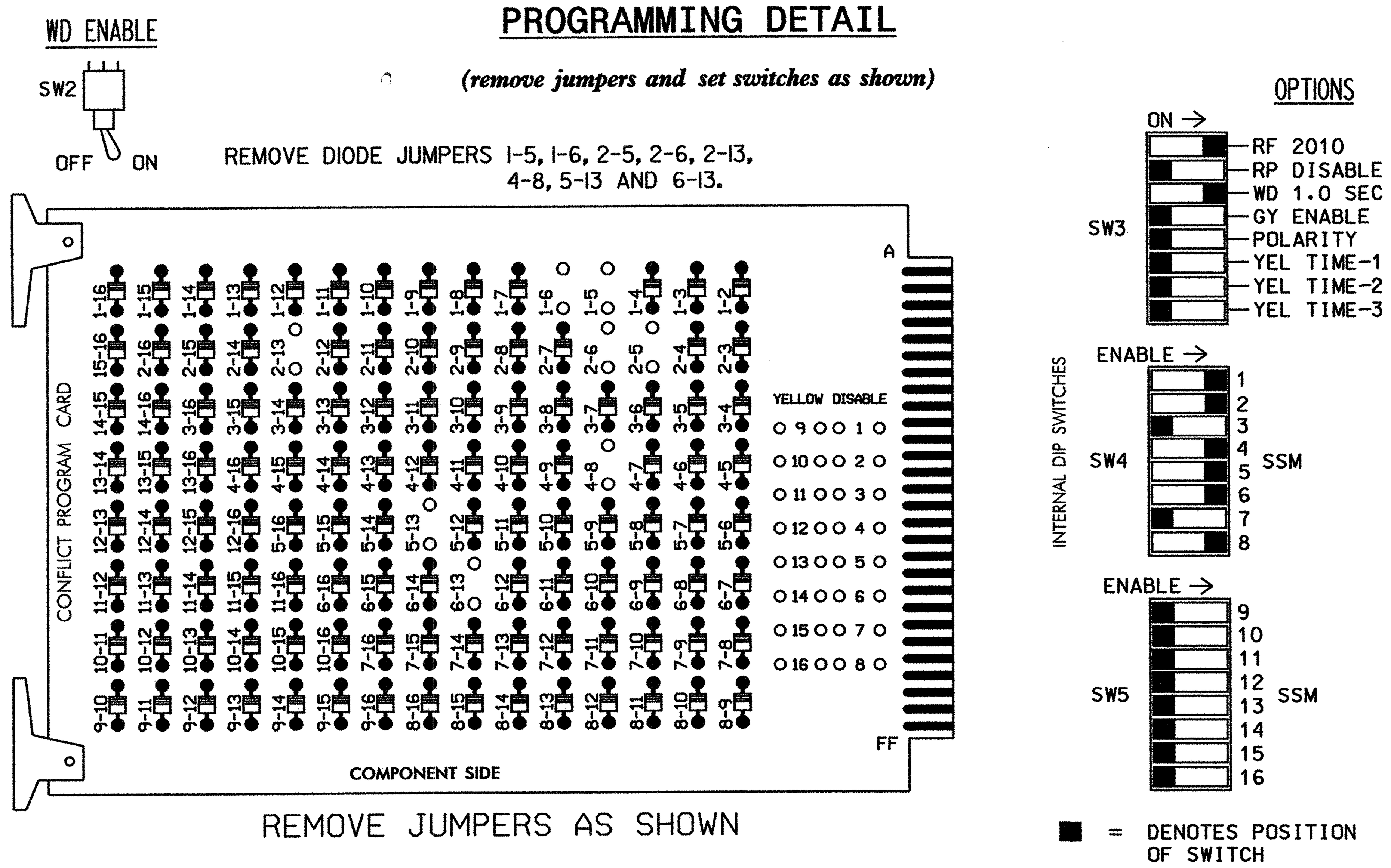
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 16

! -----> NO CHANGES FROM TEMPORARY ONE

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

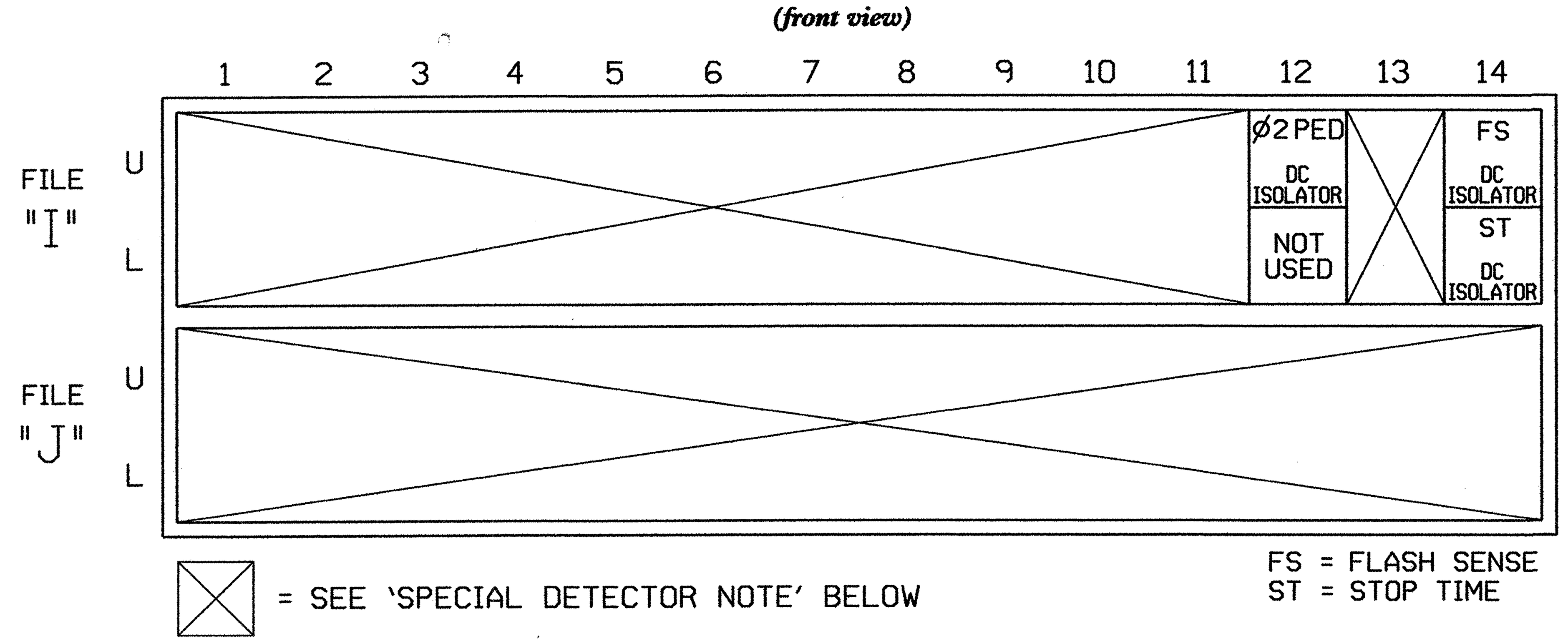
NOTES:

1. CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
2. MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

! -----> NO CHANGES FROM TEMPORARY ONE

INPUT FILE POSITION LAYOUT

(front view)



FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

A VIDEO DETECTION SYSTEM IS EXISTING AND IN USE AT THIS SIGNAL INSTALLATION. THIS CONTRACTOR IS RESPONSIBLE FOR THE LOCATION OF CAMERAS AND MODIFICATION OF DETECTION ZONES (PER VIDEO EQUIPMENT MANUFACTURER'S INSTRUCTIONS) TO ACCOMPLISH THE DETECTION SCHEMES SHOWN IN VIDEO ZONE DETECTION CHART ON THE SIGNAL DESIGN PLAN.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 3,7,9, 10,11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DOUBLE ENTRY.
7. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.

EQUIPMENT INFORMATION

*CONTROLLER..............McCAIN TRAFFIC TYPE 170E
*CABINET ....McCAIN TRAFFIC MODEL 332
SOFTWARE ....BI TRANS 233NC2
CABINET MOUNT...........BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED......S1,S2,S2P,S4,S5,S6,S8
PHASES USED.............1,2,4,5,6,8,2PED
OVERLAPS................NONE

INSTALLED UNDER TEMPORARY ONE*

! -----> NO CHANGES FROM TEMPORARY ONE

PEDESTRIAN PUSH-BUTTON CONNECTION & PROGRAMMING

PED PUSH BUTTONS	TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
P21, P22	TB8-4,6	I12U	--	67	2	2

INPUT FILE POSITION LEGEND: I12U
FILE I
SLOT 12
UPPER

DETECTOR ATTRIBUTES LEGEND:
1-FULL TIME DELAY
2-PED CALL
3-RESERVED
4-COUNTING
5-EXTENSION
6-TYPE 3
7-CALLING
8-ALTERNATE

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.

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P
PHASE	1		2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	82	21,22, 23	P21, P22	NU	41,42	NU	42	51	61,62, 63	NU	NU	81,82, 83	NU
GREEN			130			103				136			109	
YELLOW			129			102				135			108	
RED			128			101				134			107	
RED ARROW	125								131					
YELLOW ARROW	126	126						---	132					
GREEN ARROW	127	127						---	133					
* WALK				115										
* DON'T WALK				113										

NU = NOT USED

RIGHT-TURN ARROW SECTION OF HEAD 42 WILL BE BAGGED AND NOT USED DURING TEMPORARY DESIGNS TWO AND THREE. DISCONNECT, COIL AND TAPE FIELD TERMINAL WIRES FOR THIS SECTION. LEAVE FOR FUTURE RE-CONNECTION.

*SEE 'COUNTDOWN PEDESTRIAN SIGNAL OPERATION' NOTE

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN 2P OUTPUT AT KEYPAD INPUT E/125+F+5=Ø2.

THIS ELECTRICAL DETAIL IS FOR THE TEMPORARY SIGNAL DESIGNS: 05-0432T2, 05-0432T3
DESIGNED: APRIL 2006
SEALED: 27 APRIL 2006
REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED JULY 2004 AND SEALED 7/30/04

TEMPORARY DESIGN TWO
TEMPORARY DESIGN THREE

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54/SR 1959 (S. MIAMI BLVD.) at NC 54/SR 1974 (N. SLATER ROAD)

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, State of North Carolina Department of Transportation, Signals Management Section
122 N. McDowell St., Raleigh, NC 27603

DIVISION 05 — DURHAM COUNTY — DURHAM

PLAN DATE: APRIL 2006	REVIEWED BY: T. Sayla
PREPARED BY: F.E. RUSS	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022013 GEORGE C. BROWN
George C. Brown 5/4/06
SIGNATURE DATE

SIG. INV. NO. 05-0432T2,T3

02-MAY-2006 09:08
u:\drawings\1700wgs\05432_sm_ele_200605xx.dgn
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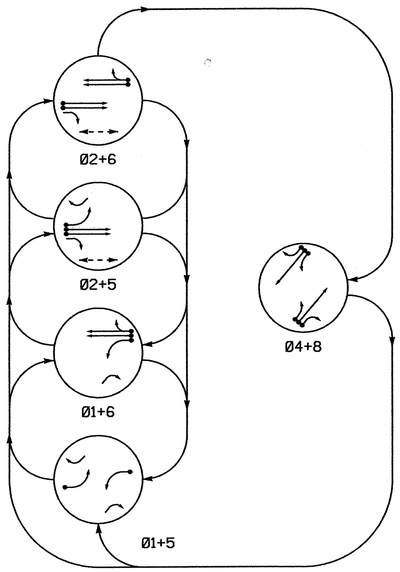
VIDEO DETECTION	PROJECT REFERENCE NO.	SHEET NO.
	R-2904	SIG.17

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

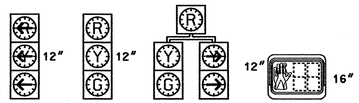
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH*
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22, 23	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R/←	R	R/→	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	Y
81, 83	R	R	R	R	G	R
82	R/→	R/→	R	R	G	R
P21, P22	DW	DW	W	W	DW	DRK

* SEE NOTE #2

SIGNAL FACE I.D.

○ Denotes L.E.D.



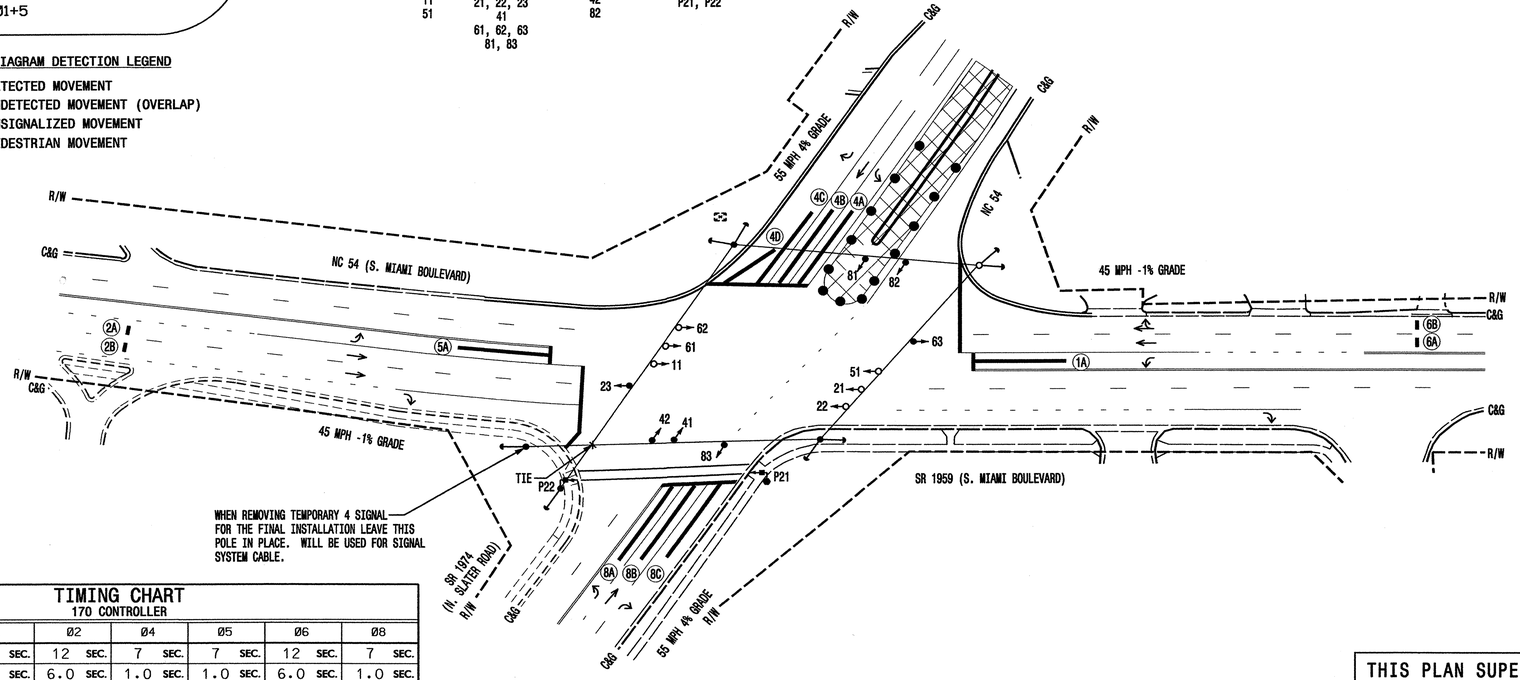
VIDEO ZONE DETECTION CHART
170 CONTROLLER AND CABINET

DECTECTON ZONES			DETECTOR PROGRAMMING																
				TIMING		ATTRIBUTES 1 FULL TIME DETECTION	2 PEDESTRIAN CALL	3 RESERVED	4 COUNT	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	SYSTEM LOOPS	STATUS NEW	STATUS EXISTING
ZONE NO.	SIZE (ft)	DIST. FROM STOPBAR (ft)	NEMA PHASE	DELAY	CARRY (STRETCH)														
1A	6X60	0	1	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2A	6X6	300	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
2B	6X6	300	2	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
4A	6X60	0	4	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4B	6X60	0	4	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4C	6X60	0	4	15 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4D	6X40	0	4	15 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
5A	6X60	0	5	3 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6A	6X6	300	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
6B	6X6	300	6	- SEC.	- SEC.	-	-	-	X	X	-	X	-	-	-	X
8A	6X60	0	8	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8B	6X60	0	8	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8C	6X60	0	8	15 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
P21,P22	N/A	N\A	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	-	X

5 PHASE FULLY ACTUATED (ISOLATED)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal head number 41 and 42.
4. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
5. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
6. Set all detection zones to presence mode.
7. A video detection system is in use at this location. The contractor shall locate cameras and modify the detection zone locations per manufacturer's instructions to accomplish the detection scheme shown.
8. Program pedstrain heads to countdown the flashing "Don't Walk" time only.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Pedestrian Signal Pedestal	⬢
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▬	Video Detection Area	▬
⊠	Controller & Cabinet	⊡
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
▲	Right of Way with Marker	▲
→	Directional Arrow	→
→	Pavement Marking Arrow	→
● ● ●	Construction Zone Drums	N/A
⊠	Construction Zone	N/A

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø4	Ø5	Ø6	Ø8
MINIMUM INITIAL	7 SEC.	12 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	6.0 SEC.	1.0 SEC.	1.0 SEC.	6.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.6 SEC.	4.8 SEC.	3.0 SEC.	4.6 SEC.	4.8 SEC.
RED CLEARANCE	5.2 SEC.	2.4 SEC.	2.0 SEC.	5.1 SEC.	2.7 SEC.	2.1 SEC.
MAXIMUM LIMIT	30 SEC.	90 SEC.	40 SEC.	30 SEC.	90 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	VEH. RECALL	NONE
VEHICLE CALL MEMORY	LOCK	YELLOW LOCK	LOCK	LOCK	YELLOW LOCK	LOCK
DOUBLE ENTRY	OFF	OFF	ON	OFF	OFF	ON
WALK	– SEC.	7 SEC.	– SEC.	– SEC.	– SEC.	– SEC.
FLASHING DON'T WALK	– SEC.	25 SEC.	– SEC.	– SEC.	– SEC.	– SEC.
TYPE 3 LIMIT	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.
ALTERNATE EXTENSION	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.	– SEC.
ADD PER VEHICLE	– SEC.	1.5 SEC.	– SEC.	– SEC.	1.5 SEC.	– SEC.
MAXIMUM INITIAL	– SEC.	34 SEC.	– SEC.	– SEC.	34 SEC.	– SEC.
MAXIMUM GAP	1.0 SEC.	7.0 SEC.	1.0 SEC.	1.0 SEC.	7.0 SEC.	1.0 SEC.
REDUCE 0.1 SEC EVERY	– SEC.	1.5 SEC.	– SEC.	– SEC.	1.5 SEC.	– SEC.
MINIMUM GAP	1.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	3.0 SEC.	1.0 SEC.

$FILES

$DATES

SIGNAL UPGRADE - TEMPORARY DESIGN FOUR

Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

NC 54/SR 1959 (S. MIAMI BLVD.)
AT
NC 54/SR 1974 (N. SLATER ROAD)

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE:	April 2006	REVIEWED BY:	Zachary Little
PREPARED BY:	L. Blount	REVIEWED BY:	Doumit Ishak

REVISIONS	INIT.	DATE

SCALE 0 50' 1"=50'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22021 RICHARD E. MULLINAX
27 APRIL 2006

SIGNATURE DATE

SIG. INVENTORY NO. 05-0432T4

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG.18

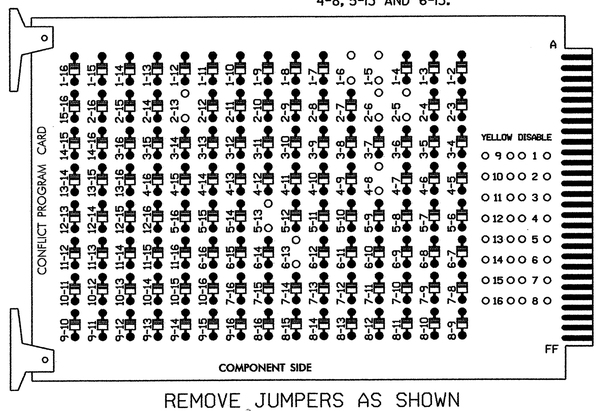
! -----> SAME AS TEMPORARY ONE

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

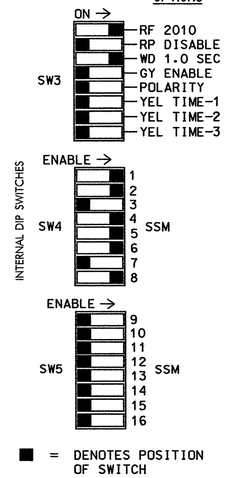
WD ENABLE
SW2
OFF ON

REMOVE DIODE JUMPERS I-5, I-6, 2-5, 2-6, 2-13, 4-8, 5-13 AND 6-13.



REMOVE JUMPERS AS SHOWN

OPTIONS



■ = DENOTES POSITION OF SWITCH

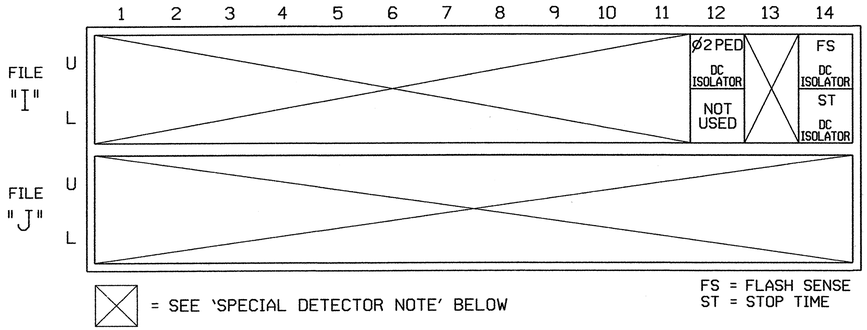
NOTES:

1. CARD IS PROVIDED WITH ALL DIODE JUMPERS IN PLACE. REMOVAL OF ANY JUMPER ALLOWS ITS CHANNELS TO RUN CONCURRENTLY.
2. MAKE SURE JUMPERS SEL1-SEL5 ARE PRESENT ON THE MONITOR BOARD.

! -----> SAME AS TEMPORARY ONE

INPUT FILE POSITION LAYOUT

(front view)



= SEE 'SPECIAL DETECTOR NOTE' BELOW

FS = FLASH SENSE
ST = STOP TIME

SPECIAL DETECTOR NOTE

A VIDEO DETECTION SYSTEM IS EXISTING AND IN USE AT THIS SIGNAL INSTALLATION. THIS CONTRACTOR IS RESPONSIBLE FOR THE LOCATION OF CAMERAS AND MODIFICATION OF DETECTION ZONES (PER VIDEO EQUIPMENT MANUFACTURER'S INSTRUCTIONS) TO ACCOMPLISH THE DETECTION SCHEMES SHOWN IN VIDEO ZONE DETECTION CHART ON THE SIGNAL DESIGN PLAN.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 3,7,9, 10,11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DOUBLE ENTRY.
7. PROGRAM PHASES 2 AND 6, ON CONTROLLER UNIT, FOR VOLUME DENSITY OPERATION.

EQUIPMENT INFORMATION

*CONTROLLER.....McCAIN TRAFFIC TYPE 170E
*CABINET .....McCAIN TRAFFIC MODEL 332
SOFTWARE .....BI TRANS 233NC2
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S1,S2,S2P,S4,S5,S6,S8
PHASES USED.....1,2,4,5,6,8,2PED
OVERLAPS.....NONE

INSTALLED UNDER TEMPORARY ONE*

! -----> SAME AS TEMPORARY ONE

PEDESTRIAN PUSH-BUTTON CONNECTION & PROGRAMMING

PED PUSH BUTTONS	TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
P21, P22	TB8-4,6	I12U	--	67	2	2

INPUT FILE POSITION LEGEND: I12U
FILE I
SLOT 12
UPPER

DETECTOR ATTRIBUTES LEGEND:
1-FULL TIME DELAY
2-PED CALL
3-RESERVED
4-COUNTING
5-EXTENSION
6-TYPE 3
7-CALLING
8-ALTERNATE

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.

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3	S4	S4P	S5		S6	S6P	S7	S8	S8P
PHASE	1		2	2 PED	3	4	4 PED	5		6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	11	82	21,22, 23	P21, P22	NU	41,42	NU	42	51	61,62, 63	NU	NU	81,82, 83	NU
GREEN			130			103				136			109	
YELLOW			129			102				135			108	
RED			128			101				134			107	
RED ARROW	125								131					
YELLOW ARROW	126	126						132	132					
GREEN ARROW	127	127						133	133					
* 🚶				115										
✋				113										

NU = NOT USED

RE-CONNECT FIELD TERMINAL WIRES FOR RIGHT-TURN ARROW SECTION OF HEAD 42 SAME AS DURING TEMPORARY DESIGN ONE. THIS SECTION WILL BE USED DURING THIS TEMPORARY DESIGN FOUR.

*SEE 'COUNTDOWN PEDESTRIAN SIGNAL OPERATION' NOTE

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN 2P OUTPUT AT KEYPAD INPUT E/125+F+5=Ø2.

THIS ELECTRICAL DETAIL IS FOR THE TEMPORARY SIGNAL DESIGN: 05-0432T4
DESIGNED: APRIL 2006
SEALED: 27 APRIL 2006
REVISED: N/A

THIS DETAIL SUPERSEDES DETAIL DATED JULY 2004 AND SEALED 7/30/04

TEMPORARY DESIGN FOUR

ELECTRICAL AND PROGRAMMING DETAILS FOR:

NC 54/SR 1959 (S. MIAMI BLVD.) at NC 54/SR 1974 (N. SLATER ROAD)

DIVISION 05 DURHAM COUNTY DURHAM

PLAN DATE: APRIL 2006 REVIEWED BY: T. Jaja
PREPARED BY: F.E. RUSS REVIEWED BY:

REVISIONS	INIT.	DATE

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Management Section
122 N. McDowell St., Raleigh, NC 27603

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022013 ENGINEER GEORGE C. BROWN
George C. Brown 5/4/06
SIGNATURE DATE

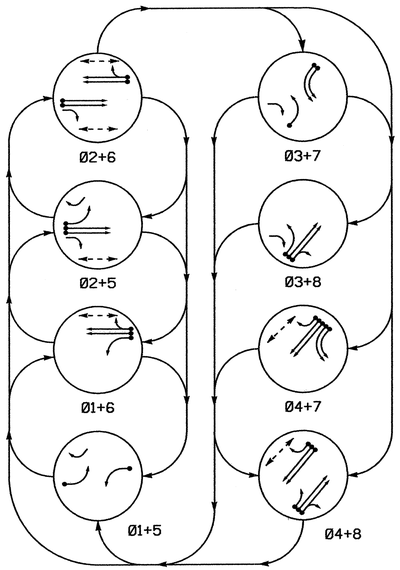
SIG. INVENTORY NO. 05-0432T4

02-MAY-2006 09:14
u:\Mdrawings\170dwgs\050432_sm_ele_20605xx.dgn
fgruss

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 19

8 PHASE
FULLY ACTUATED
(DURHAM SIGNAL SYSTEM)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

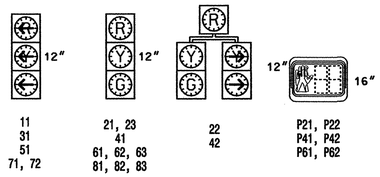
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	*FLASH
11	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 23	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/~~R~~	~~R~~/R	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~
41	R	R	R	R	R	R	G	G	R
42	R/~~R~~	R	R/~~R~~	R	R	R	G	G	R
51	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	G	R	R	R	R	Y
71, 72	~~R~~	~~R~~	~~R~~	~~R~~	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~
81, 82, 83	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK

* SEE NOTE #2

SIGNAL FACE I.D.

Denotes L.E.D.



11, 31, 51, 71, 72 — 21, 23, 41, 61, 62, 63, 81, 82, 83 — 22, 42 — P21, P22, P41, P42, P61, P62

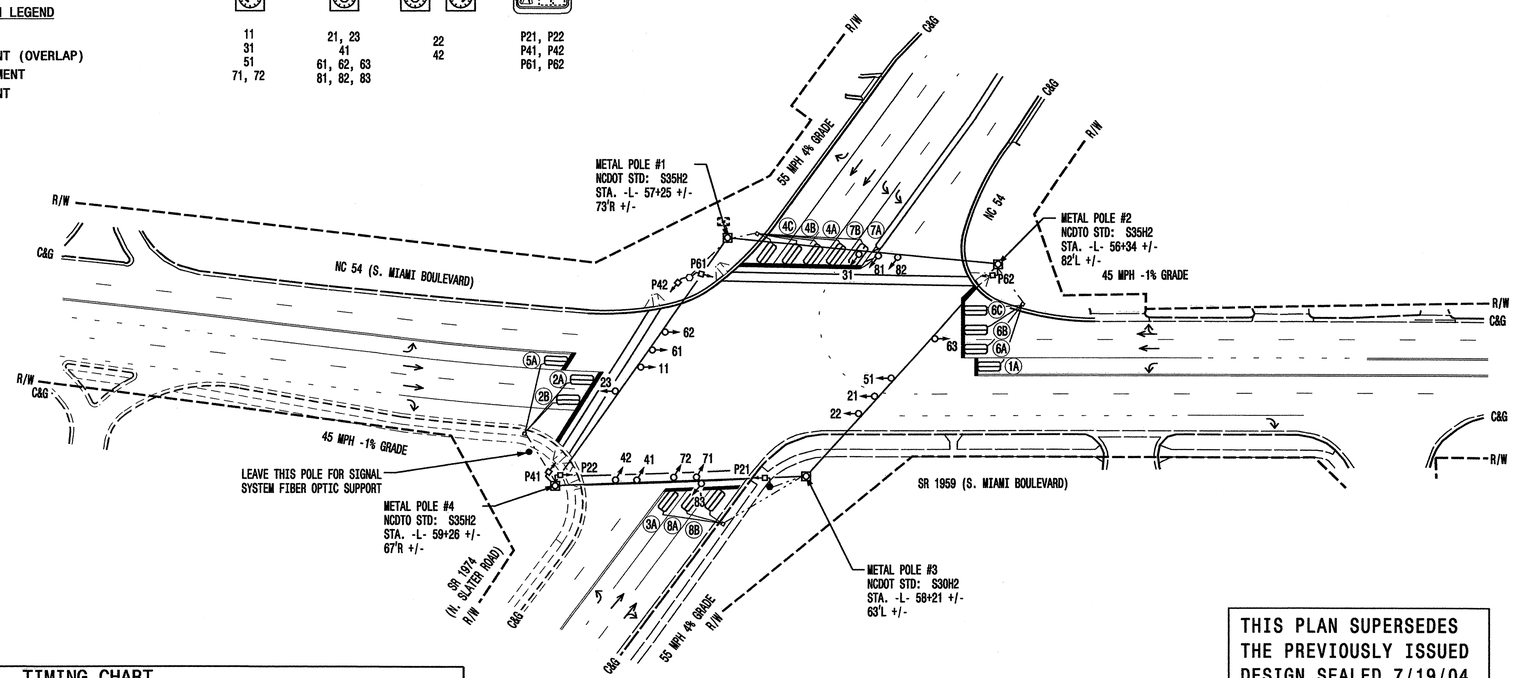
LOOP & DETECTOR UNIT INSTALLATION CHART
170 CONTROLLER AND CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING												
							TIMING		ATTRIBUTES									
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY (STRETCH)	1 FULL TIME BICYCLE/PEDESTRIAN	2 DELAY/CALL RESERVED	3 RESERVED	4 COUNT	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	SYSTEM LOOPS	STATUS NEW	STATUS EXISTING
1A	6X15	2-4-2	0	X	-	1	3** SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2A	6X15	2-4-2	0	X	-	2	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
2B	6X15	2-4-2	0	X	-	2	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
3A	6X15	2-4-2	0	X	-	3	3** SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4A	6X15	2-4-2	0	X	-	4	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4B	6X15	2-4-2	0	X	-	4	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
4C	6X15	2-4-2	0	X	-	4	15** SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
5A	6X15	2-4-2	0	X	-	5	3** SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6A	6X15	2-4-2	0	X	-	6	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6B	6X15	2-4-2	0	X	-	6	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
6C	6X15	2-4-2	0	X	-	6	15** SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
7A, 7B	6X15	2-4-2	0	X	-	7	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
8A	6X15	2-4-2	0	X	-	8	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
8B	6X15	2-4-2	0	X	-	8	10** SEC.	- SEC.	-	-	-	-	X	-	X	-	-	-	X
P21,P22	N/A	N/A	N/A	X	-	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	-	X
P41,P42	N/A	N/A	N/A	X	-	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	X	-
P61,P62	N/A	N/A	N/A	X	-	-	- SEC.	- SEC.	-	X	-	-	-	-	-	-	-	X	-

**PROGRAM DELAY IN CONTROLLER, NOT IN DETECTOR.

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the Project Special Provisions.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Install louvered backplates for all signal heads.
4. Program all timing information into phase banks 1, 2 and 3 unless otherwise noted.
5. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
6. During coordination, phase 1 or phase 5 may be lagged.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Set all detector units to presence mode.
9. Set Phase Bank 3 Maximum Limit to 250 seconds for phases used.
10. Program signal for SCATS traffic adaptive operation.
11. Program pedstrain heads to countdown the flashing "Don't Walk" time only.



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⬡	Pedestrian Signal Pedestal	⬢
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
◎	Metal Strain Pole	◘
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
▲	Right of Way with Marker	-△-
→	Directional Arrow	→
→	Pavement Marking Arrow	→

THIS PLAN SUPERSEDES THE PREVIOUSLY ISSUED DESIGN SEALED 7/19/04.

TIMING CHART
170 CONTROLLER

PHASE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM INITIAL	7 SEC.	12 SEC.	7 SEC.	7 SEC.	7 SEC.	12 SEC.	7 SEC.	7 SEC.
VEHICLE EXTENSION	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.6 SEC.	3.0 SEC.	4.8 SEC.	3.0 SEC.	4.6 SEC.	3.0 SEC.	4.8 SEC.
RED CLEARANCE	5.1 SEC.	2.4 SEC.	3.3 SEC.	2.2 SEC.	5.0 SEC.	3.1 SEC.	2.9 SEC.	2.3 SEC.
MAXIMUM LIMIT	30 SEC.	90 SEC.	30 SEC.	40 SEC.	30 SEC.	90 SEC.	30 SEC.	40 SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	NONE	VEH. RECALL	NONE	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	NONE	YELLOW LOCK	NONE	NONE
DOUBLE ENTRY	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
WALK	- SEC.	7 SEC.	- SEC.	7 SEC.	- SEC.	7 SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	25 SEC.	- SEC.	24 SEC.	- SEC.	38 SEC.	- SEC.	- SEC.

SIGNAL UPGRADE - FINAL DESIGN

Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

NC 54/SR 1959 (S. MIAMI BLVD.)
AT
NC 54/SR 1974 (N. SLATER ROAD)

DIVISION 5 DURHAM COUNTY DURHAM
PLAN DATE: April 2006 REVIEWED BY: Zachary Little
PREPARED BY: L. Blount REVIEWED BY: Doumit Ishak

SCALE 0 50' 1"=50'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 22022 ENGINEER RICHARD E. MULLINAX
27 APRIL 2006
SIGNATURE DATE

SIG. INVENTORY NO. 05-0432

$FILE$
$DATE$

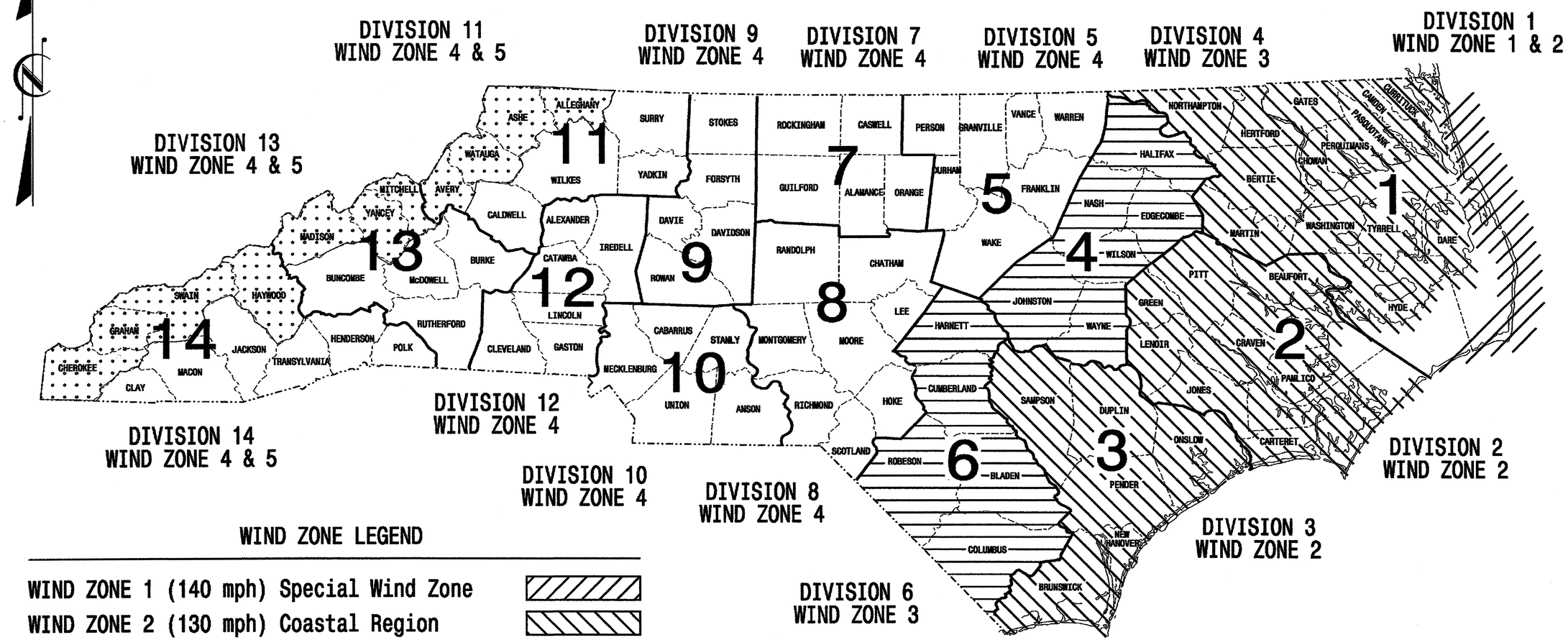
STATE	PROJECT NO.	SHEET NO.
N.C.	R-2904	Sig. 20
F. A. PROJ. NO.		M 1
PROJECT ID. NO.		

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR METAL POLES

POLE STANDARDS

NCDOT METAL P



WIND ZONE LEGEND

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

http://www.ncdot.org/doh/preconstruct/traffic/tmssu/ws/default.htm

Prepared in the Offices of:

Traffic Engineering and Safety Systems Branch
Signals and Geometrics Section
STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

122 N. McDowell St., Raleigh, NC 27603

Designed in conformance with the 2002 Interim to the 4th Edition 2001

AASHTO

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

INDEX OF PLANS

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

NCDOT CONTACTS:

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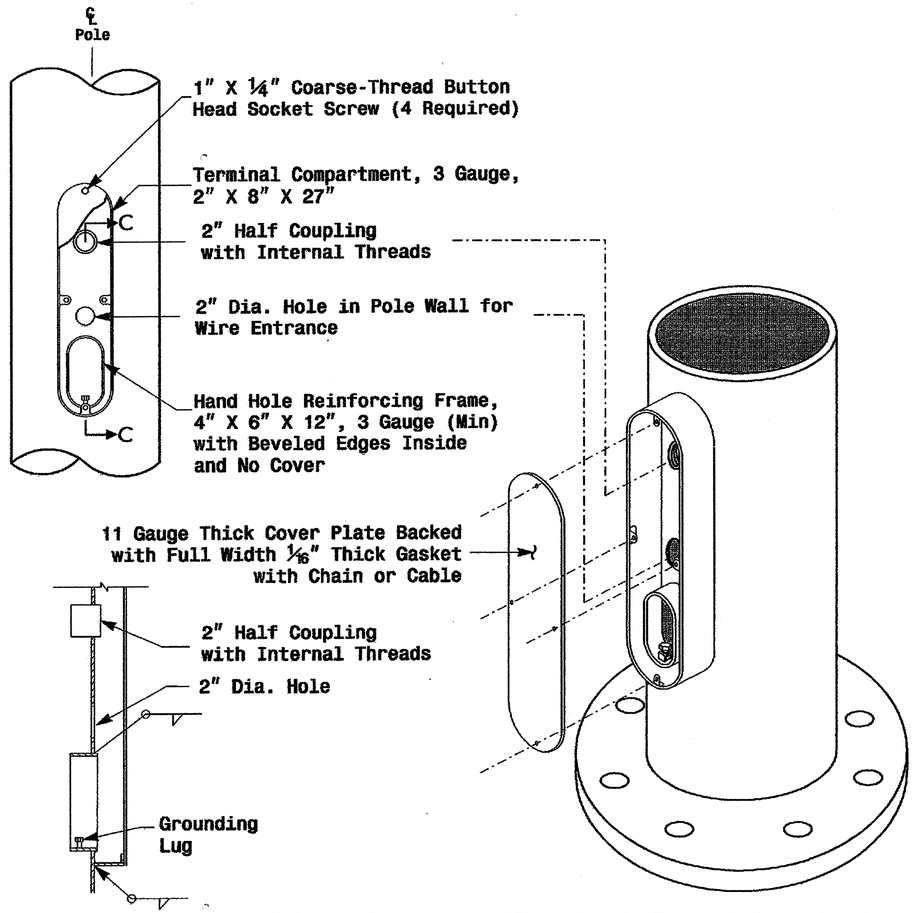
R. E. Mullinax, P.E. – Signals and Geometrics Engineer
P. L. Alexander, P.E. – Signals and Geometrics Special Projects Engineer
D. C. Sarkar, P.E. – Signals and Geometrics Structural Engineer
A. M. Esposito, P.E. – Signals and Geometrics Project Engineer
C. F. Andrews, Jr. – Signals and Geometrics Project Engineer

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 026094 ENGINEER DEBESH C. SARKAR

D. Sarkar — SIGNATURE

9.2.2005 — DATE



Section C-C

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

Terminal Compartment Detail

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 ----------

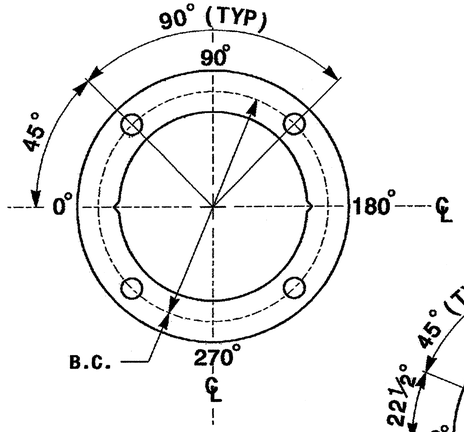
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

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

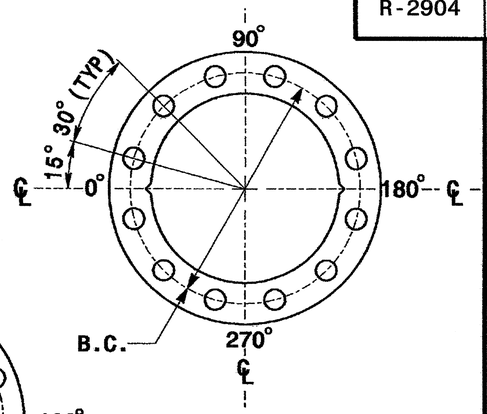
Arm I.D. Tag
(Provide on each section of a multi-section mast arm)

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

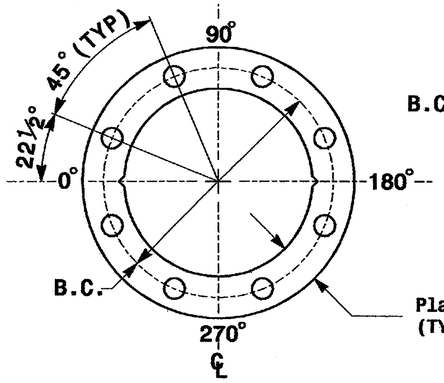
Identification Tag Details



4 Bolt Pattern



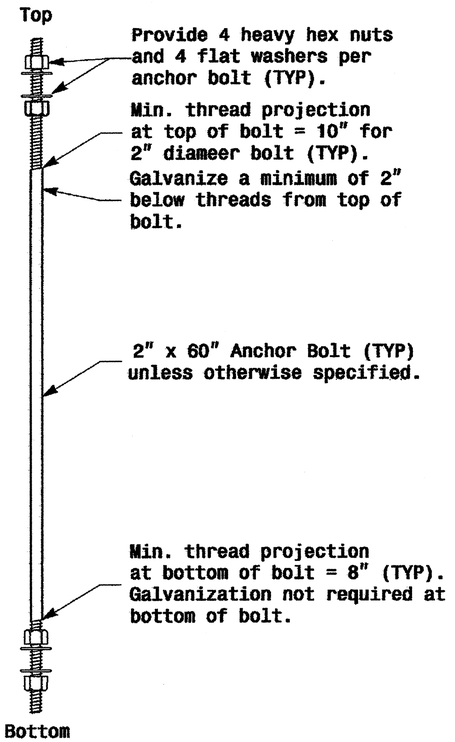
12 Bolt Pattern



8 Bolt Pattern

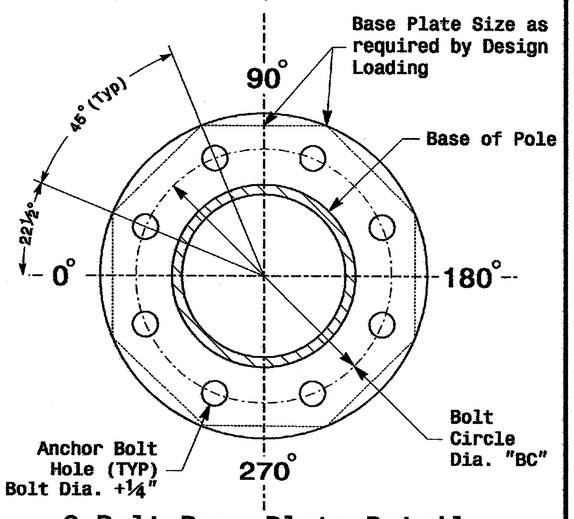
Construct Templates and Plates from ¼" min. thick Steel. Galvanizing is not required.

Base Plate Template and Anchor Bolt Lock Plate Details



Anchor Bolt Detail

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



8 Bolt Base Plate Detail

Fabrication Details – All Poles

PROJECT REFERENCE NO.	SHEET NO.
R-2904	Sig.21 M 2

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Division of Highways, North Carolina Department of Transportation, Roadway and Geometric Section, 122 N. McDowell St., Raleigh, NC 27603

Typical Fabrication Details Common To All Metal Poles

PLAN DATE: May 2005 | REVIEWED BY: C.F. Andrews
PREPARED BY: P.L. Alexander | REVIEWED BY: A.M. Esposito

REVISIONS	INIT.	DATE

SCALE: 0 NA NONE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

01-SEP-2005 18:22
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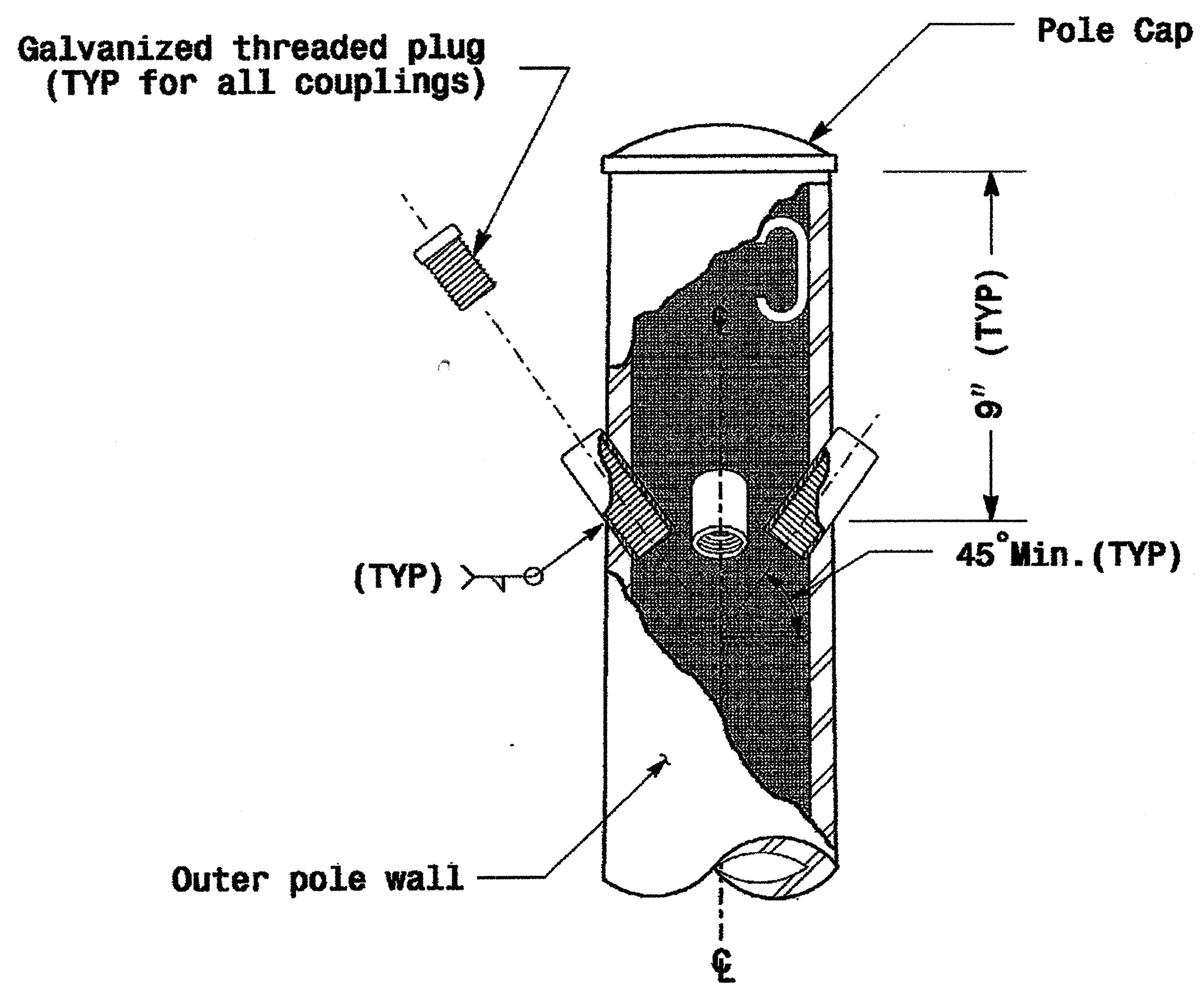
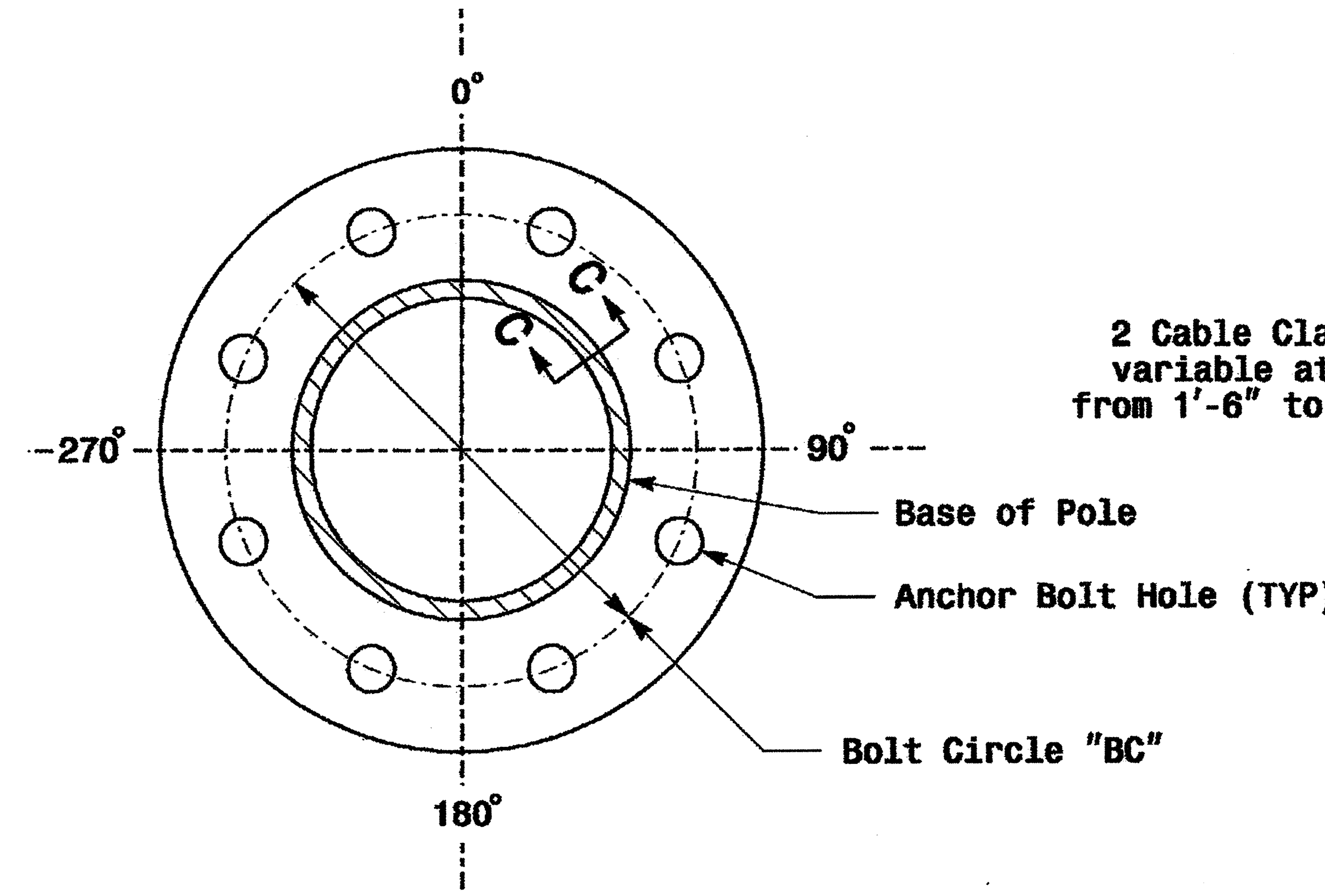
dcarawan

PROJECT REFERENCE NO.	SHEET NO.
R-2904	Sig. 22 M 3

Fabrication Details – Strain Poles



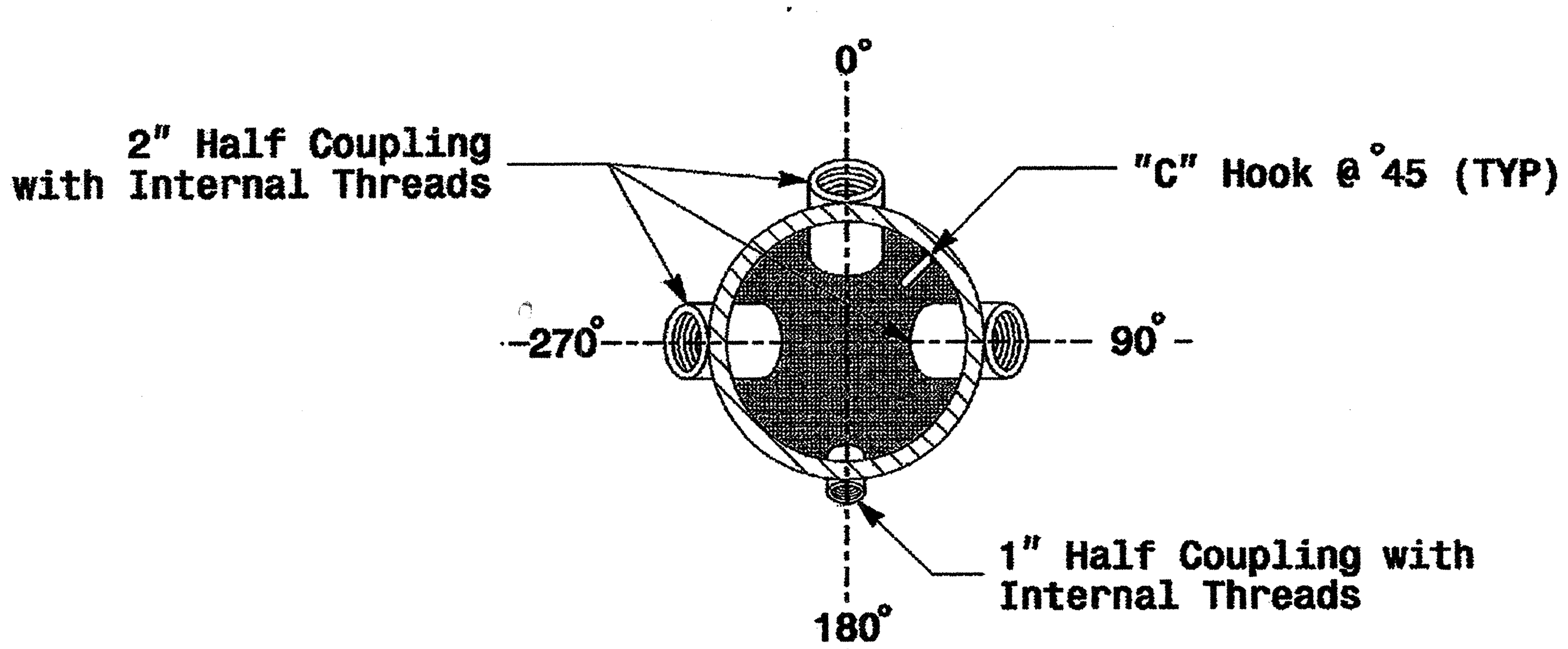
Cable Entrances at Top of Pole



Section B-B

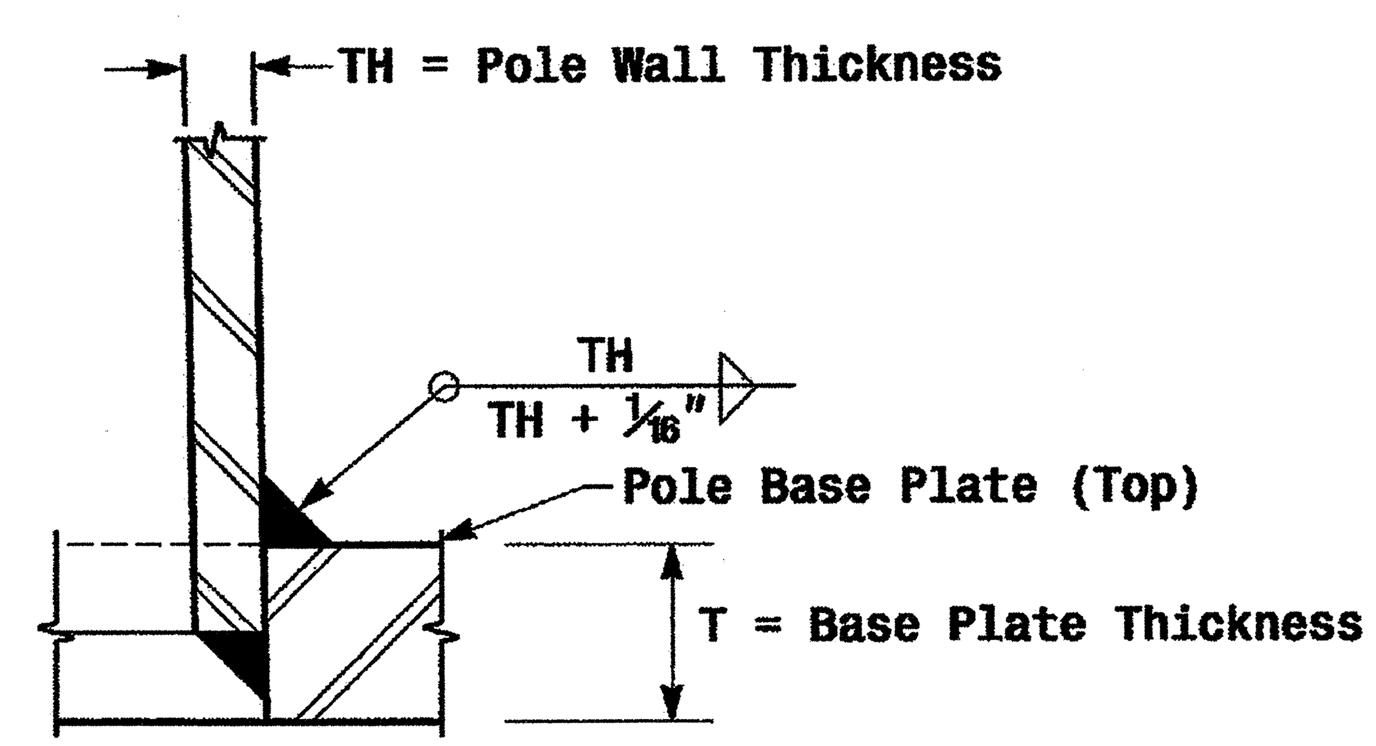
(See drawing M2)

Pole Base Plate



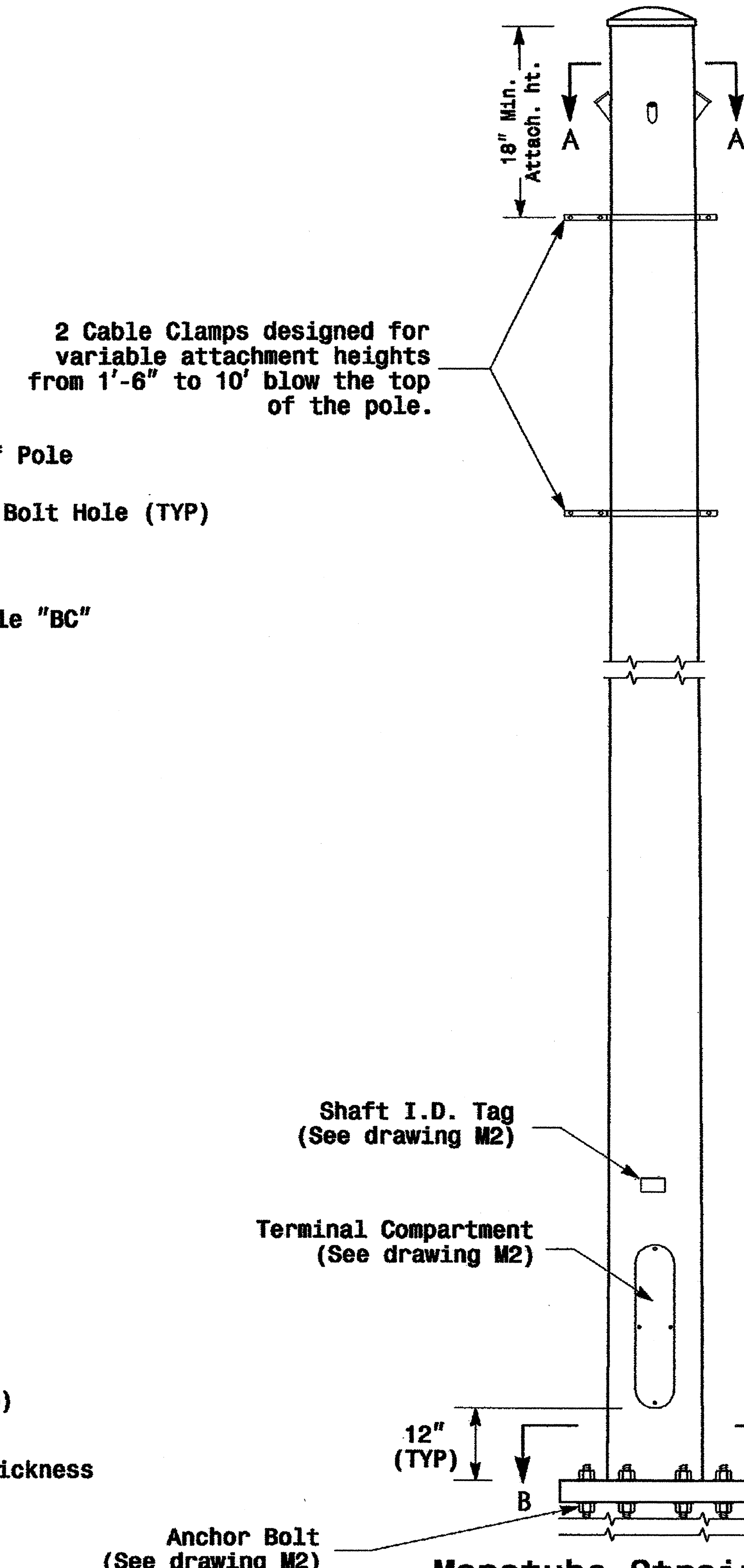
Section A-A

Radial Orientation for Factory Installed Accessories at Top of Pole



Section C-C

Socket Connection Weld Detail



Monotube Strain Pole

(.14"/Foot Taper)

Prepared in the Offices of:

122 N. McDowell St., Raleigh, NC 27603

Typical Fabrication Details
For Strain Poles

PLAN DATE:	May 2005	REVIEWED BY:	C.F. Andrews
PREPARED BY:	P.L. Alexander	REVIEWED BY:	A.M. Esposito

SCALE: 0 NA — NONE

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005

SIGNATURE DATE

SIG. INVENTORY NO.

01-SEP-2005 14:07
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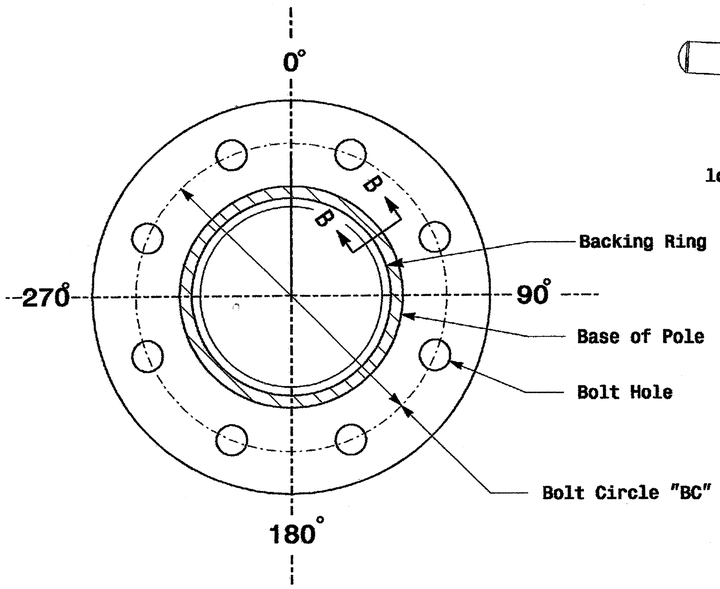
polexander

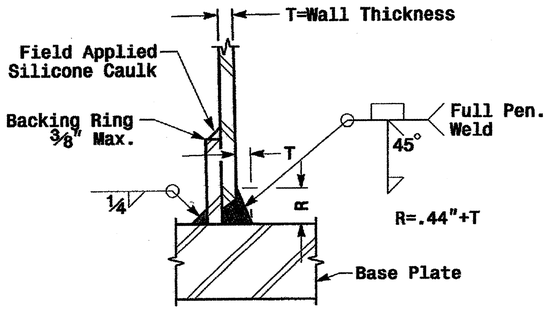
PROJECT REFERENCE NO.	SHEET NO.
R-2904	Sig.23 M 4

Fabrication Details – Mast Arm Poles



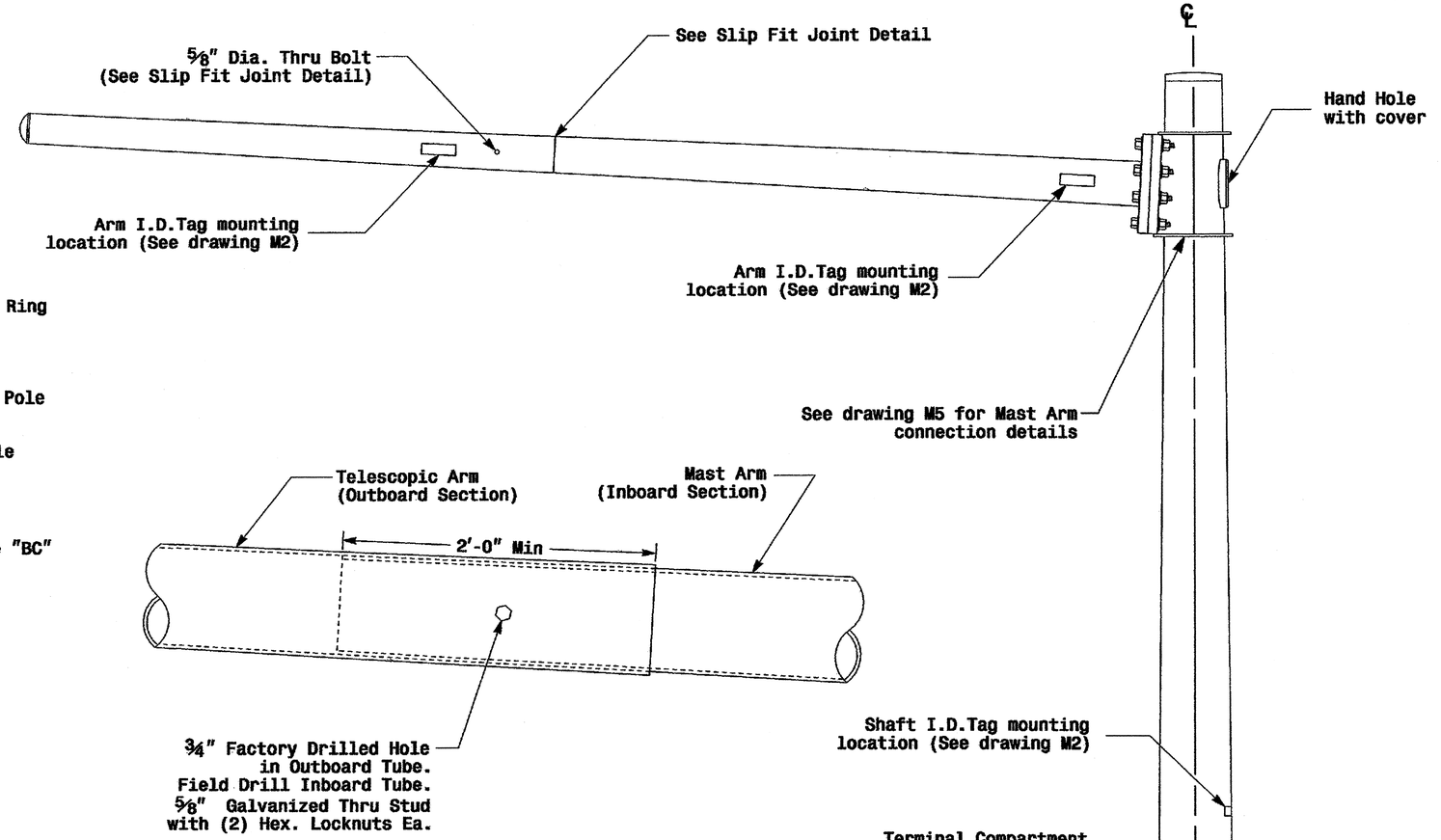
Section A-A
(See drawing M 2)

Pole Base Plate

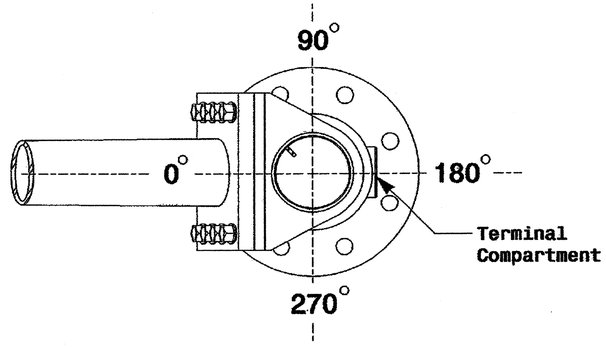


Section B-B
(Pole Attachment to Base Plate)

Full-Penetration Groove Weld Detail



Slip Fit Joint Detail for Mast Arm



Mast Arm Radial Orientation

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

Prepared in the Office of: Traffic Engineering and Safety Systems Branch, NCDOT Division of Highways, 1722 N. McDowell St., Raleigh, NC 27605

Typical Fabrication Details for Mast Arm Poles

PLAN DATE:	May 2005	REVIEWED BY:	C.F. Andrews
PREPARED BY:	P.L. Alexander	REVIEWED BY:	A.M. Esposito

REVISIONS	INIT.	DATE

SCALE: 0 NA — NONE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

SIGNATURE: D. Sarkar DATE: 9.2.2005

SIG. INVENTORY NO.

01-SEP-2005 14:08
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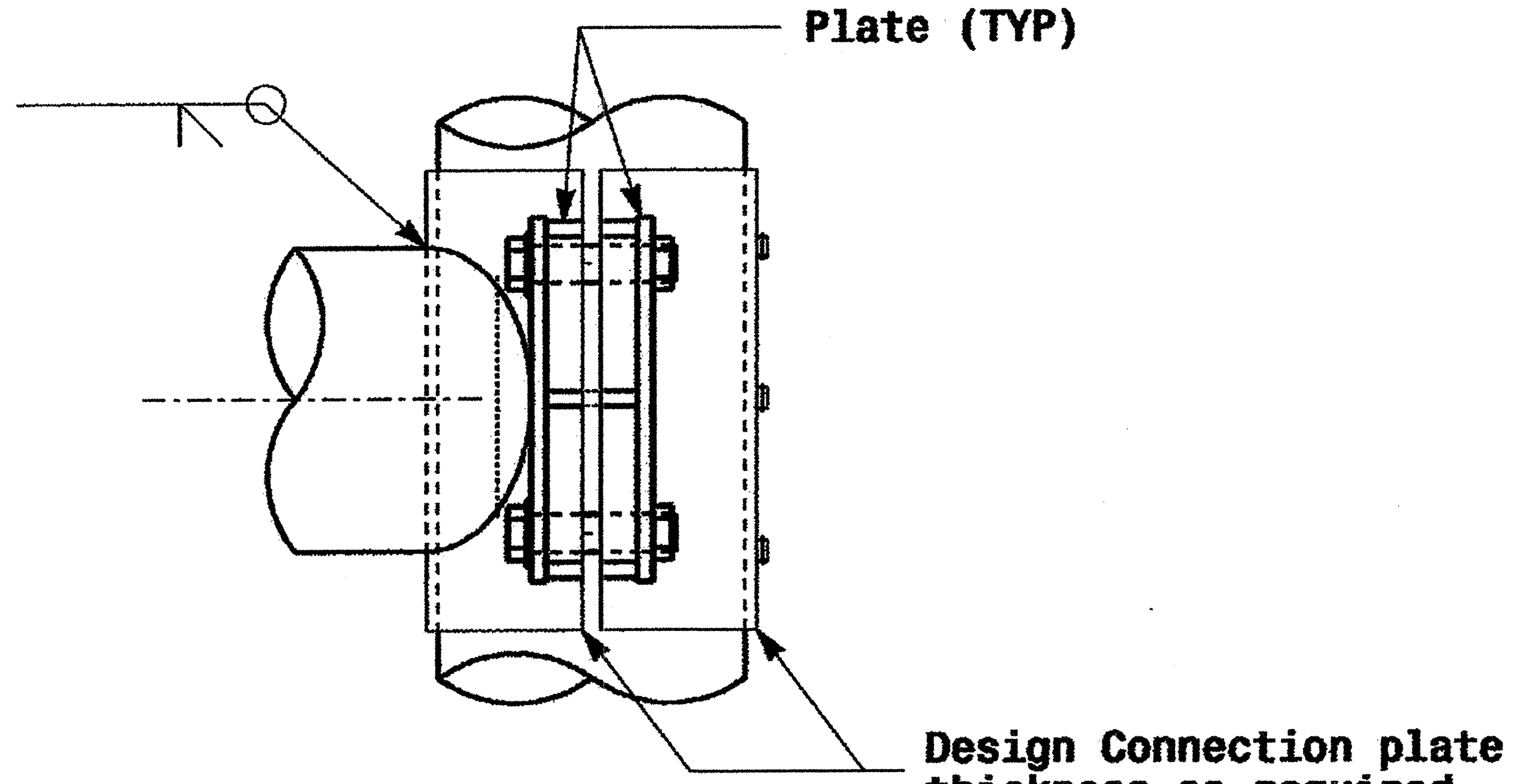
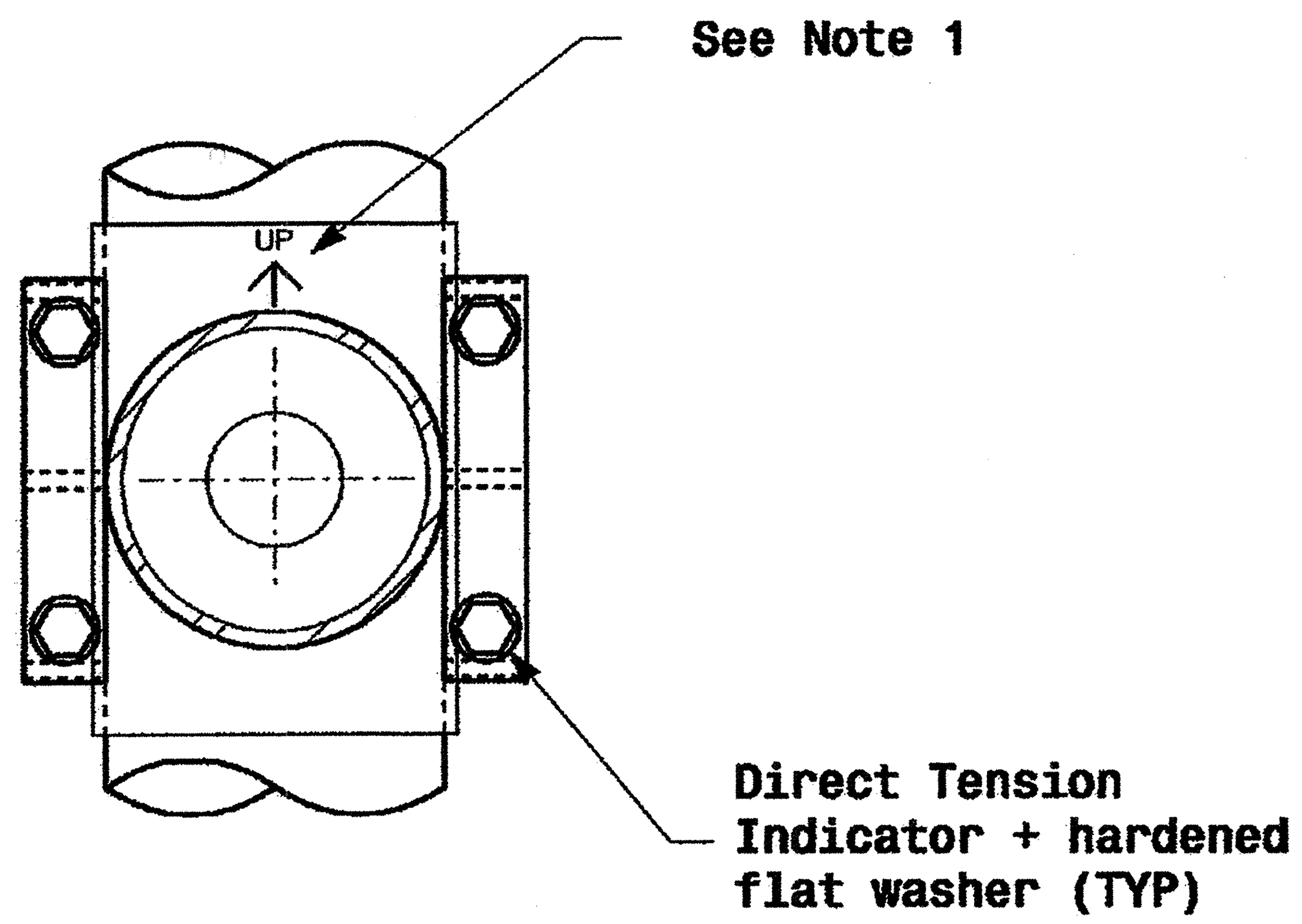
dsarkar

Fabrication Details - Mast Arm Poles

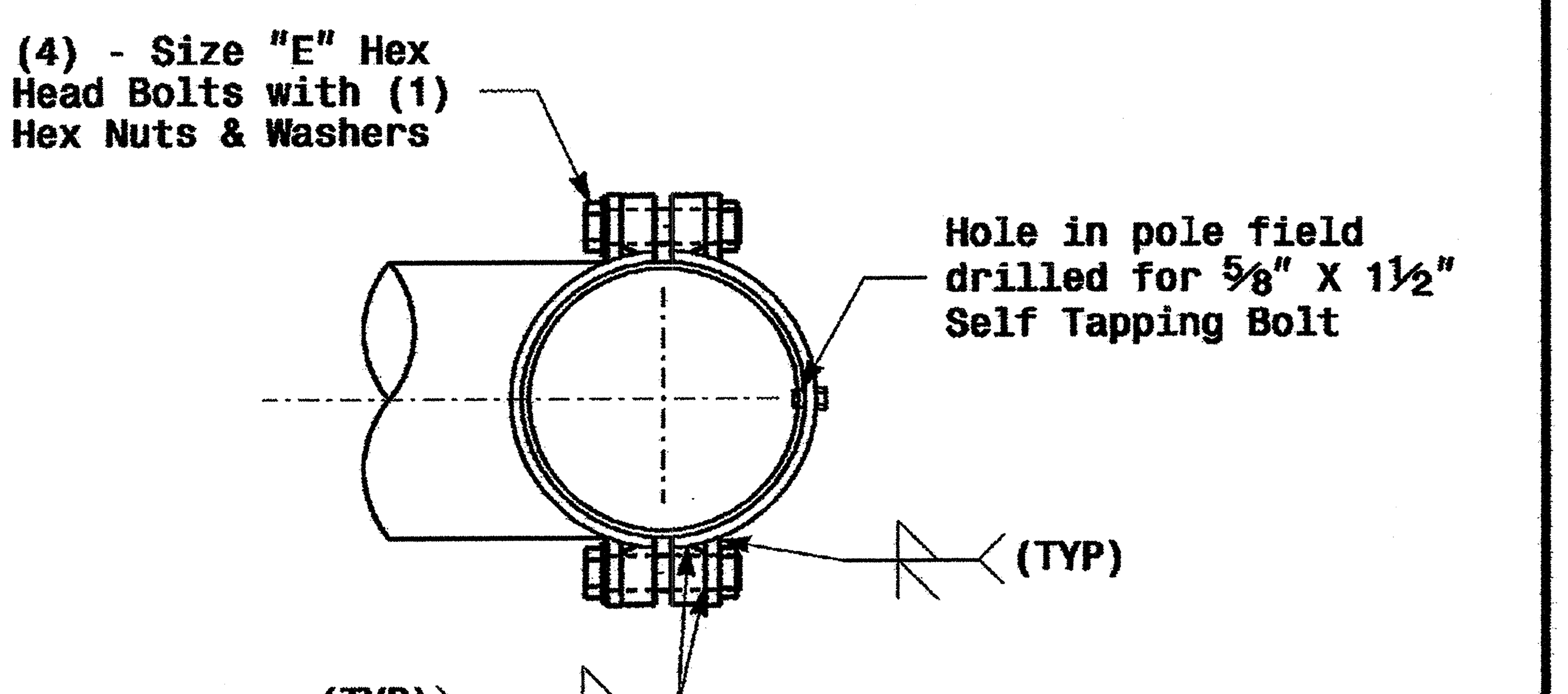
Adjustable Clamp Type Bolted Mast Arm Connection



Side Elevation View

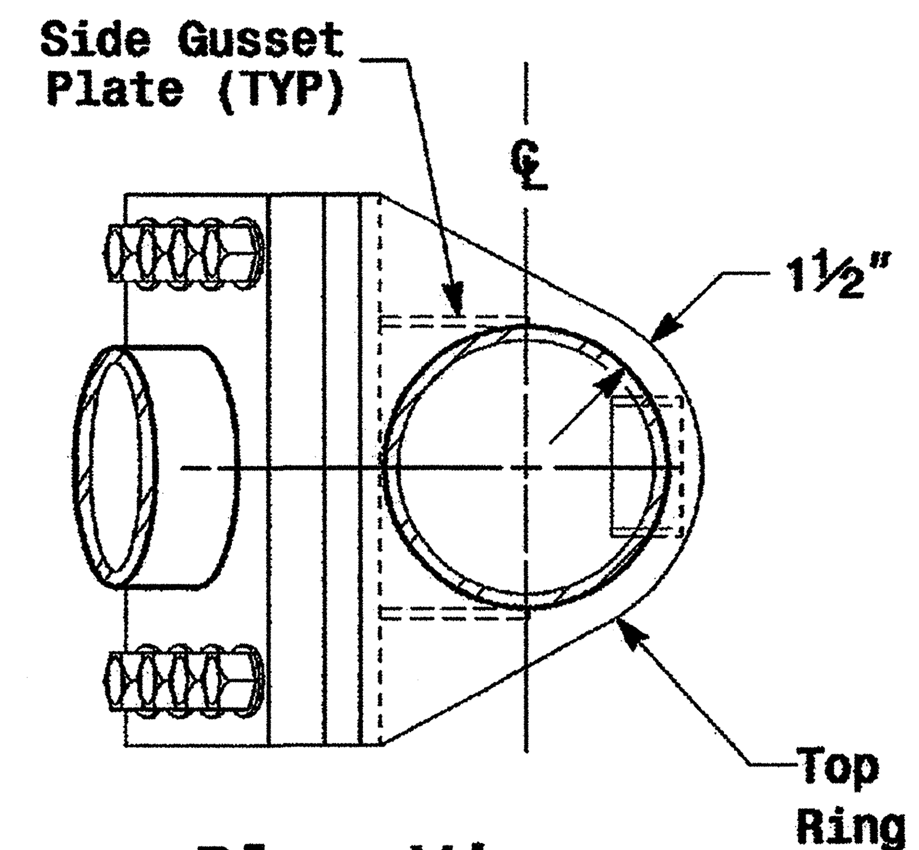


Front Elevation View

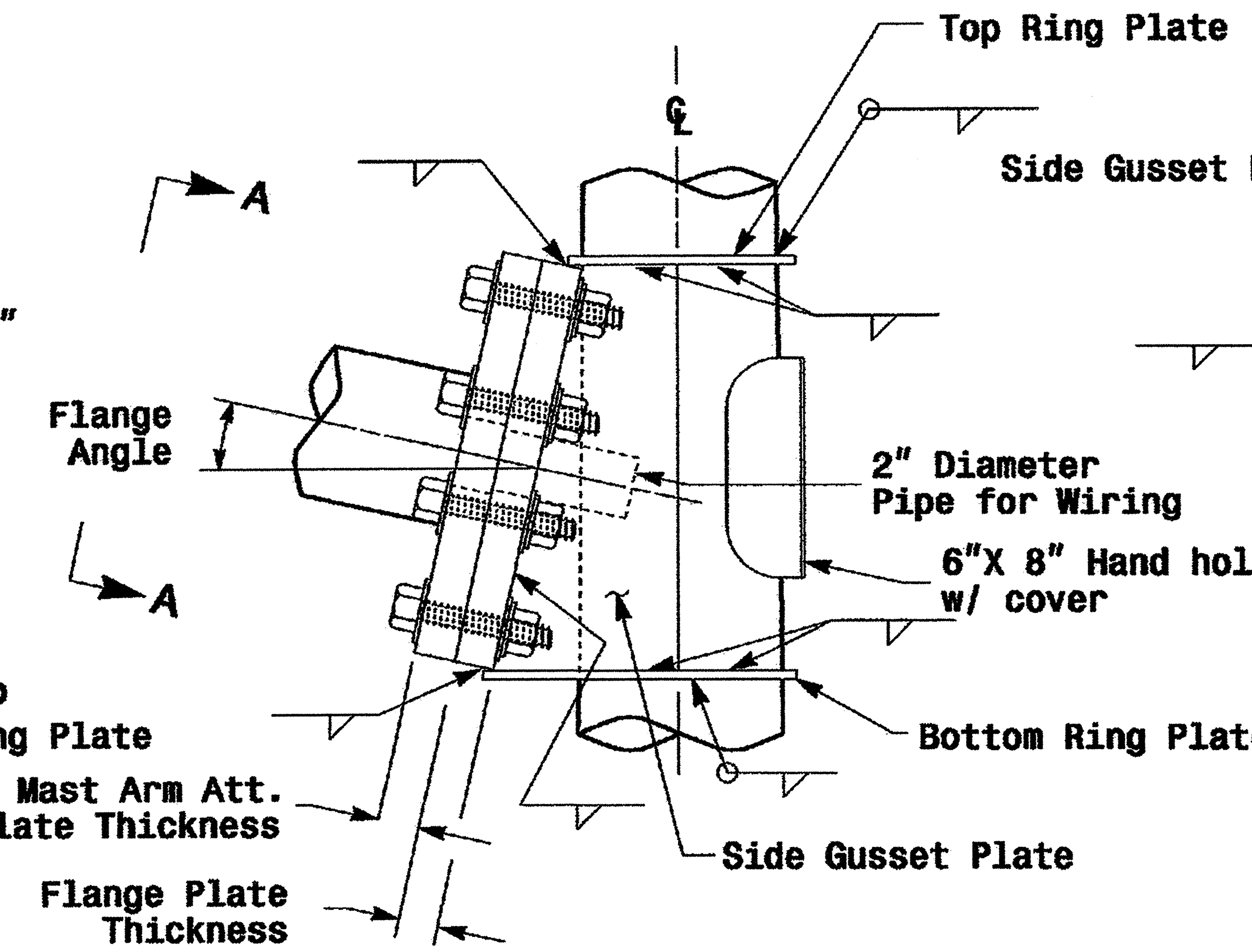


Plan View

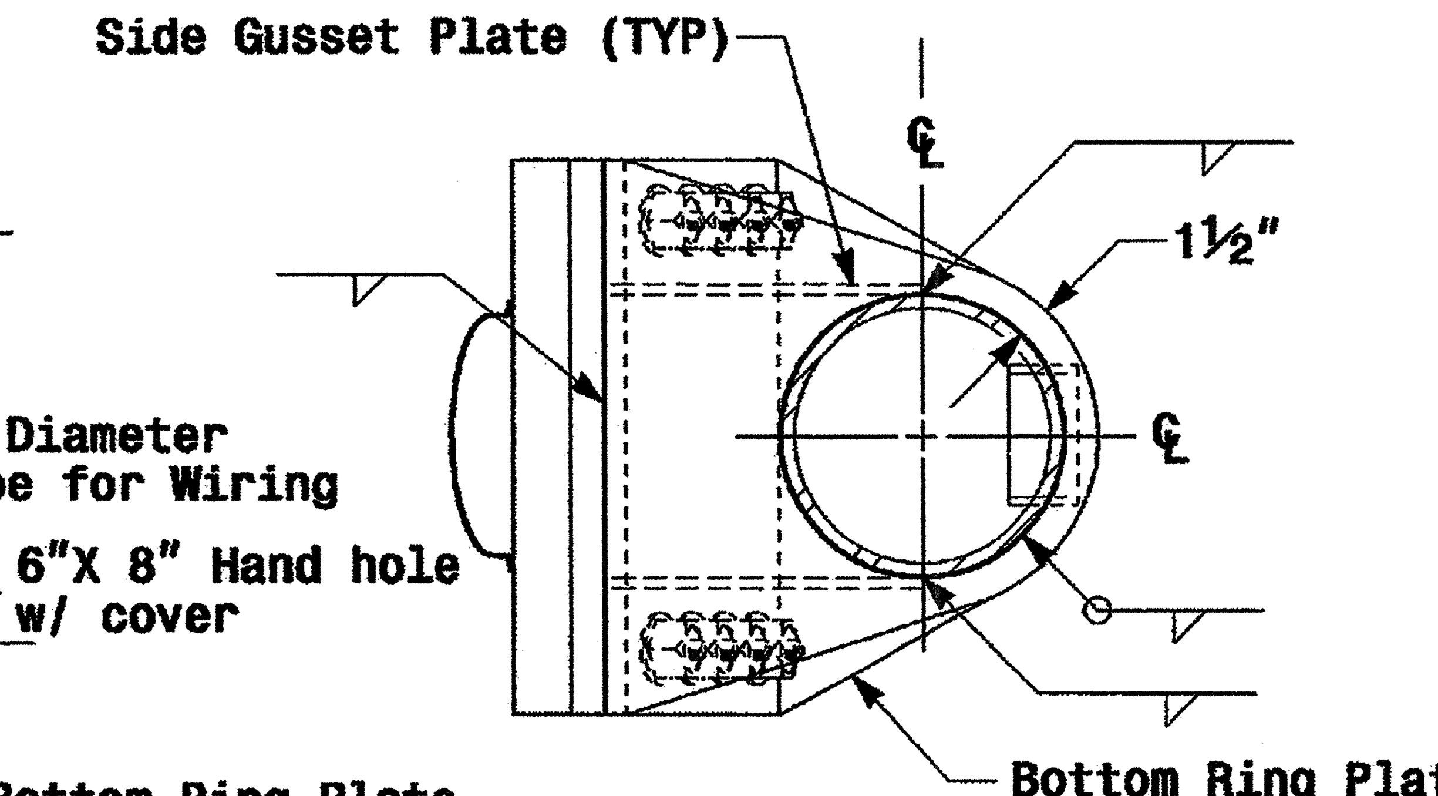
Welded Ring Stiffened Mast Arm Connection



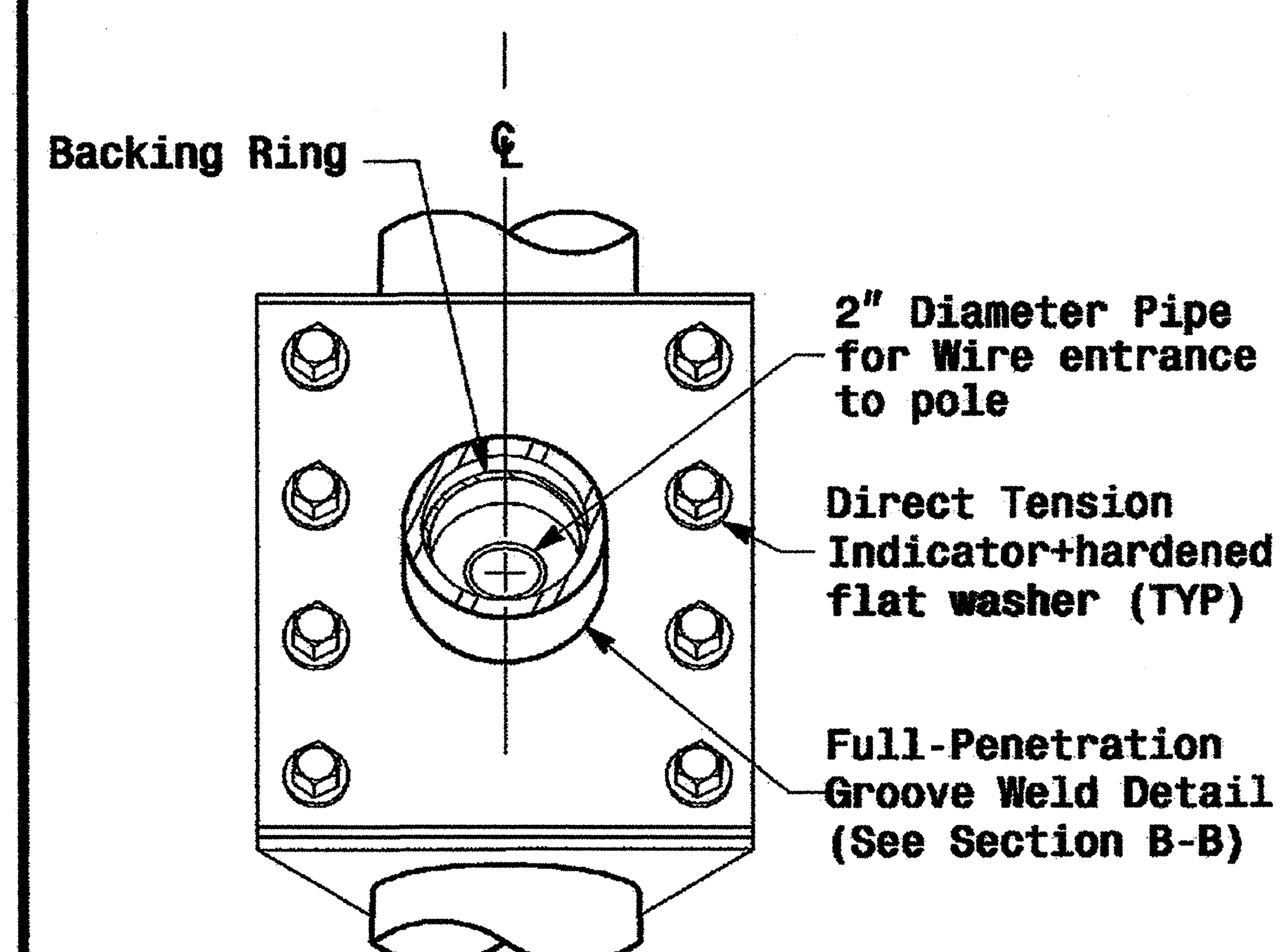
Plan View



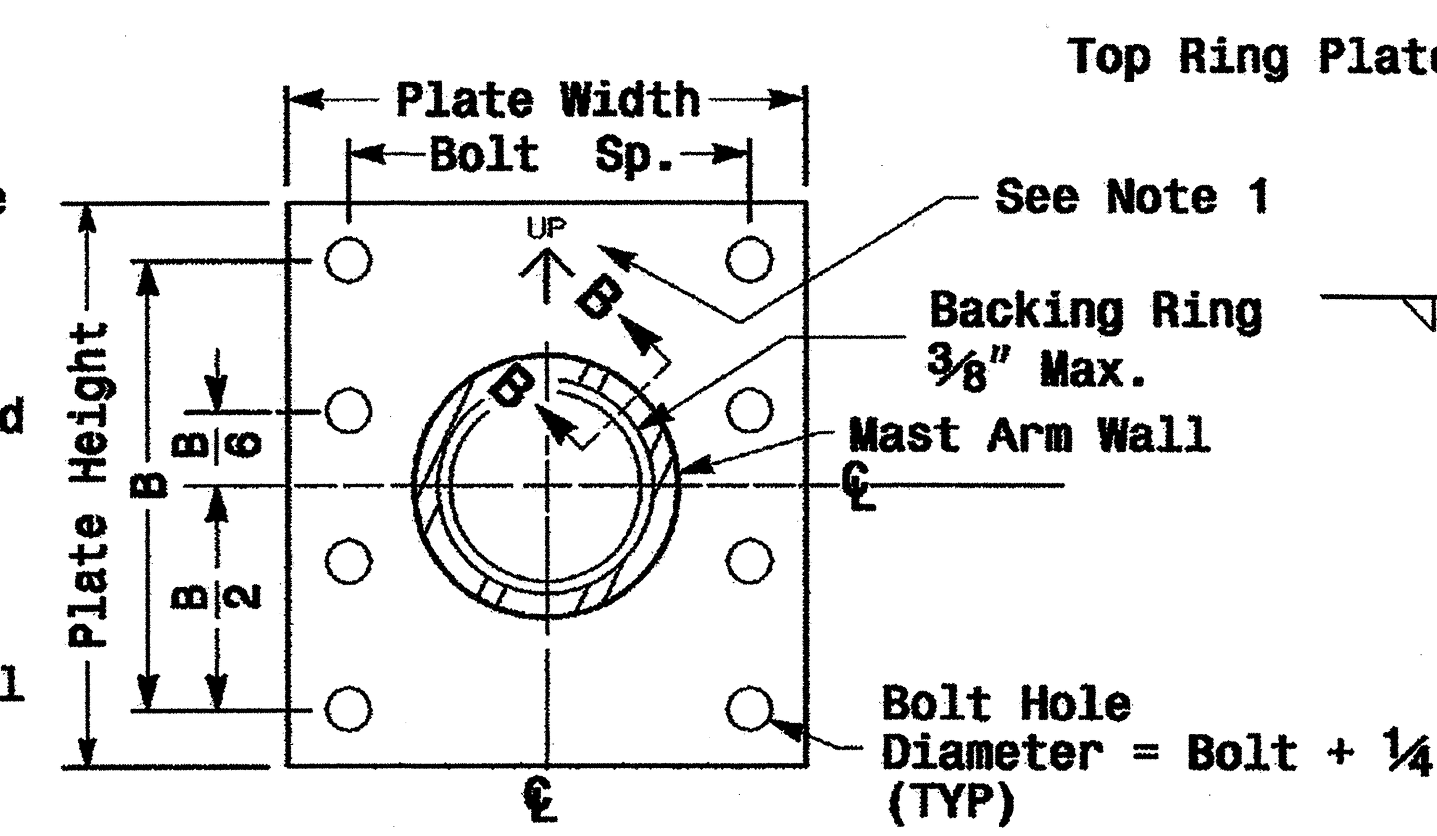
Side Elevation View



Bottom View

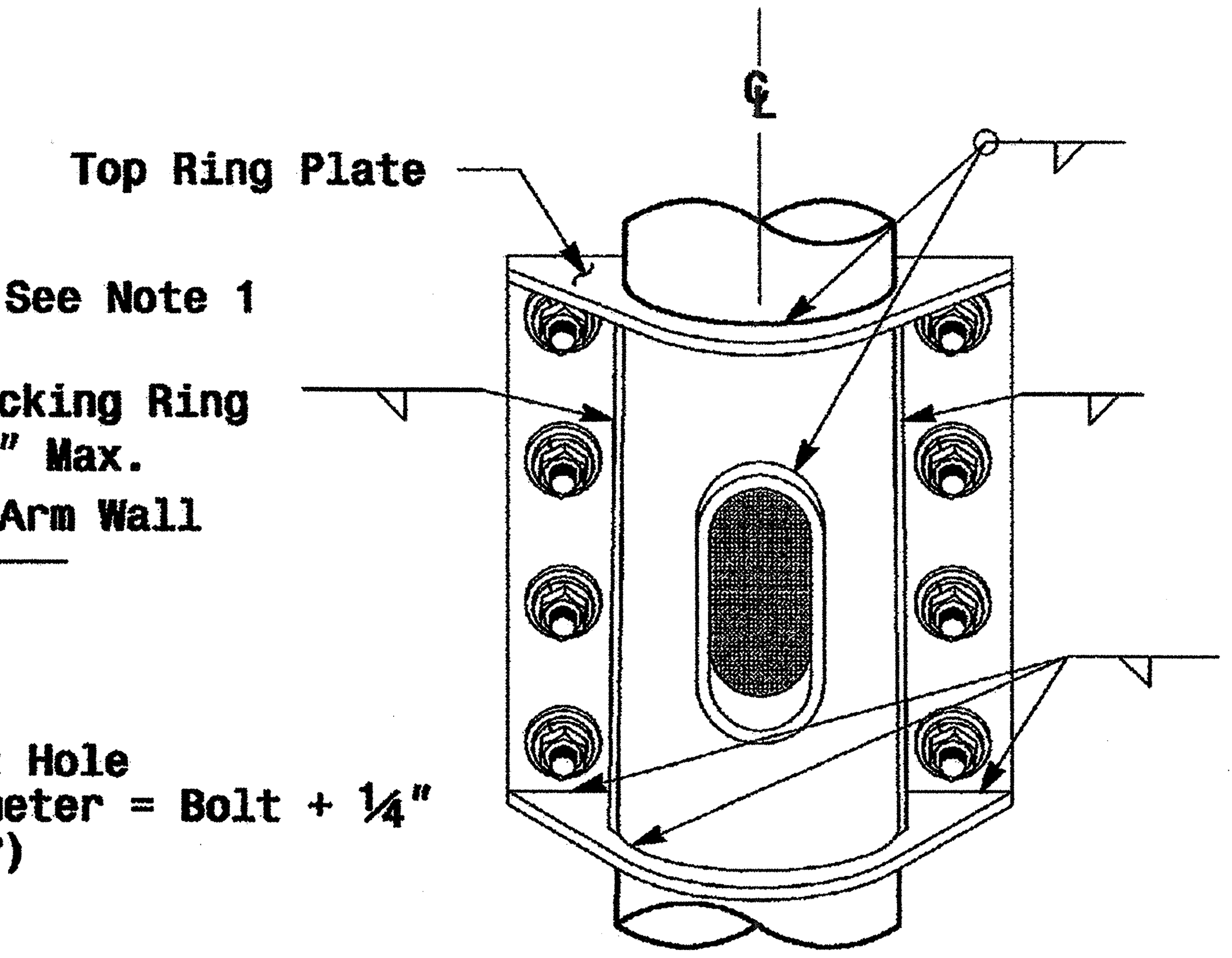


Front Elevation View

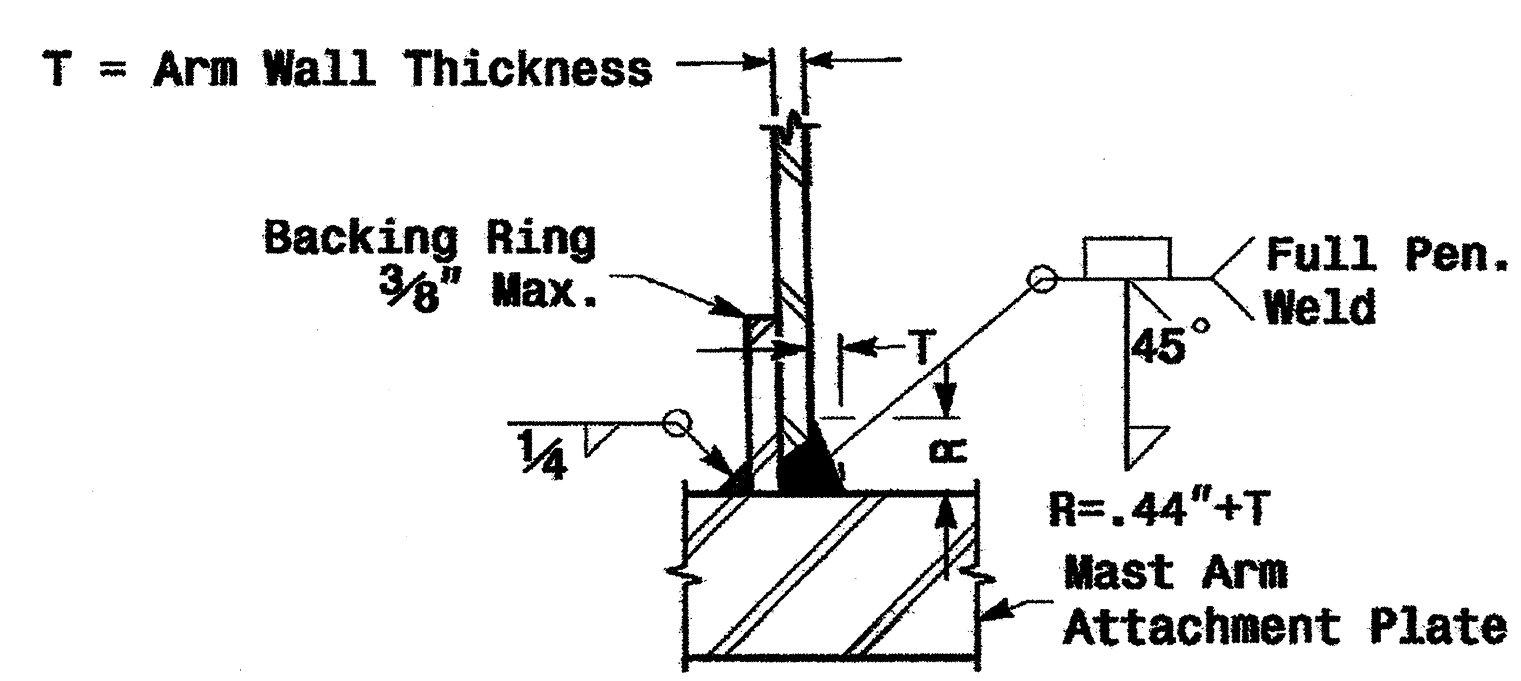


Section View A-A

Mast Arm Attachment Plate



Back Elevation View



Section B-B

Full-Penetration Groove Weld Detail

Notes:

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

Prepared in the Offices of: 122 N. McDowell St., Raleigh, NC 27603

Fabrication Details For Mast Arm Connection To Pole

PLAN DATE:	May 2005	REVIEWED BY:	C.F. Andrews
PREPARED BY:	P.L. Alexander	REVIEWED BY:	A.M. Esposito

SCALE 0 NA NONE

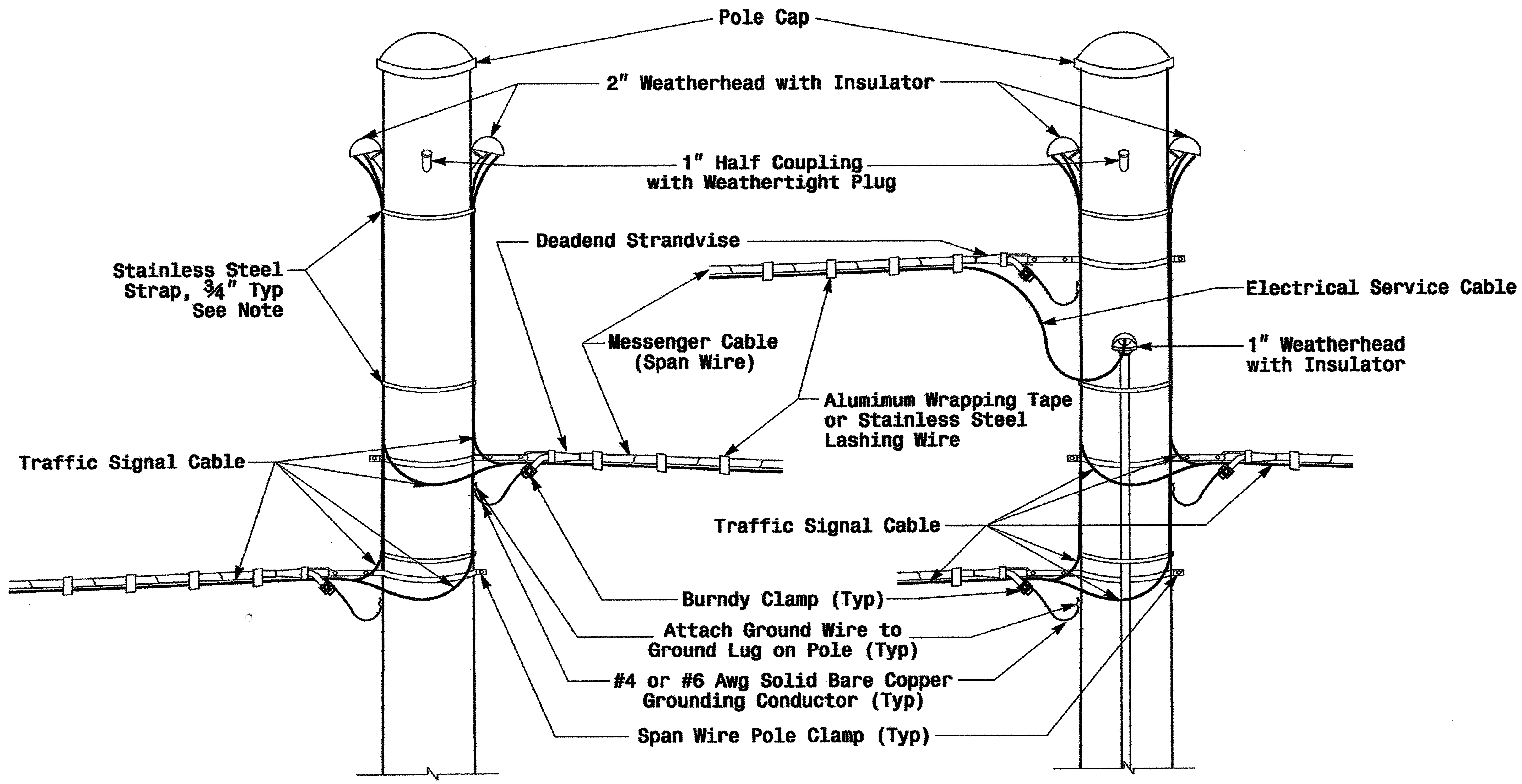
REVISIONS | INIT. | DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR
SIGNATURE 9.2.2005 DATE
SIG. INVENTORY NO.

01-SEP-2005 14:11 metal pole standards 2004 m5.dgn palexander

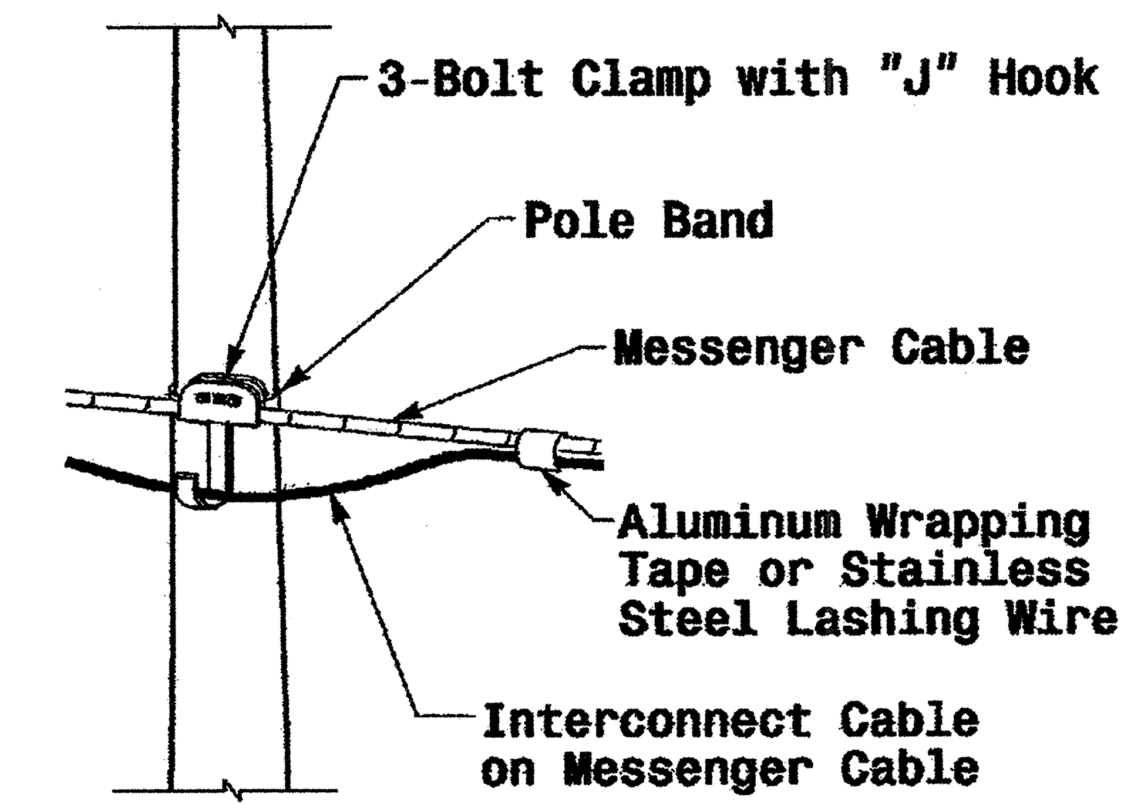
PROJECT REFERENCE NO.	SHEET NO.
R-2904	Sig.25 M 6

Construction Details – Strain Poles

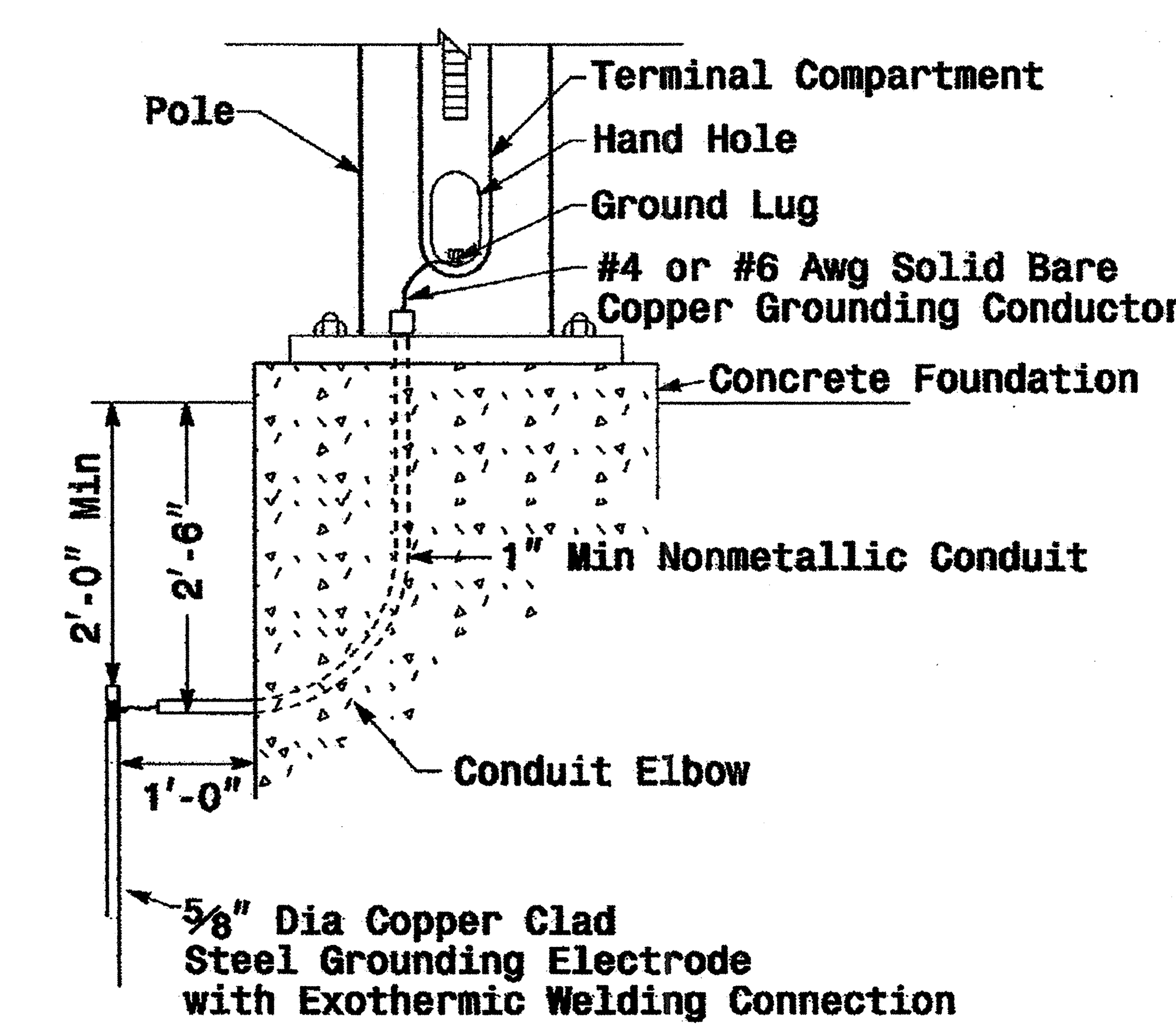


Note: Strap all signal cables to the side of the pole with ¾" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch – Signals and Geometrics Section
122 N. McDowell St., Raleigh, NC 27603

Construction Details
Strain Poles

PLAN DATE:	May 2005	REVIEWED BY:	P.L. ALEXANDER
PREPARED BY:	C.F. ANDREWS	REVIEWED BY:	D.C. SARKAR

SCALE: 0 NA — NONE

REVISIONS	INIT.	DATE

SEAL
North Carolina Professional Seal 016286 Engineer Milton I. Dean
Milton I. Dean 9-1-05
SIGNATURE DATE
SIG. INVENTORY NO.

01-SEP-2005 16:13
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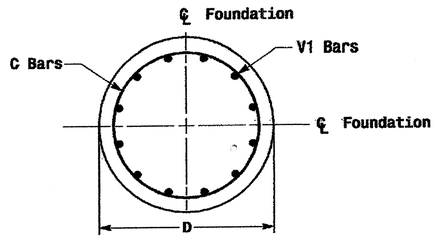
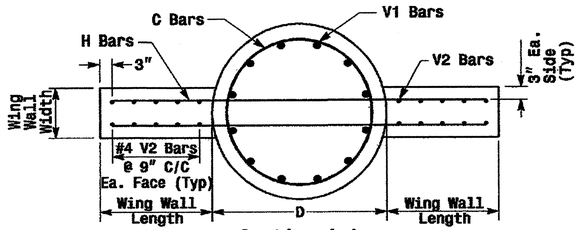
PROJECT REFERENCE NO.	SHEET NO.
R-2904	Sig. 26 M 7

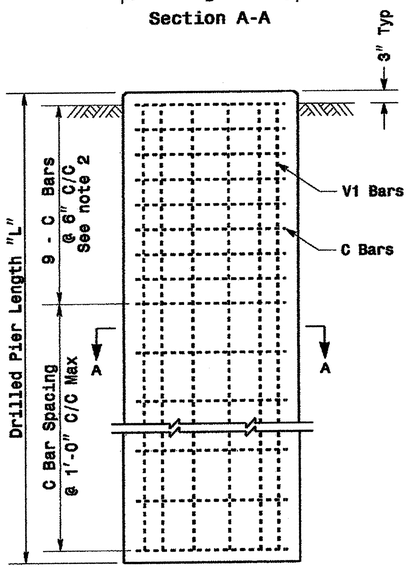
Reinforcing Steel Bars

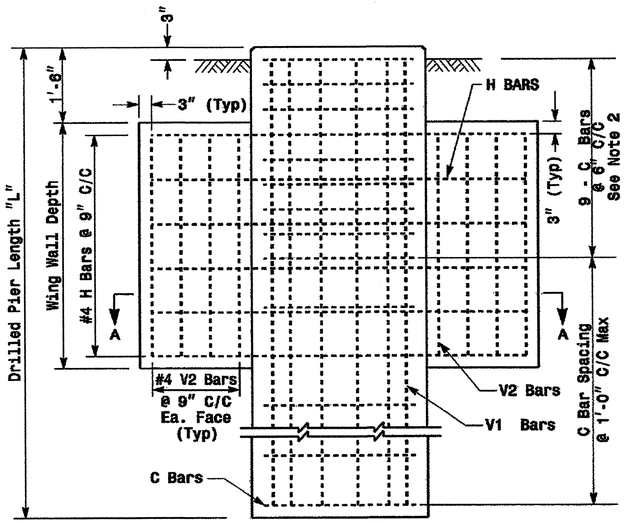


Section A-A



Section A-A





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

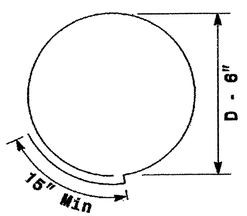
Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

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

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

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

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



Typical "C" Bars

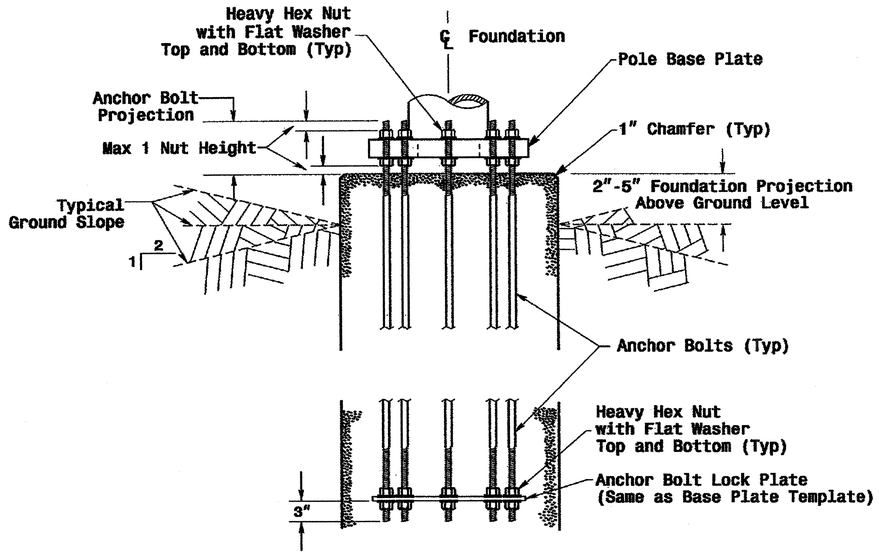
WING WALL DETAILS

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

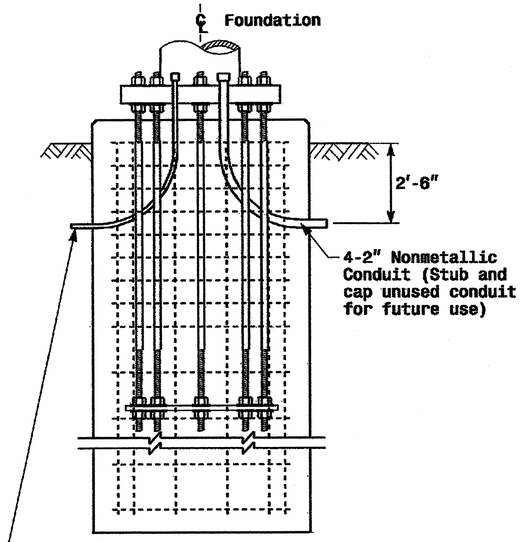
See Note No. 4

Typical Foundation Anchor Bolt Details

(Reinforcing Cage Not Shown for Clarity)



Typical Foundation Conduit Details



Notes

1. The number of C-bars is based on foundation depth. For standard foundations, see sheet M 8.
2. 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.
3. The length of V1-bars is based on foundation depth. For standard foundations, see sheet M 8.
4. The quantities for steel and concrete shown in the Wing Wall Details Chart reflect the amount of material for 1 pair of wing walls (2 wing walls per drilled pier shaft.)

Construction Details – Foundations

Prepared in the Offices of: North Carolina Department of Transportation, Highway and Geotechnical Services, 1722 N. McDowell St., Raleigh, NC 27603

Construction Details Foundations

PLAN DATE:	May 2005	REVIEWED BY:	P.L. ALEXANDER
PREPARED BY:	C.F. ANDREWS	REVIEWED BY:	A.N. ESPOSITO

REVISIONS	INIT.	DATE

SCALE: 0 NA — NONE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

01-SEP-2005 17:48
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pdalexander

		STANDARD STRAIN POLES				STANDARD FOUNDATIONS 42" Diameter Drilled Pier Length (L) – Feet						
						Clay				Sand		
Wind Zone	Load	Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Moment at the Pole Base (ft-kp)	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
WIND ZONE 1	LIGHT	S26L3	26	25	280	20.5	14.0	11.5	9.5	18.0	16.0	14.0
		S30L3	30	25	310	21.0	14.5	11.5	9.5	18.5	16.5	14.5
		S35L3	35	25	350	22.5	15.0	12.0	10.0	19.5	17.5	15.5
	HEAVY	S30H3	30	29	450	25.5	16.5	13.0	11.0	21.0	18.5	16.5
		S35H3	35	29	540	26.0	17.0	13.5	11.5	22.0	19.5	17.0
WIND ZONE 2	LIGHT	S26L2	26	23	250	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S30L2	30	23	290	20.0	14.0	11.5	9.5	18.5	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	9.5	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	24.5	16.0	13.0	10.5	21.0	18.5	16.0
		S35H2	35	29	485	25.5	16.5	13.5	11.0	21.5	19.0	16.5
WIND ZONE 3	LIGHT	S26L2	26	23	250	18.5	13.0	10.5	9.0	17.5	15.0	13.5
		S30L2	30	23	290	19.5	13.5	11.0	9.0	18.0	15.5	14.0
		S35L2	35	23	315	20.0	14.0	11.5	9.5	18.5	16.0	14.5
	HEAVY	S30H2	30	29	415	23.0	15.5	12.5	10.0	20.5	17.5	16.0
		S35H2	35	29	485	24.0	16.0	13.0	10.5	21.0	18.0	16.5
WIND ZONE 4	LIGHT	S26L1	26	22	195	18.0	13.0	10.5	9.0	16.5	14.5	13.0
		S30L1	30	22	225	18.5	13.0	10.5	9.0	17.0	15.0	13.5
		S35L1	35	22	255	19.0	13.5	11.0	9.0	17.5	15.5	14.0
	HEAVY	S30H1	30	25	330	22.0	15.0	12.0	9.5	19.5	17.0	15.0
		S35H1	35	25	385	23.0	15.5	12.5	10.0	20.0	17.5	15.5
WIND ZONE 5	LIGHT	S26L2	26	23	250	19.0	13.5	10.5	9.0	17.5	15.5	13.5
		S30L2	30	23	290	20.0	14.0	11.0	9.5	18.0	16.0	14.0
		S35L2	35	23	315	21.0	14.5	11.5	10.0	19.0	16.5	14.5
	HEAVY	S30H2	30	29	415	23.5	15.5	12.5	10.5	21.0	18.0	16.0
		S35H2	35	29	485	25.0	16.5	13.0	11.0	21.5	18.5	16.5

Concrete Volume (cubic yards)=.356 X L

Fabrication Design Notes:

1. Values shown in "Moment at the Pole Base" column represents the minimum acceptable capacity allowable for design using a design CSR of 1.

2. 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 sheet M 1.

3. Select the soil type (Clay or Sand) that best describes the soil characteristics.

4. Get the appropriate pole case load 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.

Standard Strain Poles

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Signals and Geometrics Section, 122 N. McDowell St., Raleigh, NC 27603

Standard Strain Poles and Standard Foundations

PLAN DATE: May 2005 | REVIEWED BY: C.F. Andrews
PREPARED BY: P.L. Alexander | REVIEWED BY: A.M. Esposito

SCALE: 0 NA — None

REVISIONS | INIT. | DATE

SEAL: North Carolina Professional Engineer, SEAL 028094, Debesh C. Sarkar

D. Sarkar 9.2.2005
SIGNATURE DATE

02-SEP-2005 12:42
r:\sigdata\workgroups\2004 metal pole standards\2004 m8 std strain pole.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 28

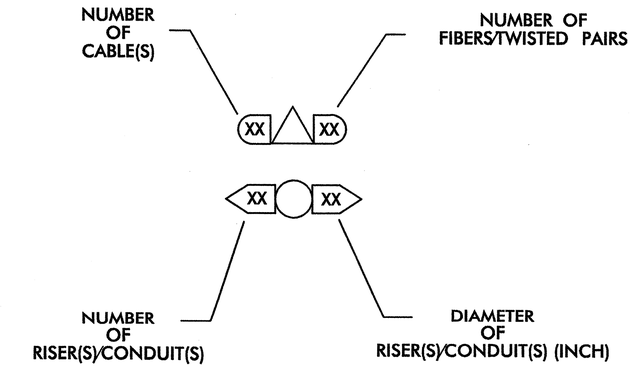
1. INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2. INSTALL REA, PE – 38, (FIGURE – 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
3. INSTALL REA, PE – 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13. INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
14. INSTALL POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER
20. INSTALL CABLE(S) IN NEW RISER
21. INSTALL CABLE(S) IN EXISTING CONDUIT STUBOUTS
22. INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
23. INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26. TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
27. INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS, AND FUSION SPLICE CABLE IN CABINET
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. INSTALL POLE MOUNTED SPLICE CABINET
32. INSTALL BASE MOUNTED SPLICE CABINET
33. REMOVE EXISTING SPLICE CABINET
34. INSTALL CABINET FOUNDATION
35. REMOVE EXISTING CABINET FOUNDATION
36. INSTALL CCTV CAMERA ASSEMBLY
37. INSTALL CCTV CAMERA WOOD POLE
38. INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39. INSTALL JUNCTION BOX
40. INSTALL OVERSIZED JUNCTION BOX
41. REMOVE EXISTING JUNCTION BOX
42. INSTALL WOOD POLE
43. REMOVE EXISTING WOOD POLE
44. INSTALL AERIAL GUY ASSEMBLY
45. INSTALL STANDARD GUY ASSEMBLY
46. INSTALL SIDEWALK GUY ASSEMBLY
47. INSTALL MESSENGER CABLE
48. REMOVE EXISTING COMMUNICATIONS CABLE AND MESSENGER CABLE
49. REMOVE EXISTING COMMUNICATIONS CABLE
50. INSTALL TELEPHONE SERVICE
51. INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52. INSTALL FIBER OPTIC 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 CABLE STORAGE RACKS (SNOWSHOES) AND STORE EXTRA 18 SMFO CABLE
60. INSTALL FIBER OPTIC TRANSCEIVER
61. ABANDON JUNCTION BOX (IN PLACE)

LEGEND

- F. O. — NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST. PR. — NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXIST. — EXISTING COMMUNICATIONS CABLE
- REM. — EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- D D — NEW DIRECTIONAL DRILLED CONDUIT
- B & J — NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- (S) NEW AERIAL SPLICE ENCLOSURE
- (S) EXISTING SPLICE ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV CAMERA ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CONTROLLER AND CABINET
- [S] EXISTING SPLICE CABINET
- [S] NEW SPLICE CABINET
- SP SIGNAL POLE
- (XX-XXXX) SIGNAL INVENTORY NUMBER
- (F) FIBER OPTIC DELINEATOR MARKER

CONSTRUCTION NOTE SYMBOLOGY KEY

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



PLAN PREPARED IN THE OFFICE OF:

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Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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1722 N. McDowell St., Raleigh, NC 27603

SCALE
0
NONE

R-2904-NC 54

CONSTRUCTION NOTES SHEET

DIVISION 5 — DURHAM COUNTY

PLAN DATE: JUNE 6, 2005 — REVIEWED BY: S.B. PRIVETTE

PREPARED BY: J.C. CROSS — REVIEWED BY: DE MARCEAU

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 24432 ENGINEER STEPHANIE B. PRIVETTE

SIGNATURE — 7/11/05 DATE

5/15/2006
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PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 29

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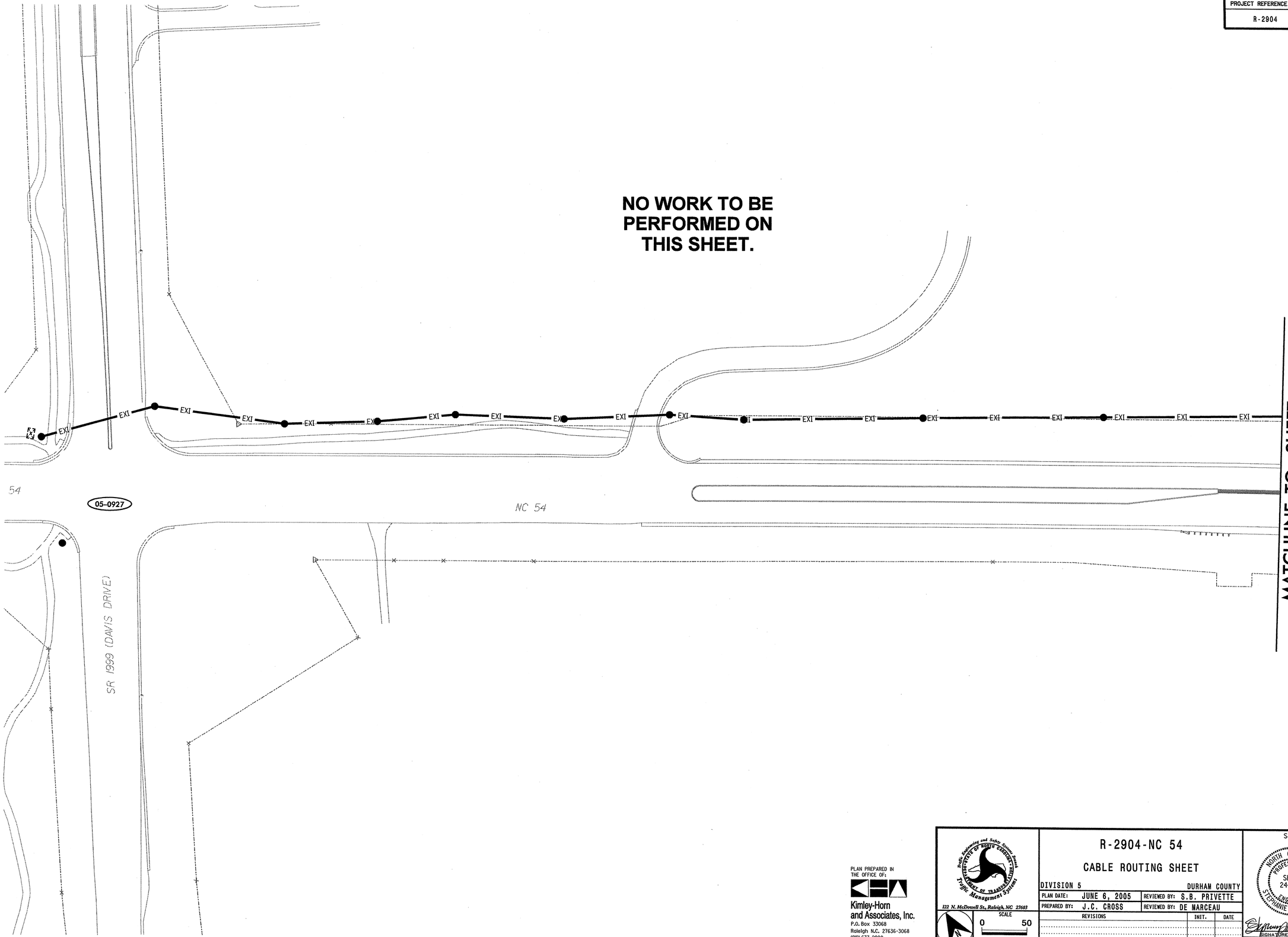

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 50

R-2904-NC 54

CABLE ROUTING SHEET

DIVISION 5 — DURHAM COUNTY

PLAN DATE:	JUNE 6, 2005	REVIEWED BY:	S.B. PRIVETTE
PREPARED BY:	J.C. CROSS	REVIEWED BY:	DE MARCEAU

REVISIONS	INIT.	DATE

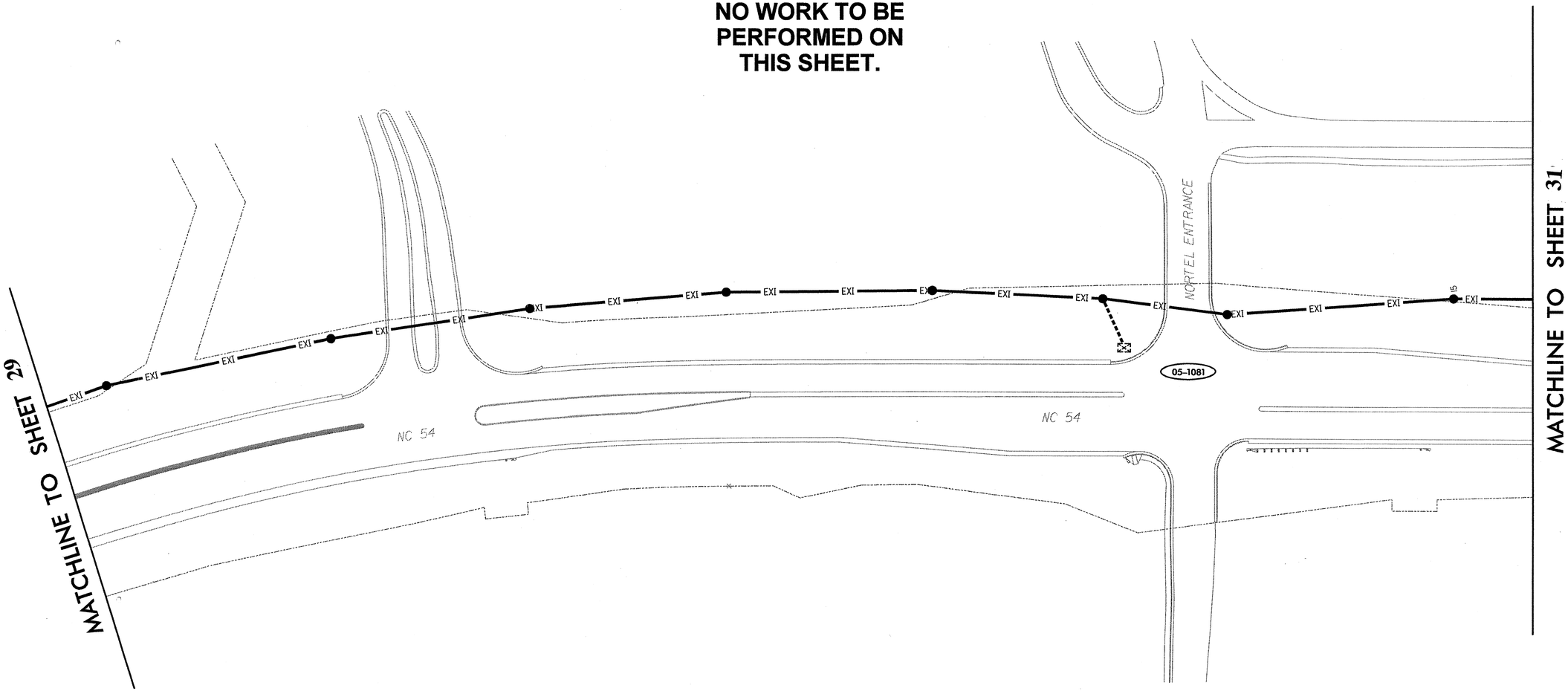
SEAL

NORTH CAROLINA PROFESSIONAL SEAL 24432 ENGINEER STEPHANIE B. PRIVETTE

SIGNATURE 7-11-2005 DATE

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 30

NO WORK TO BE PERFORMED ON THIS SHEET.



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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 50

R-2904-NC 54

CABLE ROUTING SHEET

DIVISION 5 — DURHAM COUNTY

PLAN DATE:	JUNE 6, 2005	REVIEWED BY:	S.B. PRIVETTE
PREPARED BY:	J.C. CROSS	REVIEWED BY:	DE MARCEAU

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 24432 ENGINEER STEPHANIE B. PRIVETTE

SIGNATURE

7-11-2005
DATE

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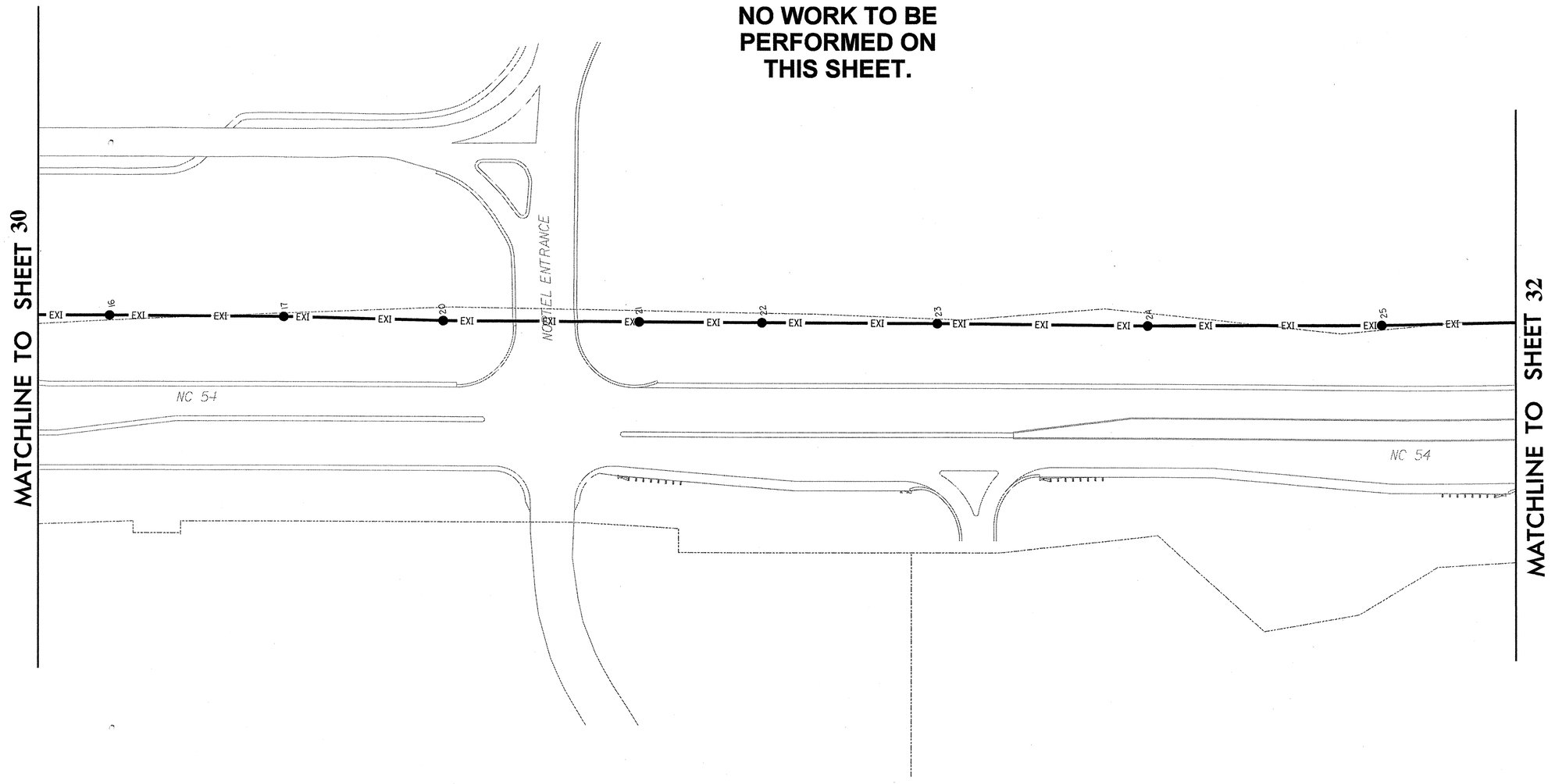
PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 31

NO WORK TO BE PERFORMED ON THIS SHEET.



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SCALE 0 50

R-2904-NC 54

CABLE ROUTING SHEET

DIVISION 5 — DURHAM COUNTY

PLAN DATE: JUNE 6, 2005 — REVIEWED BY: S.B. PRIVETTE

PREPARED BY: J.C. CROSS — REVIEWED BY: DE MARCEAU

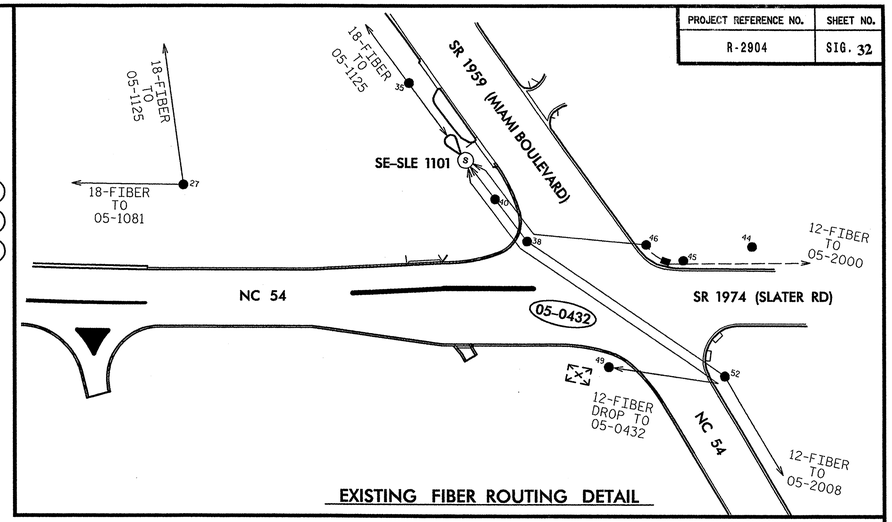
REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 24432 ENGINEER STEPHANIE B. PRIVETTE

SIGNATURE 7.11.2006 DATE

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 32



NOTES FOR EXISTING FIBER OPTIC CABLE TO BE REMOVED
(REFERENCE "EXISTING FIBER ROUTING DETAIL")

1) RECORD FIBER SPLICES FOUND IN EXISTING AERIAL SPLICE ENCLOSURE (SE-SLE 1101)
2) UPON RECORDING AND VERIFYING SPLICES, REMOVE THE FOLLOWING CABLES FROM THE EXISTING AERIAL SPLICE ENCLOSURE (SE-SLE 1101) TO THE POINT AS INDICATED BELOW.

   A) LOCATE THE 12 FIBER CABLE RUNNING BETWEEN THE EXISTING AERIAL SPLICE ENCLOSURE (SE-SLE 1101) GOING TOWARD INTERSECTION SIG. INV. #05-2000 (SR 1973 (PAGE ROAD) AND SR 1978 (HOPSON ROAD) @ SR 1974 (SLATER ROAD) TO THE EXISTING JUNCTION BOX ON THE NORTHEAST CORNER OF MIAMI BOULEVARD AND NC 54 (JB 1). REMOVE THE CABLE FROM THE EXISTING AERIAL SPLICE ENCLOSURE (SE-SLE 1101) TO JB 1. LEAVE SUFFICIENT SLACK CABLE AT JB 1 FOR TERMINATION IN A NEW SPLICE ENCLOSURE (SE 2).

   B) LOCATE THE 12 FIBER CABLE RUNNING BETWEEN THE EXISTING AERIAL SPLICE ENCLOSURE (SE-SLE 1101) GOING TOWARD INTERSECTION SIG. INV. #05-2008 (NC 54 @ SR 1978 (HOPSON RD.)) UP TO POLE #53. REMOVE THE CABLE BETWEEN THE EXISTING AERIAL SPLICE ENCLOSURE (SE-SLE 1101) AND POLE #53. LEAVE SUFFICIENT SLACK AT POLE #53 FOR TERMINATION IN A NEW AERIAL SPLICE ENCLOSURE (SE 3).

   C) LOCATE THE 12 FIBER DROP CABLE RUNNING BETWEEN THE EXISTING AERIAL SPLICE ENCLOSURE (SE-SLE 1101) AND THE INTERSECTION CONTROLLER CABINET SIG. INV. #05-0432 (MIAMI BLVD. @ NC 54 @ SLATER RD.) AND REMOVE IT COMPLETELY.

   D) ONCE ALL CABLES LISTED IN #A THROUGH #C ABOVE HAVE BEEN REMOVED, RELOCATE THE EXISTING AERIAL SPLICE ENCLOSURE (SE-SLE 1101) FROM IN BETWEEN POLES #35 AND #40 TO BETWEEN POLES #35 AND #41.

3. DO NOT REMOVE THE EXISTING AERIAL SPLICE ENCLOSURE (SE-SLE 1101) OR THE 18 FIBER CABLE GOING NORTH TOWARDS SIG. INV. #05-1125 ("MIAMI BLVD. @ NORTHERN TELECOM ENTRANCE").

4. RESPLICE TWO NEW 12 FIBER CABLES AND ONE NEW 12 FIBER DROP CABLE IN SE-SLE 1101 IN SAME MANNER AS TWO REMOVED 12 FIBER CABLES AS RECORDED IN #2 ABOVE.

PLAN PREPARED IN THE OFFICE OF:
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Traffic Engineering and Safety Systems Branch
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Management Systems
122 N. McDowell St., Raleigh, NC 27603

SCALE 0 50

R-2904-NC 54

CABLE ROUTING SHEET

DIVISION 5 — DURHAM COUNTY

PLAN DATE:	JUNE 6, 2005	REVIEWED BY:	S.B. PRIVETTE
PREPARED BY:	J.C. CROSS	REVIEWED BY:	DE MARCEAU

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24432 ENGINEER STEPHANIE B. PRIVETTE
SIGNATURE 7-11-2005 DATE

5/15/2006
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PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 33

UNDERGROUND SPLICE ENCLOSURE #2 (SE 2)
NORTHEAST CORNER OF NC 54 AND SR 1959 (MIAMI BLVD) INTERSECTION 05-0432 (EXISTING JUNCTION BOX 1 (JB 1))

LEGEND

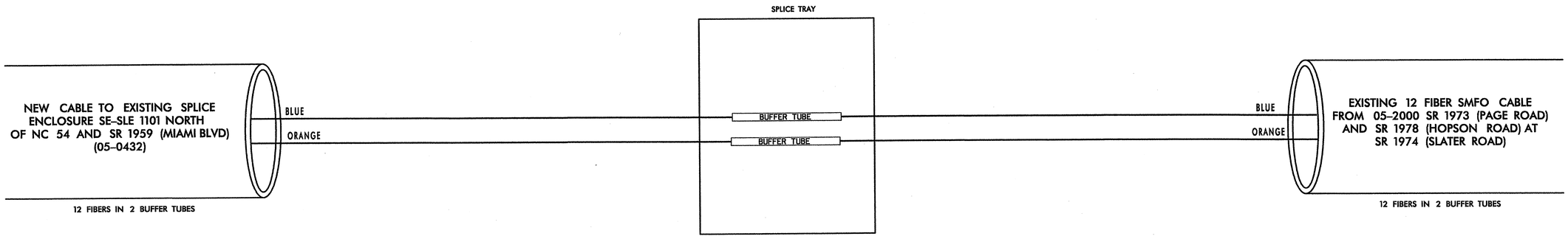
COLOR CODE TIA/EIA 598-A

(1) BLUE
(2) ORANGE
(3) GREEN
(4) BROWN
(5) SLATE
(6) WHITE

X - FUSION SPLICE INDIVIDUAL FIBER

[BUFFER TUBE] SPLICE OR EXPRESS ENTIRE BUFFER TUBE AS NOTED

SPLICE ALL FIBERS IN BLUE AND ORANGE BUFFER TUBES IN NEW CABLE FROM EXISTING SPLICE ENCLOSURE SE-SLE 1101 NORTH OF NC 54 AND SR 1959 (MIAMI BLVD) TO SAME COLOR FIBER AND SAME COLOR BUFFER TUBE IN EXISTING CABLE FROM 05-2000 (SR 1973 (PAGE ROAD) AND SR 1978 (HOPSON ROAD) AT SR 1974 (SLATER ROAD))



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Traffic Engineering and Safety Systems Branch
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FIBER-OPTIC SPLICE DETAILS
NC 54 @ SR 1959 (MIAMI BLVD)

DIVISION 5 — DURHAM COUNTY

PLAN DATE: JULY 23, 2004	REVIEWED BY: DE MARCEAU
PREPARED BY: BR LAWRENCE	REVIEWED BY: S.B. PRIVETTE

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 24432 ENGINEER STEPHANIE B. PRIVETTE

SIGNATURE 7-11-2005 DATE

PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 34

AERIAL SPLICE ENCLOSURE #3 (SE 3)
SOUTHEAST CORNER OF NC 54 AND SR 1959 (MIAMI BLVD) INTERSECTION 05-0432 (POLE 53)

LEGEND

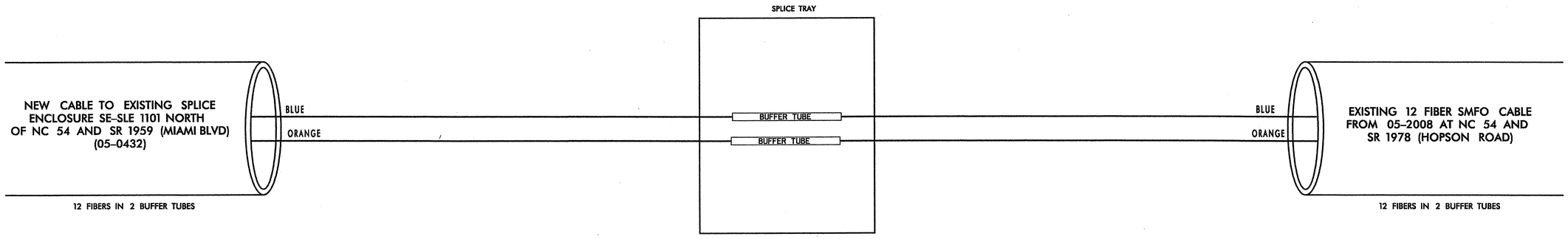
COLOR CODE TIA/EIA 598-A

(1) BLUE
(2) ORANGE
(3) GREEN
(4) BROWN
(5) SLATE
(6) WHITE

X - FUSION SPLICE INDIVIDUAL FIBER

BUFFER TUBE SPLICE OR EXPRESS ENTIRE BUFFER TUBE AS NOTED

SPLICE ALL FIBERS IN BLUE AND ORANGE BUFFER TUBES IN NEW CABLE FROM EXISTING SPLICE ENCLOSURE SE-SLE 1101 NORTH OF NC 54 AND SR 1959 (MIAMI BLVD) TO SAME COLOR FIBER AND SAME COLOR BUFFER TUBE IN EXISTING CABLE FROM 05-2008 (NC 54 AT SR 1978 (HOPSON ROAD))



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FIBER-OPTIC SPLICE DETAILS
NC 54 @ SR 1959 (MIAMI BLVD)

DIVISION 5 — DURHAM COUNTY

PLAN DATE:	JULY 23, 2004	REVIEWED BY:	DE MARCEAU
PREPARED BY:	BR LAWRENCE	REVIEWED BY:	S.B. PRIVETTE

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 24432 ENGINEER STEPHANIE B. PRIVETTE

SIGNATURE 7-11-2005 DATE

5/15/2006
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PROJECT REFERENCE NO.	SHEET NO.
R-2904	SIG. 35

05-0432 CABINET
SOUTHWEST CORNER OF NC 54 AND SR 1959 (MIAMI BLVD)

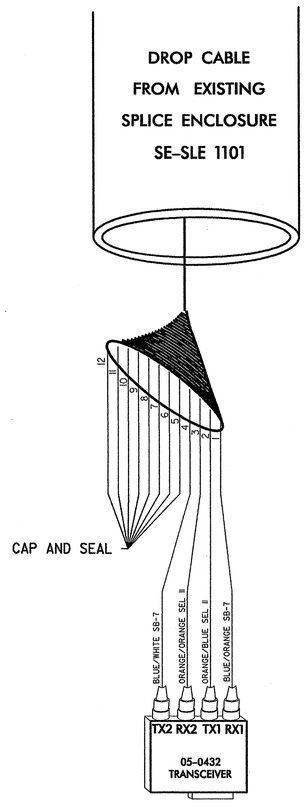
LEGEND

COLOR CODE TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA

X - FUSION SPLICE INDIVIDUAL FIBER

BUFFER TUBE SPLICE OR EXPRESS ENTIRE BUFFER TUBE AS NOTED



5/15/2006
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FIBER-OPTIC SPLICE DETAILS
NC 54 @ SR 1959 (MIAMI BLVD)

DIVISION 5 — DURHAM COUNTY

PLAN DATE:	JUNE 21, 2004	REVIEWED BY:	DE MARCEAU
PREPARED BY:	BR LAWRENCE	REVIEWED BY:	S.B. PRIVETTE

REVISIONS	INIT.	DATE

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 24432 ENGINEER STEPHANIE B. PRIVETTE

SIGNATURE 7.11.2006 DATE