Project No.	Sheet No.
U-3401	Sig. 1

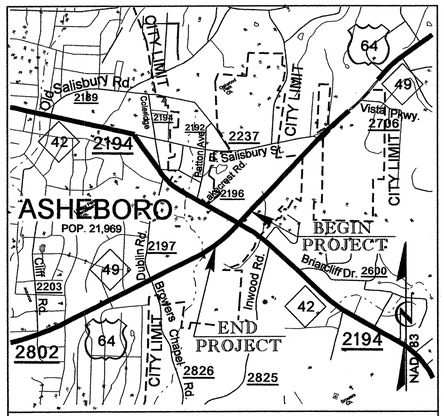
Project: U-3401

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

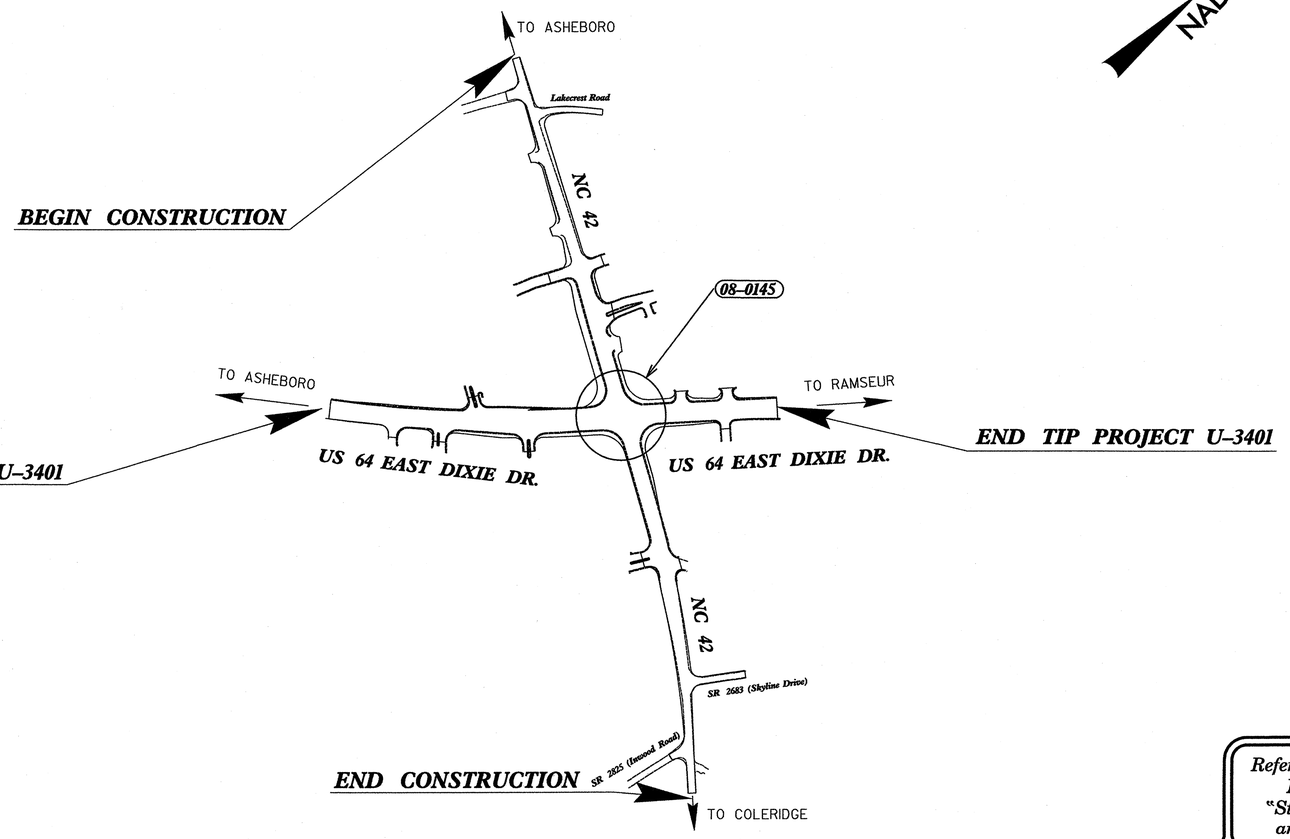
Randolph County

LOCATION: INTERSECTION OF US 64–NC 49 (DIXIE DRIVE) AT NC 42 IN ASHEBORO

TYPE OF WORK: Traffic Signals and Communications Cable Routing



Vicinity Map



NAD 83

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. 2–5	08–0145	US 64 – NC 49(Dixie Drive) at NC 42
Sig. 6–12	N/A	Communications Cable Routing Plans
Sig. 13–18	N/A	Standard Drawings for Metal Poles

TRAFFIC MANAGEMENT AND SIGNAL SYSTEMS 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

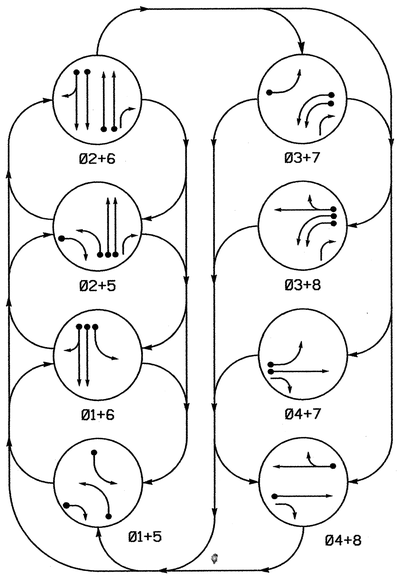
Traffic Management and Signal Systems Unit
STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

122 N. McDowell St., Raleigh, NC 27603

23-JAN-2007 14:20
tthigpen

PROJECT REFERENCE NO.	SHEET NO.
U-3401	Sig.2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

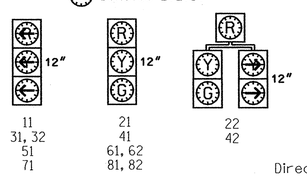
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+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, 32	R	R	R	R	←	←	R	R	R
41	R	R	R	R	R	R	G	G	R
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

SIGNAL FACE I.D.

Denotes L.E.D.



2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Y	Y	-	-	-	-	Y
2A, 2B	6X6	300	6	-	2	Y	Y	-	1.8	-	-	Y
2C, 2D	6X6	90	4	-	2	Y	Y	-	-	-	-	Y
3A	6X60	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
3B	6X60	0	2-4-2	-	3	Y	Y	-	-	-	-	Y
4A	6X6	300	6	-	4	Y	Y	-	3	-	-	Y
4B	6X60	0	2-4-2	-	4	Y	Y	-	-	-	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	3	-	Y
5B	6X15	0	4	-	5	Y	Y	-	-	15	-	Y
6A, 6B	6X6	300	4	-	6	Y	Y	-	2.0	-	-	Y
6C, 6D	6X6	90	4	-	6	Y	Y	-	-	-	-	Y
7A	6X60	0	2-4-2	-	7	Y	Y	-	-	-	-	Y
8A	6X6	300	6	-	8	Y	Y	-	3	-	-	Y
8B	6X60	0	2-4-2	-	8	Y	Y	-	-	-	-	Y
8C	6X15	0	4	-	8	Y	Y	-	-	15	-	Y
S5	6X6	+180	5	-	-	-	-	-	-	-	Y	Y
S6	6X6	+180	5	-	-	-	-	-	-	-	Y	Y
S7	6X6	+180	5	-	-	-	-	-	-	-	Y	Y
S8	6X6	+180	5	-	-	-	-	-	-	-	Y	Y

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
Max Green 1 *	15	45	20	30	20	45	15	30
Yellow Clearance	3.0	4.5	3.0	4.6	3.0	4.8	3.0	4.5
Red Clearance	2.9	1.4	3.8	1.8	3.2	1.6	3.3	1.4
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

** See Note 9.

8 Phase Fully Actuated (Asheboro Closed Loop System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

*8. During construction, the contractor is to maintain detection.

*9. During construction, the contractor is to contact the DTE to adjust the timing of this intersection.

10. Closed Loop system data: Controller Asset # 0145.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊣↓	Pedestrian Signal Head With Push Button & Sign	⊣■
○	Signal Pole with Guy	●
○↷	Signal Pole with Sidewalk Guy	●↷
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	- - - -
→	Directional Arrow	→
→	Pavement Marking Arrow	→
◎	Metal Strain Pole	◘
▬	Construction Zone	▬
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Right Arrow Sign (R3-6R)	Ⓑ

Signal Upgrade (Temporary-TCP Phase I)

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

US 64 - NC 49 (Dixie Drive) at NC 42

Division 08 Randolph County Asheboro

PLAN DATE:	December 2006	REVIEWED BY:	DY Ishak
PREPARED BY:	TS Thigpen	REVIEWED BY:	

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

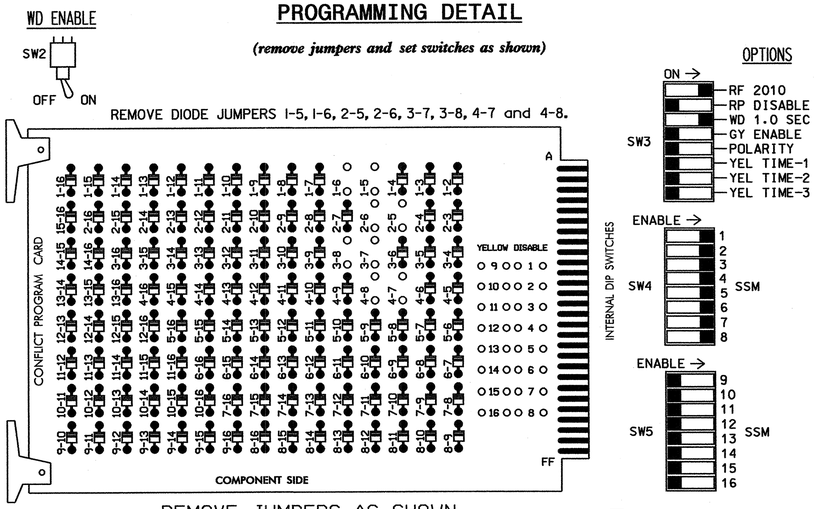
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 23027 ENGINEER RICHARD E. MULLINAX
SIGNATURE DATE
SIG. INVENTORY NO. 08-0145T

21-DEC-2006 07:05
S:\es\signals\workgroups\tip projects\u-3401\roadway\projects\sig08-0145_sig_dsn_2006mod.dgn
tthigpen

PROJECT REFERENCE NO.	SHEET NO.
U-3401	Sig. 3

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.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 9,10, 11,12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. The cabinet and controller are part of the Asheboro Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP:.....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4	S4P	S5		S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3		4	4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	22	31,32	41,42	NU	42	51	61,62	NU	71	81,82	NU	NU	NU	NU	NU	NU	NU
RED		128				101				134			107							
YELLOW		129				102				135			108							
GREEN		130				103				136			109							
RED ARROW	125				116				131			122								
YELLOW ARROW	126			117	117			132	132			123								
GREEN ARROW	127			118	118			133	133			124								

NU = Not Used

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,2B	SLOT EMPTY	SLOT EMPTY	ø3 3A	ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S5	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	ø2 2C,2D			ø3 3B	ø4 4B			SYS. DET. S6					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	ø5 5A	ø6 6A,6B	SLOT EMPTY	ø7 7A	ø8 8A	ø8 8C	SLOT EMPTY	SYS. DET. S7	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		ø5 5B	ø6 6C,6D		NOT USED	ø8 8B	NOT USED		SYS. DET. S8					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y		1.8	
2C,2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-7,8	I5L	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y		3	
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
* S5	TB6-9,10	I9U	60	22	11	SYS					
* S6	TB6-11,12	I9L	62	24	13	SYS					
5A	TB3-5,6	J2U	40	2	6	5	Y	Y			3
5B	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y		2.0	
6C,6D	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y		3	
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
8C	TB7-1,2	J7U	66	28	38	8	Y	Y			15
* S7	TB7-9,10	J9U	59	21	15	SYS					
* S8	TB7-11,12	J9L	61	23	17	SYS					

* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0145T
DESIGNED: December 2006
SEALED: 12-20-06
REVISED: N/A

Signal Upgrade - Temporary

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 64 - NC 49 (Dixie Drive)
at
NC 42

Division 8 | Randolph County | Asheboro

PLAN DATE: December 2006 | REVIEWED BY: T. Jga

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.

John T. Rowe Jr. 12-21-06
SIGNATURE DATE

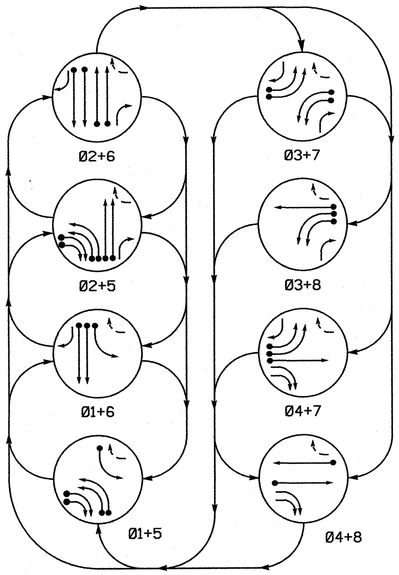
SIG. INVENTORY NO. 08-0145T

21-DEC-2006 06:57
U:\M08145_sm\e1a_xxx.dgn
jpeterson

PROJECT REFERENCE NO.	SHEET NO.
U-3401	Sig.4

8 Phase
Fully Actuated
(Asheboro Closed Loop System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

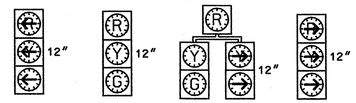
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+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, 32	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R
43, 44	→	~~R~~	→	~~R~~	~~R~~	~~R~~	→	→	~~R~~
51, 52	←	~~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, 72	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~
81, 82	R	R	R	R	R	G	R	G	R

SIGNAL FACE I.D.

Denotes L.E.D.



11
31, 32
51, 52
71, 72

21
41, 42
61
81, 82

22
62

43, 44

2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	-	-	-
2A, 2B	6X6	300	6	Y	2	Y	Y	-	1.8	-	-	-
2C, 2D	6X6	90	4	Y	2	Y	Y	-	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-
4A	6X6	300	6	Y	4	Y	Y	-	3.5	-	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	-	-	-
5C	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	-
5D	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	-
6A, 6B	6X6	300	4	Y	6	Y	Y	-	1.8	-	-	-
6C, 6D	6X6	90	4	Y	6	Y	Y	-	-	-	-	-
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	-
7B	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	-
8A	6X6	300	6	Y	8	Y	Y	-	3.5	-	-	-
8B	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	-
S5	6X6	+180	5	Y	-	-	-	-	-	-	Y	-
S6	6X6	+180	5	Y	-	-	-	-	-	-	Y	-
S7	6X6	+180	5	Y	-	-	-	-	-	-	Y	-
S8	6X6	+180	5	Y	-	-	-	-	-	-	Y	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. Closed loop system data: Controller Asset # 0145.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
→	Directional Arrow	→
→	Pavement Marking Arrow	→
	Metal Strain Pole	
Ⓐ	Left Arrow "ONLY" Sign(R3-5L)	Ⓐ
Ⓑ	Thru Arrow "ONLY" Sign(R3-5a)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ

2070L TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
Max Green 1 *	15	45	20	30	20	45	15	30
Yellow Clearance	3.0	4.5	3.0	4.6	3.0	4.8	3.0	4.5
Red Clearance	2.9	1.4	3.9	1.8	3.2	2.4	3.3	1.7
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	-	-	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

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

Signal Upgrade

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

US 64 - NC 49 (Dixie Drive) at NC 42

Division 08 Randolph County Asheboro

PLAN DATE: December 2006 REVIEWED BY: DY Ishak

PREPARED BY: TS Thigpen REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 50 1"=50'

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 23621 RICHARD E. MULLINAX
SIGNATURE 12 December 07 DATE

SIG. INVENTORY NO. 08-0145

12-FEB-2007 12:07
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timothy.green

PROJECT REFERENCE NO.	SHEET NO.
U-3401	Sig. 5

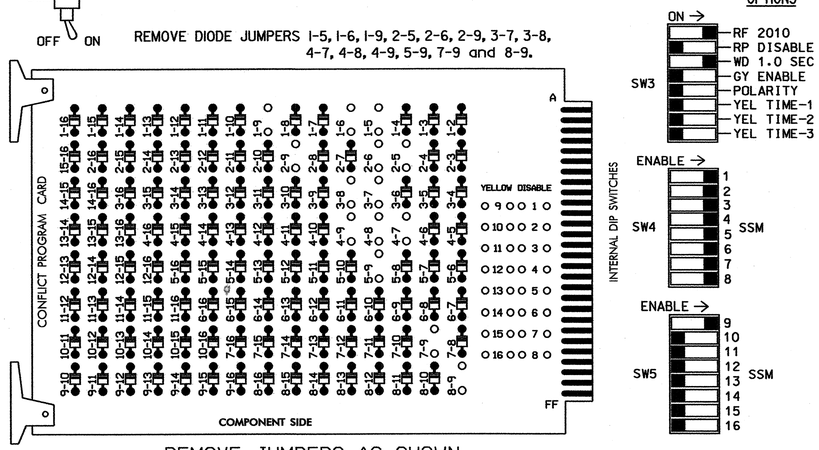
EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

WD ENABLE

SW2 OFF ON

REMOVE DIODE JUMPERS I-5, I-6, I-9, 2-5, 2-6, 2-9, 3-7, 3-8, 4-7, 4-8, 4-9, 5-9, 7-9 and 8-9.



OPTIONS

SW3 (ON →)
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- POLARITY
- YEL TIME-1
- YEL TIME-2
- YEL TIME-3

SW4 (ENABLE →) SSM
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

SW5 (ENABLE →) SSM
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

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.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Ensure that Red Enable is active at all times during normal operation. To prevent Red Failures on unused monitor channels, tie unused red monitor inputs 10,11, 12,13,14,15 & 16 to load switch AC+ per the cabinet manufacturer's instructions.
3. Program phases 2 and 6, on the controller unit, for Start Up In Green.
4. Enable Simultaneous Gap-Out, on the controller unit, for all phases.
5. The cabinet and controller are part of the Asheboro Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 2070L
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE .....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 (12-STD, 6-AUX)
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9
PHASES USED.....1,2,3,4,5,6,7,8
OVERLAP A:.....4+5
OVERLAP B:.....NOT USED
OVERLAP C:.....NOT USED
OVERLAP D:.....NOT USED

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3		S4	S4P	S5	S6	S6P	S7		S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	1	2	2 PED	3		4	4 PED	5	6	6 PED	7		8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11	21,22	NU	22	31,32	41,42	NU	51,52	61,62	NU	62	71,72	81,82	NU	43,44	NU	NU	NU	NU	NU
RED		128				101			134				107							
YELLOW		129				102			135				108							
GREEN		130				103			136				109							
RED ARROW	125				116			131				122			A121					
YELLOW ARROW	126			117	117			132			123	123			A122					
GREEN ARROW	127			118	118			133			124	124			A123					

NU = Not Used

**Flash Note: Wire Overlap "A" to flash on Flasher Unit #2, Circuit #2.

OVERLAP PROGRAMMING DETAIL

(program controller as shown below)

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

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

OVERLAP PROGRAMMING COMPLETE

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,2B	SLOT EMPTY	SLOT EMPTY	ø3 3A	ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S5	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	ø2 2C,2D			ø3 3B	ø4 4B			SYS. DET. S6					ST DC ISOLATOR
FILE "J"	U	ø5 5A	ø5 5C	ø6 6A,6B	SLOT EMPTY	ø7 7A	ø8 8A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S7	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	ø5 5B	ø5 5D	ø6 6C,6D		ø7 7B	ø8 8B			SYS. DET. S8					

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

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A	TB2-1,2	I1U	56	18	1	1	Y	Y			
2A,2B	TB2-5,6	I2U	39	1	2	2	Y	Y		1.8	
2C,2D	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			
3B	TB4-7,8	I5L	58	20	3	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y		3.5	
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
* S5	TB6-9,10	I9U	60	22	11	SYS					
* S6	TB6-11,12	I9L	62	24	13	SYS					
5A	TB3-1,2	J1U	55	17	5	5	Y	Y			
5B	TB3-3,4	J1L	55	17	5	5	Y	Y			
5C	TB3-5,6	J2U	40	2	6	5	Y	Y			15
5D	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A,6B	TB3-9,10	J3U	64	26	36	6	Y	Y		1.8	
6C,6D	TB3-11,12	J3L	77	39	46	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
7B	TB5-7,8	J5L	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y		3.5	
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			
* S7	TB7-9,10	J9U	59	21	15	SYS					
* S8	TB7-11,12	J9L	61	23	17	SYS					

* SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 08-0145
DESIGNED: December 2006
SEALED: 02-12-07
REVISED: N/A

This Electrical Detail supersedes the detail sealed on 12-21-06.

Signal Upgrade

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 64 - NC 49 (Dixie Drive) at NC 42

Division 8 | Randolph County | Asheboro

PLAN DATE: February 2007 | REVIEWED BY: MGW

PREPARED BY: James Peterson | REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 2-21-07 DATE

SIG. INVENTORY NO. 08-0145

21-FEB-2007 08:14
s:\#ts signals\#workgroups\#sig mon\#peterson\#08145_sml_e10_xxx.dgn
JTPETERSON

PROJECT REFERENCE NO.	SHEET NO.
U-3401	SIG. 6

U-3401

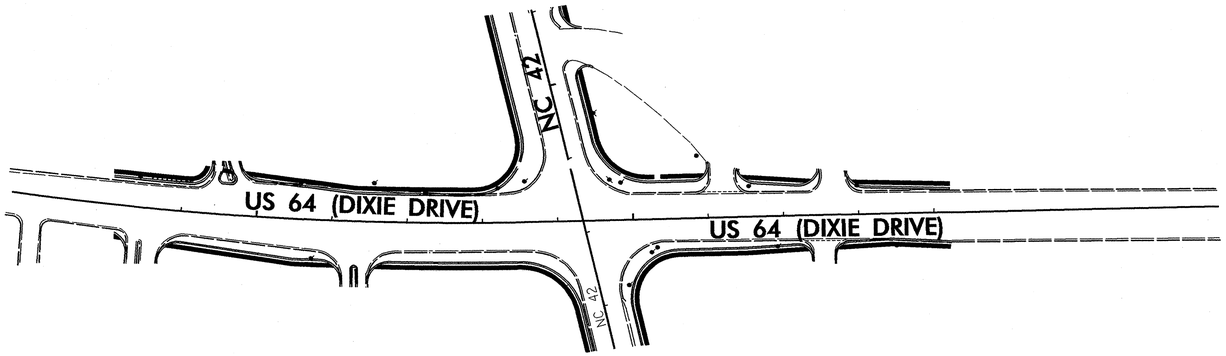
PROJECT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

LOCATION: US 64 (DIXIE DR.) AT NC 42 IN ASHEBORO

TYPE OF WORK: COMMUNICATIONS CABLE ROUTING



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

SCALE 0

COMMUNICATIONS CABLE ROUTING PLAN

DIVISION 08 RANDOLPH CO. ASHEBORO

PLAN DATE: JAN 2007	REVIEWED BY: INAVERY
PREPARED BY: H TOMA BERGGREN	REVIEWED BY: G. G. MURR, JR., PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GERALD G. MURR, JR.

SIGNATURE 1-17-07 DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
U-3401	S 16.7

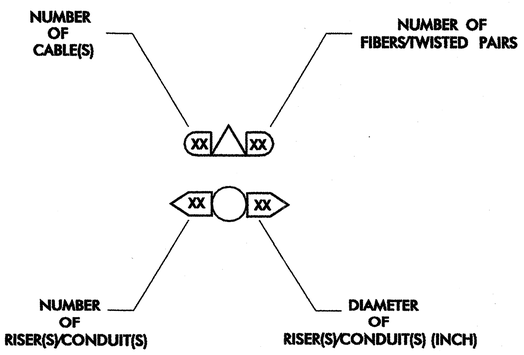
1. INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2. INSTALL REA, PE – 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
3. INSTALL REA, PE – 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP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

LEGEND

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

CONSTRUCTION NOTE SYMBOLOGY KEY

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



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

CONSTRUCTION NOTES

PLAN DATE: | REVIEWED BY:
PREPARED BY: G. A. FULLER | REVIEWED BY:

REVISIONS	INIT.	DATE

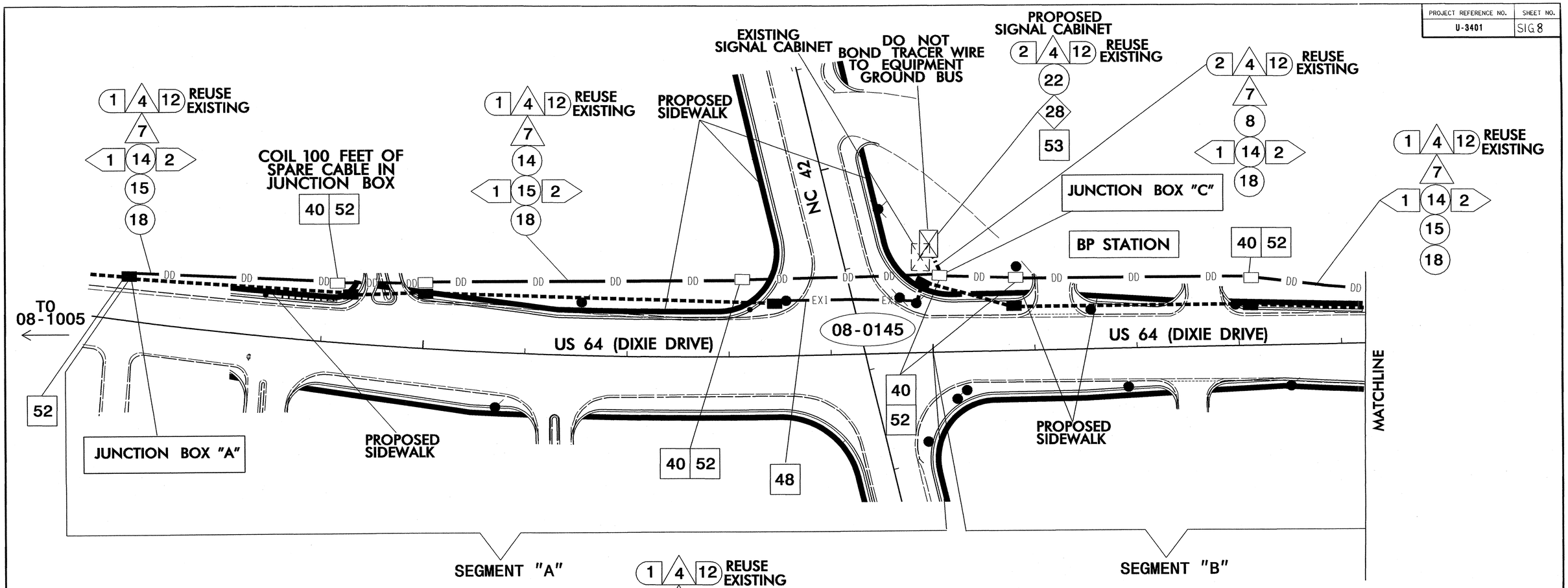
SCALE 0

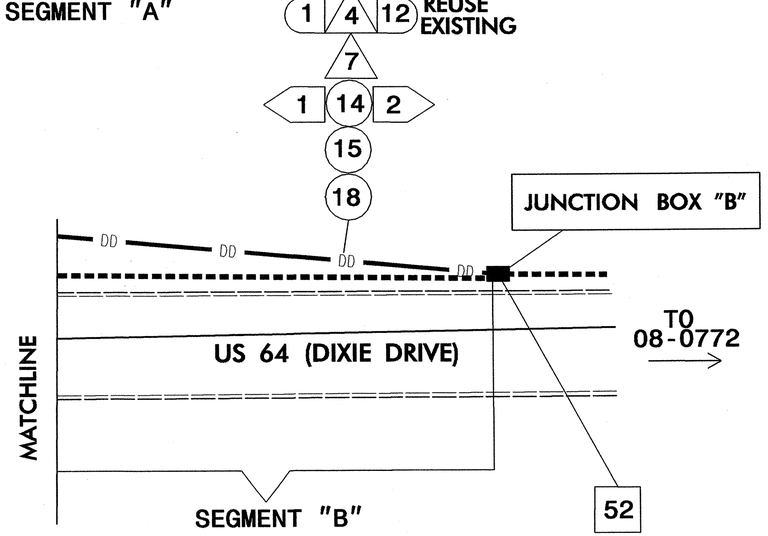
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 023919 ENGINEER GREGORY A. FULLER

Gregory A. Fuller 10/31/02
SIGNATURE DATE

CADD Filename:

PROJECT REFERENCE NO.	SHEET NO.
U-3401	SIG 8





NOTES:

LOCATE FIBER OPTIC CABLE IN THE EXISTING SIGNAL CABINET AND BACKPULL THE CABLE IN "SEGMENT A" AND "SEGMENT B" TO THEIR RESPECTIVE EXISTING JUNCTION BOXES (JUNCTION BOX "A" AND "B").

TAKE PRECAUTIONS NOT TO DAMAGE THE EXISTING FIBER OPTIC CABLE WHILE BEING BACKPULLED AND STORED.

REINSTALL THE EXISTING FIBER OPTIC CABLES (SEGMENT "A" AND SEGMENT "B") TO THE RELOCATED SIGNAL CABINET AS SHOWN. STORE ANY SPARE FIBER OPTIC CABLE IN JUNCTION BOX "C".

REMOVE ALL ABANDONDED JUNCTION BOXES AND BACKFILL TO GRADE.

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

SCALE 0

COMMUNICATIONS CABLE ROUTING PLAN

DIVISION 08 | RANDOLPH COUNTY | ASHEBORO

PLAN DATE: JAN 2007 | REVIEWED BY: INAVERY

PREPARED BY: H TOMA BERGGREN | REVIEWED BY: G. G. MURR, JR., PE

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.

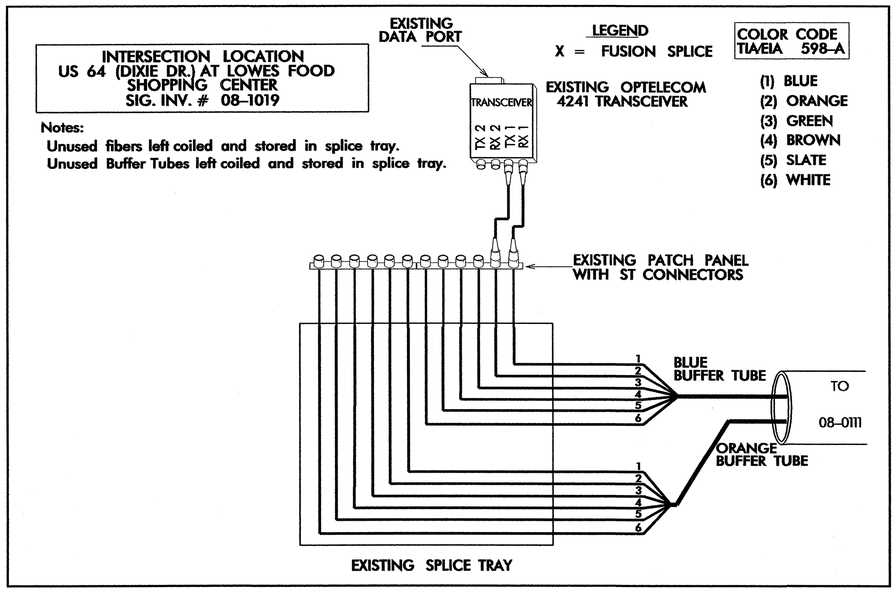
SIGNATURE 1-17-07 DATE

CADD Filename:

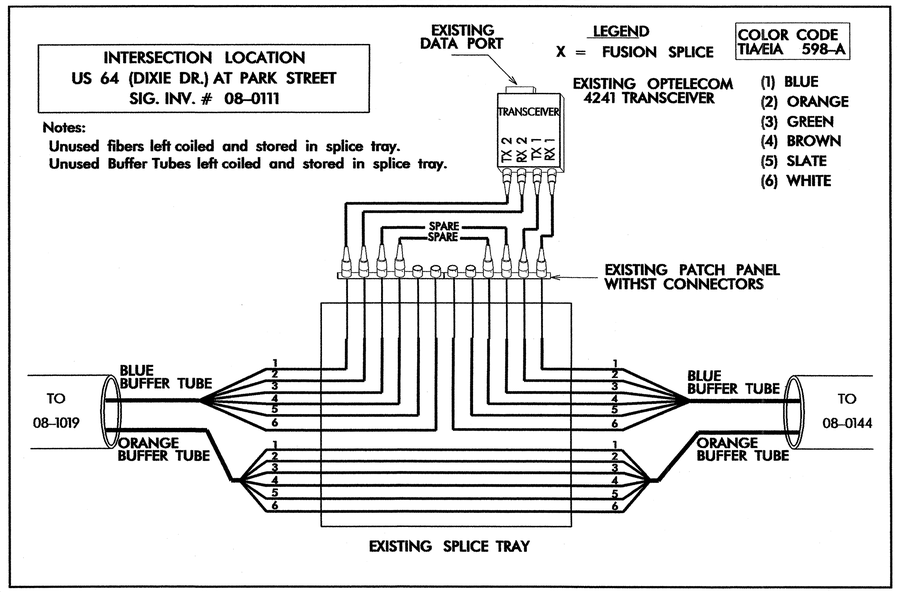
FIBER OPTIC CABLE

PROJECT REFERENCE NO.	SHEET NO.
U-3401	SIG. 9

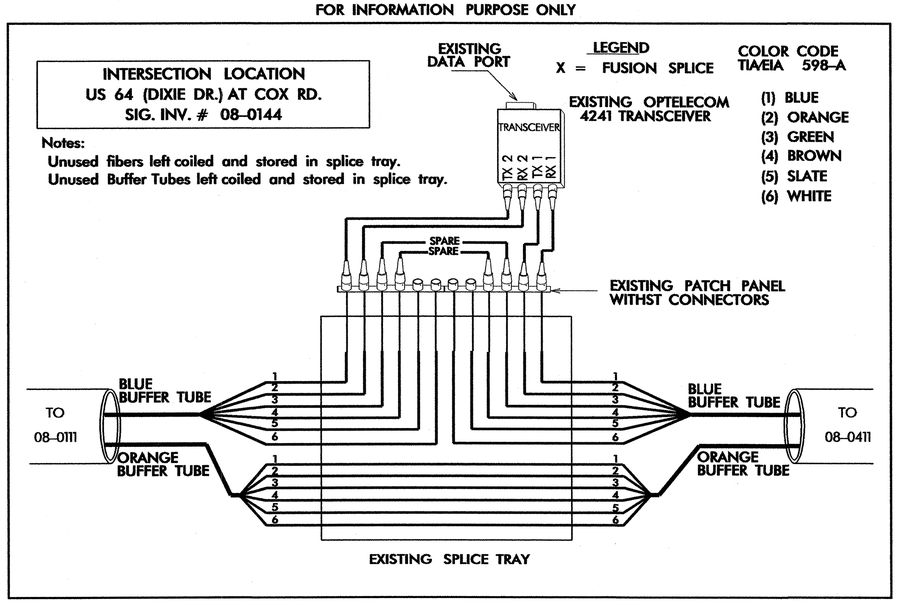
FOR INFORMATION PURPOSE ONLY



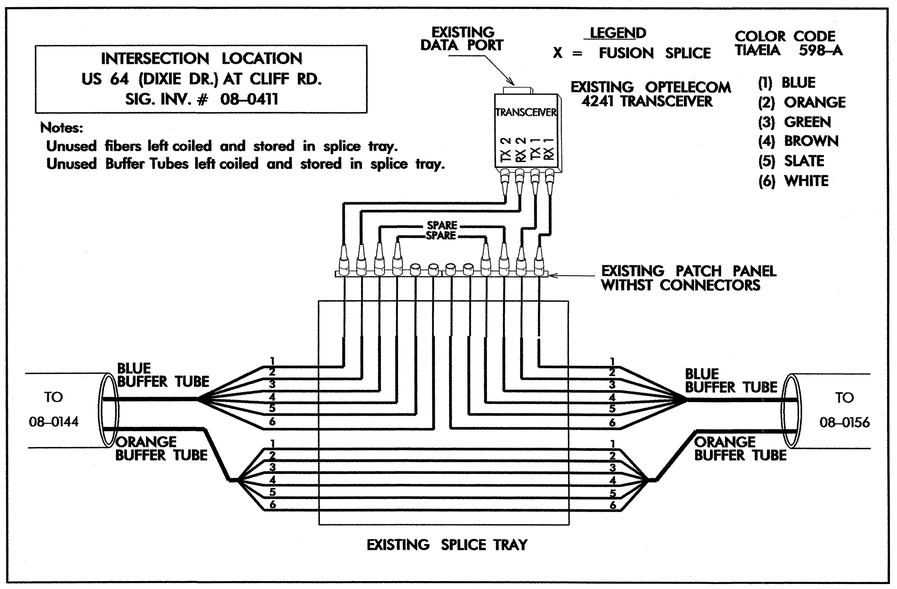
FOR INFORMATION PURPOSE ONLY



FOR INFORMATION PURPOSE ONLY



FOR INFORMATION PURPOSE ONLY



THIS PAGE IS SHOWN FOR INFORMATION PURPOSE ONLY.

EXISTING SYSTEM TRANSCEIVER MODEL OPTELECOM #4241 (DROP AND REPEAT)

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation
Traffic Management Systems
1722 N. McDowell St., Raleigh, NC 27603

EXISTING SYSTEM SPLICE DETAIL

DIVISION 08 | RANDOLPH COUNTY | ASHEBORO

PLAN DATE: JAN 2007 | REVIEWED BY: INAVERY

PREPARED BY: H TOMA BERGGREN | REVIEWED BY: G. G. MURR, JR.

REVISIONS	INIT.	DATE

SCALE 0

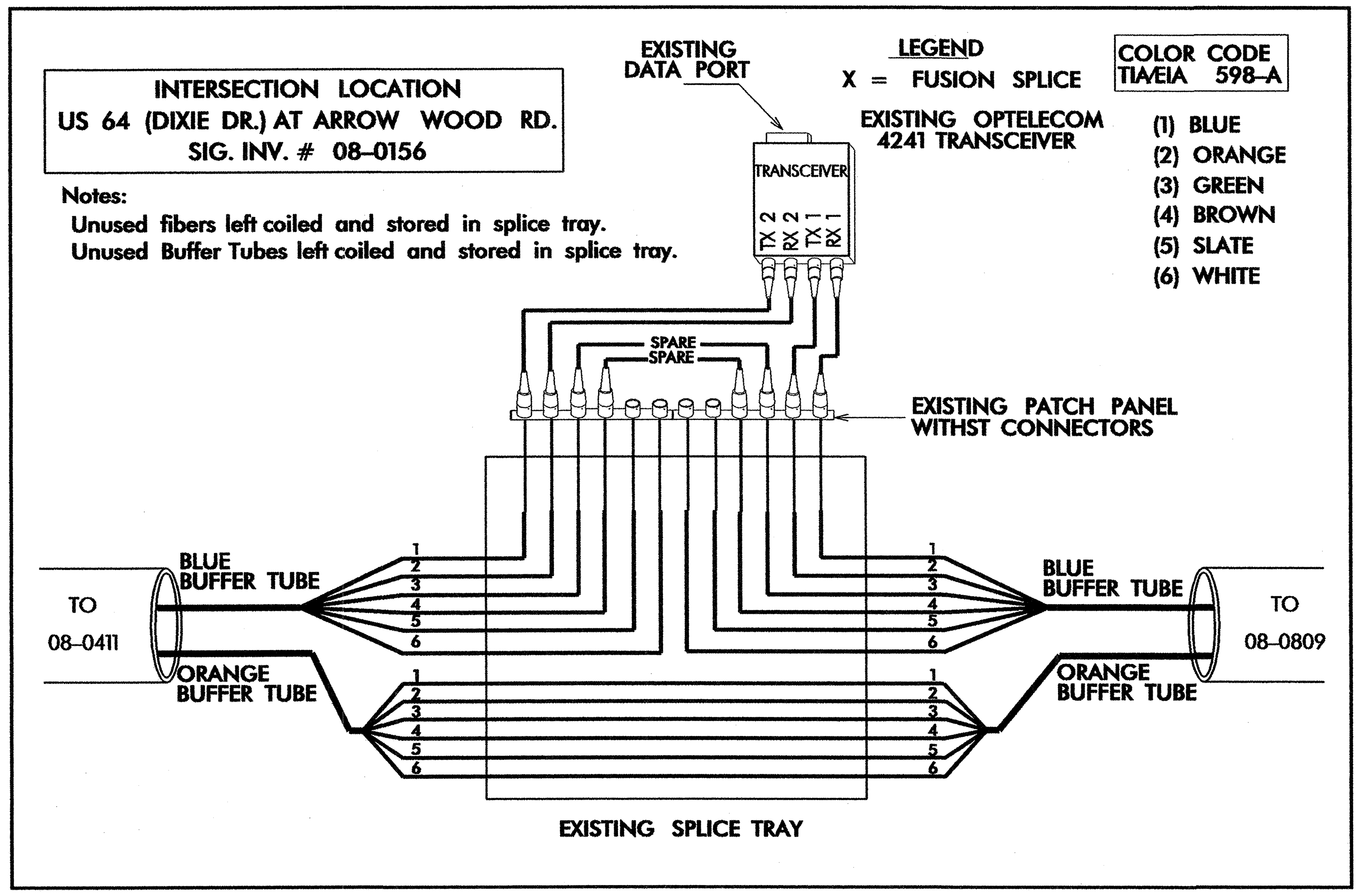
SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL 14543
ENGINEER
GENE G. MURR, JR.

SIGNATURE 1-17-07 DATE

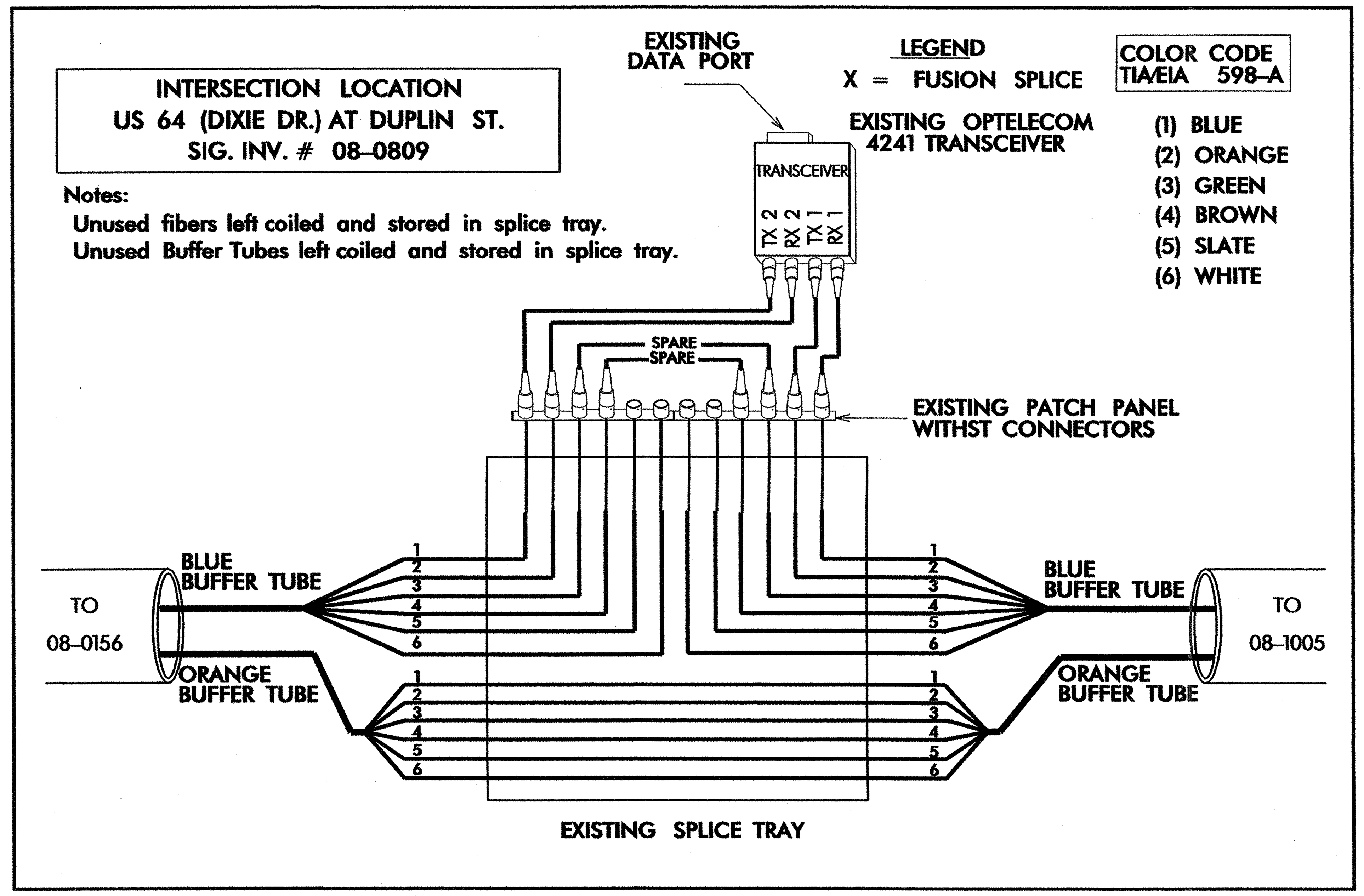
CADD Filename:

FIBER OPTIC CABLE

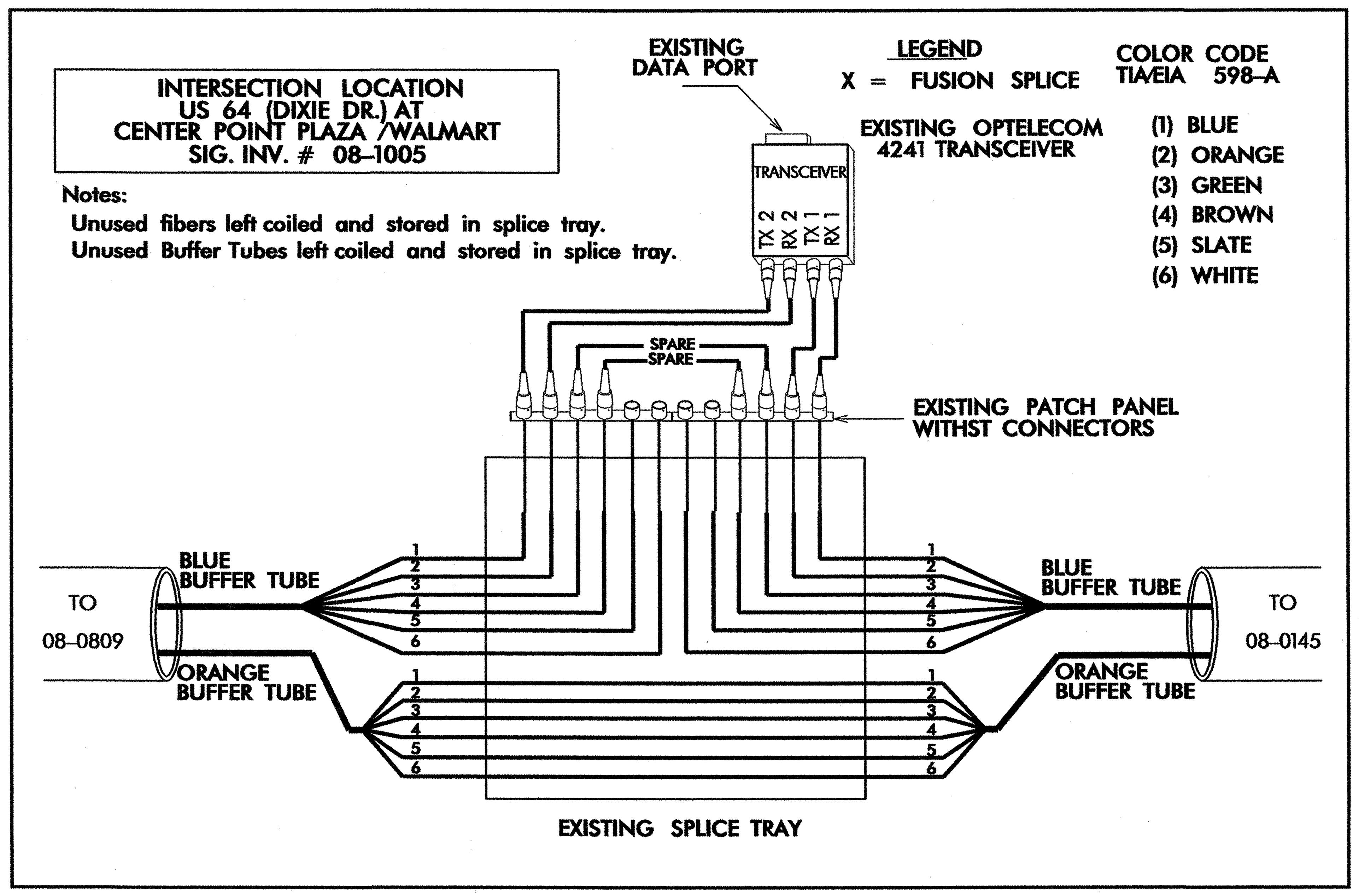
FOR INFORMATION PURPOSE ONLY



FOR INFORMATION PURPOSE ONLY



FOR INFORMATION PURPOSE ONLY



THIS PAGE IS SHOWN FOR INFORMATION PURPOSE ONLY.

EXISTING SYSTEM TRANSCEIVER MODEL OPTELECOM #4241 (DROP AND REPEAT)

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

122 N. McDowell St., Raleigh, NC 27603

EXISTING SYSTEM SPLICE DETAIL

DIVISION 08 RANDOLPH COUNTY ASHEBORO

PLAN DATE: JAN 2007	REVIEWED BY: INAVERY
PREPARED BY: H TOMA BERGGREN	REVIEWED BY: G. G. MURR, JR.

REVISIONS	INIT.	DATE

SCALE 0

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14543 GENE G. MURR, JR.

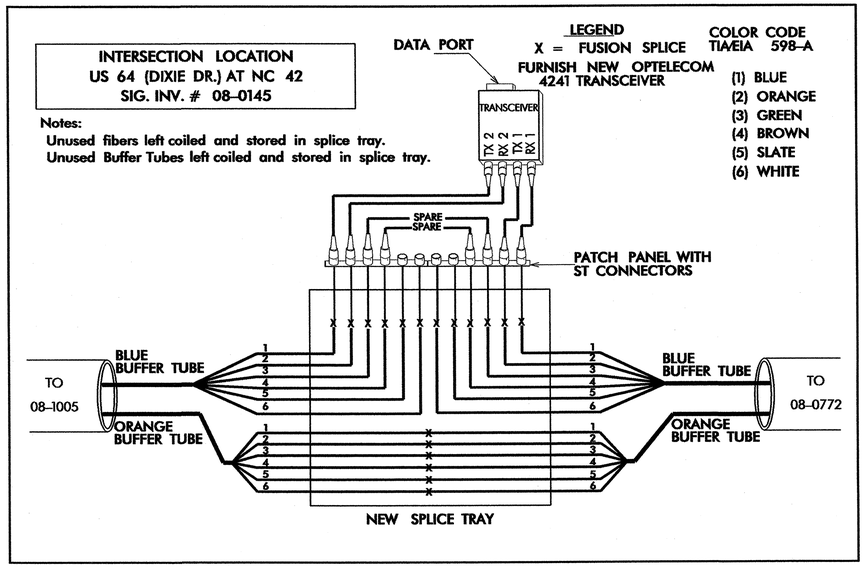
SIGNATURE DATE 1-11-07

CADD Filename

PROJECT REFERENCE NO.	SHEET NO.
U-3401	SIG.11

FIBER OPTIC CABLE

NEW/REVISED SPLICE DETAIL



PERFORM SPLICING AS SHOWN

INSTALL TRANSCEIVER MODEL OPTELECOM #4241 (DROP AND REPEAT) IN CONFORMANCE WITH EXISTNG SYSTEM AT INTERSECTION #08-0145 (DIXIE DRIVE AND NC 42)

TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS

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

SCALE 0

SPLICE DETAIL

DIVISION 08 RANDOLPH COUNTY ASHEBORO

PLAN DATE: JAN 2007 REVIEWED BY: INAVERY

PREPARED BY: H TOMA BERGGREN REVIEWED BY: G. G. MURR. JR.

REVISIONS	INIT.	DATE

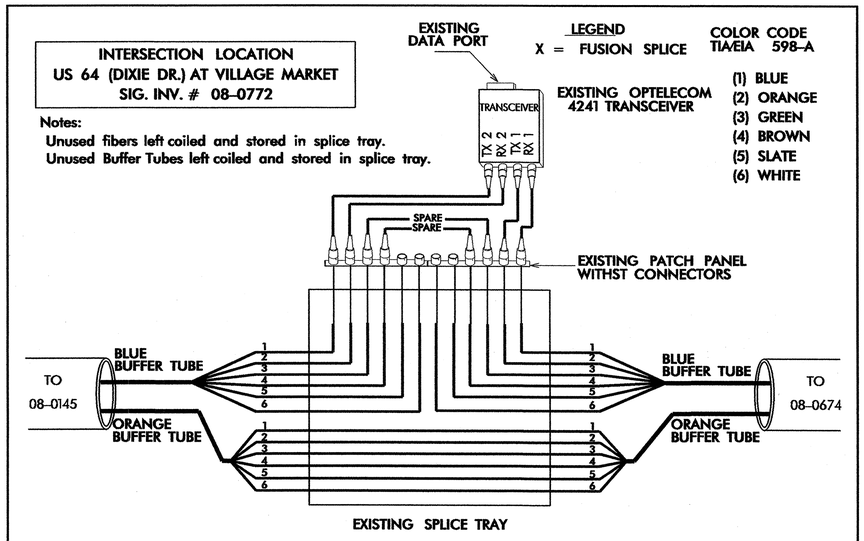
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE G. MURR, JR.
SIGNATURE 1-17-07 DATE

CADD Filename:

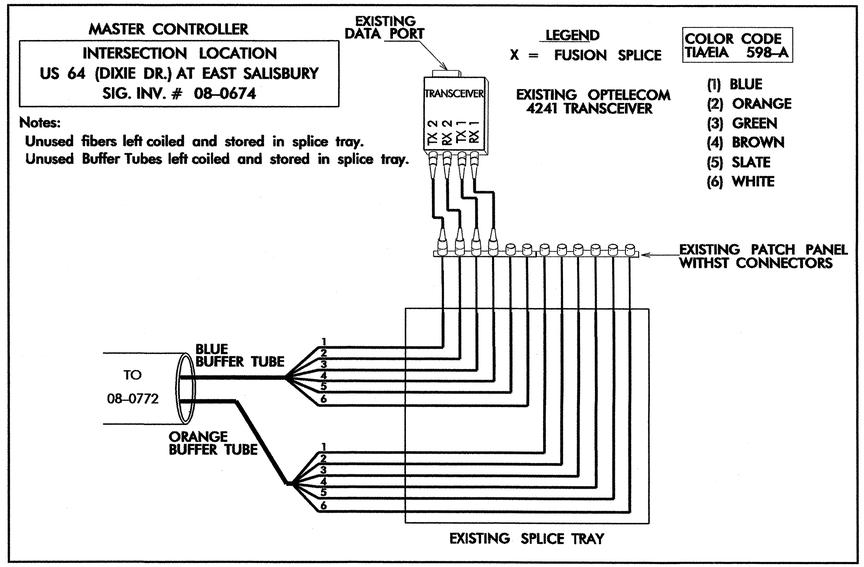
PROJECT REFERENCE NO.	SHEET NO.
U-3401	SIG.12

FIBER OPTIC CABLE

FOR INFORMATION PURPOSE ONLY



FOR INFORMATION PURPOSE ONLY



THIS PAGE IS SHOWN FOR INFORMATION PURPOSE ONLY.
EXISTING SYSTEM TRANSCEIVER MODEL OPTELECOM #4241 (DROP AND REPEAT)

Prepared in the Offices of:
Traffic Engineering and Safety Systems Branch
NCDEPARTMENT OF TRANSPORTATION
Traffic Management Systems
122 N. McDonald St., Raleigh, NC 27603

SCALE 0

EXISTING SYSTEM SPLICE DETAIL

DIVISION 08 | RANDOLPH COUNTY | ASHEBORO

PLAN DATE: JAN 2007 | REVIEWED BY: INAVERY

PREPARED BY: H TOMA BERGGREN | REVIEWED BY: G. G. MURR. JR.

REVISIONS	INIT.	DATE

CADD Filename:

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
14543
ENGINEER
GENE G. MURR, JR.

SIGNATURE 1-17-07 DATE

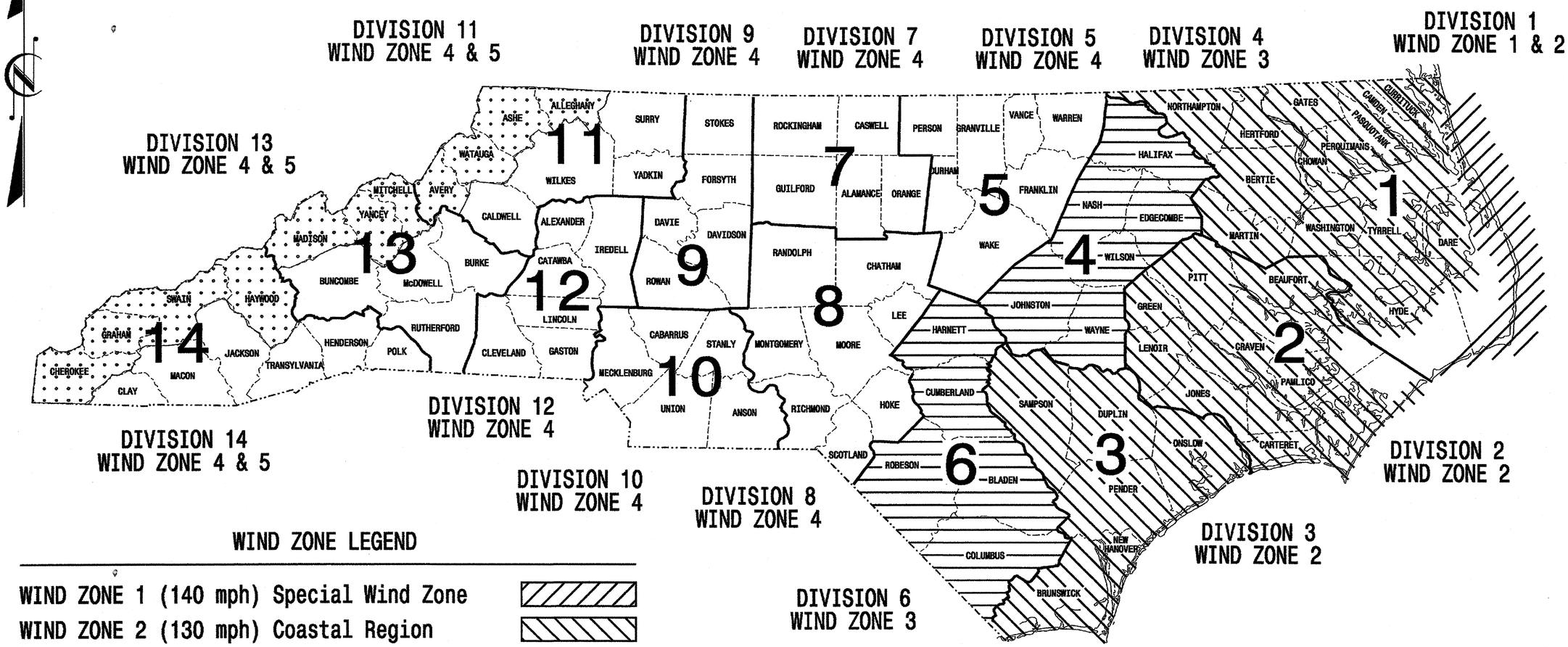
STATE	PROJECT NO.	SHEET NO.
N.C.	U-3401	Sig. 13
F. A. PROJ. NO.		M 1
PROJECT ID. NO.		

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STANDARD DRAWINGS FOR METAL POLES

POLE STANDARDS

NCDOT METAL POLES



WIND ZONE LEGEND

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

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

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

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

NCDOT CONTACTS:

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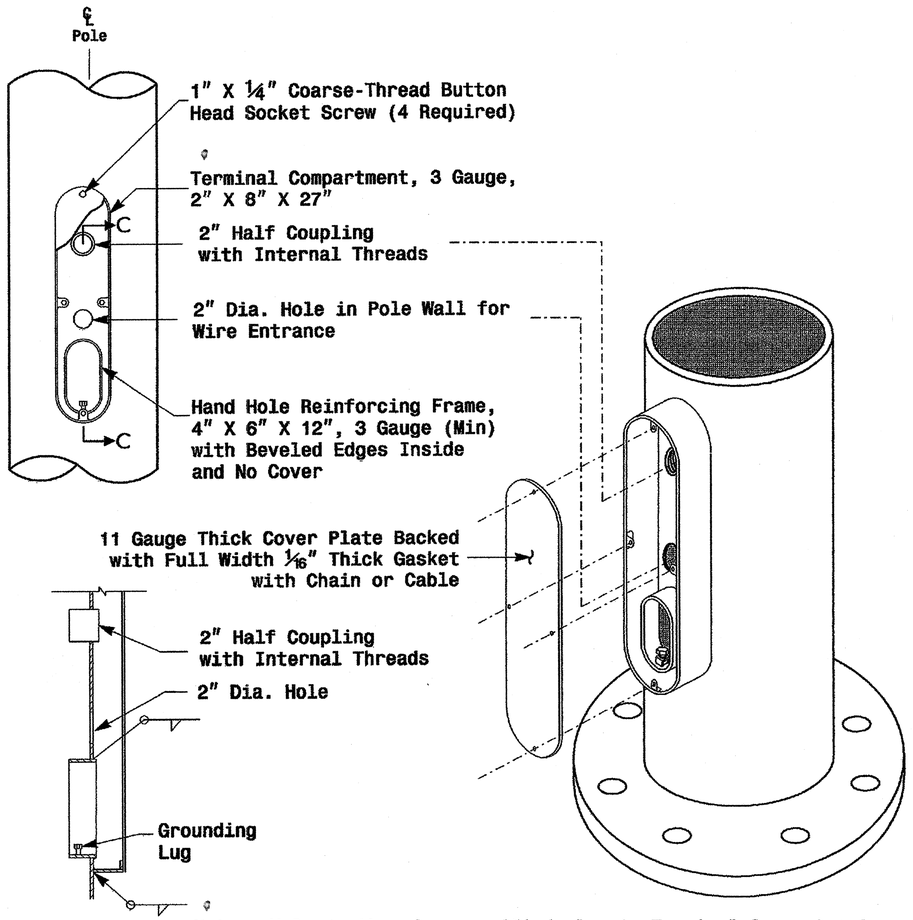
P. L. Alexander, P.E. – Signals and Geometrics Special Projects Engineer
D. C. Sarkar, P.E. – Signals and Geometrics Structural Engineer
A. M. Esposito, P.E. – Signals and Geometrics Project Engineer
C. F. Andrews, Jr. – Signals and Geometrics Project Engineer

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 ----------

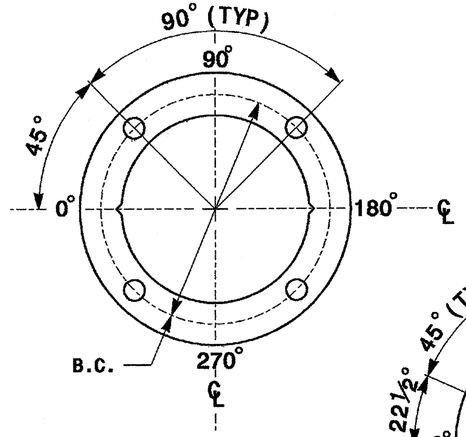
Shaft I.D. Tag
(Provide on Strain Poles and Mast Arm Poles)

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

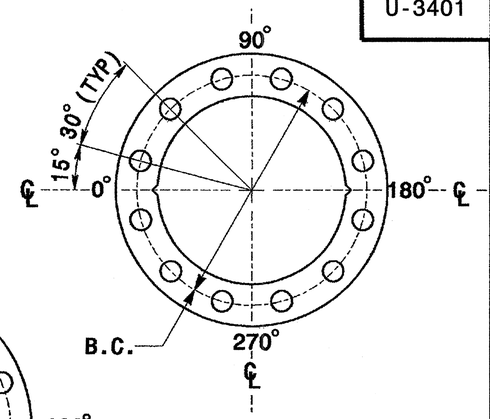
Arm I.D. Tag
(Provide on each section of a multi-section mast arm)

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.

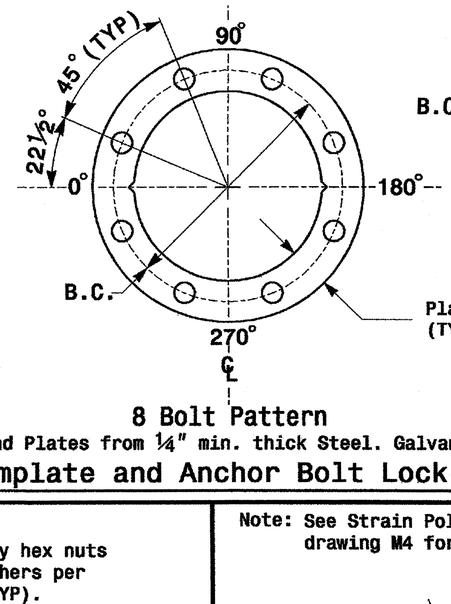
Identification Tag Details



4 Bolt Pattern



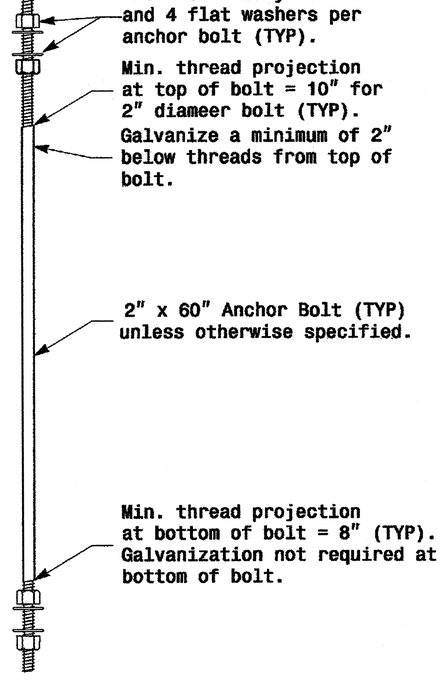
12 Bolt Pattern



8 Bolt Pattern

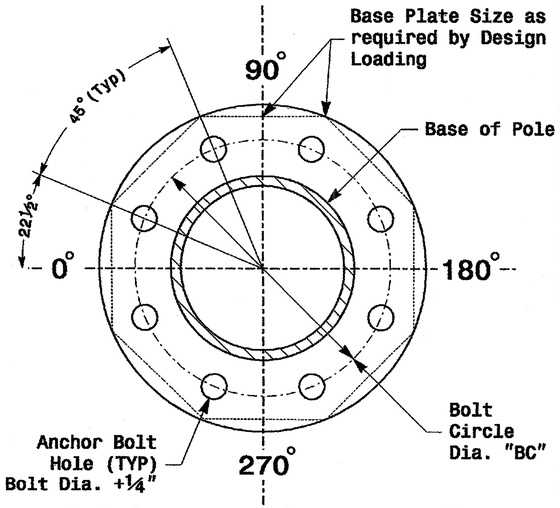
Construct Templates and Plates from ¼" min. thick Steel. Galvanizing is not required.

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

Prepared in the Offices of: Traffic Engineering and Safety Systems Branch, Department of Transportation, Raleigh, NC

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.N. Esposito

REVISIONS	INIT.	DATE

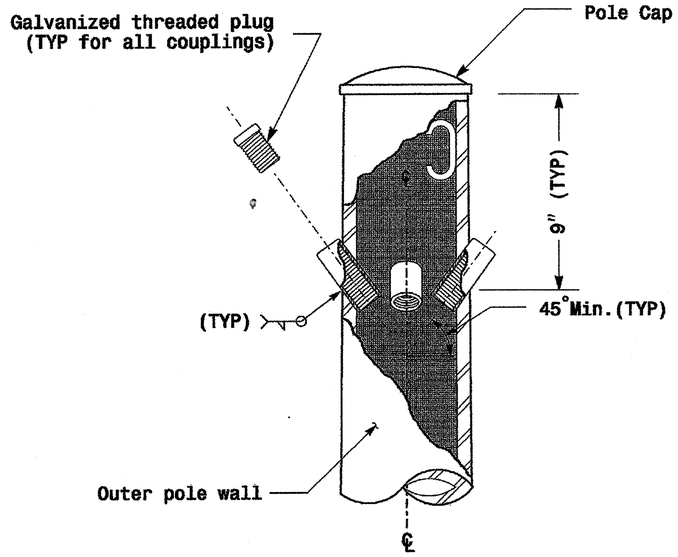
SCALE: 0 NA NONE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DIBDESH C. SARKAR

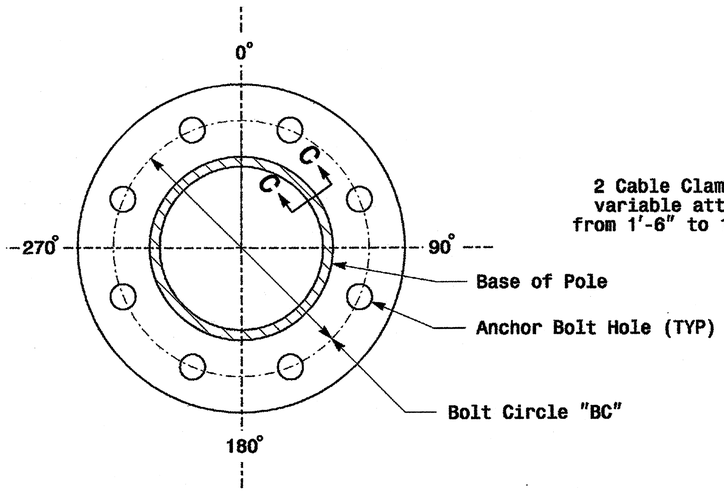
D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

PROJECT REFERENCE NO.	SHEET NO.
U-3401	Sig. 15 M 3



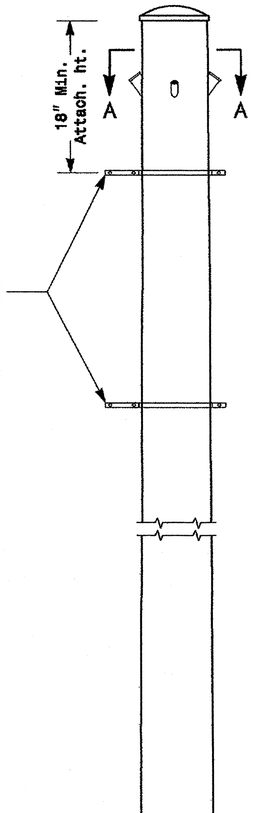
Cable Entrances at Top of Pole

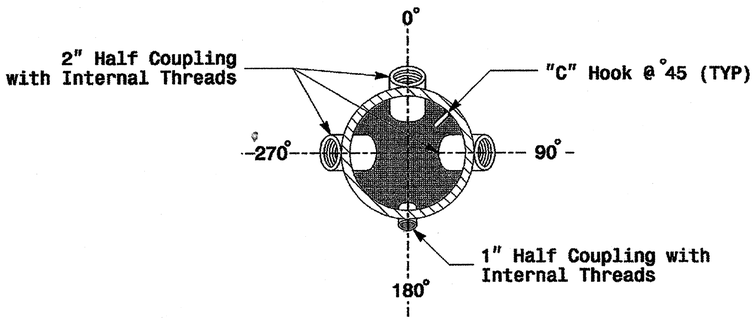


Section B-B

(See drawing M2)

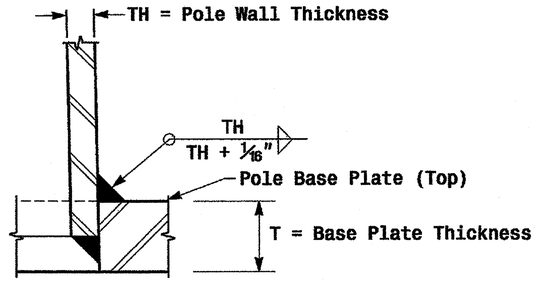
Pole Base Plate





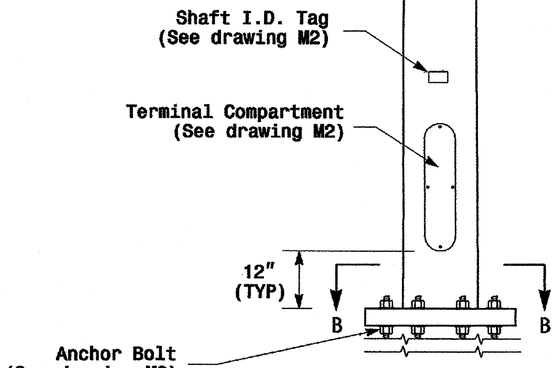
Section A-A

Radial Orientation for Factory Installed Accessories at Top of Pole



Section C-C

Socket Connection Weld Detail



Monotube Strain Pole
(.14"/Foot Taper)

Fabrication Details – Strain Poles

Prepared in the Office of:
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation
Signals and Geometrics Section
1723 N. McDowell St., Raleigh, NC 27603

SCALE
0 NA
NONE

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

REVISIONS	INIT.	DATE

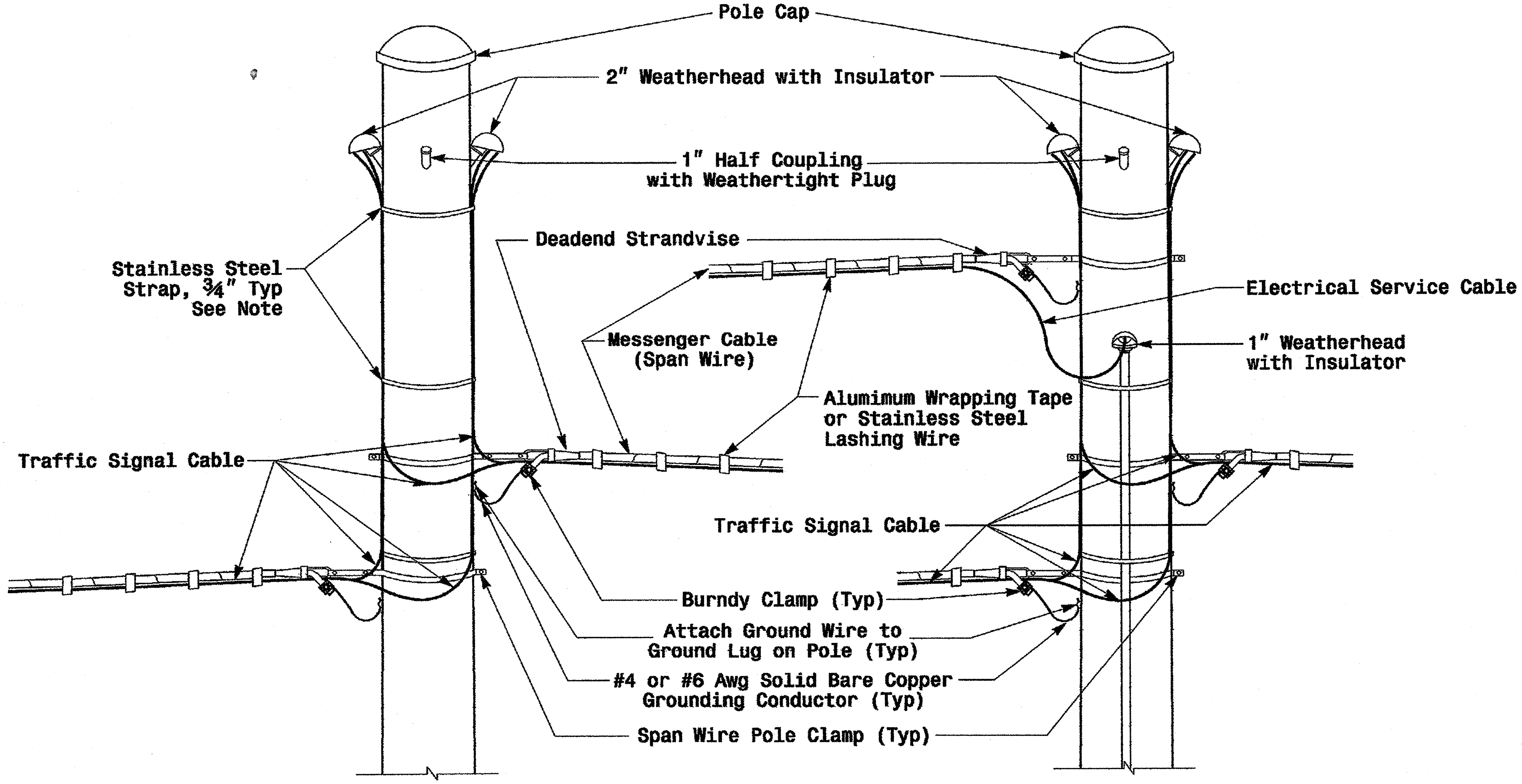
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

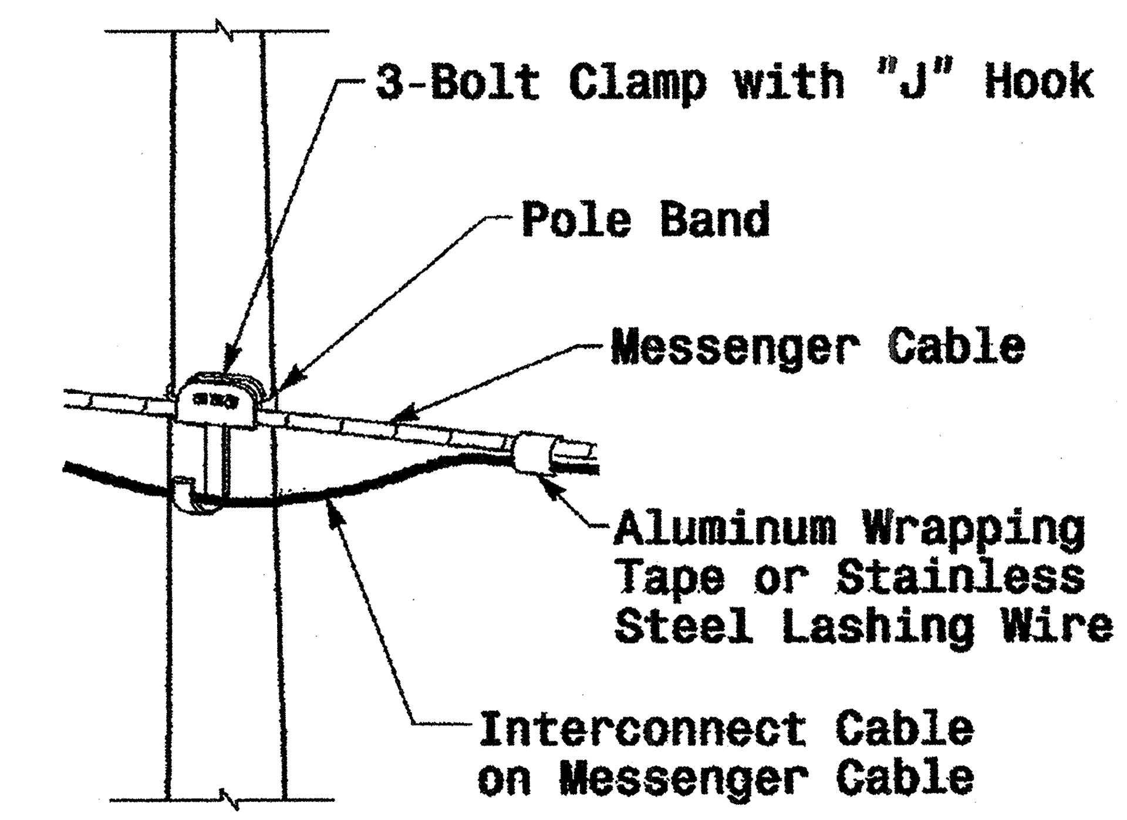
01-SEP-2005 14:07
w:\signals-unit\mwcrago\use\2004 metal pole standards\2004 m3.dgn
palexander

PROJECT REFERENCE NO.	SHEET NO.
U-3401	Sig.16 M 6

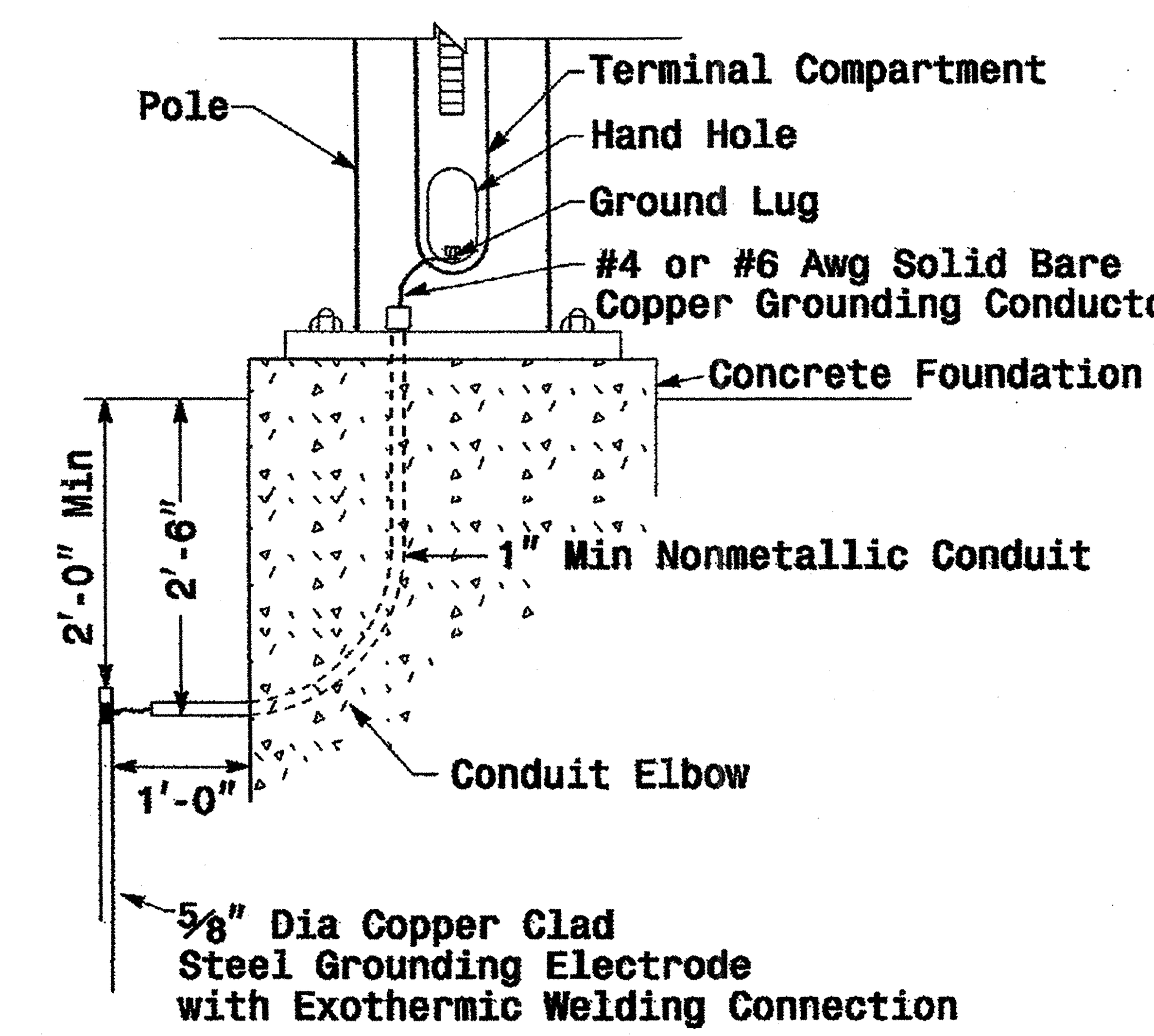


Note: Strap all signal cables to the side of the pole with ¾" stainless steel straps when the distance between the spanwire attachment clamp and the weatherheads exceeds 36"

Strain Pole Attachments



Attachment of Cable to Intermediate Metal Pole



Metal Pole Grounding Detail

Construction Details – Strain Poles

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 NA — NONE

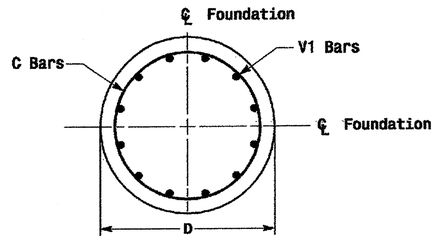
Construction Details
Strain Poles

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

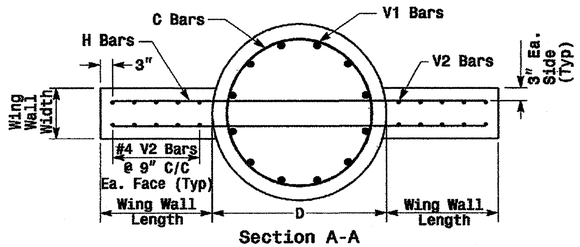
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 016286 ENGINEER MILTON I. DEAN
SIGNATURE 9-1-05 DATE
SIG. INVENTORY NO.

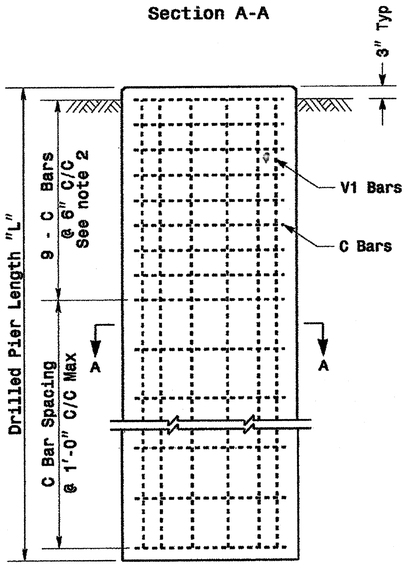
Reinforcing Steel Bars

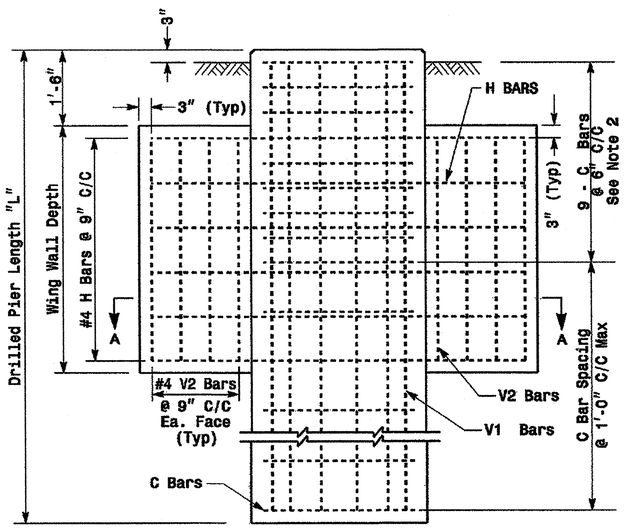


Section A-A



Section A-A





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

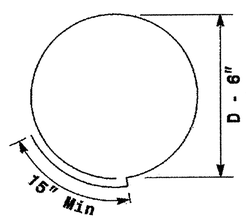
Shaft Dia (in.)	Conc. Volume (cu. yds.)	Bar Name	No.	Size	Type	Length
42"	.356 x L	V1	9	#8	STR.	**
		C	*	#4	CIR.	10'-9"
48"	.465 x L	V1	12	#8	STR.	**
		C	*	#4	CIR.	12'-6"

* 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

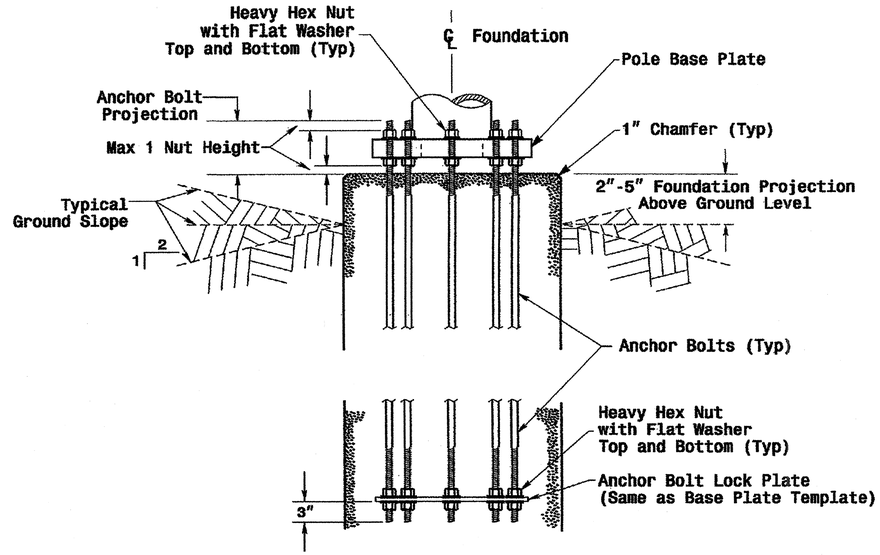
WING WALL DETAILS

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

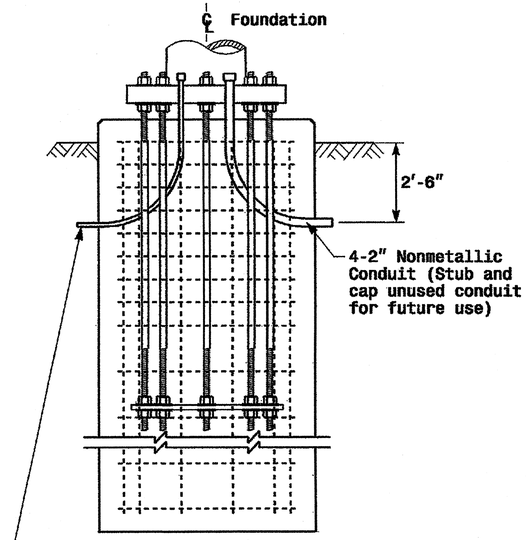
See Note No. 4

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.)

PROJECT REFERENCE NO.	SHEET NO.
U-3401	Sig. 17 M 7

Construction Details – Foundations

Prepared in the Offices of: North Carolina Department of Transportation, Bridge and Geotechnical Section, 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.M. ESPOSITO

REVISIONS	INIT.	DATE

SCALE: 0 NA NONE

SEAL: North Carolina Professional Seal 028094 Engineer Dibish C. Sarkar

D. Sarkar 9.2.2005
SIGNATURE DATE

SIG. INVENTORY NO.

01-SEP-2005 17:48
w:\pegplots-unit\workgroups\2004 metcl pole standards\2004 mf.dgn
palexander

Standard Strain Poles

Wind Zone	Type	STANDARD STRAIN POLES: Case No.	Pole Height (Ft.)	Base Plate BC (In.)	Moment at the Pole Base (ft-kp)	STANDARD FOUNDATIONS 42" Diameter Drilled Pier Length (L) – Feet: Clay Medium N-Value 4-8	Clay Stiff N-Value 9-15	Clay Very Stiff N-Value 16-30	Clay Hard N-Value >30	Sand Loose N-Value 4-10	Sand Medium N-Value 11-30	Sand 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
WIND ZONE 1	LIGHT	S30L3	30	25	310	21.0	14.5	11.5	9.5	18.5	16.5	14.5
WIND ZONE 1	LIGHT	S35L3	35	25	350	22.5	15.0	12.0	10.0	19.5	17.5	15.5
WIND ZONE 1	HEAVY	S30H3	30	29	450	25.5	16.5	13.0	11.0	21.0	18.5	16.5
WIND ZONE 1	HEAVY	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
WIND ZONE 2	LIGHT	S30L2	30	23	290	20.0	14.0	11.5	9.5	18.5	16.0	14.0
WIND ZONE 2	LIGHT	S35L2	35	23	315	21.0	14.5	11.5	9.5	19.0	16.5	14.5
WIND ZONE 2	HEAVY	S30H2	30	29	415	24.5	16.0	13.0	10.5	21.0	18.5	16.0
WIND ZONE 2	HEAVY	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
WIND ZONE 3	LIGHT	S30L2	30	23	290	19.5	13.5	11.0	9.0	18.0	15.5	14.0
WIND ZONE 3	LIGHT	S35L2	35	23	315	20.0	14.0	11.5	9.5	18.5	16.0	14.5
WIND ZONE 3	HEAVY	S30H2	30	29	415	23.0	15.5	12.5	10.0	20.5	17.5	16.0
WIND ZONE 3	HEAVY	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
WIND ZONE 4	LIGHT	S30L1	30	22	225	18.5	13.0	10.5	9.0	17.0	15.0	13.5
WIND ZONE 4	LIGHT	S35L1	35	22	255	19.0	13.5	11.0	9.0	17.5	15.5	14.0
WIND ZONE 4	HEAVY	S30H1	30	25	330	22.0	15.0	12.0	9.5	19.5	17.0	15.0
WIND ZONE 4	HEAVY	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
WIND ZONE 5	LIGHT	S30L2	30	23	290	20.0	14.0	11.0	9.5	18.0	16.0	14.0
WIND ZONE 5	LIGHT	S35L2	35	23	315	21.0	14.5	11.5	10.0	19.0	16.5	14.5
WIND ZONE 5	HEAVY	S30H2	30	29	415	23.5	15.5	12.5	10.5	21.0	18.0	16.0
WIND ZONE 5	HEAVY	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.

Prepared in the Offices of: 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 SEAL 028094 ENGINEER DEBESH C. SARKAR

D. Sarkar 9.2.2005
SIGNATURE DATE

02-SEP-2005 12:42