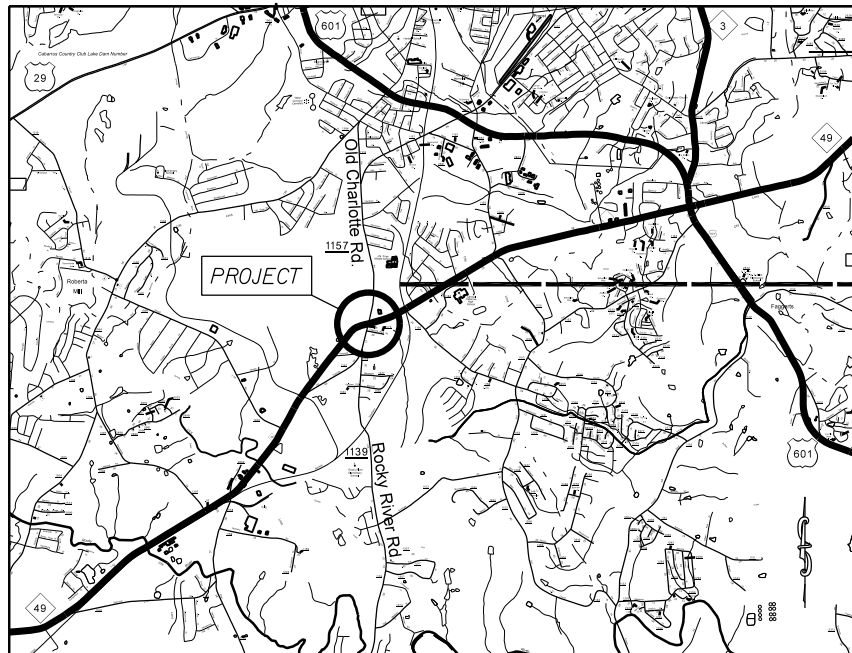


PROJECT: 50138.3.129 TIP:W-5601EB



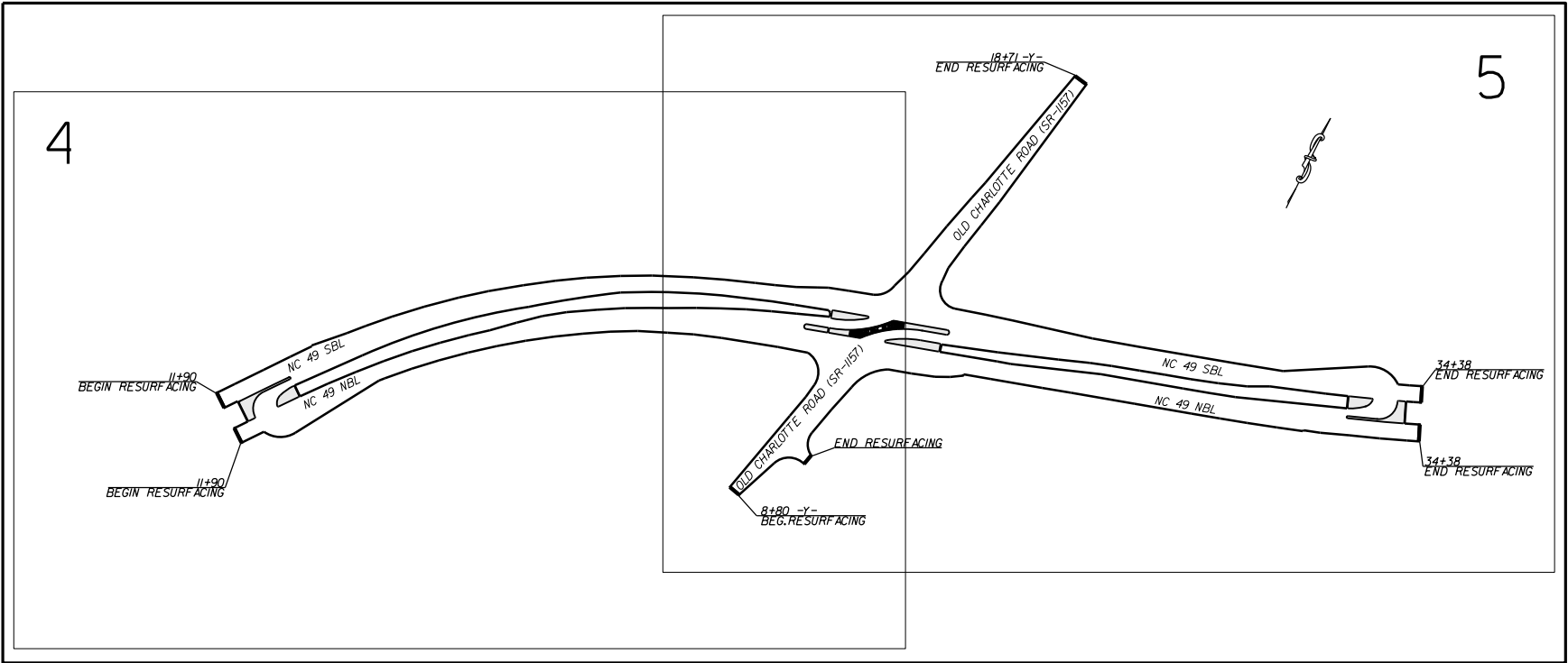
VICINITY MAP NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
CABARRUS COUNTY

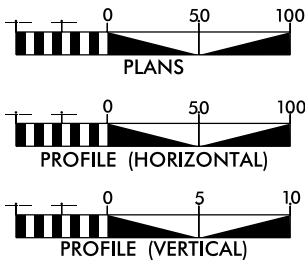
LOCATION: SIGNALIZED SUPERSTREET AT NC 49 AND OLD CHARLOTTE ROAD (SR-1157).

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CONCRETE MONOLITHIC ISLANDS, TRUCK MOUNTABLE ISLAND, TRAFFIC SIGNAL INSTALLATION, AND THERMOPLASTIC PAVEMENT MARKINGS.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	50138.3.129	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
50138.1.129	HSIP-0049(035)	P.E.	
50138.2.129	HSIP-0049(035)	R/W	
50138.3.129	HSIP-0049(035)	CONST.	



GRAPHIC SCALES



DESIGN DATA

ADT _____ = _____
ADT _____ = _____
DHV = _____ %
D = _____ %
T = _____ %
V = _____ MPH

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT 50138.3.129 = 0.61 MILES
TOTAL LENGTH OF STATE PROJECT 50138.3.129 = 0.61 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
DIVISION TEN
DIVISION DESIGN / CONSTRUCT UNIT

RIGHT OF WAY DATE:

LETTING DATE:
JULY 19, 2017

DONALD GRIFFITH
PROJECT ENGINEER

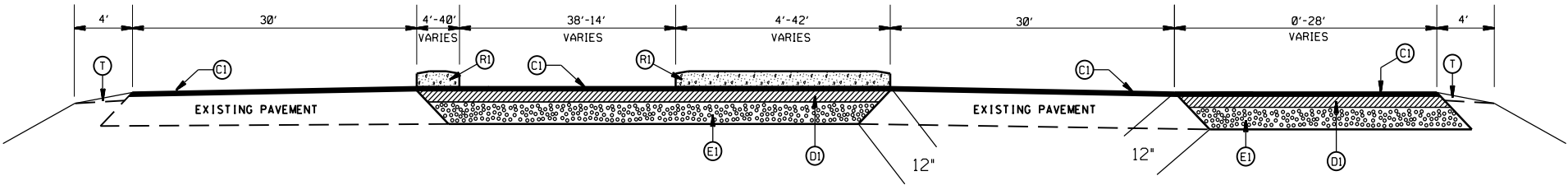
DONALD HARWARD
PROJECT DESIGN ENGINEER



DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

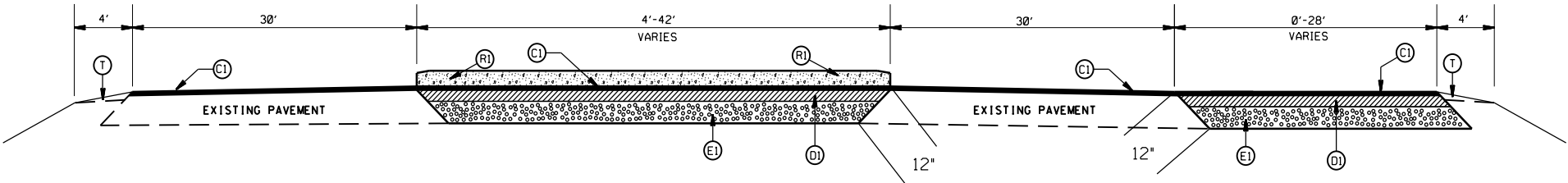
APPROVED BY _____ DATE _____
DDG ENGINEER

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50138.3129	2	
F.A. PROJECT NO. HSIP-00490351			



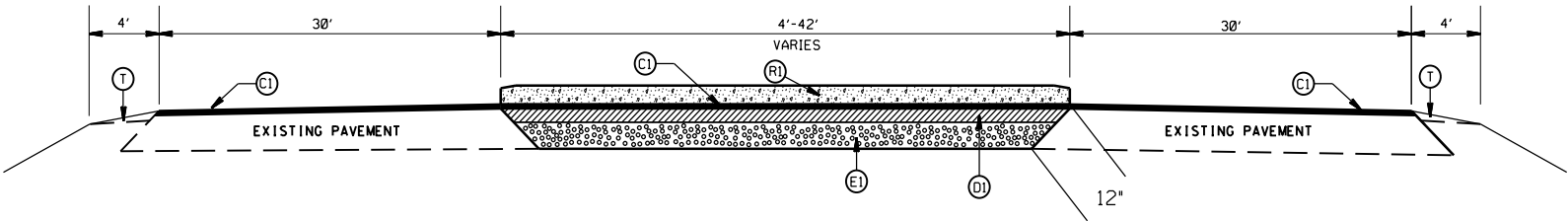
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STA 12+80.08 TO 13+25.00 -L-
STA 33+01.00 TO 34+08.00 -L-



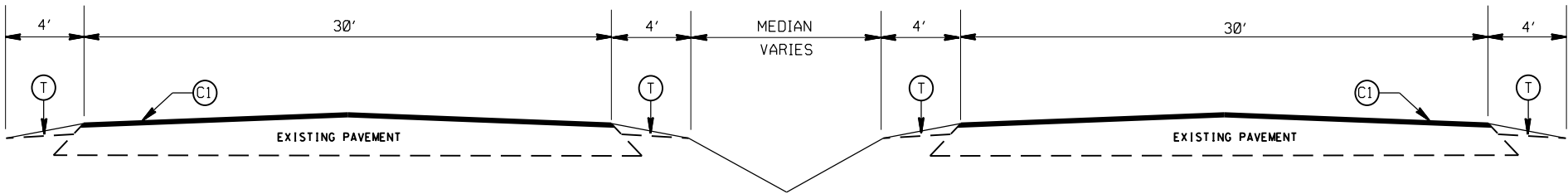
TYPICAL SECTION NO.3

STA 12+37.46 TO 12+80.08 -L-
STA 33+01.00 TO 34+08.00 -L-



TYPICAL SECTION NO.2

STA 12+19.00 TO 12+37.46 -L-
STA 33+91.53 TO 34+07.00 -L-



TYPICAL SECTION NO.1

STA 11+90.00 TO 12+19.00 -L-
STA 34+07.00 TO 34+38.00 -L-

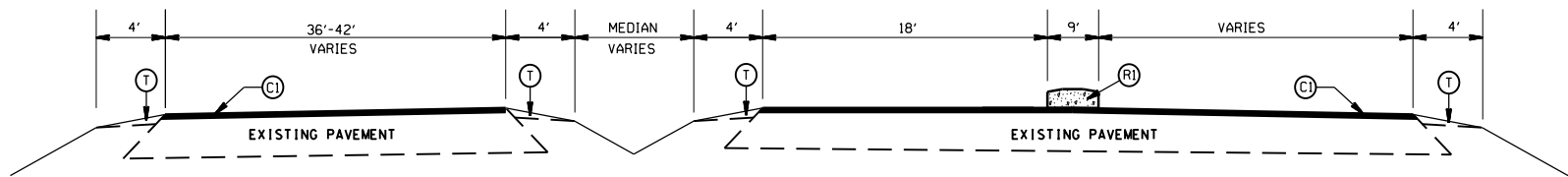
PAVEMENT SCHEDULE

(C1)	PROP. APPROX. 1.5" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
(D1)	PROP. APPROX. 2.5 " ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
(E1)	PROP. APPROX. 8.0" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
(R1)	PROP. 5" MONOLITHIC ISLAND (SURFACE MOUNTED)
(R2)	MOUNTABLE MEDIAN (SEE SHEET 2D)
(T)	EARTH MATERIAL

SIGNALIZED SUPERSTREET AT NC 49 AT
OLD CHARLOTTE ROAD (SR 1157)

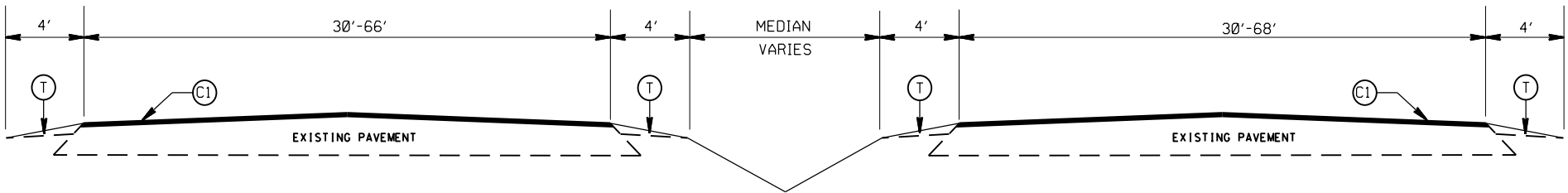
SCALE	1"=50'		REVISIONS	
DATE	NOV 2016			
DWG. BY	TBL			
DESIGN BY	JDH			
APPROVED	DCG			

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50/38.3/29	2A	
F.A. PROJECT NO. HSIP-0049035			



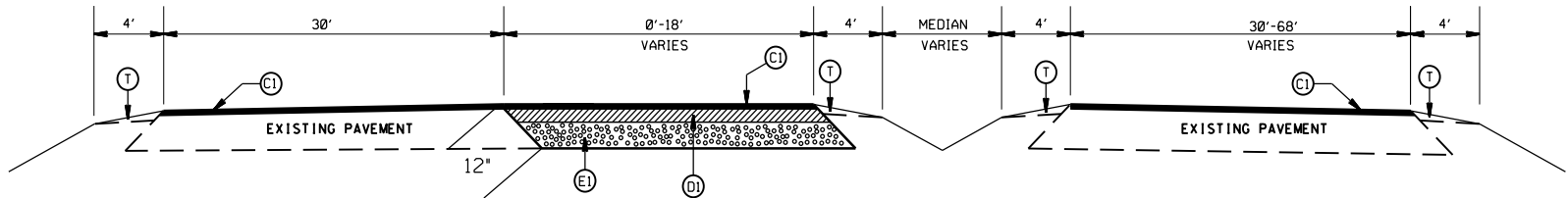
TYPICAL SECTION NO.8

STA 22+91.00 TO 23+37.00 -L-



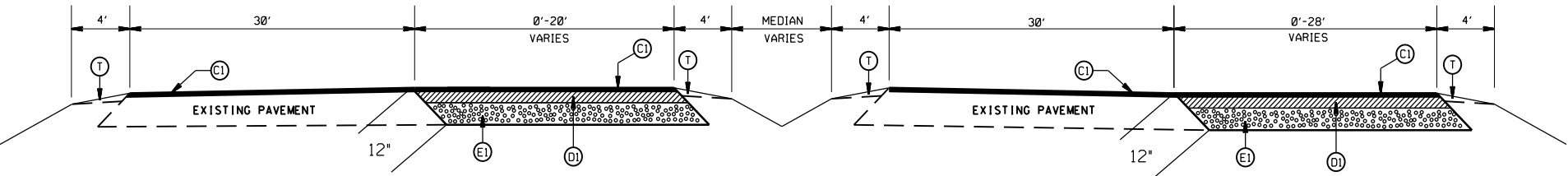
TYPICAL SECTION NO.7

STA 19+50.00 TO 22+91.00 -L-
STA 25+56.00 TO 26+78.00 -L-



TYPICAL SECTION NO.6

STA 14+74.60 TO 19+50.00 -L-



TYPICAL SECTION NO.5

STA 13+25.00 TO 14+74.60 -L-

PAVEMENT SCHEDULE

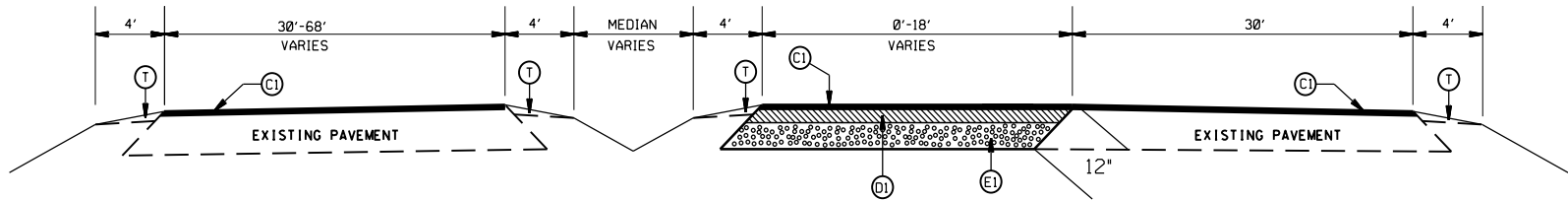
C1	PROP. APPROX. 1.5" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
D1	PROP. APPROX. 2.5 " ASPHALT CONC. INTERMEDATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
E1	PROP. APPROX. 8.0" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
R1	PROP. 5" MONOLITHIC ISLAND (SURFACE MOUNTED)
R2	MOUNTABLE MEDIAN (SEE SHEET 2D)
T	EARTH MATERIAL

SIGNALIZED SUPERSTREET AT NC 49 AT
OLD CHARLOTTE ROAD (SR 1157)

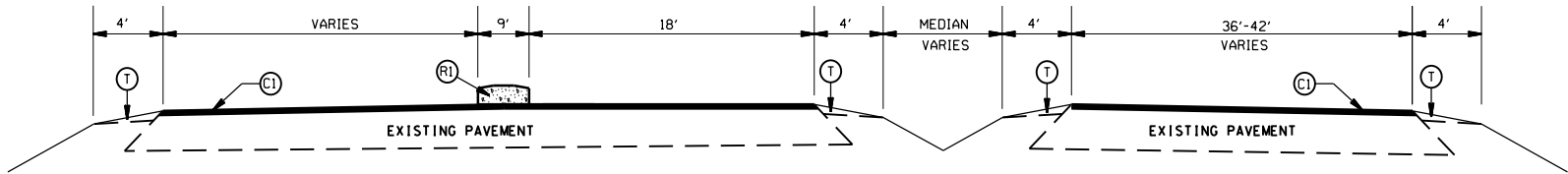
SCALE	DATE	DWG. BY	DESIGN BY	APPROVED	REVISIONS
1"=50'	NOV 2016	TBL	JDH	DCG	



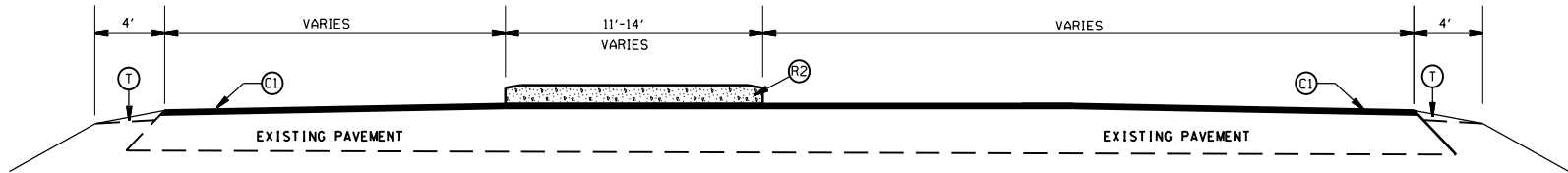
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50/38.3/29	2B	
F.A. PROJECT NO. HSIP-0049035			



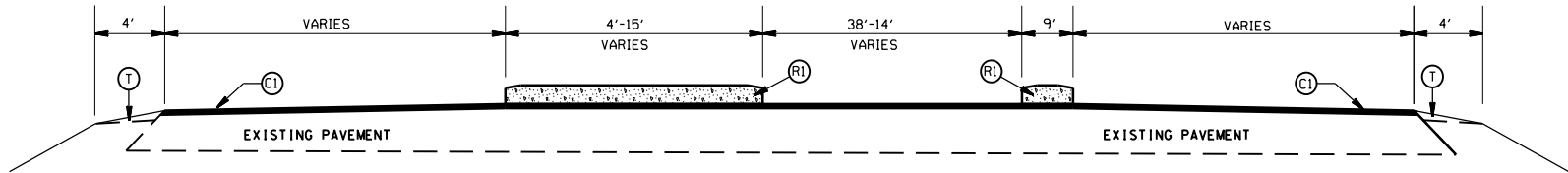
TYPICAL SECTION NO.12
STA 26+78.00 TO 31+75.56 -L-



TYPICAL SECTION NO.11
STA 25+45.00 TO 25+56.00 -L-



TYPICAL SECTION NO.10
STA 24+04.88 TO 24+43.22 -L-



TYPICAL SECTION NO.9
STA 23+37.00 TO 24+04.88 -L-
STA 24+43.22 TO 25+45.00 -L-

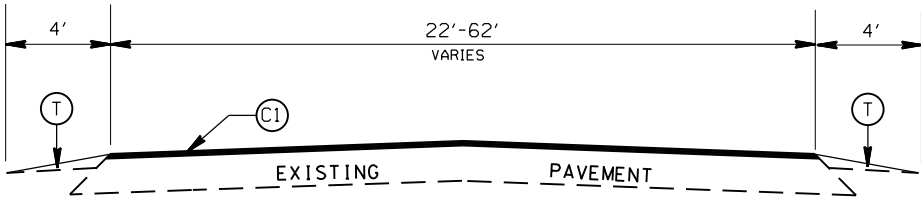
PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.5" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
D1	PROP. APPROX. 2.5 " ASPHALT CONC. INTERMEDATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
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R1	PROP. 5" MONOLITHIC ISLAND (SURFACE MOUNTED)
R2	MOUNTABLE MEDIAN (SEE SHEET 2D)
T	EARTH MATERIAL

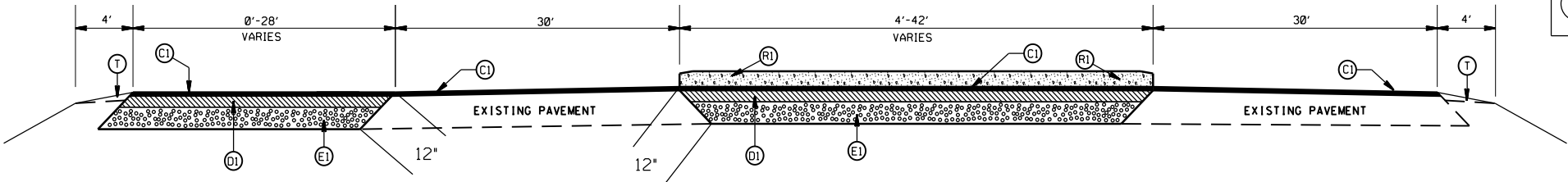
SIGNALIZED SUPERSTREET AT NC 49 AT
OLD CHARLOTTE ROAD (SR 1157)

SCALE	1"=50'		REVISIONS	
DATE	NOV 2016			
DWG. BY	TBL			
DESIGN BY	JDH			
APPROVED	DCG			

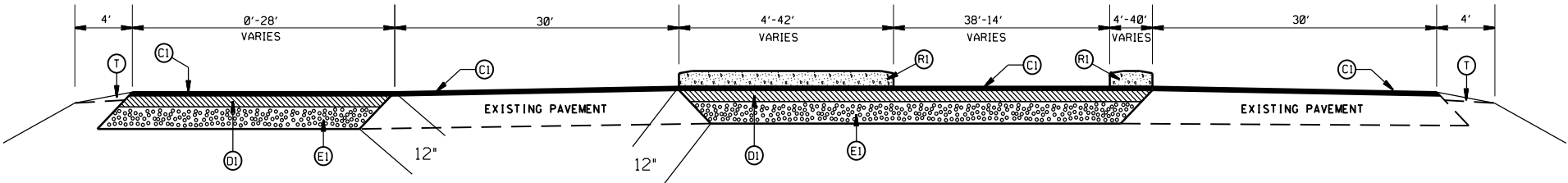
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50/38.3/29	2C	
F.A. PROJECT NO. HSIP-0049035			



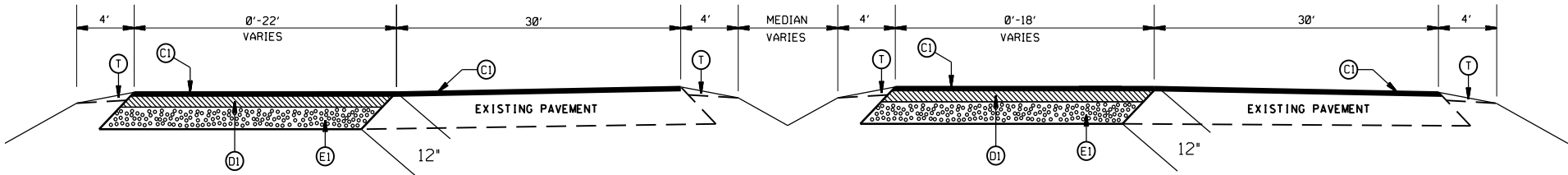
TYPICAL SECTION NO.16
STA 8+80.00 TO 18+71.00 -Y-



TYPICAL SECTION NO.15
STA 33+47.57 TO 33+91.53 -L-



TYPICAL SECTION NO.14
STA 33+01.00 TO 33+47.57 -L-



TYPICAL SECTION NO.13
STA 31+75.56 TO 33+01.00 -L-

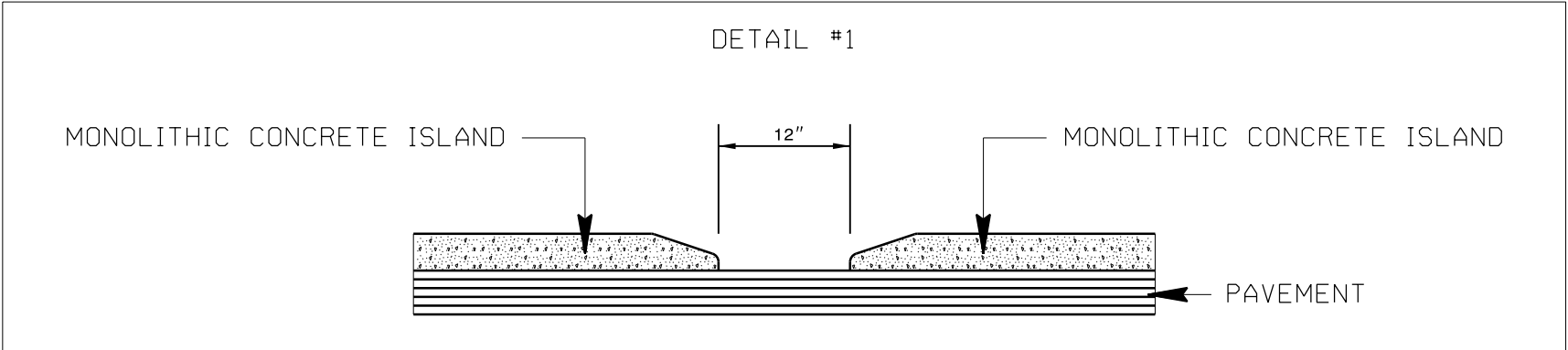
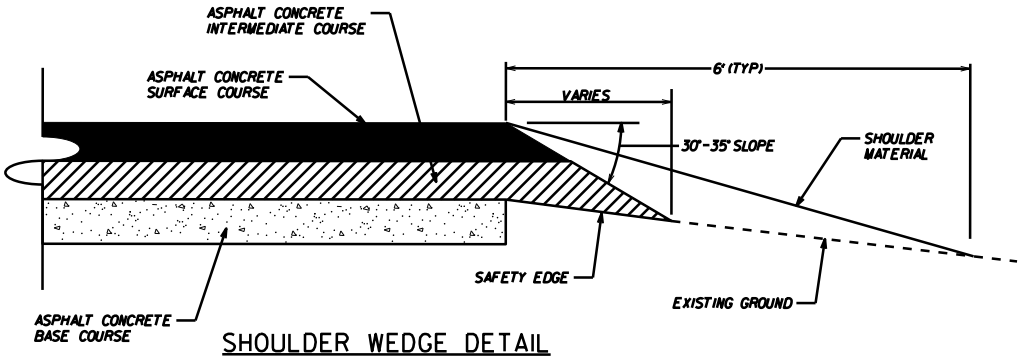
PAVEMENT SCHEDULE

(C1)	PROP. APPROX. 1.5" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
(D1)	PROP. APPROX. 2.5 " ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
(E1)	PROP. APPROX. 8.0" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
(R1)	PROP. 5" MONOLITHIC ISLAND (SURFACE MOUNTED)
(R2)	MOUNTABLE MEDIAN (SEE SHEET 2D)
(T)	EARTH MATERIAL

SIGNALIZED SUPERSTREET AT NC 49 AT
OLD CHARLOTTE ROAD (SR 1157)

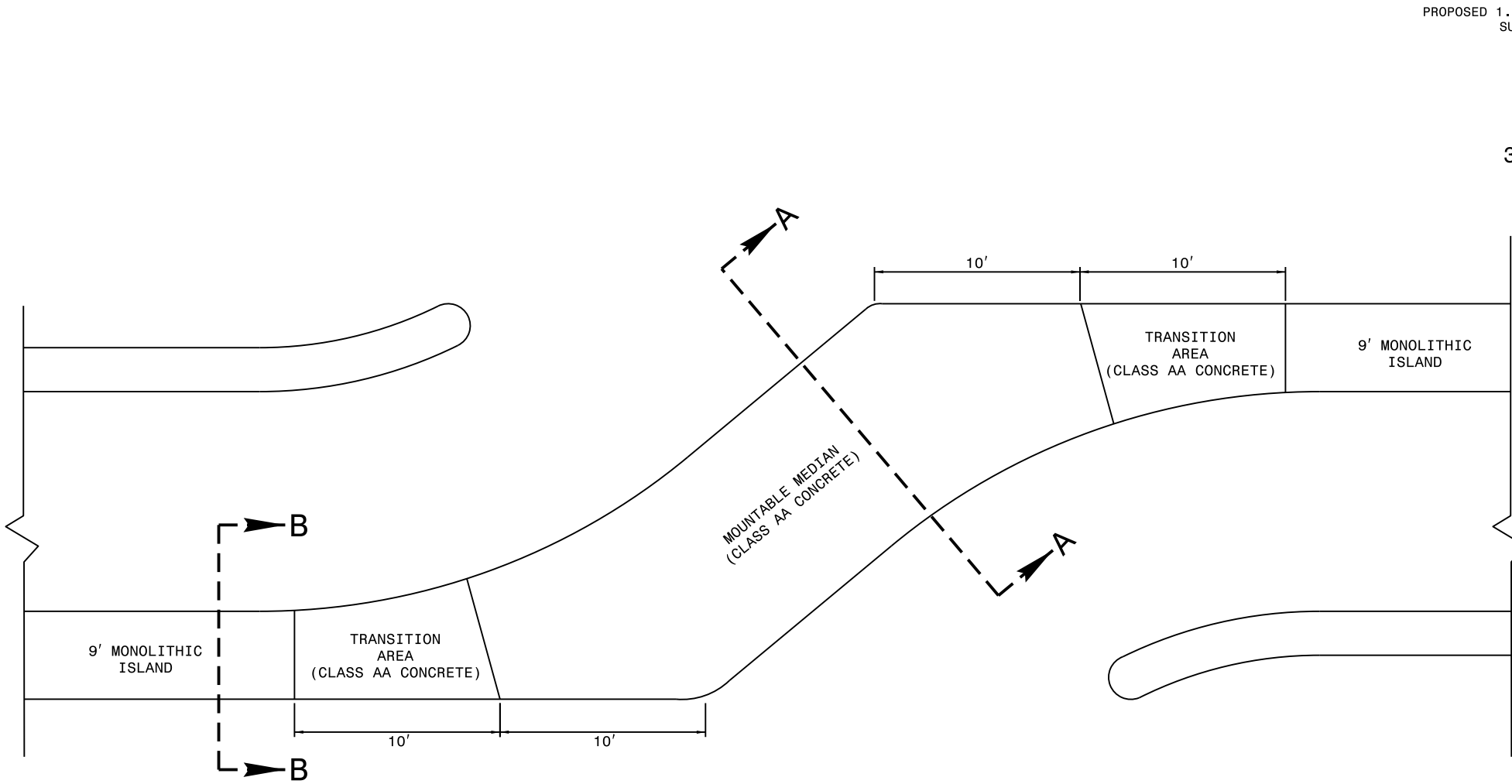
SCALE	1"=50'		REVISIONS	
DATE	NOV 2016			
DWG. BY	TBL			
DESIGN BY	JDH			
APPROVED	DCG			

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50138.3J29	20	
F.A. PROJECT NO.			



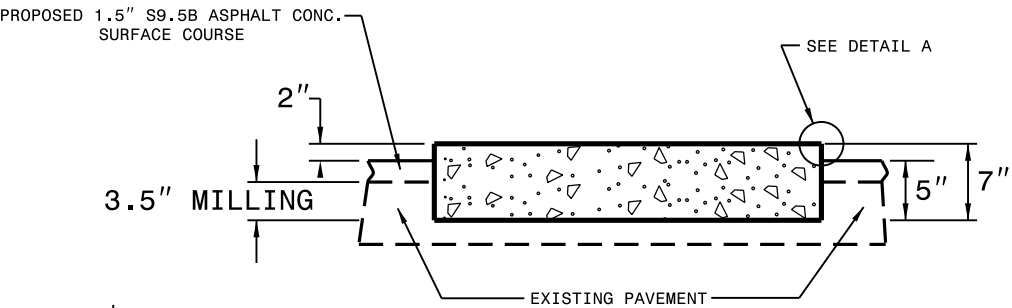
SIGNALIZED SUPERSTREET AT NC 49 AND OLD CHARLOTTE ROAD (SR-1157)			
SCALE	1"=50'		REVISIONS
DATE	NOV 2016		
DWG. BY	TBL		
DESIGN BY	JDH		
APPROVED	DCG		

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50138.3J29	2E	
F.A. PROJECT NO.			

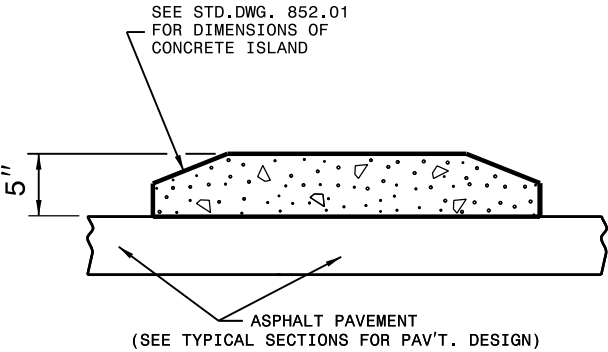


EMERGENCY VEHICLE ACCESS FOR CONCRETE ISLAND

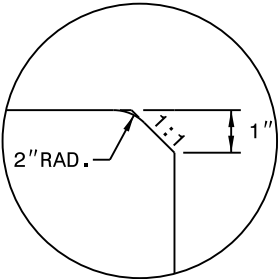
- NOTES:
- REFER TO SECTION 852 OF STANDARD SPECIFICATIONS FOR CONCRETE ISLANDS.
 - REFER TO STANDARD DRAWING 852.01 FOR CONTRACTION/EXPANSION JOINTS.
 - PLACE 6"X6" W5XW5 REINFORCING WIRE MESH IN THE BOTTOM 3RD OF THE EMERGENCY VEHICLE ACCESS PORTION OF THE CONCRETE ISLAND THAT MEETS SECTION 1070 OF THE STANDARD SPECIFICATIONS.
 - USE CLASS AA CONCRETE
 - *ISLAND WIDTH VARIES THRU THE LENGTH OF THE ISLAND.



SECTION A-A



SECTION B-B



DETAIL A

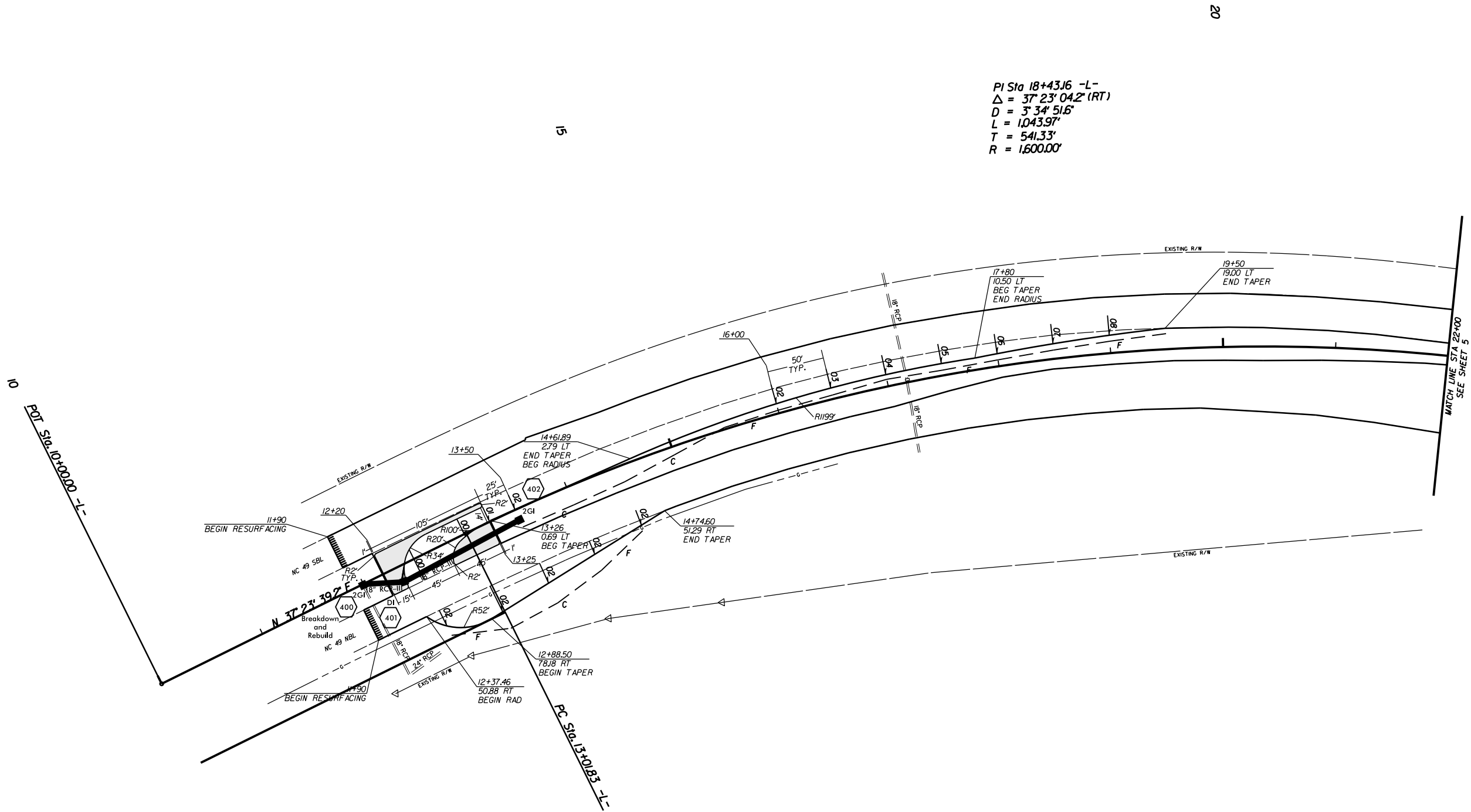
SIGNALIZED SUPERSTREET AT NC 49 AND OLD CHARLOTTE ROAD (SR-1157)				
SCALE	1"=50'		REVISIONS	
DATE	NOV 2016			
DWG. BY	TBL			
DESIGN BY	JDH			
APPROVED	DCG			

NOTE: Invert Elevations are for Bid Purposes only and shall not be used for project construction stakeout.
See "Standard Specifications For Roads and Structures, Section 300-5".

***SUB-REGIONAL & REGIONAL
LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)***

[illegible]

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50/38.3/29	4	
F.A. PROJECT NO.			

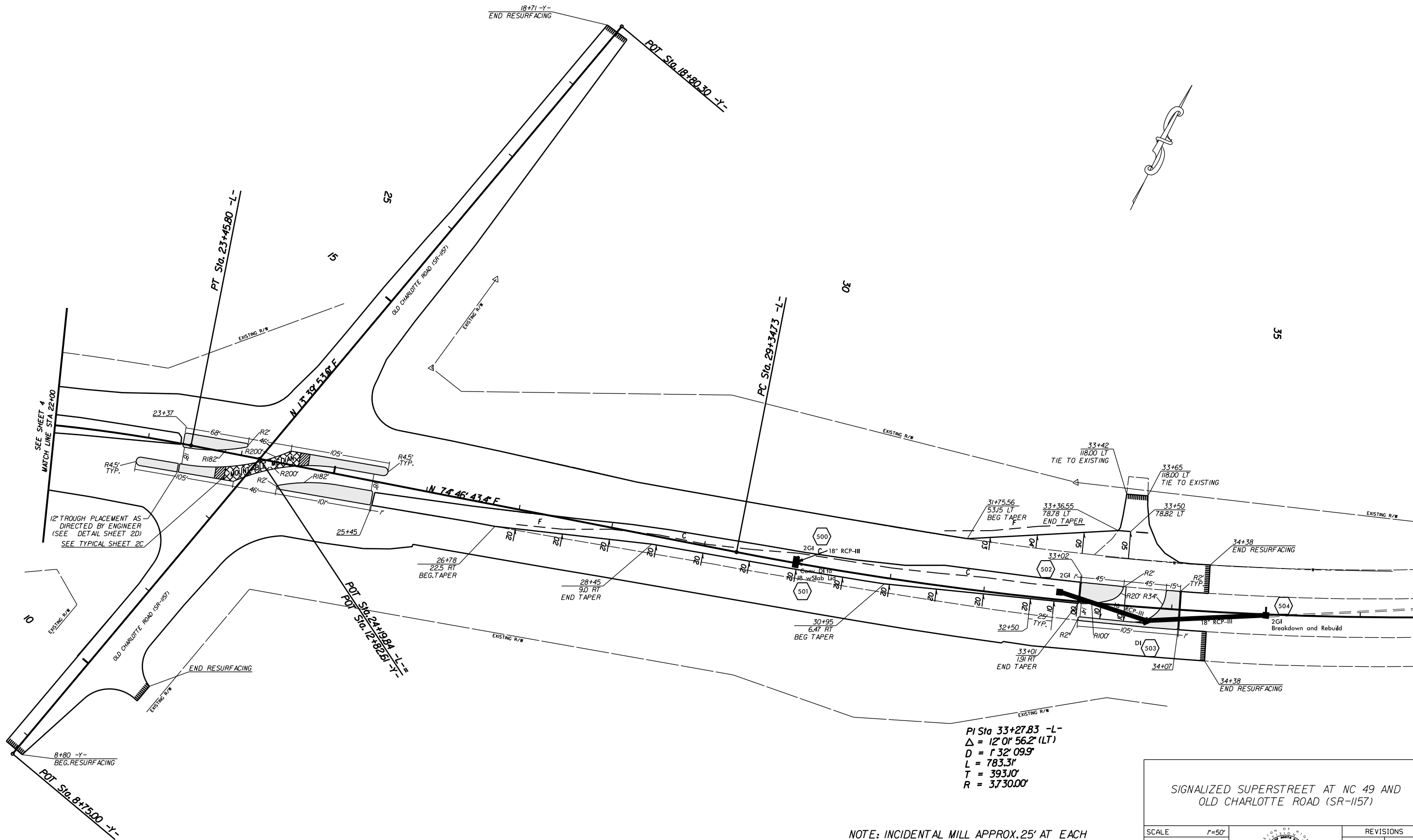


NOTE: INCIDENTAL MILL APPROX. 25' AT EACH TIE IN TO PROVIDE A SMOOTH TRANSITION TO THE EXISTING ASPHALT PAVEMENT.

SIGNALIZED SUPERSTREET AT NC 49 AND OLD CHARLOTTE ROAD (SR-1157)			REVISIONS	
SCALE	1"=50'			
DATE	NOV 2016			
DWG. BY	TBL			
DESIGN BY	JDH			
APPROVED	DCG			



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50138.3J29	5	
F.A. PROJECT NO.			



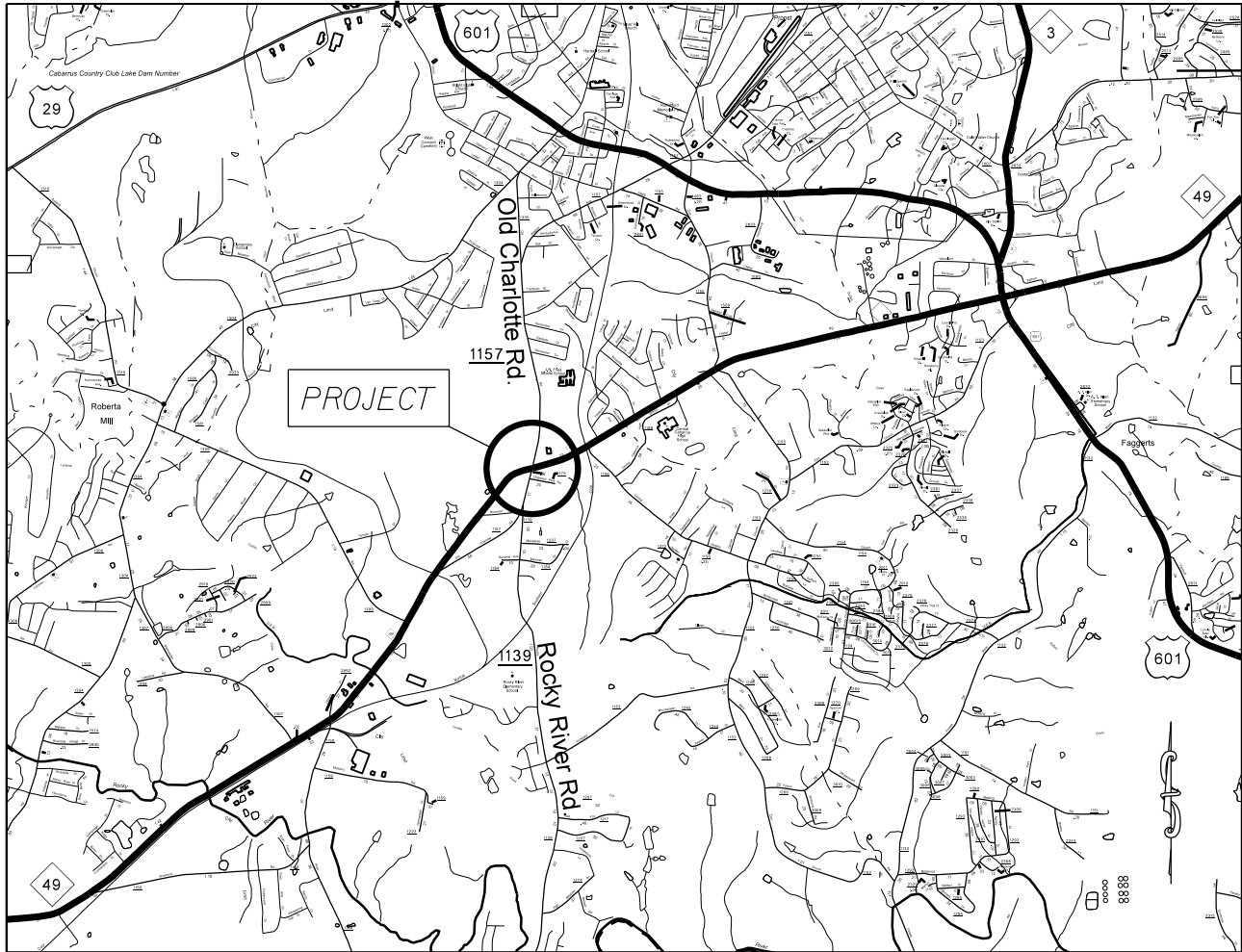
NOTE: INCIDENTAL MILL APPROX. 25' AT EACH
TIE IN TO PROVIDE A SMOOTH TRANSITION
TO THE EXISTING ASPHALT PAVEMENT.

SIGNALIZED SUPERSTREET AT NC 49 AND OLD CHARLOTTE ROAD (SR-1157)			
SCALE	1"=50'		
DATE	OCT 2016		
DWG. BY	TBL		
DESIGN BY	JDH		
APPROVED	DCG		
REVISIONS			

IC:\B\LUN-2017\513
12447-014 610510725977255
12447-014 610510725977255

PROJECT: 50138.3.129 TIP: W-5601EB

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL



VICINITY MAP NOT TO SCALE

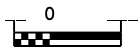
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	50138.3.129	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50138.1.129	HSIP-0049(035)	P.E.	
50138.2.129	HSIP-0049(035)	R/W	
50138.3.129	HSIP-0049(035)	CONST.	

EROSION AND SEDIMENT CONTROL MEASURES

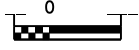
Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	
1630.05	Temporary Diversion	
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle/ Coir Fiber Wattle	
	Wattle/ Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	
1632.02	Type B	
1632.03	Type C	
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

THIS PROJECT CONTAINS
EROSION CONTROL PLANS
FOR CLEARING AND
GRUBBING PHASE OF
CONSTRUCTION.

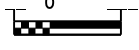
GRAPHIC SCALE



PLANS



PROFILE (HORIZONTAL)



PROFILE (VERTICAL)

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY
WITH THE REGULATIONS SET FORTH BY THE
NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011
ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES DIVISION OF WATER QUALITY.

Prepared in the Office of:
DDC UNIT DIVISION 10
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
2012 STANDARD SPECIFICATIONS

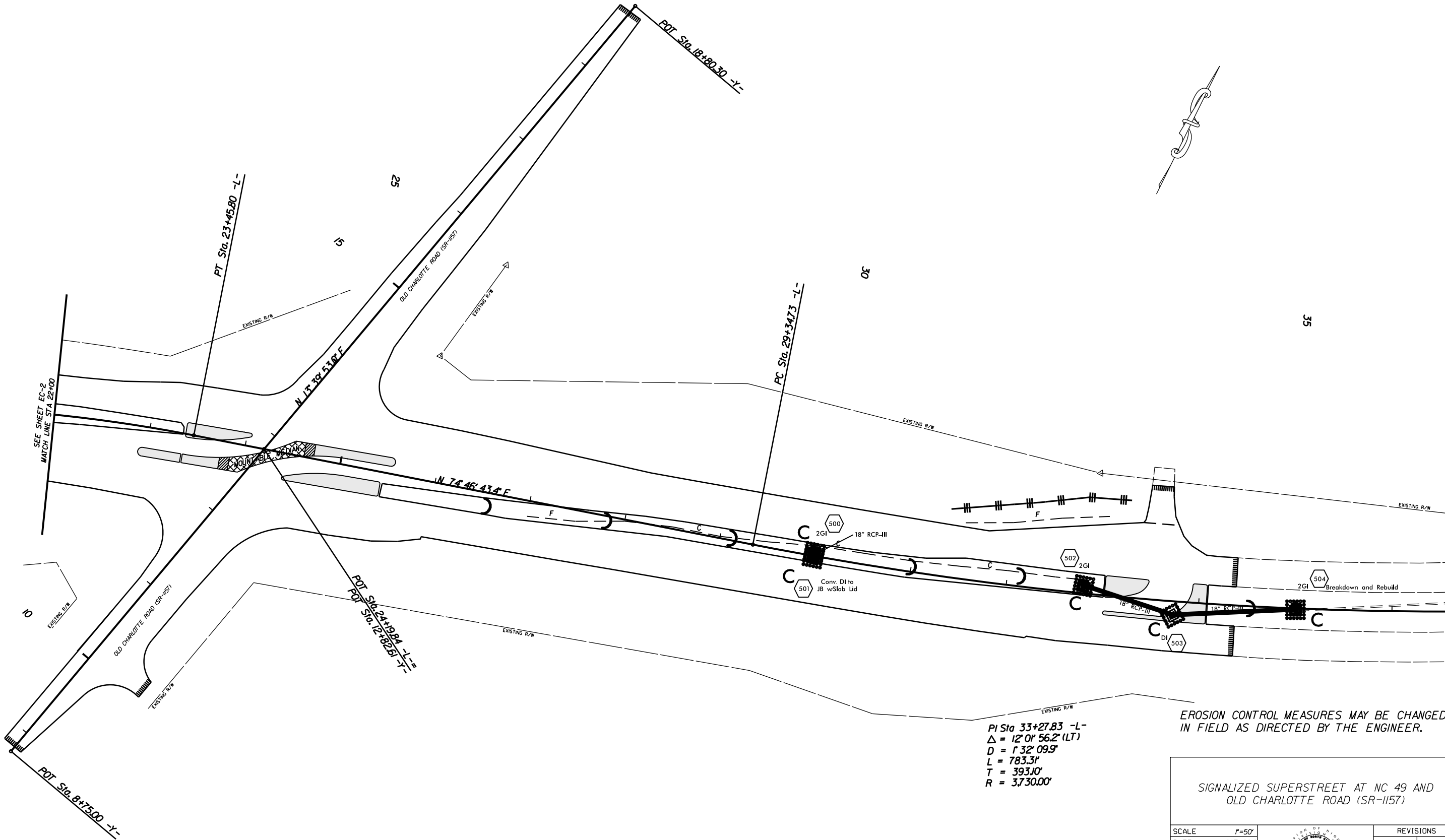
TRAVIS LOWDER 3742
EROSION CONTROL DESIGNER LEVEL III CERTIFICATION #

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2012 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50138.3129	EC-3	
F.A. PROJECT NO.			



EROSION CONTROL MEASURES MAY BE CHANGED, IN FIELD AS DIRECTED BY THE ENGINEER.

SIGNALIZED SUPERSTREET AT NC 49 AND OLD CHARLOTTE ROAD (SR-1157)

SCALE	1"=50'
DATE	OCT 2016
DWG. BY	TBL
DESIGN BY	JDH
APPROVED	DCG



REVISIONS	

PAVEMENT MARKING SCHEDULE

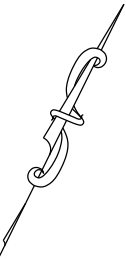
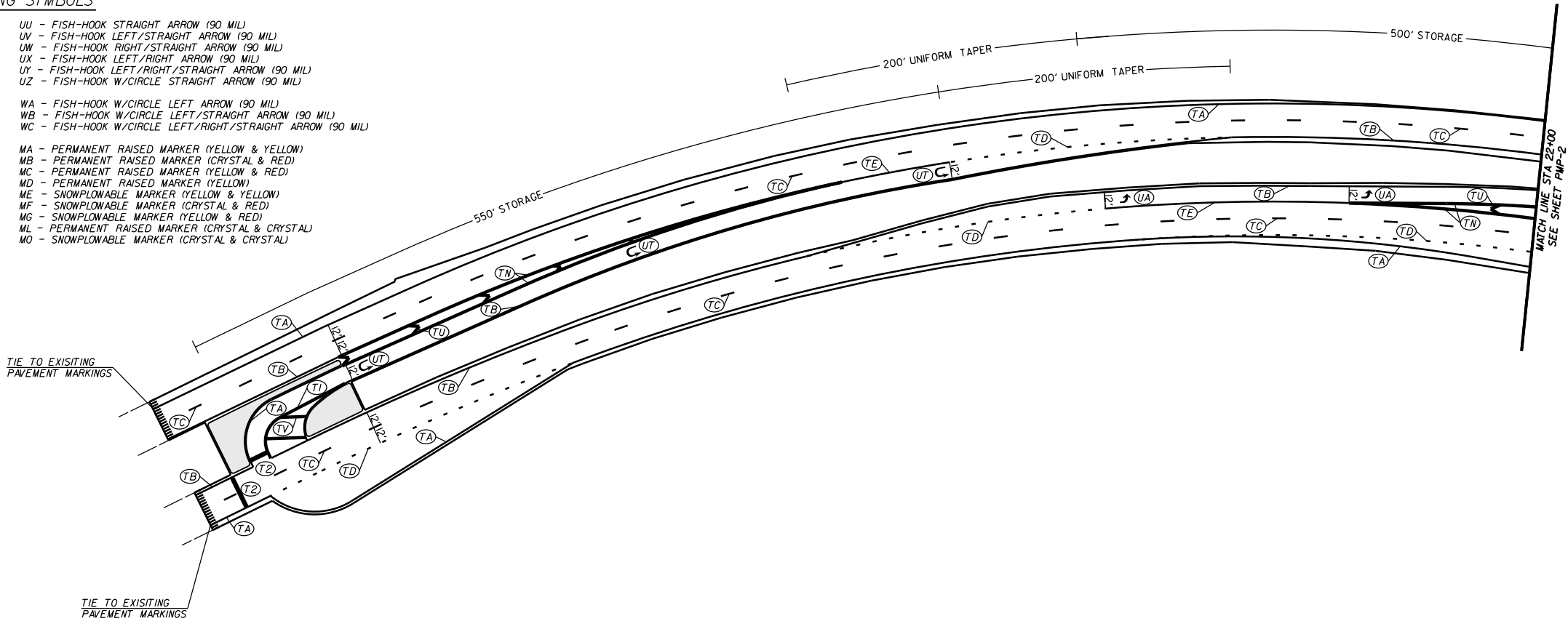
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50/38.3/29	PMP-1	
F.A. PROJECT NO.			

PAVEMENT MARKING LINES

TA - WHITE EDGELINE (4",90 MIL)	TU - WHITE DIAGONAL (12",90 MIL)
TB - YELLOW EDGELINE (4",90 MIL)	TV - YELLOW DIAGONAL (12",90 MIL)
TC - 10FT. WHITE SKIP (4",120 MIL)	T1 - WHITE LINE, RR X (16",120 MIL)
TD - 3FT.-9FT./SP WHITE MINISKIP (4",120 MIL)	T2 - WHITE STOPBAR (24",120 MIL)
TE - WHITE SOLID LANE LINE (4",120 MIL)	T3 - WHITE CROSSWALK LINE (24",120 MIL)
TF - 10FT. YELLOW SKIP (4",120 MIL)	T4 - WHITE RUMBLE STRIP (4",240 MIL)
TH - YELLOW SINGLE CENTER (4",120 MIL)	T5 - YELLOW RUMBLE STRIP (4",240 MIL)
TI - YELLOW DOUBLE CENTER (4",120 MIL)	T6 - WHITE EDGELINE (6",90 MIL)
TJ - 10FT. WHITE SKIP (6",120 MIL)	T7 - YELLOW EDGELINE (6",90 MIL)
TK - 3FT.-9FT./SP WHITE MINISKIP (6",120 MIL)	T8 - 2FT.-6FT./SP WHITE MINISKIP (4",120 MIL)
TL - WHITE SOLID LANE LINE (6",120 MIL)	T9 - 2FT.-6FT./SP YELLOW MINISKIP (4",120 MIL)
TM - 10FT. YELLOW SKIP (6",120 MIL)	T10 - 3FT.-3FT./SP WHITE MINISKIP (12",120 MIL)
TN - WHITE GORELINE (8",90 MIL)	T11 - 2FT.-6FT./SP WHITE MINISKIP (6",120 MIL)
TO - WHITE DIAGONAL (8",90 MIL)	T12 - 2FT.-6FT./SP YELLOW MINISKIP (6",120 MIL)
TP - YELLOW DIAGONAL (8",90 MIL)	T13 - 3FT.-9FT./SP WHITE MINISKIP (8",120 MIL)
TQ - WHITE CROSSWALK LINE (8",120 MIL)	T14 - 3FT.-9FT./SP WHITE MINISKIP (12",120 MIL)
TR - WHITE SOLID LANE LINE (8",120 MIL)	T15 - YELLOW SINGLE CENTER (6",120 MIL)
TS - WHITE GORELINE (12",90 MIL)	T16 - YELLOW DOUBLE CENTER (6",120 MIL)
TT - WHITE SOLID LANE LINE (12",120 MIL)	T17 - 3FT.-3FT./SP WHITE MINISKIP ENTRANCE LINE (8",120 MIL)

PAVEMENT MARKING SYMBOLS

UA -LEFT TURN ARROW (90 MIL)	UU - FISH-HOOK STRAIGHT ARROW (90 MIL)
UB - RIGHT TURN ARROW (90 MIL)	UV - FISH-HOOK LEFT/STRAIGHT ARROW (90 MIL)
UC - STRAIGHT ARROW (90 MIL)	UW - FISH-HOOK RIGHT/STRAIGHT ARROW (90 MIL)
UD - COMBO. LEFT/STRAIGHT ARROW (90 MIL)	UX - FISH-HOOK LEFT/RIGHT ARROW (90 MIL)
UE - COMBO. RIGHT/STRAIGHT ARROW (90 MIL)	UY - FISH-HOOK LEFT/RIGHT/STRAIGHT ARROW (90 MIL)
UF - COMBO. LEFT/RIGHT ARROW (90 MIL)	UZ - FISH-HOOK W/CIRCLE STRAIGHT ARROW (90 MIL)
UG - COMBO. LEFT/RIGHT/STRAIGHT ARROW (90 MIL)	
UH - HANDICAP PARKING (90 MIL)	WA - FISH-HOOK W/CIRCLE LEFT ARROW (90 MIL)
UI - ALPHANUMERIC CHAR. (120 MIL)	WB - FISH-HOOK W/CIRCLE LEFT/STRAIGHT ARROW (90 MIL)
UJ - BICYCLE SYMBOL (90 MIL)	WC - FISH-HOOK W/CIRCLE LEFT/RIGHT/STRAIGHT ARROW (90 MIL)
UK - BICYCLE STRAIGHT ARROW (90 MIL)	
UL - BICYCLE CHAR. (120 MIL)	MA - PERMANENT RAISED MARKER (YELLOW & YELLOW)
UM - 12" YIELD LINE TRIANGLE (90 MIL)	MB - PERMANENT RAISED MARKER (CRYSTAL & RED)
UN - 24" YIELD LINE TRIANGLE (90 MIL)	MC - PERMANENT RAISED MARKER (YELLOW & RED)
UO - BICYCLE LEFT ARROW (90 MIL)	MD - PERMANENT RAISED MARKER (YELLOW)
UP - MERGE ARROW (90 MIL)	ME - SNOWPLOWABLE MARKER (YELLOW & YELLOW)
UQ - RAMP ARROW SYMBOL (90 MIL)	MF - SNOWPLOWABLE MARKER (CRYSTAL & RED)
UR - SHARROW (90 MIL)	MG - SNOWPLOWABLE MARKER (YELLOW & RED)
US - BICYCLE LOOP DETECTOR (90 MIL)	ML - PERMANENT RAISED MARKER (CRYSTAL & CRYSTAL)
UT - U-TURN ARROW (90 MIL)	MO - SNOWPLOWABLE MARKER (CRYSTAL & CRYSTAL)



SIGNALIZED SUPERSTREET AT NC 49 AND
OLD CHARLOTTE ROAD (SR-1157)

SCALE	1"=50'
DATE	NOV 2016
DWG. BY	TBL
DESIGN BY	JDH
APPROVED	DCG



REVISIONS

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	50138.3J29	PMP-2	
F.A. PROJECT NO.			

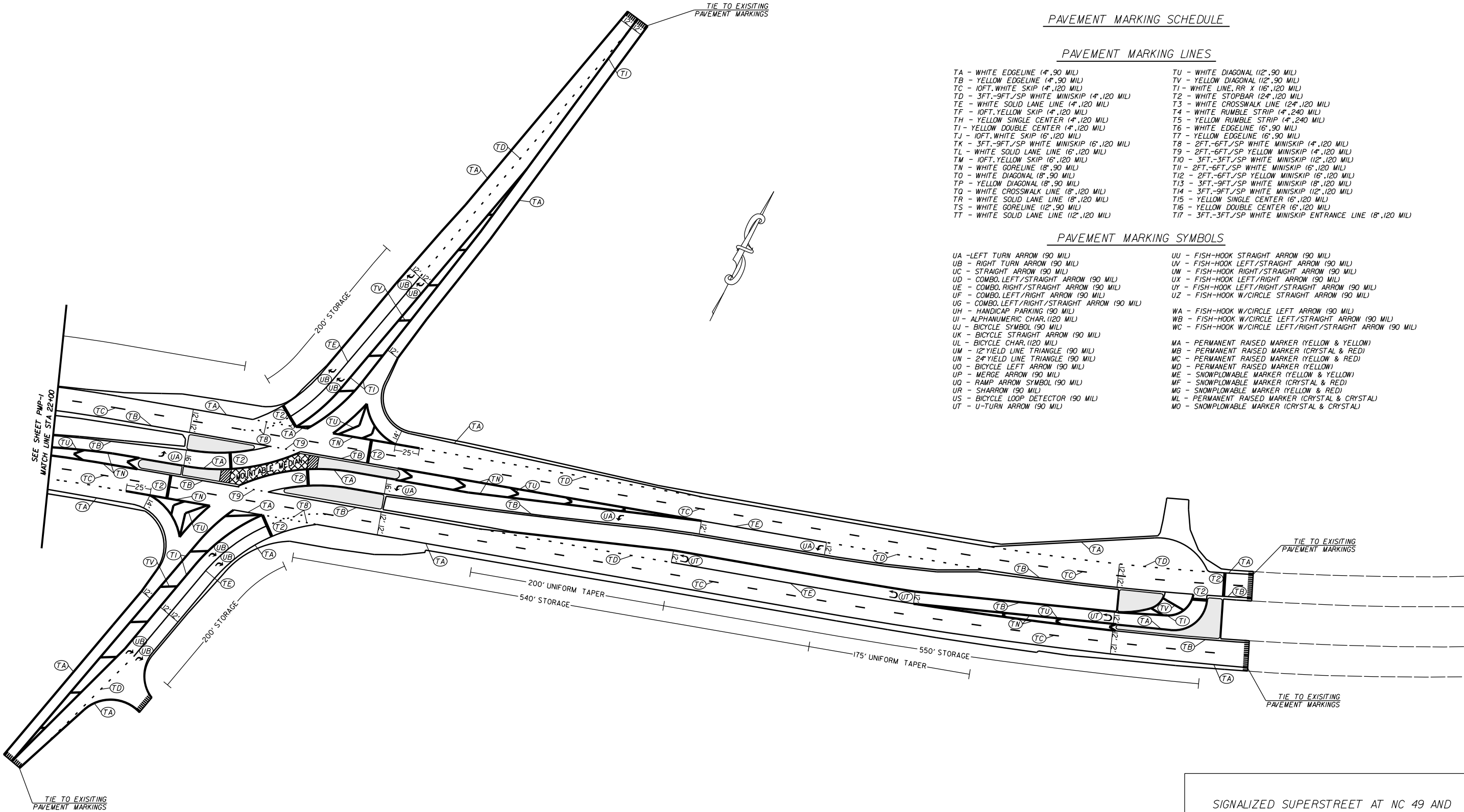
PAVEMENT MARKING SCHEDULE

PAVEMENT MARKING LINES

- TA - WHITE EDGE LINE (4", 90 MIL)
TB - YELLOW EDGE LINE (4", 90 MIL)
TC - 10FT. WHITE SKIP (4", 120 MIL)
TD - 3FT.-9FT./SP WHITE MINISKIP (4", 120 MIL)
TE - WHITE SOLID LANE LINE (4", 120 MIL)
TF - 10FT. YELLOW SKIP (4", 120 MIL)
TH - YELLOW SINGLE CENTER (4", 120 MIL)
TI - YELLOW DOUBLE CENTER (4", 120 MIL)
TJ - 10FT. WHITE SKIP (6", 120 MIL)
TK - 3FT.-9FT./SP WHITE MINISKIP (6", 120 MIL)
TL - WHITE SOLID LANE LINE (6", 120 MIL)
TM - 10FT. YELLOW SKIP (6", 120 MIL)
TN - WHITE GORE LINE (8", 90 MIL)
TO - WHITE DIAGONAL (8", 90 MIL)
TP - YELLOW DIAGONAL (8", 90 MIL)
TQ - WHITE CROSSWALK LINE (8", 120 MIL)
TR - WHITE SOLID LANE LINE (8", 120 MIL)
TS - WHITE GORE LINE (12", 90 MIL)
TT - WHITE SOLID LANE LINE (12", 120 MIL)
- TU - WHITE DIAGONAL (12", 90 MIL)
TV - YELLOW DIAGONAL (12", 90 MIL)
T1 - WHITE LINE, RR X (16", 120 MIL)
T2 - WHITE STOPBAR (24", 120 MIL)
T3 - WHITE CROSSWALK LINE (24", 120 MIL)
T4 - WHITE RUMBLE STRIP (4", 240 MIL)
T5 - YELLOW RUMBLE STRIP (4", 240 MIL)
T6 - WHITE EDGE LINE (6", 90 MIL)
T7 - YELLOW EDGE LINE (6", 90 MIL)
T8 - 2FT.-6FT./SP WHITE MINISKIP (4", 120 MIL)
T9 - 2FT.-6FT./SP YELLOW MINISKIP (4", 120 MIL)
T10 - 3FT.-3FT./SP WHITE MINISKIP (12", 120 MIL)
T11 - 2FT.-6FT./SP WHITE MINISKIP (6", 120 MIL)
T12 - 2FT.-6FT./SP YELLOW MINISKIP (6", 120 MIL)
T13 - 3FT.-9FT./SP WHITE MINISKIP (8", 120 MIL)
T14 - 3FT.-9FT./SP WHITE MINISKIP (12", 120 MIL)
T15 - WHITE SINGLE CENTER (6", 120 MIL)
T16 - YELLOW DOUBLE CENTER (6", 120 MIL)
T17 - 3FT.-3FT./SP WHITE MINISKIP ENTRANCE LINE (8", 120 MIL)

PAVEMENT MARKING SYMBOLS

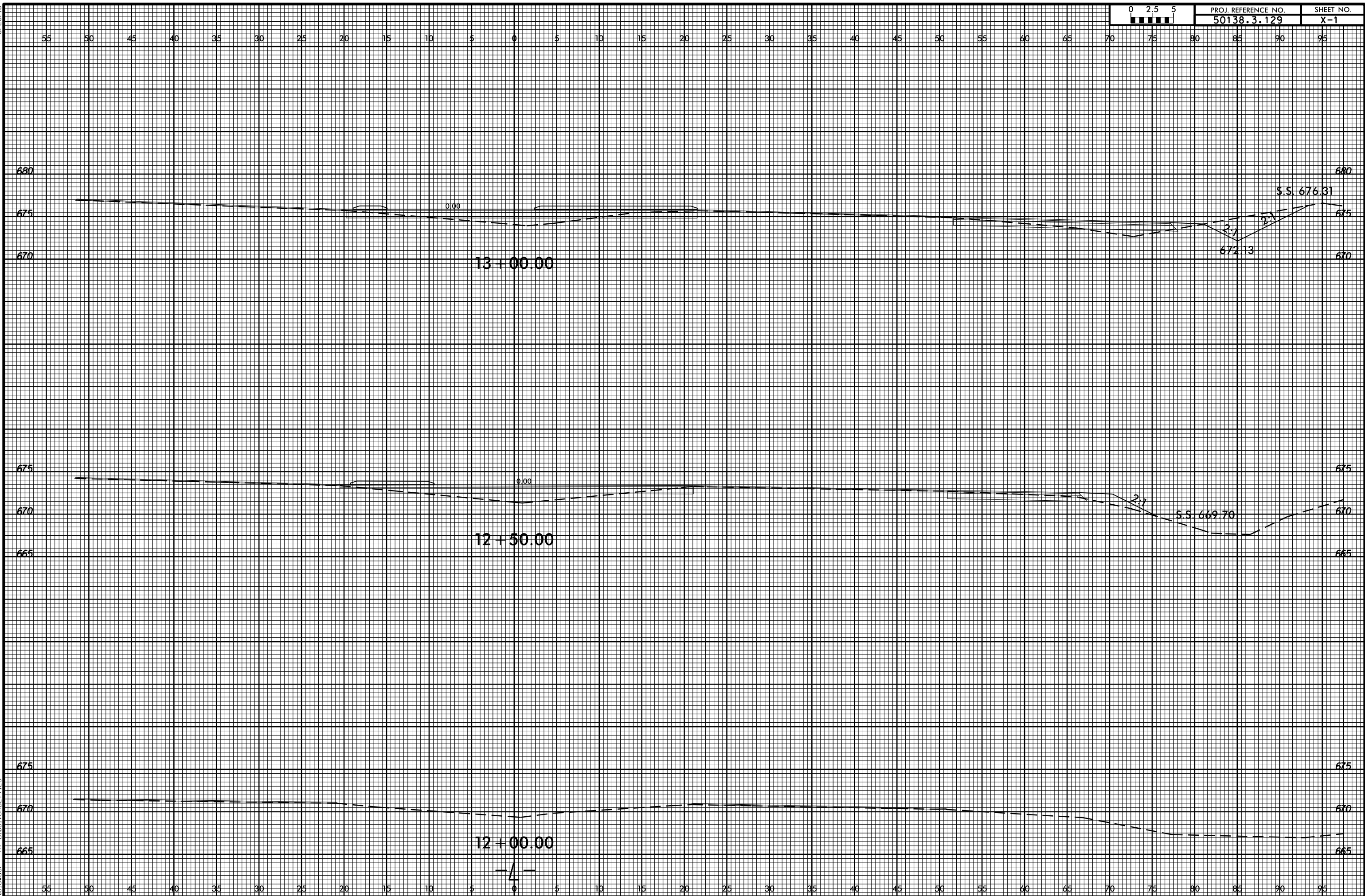
- UA - LEFT TURN ARROW (90 MIL)
UB - RIGHT TURN ARROW (90 MIL)
UC - STRAIGHT ARROW (90 MIL)
UD - COMBO. LEFT/STRAIGHT ARROW (90 MIL)
UE - COMBO. RIGHT/STRAIGHT ARROW (90 MIL)
UF - COMBO. LEFT/RIGHT ARROW (90 MIL)
UG - COMBO. LEFT/RIGHT/STRAIGHT ARROW (90 MIL)
UH - HANDICAP PARKING (90 MIL)
UI - ALPHANUMERIC CHAR. (120 MIL)
UJ - BICYCLE SYMBOL (90 MIL)
UK - BICYCLE STRAIGHT ARROW (90 MIL)
UL - BICYCLE CHAR. (120 MIL)
UM - 12" YIELD LINE TRIANGLE (90 MIL)
UN - 24" YIELD LINE TRIANGLE (90 MIL)
UO - BICYCLE LEFT ARROW (90 MIL)
UP - MERGE ARROW (90 MIL)
UQ - RAMP ARROW SYMBOL (90 MIL)
UR - SHARROW (90 MIL)
US - BICYCLE LOOP DETECTOR (90 MIL)
UT - U-TURN ARROW (90 MIL)
- UU - FISH-HOOK STRAIGHT ARROW (90 MIL)
UV - FISH-HOOK LEFT/STRAIGHT ARROW (90 MIL)
UW - FISH-HOOK RIGHT/STRAIGHT ARROW (90 MIL)
UX - FISH-HOOK LEFT/RIGHT ARROW (90 MIL)
UY - FISH-HOOK LEFT/RIGHT/STRAIGHT ARROW (90 MIL)
UZ - FISH-HOOK W/CIRCLE STRAIGHT ARROW (90 MIL)
WA - FISH-HOOK W/CIRCLE LEFT ARROW (90 MIL)
WB - FISH-HOOK W/CIRCLE LEFT/STRAIGHT ARROW (90 MIL)
WC - FISH-HOOK W/CIRCLE LEFT/RIGHT/STRAIGHT ARROW (90 MIL)
MA - PERMANENT RAISED MARKER (YELLOW & YELLOW)
MB - PERMANENT RAISED MARKER (CRYSTAL & RED)
MC - PERMANENT RAISED MARKER (YELLOW & RED)
MD - PERMANENT RAISED MARKER (YELLOW)
ME - SNOWPLOWABLE MARKER (YELLOW & YELLOW)
MF - SNOWPLOWABLE MARKER (CRYSTAL & RED)
MG - SNOWPLOWABLE MARKER (YELLOW & RED)
ML - PERMANENT RAISED MARKER (CRYSTAL & CRYSTAL)
MO - SNOWPLOWABLE MARKER (CRYSTAL & CRYSTAL)

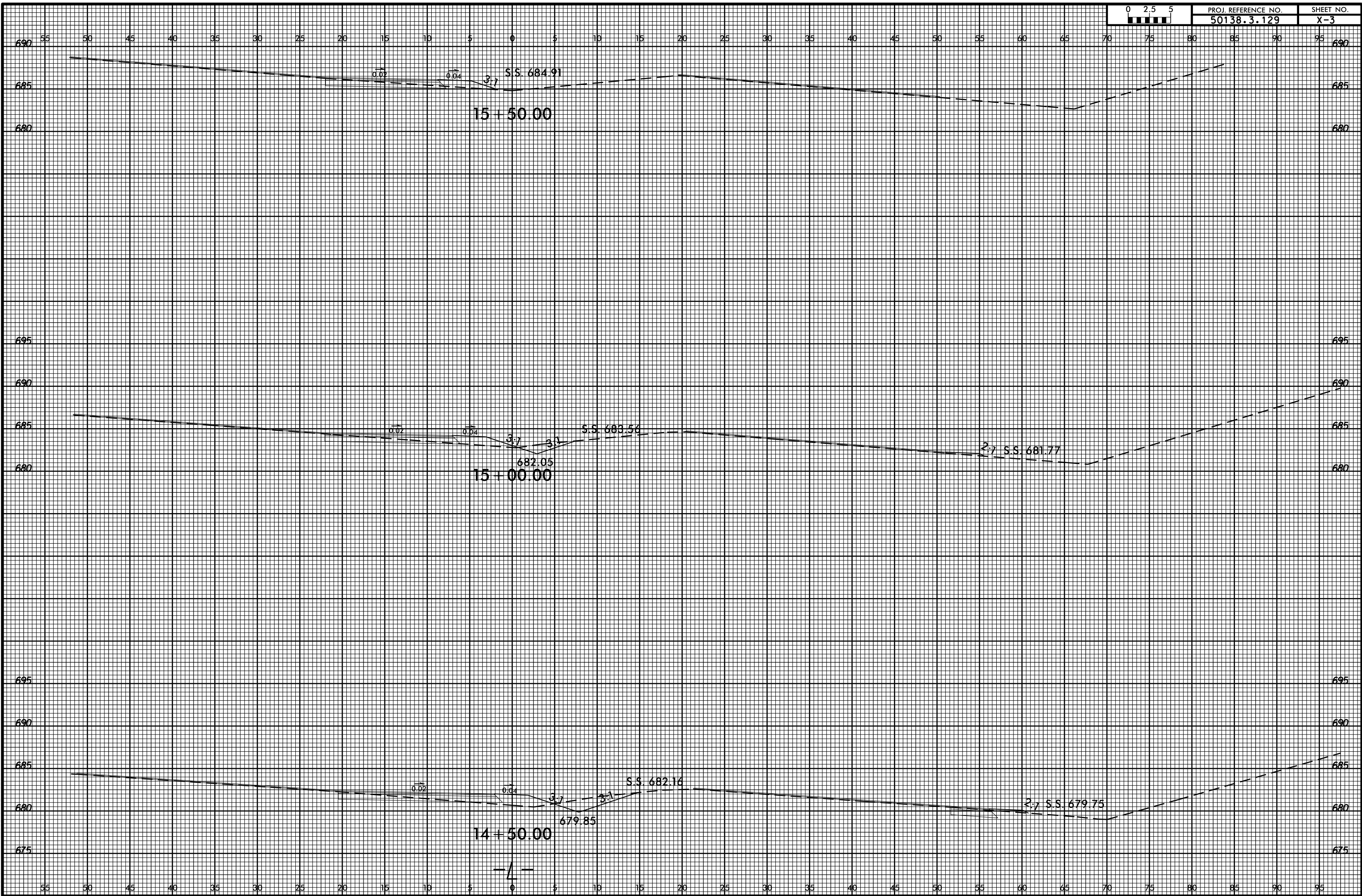


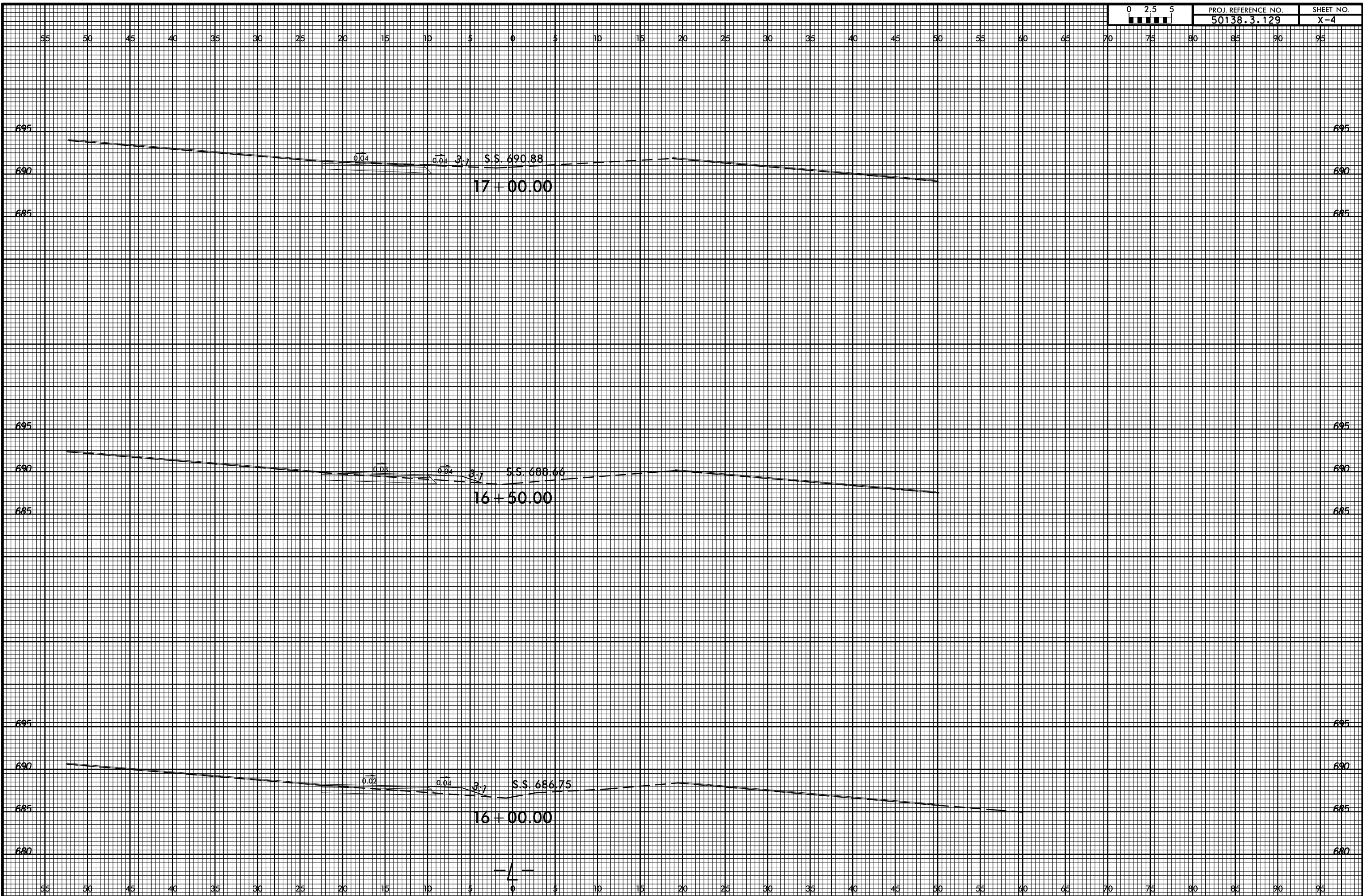
SIGNALIZED SUPERSTREET AT NC 49 AND
OLD CHARLOTTE ROAD (SR-1157)

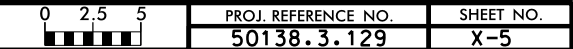
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DATE	NOV 2016
DWG. BY	TBL
DESIGN BY	JDH
APPROVED	DCG

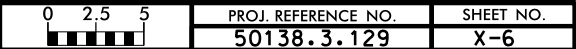
REVISIONS



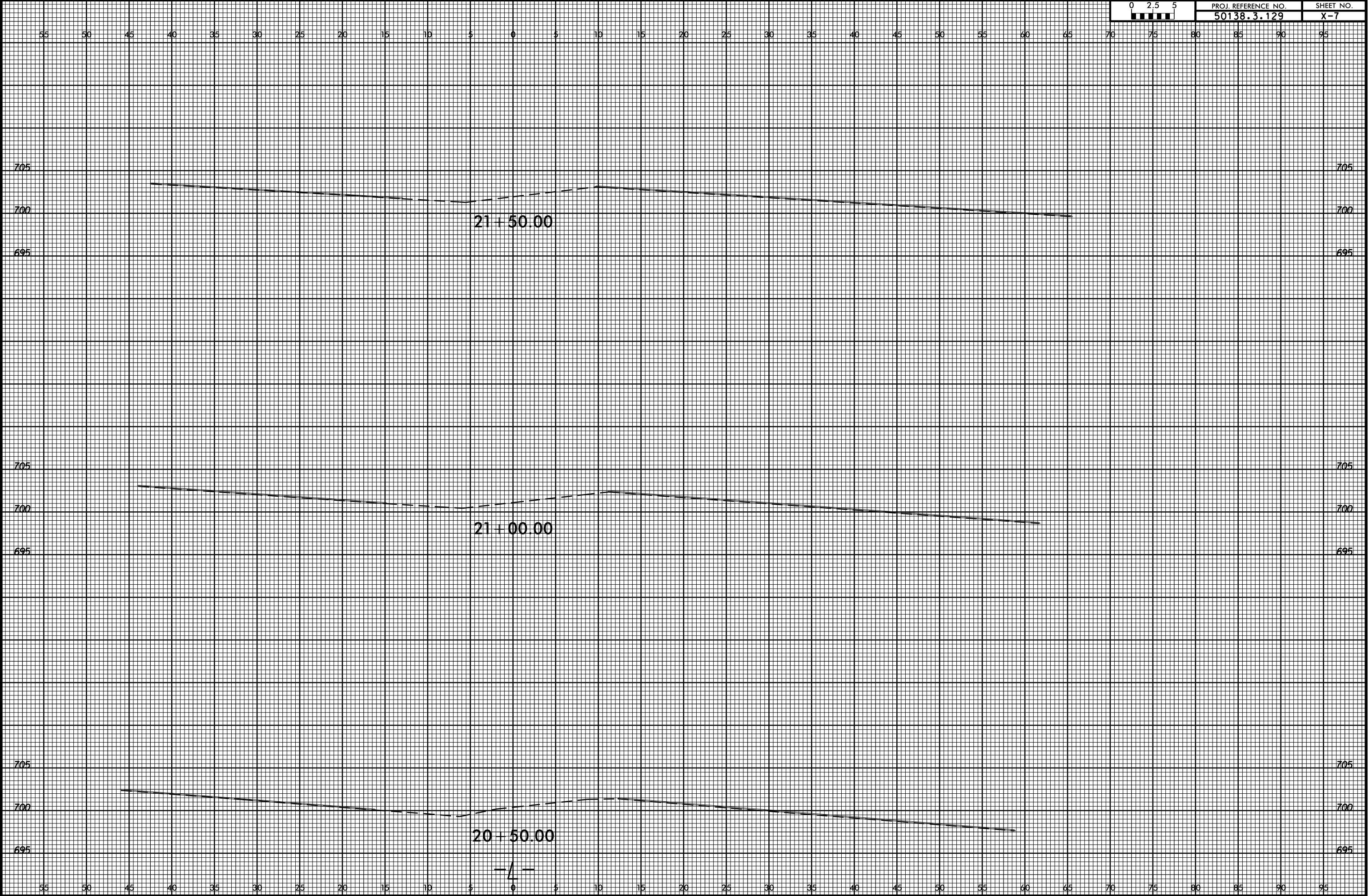






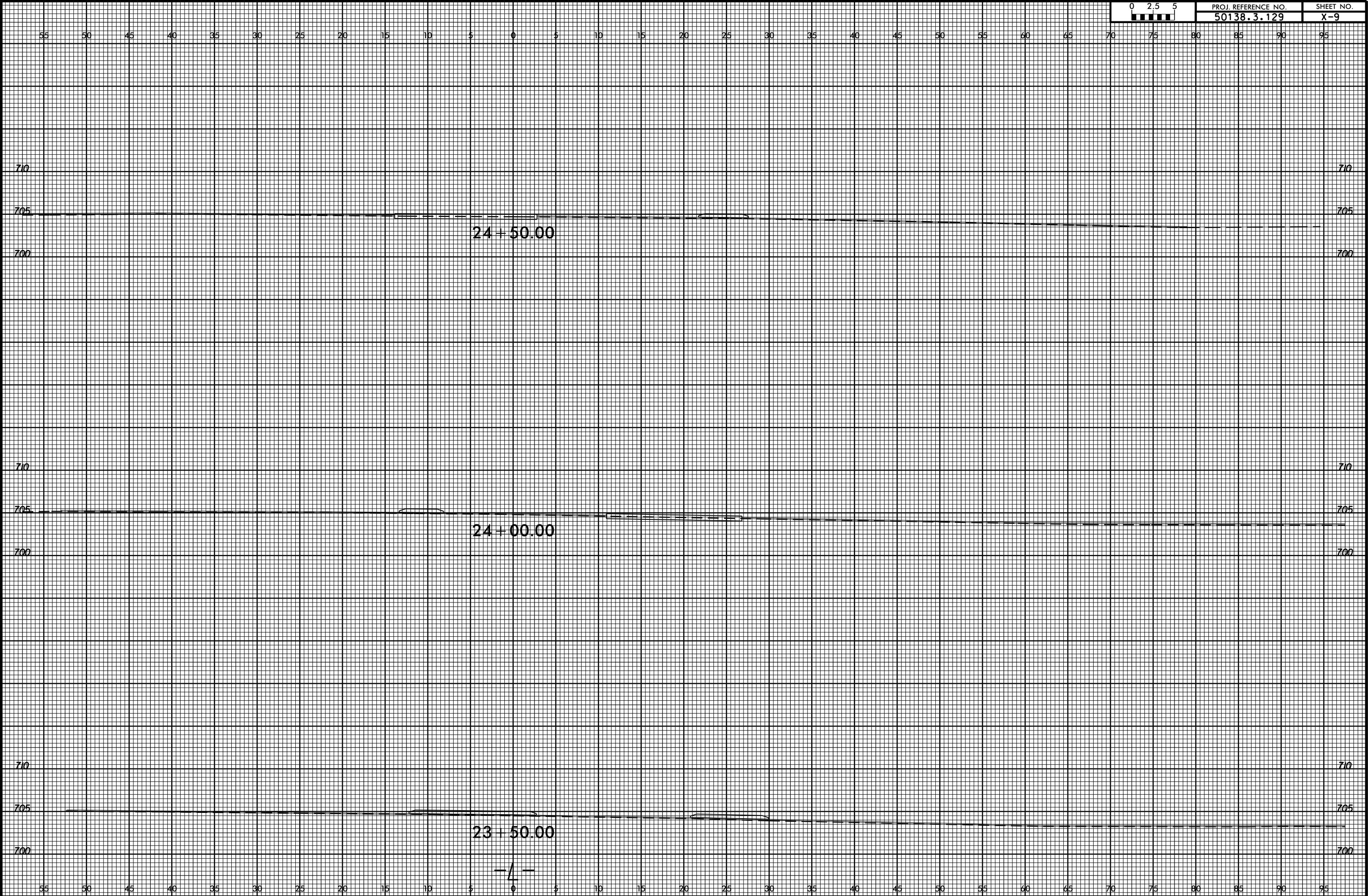


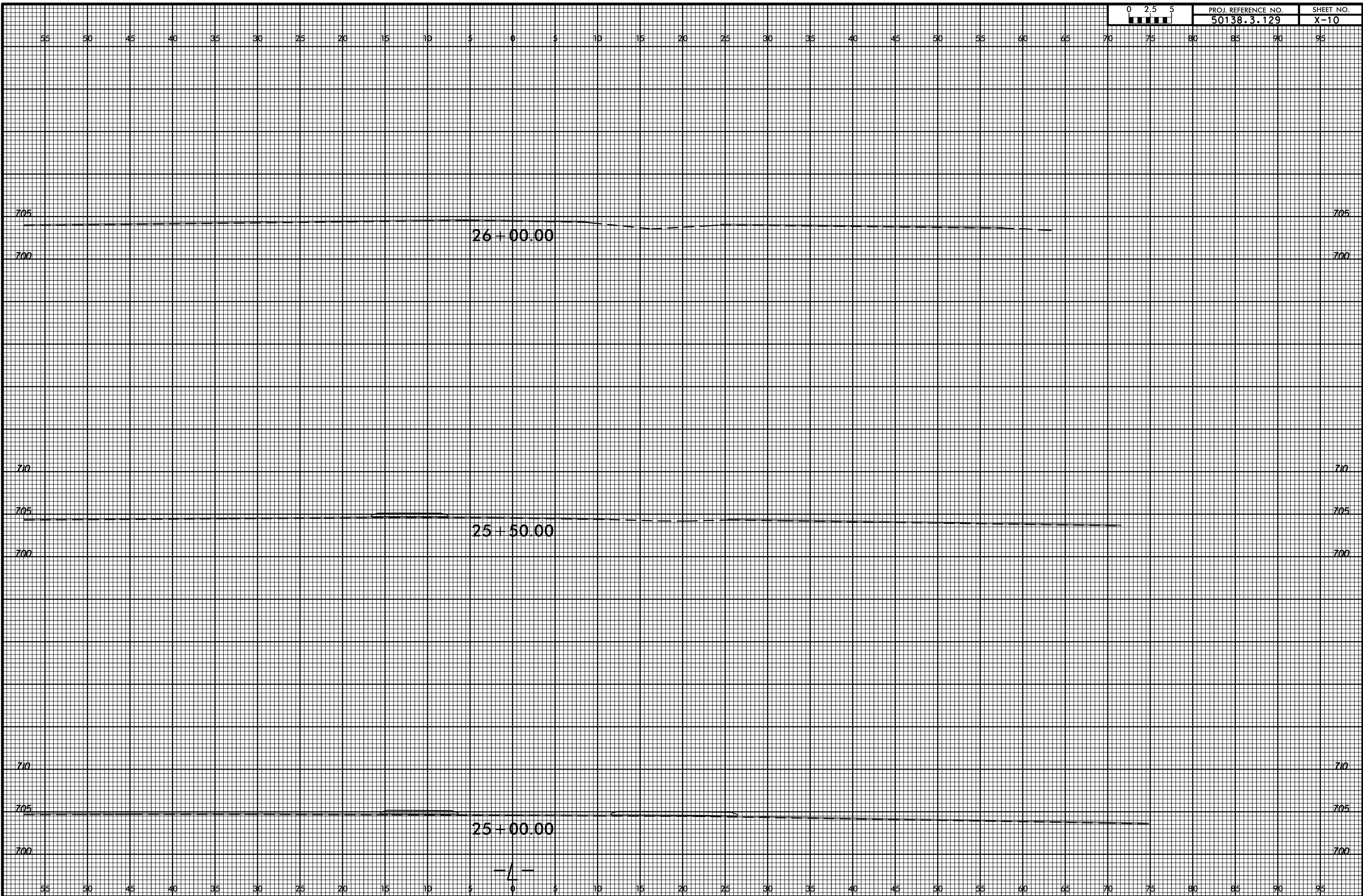
6/23/16



6/23/16



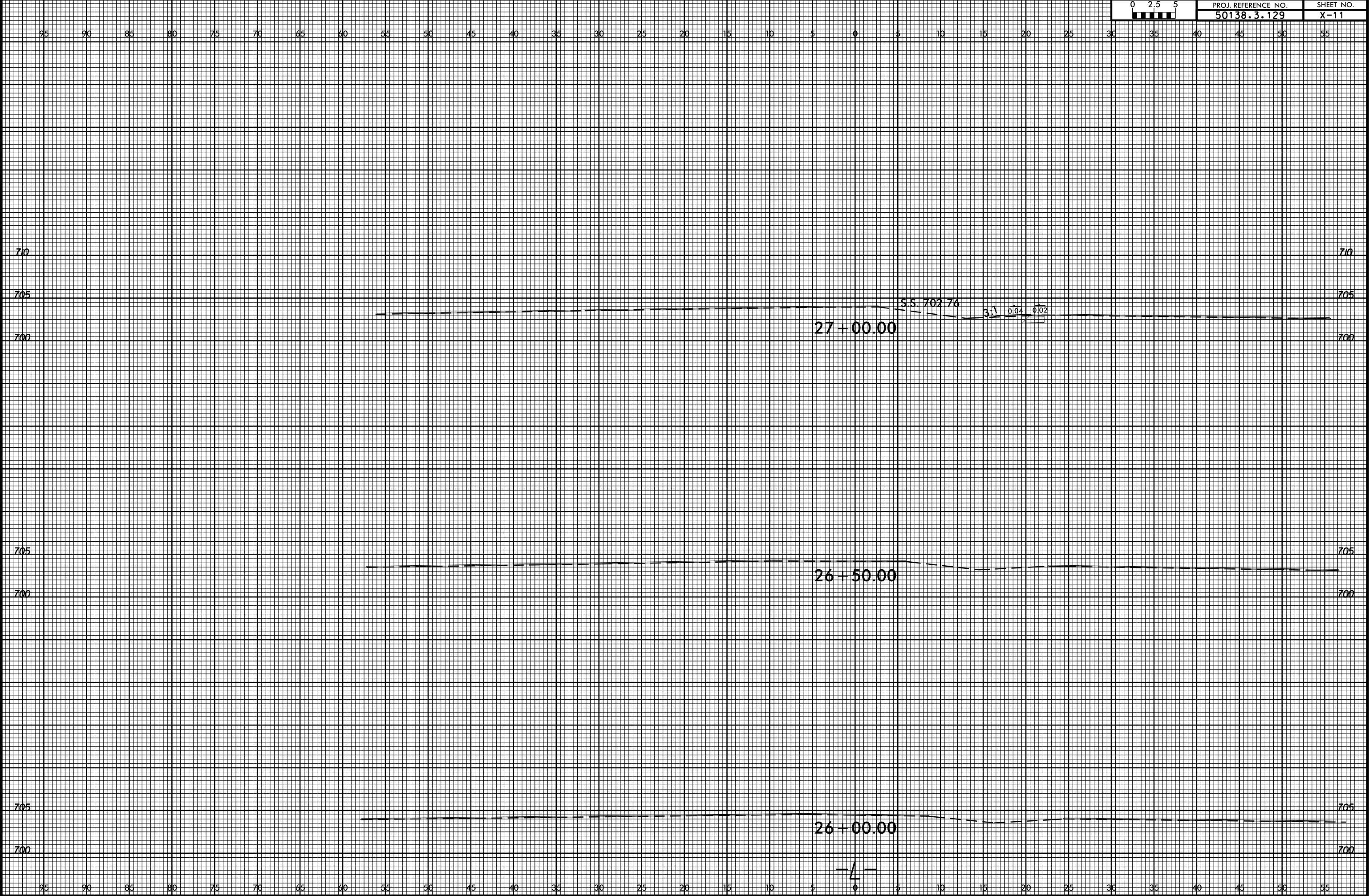




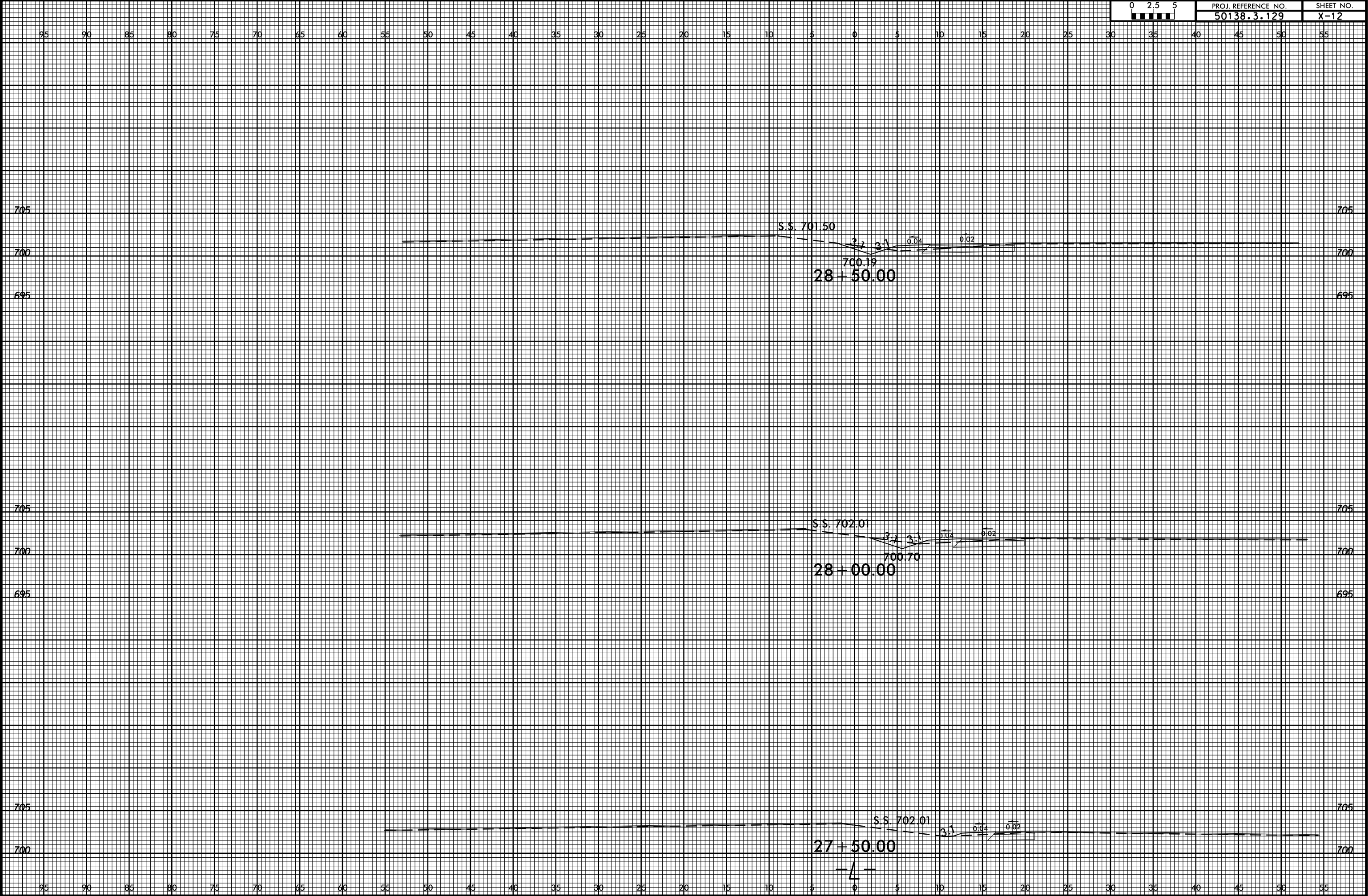
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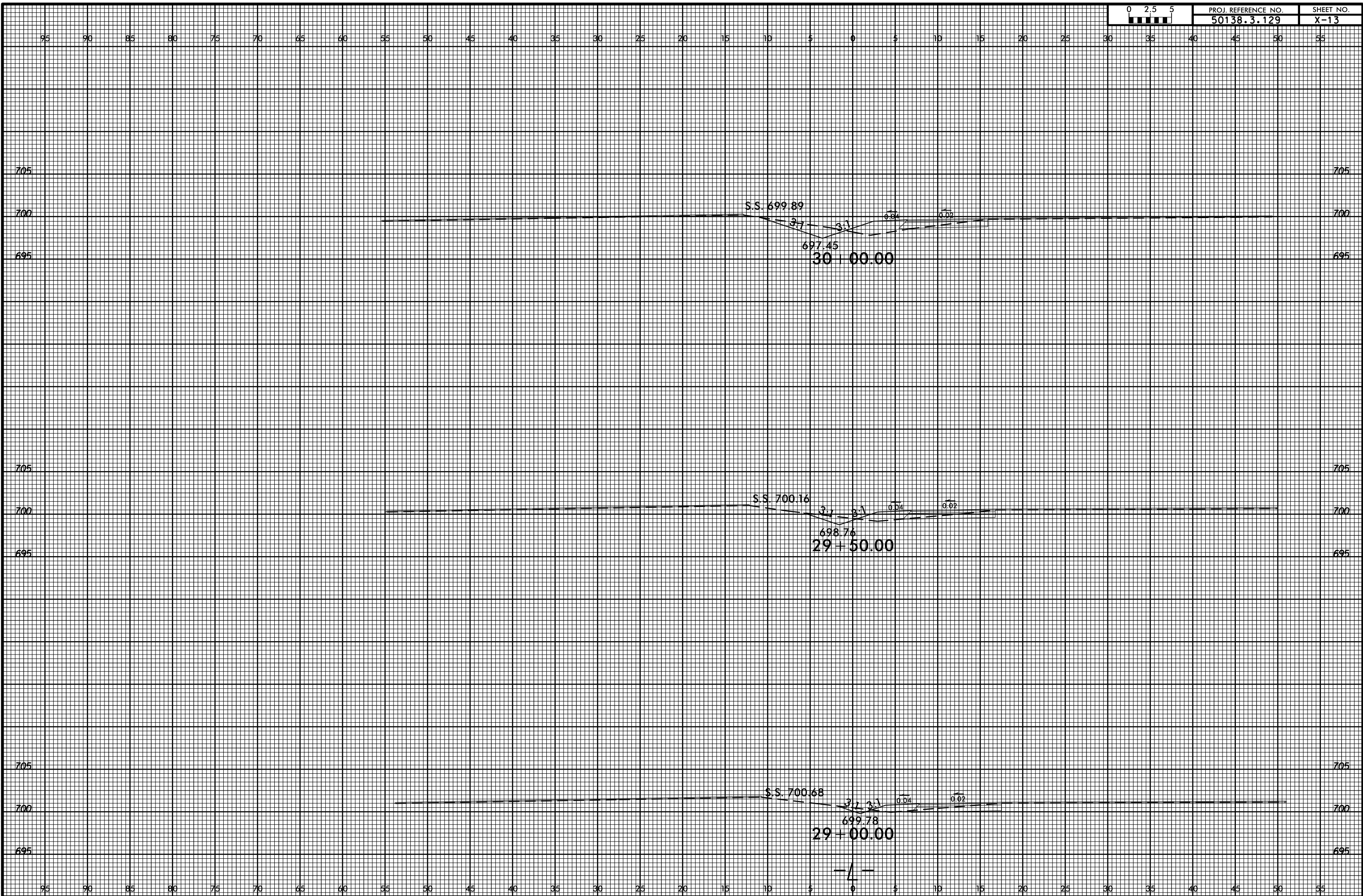
20-JUN-2017 07:39
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tblower AT D:\DDC\F01\Corr\NC 49_01d charlotte\XSC\nc49_01d charlotte.co5.xpl.dgn

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	50138.3.129	X-11

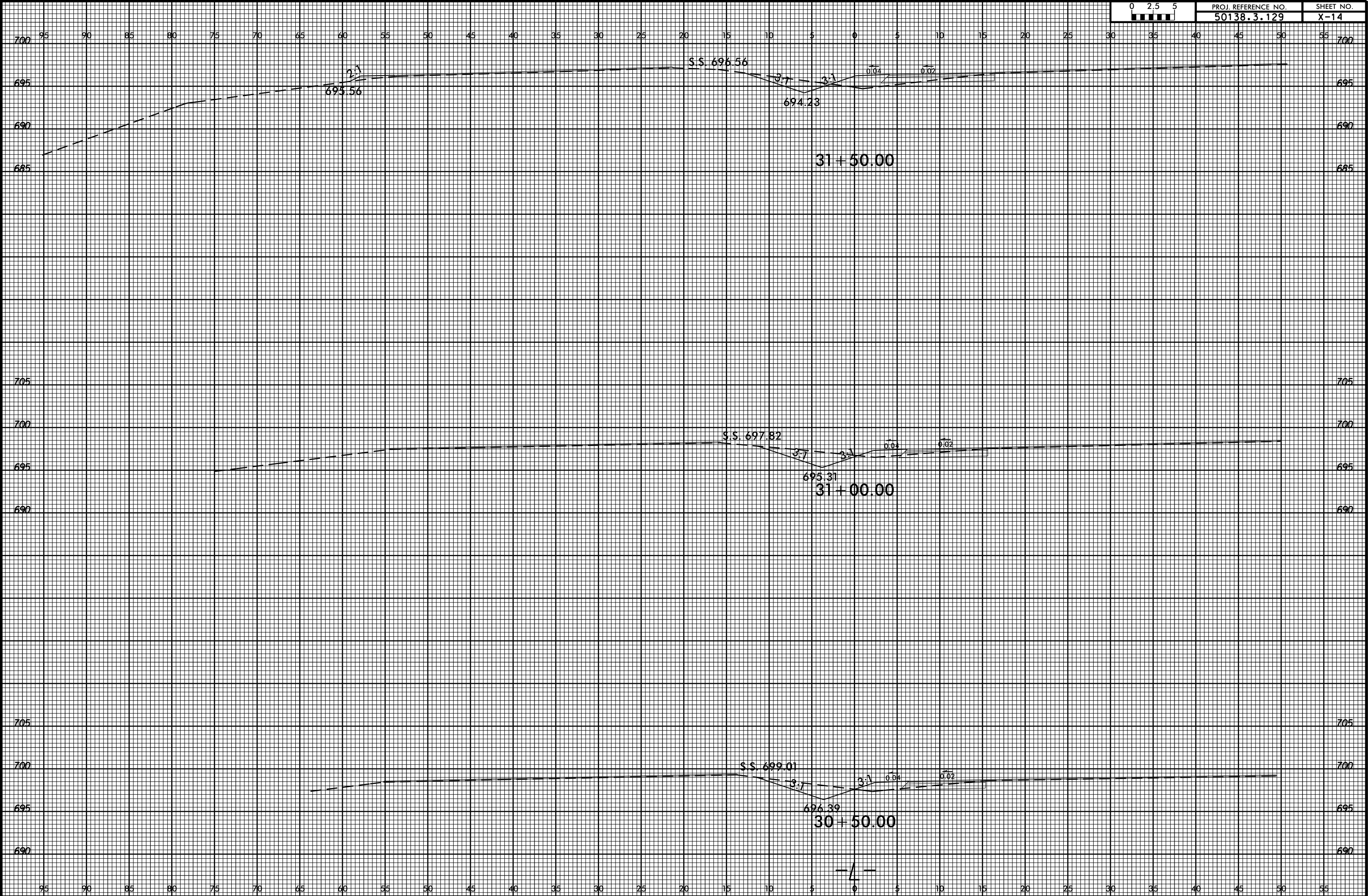


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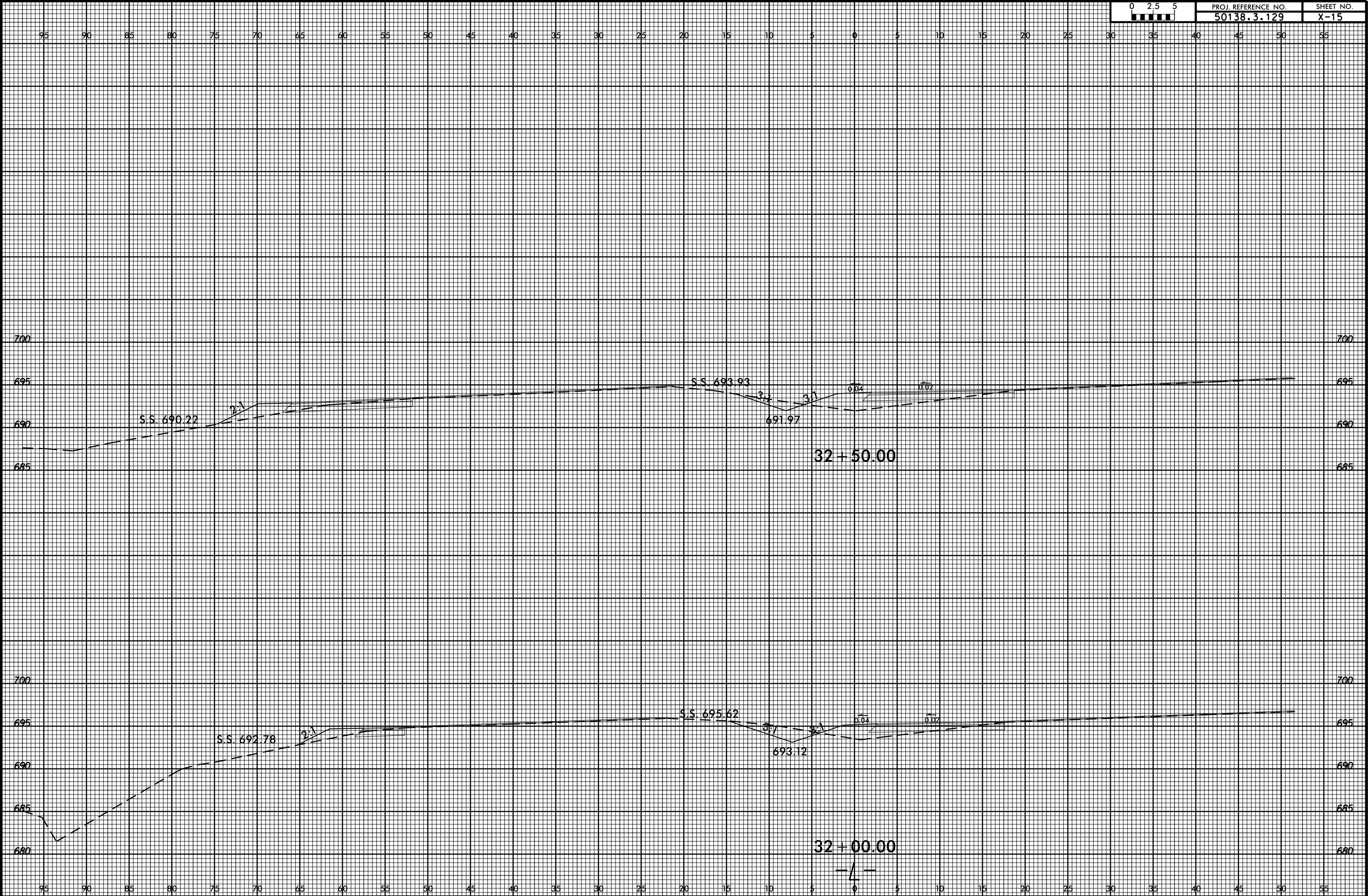




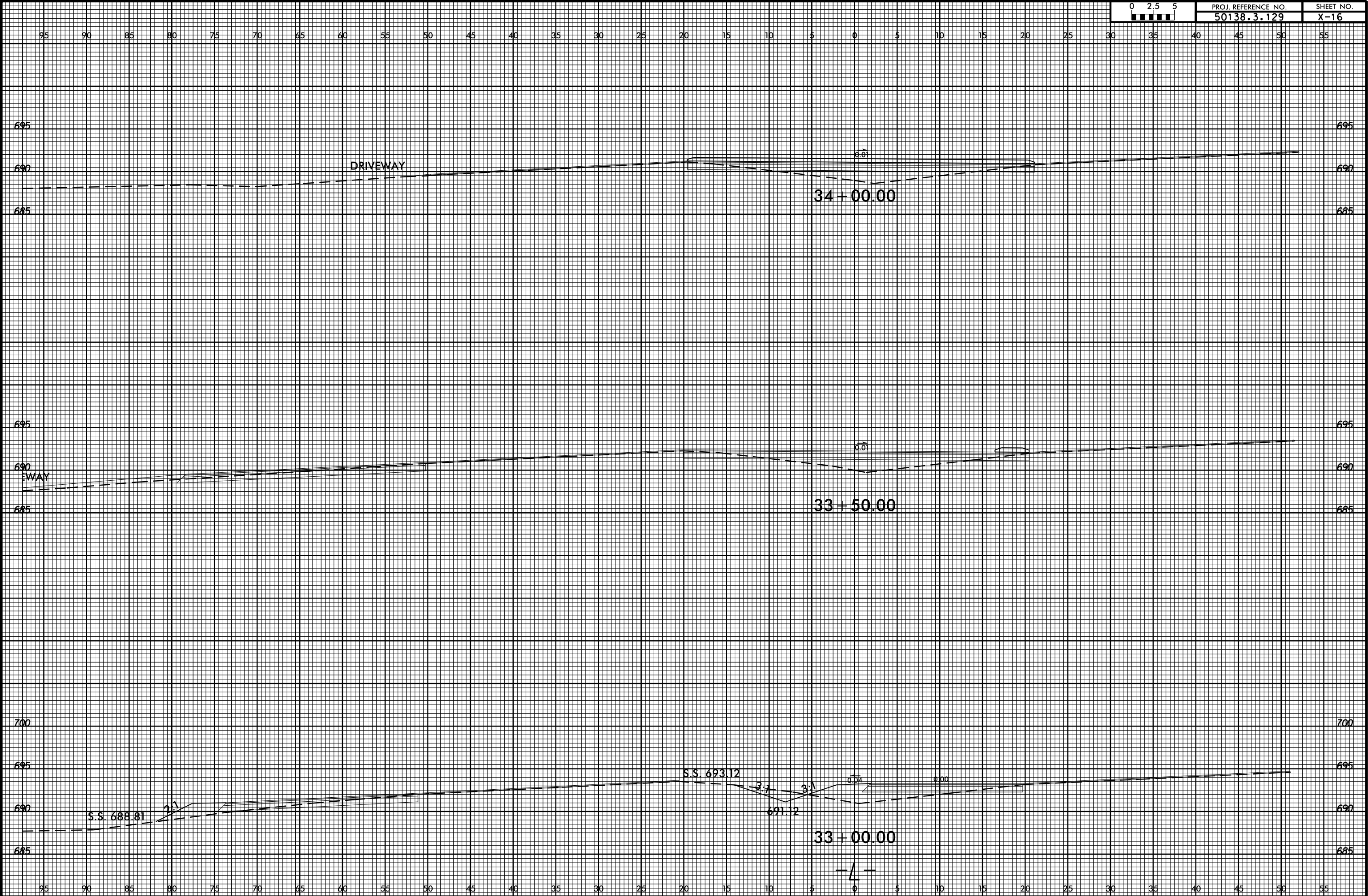
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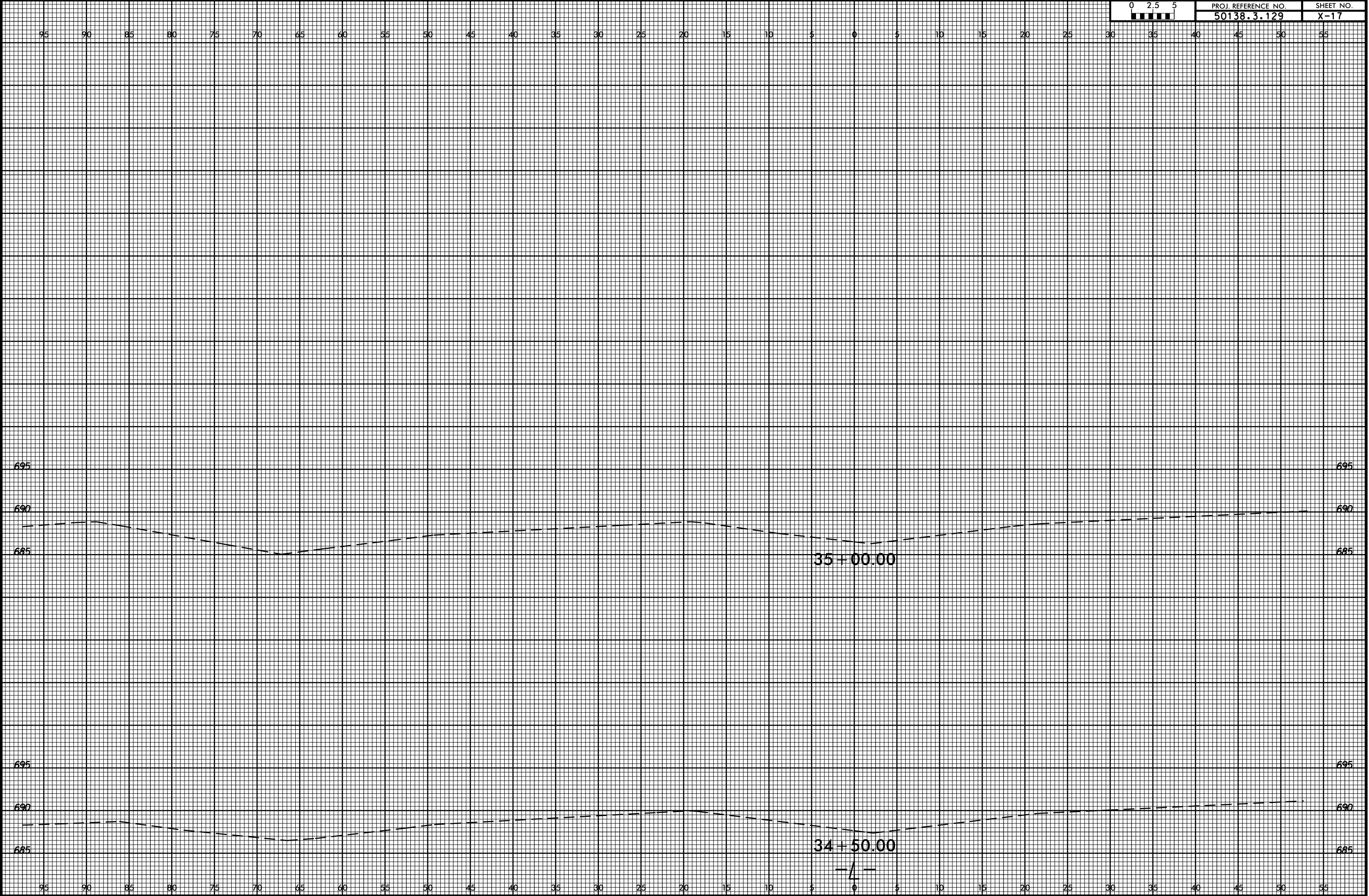
6/23/16



6/23/16



6/23/16

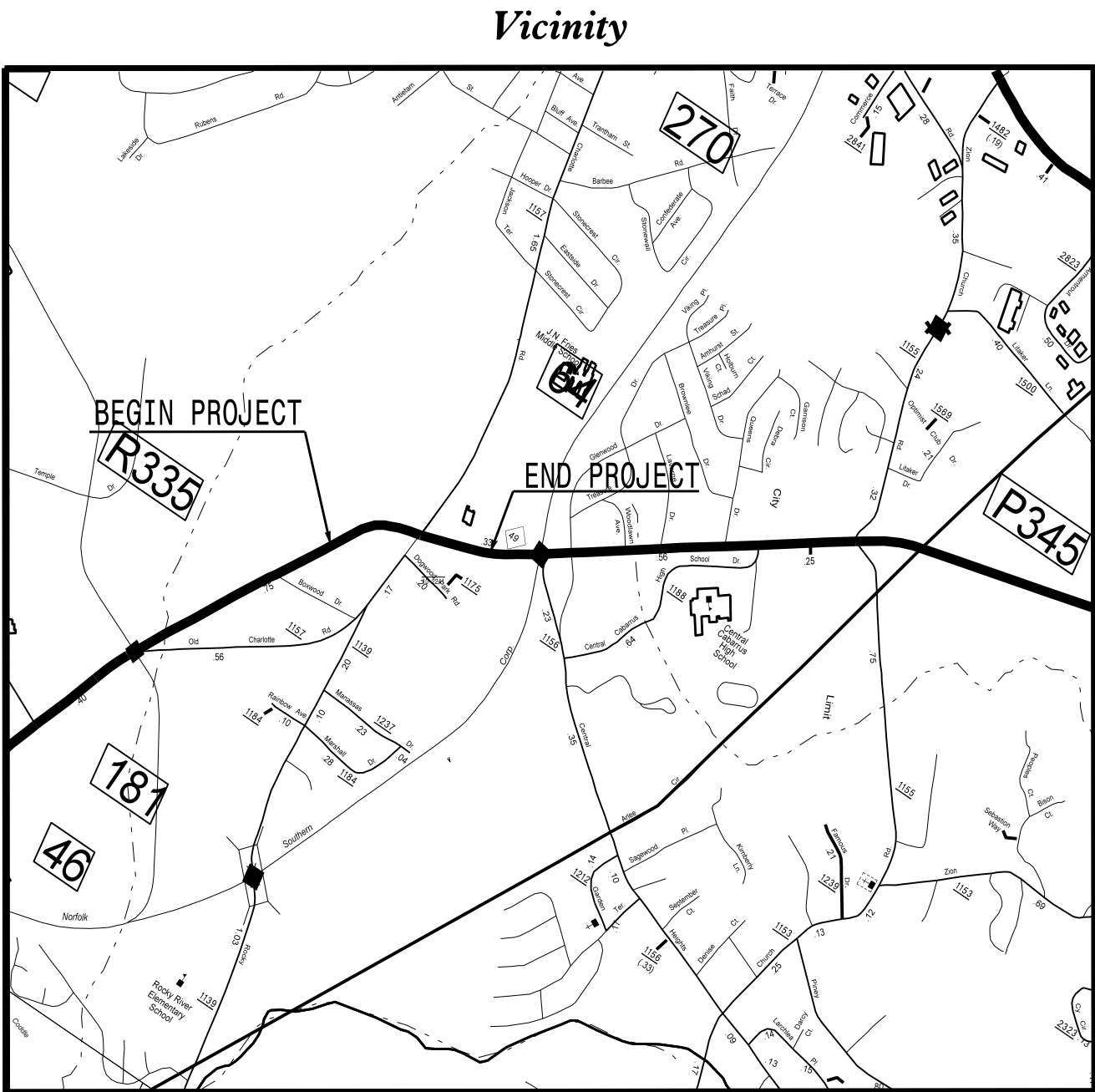


24-MAR-2017 3:33 PM C:\Users\jwilliams\OneDrive\Documents\Signal Design Section\Western Region\Div-10\10-0389\NC 49 TitleSheet.dgn

Project: W-5601 EB

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

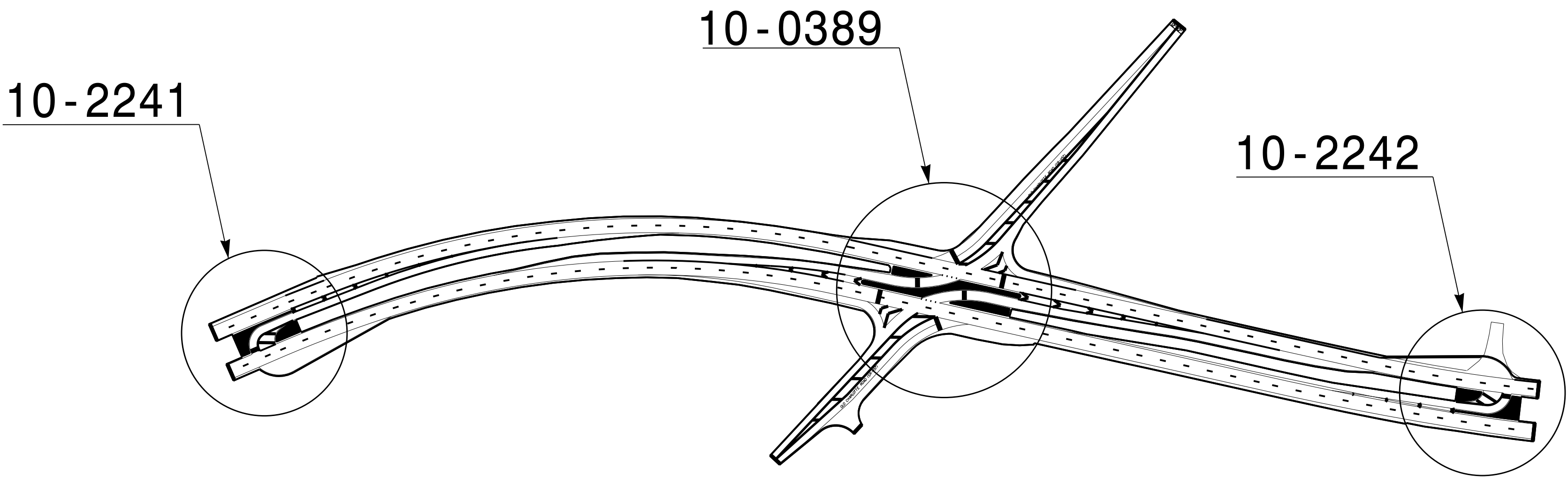
Project No.	Sheet No.
W-5601 EB	Sig. 1.0



CABARRUS COUNTY

LOCATION: NC 49 AT SR 1157 (OLD CHARLOTTE ROAD)

TYPE OF WORK: TRAFFIC SIGNALS



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

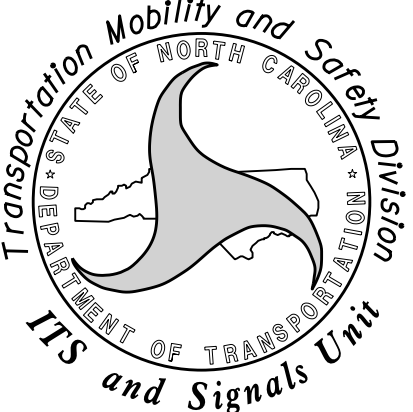
Index of Plans		
Sheet #	Reference #	Location/Description
Sig. 1.0	-----	Title Sheet
Sig. 2.0-2.2	10-2241	NC 49 NB at SR 1157 SB U-Turn
Sig. 3.0-3.4	10-0389	NC 49 at SR 1157 (Old Charlotte Road)
Sig. 4.0-4.2	10-2242	NC 49 SB at SR 1157 NB U-Turn
SCP 1 - 3	SCP	Signal Communication Plans

INTELLIGENT TRANSPORTATION AND SIGNALS UNIT

Contacts:

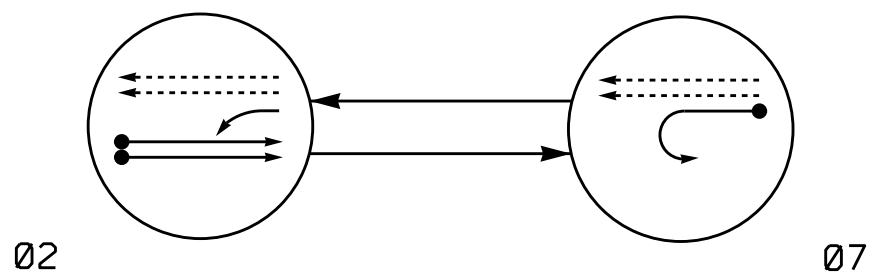
Timothy J. Williams, PE - Western Region Signals Engineer
Zachary M. Little, PE - Signal Equipment Design Engineer
Mohd A. Aslami, PE - Signals Management Engineer

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



750 N. Greenfield Parkway, Garner, NC 27529

PHASING DIAGRAM



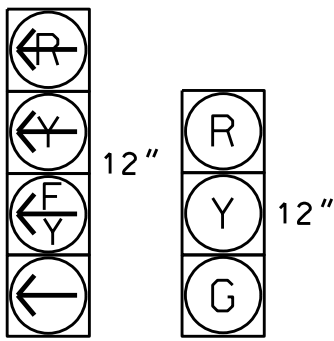
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE		
	02	07	FLIGHT
21, 22	G	R	Y
71, 72	F	Y	Y

SIGNAL FACE I.D.

All Heads L.E.D.



71, 72 21, 22

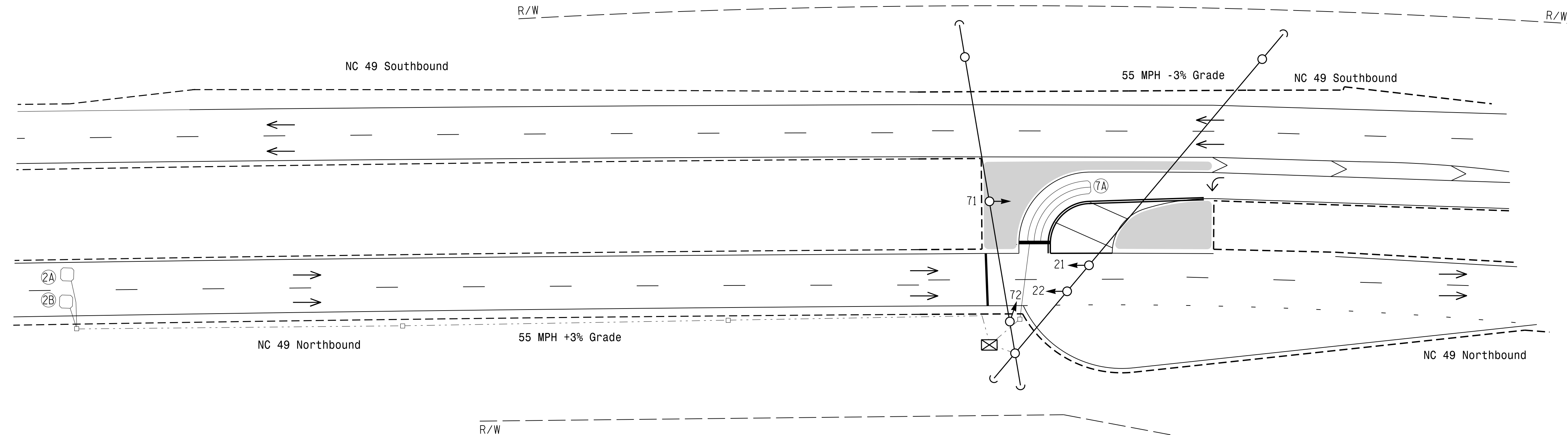
ASC/3 DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	NEW CARD
2A	6X6	420	6	Y	2	Yes	-	-	N	Y
2B	6X6	420	6	Y	2	Yes	-	-	N	Y
7A	6X40	0	2-4-2	Y	7	Yes	-	15	S	Y

2 Phase
Fully Actuated
NC 49 (Concord) CLS

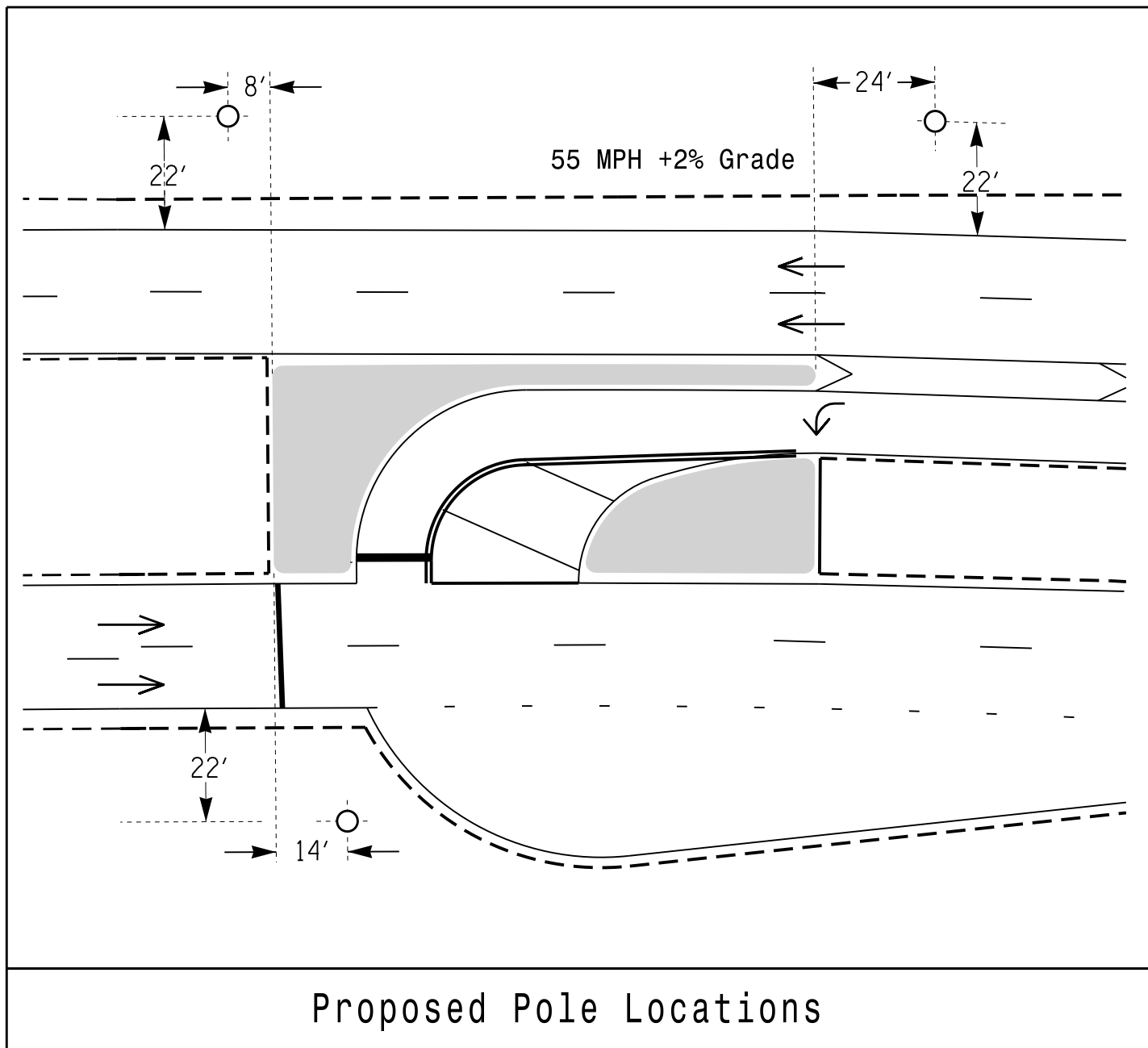
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset # 2241.



ASC/3 TIMING CHART		
FEATURE	PHASE	
	2	7
Min Green *	14	7
Walk *	0	0
Ped Clear	0	0
Veh. Extension *	6.0	2.0
Max 1 *	90	20
Yellow	4.9	3.0
Red Clear	1.0	3.7
Red Revert	2.0	2.0
Actuations B4 Add *	0	-
Seconds /Actuation *	1.8	-
Max Initial *	46	-
Time Before Reduction *	15	-
Time To Reduce *	30	-
Minimum Gap	3.4	-
Locking Detector	X	-
Recall Position	VEH. RECALL	-
Dual Entry	-	-
Simultaneous Gap	X	X

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



LEGEND

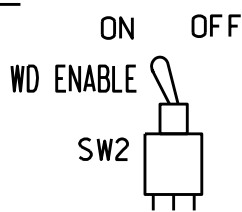
PROPOSED	EXISTING
Traffic Signal Head	Modified Signal Head
Modified Signal Head	Sign
Sign	Pedestrian Signal Head With Push Button & Sign
Pedestrian Signal Head With Push Button & Sign	Signal Pole with Guy
Signal Pole with Guy	Signal Pole with Sidewalk Guy
Signal Pole with Sidewalk Guy	Inductive Loop Detector
Inductive Loop Detector	Controller & Cabinet
Controller & Cabinet	Junction Box
Junction Box	2-in Underground Conduit
2-in Underground Conduit	Right of Way
Right of Way	Directional Arrow

New Installation

Prepared In the Offices of: 750 N. Greenfield Pkwy, Garner, NC 27529	NC 49 Northbound at SR 1157 (Old Charlotte Road) Southbound U-Turn Division 10 Cabarrus County Concord PLAN DATE: January 2017 PREPARED BY: M. Mahbooba REVIEWED BY: T. Williams	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED SEAL NORTH CAROLINA PROFESSIONAL ENGINEER J. J. WILLIAMS 3/9/2017 SIG. INVENTORY NO. 10-2241
---	---	---

(remove jumpers and set switches as shown)

(remove jumpers and set switches as shown)



NOTES:

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

(front view)



FS = FLASH SENSE
ST = STOP TIME

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all phases.
3. Program phase 2 for volume density operation.
4. Program controller to start up in phase 2 Green.
5. Program phase 6 for Red Flash.
6. The cabinet and controller are part of the NC 49 (Concord) Closed Loop System.

```

CONTROLLER.....2070
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S2,S10,AUX S5
PHASES USED.....2,7
OVERLAP "A".....NOT USED
OVERLAP "B".....NOT USED
OVERLAP "C".....NOT USED
OVERLAP "D".....*
OVERLAP "E".....NOT USED
OVERLAP "F".....NOT USED
OVERLAP "G".....*

```

* See overlap programming detail on sheet 2

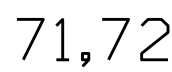
LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	OLG	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	NU	NU	NU	NU	NU	71,72 ★	NU	NU	NU	NU	NU	NU	71,72 ★	NU
RED		128																
YELLOW		129								*								
GREEN		130																
RED ARROW																	A101	
YELLOW ARROW																	A102	
FLASHING YELLOW ARROW																	A103	
GREEN ARROW										124								

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail this sheet.

(wire signal head as shown)



(install resistor as shown)

OVERLAP G YELLOW FIELD
TERMINAL (123)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2241
DESIGNED: January 2017
SEALED: 3/9/2017
REVISED:

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

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 49 Northbound at SR 1157 (Old Charlotte Road) Southbound U-Turn	SEAL 																																	
Prepared In the Offices of:																																			
	Division 10 Cabarrus County Concord																																		
PLAN DATE: <u>March 2017</u> REVIEWED BY: <u>T. Joyce</u>																																			
PREPARED BY: <u>C. Strickland</u> REVIEWED BY: _____																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">REVISONS</th> <th style="width: 20%;">INIT.</th> <th style="width: 20%;">DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>			REVISONS	INIT.	DATE																														
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750 N. Greenfield Pkwy, Garner, NC 27529																																			
Doc/Signed by: <u>Zachary M. Little</u>		3/10/2017 DATE																																	
[DCPIED04F0341F]		DATE																																	
SIG. INVENTORY NO. <u>10-2241</u>		DATE																																	

LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S10 as OLG program LD SWITCH 7 as OVLP '7' TYPE '0' as shown below.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 3. LOAD SW ASSIGN

LD	SWITCH ASSIGN		DIMMING			---FLASH---		
	PHASE /OVLP	TYPE	R	Y	G D	PWR	AUT	TGR
1	1	V	.	.	+	A	R	X
2	2	V	.	.	+	A	Y	.
3	3	V	.	.	+	A	R	X
4	4	V	.	.	+	A	R	.
5	5	V	.	.	-	A	R	.
6	6	V	.	.	-	A	R	X
7	7	O	.	.	-	A	R	.
8	8	V	.	.	-	A	R	X
9	1	O	.	.	+	A	R	X
10	2	O	.	.	+	A	R	X
11	3	O	.	.	-	A	R	.
12	4	O	.	.	-	A	Y	.
13	2	P	.	.	+	A	.	.
14	4	P	.	.	-	A	.	.
15	6	P	.	.	+	A	.	.
16	8	P	.	.	-	A	.	.

NOTICE OVLP 7
ASSIGNED TO LD SWITCH 7 ➡

ALSO ENSURE LD SWITCH 6
AUT SET TO 'R'

OVERLAP PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select **2. CONTROLLER**
2. From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**
3. Press 'Toggle' until positioned on Overlap G

OVERLAP G

Select TMG VEH OVLP [G] and 'NORMAL'

```

TMG VEH OVLP...[C] TYPE: .....NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
INCLUDED . . . . . X . . . . .
LAG GRN 0.0 YEL 0.0 RED 0.0

```

Press Toggle until
positioned on Overlap D

OVERLAP D

Select TMG VEH OVLP [D] and 'PPLT FYA'

```

TMC VEH OVLP...[D] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... OVERLAP G
OPPOSING THROUGH..... PHASE 2

FLASHING ARROW OUTPUT....CH12 ISOLATE

DELAY START OF: FYA..O.O CLEARANCE..O.O
ACTION PLAN SF BIT DISABLE.....

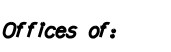
```

END PROGRAMMING

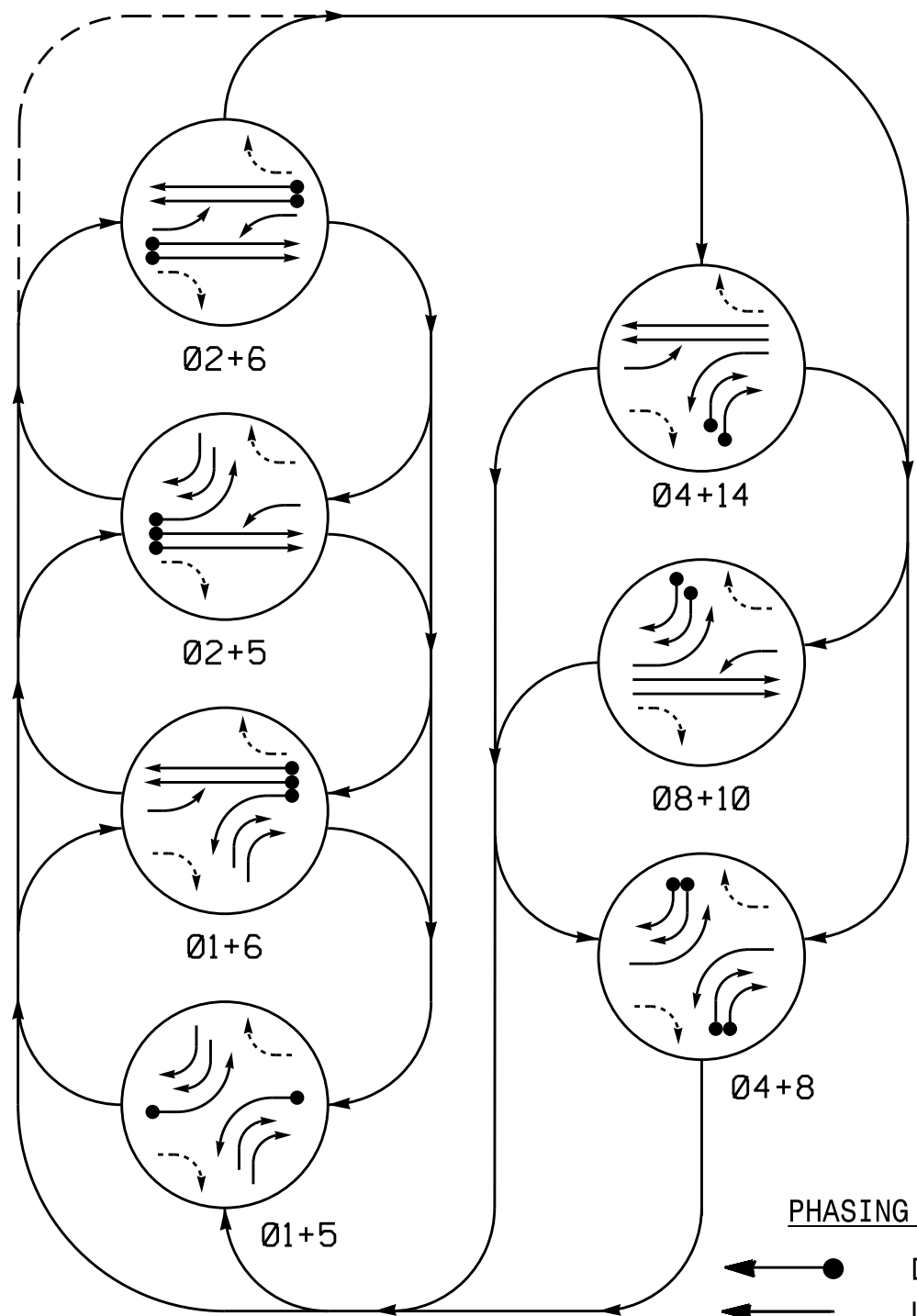
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2241
DESIGNED: January 2017
SEALED: 3/9/2017
REVISED:

Electrical Detail Sheet 2 of 2

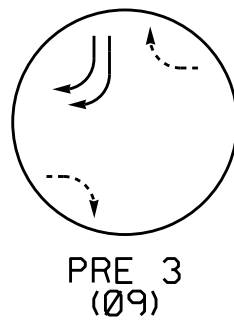
**DOCUMENT NOT CONSIDERED FINAL
UNTIL ALL SIGNATURES COMPLETED**

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 49 Northbound at SR 1157 (Old Charlotte Road) Southbound U-Turn	SEAL 
Prepared In the Offices of: 	Cabarrus County Concord	
Division 10		
PLAN DATE: March 2017	REVIEWED BY: T. Joyce	
PREPARED BY: C. Strickland	REVIEWED BY:	
REVISIONS	INIT.	DATE
Documented by: <u>Casper M. Little</u> 3/10/2017		
DATE		
SIGNATURE		
SIC - INVENTORY NO. 10 2241		

PHASING DIAGRAM



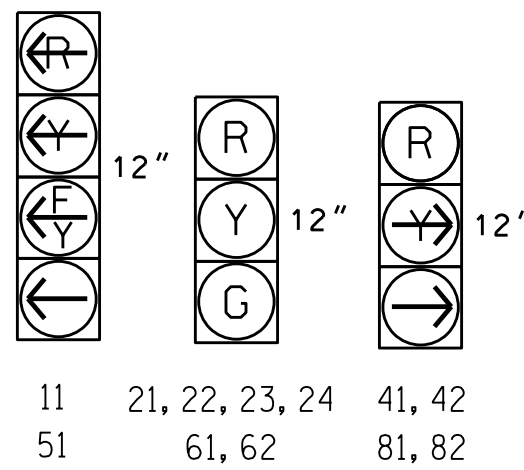
EV PREEMPT PHASES
(Medium Priority)



SIGNAL FACE	PHASE									
	01 +5	01 +6	02 +5	02 +6	04 +14	08 +10	04 +8	P 3	F E	F E
11	←	←	←	←	←	←	←	←	←	←
21, 22, 23, 24	R	R	G	G	R	G	R	R	Y	Y
41, 42	←	←	←	←	←	←	←	←	←	←
51	←	←	←	←	←	←	←	←	←	←
61, 62	R	G	R	G	G	R	R	R	Y	Y
81, 82	←	←	←	←	←	←	←	←	←	←

SIGNAL FACE I.D.

All Heads L.E.D.

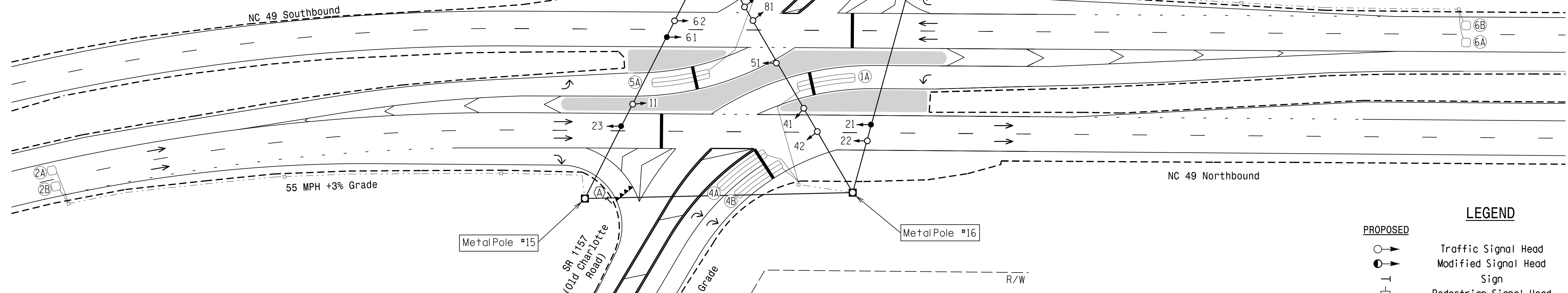


ASC/3 DETECTOR INSTALLATION CHART											
DETECTOR						PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	SYSTEM LOOP	NEW CARD
1A	6x40	+10	2-4-2	Y	1	Yes	-	15	S	-	Y
2A	6x6	420	6	Y	2	Yes	-	-	N	-	Y
2B	6x6	420	6	Y	2	Yes	-	-	N	-	Y
4A	6x40	+10	2-4-2	Y	4	Yes	-	15	S	-	Y
4B	6x40	+10	2-4-2	Y	4	Yes	-	15	S	-	Y
5A	6x40	+10	2-4-2	Y	5	Yes	-	15	S	-	Y
6A	6x6	420	6	Y	6	Yes	-	-	N	-	Y
6B	6x6	420	6	Y	6	Yes	-	-	N	-	Y
8A	6x40	+10	2-4-2	Y	8	Yes	-	15	S	-	Y
8B	6x40	+10	2-4-2	Y	8	Yes	-	15	S	-	Y

7 Phase
Fully Actuated
W/ Emergency Vehicle Preemption
NC 49 (Concord) CLS

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Reposition Optical Detector unit.
- This intersection features an optical preemption system. Shown location of optical detector is existing.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset # 0389.



ASC/3 TIMING CHART

FEATURE	PHASE									
	1	2	4	5	6	8	9	10	14	
Min Green *	7	14	7	7	14	7	7	0	0	
Walk *	0	0	0	0	0	0				
Ped Clear	0	0	0	0	0	0				
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0				
Max 1 *	20	90	30	20	90	30		0	0	
Yellow	3.0	5.0	3.3	3.0	5.0	3.3	3.3	5.0	5.0	
Red Clear	2.9	1.5	1.5	2.9	1.5	1.5	4.7	1.5	1.5	
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0				
Actuations B4 Add *	-	0	-	-	0	-				
Seconds / Actuation *	-	1.8	-	-	1.8	-				
Max Initial *	-	46	-	-	46	-				
Time Before Reduction *	-	15	-	-	15	-				
Time To Reduce *	-	30	-	-	30	-				
Minimum Gap	-	3.4	-	-	3.4	-				
Locking Detector	-	X	-	-	X	-				
Recall Position	-	SOFT RECALL	-	-	SOFT RECALL	-				
Dual Entry	-	-	-	-	-	-		X	X	
Simultaneous Gap	X	X	X	X	X	X		X	X	

* 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.

ASC/3 EV PREEMPT

FUNCTION	PRE 3
Exit Phase(s)	2+6
Preempt Override	OFF
Delay Time	0
Ped Clear Through Yellow	N
Terminate Phases	N
Entrance Walk	0
Entrance Ped Clear	0
Entrance Min Green	255*
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Minimum Dwell Time	7
Preempt Input Extension Time	0 **
Preempt Max Time	120
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

* Allows normal phase times to be used.

** Program Extend Time on the Optical Detector Unit for 2.0 seconds.

LEGEND

PROPOSED	EXISTING
○ → Traffic Signal Head	● → N/A
● → Modified Signal Head	● → N/A
⊥ Sign	⊥ Sign
⊥ Pedestrian Signal Head	⊥ Pedestrian Signal Head
⊥ With Push Button & Sign	⊥ With Push Button & Sign
○ → Signal Pole with Guy	● → Signal Pole with Guy
○ → Signal Pole with Sidewalk Guy	● → Signal Pole with Sidewalk Guy
⊠ Inductive Loop Detector	⊠ Inductive Loop Detector
⊠ Controller & Cabinet	⊠ Controller & Cabinet
⊠ Junction Box	⊠ Junction Box
2-in Underground Conduit	2-in Underground Conduit
N/A Right of Way	N/A Right of Way
→ Directional Arrow	→ Directional Arrow
▼ Yield Pavement Marking	▼ Yield Pavement Marking
⊠ Metal Strain Pole	⊠ Metal Strain Pole
⊠ Optical detector Unit	⊠ Optical detector Unit
⊠ "YIELD" Sign (R1-2)	⊠ "YIELD" Sign (R1-2)

Signal Upgrade

	NC 49 at SR 1157 (Old Charlotte Road)		
	Division 10 Cabarrus County	Concord	
	PLAN DATE: January 2017	REVIEWED BY: T. Williams	
	PREPARED BY: M. Mahbooba	REVIEWED BY:	
REVISIONS		INIT.	DATE
0			
1"=40'			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
SEAL NORTH CAROLINA PROFESSIONAL ENGINEER MOTHELY J. WILLIAMS 024393	3/21/2017
SIC. INVENTORY NO. 10-0389	

PROGRAMMING DETAIL

ON OFF
SW2

18 CHANNEL PROGRAM CARD

Row	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12	Col 13	Col 14	Col 15	Col 16	Col 17	Col 18
10-18	11-18	12-18	13-18	14-18	15-18	16-18	17-18	18-18										
10-17	11-17	12-17	13-17	14-17	15-17	16-17	17-17	18-17										
10-16	11-16	12-16	13-16	14-16	15-16	16-16	17-16	18-16										
10-15	11-15	12-15	13-15	14-15	15-15	16-15	17-15	18-15										
10-14	11-14	12-14	13-14	14-14	15-14	16-14	17-14	18-14										
10-13	11-13	12-13	13-13	14-13	15-13	16-13	17-13	18-13										
10-12	11-12	12-12	13-12	14-12	15-12	16-12	17-12	18-12										
10-11	11-11	12-11	13-11	14-11	15-11	16-11	17-11	18-11										
9-18	8-17	7-16	6-15	5-14	4-13	3-12	2-11	1-10										
9-17	8-16	7-15	6-14	5-13	4-12	3-11	2-10	1-9										
9-16	8-15	7-14	6-13	5-12	4-11	3-10	2-9	1-8										
9-15	8-14	7-13	6-12	5-11	4-10	3-9	2-8	1-7										
9-14	8-13	7-12	6-11	5-10	4-9	3-8	2-7	1-6										
9-13	8-12	7-11	6-10	5-9	4-8	3-7	2-6	1-5										
9-12	8-11	7-10	6-9	5-8	4-7	3-6	2-5	1-4										
9-11	8-10	7-9	6-8	5-7	4-6	3-5	2-4	1-3										
9-10	8-9	7-8	6-7	5-6	4-5	3-4	2-3	1-2										

COMPONENT SIDE

ON →

☐	RF 2010	OPTIONS
☐	RP DISABLE	
☐	WD 1.0 SEC	
☐	GY ENABLE	
☐	SF#1 POLARITY	
☐	LEDguard	
☐	RF SSM	FYA
☐	FYA COMPACT	
☐	FYA 1-9	
☐	FYA 3-10	
☐	FYA 5-11	
☐	FYA 7-12	

YELLOW		DISABLE	
☐ 10	☐ 0	☐ 1	☐ 0
☐ 11	☐ 0	☐ 2	☐ 0
☐ 12	☐ 0	☐ 3	☐ 0
☐ 13	☐ 0	☐ 4	☐ 0
☐ 14	☐ 0	☐ 5	☐ 0
☐ 15	☐ 0	☐ 6	☐ 0
☐ 16	☐ 0	☐ 7	☐ 0
☐ 17	☐ 0	☐ 8	☐ 0
☐ 18	☐ 0	☐ 9	☐ 0

ON →

■ = DENOTES POSITION OF SWITCH

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 are present on the monitor board.
3. Remove jumper SEL9 if it is present on the monitor board.
4. Ensure that Red Enable is active at all times during normal operation.
5. Integrate monitor with Ethernet network in cabinet.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø 1 1A	Ø 2 2A	SO P E R T Y	SO P E R T Y	SO P E R T Y	Ø 4 4A	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	FS
	L	NOT USED	Ø 2 2B	SO P E R T Y	SO P E R T Y	SO P E R T Y	Ø 4 4B	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	DC ISOLATOR ST DC ISOLATOR
FILE "J"	U	Ø 5 5A	Ø 6 6A	SO P E R T Y	SO P E R T Y	SO P E R T Y	Ø 8 8A	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	PRE3 DC ISOLATOR	SO P E R T Y	SO P E R T Y
	L	NOT USED	Ø 6 6B	SO P E R T Y	SO P E R T Y	SO P E R T Y	Ø 8 8B	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	SO P E R T Y	NOT USED	SO P E R T Y	SO P E R T Y

FS = FLASH SENSE
ST = STOP TIME
PRE = PREEMPT

FIELD CABINET

Opticom
Detector
Cable

Yellow ———→

Orange ———→

Blue ———→

Bare ———→

wrap bare wire with
insulating tape

J12

D Channel A
Input (PRE3)

E Channel B
Input (not used)

J

K

EQ Gnd

7. The cabinet and controller are part of the NC 49 (Concord) Closed Loop System.

```

CONTROLLER.....2070
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS..18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S4,S5,S6,S8,S9,S12
PHASES USED.....1,2,4,5,6,8,9**,10★,14★
OVERLAP "A".....*
OVERLAP "B".....NOT USED
OVERLAP "C".....*
OVERLAP "D".....NOT USED
OVERLAP "E".....NOT USED
OVERLAP "F".....NOT USED
OVERLAP "G".....*
OVERLAP "H".....*
OVERLAP "I".....*
OVERLAP "J".....*
OVERLAP "K".....*
OVERLAP "L".....*

```

* See overlap programming detail on sheet 2
 ** Phase used only for Preempt
 ★ Phases used for timing only

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND TIME	DELAY TIME	DETECTOR TYPE
1A	TB2-1,2	I1U	56	1	1	YES		15	S
2A	TB2-5,6	I2U	39	2	2	YES			N
2B	TB2-7,8	I2L	43	12	2	YES			N
4A	TB4-9,10	I6U	41	4	4	YES		15	S
4B	TB4-11,12	I6L	45	14	4	YES		15	S
5A	TB3-1,2	J1U	55	5	5	YES		15	S
6A	TB3-5,6	J2U	40	6	6	YES			N
6B	TB3-7,8	J2L	44	16	6	YES			N
8A	TB5-9,10	J6U	42	8	8	YES		15	S
8B	TB5-11,12	J6L	46	18	8	YES		15	S

FILE J _____
SLOT 2 _____
LOWER _____

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P	S9	S10	S11	S12	S13	S14
PHASE	OLG	OLI	2 PED	3	OLK	4 PED	OLH	OLJ	6 PED	7	OLL	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22, 23,24	NU	NU	41,42	NU	51★	61,62	NU	NU	81,82	NU	11★	NU	NU	51★	NU	NU
RED		128			101			134			107							
YELLOW	*	129					*	135										
GREEN		130						136										
RED ARROW													A121			A114		
YELLOW ARROW					102						108		A122			A115		
FLASHING YELLOW ARROW													A123			A116		
GREEN ARROW	127				103		133				109							

★ See pictorial of head wiring in detail this sheet.

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

OVERLAP G YELLOW FIELD
TERMINAL (126)

OVERLAP H YELLOW FIELD
TERMINAL (132)

AC-

AC-

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-0389
DESIGNED: January 2017
SEALED: 3/21/2017
REVISED:

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

Prepared In the Offices of:



The seal of the North Carolina Department of Transportation is circular. It features a stylized black and white design in the center, possibly representing a road or a signal. The text "TRANSPORTATION" is at the top, "DEPARTMENT OF" is on the left, "NORTH CAROLINA" is on the right, and "SIGNALS SECTION" is at the bottom.

750 N.Greenfield Pkwy.Garner,NC 27529

Division 10	Cabarrus County	Concord
PLAN DATE: March 2017	REVIEWED BY: T. Joyce	
PREPARED BY: C. Strickland	REVIEWED BY:	

SEAL

NORTH CAROLINA

PROFESSIONAL

SEAL
030530

ENGINEER

ZACHARY M. LITTLE

DocuSigned by:
Zachary M. Little 3/24/2017
0C21FED94E53A1E DATE

ECONOLITE ASC/3-2070 OVERLAP PROGRAMMING DETAIL
(program controller as shown)

1. From Main Menu select 2. CONTROLLER
2. From CONTROLLER Submenu select 2. VEHICLE OVERLAPS
3. Press 'Toggle' until positioned on Overlap G

OVERLAP G

Select TMG VEH OVLP [G] AND "NORMAL"

TMG VEH OVLP...[G] TYPE:	NORMAL
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6	
INCLUDED X . . X	
LAG GRN 0.0 YEL 0.0 RED 0.0	

Toggle Once

OVERLAP H

Select TMG VEH OVLP [H] AND "NORMAL"

TMG VEH OVLP...[H] TYPE:	NORMAL
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6	
INCLUDED X . . X	
LAG GRN 0.0 YEL 0.0 RED 0.0	

Toggle Once

OVERLAP I

Select TMG VEH OVLP [I] AND "NORMAL"

TMG VEH OVLP...[I] TYPE:	NORMAL
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6	
INCLUDED . X X	
LAG GRN 0.0 YEL 0.0 RED 0.0	

Toggle Once

OVERLAP J

Select TMG VEH OVLP [J] AND "NORMAL"

TMG VEH OVLP...[J] TYPE:	NORMAL
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6	
INCLUDED X X . .	
LAG GRN 0.0 YEL 0.0 RED 0.0	

Toggle Once

OVERLAP K

Select TMG VEH OVLP [K] AND "NORMAL"

TMG VEH OVLP...[K] TYPE:	NORMAL
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6	
INCLUDED X . . X	
LAG GRN 0.0 YEL 0.0 RED 0.0	

Toggle Once

OVERLAP L

Select TMG VEH OVLP [L] AND "NORMAL"

TMG VEH OVLP...[L] TYPE:	NORMAL
PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6	
INCLUDED X . . X X	
LAG GRN 0.0 YEL 0.0 RED 0.0	

Press Toggle until positioned on Overlap A

OVERLAP A

Select TMG VEH OVLP [A] and 'PPLT FYA'

TMG VEH OVLP...[A] TYPE:	PPLT FYA
PROTECTED LEFT TURN.... OVERLAP	G
OPPOSING THROUGH..... OVERLAP	I
FLASHING ARROW OUTPUT.....CH9	ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0	
ACTION PLAN SF BIT DISABLE.....	0

Toggle Twice

OVERLAP C

Select TMG VEH OVLP [C] and 'PPLT FYA'

TMG VEH OVLP...[C] TYPE:	PPLT FYA
PROTECTED LEFT TURN.... OVERLAP	H
OPPOSING THROUGH..... OVERLAP	J
FLASHING ARROW OUTPUT.....CH11	ISOLATE
DELAY START OF: FYA..0.0 CLEARANCE..0.0	
ACTION PLAN SF BIT DISABLE.....	0

END PROGRAMMING

ECONOLITE ASC/3-2070 CONTROLLER
RING CONFIGURATION PROGRAMMING DETAIL

(program controller as shown)

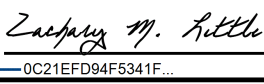
1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 1. CONTROLLER SEQ
3. From CONTROLLER SEQUENCE Submenu select 1. PHASE RING SEQUENCE AND ASSIGNMENT

CONTROLLER SEQUENCE [1]																
SEQUENCE COMMANDS	. HW	ALT	SEQ	ENA.												NO
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	
BC-B	-	B	-	B	-	B	-	B	-	-	-	-	-	-	-	-
R1-I	1	2	11	0	4	1	9	. I	. I	. I	. I	. I	. I	. I	. I	. I
R2-I	5	6	11	4	8	1	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I
R3-I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I
R4-I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I	. I

R1-R4=RING 1-4. DATA ENTRY, PHASES 1-16
BC=BARRIER CONTROL. VALUES: B.C
B=BARRIER MODE
C=COMPATIBILITY MODE

END PROGRAMMING

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-0389
DESIGNED: January 2017
SEALED: 3/21/2017
REVISED:

Electrical Detail Sheet 2 of 4		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
ELECTRICAL AND PROGRAMMING DETAILS FOR:		NC 49 at SR 1157 (Old Charlotte Road)	
Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529		Division 10 Cabarrus County Concord PLAN DATE: March 2017 REVIEWED BY: T. Joyce PREPARED BY: C. Strickland REVIEWED BY: REVISIONS INIT. DATE DocuSigned by:  3/24/2017 DATE SIG. INVENTORY NO. 10-0389	

ECONOLITE ASC/3-2070 EMERGENCY VEHICLE PREEMPT PROGRAMMING DETAIL

(program controller as shown)

1. From Main Menu select 4. PREEMPTOR/TSP
2. From PREEMPTOR/TSP/SCP Submenu select 1. PREEMPT PLAN 1-10

Place cursor in [] next to Preempt Plan and press 3. Then press the right cursor arrow and toggle the controller to YES. Next cursor down. This will select Emergency Vehicle Preempt #3.

[illegible]

PROGRAM EXTEND TIME ON OPTICAL DETECTOR UNITS FOR 2.0 SEC.

ECONOLITE ASC/3-2070
LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

Assign load switches 1, 2, 4, 5, 6 and 8 as Overlaps 7, 9, 11, 8, 10 and 12 respectively as shown below.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 3. LOAD SW ASSIGN

	LD	SWITCH	ASSIGN	DIMMING				---FLASH---		
		PHASE		R	Y	G	D	PWR	AUT	TGR
		/OVLP	TYPE							
NOTICE OVLP 7 ASSIGNED TO LD SWITCH 1	1	7	O	.	.	.	+	A	R	X
NOTICE OVLP 9 ASSIGNED TO LD SWITCH 2	2	9	O	.	.	.	+	A	Y	.
	3	3	V	.	.	.	+	A	R	X
NOTICE OVLP 11 ASSIGNED TO LD SWITCH 4	4	11	O	.	.	.	+	A	R	.
NOTICE OVLP 8 ASSIGNED TO LD SWITCH 5	5	8	O	.	.	.	-	A	R	.
NOTICE OVLP 10 ASSIGNED TO LD SWITCH 6	6	10	O	.	.	.	-	A	Y	X
	7	7	V	.	.	.	-	A	R	.
NOTICE OVLP 12 ASSIGNED TO LD SWITCH 8	8	12	O	.	.	.	-	A	R	X
	9	1	O	.	.	.	+	A	Y	X
	10	2	O	.	.	.	+	A	R	X
	11	3	O	.	.	.	-	A	Y	.
	12	4	O	.	.	.	-	A	R	.
	13	2	P	.	.	.	+	A	.	.
	14	4	P	.	.	.	-	A	.	.
	15	6	P	.	.	.	+	A	.	.
	16	8	P	.	.	.	-	A	.	.

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-0389
DESIGNED: January 2017
SEALED: 3/21/2017
REVISED:

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

ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In The Offices of:  TRANSPORTATION Mobility and Safety Division NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Sports Management Section 750 N.Greenfield Pkwy, Garner, NC 27529	NC 49 at SR 1157 (Old Charlotte Road) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Division 10</td> <td style="width: 33%;">Cabarrus County</td> <td style="width: 33%;">Concord</td> </tr> <tr> <td>PLAN DATE: March 2017</td> <td colspan="2">REVIEWED BY: T. Joyce</td> </tr> <tr> <td>PREPARED BY: C. Strickland</td> <td colspan="2">REVIEWED BY:</td> </tr> <tr> <td colspan="3" style="height: 40px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 60%;">REVISIONS</th> <th style="width: 15%;">INIT.</th> <th style="width: 25%;">DATE</th> </tr> <tr> <td style="height: 30px;"></td> <td></td> <td></td> </tr> </table> </td> </tr> </table>	Division 10	Cabarrus County	Concord	PLAN DATE: March 2017	REVIEWED BY: T. Joyce		PREPARED BY: C. Strickland	REVIEWED BY:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 60%;">REVISIONS</th> <th style="width: 15%;">INIT.</th> <th style="width: 25%;">DATE</th> </tr> <tr> <td style="height: 30px;"></td> <td></td> <td></td> </tr> </table>			REVISIONS	INIT.	DATE				SEAL NORTH CAROLINA PROFESSIONAL SEAL 030530 ENGINEER ZACHARY M. LITTLE DocuSigned by: <i>Zachary M. Little</i> 3/24/2017 0021EEDHFS41F DATE SIG. INVENTORY NO. 10-0389
Division 10	Cabarrus County	Concord																		
PLAN DATE: March 2017	REVIEWED BY: T. Joyce																			
PREPARED BY: C. Strickland	REVIEWED BY:																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 60%;">REVISIONS</th> <th style="width: 15%;">INIT.</th> <th style="width: 25%;">DATE</th> </tr> <tr> <td style="height: 30px;"></td> <td></td> <td></td> </tr> </table>			REVISIONS	INIT.	DATE															
REVISIONS	INIT.	DATE																		

ECONOLITE ASC/3-2070 LOGIC PROCESSOR PROGRAMMING

DETAIL FOR PHASE 9 OMIT AND STARTUP

(program controller as shown)

The following logic processor programming ensures phase 9 is only serviced during preemption. This logic ensures phase 9 is not served during startup and phases 2 and 6 are green during startup.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 8. LOGIC PROCESSOR
3. From LOGIC PROCESSOR Submenu select 2. LOGIC STATEMENTS

ENTER A "1" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

LP#: 1 COPY FROM: 1 ACTIVE: M (T/F)
IF PMT PREEMPT ACTIVE 3 IS OFF
THEN CTR OMIT PHASE 9 ON
ELSE

LOGIC FOR OMITTING
PHASE 9 WHILE
NOT IN PREEMPT 3

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 8. LOGIC PROCESSOR
3. From LOGIC PROCESSOR Submenu select 1. LOGIC STATEMENT CONTROL

ENABLE LOGIC PROCESSOR STATEMENT 1 BY POSITIONING THE CURSOR OVER THE FIELD SHOWN BELOW AND USING THE TOGGLE KEY TO ENABLE IT.

LOGIC STATEMENT CONTROL															
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
LP 1-15	E	E	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 16-30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 31-45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 46-60	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 61-75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LP 76-90	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

END PROGRAMMING

ENTER A "2" IN THE LP# FIELD, PRESS 'ENTER', AND PROGRAM AS SHOWN.

LP#: 2 COPY FROM: 2 ACTIVE: M (T/F)
IF LP COB CODE ON 550
THEN SIG SET OVLP GREEN 9 OFF
SIG SET OVLP GREEN 10 OFF
ELSE

LOGIC FOR PHASES
2 AND 6 GREEN AT
STARTUP

END PROGRAMMING

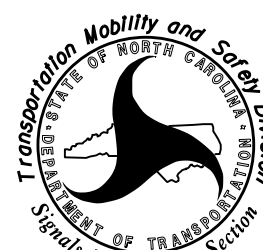
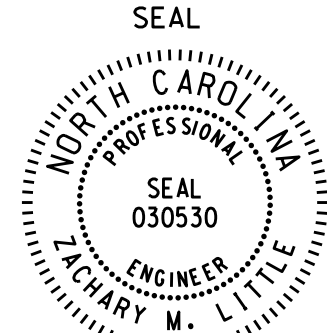
COB REFERENCE SCHEDULE

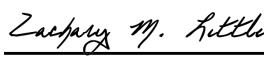
550 = Local Flash Status

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-0389
DESIGNED: January 2017
SEALED: 3/21/2017
REVISED:

Electrical Detail Sheet 4 of 4

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

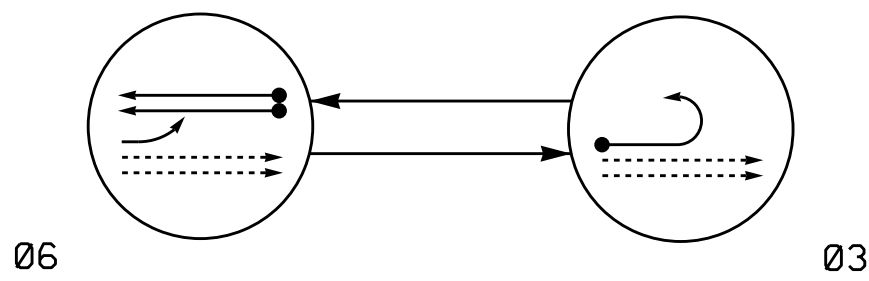
ELECTRICAL AND PROGRAMMING DETAILS FOR: Prepared In the Offices of:  TRANSPORTATION MOBILITY AND SAFETY DIVISION DEPARTMENT OF TRANSPORTATION Signal Management Section 750 N. Greenfield Pkwy, Garner, NC 27529	NC 49 at SR 1157 (Old Charlotte Road)			SEAL 			
	Division 10 Cabarrus County Concord						
	PLAN DATE: March 2017 REVIEWED BY: T. Joyce						
	PREPARED BY: C. Strickland REVIEWED BY:						
	REVISIONS			INIT.	DATE		

DocuSigned by:

0C21EFD94F6341F

3/24/2017
DATE

SIG. INVENTORY NO. 10-0389

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

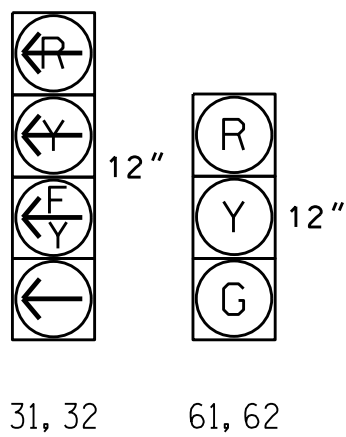
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE		
	Ø 6	Ø 3	FLIGHT
31, 32	E	Y	Y
61, 62	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

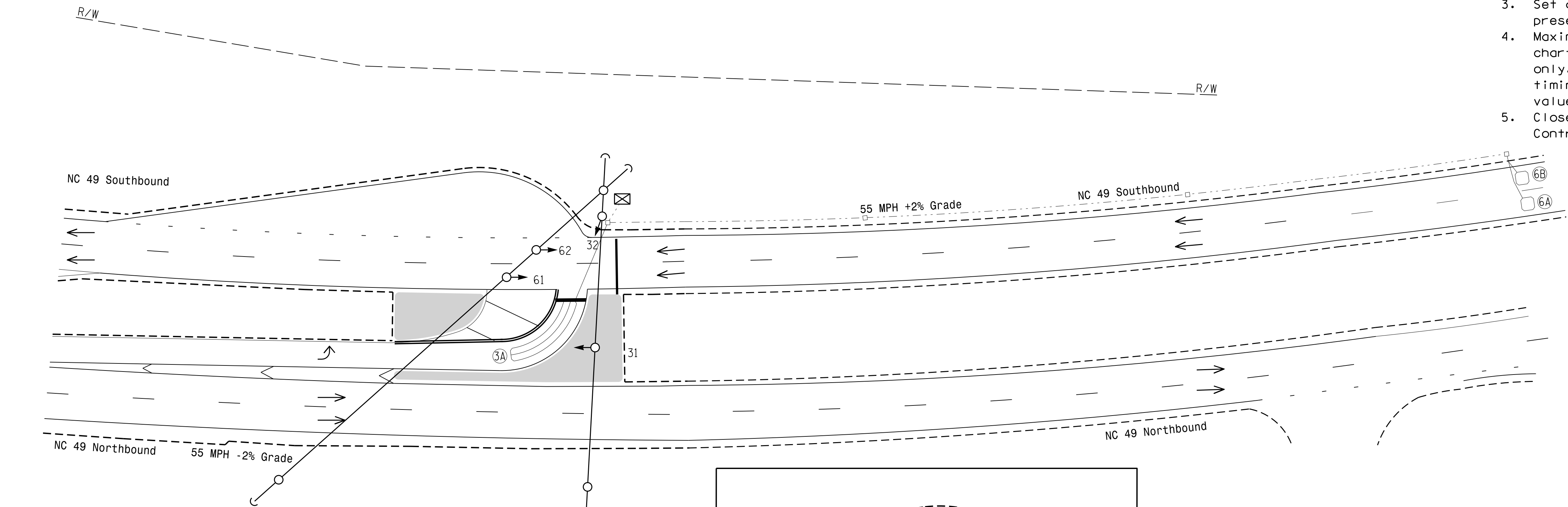


ASC/3 DETECTOR INSTALLATION CHART										
DETECTOR					PROGRAMMING					
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	URNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	TYPE	LOOP NEW CARD
3A	6X40	0	2-4-2	Y	3	Yes	-	15	S	- Y
6A	6X6	420	6	Y	6	Yes	-	-	N	- Y
6B	6X6	420	6	Y	6	Yes	-	-	N	- Y

2 Phase
Fully Actuated
NC 49 (Concord) CLS

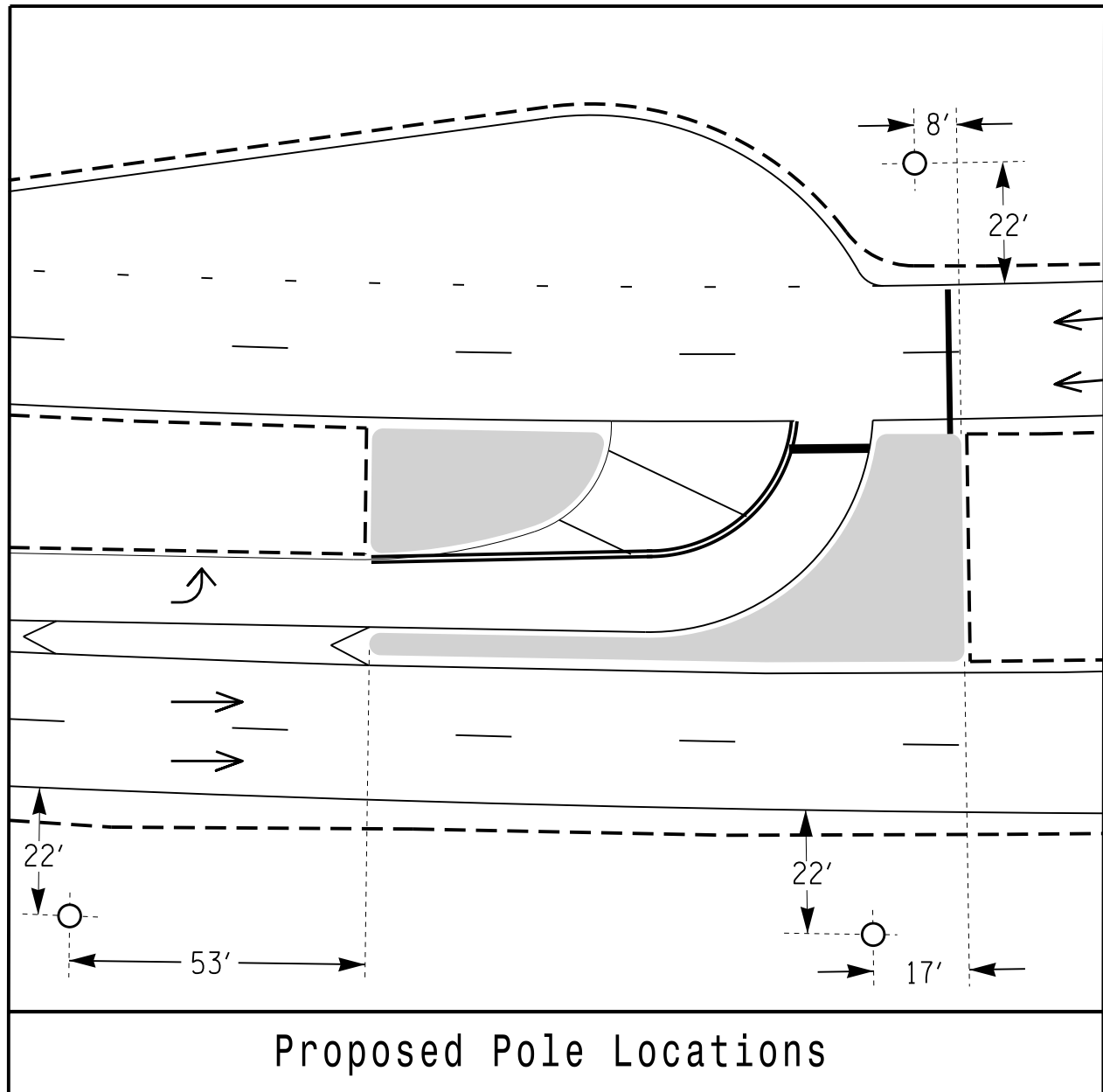
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Set all detector units to presence mode.
- Maximum times shown in timing chart are for free run operation only. Coordinated signal system timing value supersede these values.
- Closed loop system data: Controller Asset # 2242.



ASC/3 TIMING CHART		
FEATURE	PHASE	
	3	6
Min Green *	7	14
Walk *	0	0
Ped Clear	0	0
Veh. Extension *	2.0	6.0
Max 1 *	20	90
Yellow	3.0	5.0
Red Clear	3.5	1.0
Red Revert	2.0	2.0
Actuations B4 Add *	-	0
Seconds /Actuation *	-	1.8
Max Initial *	-	46
Time Before Reduction *	-	15
Time To Reduce *	-	30
Minimum Gap	-	3.4
Locking Detector	-	X
Recall Position	-	VEH. RECALL
Dual Entry	-	-
Simultaneous Gap	X	X

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



LEGEND

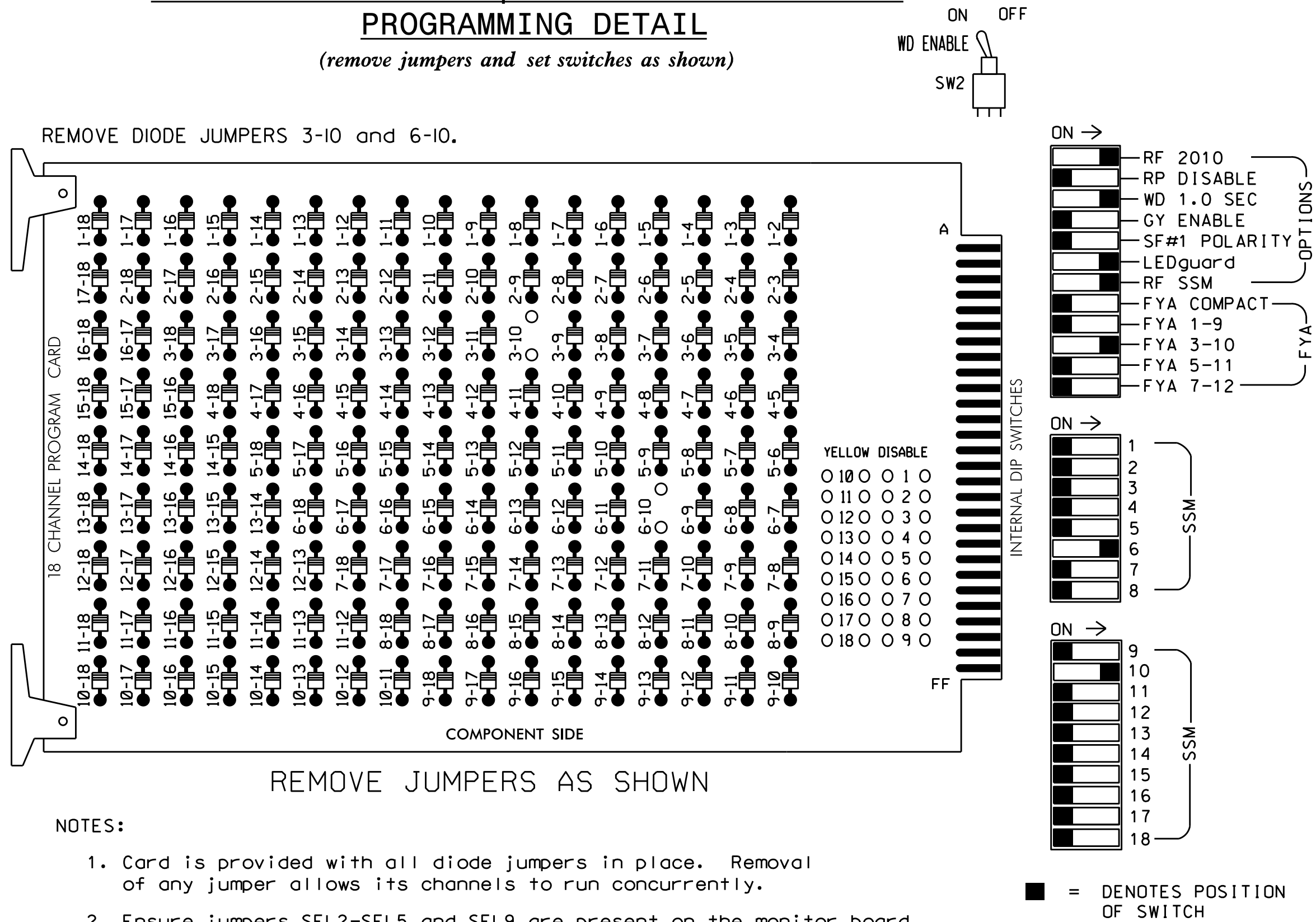
- | | | | |
|-----|-------------------------------|-----|----------|
| ○→ | Traffic Signal Head | ●→ | EXISTING |
| ●→ | Modified Signal Head | N/A | |
| ⊥ | Sign | ⊥ | |
| ○→ | Pedestrian Signal Head | ●→ | |
| ○→ | With Push Button & Sign | ●→ | |
| ○→ | Signal Pole with Guy | ●→ | |
| ○→ | Signal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

New Installation

	NC 49 Southbound at SR 1157 (Old Charlotte Road) Northbound U-Turn			
	Division 10 Cabarrus County Concord			
	PLAN DATE: January 2017	REVIEWED BY: T. Williams		
	PREPARED BY: M. Mahbooba	REVIEWED BY:		
750 N. Greenfield Pkwy, Garner, NC 27529		REVISIONS	INIT.	DATE
SCALE 0 30 1"=30'				
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		SEAL		
		S. J. Williams 3/9/2017		
		DATE		
		SIG. INVENTORY NO. 10-2242		

EDI MODEL 2018ECLip-NC CONFLICT MONITOR
PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



NOTES

- To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
- Enable Simultaneous Gap-Out for all phases.
- Program phase 6 for volume density operation.
- Program controller to start up in phase 6 Green.
- Program phase 2 for Red Flash.
- The cabinet and controller are part of the NC 49 (Concord) Closed Loop System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/AUX
SOFTWARE.....ECONOLITE ASC/3-2070
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S4,S8,AUX S2
PHASES USED.....3,6
OVERLAP "A".....NOT USED
OVERLAP "B".....*
OVERLAP "C".....NOT USED
OVERLAP "D".....NOT USED
OVERLAP "E".....NOT USED
OVERLAP "F".....NOT USED
OVERLAP "G".....*

* See overlap programming detail on sheet 2

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4	14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	OLG	4	4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	NU	NU	31,32	★	NU	NU	NU	61,62	NU	NU	NU	NU	31,32	★	NU	NU	NU
RED									134									
YELLOW				*					135									
GREEN									136									
RED ARROW														A124				
YELLOW ARROW														A125				
FLASHING YELLOW ARROW														A126				
GREEN ARROW				118														

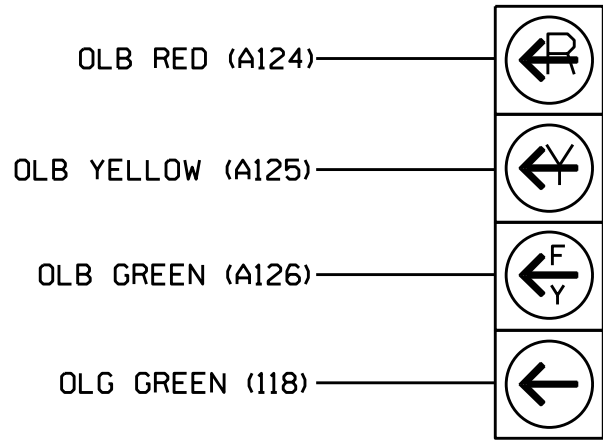
NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail this sheet.

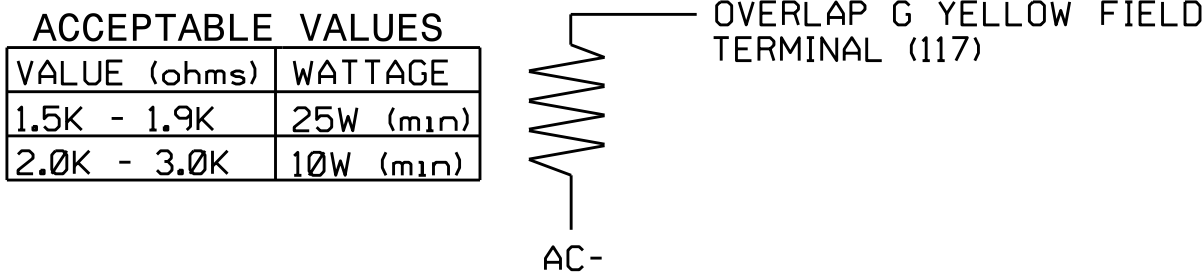
FYA SIGNAL WIRING DETAIL

(wire signal head as shown)



LOAD RESISTOR INSTALLATION DETAIL

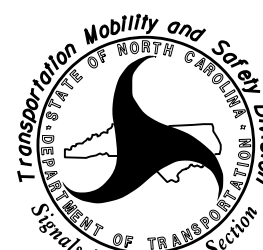
(install resistor as shown)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2242
DESIGNED: January 2017
SEALED: 3/9/2017
REVISED:

Electrical Detail Sheet 1 of 2

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UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:	NC 49 Southbound at SR 1157 (Old Charlotte Road) Northbound U-Turn	SEAL NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 030530 JACUARY M. LITTLE
Prepared In the Offices of:  750 N. Greenfield Pkwy, Garner, NC 27529	Division 10 Cabarrus County Concord PLAN DATE: March 2017 REVIEWED BY: T. Joyce PREPARED BY: C. Strickland REVIEWED BY: REVISIONS INIT. DATE DocuSigned by: C. Strickland 021EF094F5341F DATE 3/10/2017	SIG. INVENTORY NO. 10-2242

ECONOLITE ASC/3-2070 LOAD SWITCH ASSIGNMENT DETAIL

(program controller as shown)

To assign load switch S4 as OLG program LD SWITCH 3 as OVLP '7' TYPE '0' as shown below.

1. From Main Menu select 1. CONFIGURATION
2. From CONFIGURATION Submenu select 3. LOAD SW ASSIGN

LD	SWITCH		ASSIGN		DIMMING			---FLASH---		
	PHASE	/OVLP	TYPE	R	Y	G	D	PWR	AUT	TGR
1	1		V	.	.	.	+	A	R	X
2	2		V	.	.	.	+	A	R	.
3	7		O	.	.	.	+	A	R	X
4	4		V	.	.	.	+	A	R	.
5	5		V	.	.	.	-	A	R	.
6	6		V	.	.	.	-	A	Y	X
7	7		V	.	.	.	-	A	R	.
8	8		V	.	.	.	-	A	R	X
9	1		O	.	.	.	+	A	R	X
10	2		O	.	.	.	+	A	Y	X
11	3		O	.	.	.	-	A	R	.
12	4		O	.	.	.	-	A	R	.
13	2		P	.	.	.	+	A	.	.
14	4		P	.	.	.	-	A	.	.
15	6		P	.	.	.	+	A	.	.
16	8		P	.	.	.	-	A	.	.

NOTICE OVLP 7
ASSIGNED TO LD SWITCH 3 ➡

← ALSO ENSURE LD SWITCH 2
AUT SET TO 'R'

ECONOLITE ASC/3-2070
OVERLAP PROGRAMMING DETAILS

(program controller as shown)

1. From Main Menu select **2. CONTROLLER**
2. From CONTROLLER Submenu select **2. VEHICLE OVERLAPS**
3. Press 'Toggle' until positioned on Overlap G

OVERLAP

Select TMG VEH OVLP [G] and 'NORMAL

```

TMG VEH OVLP...[G] TYPE: .....NORMAL
  PHASES 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
INCLUDED . . X . . . . . . . . .
LAG GRN 0.0 YEL 0.0 RED 0.0

```

Press Toggle until
positioned on Overlap B

OVERLAP

Select TMG VEH OVLP [B] and 'PPLT FYA

```

TMG VEH OVLP...[B] TYPE: ....PPLT FYA
PROTECTED LEFT TURN.... OVERLAP 6
OPPOSING THROUGH..... PHASE 6

FLASHING ARROW OUTPUT....CH10 ISOLATE

DELAY START OF: FYA..O.O CLEARANCE..O.
ACTION PLAN SF BIT DISABLE.....

```

END PROGRAMMIN

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 10-2242
DESIGNED: January 2017
SEALED: 3/9/2017
REVISED:

Electrical Detail Sheet 2 of

**DOCUMENT NOT CONSIDERED FINAL
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ELECTRICAL AND PROGRAMMING
DETAILS FOR:

Prepared In the Offices of:



TRANSPORTATION Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
OFFICE OF TRANSPORTATION
Logistics Management Section

750 N. Greenfield Pkwy, Garner, NC 27529

NC 49 Southbound

at

SR 1157 (Old Charlotte Road)

Northbound U-Turn

Division 10	Cabarrus County	Concord
PLAN DATE: March 2017	REVIEWED BY: T. Joyce	
PREPARED BY: C. Strickland	REVIEWED BY:	
REVISIONS	INIT.	DATE

SEAL



DocuSigned by:
Zachary M. Little
3/10/2025
03:18 PM EST
03/10/2025 03:18 PM EST

- 1

INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
- 2

INSTALL COAX CABLE
- 3

INSTALL ETHERNET CABLE
- 4

INSTALL SMFO CABLE
- 5

INSTALL MMFO CABLE
- 6

INSTALL FIBER OPTIC DROP CABLE
- 7

INSTALL TRACER WIRE
- 8

TRENCH
- 9

INSTALL PVC CONDUIT
- 10

INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11

INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12

INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
- 13

INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
- 14

INSTALL POLYETHYLENE CONDUIT
- 15

DIRECTIONAL DRILL CONDUIT
- 16

BORE AND JACK CONDUIT
- 17

INSTALL CABLE(S) IN EXISTING CONDUIT
- 18

INSTALL CABLE(S) IN NEW CONDUIT
- 19

INSTALL CABLE(S) IN EXISTING RISER
- 20

INSTALL CABLE(S) IN NEW RISER
- 21

INSTALL CABLE(S) IN EXISTING CONDUIT STUB-OUTS
- 22

INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23

INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 24

INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
- 25

INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
- 26

MODIFY EXISITNG INTERCONNECT CENTER/SPLICE ENCLOSURE
- 27

INSTALL NEW FIBER OPTIC TRANSCEIVER
- 28

INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPLICE CABLE IN CABINET
- 29

INSTALL UNDERGROUND SPLICE ENCLOSURE
- 30

INSTALL AERIAL SPLICE ENCLOSURE
- 31

INSTALL POLE MOUNTED SPLICE CABINET
- 32

INSTALL BASE MOUNTED SPLICE CABINET
- 33

REMOVE EXISTING SPLICE CABINET

- 34

INSTALL CABINET FOUNDATION
- 35

REMOVE EXISTING CABINET FOUNDATION
- 36

INSTALL CCTV CAMERA ASSEMBLY
- 37

INSTALL CCTV CAMERA WOOD POLE
- 38

INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
- 39

INSTALL JUNCTION BOX
- 40

INSTALL OVERSIZED JUNCTION BOX
- 41

REMOVE EXISTING JUNCTION BOX
- 42

INSTALL WOOD POLE
- 43

REMOVE EXISTING WOOD POLE
- 44

INSTALL AERIAL GUY ASSEMBLY
- 45

INSTALL STANDARD GUY ASSEMBLY
- 46

INSTALL SIDEWALK GUY ASSEMBLY
- 47

INSTALL MESSENGER CABLE
- 48

REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
- 49

REMOVE EXISTING MESSENGER CABLE
- 50

INSTALL TELEPHONE SERVICE
- 51

INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
- 52

INSTALL DELINEATOR MARKER
- 53

STORE 20 FEET OF COMMUNICATIONS CABLE
- 54

LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
- 55

LASH CABLE(S) TO EXISTING MESSENGER CABLE
- 56

LASH CABLE(S) TO NEW MESSENGER CABLE
- 57

MODIFY EXISTING ELECTRICAL SERVICE
- 58

INSTALL NEW ELECTRICAL SERVICE
- 59

INSTALL NEW FIELD ETHERNET SWITCH
- 60

BOND TRACER WIRE TO EQUIPMENT GROUND BUSS
- 61

DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUSS
- 62

BOND RISER AND MESSENGER CABLE TO POLE GROUND

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)

X

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)

NUMBER OF CABLE(S)

NUMBER OF FIBER/TWISTED PAIRS

NUMBER OF RISER(S)/CONDUIT(S)

DIAMETER OF RISER(S)/CONDUIT(S) (INCH)

XX

XX

XX

XX

ATTACHMENT POINT:

XX"/PS
YYY

DISTANCE ABOVE (IN)/POLE SIDE REFERENCE POINT

YYY
XX"/PS

REFERENCE POINT DISTANCE BELOW (IN)/POLE SIDE

POLE SIDE

SS – SAME SIDE AS EXISTING

FS – FRONT SIDE OF POLE

BS – BACK SIDE OF POLE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:

OFFICE OF THE
COMMISSIONER OF TRANSPORTATION
NORTH CAROLINA
750 N. Greenfield Pkwy., Garner, NC 27529

CONSTRUCTION NOTES

DIVISION 10

CABARRUS CO.

HARRISBURG

PLAN DATE: MARCH 2017

PREPARED BY: I. N. AVERY

REVISIONS

INIT.

DATE

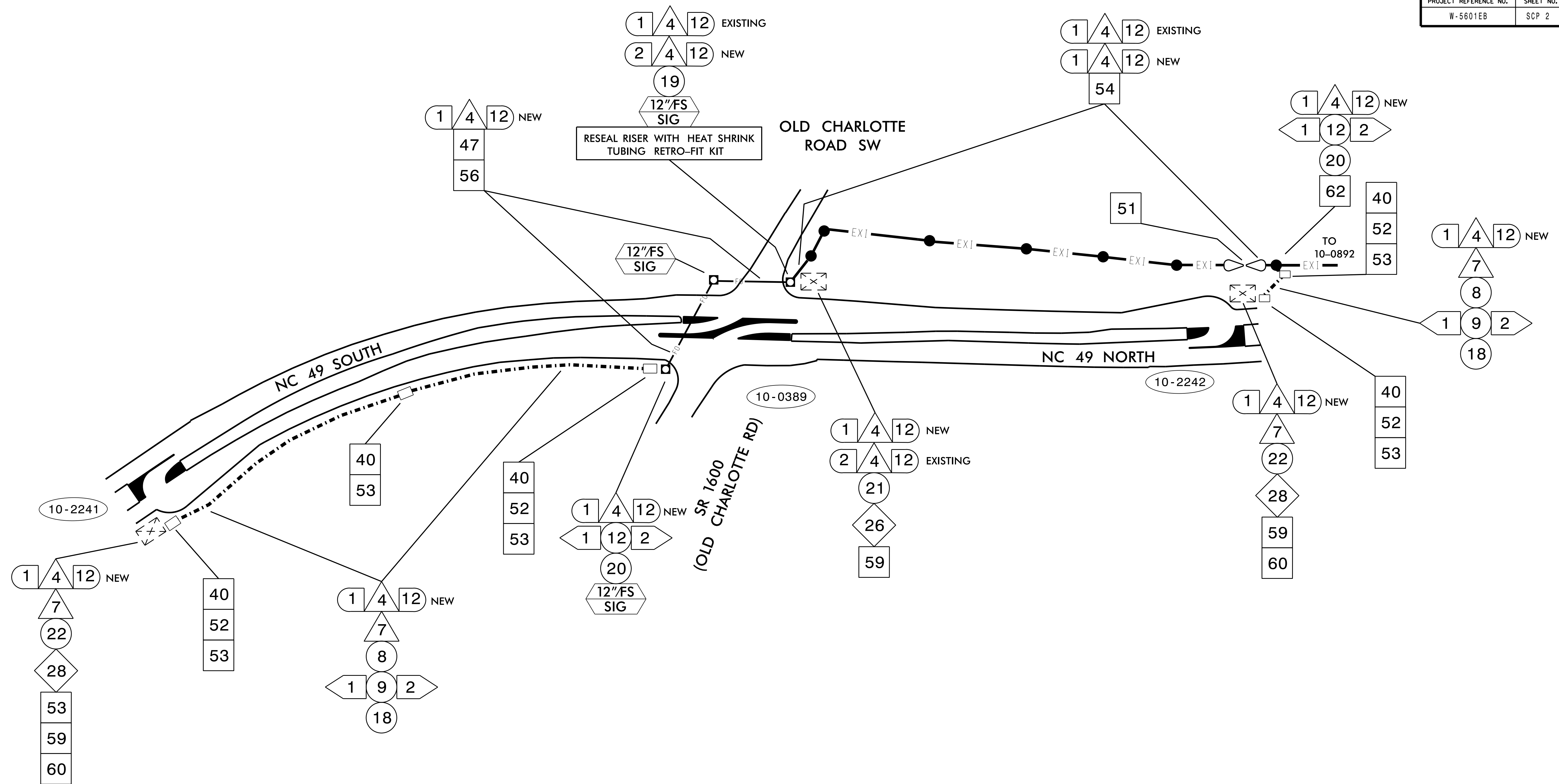
SEAL

NORTH CAROLINA
PROFESSIONAL
ENGINEER
MOHD A. ASLAMI

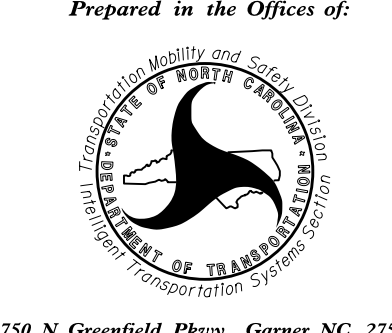
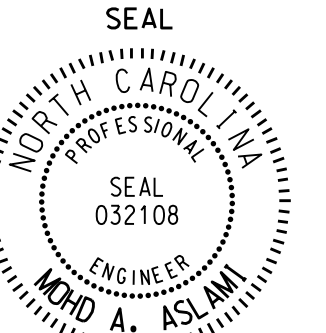
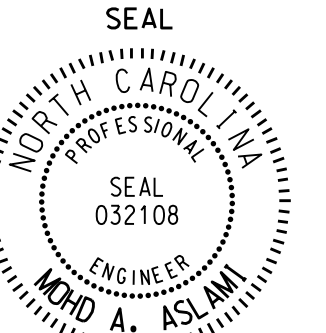
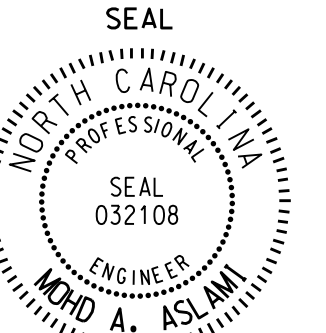
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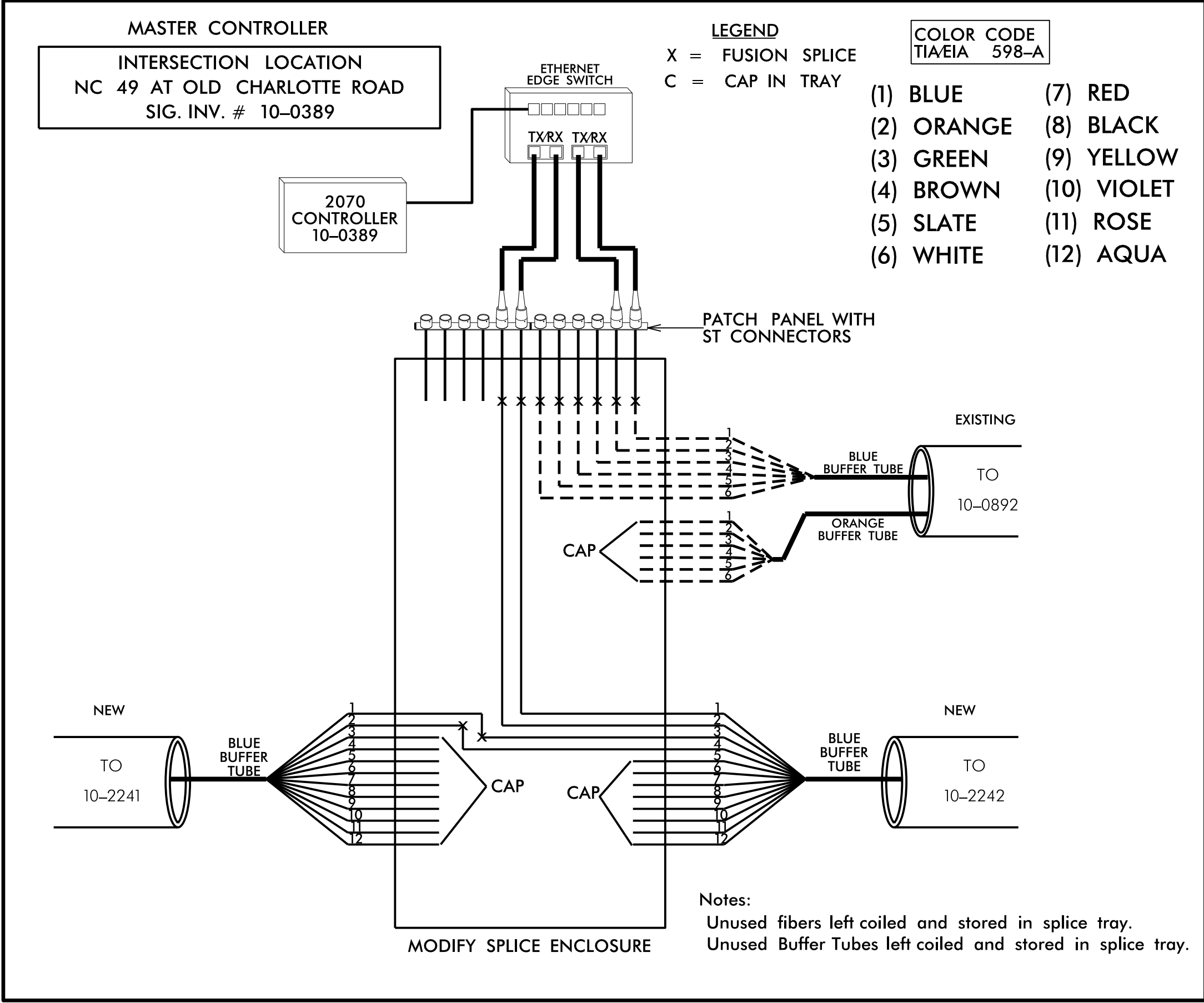
DocuSigned by:
Mohd Aslami

3/7/2017
DATE



- 1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF CONCORD TRAFFIC ENGINEER, ANDREI DUMITRU, AT (704) 920-5377 TO ARRANGE FOR THE TOWN OF CONCORD TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL
- 2) CONTRACTOR TO RECORD EXISTING SPlice ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPlice DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPlice ARRANGEMENT DIFFERS FROM THE SUPPLIED SPlice DETAILS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED																	
 750 N. Greenfield Pkwy., Garner, NC 27529	<table><tr><td colspan="2">COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS</td></tr><tr><td colspan="2">DIVISION 10 CABARRUS CO. HARRISBURG</td></tr><tr><td>PLAN DATE: MARCH 2017</td><td>REVIEWED BY:</td></tr><tr><td>PREPARED BY: I. N. AVERY</td><td>REVIEWED BY:</td></tr><tr><td>REVISIONS</td><td>INIT. DATE</td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></table>	COMMUNICATIONS CABLE AND CONDUIT ROUTING PLANS		DIVISION 10 CABARRUS CO. HARRISBURG		PLAN DATE: MARCH 2017	REVIEWED BY:	PREPARED BY: I. N. AVERY	REVIEWED BY:	REVISIONS	INIT. DATE						
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1) FIVE (5) DAYS PRIOR TO BEGINNING WORK ON THE SIGNAL SYSTEM, CONTACT THE CITY OF CONCORD TRAFFIC ENGINEER, ANDREI DUMITRU, AT (704) 920-5377 TO ARRANGE FOR THE TOWN OF CONCORD TO PROGRAM THE NEW FIELD ETHERNET SWITCHES WITH THE NECESSARY NETWORK CONFIGURATION DATA, INCLUDING BUT NOT LIMITED TO: THE PROJECT IP ADDRESS, DEFAULT GATEWAY, SUBNET MASK AND VLAN ID INFORMATION. NOTIFY THE TRAFFIC ENGINEER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL

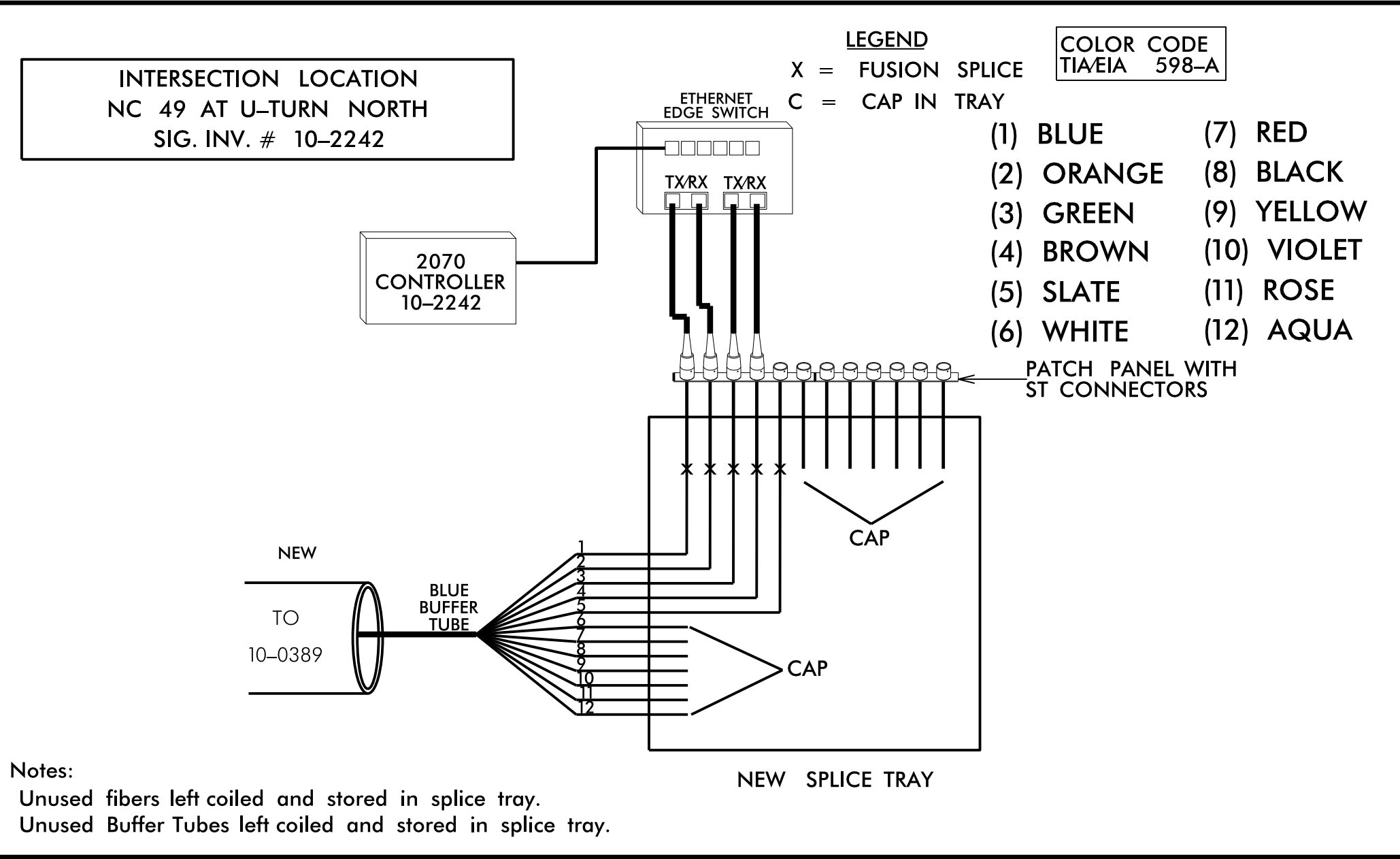
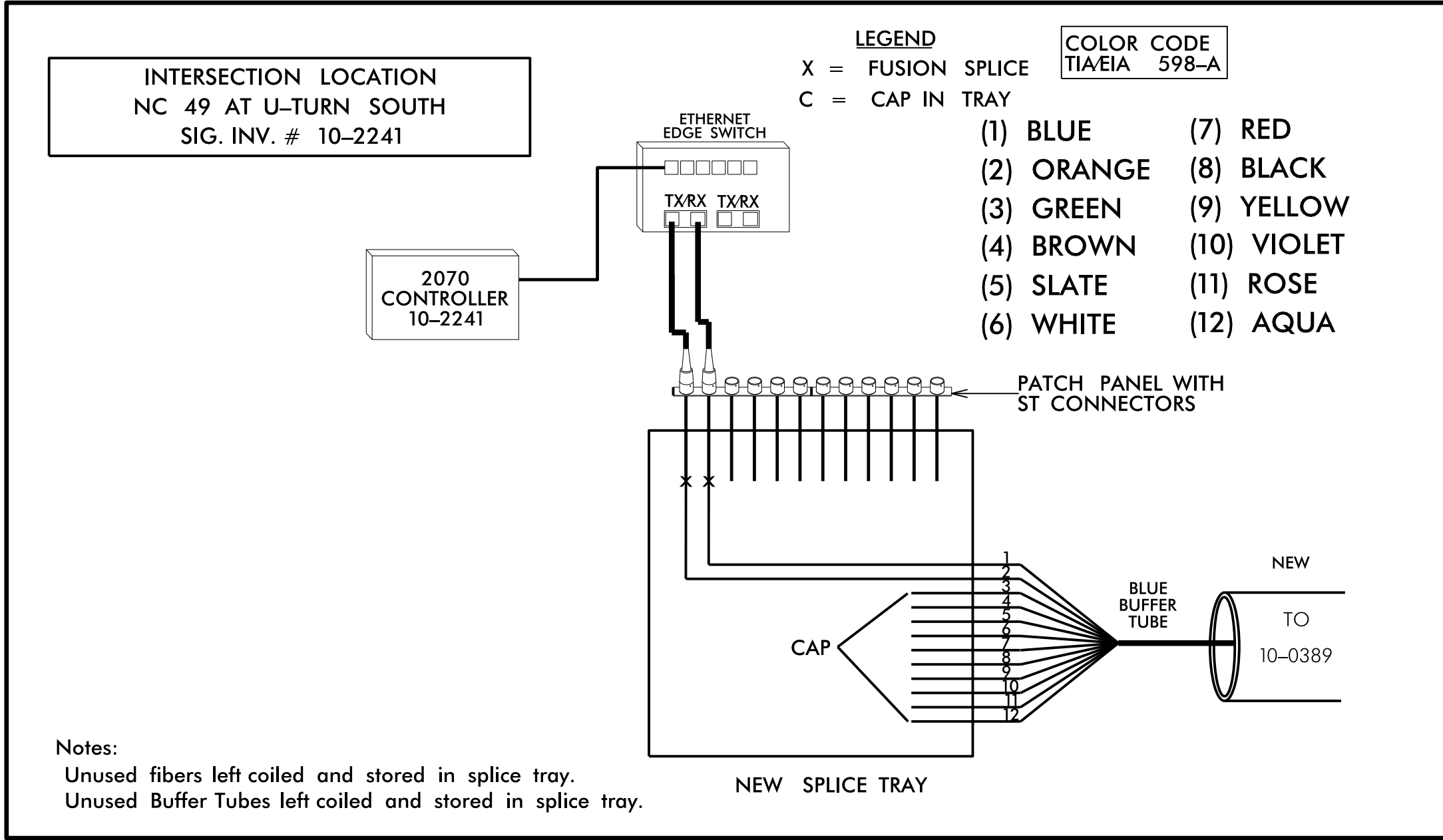
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3) ETHERNET SWITCH TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.

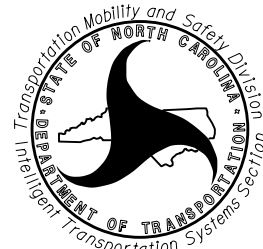
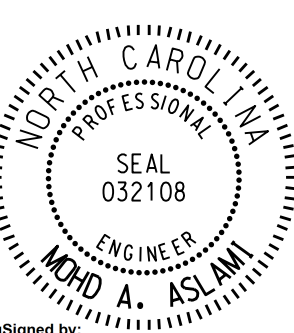
4) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING:
REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

- 1) SPLICE LOCATION
- 2) DATE
- 3) COMPANY NAME
- 4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

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



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UNLESS ALL SIGNATURES COMPLETED

Prepared in the Offices of:  750 N. Greenfield Pkwy., Garner, NC 27529	SPLICE PLANS DIVISION 10 CABARRUS CO. HARRISBURG PLAN DATE: MARCH 2017 REVIEWED BY: PREPARED BY: I. N. AVERY REVIEWED BY: REVISIONS		SEAL  MOHD A. ASLAM DocuSigned by: Mohd Aslami 3/7/2017	
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