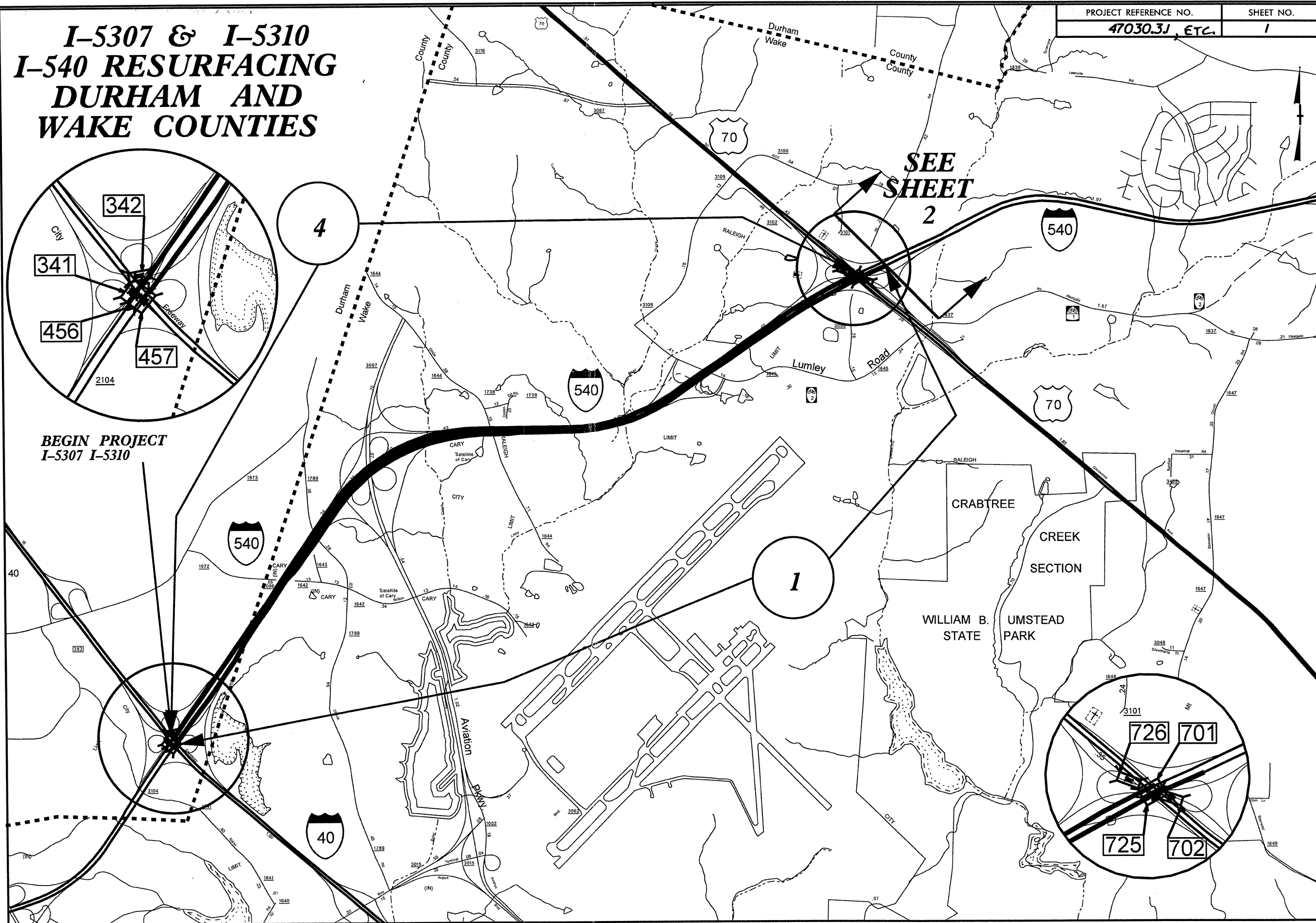


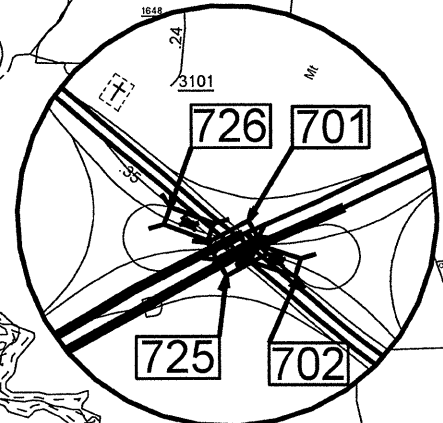
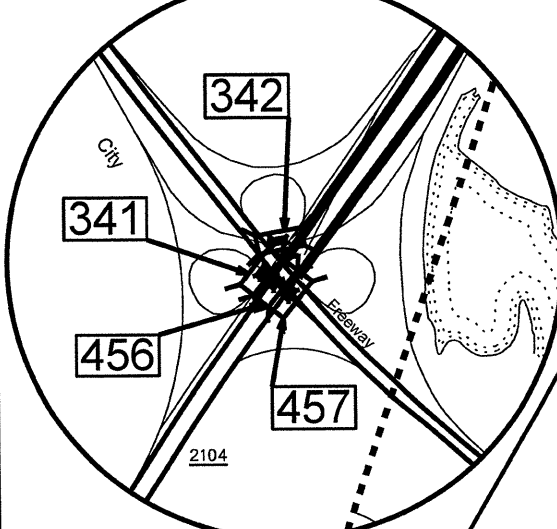
# I-5307 & I-5310 I-540 RESURFACING DURHAM AND WAKE COUNTIES

PROJECT REFERENCE NO.	SHEET NO.
47030.3J, ETC.	1



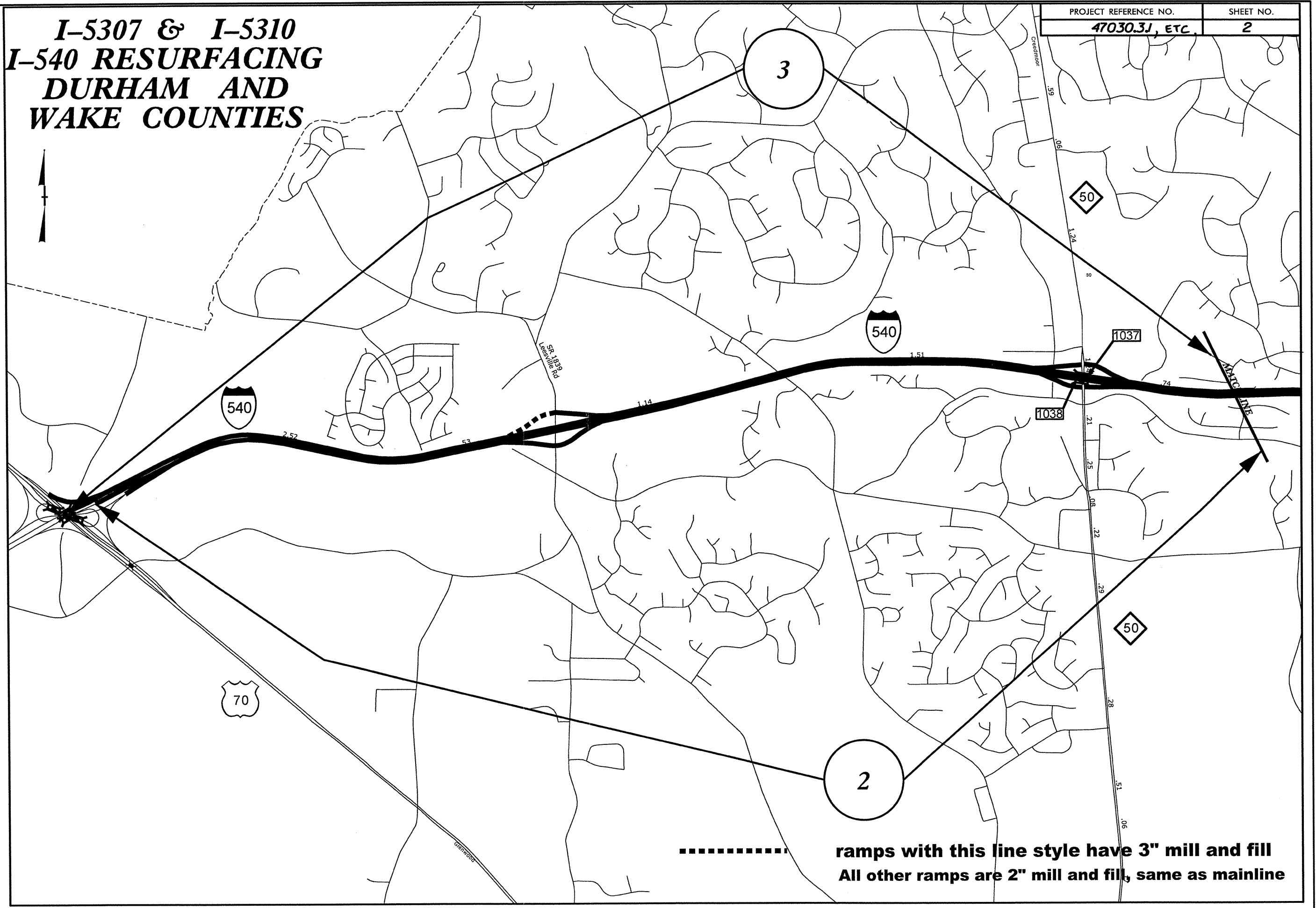
BEGIN PROJECT  
I-5307 I-5310

SEE SHEET  
2



# I-5307 & I-5310 I-540 RESURFACING DURHAM AND WAKE COUNTIES

PROJECT REFERENCE NO.	SHEET NO.
47030.3J, ETC.	2



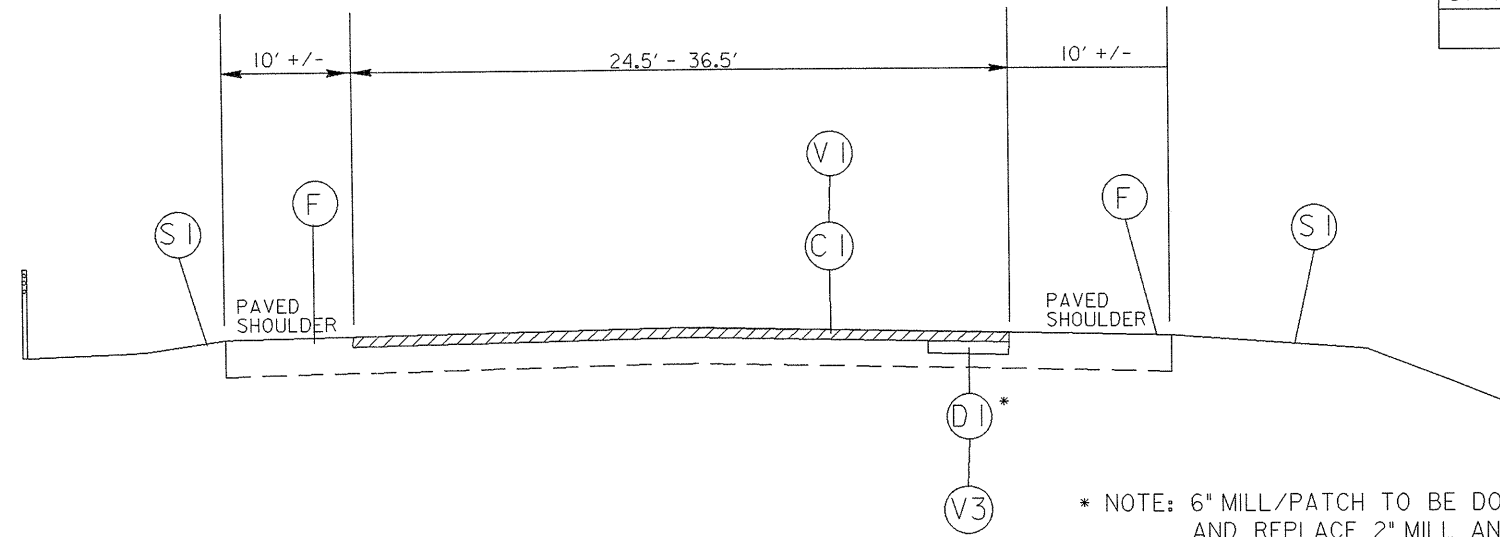
ramps with this line style have 3" mill and fill  
All other ramps are 2" mill and fill, same as mainline



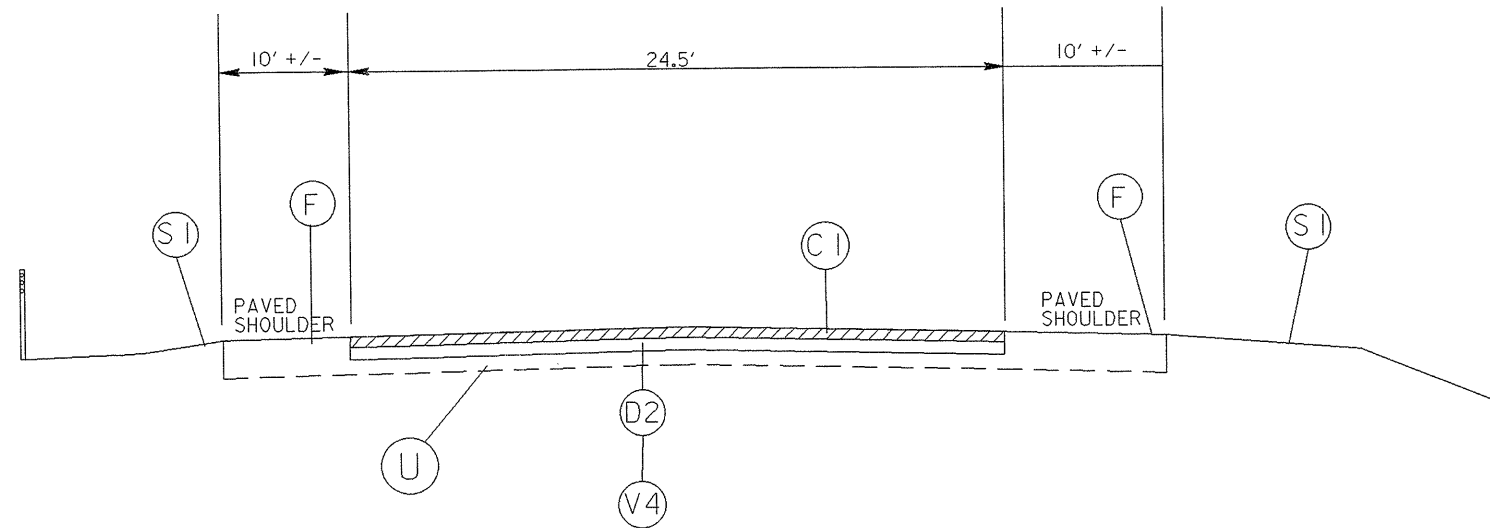
# PAVEMENT SCHEDULE

(C1)	PROP. APPROX. 2" ASPH. CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
(C2)	PROP. APPROX. 3" ASPH. CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD., IN EACH OF TWO LIFTS
(C3)	PROP. APPROX. 2" ASPH. CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
(D1)	PROP. APPROX. 6" ASPH. CONC. INTERMEDIATE COURSE, TYPE 119.0C, 4" LIFT (456 LBS. PER SQ. YD.) & A 2" LIFT (228 LBS. PER SQ. YD.)
(D2)	PROP. APPROX. 2.5" ASPH. CONC. INTERMEDIATE COURSE, TYPE 119.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
(F)	PROP FOG SEAL ON SHOULDER TO BE APPLIED AFTER CRACK SEALING OPERATION
(J1)	PROP. APPROX. 6" OF AGGREGATE BASE COURSE, AS DIRECTED BY THE ENGINEER
(J2)	PROP. INCIDENTAL STONE BASE, AS DIRECTED BY THE ENGINEER
(V1)	MILL 2" IN DEPTH
(V2)	MILL 3" IN DEPTH
(V3)	MILL 6" IN DEPTH, 6' OR 12' WIDTH
(V4)	MILL 4.5" IN DEPTH, FULL WIDTH (PATCHING I-540 WB AT CAPITAL)
(S1)	PROP. SHOULDER GRADING
(S2)	PROP. SHOULDER RECONSTRUCTION AS DIRECTED BY THE ENGINEER
(U)	EXISTING PAVEMENT
(F)	CRACK AND FOG SEAL

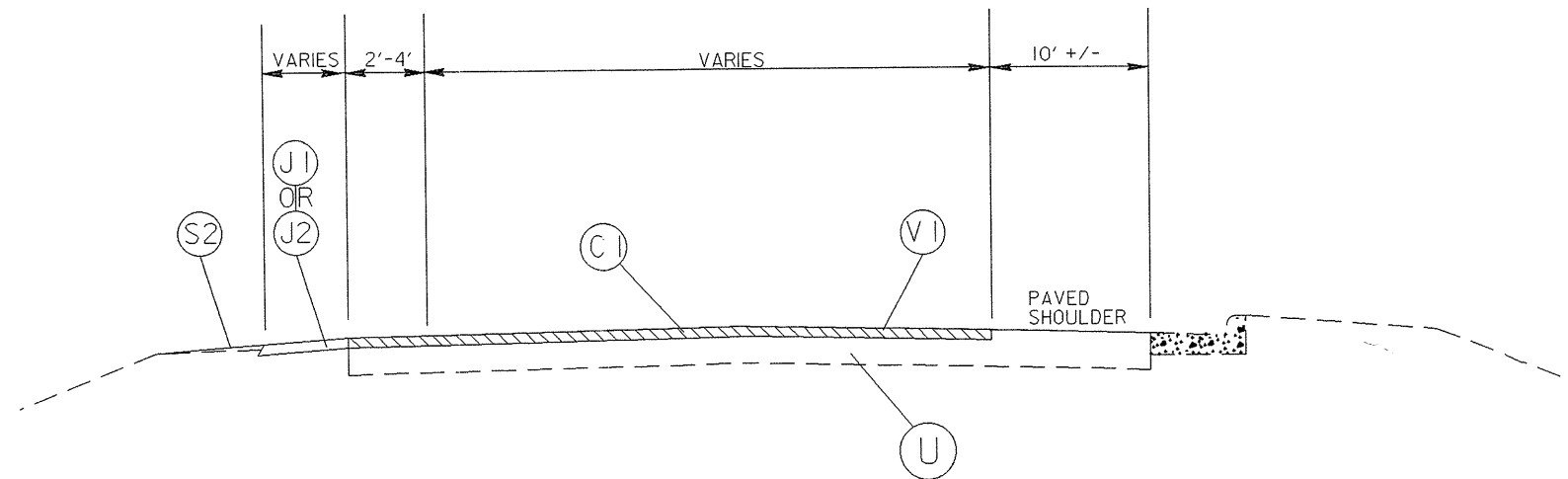
PROJ. REFERENCE NO.		SHEET NO.
I-5307, I-5310 (47030.3.1)		4
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION



TYPICAL SECTION NO. 1



TYPICAL SECTION NO. 2

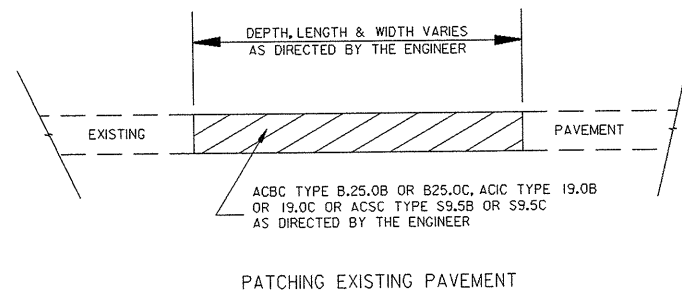


TYPICAL SECTION NO. 3

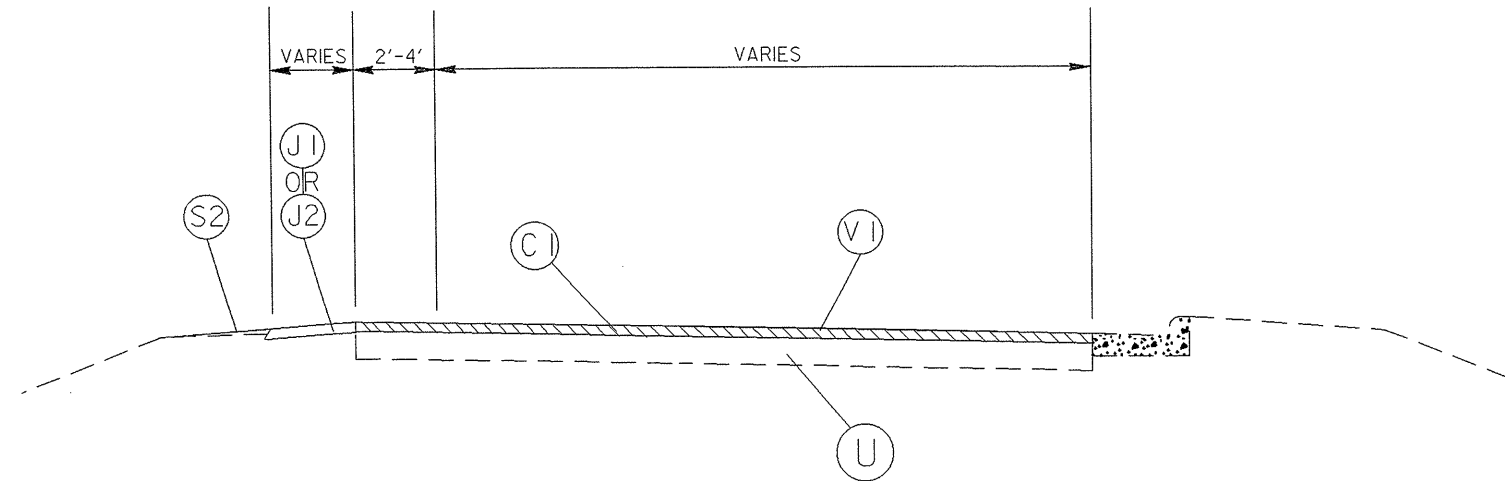
\*CONTRACTOR SHALL USE THIS TYPICAL FOR RAMPS WITH CURB AND GUTTER

# PAVEMENT SCHEDULE

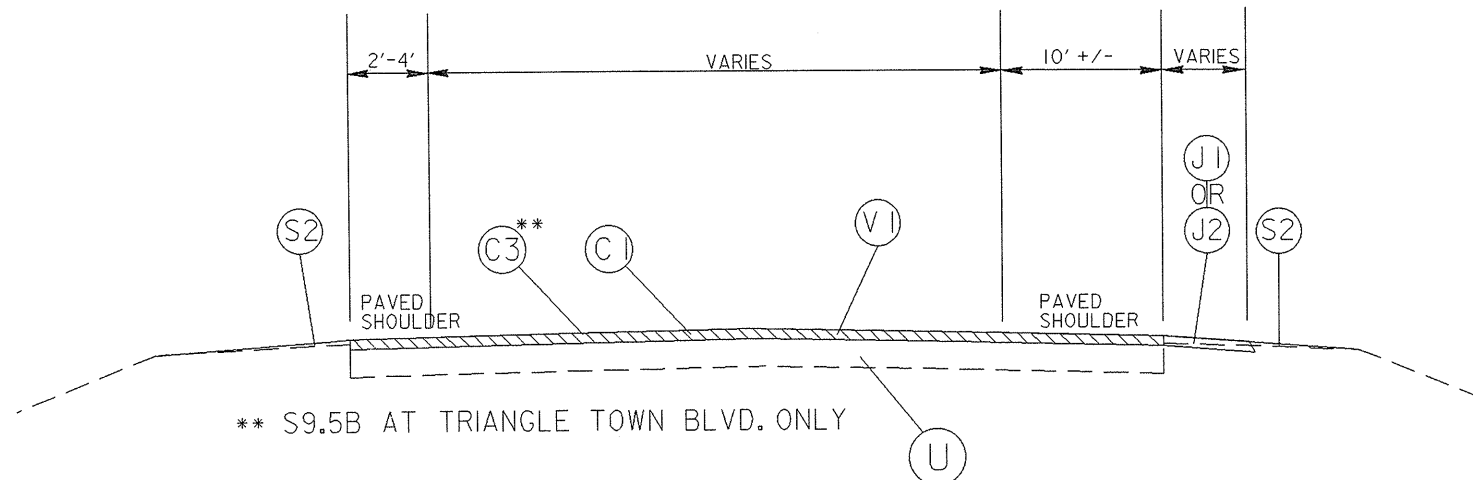
(C1)	PROP. APPROX. 2" ASPH. CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
(C2)	PROP. APPROX. 3" ASPH. CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD., IN EACH OF TWO LIFTS
(C3)	PROP. APPROX. 2" ASPH. CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
(D1)	PROP. APPROX. 6" ASPH. CONC. INTERMEDIATE COURSE, TYPE 119.0C, 4" LIFT (456 LBS. PER SQ. YD.) & A 2" LIFT (228 LBS. PER SQ. YD.)
(D2)	PROP. APPROX. 2.5" ASPH. CONC. INTERMEDIATE COURSE, TYPE 119.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
(F)	PROP FOG SEAL ON SHOULDER TO BE APPLIED AFTER CRACK SEALING OPERATION
(J1)	PROP. APPROX. 6" OF AGGREGATE BASE COURSE, AS DIRECTED BY THE ENGINEER
(J2)	PROP. INCIDENTAL STONE BASE, AS DIRECTED BY THE ENGINEER
(V1)	MILL 2" IN DEPTH
(V2)	MILL 3" IN DEPTH
(V3)	MILL 6" IN DEPTH, 6' OR 12' WIDTH
(V4)	MILL 4.5" IN DEPTH, FULL WIDTH (PATCHING I-540 WB AT CAPITAL)
(S1)	PROP. SHOULDER GRADING
(S2)	PROP. SHOULDER RECONSTRUCTION AS DIRECTED BY THE ENGINEER
(U)	EXISTING PAVEMENT
(F)	CRACK AND FOG SEAL



PROJ. REFERENCE NO.		SHEET NO.
I-5307, I-5310 (47030.3.1)		5
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION



TYPICAL SECTION NO. 4  
\*CONTRACTOR SHALL USE THIS TYPICAL FOR THE LOOPS



\*\* S9.5B AT TRIANGLE TOWN BLVD. ONLY

TYPICAL SECTION NO. 5

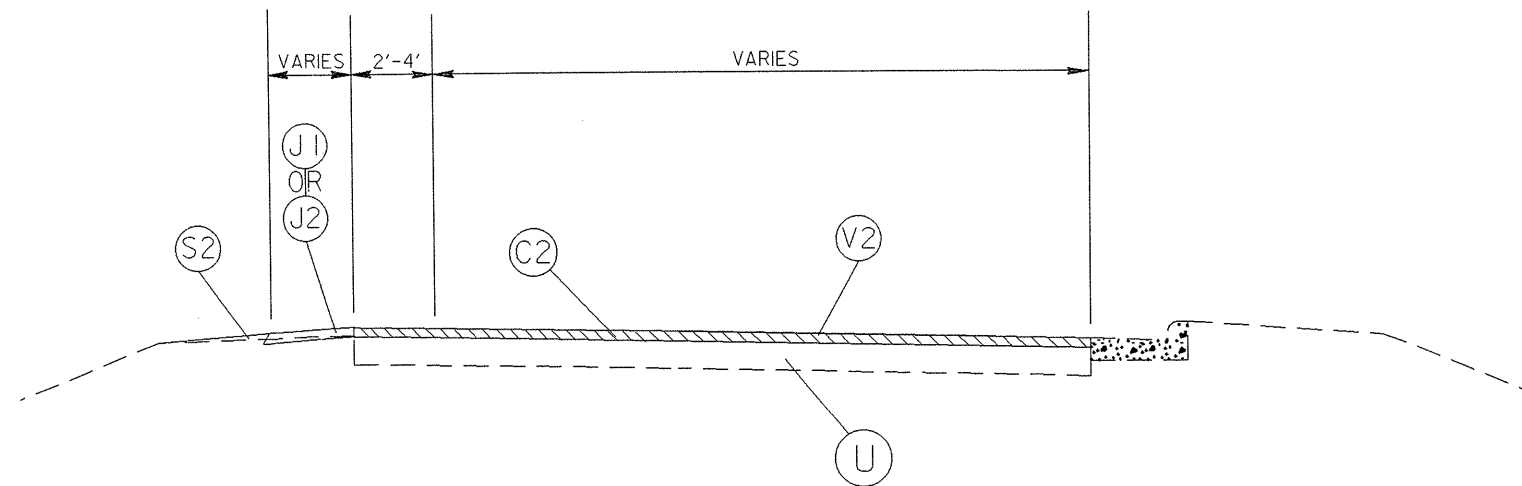
\*CONTRACTOR SHALL USE THIS TYPICAL FOR THE RAMPS WITHOUT CURB AND GUTTER AND TRIANGLE TOWN BLVD.

\*USE ON RAMPS AT GLENWOOD AVE., LEESVILLE EB RAMPS AND WB OFF, ALL CREEDMOOR RAMPS, SIX FORKS WB OFF, CAPITAL BLVD RAMPS AND TRIANGLE TOWN RAMPS

# PAVEMENT SCHEDULE

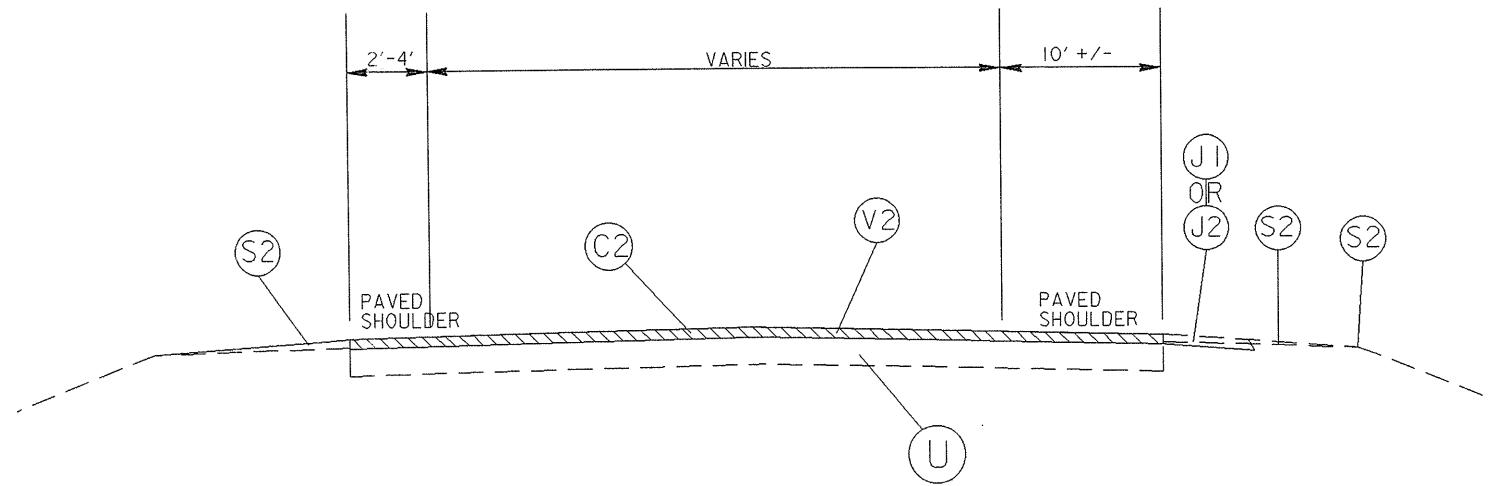
(C1)	PROP. APPROX. 2" ASPH. CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
(C2)	PROP. APPROX. 3" ASPH. CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD., IN EACH OF TWO LIFTS
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(D2)	PROP. APPROX. 2.5" ASPH. CONC. INTERMEDIATE COURSE, TYPE 119.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
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(V1)	MILL 2" IN DEPTH
(V2)	MILL 3" IN DEPTH
(V3)	MILL 6" IN DEPTH, 6' OR 12' WIDTH
(V4)	MILL 4.5" IN DEPTH, FULL WIDTH (PATCHING I-540 WB AT CAPITAL)
(S1)	PROP. SHOULDER GRADING
(S2)	PROP. SHOULDER RECONSTRUCTION AS DIRECTED BY THE ENGINEER
(U)	EXISTING PAVEMENT
(F)	CRACK AND FOG SEAL

PROJ. REFERENCE NO.		SHEET NO.
I-5307, I-5310 (47030.3.1)		6
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION



TYPICAL SECTION NO. 6

\*CONTRACTOR SHALL USE THIS TYPICAL FOR THE LOOPS  
 \*USE ON LOOPS AT FALLS OF NEUSE EB ON AND WB OFF



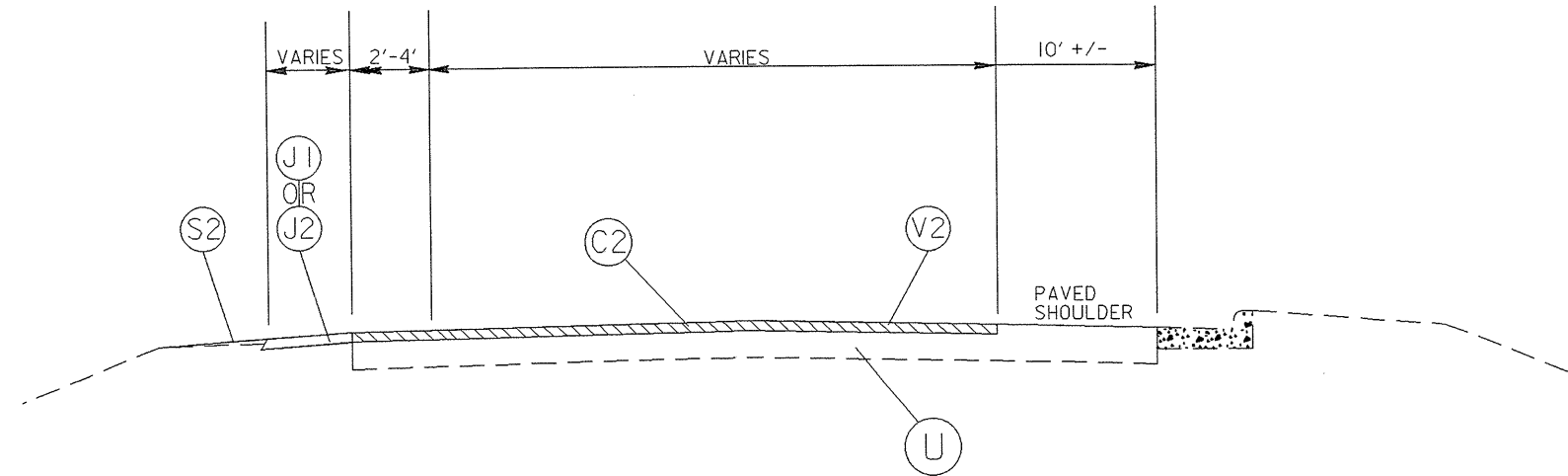
TYPICAL SECTION NO. 7

\*CONTRACTOR SHALL USE THIS TYPICAL FOR THE RAMPS WITHOUT CURB AND GUTTER  
 \*USE ON RAMPS AT LEESVILLE WB ON, SIX FORKS EB RAMPS AND WB ON, FALLS OF NEUSE EB OFF AND WB ON

# PAVEMENT SCHEDULE

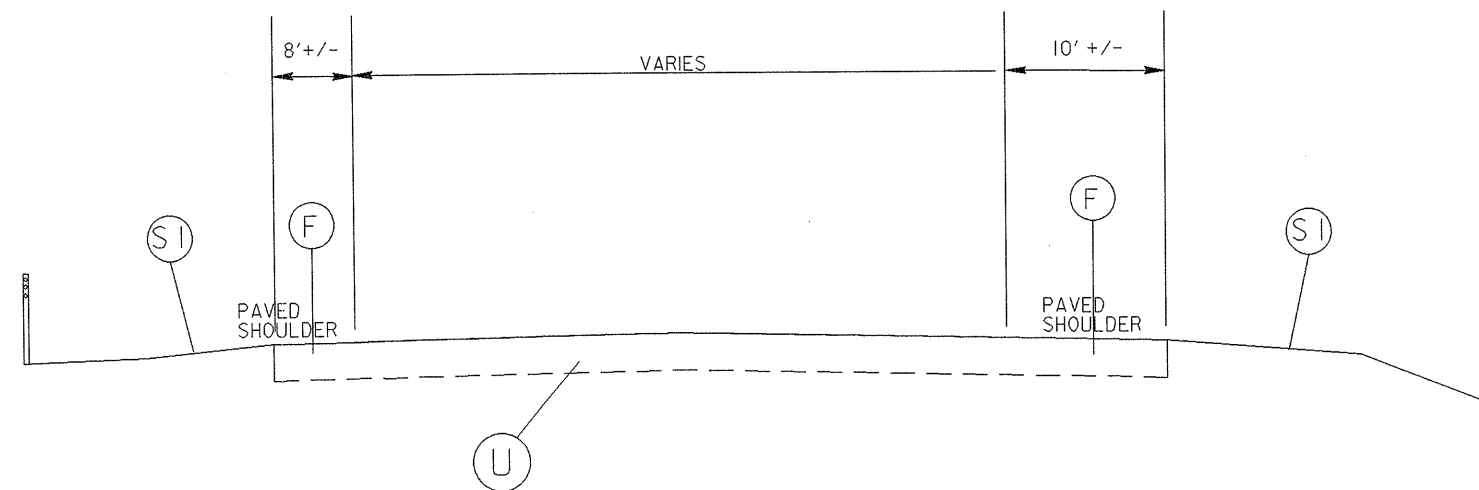
(C1)	PROP. APPROX. 2" ASPH. CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
(C2)	PROP. APPROX. 3" ASPH. CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD., IN EACH OF TWO LIFTS
(C3)	PROP. APPROX. 2" ASPH. CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
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(S2)	PROP. SHOULDER RECONSTRUCTION AS DIRECTED BY THE ENGINEER
(U)	EXISTING PAVEMENT
(F)	CRACK AND FOG SEAL

PROJ. REFERENCE NO.		SHEET NO.
I-5307, I-5310 (47030.3.1)		7
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION



TYPICAL SECTION NO. 8

\*CONTRACTOR SHALL USE THIS TYPICAL FOR RAMPS WITH CURB AND GUTTER



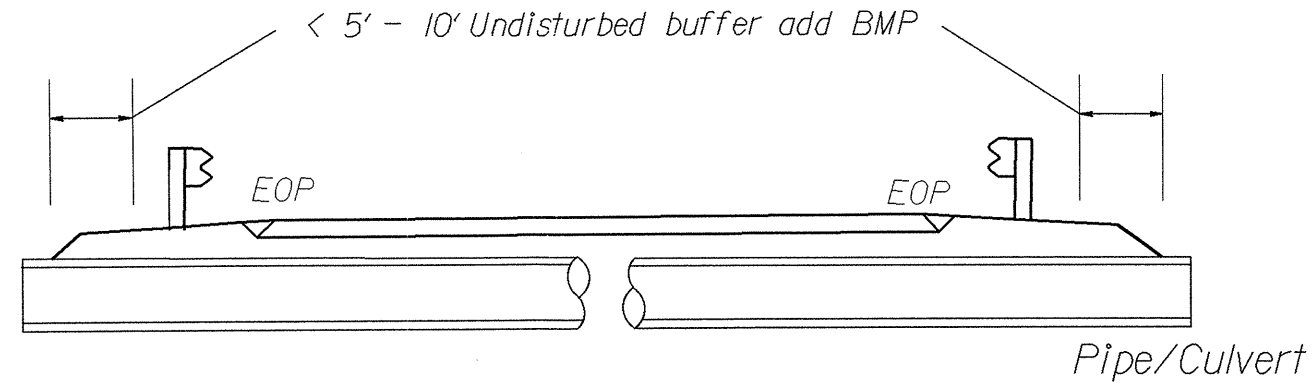
TYPICAL SECTION NO. 9

PROJECT REFERENCE NO.	SHEET NO.
I-5307 & I-5310	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

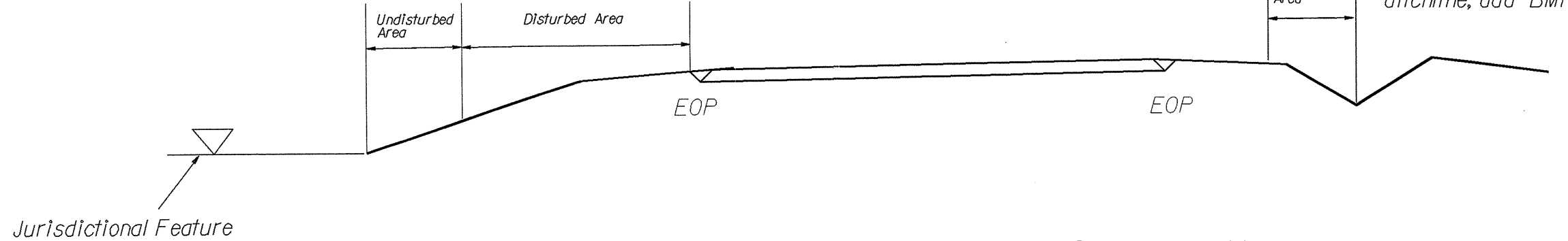
NOTES: Less than 5' - 10' undisturbed buffer from ROW, ditchline, water feature, or drainage inlet, add BMP.

BMP Options: Wattle or Silt Fence

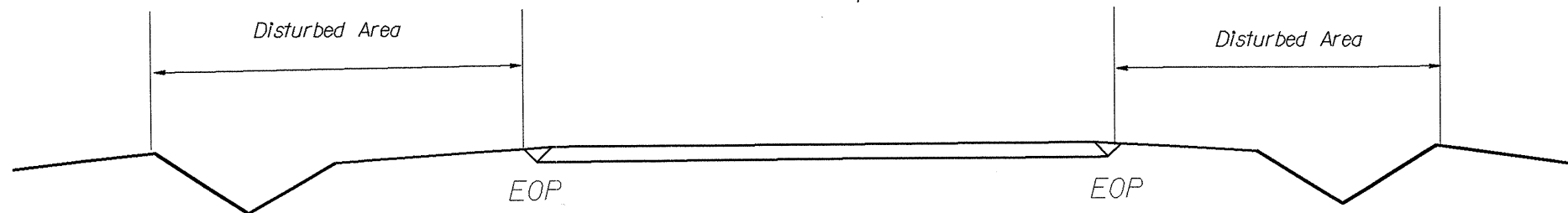
# EROSION CONTROL DETAIL



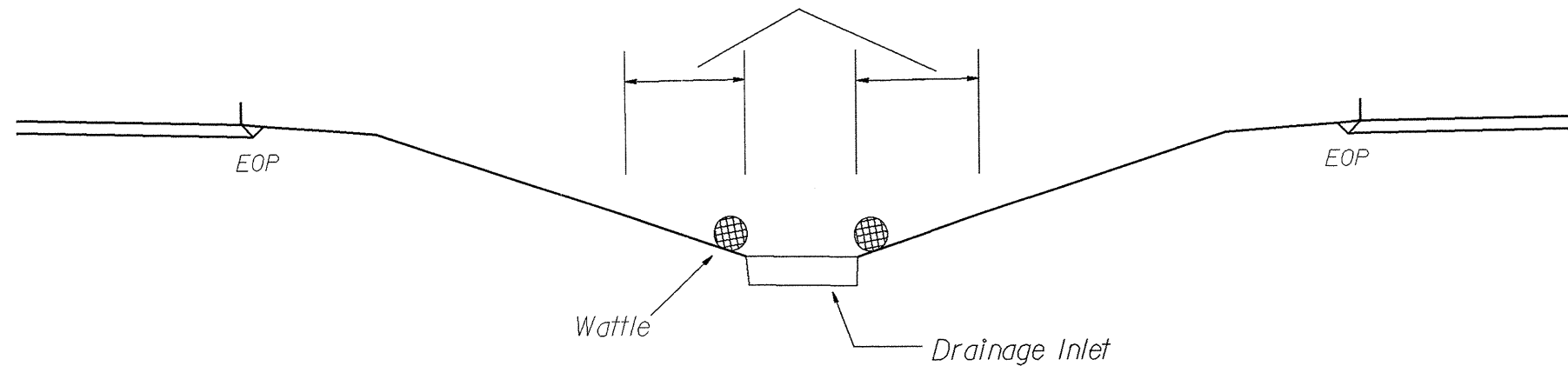
< 5' - 10' Undisturbed buffer from jurisdictional feature add BMP



Use BMP's if shoulders and/or frontslopes and/or ditchline and/or backslopes are disturbed



< 5' - 10' Undisturbed buffer from inlet, add wattle

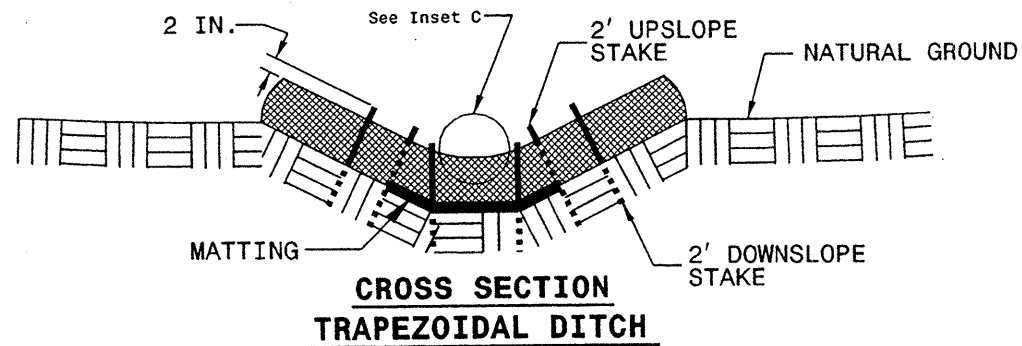
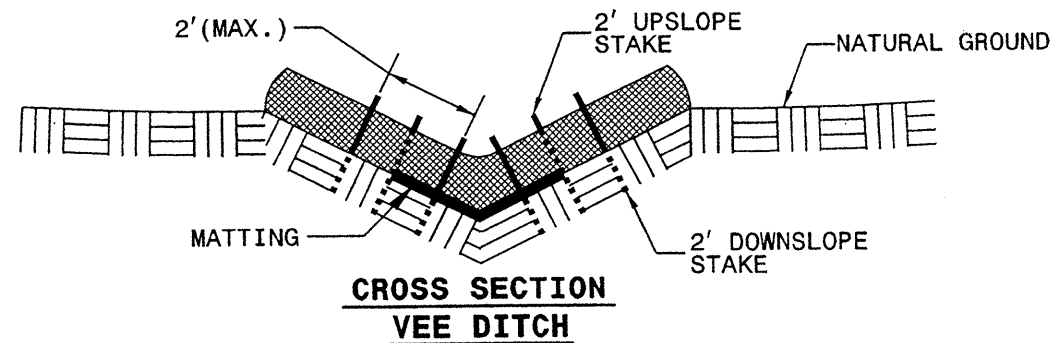
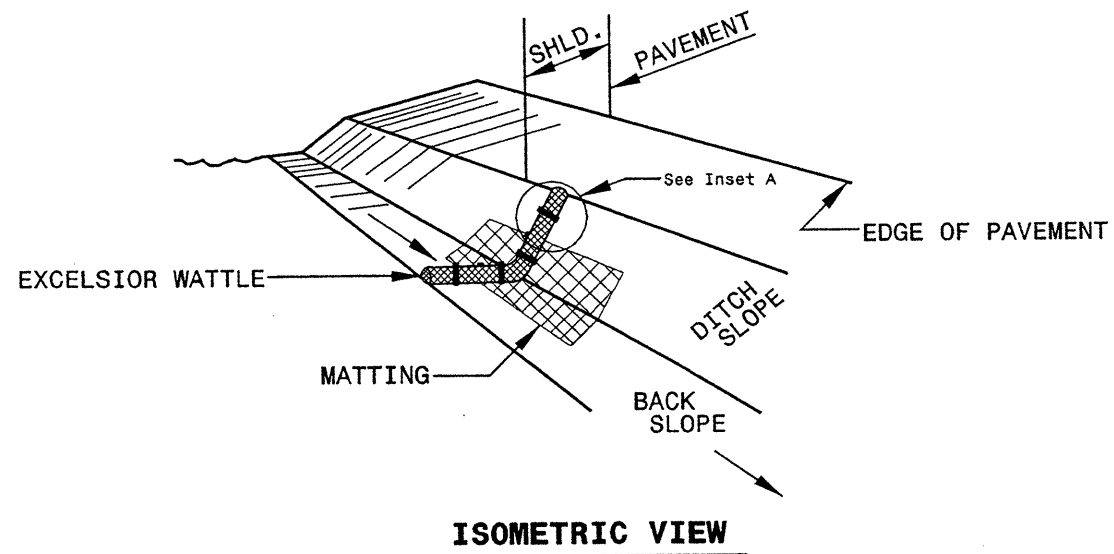


NOT TO SCALE



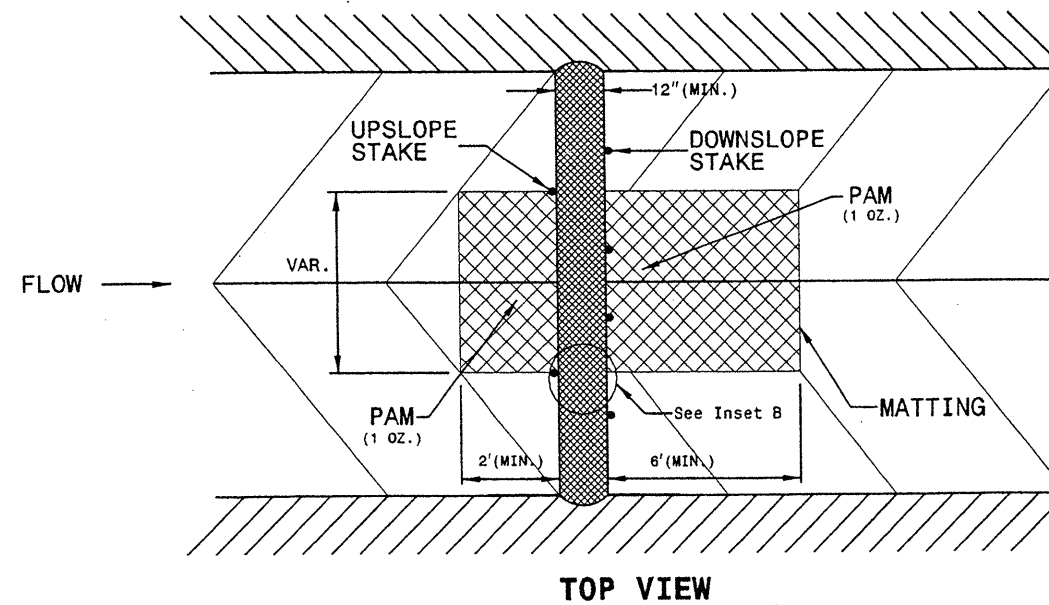
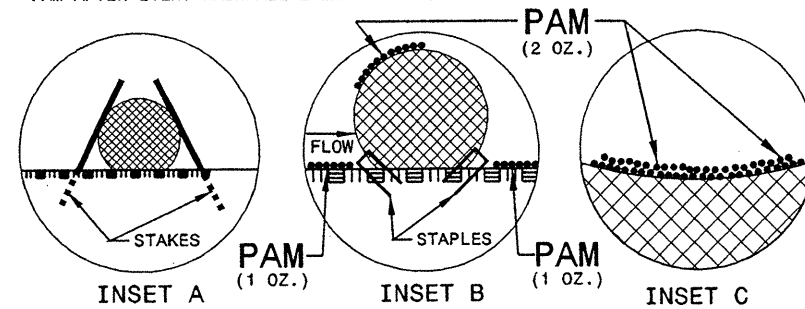
PROJECT REFERENCE NO. <b>1-5307, BTC</b>	SHEET NO. <b>9</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



**NOTES:**

- USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.
- USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.
- ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.
- INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.
- PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.
- INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.
- INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.
- PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.
- INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.



COUNTY NAME	BRIDGE NUMBER	FACILITY CARRIED	FEATURE INTERSECTED	NO. SPANS	STRUCTURE LENGTH	BRIDGE DECK WIDTH	# of existing modular expansion joints	MODULAR EXPANSION JOINT ELASTOMERIC SEAL (LF)	# of existing expansion joints with prefab strip seal	EXPANSION JOINT EPDM OR NEOPRENE GLAND ELASTOMERIC REPLACEMENT (LF)	# of existing compression joints	PREFORMED COMPRESSION JOINT SEALS (LF)	# of existing foam joints	FOAM JOINT SEALS (LF)	Deck Area	Approach Slab Area	PLACEMENT OF CRACK/DECK SEALER (SF)
<b>Map 1</b>																	
DURHAM	310342	I40 & I-540	.96 MI.E.SR1973	7	1036	45	2	90	1	45					46,620.00	1,776.00	48,396.00
DURHAM	310457	I-40	JCT.I-540 & I-40	2	278	73.8		0					2	148	20,516.40	3,456.00	23,972.40
WAKE	910725	I540 NBL	US70	3	325	82.8									26,910.00	3,648.00	30,558.00
WAKE	910726	I540 NBL R	I540 & US70	9	1603	45.9									73,577.70	1,824.00	75,401.70
								90		45		0	2	148	167,624.10	10,704.00	178,328.10
<b>Map 2</b>																	
WAKE	911038	I540 EBL	NC50	3	194	61							2	122	11,834.00	2,784.00	14,618.00
WAKE	910777	I540 EBL	SR2012 (LITCHFORD RD.)	1	143	60.2							2	120	8,608.60	2,736.00	11,344.60
WAKE	910998	I540 EBL.	CSX RAIL ROAD	2	420	72			1	72			2	144	30,240.00	3,408.00	33,648.00
WAKE	911000	I540EBL.	US1	2	254	60		0					2	120	15,240.00	2,352.00	17,592.00
WAKE	911004	I540 FLY OVER	US1	2	265	44.4							2	89	11,766.00	2,016.00	13,782.00
WAKE	911005	I540 FLY OVER	I540 EB&WB & RAMP C&B	5	895	44.3	2	89							39,648.50	1,680.00	41,328.50
WAKE	911007	I540 RAMP	I540 NS CON. B	1	138	28.6							2	57	3,946.80	1,344.00	5,290.80
WAKE	911002	I-540 EBL	TRIANGLE TOWN CTR.BLVD.	1	290	73.9	1	74					1	74	21,431.00	3,360.00	24,791.00
								163		72		0		726	142,714.90	19,680.00	162,394.90
<b>Map 3</b>																	
WAKE	911037	I540 WBL	NC50	3	190	61							2	122	11,590.00	2,784.00	14,374.00
WAKE	910778	I540 WBL	SR2012 (LITCHFORD RD.)	1	144	60.2							2	120	8,668.80	3,216.00	11,884.80
WAKE	910997	I540 WBL	CSX RAIL ROAD	2	420	72					1	72	2	144	30,240.00	3,648.00	33,888.00
WAKE	910999	I540 WB	US1	2	253	48.5							2	97	12,270.50	1,488.00	13,758.50
WAKE	911003	I540 COL.WBL	US1	2	253	40.4							2	81	10,221.20	1,872.00	12,093.20
WAKE	911006	I540 NS CO	RAMP A US1	1	102	28.8									2,937.60	1,248.00	4,185.60
WAKE	911001	I-540 WBL	TRIANGLE TOWN BLVD	1	290	62.1	1	62					1	62	18,009.00	2,784.00	20,793.00
								62		0		72		626	93,937.10	17,040.00	110,977.10
<b>Map 4</b>																	
DURHAM	310341	I40	.96 MI.E.SR1973	2	274	43		0	2	86					11,782.00	1,824.00	13,606.00
DURHAM	310456	I-40	JCT. I-540 & I-40	2	278	62		0					2	124	17,236.00	2,880.00	20,116.00
WAKE	910701	I540 SBL	US70	3	325	82.8	1	83	1	83	1	83			26,910.00	3,648.00	30,558.00
WAKE	910702	I540 SBL R	I540&US70	9	1613	43.1	4	172							69,520.30	1,920.00	71,440.30
								255		169		83		124	125,448.30	10,272.00	135,720.30

<b>Total Modular Expansion Elastomeric Seal</b>	570	<b>Total EPDM or Neoprene Seal</b>	286	<b>Total Compression Seal</b>	155	<b>Total Foam Joint Seal</b>	1624	529,724.40	57,696.00	587,420.40	<b>Total Filled Joint Replacement (LF)</b>	500
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PROJECT NO.	SHEET NO.	TOTAL NO.
47030.3.1, 5CR.20921.36	11	12

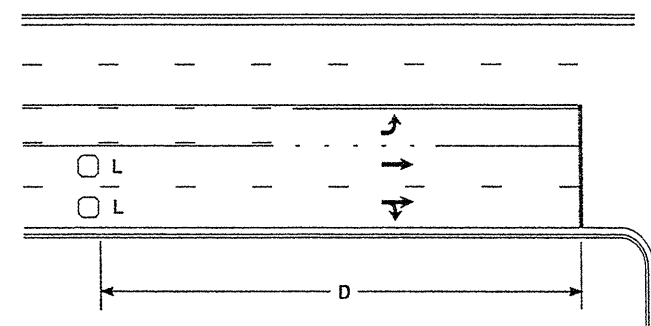
### SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP	FINAL SURFACE TESTING REQUIRED	LENGTH MI	WIDTH FT	BORROW CY	SHOULDER GRADING SMI	AGGREGATE BASE COURSE TONS	INCIDENTAL STONE BASE TONS	SHOULDER RECONSTRUCTION SMI	6" MILLING SY	3" MILLING SY	2" MILLING SY	4.5" MILLING SY	INTERMEDIATE COURSE, I19.0C TONS	SURFACE COURSE, S9.5B TONS	SURFACE COURSE, S9.5C TONS	ASPHALT BINDER FOR PLANT MIX TON	SEALING EXISTING PAVEMENT CRACKS & JOINTS LB	PATCHING EXISTING PAVEMENT TONS	FOG SEAL SY	PORTABLE LIGHTING LS		
47030.3.1	Wake	1	I-540 EB	I-40 OVERPASS TO JOINT EAST OF US 70	9	NO	4.4	18	500	11.50		400	0.80									1,540		63,306			
TOTAL FOR MAP NO. 1							4.4		500	11.50		400	0.80										1,540		63,306		
47030.3.1	Wake	2	I-540 EB AND RAMPS	US 70 TO TRIANGLE TOWN BLVD.	1-8	NO	12.4	36.5	1,500	24.80	4,801	1,240	1.00	67	17,282	355,606		23		44,014	2,598	4,340	50	160,043	1		
TOTAL FOR MAP NO. 2							12.4		1,500	24.80	4,801	1,240	1.00	67	17,282	355,606		23		44,014	2,598	4,340	50	160,043	1		
47030.3.1	Wake	3	I-540 WB AND RAMPS	TRIANGLE TOWN TO US 70	1-8	NO	12.53	24.5	1,500	25.06	4,024	1,253	1.00	647	16,445	332,698	1,467	443		40,825	2,430	4,386	50	161,720			
TOTAL FOR MAP NO. 3							12.53		1,500	25.06	4,024	1,253	1.00	647	16,445	332,698	1,467	443		40,825	2,430	4,386	50	161,720			
47030.3.1	Wake	4	I-540 WB	JOINT AT US 70 TO I-40 OVERPASS	9	NO	4.3	18	500	8.60		400	0.80									1,505		49,948			
TOTAL FOR MAP NO. 4							4.3		500	8.60		400	0.80											1,505		49,948	
TOTAL FOR PROJ NO. 47030.3.1							33.63		4,000	69.96	8,825	3,293	3.60	714	33,727	688,304	1,467	466		84,839	5,028	11,771	100	435,017	1		
5CR.20921.36	Wake	5	TRIANGLE TOWN BLVD.	I-540 TO NEW ASPHALT JT.	5	NO	0.2	50	20			10	0.20			7,514			886		53		50				
TOTAL FOR MAP NO. 5							0.2		20			10	0.20			7,514			886		53		50				
TOTAL FOR PROJ NO. 5CR.20921.36							0.2		20			10	0.20			7,514			886		53		50				
GRAND TOTAL							33.83		4,020	69.96	8,825	3,303	3.80	714	33,727	695,818	1,467	466	886	84,839	5,081	11,771	150	435,017	1		

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP	FINAL SURFACE TESTING REQUIRED	LENGTH MI	WIDTH FT	TEMPORARY SILT FENCE LF	MATTING (EROSION CONTROL) SY	WATTLE LF	POLY-ACRYLAMIDE (PAM) LB	SEED & MULCHING AC	UNPAVED TRENCHING (1 COND, 1") LF	INDUCTIVE LOOP LF	FOAM JOINT SEALS LF	EXPANSION JOINT EPDM OR NEOPRENE GLAND ELASTOMERIC REPLACEMENT LF	MODULAR EXPANSION JOINT ELASTOMERIC SEAL LF	PREFORMED COMPRESSION JOINT SEAL LF	FILLED EXPANSION JOINT REPLACEMENT LF	PLACEMENT OF CRACK/DECK SEALER SF		
47030.3.1	Wake	1	I-540 EB	I-40 OVERPASS TO JOINT EAST OF US 70	9	NO	4.4	18	500	510	630	47	8.36			148	45	90			178,328.10		
TOTAL FOR MAP NO. 1							4.4		500	510	630	47	8.36			148	45	90				178,328.10	
47030.3.1	Wake	2	I-540 EB AND RAMPS	US 70 TO TRIANGLE TOWN BLVD.	1-8	NO	12.4	36.5	1,000	910	1,130	85	18.04	75.00	780	726	72	163			162,394.90		
TOTAL FOR MAP NO. 2							12.4		1,000	910	1,130	85	18.04	75.00	780	726	72	163					162,394.90
47030.3.1	Wake	3	I-540 WB AND RAMPS	TRIANGLE TOWN TO US 70	1-8	NO	12.53	24.5	1,000	910	1,130	85	18.22	75.00	1,776	626		62	72	500	110,977.10		
TOTAL FOR MAP NO. 3							12.53		1,000	910	1,130	85	18.22	75.00	1,776	626		62	72	500		110,977.10	
47030.3.1	Wake	4	I-540 WB	JOINT AT US 70 TO I-40 OVERPASS	9	NO	4.3	18	500	510	630	47	6.26			124	169	255	83		135,720.30		
TOTAL FOR MAP NO. 4							4.3		500	510	630	47	6.26			124	169	255	83			135,720.30	
TOTAL FOR PROJ NO. 47030.3.1							33.63		3,000	2,840	3,520	264	50.88	150.00	2,556	1,624	286	570	155	500		587,420.40	
5CR.20921.36	Wake	5	TRIANGLE TOWN BLVD.	I-540 TO NEW ASPHALT JT.	5	NO	0.2	50	29		80		0.29										
TOTAL FOR MAP NO. 5							0.2		29		80		0.29										
TOTAL FOR PROJ NO. 5CR.20921.36							0.2		29		80		0.29										
GRAND TOTAL							33.83		3,029	2,840	3,600	264	51.17	150.00	2,556	1,624	286	570	155	500		587,420.40	



### High Speed Detection [≥40 mph (64 km/hr)]

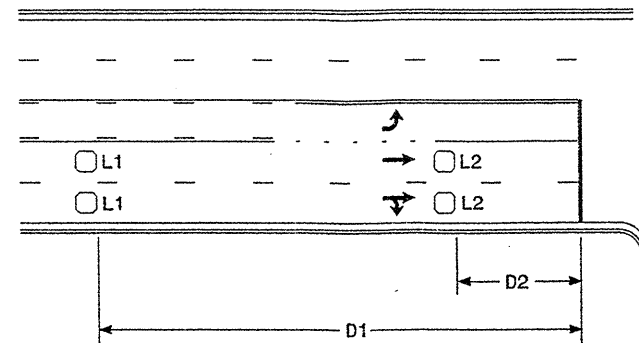


Speed Limit mph (km/hr)	D ft (m)
40 (64)	250 (75)
45 (72)	300 (90)
50 (80)	355 (110)
55 (88)	420 (130)

L = 6ft X 6ft (1.8m X 1.8m)  
Wired in series for TS1  
Controllers  
Wired separately for TS2,  
170, and 2070L Controllers

Volume Density Operation

OR

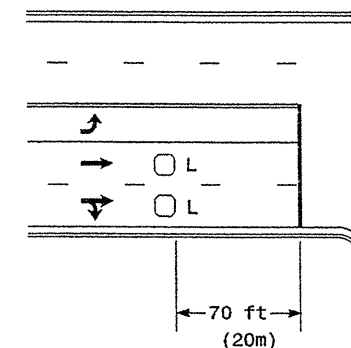


Speed Limit mph (km/hr)	D1 ft (m)	D2 ft (m)
40 (64)	250 (75)	80 (25)
45 (72)	300 (90)	90 (27)
50 (80)	355 (110)	100 (30)
55 (88)	420 (130)	110 (35)

L1 = 6ft X 6ft  
(1.8m X 1.8m)  
Wired in series  
L2 = 6ft X 6ft  
(1.8m X 1.8m)  
Wired in series

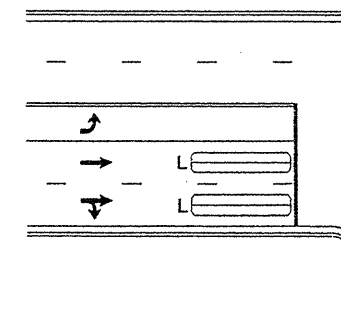
"Stretch" Operation

### Low Speed Detection [≤35 mph (56 km/hr)]



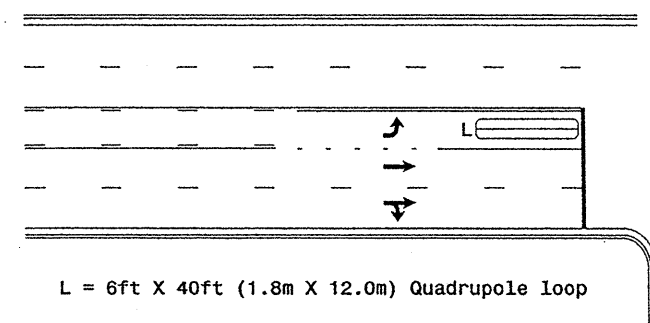
L = 6ft X 6ft (1.8m X 1.8m)  
Wired in series

OR



L = 6ft X 40ft (1.8m X 12.0m)  
Quadrupole loop, wired separately

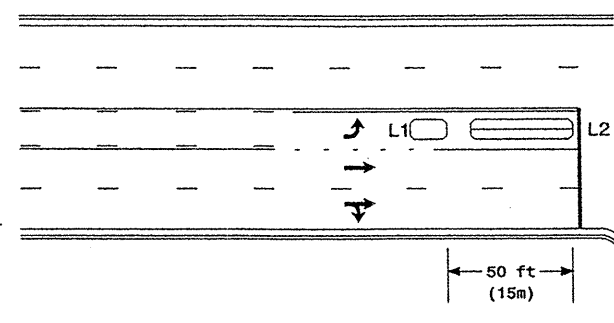
### Left Turn Lane Detection



L = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

Presence Loop Detection

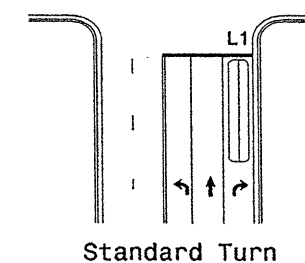
OR



L1 = 6ft X 15ft (1.8m X 4.6m) Queue detector  
L2 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop

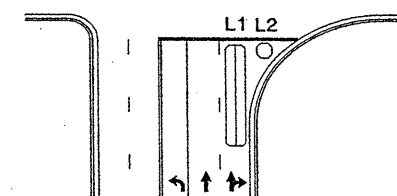
Queue Loop Detection

### Right Turn Lane Detection

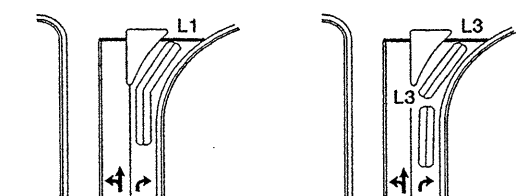


Standard Turn

L1 = 6ft X 40ft (1.8m X 12.0m) Quadrupole loop  
L2 = 6ft X 6ft (1.8m X 1.8m) [Minimum] Presence loop  
Wired separately  
L3 = 6ft X 20ft (1.8m X 6.0m) Quadrupole loop  
Wired in series

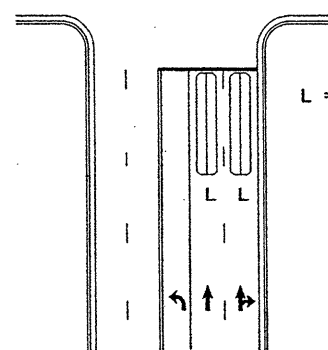


Wide Radius Turn



Channelized Turn

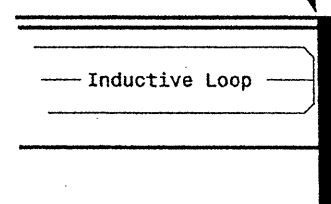
### Side Street Detection



L = 6ft X 40ft (1.8m X 12.0m)  
Quadrupole loop  
Wired to separate  
detectors/channels

### Presence Loop Placement at Stop Lines

Locate loop slightly  
behind leading  
edge of stop line




Note:  
Loop may be located in advance  
of stop line when stop line is  
greater than 15' (4.5m) from edge  
of intersecting roadway; or, when  
loop detects a permissive or  
protected/permissive left turn.

### Recommended Number of Turns

Single 6' X 6' (1.8m X 1.8m)  
loop (wired separately):

Length of Lead-in ft (m)	Number of Turns
< 250 (75)	3
250-375 (75-115)	4
375-525 (115-160)	5
> 525 (160)	6

Quadrupole loops: Use 2-4-2 turns  
6' X 15' (1.8m X 4.6m) Loops:  
Lead-in < 150' (45 m), use 2 turns  
Lead-in > 150' (45 m), use 3 turns

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

SCALE  
N/A

Typical Loop Locations

SEAL  
NORTH CAROLINA  
PROFESSIONAL ENGINEERS AND SURVEYORS  
2348  
P. L. ALEXANDER

PLAN DATE: June 2006  
REVIEWED BY:  
PREPARED BY: P. L. Alexander  
REVIEWED BY:

REVISIONS  
✓ Revise pavement markings

INIT. DATE  
P.L.A. 12/1/06

SIGNATURE DATE  
P.L.A. 12/1/06

SIG. INVENTORY NO.

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

11-08

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**

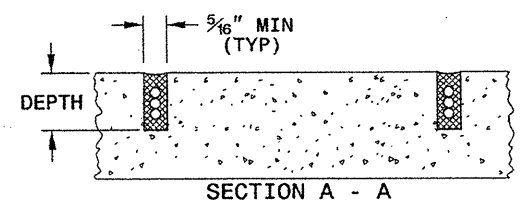
SHEET 1 OF 3  
**1725D01**

**CONVENTIONAL 4-SIDED LOOP**

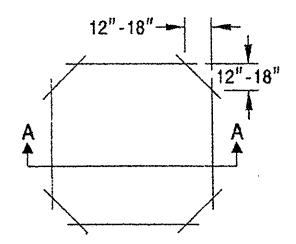
**SAW CUT OPTIONS**

**SAW SLOT DEPTH CHART**

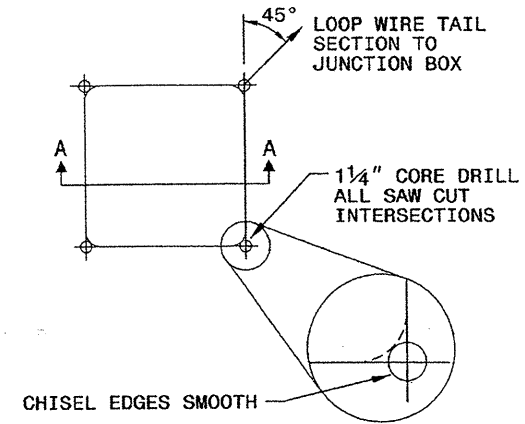
DEPTH (IN)	NO. OF WIRE TURNS					
	2	3	4	5	6	
CONCRETE	2.0	2.0	2.5	2.5	3.0	
ASPHALT	2.0	2.5	3.0	3.0	3.0	



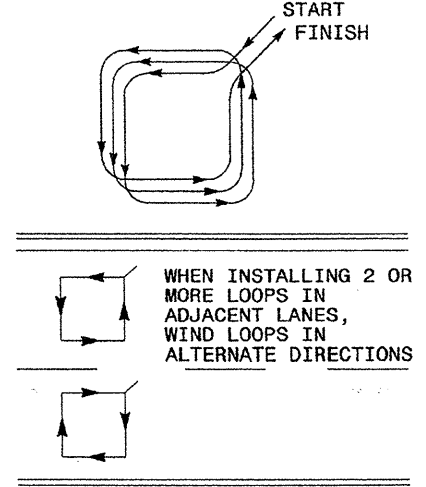
OPTION 1



OPTION 2 (POOR PAVEMENT)



**LOOP WINDING METHOD**

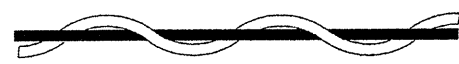


11-08

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

**LOOP WIRE TWISTING METHOD**

INCORRECT WAY TO TWIST WIRE



CORRECT WAY TO TWIST WIRE



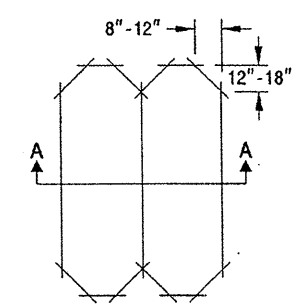
**NOTES**

1. OVERLAP SAW CUTS AT CORNERS AND INTERSECTION POINTS TO ENSURE UNIFORM SAW SLOT DEPTH.
2. MAINTAIN 12" SPACING BETWEEN LOOP WIRE TAIL SECTIONS.
3. WIRE LOOPS CONNECTED TO THE SAME DETECTOR CHANNEL IN SERIES.
4. LOCATE LOOPS IN CENTER OF LANES UNLESS OTHERWISE SHOWN ON PLANS OR APPROVED BY ENGINEER.

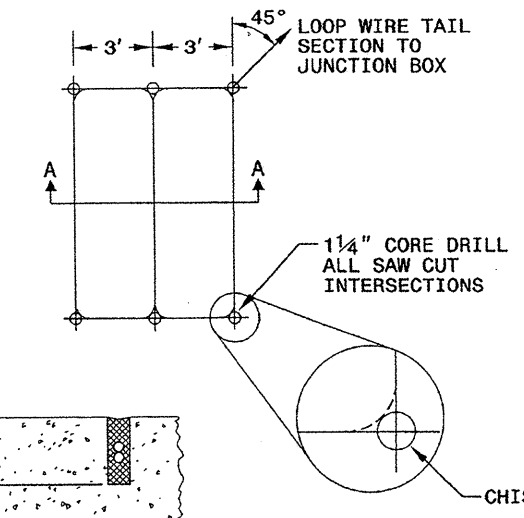
**QUADRUPOLE LOOP**

**SAW CUT OPTIONS**

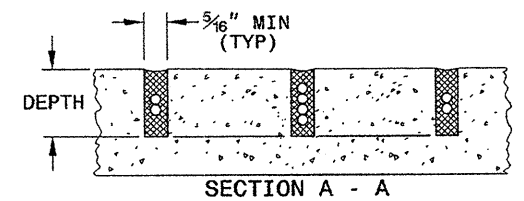
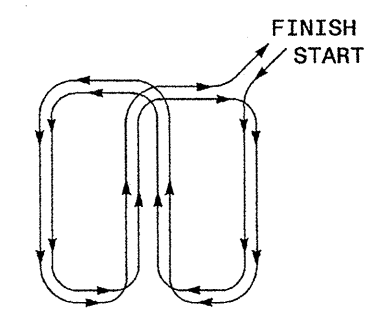
OPTION 1



OPTION 2 (POOR PAVEMENT)



**LOOP WINDING METHOD**



DEPTH IS 2.5" FOR CONCRETE AND 3.0" FOR ASPHALT

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**

SHEET 1 OF 3  
**1725D01**

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway  
Garner, NC 27529

SEAL

Milton T. Dean 1/24/08  
SIGNATURE DATE

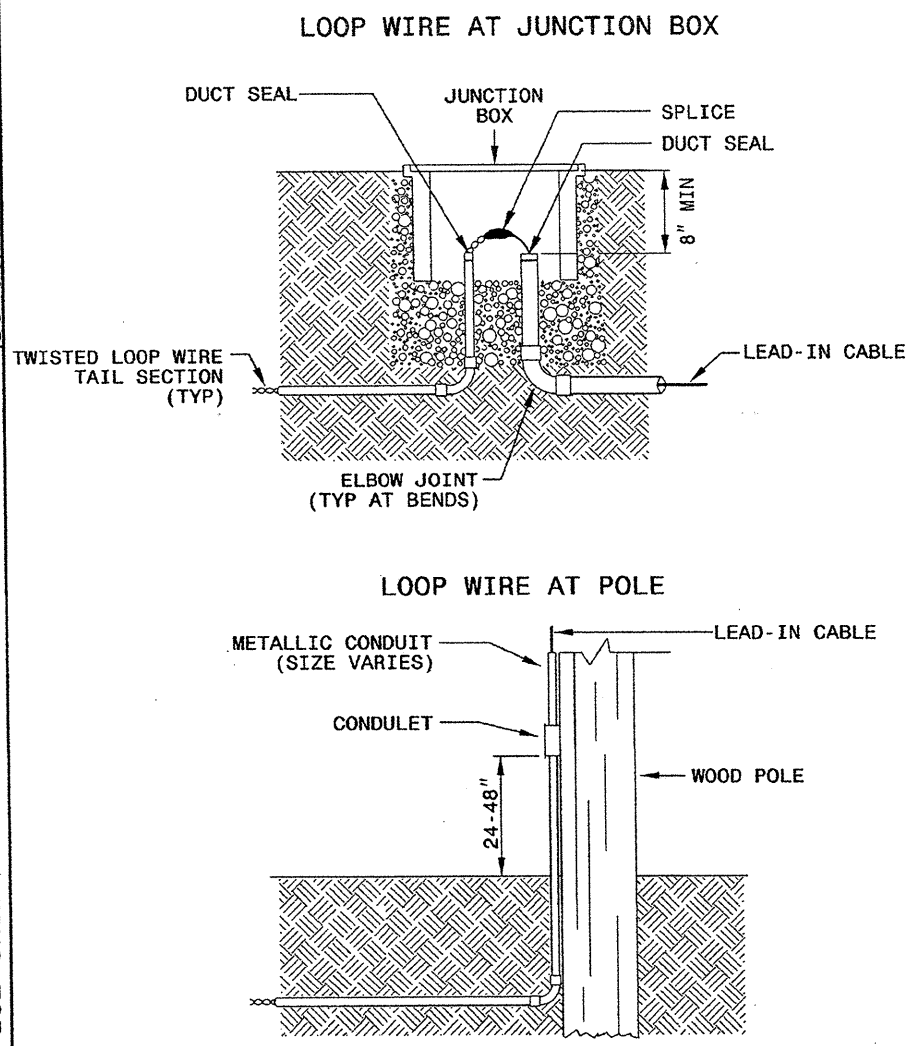
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

11-08

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
LOOP WIRE DETAILS

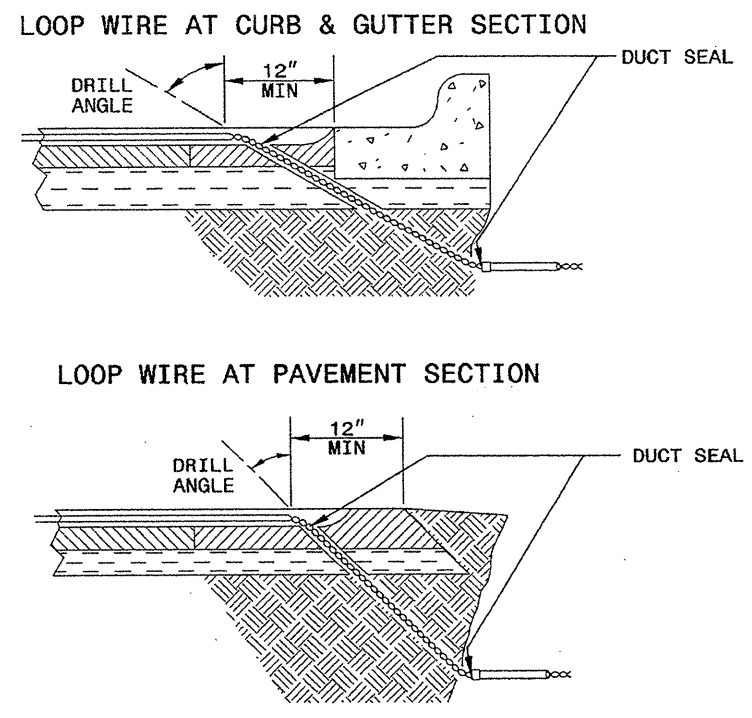
SHEET 2 OF 3  
**1725D01**

**LOOP WIRE SPLICE POINT DETAILS**



**NOTE**  
SPlice ALL LOOP WIRE TAIL SECTIONS/LEAD-IN CABLE IN JUNCTION BOXES OR APPROVED CONDULETS.

**LOOP WIRE PAVEMENT EDGE DETAILS**



- NOTES**
1. DO NOT EXCAVATE UNDER CURB AND GUTTER SECTIONS FOR CONDUIT INSTALLATION.
  2. TWIST LOOP WIRE TAIL SECTIONS FROM WHERE LOOP WIRE TAIL LEAVES SAW CUT TO JUNCTION BOX, INCLUDING THROUGH CONDUIT.
  3. BEFORE SEALING LOOPS, INSTALL DUCT SEAL WHERE LOOP WIRE TAIL SECTION LEAVES SAW CUT IN PAVEMENT AND AT ENTRANCE OF CONDUIT TO JUNCTION BOX.

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

11-08

ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
LOOP WIRE DETAILS

SHEET 2 OF 3  
**1725D01**

See Plate for Title

Prepared in the Offices of:

750 N. Greenfield Parkway  
Garner, NC 27529

SEAL

*Milton J. Dean* 11/24/08  
SIGNATURE DATE

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2011116

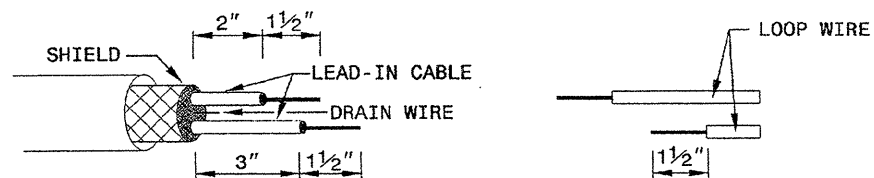
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

11-08

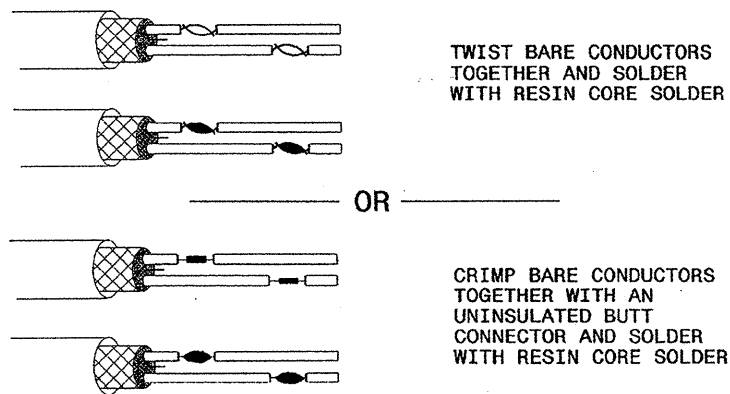
ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3  
**1725D01**

STEP 1. STRIP LOOP WIRE AND LEAD-IN CABLE

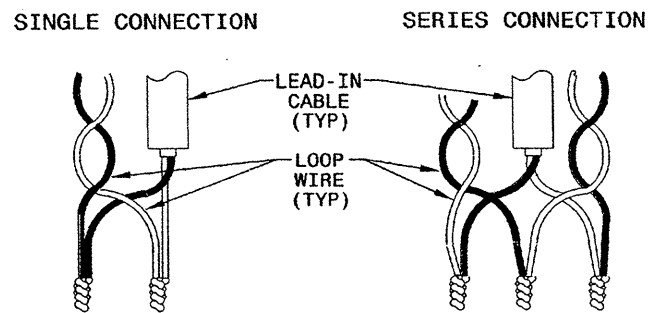


STEP 2. CONNECT AND SOLDER

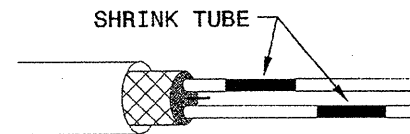


BOND SHIELD DRAIN WIRE AT SPLICE SECTIONS (DO NOT GROUND)

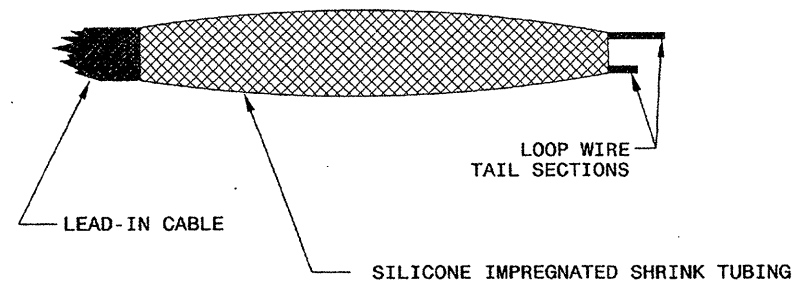
LOOP WIRE AND LEAD-IN CABLE CONNECTION DETAILS



STEP 3. INSULATE EACH SOLDER JOINT SEPARATELY



STEP 4. ENVIRONMENTALLY PROTECT SPLICE



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RALEIGH, N.C.

11-08

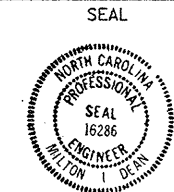
ENGLISH DETAIL DRAWING FOR  
**INDUCTIVE DETECTION LOOPS**  
SPlicing FOR LEAD-IN CABLE AND LOOP WIRE

SHEET 3 OF 3  
**1725D01**

See Plate for Title



750 N. Greenfield Parkway  
Garner, NC 27529

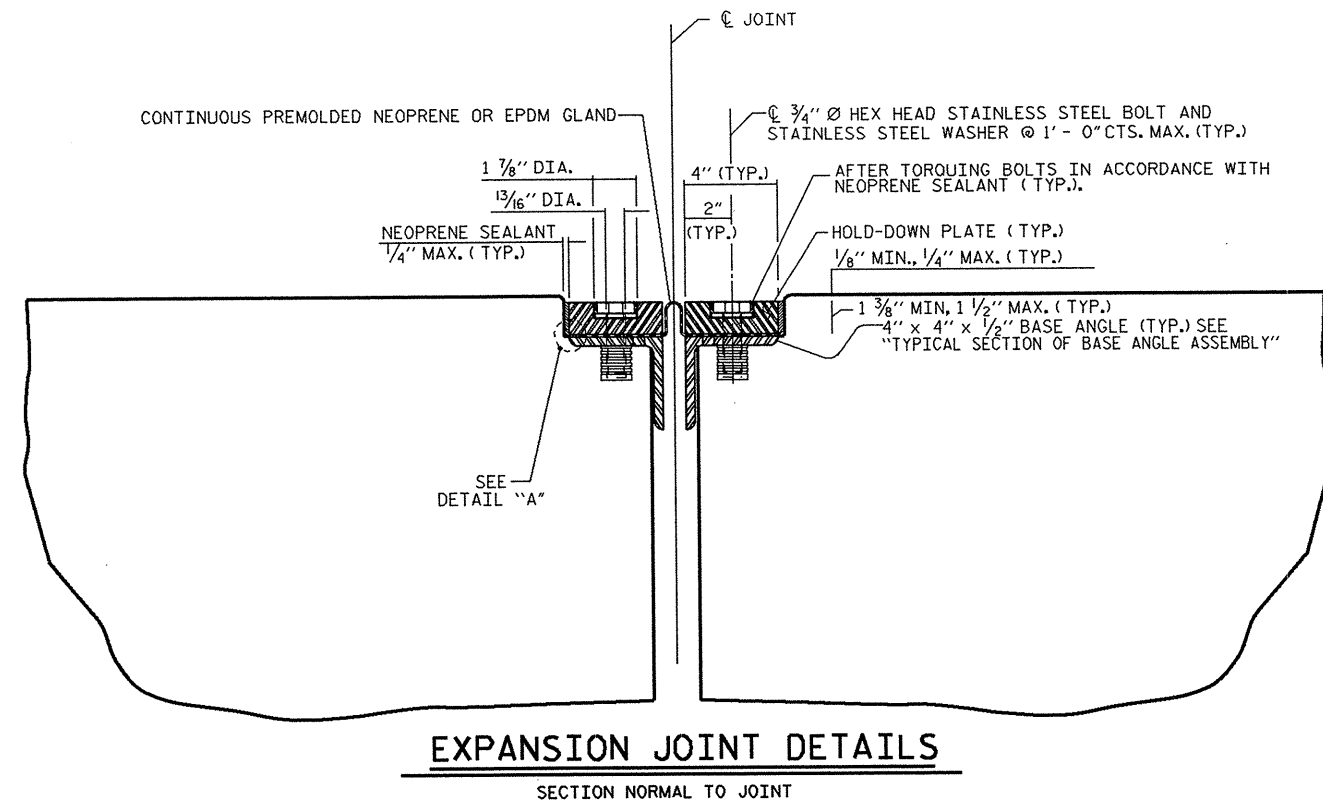


Milton L. Dean 11/24/08  
SIGNATURE DATE



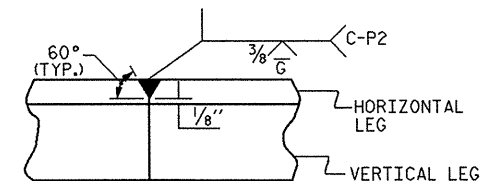
**INSTALLATION PROCEDURE**

1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE  $4\frac{1}{8}$ " TO  $4\frac{1}{4}$ " WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE  $\frac{3}{4}$ "  $\varnothing$  HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A  $1"$   $\varnothing$  HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE  $4" \times 4" \times \frac{1}{2}"$  BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED  $\frac{1}{8}"$  IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES AND THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, COMPLETELY FILL THESE RECESSES WITH NEOPRENE SEALANT.

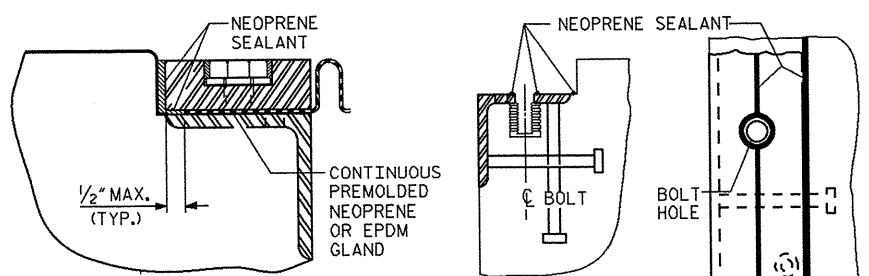


**EXPANSION JOINT DETAILS**

SECTION NORMAL TO JOINT



**DETAIL- FIELD WELD  
SPLICE OF BASE ANGLE**



**CROSS SECTION  
PLAN VIEW  
INSTALLATION SKETCH**

PROJECT NO. I-5307/I-5310  
WAKE COUNTY

STATION: \_\_\_\_\_

SHEET 51 OF \_\_\_\_\_

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>EPDM/NEOPRENE EXPANSION JOINT GLAND SEAL MAINTENANCE DETAILS</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO.
					TOTAL SHEETS

ASSEMBLED BY : REESE BRILEY	DATE : 11/29/11
CHECKED BY :	DATE :
DRAWN BY : REK 9/87	REV. 5/7/03R RWW/JTE
CHECKED BY : CRK 10/87	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM