

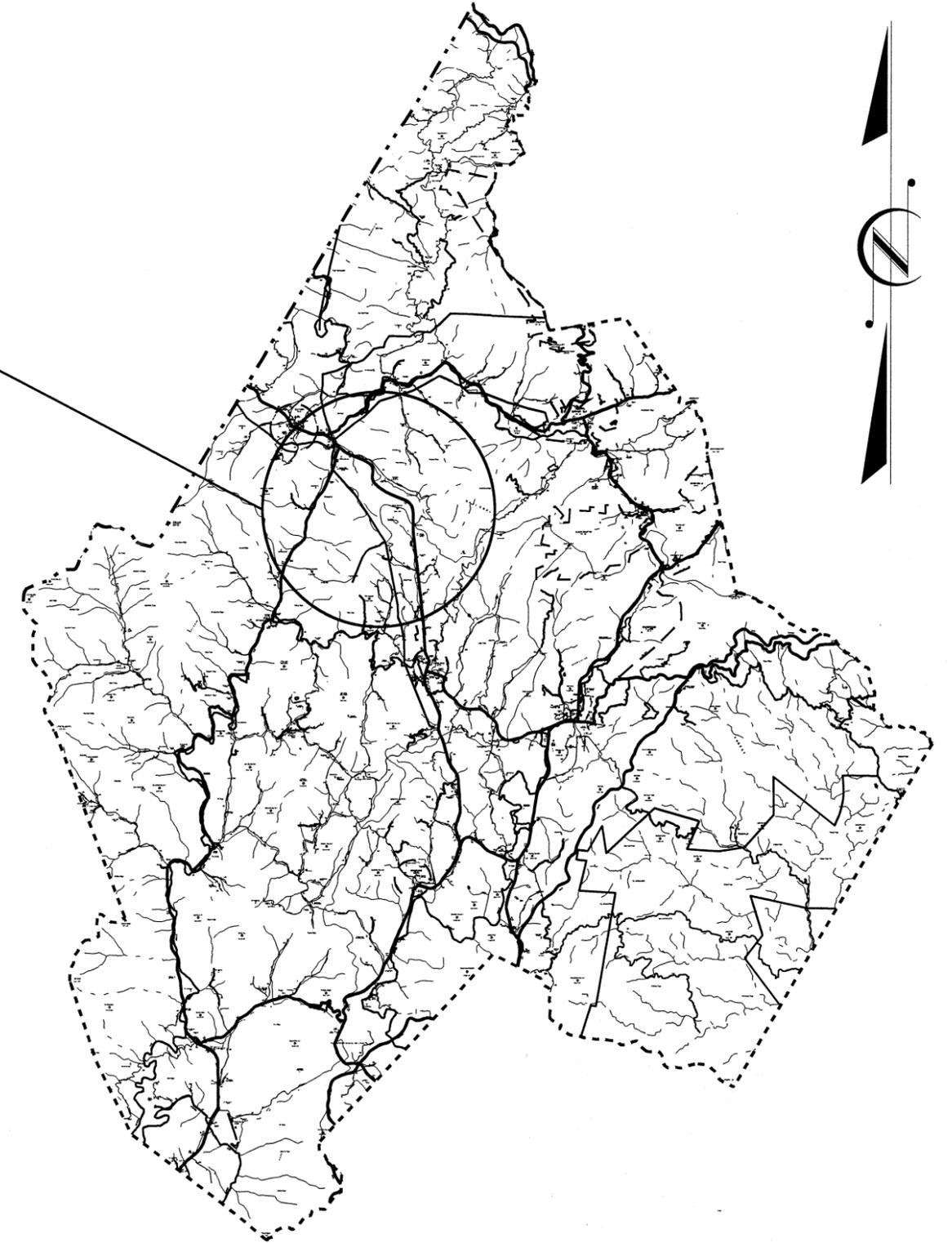
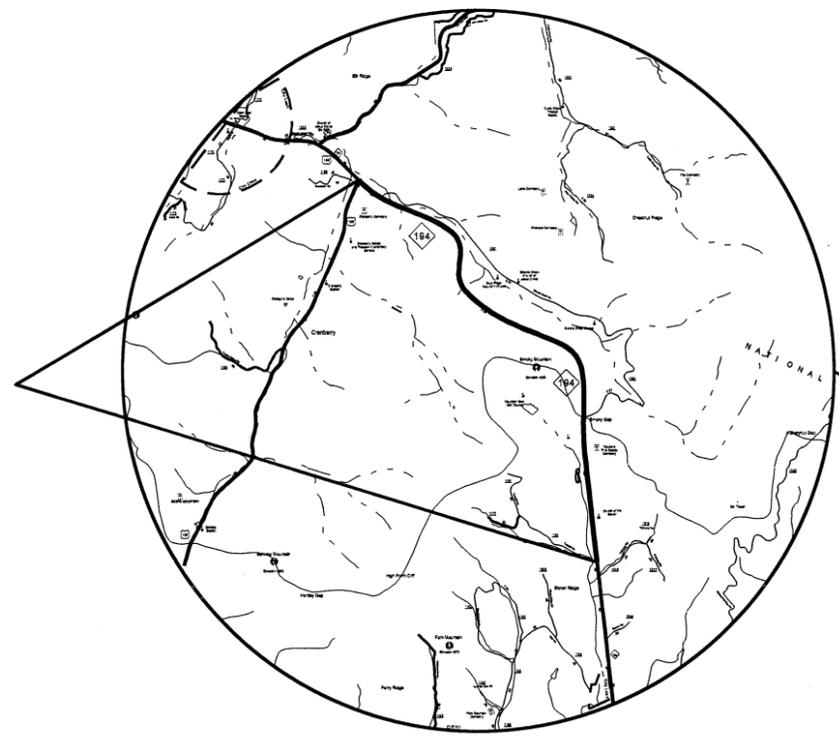
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

2014

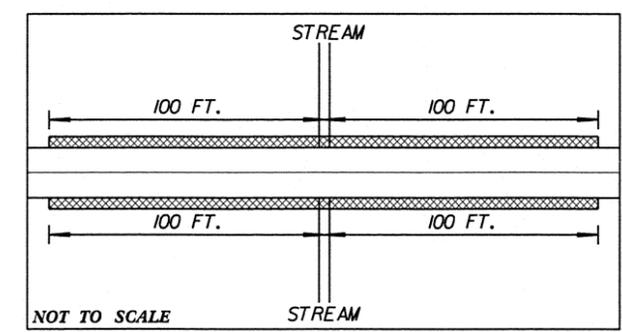
**AVERY COUNTY**

PRIMARY ASPHALT RESURFACING

MAP #1 NC 194  
FROM SR 1161 TO US 19E/NC 194



**\*DETAIL FOR AGGREGATE SHOULDER BORROW AT STREAM CROSSING**



HATCHED AREA SHOWS PLACEMENT OF AGGREGATE SHOULDER BORROW

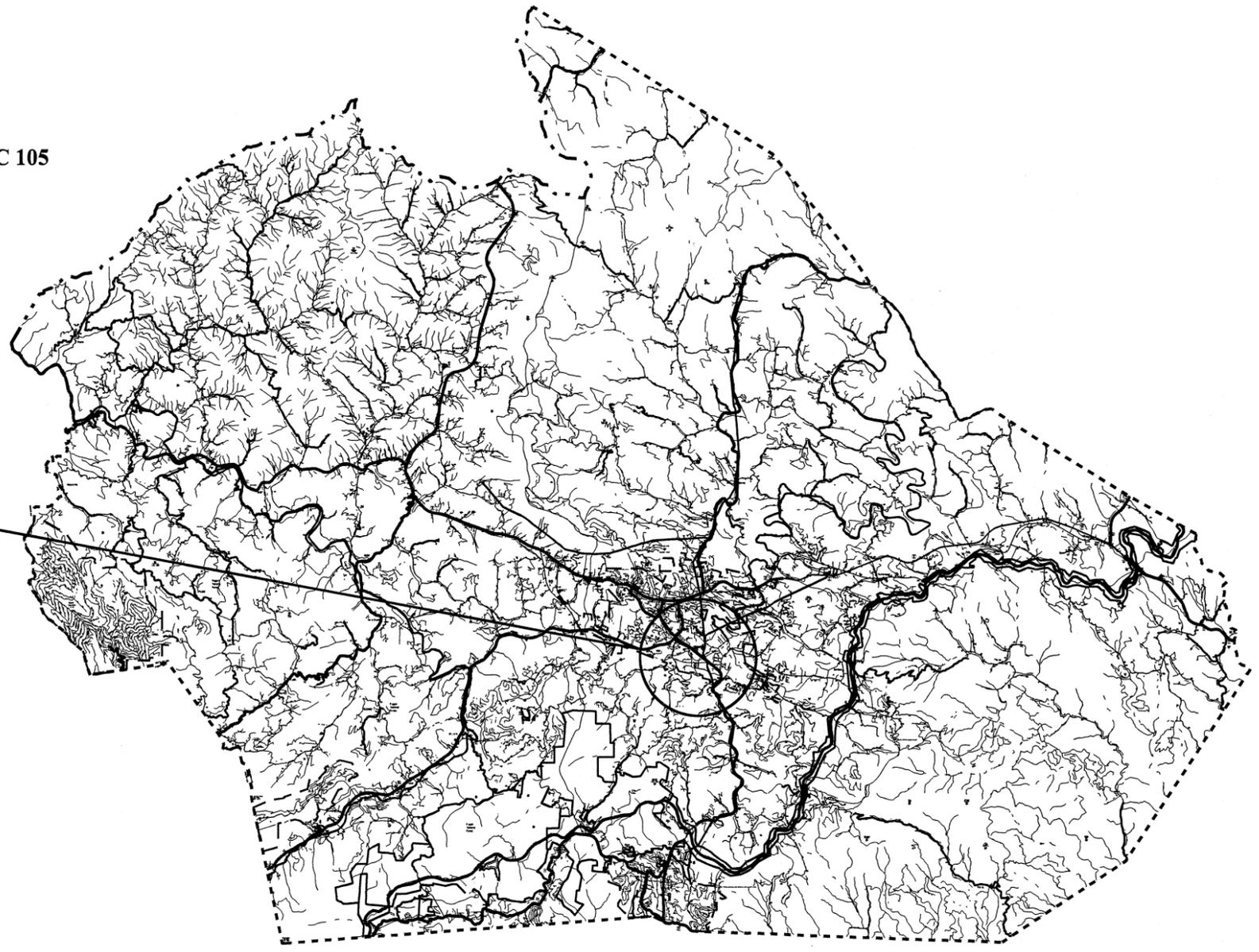
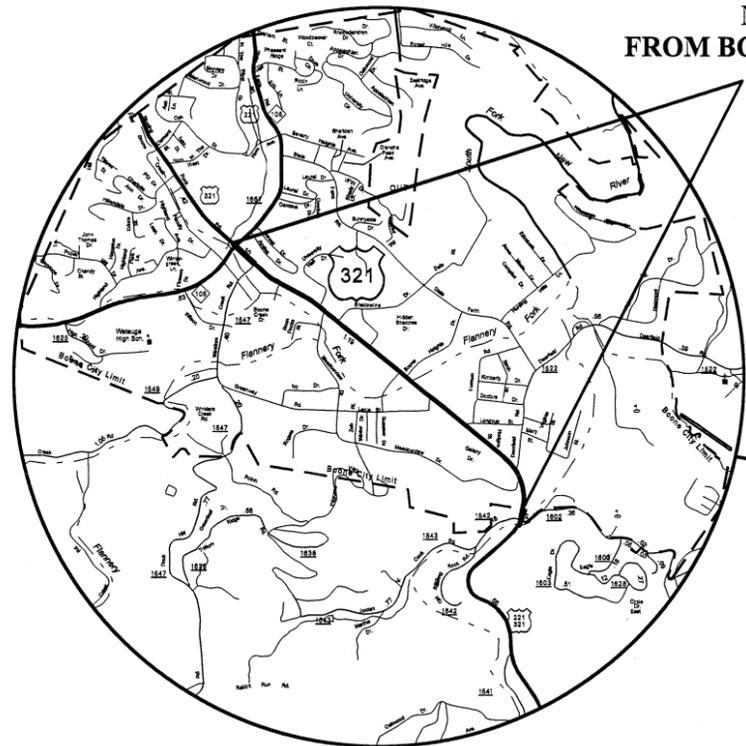
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

2014

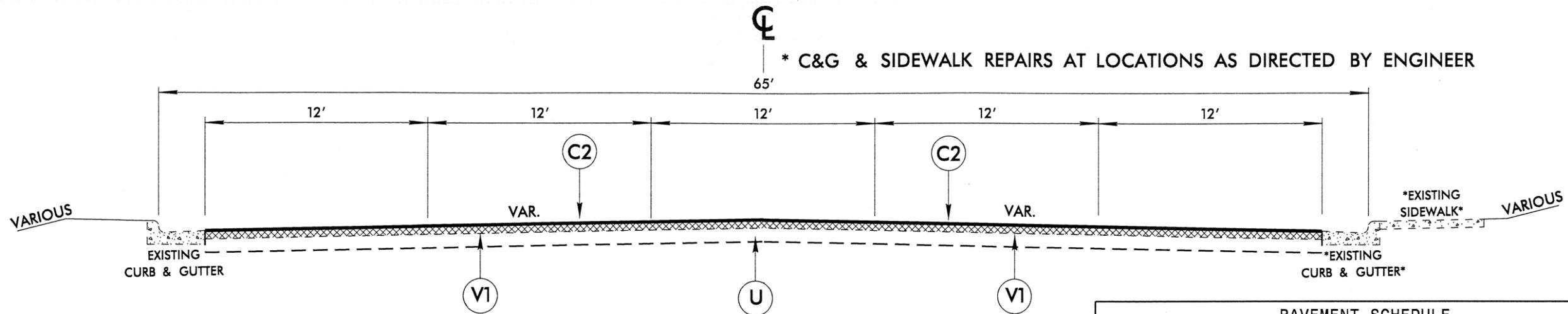
**WATAUGA COUNTY**

PRIMARY ASPHALT RESURFACING

MAP #2 US 221/321  
FROM BOONE SCL TO US 321/NC 105



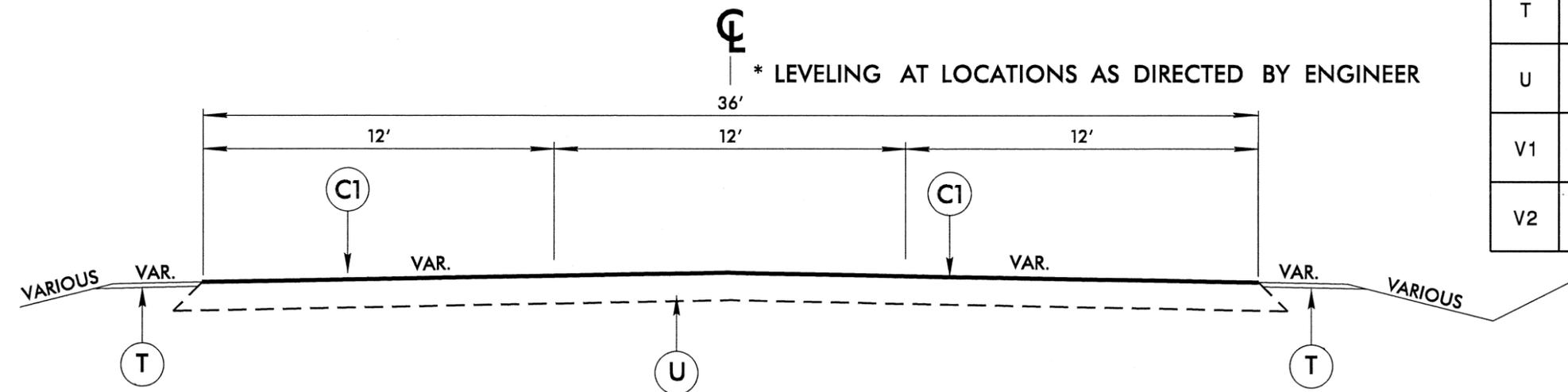
8/17/99  
C:\FEB-2014 16:58 Documents\Project Manager\Contracts\Resurfacing 2014\2014 Supplemental Resurfacing\District 2\2014 Avery-Watauga Supplemental Resurfacing Maps.dgn



### TYPICAL SECTION NO. 2

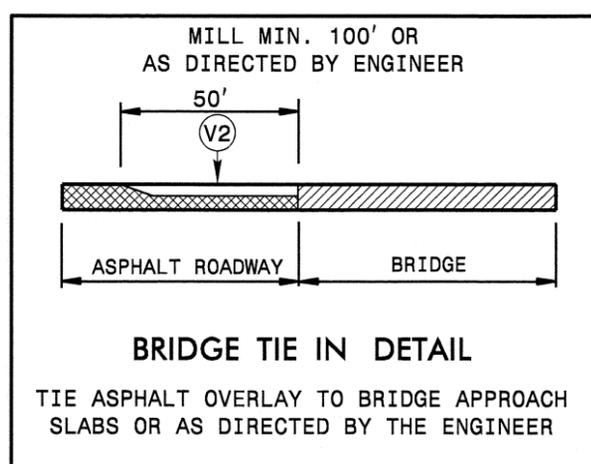
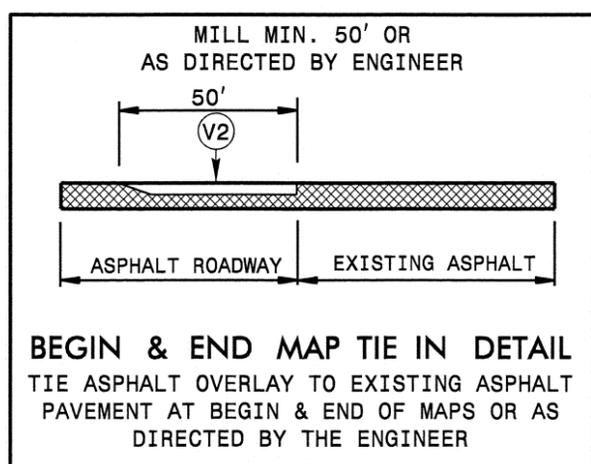
MAP #2 - US 221/321 FROM BOONE SCL TO US 321/NC 105

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
T	SHOULDER RECONSTRUCTION
U	EXISTING PAVEMENT
V1	MILLING OF EXISTING ASPHALT PAVEMENT AT DEPTH OF 0 - 1½"
V2	INCIDENTAL MILLING



### TYPICAL SECTION NO. 1

MAP #1 - NC 194 FROM SR 1161 TO US 19E/NC 194



**AVERY - WATAUGA COUNTIES**  
**PRIMARY RESURFACING**

DIVISION II

REVISIONS	INIT.	DATE

**N.C. DEPARTMENT of TRANSPORTATION**  
**DIVISION of HIGHWAYS**  
**DIVISION ELEVEN**

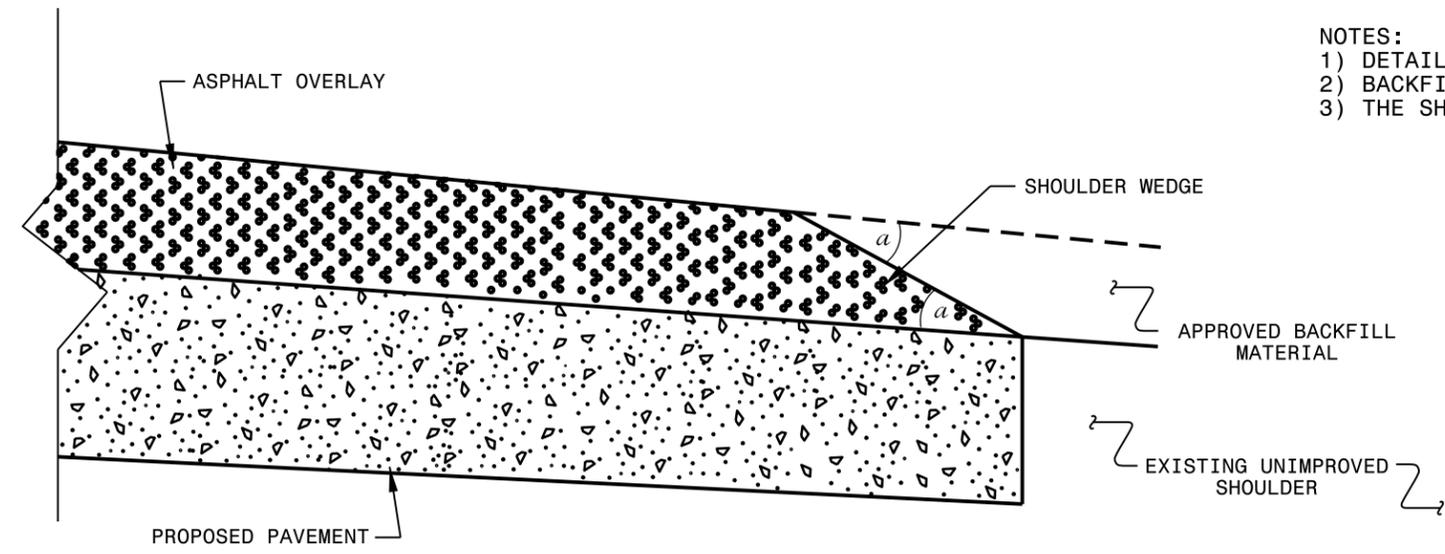
SCALE: N/A      DATE: 01/2014

PREPARED BY: J. L. LAWS

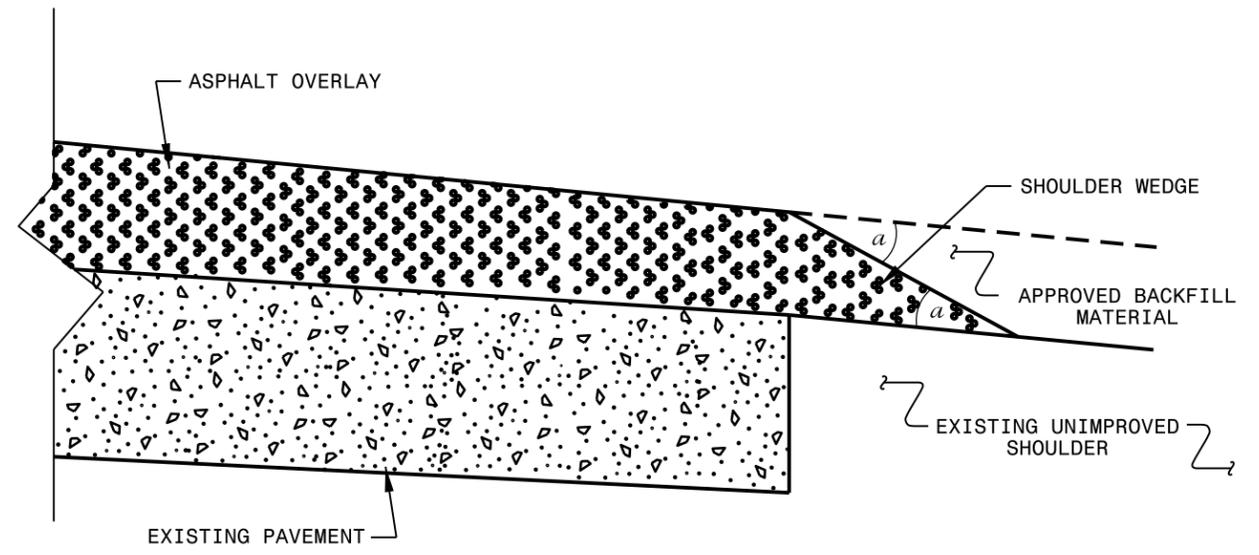
REVIEWED BY: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_

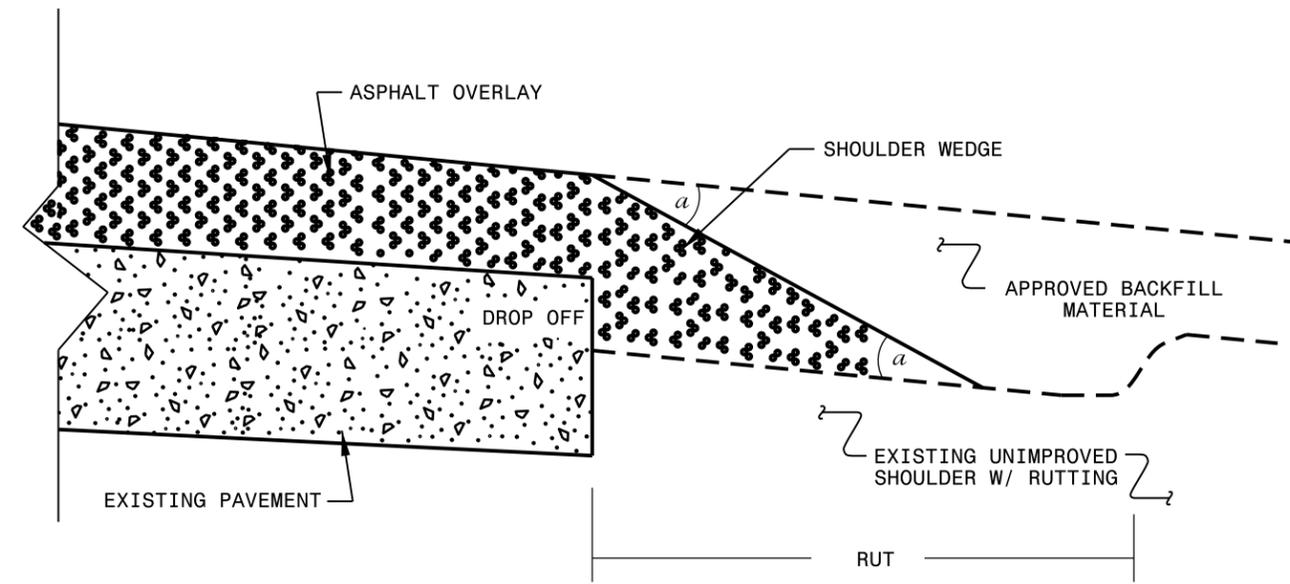
- NOTES:
- 1) DETAIL DOES NOT APPLY TO OGAFc AND ULTRA-THIN BONDED WEARING COURSE.
  - 2) BACKFILL SHOULDER WITH APPROVED MATERIAL.
  - 3) THE SHOULDER WEDGE DEVICE MAY BE DISENGAGED AT PAVED DRIVEWAYS AND SIDE STREETS.



**SHOULDER WEDGE DETAIL**  
 (Resurfacing Projects w/ Widening or  
 with Existing Paved Shoulder having no dropoffs)



**SHOULDER WEDGE DETAIL**  
 (Resurfacing Projects w/ NO Widening)



**SHOULDER WEDGE DETAIL**  
 (Resurfacing Adjacent to  
 Rutted Shoulder)

- SHOULDER WEDGE ANGLE = 30°

CONTRACT STANDARDS  
 AND DEVELOPMENT UNIT  
 Office 919-707-6950 FAX 919-250-4119

**SHOULDER WEDGE  
 DETAILS**

ORIGINAL BY: T.SPELL DATE: 7-19-11  
 MODIFIED BY: DATE: 10/16/12  
 CHECKED BY: DATE:  
 FILE SPEC.: susr/details/stand/shoulderwedgedetail.dgn

SYSTEMS DESIGN  
 USER NAME

PROJECT NO.	SHEET NO.	TOTAL NO.
11CR.10061.21, 11CR.10951.21	5	6

**SUMMARY OF QUANTITIES**

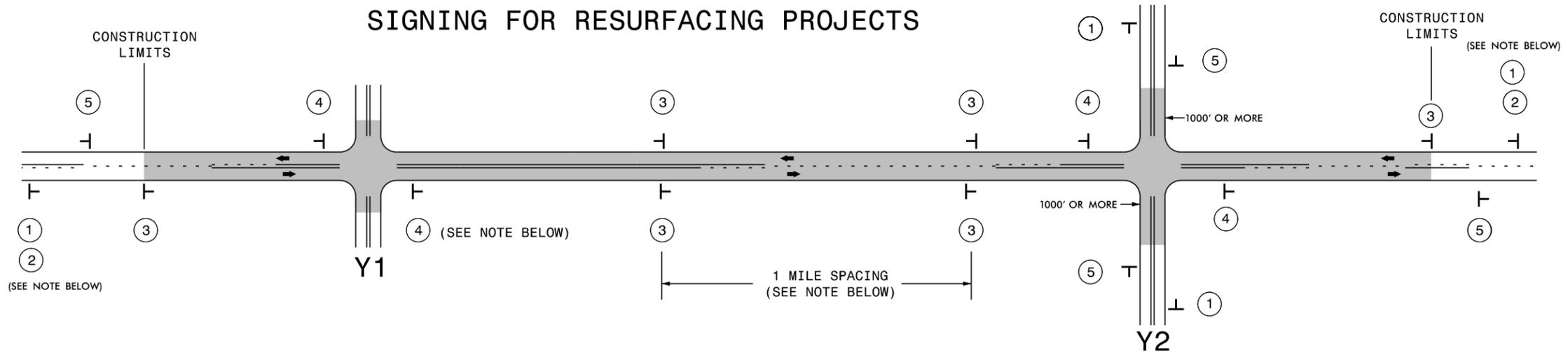
PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP	LANES	LANE TYPE	FINAL SURFACE TESTING REQUIRED	WARM MIX ASPHALT REQUIRED	LENGTH MI	WIDTH FT	GRADING LS	BORROW EXCAVATION CY	15" HDPE PIPE CULVERTS LF	SHOULDER RECONSTRUCTION SMI	0" TO 1.5" MILLING SY	INCIDENTAL MILLING SY	SURFACE COURSE, S9.5B TONS	LEVELING COURSE, S9.5B TONS	SURFACE COURSE, S9.5C TONS	ASPHALT BINDER FOR PLANT MIX TONS	FLOWABLE FILL CY	MASONRY DRAINAGE STRUCTURES EA	FRAME W/ GRATE & HOOD, STD. 840.03, TYPE E EA	2'-6" CURB & GUTTER LF	4" CONCRETE SIDEWALK SY	WHEELCHAIR RAMPS EA	6" DRIVEWAYS SY	ADJ. OF DROP INLET EA	ADJ. OF MANHOLES EA	ADJ. OF METER OR VALVE BOX EA	PORTABLE LIGHTING LS	SEED & MULCHING AC	PAVED TRENCHING [2'-2"] LF	UNPAVED TRENCHING [4'-2"] LF	INDUCTIVE LOOP LF					
11CR.10061.21	Avery	1	NC 194	FROM SR1161 TO US19E/NC194	1	3	MU	NO	NO	3.52	36		704		7.04		1,333	5,950	450		386																				
TOTAL FOR PROJ NO. 11CR.10061.21										3.52			704		7.04		1,333	5,950	450		386																				
11CR.10951.21	Watauga	2	US 221/321	FROM BOONE SCL TO US 321/NC 105	2	5	MU	NO	NO	1.45	60	1.00		100.00		51,500				4,500	265	5.00	3.00	3.00	1,400	25.00	24	100		10	12	1.00		50.00	100.00	1,475					
TOTAL FOR PROJ NO. 11CR.10951.21										1.45		1.00		100.00		51,500			4,500	265	5.00	3.00	3.00	1,400	25.00	24	100		10	12	1.00		50.00	100.00	1,475						
GRAND TOTAL										4.97		1.00	704	100.00	7.04	51,500	1,333	5,950	450	4,500	651	5.00	3.00	3.00	1,400	25.00	24	100	1	10	12	1.00	2.50	50.00	100.00	1,475					

PROJECT NO.	SHEET NO.	TOTAL NO.
11CR.10061.21, 11CR.10951.21	6	6

### THERMOPLASTIC AND PAINT QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LANES	LANE TYPE	LENGTH	WIDTH	4413000000-E	4457000000-N	4510000000-N	4810000000-E		4835000000-E	4845000000-N				4905000000-N
										WORK ZONE ADVANCE/GENERAL WARNING SIGNING	TEMPORARY TRAFFIC CONTROL	LAW ENFORCEMENT	4" YELLOW PAINT	4" WHITE PAINT	24" WHITE PAINT	PAINT LT ARROW	PAINT STR ARROW	PAINT RT ARROW	PAINT STR & RT ARROW	SNOW PLOWABLE MARKERS
										SF	LS	HR	LF	LF	LF	EA	EA	EA	EA	EA
11CR.10061.21	Avery	1	NC 194	FROM SR1161 TO US19E/NC194	1	3	MU	3.52	36	392.00	1.00		74,342	83,635						465
<b>TOTAL FOR PROJ NO. 11CR.10061.21</b>								<b>3.52</b>		<b>392.00</b>			<b>74,342</b>	<b>83,635</b>						<b>465</b>
													<b>157,977</b>							
11CR.10951.21	Watauga	2	US 221/321	FROM BOONE SCL TO US 321/NC 105	2	5	MU	1.45	60	126.00	*	240.00	38,300	7,746	744	102	44	6	20	623
<b>TOTAL FOR PROJ NO. 11CR.10951.21</b>								<b>1.45</b>		<b>126.00</b>		<b>240</b>	<b>38,300</b>	<b>7,746</b>	<b>744</b>	<b>102</b>	<b>44</b>	<b>6</b>	<b>20</b>	<b>623</b>
													<b>46,046</b>		<b>172</b>					
<b>GRAND TOTAL</b>								<b>4.97</b>		<b>518</b>	<b>1</b>	<b>240</b>	<b>112,642</b>	<b>91,381</b>	<b>744</b>	<b>102</b>	<b>44</b>	<b>6</b>	<b>20</b>	<b>1,088</b>
													<b>204,023</b>		<b>172</b>					

# SIGNING FOR RESURFACING PROJECTS



LEGEND	
⊥	STATIONARY SIGN
←	DIRECTION OF TRAFFIC FLOW

## MAINLINE (-L-) SIGNING

## -Y- LINE SIGNING

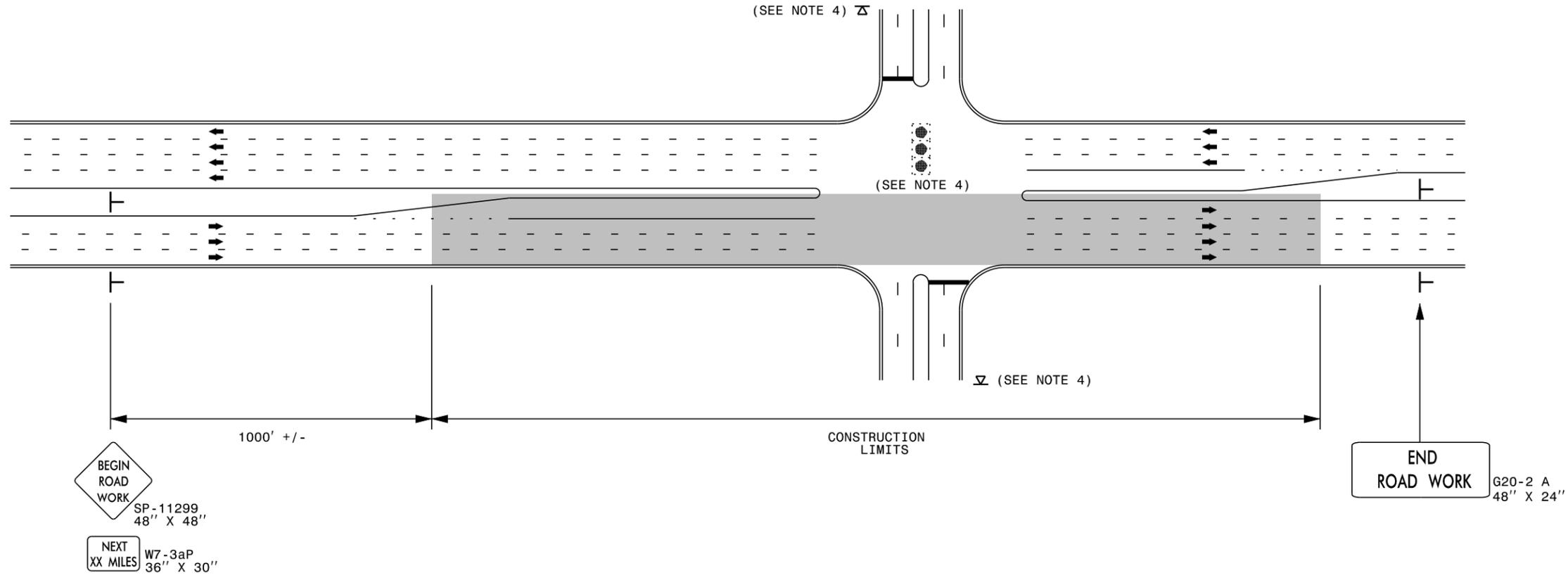
SIGNING NOTES AND PLACEMENT PER DIRECTION	MAINLINE (-L-) SIGNING		-Y- LINE SIGNING	
	①	 W20-1 48" X 48"	PLACE 1000' PRIOR TO BEGINNING OF CONSTRUCTION LIMITS. ONLY USED ON -Y- LINES IF RESURFACING LIMITS EXTEND 1000' ALONG -Y- LINE.	<p>NO REQUIRED STATIONARY SIGNING FOR THE FOLLOWING -Y- LINE CONDITIONS:</p> <ol style="list-style-type: none"> <li>LESS THAN 1000' OF RESURFACING ALONG -Y- LINE</li> <li>SUBDIVISION ROADS</li> <li>DEAD END ROADS</li> </ol> <p>WHEN PAVING/CONSTRUCTION ACTIVITIES PROCEED ACROSS AN UNSIGNED -Y- LINE, ADVANCE WARNING PORTABLE SIGNS SHALL BE USED ALONG THE -Y- LINE AS SHOWN BELOW. REMOVE UPON COMPLETION OF WORK.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>W20-1 48" X 48"</p> </div> <div style="text-align: center;"> <p>W20-7 A 48" X 48"</p> </div> </div> <p>PLACED 500' IN ADVANCE OF FLAGGER. PLACED 250' IN ADVANCE OF FLAGGER.</p>
	②	 W7-3aP 24" X 18"	#2 SIGN ONLY USED WHEN RESURFACING LIMITS ARE 2 OR MORE MILES IN LENGTH. ROUND UP TO NEXT WHOLE NUMBER. (NO FRACTIONAL OR DECIMAL NUMBERS)	
	③	 SP 13107 48" X 48"	PLACE INITIALLY AT THE CONSTRUCTION LIMITS AND SPACED 1 MILE APART THEREAFTER. IF NO -Y- LINES EXIST, PLACE 2ND SET 1/2 MILE FROM THE CONSTRUCTION LIMITS AND THEN SPACE 1 MILE THEREAFTER.	
	④	 SP 13106 48" X 48"	THESE ARE FOR -Y- LINES THAT ARE "THROUGH" ROADWAYS. DEAD END AND SUBDIVISION ROADS ARE NOT "THROUGH" ROADWAYS. INSTALL 500' +/- FROM EACH -Y- LINE APPROACH AS SHOWN ABOVE. FOR MULTIPLE -Y- LINES THAT ARE SEPARATED BY 0.25 MILES OR LESS, TREAT AS A SINGLE UNIT AND INSTALL WITHIN 500' OF EACH APPROACH. A MAXIMUM OF 2 SIGN SETS PER MILE. DO NOT INSTALL WHEN -Y- LINES ARE WITHIN 0.5 MILES FROM "END ROAD WORK" SIGN.	
⑤	 G20-2 A 48" X 24"	PLACE 500' FOLLOWING THE END OF CONSTRUCTION LIMITS.		

8/8/2013  
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 User:rmgarratt



**RESURFACING  
 ADVANCE WARNING SIGNS  
 FOR  
 RURAL AND SUBURBAN  
 2 LANE ROADWAYS**

## URBAN / SUBURBAN WORKZONES



### NOTES:

- 1) 48" x 48" SIZED SIGNS (SP- 11299) MAY BE REDUCED TO 36" X 36" ON ROADWAYS WITH SPEED LIMITS OF 40 MPH OR LESS.
- 2) MOUNT SIGNS THAT ARE LARGER THAN 10 SQUARE FEET IN AREA ON TWO OR MORE WOOD OR U-CHANNEL SUPPORTS. PERFORATED SQUARE TUBING SUPPORT SYSTEMS MAY SUPPORT LARGER AREAS ON A SINGLE SUPPORT. FOLLOW MANUFACTURER'S RECOMMENDATIONS. THESE SYSTEMS SHALL BE NCHRP 350 COMPLIANT AND NCDOT APPROVED.
- 3) ADVANCE WARNING SIGNS NOT REQUIRED ON NON-SIGNALIZED SIDE STREETS.
- 4) MAY USE LAW ENFORCEMENT TO CONTROL TRAFFIC AT SIGNALIZED INTERSECTIONS AS DIRECTED BY THE ENGINEER. PROVIDE PORTABLE "ROAD WORK AHEAD" (W20-1) SIGNS 500' IN ADVANCE ALONG BOTH APPROACHES FROM THE SIDE STREETS WHEN PAVING PROCEEDS THROUGH THE INTERSECTION.
- 5) LATERAL CLEARANCE AT ALL SIGN LOCATIONS SHALL BE 2' AS MEASURED FROM THE EDGE OF PAVEMENT OR THE FACE OF THE CURB. WHEN UNABLE TO OBTAIN THE LATERAL CLEARANCE WITHIN THE MEDIAN AREA USE SHOULDER MOUNTS ONLY.
- 6) SIGN MOUNT LOCATIONS SHALL NOT BLOCK SIDEWALKS OR DRIVEWAYS.
- 7) IF STATIONARY GENERAL WARNING SIGNS ARE USED, THEY WILL BE PAID FOR PER SECTION 104 OF THE NCDOT STANDARD SPECIFICATIONS AS EXTRA WORK.
- 8) IF MILLED AREAS ARE NOT PAVED BACK BY THE END OF THE WORK DAY, PORTABLE SIGNS SHALL BE USED TO WARN DRIVERS OF THE PRESENT CONDITIONS. THESE ARE TO INCLUDE, BUT NOT LIMITED TO "ROUGH ROAD" W8-8, "UNEVEN LANES" W8-11, "GROOVED PAVEMENT" W8-15 w/MOTORCYCLE PLAQUE MOUNTED BELOW. THESE ARE TO BE DOUBLE INDICATED ON MULTI-LANE ROADWAYS WITH SPEED LIMITS 45 MPH AND GREATER WHERE LATERAL CLEARANCE CAN BE OBTAINED WITHIN THE MEDIAN AREAS. THESE PORTABLE SIGNS ARE INCIDENTAL TO THE OTHER ITEMS OF WORK INCLUDED IN THE TEMPORARY TRAFFIC CONTROL (LUMP SUM) PAY ITEM.

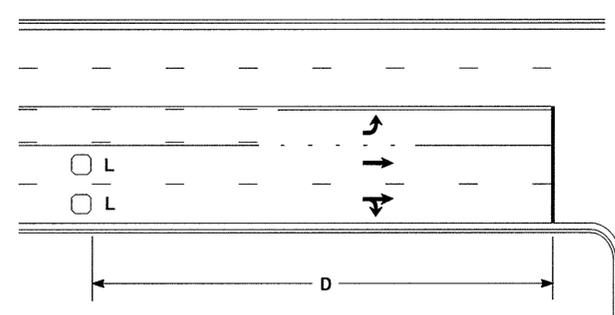
### LEGEND

- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW



**RESURFACING ADVANCE  
WARNING SIGNS FOR  
URBAN / SUBURBAN  
FACILITIES**

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

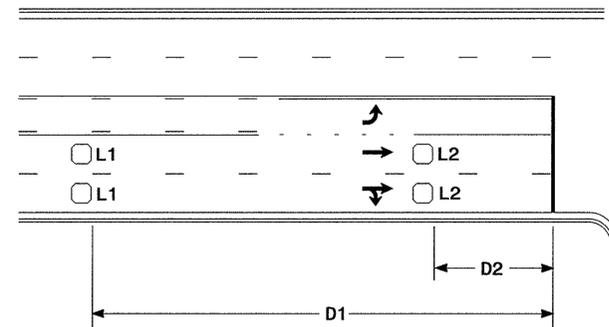


Speed Limit mph (km/hr)	D ft (m)
40 (64)	250 (75)
45 (72)	300 (90)
50 (80)	355 (110)
55 (88)	420 (130)

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

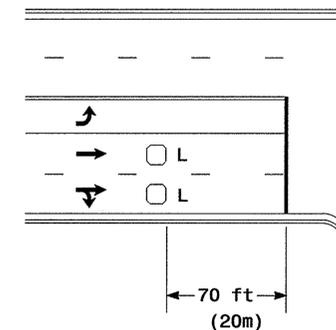


Speed Limit mph (km/hr)	D1 ft (m)		D2 ft (m)	
40 (64)	250 (75)	80 (25)	90 (27)	
45 (72)	300 (90)	90 (27)	100 (30)	
50 (80)	355 (110)	110 (35)		
55 (88)	420 (130)			

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

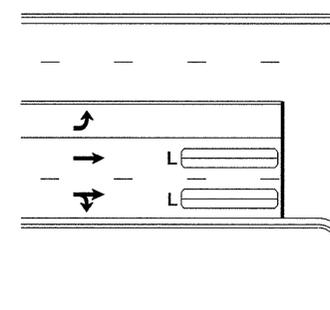
"Stretch" Operation

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



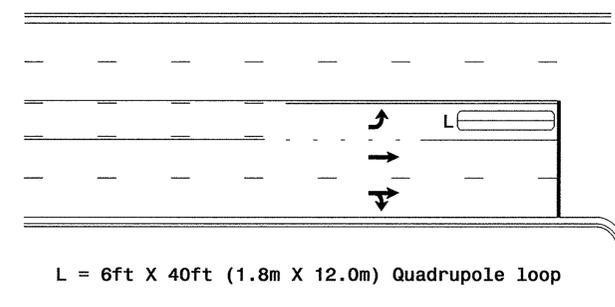
L = 6ft X 6ft (1.8m X 1.8m)  
Wired in series

OR



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

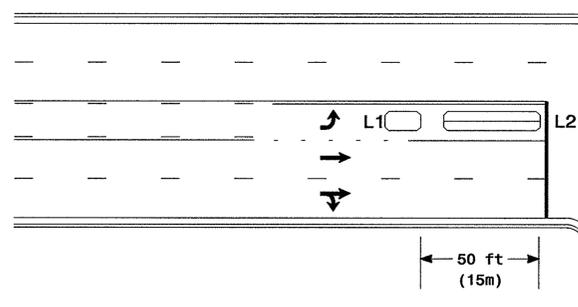
### Left Turn Lane Detection



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

Presence Loop Detection

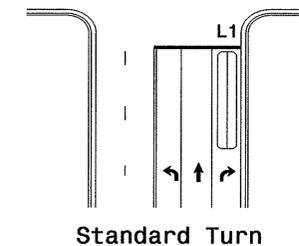
OR



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

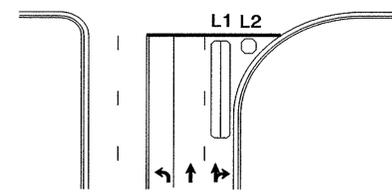
Queue Loop Detection

### Right Turn Lane Detection

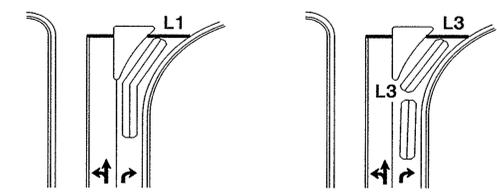


Standard Turn

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

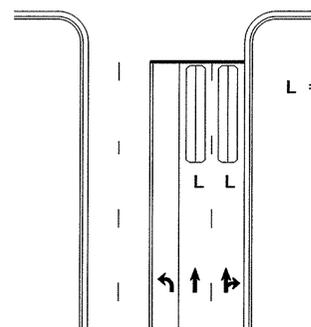


Wide Radius Turn



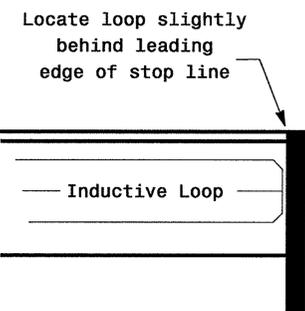
Channelized Turn

### 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



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

	Typical Loop Locations		
	PLAN DATE: June 2006 PREPARED BY: P. L. Alexander	REVIEWED BY: REVIEWED BY:	
SCALE N/A	INIT. DATE [Signature] [Date]	SIGNATURE [Signature]	DATE [Date]