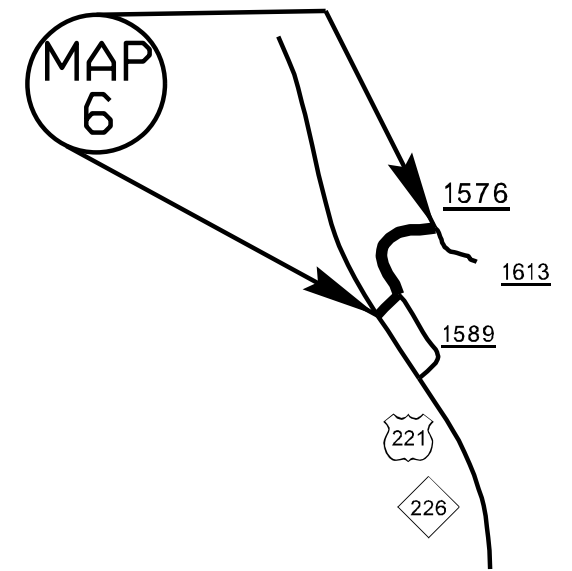
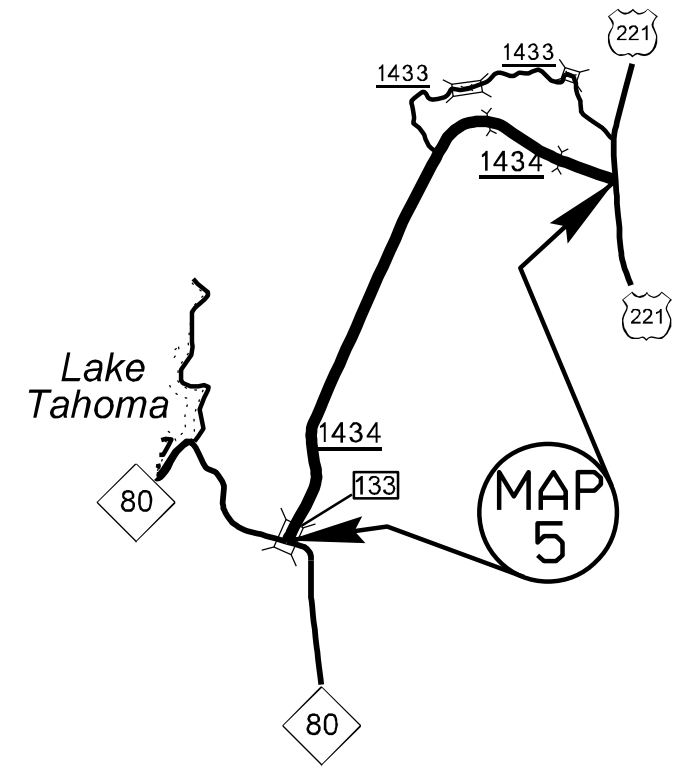
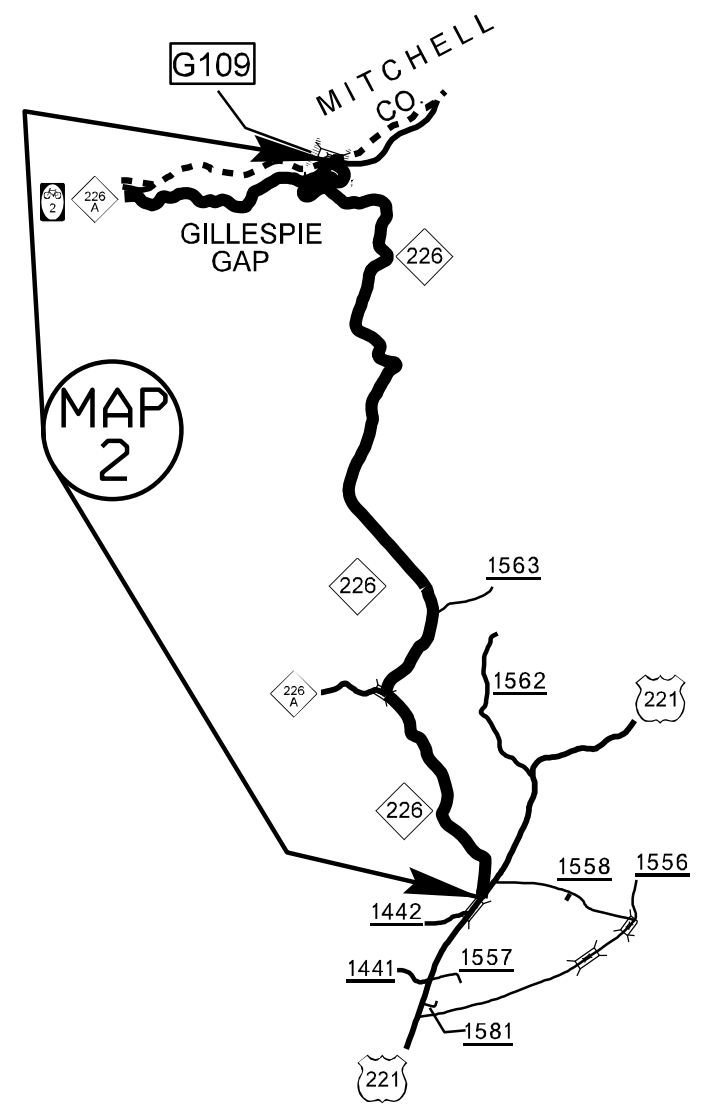
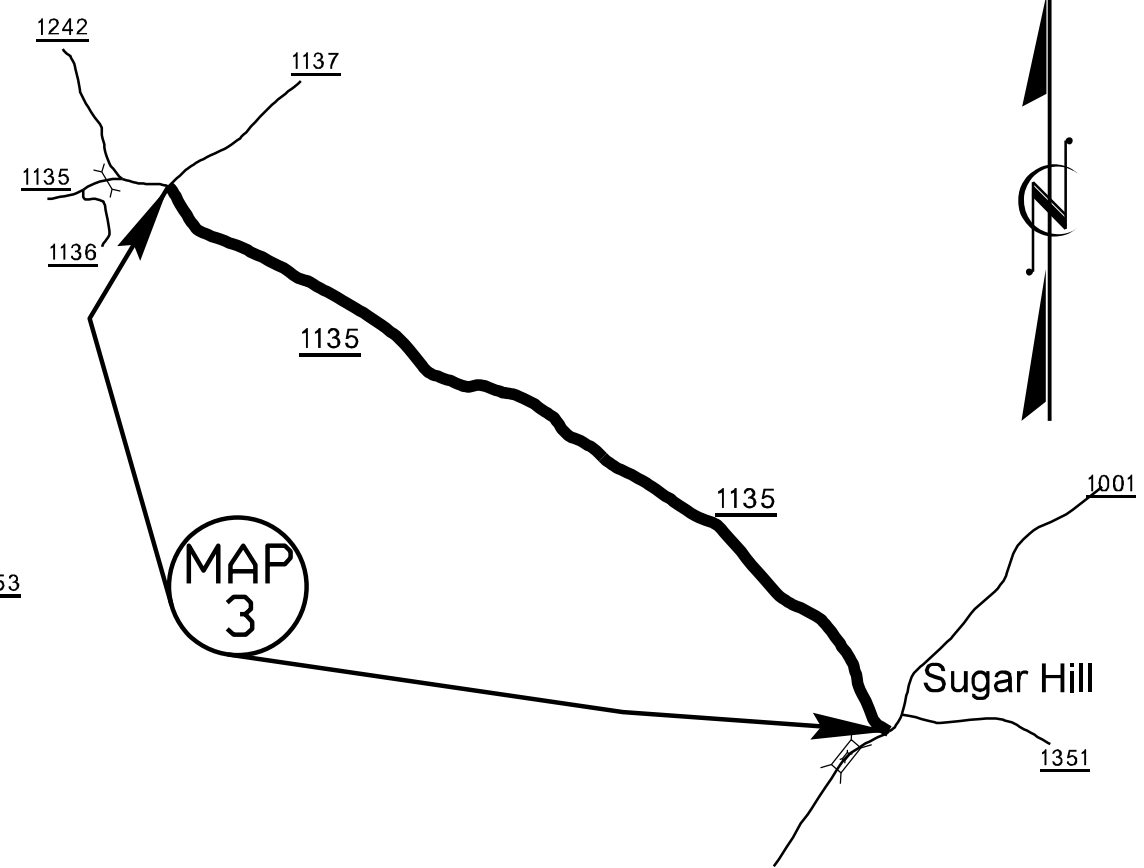
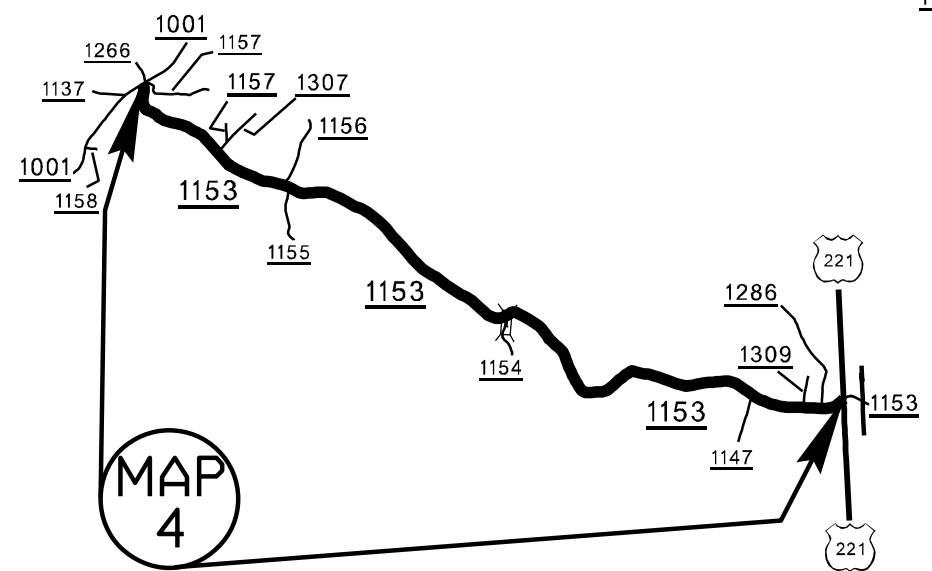
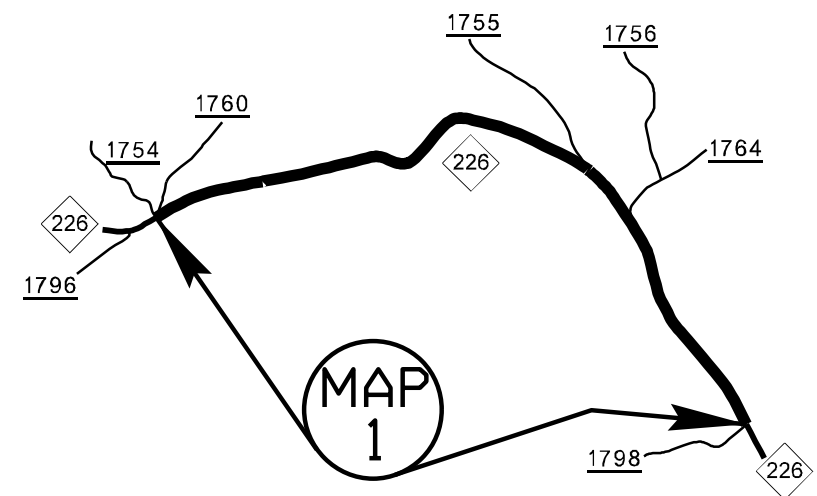
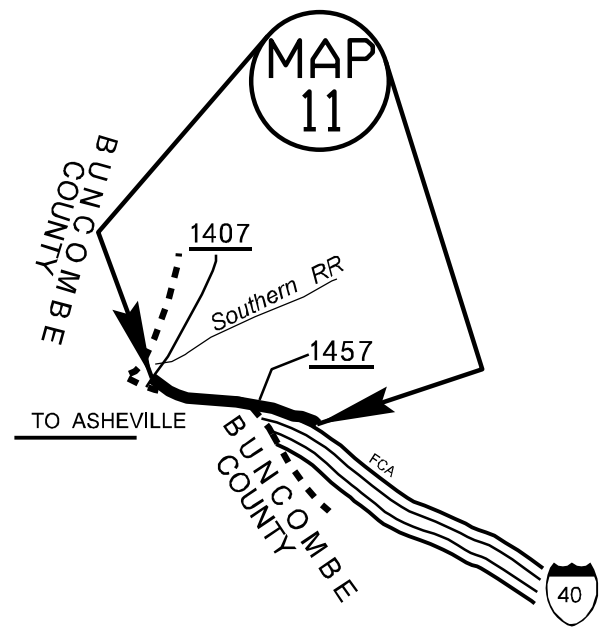
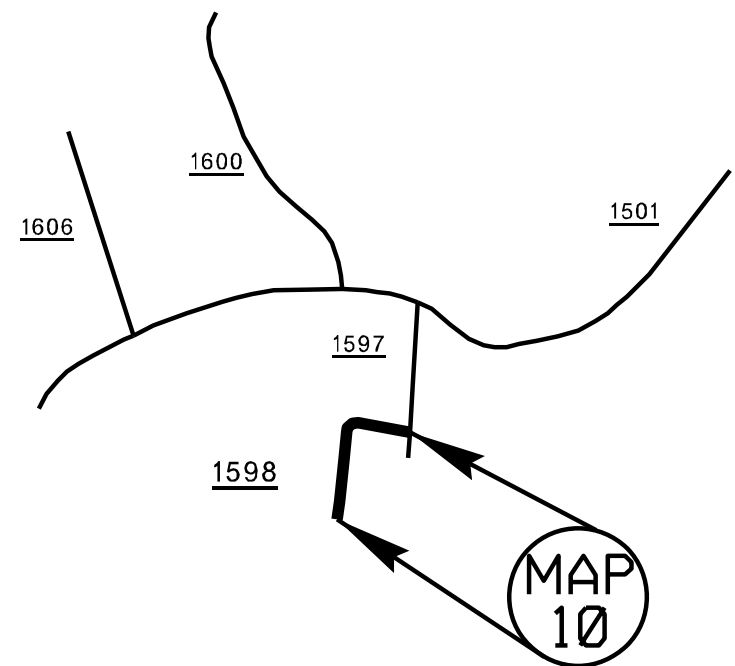
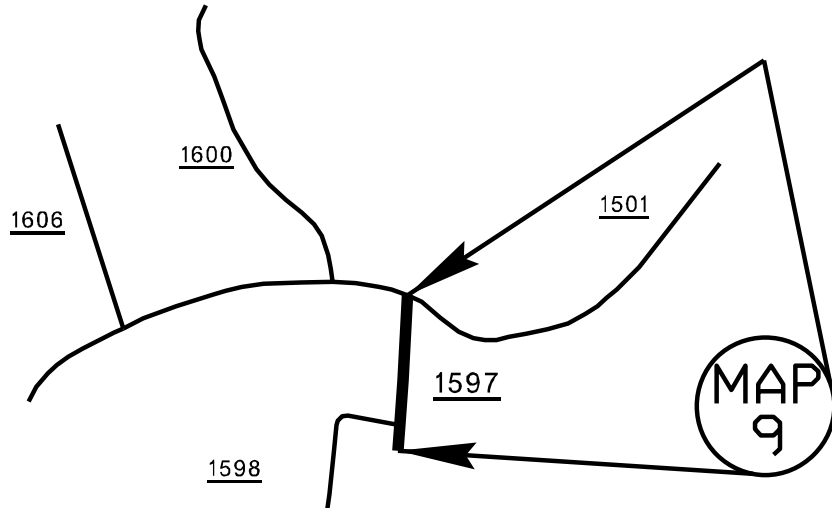
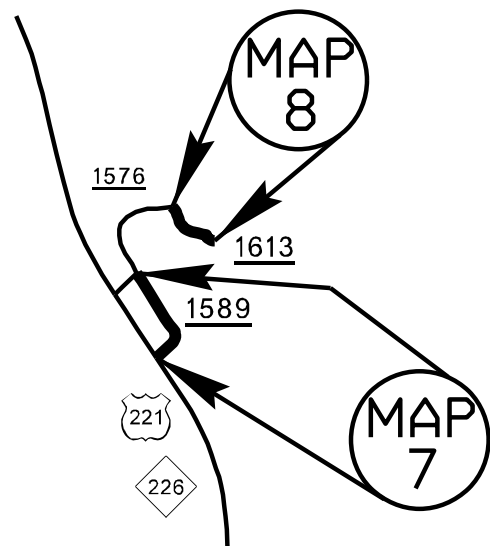


| PROJECT NO.  | SHEET NO. | TOTAL SHEETS |
|--|-----------|--------------|
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 1         | 19           |



**McDOWELL COUNTY**

| PROJECT NO.  | SHEET NO. | TOTAL SHEETS |
|--|-----------|--------------|
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 2         | 19           |



**McDOWELL COUNTY**

| PROJECT NO.  | SHEET NO. | TOTAL SHEETS |
|--|-----------|--------------|
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 3         | 19           |

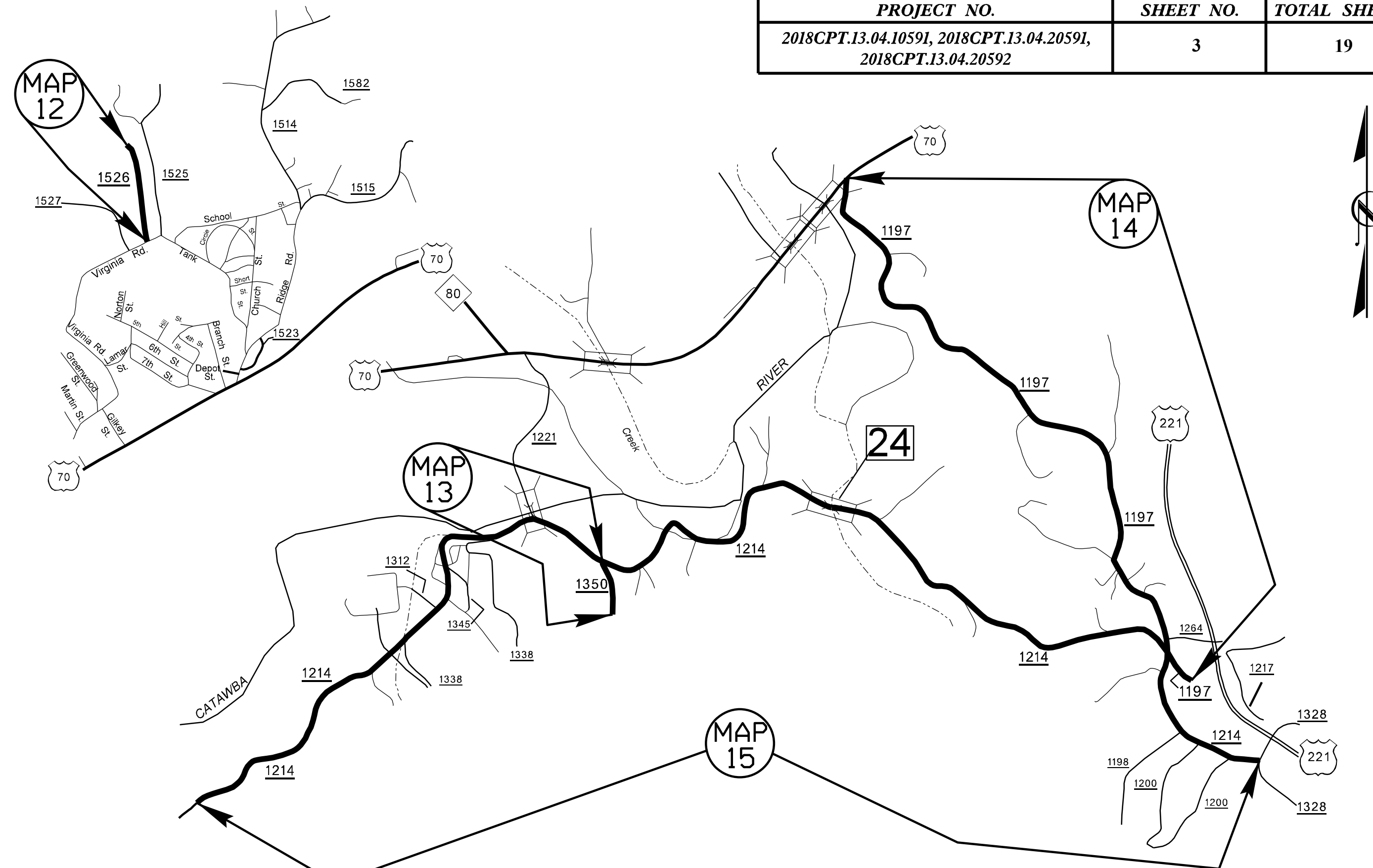
MAP 12

MAP 14

MAP 13

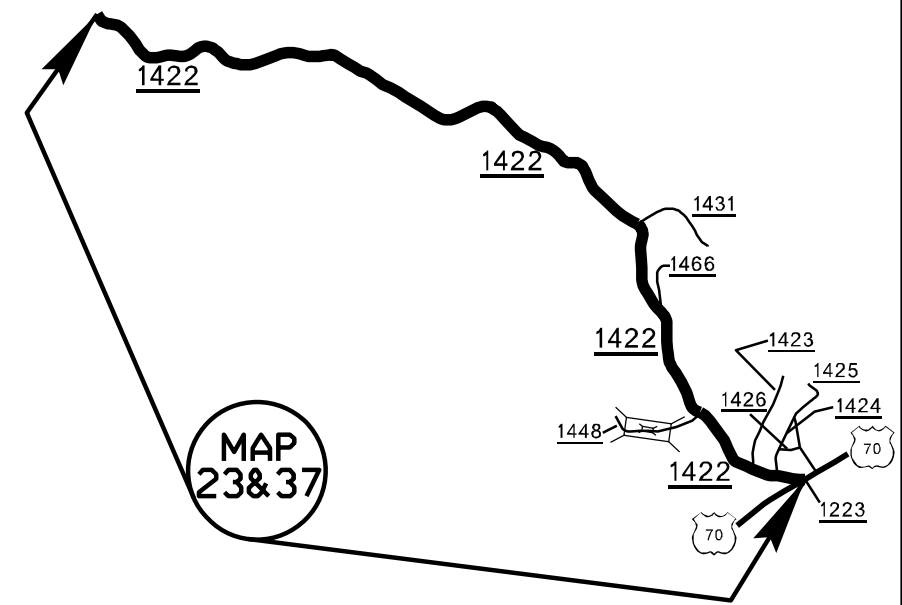
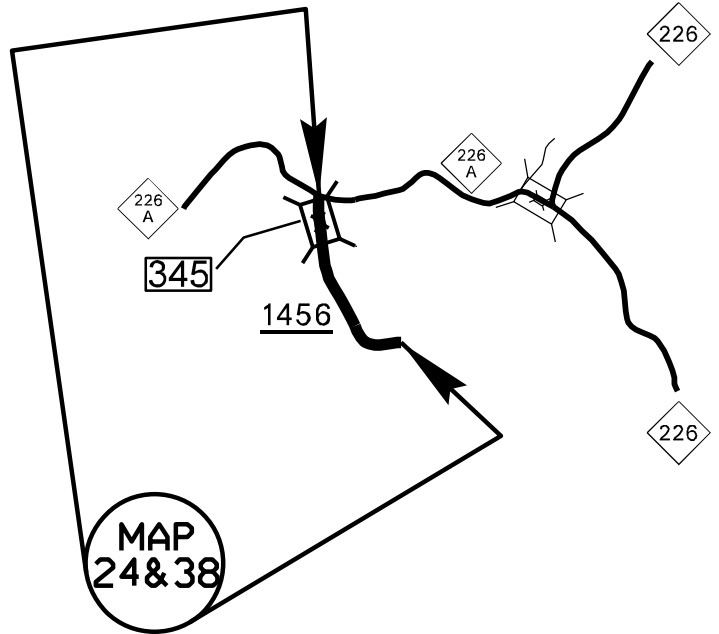
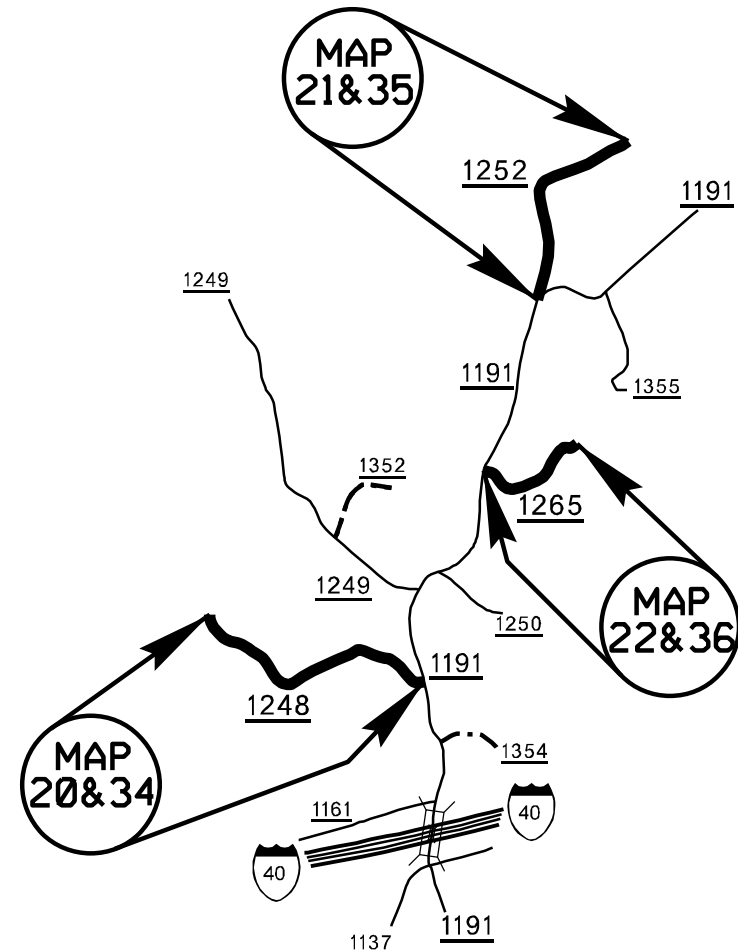
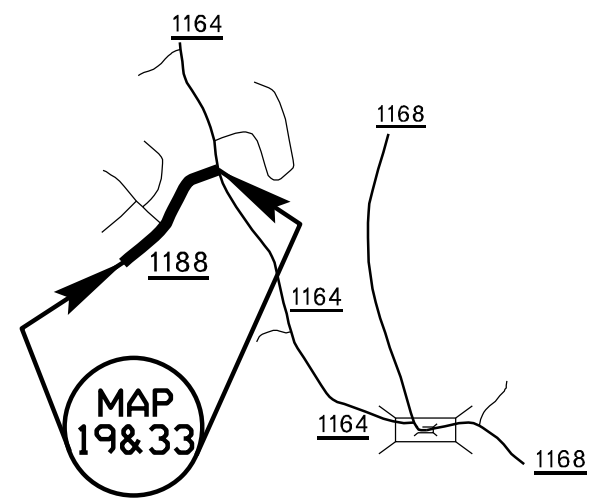
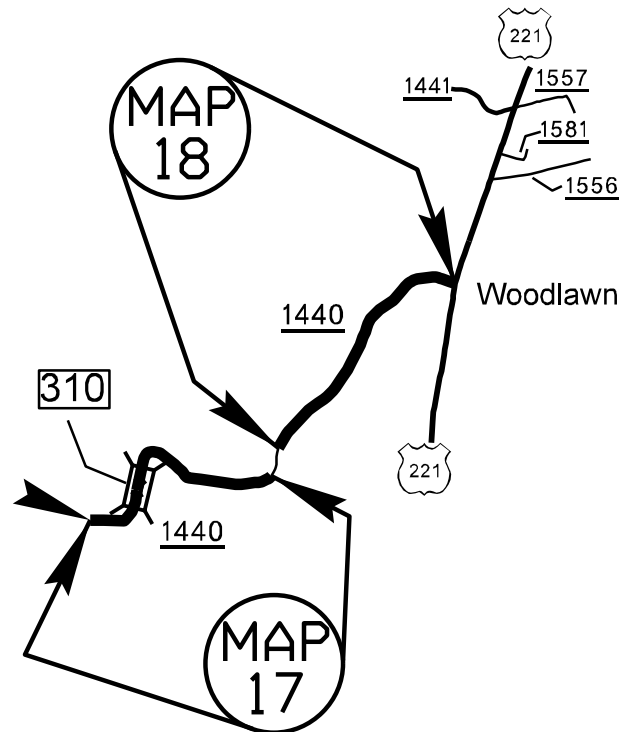
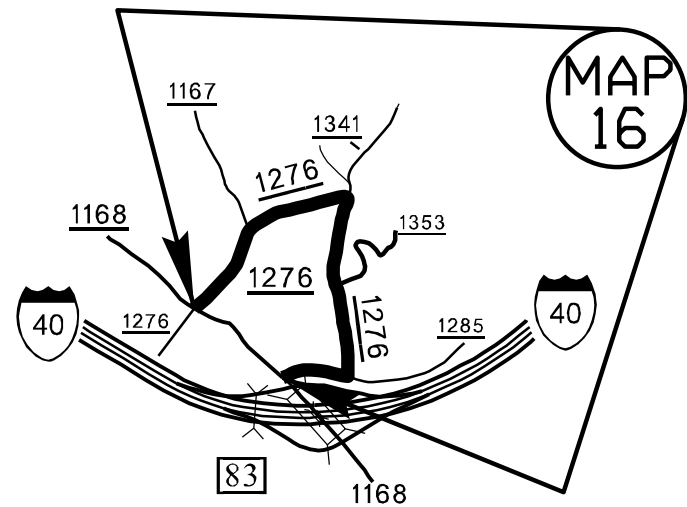
MAP 15

24



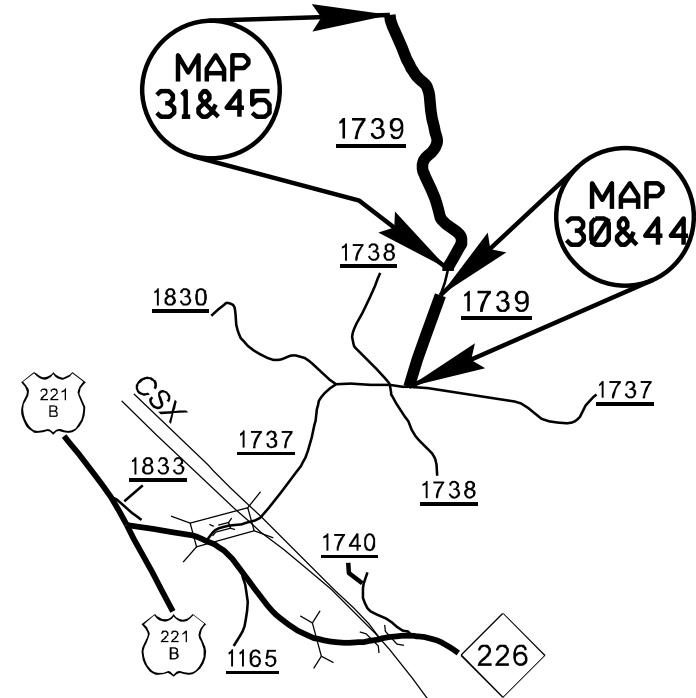
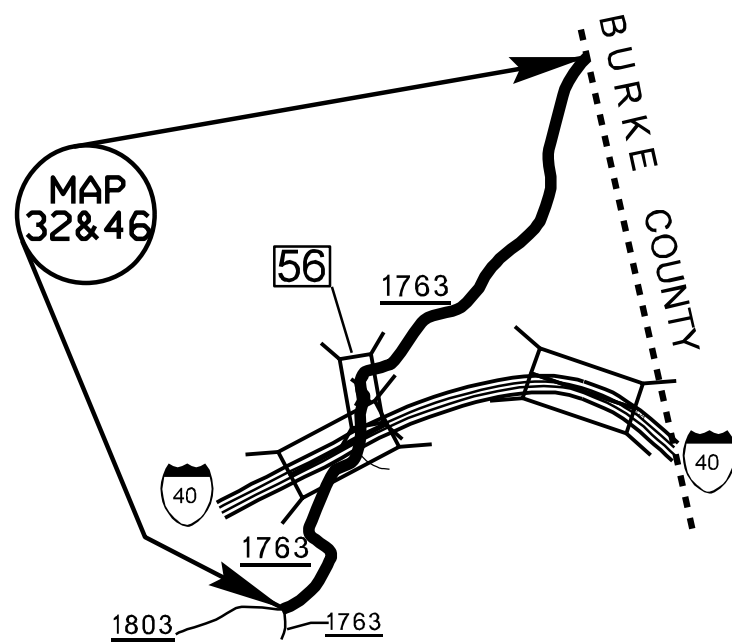
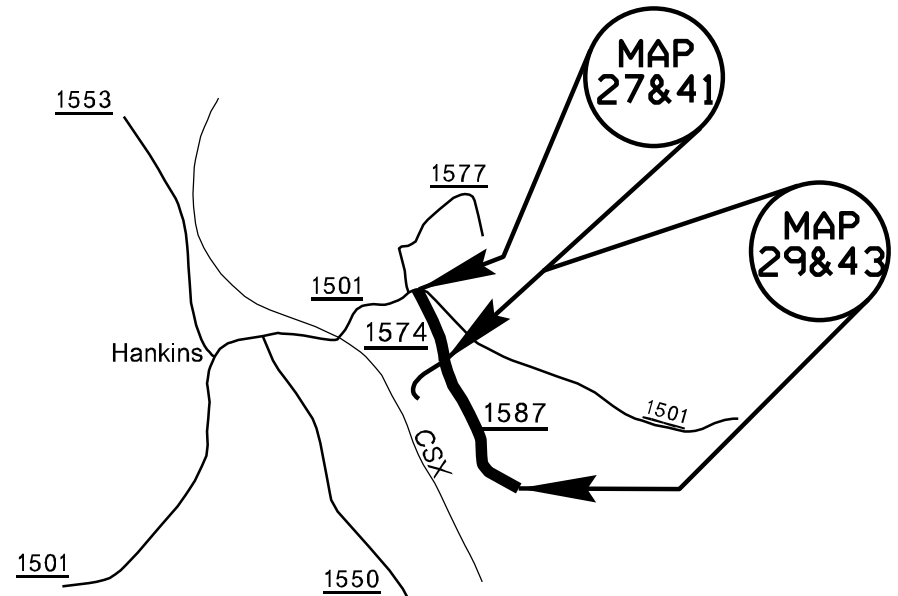
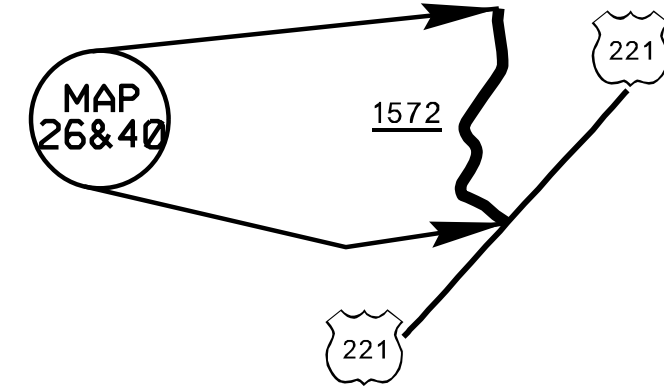
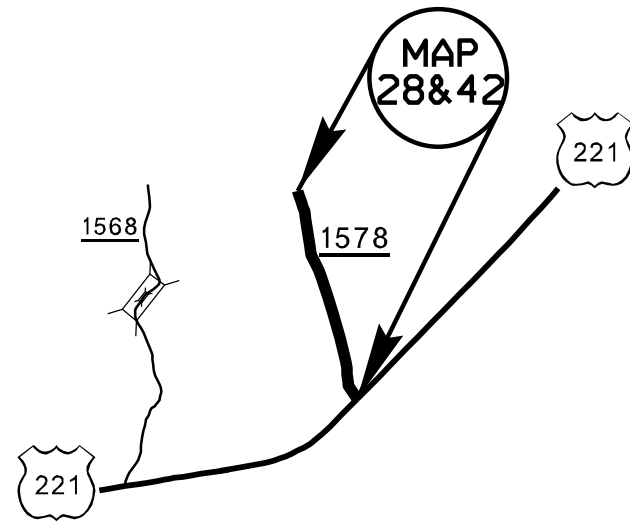
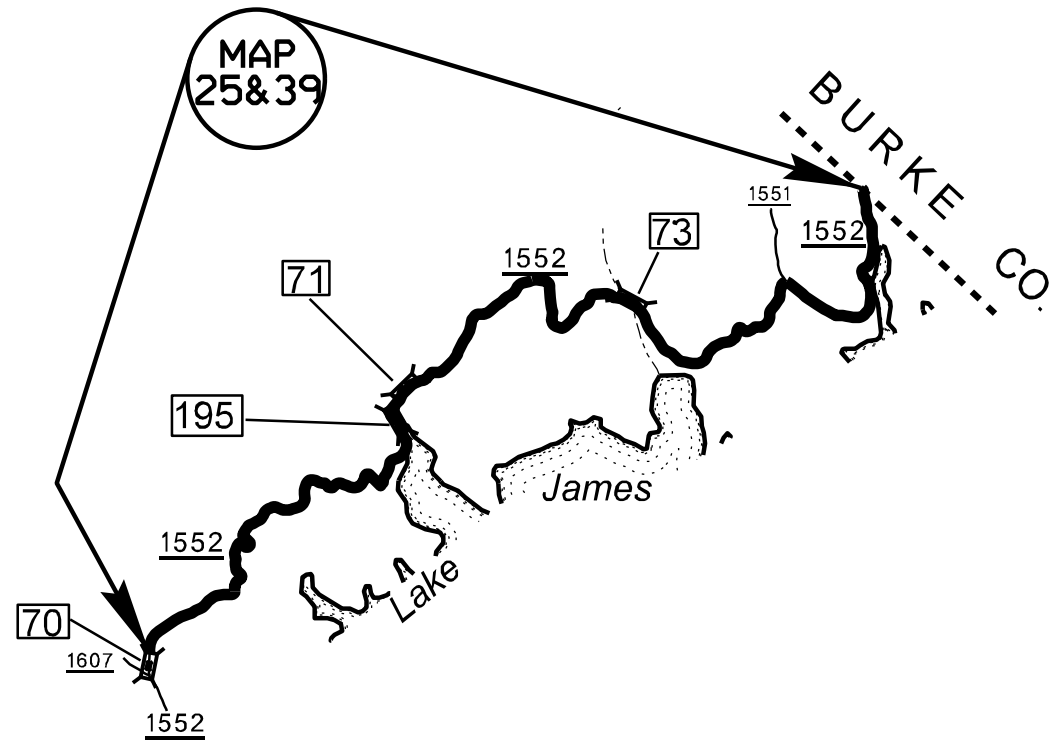
**McDOWELL COUNTY**

| PROJECT NO.  | SHEET NO. | TOTAL SHEETS |
|--|-----------|--------------|
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 4         | 19           |



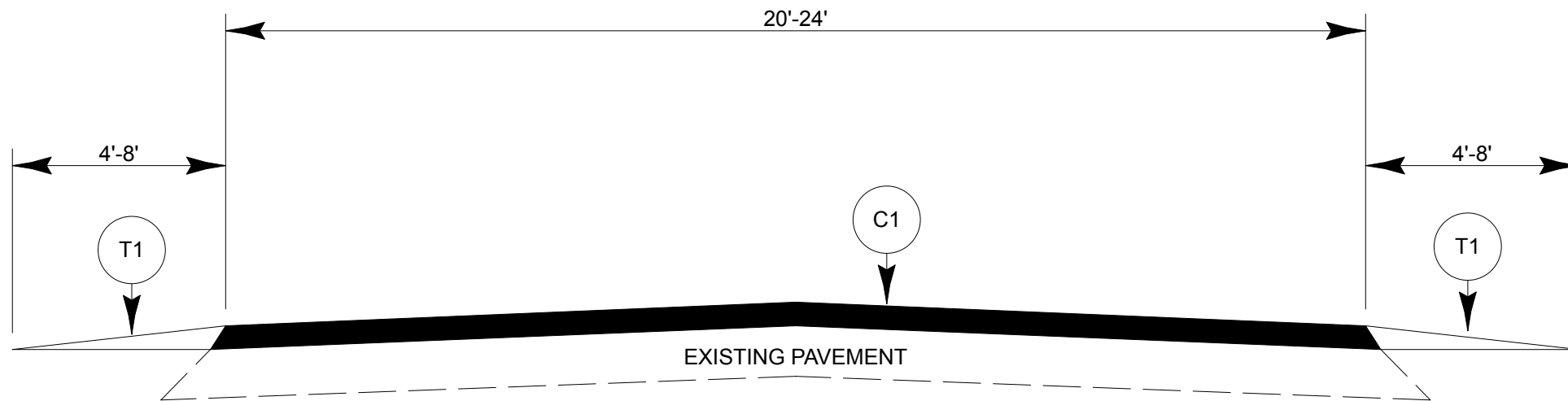
**McDOWELL COUNTY**

| PROJECT NO.  | SHEET NO. | TOTAL SHEETS |
|--|-----------|--------------|
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 5         | 19           |

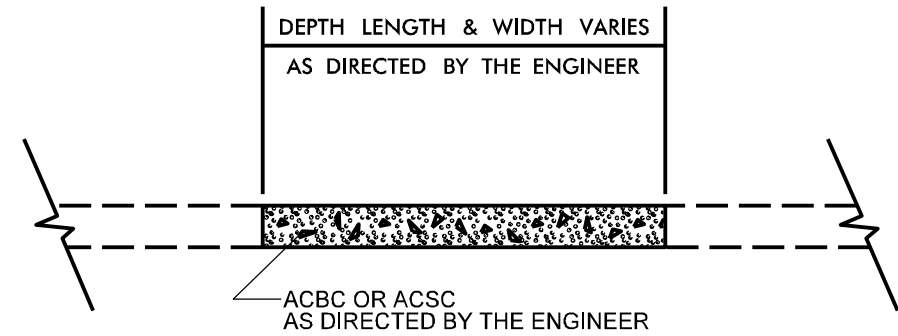


**McDOWELL COUNTY**

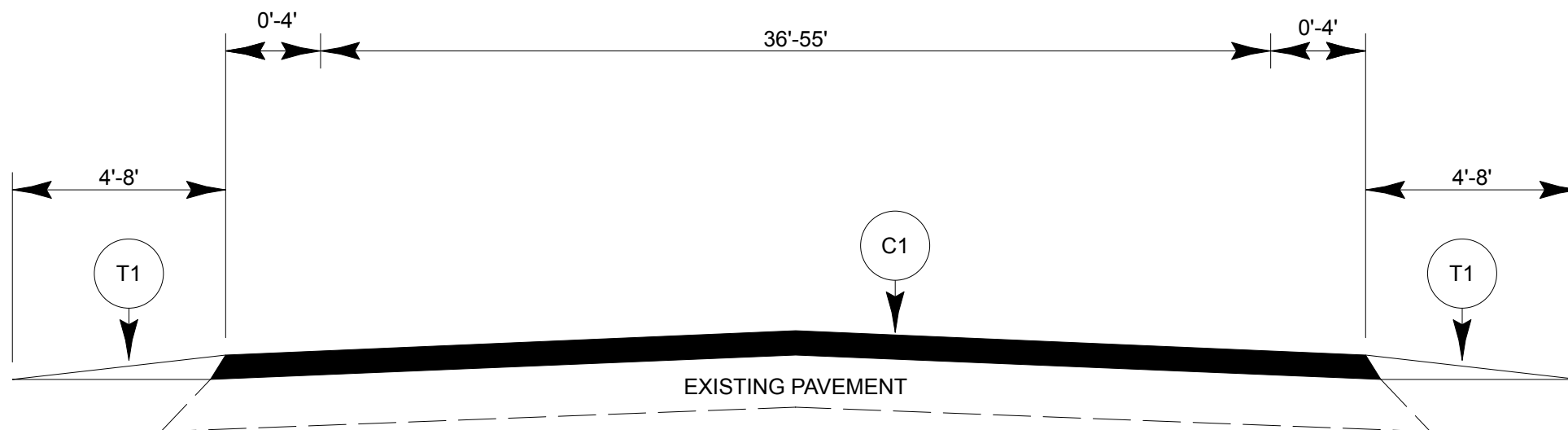
|  |                  |                     |
|--|------------------|---------------------|
| <b>PROJECT NO.</b>   | <b>SHEET NO.</b> | <b>TOTAL SHEETS</b> |
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 6                | 19                  |



TYPICAL SECTION NO. 1



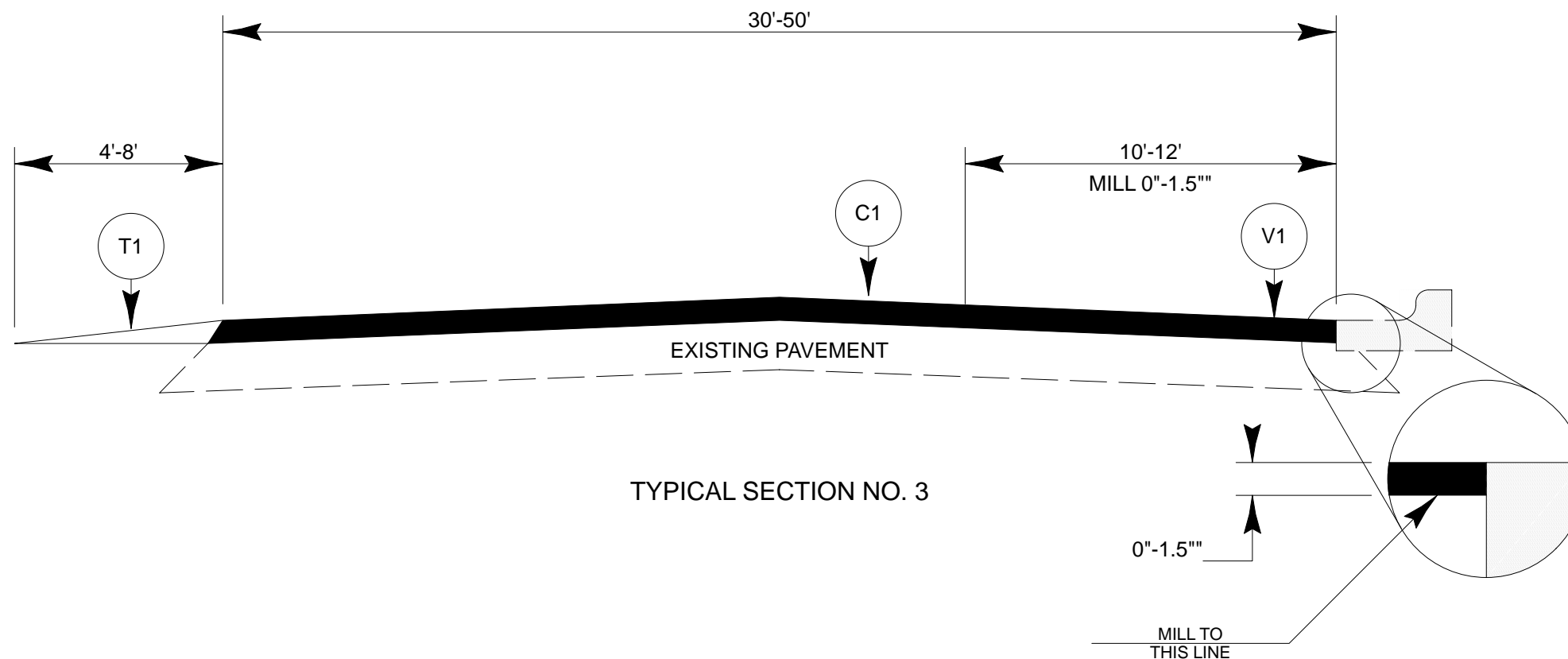
PATCHING EXISTING PAVEMENT



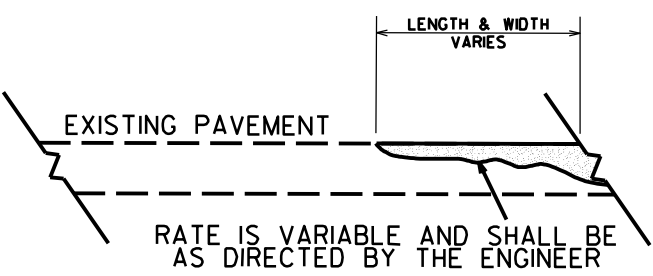
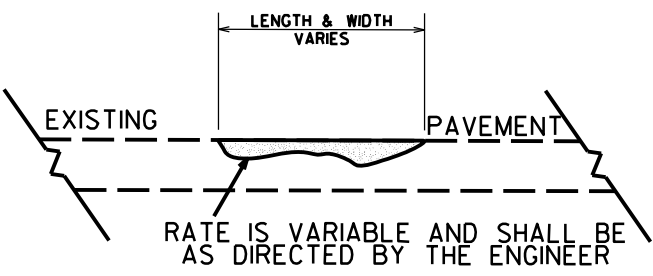
TYPICAL SECTION NO. 2

| PAVEMENT SCHEDULE |  |
|-------------------|--|
| C1                | PROP. APPROX. 1-1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YARD  |
| C2                | PROP. APPROX. 1-1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YARD |
| C3                | PROP. APPROX. 1-1/4" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 138 LBS. PER SQ. YARD |
| C4                | PROP. APPROX. 1" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YARD     |
| F1                | ASPHALT SURFACE TREATMENT, DOUBLE SEAL (5/16" LW / 78M)  |
| T1                | SHOULDER RECONSTRUCTION  |
| V1                | MILLING ASPHALT PAVEMENT, 0 TO 1-1/2" DEPTH  |
| V2                | MILLING ASPHALT PAVEMENT, 1-1/4" DEPTH   |
| V3                | INCIDENTAL MILLING   |

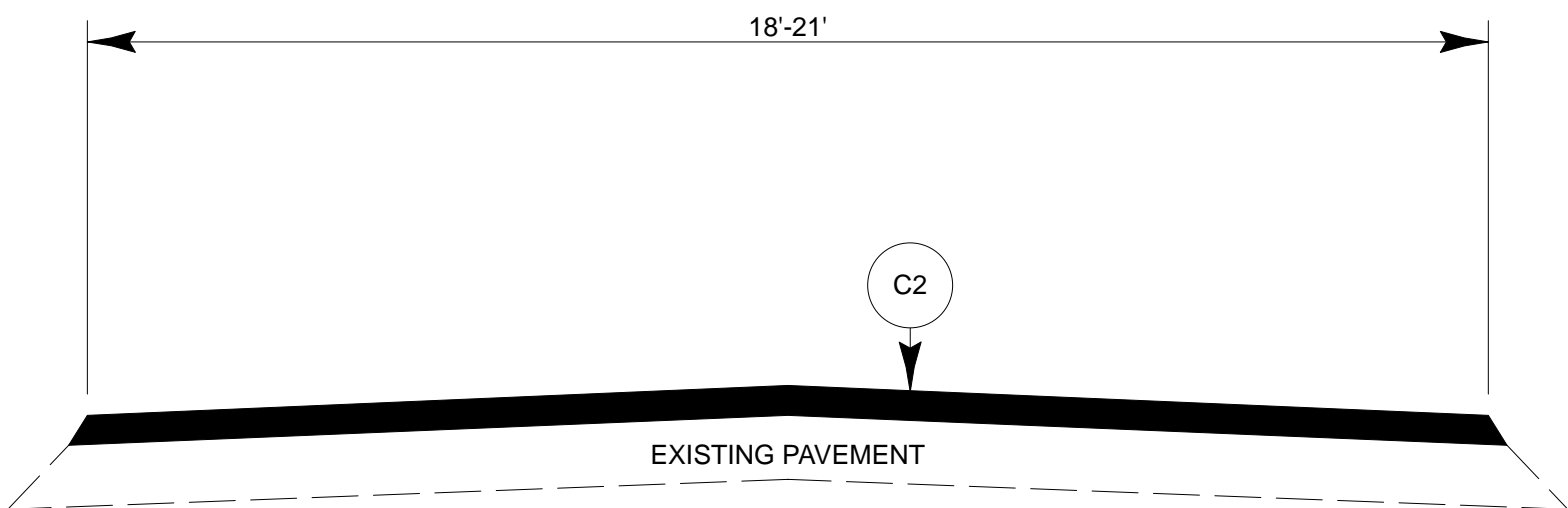
| PROJECT NO.  | SHEET NO. | TOTAL SHEETS |
|--|-----------|--------------|
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 7         | 19           |



TYPICAL SECTION NO. 3

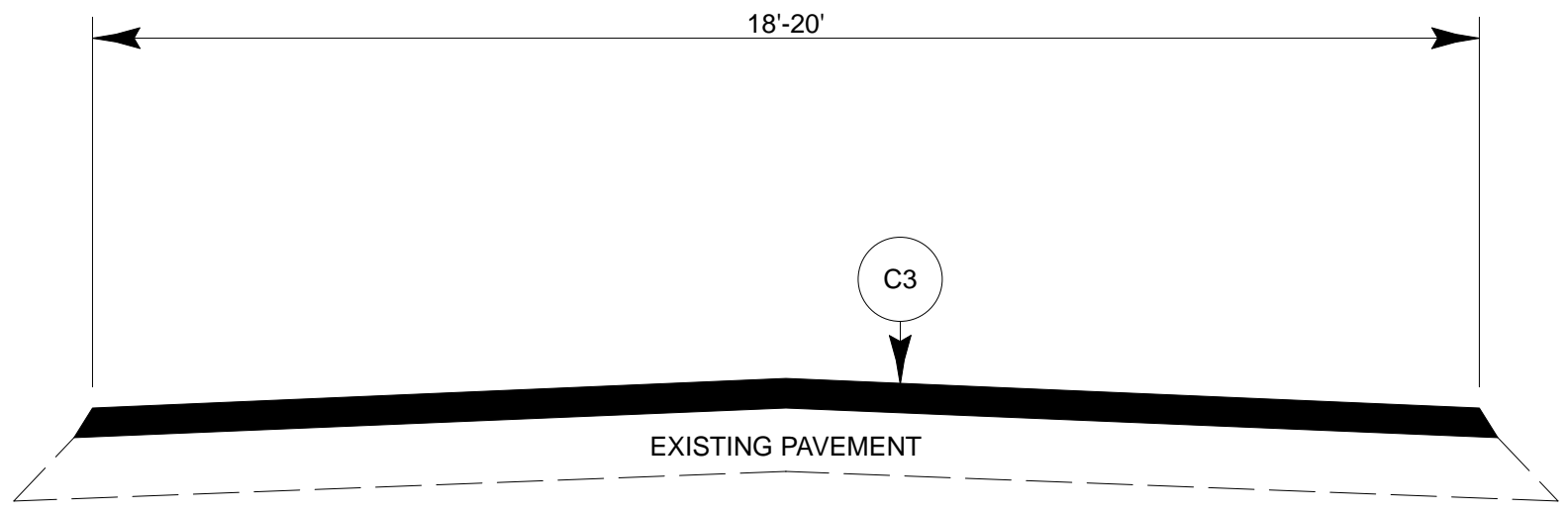
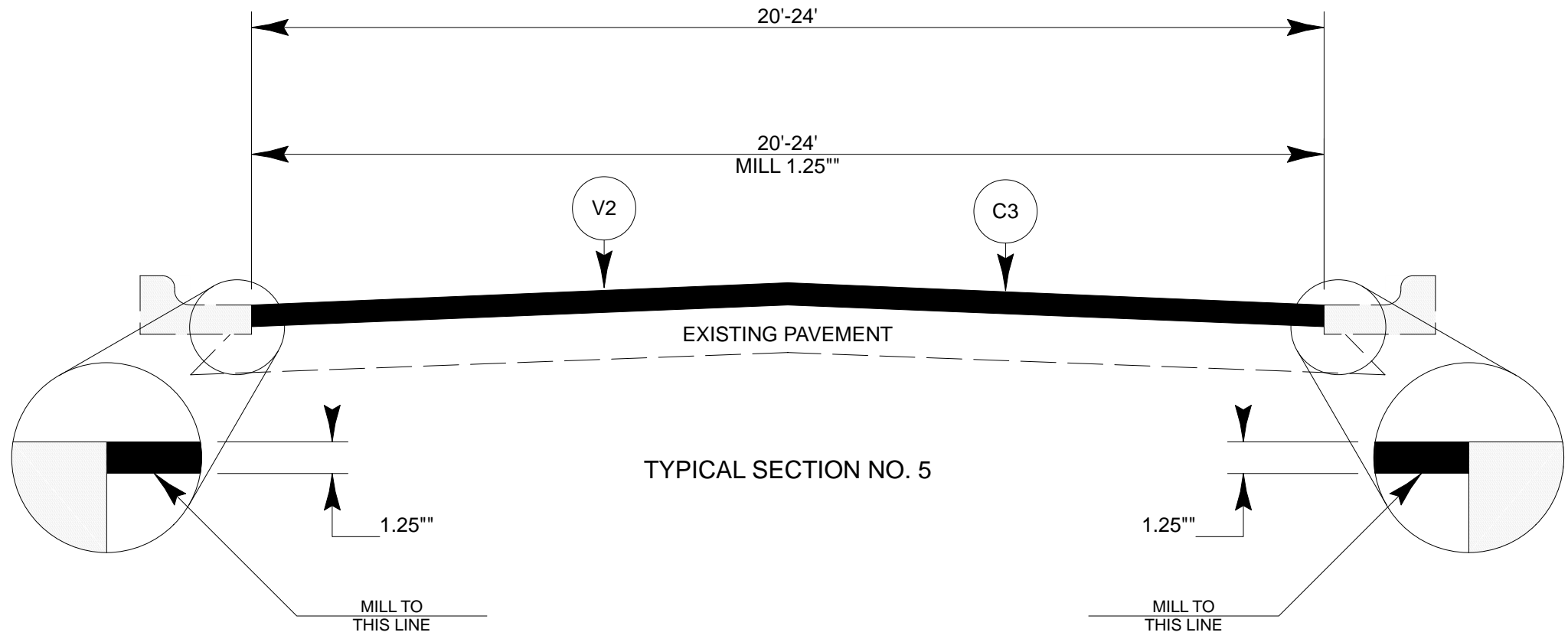


**DETAIL SHOWING  
METHOD OF WEDGING**



TYPICAL SECTION NO. 4

| PROJECT NO.  | SHEET NO. | TOTAL SHEETS |
|--|-----------|--------------|
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 8         | 19           |

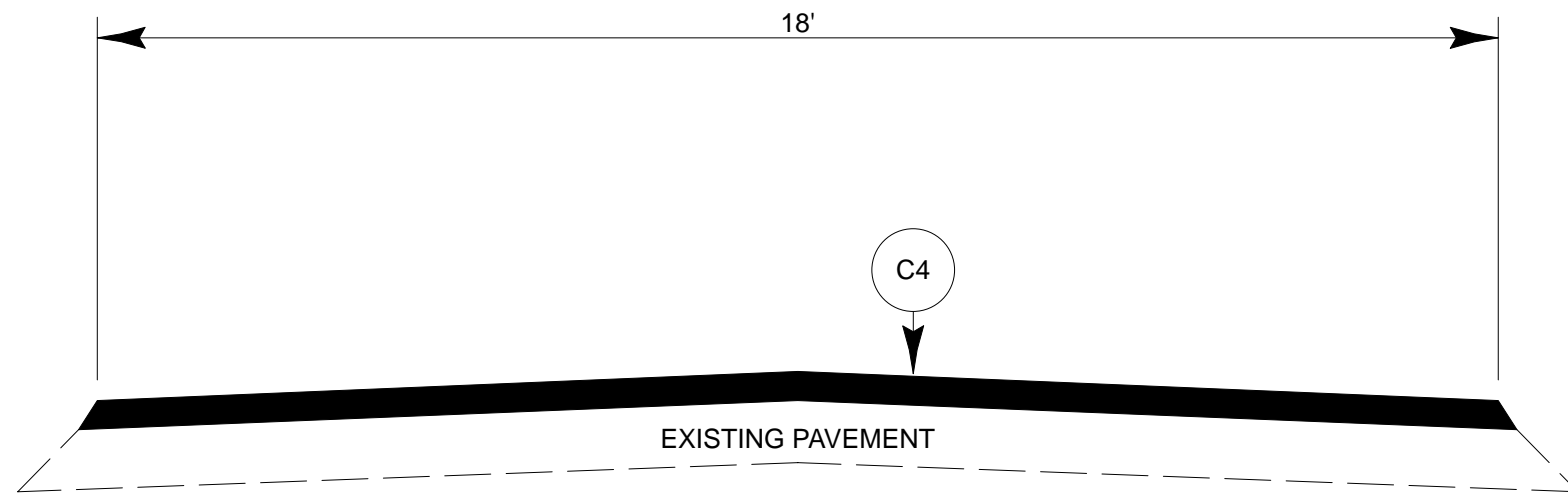


TYPICAL SECTION NO. 6

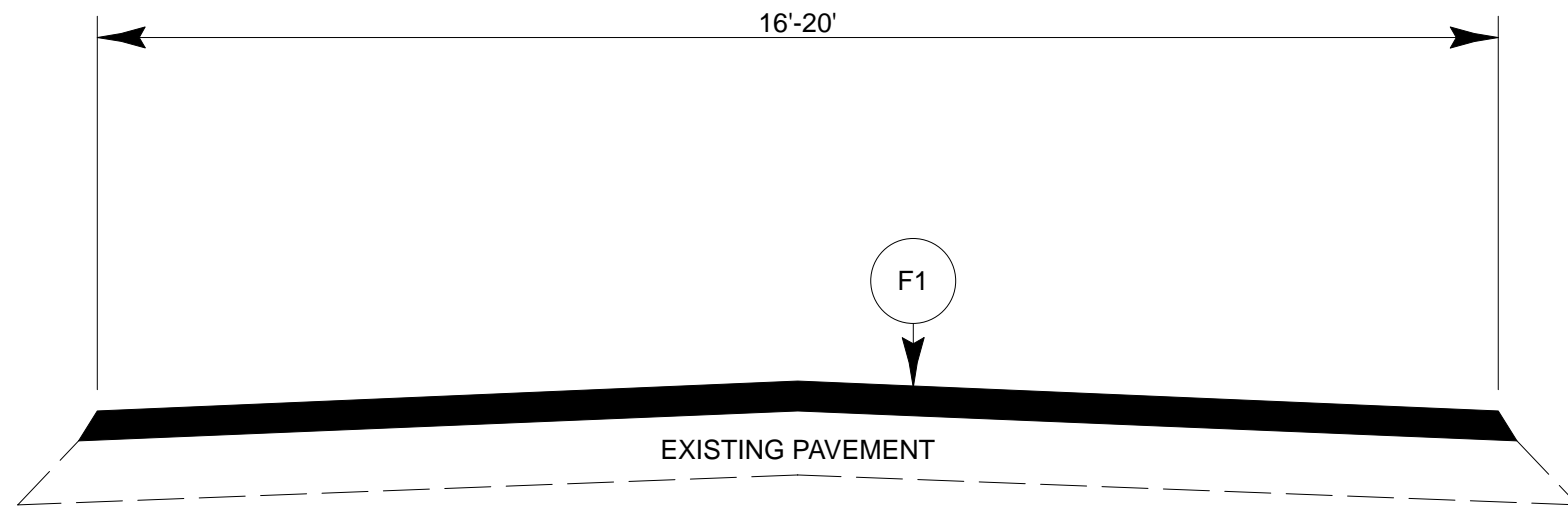
**McDOWELL COUNTY**



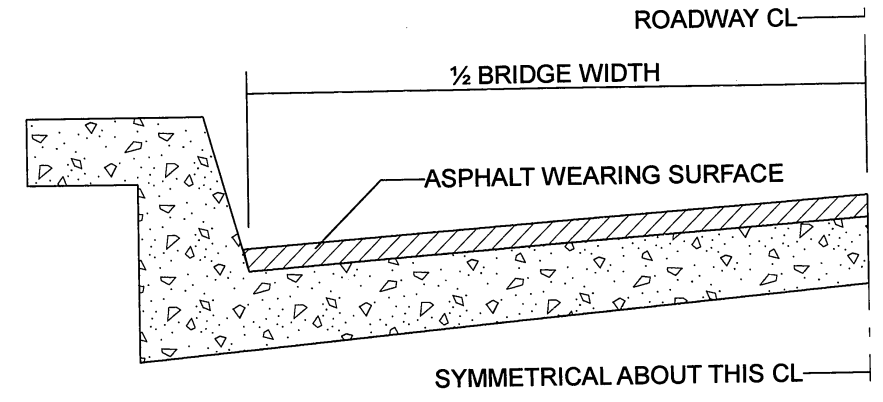
| PROJECT NO.  | SHEET NO. | TOTAL SHEETS |
|--|-----------|--------------|
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 9         | 19           |



TYPICAL SECTION NO. 7



TYPICAL SECTION NO. 8



BRIDGE HALF TYPICAL SECTION

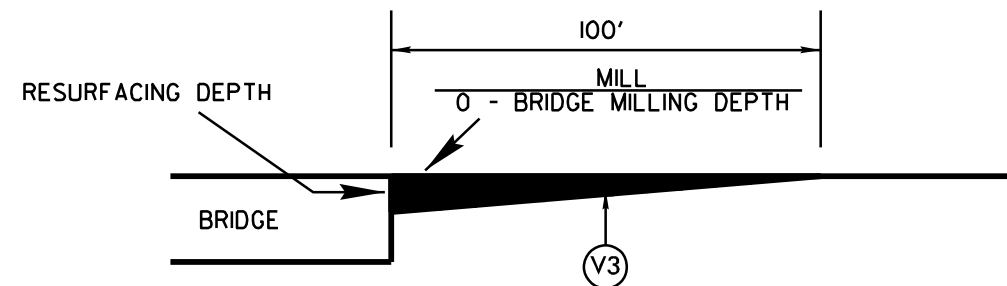
FOR BRIDGES WITH FLOOR DRAINS, CARE SHALL BE EXERCISED IN PLACING THE WEARING SURFACE AROUND FLOOR DRAINS SO AS NOT TO HINDER EFFECTIVE DRAINAGE. ALL DRAINS SHALL BE LEFT OPEN

THE PROPOSED WEARING SURFACE SHALL VARY IN THICKNESS AS NECESSARY TO PROVIDE A SMOOTH RIDING SURFACE. THE MINIMUM THICKNESS SHOULD DEPEND ON PAVEMENT TYPE AS FOLLOWS: S4.75A 1/2", SF9.5A 1.0", S9.5X 1.5", S12.5X 2.0", ULTRATHIN HOT MIX ASPHALT-TYPE A 3/4", ULTRATHIN HOT MIX ASPHALT-TYPE B 5/8", ULTRATHIN HOT MIX ASPHALT-TYPE C 1/2". THE MAXIMUM THICKNESS SHOULD DEPEND ON PAVEMENT TYPE AS FOLLOWS: S4.75A 1.0", SF9.5A 1.5", S9.5X 2.0", S12.5X 2.0", ULTRATHIN HOT MIX ASPHALT-TYPE A 3/4", ULTRATHIN HOT MIX ASPHALT-TYPE B 5/8", ULTRATHIN HOT MIX ASPHALT-TYPE C 1/2".

**NOTES**

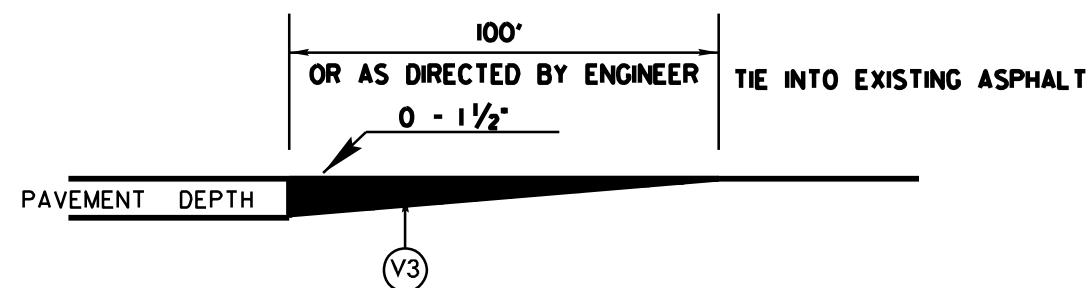
ALL UNPAVED ROADS TO BE RESURFACED 50' FROM EDGE OF PAVEMENT OF MAIN PROJECT.  
ALL PAVED S.R. ROADS TO BE RESURFACED TO THE ENDS OF THE RADII, OR AS DIRECTED BY THE ENGINEER.  
EDGES, PAVEMENT WIDENING, INTERSECTIONS AND BRIDGE FLARES ARE INCLUDED IN THE TABLE OF QUANTITIES.  
SHOULDERS AND DITCHES ARE TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE INDICATED.  
BRIDGES ARE TO BE RESURFACED AT LOCATIONS AND TO DEPTH AS DIRECTED BY THE ENGINEER.

| PROJECT NO.  | SHEET NO. | TOTAL SHEETS |
|--|-----------|--------------|
| 2018CPT.13.04.10591, 2018CPT.13.04.20591,<br>2018CPT.13.04.20592 | 10        | 19           |



### **MILLING DETAIL AT BRIDGE APPROACHES**

**WHERE BRIDGES WILL NOT BE RESURFACED, OR WILL BE MILLED AND RESURFACED.  
THIS WILL BE PAID FOR AS INCIDENTAL MILLING.  
USE AT BRIDGE NUMBER: 56 ON MAP 32/46.**

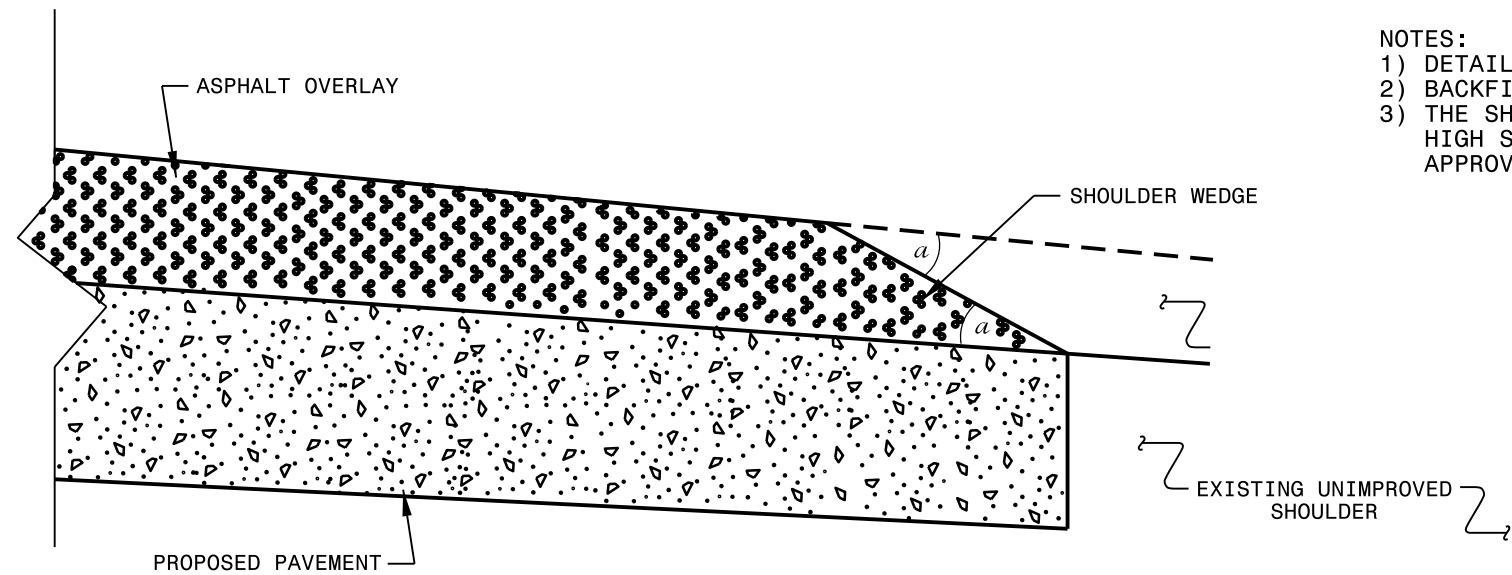


### **DETAIL TO TIE INTO EXIST PAVEMENT**

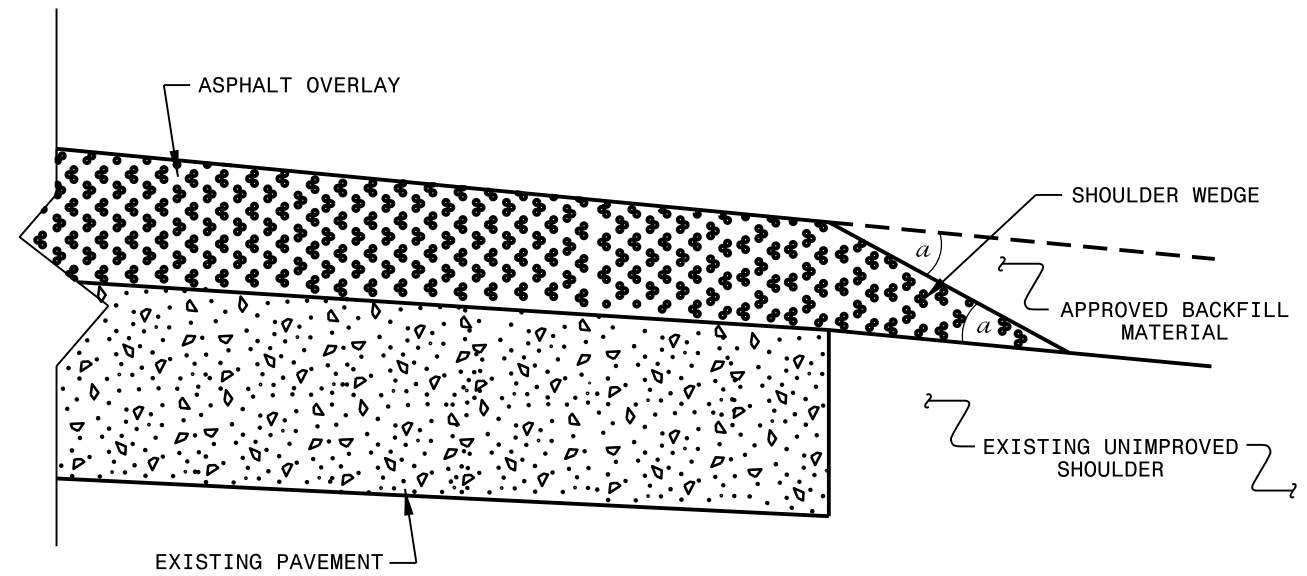
**THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FACT THAT HE WILL BE REQUIRED TO MILL THE EXISTING ASPHALT PAVEMENT TO ENSURE A PROPER TIE-IN WITH THE EXISTING SURFACE AT THE BEGINNING, END AND Y LINES OF EACH MAP TO BE RESURFACED WITH ASPHALT CONC SURFACE COURSE, TYPE S9.5B.  
THIS WILL BE PAID FOR AS INCIDENTAL MILLING.**

**McDOWELL COUNTY**

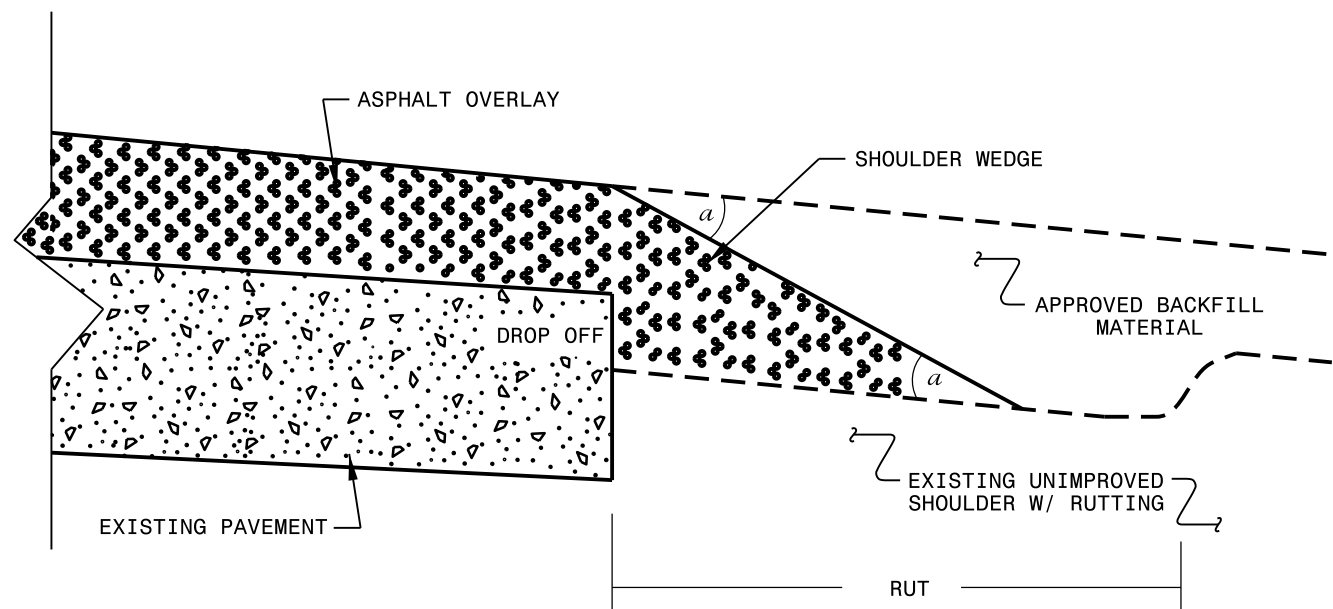
- NOTES:
- 1) DETAIL DOES NOT APPLY TO OGAFB AND ULTRA-THIN BONDED WEARING COURSE.
  - 2) BACKFILL SHOULDER WITH APPROVED MATERIAL.
  - 3) THE SHOULDER WEDGE DEVICE MAY BE DISENGAGED AT PAVED DRIVEWAYS, SIDE STREETS, HIGH SHOULDERS, AND OTHER LOCATIONS NOT FEASIBLE TO CONSTRUCT AS APPROVED BY THE ENGINEER.



**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°

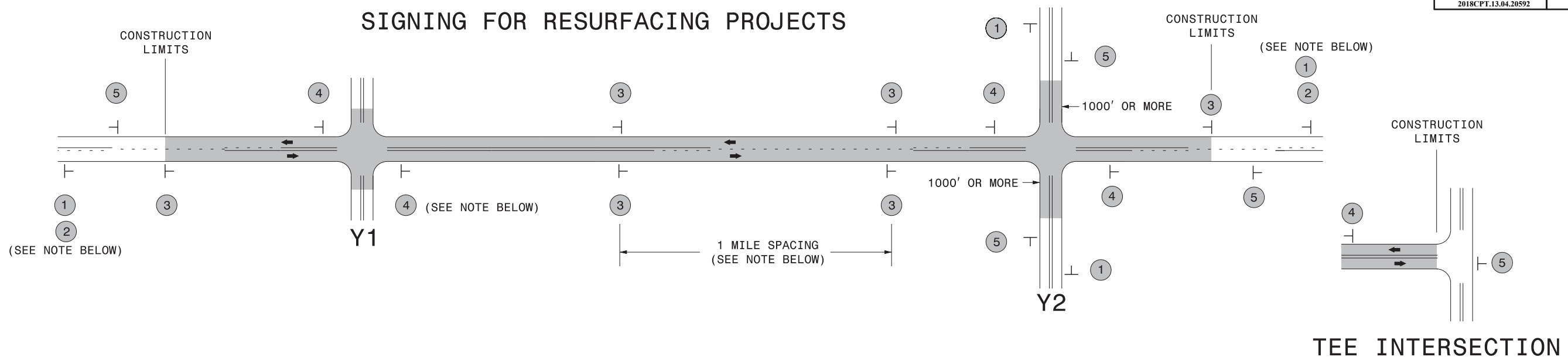
|  |               |                  |  |
|--|---------------|------------------|--|
| <b>CONTRACT STANDARDS<br/>AND DEVELOPMENT UNIT</b>     |               |                  |  |
| Office 919-707-6950                                    |               | FAX 919-250-4119 |  |
| <b>SHOULDER WEDGE<br/>DETAILS</b>                      |               |                  |  |
| ORIGINAL BY: T.SPELL                                   | DATE: 7-19-11 |                  |  |
| MODIFIED BY:   | DATE: 2/2/16  |                  |  |
| CHECKED BY:  | DATE:         |                  |  |
| FILE SPEC.: susr/details/stand/shoulderwedgedetail.dgn |               |                  |  |

SYSTEMS DESIGN  
USER NAME





# SIGNING FOR RESURFACING PROJECTS



**LEGEND**  
 ┆ STATIONARY SIGN  
 ← DIRECTION OF TRAFFIC FLOW

## MAINLINE (-L-) SIGNING

## -Y- LINE SIGNING

|   |   |                           |  |  |
|---|---|---------------------------|--|--|
| SIGNING NOTES AND PLACEMENT PER DIRECTION | 1 | <br>W20-1<br>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>1) LESS THAN 1000' OF RESURFACING ALONG -Y- LINE</li> <li>2) SUBDIVISION ROADS</li> <li>3) 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;"> <br/>         W20-1<br/>         48" X 48"       </div> <div style="text-align: center;"> <br/>         W20-7 A<br/>         48" X 48"       </div> </div> <p>PLACED 500' IN ADVANCE OF FLAGGER. PLACED 250' IN ADVANCE OF FLAGGER.</p> |
|   | 2 | <br>W7-3aP<br>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 | <br>SP 13107<br>48" X 48" | <ul style="list-style-type: none"> <li>- PLACE INITIALLY AT THE CONSTRUCTION LIMITS AND SPACE 1 MILE APART THEREAFTER.</li> <li>- AT TEE INTERSECTIONS INSTALL INITIALLY 0.5 MILE FROM INTERSECTION AND SPACE 1 MILE APART THEREAFTER.</li> </ul>  |  |
|   | 4 | <br>SP 13106<br>48" X 48" | <ul style="list-style-type: none"> <li>- THESE ARE FOR -Y- LINES THAT ARE "THROUGH" ROADWAYS. DEAD END AND SUBDIVISION ROADS ARE NOT "THROUGH" ROADWAYS.</li> <li>- INSTALL 500' +/- FROM EACH -Y- LINE APPROACH AS SHOWN ABOVE.</li> <li>- 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.</li> <li>- A MAXIMUM OF 2 SIGN SETS PER MILE. DO NOT INSTALL WHEN -Y- LINES ARE WITHIN 0.5 MILES FROM "END ROAD WORK" SIGN.</li> <li>- FOR TEE INTERSECTIONS, INSTALL WITHIN 500' +/- OF THE INTERSECTION ALONG -L- LINE.</li> </ul> |  |
|   | 5 | <br>G20-2 A<br>48" X 24"  | PLACE 500' FOLLOWING THE END OF CONSTRUCTION LIMITS OR AS SHOWN WHEN WORK ENDS AT A 3-WAY TEE INTERSECTION.  |  |

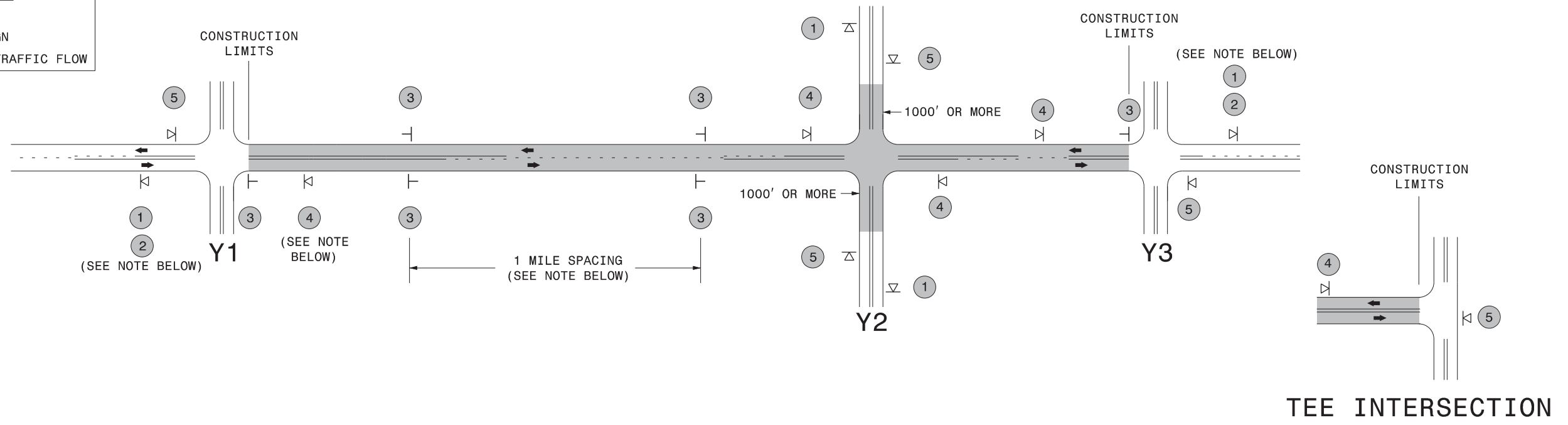
4/20/2016 C:\Users\rmgarrrett\Desktop\Resurfacing\_AdvWarn\_2Ln.dgn User:rmgarrrett

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

## SIGNING FOR ASPHALT SURFACE TREATMENT

**LEGEND**

- ⏏ PORTABLE SIGN
- ┌ STATIONARY SIGN
- ➔ DIRECTION OF TRAFFIC FLOW



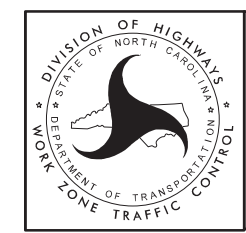
### MAINLINE (-L-) SIGNING

### -Y- LINE SIGNING

|  |   |      |  |  |
|--|---|------|--|--|
| <b>SIGNING NOTES AND<br/>PLACEMENT PER DIRECTION</b> | 1   | <br> | <ul style="list-style-type: none"> <li>- PLACE 1000' PRIOR TO BEGINNING OF CONSTRUCTION LIMITS. ONLY USED ON -Y- LINES IF RESURFACING LIMITS EXTEND 1000' ALONG -Y- LINE.</li> <li>- SIGN #2 ONLY USED WHEN RESURFACING LIMITS ARE 2 OR MORE MILES IN LENGTH. ROUND UP TO THE NEAREST WHOLE NUMBER. DO NOT USE FRACTIONAL OR DECIMAL NUMBERS.</li> </ul>   | <p><b>STATIONARY SIGNING NOT REQUIRED FOR THE FOLLOWING -Y- LINE CONDITIONS:</b></p> <ol style="list-style-type: none"> <li>1) LESS THAN 1000' OF RESURFACING ALONG -Y- LINE</li> <li>2) SUBDIVISION ROADS</li> <li>3) DEAD END ROADS</li> </ol> <p>WHEN PAVING/CONSTRUCTION ACTIVITIES PROCEED ACROSS AN UNSIGNED -Y- LINE, PORTABLE ADVANCE WARNING 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; align-items: center;"> <div style="text-align: center;"> <br/> <small>W20-1<br/>48" X 48"</small><br/>             PLACED 500' IN ADVANCE OF FLAGGER.         </div> <div style="text-align: center;"> <br/> <small>W20-7 A<br/>48" X 48"</small><br/>             PLACED 250' IN ADVANCE OF FLAGGER.         </div> </div> |
|  | 3   | <br> | <ul style="list-style-type: none"> <li>- ALTERNATE THE FOLLOWING TWO SIGNS:</li> <li>- STARTING WITH "LOOSE GRAVEL" (W8-7) FOLLOWED BY "UNMARKED PAVEMENT".</li> <li>- PLACE INITIALLY AT THE CONSTRUCTION LIMITS AND SPACED 1 MILE APART THEREAFTER.</li> <li>- AT TEE INTERSECTIONS INSTALL INITIALLY 0.5 MILE FROM INTERSECTION AND SPACE 1 MILE APART THEREAFTER.</li> </ul>   |  |
|  | 4   |      | <ul style="list-style-type: none"> <li>- THESE ARE FOR -Y- LINES THAT ARE "THROUGH" ROADWAYS. DEAD END AND SUBDIVISION ROADS ARE NOT "THROUGH" ROADWAYS.</li> <li>- INSTALL 500' +/- FROM EACH -Y- LINE APPROACH AS SHOWN ABOVE.</li> <li>- 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.</li> <li>- A MAXIMUM OF 2 SIGN SETS PER MILE. DO NOT INSTALL WHEN -Y- LINES ARE WITHIN 0.5 MILES FROM "END ROAD WORK" SIGN.</li> </ul> |  |
|  | 5   |      | <ul style="list-style-type: none"> <li>- PLACE 500' FOLLOWING THE END OF CONSTRUCTION LIMITS OR AS SHOWN WHEN WORK ENDS AT A 3-WAY TEE INTERSECTION.</li> </ul>  |  |
|  | <p>THE ABOVE SIGNS ARE ALL THAT ARE REQUIRED FOR A CONTRACTOR TO BEGIN A RESURFACING CONTRACT. ANY ADDITIONAL SIGNS REQUESTED BY NCDOT DIVISIONS SHALL BE INSTALLED WITHIN 7 BUSINESS DAYS OF THE START OF CONTRACT WORK.</p> |      |  |  |

**MAPS LESS THAN 2 MILES**

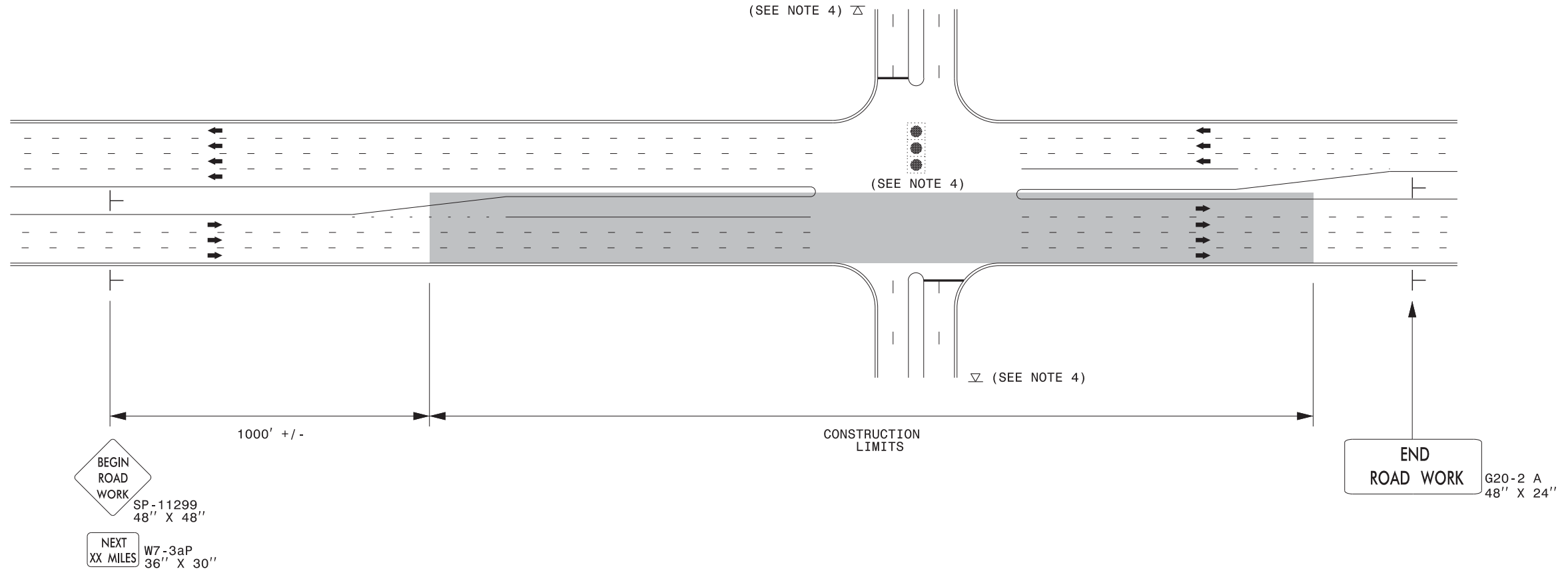
FOR AST RESURFACING MAPS WITH CONSTRUCTION LIMITS LESS THAN 2 MILES IN LENGTH, USE A STATIONARY "LOOSE GRAVEL" SIGN AT THE BEGINNING CONSTRUCTION LIMIT FOLLOWED BY AN "UNMARKED PAVEMENT" SIGN MIDWAY THROUGH AND AN "END ROAD WORK" SIGN AT THE END CONSTRUCTION LIMIT.



**ADVANCE WARNING SIGNS FOR 2-LANE ROADWAY ASPHALT SURFACE TREATMENT**

5/12/2017 S:\TUXWZTC\Resurfacing\2L2W & AST Resurfacing Details\Resurfacing\_AdvWarn\_2Ln - AST.dgn User:kedais

## URBAN / SUBURBAN WORKZONES

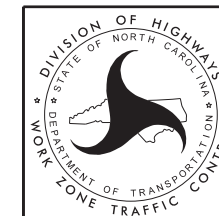


### NOTES:

- 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.

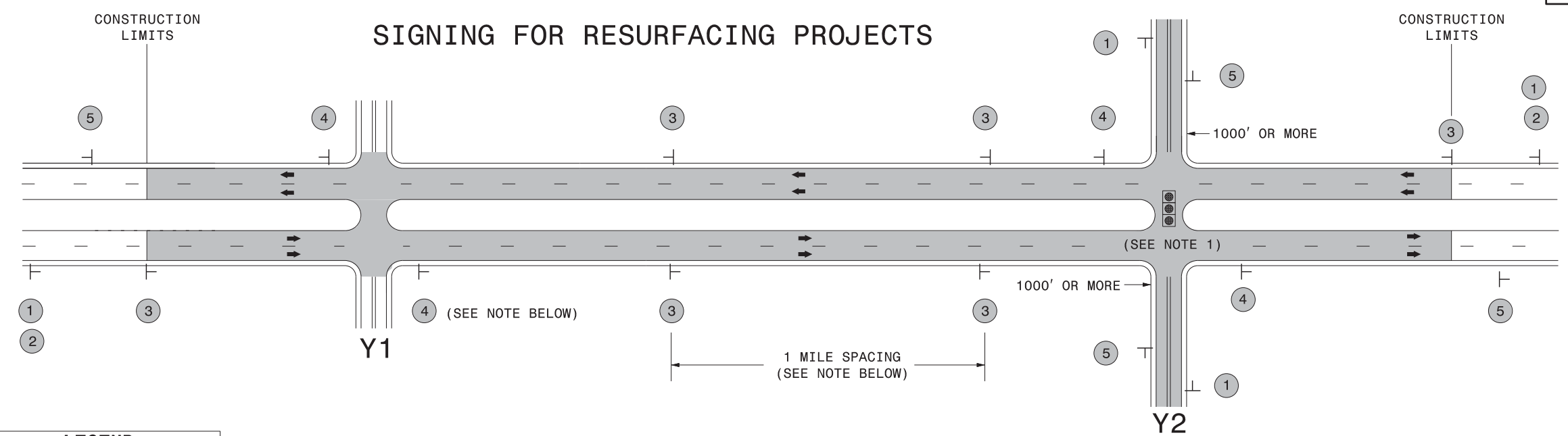
### LEGEND

- ┆ STATIONARY SIGN
- ➔ DIRECTION OF TRAFFIC FLOW



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





**LEGEND**  
 ┆ STATIONARY SIGN  
 ← DIRECTION OF TRAFFIC FLOW

**MAINLINE (-L-) SIGNING**

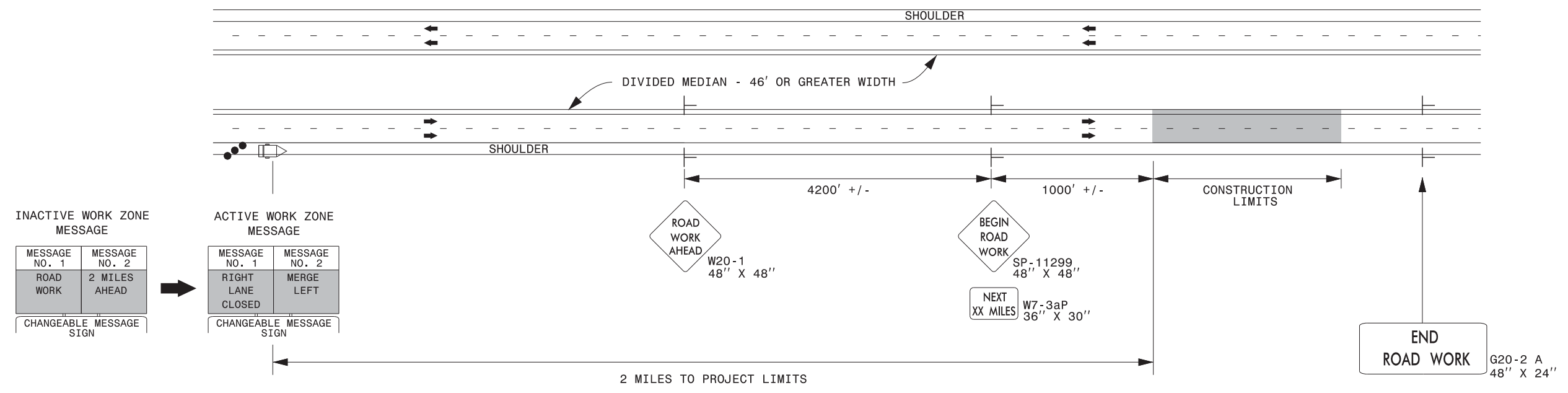
**-Y- LINE SIGNING**

|   |   |                           |   |   |
|---|---|---------------------------|---|---|
| SIGNING NOTES AND PLACEMENT PER DIRECTION | 1 | <br>W20-1<br>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><b>NO REQUIRED STATIONARY SIGNING FOR THE FOLLOWING -Y- LINE CONDITIONS:</b></p> <ol style="list-style-type: none"> <li>1) LESS THAN 1000' OF RESURFACING ALONG -Y- LINE</li> <li>2) SUBDIVISION ROADS</li> <li>3) 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;"> <br/>         W20-1<br/>         48" X 48"       </div> <div style="text-align: center;"> <br/>         W20-7 A<br/>         48" X 48"       </div> </div> <p>PLACED 500' IN ADVANCE OF FLAGGER. PLACED 250' IN ADVANCE OF FLAGGER.</p> <p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>1) 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.</li> </ol> |
|   | 2 | <br>W7-3aP<br>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 | <br>SP 13107<br>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 | <br>SP 13106<br>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 | <br>G20-2 A<br>48" X 24"  | PLACE 500' FOLLOWING THE END OF CONSTRUCTION LIMITS.  |   |

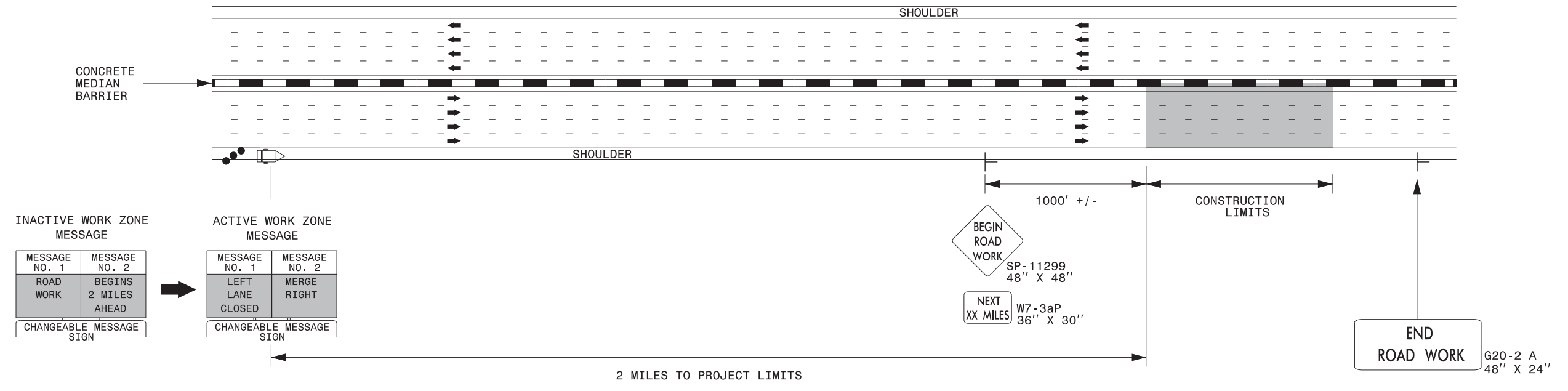
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**RESURFACING  
 ADVANCE WARNING SIGNS  
 FOR RURAL AND SUBURBAN  
 MULTI-LANE ROADWAYS  
 W/ SHOULDER SECTIONS**

## DIVIDED MEDIANS WITH WIDTHS 46' OR GREATER



## DIVIDED MEDIANS WITH WIDTHS LESS THAN 46' OR WITH PERMANENT MEDIAN BARRIER

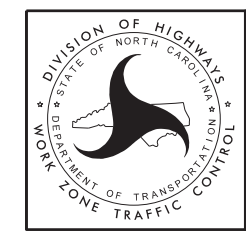


**NOTES:**

- 1) LATERAL CLEARANCE AT ALL SIGN LOCATIONS SHALL BE 6' AS MEASURED FROM THE EDGE OF PAVEMENT.
- 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) FOR MEDIAN WIDTHS LESS THAN 46' (MEASURED EDGELINE TO EDGELINE) USE THE BOTTOM DRAWING.
- 4) IF STATIONARY GENERAL WARNING SIGNS ARE USED, THEY WILL BE PAID FOR PER SECTION 104 OF THE NCDOT STANDARD SPECIFICATIONS AS EXTRA WORK.
- 5) INSTALL "ROAD WORK AHEAD" (W20-1) ALONG ENTRANCE RAMP 500' PRIOR TO RAMP TERMINAL, AND "END ROAD WORK" (G20-2a) AT THE END OF EXIT RAMP WITHIN THE WORK ZONE.
- 6) 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 AND WITH DIVIDED MEDIANS OF 46' OR GREATER. THESE PORTABLE SIGNS ARE INCIDENTAL TO THE OTHER ITEMS OF WORK INCLUDED IN THE TEMPORARY TRAFFIC CONTROL (LUMP SUM) PAY ITEM.

**LEGEND**

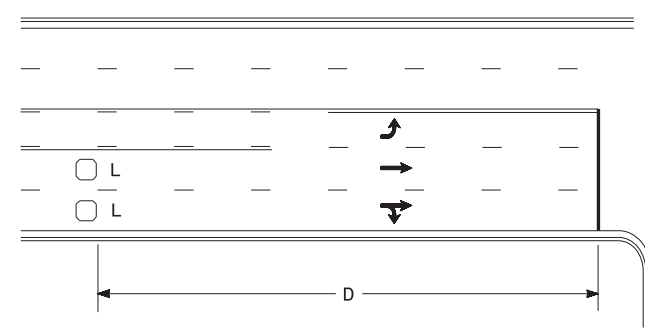
- CHANGEABLE MESSAGE SIGN (CMS)
- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW
- TRAFFIC DRUM



**RESURFACING ADVANCE  
WARNING SIGNS FOR  
HIGH SPEED FACILITIES  
≥ 60 MPH**

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### High Speed Detection (≥40 mph)

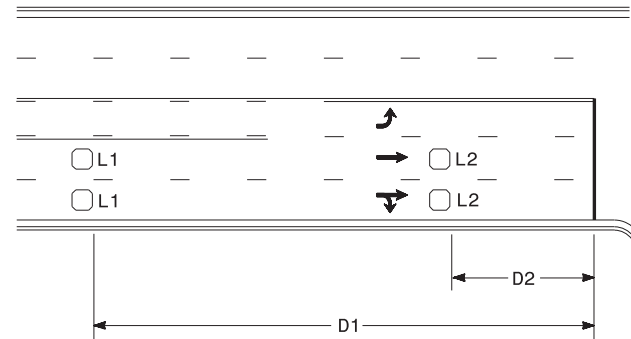


| Speed Limit<br>mph | D<br>ft |
|--------------------|---------|
| 40                 | 250     |
| 45                 | 300     |
| 50                 | 355     |
| 55                 | 420     |

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

Volume Density Operation

OR

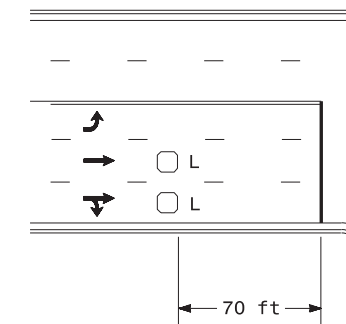


| Speed Limit<br>mph | D1<br>ft | D2<br>ft |
|--------------------|----------|----------|
| 40                 | 250      | 80       |
| 45                 | 300      | 90       |
| 50                 | 355      | 100      |
| 55                 | 420      | 110      |

L1 = 6ft X 6ft  
Wired in series  
L2 = 6ft X 6ft  
Wired in series

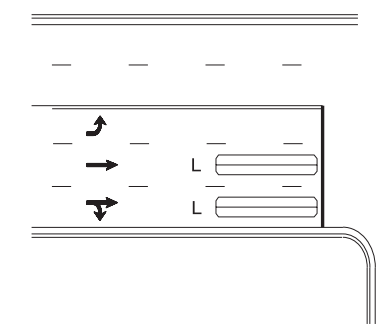
"Stretch" Operation

### Low Speed Detection (≤35 mph)



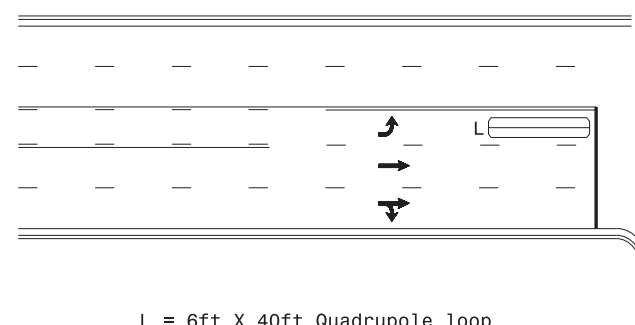
L = 6ft X 6ft  
Wired in series

OR



L = 6ft X 40ft  
Quadrupole loop, wired separately

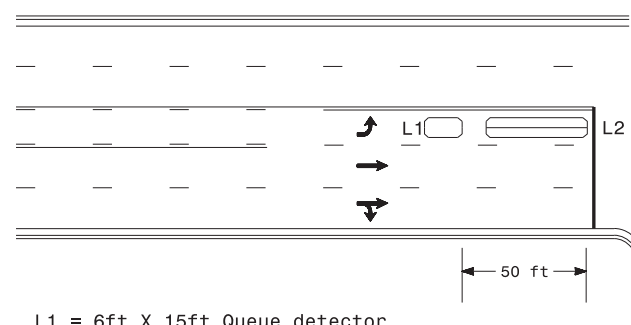
### Left Turn Lane Detection



L = 6ft X 40ft Quadrupole loop

Presence Loop Detection

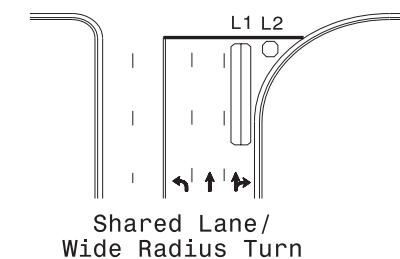
OR



L1 = 6ft X 15ft Queue detector  
L2 = 6ft X 40ft Quadrupole loop

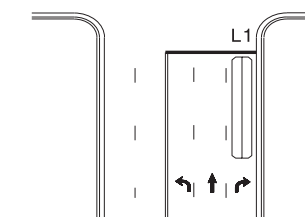
Queue Loop Detection

### Right Turn Lane Detection

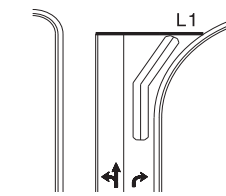


Shared Lane/  
Wide Radius Turn

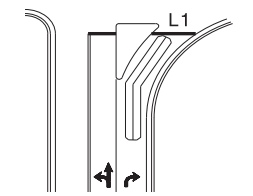
L1 = 6ft X 40ft Quadrupole loop  
L2 = 6ft X 6ft [Minimum] Presence loop  
Wired separately



Standard Turn

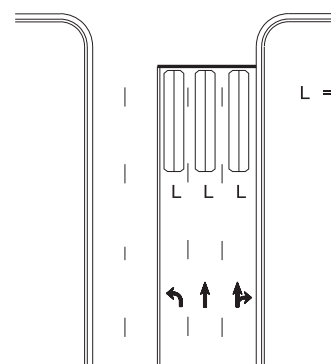


Wide Radius Turn



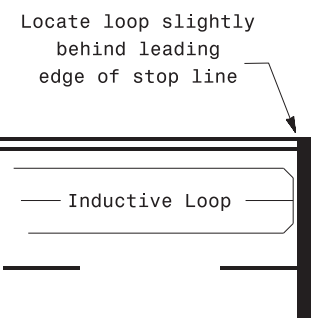
Channelized Turn

### Side Street Detection



L = 6ft X 40ft  
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 under any of the  
following conditions:  
1) stop line is greater than 15'  
from edge of intersecting  
roadway  
2) loop detects a permissive or  
protected/permissive left turn  
3) for an exclusive right turn  
lane

### Recommended Number of Turns

Single 6' X 6' loop  
(when wired separately):

| Length of<br>Lead-in<br>ft | Number<br>of Turns |
|----------------------------|--------------------|
| < 250                      | 3                  |
| 250-375                    | 4                  |
| 375-525                    | 5                  |
| > 525                      | 6                  |

Quadrupole loops: Use 2-4-2 turns

6' X 15' Loops:  
Lead-in < 150', use 2 turns  
Lead-in > 150', use 3 turns

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE  
N/A

Prepared in the Offices of:

TRANSPORTATION MOBILITY AND SAFETY DIVISION  
STATE OF NORTH CAROLINA  
SIGNAL DESIGN SECTION

750 N. Greenfield Pkwy, Garner, NC 27529

SCALE  
N/A

#### Typical Signal Loop Locations

|                         |                  |
|-------------------------|------------------|
| PLAN DATE: January 2015 | REVIEWED BY: JPG |
| PREPARED BY: PLA        | REVIEWED BY:     |
| REVISIONS               | INIT. DATE       |
|                         |                  |
|                         |                  |

SEAL  
23489  
P. Alexander  
1/30/2015  
DATE