

SAW-CUTTING TO DRAIN ASPHALT PAVEMENTS

2006 Southeastern Pavement Management
and Design Conference

Steve V. Pahnó

Georgia Department of Transportation

NOTE

- **Only a measure of last resort**
- **First saw-cut in May 2001**
- **Not widespread activity**
 - <10 projects to date
 - Only 1 in queue

WHERE'S THE WATER?

- Sags
- Crests
- Everywhere in between

SOURCE OF WATER?

- In all cases to date, *not* groundwater
 - Relatively impermeable aggregate base
 - No alligator cracking or other base-subgrade failure distresses
 - In subsurface drillings, have not seen it yet
- Likely, trapped rainwater
 - Average Statewide Precipitation: 50.78 inches (1895 to 2001)

***WHAT DOES A DRAINAGE
PROBLEM LOOK LIKE?***

GA 400 Northbound

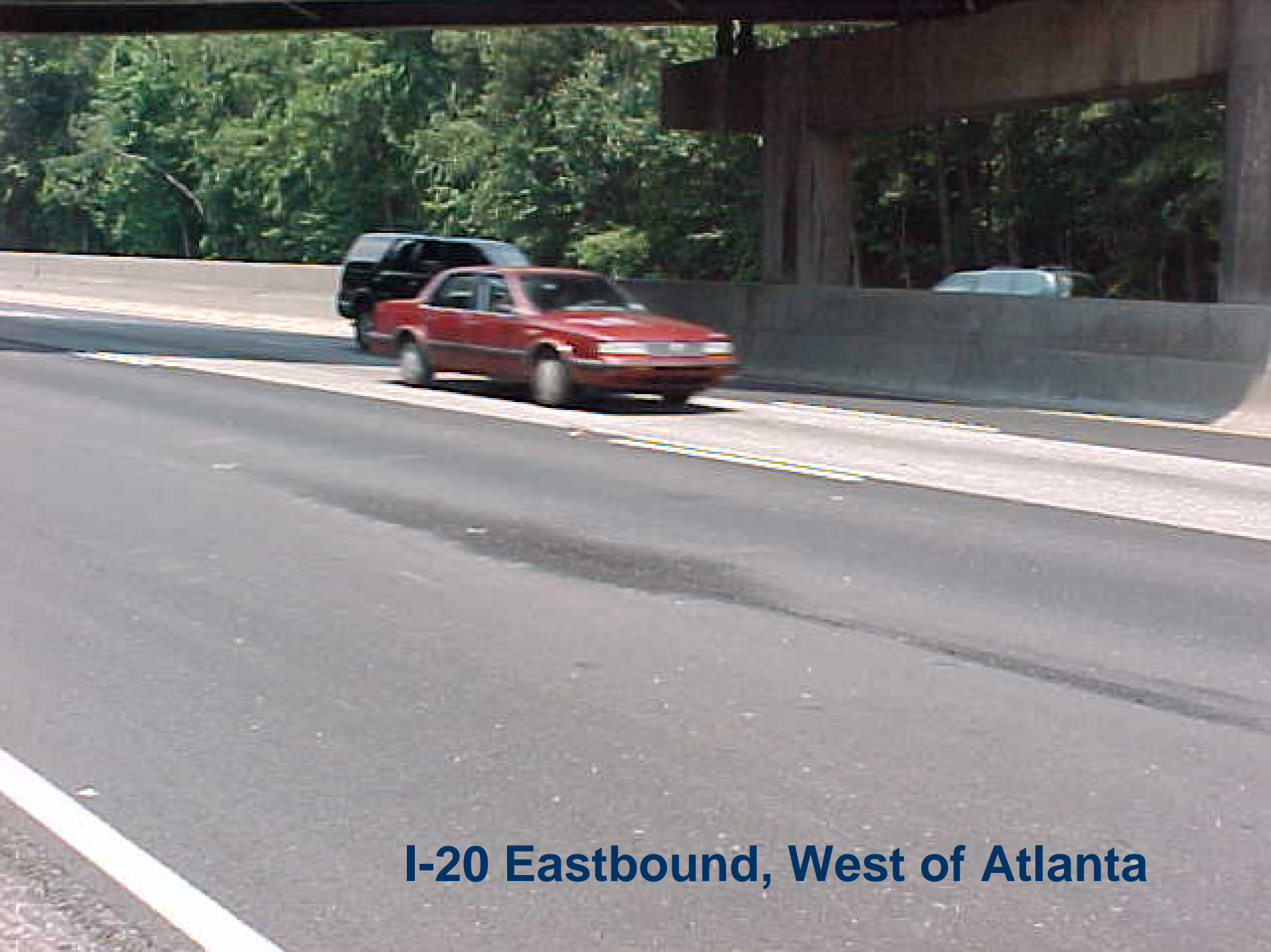




GA 400 Northbound

GA 400

- **12.5mm Superpave**
 - Average Air Voids= 6.08%
 - Standard Deviation Air Voids = 1.935
 - 8.5% of mix placed (2013 tons) > 7.8% air voids
- **12.5mm SMA**
 - Average Air Voids = 6.34%
 - Standard Deviation Air Voids = 1.511
 - 9.6% of mix placed (2267 tons) > 7.8% air voids



I-20 Eastbound, West of Atlanta

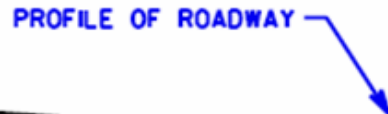
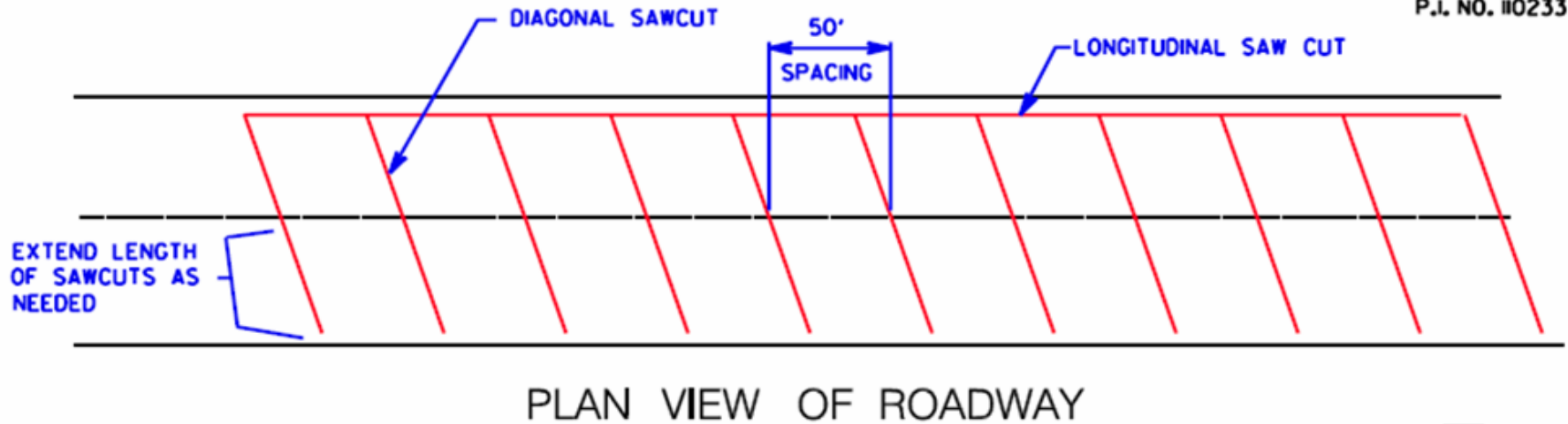
I-20 EASTBOUND

- **12.5mm Superpave**
 - Average Air Voids = 6.85%
 - Standard Deviation Air Voids = 0.942
- **12.5mm SMA**
 - Average Air Voids = 5.95%
 - Standard Deviation Air Voids = 1.595
- **19mm Superpave**
 - Average Air Voids = 6.59%
 - Standard Deviation Air Voids = 1.399
- **25mm Superpave**
 - Average Air Voids = 6.01%
 - Standard Deviation Air Voids = 1.248

CONTRIBUTING FACTORS

- **Construction joints**
 - Lined up on top of each other
- **Air voids**
- **Mix Gradation Bands**

REPAIR DETAILS



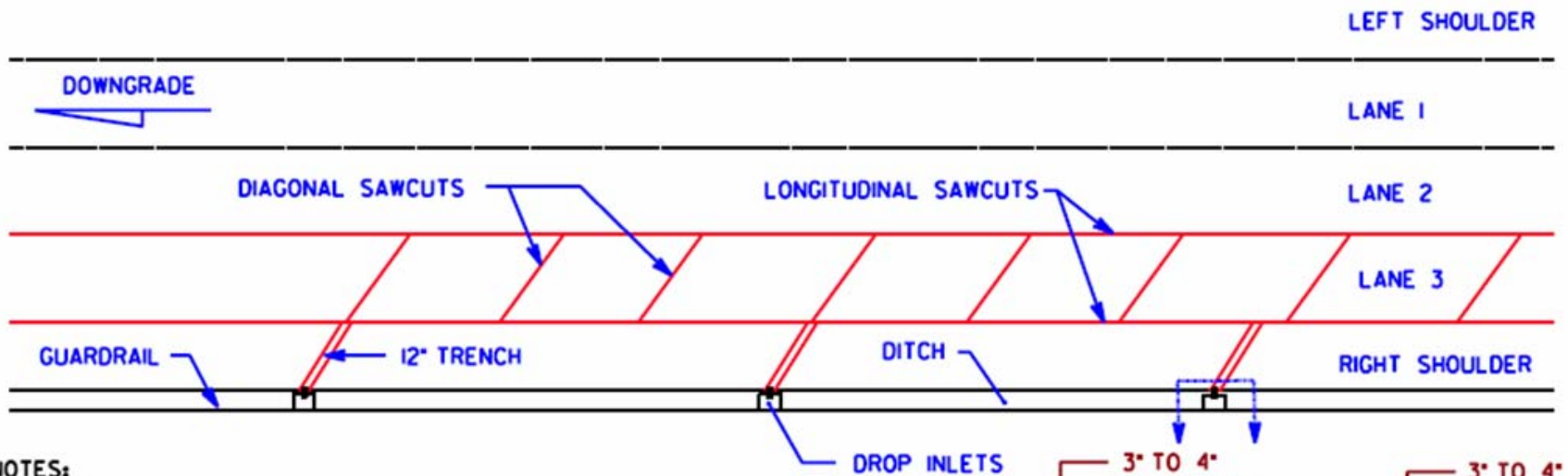
NOTES:

1. LONGITUDINAL SAWCUT SHOULD RUN PARALLEL TO LOW END OF SUPERELEVATION.
2. DIAGONAL SAWCUTS SHOULD TIE INTO LONGITUDINAL SAWCUT.
3. SAWCUTS AT LOW END OF ROAD SECTION SHOULD TIE INTO DRAINAGE STRUCTURE, WHERE POSSIBLE, OR OTHER METHOD SHOULD BE PROVIDED FOR TRAPPED WATER TO EXIT PAVEMENT.
4. SAWCUTS SHOULD BE 1/4 -INCH WIDE.
5. SAWCUT SHOULD BE MADE TO BOTTOM OF ASPHALT LAYER WHERE WATER TRAPPED.
6. SAWCUTS SHOULD BE SEALED AT SURFACE.

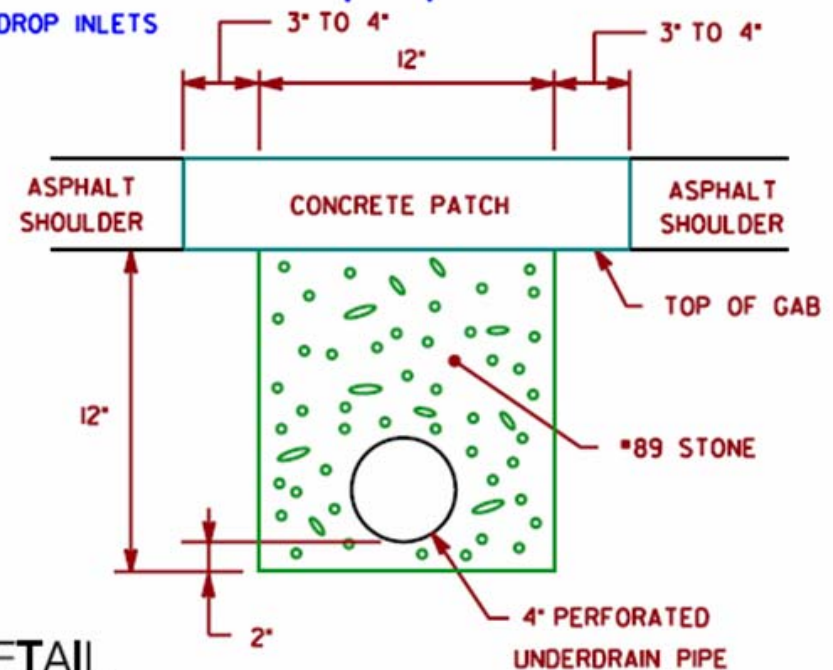
APPLIES TO STATION TO STATION	LOCATION
1118+50 ± TO 1127+00 ± RAMP "AA"	LT., RT., & C

SAW CUTTING DETAIL

NO SCALE

**NOTES:**

1. REPAIRS TO SOUTHBOUND WILL BE SIMILAR EXCEPT CUTS WILL DRAIN INTO MEDIAN.
2. LONGITUDINAL SAWCUT SHOULD RUN PARALLEL TO LOW END OF SUPERELEVATION.
3. DIAGONAL SAWCUTS SHOULD TIE INTO LONGITUDINAL SAWCUT.
4. SAWCUTS AT LOW END OF ROAD SECTION SHOULD TIE INTO DRAINAGE STRUCTURE, WHERE POSSIBLE, OR OTHER METHOD SHOULD BE PROVIDED FOR TRAPPED WATER TO EXIT PAVEMENT.
5. SAWCUTS SHOULD BE $\frac{1}{4}$ - INCH WIDE.
6. SAWCUT SHOULD BE MADE TO BOTTOM OF ASPHALT LAYER WHERE WATER IS TRAPPED.
7. SAWCUTS SHOULD BE SEALED AT SURFACE.

**REPAIR DETAIL**

NO SCALE

DOES SAW-CUTTING WORK???



US 341 – Wayne County



GA 400 Southbound




GA 400 Northbound

GA 400 Southbound





**GA 400 Northbound
(the week after a rain)**



GA 400 Northbound – outside of saw-cut area
(the week after the same rain)

I-20 Westbound



I-20 Westbound



I-20 Westbound

A photograph showing a close-up view of a road shoulder. The road surface is dark asphalt with a white painted edge line. The shoulder area is covered with a thick layer of dry, brown mulch or straw. In the bottom left corner, there is a patch of green grass. The text "I-20 Westbound" is overlaid in white on the left side of the image.



SR 124 – DeKalb County



SR 124 – DeKalb County

SR 124 – DeKalb County



SR 124 – DeKalb County



SR 124 – DeKalb County





SR 124 – DeKalb County

TWEAKING THE CUTS

- **Try wider cut**
 - Next time: ½ inch wide
 - May consider up to 1 inch wide
- **Be more aggressive intercepting water**
 - More cuts, where few places to drain

AN OUNCE OF PREVENTION...

REVISED SPECIFICATIONS

- **Section 400**
 - Hot Mix Asphaltic Concrete Construction

- **Section 828**
 - Hot Mix Asphaltic Concrete Mixtures

SOME MAJOR CHANGES

- **Gradation bands are finer**
 - on #8 and/ or
 - on #200
- **Tightened air void requirements**
- **More realistic compaction targets**
- **Added permeability testing**

NEW MIX SPECIFICATIONS

- **Air voids**
 - Target = 5%
 - Maximum = 7%
- **Permeability \leq 3.60 ft/day**

IN-PLACE MIX PROPERTIES

- **9.5mm Superpave – Type 1**
 - Air voids = 5.8%
 - Permeability = 0.0 ft/day

- **9.5mm Superpave – Type 2**
 - Air voids = 6.1%
 - Permeability = 0.23 ft/day

IN-PLACE MIX PROPERTIES

- **12.5mm Superpave**
 - Air voids = 5.6%
 - Permeability = 1.35 ft/day

- **19mm Superpave**
 - Air voids = 6.1 %
 - Permeability = 0.78 ft/day

IN-PLACE MIX PROPERTIES

- **25mm Superpave**
 - Air voids = 5.1 %
 - Permeability = 0.0 ft/day

THE RESULTS



... and the engineers designed
happily ever after...

THE END