State of the State….of Striping

Kerry NeSmith, P. E.

Pre-Construction Conference

May 25, 2021

Are stripe and markings important???

- How many of you have received a phone call from a customer about a striping issue?
- How many of YOU have driven a car/truck/bus etc.?
- How many of YOU have ever complained about or wished for better stripe/markings/raised pavement markers on a roadway at night….
- Stripe and markings are important…….
- Yet, we typically don’t ‘invest’ much into them.

Investing in stripe and markings

- Not just $$$
- It’s about time, effort, attention to details
- It’s about knowing the standards and applying them.
- It’s about ASSESSING the design and following up on previous work.
- It’s about operating in a collaborative environment, not a vacuum.
- It’s about maybe designing with a ‘striping mind’ or striping ‘in mind’


3rd Lane ends after acceleration for EB on ramp
Location of the issue
Overhead Sign
29
90
29


29
29


EXIT 84B
EXIT 84A
29
Fargo
90
WEST
Rapid City
1/4 MILE
90
EAST
Albert Lea
EXIT ONLY

Thinking out loud, but you could drop the lane in advance of the northbound on ramp (north to the left here) to eliminate the conflict and turn that right lane int
lane for entering traffic. I would need another set of lane drop signs but the would be "more MUTCD correct" compared to an exit only

Charles Dickens—*A Christmas Carol*

- Ghost of Striping Past
- Ghost of Striping Present
- Ghost of Striping Future

It’s important to know a little history

Ghost of Striping Past

- First widespread use of traffic stripe was in….?????
- Wayne County, Michigan in approximately 1911.
- How do I know this????

Evolution of the U.S. Pavement Marking System

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Texas Transportation Institute
College Station, TX 77843-3135

Prepared as part of an Interim Report for

NCHRP Project 4-28 — Feasibility Study for an All-White Pavement Marking System

Ghost of Striping Past

- Standards for striping were slow to develop and varied across the country.
- First MUTCD developed in 1935.

1935 Manual on Uniform Traffic Control Devices

The inherent conflicts created by the existence of two manuals were quickly recognized and efforts were initiated to develop a single manual for both rural and urban conditions. AASHO and NCSHS formed the Joint Committee on Uniform Traffic Control Devices (JC) in 1932 and published the original edition of the *MUTCD* in November 1935. Each part (signs, markings, signals, and islands) was subdivided into articles and sections addressing specific traffic control device aspects such as legal authority, application and location, design, and maintenance. The markings portion was further divided into divisions addressing regulatory and guidance markings and warning markings on hazardous objects. This format required the user to look at several different sections to obtain all the information about a particular type of marking.

The 1935 *MUTCD* defined markings for pavements, curbs, and objects. Lines could be marked with construction joints, paint, or pavement inserts. White, yellow, or black could be used, depending on which color would provide the greatest contrast. Lines could be between four and eight inches wide. Stripes and gaps were supposed to be equal in length and between 5 and 75 feet.

1961 Manual on Uniform Traffic Control Devices

The 1961 MUTCD was the first to be organized in parts, chapters, and sections as used in the modern *MUTCD*. New material was added to address traffic controls for construction and maintenance operations, signing for civil defense, and freeway signing. The importance of the manual was indicated by a federal requirement that all traffic control devices used on federal-aid highways conform to the standards in the 1961 edition. The new edition tried to avoid departure from the basic standards of previous editions, but provided for much greater uniformity in traffic control devices. Many of the alternatives previously permitted for a given device were eliminated and a single standard was substituted. The value of symbols continued to be recognized, but few symbols were introduced.

In the markings part of the manual, conflicts over the color of no-passing zone markings were eliminated by specifying yellow for centerlines and eliminating the use of white, as permitted in earlier editions. Table 2 presents the possible uses of white and yellow markings as specified in the 1961 MUTCD. That manual presented the following reasons for using yellow for the specified pavement marking applications:

Some standards remain constant while some change

- Lane reductions…..same from at least 1948 until present day
- Lane drops…….new standards emerged in 2000 edition

Ghost of Striping Present (well since 2014)

- John Lorentson drop lane conversation, May 2014 (rot behind a wall!)
- Numerous presentations
- MMM 2014
- Pre-Construction Spring 2015
- CEME 2015

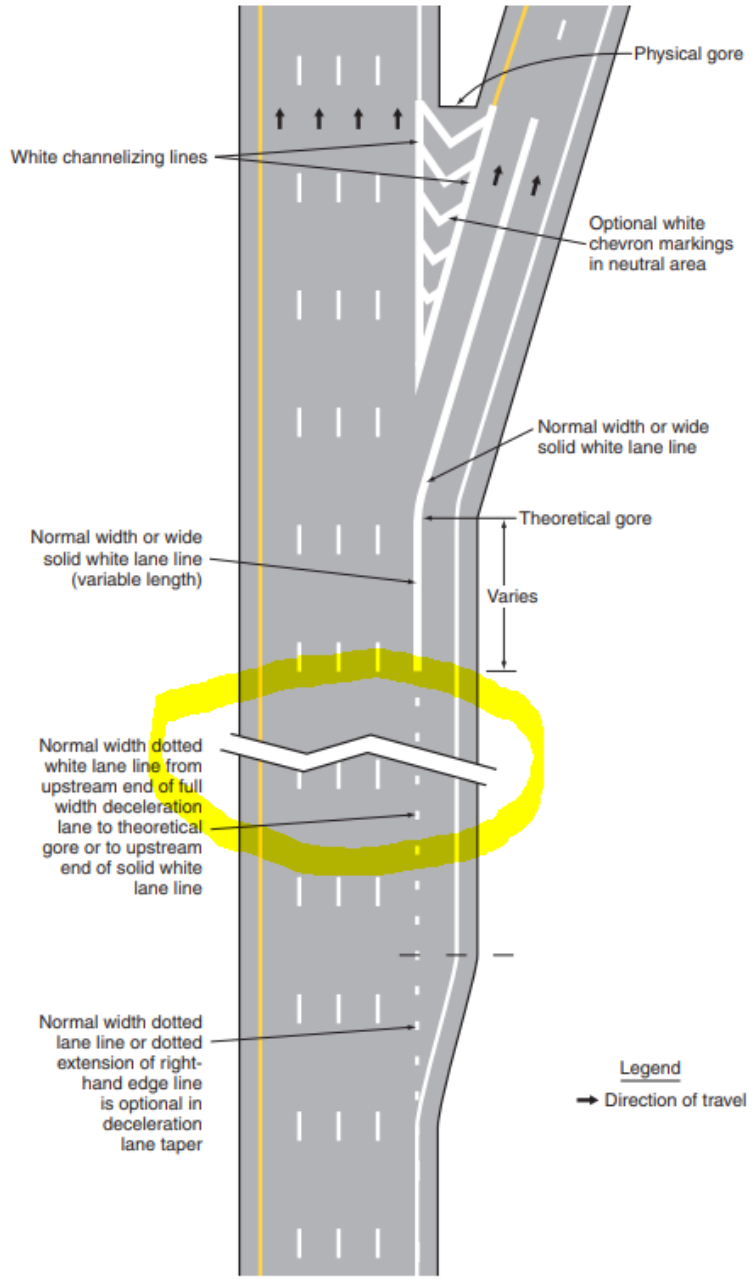
- Striping & Surprises, Pre-Construction, Spring 2018
- Striping matters 1.0, MMM, August 2018
- Striping matters 2.3, CEME September 2019
- Numerous “gripe sessions”


ONLY
ONLY


SPEED LIMIT
55

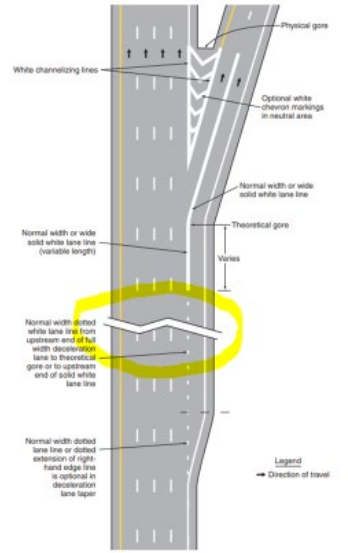
Figure 3B-6. Examples of Dotted Line and Channelizing Line Applications for Exit Ramp Markings (Sheet 2 of 2)

C – Parallel deceleration lane at a multi-lane exit ramp having an optional exit lane that also carries the through route



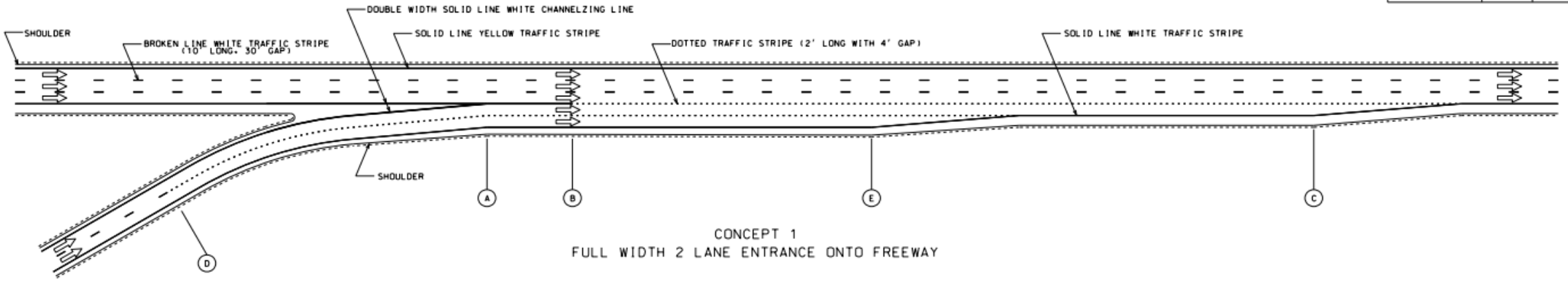
for Exit Ramp Markings (Sheet 2 of 2)

C – Parallel deceleration lane at a multi-lane exit ramp having an optional exit lane that also carries the through route

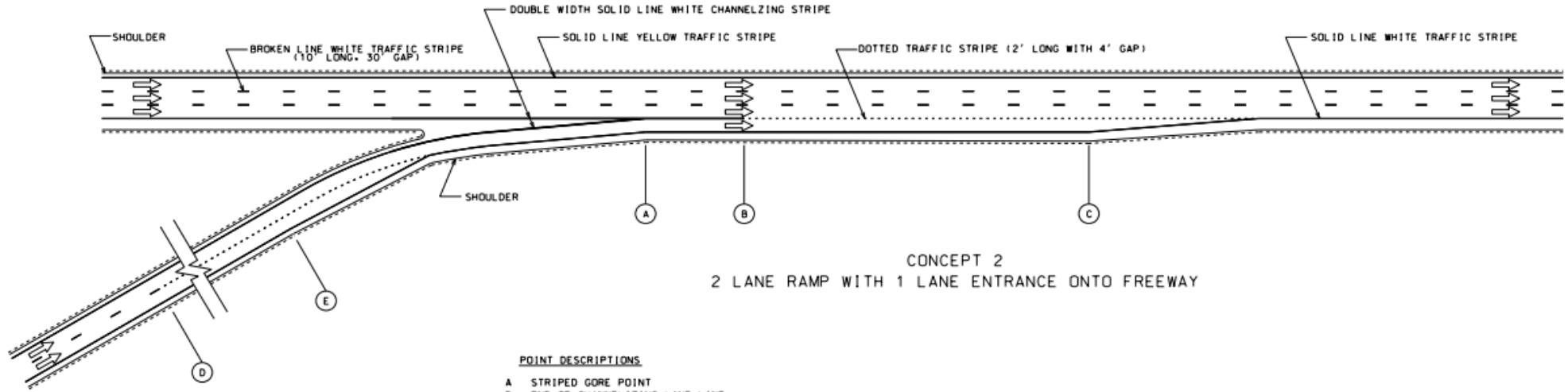


Ghost of Striping Future

REFERENCE PROJECT NO	FISCAL YEAR	SHEET NO



CONCEPT 1
FULL WIDTH 2 LANE ENTRANCE ONTO FREEWAY



CONCEPT 2
2 LANE RAMP WITH 1 LANE ENTRANCE ONTO FREEWAY

POINT DESCRIPTIONS

A STRIPED GORE POINT
B END OF CHANNELIZING LANE LINE
C END OF FULL WIDTH INSIDE RAMP LANE
D BREAK POINT BETWEEN BROKEN AND DOTTED LANE LINES
E END OF FULL WIDTH OUTSIDE RAMP LANE

GENERAL NOTES

1. DOTTED STRIPE SHALL BE USED ADJACENT TO THE THROUGH LANE BETWEEN POINTS B AND C REGARDLESS OF LENGTH.
2. DOTTED STRIPE SHALL BE USED BETWEEN THE RAMP LANES BETWEEN POINTS D AND E.
   - FOR CONVENTIONAL SIDEROADS, POINT D SHALL BE THE POINT WHERE THE TWO LANE RAMP BEGINS.
   - FOR FREEWAY-TO-FREEWAY RAMPS, POINT D SHALL BE MEASURED AND LOCATED UPSTREAM FROM POINT E AT A DISTANCE OF ½ MILE.
3. REFERENCE THE APPROPRIATE 70100 SERIES OF STANDARD DRAWINGS FOR PROPER STRIPE AND PAVEMENT MARKING DETAILS, PLACEMENT, LENGTHS, TRANSITIONS, ETC.
4. REFERENCE THE APPROPRIATE 70300 SERIES OF STANDARD DRAWINGS FOR PROPER MARKER DETAILS, PLACEMENT, ETC.

--SPECIFICATIONS--
CURRENT ALABAMA DEPARTMENT OF TRANSPORTATION

REVISIONS

ALABAMA DEPARTMENT OF TRANSPORTATION
1409 COLISEUM BOULEVARD
MONTGOMERY, AL 36130-3050

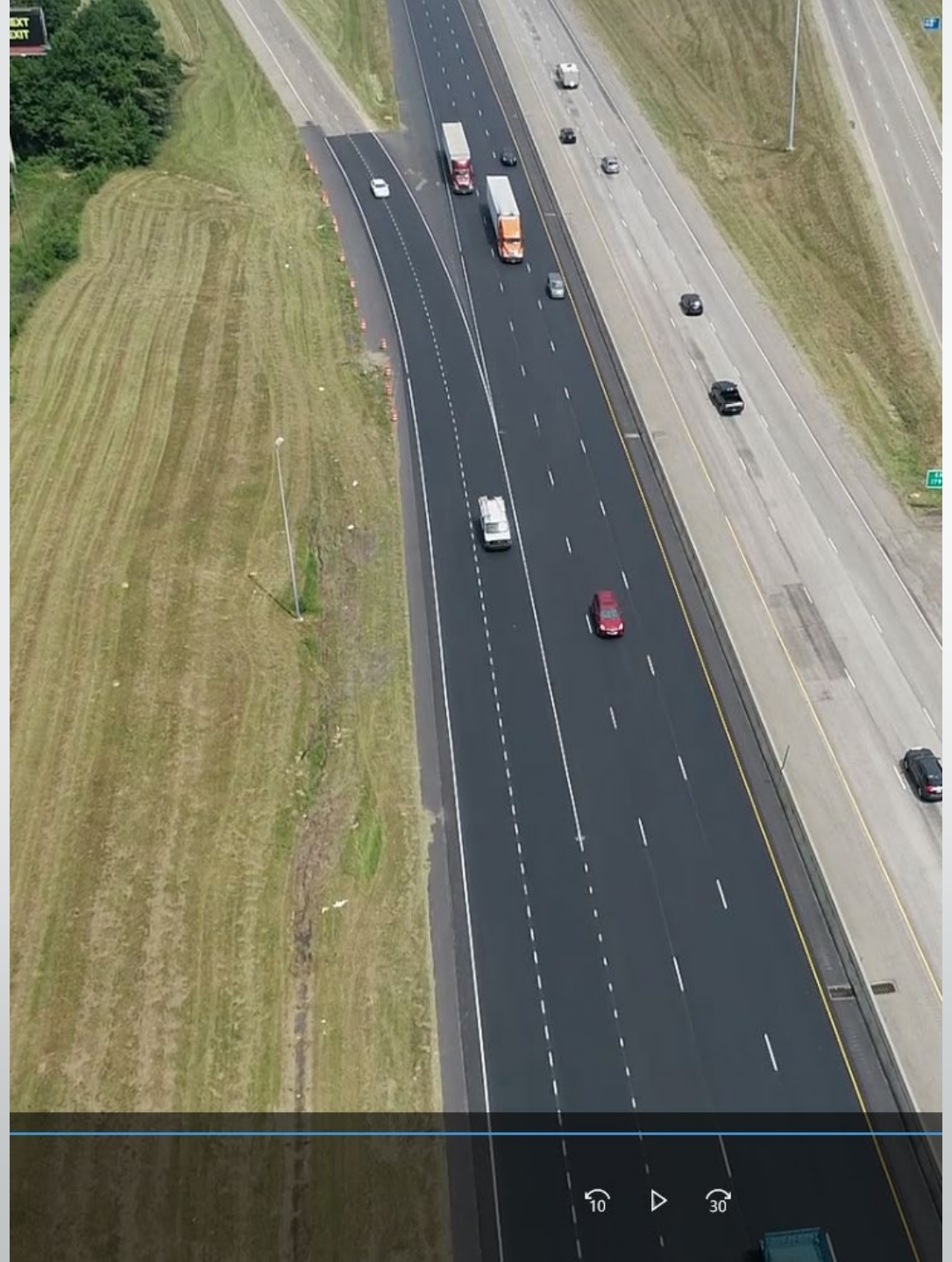
DESIGN BUREAU SPECIAL DRAWING

STRIPING CONCEPTS FOR
TWO LANE ENTRANCE RAMPS
ONTO FREEWAYS

Bureau Std Engr. D.J.B.
DRAWN BY: D.J.B. DATE DRAWN: 7-23-2020

SPECIAL DRAWING NO: FSC-701

INDEX NO: 70155

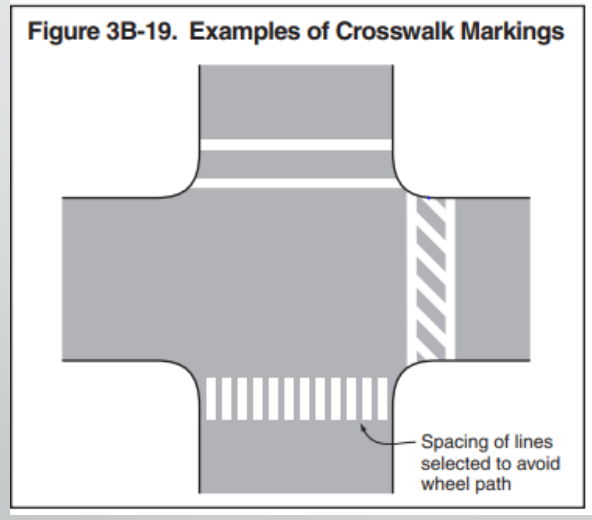

10
30

Ghost of Striping Future

- Next edition of MUTCD
- 11th Edition Notice of Proposed Amendment (NPA) released Dec 2020
- Comment period closed May 14, 2021 (26,515)
- Assessment of comments by FHWA
- Final rule released and published…….????....unless……
- ALDOT will have 2 years to adopt new manual

Crosswalks

Current 2009 Edition



Proposed 11th Edition

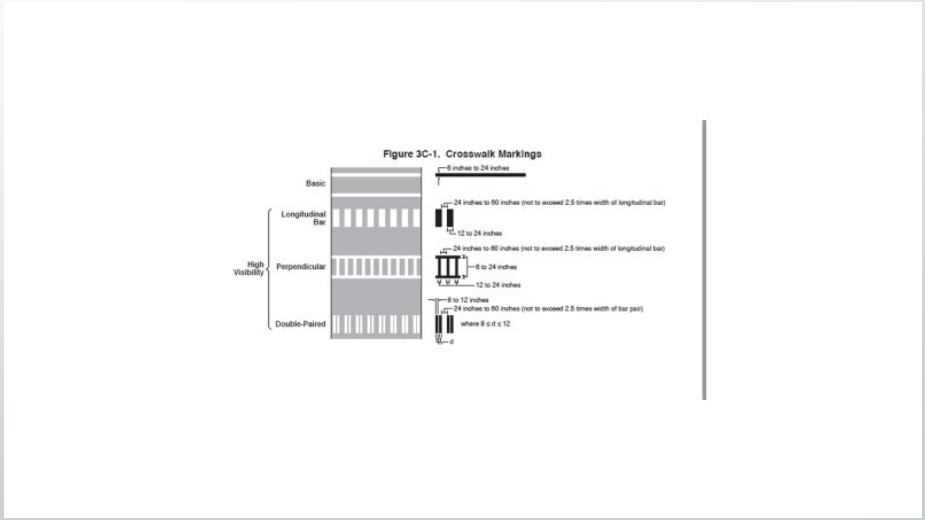


Figure 3J-2. Examples of Islands Designated by Pavement Markings

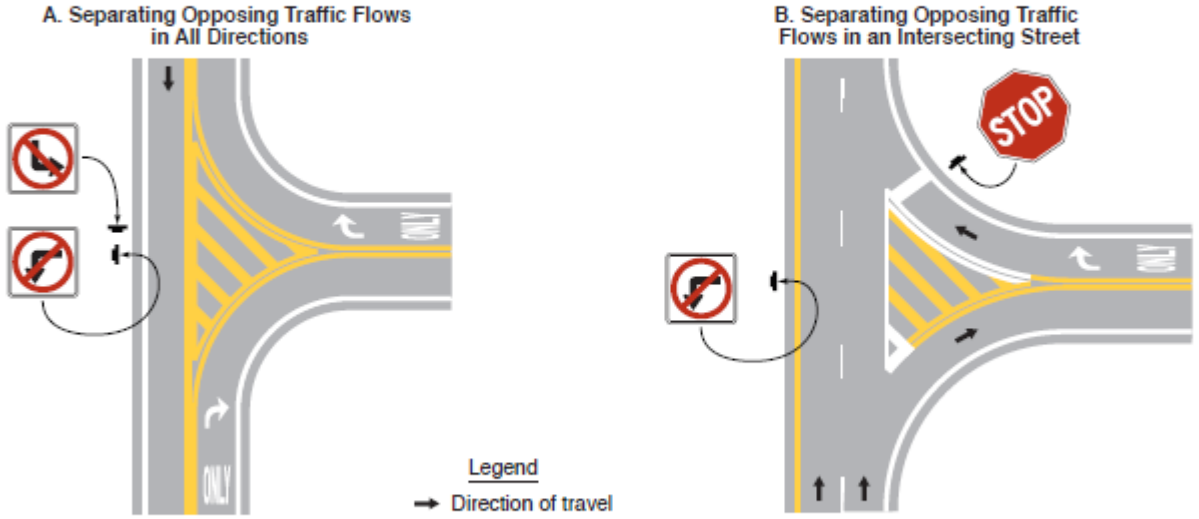


Figure 3B-14. Lane-Reduction Transitions

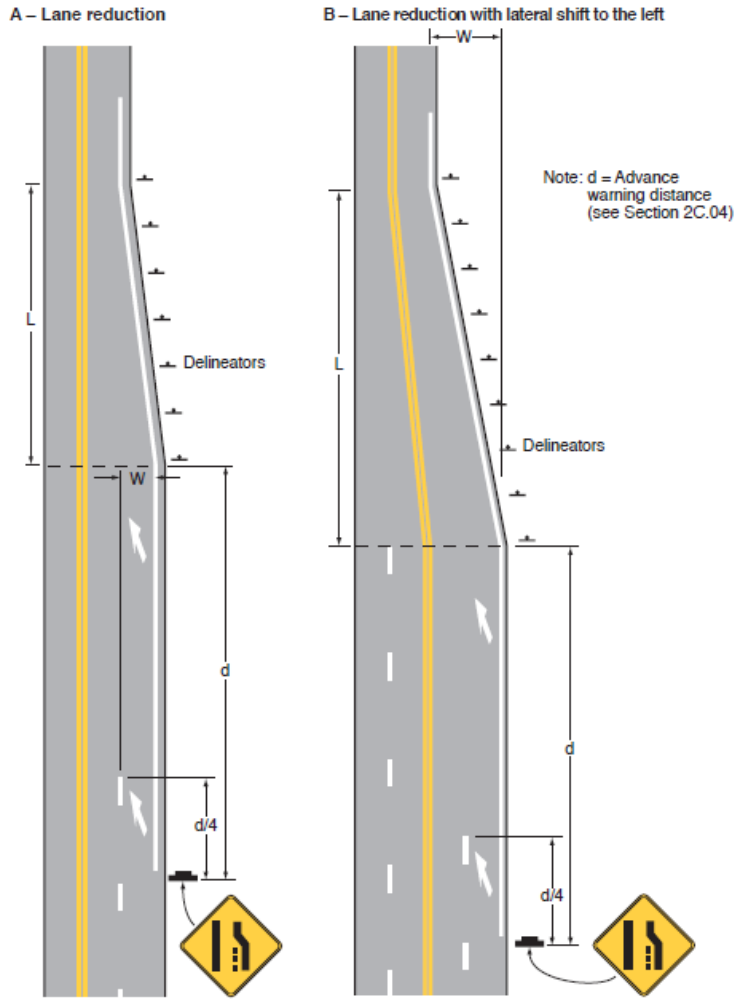


Figure 2C-13. Example Sequences for Lane Ends and Lane Merge Signs
Conventional Roads (Sheet 2 of 5)

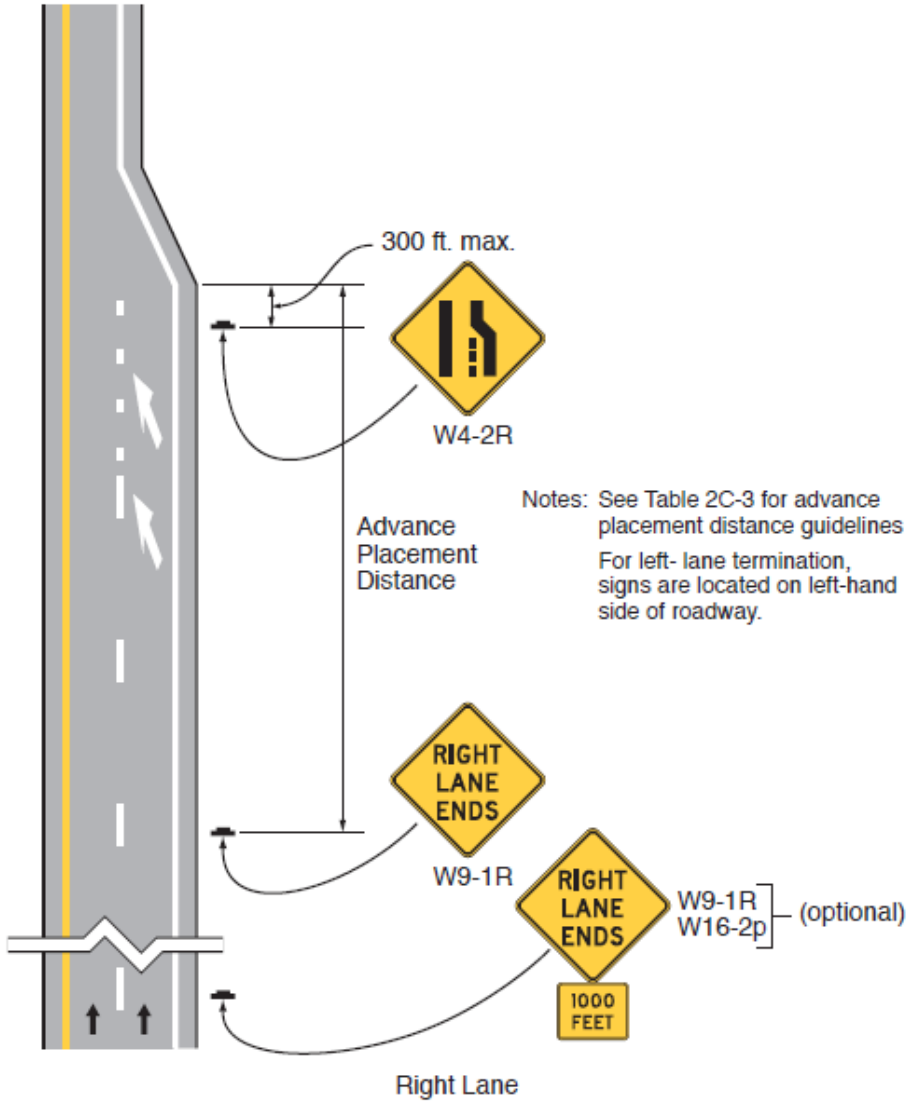
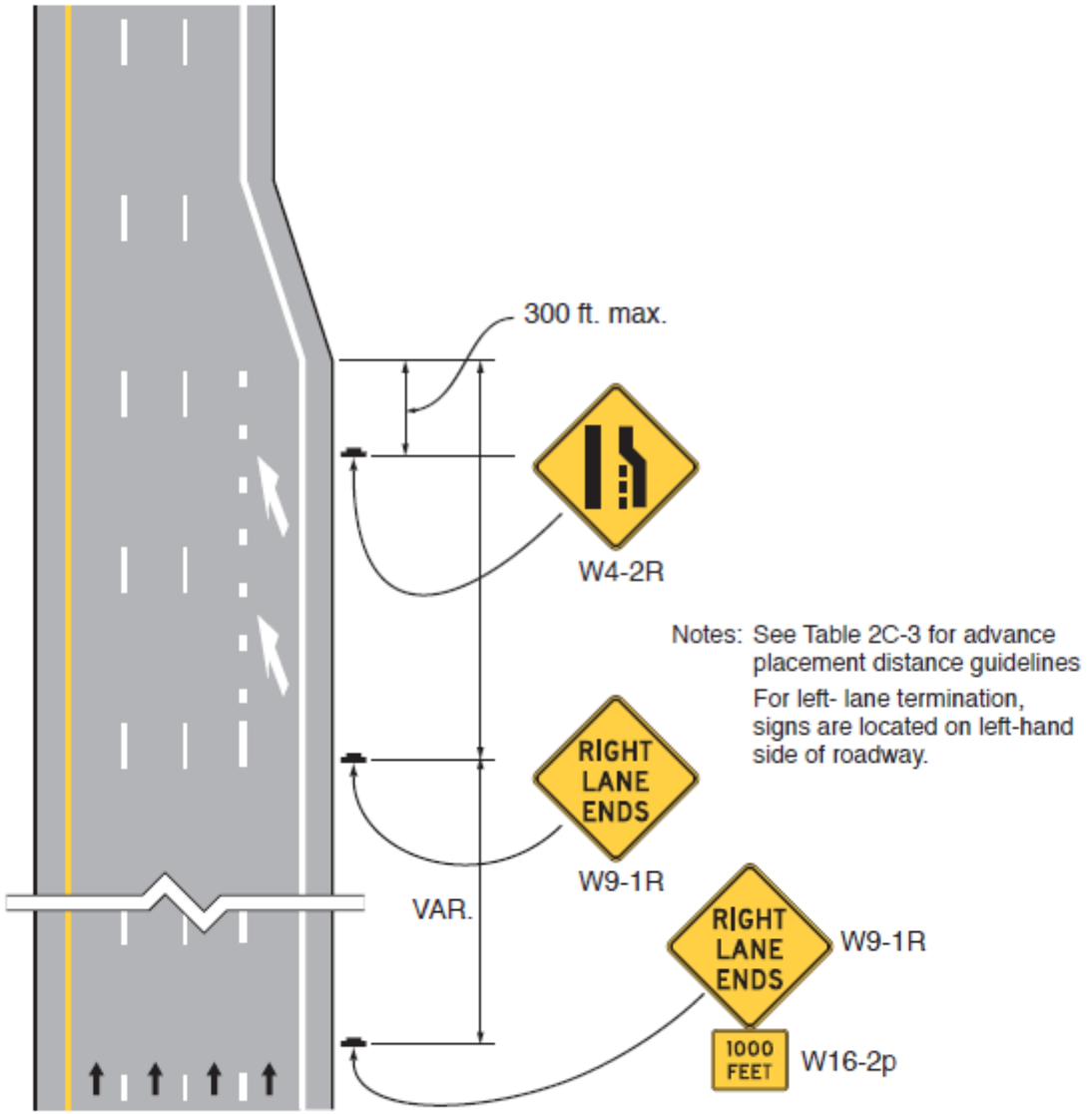


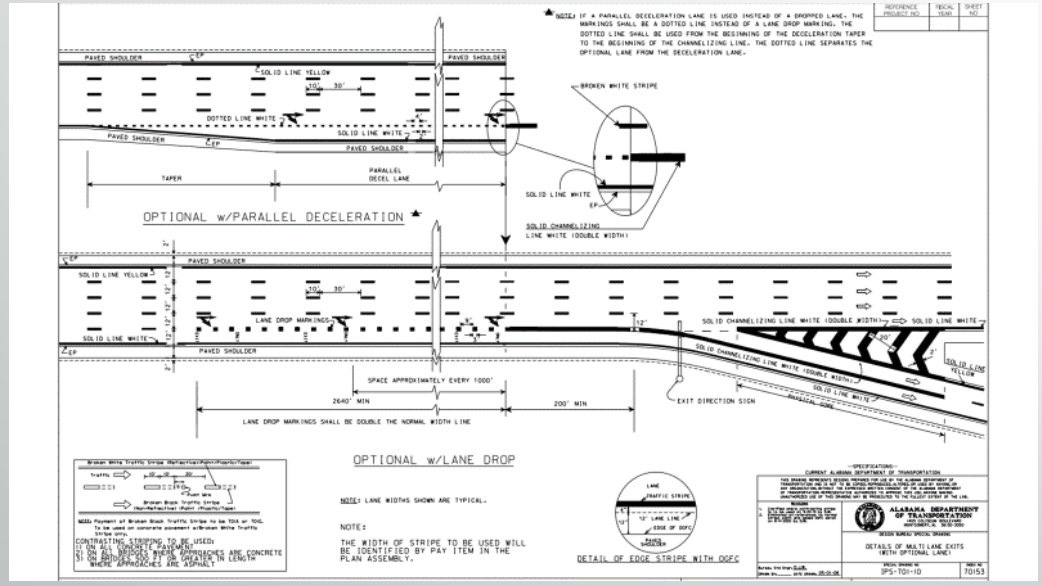
Figure 2C-13. Example Sequences for Lane Ends and Lane Merge Signs
Freeways / Expressways (Sheet 1 of 5)

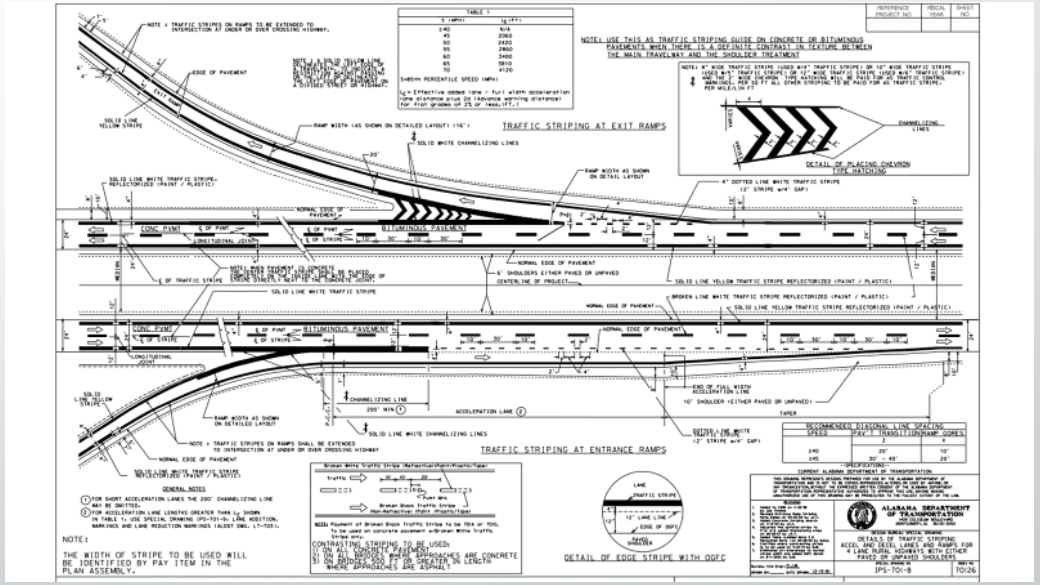


Notes: See Table 2C-3 for advance placement distance guidelines

For left- lane termination, signs are located on left-hand side of roadway.

What do we do about gores???






EXIT 171
85 NORTH
Atlanta
RAMP 40 MPH
65 NORTH
Birmingham

Section ~~3B.24~~ 3B.25 Chevron and Diagonal ~~Crosshatch~~ Markings

~~Option:~~

~~Chevron and diagonal crosshatch markings may be used to discourage travel on certain paved areas, such as shoulders, gore areas, flush median areas between solid double yellow center line markings or between white channelizing lines approaching obstructions in the roadway (see Section 3B.10 and Figure 3B-15), between solid double yellow center line markings forming flush medians or channelized travel paths at intersections (see Figures 3B-2 and 3B-5), buffer spaces between preferential lanes and general-purpose lanes (see Figures 3D-2 and 3D-4), and at grade crossings (see Part 8).~~

Support:

Chevron or diagonal markings are used to discourage travel on certain paved areas, such as shoulders, neutral areas, and flush median areas.

Guidance:

Chevron markings should be used:

A. On approaches to obstructions in the roadway (see Section 3B.13), or

B. For channelized travel paths on approaches to intersections (see Figure 2B-12), or

C. In buffer spaces between preferential lanes and general-purpose lanes (see Drawing A of Figure 3E-2), or

D. In the neutral area of exit ramp and entrance ramp gores (see Figure 3B-8, Drawing A of Figure 3B-9, and Figure 3B-10), or

E. In the neutral area of bifurcations created from open-road tolling lanes that bypass a conventional toll plaza, or

F. In neutral areas, where used, at access and egress points to and from a managed-lane facility (see Figures 2G-9, 2G-10, 2G-22, 2G-23, and 2G-25) and,

G. In neutral areas of islands (see Figures 3J-1 through 3J-3).

Option:

Chevron markings may be supplemented with white retroreflective or internally illuminated raised pavement markers (see Sections 3B.15 and 3B.17) for enhanced nighttime visibility.

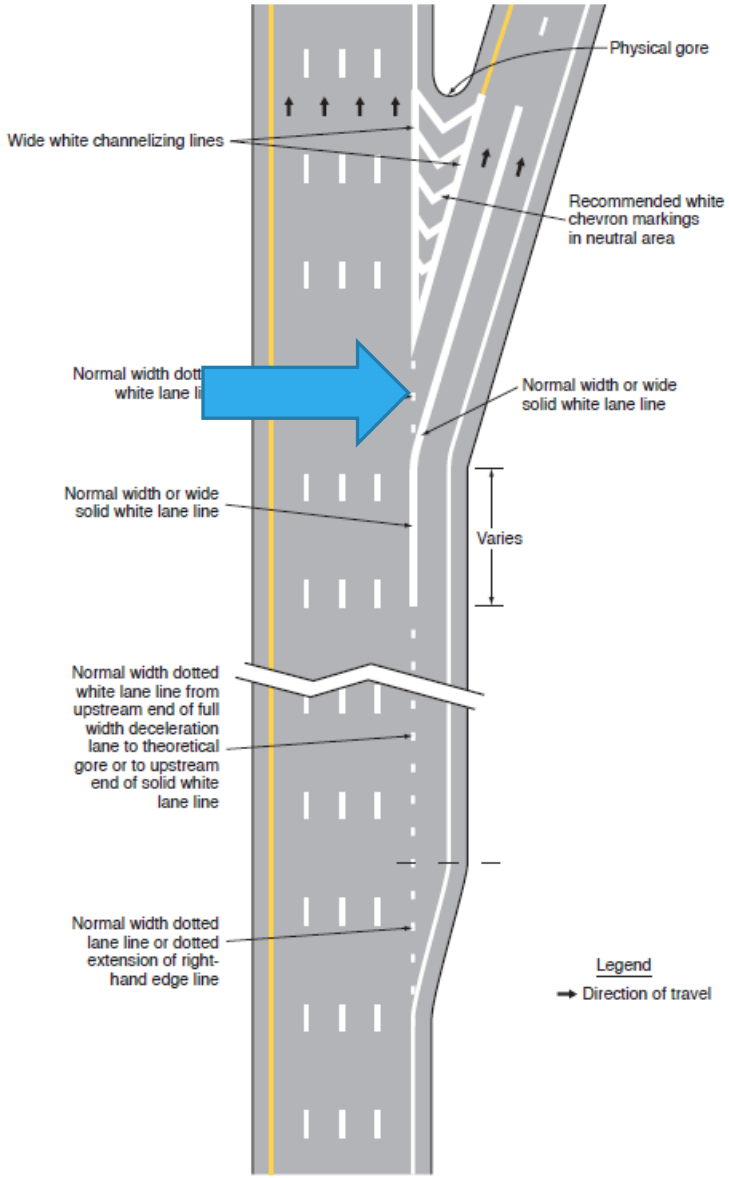
Chevron markings may be used at other locations for special emphasis where traffic flows in the same general direction as determined by engineering judgment.


EXIT
15


EXIT 171
85 NORTH
Atlanta
RAMP 40 MPH
65 NORTH
Birmingham

Figure 3B-8. Examples of Dotted Line and Channelizing Line Applications for Exit Ramp Markings (Sheet 2 of 2)

C – Parallel deceleration lane at a multi-lane exit ramp having an optional exit lane that also carries the through route



Section ~~3A.06~~3A.04 Functions, Widths, and Patterns of Longitudinal Pavement Markings

Standard:

The general functions of longitudinal lines shall be as follows:

A. A double line indicates maximum or special restrictions.

B. A solid line discourages or prohibits crossing (depending on the specific application).

C. A broken line indicates a permissive condition.~~; and~~

D. A dotted lane line provides ~~guidance or~~ warning of a downstream change in lane function.

E. A dotted line used as a lane line or edge line extension guides vehicles through an intersection, a taper area, or an interchange ramp area.

The widths and patterns of longitudinal lines shall be as follows:

A. Normal width line—~~4 to 6 inches wide.~~ 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph, 4 to 6 inches for all other roadways.

B. Wide line—~~at least twice the width of a normal line~~ at least 8 inches in width if 4 inch or 5 inch normal width lines are used and at least 10 inches in width if 6 inch normal width lines are used.

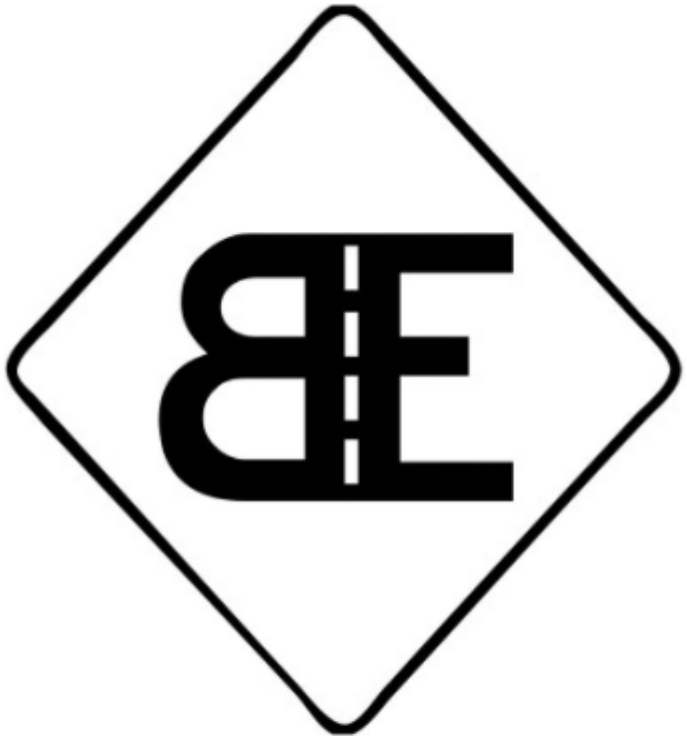
C. Double line—two parallel lines separated by a discernible space. The pavement surface shall be visible between the lines in the same way that it is visible outside the lines, except where contrast markings are used in combination with the double line (see Section 3A.03).

D. Broken line—normal width line segments separated by gaps.

E. Dotted line—noticeably shorter line segments separated by shorter gaps than used for a broken line. The width of a dotted line extension shall be at least the same as the width of the line it extends.

Ghost of Striping--Future

- While some things are still to be decided (final new standards, etc.)
- ALDOT is moving ahead with the times.



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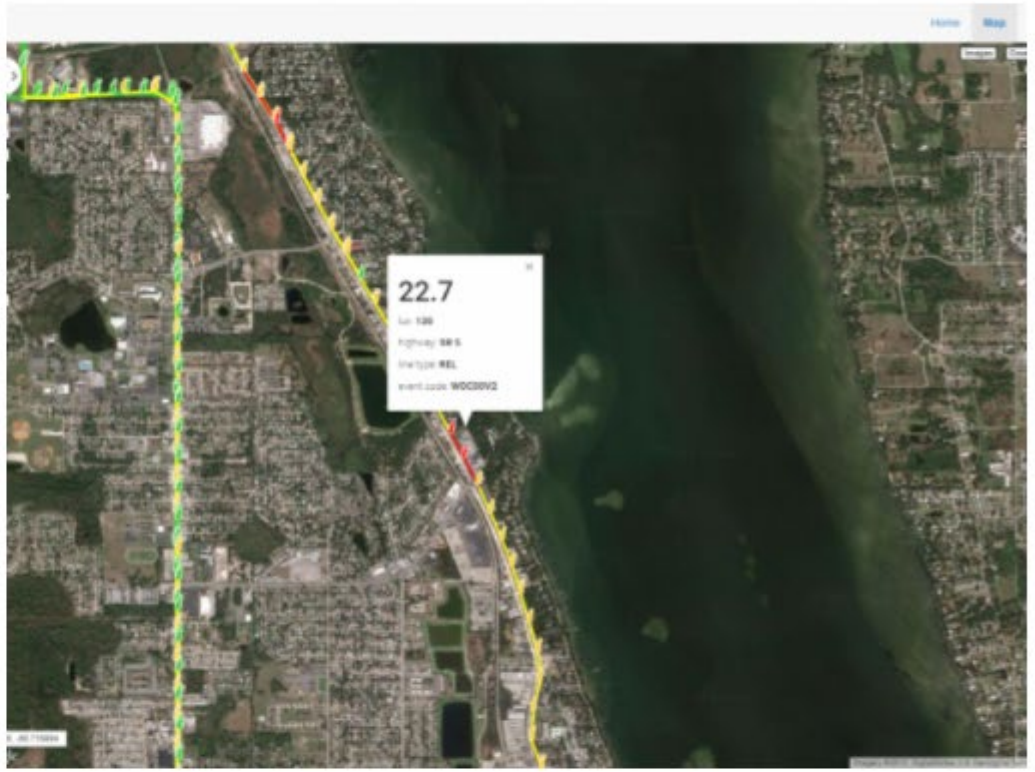

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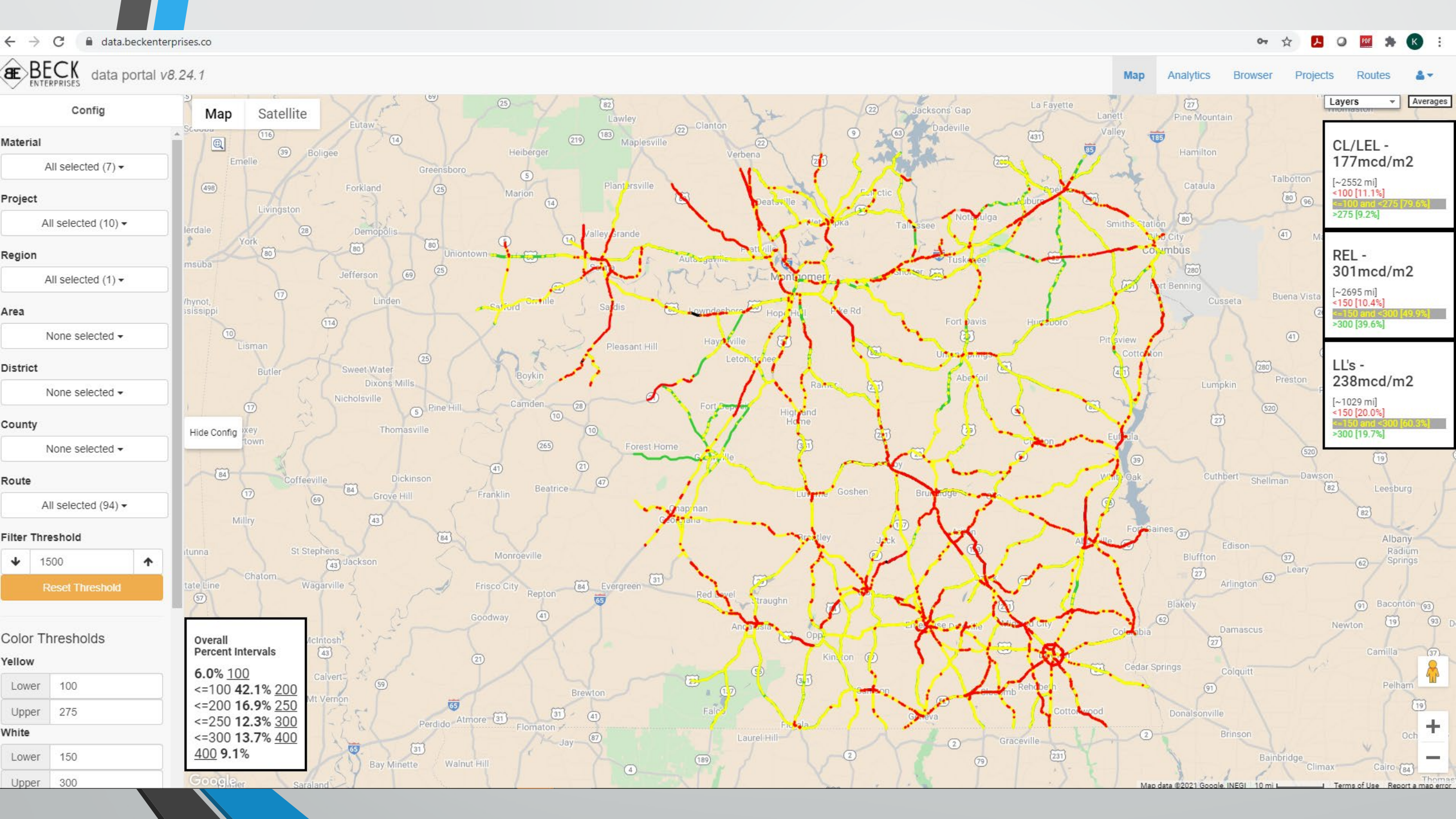
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Map
Analytics
Browser
Projects
Routes
Config
Material
All selected (7)
Project
All selected (10)
Region
All selected (1)
Area
None selected
District
None selected
County
None selected
Route
All selected (94)
Filter Threshold
1500
Reset Threshold
Color Thresholds
Yellow
Lower 100
Upper 275
White
Lower 150
Upper 300
Map
Satellite
Hide Config
Layers
Averages
CL/LEL - 177mcd/m2
[~2552 mi]
<100 [11.1%]
<=100 and <275 [79.6%]
>275 [9.2%]
REL - 301mcd/m2
[~2695 mi]
<150 [10.4%]
<=150 and <300 [49.9%]
>300 [39.6%]
LL's - 238mcd/m2
[~1029 mi]
<150 [20.0%]
<=150 and <300 [60.3%]
>300 [19.7%]
Overall Percent Intervals
6.0% 100
<=100 42.1% 200
<=200 16.9% 250
<=250 12.3% 300
<=300 13.7% 400
400 9.1%
Google
Map data ©2021 Google, INEGI 10 mi
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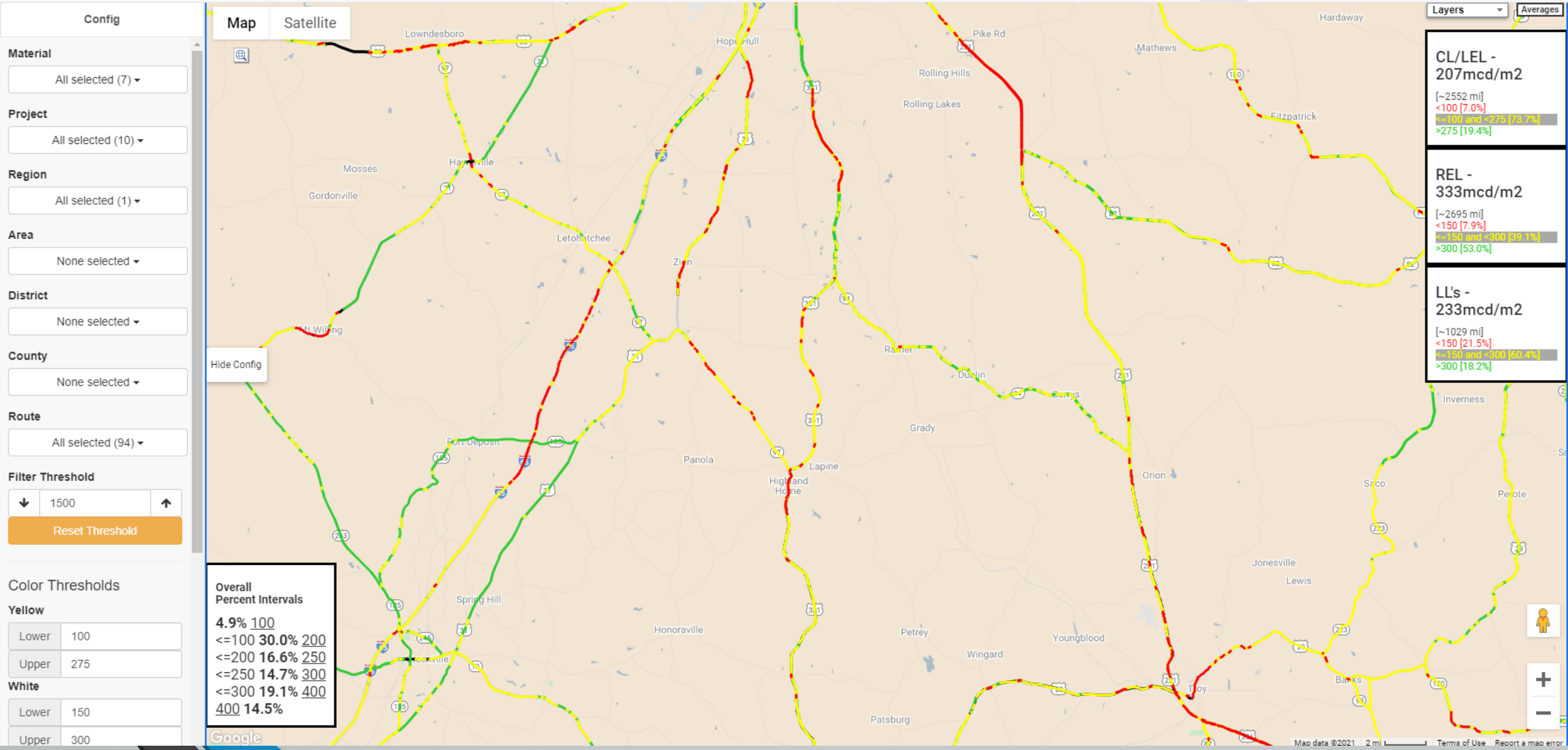
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Area
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District
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County
None selected
Route
All selected (94)
Filter Threshold
1500
Reset Threshold
Color Thresholds
Yellow
Lower 100
Upper 275
White
Lower 150
Upper 300
Map
Satellite
Hide Config
Layers
Averages
CL/LEL - 207mcd/m2
[~2552 mi]
<100 [7.0%]
<=100 and <275 [73.7%]
>275 [19.4%]
REL - 333mcd/m2
[~2695 mi]
<150 [7.9%]
<=150 and <300 [39.1%]
>300 [53.0%]
LL's - 233mcd/m2
[~1029 mi]
<150 [21.5%]
<=150 and <300 [60.4%]
>300 [18.2%]
Overall Percent Intervals
4.9% 100
<=100 30.0% 200
<=200 16.6% 250
<=250 14.7% 300
<=300 19.1% 400
400 14.5%
Lowndesboro
Hope Hull
Pike Rd
Mathews
Rolling Hills
Rolling Lakes
Fitzpatrick
Mosses
Gordonville
Letohatchee
Ziion
Mt Willing
Rasher
Dublin
Curtis
Inverness
Grady
Fort Deposit
Panola
Lapine
Highland Home
Orion
Saco
Perote
Jonesville
Lewis
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NO


1024 × 724