

# Innovative Integration of Intersection and Interchange Design Solutions for Urban Areas



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NCAMPO Conference

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Partial Credit Given To: Laurence Lambert, LSU

# Agenda

**1** CFI Basics

**2** CFI Example – Baton Rouge, LA

**3** Public Acceptance & Safety Impacts

**4** North Carolina Alternative Intersection Corridor

**5** Questions



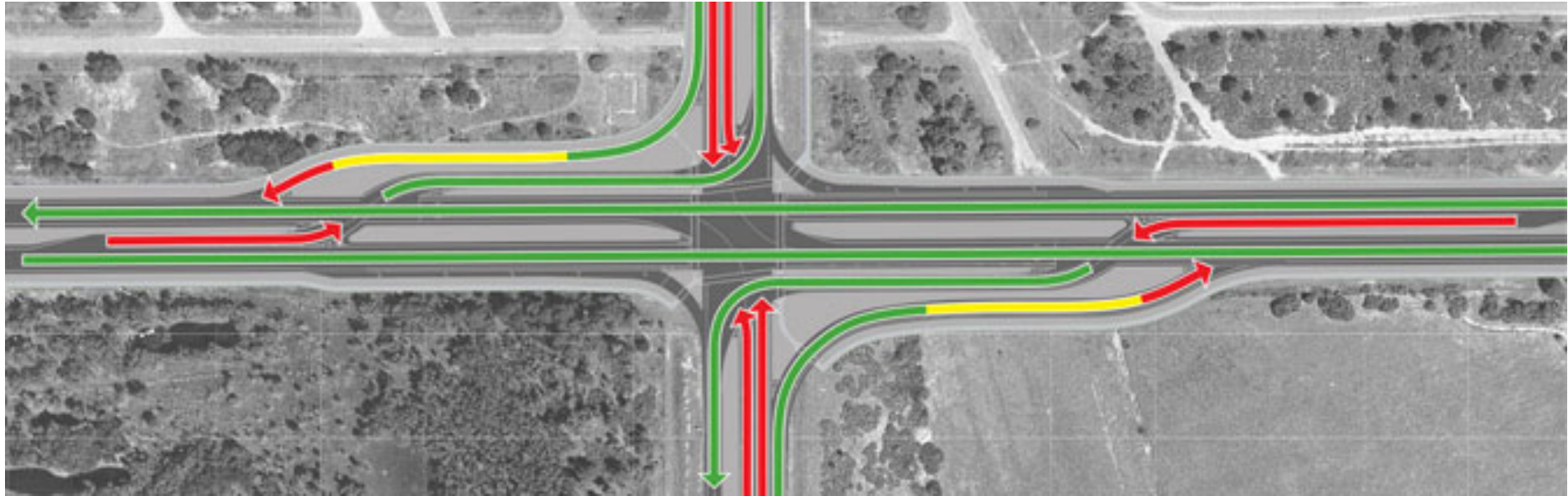
# CFI Basics

# The Basics of CFI

- At-Grade Intersection
- Left-turns happen in advance of main intersection (+/- 400 ft)
- Movements occur simultaneously
- This eliminates phases from the signal
- More Capacity → Less Congestion
- Intuitive to drivers (turn left and go left)
- Many possible configurations



# How It Works



# Some History

- Concept developed over 20 years ago
- Featured in numerous research efforts & publications
- Over 60 currently operational in US
- AASHTO's 2002 National Award for Innovation

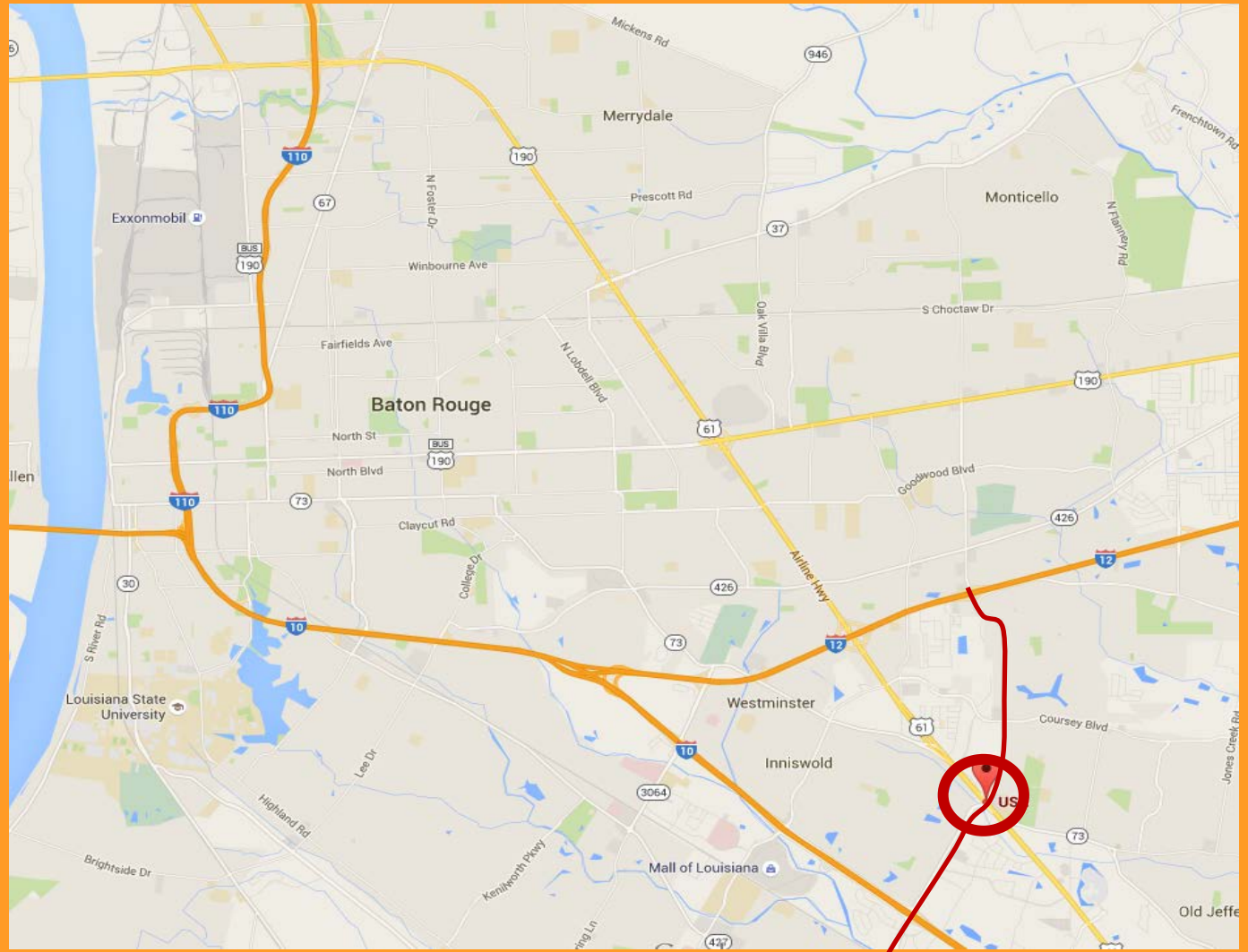


# CFI Example Baton Rouge, LA

Take a Trip to  
Louisiana...

## Baton Rouge

US 61  
(Airline  
Hwy.) at  
Siegen Ln.





# Louisiana CFI History

- 2002 LADOTD and Stantec Began Discussing Possible CFI Applications
- Construction of the Airline/Siegen CFI began in Summer 2005
- **THEN...**



...KATRINA

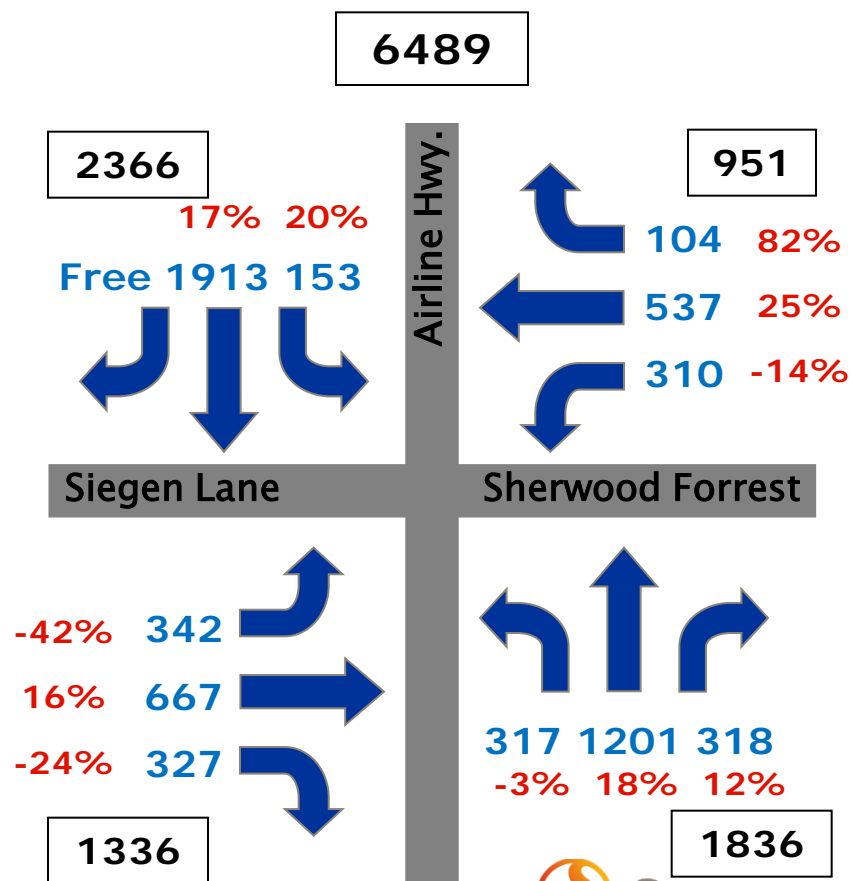
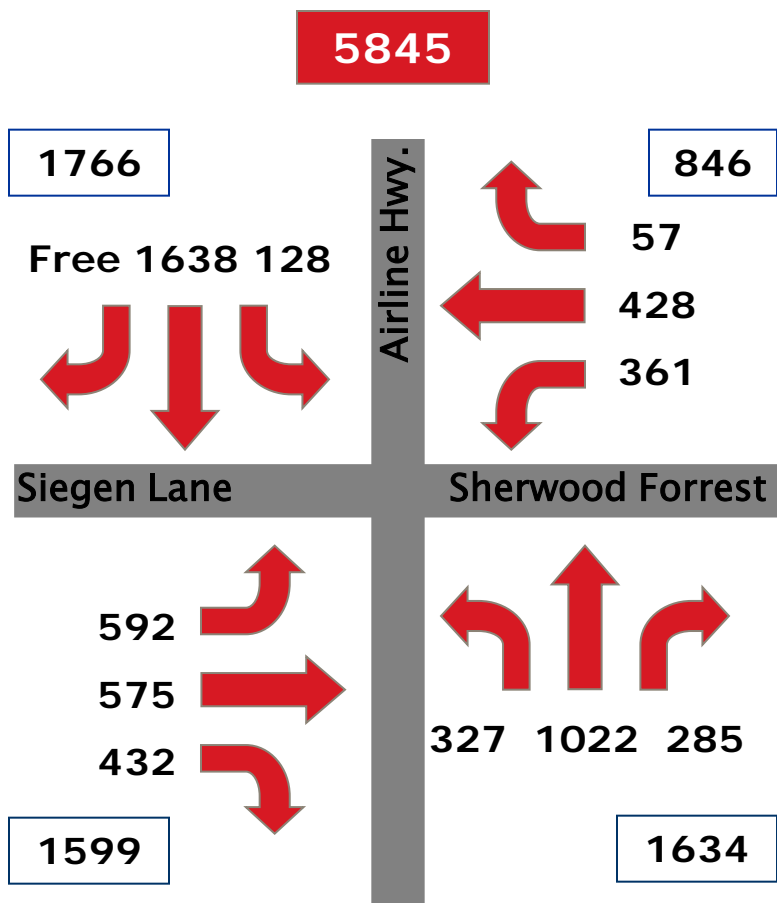
# Katrina Impacts

- Construction delayed
- Influx of temporary & permanent residents
- Volumes +19% over pre-CFI volumes
- Traffic patterns changed

# Volumes

Design Volumes  
(projected 2004)

Post-Katrina Volumes  
(May 8, 2007)





# Day Before Opening

**MONDAY**

MARCH 20, 2006

**BATON ROUGE**

2theadvocate.com

50 cents

A

# THE ADVOCATE

THE INDEPENDENT VOICE OF SOUTH LOUISIANA



**TODAY'S WEATHER**  
Thunderstorms.  
High: 77. Low: 52.  
DETAILS: 10B

★

## GOOD MORNING, LOUISIANA

SPORTS



Duke dominates  
Lady Jaguars  
in 96-27 blowout

► PAGE 1D

# Traffic fix opens on Airline

## Unique lane to ease turns at Siegen

BY WILL SENTELL  
Capitol news bureau

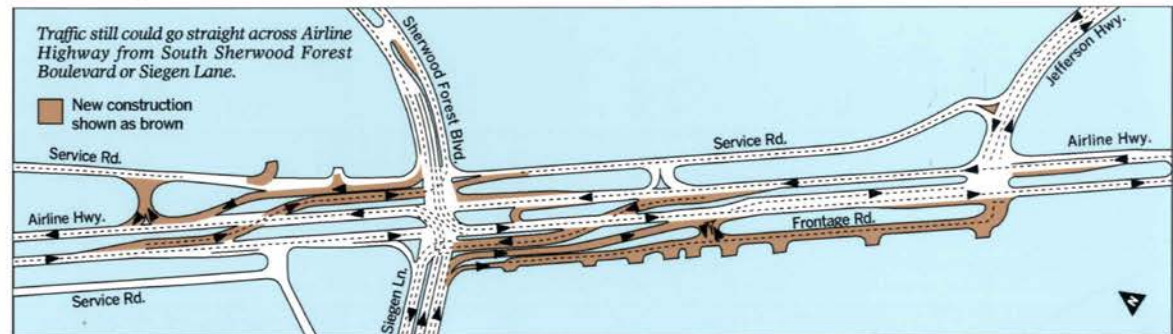
One of the most unusual intersections in the nation is set to open Tuesday in the latest bid to ease traffic jams in Baton Rouge.

The site is where Airline Highway meets Siegen Lane and South Sherwood Forest Boulevard.

Delays of three or four minutes per car or truck are common during peak travel times for motorists turning left from Airline onto Siegen or Sherwood.

Engineers promise that, starting Tuesday, waits for left turns and other traffic will drop to about half a minute.

### New turning lanes on Airline Highway at Sherwood-Siegen intersection



Source: Department of Transportation and Development

Advocate map by JOHN GIPSON

"We think between 35 and 40 seconds of delay," said Michael Bruce, principal engineer for ABMB Engineers, which is getting about \$405,000 from the state for its role in the project.

Nearby business owners had to work around construction-related traffic headaches for months. Some are confident the changes will improve things, and others are not so sure.

"I have hope that this will work," said Bill Pedneau, owner of Meineke Car Care Center, which is just southwest of the intersection.

Motorists who approach the intersection now are directed to two

lanes. Highway experts say that causes huge traffic backups for cars and trucks in the other two lanes driving through the intersection.

► Please see AIRLINE, page 4A



# March 21, 2006: Opening Day







# Results

## The Bad News

- Actual volumes much higher than design volumes
  - Katrina
  - “Avoiders” returned to intersection
- Unbalanced increases made timing adjustments challenging

## The Good News...





40%

Decrease in Travel Times

> 50%

Reduction in delay





# Public Satisfaction



# Safety





# Public Acceptance & Safety Impacts

# 4 Months After Opening

**TUESDAY**

JULY 4, 2006

**BATON ROUGE**

2theadvocate.com

50 cents

## THE ADVOCATE

THE INDEPENDENT VOICE OF SOUTH LOUISIANA



**TODAY'S WEATHER**  
Short showers.  
High: 87. Low: 72.

DETAILS: 8B



## Easing intersection

### Drivers praise makeover of once-snarled area

BY WILL SENTELL  
Capitol news bureau

What used to be one of the most jammed intersections in Baton Rouge is winning rave reviews after a Mexican makeover.

The site is the intersection of Airline Highway and Siegen Lane-South Sherwood Forest Boulevard.

Drivers turning off Airline are stopped about 350 feet from the intersection, directed to a left-turn bay and, once they get a green light, cross oncoming lanes using two new travel lanes.

The new design, which opened for traffic three months ago, is all but unheard of in the United States but is common in Mexico, which was the model for the switch.

**"I love it. I wish they would put them all over town."**

**CECIL LABORDE,**

operates a sports memorabilia shop on Sherwood Forest Boulevard east of the intersection

The early reviews from drivers are overwhelmingly positive.

W.L. "Buck" Corbin Jr. turns left off Airline onto Siegen Lane around 7:30 a.m. on work days.

Before the change?

"Oh Jesus, you might sit there 15 or 20 min-

► Please see **INTERSECTION**, page 8A



Advocate staff photo by **RICHARD ALAN HANNON**

Traffic moves along Airline Highway at the Siegen Lane-South Sherwood Forest Boulevard interchange, revamped three months ago to improve traffic flow. The change is winning praise from drivers and nearby business owners.

### INTERSECTION

Continued from page 1A

utes," Corbin said. "Now if I'm there five minutes it's unusual.

"I'm telling you, it really astounded me," he said.

Lacee Raybon, who makes the same turn between 8 a.m. and 9 a.m. on weekdays, echoed Corbin's view.

"This is so moving now," Raybon said of northbound traffic on Airline. "It used to take me 10 or 15 minutes to get through."

Cecil Laborde, who operates a sports memorabilia shop on Sherwood Forest Boulevard just east of the intersection, can look out his

front window and see that westbound traffic headed for Airline does not stack up like it used to.

"I love it," Laborde said. "I wish they would put them all over town."

Metro Councilman Mike Walker, whose district includes part of the area, said one possibility is making a similar change at the intersection of Florida and Sherwood Forest boulevards.

Walker said that, since the new traffic pattern took effect March 21, comments from constituents in barber shops, drugstores and e-mails have been enthusiastic.

"The response has been overwhelmingly positive," he said.

Walker said the cost of the project,

\$4.4 million, is modest compared with traffic improvements that often cost \$20 million or \$30 million.

Before the new plan took effect, motorists on Airline were directed to two left-turn lanes. Highway experts said that caused traffic backups for cars and trucks in the lanes traveling through the intersections. In addition, the accident rate was five times greater than the average at similar junctures.

The site of the new design serves motorists headed to and from Ascension Parish and New Orleans, the Sherwood Forest subdivision to the east and commercial establishments along Siegen to the west.

The intersection featured a rash of

traffic accidents initially.

From March 22 through April 3, there were seven accidents, compared with one during that same period the year before, according to Michael Bruce, principal engineer of ABMB Engineers, whose firm made about \$405,000 on the project.

But only seven more accidents occurred from April 3 through June 13, the same as the year before.

Bruce and others contend the new turn lanes will trim wait time at the intersection to around 30 seconds compared with four minutes before the switch.

However, results of a state study to test that hypothesis are at least three months away.

Rick Newton, who operates Jay's Bar-B-Q on South Sherwood Forest, said the new design has improved traffic flow through the intersection.

However, Newton emphatically says that the work should have included a right-turn-only lane for traffic on Sherwood Forest headed for Airline to avoid backups.

"From the customers that talk about it, that is their biggest complaint," Newton said.

Bruce said such a lane remains a possibility.

Business operators near the intersection generally praise the change, including some who were critical earlier.

Tammy Guilliams is secretary-treasurer for Service Glass Works, which sits on Airline just south of the intersection.

Guilliams said earlier this year that she was concerned the new traffic patterns would kill nearby businesses by making them hard to get to, especially for cars and trucks headed north on Airline.

Now she says the addition of a service road in front of hers and other businesses has made it easier for customers to come and go, even if a few details still need attention.

"The intersection flow is doing very well," Guilliams said. "I can give them thumbs-up on that."

# The Advocate

- May 20, 2006

## **Two roads converge ...**

**Dear Smiley:** I have always been a strong advocate of highway overpasses to help move Baton Rouge traffic.

The new intersection at Siegen Lane and Airline Highway is better than an overpass, and has to be much less in cost.

The person that came up with this idea should win the "Highway Nobel Prize," or whatever they give a genius engineer.

I've tried it at different times of the day, and it is still the best ...

I sure hope they will use this plan on many of our "deadlocked" intersections.

**VERNON YIELDING**  
**Baton Rouge**



# The Advocate

- July 11, 2006

6B ■ Tuesday, July 11, 2006 ■ The Advocate ★

## OPINION

STAT

### OUR VIEWS

# Airline project seems to work

**B**aton Rouge drivers applaud road design and traffic movement about as often as President Bush compliments the news media.

The innovative continuous-flow intersection on Airline Highway at Siegen Lane and South Sherwood Forest Boulevard appears to be an exception to the rule.

We're pleased to learn that it is getting high praise from both motorists and people who work in the area, who say traffic is moving through the intersection much faster now.

Drivers turning left off Airline onto South Sherwood and Siegen are directed into new left-turn lanes that cross oncoming Airline traffic well before they reach the intersection, where they make turns. The unusual configuration, very rare in this country but more familiar to drivers in Mexico, is designed to prevent backup of traffic through the intersection.

The cost of the intersection was about \$4.4 million, considered a relatively low figure in comparison with some other traffic improvement projects.

The revamped intersection opened March 21. A few days later we tried it and subsequently expressed our hope that the redesign would work as its designers intended, improving the flow of traffic through the intersection.

Advocate Capitol bureau reporter Will Sentell reported Tuesday that he got "overwhelmingly positive" feedback recently when he talked to drivers who use the intersection as well as people who work nearby.

Metro Councilman Mike Walker, whose district includes part of that area, said he also has heard enthusiastic comments from constituents in drugstores and barbershops, and via e-mail. Walker speculated that another likely spot for such an intersection would be Florida and Sherwood Forest.



# 225 Magazine

- June 2007

## **BRIGHT SPOT FOR LOCAL TRAFFIC**

**Dear Editor,**

I am aware of the traffic problems that exist in Baton Rouge (“Cross-town traffic,” March 2007), but in fairness I must report that there is good news in the southeastern part of the parish.

The widening of Tiger Bend Road/Jefferson Highway and the improvement of George O’Neal Road were lifesavers for those of us who live that way. The intersection at Siegen/Sherwood and Airline is a godsend! Even at rush hour that traffic moves smoothly and fast.

If that were not enough, the Interstate 10 service road from Siegen to Bluebonnet has made it possible to get the Mall of Louisiana via Picardy without any delay.

So when people complain about the lack of solutions to traffic problems, I recommend that they travel to southeast Baton Rouge to experience some wonderful improvements.

**Dot Dickinson**

# Public Acceptance Survey

The Louisiana Department of Transportation and Development designed this survey to obtain your opinions on the continuous flow intersection (CFI) improvements that opened in March 2006 at Airline Highway and Siegen Lane/Sherwood Forest Boulevard. Thank you; we appreciate you taking the time to answer these questions. Access the survey online at [www.dotd.la.gov](http://www.dotd.la.gov) (under What's New).

## Your Information: (Optional)

Name \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Address \_\_\_\_\_

E-mail \_\_\_\_\_

1. How often do you drive through the intersection of Airline at Siegen/Sherwood?

- Less than once a week
- Once a week
- Once a day
- Commute—morning and evening
- More than twice a day

2. Which roadways do you travel? Check all that apply and include the approximate time of drive.

- Airline toward Ascension Time \_\_\_\_\_
- Airline toward I-12 Time \_\_\_\_\_
- Siegen Lane Time \_\_\_\_\_
- Sherwood Forest Time \_\_\_\_\_

3. State below whether you think the improvements make the following items "Better," "Worse," or "The Same."

- |                       | Better                   | Worse                    | Same                     |
|-----------------------|--------------------------|--------------------------|--------------------------|
| a. Traffic congestion | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Traffic safety     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Property access    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

4. Please indicate how you feel the improvements have effected your travel time.

My travel time through the intersection has:

- Extremely decreased
- Slightly decreased
- Stayed about the same
- Slightly increased
- Extremely increased

5. Please indicate your level of satisfaction with the current traffic conditions of the intersection.

- Extremely satisfied
- Somewhat satisfied
- Satisfied
- Unsatisfied
- Extremely unsatisfied

6. Any additional comments?

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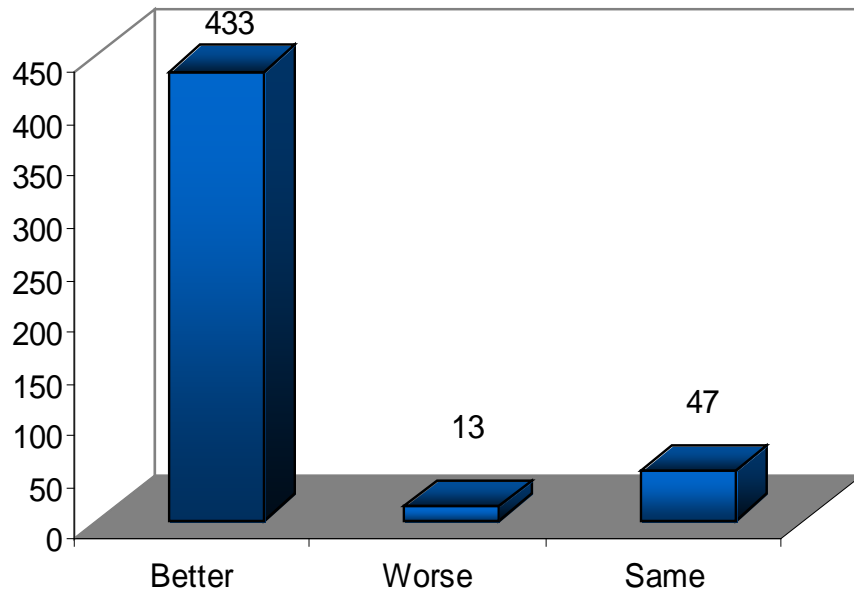
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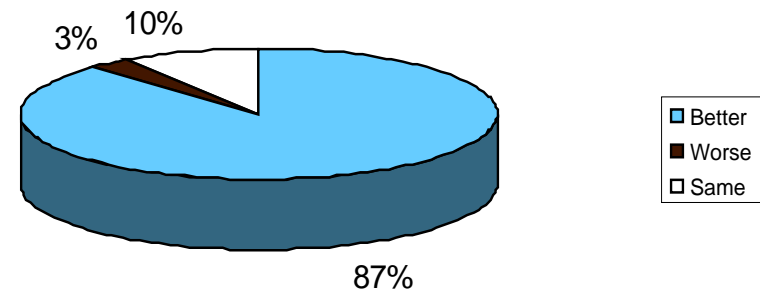
# Public Acceptance Survey

## Is Traffic Congestion BETTER, WORSE, or THE SAME?

Traffic Congestion

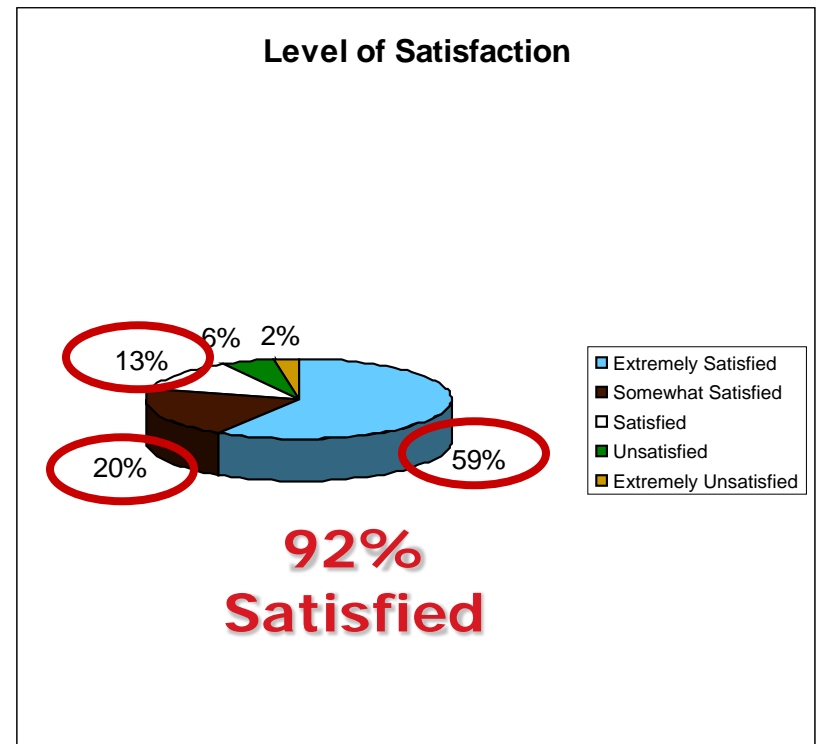


Traffic Congestion

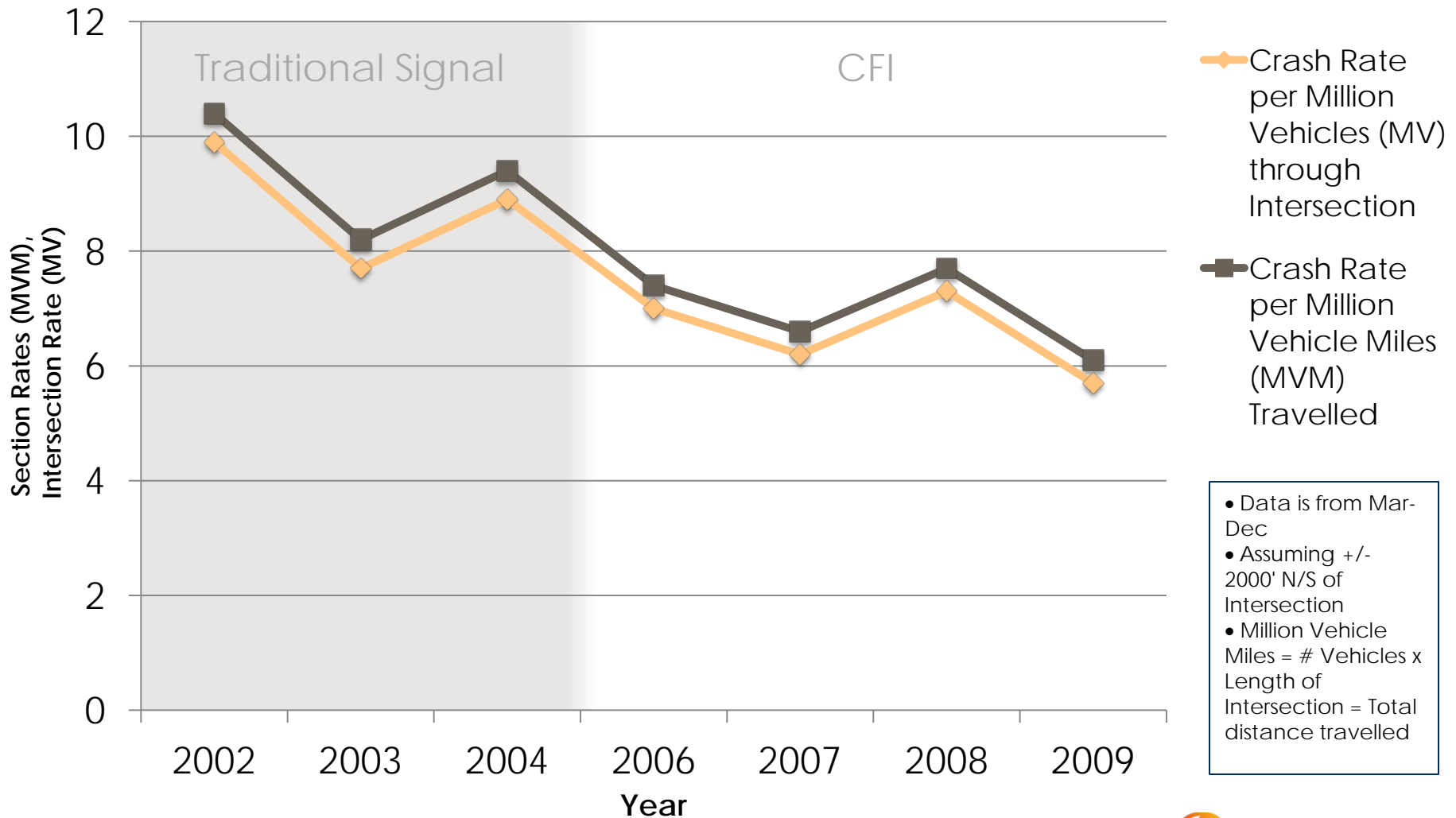


# Public Acceptance Survey

## Level of Satisfaction with CURRENT TRAFFIC CONDITIONS at the intersection

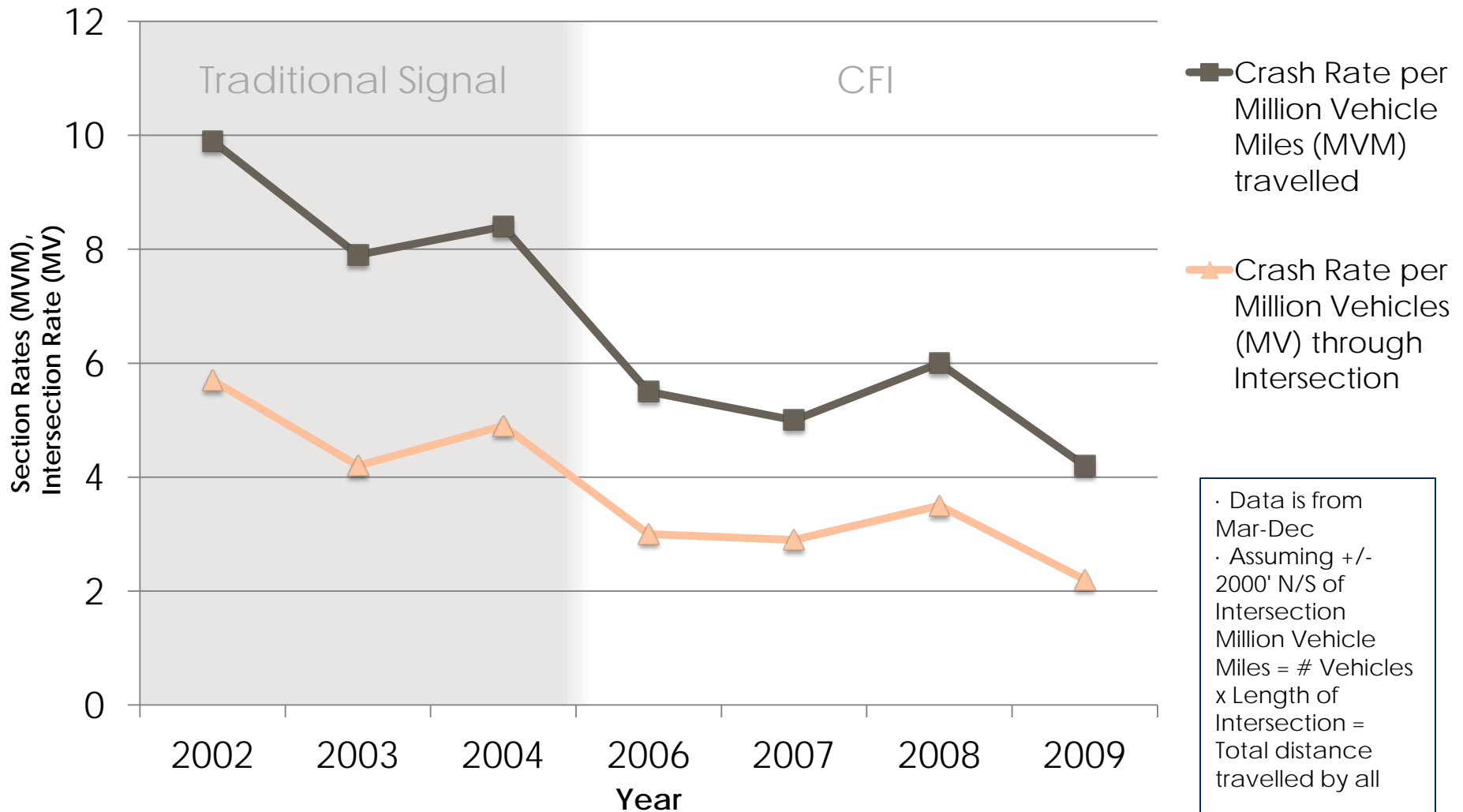


# Crash Rates – Full Extents



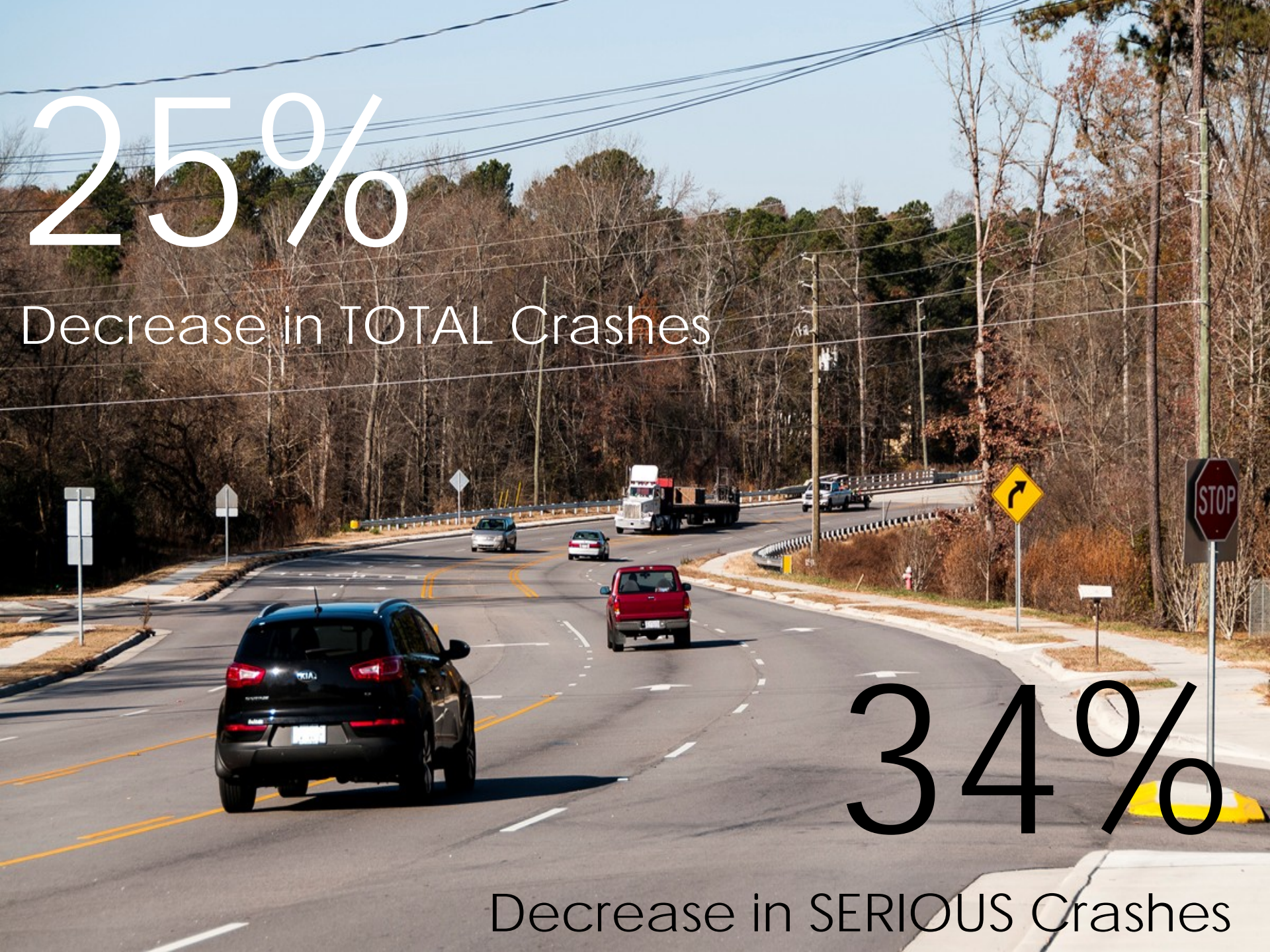


# Crash Rates – CFI Only



25%

Decrease in TOTAL Crashes



34%

Decrease in SERIOUS Crashes

# Where are CFI's Today?

- **Built:**
  - Maryland
  - Louisiana
  - Utah
  - Ohio
  - Mississippi
  - Colorado
  - Texas
  - Missouri
- **Under Design:**
  - Georgia
  - Florida
  - North Carolina
  - Virginia





# North Carolina Alternative Intersection Corridor

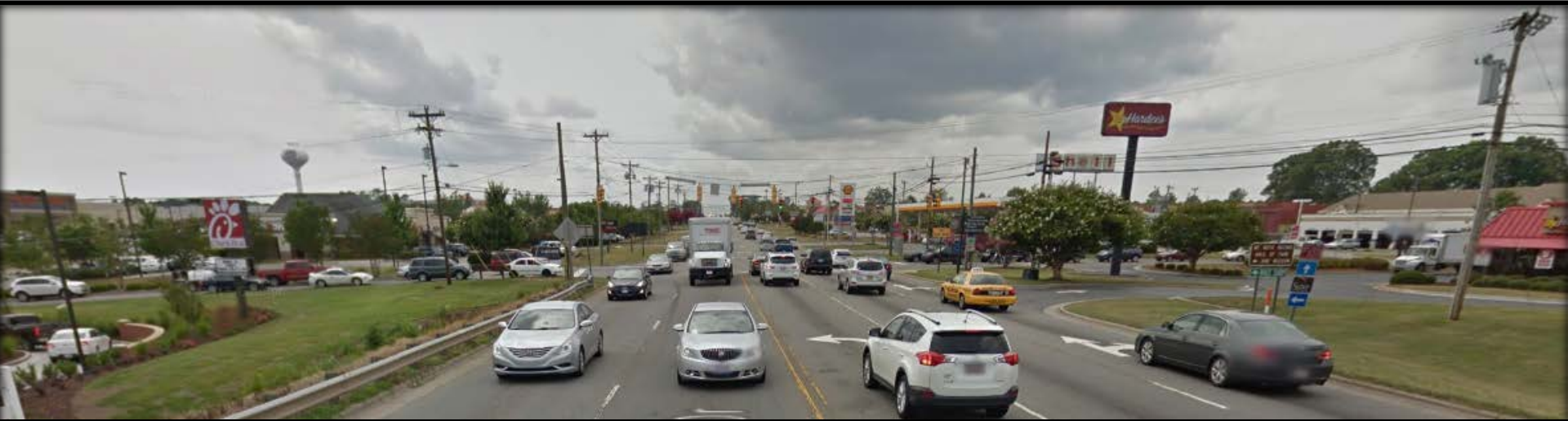
# Project Description

- In suburb of major NC city
- Rapidly growing area
- 15-mile corridor study
- Accommodate future growth & development

# Project Characteristics

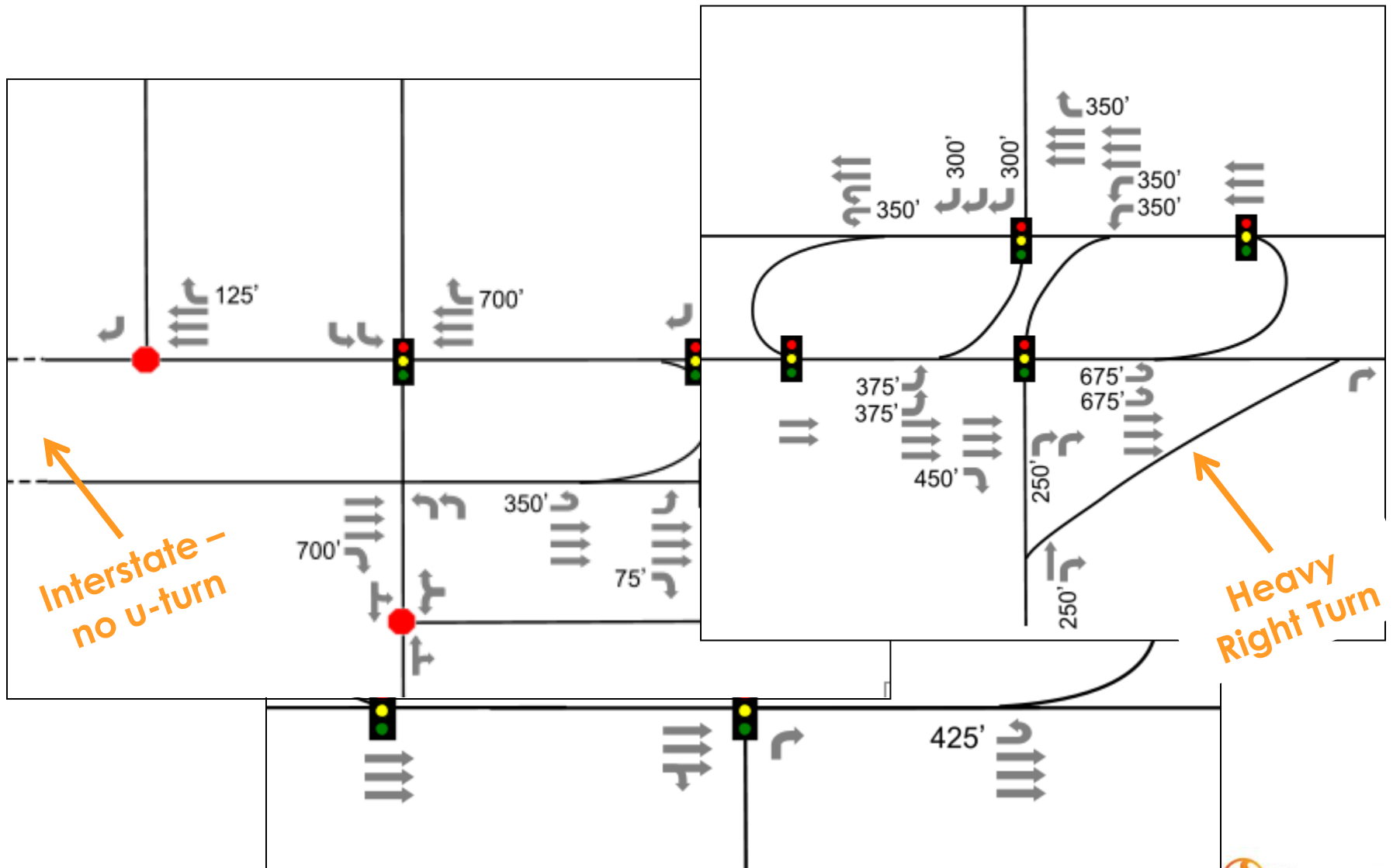
- Current AADT: ~46,000 vpd
- Projected 2040 AADT: ~60,000 vpd
- Closely spaced driveways
- Every open piece of land along corridor is either developed or in planning/construction stages

# Challenging Corridor



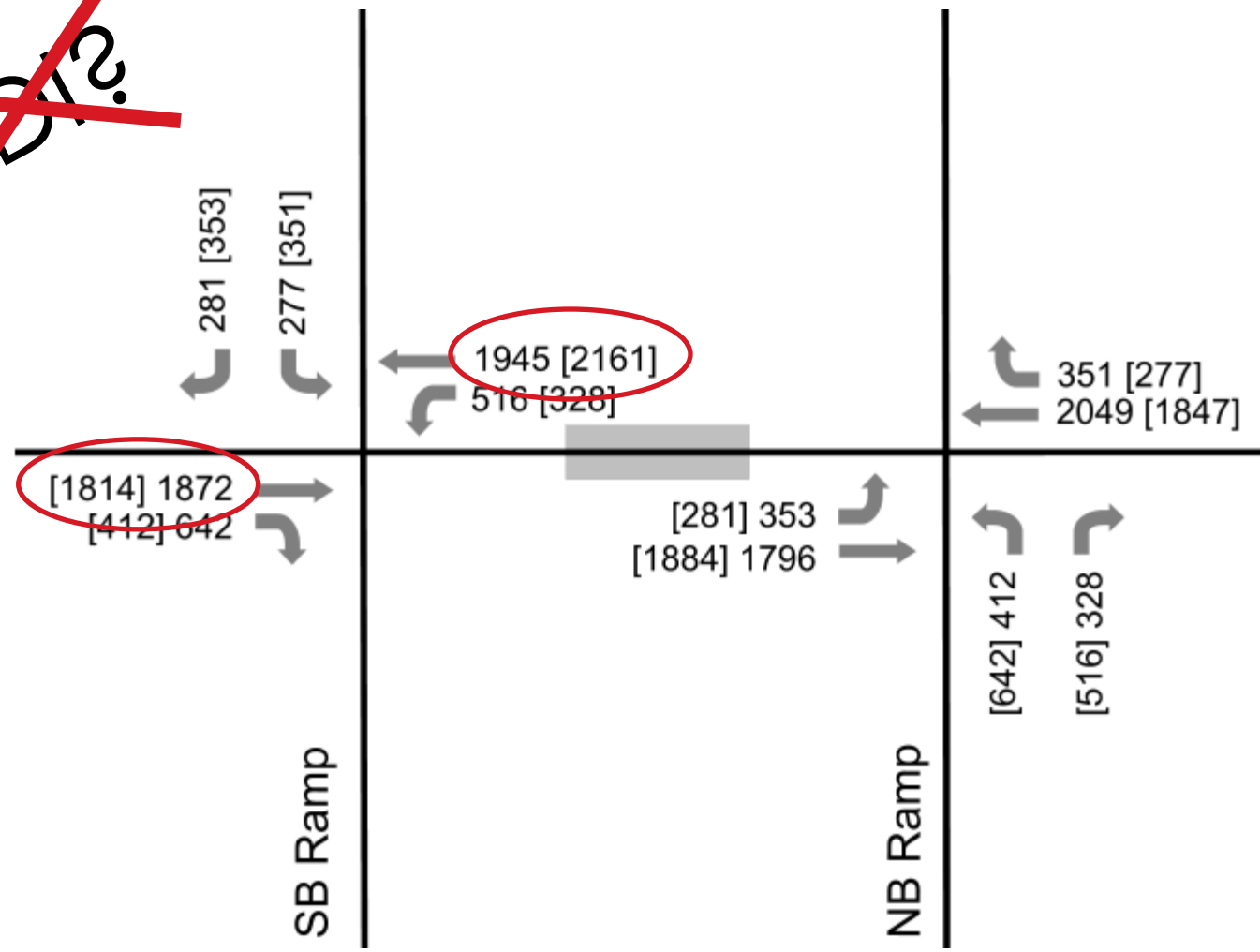


# Alternative Geometry

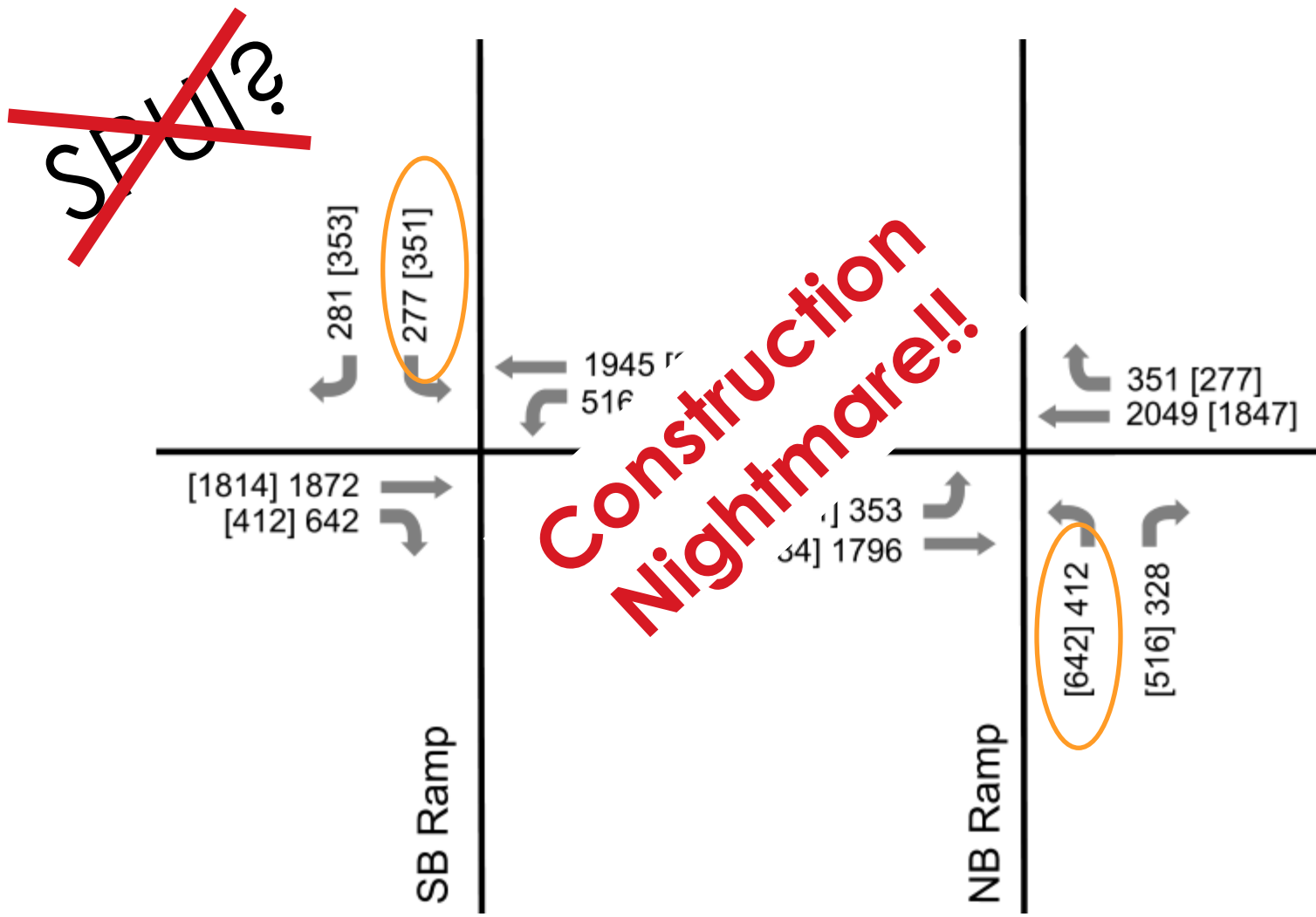


# Interchange Design Challenges

~~Data?~~

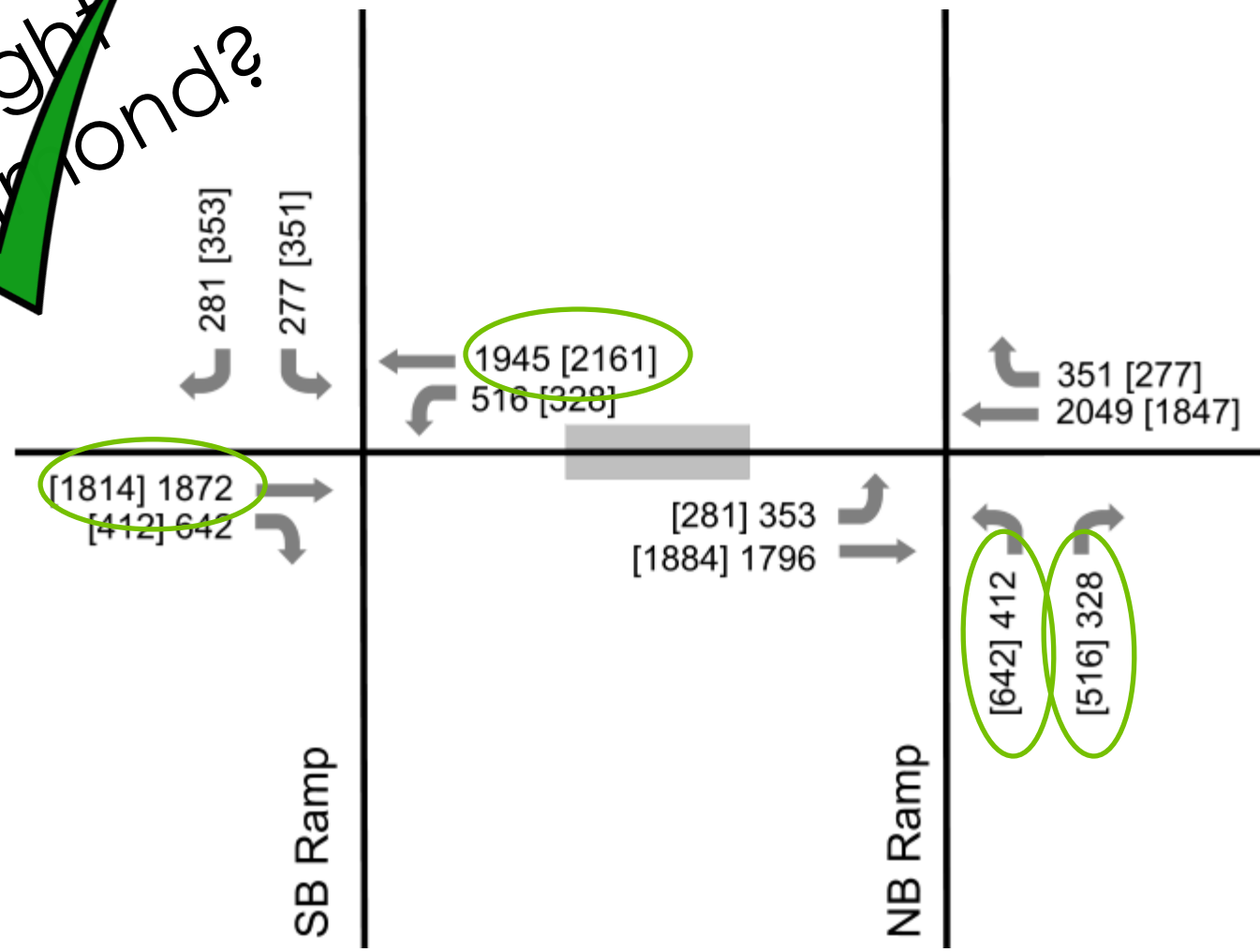


# Interchange Design Challenges



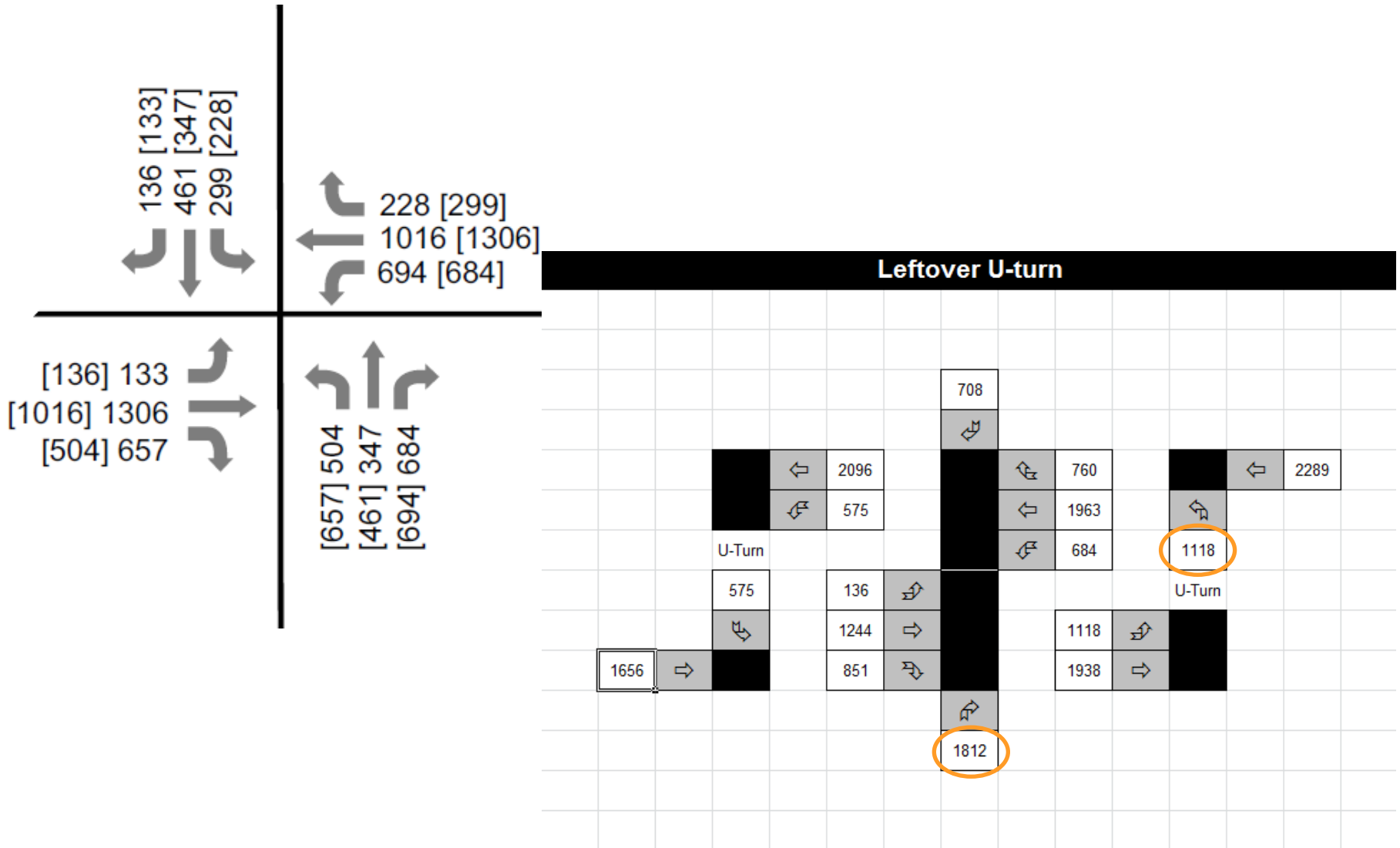
# Interchange Design Challenges

Tight  
Diamonds?

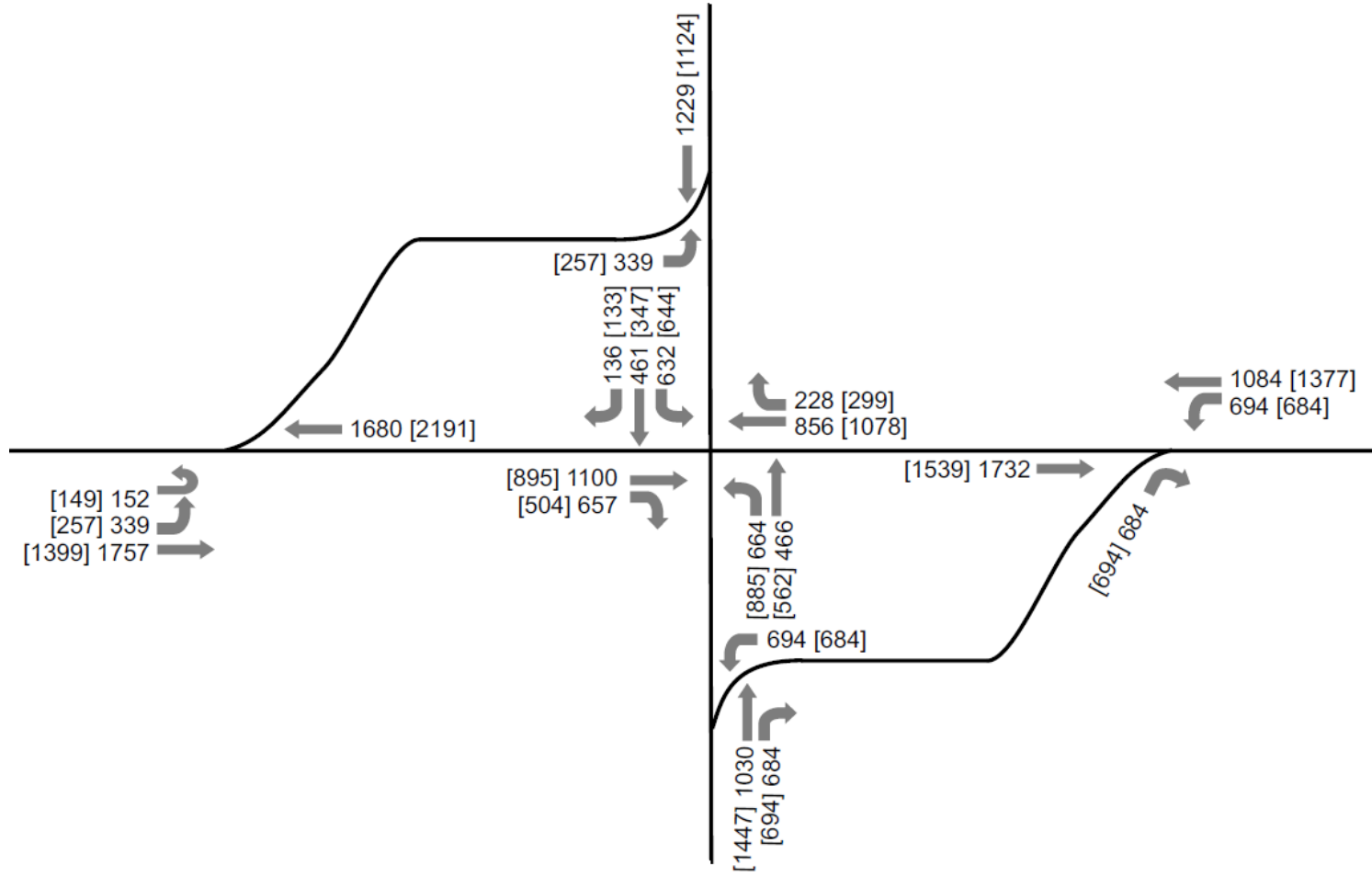




# Intersection Design Challenge



# Intersection Design Challenge



# Ultimate Recommendations

- 6-lane Alternative Superstreet Corridor
- Tight Diamond @ Interchange
- Continuous Flow Intersection at key location







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