Traffic Engineering 101 - The Basics

Understanding the basic principles and how these drive the decisions regarding traffic management in Louisiana

LOUISIANA'S ON THE MOVE... DOTD BUILDS THE WAY

LOCAL TECHNICAL ASSISTANCE PROGRAM LTAP LOUISIANA TRANSPORTATION RESEARCH CENTER

Traffic Engineering 101

- Purpose:
  - To provide an overview of engineering principles; guidelines & laws which govern traffic management in Louisiana
  - Discuss how DOTD's decisions impact local communities
  - Facilitate feedback & questions from local agencies on state and local traffic engineering issues

Manual on Uniform Traffic Control Devices

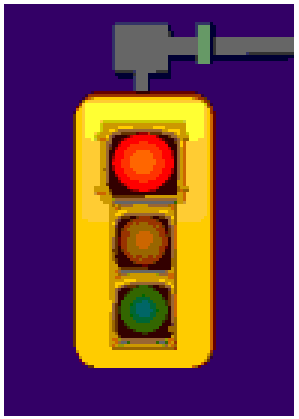
- Federal policy
- All states must adopt
- Set minimums for traffic control devices such as
  - Signs
  - Pavement marking
  - And signals

Engineering Design Standard Manual

- DOTD policy
- Signed by Chief Engineer
- Provides additional requirements

Basic Principle of Traffic Engineering

"*Everything is designed to meet Driver Expectancy*"



TR Engineering 101

- Module:
  1. Introduction & Overview (3/22/10)
  2. Speed Management Overview (4/26/10)
  3. School Zones (4/26/10)
  4. Intersection Traffic Control (5/24/10)
  5. Traffic Signal (5/24/10)
  6. Roundabouts (5/24/10)
  7. Sign Selection & Installation (6/28/10)
  8. Work Zones (6/28/10)
  9. **Access Management (7/26/10)**
  10. Roundabouts (8/23/210)

Access Management

- Access Management 101
- DOTD's Part
- Land Use Tool Kit
- Complete Streets
- Lafayette's Experience
- Central's Experience

More Suggestions?

- Other traffic issues or questions?
- Contact Jody Colvin at **Jody.Colvin@la.gov**
- or Marie B. Walsh at **mbwalsh@ltrc.lsu.edu**

Traffic Engineering 101

Thank You!

See you on August 23 at 2:00PM for:

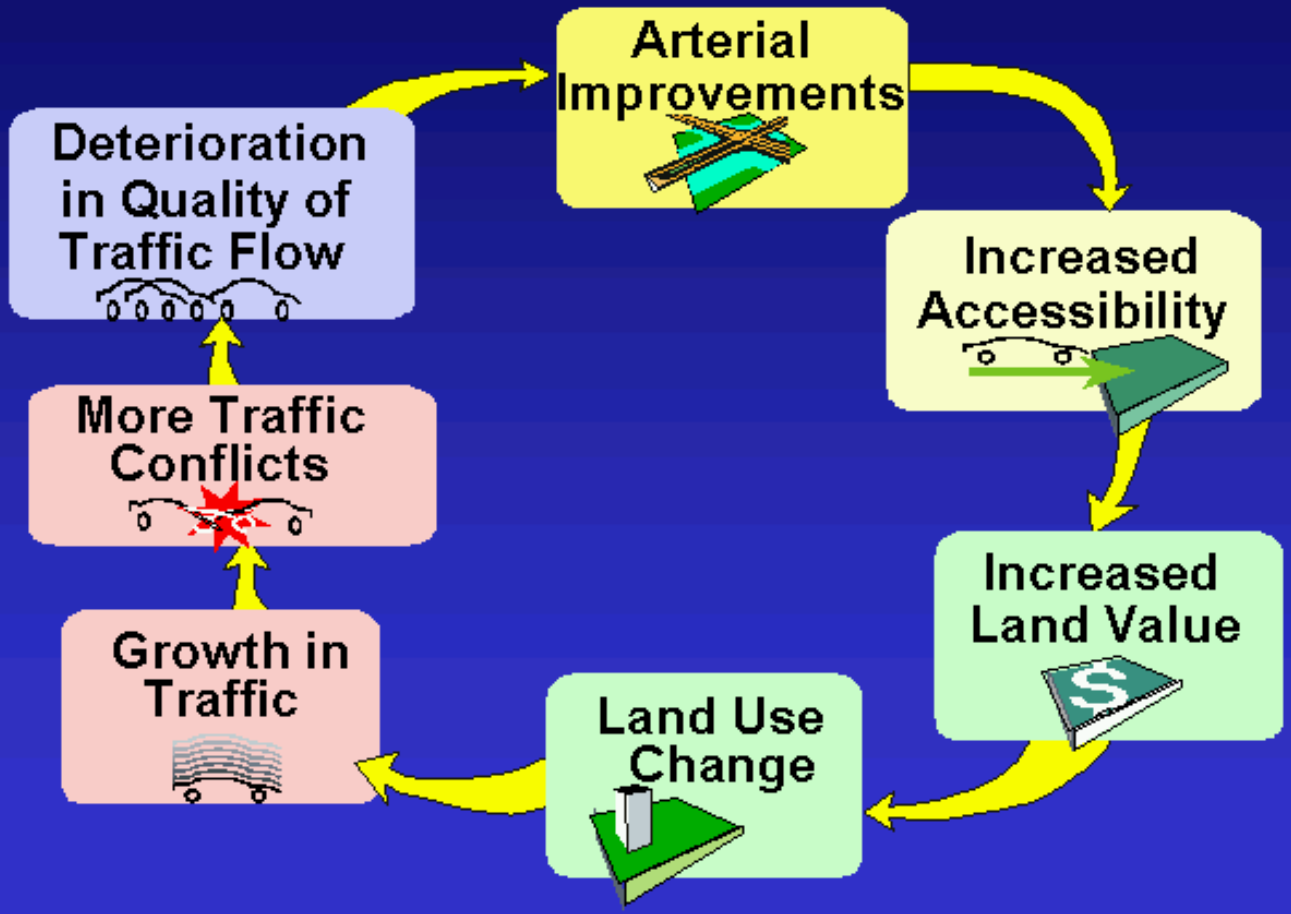
Roundabouts

“The myth uncovered”

Access Management

Slides courtesy: Kristine Williams, AICP from CUTR, University of South Florida

Transportation & Land Use Cycle



Typical Symptoms

Unsightly, accident prone commercial strips

Bypass routes as congested as the roads they were built to relieve

Neighborhoods disrupted by through traffic due to overburdened arterials

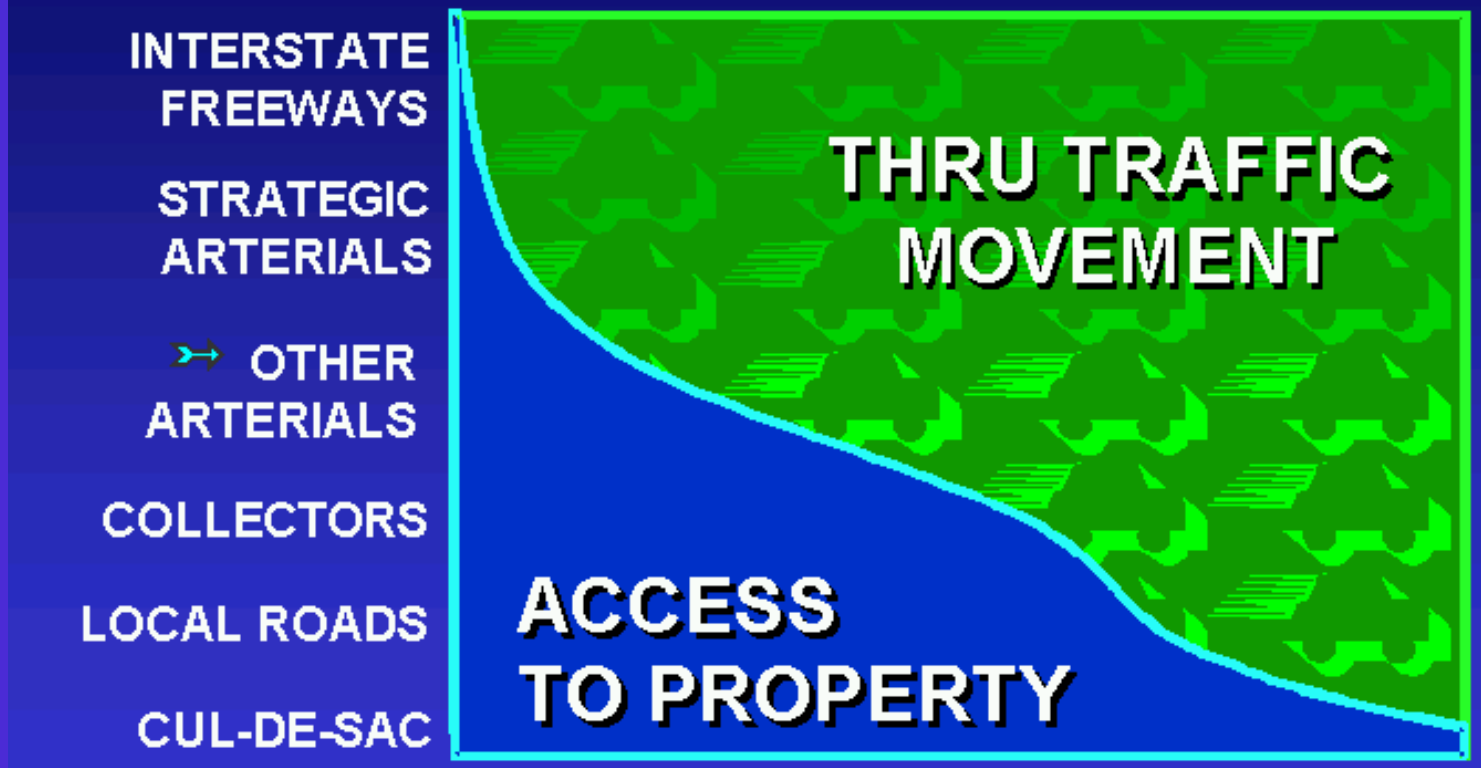
Homes and businesses damaged by widening roads

What is Access Management?

The systematic control of the location, spacing, operation and design of:

- Driveways
- Medians
- Median Openings
- Traffic Signals
- Freeway Interchanges

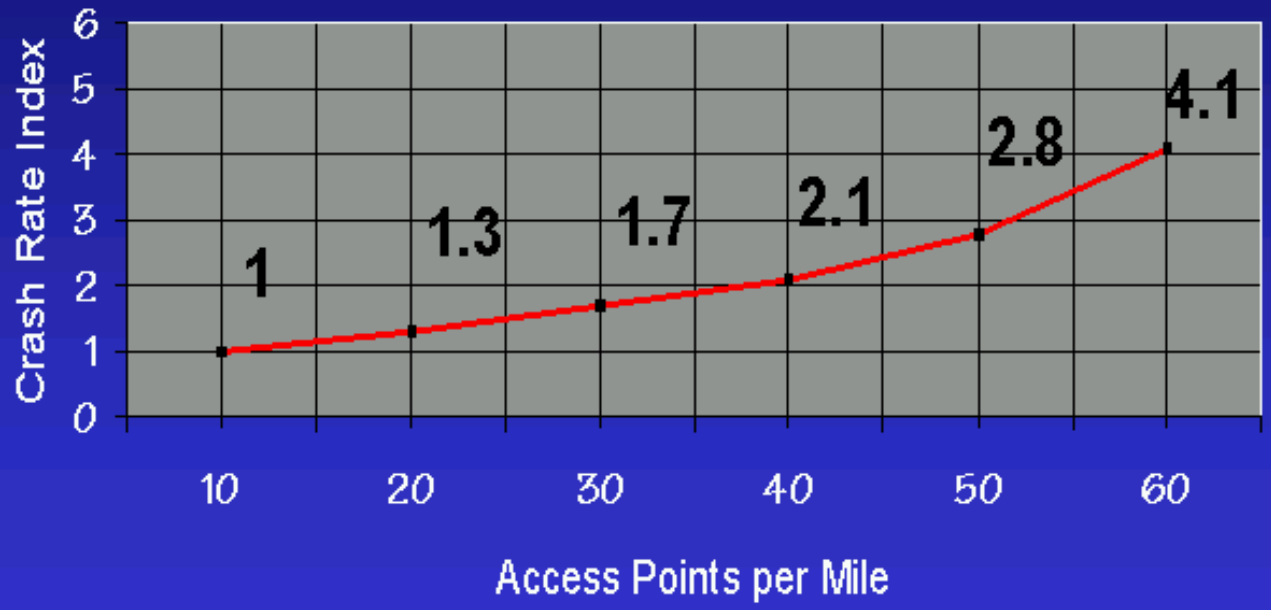
Access & Roadway Function



Benefits of Access Management

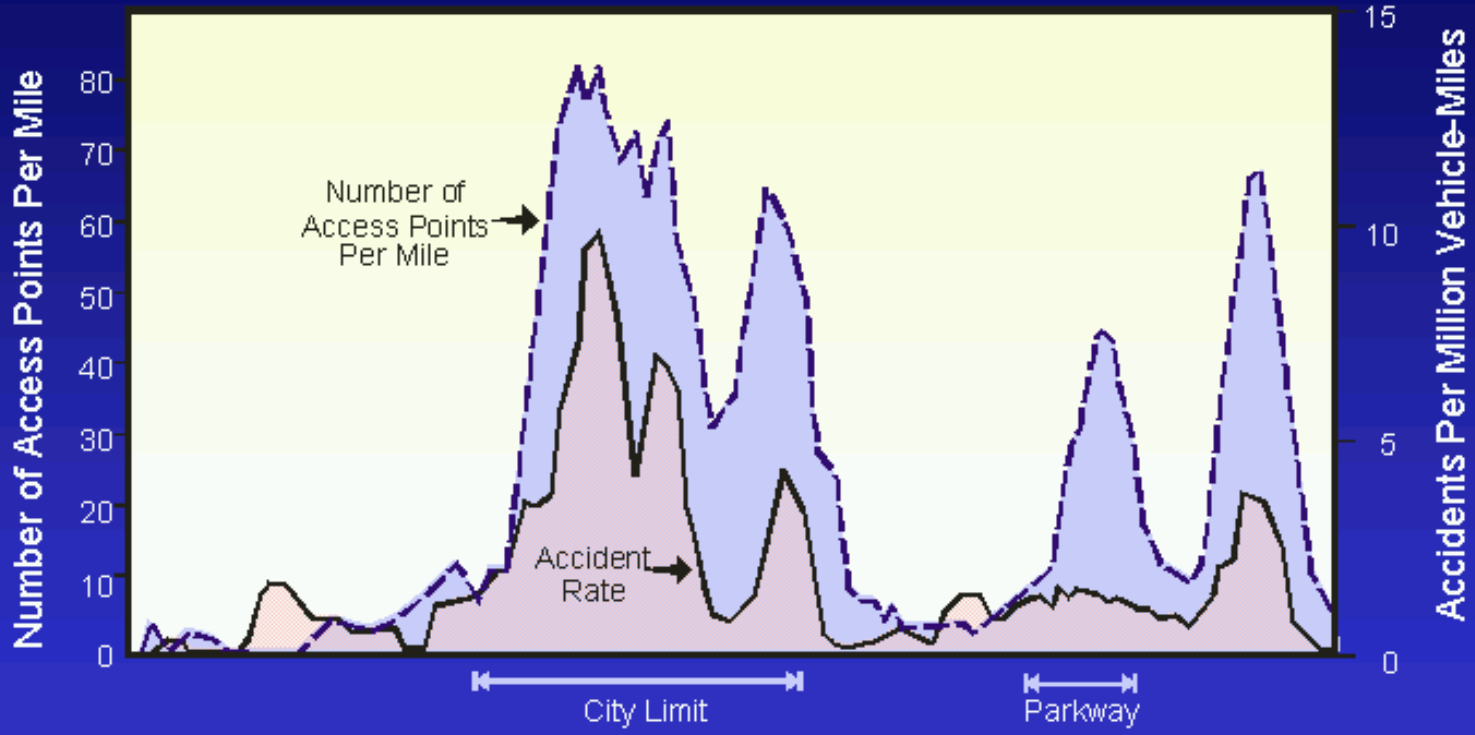
Safety

Composite Crash Rate Indices



Source: TRB Access Management Manual (2003), as adapted from NCHRP Report 420

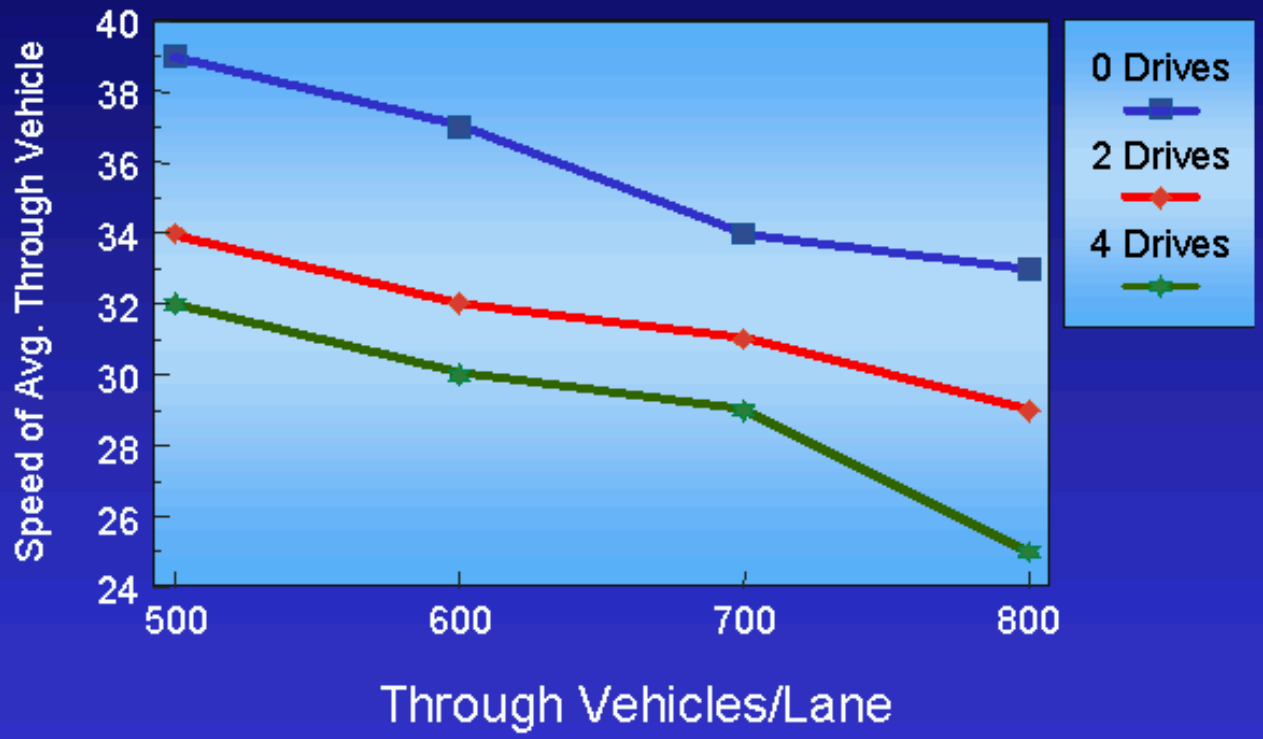
US 101 Study, Oregon



Comparison of Access Connections Per Mile with Crashes per Mile on a segment of US 101 in Oregon

Source: Lall, et al, 1996

Effect of Number of Driveways



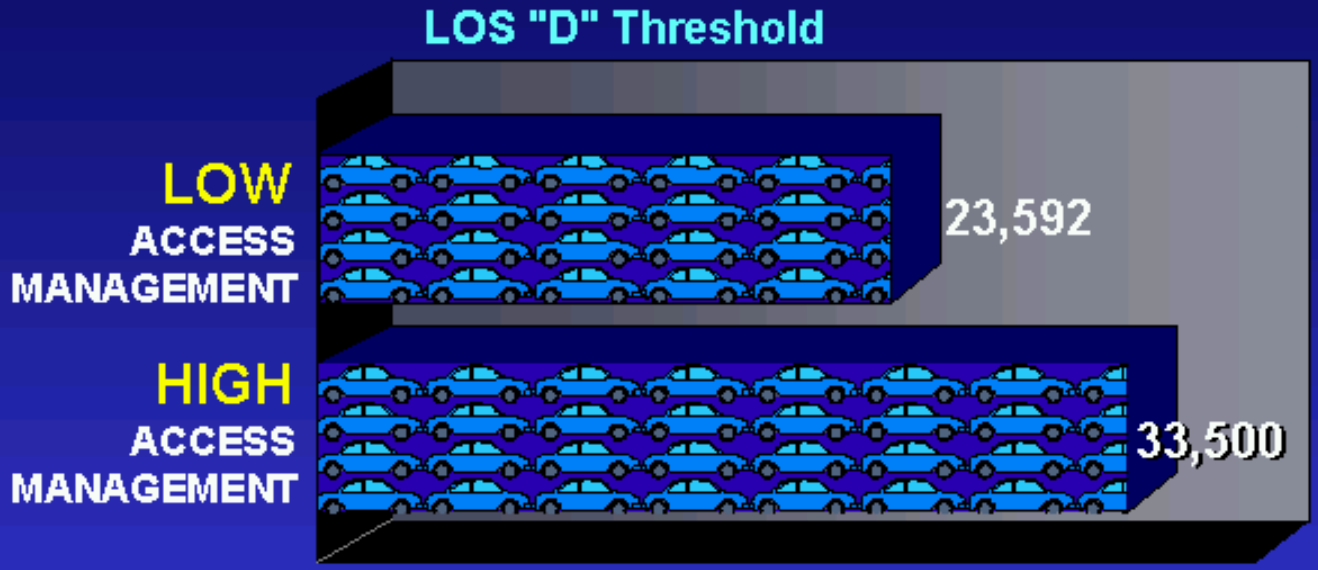
W. McShane PhD PE - July 1995

Signals and Travel Time

Signals per mile	Increase in travel time compared to two signals per mile
3	9%
4	16%
5	23%
6	29%
7	34%
8	39%

Source: NCHRP Report 420: Impacts of Access Management Techniques

Level of Service Benefits

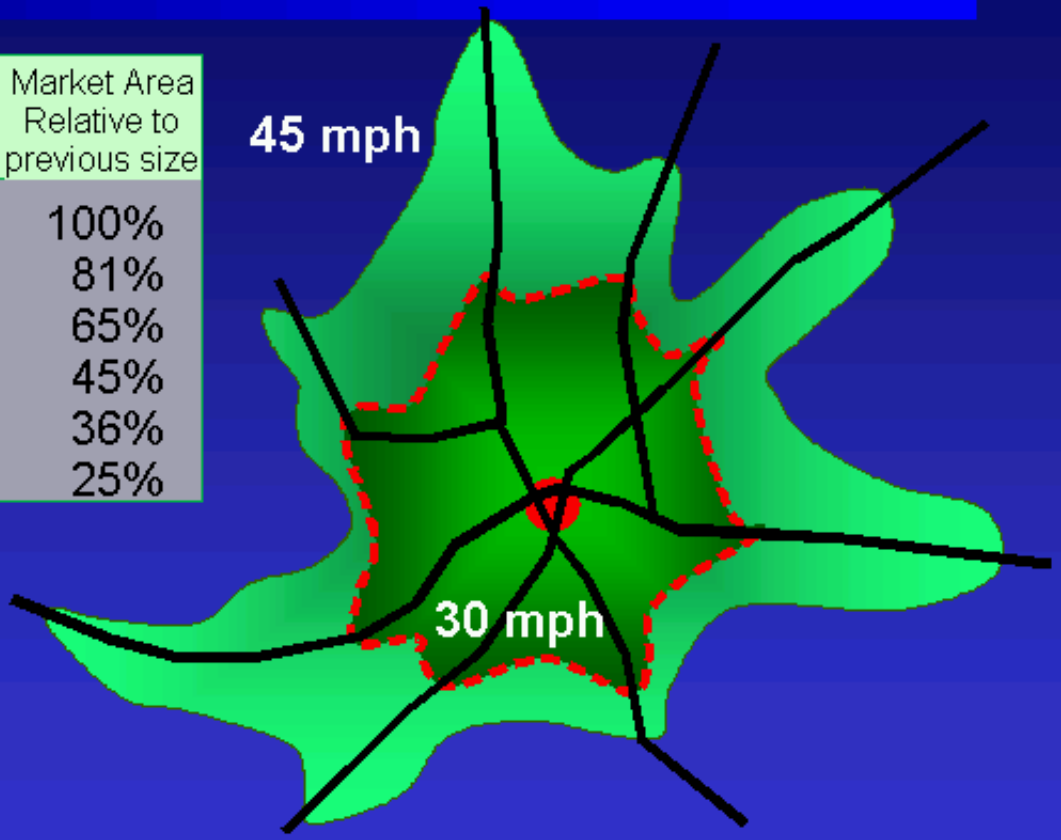


Maximum Daily Traffic at
Level of Service "D" on 4-Lane Road

Source: FDOT and 1985 Highway Capacity Manual

Increased Market Area

Reduction in Avg. System Speed	Market Area Relative to previous size
0%	100%
10%	81%
20%	65%
30%	45%
40%	36%
50%	25%

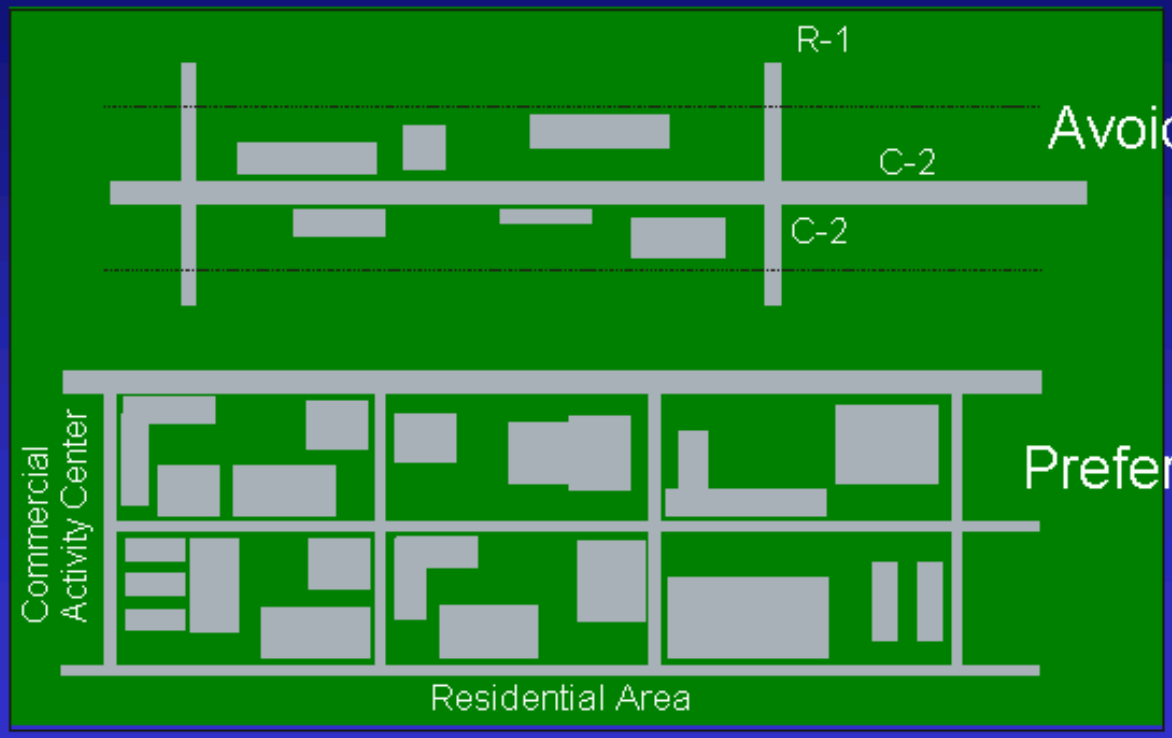


Poorly Managed Corridor

Well Managed Corridor

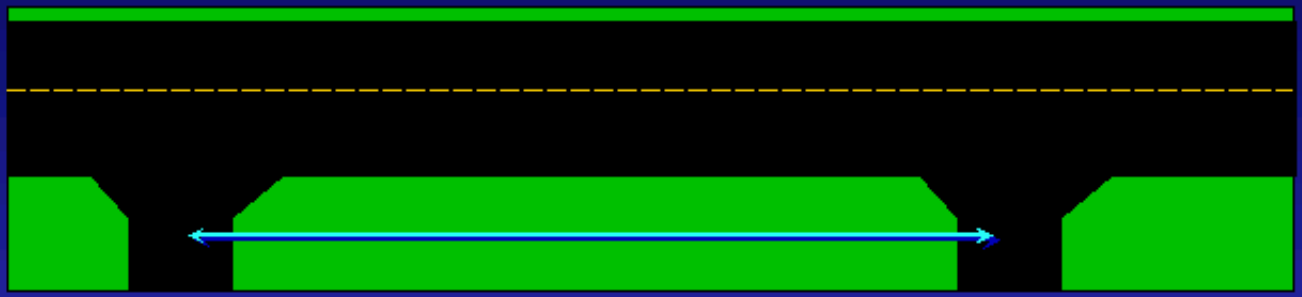
Land Development & Access Management Strategies

Promote activity centers NOT strips



Regulate the location, spacing & design of driveways

2

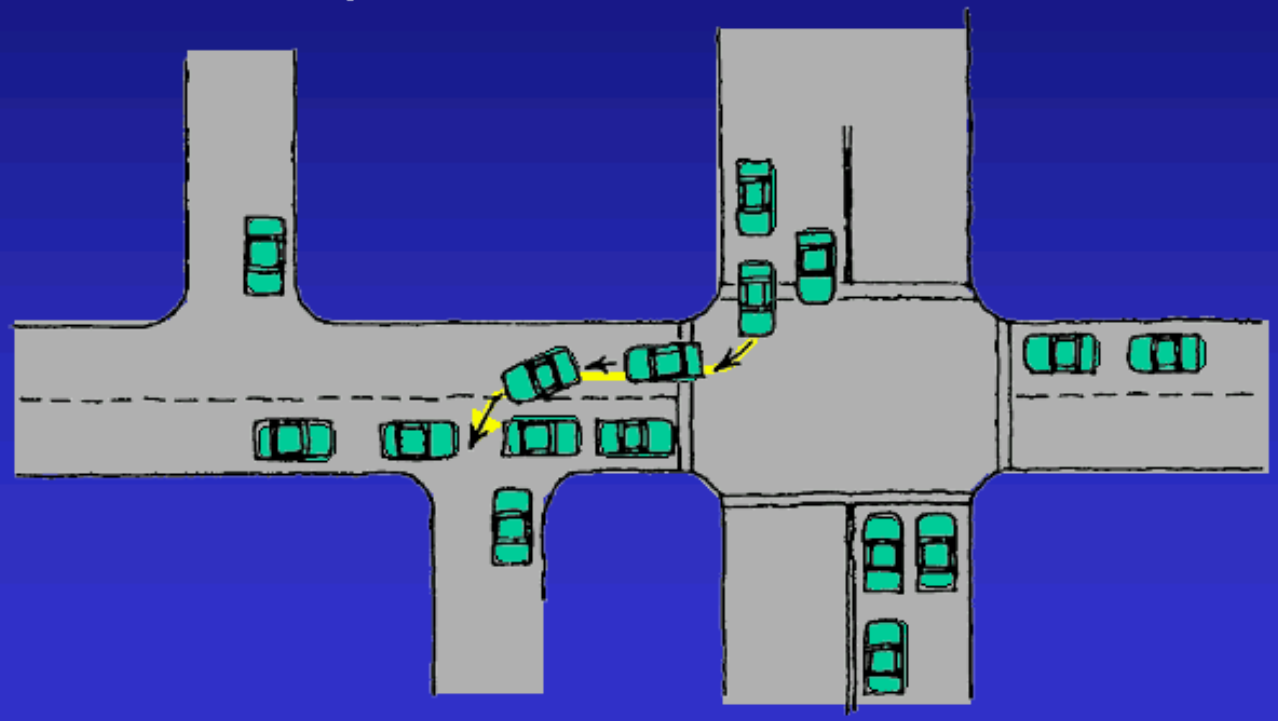


- Adopt minimum spacing standards for driveways
- Require driveway permit for arterial and collector roadways

Locate driveways away from intersections

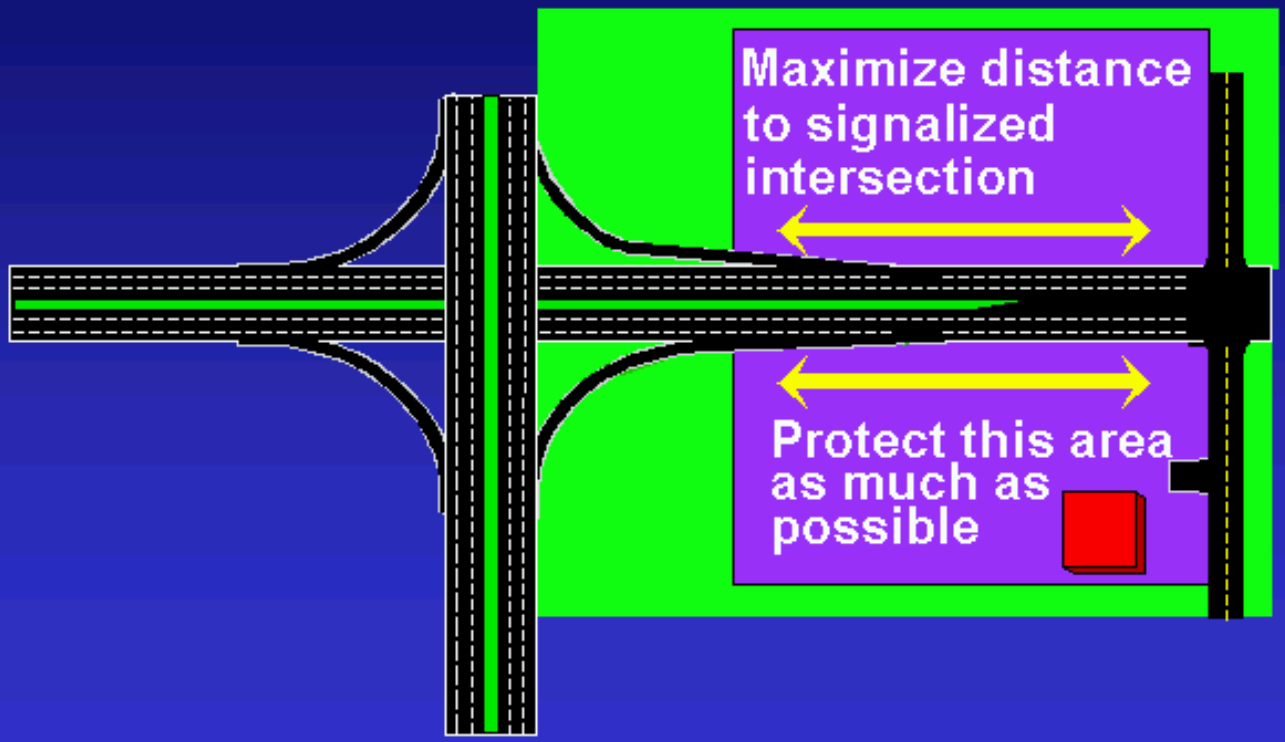
3

- Inadequate corner clearance causes delay and safety hazards



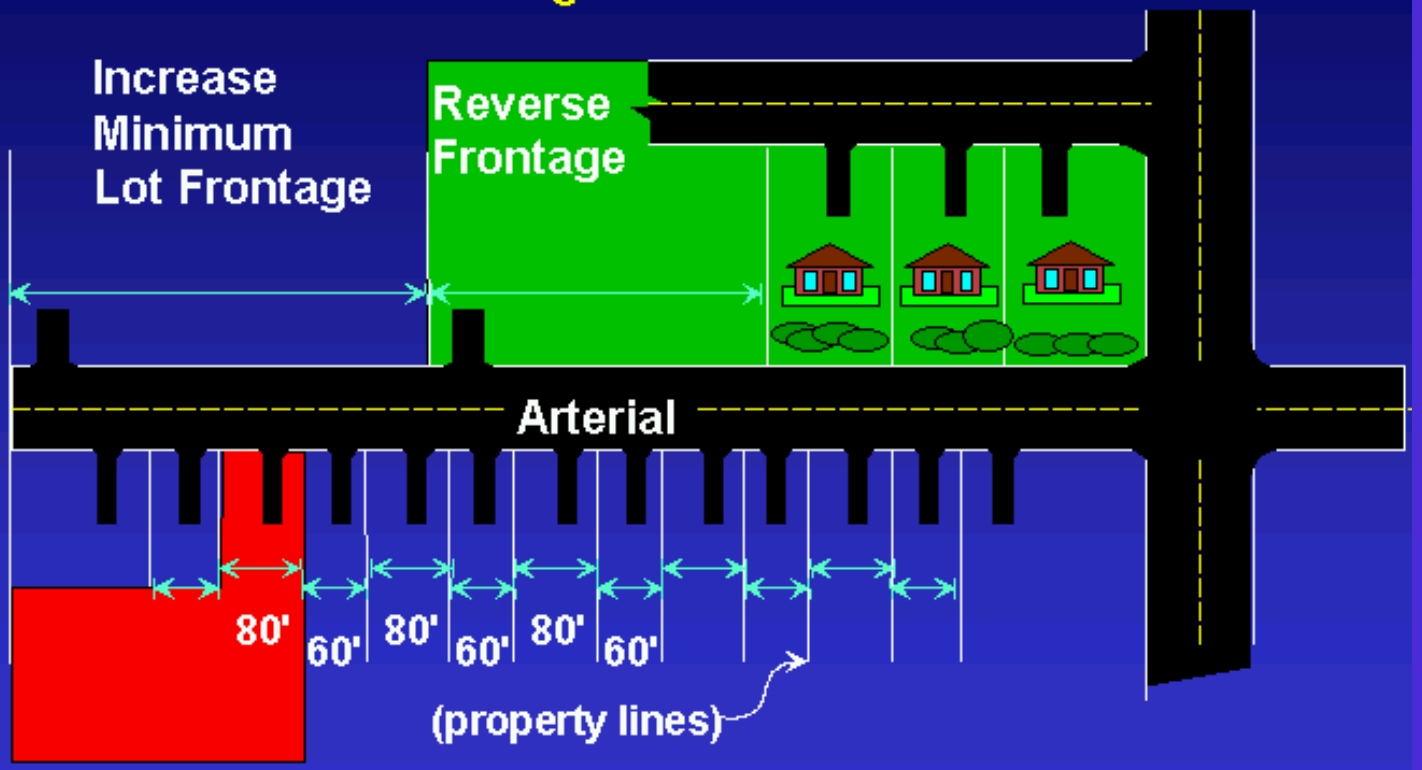
Move access away from interchange ramps

4



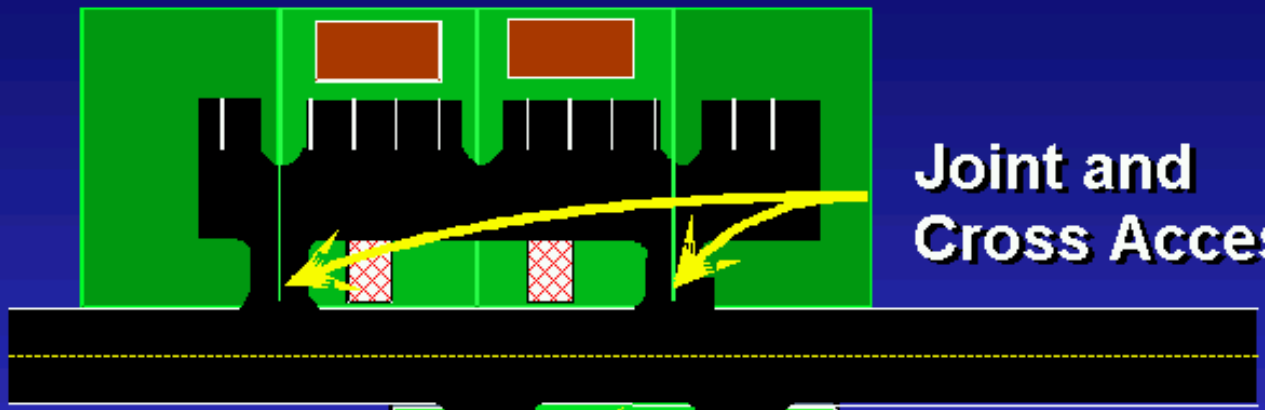
Prevent small lot frontages on major roads

5

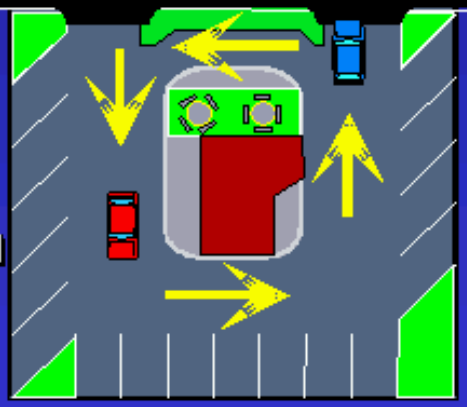


Connect parking lots and consolidate driveways

6

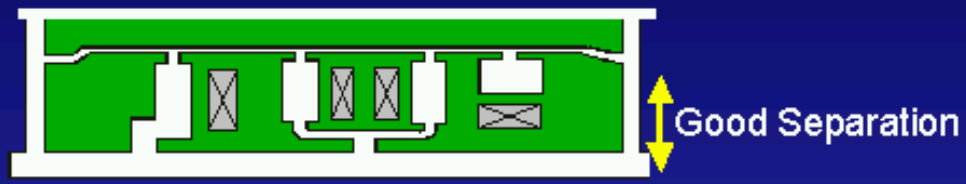


Joint and Cross Access



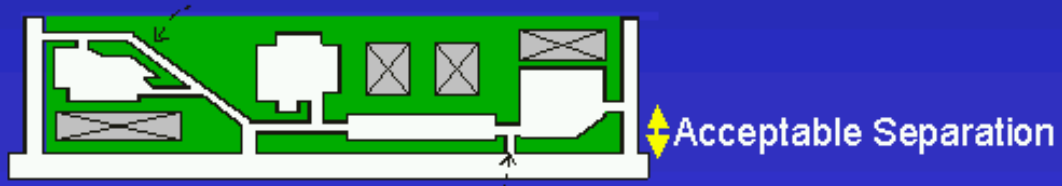
Complete On-Site Circulation

Cross Access Overlay



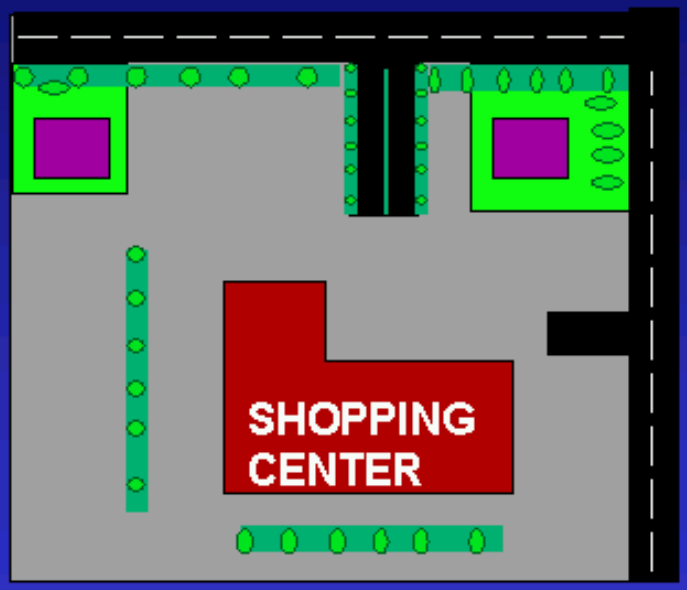
Rear Cross Access Drive

Front Cross Access Drive



Zig-Zag Cross Access Drive

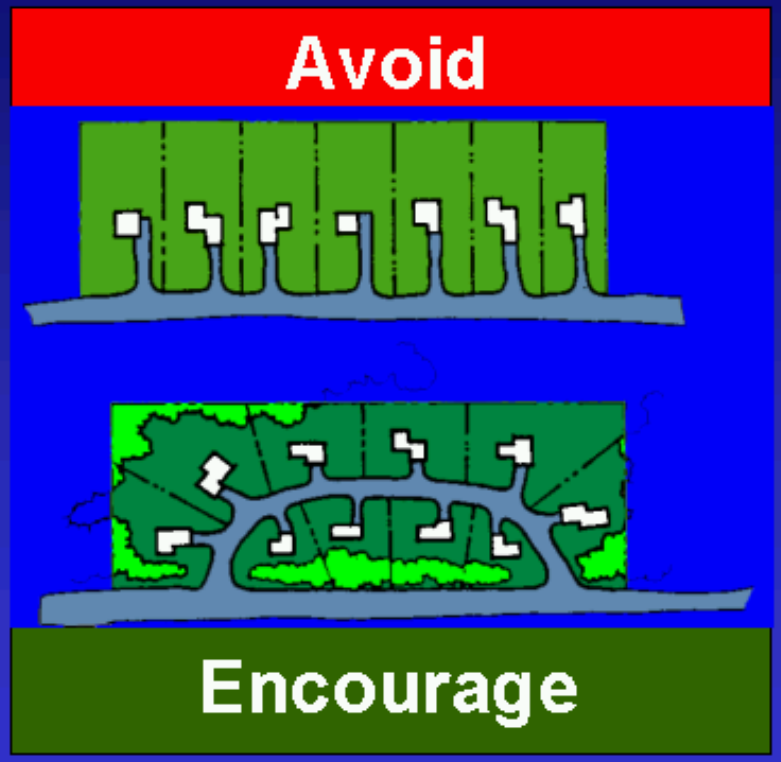
Promote internal access to outparcels



- Require unified access and circulation plan
  - For properties under same ownership or consolidated for development

Provide residential access through neighborhood streets

8



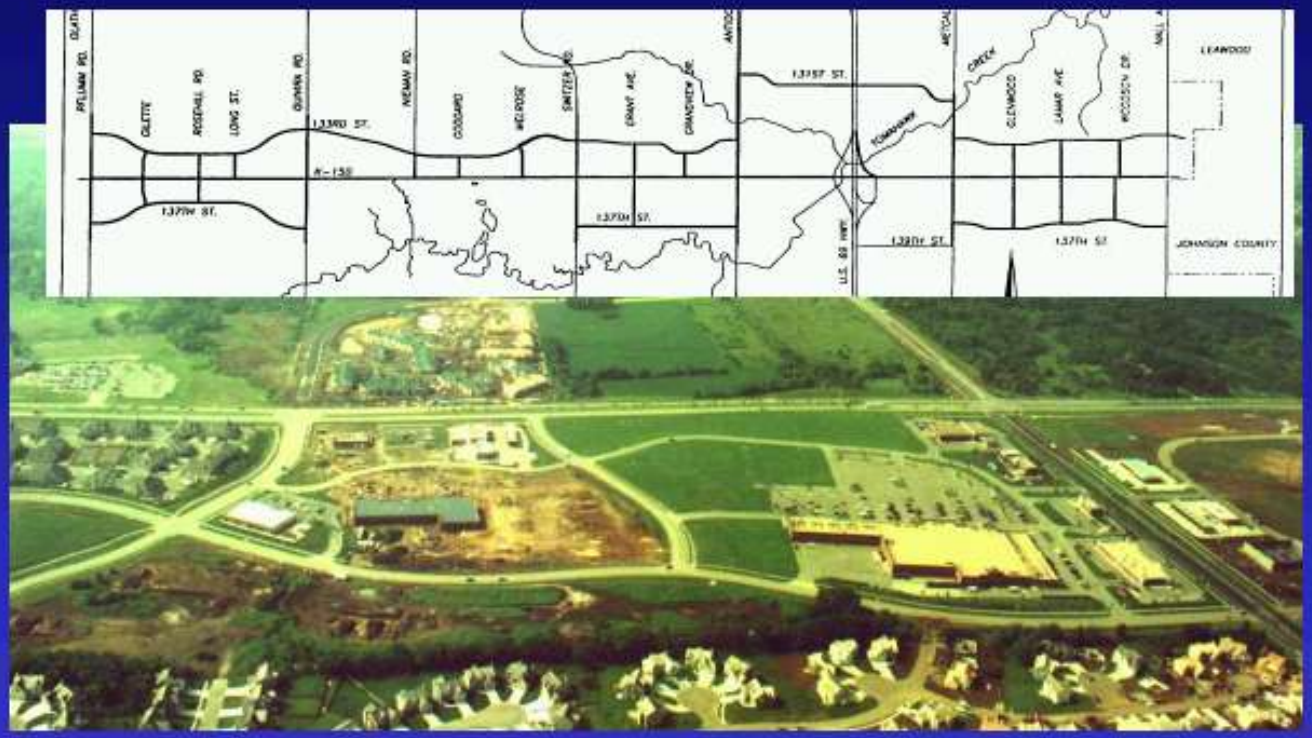
- Regulate small subdivisions
- Require internal access to subdivision lots

Use Medians

9

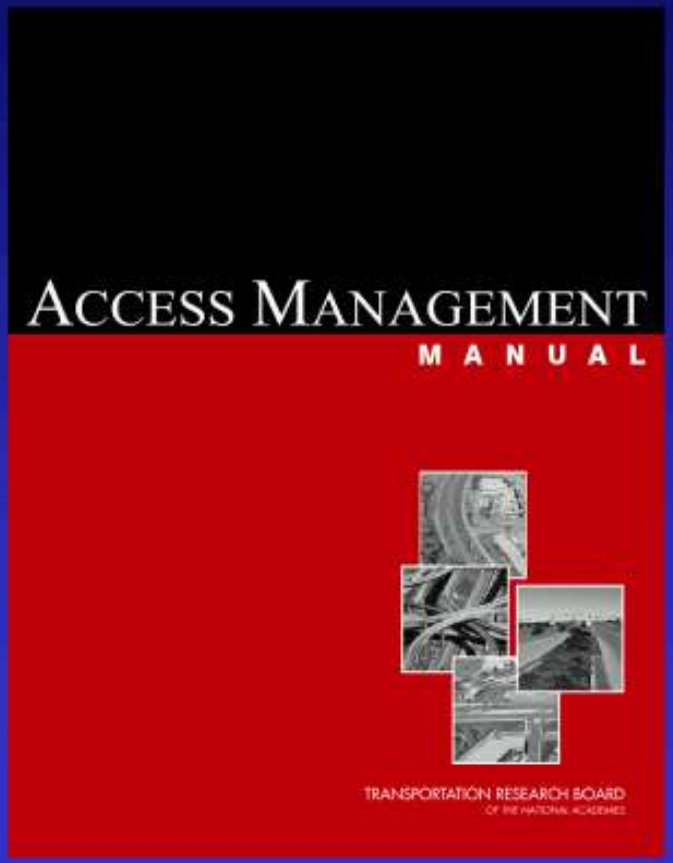
- Pedestrian and vehicular safety
- Corridor beautification
- Retrofitting problem areas

Provide a supporting local street and circulation system 10



135th Street Acc. Mgt. Plan, Overland Park, Kansas

TRB Access Mgt Manual



More Information

TRB Subcommittee on Access Management Website

http://www.accessmanagement.info

More Information

FHWA Website on Access Management

http://www.ops.fhwa.dot.gov/access_mgmt

9th National Conference

Contact

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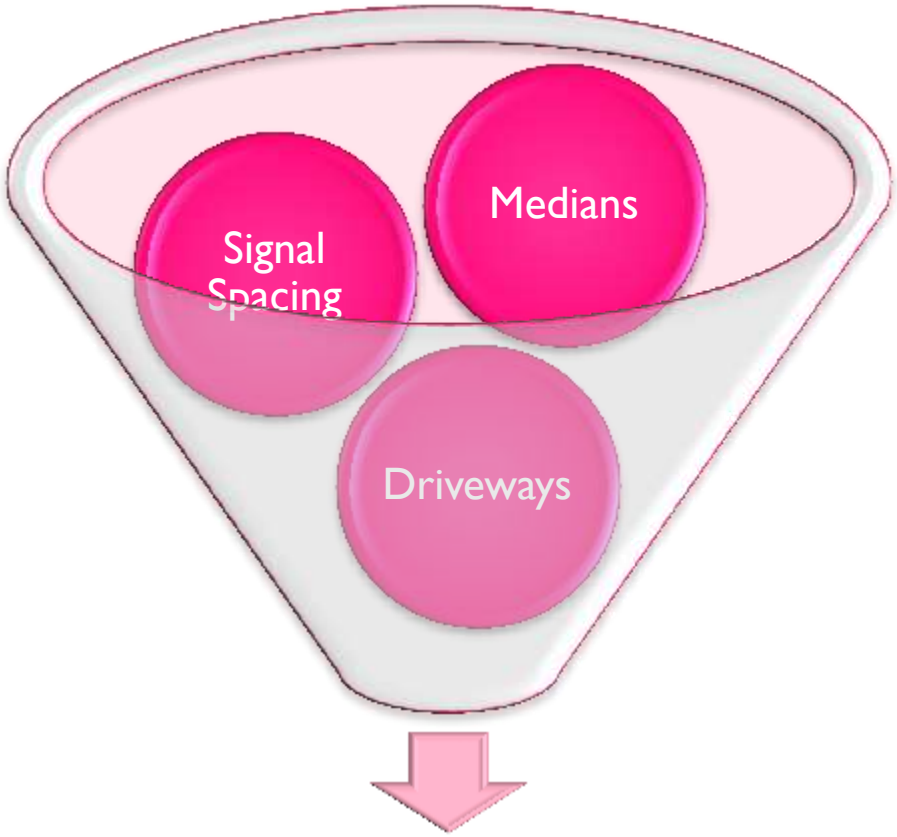
ACCESS MANAGEMENT

MEDIANS, SIGNALS, & ACCESS CONNECTIONS

Kimberly D. McDaniel, PE, PTOE
Access Management Engineer

Access Management Initiatives



Why Access Management?

More than 60% access-related crashes involve left-turning vehicles.

More than half of all crashes involve access connections.

Medians result in a reduction in conflict points – from 13 with a TWLTL down to just 6 with a median!

Effective Access Management can…

…reduce crashes by as much as 50%.

…increase roadway capacity by as much as 45%.

…reduce travel time and delay by as much as 65%.

MEDIANS

The portion of a highway that separates opposing traffic flows, not including center two-way left-turn lanes

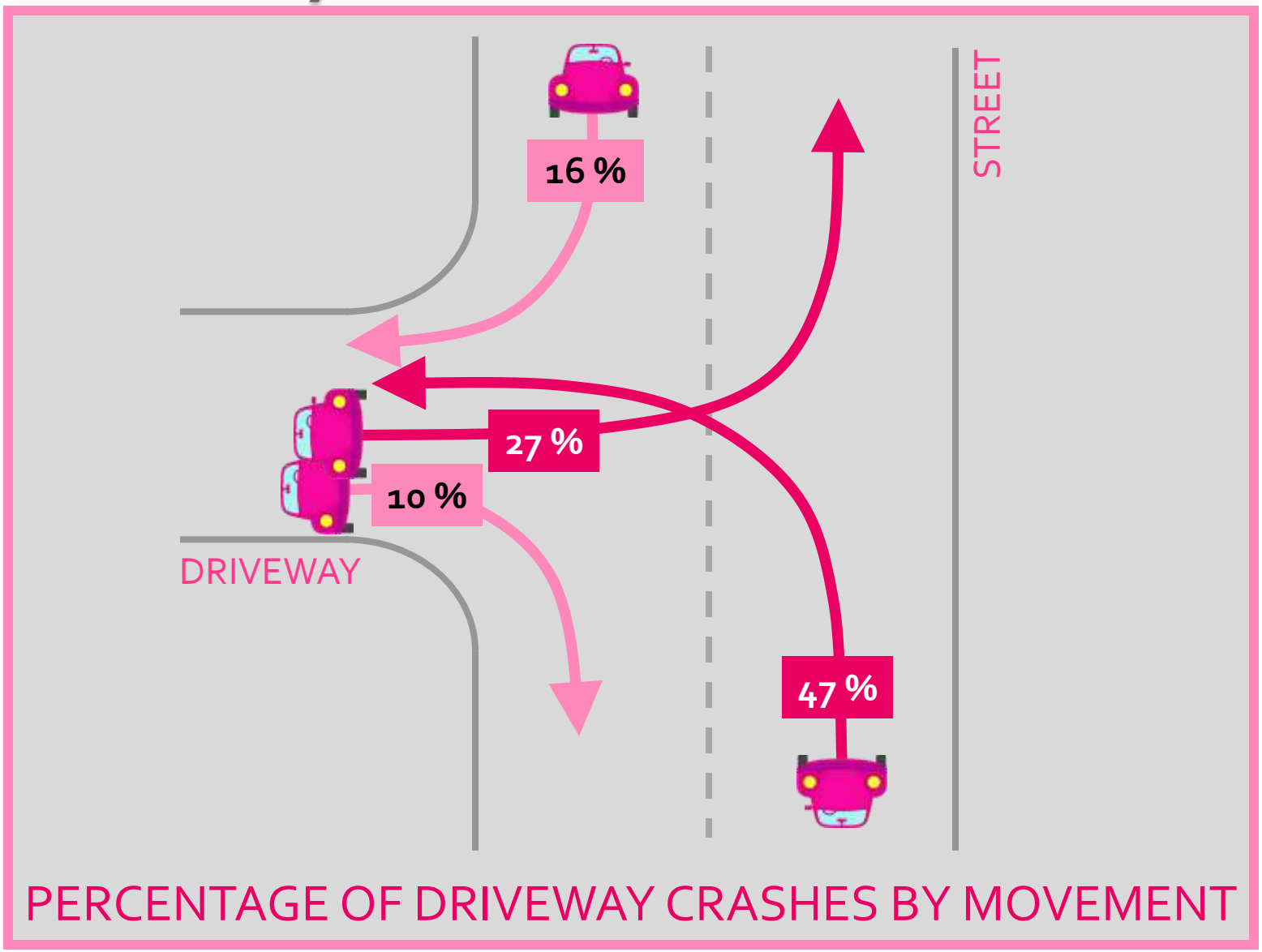
Types of Median Openings

FULL MEDIAN OPENING

PARTIAL MEDIAN OPENING

U-TURN OPENING

Driveway-Related Crashes



Benefits of Medians

- Increase Traffic Flow
- Improve Safety
- Better Pedestrian Safety
- Opportunities for Aesthetic Improvements

Common Myths about Medians

"You're going to put me out of business!"

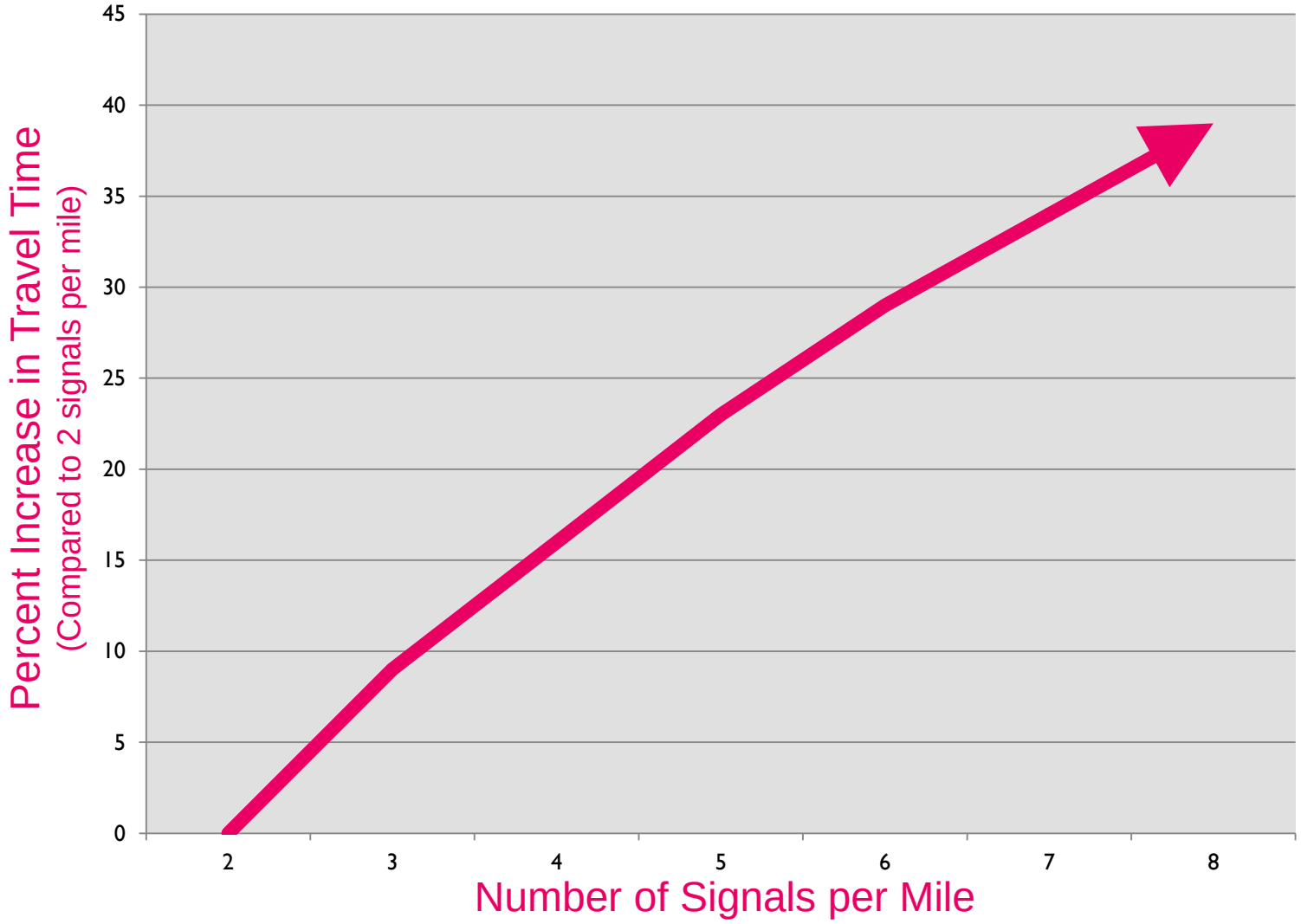
"What about trucks?"

"U-Turns are not safe!"

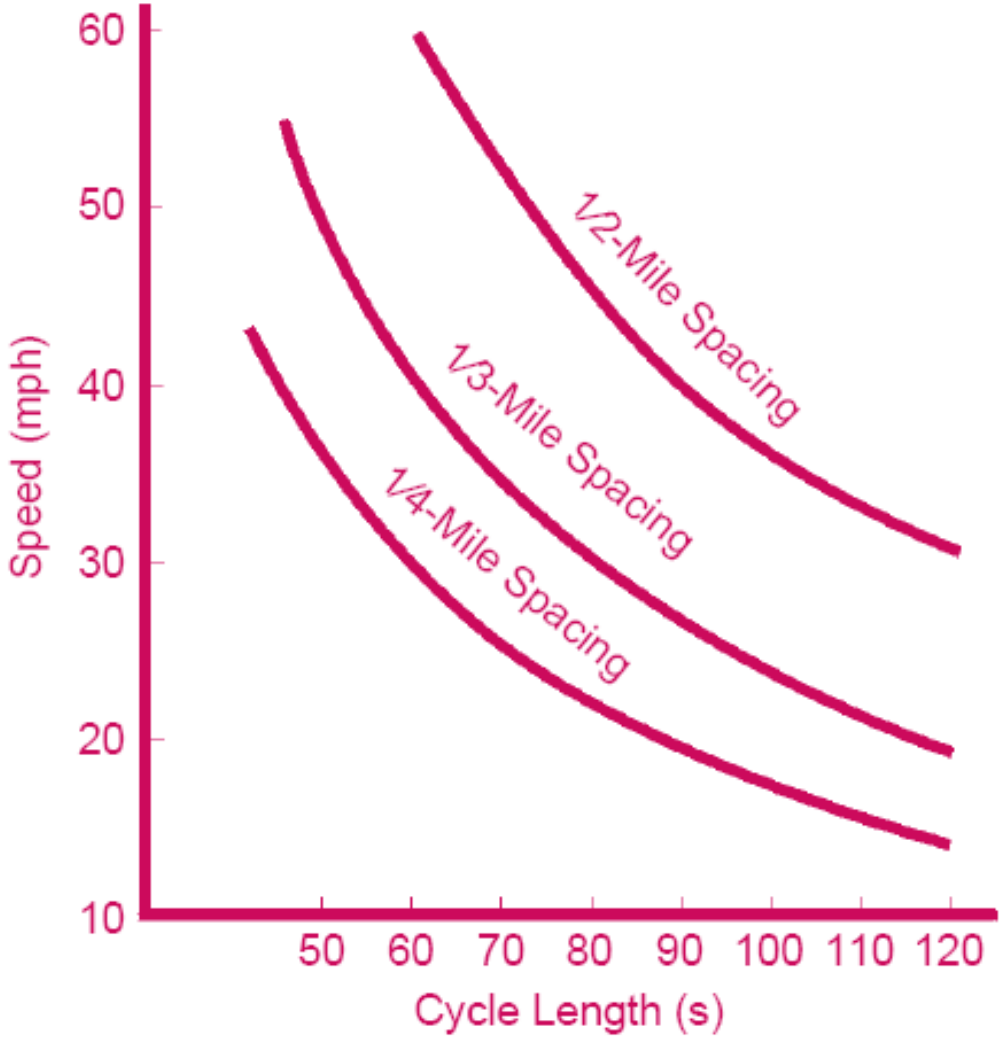
TRAFFIC SIGNAL SPACING

The distance between traffic signals along a roadway

More Signals = More Travel Time



Uniform Signal Spacing



Effects of Signal Spacing

½ mile spacing could reduce delay by over 60% and travel time by over 50%.

Each traffic signal per mile added to a roadway REDUCES speed by 3 MPH.

Crash rates increase as the number of signals increases.

ACCESS CONNECTIONS

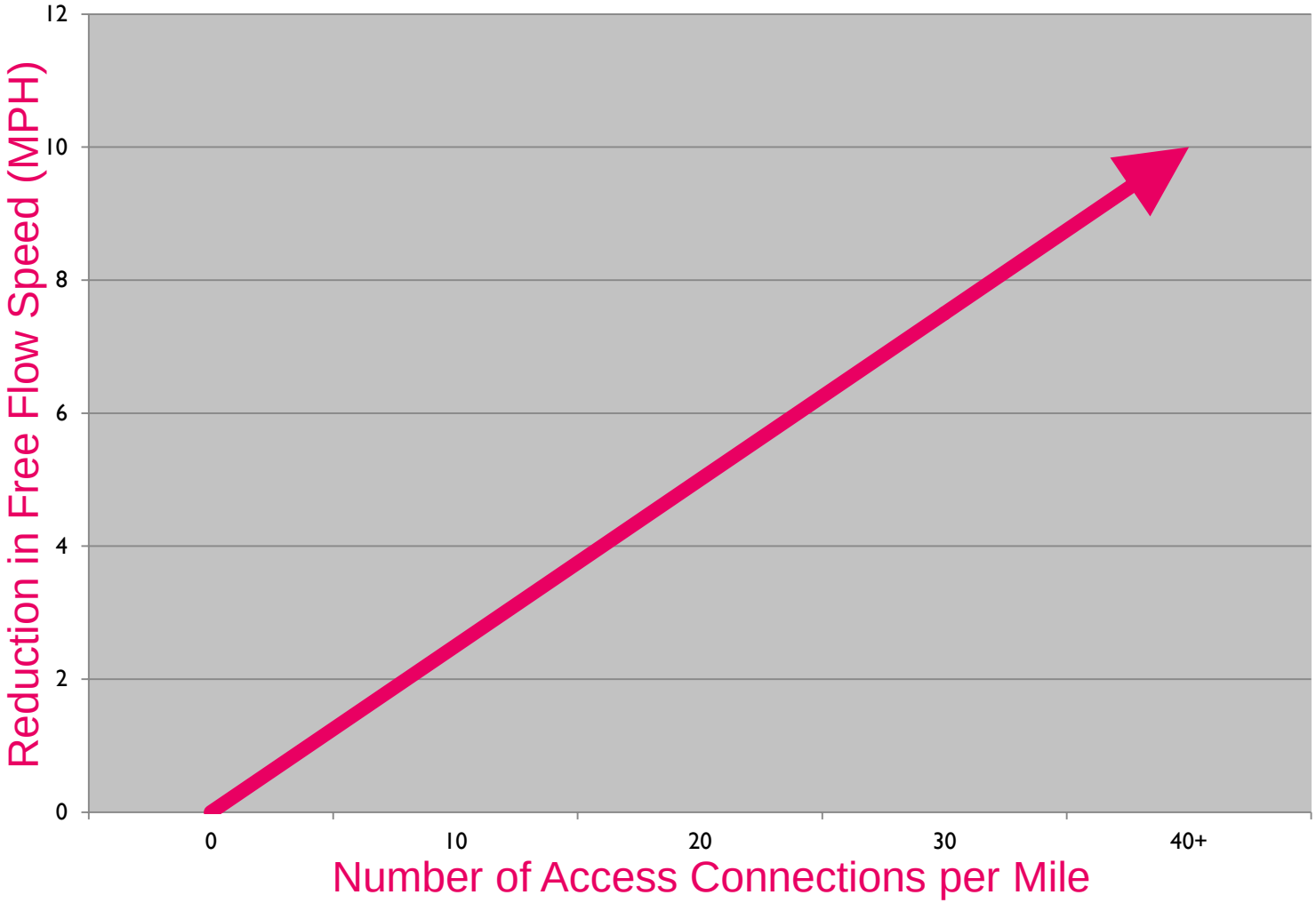
Any driveway, street, or other means of providing for the movement of vehicles to or from the public roadway system

LaDOTD Policy on Access Connection Permits

Requires access connection permits to achieve the following:

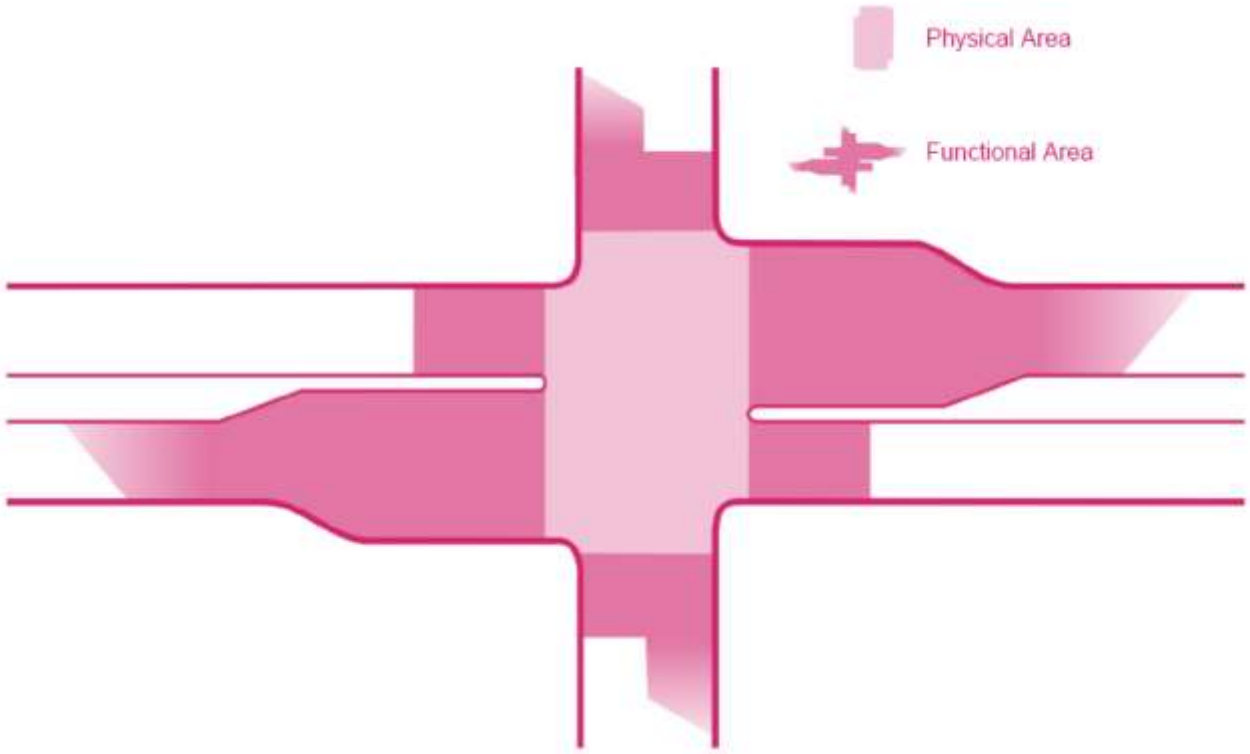
- To ensure safe and orderly movement of traffic
- To prevent hazardous parking
- To preserve visibility at intersections
- To encourage beatification of property
- To ensure uniform design and construction of access

More Access Connections = Lower Free Flow Speeds



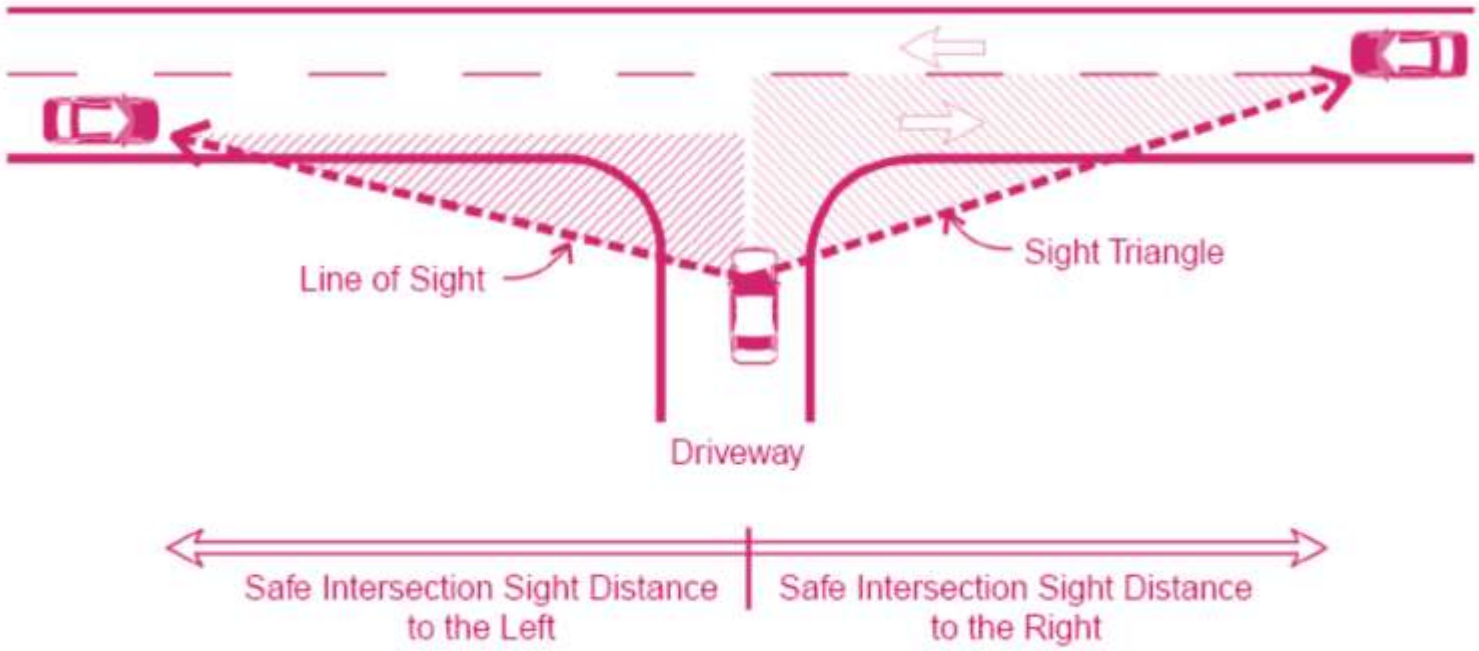
LaDOTD Policy on Access Connection Permits

Functional Area of the Intersection



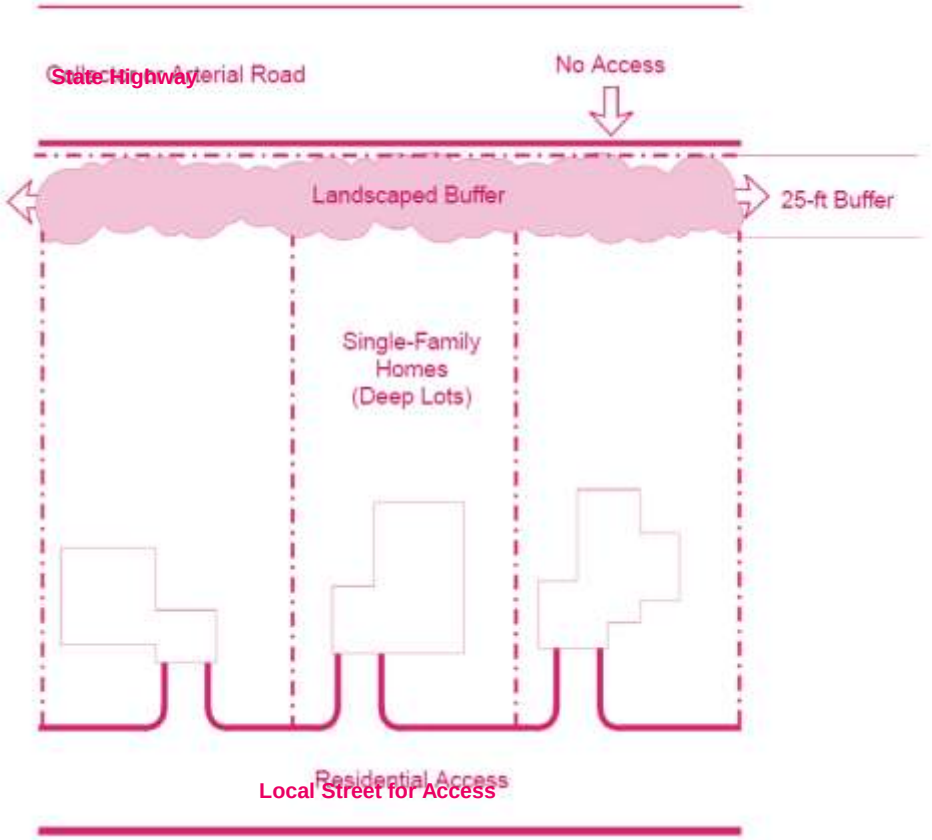
LaDOTD Policy on Access Connection Permits

Adequate Sight Distance



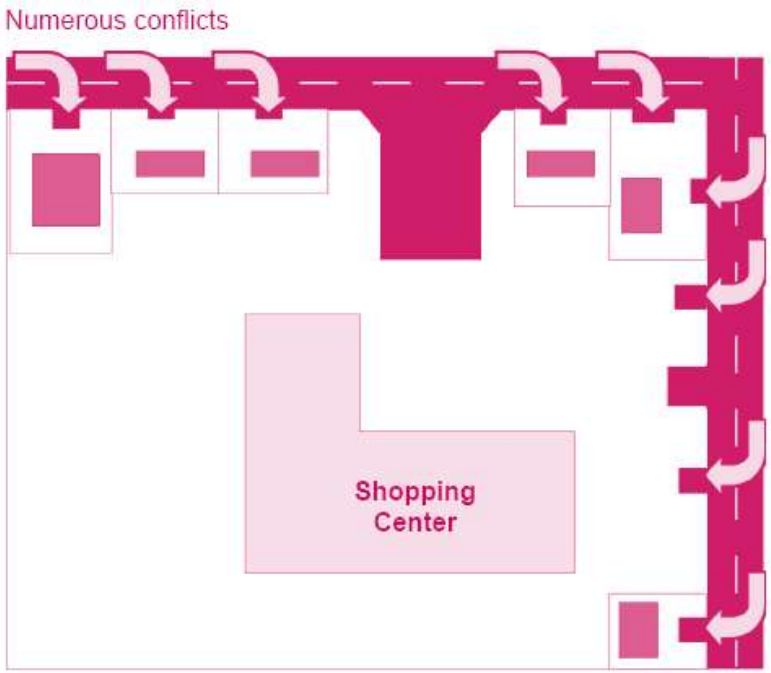
Access Connection Sharing

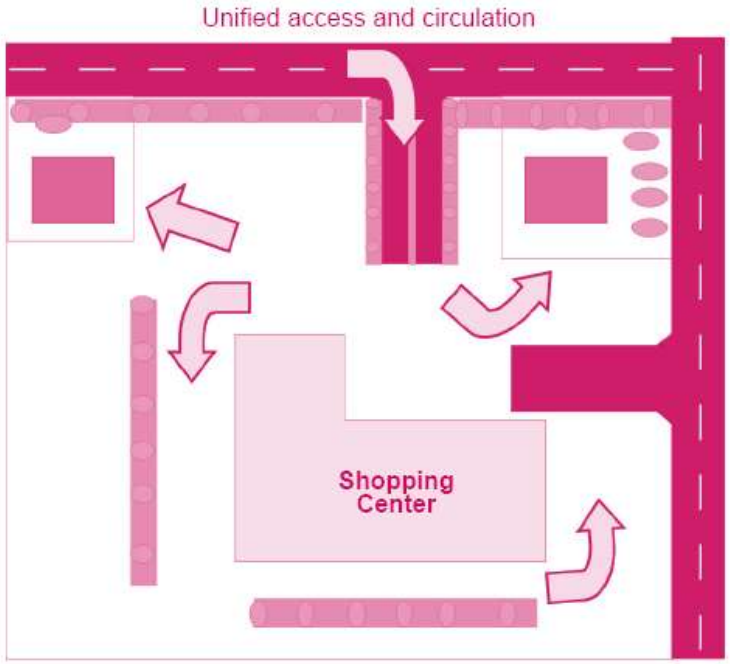
Adjacent properties subdivided for single-family homes may be required to construct a residential access road rather than have individual connections on the highway.



Access Connection Sharing

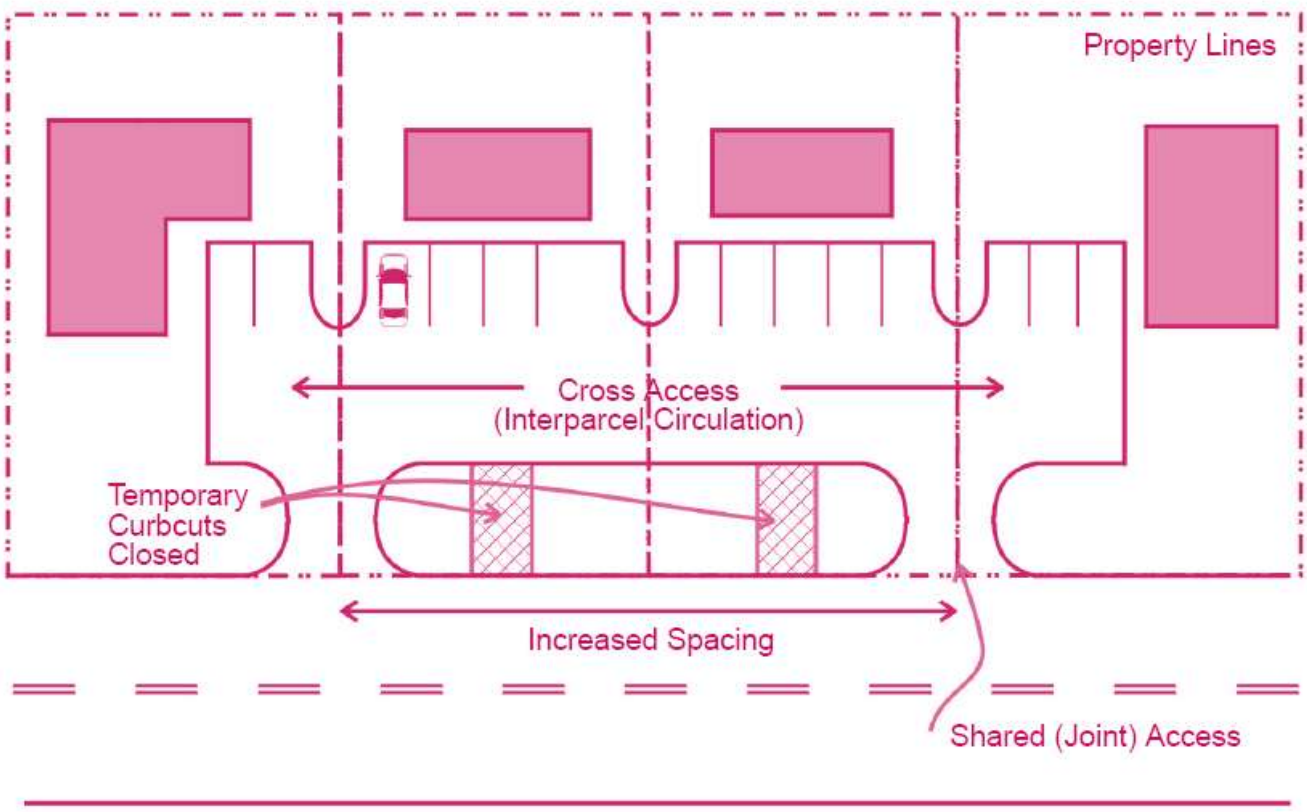
DOTD will review and require necessary changes to internal circulation plans in order to preserve the roadway and increase safety.





Access Connection Sharing

As part of a roadway project, DOTD may re-evaluate all access connections and determine what needs to be reconstructed, improved, modified, or removed as part of the project.



LaDOTD Policy on Access Connection Permits

- Notice of Intent will be published in August edition of the Louisiana Register with a 30 day public comment period.
- You can view this publication online at: http://doa.louisiana.gov/osr
- Comments may be submitted by the posted deadline for review.

For more information contact:

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225.242.4633

Louisiana Land Use Toolkit Version 2.0

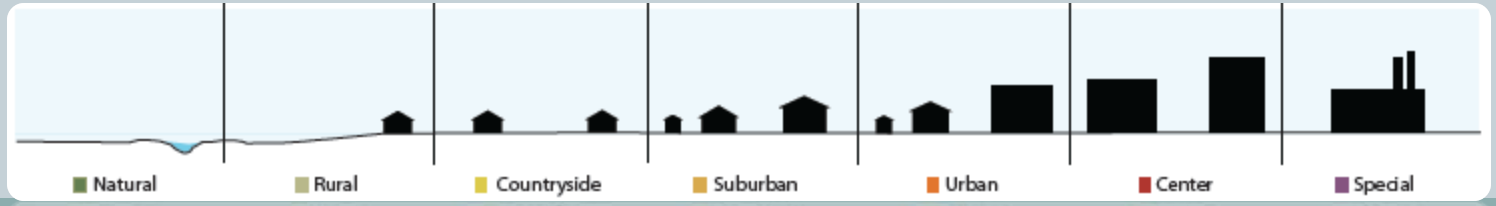
ACCESS MANAGEMENT AND LAND USE PLANNING

Presented to the Louisiana Municipal Association
Traffic Engineering 101
July 26, 2010

What is the Louisiana Land Use Toolkit?

1. Outgrowth of the Louisiana Speaks Regional Plan.
2. Provides Louisiana communities with a free resource for customizable smart growth development codes.
3. Contextually based to get the right rules in the right places.

"The Louisiana Land Use Toolkit is a model development code (zoning and subdivision regulations) rooted in smart growth principles"



Access Management and Smart Growth

Smart Growth is often broken down into 10 principles that serve to summarize the basics of smart growth. Of these principles there are two that directly address access management.

- **Smart Growth Principle # 2: Create Walkable Neighborhoods -** Walkable communities are desirable places to live, work, learn and play. They include safe, attractive streets and interesting places to visit. The more permeable a neighborhood's street network is the more walkable it streets are likely to be.

- **Smart Growth Principle # 8: Provide a Variety of Transportation Options-** Providing people with more transportation choices to meet all of their weekly needs is a key aim of Smart Growth. This gets at transportation modes as well as routes. Neighborhoods with access in the form of street connections and few cul-de-sacs promote higher levels of pedestrian activity.

Access Management In Rural Louisiana

- The State of Louisiana currently has very loose standards regarding access management in rural areas.

- Lots abutting state thoroughfares are required to have a driveway permit prior to gaining access.

- The minimal regulations contribute to the "stripping out" of rural corridors.

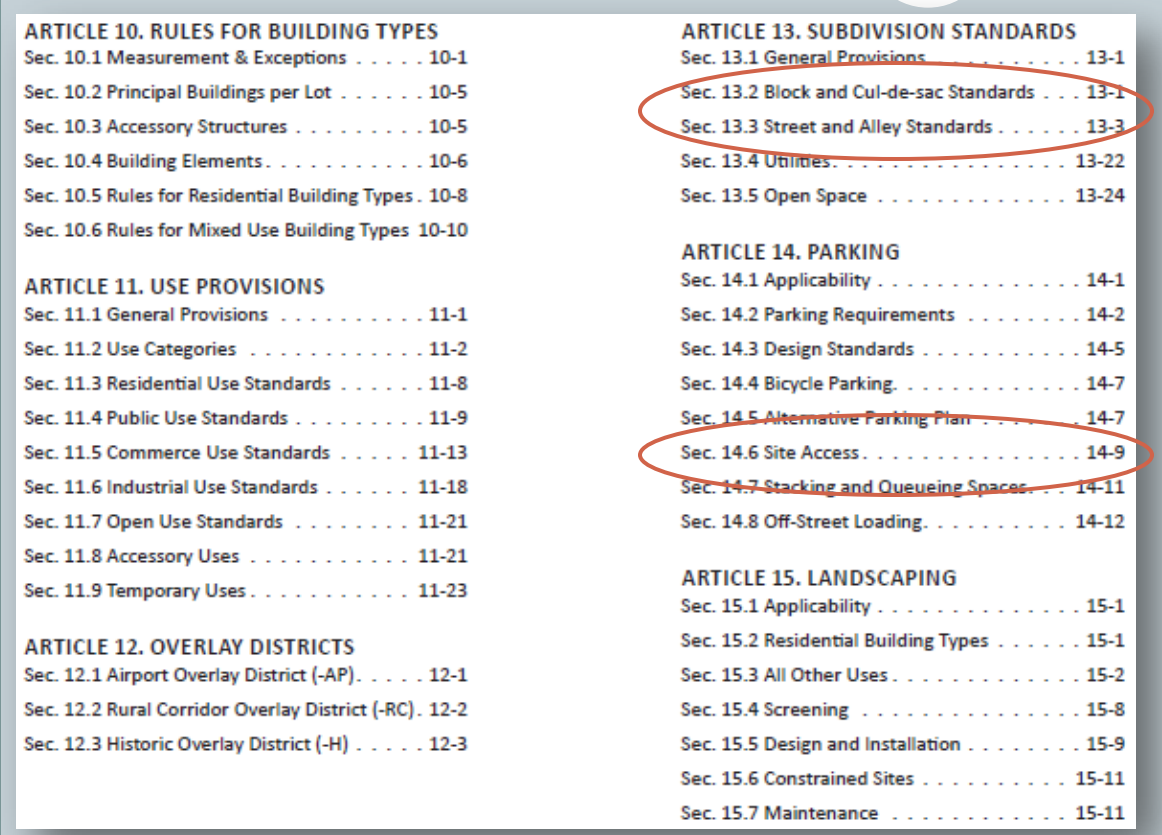
- Many of the current patterns appear in to be in violation of the current state regulations (continuous curb cuts).

No use of ROW as off-street parking.

Continuous curb cuts.

Unnecessarily wide driveways.

Access Management and the Toolkit?



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Two primary ways that the Toolkit addresses access management.

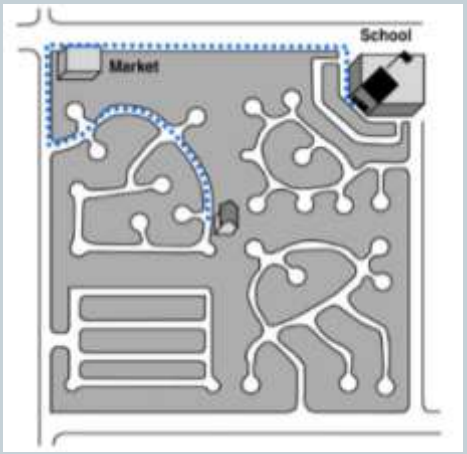
- Neighborhood Access – connectivity and public access
- Site Access – pedestrian access, driveways and private access.

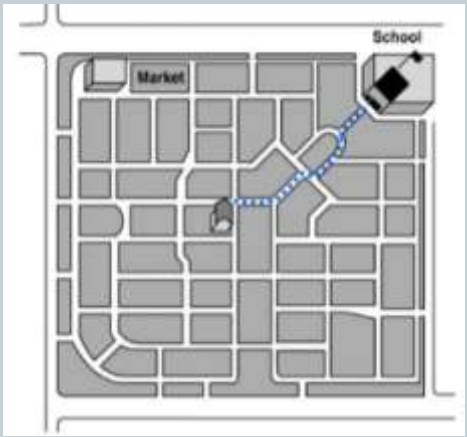
Block and Cul-de-sac standards

BLOCK AND CUL-DE-SACS	Block Perimeter (max)	Block Face / Cul-de-sac (max)
Rural*		
Residential Districts	n/a	n/a
Residential Cluster	3,500 ft.	1,500 ft.
Mixed Use District	3,200 ft.	1,000 ft.
Commercial Districts	3,500 ft.	1,200 ft.
Special Purpose Districts	n/a	n/a
Countryside*		
Residential Districts	10,000 ft.	2,500 ft.
Residential Cluster	3,500 ft.	1,000 ft.
Mixed Use District	2,200 ft.	650 ft.
Commercial Districts	2,800 ft.	750 ft.
Special Purpose Districts	n/a	n/a
Suburban		
Residential Districts	2,800 ft.	750 ft.
Residential Cluster	2,000 ft.	600 ft.
Mixed Use District	2,000 ft.	600 ft.
Commercial Districts	2,600 ft.	700 ft.
Special Purpose Districts	5,500 ft.	1,800 ft.
Urban		
Residential Districts	2,000 ft.	600 ft.
Residential Cluster	n/a	n/a
Mixed Use District	1,600 ft.	450 ft.
Commercial Districts	2,200 ft.	650 ft.
Special Purpose Districts	4,000 ft.	1,200 ft.
Center		
Residential Districts	n/a	n/a
Residential Cluster	n/a	n/a
Mixed Use District	1,300 ft.	350 ft.**
Commercial Districts	2,000 ft.	600 ft.**
Special Purpose Districts	n/a	n/a

*No block or cul-de-sac standards apply in the Large Lot Residential Districts.
**No cul-de-sacs are permitted in the Center context.

Regulating block perimeter maximum helps ensure that new developments will not exhibit the auto dominated pattern to the left but rather reflect the more walkable gridded street network seen below.





Neighborhood Access

(A) Open Access

- Requires that developments remain permanently open to the public as part of an overall connected street network

(B) Connections

- Requires minimum external access points depending on the number of lots developed

(C) Street Stubs

- Requires street stubs to be extended to adjacent properties

"Vibrant neighborhoods are the building blocks of sustainable communities"

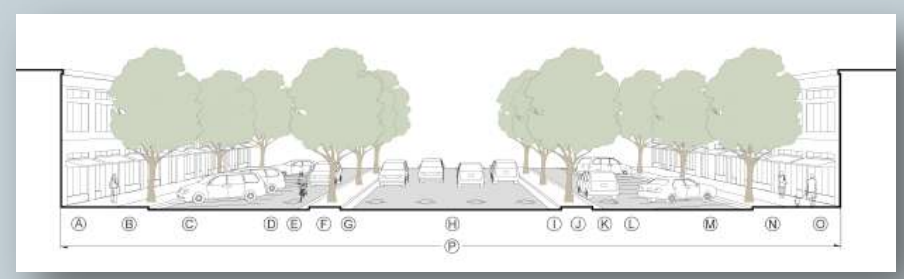
Subdivision dominated by cul-de-sacs with little to no interconnectivity

Highly interconnected neighborhood in Denver, Colorado

Site Access - Arterials

General Standards

- Requires that all buildings be on a site abutting a street
- Requires shared access easements between mixed use buildings on arterial streets



Access to Arterial Streets

- Lots may not take direct access to arterial streets including state thoroughfares unless they meet minimum lot widths. (Take access via alley or non-arterial frontage or side street)
- Lots within 300' of intersecting arterials be reviewed by the jurisdictions engineer for access

Context of Lot	Lot Width (min)
Natural, Rural, Special	300'
Countryside	200'
Suburban	100'
Urban, Center	50'

Site Access - Driveways

Driveways to Residential Building Types

- Alley access required on lots less than 40’ in width
- Number of driveways limited by amount of frontage available on each site
- Regulates driveway width
- 30’ driveway separation

THIS

NOT THIS

Driveways for Mixed Use Building Types

- Driveway widths must be between 8 and 30’
- Number of driveways limited by amount of frontage available on each site
- 150’ driveway separation

Total Site Frontage	Number of Driveways (max)
200 feet of frontage or less	1
201 feet to 400 feet of frontage	2
401 feet to 600 feet of frontage	3
601+ feet of frontage	4

Edgewood Retail District in Atlanta: Signaled private drive provides internal access

Questions? Input? Contact Us

camille@c-pex.org

- Camille Manning-Broome

tara@c-pex.org

- Tara Titone

COMPLETE STREETS

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ENGINEERS, ARCHITECTS, PLANNERS, ENVIRONMENTAL SCIENTISTS

Agenda

1. What are Complete Streets?
2. Why do we need Complete Streets?
3. How do you get Complete Streets?

What are Complete Streets?

- Complete streets are designed and operated to enable safe access for all users.

- Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street







What does a complete street look like?

- A complete street might include sidewalks, bike lanes (or wide paved shoulders), special bus lanes, comfortable and accessible transit stops, frequent crossing opportunities, median islands, accessible pedestrian signals, curb extensions, and more.
- A complete street in a rural area will look quite different from a complete street in a highly urban area. But both are designed to balance safety and convenience for everyone using the road.








FUN JUMPS
BIKE LANE
981-JUMP


SBN 886

EXAMPLES OF TREATMENTS


SHARE
THE
ROAD


BIKE ROUTE


15


AHEAD


YIELD


2418

WHY DO WE NEED COMPLETE STREETS?

Safety

- Pedestrians and Bicyclists are allowed on all roads in Louisiana (except the interstate)
- Reduces risk by 28% for pedestrians.
- As the number & portion of people bicycling & walking increases, deaths & injuries decrease.

Children and Active Living

– *Report Card on Physical Activity and Health for Children and Youth 2009*: Louisiana's Overall Grade for 2009 was a D (again)!

Mobility

- 21% of Americans over 65 don't drive
- By 2025, 18% of the population will be 65 or older
- 50% of paratransit users live within 2 blocks of a transit stop.

Economic Development and Environmental Policies

- Helps Urban Areas that are non-attainment achieve emissions reduction goals
- Supports economic development corridor initiatives

HOW DO WE GET COMPLETE STREETS?

Complete Streets Policies

- Complete Streets Policies can be resolutions, ordinances, state laws or administrative policies
- They ensure that all transportation projects will accommodate all users
- They are based on Federal Guidance
  - 2000 Policy Statement on Integrating Bicycle and Walking in Transportation Infrastructure
  - 2008 Guidance on Bicycle and Pedestrian Provisions of Federal Transportation Legislation
  - 2010 Policy Statement on Bicycle and Pedestrian Accommodation

Who has one?

- 110 Jurisdictions in the US
- 17 State Policies
- The Louisiana Department of Transportation and Development has an administrative Complete Streets Policy pending the Secretary’s signature

What should be included?

1. Vision
2. All Users
3. Create a Network
4. All Agencies
5. All Projects
6. Grant Exceptions
7. Standards
8. Context Sensitive
9. Performance Standards
10. Implementation

Questions?

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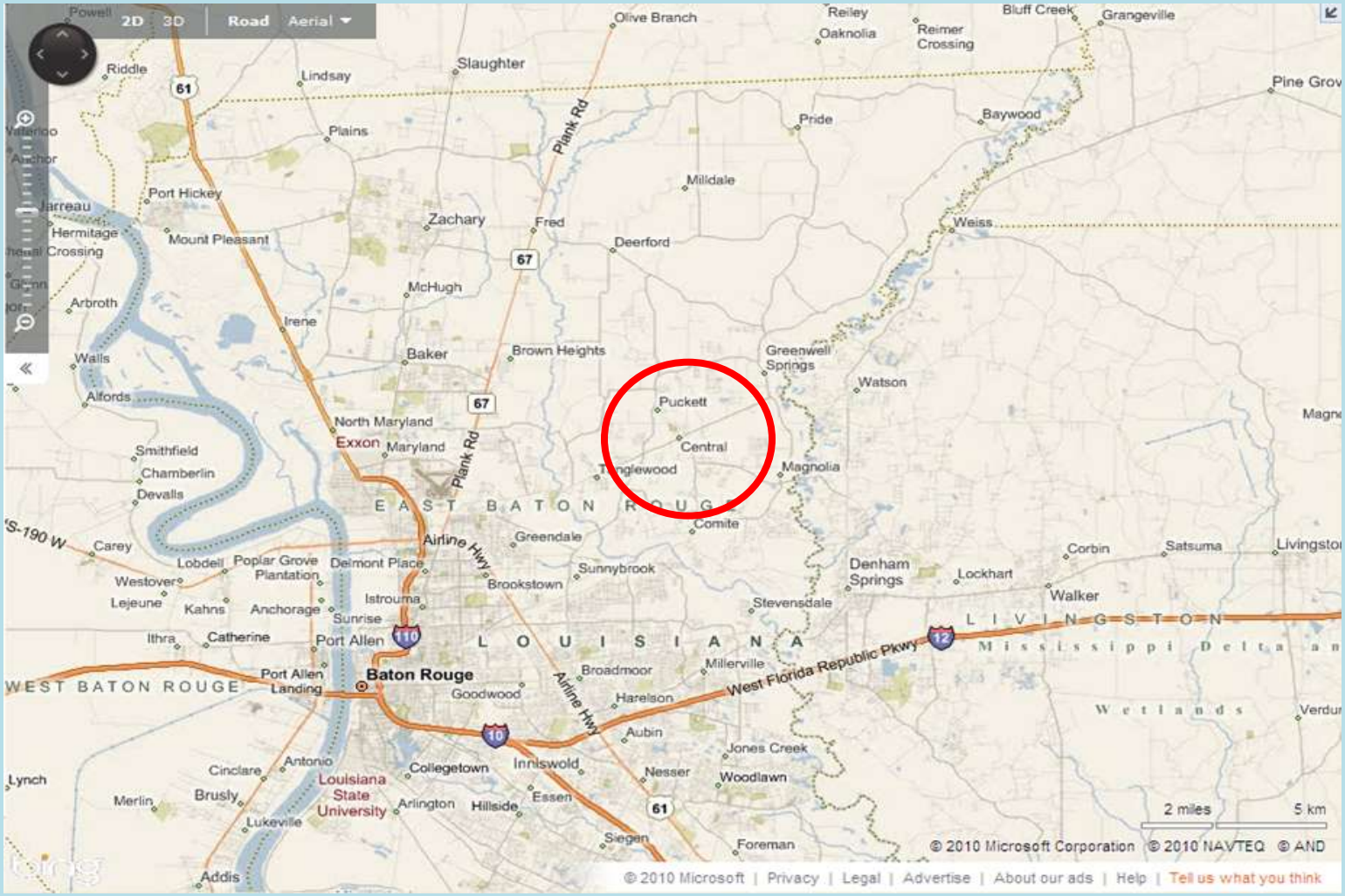
A Real Life Example:

City of Central

City of Central, Louisiana



CENTRAL

A COMMUNITY THAT CARES

CENTRAL, LOUISIANA

- 28,000 people
- 66 sq. miles
- 12th largest city in the state
- 2005 incorporated
- 2008 took over services from East Baton Rouge Parish
- **#5 School District** in the entire state of Louisiana*

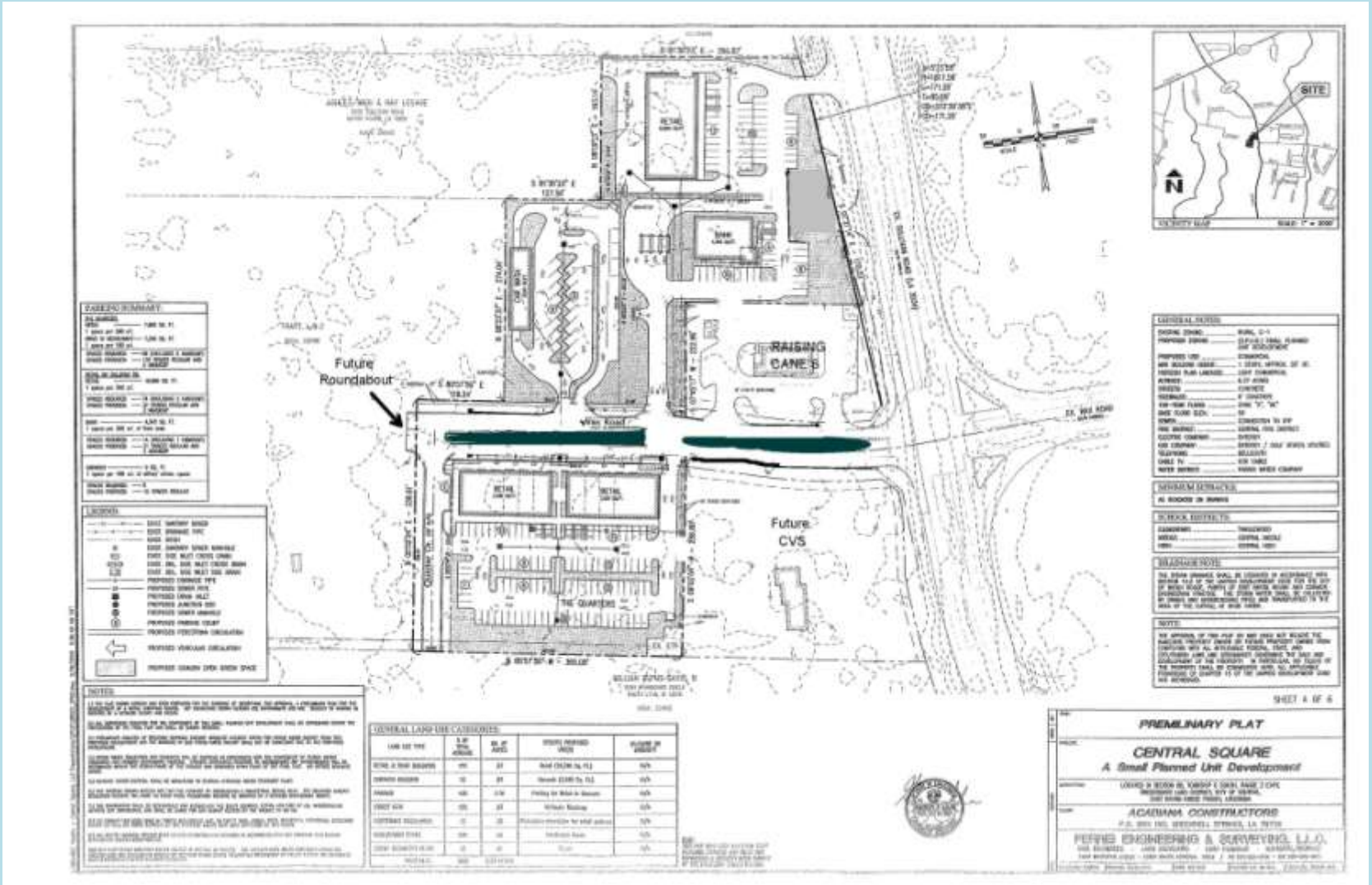
*http://www.centraleconomicdevelopment.org/louisiana-schools.php

American Institute of Architects (AIA) for a Sustainable Design

- Nationwide Evaluation
- Strategic Design Assessment Team (SDAT)
- 5 cities chosen nationwide
- FREE
- Experts in Traffic, Planning, Transportation and Architects

Central Crossing Aerial View

Picture of New Development That Will Tie Into Wax Road



Next ENG 101!

- August 23, 2010
- 2:00 – 3:30 PM Central

David Barrow, **EA to the Mayor of Central,** will discuss the City of Central's Access Management practices in more detail and will be available to answer questions.