

Access Management in the Vicinity of Intersections



Photo: Ralph Bentley (used with permission)

Access Management is:

- The design, implementation and management of entry and exit points between roadways and adjacent properties.
- This presentation overviews the safety considerations of access management near intersections.



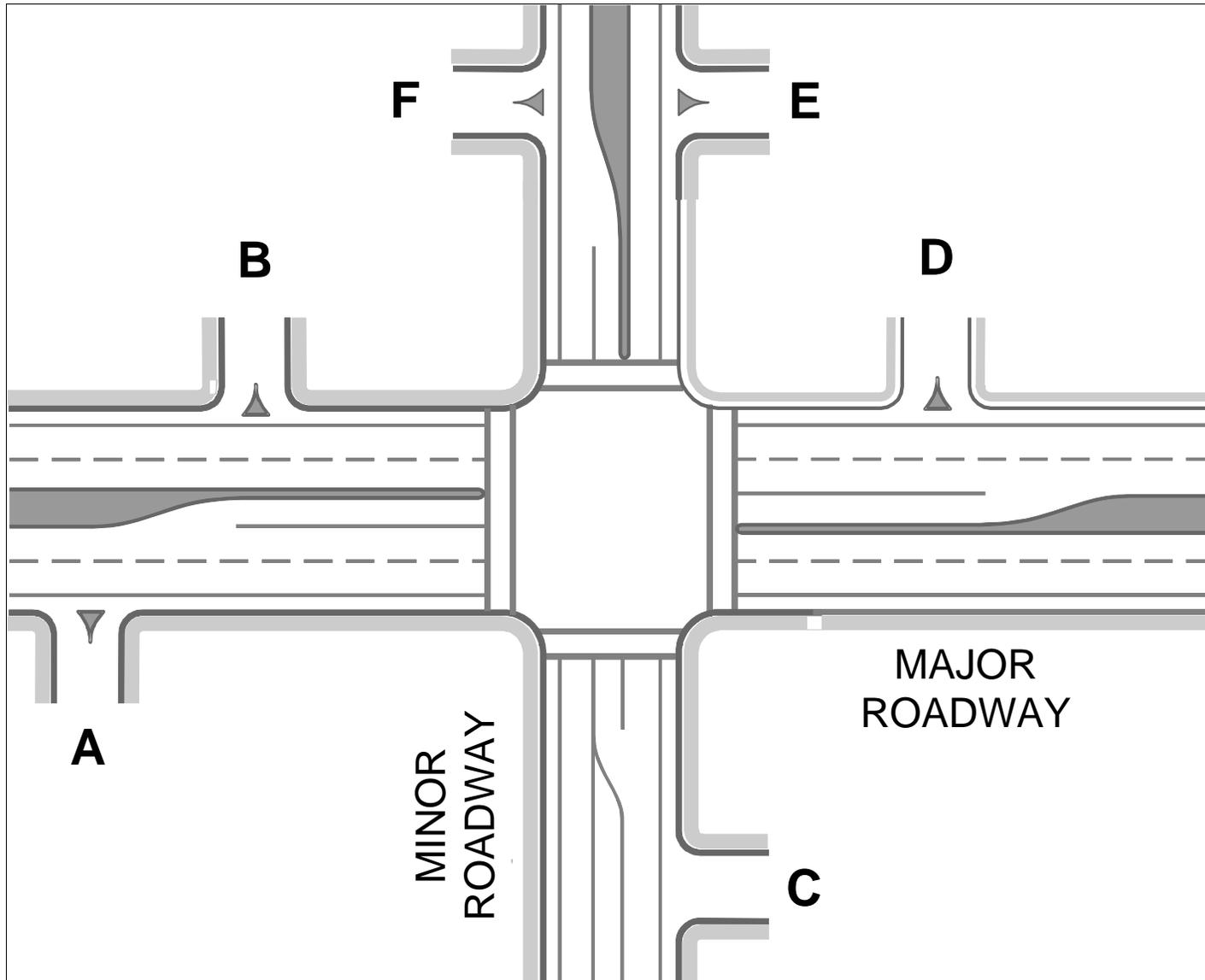
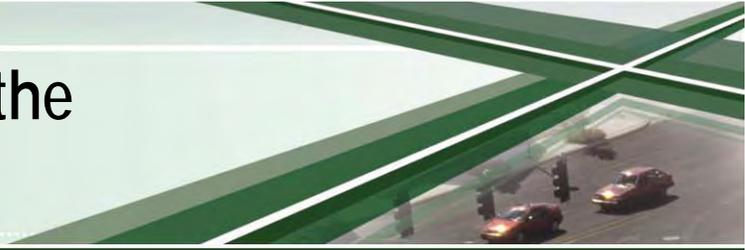
Photo: Kittelson & Associates, Inc.

Presentation Overview

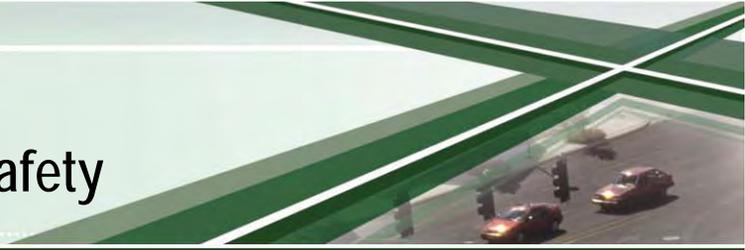


- General Access Management Considerations
- Special Considerations for
 - Suburban Areas
 - Urban Areas
 - Rural Areas

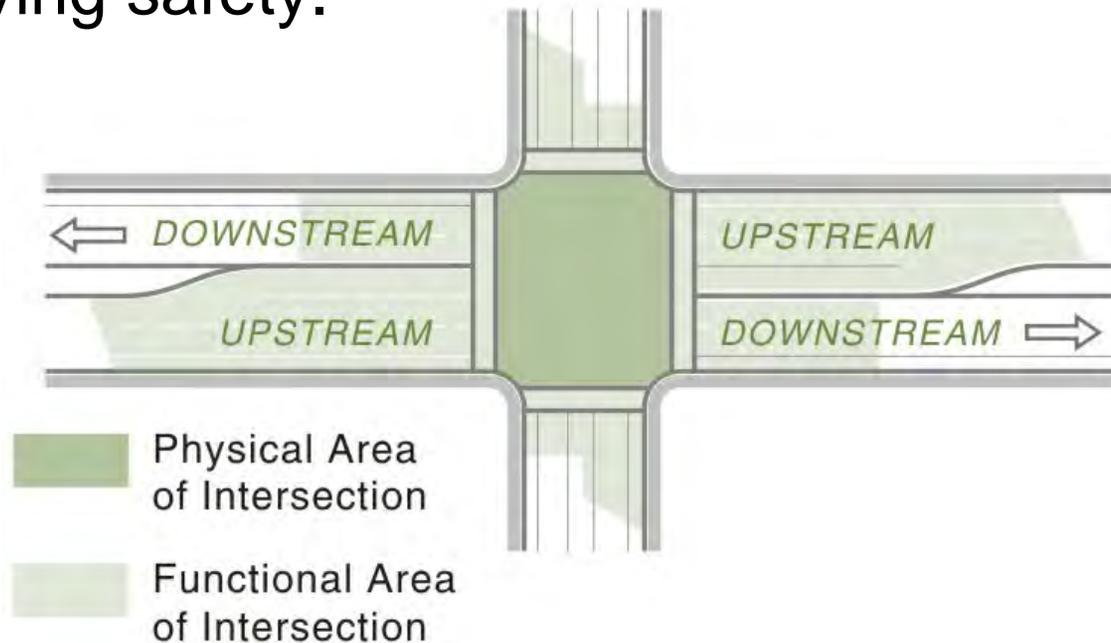
Consideration 1: Locate Driveways on the Appropriate Roadways



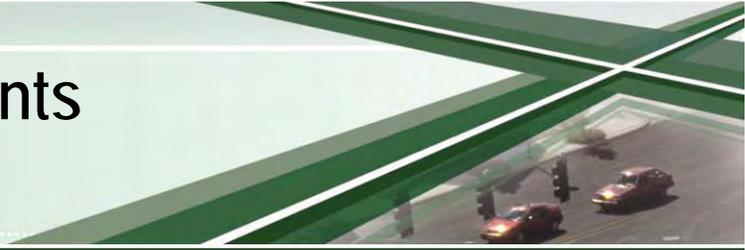
Consideration 2: Limiting Driveways in the Functional Area of an Intersection Improves Safety



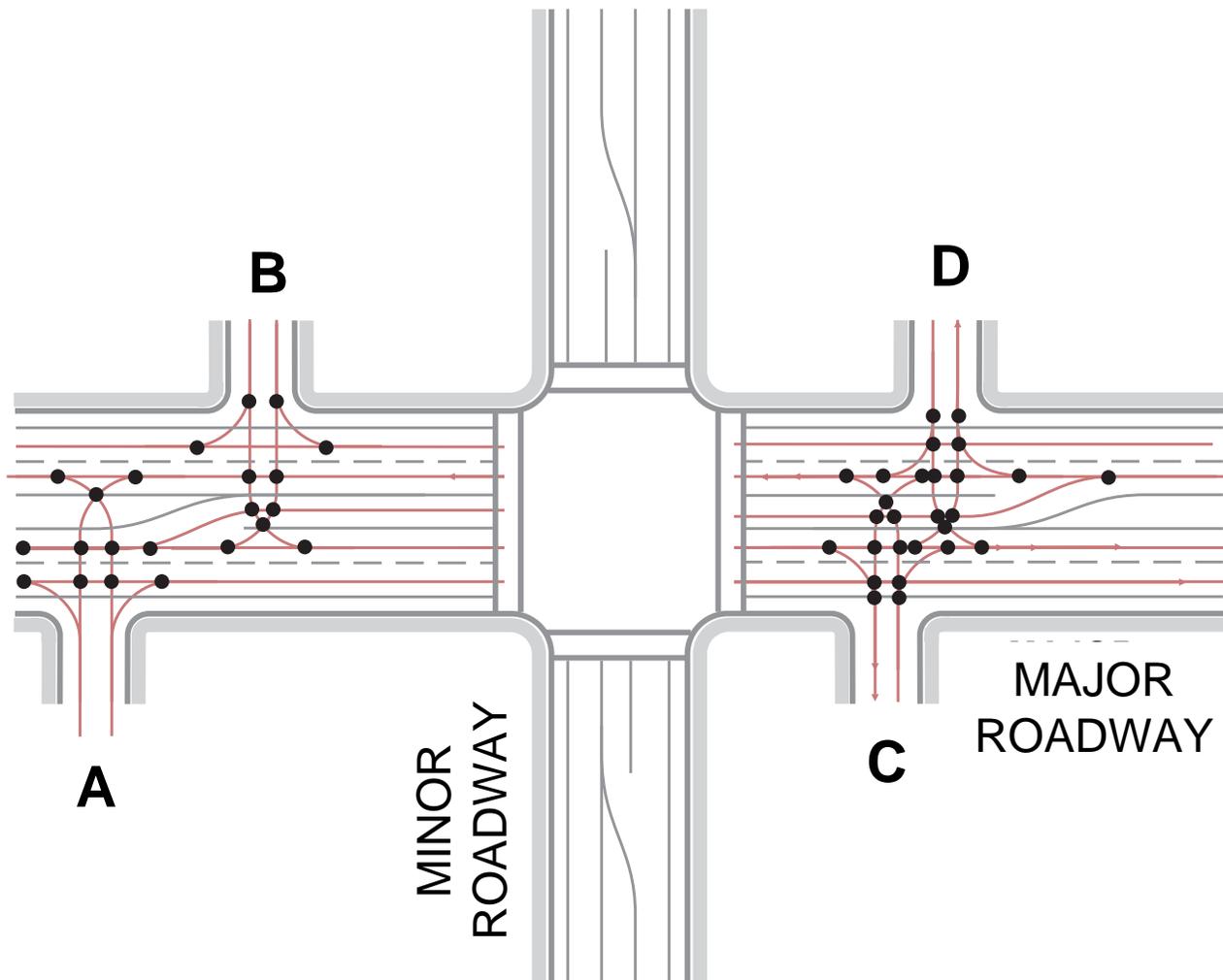
- The functional area is the affected area upstream and downstream of intersection.
- Limiting driveways helps reduce the number of decisions motorists must make near an intersection, improving safety.



Consideration 3: Reducing Conflict Points May Reduce Crashes

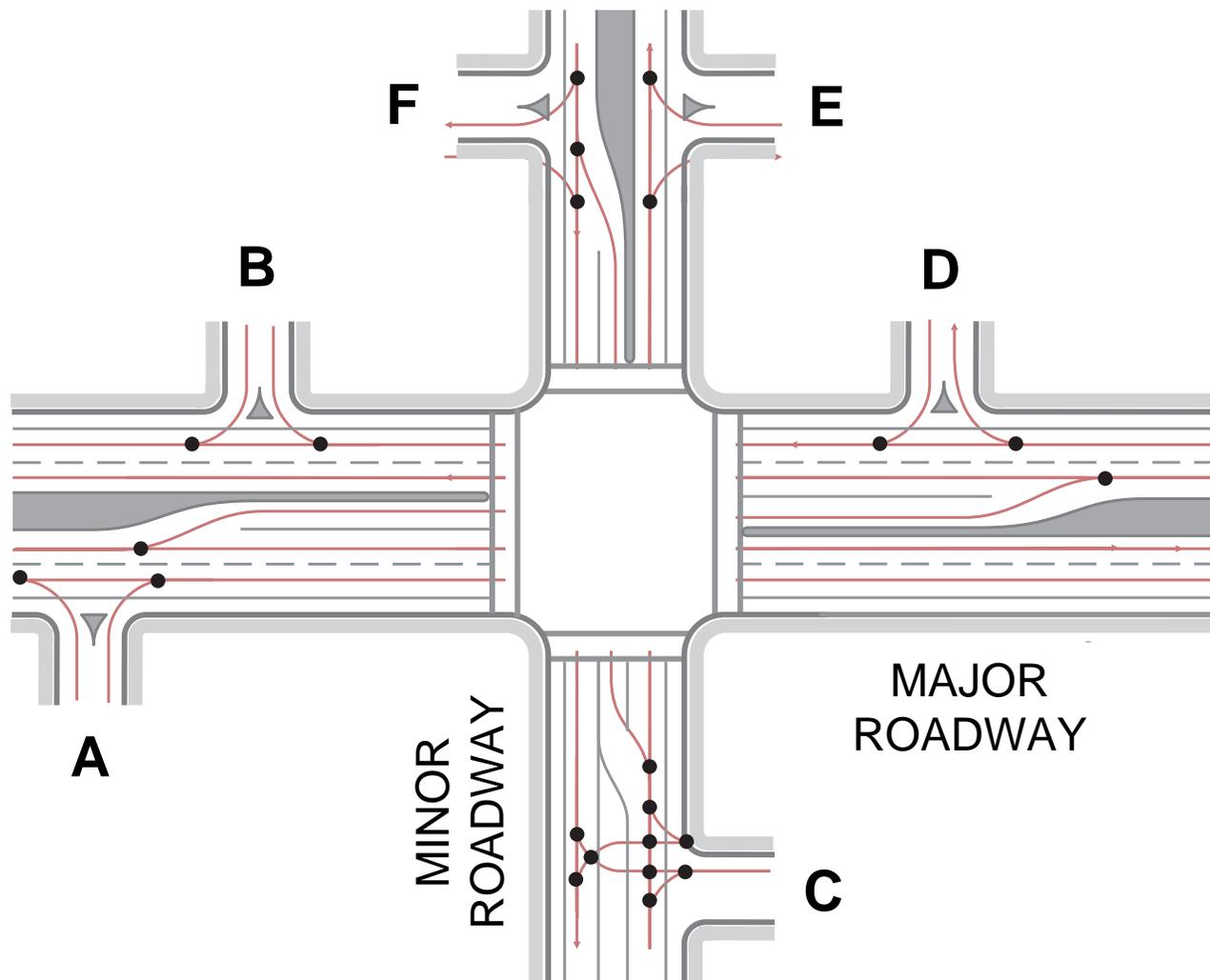


Full-Movement Driveways Without Median



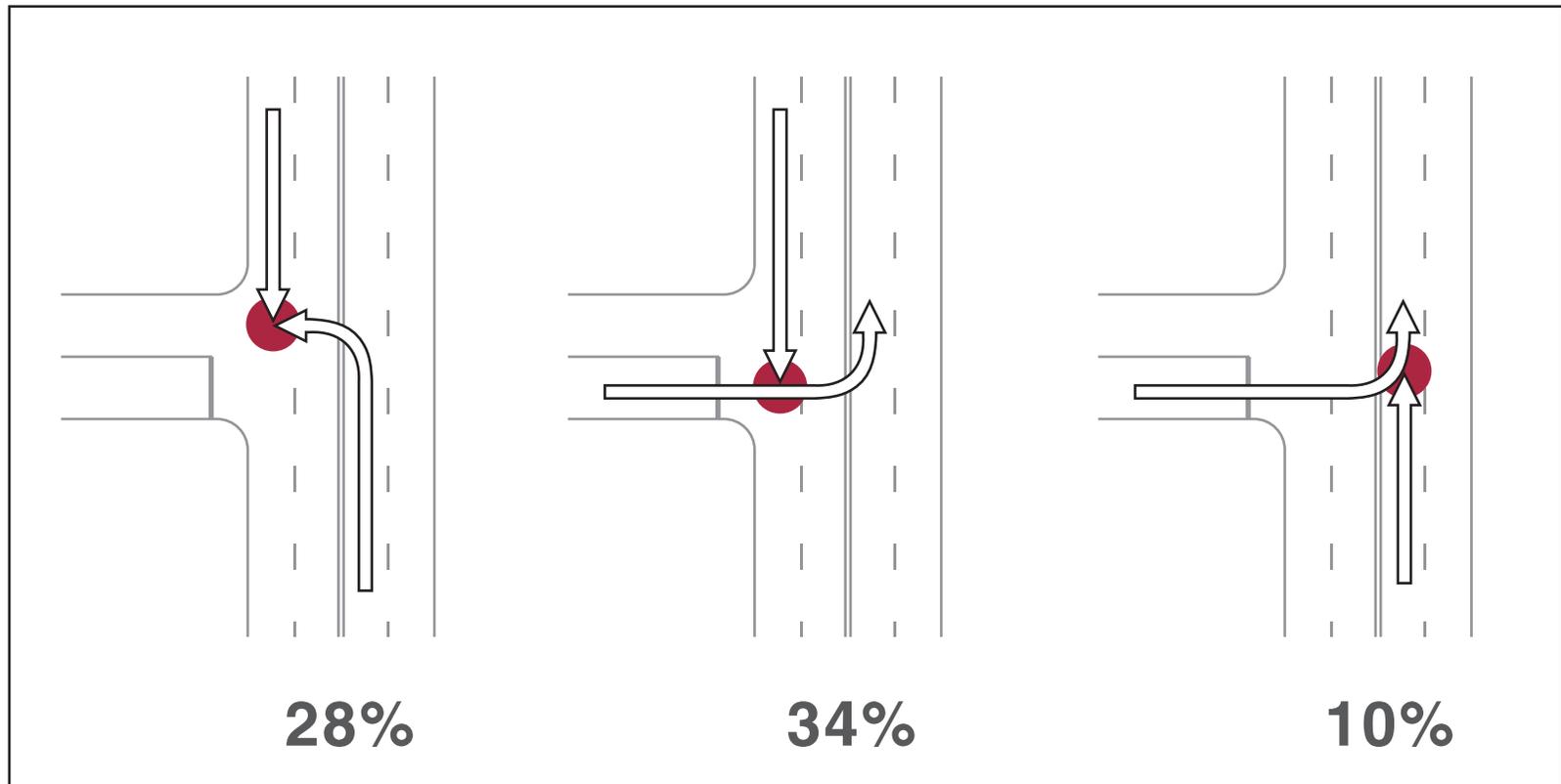
Consideration 3: Reducing Conflict Points May Reduce Crashes

Limited Access Driveways with Raised Median



Consideration 4: Eliminating Left-Turn Movements Improves Safety

- 72% of crashes at a driveway involve a left-turning vehicle



Consideration 5: Medians Can Reduce Crashes

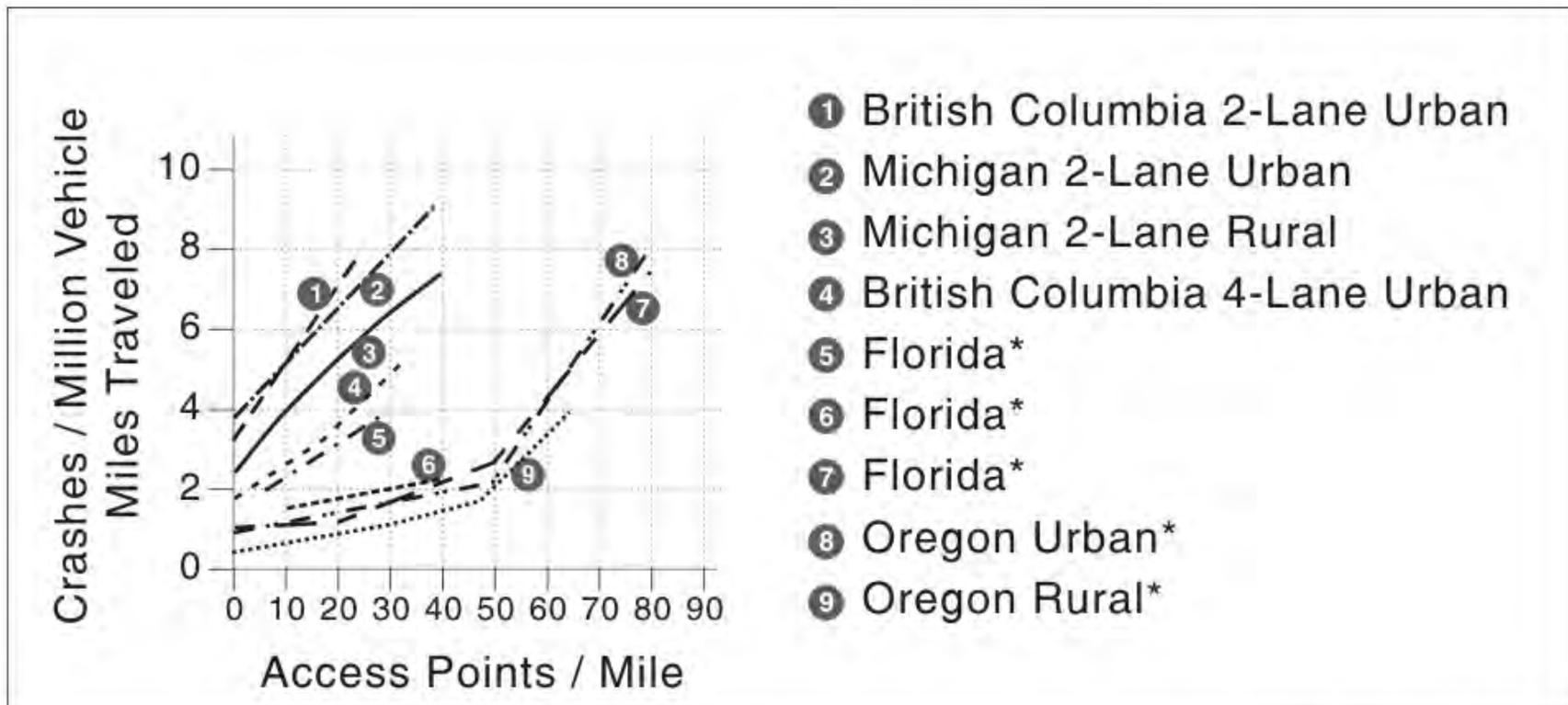
- Implementing two-way left-turn lanes can result in an overall crash reduction of approximately 33%
- Non-traversable medians can reduce crashes by approximately 35%



Photo: Kittelson & Associates, Inc.

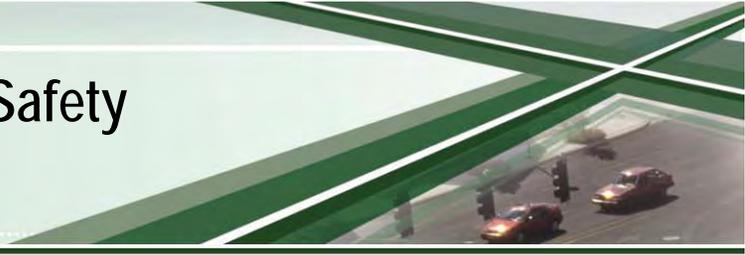
Consideration 6: Reducing Driveway Density Reduces Crash Rates

- Research shows as driveway density increases, crash rates also increase



* Road type not specified

Consideration 7: Driveway Design Influences Safety and Mobility

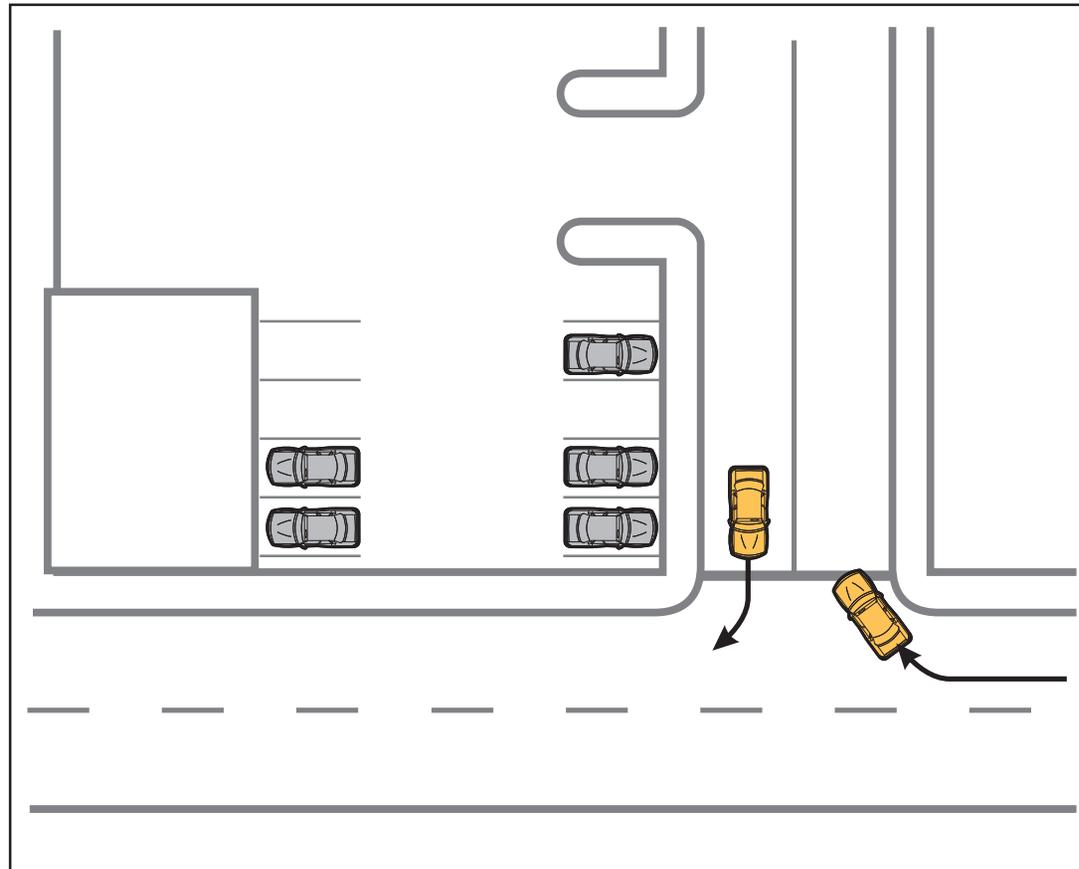


Elements to Consider

- Upstream and downstream sight distance
- Angle at which driveway intersects the major road
- Driveway width and curb radii
- Number of lanes should be sufficient for the volume at the site
- Vertical grade should be level to allow motorists to easily stop with adequate sight distance prior to entering major roadway

Consideration 7: Driveway Design Influences Safety and Mobility (Continued)

- Length of driveway throat should allow motorists to completely pull off the road without interference

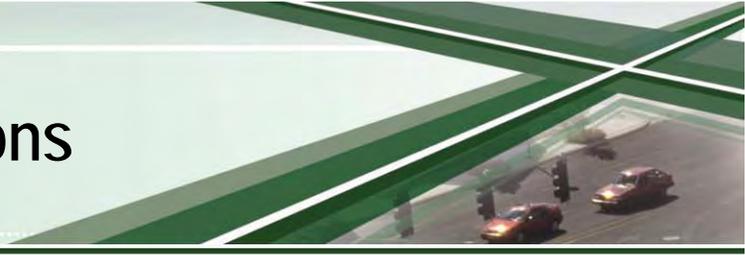


Presentation Overview



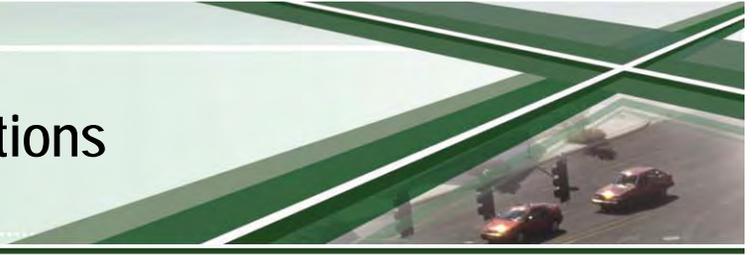
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Characteristics of Suburban Intersections



- Large-scale and residential, commercial, industrial, or retail development separated by larger distances than the urban core
- Parcels often combined
- Spacious parking lots
- Speeds generally 35 to 50 mph
- Medium to high traffic volumes

Physical Characteristics of Suburban Intersections



- Medium to long block lengths
- Moderate to large site setbacks for structures
- Non-traversable medians or continuous two-way left-turn lanes
- Left- and right-turn lanes
- Six or fewer traffic signals per mile

Access Management Near Suburban Intersections

- Suburban areas offer the greatest opportunity to manage access and positively impact safety



Photo: Ralph Bentley (used with permission)



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Treatments to Improve Motorist Safety Near Suburban Intersections

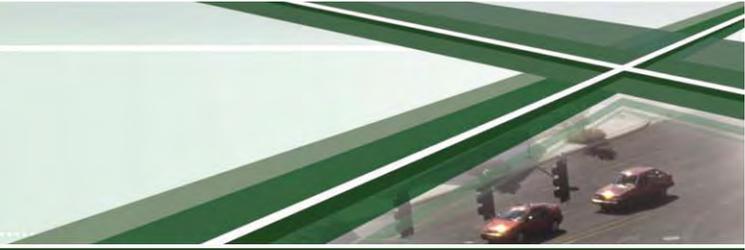
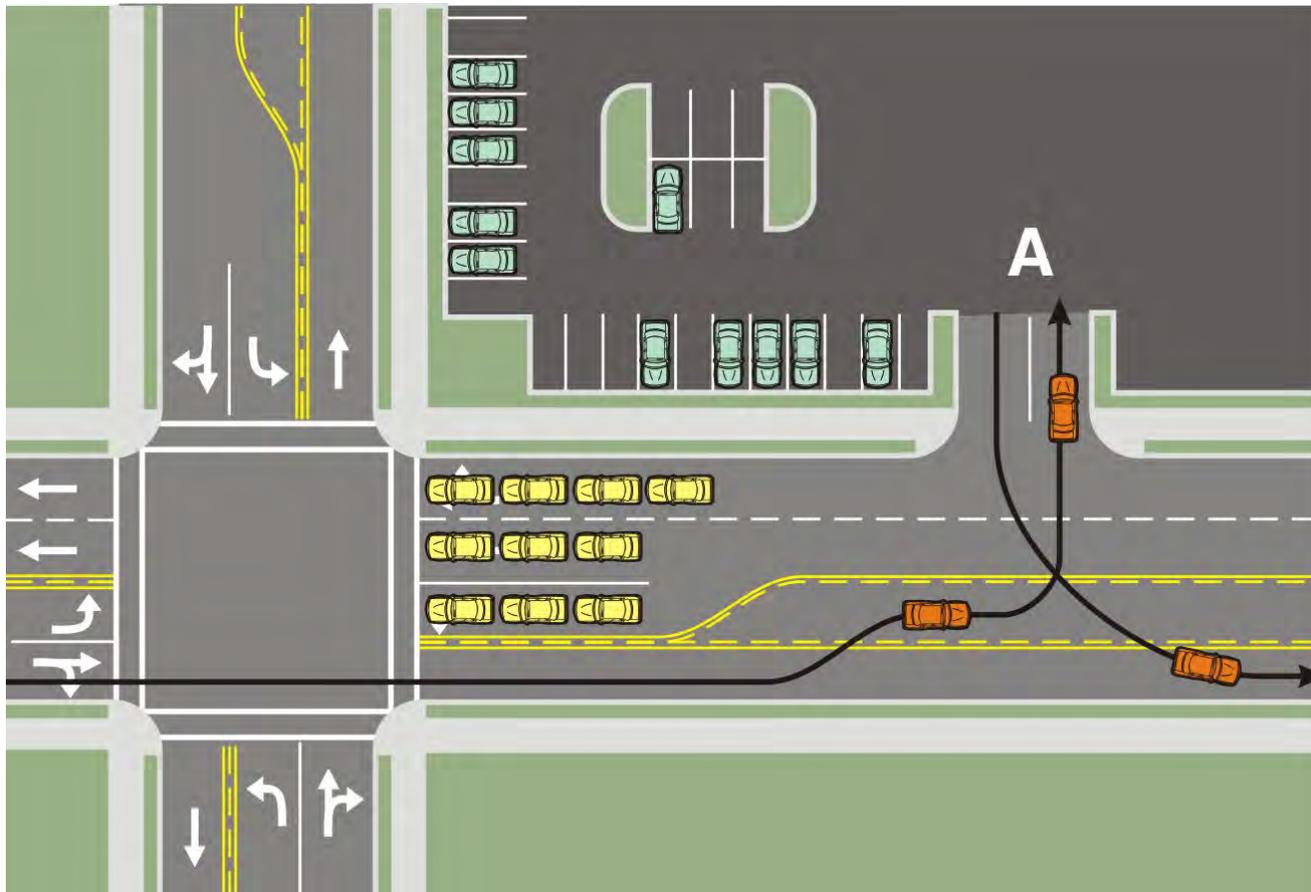


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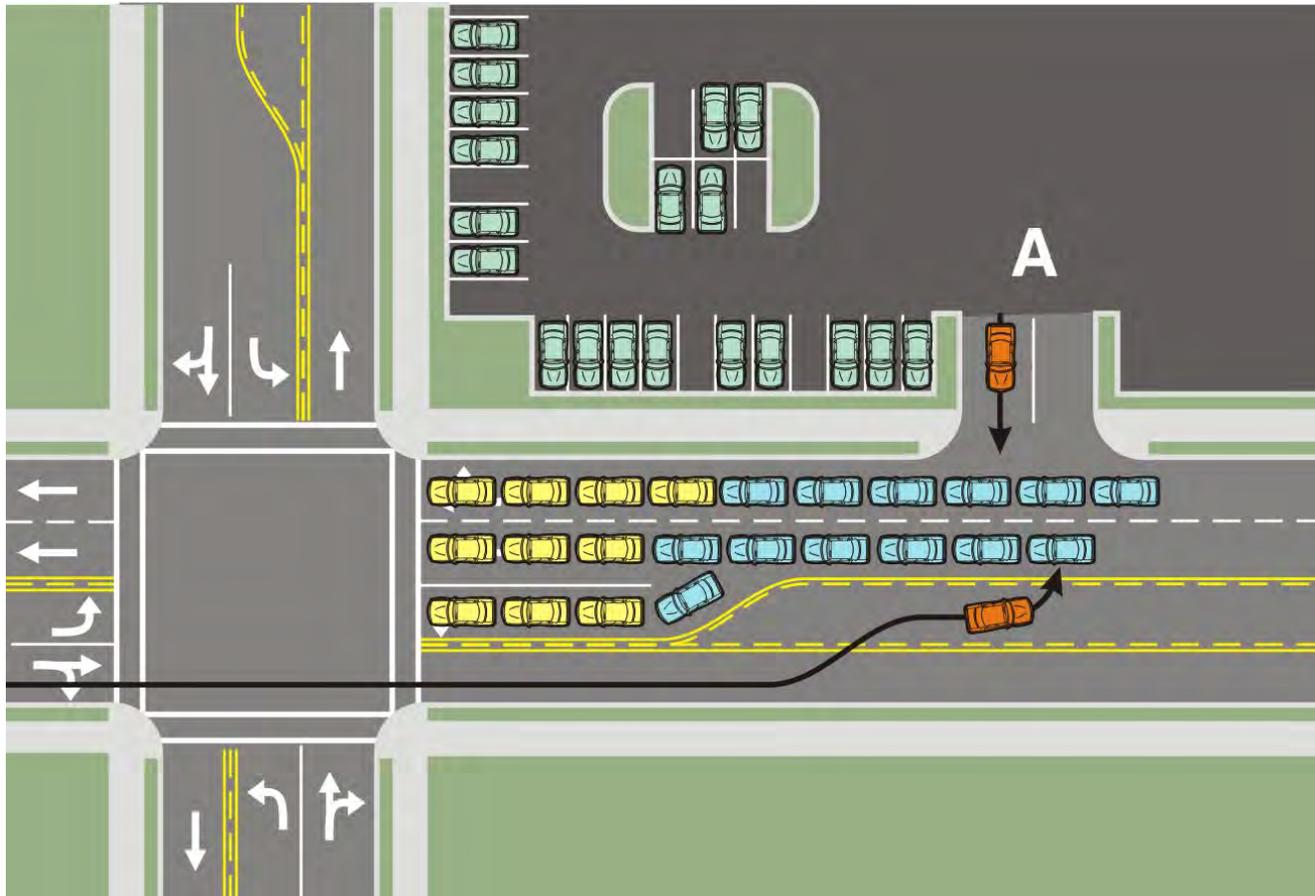
Suburban Intersections Treatment 1: Locate Driveways Upstream of Queues

- Locate driveways upstream of the vehicle queue caused when the downstream traffic signal is red



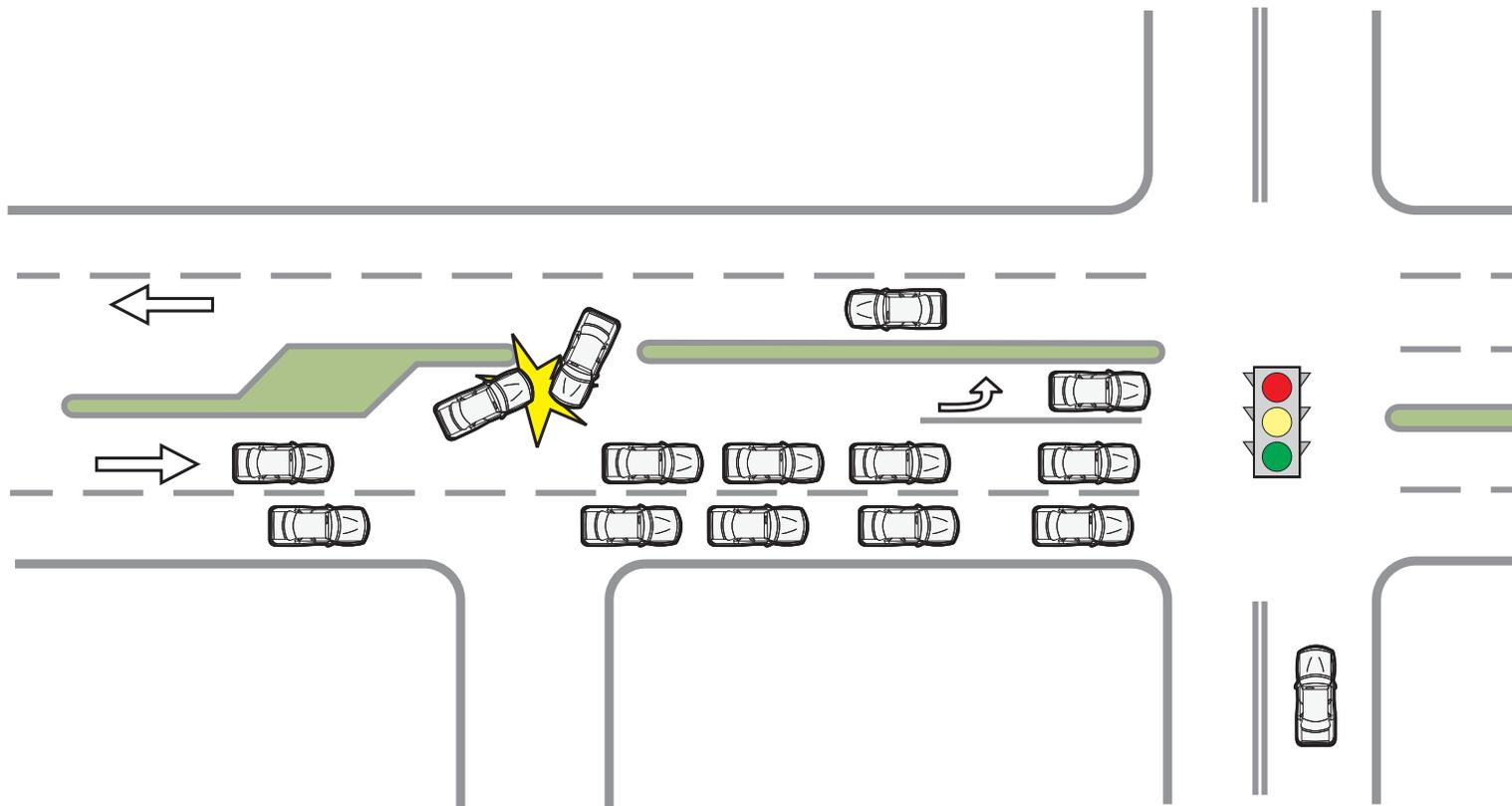
Suburban Intersections Treatment 1: Locate Driveways Upstream of Queues (Continued)

- Plan and locate driveways for future estimated traffic volumes so queues will not block driveway

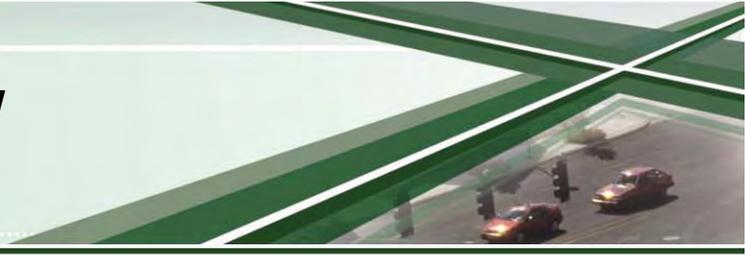


Suburban Intersections Treatment 2: Prohibit Median Openings

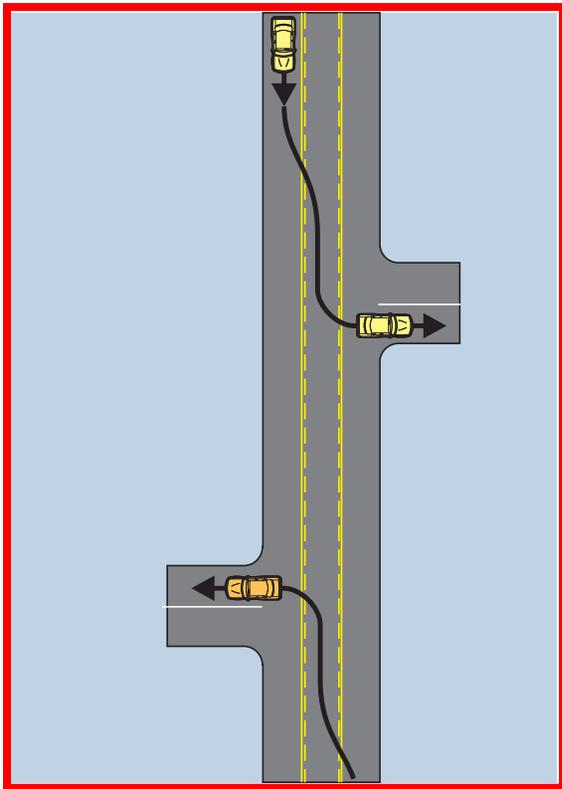
- Restricts driveway movements to and from the left-turn lane at a major intersection, reducing risk of conflict



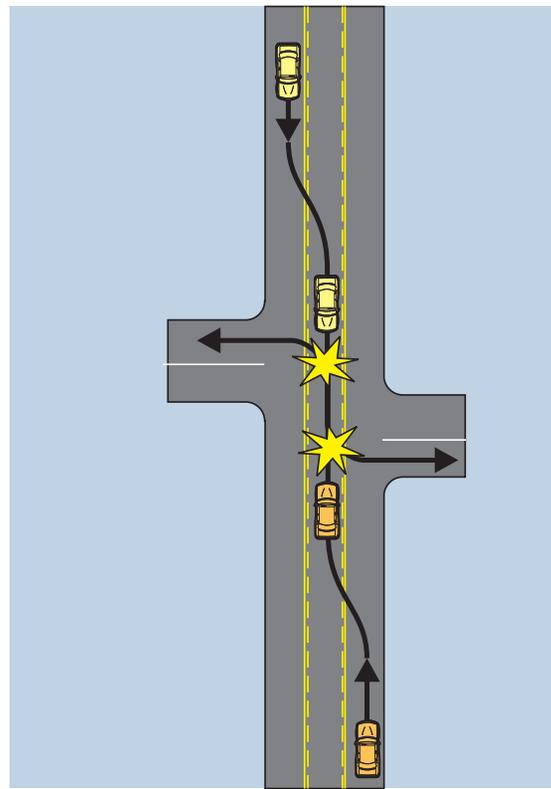
Suburban Intersections Treatment 3: Driveway Alignment



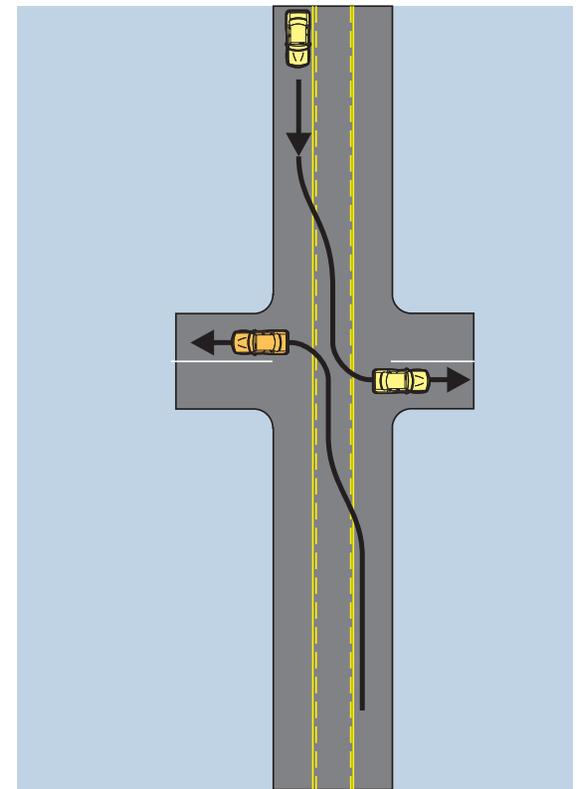
- Align driveways with positive offset to reduce likelihood of a crash



Positive Offset Preferred



Negative Offset



Direct Alignment

Treatments to Improve Bicyclist and Pedestrian Safety Near Suburban Intersections



Photo: Kittelson & Associates, Inc.

Suburban Intersections – Pedestrian and Bicyclist Safety Treatment 1: Construct a Channelized Island at Right-In Right-Out Driveways

- Provide pedestrian refuge across driveway



Photo: Kittelson & Associates, Inc.

Suburban Intersections – Pedestrian and Bicyclist Safety Treatment 2: Include Bike Lanes and Signage

- Alerts bicyclists that motorists may be using driveway
- Alerts motorists that bicyclists may be crossing driveway



Other Treatments to Improve Bicyclist and Pedestrian Safety Near Suburban Intersections

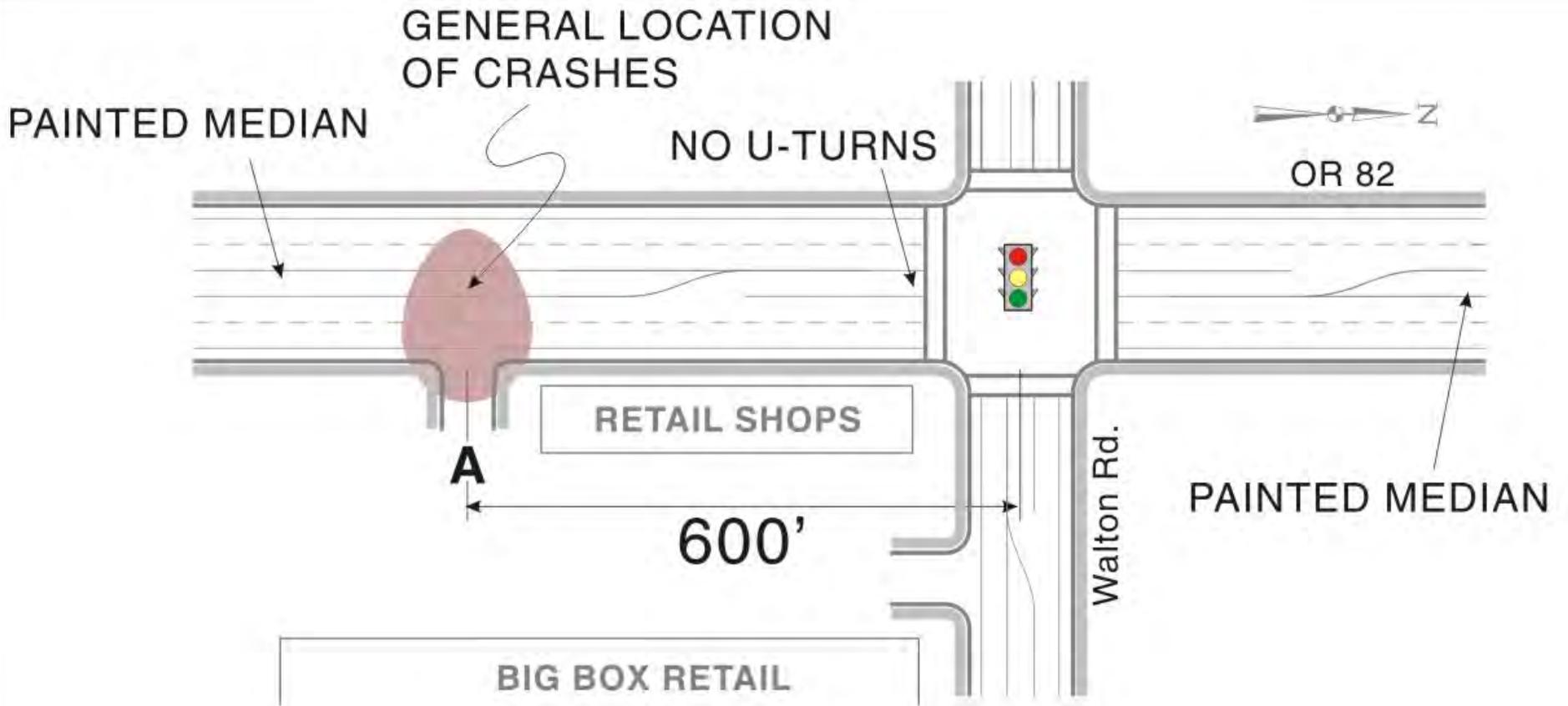
- Provide raised medians to prohibit left turns
 - Reduces number of potential pedestrian-vehicle conflicts



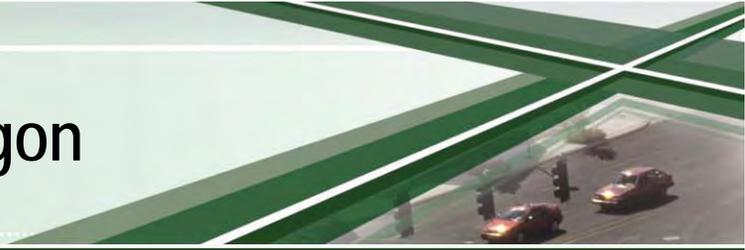
Photo: Ralph Bentley (used with permission)

- Minimize the driveway width as much as possible
 - Reduces pedestrian crossing distance and exposure
- Do not block pedestrian-driver sight lines
 - Make pedestrians and drivers visible to each other

Suburban Case Study: La Grande, Oregon



Suburban Case Study: La Grande, Oregon



Reported Crashes on OR 82 at Study Driveway (November 1994 to August 1997)

Total Crashes	Crash Severity			Left-turn
	Fatality	Injury	PDO	
12	0	6	6	12

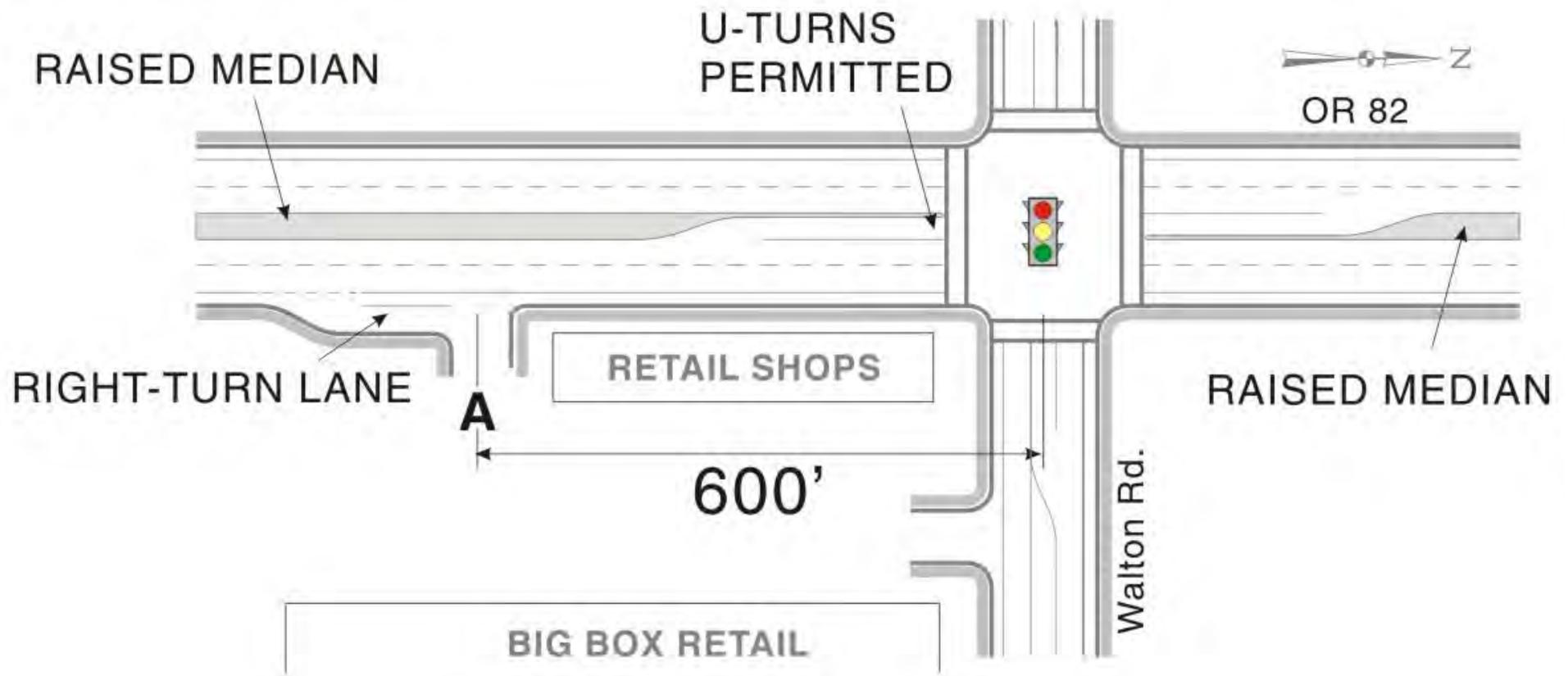
PDO = Property Damage Only

AADT (veh/day)

OR 82 = 17,200

Driveway A = 500

Suburban Case Study: La Grande, Oregon

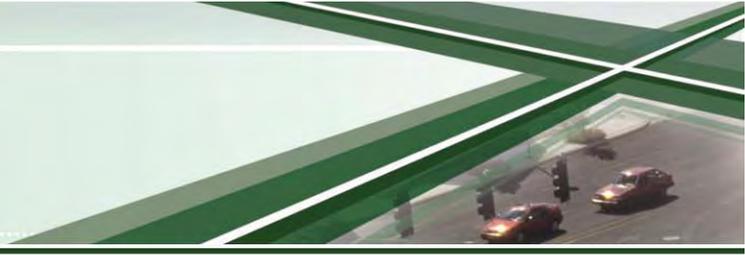


Presentation Overview



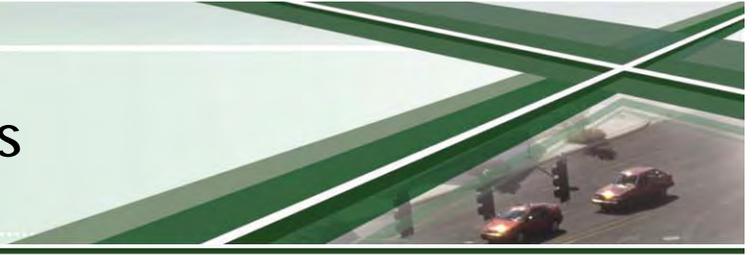
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Characteristics of Urban Intersections



- Dense, multi-modal, fully built-out transportation systems
- High density office, commercial, and retail developments
- Parking along roadways, in parking structures, and in some cases via surface parking lots
- Medium to high traffic volumes
- Coordinated, fixed signal timing
- Speeds generally equal to or below 30 mph

Physical Characteristics of Urban Intersections



- Short block lengths
- Two-way streets with some left-turn lanes
- Six or more traffic signals per mile
- Minimal site setbacks

Access Management Near Urban Intersections

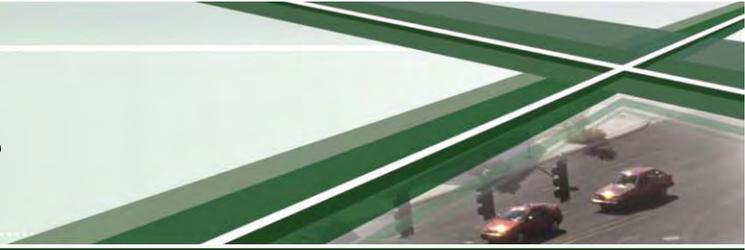


Photo: Kittelson & Associates, Inc.



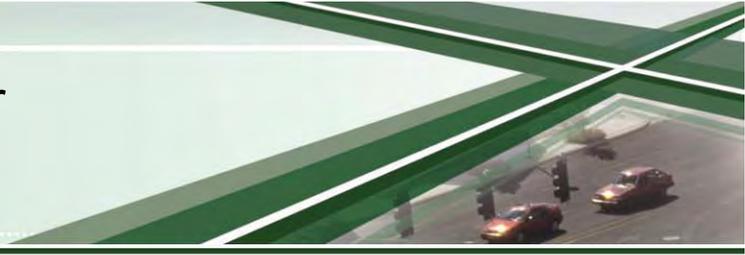
Photo: Kittelson & Associates, Inc.

Treatments to Improve Motorist Safety Near Urban Intersections

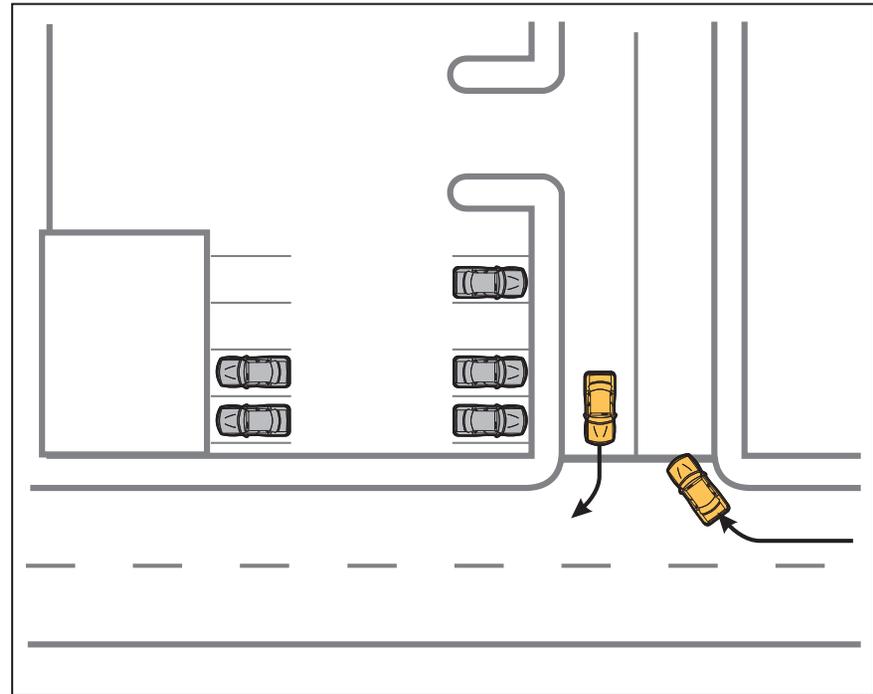
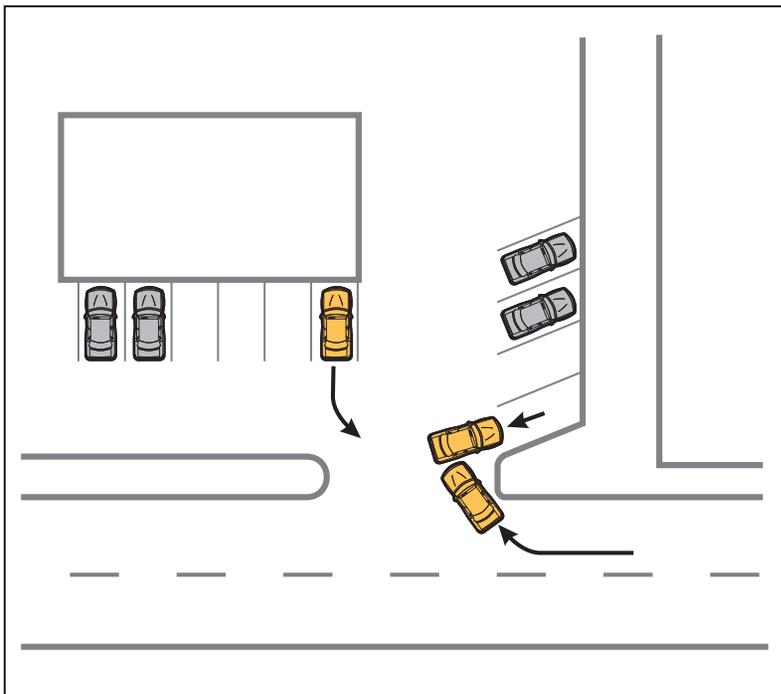


Photo: Ralph Bentley (used with permission)

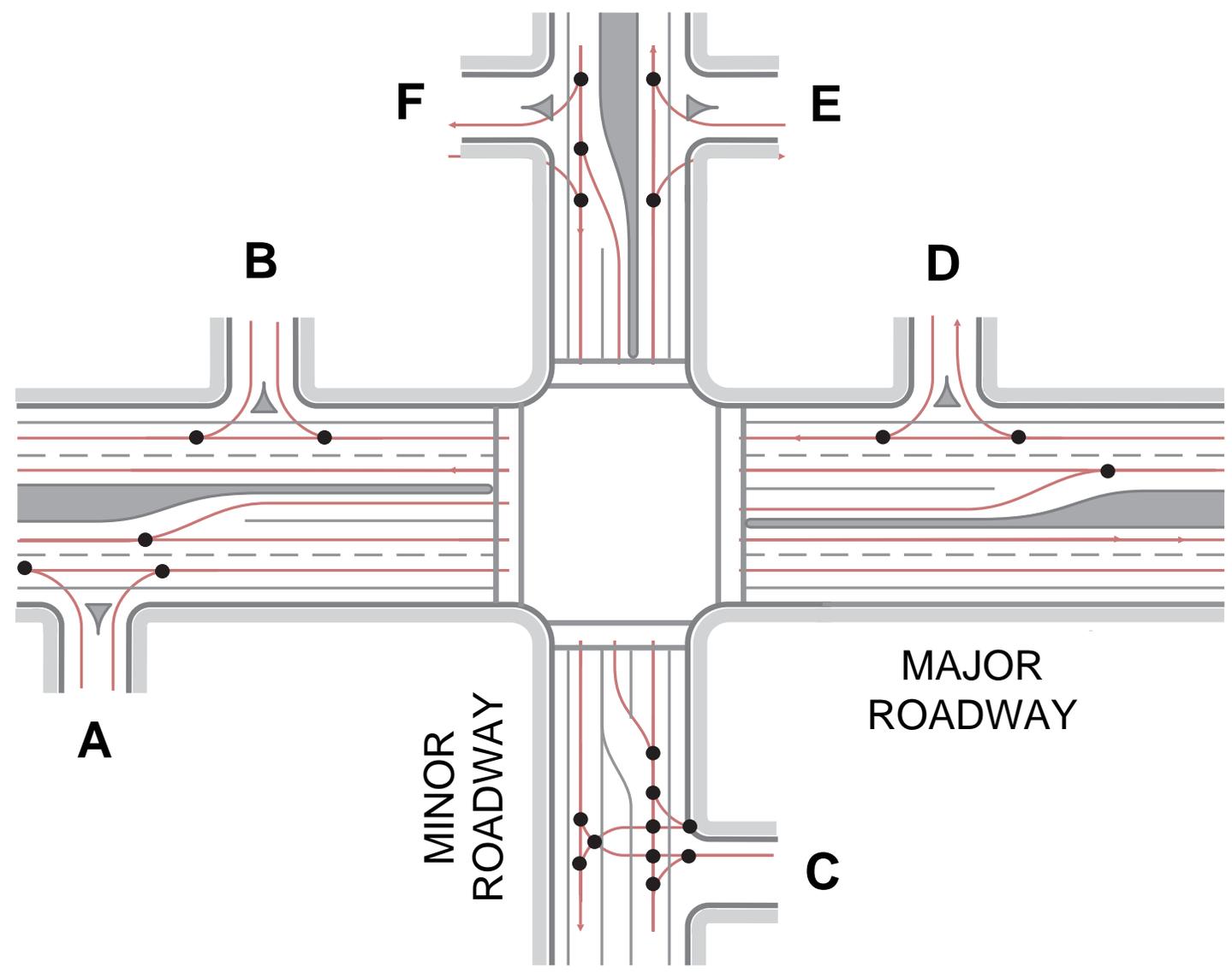
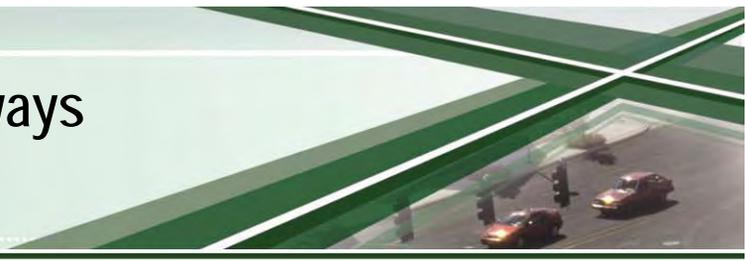
Urban Intersections Treatment 1: Parking Near Driveways



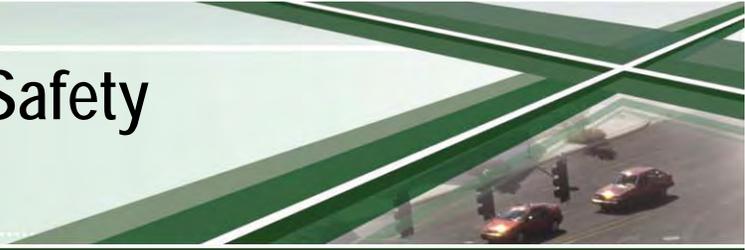
- Avoid locating parking near driveways so motorists drive completely onto the property without having to stop for other motorists



Urban Intersections Treatment 2: Place Driveways on Lower Volume Roadways



Other Treatments to Improve Motorist Safety Near Urban Intersections

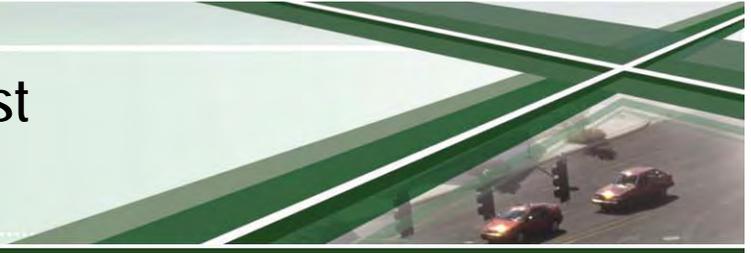


- Develop a right-turn lane for inbound vehicles
 - Removes turning vehicle from traffic flow
- Replace gated parking entries with other ticket options
 - Reduces likelihood of queues on main roadway
- Locate bus bays on far side of driveway
 - Maximizes sight distance for existing motorists
- Sign and stripe for right-out only
 - Eliminates left-turning conflicts

Other Treatments to Improve Motorist Safety Near Urban Intersections (Continued)

- Place driveways on one-way streets
 - Creates fewer conflict points
- Place left-in driveways near center of block
 - Minimizes interaction with intersection queues
- Position driveways as far upstream from intersections as possible
 - Provides exiting motorists distance to make lane changes

Treatments to Improve Pedestrian and Bicyclist Safety Near Urban Intersections



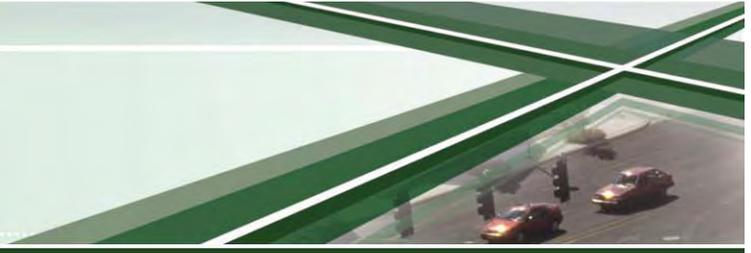
- Use colored pavement across driveways with crosswalk markings and active treatments (e.g. bells, lights) for exiting vehicles with limited sight distance
 - Increases pedestrian awareness of exiting vehicle
- Restrict inbound vehicle speeds by driveway design
 - Design appropriate radii to reduce speeds
- Design driveway with a radius that balances vehicle and pedestrian safety
 - Smaller radii reduce vehicle speeds, improving pedestrian safety

Presentation Overview



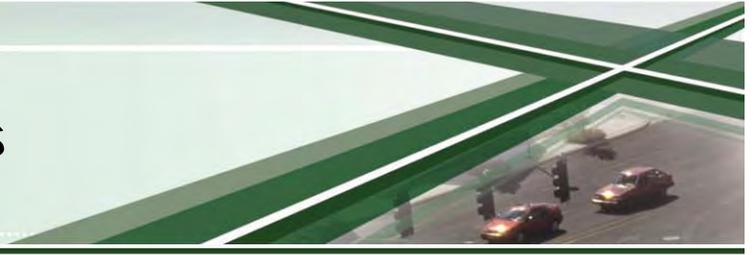
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Characteristics of Rural Intersections



- Low-density commercial development, industrial land and farm land, or large expanses of private or publicly owned undeveloped property
- Large property frontages along rural roadways allow jurisdictions to adequately space driveways, though environmental constraints may impact driveway locations
- Speeds generally 50 mph and higher
- Pedestrian and bicycle volumes lower than urban and suburban roadways

Physical Characteristics of Rural Intersections



- Divided or undivided two-lane and multilane highways
- Paved and unpaved shoulders
- Infrequent full-access, unsignalized intersections, and on occasion, signalized intersections

Access Management Near Rural Intersections

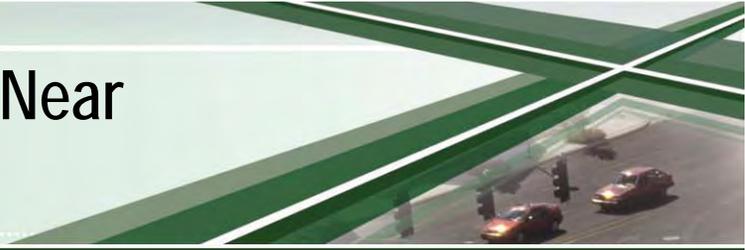


Photo: Kittelson & Associates, Inc.



Photo: Kittelson & Associates, Inc.

Treatments to Improve Motorist Safety Near Rural Intersections



- Encourage early stakeholder participation in planning processes
 - Helps assure that access requests do not become problematic
- Provide adequate throat depth and on-site circulation
 - Minimizes speed differentials between through and turning vehicles
- Pave the shoulders near driveways
 - Minimizes speed differentials between through and turning vehicles
- Employ frontage roads near high-traffic generators
 - Eliminates access points on major roadway

Treatments to Improve Pedestrian and Bicyclist Safety Near Rural Intersections

- Provide facilities for non-auto travelers such as roadway shoulders
 - Paved and well-maintained facilities provide a place for pedestrian and bicyclists away from vehicles



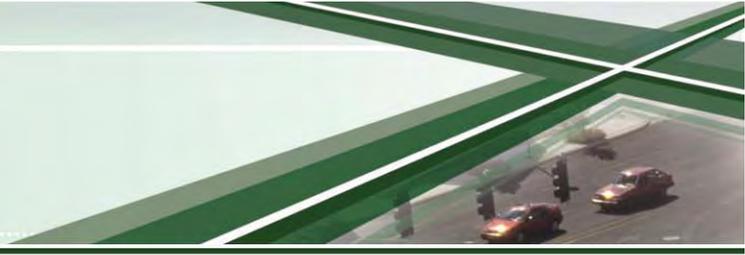
Photo: Kittelson & Associates, Inc.

Conclusion



- The implementation of effective access management strategies near intersections improves safety for motorists, bicyclists, and pedestrians
- General access management factors should be considered near intersections in any setting
- Access management strategies that are specific to the suburban, urban, or rural setting of a given intersection should also be considered

References



- Roundabouts: An Informational Guide, Report FHWA-RD-00-067. FHWA, U.S. Department of Transportation, June 2000.
- A Policy on Geometric Design of Highways and Streets, AASHTO 2004.
- Access Management Manual. Transportation Research Board. Washington, D.C. 2003.
- J. Bonneson, K. Zimmerman, and K. Fitzpatrick, Roadway Safety Design Synthesis, Texas Transportation Institute, November 2005.
- Shultz, G., Allen, G., and Eggett, D. Crashes in the Vicinity of Major Crossroads, Brigham Young University, Department of Civil and Environmental Engineering for the Utah Department of Transportation, December 2008.

References (Continued)

An aerial photograph of a road intersection with several cars. A large green graphic, consisting of a wide arrow pointing right and a crosshair, is overlaid on the top right portion of the image.

- Analysis of Crossing Path Crashes. U.S. Department of Transportation. July 2001.
- Report 420, Impacts of Access Management Techniques, Transportation Research Board. Washington, D.C. 1999.
- Florida Driveway Information Guide Florida Department of Transportation. September 2008.
- J. Bonneson, K. Zimmerman, and K. Fitzpatrick, Roadway Safety Design Synthesis, Texas Department of Transportation, 2005.

Thank You

[Speaker Contact Information]

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