QUESTION 14:

What access management measures might be implemented during a four- to three-lane conversion project?

The function of a roadway corridor in terms of operations and safety is directly affected by the number and character of its driveways and intersections. Four-lane undivided to three-lane (four- to three-lane) and other cross section conversion projects occur along roadways with a varying number of driveway access points and intersections. A cross section conversion project, of any kind, is a good time to consider access management measures that might improve corridor operations and safety.

For example, several specific aspects of access management are addressed in the Federal Highway Administration (FHWA) *Road Diet Informational Guide* (Knapp et al. 2014) and should be considered during the evaluation of a four- to three-lane conversion. These access characteristics include the following:

- Operations and efficiency of the intersecting driveways and roadways
- Identification of high-volume driveways with a negative offset layout
- Maintenance of access to properties
- Sight distance between vehicles and pedestrians
- Driveway use (i.e., backing out versus forward out)

Additional information about these specific items can be found in Knapp et al. (2014). The information below provides a more general overview of access management measures that an agency might also consider as part of a four- to three-lane conversion project. These measures are often applicable in combination with one another.

ACCESS MANAGEMENT MEASURES

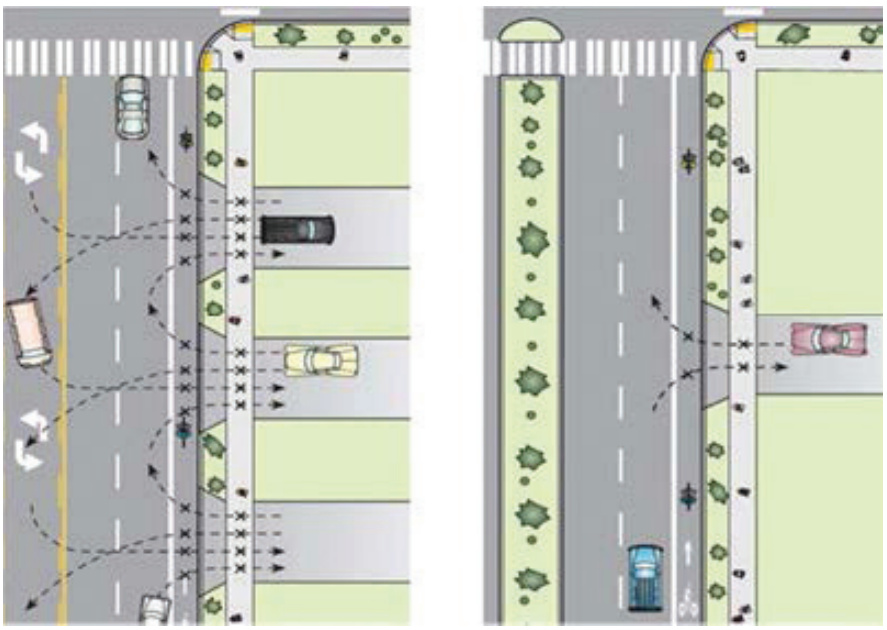
Reduce Driveway Density

One of the most straightforward access management techniques available is to reduce driveway density through closure or consolidation. Reducing the number of driveways along a corridor decreases the number of turning vehicle conflict points and the complexity of the driving environment. Various studies have shown that as the number of driveways increases, the number of crashes along a corridor also increases (Gluck et al. 1999). Eliminating or combining driveways to reduce their density along a corridor can improve safety and make traffic flow more smoothly.

Manage Driveway Spacing and Driveway Relocation

The spacing of driveways along a roadway can depend on various criteria, including the functional area of signalized or unsignalized intersections, stopping sight distance requirements, the presence of right-turn overlap (i.e., cases in which a through vehicle driver must monitor the movements of two right-turning vehicles at different driveways simultaneously), and other, agency-specified criteria.

The 2023 Iowa DOT *Access Management Manual* (Iowa DOT 2023) includes a discussion about intersection and driveway spacing. The types and categories of access are defined in Chapter 2 and summarized in Tables 6 and 7 of that document. Chapter 3 of the manual also includes an extensive discussion of access location and design. The reader is directed to the *Access Management Manual* for more detailed information and specifics that may apply to a given corridor being considered for a lane conversion project.



TRB 2014

Reducing driveway density along a corridor

The Iowa Statewide Urban Design and Specifications (SUDAS) program also provides Iowa-specific guidance about minimum access point spacings for major arterials to prevent right-turn overlap between driveways. (See Section 5L of the SUDAS *Design Manual* [SUDAS 2024] for specifics.) Overall, this guidance appears to be consistent with the stopping sight distances provided in the current edition of the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* (i.e., the Green Book) (AASHTO 2018).

In some instances, it may also be necessary to relocate one or more driveways to reduce driver confusion. For example, a driveway access point to a property within the functional area of an intersection may need to be moved farther upstream.

Add Right-Turn Lanes

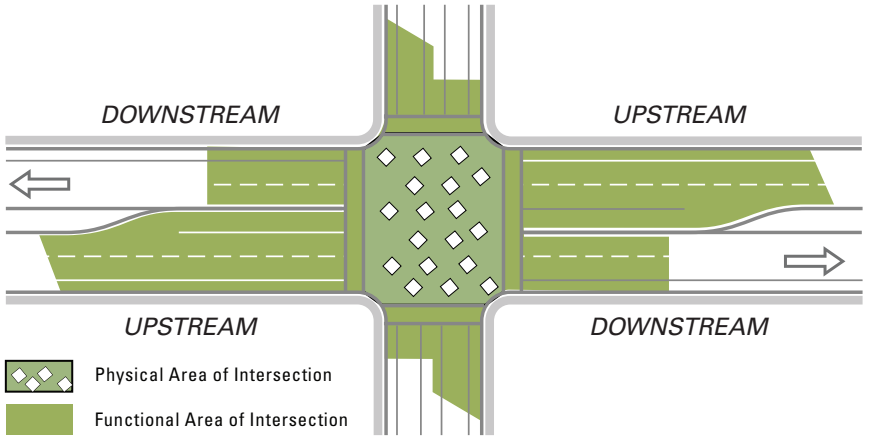
The presence of driveways, minor intersections, or access points may result in high right-turning volumes. When an analysis shows that the potential for high right-turning volumes is present, there may be a need to add a right-turn lane to assist in the flow of through traffic and reduce the potential for rear-end crashes.

Offset Left Turns

Left-turn movements from a two-way left-turn lane when two driveways with relatively high volumes are present can be a concern when the driveways are offset and opposite each other. In such an instance, left-turning vehicles may compete for the same space in the two-way left-turn lane. Identifying and understanding the impacts of such offset locations (especially those involving high-volume driveways) is important. In these scenarios, the application of a lane reduction conversion project maybe provide an opportunity to relocate the driveways directly opposite one another or in a manner that produces a positive offset.

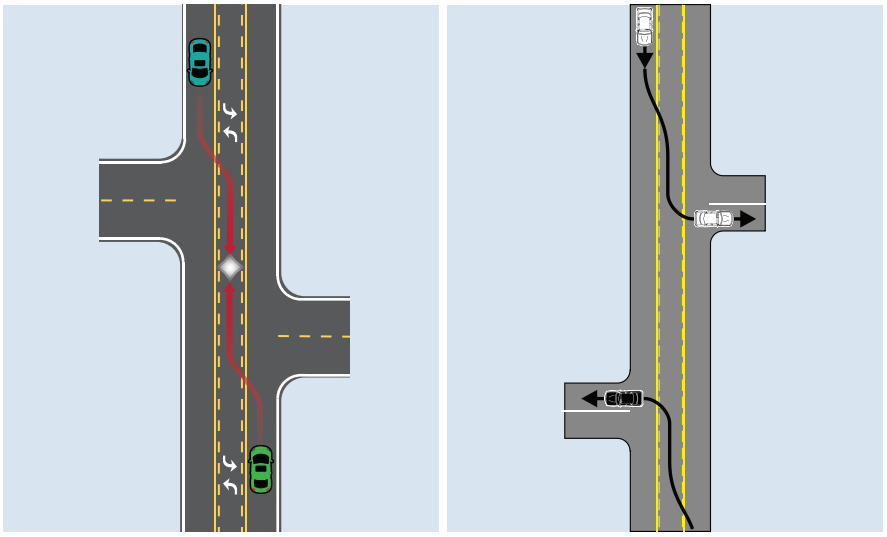
Manage Signal Spacing

The spacing and coordination of signalized intersections (combined with properly designed signal cycles that favor traffic flow along the conversion corridor) can improve traffic flow and produce more consistent travel times. Providing longer intersection spacing results in a reduction in the number of signals along a corridor and may also improve vehicle safety along that corridor. The Iowa DOT Access Management Manual indicates that uniform half-mile signal spacing is more efficient than quarter-mile spacing on a similar street with a posted speed limit of 35 mph (Iowa DOT 2023).



FHWA 2020

Intersection functional area



Knapp et al. 2014 (left) and FHWA 2020 (right)

Negative driveway offset (left) and positive driveway offset (right)

Restrict Movements

In some instances, it may be necessary to limit the movements that a vehicle can make at certain access points. For example, along an arterial with a relatively high amount of through traffic, access at particular driveways may be limited to right-in, right-out movements to help improve safety.

SUMMARY

This summary addresses some of the access management measures that might be considered when a four- to three-lane or other cross section conversion project is being implemented. Several access issues identified and discussed in the Road Diet Informational Guide (Knapp et al. 2014) are listed, and other measures included in the Iowa DOT Access Management Manual (Iowa DOT 2023) are described in greater detail. The reader is referred to both of these documents for more detail.

References available in: Knapp, K., and D. Veneziano. 2024. *Roadway Cross Section Reconfiguration: Responses to 14 Commonly Asked Questions*. Iowa Local Technical Assistance Program, Institute for Transportation, Ames, IA. https://intrans.iastate.edu/uploads/2024/10/roadway_cross_section_reconfiguration_w_cvr.pdf.