# Safe Access for Everyone Is Good for Business

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16. Abstract
An overarching goal of road corridor projects is to reduce traffic delays and improve safety for all users, including drivers, pedestrians, cyclists, and delivery vehicles. Doing so often involves changing the way road users access sites along the road, such as by removing or relocating driveways; adding medians, turning restrictions, service and frontage roads, and new intersection designs; and introducing treatments for safer pedestrian, bicycle, and transit access. The purpose of this document is to address the concerns of business owners about the potential effects of such changes in roadway design on their businesses.
Research and experience show that after construction, access changes are unlikely to negatively affect a business. The success or failure of a business depends on many other, more prominent, factors, including the business plan, the quality of the product, demand for the product, competition, price, and customer service. Absent a major change such as the relocation of a major road away from the business or the construction of a view-limiting berm or noise wall, the effects of a change in access tend to occur during construction and are short term.
Indeed, corridor projects often provide a boon to businesses. Customers soon learn the new travel patterns, and enhancements to the corridor could entice customers to shop in the area. Improvements through access management could be a win-win situation for both businesses and those who travel on the corridor.

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# CHAPTER 1. INTRODUCTION

State transportation agencies and local governments often develop access management strategies that, upon execution, could potentially affect access to adjacent businesses. For example, the agency representatives may be planning to install a raised median, close a median opening, redesign a nearby intersection, or reconfigure existing driveways. In some cases, an agency's request for a driveway is under review or the regulating agency has imposed conditions on its approval. The State or local agency could be in the initial stages of developing a new access management policy or plan, and these potential changes may introduce questions or concerns about these changes.

Whatever the reason, an agency could successfully apply access management strategies once the agency representatives fully understand the basis for these changes and how they might affect local businesses. This primer addresses questions that commonly arise with access management and its effect on business activity and the local economy. This primer focuses on economic concerns that may arise in response to proposed access changes or policies, including potential effects on business activity, freight and deliveries, customers, and the property or the resale value of the affected property.

## CHAPTER 2. WHY IS ACCESS BEING CHANGED OR REVIEWED?

Government agencies manage roadway access to reduce crashes and improve traffic flow. These efforts, known as access management, involve the careful planning, regulation, and design of access between roadways and land development. Common examples include the use of medians to channel left turns and U-turns to safe locations, provision of turn lanes so that turning vehicles do not impede through traffic, and limitation of driveways near intersections or interchange ramps to limit conflicts that may contribute to crashes.

Roads with access management applications have two primary functions—to provide access for a smoother transition and to move traffic. The conceptual relationship between these functions varies depending on the type of road, as shown in figure 1 and explained in the following section:

- The primary function of *minor roads*, such as neighborhood collectors and local streets, is to provide access. Minor roads generally operate at slower speeds so vehicles can enter and exit private and business driveways safely and conveniently. Slower speeds facilitate truck deliveries, enhance the boarding process for buses, and accommodate pedestrian and bicyclist circulation safely.

- The primary function of *major roads*, such as interstate freeways and regional highways, is to move traffic over long distances at higher speeds. The management and design of access at major roads and crossing locations can help to ensure that access does not lead to unsafe or congested conditions for pedestrians, bicyclists, drivers, or transit users.

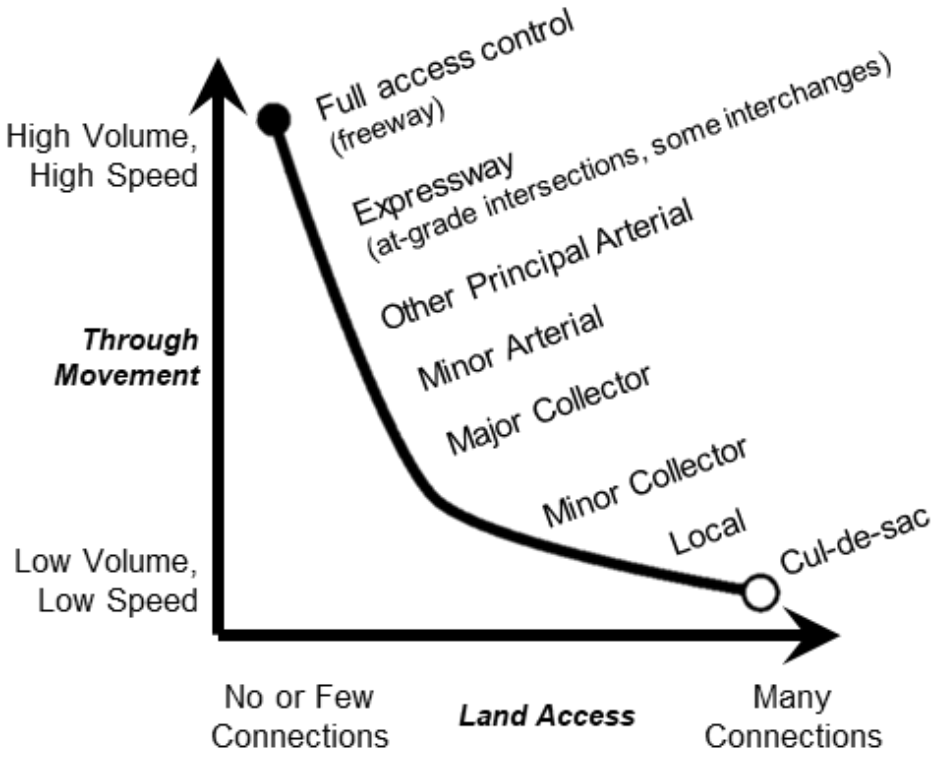


**Figure 1. Diagram. Roadway function and land access.**
Source: Transportation Research Board of the National Academies of Sciences, Engineering, and Medicine.[1]

[1]From *Access Management Manual*, by Kristine Williams, Vergil G. Stover, Karen Dixon, Philip Demosthenes, et al., 2014, Transportation Research Board (TRB) of the National Academies of Sciences, Engineering, and Medicine (NASEM).

## CHAPTER 3. HOW DOES THIS IMPROVE ROADWAY ACCESS?

Access management improves roadway performance based on the following four areas—safety, mobility, economy, and livability. All are integral to the vitality of businesses.

### SAFETY

Access management improves safety by reducing traffic conflicts on busy roads. Each point where a traffic conflict can occur introduces the potential for a crash. The types of traffic conflicts that can occur are shown in figure 2.

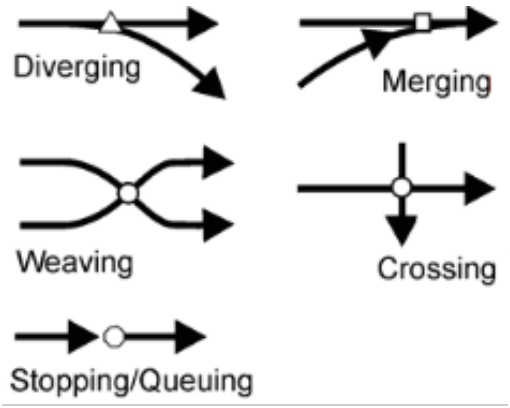


**Figure 2. Illustration. Types of traffic conflicts.**
Source: Transportation Research Board of the National Academies of Sciences, Engineering, and Medicine.[1]

Driveways in busy commercial areas that are too close to roadway intersections or interchange ramps are especially hazardous because of the overlapping conflicts resulting from turning and weaving movements at these locations. A 2023 Florida study, for example, found that commercial driveways within 500 ft of interchange ramps were 261 percent more likely to cause severe injury crashes.(1)

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*Access management results in a more predictable, and thus safer, roadway for motorists, pedestrians, bicyclists, and deliveries.*

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Using medians and providing space between driveways reduce traffic conflicts and separate areas where they can occur. For example, replacing a two-way left-turn lane with a median and combining several adjacent driveways into one driveway reduces conflict points and the potential for crashes. The result is a roadway that is safer and more predictable for everyone, including pedestrians and cyclists (figure 3).

[1]From *Access Management Manual*, by Kristine Williams, Vergil G. Stover, Karen Dixon, Philip Demosthenes, et al., 2014, TRB of the NASEM.

*If access of a road is perceived as unsafe, customers may seek other options. Bear in mind that a single crash could tie up traffic and potential customers for hours.*

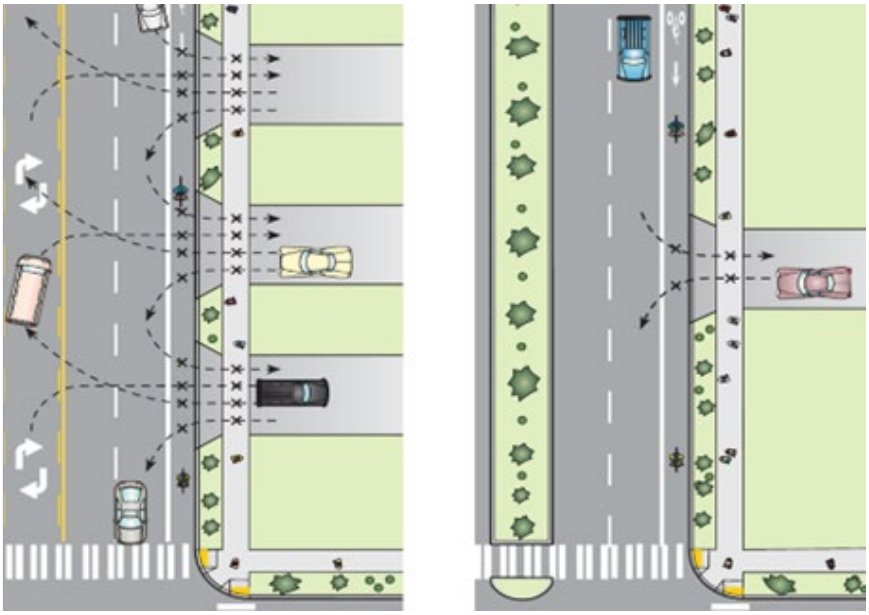

**Figure 3. Diagram. Adding a median and consolidating driveways reduce conflict points and crashes.**

Source: Oregon Department of Transportation and Department of Land Conservation and Development.[2]

## MOBILITY

Good access design preserves roadway capacity and improves mobility. This approach equates to free advertising for corridor businesses. In business terms, this is known as "pass-by traffic."

Studies show that too many driveways and signals accelerate the loss of roadway capacity.(2) As congestion increases, so does delay. People may seek out other routes or businesses, thereby increasing the need to widen or bypass roads. As market reach would also shrink, competitors in the same general market area may begin to draw away customers. In fact, increases in travel time explain why some commercial areas have deteriorated while others have prospered.(3)

## ECONOMY

Keeping people and goods moving is vital to the economy and local businesses. Delay due to congestion and crashes interferes with the supply chain and can increase shipping and distribution costs. For example, the average cost of operating a semitruck is $74.65 per hour; costs include fuel, maintenance and repair, and wages.(4) A 10-percent travel time delay would add $7.47 per truck per hour to the average cost of each trip. Furthermore, if the routes where

[2]From *Main Street . . . When a Highway Runs Through It: A Handbook for Oregon Communities* by Karen Swirsky, Nils Eddy, David Olsen, Brian Rankin, Dan Burden, and Pat Kliewer, 1999, p. 60. Department of Transportation and Department of Land Conservation and Development, State of Oregon.

deliveries and distribution take place have high crash rates, insurance companies can and do increase premiums. When shipping and distribution costs increase significantly, businesses with small margins that rely on these deliveries can become unprofitable.

## LIVABILITY

Access management strategies also indirectly benefit businesses by helping enhance the livability of major corridors. Medians provide space for landscaping, art, and other aesthetic treatments. Fewer driveways mean more area for landscaping in front of businesses and more space for sidewalks and customer seating. Businesses are also more likely to thrive along attractive, well-managed corridors, especially those with bicycle and pedestrian facilities and street networks that create centers of activity.

In fact, redesigning driveway access and improving connections with abutting neighborhoods are common strategies for revitalizing declining commercial corridors. Roads where access has been carefully planned can be compared with roadways having numerous driveways, open frontages, and no median. The roads with the carefully planned roadways generally equate to corridors that have the most vibrant businesses.

For example, in 2002, Bridgeport Way in suburban University Place, WA, experienced more than 300 crashes in 4.5 years. Several of these crashes involved pedestrians. The corridor was reconstructed in 2002 to improve safety.[2,5] The project replaced the two-way left-turn lane with a landscaped median, wide sidewalks, bike lanes, left-turn lanes with U-turns at signalized intersections, signalized midblock crossings at transit stops, and a network plan with connected streets adjacent to the corridor to support a new town center. The result was a safer and more attractive corridor and business environment. Figure 4 shows a segment of the corridor before reconstruction. Figure 5 shows a segment of the corridor after reconstruction.

**Figure 4. Photo. Bridgeport Way before access management project.**
Source: National Academies of Sciences, Engineering, and Medicine.[3]

**Figure 5. Photo. Bridgeport Way after access management project.**
Source: National Academies of Sciences, Engineering and Medicine.[4]

The project yielded a 60-percent reduction in crashes, better pedestrian connections to transit, and a corridor with a revitalized, thriving town center area. Despite business owners' concerns about the median and its potential to deter customers and reduce revenues, city staff found that sales tax revenue had increased 8 percent after each construction phase.(2)

[3]From *How to Measure and Communicate the Value of Access Management* by NASEM, 2023, https://doi.org/10.17226/27017. NASEM.

[4]Ibid.

## CHAPTER 4. HOW WOULD A CHANGE IN ACCESS AFFECT THE SUCCESS OF LOCAL BUSINESSES?

To answer the question about how a change in access will affect the success of local businesses, a business owner may need to first determine the type of affected business—destination or convenience oriented.

Destination businesses are businesses that customers plan to visit in advance of the trip. Examples include electronics stores, doctor or dentist offices, major retailers, grocery stores, insurance agencies, and "sit down" restaurants. Most small destination businesses or specialty stores benefit from access to a lower speed neighborhood collector road. For larger destination businesses, a major road provides exposure, which could be advantage, but access from more than one roadway could add to the advantage. Allowing customers to enter and exit at signalized locations and from different directions could increase their safety and convenience and could reduce their apprehension. If a business has a driveway on a congested highway or a highway perceived as unsafe, customers may seek other options.

Convenience-oriented businesses are those that customers tend to frequent on impulse or while driving by, such as convenience stores, gas stations, and fast-food restaurants. If a business is convenience oriented, clients will expect to enter and exit the driveway easily from the highway. Issues include visibility, signage, good onsite circulation, and convenient access. If the site is small, a driveway connecting to the highway may not be the best option. Short driveways or open frontages have less capacity to handle customer traffic. A well-designed shared driveway and internal circulation system serving several properties can increase access convenience and safety. This enhanced access design can directly improve the volume of customers that a site can handle.

## CHAPTER 5. HOW IMPORTANT IS ACCESS TO THE SUCCESS OF A BUSINESS?

Location and access are factors in determining whether businesses succeed or fail, but these are not always the most important factors. According to many business advisers, businesses succeed or fail because of factors such as management, customer service, marketing, product or service quality, financing, employee training, systems, and the level and nature of competition.[6,7] It follows, therefore, that a change in access will not be the primary cause of whether a business survives or fails. In fact, studies of business owners on access-managed corridors have found that access is one of the lesser factors that customers consider when weighed against prices, service, product quality, and store amenities.[8,9]

A study of 280 businesses along six commercial corridors in Washington State, for example, found that business owners felt that business type, operations, corridor and street environment, and willingness-to-pay measures had more effect on business patronage than access.[10] The owners of retail businesses such as banks, clinics, and salons tended to see customer allegiance as generally more important than access.[10]

This is not to say that access is not important to a business. Whether the business is large or small, access to the business should be safe, convenient, and able to handle customer traffic demand. For major retail or office centers, the location and design of access are notable to customers and employees. For shopping centers, poorly designed entrances and exits can create a negative image of the business and potentially deter customers. This is also true for small businesses, especially those at the intersection of busy roads. If entering or exiting the business is difficult to navigate, if the access does not seem safe, or if the access is inadequately designed, customers may think twice about visiting the business.

For example, the line of cars in figure 6 is blocking the business's driveway and street traffic. Is this the sign of a store doing great business, or one that is telling customers to try the next business down the street? Consider the number of customers that this site might have handled during peak hours if its driveway and site circulation system had been designed properly.

**Figure 6. Photo. A fast-food restaurant with inadequate site circulation and storage for customers.**

Source: Florida Department of Transportation.[1]

There is a need to also consider corner properties. Although valued highly because of their visibility, small corner properties can be hard to access, particularly at signalized intersections, because queueing traffic often blocks driveways (figure 7). The more distance between the driveway and the signalized intersection, the easier it can be for customers to get in and out. If driveways are often blocked or hard to use, then customers may choose another business that is easy to enter and exit.

[1]From *Access Management: Answers to Your Business Questions* by Florida Department of Transportation, 2016, Florida Department of Transportation.


**Figure 7. Photo. Driveways to corner properties are often blocked, which may cause customers to consider other options.**

Source: *Record Journal, Southington-Plainville Citizen*, Meriden, CT.

# CHAPTER 6. WHAT HAS BEEN THE EFFECT TO BUSINESSES WHERE ACCESS MANAGEMENT PROJECTS HAVE BEEN DEPLOYED?

Large peer-reviewed studies have explored the business effects of access management projects in hundreds of commercial corridors in cities across the United States. These studies have found that access management projects neither increase nor decrease business failure rates. This finding makes sense considering that many factors other than highway access affect business success.

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*Studies across the United States show that access management projects neither increase nor decrease business failure rates.*

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Businesses can be adversely affected when reconstruction projects reduce their visibility from the major road or cause businesses to have circuitous or inconvenient access. These effects are not typical of access management projects, however, and where they do occur, transportation agencies typically compensate the business owner for losses.

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*Business owners report that the actual effects to their business were much less than they anticipated. Most adverse effects were temporary and due to construction, not change in accessibility.*

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## BUSINESS ACTIVITY

Before-and-after studies of businesses along highways where access has been managed have found that a large majority of businesses do as well or better after the project is completed. The following are examples of the study findings:

- A Utah study of retail sales tax data on corridors 1 year before and 1 year after installation of raised medians found no evidence of adverse sales effects. Rather, the average sales tax on study corridors (weighted by corridor length) increased by 32 percent.[11]

- A survey of 789 business owners and managers in North Carolina on corridors where a median was installed and on corridors with no median found no significant difference in self-reported revenues on roads with and without medians.[8] Surveyed businesses also had a more favorable perception of medians after they were built, and 58 percent indicated that the number of customers rose or stayed the same after median installation.

- A New York City Department of Transportation study found that "street projects that improve safety and design and that welcome pedestrians, cyclists, and transit riders see higher retail sales" due to improved accessibility and a more welcoming street environment.[12] For example, retail sales doubled in the 3 years after the installation of bicycle lanes and a tree-lined median on Brooklyn's Vanderbilt Avenue.[12] Other studies have reinforced the finding that more bicycle and pedestrian activity on a street translates into more potential customer traffic.[13]

- In Iowa, about 65 percent of businesses on corridors where access management projects were completed reported stable or increased sales after project completion, and 75 percent reported no customer complaints about access to their business (figure 8).[14] Another Iowa study found that some businesses on a road changed to a controlled-access highway reported increased sales because the project improved access to the surrounding neighborhood.[15]

- In Iowa and Minnesota, the turnover rate of businesses (the proportion of businesses that close or move out each year) along newly access-managed corridors studied was similar to or lower than that of the surrounding area.[14]

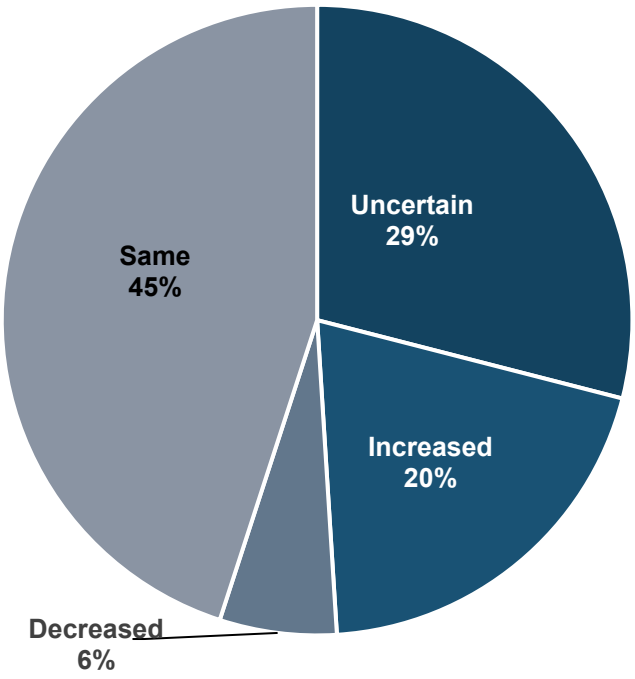


**Figure 8. Chart. Reported post project sales following an access management project.**
Source: Center for Transportation Research and Education, Iowa State University.[1]

## PROPERTY VALUES

Most property owners surveyed after an access management project do not report any adverse long-term effect of the project on property values. Indeed, such projects often have a positive effect by cleaning up a patchwork of driveways and curb cuts and improving traffic flow. For example, a study of property values on Texas corridors with access management projects found that land values stayed the same or increased, with very few exceptions.[9] Over 70 percent of the businesses that a Florida project involving several median-opening closures affected reported no change in property value, and 13 percent reported some increase in value.[16]

[1]From "The Impact of Access Management on Business Vitality Along Corridors," by David J. Plazak, 1999, TRB of the NASEM.

*Three States (Kansas, Minnesota, and Texas) studied the effect of access projects on property values, and they all found that property values stayed the same or increased.*

A study of commercial property values along a major access management project in Minnesota found that property values depend more on the strength of the local economy and the general location of the parcel in the metropolitan area; changes in access seemed to have little or no effect on the value of parcels.[15] A study of Kansas properties with access changes found that the majority were suitable for the same types of commercial uses after the access management project was completed.[17] This finding was true even for businesses that had direct access before the project and access only via frontage roads after the project.

Access management techniques that complete gaps in the network and provide more efficient routing for vehicles, bicycles, and pedestrians could increase property values and lead to new investment in that area.[18] Businesses could see greater customer traffic if access to their location is improved.[2]

Studies also note the following considerations relative to the economic value of access management:[5]

- Although a traffic signal increases the value of adjacent retail properties, it also increases the loss of market area, congestion, and delay.
- Multiple driveways do not increase property value and may even damage this value by reducing the area available for parking, circulation, and landscaping.
- The ability to move traffic into a site efficiently and to accommodate roadway traffic volumes at a reasonable level of service does increase property value.

## CUSTOMERS AND DELIVERIES

Before-and-after studies conducted in Iowa, Texas, and Florida examined the attitudes of truck drivers and customers to access management projects and their effects on deliveries. Although completed decades ago, these studies consistently showed that most customers and truck drivers surveyed reacted positively to the projects for improving both safety and traffic flow. Customers overwhelmingly supported the projects because they made their drives quicker, easier, and safer.[9,19,20] These studies had the following findings:

- In Iowa, 90 to 100 percent of motorists surveyed on eight corridors that had undergone access management projects had a favorable opinion of the improvements, and the vast majority of motorists thought that the roadways were safer and that traffic flow had improved.[19]
- In Texas, about 93 percent of business owners reported that their regular customers were at least as likely or more likely to continue patronizing their businesses after median

installations. Business owners also reported no change in the number of customers stopping by on their way to another destination.[9]

- In Florida, over 75 percent of drivers surveyed reported feeling safer on access-managed roadways, and 84 percent felt that traffic movement was improved.[20] About 70 percent of business owners surveyed in Fort Lauderdale after reconstruction of a median and closures of median openings on Oakland Park Boulevard felt that the median changes had no adverse effect on truck deliveries; over 60 percent perceived no change in business activity following the project, and more than half (57 percent) favored the median changes.[21]

## PROPERTY RESALE AND REDEVELOPMENT POTENTIAL

The long-term redevelopment potential of a commercial site can affect its value.[22] A well-planned access and circulation system that supports safe and convenient ingress and egress can help preserve the redevelopment potential of a development site well into the future for a variety of uses. Other factors benefiting from access management that can make a commercial property more valuable for resale include nearby access to mass transit, bike paths, the walkability of the area, corner exposure, the amount of pass-by traffic, and proximity to potential customers.[22]

## CHAPTER 7. WHAT ARE COMMON ACCESS MANAGEMENT TECHNIQUES?

There are many access management techniques, each with a specific purpose and different type of effect. The following strategies for mitigating the issues or effects associated with these projects can be considered when working with an agency to explore deployment of these techniques.

### MEDIANS AND TWO-WAY LEFT-TURN LANES

A common type of access change is one in which an agency builds a corridor median or closes existing median openings. A median is a grass or raised divider in the center of a road. The median separates opposing traffic and discourages or prevents vehicles from crossing the divider. Medians may be installed or reconstructed to direct or define access opportunities. They not only improve safety for drivers but also provide a safe refuge for pedestrians or cyclists crossing a roadway (figure 9).

**Figure 9. Photo. Pedestrians crossing a roadway safely with a median refuge.**
Source: North Carolina Department of Transportation.[1]

Openings in the median allow drivers to execute turning or crossing maneuvers, depending on how the openings are designed. For example, some medians have dedicated lanes for turning and vehicle storage apart from the through lanes. Median openings can be directional or full. A

[1]From *North Carolina Pedestrian Crossing Guidance*, by Bastian J. Schroeder, Sarah Worth O'Brien, and Daniel J. Findley, 2015, Report FHWA/NC/2014-15. North Carolina Department of Transportation.

directional median opening allows certain movements, usually only left turns or U-turns. Full median openings allow all turning and crossing movements and sometimes are signalized.

A continuous two-way left-turn lane (TWLTL) is a lane in the middle of a roadway that allows traffic to turn from either direction. These lanes may also provide a temporary refuge for drivers turning out of a driveway and re-entering the roadway. Like roadways with just a painted center line, however, TWLTLs offer little to no protection to pedestrians crossing the roadway (figure 10).

**Figure 10. Photo. Customers with children crossing a busy highway with no median refuge.**

Source: City of Charlotte (NC) Department of Transportation.[2]

## Why Use a Median and Not a Two-Way Left-Turn Lane?

Medians can have a profound effect on improving corridor safety compared with a TWLTL. A median can help reduce the number of conflicts and crashes between pedestrians, bicycles, and motor vehicles, and reduce crashes by 30 percent to 50 percent or more compared with a TWLTL.[(2,23)]

This benefit does not go unnoticed by businesses. A before-and-after study of 18 corridors in Florida where TWLTLs were replaced with medians found that crashes were reduced by 30 percent and that two-thirds of the 151 businesses interviewed in the study felt that the raised medians were safer than TWLTLs.[(24)] A TWLTL also does not provide pedestrians with refuge at midblock crossings. Similarly, a driver who is turning left may need to be able to verify that the traffic is clear from multiple directions of travel. When this is not feasible, drivers attempting to merge into traffic sometimes pause in the TWLTL. Such maneuvers can lead to serious crashes, and the frequency of crashes increases with an increase in traffic volume.

[2]From *Charlotte WALKS Pedestrian Plan Draft* by City of Charlotte (NC) Department of Transportation, 2017, City of Charlotte Department of Transportation.

TWLTLs may be beneficial, however, for low-speed retail urban core conditions where road diets can reduce speeding and make additional room for walking and cycling. TWLTLs can also be a cost effective treatment for two-lane rural locations, especially those with frequent rear-end collisions involving a lead vehicle attempting to make a turn.(25)

### How Will a Median or Median Construction Influence Day-to-Day Business?

When a median is introduced, customers may have to drive past a business and perform a U-turn at the next median opening to reach a business. Turn lanes are added to median U-turn locations so drivers can wait there safely before completing a U-turn. This configuration provides safe and convenient access to both sides of the street.

### Won't a Business Lose Customers if They Can No Longer Directly Turn Left Into the Business?

The number of customers making left turns into a business is already very low during peak travel periods or on roadways with congested conditions. This is because left turns into any business become increasingly difficult as traffic volumes in the opposing lanes increase. To reach a business, customers may either alter their travel patterns slightly to reach a business or simply make a convenient U-turn at the next median opening.

Today customers may wait with apprehension to turn left out of a driveway as cars queue behind them, or they may dart across a busy road to complete a left turn. A turn lane at a median opening or signalized intersection could allow them to wait safely to complete a U-turn when traffic clears—a safer option on a busy road. In fact, left turns into and out of a driveway create the majority of driveway crashes and are much less safe than a U-turn. Figure 11 shows that about 72 percent of driveway crashes involve left turns and about 44 percent of these crashes occur when a driver is making a left turn onto the roadway.

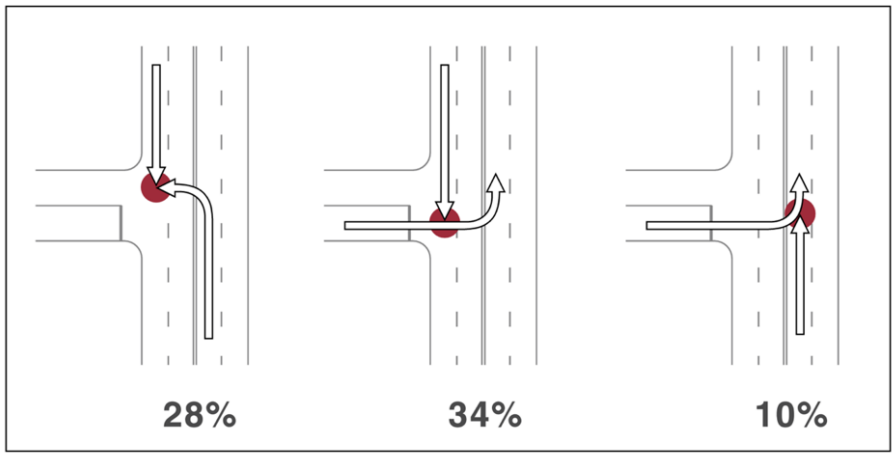


**Figure 11. Diagram. Percentage of driveway crashes involving left turns.**
Source: FHWA.[3]

[3]From *Access Management in the Vicinity of Intersections* (FHWA-SA-10-002) by FHWA, 2020, FHWA.

*Most driveway-related crashes involve left turns, which are also more likely to result in serious injuries or death.*

A detailed study of U-turn safety in Florida, where medians are common, found that making a U-turn at a median opening to get to the opposite side of a busy highway is about 27 percent safer than a direct left turn from a side street or other access point (figure 12).[26]

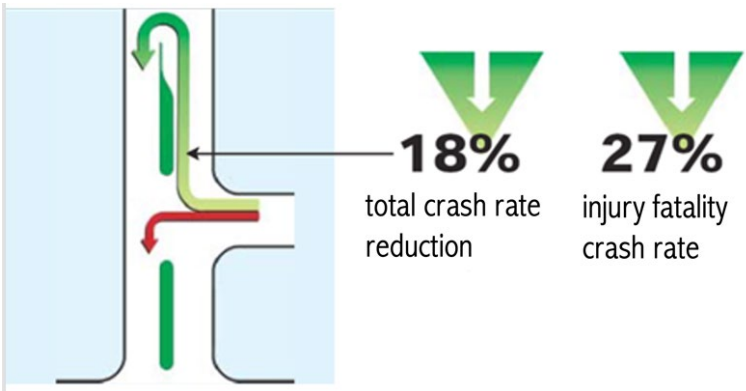


**Figure 12. Diagram. U-turns are safer than direct left turns from driveways.**
Source: Florida Department of Transportation.[4]

Researchers have conducted surveys of customers in Florida and Texas to determine driver reaction to the U-turn access configuration at medians.[21] Most drivers said that they had no problem making U-turns at median openings to get to businesses on the opposite side of the road. Studies show that where direct left turns are prohibited, motorists change their driving or shopping patterns to continue patronizing specific establishments. In fact, most drivers report that access management improvements made the roads safer and that they approve of the changes, despite minor inconveniences associated with U-turns.

These studies found that although some owners of convenience-oriented businesses reported a loss of customers after a median or other change eliminated left turns in or out, the majority do not.[9,21] A before-and-after study of a median reconstruction project in Florida involving numerous closures of median openings found that 68 percent of surveyed merchants reported little or no economic impact to their businesses, while 27 percent reported some type of loss.[21] Generally business proprietors who felt they were adversely effected also have competition nearby or may have experienced reduced visibility of signage.

[4]From *Methodology to Quantify the Effects of Access Management on Roadway Operations and Safety* by Lu et al., 2001, University of South Florida, prepared for the Florida Department of Transportation.

*Because of the design of the roads, the timing of the traffic signals, and the way the traffic is broken up, it has become very convenient for people to pull into a safe haven, or storage lane within the raised median, take their time and make a safe and convenient U-turn to access properties that were very concerned about that problem.*

—Kurt Easton, executive director of Merritt Island Redevelopment Agency, Florida, circa 2006, FHWA-HOP-06-107

A Texas study found that installation of a raised median did not result in economic losses among adjacent businesses.[9] About 93 percent of business owners reported that their regular customers were at least as likely or more likely to continue patronizing their businesses after the median installations. Business owners reported no change in the number of customers stopping by on their way to another destination. Most business types (including specialty retail locations, fast-food restaurants, and sitdown restaurants) reported increases in the numbers of customers per day and gross sales.

### Why Not Just Signalize All Median Openings and High-Volume Driveways?

The decision on whether to signalize a median opening or access point depends on many factors, including the volume of traffic using the access, the proximity of other traffic signals, and the potential effect on public safety and traffic congestion. Traffic signals have "warrants" that can be found in FHWA's *Manual on Uniform Traffic Control Devices for Streets and Highways*.[27] Most signal warrants are related to traffic volumes, but some consider school crossings, crash history, pedestrian crossings, rush-hour congestion, and other situations.

Unwarranted signals cause undue delays as motorists wait at a red light where little or no cross traffic exists. Worse, unwarranted signals may eventually be disobeyed or ignored by frustrated motorists, who are only one reckless incident away from causing an accident or injury. For these reasons, median openings and driveways should not be signalized where they do not meet the requirements of a traffic signal study.

### What About Effects of Medians and Driveway Controls on Truck Deliveries?

Some trucks and large vehicles may need to take alternate routes because U-turns can be difficult to negotiate. However, the limited number of before-and-after studies have found that truck deliveries may be inconvenienced, at worst, but may in fact benefit from improved opportunities resulting from a change in access. In urban areas, for example, reducing the number of driveways allows more curb space for loading and unloading. Although there may be few studies, the many anecdotal comments available are favorable. Figure 13 summarizes the comments from truckers and merchants in Florida after the installation of a raised median. Table 1 summarizes merchants' reactions to the new median.

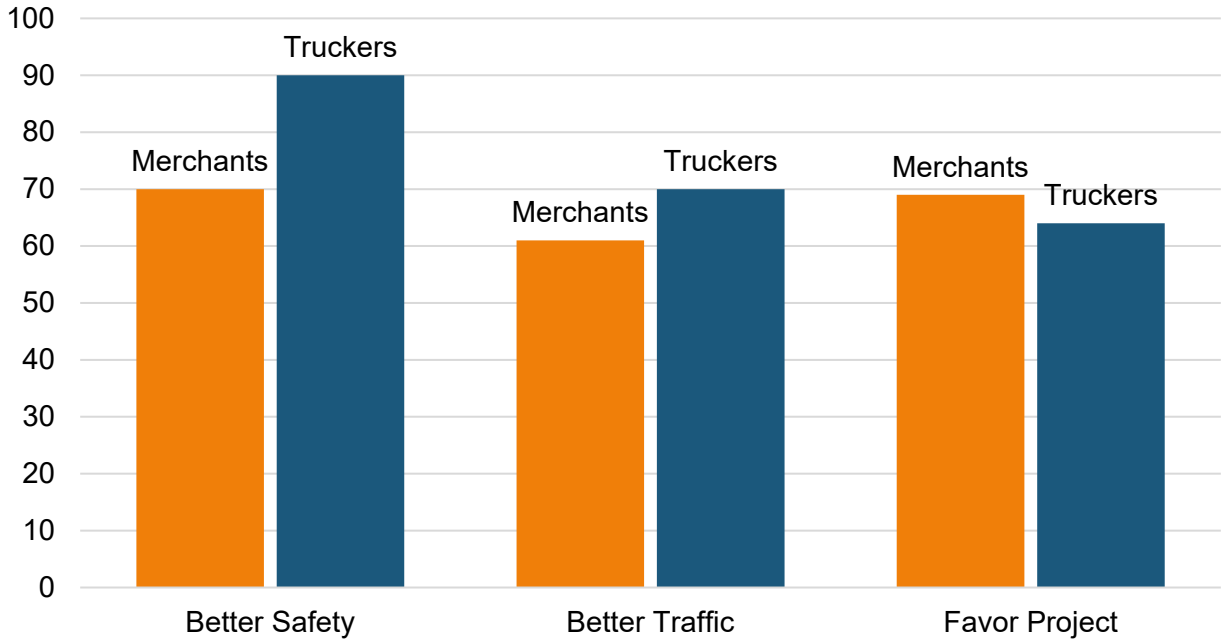


**Figure 13. Chart. Merchant and trucker opinions about a median project in Fort Lauderdale, FL.**

Source: University of Florida.[5]

**Table 1. Merchant opinions of median changes along Oakland Park Boulevard, FL.**

| Question | Yes (percent) | No (percent) | Increased (percent) | No Effect (percent) | Decreased (percent) |
|---|---|---|---|---|---|
| Have the median changes adversely affected truck deliveries? | 30 | 70 | | | |
| Have the median changes caused major changes in business? | 16 | 84 | | | |
| How have property values changed due to the median change? | | | 13 | 72 | 15 |
| How has the median change affected profits? | | | 6 | 66 | 28 |
| How has the median change affected the number of customers? | | | 10 | 61 | 29 |

Note: Responses received from 96 merchants.

Source: University of Florida.[6]

In addition, some delivery companies have found that reducing left turns saves delivery costs, and these benefits can be passed on. For example, a large delivery service has vehicle routing software that aims to eliminate as many left turns as possible. The company has found that not

[5]From *Median Design for Six-Lane Urban Roadways* by Gary Long and Jeff Helms, 1991, Transportation Research Center, University of Florida.

[6]Ibid.

turning left saves gas, increases deliveries, and even helps the environment by reducing emissions.(28)

## REDUCED LEFT-TURN CONFLICT INTERSECTIONS

Throughout the United States some new intersection designs are improving safety and reducing delay by changing how left turns can be made. The restricted crossing U-turn and the median U-turn are common examples of these intersection types and can be described as follows:

- The restricted crossing U-turn directly restricts left turns and through lane movements from a minor to a major road and reroutes turns using median barriers (figure 14).
- For the median U-turn, one can only drive straight through the intersection or turn right. A left turn is typically handled with a U-turn after the signal followed by a right turn (figure 15).

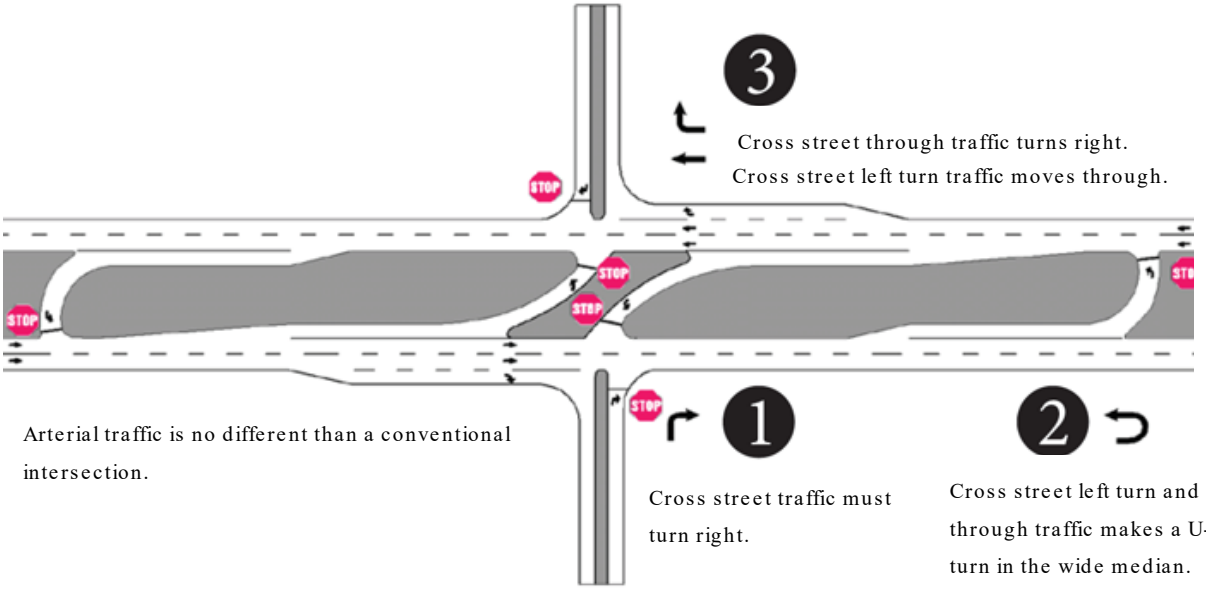


**Figure 14. Diagram. Example of unsignalized restricted-crossing U-turn intersection.**
Source: FHWA.[7]

[7]From *Reduced Left-Turn Conflict Intersections* (Report No. FHWA-SA-21-030) by FHWA, 2021, FHWA.

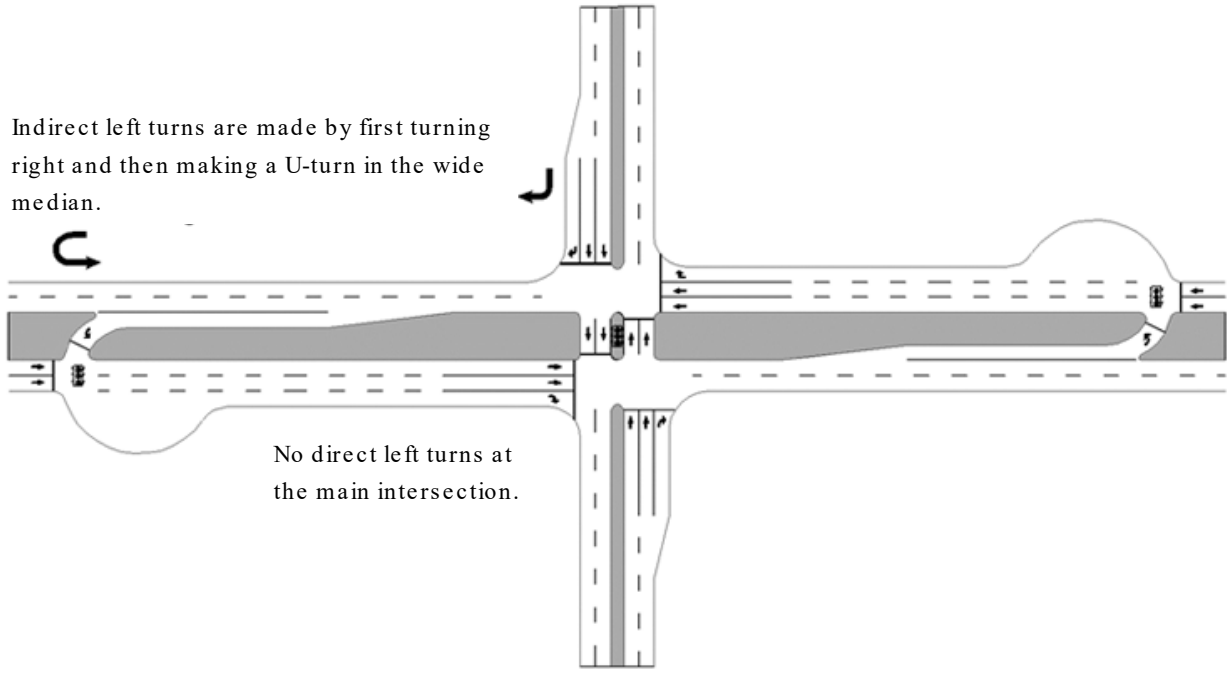


**Figure 15. Diagram. Example of a median U-turn intersection.**
Source: FHWA.[8]

By eliminating left-turn signal phases, these alternative intersections reduce the potential for crashes and allow much more green time on signalized highways. This approach also helps improve business activity. Analysis of aggregated sales data at businesses on corridors where restricted crossing U-turns were installed, for example, found an increase in sales after project construction.(29)

## SERVICE AND FRONTAGE ROADS

Another common access management project is where a frontage road or a rear service road is provided along a highway for access to businesses. Service roads provide safe access to small commercial tracts along major roadways by separating low-speed customer traffic from higher speed through traffic (figure 16). For example, the businesses pictured at the bottom of figure 16 are visible from the major road, but access to them is from a service road behind the property, as the arrows show. A frontage road is a type of service road that is located between a major roadway and the abutting building sites. Periodic street or access connections between the frontage or rear service road and the highway or side streets provide convenient access.

[8]From *Reduced Left-Turn Conflict Intersections* (Report No. FHWA-SA-21-030) by FHWA, 2021, FHWA.

**Figure 16. Photo. Unified site access and circulation system for businesses along a major highway.**

Source: National Academies of Sciences, Engineering, and Medicine.[9]

## How Can a Business Get Access While Waiting for a Frontage or Service Road To Be Finished?

The frontage or service road can provide periodic direct access to the major road and connect to side streets. But when these roads are being built in segments through the development process, some sites may be landlocked and need temporary access to the major roadway until the full-service road system is complete. Most agencies require that such temporary driveways be removed at the owner's expense so that site access is obtained only from the service or frontage road.

## How Will Customers Know How To Access a Business From the Highway?

Service roads maintain visibility for businesses along a major road, and typically the paths for entering and exiting the road to reach a business are apparent. Signs that show clearly where a service road or frontage road connects at a side street help customers know they can access businesses that may not be visible from the side street.

## What Are Other Issues With Frontage or Service Roads?

Service roads that are located behind businesses are often less disruptive to businesses than frontage roads, are less costly for an agency, and are more functional than a frontage road.

[9]From *Access Management Manual*, by Kristine Williams, Vergil G. Stover, Karen Dixon, Philip Demosthenes, et al., 2014, TRB of the NASEM.

Rear service roads provide buildable sites on both sides. They can provide access to businesses on each side and operate safely from both directions, as well as where they intersect with the highway or side street.

Frontage roads provide access only to businesses fronting the highway and are safer when designed for one-way traffic. Frontage road intersections may need to be set back an approved distance from the highway, or safety and operational issues can occur at the entrance.

Right-of-way is needed for a frontage or service road and to connect a service road back to the highway or side street. If a site is effected by such construction, a business can work with the agency on how to reduce adverse effects. For example, if a site becomes nonconforming under local zoning regulations because the access management project reduces the size of a setback or other creates other changes, the business owner can work with the local agency to waive that requirement because a government taking right-of-way caused the noncomformance.

## UNIFIED AND INTERPARCEL ACCESS AND CIRCULATION

Unified and interparcel access and circulation is when separate stand-alone sites or those consolidated for development share a common site access and circulation system. This situation is typically required as a condition of a development permit. Examples include sharing driveways at the front and side of developing areas, constructing cross-access to the parking lot, providing cross-access easements, and developing internal shopping center roads.

Figure 17 shows a commercial area where connected parking lots and internal circulation roads allow travel between adjacent sites. The parcels above the highway have no direct access. They obtain access from the shared access and circulation system. This type of system increases opportunities for customers to circulate among adjacent businesses and even use nearby traffic signals to execute safe left turns, as the arrows show.

**Figure 17. Photo. Unified site access increases customer convenience and business accessibility.**

Source: Florida Department of Transportation.[10]

Unified and interparcel access and circulation create the following advantages for businesses:

- Increasing the accessibility of stand-alone businesses on busy or median-separated roads by allowing access and circulation from different directions, especially where several properties can obtain access to a signal and side streets.
- Having access to a signal, which can increase the value of a property.(18)
- Increasing the percentage of a site that is usable for building, onsite circulation, and parking.
- Increasing the development potential of interior lands along corridors and near interchanges.

  For example, figure 18 shows an example of a grid street network that was required as a condition of development near a freeway interchange. The purpose of the street network is to provide access to businesses in a way that preserves the safety and operation of the freeway interchange.

[10]From *Multimodal Access Management Guidebook* by Florida Department of Transportation, 2023, Figure 22, page 46.

**Figure 18. Photo. Example of street network supporting development around interchanges.**

Source: National Academies of Sciences, Engineering, and Medicine.[11]

[11]From *Incorporating Roadway Access Management into Local Ordinances* (NCHRP Synthesis 549) by Kristine Williams, 2020, TRB of the NASEM, Figure 12, page 62.

# CHAPTER 8. HOW MIGHT CONNECTED AND AUTOMATED VEHICLES AFFECT ACCESS MANAGEMENT?

Technology is changing rapidly; the advent of automated vehicles, driverless deliveries, and curb management is affecting our transportation system. Roadway vehicles are already equipped with automated driving systems that allow them to park, avoid hazards, and even drive themselves. In some places, automated vehicles can provide food delivery or even take customers to appointments.

Roadways can be outfitted with sensors that communicate information to agencies, transit users, and drivers. Mobile applications (apps) can warn of road hazards or delays that can be avoided through alternate routes, identify opportunities to take transit, and provide other travel advice.

Transportation technology may affect access to businesses as well. Automated vehicles may need to determine how to get into and out of a business and how to circulate onsite. Multiple driveways for a single address could create confusion for these vehicles, as could one-way onsite circulation. Designing sites with unified access and circulation in mind could help automated vehicles circulate more easily and bring customers closer to the doors of businesses. Providing information for in-vehicle or mobile traffic apps can also help guide users who rely on this type of technology.

This technology is increasing the use of ride-hailing applications. As a result, demand for passenger loading and unloading with access at the curb is increasing. Automated vehicles may not stop if there is no access to the curb. Managing and retrofitting driveway access helps to reserve curb space for transportation network companies. Active research efforts are focusing on dynamic curbside management and emerging technology to address these needs.[30,31]

## CHAPTER 9. HOW CAN BUSINESSES INFLUENCE ACCESS MANAGEMENT PROJECTS?

To influence access management projects for local agencies, a business can get involved. Many government transportation agencies offer open-house meetings during project planning and design. Both State and local government agencies conduct public meetings and hearings when making important policy or regulatory changes that involve access management. Business owners can also review area master plans to research potential changes.

**Figure 19. Photo. Public meetings provide a forum for expressing ideas and concerns.**
Source: Getty Images.

Stakeholders of access management projects can attend public meetings and hearings to voice ideas and concerns (figure 19). Involvement works best when ideas and concerns are conveyed in a cooperative manner, with an understanding that there are two issues at stake—providing suitable access for adjacent properties and creating a safe and efficient transportation environment.

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*Access management stakeholders can attend public meetings and hearings to voice ideas and concerns.*

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These meetings are opportunities for business owners to learn about a project or plan and to make the planners and engineers aware of how their decisions might affect business. Items of interest include determining if the access management projects affect internal circulation and parking, deliveries, or expansion plans. Acquiring input on these matters early in the project planning or design process allows planners and engineers to make better project decisions that can result in changes that reduce or avoid adverse effects on businesses.

## CHAPTER 10. WHAT CAN BE DONE TO KEEP BUSINESSES GOING DURING CONSTRUCTION?

Road construction can disrupt customers and drivers, but adverse effects can be minimized. The two main issues during construction are maintaining access to businesses for customers and deliveries and having sufficient signage and visibility so that customers know a business is open and understand how to enter and exit the site. When a road is scheduled for reconstruction, the associated transportation agency may notify businesses about what to expect in terms of traffic, duration of construction, foreseeable disruptions, and so on. This provides business owners the opportunity to respond to the transportation agency about related special needs and concerns. A business can make some of the following requests of the agency:

- Provide clear signage from the roadway for business entrances (figure 20).
- Provide temporary business access points,  secondary business access points, or both, where feasible.
- Schedule construction for after business hours, or for seasonally oriented businesses, during times of low usage.
- Provide alternative parking if possible and avoid taking or blocking parking spaces.
- Stagger construction along a corridor so effects are localized and staged.
- Expedite construction through incentive and disincentive programs.
- Avoid blocking business entrances with construction equipment or construction barriers.
- Establish a single point of contact in the agency about the construction project to communicate with property and business owners and help address issues that may arise.
- Provide regular project progress reports to business and property owners.


**Figure 20. Illustration. Sample signage letting customers know a business remains open during construction.**
Source: FHWA.

Business owners certainly may see decreases in gross revenues during construction. But these are not unlike drops that business owners may routinely experience during expansions, remodeling, seasonal variations, or similar. Experience has shown that construction-related drops are temporary too, and that retail sales typically return to preconstruction levels or increase.

Research from corridors in Texas found that businesses did not change employment levels during construction periods.[9] This finding indicates that retailers understand that construction projects are a temporary and perhaps even an inevitable disruption to business, and that loyal patrons will return to stable businesses. The same research found that gross revenues typically either returned to preconstruction levels or were higher after construction was complete.

## CHAPTER 11. WHAT'S THE BOTTOM LINE ON ACCESS MANAGEMENT?

Efforts by government agencies to manage access during site development and road projects can help businesses in a variety of ways, even those on older highway corridors. Automated vehicles could introduce new challenges. Here are some benefits of good access management for businesses and their customers:

- Fewer roadway delays and better traffic flow, which can preserve and possibly even enhance the market reach of corridor businesses.
- Safer approaches to businesses, resulting from installation of medians, which can also be landscaped to improve the image of the area.
- Multiple business-shared well-designed entrances, which allow more area for parking, more customer options to access businesses, and improved landscaping or other site amenities.
- Service roads along the highway, which allow customers to enter and exit businesses conveniently and safely, away from faster moving through traffic.
- Internal connections between businesses, which allow customers to circulate easily without re-entering a busy road.
- Driveways and service road entrances farther away from signalized intersections, which allow easy access for customers, even during times of peak congestion.

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*It has been a very positive thing all the way around, from the economic and the community sides. We have improved our tax base, we have also improved our traffic problem, and plus we have improved our business community.*

—Chuck Fisher, superintendent of Public Works, Ankeny, IA,
circa 2006, FHWA-HOP-06-107

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In brief, minimizing the number of driveways, consolidating driveways, constructing landscaped medians, and coordinating internal site circulation and parking among several businesses results in a visually pleasing and more functional corridor. That protects business and public investments in the roadway and can even help attract new investment into the area.

*There are a lot of beautification projects going on, tree plantings and what have you. I think the landscaping in the medians has very much added to the very nice decorum of Ankeny. It will make a very nice impression on those visiting Ankeny or living here.*

—Andy Kasper, Iowa Realty, Ankeny, IA
circa 2006, FHWA-HOP-06-107

## CHAPTER 12. WHERE IS MORE INFORMATION ABOUT ACCESS MANAGEMENT AVAILABLE?

This primer answers questions that a business or property owner may have about access management. A State or local transportation agency or a State's Federal Highway Administration division office (for larger projects) is another excellent resource to point a business to the right project manager or to answer questions about access changes. These transportation agencies need and value the opinion of business owners as they strive to provide safe and efficient roads.

For the latest information on access management, go to www.accessmanagement.info or search for access management on applicable State transportation agencies' websites. Other sources for information on the economic effects of access management include the Transportation Research Board *Access Management Manual*, second edition (2014)[2] and NCHRP Report 1032: *How to Measure and Communicate the Value of Access Management*,[5] which are available from the TRB of the National Academies at www.trb.org.

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