WHAT IS ACCESS MANAGEMENT?

Access management is the process of providing access to developed land located adjacent to a roadway system while at the same time preserving the flow of traffic along the roadway in terms of safety, capacity, and speed. Generally state DOT's and local agencies manage the design, location, and supporting facilities for access points. Access management contributes to how well vehicles, bicycles, and pedestrians can enter and exit commercial and residential areas adjacent to highways or arterials.

Good access is a function of the design and location of driveways and side streets/arterials. Improved access is dependent on the following:

- Location of the driveway/arterial with reference to other access points
- Motorists' ability to easily access the property or road
- The placement of traffic signals

WHY ACCESS MANAGEMENT?

It is vital for transportation agencies to effectively manage their transportation system in order to extend the life of the infrastructure, reduce congestion, improve air quality, promote public safety and maintain or improve the appearance and overall quality of the system and surrounding areas. Access management provides for effective movement of people and goods to businesses, commercial properties, and residential developments, thereby aiding economic development and growth, preserving land values, and inspiring redevelopment.

The key to access management is planning for the number and location of access points rather than responding to requests by local governments or developers. It is better to have planned access as opposed to access that is the result of reactions to local governments and developers.

BENEFITS OF ACCESS MANAGEMENT

- Improved mobility
- Improved safety
- Improved corridor vitality

HOW IS ACCESS MANAGEMENT ACCOMPLISHED?

1. Policies, directives and guidelines
2. Access management regulations
3. Development review and traffic impact assessment
4. Geometric design

WHAT ARE SOME OF THE ACCESS MANAGEMENT TOOLS?

Access management is accomplished through a number of strategic measures aimed at improving mobility and safety. These measures include:

MEDIANS

The presence or absence of medians has a significant impact on roadway operations and safety, and on the provisions of left turn access to abutting properties. There are many types of median treatments such as:

No median – usually a center stripe treatment typically found on two or four-lane undivided roadways.

Flush median with a continuous two way left turn lane (TWLTL) – usually recommended for two and four-lane roadways with traffic volumes between 24,000 and 28,000 vehicles per day.

Adding a TWLTL in the median has the following advantages:

1. Removing left-turning traffic from the through lanes
2. Providing access to adjacent properties
3. Providing refuge area for vehicles turning left from a driveway
4. Separating the opposing through traffic streams

In spite of these safety and operational benefits, the TWLTL is generally associated with higher crash risk than a raised or depressed median when there are frequent busy driveways[1]. Roadways with TWLTL are generally safer than undivided roadways, with average crash rates that are about 35% lower than those of undivided roadways[2].

Raised medians with channelized median openings – usually the safest median treatment and is recommended for roadways with four or more lanes with high through and turning volumes and adequate right of way width.
Raised medians provide several safety benefits including:

1. Positive separation between oncoming traffic streams
2. Space and refuge for left-turn bays
3. Refuge for pedestrians
4. Control of access from adjacent properties
5. Limits the number of conflict points

Research shows that intersections with a median are associated with fewer crashes than intersections without medians. The degree of benefits correlates with the width and type of the median.

(1) TTI Procedures for Using Accident Modification Factors in the Highway Design Process, 4/1/2006.
(2) Access management Manual, TRB, 2003.

RIGHT AND LEFT TURN BAY

Turn bays offer an auxiliary lane for the right and left turns from a roadway and thus reduce disruption to the traffic flow. Turn bays improve safety and increase the capacity at signalized intersections so delays are reduced. Adding a left turn lane on one or both of the major road approaches can result in a 28 to 48% reduction in crashes. Adding a right turn lane on one or both of the major road approaches can result in a 14 to 26% reduction in crashes respectively.

UPSTREAM AND DOWNSTREAM CORNER CLEARANCES

Corner clearance is the distance required from the intersection to the first access connection. Corner clearance is directly related to the roadway speed and the queuing requirements at intersections[(3)]. Inadequate corner clearances can result in traffic-operation, safety, and capacity problems.

DRIVEWAY MODIFICATIONS

Part of access management is improving the flow of traffic to and from adjacent properties; this can be accomplished by modifying existing driveways along a roadway. There are two types of driveway modification techniques that can be used:

Minor Driveway Modification

Increasing driveway throat length - this is the distance, parallel to the centerline of the driveway, from major roadway to the first on-site location where a vehicle can make a turn. It is desirable to increase this distance to enable more efficient movement of vehicles and to provide a storage area for the entering and exiting vehicles, unimpeded from the circulating vehicles.

Driveway width and radius – If a driveway is too narrow or has an inadequate turning radius, vehicles will have difficulty in maneuvering in and out of the driveway.

Major Driveway Modification

Driveway consolidation, may offer a more efficient way to get vehicles in and out. Consolidation may also offer an opportunity for landscaping and additional parking spots.

Driveway closures or relocation, will limit interference with the upstream or downstream clearance distance to the intersection.

DRIVEWAY SPACING

Traffic turning in and out of driveways moves more slowly than through traffic, causing conflicts that can lead to crashes. The various methods that can be utilized to separate conflict areas include the following:

Minimum access spacing
Minimum corner clearance
Limited number of openings per property
Shared access between properties

DRIVEWAY DESIGN

It is essential that driveways be located and designed to ensure safe ingress and egress for the development while minimizing adverse impacts on roadway. The following objectives should be considered when considering access points and driveway design:

Preserve the functional integrity of the roadway
Minimize encroachment of turning vehicles on adjacent lanes

Use driveway design (throat length, driveway width, and driveway radii) to accommodate traffic intended for the development

CHARACTERISTICS TO CONSIDER IN ACCESS LOCATION AND DESIGN

1) Roadway Characteristics

- Functional classification
- Speed
- Functional area near intersections
- Traffic volumes
- Median type
- Crash history

2) Site Characteristics

- Type of development – residential, commercial, industrial, mixed use
- Size of development – number of dwelling units, floor area
- Volume of site traffic during peak hours for the development and the abutting roadway
- Availability of alternative access – such as joint access, interparcel circulation etc

3) User Characteristics

- Mix of vehicle types
- Presence of pedestrian and bicycles
- Frequency of use by large vehicles

(3) Access Management Manual TRB, 2003.

JOINT AND CROSS ACCESS AND INTERNAL ACCESS TO OUT-PARCELS

Joint and cross access - provides unified access and circulation system that is shared by multiple adjacent developments. It can include joint-use driveways, internal cross access or a combination.

Out-parcels - are lots on the perimeter of a larger parcel that breaks its frontage along the roadway. Direct access to major roadways from the out-parcels should be discouraged and more coordinated internal circulation should be encouraged.

Both treatments will limit the number of access points from the roadway, helping to reduce the number of conflict points thus reducing crashes caused by turning vehicles and improving the flow of traffic.

SIGNAL SYNCHRONIZATION

Synchronization involves the modification of the signal timing along a corridor to allow for progression of traffic at a planned rate without stopping through adjacent signalized locations within a traffic control system. A coordinated traffic signal system can yield a 12% reduction in crashes during peak morning and evening driving periods[(4)].

SUPPORTING STREET NETWORK

Side streets, parallel streets, and inter-parcel circulation systems can lead to improved accessibility to businesses and neighborhoods and reduce the need for individual driveway access to major arterials.

OTHER PROPOSED IMPROVEMENTS ALONG THE CORRIDOR

BETTER SIGNAGE

Block Numbers: The addition of block numbers to the street signs and better signing will lead to less confusion and more time to make decisions, which in turn may translate to fewer crashes.

Advanced Information Signs: A better informed driver is more prepared to make decisions and minimize confusion, which may lead to lower crash rates.

Warning Signs: Warning signs should be added to call attention to unexpected conditions and situations that might not be readily apparent to road users. Cited reduction in fatalities by 39% and injuries by 15% [(5)].

NEW PAVEMENT MARKINGS

Clearly visible markings will help drivers stay in their respective lane and will provide more organized and uniform movement of vehicles along the roadway. Good markings are especially critical during rain and at night, and also will result in less confusion and fewer crashes. Cited reductions of 15% in fatalities and 6% in injuries[(6)].

ADDITION OF BACK PANELS TO ALL SIGNAL HEADS

On east-west arterials, back panels help to minimize the sun glare in the morning and the afternoon. They also help drivers clearly see the signal head color and separate it from all other visual distractions along the corridor. Adding back plates can reduce red light running by 25% and result in a 32% reduction in related crashes[(7)].

SIDEWALK IMPROVEMENTS

Sidewalks should be considered, at a minimum, near schools and subdivisions to the nearest signalized intersection to provide a safe crossing for pedestrians.

SHOULDER WIDENING

Widen the shoulder at rural intersections. Cited crash reduction of 2.8% per foot of shoulder widening[(8)].

RUMBLE STRIPS AND RUMBLE GROOVES

Installing rumble strips perpendicular to the traffic lane to alert drivers in advance of intersections can help reduce rear-end and stop violation crashes by up to 50%.

Installing rumble grooves along the edge of the travel lane offers benefits of both an audible and a tactile warning to drivers that have drifted laterally from the travel lane. This measure can result in crash reductions from 20 to 49% on two-lane roads[(9)].

LONGITUDINAL CHANNELIZERS AT RAILROAD GRADE CROSSINGS

The use of longitudinal channelizers is an approved supplemental safety measure (SSM) that may be installed at highway-railroad grade crossings as an effective substitute for locomotive horn. The recommended length of the longitudinal channelizers from the gate arm is 100 feet, with a minimum of 60 feet where there is an intersecting roadway. The longitudinal channelizer will reduce gate violations and the probability of a collision at a highway-railroad grade crossing by 77%.

(4)(5)(6)(7)(8)(9) GAO Report to Congressional Committee: Highway Safety- Federal and State efforts to Address Rural Roads Safety Challenges, May 2004.