APPENDIX B
Boonville Code of Ordinances

BOONVILLE, MISSOURI
Access Management Manual

March 2002

Revised April 2009

INDEX

1.0 INTRODUCTION AND DEFINITIONS

Purpose

Access management involves the thoughtful planning and design of points of access to the public roadway system, for example, interchanges, intersections between public roads, median breaks, and private driveways. Sound access management can have a profound impact on highway safety and the ability of roadways to successfully carry traffic. Failure to properly manage access can result in safety concerns as well as lead to diminution of the public's investment in the roadway system.

The classification system and standards herein are intended to establish goals for access management in Boonville, Missouri, and to guide the implementation of access management in the city so that those goals can be achieved. The standards have been developed to establish uniformity in the design and provision of access to facilities operated by the city of Boonville. The standards apply to a variety of situations, including long-range planning, project planning and design, right-of-way acquisition, redesign of existing highway corridors, and driveway permitting. Uniform standards are intended to improve the safety, effectiveness, and efficiency of traffic moving on and off of public roadway facilities.

Background

The goals established to guide the development of access management standards for the city of Boonville include the following:

- Improve roadway safety
- Improve traffic operations
- Protect the taxpayers' investment in roadways
- Create better conditions for non-automobile modes

Development of a roadway classification system is the first step to defining the contingent access management standards. The roadway classification identifies the present and future functional role of a particular section of roadway and provides the basis for access management standards that will be incorporated. A matrix of ten classifications of roadway were identified for the Missouri highway system, including five main categories, each with a rural or urban component.

Standards were then developed for the intersections and interchanges, driveways, and other pertinent issues related to these classifications of roadway. Standards for intersections and interchanges include interchange spacing, clearance of functional areas for interchanges, freeway and expressway transition standards, spacing for public road intersections, and spacing of traffic signals. Driveway standards include the following:

- Driveway spacing and density
- Corner clearance and clearance of functional areas of public road intersections
- Sight distance minimums
- Driveway geometric design
- Angle of intersection and approach radii
- Driveway width, throat length, and grade
- Standards for surfacing and curbs

Other, related issues that the standards consider relate to median openings, guidelines for the use of two-way left-turn lanes (TWLTLs), three-lane roadways, raised medians, warrants for auxiliary turn lanes, frontage and backage roads, recommended practices for local land use planning agencies, and consideration of non-automobile modes in managing access.

New Projects versus Retrofit Projects

All of the standards contained in this guidebook shall apply to new highway construction projects. Where access is being managed on an existing roadway (a "retrofit project"), the city will strive to incorporate the standards contained in this guidebook and will always incorporate the sight distance standard at a minimum. However, it may not be possible to incorporate and attain all of the access management standards in retrofit projects because of economic, physical, and other constraints.

Definition of Terms

AASHTO –The American Association of State Highway and Transportation Officials.

Access –The ability to enter or leave a business, residence or lane parcel from a public roadway via a connecting driveway. In real estate law, the term "access" denotes the right vested in an owner of land that adjoins a highway or other road to go and return from his/her own land to the highway without obstruction.

Access Management –The design of driveways, intersections, interchanges, and other access features of roadways so as to maintain safety and operational performance of roadways.

Access Management Program –The whole of all actions taken by a governing council, board, or agency to maintain the safety and traffic carrying capacity of its roadways.

Rev. 4-09 **Alley** – See Backage Road

Annual Average Daily Traffic (AADT) –The annual average two-way daily traffic volume on a route. AADT represents the total traffic on a road per year, divided by 365. For the purposes of access management on MoDOT routes, all AADT figures should come from MoDOT data collection (past or current traffic), a Metropolitan Planning

Organization (MPO) urban transportation model, or the MoDOT statewide traffic model (forecast traffic).

Arterial –A road intended primarily to serve through traffic and where access is carefully managed.

At Grade –Where two or more facilities meet in the same plane of elevation.

Auxiliary Lane –A lane adjoining a roadway that is used for acceleration, deceleration, or storage of vehicles.

Backage Road –A local road that is used to provide alternative access to a road with higher functional classification; backage roads typically run parallel with the main route and provide access at the back of a line of adjacent properties.

Collector –Roads intended to move traffic from local roads to secondary or principal arterials.

Commercial –Property developed for the purpose of retail, wholesale, or industrial activities, and that typically generate higher numbers of trips and traffic volumes than do residential properties.

Conflict –A traffic-related event that causes evasive action by a driver to avoid a collision.

Conflict Point –Any point where the paths of two through or turning vehicles diverge, merge, or cross and create the potential for conflicts.

Congestion –A condition resulting from more vehicles trying to use a given road during a specific period of time than the road is designed to handle with what are considered acceptable levels of delay or inconvenience.

Corner Clearance –The distance between the edge of an intersection between a public road and the closest edge of the first driveway.

Corridor –The major roadway designed for relatively uninterrupted, high-volume mobility between regions.

Crash Rate –The number of vehicular collisions occurring on a facility divided by traffic volume during a selected time period.

Cross Access –A service drive that provides access between two or more abutting sites so that the driver need not enter the public street system to move between them.

Deceleration Lane –A speed-change lane that enables a vehicle to leave the through-traffic lane and decelerate to stop or make a slow speed turn.

Directional Median –A (typically) raised median used to channel traffic in a particular direction. For example, a directional median may allow only right turns at a particular location.

Design Traffic Volume –The traffic volume that a roadway or driveway was designed to accommodate and against which its performance is evaluated.

Downstream –The next feature (e.g., a driveway) in the same direction as the traffic flow.

Driveway –A (typically) private roadway or entrance used to access residential, commercial, or other property from an abutting public roadway.

Driveway Width –The width of a driveway measured from one side to the other at the point of tangency.

Easement –A grant of one or more property rights by a property owner. For example, one property owner may allow a neighbor to access public roads across his/her property.

Entering Sight Distance –The distance of minimum visibility needed for a passenger vehicle to safely enter a roadway and accelerate without unduly slowing through traffic.

Expressway –A major roadway designed for relatively uninterrupted, high-volume mobility between regions, access to which is limited and often includes a mixture of intersections (at grade) and interchanges (grade separated).

Facility –A transportation asset designed to facilitate the movement of traffic, including roadways, intersections, auxiliary lanes, frontage roads, backage roads, bike paths, etc.

FHWA –The Federal Highway Administration of the U.S. Department of Transportation.

Flag Lot –A lot not meeting minimum frontage requirements where access to a public road is provided by a narrow strip of land carrying a private driveway.

Freeway –A major roadway designed for relatively uninterrupted, high-volume mobility between areas, access to which is limited to grade-separated interchanges only. Interstates are freeways.

Frontage –The length of a property that directly abuts a highway.

Frontage Road –A local road that is used to provide alternative access to property from a road with higher functional classification; frontage roads typically run parallel to the mainline road and provide access at the front of a line of adjacent properties.

Functional Area –The area surrounding an interchange or intersection that includes the space needed for drivers to make decisions, accelerate, decelerate, weave, maneuver, and queue for turns and stop situations. The functional area should be kept as clear as possible of driveways and median openings where left turns are allowed.

Functional Classification System –A system used to categorize the design and operational standards of roadways according to their purpose in moving vehicles; higher functional classification implies higher traffic capacity and speeds and typically longer traveling distances.

Functional Integrity –Incorporation of appropriate access management standards and controls that allow a roadway to maintain its classified purpose.

Geometric Design Standards –The acceptable physical measurements that allow a facility to maintain functional integrity.

Grade Separated –Two or more facilities that intersect in separate planes of elevation.

Highest and Best Use –The probable and legal use of vacant land or improved property that is physically possible, appropriately supported, and financially feasible, which results in the highest property value.

Highway –A public way that every person has a right to use. The two critical aspects of a highway are the right of common enjoyment and the duty of public maintenance. In this document, a highway generally refers to a roadway under MoDOT jurisdiction that plays some role in moving through traffic.

Highway Capacity –The maximum number of vehicles a highway can handle during a particular amount of time and at a given level of service.

Highway System –All public highways and roads, including controlled access highways, freeways, expressways, other arterials, collectors, and local streets.

Interchange –A grade-separated facility that provides for movement between two or more roadways.

Internal Circulation –Traffic flow that occurs inside a private property.

Internal Site Design –The layout of a private property, including building placement, parking lots, service drives, and driveways.

Intersection –An at-grade facility that provides mobility between two or more roadways.

Interstate –A federally designated roadway system for relatively uninterrupted, high-volume mobility between states.

Jersey Barrier –A special variety of very high raised median that is used to separate opposing flows of traffic on high-speed urban interstates and freeways.

Joint (or Shared) Access –A private access facility used by two or more adjacent sites.

Just Compensation –The measure of damages in condemnation that represents the difference between the fair market value of the property immediately before a taking (a change in access that altered the value) and the value of the property in the after condition.

Land Use –The particular application for which a portion of land is employed, for instance, commercial use.

Lane –The portion of a roadway used in the movement of a single line of vehicles.

Left-Turn Lane –A lane used for acceleration, deceleration, or storage of vehicles conducting left-turning (cross traffic) maneuvers.

Level of Service –The factor that rates the performance of a roadway by comparing operating conditions to ideal conditions; "A" is the best, "F" is the worst.

Local Land Use Authority –Governmental entities such as cities and counties have authority to plan, zone, and control the subdivision of land on properties outside the right-of-way. Such authority is often critical to an effective program of roadway access management.

Local Service Street –A road whose primary purpose is to provide access between abutting properties and roads of higher functional classification.

Median –A barrier that separates opposing flows of traffic. Raised medians (with curbs and a paved or landscaped area in the center) are generally used in urban areas. Raised medians should not be confused with the more obtrusive Jersey Barriers. Flush medians (with no curbs and a grass-covered area in the center) are generally used in rural areas. Medians can be both functional and attractive.

Mid-Block Crossing –A crossing that is provided so that pedestrians can conveniently and safely cross a roadway in the middle of a block or segment of roadway.

Minor Arterial –A road whose primary purpose is to provide access between collectors and roadways of higher functional classification; these roads mainly provide local mobility and some access to land.

MoDOT –The Missouri Department of Transportation.

NCHRP –The National Cooperative Highway Research Program, a program that sponsors research on highway safety, operations, standards, and other topics.

Peak Hour Traffic –The number of vehicles passing over a section of roadway during its most active 60-minute period each day.

Police Power –The general power vested in the legislature to make reasonable laws, statutes, and ordinances where not in conflict with the Constitution that secure or promote the health, safety, welfare, and prosperity of the public.

Principal Arterial –A road whose primary purpose is to provide long-distance mobility between areas as well as connections between roads of lower functional classification, particularly minor arterials and collectors.

Queue Storage –A lane used to temporarily hold traffic that is waiting to make a turn or proceed through a location controlled by a traffic control device such as a stop sign or traffic signal.

Raised Median –The elevated section of a divided road that separates opposing traffic flows.

Residential –Property developed for the purpose of family, multi-unit, or other housing quarters, and that typically generates a lower number of trips and a lower volume of traffic than do commercial properties.

Right-In, Right-Out –A driveway or median where left turns are prohibited either by physical or regulatory means. In general, regulatory approaches to preventing left turns are ineffective.

Right-of-Way –Land reserved, used, or slated for use for a highway, street, alley, walkway, drainage facility, or other public purpose related to transportation.

Road –For the purposes of this document, a transportation facility extending from one community to another.

Roadway –The part of a public transportation facility intended for use by through traffic.

Roadway Classification System –See "Functional Classification System"

Rural –A geographic area that is not in an urbanized area, municipality, or similarly densely developed area and which is not likely to be so in the next 20 years.

Service Road –A local road that is used to provide alternative access to a road with higher functional classification; service roads may include internal circulation systems, frontage roads, or backage roads.

Shared Driveway –A single, private driveway serving two or more lots.

Side Friction –Driver delays and conflicts caused by vehicles entering and exiting driveways.

Sight Distance –The distance visible to the driver of a passenger vehicle measured along the normal travel path of a roadway to a specified height above the roadway when the view is unobstructed to oncoming traffic.

Speed Differential –The difference in travel speed between through traffic and traffic entering or exiting a roadway. Large speed differentials can contribute to delay, congestion, and rear-end collisions.

Stopping Sight Distance –The minimum distance required for a vehicle traveling on a roadway to come to a complete stop upon the driver seeing a potential conflict; it includes driver reaction and braking time and is measured on a wet pavement.

Storage Length –The length of a lane of roadway used to temporarily accumulate traffic that is waiting to proceed through a traffic control device or other stop or yield situation.

Street –For the purposes of this document, roads or public ways that are contained within a city, town, or village.

Strip Development –A linear pattern of roadside commercial development that often creates a large number of driveways and conflict points along a roadway.

Subdivision –A tract of land that is divided into multiple lots, often along an existing or proposed street, highway, easement, or right-of-way.

Taper –The transitional area of a roadway where it becomes wider or narrower.

Thoroughfare Plan Map –A long-range traffic circulation map that identifies the right-of-way widths for each roadway and serves as an official listing of rights-of-way to be reserved.

Throat Length –The distance between an intersecting roadway and where the internal circulation of a commercial driveway or parking lot begins; it provides queue storage mainly for traffic exiting a development.

Traffic Flow –The actual amount of traffic movement.

Traffic Impact Study –A report that compares relative roadway conditions with and without a proposed development; it may include an analysis of mitigation measures.

Transition –The area of a roadway where a change in traffic patterns occurs, including acceleration, deceleration, and turning activities.

Trip Generation –The estimated volume of entering and exiting traffic caused by a particular development.

Turning Radius –The radius of an arc that approximates the turning path of a vehicle.

Two-Way Left-Turning Lane (TWLTL) –A lane located between opposing traffic flows, which provides a transition area for left-turning (cross traffic) vehicles.

Uncontrolled Access –A situation that results in the incremental development of an uncontrolled number, spacing, and/or design of access facilities; an access management program is intended to constrain uncontrolled access.

Upstream –Against the direction of the traffic flow.

Urban –Within a current census urbanized area or municipal boundary or an area with similar density characteristics or forecast to be of an urban character within the next 20 years.

Vehicle Trip –A vehicle moving from a point of origin to a point of destination.

Warrant –The standardized condition under which traffic management techniques are justified.

Weaving –Crossing of traffic streams moving in the same general direction through merging and diverging, for instance, near an interchange or intersection.

2.0 ROADWAY CLASSIFICATION SYSTEM

Roadways, by their nature, serve a dual purpose providing a means of transport between one place and another and providing access to adjacent property. Sometimes these dual purposes come into conflict. Access management is intended to emphasize roadways' role of serving through traffic. The property access role of roadways becomes secondary or even eliminated when access is strictly managed.

Highways should be carefully classified based on their intended function so that their property role can be emphasized and so that access can be managed in an appropriate way. Highways that are intended to mainly serve through traffic should play a limited role in terms of direct property access. Access management on these routes should be stricter than on other routes.

The following classification system is used throughout this document to establish a functional hierarchy of roadways. It was developed and is used by MoDOT. In general, routes classified with a low number are intended to carry long-distance, high-speed travel and will have a high level of access control. Routes classified as minor arterials and

collectors will make up the bulk of the miles of the system, serve more local destination traffic, and have a lower level of access control.

	Urban	Rural
Interstate/Freeway	U1	R-1
Principal Arterial (A)	U2	R2
Principal Arterial (B)	U3	R3
Minor Arterial	U4	R4
Collector	U5	R5

- "Principal Arterial (A)" routes are key, non-freeway or non-interstate, intercity or inter-regional routes. They are intended to serve long-distance trips at relatively high speeds.

- The "Collector" classification includes both major collectors and minor collectors.

- "U" indicates Urban: the highway is within current urbanized or census urban area or is forecasted as urban within 20 years.

- "R" indicates Rural: the highway is not within a current and is not in a 20-year forecast urban area.

3.0 GUIDELINES FOR DETERMINING URBAN AND RURAL SEGMENTS

Breaks between urban and rural are established on a regular basis by MoDOT district staff for access management purposes. Each break between urban and rural must occur at a readily identifiable physical feature such as a bridge, creek, river, or public road intersection.

MoDOT has traditionally used an area with a population of 5,000 to define what is urban. Places at or below 5,000 persons that have a population density of at least 1,000 persons per square mile (1.6 persons per acre) should also be considered as urban for access management purposes. In some places, traffic density may be a more important consideration than population density. Such areas might be described as commercial communities located in what are now rural areas. These would include individual commercial developments that generate a least 250 trips per hour or clusters of commercial development that generate at least 400 trips per hour along a mile of road.

4.0 LIST OF STANDARDS

The following table provides a listing and rationale for the standards included in this document.

Access Management Standard	What It Means	Why It Is Important
Access management roadway classification system.	Access management standards should vary by the functional roadway type; the system classification should be mapped.	Allows access management standards to properly fit the functional role of the highway or street. The higher function, the less direct access is allowed.
Distance between major at-grade intersections	The minimum distance or spacing between types of intersections of roads or driveways.	Preserves traffic flow and ensures that a functional hierarchy of roads is maintained.
Distance between traffic signals.	The minimum and desirable spacing between signals.	Ensures efficient traffic flow on signalized arterials. Too many signals placed too close together will disrupt traffic flow.
Driveway spacing and density.	The amount of distance between driveways and the number of driveways per unit of frontage. These standards should vary with the roadway classification, the expected land use, and the speed limit for the road.	Short spacing between driveways and high driveway densities generate conflict points that in turn lead to higher crash rates and more traffic congestion.
Corner clearance and clearance of the functional areas of intersections.	The minimum distance allowed between an intersection and the first driveway.	Insufficient corner clearance is a major cause of access-related crashes.
Sight distance standards.	The sight distance conditions under which a driveway should not be allowed.	A driveway opening where there is insufficient sight distance is inherently dangerous.
Driveway geometric standards.	The width, turning radius, throat length, approach angle, grade, and surfacing requirements for driveways. These can vary by the expected land use served by the driveway and the roadway classifications.	Insufficient driveway geometrics lead to slow driveway entrance and exit speeds. This leads to conflicts between turning and through traffic.
Median opening.	Where openings in medians will and will not be allowed.	Too many median openings or closely spaced median openings detract from the proper functioning of a median
Guideline on using two-way left-turn lane (TWLTL).	When TWLTLs should be used and when raised medians should be used instead.	TWLTLs are far less controversial than raised medians; however TWLTLs do not function well once a certain traffic volume range has been reached.
Auxiliary lanes (dedicated left and right turning land standards).	The traffic conditions under which turning lanes should be provided to serve a commercial or industrial driveway.	Some high volume driveways should have dedicated left or right turn lanes to reduce conflicts with through traffic. This is particularly true on high-speed routes.
Frontage and backage road spacing.	How far away frontage and backage rods should be placed from the mainline.	Frontage and backage roads that are placed too close to mainlines may create more conflicts than they solve.
Guideline for using three-lane	A three-lane road may perform	Three-lane roads are a relatively

TWLTL cross-sections.	better than a four-lane undivided roadway under the right circumstances.	new concept that may be an economical solution to some access problems

5.0 AT-GRADE INTERSECTIONS SPACING

What This Standard Means

This standard governs the minimum distance or spacing between types of public roadways and their intersections. This standard provides for a hierarchy of roads and maintains adequate spacing between roads that are intended to mainly serve through traffic. Interstates, freeways, and the three types of arterials are mainly intended to serve through traffic and therefore are spaced the farthest apart. Collectors provide some service to through traffic but also provide direct access to property; therefore, they can be placed closer together.

Minimum Standard

Roadway Classification	In Current and Projected Urban Areas	In Rural Areas
Principal Arterial (A)	2,640 feet	1 mile (5,280 feet)
Principal Arterial (B)	2,640 feet	1 mile (5,280 feet)
Minor Arterial	1,320 feet	2,640 feet
Collector	660 feet	1,320 feet

6.0 TRAFFIC SIGNALS SPACING

What This Standard Means

This standard governs the distance between signalized at-grade intersections on public roadways. Minimum spacing is mainly intended to preserve efficient traffic flow and progression on urban arterial roadways; for instance a quarter- or half-mile spacing allows traffic signals to be effectively interconnected and synchronized. Adequate spacing will also tend to reduce rear-end collision and "stop and go" driving that increases congestion, delay, and air pollutions. In urban areas, these standards were developed to allow for smooth operations given a 90-second total traffic signal cycle length.

Minimum Standard

Roadway Classification	In Current and Projected Urban Areas	In Rural Areas
Principal Arterial (A)	2,640 feet	Not allowed
Principal Arterial (B)	2,640 feet	Not allowed
Minor Arterial	2,640 feet	Not allowed
Collector	1,320 feet	Not allowed

7.0 MEDIAN OPENING SPACING

What This Standard Means

Openings in raised medians should only be provided to accommodate turning traffic in locations where this can be safely done. When openings are provided, an adequate spacing between them is required to allow for weaving of traffic so as to preserve traffic flow and provide for safe lane changes and turns.

A full opening allows turns to be made in both directions; a directional opening allows turns to be made in only one direction. An example of a directional median would be one that allows left turns into a driveway but does not allow left turns to be made out.

Median openings shall not be allowed under the following circumstances:

- Within the functional area of an interchange
- Within the functional area of an intersection between two public roads
- At locations that have high accident rates
- Where an opening would be unsafe because of inadequate sight distance

Queue storage for median openings should be a minimum of 40 feet (two standard car lengths) in rural areas and 60 feet (three standard car lengths) in urban areas. Traffic studies should support the required length of queue storage for major traffic generator such as a shopping mall or industrial plant.

Accommodating Safe U-Turns

In cases where left turns are restricted by lack of median openings, care must be taken to allow for U-turns to be made in a safe manner. U-turns can be safely accommodated through a variety of means, including signal phasing and timing, widening, and including physical design features such as turning lanes and "jug handles." Where U-turns cannot be made safely, they should be explicitly prohibited. U-turn opportunities should be designed with a typical design vehicle type in mind, generally a standard passenger car. For clarification see Appendix Page APP 2, Diagram # D-1

Minimum Standard

Roadway Classification	In Current and Projected Urban Areas	In Rural Areas
Principal Arterial (A)	2,640 feet 1,320 feet (directional)	2,640 feet (full) when posted speed is over 45 mph 1,320 feet (full) when posted speed is under 45 mph
Principal Arterial (B)	1,320 feet (full) 660 feet (directional)	2,640 feet (full) when posted speed is over 45 mph 1,320 feet (full) when posted

		speed is under 45 mph
Minor Arterial	1,320 feet (full) 660 feet (directional)	1,320 feet (full) at all speeds
Collector	Medians generally not used	Medians generally not used

8.0 RAISED MEDIANS

What This Standard Means

Raised medians are the most effective access management strategy on high-volume urban routes. They are 25 or more percent safer than multi-lane undivided sections and 15 percent safer than two-way left-turn lane cross-sections in such high traffic situations.

In general, use of raised medians is recommended where current and projected traffic volume is greater than 28,000 average annual daily traffic (AADT). Raised medians are especially recommended in corridors where the traffic volume is high, the density of commercial driveways is high (over 24 miles in both directions), and other access management strategies such as driveway consolidation and corner clearance are not practical. Raised medians should certainly be used on arterial facilities with three or more through traffic lanes in each direction.
For clarification see Appendix Page APP2, Diagram #D-2

Minimum Standard

Roadway Classification	In Current and Projected Urban Areas	In Rural Areas
Principal Arterial (A)	Use a raised median when current and projected traffic exceeds 28,000 AADT	Use flush median instead
Principal Arterial (B)	Use a raised median when current and projected traffic exceeds 28,000 AADT	Use flush median instead
Minor Arterial	Use a raised median when current and projected traffic exceeds 28,000 AADT	Use flush median instead
Collector	Generally not applicable due to low traffic volumes	Generally not applicable due to low traffic volumes

9.0 AUXILIARY ACCELERATION AND TURNING LANES

What This Standard Means

Dedicated left- and right-turn lanes should be provided in situations where traffic volumes and speeds are relatively high and conflicts are likely to develop at public road intersections and private driveways between through and turning traffic. Auxiliary lanes are an asset in promoting safety and improved traffic flow in such situations. The use and design of any auxiliary lanes should always be guided by a traffic study. Some major applications for and considerations for the design of auxiliary lanes are as follows:

- Installing a right-turn acceleration lane. These lanes allow entering vehicles (those that have turned right from a driveway or minor public road onto the major route) to accelerate before entering the through-traffic flow. Such acceleration lanes may be appropriate when the average daily traffic on the major route with a posted speed of 35 miles per hour or more exceeds 10,000 and there are at least 75 right-turn egress movements from a driveway or minor public road. Such lanes may also be warranted where crash experience indicates a problem with right turning, entering vehicles. The right-turn acceleration lane should be of a sufficient length to allow safe and efficient acceleration lanes should always be guided by a traffic study.

- Installing auxiliary left-turn lanes. Such lanes, installed in the roadway center, are intended to remove turning vehicles from the through traffic flow. This should reduce the frequency of rear-end collisions at locations where there is considerable left-turn ingress activity, such as major driveways and minor public road intersections. Suggested application for left-turn lanes in the median are shown in the table below. A turn lane should be considered when the left-turning volume meets or exceeds the value in the table for a posted speed.

Posted Speed Limit (mph)	Left-Turn Volume (at Peak Hour)
35	20
45	15
55 or more	10

The use and design of auxiliary left-turn lanes should always be guided by a traffic study. In general, auxiliary left-turn lanes must be long enough to accommodate a safe deceleration distance and to provide adequate storage of a queue for expected peak hour turning traffic.

- Installing auxiliary right-turn lanes. The use of dedicated right-turn lanes should also always be guided by a traffic study. In general, dedicated right-turn lanes should be provided in both rural and urban areas on two lane routes as shown in the table below when the right-turn volumes at peak hours are met or exceeded.

Posted Speed Limit (mph)	Right-Turn Volume (at Peak Hour)
35	40
45	30
55 or more	20

- On four-lane routes, these warrants can be roughly doubled to 80, 60 and 40 turning vehicles per peak hour. In such cases there will be some ability for through traffic to avoid stopping or slowing dramatically to avoid turning vehicles.

Dedicated right-turn lanes should also be strongly considered in situations where:

- Poor internal site design and circulation leads to backups on the mainline. Auto-oriented businesses with short drive-through lanes or poorly designed parking lots would be prime examples of this situation.
- The peak hour turning traffic activity is unusually high (e.g. greater than 10 percent of the daily total.)
- Operating speeds on the mainline route are very high (greater than 60 miles per hour) and drivers would generally not expect right turns.
- The driveway or minor public road intersection is difficult for drivers to see.
- The driveway entrance is gated or otherwise must be entered very slowly.
- Right turning traffic consists of an unusually high number of trailers or other large vehicles.
- The intersection or driveway angle is highly skewed.
- Rear-end collision experience is unusually high at a location.

For clarification see Appendix Page APP 3, Diagram # D-3
As with any auxiliary turning lane, dedicated right-turn lanes should be designed based on the results of a traffic study.

Width of Auxiliary Acceleration and Turn Lanes

Any auxiliary turning lanes such as dedicated right-turn, left-turn, and acceleration lanes should always be at least 11 feet wide. Twelve feet is a desirable width, not including the gutter. The following diagram shows several typical left-turn lane designs.
For clarification see Appendix Page APP3, Diagram #D-4 a & #D 4b

10.0 FRONTAGE AND BACKAGE ROADS

What This Standard Means

Rev. 4/09 Frontage roads and backage roads or alleys provide primary, alternative or additional access to property and help remove or assist traffic flow in and about a mainline route. A frontage road usually provides primary access at the front of properties while a backage road provides alternative or auxillary access at the rear of properties. These types of roads are most often used to provide alternative access to commercial businesses and developments.

Frontage and backage roads can dramatically improve safety and operations. However, a common mistake involves placing frontage or backage roads in very close proximity to the mainline. Placement of frontage roads in close proximity to mainline roads can actually create additional opportunities for delay, congestion, and crashes due to insufficient storage (“throat length”) provided for entering and exiting vehicles. When this happens, the access problem that the frontage or backage road was designed to address, is relocated rather than cured.

Minimum Standard

Frontage and backage roads should be spaced a minimum 300 feet from the mainline route in which they provide alternative access for. Measurements should be taken from pavement edge to pavement edge. In effect, this 300 foot minimum spacing will tend to promote the use of backage roads rather than frontage roads.

Rev. 4-09 **Impact Assessment and Fee for Utilization of Backage Roads or Alleys as Ingress/Egress/Storm Water for Commercial Enterprises**

In the commercial zones and areas of Boonville, there are a number of properties that need to use or could benefit from a increased or modified use of an alley way adjacent to their business to allow for more appropriate ingress, egress and traffic flow in and around the commercial enterprise. In addition, due to storm water management issues, alleys may be used to move storm water run off from the subject property without burdening surrounding properties. Alley ways have not been traditionally designed or built for this level of traffic movement or storm water management and may need modification or higher levels of maintenance to handle this increased and/or altered use above and beyond the current municipal road maintenance program.

If a commercial enterprise uses an alley way or backage road for expansion, modification, re-development or new development, the City Engineer or other City representative will evaluate the impact of this development and make recommendations for the use. The developer or business owner will bear some financial responsibility for any ultimate pavement upgrades required and will therefore be assessed a one-time impact fee of ten ($10.00) dollars per foot of alley or backage road affected by the development payable prior to issuance of the building permit. In addition, necessary upgrades to drainage design or structures or other city infrastructure in and around the alley way or backage road including extraordinary alley design costs and improvements will be assessed a one-time impact fee on a case-by-case basis and payable prior to the issuance of the building permit.

11.0 DRIVEWAY SPACING

What This Standard Means

This standard governs the minimum recommended spacing between private driveways on various classes of roadways. This is necessary to preserve both safety and traffic flow. Spacing between driveways must be longer on higher speed routes and are also longer in rural areas than in urban areas because of higher posted speed limits. In urban areas, these standards allow for about one driveway per city block face on principal arterials and minor arterials, and two driveways per block face on major collectors.

In order to preserve spacing, direct access should be moved to local streets (not arterials and collectors) where possible. In particular, access for corner lots should be moved to a

lower traffic side street whenever possible. Access can often be better accomplished on major streets through such means as frontage and backage roads, sight distance allows. Driveways should not be allowed where sight distance in inadequate even if the driveway spacing standard would allow them.

Driveway accesses should be provided on local and collector streets ("side streets") rather than arterials whenever possible. Driveways should also be lined up from each other across the public roadway whenever possible. When driveways are not lined up, the minimum spacing should be measured from the closest driveway on either side of the road, except where a raised median exists, shorter driveway spacing may be acceptable for right-in, right-out driveways only.

Minimum Standard

Roadway Classification	In Current and Projected Urban Areas	In Rural Areas
Principal Arterial (A)	660 feet	1,320 feet
Principal Arterial (B)	440 feet	660 feet
Minor Arterial	330 feet	440 feet
Collectors	220 feet	330 feet

12.0 DRIVEWAY CORNER CLEARANCE

What This Standard Means

Corner clearance represents the distance between the corner of the intersection of two public roadways and the next private driveway. It is important to provide enough distance between the corner and the first driveway to effectively separate conflict points and to allow drivers enough time to make safe maneuvers. When corners are not adequately cleared, high crash rates tend to occur. Delays and traffic congestion also result when corners are not adequately cleared. These standards correspond to the minimum driveway spacing standards for the same roadway classification. This standard only applies where the minimum sight distance standard allows.

Minimum Standard

Roadway Classification	In Current and Projected Urban Areas	In Rural Areas
Principal Arterial (A)	660 feet	1,320 feet
Principal Arterial (B)	440 feet	660 feet
Minor Arterial	330 feet	440 feet
Collectors	220 feet	330 feet

13.0 SPACING/CLEARANCE FOR RIGHT-IN, RIGHT-OUT DRIVEWAYS

What This Standard Means

This standard governs the minimum recommended spacing and corner clearance for driveways along roadways in urban areas that have a non-traversable median and speed limits at or below 45 miles per hour. A non-traversable median restricts left-turn movements into and out of driveways. Adequate spacing between driveways and corner clearance are both necessary to preserve safety and traffic flow. Spacing between driveways must be longer on higher speed routes and also must be longer in rural areas than in urban areas because of higher posted speed limits.

Research and operating experience in other states indicates that on urban routes where non-traversable median exist, shorter driveway spacing and corner clearance upstream from an intersection is acceptable for right-in, right-out driveways. This standard provides for double the number of right-in, right-out driveway access points that are allowed when left turns into and out of driveways are permitted. It also allows for a shorter clearance distance from corners to the last driveway upstream from the corner. For safety reasons, the minimum downstream corner clearance should stay the same as in situations in which there is no non-traversable median present. This shorter standard for right-in, right-out driveways should not be used where a non-traversable median does not exist (e.g., where there is a continuous left-turn lane.) It should also not be used in rural areas, where higher operating speeds prevail for safety reason.

Experience has shown that a shorter standard for right in, right-out drives will only work well where there is a significant physical barrier that prevents left turns (e.g., a non - traversable median). Regulatory restrictions on left turns (e.g., "No Left Turn" signals) are not effective in preventing left turns. Neither are small traffic directors located at driveway entrances.

In order to preserve spacing, direct access should be moved to local streets (not arterials and collectors) where possible. Access can be better accomplished on major streets through such means as frontage and backage roads, joint access, cross access, and shared driveways. These standards only apply where sight distance allows. Driveways should not be allowed where sight distance is inadequate even if the spacing standards would allow them.

Minimum Standard

	Minimum Spacing For Right-In	**Right out Driveways**
Roadway Classification	**In Current and Projected Urban Areas**	**In Rural Areas**
Principal Arterial (A)	330 feet	330 feet
Principal Arterial (B)	220 feet	220 feet
Minor Arterial	165 feet	165 feet
Collectors	110 feet	110 feet

14.0 DRIVEWAYS SIGHT DISTANCE

Sight distance for driveway construction should be considered essential in the design and issuance of permits for all classes of driveways. If there is a request to construct a driveway at a questionable location, a traffic study must include an on-site inspection to evaluate the sight distance. Sight distance is always the most important consideration in allowing, not allowing, or placing driveways.

There are two basic concerns of responsibility when considering the sight distance requirements for any driveway. The first concern is to provide maximum safety for the motoring public. The second concern is to provide for access to the adjacent property owners. Both vertical and horizontal alignment can limit sight distance. Vertical and horizontal alignments of many existing supplementary routes are based on 30 mph design speed while the posted speed is often 55 mph. Fortunately, adjacent property owners are usually anxious to consider the safest location for a driveway.

How to Measure Vertical Sight Distance

To measure actual sight distance limited by vertical alignment in the field, place a sighting target 4.25 feet above and 20 feet from the edge of pavement at the proposed driveway location (approximate location of a driver approaching the roadway). On minor arterial and collector routes, the target may be placed at a point 14.4 feet from edge of pavement. Sighting from the height of 3.5 feet, move along the roadway away from the proposed driveway site to a point just beyond where the target disappears. Then move back toward the target until it can first be seen. Place a mark on the pavement and then measure the distance along the roadway between the mark and the target. This measured distance is the vertical sight distance. Measurement may also be made with an accurate measuring device mounted on an automobile.

How To Measure Horizontal Sight Distance.

To measure horizontal sight distance, place a sighting target 4.25 feet above and 20 feet from the edge of pavement at the proposed driveway location. On minor arterial and collector routes, the target may be placed at a point 14.4 feet from edge of pavement. Move away from the target along the roadway until the target is just out of sight or the line of sight is beyond the right-of-way limits. The line of sight must stay within the limits of the right-of-way. Consideration should also be given to vegetation both on the right-of-way and adjacent to the right-of-way as may impede vision more during certain times of the year. Sighting from a height of 3.5 feet, move along the roadway toward the target until it can first be seen and place a mark on the pavement. Measure the distance between the mark and the target along the roadway. This measured distance is the sight distance.

The following criteria are based on the American Association of State Highway and Transportation Officials Guidelines and NCHRP Report 383 and have been developed in

order to establish a uniform method of determining the necessary sight distance for the driveways constructed by MoDOT or by MoDOT permit.

The three sight distance categories are; design sight distance, minimum sight distance and minimum stopping sight distance.

Design Sight Distance (Feet)

Speed*	30	35	40	45	50	55	60	65	70
Distance	370	470	570	700	830	980	1,150	1,340	1,560

Application

Preparation for issuing a driveway permit must include a prior inspection of the driveway site to ensure that vehicles can enter and exit from the proposed driveway with a minimum disruption of traffic along the roadway. Sight distance should be considered the essential element in the location of all driveways with particular emphasis place upon public street approaches, high-volume commercial and industrial driveways, and all driveways on principal arterial routes. Field measurements shall be based on a 3.5 feet height of eye and a 4.25 feet height of object. The sight distance for the proposed driveway is measured for each direction of travel and the smaller distance is then located in the sight distance chart for the speed of the roadway to determine which sight distance criterion is met, if any.

If the driveway location meets or exceeds the requirements for the design sight distance for the speed of the roadway as established in the previous table, a permit may be written, providing the other appropriate requirements are met.

Minimum Sight Distance (Feet)

Speed*	30	35	40	45	50	55	60	65	70
Distance	310	360	410	460	510	560	620	670	720

If no location on the applicant's frontage meets or exceeds design sight distance but a location does meet or exceed the distances shown in the preceding table, a permit may be issued in accordance with the following criteria:

1) The proposed driveway location has the maximum sight distance available on the entire property frontage.
2) The access management classification category for the route is minor arterial or collector.
3) The proposed location is not for a public street approach or a high-volume commercial driveway.
4) The following applicant's responsibility clause is added to the permit: "Applicant understands the presence of this driveway creates a potential sight distance problem and has been so informed in writing by the department."

* The posted speed shall take precedence over the design speed.

In this instance, it is imperative that property owners be on the site to be certain they understand the conditions of this driveway construction.

Minimum Stopping Sight Distance (Feet)

Speed	30	35	40	45	50	55	60	65	70
Distance	200	225	275	325	400	450	525	550	625

If no location on the applicant's frontage meets or exceeds minimum sight distance but a location does meet or exceed the distances shown in the preceding table, a permit may be issued with the district engineer's approval, in accordance with the following criteria:

1) The proposed driveway location has the maximum sight distance available on the entire property frontage.
2) The access management classification category for the route is minor arterial or collector.
3) The proposed location is not for a public street approach or a high-volume commercial driveway.
4) There is no other available access having equal or greater sight distance.
5) The following applicant's responsibility clause is added to the permit: "Applicant understands the presence of this driveway creates a potential sight distance problem and has been so informed in writing by the department."
6) The following clause is added to the permit in addition to the applicant's responsibility clause: "Applicant is aware that the sight distance of this driveway is severely restricted. The sight distance is the minimum necessary for a vehicle traveling at the posted speed to come to a complete stop prior to the driveway."

If these conditions are not met, the permit shall not be issued for the driveway. If an appeal for the access is made, it should be sent to the Public Works Director for additional review.

The applicant should be advised of work that could improve sight distance for the locations, such as minor grading or brush removal.

The city may allow the widening of a driveway with limited sight distance or may allow the relocation of a driveway with limited sight distance to a location on the property frontage with better sight distance without division approval. This will be allowed on routes with normal right of way, provided there is no change in driveway usage. The following responsibility clause must be added to the permits:

"Applicant understands that the existing sight distance for this driveway is less than current design standards and the driveway modification, while beneficial to the property owner, will not remedy the sight distance limitation."

Adjustment for Steep Grades

The sight distance standards here assume a level (flat) roadway. On many roadways in Missouri, there are significant upgrades or downgrades also the road profile. The AASHTO Green Book indicates that for upgrades or downgrades of up to and including 3%, there is little effect of grade on stopping site distance. However, when an upgrade equals or exceeds 4%, stopping sight distances need to be adjusted to account for the fact that vehicles entering the traffic stream will take longer to accelerate to the posted speed limit. The impact of grade will be most profound for combination trucks (e.g., the AASHTO WB-50 design vehicle) and other heavy vehicles.

When there is a significant upgrade (e.g., over 4 percent) that must be negotiated by an entering vehicle, the adjustment factors in the following table should be applied to the stopping sight distance tables noted above by multiplying the adjustment factor to the appropriate stopping sight distance figure. When a driveway with a significant number of combination vehicles is used, the higher of the two adjustment factors should be used.

Adjustment Factors for Steep Grades

Typical Entering Vehicle	Flat to 4% Grade	Grades Between 4% to 6%	Grades 6% or More
Passenger Vehicles (P) and Single-Unit Trucks (SU)	No adjustment needed	1.3	1.5
Combination Trucks (WB-50)	No adjustment needed	1.7	2.2

If at all possible, public road intersections or high-volume private driveways should not be placed along roadway segments where the grade of the roadway exceeds 6%.

15.0 DRIVEWAY GEOMETRICS

The design of driveways is critical in access management in that it affects the speed of traffic turning into and out of driveways. This in turn affects the speed differential between through traffic and turning traffic. Large speed differentials are created when driveways are inadequately designed. Large speed differentials are associated with higher crash rates and diminished traffic operations.

The following standards are adapted form the Institute for Transportation Engineers (ITE) latest recommended practice for driveway design with modifications by the Access Management Technical Committee. The existing ITE guidelines are from 1974 and are currently undergoing substantial revision; this should result in standards that resemble those on these pages. Driveway designs should always be based on the results of a study of the traffic likely to use them; these guidelines are presented to illustrate good practices for driveway designs.

Lining Up Driveways Across Roadways

Driveways should be as closely lined up with driveways across roadways without non-traversable medians to the maximum extent possible even if less spacing between driveways is the result.

Angle of Intersection to the Public Roadway

- Driveways that serve two-way traffic should have angles of intersection with the public road of 90 degrees or very near 90 degrees. The minimum acceptable angle for driveways that serve two-way traffic is 70 degrees.

- Driveways that serve one-way traffic may have an acute angular placement of from 60 to 90 degrees, but this is not recommended.

Right-Turn (Approach) Radius

Approach radii should be large enough to allow entering vehicles to do so at a reasonable rate of speed. The following are suggested as minimum approach radii and are measured from the edge of the driving surface of the roadway. Any maximum approach radius is allowable for driveways.

Minimum Right-Turn Radius for Driveways	Urban Areas (Or at or below 45 mph Posted Speed)	Rural Areas (Or greater than 45 mph Posted Speed)
Residential Driveways	10 feet	25 feet
Commercial Driveways	25 feet	50 feet
Industrial Driveways	Design to handle typical large truck that uses the driveway	Design to handle typical large truck that uses the driveway

Inside radii should be determined on a case-by-case basis given driveway angle, traffic volume, and other relevant factors. Sites that generate substantial large truck traffic need inside larger radii to accommodate the wheel path of the turning trucks.

Driveway Width

No driveways should have widths less than 20 feet. Driveways of greater than 54 feet should be strongly discouraged unless they contain a raised median to separate traffic lanes. Driveways that serve one-way traffic should be from 20 to 30 feet wide. Driveway widths should be measured from the face of curb to the face of curb at the point of tangency. Any medians contained in the driveway are above and beyond the minimum widths in the table. Minimum acceptable and maximum acceptable widths for various levels of traffic and directions of access are shown in the table below:

Driveway Traffic Category	Average Daily Traffic Using Driveway	Peak Hour Traffic Using Driveway	With Two-Way Access		With One-Way Access	
			Minimum Width	Maximum Width	Minimum Width	Maximum Width
Residential	0 - 100	0 - 10	20 feet	30 feet	NA	NA
Low Volume Commercial/Industrial	<1500	<150	28 feet**	42 feet***	20 feet*	20 feet*
Medium Volume Commercial/Industrial	1,500 – 4,000	150 – 400	42 feet***	54 feet****	20 feet*	30 feet**
High Volume Commercial/Industrial	> 4000	> 400	42 feet***	To be determined through a traffic study	Generally not applicable	Generally not applicable

*One-lane driveways
**Driveway striped for two lanes
***Driveway striped for three lanes
****Driveway striped for four lanes

All commercial and industrial driveways should be curbed on approach.

Driveways and Accommodation of Pedestrians

In current and future urban places, all driveways must adequately accommodate pedestrians using sidewalks or paths. The minimum practical width should be used to accommodate pedestrians, and the driveway should be designed to provide the shortest practical path across the driveway for pedestrian movements. A safe boundary should always be created between pedestrian and motor vehicle traffic.

Driveways and Accommodation of Bicycles

Where a new driveway crosses a bicycle facility (such as a dedicated bike path or an on-street bike lane), the driveway should be designed so as to accommodate the safe crossing of bicyclists. Likewise, when a new bicycle facility is built that crosses existing driveways, the bicycle facility should be designed with safe crossings in mind.

Tapers

The minimum distance between the entrance and exit tapers of adjacent driveways must be at least 50 feet. If they are not, the tapers should be eliminated and the shoulder paved to form a turn lane.

Driveway Throat Length

The throat length is the distance between the street and the parking lot served by a driveway. An adequate throat length helps to keep traffic conflicts within a parking lot to a minimum and frees up space on the driveway for incoming and outbound traffic. The following throat-length guidelines are suggested:

- For low traffic volume commercial and industrial driveways (below 150 peak hour vehicles in both directions), the minimum desirable driveway throat length is 20 feet (about one 20-foot car length).

- For medium traffic volume commercial and industrial driveways (150 - 400 peak hour vehicles in both directions), the minimum desirable driveway throat length is 20 feet (about one 20-foot car length).

- For high-volume driveways (over 400 peak hour vehicles in both directions) such as a shopping center entrance, the adequate throat length should always be determined by the results of a traffic study.

Vertical Geometrics (Driveway Grade Change)

Access driveways on arterial roadways should always be designed to allow vehicles to proceed into or out of the driveway at a speed that will prevent large speed differentials between turning and through traffic. Required apron lengths, desirable grade changes and maximum allowable grade changes are shown in the table below. The apron is a relatively flat area where the driveway meets the public roadway. These standards apply to all types of driveways, including for residential, commercial and industrial uses. Driveways should always have a minimum grade change between ½ to 1 percent to provide for adequate drainage. Either an upgrade or downgrade is permissible.

Desirable grades and maximum allowable grades are shown in the following table. Driveways should have a minimum grade of ±1% for drainage.

Roadway Classification	Required Minimum Apron Length	Desirable Grade Change, Urban	Maximum Grade Change Allowed, Urban	Desirable Grade Change, Rural	Maximum Grade Change Allowed, Rural
Principal Arterial A	μ 30 feet	<2%	<3%	<1%	<2%
Principal Arterial B	μ 25 feet	<3%	<4%	<2%	<3%
Minor Arterial	μ 20 feet	<4%	<5%	<3%	<4%
Collector	μ 15 feet	<5%	<6%	<4%	<5%

Driveway Surfacing

Required driveway surfaces depend on the roadway they are entering. These are included in the City's Street Specifications.

16.0 PARKING ON FACILITIES

What This Standard Means

This standard suggests when parking may be allowed on facilities. In general, parking should not be allowed on highway facilities that are primarily intended to serve through-traffic movement. This includes such facilities as interstates, other freeways, and arterials. On-facility parking should not generally be allowed along collectors in rural areas since these roadways allow for high travel speeds. On facilities such as urban collectors, parking may be allowed if an engineering study indicates that it is safe to do so and that the parking will not unduly hinder traffic operations.

Only parallel parking should be allowed. No angle parking should be permitted on any of the types of facilities listed in the table below. Angle parking may, however, be appropriate if the goal is to provide something other than smooth traffic flow or safety. For instance in a small town, promotion of a "walkable community" may be encouraged by providing angle parking in the central business district.

Recommended Standard

Roadway Classification	In Current and Projected Urban Areas	In Rural Areas
Interstate/Freeway	No parking	No parking
Principal Arterial (A)	No parking	No parking
Principal Arterial (B)	No parking	No parking
Minor Arterial	Parking should be studied but may be allowed when warranted to serve and when it can be provided safely	No parking*
Collectors	Parking should be studied but may be allowed when warranted to serve and when it can be provided safely	No parking*

*The urban standard may be applied on minor arterials and collectors in developed areas that are not urban, for example, cities with populations under 5,000.

17.0 OTHER MODES

Other complementary corridor management features that are not access management features per se, such as bicycle and pedestrian accommodation and public transit pull-ins are included here. The MoDOT has developed a General Pedestrian and Bicycle Guide that should be used to determine what should be done to accommodate those modes when access is managed. The section of this handbook that discusses driveway geometrics has the largest bearing on pedestrians and bicyclists. In addition, access management treatments such as reducing driveway density and adding raised medians and mid-block crossings will have a positive impact on safety and convenience for pedestrians and bicyclists.

Managing access can also have a positive impact on the operation of public transit vehicles since they will be able to operate more efficiently and safely when they use arterial and collector routes.

What This Standard Means

In urban areas and future urban areas, access management projects should accommodate public transit vehicles through the use of such design features as bus pull-outs.

Mid-block bus pull-outs should be a minimum of 50 feet in length, and 12 feet in width and have an additional 40 – 60 foot taper in each direction. These standards do not apply in future urban areas.

Standard For Public Transit Accommodation

Roadway Classification	Public Transit Buses
Interstate/Freeway	Use of these facilities recommended for express bus routes only
Principal Arterial (A)	Use of these facilities recommended for express bus routes only
Principal Arterial (B)	Include bus pull-outs in design as appropriate
Minor Arterial	Include bus pull-outs in design as appropriate
Collectors	Generally no applicable due to low traffic volumes

Basis: Delaware DOT standards.

18. ACCESS MANAGEMENT AND LAND SUBDIVISION PRACTICES

In addition to the existing zoning regulations, the following are recommended practices:

In General

- Establish a cooperative review process of new subdivision plats with MoDOT to assure that sound access management principles are followed where the development abuts MoDot controlled highways.

- Refuse to plat "flag lots," e.g., lots in which a narrow section of land carrying the driveway connects the main lot to the road.

- Encourage the use of cross-access agreements and joint access (adjacent landowners sharing driveways) where possible to limit the number of driveways needed. This limits potential conflict points.

Commercial

- Encourage developers and landowners to use the minimum number of driveways possible and locate them as far away from public road intersections and other driveways as possible.

- Have developers design parking lots and private driveways so as to encourage good internal circulation. Good internal circulation can prevent a number of access problems such as large speed differentials between turning traffic and through traffic or cars backing up onto streets.

- Encourage a parcel frontage (width) on arterial and collector roadways of at least 220 feet.

- Encourage direct access via collector and local service streets rather than on the arterial road for as many driveways as possible.

Residential

- Encourage direct access via collector and local service streets rather than on the arterial road. Consolidate driveway accesses through the use of neighborhood collectors.

- Allow an absolute minimum parcel frontage of 50 feet. Under this situation, shared driveways, cross-access, or access off a side street should be encouraged.

19. WAIVER OF SPECIFICATIONS FOR MAJOR DEVELOPMENTS

A partial waiver of a specification herein contained may be considered under the following circumstances:

- A plan is submitted to the Planning and Zoning Commission under section 2.5.5 of Appendix C - Zoning concerning Planned Business Districts.
- A plan is submitted to the Planning and Zoning Commission under section 2.8 of Appendix C - Zoning concerning large scale development projects.
- No waiver shall be considered until it is shown that the lack thereof creates a hardship for the developer that cannot be overcome without the waiver.