PennDOT Planning Services and Implementation

Work Order # 7

Development of Model Access Management Ordinances
Task 2: Access Management State of Practice

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Pennsylvania Department of Transportation

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INTRODUCTION

The Pennsylvania Department of Transportation (PennDOT), which is responsible for the state roadway system, understands that pro-active actions regarding access management are necessary to support growth and development in an environmentally sound manner. PennDOT asked the Parsons Brinckerhoff (PB) Team to assist in the development of model access management ordinances in order to help the local governments understand the concept and ultimately implement the program.

As the first step in the process to ultimately develop model access management ordinances, this technical memorandum was designed to identify, review and present the results of a nationwide search of access management standards and planning practices. The team researched several state Departments of Transportation (DOTs) that currently have or are in the process of establishing access management standards. This report discusses the access management practices in: Iowa, South Dakota, Utah, Colorado, Florida, Oregon, Missouri, Michigan, New York and New Jersey. The team conducted a review of previous research by various transportation-engineering organizations such as: the Transportation Research Board (TRB) in cooperation with the Federal Highway Administration (FHWA), Institute of Transportation Engineers (ITE), American Society of Civil Engineers (ASCE), American Association of State Highway and Transportation Officials (AASHTO) and Center for Transportation Research and Education at Iowa State University. The results of the research are summarized below. The team reviewed two Pennsylvania planning commission reports. The Lehigh Valley Planning Commission has completed a manual regarding access management practices on arterial roadways and the Chester County Planning Commission's *Circulation Handbook* contains various recommendations regarding access management measures.

WHAT IS ACCESS MANAGEMENT?

The Transportation Research Board's (TRB) *Access Management Manual* defines access management as the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. It also involves roadway design applications, such as median treatments and auxiliary lanes, and the appropriate spacing of traffic signals. The purpose of access management is to provide vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system. It incorporates the delicate balance between constitutional rights, private property rights and state regulations. The principles of access management seek to limit and consolidate access along major roadways, while promoting a supporting street system and unified access and circulation systems for development. The TRB Manual identifies 10 principles:

- Provide a specialized roadway system – it is important to design and manage roadways according to the primary functions that they are expected to serve;
- Limit direct access to major roadways – roadways that serve higher volumes of regional through traffic need more access control to preserve their traffic function;
- Promote intersection hierarchy – an efficient transportation network provides appropriate transitions from one classification of roadway to another;

- Locate signals to favor through movements – long, uniform spacing of intersections and signals on major roadways enhances the ability to coordinate signals and ensure continuous movement of traffic at the desired speed;
- Preserve the functional area of intersections and interchanges – the critical area is where motorists are responding to the intersection – i.e. decelerating, maneuvering into the appropriate lane to stop or complete a turn;
- Limit the number of conflict points – drivers make more mistakes and are more likely to have collisions when they are presented with the complex driving situations created by numerous conflicts. Traffic conflicts occur when the paths of vehicles intersect and may involve merging, diverging, stopping, weaving or crossing movements;
- Separate conflict areas – drivers need sufficient time to address one potential set of conflicts before facing another;
- Remove turning vehicles from through-traffic lanes – turning lanes allow drivers to decelerate gradually out of the through lane and wait in a protected area for an opportunity to complete a turn, thereby reducing the severity and duration of conflict between turning vehicles and through traffic;
- Use nontraversable medians to manage turn movements – they minimize left turns or reduce driver workload and can be especially effective in improving roadway safety; and
- Provide a supporting street and circulation system – a supporting network of local and collector streets accommodate development, and unify property access and circulation systems.

Access management principles should be incorporated into transportation and land use planning to increase safety options for the traveling public. The forthcoming *Legal and Policy Barriers Technical Memorandum* will include a detailed discussion of Pennsylvania laws that affect access management.

PENNSYLVANIA ACCESS MANAGEMENT PRACTICES

Extensive research into specific access management programs and ordinances at the state and local levels revealed that Pennsylvania offers limited applications of access management.

Pennsylvania Department of Transportation

The United States Constitution and Pennsylvania Constitution, and common law precedence have established the right of property owners to have reasonable access to their property. PennDOT is responsible for balancing the needs of its residents with the need for growth and development. They have expended millions of dollars to compensate owners of properties that abut limited access highways for their loss of access. PennDOT regulates the design, manner, place and time of access, while exercising sound discretion with regard to benefiting safe and efficient traffic movements.

Presently, PennDOT does not have a stand-alone Access Management Program rather they have regulations and publications that address permitting for Highway Occupancy Permits (HOP), general driveway requirements, driveway design requirements and traffic and engineering studies. These principles guide PennDOT's application of access management techniques and guide property owners in applying for access permits.

67 PA Code, Chapter 441 Regulations – Access to and Occupancy of Highways by Driveways and Local Roads (January 1992) governs the permit application process, permit fees, issuance of permits and driveway design requirements. An amendment to the January 1992 regulations is under review by the Department and others but has not been adopted. Owners of property adjacent to non-limited access State highways have a right of reasonable access. At the same time, the efficiency and safety of a highway is affected by the amount and type of interference caused by access traffic. As the number of access points onto a highway increases, the ability of the highway to provide unimpeded and reasonably safe movement of traffic is diminished. The regulations listed below reflect the existing policies that seek to reconcile the different needs that exist between normal highway traffic and motorists entering or leaving State highway right-of-way via adjacent property.

Section 441.7(c) states that there are specific access location restrictions:

1. access driveways may not be located at interchanges, ramp areas, or locations that would interfere with the placement and proper functioning of highway signs, signals, detectors, lighting or other devices that affect traffic control;
2. the location of a driveway near a signalized intersection may include a requirement that the permittee provide, in cooperation with the municipality, new or relocated detectors, signal heads, controller and the like, for the control of traffic movements from the driveway;
3. access to a property which abuts two or more intersecting streets or highways may be restricted to only that roadway which can more safely accommodate its traffic; and

4. The Department may require the permittee to locate an access driveway directly across from a highway, local road, or access driveway on he opposite side of the roadway if it is judged that offset driveways will not permit left turns to be made safely or that access across the roadway from one access to the other will create a safety hazard.

Section 441.7(e) states that, the number and location of entrances, which may be granted, will be based on usage, interior and exterior traffic patterns, and current design policy for the Department.

1. Normally, only one driveway will be permitted for a residential property and not more than two driveways will be permitted for a nonresidential property.
2. If the property frontage exceeds 600 feet, the permit may authorize an additional driveway.
3. Regardless of frontage, a development may be restricted to a single entrance/exit driveway, served by an internal collector road separated from the traveled way.

Section 441.6(16) states that PennDOT can require a property owner to enter into an agreement as a condition of approval for a HOP in order to restrict access points to only the locations covered under the permit, even if the property is subdivided at a later date.

Section 441.8(c) states that driveways serving properties located adjacent to a highway intersection shall be subject to the following:

1. there shall be a minimum 10-foot tangent distance between the intersecting highway radius and the radius of the first permitted driveway;
2. the distance from the edge of pavement of the intersecting highway to the radius of the first permitted driveway shall be a minimum of 20 feet on curbed highways and 30 feet on uncurbed highways; and
3. paragraphs 1 and 2 of this subsection may be waived only if the intersecting highway radius extends along the property frontage to the extent that compliance is physically impossible.

Section 441.8(e) states that multiple driveways serving the same property shall be separated by a minimum distance of 15 feet measured along the right-of-way line and 20 feet measured along the shoulder, ditch line, or curb. When the distance between multiple driveways is 50 feet or less measured along the shoulder or ditch line, the areas between shall be clearly defined by permanent curbing. This curb shall be placed in line with existing curb or two feet back of the shoulder ditch line on uncurbed highways. It shall be extended around the driveway radii to the right-of-way line.

Section 441.8(h) states that sight distance for access driveways shall be located at a point within the property frontage limits which provides at least the minimum sight distance

listed in the tables. Please refer to Tables 1 through 6 and Figures 1 through 6 in the Pennsylvania code.

Section 441.8(j) contains guidelines on the application of auxiliary lanes:

1. Acceleration and deceleration lanes. The combination of highway speed, volumes, location, and arrangement of driveways and intersections may require the installation of an acceleration or deceleration lane, or both, to serve a proposed low, medium, or high volume driveway. When required by the permit, a speed change lane of sufficient length and width shall be constructed to allow vehicles to safely decelerate or accelerate when entering or leaving the property;
2. Left turn stand-by lanes. This permit may require the installation of a left turn stand-by lane to separate and protect left turning vehicles from through traffic if failure to do so would result in an undue hazard to the traveling public;
3. Additional right-of-way for lanes. Where the width of the highway right-of-way is insufficient to permit the construction of a needed auxiliary lane, the permittee shall provide any necessary additional right-of-way;
4. Cost. When required, auxiliary lanes shall be constructed, at no cost to the Department, in accordance with the Roadway Construction Standards and Form 408; and
5. Lane in front of another property. If an auxiliary lane must be located in front of the property of another person, the applicant shall be required to secure the approval of the other person or indemnify the Commonwealth against any action which the other person may bring against the Commonwealth.

(Section 441.8 (j) does not give specific criteria for the design of access points, left or right turn lanes, and acceleration/deceleration lanes but it encourages applicants to use the accepted standards as outlined in the American Association of State Highway and Transportation Officials (AASHTO) *Green Book*.

Section 441.8(m) states that median requirements shall consist of:

1. the removal of a portion of median divisor along a divided highway to provide access to and from traffic in both directions will not be permitted unless it is determined that the operating characteristics of the highway system will be improved by the action;
2. a left turn standby lane shall be installed to separate and protect left turning vehicles whenever a median opening or alteration is permitted; and
3. requests for removal of a median divisor will not be granted without the approval of the director.

Publication 282 - Highway Occupancy Permit Handbook contains details on when HOP's can and cannot be issued; requirements for permit applications and traffic impact studies. Although access management techniques are not specifically addressed in this publication, it serves as a supplement/an interpretive guide to the Department Access Permitting Regulations, Chapter 441. However, the publication does state that where new intersections are being

established to access a proposed development, the intersections must be designed to operate at a level of service C or better in rural conditions or level of service D or better in urban conditions, with no degradation in level of service to the state highway, sight distance information and traffic impact study (TIS) guidelines.

Pennsylvania State Transportation Advisory Committee
Statewide Highway Access Management and Growth Accommodation

The State Transportation Advisory Committee (TAC) authorized a study to develop and recommend strategies PennDOT should take to effectively address highway access management in the Commonwealth. The TAC Task Force focused on the following major issues:

- Currently, there is little coordination between each of the agencies that directly or indirectly impact access management. This includes PennDOT, municipalities, and Metropolitan Planning Organizations (MPO) or Rural Planning Organizations (RPO);
- Early in the project planning phase, in advance of site development, there is little coordination with the landowners and site developers; and
- Improved access management should be considered systematically in relation to possible amendments to Chapter 441 and the Pennsylvania Municipalities Planning Code (MPC).

One of the recommendations resulting from the project was for PennDOT, in conjunction with the Department of Community and Economic Development (DCED), to develop a series of model municipal ordinances for access management. The mission of (DCED) is to foster opportunities for businesses and communities to succeed and thrive in a global economy, thereby enabling Pennsylvanians to achieve a superior quality of life. One of the divisions located within DCED is the Governor's Center for Local Government Services. The Center's mission is to be the principal advocate for local governments; provide vital programs, services and training to local officials and municipal employees; and to solve problems expeditiously at the local level. They provide a full range of financial assistance to local governments as well as land use planning assistance.

Because of the diverse nature of Pennsylvania's communities, several model ordinances would need to be developed to meet the diverse needs of townships, boroughs and cities. The TAC concluded that the ordinances should address the following elements:

- Provision for an access management element in the local comprehensive plan;
- Access standards for the spacing of intersections with other roadways;
- Access standards for driveway access to each street type;
- Spacing and design of driveways near the intersection of roadways;
- Provisions for connecting parking lots and consolidating driveways of neighboring properties;
- Residential access through neighborhood streets;
- Minimum lot frontages on major roadways;
- Internal access to out-parcels; and

- Coordination with PennDOT.

Municipal Access Management

The Municipalities Planning Code (MPC) establishes a granting of power to the governing body of each municipality to regulate subdivisions and land development within the municipality by enacting a subdivision and land development ordinance (SALDO). Municipalities are given the legal authority by the following sections of the MPC to include provisions in their ordinances pertaining to the modification of existing roadways or construction of new roadways:

Section 503: Contents of Subdivision and Land Development Ordinance Subsection 3 states:

> (2) Provisions for insuring that:
> (ii) Streets in and bordering the subdivision or land development shall be coordinated, and be of such widths and grades and in such locations as deemed necessary to accommodate prospective traffic, and facilitate fire protection.

Section 503: Contents of Subdivision and Land Development Ordinance Subsection 3 states:

> Provisions governing the standards, by which streets shall be designed, graded and improved and other improvements shall be installed as a condition precedent to final approval of plats in accordance with Section 509. The standards shall insure that the streets be improved to such a condition that the streets are passable for vehicles which are intended to use that street. Provided, however, that no municipality shall be required to accept such streets for public dedication until the streets meet such additional standards and specifications as the municipality may require for public dedication.

The MPC also grants powers to municipalities to enact and amend zoning ordinances to implement comprehensive plans. Included in Article VI of the MPC, are the following provisions enabling municipalities to regulate aspects of transportation through their zoning ordinance:

Section 604 – Zoning Purposes: The provisions of zoning ordinances shall be designed:

(1) To promote, protect and facilitate any or all of the following: ... vehicle parking and loading space, transportation...

(2) To prevent one or more of the following... danger and congestion in travel and transportation...

Many municipalities utilize the powers granted by the MPC to include provisions within their SALDO and/or zoning ordinance to regulate the following practices related to access management:

- Design guidelines regarding the number of access points permitted for individual parcels;
- Restriction of access points for corner lots to the lower classification of roadway;
- Design requirements for driveways;
- Regulation of off-street parking location, design and access;
- Regulation of land uses, lot sizes, lot dimensions and other aspects of lot design;
- Overlay districts with access management as the defining characteristic;

- Official maps that enable municipalities to reserve land for right-of-way thus giving them control of access to roadways; and
- Regulation of population densities and intensity of particular uses.

The North Coventry Township, Chester County zoning ordinance contains provisions for an interchange overlay district. One of the purposes of the overlay district is to concentrate major commercial or business activities at interchange areas rather than extending them along arterial and collector roads. The ordinance contains transportation and circulation criteria for the evaluation of interchange overlay applications including the following:

- The probable effects of the proposed conditional use on the nearby highway interchange and on general highway congestion shall be considered. Adequate access arrangements shall be provided in order to protect streets and highways in the Township from undue congestion and hazard.
- The development of highway frontage shall be designed to limit the total number of access points, reduce the need for on-street parking and encourage the frontage of buildings on parallel marginal roads perpendicular to the highway. Overall vehicular circulation within the areas affected by the proposed conditional use shall be considered, and the applicant shall make provisions to ensure safe and efficient traffic flow.

Cranberry Township, Butler County implements aspects of access management in several of its ordinances. The township-zoning ordinance contains regulations on the number of permitted access points for various types of land uses. The subdivision and land development ordinance contains regulations and design criteria regarding intersection spacing, service roads, street classifications, sight distance, turning radii and other driveway design elements. In addition, the township has adopted an official map ordinance for the Route 228 corridor. It is intended to preserve right-of-way for future modification to an interchange, and the construction of new collector roads intersecting the Route 228 corridor.

This memorandum does not discuss the Pennsylvania management practices regarding the approval process for highway access, how it varies from state and local roadways, and how are the two are coordinated by the recent changes to the MPC; however, these topics will be referenced in the *Best Practices Technical Memorandum.* The *Best Practices Technical Memorandum* will also discuss the need for maintenance agreements where joint driveways are encouraged.

OTHER STATE DOT ACCESS MANAGEMENT PROGRAMS

The following access management programs exist in other states and provide a variety of examples for PennDOT's consideration. These are not concepts that PennDOT necessarily endorses.

Iowa Department of Transportation
Access Management Handbook

Iowa Department of Transportation (IDOT), along with the Center for Transportation Research and Education at Iowa State University (CTRE), published their *Access Management Handbook* in October 2000. The handbook is intended to assist local officials who want to incorporate access management principles into their community's comprehensive plan. Although all communities do not have a comprehensive plan, they can use the handbook to develop a successful access management program. It is intended to be particularly helpful for those local officials who seek to include access management standards in their zoning, subdivision, or site plan review ordinances. It is a comprehensive handbook that details the goals of an access management plan, basic access management practices, techniques for retrofitting existing access conditions and public involvement.

Some of the goals that IDOT hopes to achieve with access management plans are to: limit the number of conflict points experienced at a particular access point by separating access points or eliminating an access point; save tax dollars by preserving the roadway function rather than build new roads; reduce accidents; and enhance the environment and economies of local communities.

The first practice includes limiting the number of driveways through strategies such as minimum spacing between driveways, minimizing the number of driveways per lot, corner clearance, encouraging shared driveways for residential and non-residential use, and requiring safe sight distances. The second practice entails removing turning movements from through traffic. By providing auxiliary turn lanes and having larger turning radii into the access point, the turning vehicles can more efficiently be removed from the through traffic. Other strategies the handbook suggests include:

- Requiring a traffic impact study;
- Providing inter-parcel connection between adjacent commercial developments;
- Providing a driveway turn-around area to prevent the need for backing onto an arterial roadway;
- Limiting on-street parking during peak hours or requiring businesses to provide off-street parking;
- Restricting deliveries during peak hours;
- Providing turn-out bays for public transit buses; and
- Coordinating a bicycle and pedestrian plan in areas of mixed-use developments.

Ideally, access management should be an asset to the community's comprehensive plan. Access management guidelines are best implemented after a municipality has determined where development should occur and where it should be limited. Land development often has a tremendous impact on traffic conditions. Careful consideration of where to encourage and deter development can play a major role in preventing future traffic and congestion problems on arterials. Municipalities should determine the extent to which traffic has increased in recent years on arterials and where it is likely to increase in the future. The comprehensive plan should determine how transportation and land use policies could be enhanced by sensible access management guidelines.

There are many ways that a comprehensive plan can address access management issues. One of the most effective ways is through the careful consideration of strip retail centers. If not planned properly, these centers can produce substantial negative impacts on a local access management program. The Iowa Handbook offers many goals, policies and strategies that address strip development along arterials. Other planning tools that can assist in the implementation of an effective program include: capital investment plans, future land use maps, commercial cluster development, designated commercial centers, rural business districts and low-intensity commercial districts.

One of the challenges in managing access is how to improve already developed corridors. In areas of high growth and economic development, corridors originally intended to provide local access are now needed to accommodate through traffic. Access improvements in developed corridors are often difficult because right-of-way is limited, land uses are in close proximity to the roadway and adjacent property owners and business often oppose any changes. Options are also limited because land is simply unavailable and highway designers often fail to consider combining access for various properties and businesses as part of a highway improvement project. This factor would help to limit the number of access points along a corridor. For example, access to two or three properties could be combined to provide a single, possibly signalized access point. The only additional ROW required would be the necessary reciprocal easements and whatever is necessary to improve the new common and, most likely, existing driveway intersection. An effective strategy could be preparing access management plans for high priority corridors. Corridor zoning and overlay districts can be designed to address unique conditions of a corridor to address local access management goals.

Ordinances can include retrofit guidelines that specify when existing users must begin compliance with new regulations. Such ordinances can often be applied when an owner petitions for a substantial enlargement of the use, there is a significant increase in the trips generated by the site, or new permits are requested. In cases where an access point already exists, the handbook identified examples of retrofit techniques. These include:

- Relocating, consolidating or eliminating driveways;
- Promoting shared driveways;
- Improving turning radii into a driveway;
- Restricting turning movements such as left turns;
- Adding or redesigning turn lanes;
- Two-way left turn lanes; and
- Providing frontage and reverse frontage roads.

Access management projects are frequently considered to be exempt from public involvement requirements. However, public acceptance and support will facilitate the implementation of access management projects. By involving the public in the development, the DOT builds trust, strengthens their credibility, provides the opportunity to educate, and reduces delays associated with hearings and litigations. IDOT developed the following public involvement principles that help minimize conflict, foster public trust and achieve broad support from the public and policymakers for access management decisions:

- Ensure a fair, reasonable and open process;
- Involve stakeholders;
- Begin early and parallel the decision process;
- Maintain continuity of involvement as the project progresses;
- Inform the public of the agency's basis for making decisions, including policies and guidelines;
- Seek a clear understanding of public concerns;
- Prove to the public that their concerns will be considered; and
- Achieve a clear resolution and provide prompt feedback.

The IDOT handbook provides model access management ordinances for cities and counties. The model ordinance for cities was adapted from the municipal ordinance of College Station, Texas. IDOT noted that College Station's ordinance is one of the most comprehensive ordinances developed by a city. The county model ordinance was adapted from Washington County, Oregon. The model ordinances contain a classification of roadways by function and access management requirements for each classification. This memo contains a copy of the model ordinances in Appendix A.

South Dakota Department of Transportation
Highway Access Control Process

The South Dakota Department of Transportation (SDDOT) *Highway Access Control Process* was developed in the 1970's to: articulate access policies; provide design guidelines; and develop procedures for applying those guidelines, with the goal of improving access control. Under the previous statute, the state was not able to designate controlled access routes. The purpose of the Highways Access Control Process was to recommend policies, guidelines and procedures that would:

- Improve highway safety by minimizing the number, severity and cost of accidents arising from access to the highway system;
- Preserve investments in highways and roads by maintaining the functional integrity of the system;
- Improve coordination and consistency between state and local governments regarding access policies; and
- Update the original access management policies and design guidelines to provide an improved and consistent basis for managing highway access.

In conducting a review of their practices, the SDDOT found that their access policies should be modernized and strengthened. The review found that adopting the following policies would help provide safe and efficient access to the highway system:

- Protect the public's investment in the highway system by preserving its functional integrity;
- Use police powers and existing statutory authority, and promote the modernization of laws to ensure the safe and efficient management of access;
- Establish and maintain an access classification system that defines a planned level of access for different highways in the State;

- Provide a consistent statewide approach to the management of access to the state highway system;
- Maintain and apply access criteria to guide driveway location and design based on best engineering practices;
- Coordinate with local jurisdictions to ensure that South Dakota's access policy and criteria address the local land use programs and policies;
- Provide advocacy, educational, and technical assistance to promote access management practices among local jurisdictions;
- Undertake proactive corridor preservation through coordination with local units of government on corridor management, the purchase of access rights, and other investments; and
- Require traffic impact analysis for developments that impact the safety and capacity of the highway system.

The changes to the SDDOT access policies sought to lower crash rates, improve access to properties adjacent to roads, and preserve the functional integrity of the highway system. Along with using police powers and statutory authority to manage access, SDDOT created a set of criteria for location and design of access points based on best engineering practices. These criteria include signal spacing distance, median openings, access spacing, and requiring a traffic impact study for developments that impact safety and capacity of an intersection.

The level that the criteria are to be applied is based on an access classification system. This classification system is divided into three general categories, functional role, divided or undivided, and urban and non-urban. The purpose of a classification system is to ensure that the functional integrity of the roadway is preserved and to assure that standards are applied uniformly through the state.

For areas where development already exists, retrofit techniques were developed. Retrofit techniques are used to modify the existing roadway system to achieve access management goals. These techniques include consolidation and relocation of existing accesses, restricting left turn movements in and out and or adding a left turn lane into or out of the access point, coordinating access locations on either side of the roadway, and requiring adjacent properties to share a single access point.

SDDOT also set out to assist local governments in the development of ordinances for access permitting by standardizing the permit process statewide and creating an access management plan for coordination between public roads and surrounding development. In general, SDDOT provided model ordinance language for access permitting, land development, major traffic generators and access management plans that require conformance with SDDOT criteria and guidelines. Local jurisdictions are not encouraged to adopt the model language verbatim; rather they are encouraged to apply elements that fit local conditions and administrative practices. Although the model ordinance language may not be applicable in all instances, it provides a basis for local jurisdictions to draft their ordinances. This memo contains a copy of the model ordinances in Appendix B.

Utah Department of Transportation
Access Management Manual

The Utah Department of Transportation (UDOT) has drafted a *State Highway Access Management Manual* that outlines the permitting process; outlines access categories and provide design specifications and standards for access onto state roadways.

The manual identifies a system of nine highway categories to which all sections of state roadways have been assigned. Each category describes the function of the roadway including operational standards that are applied to maintain the roadway's function in terms of mobility, capacity, traffic flow and safety. The manual lists criteria for each category that must be met for UDOT to grant access to a particular roadway. If access is granted, the location, operational characteristics and design standards are assigned to each category to allow the roadways to function at the category assigned.

The manual identifies a set of key access management guidelines to successfully implement a plan. UDOT suggests reducing the number of conflict points that drivers have with movements into and out of a driveway. When a left turn across a through movement is prohibited, the number of potential conflicts is greatly reduced. UDOT also suggests that a removal of turning movements from the through movement will improve the flow along a corridor because vehicles waiting to turn into a driveway will not impede the through movement. Getting vehicles into and out of a driveway quickly and safely can be accomplished with a good internal circulation plan. Adequate turning radii, driveway width and throat length all contribute to an efficient system.

UDOT developed a brief handout as a supplement to the manual that defines access management and possible measures to make the plan successful. UDOT defines access management as a way to provide access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed.

In order to promote access management planning, UDOT has established the Transportation Corridor Preservation Revolving Loan Fund. The Fund authorizes UDOT to expend funds to acquire real property or any interests in real property for state, county and municipal transportation corridors to preserve transportation corridors, promote long-range statewide transportation planning, save on acquisition costs, and minimize impacts on prime agricultural land. However, UDOT may not expend monies from the Fund for projects in jurisdictions that do not have an access management policy or ordinance in effect. The policy or ordinance must meet the following requirements:

- Limit the number of conflict points at driveway locations;
- Separate conflict areas;
- Reduce the interference of through traffic;
- Address the spacing of signalized intersections; and
- Provide for adequate on-site circulation.

The Transportation Corridor Preservation Revolving Loan Fund is a competitive funding program that prioritizes funding for projects based on the following criteria:

- Areas with rapidly expanding population;
- The willingness of the local governments to complete studies and impact statements that meet UDOT standards;
- The preservation of corridors through the use of local planning and zoning processes; and
- The availability of other public and private matching funds for the project.

Colorado Department of Transportation
State Highway Access Code

Seeking to reduce crash rates and preserve the existing highway system, the Colorado Department of Transportation (CDOT) adopted a *State Highway Access Code* in June 1998, with an updated version published in March 2002. The code serves several purposes including:

- Aid in the management of the state highway system;
- Protect the public health, safety and welfare;
- Maintain smooth traffic flow;
- Maintain highway right-of-way drainage; and
- Protect the functional level of state highways while considering state, regional and local transportation needs.

The code outlines a detailed permit application process for obtaining a highway access permit. The most notable feature of the code is the strict guidelines for traffic impact studies to achieve the access management principles. The code provides guidelines for administration, access standards, design standards and specifications.

The code has eight basic access classification categories based on the function of the roadway, existing conditions and uses, and long range plans. The "Functional Characteristics and Category Assignment Criteria" are intended to describe the existing and future function of roadways. Existing access points are not required to satisfy the code's design standards. However, all new access permits and design decisions must meet the standards outlined in the code. Each classification has set standards for sight distance, access spacing, access width, turning radii, access surfacing, and speed change lanes. The standards are primarily based on the AASHTO *Green Book*.

Florida Department of Transportation
State Highway System Access Management Classification Systems and Standards

The Florida Department of Transportation (FDOT) had established a program that was originally based on the posted speed of a roadway. Over time, FDOT created a seven level access classification system based on roadway function. The implementation of the system is intended to protect public safety and general welfare, provide for the mobility of people and goods and preserve the functional integrity of the state highway system. Regional committees have been established throughout the State to maintain consistency of access management policies between neighboring counties. The *State Highway Connection Permits, Administrative Process* outlines the procedures for obtaining approval for access onto a state roadway.

The classification system is based largely on the surrounding land uses for a particular roadway, the planned level of development and the potential need for traversable or non-transversable medians. For example, "Area Type 1" includes those roads located within a central business district (CBD), CBD fringe for cities, or urbanized areas.

The Florida classification system provides an exemption to its access management design requirements. Any land use that is projected to generate five or less peak hour two-way vehicular trips is exempt from the design requirements as long as it does not create a safety or operational hazard. The exemption includes the statement that the minor access points will not be considered in measuring distances between other access points for their compliance with spacing standards. In addition, FDOT created the *Median Opening and Access Management Decision Process*, which provides criteria for new, relocated, closed or modified median openings with respect to traffic safety, efficiency, and the highway's functional design. This memo does not discuss the process in detail, but outlines the operational and design elements that must be considered for proposed changes to existing medians, including the stakeholders that should be involved in the final decision-making process.

FDOT has developed an access management educational booklet and CD to educate citizens and the business community on the purpose of the state's access management program. It provides national research on the benefits of access management, most notably safety and improved traffic flow. One section deals specifically with the benefits that access management provides to the business community. The intent of the booklet is to gain the support of stakeholders early on in the development process so that access management guidelines can be implemented successfully. This memo contains a copy of the *Median Opening and Access Management Decision Process* and Access Management brochure in Appendix C.

Oregon Department of Transportation
Oregon Highway Plan

Goal 3 of the *Oregon Highway Plan* states, "To employ access management strategies to ensure safe and efficient highways are consistent with their determined function, ensure the statewide movement of goods and services, enhance community livability and support planned development patterns, while recognizing the needs of motor vehicles, transit, pedestrians and bicyclists." The criteria contained in the Access Management Policies section of the Plan and their associated design standards must be applied to all highway

construction, reconstruction or modernization projects, approach road permits as well as all planning processes involving state highways, including corridor plans, refinement plans, state and local transportation plans and local comprehensive plans.

The Oregon Department of Transportation (ODOT) emphasizes access rights. Approaches and access can only be made where the property owner has the right to access and as in most cases, owners have a common law right to access if the property abuts the highway. However, that right does not ensure that the owner can have an approach road wherever he desires. ODOT may acquire the access rights for a property through purchase, donation, condemnation, or law.

The classification system adopted by ODOT is generally based on the federal functional classification of roadways. For each classification, the Plan provides a description of the intended function of that particular type of roadway and lists general guidelines regarding direct access, intersection spacing, traffic signal spacing, parking and median treatments. More specific design criteria regarding these guidelines are contained in the Appendix (ODOT page 8) of the plan.

One unique aspect of the ODOT Plan is that it contains guidelines that require applicants to take into account existing and/or planned pedestrian, bicycle and public transportation facilities to ensure that these types of facilities are not negatively impacted. In some instances, local alternative modes of transportation are given a greater importance than the need to accommodate through traffic.

Missouri Department of Transportation
A Comprehensive Process for Developing a Statewide Access Management Program

The Missouri Department of Transportation (MODOT) is responsible for one of the largest state maintained roadway systems in the country totaling more than 30,000 miles. MODOT has ongoing research efforts in developing an access management plan that is one of the most important elements for improving roadway safety in the Department's strategic plan. One of the latest strategies under study in the plan is to integrate access management at the local, regional and statewide levels. The main objectives of the Missouri comprehensive access management plan are to:

- Develop a comprehensive approach to access management in the State;
- Develop all necessary classifications, standards, guidelines and administrative processes;
- Identify current and likely future corridors with access management problems; and
- Provide access management training for the MODOT staff and other stakeholders.

One of the initial steps in completing the state's access management plan was to identify access management goals. The following goals were identified:

- Increase Safety – fewer crashes and lower crash rates are the key measures;
- Improve Traffic Operations – access management can help reduce congestion, reduce travel times, improve mobility and help protect the environment;
- Protect Taxpayer's Investment – access management can protect expensive roadway assets and limit the need for future investments; and

- Improve Operating Conditions for Non-Automobile Modes – pedestrians, bicyclists and public transportation can also expect to benefit from access management.

MODOT identifies classification systems as a key element of the access management process. Classification systems allow access management standards to properly fit the intended function of the roadways and are useful for explaining access management concepts to the public and property owners. The proposed Missouri classification system is based on the traditional functional classification for rural and urban conditions. Examples of features to be managed for each classification include:

- Distance between interstates and freeway exits;
- Corner clearance of functional areas of interchanges and intersections;
- Distance between at-grade intersections and traffic signals;
- Driveway spacing and geometries;
- Median openings;
- Left- and right-turn lanes;
- Two-way left turn lanes;
- Parking; and
- Internal circulation and parking for the site.

A key element in Missouri will be the identification and involvement of local land use planners and developers. The knowledge and understanding of the goals, policies, guidelines, and procedures established in the statewide plan could substantially aid or hinder the successful application of access management practices. One of the last phases of the project involves the development of educational materials on the policies, practices and standards of the statewide access management plan. The materials will be prepared for use by both the staff within MODOT and local officials, land use planners, developers and transportation professionals.

Michigan Department of Transportation
Improving Driveway and Access Management in Michigan Booklet

The Michigan Department of Transportation (MDOT) has created a booklet for interested parties, such as developers and elected officials, on how to better manage access along highways and arterials. The purpose of the booklet is to promote and support cooperative efforts of MDOT and local agencies that manage access for development along the state's roadways. MDOT's goal for their access management plan was to:

- Reduce crashes and factors that produce crashes;
- Preserve the capacity and useful life of roadways;
- Decrease travel time;
- Coordinate land use and transportation decisions;
- Improve air quality; and
- Maintain travel efficiency and economic prosperity

MDOT has developed six basic access management principles to achieve these goals. The booklet contains the following principles:

- Limit the number of conflict points;
- Separate conflict points;

- Separate turning volumes from through movements;
- Locate traffic signals to facilitate traffic movement;
- Maintain a hierarchy of roadways by function; and
- Limit direct access on higher speed roads.

The booklet does not contain specific design criteria necessary to achieve these principles. The design criteria is contained in the MDOT Driveway Permit Program. The program establishes procedures and restrictions for connecting driveways to state roadways. It outlines a driveway permit application review process that evaluates geometric design, sight distance, drainage design, environmental conflicts and impacts on any proposed improvements in the project area.

Many local governments in Michigan are developing access management plans. They range from simple standards limiting the number and location of driveway points to requirements for shared driveways and frontage roads, to remediation in existing areas where problems are particularly severe. Most local access management requirements are located within zoning regulations. A critical element to the success of any access management program is the coordination of land use and access decisions by local and state governments.

New York State Department of Transportation
Best Practices in Arterial Management

The New York State Department of Transportation (NYSDOT) *Arterial Management Initiative* is collaboration between NYSDOT and local governments which focuses on blending transportation and land use management strategies to preserve and enhance mobility along uncontrolled access facilities. NYSDOT does not have laws or regulations governing access. The authority in New York is decentralized; therefore, municipalities apply specific access control tools to address specific problems.

NYSDOT promotes several transportation tools that can be applied by state and local agencies to resolve capacity deficiencies, and safety problems on uncontrolled access arterials including:

- Minimum driveway spacing;
- Driveway design standards;
- Restriction of turning movements;
- Requirement of shared driveways;
- Minimum corner clearance;
- Maximum number of driveways per parcel;
- Turn and merge lanes;
- Medians;
- Signal spacing and timing;
- Separate heavy vehicles from through traffic;
- New or improved public transportation service;
- Travel demand management strategies;
- Traffic calming;
- Bicycle and pedestrian facilities; and
- Parking management.

Development along uncontrolled access arterials has created conflicts between through traffic and vehicles entering and exiting the developments, which has increased congestion and reduced safety. Uncontrolled access and land development can also obstruct operational and capacity improvements due to the high costs associated with the relocation of buildings or purchase of right-of-way. NYSDOT promotes the following land use management tools that are most effective when applied at the local level:

- Subdivision design and control;
- Mixed use zoning;
- Restriction of commercial strip zoning;
- High density and cluster zoning;
- Transit oriented development;
- Official map;
- Overlay districts;
- Elimination or restriction of flag lots; and
- Promotion of bicycle and pedestrian design.

NYSDOT developed a model access management ordinance for use by municipalities. The model ordinance was developed on the premise that local land use management can better balance full development, and the safe and efficient movement of traffic. It addresses those elements of development that contribute to the deterioration of local transportation systems. The model ordinance represents an extension of matters addressed by municipal zoning, and thus can be adapted and applied most effectively only in municipalities that have zoning. This memo contains a copy of the model ordinance in Appendix D.

New Jersey Department of Transportation
State Highway Access Management Code

New Jersey's long-range transportation plan *Transportation Choices 2025* identifies access management as one of several emerging initiatives to both improve transportation facilities and services and support local governments as they work to enhance their communities. The main purpose of New Jersey's Highway Access Management Code is to encourage the placement of access points on secondary roads and, preferably, roads not maintained by New Jersey Department of Transportation (NJDOT). The Code is used along state highways where additional lanes of new capacity are added so that the existing capacity of the facility and the new capacity will be maintained. For new roadway alignments, the Code gives NJDOT full control of access.

New Jersey's code is a comprehensive document that contains access classifications, access standards, and permitting requirements. The Code presents an access classification system referred to as access levels (AL). The classification system is based on access class such as limited access, urban or rural area, speed limit and the desirable typical section of the highway. Each AL contains specific design criteria for driveways and access points. The document is very technical in nature. The Code does not discuss the policies or goals that NJDOT wishes to achieve, or the manner in which it was developed.

OTHER ACCESS MANAGEMENT RESOURCES

A review of publications and research efforts by other agencies and transportation organizations was conducted. The Lehigh Valley Planning Commission, Chester County Planning Commission, ITE, AASHTO and NCHRP publications cover a broad spectrum of transportation planning and engineering topics but they all place special emphasis on the importance of access management.

Lehigh Valley Planning Commission – Lehigh and Northampton Counties, Pennsylvania

Access Management on Arterial Roads

The Lehigh Valley Planning Commission (LVPC) developed a planning manual in December 2000 to address the best access management practices for the Lehigh Valley. Benefits the LVPC expects to see are the reduction of crash rates by as much as 50%, an increase in the capacity of an existing roadway by 25-45%, and the reduction of travel time along arterials by 40-60%. In order to achieve these results, the LVPC has recommended the following practices be incorporated into Subdivisions and Land Development Ordinance (SALDO) for effective access management:

- Require access from local roads in lieu of arterial roads;
- Provide frontage roads;
- Limit the number of access points per property;
- Develop minimum spacing requirements between driveways and intersections;
- Promote shared driveways;
- Construct auxiliary turn lanes;
- Use of median barriers;
- Channelization to restrict turning movements; and
- Develop throat area standards to adequately handle stacking on the driveway.

The manual also suggests the following access management practices that are unique to zoning ordinances:

- Increase lot width;
- Increase the size of corner lots;
- Reduce the amount of traffic by controlling the land use and amount of development;
- Allow mixed uses in employment centers;
- Use of out parcels;
- Place buildings close to the front lot line; and
- Use of linked parking lots.

Zoning overlay districts impose a second set of controls. Zoning provisions related to access management can be established with a separate district such as an arterial corridor overlay district. The district can be composed of all properties with frontage on a particular arterial roadway. The types of zoning regulations mentioned previously can be applied to the properties within the district without involving properties where the controls would not be relevant.

Chester County Planning Commission - Chester County, Pennsylvania
Circulation Handbook

The Chester County *Circulation Handbook* includes a section on access management. One of the findings/recommendations of the handbook is that "there is no formal mechanism for municipalities to submit an access management plan to the Pennsylvania Department of Transportation (PennDOT), have it reviewed and have them accept it." With that, the handbook suggests some basic practices in regard to access management:

- Limit the movements into or out of a driveway;
- Separate conflict areas by reducing the number of driveways;
- Remove turning movements from the through movement with auxiliary turn lanes;
- Provide access between adjacent parcels;
- Create one-way traffic patterns; and
- Monitor traffic signal operations.

The handbook provides illustrations of design techniques that can be effective as well as examples of improper designs that do not achieve the goals of access management. It also identifies access management techniques related to traffic signal timing procedures including:

- Regularly monitor and adjust timing to optimize traffic flow;
- Install volume density controller to better utilize green time for side streets;
- Establish variable phasing for different times of day;
- Interconnect traffic signals to improve traffic flow; and
- Install time-base coordination to optimize traffic flow.

The handbook also states "PennDOT and the State General Assembly need to develop a policy dealing with the validity and legal standing of an access management plan. PennDOT needs to develop an access management manual for themselves and for municipal and developer applications."

Institute of Transportation Engineers
Traffic Engineering Handbook, 5th Edition

The *Traffic Engineering Handbook* states that access management can be achieved by the following: zoning controls, geometric design, access control guidelines and purchasing access rights. The methods include identifying a roadway based on its functional classification and planning and maintaining a logical hierarchy of classified roadways. It also suggests defining allowable types and levels of access for each road class, applying the appropriate geometric design and traffic engineering analysis and setting criteria for spacing of signalized and unsignalized access points based on the roadway class and speed. Techniques suggested to achieve these access management principles include:

- Intersection spacing standards;
- Limiting the number of conflict points by using auxiliary turn lanes and median openings;
- Corner clearance standards;
- Limiting the number of access points per property; and
- Use of frontage roads.

American Association of Highway and Transportation Officials
A Policy on Geometric Design of Highways and Streets (Green Book)

The American Association of State Highway and Transportation Officials (AASHTO) states that access management can be controlled by a state DOT, land use ordinances, geometric design, and driveway regulations. It also states a few practices to accomplish this such as:

- Classify a roadway system by the primary function of each roadway;
- Limit direct access to roads with higher functional classifications;
- Locate traffic signals to emphasize through traffic movements;
- Locate driveways and major entrances to minimize interference with traffic operations; and
- Use curbed medians and locate medians openings to manage access movements and minimize conflicts.

The AASHTO publication contains detailed design guidelines and criteria associated with common access management practices. For example, the publication recommends an outer separation distance of at least 300 feet between arterial roadways and frontage roads. Many states use the AASHTO guidelines as their own, while others use them as the basis for establishing slightly different guidelines.

The Transportation Research Board
NCHRP Report 420: Impacts of Access Management Techniques

This report published by the Transportation Research Board (TRB) classifies various access management techniques for estimating safety and operation effects. For the report, more than 100 access management techniques were evaluated from which a series of priority techniques was identified for detailed analysis. The priority techniques included the following:

- Establish traffic signal spacing criteria;
- Establish spacing for unsignalized access;
- Establish corner clearance criteria;
- Establish access separation distances at interchanges;
- Install continuous medians;
- Replace continuous two-way left turn lane with restrictive median;
- Install left turn deceleration lanes;
- Install continuous two-way left turn lanes;
- Install “U-turns” as alternative to direct left turn lanes;
- Install jug handles and eliminate left turn lanes;
- Install frontage road to provide access to individual parcels; and
- Locate/relocate the intersection of a parallel frontage road and cross road further from the arterial cross road connection.

The TRB publication contains detailed design guidelines and criteria associated with the common access management practices. The report recommends that comprehensive access management programs and ordinances should indicate where access points are allowed or denied for various classes of roads, specify allowable spacing for signalized and unsignalized intersections and establish permit procedures and requirements. The report identifies the

following basic policy issues that should be addressed when developing access management programs or community zoning ordinances:

- Classify roads according to the statewide or local transportation plans;
- Establish access and geometric standards for each class of roadway;
- Limit access points along major arterials; and
- Consider restricting left turns where access points are provided along arterials.

CONCLUSIONS

Several state DOT's have developed access management programs in recent years. Other states including Texas, New Hampshire and Arkansas are in the process of developing access management programs. Although different formats have been used among the various states, common themes stand out.

- All the DOT's that were researched have adopted policies or have received a mandate from the state legislature to establish a statewide access management program;
- A majority of the DOT's that have developed programs, present planning guidelines, permitting processes and design criteria within one document or handbook;
- The various programs have established similar goals including improved safety and traffic flow, protection of the investment in the existing roadway system, preserving the functional integrity of the existing roadways and improving coordination between the state and local officials on access management decisions;
- The programs established a classification system for which design guidelines and criteria have been developed to maintain the intended function of every state roadway; and
- Several DOT's have developed model access management ordinances for local jurisdictions to help implement the statewide program. Model ordinances in addition to those previously mentioned are contained in the Appendix.

A review of the programs by other DOT's and research presented at the Transportation Research Board National Access Management Conference suggested that the most critical element in implementing a successful statewide access management program is strong support from the state government. The state can provide this support either through adopted policies by the DOT or legislation giving the DOT legal authority to administer an access management program. Often, without legal authority at the state level, there is little support on the local level to adopt ordinances or implement plans. Before the state adopts policies or legislation on an access management program, it is important to achieve a consensus from the public through a detailed public participation program. If the majority of the public does not agree with the program, they could oppose the proposed program and require more coordination to advance the program.

In the absence of clear legal authority and adopted statewide procedures and guidelines, haphazard and disjointed access management planning at the local and regional level could occur. Therefore, access management practices will be inconsistent among neighboring municipalities. In addition, municipalities will likely not have any legal authority to enforce their ordinances or programs on state maintained roadways. If the guidelines established in

the local ordinance differ from the state guidelines, the result could be two incompatible access programs within a single municipality.

Currently, PennDOT has the necessary authority to adopt a regulatory program, if it desires to do so, but may want to consider the inclusion of a monetary incentive to municipalities who develop access management ordinances for State and local highways or along specific corridors as an incentive to support projects. Combined, these factors would encourage the development of the access management programs throughout the state.

Lessons Learned from Other DOTs

The Texas Department of Transportation (TxDOT) analyzed lessons learned from the development of access management programs in Colorado, Florida, New Jersey and Oregon. Several states indicated the need to provide a statewide coordinator to oversee the access management program. In addition, some states have also appointed a district or regional access management coordinator and/or committee. The local access management coordinator is responsible for ensuring that access management practices are followed in their area of assignment.

Another lesson learned highlighted the gradual yet beneficial aspects of a state or local access management program. Florida DOT found that it took more than 10 years of monitoring and enforcing their access management program, before they began to realize the benefits. In order to achieve the benefits of a program, the guidelines and criteria contained in a program must be enforced consistently over the entire jurisdiction. Some DOT's recommend training staff and public officials on the program to ensure consistency throughout the state.

In developing an access management classification system for roadways, states often use the Federal Highway Administration's (FHWA) functional classification in order to keep multiple classifications systems consistent. However, the FHWA functional classification has changed infrequently over an extended period of time. In some cases, roads may have a particular FHWA functional classification, but may actually be serving another function. This is especially relevant in high growth areas due to substantial increases in traffic volumes in recent years. Roads that may have been originally designated as local roads are now serving the function of collectors. Using the FHWA system as a base, with slight variations, can also be confusing.

TxDOT found that the best alternative was to develop a completely separate access classification (AC) that considers factors such as roadway purpose, land use, system continuity, design features, location and safety. In addition, the system should consider future conditions for a 20-year horizon that considers projected land use, future land configurations, and the ultimate build-out conditions of the roadway.

NEXT STEPS

The next step towards the completion of the model access management ordinance involves research on more specific access management techniques and design criteria including land use regulations that may be employed by local governments in Pennsylvania. Research will identify the positive and negative aspects of each practice in terms of practicality, ease of implementation, schedule to achieve desired outcomes, cost of administration and coordination difficulties.

RESEARCH SOURCES

State DOTs

- Colorado State Highway Access Code
- Florida State Highway System Access Management Classification System and Standards Florida Median Opening and Access Management Decision Process
- Iowa Access Management Handbook
- Michigan Access Management Booklet
- Missouri: A Comprehensive Process for Developing a Statewide Access Management Program
- Oregon Highway Plan – Chapter 3: Access Management
- South Dakota Highway Access Control Process
- Utah State Highway Access Management
- New York State Department of Transportation : Best Practices in Arterial Management

Reference Materials

- Implementing a Comprehensive Access Management Program in the State of Texas – ITE 2002 Conference Paper
- Access Management on Arterial Roads – Lehigh Valley Planning Commission
- Access Management Handbook – Iowa
- Transportation and Land Development – ITE
- Traffic Engineering Handbook – ITE
- Green Book – AASHTO
- Chester County Circulation Handbook
- NCHRP Report 420: Impacts of Access Management Techniques
- An Introduction to Access Management – Stover & Koepke

Websites

- http://www.fhwa.dot.gov///utdiv/programs/saftyam.htm - *Utah Division FHWA*
- http://www.ctre.iastate.edu/Research/access/Litrev.html - *Center for Transportation Research and Education*
- http://www.dot.state.co.us/BusinessCenter/Permits/Access/ - *Colorado DOT*
- http://ntl.bts.gov/display.cfm?sub=l13&cat=12 – *US DOT National Transportation Library*
- http://www.state.nj.us/transportation/cpm/DesignServices/MajorAccessPermits/accesscode.html - *New Jersey DOT*
- http://www.cutr.eng.usf.edu/index2.htm - *The Center for Urban Transportation Research*
- http://www.dot.state.mn.us/access/ - *Minnesota DOT*
- http://www.odot.state.or.us/tdb/planning/access_mgt/ - *Oregon DOT*
- http://www11.myflorida.com/planning/systems/sm/accman/default.htm#pubs – *Florida DOT*

APPENDICES

A: Iowa Department of Transportation
Example Access Management Ordinance for a City
Example Access Management Ordinance for a County

B: South Dakota Department of Transportation
Model Access Permitting Ordinance

C: Florida Department of Transportation
Median Opening and Access Management Decision Process
Access Management – Balancing Access and Mobility

D: Stover and Koepke: Model Access Management Ordinances
New York State Department of Transportation
City of Chesapeake, Virginia