10 Transportation Management and Operations

INTRODUCTION

With the costs of providing new transportation facilities and systems on the rise, federal, state, and local governments are constantly looking for ways to more effectively use their existing and future transportation systems. Two of the tools frequently employed by these agencies in an effort to reduce travel demand and improve the efficiency of their existing transportation systems are transportation demand management (TDM) and transportation system management (TSM). TDM addresses traffic congestion by reducing travel demand rather than increasing transportation capacity and focuses on alternatives such as ride sharing, flextime, increased transit usage, walking, and bicycling. TSM strategies focus on increasing the efficiency, safety, and capacity of existing transportation systems through such techniques as facility design treatments, access management programs, high occupancy vehicle (HOV) lanes, incident response plans, targeted traffic enforcement, and intelligent transportation systems (ITS).

This chapter of the Metropolitan Transportation Plan outlines the TDM and TSM strategies and processes the Tyler Area MPO has adopted and will continue to implement in future planning for an efficient and cost effective regional transportation system. For TSM strategies, ITS and access management are discussed.

TRAVEL DEMAND MANAGEMENT

Introduction

Travel Demand Management is a term used to describe how cities and regions can manage traffic congestion and reduce the number of cars on the road, while maintaining full accessibility for individual residents, employees, students, and visitors. Through the use of incentives, pricing, education, and the implementation of viable and desirable travel services, TDM encourages travelers to shift demand away from trips by personal automobile to trips by other modes of travel, or, to trips that occur at a more efficient time, route, or place. There are three components to TDM, all tightly integrated together so as to build synergies and cost efficiencies:

- **Providing actual services and travel options**. The city's transit network and bicycle system are examples of actual services/options that are provided to travelers in the area. In order to be successful, TDM must be able to demonstrate viable alternatives to the automobile for travel needs.
- **Promotion and education of alternatives**. Through marketing, incentives, and education, alternative modes of transportation are promoted to area travelers. As with consumer products, a potential life-long customer of alternative modes is always simply one good experience away.

- **Management through pricing**. Balancing the price of services with the use of services is an effective way to create balance in the demand and supply of transportation resources. For example, by managing parking supply through the use of parking fees, such as in downtown and large employers parking, excess automobile travel can be reduced. Parking pricing helps encourage more transit and shared-car travel to the priced area, and discourages automobile travel within the priced area.

The main goal of TDM is to provide more travel options to more people, in a way that is consistent with the character and quality of the community.

Potential TDM Strategies

TDM promotes programs that are designed to maximize the people-moving capability of the transportation system by increasing the number of persons in vehicles, shifting travel to non-automobile modes, influencing the time of or need to travel, and so forth. TDM programs can be voluntary, incentive-based, or mandatory, depending on the level of community desire and government oversight. At a minimum, all TDM programs should include educational and public outreach components.

Potential TDM strategies include the following:

- **Telecommuting**: part-time or full time situation in which employees work at home or another location outside the central office on one or more days a week.
- **Carpooling**: an arrangement in which two or more people share the use and cost of privately owned vehicles while traveling together to and from prearranged destinations.
- **Vanpooling**: provides transportation to a group of individuals traveling directly between their homes, which tend to be in close proximity, and their regular workplaces, which also tend to be in close proximity.
- **School Pool Programs**: a service that matches students from the same school who live in close proximity to use a single vehicle to commute.
- **Ridematching Software**: software that archives commuter profiles and matches up those who live and work in similar locations and desire to share the commute.
- **Park and Ride Lots**: parking facilitates that allow the transfer from low occupancy vehicles to carpools, vanpools, or transit services.
- **Flex Time**: alternative work schedules in which employees choose their own work schedule within set standards in order to avoid congested traffic conditions.
- **Staggered Work Hours**: alternative work schedules in which different groups of employees arrive and depart at different times to offset the congestion impacts of simultaneous trip-making.
- **Compressed Work Week**: a program where an employee works a full-time work week in four (or fewer) days, thus reducing the number of weekly trips to work.
- **Paid Parking and Carpool Incentives**: preferential parking locations, discounted parking, and other monetary incentives provided by employers to encourage drivers to participate in ridesharing.

- **Congestion Pricing**: market-based pricing strategies designed to encourage a shift of peak period trips to off-peak periods or to route traffic away from congested facilities during the peak demand periods. Congestion pricing can also encourage the use of transit or high-occupancy vehicles.
- **Bicycling**: a low-cost alternative that results in healthier, more productive employees and reduced vehicular travel, congestion, parking demand, and cost.
- **Parking Management**: strategies that utilize a variety of factors to balance the availability of parking with the availability of modal alternatives. Residential and commercial parking permits, parking pricing, shared use parking, time restrictions, and other strategies are included in parking management.
- **Public Transit Bus Pass Programs**: community or business-based transit passes that can include promotional and marketing activities oriented toward encouraging commuters to use bus and rail alternatives. Activities include bus route maps, brochures, posters, how-to classes, and free-ride days.
- **Emergency and Guaranteed Ride Home Programs**: a program where transit users are provided rides home in a daytime emergency or guaranteed at night after regular transit service has ceased.
- **Electronic and Smartcard Collection Systems**: a fare collection system that uses fare cards with magnetic strips or smartcard technology that allow for electronic payment and the expedited boarding of transit patrons.
- **Advanced Marketing and Alternate Routes for Special Events or Construction**: using the media to inform travelers of alternate routings for special events or long-term construction projects.
- **Transportation Management Organization/Coordinator**: a public or private organization or professional staff that provides information and programs to businesses and individuals to facilitate the increased alternative transportation mode use.

TDM Potential for Tyler

Besides the limited bike racks on buses and the newly created mixed-use zoning, no other measure of TDM is currently implemented in Tyler. However, there is potential for implementing some TDM strategies now and in the future. **Table 10-1** presents a matrix of TDM strategies and the potential for implementation in the Tyler area.

Large employers in the community add significantly to the peak hour transportation demand on the roadway system. One example of a TDM technique is to encourage work rescheduling (flextime) for some of the largest employers in the region. This technique decreases peak hour demand by spreading out commuter trips. Large businesses in many communities have implemented ridesharing programs for their employees. Many of these companies have sponsored a vanpool, either purchasing or leasing the van(s), where employees are responsible for coordinating pickup and driving responsibilities. Employers often offer employees incentive, such as preferred parking, to promote the vanpool.

As discussed in Chapter 4, there are eight employers in the Tyler area with over one thousand employees and another nine employers with over five hundred employees. Thus, there is a potential for some form of employer participation to promoting TDM.

TABLE 10-1 POTENTIAL TDM STRATEGIES FOR TYLER

Travel Demand Management Strategy	Now	Future
Telecommuting	●	●
Carpooling	●	●
Vanpooling	○	◎
School Pool	○	◎
Ridematching Software	○	◎
Park and Ride Lots	○	◎
Flex Time/Staggered Work Hours/Compressed Work Week	◎	●
Paid Parking and Carpool Incentives	○	◎
Congestion Pricing	⊗	⊗
Bicycling	◎	●
Parking Management	○	◎
Public Transit Bus Programs	◎	◎
Emergency/Guaranteed Ride Home	○	◎
Electronic Collection System	●	●
Route Notification for Special Events or Construction	◎	◎
Transportation Management Organization/Coordinator	○	○

Legend: ● high; ◎ medium; ○ low; ⊗ no potential; ● already in place

INTELLIGENT TRANSPORTATION SYSTEMS

Intelligent Transportation Systems (ITS) is a designation given to numerous applications that use smart processes and advanced technologies to improve the efficiency of the transportation system (reduce traffic congestion, freight movement, etc.), improve safety (at rail crossing, in work zones for road construction, etc.), and provide timely information to travelers (detours, approaching accidents, etc). Ultimately, ITS is expected to increase people and vehicle carrying capacity of the multimodal transportation system.

Tyler Regional ITS Architecture

ITS architecture refers to the structure or process required for the design and implementation of intelligent transportation systems. It provides a framework that integrates telecommunications and transportation systems to ensure that all network elements can work together and support each other. Use of ITS architecture can help identify projects, as part of an integrated system approach, consistent with a region's overall transportation needs.

In January 2001, the Federal Highway Administration (FHWA) issued a final rule to implement Section 5206(e) of the Transportation Equity Act for the 21st Century (TEA-21) requiring that ITS projects funded through the Highway Trust Fund conform to the National ITS Architecture and applicable standards.

To meet these requirements TxDOT initiated the development of regional ITS architectures and deployment plans throughout the State of Texas. Although not required by the FHWA final rule, TxDOT took the opportunity to also develop an ITS deployment plan for each Region. The Tyler Regional ITS Architecture and Regional ITS Deployment Plan was prepared as part of this initiative.

The Tyler Regional ITS Architecture provided the framework and prioritized the key functions and services desired by stakeholders in the Region. The ITS Deployment Plan builds on the architecture by prioritizing market packages, outlining specific ITS project recommendations and strategies for the Region, and identifying deployment timeframes so that the recommended projects and strategies can be implemented over time. Agency responsibilities for implementing and operating the systems also are a key component of the ITS Deployment Plan.

The Tyler Region is bordered by the TxDOT Atlanta District to the northeast, the TxDOT Lufkin District to the southeast, the TxDOT Bryan and TxDOT Dallas Districts to the west and the TxDOT Paris District to the north. For the Tyler Regional ITS Architecture and Deployment Plan, the study area included all eight counties that comprise the TxDOT Tyler District.

Counties included in the Tyler Region are as follows:

- Anderson;
- Cherokee;
- Gregg;
- Henderson;
- Rusk;
- Smith;
- Van Zandt; and
- Wood.

Existing ITS in the Tyler Region

The ITS Regional Deployment Plan study identified the following ITS applications that are currently in place within the Tyler Region:

- TxDOT has a permanent dynamic message sign (DMS), as well as several portable DMS, that are utilized primarily for displaying delay information.
- Closed-circuit television (CCTV) cameras have also been installed at an interchange to monitor delay, and TxDOT and the City of Longview are using video detection at several intersections in the Region.
- Highway advisory radio (HAR) along I-20 provides motorists with information on construction, lane closures, possible alternate routes and traffic conditions.
- High-water detection technology has been implemented in flood prone areas of the City of Longview to provide early notification of dangerous conditions resulting from a flooded roadway.

Regional ITS Deployment Plan

The Tyler Regional ITS Deployment Plan outlines a vision for ITS deployment, and identifies and prioritizes projects that are needed to implement the ITS architecture on a short, medium, and long-term basis. In doing so, this plan also helps the Region to prioritize funding decisions. As infrastructure is incrementally built-out over a 20-year horizon, integration among key foundation systems in the Region can occur as the system grows and expands.

The majority of ITS projects recommended for the Tyler Region were identified in the following key areas:

- Travel and Traffic Management;
- Emergency Management;
- Maintenance and Construction Operations; and
- Public Transportation Management.

The ITS Deployment Plan recommended ITS projects in the 5-year (short-term), 10-year (mid-term), and 20-year (long-term) deployment timeframes. **Tables 10-2 to 4** presents a summary of recommended ITS projects. The list in the tables include only those projects that largely affect the Tyler metropolitan planning area. A complete listing of projects that includes the entire Tyler Region— including details of probable cost, an indication as to whether funding has been identified, and an estimated duration for the project to be designed and implemented — is found in the report *"State of Texas Regional ITS Architecture and Deployment Plans for Tyler Region, July 16, 2003."*

Stakeholders in the Tyler Region invested substantial amount of effort to develop both the Regional ITS Architecture and the Deployment Plan. A plan for maintaining these important tools was a key component of the process. Stakeholders agreed that both the Regional ITS Architecture and Deployment Plan would need to be periodically reviewed and potentially updated in order to reflect current deployment status, as well as to re-evaluate priorities. They also agreed that it would be appropriate to review the plan annually. Updated status information and changes discussed will be gathered and recorded by TxDOT to be incorporated into the plan when it is updated on a two year cycle that corresponds to the Transportation Improvement Plan (TIP) update cycle. The TxDOT Tyler District was identified as the agency that should take the lead in maintaining and updating the Region's ITS Architecture and Deployment Plan, with support from a multijurisdictional committee in the Region.

TABLE 10-2 ITS SHORT-TERM PROJECTS (5-YEAR) IMPACTING TYLER METROPOLITAN PLANNING AREA

Program / Area Project	Description	Responsible Agency	Key Areas*
TxDOT Advanced Traffic Management System (ATMS) Implementation	Implement TxDOT ATMS in TxDOT Tyler Traffic Management Center (TMC)	TxDOT	TTM
TxDOT Freeway Management System Implementation Phase 1	Implement 4 closed-circuit television cameras, 2 dynamic message signs (DMS) and highway advisory radio (HAR) in the Tyler Region along the I-20 corridor	TxDOT	TTM
TxDOT Center-to-Center Communication (Statewide)	Enhance coordination with other TxDOT Districts through implementation of center-to-center communications between TxDOT TMCs	TxDOT	TTM
TxDOT Closed Loop Signal System Expansion Phase 1	Expand TxDOT closed loop signal system at signalized intersections throughout the Region	TxDOT	TTM
City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection	Implement a fiber connection between the City of Tyler TMC and the TxDOT Tyler District TMC to allow video sharing and control, traffic data sharing, and other joint functions	TxDOT/City of Tyler	TTM
City of Tyler Closed Loop Signal System Expansion Phase 1	Expand City of Tyler closed loop signal system at 12 additional signalized intersections in the City of Tyler	City of Tyler	TTM
City of Tyler VIVDS Expansion Phase 1	Implement video image vehicle detection systems (VIVDS) on an additional 12 signalized intersections in Tyler	City of Tyler	TTM
Media Liaison and Coordination	Develop agreements/enhanced coordination with local media to improve information sharing and dissemination. Provide CCTV camera feeds to media.	TxDOT/City of Tyler /City of Longview	TTM
Tyler Regional Telecommunications Master Plan	Develop Regional Telecommunications Master Plan including needs analysis and recommendations	TxDOT/City of Tyler/City of Longview	TTM
East Texas 911 Center/TxDOT Tyler District TMC Connection	Install connection between East Texas 911 Center and TxDOT Tyler District TMC for CCTV camera shared monitoring and control and data sharing. This connection may be implemented through the City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection project.	TxDOT/East Texas 911 Center/ Smith County	EM
City of Tyler EOC/TxDOT Tyler District TMC Connection	Operations Center (EOC) and TxDOT Tyler District TMC to allow for DMS and CCTV camera shared monitoring and control, data sharing. This connection may be implemented through the City of Tyler TMC/TxDOT Tyler District TMC Fiber Connection project.	TxDOT/City of Tyler EOC	EM

TABLE 10-2 ITS SHORT-TERM PROJECTS (5-YEAR) IMPACTING TYLER METROPOLITAN PLANNING AREA (CONTINUED)

Program / Area Project	Description	Responsible Agency	Key Areas*
DPS/TxDOT Tyler District TMC Connection	Install connection between DPS and TxDOT Tyler District TMC for CCTV camera shared monitoring and control and data sharing	TxDOT/DPS	EM
Incident Detour Plans	Develop incident detour plans for roads that would be used as detour routes during incidents along I-20	TxDOT/DPS/City of Longview/ City of Tyler/Other Cities and Counties	EM
City of Tyler Emergency Vehicle Signal Preemption	Implement signal pre-emption at City of Tyler intersections for emergency vehicles	Implementation: City of Tyler Fire Operations and Maintenance: City of Tyler Traffic Engineering Department	EM
City of Tyler Flood Detection Stations	Implement flood detection stations at arterial street locations prone to flooding in the City of Tyler	City of Tyler	MCO
City of Tyler Transit Web-based Ride Scheduling and Travel Data	Provide web-based ride scheduling and real-time travel data via the internet	City of Tyler Transit	PTM
City of Tyler Transit AVL	Install automatic vehicle location (AVL) on fixed route buses and paratransit vehicles	City of Tyler Transit	PTM
City of Tyler Transit Automatic Passenger Counters	Implement passive system to accurately count ridership	City of Tyler Transit	PTM
City of Tyler Transit/ETCOG TOC Communication	Implement a link between Tyler Transit and ETCOG to provide Tyler Transit the ability to share schedules and real time information between agencies	City of Tyler Transit/ETCOG	PTM
HAZMAT Incident Notification System	Implement incident notification system for vehicles carrying hazardous materials	DPS/Municipal Public Safety Dispatch/County Public Safety Dispatch	CVO

**TTM->Travel and Traffic Management*
EM-> Emergency Management
MCO-> Management and Construction Operations
PTM-> Public Transportation Management
CVO-> Commercial Vehicle Operations
Source: State of Texas Regional ITS Architecture and Deployment Plans for Tyler Region, July 16, 2003

TABLE 10-3 ITS MID-TERM PROJECTS (10-YEAR) IMPACTING TYLER METROPOLITAN PLANNING AREA

Program / Area Project	Description	Responsible Agency	Key Areas*
TxDOT US 69 instrumentation	Implement CCTV cameras, DMS, detectors, and HAR along US 69 in the Tyler Region to help provide information during evacuations	TxDOT	TTM
TxDOT Closed Loop Signal System Expansion Phase 2	Continue expansion of closed loop signal system at TxDOT intersections throughout the Region	TxDOT	TTM
City of Tyler Closed Loop Signal System Expansion Phase 2	Continue implementation of closed loop signal systems in the City of Tyler	City of Tyler	TTM
City of Tyler VIVDS Expansion Phase 2	Continue implementation of VIVDS at signalized intersections in City of Tyler	City of Tyler	TTM
City of Tyler CCTV Camera Implementation	Implement CCTV cameras at major intersections such as those along Loop 323	City of Tyler	TTM
City of Tyler Highway/Rail Intersection Warnings	Add highway/rail intersection warning systems that are integrated with TxDOT Tyler District TMC and City of Tyler TMC as needed	TxDOT Tyler District TMC/City of Tyler TMC	TTM
Regional 511 Advanced Traveler Information System Server	Implement advanced traveler information system (ATIS) server in the TxDOT Tyler District TMC that will collect, consolidate, and distribute traveler information to a 511 based phone system, web, and private Information Service Providers (ISPs)	TxDOT	TTM
City of Tyler Transit On-board Security Cameras	Install on-board security cameras on buses	City of Tyler Transit	PTM
City of Tyler Transit Electronic Fare Payment System	Install electronic fare payment system on fixed route buses	City of Tyler Transit	PTM

**TTM->Travel and Traffic Management*
PTM-> Public Transportation Management
Source: State of Texas Regional ITS Architecture and Deployment Plans for Tyler Region, July 16, 2003

TABLE 10-4 ITS LONG-TERM PROJECTS (20-YEAR) IMPACTING TYLER METROPOLITAN PLANNING AREA

Program / Area Project	Description	Responsible Agency	Key Areas*
TxDOT Closed Loop Signal System Expansion Phase 3	Continue expansion of closed loop signal system at TxDOT intersections throughout the Region	TxDOT	TTM
City of Tyler Closed Loop Signal System Expansion Phase 3	Continue expansion of the closed loop system in the City of Tyler	City of Tyler	TTM
City of Tyler VIVDS Expansion Phase 3	Continue implementation of VIVDS at signalized intersections in City of Tyler	City of Tyler	TTM
Regional Emissions Monitoring	Implement systems to allow emissions monitoring of vehicles and areas of concern	TxDOT/City of Tyler/ City of Longview	TTM

**TTM->Travel and Traffic Management*
Source: State of Texas Regional ITS Architecture and Deployment Plans for Tyler Region, July 16, 2003

ACCESS MANAGEMENT

Land use and transportation are mutually dependent systems. Highways and streets provide access to land enabling its development. Land development generates demands on the transportation system in the form of auto, truck, transit, bicycle, and pedestrian trips. As a result, a community's long-term development prospects can be stymied by inadequate transportation connections. On the other hand, inadequate community planning and insensitive site development can severely reduce the effectiveness of an otherwise adequate transportation system. Therefore, as long as land use and transportation responsibilities remain segmented, intergovernmental partnerships are essential, as well as private-public partnerships.

Access management is defined as the systematic control of the location, spacing, operation and design of driveways, medians, median openings, traffic signals, interchanges, and street connections to maintain safety at a roadway's full traffic carrying capacity. Implementing an access management program will encourage smooth and safe traffic flow on a community's roadways and will help communities avoid some of the traffic problems caused by uncontrolled strip development.

The Federal Highway Administration's (FHWA) official definition of access management is "the process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding system in terms of safety, capacity, and speed." In practical terms, it means managing the number of driveways that a vehicle may encounter without hampering reasonable access to a property and removing slower, turning vehicles from the arterial as efficiently as possible.

Existing Policies and Practices in the Tyler MPO

Currently no cities in the Tyler Metropolitan Planning Area have an independent access management program in place. Instead the guidelines set forth by the Texas Department of Transportation (TxDOT) in their *Access Management Manual* are utilized. With the exception of Tyler, the cities located in the Tyler MPO boundaries are primarily comprised of state maintained highways. Therefore, the use of the state's access management policies is appropriate.

The City of Tyler has adopted TxDOT access management criteria for state roads but not for local arterials. The Tyler 21 Comprehensive Plan discusses the implementation of access management strategies on the local arterials. The plan recognizes access management application on most Tyler arterial roads is poor and improvement is needed. Although Tyler 21 does not directly create an access management plan for the city, it does suggest future access management criteria may include requirements such as the following:

- Joint use driveways with joint maintenance agreements for sharing of access driveways to South Broadway Avenue by adjacent developments. Where sharing is not possible in the short term, reservation of rights of way for future inter-parcel connections to be required.
- Creation of local access drives, to the degree feasible, connecting adjacent developments, with easements and joint maintenance agreements.

- Internal cross-access drives plus pedestrian access ways to connect adjacent developments with cross access easements and joint maintenance agreements.
- Building layouts to reduce walking distances between buildings.
- Parking to be sited so that users can easily access multiple buildings on foot.
- Parking designed with a series of fields grouped with trees and pathways.
- Shared parking between adjacent developments that have different hours of normal activity.
- Sidewalks and pedestrian paths to be constructed to the principal uses from parking areas, outparcels, surrounding streets, and public sidewalks.
- Delivery and loading areas to be separated from public access routes (vehicle and pedestrian) and parking areas.
- Developments meeting large size criteria to provide plazas or similar public spaces.
- Drive-through facilities to be designed as integral to buildings, not stand-alone, with safe access through clearly defined pedestrian circulation which minimizes vehicle/pedestrian conflict points.

Policies of the Texas Department of Transportation

The TxDOT *Access Management Manual* describes the application of access connection criteria on the state highway system for the following: new highways on new alignments, freeway mainlines, frontage roads, and other state system highways. The criteria are intended to provide reasonable access, while ensuring the safe and efficient operations of each roadway type.

New Highways on New Alignments

When a new highway is constructed on a new alignment, and the Commission determines that the new highway will be access controlled, direct access to the new highway will be determined prior to right-of-way acquisition and will be described in the right-of-way deeds. (For application of access connections where TxDOT controls the access, refer to *TxDOT Access Management Manual*, Chapter 2, Section 2, Application of Access Criteria).

Freeway Mainlanes

Freeway mainlanes provide no direct access to property and access to the freeway mainlanes is provided only at interchanges and ramps. The spacing of interchanges and ramps needs to allow entering and exiting vehicles to weave safely and to provide adequate acceleration/deceleration. The design of freeways is governed by the *TxDOT Roadway Design Manual*, Chapter 3.

Frontage Roads

Frontage roads are roadways that are constructed generally parallel to a freeway or other highway. Frontage roads may be considered in order to provide direct access to abutting property where (1) alternative access is not available and the property would otherwise be landlocked, (2) it is not practical for TxDOT to purchase the access, and (3) the frontage road allows for improved mobility together with the property access.

Direct access to the frontage road is prohibited in the vicinity of ramp connections, as described in the *TxDOT Roadway Design Manual*, Chapter 3. Otherwise, on roadways where TxDOT does not control the access, access connecting to the frontage road is typically permitted subject to the access connection criteria set forth in *TxDOT Access Management Manual*. (For application of access connections where TxDOT controls the access, refer to the TxDOT Access Management Manual, Chapter 2, Section 2, Application of Access Criteria).

Table 10-5 gives the minimum access connection spacing criteria for frontage roads. However, a lesser connection spacing may be allowed without deviation in certain circumstances such as to keep from land-locking a property or re-establishment of reasonable access to the state highway system under highway reconstruction/rehabilitation projects. Chapter 2, Section 5, of the *TxDOT Access Management Manual* describes land-locking and the circumstances to which deviation to the connection spacing criteria do not apply.

TABLE 10-5 FRONTAGE ROAD CONNECTION SPACING CRITERIA AS DEFINED IN TxDOT ACCESS MANAGEMENT MANUAL (MARCH 2009)[1,2]

Posted Speed (mph)	Minimum Access Connection Spacing (feet)	
	One-Way Frontage Roads	Two-Way Frontage Roads
≤30	200	200
35	250	300
40	305	360
45	360	435
≥50	425	510

1 Distances are for passenger cars on level grade. These distances may be adjusted for downgrades and/or significant truck traffic. Where present or projected traffic operations indicate specific needs, consideration may be given to intersection sight distance and operational gap acceptance measurement adjustments.

2 When these values are not attainable, refer to the deviation process as described in Chapter 3, Section 1 or Chapter 2, Section 2 of the TxDOT Access Management Manual.

While **Table 10-5** gives minimum connection spacing criteria, the critical areas with respect to the ramp pattern may need greater spacing requirements for operational, safety, and weaving efficiencies.

The distance between access connections is measured along the edge of the traveled way from the closest edge of pavement of the first access connection to the closest edge of pavement of the second access connection as the figure on the right indicates. Additionally, the access connection spacing in the proximity of frontage road U-turn lanes will be measured from the inside edge of the U-turn lane to the closest edge of the first access connection.

Other State Highways

This classification applies to all state highway system routes that are not new highways on new alignments, freeway mainlanes, or frontage roads.

Table 10-6 provides minimum access connection spacing criteria for other state system highways. However, a lesser connection spacing may be allowed without deviation in certain circumstances such as to keep from land-locking a property or re-establishment of reasonable access to the state highway system under highway reconstruction/rehabilitation projects. References to land-locking and the circumstances to which deviation to the connection spacing criteria do not apply are described in the *TxDOT Access Management Manual*, Chapter 2, Section 6.

TABLE 10-6 TxDOT MINIMUM ACCESS CONNECTION SPACING CRITERIA FOR OTHER STATE HIGHWAYS[1,2]

Posted Speed (mph)	Distance (feet)
≤30	200
35	250
40	305
45	360
≥50	425

1 Distances are for passenger cars on level grade. These distances may be adjusted for downgrades and/or significant truck traffic. Where present or projected traffic operations indicate specific needs, consideration may be given to intersection sight distance and operational gap acceptance measurement adjustments.

2 When these values are not attainable, refer to the deviation process as described in Chapter 3, Section 1 or Chapter 2, Section 2 of the TxDOT Access Management Manual.

Note the values shown in **Table 10-6** do not apply to rural highways outside of metropolitan planning organization boundaries where there is little, if any, potential for development with current ADT volumes below 2000. For those highways, access location and design will be evaluated based on safety and traffic operation considerations. Such considerations may include traffic volumes, posted speed, turning volumes, presence or absence of shoulders, and roadway geometrics.

In the case of existing access, all previously permitted access will be grandfathered as accepted access. However, property owners must coordinate with TxDOT or the municipality responsible for access permitting prior to making any property modifications that will result in changes to the traffic patterns associated with the access.

Corner Clearance

Corner clearance refers to the separation of access connections from roadway intersections. **Table 10-5** provides minimum corner clearance criteria. Where adequate access connection spacing cannot be achieved, the permitting authority may allow for a lesser spacing when shared access is established with an abutting property. Where no other alternatives exist, construction of an access connection may be allowed along the property line farthest from the intersection. To provide reasonable access under these conditions but also provide the safest operation, consideration should be given to designing the driveway connection to allow only the right-in turning movement or only the right-in/right-out turning movements if feasible.

Auxiliary Lanes

Section 7 of Chapter 2 of the *TxDOT Access Management Manual* describes the basic use and functional criteria associated with auxiliary lanes. Auxiliary lanes consist of left-turn and right-turn movements, deceleration, acceleration, and their associated transitions and storage requirements. Left-turn movements may pose challenges at driveways and street intersections. They may increase conflicts, delays, and crashes and often complicate traffic signal timing. These problems are especially acute at major highway intersections where heavy left-turn movements take place, but also occur where left–turn movements enter or leave driveways serving adjacent land development. As with left-turn movements, right-turn movements pose problems at both driveways and street intersections. Right-turn movements increase conflicts, delays, and crashes, particularly where a speed differential of 10 mph or more exists between the speed of through traffic and the vehicles that are turning right. Table 2-3 on page 2-17 of the TxDOT *Access Management Manual* provides thresholds for auxiliary lanes.

Access Management Permitting

Access management permitting is detailed in Chapter 3 Administrative Procedures of the *TxDOT Access Management Manual*. Under recently enacted state legislation, TxDOT allows cities with access management plans to control permitting of driveways on the state highway system. To be eligible, a city must present its access management plan to TxDOT for approval. Another possible approach is for cities to work in cooperation with TxDOT on the issuance of driveway permits.

Toolbox of Access Management Techniques

A variety of access management, location and design practices and policies can be used to improve the safety and operations of the roadway. These techniques can be grouped broadly into: policy and design related techniques, techniques that can be applied on new and developing corridors, and most importantly techniques that can be used for retrofit projects in built-up urban corridors.

Policy and Design Related Techniques

The *NCHRP Report 420: Impacts of Access Management Techniques* identified more than 100 individual access management techniques which were grouped according to policy and roadway design features. The NCHRP Report 420 recommends a classification system for access management techniques.

I. Policy – Management: (a) Access codes/spacing; (b) Zoning/subdivision regulations; (c) Purchase of access rights; and (d) Establishment of setbacks from interchanges and intersections.

II. Design – Operations (By Roadway Features): (a) Interchanges; (b) Frontage roads; (c) Medians –left turns; (d) Right turns; (e) Access/driveway location (mainly retrofit—consolidation, reorientation, relocation); (f) Traffic controls; and (g) Access/driveway design.

The NCHRP Report 420 classification system is one of many classification systems of grouping the variety of access management techniques. The toolbox of techniques summarized in **Table 10-7** is another classification system that reflects the 10 principles for access management

outlined in the Transportation Research Board's *Access Management Manual*. The techniques are grouped into the following six categories that include both policy and design techniques: (1) Limit the Number of Conflict Points; (2) Separate Conflict Areas; (3) Remove Turning Vehicles from Through Traffic Lanes; (4) Reduce Conflicting Volumes; (5) Improve Roadway Operations; and (6) Improve Driveway Operations. Individual techniques under each category are listed below in **Table 10-7**.

TABLE 10-7 ACCESS MANAGEMENT TOOLBOX

Limit Conflicts

- Purchase access rights
- Regulate the location, spacing, & design of driveways
- Restrict the number of driveways per lot
- Restrict the number of lots
- Encourage adjacent properties to share access
- Coordinate driveway locations on both sides of the roadway
- Install a nontraversable median
- Replace a continuous two-way left turn with a nontraversable median
- Close a median opening
- Replace a full median opening with a directional opening
- Install a separator island to prevent left-turns within the functional intersection area
- Install a median divider on the cross-road
- Install a divisional island to prevent entry into left-turn bay
- Install a physical barrier to eliminate uncontrolled access along property frontage
- Locate access opposite signalized 3-way intersection
- Install channelizing island to discourage left-turn maneuver
- Install narrow median with indirect left-turns

Separate Conflicts

- Minimum corner clearance
- Maximize corner clearance by locating access as far from the intersection as possible
- Designate the access for each property
- Consolidate access drives

Remove Turning Vehicles from the Through Traffic Lanes

- Provide separate left-turn entrances and exits at major traffic generators
- Install a continuous two-way left-turn lane
- Install a left-turn deceleration bay at existing median opening
- Install a nontraversable median with left-turn bays
- Increase the length of existing turn bay
- Install a right-turn deceleration bay
- Install a continuous right-turn lane
- Install a right-turn lane serving multiple access connections

Reduce the Number of Turning Movements

- Provide connection between adjacent parcels
- Require adequate internal circulation
- Provide alternative access
- Provide a supporting circulation system
- Vehicular use limitations

Improve Roadway Operations

- Long, uniform signal spacing
- Install access on the cross-road
- Provide adequate sight distances
- Shared access/joint access
- Internal access to outparcels
- Indirect u-turn
- Provide a frontage road

Improve Driveway Operations

- Smooth vertical geometrics
- Adequate driveway throat width and curb return radii
- Provide adequate sight distance
- Additional egress lane
- Define the ingress and egress sides of the access drive

Techniques for New Areas and Developing Corridors

Effective implementation of access management principles starts during planning for new corridors and on developing corridors. Effective local access management requires planning, as well as regulatory solutions. Local jurisdictions should establish a policy framework that supports access management in the local comprehensive plan, prepare corridor or access management plans for specific problem areas, and encourage good site planning techniques. Land development and subdivision regulations should be amended accordingly and local jurisdictions may also consider a separate access management ordinance.

The Tyler MPO would need to coordinate with all three cities to establish a model access management ordinance that defines consistent land development and subdivision regulations that support access management. Access management programs should address commercial development along thoroughfares, as well as flag lots, residential strips, and other issues related to the division and subdivision of land. Comprehensive and subarea plans provide the rationale for access management programs and can serve as the legal basis for public policy decisions.

Techniques for Retrofit Projects

Many existing roadways– in particular, older commercial strip developments– tend to be dotted with undesirable access design features. A project that applies access management design principles to existing, already built-up street corridors is sometimes called a “retrofit” project.

Retrofit projects can be complex and challenging. Along roadways where the property lines, buildings, and driveways have already been established, the benefits from any access management modifications have to be weighed against the costs and any disruptions that would be caused by modifying, moving, or eliminating driveways and median openings. Bringing such roadways into compliance may not always be a sufficiently high priority to pass the threshold for effort and funding. Nevertheless, access management policies and standards can be applied when land along existing roadways redevelops to keep the situation from further deteriorating.

Studies indicate that interviews with governmental agency staff suggest that retrofit projects tend to be combined state and local efforts, with an added degree of property owner cooperation. A retrofit access management project may be accompanied by other incentives from the local government to the property owners, such as beautification or minor discretionary code variances. The government pays the cost of modifying existing driveways, and may also pay for parking lot modifications to accommodate changes in on-site traffic circulation patterns necessitated by the driveway modifications.

It is not uncommon to find that a retrofit project cannot fully accomplish all access management objectives. Those with experience in this area offer that installing or modifying a median is commonly done, albeit in some cases strong opposition from businesses could be expected. A not well-thought out plan for median changes could result in failure. Unneeded multiple driveways can be eliminated, provided the onsite circulation pattern will accommodate the reduced number of driveways. If lot frontages are small, then some driveway spacing may remain less than desired.

There are a number of principles that can be applied to retrofit situations to support the access policy goals, including those access management principles defined under the six categories of access management techniques. Their aim is to reduce the number of access connections (conflict points) and reduce their adverse effects by applying a variety of techniques; in this way the current undesirable situation can be improved. Retrofit techniques described in this section are divided into two categories: access/driveway location and operation and roadway design. As feasible, these techniques should be applied both during permit review and as part of retrofit during reconstruction projects.

Access/ driveway location and operation retrofit techniques:

- Consolidate driveway access for adjacent properties
- Encourage connections between adjacent properties to share access
- Relocate or reorient driveways
- Encourage adjacent properties to share access
- Coordinate driveway locations on both sides of street— align opposing driveways or establish minimum offset
- Locate a new driveway opposite an intersection or driveway and install a traffic signal where warranted and properly spaced
- Maximize corner clearance by locating access as far from the intersection as possible (i.e., near the property line
- Install barrier to prevent uncontrolled access along property frontage
- Install driveway channelizing island to discourage left-turn maneuvers
- Provide separate left-turn entrances and exits at major traffic generators
- Require access on collector street (when available) in lieu of additional driveway on highway
- Install two one-way driveways in lieu of one two-way driveway
- Install two two-way driveways with limited turns in lieu of one standard two-way driveway
- Install two one-way driveways in lieu of two two-way driveways
- Install two two-way driveways with limited turns in lieu of two standard two-way driveways

Roadway design retrofit techniques:

- Replace a continuous two-way left-turn lane with a nontraversable median
- Install two-way left-turn lane
- Provide left-turn deceleration lane
- Provide right-turn deceleration lane
- Install right-turn deceleration lane to serve several driveways