

## **APPENDIX B. ACCESS MANAGEMENT TOOLKIT**

## **ACCESS MANAGEMENT TOOLKIT**

This appendix presents land use and development strategies and technical tools that can be used for access management.

### **LAND USE AND DEVELOPMENT STRATEGIES**

The following describes tools for planning, design, and regulatory tools for managing land use and development.

#### **Acquisition of Access Rights**

Property ownership is accompanied by a bundle of rights. Some of these rights can be separated and sold or acquired separately from the remaining property interest. The right of access to an abutting roadway, for example, may be acquired through negotiation, purchase, or the power of eminent domain. The clear benefit of this method to a regulating agency is that the access restriction is recorded with the deed of the land and therefore runs with the land, allowing the agency to clearly retain the right of access control. This technique has been most frequently used along freeways, but is increasingly applied to arterial roadways and bypasses. Access rights should be acquired before development occurs, when the cost of the land is still low.

#### **Dedications and Exactions**

Local governments can require monetary payments or contributions of land by an applicant as a condition of development approval. Usually such exactions are determined through open-ended negotiations between the local government and the developer. In the case of subdivision regulations, dedications are required from the developer for site related improvements. Voluntary and informal measures also can be effective if it is successfully communicated that dedicated rights-of-way will contribute to the success of a development.

#### **Interim Use Allowances**

Interim use allowances restrict structural improvements within transportation rights-of-way and allow for modest structural investments, such as nurseries and storage yards. These types of allowances ensure the owner of the potential for some economic use of the property until the property is acquired as right-of-way for a transportation project.

## **Purchase of Development Rights**

Development rights can be separated from other property rights or from the remainder of the property and purchased, donated, sold, or condemned for public purpose. The property owner from which the rights are purchased is compensated for maintaining the property in an undeveloped state.

## **Transfer of Development Rights**

Instead of purchasing development rights through the governmental agency, the rights are transferred from one area of the parcel to another through the establishment of a sending and receiving area. The sending area is usually established around an area in need of protection from development and can include future transportation right-of-way. The receiving area might be an area with higher intensity uses than prescribed in the underlying zoning.

## **Land Development Regulation**

Access management can be implemented successfully in areas where local jurisdictions participate in managing development through comprehensive planning, land development regulation, and development review (*Listokin and Walker, 1989 in Land Development and Subdivision Regulation that Support Access Management*). Local plans and ordinances provide a policy foundation for managing access, which is carried out through development review and permitting actions.

The information contained in general and land use plans, for example, provides the overall guidance on how to balance mobility with access. A community's transportation plan, on the other hand, describes a community's future roadway network based on anticipated development patterns. Based on the anticipated future development and the future functional classification of the roadways, access management categories can be established. These categories provide guidance in regard to the application of access management strategies and help identify the type and number of access points required along a highway.

Overall, the comprehensive planning process will:

- Promote orderly and efficient development
- Protect property values
- Preserve community character, natural resources, and environment
- Promote economic development
- Increase the public awareness of the forces of community change

## **Flexible or Cluster Zoning**

Flexible zoning is another way of achieving access control. Planned unit developments often incorporate flexible zoning concepts for the purpose of clustering denser development in one portion of a development and leaving open space in another portion. Planned Unit Development incorporates flexible zoning in order to achieve the same gross densities while avoiding encroachment of development into future rights-of-way. Access points can be few in number, yet designed to optimally serve the more densely developed areas. In order to promote creative site design, land-use and lot dimensional zoning are relaxed.

## **Overlay Zones**

Overlay zoning can add special requirements onto an existing zoning district. With overlay zoning, standards can be tailored by priority or intensity of access, safety, and congestion problems of a corridor.

## **Subdivision Regulations and Site Plan Review**

Subdivision regulations provide guidance on the division or subdivision of land into lots, blocks, and public ways. These regulations complement the underlying zoning. The subdivision plat review can require documentation of all access points and the internal circulation system. Access and design standards can require such items as traffic signals, medians, and on-site circulation.

The subdivision review process should result in an affirmative response to questions such as:

- Is the road system designed to meet the projected traffic demand and does the road network consist of a hierarchy of roads designed according to function?
- Is access properly placed in relation to sight distance, driveway spacing, and other related considerations?
- Do units front on residential access streets rather than major roadways?
- Does the project avoid areas unsuitable for development?
- Does the pedestrian path system link buildings with parking areas, entrances to the development, open space, and recreational and other community facilities?
- Have utilities been properly placed?

The site plan review process for large-scale uses on individual property parcels (such as large commercial developments) can include procedures similar to a subdivision review process.

## Zoning Regulation

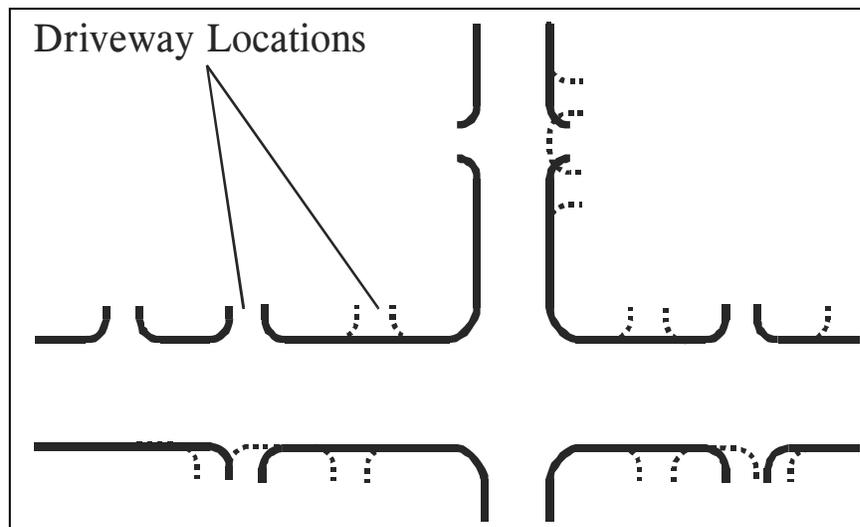
Zoning regulations provide information on the type of land use or development that can occur within each defined parcel. Zoning regulations work in conjunction with land use plans and subdivision regulations. Some types of lot configurations encourage inadequate spacing between access points. Zoning regulation can help reorient lots in order to access local streets instead of the main highway, as well as to ensure adequate spacing between access points. Controlling lot dimensions can have impacts on driveway spacing, on-site circulation, and driveway lengths.

## TECHNICAL TOOLS

### Driveway Consolidation

Driveways are consolidated in order to limit the number of access points along a roadway and to provide adequate access spacing (Figure B-1). Retrofit strategies include:

**FIGURE B-1. DRIVEWAY TREATMENTS**



- Selectively relocate or reconstruct substandard driveways.
- Negotiate driveway closure, reconstruction, or relocation during roadway resurfacing or improvement projects.
- Require improvement of access during redevelopment or expansion of an existing use, including joint and cross access with abutting properties.
- Negotiate redesign of driveway access during sidewalk maintenance, reconstruction, or additions.
- Consolidate access when adjacent properties come under common ownership.

- Improve the traffic signal system through longer, more uniform intervals with advance traffic monitoring and control capabilities.
- Use raised medians or other traffic barriers at hazardous intersections, or along certain roadway segments to control mid-block turning movements and improve safety.
- Develop special corridor overlay zoning districts that are tailored to the circumstances of build-up areas.

### **Joint Driveway/Cross-Access**

Joint Driveway/Cross-Access provides for a unified on-site circulation plan serving several properties on a commercial corridor. Cross access connects adjacent parcels and allows for circulation between the parcels without using the arterial street system. In the case that lot frontage is inadequate, joint access/cross access can achieve adequate driveway spacing. The method requires that joint-use driveways and cross access easements need to be established between the adjacent properties. Additionally building sites must reflect the circulation system. The jurisdiction with the zoning authority would need to adopt cross access standards.

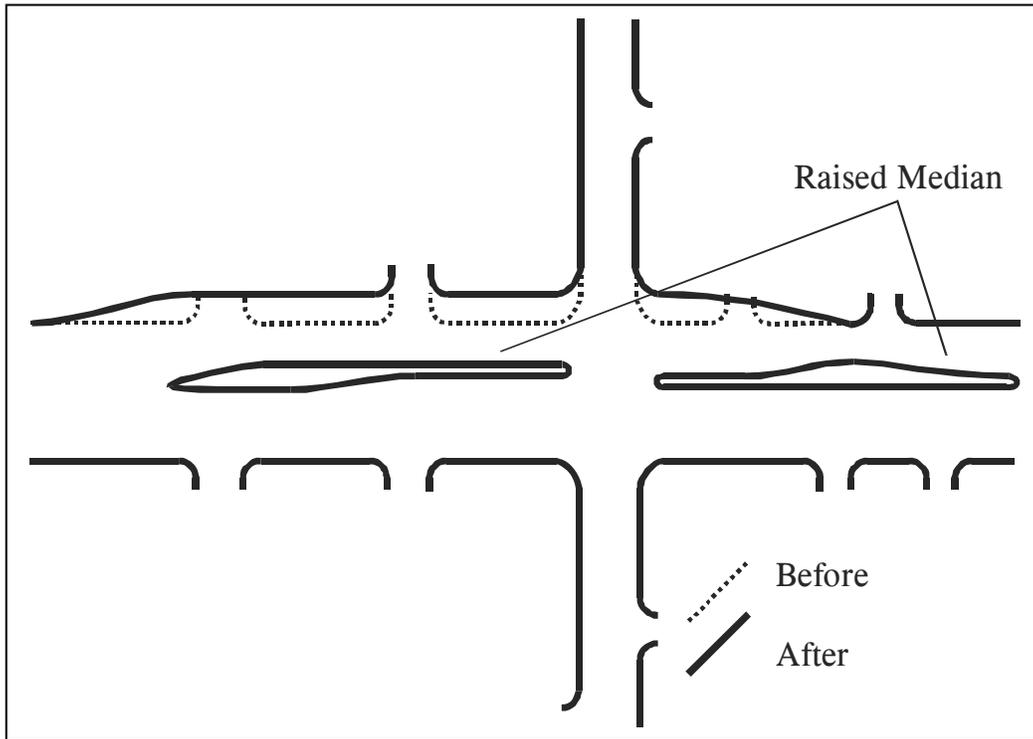
### **Raised Medians at Intersections**

Raised medians at intersections, as shown in Figure B-2, provide a center barrier to prevent certain turning movements, such as left turn-in only/no left turn-out which allows greater access to the adjacent property and leaves right turns unrestricted. Right-in and right-out driveways are also commonly used. The overall advantage of raised medians at intersections is the ability to define allowed movements while eliminating undesirable ones.

### ***Full Raised Medians***

Medians are effective for the control and management of left turns and crossing movements and may be located at intersection approaches, or along the full length of a road between intersections. See Figure B-2 for illustration. A variety of designs allows for full or restricted turning movements. The presence or absence of a median barrier has a substantial effect on the safety and operations of major roadways. The main advantage of a raised median is that it reduces conflict points by restricting turn movements to right-in and right-out movements. In addition, it provides a means of controlling highway crossings to specific locations where sight distance and vehicle storage can be provided. A sufficiently wide median can provide shelter for vehicles or pedestrians crossing the roadway. The disadvantage of a raised median is that through the limitations of crossing movements, the number of U-turns will most likely increase which might lead to an increase in rear-end crashes.

**FIGURE B-2. RAISED MEDIAN AT INTERSECTIONS**

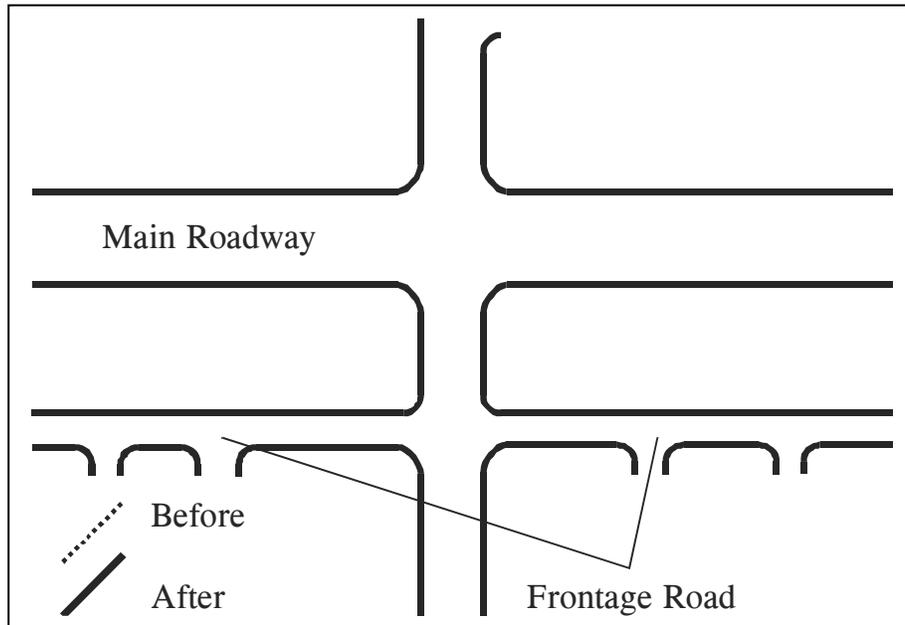


### **Alternative Access Ways**

The long-term planning objective for major corridors is to develop a system of side streets, parallel roads, and traffic control features to support existing and planned development. Main components of such a system are frontage or reverse access roads, which together with inter-parcel connections provide alternative routes for short local trips; thereby, helping to reduce local traffic on the arterial.

Frontage roads are typically constructed adjacent to the main corridor highway, but outside the highway right-of-way, providing access to properties fronting the highway. This allows funneling of local traffic to a common point gaining access to the highway. An example is shown in Figure B-3. Reverse access roads or backage roads are also paralleling the highway, but are off-set from the right-of-way to provide site access at the back of the property rather than the highway side. Both concepts help to provide access to local properties while preserving the safety and capacity of the highway. One issue to consider is the provision for adequate separation between the highway and frontage road, especially in areas where cross streets intersect with the highway at at-grade intersections. If not properly designed, traffic might backup into the intersection of the backage road and cross street.

**FIGURE B-3. FRONTAGE ROAD**



### **APPLICATION OF RETROFIT TO EXISTING CORRIDORS**

Access management can be applied to existing, developed corridors as a "retrofit" process, or to future or currently undeveloped corridors as an adopted comprehensive/sub-area plan. Introducing access management techniques into corridors that currently are developed is sometimes difficult and controversial. Unique solutions often need to be used in this reactive process to achieve corridor objectives. Most likely, the consolidation or removal of existing access will be sought in conjunction with roadway reconstruction or urban redevelopment projects.

Access management is easier to preplan as part of a proactive comprehensive planning process, which carefully integrates land use and access elements of an adopted sub-area plan. It is primarily on the urban fringes and beyond where it is possible to coordinate transportation system improvements with land development in order to protect the functional integrity of the roadway.

The "retrofit" program to manage access to an existing roadway is often difficult. Restraints, such as the unavailability of land are making certain access management techniques impossible. In addition, property rights need to be respected and the resulting legal, social, and political aspects of access management need to be thoroughly understood by the implementing agency and all stakeholders. The Access Management Guidelines for the City of Tucson identify the following condition possibly warranting an access management retrofit program:

- Safety: increased congestion and crashes along a given section of road exists which can be attributed to random or inadequate access.
- Major Reconstruction: Major reconstruction or design plans make access management and control essential.
- Street expansion: Improvements make it practical to reorient access to a cross street and remove (or reduce) arterial access.
- Coordinating Driveways: Planned new driveways on one side of the street lead to coordination of existing driveways on the other side.

The following Tables B-1 through B-4 outline retrofit techniques identified in the City of Tucson Transportation Access Management Guidelines.

**TABLE B-1. RETROFIT TECHNIQUES — CATEGORY A: LIMIT NUMBER OF CONFLICT POINTS**

<b>No.</b>	<b>Description</b>
A-1	Install median barrier with no direct left-turn access
A-2	Install raised median divider with left-turn deceleration lanes
A-3	Install one-way operations on the roadway
A-4	Install traffic signal at high-volume driveways
A-5	Channelize median openings to prevent left-turn ingress and/or egress maneuvers
A-6	Widen right through-lane to limit right-turn encroachment onto the adjacent lane to the left
A-7	Install channelizing islands to prevent left-turn deceleration lane vehicles from returning to the through lanes
A-8	Install physical barrier to prevent uncontrolled access along property frontages
A-9	Install median channelization to control the merge of left-turn egress vehicles
A-10	Offset opposing driveways
A-11	Locate driveway opposite a three-leg intersection or driveway and install traffic-signals where warranted
A-12	Install two one-way driveways in lieu of one two-way driveway
A-13	Install two two-way driveways with limited turns in lieu of one standard two-way driveway
A-14	Install two one-way drives in lieu of two driveways
A-15	Install two-way driveways with limited turns in lieu of two standard two-way driveways
A-16	Install driveway channelizing island to prevent left-turn maneuvers
A-17	Install driveway channelizing island to prevent driveway encroachment conflicts
A-18	Install channelizing island to prevent right-turn deceleration lane vehicles from returning to the through lanes
A-19	Install channelizing island to control the merge area of right-turn egress vehicles
A-20	Regulate the maximum width of driveways

Source: Transportation Access Management Guidelines for the City of Tucson, Arizona, March 17, 2003

**TABLE B-2. RETROFIT TECHNIQUES — CATEGORY B: SEPARATE BASIC CONFLICT AREAS**

<b>No.</b>	<b>Description</b>
B-1*	Regulate minimum spacing of driveways
B-2	Regulate minimum corner clearance
B-3	Regulate minimum property clearance
B-4*	Optimize driveway spacing in the permit authorization stage
B-5*	Regulate maximum number of driveways per property frontage
B-6	Consolidate access for adjacent properties
B-7	Require roadway damages for extra driveways
B-8	Purchase abutting properties
B-9	Deny access to small frontage
B-10	Consolidate existing access whenever separate parcels are assembled under one purpose, plan, entity or usage
B-11*	Designate the number of driveways regardless of future subdivision of that property
B-12	Require access on collector street (when available) in lieu of additional drive on arterial

\*not directly applicable for retrofit

Source: Transportation Access Management Guidelines for the City of Tucson, Arizona, March 17, 2003

**TABLE B-3. RETROFIT TECHNIQUES — CATEGORY C: LIMIT SPEED ADJUSTMENT PROBLEMS**

<b>No.</b>	<b>Description</b>
C-1	Install traffic signals to slow roadway speeds and meter traffic for larger gaps
C-2	Restrict parking on the roadway next to driveways to increase driveway turning speeds
C-3	Install visual cues of the driveway
C-4	Improve driveway sight distance
C-5	Regulate minimum sight distance
C-6*	Optimize sight distance in the permit authorization stage
C-7	Increase the effective approach width of the driveway (horizontal geometrics)
C-8	Improve the driveway profile (vertical geometrics)
C-9	Require driveway paving
C-10	Regulate driveway construction (performance bond) and maintenance
C-11	Install right-turn acceleration lane
C-12	Install channelizing islands to prevent driveway vehicles from backing onto the arterial
C-13	Install channelizing islands to move ingress merge point laterally away from the arterial
C-14	Move sidewalk-driveway crossing laterally away from the arterial

\* =not directly applicable for retrofit

Source: Transportation Access Management Guidelines for the City of Tucson, Arizona, March 17, 2003

**TABLE B-4. RETROFIT TECHNIQUES — CATEGORY D: REMOVE TURNING VEHICLES FROM THROUGH LANES**

<b>No.</b>	<b>Description</b>
D-1	Install two-way left-turn lane
D-2	Install continuous left-turn lane
D-3	Install alternating left-turn lane
D-4	Install isolated median and deceleration lane to shadow and store left-turning vehicles
D-5	Install left-turn deceleration lane in lieu of right-angle crossover
D-6	Install median storage for left-turn egress vehicles
D-7	Increase storage capacity of existing left-turn deceleration lane
D-8	Increase the turning speed of right-angle median crossovers by increasing the effective approach width
D-9	Install continuous right-turn lane
D-10	Construct a local service road
D-11*	Construct a bypass road
D-12*	Reroute through traffic
D-13	Install supplementary one-way right-turn driveways to divided roadway (non-capacity warrant)
D-14	Install supplementary access to street when warranted
D-15	Install additional driveway when total driveway demand exceeds capacity
D-16	Install right-turn deceleration lanes
D-17	Install additional exit lane on driveway
D-18	Encourage connections between adjacent properties (even when each has arterial access)
D-19	Require two-way driveway operation where internal circulation is not available
D-20	Require adequate internal design and circulation plan

\* = not directly applicable for retrofit

Source: Transportation Access Management Guidelines for the City of Tucson, Arizona, March 17, 2003