Central Arkansas Regional Transportation Study Area
ROADWAY DESIGN STANDARDS
And Implementation Procedures

These standards have been prepared for the use of all jurisdictions to incorporate into their locally adopted plans (e.g. Master Street Plan, Subdivision Regulations,) in accordance with the CARTS agreement. The standards are established to ensure regional continuity and protect the development of the transportation system. The purpose of these standards is to serve as implementing policies for the metropolitan long-range transportation plan.

The Roadway Design Standards consist of three parts. Part I is the Roadway Cross-Section Standards that define minimum cross-section requirements for various classifications of roadways, pedestrian ways and bikeways. Part II is the Access Management Recommendations consisting of minimum access management standards recommended to local jurisdictions for incorporation into local plans specifically for roadways on the Regional Arterial Network. Part III is the Project Review Process that defines the procedures by which project designs are reviewed to ensure consistency with this policy.

Overriding Policy

The following overriding policies apply to all parts of this policy document:

Policy on Freeways and Expressways

The Metroplan Board has adopted the following policy with regard to Freeways and Expressways in the CARTS area:

> The metropolitan freeway system should be built to six through lanes. It is the Metroplan Board's intent that demand over that capacity be met with a robust regional arterial network and public transit.
>
> If the Arkansas State Highway and Transportation Department sees the need to widen metropolitan freeways beyond six through lanes, it should consult with the Metroplan Board for its concurrence. Prior to planning for widening beyond six through lanes, the Department is expected to do a thorough analysis of alternative methods of meeting travel demand in the corridor with improved arterials and public transit. A thorough analysis of the impact of the induced traffic demand on local roadways as a result of the widening beyond six through lanes would also be required. The Metroplan Board may also consider conducting an independent analysis of widening proposals over six through lanes for its use and benefit.

Definition of Median

The term "median" as used in this policy shall be consistent with the definition in the AASHTO Green Book cited below:

"A median is the portion of a highway separating directions of the traveled way. …Medians may be depressed, raised or flush with the traveled way surface."[1]

In this policy document, types of medians are divided into *traversable or flush medians,* which include painted medians and two way left turn lanes, and *non-traversable medians* which include raised, depressed or other concrete barrier medians.

Policy on Design of State Highways on the Regional Arterial Network

As part of the METRO 2030 Plan, the Metroplan Board adopted this policy on the design of state highways on the Regional Arterial Network.

> A RAN corridor should always consider and balance its obvious purposes, which are not only to safely move traffic but also to enhance and support economic development. Metroplan encourages the design of the RAN network to carry large volumes of traffic for reasonably long distances within the region. The corridors are expected to support relatively dense mixed-use development supportive of public transit options. While the AHTD will determine the precise design of the RAN roadways on the state highway system, Metroplan acknowledges the need to jointly collaborate between local jurisdictions, CATA, Metroplan and AHTD to provide the most efficient and desirable RAN network that will serve the central Arkansas area.

Costs for Local Standards on State Highways beyond AHTD Standards

On state highways it is AHTD policy that the cost for any local standards which are beyond AHTD standards is the responsibility of others.

Local Elected Officials Role in Median Selection

For Roadways on the Regional Arterial Network and below, not on the state highway system, where medians are recommended, the local elected officials in whose jurisdiction(s) the roadway is located shall determine if the median is to be traversable or non-traversable. For such roads on the state highway system, the highway department shall determine the type of median in consultation with the local elected officials in the jurisdiction(s) in which the roadway is located.

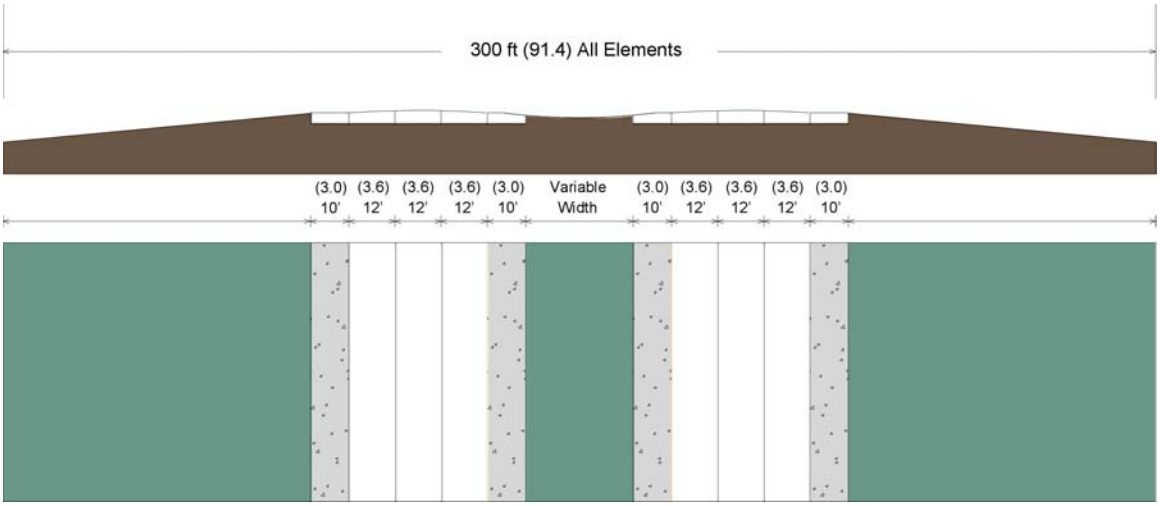
[1] A *Policy of Geometric Design of Highways and Streets*, Edition 2001; Chapter 4, Page 341, AASHTO

PART I Roadway Cross-Section Standards

CLASS I **Interstates and Other Freeways** are divided, fully access-controlled facilities, which are designed for long distance, through trips.

1. **Required Elements:**
   - **Right of Way** must be adequate to accommodate 6 main lanes; a generalized width of 300 feet may be used for planning purposes and may vary depending on terrain.
   - **Maximum lane width** is 12 ft. (3.6 m.).
   - **A non-traversable median** (e.g. raised, depressed, concrete barrier) is required.
   - **Shoulders**
     - **Inside shoulders** must be a minimum of 6 ft. (1.8 m) wide on a 4-lane section and 10 ft. (3.0m) wide for a standard 6-lane cross-section.
     - **Outside shoulders** will be a minimum of 10ft. (3.0 m) for either section.

Interstate or Freeway



2. **Optional Elements:**
   - none

3. **Preferred Elements:**
   - Landscaping of medians and buffers

4. **Prohibited Elements:**
   - none

CLASS II **Expressways** are divided, partially controlled facilities with access available at minor arterials or higher functionally classified roadways. Design features include signalization at intersections where warranted and no direct access from adjoining land uses.

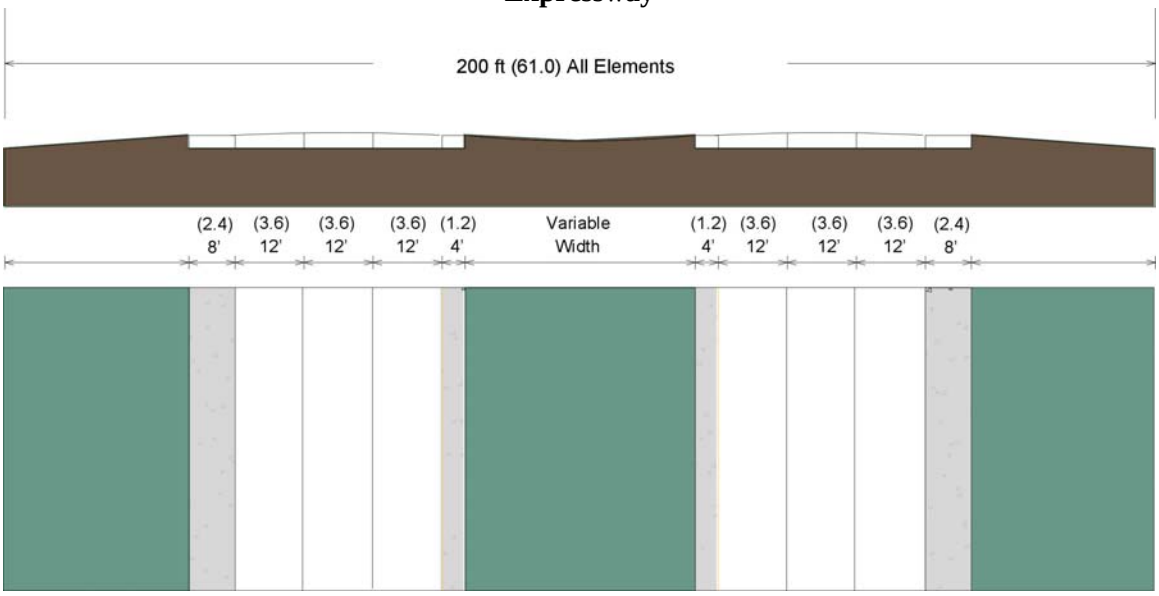
1. **Required Elements:**
   - **Right of Way** must be adequate to accommodate 6 main lanes; a generalized width of 200 feet may be used for planning purposes and may vary depending on terrain.
   - **Maximum lane width** is 12 ft. (3.6 m.).
   - **A non-traversable median** (e.g. raised, depressed, concrete barrier) is required.
   - **Shoulders**
     - **Inside shoulders** must be a minimum of 6 ft. (1.8 m) wide on a 4-lane section and 8 ft. (2.4 m) wide for a standard 6-lane cross-section.
     - **Outside shoulders** will be a minimum of 8 ft. (2.4 m) for either section.

2. **Optional Elements:**
   - Where median widths are 40 ft. (12.2 m.) or greater, turn-arounds should be provided at median breaks.

3. **Preferred Elements:**
   - Landscaping of medians and buffers.

4. **Prohibited Elements:**
   - none

Expressway



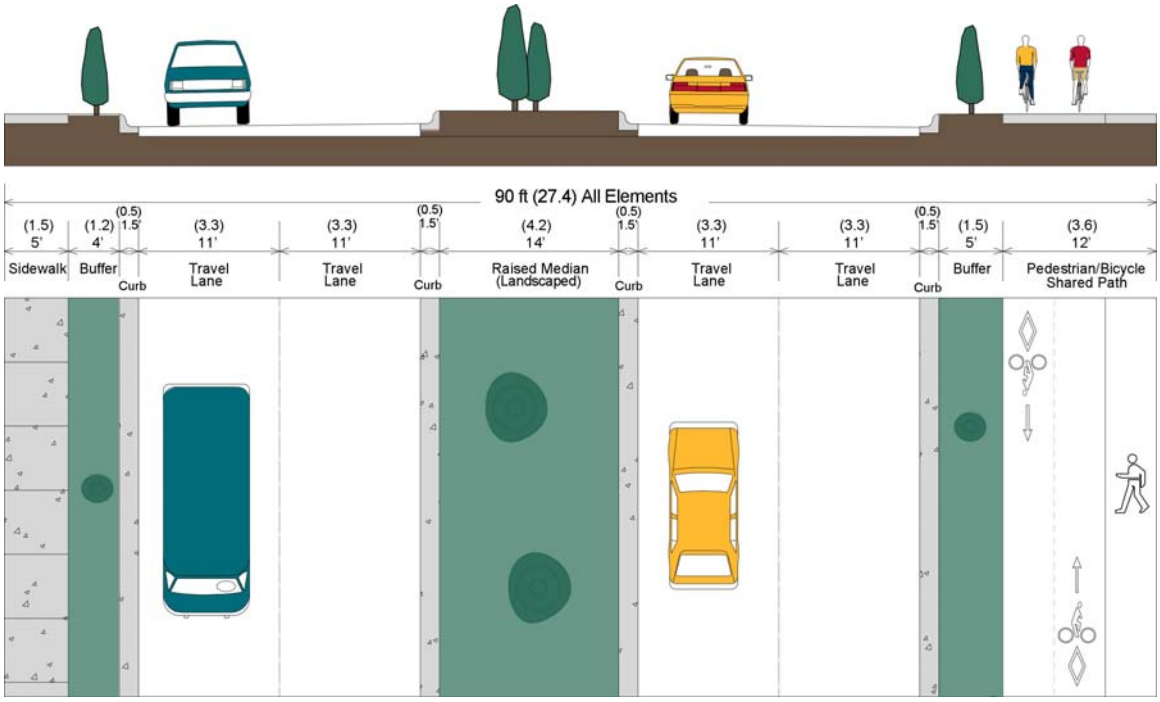
CLASS III **Principal Arterials** provide for long distance travel between major activity districts, and should be designed for slightly higher speeds as compared to minor arterials. They are to serve through-traffic and to connect major traffic generators or activity centers.

1. Required Elements:

- **All required design elements** must be included in the cross-section and located on publicly owned R.O.W. Sidewalks or bikeways may be located on permanent dedicated easements.
- **Right of Way** must accommodate 4 main lanes unless the 20-year forecast requires 6 lanes. But ROW for 6 lanes may be acquired for justified conditions. There is a maximum of 3 through lanes in each direction.
- **Curb and gutter** is required except in cases where terrain and/or forecast land use densities are compatible with an open shoulder design typically used in rural or exurban areas. The gutter width is not to be included in the travel lane.
- **Pedestrian friendly design is required**, including:
  - *a.* **Sidewalks** are required on both sides of the roadway. Minimum sidewalk width is 5 ft. (1.5 m.) and must be compatible with the Americans with Disabilities Act. *On state highways, AHTD policy is that sidewalks will be constructed on both sides of curb and gutter facilities through developed areas. In undeveloped areas, sidewalks will be considered on one side of the roadway unless evidence of pedestrian traffic warrants sidewalks on both sides of the roadway.*
  - b. **A buffer** is required between the back of curb and the sidewalk that is a minimum of 4 ft. (1.2 m.). However, no buffers are required in Central Business Districts. On state highways, AHTD policy is a 3 feet buffer with no obstructions allowed in the sidewalk and with vertical clearance of 80 inches for any overhanging object.
  - c. **Safe pedestrian crossing provisions** are required to be demonstrated by the proposing jurisdiction or agency where more than 50 ft. (15.2 m.) of pavement (including the gutter) have to be crossed by a pedestrian where pedestrian crossing is anticipated based on land use. For design options and recommendations see the Pedestrian Facilities section of these standards.
- If on a **planned bikeway route**, the bicycle element must be included and must adhere to the bicycle design standards as specified herein.
- **Maximum lane width** is 11 ft. minimum (3.3 m.) for main travel lanes or 12 ft. maximum (3.6 m) lanes where the design speed and traffic mix warrant.
- **Medians**, either non-traversable or traversable, are required on 4 or 6 lane cross sections of roadways on the Regional Arterial Network (RAN).
  - Non-traversable medians are preferred for new roadway locations on the RAN. On existing roadways either non-traversable or traversable medians may be used based on corridor conditions.
  - Where traversable medians are used as continuous center turn lanes on RAN routes, an access management plan is required to regulate driveway location, spacing and design based on local master street plan standards. Where local master street plans do not address access management, the recommended standards in Part II of this policy should be considered by the project sponsor.
  - Allowed exception: 2-lane undivided, if first phase of planned 4-lane or 6-lane principal arterial

Principal Arterial

Preferred

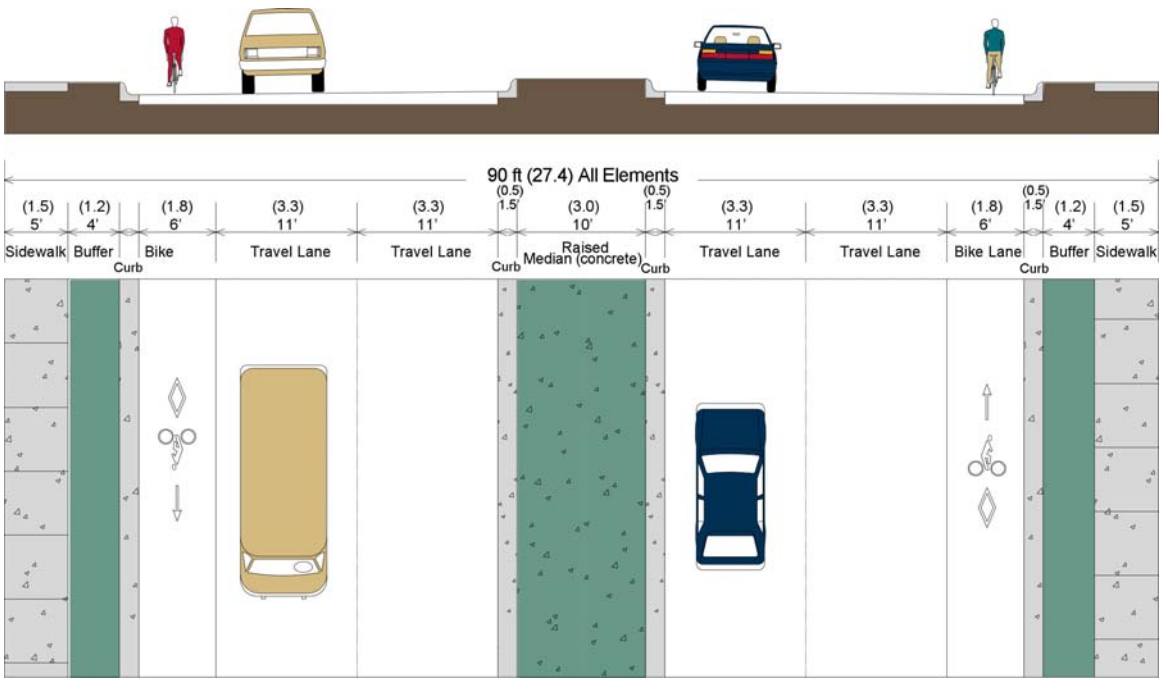


2. **Optional Elements:**
   - 8 ft. minimum (2.4 m.) paved shoulder on first phase of a planned 4-lane or 6-lane principal arterial, with or without curb and gutters

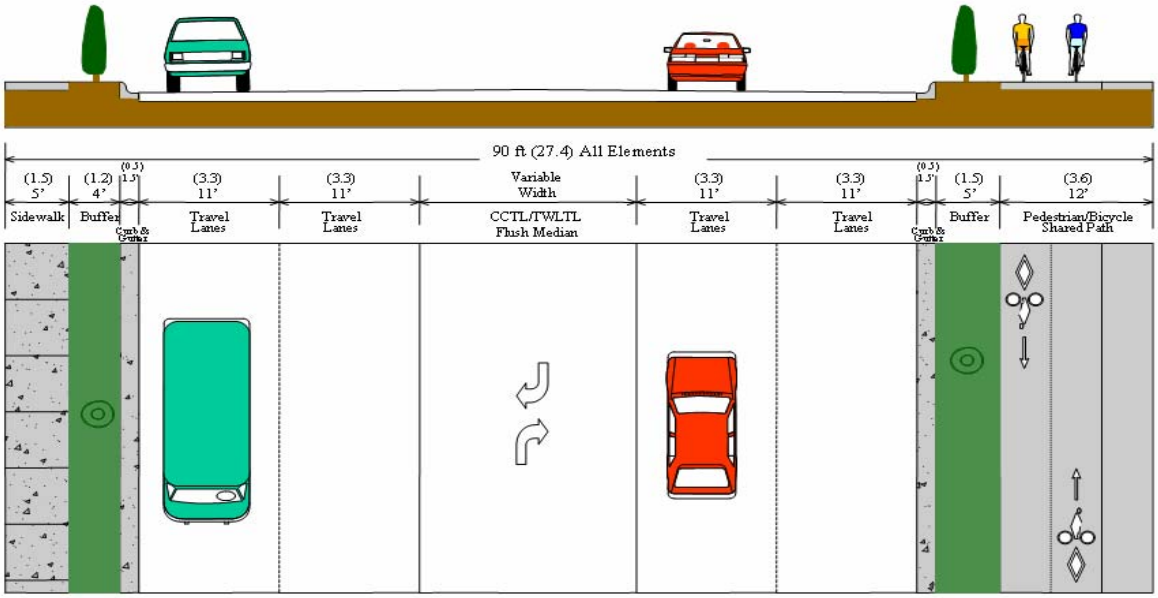
3. **Preferred Elements:**
   - Landscaping of medians and buffers.
   - If on a planned bikeway route, a Class I Shared Path is preferred.
   - A non-traversable median is preferred (i.e. raised or depressed) for major retrofits and on new location.

4. **Prohibited Elements:**
   - Parking on one or both sides.

Principal Arterial
Acceptable



Principal Arterial: An Example
On Designated Bike Route (Class I/II)
New Roadway Location - Not in CBD



CLASS IV Minor Arterials provide network connections within and through the urbanized area. These facilities typically provide a greater amount of access to adjoining land as compared to principal arterials.

1. Required Elements:

- **All required design elements** must be included in the cross-section and located on publicly owned R.O.W. Sidewalks or bikeways may be located on permanent dedicated easements.
- **Right of Way** must accommodate 4 main lanes. There is a maximum of 2 through lanes in each direction.
- **Curb and gutter** is required except in cases where terrain and/or forecast land use densities are compatible with an open shoulder design typically used in rural or exurban areas. The gutter width is not to be included in the travel lane.
- **Pedestrian friendly design is required**, including:
  - *a.* **Sidewalks** are required on both sides of the roadway. Minimum sidewalk width is 5 ft. (1.5 m.) and must be compatible with the Americans with Disabilities Act. *On state highways, AHTD policy is that sidewalks will be constructed on both sides of curb and gutter facilities through developed areas. In undeveloped areas, sidewalks will be considered on one side of the roadway unless evidence of pedestrian traffic warrants sidewalks on both sides of the roadway.*
  - b. **A buffer** is required between the back of curb and the sidewalk that is a minimum of 4 ft. (1.2 m.). However, no buffers are required in Central Business Districts. On state highways, AHTD policy is a 3 feet buffer with no obstructions allowed in the sidewalk and with vertical clearance of 80 inches for any overhanging object
  - c. **Safe pedestrian crossing provisions** are required to be demonstrated by the proposing jurisdiction or agency where more than 50 ft. (15.2 m.) of pavement (including the gutter) have to be crossed by a pedestrian where pedestrian crossing is anticipated based on land use. For design options and recommendations see the Pedestrian Facilities section of these standards.
- If on a **planned bikeway route**, the bicycle element must be included and must adhere to the bicycle design standards as specified herein.
- **Maximum lane width** is 11 ft. minimum (3.3 m.) for main travel lanes or 12 ft. maximum (3.6 m) lanes where the design speed and traffic mix warrant.

2. Optional Elements:

b. 8 ft. minimum (2.4 m.) paved shoulder maybe used on the first phase of a planned 4-lane or 6-lane principal arterial, with or without curb and gutters.

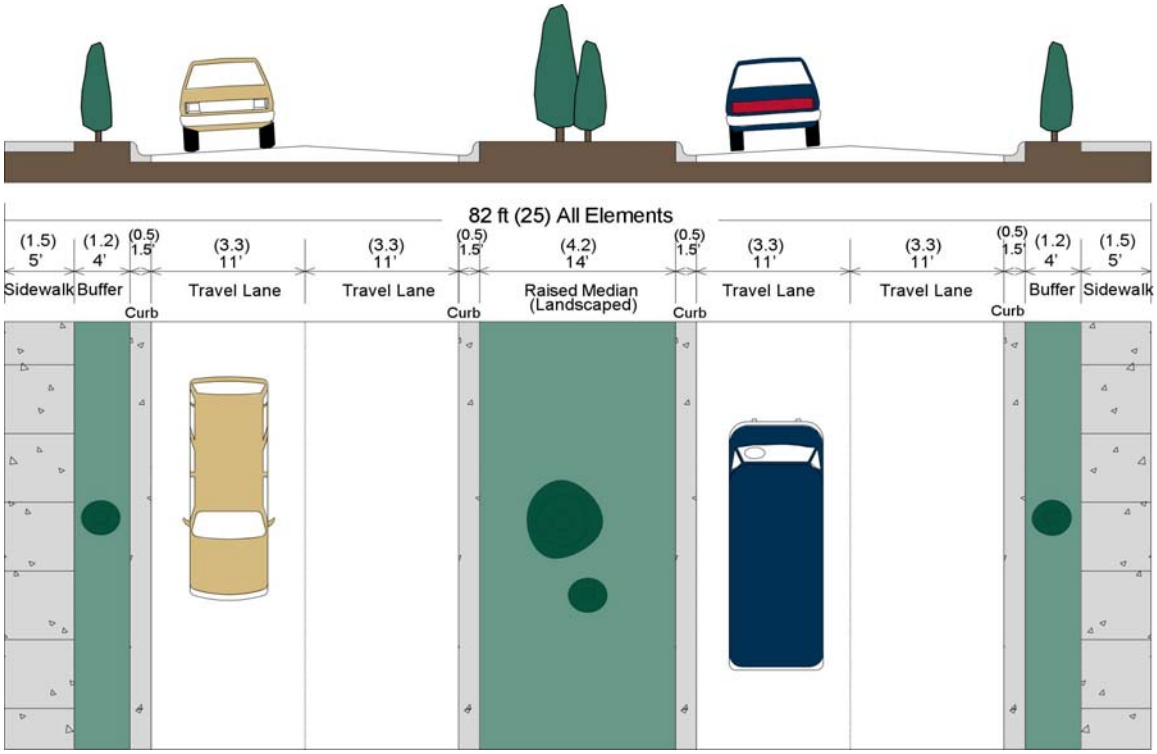
c. 8 ft. minimum (including gutter) parallel parking may be installed on one or both sides.

3. Preferred Elements:

- Landscaping of medians and buffers.
- If on a planned bikeway route, a Class I Shared Path is preferred.
- A non-traversable median is preferred (i.e. raised or depressed) for major retrofits and on new location.

Minor Arterial

Preferred



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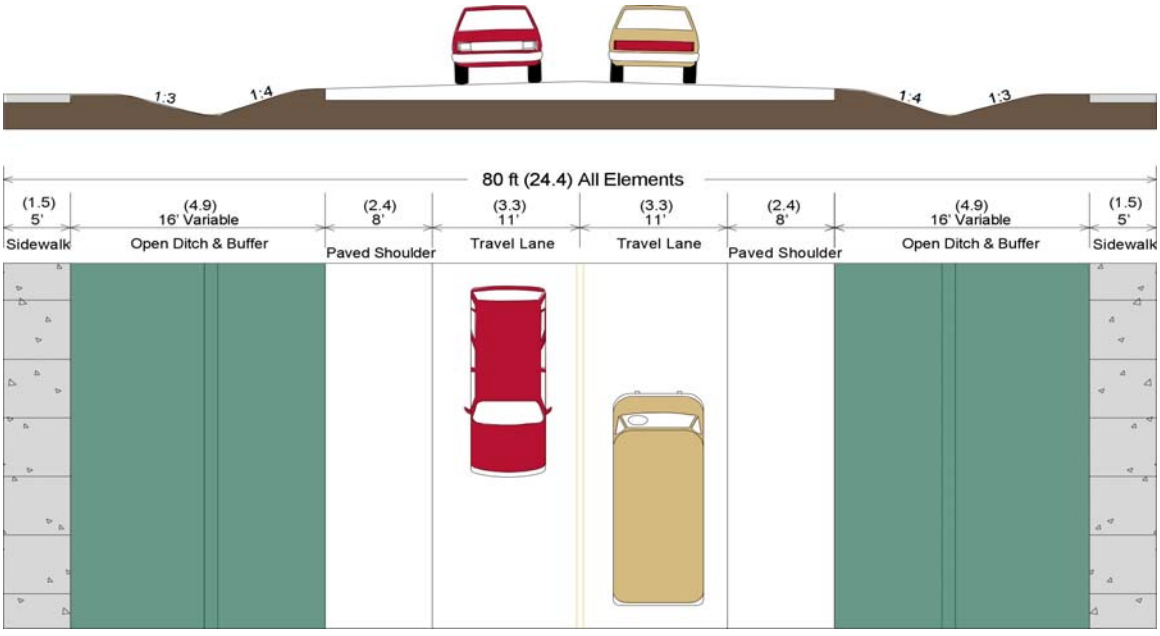
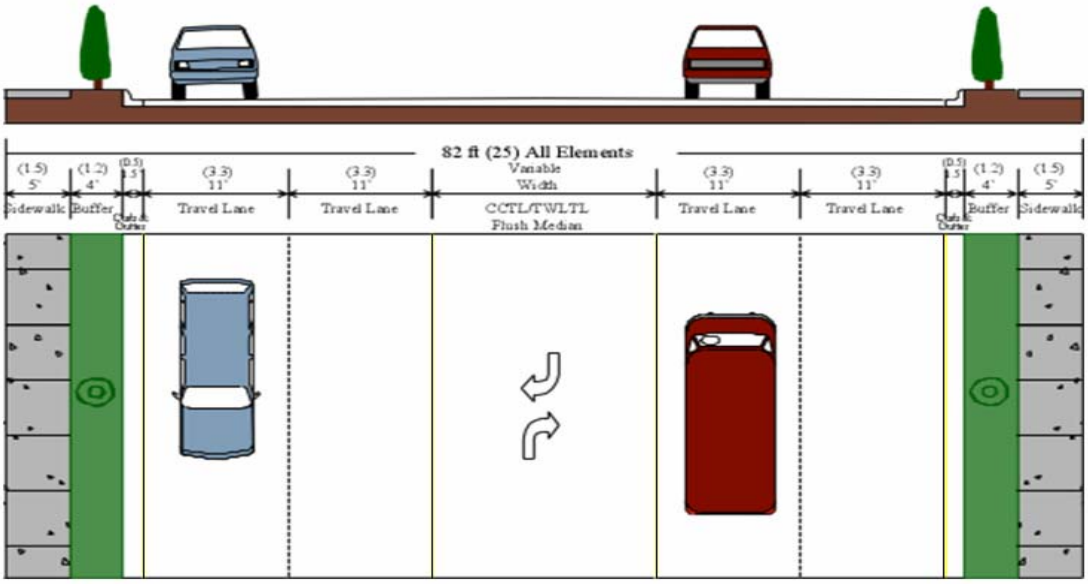


Minor Arterial: An Example
Not in CBD



CLASS V Collector Roadways

Collector Roadways connect local traffic with the arterial roadway network and provide easy access to adjoining land.

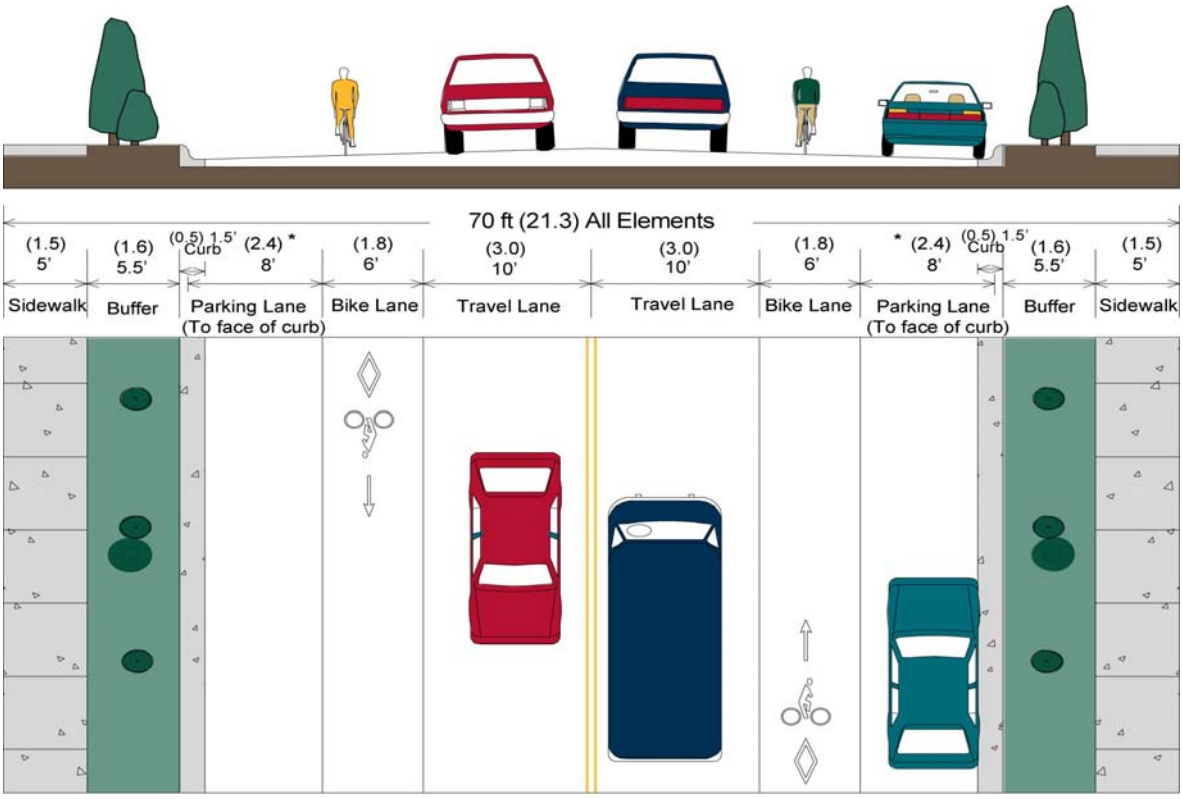
1. **Required Elements:**
   - **All required design elements** must be included in the cross-section and located on publicly owned R.O.W. Sidewalks or bikeways may be located on permanent dedicated easements.
   - **Curb and gutter** is required except in cases where terrain and/or forecast land use densities are compatible with an open shoulder design typically used in rural or exurban areas. The gutter width is not to be included in the travel lane.
   - **Pedestrian friendly design is required**, including:
     a. **Sidewalks** are required on both sides of the roadway. Minimum sidewalk width is 5 ft. (1.5 m.) and must be compatible with the Americans with Disabilities Act. *On state highways, AHTD policy is that sidewalks will be constructed on both sides of curb and gutter facilities through developed areas. In undeveloped areas, sidewalks will be considered on one side of the roadway unless evidence of pedestrian traffic warrants sidewalks on both sides of the roadway.*
     b. **A buffer** is required between the back of curb and the sidewalk that is a minimum of 4 ft. (1.2 m.). However, no buffers are required in Central Business Districts. On state highways, AHTD policy is a 3 feet buffer with no obstructions allowed in the sidewalk and with vertical clearance of 80 inches for any overhanging object
     c. **Safe pedestrian crossing provisions** are required to be demonstrated by the proposing jurisdiction or agency where more than 50 ft. (15.2 m.) of pavement (including the gutter) have to be crossed by a pedestrian where pedestrian crossing is anticipated based on land use. For design options and recommendations see the Pedestrian Facilities section of these standards.
   - If on a **planned bikeway route**, the bicycle element must be included and must adhere to the bicycle design standards as specified herein.
   - **Maximum lane width** is 10 ft. minimum (3.0 m.) for main travel lanes or 12 ft. maximum (3.6 m) lanes where the design speed and traffic mix warrant. There is a maximum of 2 through lanes in each direction.

2. **Optional Elements:**
   - 6 ft. minimum (1.8 m.) paved shoulder may be used on the first phase of a planned 4-lane, with or without curb and gutter.
   - Parallel parking may be used on one or both sides of collectors, suggested 8 ft. (2.4 m.) minimum (including gutter).

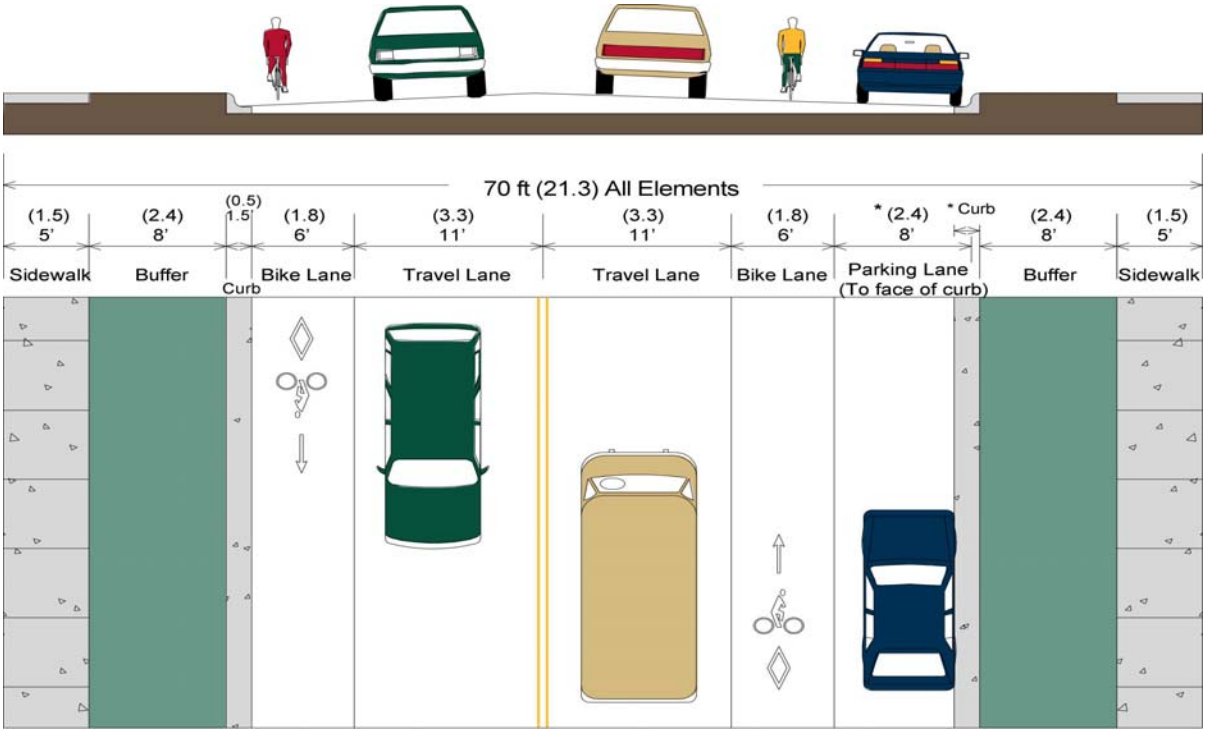
3. **Preferred Elements:**
   - Landscaping of medians and buffers.
   - If on a planned bikeway route, a Class I Shared Path is preferred.
   - Non-traversable median (i.e. raised or depressed) is preferred if the roadway is four or more lanes.

Collector

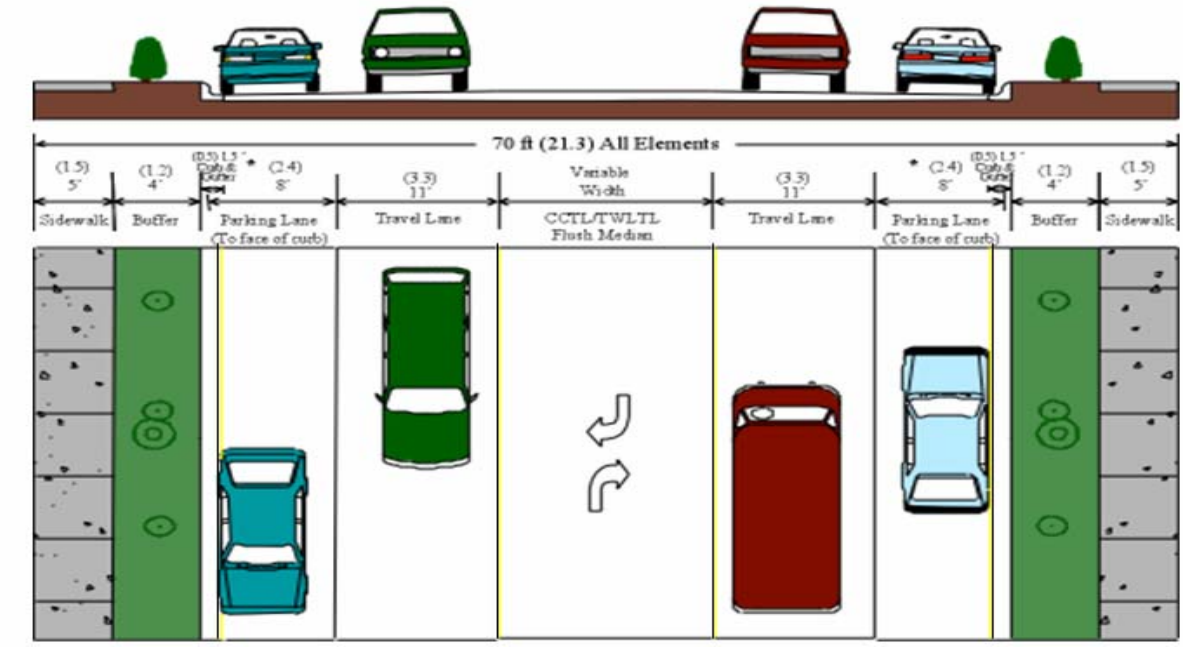
Preferred



Acceptable



Collector: An Example
Not in CBD



CARTS
Bicycle Design Standards

Types of Bicycle Facilities

Bicycle paths are rated as suitable for three types of cyclists – Adults (Group A), Beginners (Group B) and Children (Group C).

Class I: Separate Shared Paths (Groups A, B/C)

Definition - A shared pedestrian/bicycle path that is physically separated from motorized vehicular traffic by an open space or barrier and either within the roadway right of way or within an independent right of way.

Two-way shared pedestrian/bicycle paths will be a minimum of 12 ft (3.6 m) wide.

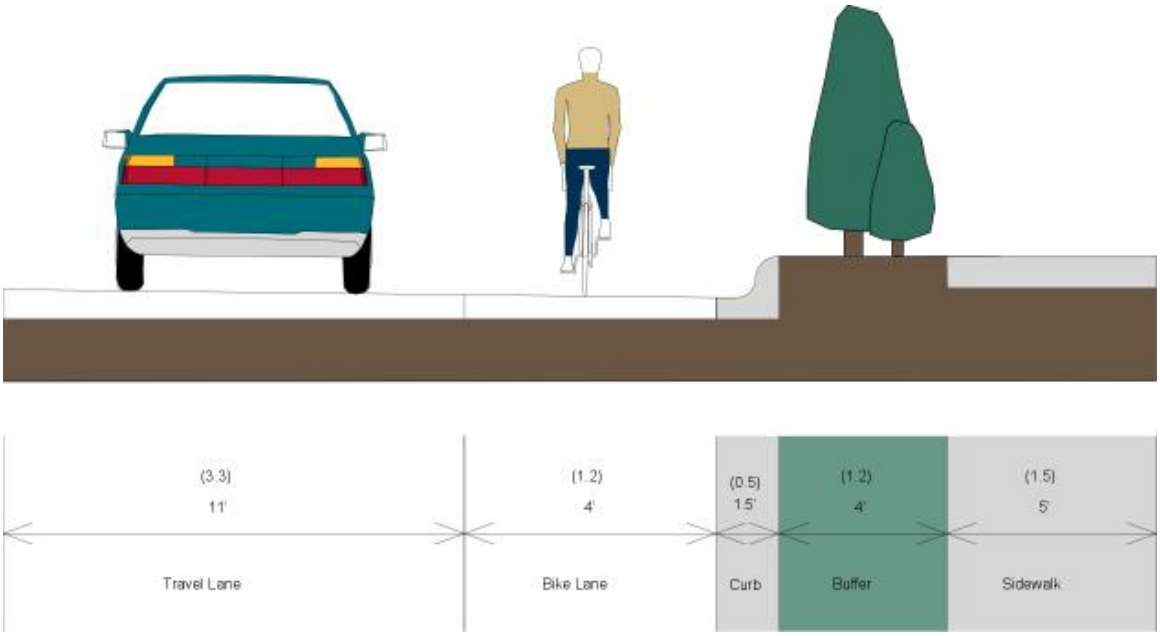
Two-Way Separated Shared Pedestrian/Bike Path
Preferred

Class II: Bike Lanes (Groups A, B/C)

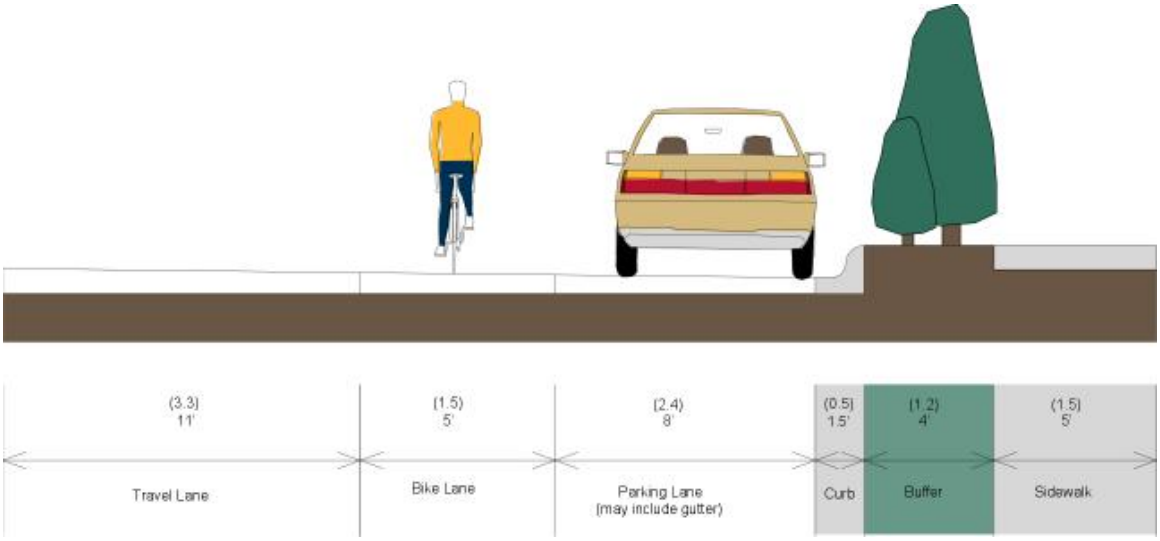
Definition - A portion of the roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

Bike lanes should always be one-way facilities carrying traffic in the same direction as adjacent motor vehicle traffic. Bike lanes should not be placed between parking spaces and the curb to minimize conflicts. They shall be a minimum of 4 ft (1.2 m) wide, not including the gutter pan.

One-Way Bike Lane Next to Curb
Preferred



One-Way Bike Lane with Parking Lane
Preferred



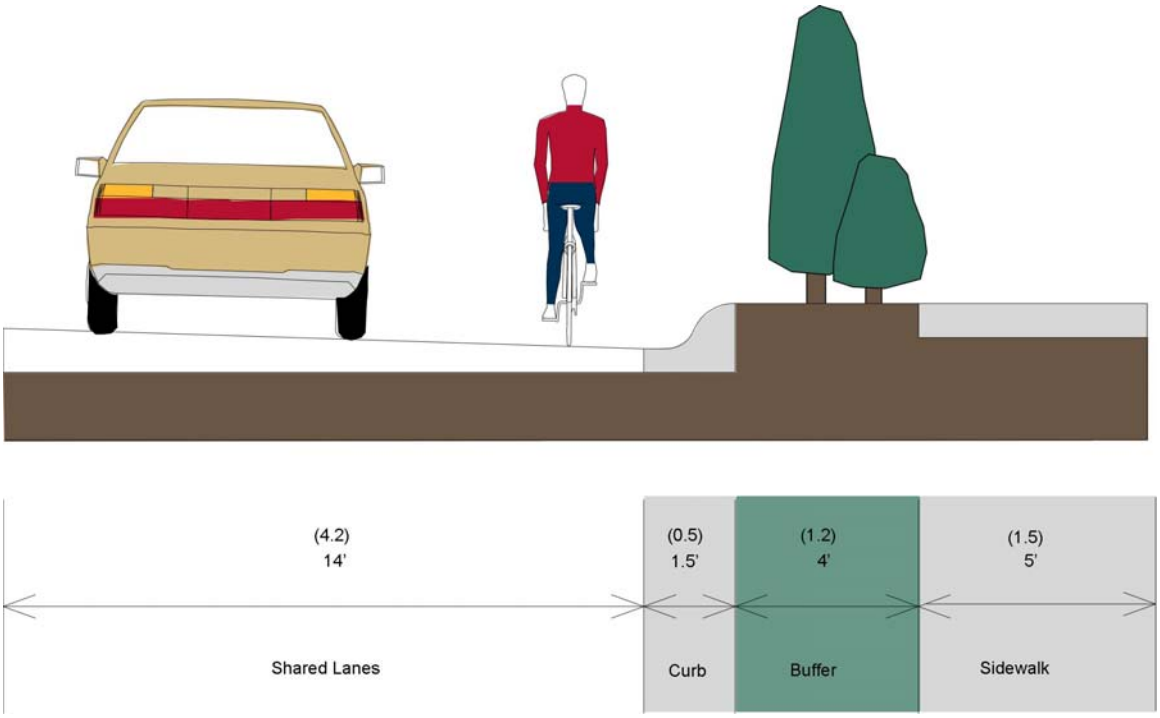
Class III: Shared Lanes (Group A)

Definition - Shared lanes are roadways with no special provision (except for signing of the bike route) for bicyclists. Shared lanes typically feature 12 ft (3.6 m) lane widths or less with no shoulders, allowing cars to safely pass bicyclists only by crossing the centerline or moving into another traffic lane.

Other Types of Shared Facilities:

Wide Outside Lane: An outside lane (right–most through traffic lane) with a width of at least 14 ft (4.2 m).

Shared Lanes
Preferred



Shoulders: Shoulders must be paved and a minimum of 4 ft (1.2 m) wide when they are designed to accommodate bicycle travel. A width of 5ft (1.5 m) or greater is preferable and additional widths are desirable where substantial truck traffic is present, or where motor vehicle speeds exceed 50 mph (80 km/h).

PEDESTRIAN CROSSING OPTIONS

Options include, but are not limited to:

(1) **A non-traversable median refuge** -- should be at least 6 ft. (1.8 m.) wide from face-of-curb to face-of curb. The minimum width should not be less than 4 ft. (1.2 m.) wide. The island should not be less than 12 ft. (3.6 m.) long or the width of the crosswalk, whichever is greater.

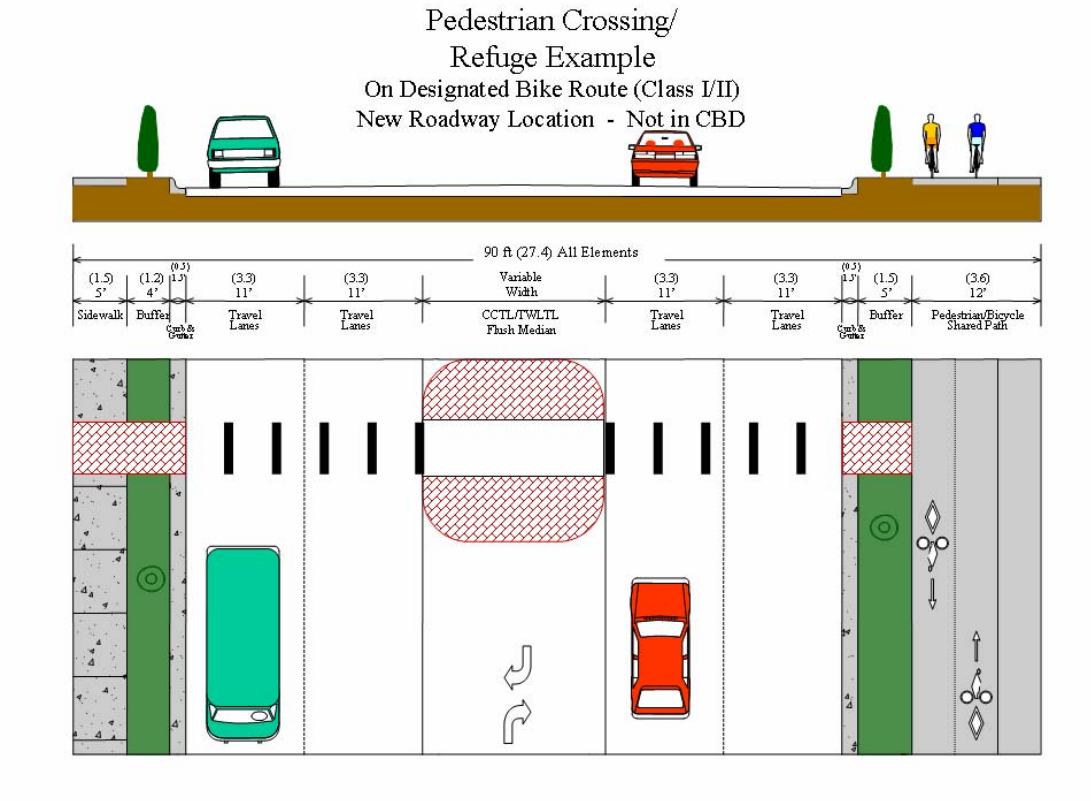
(2) At a signalized intersection, a striped pedestrian crossing with adequate crossing time allotted to the pedestrian.

Recommended time allotment is 4.0 seconds per linear foot to be crossed.[2]

Pedestrian crossing count-down signals are recommended in areas of heavy pedestrian movements.

(3) **Mid-block pedestrian refuge**. The mid-block pedestrian crossing should be adequately striped, may be signalized or unsignalized, and may include in-pavement lighting to alert drivers of pedestrian presence at night.

(4) **Pedestrian overpass or underpass**, although not generally recommended because of cost and handicap access issues. Significant variations in topography may make an overpass or underpass a viable solution, however.



[2]*The Manual on Uniform Traffic Control Devices*

PART II. Access Management Recommendations On the Regional Arterial Network

Introduction – Access management is a new item to the METRO 2030 planning process. To be successful it will require special attention from each member jurisdiction. Although access management by itself will not solve all transportation system problems, it can and should be a major part of both systems and project planning in order to improve safety and capacity on key corridors.

The Metroplan Board of Directors adopted the following access management recommendations as a means of implementing the objectives of the METRO 2030. The Board recommends that each member jurisdiction consider the adoption of these standards into their local master street plans and subdivision regulations covering at least the defined routes on the Regional Arterial Network.

Definition –

"Access management is the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway."

--*Transportation Research Board (TRB) Access Management Manual*

Purpose – Safety and Capacity

The purpose of access management is to provide all modes of transportation access to land development in a manner that preserves the safety and efficiency of the transportation system. An effective access management program can reduce crashes as much as 50%, increase roadway capacity by 23% to 45%, and reduce delay as much as 40% to 60%[3].

Roadways are a critical public resource. The cost to construct, improve, or replace roadways continue to increase. By effectively managing roadway access, agencies can extend the life of roadways, increase public safety, reduce traffic congestion, and improve the appearance and quality of the built environment. Proper access management can be a valuable tool in the continuing effort to move people and goods in a safe and efficient manner.

Access management benefits not only the motorists but also cyclists, pedestrians, and transit riders. Through effective access management, they face fewer decision points and traffic conflicts, and have safe havens for street crossings. It is the intent of these standards along with the CARTS Roadway Design Standards, to guide the planning and design of roadways that facilitate the safe movement of these other modes as well as the motorist.

[3] S&K Transportation Consultants, Inc. *Access Management, Location and Design*. Participant notebook for NHI Course 133078. National Highway Institute. FHWA, April 1998, revised April 2000.

Policy on Design of State Highways on the Regional Arterial Network

As part of the METRO 2030 Plan, the Metroplan Board adopted this policy on the design of state highways on the Regional Arterial Network.

> A RAN corridor should always consider and balance its obvious purposes, which are not only to safely move traffic but also to enhance and support economic development. Metroplan encourages the design of the RAN network to carry large volumes of traffic for reasonably long distances within the region. The corridors are expected to support relatively dense mixed-use development supportive of public transit options. While the AHTD will determine the precise design of the RAN roadways on the state highway system, Metroplan acknowledges the need to jointly collaborate between local jurisdictions, CATA, Metroplan and AHTD to provide the most efficient and desirable RAN network that will serve the central Arkansas area.

Costs for Local Standards on State Highways beyond AHTD Standards

On state highways it is AHTD policy that the cost for any local standards which are beyond AHTD standards is the responsibility of others.

Recommended RAN Access Management Standards

These access management standards are specifically designed to apply to the Regional Arterial Network (RAN) in the CARTS area, although they can be used more generally, if desired. The RAN is comprised of arterials and major collectors designed to provide feasible alternatives to the area's freeway network for intra-regional travel (see Figure 2). By definition, the roadways on this system are nationally and regionally significant and are intended to serve longer trips and move traffic safely and efficiently.

The recommended CARTS RAN access management policies, if adopted by the jurisdictions of the region, should lead to the development of a network of high capacity corridors crisscrossing the region.

This section is composed of the following:

1. Spacing Standards

2. Median Recommendations

3. Implementation Guidelines

4. Access Management Tools

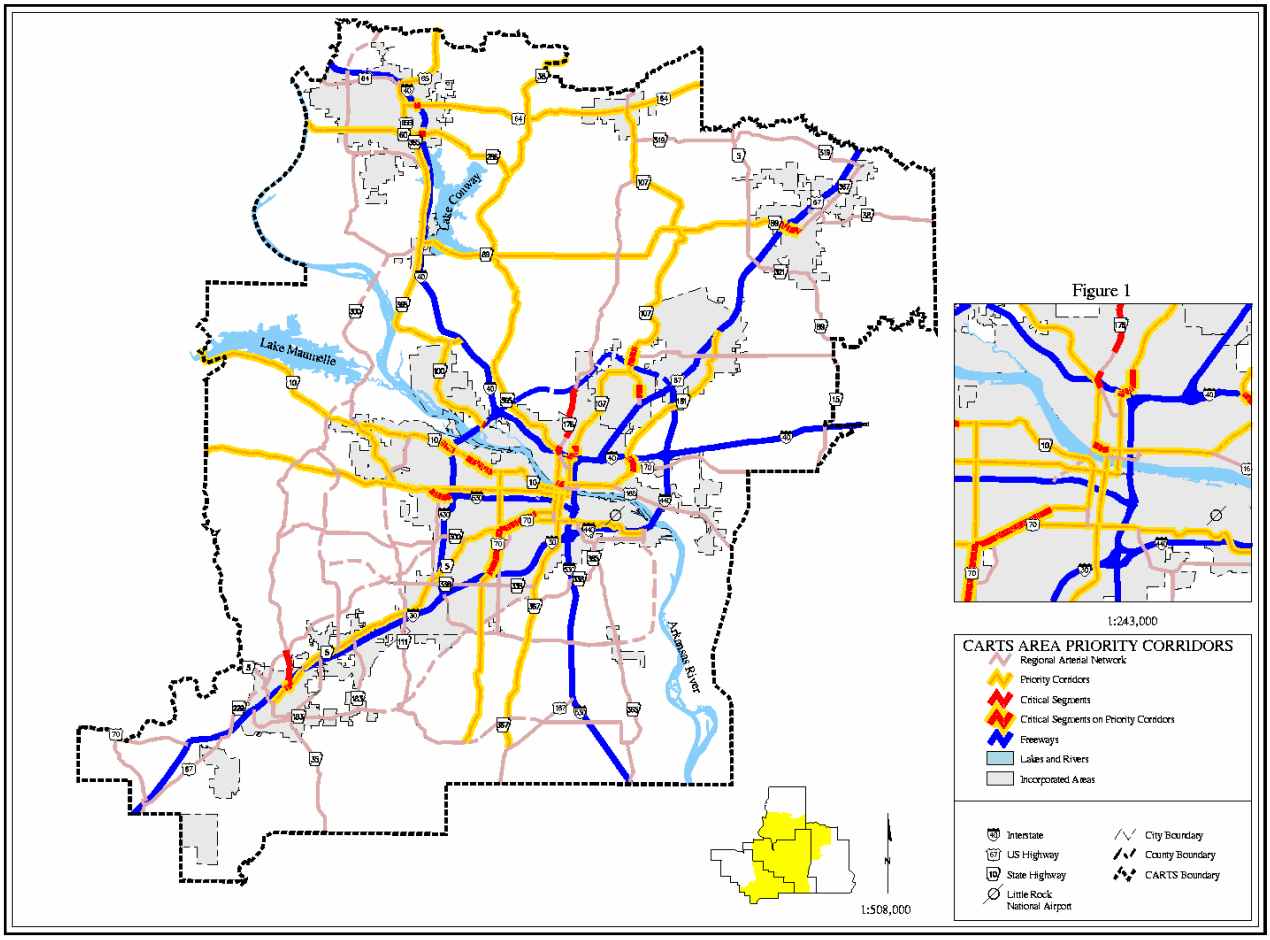
5. Regulatory Tools for Local Jurisdictions

6. Corridor Specific Access Management Plans

7. Multi-Party Access Management Agreements

8. Technical Assistance

Figure 2. Regional Arterial Network



1. Spacing Standards

Spacing of non-traversable median openings, connections (i.e. driveways and/or side streets), and traffic signals are essential elements in establishing access spacing standards. Inadequate spacing of connections causes additional vehicle delay and increases crash frequency. Closely spaced or irregularly spaced traffic signals on arterial roadways result in frequent stops, unnecessary delay, increased fuel consumption, excessive vehicular emissions, and high crash rates[4]. To address these issues, following are the recommended minimum spacing standards. For new facilities on the RAN, a corridor access management plan should include these as minimum connection spacing.

Minimum Spacing Standards for Traversable Medians and Undivided Roadways

Area Type	Median Opening Spacing		Connection Spacing and Corner Clearance		Signal Spacing
	Channelized	Full	> 45 mph	=<45 mph	
CBD	NA	NA	NA	125	NA
Urban	NA	NA	440	245	1320
Ex-Urban	NA	NA	660	440	2640

Note: All distances are in feet and are measured as shown in Figure 3.

Minimum Spacing Standards for Nontraversable Median-Divided Facilities

Area Type	Median Opening Spacing		Connection Spacing and Corner Clearance		Signal Spacing
	Channelized	Full	> 45 mph	=<45 mph	
CBD	NA	NA	NA	125	NA
Urban	660	1320	440	245	1320
Ex-Urban	1320	2640	660	440	2640

Note: All distances are in feet and are measured as shown in Figure 3.

[4] Gluck, J., H.S. Levinson and V. Stover. NCHRP 420: *Impacts of Access Management Techniques*. TRB, 1999.

2. Median Recommendations

The CARTS Roadway Design Standards recommends that on multilane arterials the cross-section include a nontraversable median. However, traversable medians, when used as two way left turn lanes, may be used and can be quite effective at lower volumes, lower speeds and lower access density.

At higher traffic volumes and higher speeds, a nontraversable median becomes increasingly safer than traversable medians. Under any of the following conditions, a nontraversable median should be considered and is recommended on RAN Corridors:

1. Present or future (25 year max.) traffic exceeds the Average Dailey Trips (ADT) threshold below and is within the range of design speed and access densities,

Design Speed	Access Density*	ADT
0-30	0-84	28,000
31-45	0-43	28,000
0-30	>84	24,000
31-45	>43	24,000

*Total number of access points on both sides of the road per mile

2. Design speed exceeds 45 mph,

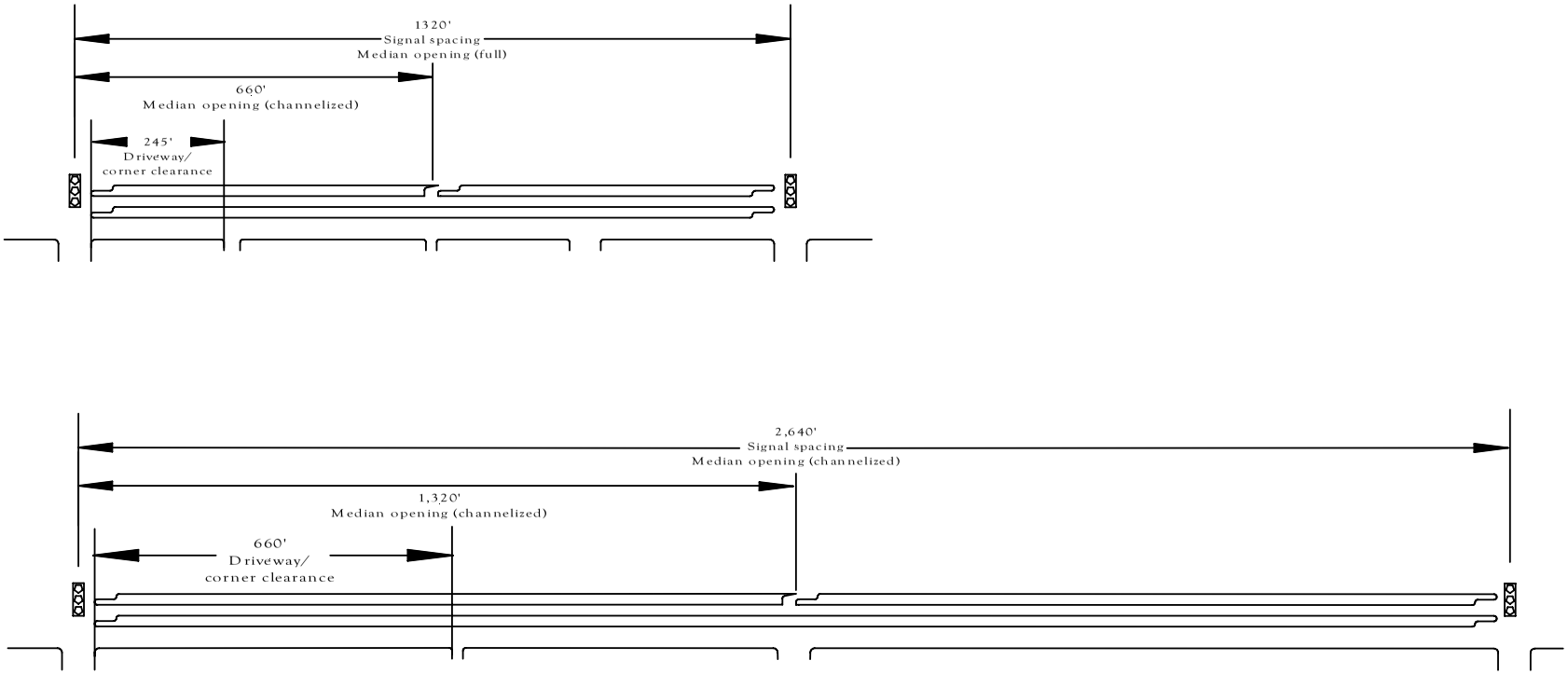
3. Roadways on new locations, and

4. Any roadway widening beyond four main travel lanes (2 each direction).

3. Implementation Guidelines

The access management standards are easiest to implement on roadways on new location since there is typically little or no existing development in the corridor. On existing roadways, the access management standards should serve as the starting point from which corridor specific access management plans can be tailored to best fit the characteristics of a corridor. If high volumes, frequent or poorly spaced driveways, or high accident rates are resulting in safety and/or capacity problems along a corridor, initial access management efforts should focus on driveway consolidation and proper spacing of streets and driveways. Major reconstruction of an existing roadway or major land redevelopment along an existing roadway are opportunities to apply access management standards and principles more broadly.

Figure 3
Examples of Access Management Spacing Standards



4. Access Management Tools

The following tools are useful in implementing access management standards:

1. Access Spacing (driveways and intersecting streets)
   The spacing, location, and design of access points are crucial to driver safety and roadway efficiency. Each new access point introduces conflicts and friction into the traffic stream. With more conflicts comes a higher potential for crashes, and the resulting friction translates into longer travel time and greater delay[5]. By controlling the location and type of access points on an arterial the efficiency of the roadway is maintained and a safer roadway environment is created for drivers and pedestrians.

   1.1 Driveway Consolidation – A single parcel may have multiple driveways that can be consolidated into a single drive. Or closely spaced driveways on abutting parcels can be consolidated into a single drive on the property line with a joint access agreement between the property owners.

   1.2 Joint Access Agreements – Two or more abutting property owners can enter into a joint access agreement between their properties to allow all properties access to a single access point. This is most beneficial with a nontraversable median in order to secure as many businesses access to a median break as possible.

   1.3 Driveway Design – Good driveway design that can allow deceleration and acceleration space outside of the main travel lanes and provides a deep driveway throat that allows cars to enter and leave the main corridor more smoothly.

   1.4 Access Roads or Drives – A shared access roadway among abutting property owners, either in front of or behind their properties serves the same purpose as joint access agreements. This function can also be met by a well-connected network of local streets just off of the main corridor.

2. Medians
   The portion of the roadway that separates opposing traffic flows is called a median. Turning traffic, particularly left turns, increase vehicular conflicts as well as conflicts with pedestrians and bicyclists. They result in increased crashes, delay, and complicate signal timing. The type of median determines the location where vehicles turn and pedestrians can most safely cross a roadway. Therefore, the presence and type of median has a significant impact on the operations, safety,

[5] TRB Access Management Manual. 2003

and access to adjacent land uses along the roadway. Median types can be grouped as follows:

2.1 Traversable Medians
Continuous two-way left-turn lane (TWLTL) – a continuous lane located between opposing traffic streams that provides a refuge area for motorists traveling in either direction seeking to complete left turns from both directions.

Narrow or Traversable Medians – a median that by its design does not physically discourage or prevent vehicles from entering upon or crossing over it, including painted medians;

2.2 Nontraversable Medians – a median that by its design physically separates traffic traveling in opposite directions, such as a concrete barrier or a landscaped island.

3. Signal Spacing and Coordination
Closely spaced or irregularly spaced traffic signals on arterials roadways result in frequent stops, unnecessary delay, increased fuel consumption, excessive vehicle emissions, and high crash rates. Alternatively, long and uniform signal spacing allows timing plans that can efficiently accommodate varying traffic conditions during peak and off-peak periods as well as adoption of a traffic control system that can accommodate changes that occur over time. Therefore, selecting a long and uniform spacing of signalized intersection is an important element in establishing access spacing standards.

5. Regulatory Tools Available for Local Jurisdictions

Access management is difficult to accomplish solely through access permitting and roadway improvement. A variety of other means are available to local jurisdictions to aid in the process of implementing a successful access management plan. Comprehensive plans, zoning and subdivision regulations, and development review are a few of these tools.

1. **Zoning.** Local zoning regulations are a set of standards for land use, parking and loading, building setbacks, and lot dimensions. Minimum lot frontages, dimensional analysis requirements, and building setbacks allow for greater driveway spacing and flexibility for on-site circulation. Corridor overlay zones, used on high-priority corridors, add special requirements that allow customizing to unique circumstances of a particular corridor.

2. **Subdivision Regulations.** Subdivision regulations guide the division and subdivision of land into lots, blocks and public ways. Subdivision regulations provide an opportunity to ensure proper access and street layout in relation to existing or planned roadways.

3. **Traffic Impact Assessment.** Traffic impact assessment is a form of access management used at the development phase of a project. A Traffic Impact Assessment is a brief study that assesses the impacts of development on the surrounding roadways and recommends mitigation actions.

List of Potential Specific Local Strategies

1. Increase minimum lot frontage and setback requirements along major roadways.
2. Increase the minimum lot size for corner lots to improve corner clearance.
3. Regulate access to out parcels.
4. Provide an incentive for combining access points or relax parking and dimension requirement where necessary to achieve shared drives.
5. Optimize driveway locations and access design in the development review process.
6. Establish policies for internal access for residential subdivisions and manage lot splits to promote shared access to and from major thoroughfares.
7. Regulate flag lots and restrict them along major roadways.
8. Consider a corridor overlay ordinance for high-priority corridors.
9. Develop a connected local road network of side streets and parallel roads to accommodate desired land development along major thoroughfares.

6. Corridor Specific Access Management Plan

A corridor specific access management plan goes beyond the traditional roadway improvement study by considering land development and access. It is a versatile planning tool that is used to provide solutions to existing problems and prevent future access problems. These plans should be specific to the existing conditions of that corridor and could expand on the spacing standards outlined previously.

An example of such expanded language is the following language from the City of Little Rock's Access Management standards on driveways at intersections:

> "No driveway access shall be allowed within the limits of any arterial or collector street intersection. Driveway access on the far side of the intersection may be considered 200- ft from the intersecting streets when limiting the driveway to right turn in and right turn out only. The limits of the intersection include any and all auxiliary left and right turn lanes and necessary tapers form the standard roadway section to the full intersection cross-section."

Metroplan's experience with implementing access management plans has emphasized individual negotiation with businesses along the targeted corridor. It is important to work with each business to craft an access solution for them consistent with the safety and capacity improvements desired in the corridor. A corridor specific access management plan is most useful in showing the entire segment of the corridor under consideration and how each business is being treated. Most business owners recognize the need to improve safety and corridor capacity, but are very concerned that their business be treated fairly and equally with others in the corridor.

Corridor access management plans can also be very useful where Regional Arterial corridors cross local jurisdictions' borders and/or where they are owned by another entity such as the state highway department. The issue of consistency, both for driver expectations and for treatment of businesses along the corridor, recommends a corridor access management plan.

Before a capacity improvement project (i.e., minor or major widening, intersection improvements, signal coordination, or intelligent transportation system application) on a section of RAN corridor, it is recommended that an access management plan be developed.

7. Multi-party Access Management Agreements

Local jurisdictions may deem it beneficial to enter into a multi-party access management agreement for RAN corridors with other local governments along the corridor, with Metroplan and/or the state highway department if the corridor is a state highway. Some jurisdictions have found such pacts beneficial in maintaining the integrity of the access management plan.

8. Technical Assistance

The Metroplan staff is available to assist any member jurisdiction in developing their own access management standards, in educating the public and local businesses about the benefits of access management, and in assisting in the application of access management standards to specific corridors.

References

The Recommended Access Management Standards herein are derived from the following sources:

Access Management Manual (Transportation Research Board)
TWLTL may be appropriate for the following roadways:

- Roadways in urban and suburban areas with a projected average daily traffic of less than 24,000 vehicles per day;
- Collector streets in developing residential areas where residences front on local streets that intersect the collector street;
- Collector streets in developing suburban areas where direct access is to be provided to small abutting properties; and
- Collector streets in developed urban and suburban areas where there is no crash pattern that is correctable by a raised median.

A nontraversable median is more desirable than a TWLTL for the following situations:

- All new multilane urban arterial roadways,
- Existing multilane urban arterial roadways with ADT in excess of 24,000 to 28,000 vehicles per day, depending on local conditions;
- Rural multilane roadways;
- Multilane roadways with a high level of pedestrian activity; and
- High crash locations (that are correctable with left-turn treatment) or areas where it is desirable to limit left turns to improve safety.

AASHTO (A Policy on Geometric Design of Highways and Streets 2001)
This type of operation (TWLTL) works well where the speed on the arterial highway is relatively low (40 to 70 km/hr [25-45] mph) and there are no heavy concentrations of left-turning traffic.

Florida Department of Transportation
Policy Enacted in 1993

> "All multilane facilities shall be designed with a raised or restrictive median except four-lane sections with design speeds of 40 mph or less. Facilities having design speeds of 40 mph or less are to include sections of raised or restrictive median for enhancing vehicular and pedestrian safety, improving traffic efficiency, and attainment of the standards of the Access Management Classification of that highway section."

Texas Design & Access Management Manual

Texas Design Standards considers a Raised Median when volumes reach 20,000 ADT.

Roadways with nontraversable medians are safer at higher speeds and at higher traffic volumes than undivided roadways or those with continuous two-way left-turn lanes (TWLTL). Numerous studies from across the nation have been conducted relating to undivided, TWLTL, and divided roadways with a nontraversable median. Based on studies, it can be concluded that roadways with a nontraversable median have an average crash rate about 30 percent less than roadways with a TWLTL. Additionally, where ADT exceeds 20,000 vehicles per day and the demand for mid-block turns is high, a raised median should be considered.

Other TX State Highway Minimum Spacing	
Posted Speed/Design Speed	Connection Spacing and Corner Clearance
<= 30	200
35	250
40	305
45	360
>50	425

Regional Arterial Network Study Access Management Standards (Based on Florida DOT Standards)

Class	Median Opening Spacing		Connection Spacing and Corner Clearance		Signal Spacing
	Channelized	Full	> 45 mph	=<45 mph	
1	NA	NA	NA	125	NA
2	660	1320	440	245	1320
3	1320	2640	660	440	2640

PART III Implementation Procedures

Purpose
The CARTS Roadway Design Standards, including pedestrian and bike elements, are intended to inform the implementing agencies and member jurisdictions as to the MPO's roadway and pedestrian/bicycle typical cross sections that best implement the vision, goals and objectives expressed in the long-range transportation plan. Of particular regional concern is the development and implementation of the strategic regional network comprised of the regional arterial network, strategic regional transit investments and strategic regional bikeway connectors. Implementation of this strategic network is critical in maximizing overall transportation investments, while providing the region with real transportation choices.

Transportation Improvement Program Project Review
Monitoring implementation of the long-range plan is accomplished primarily through the CARTS Transportation Improvement Program (TIP) Project Review process. This process is intended to foster interaction and understanding among member governments and/or implementing agencies regarding the likely impacts of a proposed project design on an individual city or adjacent locality, the overall transportation system and the long-range transportation plan particularly. Review of a project's preliminary design also helps reinforce consistency of both plan and policy application on all parties concerned.

Applicability
The Project Review Process applies to all transportation projects (roadway, transit, pedestrian or bike) proposed for inclusion in the CARTS TIP.

TIP Process and Project Review
In the TIP, projects are funded for different phases. Those phases generally are (1) preliminary engineering (PE), (2) rights-of-way (ROW) and utilities, and finally (3) construction.

Preliminary engineering is included in the first year of the TIP, with the remaining project phases listed in any of the outer years. Before a project may advance to a future phase (right-of-way, utilities and/or construction), the project, as designed in preliminary engineering, must be reviewed by the MPO staff and the Technical Coordinating Committee (TCC) and approved by the MPO Board.

Project Review by the MPO is not a review of engineering design practice, but rather a review of the project's design for consistency with 1) the overall project concept as originally proposed by the implementing jurisdiction/agency, 2) locally adopted master street, pedestrian and/or bicycle plans, and 3) the regional long-range transportation plan.

Depending on the complexity of an individual transportation project, MPO project review approval can be requested as early as 30% into the preliminary engineering design phase. Following approval by the MPO of the design, any substantive change in the approved design must also be reviewed and approved. A request for scope change is handled in the

same manner as for design approval, but may come at any time and any phase of the project.

Waivers

Waivers to any of the design standards listed herein may be requested at time of submission of the project for review. The single requirement before asking for a waiver is that the proposing jurisdiction or agency must demonstrate having made a good faith effort to implement the standard prior to asking for a waiver from it.