CHAPTER 5
SUBURBAN SRA ROUTES

5.1 INTRODUCTION

Desirable route characteristics for suburban SRA routes in the year 2010 have been developed to provide adequate traffic service and geometric design. Recommended features include three through lanes in each direction and turn lanes at intersections. Capacity-increasing measures will also include signal synchronization, transit and pedestrian amenities, and policies related to access and parking.

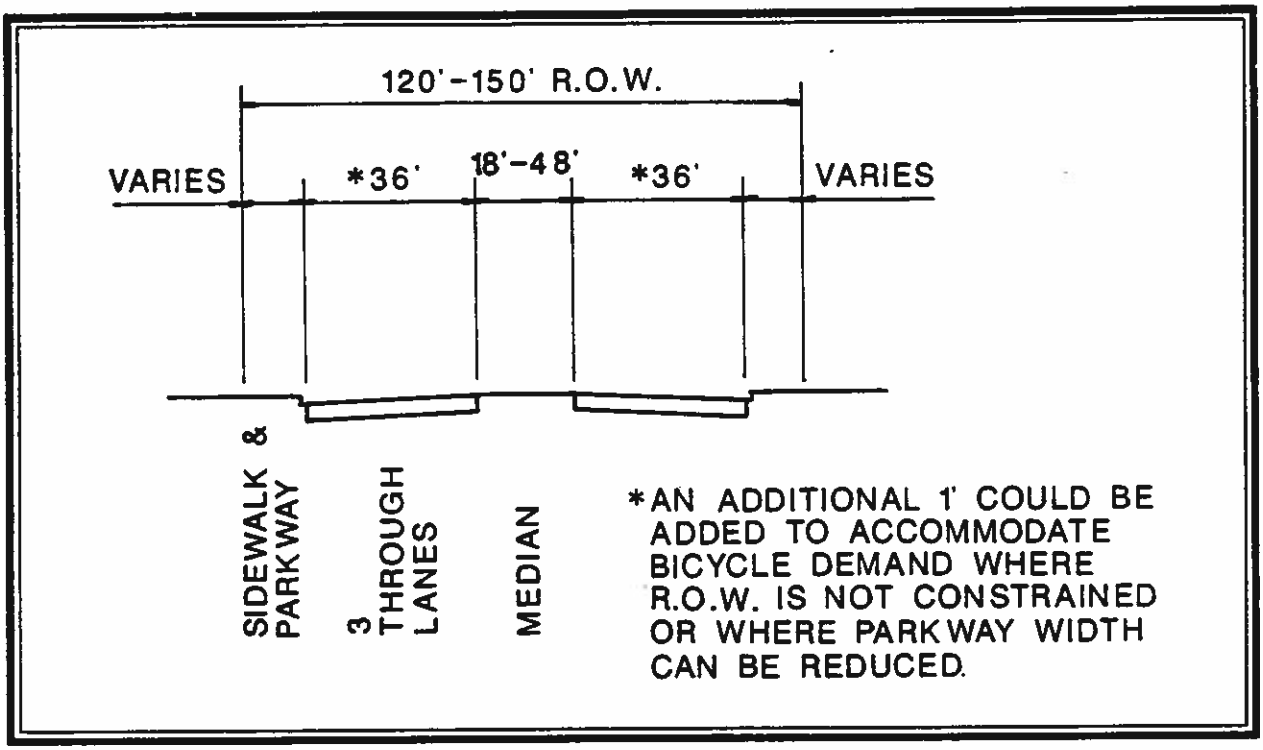
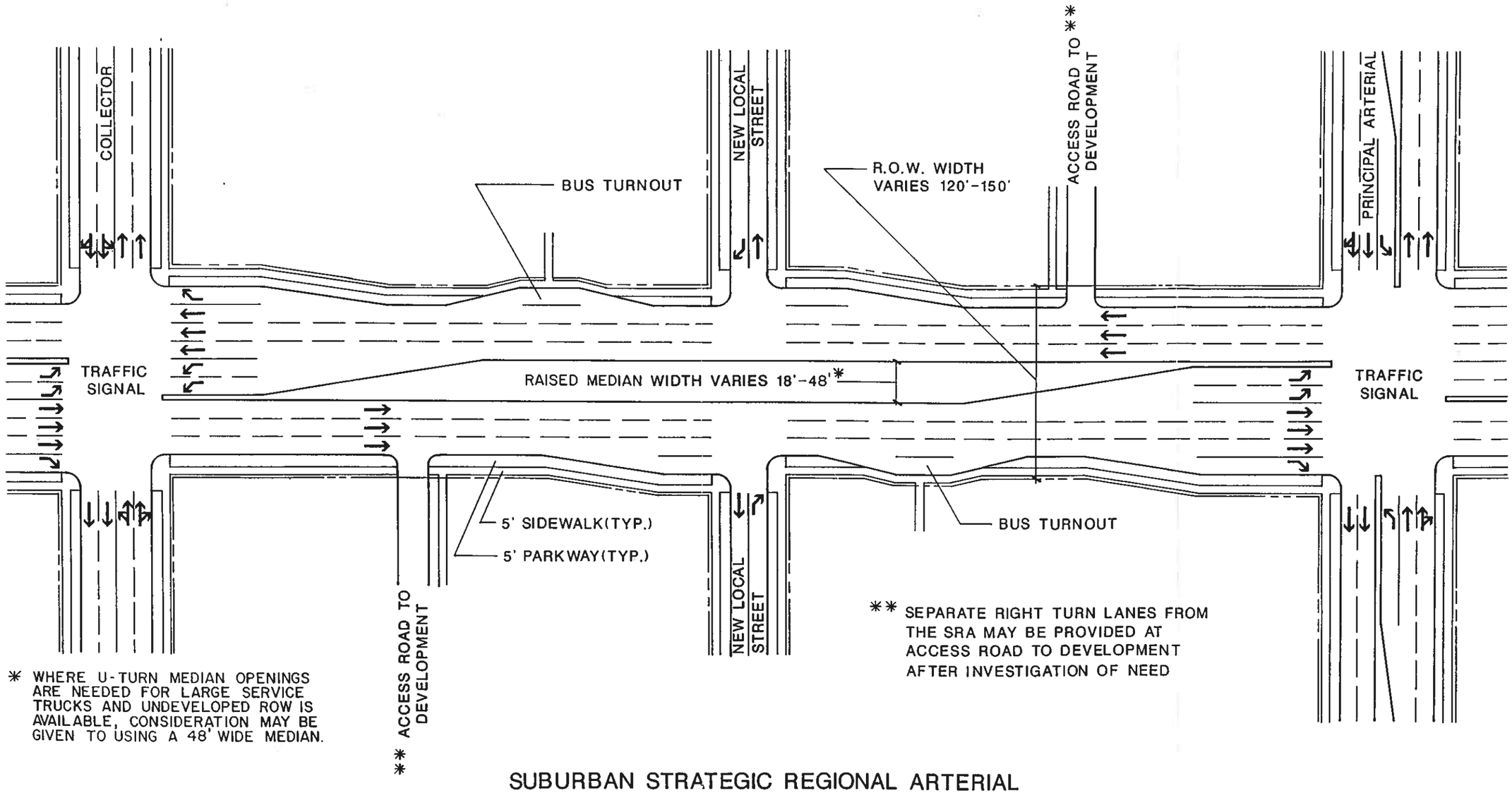


Figure 5.1 Desirable Suburban SRA Cross-Section

Table 5.1 lists the desirable characteristics for suburban SRA routes in 2010. These characteristics are the basis for the desirable suburban cross-sections on *Figure 5.1* and the typical design configuration in *Figure 5.2*. The remainder of this chapter describes design features along with recommended standards and policies.

Table 5.1
2010 Desirable Route Characteristics
Suburban Strategic Regional Arterials

Right-of-way Width	120' - 150'
Level of Service (Peak Hour)/Design Speed	C or D / 45 mph
Number of Through Lanes	3 in each direction; 12' width
Median Width	18' - 48', raised
Bicycle Accommodation	13' outside lane desirable
Right Turns	Turn lanes at all major intersections
Left Turns	Dual left turn lanes at all major intersections
Shoulders	Where appropriate, 10' width paved
Curbs	Yes, with 2' gutters
Sidewalks	Where appropriate, 5' width
Parking	Not recommended
Cross Street Intersections	Signals with collectors and arterials New local roads right-in/right-out only
Curb Cut Access	Consolidate access points at 500' spacing with cross easements
Transit	Bus turnouts, signs and shelters. Express bus service only. Signal pre-emption and HOV potential.
Number of Traffic Signals Per Mile	4 maximum
Signalization	Synchronization with pedestrian actuation where needed.
Freight: Radii Vertical Clearances	WB-55 typical/WB-60 Type II truck route New structures: 16'-3" Existing Structures: 14'-6"
Railroads	Evaluate the need for a grade separation at all railroads
Loading	Off-street loading



SUBURBAN STRATEGIC REGIONAL ARTERIAL
TYPICAL DESIGN CONFIGURATION FOR TWO BLOCK SEGMENT

NOT TO SCALE

Figure 5.2

5.2 RECOMMENDED DESIGNS AND FEATURES

5.2.1 Signals

All signalized intersections on suburban SRA routes should be fully-actuated. Fully-actuated means that all approach and left-turn lanes are capable of detecting vehicles and adjusting signal timings.

Where feasible, all signalized intersections at spacings along suburban SRA routes of 1/2 mile or less, should be interconnected into signal systems. The interconnection is used to provide signal coordination and vehicular progression along the SRA. All signal systems along suburban SRAs should be timed for vehicular progression based on a traffic engineering study. The signal timings should be evaluated every three to five years to determine if they are adequate for current traffic patterns.

All signalized intersections on suburban SRA routes should be capable of priority preemption for express bus service. This preemption capability should only be used to keep buses on schedule, as described in Section 5.2.5 in this chapter. The preemption by buses should be coordinated with vehicular progression along the SRA route.

The goal of traffic signal timings along suburban SRA routes is to achieve a level-of-service C for the arterial through lanes. To achieve this, it may be necessary to lower the level-of-service for the turning movements and cross-streets to maximize the through movements on the SRA.

5.2.2 Roadway Design Criteria

The Design Criteria for suburban SRA routes shown in *Table 5.2* should serve as a guide for identifying substandard roadway features and specifying their subsequent improvement.

Where right-of-way is available, construction of new roadway features such as grade separations and route bypasses should follow the recommended design criteria. Partial access control should be considered on route bypasses proposed on undeveloped land.

5.2.3 Intersections

For suburban SRA routes, left turn lanes should be provided at all existing intersections; left and right turn lanes should be provided at all major signalized intersections. Right-of-way should be protected to convert the major suburban SRA intersections to dual left turn lanes as volumes warrant. At many suburban intersections turning movements are very high and may warrant double left turn lanes. Double left turns have been used with success in the Chicago metropolitan area.

When turn lanes are developed, the turn bay storage should be 1.5 to 2 times the expected arrival rate of vehicles over one cycle at signalized intersections. Where turn bay storage is inadequate, the storage capacity should be increased. This can be done by lengthening the existing storage bay or reconstructing the intersections to have dual left turn lanes. Projected vehicular storage lengths should exceed 350 feet before dual left turn lanes are proposed as a year 2010 improvement. At unsignalized intersections, turning lengths should be determined by traffic studies undertaken on a case-by-case basis.

Table 5.2
Suburban SRA Roadway Design Criteria

Route Type	Suburban
Horizontal Alignment	
Minimum Design Speed	45 mph
Minimum Stopping Sight Distance	325'
Minimum Radius Horizontal Curve	740'
Maximum Degree of Curvature	7° 45'
Maximum Superelevation	4%
Minimum Length of Superelevation - Six Lane Section - Four Lanes w/small probability of Six Lanes	 234' 192'
Horizontal Clearance	2'
Vertical Alignment	
Maximum Grades	6%
Length Crest Vertical Curve	Compatible with Design Speed
Length Sag Vertical Curve	Compatible with Design Speed
Vertical Clearance (Minimum New Construction)	16'-3"
Vertical Clearance (Minimum Reconstruction)	14'-6"

Due to problems of sight distance and intersection width, double left turns should be used under "protected only" phasing. "Protected only" phasing means that a left turn movement is allowed only on a green arrow and not during the green ball phase for the through movement. All dual left turn lanes must be protected by a raised median between opposing lanes.

Certain suburban SRA routes are diagonal arterials that originate in the central Chicago area. These diagonal arterials frequently intersect with other arterials constructed on the conventional grid pattern which can create intersection triangles. It is recommended that signal timings be optimized to provide progression along the suburban SRA route through the intersection triangle. Construction of a grade separation for the SRA may be considered, subject to an evaluation of right-of-way availability and access requirements.

It is recommended that suburban SRA intersections with new local roads be restricted to right-in/ right-out movements. A raised median for the suburban SRA route will restrict left turn movements from the SRA to the local road, left turn movements from the local road to the SRA and through movements across the SRA for the local road. Alternative routes and emergency vehicle response times must be evaluated in each instance, however, before this can be ultimately implemented.

Radii for right-turn movements on suburban SRA routes should be able to accomodate a WB-55 design vehicle without encroachment into oncoming traffic. If the suburban SRA route is designated a Class II truck route, the turning radii should accommodate a WB-60 design vehicle.

5.2.4 Add Lanes

The protection of right-of-way along suburban SRA routes will allow for the eventual development of the desirable suburban cross section. *Figure 5.1* shows both the desirable cross section and corresponding right-of-way requirements for the suburban SRA.

Once the right-of-way is acquired, the desired cross-section with three through lanes in each direction and raised median can be achieved by widening the existing roadway. In some cases, areas that were once shoulders and open ditches would be utilized to construct additional through lanes.

5.2.5 Express Bus Service with Priority Preemption

Bus service on suburban SRA routes should be limited to express buses which are equipped with priority signal preemption capability that can be deployed when they are running behind schedule. However, the bus preemption should be coordinated with existing vehicular progression along the SRA route. Bus stop locations should occur every one-half to one mile.

Considerations in the location of bus stops include intersecting bus routes with a corresponding potential for transferring riders and locations of residential, commercial, retail or office developments to be served along the route.

The stops would be designed as turnouts, consistent with **Pace Development Guidelines**. Walkways to stops of intersecting services would facilitate transfers and promote safety. Near-side and far-side bus stop configurations would be planned to minimize distance between connecting lines.

5.2.6 Access Management

It is recommended that curb cut access be limited to right-in, right-out traffic movements. In suburban areas where numerous curb cut access points to properties are present, it is recommended that the access be consolidated into single points at desirable spacing of 500 feet between access points as

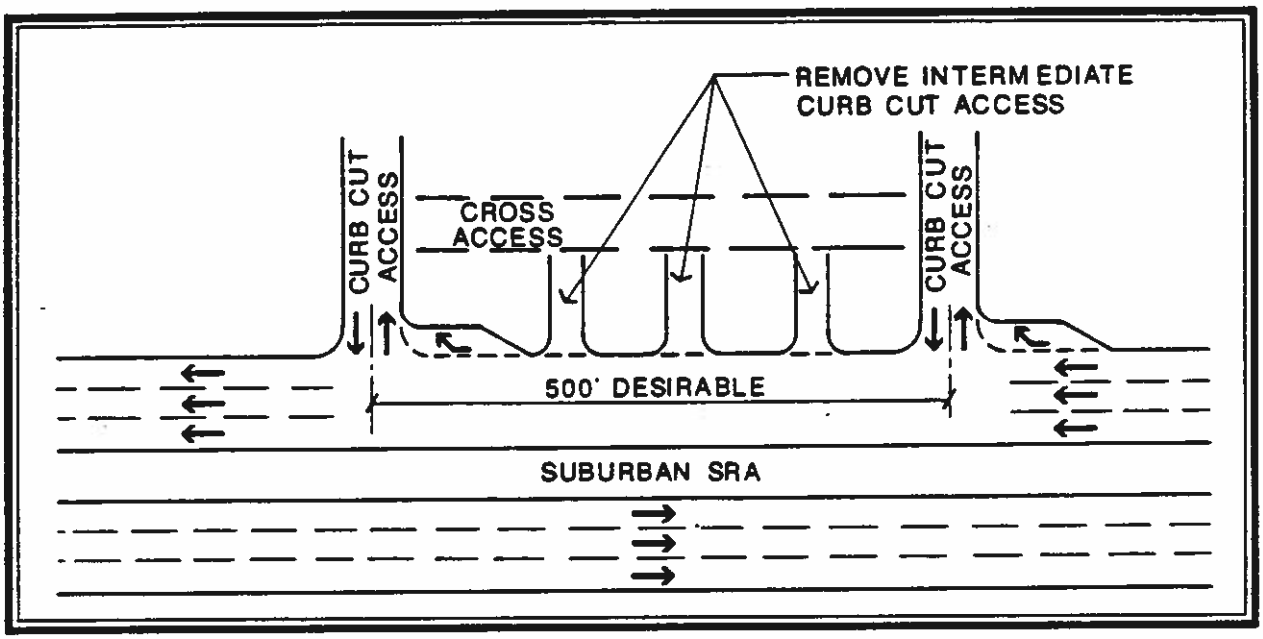


Figure 5.3 Consolidated Access

shown in *Figure 5.3*. The properties would need to be interconnected through the use of cross access easements, as discussed in Section 4.2.6 of Chapter 4.

Where it is necessary to allow left turns into access points, efforts should be made to provide adequate turn bay storage. Increasing turn bay storage at these locations to accommodate left turn queues during peak periods will remove turning traffic from the through lanes. An example of this idea is shown in *Figure 4.5*.

Circulation using internal access roads is recommended for all new development and redevelopment. This circulation should accommodate autos, delivery vehicles, transit, and bicycles. Sidewalks are recommended to facilitate pedestrian circulation. *Figure 5.4* displays a possible configuration. Requirements for access to the SRA and internal circulation should be considered as part of the development approval process. Internal cirulation roadways should facilitate transit opera-

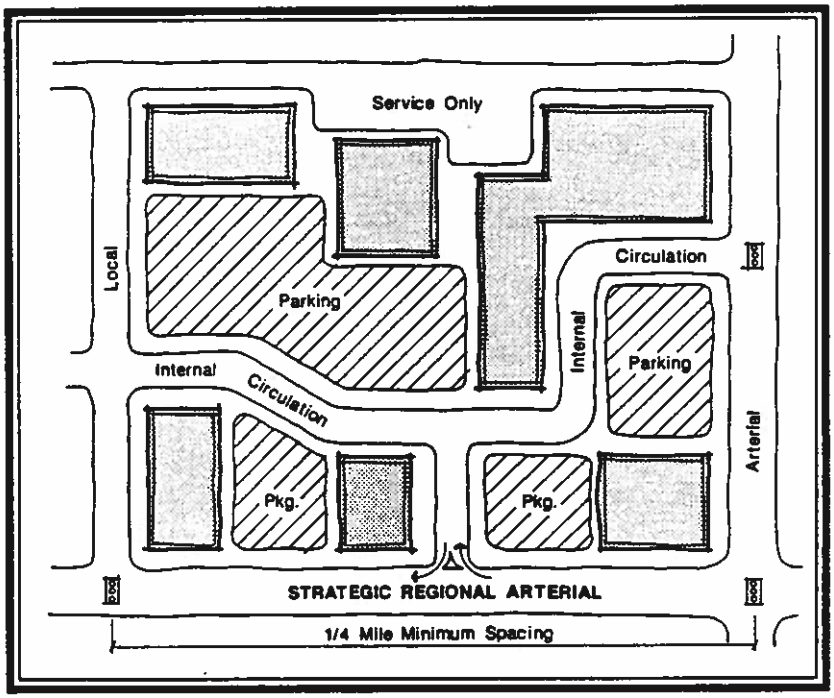


Figure 5.4 Internal Circulation

tions by reducing the number of times buses enter/leave the SRA. The SRA and internal roadways should be designed to provide convenient transit access to buildings.

If a signal is warranted at the local road as shown on *Figure 5.4*, the spacing should not be less than 1/4 mile to an adjacent signal.

5.2.7 Median Control

It is recommended that all suburban SRA routes have a raised median with a minimum width of 18 feet. This will permit left turn movements from the SRA only at desired intersections. However, if some unsignalized median crossovers became necessary during project planning, then the minimum median width should be 22 feet. The raised median is an effective tool to provide the level of service desirable on suburban SRA routes.

5.2.8 Structural Clearance Improvements

All structures along suburban SRA routes should have a 14 feet - 6 inches vertical clearance. Existing structures that do not meet this requirement are candidates for modification. Improvement of inadequate horizontal and vertical clearances at structures will improve the mobility of freight vehicles along suburban SRA routes. The recommended method to improve vertical structural clearances where the SRA route is in an underpass is to physically lower the suburban SRA roadway. Potential drainage and utility problems should be carefully evaluated when this method is proposed.

5.2.9 Stop Sign Removal

Stop sign control for traffic movements on an SRA route is contrary to the concept of an SRA having priority of through movement. Stop sign control used on through lanes of any suburban SRA route should be removed and a traffic engineering study performed to determine appropriate traffic control at the location. The removal of stop signs is recommended for the SRA route only and not the intersecting cross-streets.

5.2.10 Pavement Markings

High-type pavement markings should be used on suburban SRA routes. High-type pavement markings include thermoplastics, epoxy and pre-formed plastics. It is recommended that high-type pavement markings be used because they provide a durable and highly visible striping material

Raised pavement markers should also be used on suburban SRA routes. Raised pavement markers are a cost-effective technique to promote greater safety and are particularly beneficial during inclement weather. The spacing of raised pavement markers should be in accordance with IDOT District One raised reflective pavement marker standards. Raised pavement markers should also be placed on top of raised median curbs.

5.2.11 Drainage

On suburban SRA routes roadway drainage generally consists of an enclosed system. During roadway reconstruction for lane additions or intersection widening, the existing drainage system should be assessed for capacity or flooding problems. Any improvements to the existing drainage system must be in accordance with the procedures and values in the IDOT Drainage Manual.

5.2.12 Right-of-Way Acquisition and Protection

A major goal of the SRA planning process is to identify and protect future right-of-way needed to construct the ultimate roadway design and configuration. It is recommended that right-of-way be protected as soon as possible after it is identified. Suburban rights-of-way may adjoin both developed and undeveloped properties.

It is recommended that local governments work with roadway jurisdictional agencies to insure that adequate right-of-way for the SRA is provided in the approval process for new development. Local governments should review their building setback requirements to locate all new construction outside the ultimate right-of-way width to protect the ability to expand the right-of-way in the future.

Acquisition of easements and rights-of-way adjacent to undeveloped land may be more feasible in some circumstances when the local development approval allows the entire site to be used in calculations of how much land is available for development. *Figure 5.5* displays how the site would be measured.

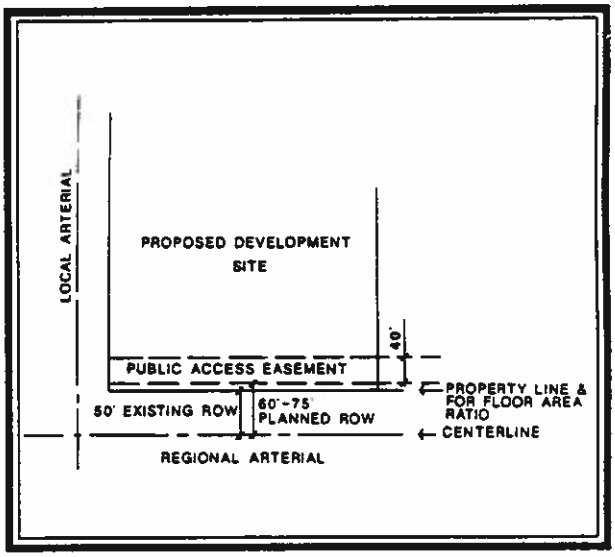


Figure 5.5 Land Available for Development

5.2.13 Railroad Crossings

The grade separation of suburban SRA routes from intersecting railroads can increase capacity and safety. The feasibility of this improvement is dependent upon projected traffic volume, roadway characteristics, duration and volume of rail movements and amount of right-of-way available for its construction.

All at-grade railroad intersections with suburban SRA routes should be evaluated for grade separations. Preference for grade separation construction may be given to freight rail crossings where delays due to length of freight trains are considerably longer than at crossings for passenger rail lines. However, the requirement for grade separation at commuter rail lines is important to consider because peak rail and roadway traffic always coincide. Additional factors to assess include proximity of rail line to adjacent arterial intersections, access requirements, right-of-way availability and projected traffic volumes on the suburban SRA route.

At all locations where railroad grade separations are not feasible, the use of constant time warning devices should be investigated. Constant time warning devices adjust the down time of the gates based on the speed of the train. This helps reduce excessive delay to vehicular traffic caused by gates being down when trains are not present. This type of device can also recognize when a train is stopped. This can be beneficial where a train station is near an at-grade rail crossing and trains loading and unloading passengers trigger the gates to go down even though the train is not in the intersection.

5.3 CRITERION AND CONDITIONS FOR REMOVAL OF ON-STREET PARKING

On-street parking is currently permitted on some portions of SRA routes in suburban areas. In areas where parking is allowed, there may be restrictions on parking during peak hours.

The general criterion and conditions for institution of "No Parking" regulations along suburban SRA routes are shown below. One or more of the conditions should apply and the criterion should be met before parking is removed.

Conditions

Less than the Minimum Number of Travel Lanes On segments where the suburban SRA minimum standard of two lanes in each direction is not provided, on-street parking should be prohibited. The curb parking lane should be converted to a through lane.

Less than the Minimum Level of Service On segments where the projected level of service is below the suburban SRA minimum standard of C for peak hour, on-street parking in peak hours should be prohibited, with the curb lane being converted to a through lane.

High Accident Rate Parking should be relocated along segments of suburban SRA routes that pose a safety hazard due to high accident rate. If the accident rate is 5 per year per 10,000 average daily traffic (vehicles) or greater, then parking should be relocated.

Criterion

Alternative Off-Street Parking Available If adequate off-street parking exists in public or private lots/ garages, on-street parking can be eliminated. If the existing supply is not adequate to absorb those vehicles currently parked on-street, vacant or under-utilized parcels of land in the vicinity provide an opportunity to develop additional off-street parking. A public agency would be responsible for purchase of the land and development of a parking facility.

5.4 CRITERIA AND CONDITIONS FOR IMPLEMENTATION OF HOV LANES

High occupancy vehicle (HOV) lanes designated for buses, carpools and vanpools may be appropriate in selected areas with high levels of transit ridership and ridesharing activity. There should also be adequate capacity to accommodate traffic in general use lanes. The following criteria and conditions are applicable using a with-flow HOV lane along the curb or median. In suburban areas, institution of an HOV lane would generally involve new construction. It would be designed primarily for buses, although carpools and vanpools would also be encouraged.

The general criteria and conditions are shown below. One or more of the conditions should apply and all of the criteria should be met before an HOV lane is implemented.

Conditions

High Level of Usage: Curb Lane Route segments should have an existing or projected transit ridership of at least 1200 one-way passengers in the peak hour. A curb HOV lane would be expected to be utilized almost exclusively by buses. Existing or projected bus volumes should be 15-40 vehicles in the peak hour one way.

High Level of Usage: Median Lane Route segments should have an existing or projected usage of 2400 one-way passengers or rideshare occupants in the peak hour. A higher demand threshold has been established for a median HOV lane to reflect the potential for higher costs and operational problems associated with implementation.

Criteria

Reduce Total Person Delay There should be a net reduction in the average travel time per person for all users of the route.

Minimal Disruption to Traffic Operations It must be feasible to institute turn restrictions and signalization adjustments necessary for HOV improvement with only minimal disruption to traffic flow in the general use lanes.

No Peak Hour On-Street Parking or Loading For implementation of a curb HOV lane, it must be feasible to prohibit parking and loading in the curb lane.

More Than Desirable Right-of-Way Available In suburban areas, the desirable cross-section of three lanes in each direction must be provided within available right-of-way; right-of-way not required for the three through lanes could be designated for HOV lanes.

5.5 BICYCLES AND PEDESTRIANS

On suburban SRA routes more options are available for handling pedestrian and bicycle access. For example, while right-of-way availability is still a critical issue, dense development immediately adjacent to the roadway is not as common an occurrence as in urban areas. Also, in suburban situations, the alternative parallel routes may not always be available. Under all situations, the goal is to have a continuous system of bicycle and pedestrian facilities. Handicapped access ramps for pedestrians will be constructed at intersections and curb cut locations, consistent with appropriate state and local policies and standards.

Provisions for bicycles and pedestrians may be accommodated within the SRA right-of-way itself. The choice of how to provide access within the SRA corridor should be based on each situation. In order to allow vehicles sufficient room to pass slower-moving cyclists, the outside curb lane could be widened to 13 feet to accommodate bicycle travel. Where right-of-way is constrained, this additional width could be taken from the parkway. This solution provides a minimal width to safely allow experienced cyclists access to destinations along the SRA, while not encouraging continuous bike travel on the SRA.

As in the cases of the urban and rural SRA routes, access across major obstacles or barriers will be handled by the SRA if alternative access is not feasible.

5.6 TYPICAL ENVIRONMENTAL CONSIDERATIONS

The environmental analysis component of the SRA planning process is primarily an inventory of existing conditions. The purpose of the inventory is to identify those environmental characteristics which may not be compatible with potential roadway improvements or an increase in traffic volumes. Detailed environmental assessments will be performed when SRA improvements move into preliminary design engineering.

Each route type can be expected to provide slightly different environmental concerns. Environmental considerations important to suburban route types are likely to include, at a minimum, land uses that:

- Are sensitive to noise: nursing homes, hospitals, auditoriums, residential areas, and schools;
- Are gathering places for children: schools, parks, and recreation facilities; and
- Generate large volumes of traffic: regional shopping centers, business parks, and major office buildings.

Other environmental concerns include but not limited to:

- Public open space, parks and recreation areas, scenic areas and designated natural areas, nature preserves, historic areas, sites and structures, cemeteries, and floodplains and retention/detention areas,
- Publicly-owned properties,
- Multiple land use plans and varying growth rates,
- Neighborhood boundaries,
- Air quality,
- Hazardous materials,
- Cemeteries,
- Rivers, streams and wetlands,
- Threatened and endangered species and their habitat,
- Sight screening,
- Effects of roadway lighting on existing light canopy,
- Drainage,
- Water quality,
- Tree preservation,
- Agricultural preservation,
- Visual/Aesthetic impact.