# CHAPTER 6
# RURAL SRA ROUTES

## 6.1 INTRODUCTION

Desirable route characteristics for rural SRA routes in the year 2010 have been developed to insure adequate traffic service and geometric design as well as protection of right-of-way for needs beyond the year 2010. Key features designed to maintain acceptable operating speeds and enhance safety include two-way frontage roads, left turn lanes at all intersections, and wide medians.

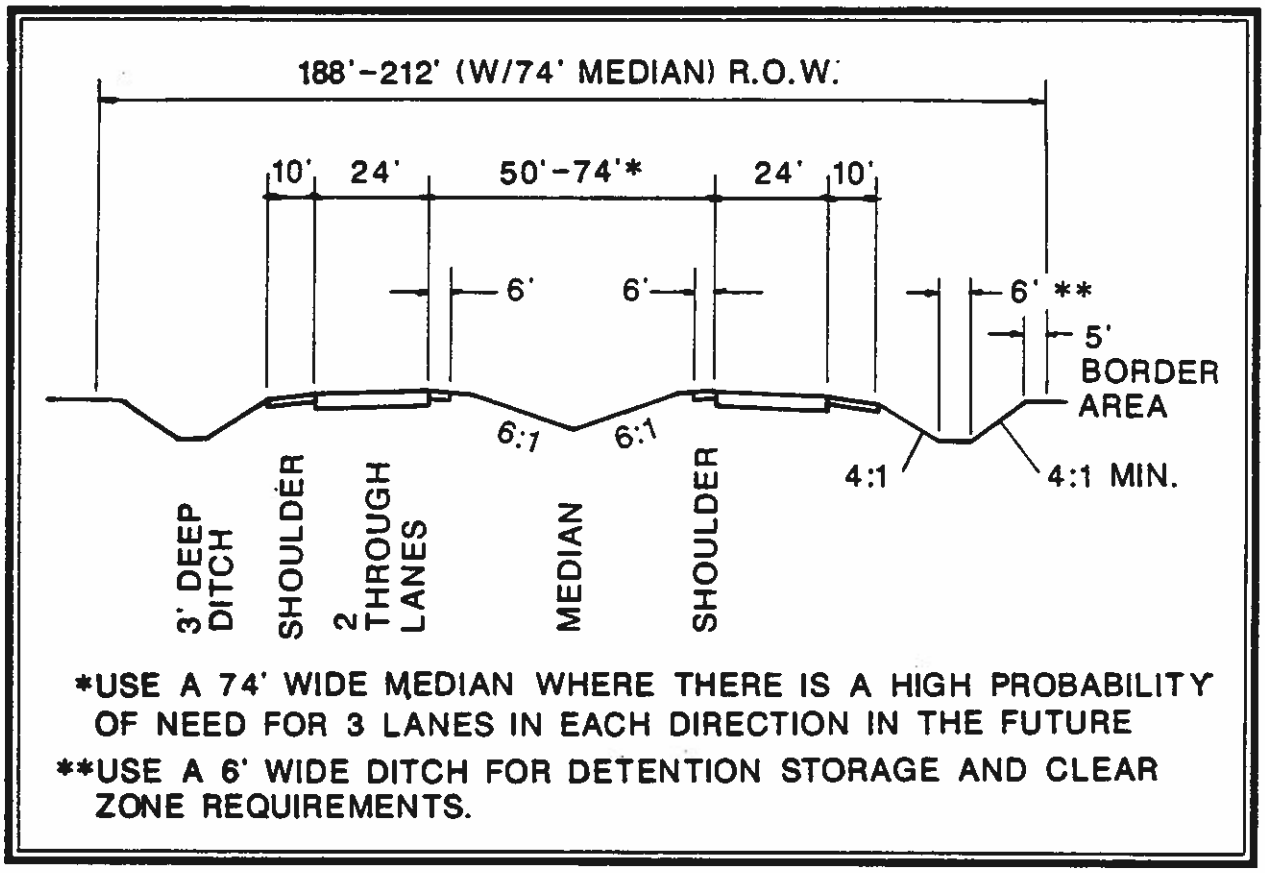


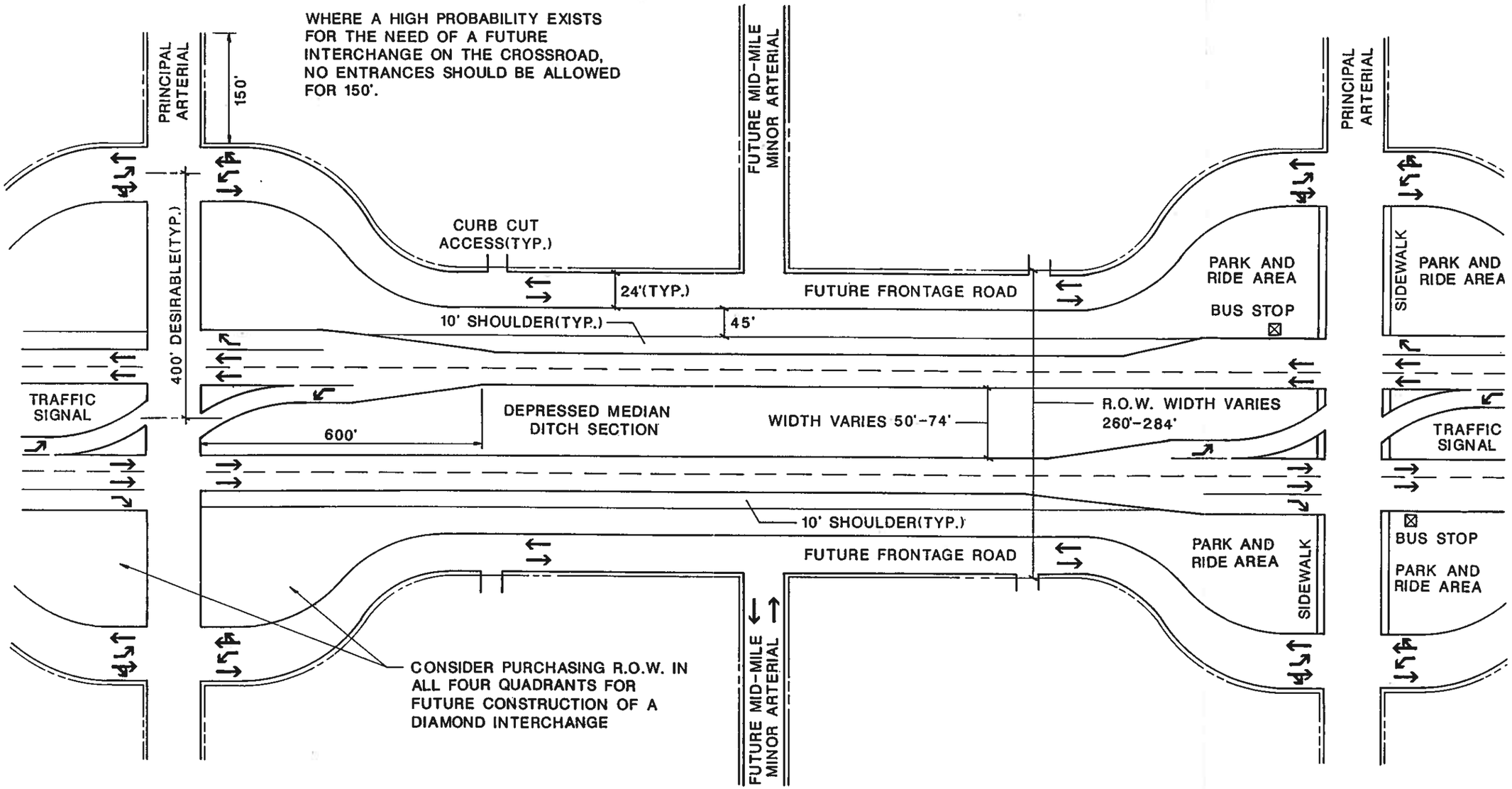

***Figure 6.1 Desirable Rural SRA Cross-Section without Frontage Roads***

*Table 6.1* lists the desirable characteristics for rural SRA routes in 2010. These characteristics are the basis for the desirable rural cross-sections on *Figure 6.1* and *Figure 6.3* and the typical design configurations in *Figures 6.2A* and *6.2B*. The remainder of this chapter describes design features along with recommended standards and policies.

**Table 6.1**
**2010 Desirable Route Characteristics**
**Rural Strategic Regional Arterials**

| | |
|---|---|
| Right-of-way Width | 188' - 284' (w/frontage roads) |
| Level of Service (Peak Hour)/Design Speed | C / 60 mph |
| Number of Through Lanes | 2 in each direction, 12' width; with provision for future expansion to 6 total lanes |
| Median Width | 50' - 74' |
| Right Turns | Turn lanes at major cross-streets |
| Left Turns | Turn lanes at all intersections |
| Shoulders | 10' right paved; 6' left paved |
| Curbs | No |
| Sidewalks | If needed, along outside of frontage roads. |
| Bicycle Accommodation | Paved Shoulder (minimum 6') |
| Parking | No |
| Cross Street Intersections | Permitted. Stop sign control for cross street. Crossovers permitted at 1/2 mile spacing until frontage roads are constructed. |
| Curb Cut Access | Protect right-of-way for post-2010 construction of two-way frontage roads.* Right-in/right-out until frontage roads are constructed. |
| Transit | Bus pull-off and shelter. Express bus service and signal pre-emption potential |
| Number of Traffic Signals Per Mile | 2, signals spaced 1/2 mile apart until frontage roads are constructed. |
| Signalization | Fully-actuated |
| Freight: Radii | WB 60; Standard |
| Vertical Clearance | New Structures: 16'-3"<br>Existing Structures: 14'-6" |
| Railroads | Consider a grade separation at all railroads. |
| Loading | Off-street loading |

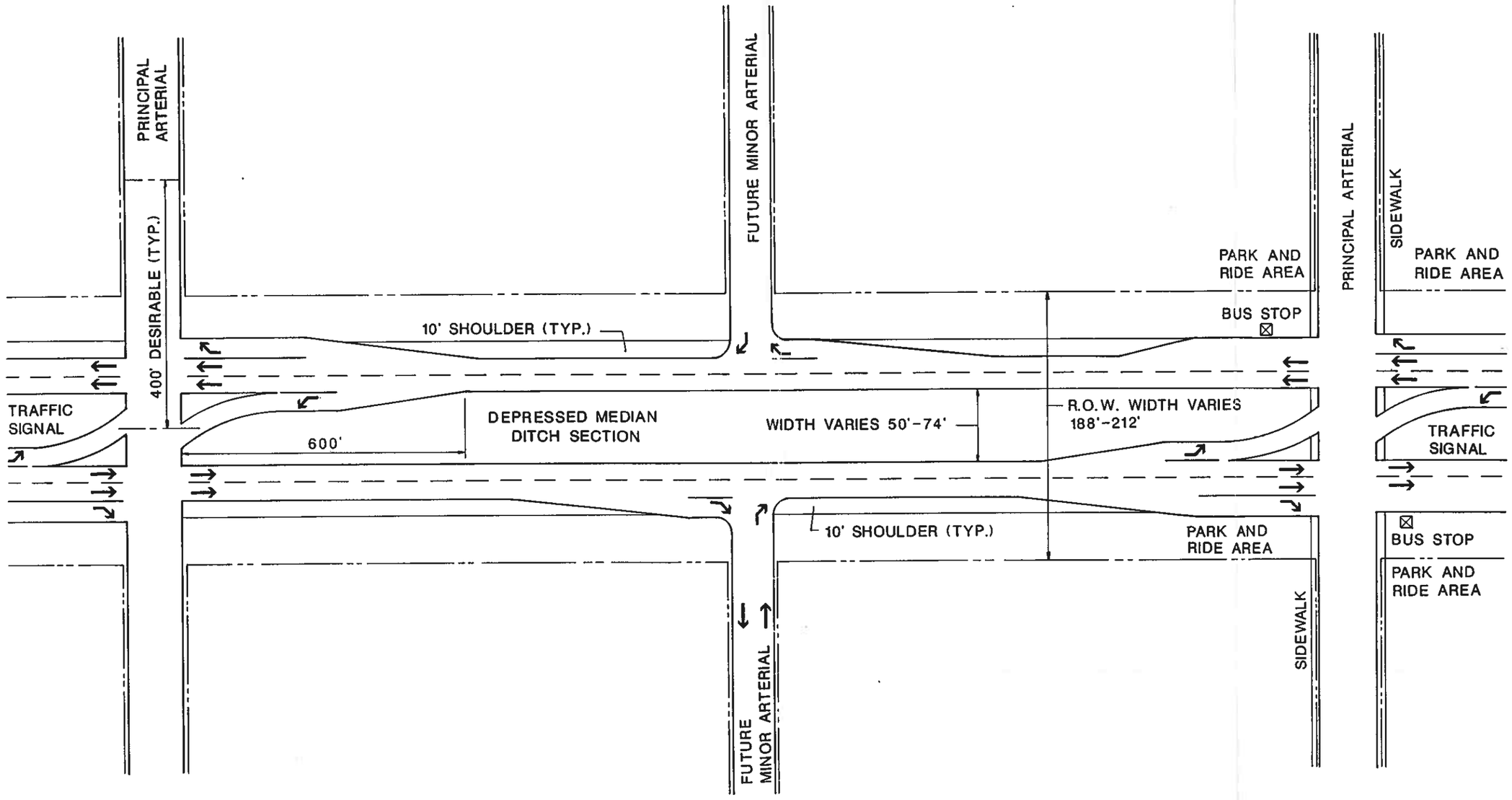
*unless criteria and conditions of Section 6.3 are met




RURAL STRATEGIC REGIONAL ARTERIAL
TYPICAL DESIGN CONFIGURATION FOR ONE MILE SEGMENT

(WITH FRONTAGE ROADS)
NOT TO SCALE

*Figure 6.2A*




RURAL STRATEGIC REGIONAL ARTERIAL
TYPICAL DESIGN CONFIGURATION FOR A HALF MILE SEGMENT
(WITHOUT FRONTAGE ROADS)
NOT TO SCALE

*Figure 6.2B*

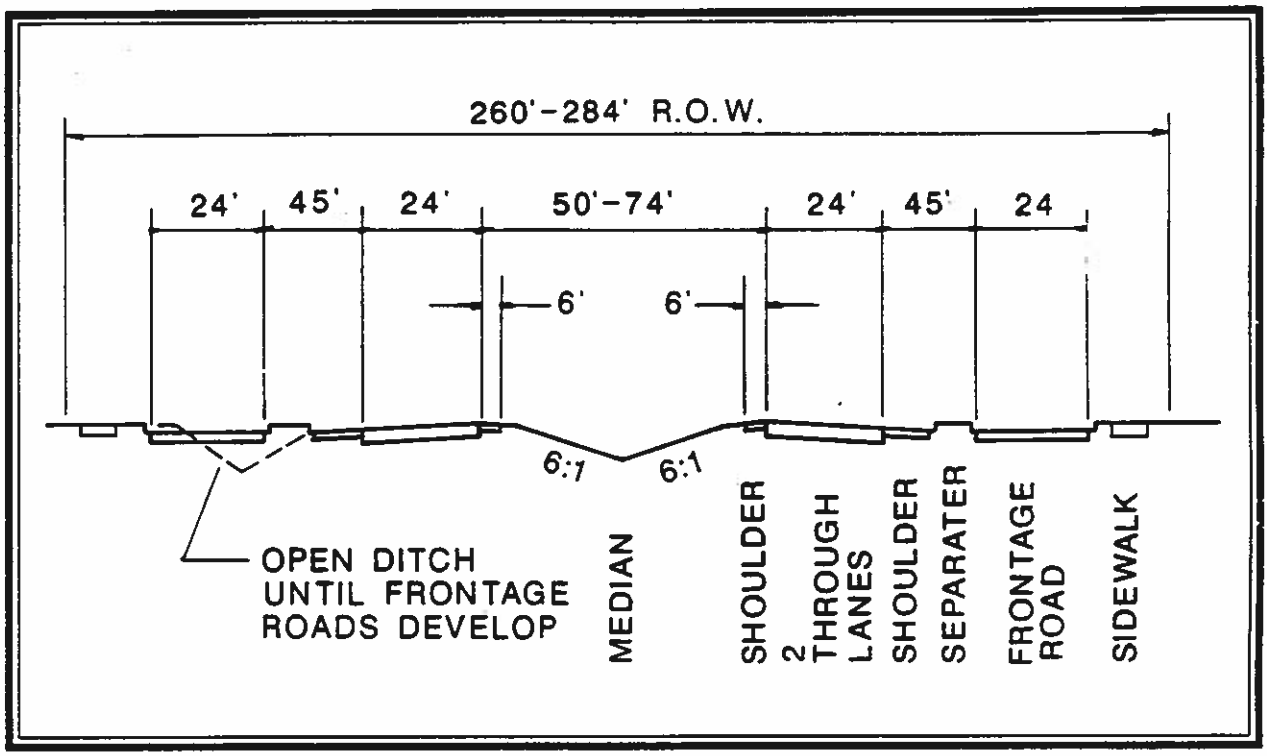



***Figure 6.3 Desirable Rural SRA Cross-Section with Frontage Roads***

## 6.2 RECOMMENDED DESIGNS AND FEATURES

### 6.2.1 Signals

All signals along rural SRA routes should be fully-actuated. Fully-actuated means that all approaches are capable of detecting vehicles and adjusting signal timings to respond to variance in traffic.

### 6.2.2 Roadway Design Criteria

The Roadway Design Criteria shown in *Table 6.2* are meant to guide the construction and reconstruction of roadway features on rural SRA routes. The construction of a bypass route or grade separation are examples of new roadway features that may be feasible along a rural SRA route.

In addition to guiding new construction, the design criteria can be used to identify substandard roadway elements that may lower capacity and pose safety problems on the rural SRA routes. Reconstruction would then be based on the recommended design criteria.

### 6.2.3 Intersections

At all signalized and major intersections along rural SRA routes, separate left and right turn lanes should be developed. The desirable configuration of two through lanes should be maintained along all rural SRA routes.

**Table 6.2**
**Rural SRA Roadway Design Criteria**

| Route Type | Rural |
|---|---|
| Horizontal Alignment | |
| Minimum Design Speed | 60 mph |
| Minimum Stopping Sight Distance | 525' |
| Minimum Radius Horizontal Curve | 1350' |
| Maximum Degree of Curvature | 4° 15' |
| Maximum Superelevation | 6% |
| Minimum Length of Superelevation<br>- Transition for 4 Lanes w/probability of Six Lanes<br>- Six Lane Section | <br>234'<br>258' |
| Horizontal Clearance | Compatible with Design Speed |
| Vertical Alignment | |
| Maximum Grades | 5% |
| 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" |

Where left turn lanes are developed, the turn bay storage should be long enough to store the expected arrival over an average 2 minute period during the peak hours.

As rural areas experience future development, caution should be exercised in the determination of the alignments of future streets. Situations such as intersection triangles, intersections with more than four legs and extreme intersection skews should be avoided.

### 6.2.4 Add Lanes

Additional through traffic lanes can provide the extra capacity needed to handle projected traffic. The most common form of lane addition to the rural SRA routes will be to widen the existing pavement. Additional right-of-way may be required for this improvement which should be designed in accordance with *Figure 6.1*.

### 6.2.5 Express Bus Service w/Priority Preemption

Bus routes operating on rural SRA routes should be limited to express services. The buses should have signal preemption capability which can be deployed when they are running behind schedule . Because of the higher speed characteristics of rural SRA routes, flag stops are not considered appropriate. Wherever possible, bus stops on these routes should be planned as public-private cooperative ventures in conjunction with activity centers. These off-the-road sheltered stops would also serve connecting routes and incorporate park-and-ride facilities. They should be located every five miles. Bus stops should be located on the actual SRA routes when there are no opportunities for off-road facilities, and/or to serve riders transferring from connecting services. These stops would be designed consistent with **Pace Development Guidelines** for bus stop location and passenger waiting areas, and they would be located to take maximum advantage of the ten foot wide right shoulder of the road.

### 6.2.6 Access Management

Because of the potential safety hazards introduced by intermittent access points, the most desirable form of access management for rural SRA routes is the frontage road. It is not recommended that frontage roads be constructed prior to year 2010 unless the criteria and conditions stipulated in Section 6.3 are satisfied. However, it is recommended that right-of-way be protected along all rural SRA routes as indicated in *Figure 6.2* for provision of frontage roads in the future.

When frontage roads are recommended, the most desirable arrangement is for them to operate as a two-way roadway and allow direct access to the rural SRA route from principal arterials, as shown on *Figure 6.2*. One-way frontage roads are permissible when safe, mid-mile slip ramps are present to provide access between the SRA and the frontage road, as shown on *Figure 6.4*.

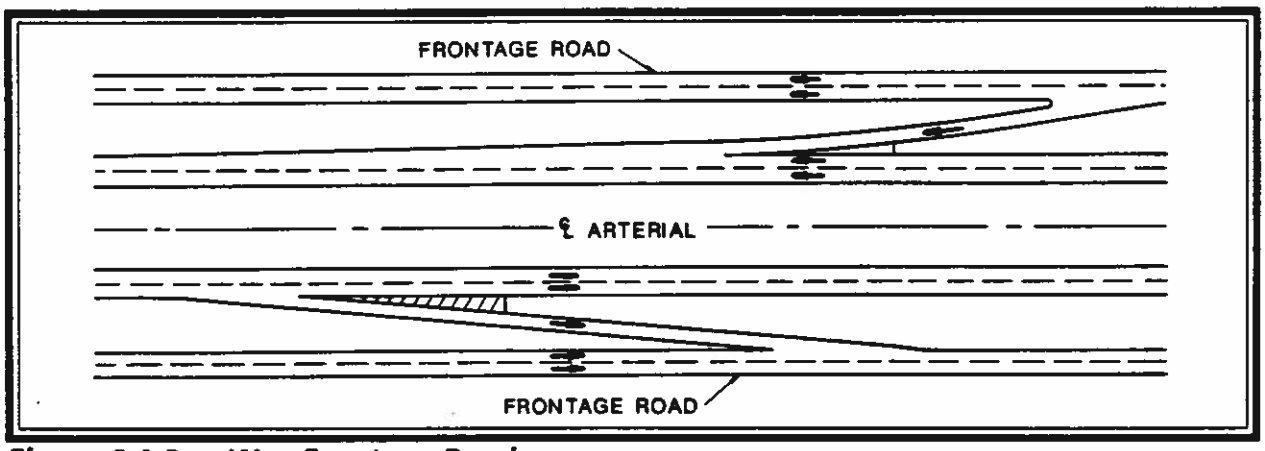



***Figure 6.4 One-Way Frontage Roads***

To allow optimal operations of intersections between rural SRA intersections with frontage roads and principal arterials, it is recommended that the lateral separation between the SRA and frontage road be increased to 400 feet, as shown on *Figure 6.2*. No development should be allowed to occur in the area between the SRA and the frontage road. This jughandle design of the frontage road intersection also protects right-of-way for post-2010 construction of a grade separation or single point diamond interchange for the rural SRA route. Modifications to this recommended frontage road design may be also evaluated provided that the level of service along the rural SRA route is not adversely impacted.

### 6.2.7 Median Control

The establishment of median control on rural SRA routes will provide protection for left turning vehicles, direct turning movements to desired locations and reduce centerline conflicts.

The recommended median type for the rural SRA route is the depressed median with a minimum width of 46 feet. The median width will allow eventual expansion of the rural SRA route from a 4 lane cross-section to a 6 lane cross-section by construction of the new lanes in the median with adequate median width to provide separate left turn lanes. Median crossovers should be permitted only for dedicated public roads, and the spacing of median crossovers should not be less than 1/2 mile. When frontage roads are constructed access should be consolidated to principal arterials and all mid-mile median crossovers should be removed. The minor arterial would form a "T" intersection with the frontage road.

The right-of-way dimensions shown on *Figure 6.1* are adequate for the development of a depressed median with paved inside shoulders and recoverable sideslopes for errant vehicles. Because the median sideslopes are traversable, centerline conflicts may not be totally eliminated. Impact attenuation devices may be necessary at obstructions such as bridge piers.

### 6.2.8 Structural Clearance Improvements

Freight hauling capacity of rural SRA routes could be increased by the improvement of inadequate vertical clearances at overpasses and other structures. Existing structures that do not provide the recommended standard vertical clearance of 14 feet - 6 inches should be evaluated for modification.

Vertical clearances can be improved by lowering the roadway profile beneath the structure. Drainage problems should be carefully evaluated when this method is proposed. The horizontal clear zone on the rural SRA is a function of speed, horizontal alignment, and sideslope and thus should be evaluated at individual locations.

### 6.2.9 Stop Sign Control 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 on through lanes of any rural SRA route is inappropriate. A traffic engineering study should be performed to determine appropriate traffic control to the location. The removal of stop signs is recommended for the SRA route only and not the intersection cross-streets.

### 6.2.10 Pavement Markings

All pavement markings at rural intersections should be of a high-type. High-type pavement markings include thermoplastic, epoxy and pre-formed plastics. High-type markings are more durable and have higher visibility than painted markings.

Raised pavement markers should be used along all rural SRA routes. The use of raised pavement markers can aid motorists during night driving and under poor weather conditions. Recent improvements in the design of raised pavement markers have made them less susceptible to damage caused by snowplows. The spacing of raised pavement markers should be in accordance with IDOT District One raised reflective pavement marker standards.

### 6.2.11 Drainage

An open ditch drainage system will be utilized on the rural SRA. Design of ditches and drainage appurtenances will conform to the standards set forth in the IDOT Drainage Manual.

### 6.2.12 Right-of-Way 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. 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.

### 6.2.13 Railroad Crossings

It is recommended that right-of-way be protected at all rural SRA routes and railroad intersections for future grade separation construction for railroad crossings that have one or more trains per day.

Grade separations are particularly appropriate on rural SRA routes, which have high posted speeds, because of the safety element that they introduce. At freight rail line grade crossings, delays can be excessive because of the length of freight trains. At commuter rail lines, peak rail traffic and peak roadway traffic can coincide.

It is recommended that frontage roads parallel to the rural SRA route be grade separated from the railroad. Frontage roads should flare out an appropriate distance from the rural SRA grade separation so the sight lines to on-coming trains are not blocked by the grade separation structure.

It is recommended that the rural SRA route pass over the railroad wherever feasible. The vertical clearance requirement for the railroad is 23 feet - 6 inches. If the rural SRA route passes beneath the railroad, then enough right-of-way must be protected to permit construction of a temporary shoo-fly or detour for the railroad during construction of the grade separation.

## 6.3 CRITERIA AND CONDITIONS FOR IMPLEMENTATION OF FRONTAGE ROADS

Frontage roads are appropriate in rural areas to segregate high-speed, long-distance traffic from lower speed, local traffic and to reduce the number of conflict points along the SRA.

The general criteria and conditions for implementation of frontage roads along rural SRA routes are shown below. One or more of the conditions should apply and all of the criteria should be met before a frontage road is constructed.

### Conditions

**Closely Spaced Driveways** Road segments including groups of businesses or residences and significant numbers of driveways or curb cuts are candidates for frontage roads.

**Groupings of Potentially Dangerous Intersections** Segments with a number of intersections likely to experience accident problems due to sight distance restrictions, grades, or offsets should also be considered for frontage roads.

### Criteria

**Adequate Right-of-Way** Between intersections, the total SRA right-of-way with frontage roads should be 260 to 284 feet. At intersections, the minimum right-of-way should be 400 feet to allow the frontage road to taper away from the intersection. A separate intersection is created by the cross-street and the frontage road to insure adequate space for design of turning bays, and for signal coordination (if applicable).

**Two-way Operation with Access at Cross-Streets** In rural areas where cross-streets are not regularly spaced, two-way operation will minimize indirect routing of local trips. By providing access to the SRA only at cross-streets, potential accident hazards associated with slip ramps are avoided.

**Continuity** The frontage road should have the capability of being continuous for a distance of at least three miles and terminate at cross-streets. It should serve several activity centers and cross-streets along the SRA.

## 6.4 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 route recommendations move into preliminary design engineering.

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

- Are sensitive to noise: residential, schools; and
- Are gathering places for children: schools, parks.

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 and floodplains,
- Unsuitable lands: unstable soils and prime agricultural lands,
- Publicly-owned properties,
- Air quality,
- Hazardous materials,
- Cemeteries,
- Rivers, streams and wetlands
- Threatened and endangered species and their wildlife habitat,
- Sight screening,
- Effects of roadway lighting on existing light canopy,
- Drainage,
- Water quality,
- Tree preservation,
- Agricultural preservation,
- Visual/Aesthetic impact.