

## *Transportation*

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With urban development comes an increased need for an improved road network. To effectively plan for new roads, current and anticipated land use must also be considered. Haphazard land use decisions can reduce the efficiency of planned networks.

The County's principal land use concept is the Urban Development Area (UDA). Within the UDA, development will occur at greater densities and intensities than in other areas. Special emphasis should be placed on providing roads and transportation services to meet the needs of the this area.

The plan also contains strong economic development goals. These goals suggest that emphasis should also be placed on intercounty and interstate travel through the County. There is a need to insure that adequate arterials and collectors are provided to accommodate travel to and from the County and its industrial and commercial areas.

A large portion of the rural roads within the County are currently inadequate to meet the needs of the areas they serve. There is a need to insure that improvements to existing rural roads continue to be made in a systematic way and that new rural roads are provided as needed.

### **Existing Road System**

Eastern Frederick County has well-developed north-south routes with Interstate 81 as the main route. There are eight interchanges on Interstate 81 in the County, connecting the interstate with east-west routes. The main east-west routes include Routes 7, 50, and 522. These connect the County with the Washington Metropolitan Area, and with other areas in Virginia and surrounding states. Interstate 66, a major route to the Washington area, connects with Interstate 81 just south of Frederick County. There are approximately 100 miles of primary, arterial highways in the County.

The other state-maintained roads in the County are secondary roads. As of 1993, there were officially 542 miles of secondary roads in Frederick County. With the dedication of new roads in the County, the miles of secondary roads are constantly growing. The Virginia Department of Transportation is responsible for maintenance of primary and secondary roads.

There are also roads in the County that are not state-maintained. These are private roads or access easements that have been dedicated to private property owners in rural subdivisions. The private owners and users are responsible for the maintenance of these roads. The Shawneeland Sanitary District has a program for improving and maintaining roads in Shawneeland.

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### **Traffic Volumes**

Major arterial roads in the vicinity of the City of Winchester have particularly high traffic volumes. These would include U.S. Routes 7, 11, 50, and 522. The major arterial roads with the greatest increase in traffic volumes include Interstate 81, U.S. Route 50 west of Winchester, and Route 277 near Stephens City.

The majority of the major secondary roads with traffic volumes exceeding 2,000 trips per day are located within the Urban Development Area. There are, however, several major secondary roads outside of the Urban Development Area that surpass 2,000 trips per day. These roads, for the most part, serve residential uses and provide connections between arterial roads and the City of Winchester. Major secondary roads with particularly high traffic volumes include Brick Kiln Road, Cedar Creek Grade, Senseny Road, Macedonia Church Road, Welltown Road, and Aylor Road.

The major secondary roads with the greatest rates of increase in traffic include those in the suburban residential areas along Senseny Road, Macedonia Church Road, Aylor Road, and Valley Mill Road, and the industrial areas along Welltown Road, Fort Collier Road, and Shawnee Drive. The majority of secondary roads with the greatest *rates* of increase in traffic are located within, or in close proximity to, the Urban Development Area.

The high levels and rapid growth of traffic in the Urban Development Area is due to the more intense land development activities occurring there. The predominant land use in the Urban Development Area continues to be suburban residential housing at an average density of three units per acre. When developed for residential use, the urban development area can be expected to generate between 24 and 30 average daily trip ends per acre. In addition, industrial and business uses are concentrated in the urban area; in the interstate interchange areas and in the vicinity of large industrial areas. These areas constitute major traffic generators that will create traffic on a per acre basis above the levels generated by residential areas. Roads should be planned in coordination with potential traffic levels.

### **Accidents**

Specific information on accidents at particular intersections and along identified corridors should be obtained and considered as part of the reviewing process for land development proposals.

### **Critical Intersections and Corridors**

Some of the most heavily traveled road segments in the County are portions of arterial roads in the vicinity of Winchester and interchanges on Interstate 81 and Route 37. Special care is needed to

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insure that these intersections and corridors are adequate to accommodate growing traffic. There is a need to develop plans for these intersections and corridors that will address traffic and land use issues.

### **Other Transportation Systems**

The County is served by the greyhound bus lines. It is also served by the CSX, and Winchester and Western freight rail lines. Industrial development along these rail corridors should be encouraged where appropriate. Efforts should be made to insure that development along rail corridors is sensitive to the potential use of the rails for tourism.

The City of Winchester transit system provides bus service to the City and to portions of the County, including Sunnyside and Kernstown. The area is also served by the Winchester Airport. The airport is currently undergoing a substantial capital improvements program.

The Virginia Port Authority has developed an inland port facility on Route 522 south of Frederick County. The inland port allows the transfer of containerized cargo from trucks to trains to be shipped to the Hampton Roads harbors. It will undoubtedly increase truck traffic on certain roads in Frederick County.

The County is working toward the creation of a complete networked transportation system within the Urban Development Area. This system includes motorized, non-motorized, and pedestrian facilities. The County has adopted the Bicycle Plan For The City Of Winchester And Frederick County, as a guide for the development of non-motorized facilities. Developers are encouraged to provide complete non-motorized and pedestrian facilities that can be networked with adjoining land uses throughout the Urban Development Area. The County will work with the Virginia Department of Transportation to create a complete networked transportation system as existing roads are improved and new roads are constructed.

### **Road Classification**

Roads can be classified according to their functions. These classifications are used to determine the necessary design of proposed roads. The following are the functional classification categories used in Frederick County:

Major Arterial Roads - Major roads providing important travel routes through the County. Major arterials provide for statewide and interstate travel. Higher speeds and free traffic flow are maintained over large portions of the major arterials.

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Minor Arterial Roads - Major roads providing important travel routes through portions of the County. Minor arterials serve to provide access between collector roads and major arterials. Minor arterials provide access to large areas of land or corridors with intensive development. Higher speeds and free traffic flow are maintained over large portions of the minor arterials.

Major Collector Roads - Major roads providing access between large areas of land and arterial roads. They collect traffic from minor collectors and local roads. Major collectors provide important through routes between arterial roads and for travel within the County. Free traffic flows are maintained on major collectors.

Minor Collector Roads - Roads providing access to collector and arterial roads and collecting traffic from local roads. Minor collectors serve as entrance roads and main roads in neighborhoods and larger scale developments. Free traffic flows are maintained on minor collectors.

Local Roads - Roads collecting traffic from driveways and individual land uses and providing access to major and minor collector roads. Local roads serve travel over short distances to collector roads.

Direct access from land uses to arterial and collector roads should be appropriately limited. Access to these roads from private driveways should be discouraged. Existing standards concerning the location and design of entrances onto such roads should be reviewed periodically to insure that they achieve the desired results. Existing buffer and landscaping requirements along collector and arterial roads should also be reviewed periodically.

Appropriate systems of arterial and collector roads should be required within new developments to insure that adequate traffic circulation can be provided.

### **Road Characteristics**

The capacity of any road is determined by factors such as its alignment, number and width of lanes, the numbers and locations of driveways, intersections, and traffic signals.

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The commonly used Highway Capacity Manual, which is produced by the Transportation Research Board, contains methods for measuring the congestion and efficiency of existing and planned streets. The Highway Capacity Manual describes congestion and the capacity of the road to carry traffic in terms of levels of service, as shown in Table 13:

**Table 13: Level of Service- Categories and Description**

Category	Description of Traffic Conditions
A	Free flow, operating speed at speed limit, turns easily made, excess green time at signals.
B	Stable flow, operating speed at speed limit, some lines of vehicles at intersections and turns, less than 10% of cycles loaded at signals.
C	Stable flow, operating below speed limit, some lines of vehicles at intersections and turns, 10% to 30% of cycles loaded at signals.
D	Approaching unstable flow, fluctuating flow, little freedom to maneuver, 30% to 70% of cycles loaded at signal, some drivers must wait through one cycle.
E	Unstable flow, low operating speed, 70% to 100% of cycles loaded at signals, vehicles frequently wait through cycles

*Source: Transportation Research Board, Highway Capacity Manual, Special Report 209, 1987*

Most roads in Frederick County are currently operating at a "A" or "B" level of service. Many localities use a standard of "C" as the minimum acceptable level. Level of service "C" should be maintained on roads adjacent to and within new developments in the County. Traffic analysis should be provided by applicants proposing new development to insure that needed road improvements are identified in order to maintain or improve upon the level of service. In some cases, it will be appropriate to expect the level of service of roads to be maintained at an "A" or "B" level. It will not be acceptable for roads or intersections that are operating at a level of service "A" to deteriorate to a "C" level over relatively short periods of time as a result of traffic generated from a single development.

The type of land use adjoining any road and the resulting traffic generated is a major factor influencing whether the use of a road exceeds its capacity. Land use, road improvements and intersections should be carefully planned and controlled to provide maximum safety and efficiency based on design capacity and level of service.

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### **Future Road Improvements**

A general road plan covering the eastern portion of the County has been prepared for arterial and collector roads. The plan is not meant to identify the specific location and alignment of right-of-ways but is intended to show the connections that need to be made between various locations and routes. The road plan describes existing and proposed roads according to their functional classification.

As required by the Code of Virginia, Frederick County maintains a Secondary Road Improvement Plan. This plan, which is updated annually, prioritizes improvement projects throughout the County which are classified as major road improvements, hard surfacing, and incidental construction. The plan is used by the Virginia Department of Transportation to determine the allocation of funding for secondary road improvement projects in the County. Secondary road improvement funding is supplemented by industrial, recreational, and airport access funding.

The County also prepares recommendations on primary road improvements which are submitted to the Virginia Department of Transportation. VDOT considers these recommendations in determining the funding for primary road improvements. Recommendations for primary roads include improvements to Route 522 South, which are underway. The recommendations also emphasize the completion of an eastern by-pass loop, connecting the northern and southern ends of Route 37, and major improvements at critical intersections as follows:

- I-81/11 North/37/661 Intersection (North of Winchester)
- I-81/11 South/37 Intersection (South of Winchester)
- I-81/50 & 17/522 Intersection (East of Winchester)
- I-81/7 East Intersection (East of Winchester)
- 37/522 North Intersection (West of Winchester)
- 37/50 West Intersection (West of Winchester)

The Virginia Department of Transportation is in the process of updating the Winchester Area Transportation Plan. This plan will include the urban areas in the County. It will address major routes and critical corridors and intersections. It is particularly important that the County work with the State to insure that all issues are properly addressed.

Plans for new development should provide for the right-of-ways necessary to implement planned road improvements. New roads shown on the road plan should be constructed by the developer when warranted by the scale, intensity; or impacts of the development. Existing roads should be improved as necessary by adjacent development to implement the intentions of the plan.

In some cases, new development may need to contribute to the provision, construction, or improvement of roads that are not adjacent to the development. In such cases, developments should

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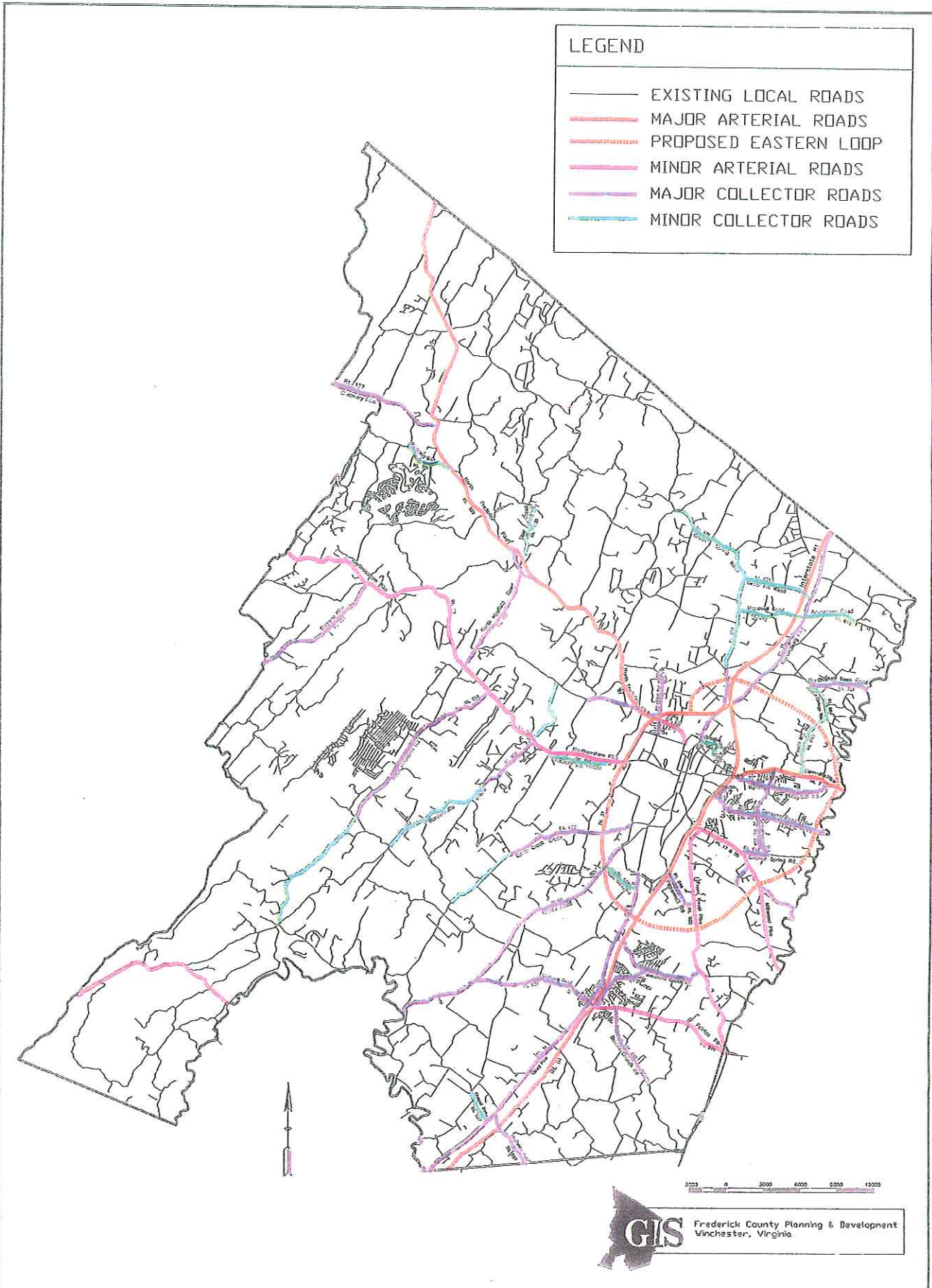
contribute their fair share of the costs of road improvements needed to accommodate the traffic generated by the particular development. Impact analysis should be used to determine the impacts of developments on surrounding road networks.

To determine what the fair share of road improvement costs will be, levels of service desired should be determined for the road network based on the anticipated development for the area. The costs of maintaining this level of service on the network should be determined. Impact analysis should be used to determine the portion of the future traffic growth caused by individual development proposals. Each planned development should contribute a proportionate share of improvement costs based on their projected traffic generation.

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FREDERICK COUNTY, VIRGINIA

VDOT FUNCTIONAL CLASSIFICATION

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In general, new roads and road improvements should be provided according to Virginia Department of Transportation and County design standards. Collector roads should be provided with a minimum right-of-way width of 60 feet. Both collector and arterial roads should be provided according to the Eastern Road Plan.

County road improvement plans should further the implementation of the general plan. Necessary improvements should be made to arterial, collector, and local roads to maintain an efficient road system.

### *Issues:*

- ▶ *There is a need to plan road improvements to deal with traffic generated by development occurring in the Urban Development Area and along the Interstate 81 corridor.*
- ▶ *There is a need to identify and reserve collector and arterial road right-of-ways that will be needed to accommodate growth.*
- ▶ *Design and construction standards for new roads should be evaluated and improved as necessary.*
- ▶ *There is a need to identify and improve unsafe road segments. Better information is needed on accidents occurring at particular locations.*
- ▶ *Special attention needs to be given to land use and transportation improvements urban arterial corridors and at intersections.*
- ▶ *Special attention should be given to controlling and improving access to urban corridors.*
- ▶ *Standard methods are needed for evaluating the potential impacts of development proposals on existing roads and intersections.*
- ▶ *There is a need to develop a local functional classification system to use in planning for the adequate provision of roads and road improvements.*
- ▶ *Careful planning is needed to insure that special road needs associated with the inland port, the Winchester Airport, and planned commercial and industrial areas are met.*
- ▶ *Better guidelines are needed for setting priorities in the road improvement plans.*

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*These guidelines should address design, capacity and traffic needs.*

- ▶ *Standards and guidelines are needed for the improvement of existing rural roads and for the design of new rural roads. In some cases, standards for new rural roads should be less intensive than urban standards.*
- ▶ *Planning in the County should also address non-road transportation issues including bus service, park and ride needs, rail service, and pedestrian and bicycle needs.*
- ▶ *In general, there is a need to plan for a complete road network with a total system of interconnected roads of all types.*

### **Transportation Policy**

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***GOAL*** - *Provide a safe and efficient road system throughout the County.*

***GOAL*** - *Coordinate land use planning and decisions with transportation planning.*

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Strategy 1 - Continue to maintain and update secondary and primary road improvement plans based on consistent policies and criteria. Such criteria should provide means for establishing priorities. Separate criteria should be developed for urban and rural roads.

Strategy 2 - Identify needed road improvements in the update of the Winchester Area Transportation Plan.

Strategy 3 - Prepare corridor plans for critical sections of arterial highways. Such plans should deal with traffic patterns, land use, and public facilities.

Strategy 4 - Prepare plans for key interchange areas. Such plans should deal with traffic patterns, land use, and public facilities.

Strategy 5 - Plan road improvements in anticipation of planned development and expected traffic generation. Adopt a general road plan identifying a complete arterial and collector network. Require that interconnected road networks be provided.

Strategy 6 - Identify new collector and arterial roads that are needed in the general road plan and develop means to reserve rights-of-way for these roads.

Strategy 7 - Provide appropriate standards for road design in association with various types and

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intensity of development.

Strategy 8 - Continue to regulate entrances onto arterial and collector roads.

Strategy 9 - Develop better information on traffic accidents in order to identify problem areas.

Strategy 10 - Coordinate road planning with economic development policies.

Strategy 11 - Develop an approach for measuring the impacts of rezonings on traffic throughout the transportation network.

### **Implementation Methods:**

1. Review procedures and criteria for creating the secondary and primary road plans. Continue to update plans annually.
2. Work closely with the Virginia Department of Transportation and the consultant to insure that all issues are addressed in the Winchester Area Transportation Plan. Make sure that needed road improvements and new roads are included.
3. Use right-of-way dedication, conditional zoning, condemnation, or other methods to insure that needed roads, as identified in the plan, are provided and constructed.
4. Require that collector street systems in new developments be interconnected.
5. Prepare plans for critical interchanges and corridors. Include these plans in the Comprehensive Plan.
6. Use functional classification systems to determine necessary road design and improvements.
7. Continue to support industrial access requests.
8. Include all agencies involved in transportation and transportation safety in the transportation planning process.
9. Explore the desirability of utilizing private funding sources to facilitate highway construction.
10. Work to implement the recommendations of the Winchester Area Transportation Plan and

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insure that adequate road networks are provided.

11. Periodically update the Eastern Road Plan to reflect current conditions and respond to changing circumstances.

12. Strive to locate and obtain the needed right-of-way for Route 37 and other needed road improvements.

***GOAL** - Encourage the provision of a full range of transportation options including air, rail, and bus services.*

***GOAL** - Provide for adequate and safe pedestrian and bicycle travel.*

Strategy 1 - Continue to support air and rail service improvements.

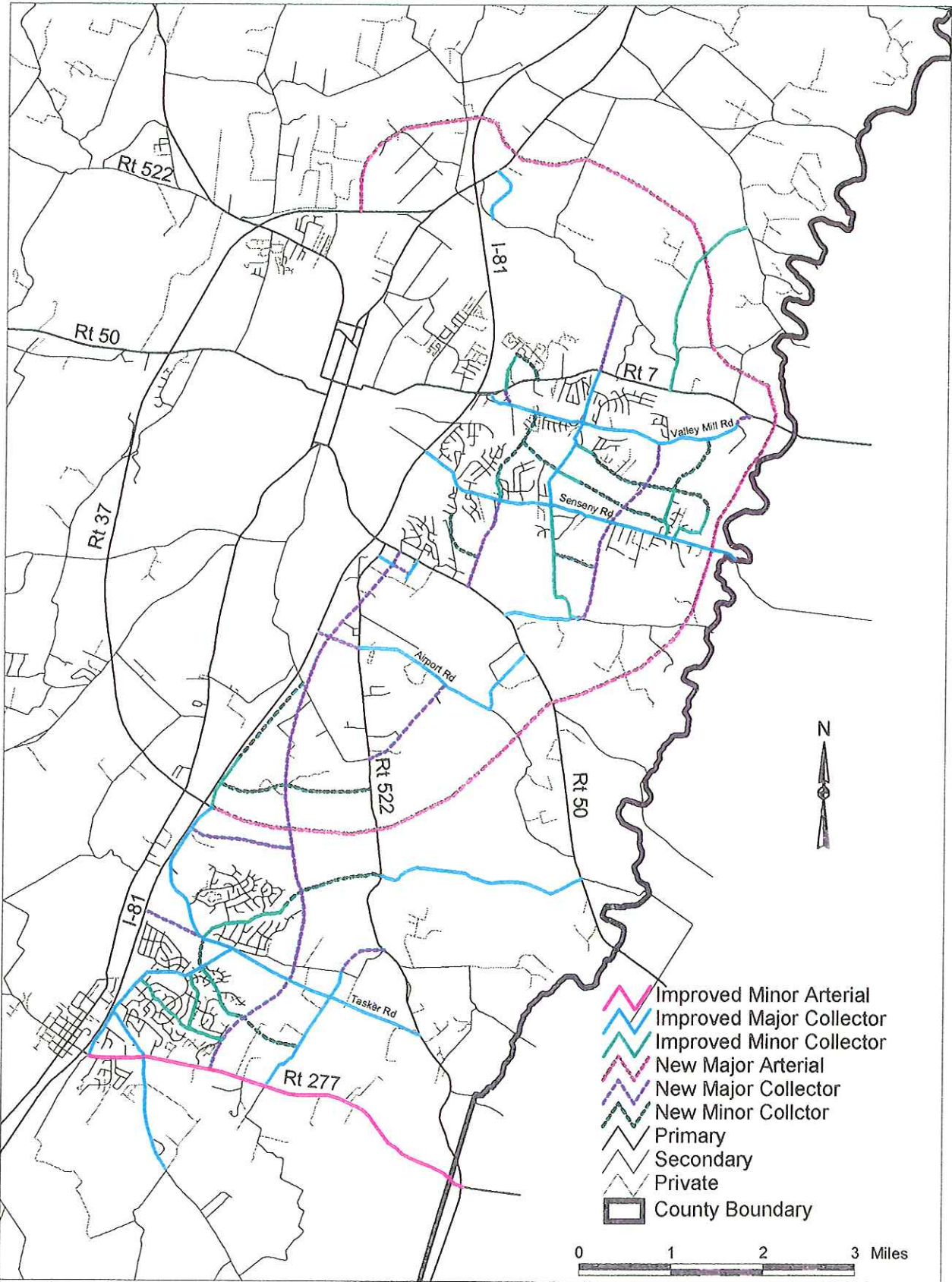
Strategy 2 - Work with the City of Winchester to provide bus service to the urban areas in the County.

Strategy 3 - Provide park and ride locations.

Strategy 4 - Provide appropriate routes for pedestrian and bicycle travel in urban and suburban areas. Provide safe pedestrian access.

### **Implementation Methods:**

1. Support improvements to the airport and airport access as a central factor in economic development.
2. Study the transit needs of the urban areas in the County.
3. Review park and ride needs and identify possible locations.
4. Insure that provisions for pedestrian and bicycle travel are made in developments in the urban areas.



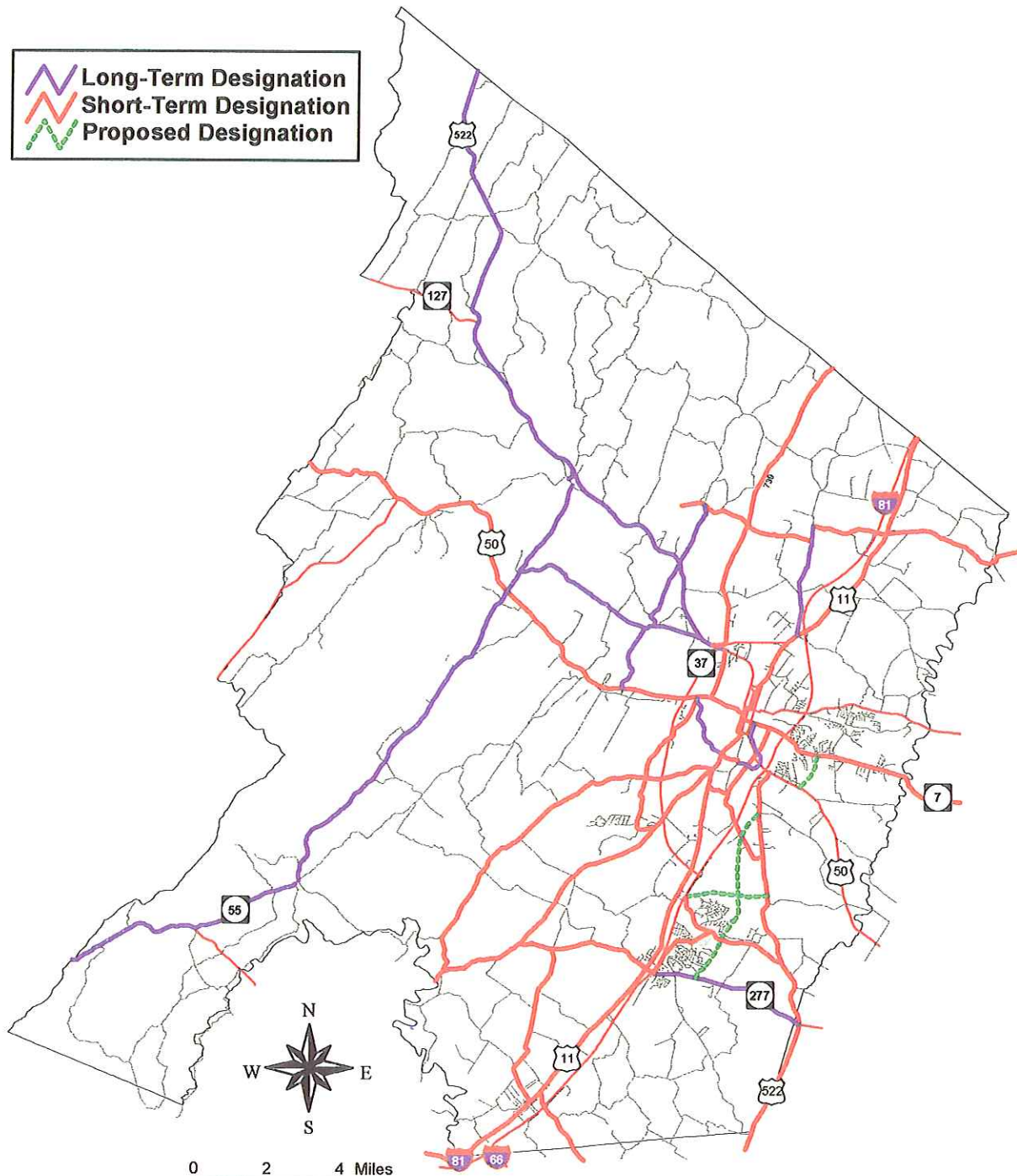
# EASTERN ROAD PLAN

Frederick County, Virginia, Department of Planning and Development

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**Long-Term Designation**  
**Short-Term Designation**  
**Proposed Designation**



Frederick County Department of Planning  
 and Development, Winchester, VA  
 7/18/99

# Frederick County Bicycle Plan