

Route 7 Corridor Study

Executive Summary

Study Area

The following report analyzes a segment of the Virginia State Route 7 corridor. The corridor study area, spanning over 5 miles in length, is a multi-jurisdictional route that travels from N. Cameron Street in the City of Winchester to the eastern county line of Frederick County. At different points throughout this segment of Route 7 the roadway is also known as; E. Piccadilly Street, National Avenue, Berryville Avenue, and Berryville Pike. An overview of the study area, right, highlights the corridor in green.

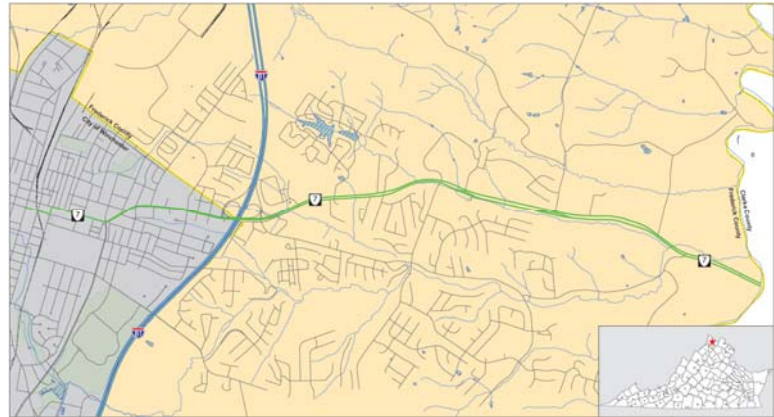


Figure 1: Study Corridor Overview

The study of this corridor is a cooperative multimodal project between the Win-Fred MPO localities of Frederick County and the City of Winchester to analyze the transportation impacts of existing and future development along Route 7. The report includes the analysis of existing area plans, policies and ordinances; existing and future land use regulations; accident reports and crash data; existing multimodal services, including freight movement; and the existing and future traffic volumes, turning movements, and roadway level of service. In particular, the report focuses on assessing the level of service and future deficiencies at 18 intersections along the corridor. These intersections include:

- Piccadilly Street (Route 7) & N. Kent Street
- National Avenue (Route 7) & N. Pleasant Valley Rd
- Berryville Avenue (Route 7) & Battle Avenue
- Berryville Avenue (Route 7) & Baker Lane
- Berryville Avenue (Route 7) & Shopping Center
- Berryville Avenue (Route 7) & Fort Collier Road
- Berryville Avenue (Route 7) & Atwell Avenue
- Berryville Avenue (Route 7) & Ross Street
- Berryville Pike (Route 7) & I-81 SB Ramps
- Berryville Pike (Route 7) & I-81 NB Ramps
- Berryville Pike (Route 7) & Gateway Drive
- Berryville Pike (Route 7) & Regency Lakes Drive
- Berryville Pike (Route 7) & Millbrook Drive / Blossom Drive
- Berryville Pike (Route 7) & First Woods Drive / Greenwood Drive
- Berryville Pike (Route 7) & Morgan Mill Road
- Berryville Pike (Route 7) & Woods Mill Road

- Berryville Pike (Route 7) & Valley Mill Road
- Berryville Pike (Route 7) & (Future) Haggerty Boulevard

Purpose and Need

The following report serves as a Corridor Plan that will provide the Win-Fred MPO and VDOT with a tool to help advance projects in VDOT’s Six-Year Construction Plan and to obtain needed right-of-way and roadway improvements when properties along the corridor develop or redevelop. To best serve this purpose the Corridor Plan elaborates on the following task orders:

- Document traffic patterns at the main intersections along the study corridor.
- Identify existing (2008) capacity deficiencies on Route 7.
- Determine current access patterns and volumes of truck traffic along Route 7.
- Identify high-frequency crash locations along the corridor.
- Document existing transit services and ridership.
- Identify possible deficiencies associated with transit service or amenities.
- Identify new potential Park and Ride lot locations.
- Identify possible pedestrian/bicycle facility integration along corridor.
- Identify projected deficiencies on Route 7 for future conditions (Year 2035) based on future traffic growth and anticipated land use changes.
- Provide concepts for roadway and intersection improvements and access management to address the identified deficiencies along the Route 7 Corridor.
- Provide planning-level cost estimates for intersection improvement recommendations.

Corridor Characteristics

The study corridor begins at N. Cameron Street in the urban core of Winchester and travels east into more rural and undeveloped areas of Frederick County. As a result, corridor characteristics vary widely in different parts of the study area. For example, land use in the western section of the corridor consists mostly of commercial and residential development. This section, within the boundaries of the City of Winchester, is mostly developed with little or no planned development or redevelopment. In contrast, the eastern most section of the corridor is mostly undeveloped and includes lighter residential development with small pockets of business activity. Likewise, the corridor’s typical section changes with the altering landscape. In Winchester, the western segment of the corridor is predominantly a two-lane roadway with on-street parking, a right-of-way between 42 to 50 feet, and a speed limit ranging between 25 and 35 miles per hour. Moving east of Pleasant Valley Road, Route 7 is a four-lane undivided facility with limited turn lanes, before becoming a four-lane divided facility with many turn lanes. Moving into Frederick County, east of I-81, the corridor remains a four-lane divided highway with a right-of-way varying between 100 and 280 feet wide, and speed limits up to 55 miles per hour. As such, the varying corridor characteristics affect capacity and safety issues throughout the study area.

Figure 2: Varying Corridor Characteristics



Route 7, West of Pleasant Valley Rd



Route 7, East of Pleasant Valley Rd



Eastbound Route 7, East of Interstate 81

Common along the length of the corridor is that the dominant mode of travel is private automobile. Alternative modes are accommodated more so to the west of the interchange with Interstate 81 within the city limits of Winchester, where there are transit services and the provision of sidewalk networks that can meet demand for alternative modes. In general, alternative modes do not exist in the rest of the study corridor. Additionally, freight movement is not a significant contributor to the traffic volumes on Route 7.

Historic and existing traffic counts suggest that volumes on Route 7 are highest to the east of the I-81 interchange. However, the western most roadway segments have seen the highest growth over the years. A capacity analysis for the 17 existing intersections was conducted to determine baseline conditions. Of the 17 existing intersections, 14 are signalized and 3 are stop controlled. Currently, 11 of the 14 signalized intersections are operating at an acceptable LOS D or better in both the AM and PM peak hour. The intersections with N. Pleasant Valley Road, Valley Mill Road, and First Woods/Greenwood Drive operate beyond capacity at LOS E or F in either the AM or PM peak. The stop controlled intersections do not meet the standard peak hour traffic signal warrants, but should continued to be monitored for operational and safety issues. The link level of service analysis had similar results, showing most of the roadway operating at an acceptable LOS D or better. Many of the links operating at an unacceptable LOS E or F correspond with the intersections that have exceeded capacity; for example, near Pleasant Valley Road and the I-81 interchange.

In addition to most of the roadway operating at an acceptable level of service, crash data indicates that safety is an issue at a limited number of locations. Only 3 of the 17 existing intersections exceeded the ITE threshold of 2 crashes per million entering vehicles. The intersections at Battle Ave, Baker Lane, and Ross Street have a Crash per MEV rates of 2.09, 3.01, and 2.05, respectively. Battle Ave and Ross Street slightly surpass the threshold and 46% of the crashes at Baker Lane were "Rear End" type of crashes.

Future Conditions

Future land use conditions are not expected to change significantly within the study area. A great mix of uses is expected west of the I-81 interchange, within the City of Winchester. East of I-81, development is expected and the future land use policies direct business and commercial growth along the corridor with residential development occurring just off the corridor, behind the expected commercial businesses. These land use changes, incorporated into VDOT's regional travel demand model for the Win-Fred MPO region, along with historic traffic counts, and professional judgments were used to forecast the 2008 traffic counts to 2035. These future year volumes were used to conduct a capacity analysis along the arterial roadway and for the 17 existing intersections plus the expected future intersection with Haggerty Boulevard (serving a 300 unit residential development known as Haggerty Property, as identified in their Master Development Plan).

Based on the future traffic counts approximately half of the signalized intersections will operate at an acceptable LOS D or better. A total of eight future signalized intersections, up from 3 existing intersections, will operate at LOS E or F, including; N. Kent Street, N. Pleasant Valley Rd, Fort Collier Road, I-81 SB Ramps, I-81 NB Ramps, Regency Lakes Drive, Millbrook Drive/Blossom Drive, First Woods Drive/Greenwood Drive. Of the 3 stop controlled intersections both Morgan Mill and Valley Mill Road meet the peak hour signal warrants in 2035. A decrease in LOS was also observed in the link level analysis. Over 60% of the analyzed links will operate at LOS E or F during either the AM or PM peak in 2035, up from less than 30% in 2008.

Recommendations

The expected growth in the Route 7 Corridor will bring additional traffic to the study area and have a negative impact on the operation of area roadways and intersections. Diverting traffic off of Route 7 to help improve the corridor intersections to an acceptable LOS is very difficult due to the limited east-west connectivity through the immediate area. There are some simple geometric fixes for certain intersections, such as adding turn lanes, while others have no conventional solution. Ultimate solutions to Route 7 and the intersections will require right-of-way, impacting existing development, and has the potential to be very expensive. The recommendations developed consist of all of the improvements that would be needed to improve the study area roadways and intersections to acceptable operating conditions.

In general, intersection improvements will help the mainline deficiencies where congestion occurs. In that regard, traditional road widening is not recommended; spot improvements and stricter adherence to VDOT's *Access Management Design Standards for Entrances and Intersections: Principal Arterials*, as adopted in July 2008, should help mitigate operational issues. Corridor intersections, excluding the I-81 interchanges, are able to achieve LOS D, or better, through traditional improvements such as adding turn lanes, improving and optimizing traffic signals, and/or adding new traffic signals. However, many of these improvements possibly require large quantities of right-of-way, relocating businesses, and extensive earthwork. In addition, the I-81 interchange ramps are expected to operate above the intersection capacity with no simple solution to enhance their performance. To improve these intersections various options should be considered; interchange redesign, grade separated intersection, or a Valley Mill Road access closure.

Multimodal recommendations include constructing a bike network with multi-use trails, adding sidewalks and pedestrian crosswalks, extending transit service, and introducing two new park and ride lots. Specifically, it was found that striped, on-road lanes for cyclists would be dangerous considering



Figure 3: Overview of Recommended Multimodal Improvements

The recommended transit extension travels along Route 7 to First Woods, corresponding with the recommended pedestrian and bike improvements and connecting with one of two proposed park and ride lots just east of I-81. The second park and ride lot is proposed at the future Route 37 connection.

the high speeds of automobile travel. As a result, a 10' multi-use trail is proposed to parallel the corridor on the south side between First Woods Drive and the I-81 interchange, where the trail will connect with a sidewalk extension and pedestrian amenities. Several crosswalks are proposed at major intersections so that trail users can access the north side of the corridor safely. The

Many of the lower cost recommended improvements focus on more efficient use of current infrastructure to alleviate current and projected deficiencies. For example, travel demand management practices such as ride sharing can alleviate the number of vehicles utilizing the roadway; developing a greater mix of land uses can reduce the length of vehicle trips and encourage alternative mode trips that have less impact on infrastructure; and access management guidelines can be more strictly followed to reduce turning movements and potential conflict points.

Summary

The Route 7 Corridor is a special area due to the many types of land use and different characteristics along the primary arterial from within the City of Winchester, through Frederick County, to the county boundary with Clarke County. Much of the corridor currently operates at an acceptable level of service, but increased growth and development will cause several areas of deficiency by 2035. This auto-oriented corridor deserves increased multimodal infrastructure, travel demand management, and access management to more efficiently utilize existing infrastructure. Spot specific improvements, such as adding turn lanes and improving signal optimization, will also be needed for this corridor to continue to operate within its capacity. As such, these recommendations will provide the City of Winchester, Frederick County and VDOT with a tool to help advance projects in VDOT's Six-Year Improvement Program and to obtain the needed right-of-way and roadway improvements when properties along the corridor develop or redevelop.