U.S. ROUTE 460 LAND USE AND CONNECTIVITY STUDY

ROANOKE COUNTY, VA

ROANOKE COUNTY VA PLANNING

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

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JANUARY 2023

U.S. Route 460 Land Use and Connectivity Study

Roanoke County, Virginia

January 2023

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U.S. ROUTE 460 LAND USE AND CONNECTIVITY STUDY

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I. Introduction

The U.S. Route 460 Land Use and Connectivity Study (Study) has been prepared for the County of Roanoke (County) to identify opportunities for mitigating the impacts of development and reducing high volumes of traffic in the Challenger Avenue Corridor. Efforts to mitigate safety challenges and increase convenience and quality of life are among the goals of the Study.

Timmons Group met with the County and other stakeholders, including surrounding governmental jurisdictions, Virginia Department of Transportation (VDOT), agencies, residents, and businesses in the Bonsack area, to understand the challenges the area faces.

Timmons Group identified potential transportation improvements based on feedback from these stakeholders and shared this information in several public meetings, where feedback was received and incorporated into the Study.

Three surveys were employed during this Study. The first survey sought to better understand the challenges and priorities of the community. The second survey accompanied the first draft of opportunities identified for potential traffic and future land use improvements, asking whether the opportunities were seen as a positive or negative impact on the Bonsack area. The third survey was a final check-in on the community after additional changes were made, to respond to clear direction given from the residents as to preferences of improvements to consider.

This report outlines the recommended opportunities for Roanoke County to consider in its Future Land Use Plan update, as well as transportation improvements, so that planning, funding, and other important steps can be taken to enable this.

Aerial View Looking West on Route 460

II. Project Overview

Purpose of Study

Roanoke County desires to position itself for future economic growth. Safety, access, and availability of utilities and other infrastructure is imperative to that goal. The U.S. Route 460 (Route 460) corridor between the City of Roanoke and Botetourt County (also referred to in this report as the Challenger Avenue Corridor) is identified as one of the primary locations for future commercial development and redevelopment, along with infill opportunities.

Roanoke County's Route 460 Land Use and Connectivity Study focuses on recommending alternate ways to travel around the Bonsack community, consideration of whether existing zoning and future land use designations match the desired development of the area, and an examination of whether the two at-grade railroad crossings can and should be improved to create development opportunities between the railroad and the Blue Ridge Parkway.

This study identifies improvement opportunities in both traffic and land use for the Challenger Avenue Corridor. Traffic issues, including heavy daily traffic backups that lead to safety concerns, are central to addressing if the corridor is to successfully grow. Similarly, the correct decisions in land use for the properties that are yet to be developed or redeveloped, is critical to preserving the character of the area which so many residents and landowners currently enjoy.

This Study will guide Roanoke County in its future decisions and actions over the next 5 to 15 years in the Challenger Avenue Corridor and can be reviewed in the next two pages.

Limits of Study

The limits of this study include the Challenger Avenue Corridor from the City of Roanoke to Botetourt County and includes properties proximate to Route 460 most impacted by land use and transportation issues. The Study Area also includes lands east of the Norfolk Southern Railroad Tracks to the Blue Ridge Parkway.

Study Area Map

Study Purpose

1. Recommend ways to travel around the Bonsack community that are alternatives to Route 460/Challenger Avenue

One characteristic of the Challenger Avenue Corridor impacts Bonsack traffic more than any other, and that is the presence of a single major arterial road serving high volumes of local and regional motorists. Central to this study is determining viable recommendations for potential ways to travel through the area using alternatives to Route 460, which can include existing and potential proposed routes

Exisitng Congestion on Route 460

2. Consider existing zoning classifications and future land use designations to determine potential changes to match desired development types

The area surrounding the Challenger Avenue Corridor is poised for commercial growth and economic development opportunities for Roanoke County. This Study examines, in combination with alternate routes of travel around the Bonsack community, whether the existing future land use types, and newly created areas of development, along the corridor meet the future land use goals and desires of Roanoke County and its residents.

Exisitng Retail Access Points and Southbound Access Limitations

Study Purpose

3. Examine existing at-grade railroad crossings for potential improvements that may create development opportunities between the railroad and the Blue Ridge Parkway

Because of the abundance of large parcel acreage to the east of the Norfolk Southern rail line, this Study evaluates the opportunities for economic development and expansion of land use options to that area. Expansion in that area will depend on safe access and other appropriate infrastructure to support such activities. As such, the Layman Road railroad crossing and Glade Creek railroad crossing were studied to evaluate what improvements could be made to either crossing to access the land east of the railroad.

Outdoor Recreation and Greenways are a Priority of This Study

4. Examine the potential for a greenway along Glade Creek as an expansion of the Roanoke Valley Greenway Plans

Following the first public response of this Study, many respondents expressed overwhelming support for the construction of a greenway along Glade Creek. Due to the public response, this Study seeks to determine opportunities for the Bonsack community to enhance and develop outdoor recreation opportunities in the form of greenways and trails. Greenways are envisioned as part of three Roanoke Valley Greenway Plans conducted since 1995. Inclusion of this corridor in advancing that vision and determining the viability of a greenway along Glade Creek is an important component of this Study. This Study also seeks to find ways to improve pedestrian and bicycle accommodations within the Bonsack community to reduce the auto dependence for all activities in the area.

View of Agricultural Land East of the Railroad

Project Timeline

The process of this study was a combination of consultant and County evaluations as well as engagement with the public, particularly those stakeholders who live, work, or commute in the area. Consultant meetings also included coordination with outside agencies, including VDOT, Roanoke City, Botetourt County, and the Roanoke Valley Alleghany Regional Commission.

OCT 2021- JAN 2022

Consultant Due Diligence and Review of the Study Area

JAN - FEB 2022

First Community Survey

FEB 2022

First Community Open House

FEB - MAY 2022

Consultant Review of Community Feedback and Preparation of Potential Improvements

MAY 2022

Second Community Open House

MAY 2022

Second Community Survey

MAY - SEPT 2022

Consultant Revisions Based On Community Feedback

SEPT 2022

Final Community Meeting

OCT 2022

Presentation to Planning Commission and Economic Development Authority

NOV 2022

Presentation to Board of Supervisors

NOV/DEC 2022

Report Document Finalized

Public Engagement

Meetings with Public

Public engagement and feedback is critical for the successful implementation of the Plan. Many points of interaction were planned and executed in the Study to help guide the final recommendations. In all, three in-person community engagement sessions were held, along with companion surveys for each session to allow the public a variety of options to participate.

These meetings proved to be valuable to the final report. Many comments were based on issues of traffic congestion, existing road conditions, and safety concerns. In addition, issues were discussed with the public, including property rights, expectations of how the report would be used, and whether there were future processes that would take place where public input could be gathered.

Over the three meetings, 249 citizens attended in person and 399 more responded to surveys. These sessions are detailed in Section VII of this report and the surveys are included in the appendix.

The public engagement sessions were followed by staff and consultant meetings with the County Planning Commission (in a joint work session with the Economic Development Authority) and the Board of Supervisors. Each of these meetings is further detailed in Section VII of this report.

January 13, 2022 Community Open House

May 18, 2022 Community Open House

Public Engagement

Surveys of the Public

Three surveys were employed during this plan process. They are included, along with responses, in Appendix E and are further described below.

- Survey 1 – General Information & Opinion Request

  This survey requested feedback from the public on their concerns and hopes for the future of the Challenger Avenue Corridor.

- Survey 2 – Feedback and Concerns Survey of Draft Improvements Recommendations

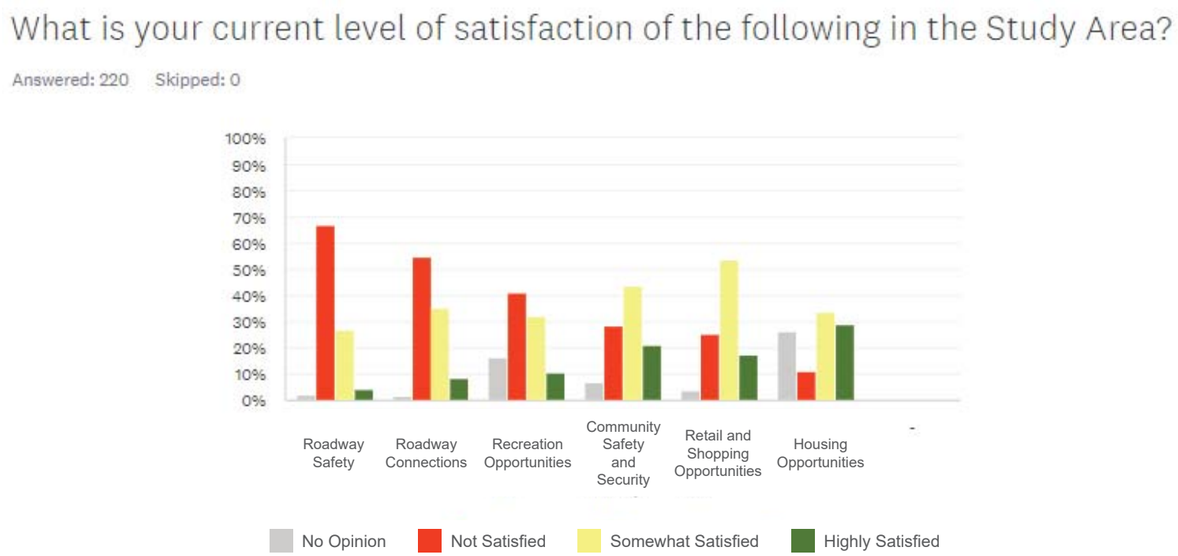
  This survey asked for specific feedback on the various improvements offered by the consultants in both transportation and future land use.

- Survey 3 – Feedback on Final Draft

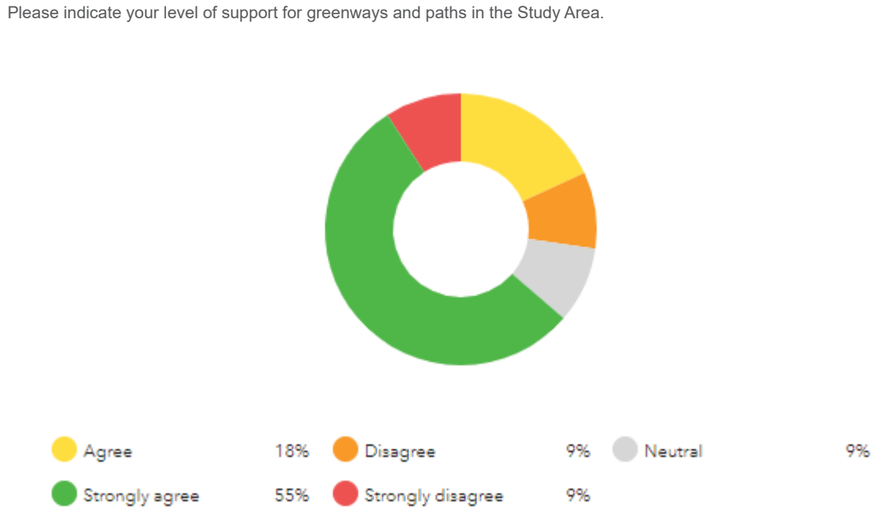
  This brief survey sought additional feedback given the changes between public meetings prior to sharing the draft report with the Planning Commission, Economic Development Authority, and Board of Supervisors.

Response to Public Input

The public input was critical to the final draft. Input received in all public meetings and surveys generated substantial beneficial guidance to the final product, and substantially benefits the legitimacy of the improvement plan included in this report.



Roanoke County Survey for the U.S. Route 460 Land Use and Connectivity Study Results



Roanoke 460 Land Use and Connectivity Study Feedback on Greenway Opportunities

III. Corridor Issues

This Study was produced to plan for the future of the Challenger Avenue Corridor, specifically as it relates to traffic issues existing and likely to increase in the future. Significant daily rush-hours in the corridor contribute to challenges to the quality of life and potential economic growth. Some of the problems encountered in the corridor are included below.

Route 460 Mainline Congestion – Heavy commuter traffic during rush hour between the City of Roanoke, Roanoke County, Botetourt County, and Bedford County produces the most common traffic concern, which is backups on Route 460.

Lack of Alternate Routes – The Challenger Avenue Corridor provides only one direct route from the City of Roanoke to points east. Alternative routes, where available, generally carry traffic through residential neighborhoods, creating safety concerns in those communities.

Recent Commercial Development – Several recent commercial developments along the corridor have increased congestion and intersection delays, which lead to commuter tendency to run red lights during signal changes. This safety concern will only increase as the commercial development along Route 460 increases.

Route 460/Alt 220 Intersection


Existing Carson Road

Corridor Issues

Route 460 Capacity

Route 460 serves as the only primary arterial to points east and north of Roanoke, aside from Interstate 81 and Route 11 several miles to the north. Virtually all traffic in Roanoke riding east, including non-local commuters traveling to places like Lynchburg, Richmond, and the Atlantic coast, use one of these two routes.

Challenger Avenue is four lanes wide, with two lanes in each direction, along with associated turn lanes at several intersections through the Corridor.

There are four major signalized intersections that serve the corridor, including Alternate Route 220, West Ruritan Road, Valley Gateway Boulevard, and Walmart/ Lowes Shopping Center (Walmart), These are the most controlled points through the corridor. There are an additional 23 access points, both public roads and private entrances, along Route 460 that are less controlled and add to congestion and safety in the area.

Congestion on Route 460 at West Ruritan Intersection

Travelers on Route 460 in the City of Roanoke

Corridor Issues

Route 460 Access

One of the primary constraints along the corridor for businesses and residents are the limited access points. Due to the high volume and speed along the corridor and the lack of available alternative routes, VDOT classifies this roadway as a principal arterial. On principal arterials, minimizing access points for safety and through traffic progression is desirable. This is because any crashes or congestion impact proportionally larger numbers of roadway users when compared to less important highways.

VDOT's access management standards provide minimum spacing of various types of intersections to help preserve these characteristics, becoming more restrictive as roadway volumes and speeds increase. An excerpt of VDOT's standards is available in the table below.

Functional Classification	Design Speed	Minimum Distance (ft) Between Intersections			
		Signalized	Four Leg	Tee/ Directional Four Leg	Right-In Right-Out
Principal Arterial	35 to 45 mph	1,320	1,050	565	305
Collector	35 to 45 mph	660	440	335	250
See VDOT Road Design Manual, Appendix F, Table 2-2 for additional functional classifications and speeds					

Many intersections along the corridor were established prior to these standards and violate minimum spacing requirements. As such, VDOT's study recommends restricting certain turning movements for safety reasons and optimizing signals and their geometry to reduce delay along the corridor. Route 460 is also one of VDOT's Corridors of Statewide Significance and is part of its Arterial Preservation Program, which further restricts access. As a result, adding new signals to provide access for developments is more difficult.

Access management requirements also greatly restrict access to properties along roads connecting to Route 460, many of which are collectors with speed limits of 35 miles per hour (mph). This limits the ability to create accesses to parcels or parallel routes off of side streets.

Existing Retail Access Along Route 460


Topographic Challenges to New Access Points

Corridor Issues

Carson Road

During the study, Carson Road emerged as a significant component of the Challenger Avenue Corridor network. It serves as a primary relief valve for daily backup traffic and is a cut-through for many commuters, including (through public communications) students that travel to William Byrd High School.

Carson Road has many challenges that make it a priority for improvement consideration. It is two lanes of inconsistent alignment and width, and has a one-lane bridge where Glade Creek crosses the road. It is tightly fit between a tributary stream and rock-faced slopes, leaving little potential for major improvements.

Carson Road also is the focus of many concerns expressed in the public engagement sessions, primarily relating to safety concerns and worry about the extent of potential improvements by those who own property along it or in the vicinity.

While Carson Road will likely serve as a continued relief-valve road for peak hour traffic in the future, care should be taken in balancing improvements that help the current safety challenges without disrupting the nature of the current Carson Road and the neighborhoods that it serves.

Existing Carson Road with Limited Sight Distance

Existing One Lane Bridge on Carson Road

Corridor Issues

West Ruritan Road Intersection

West Ruritan Road at its intersection with Route 460 has seen significant change in recent years with the arrival of a new Chick-fil-A restaurant on the northwest corner of the intersection. The successful chain, opened in 2015, has created backups and neighborhood challenges to those who use West Ruritan Road as the primary access.

Furthering the congestion is the recent opening of the Lewis Gale Blue Hills Emergency Room across the street from Chick-fil-A. These two commercial uses are generating steady traffic on West Ruritan Road.

VDOT has proposed and is scheduled to improve the intersection by converting it to a thru-cut. A thru-cut is an intersection design where side street through movements are prohibited. A thru-cut will reduce the number of points where vehicles cross paths, and it will eliminate the side street through movement, allowing for fewer and shorter traffic signal phases, which reduces delay and increases capacity. Fewer traffic signal phases means less time stopped at the intersection. Offset left turn lanes will also be included for improved sight distance, along with pedestrian facilities through the median. As the majority of movements on the side streets are left and right turns, this will not significantly impact the way that drivers currently use the intersection, except for trips between the residential uses to the north and the CVS which will require vehicles to U-turn at the next downstream intersection.

While this intersection brings economic benefit through its commercial activity, traffic challenges will continue in the future. Improvements made elsewhere in the corridor will be aimed at helping reliever visitors to this area without further disrupting neighborhoods.

Businesses at West Ruritan Road Intersection

West Ruritan/Route 460 Intersection

IV. Current Conditions

In evaluating the best future for the Challenger Avenue Corridor, it is important to begin with the conditions that exist today. There are several factors that are considered in determining land use and transportation options. The primary factors include more than just road networks and geographic features. They also include the land uses that the existing infrastructure is serving. The following pages identify current conditions that are relevant to determining the best improvement strategies for the future of the corridor.

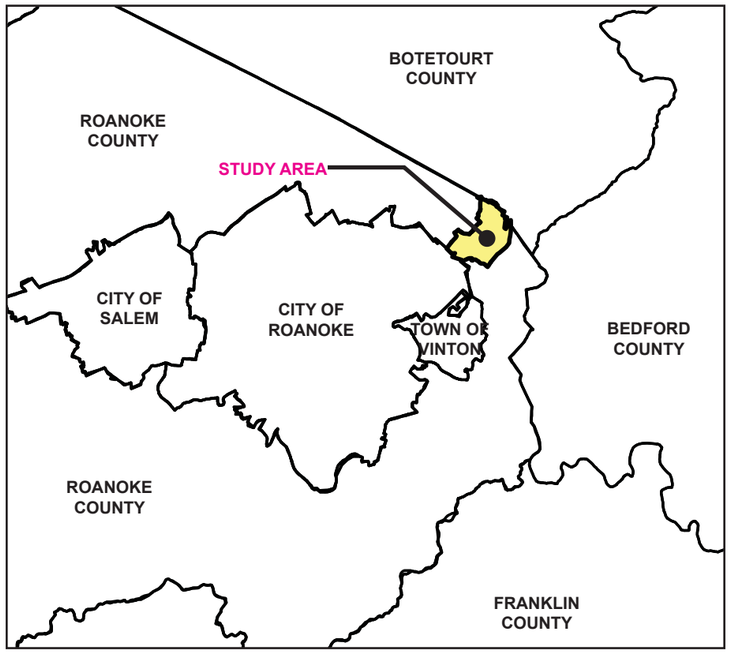
Existing Neighborhoods Near Route 460

Existing Residential and Commercial Near Route 460

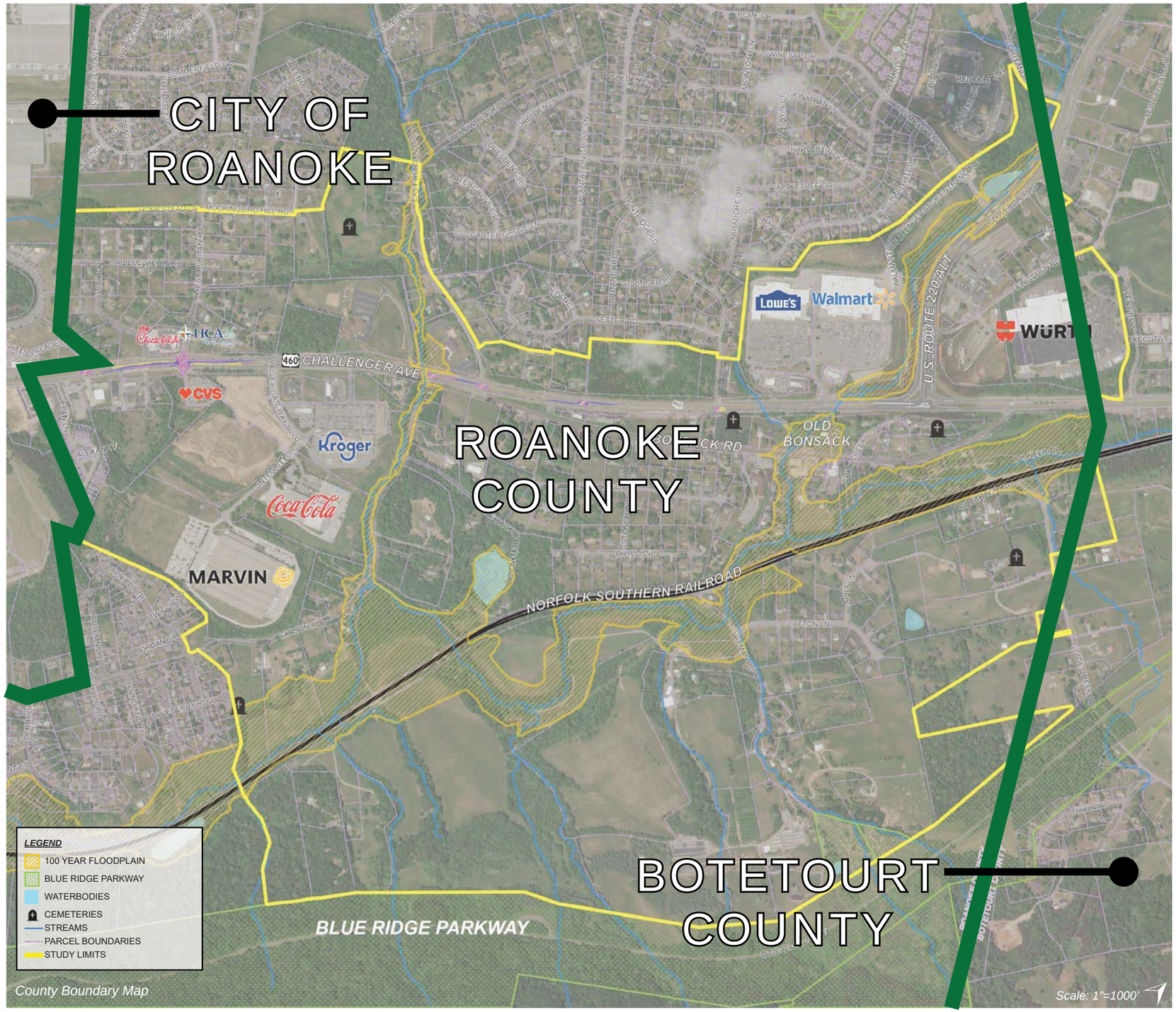
Current Conditions

Jurisdictional Boundaries

The study area is located at the northeastern edge of Roanoke County between the City of Roanoke and the County of Botetourt. It is a narrow but significant segment of Roanoke County, given the lack of regional roads other than Route 460.



Jurisdictional Boundaries Map



County Boundary Map

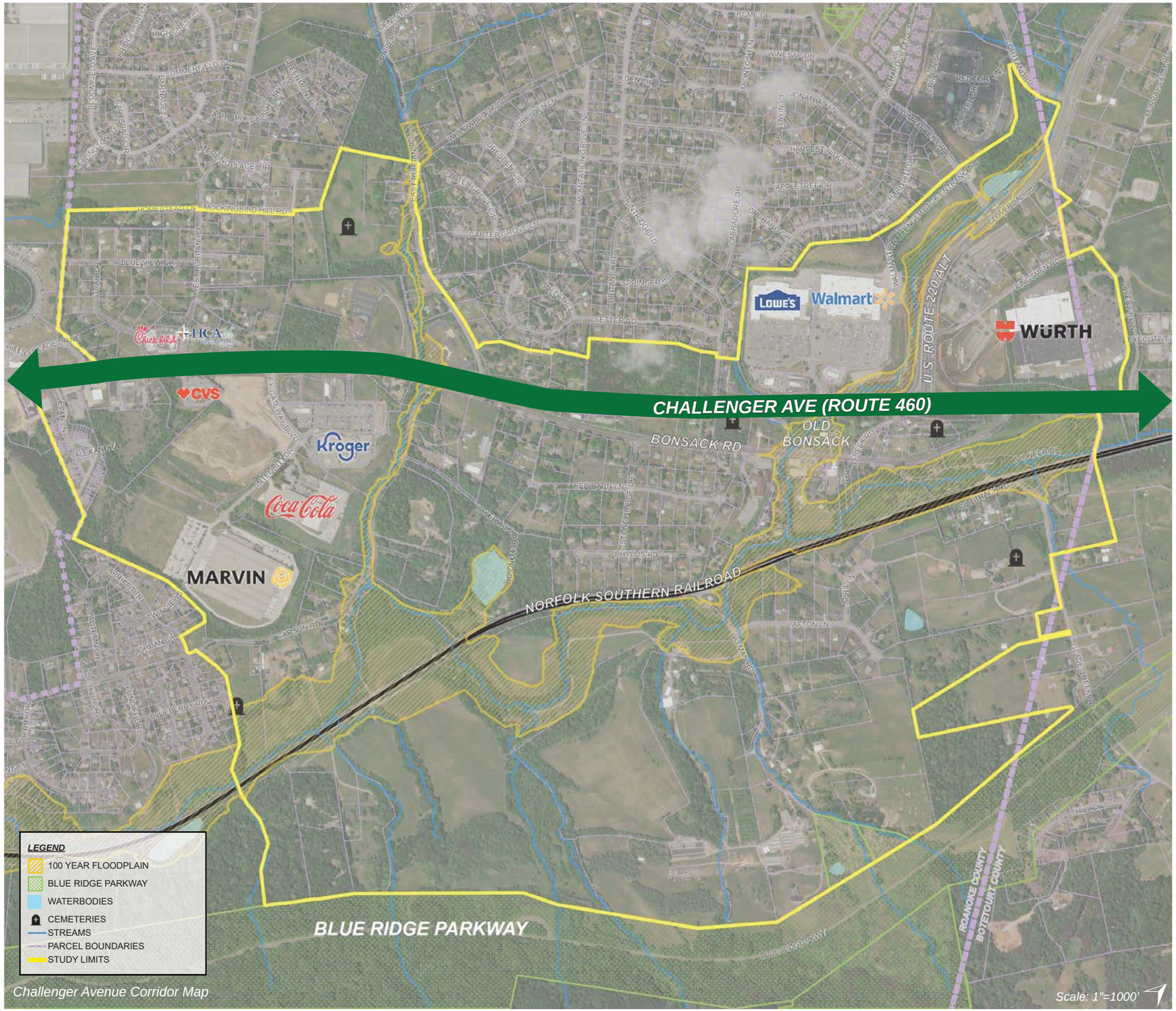
Current Conditions

Challenger Avenue Corridor

The existing Route 460 corridor is a 45 mph urban major arterial throughout most of the study area until after U.S. Route 220 Alternate(Alt.), which provides a connection to I-81. Traffic volumes are approximately 34,000 vehicles per day. Land uses along the corridor are a mix of low density residential, commercial, industrial, and institutional uses (churches and cemeteries). There are also undeveloped, forested parcels to the west of the road and a mix of forested parcels and graded pads present to the east, along with agricultural uses further east across the railroad.

The existing roadway section is a four lane divided highway with wide outside paved shoulder for most of its length and intermittent left and right turn lanes. Regional drainage patterns run west to east from a ridge to Glade Creek, which roughly parallels Route 460. Drainage along the roadway is primarily conveyed by ditches or sheet flow, with a number of crossing culverts with mapped floodplains crossing under the road. No pedestrian or bicycle facilities are present along the road.

Intermittent median openings are present in Roanoke County at Blue Hills Village Drive, Carson Road, East Ruritan Road, Country Corner Store, Huntridge Road, and Bonsack Road. Signals are present at West Ruritan Road, Valley Gateway Boulevard, the entrance to the Walmart and Lowe's shopping center, and at Route 220 Alt. Improvements are funded for several of these intersections, as discussed later in this document.



Challenger Avenue Corridor Map

Current Conditions

Railroad

Norfolk Southern railroad has a strong history in the Roanoke Region, and its impact on the Bonsack community is significant.

The railroad serves as a primary coal carrying route from states to the west through Roanoke to Norfolk. Amtrak also uses the railroad track to access the Roanoke station.

It divides land in the Bonsack area between the residential areas and the agricultural lands adjacent to the Blue Ridge Parkway. The tracks generally sit in the lower elevations that follow the Glade Creek watershed through the County.

There are two at-grade railroad crossings in Bonsack impacted by the Norfolk Southern line. Those lines include the Layman Road crossing and the Glade Creek Road crossing. Both are further identified and studied in this report.

Railroad Map

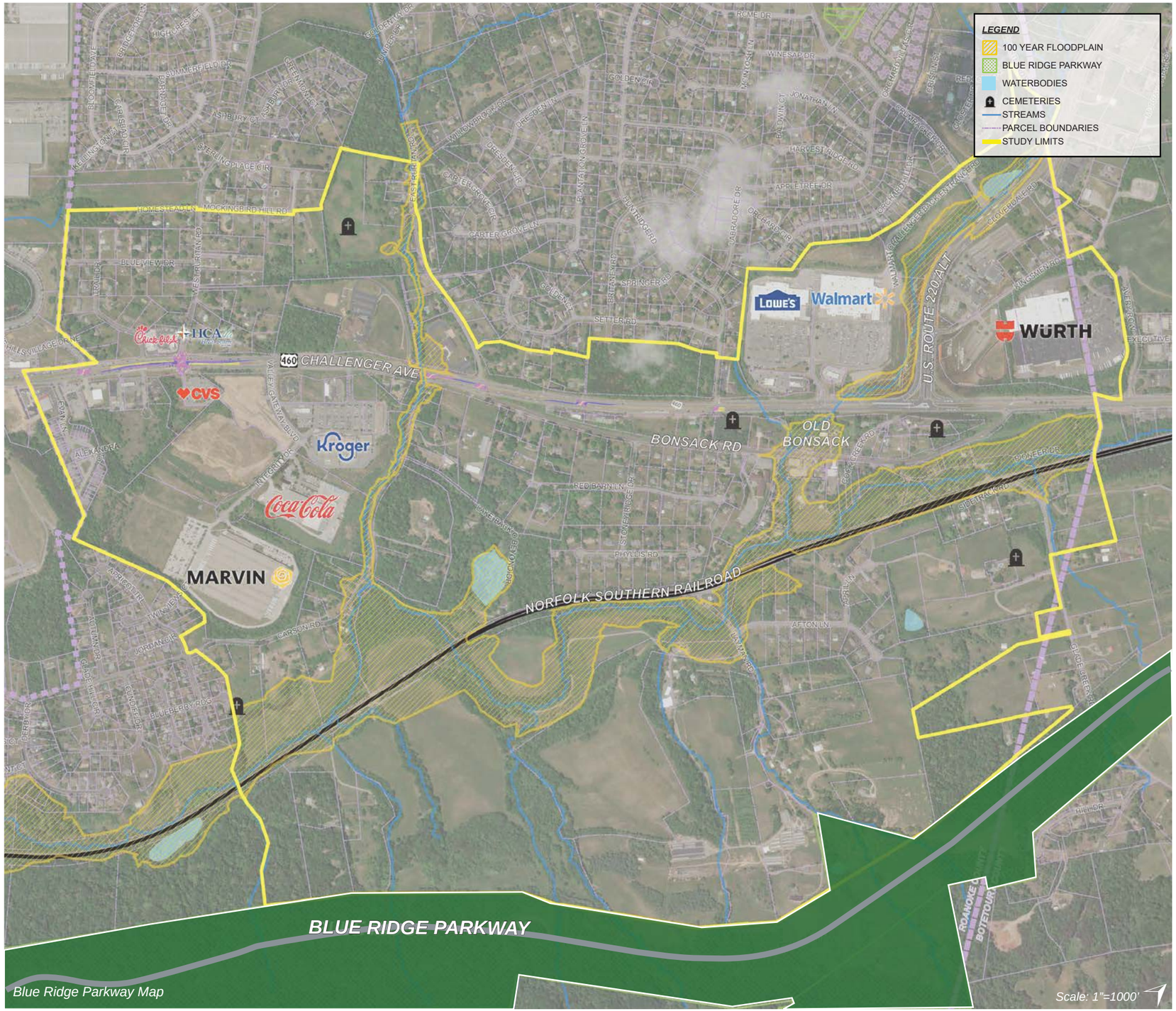
Current Conditions

Blue Ridge Parkway

The internationally recognized Blue Ridge Parkway is adjacent to the Bonsack community and provides a unique outdoor benefit to the residents of Roanoke as well as those visiting the area. There is no direct access to the Blue Ridge Parkway from the Bonsack community.

The Blue Ridge Parkway does present some issues that were evaluated in this Study, including visibility of proposed land uses, and potential additional points of pedestrian and non-motorized access directly to it from Bonsack.

Because of the location of, and access to, the Blue Ridge Parkway, its primary beneficial role in the Bonsack community is aesthetic. It provides a direct view of outdoor conservation and preservation, and the residents who currently see views of the Parkway and beyond can be confident that they will continue to enjoy this for generations to come.



Blue Ridge Parkway Map

Scale: 1"=1000'

Current Conditions

Neighborhoods

The most prevalent land use, in and around the Study Area, is residential single-family neighborhoods. These neighborhoods were built primarily in the 1980's and 1990's, while other parcels have long been residential homesites, making the Bonsack area a long-known and desired location for residential living in Roanoke County.

Larger scale residential neighborhoods are prevalent to the west of Challenger Avenue. These neighborhoods have their primary access limited to East and West Ruritan Roads and Huntridge Road, so traffic impacts to these roads directly impact these neighborhoods.

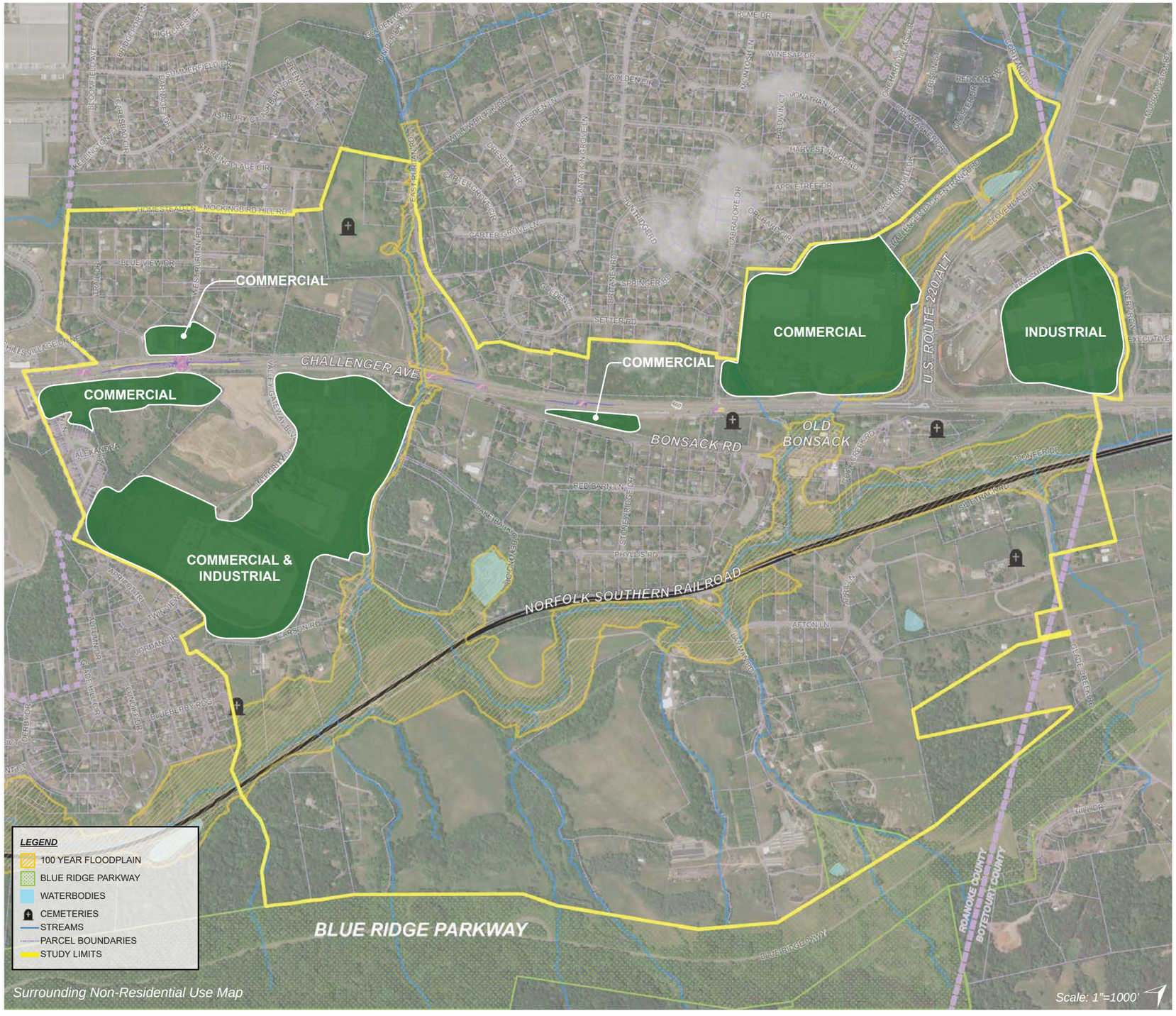
Neighborhoods east of Challenger Avenue are directly visible from Challenger Avenue and more familiar to commuters as a result. This community is primarily individually built parcels, though there are two small subdivisions that have been built through the years, including Little Tree Acres and more recently, Aprils Meadow east of the railroad.

Current Conditions

Commercial and Industrial Uses

Commercial use exists along the Challenger Avenue Corridor and is a reason for much of the traffic on Route 460. Commercial uses range from long-standing roadside garden centers to big-box retailers like Lowe's and Walmart. The corridor has a major grocer and also is home to several large-scale industrial users. More recently, commercial development has expanded to bring fast-food restaurants and emergency medical service centers to the area.

These commercial and industrial uses are recognized as important drivers of the local economy while at the same time adding to some of the traffic challenges in the area.



Surrounding Non-Residential Use Map

Scale: 1"=1000'

Current Conditions

Topography

Part of the beauty and attractiveness of the Challenger Avenue Corridor and Bonsack is its rolling hills and varied vertical landscapes. What is pleasing to the eye, however, is a challenge for infrastructure, most specifically roads with safe sight distances.

With the exception of the Glade Creek floodplain that parallels the rail line, well over 50% of the Bonsack area exceeds topographical grades of 10%. Route 460 itself was carved into some of the steepest topography through the corridor and the steepest slopes in the area are found near East Ruritan Road. Carson Road is also carved into a very steep granite hillside.

In areas east of the rail line, the lands steepen significantly from flat in the floodplain to 25% or more in some areas as the land moves east toward the Blue Ridge Parkway.

Existing Slope Map

Scale: 1"=1000'

Current Conditions

Streams & Floodplains

Glade Creek carves a significant floodplain through the heart of the Bonsack area. This floodplain ranges from 60 to 1,460 feet wide in some areas and limits the opportunities for both access and development due to the constraints it creates.

Streams, both Glade Creek and its tributaries, braid through the area, with the most significant tributaries extending north along Carson Road and to East Ruritan Road. A second significant stream bed drains lands from the Route 220 Alt area and carries water south past the Walmart shopping center and through the heart of Bonsack before reaching Glade Creek.

These environmental features, including the wetlands and soil conditions that often accompany them, create development constraints that must be considered when identifying opportunities for future development.

Environmental Features Map

Scale: 1"=1000'

V. VDOT Improvements Underway

U.S. Route 460 is a high speed urban arterial with heavy traffic volumes. As speeds increase, access points should be reduced to remove conflicts, thus improving safety. Similarly, intersections and other sources of delay should be optimized to improve through traffic progression. VDOT's study achieves both of these goals by removing side-street lefts, which are one of the most dangerous and time consuming movements to make. VDOT also limits crossings of U.S. Route 460, which, while generally small in volume, contribute to greater delay. This is especially true at signalized four-leg intersections, where having through movements and left turns on the side streets requires an additional phase, including lost time in the form of the yellow clearance interval and all red-time. Where through movements are low, installing a thru-cut removes through movements, allows simultaneous lefts, and removes a signal phase, maximizing the time that can be alloted to through movements.

VDOT's study optimizes through movements along the corridor by sacrificing access. For residents and businesses along the corridor, restricting movements from requires additional turns to get between locations. One of the best ways to mitigate access issues is to provide parallel routes between businesses and residential uses. This allows turning movements to have full access on side streets which have lower speeds and traffic volumes, including directing themselves out to signals or other access points along U.S. Route 460. For vehicles that wish to turn left onto U.S. Route 460, getting them out to signals removes the need to take a combination of right and U-turns, reducing conflicts on U.S. Route 460. In some cases, vehicles can avoid using U.S. Route 460 entirely, which is by far the best option from a safety and congestion standpoint.

Exisitng Congestion on Route 460

Exisitng Retail Access Points and Southbound Access Limitations

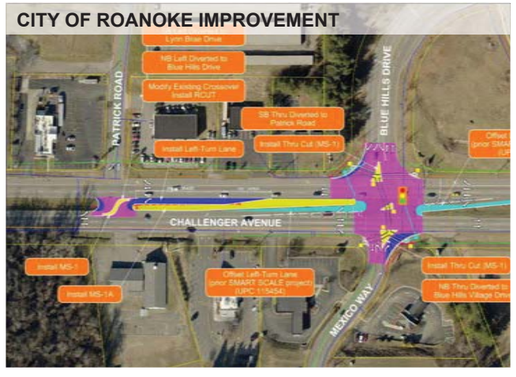
VDOT Improvements Overview

In 2019 and 2020, VDOT, the City of Roanoke, and Roanoke County studied potential safety and operational improvements along Route 460 from Williamson Road to Alternate Route 220. This is known as the VDOT Route 460 STARS Study. The purpose of the study was to evaluate operational and safety conditions along Route 460 within the study area, consider and assess potential safety and operational improvements in the study area, and develop cost estimates for potential improvements.

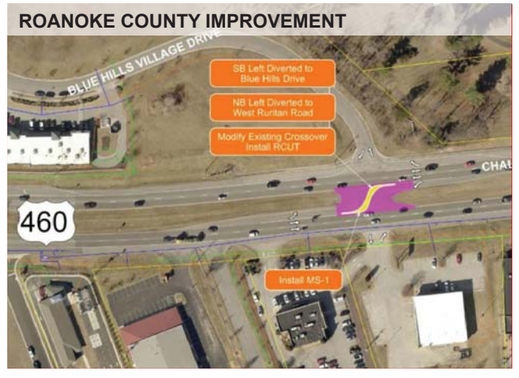
While this County study focuses on improving traffic flow around Route 460, the VDOT STARS Study provided recommendations for improving intersections and traffic flow on Route 460.

For this study to properly propose new and improved ways for motorists, pedestrians, and bicyclists to move around the Bonsack area without having to use Route 460, it must consider the Route 460 improvements planned as a result of the VDOT STARS Study. Two of the intersection improvements (Route 460 at Patrick Road and Blue Hills Drive/Mexico way and Route 460 at Blue Hills Village Drive) are located within City of Roanoke limits and therefore their outcomes are not directly impacted by Roanoke County. However, since the intersections are adjacent to the study limits, they are included for completeness.

CITY OF ROANOKE IMPROVEMENT



ROANOKE COUNTY IMPROVEMENT



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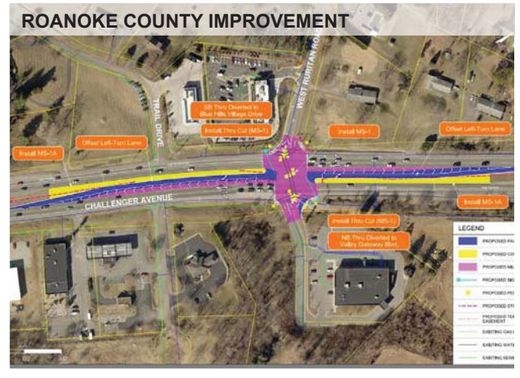

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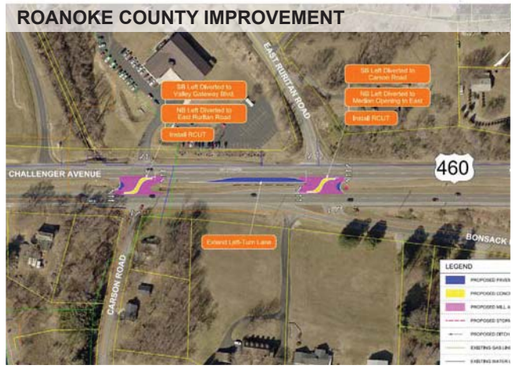

ROANOKE COUNTY IMPROVEMENT

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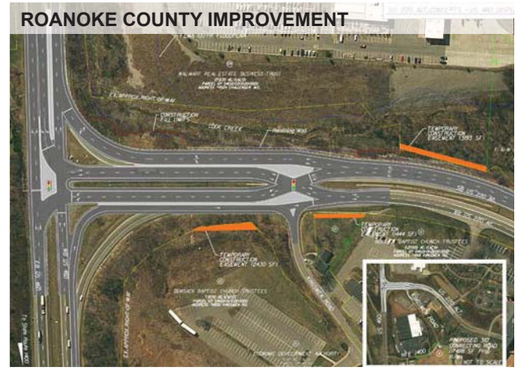


VDOT Improvements Underway

Blue Hills Drive

Just south of the County of Roanoke line, the left out of Patrick Road will be removed to reduce delay and crashes caused by vehicles trying to take lefts out of Patrick Road during heavy traffic. A southbound left lane will be added to the existing median opening so that vehicles who want to turn left into Grace and Truth Baptist Church or take a U-turn to access other businesses can do so without blocking one of the southbound through lanes.

The signal at Blue Hills Drive and Mexico Way will be converted to a thru-cut. This will reduce the number of phases at the signal from four to three by allowing the side streets to operate simultaneously, reducing loss time at the signal, and optimizing performance. Offset left turn lanes will improve sight distance for left turn vehicles so that opposing lefts do not block sight distance. Removing the through movement will reduce the number of conflict points in the intersection. Pedestrian facilities will be installed to facilitate safe

PROJECT FACTS:

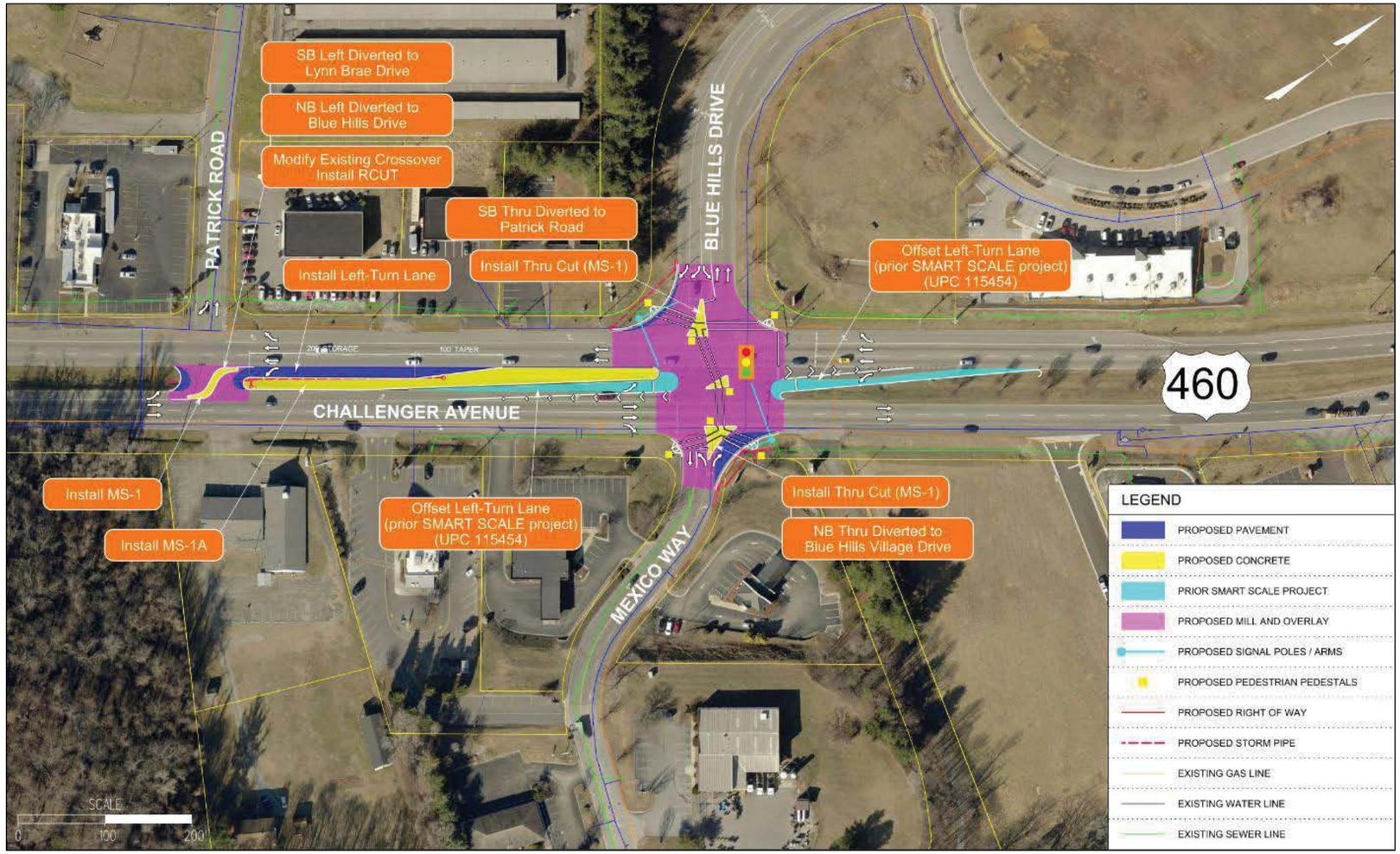
COST: $5.6M

FUNDING SOURCE: FUNDED THROUGH SMART SCALE

ESTIMATED CONSTRUCTION ADVERTISEMENT DATE: 2026

Route 460 (Orange/Challenger Avenue) Operational Improvements Study

Figure 6-7: Route 460 from Lynn Brae Drive to Blue Hills Village Drive (Sheet 2 of 3)



VDOT Improvements Underway

Blue Hills Village Drive

At Blue Hills Village Drive, the existing median opening will have a concrete island installed. All maneuvers on Route 460 will be completed as they are today. Drivers who previously took lefts out of Blue Hills Village Drive or the Advance Auto Parts or crossed Route 460 will no longer be able to do so. This will improve safety by reducing the number of vehicles trying to cross multiple lanes of traffic, which is especially dangerous during periods of heavy traffic.

For businesses along Blue Hills Village Drive, vehicles can route out the other end to Blue Hills Drive, turn left, and then use the signal at Blue Hills Drive and Route 460 to have a signalized movement to head north. This moves the unprotected left turn movement off of Route 460 and onto Blue Hills Drive, which is lower volume and lower speed, and directs traffic to a signal with protected movements, which is safer than using the currently uncontrolled movement.

PROJECT FACTS:

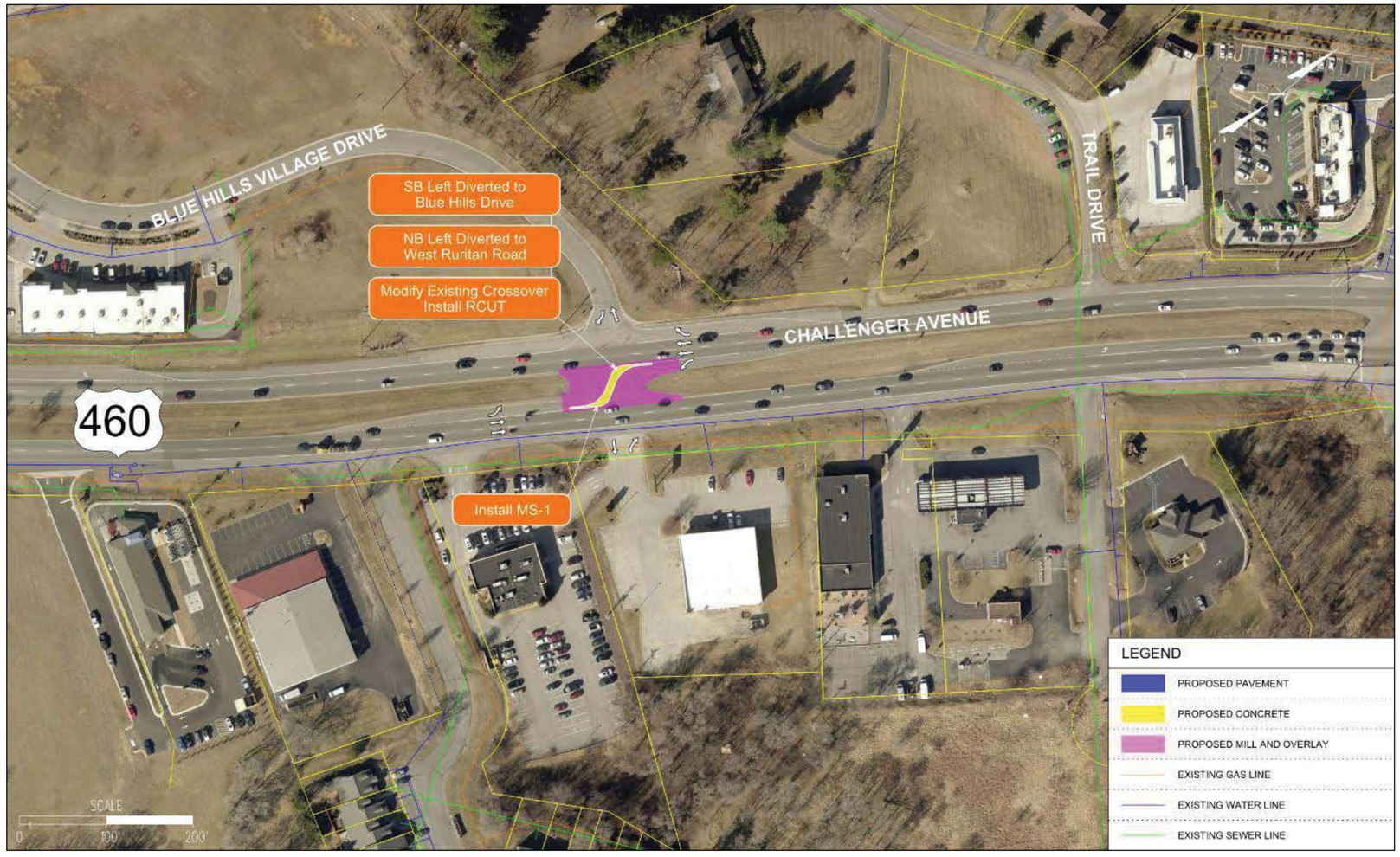
COST: $5.6M

FUNDING SOURCE: FUNDED THROUGH SMART SCALE

ESTIMATED CONSTRUCTION ADVERTISEMENT DATE: 2026

Route 460 (Orange/Challenger Avenue) Operational Improvements Study

Figure 6-7: Route 460 from Lynn Brae Drive to Blue Hills Village Drive (Sheet 3 of 3)



VDOT Improvements Underway

West Ruritan Road

Similar to the intersection at Blue Hills Drive, the intersection of Route 460 and West Ruritan Road will also be converted to a thru-cut to improve operations and reduce conflicts points, thus improving safety. Offset left turn lanes will also be included for improved sight distance, along with pedestrian facilities through the median. As the majority of movements on the side streets are left and right turns, this will not significantly impact the way that drivers currently use the intersection, except for trips between the residential uses to the north and the CVS which will require vehicles to U-turn at the next downstream intersection.

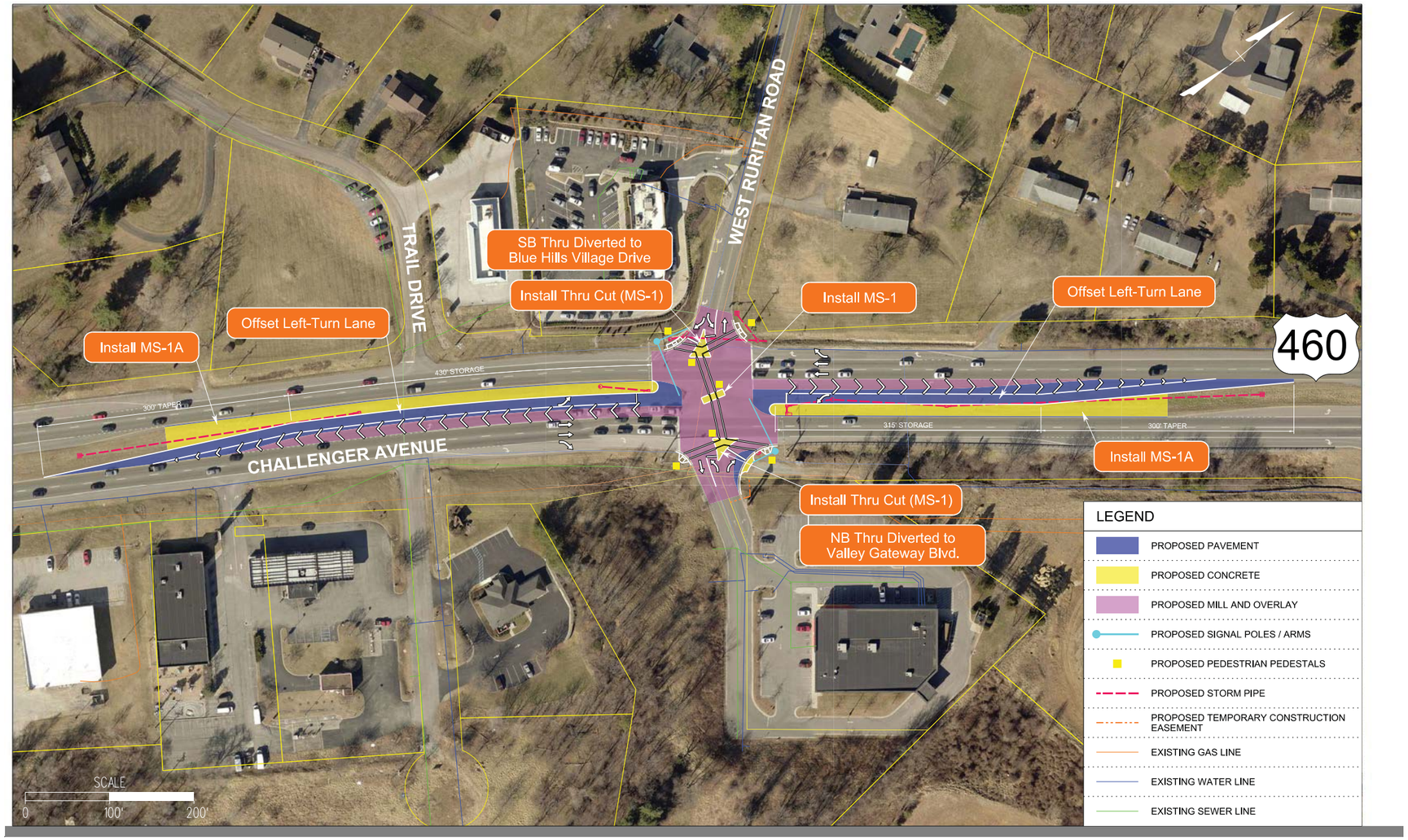
PROJECT FACTS:

COST: $7.5M

FUNDING SOURCE: FUNDED THROUGH SMART SCALE

ESTIMATED CONSTRUCTION ADVERTISEMENT DATE: 2026

ROUTE 460 AT WEST RURITAN ROAD



VDOT Improvements Underway

Carson Road to Huntridge Road

Carson Road and East Ruritan Road currently operate as four leg intersections in very close proximity to one another. The larger number of turns and crossing movements in a short distance is unsafe and violates access management standards.

By removing the ability to take lefts or make through movements from Carson Road, the Roanoke Seventh-Day Adventist Church entrance, East Ruritan Road, and Bonsack Road, the number of conflict points between vehicles making those movements and vehicles along the mainline is reduced. These are also some of the most dangerous maneuvers to make, especially when traffic is heavy and there are minimal gaps between vehicles.

Vehicles who previously turned left onto Challenger Avenue will have to turn right. For most of these movements, the next available movement will be an unprotected U-turn at the adjacent intersection.

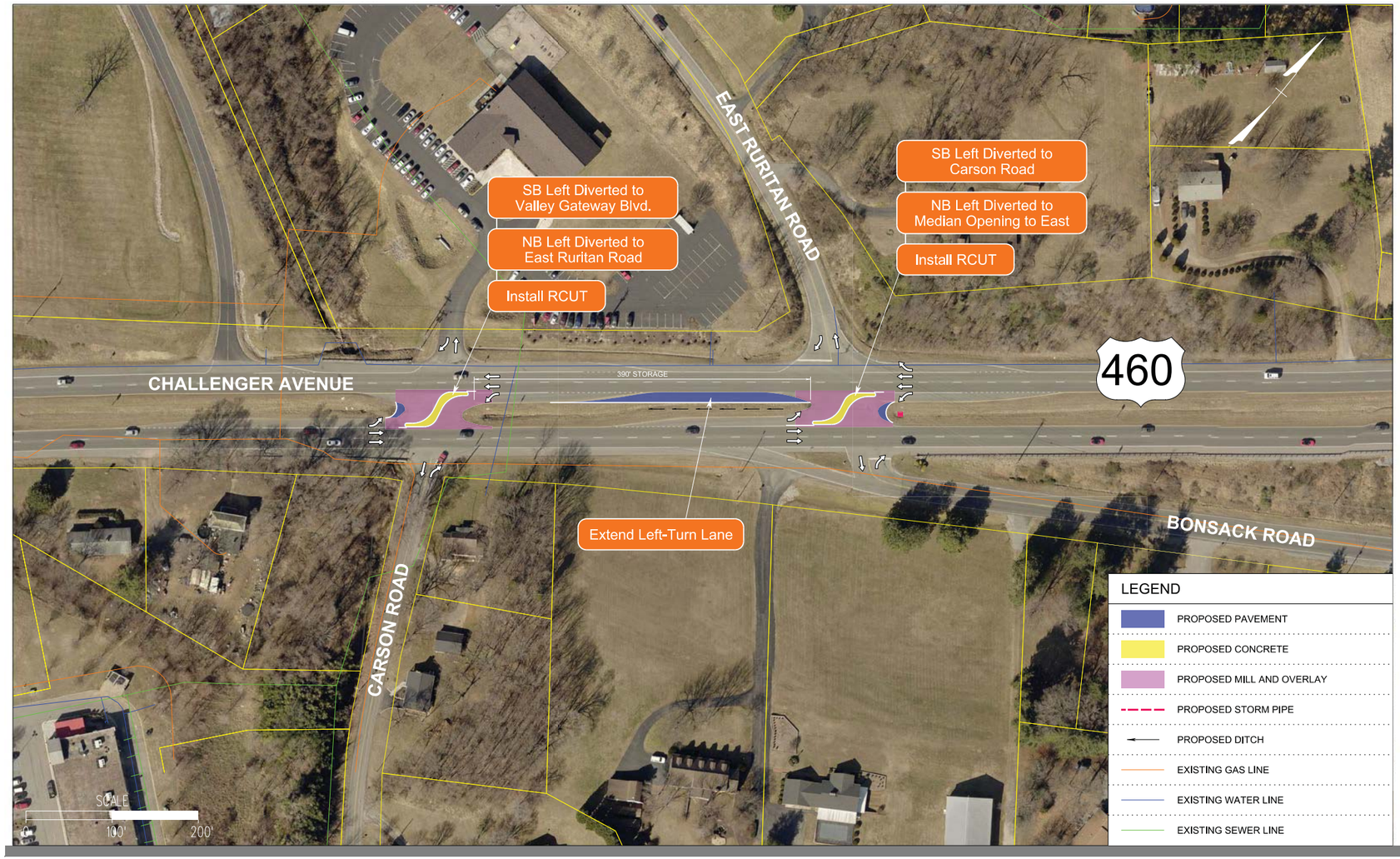
PROJECT FACTS:

COST: $2.8M

FUNDING SOURCE: FUNDED THROUGH SMART SCALE

ESTIMATED CONSTRUCTION ADVERTISEMENT DATE: 2026

ROUTE 460 FROM CARSON ROAD TO HUNTRIDGE ROAD (SHEET 1)



VDOT Improvements Underway

Carson Road to Huntridge Road (cont.)

The median opening outside of Country Corner currently has no left turn lanes. Vehicles trying to make left turns and U-turns can wait in the median, but if there are too many vehicles, they block one of the through lanes, leading to congestion and accidents. By adding left turn lanes in both directions, the safety of the intersection is greatly improved.

Similar to other intersections, vehicles turning left out of Country Corner have more lanes of traffic to cross, which can be difficult and unsafe during periods of high volume. By adding a concrete island, these vehicles are directed northbound to U-turn at Huntridge Road or to the signal at the commercial entrance north of Huntridge Road.

Limiting through movements from the west side of the intersection currently only affects one home. Due to topographic constraints, there are currently no downstream ingresses for over 1,000'. If the northwest parcel is redeveloped and desires full access to Route 460, vehicles can route to Huntridge Road, turn right, and then U-turn at this intersection.

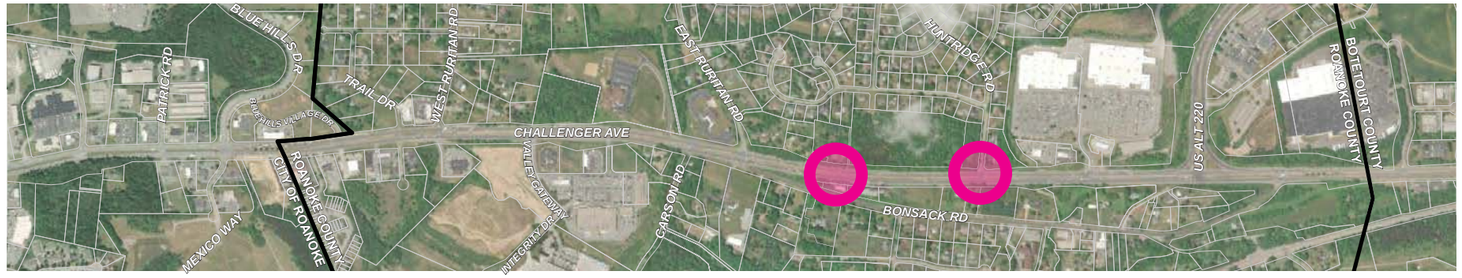
At Huntridge Road, full access is currently permitted, which presents similar safety concerns for outbound lefts during heavy traffic. By removing the outbound left and restricting the intersection to right turns and downstream U-turns, the crash rate at the intersection will decrease.

PROJECT FACTS:

COST: $2.8M

FUNDING SOURCE: FUNDED THROUGH SMART SCALE

ESTIMATED CONSTRUCTION ADVERTISEMENT DATE: 2026



ROUTE 460 FROM CARSON ROAD TO HUNTRIDGE ROAD (SHEET 2)

VDOT Improvements Underway

Route 220 Alternate

The intersection of Route 460 and Route 220 Alternate (Cloverdale Road) is currently one of the main sources of congestion along the corridor since Cloverdale Road provides access across a mountain ridge to I-81, the only such crossing for almost 5 miles. Heavy turning movements occur at this intersection. Safety issues on the southbound approach caused by congestion are compounded by the reduction in speed limit from 60 mph to 45 mph to the north and the fact that there are no nearby traffic signals, so drivers are not expecting to stop.

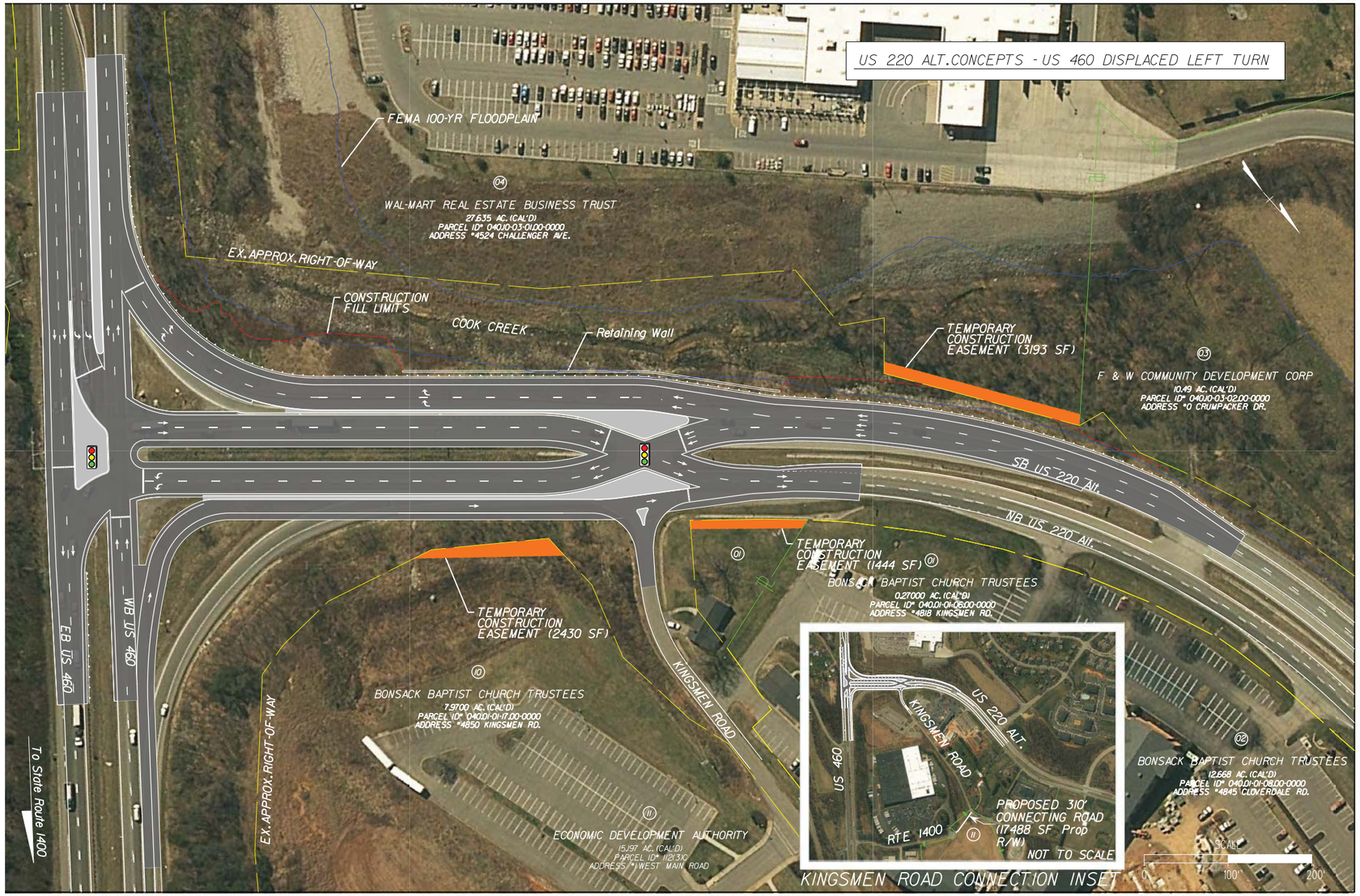
By converting the intersection to have a displaced left turn on Cloverdale Road, operations are improved by allowing the northbound left to operate simultaneously with turning movements from Cloverdale Road. This reduces the number of phases at the primary signal from three to two, optimizing operations. The two-phase signal along Cloverdale Road would be coordinated to optimizing progression of left turning movements. Adding a second right turn lane will reduce queues and maximize the benefits of providing an overlapping (or simultaneous) movement with the northbound left.

PROJECT FACTS:

COST: $21.8M PROJECT

FUNDING SOURCE: FUNDED THROUGH SMART SCALE

ESTIMATED CONSTRUCTION ADVERTISEMENT DATE: 2027



VI. Transportation Improvement Tools

Central to this study is the goal of improving transportation options. Improvement options include physical road improvements as well as pedestrian, bicycle, and/or transit improvements. For the purpose of this study, no plans for transit are contemplated, including bus, rideshare, or other non-infrastructure based improvements.

Land use decisions also impact the expectation of additional traffic as the Bonsack area builds out. This study evaluates the impact of future land use changes and makes recommendations for potential amendments to the Future Land Use Map in the Roanoke County Comprehensive Plan.

Infrastructure improvements include several options, and those options are outlined on the next two pages. Each option carries different costs to implement, different challenges to acquire property needed, and different community concerns regarding the nature of change that the improvement will create.

This Study evaluates the benefit of each option weighed generally against the potential adverse impacts. It further includes feedback from the public engagement to include the opinions of the community most directly impacted in shaping the final recommendations.

New Tie-Ins & Connections

New connections, or points of connection for vehicles serve several beneficial goals. A new connection adds capacity to the system. More important, it adds directional options for traffic. This is particularly important for emergency vehicle access to citizens in need, but also provides peak time-of-day alternative options for residents to get to and from their destinations.

Example of a New Road Connection

Road Widening

Road widening options in this category include building new lanes of traffic, widening existing lanes of traffic, adjusting paint markings, and widening shoulders and medians.

Road widenings can increase capacity where it is needed without diverting that traffic to other points on the route to destinations. Continued widening of roadways has a point of diminishing returns when the improvements are met with road networks nearby with lower capacity. Right-of-way acquisition costs increasingly make widening projects financially infeasible. Care should be taken in utilizing road widenings to areas where the traffic backlogs have a reasonable long-term benefit in traffic throughout.

Example of a Road Widening Project

Road Realignment

Road realignments can improve roads that have evolved from old alignments. In Virginia, many roads are built along historic wagon and horse roads that are paved over as the need for additional roadways arise. These old alignments can be unsafe from both a visibility and curvature standpoint. Visibility of higher speed roads requires longer sight distances for safe stopping and maneuvering of vehicles, and curvatures of some of the old roadbeds do not consider such speeds.

Many of these roadways also don't consider wide shoulders which provides a factor of safety for motorists whose tires leave the driving surface for whatever reason. The lack of safe shoulders, when combined with limited visibility, can be major factors in crashes.

Road realignment uses more modern design criteria to reduce the risk of crashes due to unsafe stopping conditions. Road realignment can be considered a form of road widening, since in most realignments, the road is improved in both curvature and lane width.

One concern when choosing a road realignment is whether the alignment improvement will create a more attractive alternative for motorists to use. If too many new motorists use an improved alignment, it can burden the capacity of that road which then may create unsafe conditions.

Road Realignment Improves Visibility and Safety (Courtesy VDOT)

Traffic Calming

Traffic calming is a technique primarily aimed at reducing speeds and increasing safety on existing roads without restricting capacity or access to those roads. These tools include speed humps, raised intersections, chokers, raised intersections, curb extensions, and median island refuges.

Roundabouts in certain forms can act as a traffic calming device, reducing approach speeds to the intersection while improving flow through the intersections.

Most traffic calming techniques are employed on roadways where excessive speed is the primary issue. In the Bonsack community, this issue was not seen as a prevalent issue. The exception was Carson Road, which many in the community felt was dangerous and needed more safety measures to reduce dangerous speeds through the corridor.

Example of a Traffic Calming Measure

VII. Community Engagement

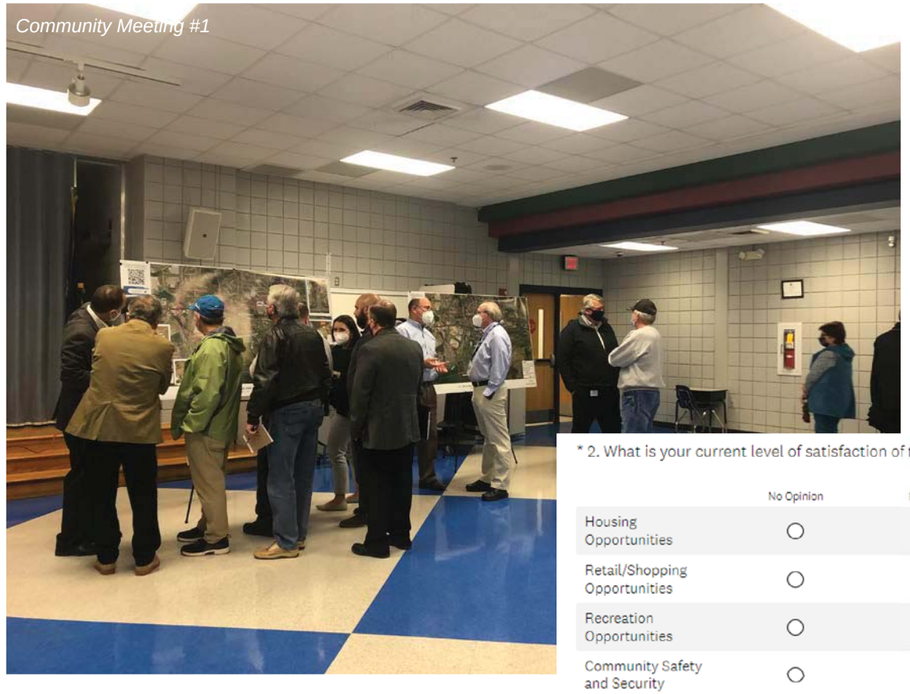
Community Meeting #1

January 13, 2022

Purpose – Because the Challenger Avenue Corridor goals include improving the quality of life for the citizens who regularly use the roads, Community outreach was an important component of this study. The purpose of Meeting #1 was providing the community with clarity of purpose of the study, so that the public could understand their role in shaping the study and its recommendations.

Survey – Prior to the first meeting, a community survey was offered for the community to share their thoughts on a variety of topics, including traffic, economic opportunities, quality of life, and the history of Bonsack. The survey received 220 responses which are provided in Appendix D. These responses helped the team in prioritizing elements of the study for the first draft of improvement suggestions.

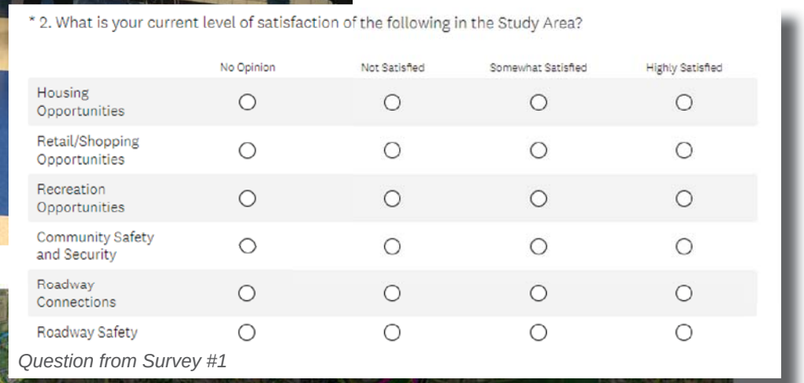
Meeting Summary – The meeting, held at Bonsack Elementary School, on January 13, 2021, was attended by 44 citizens. Timmons Group provided maps and was present to share the study limits that define the scope of the study. The team listened to questions and comments from those in attendance. No recommended strategies were provided to the public, rather the event was entirely about collecting the thoughts of those most impacted by the area, those who live and work in the area.



Community Meeting #1

220 SURVEY RESPONDENTS

44 MEETING ATTENDEES



* 2. What is your current level of satisfaction of the following in the Study Area?

	No Opinion	Not Satisfied	Somewhat Satisfied	Highly Satisfied
Housing Opportunities	○	○	○	○
Retail/Shopping Opportunities	○	○	○	○
Recreation Opportunities	○	○	○	○
Community Safety and Security	○	○	○	○
Roadway Connections	○	○	○	○
Roadway Safety	○	○	○	○

Question from Survey #1

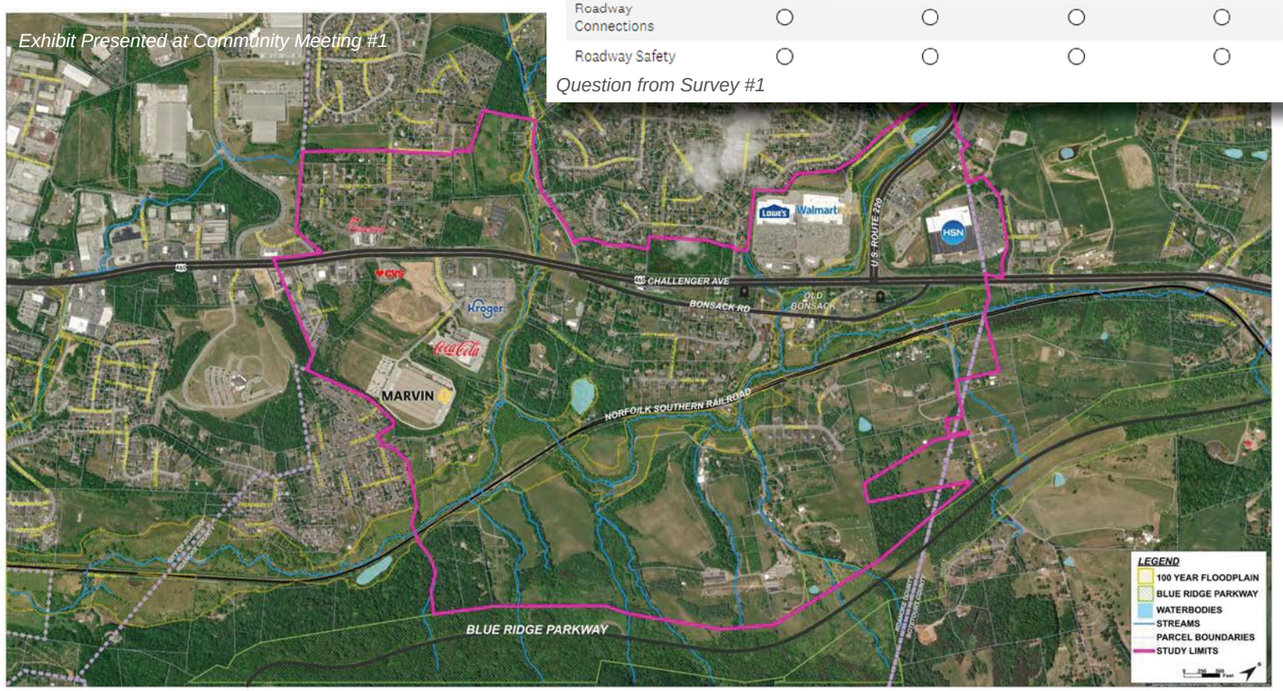


Exhibit Presented at Community Meeting #1

Community Engagement

Community Meeting #2

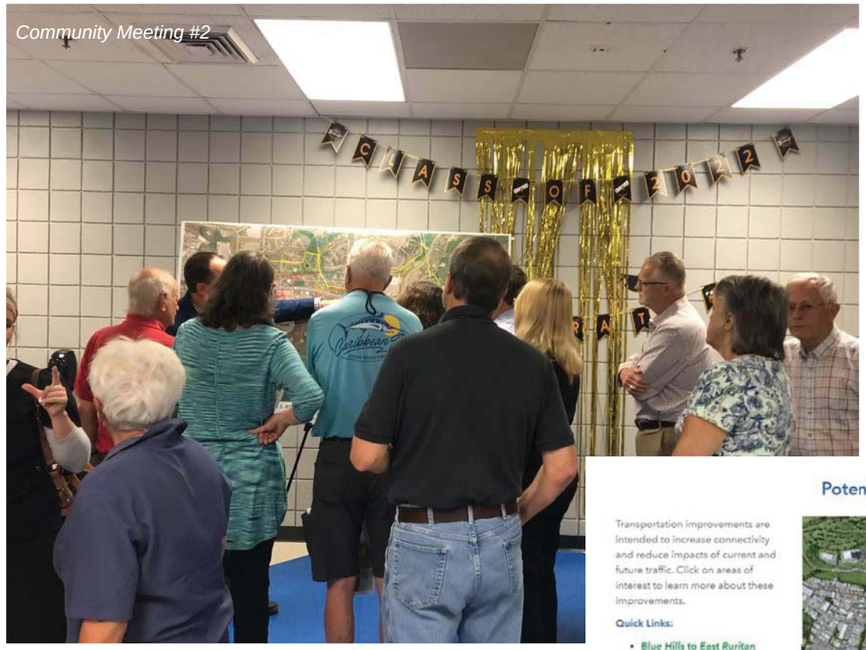
May 18, 2022

Purpose – In Meeting #2, the study team shared initial opportunities for consideration and feedback. The opportunities included a variety of new roads, improvements to existing roads, and pedestrian path options. The graphic locations and their relationship to properties was shown on large boards and displayed for the community to see.

Survey – Prior to Community Meeting #2, a detailed study shared potential improvements throughout the Bonsack Community. 140 surveys were completed and included a wide range of ideas and comments. The survey responses are shown in Appendix E.

Meeting Summary – Community Meeting #2 was attended by 98 citizens interested in commenting and asking questions about the plan. This meeting included considerable feedback from those at the meeting. As expected in such meetings, many comments were focused around areas that were relevant to an individual's home or property. The team learned about historical elements and property details, and fielded questions about the purpose of the opportunities presented.

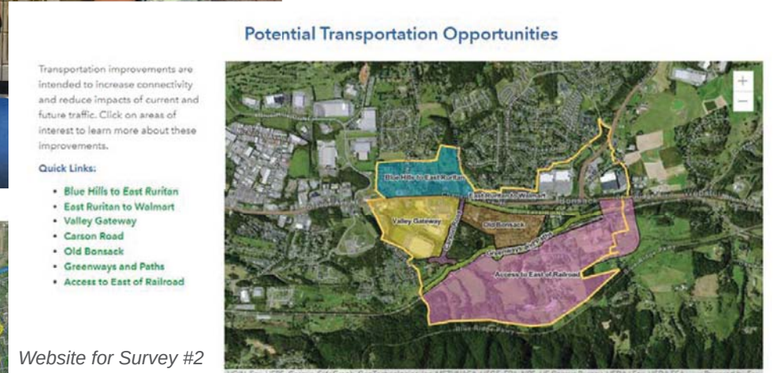
The substantive feedback, along with concerns about safety and property impacts, was valuable in adjustments for the team in consideration of priorities and the value that the community placed on the improvements. Resulting from the meeting, it was decided by the study team to add an additional engagement meeting to share new improvement opportunities that would be presented in the final document.



Community Meeting #2

140 SURVEY RESPONDENTS

98 MEETING ATTENDEES



Website for Survey #2

Transportation Exhibit Shown at Community Meeting #2

ROANOKE COUNTY VA

U.S. ROUTE 460 LAND USE AND CONNECTIVITY STUDY
POTENTIAL TRANSPORTATION IMPROVEMENTS
ROANOKE COUNTY, VA - MAY 2022

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Community Engagement

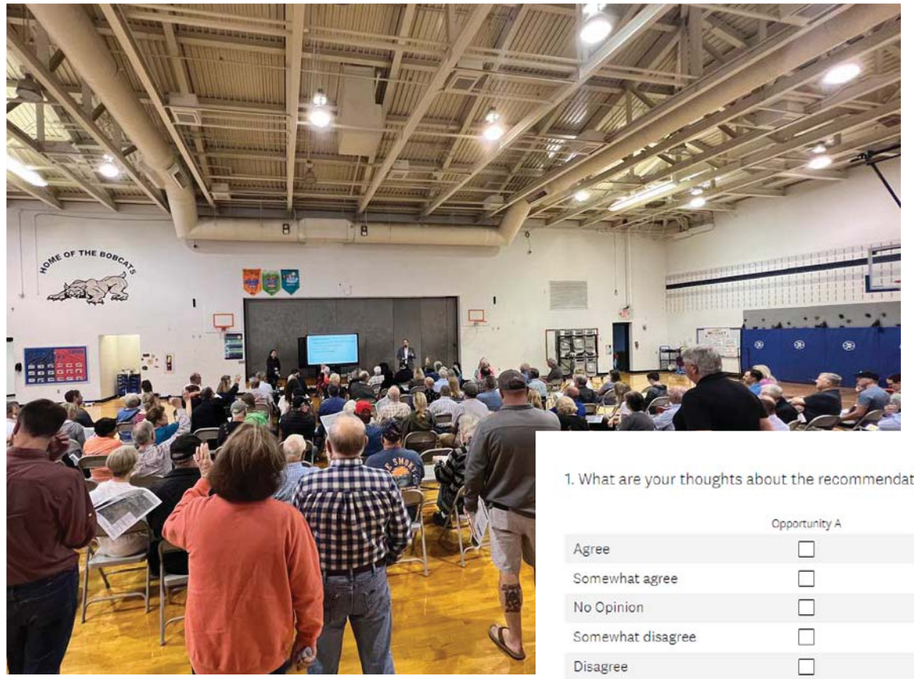
Community Meeting #3

Septemeber 29, 2022

Purpose – Community Meeting #3 intended to share the substantive changes that were made to the improvement opportunities after the study team heard feedback from both survey and in-person responses from the community in Meeting #2. Like each of the other meetings, central to the purpose of this meeting was clarity and opportunity for responding to the ideas presented.

Survey – Prior to Meeting #3, a final survey showed the recommended improvements prepared by the team and asked for responses of agreement or disagreement. In all, 39 surveys were completed and those surveys are shown in Appendix F.

Meeting Summary – Meeting #3 was held in the gymnasium of Bonsack Elementary School. There were 107 attendees, again providing an opportunity to ask questions and present feedback to the team. In addition to the recommendations for the Challenger Avenue Corridor, pipeline projects (those already underway) were shared to ensure that concerns of specific projects were not misconstrued as part of the study proposals for the corridor. In addition to general conversation and feedback, many in attendance shared their appreciation that the team had listened and incorporated public feedback substantively into the plan.



39 SURVEY RESPONDENTS

107 MEETING ATTENDEES


1. What are your thoughts about the recommendations shown in the area above?

	Opportunity A	Opportunity B	Opportunity C
Agree	☐	☐	☐
Somewhat agree	☐	☐	☐
No Opinion	☐	☐	☐
Somewhat disagree	☐	☐	☐
Disagree	☐	☐	☐

Question from Survey #3

Transportation Exhibit Shown at Community Meeting #3

Community Engagement

Other County Meetings

Joint Meeting of the Planning Commission and Economic Development Authority

October 19, 2022

In this special meeting of the Planning Commission and the EDA, Timmons Group and County Planning reviewed the project, the process, and the recommendations to the members, and received questions and feedback. Comments and questions included economic development issues east of the railroad tracks, Read Mountain Preserve (unrelated to this study), and County/City cooperation in the study.

Roanoke County Planning Commisson

Board of Supervisors Work Session

November 9, 2022

In this work session of the Board of Supervisors, Timmons Group and County Planning staff reviewed the project, process, and recommendations to the Board members present. Comments from the Board members was focused on the value and importance of moving forward on improvements, along with funding needs to ensure that the improvements can become reality. The Board received the report with enthusiasm, and was supportive of taking the next steps to finalize and work toward Comprehensive Plan changes to ensure guidance of this report into future land use decisions.

Roanoke County Board of Supervisors

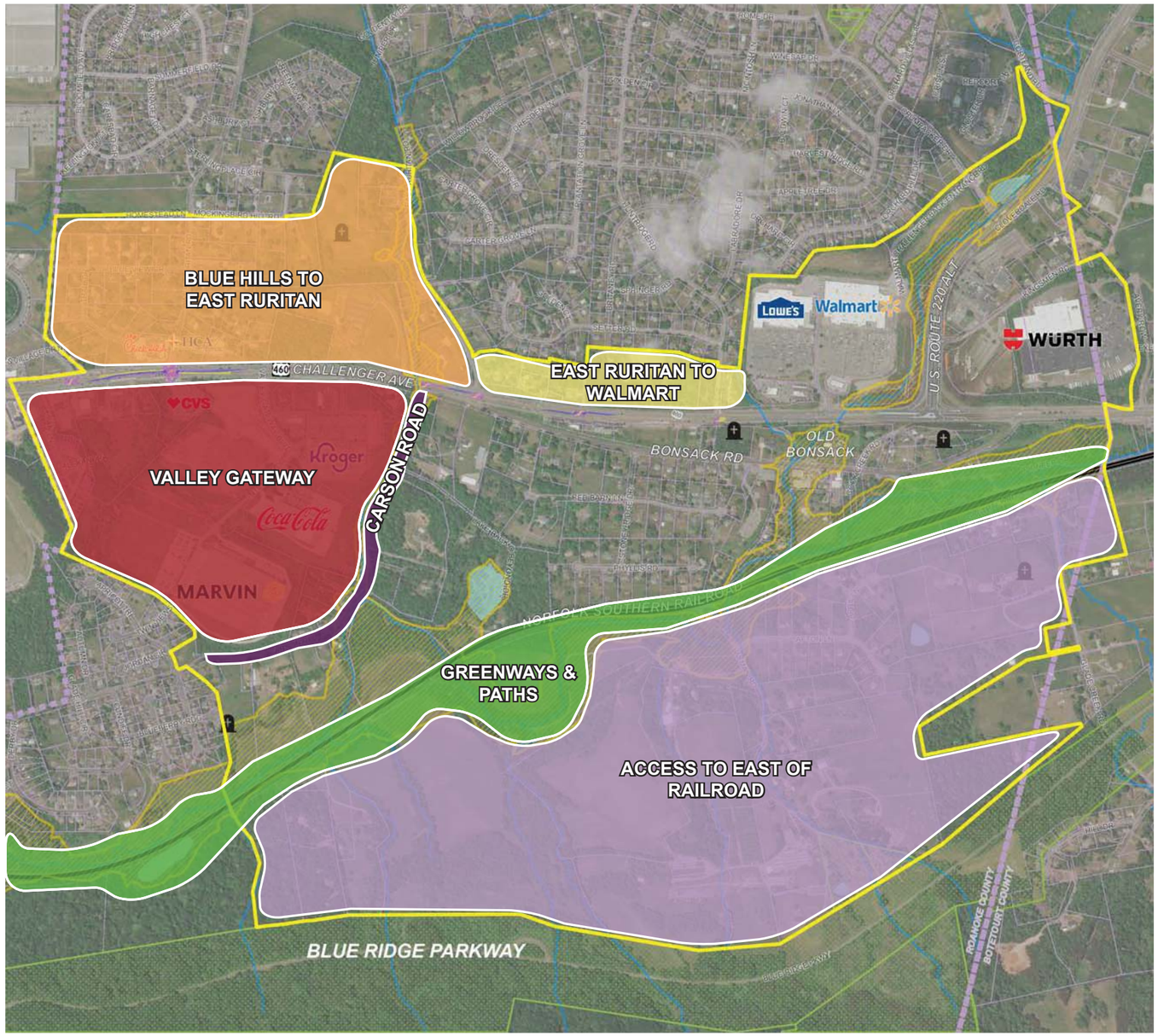
VIII. Transportation Improvement Options

After review of existing conditions, road improvement projects in the pipeline, and after hearing from the public through three community meetings and surveys, Timmons Group analyzed the potential tools that could be used to improve transportation options in the Bonsack community.

Those areas of study, and recommendations, are grouped into areas of impact. There are seven areas of potential transportation improvements. They are:

- Blue Hills to East Ruritan
- East Ruritan to Walmart
- Valley Gateway
- Carson Road
- Greenways & Paths
- Access to Points East of Railroad

These improvement opportunities are detailed on the next several pages.



Blue Hills Drive to East Ruritan Road

The improvements shown in this area are intended to increase directional driving options for residents and commercial travelers on the west side of Challenger Avenue between the Roanoke City line and East Ruritan Road. Central to these improvements are efforts to reduce impacts, both current and future, at the intersection of West Ruritan Road and Route 460.

Improvement recommendations include an extension of a publicly accessible road between Trail Drive and Blue Hills Village Drive. This road will give viable options to residents living west of Challenger Avenue in the vicinity of West Ruritan Road, to customers of Chick-Fil-A, and other nearby businesses with indirect but convenient access to a signalized intersection at Blue Hills Drive in Roanoke City. This improvement is depicted as Project A on the map.

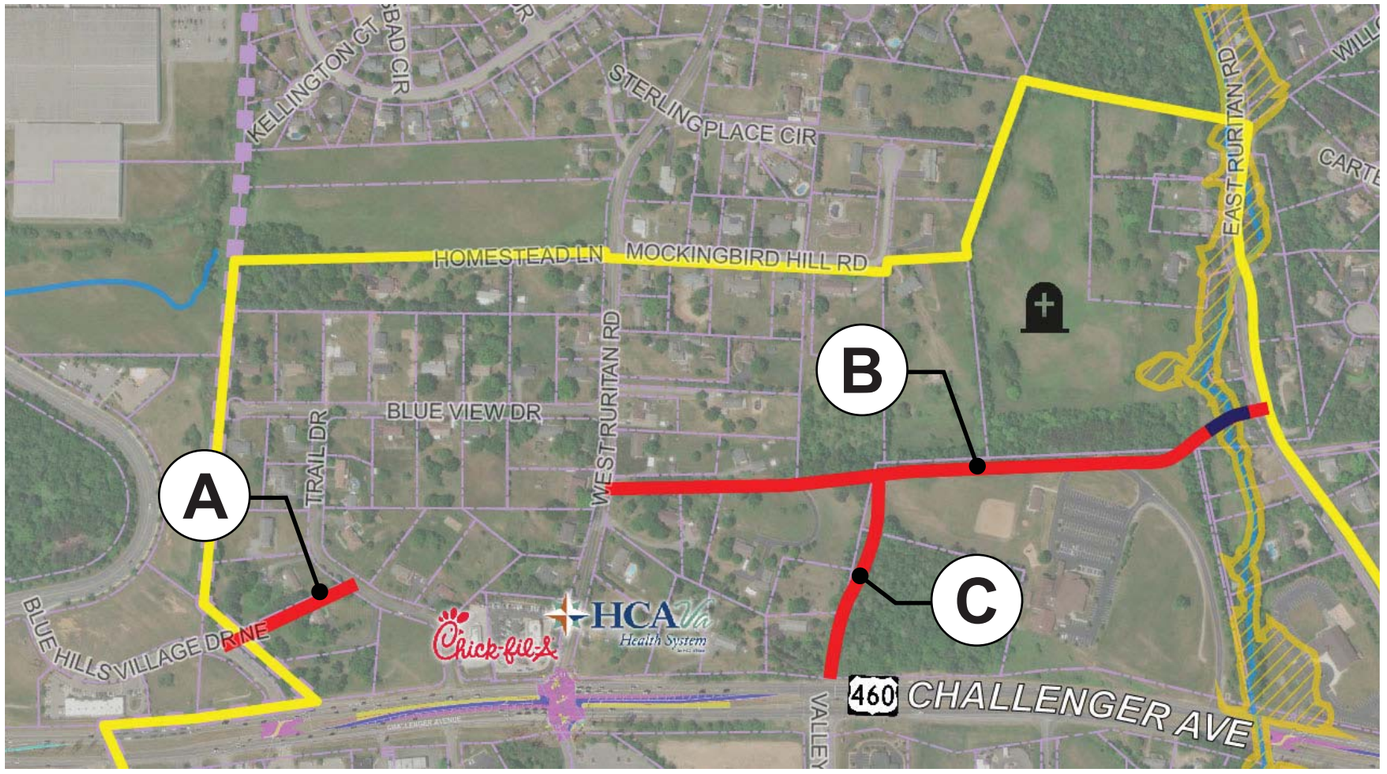
Project B shows an improvement opportunity for the neighborhoods west of Route 460 to have alternative paths to destinations without having to access Route 460 directly. This additional connection serves not only to benefit travel at rush hours, but throughout the day as well.

This road would likely be constructed as part of new development or redevelopment of the parcels over which the road is built. This might include commercial and/or residential development. Right-of-way acquisition would be an important element of this road, and the conceptual alignment has been shown to minimize the need for right-of-way from different property owners.

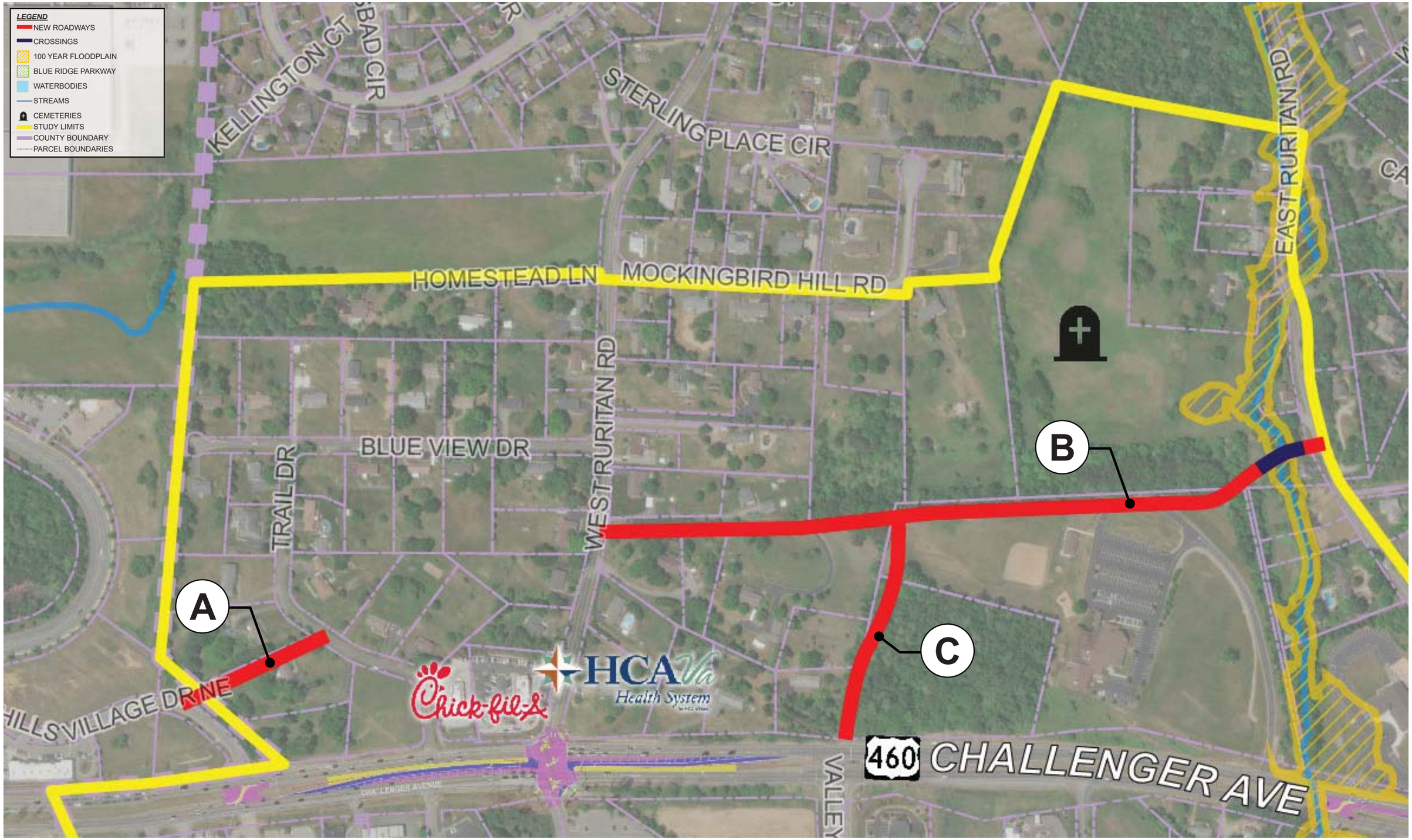
The addition of this road, if built, is not anticipated to increase traffic to the neighborhoods, but it will provide more convenient options for the residents of those neighborhoods, while reducing slightly the burden of traffic on Route 460.

Project C includes a proposed access road from the currently signalized intersection of Route 460 and Valley Gateway Boulevard. This access, if built, would be part of the development of parcels along the Challenger Avenue Corridor and is intended to connect with the road alignment depicted as Project B.

The primary purpose of this improvement is to reduce traffic on Route 460. It will have minimal impact on current traffic patterns and is thus not a short-term priority.



Blue Hills to East Ruritan



East Ruritan Road to Walmart

The improvements shown in this area are intended to increase driving options for residents and commercial travelers on the west side of Challenger Avenue between East Ruritan Road and Walmart. The improvements also allow an increased use of existing signalized intersections nearby for better mobility after the current VDOT projects are in place.

Project D represents an opportunity to provide a direct access from Huntridge Road to Walmart without having to access directly to Route 460 to do so. This directional option will be important particularly as the VDOT improvement at Huntridge Road and Route 460 closes off eastbound left turns for those on Huntridge Road heading to Walmart.

While topography is a consideration because of the grade differential from Huntridge Road to the Lowes side of the shopping center, there is a viable access that ties directly to the service road in the shopping center.

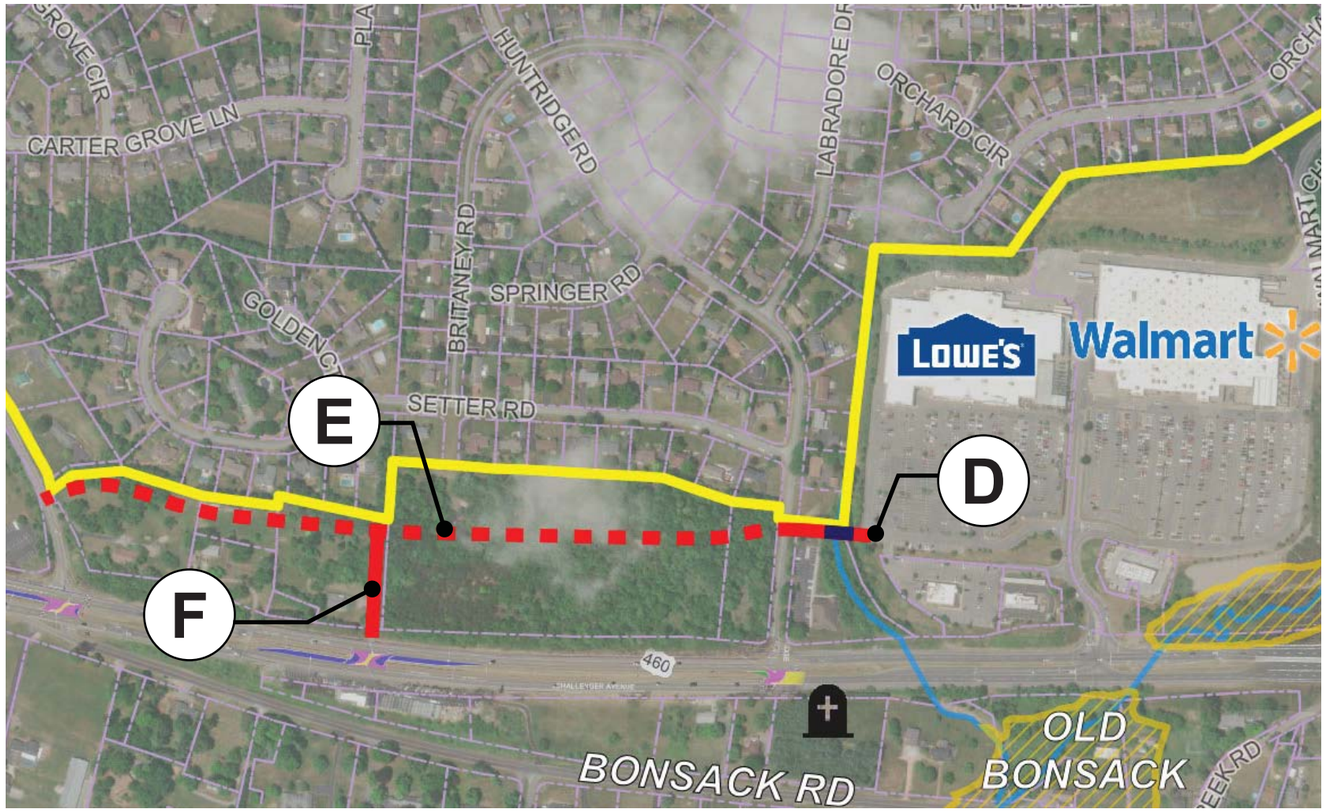
Project E, as shown on the map, represents a potential east/west parallel road to Route 460 between East Ruritan Road and Huntridge Road, without necessarily having to access Route 460 directly. This road serves a significantly similar role as Project B, described in the preceding pages.

This road, if built, is envisioned as a public or private road (with public access granted), and would likely be constructed as part of new development of the parcels over which the road is built. This might include commercial and/or residential development.

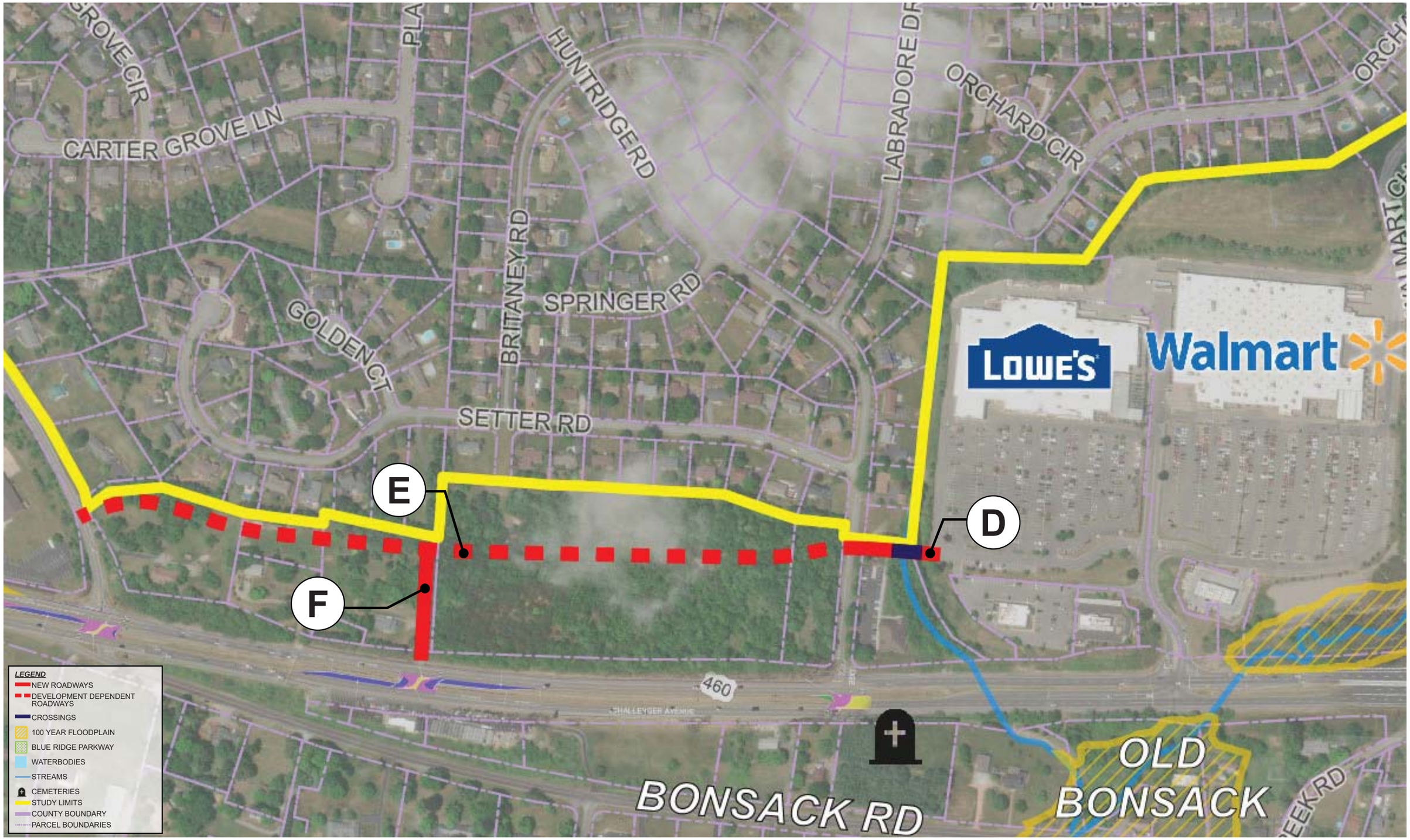
The road is shown as a dashed line to reference the importance of the connection, but not specifically the alignment. As development is planned in the area, this access can be woven into the design of road and parking elements of new development. The exact location of this access path would be determined at the time of concept planning for the development.

The addition of Project E, if built, is not anticipated to increase traffic to the neighborhoods, but it will provide more convenient options for the residents of those neighborhoods, especially those traveling to Walmart, while reducing slightly the burden of traffic on Route 460.

Project F represents an opportunity for primary access to new development along the Route 460 corridor without adding burden to East Ruritan Road or Huntridge Road to get there. This road is not anticipated to have any signalization in the future, so its primary benefit is to address eastbound traffic turning into the new development.



East Ruritan to Walmart



Valley Gateway

Valley Gateway is a significant traffic driver because it has both a major grocer and is the primary access for several major employers in the area. While improved with one of the few signalized intersections on the corridor, it faces unique challenges that are addressed in these recommendations.

Major employers like Marvin and Coca-Cola present “shift-change” peak trip challenges that generate significant backups during those times. Though signalized, the Valley Gateway intersection can only accommodate so many exits during a single traffic cycle, while keeping Route 460 traffic flow moving as the priority. Extending the signal cycle for exiting Valley Gateway is not seen as a viable and reliable improvement.

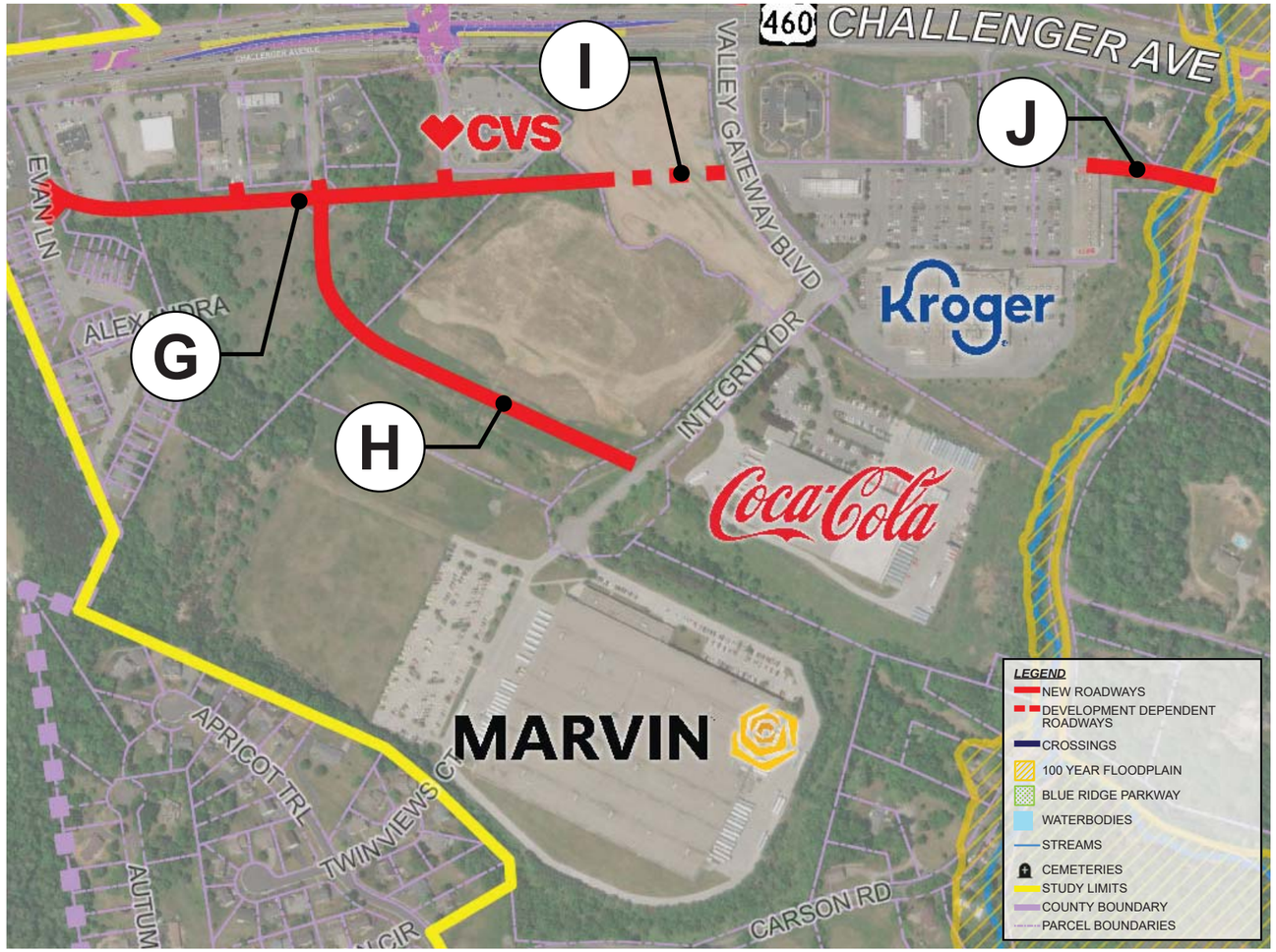
Additionally, the expectation of future potential employment centers will increase traffic on the already burdened “cul-de-sac” of Valley Gateway and Integrity Drive. For these new potential economic development opportunities to succeed, new paths for incoming and outgoing traffic should be considered.

Project G shows how several points of access to Route 460 can be tapped to allow for multiple options for drivers, including direct access to shopping at stores like CVS, Exxon, and Bank of Botetourt. More significantly, it gains a second signalized intersection by accessing the West Ruritan Road traffic signal through the CVS property. This Project, if built, provides a parallel road connector to Route 460 that gives options for arrival and departure that will have a positive impact on employment center-based traffic issues.

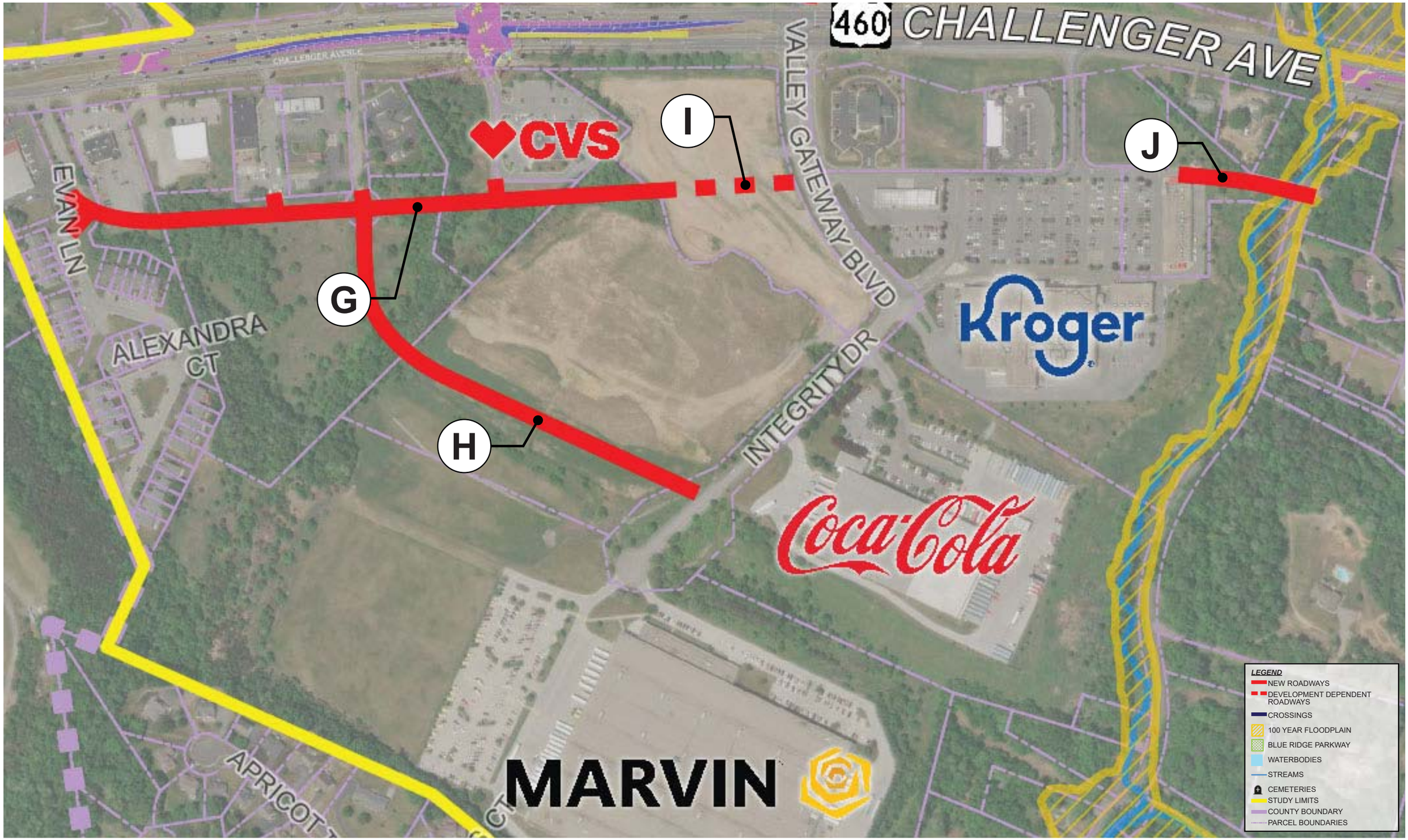
Project H is offered as a recommendation because Integrity Drive and Valley Gateway Boulevard cannot carry the burden of employment center traffic alone. The additional road connection from Integrity Drive aims to reduce the “one way in and one way out” current condition of the industrial center. Properly designed, this road could dramatically reduce the existing traffic to Valley Gateway Boulevard, and help with future economic development traffic. This project, if built, would be constructed as part of the expansion of the business park and serve as either a private or public road, depending on the end user.

Project I is shown as an extension through the parcel immediately adjacent to Valley Gateway Boulevard and is shown to indicate a goal of connecting Project G to Valley Gateway Boulevard. The exact location of the connection is not critical, and this location would be finalized during the site plan approval process for an end user. The intersection with Valley Gateway Boulevard is anticipated to be a right-in-right out access only, but this is enough to benefit arriving employees from Route 460 as well as those on Project G seeking to access the Kroger Shopping Center.

Project J is a short but important connector that allows the Shopping Center to have a direct connection to Carson Road without having to access Route 460. This project would likely tie to an improvement plan for Carson Road, detailed on the pages that follow. This access is close to Carson Road’s intersection with Route 460, so close coordination with VDOT will be needed to assure that this opportunity can become a reality.



Valley Gateway



Carson Road

The most significant feedback received in this Study related to the current condition of Carson Road, Project K. Due to the lack of other viable relief roads, Carson Road currently serves as the alternate route for commuters looking to get out of the Route 460 traffic backups that occur daily. In the public engagement meetings and surveys, speed, safety, and traffic volume on Carson Road were consistently mentioned as the biggest traffic concerns.

Because Carson Road is well known as a cut-though, the goal of recommendations for this road is to improve safety while not creating a more inviting cut-through alternative that will increase the total volume of traffic on Carson Road.

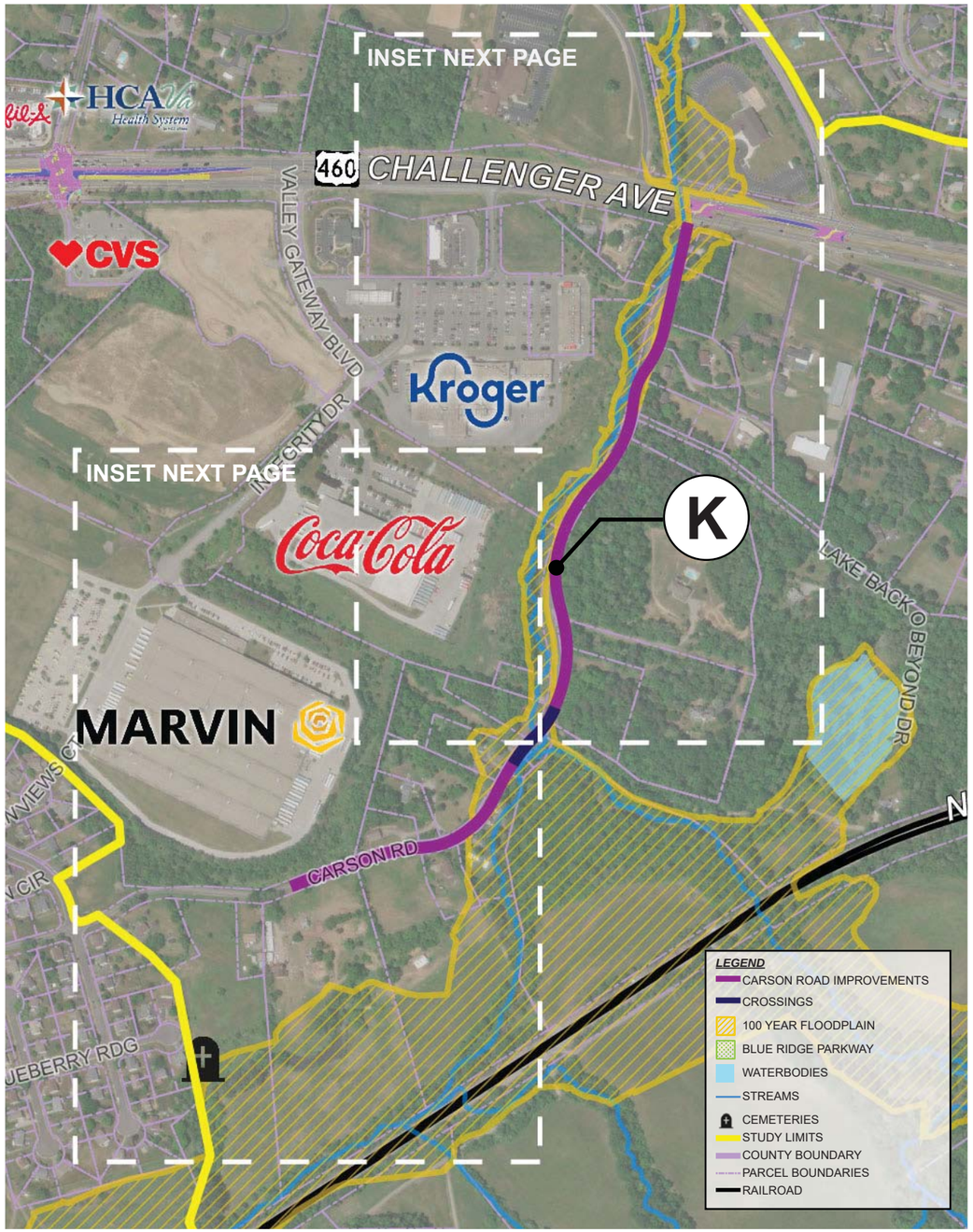
Carson Road is physically challenged with steep topography, a narrow (one lane) bridge, little to no shoulders in some segments, and existing homes and properties along the narrow right-of-way. All of these elements create design challenges for improvement options. While a typical public road realignment project is an easy tool to consider here, there is very little room for an actual realignment to happen without retaining walls, blasting rock, and property acquisition.

Regarding safety, several iterations of improvement options were investigated, including a potential roundabout to reduce speed and provide potential access to a greenway park envisioned for the Glade Creek area. The space needed for a roundabout required a significant amount of land. Numerous public comments were received that rejected the value of such a traffic calming method.

Ultimately, Carson Road modifications should include minor improvements to the road alignment, along with shoulder and road width improvements. The alignment would generally follow the current alignment with modest curvature improvements to increase sight distances. Improvements to the shoulder, including guardrails where warranted, would reduce the danger for motorists that might lose control on Carson Road. Widened roads, though maybe by only one or two feet for each lane, should be accompanied by narrow pavement markings that visually imply slower speeds. This gives the dual benefit of slower and steadier traffic, but with additional paved material (outside the paint) if needed for safety maneuvers.

The significant improvement recommendation for Carson Road is the replacement of the Glade Creek tributary bridge, which should be improved to carry two lanes of traffic.

These improvements will likely include a high degree of environmental scrutiny and mitigation, as well as modest right-of-way acquisition to fit the needed improvements. If built, this improved Carson Road will dramatically increase safety for those traveling it, and modestly increase its capacity, while not becoming a primary route for motorists avoiding Route 460.



Carson Road

EXISTING CARSON ROAD SECTION
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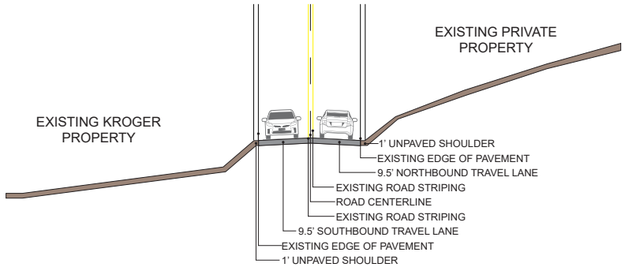

POTENTIAL CARSON ROAD SECTION
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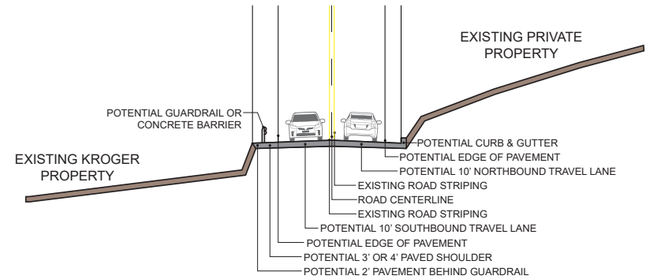


Greenways & Paths

The first survey asked the public its opinion of a publicly accessible greenway in the area along Glade Creek. The response to this topic was overwhelmingly positive. Residents thought there should be a greenway available, and if one was built, that they would likely use it themselves.

Because outdoor recreation is one of the high-priority influences on quality of life for this and upcoming generations, the study recommends that the Glade Creek Greenway be a priority for the County in the years ahead. The exact alignment of the greenway will be subject to separate discussions with stakeholders and landowners.

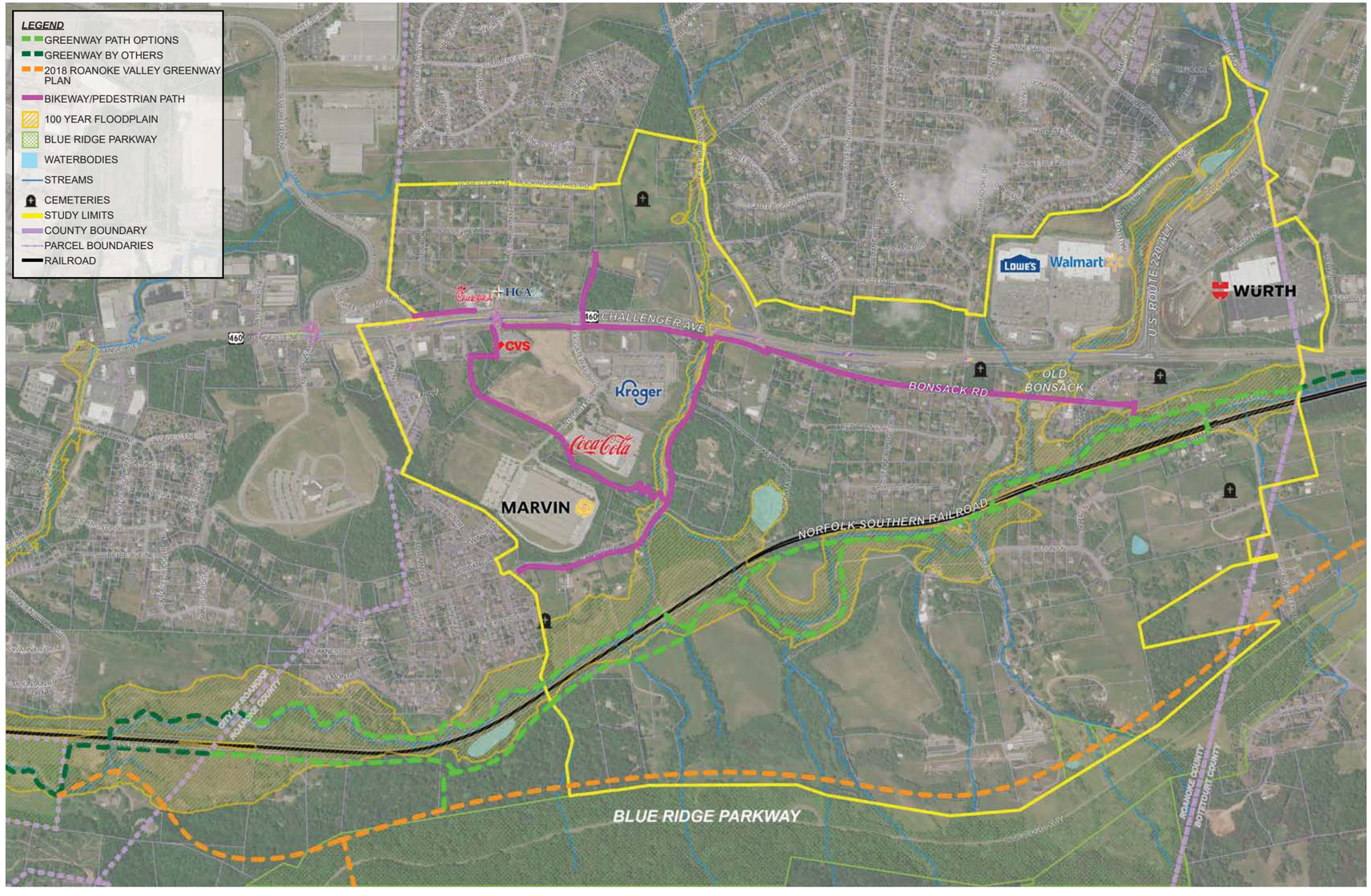
The Greenway can and should be designed to connect to points beyond the county, both toward the city and into Botetourt County, as indicated in the 2018 Roanoke Valley Greenway Plan.

Additional efforts may be considered to link non-motorized pathways to the Blue Ridge Parkway and its access to hikers and cyclists. Blue Ridge Parkway staff will be critical to these efforts.

This study also reveals locations that are suitable for improvements for bicycle and pedestrian activities. These modest improvements will allow more activities in the area to be accessed without a car, including access to the greenway itself.

Because of its volume and speed of traffic, the opportunity for pedestrian crossings on Route 460 are limited to the VDOT intersection improvements planned for West Ruritan Road. These proposed improvements envision a crosswalk-oriented design that allows pedestrians to cross with multiple refuge spots along the way.

Carson Road also envisions a shared use path for bicycles and pedestrians along this improved corridor.



Access to East of Railroad

Part of this Study focused on the potential long-term viability of the properties east of the Norfolk Southern Railway. Because several large tracts of land exist in close proximity, this study sought to determine whether industrial or other economic development opportunities exist.

Challenges to economic development east of the railroad include limits of access, at-grade railroad crossings, potential viewshed issues with Blue Ridge Parkway, and current land use expectations. Public engagement sessions furthered the expectation that a rural edge to the Bonsack community was an appreciated and expected future characteristic.

Two at-grade railroad crossings are a primary concern for potential economic development. For the area to attract prospects, grade-separated crossings would need to be constructed, for an easy means of access need to be available to the property.

Assuming that the grade-separated crossing issue was successfully addressed, the access to and through the community of Bonsack could show an increased percentage of tractor trailer traffic. This type of traffic would require more segregated access and road geometries than are currently available through the Bonsack community. Given the public position of expectations, including residents and landowners' views, this infrastructure requirement is not anticipated to be a viable possibility.

Finally, when evaluating the opportunities for economic development, a low-traffic, high-revenue option is a data center. When evaluating the viability of a data center site, most important are access to high voltage power transmission lines and water for cooling the high-temperature producing electrical systems. Delivery of both is not impossible in the Bonsack area. An AEP transmission line runs just north of the Roanoke County/Botetourt County line, and a water line network could be extended with an elevated storage tank for water redundancy needs.

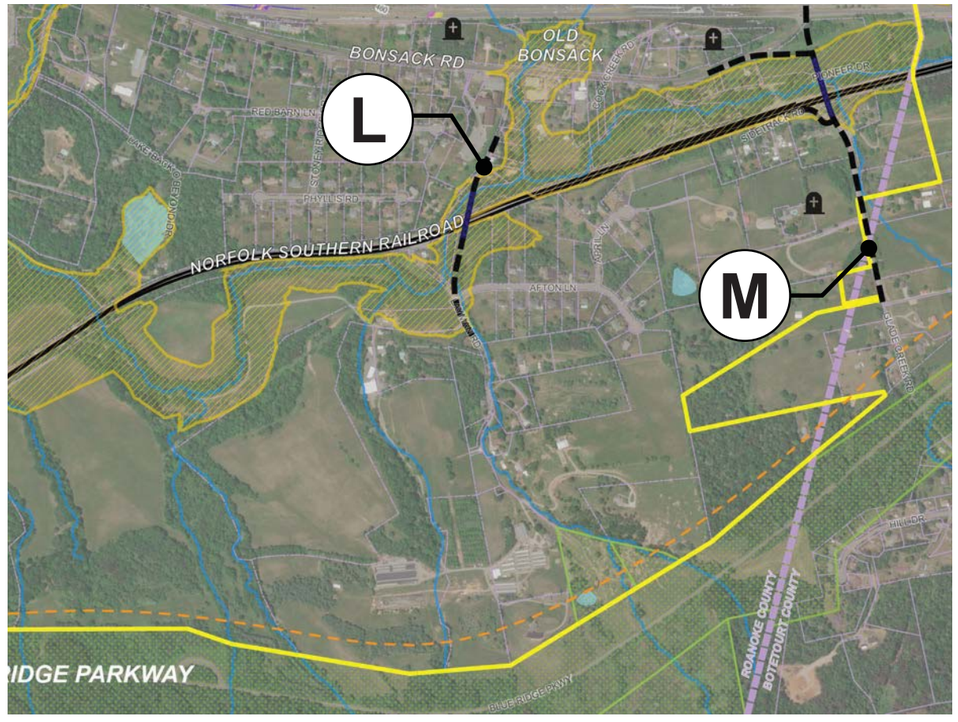
After thorough review of the space between the Norfolk Southern railroad and the Blue Ridge Parkway, the recommendation is to keep the properties in the agricultural and low-intensity residential use that it is currently in, reducing the need for future road network upgrade considerations.

An analysis of the existing at-grade railroad crossings at Layman Road and Glade Creek Road can be found in Appendix C. In October 2022, Roanoke County utilized the information compiled for both railroad crossings to submit a planning grant for a Bonsack Area Railroad Elimination Study. If funded, the study will set a foundation to apply for construction funding to build a bridge over the railroad tracks in the future.

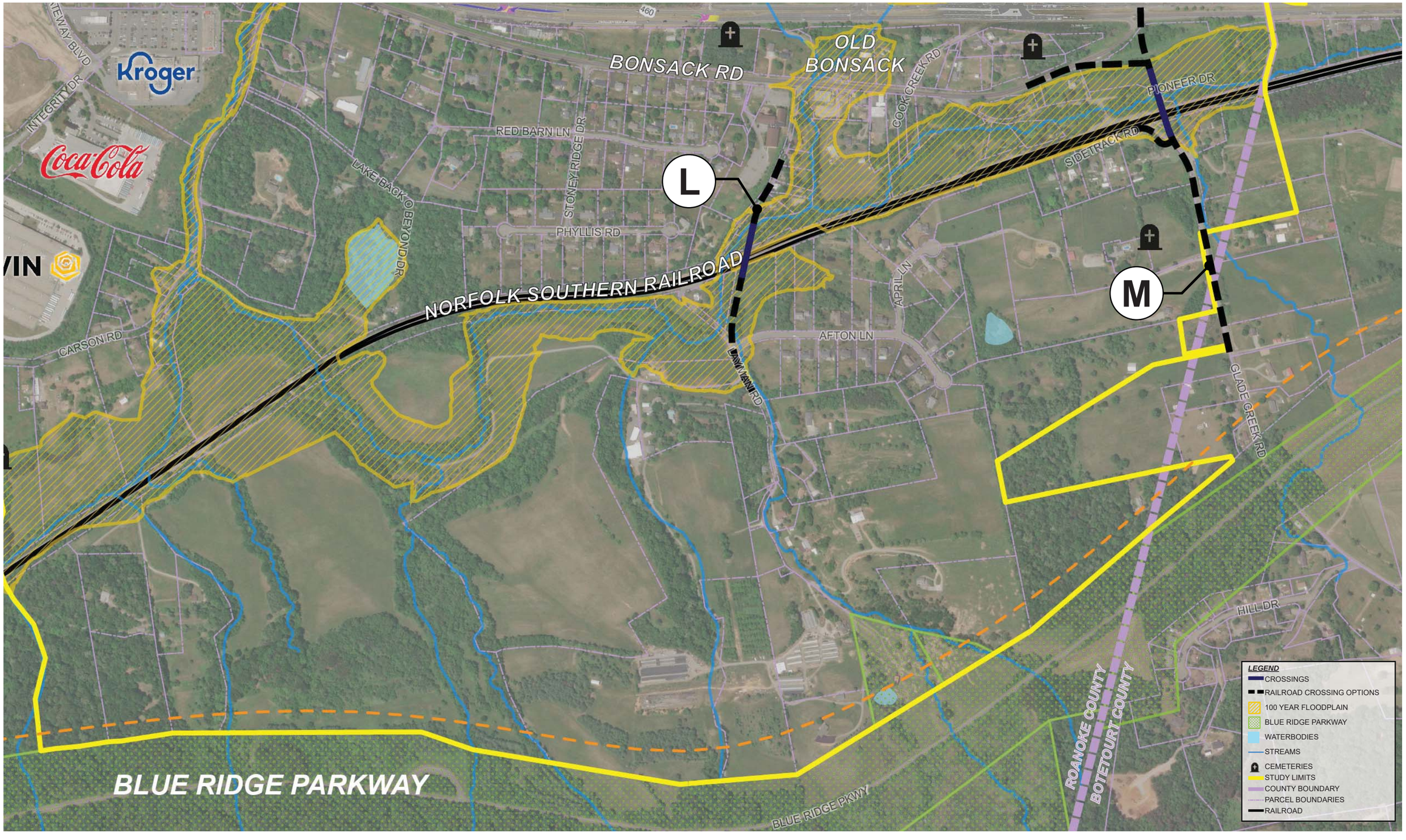
A grade-separated railroad crossing is supported by several comments received during the public comment period of this study. Comments indicate that trains block road access for residents on a frequent basis. In addition to inconvenience, trains blocking tracks has fire and rescue respond implications.

Funding the railroad crossing should be a priority for the County. During the public engagement process, several stories emerged where citizens had at times been blocked by stalled trains on the rail line speak to the importance of improving the access to those who live east of the rail line. The potential lack of ingress or egress during an emergency should help Roanoke County to pursue grant opportunities to improve the safety and health of its citizens.

Providing funding for both grade separated crossings may prove challenging, and should there be only funding available for one project at a time, Timmons Group recommends that the Layman Road Crossing be prioritized, since it is the more frequently blocked crossing, and also accesses a greater acreage of land to the east.



Access to East of Railroad

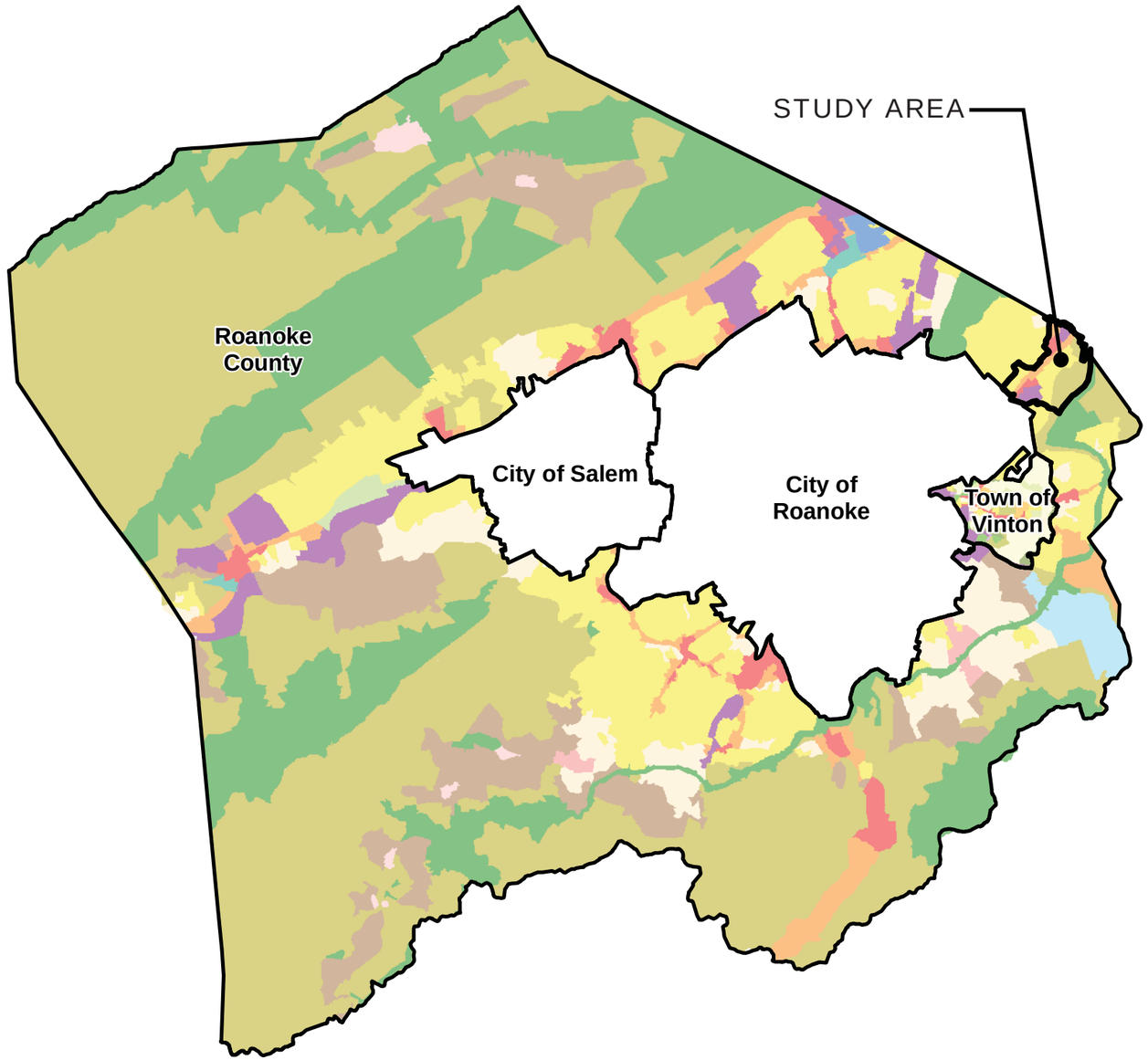


IX. Future Land Use Analysis

Beyond improvements for the current traffic concerns in the Challenger Avenue Corridor, it is important to evaluate the future land use recommendations in Roanoke County's Comprehensive Plan. The goal is to facilitate appropriate future growth, where the added business and residential activity mitigate traffic concerns.

Roanoke County's Comprehensive Plan can be found at Roanoke County's Planning Office or online. It outlines the expected land use patterns in the future and helps guide decisions of County leadership and staff when considering zoning cases and other land use requests from landowners.

This study reviewed the Future Land Use Map in the Challenger Avenue Corridor and identifies opportunities to modify the Future Land Use Map in ways that will balance positive growth in the future with the traffic challenges that can come with that growth.



Roanoke County Future Land Use Map

Current Future Land Use Map

The Future Land Use Map sets the course for future development in the County. Future Land Use designations are typically considered when Rezoning or Special Use Permit requests are evaluated by the Planning Commission and Board of Supervisors. The map to the right shows the County's Future Land Uses as of the date of this study. See the Future Land Use designation descriptions below for additional information.

Core: *A future land use area where high intensity urban development is encouraged. Land uses within core areas may parallel the central business districts of Roanoke, Salem and Vinton. Core areas may also be appropriate for larger-scale highway-oriented retail uses and regionally-based shopping facilities. Due to limited availability, areas designated as Core are not appropriate for tax-exempt facilities.*

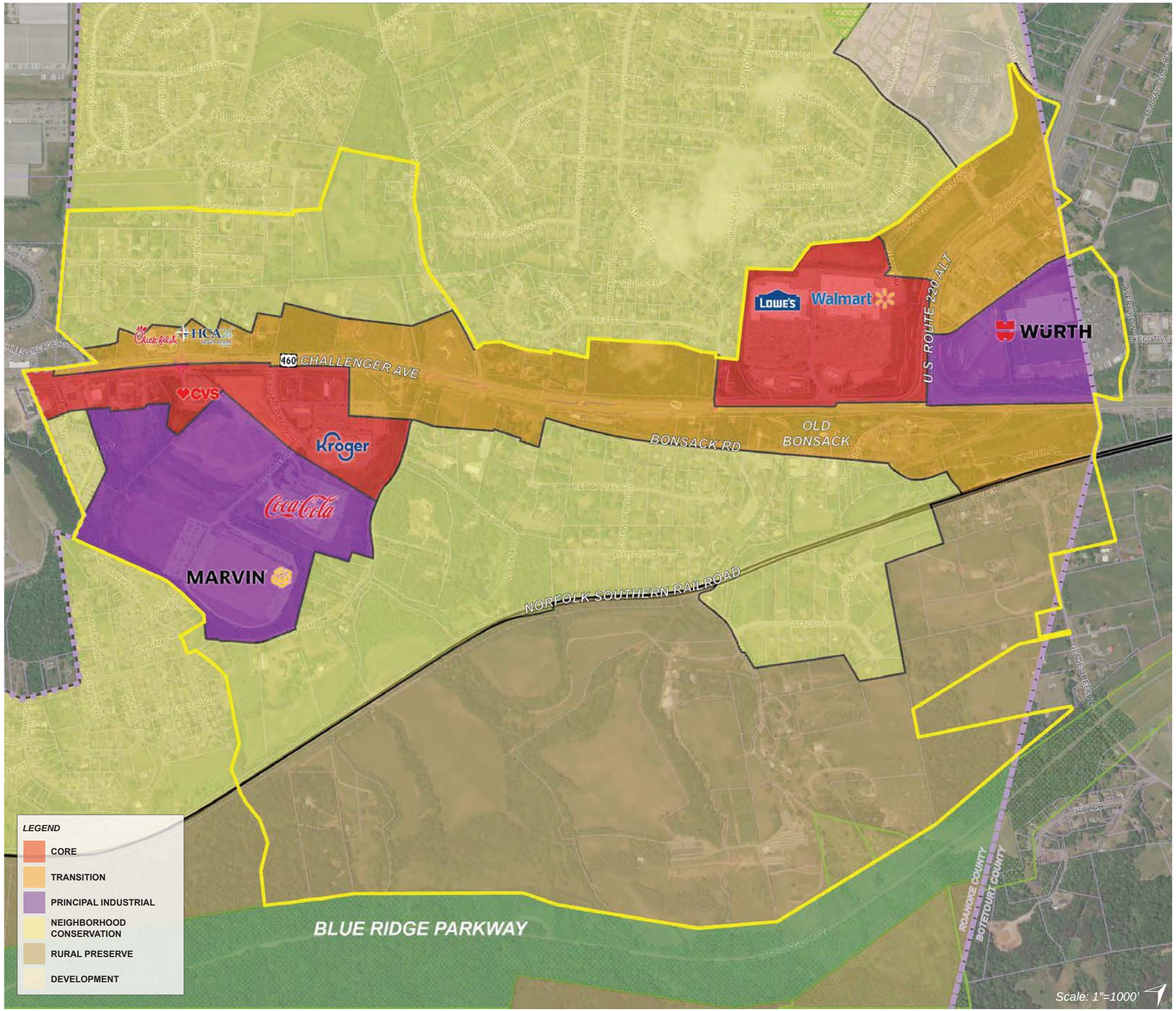
Transition: *A future land use area that encourages the orderly development of highway frontage parcels. Transition areas generally serve as developed buffers between highways and nearby or adjacent lower intensity development. Intense retail and highway oriented commercial uses are discouraged in transition areas, which are more suitable for office, institutional and small-scale, coordinated retail uses.*

Principal Industrial: *A future land use area where a variety of industry types are encouraged to locate. Principal Industrial areas are existing and planned regional employment centers are distributed throughout the county, convenient to major residential areas and suitable highway access. Due to limited availability, areas designated as Principal Industrial are not appropriate for tax-exempt facilities.*

Neighborhood Conservation: *A future land use area where established single-family neighborhoods are delineated and the conservation of the existing development pattern is encouraged.*

Rural Preserve: *A future land use area of mostly undeveloped, outlying lands. These rural regions are generally stable and require a high degree of protection to preserve agricultural, forestall, recreational, and remote rural residential areas.*

Development: *A future land use area where most new neighborhood development will occur, including large-scale planned developments which mix residential with retail and office uses. Innovation in housing design and environmental sensitivity in site development is a key objective. Clustered developments are encouraged as is the use of greenways and bike and*

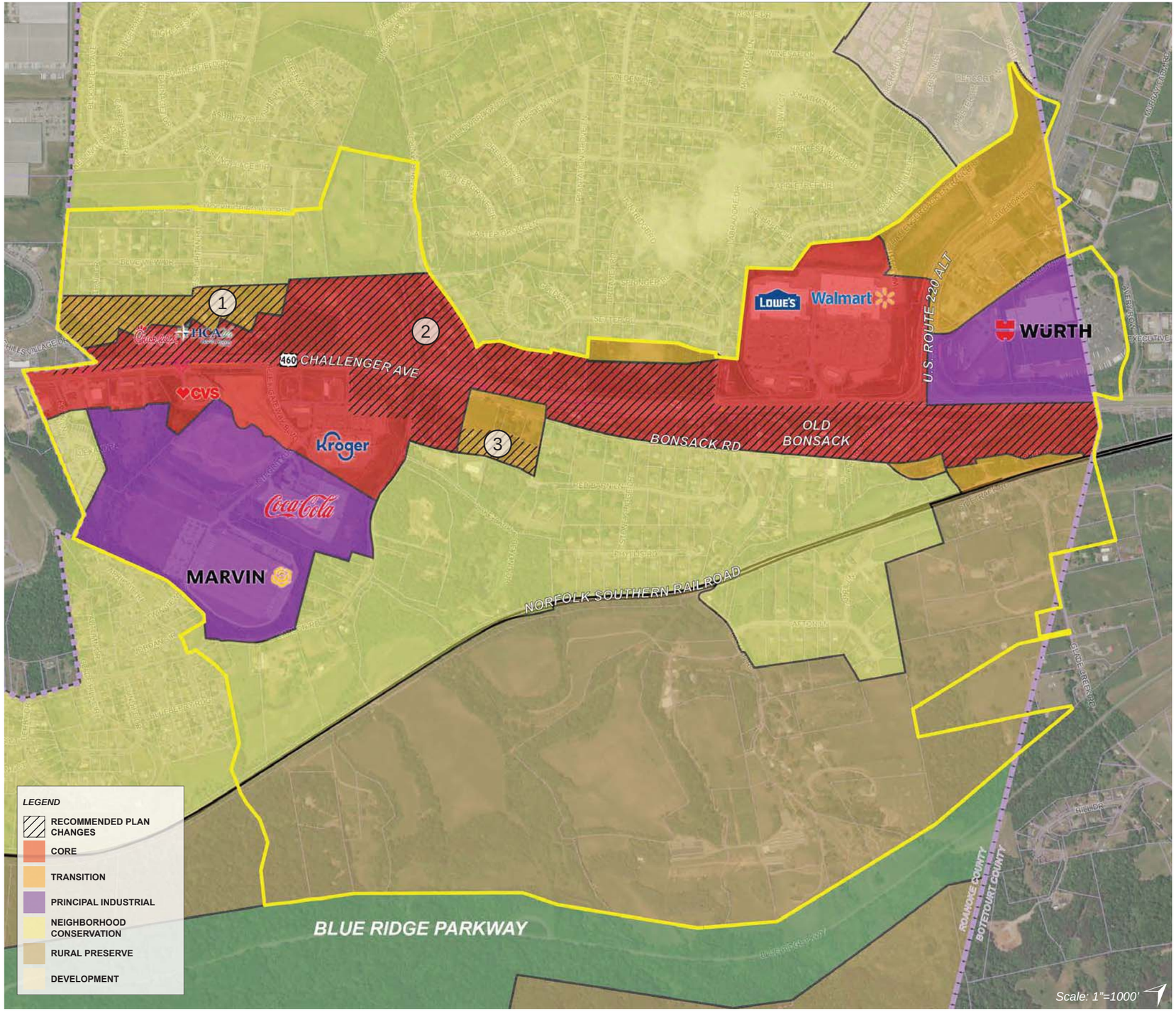


Future Land Use Map

The recommended opportunities for the County to update its Future Land Use Map are shown at the right with hatching to identify the extent of those changes.

Area 1: In the western portion of the corridor, an expansion of the Transition area to the parcels behind the Route 460 commercial Core properties is recommended. This will allow for transition uses that extend the commercial and higher density residential without disruption to the neighborhoods to the west and north of the area.

Area 2: With large parcels and frontage along the Route 460 right-of-way, this highly visible area is envisioned as an appropriate location for Core uses. This use type can take advantage of VDOT planned improvements and the improvements recommended in this study to expand the retail and commercial opportunities for the Bonsack community.



X. Railroad Crossings

Current Concerns & Conditions

In order to access large areas across the railroad that are currently undeveloped or underdeveloped, safe, reliable access needs to be provided. Currently, there are two at-grade railroad crossings in Roanoke County which provide access to these areas. Both are substandard in width and have many geometric deficiencies. In the short term, signing, striping, clearing, and pavement widening can help positively guide drivers across the existing crossings. These options, however, will not solve larger safety issues from poor crossing angles and other substandard geometry, conflicts with trains, and potential flooding of Glade Creek. For reliable long-term access for denser development, grade separation is recommended.

The Railroad Crossing Study completed was limited to existing railroad crossings, which constrains the alternatives as both have numerous residences nearby. A new crossing could avoid impacts to structures and optimize access and length of crossing and depending on the connecting road may need significant road improvements, such as if a crossing were added that connects to Carson Road.

A grade-separated railroad crossing is supported by several comments received during the public comment period of this study. Comments indicate that trains block road access for residents on a frequent basis. In addition to inconvenience, trains blocking tracks has fire and rescue respond implications.

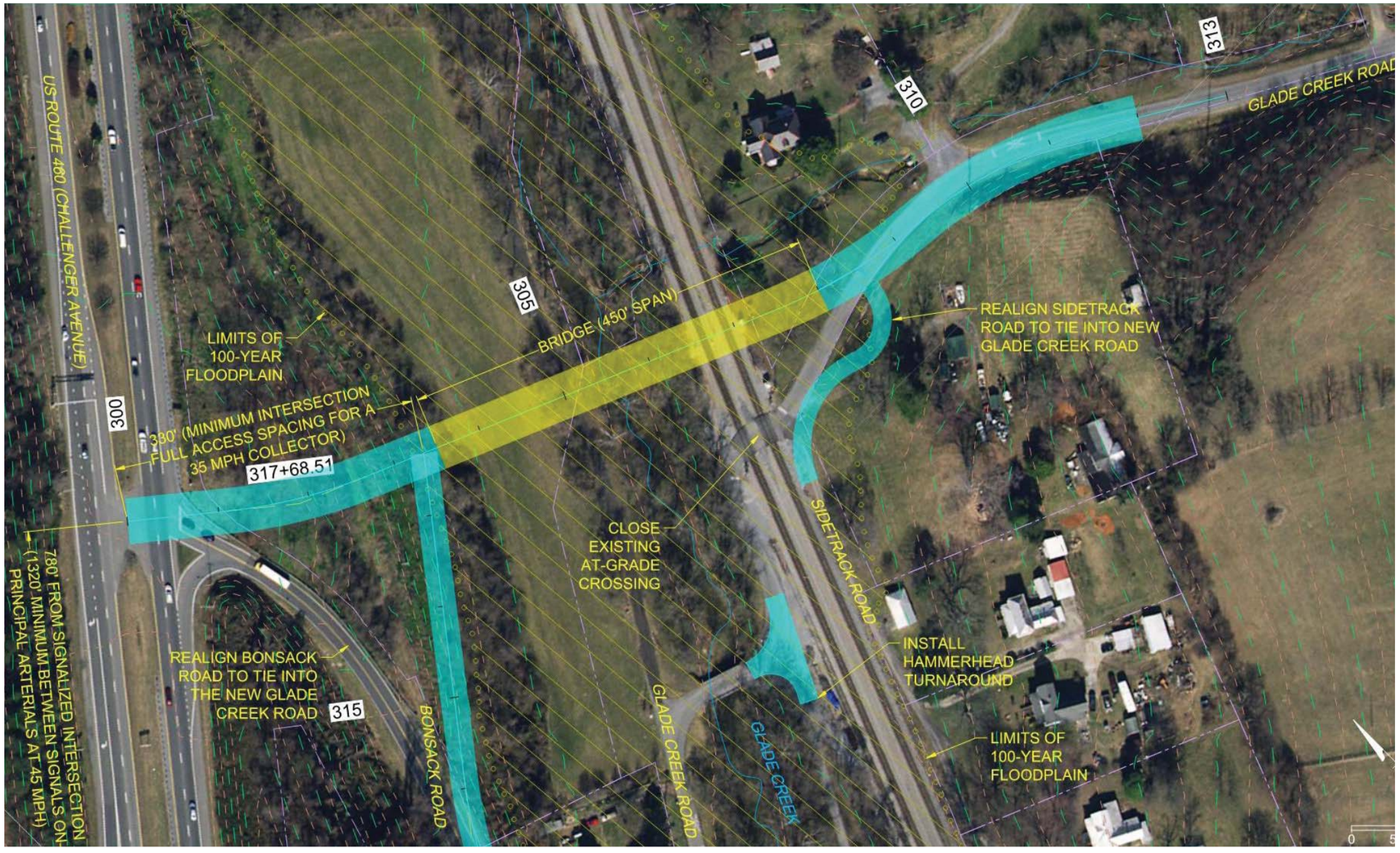
In October 2022, Roanoke County utilized the information compiled for both railroad crossings to submit a planning grant for a Bonsack Area Railroad Elimination Study. If funded, the study will set a foundation to apply for construction funding to build a bridge over the railroad tracks in the future.

Glade Creek Railroad Crossing

Layman Road Railroad Crossing

Glade Creek Road Crossing

The first crossing is along Glade Creek Road. The existing road is accessed from Bonsack Road and parallels Glade Creek road and the railroad in the floodplain before crossing both with a series of sharp curves. Since most of the road is running parallel to and within the floodplain, an alternative alignment that provides the shortest crossing of the floodplain possible is preferred. This can be achieved and even furthered by realigning Bonsack Road to tie into the new alignment, giving the realigned Glade Creek Road a full access point to Route 460. This avoids routing development traffic through Old Bonsack and would likely have a shorter bridge than the Layman Road option but would be further from developable land and would require additional road work.



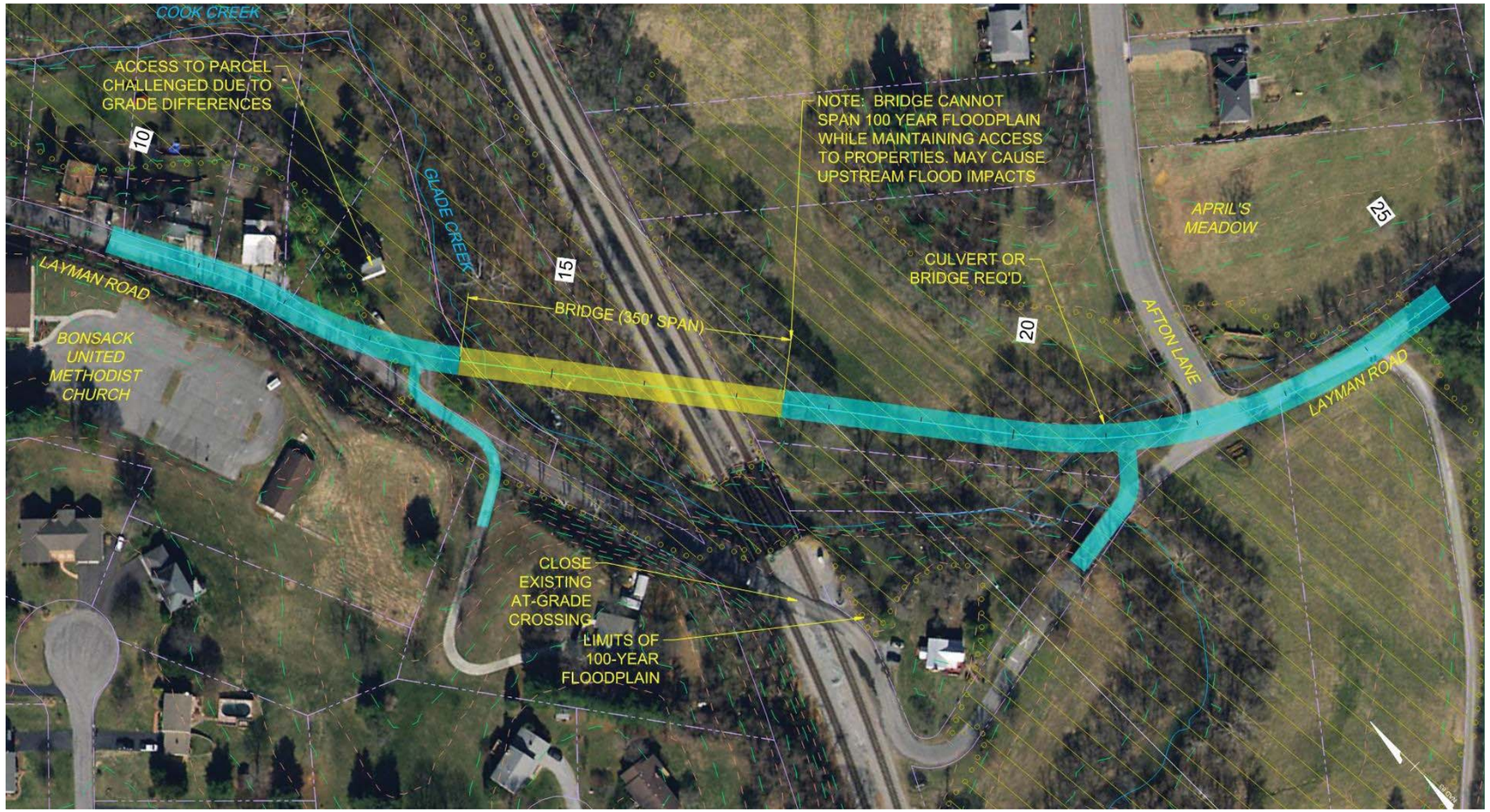
Layman Road Crossing

The second crossing studied along Layman Road provides the most direct access to the best available developable land. To access Layman Road, however, requires driving through historic Old Bonsack, where roads are substandard in width and many historic properties are directly adjacent to the road, limiting opportunities to support additional traffic. The existing road also crosses the floodplain and railroad track at an angle with multiple sharp turns. The road will need to be realigned to safely handle larger traffic volumes, but due to adjacent historic properties, there is no way to correct the angle. To prevent flooding to upstream properties, this will require a longer bridge, which limits the ability to connect existing driveways to the realigned road, further increasing cost.

Creating a grade-separated railroad crossing to eliminate the possibility of train and vehicle collisions is the most expensive traffic improvement considered in this study. It is recommended that only one grade-separated crossing be built because of the financial cost.

Layman Road provides access to more property than does Glade Creek Road. Agricultural activities, along with future potential land use options, are reasons that Layman Road is the preferred project to consider for a grade-separated crossing.

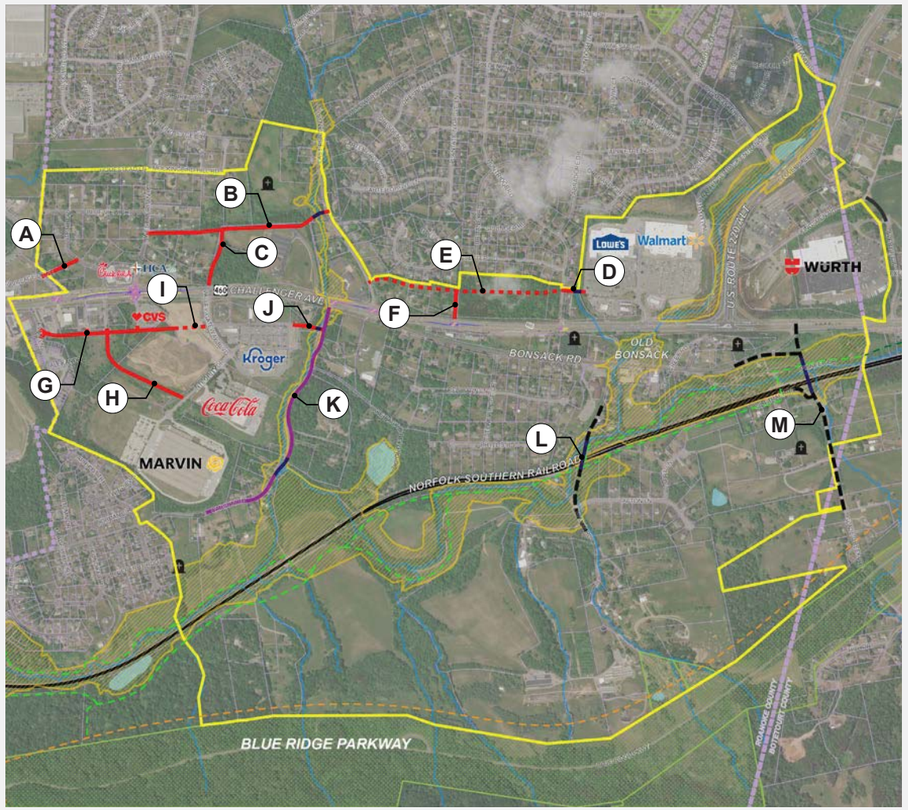
The Layman Road crossing also has a history of actual blockages due to train backups on the tracks. This is a dangerous scenario from an emergency services standpoint, furthering the benefit of a grade-separated crossing here.



XI. Recommended Priority of Improvement Options

Each of the potential improvement projects described in this report have different capacity to improve the quality of life in the Bonsack community. Each has the potential to improve safety and convenience, but each comes with different costs to implement. Recognizing the need to identify opportunities in a context that can be evaluated for prioritization by Roanoke County, the matrix to the right identifies some of the cost and benefit expectations of each of the improvements noted in this report.

Note, the cost, safety, and congestion/convenience scales are relative to one another, and do not reflect real dollars or expected level of service improvements, respectively.



Opportunity	Improvement	Description	Safety Impact	Congestion/ Convenience Impact	Mitigate New Development	Pedestrian/ Bicycle Accommodations	Level of Public Interest	Cost	Recommended Priority
Carson Road	K	Carson Road Safety Improvements	High	High	No	Yes, Where Feasible	High	High	High
Access to East of Railroad	L	Layman Road Grade-Separated Railroad Crossing and Roadway Realignment	High	High	Yes	No	Medium	High	High
Access to East of Railroad	M	Glade Creek Road Grade-Separated Railroad Crossing and Connection to Route 460	High	High	Yes	No	Medium	High	High
Greenway	N	Glade Creek Greenway Extension Generally along Glade Creek	High for Pedestrians and Bicyclists	Medium	No	N/A	High	High	High
Blue Hills to East Ruritan	A	Trail Drive to Blue Hills Village Drive connection	Medium	High	Yes	Yes, Where Feasible	Medium	Medium	High
Blue Hills to East Ruritan	B	West Ruritan Road to East Ruritan Road connection	Medium	High	Yes	Yes, Where Feasible	Medium	High	Medium
Valley Gateway	G	Evan Lane to CVS Private Driveway	Medium	High	Yes	Yes, Where Feasible	High	High	Medium
East Ruritan to Walmart	E	East Ruritan Road to Huntridge Drive (Optional)	Medium	High	Yes	Yes, Where Feasible	Low	High	Medium
Valley Gateway	H	Route 460/Trail Drive Intersection to Integrity Drive	Medium	High	Yes	Yes, Where Feasible	High	High	Medium
Valley Gateway	I	CVS Private Driveway to Valley Gateway Boulevard (Optional)	Medium	High	Yes	Yes, Where Feasible	Medium	Medium	Medium
Blue Hills to East Ruritan	C	Route 460/Valley Gateway Intersection to "B"	Medium	Medium	Yes	Yes, Where Feasible	High	Medium	Medium
East Ruritan to Walmart	F	Country Corner crossover to "E"	Medium	Medium	Yes	Yes, Where Feasible	Low	Medium	Medium
East Ruritan to Walmart	D	Huntridge Road to Lowe's/ Walmart Parking Lot	Low	High	No	Yes, Where Feasible	Medium	High	Low
Valley Gateway	J	Kroger Parking Lot to Carson Road	Low	Medium	No	Yes, Where Feasible	High	High	Low