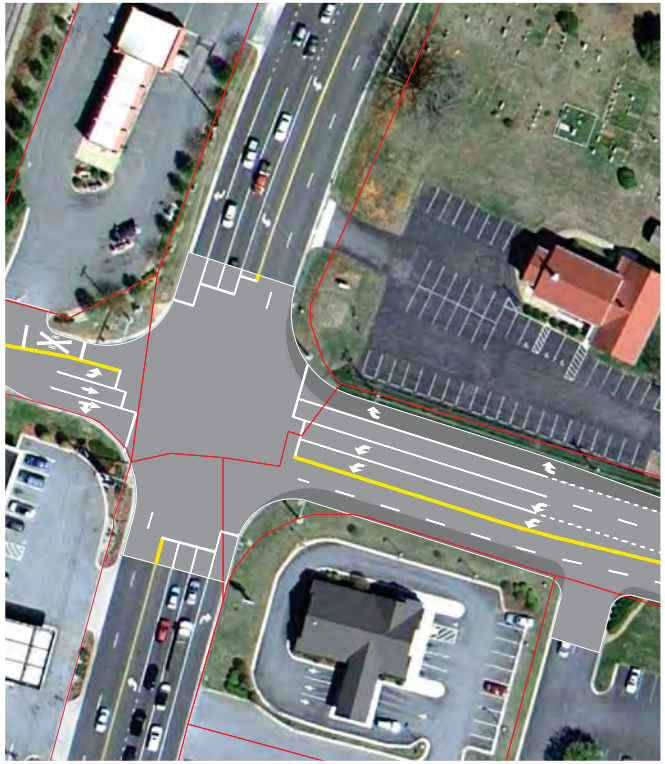
# Route 221 Corridor Plan
# Bedford County/City of Lynchburg, VA



Submitted by:
EPR, P.C.
in association with Parsons Brinckerhoff

for:
Region 2000 Local Government Council & Central Virginia
Metropolitan Planning Organization

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EPR PARSONS BRINCKERHOFF

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# 1. Introduction and Purpose

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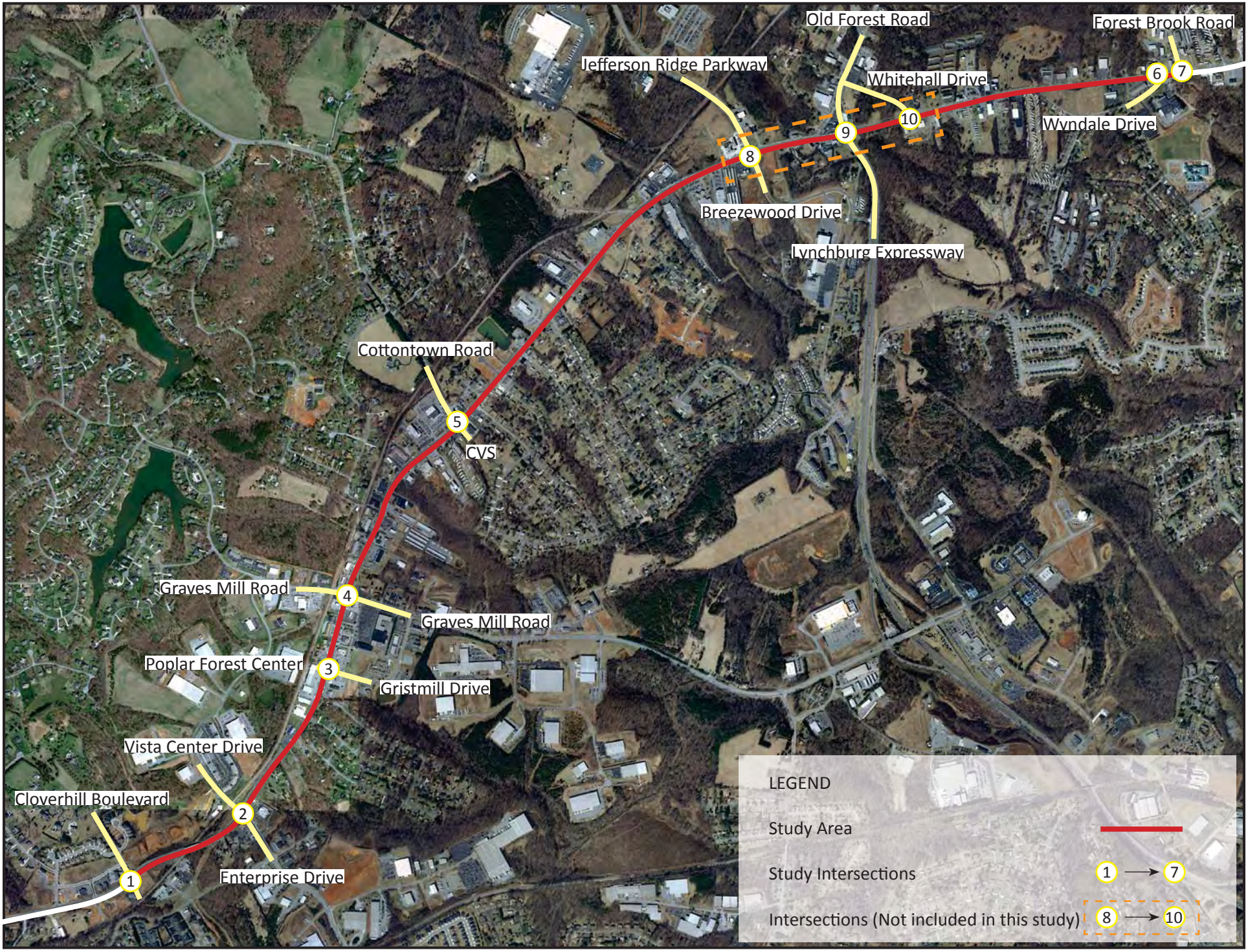
Route 221, named Forest Road in Bedford County and Lakeside Drive in the City of Lynchburg, is a major transportation link that is critical to the economic vitality of the County and City. This roadway serves local residents, as well as local businesses that rely on Route 221. Route 221 also serves as the major connector between the Town of Bedford and the City of Lynchburg.

This study investigated existing and future traffic conditions, traffic operations, multimodal features, and safety issues along Route 221, from Cloverhill Boulevard at the southwest terminus to Forest Brook Road at the northeast terminus, resulting in recommendations for the benefit of the citizens and businesses in the surrounding study area. **Figure 1** provides an illustration of the study area, as well as the intersections this study examined.

A summary of the recommended projects is included. This information is intended to aid the County and City with project prioritization and implementation when grant or other funding opportunities arise in the future. The project list should continue to be updated in the future as a tool to track opportunities and needs within the corridor.

**Figure 1 Study Area and Study Area Intersections**



# 2. Data Collection Summary

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The overall methodology for this study included assembling existing data, analyzing existing and future traffic operations, comparing existing and proposed conditions to accepted traffic engineering standards, and recommending improvements. The recommendations are summarized at the end of the document in a table of strategies for implementation. A summary of funding tools and strategies that may be considered for implementation is also included.

Various sources of information such as traffic counts, traffic forecasts, and crash data were brought together for this study. These include:

- VDOT Historical Traffic Data obtained from VDOT's website at http://www.virginiadot.org/info/ct-TrafficCounts.asp,
- Travel Demand Model Data for the Year 2014 and the Year 2040,
- Gables Development Traffic Impact Study prepared in 2012 by EPR, P.C.,
- Lakeside Crossing Traffic Impact Analysis prepared in 2012 by Ramey Kemp & Associates of Richmond, Inc.,
- Gables I Traffic Impact Analysis prepared in 2012 by EPR, P.C.,
- Rosedale Farms Traffic Impact Analysis prepared in 2013 by EPR, P.C.,
- Crash Data received from VDOT for the three year period between January 1, 2010, and December 31, 2012,
- Field observations by professional engineers specializing in traffic engineering, and
- New traffic turning movement counts at Gristmill Drive, Graves Mill Road, Cottontown Road, Wyndale Drive, and Forest Brook Road intersections.

# 3. Existing Conditions

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## Roadways and Land Use

The Route 221 corridor is an urban minor arterial roadway with four lanes and a two-way left turn lane from Cloverhill Boulevard to the Lynchburg Expressway, and with two lanes and a two-way left turn lane from the Lynchburg Expressway to Forest Brook Road. The existing land use throughout the corridor varies. While much of the adjacent land is developed, there remain a number of large, undeveloped parcels. Based on the Future Land Use map contained within the Bedford County Comprehensive Plan, the portion of Route 221 within Bedford County (Cloverhill Boulevard to east of Cottonwood Drive) is planned to be Mixed Use, with primarily commercial and residential development. Based on the Future Land Use map contained in the City of Lynchburg's Comprehensive Plan, the portion of Route 221 within Lynchburg (east of Cottonwood Drive to Forest Brook Road) is zoned for Community Commercial, with the exception of the section between Whitehall Road and Countryplace Lane which is zoned as Medium Density Residential.

**Figure 2** provides an illustration of the roadway conditions and the planned land uses in the study area.

## Existing Traffic Volumes

The traffic volumes used as the basis for this study were obtained from recent studies, new traffic counts, and VDOT's annual traffic count program. For the intersections of Gristmill Drive, Graves Mill Road, Cottonwood Road, Wyndale Drive and Forest Brook Road with Route 221 new traffic counts were conducted. All traffic counts were performed on a Tuesday, Wednesday, or Thursday of a typical week while schools were in session. The counts for the morning peak period were performed between 7AM and 9AM, and the counts for the afternoon peak period were performed between 4PM and 6PM.

Traffic volumes for the remaining intersections were gathered from other studies and factored up to reflect 2014 conditions. For the intersections of Clover Hill Boulevard and Enterprise Drive with Route 221, existing traffic volumes from the **Gables Development Traffic Impact Study** (completed in 2012 by EPR, P.C.), were factored up by 0.5% per year. For the intersections of Jefferson Ridge Parkway, the Lynchburg Expressway, and Whitehall Road with Route 221, traffic volumes from the **Lakeside Crossing Traffic Impact Analysis** (completed in 2012 by Ramey Kemp & Associates of Richmond, Inc.) 2014 build conditions were used. **Figure 3** provides an illustration of the existing traffic volumes assumed for the study intersections.

Existing average daily traffic volumes along Route 221 were computed from the peak hour traffic volumes by applying the appropriate K Factors per VDOT. The factors were found at http://www.virginiadot.org/info/ct-TrafficCounts.asp. **Figure 4** provides an illustration of the existing average daily traffic volumes along Route 221.

**Figure 2 Roadway Conditions and Planned Land Uses**

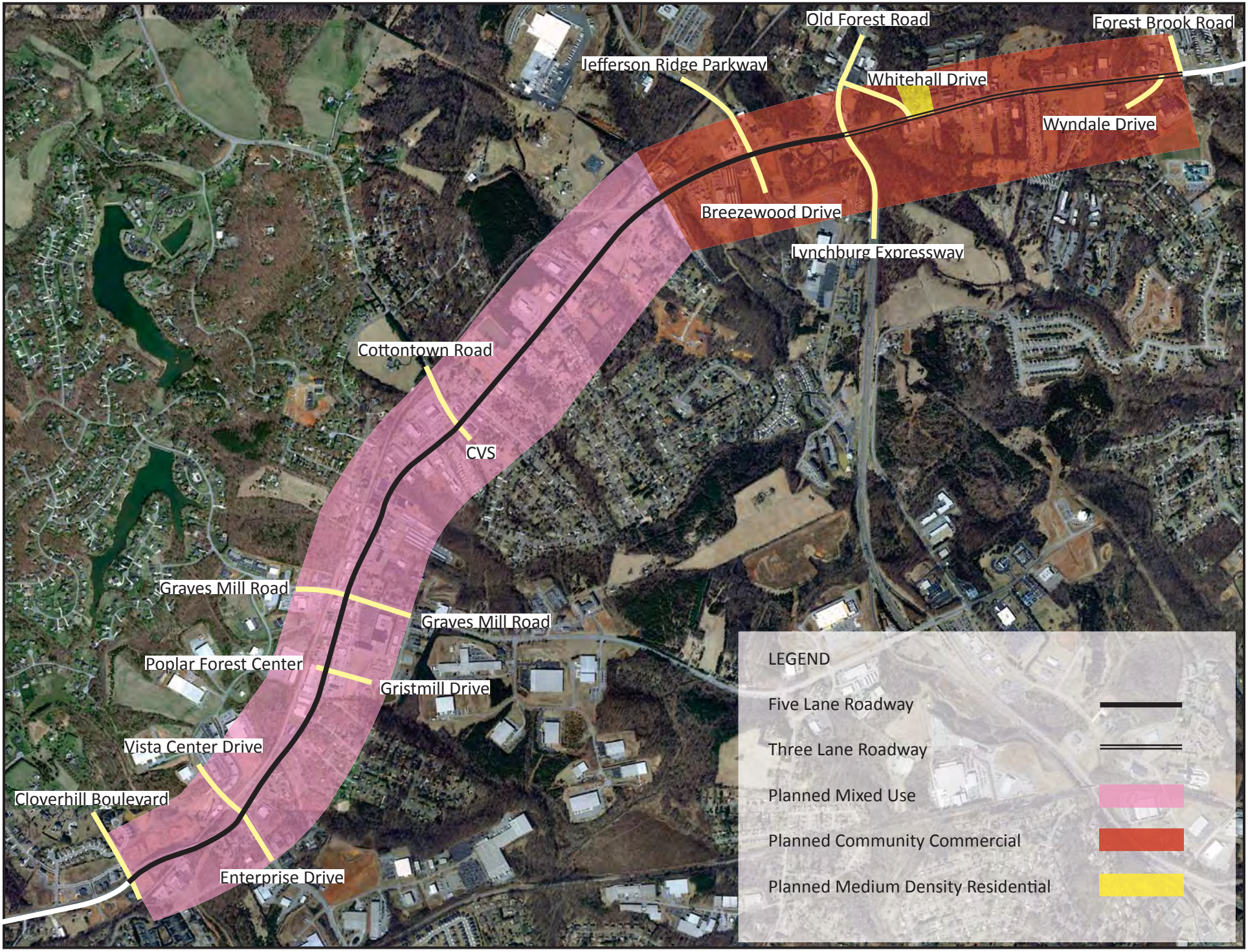


**Figure 3 Existing (2014) Traffic Volumes at Study Intersections**

XX/XX AM/PM

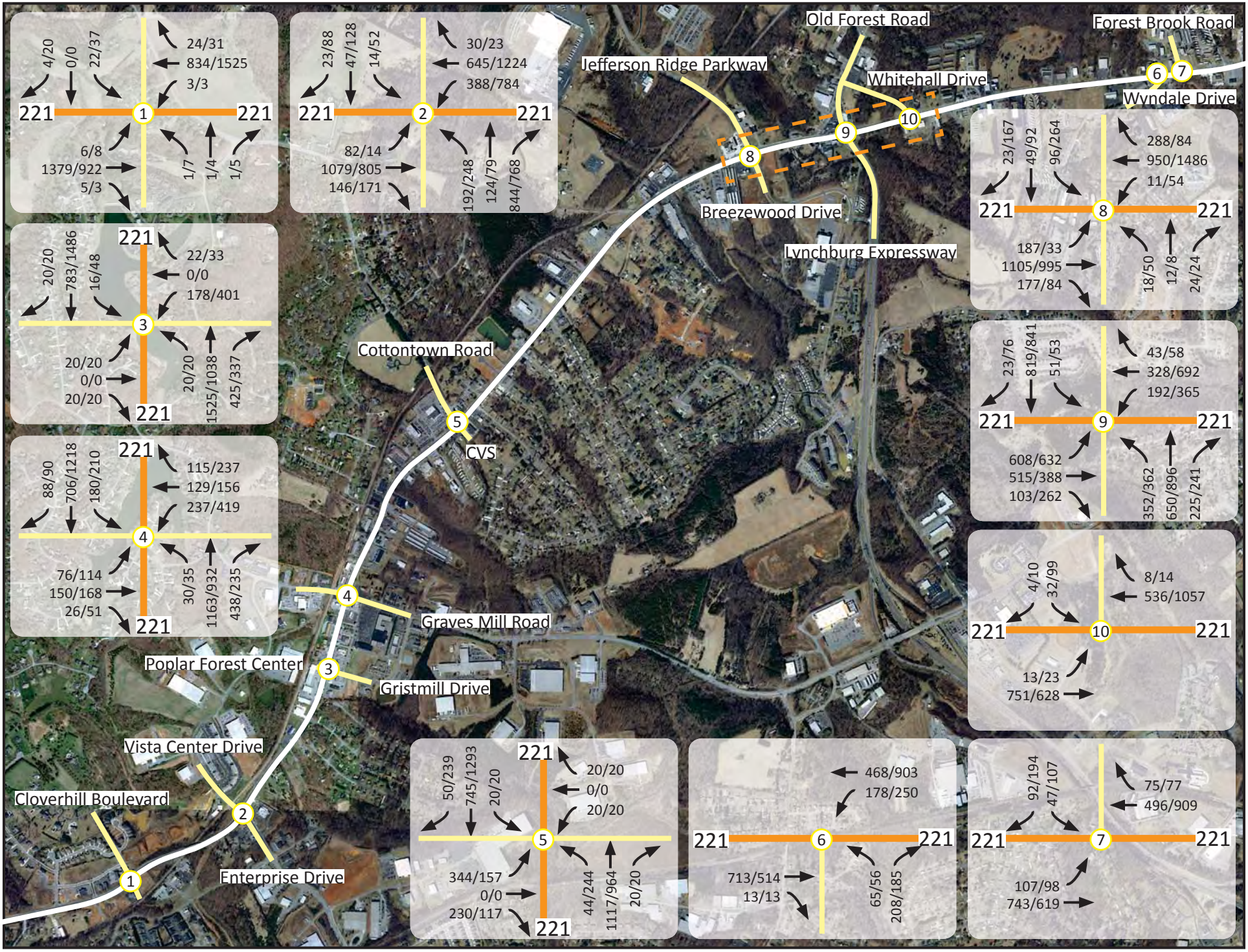
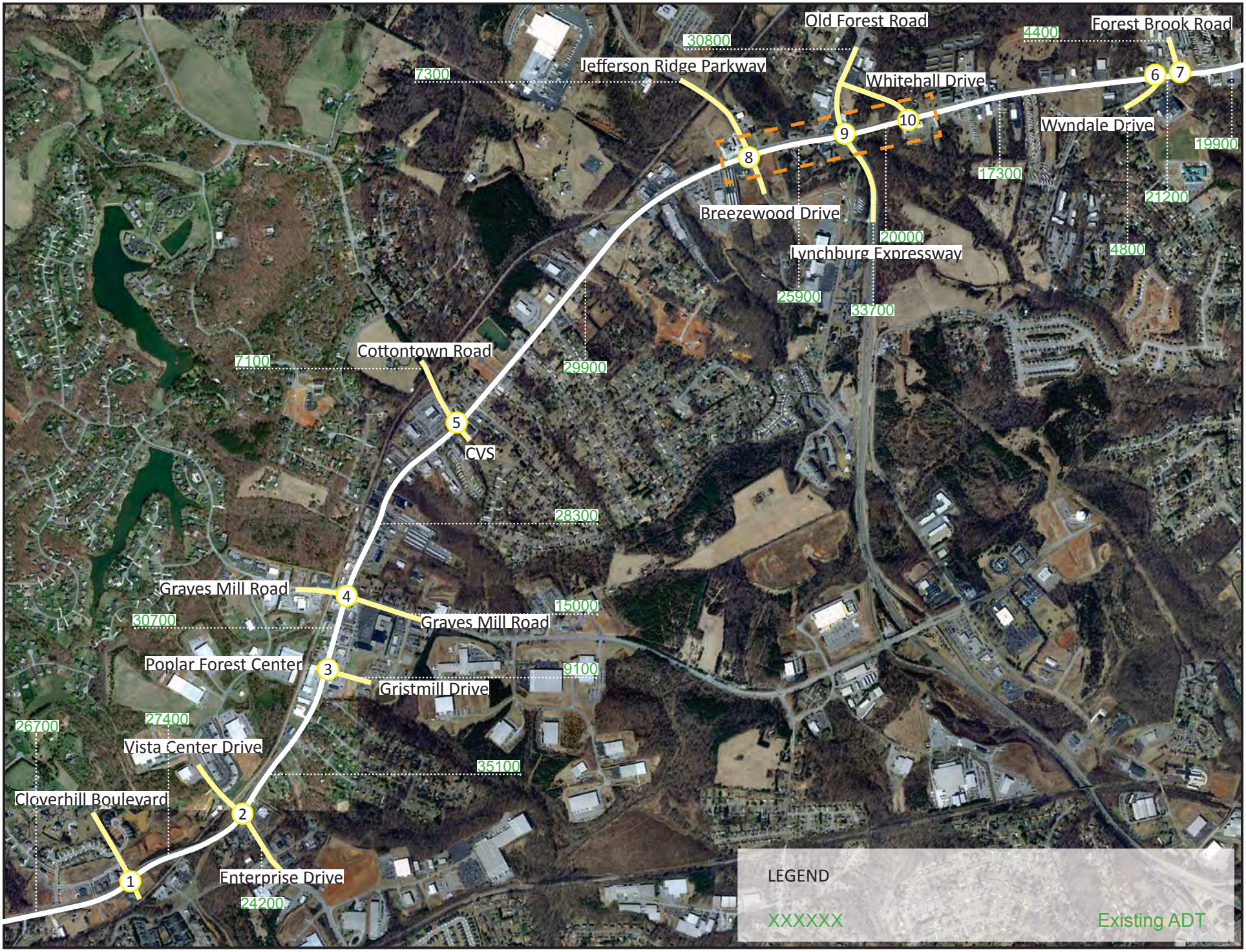


**Figure 4 Existing (2014) Average Daily Traffic Volumes**



## Existing Traffic Operations

Existing traffic operations were examined using Synchro and SimTraffic (version 8) and reports are provided in attached **Technical Appendix A**. The existing intersection lane configurations and storage lane lengths which the analysis was based on are illustrated in **Figure 5**. Traffic signal timings were provided by VDOT and the City of Lynchburg.

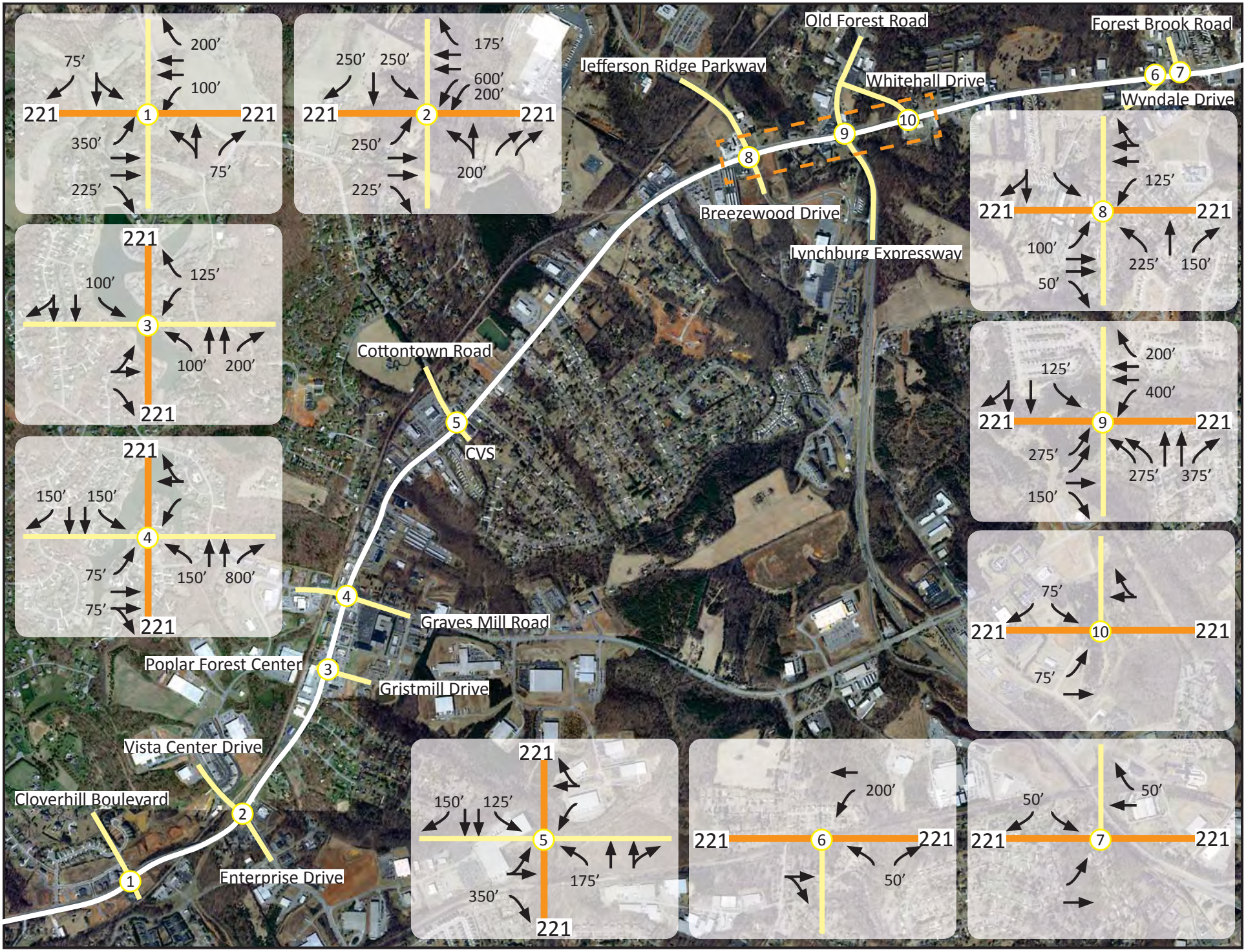
The intersections of Jefferson Ridge Parkway, the Lynchburg Expressway and Whitehall Drive with Route 221 are part of a study soon to be undertaken by others and therefore, were not analyzed in this study.

Currently all of the study area intersections operate at LOS D or better overall with the exception of Enterprise Drive during both peak periods and Graves Mill Road during the afternoon peak period. All of the intersections from Cloverhill Boulevard to Cottontown Road have at least one movement that is currently operating at LOS E or F during one peak period. All movements at the intersection of Wyndale Drive and Forest Brook Road currently operate at LOS D or better.

**Table 1** provides the existing conditions levels of service, delays, and queues and **Figure 6** provides an illustration of existing levels of service on aerial base mapping.

**Figure 5 Existing Intersection Geometry**

XX' Storage Lane Length



## Table 1 Existing Levels of Service, Delays and Queues

| 1. Route 221/Cloverhill | | Existing | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cloverhill | NBL/NBT | C | 31.4 | 22 | D | 38.7 | 28 |
| Cloverhill | NBR | C | 28.7 | 17 | D | 35.7 | 21 |
| Cloverhill | SBL/SBT | F | 164.6 | 46 | C | 34.1 | 58 |
| Cloverhill | SBR | C | 28.9 | 10 | C | 32.3 | 27 |
| Route 221 | EBL | A | 4.5 | 23 | A | 9.3 | 37 |
| Route 221 | EBT | B | 11.3 | 160 | A | 8.8 | 142 |
| Route 221 | EBR | A | 4.6 | 21 | A | 6.0 | 10 |
| Route 221 | WBL | A | 7.0 | 10 | A | 6.1 | 11 |
| Route 221 | WBT | A | 6.7 | 127 | B | 13.1 | 220 |
| Route 221 | WBR | A | 4.7 | 25 | A | 6.2 | 25 |
| | | | | | | | |
| INTERSECTION | | B | 11.2 | | B | 12.3 | |

| 2. Route 221/Enterprise | | Existing | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Vista Center | EBL | D | 49.4 | 44 | D | 48.6 | 96 |
| Vista Center | EBT | D | 52.5 | 102 | E | 63.0 | 175 |
| Vista Center | EBR | D | 47.3 | 72 | D | 46.3 | 153 |
| Enterprise | WBL/WBT | E | 67.5 | 357 | F | 175.3 | 430 |
| Enterprise | WBR | D | 40.1 | 305 | D | 45.5 | 508 |
| Route 221 | NBL | D | 53.6 | 400 | E | 62.6 | 56 |
| Route 221 | NBT | F | 121.5 | 1061 | D | 52.4 | 409 |
| Route 221 | NBR | A | 0.1 | 425 | A | 0.2 | 282 |
| Route 221 | SBL | D | 50.7 | 244 | F | 247.2 | 476 |
| Route 221 | SBT | C | 26.8 | 244 | D | 39.9 | 419 |
| Route 221 | SBR | B | 15.8 | 67 | B | 10.8 | 150 |
| | | | | | | | |
| INTERSECTION | | E | 63.9 | | F | 90.1 | |

| 3. Route 221/Gristmill | | Existing | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Center | EBL/EBT | D | 46.6 | 61 | D | 46.9 | 60 |
| Center | EBR | D | 44.8 | 55 | D | 45.1 | 59 |
| Gristmill | WBL | D | 37.9 | 188 | E | 79.5 | 451 |
| Gristmill | WBR | C | 28.7 | 73 | C | 25.3 | 175 |
| Route 221 | NBL | A | 8.4 | 104 | B | 16.2 | 89 |
| Route 221 | NBT | B | 19.9 | 307 | B | 18.2 | 262 |
| Route 221 | NBR | A | 5.5 | 73 | A | 5.4 | 73 |
| Route 221 | SBL | B | 14.2 | 82 | B | 11.1 | 205 |
| Route 221 | SBT/SBR | B | 11.4 | 241 | C | 21.4 | 673 |
| | | | | | | | |
| INTERSECTION | | B | 16.8 | | C | 25.5 | |

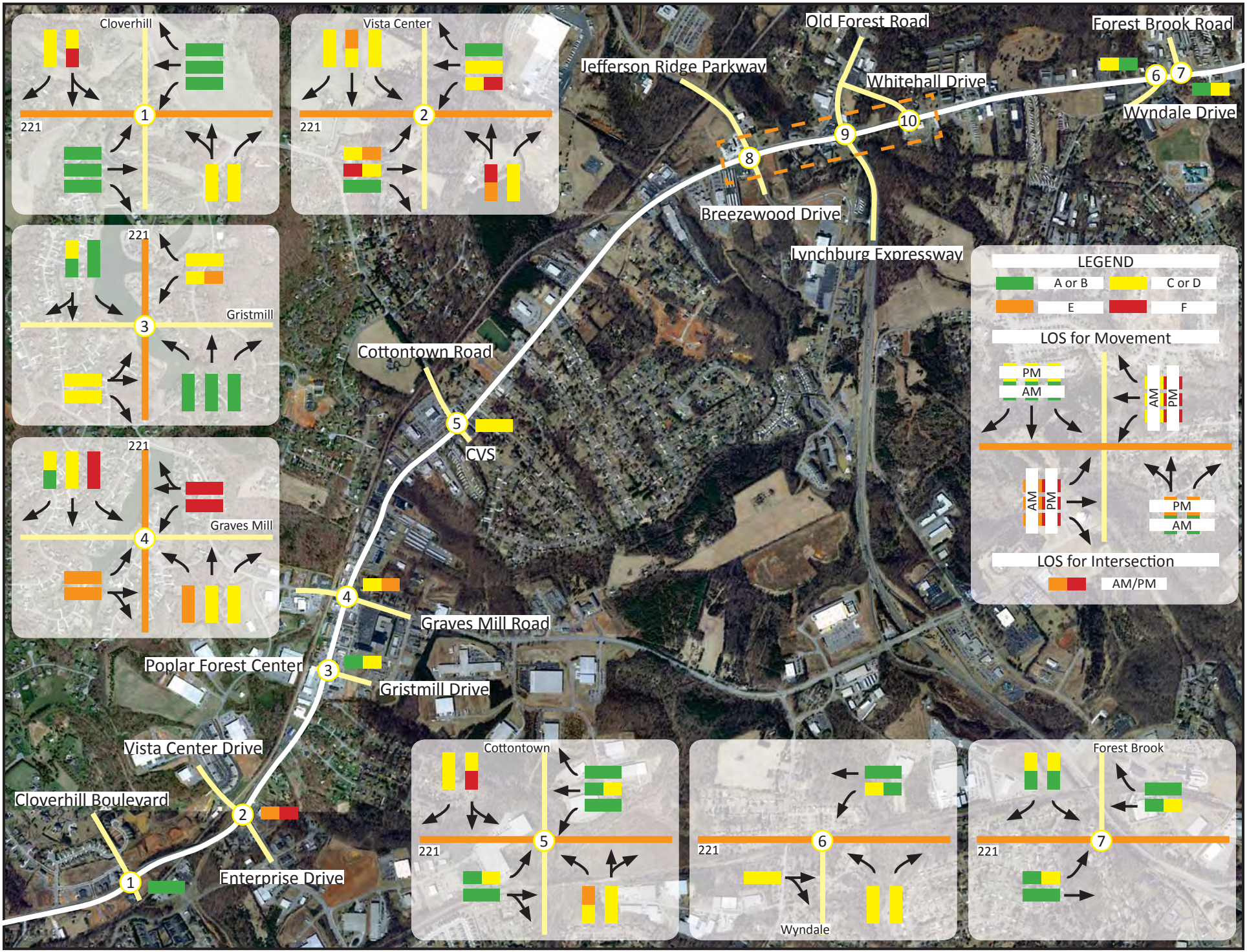
| 4. Route 221/Graves Mill | | Existing | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Graves Mill | EBL | E | 56.1 | 143 | E | 68.9 | 149 |
| Graves Mill | EBT/EBR | E | 57.7 | 215 | E | 62.8 | 317 |
| Graves Mill | WBL | F | 136.0 | 322 | F | 96.8 | 557 |
| Graves Mill | WBT/WBR | F | 129.5 | 300 | F | 106.4 | 499 |
| Route 221 | NBL | E | 59.8 | 214 | E | 72.2 | 249 |
| Route 221 | NBT | D | 38.9 | 418 | D | 48.9 | 472 |
| Route 221 | NBR | C | 23.6 | 225 | C | 34.3 | 132 |
| Route 221 | SBL | F | 113.5 | 257 | F | 203.9 | 325 |
| Route 221 | SBT | C | 21.3 | 258 | D | 52.6 | 1271 |
| Route 221 | SBR | B | 17.1 | 68 | C | 29.9 | 400 |
| | | | | | | | |
| INTERSECTION | | D | 54.4 | | E | 69.8 | |

| 5. Route 221/Cottontown | | Existing | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cottontown | EBL/EBT | F | 93.2 | 280 | D | 52.2 | 205 |
| Cottontown | EBR | C | 22.7 | 132 | C | 25.5 | 114 |
| CVS | WBL | D | 43.4 | 54 | E | 55.3 | 52 |
| CVS | WBT/WBR | D | 41.1 | 46 | D | 52.0 | 49 |
| Route 221 | NBL | B | 10.3 | 73 | D | 43.7 | 266 |
| Route 221 | NBT/NBR | B | 19.4 | 325 | B | 11.7 | 340 |
| Route 221 | SBL | B | 14.7 | 63 | B | 14.7 | 114 |
| Route 221 | SBT | B | 18.7 | 253 | C | 30.0 | 407 |
| Route 221 | SBR | A | 4.8 | 73 | A | 9.9 | 301 |
| | | | | | | | |
| INTERSECTION | | C | 30.3 | | C | 25.1 | |

| 6. Route 221/Wyndale | | Existing | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBT/EBR | C | 24.7 | 432 | C | 20.8 | 367 |
| Route 221 | WBL | C | 22.7 | 145 | B | 10.9 | 199 |
| Route 221 | WBT | A | 3.9 | 194 | A | 6.7 | 232 |
| Wyndale | NBL | D | 46.0 | 201 | C | 33.9 | 111 |
| Wyndale | NBR | D | 43.0 | 125 | C | 32.6 | 111 |
| | | | | | | | |
| INTERSECTION | | C | 22.6 | | B | 14.8 | |

| 7. Route 221/Forest Brook | | Existing | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBL | A | 8.0 | 116 | C | 25.8 | 127 |
| Route 221 | EBT | A | 8.7 | 231 | A | 5.6 | 231 |
| Route 221 | WBT | B | 16.7 | 201 | C | 25.8 | 638 |
| Route 221 | WBR | A | 8.7 | 97 | A | 7.1 | 100 |
| Forest Brook | SBL | B | 18.4 | 74 | C | 32.1 | 228 |
| Forest Brook | SBR | B | 17.7 | 87 | C | 32.9 | 100 |
| | | | | | | | |
| INTERSECTION | | B | 12.1 | | C | 20.5 | |

**Figure 6 Existing (2014) Levels of Service**



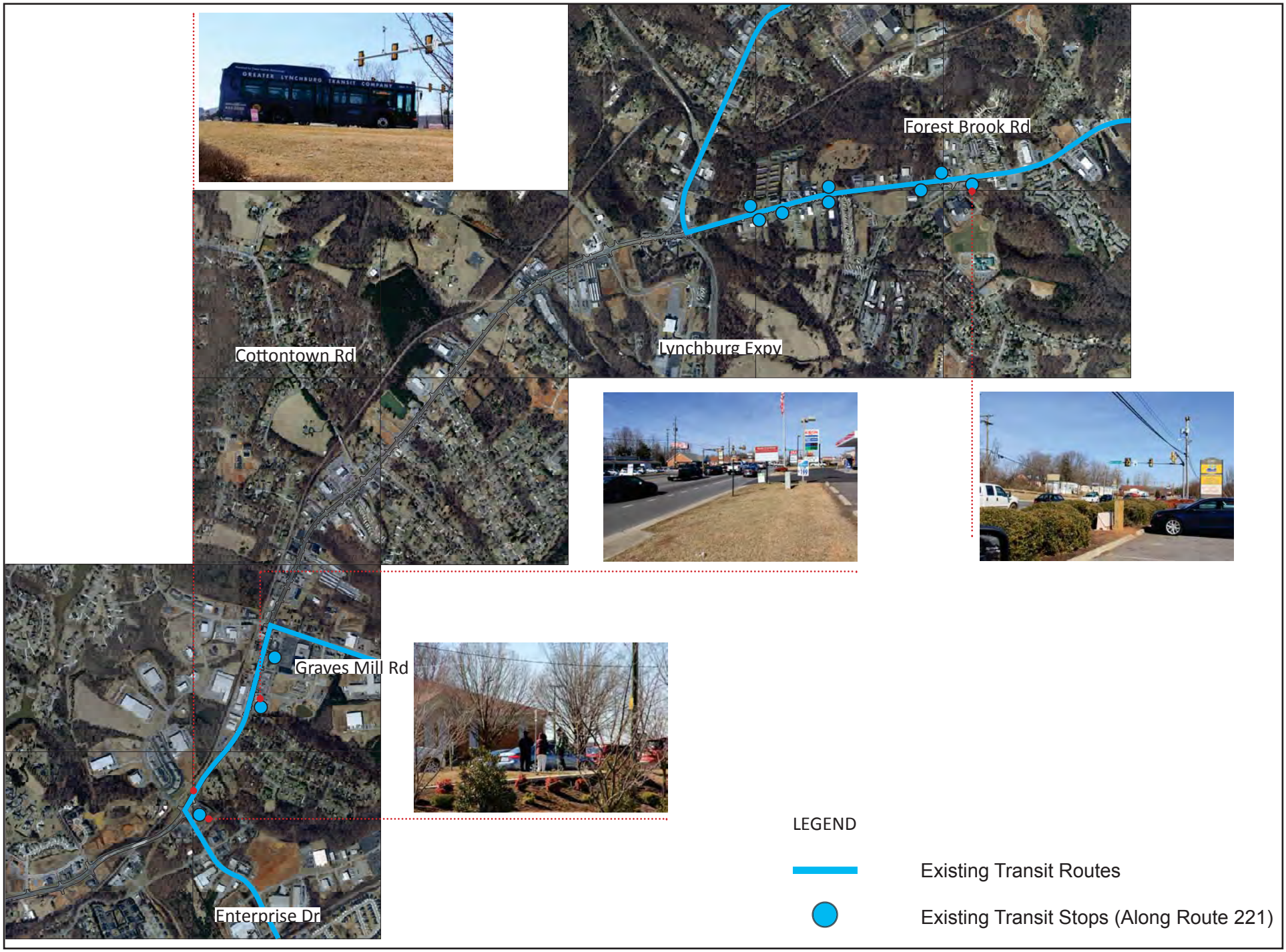
## Existing Multimodal Features

The existing multimodal features along the corridor were examined via professional field observations. Currently no bicycle facilities are provided in either Bedford County or the City of Lynchburg. In Bedford County, from Cloverhill Boulevard to the city limit, there is no sidewalk on either side of Route 221. In the City of Lynchburg, sidewalks are provided on both sides of the corridor from the city limit to the Lynchburg Expressway, and lighting is provided all the way from the city limit to Forest Brook Road. However, from the Lynchburg Expressway to Forest Brook Road, similar to the county, there is no sidewalk on either side of Route 221. Throughout the corridor, where sidewalks are absent, walking paths are evident adjacent to the roadway demonstrating the critical need for sidewalks along the corridor. None of the intersections in the corridor have pedestrian features such as crosswalks or pedestrian signals. **Figure 7** illustrates where sidewalks currently exist.

Bus service is provided along Route 221 by Routes #7, #8 and #32. In Bedford County, three bus stops serve Bus Route #7 between Enterprise Drive and Graves Mill Road. In the City of Lynchburg, eight bus stops are located between the Lynchburg Expressway and Forest Brook Road serving Routes #8 and #32. None of the bus stops have sidewalks or bus shelters. **Figure 8** provides an illustration of existing bus routes and bus stops along the corridor.

**Figure 7 Existing Sidewalks**

**Figure 8 Existing Transit Stops and Routes**



## Crash Analysis

VDOT provided crash data for the period from January 1, 2010, to December 30, 2012. This data was summarized, mapped and analyzed. Over the three year period analyzed, rear-end, left turn, and right angle collisions were the three most common types of crashes to occur along the corridor. Other types of crashes that occurred along the corridor in include: head-on, side swipe, fixed object and collisions with deer. **Figures 9A – 9J** provide a graphical representation of the crashes.

Based on the crash history, the intersections Cottontown Road, Gristmill Drive, and the Lynchburg Expressway with Route 221 have the highest intersection crash rates, and the sections between Gristmill Drive/Graves Mill Road, Graves Mill Road/Cottontown Road, and Cottontown Road/Wayne Drive have the highest corridor crash rates.

When compared with the Virginia statewide average for similar roadways, overall Route 221 is similar to other primary routes throughout the state. **Table 2** shows the crash, injury and fatality rates per 100 million vehicle miles traveled (VMT) for Route 221 and the primary route statewide average.

**Table 2 Primary Route Crash Rate Comparison**

| | Route 221 (2010 - 2012) | VA Primary Route Statewide Average |
|---|---|---|
| **Crash Rate** | 272 | 271 |
| **Injury Rate** | 141 | 150 |
| **Fatality Rate** | 0.0 | 0.7 |

**Figures 10A – 10D** provide illustrations of corridor crash rates as summarized from the crash history and **Figures 11A – 11D** provide illustrations of the intersection crash rates summarized from the crash history. **While the corridor overall is comparable to the statewide average, five of the nine segments exceed the statewide average and the segment between Gristmill Drive and Graves Mill Road is 2.5 times higher.**

One reason the crash rate is higher than would be expected in certain segments of Route 221 is the lack of access management. **Figure 12** on the right is a graph of the crash rate vs the driveway rate, or number of access points per mile. With two exceptions, segments 6 and 8, there is a direct correlation between the increase in crash rate and the increase in the number of driveways. Therefore, the fewer driveways, the safer the roadway. The most likely reason for the two inconsistencies is the length of these segments. Segments 6 and 8 are 0.72 and 0.52 miles long, respectively. The average length of the other seven segments is 0.38 miles. The reason the length of the segment is significant is because the longer the segment is the less consistent the driveway spacing and density are.

**Figure 12 Route 221 Crash Rate vs Driveway Rate**

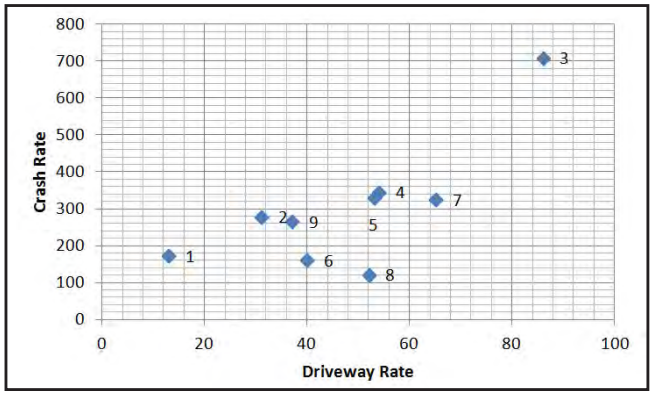


Figure 9-A Crash History

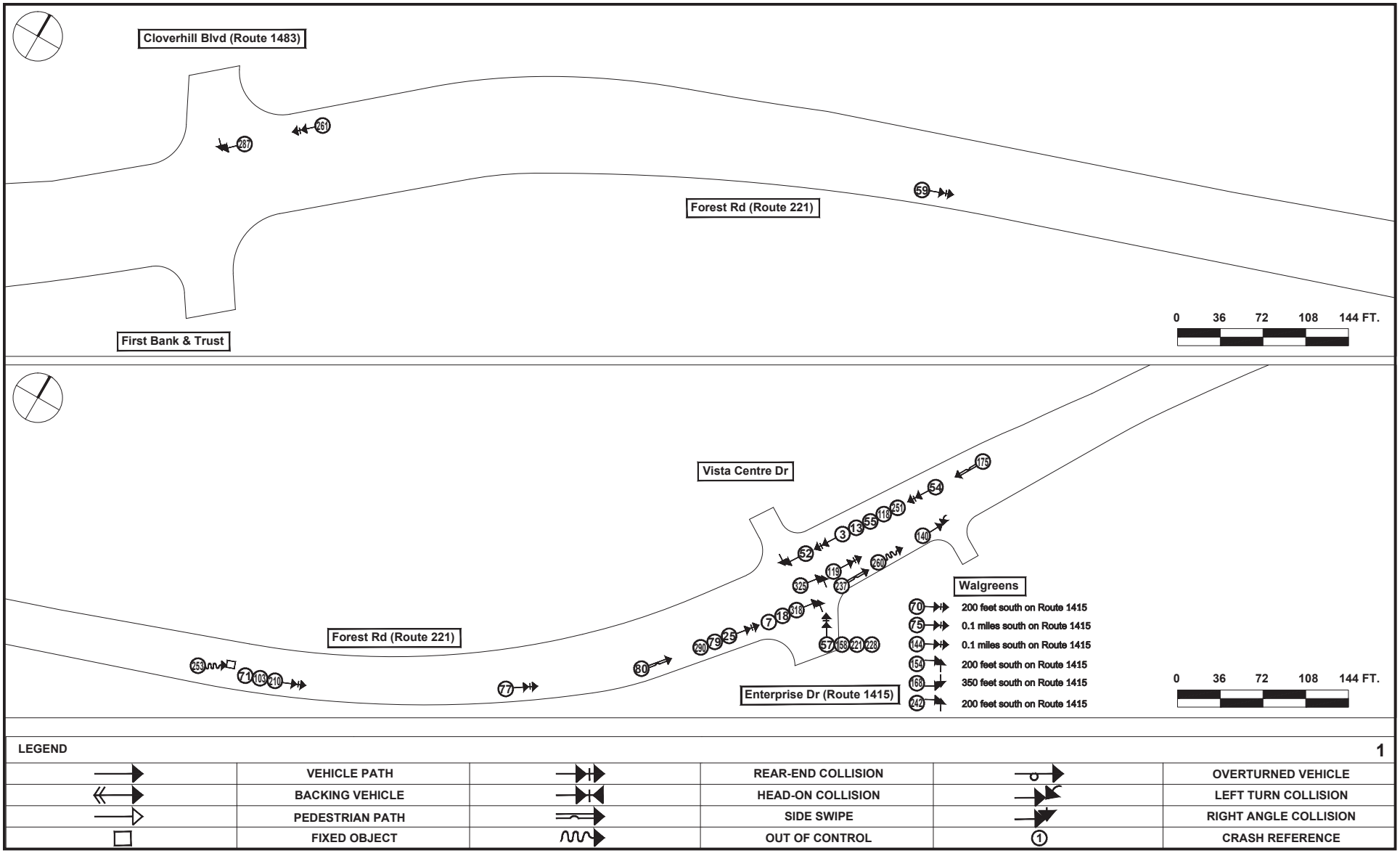


Figure 9-B Crash History

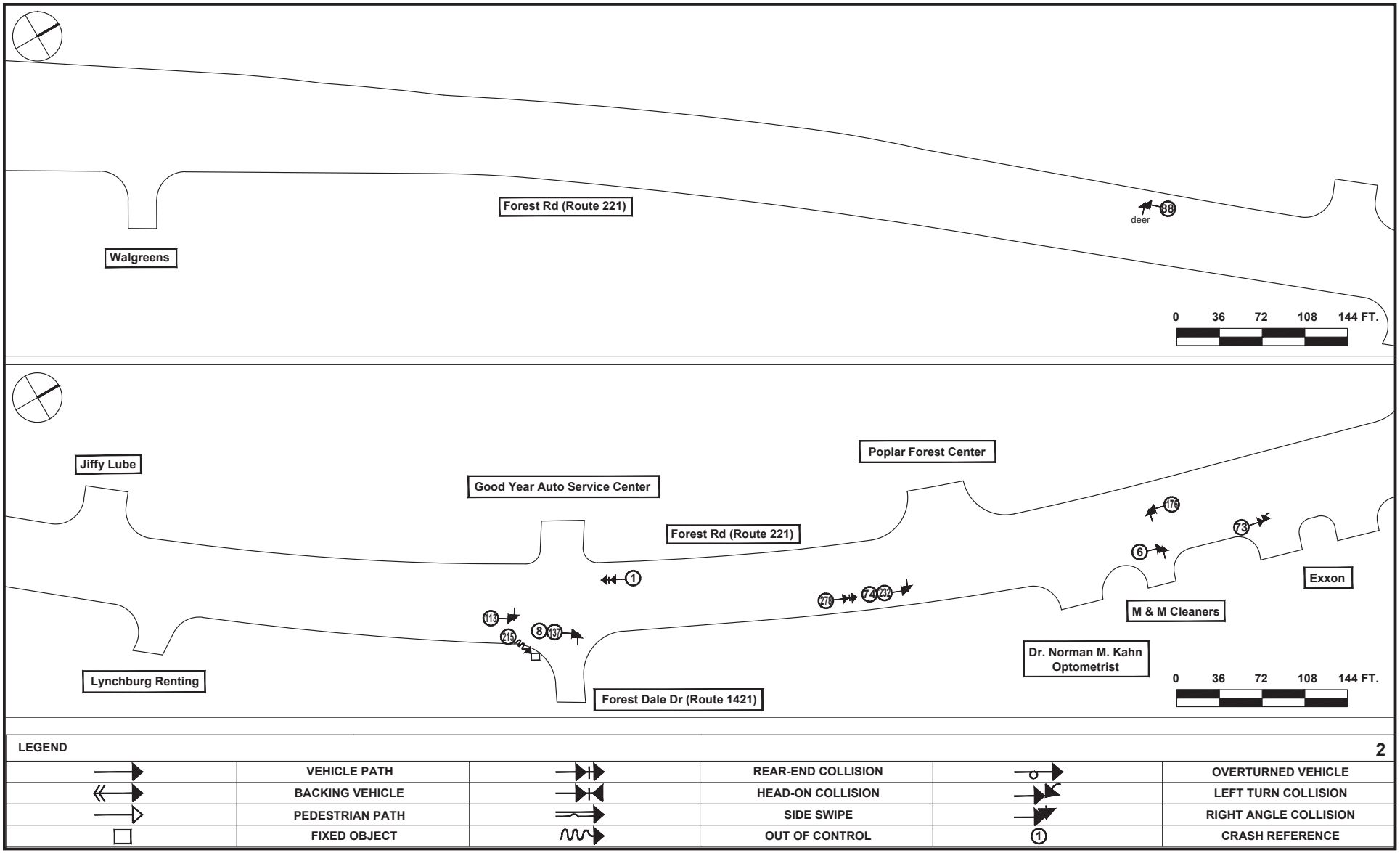


Figure 9-C Crash History

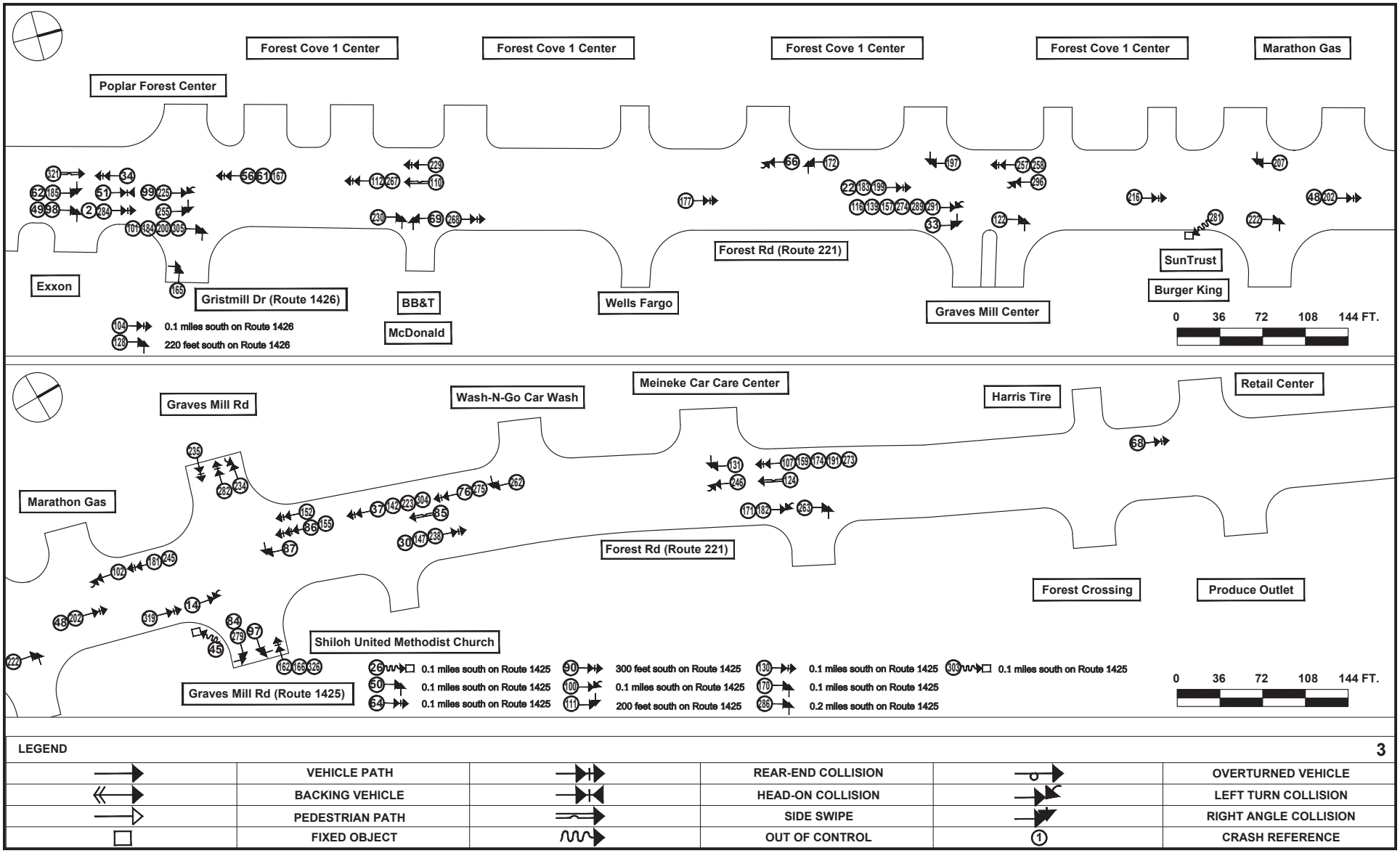


Figure 9-D Crash History

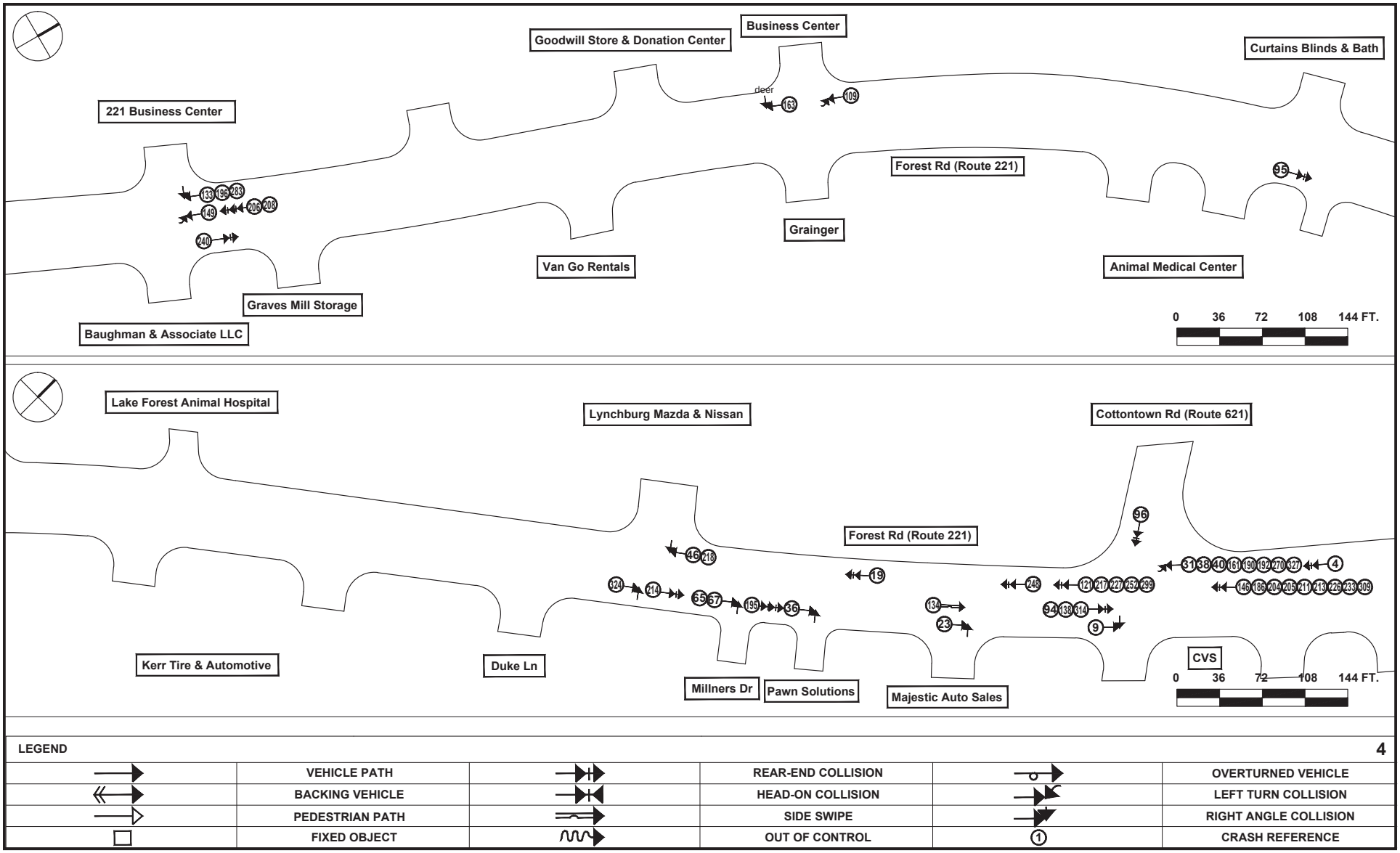


Figure 9-E Crash History

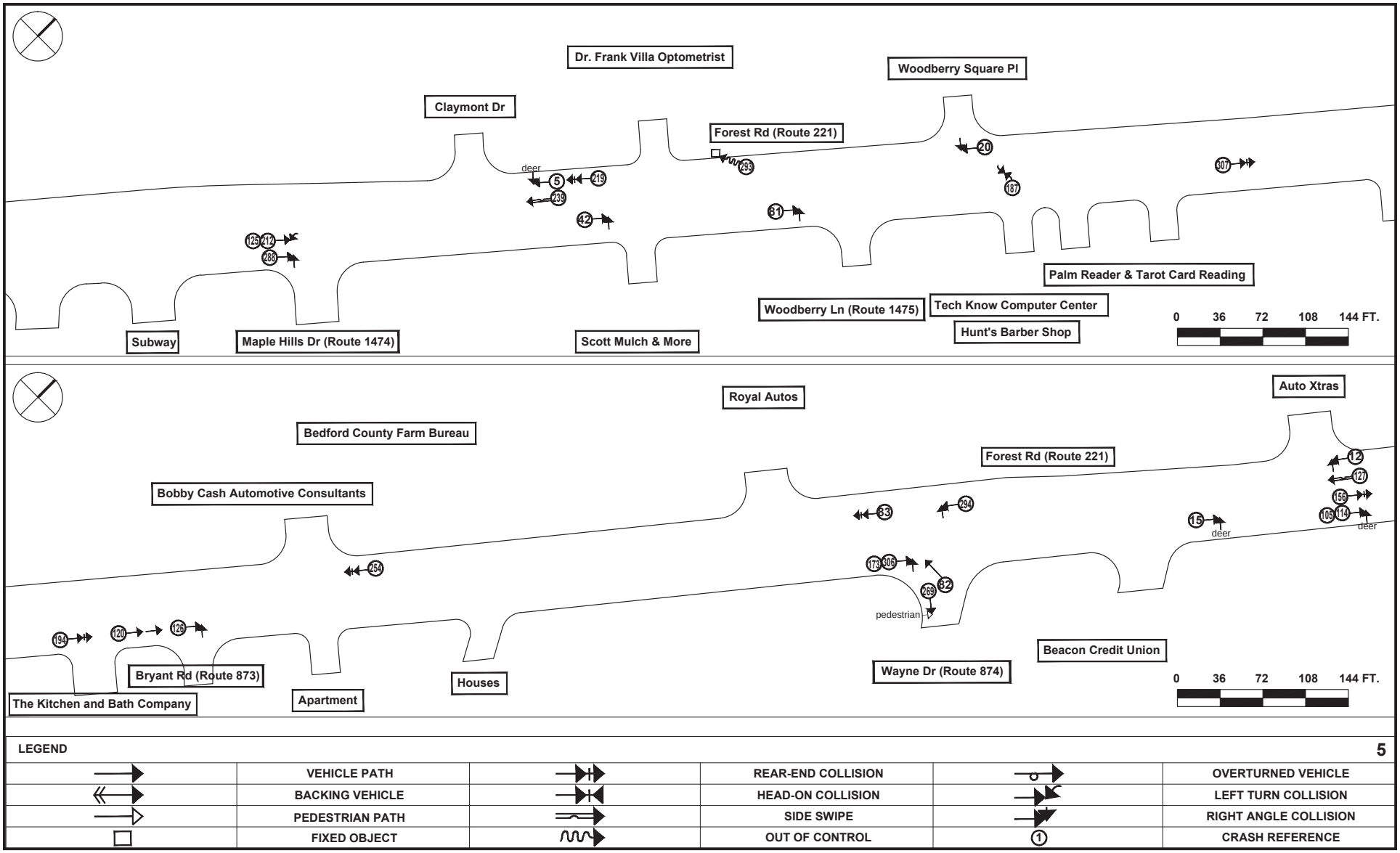
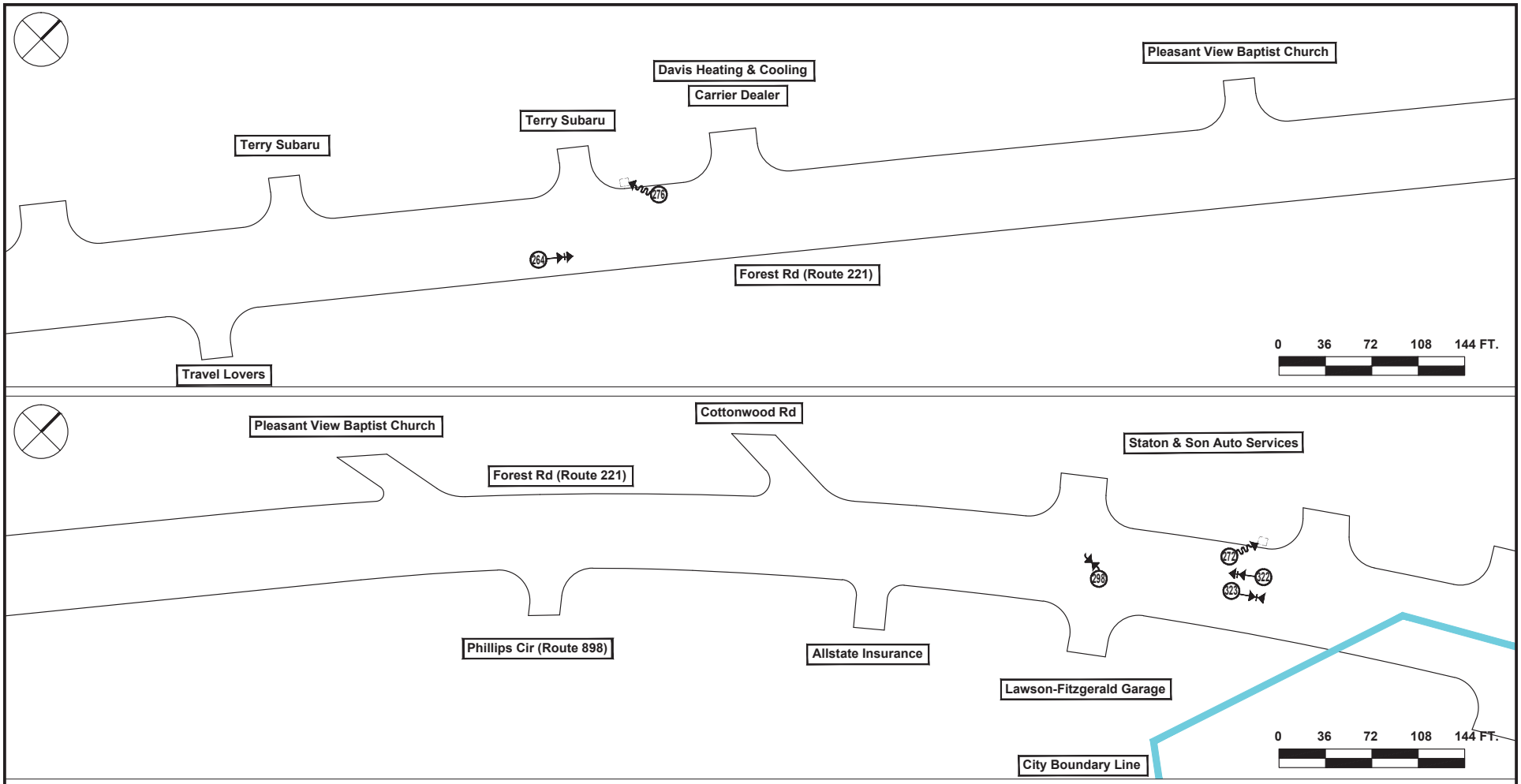


Figure 9-F Crash History




| LEGEND | | | | | 6 |
|---|---|---|---|---|---|
| | VEHICLE PATH | | REAR-END COLLISION | | OVERTURNED VEHICLE |
| | BACKING VEHICLE | | HEAD-ON COLLISION | | LEFT TURN COLLISION |
| | PEDESTRIAN PATH | | SIDE SWIPE | | RIGHT ANGLE COLLISION |
| | FIXED OBJECT | | OUT OF CONTROL | 1 | CRASH REFERENCE |

Figure 9-G Crash History

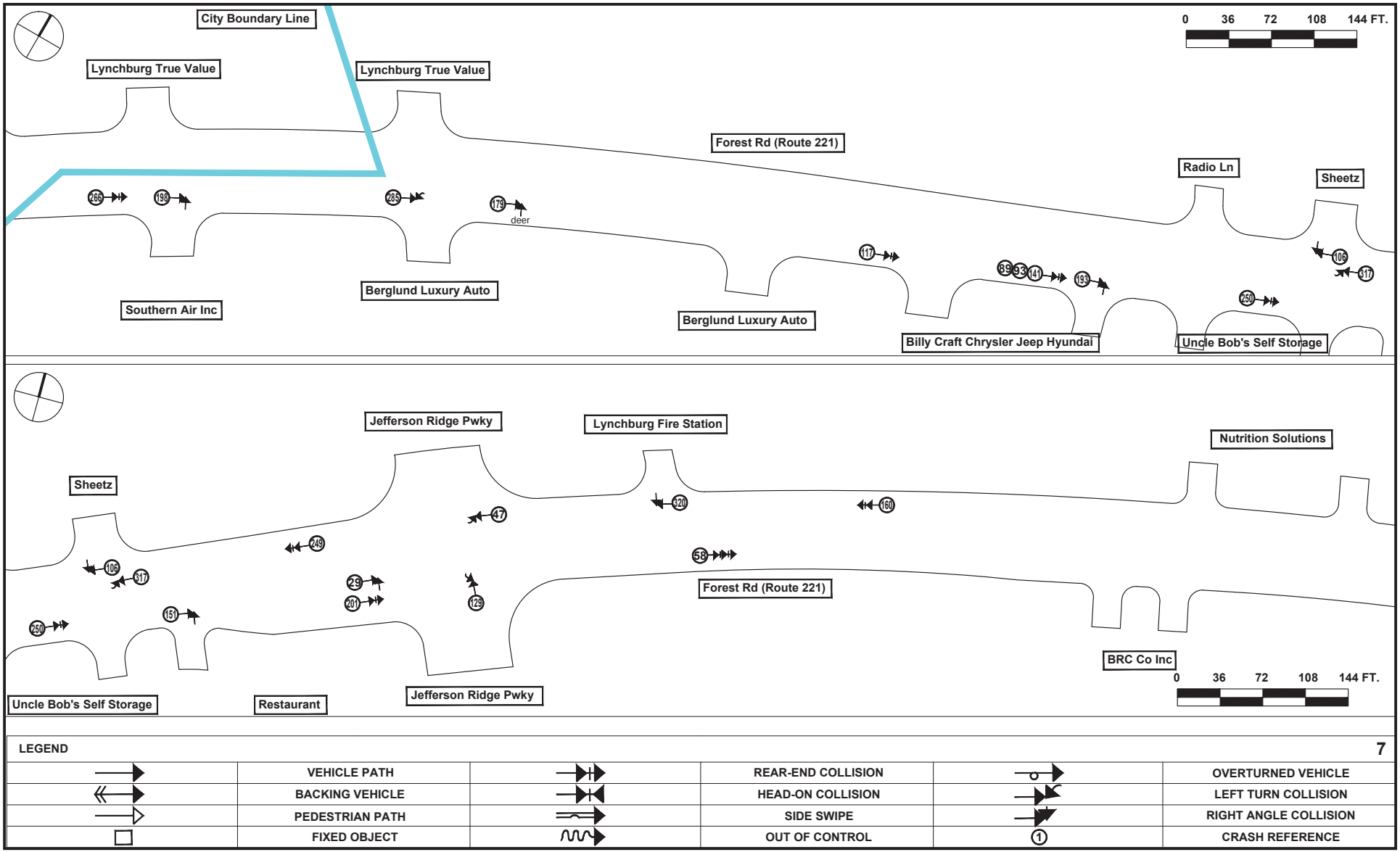


Figure 9-H Crash History

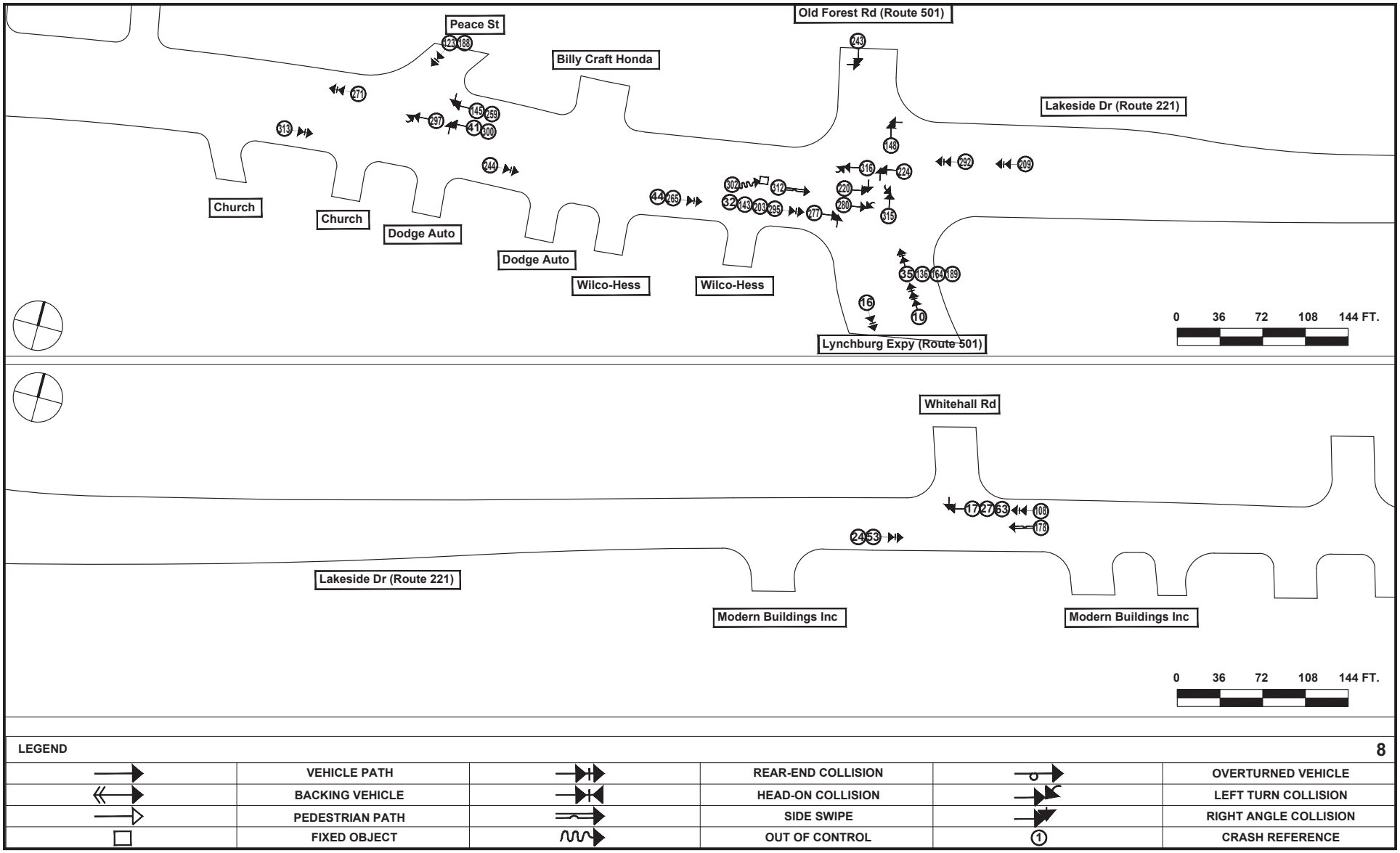


Figure 9-I Crash History

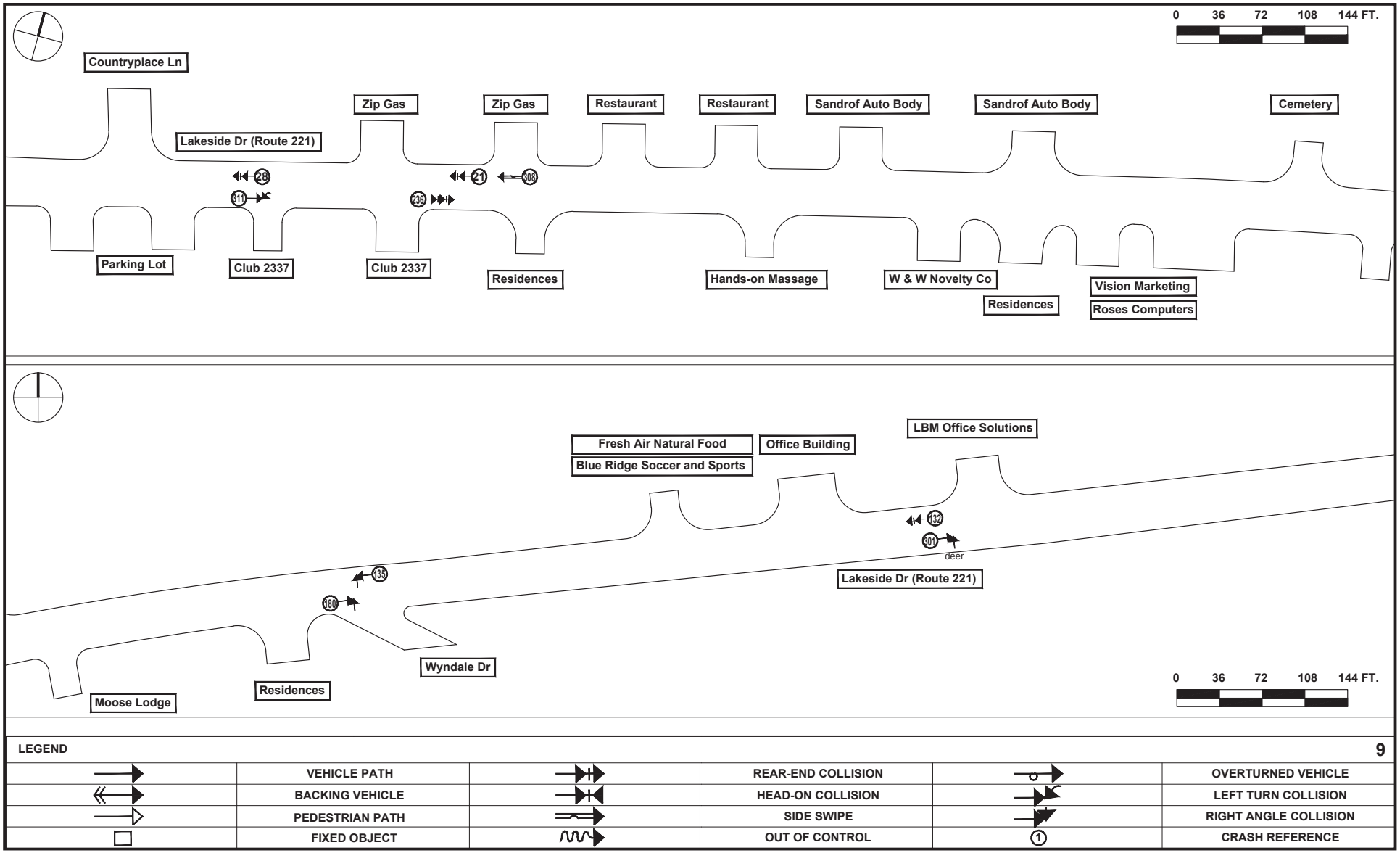


Figure 9-J Crash History

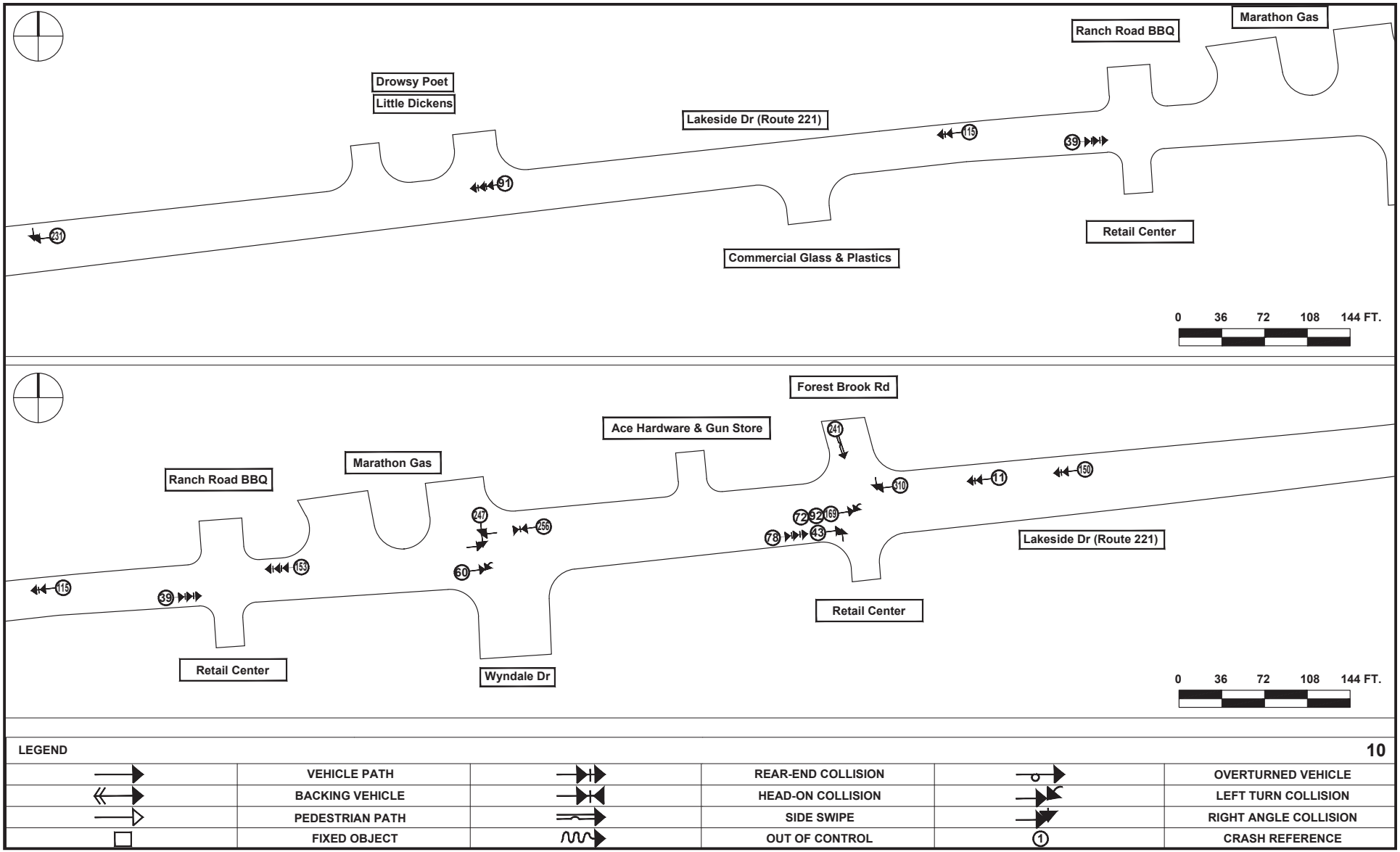


Figure 10-A Corridor Crash Rate Summary

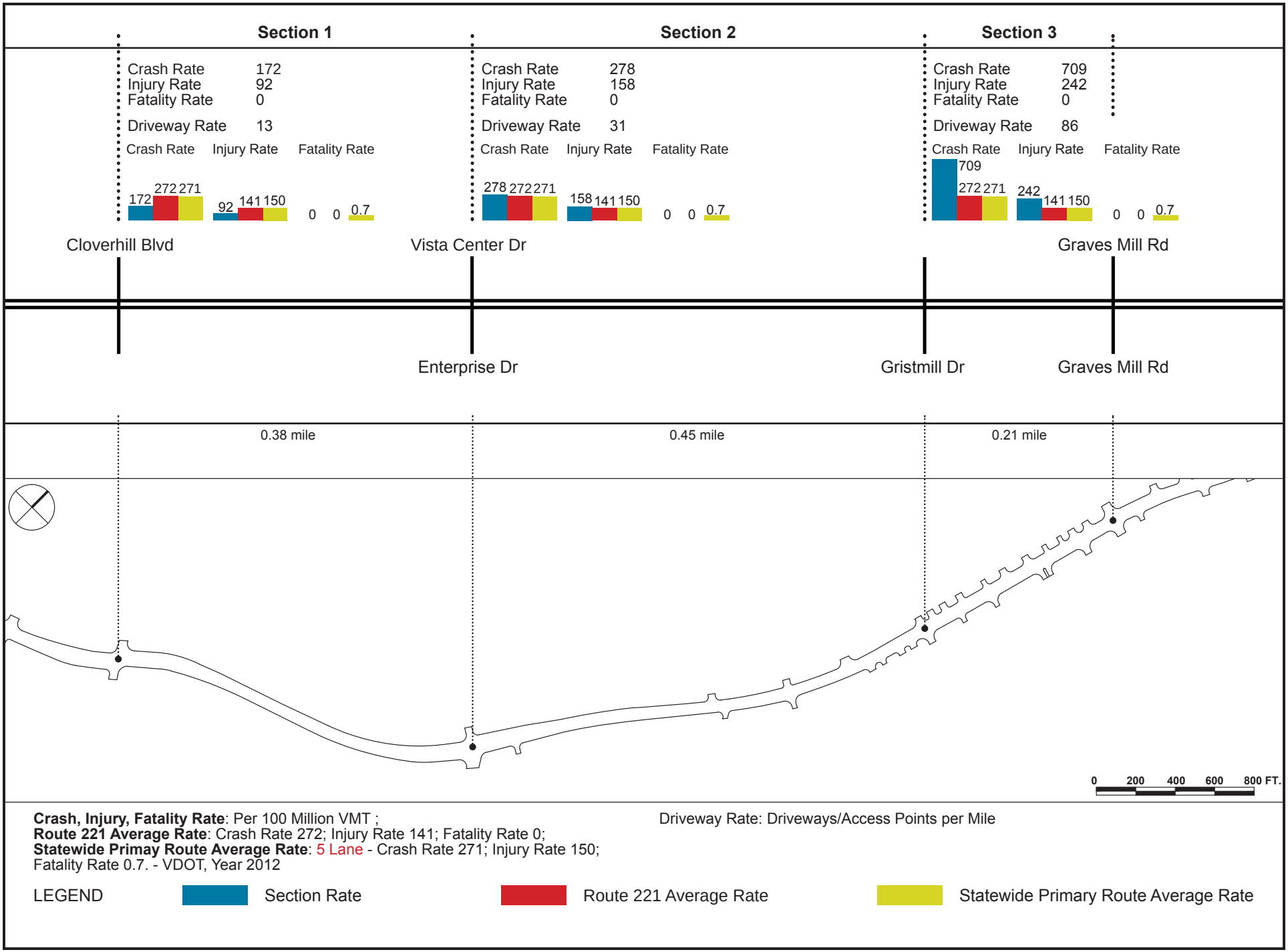


Figure 10-B Corridor Crash Rate Summary

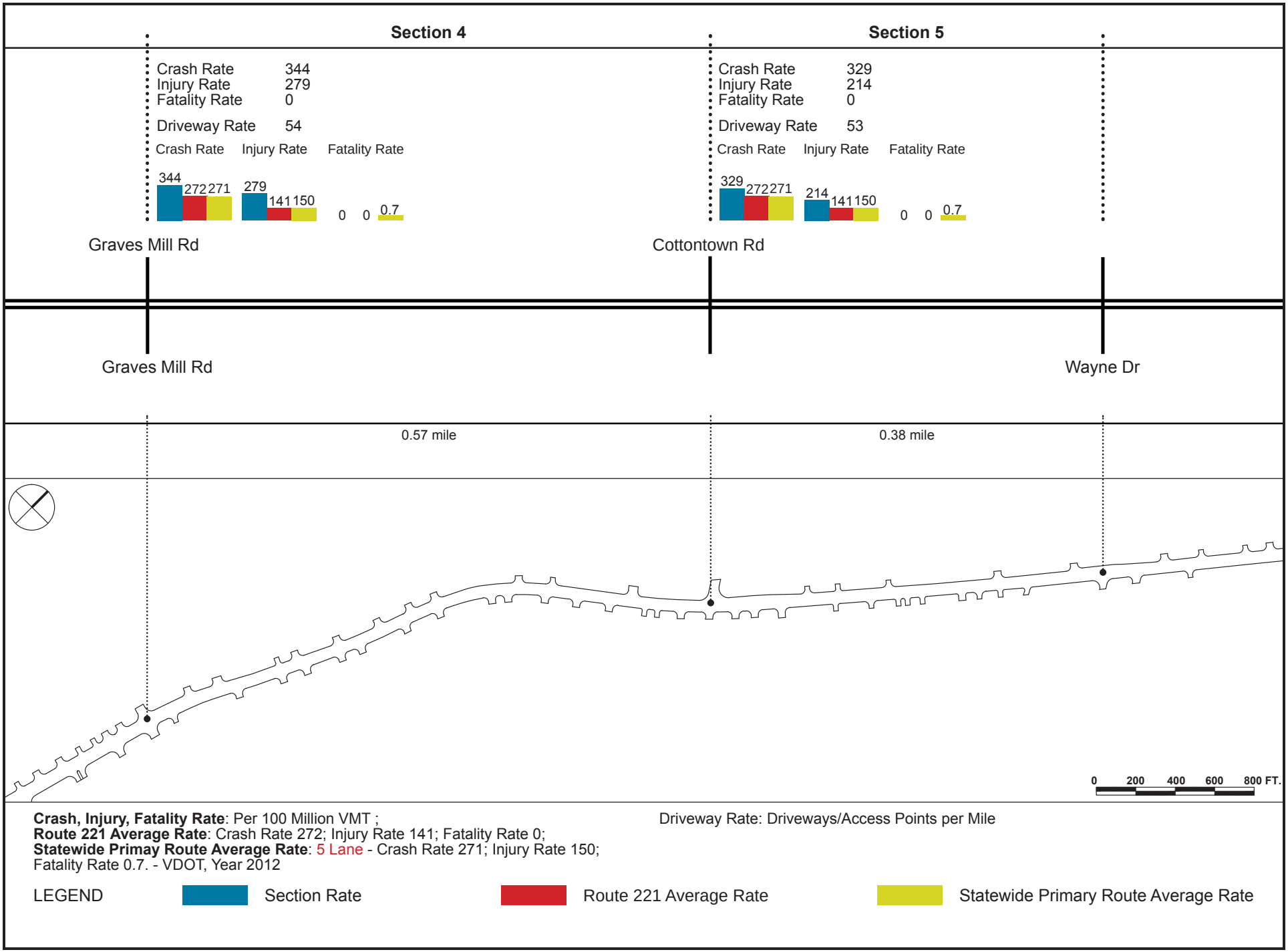
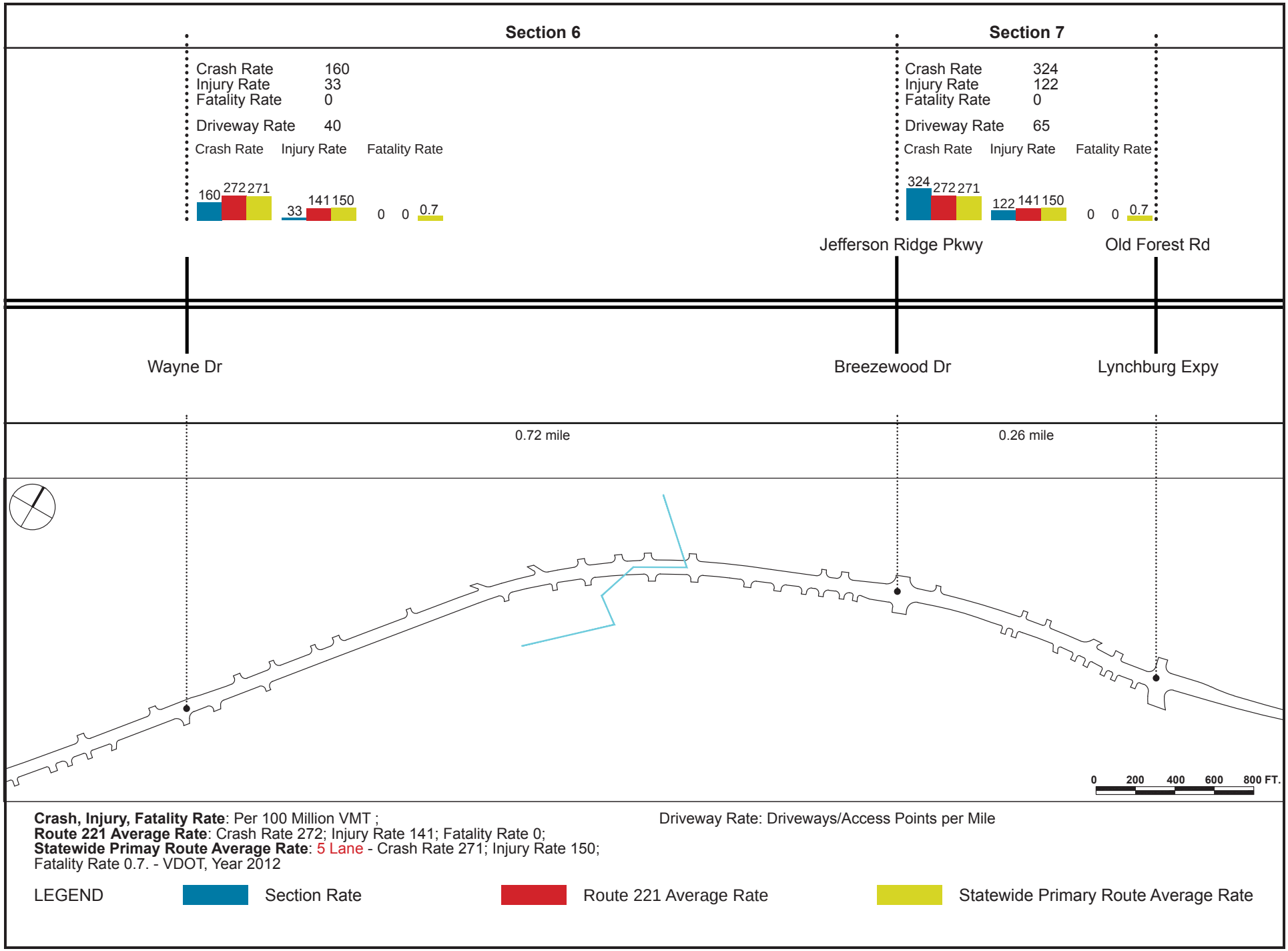


Figure 10-C Corridor Crash Rate Summary




**Crash, Injury, Fatality Rate**: Per 100 Million VMT ;
**Route 221 Average Rate**: Crash Rate 272; Injury Rate 141; Fatality Rate 0;
**Statewide Primay Route Average Rate**: 5 Lane - Crash Rate 271; Injury Rate 150;
Fatality Rate 0.7. - VDOT, Year 2012

Driveway Rate: Driveways/Access Points per Mile

LEGEND Section Rate Route 221 Average Rate Statewide Primary Route Average Rate

Figure 10-D Corridor Crash Rate Summary

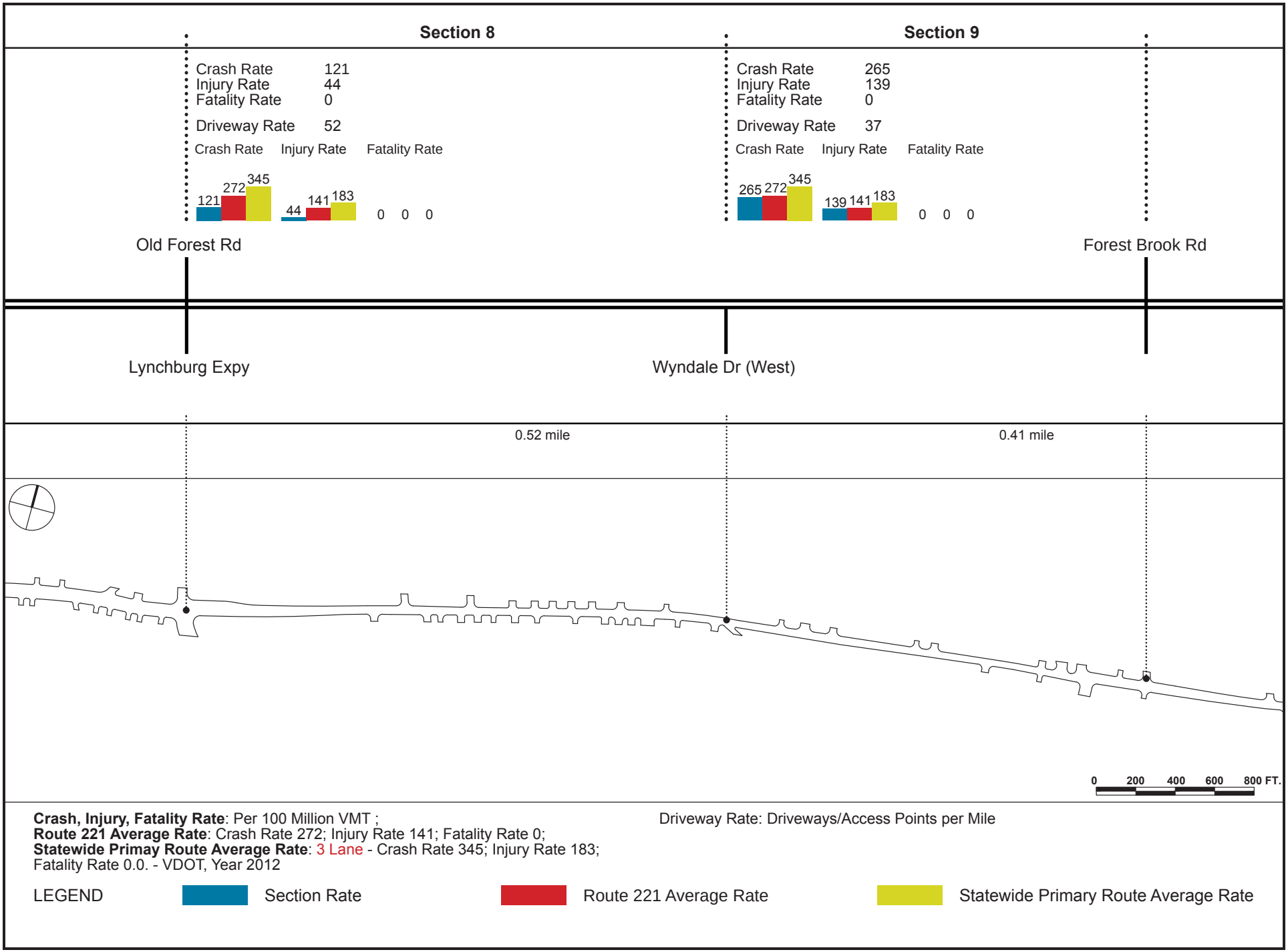
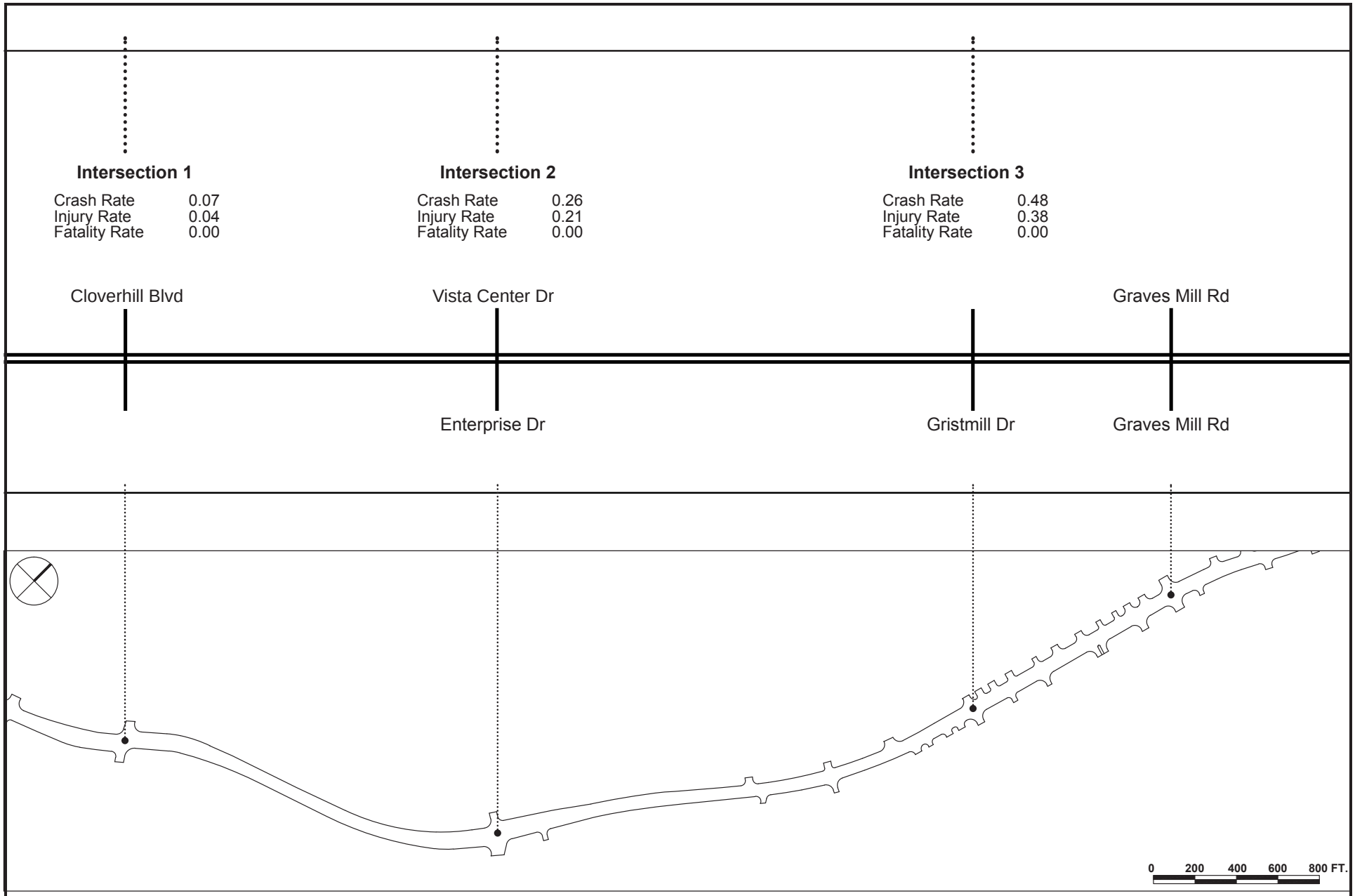


Figure 11-A Intersection Crash Rate Summary




**Crash, Injury, Fatality Rate**: Per Million Entering Vehicles

Figure 11-B Intersection Crash Rate Summary

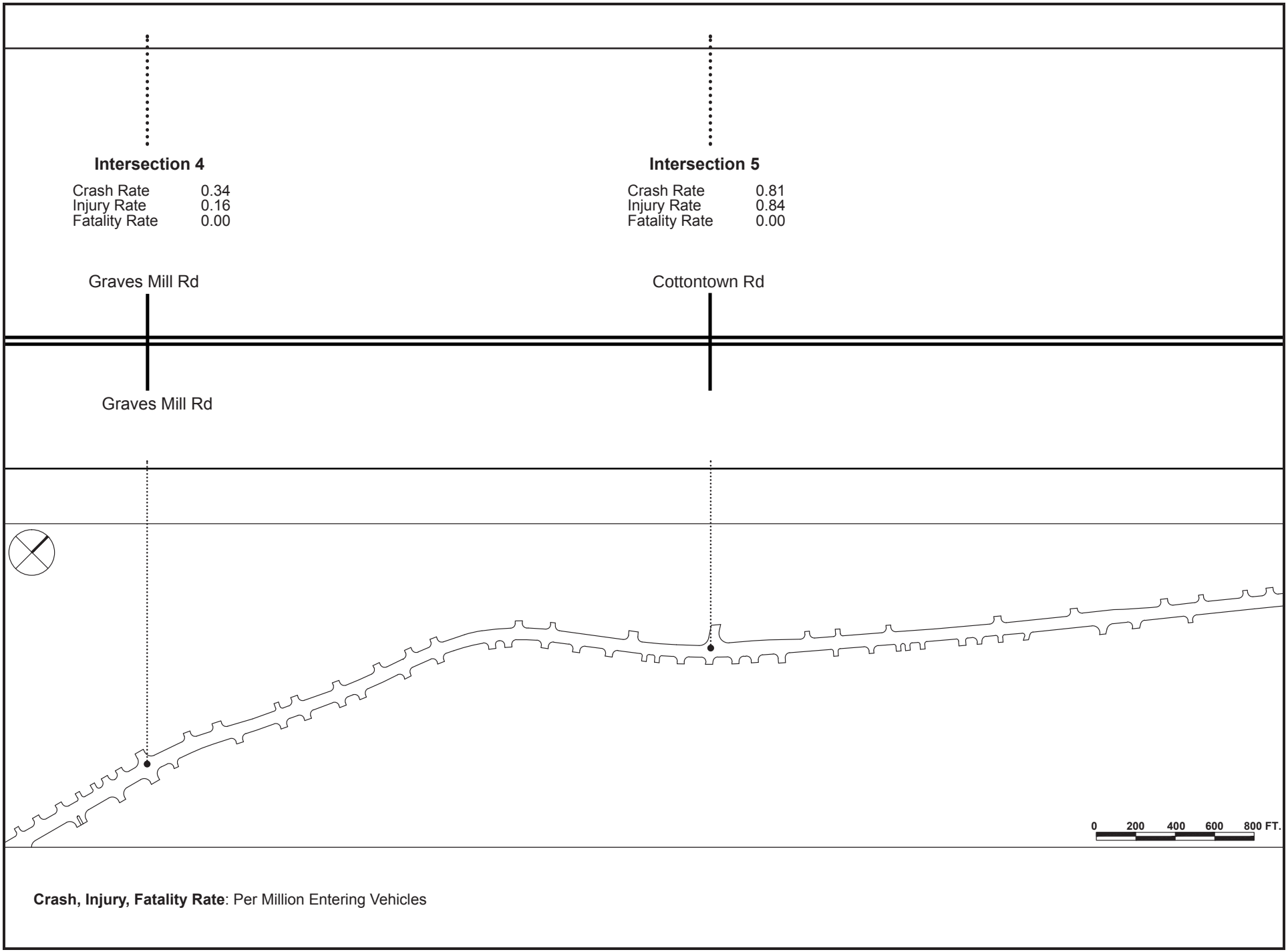
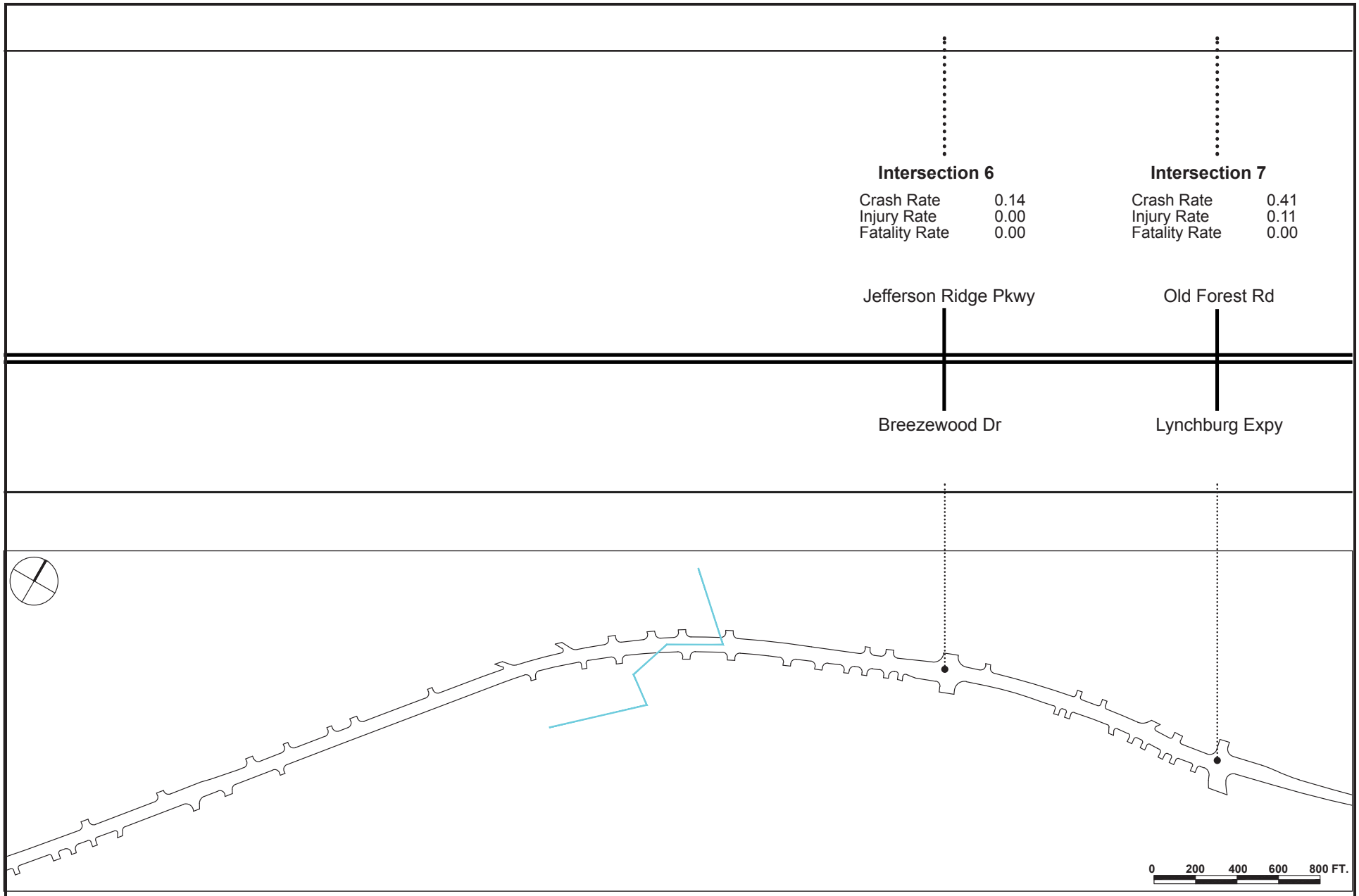
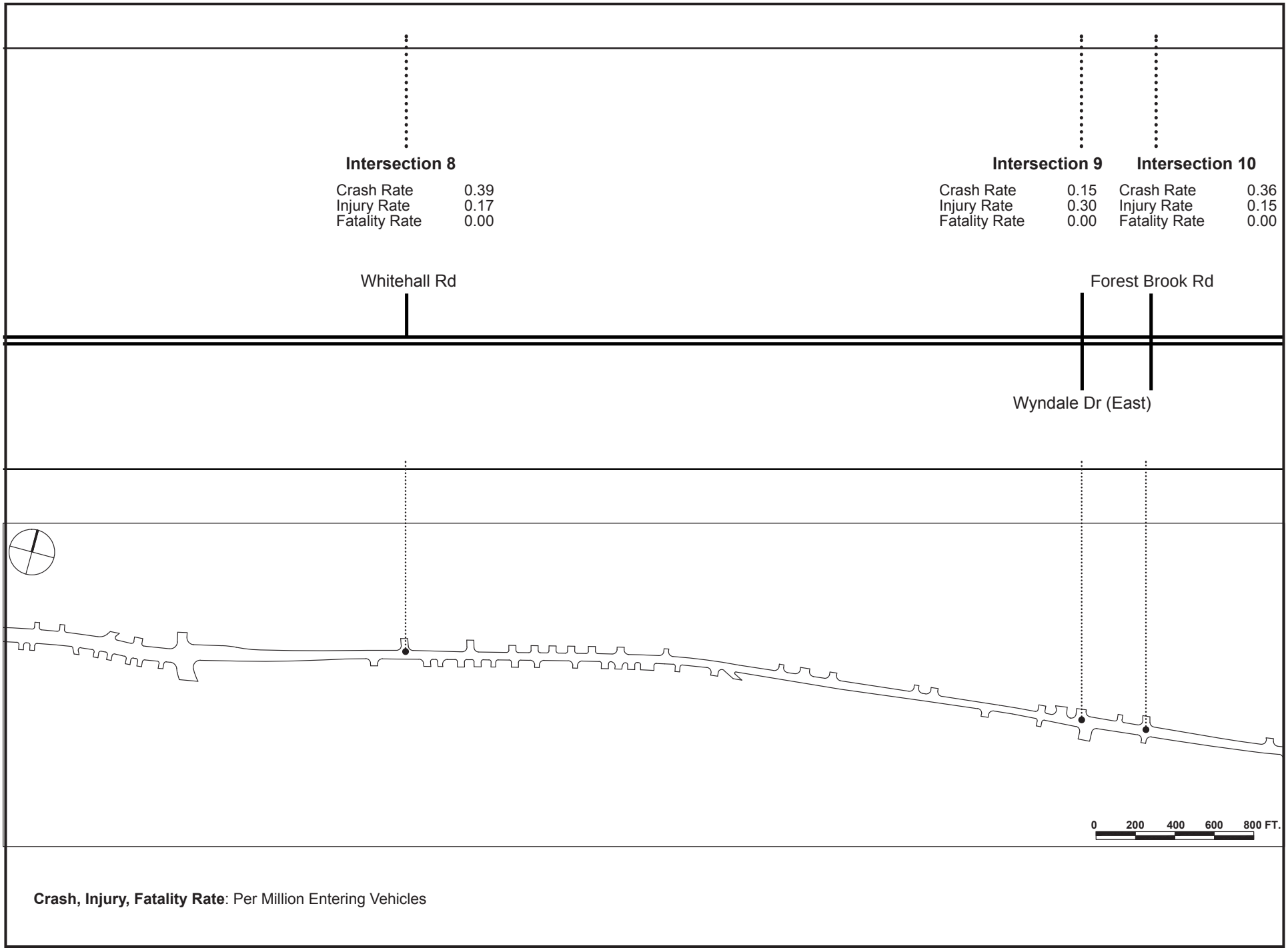


Figure 11-C Intersection Crash Rate Summary




**Crash, Injury, Fatality Rate**: Per Million Entering Vehicles

Figure 11-D Intersection Crash Rate Summary



# 4. Access Management

# 4. Access Management

Access management is the process of managing access to property while preserving the flow of traffic on the roadway. Both property owners and roadway users have a right to roadway facilities. Property owners have a right to access while drivers have a right to safety and transport. Managing access of roadways significantly affects the operation and safety of the facility. As noted in the prior section of this report, there is a direct correlation between the number of crashes and the number of driveways on a roadway confirmed by countless studies in addition to the Route 221 data.

The goals of access management per VDOT's Access Management Design Standards are to:

- Enhance public safety,
- Reduce traffic congestion,
- Support economic development,
- Reduce the need for new highways and roadway widening, and
- Preserve the investment in new highways.

## 4.1 Access Management Overview and Principles

Access management is the control of the location, spacing, design and operation of driveways, median openings and traffic signals in order to provide access to property while preserving the safety and efficiency of the transportation system. The goals of improving safety and operation of a roadway through access management are achieved by following key established traffic engineering and planning principles discussed below.

### Follow the Established Roadway Hierarchy

VDOT establishes a functional classification for each facility it maintains. This classification relates to the purpose of the roadway and its characteristics. Roadways provide both travel mobility and access to property which relate inversely to one another. For example, the greater the access allowed, the less mobility a roadway can provide as illustrated in **Figure 13**.

Classified as a minor arterial, Route 221 is intended to serve traffic with carefully controlled access. Over time as development has occurred along Route 221, more and more access points have been constructed with little restriction.

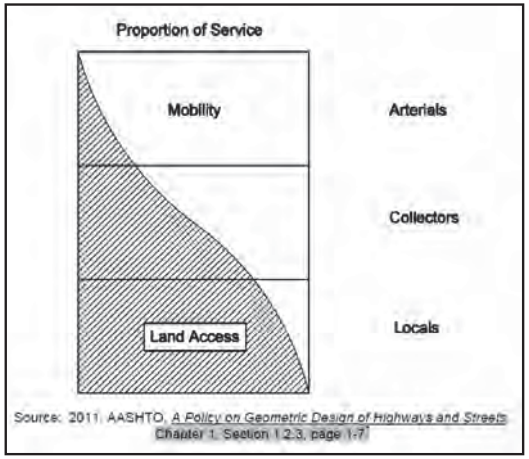



**Figure 13 Access vs Mobility**

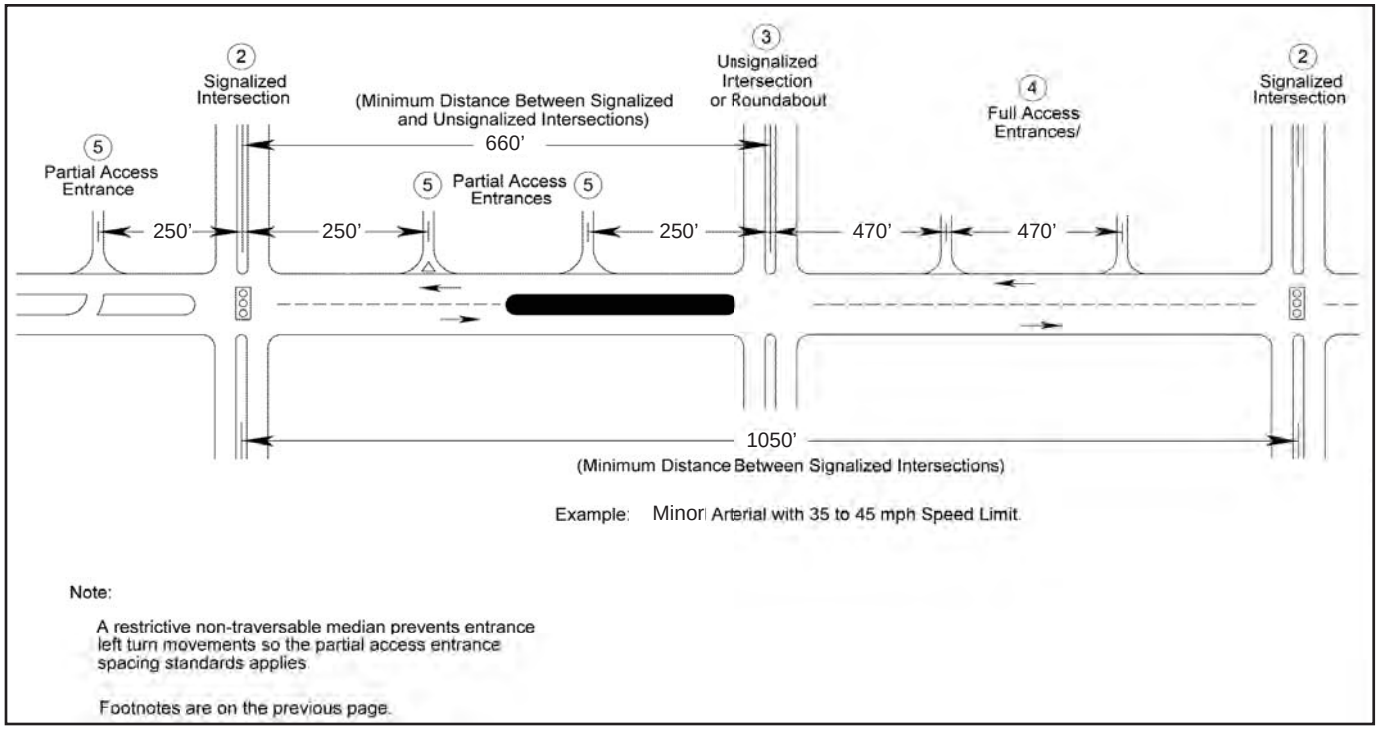
## Provide Space Between Conflict Areas

Conflict areas occur where vehicle paths intersect as seen at intersections. Increasing the spacing between conflict areas increases the overall safety of a corridor by providing more time for vehicles to perceive each individual conflict area. VDOT's minimum spacing standards are based on the functional classification of the roadway and posted speed limit. The VDOT standard for Route 221 based on its classification as a minor arterial with a posted speed limit of 45 mph is shown in **Table 3** and illustrated in **Figure 14** below.

**Table 3 VDOT Intersection Spacing Standards**

| | | Minimum Centerline to Centerline Spacing (feet) | | | |
|---|---|---|---|---|---|
| **Functional Class** | **Posted Speed Limit (mph)** | **Signalized Intersections to Other Signalized Intersections** | **Unsignalized Intersections to Signalized Intersections** | **Full Entrances to Other Full Entrances or Intersections** | **Partial Entrances to Any Entrance or Intersection** |
| **Minor Arterial** | 45 | 1,050 | 660 | 470 | 250 |

**Figure 14 VDOT Intersection Spacing Standard**



## Limit Conflict Points

**Figure 15 Conflict Points**

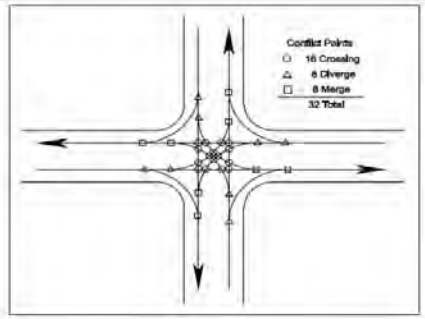



FIGURE 2-1 CONFLICT POINTS
Source: Transportation Research Board, *Access Management Manual*

The greater the number of legs there are at an intersection, the higher the number of conflict points among vehicles. An intersection with four two-way legs has 32 conflict points as shown in **Figure 15**, compared to a right-in, right-out only intersection has two conflict points. Drivers are only prepared to react to a limited number of conflicts at a time.

## Provide Deceleration Lanes

Deceleration lanes provide an area where vehicles can slow down and turn while removed from higher speed through traffic. These lanes improve safety by reducing the speed differential between vehicles if they should collide.

## Provide Side Street Connectivity

A connected network of streets beyond the arterial allows for fewer connections to the arterial roadway and for short trips to be made off the arterial reducing the number of conflicts.

## 4.2 Access Management Benefits

The main benefits of access management are increased safety by reducing crashes and enhanced traffic operations. Roadways with well managed access may experience:

- Reduced crashes and crash potential,
- Decreased travel time and congestion,
- Improved access to properties,
- Maintained economic prosperity as a result of continued travel efficiency,
- Preserved roadway capacity and the useful life of roads, and
- Reduced need for more new roadways.

Research indicates that the appropriate number of reasonably spaced and located access points reduces crash rates. This research is confirmed by analysis of Route 221. As noted previously, on Route 221 the section of roadway with the highest crash rate, between Gristmill Drive and Graves Mill Road, also has the most driveways.

Studies have also shown that corridors with managed access experience higher vehicular capacity when compared to corridors with poor access management. Providing turn lanes for vehicles to decelerate and fewer, better controlled driveways and intersections where vehicles enter and exit the arterial allow for improved traffic flow.

## 4.3 Access Management Techniques

Many options exist to implement improved access management on a corridor. Those that are appropriate and that have been considered for Route 221 are discussed below. These techniques help to limit the conflict points, separate conflict areas, reduce interference of turning traffic with through traffic and provide access to properties.

### Driveway Consolidation and Cross Access

Consolidating and removing redundant driveways aimed toward VDOT's driveway and intersection spacing standard shown in Figure 14 and Table 3 reduces the number of conflict points and spreads them out.

Providing access between adjacent properties also reduces conflict and reduces the number of trips on the arterial roadway. Rather than use Route 221 between destinations, trips to adjacent properties can be made via connecting driveways.

### Median Alternatives

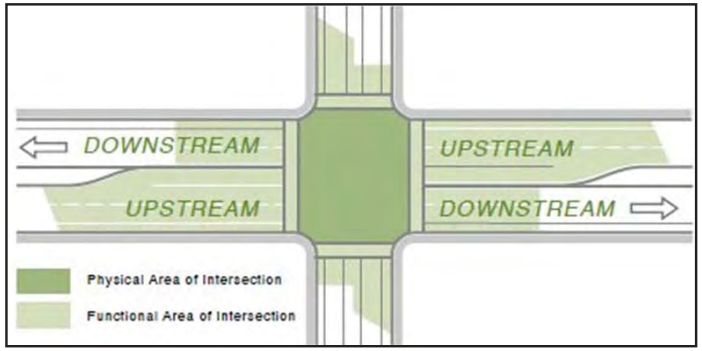
Installing a median separates the opposing travel lanes and also restricts the left turn movements to and from the arterial roadway, both reducing the number of conflict points and separating the conflict areas. Based on the research similar roadways with a median experience an overall crash reduction of approximately 35 percent when compared to undivided roadways. (NCHRP)

### Limiting Driveways Within the Functional Area of an Intersection

The functional area, illustrated in **Figure 16,** of an intersection includes the area surrounding the intersection where drivers are recognizing the intersection, maneuvering, and/or queuing. Eliminating driveways within the functional area of an intersection improves safety by allowing drivers to focus solely on the intersection rather than vehicles entering and exiting from driveways.

An example of this can be found at the intersection of Graves Mill Road with Route 221. Just west of Graves Mill Road multiple driveways intersect Route 221 within the functional area of the intersection. Similar examples can be found at all of the signalized intersections along the corridor.

**Figure 16 Functional Area of an Intersection**




### Eliminating or Minimizing Left Turn Movements

Based on recent research, the majority of crashes at driveways include left-turning vehicles either entering or exiting the driveway. Therefore, eliminating left turns enhances safety.

# 5. Future Traffic Projections

# 5. Future Traffic Projections

A number of information sources and methods were considered to calculate the future 2040 traffic volumes for the Route 221 corridor. The regional travel demand model forecasts, historic traffic growth, and anticipated future development were analyzed in an effort to most accurately predict the future traffic volumes. A more detailed discussion of the methods follows.

## Regional Travel Demand Model

One tool for estimating future volumes is the Regional Travel Demand Model. The Regional Travel Demand Model was examined using assumed year 2040 employment and household data and generated 2040 average daily traffic volumes. The resulting 2040 average daily traffic volumes are shown in **Figure 17**.

## Historic Traffic Data

In addition to using the regional travel demand model, other methods were considered to calculate the future 2040 traffic volumes on Route 221. Historical count data was collected and analyzed along with traffic projections associated with anticipated future development along the corridor.

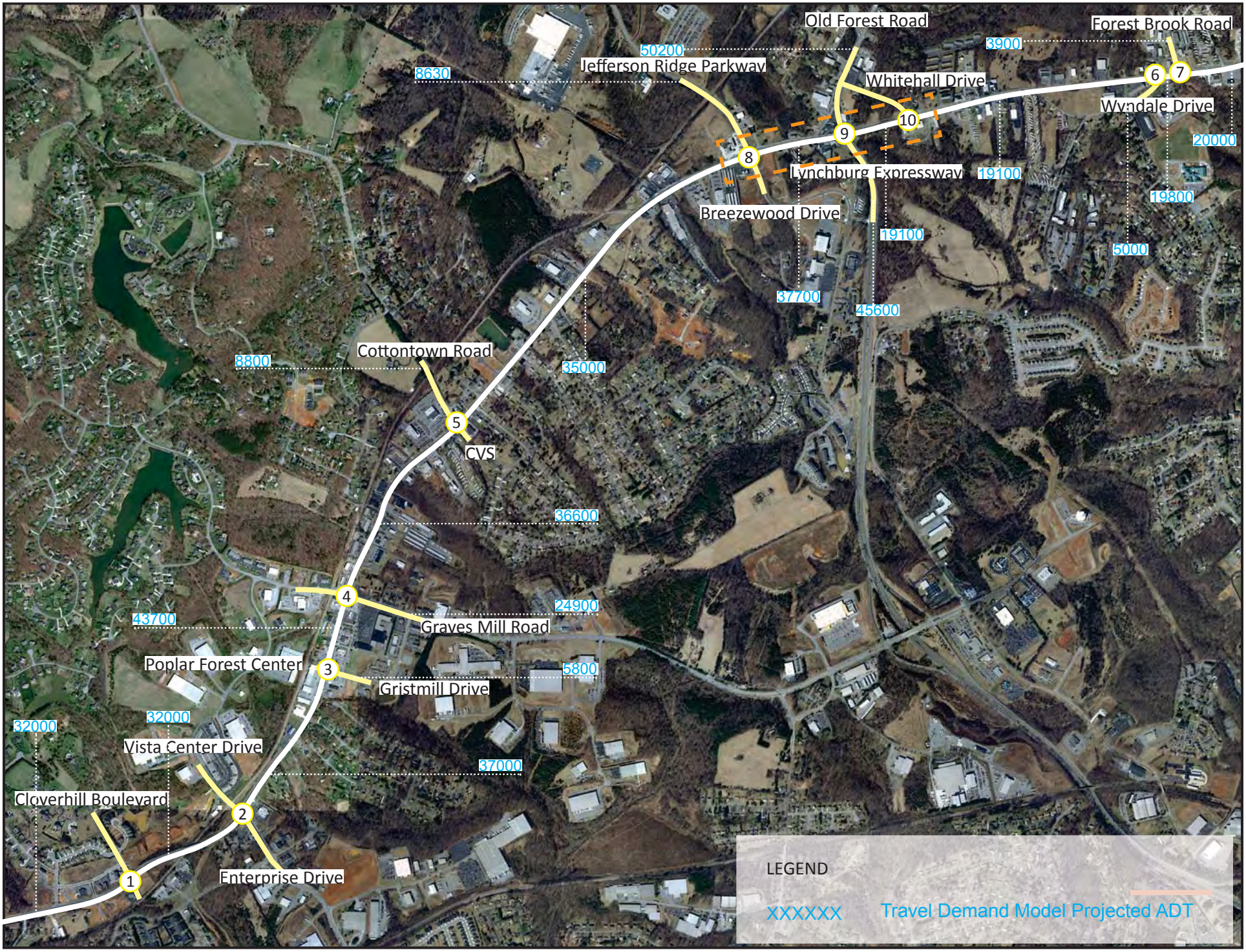
Background growth rates were analyzed based on VDOT historical traffic data from 2001 to 2012. The study area was broken into three segments for this analysis based on the available count data and roadway characteristics (such as four travel lane or two travel lane typical section). Segment one extends from the western study boundary at Cloverhill Boulevard to the City/County boundary. Segment two extends from the City/County boundary to the Lynchburg Expressway. Segment three extends from the Lynchburg Expressway to the eastern study boundary at Forest Brook Road.

For each segment the average daily traffic volumes and growth rates are shown in **Table 4.** As shown, the growth rates throughout the study area are flat with the exception of the middle section.

**Table 4 Historic Traffic Volumes**

| Year | Segment 1 | | Segment 2 | | Segment 3 | |
|---|---|---|---|---|---|---|
| | ADT | Growth Rate | ADT | Growth Rate | ADT | Growth Rate |
| **2001** | 27,000 | | 23,000 | | 16,000 | |
| **2002** | 26,000 | -3.7% | 23,000 | 0.0% | 16,000 | 0.0% |
| **2003** | 26,000 | -1.9% | 23,000 | 0.0% | 16,000 | 0.0% |
| **2004** | 23,000 | -4.9% | 23,000 | 0.0% | 15,000 | -2.1% |
| **2005** | 23,000 | -3.7% | 26,000 | 3.3% | 14,000 | -3.1% |
| **2006** | - | - | - | - | - | - |
| **2007** | 26,000 | -0.6% | 27,000 | 2.9% | 16,000 | 0.0% |
| **2008** | 26,000 | -0.5% | 28,000 | 3.1% | 16,000 | 0.0% |
| **2009** | 25,000 | -0.9% | 26,000 | 1.6% | 16,000 | 0.0% |
| **2010** | 27,000 | 0.0% | 27,000 | 1.9% | 16,000 | 0.0% |
| **2011** | 27,000 | 0.0% | 27,000 | 1.7% | 16,000 | 0.0% |
| **2012** | 27,000 | 0.0% | 26,000 | 1.2% | 16,000 | 0.0% |
| **Average Background Growth Rate** | | -1.6% | | 1.6% | | -0.5% |
| **11-Year Compound Growth Rate** | | 0.0% | | 1.1% | | 0.0% |

Figure 17 Travel Demand Model Projected 2040 Average Daily Traffic Volumes



## Development Projects

Information related to specific development projects was collected. Three mixed-use developments within the study area are currently approved by the City/County. The Gables Development, Gables I Development, and Rosedale Farms Development are anticipated to be complete and occupied by 2040. The proposed location and anticipated daily trip generation is detailed in **Table 5** and **Figure 18**.

**Table 5 Future Development Projects**

| Development | Location | Daily Trip Generation |
|---|---|---|
| **Gables** | North of Route 221, west of Vista Center Drive | 3,450 trips |
| **Gables I** | South of Route 221, west of Bateman Bridge Road | 1,024 trips |
| **Rosedale Farms** | North of Graves Mill Road, west of Old Graves Mill Road | 21,169 trips |

Less certain than the three residential developments above is a major retail project with approximately 609,200 square feet of retail space (assumed as 15% of the site's area, which is 4,061,354 square feet) to be located in the southeast quadrant of the intersection of Route 221 and the Lynchburg Expressway. Based on ITE code 820 this project is anticipated to generate approximately 21,980 trips per day.

## Future Traffic Projections

After considering the results of the regional travel demand model projections, analysis of the historical traffic data (that the background growth rate is negligible in two of the three segments of the corridor), and details of future development plans along the Route 221 corridor, future traffic projections were created. These projections are based on a 0.25 percent per year growth rate on Route 221 throughout the entire study area and the anticipated trips generated by the three mixed-use projects currently approved. The large retail development was not specifically included within these projections as it is less certain. It is assumed that these trips are accounted for by the background traffic growth.

The 2040 average daily traffic volumes are shown in **Figure 19** along with the existing average daily traffic volumes. As shown, daily volumes are expected to range between 23,200 vpd (east of the Lynchburg Expressway) and 42,500 vpd (east of Enterprise Drive). **Figure 20** illustrates estimated future 2040 intersection traffic volumes.

Figure 18 Approved Developments

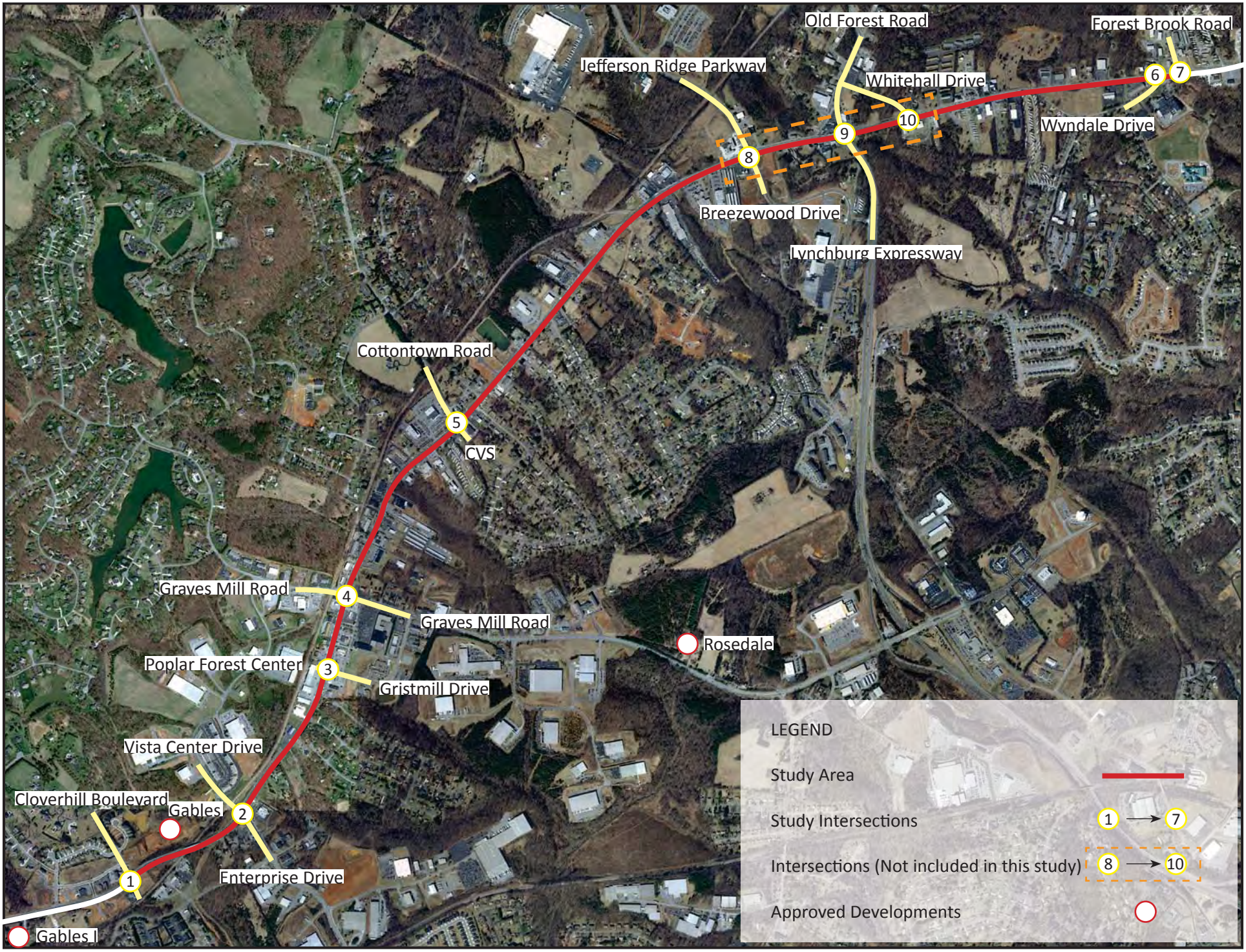


Figure 19 Projected 2040 Average Daily Traffic Volumes

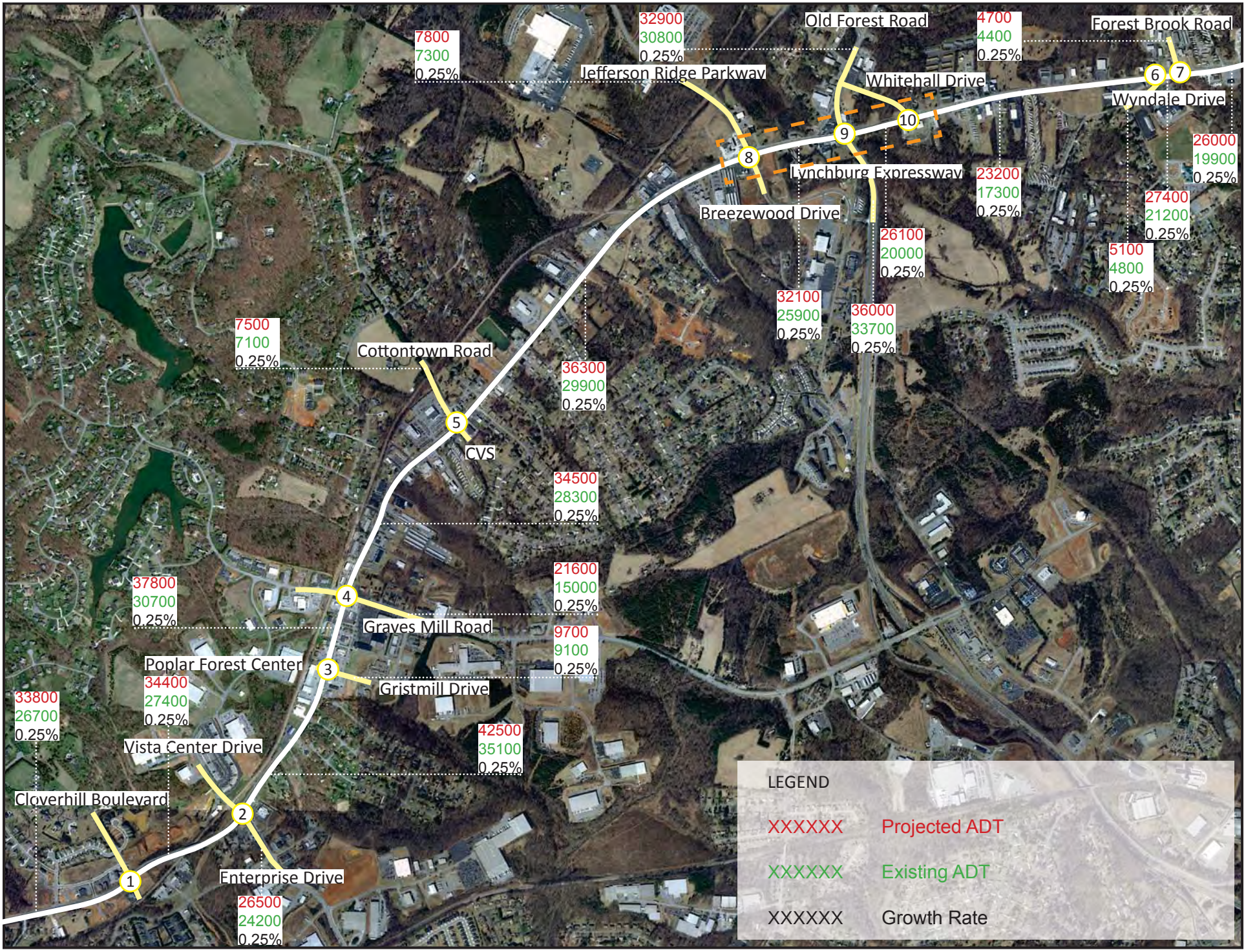
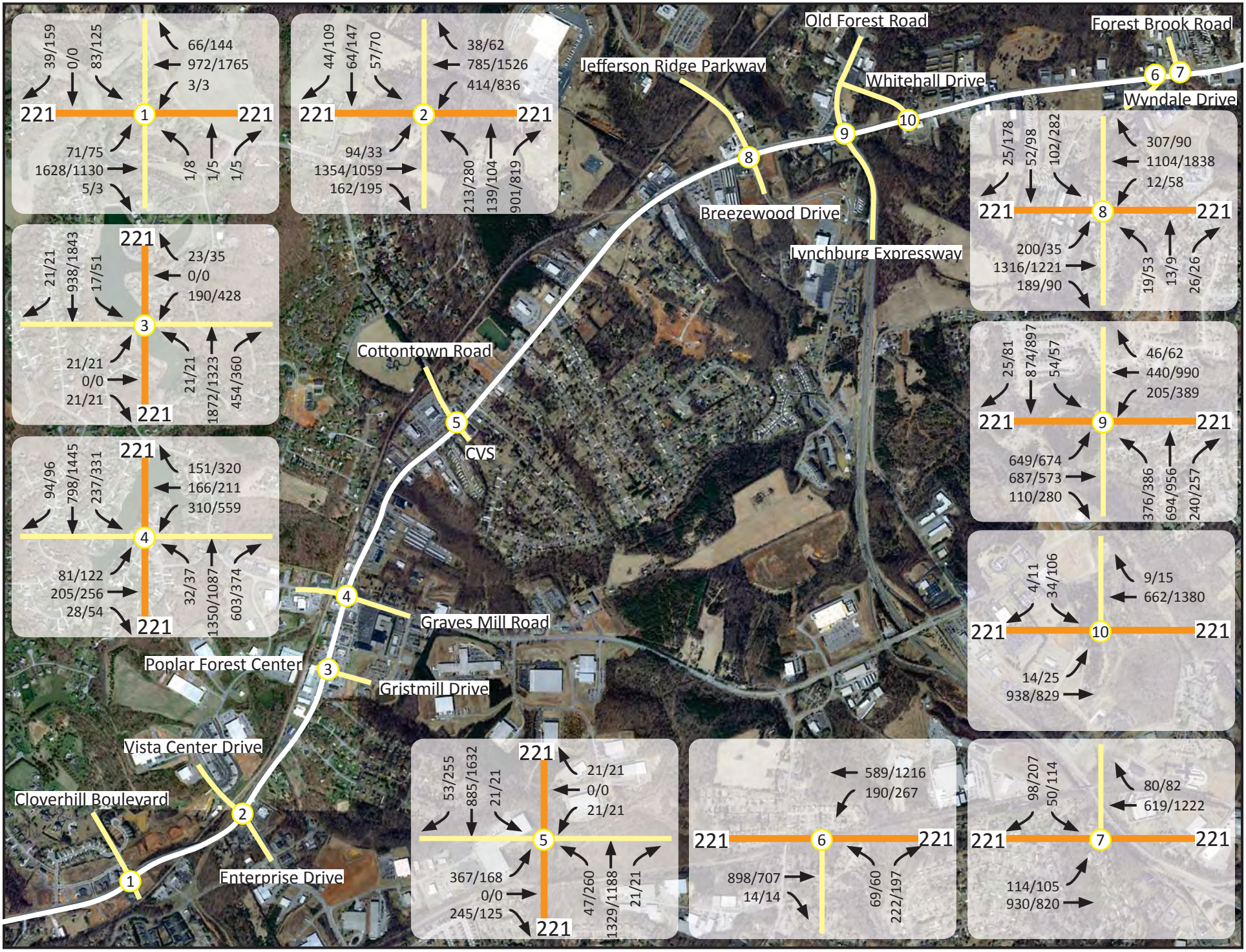


Figure 20 Future (2040) Traffic Volumes at Study Intersections

XX/XX AM/PM



# 6. Public Process

# 6. Public Process

Input from those who travel the corridor regularly was vital to this project. Opportunities for the public to share their experiences and suggestions were provided at two public meetings and through the project website.

The first set of public meetings was held on January 30th at the public library in Forest with one and a half hour sessions starting at 1:30 PM and 5:00 PM. Citizens were invited to hear a brief presentation about the project and then participate in a work session to offer their input on how the corridor operates.

The second public meeting was held on April 10th also at the library in Forest. From 1:30 PM to 6:00 PM an open house style session was held where citizens were invited to stop by at their convenience. Displays illustrating crash data, traffic volumes, levels of service and draft recommendations were available for review and comment.

In addition to the public meetings, a website was developed for the project and can be found at http://route221.businesscatalyst.com/index.html. Between February and March of 2014, variable message signs were located along the corridor encouraging drivers to provide input about the corridor via the website. This proved to be a valuable tool.

Through the meetings and website, over 140 citizens participated. **Appendix A** includes full documentation of the public process. A summary of the comments received follows.

**Most Frequent**

- Synchronize and use detection at the signals – 9
- Roadway is congested – 7

**Access Management**

- Left turns onto Route 221 unsafe, difficult, etc. – 6
- Two way left turn lane is unsafe – 11 with the following specific locations called out Woodberry Square/Woodberry Lane, Enterprise Drive to Graves Mill Road, 11 Wayne Drive, Forest Drive
- Close entrances/exits – 4
- Add median at Graves Mill Center – 2

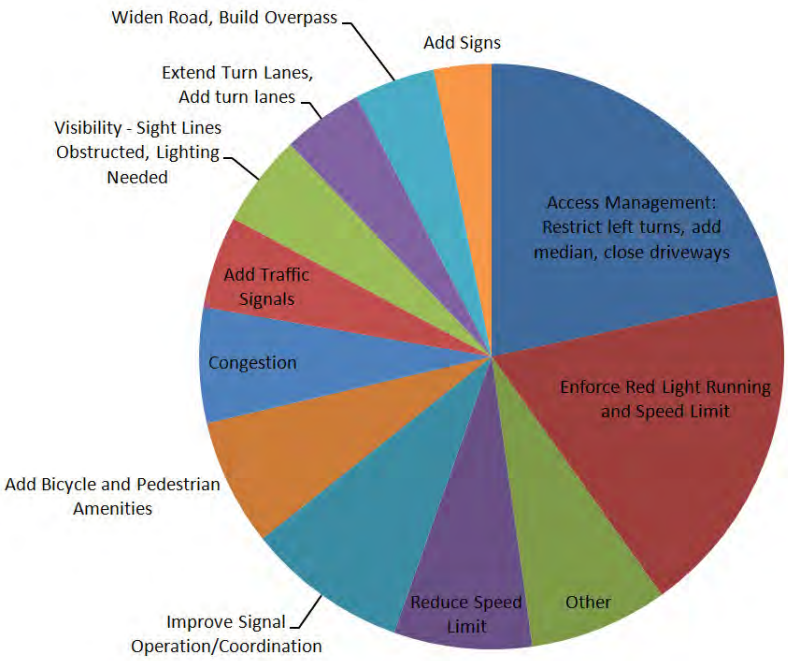
**Speed Limit**

- Speed limit too high/reduce the speed limit – 6
- Increase speed limit to 55 – 1
- Larger speed limit signs – 1

**Enforcement**
- Red light running is a problem – 12
- Lack of needed speed enforcement – 7

**Bicycle**
- Add bike lanes – 2
- Add share the road signs

**Improvements**
- Widen 2 lane section to 4 lanes – 3
- New traffic lights needed – 2 (Kroger), 2 (Wayne Drive), 1 general
- Build overpass at 501/221 – 2
- Lighting is needed – 2
- Extend Enterprise Drive left turn lane so both same length
- Change Graves Mill Road lane configuration to dual northbound lefts and right lane allowing left/straight/right
- Widen to 6 lanes
- Add turn lane to Bedford County Recycle Center
- Extend Wyndhurst left turn lane
- Add slower traffic keep right signs
- Add sign at Cottontown Road "No Left Turn after Green Arrow"
- Add exit ramps at intersections




**Miscellaneous**
- School bus stop at Gables Drive backs up traffic and is just over hill so hard to see
- Signs obstruct sight lines at Jiffy Lube and Father's Table Café
- Project signs soliciting feedback are distracting and unsafe – 2
- Discourage cut-thru that uses Bateman Bridge to/from 811
- Expand study to 811
- Maintenance – striping not reflective when dark and raining
- No improvements necessary – do not want to be bothered by construction
- Gables Development traffic impact will worsen problems
- Placement of the Cloverhill signal where visibility is limited westbound due to hill is problematic

# 7. Recommended Improvements

# 7. Recommended Improvements

A tiered approach was taken to improving traffic flow and safety on Route 221. Low-cost, more readily implementable improvements were considered first and analyzed before larger projects requiring more in depth design, construction, and additional right-of-way.

## Coordinated Traffic Signal Operation (2014)

The first improvement considered and analyzed was traffic signal coordination including timing and phasing optimization for each signalized intersection. This improvement was analyzed for both the 2014 conditions and 2040 conditions. Traffic operations were examined utilizing Synchro and SimTraffic (version 8). Synchro and SimTraffic reports are provided in **Technical Appendix B**.

As expected and shown in **Figure 21**, under existing conditions, optimizing and coordinating the traffic signals improves the overall levels of service and delays at intersections, and reduces the number of movements operating at LOS E and F. With optimization and coordination of the traffic signals all study intersections operate at LOS D or better overall during both peak periods with only one exception at Enterprise Drive during the afternoon peak period which operates at LOS E. All of the intersections have at least one movement that is expected to operate at LOS E or F during one peak period. Most of the movements with higher delays occur on the side streets or left turn movements.

As previously noted, the intersections of Jefferson Ridge Parkway, the Lynchburg Expressway and Whitehall Drive with Route 221 are part of a study soon to be undertaken and therefore, were not analyzed in this study.

**Table 6** provides the 2014 levels of service, delays, and queues with optimized and coordinated signal operations.

On an arterial roadway such as Route 221, travel speed and travel time are additional measures considered when evaluating traffic operations. With implementation of coordinated signal timing, the traffic model indicates that travel time in the corridor is reduced by 14% compared to existing conditions.

# Table 6 2014 Levels of Service, Delays and Queues with Coordinated Signal Operation

| 1. Route 221/Cloverhill | | 2014 - Coordinated | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cloverhill | NBL/NBT | D | 53.0 | 24 | E | 68.8 | 42 |
| Cloverhill | NBR | D | 51.9 | 14 | E | 65.3 | 21 |
| Cloverhill | SBL/SBT | D | 53.1 | 44 | E | 68.2 | 85 |
| Cloverhill | SBR | D | 50.3 | 16 | E | 62.6 | 39 |
| Route 221 | EBL | A | 3.8 | 28 | A | 8.0 | 25 |
| Route 221 | EBT | A | 9.1 | 153 | A | 6.2 | 134 |
| Route 221 | EBR | A | 4.0 | 11 | A | 4.1 | 5 |
| Route 221 | WBL | A | 1.8 | 10 | A | 2.6 | 7 |
| Route 221 | WBT | A | 4.8 | 140 | A | 3.3 | 233 |
| Route 221 | WBR | A | 3.7 | 28 | A | 0.7 | 22 |
| | | | | | | | |
| INTERSECTION | | A | 8.2 | | A | 6.9 | |

| 2. Route 221/Enterprise | | 2014 - Coordinated | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Vista Center | EBL | D | 50.1 | 62 | E | 59.8 | 114 |
| Vista Center | EBT | D | 54.6 | 94 | F | 132.5 | 261 |
| Vista Center | EBR | D | 47.5 | 70 | E | 55.9 | 170 |
| Enterprise | WBL/WBT | E | 74.0 | 398 | F | 111.8 | 400 |
| Enterprise | WBR | D | 49.7 | 462 | D | 46.6 | 353 |
| Route 221 | NBL | D | 48.6 | 190 | E | 66.1 | 155 |
| Route 221 | NBT | D | 48.6 | 446 | F | 85.6 | 557 |
| Route 221 | NBR | A | 0.1 | 272 | A | 0.2 | 424 |
| Route 221 | SBL | F | 87.3 | 225 | E | 78.2 | 431 |
| Route 221 | SBT | C | 20.2 | 219 | C | 31.1 | 356 |
| Route 221 | SBR | B | 19.5 | 59 | A | 7.2 | 33 |
| | | | | | | | |
| INTERSECTION | | D | 48.9 | | E | 61.5 | |

| 3. Route 221/Gristmill | | 2014 - Coordinated | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Center | EBL/EBT | D | 52.3 | 74 | E | 65.8 | 80 |
| Center | EBR | D | 50.4 | 62 | E | 63.8 | 63 |
| Gristmill | WBL | E | 61.8 | 235 | E | 66.6 | 545 |
| Gristmill | WBR | D | 37.8 | 150 | C | 34.2 | 175 |
| Route 221 | NBL | A | 2.8 | 73 | B | 14.2 | 54 |
| Route 221 | NBT | A | 3.5 | 268 | B | 10.5 | 183 |
| Route 221 | NBR | A | 0.0 | 78 | A | 0.6 | 76 |
| Route 221 | SBL | A | 7.8 | 52 | A | 5.7 | 170 |
| Route 221 | SBT/SBR | A | 6.4 | 184 | A | 7.0 | 390 |
| | | | | | | | |
| INTERSECTION | | A | 8.4 | | B | 15.3 | |

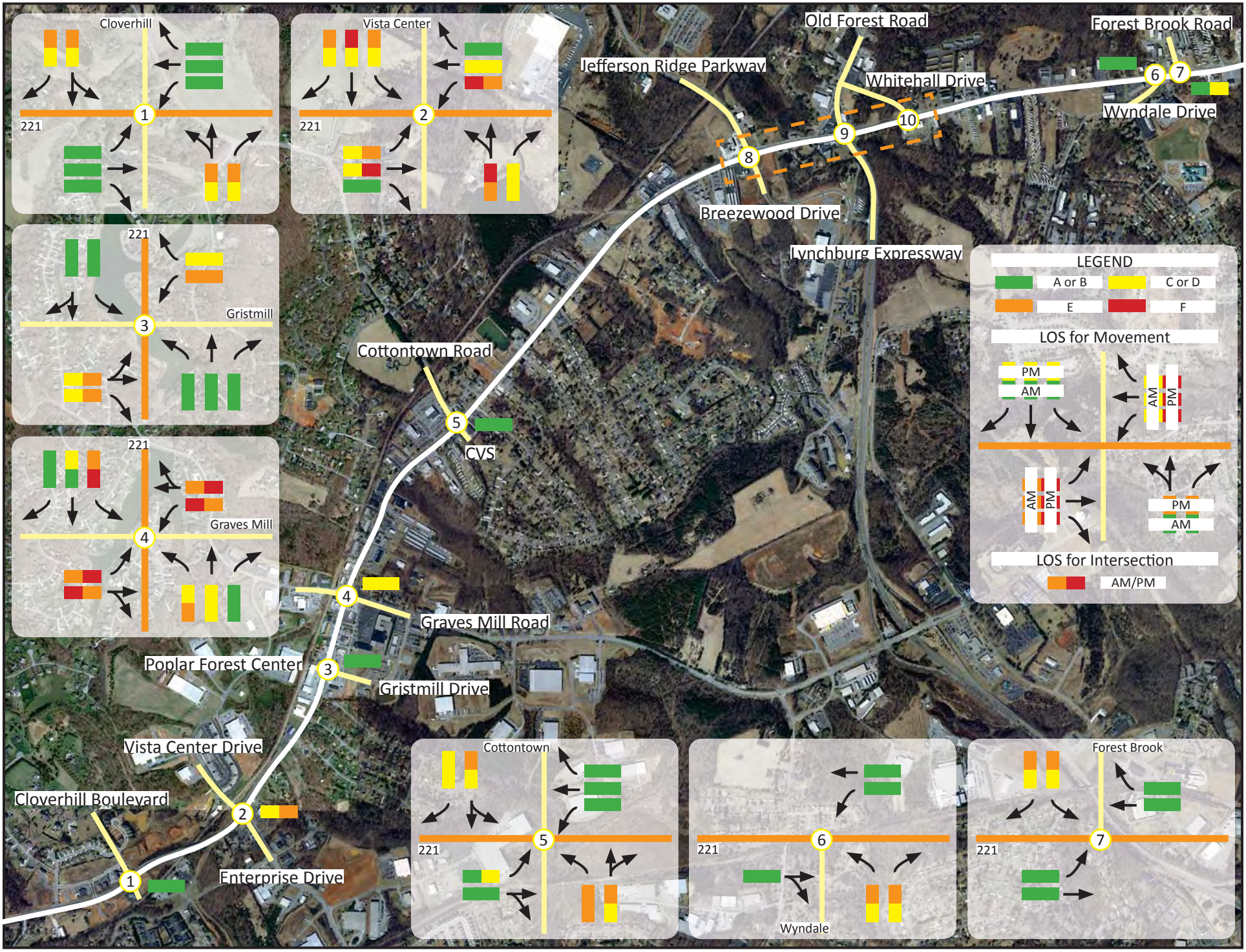
| 4. Route 221/Graves Mill | | 2014 - Coordinated | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Graves Mill | EBL | E | 70.6 | 149 | F | 95.8 | 149 |
| Graves Mill | EBT/EBR | F | 82.0 | 252 | E | 71.6 | 254 |
| Graves Mill | WBL | F | 83.1 | 309 | E | 76.3 | 497 |
| Graves Mill | WBT/WBR | E | 75.8 | 315 | F | 81.0 | 452 |
| Route 221 | NBL | E | 67.1 | 134 | D | 47.3 | 201 |
| Route 221 | NBT | C | 21.5 | 321 | C | 30.6 | 358 |
| Route 221 | NBR | B | 19.8 | 172 | A | 5.7 | 114 |
| Route 221 | SBL | F | 104.9 | 264 | E | 69.5 | 324 |
| Route 221 | SBT | B | 11.1 | 250 | C | 26.9 | 626 |
| Route 221 | SBR | A | 8.1 | 49 | A | 4.9 | 364 |
| | | | | | | | |
| INTERSECTION | | D | 38.2 | | D | 45.3 | |

| 5. Route 221/Cottontown | | 2014 - Coordinated | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cottontown | EBL/EBT | D | 51.9 | 332 | E | 71.3 | 254 |
| Cottontown | EBR | C | 26.3 | 142 | D | 35.8 | 125 |
| CVS | WBL | E | 58.4 | 59 | E | 72.3 | 58 |
| CVS | WBT/WBR | D | 51.8 | 52 | E | 65.8 | 53 |
| Route 221 | NBL | A | 4.4 | 62 | C | 31.1 | 271 |
| Route 221 | NBT/NBR | A | 6.7 | 216 | A | 9.1 | 251 |
| Route 221 | SBL | A | 3.7 | 40 | A | 4.4 | 189 |
| Route 221 | SBT | A | 6.1 | 285 | B | 11.2 | 497 |
| Route 221 | SBR | A | 1.8 | 108 | A | 2.7 | 302 |
| | | | | | | | |
| INTERSECTION | | B | 15.4 | | B | 16.6 | |

| 6. Route 221/Wyndale | | 2014 - Coordinated | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBT/EBR | A | 7.2 | 306 | A | 6.8 | 263 |
| Route 221 | WBL | B | 17.8 | 165 | A | 6.0 | 204 |
| Route 221 | WBT | A | 2.4 | 203 | A | 4.0 | 227 |
| Wyndale | NBL | D | 49.9 | 213 | E | 64.7 | 150 |
| Wyndale | NBR | D | 45.5 | 125 | E | 61.1 | 121 |
| | | | | | | | |
| INTERSECTION | | B | 15.2 | | B | 12.7 | |

| 7. Route 221/Forest Brook | | 2014 - Coordinated | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBL | A | 1.8 | 88 | B | 10.8 | 141 |
| Route 221 | EBT | A | 2.3 | 212 | A | 4.1 | 227 |
| Route 221 | WBT | A | 9.2 | 218 | B | 16.2 | 634 |
| Route 221 | WBR | A | 5.9 | 100 | A | 6.2 | 100 |
| Forest Brook | SBL | D | 49.9 | 99 | E | 66.2 | 368 |
| Forest Brook | SBR | D | 47.0 | 93 | E | 62.0 | 100 |
| | | | | | | | |
| INTERSECTION | | A | 9.1 | | C | 20.4 | |

Figure 21 2014 Levels of Service with Coordinated Signal Operation



## Intersection Improvements (2014)

Review of the traffic operations with signal timing improvements shows that additional improvements are required to sufficiently accommodate the traffic volumes on Route 221 today. The first step for identifying improvements was to consider modifying the lane configurations on the side streets. Specific improvements were analyzed for the intersections of Enterprise Drive, Gristmill Drive, and Graves Mill Road where the intersections continue to operate with multiple movements at LOS E or F.

The specific improvements considered are outlined below:

- Enterprise Drive
    - Eastbound approach (Vista Center Drive) – Modify the existing exclusive right turn lane to allow through and right turn movements.
    - Westbound approach (Enterprise Drive) – Provide two additional left turn lanes resulting in dual lefts and single through and dual rights.
    - Westbound signal operation – Add an overlap phase so that westbound right turning traffic has a green arrow while the southbound left turn movement is green.
- Gristmill Drive – On the westbound approach (Gristmill Drive) modify the existing exclusive right turn lane to allow left, through, and right turn movements, and extend the outside lane to better accommodate traffic queues.
- Graves Mill Road – On the westbound approach (Graves Mill Road) provide an additional left turn lane and an exclusive right turn lane resulting in dual lefts, a single through and a single right turn lane.

As hoped, and shown in **Figure 22**, with the additional turning lanes all three of the intersections' operations improve to LOS D or better overall during both peak periods and all individual movements operate at LOS E or better. Analysis of the traffic operations with the above improvements was conducted utilizing Synchro and SimTraffic (version 8) and the reports are provided in **Technical Appendix C**.

**Table 7** provides the 2014 levels of service, delays, and queues with optimized/coordinated signal operations and the additional turn lanes detailed above.

Combining signal coordination with the intersection improvements, the corridor travel time is reduced by 21% compared to existing conditions, and is reduced by 8% compared to just coordinating the signals.

# Table 7 2014 Levels of Service, Delays and Queues with Coordinated Signal Operation and Intersection Improvements

| 1. Route 221/Cloverhill | | 2014 - Coordinated w/mitigations #1 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cloverhill | NBL/NBT | D | 47.8 | 18 | E | 63.4 | 38 |
| Cloverhill | NBR | D | 46.9 | 14 | E | 60.3 | 25 |
| Cloverhill | SBL/SBT | D | 47.6 | 46 | E | 64.9 | 80 |
| Cloverhill | SBR | D | 45.3 | 10 | E | 58.4 | 30 |
| Route 221 | EBL | A | 5.1 | 22 | B | 13.2 | 25 |
| Route 221 | EBT | B | 10.1 | 122 | A | 6.4 | 145 |
| Route 221 | EBR | A | 4.4 | 13 | A | 4.3 | 10 |
| Route 221 | WBL | A | 3.3 | 11 | A | 4.3 | 11 |
| Route 221 | WBT | A | 3.1 | 124 | A | 3.1 | 308 |
| Route 221 | WBR | A | 0.8 | 24 | A | 2.3 | 23 |
| | | | | | | | |
| INTERSECTION | | A | 8.1 | | A | 6.7 | |

| 2. Route 221/Enterprise | | 2014 - Coordinated w/mitigations #1 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Vista Center | EBL | D | 44.7 | 57 | E | 58.6 | 120 |
| Vista Center | EBT | D | 44.4 | 104 | E | 77.3 | 192 |
| Vista Center | EBT/EBR | D | 44.4 | 85 | E | 77.3 | 185 |
| Enterprise | WBL\|WBT | D\|E | 47.3\|69.9 | 190\|203 | E\|E | 66.7\|76.3 | 220\|133 |
| Enterprise | WBR | D | 49.5 | 259 | C | 32.5 | 239 |
| Route 221 | NBL | C | 34.3 | 150 | E | 57.0 | 62 |
| Route 221 | NBT | D | 40.0 | 388 | D | 37.9 | 359 |
| Route 221 | NBR | A | 0.1 | 85 | A | 0.2 | 44 |
| Route 221 | SBL | C | 26.2 | 204 | D | 45.9 | 367 |
| Route 221 | SBT | B | 14.7 | 163 | B | 15.1 | 262 |
| Route 221 | SBR | A | 7.6 | 34 | A | 1.3 | 18 |
| | | | | | | | |
| INTERSECTION | | D | 36.2 | | D | 36.1 | |

| 3. Route 221/Gristmill | | 2014 - Coordinated w/mitigations #1 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Center | EBL/EBT | D | 47.5 | 74 | E | 63.7 | 74 |
| Center | EBR | D | 45.4 | 58 | E | 59.9 | 63 |
| Gristmill | WBL | D | 38.2 | 131 | D | 51.5 | 250 |
| Gristmill | WBL/WBR | D | 39.9 | 138 | D | 52.9 | 250 |
| Route 221 | NBL | A | 4.7 | 58 | B | 10.1 | 62 |
| Route 221 | NBT | A | 7.7 | 267 | A | 9.9 | 204 |
| Route 221 | NBR | A | 4.6 | 79 | A | 4.4 | 63 |
| Route 221 | SBL | A | 4.4 | 54 | A | 4.3 | 109 |
| Route 221 | SBT/SBR | A | 2.3 | 96 | A | 6.7 | 268 |
| | | | | | | | |
| INTERSECTION | | A | 8.6 | | B | 13.8 | |

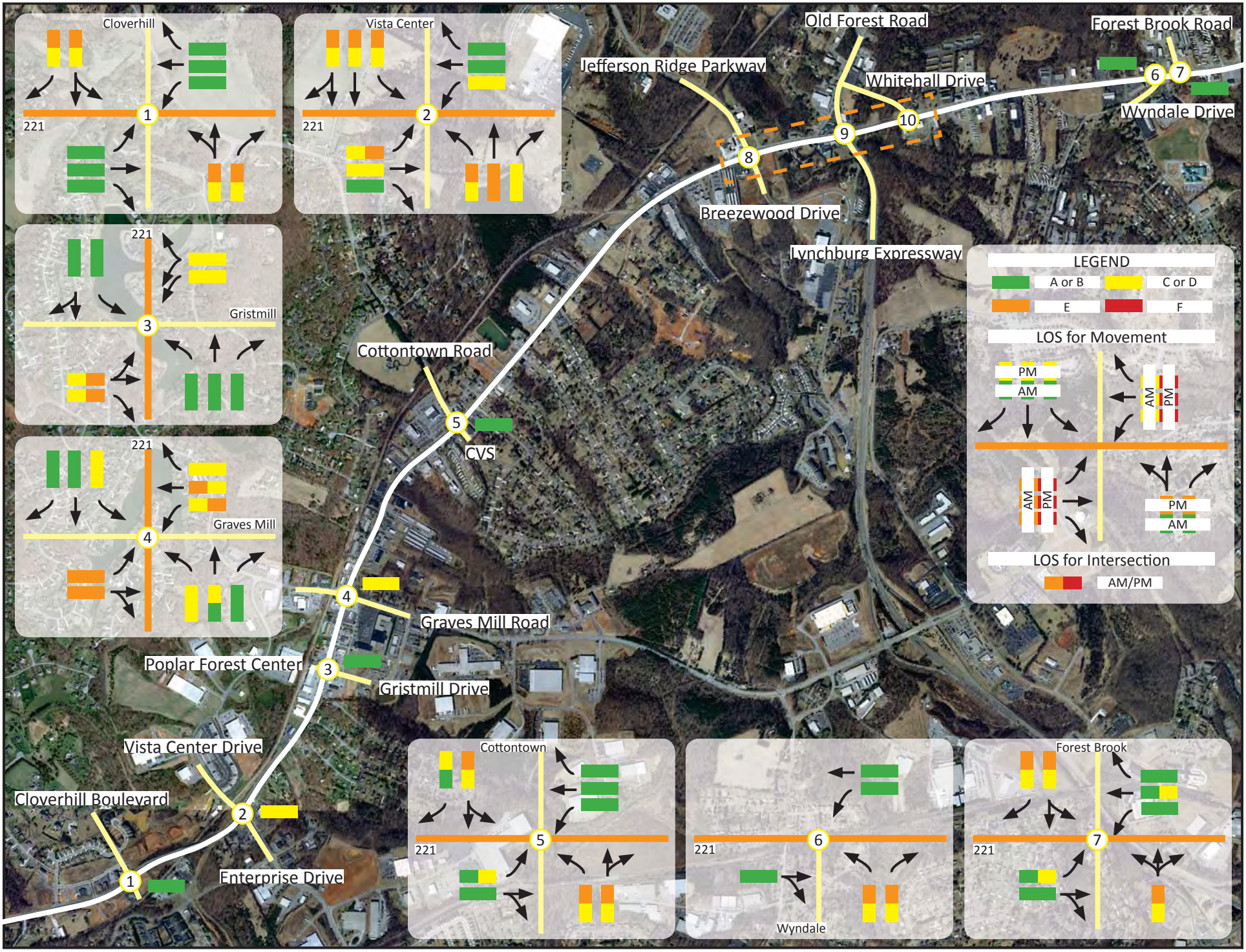
| 4. Route 221/Graves Mill | | 2014 - Coordinated w/mitigations #1 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Graves Mill | EBL | E | 56.7 | 147 | E | 69.8 | 148 |
| Graves Mill | EBT/EBR | E | 62.4 | 211 | E | 58.8 | 236 |
| Graves Mill | WBL | D | 51.8 | 204 | E | 59.8 | 318 |
| Graves Mill | WBT\|WBR | E\|D | 57.9\|38.9 | 186\|140 | D\|D | 55.0\|46.9 | 225\|182 |
| Route 221 | NBL | C | 33.2 | 86 | D | 54.9 | 136 |
| Route 221 | NBT | B | 17.0 | 271 | C | 24.5 | 312 |
| Route 221 | NBR | B | 10.2 | 157 | A | 8.6 | 140 |
| Route 221 | SBL | D | 50.4 | 250 | D | 47.7 | 292 |
| Route 221 | SBT | A | 6.2 | 166 | B | 10.3 | 395 |
| Route 221 | SBR | A | 1.5 | 30 | A | 1.6 | 256 |
| | | | | | | | |
| INTERSECTION | | C | 24.8 | | C | 31.0 | |

| 5. Route 221/Cottontown | | 2014 - Coordinated w/mitigations #1 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cottontown | EBL/EBT | D | 50.6 | 342 | E | 72.9 | 221 |
| Cottontown | EBR | B | 15.6 | 139 | C | 30.4 | 112 |
| CVS | WBL | D | 54.3 | 54 | E | 77.3 | 51 |
| CVS | WBT/WBR | D | 47.2 | 46 | E | 62.3 | 50 |
| Route 221 | NBL | B | 17.9 | 83 | D | 50.0 | 286 |
| Route 221 | NBT/NBR | A | 8.2 | 222 | A | 5.8 | 285 |
| Route 221 | SBL | A | 6.5 | 131 | A | 3.7 | 131 |
| Route 221 | SBT | B | 13.7 | 358 | B | 12.1 | 496 |
| Route 221 | SBR | B | 13.3 | 138 | A | 2.8 | 324 |
| | | | | | | | |
| INTERSECTION | | B | 17.6 | | B | 17.5 | |

| 6. Route 221/Wyndale | | 2014 - Coordinated w/mitigations #1 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBT/EBR | A | 6.6 | 335 | A | 6.0 | 245 |
| Route 221 | WBL | B | 17.9 | 188 | A | 2.9 | 188 |
| Route 221 | WBT | A | 2.3 | 216 | A | 1.5 | 231 |
| Wyndale | NBL | D | 44.2 | 216 | E | 59.5 | 164 |
| Wyndale | NBR | D | 40.9 | 125 | E | 56.3 | 122 |
| | | | | | | | |
| INTERSECTION | | B | 14.0 | | B | 10.2 | |

| 7. Route 221/Forest Brook | | 2014 - Coordinated w/mitigations #1 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBL | A | 4.3 | 82 | D | 53.2 | 145 |
| Route 221 | EBT/EBR | A | 8.1 | 232 | A | 5.7 | 223 |
| Route 221 | WBL | B | 16.9 | 72 | B | 14.5 | 182 |
| Route 221 | WBT | B | 20.0 | 278 | D | 37.5 | 836 |
| Route 221 | WBR | B | 12.4 | 100 | B | 12.1 | 100 |
| Forest Brook | NBL/NBR | D | 47.7 | 85 | E | 61.4 | 84 |
| Forest Brook | SBL | D | 44.8 | 116 | E | 65.5 | 360 |
| Forest Brook | SBR | D | 42.3 | 95 | E | 57.9 | 100 |
| | | | | | | | |
| INTERSECTION | | B | 15.9 | | B | 32.2 | |

Figure 22 2014 Levels of Service with Coordinated Signal Operation and Intersection Improvements



## Future Conditions (2040)

When analyzing the future 2040 conditions it was assumed that traffic signals would be optimized and coordinated and that the additional turn lanes previously analyzed would be in place. The results of the analysis based on these conditions are shown in **Figure 23** and **Table 8** and the Synchro/SimTraffic printouts are contained in **Technical Appendix D**.

In general, the levels of service and delay significantly degrade by year 2040. The intersection at Enterprise Drive is expected to operate at overall LOS E during the morning peak period and the intersection at Forest Brook Road is expected to operate at overall LOS E during the afternoon peak period. All of the study area intersections are expected to have multiple movements operating at LOS E and F during both peak periods.

By year 2040, the corridor travel time increases significantly by 41% compared to the conditions with signal coordination and the intersection improvements in 2014.

The results of the analysis indicate that the existing roadway with coordinated traffic signal operation and specific intersection improvements will not be sufficient to accommodate the anticipated traffic volumes along Route 221 in the future. As a result, widening the four lane section of Route 221 to six lanes and the two lane section to four lanes was analyzed.

As expected, the results of the analysis assuming Route 221 is widened are an improvement. As shown in **Figure 24**, all of the study area intersections are expected to operate at LOS D or better overall. In addition, all movements are expected to operate at LOS E or better with exceptions only on the side street approaches at the intersections of Enterprise Drive and Gristmill Drive. The results of the analysis based on these conditions are shown in **Table 9** and the Synchro/SimTraffic printouts are contained in **Technical Appendix E**.

After widening the roadway, the corridor travel time is reduced by 23% compared to the conditions before widening the roadway in 2040.

## Table 8 2040 Levels of Service, Delays and Queues with Coordinated Signal Operation and Intersection Improvements

| 1. Route 221/Cloverhill | | 2040 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cloverhill | NBL/NBT | E | 58.2 | 29 | E | 76.0 | 51 |
| Cloverhill | NBR | E | 56.9 | 18 | E | 70.3 | 21 |
| Cloverhill | SBL/SBT | E | 69.8 | 149 | F | 82.5 | 269 |
| Cloverhill | SBR | D | 51.1 | 93 | E | 67.4 | 150 |
| Route 221 | EBL | A | 6.8 | 111 | D | 49.2 | 140 |
| Route 221 | EBT | B | 14.3 | 244 | B | 11.0 | 216 |
| Route 221 | EBR | A | 4.9 | 51 | A | 6.6 | 16 |
| Route 221 | WBL | A | 3.4 | 11 | A | 6.3 | 60 |
| Route 221 | WBT | A | 5.7 | 184 | B | 13.6 | 987 |
| Route 221 | WBR | A | 7.0 | 38 | A | 4.9 | 332 |
| | | | | | | | |
| INTERSECTION | | B | 13.5 | | C | 20.4 | |

| 2. Route 221/Enterprise | | 2040 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Vista Center | EBL | F | 140.5 | 123 | E | 71.3 | 135 |
| Vista Center | EBT | D | 53.7 | 125 | F | 136.2 | 223 |
| Vista Center | EBT/EBR | D | 53.7 | 123 | F | 136.2 | 237 |
| Enterprise | WBL\|WBT | E\|F | 75.7\|160.9 | 251\|351 | E\|F | 76.5\|114.4 | 271\|264 |
| Enterprise | WBR | F | 137.5 | 336 | D | 39.8 | 319 |
| Route 221 | NBL | D | 53.0 | 400 | F | 89.2 | 267 |
| Route 221 | NBT | F | 92.3 | 1214 | D | 54.9 | 533 |
| Route 221 | NBR | A | 0.1 | 425 | A | 0.2 | 382 |
| Route 221 | SBL | C | 24.2 | 202 | E | 66.6 | 442 |
| Route 221 | SBT | A | 8.0 | 203 | C | 24.5 | 380 |
| Route 221 | SBR | A | 0.6 | 50 | A | 2.2 | 235 |
| | | | | | | | |
| INTERSECTION | | E | 77.5 | | D | 51.9 | |

| 3. Route 221/Gristmill | | 2040 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Center | EBL/EBT | E | 58.6 | 71 | E | 74.6 | 90 |
| Center | EBR | E | 55.2 | 58 | E | 68.7 | 71 |
| Gristmill | WBL | E | 55.2 | 164 | E | 70.3 | 287 |
| Gristmill | WBL/WBR | E | 55.7 | 160 | E | 70.4 | 290 |
| Route 221 | NBL | B | 10.3 | 96 | B | 17.4 | 57 |
| Route 221 | NBT | A | 9.9 | 382 | A | 8.8 | 282 |
| Route 221 | NBR | A | 4.4 | 157 | A | 3.6 | 78 |
| Route 221 | SBL | D | 35.5 | 63 | A | 4.3 | 154 |
| Route 221 | SBT/SBR | A | 2.0 | 80 | A | 6.4 | 300 |
| | | | | | | | |
| INTERSECTION | | B | 10.8 | | B | 14.8 | |

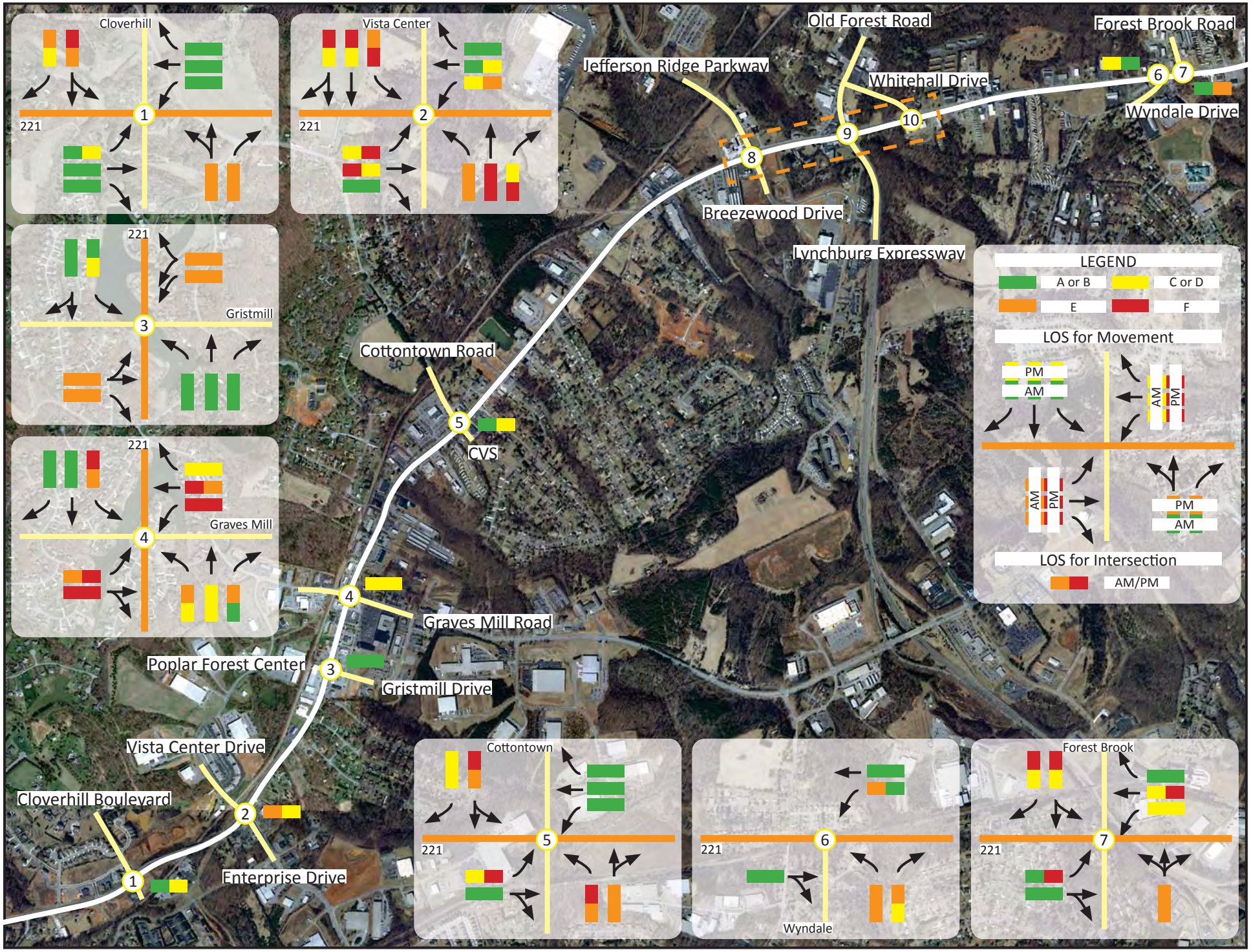
| 4. Route 221/Graves Mill | | 2040 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Graves Mill | EBL | E | 66.7 | 149 | F | 87.1 | 150 |
| Graves Mill | EBT/EBR | F | 125.0 | 280 | F | 113.4 | 434 |
| Graves Mill | WBL | F | 88.2 | 263 | F | 93.5 | 453 |
| Graves Mill | WBT\|WBR | F\|D | 97.9\|46.3 | 289\|178 | E\|D | 72.1\|53.2 | 295\|262 |
| Route 221 | NBL | D | 46.4 | 148 | E | 58.8 | 250 |
| Route 221 | NBT | D | 37.6 | 403 | D | 46.0 | 474 |
| Route 221 | NBR | B | 11.7 | 193 | E | 69.1 | 208 |
| Route 221 | SBL | E | 75.7 | 296 | F | 89.3 | 325 |
| Route 221 | SBT | B | 14.6 | 371 | B | 13.1 | 741 |
| Route 221 | SBR | B | 12.8 | 52 | A | 1.4 | 291 |
| | | | | | | | |
| INTERSECTION | | D | 45.5 | | D | 54.2 | |

| 5. Route 221/Cottontown | | 2040 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cottontown | EBL/EBT | E | 62.7 | 390 | F | 99.7 | 258 |
| Cottontown | EBR | C | 20.4 | 163 | D | 36.6 | 146 |
| CVS | WBL | E | 70.2 | 60 | F | 81.9 | 61 |
| CVS | WBT/WBR | E | 57.3 | 63 | E | 71.3 | 50 |
| Route 221 | NBL | C | 23.2 | 97 | F | 95.5 | 298 |
| Route 221 | NBT/NBR | A | 7.4 | 255 | A | 2.2 | 364 |
| Route 221 | SBL | A | 6.1 | 210 | A | 3.9 | 172 |
| Route 221 | SBT | B | 11.7 | 458 | B | 13.5 | 567 |
| Route 221 | SBR | A | 0.1 | 300 | A | 1.9 | 325 |
| | | | | | | | |
| INTERSECTION | | B | 18.2 | | C | 21.5 | |

| 6. Route 221/Wyndale | | 2040 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBT/EBR | B | 11.3 | 430 | B | 13.3 | 585 |
| Route 221 | WBL | E | 59.5 | 194 | B | 14.0 | 194 |
| Route 221 | WBT | A | 2.2 | 238 | A | 2.5 | 238 |
| Wyndale | NBL | E | 56.4 | 265 | E | 69.8 | 268 |
| Wyndale | NBR | D | 50.3 | 125 | E | 65.6 | 125 |
| | | | | | | | |
| INTERSECTION | | C | 22.5 | | B | 14.2 | |

| 7. Route 221/Forest Brook | | 2040 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBL | B | 10.3 | 92 | F | 116.5 | 216 |
| Route 221 | EBT/EBR | A | 9.7 | 234 | B | 12.8 | 229 |
| Route 221 | WBL | C | 28.6 | 169 | C | 26.9 | 184 |
| Route 221 | WBT | C | 23.6 | 382 | F | 85.5 | 1127 |
| Route 221 | WBR | B | 12.6 | 100 | A | 9.8 | 100 |
| Forest Brook | NBL/NBR | E | 56.3 | 99 | E | 71.7 | 98 |
| Forest Brook | SBL | D | 54.9 | 161 | F | 82.5 | 440 |
| Forest Brook | SBR | D | 51.5 | 99 | F | 96.0 | 100 |
| | | | | | | | |
| INTERSECTION | | B | 19.0 | | E | 62.7 | |

Figure 23 2040 Levels of Service with Coordinated Signal Operation and Intersection Improvements



# Table 9 2040 Levels of Service, Delays and Queues with Roadway Widening

| 1. Route 221/Cloverhill | | 2040 w/mitigations #2 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cloverhill | NBL/NBT | E | 58.2 | 22 | E | 70.0 | 49 |
| Cloverhill | NBR | E | 56.9 | 18 | E | 65.3 | 19 |
| Cloverhill | SBL/SBT | E | 55.7 | 129 | E | 67.9 | 245 |
| Cloverhill | SBR | D | 49.0 | 34 | E | 56.9 | 149 |
| Route 221 | EBL | A | 5.8 | 61 | C | 20.5 | 89 |
| Route 221 | EBT | A | 10.0 | 154 | A | 9.9 | 167 |
| Route 221 | EBR | A | 5.6 | 18 | A | 7.3 | 10 |
| Route 221 | WBL | A | 3.0 | 11 | A | 5.7 | 6 |
| Route 221 | WBT | A | 4.8 | 155 | A | 9.0 | 193 |
| Route 221 | WBR | A | 7.4 | 43 | A | 4.4 | 53 |
| | | | | | | | |
| INTERSECTION | | B | 10.4 | | B | 15.7 | |

| 2. Route 221/Enterprise | | 2040 w/mitigations #2 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Vista Center | EBL | F | 109.5 | 111 | E | 60.2 | 140 |
| Vista Center | EBT | D | 52.5 | 124 | E | 77.7 | 202 |
| Vista Center | EBT/EBR | D | 52.5 | 104 | E | 77.7 | 215 |
| Enterprise | WBL\|WBT | E\|F | 59.2\|100.0 | 217\|309 | E\|F | 64.4\|83.4 | 238\|174 |
| Enterprise | WBR | E | 65.8 | 288 | C | 31.6 | 239 |
| Route 221 | NBL | D | 52.6 | 150 | E | 78.4 | 84 |
| Route 221 | NBT | D | 43.0 | 492 | D | 43.7 | 381 |
| Route 221 | NBR | A | 0.1 | 340 | A | 0.2 | 178 |
| Route 221 | SBL | B | 15.1 | 206 | D | 51.9 | 426 |
| Route 221 | SBT | A | 6.4 | 169 | C | 20.5 | 356 |
| Route 221 | SBR | A | 0.1 | 43 | A | 9.8 | 85 |
| | | | | | | | |
| INTERSECTION | | D | 42.1 | | D | 39.6 | |

| 3. Route 221/Gristmill | | 2040 w/mitigations #2 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Center | EBL/EBT | E | 58.7 | 69 | E | 68.8 | 69 |
| Center | EBR | E | 55.4 | 60 | E | 63.7 | 57 |
| Gristmill | WBL | D | 54.6 | 159 | F | 97.1 | 258 |
| Gristmill | WBL/WBR | D | 53.6 | 163 | F | 92.1 | 283 |
| Route 221 | NBL | A | 3.3 | 44 | A | 5.9 | 52 |
| Route 221 | NBT | A | 5.0 | 221 | A | 6.5 | 288 |
| Route 221 | NBR | A | 1.6 | 99 | A | 3.8 | 88 |
| Route 221 | SBL | A | 5.9 | 56 | A | 2.1 | 155 |
| Route 221 | SBT/SBR | A | 2.2 | 88 | A | 4.0 | 282 |
| | | | | | | | |
| INTERSECTION | | A | 7.6 | | B | 15.6 | |

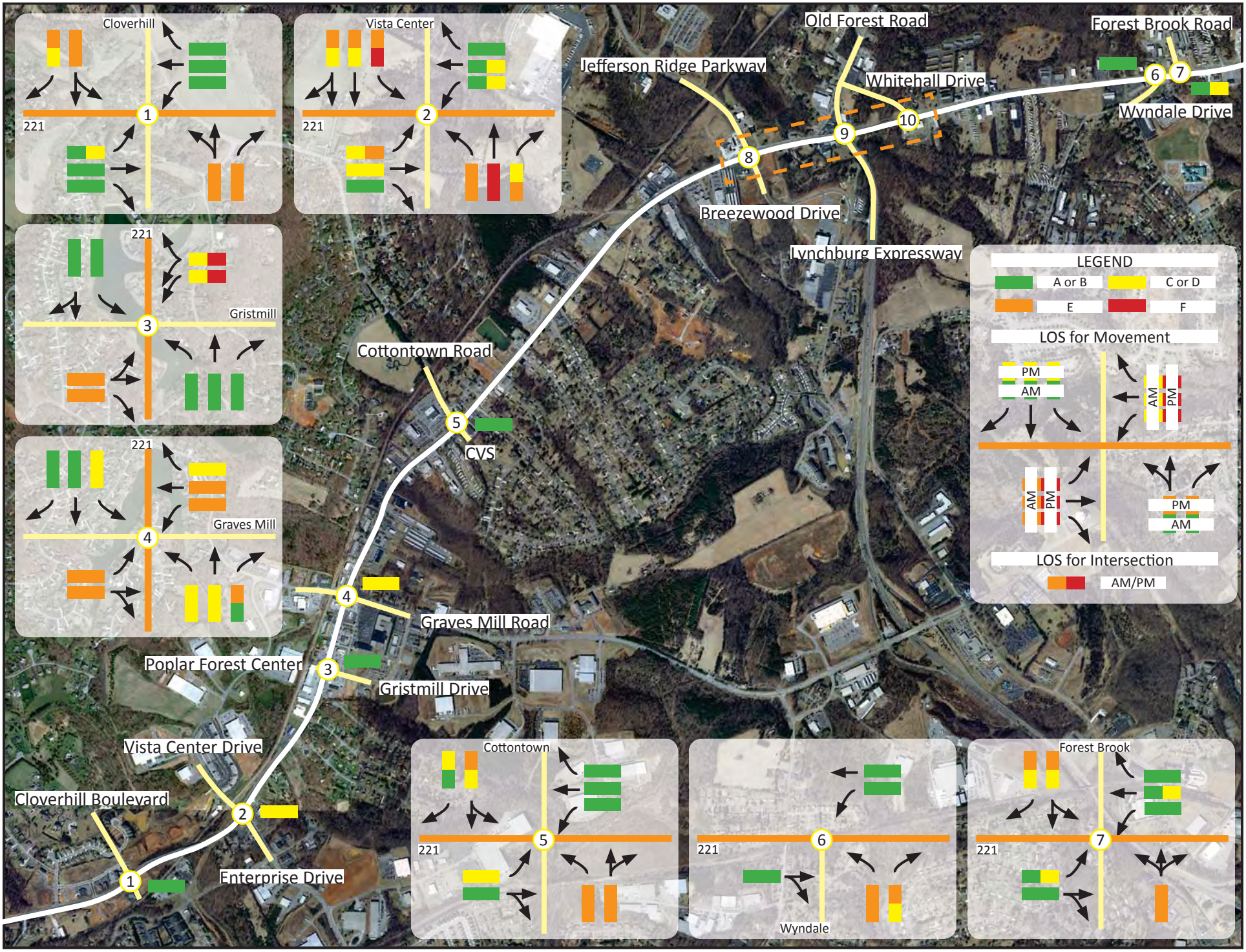
| 4. Route 221/Graves Mill | | 2040 w/mitigations #2 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Graves Mill | EBL | E | 56.2 | 149 | E | 68.8 | 150 |
| Graves Mill | EBT/EBR | E | 76.2 | 264 | E | 79.0 | 403 |
| Graves Mill | WBL | E | 60.6 | 259 | E | 64.1 | 385 |
| Graves Mill | WBT\|WBR | E\|D | 66.1\|44.0 | 250\|135 | E\|D | 57.2\|46.3 | 279\|221 |
| Route 221 | NBL | D | 46.7 | 83 | D | 50.7 | 160 |
| Route 221 | NBT | C | 24.3 | 273 | C | 34.8 | 299 |
| Route 221 | NBR | B | 13.0 | 263 | E | 65.2 | 260 |
| Route 221 | SBL | D | 44.8 | 305 | D | 51.5 | 324 |
| Route 221 | SBT | B | 14.2 | 472 | B | 15.3 | 566 |
| Route 221 | SBR | B | 17.3 | 71 | A | 4.8 | 40 |
| | | | | | | | |
| INTERSECTION | | C | 32.2 | | D | 42.0 | |

| 5. Route 221/Cottontown | | 2040 w/mitigations #2 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Cottontown | EBL/EBT | D | 50.1 | 386 | E | 71.8 | 244 |
| Cottontown | EBR | B | 17.2 | 150 | C | 26.2 | 120 |
| CVS | WBL | E | 61.7 | 57 | E | 72.8 | 59 |
| CVS | WBT/WBR | E | 56.1 | 55 | E | 65.9 | 46 |
| Route 221 | NBL | C | 20.1 | 89 | D | 51.9 | 297 |
| Route 221 | NBT/NBR | A | 6.0 | 174 | A | 3.2 | 338 |
| Route 221 | SBL | A | 8.7 | 125 | A | 7.3 | 208 |
| Route 221 | SBT | B | 14.3 | 320 | B | 14.5 | 554 |
| Route 221 | SBR | A | 6.9 | 134 | A | 3.5 | 325 |
| | | | | | | | |
| INTERSECTION | | B | 16.4 | | B | 16.9 | |

| 6. Route 221/Wyndale | | 2040 w/mitigations #2 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBT/EBR | A | 5.3 | 489 | A | 3.4 | 384 |
| Route 221 | WBL | B | 16.6 | 184 | B | 10.3 | 199 |
| Route 221 | WBT | A | 1.3 | 200 | A | 2.2 | 268 |
| Wyndale | NBL | E | 56.4 | 166 | E | 64.7 | 183 |
| Wyndale | NBR | D | 50.3 | 122 | E | 60.9 | 125 |
| | | | | | | | |
| INTERSECTION | | B | 13.7 | | B | 10.1 | |

| 7. Route 221/Forest Brook | | 2040 w/mitigations #2 | | | | | |
|---|---|---|---|---|---|---|---|
| | | AM | | | PM | | |
| | | LOS | DELAY (s) | QUEUE (ft.) | LOS | DELAY (s) | QUEUE (ft.) |
| Route 221 | EBL | A | 3.2 | 107 | C | 29.2 | 135 |
| Route 221 | EBT/EBR | A | 3.3 | 236 | A | 5.5 | 237 |
| Route 221 | WBL | B | 11.1 | 61 | B | 12.0 | 138 |
| Route 221 | WBT | B | 13.9 | 217 | C | 20.1 | 474 |
| Route 221 | WBR | B | 11.3 | 87 | B | 12.5 | 100 |
| Forest Brook | NBL/NBR | E | 56.3 | 101 | E | 66.6 | 97 |
| Forest Brook | SBL | D | 54.9 | 144 | E | 66.1 | 365 |
| Forest Brook | SBR | D | 51.5 | 98 | E | 65.0 | 100 |
| | | | | | | | |
| INTERSECTION | | B | 12.3 | | C | 23.1 | |

Figure 24 2040 Levels of Service with Roadway Widening



## Future Multimodal Improvements

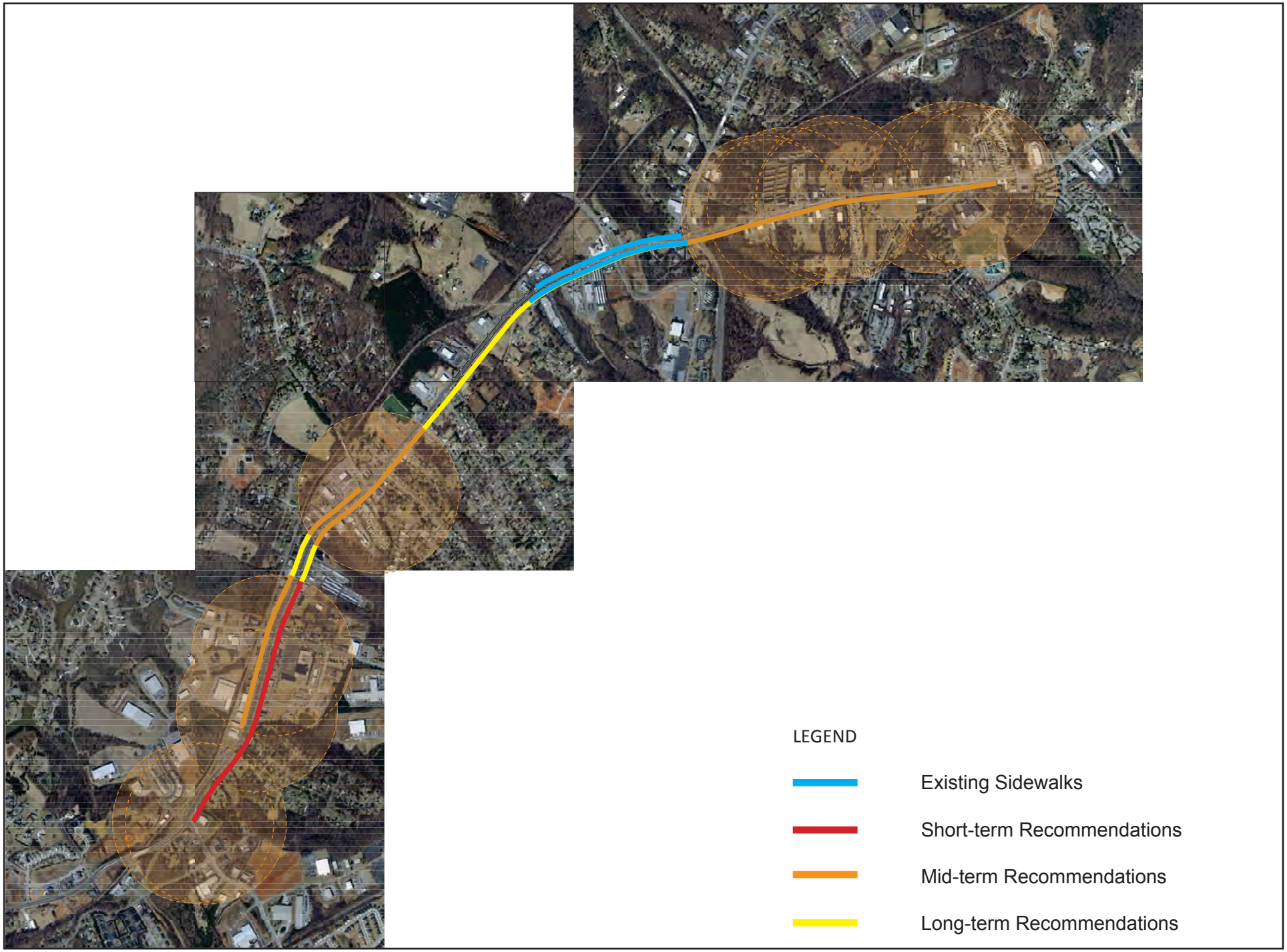
Beyond vehicular-related improvements, the need for improved pedestrian, bicycle, and transit facilities was considered. **Figure 25** illustrates the existing and proposed sidewalks within the study area. While sidewalks in all of the locations shown are necessary to provide a safe and fully connected pedestrian environment, locations shown in red are the highest priority, then orange, and finally yellow. The need for new sidewalks was assessed and recommendations were prioritized by considering: bus stop locations (and ¼ mile surrounding them), the intensity and type of land use such as drug stores and residential areas, and observation of worn paths along the corridor. In addition to sidewalks, pedestrian signals and pushbuttons are recommended at all of the signalized intersections.

Currently there are eleven transit stops within the study area. It is recommended that bus shelters and lighting be installed at each stop.

Amtrak and the Virginia Department of Rail and Public Transit are currently in discussions about extending train service to Roanoke. The rail line for this service is in close proximity to the study corridor. Should there be an opportunity in the near or distant future to provide a rail stop somewhere in the study area, then it could be expected that the local bus transit usage could increase, and the need for sidewalks in the corridor will be further emphasized.

Recognizing the high traffic volumes and speeds along Route 221, the addition of on-street bicycle facilities is not recommended in the short term. However, when designing the future, widened roadway, appropriate bicycle facilities shall be included.

**Figure 25 Sidewalk Recommendations**



## Recommendations

**Table 10** contains a summary of the recommendations resulting from this study. They are categorized by type and time frame. Short-term projects are anticipated to begin within 0-3 years, mid-term 3-10 years, and long term beyond ten years.

The recommendations include: adding sidewalks and medians, consolidating driveways, optimizing and coordinating traffic signals, adding lanes at intersections, and ultimately widening the roadway.

Coordinating the traffic signals and optimizing the timing and phasing will improve traffic flow as detailed previously. These improvements are relatively low cost and can be implemented fairly quickly. The benefits include reduced travel time and congestion and increased safety due to a decrease in rear-end crashes resulting from frequent stops.

Specific improvements are recommended at the intersections of Enterprise Drive, Gristmill Drive, and Graves Mill Road and are illustrated in **Figures 26-28**, respectively.

At the intersection of Enterprise Drive with Route 221 the following improvements are recommended:

- Eastbound approach (Vista Center Drive) – Modify the existing exclusive right turn lane to allow through and right turn movements,
- Westbound approach (Enterprise Drive) – Provide two additional left turn lanes resulting in dual lefts and single through and dual rights,
- Westbound signal operation – Add an overlap phase so that westbound right turning traffic has a green arrow while the southbound left turn movement is green, and
- Provide pedestrian features and sidewalks as shown.

At the intersection of Gristmill Drive and Route 221 the following improvements are recommended:

- Modify the existing exclusive right turn lane to allow left, through, and right turn movements, and extend the outside lane to better accommodate traffic queues,
- Consolidate entrances, and
- Provide pedestrian features and sidewalks as shown.

At the intersection of Graves Mill Road and Route 221 the following improvements are recommended:

- Widen the westbound approach (Graves Mill Road) to provide an additional left turn lane and an exclusive right turn lane resulting in dual lefts, a single through and a single right turn lane,
- Modify the sight access in the functional area of the intersection, and
- Provide pedestrian features and sidewalks as shown.

In an effort to improve safety and reduce crashes in the segment of the study area with the highest crash rate, a median is proposed in the area just west of Gristmill Drive to east of Graves Mill Road. Along with the median other access management improvements are proposed at the driveways. The improvements are shown in **Figure 29**.

## Table 10 Recommended Improvements

| Location | Description | Time Frame | Funding* | Category |
|---|---|---|---|---|
| County Section | Conduct a lighting justification study and install lighting where shown to be necessary. | Short term | VDOT Study | Safety |
| City Section | City of Lynchburg adopt access management standards and apply them to new developments. | Short term | VDOT Study | Safety |
| Entire Corridor | Increase speed enforcement. | Short term | Local | Safety |
| Entire Corridor | Prohibit left turn egress from driveways within the functional area of signalized intersections. | Short term | VDOT | Safety |
| Cottontown Road | Modify the signal phasing so that northbound left turn movement operates when protected only. | Short term | 2 | Safety |
| Entire Corridor | Conduct a speed study and make any needed changes based on the results. | Short term | City & VDOT Study | Safety |
| Cloverhill Boulevard | Install queue detection equipment and advance warning beacons for drivers coming over the bridge approaching the intersection. | Short term | 1, 2 | Safety |
| Intersection of Graves Mill Road with Gristmill Drive | Conduct traffic counts to determine whether a northbound left turn lane is needed. | Short term | VDOT Study | Safety |
| Intersection of Enterprise Drive with Route 221 | Restripe southbound dual left turn lanes into Enterprise Drive to extend inside left turn lane | Short term | 5 | Operations |
| All Signalized Intersections | Evaluate and update the signal timing and phasing at each individual intersection in the county and coordinate the traffic signals with one another corridor wide. | Short term | 2, 6 | Operations |
| Route 221 at Forest Brook Road | Incorporate northbound leg into the intersection's traffic signal design by adding signal heads and detection, and westbound left turn lane, or close the entrance. | Short term | 4 | Operations/ Safety |
| All Signalized Intersections | Install pedstrian push buttons and hand/man signals with count down timers. | Short term | 3 | Multimodal |
| Transit Stops | Install bus shelters and lighting. | Short term | 3 | Multimodal |
| | | | | |
| Gristmill Drive to Graves Mill Road | Implement access management improvements including: median installation and driveway consolodation. | Mid term | 1, 4, 6 | Safety |
| Intersection of Enterprise Drive with Route 221 | Modify the eastbound Vista Center Drive approach to include a left turn lane, through lane and shared through/right turn lane. Modify the westbound Enterprise Drive approach to provide dual right turn lanes, dual left turn lanes and a single through lane. | Mid term | 1, 6 | Operations |
| Intersection of Graves Mill Road with Route 221 | Widen the westbound Graves Mill Road approach to include dual left turn lanes, a through lane and a dedicated right turn lane. | Mid term | 1, 6 | Operations |
| Intersection of Grist Mill Road with Route 221 | Modify the westbound Gristmill Drive approach to provide a left turn lane and shared left/through/right turn lane. | Mid term | 1, 6 | Operations |
| Construct Sidewalks | Add sidewalks in the locations shown as prioritized. | Short, Mid and Long Term | 3 | Multimodal |
| | | | | |
| McConville Road | Extend McConville Road to intersect Route 221 at a signalized intersection. This new traffic signal will replace the existing traffic signal at Wyndale Drive. | Long term | 6 | Operations |
| East of the Lynchburg Expressway | Widen from two lanes to four lanes and incorporate the appropriate bicycle and pedestrian amenities. | Long term | 1, 2, 6 | Operations/ Multimodal |
| West of the Lynchburg Expressway | Widen from four lanes to six lanes (initial priority is Cloverhill Boulevard to Cottontown Road) and incorporate the appropriate bicycle and pedestrian amenities (entire study area) | Long term | 1, 2, 6 | Operations/ Multimodal |
| | | | | |
| Entire Corridor | As redevelopment occurs, begin acquiring needed right-of-way for future widening from Enterprise Drive to Graves Mill Road. | All | 4 | Operations |

* For description of funding, see Section 8

**Figure 26 Enterprise Drive Improvement Concept**

**Before**

**After**

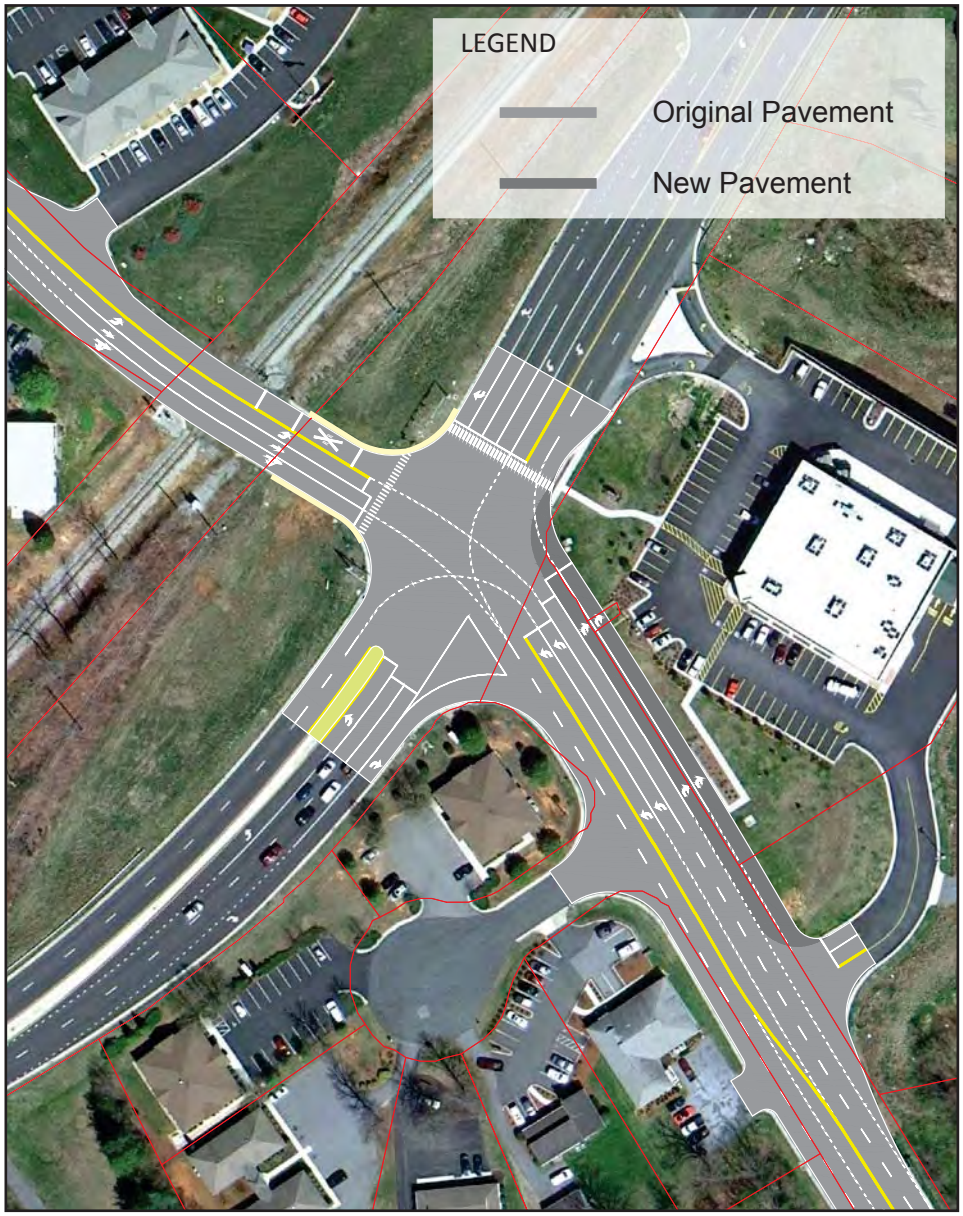


**Figure 27 Gristmill Drive Improvement Concept**

**Before**

**After**

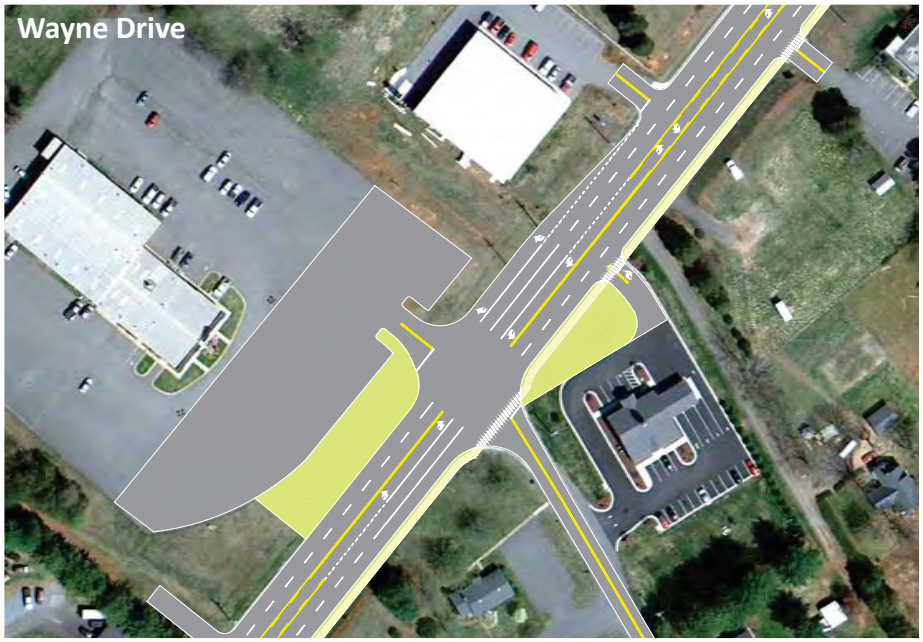
**Figure 28 Graves Mill Road Improvement Concept**

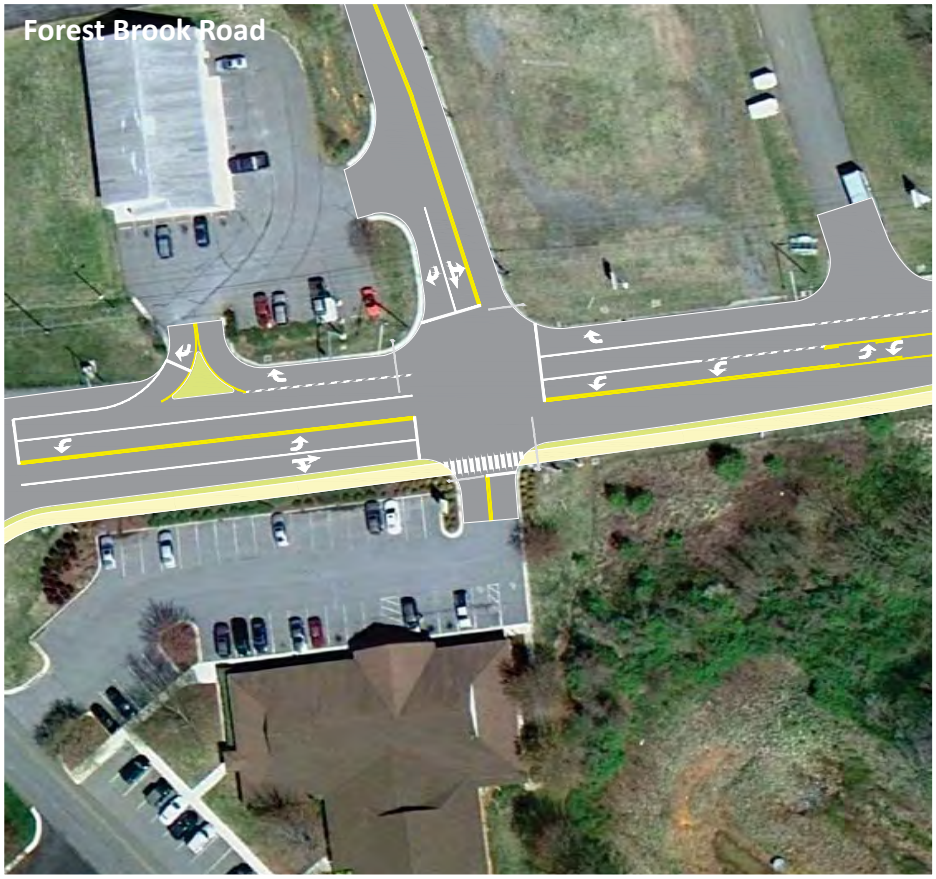
**Before**

**After**

**Figure 29 Gristmill Drive to Graves Mill Road Access Management Improvement Concept**

**Figure 30 Wayne Drive, Cottontown Road, and Forest Brook Road Improvement Concepts**



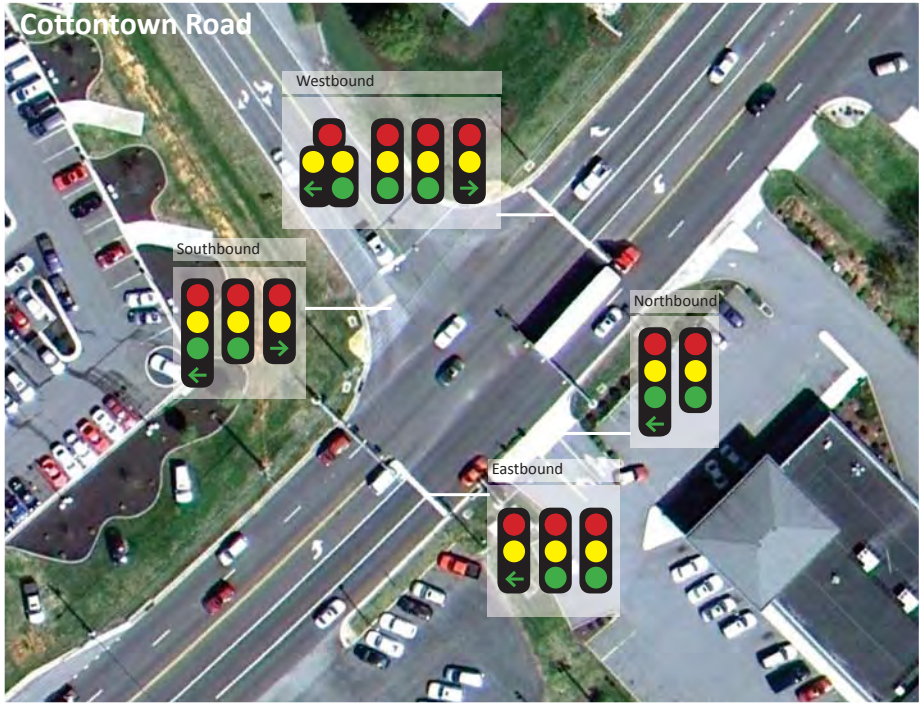
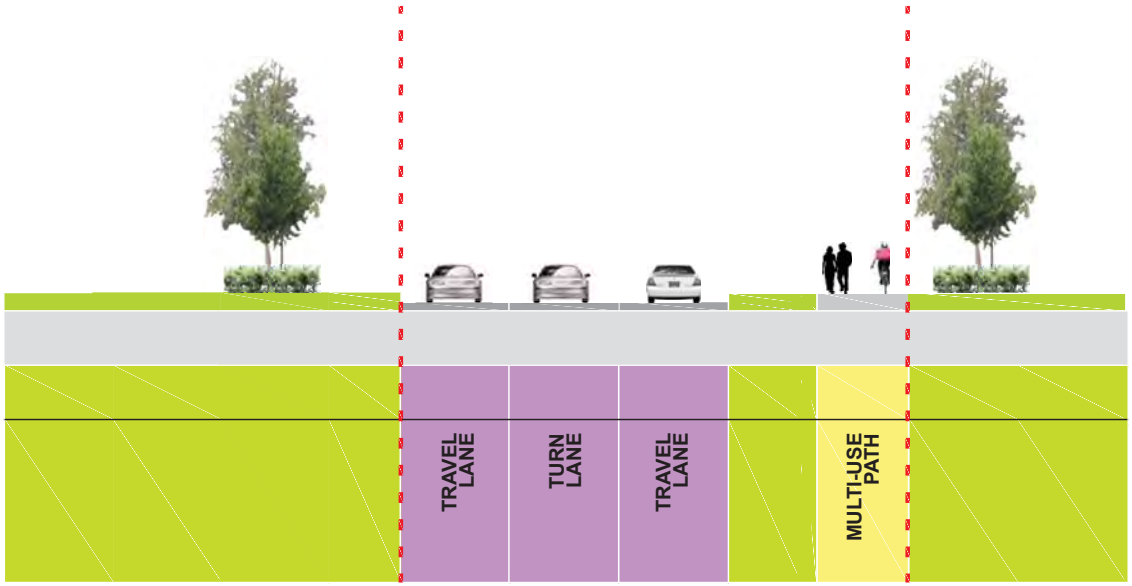
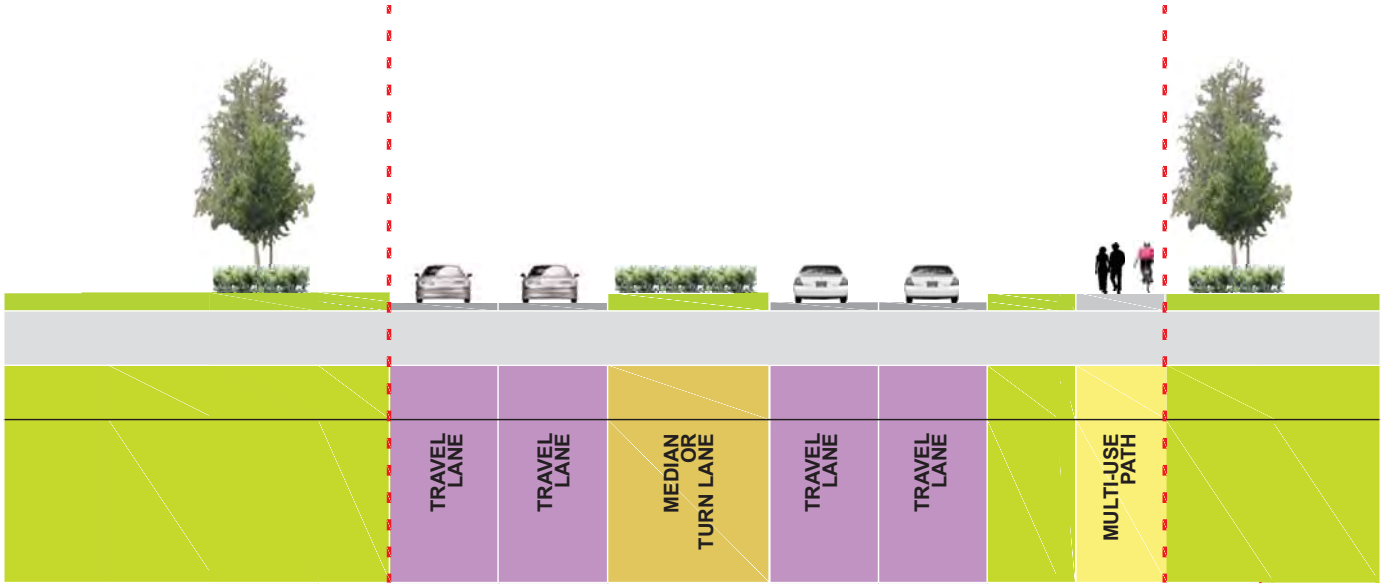



**Figure 31 Bicycle Route in the City (East of Lynchburg Expressway) - Cross-sections**

Mid-term




Long-term



# 8. Implementation

# 8. Implementation

This section provides a toolbox of strategies that could be utilized for implementation of the project recommendations. The strategies generally entail various VDOT or grant funding opportunities.

**Table 11**

| (1) Six-Year Improvement Program (SYIP) | |
|---|---|
| Purpose | This program is overseen by Commonwealth Transportation Board's (CTB) for allocating funding for rail, public transportation, commuter assistance, bicycle, pedestrian, interstate and primary highway transportation projects over the next six years |
| Funding | • Allocations are applied to projects in the SYIP based on the type of funding |
| Eligible Projects | • Local governments work with citizens and Virginia's transportation agencies to develop a plan that anticipates land use changes and travel patterns more than two decades into the future |
| Eligible Applicants | • Local Governments, Metropolitan Planning Organizations (MPO) |
| Evaluation Criteria | • Statewide and regional plans that identify transportation needs and projects required to serve future travel demands over a 20- to 25-year period<br>• An analysis of projected traffic volumes and population, as well as business and residential growth<br>• An evaluation of the priorities for implementation of the transportation plan<br>• Citizen and community participation meetings to receive input on the transportation priorities<br>• Residents' input on transportation priorities at the SYIP public hearings is important in determining which projects to add to the program |
| Contact | Virginia Department of Transportation (VDOT): http://www.virginiadot.org/projects/syp-faq.asp |

**Table 12**

| (2) Highway Safety Improvements Program (HSIP) | |
|---|---|
| Purpose | This program is structured and funded to make significant progress in reducing highway fatalities and injuries on all public roadways and streets |
| Funding | • Up to 90% of a project can be financed with VDOT funds. A local match of 10%, from other public or private sources, is required<br>• If the final project cost is higher than what was originally submitted, the project manager will be responsible for identifying sources for funding over those estimates |
| Eligible Projects | • Projects involve the identification of high-crash spots or corridor segments, an analysis of crash trends and existing conditions, and the prioritization and scheduling of improvement projects |
| Eligible Applicants | • Local Governments, railroad companies, and VDOT Districts and Regional staff |
| Evaluation Criteria | • Evaluated on a statewide basis rather than on a local or district basis<br>• Locations or corridors where a known "substantive safety" problem exists as indicated by location-specific data on severe crashes, and where it is determined that the specific project action can with confidence produce a measurable and significant reduction in the number and/or consequences of severe crashes<br>• To achieve the maximum benefit, the focus of the program is on cost effective use of the funds allocated for safety improvements<br>• Priority will be given to projects having higher total number of deaths and serious injuries affected |
| Contact | Virginia Department of Transportation (VDOT): HSIProgram@VirginiaDOT.org |

**Table 13**

| (3) Transportation Alternatives Program | |
|---|---|
| Purpose | This program is an initiative to focus on enhancing the travel experience and fostering the quality of life in American communities |
| Funding | • Up to 80% of a project can be financed with federal funds. A local match of at least 20%, from other public or private sources, is required<br>• Local matches may be in-kind contributions including tangible property professional services and volunteer labor (This is a reimbursable program) |
| Eligible Projects | • Pedestrian and bicycle facilities such as sidewalks, bike lanes and shared use paths<br>• Pedestrian and bicycle safety and educational activities such as classroom projects, safety handouts and directional signage for trails<br>• Preservation of abandoned railway corridors such as the development of a rails-to-trails facility |
| Eligible Applicants | • Any local government, state agency, group or individual may apply to the program. All projects need to be formally endorsed by a local jurisdiction or public agency |
| Evaluation Criteria | • Number of federal enhancement categories<br>• Inclusion in a state, regional, or local plan<br>• Public/private venture-cooperation (multijurisdictional)<br>• Total cost and matching funds in excess of minimum<br>• Demonstrable need, community improvement<br>• Community support and public accessibility<br>• Compatibility with adjacent land use<br>• Environmental and ecological benefits<br>• Historical criteria met, significant aesthetic value to be achieved and visibility from a public right of way<br>• Economic impact and effect on tourism |
| Contact | VDOT district offices – www.VirginiaDOT.org |

**Table 14**

| (4) Developer Proffer | |
|---|---|
| Purpose | Developer contributions, known as proffers, provide one source of funding for capital facilities. Proffers are typically cash amounts, dedicated land, and/or in-kind services that are voluntarily granted to the County to partially offset future capital facility costs associated with specific land developments |
| Funding | • The cost of the program can be financed with Developer contributions |
| Eligible Projects | • Rezoning requests that permit residential and/or commercial uses in accordance with this policy<br>• Also accept cash, land, conservation easements or in- kind improvements in accordance with county and state law. |
| Eligible Applicants | • Any land developers seeking a rezoning |

**Table 15**

| (5) VDOT Road Maintenance |
|---|
| The VDOT Road Maintenance category of funding covers a wide variety of maintenance and operations activities. Road maintenance funds comprise the majority of VDOTs scheduled funding (versus new construction). Road maintenance funding addresses needs having to do with pavement management, signals, pavement markings, signs, stripes, guardrail, and ITS (intelligent transportation system) assets that are considered to be of critical safety and operational importance. Maintenance funding also addresses operations "services," comprising ordinary and preventive maintenance work, such as cleaning ditches, washing bridge decks, patching pot-holes, debris removal, snow and ice removal, emergency response, incident management, mowing, and equipment management. |

**Table 16**

| (6) VDOT Revenue Share Program | |
|---|---|
| Purpose | This program provides additional funding for use by a county, city, or town to construct, reconstruct, improve or maintain the highway stystems within such county, city, or town and for eligible rural additions in certain counties of the Commonwealth. Locality funds are matched, dollar for dollar, with state funds, with statutory limitations on the amount of state funds authorized per locality |
| Funding | • Up to 50% of a project can be financed using the Revenue Share Program. A local match of 50% is required |
| Eligible Projects | Eligible Project means work including construction, reconstruction, improvement, or maintenance and eligible street additions for which Revenue Share Program funds are available.<br><br>• Construction Projects are those projects that change or add to the characteristics of a road, facility or structure to provide a new or significantly modified transportation facility.<br>• Reconstruction Projects are those projects that completely replace an existing facility or significantly improve the functionality of an existing facility. (examples: replacement through the sub-base of a pavement structure or complete replacement of bridge)<br>• Improvement Projects are those projects that facilitate or control traffic or pedestrian flow, such as intersection improvements, turn lanes, channelization of traffic, traffic signalization and installation of new sidewalks, trails, curb and gutter or any new installation that will enhance traffic flow or safety.<br>• Maintenance Projects are those projects that involve work in preserving or restoring the roadway, facility, or structure to its original condition, as nearby as possible. |
| Eligible Applicants | • Any county, city, or town |
| Evaluation Criteria | • Priority 1 - Construction Projects that meet priority criteria of accelerating a project in the Six-Year Improvement Program or the locality's capital plan<br>• Priority 2 - Maintenance Projects that meet priority criteria<br>• Priority 3 - Construction and Maintenance Projects that do not meet priority criteria |
| Contact | VDOT district offices – www.VirginiaDOT.org |

An important opportunity for implementation of projects is the Highway Safety Improvement Program funding stream. This funding stream has certain requirements relative to the ration of benefits to costs. The following describes the effort undertaken to perform an initial assessment of the benefit to cost ratios for the projects identified in this study.

## Route 221- Corridor Study Safety-Benefit/Cost Analysis

The crash history for the Route 221 corridor between Cloverhill Boulevard and Forest Brook Road, a distance of approximately 3.9 miles, was analyzed (as shown in the prior sections of this document) for the purpose of determining appropriate safety related improvements. Public opinion has also been gathered, via community meetings, a project website, and comments submitted directly to the MPO, for the purpose of producing a context sensitive solution approach to improvements which address stakeholders' concerns. The list of potential improvements were further broken down into short, mid and long-term improvements.

Once the possible improvements were developed and categorized, a construction cost estimate was developed for each improvement, as appropriate. Crash reduction factors were determined for each improvement type and were applied to the crash history in order to determine anticipated safety related benefits. Utilizing these approximate costs, and the quantifiable benefits that were determined, a Safety Benefit/Cost (B/C) analysis was completed for each improvement type and provided in **Appendix C**.

**Table 17** outlines the improvements, broken down into short/mid/long-term categories, as well as a pedestrian related improvement category. The estimated construction cost is included in the table, as well as the calculated B/C for each improvement. B/C ratios of 1.0 or better indicate that the proposed improvement's anticipated annualized benefits meet or exceed the annualized anticipated costs.

## Summary

A number of the proposed improvements show a B/C of 1.0 or better, indicating a favorable outcome for determining whether a proposed improvement can be cost-justified. Conversely, proposed improvements that indicate a B/C of under 1.0 indicate that the improvements are not cost-justifiable based upon safety benefits alone. Some of the latter type would be classified as "quality-of-life" improvements (such as the addition of sidewalks and multi-use paths), therefore strict adherence to a safety B/C ≥ 1.0 is not necessarily the driving factor for determining whether or not to fund the improvement project. Other proposed improvements (such as increasing the number of through lanes in the corridor) have, in addition to safety benefits, those which would be derived from roadway capacity improvements. These operational benefits are not included in this analysis.

## Table 17 Implementation Analysis

| SUMMARY OF PROPOSED IMPROVEMENT County, City | ESTIMATED CONSTRUCTION, ROW & UTILITIES COST | B/C ANALYSIS |
|---|---|---|
| **SHORT TERM IMPROVEMENTS** | | |
| Increase speed enforcement ($4,000.00 in City, $16,000.00 in County) | $20,000/yr. | 6.36 *(comb. crash reduction analysis corridor wide)* |
| Update the signal timing and phasing at each individual intersection and coordinate the traffic signals with one another. (County Section – assumes controller replacement and use of insync or similar, radio comm) | $600,000 | |
| Install Roadway Lighting between Enterprise Dr. and Gristmill Rd. (initial section of the corridor in the County) | $615,000 | 2.80 |
| Prohibit left turn egress from driveways within the functional area of signalized intersections (approximately 20± signs) (County Section) | $40,000 | 9.80 |
| Modify the signal phasing so that northbound left turn movement operates when protected only → *Cottontown Road* | $10,000 | 25.25 |
| Install queue detection equipment and advance warning beacons for drivers coming over the bridge approaching the intersection → *Prior to Enterprise Dr. (eastbound)* | $20,000 | 4.30 |
| Incorporate northbound leg into the intersection's traffic signal design by adding signal heads, detection, and westbound left turn lane, or close the entrance → *Forest Brook Road* | $110,000 | 1.91 |
| **MID TERM IMPROVEMENTS** | | |
| Implement access management improvements including: median installation and driveway consolidation - Gristmill Drive to Graves Mill Road | $830,000 | 2.23 |
| Modify the eastbound **Vista Center Drive approach** to include a left turn lane, through lane and shared through/right turn lane. Modify the westbound **Enterprise Drive approach** to provide dual right turn lanes, dual left turn lanes and a single through lane. | $2,000,000 | 0.13 |
| Widen the westbound **Graves Mill Road approach** to include dual left turn lanes, a through lane and a dedicated right turn lane. | $1,400,000 | 0.29 |
| Modify the westbound **Gristmill Drive approach** to provide a left turn lane and shared left/through/right turn lane. | $910,000 | 0.43 |
| **LONG TERM IMPROVEMENTS** | | |
| Widen from two lanes to four lanes and incorporate the appropriate bicycle and pedestrian amenities → Whitehall to Forest Brook (cost updated in September of 2014) | $10,000,000 | 0.13 |
| Widen from four lanes to six lanes and incorporate the appropriate bicycle and pedestrian amenities → County Section. (if phased, initial priority is Enterprise to Graves Mill) Update in September 2014 - Estimate assumes rebuilding entire roadbed to six lanes versus just adding two lanes to the existing road section. Includes lighting. R/W and utilities impacts may be extensive, cost estimates for impacts to be determined as part of preliminary design – initially estimated at 30% of construction cost. | $50,000,000 | 0.13 |
| Extend McConville Road to intersect Route 221 at a signalized intersection. This new traffic signal will replace the existing traffic signal at Wyndale Drive | $1,150,000 | 0.16 |

| PEDESTRIAN RELATED IMPROVEMENTS | | |
|---|---|---|
| *SHORT TERM* | | |
| Install ped. push buttons and hand/man signals with countdown timers and crosswalks (City – Forest Brook, Wyndale) | $120,000 | N/A |
| Install ped. push buttons and hand/man signals with countdown timers and crosswalks (Cloverhill, Enterprise, Gristmill, Gravesmill, Cottontown) | $300,000 | |
| Install bus shelters and lighting (GLTC has shelters. Estimated costs for pads and installation is $20,000 each location) | *not included* | |
| Add sidewalks in the locations shown with red* (County - Enterprise to Graves Mill) | $450,000 | |
| **MID TERM** | | |
| Add multiuse path in the City* from Whitehall to Forest Brook, includes lighting (City, option is to advance road project and do this with the road project) | $1,600,000 | |
| Add sidewalks in the locations shown with orange* in the sidewalk planning exhibit(County) | $800,000 | |
| **LONG TERM** | | |
| Add sidewalks in the locations shown with yellow* in the sidewalk planning exhibit (County) | $725,000 | |

**The "red", "orange" and "yellow" sidewalk locations refer to those sections shown on the exhibit at the public meeting*

**Summary of Costs By Jurisdiction**

**City Projects**

**Short Term - $234,000**

**Mid Term – $1,600,000**

**Long Term – $11,150,000**

**Total - $12,980,000**

**County Projects**

**Short term - $2,035,000**

**Mid Term - $5,940,000**

**Long Term $50,725,000**

**Total - $58,700,000**

# Appendices

# Appendix A Public Process Documentation

The News & Advance

**Advertising Affidavit**

101 Wyndale Drive
Lynchburg, Virginia 24501
(434) 385-5400

| Account Number |
|---|
| 3312739 |

| Date |
|---|
| January 29, 2014 |

RECEIVED
FEB 04 2014
BY: .....

REGION 2000 LOCAL GOV'T COUNCIL
828 MAIN ST,12TH FLOOR
LYNCHBURG, VA 24504-1522

| Date | Category | Description | Ad Size | Total Cost |
|---|---|---|---|---|
| 01/29/2014 | Legal Notices | CORRIDOR STUDY | 1 x 43 L | 194.90 |

**Citizens Information Meetings**
**Route 221 Corridor Safety Study**

You are invited to attend the first Citizens Information Meetings for the Route 221 Corridor Safety Study.

On behalf of the City of Lynchburg and Bedford County and in cooperation with VDOT, the Region 2000 Local Government Council and the Central Virginia Metropolitan Planning Organization are beginning a safety study of the Route 221 corridor from Cloverhill Boulevard to Forest Brook Road.

The purpose of the study is to identify opportunities for safety improvements, congestion reduction, and bicycle, walking, and public transportation accommodations.

Citizens are encouraged to attend and express their views as this study begins. Both staff and consultants will be available to discuss issues and answer questions.

The meetings are scheduled for:
Thursday, January 30, 2014
Two meetings are scheduled: the first from 1:00 to 2:30, the second from 5:00-6:30
Forest Public Library
15583 Forest Road
Forest, VA 24551

If you have questions concerning this study or meeting, please contact Bob White, Deputy Director, Region 2000 Local Government Council, Tel: 434.845.3491, Email: bwhite@region2000.org, 828 Main Street, 12th Floor, Bank of the James Building, 24504.

## Publisher of the News and Advance

**This is to certify that the attached** CORRIDOR STUDY **was published by the News and Advance in the city of Lynchburg, in the State of Virginia, on the following dates:**

01/23/2014 ✓

**The First insertion being given ...** 01/23/2014

**Newspaper reference:** 0003200699

Teresa Y. Bryan
NOTARY PUBLIC
Commonwealth of Virginia
Reg. # 7101068
My Commission Expires 3/31/2015

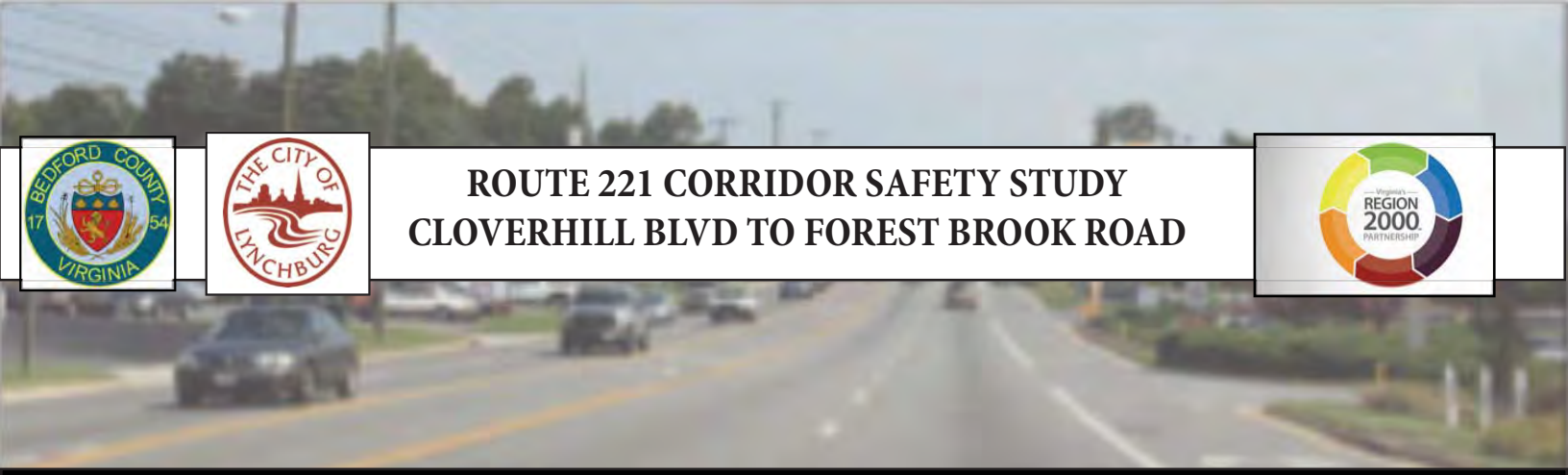
**Given under my hand on**

**the** 29th **day of** January 2014

Lesa McChesney

**Classified Manager**

THIS IS NOT A BILL. PLEASE PAY FROM INVOICE. THANK YOU



# ROUTE 221 CORRIDOR SAFETY STUDY
# CLOVERHILL BLVD TO FOREST BROOK ROAD

## COMMUNITY INFORMATION MEETING

A public information workshop for the Route 221 Corridor Safety Study will be held on Thursday January 30th, 2014 at the Public Library in Forest, Virginia. The address is 15583 Forest Road, Forest VA 24551.

There will be two meeting sessions during the day. The first session is from 1:00 PM to 2:30 PM, and the second session will be from 5:00 PM to 6:30 PM. Each meeting session will include a short presentation, followed by a "work session" around maps with information about the corridor. Attendees will be encouraged to provide input regarding safety concerns, corridor congestion, multimodal needs including sidewalks, bicycle accommodations, improved transit service, and any other issues or opportunities for this corridor.

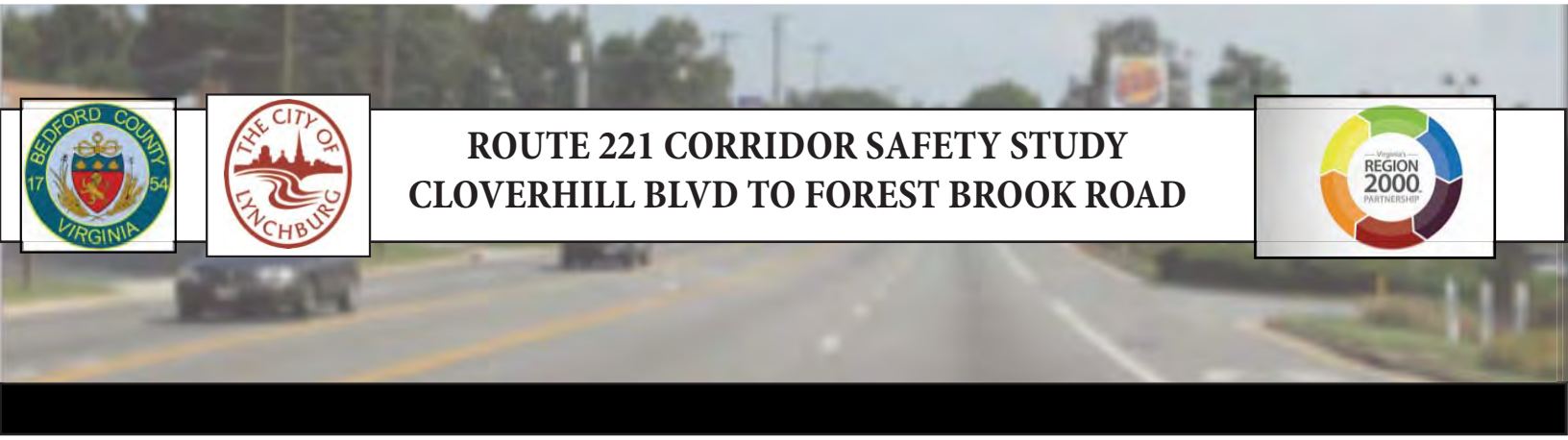
If you would like more information about this meeting or the project, or if you need special accommodations under the Americans with Disabilities Act of 1990, please contact Bob White prior to the meeting at 434-845-3491 or by email at bwhite@region2000.org.

## Project Description

The Region 2000 Local Government Council and Central Virginia MPO, in partnership with Bedford County and the City of Lynchburg, and with assistance from EPR, P.C., has begun a safety improvement study for the Route 221 corridor. **The study limits commence at Cloverhill Blvd in Bedford County and extend into the City of Lynchburg to Forest Brook Road.**

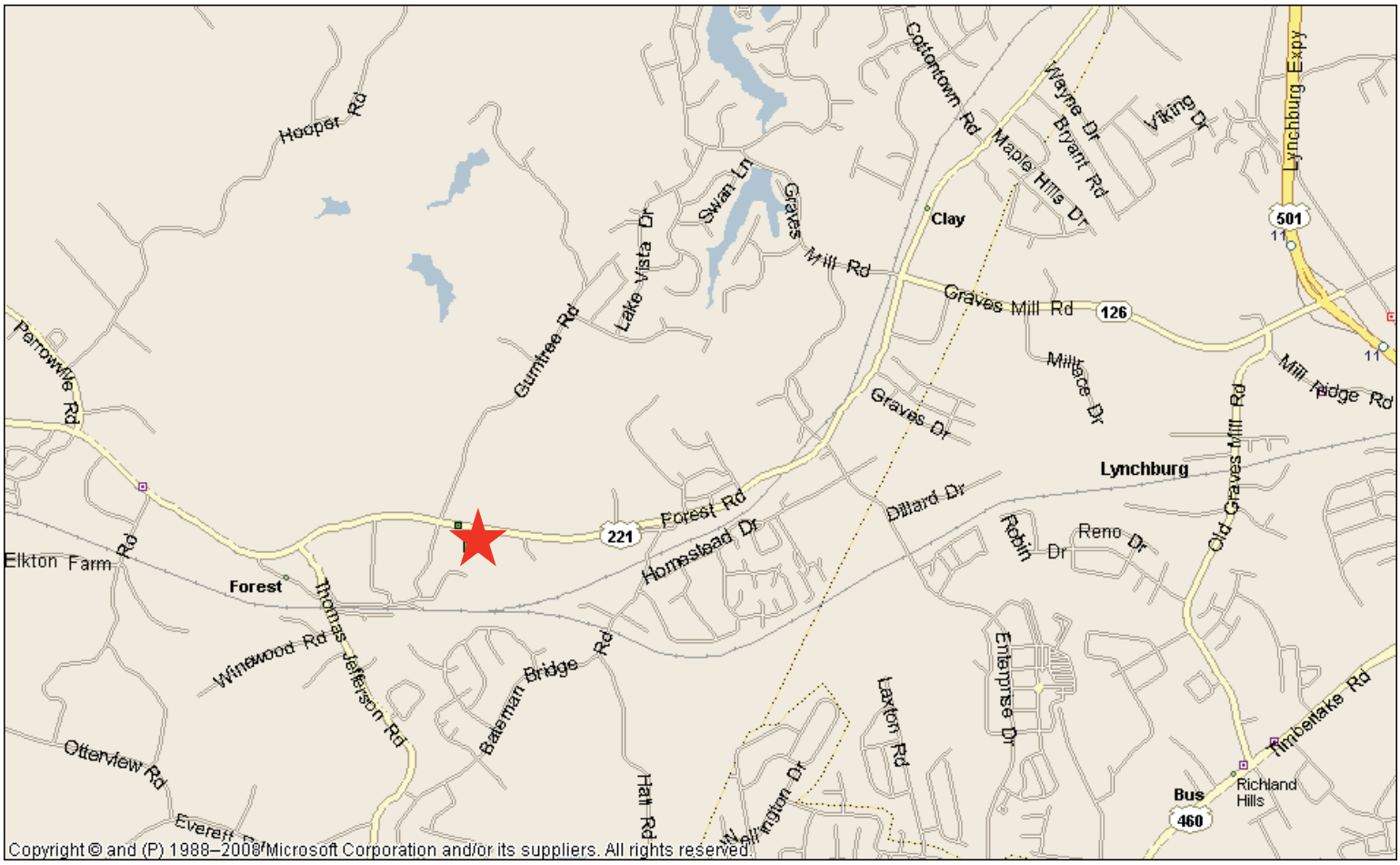
**The purpose of the study is to identify and document opportunities for safety improvements, congestion reduction, and multimodal accommodations.** Opportunities may include improved access management, turn lanes at key intersections, traffic operations improvements, and additional multimodal accommodations (walking, bicycling, transit access), among others. The study process will include two public meetings, with the first occurring in late January and the second meeting in March. The final study deliverable will clearly identify projects and potential funding sources to move the projects forward. The study will be completed in June of 2014.

City of Lynchburg
Community Development
900 Church Street
Lynchburg, VA 24501

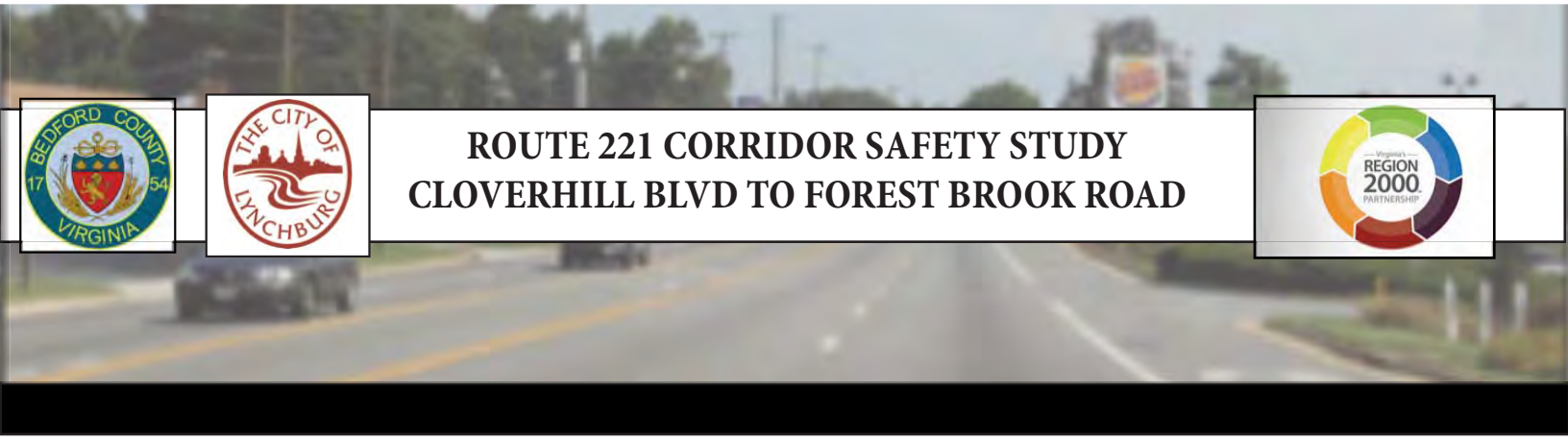


# ROUTE 221 CORRIDOR SAFETY STUDY
# CLOVERHILL BLVD TO FOREST BROOK ROAD

COMMUNITY MEETING LOCATION – FOREST PUBLIC LIBRARY

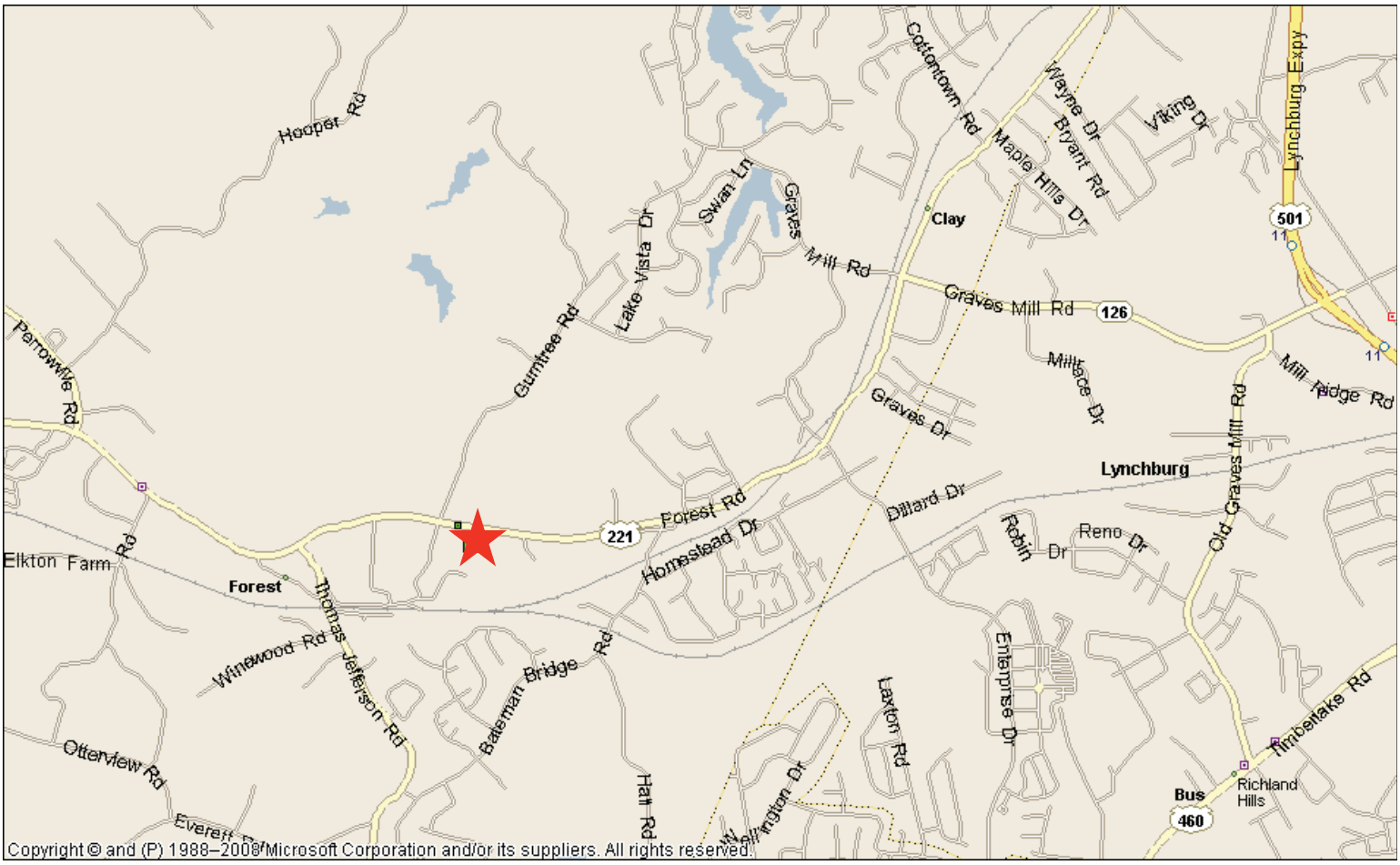


Bedford County Department of Planning
122 E. Main Street
Suite G-03
Bedford, VA 24523



# ROUTE 221 CORRIDOR SAFETY STUDY
# CLOVERHILL BLVD TO FOREST BROOK ROAD

COMMUNITY MEETING LOCATION – FOREST PUBLIC LIBRARY



## w.wuensch

**From:** Bob White [bwhite@region2000.org]
**Sent:** Thursday, January 16, 2014 2:46 PM
**To:** Bill Wuensch (w.wuensch@epr-corp.com)
**Subject:** FW: Route 221 Corridor Study - Community Meeting
**Attachments:** Route 221 Meeting Announcement.pdf

Bill,

See below for public participation documentation. I'll be sending along the email list shortly.

Robert E. White, AICP
Deputy Director
Region 2000 Local Government Council
828 Main Street, 12th Floor
Lynchburg, Va 24504-1522
Phone: 434.845.3491 Ext. 220
Fax: 434.845.3493
E-mail: bwhite@region2000.org

A member of Virginia's Region 2000 Partnership

---

**From:** Kelly Hitchcock
**Sent:** Thursday, January 16, 2014 12:35 PM
**To:** Kelly Hitchcock
**Subject:** Route 221 Corridor Study - Community Meeting

### Route 221 Corridor Safety Study – Community Information Meeting

A safety improvement study for the Route 221 corridor, between Cloverhill Blvd in Bedford and Forest Brook Road in Lynchburg, is being led by Region 2000 Local Government Council and the Central Virginia MPO, in partnership with Bedford County and Lynchburg City. The purpose of the study is to identify and document opportunities for safety improvements, congestion reduction, and multimodal accommodations.

The first public information workshop for the Route 221 Corridor Study will be held on Thursday January 30th, 2014 at the Public Library in Forest, 15583 Forest Road, Forest, Virginia.

There will be two meeting sessions. The first session from 1:00 PM to 2:30 PM, and the second session will be from 5:00 PM to 6:30 PM. Each meeting session will include a short presentation, followed by a "work session" around maps with information about the corridor. Attendees will be encouraged to provide input regarding safety concerns, corridor congestion, multimodal needs, including sidewalks, bicycle accommodations, improved transit service, and any other issues or opportunities for this corridor.

A more detailed meeting and project description is attached.

For more information about this pending meeting or the project, or if you need special accommodations under the Americans with Disabilities Act of 1990, please contact Bob White prior to the meeting at 434-845-3491 or bwhite@region2000.org

Bike Pedestrian Stakeholders Sent
Route 21 Corridor Emails

| First Name | Last Name | Email | Affiliation | Street Address | Locality |
|---|---|---|---|---|---|
| John | Abell | jabelle@randolphcollege.edu | Randolph College; Lynchburg Area Food Council | 2404 Terrell Place | Lynchburg |
| Amanda | Adams | amada.adams@cjmw.com | CJMW Artcitects | | |
| Bill | Ashe | bill.ashe@macvmd.com | Medical Associates of Central Virginia | 2215 Landover Place | Lynchburg |
| Paul | Bailey | pbailey@blairmarketing.com | Blair Marketing | | |
| Steve | Barmwell | barnwell.steve@yahoo.com | | 1203 St Cloud Ave | Lynchburg |
| Rick | Barnes | rbarnes@randolphcollege.edu | Randolph College | | |
| Ted | Batt | tbatt@academyfinearts.com | took CCC | | |
| Gigi | Batt | tedgigi@yahoo.com | | 3821 Sheringham Place | Lynchburg |
| Sean | Bell | sean.bell@genworth.com | Genworth | | |
| Regie | Bennett | reggieb6@hotmail.com | Greenway Alliance | 704 10th Street | Altavista |
| Steve | Bowman | steve@wheelpower.org | Wheelpower; Christian Cyclists group | | |
| Robert | Brennan | robert.brennan@macvmd.com | Medical Associates of Central Virginia | 2215 Landover Place | Lynchburg |
| Daniel | Carey | daniel.carey@centrahealth.com | Team Tortoise bicycling group | | |
| Ken | Carlton | kecarlton@verizon.net | VDOT | 156 Howard Drive | Lynchburg |
| Robin | Clifford | bajabug72@aolcom | | | |
| David | Cook | David.cook@VDOT.virginia.gov | | | |
| Paula | Dahl | pauladahl@verizon.net | 811 Velo Bicycling Group; YMCA | | |
| Joey | Daniel | joeadaniel@aol.com | | 310 Overstreet Ln | Lynchburg |
| James | Day | jday@bedfordva.gov | Chief, Bedford City | | |
| Joan | Deal | joan.deal@centrahealth.com | Centra Health | | |
| Tyler | Edwards | te413803@gmail.com | | 7612 Timberlake Rd. Apt 445 | Lynchburg |
| Cap | Eschenroeder | hcesch@gmail.com | Team Tortoise bicycling group | | |
| Dave | Farley | d48farley@gmail.com | Team Tortoise bicycling group | | |
| Jeff | Fedorko | info@riversiderunners.com | Riverside Runners | 2301 Rivermont Ave | Lynchburg |
| Tamera | Ferguson | tameralw@gmail.com | | | |
| Tom | Fitzgerald | tfitzgerald@wileywilson.com | Wiley Wilson | | |
| Laural | Foot | happifeet@msn.com | Greenway Alliance, ATC | 1704 Lexington Drive | Lynchburg |
| Kriss | Freeman | Kriss.Freeman@ipaper.com | Team Tortoise bicycling group | | |
| Rachel | Gagen | fortune8@comcast.net | | | |
| Jack & Jan | Gellerstedt | gelljj@gmail.com | retired folks that love to cycle | 608 Lake Vista Drive | Forest, VA |
| Bryan | Gentry | bryangentry@gmail.com | | | |
| Jeff | Gray | scene3boardshop@gmail.com | Scene 3 | 3400 Plymouth Place | Lynchburg |

Bike Pedestrian Stakeholders Sent
Route 21 Corridor Emails

| | | | | | |
|---|---|---|---|---|---|
| Jonathan | Hale | jhale@traxintl.com | | 1021 Chowan Ave | Lynchburg |
| Mark | Haskew | mhaskew@classikafitness.com | Owner, Classika Fitness | | |
| Davy | Hazlegrove | info@blackwaterbikeshop.com | Lynchburg Area Greenway Alliance, Blackwater Bike Shop | 18869 Forest Road | Lynchburg |
| Kelly | Hazlegrove | kelly.hazlegrove@gmail.com | DEQ; GLOC | 140 Linden Ave | Lynchburg |
| Leslie | Hogland | leslie.hoglund@vdh.virginia.gov | Virginia Dept. of Health; Lynchburg Health District | 1900 Thompson Drive | Lynchburg |
| Barbara | Hopper | barbara.hopper@cjmw.com | | | |
| David | Horton | dhorton@liberty.edu | Liberty University | | |
| Brandon | Kosse | brandon.kristi@gmail.com | GLOC | | |
| Abe | Loper | abe.loper@gmail.com | Lynchburg Area Greenway Alliance; Young Professionals | 828 Main Street; 12th Floor | Lynchburg |
| Kelly | Love | lovely_girl_62@yahoo.com | | 131 Easton Ave | Lynchburg |
| Douglas | Main | mainones@juno.com | | 108 Sunbury Place | Lynchburg |
| Bradley | Malcolm | doctorski1@aol.com | Team Tortoise bicycling group | 4509 Fieldale Road | Lynchburg |
| Joe | Malloy | Kathy_n_joe@gmail.com | | | |
| David | Marple | david@lifemarkdesigns.com | Life Mark Designs | wanted to see nonprofitt | |
| Katrina | Marple | david@lifemarkdesigns.com | | 850 Victoria Avenue | Lynchburg |
| Jacob | McGlauflin | jmcgruff@gmail.com | | | |
| Daniel | McPeake | dan4jeepin@hotmail.com | GLOC | | |
| Ross | Meyer | romeyer2@yahoo.com | | | |
| Coco | Michael | coco@lynchburg.edu | Ph. D. Mathematics Department | Lynchburg College | |
| Tim | Miles | mudhoundus@yahoo.com | GLOC/Areva | | |
| Terri | Miller | tmillerywca@yahoo.com | YGYRL Leaders & Drum Ensemble Program Coordinator, YWCA | 626 Church Street | Lynchburg |
| Ted | Moreland | tedbikes2@verizon.net | | | |
| Gary | Nero | garynero@msn.com | | | |
| David | Neumeyer | david.neumeyer@gmail.com | | | |
| Donato | Nosce | dnosce@hotelequities.com | General Manager; Wingate Liberty Universtiy | | |
| Tom | Owen | towen@wileywilson.com | Wiley Wilson | | |
| Ryan | Packett | rpack07@vt.edu | | | |
| Kenny | Palmer | kpalmer@bedfordcountyva.gov | | | |
| Guillermo R. | Pancheco Sanchez | gusapa@mindspring.com | Amherst, lovest to cycle | | |

Bike Pedestrian Stakeholders Sent
Route 21 Corridor Emails

| | | | | | |
|---|---|---|---|---|---|
| Jack | Parker | jack@bikesunlimited.com | Owner, Bikes Unlimited | 1040 Running Cedar Circle | Forest |
| Jay | Parker | jayparker@lynchburgymca.org | YMCA | 1315 Church Street | Lynchburg |
| Jim | Pittard | jimpittard@comcast.com | Team Tortoise bicycling group | | |
| Steven | Plunkett | plunketts@mac.com | Team Tortoise bicycling group | | |
| Robert | Pumphrey | richardpumphrey@gmail.com | Lynchburg College | 104 Aldyar | Lynchburg |
| Jeremy | Ramsey | jeremy@theaidstation.com | The Aid Station | | |
| Wren | Roberts | Wren.Roberts@centrahealth.com | | | |
| Eric | Schrader | schrader_eric@hotmail.com | | | |
| Joe | Seiffert | Joe4Council@aol.com | Past City Council member | | |
| Tom | Shahady | shahady@lynchburg.edu | Lynchburg College | | |
| Robbie | Shull | robbie.shull@gmail.com | | | |
| Sarah | Shaw | sasarah00@yahoo.com | | | |
| Jeff | Smith | jeff@rushhomes.org | | 1824 Clayton Ave | Lynchburg |
| Joe | Souza | souzaJoe53@yahoo.com | | | |
| Eric | Spain | spaineric@yahoo.com | Team Tortoise bicycling group | | |
| Marianne | Storton | makcottage@aol.com | | | |
| Laura-Gray | Street | lstreet@randolphcollege.edu | Randolph College | | |
| Bethany | Sykes | bethanysykes@gmail.com | | | |
| Scott | Wade | Scott.Wad@macvmd.com | Team Tortoise bicycling group | | |
| Heather | Welcher | hwelcher@traxintl.com | | 623 Wyndhurst Drive, Unit 305 | Lynchburg |
| Shannon | Weller | shannonweller@gmail.com | | | |
| Jeremy | White | jeremy2@vlas.org | | | |
| Barry | Witt | burware@yahoo.com | Dire Wolf Cycling | | |
| John | Wormuth | john@galazimodern.com | | | |
| | | joshdavis681@gmail.com | | | |
| | | ladytwiss@gmail.com | | | |
| | | papazahn@msn.com | | | |
| | | dcarney32026@gmail.com | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

CONTACT LIST FOR THOSE WITHIN 1000' OF THE CENTERLINE OF THE CORRIDOR

| Name | name1 |
|---|---|
| 221 SOUTH DEVELOPERS LLC | 221 SOUTH DEVELOPERS LLC |
| 3-D FOREST LLC | 3-D FOREST LLC |
| 3-D LYNCHBURG LLC | 3-D LYNCHBURG LLC |
| A & W INVESTMENTS | A & W INVESTMENTS |
| ABCL LLC | ABCL LLC |
| ACC/VLA PARTNERSHIP | ACC/VLA PARTNERSHIP |
| ALLEN GROUP INC THE | ALLEN GROUP INC THE |
| ANDERSON APRIL C J & MAY A C & GOOCH JUNE C | ANDERSON APRIL C J & MAY A C & GOOCH JUNE C |
| ANDERSON GUY EDWARD JR & | ANDERSON GUY EDWARD JR & |
| ANGUS MOBILE HOMES ESTATE | ANGUS MOBILE HOMES ESTATE |
| ANNJO LAND CORP | ANNJO LAND CORP |
| ANTHONY PAUL J & ANTHONY SHERRYL S | ANTHONY PAUL J & ANTHONY SHERRYL S |
| ARTHUR JAMES D & ARTHUR PATRICIA D | ARTHUR JAMES D & ARTHUR PATRICIA D |
| AYERS MALCOLM E & | AYERS MALCOLM E & |
| B AND W PARTNERSHIP | B AND W PARTNERSHIP |
| BAKER MICHAEL T & JOYCE A | BAKER MICHAEL T & JOYCE A |
| BALLOWE CHARLES T & BONNIE M | BALLOWE CHARLES T & BONNIE M |
| BANK OF THE JAMES | BANK OF THE JAMES |
| BARBER FRANKLIN E & ELIZABETH M | BARBER FRANKLIN E & ELIZABETH M |
| BEACON CREDIT UNION | BEACON CREDIT UNION |
| BECKNER DOUGLAS A & | BECKNER DOUGLAS A & |
| BEDFORD FOUR INC | BEDFORD FOUR INC |
| BENDER MARK L & LINDSEY H | BENDER MARK L & LINDSEY H |
| BILLER JOHN R & ISABEL R | BILLER JOHN R & ISABEL R |
| BLACK FREDERICK E JR & MARY L | BLACK FREDERICK E JR & MARY L |
| BLANKENSHIP JOHN G & DORIS L | BLANKENSHIP JOHN G & DORIS L |
| BLANKENSHIP WILLIAM B | BLANKENSHIP WILLIAM B |
| BOHLING MARK ANDREW SR REVOCABLE TRUST | BOHLING MARK ANDREW SR REVOCABLE TRUST |
| BONNET WILLIAM H | BONNET WILLIAM H |
| BOOTH GEORGE M III & CYNTHIA T | BOOTH GEORGE M III & CYNTHIA T |
| BOSIGER BRIAN W | BOSIGER BRIAN W |
| BOSWELL LORRAINE S | BOSWELL LORRAINE S |
| BRAHLER JOANNE E | BRAHLER JOANNE E |
| BROWN FREDERICK R JR & | BROWN FREDERICK R JR & |
| BROWN THURMAN R | BROWN THURMAN R |
| BROWN WILLIAM F & KATHRYN I | BROWN WILLIAM F & KATHRYN I |
| BRYANT BARRY E & BONNIE M | BRYANT BARRY E & BONNIE M |
| BRYANT MARSHA BABCOCK REVOCABLE LIVING TRUST | BRYANT MARSHA BABCOCK REVOCABLE LIVING TRUST |
| BUCK HOLDINGS LLC | BUCK HOLDINGS LLC |
| BURNETTE ALBERT T | BURNETTE ALBERT T |
| BURNLEY DEBORAH J | BURNLEY DEBORAH J |
| BUSH MARY G | BUSH MARY G |
| BYERS JOHN D & DAISY I | BYERS JOHN D & DAISY I |
| C & I PROPERTIES | C & I PROPERTIES |
| C & M REAL ESTATE LLC | C & M REAL ESTATE LLC |
| CAELS ASSOCIATES | CAELS ASSOCIATES |
| CALLAHAN BETTY L | CALLAHAN BETTY L |
| CANADA DAVID H | CANADA DAVID H |
| CARLUND DARREN RICHARD & JAMIE L | CARLUND DARREN RICHARD & JAMIE L |
| CARPE DIEM LLC | CARPE DIEM LLC |
| CARTER CHARLES D JR & | CARTER CHARLES D JR & |
| CARTER DEBORAH BERKLEY | CARTER DEBORAH BERKLEY |
| CARTER STUART RILEY | CARTER STUART RILEY |
| CASE GARY W | CASE GARY W |
| CASH CARLTON W | CASH CARLTON W |
| CASH ROBERT W & PATRICIA M | CASH ROBERT W & PATRICIA M |
| CASSIDY JAMES W & CASSIDY LINDA | CASSIDY JAMES W & CASSIDY LINDA |
| CCM PROPERTY LLC | CCM PROPERTY LLC |
| CENTRA HEALTH FOUNDATION | CENTRA HEALTH FOUNDATION |
| WELLS FARGO BANK | WELLS FARGO BANK |
| CHERISH LLC | CHERISH LLC |
| CHIEF INVESTMENTS LLC | CHIEF INVESTMENTS LLC |
| CHUEH SHAN-SONG | CHUEH SHAN-SONG |
| CLAIBORNE DENISTRY | CLAIBORNE DENISTRY |
| CLAPP DENICE D | CLAPP DENICE D |
| CLAY KEVIN D & MICHELLE L | CLAY KEVIN D & MICHELLE L |
| COFER G WAYNE & RITA B | COFER G WAYNE & RITA B |
| COLEMAN FAMILY LLC | COLEMAN FAMILY LLC |
| COLES PEARL N | COLES PEARL N |
| COLUMBUS TIMOTHY | COLUMBUS TIMOTHY |
| COMMONWEALTH OF VA | COMMONWEALTH OF VA |
| COMPUTER ACCESS SERVICES | COMPUTER ACCESS SERVICES |
| CONNER JEFFREY A & CONNER DOROTHY H | CONNER JEFFREY A & CONNER DOROTHY H |
| COOK JAMES C & SANDRA H | COOK JAMES C & SANDRA H |
| COOPERATIVE SAVINGS BANK | COOPERATIVE SAVINGS BANK |
| CORONATO JENNIFER R | CORONATO JENNIFER R |
| COTHREN RICHARD K & JIMMIE LOU | COTHREN RICHARD K & JIMMIE LOU |
| COTTONTOWN MASTER HOLDINGS LLC | COTTONTOWN MASTER HOLDINGS LLC |
| COVEY R DRAKE & COVEY KAREN L | COVEY R DRAKE & COVEY KAREN L |
| CRAFT INVESTMENTS LLC | CRAFT INVESTMENTS LLC |
| CRAIG NANCY L | CRAIG NANCY L |
| CRAWFORD PHYLLIS J | CRAWFORD PHYLLIS J |
| CREASY IRVIN CARROLL & CREASY BARBARA | CREASY IRVIN CARROLL & CREASY BARBARA |
| CRESTAR BANK | CRESTAR BANK |
| CURRENT TIMOTHY G & KATHY M | CURRENT TIMOTHY G & KATHY M |
| CUSTOM STRUCTURES ARCHITECTURAL DESIGN | CUSTOM STRUCTURES ARCHITECTURAL DESIGN |
| D M H PROPERTIES LLC | D M H PROPERTIES LLC |
| DALTON JAMES A & PATRICIA G | DALTON JAMES A & PATRICIA G |
| DANIEL EARL B JR & | DANIEL EARL B JR & |
| DAUSSIN DAVID M & SHARON | DAUSSIN DAVID M & SHARON |
| DAVIS BOBBY R | DAVIS BOBBY R |
| DAVIS THOMAS F & DAVIS SCARLETT A | DAVIS THOMAS F & DAVIS SCARLETT A |

| | |
|---|---|
| DAVISON JOHN P & R EVELYN | DAVISON JOHN P & R EVELYN |
| DAWSON ROBERT E | DAWSON ROBERT E |
| DEMPSEY DAVID S & CLAUDIA E | DEMPSEY DAVID S & CLAUDIA E |
| DILL THOMAS A SR | DILL THOMAS A SR |
| DINKINS GENE L | DINKINS GENE L |
| DMH PROPERTIES LLC | DMH PROPERTIES LLC |
| DOLAN ANDREW B & DOLAN TARA H | DOLAN ANDREW B & DOLAN TARA H |
| DOLAN MARSHALL R & MARION B | DOLAN MARSHALL R & MARION B |
| DOUBLE H PROPERTIES LLC | DOUBLE H PROPERTIES LLC |
| DRISKILL STEPHEN M & NANCY C | DRISKILL STEPHEN M & NANCY C |
| DUBOVSKY GEORGE S & | DUBOVSKY GEORGE S & |
| EADIE GREGORY & DONNA | EADIE GREGORY & DONNA |
| ELDER JERRILYNN C | ELDER JERRILYNN C |
| ELLIOTT GWENDOLYN A | ELLIOTT GWENDOLYN A |
| ELLIS BRADLY K & TRISTA R | ELLIS BRADLY K & TRISTA R |
| ENTERPRISE EXTENDED LLC | ENTERPRISE EXTENDED LLC |
| ESTILL CHRISTOPHER J & REGINA K | ESTILL CHRISTOPHER J & REGINA K |
| EUBANK JAMES E & MARILYN | EUBANK JAMES E & MARILYN |
| EUBANK SHELVA C | EUBANK SHELVA C |
| EVANS DALE C & DENISE C | EVANS DALE C & DENISE C |
| EVANS DARRELL MATTHEW & | EVANS DARRELL MATTHEW & |
| EVANS RHONDA A | EVANS RHONDA A |
| EVERTON MICHAEL | EVERTON MICHAEL |
| EXTEN LLC | EXTEN LLC |
| F & R PARTNERSHIP | F & R PARTNERSHIP |
| FAIRBROTHER D BLAIR & FAIRBROTHER FRANCES E | FAIRBROTHER D BLAIR & FAIRBROTHER FRANCES E |
| FALLS JAMES E & JOYCE W | FALLS JAMES E & JOYCE W |
| FARISS MARSHA M | FARISS MARSHA M |
| FARLEY BRIAN K & JULIE L | FARLEY BRIAN K & JULIE L |
| FARMER GORDON J & FARMER CAROLYN V | FARMER GORDON J & FARMER CAROLYN V |
| FARRELL PROPERTIES FOREST LLC | FARRELL PROPERTIES FOREST LLC |
| FERGUSON ENTERPRISES INC | FERGUSON ENTERPRISES INC |
| FERGUSON TERRY G & FERGUSON JENNIFER C | FERGUSON TERRY G & FERGUSON JENNIFER C |
| FIRST BANK & TRUST COMPANY | FIRST BANK & TRUST COMPANY |
| FISHER ROY & FISHER DORIS | FISHER ROY & FISHER DORIS |
| FLORES LAWRENCE H & JILL | FLORES LAWRENCE H & JILL |
| FLOUNDER LLC | FLOUNDER LLC |
| FOREST CROSSING LLC | FOREST CROSSING LLC |
| FOREST INDUSTRIES INC | FOREST INDUSTRIES INC |
| FOREST PROFESSIONAL PARK LLC | FOREST PROFESSIONAL PARK LLC |
| FOSTER BUILDERS INC | FOSTER BUILDERS INC |
| FOWLER WALTER W, JOHN R & LEE A & LARRY G | FOWLER WALTER W, JOHN R & LEE A & LARRY G |
| FRALICK FREDRIC R & PHYLLIS D TRUST | FRALICK FREDRIC R & PHYLLIS D TRUST |
| FRANKLIN SHARON H & HAINES PATRICIA A | FRANKLIN SHARON H & HAINES PATRICIA A |
| FREEMAN DONALD R & BRENDA M | FREEMAN DONALD R & BRENDA M |
| GALLAGHER GENE D & GALLAGHER JUDITH W | GALLAGHER GENE D & GALLAGHER JUDITH W |
| GALLIER SHELTON C JR & | GALLIER SHELTON C JR & |
| GARNETT MARGARET H | GARNETT MARGARET H |
| GEDICKS ELLEN R | GEDICKS ELLEN R |
| GENERATION'S HOME MEDICAL SUPPLIES & EQ | GENERATION'S HOME MEDICAL SUPPLIES & EQ |
| GEORGE JOHN D JR & JUDITH E | GEORGE JOHN D JR & JUDITH E |
| GG SCOUT PROPERTIES LLC | GG SCOUT PROPERTIES LLC |
| GILBERT OSBORNE & FRANCES | GILBERT OSBORNE & FRANCES |
| GIRLING ROWLAND L | GIRLING ROWLAND L |
| GJM HOLDINGS LLC | GJM HOLDINGS LLC |
| GLASS MAXWELL SR & EDITH | GLASS MAXWELL SR & EDITH |
| GOMES EDMUND J & RUTH U | GOMES EDMUND J & RUTH U |
| GORDON ROBERT E & GORDON NANCY J | GORDON ROBERT E & GORDON NANCY J |
| GOURLEY STEVEN J & JOYCE | GOURLEY STEVEN J & JOYCE |
| GRAHAM MARIE A | GRAHAM MARIE A |
| GRAINGER W W INC | GRAINGER W W INC |
| GRAVES MILL CENTER PROP | GRAVES MILL CENTER PROP |
| GRAVES THOMAS W JR | GRAVES THOMAS W JR |
| GRAY RANDALL & MARILYN | GRAY RANDALL & MARILYN |
| GREEN RALPH WILFRED II & LOUISE RUTH | GREEN RALPH WILFRED II & LOUISE RUTH |
| GREENE FRANKLIN T II & ANNE B | GREENE FRANKLIN T II & ANNE B |
| GRIFFIN TERRIE E | GRIFFIN TERRIE E |
| GRISTMILL LAND HOLDINGS LLC | GRISTMILL LAND HOLDINGS LLC |
| HALL MARTHA | HALL MARTHA |
| HALL RICHARD H SR & | HALL RICHARD H SR & |
| HARPER RICHARD L & FAYE B | HARPER RICHARD L & FAYE B |
| HARRIS JAMES A & JEAN S | HARRIS JAMES A &JEAN S |
| HARRIS TIRE CO INC | HARRIS TIRE CO INC |
| HARTLESS KAYE M | HARTLESS KAYE M |
| HASSAN HASSAN A H & NABIL | HASSAN HASSAN A H & NABIL |
| HAWKINS BROOK D & HAWKINS SAMANTHA M | HAWKINS BROOK D & HAWKINS SAMANTHA M |
| HAWLEY WILLIAM W & DORIS W | HAWLEY WILLIAM W & DORIS W |
| HAYDEN KYLE DAVIS | HAYDEN KYLE DAVIS |
| HAZELGROVE PROPERTIES LLC | HAZELGROVE PROPERTIES LLC |
| HEIDORN JEFFREY A & MARGARETE A | HEIDORN JEFFREY A & MARGARETE A |
| HERITAGE PLACE DEVELOPMENT INC | HERITAGE PLACE DEVELOPMENT INC |
| HICKS ROBT L SR & | HICKS ROBT L SR & |
| HIGHT SCOTT BRADLEY & BECKY JO | HIGHT SCOTT BRADLEY & BECKY JO |
| HINSON VICTOR D & PEGGY S | HINSON VICTOR D & PEGGY S |
| HIRSCHMAN DAVID W & CHERYL L | HIRSCHMAN DAVID W & CHERYL L |
| HOSTUTLER GARY P & HOSTUTLER PATRICIA A | HOSTUTLER GARY P & HOSTUTLER PATRICIA A |
| HOYNE THOMAS M & CHRISTINE P | HOYNE THOMAS M & CHRISTINE P |
| INDUSTRIAL DEV AUTHORITY OF THE COUNTY | INDUSTRIAL DEV AUTHORITY OF THE COUNTY |
| IRVAN JON WESLEY | IRVAN JON WESLEY |
| IVY WOLF FARM LC | IVY WOLF FARM LC |
| J & K HOLDINGS LLC | J & K HOLDINGS LLC |
| JACOBS JAMES T III & DORIS A | JACOBS JAMES T III & DORIS A |
| JAEGER LISA A TR | JAEGER LISA A TR |
| JAEGER RAYMOND A LTD | JAEGER RAYMOND A LTD |

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| JAKOBOWSKI ROBERT A & JUNE A | JAKOBOWSKI ROBERT A & JUNE A |
| JBMB PROPERTIES LLC | JBMB PROPERTIES LLC |
| JEFFERSON OAKS PROPERTY OWNERS ASSOC THE | JEFFERSON OAKS PROPERTY OWNERS ASSOC THE |
| JEFFERSON PARC ASSOCIATES LLC | JEFFERSON PARC ASSOCIATES LLC |
| JENNINGS JACK & REBECCA K | JENNINGS JACK & REBECCA K |
| JIM MCQUADE PONTIAC - GMC | JIM MCQUADE PONTIAC - GMC |
| JLW PROPERTIES LLC | JLW PROPERTIES LLC |
| JNT PROPERTIES LLC | JNT PROPERTIES LLC |
| JOHNSON GARY J & VANESSA T | JOHNSON GARY J & VANESSA T |
| JOHNSON HOWARD D II | JOHNSON HOWARD D II |
| JOHNSON JESSE H III | JOHNSON JESSE H III |
| JOHNSON ROBERT K & JANE R | JOHNSON ROBERT K & JANE R |
| JONES JERRY JASON & JENNIFER M | JONES JERRY JASON & JENNIFER M |
| JONES JONATHAN D & KAREN H | JONES JONATHAN D & KAREN H |
| JONES THURMAN E & DELORES | JONES THURMAN E & DELORES |
| JORDAN KENNETH F & JORDAN PHYLLIS M | JORDAN KENNETH F & JORDAN PHYLLIS M |
| JUSTICE REAL ESTATE LLC | JUSTICE REAL ESTATE LLC |
| JWC INC | JWC INC |
| KEEN JIMMIE R & FRANKIE C | KEEN JIMMIE R & FRANKIE C |
| KEMP LINDA A & LIFE OUTREACH INC | KEMP LINDA A & LIFE OUTREACH INC |
| KEMPSON ALAN TERRENCE | KEMPSON ALAN TERRENCE |
| KERR ROBERT W | KERR ROBERT W |
| KERSHAW DOUGLAS B III & SANDRA R | KERSHAW DOUGLAS B III & SANDRA R |
| KLACYNSKI CHAD D II | KLACYNSKI CHAD D II |
| LAWSON CLARENCE M & JUDY | LAWSON CLARENCE M & JUDY |
| LEE CHRISTOPHER J & LEE MELISSA F | LEE CHRISTOPHER J & LEE MELISSA F |
| LEFAH LLC | LEFAH LLC |
| LENZ VIRGINIA A | LENZ VIRGINIA A |
| LESTER GREGORY D & SHARON | LESTER GREGORY D & SHARON |
| LESTER PATRICIA M | LESTER PATRICIA M |
| LICHIELLO PROPERTIES LLC | LICHIELLO PROPERTIES LLC |
| LOGAN DANIEL K & DENISE R | LOGAN DANIEL K & DENISE R |
| LYNCHBURG 706 LLC | LYNCHBURG 706 LLC |
| LYNCHBURG RENTING LLC | LYNCHBURG RENTING LLC |
| M & N DEVELOPERS LLC | M & N DEVELOPERS LLC |
| MABERY JAMES A & MABERY SARAH R | MABERY JAMES A & MABERY SARAH R |
| MACDOWELL TODD & MACDOWELL AUDREY | MACDOWELL TODD & MACDOWELL AUDREY |
| MADDOX ANN H | MADDOX ANN H |
| MAPLE HILLS ASSOCIATES INC | MAPLE HILLS ASSOCIATES INC |
| MAPLE HILLS INC | MAPLE HILLS INC |
| MARKHAM MICHAEL LEE | MARKHAM MICHAEL LEE |
| MARKLAND JOHN E & SUZETTE | MARKLAND JOHN E & SUZETTE |
| MARTIN RONALD E & CAROL R | MARTIN RONALD E & CAROL R |
| MARTINEZ JORGE NERI | MARTINEZ JORGE NERI |
| MCCABE DEBRA H | MCCABE DEBRA H |
| MCDONALDS CORP | MCDONALDS CORP |
| MCLAUGHLIN SCOTT D & COLLEEN ANN | MCLAUGHLIN SCOTT D & COLLEEN ANN |
| MCNALLY EDWARD B TRUST | MCNALLY EDWARD B TRUST |
| MERRICKS LOUIE S JR & CAROL M | MERRICKS LOUIE S JR & CAROL M |
| METTS JIMMIE H & DORIS M | METTS JIMMIE H & DORIS M |
| MIKKELSON SHIRLEY A REVOCABLE LIVING TRUST | MIKKELSON SHIRLEY A REVOCABLE LIVING TRUST |
| MILLER STEVEN R | MILLER STEVEN R |
| MILLNERS MOBILE HOME EST | MILLNERS MOBILE HOME EST |
| MILTON & NEAL RLLP | MILTON & NEAL RLLP |
| MILTON WILLIAM L & JOYCE | MILTON WILLIAM L & JOYCE |
| MIZENER SAMUEL E & MIZENER MARY RUTH | MIZENER SAMUEL E & MIZENER MARY RUTH |
| MOON HARLSIE M & ELLA V | MOON HARLSIE M & ELLA V |
| MOORE ROBERT D & MOORE SHIRLEY G | MOORE ROBERT D & MOORE SHIRLEY G |
| MORCOM DOROTHY U | MORCOM DOROTHY U |
| MORRIS HOWARD WAYNE & | MORRIS HOWARD WAYNE & |
| MOXLEY MICHAEL F & JOELLE | MOXLEY MICHAEL F & JOELLE |
| MSK HOLDINGS LLC | MSK HOLDINGS LLC |
| MUNIZ JOHN F & DORIS C | MUNIZ JOHN F & DORIS C |
| MURPHY WILLIAM T JR & MURPHY MARIE K | MURPHY WILLIAM T JR & MURPHY MARIE K |
| MYERS STEPHEN J & ANN M | MYERS STEPHEN J & ANN M |
| NEAL W P JR & GAIL N | NEAL W P JR & GAIL N |
| NELSON THOMAS P & VIRGINIA D | NELSON THOMAS P & VIRGINIA D |
| NEWCOMB FAMILY LIMITED PARTNERSHIP | NEWCOMB FAMILY LIMITED PARTNERSHIP |
| NICHOLAS JOHN & ROSE | NICHOLAS JOHN & ROSE |
| NOEL DONALD E JR | NOEL DONALD E JR |
| NOLEN W B & MARY B & | NOLEN W B & MARY B & |
| PANNELL GERALD STEVEN & NAKISHA N | PANNELL GERALD STEVEN & NAKISHA N |
| PATE SAMUEL K & CAROLE T | PATE SAMUEL K & CAROLE T |
| PAULEY PROPERTIES LLC | PAULEY PROPERTIES LLC |
| PERKINS FRANCES M | PERKINS FRANCES M |
| PERRY GLORIA J | PERRY GLORIA J |
| PHILLIPS BENJAMIN R & RUTH R | PHILLIPS BENJAMIN R & RUTH R |
| PLEASANT VIEW BAPTIST | PLEASANT VIEW BAPTIST |
| PLEASANT VIEW BAPTIST | PLEASANT VIEW BAPTIST |
| PUZON GIL C & PAULITA R | PUZON GIL C & PAULITA R |
| RAMSEY REUBEN C | RAMSEY REUBEN C |
| RAY CORY K & HANNAH E | RAY CORY K & HANNAH E |
| RDX LLC | RDX LLC |
| REEVES LYNN K | REEVES LYNN K |
| REM III LLC | REM III LLC |
| REVIS KENNETH M | REVIS KENNETH M |
| REVIS KENNETH M | REVIS KENNETH M |
| RHODES CARL A & KELLY S | RHODES CARL A & KELLY S |
| RICE FAMILY IRREVOCABLE TRUST | RICE FAMILY IRREVOCABLE TRUST |
| RICHARDSON LINDA B | RICHARDSON LINDA B |
| RICHARDSON MARY WASHINGTON | RICHARDSON MARY WASHINGTON |
| RIELEY LORETTA G | RIELEY LORETTA G |
| RITCHEY JEFFREY P & BRIGITTE M | RITCHEY JEFFREY P & BRIGITTE M |
| ROAKES ERNEST W & | ROAKES ERNEST W & |

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| ROBERTSON EARLENE & JEARLENE | ROBERTSON EARLENE & JEARLENE |
| ROGERS JEFFREY R & | ROGERS JEFFREY R & |
| ROGERS JEFFREY R & MELISSA K | ROGERS JEFFREY R & MELISSA K |
| ROSSER JAMES A JR & | ROSSER JAMES A JR & |
| ROSSER SHIRLEY POWELL | ROSSER SHIRLEY POWELL |
| ROWSE DAVID S & MELANIE M | ROWSE DAVID S & MELANIE M |
| ROYAL THOMAS W JR | ROYAL THOMAS W JR |
| RUCKER FRANCES J | RUCKER FRANCES J |
| RULES L.L.C. | RULES L.L.C. |
| RUNK & PRATT LLC | RUNK & PRATT LLC |
| SAND CRAIG R | SAND CRAIG R |
| SARGEANT JOEL D & SARGEANT APRIL A | SARGEANT JOEL D & SARGEANT APRIL A |
| SAVAGE THOMAS A & CHERYL | SAVAGE THOMAS A & CHERYL |
| SCARLETTO FREDERICK C & ANN T | SCARLETTO FREDERICK C & ANN T |
| SCOTT CHRISTOPHER A SR | SCOTT CHRISTOPHER A SR |
| SCOTT THOMAS E & L SHARON | SCOTT THOMAS E & L SHARON |
| SCRIVENER R BRUCE & | SCRIVENER R BRUCE & |
| SELECTBANK | SELECTBANK |
| SELF WILLIAM H JR & LEIGH ANN | SELF WILLIAM H JR & LEIGH ANN |
| SHILOH METHODIST CHURCH | SHILOH METHODIST CHURCH |
| SHOEBOX PROPERTIES LLC | SHOEBOX PROPERTIES LLC |
| SKINNELL JOHN A & DORIS H | SKINNELL JOHN A & DORIS H |
| SMITH CHRISTINE F TRUST | SMITH CHRISTINE F TRUST |
| SMITH DAVID M & ELIZABETH | SMITH DAVID M & ELIZABETH |
| SMITH DONALD A & SHIRLEY | SMITH DONALD A & SHIRLEY |
| SMITH JUDY E & GARRETT JOYCE M | SMITH JUDY E & GARRETT JOYCE M |
| SNELL STANLEY L & SHIRLEY M | SNELL STANLEY L & SHIRLEY M |
| SORRELLS BONNIE B | SORRELLS BONNIE B |
| SOUTHERN AIR INC | SOUTHERN AIR INC |
| SPANGLER LEROY & LYNN M | SPANGLER LEROY & LYNN M |
| SPECTRUM ENTERPRISES LLC | SPECTRUM ENTERPRISES LLC |
| SPRUCE HARRY L & ROXIE J | SPRUCE HARRY L & ROXIE J |
| STATON & SONS AUTO | STATON & SONS AUTO |
| STEGER CREEK INC | STEGER CREEK INC |
| STERLING WEST PROPERTIES | STERLING WEST PROPERTIES |
| SWARTZ CHARLES T & MARY L | SWARTZ CHARLES T & MARY L |
| SWEENEY PROPERTIES INC | SWEENEY PROPERTIES INC |
| SWEET P'S LLC | SWEET P'S LLC |
| SWISHER JOHN R & MARGARET | SWISHER JOHN R & MARGARET |
| SYCAMORE CREEK PROPERTIES LLC | SYCAMORE CREEK PROPERTIES LLC |
| TALLEY GENEVA GARRETT | TALLEY GENEVA GARRETT |
| TANNER CLAIRE E | TANNER CLAIRE E |
| TAYLOR MATTHEW S & TAYLOR STACIE H | TAYLOR MATTHEW S & TAYLOR STACIE H |
| TERRY REAL ESTATE-LYNCHBURG LLC | TERRY REAL ESTATE-LYNCHBURG LLC |
| THEISEN ROBERT S | THEISEN ROBERT S |
| THOMPSON JOHN H & ANN M | THOMPSON JOHN H & ANN M |
| THOMPSON JOHN H & HALL WILLIAM D | THOMPSON JOHN H & HALL WILLIAM D |
| TIFFANY PETER D | TIFFANY PETER D |
| TILLMAN JOHN W & DONNA E | TILLMAN JOHN W & DONNA E |
| TSUEI RONNIE MING HWA & NINA | TSUEI RONNIE MING HWA & NINA |
| TURNER DANIEL W | TURNER DANIEL W |
| TWEEDY ROBERT O & MAYBERRY MONICA T | TWEEDY ROBERT O & MAYBERRY MONICA T |
| TWILIGHT DEVELOPMENT CO LLC | TWILIGHT DEVELOPMENT CO LLC |
| TY LLC | TY LLC |
| VABEDCO INC | VABEDCO INC |
| VC ENTERPRISES LLC | VC ENTERPRISES LLC |
| VILLAGE MOTORS INC | VILLAGE MOTORS INC |
| VISTA VERDE PROPERTIES LC | VISTA VERDE PROPERTIES LC |
| VITALE SALVATOE & ANTONINA LO DUCA | VITALE SALVATOE & ANTONINA LO DUCA |
| VITALE VINCE | VITALE VINCE |
| WALKER CAUTHORN & VALOYCE | WALKER CAUTHORN & VALOYCE |
| WALLOWER TRACY CHRISTINE | WALLOWER TRACY CHRISTINE |
| WALTHALL ANITA LYNN | WALTHALL ANITA LYNN |
| WASHBURN EDGAR M JR | WASHBURN EDGAR M JR |
| WASHBURN TERESA G & WASHBURN NANCY D | WASHBURN TERESA G & WASHBURN NANCY D |
| WASMER THOMAS J & CAROL L | WASMER THOMAS J & CAROL L |
| WATKINS JAMES M JR & JUDY | WATKINS JAMES M JR & JUDY |
| WC PROPERTIES LLC | WC PROPERTIES LLC |
| WEATHERHOLT O VICTOR & ANITA B | WEATHERHOLT O VICTOR & ANITA B |
| WEATHERHOLT O VICTOR REVOCABLE TRUST | WEATHERHOLT O VICTOR REVOCABLE TRUST |
| WESTBOUND PROPERTIES LLC | WESTBOUND PROPERTIES LLC |
| WESTERN WAYS INC | WESTERN WAYS INC |
| WHITE JOHN A & NORMA S | WHITE JOHN A & NORMA S |
| WILEY DAVID A & MARTHA K | WILEY DAVID A & MARTHA K |
| WILLIAMS ROBERT E & LOIS E REVOCABLE TRUST | WILLIAMS ROBERT E & LOIS E REVOCABLE TRUST |
| WILLIS LISA R | WILLIS LISA R |
| WILSON TIMOTHY J &MELINDA | WILSON TIMOTHY J &MELINDA |
| WINN LARRY SR & WINN NANCY C | WINN LARRY SR & WINN NANCY C |
| WOODALL RONALD E & WOODALL JEAN M | WOODALL RONALD E & WOODALL JEAN M |
| WOODBERRY ASSOCIATES LLC | WOODBERRY ASSOCIATES LLC |
| WOODS PROPERTIES LLC | WOODS PROPERTIES LLC |
| WRIGHT FOODS INC | WRIGHT FOODS INC |
| YEATTS BERNARD C & AIDA J | YEATTS BERNARD C & AIDA J |
| ZIMPRITSCH JOSEPH E | ZIMPRITSCH JOSEPH E |

# Route 221 Corridor Safety Study

# Community Meeting #1

*Thank you for coming to this meeting. The purpose of the project is to identify opportunities to reduce congestion, improve safety, and improve the ability to use transit, walk, and bicycle along the corridor. The purpose of this meeting is to discuss the project, share some initial findings about safety and congestion, and then provide an opportunity to hear from you – the users of this corridor, about your thoughts and ideas about how to improve travel conditions along this corridor.*

## Agenda

1. **Welcome message**

2. **Project overview (short presentation)**

3. **Corridor review session (working session around the maps and comment boards)**

EPR - "ENGINEERING & PLANNING RESOURCES"
637 BERKMAR CIRCLE, CHARLOTTESVILLE, VA 22901

MEMORANDUM

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| TO: BOB WHITE, AICP | FROM: BILL WUENSCH, P.E., PTOE |
| ORGANIZATION: CENTRAL VA MPO | DATE: FEBRUARY 3RD, 2014 |
| PHONE NUMBER: | SENDER'S REFERENCE NUMBER: |
| RE: ROUTE 221 CORRIDOR SAFETY STUDY – SUMMARY OF THE FIRST COMMUNITY MEETING | YOUR REFERENCE NUMBER: |

☐ URGENT X FOR YOUR USE ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

A community meeting was held from 1PM until 2:30PM, and then again from 5:00PM unitl 6:30PM on January 30th, 2014. A total of ten people attended the meetings, in addition to VDOT, County, City, MPO, and consultant staff.

The meeting(s) commenced with a welcome message and presentation about the project, and then the participants were directed to large aerial images of the corridor containing information about the crash history intersection level of service. The attendees were asked to provide commentary about conditions along the corridor. Also, each attendee was given red and yellow sticky dots and were asked to place the dots at locations where they perceive the corridor to be congested or where safety concerns exist.

In general, the feedback confirmed that the users of the corridor experience high degrees of congestion in the peak travel periods of the day. It was also indicated that there is a desire to identify places along the corridor where sidewalks could constructed to accommodate walking trips from the neighborhoods or bus stops to commercial areas. Furthermore, several attendees noted that there seem to be an excessive amount of driveways, or poorly organized site access along the corridor. Commentary was provided regarding Graves Mill Road approaching Route 221 relative to the need for turn lanes into the shopping center. The topic of coordinating signals to reduce the amount of stopped traffic along the

corridor was brought up. The sticky dots were largely clustered around Enterprise Drive, Gristmill, and Graves Mill Road intersections, although other locations were flagged also.

The following provides a direct translation of the comments from the comment forms, comment sheets, and sticky dot input regarding the congested and perceived unsafe areas along the corridor.

**From the comment sheet handout:**

- It seems that a lot of people don't know road rules about turning in a 2 lane road to stay in the same lane. It's an issue coming onto Graves Mill exit to left on Greaves Mill Road.
- Yes, we need sidewalks. At a minimum from high density apartments toward schools and shopping centers.
- The strip from Mill Race (toward Forest) to end of Graves Mill to Forrest Road/221 is dangerous from 5 to 6:30 PM.
- Bike lanes – no money to pay for them but they are needed for safety and alternative transportation. Start with school, - sidewalks and bike lanes.
- Lights need to be synchronized.
- Sidewalks are needed in certain areas.
- No bicycles- too dangerous.
- Area is getting very commercial.
- Try traffic signals instead of lights.

**Comment Boards**

- Lower speed limit to 35 mph on Graves Mill
- Dual lefts at Enterprise insufficient extend lanes – traffic blocks thru lanes
- Turn lanes at Grave Mill are too short
- Cross parcel access policy
- Pedestrian crosswalks needed at unsignalized and signalized location (Walgreens, etc
- Enterprise bus stop – move it further south.
- Ped/bike trail from north of Enterprise development between 221 and RR tracks to east
- More ped/bike facilities near residential
- Stop light signal timing @Enterprise Drive – seems to be the same everyday/all day
- Lynchburg Road/221 intersection – bad/high volume. Main feeder to residential/Wal-Mart to the north (Forest Brook Road to Wal-Mart - some people might use as cut through)
- Whitehall Road towards the east – find
- Change Road name from Peace Street – not peaceful
- Heritage Baptist Church – very heavy weekend traffic!
- South of 221 between Lynchburg and Jefferson Ridge.

- Assess into Heritage onto Lynchburg – no crossover. This creates problems on Lynchburg Road because people from Lynchburg coming to Heritage Church.
- Coming out of auto dealership = turning left is impossible. Must go firth and do a U-turn.
- Tight turn lane by Burger Kink – seems to be problematic trying to make a right going east towards Graves Mill
- Grist Mill as curt through – super dangerous
- Coming north on Graves Mill Road towards Route 221 . There is no turn lane for going left – Dangerous!
- Left turn lane onto Enterprise is very long driving in rich hour. 221 towards the west.
- Vista Center Drive – cut thru from Graves Mill to Enterprise.
- Homestead as cut thru/ runs parallel to 221
- No center turn lanes on Enterprise Drive into Walgreens
- At US Cellular/DJ Electronics Plus (Gristmill) extension of westbound turn lane eliminated left turn into the site.
- Can Poplar Forest Center and US Cellular parking lots be joined? This would give US Cellular access to Grist Mill signal. See above.
- Access road along north side between Gristmill and Graves Mill.
- Need northbound left turn lane on Graves Mill at Gristmill – close calls
- Need signal coordination.
- Speeding is an issue. Need more enforcement.
- Far too many curb cuts.
- Blind hill creates a dangerous condition east of the S-N.
- Fatality occurred at Wayne Drive 5 or 6 years ago.
- Queuing on Vista Center should have turn lanes at Gables Site. Vista center will get busier.
- Enterprise dual right turn lanes has a no turn on red sign for the inside right turn lane. People do not obey that sign.
- Enterprise at 221 is dangerous for pedestrians.
- Consider improving the ability to talk from Forestdale to the shopping center to the east.
- Shared access – forest cove access.
- Dangerous movements from Burger King access. People turn onto 221 and try to cross all lanes to get to left turn lanes.
- Graves Mill access into the food lion – too many access points.
- Westbound at Cloverhill – due to curve and hill sight distance to stopped traffic can be a concern.
- More signal ahead signs and warning beacons.

- Signal coordination needed (western section especially)
- Can be a race track going west from Jefferson Ridge Parkway. Need more speed enforcement.
- Less congestion Jefferson Ridge to Cottonwood.
- Roundabouts @ just east of Forest Brook Road, Jefferson Ridge, Cottonwood, Graves Mill.
- Sidewalks and bike lanes (separated from cars) needed through, bus service too.
- Need two eastbound through lanes at the expressway intersection.
- Do not like the center two way left turn lane.
- Speeding – need more enforcement.
- No bike lanes on 221 – would fear that the lane widths would be reduced.
- Peace Street – no left turn lane off of it out onto Route 501 bud people do it anyways.
- No turn tapers, need more of those.
- There is a need for sidewalks. Consider going west from the new mall area.
- Lack of sewage in the growth corridor.
- Shared business drives.
- No more stop lights
- Potential problem – Woodberry Lane/Woodberry Sq. Pl – diagonal intersection. Concerned about stop light.
- Graves Mill should have turn lanes into the shopping center on the west.
- Problem in the mid-0day with the turns off of Graves Mill Road – aggressive drivers.
- Issues with lane exchanges in turn off of expressway onto Graves Mill Road.
- Tractor trailers use Peace Street to make deliveries to adjacent businesses. Need to keep that access.
- Comments on Graphics
- Forest Cove 1 shopping center (at Graves Mill/221) has too many entrances. Find opportunities to combine them and create access between the businesses.
- Notice the future development parcels in the northeast corner of Graves Mill, and behind the Kerr Tire and Automotive business.

**Congestion Concerns (yellow dots):**

- 1 yellow dot southbound at the expressway
- 1 yellow dot northbound at the expressway
- 2 dot at Walgreens and Enterprise
- 2 dots westbound approach at Enterprise
- 1 dot at McDonalds are entrance
- 1 at Graves Mill end of Gristmill

- 2 at Cottontown
- 3 for the eastbound approach to the expressway

**Safety Concerns (red dots):**

- 1 at Cloverhill
- 3 at Gristmill
- 3 at Graves Mill
- 3 at Enterprise
- 1 at Walgreens entrance at Enterprise
- 1 dot at Woodberry Square Place entrance
- 1 dot at Bryant Road/221
- 1 dot between the Auto Extras and Royal Autos
- 1 dot at entrance to Berglund luxury auto.
- 1 dot at entrance to Billy Craft Chrysler Jeep Hyundai
- 2 dots for westbound at the expressway.
- 3 at Expressway
- 3 at 3 entrances (one dot each entrance) on Graves Mill into shopping center
- 1 at Cottontown
- 1 at Forest Cove 1 Center
- 1 at Graves Mill end of Gristmill
- 1 dot at Wyndale drive (western leg) and adjacent access points

**Additional Comments (provided before the meeting)**

- Concern by a business: a bus stop across Lakeside. I understand during wet weather a puddle forms at the stop and as the bus approaches, it splashes the people waiting at the stop. Can the stop be moved away from the puddle so people aren't splashed?
- I took bus # 6 and walked from Billy Craft. First thing I noticed is that the sidewalk ends once you cross into Bedford and you can see the trail in the grass in both sides proof that a lot of people walk there. A couple of years ago I walked from the opposite direction, took bus # 7 and walked from Graves Mill Shopping Ctr to Generation Solutions, also without a sidewalk.
- I also saw two cyclists, one without a helmet and both with dark clothes, we have to do our part if we are going to have a little respect from drivers someday. I use my blinkies even during the day and a reflective vest that bought at Tractor Supply, they might not be chic or fancy but takes away the same stupid excuse they always use: "I didn't see you..." The advantage of those is that you use them of top of your jacket in winter or if you use a backpack instead of a rack.
- The obvious improvements for that road would be sidewalks and sharrows or bike lanes.

Photos of the Aerial Graphics Showing the DOT Locations

**END OF MEMORANDUM**

ATTACHMENT:

1. Meeting sign-in sheets

## Route 221 Corridor Safety Study - Meeting #1 - January 30, 2014

| Name (first) | Name (last) | Representing |
|---|---|---|
| Ed | Anderson | Citizen |
| Ed | McNally | Citizen |
| Kendall | Craft | Craft Auto |
| Bob | Tweedy | Citizen |
| June | Jakobowski | Citizen |
| Jim | McQuade | Citizen |
| Jay | Guy | VDOT |
| Rick | Youngblood | VDOT |
| Todd | Daniel | VDOT |
| Brian | Casella | VDOT |
| Linda | Rose | Rose Computers |
| Lonnie | Rose | Rose Computers |
| Josiah | Tillett | Bedford Planning |
| Rick | Read | CBCRead |
| Brad | Robinson | Bedford County |
| Jim | jacobs | DJ Electronics Us Cellular |
| | | |

# COMMENT SHEET

# Route 221 Corridor Safety Study

## January 30th , 2014

**The Study Team needs to hear from you regarding your concerns, issues, and opportunities for the Route 221 corridor. Your input is valued and will inform the planning process. Thank you!**

**Please leave the comment sheet in the comment box, or you can also send or deliver (by February 7th, 2014) your comments to:**

Bob White
Region 2000
828 Main Street, 12th Floor
Lynchburg, VA 24504

Publish date: 4/3

ORANGE COUNTY REVIEW The Madison Eagle The Daily Progress GREENE COUNTY RECORD THE NEWS VIRGINIAN

# Central Virginia Newspapers Review Order Confirmation for Ad #0003243068-01

| | | | | | |
|---|---|---|---|---|---|
| **Client** | REGION 2000 LOCAL GOV'T COUNCIL | **Payor Customer** | REGION 2000 LOCAL GOV'T COUNCI | **Acct. Exec** | dhubbardLYN |
| **Client Phone** | 434-845-3491 | **Payor Phone** | 434-845-3491 | | |
| **Account#** | 3312739 | **Payor Account** | 3312739 | | |
| **Address** | 828 MAIN ST,12TH FLOOR<br>LYNCHBURG VA 24504-1522 USA | **Payor Address** | 828 MAIN ST,12TH FLOOR<br>LYNCHBURG VA 24504-1522 | **Ordered By** | Matt Perkins |
| **Fax** | 434-845-3493 | | | | |
| **EMail** | MPerkins@region2000.org | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Total Amount** | **$225.00** | **Status** | | | **Materials** | |
| **Payment Amt** | **$0.00** | **Tear Sheets** | **Proofs** | **Affidavits** | **PO Number** | **Blind Box** |
| **Amount Due** | **$225.00** | 0 | 0 | 1 | | |
| **Payment Method** | | | | | | |

**Text:** Route 221 Safety Study

**Order Notes:**

| | | | |
|---|---|---|---|
| **Ad Number**<br>0003243068-01 | **Ad Type**<br>CLP Legal Liner | **Color**<br><NONE> | **Production Color** |
| **Pick Up Number** | **Ad Size**<br>1.0 X 50 Li | **Production Method**<br>AdBooker (liner) | **Production Notes** |

| **Product**<br>**Run Schedule Invoice Text**<br>**Run Dates**<br>**Tag Line** | **Placement/Class** | **Position** | **# Inserts** |
|---|---|---|---|
| LYN News and Adv CLP:: | _Legal Ads - CLP | **_Legal Notices-Legal-CLP** | 1 |
| **4/3/2014**<br>ROUTE 221 SAFETY STUDY | | | |
| LYN TN FeatCLP.com:Onl Any: | _Legal Ads - CLP | **_Legal Notices-Legal-CLP** | 7 |
| **4/3/2014, 4/4/2014, 4/5/2014, 4/6/2014, 4/7/2014, 4/8/2014, 4/9/2014**<br>ROUTE 221 SAFETY STUDY | | | |

ORANGE COUNTY REVIEW The Madison Eagle The Daily Progress GREENE COUNTY RECORD THE NEWS VIRGINIAN

# Central Virginia Newspapers Review Order Confirmation for Ad #0003243068-01

| | | | | | |
|---|---|---|---|---|---|
| **Client** | REGION 2000 LOCAL GOV'T COUNCIL | **Payor Customer** | REGION 2000 LOCAL GOV'T COUNCI | **Acct. Exec** | dhubbardLYN |
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| **Fax** | 434-845-3493 | | | | |
| **EMail** | MPerkins@region2000.org | | | | |

| | |
|---|---|
| **Total Amount** | **$225.00** |
| **Payment Amt** | **$0.00** |
| **Amount Due** | **$225.00** |
| **Payment Method** | |

**Status**

**Materials**

| Tear Sheets | Proofs | Affidavits | PO Number | Blind Box |
|---|---|---|---|---|
| 0 | 0 | 1 | | |

**Text:** Route 221 Safety Study

**Order Notes:**

| | | | |
|---|---|---|---|
| **Ad Number**<br>0003243068-01 | **Ad Type**<br>CLP Legal Liner | **Color**<br><NONE> | **Production Color** |
| **Pick Up Number** | **Ad Size**<br>1.0 X 50 Li | **Production Method**<br>AdBooker (liner) | **Production Notes** |
| **Product** | **Placement/Class** | **Position** | **# Inserts** |
| **Run Schedule Invoice Text** | | | |
| **Run Dates** | | | |
| **Tag Line** | | | |

LYN newsadva CLP.com:Onl Any: _Legal Ads - CLP **_Legal Notices-Legal-CLP** 7

**4/3/2014, 4/4/2014, 4/5/2014, 4/6/2014, 4/7/2014, 4/8/2014, 4/9/2014**
ROUTE 221 SAFETY STUDY

# Central Virginia Newspapers Review Order Confirmation for Ad #0003243068-01

**Ad Content Proof Actual Size**

## Citizens Information Meeting
## Route 221 Corridor Safety Study

You are invited to attend the second Citizens Information Meeting for the Route 221 Corridor Safety Study.

On behalf of the City of Lynchburg and Bedford County and in cooperation with VDOT, the Region 2000 Local Government Council and the Central Virginia Metropolitan Planning Organization are undertaking a safety study of the Route 221 corridor from Cloverhill Boulevard to Forest Brook Road.

The purpose of the study is to identify opportunities for safety improvements, congestion reduction, and bicycle, walking, and public transportation accommodations.

The purpose of this second meeting is to present draft recommendations and receive comments from the public. The meeting will be an open house format.

Citizens are encouraged to attend and express their views. Both staff and consultants will be available to discuss the recommendations and answer questions.

The meeting is scheduled for:
**Thursday, April 10, 2014**
**1:30 to 6:30**
(open house format)
Forest Public Library
15583 Forest Road
Forest, VA 24551

If you have questions concerning this study or meeting, please contact
Bob White, Deputy Director,
Region 2000 Local Government Council,
Tel: 434.845.3491,
Email: bwhite@region2000.org
828 Main Street, 12th Floor,
Bank of the James Building, 24504.

# ROUTE 221 CORRIDOR SAFETY STUDY
# CLOVERHILL BLVD TO FOREST BROOK ROAD

## COMMUNITY INFORMATION MEETING #2

- A public information workshop for the Route 221 Corridor Safety Study will be held on Thursday April 11th, 2014 at the Public Library in Forest, Virginia. The address is 15583 Forest Road, Forest VA 24551.

- The meeting will be conducted in an open house format between the hours of 1:30 and 6:30PM. The purpose of the meeting is to present the draft recommendations and receive comments and additional input regarding the recommendations. The draft recommendations will be displayed and attendees will be encouraged to provide their input and comments. The recommendations address topics such as safety improvements, corridor congestion, multimodal improvements including sidewalks, bicycle, and transit service accommodations and improvements.

- If you would like more information about this meeting or the project, or if you need special accommodations under the Americans with Disabilities Act of 1990, please contact Bob White prior to the meeting at 434-845-3491 or by email at bwhite@region2000.org.

## PROJECT DESCRIPTION

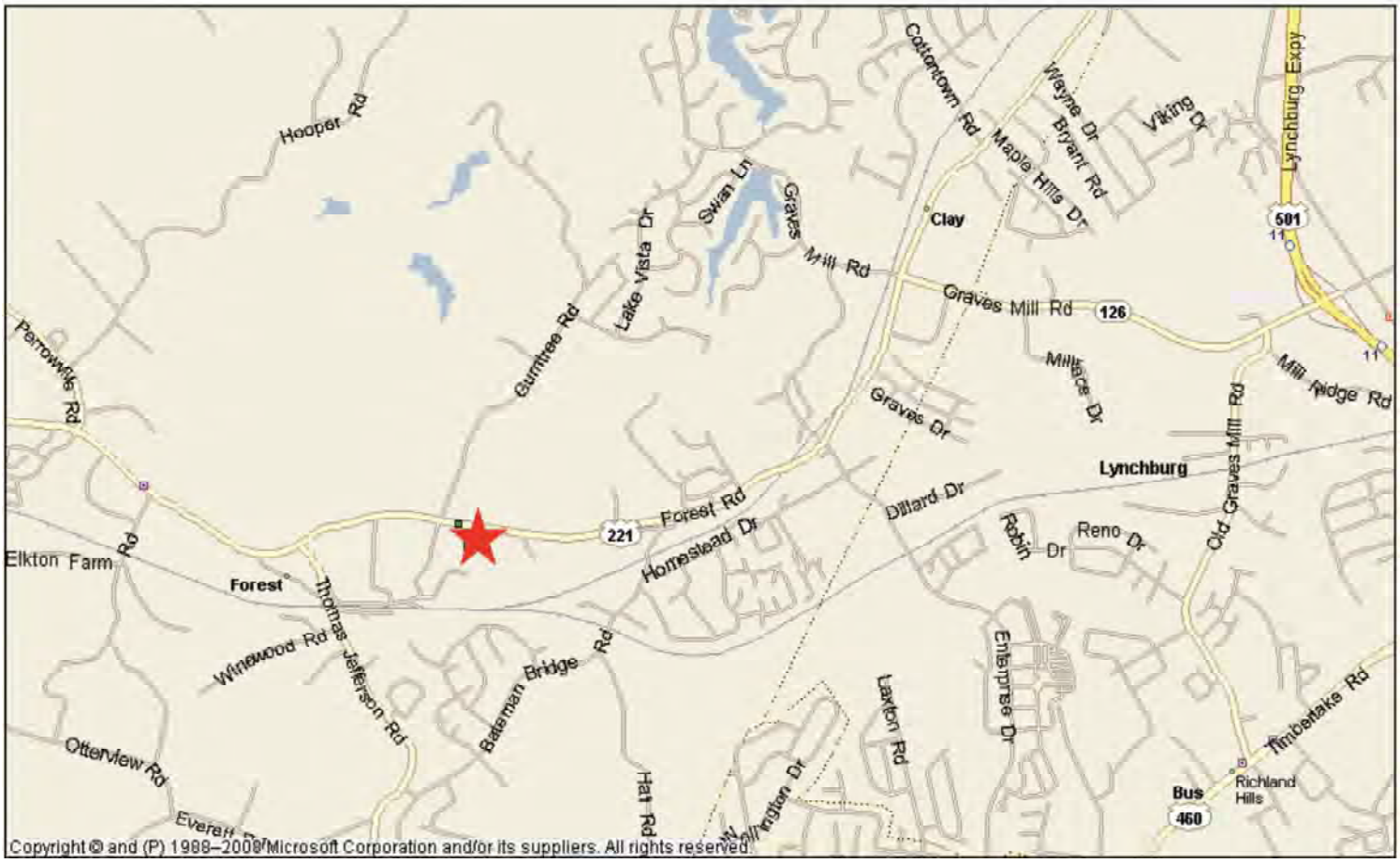
- The Region 2000 Local Government Council and Central Virginia MPO, in partnership with Bedford County and the City of Lynchburg, and with assistance from EPR, P.C., have been conducting a study of Route 221 corridor between Cloverhill Blvd in Bedford County and Forest Brook Road in the City of Lynchburg. The study began in January of 2014 and will be concluded in June of 2014.

- The purpose of the study is to identify and document opportunities to reduce congestion, improve safety, and accommodate bicycle and pedestrians as needed. The opportunities that have been identified to date include projects such as signal coordination, additional turn lanes at intersections, changes to traffic control devices, access management improvements, sidewalks, bicycle accommodations, and improved access to bus stops.

The first public meeting was conducted in late January to introduce the project and receive input about the corridor. A project website has been in place and additional comments have been received over the past couple of months. **The April meeting is the final community meeting.** The final study document will identify projects to be addressed in the short, mid, and longer term timeframes, along with potential funding sources for implementation.

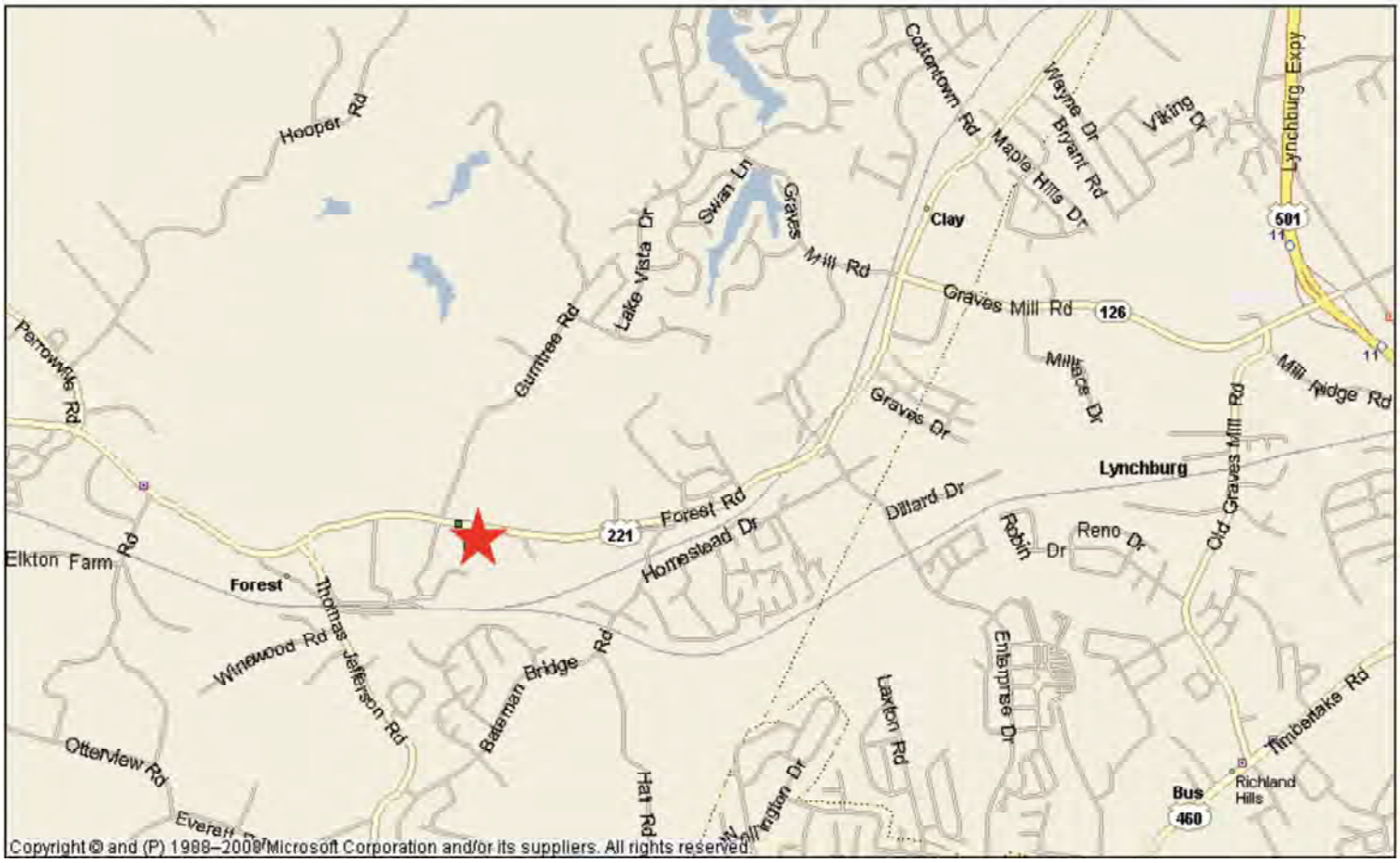
**Dept. of Community Development**
**900 Church Street, Second Floor**
**Lynchburg, VA 24504**

COMMUNITY MEETING LOCATION – FOREST PUBLIC LIBRARY



**Dept. of Community Development**
**122 E. Main Street, Suite G-03**
**Bedford, VA 24523**

COMMUNITY MEETING LOCATION – FOREST PUBLIC LIBRARY



April 16, 2014

The 2nd public meeting for the Route 221 Corridor Safety Study was **conducted on April 10th, 2014** at the Forest Library. The meeting was held between 1:30PM and 6:30PM. Throughout the day, approximately 56 citizens attended the meeting. The attendees were greeted by representatives of Region 2000, VDOT, the City, Bedford County, and EPR (consultant group).

The format of the meeting was an "open house" type setting where informational boards were displayed and the attendees were encouraged to provide comments via the comment boards or by comment sheets.

The display boards included the following information:

1. Summary of public feedback to date.
2. Summary of crash data and statistics for various parts of the study area along Route 221
3. DRAFT Recommendations summary boards for:
    a. Safety
    b. Access Management
    c. Traffic Operations
    d. Multimodal (sidewalks and bicycle accommodations)

Fifty comments were recorded via the comment boards and/or comment sheets. Overall, the comments were supportive of the draft recommendations, and were generally consistent with the commentary received on the project website. There was some concern relative to the (long term) access management concept(s) about restricting access to adjacent businesses, though there was an equal amount of support for the safety benefits resulting from access management. Commentary was provided for areas outside of the study area for this project. These comments will be forwarded to the City and County for their information and consideration in future study efforts.

The following provides a summary of the comments received at the April 10th, 2014 public meeting.

1. Medians and synchronized traffic lights would create vast improvements in the safety of the traffic flow by reducing disruptions to orderly transitions of speed and direction.
2. Add shared bike lane/ped path on Route 811.
3. Widen 811 at least for 3 lanes, needs 4 lanes. (from resident)
4. Traffic signal at fire station needed (Rt 811)
5. Enterprise advance beacon timing is off.
6. Enterprise needs right turn overlap.
7. Extend westbound enterprise left turn lanes.
8. Left turn lane onto Route 811 needs to be extended on Route 221.

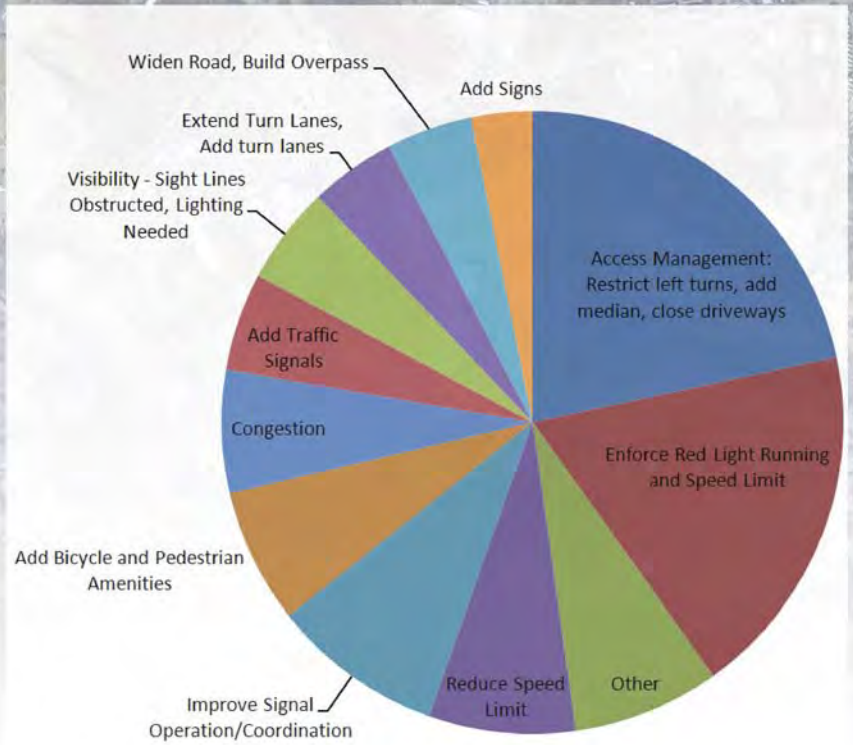
9. Route 221 at Breezewood – yellow time is too short. Light doesn't change when left turn lane is empty (check detection).
10. In City, stop using pavers, economically expensive tax money better used elsewhere (i.e. Wards Ferry Road).
11. East of the expressway the traffic is very heavy. Need to widen Route 221 east of the expressway.
12. Many cars run red lights.
13. No left turns out of Graves Mill Center during peak hours.
14. Graves Mill/Gristmill intersection sight distance blocked by shrubs.
15. Sidewalks not needed, use space for roadway widening for turning lanes (start at Food Lion past Sheetz).
16. Can't get to businesses.
17. "Your Speed Is ……" signs would be helpful.
18. Speed enforcement is needed.
19. Left turn into Walgreens – redesign to address the left turn conflicts.
20. Graves Mill / 221 northeast corner access would be difficult with medians. No way to get back eastbound from the parcel.
21. Improve Coffee Road to act as a reliever road. Road is a federal aid facility.
22. If every major intersection were equipped with lighted street signs overhead (as they are at Forest Road and Enterprise Drive) there would be fewer accidents caused by drivers searching for signage.
23. Do something about the continuous right turn lanes – dangerous.
24. Add stop light/signal at Walden Pond Apartment Homes.
25. Need more enforcements
26. Connect Homestead to Gristmill.
27. Gristmill – odd sign – "turn only at signal".
28. 221/Enterprise – "No Right on Red" sign is too small. Cars in left – right turn lane frequently run the light.
29. 221 at Lakeside – Need additional lane for cars going to Lakeside.
30. Do more Bike path/walk paths to increase this kind of traffic along the roads?
31. Add lane markings/signs earlier to allow drivers time to get into correct lane. Markings blocked by congestion.
32. Consider strobes at the signals.
33. Pull stop bar back at locations where left turning entering vehicles "clip" cars that have crept over stop bar (Old Forest).
34. Lakeside lane shifts.
35. Advance warning prior to signals.
36. Why sidewalks near Walgreens?

37. The “no right on red” at Enterprise is too small.
38. Wayne drive has bad “dips”.  Need to fill them in.
39. Intelligent signal control – link all lights.
40. 221/Cottontown – west/south – red light running.  Warning beacon would help, relocate signal heads to near side.
41. Forest Dale could use a signal. 45 homes on Bedford County side, 69 homes on Lynchburg side.
42. Speed limit at 45 is high for volume and access. 35 Walgreens to SunTrust of Cottontown.
43. Proposed development will compound the problems.
44. Sidewalk from Forestdale to the Expressway.
45. On Enterprise, provide left turn lane into Walgreens.
46. Time the lights from Walgreens to Nissan, Graves Mill ant 221 Intersection with Graves Mill and Gristmill.
47. Right turn lane from Graves Mill to 221 (at Shiloh Church).
48. Proposed median would make it difficult to turn into the shopping centers.
49. Continuous right/merge at intersection of 221 and 501. The result is traffic couldn’t be stopped at the light and traffic could merge onto 501 South.
50. Traffic light at Kroger gas station entrance needed to curb the red light running.

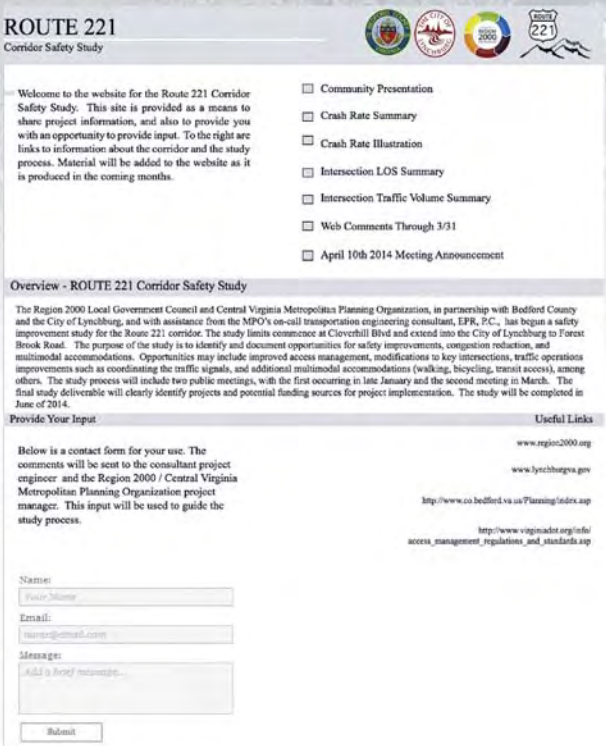
# ROUTE 221 CORRIDOR PLAN

## What we heard

The chart illustrates the distribution of comments received in the first public meeting and on the project website. In total, the website received 85 total comments, many of which touched on multiple topics.




## What we did



ROUTE 221
Corridor Safety Study

Welcome to the website for the Route 221 Corridor Safety Study. This site is provided as a means to share project information, and also to provide you with an opportunity to provide input. To the right are links to information about the corridor and the study process. Material will be added to the website as it is produced in the coming months.

- Community Presentation
- Crash Rate Summary
- Crash Rate Illustration
- Intersection LOS Summary
- Intersection Traffic Volume Summary
- Web Comments Through 3/31
- April 10th 2014 Meeting Announcement

Overview - ROUTE 221 Corridor Safety Study

The Region 2000 Local Government Council and Central Virginia Metropolitan Planning Organization, in partnership with Bedford County and the City of Lynchburg, and with assistance from the MPO's on-call transportation engineering consultant, EPR, P.C., has begun a safety improvement study for the Route 221 corridor. The study limits commence at Cloverhill Blvd and extend into the City of Lynchburg to Forest Brook Road. The purpose of the study is to identify and document opportunities for safety improvements, congestion reduction, and multimodal accommodations. Opportunities may include improved access management, modifications to key intersections, traffic operations improvements such as coordinating the traffic signals, and additional multimodal accommodations (walking, bicycling, transit access), among others. The study process will include two public meetings, with the first occurring in late January and the second meeting in March. The final study deliverable will clearly identify projects and potential funding sources for project implementation. The study will be completed in June of 2014.

Provide Your Input

Below is a contact form for your use. The comments will be sent to the consultant project engineer and the Region 2000 / Central Virginia Metropolitan Planning Organization project manager. This input will be used to guide the study process.

Name:
Email:
Message:
Submit

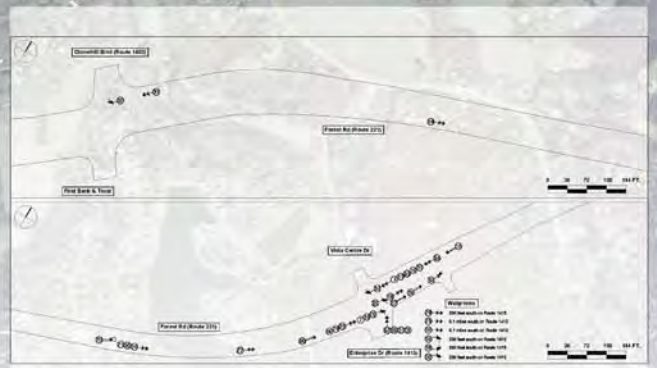
Useful Links

www.region2000.org
www.lynchburgva.gov
http://www.co.bedford.va.us/Planning/index.asp
http://www.virginiadot.org/info/access_management_regulations_and_standards.asp

# PUBLIC FEEDBACK

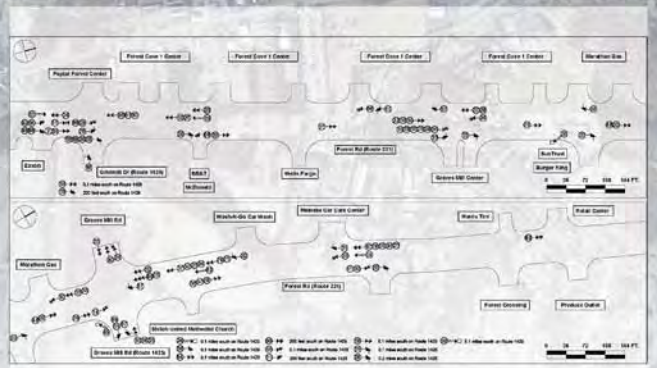
# WHAT WE HEARD

# ROUTE 221 CORRIDOR PLAN

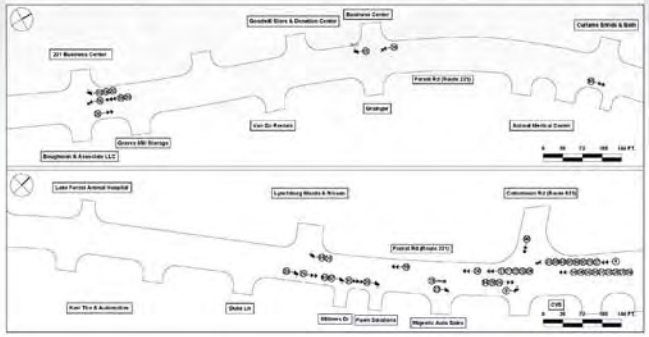


Cloverhill Blvd - Enterprise Dr

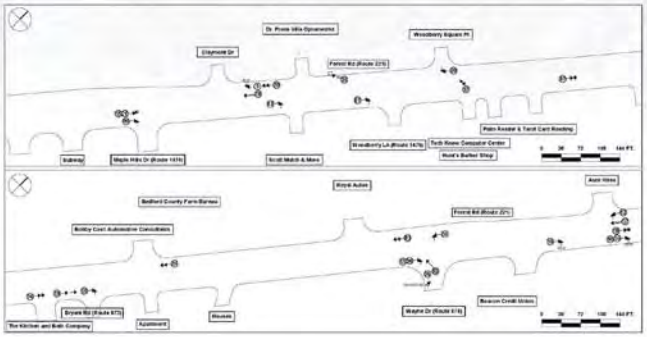
Enterprise Dr - Gristmill Dr



Gristmill Dr - Graves Mill Rd



Graves Mill Rd - Cottontown Rd



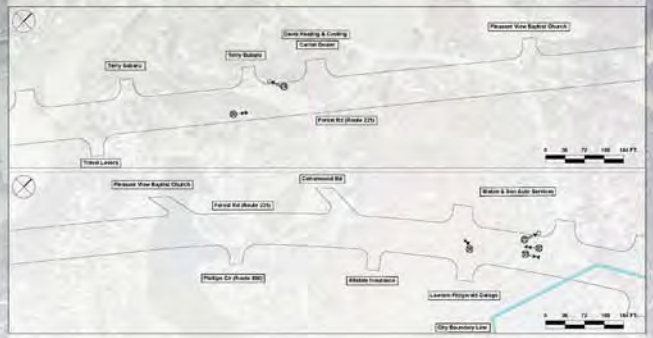
Cottontown Rd - Wayne Dr

LEGEND

## CRASH HISTORY I

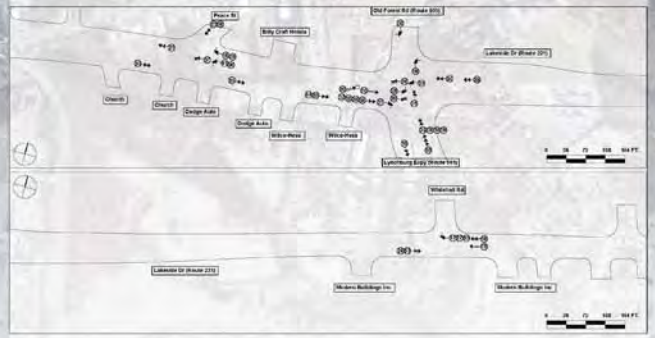
SAFETY

# ROUTE 221 CORRIDOR PLAN

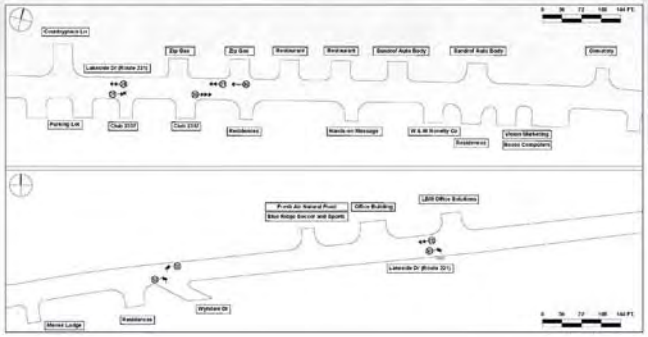


Wayne Dr - City Boundary

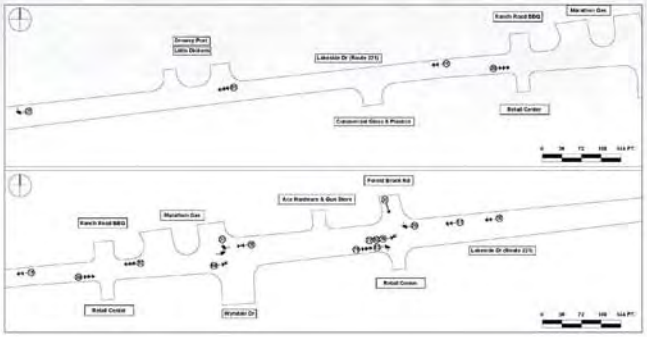
City Boundary - Breezewood Dr



Breezewood Dr - Whitehall Rd



Whitehall Rd - Wyndale Dr (west)



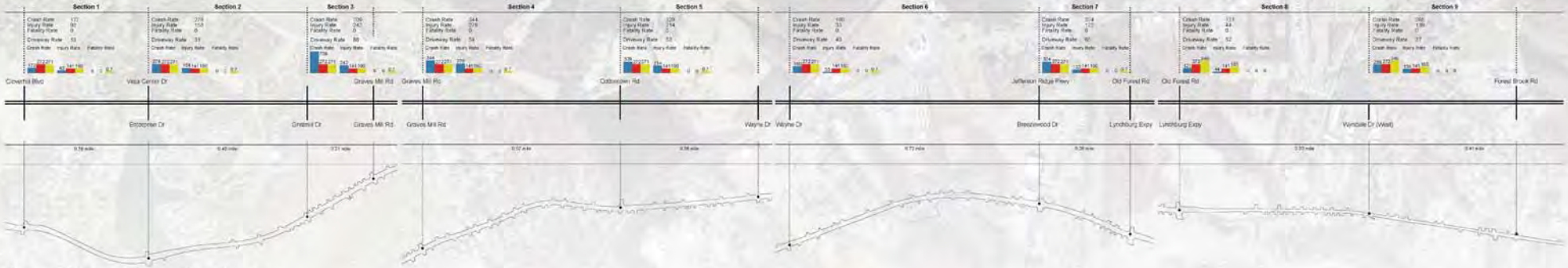
Wyndale Dr (west) - Forest Brook Rd

LEGEND

# CRASH HISTORY II

SAFETY

# ROUTE 221 CORRIDOR PLAN




## Section Crash Rate

## Intersection Crash Rate

| Section | 1-Cloverhill Blvd - Enterprise Dr | 2-Enterprise Dr - Greenhill Dr | 3-Greenhill Dr - Graves Mill Rd | 4-Graves Mill Rd - Cottontown Rd | 5-Cottontown Rd - Wayne Dr |
|---|---|---|---|---|---|
| # of Crashes | 13 | 37 | 44 | 38 | 37 |
| # of Injuries | 8 | 21 | 15 | 47 | 24 |
| # of Fatalities | 0 | 0 | 0 | 0 | 0 |
| Length | 0.38 | 0.45 | 0.21 | 0.57 | 0.38 |
| AADT | 21,000 | 27,000 | 21,000 | 27,000 | 21,000 |
| # of Years | 5 | 5 | 5 | 5 | 5 |
| | | | | | |
| Crash Rate | 172 | 278 | 709 | 344 | 329 |
| Injury Rate | 92 | 158 | 242 | 279 | 215 |
| Fatality Rate | 0 | 0 | 0 | 0 | 0 |

| Section | 6-Wayne Dr - Breezewood Dr | 7-Breezewood Dr - Lynchburg Expy | 8-Old Forest Rd - Wyndale Dr | 9-Wyndale Dr - Forest Brook Rd | Route 221 Average |
|---|---|---|---|---|---|
| # of Crashes | 34 | 14 | 13 | 19 | 279 |
| # of Injuries | 9 | 6 | 4 | 10 | 165 |
| # of Fatalities | 0 | 0 | 0 | 0 | 0 |
| Length | 0.72 | 0.26 | 0.52 | 0.42 | 6.9 |
| AADT | 27,000 | 26,000 | 16,000 | 16,000 | 18,000 |
| # of Years | 5 | 5 | 5 | 5 | 5 |
| | | | | | |
| Crash Rate | 248 | 424 | 123 | 269 | 272 |
| Injury Rate | 33 | 122 | 44 | 139 | 141 |
| Fatality Rate | 0 | 0 | 0 | 0 | 0 |

## Section Crash Rate Summary

| Intersection | 1-Cloverhill/Route 221 | 2-Enterprise/Route 221 | 3-Greenhill/Route 221 | 4-Graves Mill/Route 221 | 5-Cottontown/Route 221 |
|---|---|---|---|---|---|
| # of Crashes | 2 | 22 | 23 | 15 | 17 |
| # of Injuries | 1 | 8 | 12 | 7 | 28 |
| # of Fatalities | 0 | 0 | 0 | 0 | 0 |
| North 221 Entering AADT | 24,000 | 27000 | 27000 | 27000 | 27000 |
| Southbound Entering AADT | 500 | 8575 | 1600 | 12500 | 1350 |
| AADT | 24,500 | 35,575 | 28,600 | 40,700 | 28,350 |
| # of Years | 5 | 5 | 5 | 5 | 5 |
| | | | | | |
| Crash Rate | 0.07 | 0.28 | 0.48 | 0.34 | 0.81 |
| Injury Rate | 0.04 | 0.21 | 0.38 | 0.16 | 0.84 |
| Fatality Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Intersection | 6-Jefferson Ridge/Route 221 | 7-Old Forest/Route 221 | 8-Whitehall/Route 221 | 9-Wyndale/Route 221 | 10-Forest Brook/Route 221 |
|---|---|---|---|---|---|
| # of Crashes | 4 | 10 | 0 | 2 | 2 |
| # of Injuries | 0 | 3 | 0 | 4 | 0 |
| # of Fatalities | 0 | 0 | 0 | 0 | 0 |
| Route 221 Entering AADT | 28000 | 31000 | 16000 | 16000 | 16000 |
| Southbound Entering AADT | 500 | 10000 | 500 | 2000 | 1950 |
| AADT | 28,500 | 41,000 | 16,500 | 18,000 | 17,950 |
| # of Years | 5 | 5 | 5 | 5 | 5 |
| | | | | | |
| Crash Rate | 0.28 | 0.32 | 0.00 | 0.22 | 0.06 |
| Injury Rate | 0.00 | 0.12 | 0.00 | 0.44 | 0.00 |
| Fatality Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## Intersection Crash Rate Summary

# CRASH RATE SUMMARY

SAFETY

# ROUTE 221 CORRIDOR PLAN

## Gristmill Dr - Graves Mill Rd Access Concept

- manage access points
- add median and control turning
- improve intersections

## Wayne Dr



- Re-align the entrance to the auto center with Wayne Dr

## Cottontown Rd

- change northbound left from protected/ permitted to protected only

## Forest Brook Rd

- Include northbound leg into signal control or close the entrance

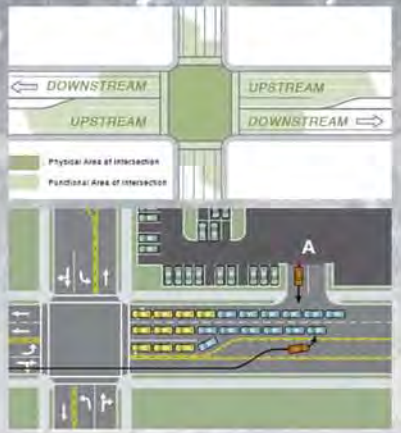
# IMPROVEMENTS

**SAFETY**

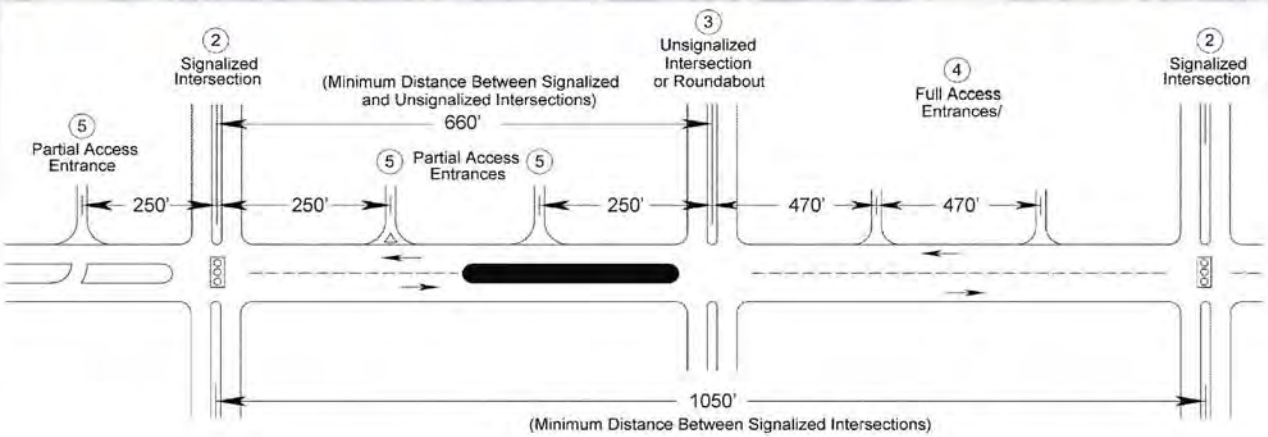
# ROUTE 221 CORRIDOR PLAN

| Location | Description | Time Frame | Category |
|---|---|---|---|
| County Section | Conduct a lighting justification study and install lighting where shown to be necessary. | Short term | Safety |
| City Section | City of Lynchburg adopt access management standards and apply them to new developments. | Short term | Safety |
| Entire Corridor | Increase speed enforecement | Short term | Safety |
| Entire Corridor | Prohibit left turn egress from driveways within the functional area of signalized intersections. | Short term | Safety |
| Cottontown Road | Modify the signal phasing so that northbound left turn movement operates when protected only. | Short term | Safety |
| Entire Corridor | Conduct a speed study and make any needed changes based on the results. | Short term | Safety |
| Cloverhill Boulevard | Install queue detection equipment and advance warning beacons for drivers coming over the bridge approaching the intersection. | Short term | Safety |
| Intersection of Graves Mill Road with Gristmill Drive | Conduct traffic counts to determine whether a northbound left turn lane is needed. | Short term | Safety |
| Route 221 at Forest Brook Road | Incorporate northbound leg into the intersection's traffic signal design by adding signal heads, detection, and westbound left turn lane, or close the entrance. | Short term | Operations/Safety |
| Gristmill Drive to Graves Mill Road | Implement access management improvements including: median installation and driveway consolodation. | Mid term | Safety |

Safety Recommendation List




| Highway Functional Classification | Legal Speed Limit (mph)① | Minimum Centerline to Centerline Spacing (Distance) in Feet | | | |
|---|---|---|---|---|---|
| | | Spacing from Signalized Intersections to Other Signalized Intersections ② | Spacing from Unsignalized Intersections & Full/Directional Median Crossovers to Signalized or Unsignalized Intersections& Full/Directional Median Crossovers ③ | Spacing from Full Access Entrances to Other Full Access Entrances and Any Intersection or Median Crossover ④ | Spacing from Partial Access One or Two Way Entrances to Any Type of Entrance, Intersection or Median Crossover ⑤ |
| Principal Arterial | ≤ 30 mph | 1,050 | 880 | 440 | 250 |
| | 35 to 45 mph | 1,320 | 1,050 | 565 | 305 |
| | ≥ 50 mph | 2,640 | 1,320 | 750 | 495 |
| Minor Arterial | ≤ 30 mph | 880 | 660 | 355 | 200 |
| | 35 to 45 mph | 1,050 | 660 | 470 | 250 |
| | ≥ 50 mph | 1,320 | 1,050 | 555 | 425 |




Example: Minor Arterial with 35 to 45 mph Speed Limit.

Safety Concerns

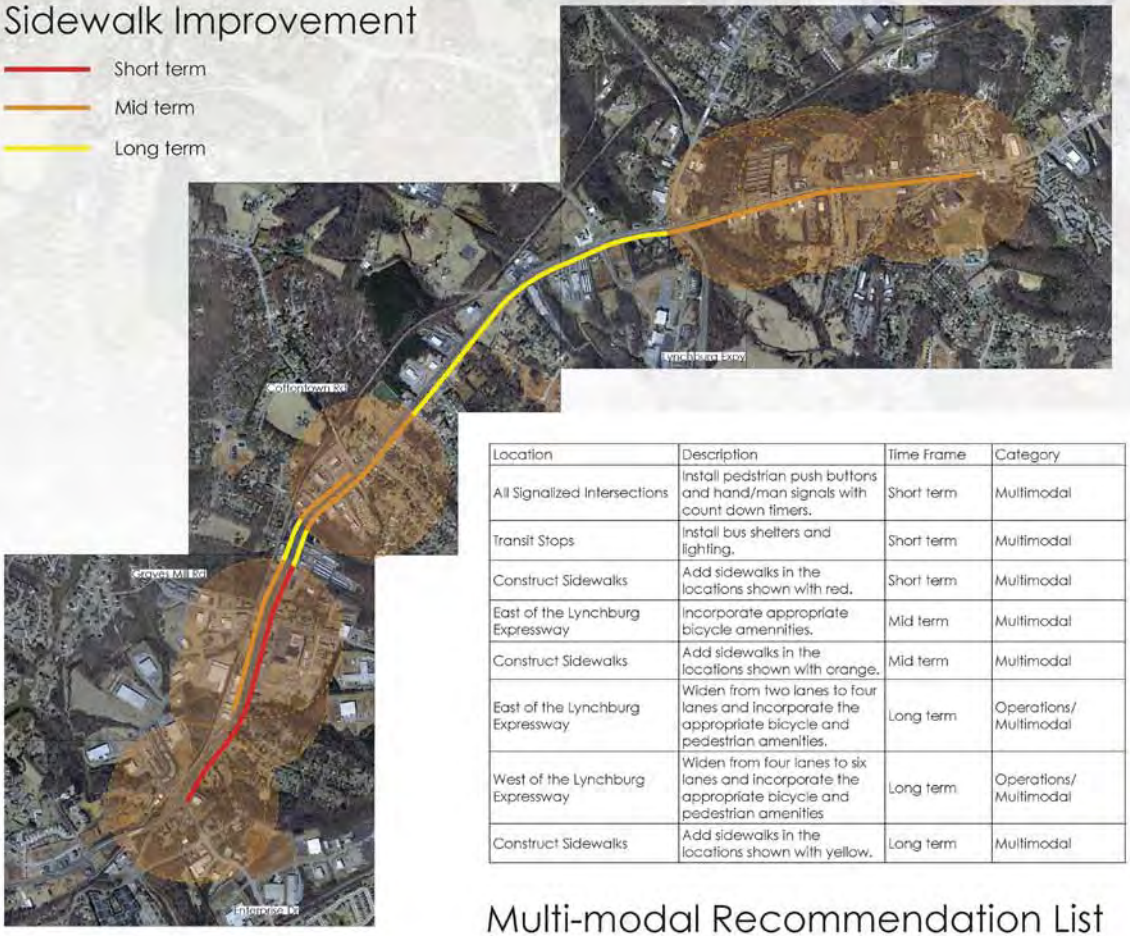
# IMPROVEMENTS AND DETAILS

SAFETY

# ROUTE 221 CORRIDOR PLAN

## Sidewalk Improvement

- Short term
- Mid term
- Long term



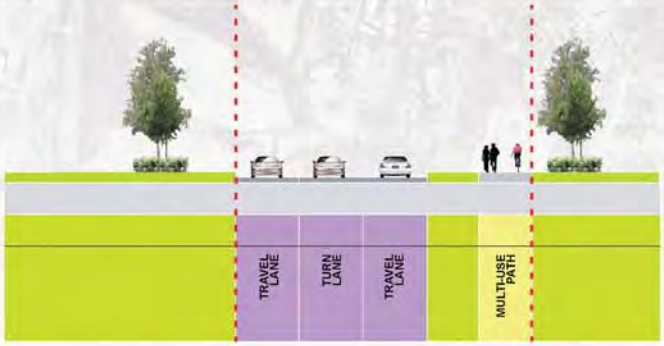

| Location | Description | Time Frame | Category |
|---|---|---|---|
| All Signalized Intersections | Install pedstrian push buttons and hand/man signals with count down timers. | Short term | Multimodal |
| Transit Stops | Install bus shelters and lighting. | Short term | Multimodal |
| Construct Sidewalks | Add sidewalks in the locations shown with red. | Short term | Multimodal |
| East of the Lynchburg Expressway | Incorporate appropriate bicycle amennities. | Mid term | Multimodal |
| Construct Sidewalks | Add sidewalks in the locations shown with orange. | Mid term | Multimodal |
| East of the Lynchburg Expressway | Widen from two lanes to four lanes and incorporate the appropriate bicycle and pedestrian amenities. | Long term | Operations/ Multimodal |
| West of the Lynchburg Expressway | Widen from four lanes to six lanes and incorporate the appropriate bicycle and pedestrian amenities | Long term | Operations/ Multimodal |
| Construct Sidewalks | Add sidewalks in the locations shown with yellow. | Long term | Multimodal |

## Multi-modal Recommendation List

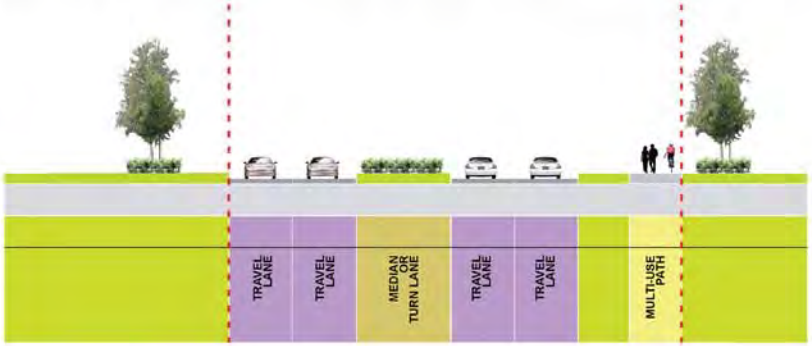
## Bicycle Route in the City - Cross-section

East of Lynchburg Expressway

### Mid-term




### Long-term




# TRANSIT, BICYCLE & PEDESTRIAN

# MULTI-MODAL

# ROUTE 221 CORRIDOR PLAN

Traffic Volumes - Existing

LOS - After Signal Coordination

LOS - Existing

LOS - After Intersection Improvements & Signal Coordination

| Location | Description | Time Frame | Category |
|---|---|---|---|
| All Signalized Intersections | Evaluate and update the signal timing and phasing at each individual intersection and coordinate the traffic signals with one another. | Short term | Operations |
| Route 221 at Forest Brook Road | Incorporate northbound leg into the intersection's traffic signal design by adding signal heads, detection, and westbound left turn lane, or close the entrance. | Short term | Operations/Safety |
| Intersection of Enterprise Drive with Route 221 | Modify the eastbound Vista Center Drive approach to include a left turn lane, through lane and shared through/right turn lane. Modify the westbound Enterprise Drive approach to provide dual right turn lanes, dual left turn lanes and a single through lane. | Mid term | Operations |
| Intersection of Graves Mill Road with Route 221 | Widen the westbound Graves Mill Road approach to include dual left turn lanes, a through lane and a dedicated right turn lane. | Mid term | Operations |
| Intersection of Gristmill Road with Route 221 | Modify the westbound Gristmill Drive approach to provide a left turn lane and shared left/through/right turn lane. | Mid term | Operations |
| East of the Lynchburg Expressway | Widen from two lanes to four lanes and incorporate the appropriate bicycle and pedestrian amenities. | Long term | Operations/ Multimodal |
| West of the Lynchburg Expressway | Widen from four lanes to six lanes and incorporate the appropriate bicycle and pedestrian amenities | Long term | Operations/ Multimodal |
| McConville Road | Extend McConville Road to intersect Route 221 at a signalized intersection. This new traffic signal will replace the existing traffic signal at Wyndale Drive. | Long term | Operations |
| Entire Corridor | As redevelopment occurs, begin acquiring needed right-of-way for future widening from Enterprise Dr to Graves Mill Rd. | All | Operations |

Traffic Operations Recommendation List

## LEVEL OF SERVICE

## TRAFFIC OPERATIONS

# ROUTE 221 CORRIDOR PLAN

Enterprise Dr Intersection

Gristmill Dr Intersection

Graves Mill Rd Intersection

LEGEND

Existing Pavement | New Pavement | New Median | New Sidewalk | Parcel Line | Existing Entrance

# IMPROVEMENTS

# TRAFFIC OPERATIONS

# COMMENT SHEET

# Route 221 Corridor Safety Study

## April 10th , 2014

**The Study Team needs to hear from you regarding your thoughts on the draft recommendations, and any other ideas/concerns you wish to share. Your input is valued and will inform the planning process. Thank you!**

**Please leave the comment sheet in the comment box, or you can also send or deliver (by April 24th, 2014) your comments to:**

Bob White
Region 2000
828 Main Street, 12th Floor
Lynchburg, VA 24504
BWhite@region2000.org

# ROUTE 221

Corridor Safety Study

Welcome to the website for the Route 221 Corridor Safety Study. This site is provided as a means to share project information, and also to provide you with an opportunity to provide input. To the right are links to information about the corridor and the study process. Material will be added to the website as it is produced in the coming months.

- Community Presentation
- Crash Rate Summary
- Crash Rate Illustration
- Intersection LOS Summary
- Intersection Traffic Volume Summary
- Web Comments Through 4/16
- April 10th 2014 Meeting Announcement
- Route 221 Exhibit
- Route 221 Second Meeting Summary

## Overview - ROUTE 221 Corridor Safety Study

The Region 2000 Local Government Council and Central Virginia Metropolitan Planning Organization, in partnership with Bedford County and the City of Lynchburg, and with assistance from the MPO's on-call transportation engineering consultant, EPR, P.C., has begun a safety improvement study for the Route 221 corridor. The study limits commence at Cloverhill Blvd and extend into the City of Lynchburg to Forest Brook Road. The purpose of the study is to identify and document opportunities for safety improvements, congestion reduction, and multimodal accommodations. Opportunities may include improved access management, modifications to key intersections, traffic operations improvements such as coordinating the traffic signals, and additional multimodal accommodations (walking, bicycling, transit access), among others. The study process will include two public meetings, with the first occurring in late January and the second meeting in March. The final study deliverable will clearly identify projects and potential funding sources for project implementation. The study will be completed in June of 2014.

## Provide Your Input

Below is a contact form for your use. The comments will be sent to the consultant project engineer and the Region 2000 / Central Virginia Metropolitan Planning Organization project manager. This input will be used to guide the study process.

Name:

Email:

Message:

## Useful Links

www.region2000.org

www.lynchburgva.gov

http://www.co.bedford.va.us/Planning/index.asp

http://www.virginiadot.org/info/access_management_regulations_and_standards.asp

# SUMMARY OF WEBSITE COMMENTS

**1. Message**
There needs to be a left hand turning lane for Walgreens on Enterprise Dr. driving towards Wyndhurst.

**2. Message**
I am all for progress, but I also think as stewards of the community, we have a responsibility for the safety of our residents and community. This proposed project ends at Forestbrook Road and therefore will bottleneck before the entrance of the Walden Pond community. I would like to kindly request for a consideration and adjustment to be made for the project to extend further and allow for a stoplight at the entrance of our community. This would allow an ease in traffic congestion and allow for safer turns out of our community. Since my time here, I have seen so many non-serious accidents and fender benders and believe that installing a traffic light would greatly decrease the risk as well as the chances of someone truly getting hurt. While this is an additional expense for the project, I know it would offer a sense of security & safety to our residents and employees. Our community has 41 buildings and houses 492 households. A stoplight would be a great resolution to a problem that will continue to get worse as traffic and businesses grow in the Lakeside Drive area.

**3. Message**
Needed along 221: Sidewalks along both sides of 221 to extend to Lynchburg City Limits and Wyndhurst. Crosswalks at stop lights Benches and/or shelters at bus stops Reduced speed limit from 45 mph to 35 mph between Sheetz near fire department and Bank of the James Bike path adjacent to railroad tracks Reduce number of business entrances along 221 by providing adjoining access roads between businesses. Tighter regulations regarding signage and landscaping along 221 to prevent visual obstructions and to enhance 221 beautification.

**4. Message**
1. Reduce speed limit between Sheetz and Bank of the James. Intersection of 221 and Cottontown is particularly dangerous at evening commute time due to speeding and inattention of Westbound drivers. There is nothing to slow/calm westbound traffic into the intersection. 2. Provide sidewalks along the route. They are needed in particular between Enterprise Drive and the neighborhoods behind Subway. The beat-down paths through the grass are evidence of the large amount of pedestrian traffic already present. 3. Crosswalks are needed at each major intersection. There are a significant number of pedestrians crossing 221 each day with no protection. Between Cottontown and Enterprise, the employers/employees are predominately on the North side of 221 and the services/restaurants are on the South. 4. Reduce the number entrances from businesses directly onto 221. Many have more than one. Also, on the service roads connecting to 221 (Gristmill, McDonalds, Food Lion, etc.) there are many business entrances that are too close to the 221 entrance. Drivers exiting the businesses do not have sufficient visibility of traffic exiting off 221 which sometimes is moving quickly. 5. A center divider is needed to limit and control left turns, particularly between Graves Mill and Gristmill. Some kind of control is also needed to prevent the right turn lane from becoming another high speed traffic lane, particularly eastbound between Gristmill and

Graves Mill. 6. Control signage and plantings directly adjacent to the road which limit visibility of oncoming traffic to cars entering 221.

**4. Message**
Glad you are doing the safety study. I would suggest two things: 1. A bike lane. I see cylists on 221, but the congestion, speed, and rolling hills makes it unsafe. 2. Please consider traffic circles/round abouts. I see many calls for more traffic lights; however, traffic lights will add to the congestion. Traffic circles keep the traffic flowing, there's very little maintenance, and they work when the power is out. They have a high capital cost, but they have long-term benefits. They also help control speed.

**5. Message**
Concerned entering and exiting Gables at Jefferson Forest Apartments especially exiting. At times very difficult exiting because of volume of traffic. Traffic from the north most bothersome because of hill and bend in road. Should there be a traffic light here before a serious accident takes place?

**6. Message**
Bikes shouldn't be allowed on 221, period! The road is already dangerous enough & trying to pass one safely while contending with heavy traffic is ludacris. Unfortunately, everyone is always in a hurry & it's just not a safe road for bikers nor the drivers; as they're impeding flow of traffic.

**7. Message**
The Lynchburg metropolitan area is the only area I have driven that has NO roads with three travel lanes per direction. It is too late for most sections of the area, but eventually I would expect 221 to go to all the way to Bedford as a multi-lane road. Further development should be set back far enough to allow for six lanes instead of four.

**8. Message**
Rt. 221 is an extremely dangerous road. As you know, it has numerous businesses, and the speed limit is 45 m.p.h. People travel at much higher speeds, and cars are continuously coming into the flow of traffic from the local businesses. It seems to me that the speed limit needs to be reduced by at least 10 m.p.h. In addition, perhaps a greater police presence would be helpful if speed limits were enforced. Another BIG problem with 221 would be the passing lines. The passing zones are EXTREMELY dangerous in that cars pass when it is not safe to do so, and other drivers don't let cars back in - or they can't let them back in. It is a serious situation, and it needs to be addressed. Furthermore, the entrance to the new Kroger (by the gas station entrance) is very dangerous. It would be very helpful if a light was put in at that point. Thank you for your consideration of these comments.

**9. Message**
221 is heavily congested and dangerous. Areas for concern- 1. Traffic light at Cloverhill is unnecessary 2. Eastbound and Westbound traffic near Graves Mill Shopping Plaza is frequently heavily congested due to poorly designed turn lanes, ill-timed traffic lights,

and reckless driving. 3. Eastbound lanes approaching the intersection at 501 near the Hess station are frequently backed-up as the right-turn lane is inadequate in length 4. Traffic light at Forest Brook is extremely hazardous, as traffic entering Lakeside and turning left near the News-Advance will often block all lanes of traffic. Overall, the entire corridor is not equipped to handle current traffic needs and is a safety concern.

**10. Message**
First, the speed limit of 45 mph at Graves Mill Shopping Center is exceedingly dangerous. No vehicle should be coursing through that heavily -trafficked area at such a fast speed. Second and even more dangerous is the flow of cars making a right turn from Enterprise Drive onto 221 northbound. The cars rarely yield and often-times feel they have the right-of-way despite a red light. Cars travelling toward Lynchburg have to slow and yield even though they have a green light. The cars on Enterprise Drive should be REQUIRED to come to a complete stop. I travel this route many times a day and should not have to submit my passengers to these hazards.

**11. Message**
The addition of designated walking/bicycle lanes would be beneficial and offer safer access for residents and business clientele in the area. A reduction of congestion would certainly be welcomed.

**12. Message**
Stop the terrible speeding. I go 45-50 mph and the traffic speeds by me. Perhaps raise the speed limit and then ENFORCE IT.

**13. Message**
We live on Rt. 221. The main problem we witness is excessive speed - a huge portion of drivers exceed the speed limit by a large margin. Intersections are a major problem, especially caused by those running red lights.

**14. Message**
We need turn lanes at the library and the dump. We need signs for slower traffic to keep right.

**15. Message**
Unnecessary stop lights are causing congestion. 2 in particular seem to have very little cross traffic and accomplish nothing other than traffic congestion and the resulting decrease in safety. These are at Cloverhill Blvd and Rustic Village. The light at Cloverhill is particularly dangerous because of the often slippery downhill bridge lane immediately before the light. This intersection should be closed and the meager traffic from Cloverhill Blvd rerouted to Ambassador Dr and/or Newcomb Blvd which already have turning lanes and a stoplight would not be necessary. Barriers should be placed to prevent left turns into the bank entrance and the bank should be encouraged to build an entrance opposite Newcomb Blvd.

**16. Message**
I have traveled Rt. 221 for over 40 years as well as many other streets similar to the one in this study. I believe that adding basic street lighting similar to the lights on the new Rt 460 corridor near the Lynchburg Airport would be a tremendous safety asset especially for night driving on this route. I think cruelty the road passage is too dark especially at night, making the side streets, businesses, curbing, sidewalls, extremely hard to see and recognize for the speed limits posted on that section of roadway.

**17. Message**
I have traveled Rt. 221 for over 40 years as well as many other streets similar to the one in this study. I believe that adding basic street lighting similar to the lights on the new Rt 460 corridor near the Lynchburg Airport would be a tremendous safety asset especially for night driving on this route. I think cruelty the road passage is too dark especially at night, making the side streets, businesses, curbing, sidewalls, extremely hard to see and recognize for the speed limits posted on that section of roadway.

**18. Message**
I have traveled Rt. 221 for over 40 years as well as many other streets similar to the one in this study. I believe that adding basic street lighting similar to the lights on the new Rt 460 corridor near the Lynchburg Airport would be a tremendous safety asset especially for night driving on this route. I think cruelty the road passage is too dark especially at night, making the side streets, businesses, curbing, sidewalls, extremely hard to see and recognize for the speed limits posted on that section of roadway.

**19. Message**
As a daily commuter on the 221 corridor, I would like to suggest three main bottlenecks and problem areas for further study. These three areas are mentioned below and these comments are based on the morning commute. (1) Traffic attempting to change lanes from left to right to prepare to turn from 221 to Graves Mill Road causes problems in front of the Graves Mill Center. The right turn lane is not well defined in this area and traffic attempting to enter the shopping center from 221 can be problematic, especially when some drivers stop to allow them to cross and others do not stop. I see several potential accidents from drivers exiting McDonalds onto 221 in this area also. (2) After Enterprise Drive (morning commute), there is a large number of lane changes that happen as drivers try to poisition themselves for the right turn behind the shopping center, bypassing the intersection at 221/Graves Mill Road. (3) Along Graves Mill Road, there is a problem when the center turn lane stops and vehicles clog the left travel lane waiting to turn left into Forest Dental Center. Under normal conditions, this would not be problematic, but combined with driving habits and heavy traffice volume associated with the morning commute, this is a receipe for disaster. Finally, a couple of general observations: (a) The 45 mph speed limit seems unsafe in the congested area between Enterprise Drive and Graves Mill Road. There are a large number of driveway entrances and uncontrolled intersections in this area. (b) There are a large number of entrances/exits from the Graves Mill Road Shopping Center, leading to many drivers being surprised by people turning or stopping to leave 221/Graves Mill Road and others entering 221/Graves Mill Road. Surprises equate to crashes when drivers are following too close or exceeding

the speed limit. Thank you for the opportunity to contribute to the study. Please reply with questions for need for clarification.

**20. Message**
Need to find a way to slow down traffic. Since 221` went to 4 lanes in Forest cars are doing 55 + MPH and it is not designed for that speed. Its not a by-pass but a local road with business and homes off it.

**21. Message**
slower traffic needs to keep right,its the law,place signs,enforce impeding the flow of traffic,by educating,warnings..move Kroger outlet north near electrical substation,to improve sight distance,slower traffic is the main problem people get mad and dart in and out,by keeping right the flow will improve and speeders will be easier to pick out,,thanks

**22. Message**
bike lane Bike Safety

**23. Message**
Looking at data there are way to many accidents on 221. It is way to dangerous for bicyles or people walking on 221. This should be treated like the Lynchburg Expressway. There are also to many turn offs and entrances to 221. Also could think about doing away with right turn on red and only have turns with protected arrows. Need som way to get money into the VOLUNTEER Fire and Rescue Depts that have to respond to all these crashes.

**24. Message**
Enforcement of the speed limit would make this road safer. Most drivers travel at 10 to 15 MPH over the 45MPH posted limit.

**25. Message**
Increased police both county and state running radar, along with ticketing drivers that are hazaedous driving. Lane changes, just reckless driving. Having the lights timed better during peak times to create a better flow. The turn lane going toward Lynchburg from Forest at BB&T down to Suntrust is one of the worst place of Rt 221. Seal all exits and create one turn lane and take advantage of the current traffic lights to enter the shopping center. As a rescue squad member I can't tell you how many crashes I been to in that area. Lastly the Enterprise Dr, Rt 221 intersection is a very screwed up pattern , we have a pattern that allows R turn on red in the lane closest to Walgreen but the second lane is not a R turn. People pulling out on the redlight. BAD planning. THE NO TURN SIGN IS TO SMALL, or maybe most people need eye wear to see the sign. Lastly, I truly belive that if more people are ticketed for traffic infractions the less crashes that would occur. The sheriff dept is out there ,just not enough of them, hire more police On a lighter note, Route 221could be renamed "The Forest Road 500"

**26. Message**
The Graves Mill Plaza has bushes that are terribly placed along Graves Mill Rd. When

one pulls out of the plaza onto Graves Mill Rd., it is pretty much a blind exercise. I cannot understand for the life of me why those bushes are allowed to be in the location they are.

**27. Message**
Red light cameras especially at Graves Mill/Forest Rd, Cottontown/Forest Rd. and Enterprise/Forest Rd. It is amazing the number of vehicles who disregard the red lights. Speed cameras all along the corridor, and perhaps permanent roadside speed indicators - i.e. "Your speed is XX mph." Overall more comprehensive enforcement of existing laws - stop signs, turn signals, speed limits. It is a rare occasion when a law enforcement presence is noted. Stricter enforcement of cell phone usage and texting. On average, 30 to 40% of the drivers at the intersection of Enterprise and Forest Rd are actively using a cellular device. Coordinating signal lights is a waste of money and effort if drivers simply ignore them.

**28. Message**
We need a traffic light at the entrance to our Forest Dale subdivision. During rush hour traffic it is a nightmare trying to get in or out of the subdivision .Forest Dale Drive is the only way to access/exit the entire subdivision.

**29. Message**
You must synchronize the signal lights from the intersection of 501/221 through Perrowville Rd/221.

**30. Message**
I travel 221 between highway 811 and the lynchburg expressway daily for work. Accidents are frequent along this stretch during morning and afternoon commutes. Left turns out of businesses into the turning lane seem to major cause of accidents. Also, the 45 mph speed limit is too high from enterprise drive to the expressway.

**31. Message**
TRAFFIC LIGHTS !!!! I travel from Route 811 to Old Forest /221 intersection. The traffic lights need to be working so they do not stop traffic flow when NO ONE is waiting to enter onto route 221. Gristmill is the worst!!! Stops you for no reason (nobody waiting to come onto 221!! I don't know if they are on sensors or timers or what, but they are wacky

**32. Message**
My biggest concern is the number of cars that "run" the traffic lights at the corner of route 221 and Cloverhill Blvd. I have repeatedly had "near misses".

**33. Message**
Plans need to include bicycle lanes. You have a college and a large apartment complex on this road just outside of the study area in the city. I have often encountered bicycles in this area and there is no shoulder to ride on. With the proliferation of both shops and student population in the area bicycles will also be increasing.

**34. Message**

My concern with the 221 safety is that residents of Maple Hills have a very hard time making a left hand turn onto 221. It's very dangerous. Now we have the turn lane into Woodberry Square that makes it dangerous to make a left off of 221 into Woodberry Lane. There is going to be ahead on there in the turn lane.

**35. Message**

The lines in 221 are very poorly painted, without glass beads in the paint and they become invisible when it is dark and raining. I drive 14 miles everyday from Lowry to Forest.

**36. Message**

Enforce the speed limit. People speed, run red lights, cut you off. What we need is more police presence early in the morning and early evening during rush hour traffic.

**37. Message**

The stretch of Rt. 221 between Enterprise Dr. and Graves Mill Rd. needs the most attention when it comes to safety improvements. The congestion is compounded by traffic trying to enter and exit existing businesses along this stretch. Rt. 221/Lakeside Dr & Old Forest Rd are becoming more congested as additional shopping centers emerge along these corridors. Currently, entering the Fresh Market shopping center is fine from Old Forest Rd. However, to exit from that direction involves crossing two lanes of traffic without benefit of a middle turning lane to allow a vehicle to advance halfway across Old Forest and wait for traffic to clear. Lakeside Dr. is more congested and will continue to become more so with new restaurants and shops opening. Expanding this portion from 2-lane to 4-lane would relieve existing and future congestion. Thank you for allowing those of us who live off of and travel Rt. 221 on a regular basis the opportunity to bring these issues to your attention.

**38. Message**

Catch speeders going 10 or over. Add stoplight at Kroger. Fix turn lane light at Pebo's gas station. It turns on when no one is turning. Even at 5 in the morning. Sheetz light changes through all signals sometimes when no one is around (everytime it rains.) Expand turn lane at intersection heading into Wyndhurst. Old people and idiots will stop in the traveling lane to get into the turn lane. It's like the yellow middle turning lane is lava and must be avoided. Seriously. get. into. the. turning. lane! Also, coming out of Wyndhurst. If turn light is red it means stop. Not quickly inch out to scare people going straight. Stop then turn. Not zoom out and say oops.. sorry.

**39. Message**

Before undertaking any work, I feel a police presence would greatly reduce the number of traffic accidents. Drivers speed 10 to 15 mph over the speed limit with aggressive drivers swerving across lanes. I have NEVER seen one police officer, either city, county or state, along this stretch of road. Before spending money to rebuild the road, try enforcing the safety laws first!

**40. Message**
Without an overpass at the 501/221 intersection there will never be any improvement in traffic flow nor opportunity for any more development.

**41. Message**
I have a main concern with the stoplight at Bank of the James. I work there and am constantly seeing people running red lights! I know if I had pulled out a few times I would have gotten slammed. Not sure what to do, the road is congested and people nowadays won't slow down, if you don't go 60 out there they run you over, stay on your car until you get over, speed up or turn off. I've gotten hands thrown up at me, the finger, I can see people saying things to me all because I'm in the left lane going 50!! It's crazy. We also need better exit ramps at intersectons. I really wish the police would be out there in unmarked cars for at least a week to observe so they can see....Thanks for listening to me!

**42. Message**
The intersections with stoplights need to be lit at night the same way the intersection of Rt. 811 and Bateman Bridge Road are. They would better mark the intersections at night as the traffic approaches. I live near and travel on this road and many people run the stop lights.

**43. Message**
There are several places along 221 (Forest Road) where signs (temporary and permanent) block the vision of drivers leaving business parking lots. For example, the Jiffy Lub sign plus a curve in the road blocks the vision of drivers leaving Jiffy Lub. Drivers leaving the Good Will store sometimes cannot see well when entering Forest / 221 because of the signs in front of Father's Table Cafe. There are other places where drivers need to pull out into traffic without getting a clear view of traffic on 221 / Forest. Thank you.

**44. Message**
We currently live in Forest Dale Subdivision. Approx. 70% of day very unsafe to make a left out of subdivision heading west due to heavy traffic both ways. Lights east and west are not timed to allow opening to get out. If west bound traffic clears, east bound traffic is heavy not allowing a west exit without danger. Same with east bound traffic being clear, west bound is heavy. We majority of time make a right going and proceed behind Express Lane store to use traffic light at BBT Bank to go west.

**45. Message**
We need a traffic light at the corner of Wayne Dr and Rt.221. The hill blocks your view when making a left turn onto 221. Also, when the car dealership across the street opens again, the left turn lane that everyone pulls into while making the turn will be a sight of more head on collisions than it already is. We have had a number of accidents and near misses. The intersection of Rt 221 and Graves Mill Rd. is a mess. Since the shopping center has internal roadways several entrances/exits should be closed off. Drivers should go to the lights to enter and exit the center. The current configuration encourages poor decision making and multiple accidents that could be prevented. On Rt. 221, in front of

Walgreens, there is a Walgreen entrance that allows drivers heading towards Lynchburg to turn right off 221 into Walgreens. Drivers heading towards Forest do a U-turn from the turn lane for Enterprise Dr. to go to Walgreens rather than go thru the light and turn off of Enterprise. Good luck! Thank you for allowing me to make suggestions. We were sued for $750,000.00 for a fairly minor accident at the corner of Wayne Dr - I work at Backstitches and I hear the brakes and horns, and see the near misses all day long.

**46. Message**
1) A traffic light at the entrance to the Forest Kroger Store and/or the Forest Square Shopping Center is needed. 2)The speed limit from Forest Middle School to the intersection of Old Forest Rd. should be reduced to 35 mph.

**47. Message**
My biggest safety concern is the large flashing signs in a very high traffic area that distract drivers attention. Think about it, I'm going to take my eyes off the road at Enterprise drive to read a sing meant to improve safety? Wow, special.

**48. Message**
The speed limit on 221 should be lowered between Cottontown Rd & Perrowville Rd. to 35. With businesses on both sides of the road and only one turn lane. The sign at intersection at Enterprise Dr. & 221 that says no right turn from this lane (left lane, right turn) should be made larger or taken down since it is ignored. Install traffic camera to ticket those who ignore lights & signs.

**49. Message**
There should not be a turn lane leading to the Graves Mill Center- I have seen several accidents where the inside lane stops to let someone cross 3 lanes of traffic only to be hit by a car driving in the outer most turn lane. It is crazy. A fixed median needs to be along that line and only have turns at the intersections into the shopping center.

**50. Message**
I live in Maple Hills off route 221. Many times during the day it is almost impossible to turn left onto route 221 (west). This is caused most of the time by traffic backing up at the light at Hawkins mill road and the CVS. At meal time, with the traffic associated with the Subway restaurant, I see many drivers taking unnecessary chances. This used to happen in Lynchburg on Fort avenue at the intersections with Perrymont and Toledo. Additional lights addressed the problem and there was a lot less traffic involved.

**51. Message**
The study is certainly needed. One of the worst problems from end to end is people running red (not even yellow) lights, especially noted at our street: 221/Cloverhill Blvd. Cameras would be good, but will probably not pass through the Bedford or Lynchburg councils. Thanks. rkj

**52. Message**
Thank you for working to coordinate lights through this area in both directions and at all times. When traveling north towards Lynchburg, the light at Enterprise might be given more time. I note that I usually stop there when heading to work in the 7 am range. Heading home to Forest ( south bound) I will comment that the light at Cloverhill was poorly placed, being directly south of the bridge. I imagine this light was placed for the convenience of particular resident of that subdivision. It should have been placed at Ambassador instead. It backs up traffic that has just gotten up to speed from Enterprise and I imagine is a source of rear end collisions over the crest of the hill. Thank you for taking my comments.

**53. Message**
I think there may be too many driveways opening up to those sections of road. It is very hard to get in and out of McDonalds and Fiesta Tapatia. Their main points of entry are not at lights where ingress and egress are safest. Closing those openings and directing traffic to the light controlled areas would help flow. Regarding 501 and 221 by Billy Craft Honda, It would be better for everyone if the expressway extended over lakeside and old forest and was a direct rout. Those intersections could be clover leafs like fort. Intersecting an expressway and a major road like 221 with a light is problematic. It is only going to get worse as businesses build up there around Fresh Market.

**54. Message**
I've lived off Maple Hills Dr. For 23yrs. And what I haven't seen is anyone getting ticketed. What this area needs is for the city and Bedford to patrol it and hand out some hefty tickets.. Every day I see people driving 10-15 miles an hour over the limit and weaving in and out of traffic,and trying to run over the person who is driving the speed limit. This is a big part of the problem. Thank you.

**55. Message**
Rt 221 has become very dangerous to travel. There are three things that come to mind. If you are traveling from Old Forest Rd to 221 and you are looking to make a left on Enterprise drive, busy street with YMCA, there are two turning lanes but one lane is not quite as long as the other. This creates havoc there is no reason for the other lane not to be as long as the other lane so that there would be enough room for those wanting to make a left. Then if you continue down the road, making a left onto Thomas Jefferson 811 is an absolute nightmare. That lane is not long enough to hold the volume of traffic that turns left there at 5:00 pm at night and I am sure other times. Cant that turning lane be extended? Then this I think is going to continue to get worse. All along the busy part of 221 Graves mill to past eneterprise there is one turning lane, so those that want to turn left or right are runnging into each other. Its hard for me to explain but if I am coming from old forest and I want to make a left into Food lion but someone is coming from 811 and they want to make a left into Amy's nails there is one turning lane for both of us to use and we are going in opposite directions.

**56. Message**
Traffic flow is pretty good. One issue is the school bus stop at Gables Dr. Bad spot. Sometimes the kids take a while to get on/off the bus. Westbound traffic gets backed up to the point that cars & trucks coming over the hill there have little warning that cars are stopped for the bus ahead of them.

**57. Message**
Enforce speed limits and tailgating laws to lower accidents. People ride your bumper at 45 when traffic lanes are heavy in both lanes and weave in and out of traffic in the hopes of saving a minute. End result more accidents. Just my 2 cents worth. You can send a lot more and get less results. Thanks for the opportunity to participate.

**58. Message**
Enforce speed limits and tailgating laws to lower accidents. People ride your bumper at 45 when traffic lanes are heavy in both lanes and weave in and out of traffic in the hopes of saving a minute. End result more accidents. Just my 2 cents worth. You can send a lot more and get less results. Thanks for the opportunity to participate.

**59. Message**
Rt. 221 from Rt. 501 (Billy Craft Honda) to Wyndhurst is a dangerous stretch of highway. However, as a cyclist, it is biked regularly, primarily in the summer. The addition of "Share the Road" signs would be helpful. Implementing bike lanes would be ideal to ensure our safety due to the heavy traffic.

**60. Message**
Lynchburg just needs 221 to be 4 lanes. Too much traffic and development for 2 lanes. Build for future not just for a temporary period

**61. Message**
I travel this area every day going to work in the Lynchpin Industrial Park. Traffic is very congested. Adding the Fresh Market shopping center has increased traffic. It is a regular thing to see people run through red lights to keep moving. Please consider making improvements to traffic flow before further development takes place. Don't create another Wards Road.

**62. Message**
It gets pretty bad before you get to Walgreen's if you want to get to 29 from graves mill road. No way to get over there

**63. Message**
First, I want to thank you for this safety improvement study. I have lived at 17559 Forest Rd for 44 years and watch what at that time I considered the boonies grow into a small major city in regards to traffic and population. One of my major concerns is when I try to come out of my driveway no matter what time of day, if I am going right toward Lynchburg sometimes I can get a break other times I am taking a chance. But if I need to go left toward Forest, the majority of the time I have to take a right go the Jiffy Lube turn

around in their drive and then head toward Forest. If I am coming home from Lynchburg, I will move to the center lane just as I pass Jiffy Lube while giving my left hand signal only to have traffic move in behind me thinking I am going to Enterprise. When the five lanes were first completed the start of the turn lane was right in front of my drive, since the repaving and painting of the lines the turn lane did move a little pass my driveway but that still does not stop people from moving into the center lane before they should. We just thank God we have not had a major accident. Now with the apartments almost done and people will be moving in my chances of exiting or entering my driveway will be even more of a problem.

**64. Message**
I live off 221 near graves mill center it is my option that the road is constructed well and needs in improvements . The residents do not need to bothered by construction delays save the mony for a worthwhile project

**65. Message**
I have lived out in Forest over 20 years and have volunteered as a Firefighter for 25 years in Forest, the changes to Forest Road that I see area's of improvement would include, we need to reduce the number of areas that you can cross over and turn to either side of the road way. We also need to improve the middle turning lane, as that is what is for not an additional driving lane. The stop lights need to flow better, there are times that I have sat for 4 to 5 cycles trying to turn left on Forest Road from Graves Mill, we need to improve the flow coming out of Lynchburg into the County. I am fearfully by placing a bike lane on Forest Road, there are just to many distraction for drivers on the busy roadway to have to contend with cycles. I would rather see those folks travel secondary roadways. Thanks,

**66. Message**
I would install barriers between lanes and not all left hand turns except at lights

**67. Message**
My family lives off 221 on Mayfield dr. It is getting unsafe to turn in/out of Wayne drive. I have almost been hit head on multiple times in the center turn lane trying to turn from 221 on to Wayne drive by people trying to turn into Auto extras including a semi. Very scary. It is also difficult when you have people darting over in that lane right in front of you to turn in to Beacon. It's near impossible to get out during rush hour. There really needs to be a traffic signal and/or restructuring of the turn lane since it is at a crest of a hill.

**68. Message**
My husband and I travel the Rt 221 corridor daily and have done so since the early 1990s, when it was still 2 lanes. We live in Homestead Haven, Bedford County. I am appaled by the number of vehicles, including school busses, that run the stoplights all along this section of road. If I could have 2 wishes, it would be for stoplight cameras that would result in tickets for these drivers. The second wish would be some way to discourage drivers from using Bateman Bridge/Homestead for a fast cut through to and from Rt 811 so they can briefly avoid Rt 221. The road into our subdivision is so dangerous that I will

no longer risk riding a bicycle on the 2 lane road that runs through my neighborhood, even well after the school and business day has begun. I worry that some day some engineer who has never been here will decide to straighten out Bateman Bridge and Homestead, making it faster and hence much more dangerous. Sirens on rescue vehicles racing to wrecks are audible at least twice a week in the morning, and less often, evenings. My husband has to cross Rt 221 from Enterprise to Vista Centre get to work. Much too often he tells me, "I nearly bought it again today. Some man (or woman) ran the light again;" or they turned from the wrong lane, turned into Walgreen against the "Do Not Enter" sign, cut off other drivers, or were speeding. There is virtually no police presence here. I realize the police force is spread thin, but in this stretch of road where Bedford County, Campbell County and Lynchburg city come together, it actually appears that none of those agencies will take ownership of this problem area. Technological solutions like cameras make sense here, along with slower speed limits and perhaps coordinating lights to smooth out the flow of traffic.

**69. Message**
There needs to be two "No Left Turn After Green Arrow" signs hanging at the signal light at the intersection of Forest Rd and Cottontown Rd. ( It's a no brainer and it can't be that hard or expensive to do) There's way too many accidents at this intersection from reckless people trying to beat the on coming traffic to make left turns onto Cottontown Rd and left turns into CVS. I know nothing will be done, but at the very least it gives me a chance to vent. For that I am extremely grateful.

**70. Message**
Our concern is with the amount of people who run the light when it turns red on 221 - coming out of Cloverhill Blvd this has happened many times and we now make sure even though we have the green light we always look both ways - cause speeding cars always come from both directions - someone is going to get killed there. Also concerned about the addtional traffic the The Gables At Spring Creek will create especially if it has an entrance on Cloverhill because coming around the corner from 221 it will cause rear end crashes to those turning into the road to the apartments. There is a lot of backup traffic around 8 am from Walgreens back to Cloverhill and 221 - the turn lane onto Enterprise is blocked every morning so traffic doesn't move well.

**71. Message**
221 from Cottontown Rd. to Enterprise Dr. is very congested during most business hours. There are a lot of traffic signals that slow traffic considerably and too much commercial activity requiring cars to slow down and turn off. It's very inconvenient driving to and from Bedford having to pass through this area.

**72. Message**
I've just moved back to Lynchburg and it takes me at least 5 to 6 minutes to get out due to the amount of traffic on this highway. And sometimes I have to go the obosit way just to get on the highway

**73. Message**
I suggest that the speed limit in the busy area from Enterprise Drive to Cottontown Rd. be reduced to 35mph

**74. Message**
wayne dr traffic volumer update

**75. Message**
I think that this study needs to also take into account the heavy traffic flow on SR 811 with the back ups. There seems to already be unused stoplights already in place at some of the intersections from poplar forest to waterlick. Many trucks use this route. It should not take me 30 plus minutes to go from 460 in New London to just past Billy Craft Honda in the city.

**76. Message**
I utilize 221 to get from Forest to Roanoke. I switch to route 460 in Bedford. I would love it if this were made I to a four lane hwy instead of a two lane hwy. inevitably I be some stuck behind a very slow driver with almost no opportunity to pass.

**77. Message**
Need both Graves Mill lanes to allow left turns onto 221 toward Forest. Now, people jockey around cars in left lane (who are stopped trying to turn into Food Lion) and that is dangerous. The Graves Mill right lane should allow left, straight or right turns. Currently that lane allows only straight or right turns.

**78. Message**
Center lane (turn lane) is dangerous. Drivers use it as a speed up lane to enter into the traffic flow and do not look ahead for drivers in the lane trying to make a turn. Not enough stoplights. Speed limit of 45 mph is excessive...needs to be lowered. Law enforcement needs to ticket drivers that exceed the speed limit and also run red lights.

**79. Message**
A number of the issues along this corridor are due to lack of enforcement of cell phone and texting drivers and running of red lights. I came from the Baltimore/DC area and have never seen the red light running as bad as here. I have a new young driver in the family and our first point of safety is to wait after a light turns green, two or three cars are going to run through. I think the traffic light adjustments at 501 and 221 had made an improvement. We need red light cameras at most intersections.

**80. Message**
A turning lane to the Bedford County Recycle center next to Aylors would be a great help. It slows morning traffic and could be a traffic hazard. Best wishes in your endevour!

**81. Message**
In the 5 seconds it take to read the two non-traffic related flashing state signs flashing this

survey each car travel 330 feet...while not focused on actual traffic or road conditions. and you elected to install them near highly congested intersections. Please discontinue such deployments in the future. 211 is fine except for the new Goode intersection design, which will lead to further accidents. thank you

**82. Message**
I live in Forest all my life and 221 has been my daily commute route since I can remember. The changes on 221 have came slow, infact not fast enough. The adding of four Lane from the Lakeside Drive area to the Forest Road has brought more traffic some good and some bad. I still deal with traffic issues coming home between 4pm & 7pm. I have a solution and examples of other areas in Virginia I have had the pleasure of traveling through, area such as Midlothian Va, Tysons Corner and Fairfax Va. Their Road have six to eight lane the business sections to help the ever growing traffic concerns.With better street lighting like signs and traffic signals, Upgrades to 221 are very vital to the Forest Community, it will bring more jobs and other opportunities to our area. I Graduated from Jeffers0n Forest High School in 1996, I remember a small two lane road from Bedford to Forest until you got close to the Former Greenstone sight. A lot of change and growth has been made since that time, But 221 has not gone through the Major Upgrades proposed in the early 2000's, For example extended the four lanes from Lynchburg through Forest until it reach the intersection Of Independence Blvd in Bedford Virginia. Inconclusion to you from a Born and raised Forest resident, 221 is a major highway and popular road that needs improving. Thank you!!

**83. Message**
Change the speed back to 55 where it used to be! You straightened it, widened it, flattened it and changed the speed from 55 to 45??? Then the state and Bedford boys spend all their time collecting revenue on it! Thanks!

**84. Message**
Intersection of 221 and Forest Dale. Very difficult to turn to left. Many people drive into the turn lane and await an opening then merge with traffic. This also occurs in the other direction from the various businesses located there. Sometime I enter traffic when there is even a small break - or wait for up to ten minutes.

**85. Message**
Intersection LOS Summary doesn't show intersections 8, 9, or 10 from the Intersection Volume Summary. As I travel this road daily the timing of the traffic lights would ease congestion if you didn't have to stop at every single light from Lynchburg college all the way to Kroger in Forest. Timmy the lights for drivers that travel at speeds of 40 mph instead of 45 mph would ease congestion greatly. Also increase the size of the speed limit sign. The 45 mph sign on Lakeside dr is bigger than the sign on Rt 221. Also put a slower traffic to the right sign up to help those who actually pass other drivers in the correct lane ( the passing lane)

Route 221 Corridor Safety Study – Summary of Comments Received via Comment Forms or Via Email

1. Pedestrian walk-ways from one side of 221 to the other (at major roads/stoplights) in areas of shopping.
2. Sidewalks or something for bicycles.
3. Trails or narrow strips of land.
4. Cross connections to take traffic off of Route 221
5. Desparately need a traffic signal at intersection of Walden Pond/Lakeside Drive
6. We need a traffic light at Weeping Willow Drive and Lakeside Drive. I take the #32 bus which lets me off on othe other side of the street. It is terrifying to try to cross Lakesiide Drive because the cars and trucks are driving so fast in either direction. Please help us get a light.
7. Please look into letting us have a traffic light [at Walden Pond/221]. I am very concerned about a tragedy happening at our entrance. It is very important to the residents here to have a safe entrance and exit. Thanks you in advance for your attention.
8. The study team should know that the traffic light is very important to the people at Waldon Pond. Not only the resident at Waldon Pond but you have to wait 15-20 minutes before you can get out. People are at risk because they pull out in front of other cars which cause an accident. If there is an emergency and the ambulance can not get out this could be a matter of life or death, with the new Kroger store coming the traffic will be double to what is is now. We have school buses coming into Waldon Pond and they have to wait on the heavy traffic to get out. Yes we do need the traffic light at Waldon Pond. We would appreciate you to make this a safer road for all.
9. I have been a resident of Waldon Pond Apartments, Lakeside Drive, for 22 years. There are approximately 1200 residents now. Traffic on Lakeside Drive has increased unbelievably and has become a traffic bottleneck. Please consider a traffic light at this location before there is a serious accident (Route 221). A light at this entrance of Weeping Willow Drive and Lakeside Drive is greatly needed before someone gets hurt.
10. It seems that a lot of people dong know road rules about turning in a 2 lane road to stay in same lane. Its an issue coming onto Graves mill exist to left on Graves mill Road.
11. Yes, we need sidewalks at a minimum from high density apartments toward schools and grocery stores. The strip from Mill Race towards Forest to end of Graves Mill to Forest Road/221 is dangerous from 5 to 6:30PM. Bike Lanes – no money to pay for them but they are needed for safety and alternative transportation. Start with Schools – sidewalks and bike lanes.
12. Lights need to be synchronized. Sidewalks are needed in certain areas. No bicycles – too dangerous. Area is getting very commercial try traffic signals instead of lights.
13. Improved signal coordination, enforce the red light running, enforce speed limit on lower speed limit. Do not create through-way express 5th St. – 221. Bicycle lanes on pedestrian sidewalks unnecessary dangerous and low percentage, unsafe.

# Appendix B City Planning Commission Resolution

## RESOLUTION OF THE LYNCHBURG PLANNING COMMISSION

WHEREAS: The Region 2000 Local Government Council and Central Virginia Metropolitan Planning Organization in partnership with Bedford County and the City of Lynchburg seek to improve the safety of the Route 221 Corridor.

WHEREAS: The study limits would extend from Cloverhill Boulevard in Bedford County to Forest Brook Road in the City of Lynchburg.

WHEREAS: The purpose of the study would be to identify and document opportunities for safety improvements, congestion reduction and multimodal accommodations in the corridor.

WHEREAS: Opportunities may exist to improve access management, geometric modifications to key intersections, traffic operations improvements and the addition of pedestrian, bicycling and transit access.

WHEREAS: The purpose of the study is consistent with the goals and objectives of the City of Lynchburg's *Comprehensive Plan.*

NOW THEREFORE BE IT RESOLVED by the Lynchburg Planning Commission that in order to promote the public necessity, convenience, general welfare and good zoning practice the Planning Commission does hereby initiate, will consider and directs City staff to participate in the preparation of the Route 221 Safety Improvement Study for inclusion in the Transportation Element of the City of Lynchburg *Comprehensive Plan.*

Adopted: January 8, 2014

Certified: _____

Secretary, Lynchburg Planning Commission

# Appendix C Implementation Analysis Reports

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation
Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | |
|---|---|
| UPC #: | |
| Receive# | |
| HSIP file | |
| Initiate Date | (for office use only) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | | | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | 2-Rural Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study SHORT TERM IMPROVEMENTS: S-1 Install Roadway Lighting Enterprise Dr. to Graves Mill ONLY | | | | |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 6 | | 6 |
| | B=3 | 2 | 5 | 1 | 0 | 0 | 0 | 2 | 0 | 10 | | 10 |
| | C=4 | 19 | 10 | 0 | 0 | 0 | 0 | 5 | 0 | 34 | | 34 |
| PDO | PDO | 32 | 37 | 0 | 0 | 0 | 0 | 4 | 0 | 73 | | 73 |
| | Total | 54 | 53 | 1 | | | | 15 | | 123 | | 123 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

**Traffic Data (Inter.)**

| Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 0.02 |

**Traffic Data (Section)**

| Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section Length (Mile) | | 0.67 | | | | | 0.67 | | 620.94 | | |
| Average AADT | | 27000 | | | | | 27000 | Lane Width (ft) | Critical Rate (Section) | | |
| Number of Lanes | | 4 | | | | | 4 | | | | |

**Improvement Action**

Number of Improvements: 1 — Discount Rate: 3.0%

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Roadway Lighting | 20 | 0.05 | 0.05 | 0.05 | | $ 160,000 | $ 670,000 | $ 55,789 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 20 | 0.05 | 0.05 | 0.05 | Total Initial Cost | $ 830,000 | | $ 55,789 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 85,950 | 1.24 | $ 106,506 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 55,789 | $ - | $ 55,789 |

**B/C= 1.91**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 6 | 0.10 | $ 275,000 | $ 27,500 |
| B | 10 | 0.17 | $ 98,000 | $ 16,333 |
| C | 34 | 0.57 | $ 55,000 | $ 31,167 |
| PDO | 73 | 1.22 | $ 9,000 | $ 10,950 |
| Total | 123 | 2.05 | | $ 85,950 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) _____ Signature _____ Date _____

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***
***Attn:* HSP Improvement Proposal**
Mr. Raymond Khoury , P.E.
State Traffic Engineer
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

***Counties, Towns and Cities:***
*County, Town and City Staff are requested to submit proposed improvement forms and supporting documents through the VDOT District Local Assistance staff for concurrence and a project sponsor. VDOT staff should obtain concurrence from District PE Managers and PIMs to assign a sponsor.*

(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.
(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | | | | | |
|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | 2-Rural Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study SHORT TERM IMPROVEMENTS: Combined S-3 Increase Speed Enforcement; S-13 Signal Update & Coordination | | | | |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | | 11 |
| | B=3 | 11 | 15 | 2 | 0 | 0 | 1 | 1 | 0 | 30 | | 30 |
| | C=4 | 45 | 22 | 1 | 0 | 0 | 4 | 6 | 0 | 78 | | 78 |
| PDO | PDO | 89 | 93 | 0 | 0 | 0 | 5 | 22 | 0 | 209 | | 209 |
| | Total | 151 | 135 | 3 | | | 10 | 29 | | 328 | | 328 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

**Traffic Data (Inter.)**

| Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 0.02 |

**Traffic Data (Section)**

| Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section Length (Mile) | | 2.97 | 0.93 | | | | 3.9 | | 357.24 | | |
| Average AADT | | 27000 | 16000 | | | | 21500 | Lane Width (ft) | Critical Rate (Section) | | |
| Number of Lanes | | 4 | 2 | | | | 2 | 12 | | | |

**Improvement Action**

Number of Improvements: 1 — Discount Rate: 3.0%

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Speed Enforcement $20k/yr | 5 | 0.09 | 0.09 | 0.09 | | | $ 100,000 | $ 21,835 | $ - |
| 2 | Signal Update & Coordinate | 5 | 0.15 | 0.15 | 0.15 | | | $ 600,000 | $ 131,013 | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 5 | 0.23 | 0.23 | 0.23 | Total Initial Cost | $ 700,000 | | $ 152,848 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 916,268 | 1.06 | $ 972,732 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 152,848 | $ - | $ 152,848 |

**B/C= 6.36**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 11 | 0.83 | $ 275,000 | $ 228,388 |
| B | 30 | 2.27 | $ 98,000 | $ 221,970 |
| C | 78 | 5.89 | $ 55,000 | $ 323,895 |
| PDO | 209 | 15.78 | $ 9,000 | $ 142,016 |
| Total | 328 | 24.76 | | $ 916,268 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) Signature Date

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***

***Attn:* HSP Improvement Proposal**

Mr. Raymond Khoury , P.E.
State Traffic Engineer
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

***Counties, Towns and Cities:***

*County, Town and City Staff are requested to submit proposed improvement forms and supporting documents through the VDOT District Local Assistance staff for concurrence and a project sponsor. VDOT staff should obtain concurrence from District PE Managers and PIMs to assign a sponsor.*

(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.

(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | | | | | |
|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | E-Urban Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|

**Briefly Describe Problem and Proposed Work:** Rt. 221 Corridor safety study SHORT TERM IMPROVEMENTS: Left Turn Prohibitions (left turn crashes only for reductions)

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | | | | | | | | | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | | 0 | | | | | | | 0 | | 0 |
| Personal Injury (PI) | B=3 | | 1 | | | | | | | 1 | | 1 |
| Personal Injury (PI) | C=4 | | 2 | | | | | | | 2 | | 2 |
| PDO | PDO | | 15 | | | | | | | 15 | | 15 |
| | Total | | 18 | | | | | | | 18 | | 18 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

**Traffic Data (Inter.)**

| Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 0.02 |

**Traffic Data (Section)**

| Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section Length (Mile) | | 2.97 | 0.93 | | | | 3.9 | 40% | 19.60 | | |
| Average AADT | | 27000 | 16000 | | | | 21500 | Lane Width (ft) | Critical Rate (Section) | | |
| Number of Lanes | | 4 | 2 | | | | | | | | |

**Improvement Action**

Number of Improvements: 4 Discount Rate: 3.0%

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Left turn prohibs (20~ signs) | 10 | 0.36 | 0.36 | 0.36 | | $ - | $ 40,000 | $ 4,689 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 10 | 0.36 | 0.36 | 0.36 | Total Initial Cost | $ 40,000 | | $ 4,689 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 41,160 | 1.12 | $ 45,970 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 4,689 | $ - | $ 4,689 |

**B/C= 9.80**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 0 | - | $ 275,000 | $ - |
| B | 1 | 0.12 | $ 98,000 | $ 11,760 |
| C | 2 | 0.24 | $ 55,000 | $ 13,200 |
| PDO | 15 | 1.80 | $ 9,000 | $ 16,200 |
| Total | 18 | 2.16 | | $ 41,160 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) Signature Date

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***

***Attn:* HSP Improvement Proposal**

Mr. Raymond Khoury , P.E.
State Traffic Engineer
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.

(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

***Counties, Towns and Cities:***

*County, Town and City Staff are requested to submit proposed improvement forms and supporting documents through the VDOT District Local Assistance staff for concurrence and a project sponsor. VDOT staff should obtain concurrence from District PE Managers and PIMs to assign a sponsor.*

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | | | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | E-Urban Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study SHORT TERM IMPROVEMENTS: Modify Permissive/protected to Protected only Northbound Cottonwood Rd. | | | | |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | | | | | | | | | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 2 | | | | | | | | 2 | | 2 |
| | B=3 | 1 | 3 | | | | | | | 4 | | 4 |
| | C=4 | 4 | 1 | | | | | | | 5 | | 5 |
| PDO | PDO | 7 | 5 | | | | | | | 12 | | 12 |
| | Total | 14 | 9 | | | | | | | 23 | | 23 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

| Traffic Data (Inter.) | Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1700 | 1700 | 13500 | 13500 | | 4 | | | | 0.02 |

| Traffic Data (Section) | Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Section Length (Mile) | | | | | | | 0 | 40% | | | |
| | Average AADT | | | | | | | | Lane Width (ft) | Critical Rate (Section) | | |
| | Number of Lanes | | | | | | | | | | | |

**Improvement Action**

Number of Improvements: 4 — Discount Rate: 3.0%

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Add Protected only Phase | 10 | 0.06 | 0.06 | 0.06 | | $ 5,000 | $ 5,000 | $ 1,172 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 10 | 0.06 | 0.06 | 0.06 | Total Initial Cost | $ 10,000 | | $ 1,172 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

| Project Administrated by | | Project Schedule (After STIP Approval) | Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|---|---|---|
| | | | Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 26,500 | 1.12 | $ 29,597 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 1,172 | $ - | $ 1,172 |

**B/C= 25.25**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 2 | 0.04 | $ 275,000 | $ 11,000 |
| B | 4 | 0.08 | $ 98,000 | $ 7,840 |
| C | 5 | 0.10 | $ 55,000 | $ 5,500 |
| PDO | 12 | 0.24 | $ 9,000 | $ 2,160 |
| Total | 23 | 0.46 | | $ 26,500 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) _____ Signature _____ Date _____

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***

***Attn:* HSP Improvement Proposal**

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1401 East Broad Street
Richmond, Virginia 23219

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(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.

(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | | | | | |
|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | E-Urban Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study SHORT TERM IMPROVEMENTS: Queue detection prior to Enterprise Dr Intersection | | | | |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 0 | 0 | | | | | 0 | | 0 | | 0 |
| | B=3 | 1 | 0 | | | | | 0 | | 1 | | 1 |
| | C=4 | 0 | 2 | | | | | 0 | | 2 | | 2 |
| PDO | PDO | 4 | 2 | | | | | 1 | | 7 | | 7 |
| | Total | 5 | 4 | | | | | 1 | | 10 | | 10 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

| Traffic Data (Inter.) | Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 500 | 12000 | 12000 | | 3 | | | | 0.02 |

| Traffic Data (Section) | Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Section Length (Mile) | | | | | | | 0 | 40% | | | |
| | Average AADT | | | | | | | | Lane Width (ft) | Critical Rate (Section) | | |
| | Number of Lanes | | | | | | | | | | | |

**Improvement Action**

| Number of Improvements | 4 | Discount Rate | 3.0% |
|---|---|---|---|

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Queue detect before Ent Dr. | 10 | 0.10 | 0.10 | 0.10 | | $ - | $ 20,000 | $ 2,345 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 10 | 0.10 | 0.10 | 0.10 | Total Initial Cost | $ 20,000 | | $ 2,345 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 9,033 | 1.12 | $ 10,089 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 2,345 | $ - | $ 2,345 |

**B/C= 4.30**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 0 | - | $ 275,000 | $ - |
| B | 1 | 0.03 | $ 98,000 | $ 3,267 |
| C | 2 | 0.07 | $ 55,000 | $ 3,667 |
| PDO | 7 | 0.23 | $ 9,000 | $ 2,100 |
| Total | 10 | 0.33 | | $ 9,033 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) Signature Date

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***

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(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.

(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | | | | | |
|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | E-Urban Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study SHORT TERM IMPROVEMENTS: Intersection of Forest Brook Rd with Route 221 | | | | |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 0 | 1 | | | | | 0 | | 1 | | 1 |
| | B=3 | 0 | 0 | | | | | 0 | | 0 | | 0 |
| | C=4 | 1 | 1 | | | | | 1 | | 3 | | 3 |
| PDO | PDO | 0 | 2 | | | | | 1 | | 3 | | 3 |
| | Total | 1 | 4 | | | | | 2 | | 7 | | 7 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

| Traffic Data (Inter.) | Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1950 | | 8000 | 8000 | | 3 | | | | 0.02 |

| Traffic Data (Section) | Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Section Length (Mile) | | | | | | | 0 | 40% | | | |
| | Average AADT | | | | | | | | Lane Width (ft) | Critical Rate (Section) | | |
| | Number of Lanes | | | | | | | | | | | |

**Improvement Action**

| Number of Improvements | 4 | Discount Rate | 3.0% |
|---|---|---|---|

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | inter. Mod Enterprise Dr. | 7 | 0.20 | 0.20 | 0.20 | | $ 50,000 | $ 60,000 | $ 17,656 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 7 | 0.20 | 0.20 | 0.20 | Total Initial Cost | $ 110,000 | | $ 17,656 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 31,133 | 1.08 | $ 33,726 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 17,656 | $ - | $ 17,656 |

**B/C= 1.91**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 1 | 0.07 | $ 275,000 | $ 18,333 |
| B | 0 | - | $ 98,000 | $ - |
| C | 3 | 0.20 | $ 55,000 | $ 11,000 |
| PDO | 3 | 0.20 | $ 9,000 | $ 1,800 |
| Total | 7 | 0.47 | | $ 31,133 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) Signature Date

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***

***Attn:* HSP Improvement Proposal**

Mr. Raymond Khoury , P.E.
State Traffic Engineer
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

***Counties, Towns and Cities:***

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(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.

(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | | | | | |
|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | 2-Rural Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study MID TERM IMPROVEMENTS M-1 Access Management Gristmill Drive to Graves Mill Road | | | | |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 0 | 1 | 0 | | | | 4 | | 5 | | 5 |
| | B=3 | 2 | 4 | 1 | | | | 2 | | 9 | | 9 |
| | C=4 | 15 | 6 | 0 | | | | 1 | | 22 | | 22 |
| PDO | PDO | 21 | 25 | 0 | | | | 0 | | 46 | | 46 |
| | Total | 38 | 36 | 1 | | | | 7 | | 82 | | 82 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

**Traffic Data (Inter.)**

| Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 0.02 |

**Traffic Data (Section)**

| Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section Length (Mile) | | 0.21 | | | | | 0.21 | | 1320.74 | | |
| Average AADT | | 27000 | | | | | 27000 | Lane Width (ft) | Critical Rate (Section) | | |
| Number of Lanes | | 4 | | | | | 4 | 12 | | | |

**Improvement Action**

Number of Improvements: 1 — Discount Rate: 3.0%

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Access management | 10 | 0.15 | 0.15 | 0.15 | | $ 400,000 | $ 430,000 | $ 97,301 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 10 | 0.15 | 0.15 | 0.15 | Total Initial Cost | $ 830,000 | | $ 97,301 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 194,050 | 1.12 | $ 216,729 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 97,301 | $ - | $ 97,301 |

**B/C= 2.23**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 5 | 0.25 | $ 275,000 | $ 68,750 |
| B | 9 | 0.45 | $ 98,000 | $ 44,100 |
| C | 22 | 1.10 | $ 55,000 | $ 60,500 |
| PDO | 46 | 2.30 | $ 9,000 | $ 20,700 |
| Total | 82 | 4.10 | | $ 194,050 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) Signature Date

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***

***Attn:* HSP Improvement Proposal**

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State Traffic Engineer
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

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(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.

(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | | | | | |
|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | |
| Email: | | Street Address: | | Fax: | |
| VDOT District: | | VDOT Region: | | City, State, Zip : | |
| Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | | | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | E-Urban Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|

**Briefly Describe Problem and Proposed Work:** Rt. 221 Corridor safety study MID TERM IMPROVEMENTS: Intersection of Enterprise Drive with Route 221

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 0 | 0 | | | | | | | 0 | | 0 |
| | B=3 | 0 | 0 | | | | | | | 0 | | 0 |
| | C=4 | 4 | 3 | | | | | 2 | | 9 | | 9 |
| PDO | PDO | 9 | 2 | | | | | | | 11 | | 11 |
| | Total | 13 | 5 | | | | | 2 | | 20 | | 20 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

| Traffic Data (Inter.) | Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 4300 | 4300 | 13000 | 13000 | | 4 | | | | 0.02 |

| Traffic Data (Section) | Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Section Length (Mile) | | | | | | | 0 | 40% | | | |
| | Average AADT | | | | | | | | Lane Width (ft) | Critical Rate (Section) | | |
| | Number of Lanes | | | | | | | | | | | |

**Improvement Action**

Number of Improvements: 4 — Discount Rate: 3.0%

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | inter. Mod Enterprise Dr. | 7 | 0.20 | 0.20 | 0.20 | | $ 700,000 | $ 1,300,000 | $ 321,013 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 7 | 0.20 | 0.20 | 0.20 | Total Initial Cost | $ 2,000,000 | | $ 321,013 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 39,600 | 1.08 | $ 42,898 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 321,013 | $ - | $ 321,013 |

**B/C= 0.13**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 0 | - | $ 275,000 | $ - |
| B | 0 | - | $ 98,000 | $ - |
| C | 9 | 0.60 | $ 55,000 | $ 33,000 |
| PDO | 11 | 0.73 | $ 9,000 | $ 6,600 |
| Total | 20 | 1.33 | | $ 39,600 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) Signature Date

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***

***Attn:* HSP Improvement Proposal**

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Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

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(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.

(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | | | | | |
|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | E-Urban Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study MID TERM IMPROVEMENTS: Intersection of Graves Mill Road with Route 221 | | | | |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 0 | 0 | | | | | | | 0 | | 0 |
| | B=3 | 0 | 1 | | | | | | | 1 | | 1 |
| | C=4 | 7 | 3 | | | | | 2 | | 12 | | 12 |
| PDO | PDO | 7 | 8 | | | | | 1 | | 16 | | 16 |
| | Total | 14 | 12 | | | | | 3 | | 29 | | 29 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

| Traffic Data (Inter.) | Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 6900 | 6900 | 13000 | 13000 | | 4 | | | | 0.02 |

| Traffic Data (Section) | Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Section Length (Mile) | | | | | | | 0 | 40% | | | |
| | Average AADT | | | | | | | | Lane Width (ft) | Critical Rate (Section) | | |
| | Number of Lanes | | | | | | | | | | | |

**Improvement Action**

Number of Improvements: 4 — Discount Rate: 3.0%

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | inter. Mod Graves Mill Road | 7 | 0.20 | 0.20 | 0.20 | | $ 600,000 | $ 800,000 | $ 224,709 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 7 | 0.20 | 0.20 | 0.20 | Total Initial Cost | $ 1,400,000 | | $ 224,709 | $ - |

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**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 60,133 | 1.08 | $ 65,141 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 224,709 | $ - | $ 224,709 |

**B/C= 0.29**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 0 | - | $ 275,000 | $ - |
| B | 1 | 0.07 | $ 98,000 | $ 6,533 |
| C | 12 | 0.80 | $ 55,000 | $ 44,000 |
| PDO | 16 | 1.07 | $ 9,000 | $ 9,600 |
| Total | 29 | 1.93 | | $ 60,133 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) Signature Date

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***Mailing address:***

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(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.

(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | | | | | |
|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | E-Urban Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study MID TERM IMPROVEMENTS: Intersection of Gristmill Drive with Route 221 | | | | |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| | Crash Type | Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 0 | 1 | | | | | | | 1 | | 1 |
| | B=3 | 1 | 1 | 1 | | | | | | 3 | | 3 |
| | C=4 | 2 | 2 | | | | | | | 4 | | 4 |
| PDO | PDO | 4 | 5 | | | | | | | 9 | | 9 |
| | Total | 7 | 9 | 1 | | | | | | 17 | | 17 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

**Traffic Data (Inter.)**

| Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2012 | 39800 | 6900 | 6900 | 13000 | 13000 | 0 | 4 | 0.39 | | | 0.02 |

**Traffic Data (Section)**

| Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section Length (Mile) | | | | | | | 0 | 40% | | | |
| Average AADT | | | | | | | | Lane Width (ft) | Critical Rate (Section) | | |
| Number of Lanes | | | | | | | | | | | |

**Improvement Action**

Number of Improvements: 4 — Discount Rate: 3.0%

| Severity Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | inter. Mod. Gristmill Drive | 7 | 0.20 | 0.20 | 0.20 | | $ 350,000 | $ 560,000 | $ 146,061 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 7 | 0.20 | 0.20 | 0.20 | Total Initial Cost | $ 910,000 | | $ 146,061 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 58,000 | 1.08 | $ 62,830 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 146,061 | $ - | $ 146,061 |

**B/C= 0.43**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 1 | 0.07 | $ 275,000 | $ 18,333 |
| B | 3 | 0.20 | $ 98,000 | $ 19,600 |
| C | 4 | 0.27 | $ 55,000 | $ 14,667 |
| PDO | 9 | 0.60 | $ 9,000 | $ 5,400 |
| Total | 17 | 1.13 | | $ 58,000 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) Signature Date

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

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Richmond, Virginia 23219

***Counties, Towns and Cities:***

*County, Town and City Staff are requested to submit proposed improvement forms and supporting documents through the VDOT District Local Assistance staff for concurrence and a project sponsor. VDOT staff should obtain concurrence from District PE Managers and PIMs to assign a sponsor.*

(3) The yellow are required inputs and white areas are optional. The gray areas are automatically generated by embedded formulas.

(4) For all fields, please refer to "Instruction for FY2013-14 Highway Safety Project (HSP)" in the Appendix A of "HSIP Guideline"

HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

VDOT

# HSP Proposed Safety Improvements FY2013-14

| | |
|---|---|
| UPC #: | |
| Receive# | |
| HSIP file | |
| Initiate Date | (for office use only) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | City | Route 221 | Primary (P) | All way Stop | City Line to Breezewood | Whitehall to Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | 2-Rural Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|

| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study SHORT TERM IMPROVEMENTS: S-1 Install Roadway Lighting ONLY |
|---|---|

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| Severity | | Crash Type: Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 2 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | | 9 |
| | B=3 | 4 | 7 | | 0 | 0 | | | 0 | 11 | | 11 |
| | C=4 | 6 | 7 | | 0 | 0 | | | 0 | 13 | | 13 |
| PDO | PDO | 11 | 5 | 0 | 0 | 0 | | | 0 | 16 | | 16 |
| | Total | 23 | 26 | | | | | | | 49 | | 49 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

**Traffic Data (Inter.)**

| Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 0.02 |

**Traffic Data (Section)**

| Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section Length (Mile) | | 1 | | | | | 1 | | 186.45 | | |
| Average AADT | | 24000 | | | | | 24000 | Lane Width (ft) | Critical Rate (Section) | | |
| Number of Lanes | | 4 | | | | | 2 | 12 | | | |

**Improvement Action**

Number of Improvements: 1 — Discount Rate: 3.0%

| Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Roadway Lighting | 20 | 0.05 | 0.05 | 0.05 | | $ 200,000 | $ 646,000 | $ 56,864 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 20 | 0.05 | 0.05 | 0.05 | Total Initial Cost | $ 846,000 | | $ 56,864 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit: Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|
| $ 73,533 | 1.24 | $ 91,120 |

| Cost: Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|
| $ 56,864 | $ - | $ 56,864 |

**B/C= 1.60**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in Crashes | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 9 | 0.15 | $ 275,000 | $ 41,250 |
| B | 11 | 0.18 | $ 98,000 | $ 17,967 |
| C | 13 | 0.22 | $ 55,000 | $ 11,917 |
| PDO | 16 | 0.27 | $ 9,000 | $ 2,400 |
| Total | 49 | 0.82 | | $ 73,533 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) _____ Signature _____ Date _____

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***

***Attn:* HSP Improvement Proposal**

Mr. Raymond Khoury , P.E.
State Traffic Engineer
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

***Counties, Towns and Cities:***

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HSIP-Proposal Rev (10/15/12)
Virginia Department of Transportation
Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | |
|---|---|
| UPC #: | |
| Receive# | |
| HSIP file | |
| Initiate Date | (for office use only) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| Functional Class Code | 2-Rural Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |
|---|---|---|---|---|---|

**Briefly Describe Problem and Proposed Work:** Rt. 221 Corridor safety study LONG TERM IMPROVEMENTS West of Lynchburg Expressway widening 4 lanes --> 6 Lanes

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| Severity | | Crash Type: Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 5 | 3 | 0 | | | 0 | 0 | | 8 | | 8 |
| | B=3 | 10 | 13 | 1 | | | 1 | 0 | | 25 | | 25 |
| | C=4 | 40 | 20 | 1 | | | 4 | 5 | | 70 | | 70 |
| PDO | PDO | 74 | 79 | 0 | | | 5 | 19 | | 177 | | 177 |
| | Total | 129 | 115 | 2 | | | 10 | 24 | | 280 | | 280 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

**Traffic Data (Inter.)**

| Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 0.02 |

**Traffic Data (Section)**

| Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section Length (Mile) | | 2.97 | | | | | 2.97 | | 318.88 | | |
| Average AADT | | 27000 | | | | | 27000 | Lane Width (ft) | Critical Rate (Section) | | |
| Number of Lanes | | 4 | | | | | 4 | 12 | | | |

**Improvement Action**

Number of Improvements: 1 — Discount Rate: 3.0%

| Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Roadway Widen 4-> 6 Lanes | 10 | 0.20 | 0.20 | 0.20 | | $ 10,000,000 | $ 40,000,000 | $ 5,861,525 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 10 | 0.20 | 0.20 | 0.20 | Total Initial Cost | $ 50,000,000 | | $ 5,861,525 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit: Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|
| $ 672,867 | 1.12 | $ 751,506 |

| Cost: Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|
| $ 5,861,525 | $ - | $ 5,861,525 |

**B/C= 0.13**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in Crashes | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 8 | 0.53 | $ 275,000 | $ 146,667 |
| B | 25 | 1.67 | $ 98,000 | $ 163,333 |
| C | 70 | 4.67 | $ 55,000 | $ 256,667 |
| PDO | 177 | 11.80 | $ 9,000 | $ 106,200 |
| Total | 280 | 18.67 | | $ 672,867 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) _____ Signature _____ Date _____

***VDOT anticipates providing the 10 percent match for the FY2013-14 ; however, the sponsor should be able to supply the local match if state funding becomes unavailalble. Please submit an electronic copy of this spreadsheet to HSIProgram@virginiadot.org and mail a paper copy with signature to the address below.***

***Mailing address:***
***Attn:* HSP Improvement Proposal**
Mr. Raymond Khoury , P.E.
State Traffic Engineer
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

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HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | |
|---|---|
| UPC #: | |
| Receive# | |
| HSIP file | |
| Initiate Date | (for office use only) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| | | | | | |
|---|---|---|---|---|---|
| Functional Class Code | 2-Rural Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |

| | |
|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study LONG TERM IMPROVEMENTS East of Lynchburg Expressway widening 2 lanes --> 4 Lanes |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| Severity | | Crash Type: Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 1 | 2 | | | | | | | 3 | | 3 |
| | B=3 | 1 | 2 | 1 | | | | 1 | | 5 | | 5 |
| | C=4 | 5 | 2 | | | | | 1 | | 8 | | 8 |
| PDO | PDO | 15 | 14 | | | | | 3 | | 32 | | 32 |
| | Total | 22 | 20 | 1 | | | | 5 | | 48 | | 48 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

**Traffic Data (Inter.)**

| Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 0.02 |

**Traffic Data (Section)**

| Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section Length (Mile) | | 0.93 | | | | | 0.93 | | 294.59 | | |
| Average AADT | | 16000 | | | | | 16000 | Lane Width (ft) | Critical Rate (Section) | | |
| Number of Lanes | | 2 | | | | | 2 | 12 | | | |

**Improvement Action**

| Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number of Improvements | 1 | Discount Rate | | 3.0% | Project Cost | | | | |
| 1 | Roadway Widen 2-> 4 Lanes | 10 | 0.20 | 0.20 | 0.20 | | $ 2,500,000 | $ 7,500,000 | $ 1,172,305 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 10 | 0.20 | 0.20 | 0.20 | Total Initial Cost | $ 10,000,000 | | $ 1,172,305 | $ - |

NOTE: 1. A local resolution is required upon notification of program approval for secondary road and urban projects 2. VDOT District and Central Office personnel charge review and administration time to project managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs

| Project Administrated by | | Project Schedule (After STIP Approval) | Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|---|---|---|
| | | | Jan, 2011 | | | | |

**B/C Calculation**

| Benefit | Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|---|
| | $ 136,200 | 1.12 | $ 152,118 |

| Cost | Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|---|
| | $ 1,172,305 | $ - | $ 1,172,305 |

**B/C= 0.13**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in Crashes | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 3 | 0.20 | $ 275,000 | $ 55,000 |
| B | 5 | 0.33 | $ 98,000 | $ 32,667 |
| C | 8 | 0.53 | $ 55,000 | $ 29,333 |
| PDO | 32 | 2.13 | $ 9,000 | $ 19,200 |
| Total | 48 | 3.20 | | $ 136,200 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) _____ Signature _____ Date _____

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HSIP-Proposal Rev (10/15/12)

Virginia Department of Transportation

Highway Safety Improvement Program

# HSP Proposed Safety Improvements FY2013-14

| | |
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| UPC #: | |
| Receive# | |
| HSIP file | |
| Initiate Date | (for office use only) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Agency: | | Project Sponsor: | | Tel: | | Email: | |
| Street Address: | | Fax: | | VDOT District: | | VDOT Region: | |
| City, State, Zip : | | Priority # ( If submitting 2 + proposals): | | | | Repeated Proposal from prev. yrs?: | |

| Program Type | Project Type | County | Route (Include Name) | System (1) | Traffic Control | Frm/Mjr Rd (HTRIS/RNS Node-Offset If Applicable) | To/Cross Rd(HTRIS/RNS Node-Offset If Applicable) | Study Period Begins | Study Period Ends |
|---|---|---|---|---|---|---|---|---|---|
| HSP_Regular | SEGMENT | Bedford | Route 221 | Primary (P) | All way Stop | Cloverhill Road | Forest Brook Road | 01/01/10 | 12/31/12 |

| | | | | | |
|---|---|---|---|---|---|
| Functional Class Code | E-Urban Principle Arterial | Area Location Code | 3-Urbanized (50,000-199,999) | Federal System Code | 1-NHS |

| | |
|---|---|
| Briefly Describe Problem and Proposed Work | Rt. 221 Corridor safety study LONG TERM IMPROVEMENTS: Intersection of McConville Road with Route 221 (Wyndale Dr.) |

**Crash Data** (Collision Diagrams/ Maps are required with all proposals)

| Severity | | Crash Type: Rear End | Angle | Head on | Bicyclist | Non-Collision | Fixed object in road | Miscellaneous or other | Non-Collision | Total Related Crashes | Total Unrelated Crashes | Total Crashes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | K=1 or 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Personal Injury (PI) | A=2 | 0 | 1 | 0 | | | | 0 | | 1 | | 1 |
| | B=3 | 0 | 2 | 0 | | | | 0 | | 2 | | 2 |
| | C=4 | 0 | 0 | 0 | | | | 0 | | 0 | | 0 |
| PDO | PDO | 0 | 2 | 0 | | | | 0 | | 2 | | 2 |
| | Total | | 5 | | | | | | | 5 | | 5 |

**Notes** For traffic data , please fill corresponding section for intersection and section projects. Do not fill both traffic data sections. # of Crash Year: 3

**Traffic Data (Inter.)**

| Period | Enter. ADT | NB Ent. ADT | SB Ent. ADT | EB Ent. ADT | WB Ent. ADT | Other leg Ent. ADT | # of Approaches | Crash Rate (Intersection) | Critical Rate (Intersection) | Inventory NODE | Traffic Annual Growth Rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2012 | 39800 | 6900 | | 8000 | 8000 | 0 | 3 | 0.11 | | | 0.02 |

**Traffic Data (Section)**

| Period | 2012 | Sec1 | Sec 2 | Sec 3 | Sec 4 | Sect 5 | Total/ Average | Speed Limit (Average) | Crash Rate (Section) | | Top 5% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Section Length (Mile) | | | | | | | 0 | 40% | | | |
| Average AADT | | | | | | | | Lane Width (ft) | Critical Rate (Section) | | |
| Number of Lanes | | | | | | | | | | | |

**Improvement Action**

Number of Improvements: 4 — Discount Rate: 3.0%

| Number | Improvement Description | Service Life | PRF | PRI | PRPD | PE cost plus $5000(2) | R/W & Utility | Construction | Annual Initial Cost | Annual Mnt. Cost(If any) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | inter. Mod. McConville Road | 7 | 0.17 | 0.17 | 0.17 | | $ 250,000 | $ 900,000 | $ 184,582 | $ - |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| Total | | 7 | 0.17 | 0.17 | 0.17 | Total Initial Cost | $ 1,150,000 | | $ 184,582 | $ - |

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**Project Administrated by**

**Project Schedule (After STIP Approval)**

| Begin PE | Target Advert. | Begin Construction | Estimated Complete Date | Type of Plan |
|---|---|---|---|---|
| Jan, 2011 | | | | |

**B/C Calculation**

| Benefit: Total Annualized Benefit | Traffic Growth Factor(TGF) | Total Annual Benefit |
|---|---|---|
| $ 27,710 | 1.08 | $ 30,018 |

| Cost: Total Annualized Initial Cost | Total Annual Maintenance Cost | Total Annual Cost |
|---|---|---|
| $ 184,582 | $ - | $ 184,582 |

**B/C= 0.16**

**Project Benefit**

| Type of Crash | Related Crash # | Annual Change in Crashes | Cost per Crash | Annual Benefit |
|---|---|---|---|---|
| K | 0 | - | $ 5,000,000 | $ - |
| A | 1 | 0.06 | $ 275,000 | $ 15,583 |
| B | 2 | 0.11 | $ 98,000 | $ 11,107 |
| C | 0 | - | $ 55,000 | $ - |
| PDO | 2 | 0.11 | $ 9,000 | $ 1,020 |
| Total | 5 | 0.28 | | $ 27,710 |

**Signature of Sponsor with Authority to Expend 10% Matching Funds**

Name (Print) _____ Signature _____ Date _____

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