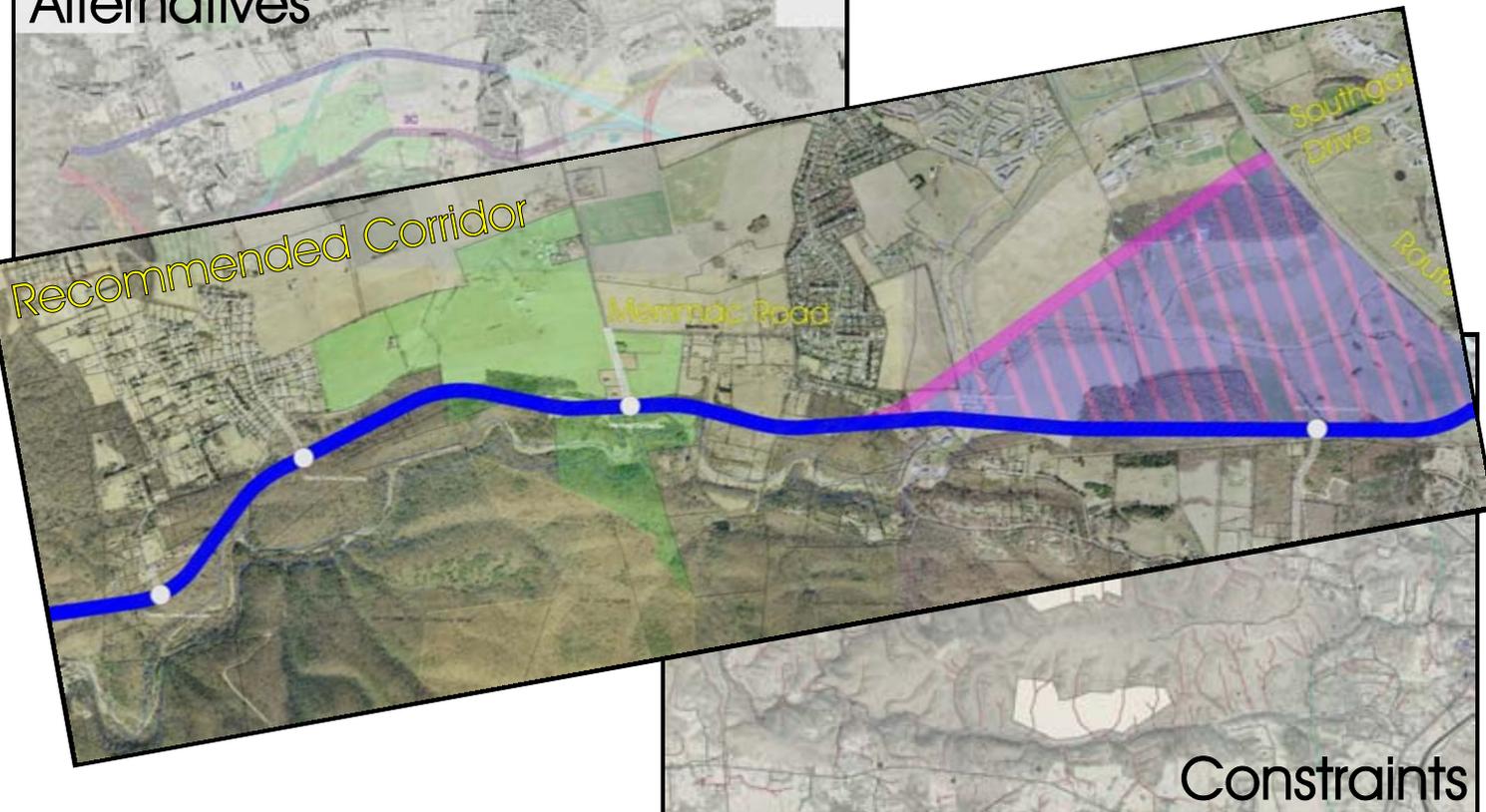


Route 460 Connector Corridor Study



Alternatives



Developed by the
Blacksburg-Christiansburg-Montgomery
Area Metropolitan Planning Organization
in cooperation with
the Virginia Department of Transportation,
the Virginia Department of Rail and Public Transportation,
the Federal Highway Administration, and
the Federal Transit Administration

April 2008

The contents of this report reflect the views of the author(s), who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration (FHWA) or the Commonwealth Transportation Board. This report does not constitute a standard, specification, or regulation. FHWA acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute approval of location and design or a commitment to fund any such improvements. Additional, project-level environmental impact assessments and/or studies of alternatives will generally be necessary.

Table of Contents

| | |
|--|------|
| Executive Summary | ES-1 |
| 1. Study Background..... | 1 |
| 2. Need for the Project | 2 |
| 3. Project Constraints | 5 |
| 4. Alternatives Development and Analysis..... | 7 |
| 5. Study Recommendation | 17 |
| 6. Next Steps | 21 |
| Appendix A: Mapping of Minority and Low-Income Populations | A-1 |
| Appendix B: Data Sources and Study Methodologies..... | B-1 |

List of Exhibits

| | |
|--|------|
| Exhibit ES-1: Study Recommendation | ES-4 |
| Exhibit 1: Study Area Boundary | 2 |
| Exhibit 2: Year 2030 Roadway Operations | 3 |
| Exhibit 3: Effect of Driveway Spacing on Safety..... | 4 |
| Exhibit 4: Study Area Employment and Population..... | 5 |
| Exhibit 5: Environmental Constraints..... | 6 |
| Exhibit 6: Preliminary (Stage 1) Alignments..... | 9 |
| Exhibit 7: Stage 1 Alternatives – Cross-Sections for Consideration | 10 |
| Exhibit 8: Stage 2 Alignments and Proposed Cross-Sections | 12 |
| Exhibit 9: Stage 2 Alternatives | 14 |
| Exhibit 10: Traffic Diversion Impacts of Stage 2 Alternatives | 15 |
| Exhibit 11: Environmental Impacts and Costs of Stage 2 Alternatives..... | 16 |
| Exhibit 12: Summary of Public Support for Stage 2 Alternatives..... | 17 |
| Exhibit 13: Final Study Recommendation..... | 18 |
| Exhibit 14: Environmental Impacts and Costs of Recommended Alignment | 19 |
| Exhibit A-1: Minority Populations in the Study Area | A-2 |
| Exhibit A-2: Hispanic Populations in the Study Area | A-3 |
| Exhibit A-3: Low-Income Populations in the Study Area | A-4 |

Executive Summary

The Route 460 Connector Corridor Study was performed to assess the need for an east-west roadway extending from the Route 460 Bypass in the vicinity of Southgate Drive to Prices Fork Road south of the community of Prices Fork, and to establish a future planning corridor for the roadway. Establishing a planning corridor will allow Montgomery County and the Town of Blacksburg to preserve rights-of-way for a future roadway, and will provide overall guidance for transportation and land use planning in the region.

The concept and initial need for the Route 460 Connector was identified as part of the Blacksburg-Christiansburg-Montgomery Area Metropolitan Planning Organization's (MPO) Year 2030 Transportation Plan (the 2030 Plan), and is included in the Vision Plan portion of the 2030 Plan. This study sought to refine the level of detail for the corridor based on assessments of the potential benefits and impacts of a number of possible alignments. The study included data collection, development of project need, identification of constraints, development and refinement of alternatives, and public involvement at all key study milestones. While the termini of the study were the Route 460 Bypass and Prices Fork Road, consideration in the alternatives development and refinement process was given to accommodating a future extension into the Radford Arsenal property.

Project Need: The need for the Route 460 Connector project is based on its inclusion in the region's long-range transportation plan as well as project-specific needs. Four areas of need were identified by this study:

- **Traffic Operations:** The proposed roadway is anticipated to provide traffic relief for other regional roadways, including Prices Fork Road, Peppers Ferry Road, and portions of the Route 460 Bypass. These roads currently operate at high levels of congestion, or are projected to do so.
- **Safety:** The Route 460 Connector would improve regional roadway safety by shifting traffic to a safer, less congested type of roadway.
- **Serve Expected Growth:** The Route 460 Connector would accommodate projected growth in both population and employment. The study area and immediately surrounding areas are projected to grow at rates higher than the region as a whole.
- **Connectivity:** The proposed roadway would enhance the regional transportation network by providing important connections between the Route 460 Bypass and Prices Fork Road, as well as improved long-term connections to western Montgomery County and into Pulaski County.

Project Constraints: Alternative alignments for the proposed Route 460 Connector were developed taking into consideration a range of potential environmental and socio-economic constraints in the study area including historic and archaeological resources; conservation features; community facilities such as churches, schools, and recreation centers; waterways and floodplains; and environmental features such as threatened and

endangered species. The project also considered the potential for disproportionate impacts on minority and low-income populations as required by Presidential Executive Order 12898 on Environmental Justice.

Alternatives Development and Analysis: The alternatives development process was a two-stage process that incorporated public input at each stage. Stage 1 included consideration of a wide range of possible alignments and facility types. Following review and public input, these were narrowed and refined to two primary alignments along with options for termini. These narrowed options were analyzed at a higher level of detail in order to assess potential transportation and accessibility benefits, environmental impacts, and estimated project costs. Following a second public meeting, these options were further narrowed to a single recommended alignment, with the option for an alternative connection to the Route 460 Bypass.

Recommended Alignment and Facility Type: The recommended alignment is shown in Exhibit ES-1. The proposed corridor extends from Prices Fork Road in the vicinity of Coal Hollow Road to the Route 460 Bypass approximately 1 mile south of Southgate Drive. The proposed roadway would incorporate the following features:

- Construct as a parkway-type facility with posted speed limit of 45 miles per hour. Access would be controlled, with connections to the local roadway system proposed at the following six locations (designated with open circles in Exhibit ES-1):
 - Prices Fork Road (western terminus of the proposed roadway)
 - Thomas Lane
 - Sandy Circle
 - Merrimac Road
 - Connection to the Warm Hearth community
 - Route 460 Bypass (eastern terminus)
- Incorporate a separate multi-purpose (walking and bicycling) trail along the entire length of the proposed roadway. East of Merrimac Road, the proposed roadway would also include a bicycle lane in each direction adjacent to the roadway travel lanes.
- From Prices Fork Road to east of Tall Oaks Drive, the proposed roadway would be constructed as a two-lane undivided roadway with sufficient right-of-way purchased to allow for widening to four-lanes divided when needed. From east of Tall Oaks Drive to the Route 460 Bypass, the roadway would be constructed as a four-lane divided parkway. The total estimated right-of-way width for the roadway corridor would be approximately 130 feet (note that the impact analysis for this study used 200 feet – this provides for worse-case analysis and allows for shifting of the final alignment within the 200 foot planning corridor).

A decision by Virginia Tech about a preferred connection into the Virginia Tech Campus and the Virginia Tech Corporate Research Center is pending, and the ultimate location of the connection also clearly affects the placement of the project's eastern terminus at the Route 460 Bypass. While the pink line shown in Exhibit ES-1 depicts a Southgate Drive

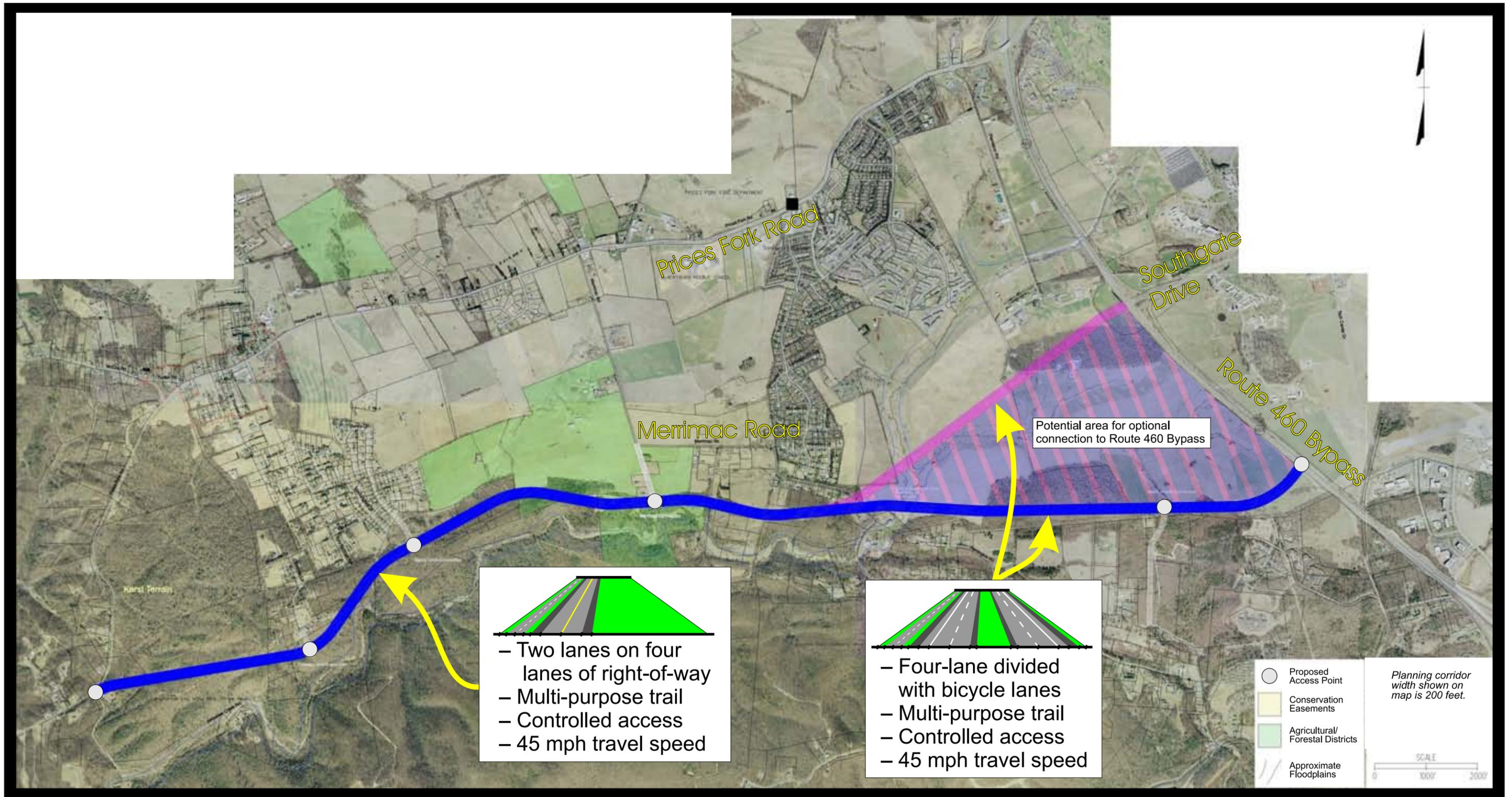
optional alignment tying into existing Southgate Drive at the Route 460 Bypass, the ultimate tie-in point could be located anywhere between the blue and pink lines. Consequently, the alignment of the Route 460 Connector would be located within the hatched area shown on the map, but the specifics of the corridor placement within the hatched area would be dependent on land use and transportation decisions still to be made by Virginia Tech and/or the Town of Blacksburg. Note that, with the exception of a connection to the Warm Hearth community, optional alignments (i.e., those not following the blue line in Exhibit ES-1) would include the same project details (roadway type, lanes, etc.) listed above. Optional alignments, at this time, do not include a direct connection to the Warm Hearth community, and such a connection is not included in the cost estimates described below.

The total estimated cost, including right-of-way, for the final recommendation is \$79.96 million. The shortest option for an alternative alignment (one that connects directly to existing Southgate Drive as shown in the pink line) is estimated to cost \$73.44. These are planning-level estimates and are subject to change based on further study and refinement.

Next Steps: The establishment of the Route 460 Connector planning alignment allows Montgomery County to preserve rights-of-way and plan for such a road that could be constructed if and when funding is identified and local and state decisions are made to proceed with project development, design, and construction. The first follow-on step from this study is the adoption of the study's planning alignment into the Montgomery County Comprehensive Plan and, where appropriate, the adoption of appropriate regulatory actions (such as zoning and/or subdivision changes) in order to proactively implement and preserve the recommended alignment.

At this point, no funding has been identified for the project. Should funding be identified and the project identified as a priority, additional follow-on activities could include location studies, design, right-of-way acquisition, and construction. Public involvement is a key component of each of these project development activities and alignment details are subject to change based on environmental and engineering considerations, as well as ongoing public input.

Exhibit ES-1
Study Recommendation



1. Study Background

The Route 460 Connector Corridor Study was performed to identify and assess the potential need for an east-west roadway extending from the Route 460 Bypass in the vicinity of Southgate Drive to Prices Fork Road south of the community of Prices Fork. Pending the identification of need, the study also sought to establish a future planning corridor for the roadway in order to better inform the land use and transportation planning process. The benefits of establishing the planning corridor include: allowing for the preservation of rights-of-way, allowing land owners who wish to develop their properties to prepare site plans that can incorporate the future roadway, and to provide overall guidance in directing long-range transportation and land use planning efforts in both the Town of Blacksburg and western Montgomery County.

The concept and initial need for the Route 460 Connector was identified as part of the Blacksburg-Christiansburg-Montgomery Metropolitan Planning Organization's (MPO) Year 2030 Transportation Plan (the 2030 Plan), and is included in the Vision Plan portion of the 2030 Plan. The 2030 Plan is a general document that includes region-wide transportation policies as well as proposed transportation improvements and projects. Projects are shown in the 2030 Plan as conceptual alignments with proposed conceptual cross-sections rather than specific geographic corridors. This study sought to refine the level of detail for the corridor based on assessments of the potential benefits and impacts of a number of possible alignments.

This study was performed on behalf of Montgomery County and the Town of Blacksburg, in cooperation with the Virginia Department of Transportation. Project direction was provided by the MPO's Technical Advisory Committee (TAC), which includes technical staff from localities within the region as well as participation from Blacksburg Transit, Virginia Tech, the New River Valley Planning District Commission, Montgomery County Regional Airport Authority, Virginia Department of Transportation, Virginia Department of Rail and Public Transportation, the Federal Highway Administration, and the Federal Transit Administration. The study team included the TAC, the MPO Executive Director, and the consulting firm of Parsons Transportation Group.

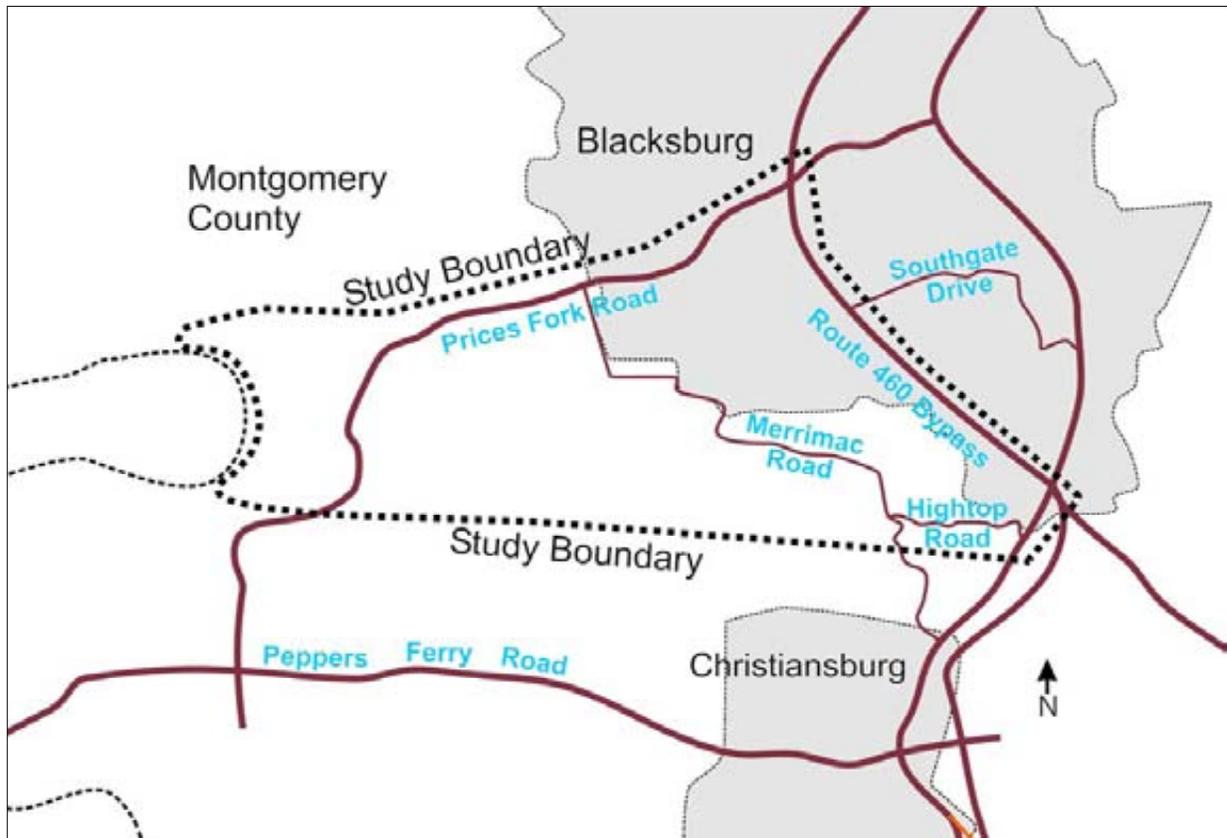
The study included the following major activities and milestones:

- Data collection, organization, and mapping
- Identification and refinement of project need
- Identification and mapping of engineering, environmental, socio-economic, and planning constraints
- Development and refinement of alternatives
- Public meeting to review alternatives
- Refinement of alternatives
- Public hearing on study recommendations
- Final report

The primary focus of this study is a broad corridor extending directly westward from Southgate Drive to Prices Fork Road. A broader study area was defined, however, to allow for consideration of a variety of alignments, and to assess broader transportation, socio-economic, and environmental impacts. This broader study area, shown in Exhibit 1, is bounded by Peppers Ferry Road (VA Route 114) to the south, Prices Fork Road (Virginia Routes 412 and 685) to the north, US Route 460 Bypass to the east, and Montgomery County' western boundary to the west.

While the western terminus of this current study is Prices Fork Road, a longer-term concept for a future extension into the Radford Arsenal property was also taken into consideration as alternatives alignments were developed.

Exhibit 1
Study Area Boundary



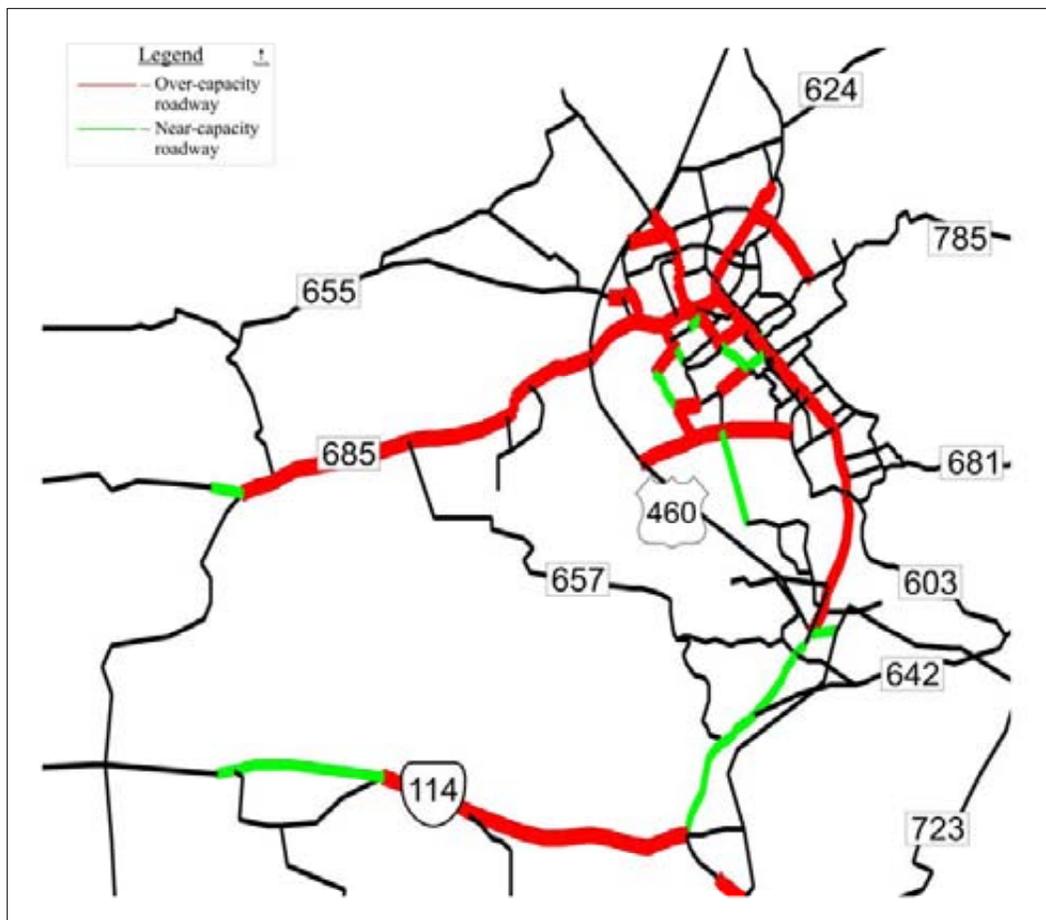
2. Need for the Project

The need for the Route 460 Connector project is based on its inclusion in the region's long-range transportation plan as well as project-specific needs. Four areas of need were identified by this study:

- **Traffic Operations:** Provide traffic relief for other regional roadways, some of which currently operate at high levels of congestion, or are projected to do so.
- **Safety:** Improve regional roadway safety by shifting traffic to a safer, less congested type of roadway.
- **Serve Expected Growth:** Accommodate projected growth in both population and employment. The study area and immediately surrounding areas are projected to grow at rates higher than the region as a whole.
- **Connectivity:** Enhance the regional transportation network by providing important connections between the Route 460 Bypass and Prices Fork Road, as well as improved long-term connections to western Montgomery County and into Pulaski County.

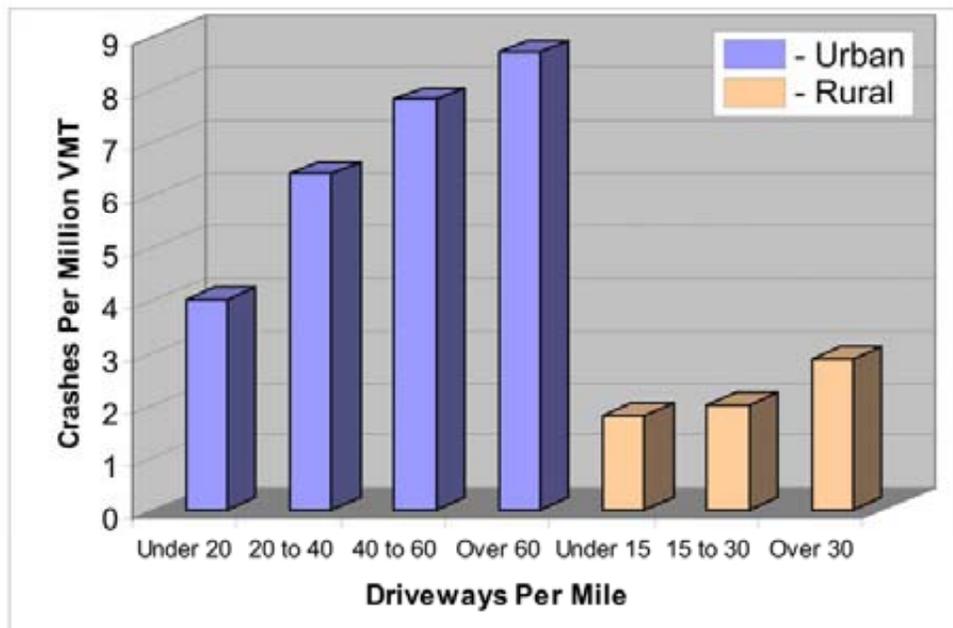
Traffic Operations: Traffic operations analysis indicates that both Prices Fork Road and Peppers Ferry Road are projected to operate at over-capacity, congested conditions by the year 2030 (as shown in Exhibit 2 below). The proposed Route 460 Connector is anticipated to carry between 4,000 and 10,000 vehicles per day in 2030 – reducing traffic on Prices Fork Road by 2,000 to 7,000 vehicles per day, and reducing traffic on Peppers Ferry Road by 2,000 vehicles per day. It is also expected that the Route 460 Connector would reduce traffic on the Route 460 Bypass, Hightop Road, and Glade Road.

Exhibit 2
Year 2030 Roadway Operations



Safety: The proposed Route 460 Connector would improve regional roadway safety by shifting traffic from existing roads to a safer, less congested type of roadway. Safety would also be enhanced by constructing the new facility to meet current standards with full width shoulders. Consideration is also being given to developing the Route 460 Connector as a controlled access parkway type of facility. Research has shown that roadway safety is directly related to the number of access points along roadways, and a controlled access facility is expected to be substantially safer than many of the study area’s existing roadways. This relationship is illustrated in Exhibit 3.

Exhibit 3
Effect of Driveway Spacing on Safety



Source: Access Management Brochure, Federal Highway Administration.
<http://safety.fhwa.dot.gov/geometric/accessmgmtbrochure/accessmgmtbrochure.pdf>

Accommodate Existing and Planned Growth: As shown in Exhibit 4, the study area and those areas immediately surrounding it were home to 13,900 persons in 2003 and served 11,700 jobs. By 2030, the population is expected to increase by 72 percent to just under 24,000 persons and employment is expected to increase by 33 percent to 15,600 jobs. This anticipated growth is higher than for the remainder of the region, with the population of the study area anticipated to grow at twice the rate of the region as a whole (72.0 percent vs. 36.4 percent). In terms of employment, the growth in jobs within the study area is expected to be slightly higher rate than the remainder of the region (33.5 percent vs. 31.8 percent). The proposed Route 460 Connector would serve this expected growth.

Exhibit 4

Study Area Employment and Population*

| | Employment | Population |
|------------------------------|---------------------|---------------------|
| Year 2003 Study Area | 11,700 | 13,943 |
| Year 2003 Rest of Region | 36,375 | 74,650 |
| <i>Percent in Study Area</i> | <i>32.2%</i> | <i>18.7%</i> |
| Year 2030 Study Area | 15,622 | 23,977 |
| Year 2030 Rest of Region | 47,949 | 101,839 |
| <i>Percent in Study Area</i> | <i>32.6%</i> | <i>23.5%</i> |
| Growth 2003 to 2030 | | |
| Study Area | 3,922 | 10,034 |
| <i>Percent Growth</i> | <i>33.5%</i> | <i>72.0%</i> |
| Rest of Region | 11,574 | 27,189 |
| <i>Percent Growth</i> | <i>31.8%</i> | <i>36.4%</i> |

* -- The area used for this analysis encompasses geographic areas termed Traffic Analysis Zones (TAZs) that were developed for transportation planning and forecasting purposes. US Census and Virginia Employment Commission data on population and employment were allocated to these TAZs as part of the process of developing and validating the region's computerized transportation model. Population and employment forecasts for these TAZs were developed and approved by the MPO in 2005. The analysis area included 42 TAZs that are either entirely or partially within the project study area.

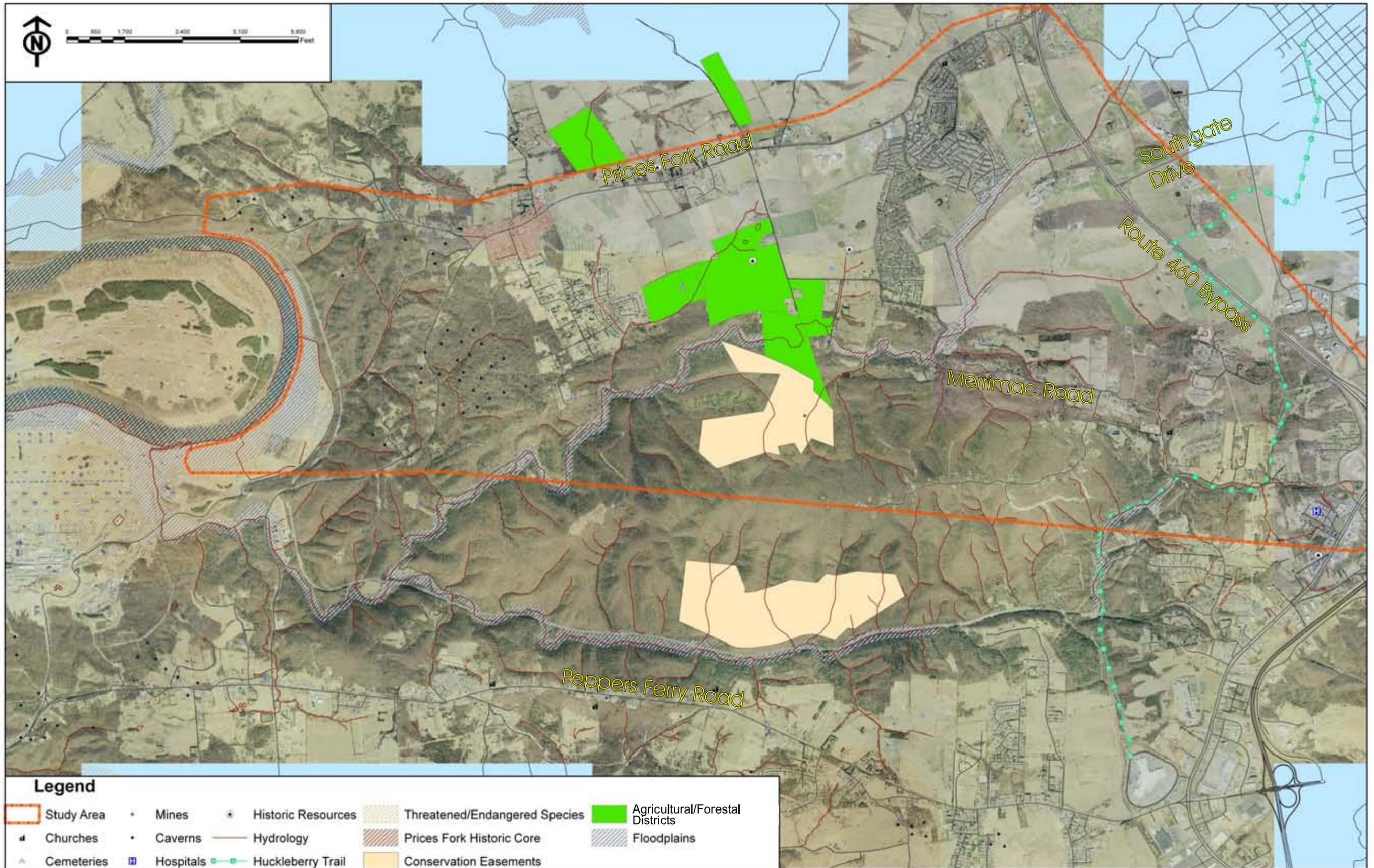
Connectivity: The Route 460 Connector would enhance the regional transportation network by providing important connections between the Route 460 Bypass and Prices Fork Road, as well as improved long-term connections to western Montgomery County and into Pulaski County. The need for such connections was cited as part of the development of the region's 2030 Transportation Plan and the public involvement process for the study. The inclusion of bicycle and/or pedestrian trails as part of the Route 460 Connector also provides the potential for expanding and increasing the connectivity of the transportation system for these travel modes.

These elements of project need were reviewed at each of the public meetings that were held as part of the study.

3. Project Constraints

Prior to developing potential alignments for the Route 460 Connector, the study team identified potential environmental and socio-economic constraints within the study area using existing mapping data from Montgomery County. The constraints, which are shown in Exhibit 5, include the following:

Exhibit 5
Environmental Constraints



- Historic and archaeological sites and historic districts
- Conservation districts
- Community facilities – churches, schools, recreation centers
- Floodplains
- Threatened and endangered species

Federal transportation regulations also require that transportation projects consider and seek to mitigate potentially disproportionate impacts on minority and low-income populations (Presidential Executive Order 12898 on Environmental Justice). For this reason, this planning study included a preliminary assessment of the extent of minority and low-income populations. The mapping in Appendix A illustrates the extent and location of these populations within the study area. Areas where any of the alternative alignments would cross were not judged to have disproportionately large minority or low-income populations, and those populations that are within the study area would also benefit from the increased accessibility that the proposed Route 460 Connector would provide to the region as a whole.

All of the alignments developed as part of this study sought to minimize potential environmental and socio-economic impacts while also considering potential engineering constraints such as topography, the location of utilities, locations of residences and businesses including access considerations, connections to existing roads, as well as broader regional transportation planning concerns. As described in the next section, every potential alignment is anticipated to result in some level of impact; the alternatives development and analysis process sought to minimize impacts, and to incorporate public input in the weighing of relative impacts.

4. Alternatives Development and Analysis

The alternatives development process was a two-stage process that incorporated public input at each stage. This section describes both the alternatives development/analysis process as well as the public input received at each of the two stages in the process.

4.1 Stage 1 Alternatives Development and Analysis

The intent of the first stage of the alternatives development and analysis process was to identify a range of roadway alignments and types that would foster discussion and brainstorming within the study team and with the general public. During this stage, the study team developed three generalized conceptual alignments, along with optional variations. The three alignments were intended to be geographic “book-ends”, including lines that would be as far north and as far south as would likely be considered while still meeting the purpose and need of the project. Alignment 1, the northernmost alignment, parallels Prices Fork Road most closely – this alignment illustrated the extent of potential impacts to many of the developed properties located just south of Prices Fork Road. Alignment 2 passed furthest to the south and highlights some of the challenges associated with southern lines, including the steep topography of Prices Mountain. A third, middle

alignment highlighted some of the concerns through the middle part of the study area, including traversing conservation districts and some of the most developable land in the study area, as well as impacts to existing residential areas. Each of these three generalized alignments, along with some variations, is illustrated in Exhibit 6.

The first stage of the alternatives development process also considered a range of facility types and cross-sections. Design considerations at this stage included the following:

- Number of lanes: A total of either two or four through travel lanes, including the option of constructing two lanes of roadway but preserving/purchasing four lanes of right-of-way in order to allow for future expansion.
- Access controls: Access control refers to the extent to which driveways and smaller, secondary roads are allowed to have direct access onto the proposed roadway. In general, more access control (meaning fewer access points) results in safer and smoother traffic flow. Specific facility types proposed for consideration included:
 - Full access control with access points only at grade-separated interchanges
 - Controlled access with access points limited to key at-grade intersections only
 - Access control provided not through roadway design features, but through local government regulations such as zoning, zoning overlays, and/or other planning regulations
 - Uncontrolled access
- Median treatment: Describes whether the design would be a divided roadway incorporating a median, or an undivided roadway where travel lanes would be separated by a double-yellow line.
- Design speed: Initially proposed to be either 50 or 60 miles per hour, with posted speeds of either 45 or 55 miles per hour.
- Type of facility: A generalized overall description of the type of facility that incorporates aspects of design speed and access control, as well as landscaping treatments. The facility types proposed for initial discussion included:
 - Parkway – generally a limited access facility that is of lower design speed than a freeway and that also incorporates context-sensitive landscaping to minimize visual impacts
 - Suburban arterial – a roadway that would incorporate some level of access control in order to limit the overall number of access points, but would also allow for direct access from the roadway to adjacent commercial, retail, and residential land uses
- Inclusion of multi-purpose trails: Describes whether a multi-purpose trail for bicycles and pedestrians would be incorporated into the conceptual designs. This trail would be included on one side of the roadway with the side dependent on where bicycle/pedestrian access to residential areas would be most effective.

Five illustrative cross-sections were developed for consideration and discussion in the first stage. These are shown in Exhibit 7.

Exhibit 6
 Preliminary (Stage 1) Alignments

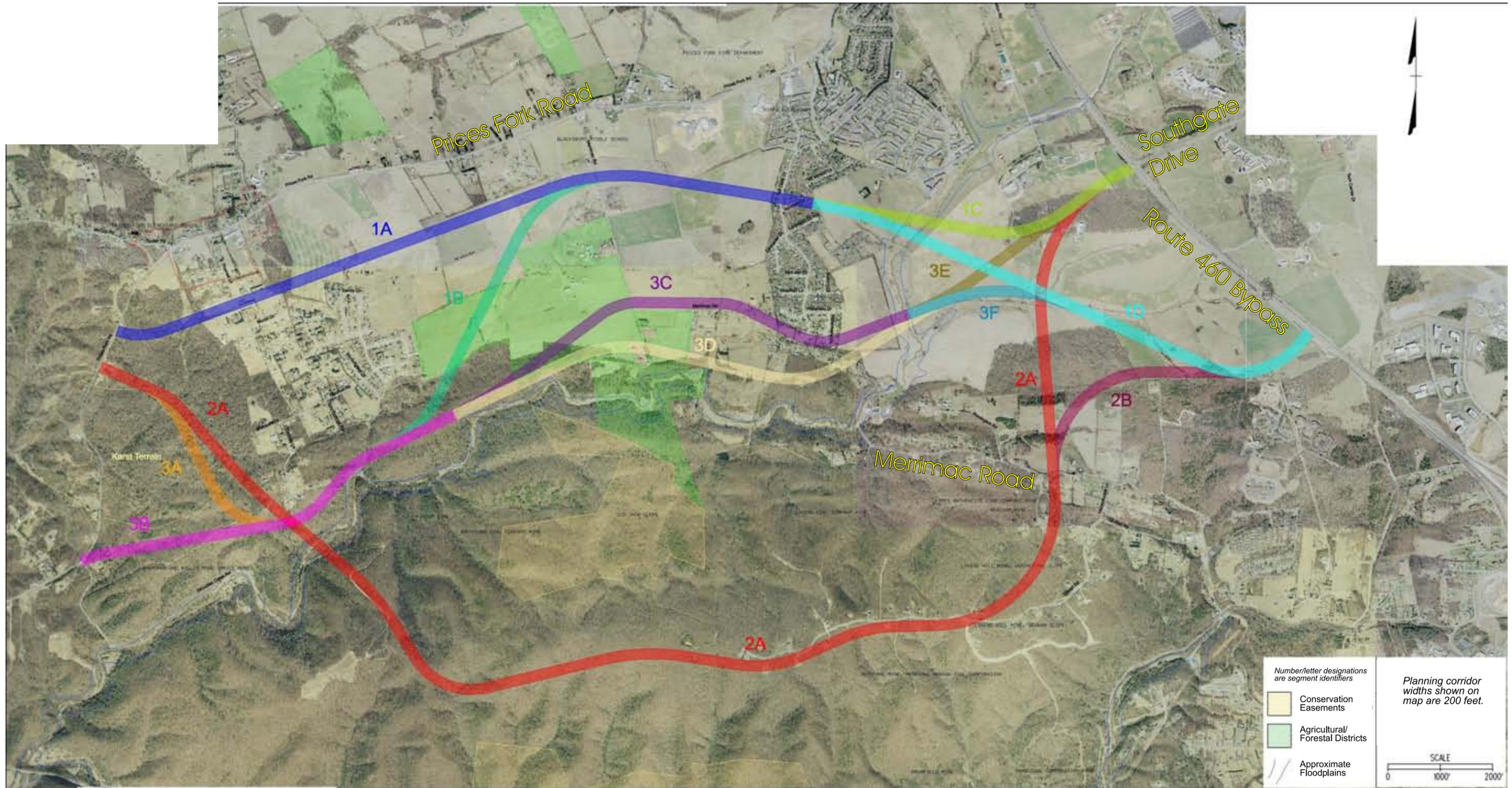
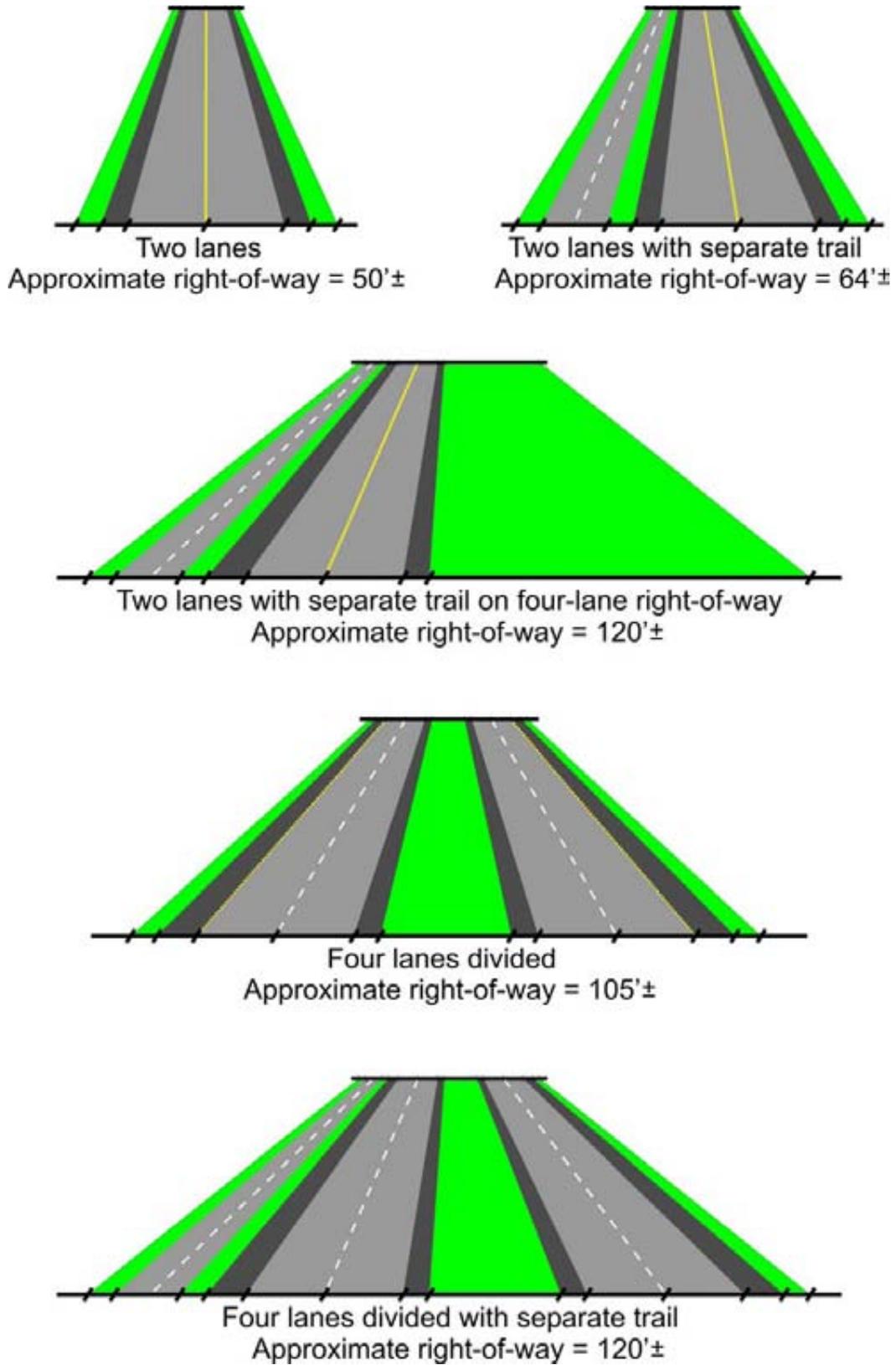


Exhibit 7
Stage 1 Alternatives – Cross-Sections for Consideration



Information on study background, project need, environmental constraints, and preliminary alignments and facility types were presented at the first public meeting which was held on November 15, 2006. Over 30 people attended the meeting, and a total of 195 comment forms were received both from those who attended the meeting as well as others. General feedback from the first meeting included:

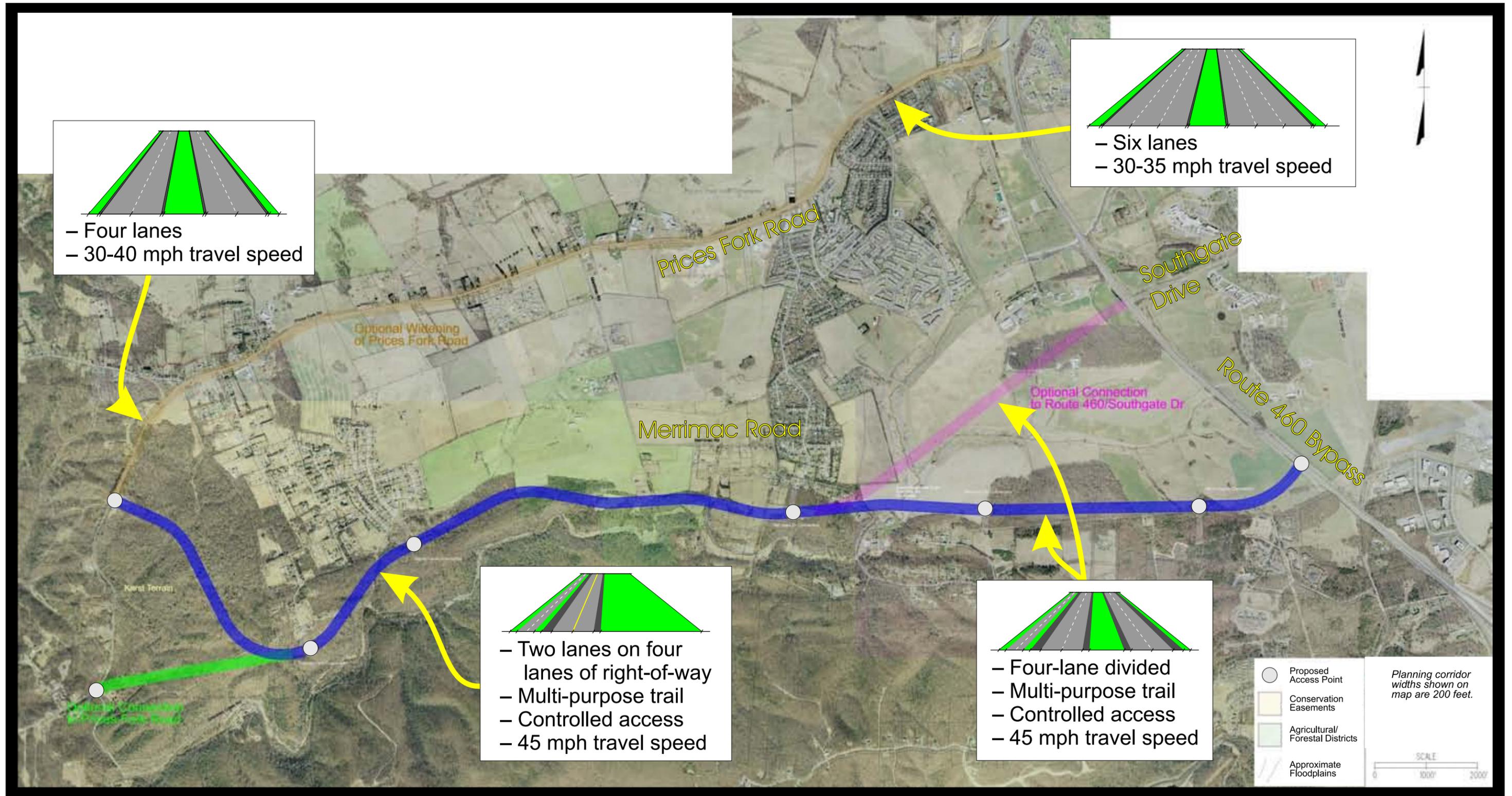
- Based on impacts to established neighborhoods as well as community facilities, the majority of those commenting recommended that the northern alignments (Alignment 1) be dropped from further consideration. There was also little support for a southern alignment (Alignment 2) that would go on Prices Fork Mountain. Many suggested that the widening of existing Prices Fork Road should also be considered as a stand-alone solution. Refinements to the middle alignment (Alignment 3) were also recommended based on impacts to properties and to the access to the properties.
- The majority of those commenting supported a parkway-type concept with full access control (access provided only at a limited number of locations), and the inclusion of a median and multi-purpose bicycle/walking trail. Travel speeds of 45 miles per hour rather than 55 miles per hour were supported by most.
- Responses on the need for the proposed improvement were mixed between those who believed that it was needed now, those who believed that it will be needed in the future, and those who believe that it will not be needed at all. Some stated that only parts of the project would be needed (such as a bypass around the community of Prices Fork), but not all of the proposed improvements. A variety of viewpoints were also expressed with respect to where the proposed roadway should connect to the Route 460 Bypass (either at Southgate Drive or at a location to the south) as well as where access points to local streets would be provided on the proposed facility.

4.2 Stage 2 Alternatives Development

Based on comments received from the general public at the first public meeting, as well as ongoing technical analyses, the proposed improvement concepts were narrowed down and refined as part of Stage 2 alternatives development and analysis process. The refined alignments are shown in Exhibit 8, which depicts a single alignment through the central part of the study area. This alignment sought to minimize impacts to residential areas, align more closely with known development plans, and to address the full range of concerns identified by the public at the first public meeting. At both the western and eastern ends of the proposed alignment, options were also developed for consideration. In addition, the widening of existing Prices Fork Road was incorporated as a stand-alone alternative.

In addition to the removal of the Stage 1 Alignments 1 and 2 from consideration based on public feedback, potential impacts, and costs, the regional Technical Advisory Committee (TAC) indicated a desire to consider the following as part of the Stage 2 alternatives analysis:

Exhibit 8
 Stage 2 Alignments and Proposed Cross-Sections



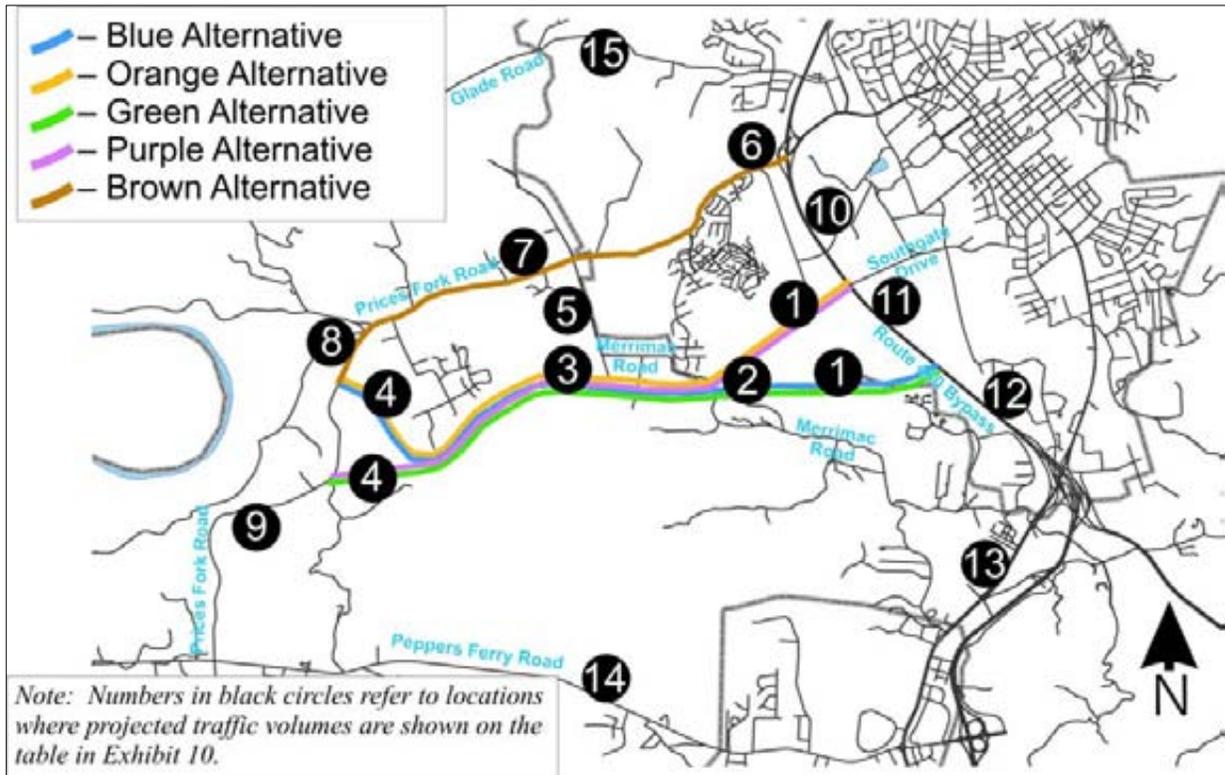
- Providing access connections to the following: Tall Oaks Drive, Warm Hearth, Merrimac Road, Sandy Circle, and Thomas Lane.
- Consider future extension of the proposed roadway into the Radford Arsenal property when developing the appropriate connection point for the project's western terminus at Prices Fork Road.
- Consider providing both on-road trail and bicycle lanes on the eastern portion of the project between Merrimac Road and the Route 460 Bypass.
- Retain a parkway concept with access control that allows only a minimal number of direct connections.
- Four lanes of right-of-way should be retained for the entire length of the proposed alternatives; however, additional analysis should be performed to determine where four lanes should be constructed.

With the optional connections at both Prices Fork Road in the west and the Route 460 Bypass in the east, a total of five distinct alternatives were identified to facilitate analysis of potential benefits and impacts, and to aid in presentation at the public meeting. The five alternatives, differentiated by color on mapping and in text descriptions, are summarized below and shown graphically on the map in Exhibit 9.

- Blue Alternative: Extends from Prices Fork Road approximately 0.5 mile south of McCoy Road to the Route 460 Bypass approximately 1 mile south of Southgate Drive.
- Orange Alternative: Extends from Prices Fork Road approximately 0.5 mile south of McCoy Road to the Route 460 Bypass at Southgate Drive.
- Green Alternative: Extends from Prices Fork Road in the vicinity of Coal Hollow Road to the Route 460 Bypass approximately 1 mile south of Southgate Drive.
- Purple Alternative: Extends from Prices Fork Road in the vicinity of Coal Hollow Road to the Route 460 Bypass at Southgate Drive.
- Brown Alternative: Widens existing Prices Fork Road by one lane in each direction between the Route 460 Bypass and approximately 0.5 mile south of McCoy Road.

The five alternatives were also refined in terms of specifying the number of travel lanes based on projected Year 2030 travel demand. The eastern portion of the new-alignment alternatives (the new-alignment alternatives include all but the Brown Alternative) is proposed to incorporate four through-lanes (total in both directions), while the remainder of the alternatives would include two through-lanes with sufficient right-of-way acquired to construct four travel lanes if and when travel demand supports the need for additional capacity. All of the new-alignment alternatives would also include multi-purpose trails on one side of the roadway, controlled access that would limit vehicular access to approximately seven local roadway connections, posted speed limits of 45 miles per hour, and a general parkway-type configuration and cross-section.

Exhibit 9
Stage 2 Alternatives



4.3 Stage 2 Alternatives Analysis

The Stage 2 alternatives were subjected to a comparative analysis in terms of traffic service, potential planning-level impacts, and planning-level cost estimates.

Comparison of Traffic Impacts: Each of the alternatives will affect the traffic flow in the region to differing degrees, and these traffic impacts are summarized for key study area locations in Exhibit 10. In general, the Blue and Green Alternatives that connect to the Route 460 Bypass south of Southgate Drive are expected to carry the highest amount of traffic. The widening of Prices Fork Road in the Brown Alternative is anticipated to increase traffic along Prices Fork Road by approximately 3,000 vehicles per day. The Orange Alternative, which swings closest to Prices Fork Road on both the Prices Fork Road end and the Route 460 Bypass end, is anticipated to reduce traffic on Prices Fork by the greatest amount. The “Map Key Location” column references the numbers in black circles in Exhibit 9. The colored cells highlight segments where traffic operations in 2030 would be near or over capacity.

Exhibit 10
Traffic Diversion Impacts of Stage 2 Alternatives

| Map Key | Road | Location | Daily Traffic Volumes in 2030 (For Each Alternative) | | | | | |
|---------|--------------------|--------------------------------|--|--------|--------|--------|--------|--------|
| | | | No-Build | Blue | Orange | Green | Purple | Brown |
| 1 | 460 Connector | West of Route 460 Bypass | NA | 11,040 | 8,790 | 10,850 | 8,690 | NA |
| 2 | 460 Connector | East of Merrimac Rd Connector | NA | 5,870 | 8,790 | 5,770 | 8,690 | NA |
| 3 | 460 Connector | West of Tall Oaks Connector | NA | 4,690 | 7,820 | 7,230 | 11,270 | NA |
| 4 | 460 Connector | West of Thomas Lane Connector | NA | 880 | 3,220 | 4,370 | 8,270 | NA |
| 5 | Merrimac Road | South of Prices Fork Road | 720 | 370 | 570 | 560 | 580 | 1,450 |
| 6 | Prices Fork Road | West of Route 460 Bypass | 42,750 | 36,510 | 33,530 | 37,180 | 34,850 | 45,600 |
| 7 | Prices Fork Road | West of Merrimac Road | 24,890 | 22,510 | 20,480 | 21,170 | 18,270 | 28,440 |
| 8 | Prices Fork Road | South of McCoy Drive | 19,610 | 19,100 | 17,220 | 16,520 | 13,450 | 20,820 |
| 9 | Prices Fork Road | North of Peppers Ferry Road | 19,340 | 19,700 | 20,180 | 20,600 | 21,440 | 20,550 |
| 10 | Route 460 Bypass | Btwn Prices Fork and Southgate | 54,220 | 47,980 | 45,830 | 48,800 | 46,760 | 53,540 |
| 11 | Route 460 Bypass | Btwn Southgate and Alt 1A | 60,730 | 58,880 | 55,890 | 59,760 | 54,900 | 59,310 |
| 12 | Route 460 Bypass | Btwn Alt 1A and Route 460 Bus | 60,730 | 56,160 | 55,890 | 55,650 | 54,900 | 59,310 |
| 13 | Route 460 Bus | South of Hightop Road | 32,020 | 30,010 | 29,920 | 29,160 | 29,270 | 30,870 |
| 14 | Peppers Ferry Road | East of Route 760 | 29,610 | 28,470 | 28,080 | 27,740 | 27,510 | 27,900 |
| 15 | Glade Road | East of Meadowbrook Drive | 3,030 | 2,150 | 1,940 | 2,080 | 1,860 | 1,780 |

Cells highlighted in yellow indicate roadway segments that are expected to operate at near-capacity conditions in 2030. Cells highlighted in orange are expected to operate at over-capacity conditions.

Environmental Impacts and Cost Estimates: Environmental and socio-economic impacts of the Stage 2 alternatives were assessed at a planning overview level. Potential impacts include displacements of residences, businesses, as well as impacts on floodplains, agricultural/forestral districts, and, for the Prices Fork (Brown) Alternative, potential impacts on the Prices Fork historic district. Planning-level cost estimates were also developed based on statewide unit cost averages. Total costs for the alternatives, including right-of-way, are expected to be between \$72 million and \$81 million. For consistency, all of the alternatives include grade separation of the existing intersection of the Route 460 Bypass and Southgate Drive, or the shifting of this junction point to the south by approximately one mile. The Brown Alternative (Prices Fork Road Widening), therefore, also includes the grade separation of the intersection of the Route 460 Bypass and Southgate Drive. It is estimated that more than half of the estimated cost for each of

the alternatives would be for the interchange. Exhibit 11 summarizes the potential impacts and costs for the alternatives presented at the Stage 2 public meeting.

**Exhibit 11
Environmental Impacts and Costs – Stage 2 Alternatives**

| Description | Blue Alternative | Orange Alternative | Green Alternative | Purple Alternative | Brown Alternative |
|---|-------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| Length of improvement (lane miles) | 11.55 | 9.81 | 11.17 | 9.43 | 17.8 |
| Total estimated cost (\$ millions) | \$80.93 | \$75.51 | \$80.21 | \$74.79 | \$72.35 |
| Estimated cost – roadway (\$ millions) | \$64.17 | \$56.92 | \$63.69 | \$59.44 | \$53.09 |
| Estimated cost – structures (\$ millions) | \$6.77 | \$7.37 | \$6.77 | \$7.37 | \$0.00 |
| Estimated cost – right-of-way (\$ millions) | \$9.99 | \$8.22 | \$9.75 | \$7.98 | \$19.26 |
| Floodplain impacts (acres) * | 2.6 | 1.9 | 2.6 | 1.9 | 0 |
| Agricultural/Forestral district impacts (acres) * | 8.3 | 8.3 | 8.3 | 8.3 | 0 |
| Potential residential displacements * | 4 | 5 | 4 | 5 | 32 |
| Potential commercial displacements * | 0 | 0 | 0 | 0 | 5 |
| Historic district (acres within impact area) * | 0 | 0 | 0 | 0 | 10.3 |

All estimates are planning level and are subject to change based on further study and refinement. Costs are in year 2006 dollars.

** Impacts are calculated based on 200-foot corridor widths. Because, in most cases, the required rights-of-way will be less than 200 feet, the indicated impacts essentially represent a worst-case scenario. Many of the impacts would likely be reduced and/or mitigated through design refinements made as part of the final design process.*

The second public meeting, to review the Stage 2 alternative alignments and potential benefits, impacts, and costs, took place on February 14, 2007. A total of 62 people attended this second meeting, and a total of 130 comment forms were returned. There was consistent support in the comments for limiting access (support was 10 to 1 in favor of limiting access), providing a multi-purpose trail (8 to 1 ratio in favor), and limiting the speed to 45 miles per hour (9 to 1 ratio in favor). Constructing the roadway as a parkway and providing a median were also strongly supported.

Exhibit 12 summarizes the level of support for each of the Stage 2 alternatives. Overall, meeting participants indicated a preference for implementing one of the alternative improvements, as support for the No-Build alternative was low. Slightly less than one-fifth of those responding supported widening Prices Fork Road (Brown Alternative); however, a significant number of additional comments on the response sheets included notes opposing the widening of Prices Fork Road. The highest level of support was for the Green Alternative which includes the southern connection on both Prices Fork Road and the Route 460 Bypass.

Exhibit 12

Summary of Public Support for Stage 2 Alternatives

| Alternative | Level of Support for Alternative | |
|-------------|----------------------------------|---------|
| | Number | Percent |
| No-Build | 8 | 6.4% |
| Blue | 9 | 7.2% |
| Orange | 3 | 2.4% |
| Green | 76 | 60.8% |
| Purple | 6 | 4.8% |
| Brown | 23 | 18.4% |

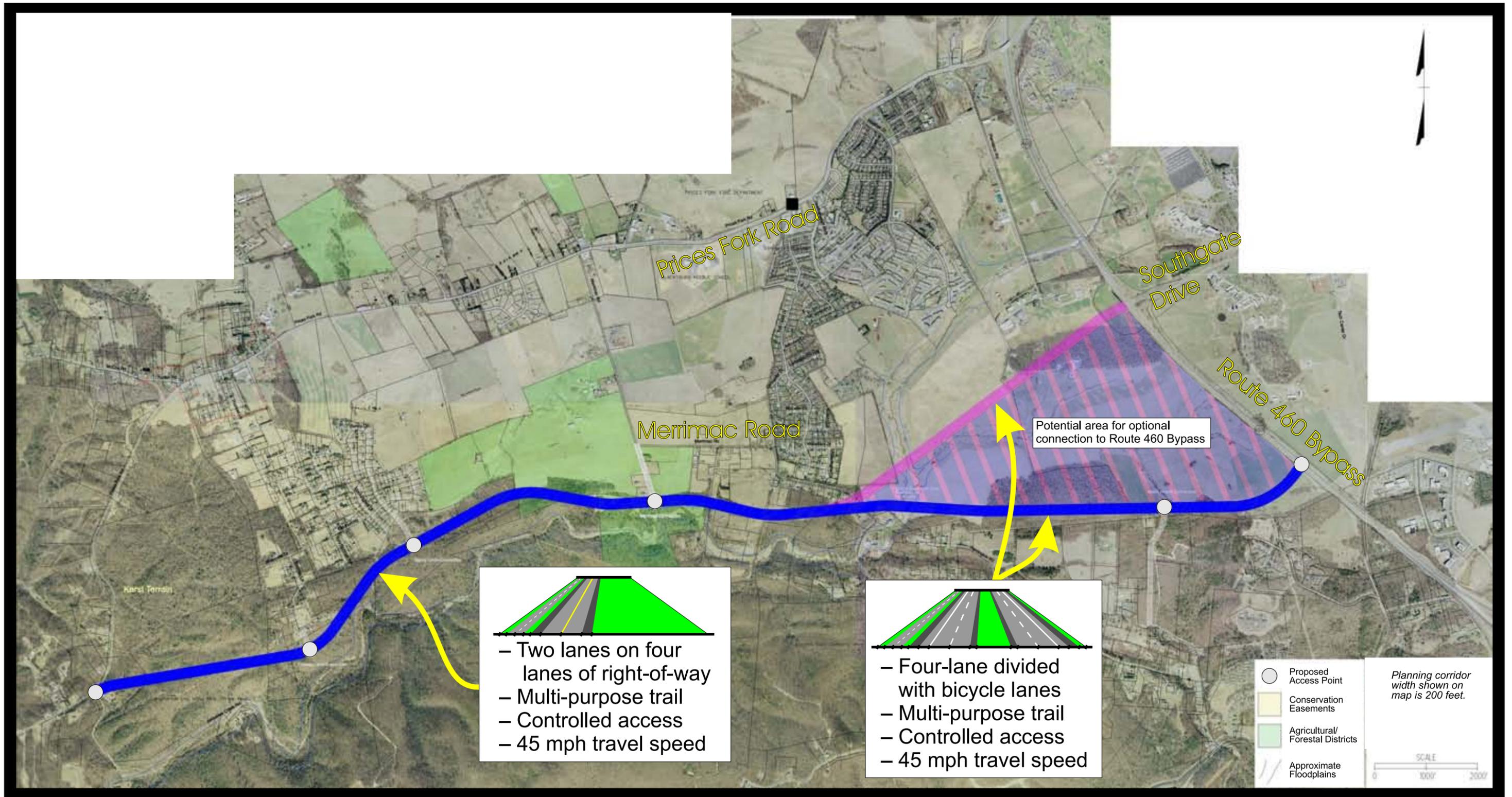
Other items that were commented on by meeting participants include a concern about a connection from the proposed road to Tall Oaks Drive and the increased traffic that such a connection could induce on Tall Oaks Drive. A number of meeting participants were also concerned about impacts on residential communities in the vicinity of Southgate Drive.

5. Study Recommendation

The study’s final recommendation was developed following review of the public input from the second meeting as well as input from the Technical Advisory Committee. In general, the recommended alignment reflects the Green Alternative that was developed as part of the Stage 2 Alternatives Analysis process. Slight refinements to alignment and access points were made based on public input. The study recommendation, shown in Exhibit 13, would incorporate the following features:

- Construct the roadway on the new alignment shown in Exhibit 13 as a parkway-type facility with posted speed limit of 45 miles per hour. Access would be controlled, with connections to the local roadway system proposed at the following six locations (designated with open circles in Exhibit 13):
 - Prices Fork Road (western terminus of the proposed roadway)
 - Thomas Lane
 - Sandy Circle
 - Merrimac Road
 - Connection to the Warm Hearth community
 - Route 460 Bypass (eastern terminus)
- Incorporate a separate multi-purpose (walking and bicycling) trail along the entire length of the proposed roadway. East of Merrimac Road, the proposed roadway would also include a bicycle lane in each direction adjacent to the roadway travel lanes.
- From Prices Fork Road to east of Tall Oaks Drive, the proposed roadway would be constructed as a two-lane undivided roadway with sufficient right-of-way purchased to allow for widening to four-lanes divided when needed. From east of Tall Oaks Drive to the Route 460 Bypass, the roadway would be constructed as a four-lane divided parkway. The total estimated right-of-way width for the

Exhibit 13
Final Study Recommendation



roadway corridor would be approximately 130 feet (note that the impact analysis for this study used 200 feet – this provides for worse-case analysis and allows for shifting of the final alignment within the 200 foot planning corridor).

A decision by Virginia Tech about a preferred connection into the Virginia Tech Campus and the Virginia Tech Corporate Research Center is pending, and the ultimate location of the connection also clearly affects the placement of the project’s eastern terminus at the Route 460 Bypass. While the pink line shown in Exhibit 13 depicts a Southgate Drive optional alignment tying into existing Southgate Drive at the Route 460 Bypass, the ultimate tie-in point could be located anywhere between the blue and pink lines. Consequently, the alignment of the Route 460 Connector would be located within the hatched area shown on the map, but the specifics of the corridor placement within the hatched area would be dependent on land use and transportation decisions still to be made by Virginia Tech and/or the Town of Blacksburg. Note that, with the exception of a connection to the Warm Hearth community, optional alignments (i.e., those not following the blue line in Exhibit 13) would include the same project details (roadway type, lanes, etc.) listed above. Optional alignments, at this time, do not include a direct connection to the Warm Hearth community, and such a connection is not included in the cost estimates described below.

Exhibit 14 summarizes the estimated cost and potential impacts of the study recommendation and the optional Southgate Drive alignment.

Exhibit 14
**Environmental Impacts and Costs
of Recommended Alignment**

| Description | Recommended Alignment | Recommended Alignment with Optional Alignment Connecting to Southgate Drive |
|--|-----------------------|---|
| Length of improvement (lane miles) | 11.40 | 9.06 |
| Total estimated cost (\$ millions) | \$79.96 | \$73.44 |
| Estimated cost – roadway (\$ millions) | \$63.38 | \$58.40 |
| Estimated cost – structures (\$ millions) | \$6.77 | \$7.37 |
| Estimated cost – right-of-way (\$ millions) | \$9.81 | \$7.67 |
| Floodplain impacts (acres) * | 2.6 | 1.9 |
| Agricultural/Forestal district impacts (acres) * | 8.3 | 8.3 |
| Potential residential displacements * | 4 | 5 |
| Potential commercial displacements * | 0 | 0 |
| Historic district (acres within impact area) * | 0 | 0 |

Cost estimates are planning level and are subject to change based on further study and refinement. Costs are in year 2006 dollars.

** Impacts are calculated based on 200-foot corridor widths. Note that many of the impacts would likely be reduced and/or mitigated through design refinements made as part of the final design process.*

A public hearing to review the draft recommended concept was held on March 19, 2008. A total of 42 people attended the meeting. Drawings showing the recommended concept were shown at the meeting, along with display boards describing the identified need for the project, environmental and socio-economic constraints, and the multi-stage alternatives development process. A formal public comment period was set aside at the meeting, and four people chose to speak during this time period. In addition, five letters or e-mails were received prior to the public meeting, and 17 comment forms were received either at the meeting or were mailed in prior to the end of the comment period. The following summarizes the public input received:

- **Oral comments:** Three of the four speakers were generally in favor of the project. The fourth speaker, while not specifically opposing the project, voiced concern about the additional traffic that could potentially be added to Southgate Drive east of the Route 460 Bypass. One of the speakers requested the addition of either one or two additional connections from the proposed Route 460 Connector to Merrimac Road. One speaker, a commuter to Virginia Tech from Pulaski, indicated support for the project and highlighted the substantial benefit it would provide to improve accessibility to the Blacksburg/Christiansburg/Virginia Tech area from the west.
- **Written comments:**
 - Two comments included support for the optional connection to Southgate Drive.
 - Three additional comments opposed the optional Southgate connection, and also included support for reinstating previous plans for a Hubbard Street extension project.
 - Two comments supported the project, but also included opposition to the optional connection at Southgate Drive. One of these two comments also incorporated a request to move the proposed Route 460 Connector as far away from Tall Oaks Drive as possible (similar comments are described in the bullet item below).
 - Three of those commenting, while not supporting the project, requested that if it does proceed, consideration be given to moving the Route 460 Connector as far away from Tall Oaks Drive as possible.
 - One comment included support for the project but indicated that it needed to be included in a comprehensive transportation plan for the Town of Blacksburg in order to fully assess its impacts on traffic flow within the Town. This request was based on concerns about adding more traffic to Southgate Drive east of the Route 460 Bypass.
 - One comment included a request to shift the Warm Hearth connection to the west (to the edge of the current Warm Hearth property).
 - One comment indicated that improvements would be needed on Prices Fork Road past (south of) the location where the proposed Route 460 Connector intersects Prices Fork Road (western terminus).
 - One comment supported the project, but also included a recommendation to grade-separate any locations where pedestrians and/or bicycles would

cross. It was also suggested that the off-road trail should connect to other trails in Montgomery County.

- One comment did not support the project because it was felt that it would not reduce traffic on Prices Fork Road.

6. Next Steps

As indicated previously, the goal of this study was to identify the most feasible and practical planning alignment for a possible connector between the Route 460 Bypass and Prices Fork Road south of the Prices Fork community. The establishment of this alignment allows Montgomery County to preserve rights-of-way for such a road that could be constructed if and when funding is identified and local and state decisions are made to proceed with project development, design, and construction. The establishment of a planning alignment also serves as an important tool that allows informed decision-making by local land-owners with respect to long-term land use and accessibility plans. The first follow-on step from this study is the adoption of the study's planning alignment into the Montgomery County Comprehensive Plan and, where appropriate, the adoption of appropriate regulatory actions (such as zoning and/or subdivision changes) in order to proactively implement and preserve the recommended alignment.

The Route 460 Connector project is included in the "Vision Plan" portion of the region's 2030 Transportation Plan. This means that funding has not been identified for location studies, design, right-of-way acquisition, or construction within the 2030 Plan's 20-year timeframe. It is important to note, however, that the 2030 Plan is a dynamic document that could be amended to include this project if and when funding is identified (regional long-range transportation plans are also updated every five years). Should this occur, along with local government decisions to advance the project and make it a priority, the project would then advance in the project development process. At that point, environmental studies would be performed (at a substantially higher level of detail than was performed for this study). These studies would include extensive opportunities for public involvement. While the alignment proposed for this study is very likely to be one of those studied in detail (particularly if local government actions have been successful in preserving the corridor and land use plans have incorporated the alignment), it is important to recognize that this is not guaranteed.

Following environmental and detailed project location studies, the project would then be designed and right-of-way would be purchased. As with the environmental studies, public participation and input is an important part of the design process.

Appendix A

Mapping of Minority and Low-Income Populations

The mapping on the following pages shows locations of minority and Hispanic populations, as well as low-income populations. The information shown is based on information provided by the US 2000 Census. Minority and Hispanic populations are shown by Census block. Income data is only provided at the Census tract level, so low-income information is shown by Census tract. The low-income population mapping is based on percent of households where income in 1999 was below the federally defined poverty level.

Exhibit A-1
Minority Populations in the Study Area

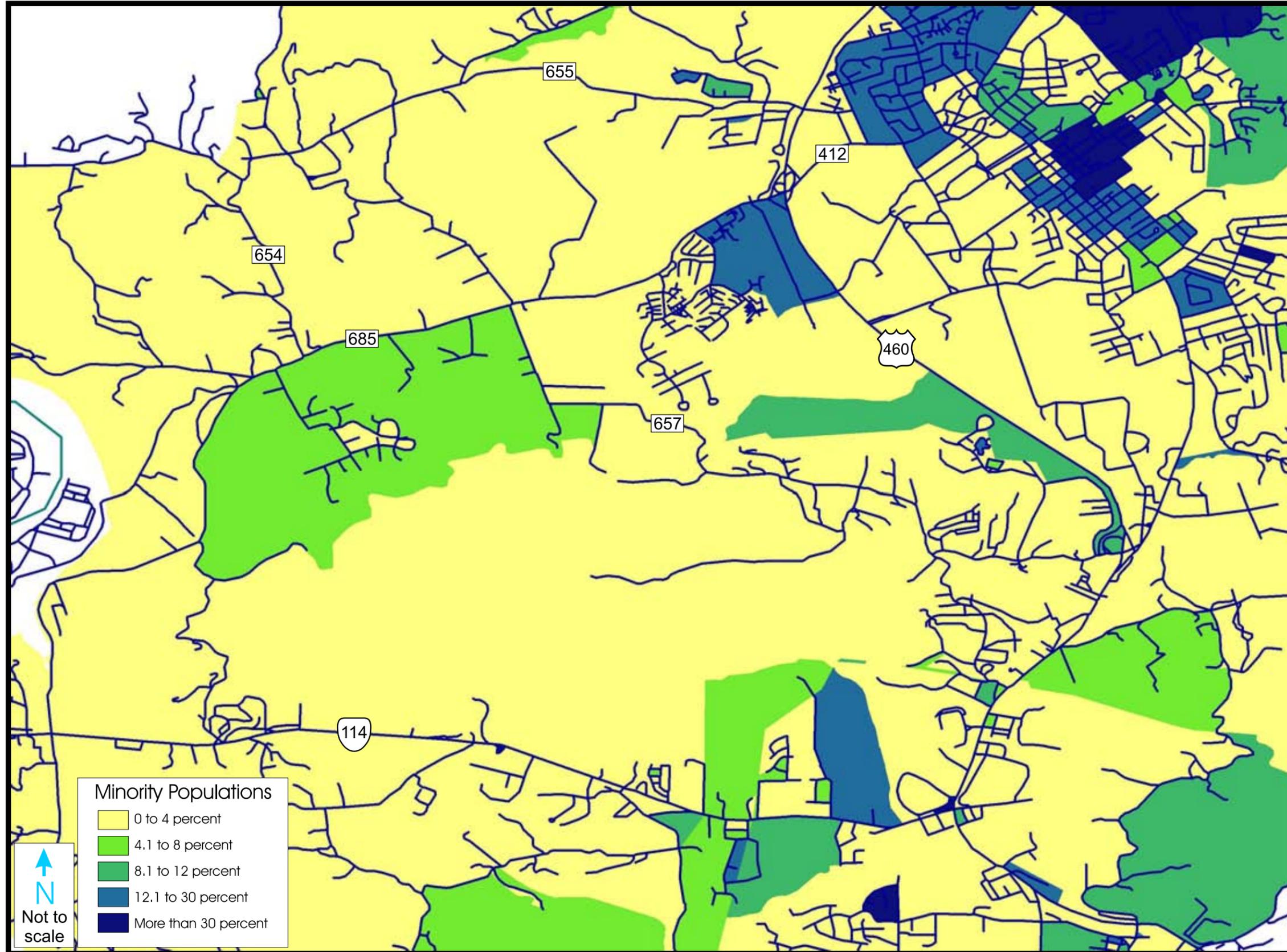


Exhibit A-2
Hispanic Populations in the Study Area

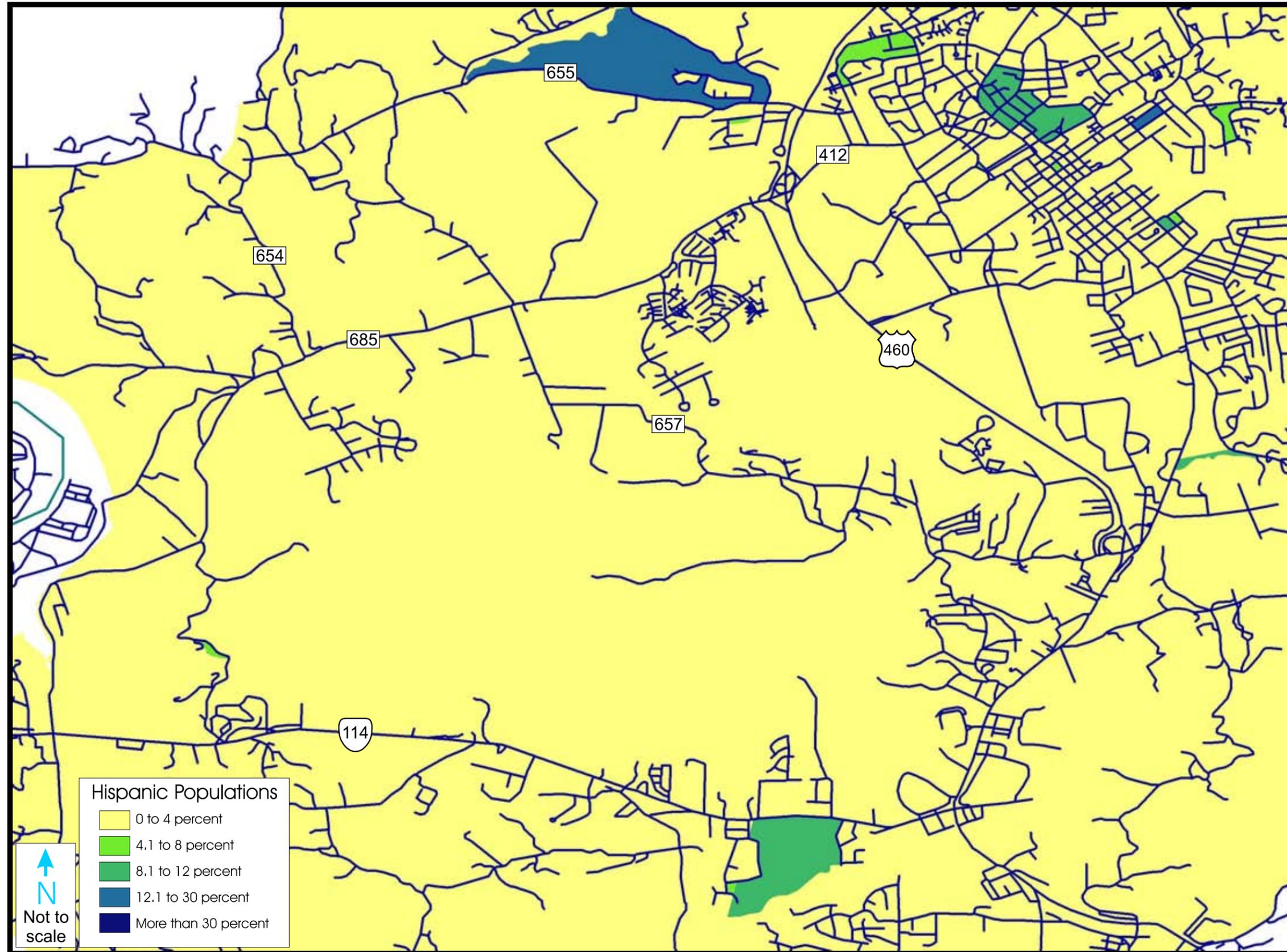
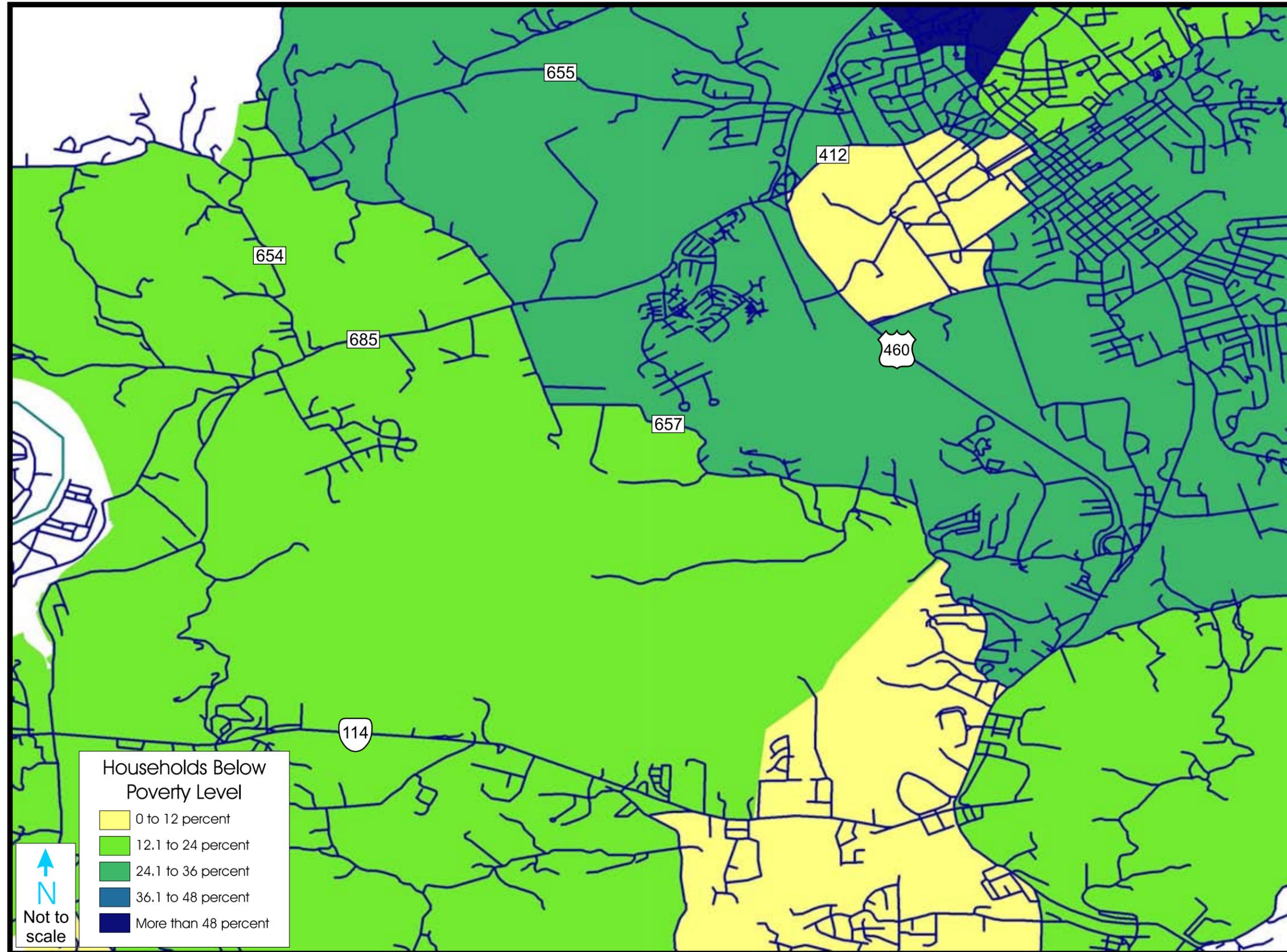


Exhibit A-3
Low-Income Populations in the Study Area



Appendix B

Data Sources and Study Methodologies

This study made extensive use of existing data sets for traffic analysis, population and employment forecasts, travel demand forecasts, constraints identification, environmental overviews, and conceptual engineering. Traffic analysis and travel forecasting databases included traffic counts developed as part of the development of the region's *2030 Transportation Plan*, published in November 2005. Population and employment data sets for used for the study were also originally developed for the *2030 Transportation Plan*.

Travel forecasts were developed using the region's computerized transportation model which was last updated and validated for the *2030 Transportation Plan*. The model, developed using industry-standard TP+ modeling software, used 2003 as its base year and 2030 as the horizon year. For this study, each of the alternatives were coded into the model and year 2030 forecasts were obtained based on model runs and checks for reasonableness.

The primary source of data for constraints identification, environmental overviews, and conceptual engineering was geographic information system (GIS) mapping databases provided by Montgomery County. These data sets included:

- aerial photography
- agriculture/forest district boundaries
- conservation easement boundaries
- historic district boundaries and locations of historic resources
- approximate floodplain boundaries
- locations of rivers and streams
- locations of prime soils
- locations of mines and karst (cavern) features
- locations of habitat for threatened and endangered species
- locations of community features including fire/rescue stations, hospitals, trails (Huckleberry Trail), churches, cemeteries, schools
- tax parcel boundaries and existing zoning

US Census data for the year 2000 was used to develop mapping with respect to minority, Hispanic, and low-income populations.