



Creating and  
Connecting  
Communities  
in Northern Albemarle

# US 29 NORTH CORRIDOR TRANSPORTATION STUDY

## FINAL REPORT



Prepared for



Meyer, Mohaddes Associates  
Community Design + Architecture  
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August 18, 2008

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## Introduction

The objective of the US 29 North Corridor Transportation Study is to develop a context-sensitive, multimodal transportation plan for the 10 <sup>3</sup>/<sub>4</sub> -mile long US 29 Corridor from the Route 250 Bypass to the Greene County boundary. Within the Corridor, the southernmost portion south of Hydraulic Road is in the City of Charlottesville. The major portion of the corridor is in Albemarle County. As such, the US 29 North Corridor Transportation Study was performed in conjunction with development of the Places29 Master Plan by Albemarle County and their planning consultant.

This study builds on and incorporates the recommendations developed in the *29H250 Intersections Study* that was prepared in 2004 by the Thomas Jefferson Planning District Commission. The 29H250 work established the following goals for the US 29 North Corridor:

- Improved function for all transportation types (regional and local auto, truck, transit, pedestrian, bicycle, and ADA)
- Access and safety maintained during construction
- Financially feasible in terms of construction cost and minimizing lost tax revenue.
- Near-term economic impacts are balanced with long-term gains.
- A context-sensitive road network that supports redevelopment opportunities and a mix of uses.
- Improved landscape quality and stormwater systems, and the visual character of private development and streetscape are enhanced.

## Existing Conditions

US 29 (Seminole Trail) is a multi-lane principal arterial that transitions from rural to urban as it traverses the corridor. US 29 is characterized by the following four basic cross sections:

Segment	Basic Cross Section
1. US 250 Bypass to Hydraulic Road	Six lanes with median and curb and gutter, right and left turn lanes, no parking, no bike lanes, sidewalks on both sides of the roadway.
2. Hydraulic Road to the South Fork of the Rivanna River	Eight lanes with median and curb and gutter, right and left turn lanes, no parking, no bike lanes, sidewalks on both sides of the roadway.
3. North of the South Fork of the Rivanna River (except Hollymead Town Center)	Four lanes with wide median, narrow shoulders, side swales, no parking, no bike lanes, no sidewalks.
4. Hollymead Town Center (Timberwood Blvd to Airport Rd)	Six lanes with median and curb and gutter, right and left turn lanes, no parking, no bike lanes, no sidewalks.

Average daily traffic (ADT) volumes on US 29 range from about 35,000 vehicles per day (vpd) at the Greene County boundary to about 50,000 vpd near Polo Grounds Road and climb to over 60,000 vpd near the US 250 Bypass. At the Bypass, traffic on US 29 distributes to both directions of the Bypass, which substantially reduces the volume of traffic on US 29 as it becomes Emmet Street in the City of Charlottesville.

In addition to the US 250 Bypass, other major intersecting roadways are Hydraulic Road and Rio Road, which carry volumes that range from about 15,000 vpd to over 30,000 vpd. Another group of intersecting roads that carry ADT volumes in the range of 5,000 to 10,000 vpd includes Airport Road, Hilton Heights Road, and Greenbrier Drive. The other intersecting roadways and driveways have lower daily traffic volumes.

The signalized intersections on US 29 in the Northern Development Areas operate in acceptable conditions during the peak periods, except for the locations from Hydraulic Road to the US 250 Bypass. In the northern portion of US 29, where more of the intersections are unsignalized, traffic on the side street approaches at these intersections experiences long delays during peak periods, but otherwise can access the roadway. There are congested intersections on Hydraulic Road between US 29 and the US 250 Bypass. Travel time data collected for the corridor indicates that peak period travel on northbound and southbound US 29 north of Polo Grounds Road is at or near the posted speed limit. South of Polo Grounds Road, peak period travel is also at or near the speed limit, except near Rio Road and from Hydraulic Road to the US 250 Bypass. There is a high volume of large vehicles in the traffic stream on US 29. Truck volumes on US 29 range from 2% to 13% of total traffic and average about 6% of total traffic. This volume of heavy vehicles, when combined with the rolling terrain present in the US 29 corridor, causes periodic queuing upstream of intersections. This queuing is a function of the longer time taken by trucks on an up-grade to start up after stopping for a traffic signal. The travel time observations show that such queuing does occur, but is isolated and does not occur on a regular basis, except at the congested intersections noted above.

The traffic volume pattern noted above is the product of several factors, the primary of which is that Albemarle County and the US 29 North Corridor in particular attract regional travel from neighboring areas. Commuting patterns from the 2000 Census indicate that people from neighboring counties and cities come to work in Albemarle County and the City of Charlottesville. Similarly, among workers who reside in Albemarle County, a vast majority of residents commute to jobs in either Albemarle County or Charlottesville. Few commute to the Richmond or Washington Metro Areas. This means that there is a concentration of traffic along destination corridors where employment, retail, and residential land uses are located. The developed portions of Albemarle County adjacent to the US 29 North Corridor are both a major attractor of regional and local travel, as well as a generator of trips by residents living in these areas.

When these movement patterns are viewed in relation to US 29, they show that about 10 percent of the daily travel is from trips that travel through the corridor to destinations outside the Charlottesville Metro area. Another 25 percent of the daily travel is people commuting in and out of the corridor to and from neighboring counties. The trips that originate within the corridor and the City of Charlottesville that travel to jobs, services, and shopping in the corridor are about 65 percent of the daily travel on US 29. Figure 1 provides an illustration of these travel characteristics.

## Future Trends

What is significant about the above relationships is that as growth occurs in the region, this pattern of activity that focuses travel on the corridor will continue to intensify. The travel demand forecasts prepared for the UnJAM 2025 regional plan indicate that traffic growth on US 29 north of the US 250 Bypass will add approximately 20,000 vpd to the existing traffic counts. In 2025, the UnJAM Plan projects that volumes on US 29 near the US 250 Bypass will be approximately 80,000 vpd. Further north in the corridor, volumes of over 50,000 vpd are projected north of Airport Road.

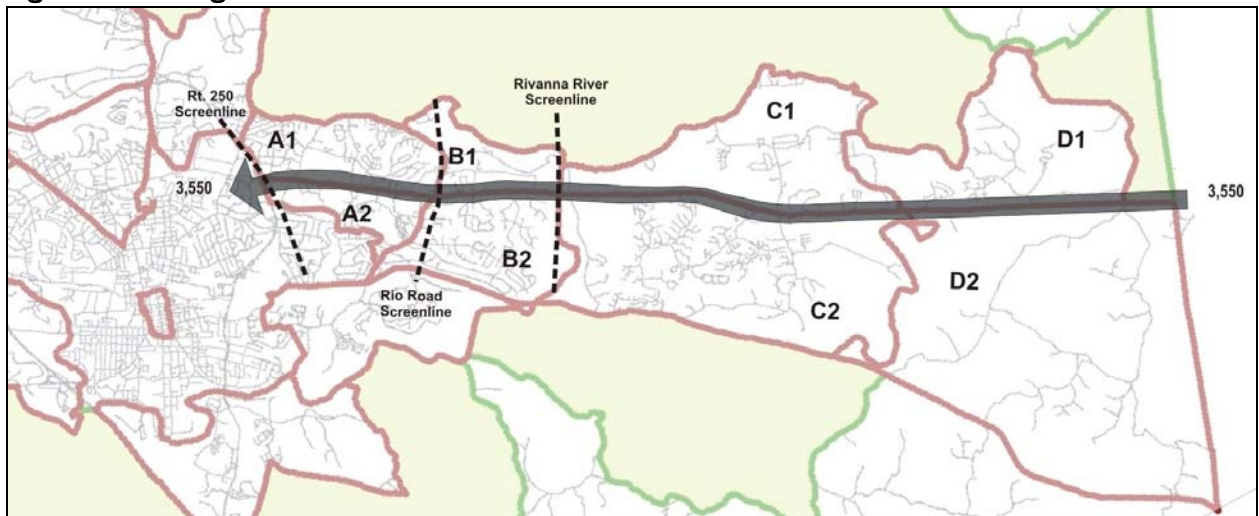
The projected future traffic by 2025 would be sufficient to more than triple existing travel times in the corridor and to congest peak period intersection operations throughout the corridor.

## Defining the Problem

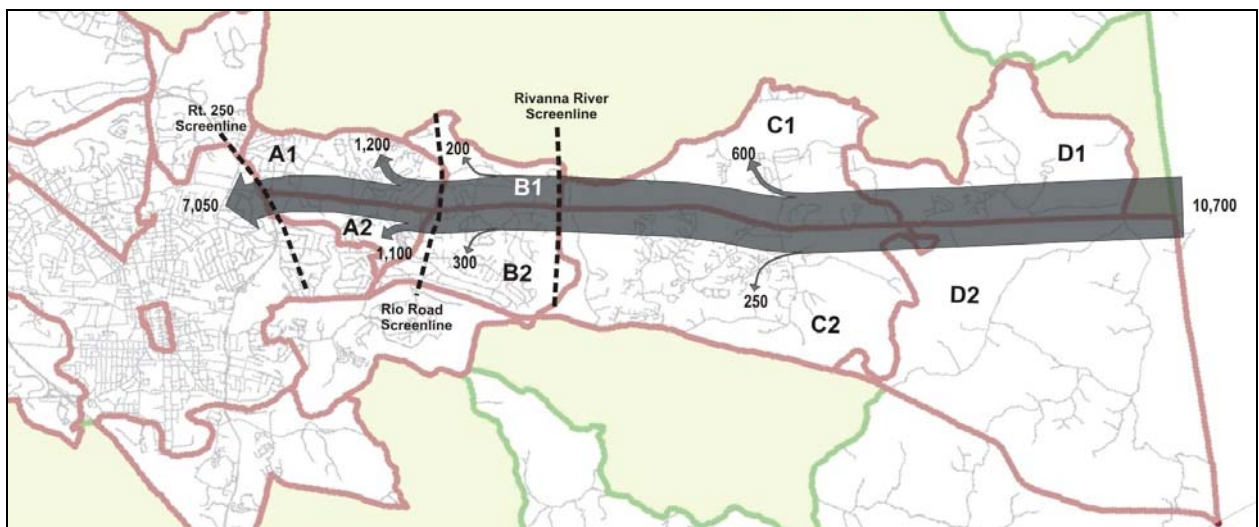
From a traffic operations standpoint, these travel patterns combine to form conditions where US 29 carries very high northbound and southbound volumes of traffic at all intersections. The current design of the roadway is organized to accommodate these traffic volumes reasonably efficiently – at the expense of delaying turning and crossing multimodal traffic at intersections.



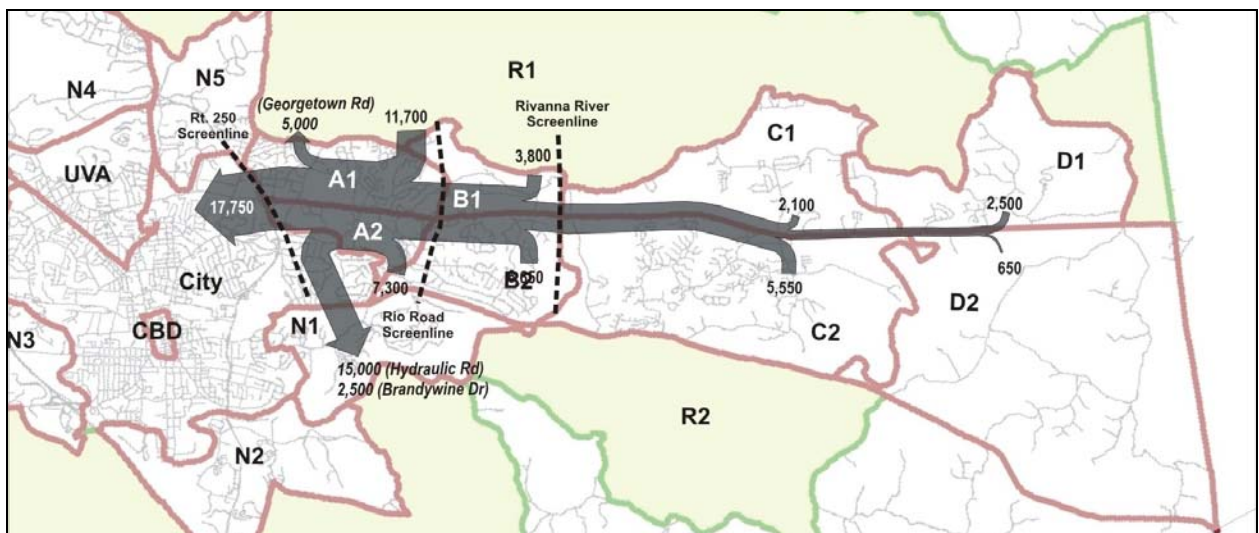
Figure 1. Existing Corridor Travel Characteristics



Through-corridor Travel



Neighboring County Travel



Intra-Corridor Travel

As long as the turning and crossing traffic volumes are sufficiently small, the system functions. However, where there are larger movements of turning or crossing traffic (e.g., at the US 250 Bypass, Hydraulic Road and Rio Road), the resulting conflict between them and the high northbound and southbound volumes on US 29 causes substantial peak period queues to develop at these locations. As traffic continues to intensify in the US 29 North Corridor, locations that are currently functioning well will reach a tipping point and begin to experience similar queuing during peak periods.

Simply put, the basic “problem” is one of supply and demand. The demand part of the problem is that the US 29 North Corridor is a place that people not only want to *go through*, but want to *go to*. The supply part of the problem is that US 29 is the only continuous north-south roadway in the corridor<sup>1</sup> – which means that at one point or another, all traffic in the north corridor winds up on US 29 regardless of the length or destination of the trip.

The 29H250 Intersections Study effectively defined a strategy for untangling the “to” and “through” traffic by combining selected improvements to US 29 with improvements to a network of parallel and connecting streets. The 29H250 strategy:

- Highlighted the relationship between local and regional traffic on the US 29 North Corridor and illustrated the benefit of providing separate facilities for shorter distance trips in the corridor to protect capacity on US 29 for longer distance trips
- Illustrated the value of selected interchange improvements to reduce delay and to extend the useful life of the current facility as well as to provide for effective bicycle and pedestrian crossings of US 29
- Illustrated the value to the primary system of adding streets in the secondary and local systems
- Illustrated that opportunities for development and redevelopment and transit readiness were enhanced by the network of parallel local roads
- Established US 29 as an urban expressway supported by a network of parallel and perpendicular local streets

The strategy works by recognizing that adding capacity for through traffic on US 29 is, by itself, not sufficient to resolve the long term problems in the corridor. Rather, it is a combination of improvements to US 29 *and* to the parallel and connecting network that is needed, augmented by transit and a land use pattern that encourages more trips to be made by walking and bicycling.

The combination of on- and off-US 29 improvements provides for more uniform operating conditions on US 29 and addresses the long-term issues by providing a network of streets that allows the pattern of development to evolve in ways that are more supportive of walking, bicycling, and transit. There are two added benefits to this strategy. One benefit is that the pattern of development encouraged by the parallel road network improvements is more transit-ready and supportive of bicycling and walking for shorter trips than a pattern of development that continues to concentrate on US 29 frontage alone. The other benefit is that the improvements both to US 29 and to the parallel road network are not needed all at once and can be implemented incrementally over time as development and growth occur in the corridor.

## Alternatives Development and Evaluation

At the southern end of the corridor, the above strategy resulted in development of three alternative concepts for the triangle of US 29, the US 250 Bypass and Hydraulic Road. The selected concept introduced a compact interchange at Hydraulic Road and combined it with improvements to the

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<sup>1</sup> In this context, US 29 is part of and is recognized as a major regional link in the National Highway System.

existing interchange at the US 250 Bypass. A network of parallel streets was developed on the east side that extended Hillsdale Drive south to the US 250 Bypass. On the west side of US 29, the parallel network was centered on Cedar Hill Drive extending north to Greenbrier Drive.

The Needs Analysis<sup>2</sup> pointed out that continuing the existing linear pattern of development in the US 29 North Corridor was one element in the complex problem of roadway capacity in the corridor. Consequently, in developing alternatives for the corridor, it was important to test different land use and urban structure arrangements to determine if modifying the pattern of development could change the overall corridor transportation needs. This approach was integrated with the development of a master plan for the Northern Development Areas of Albemarle County (an area also referred to here as Places29). In Albemarle County, the Neighborhood is the fundamental unit of planning. The Neighborhood Model defines a Neighborhood as “a place where people can live, work, shop, and play. Its buildings, streets, and public and private areas relate well to one another by plan, not by happenstance.” The Neighborhood “is sized so that an average person can walk from its center to its fringe in five minutes. Within the Neighborhood, densities are mixed, as are uses.”<sup>3</sup> The Neighborhood Model is a part of the County’s Comprehensive Plan and guides development in the Northern Development Areas adjacent to US 29 north of the City of Charlottesville.

The concept of the Neighborhood is central to the County’s current growth policy in all Development Areas. It encourages new development to form compact and walkable Neighborhoods<sup>4</sup> that become the high quality urban environments and livable places that are attractive to current and future residents of the County and can result in reduced development pressure on the County’s Rural Areas. The basic structure of a Neighborhood is simple: a Neighborhood is the combination of two Place Types<sup>5</sup> – a Center and a *walkable area* around the Center.

To gauge the overall capacity necessary for the corridor, both the regional forecasts of growth and a parallel analysis of real estate market conditions<sup>6</sup> were evaluated against the pattern and scale of existing land use in the corridor. Demographic and economic trends for the Charlottesville Metropolitan Area and Albemarle County were evaluated to determine rates of population growth, existing and future household characteristics, and employment trends. Population and employment projections were made to identify potential growth over the next ten years and the market for future residential, retail, and office development was quantified in terms of supportable land uses in light of market demand.

Three sketch frameworks were developed to test the effects of organizing the centers and neighborhoods in different configurations to achieve the proper balance between land use activity and travel patterns in the corridor. Aside from development in specific locations that is already approved or proposed, the three sketch frameworks explored options for distributing the following land uses categories within the Development Areas: high and low density housing, mixed use, stand-alone retail, and employment uses. The sketch frameworks also explored shifting the boundaries of the Development Areas in several locations. The largest of the boundary shifts north of the South Fork of the Rivanna River, related mainly to roadway network extensions outside of the current Development Area boundaries. Each sketch framework was accompanied by a concept diagram that illustrated the distribution of mixed use and retail centers of varying sizes throughout the Places29

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<sup>2</sup> The Needs Analysis is documented in Technical Memorandum 6 available at [www.tjpc.org](http://www.tjpc.org)

<sup>3</sup> *The Neighborhood Model* - Albemarle County

<sup>4</sup> In addition, development is expected to follow the 12 Principles of the Neighborhood Model. These principles outline the most critical elements of the Model’s approach to development in the Development Areas. See the Neighborhood Model for a description of the 12 Principles and other general guidance regarding the planning and design of neighborhoods.

<sup>5</sup> Place Types and Centers are described more fully in Technical Memorandum 11: Preferred Alternative available at [www.tjpc.org](http://www.tjpc.org).

<sup>6</sup> The economic analyses are published under separate cover as part of the Places29 Master Plan.



area, as well as the relationship of the centers to a roadway network consisting of existing and proposed roads. The network of roads varied between each sketch framework, depending on the distribution pattern of the centers, as well as other variations related to transportation factors that were desirable to test.

The land use and urban form concepts initially developed to test urban structure are the following:

- Sketch Framework A – A linear development pattern that largely continued the pattern of development of recent decades and focused development on US 29 and major arterial roads. While some mixed use was introduced into the land use pattern in this sketch framework, it still contained a large amount of single-use retail development. The concept diagram showed a distribution of large and small centers with one major concentration in the larger US 29/Airport Road area. This land use pattern was paired with transportation network improvements that also focused on US 29 and targeted new roads parallel and perpendicular to US 29 in the areas where new development would occur. Overall, the development pattern in this sketch framework relied heavily on US 29 for access to adjacent land uses.
- Sketch Framework B – A development pattern that included a significant amount of mixed use development, much of which was focused in two major clusters of mixed use centers; one located in the area surrounding the US 29/Rio Road intersection and the other in the central portion of Hollymead. In addition, the sketch framework included most of Sketch Framework A's smaller mixed use centers along major arterials. This development pattern was paired with a transportation network that included numerous new roads that created routes parallel to US 29 and perpendicular connections between the parallel routes and US 29. This network allowed access to existing and new land uses that was less dependent on US 29.
- Sketch Framework C – A development pattern that located retail development and mixed use centers around connecting roads between US 29 and segments of parallel routes. The most significant concentrations of commercial activity are located between Hydraulic Road and Rio Road and in central Hollymead. The concept diagram showed a higher number of centers in the southern half of the corridor than in Sketch Framework A, but a lesser intensity of clustering around the immediate US 29/Rio Road intersection compared to Sketch Framework B. Sketch Framework C explored the transportation concept of two “bypass-like” roads along the western and easternmost edges of the development area boundaries. The alignments of these roads also traversed significant stretches of the Rural Areas adjacent to the Northern Development Areas.

The extension of the 29H250 network strategy to the northern portions of the corridor led to a set of roadway concepts that focused on network connectivity. The Existing plus Committed network<sup>7</sup> that included Meadow Creek Parkway, Hillsdale Drive Extended, and a number of other roadways to be constructed as part of approved development was used as the basis for developing the network concepts. The additional network connections and extensions identified in the UnJAM Plan (Berkmar Drive Extended, Northern Free State Road, and an Eastern Connector) were also incorporated into the network concepts. Independent of UnJAM, a concept for a “Ruckersville Parkway”- was also considered, as were new roadway connections not included in previous plans.<sup>8</sup>

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<sup>7</sup> Refer to Technical Memorandum 6: Transportation Needs Analysis for a discussion of the E+C network

<sup>8</sup> Refer to Technical Memorandum 9: Alternatives Analysis for detail on the networks. The Western Bypass alignment was not included since it had been previously analyzed and would not address the northern portion of the corridor. However, several of the alternatives incorporated aspects of the Western Bypass alignment.

Upwards of ten network alternatives were initially explored and then winnowed down to three primary alternatives. Alternate development frameworks for each of the network alternatives were identified and the combined land use and transportation alternatives evaluated to determine what level of improvements to US 29 would be most effective and which network connections and development patterns would best support the future of the corridor. In general, the three frameworks tested three different urban structures and four different networks:

Alternative 1:

- A linear development pattern that largely continued the pattern of development of recent decades and located most future development in the area north of the South Fork of the Rivanna River. Larger Centers (Community and Destination Centers) were primarily located adjacent of US 29.
- A road network that focused traffic on US 29 by widening US 29 to Lewis and Clark Road and minimizing new parallel routes between the northern and southern portions of the corridor.

Alternative 2:

- Larger Centers (Community and Destination Centers, as well as a “Midtown”) in this alternative were focused along parallel roads and more dispersed as compared to Alternative 3. The area around the Rio Road/US 29 intersection was treated as an opportunity for major redevelopment and its southwest quadrant developed into a “Midtown” – a mixed use area with a diverse urban character.
- A road network that distributed traffic over a symmetrical parallel network by extending Berkmar Drive and Northern Free State Road into the northern portion of the corridor, adding a parallel local street through Forest Lakes and not widening US 29 south of Hollymead.

Alternative 3:

- This alternative clustered the larger Centers (Community and Destination Centers, as well as an “Uptown”) around key intersections of US 29, Rio Road, and Airport Road. In general, development was focused on roads that provide perpendicular connections from US 29 to parallel roads and Berkmar Drive Extended. Development to the south of the South Fork included major redevelopment and reconfiguration of existing retail and services uses. New development north of the South Fork included the concept of an “Uptown” (north of Airport Road) intended as a vibrant mixed use area that also takes advantage of the employment concentration in the UVA Research Park and a close relationship to the regional draw of the airport.
- A one-sided parallel road network that focused traffic on the local road network on the west side of US 29; Alternative 3A considered Berkmar Drive extended (as both a two and four-lane street), while Alternative 3B looked at the Ruckersville Parkway concept

As part of the Alternatives Analysis<sup>9</sup> an analysis of the development capacity of each alternative was prepared. While the forecast for housing units and jobs used for the travel demand forecast in the year 2025 was kept constant across the three alternatives<sup>10</sup>, the overall development capacity for the three alternatives differed significantly. Table 1 shows a comparison of the overall development capacity for the alternatives and how much of the capacity would be used by the projected growth in 2025.

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<sup>9</sup> See Technical Memorandum 9

<sup>10</sup> Doing so enabled the best direct comparison between the different approaches taken in each alternative to the configuration of the transportation network. This comparison would have been rendered very complex and potentially confusing to the public, had it included additional assumptions about variations in projected growth rates for 2025.

**Table 1. Development Related Characteristics of Framework Alternatives**

	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
<b>Relationship Between Housing and Employment</b> (numbers include existing development) (2005: 14,200 units and 15,900 jobs) (2025: 21,000 units and 39,800 jobs)	Buildout: 32,200 existing and new units (48% change by 2025 and 127% change at buildout)  93,100 existing and new jobs (150% change by 2025 and 486% change at buildout)	Buildout: 39,500 existing and new units (48% change by 2025 and 178% change at buildout)  93,800 existing and new jobs (150% change by 2025 and 490% change at buildout)	Buildout: 37,800 existing and new units (48% change by 2025 and 166% change at buildout)  128,400 existing and new jobs (150% change by 2025 and 708% change at buildout)
<b>Compactness of Development</b>	8.5 units/acre (Average Residential Density) 90 employees/acre (Average Density of Jobs)	9.6 units/acre (Average Residential Density) 82 employees/acre (Average Density of Jobs)	9.9 units/acre (Average Residential Density) 91 employees/acre (Average Density of Jobs)
<b>Amount of "Greenfield" Vs. Redevelopment</b>	2,500 acres of development between 2005 and buildout: - 87% of Total New Growth is Greenfield Development - 13% of Total New Growth is Redevelopment (existing commercial uses – not residential)	2,900 acres of development between 2005 and buildout: - 81% of Total New Growth is Greenfield Development - 19% of Total New Growth is Redevelopment (existing commercial uses – not residential).	2,800 acres of development between 2005 and buildout: - 81% of Total New Growth is Greenfield Development - 19% of Total New Growth is Redevelopment (existing commercial uses – not residential)

Alternative 1 had the lowest overall development capacity in residential, non-residential, and retail land use categories, and therefore has a higher proportion of its capacity used by 2025, while Alternative 2 had the most housing capacity and slightly more employment capacity than Alternative 1. Alternative 3 had the highest overall capacity for both residential and commercial development and therefore has the most future development capacity remaining after 2025.

Using Alternative 2 as an example, the pie charts in Figure 2 illustrate this information as a percentage of the overall development capacity (beyond the 2025 time horizon) for residential and employment uses (retail plus all other non-residential uses). The entirety of the circle in each chart represents the overall development capacity of the Places29 area. This includes existing development (blue), approved and proposed or "Pipeline" development (red), the share of capacity representative of the difference between approved and proposed development and the state demographer's 2025 growth projections, and the remaining capacity after accounting for all of the above (green). Both charts illustrate the large amount of capacity in this alternative that remain for both residential and employment uses beyond the 2025 time horizon.

Figure 2 illustrates the importance of already approved, proposed, or active projects<sup>11</sup> with respect to the 2025 growth projections used for the travel demand forecast of this transportation study. With respect to residential uses, the combination of approved, proposed, or active projects would accommodate almost 60% of the state demographer's projections for 2025. For retail uses, over 90% of the projected growth for 2025 is accommodated in approved, proposed, or active projects, while the percentage for non-residential uses is 60%.

<sup>11</sup> Active projects are projects that are known to planning staff, but for which no formal applications have been filed yet.

These figures indicated that a substantial portion of the 2025 growth allocated to the region already had its basic land use pattern and urban form defined by the year 2006. This analysis pointed to the significance of beginning the coordination of land use planning and transportation with projects already “on the drawing board” for the Places29 area. The breakdown illustrated in Figure 2 was the same for all three alternatives due to the assumption of equal 2025 growth rates for residential and employment (the state demographer’s numbers for housing units and jobs).

### Traffic Projections

Future demand on the transportation system was estimated for a 20-year planning horizon using a focused version of the regional travel demand forecasting model that calculates future traffic demand on roadway segments on the basis of projected employment and households in the region. The focused model was calibrated using existing counts and census data about trip making in the Charlottesville region.

Figure 3 shows a graphic comparison of the daily traffic volumes from the alternatives and the variant.

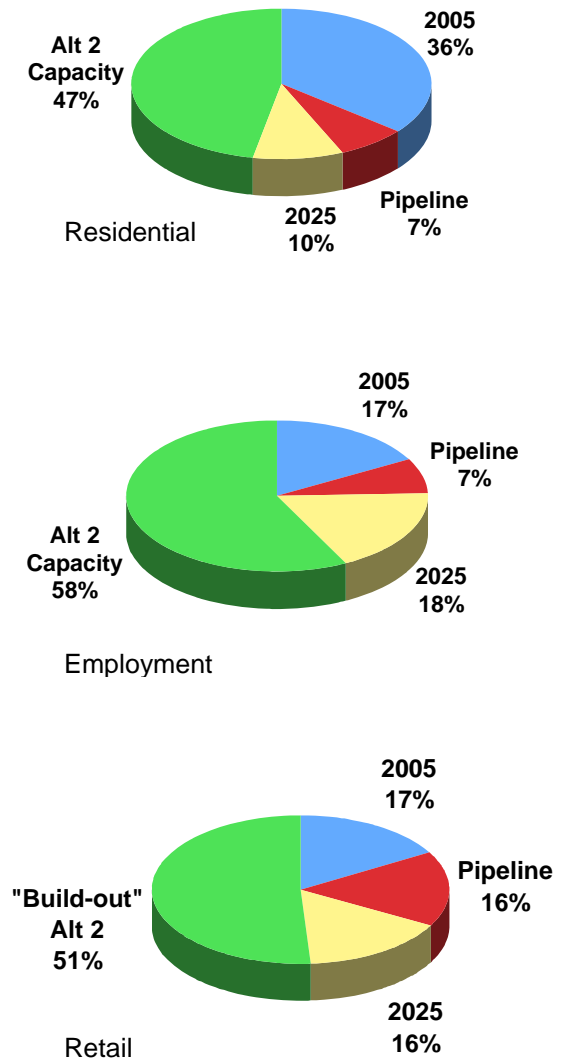


Figure 2. Development Capacity Phasing – Alternative 2

The alternatives have the following future traffic volume patterns:

- Alternative 1
  - Highest traffic volumes on middle and northern segments of US 29, particularly in the middle segment near Polo Grounds Road
  - Volumes on southern segment of US 29 similar to other alternatives
  - Lowest use of parallel network by corridor traffic
- Alternative 2
  - Lowest traffic volumes on middle segment of US 29 near Polo Grounds Road
  - Volumes on other segments of US 29 equivalent to or slightly higher than Alternative 3 volumes
  - Most use of parallel network by corridor traffic
- Alternative 3
  - Lowest traffic volumes on northern and southern segments of US 29, but volumes in middle segment near Polo Grounds Road higher than Alternative 2
  - Use of parallel network by corridor traffic less than Alternative 2, but higher than Alternative 1





- Alternative 3B
  - Volume pattern in the northern segments of US 29 similar to Alternative 3, but volumes in the middle segment near Polo Grounds Road are similar to Alternative 1
  - Ruckersville Parkway would carry volumes similar to Dickerson/Earlsville Roads in the other alternatives. Overall, the Ruckersville Parkway would carry less traffic than the combination of Berkmar Extended and Dickerson/Earlsville Roads in Alternative 3.

The evaluation of alternatives, which is described in detail in Technical Memorandum 9, indicated the following:

- At least one parallel roadway that is reasonably close to US 29 is needed to connect the northern and southern portions of the corridor<sup>12</sup> to provide for effective separation of local and regional traffic. The Ruckersville Parkway concept would not attract a sufficient amount of traffic to reduce the need for additional widening on US 29. Berkmar Drive Extended would attract enough traffic to allow the six-lane cross section to function on US 29. Combining Berkmar Drive Extended with the Northern Free State Road connection in Alternative 2 would result in the lowest volume on US 29 in the future at the crossing of the South Fork of the Rivanna River.
- The four-lane section of US 29 south of Hollymead would need to be at least eight lanes under Alternative 1, six lanes under Alternatives 3 and 3B and could remain at four lanes under Alternative 2.
- The 29H250 improvements recommended for US 29 at the US 250 Bypass and Hydraulic Road would be required in all three alternatives.
- A grade separation would be required at Rio Road to allow traffic to operate effectively in the southern half of the corridor.
- The need for additional grade separations at Greenbrier Drive, Timberwood Boulevard, and Airport Road is evident under Alternative 1, but is less clear under Alternatives 2 and 3.
- Widening US 29 north of Airport Road appears to be necessary in Alternative 1 and likely in the other two alternatives.
- The current pattern of access to US 29 needs to be managed to reduce the number of driveways and intersections in the southern portion of the corridor and to limit the number of new driveways in the northern portion of the corridor.
- Conventional intersection design would not be adequate to accommodate pedestrian and bicycle crossings of US 29 because of the need to maintain the large numbers of through and turn lanes on US 29 south of the South Fork of the Rivanna River under all of the alternatives. Alternative designs that provide for partial crossings of US 29 will be needed.

Alternative 1 included a Rapid Bus (higher quality buses, improved transit stops) on US 29 with stops located about one-half mile apart, near key centers and supplemental local service. A concept of two routes was illustrated that showed one line on US 29 that would connect the UVA campus and the UVA Research Park in Hollymead and a second line that would provide service on the parallel road network and US 29, connecting to Downtown Charlottesville.

Alternative 2 included Bus Rapid Transit (BRT) (higher-quality service than Rapid Bus: faster travel times, ticketing at stations, priority movement on streets) that would connect Centers along the parallel routes. A concept of two routes was illustrated with one line that would connect to

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<sup>12</sup> This finding is consistent with and reinforces the findings of the UnJAM study for Berkmar Drive Extended. These analyses also reinforced the need for parallel capacity north of the South Fork of the Rivanna River and validated the findings of the Western Bypass study that indicated that a Western Bypass in the southern half of the corridor would not attract sufficient traffic to preclude the need to improve US 29.

Downtown Charlottesville and primarily serve the east side of US 29 and a second line to the UVA campus that would serve primarily the west side of US 29.

Alternative 3 would have BRT or street car similar to Alternative 2, also with two routes. One line on the parallel road network that would connect to Downtown Charlottesville; and a second line mainly on US 29 that would provide a more rapid connection from Charlottesville and UVA to Airport Road, the proposed Uptown, and the concentrations of employment at the UVA Research Park, NGIC, and GE-Fanuc.

Parks & Green Systems include the public and semi-public open spaces that will serve active and passive recreation needs of the Places29 area residents, workers, and visitors. Green Systems include existing and proposed public open spaces (Civic Green Centers and public greens), as well as the network of linear open spaces (consisting of floodplains, stream valleys, steep slopes, and wetlands) throughout the Northern Development Areas. In addition to recreational uses, such networks provide ecological benefits to flora and fauna as well as the potential to create non-roadway connections for pedestrians and bicyclists to destinations located in and around the Places29 area.

All three Framework alternatives included nearly identical patterns of Green Systems elements. However, minor variations existed in the location and size of new public open spaces, mostly based on variations in the location and type of Centers they are associated with.

A preferred land use framework and transportation network were selected through a series of public workshops that are documented in Technical Memorandum 10. The findings from the workshops indicated the following:

- Alternative 1 was the least desirable - too much focus on US 29
- Alternative 2 was perceived as best for the southern portion of the corridor, while Alternative 3 was perceived as best for the northern portion of the corridor
- The Major Centers should be primarily oriented to parallel and perpendicular roads
- The Uptown at Airport Road was marginally preferred over the Midtown at the Rio Road/US 29 intersection. However, the size of the Uptown near the Airport should be reduced.
- The Centers around Rio Road and US 29 should be reconfigured to provide a looping road network around the interchange to make the Midtown a Mixed-Use Center
- Neighborhood Service centers should be dispersed to serve local community needs
- Employment uses should be concentrated in the northern area with some clusters south of the river
- Up to 20% of projected new growth should be via redevelopment in the southern portion of the corridor
- Clusters of mixed use and employment centers should establish target areas for transit and these areas should be planned as mixed use and transit ready
- Transit service should extend to the airport and be provided on the east and west sides of US 29
- Affordable and work force housing should be addressed
- Existing shopping centers should be redeveloped before they become obsolete and a detracting element in the existing environment. Redevelopment should be viewed as an alternative to greenfield development.
- New public open spaces should be integrated in future development
- Adding Berkmar Drive Extended as parallel road was deemed essential

- Parallel routes should be lower speed roads
- US 29 should be widened even with a network of parallel roads
- Grade separated crossings of US 29 were suggested for Hydraulic Road, between Greenbrier and Rio Road, at Rio Road, and at Airport Road
- Separate bicycle crossing should be included
- Substantial landscape buffers should be provided along US 29 north of the South Fork of the Rivanna River

## Preferred Alternative

The preferred alternative is comprised of a Land Use Framework and a Transportation Network. These components, while similar to those developed for the alternatives, were refined. A more detailed explanation of the Future Land Use Plan and Transportation Network is provided in Technical Memorandum 11.

## Future Land Use Plan

The Future Land Use Plan (see Figure 4) defines the land use pattern and neighborhood structure for the Places29 area. It is expected that the development capacity—the full implementation of the illustrated land use pattern and neighborhood structure—will occur many years or even decades after 2025. It is important to distinguish between growth projected to occur by the year 2025 and the potential development capacity of the Places29 area to accommodate land uses designated in the Future Land Use Plan.

- *2025 Growth Projections:* The traffic analysis takes in to account the growth projections for the Charlottesville/Northern Albemarle area as established by the 2025 regional growth allocation from the state demographer. Since projections from the state demographer cover the entire County, the consultant team used a proportional share to represent growth projections for the Northern Development Areas. The projected growth between the base year for this plan (2005) and the year 2025 are listed in Table 2 below. The majority of the projected growth will occur in already approved projects, with the remaining growth assumed to occur in areas surrounding these ongoing developments.
- *Potential Capacity:* Currently, no exact predictions can be made about growth rates and the spatial allocation of growth in the Places29 area beyond the 2025 time horizon. However, using the Future Land Use Plan, the potential development capacity, which is the capacity of an area of land to accommodate a designated land use, can be calculated. The calculations of potential development capacity for the Places29 area take into account the range of intensities and the mix of uses that are allowed within the different land use designations shown on the Future Land Use Map. Table 2 lists the possible range of potential development capacities for employment and residential land uses in the Places29 area.

It should be noted that it is unlikely that future development will consistently occur at the highest or lowest end of the range. So, it is very unlikely that the extreme lower or higher ends of the range will be the result of development beyond 2025.

**Table 2. Residential Units and Employment in the Places29 Area (Preferred Alternative)**

	Residential (Dwelling Units)	Midpoint of Range	Residential Change over Existing	Employment (Jobs)	Midpoint of Range	Employment Change over Existing
Existing (2005)	14,200	n/a	n/a	15,900	n/a	n/a
Projected (2025)	21,000	n/a	48%	40,900	n/a	157%
Development Capacity*	28,000 to 71,400	49,700	250%**	29,600 to 107,500	68,550	330%**
* Numbers include Existing and Approved Residential Units			**for Midpoint		**for Midpoint	







## Future Land Use Plan Description

The Future Land Use Plan follows the principles of the Neighborhood Model and organizes new development and major redevelopment to include a pattern of mixed-use centers with surrounding land uses oriented toward the Centers. In general, the desired pattern of development would result in all developed land in the Places29 Area being within one-quarter to one-half mile of a center. Established suburban neighborhoods like Forest Lakes, Raintree, Dunlora, Woodbrook, and others would retain their current land use pattern and would not include new mixed-use centers. However, all new development and major redevelopment would be located within one-quarter to one-half mile of either a Center (Civic Green, Neighborhood Service, Community, or Destination) or the Uptown.

In the Preferred Alternative, Neighborhood Service Centers are spaced along major roadways, such as Rio Road East, Rio Road West/Hydraulic Road, Lewis and Clark Drive, and Berkmar Drive (Extended), in order to provide increased pedestrian and bicycle access to the everyday goods and services offered in these Centers. These locations are also well-located from a market perspective, as the Centers have a visual and physical relationship with these major roads, making them accessible to additional clientele from outside the immediate neighborhood. The locations of Neighborhood Service Centers were determined by both the availability of opportunity sites (vacant or underutilized properties) and the concept of distributing these Centers to maximize their accessibility. The spacing of the Centers also allows them to have a relationship to potential transit stop locations.

There are two concentrations of Community and Destination Centers. One is located around the intersection of Rio Road and US 29. The second is the large area that includes the Hollymead Town Center, the proposed North Pointe development, and several other Centers around the intersection of Airport Road and US 29. This second area also includes the Uptown, a vibrant new urban center in the northern portion of Places29 similar to a traditional downtown area. Several of the Centers in this second area are the result of development that is now underway (Hollymead Town Center) or has been approved (North Pointe). The concentration of Community and Destination Centers at the intersection of Rio Road and US 29 reflects the area's existing retail function and the concentration of opportunity sites for major redevelopment.

Employment Mixed Use Neighborhood Service Centers are located at the intersection of Dickerson Road and Towncenter Drive, along a new loop road in Piney Mountain, at the southwestern corner of the US 29 and Airport Road intersection, and on Lewis and Clark Drive in the UVA Research Park. Some of these centers combine Urban Mixed Use and Employment Mixed Use. These Centers will serve employees whose workplaces are within walking distance of a Center. The Centers will not only provide cafes and restaurants that cater to employees at lunchtime, but also provide opportunities to shop for daily needs. The combination of employee activities associated with the Center will help to reduce the need for additional trips by car.

Civic Green Centers are not shown on Figure 4, as their specific locations are flexible to best fit in with future development proposals. However, approximate locations for Civic Green Centers are included on the Parks & Green Systems Map (see Figure 7). In general, a Civic Green Center is required for areas that are designated for development, but that are not located within one-quarter mile of a mixed-use center (Neighborhood Service, Community, Destination, or the Uptown). The location and spacing of Civic Green Centers will depend on the walking sheds of adjacent Civic Green and mixed-use centers.

In general, new residential uses outside of Centers are located around new mixed-use centers to create walkable residential neighborhoods (this approach is most clearly visible on the Framework Map in the areas north of the South Fork of the Rivanna). As discussed previously, locating residential uses around centers is a central component of the Neighborhood Model; it locates residences within walking distance (a 5- to 10-minute walk) of a mixed-use center that provides neighborhood-serving uses. The mixed-use center, in turn, depends on the residential areas for a customer base. The densities allowed under the urban density residential designation not only maximize the number of people benefiting from the proximity of centers, but also increases the economic viability of the centers and helps provide a range of housing choices.

Urban Mixed Use outside of Centers occurs adjacent to a few Neighborhood Service Centers, along portions of Berkmar Drive north of Agnor-Hurt Elementary School, and—most prominently—around the Neighborhood Service Center in the southwestern quadrant of the US 29/Rio Road intersection.

All areas designated Commercial Mixed Use on the Future Land Use Map are related to existing or already approved commercial development. Today, these areas consist of Community, Industrial, and Regional Service designations, such as strip malls, big box development, and other commercial development at a variety of scales. An important aspect of the redesignation to Commercial Mixed Use is the intended long-term transformation of single-use commercial areas into Commercial Mixed Use areas that include residential uses. In order for this integration to be successful, high quality site design will be required.

While the balance of employment uses<sup>13</sup> is located in the area north of the South Fork of the Rivanna, the area south of the river still provides opportunities for employment uses located in proximity to the substantial residential areas in Neighborhoods 1 and 2. The distribution of employment uses south of the South Fork of the Rivanna largely follows the pattern already established by existing uses in the Office|R&D designation, such as Sperry Marine, the Comdial Site, and a variety of smaller areas along Greenbrier Drive, Rio Road, and Berkmar Drive. The Future Land Use Map shows a concentrated cluster of Office|R&D in the Greenbrier Drive area. The majority of Office|R&D is located along US 29, Cedar Hill Extended, and Berkmar Drive Extended.

With the exception of a small area in the proposed North Pointe development, all employment uses in Hollymead are located west of US 29, where they form three different zones for Office|R&D, Light Industrial, and Heavy Industrial. A smaller area south of Airport Road and west of US 29 combines Light Industrial and Office|R&D uses. This clustering of employment will make Central and Northern Hollymead west of US 29 a major employment center. Airport Road, Dickerson Road, and Lewis & Clark Drive will serve as major access roads for these uses.

Approximately 28.7 percent of the land area designated as employment uses in Piney Mountain falls into the Office|R&D land use designation. This makes Piney Mountain, along with central and northern Hollymead, a major place for employment in the Places29 area.

It is expected that Albemarle County will build a new elementary school in the North Pointe development. The site for a new public library has also been proffered in this development.

The area around the intersection of Rio Road and US 29 is anticipated to redevelop into a vibrant mixed-use node of activity. It will include a cluster of Community and Destination Centers and a larger Mixed Use Neighborhood in the southwestern “quadrant” of the intersection. This mixed-use node is also referred to as “Midtown,” because of its location half way between the Uptown and the City of Charlottesville, and the future concentration of activity in the Uptown and the University of

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<sup>13</sup> Employment uses include Office|R&D, Light Industrial, and Heavy Industrial uses.

Virginia Research Park. The sequence of photo simulations in Figure 5 illustrates the transformation of the southwestern quadrant of the Midtown along Berkmar Drive. It also illustrates how this transformation occurs incrementally and can be driven by individual decisions (here just illustrated as an example) made by various property owners in the area.

The Uptown will be a new urban center in the northern portion of Places29 and is intended to serve the needs of many people in a relatively small area. People can walk throughout the area, patronizing various businesses and amenities. The Uptown will take advantage of the regional attraction of the airport, the University of Virginia Research Park, and the new regional retail activities in Hollymead Towncenter and North Pointe. The Uptown will provide a complementary and more urban place within this regionally attractive location. The Urban Mixed Use portion of the Uptown is anchored by restaurant and entertainment uses, and is paired with a strong Employment Mixed Use component that includes portions of the Research Park. This area may include a hotel and other uses that support the concept of living, working, and entertainment in the Uptown area. The ability to walk to urban services and entertainment from the campus-like setting of the Research Park should make it an even more attractive location for knowledge-based businesses. It is expected that in the mixed use areas, residential uses will be developed above retail or commercial ground floor uses (vertical mixed use). These areas may also contain some convenience retail, as well as urban open space and a significant recreational or civic facility.

Land uses in the Research Park shown on the Future Land Use Map are consistent with the University of Virginia Foundation's long-term, conceptual site plan. This includes the general location of developable areas, a Neighborhood Service Center along Lewis and Clark Drive, a residential land use component north of Lewis and Clark Drive, and public and semi-public open spaces and Greenways. The portions of the Research Park property that fall within the Uptown have been designated to fit with both the Research Park's mission statement and land use program for the area, as well as with the Employment Mixed Use characteristics envisioned for the Uptown. The goal is for the Research Park and the Uptown to enhance the viability and value of each other. The sequence of photo simulations in

Figure 6 illustrates how development in the Uptown is compatible with the Foundation's plans for office|R&D uses near the corner of Lewis and Clark Drive<sup>14</sup> and Airport Road. Most importantly, the sequence shows how, through strategic phasing and site planning, it is possible to develop a mixed-use building with first floor retail that marks the entrance to the Uptown and the Research Park. In the early stages of development in the Uptown, economics will likely require that the necessary parking for office and R&D buildings in the Research Park be located in surface parking lots. At this stage of the development, a mixed-use building at the corner is unlikely to be feasible. The site planning approach illustrated in the photo simulations, therefore, uses the future site of the desired mixed-use corner building as a surface parking lot until the increasing density of the surrounding buildings and changing market conditions make structured parking and the implementation of the mixed-use building feasible. The final image of the sequence indicates Bus Rapid Transit service to the area, which may be realized once the necessary ridership levels in the larger Hollymead area have been reached.

Airport operations at the Charlottesville-Albemarle Airport have impacts that require the Airport to be physically buffered from the surrounding areas. For this reason, the Airport has been classified as a single-use district, which is not required to follow the concepts of the Neighborhood Model. However, it is no less important that the Airport be well-connected and integrated into the Place29 transportation network, the City of Charlottesville, and the larger region. The Airport's continued growth will play an important role in the development of the Uptown, Hollymead, and the County.

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<sup>14</sup> Proposed by not yet constructed at the time of the writing of this document.







Over the longer term, the combination of the Uptown, the Airport, the Research Park, and other activities in the area are expected to create the opportunity to provide transit service between this northern node of activity and both the southern areas of the County and Charlottesville.

## **Parks & Green Systems**

Albemarle County's open spaces, natural features, and scenic areas are at the heart of the County's character and livability, and have attracted many residents to the County. These open spaces and the County's designated Rural Areas also provide a counterpoint to the urban character of the Development Areas and the City of Charlottesville, enabling residents to experience the high quality of life in Albemarle County.

Many goals and provisions of the County's Comprehensive Plan are devoted to maintaining the overall rural character of the County, as well as its open space and natural resources. These goals led to establishing the Development Areas and the use of the Neighborhood Model as a planning paradigm for creating walkable neighborhoods and desirable urban environments.

Because some of the new neighborhoods in the Northern Development Areas will be among the County's most urban places, it is important to maintain a sense of connectedness to the rural surroundings as well as the natural features and open space assets located within the Development Areas. It is equally important to provide an appropriate level of public parks that meet the recreational needs of current and future residents in the Places29 Area. The Parks & Green Systems Map (Figure 7) reflects the elements that will provide the desired open space network and connections to the surrounding areas as well as other key elements of the open space system that complement the land uses in the Northern Development Areas.

Figure 7 illustrates the system of public and semi-public open spaces that will serve the active and passive recreation needs of residents, workers, and visitors in the Places29 area. The map shows a network of linear open spaces that connect the various elements of green systems in the Northern Development Areas. Such networks provide ecological benefits to flora and fauna, can be integrated into stormwater management solutions, and be used to create non-roadway connections for pedestrians and bicyclists.

Finally, Figure 7 illustrates key public facilities, such as existing and planned schools, fire stations, and libraries. Combining the depiction of these facilities with that of bicycle and trail connections illustrates how schools and libraries can be accessed with non-motorized transportation modes.

With the exception of Humphris Park, existing public parks within the Places29 area are associated with public schools located in or adjacent to the area. New public parks will be included in every Community Center, Destination Center, Civic Green Center, and the Uptown.

Civic Green Centers are public open spaces of 1 to 3 acres in size that serve as main focal points for the surrounding residential or employment land uses creating a walkable neighborhood. Civic Green Centers may include a tot lot, playground, or other smaller scale facilities for active recreation as well as multi-purpose lawns and park areas dedicated to passive recreation.





Figure 7 illustrates only approximate locations for Civic Green Centers. Their final location will be determined either during the planning stages of larger rezonings or through the Small Area Plans. Their approximate location is determined by analyzing the extent of walkable areas around all Neighborhood Service, Community, and Destination Centers, as well as the Uptown. New development that falls outside of any of the walking sheds created by these mixed use centers requires a Civic Green Center in order to create a Neighborhood. The required Civic Green Center should be centrally located in the walking sheds formed by the mixed use centers.

Public Greens are a required element in Community and Destination Centers, and in the Uptown. These Greens are two to three acres in size and have a program similar to Civic Green Centers. Public Greens provide a focal point to the activity in a mixed use center that should be well-integrated into and centrally located in the fabric of the uses in these more intense Center types. It is encouraged that Public Greens be paired with civic or institutional uses, such as libraries, museums, day care or teen facilities, or community centers, in order to broaden the level of public activity and to extend the hours of activity into the evening.

Figure 7 also shows the two existing public parks in the Northern Development Areas that are not associated with schools. They are Humphris Park in Neighborhood 1, a park currently used exclusively for passive recreation, and a park in the University of Virginia Research Park north of Lewis and Clark Drive, which includes a variety of facilities for active recreation. The map also shows the planned, but as yet unprogrammed, public park land along the alignment of Meadowcreek Parkway in Neighborhood 2. This park land is expected to become available at the time of the construction of the parkway.

The semi-public open space designation combines significant clusters and contiguous areas of steep slopes with larger areas of semi-public open space in existing larger developments (e.g., Forest Lakes, Dunlora, or Raintree). Where this designation is shown on the map as extending onto individual private properties, it illustrates that steep slopes are present and that these may have a bearing on the way in which the property could be redeveloped. As long as no redevelopment occurs, the designation as Semi-Public Open Space on individual, already developed parcels will not require any change.

The map also illustrates how semi-public open spaces, areas of steep slopes, the 100-year floodplain, and existing and proposed stream buffers combine to create a significant and comprehensive open space network. Such open space networks can provide substantial ecological, visual, and recreational benefits. The land designated semi-public open space, 100-year floodplain, and existing and proposed stream buffers was used in identifying the alignments of proposed multi-use paths and trails also shown on the Parks & Green Systems Map. The proposed trails and multi-use paths and immediately adjacent open spaces represent proposed extensions to the County's system of Greenways and Blueways.

### ***Future Transportation Network***

The transportation network is composed of roadway, transit, pedestrian, and bicycle elements. A more detailed explanation of the transportation and design elements are provided in Technical Memorandum 11. The roadway network, as illustrated in Figure 8, is made up of the following layers:

- Improvements to US 29, which include improvements to parallel and connecting roads that are necessary to support the changes on US 29 (primarily in the areas where grade separations are recommended)



- Improvements to a core network of parallel roads (primarily Hillsdale and Berkmar Drives, Meadow Creek Parkway, and North Pointe Boulevard/Leake Lane) that are needed independent of private development projects
- Roadways necessary to support private development in the corridor that should be integrated into the corridor network to provide for continuity of movement
- Roadways projected to be needed beyond the 2025 planning horizon.

The transportation network for the portion of Places29 between the US 250 Bypass and the South Fork of the Rivanna River would introduce grade-separations at Hydraulic Road, Rio Road, and Hilton Heights Road. Parallel roadways in this segment are Berkmar Drive, Cedar Hill Drive, and Hillsdale Drive, portions of which currently exist. The transportation network would extend these roadways to provide a more complete network parallel to US 29.

In the portion of Places29 from the South Fork of the Rivanna River to Hollymead Towncenter, the transportation network would introduce a grade-separation at Ashwood Boulevard. US 29 would be widened to three lanes in each direction, but would preserve the rural cross section. A parallel road would be added on the west side of US 29 by extending Berkmar Drive with a connection across the South Fork of the Rivanna River on a new Berkmar bridge.

In the portion of Places29 from Hollymead Towncenter to Lewis and Clark Drive, two existing signalized intersections on US 29 would be replaced by grade separations at Airport Road and Timberwood Boulevard. A signal would be added on US 29 at the Airport Acres North intersection. A new parallel road on the west would extend from Airport Acres South to Timberwood Boulevard. North Pointe Boulevard (proposed) would provide a new parallel road on the east side of US 29. The roadway network in the Uptown would be expanded to increase connectivity on the west side of US 29. A signal would be added on US 29 at the intersection of Northside Drive. The six-lane cross section on US 29 would be extended through Lewis and Clark Drive, but would transition back to the existing four-lane cross section at the bridge over the North Fork of the Rivanna..

In the portion of Places29 north of Lewis and Clark Drive, signals would be introduced on US 29 at Austin Drive, Dickerson Road, and Burnley Station Road. The cross section of US 29 would remain a four-lane rural divided, except near the signalized intersections where turn lanes would be necessary.

The transportation network was refined through a series of detailed analyses. The growth potential was calculated for the Preferred Framework and another forecast of future traffic volumes was made using the forecast model. The forecast volumes were used to develop morning and evening peak-hour turning movement volumes for 2025. The volumes for the preferred alternative are, in most cases, higher than Alternative 2, but lower than Alternative 3.

During this part of the analysis, several variants were evaluated that considered the impacts of using lower speed designs on the parallel road network, whether Berkmar Drive Extended should be two or four lanes, and not including Northern Free State Road in the network. The Eastern Connector concept was evaluated for several different points of connection to the US 250 Bypass.

The parallel streets in the existing network (Hillsdale, Berkmar) are for the most part collectors with two travel lanes, with some minor arterial roadways that are four lanes in places. The expanded system of streets in the future road network follows this general principle and reflects the decision to use a basic two-lane, low-speed design for the parallel street network. An exception to this two-lane rule is the section of Berkmar Drive that would extend across the South Fork of the Rivanna River to Hollymead Towncenter. A low-speed four-lane design was selected for this segment of Berkmar to

provide the best balance of traffic on the extension and on US 29. Accordingly the Berkmar extension north of the South Fork of the Rivanna River to Hollymead Towncenter is proposed as a minor arterial with a four-lane design.

The network analyses indicated that if Berkmar Drive is extended across the South Fork of the Rivanna River, the Northern Free State Road connection would not be necessary within the 2025 planning horizon. However, the operations analyses showed that by 2025, several locations on US 29 would be near capacity to the extent that additional development in the northern portion of the corridor beyond 2025 would require additional improvements on US 29. In this post-2025 condition, Northern Free State Road would be required to relieve traffic on US 29. An Eastern Connector alignment that links to either Rio Road or Polo Grounds Road would reinforce the need for the Northern Free State Road connection across the river. Accordingly, preserving right-of-way for the roadway is included as an element of the preferred framework.

The Eastern Connector concept analysis evaluated three different possible alignments and connecting points. Connecting an Eastern Connector to Rio Road was shown to produce the most interaction with the US 29 North Corridor. Linking an Eastern Connector to Rio Road would increase the need for a direct southbound to eastbound ramp at the intersection/interchange of Rio Road and US 29, rather than a ring road as is included in the preferred network. Constructing Northern Free State Road would reduce the need for the direct ramp by intercepting traffic north of the Rivanna River.

Traffic operations for the projected conditions were evaluated at all the intersections in the corridor and the results were used to refine the design requirements for lane patterns, signalization, and turn storage requirements. This information was further analyzed using a traffic simulation model of the corridor that was calibrated to reflect existing travel times and queuing. From the simulation analysis, refinements to the roadway requirements were identified. The resulting findings were used to develop a roadway network for the corridor. The operations analyses indicated that most of the major intersections in the northern portion of the corridor would require signalization by 2025.

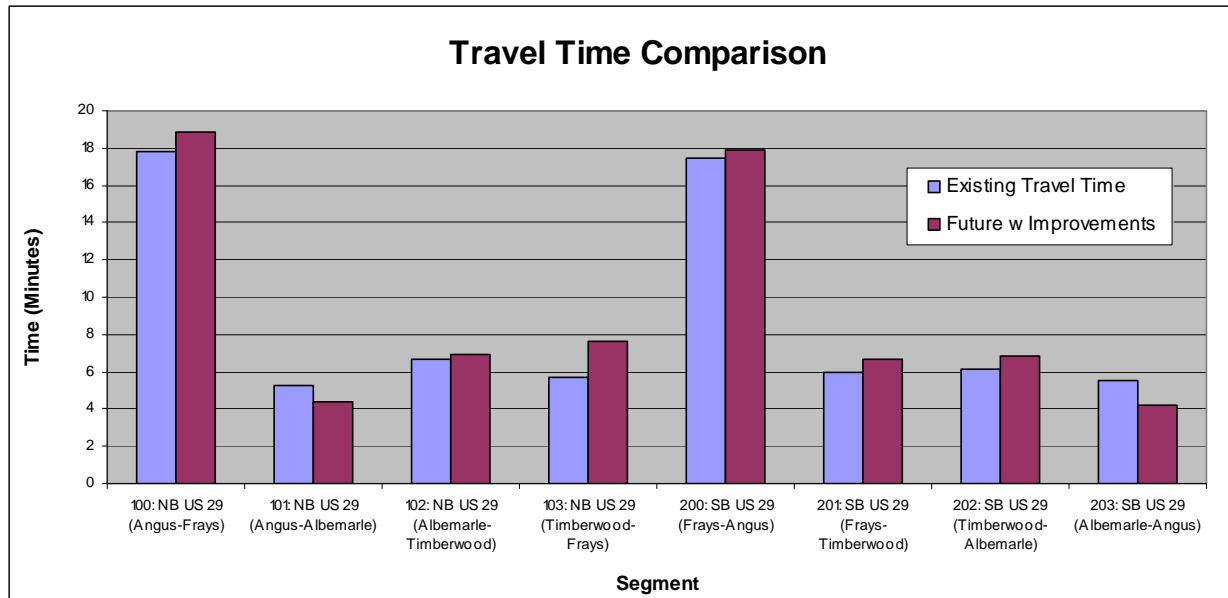
The 2025 conditions with the proposed roadway network are shown to have acceptable levels of operation of LOS D or better at most intersections along US 29 during both peak hours. The intersection of Seminole Square and US 29 is projected to be at LOS E in the P.M. peak hour.

To assess how well the Preferred Alternative would operate with its mixture of grade-separated interchanges and intersections, the VISSIM traffic simulation model<sup>15</sup> was used to determine travel times over the corridor. The analysis showed that the future modeled travel time is comparable to the existing modeled times, which means that the proposed roadway network would perform at similar levels of delay as the existing network does today, despite a substantial increase in traffic on the network. Figure 9 shows a comparison of travel times for existing and future conditions for multiple sections of US 29. These results illustrate that the recommended roadway network<sup>16</sup> would adequately serve the projected traffic volumes in the future.

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<sup>15</sup> The details of how the model was used are discussed in Technical Memorandum 5.

<sup>16</sup> The recommended roadway network includes the blue, yellow, and red roads in Figure 8, but not the red dashed roads.



**Figure 9. Travel Time Comparison: Existing and Preferred Alternative**

The preceding analyses determined the roadway design parameters that are needed for the future street network – the number of lanes by roadway segment, intersection turn lanes and storage lengths, where interchanges are needed, and what type of interchanges would be proposed. A conceptual network was prepared for the corridor that overlays the proposed elements on the existing network and topographic conditions in the corridor. Figure 10 shows the roadway layout in four sections and illustrates via color coding where new pavement and new structures would be necessary. The portions of the parallel network that are essential to the primary US 29 network are also differentiated from other portions of the parallel network similar to Figure 8.

The transit improvements recommended for Places29 are shown in Figure 11. Two types of service are included in the recommended network. One service type would be Bus Rapid Transit (BRT) or ultimately, Light Rail Transit (LRT) that would operate on US 29 and would provide a rapid connection from Charlottesville and UVA to Airport Road, the proposed Uptown, and the concentrations of employment at the UVA Research Park, NGIC, and GE-Fanuc. Widely spaced stops would be provided at Hydraulic Road, Greenbrier Drive, and on either side of the proposed Midtown adjacent to Rio Road. This rapid service would be supplemented with local circulator routes that would operate either as bus or street car systems. One of the two circulator routes would operate on the parallel routes on either side of US 29 in the area between Hydraulic Road and Albemarle Square, generally following Hillsdale Drive and Cedar Hill Road. The other circulator route would operate in the Hollymead area connecting North Pointe and the proposed Uptown with Hollymead Towncenter.

The transit network could be implemented in two phases. The initial phase would extend as far north as the Midtown at Rio Road. The second phase would extend to the Uptown at Airport Road. The Hydraulic to Albemarle Square circulator service could initially be an extension of the CTS routes that operate in the southern portion of the Places29 area today, whereas the route in the Uptown area would need to be new service.













In order to ensure transit use and to create the type of walkable neighborhoods and centers envisioned by the Neighborhood Model, it is critical that the future network of roads in the Places29 area be well connected and that each street includes appropriate pedestrian facilities. All future roads in the Places29 area are required<sup>17</sup> to include sidewalks or multi-use paths in order to accommodate pedestrian travel.

A critical element to the success of the bicycling and trails network is the ability to cross US 29 safely. The Parks & Green Systems Map (Figure 7) identifies locations where adjacent grades support the construction of grade-separated bicycle-pedestrian bridges or undercrossings, where grade-separated bridges for all modes of travel are proposed, and where at-grade crossings should be specifically designed to safely guide pedestrians and bicycles across the street.

A pedestrian-bicycle bridge is proposed to connect the east and west sides of US 29 in the Midtown area. The topography along the western edge of the Fashion Square Mall site supports the construction of such a connection without major structural supports on this side of US 29. On the western side, the needed ramps could be accommodated within a structure that presents a human-scaled façade at the corner of Berkmar Drive and US 29 (similar to that illustrated in the photo simulation in Figure 12,).



**Figure 12. Proposed Bike/Pedestrian Overpass**

At the two river crossings, opportunities exist to route multi-use paths or trails underneath US 29. Bicycle and pedestrian facilities will also be an integral part of any multimodal bridge across US 29. Where pedestrians and bicyclists cross US 29 at at-grade crossings, additional pedestrian refuges will be incorporated into the standard US 29 cross section. This condition is illustrated in Figure 13.

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<sup>17</sup> With exception of Residential and Commercial Alleys (as per County Neighborhood Model Street Design Standards)



**Figure 13. At-Grade Crossing with Enhanced Pedestrian Refuges**

The proposed bicycle and trails network shown on the Parks & Green Systems Map (Figure 7) allows bicyclists and hikers to travel north and south along routes parallel to US 29<sup>18</sup>. West of US 29, this is achieved through a combination of bicycle lanes and multi-use paths along the extensions of Cedar Hill Drive, Berkmar Drive, and Lewis and Clark Drive, stretching almost the entire north to south length of the Places29 area. East of US 29, Hillsdale Extended and the proposed new roadway connections through the Fashion Square Mall, Albemarle Square, and proposed Northtown Center properties allow for a similar approach. However, topographic conditions and already established land uses north of Northtown Center prevent a parallel route from extending further north. Instead, bicycles and pedestrians are routed on a 14-foot wide multi-use path along the east side of US 29. A parallel route is reestablished at Timberwood Boulevard and continues north through the North Pointe area. North of North Pointe, the route returns to the edge of US 29 due to the North Fork of the Rivanna River and the steep topography along the river's banks. All multi-use paths along US 29 will be separated from the highway by a 12- to 18-foot wide landscape buffer (see Figure 14).



**Figure 14. Example of Multi-Use Paths along US 29**

Bicycle and pedestrian facilities outside of the Northern Development Areas are not shown on the Parks & Green Systems Map, with the exception of multi-use paths along Earlysville Road and Proffit

<sup>18</sup> It should be noted that the bicycle facilities and trails illustrated on the Green Infrastructure Map do not include all bicycle facilities and paths within existing and proposed subdivisions and projects (i.e. North Pointe and Belvedere).

Road. These have been included for reference purposes because several Places29 bicycle facilities tie directly into both of these roads.

The bicycling and trails network also includes east-west connections between the north-south routes at regular intervals. These connections often coincide with “perpendicular main streets” through mixed use centers located between US 29 and Berkmar Drive Extended and other parallel roads east of US 29. Additional east-west bicycle and trail connections create links to trails along both forks of the Rivanna River, the Ivy Creek Natural Area, and Chris Greene Lake Park. A multi-use path along the potential future alignment for Northern Free State Road may provide the opportunity to tie into the proposed trail that is intended to loop around the City of Charlottesville and through portions of Albemarle County.

The existing and proposed on-street bike lanes are closely integrated into the greater network of bicycle infrastructure formed by a combination of low-speed streets, multi-use paths, and trails. Within this overall network, bicycle lanes provide on-street facilities for bicyclists throughout a number of the neighborhoods along US 29. The proposed bicycle lanes shown on the Parks & Green Systems Map will enhance the limited network of existing bicycle lanes and accommodate anticipated future increases in bicycle traffic as redevelopment and new development takes place in the area. South of the South Fork of the Rivanna River, bike lanes are added along the major proposed roadways running north-south (such as the new parallel route east of US 29 and portions of Berkmar Drive Extended). Additional bicycle lanes on existing residential neighborhood streets, such as Northfield and Carrsbrook roads, are intended to collect bicycle traffic from local, low-speed streets and cul-de-sacs and provide a safe cycling environment for individuals less comfortable riding in traffic lanes shared with auto traffic. Similarly, north of the South Fork of the Rivanna River, bicycle lanes are proposed on important roads through Forest Lakes (like Ashwood Boulevard, Timberwood Parkway, and Timberwood Boulevard) and also along proposed north-south roads, such as Berkmar Drive Extended (Meeting Street) in the Hollymead Towncenter and North Pointe Boulevard. Several routes of bicycle lanes create direct connections with multi-use paths, which together form the backbone of the bicycle network in the Places29 area.

Bicycle lanes are included primarily along streets with a moderate to high levels of automobile traffic. Typically roads with bicycle lanes include one lane for each direction of traffic. Bicycle lanes should have widths of five feet next to parking, and six feet where no on-street parking is provided.

Multi-use paths are a critical component of the Places29 bicycle and pedestrian network. These bidirectional paths simultaneously accommodate pedestrians and bicyclists. Multi-use paths are included in the Places29 network primarily along major thoroughfares, such as US 29 and portions of Berkmar Drive Extended, where the safe accommodation of pedestrians and bicyclists requires a greater separation from moving traffic, where development along the street is dominated by deeper landscaped setbacks and a lower intensity of development, and along major greenways and natural areas. The section of Northside Drive between Dickerson Road and Berkmar Drive Extended is an example of a multi-use path along a street that is expected to carry elevated levels of truck traffic. For this reason, bicycles and pedestrians are accommodated on a multi-use path buffered from the road rather than on bicycle lanes and sidewalks. West of US 29, most north-south traveling bicyclists are expected to use the bicycle facilities along Berkmar Drive Extended. However, an 8-foot wide path for shared pedestrian and bicycle use on the west side of US 29 can accommodate bicyclists who wish to travel a shorter distance directly along US 29 without crossing to the wider multi-use path on the eastern side. Pedestrian-scale lighting will be provided along the path on the east side of US 29 in order to create a higher sense of safety for all users of the facility, which passes through several heavily wooded areas along US 29.



Because of the destinations they serve and the natural character of landscapes they traverse, multi-use paths are expected to be used by bicycle commuters, recreational bikers, and pedestrians. Multi-use paths also are important components of the greenways network as they provide alternatives to driving a car to parks and open spaces like Chris Green Lake Park and the Ivy Creek Natural Area. While multi-use paths typically follow road alignments, in some cases they diverge and provide improved access along natural features, such as the recently completed multi-use path between the Deerwood residential neighborhood and US 29 in Hollymead.

The network of trails shown on the Parks & Green Systems Map focuses on providing access to natural areas and features, as well as recreational amenities throughout the Places29 area. Routed along streams and through preserved areas, they allow residents who seek opportunities for passive recreation to escape from the faster pace of urban life. The trails can also function as scenic route segments along pedestrian and bicycle trips to shopping and employment destinations.

In order to facilitate further connectivity for pedestrians and bicyclists, several segments of Class A<sup>19</sup> trails have been added to the trails network in order to provide a closer integration with and broader access between greenway trails and the remainder of the bicycle and pedestrian network. These trails are designed for pedestrian use, but also include an 8-foot wide paved path suitable for bicycle and wheelchair travel. Desired Class A segments are also reflected on the Parks & Green Systems Map and generally facilitate a more direct connection between parks and natural areas and neighborhoods and employment centers.

## Implementation

Given that most of the next 10 years of growth can be accommodated in plans that have already been approved, priority should be given to new transportation investments that support this growth. But at the same time, investments must also be made to serve regional traffic growth, to make improvements in areas that are currently experiencing unacceptable levels of congestion, and to address safety and accessibility concerns for all modes of travel. Similarly, incremental investment will need to be made in US 29 and the network that supports its efficient functioning.

In most cases, construction of the parallel road network improvements is largely dependent upon the timing of private development projects along the corridor. However, parallel roadways will be needed adjacent to those areas of US 29 that will be most disrupted by construction so that alternate routes are available during construction of US 29 improvements. In these areas, portions of the parallel road network may have to precede private development. Similarly, portions of the parallel road network are needed to extend the useful life of the existing roadway design on US 29 such that large-scale improvements can be deferred as far as possible into the future. The affected areas are the following:

- Hillsdale Drive – construction of the portion north of Hydraulic Road is needed to reduce the volume of turning traffic at the intersection of US 29 and Hydraulic Road
- Rio Ring Road – the northwest and southeast portions are needed to provide for construction of the interchange at Rio. The southwest and northeast portions largely use existing development roads that will need to be reconstructed as public streets, but can wait until the centers redevelop

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<sup>19</sup> Class A trails are eight foot wide paved or crushed-stone surfaced trails that are ADA and bicycle accessible (see *Comprehensive Plan*, Natural Resources And Cultural Assets, Appendix A: Greenway Plan, County Of Albemarle, 1999).

- Berkmar Extended – the portion north of Hilton Heights to Town Center Drive is needed to support widening of the portion of US 29 north of Polo Grounds. The timing of this widening will be influenced by the pace of development in Hollymead and Piney Mountain and when Berkmar Drive Extended is constructed.
- Jug Handle Roads – the Jug Handle Roads are the connections to US 29 **and** the parallel road on the west side of US 29 between Timberwood Boulevard and Airport Drive. These roads are needed to provide for construction of the crossover bridges at Timberwood Boulevard and Airport Road. These connections can also extend the useful life of the signalized intersections at these two locations by dispersing some turning traffic that currently concentrates at the intersections.

The phasing for constructing the recommended improvements to US 29 and the parallel routes has been addressed in four time frames: 1-5 years, 5-10 years, 11-20 years and beyond 20 years. Tables 3, 4 and 5 contain three detailed lists of projects for the 1-5, 5-10 and 11-20 year periods. The projects are listed in relation to which portion of US 29 they would be located in and are differentiated between those on the primary network (US 29) and those on the parallel network. Included in the latter category are the development-related street networks that are part of Albemarle Place, North Pointe, and Northtown Center. Not shown in these tables are the improvements (e.g., Northern Free State Road) not likely to be needed until after the 20-year planning horizon.

The recommended corridor improvement plan provides flexibility in two areas—the construction timing of future improvements and the sequence of construction for each improvement. This flexibility allows the corridor improvements to be implemented as a series of independent roadway projects over the 20-year planning horizon (except for those areas as noted above). Many individual design elements can be implemented concurrent with redevelopment activities. The recommended design also provides for existing interchange movements to operate relatively unimpeded during construction of the new ramps. The sequencing of design elements shown in the tables is recommended, although planning, design, and right-of-way acquisition for these elements may need to start in the short-term. The recommended sequencing should also be adjusted to meet specific development plans of major property owners in the corridor.

The phasing priorities should be reexamined every five years by the MPO, consistent with updates in the regional transportation plan, and by Albemarle County when the Northern Development Areas Master Plan is reviewed and updated. Annual and bi-annual programming of construction funds by VDOT and TJPDC will also offer opportunities to review the above recommendations for implementation.

## **Cost Estimate**

Costs for design and construction of the transportation options were prepared from the roadway layout shown in Figure 10, using unit costs for planning projects provided by the Virginia Department of Transportation (VDOT). A more detailed explanation and calculations are provided in Technical Memorandum 11. VDOT provides a Statewide Planning Level Cost Estimate table that is adjusted for conditions in the local area. The planning costs are based on unit costs for design and construction, while right-of-way costs and utility costs are determined on a percentage basis of construction cost. The currently available version of the VDOT table uses 2006 dollars. For this analysis, the costs have been escalated to 2007 dollars using a 5.5% growth factor provided by VDOT. In addition to the roadway construction costs, there would be regional costs for expanding the transit system to achieve the levels of transit use discussed above.

As noted previously, the US 29 widenings would be three separate projects. Interchanges are individual projects in the range of \$15-\$50 million and would all require more detailed design studies to determine actual cost. While the Berkmar Extension across the Rivanna River will need to be one project including both the bridge and the road, the other parallel roads will be many smaller projects, some as part of developments. Accordingly, the investment reflected in Tables 3, 4 and 5 will need to be made over the entire 20-year planning horizon.

**Table 3. Implementation Strategy – Short Term**

System	Short-term: (1-5 years) Projects	Construction Cost <sup>20</sup>	Responsible Agency
<b>Corridor Wide</b>			
US 29	<ul style="list-style-type: none"> <li>Implement ITS strategies (management center, improved monitoring, communications infrastructure, and traffic signal improvements). The strategies are described in detail in Technical Memorandum 7</li> </ul>	[Cost is subject to a separate study by VDOT]	<ul style="list-style-type: none"> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Extend local bus service as neighborhood centers develop</li> <li>Implement network of bicycle trails and paths</li> </ul>	[Cost subject to a separate CTS/RTA study] [Included with development]	<ul style="list-style-type: none"> <li>RTA (being formed), CTS</li> <li>Albemarle County</li> </ul>
<b>The portion of US 29 from the US 250 Bypass to Hydraulic</b>			
US 29	<ul style="list-style-type: none"> <li>Expand southbound-to-westbound ramp at US29/US250 Bypass (near Best Buy) with auxiliary lane to Barracks Road off-ramp</li> <li>Construct westbound merge lane on US250 Bypass at Barracks Road interchange</li> <li>Implement near-term access management strategies as detailed in Technical Memorandum 7</li> </ul>	<ul style="list-style-type: none"> <li>\$2,000,000</li> </ul> [Cost determined case by case]	<ul style="list-style-type: none"> <li>VDOT</li> <li>VDOT, Property Owners</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<b>The portion of US 29 from Hydraulic Road to Shoppers World</b>			
US 29	<ul style="list-style-type: none"> <li>Implement near-term access management strategies as detailed in Technical Memorandum 7</li> <li>Add southbound left turn lane and westbound right turn lane at Greenbrier</li> </ul>	[Cost determined case by case] <ul style="list-style-type: none"> <li>\$260,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT, Property Owners</li> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Construct Albemarle Place street system (development-dependent)</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Property Owner</li> </ul>
<b>The portion of US 29 from Shoppers World to Albemarle Square</b>			
US 29	<ul style="list-style-type: none"> <li>Implement near-term access management strategies as detailed in Technical Memorandum 7</li> </ul>	[Cost determined case by case]	<ul style="list-style-type: none"> <li>VDOT, Property Owners</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Prepare a small area plan for the Midtown area that identifies the alignment of the Rio Ring Road</li> </ul>	<ul style="list-style-type: none"> <li>\$50,000</li> </ul>	<ul style="list-style-type: none"> <li>Albemarle County</li> </ul>

<sup>20</sup> Costs shown are estimates of the construction/implementation costs only and include costs for design and construction contingencies. Right-of-way acquisition and utilities are not included but are incorporated into the detailed estimates published in Technical Memorandum 11.

System	Short-term: (1-5 years) Projects	Construction Cost <sup>20</sup>	Responsible Agency
<b>The portion of US 29 from Albemarle Square to Polo Grounds Road</b>			
US 29	<ul style="list-style-type: none"> <li>Implement near-term access management strategies as detailed in Technical Memorandum 7</li> </ul>	[Cost determined case by case]	<ul style="list-style-type: none"> <li>VDOT, Property Owners</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Initiate an alignment study for the Berkmar Bridge to determine the best crossing location and profile.</li> </ul>	<ul style="list-style-type: none"> <li>\$150,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT, TJPDC</li> </ul>
<b>The portion of US 29 from Polo Grounds Road to Towncenter Drive</b>			
US 29	<ul style="list-style-type: none"> <li>Implement near-term access management strategies as detailed in Technical Memorandum 7</li> </ul>	[Cost determined case by case]	<ul style="list-style-type: none"> <li>VDOT, Property Owners</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<b>The portion of US 29 from Towncenter Drive to Airport Road</b>			
US 29	<ul style="list-style-type: none"> <li>Implement near-term access management strategies as detailed in Technical Memorandum 7</li> </ul>	[Cost determined case by case]	<ul style="list-style-type: none"> <li>VDOT, Property Owners</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Construct North Pointe Drive and Airport Acres Road North Extended (development-dependent)</li> </ul>	<ul style="list-style-type: none"> <li>\$9,190,000</li> <li>\$350,000</li> </ul>	<ul style="list-style-type: none"> <li>Property Owner</li> <li>Property Owner</li> </ul>
<b>The portion of US 29 from Airport Road to Lewis and Clark Drive</b>			
US 29	<ul style="list-style-type: none"> <li>Implement near-term access management strategies as detailed in Technical Memorandum 7</li> </ul>	[Cost determined case by case]	<ul style="list-style-type: none"> <li>VDOT, Property Owners</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Construct North Pointe Drive Extended (development dependent)</li> </ul>	<ul style="list-style-type: none"> <li>\$700,000</li> </ul>	<ul style="list-style-type: none"> <li>Property Owner</li> </ul>
<b>The portion of US 29 from Lewis and Clark to Greene County</b>			
US 29	<ul style="list-style-type: none"> <li>Implement near-term access management strategies as detailed in Technical Memorandum 7</li> <li>Add left turn lanes at Burnley Station Road/ Frays Mill Road and signalize</li> </ul>	<ul style="list-style-type: none"> <li>[Cost determined case by case]</li> <li>\$2,150,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT, Property Owners</li> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

Table 4. Implementation Strategy – Mid Term

System	Mid-term (5-10 years) Projects	Construction Cost <sup>21</sup>	Responsible Agency
<b>Corridor Wide</b>			
US 29	<ul style="list-style-type: none"> <li>Implement BRT service on US 29 from Charlottesville to Midtown</li> </ul>	<ul style="list-style-type: none"> <li>\$16,500,000</li> </ul>	<ul style="list-style-type: none"> <li>RTA</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Extend local bus service as neighborhood centers develop</li> <li>Implement network of bicycle trails and paths</li> </ul>	<ul style="list-style-type: none"> <li>[Cost subject to a separate CTS/RTA study]</li> <li>[Included with development]</li> </ul>	<ul style="list-style-type: none"> <li>RTA, CTS</li> <li>Albemarle County</li> </ul>
<b>The portion of US 29 from the US 250 Bypass to Hydraulic</b>			
US 29	<ul style="list-style-type: none"> <li>Construct eastbound to northbound/southbound off-ramp at US29/US250 Bypass, construct new off-ramp at Holiday</li> <li>Close eastbound to northbound/southbound off-loop at US29/US250 Bypass and reconstruct northbound to eastbound on-ramp and southbound to eastbound on-loop at US29/US 250 Bypass</li> <li>Expand US 29 from Seminole Square to Morton Drive</li> </ul>	<ul style="list-style-type: none"> <li>\$12,000,000</li> <li>\$7,000,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Reconstruct Hydraulic Road from US29 to US250 Bypass</li> <li>Construct Hillsdale Drive extension</li> </ul>	<ul style="list-style-type: none"> <li>\$8,000,000</li> <li>\$8,260,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> <li>City of Charlottesville, Albemarle County, VDOT</li> </ul>
<b>The portion of US 29 from Hydraulic Road to Shoppers World</b>			
US 29	<ul style="list-style-type: none"> <li>Construct access lane on east side of US 29 to consolidate access from USPS to Greenbrier Road</li> </ul>	<ul style="list-style-type: none"> <li>\$680,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT/Property Owners</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Construct Cedar Hill Extended to Greenbrier</li> </ul>	<ul style="list-style-type: none"> <li>\$1,430,000</li> </ul>	<ul style="list-style-type: none"> <li>Property Owner, Albemarle County</li> </ul>
<b>The portion of US 29 from Shoppers World to Albemarle Square</b>			
US 29	<ul style="list-style-type: none"> <li>Construct northbound auxiliary lanes for Rio Ring Road intersection</li> <li>Widen Shoppers World approach</li> <li>Reconstruct Mall Drive approach</li> <li>Construct southbound auxiliary lane at Berkmar</li> <li>Westbound Albemarle Square approach</li> </ul>	<ul style="list-style-type: none"> <li>\$450,000</li> <li>\$530,000</li> <li>\$50,000</li> <li>\$2,620,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> <li>VDOT, Property Owners</li> <li>VDOT</li> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Construct northwest Rio Ring Road</li> <li>Construct southeast Rio Ring Road</li> </ul>	<ul style="list-style-type: none"> <li>\$1,450,000</li> <li>\$950,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT, Albemarle County</li> </ul>

<sup>21</sup> Costs shown are estimates of the construction/implementation costs only and include costs for design and construction contingencies. Right-of-way acquisition and utilities are not included but are incorporated into the detailed estimates published in Technical Memorandum 11 (see the Appendix).

System	Mid-term (5-10 years) Projects	Construction Cost <sup>21</sup>	Responsible Agency
<b>The portion of US 29 from Albemarle Square to Polo Grounds Road</b>			
US 29	<ul style="list-style-type: none"> <li>Channelize Woodbrook intersection</li> </ul>	<ul style="list-style-type: none"> <li>\$910,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Construct the bridge needed to extend Berkmar Drive across the South Fork of the Rivanna River</li> <li>Widen Berkmar from Rio Road to Hilton Heights Road</li> <li>Extend Berkmar from Hilton Heights Road to the River</li> </ul>	<ul style="list-style-type: none"> <li>\$14,910,000</li> <li>\$10,020,000</li> <li>\$2,660,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT, Albemarle County</li> <li>VDOT, Albemarle County</li> </ul>
<b>The portion of US 29 from Polo Grounds Road to Towncenter Drive</b>			
US 29	<ul style="list-style-type: none"> <li>Widen US 29 to six lanes</li> <li>Construct over crossing at Ashwood Boulevard</li> <li>Hollymead Drive</li> </ul>	<ul style="list-style-type: none"> <li>\$15,060,000</li> <li>\$10,000,000</li> <li>\$100,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Construct Berkmar Drive Extended</li> <li>Construct Hollymead Drive Extended</li> </ul>	<ul style="list-style-type: none"> <li>\$10,230,000</li> <li>\$1,010,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT, Albemarle County</li> </ul>
<b>The portion of US 29 from Towncenter Drive to Airport Road</b>			
US 29	<ul style="list-style-type: none"> <li>Jug handle road<sup>22</sup> right-in/right-out</li> <li>Construct jug handle road and consolidate access on US 29 east side between Timberwood Boulevard and Airport Road</li> <li>Construct jug handle and parallel road on west side and consolidate access on US 29 west side between Timberwood Boulevard and Airport Road</li> </ul>	<ul style="list-style-type: none"> <li>\$70,000</li> <li>\$2,170,000</li> <li>\$2,610,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> <li>VDOT, Property Owners</li> <li>VDOT, Property Owners</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Berkmar Drive Extended</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Property Owners</li> </ul>
<b>The portion of US 29 from Airport Road to Lewis and Clark Drive</b>			
US 29	<ul style="list-style-type: none"> <li>Signalize US 29 at Airport Acres North</li> <li>Signalize US 29 at Northside Drive</li> </ul>	<ul style="list-style-type: none"> <li>\$270,000</li> <li>\$270,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Berkmar Drive Extended</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Property Owners</li> </ul>
<b>The portion of US 29 from Lewis and Clark to Greene County</b>			
US 29	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

<sup>22</sup> The Jug Handle Roads are the right-in/right-out connector roads on US 29 that connect to the parallel street system. The parallel roadways are included in the construction item as illustrated in Figure 10.

Table 5. Implementation Strategy – Long Term

System	Long-term (11-20 years) Projects	Construction Cost <sup>23</sup>	Responsible Agency
<b>Corridor Wide</b>			
US 29	<ul style="list-style-type: none"> <li>Implement BRT service on US 29 from Midtown to Uptown<sup>24</sup></li> </ul>	<ul style="list-style-type: none"> <li>\$16,500,000</li> </ul>	<ul style="list-style-type: none"> <li>RTA</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Extend local bus service as neighborhood centers develop</li> <li>Implement network of bicycle trails and paths</li> </ul>	<ul style="list-style-type: none"> <li>[Cost subject to a separate CTS/RTA study]</li> <li>[Included with development]</li> </ul>	<ul style="list-style-type: none"> <li>RTA, CTS</li> <li>Albemarle County</li> </ul>
<b>The portion of US 29 from the US 250 Bypass to Hydraulic</b>			
US 29	<ul style="list-style-type: none"> <li>Replace US29/Hydraulic intersection with single point urban interchange</li> </ul>	<ul style="list-style-type: none"> <li>\$33,000,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Reconstruct US 250 Bypass/Hydraulic Road intersection</li> </ul>	<ul style="list-style-type: none"> <li>\$4,000,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> </ul>
<b>The portion of US 29 from Hydraulic Road to Shoppers World</b>			
US 29	<ul style="list-style-type: none"> <li>Dual SB right turn lane at Seminole Square</li> <li>Extend turn lane at Branchlands (to Premier Circle)</li> </ul>	<ul style="list-style-type: none"> <li>\$280,000</li> <li>\$140,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Realign Premier Circle</li> <li>Construct Cedar Hill Extended to Shoppers World</li> </ul>	<ul style="list-style-type: none"> <li>\$130,000</li> <li>\$2,550,000</li> </ul>	<ul style="list-style-type: none"> <li>Albemarle County, VDOT</li> </ul>
<b>The portion of US 29 from Shoppers World to Albemarle Square</b>			
US 29	<ul style="list-style-type: none"> <li>Replace Rio Road/US 29 intersection with interchange/cross over</li> <li>Construct pedestrian overcrossing (of US 29) at Berkmar Drive</li> <li>Construct southwest Rio Ring Road</li> <li>Construct northeast Rio Ring Road</li> </ul>	<ul style="list-style-type: none"> <li>\$35,000,000</li> <li>\$1,800,000</li> <li>\$3,940,000</li> <li>\$2,320,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> <li>VDOT, Albemarle County</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li>Construct roundabout on Mall Drive</li> <li>Construct Cedar Hill Drive to Berkmar</li> <li>Extend roadway on west side of US 29 opposite Albemarle Square to Berkmar Drive</li> <li>Extend roadway on east of US 29 Mall Drive to Rio Ring Road</li> </ul>	<ul style="list-style-type: none"> <li>\$450,000</li> <li>\$860,000</li> <li>\$3,490,000</li> <li>\$1,880,000</li> </ul>	<ul style="list-style-type: none"> <li>Property Owner</li> <li>VDOT, Property Owner</li> <li>Property Owner, Albemarle County, VDOT</li> </ul>
<b>The portion of US 29 from Albemarle Square to Polo Grounds Road</b>			
US 29	<ul style="list-style-type: none"> <li>Expand turn lanes at Schewel Furniture</li> <li>Jug handle at Wal-Mart access</li> <li>Construct over crossing at Hilton Heights Road, access road, auxiliary lane at Seminole Lane</li> </ul>	<ul style="list-style-type: none"> <li>\$1,180,000</li> <li>\$750,000</li> <li>\$17,640,000</li> </ul>	<ul style="list-style-type: none"> <li>VDOT</li> <li>VDOT</li> <li>VDOT</li> </ul>
Parallel Routes	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

<sup>23</sup> Costs shown are estimates of the construction/implementation costs only and include costs for design and construction contingencies. Right-of-way acquisition and utilities are not included but are incorporated into the detailed estimates published in Technical Memorandum 11 (see the Appendix).

<sup>24</sup> The ultimate timing on this improvement is subject to the RTA study/implementation recommendations

System	Long-term (11-20 years) Projects	Construction Cost <sup>23</sup>	Responsible Agency
<b>The portion of US 29 from Polo Grounds Road to Town Center Drive</b>			
US 29	•		•
Parallel Routes	• Extend Ashwood Boulevard to Berkmar Drive Extended	• \$1,590,000	• VDOT, Albemarle County
<b>The portion of US 29 from Town Center Drive to Airport Road</b>			
US 29	• Construct cross over at Airport Road • Construct cross over at Timberwood Boulevard	• \$15,000,000 • \$15,000,000	• VDOT • VDOT
Parallel Routes	• Construct jug handle and parallel road on west side and consolidate access on US 29 west side between Timberwood and Airport Boulevards • Construct roundabout at Worth Crossing and Timberwood Boulevard	• \$630,000	• VDOT, Property Owners
<b>The portion of US 29 from Airport Road to Lewis and Clark Drive</b>			
US 29	• Widen US 29 to six lanes • Airport Acres Road South auxiliary lane • Signalize US 29 at Northside Drive	• \$10,690,000 • \$50,000 • \$270,000	• VDOT • VDOT • VDOT
Parallel Routes	• Frontage road Airport to Airport Acres South	• \$1,740,000	• VDOT, Property Owners
<b>The portion of US 29 from Lewis and Clark to Greene County</b>			
US 29	• Lewis and Clark Drive transition • Signalize US 29 at Austin Drive • Signalize US 29 at Dickerson Road	• \$240,000 • \$270,000 • \$270,000	• VDOT • VDOT • VDOT
Parallel Routes	• Boulders Road Extended • Austin Road Extended	• \$950,000 • \$6,250,000	• Property Owners, Albemarle County