

Richmond Regional Park and Ride Investment Strategy

Technical Memo II – Future Needs (Final)
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Introduction

The Richmond Regional Transportation Planning Organization (RRTPO) identified the opportunity in the FY19 Unified Planning Work Program (UPWP) to assess park and ride needs and develop an investment strategy to advance park and ride projects at a regional level. The development of a regional park and ride investment strategy was specifically called for in the UPWP under the focal area of “expanding access to transit through multimodal connectivity and park and ride projects” and is intended to inform plan2045, the RRTPO’s next Long Range Transportation Plan.

The purpose of the resulting *Richmond Regional Park and Ride Investment Strategy* study is to form the foundation for leveraging park and ride lots in the Richmond region as part of a larger travel demand management strategy. This study will assess existing conditions and existing needs, identify potential future needs, prioritize and rank project recommendations, and develop implementation strategies to advance and promote park and ride projects in the Richmond region.

Previous statewide efforts have been conducted to identify and evaluate park and ride needs and this study will add a regional perspective and build upon these statewide studies. Relevant previous statewide studies include:

- The VDOT Statewide Park and Ride Study (2013) - conducted a statewide inventory of existing park and ride lots; identified recommendations for new, expanded, or closed park and ride lots; conducted a statewide survey to understand characteristics of park and ride users; and assisted VDOT with public outreach and awareness of park and ride facilities.
- The VDOT Park and Ride Investment Strategy (2016 and 2018 update) - compiled park and ride project recommendations from each of the VDOT districts, developed a project prioritization process, and scored and ranked projects to develop an investment strategy for each district.

The types, sizes, and features of a park and ride lot vary depending on many factors including demographics, land use, and travel patterns. Since these factors differ throughout Virginia, regional park and ride priorities can be fine-tuned within the statewide framework. Previous statewide studies evaluated park and ride lots using a single methodology statewide. This statewide methodology prioritized projects based on population density, traffic volumes, traffic congestion, and proximity to existing park and ride facilities. The *Richmond Regional Park and Ride Investment Strategy* will build upon these previous studies by identifying and validating park and ride projects to align with regional needs. The study will consider factors such as proximity to transit, demographics, land use, and travel patterns, in addition to factors considered in the statewide study. The desired outcome of the study is to develop a regional strategy for park and ride in the Richmond area and provide jurisdictions with the foundation and support to advance park and ride projects locally by prioritizing and better positioning projects for funding.

A Study Advisory Group (SAG) was formed for this study to help inform the development of the regional strategy for park and ride in the Richmond area. SAG members provided regional perspectives, participated in project meetings, reviewed technical memos, and provided feedback to help identify park and ride needs and develop project recommendations. SAG members included representatives from the following jurisdictions and agencies:

- Town of Ashland
- Charles City County
- Chesterfield County
- Goochland County
- Hanover County
- Henrico County
- New Kent County
- Powhatan County
- City of Richmond
- Greater Richmond Transit Company (GRTC)
- RideFinders, Inc.
- Virginia Department of Rail and Public Transportation (DRPT)
- Virginia Department of Transportation (VDOT)

This technical memo summarizes the projected future needs and needs evaluation methodology for park and ride in the Richmond region. This is the second of five technical memorandums to be completed as part of the *Richmond Regional Park and Ride Investment Strategy* study:

- Technical Memo I – Existing Conditions and Existing Needs
- **Technical Memo II – Future Needs**
- Technical Memo III – Prioritization and Ranking of Project Recommendations
- Technical Memo IV – Implementation Strategy
- Technical Memo V – Funding Needs and Potential Funding Sources

Park and Ride Needs Evaluation Methodology

Purpose and Overview of Needs Evaluation

The purpose of the park and ride needs evaluation was to identify and evaluate potential locations for park and ride investments that align with regional needs. The methodology was highly data-driven but also allowed for adjustments to reflect the added value associated with certain locations that were not fully accounted for through the data analysis. This resulted in two primary phases of the needs evaluation methodology:

- **Phase I – Baseline Census Tract Scoring**
- **Phase II – Added-Value Adjustments**

In Phase I, scores were calculated for each census tract in the Richmond TPO for several data-driven evaluation factors. These factors and the specific evaluation methodologies are described in more detail in the following sections. The scores of all evaluation factors for a given census tract were combined into a single Phase I score and used to identify the initial high-priority park and ride investment areas.

In Phase II, additional high-priority park and ride investment areas were identified to account for added-value factors (factors that indicated a demonstrated need for park and ride in the area but may not have been fully accounted for through the data-driven methodology of Phase I). Added-value factors and additional high-priority locations were identified in collaboration with the SAG.

Needs Evaluation Goal Areas

For Phase I, park and ride needs were scored based on three goal areas. Each of these goal areas was comprised of two or more evaluation factors that could be measured using readily available data. A summary of the goal areas and factors in each goal area is provided below.

- **Goal 1: Multimodal Connectivity** – Provide an integrated multimodal network
 - Proximity to Existing Transit
 - Proximity to Proposed Transit
 - Proximity to Vanpool Origins
- **Goal 2: Access** – Serve the most people who can benefit from park and ride
 - Density of Working Population
 - Anticipated Population Growth
 - Single Occupancy Vehicle (SOV) Commuting Mode Split
- **Goal 3: Congestion Mitigation** – Reduce the demand on the roadway network
 - Commute Time
 - Priority Investment Area (PIA) as defined by the *VDOT Park and Ride Investment Strategy*

Each of the factors and the specific evaluation measurements are described in more detail in following sections.

Needs Evaluation Factor Scoring

In Phase I, each census tract in the study area was scored according to the evaluation factors described below. The following briefly summarizes the steps involved in the scoring process:

1. **Raw Score** – A raw score was calculated for each census tract for each factor (such as the working population density of a specific census tract).
2. **Factor Score** – Each census tract raw score was converted to a score out of 10 for each evaluation factor. The score out of 10 was based on a comparison of an individual census tract's raw score to the maximum raw score for all census tracts.
3. **Goal Area Score** – All the factor scores within a goal area were averaged together to get a score out of 10 for each goal area.
4. **Overall Score** – The three goal area scores were added together to get a total overall score out of 30 points.

Table 1 summarizes this scoring process. In this process each goal area was weighted equally in the overall score.

Table 1: Phase I Baseline Evaluation Scoring Summary (Census Tract Basis)

Goal Area	Factor	Max Factor Score	Max Goal Area Score	Max Overall Score
Multimodal Connectivity	Proximity to Existing Transit	10	10	30
	Proximity to Proposed Transit	10		
	Proximity to Vanpool Origins	10		
Access	Density of Working Population	10	10	
	Anticipated Population Growth	10		
	SOV Commuting Mode Split	10		
Congestion Mitigation	Commute Time	10	10	
	Priority Investment Area (PIA)	10		
		Factor scores averaged for each Goal Area	→	Goal Area scores added to get Overall Score

The maps in the following sections present the factor scores (step 2) for each of the evaluation factors as well as the overall score (step 4). These maps illustrate the census tracts scores, relative to each other, for individual factors and in aggregate for all goal areas.

Park and Ride Needs Evaluation Results

Phase I – Baseline Census Tract Scoring

The following sections describe each of the three goal areas and the associated evaluation factors. The tables in each section describe the factor, how it was measured, the data source, and also provide additional notes for clarification. The maps show the relative Phase I census tract scores for each of the evaluation factors.

Goal Area 1: Multimodal Connectivity

Park and ride lots are key elements in providing an integrated multimodal network. The three evaluation factors in this goal area aim to identify areas that would provide connections to existing transit, proposed transit routes, and locations at which vanpools originate. These represent potential ways that park and ride lots provide additional travel choices and support alternative modes of travel. **Table 2** summarizes the three multimodal connectivity evaluation factors.

Table 2: Multimodal Connectivity Evaluation Factors

Factor	Measurement	Data Source	Notes
Proximity to Existing Transit	Number of existing transit service termini	GRTC Existing Weekday/Saturday Route Termini (including Pulse BRT)	Score is based on the number of routes that terminate in a given census tract.
Proximity to Proposed Transit	Number of proposed transit service termini	Proposed Richmond Transit Vision Plan Route Termini	Score is based on the number of routes that terminate in a given census tract.
Proximity to Vanpool Origins	Number of vanpool passengers originating	Vanpool Origin Location Data provided by RideFinders (October 2018).	Score based on the number of vanpool passengers originating in a given census tract to prioritize based on serving the most people. Note: The number of passengers is approximate and based on October 2018 data. Some (3 out of 81) vanpools did not have ridership data available.

For this goal area, census tracts received a higher score based on the number of connections (the number of transit route termini or the number of estimated vanpool passengers) in the census tract. A survey conducted in 2011 for the *VDOT Statewide Park and Ride Study* showed that approximately 90% of park and rider users in Central Virginia use park and ride lots as a location to park their vehicle and ride the bus or to carpool/vanpool. As a result, route termini were considered to identify potential lots at the “end-of-the-line”. **Figure 1**, **Figure 2**, and **Figure 3** illustrate the Phase I evaluation results for the multimodal connectivity evaluation factors.

Figure 1: Proximity to Existing Transit

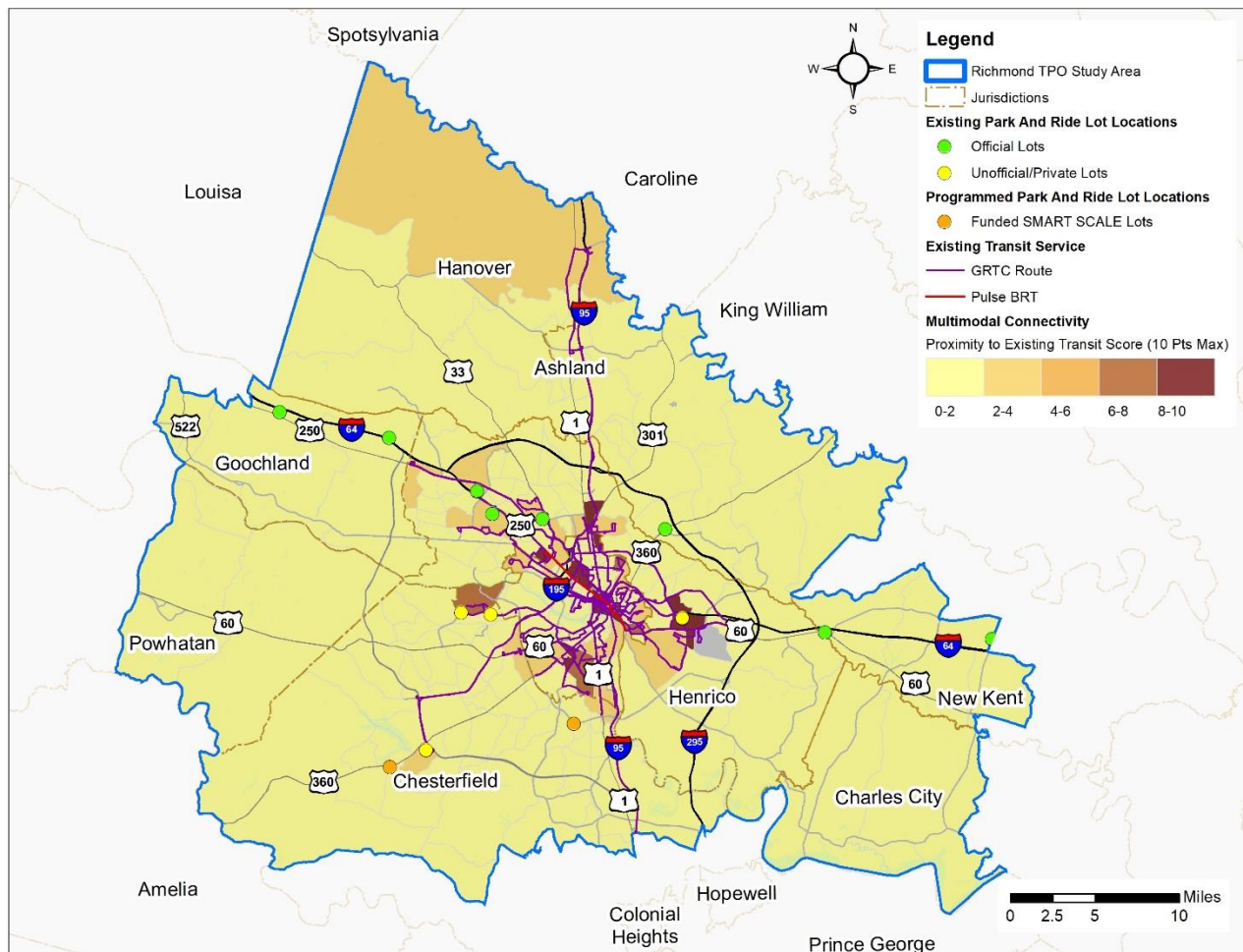


Figure 2: Proximity to Proposed Transit

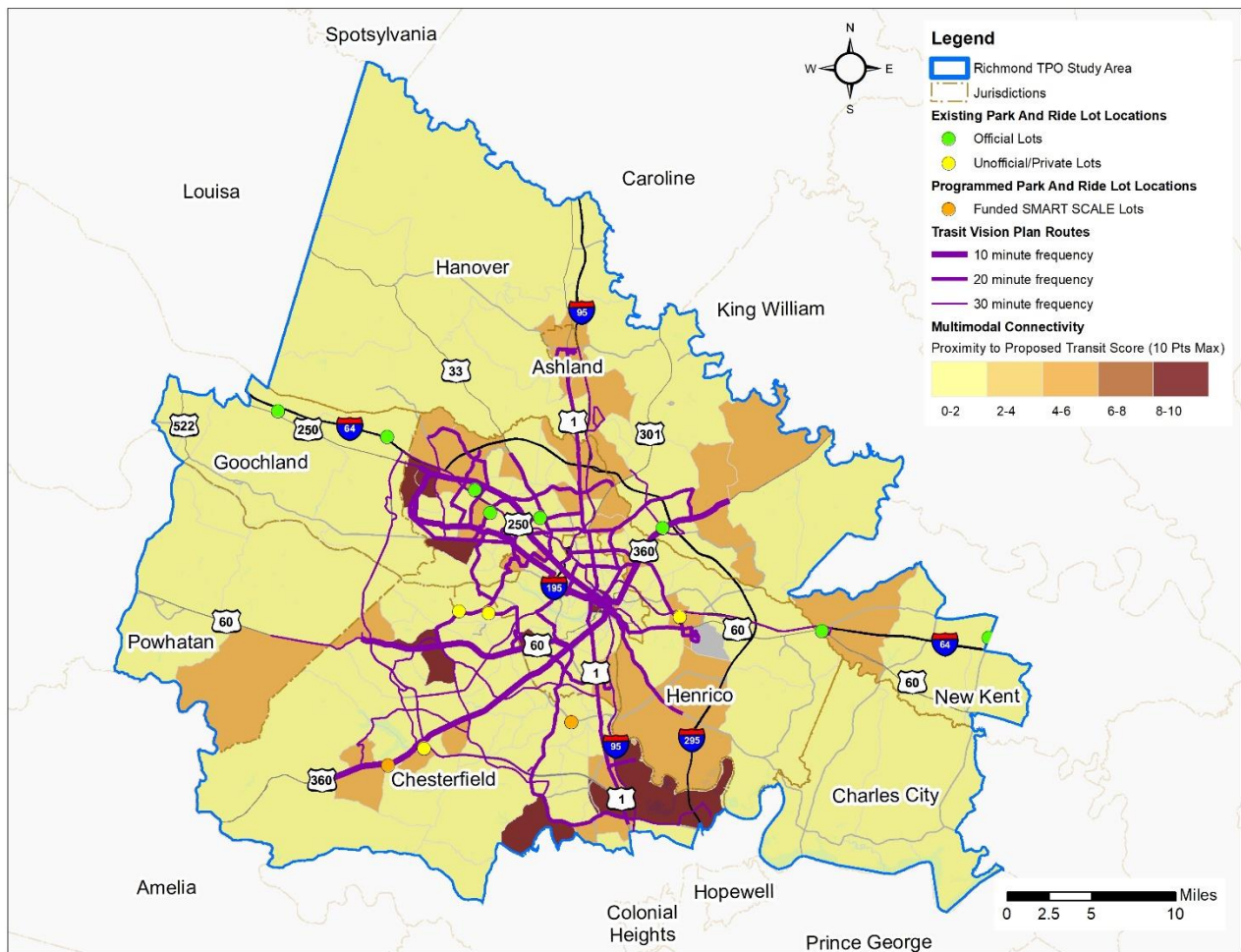
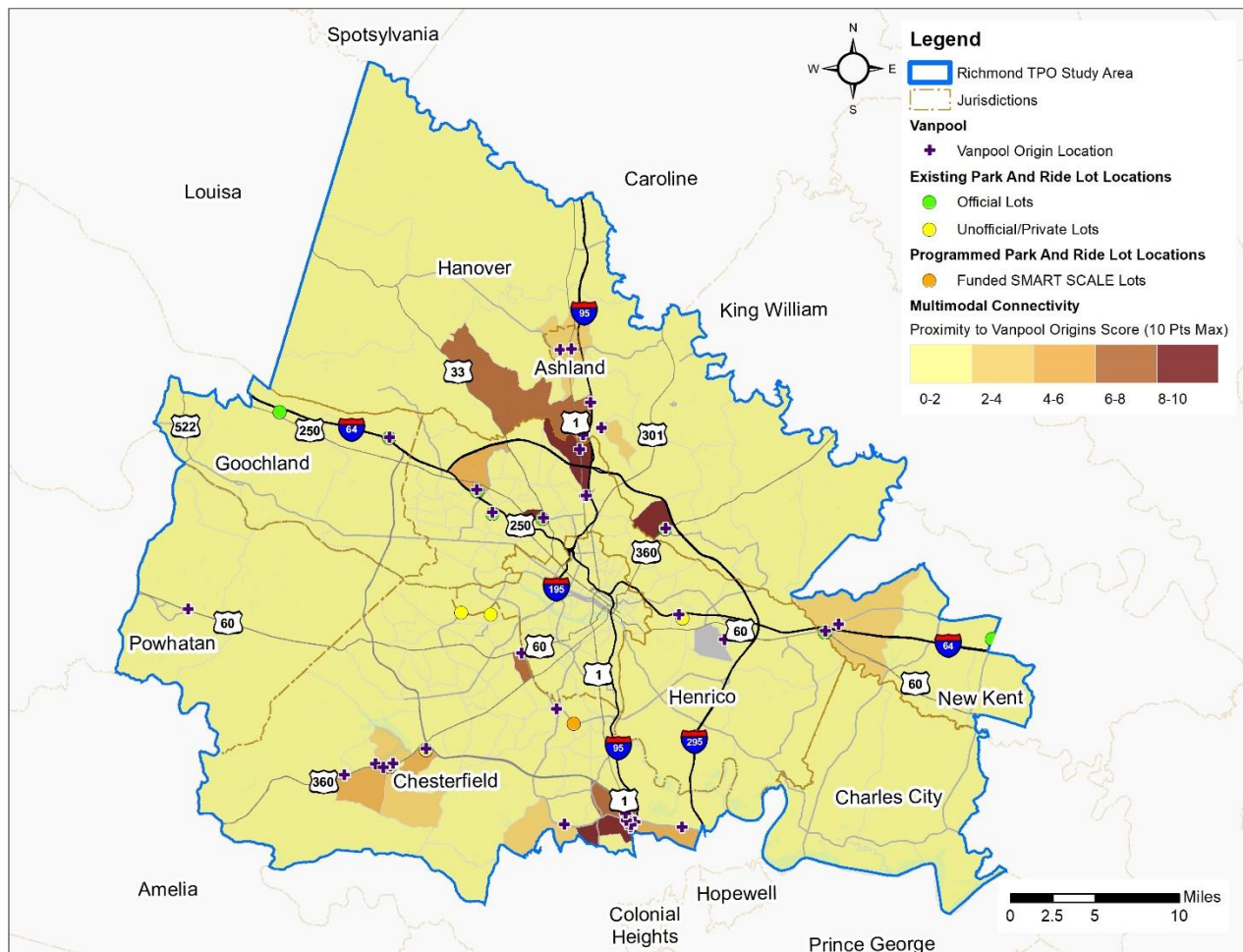


Figure 3: Proximity to Vanpool Origins



Goal Area 2: Access

The access goal area strives to identify areas in which park and ride investment would serve locations with the greatest number of people who need access to transportation options through park and ride lots. The three evaluation factors in this goal area identify the areas where the highest densities of workers live, the areas forecasted to experience significant population growth in the future, and the areas with the highest number of people who commute in single occupancy vehicles. **Table 3** summarizes the three evaluation factors included in the access goal area. **Figure 4**, **Figure 5**, and **Figure 6** illustrate the Phase I evaluation results for these factors.

Table 3: Access Evaluation Factors

Factor	Measurement	Data Source	Notes
Density of Working Population	Working population (all employed persons) per square mile (by census tract)	American Community Survey: 2012-2016 5-Year Estimates (Table S2301)	Score is based on existing conditions analysis. Same data shown in Worker Density map completed for Tech Memo I. The average density in the study area is approximately 1,660 employed persons per square mile.
Anticipated Population Growth	Forecast residential growth percentage	RRTPO Population Forecasts by TAZ, 2012 and 2040 (October 2015)	Score is based on forecast growth within a TAZ. The same score is applied to all census tracts within a TAZ. The average growth in the study area from 2012 to 2040 is approximately 37%. The darkest colored areas for this factor highlight areas that are forecast to grow at a rate more than double the average rate (on a percentage basis).
Single-Occupant Vehicle (SOV) Commuting Mode Split	Percentage of employed workers that drive alone to work	American Community Survey: 2012-2016 5-Year Estimates (Table S0801)	Score is based on percentage of people who drive alone to work. The average percentage in the study area is approximately 80%. This factor highlights areas where the largest percentage of workers drive alone to work. Areas with higher percentages of people who drive alone may represent potential target markets for travel behavior shift.

Figure 4: Density of Working Population

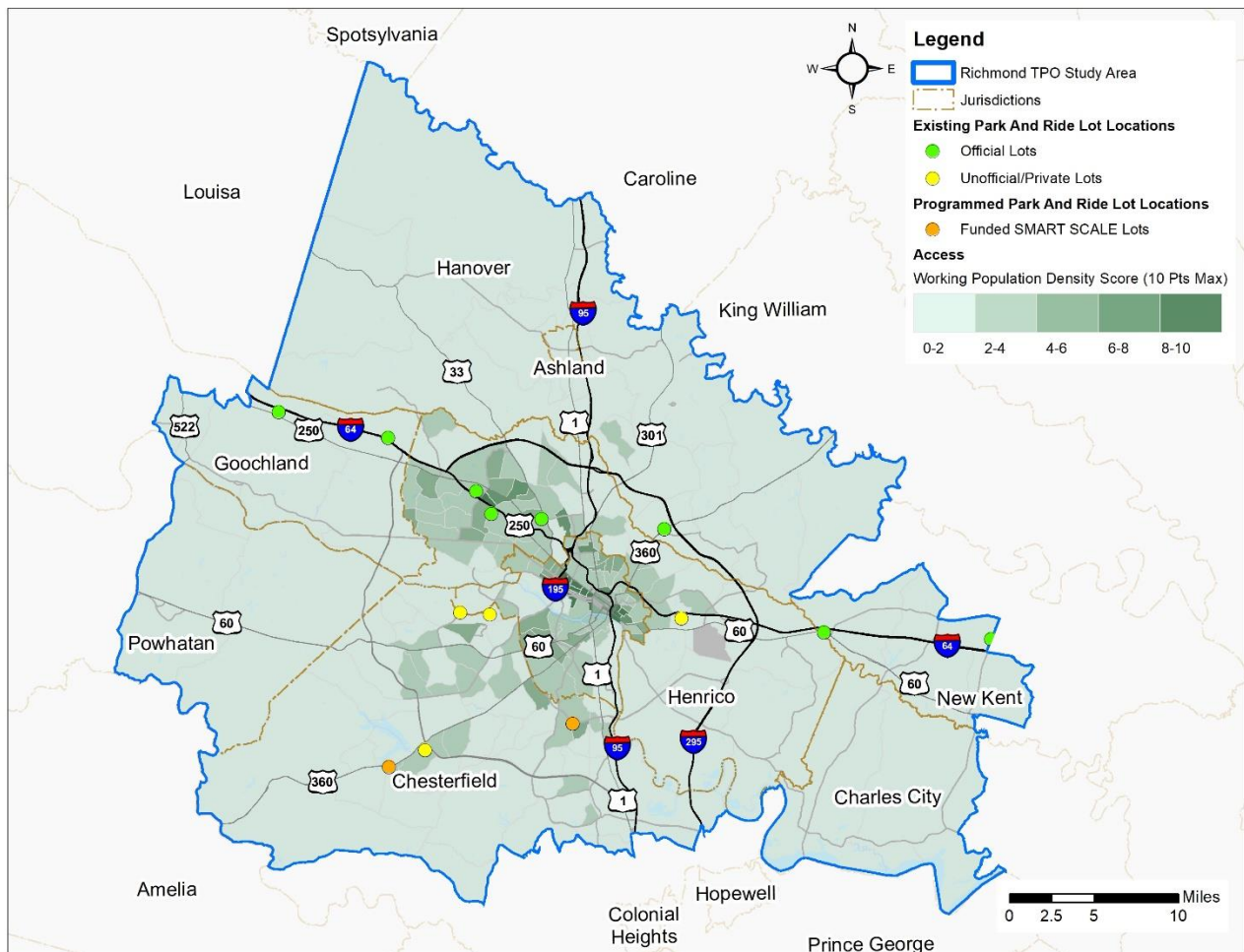


Figure 5: Anticipated Population Growth

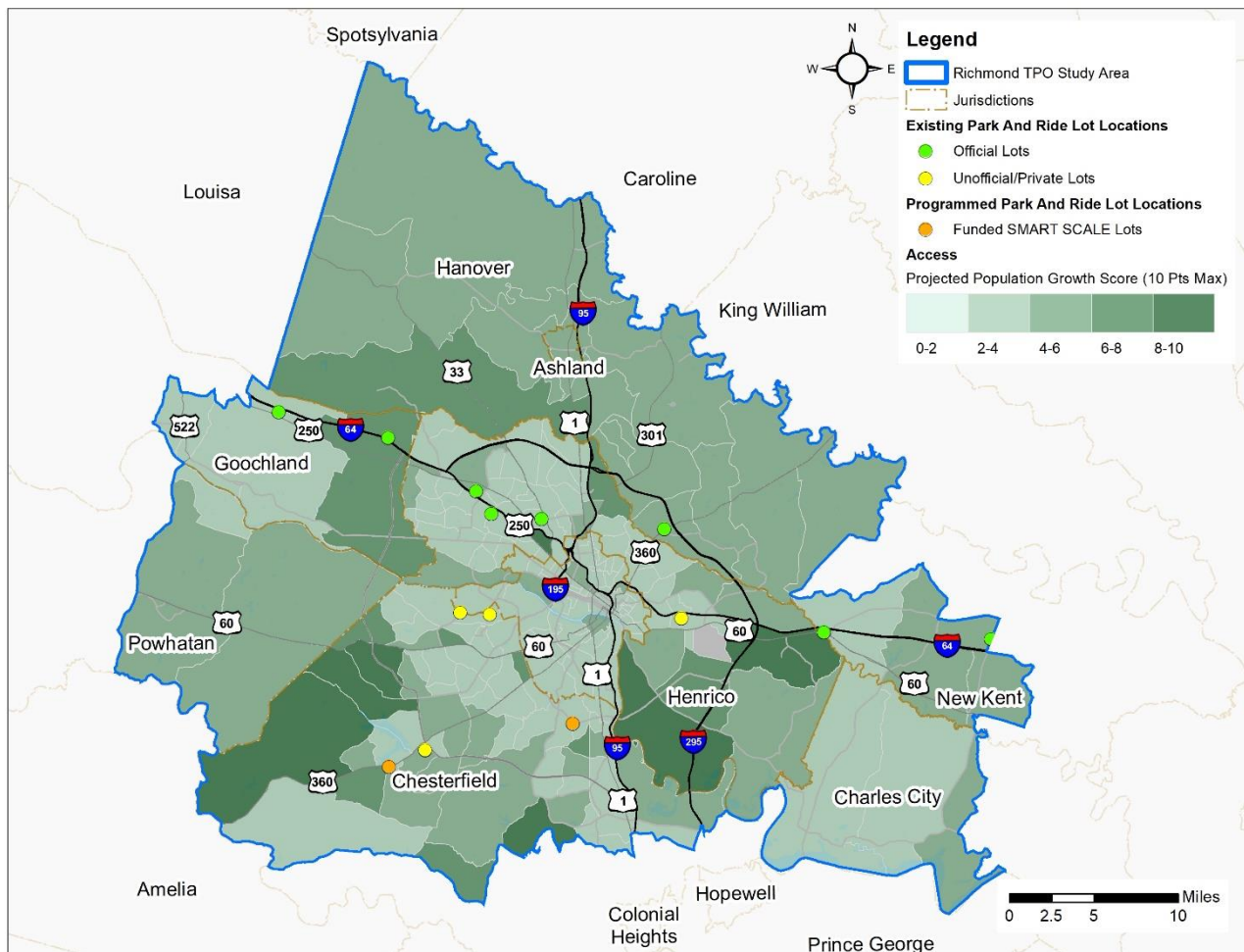
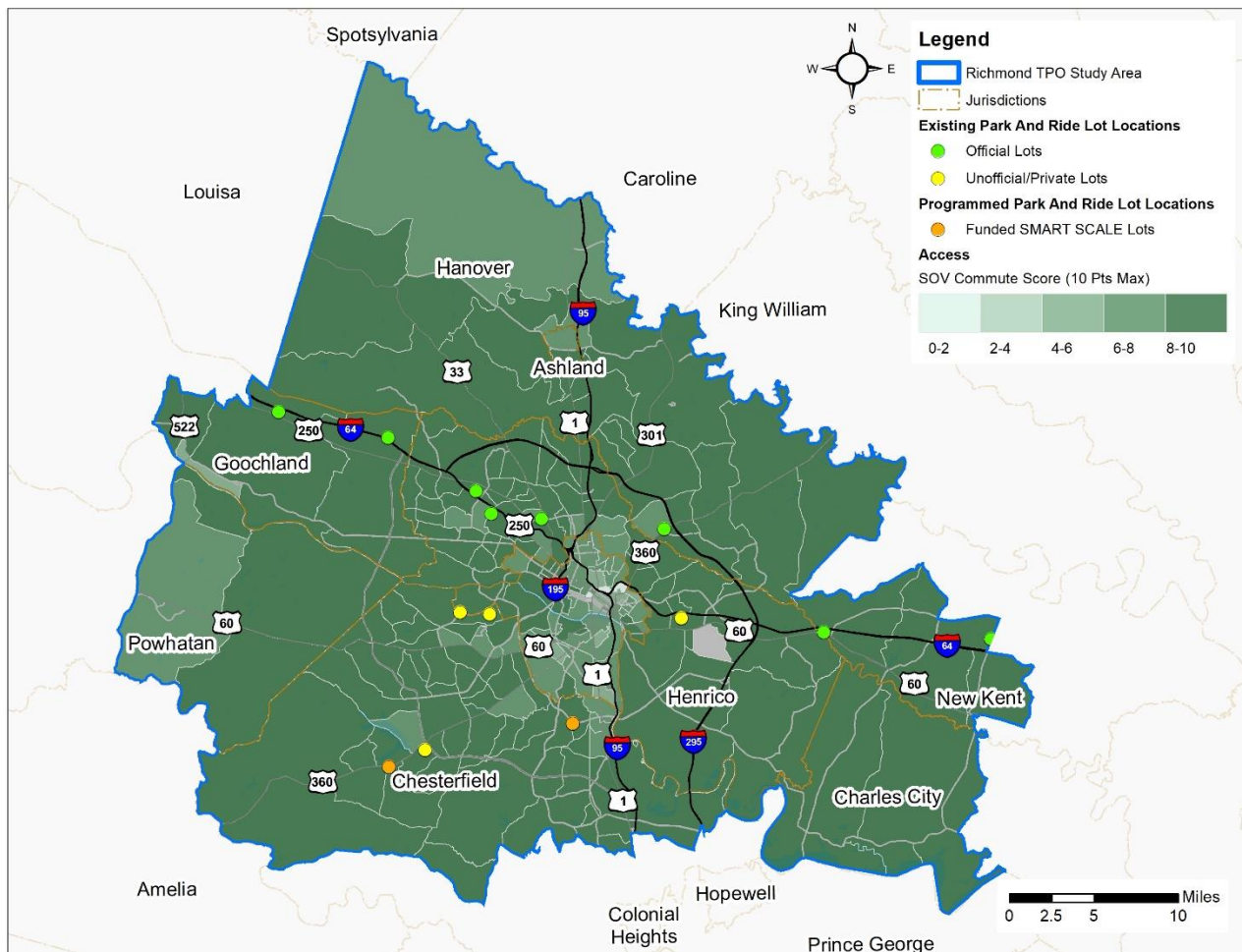


Figure 6: SOV Commuting Mode Split



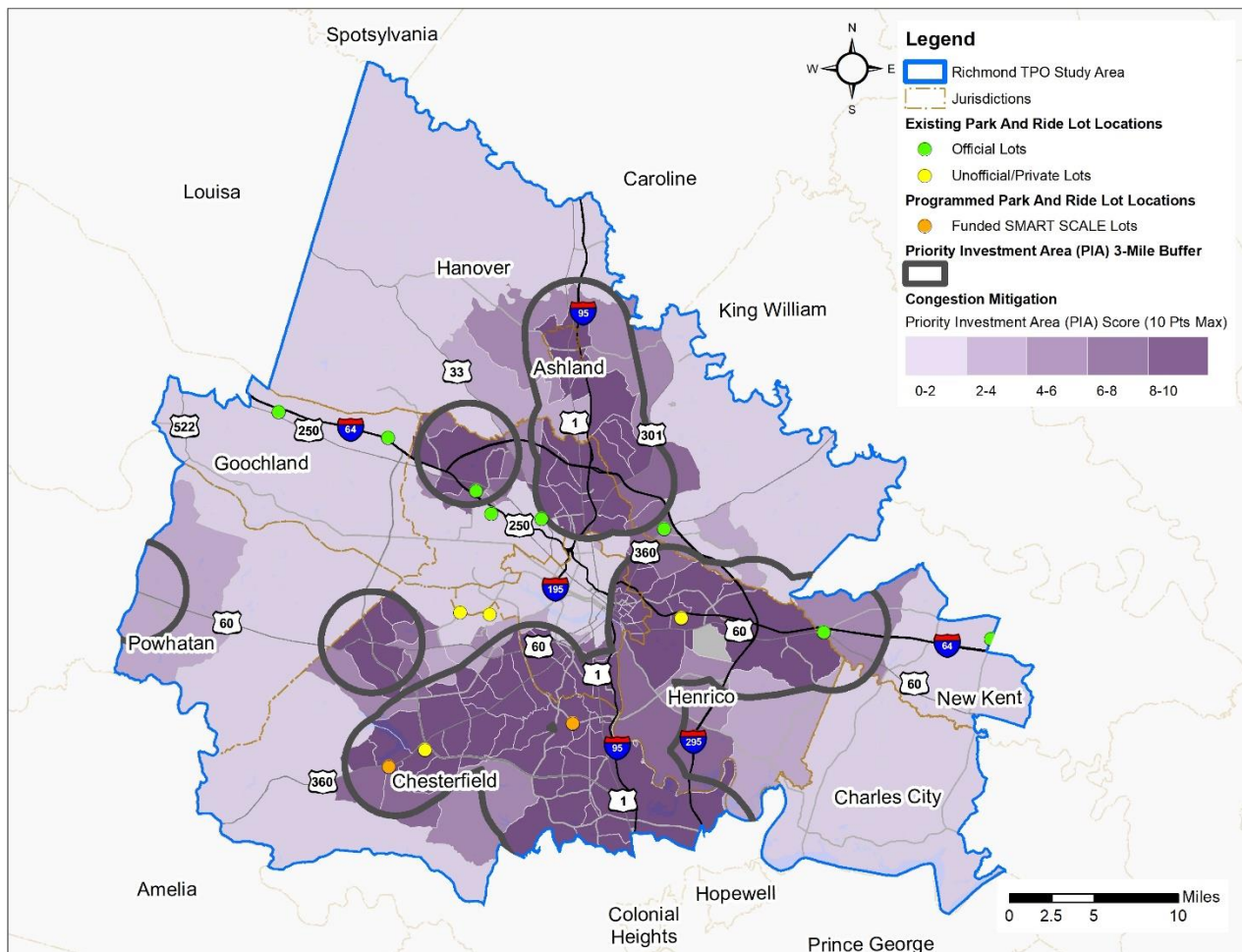
Goal Area 3: Congestion Mitigation

The third goal area, congestion mitigation, focuses on reducing demand on the roadway network. The commute time evaluation factor identifies areas in which workers are traveling longer than average times to work. The Priority Investment Area (PIA) evaluation factor accounts for locations that were identified as part of the previous planning effort (VDOT Park and Ride Investment Strategy) based on the convergence of population density, traffic volumes, and proximity to existing park and ride facilities. PIAs were developed to identify locations in each VDOT district where park and ride lots did not already exist but offer the potential to serve greater numbers of people and have larger impacts on reducing congestion. **Table 4** summarizes the two congestion mitigation evaluation factors. **Figure 7** and **Figure 8** illustrate the Phase I evaluation results for these factors.

Table 4: Congestion Mitigation Evaluation Factors

Factor	Measurement	Data Source	Notes
Commute Time	Mean travel time to work (by census tract)	American Community Survey: 2012-2016 5-Year Estimates (Table S0801)	Score is based on mean travel time to work for a census tract. This factor helps to identify commuters with long commutes who would be more likely to use park-and-ride lots, including both commuters traveling long distances as well as commuters traveling shorter distances along congested routes. The mean commute time in the study area is approximately 24 minutes.
Priority Investment Area (PIA)	Percentage of census tract located within 3-mile buffer PIA	GIS analysis using the 3-mile buffer polygon created by previous VDOT efforts	Score is based on 3-mile buffer PIAs developed for VDOT Park and Ride Investment Strategy. Scoring reflects the percentage of the census tract that overlaps with a 3-mile PIA buffer.

Figure 8: Priority Investment Areas



Overall Phase I Needs

As described in the scoring section, for each census tract, the three goal area scores (out of 10) were added together to get an overall score for Phase I (out of 30). The results of the Phase I evaluation are shown in **Figure 9** and the census tracts with the highest scores are highlighted in **Figure 10**.

Figure 9: Phase I Evaluation Baseline Scoring

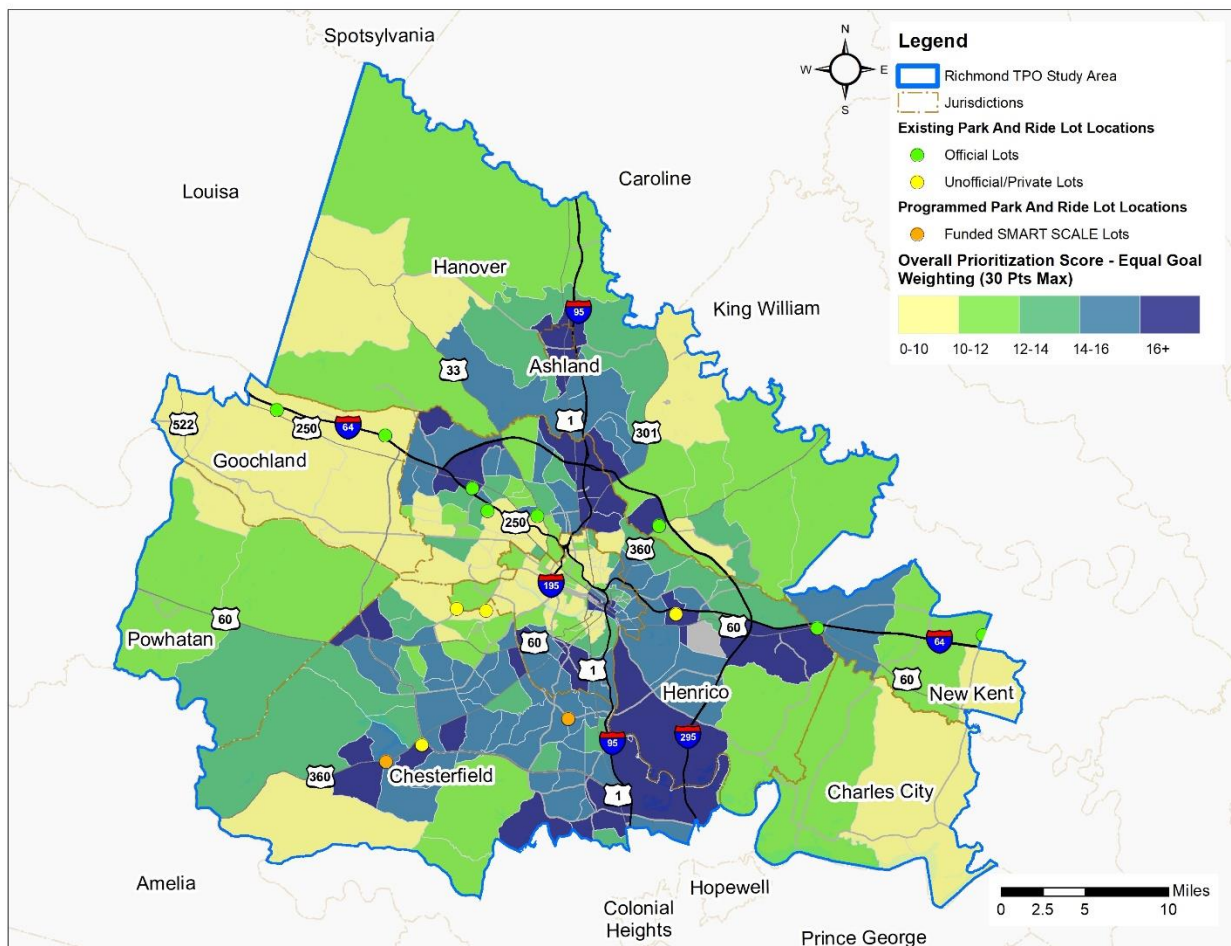
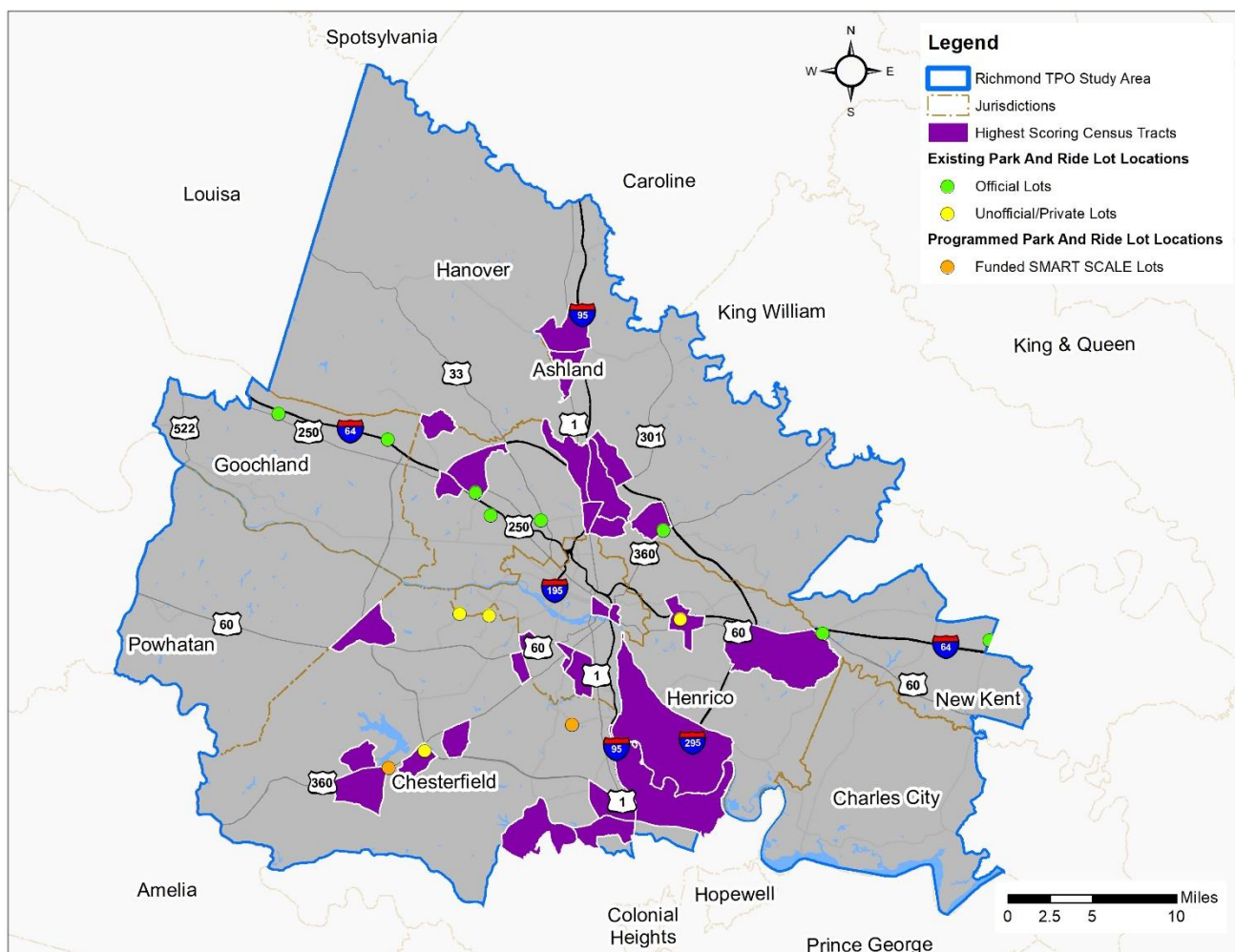


Figure 10: Phase I Highest Scoring Census Tracts



Phase II – Added-Value Adjustments

During the January 29, 2019 meeting, the SAG identified a list of high-priority park and ride investment areas for consideration as added-value locations. Areas on this list included the following:

- Major commuter corridors and roadway interchanges
- Priority transit locations
- Locations near unofficial lots
- Locations near where vanpools had to be relocated
- Locations where existing park and ride lots are currently at or approaching capacity (>80% full)

This list was then compared to the identified Phase I needs to determine where gaps existed. High-priority locations that did not fall into or adjacent to a Phase I needs area were reviewed as potential

added-value locations. The following two areas were recognized as added-value locations because they demonstrated a need in areas that did not fall into or adjacent to a Phase I needs area:

- Area near Pulse BRT western termini
 - Pulse ridership shows a demonstrated need for an official park and ride lot in this area
- Area near unofficial park and ride lots at Bon Air Baptist Church and Huguenot United Methodist Church
 - Usage of the unofficial lots, liability concerns by private lot owners, and concerns about congestion from surrounding neighbors demonstrate need for official park and ride lot in this area

Overall Regional Park and Ride Needs Areas

The combined results of the Phase I and Phase II needs evaluation are shown in **Figure 11**. In many cases, several high-needs census tracts were clustered together in the same geographic area. For these areas, the multiple census tracts in close proximity were combined into one “needs area”.

Table 5 presents the needs areas with their general location.

Figure 11: Regional Park and Ride Needs Areas

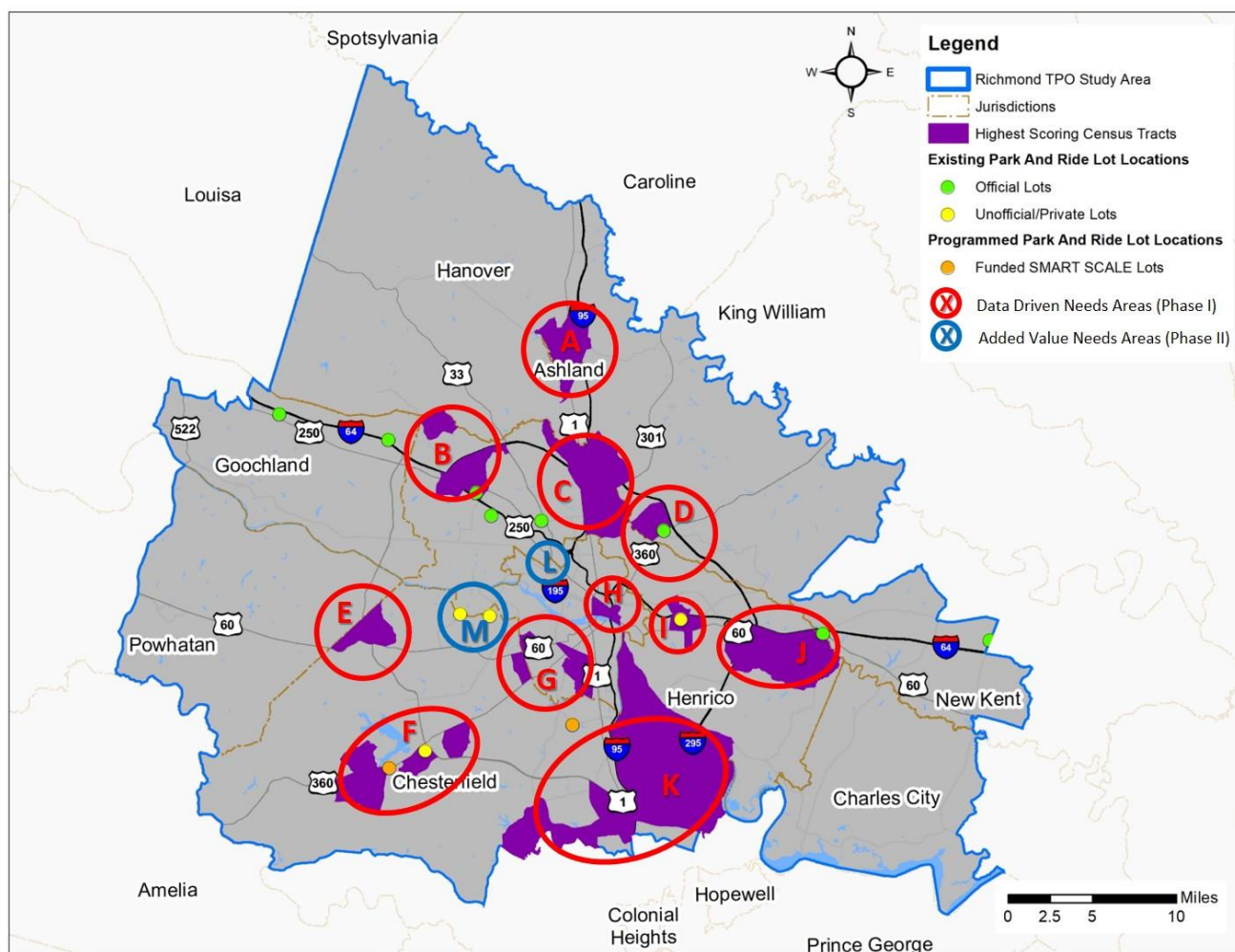


Table 5: Regional Park and Ride Needs Areas

Phase	Map ID	Needs Area	Jurisdiction(s)
I - Data Driven Needs	A	Ashland	Hanover, Ashland
	B	I-64 at I-295	Henrico
	C	I-95 at I-295	Henrico, Hanover
	D	I-295 at US 360	Hanover, Henrico
	E	US 60 at Route 288	Chesterfield, Powhatan
	F	US 360 at Route 288	Chesterfield
	G	Chippenham Parkway	Chesterfield, Richmond
	H	East of Downtown	Richmond
	I	I-64/US 60 at S. Laburnum Road	Henrico
	J	I-295 at US 60	Henrico, New Kent
	K	Route 10/Route 288 at I-95/I-295	Chesterfield, Henrico
II - Added-Value	L	US 250 at Willow Lawn/Staples Mill	Henrico, Richmond
	M	Huguenot Road at Forest Hill Avenue	Chesterfield

Next Steps

In the next phase of this project, the high-priority park and ride needs areas will be further examined to identify locations within the areas of greatest need for specific project recommendations. SAG members will be asked to support this process by identifying potential locations based on local knowledge of the area as well as the availability of public-owned land to ensure more cost-effective solutions. As part of this recommendations process, the locations of existing and programmed park and ride lots will be considered to determine if the identified need is already met or if an existing lot may be a candidate for expansion. In addition, concentrations of environmental justice populations (as described in Tech Memo I, Figure 8) will also be considered within the areas recommended for park and ride lots to ensure individual access enhancements, such as bicycle and pedestrian connections, signalization, and other infrastructure, are included in project recommendations where appropriate.

An overview of the evaluation of needs and project recommendation development process is illustrated in **Figure 12**.

Figure 12: Needs Evaluation and Recommendation Development Process

