2045 Long Range Growth Forecast Analysis (Draft)

ACKNOWLEDGEMENT

This report was prepared in cooperation with the United States Department of Transportation, Federal Highway Administration, the Virginia Department of Transportation, Virginia Department of Rail and Public Transportation, GRTC Transit Systems and the representatives of the nine local jurisdictions of the Richmond region and is the collective work of state, regional and local representatives of the Richmond Regional Transportation Planning Organization (RRTPO) Socioeconomic Data Work-group.

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1. Introduction

The 2045 Long Range Growth Forecast Analysis (GFA) is an important component of **ConnectRVA 2045**. It provides a set of common regional assumptions informing the discussion among RRTPO, local jurisdictions and other regional and state partners on how the Richmond region might grow in the next twenty-five years and beyond. The Richmond Region is comprised of nine jurisdictions in the US Census-defined Richmond Metropolitan Statistical Area (MSA), including the City of Richmond, the Town of Ashland, and the Counties of Hanover, Henrico, Chesterfield, Charles City, New Kent, Goochland, and Powhatan.

To better anticipate the future transportation needs in the Richmond region, it is essential to predict the demands on the system and understand how population and employment growth dynamics influence the region over time. The long-range planning process relies on current residential patterns and projections of future population and employment trends to identify the magnitude of anticipated travel demand. This process also helps to assess how changing commuting patterns and travel habits of the region's population are impacted and/or benefit from the transportation system network.

Growth forecasts show that between 2017 and 2045, employment in the Richmond region is projected to grow from 555,000 to 691,000 jobs, while the population is projected to grow from 1.1 million to 1.4 million people. This population will live in 552,000 households, an increase of nearly 125,000 households over 2017 levels.

This document examines the socioeconomic characteristics of the Richmond region including population, household characteristics, automobile ownership and employment. Transportation Analysis Zones (TAZs) serve as the base geographic unit of data for these socioeconomic characteristics and generally fall between a Census Block and a Census Block group in size. TAZs are generally defined as areas of homogeneous activity served by one or two major roadways. There are 875 TAZs in the Richmond region. The TAZ data is aggregated to the jurisdictional level to provide data for the individual localities and further aggregated to produce a regional data set. The population and employment densities were also derived from the TAZ data. The density pattern illustrates the problem of in the Richmond region using the data from TAZsof varying sizes. The intersections of population and employment concentrations by

TAZ revealed 20 Regional Activity Centers or areas of higher relative activity within the Richmond Region.

The 2045 Long Range Growth Forecast Analysis is a realistic look at regional factors that influence growth over time and is based on actual data collected in partnership between the member jurisdictions of the region and our partners. For 2017, housing and population data was collected with the cooperation of localities tracking local residential development through certificates of occupancy (COs) and demolition permit (Demos) activity. The employment data was derived from Virginia Employment Commission (VEC) ES-202 data. School and College enrolment data was provided by Virginia Department of Education, locality school boards and individual institutions. The automobile registration data was provided by Department of Motor Vehicles. For 2045, two independent projections were done to establish the control-totals for population and employment for each jurisdiction. Distribution of the population and employment estimates to the TAZs was informed by working with each of the localities. Future projections relied on a combination of local residential and commercial development activity in the" pipeline" (approved but not built), existing and future land use, and comprehensive local land use plans. Other dependent socioeconomic attributes like housing characteristics, automobiles registration and school enrolment numbers were derived directly from the established population control totals. The data at the TAZ level and the detailed methodology used to derive 2017 and 2045 data are described in the Socioeconomic Data Report for the 2017 Base Year and 2045 Forecast Year.

ConnectRVA 2045 also requires identification of concentrated areas of traditionally disadvantaged groups in the Richmond region. Title VI of the Civil Rights Act of 1964 and Executive Order 12898 on Environmental Justice direct every recipient of federal funds to identify and address the effects of all programs, policies, and activities on populations protected from discrimination and those of traditionally disadvantaged groups. Areas are designated areas of concentration if the percentage of the sensitive population exceeds the average percentage of the target population in the region. Special populations meeting the requirements of Title VI and Environmental Justice analysis standards include minorities, low income population, the elderly, individuals with a disability, individuals with Limited English Proficiency (LEP), and zero- car households. These areas of concentration have been identified using data from the US Census's American Community Survey. ConnectRVA 2045 uses these areas so identified as a baseline to investigate ways to better include underserved populations in the region through identification of transportation priorities and funding opportunities.

2. Regional Trends

Exhibit 1: 2017 and 2045 Socioeconomic Data Summary

2017

Jurisdiction[1]	Population			Housing		Autos	School Enrollment		Employment		
	Total	In Households	In Group Quarters	Housing Units	Households		K-12	Colleges	Total	Retail	Non-Retail
Charles City	7,126	7,126	0	3,328	2,874	8,672	650	0	1,668	96	1,572
Chesterfield[2]	340,848	336,197	4,651	132,586	124,595	293,337	62,779	20,985	131,120	34,646	96,474
Goochland	23,536	22,812	724	9,679	8,981	23,485	2,925	531	13,966	1,360	12,606
Hanover[3]	109,595	106,677	2,918	41,706	40,247	97,794	18,226	1,418	50,625	12,969	37,656
Henrico	335,283	328,396	6,887	135,623	132,421	279,241	57,860	11,490	191,240	45,877	145,363
New Kent	21,347	20,740	607	8,389	8,008	21,868	3,336	100	3,956	948	3,008
Powhatan	29,147	27,150	1,997	11,022	10,442	29,566	4,635	0	6,092	1,577	4,515
Richmond	224,798	210,302	14,496	108,043	99,958	129,444	29,536	41,746	152,044	24,468	127,576
Total	**1,091,680**	**1,059,400**	**32,280**	**450,376**	**427,526**	**883,407**	**179,947**	**76,270**	**550,711**	**121,941**	**428,770**

2045

Jurisdiction[1]	Population			Housing		Autos	School Enrollment		Employment		
	Total	In Households	In Group Quarters	Housing Units	Households		K-12	Colleges	Total	Retail	Non-Retail
Charles City	8,540	8,540	0	3,988	3,444	10,391	617	0	1,832	112	1,720
Chesterfield[2]	437,512	432,861	4,651	169,660	159,420	375,168	77,677	22,272	177,742	43,522	134,220
Goochland	33,738	33,014	724	14,025	13,003	33,705	4,182	531	20,507	1,976	18,531
Hanover[3]	145,559	142,584	2,969	54,324	52,423	127,162	19,553	1,418	65,859	18,847	47,012
Henrico	430,222	423,335	6,887	174,837	170,701	360,612	74,880	12,329	238,938	51,987	185,951
New Kent	36,270	35,435	835	14,334	13,682	37,365	6,102	310	5,979	1,267	4,712
Powhatan	41,248	39,251	1,997	15,934	15,097	42,694	6,362	0	7,528	1,843	5,685
Richmond	280,141	264,645	15,496	135,306	125,169	162,014	42,990	41,809	173,089	25,987	147,102
Total	**1,413,230**	**1,379,665**	**33,559**	**582,408**	**552,939**	**1,149,111**	**232,363**	**78,669**	**691,474**	**145,541**	**544,933**

1. Includes all jurisdictions in Planning District 15 (i.e. MPO Study area, rural areas, and Tri-Cities Area MPO portion of Chesterfield)

2. Chesterfield County TAZs are located in both the Richmond TPO and Tri-Cities MPO3. Includes the Town of Ashland

3. Includes the Town of Ashland

Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

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2.1 Population

From 1970 to 2017, each locality exhibited different levels of growth, except for the City of Richmond which experienced a 10% population loss, as shown in *Exhibit 4*. Chesterfield County had the highest population increase at 350% growth resulting in a population of 264,000. Henrico County experienced 120% growth with a 180,000 population increase. The 2017 Hanover County population is almost three times its value in 1970 with 72,000 additional population. Except for Charles City County, the smaller jurisdictions have experienced significant growth in this period. New Kent County has

Exhibit 2: Richmond Regional Population Growth from 1970 to 2045 by Locality

| Jurisdiction	1970	1970-1980%	1980	1980-1990%	1990	1990-2000%	2000	2000-2010%	2010	2010-2012%	2012	2012-2017%	2017	2017-2045%	2045
Charles City	6,158	8.7%	6,692	-6.1%	6,282	10.3%	6,926	4.8%	7,256	1.9%	7,392	-3.6%	7,126	19.8%	8,540
Chesterfield	77,045	83.5%	141,372	48.0%	209,274	24.2%	259,903	21.7%	316,236	1.7%	321,718	5.9%	340,848	28.4%	437,512
Goochland	10,069	16.8%	11,761	20.4%	14,163	19.1%	16,863	28.8%	21,717	1.0%	21,942	7.3%	23,536	43.3%	33,738
Hanover*	37,479	34.5%	50,398	25.6%	63,306	36.4%	86,320	15.7%	99,863	1.8%	101,666	7.8%	109,595	32.8%	145,559
Henrico	154,463	17.0%	180,735	20.6%	217,881	20.4%	262,300	17.8%	308,935	3.0%	318,163	5.4%	335,283	28.3%	430,222
New Kent	5,300	65.7%	8,781	19.0%	10,445	28.9%	13,462	36.9%	18,429	4.6%	19,277	10.7%	21,347	69.9%	36,270
Powhatan	7,696	69.7%	13,062	17.3%	15,328	46.0%	22,377	25.3%	28,046	1.3%	28,410	2.6%	29,147	41.5%	41,248
Richmond	249,332	-12.1%	219,214	-7.4%	203,056	-2.6%	197,790	3.2%	204,214	2.8%	209,896	7.1%	224,798	24.6%	280,141
Region	547,542	15.4%	632,015	17.0%	739,735	17.1%	865,941	16.0%	1,004,696	2.4%	1,028,464	6.1%	1,091,680	29.5%	1,413,230

* Incluldes the Town of Ashland

Source: Decennial Census 1970 -2010; Socioeconomic Data Report 2012-2040 & 2017-2045, RRTPO, September 2019

seen a 300% increase with 16,000 additional residents. Powhatan County has 21,000 more residents compared with its population in 1970, or 280% growth. Goochland's population in 2017 was 1.3 times larger than it was in 1970. Charles City County experienced a modest increase of 16% during the same time period.

In the past five years from 2012 to 2017, the population of the Richmond region has maintained steady growth at a six-percent rate. A total of increase of 63,000 in population has been added across the region, with an annual growth rate of 1.2%. With the exception of Charles City County which has a population loss of 266 residents, all other counties' population have increasedpopulation at rates ranging from 2.6% to 10.7%.

A different perspective is gained by looking back 30 years (1990-2017) to look forward another 30 years (2017-2045): The growth rate from 1990-2017 is 56% while a smaller increase of 44% is expected in the next 30 years shown in *Exhibit 4*. This rate indicates the population of the Richmond Region is expected to grow at a slightly slower rate in the next 30 years, compared with the past (1990-2017). Specifically, Chesterfield, Goochland, Hanover, Henrico, and Powhatan will follow the regional trend with a slow-down in growth rate. However, Charles City, New Kent and Richmond City are expected to experience a higher growth rate in the future.

Exhibit 3: Richmond Regional Population Growth 1970-2045
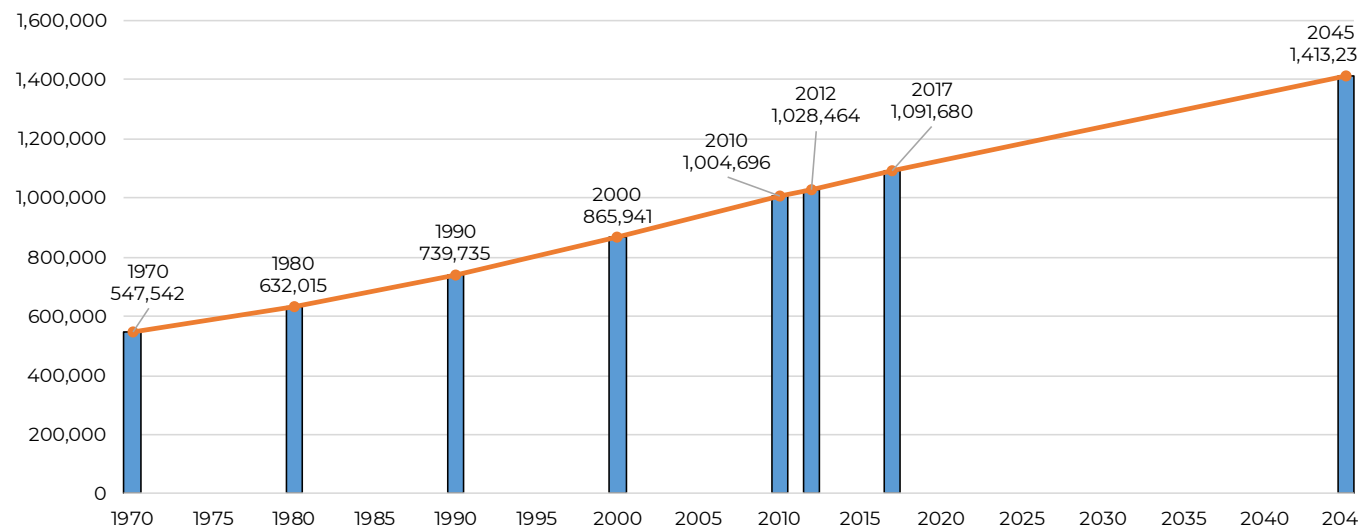
*Includes the Town of Ashland.
Source: Decennial Census (1970 -2010); 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

2.2   Housing

2.2.1   Housing Units

Exhibit 4: Richmond Region Population Growth Rates by the Decade 1970-2045

Jurisdiction	1970	1990	2012	2017	2045	1970-2017	1970-2017 %	2012-2017	2012-2017 %	1990-2017	1990-2017 %	2017-2045	2017-2045 %
Charles City	6,158	6,282	7,392	7,126	8,540	968	15.7%	-266	-3.6%	844	12.6%	1,414	22.5%
Chesterfield	77,045	209,274	321,718	340,848	437,512	263,803	342.4%	19,130	5.9%	131,574	93.1%	96,664	46.2%
Goochland	10,069	14,163	21,942	23,536	33,738	13,467	133.7%	1,594	7.3%	9,373	79.7%	10,202	72.0%
Hanover*	37,479	63,306	101,666	109,595	145,559	72,116	192.4%	7,929	7.8%	46,289	91.8%	35,964	56.8%
Henrico	154,463	217,881	318,163	335,283	430,222	180,820	117.1%	17,120	5.4%	117,402	65.0%	94,939	43.6%
New Kent	5,300	10,445	19,277	21,347	36,270	16,047	302.8%	2,070	10.7%	10,902	124.2%	14,923	142.9%
Powhatan	7,696	15,328	28,410	29,147	41,248	21,451	278.7%	737	2.6%	13,819	105.8%	12,101	78.9%
Richmond	249,332	203,056	209,896	224,798	280,141	-24,534	-9.8%	14,902	7.1%	21,742	9.9%	55,343	27.3%
Region	**547,542**	**739,735**	**1,028,464**	**1,091,680**	**1,413,230**	**544,138**	**99.4%**	**63,216**	**6.1%**	**351,945**	**55.7%**	**321,550**	**43.5%**

* Inclues Town of Ashland

Source: Decennial Census (1970 -2010); 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

The significant population growth in the Richmond Region since 1970 is evident in the increase in the number of housing units. *Exhibit 5* shows that 180,000 housing units in 1970 expanded to 450,000 by 2017 with an average of 24% growth every ten years. From 2017 to 2045, an estimated 134,000 new housing units are expected to be added to the region's housing stock to try to meet the residential demand of 320,000 additional people as shown in *Exhibit 6*.

From 1970 to 2017 the Richmond region experienced an increase of 272,000 housing units, or a 150% increase. The suburbanizing counties showed the most growth. Chesterfield County's number of housing units in 2017 is more than five times more than it was in 1970; increasing from 23,000 in 1970 to 132,000 in 2017, a total of 110,000 units. The growth percentages of housing units in New Kent and Powhatan counties are also over 400%.

In the past five years, from 2012 to 2017, 24,000 new housing units were added to the region's stock. Chesterfield County experienced the highest growth with 8,000 units, or a 6.4% rate. Encouraging from an infill perspective, the City of Richmond had the next highest number of units added with 7,000 new housing units. The more rural counties such as

Goochland and New Kent have a positive increase (10.4% and 9.3%) although in real terms not more than 1,000 units in each county. Charles City County continues to remain slow growing at 0.8%.

With the comparison of three decades before and after the base year of 2017, the housing unit average annual growth rate for the region is approximately 1%, or 4,500 new units added every year shown in *Exhibit 6*.

Exhibit 5: Richmond Region Housing Units from 1970 to 2045

| Jurisdiction	1970	1970-1980 %	1980	1980-1990 %	1990	1990-2000 %	2000	2000-2010 %	2010	2010-2012 %	2012	2012-2017 %	2017	2017-2045 %	2045
Charles City	1,576	37.8%	2,172	6.5%	2,314	25.1%	2,895	11.5%	3,229	2.2%	3,301	0.8%	3,328	19.8%	3,988
Chesterfield	22,554	116.7%	48,883	58.2%	77,329	26.4%	97,707	25.4%	122,555	1.7%	124,584	6.4%	132,586	28.0%	169,660
Goochland	2,873	40.3%	4,031	29.1%	5,203	26.0%	6,555	31.5%	8,618	1.7%	8,768	10.4%	9,679	44.9%	14,025
Hanover*	10,948	57.8%	17,278	37.3%	23,727	35.7%	32,196	19.1%	38,360	1.8%	39,033	6.8%	41,706	30.3%	54,324
Henrico	49,528	42.2%	70,428	34.2%	94,539	19.1%	112,570	18.0%	132,778	-0.8%	131,660	3.0%	135,623	30.4%	176,854
New Kent	1,641	98.4%	3,256	21.9%	3,968	31.1%	5,203	40.2%	7,295	5.2%	7,676	9.3%	8,389	70.9%	14,333
Powhatan	1,968	95.0%	3,838	27.9%	4,910	52.9%	7,509	33.7%	10,043	1.8%	10,224	7.8%	11,022	44.6%	15,935
Richmond	87,026	5.2%	91,527	2.9%	94,141	-2.0%	92,282	6.6%	98,349	2.7%	101,028	6.9%	108,043	25.2%	135,306
Region	**178,114**	**35.5%**	**241,413**	**26.8%**	**306,131**	**16.6%**	**356,917**	**18.0%**	**421,227**	**1.2%**	**426,274**	**5.7%**	**450,376**	**29.8%**	**584,425**

* Inclues Town of Ashland

Source: Decennial Census (1970 -2010); 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

Exhibit 6: Richmond Region Housing Units from 1970 to 2045 by the Decade

Jurisdiction	1970	1990	2012	2017	2045	1970-2017	1970-2017%	012-2017	2012-2017%	1990-2017	1990-2017%	2017-2045	2017-2045%
Charles City	1,576	2,314	3,301	3,328	3,988	1,752	111.2%	27	0.8%	987	42.7%	660	19.8%
Chesterfield	22,554	77,329	124,584	132,586	169,660	110,032	487.9%	8,002	6.4%	47,255	61.1%	37,074	28.0%
Goochland	2,873	5,203	8,768	9,679	14,025	6,806	236.9%	911	10.4%	3,565	68.5%	4,346	44.9%
Hanover*	10,948	23,727	39,033	41,706	54,324	30,758	280.9%	2,673	6.8%	15,306	64.5%	12,618	30.3%
Henrico	49,528	94,539	131,660	135,623	176,854	86,095	173.8%	3,963	3.0%	37,121	39.3%	41,231	30.4%
New Kent	1,641	3,968	7,676	8,389	14,333	6,748	411.2%	713	9.3%	3,708	93.4%	5,944	70.9%
Powhatan	1,968	4,910	10,224	11,022	15,935	9,054	460.1%	798	7.8%	5,314	108.2%	4,913	44.6%
Richmond	87,026	94,141	101,028	108,043	135,306	21,017	24.2%	7,015	6.9%	6,887	7.3%	27,263	25.2%
Region	178,114	306,131	426,274	450,376	584,425	272,262	152.9%	24,102	5.7%	120,143	39.2%	134,049	29.8%

Source: Decennial Census (1970 -2010); 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

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Exhibit 7: Richmond Region Housing Unit Growth Trends 1970-2045
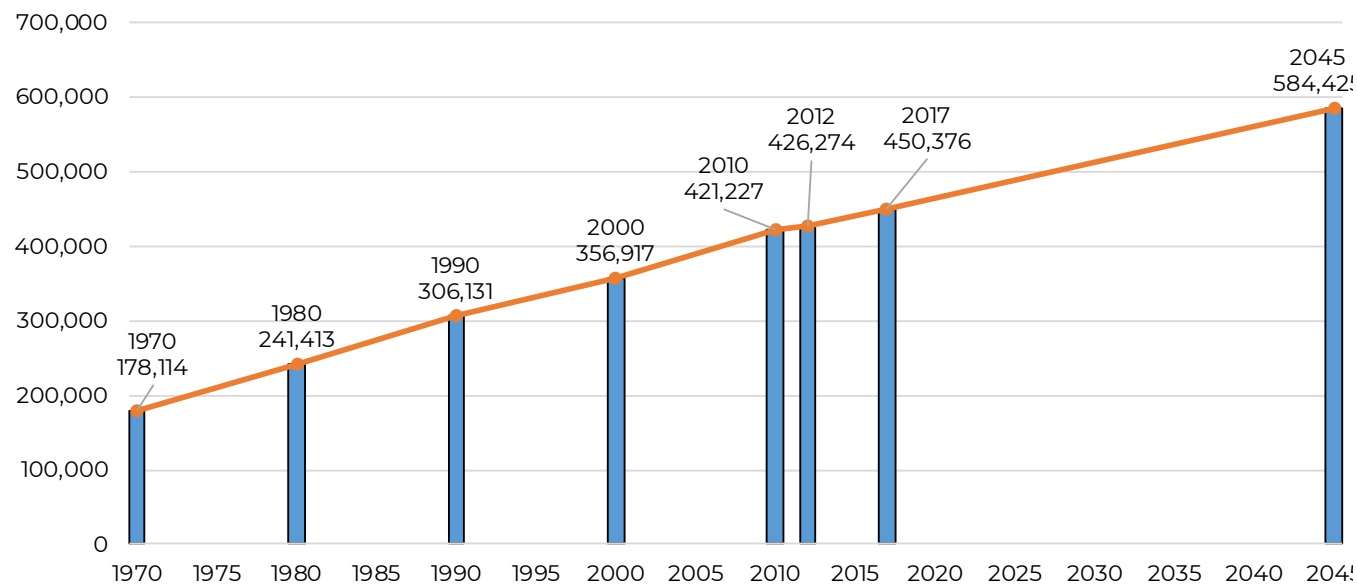
Source: Decennial Census (1970 -2010); 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

2.2.2 Household Size

Household Size 1970-2045

Mirroring national trends, the average household size in the Richmond region has been declining over the past 47 years, as shown in *Exhibit 8* and *Exhibit 9*. The average size of the Richmond region's households was calculated by dividing each locality's population in household by the number of occupied housing unit From 1970 to 2017, the increase in number of housing units was 150%, exceeding the population increase of 100% in the same time period. This is reflected in the reduction in household size of 3.5 in 1970 compared to 2.5 in 2017. Households in the more rural areas are declining in size more dramatically than in the more urban areas. The current household size in Richmond region is 2.48, which is comparable to the national level of 2.54.

Exhibit 8: Richmond Regional vs. U.S. Household Size Growth Rates by Locality 1970-2045

Jurisdiction	1970	1980	1990	2000	2010	2012	2017	2045	1990-2017	2017-2045
Charles City	4.19	3.22	2.91	2.59	2.46	2.48	2.48	2.48	-0.43	0.00
Chesterfield	3.42	2.85	2.82	2.73	2.69	2.71	2.70	2.72	-0.12	0.02
Goochland	3.64	2.87	2.70	2.51	2.54	2.54	2.54	2.54	-0.16	-0.00
Hanover[1]	3.45	2.86	2.73	2.71	2.68	2.67	2.65	2.72	-0.08	0.07
Henrico	3.18	2.54	2.41	2.39	2.44	2.44	2.48	2.48	0.07	0.00
New Kent	3.51	2.79	2.77	2.65	2.62	2.62	2.59	2.59	-0.18	-0.00
Powhatan	3.61	2.96	2.84	2.75	2.70	2.70	2.60	2.60	-0.24	-0.00
Richmond	2.89	2.43	2.25	2.21	2.20	2.18	2.10	2.11	-0.15	0.01
Region[2]	**3.49**	**2.82**	**2.68**	**2.57**	**2.54**	**2.49**	**2.48**	**2.50**	**-0.20**	**0.02**
U.S.	3.14	2.76	2.63	2.62	2.59	2.55	2.54	NA	-0.09	NA

Source: Decennial Census (1970 -2010); 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

Exhibit 9: Figure of Richmond Regional vs. U.S. Household Sizes 1970-2045
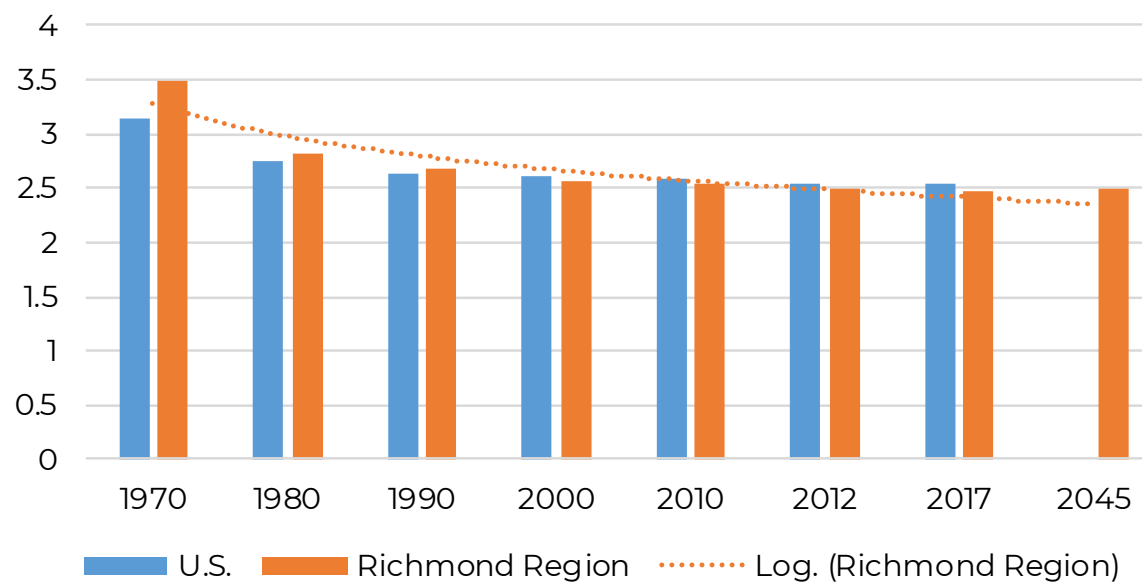
Source: Decennial Census (1970 -2010); 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

2.3 Automobiles

Auto Ownership Trends 2012-2045

From 2012 to 2017, the number of automobiles in the region increased annually at an average rate of 3%. An additional 120,000 automobiles were added to the roads of the Richmond region, a 15% increase from 2012 shown in *Exhibit 10*. The two largest populations, the counties of Chesterfield and Henrico, each contributed to over 40,000 new vehicles added as shown in *Exhibit 11*. The rural counties including Charles City, Goochland, New Kent and Powhatan lead the highest growth percentage of auto numbers with over 20%.

Exhibit 10: Richmond Region Auto Ownership by locality 1970-2045

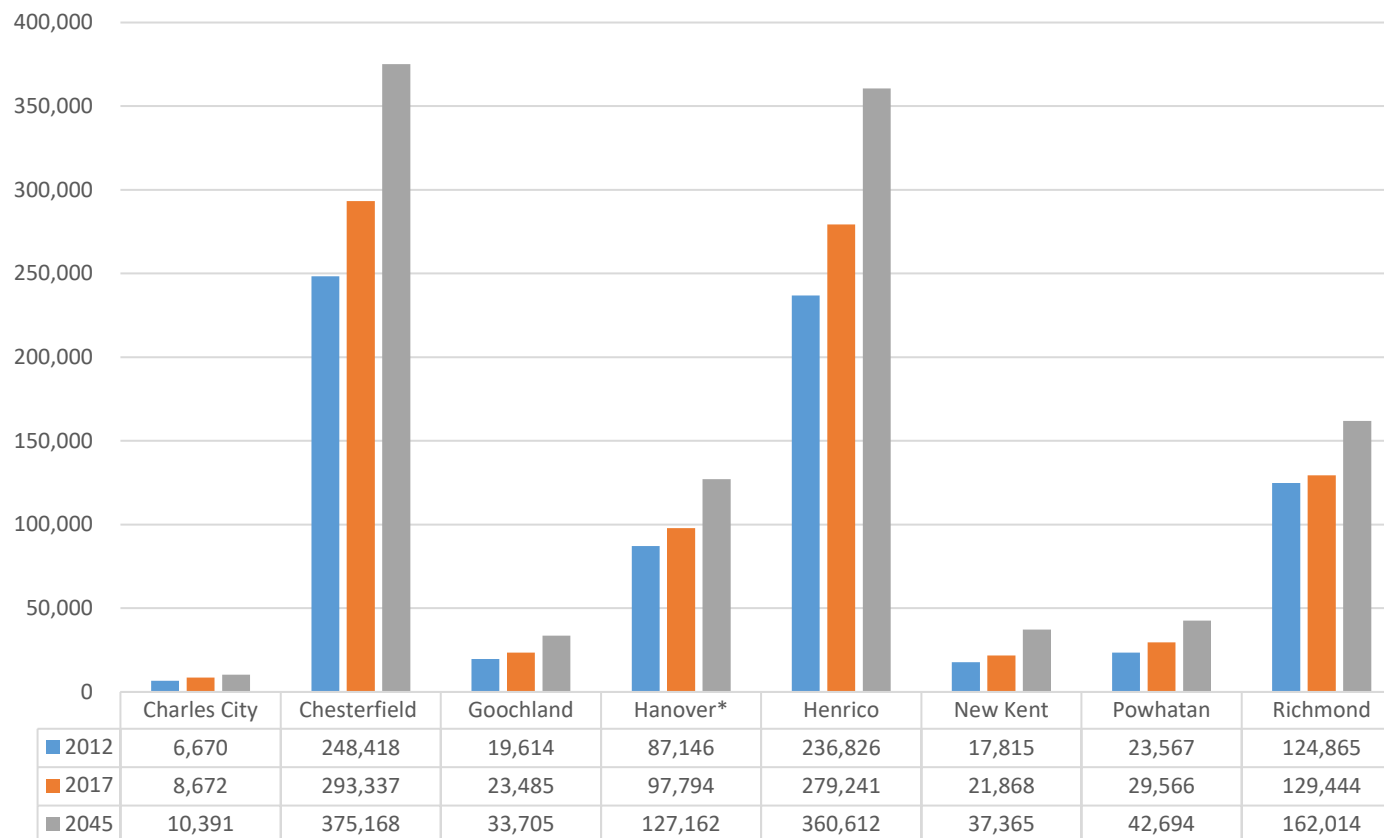| Jurisdiction	2012	2012-2017	2012-2017 %	2017	2017-2045	2017-2045 %	2045
Charles City	6,670	2,002	30%	8,672	1,719	20%	10,391
Chesterfield	248,418	44,919	18%	293,337	81,831	28%	375,168
Goochland	19,614	3,871	20%	23,485	10,220	44%	33,705
Hanover*	87,146	10,648	12%	97,794	29,368	30%	127,162
Henrico	236,826	42,415	18%	279,241	81,371	29%	360,612
New Kent	17,815	4,053	23%	21,868	15,497	71%	37,365
Powhatan	23,567	5,999	25%	29,566	13,128	44%	42,694
Richmond	124,865	4,579	4%	129,444	32,570	25%	162,014
Region	**764,921**	**118,486**	**15%**	**883,407**	**265,704**	**30%**	**1,149,111**

Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

Assuming rate of increase in personal automobile ownership continues, the total number of automobiles is expected to reach 1,150,00 vehicles by 2045. This is a 30% growth with a 265,000-difference compared to 2017. At the locality level, 82,000 new vehicles are projected to be added in Chesterfield County for the largest absolute number among other jurisdictions. The 71% growth rate of New Kent is expected to be the highest

The rates of auto ownership per person and per household have generally increased from 2012 to 2017. Average automobile ownership per household stands at 2.1 autos/household for the region. The City of Richmond has the lowest auto ownership rate at 1.3 autos per household and 0.6 autos/person while Charles City County has the highest at 3.0 autos per household and 1.2 autos per person. If these trends were to continue, more vehicles could be expected

on the road by 2045. Countering this trend, research on local, regional and national, current and future trends show a decline in future auto-ownership rates. Connected and Autonomous Vehicles (CAV) market penetration by 2045 is one factor that is expected to affect auto-ownership rates in the future, but increased density, re-population of the city and activity centers make public transit and the shared economy more likely. For purposes of this study, the autoownership rates were kept constant from the base year to the future year as shown in *Exhibit 13* to measure the impact on mobility in the region. As CAV technology progresses, PlanRVA staff will be looking for the effect on trends to revisit projections.

Exhibit 11: Auto Ownership by Locality 2012, 2017 & 2045

	Charles City	Chesterfield	Goochland	Hanover*	Henrico	New Kent	Powhatan	Richmond
2012	6,670	248,418	19,614	87,146	236,826	17,815	23,567	124,865
2017	8,672	293,337	23,485	97,794	279,241	21,868	29,566	129,444
2045	10,391	375,168	33,705	127,162	360,612	37,365	42,694	162,014

Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

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12: Auto Ownership Trends in Region 2012, 2017 & 2045
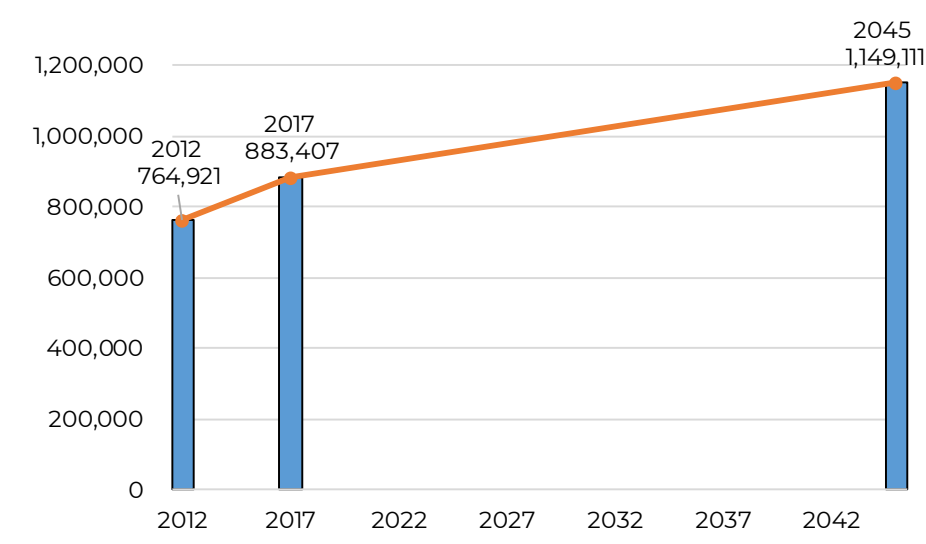
Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

Exhibit 13: Auto Ownership Per Person & Per Household 2012, 2017 & 2045

Jurisdiction	Auto Per Person			Auto Per Household		
	2012	2017	2045	2012	2017	2045
Charles City	0.9	1.2	1.2	2.2	3.0	3.0
Chesterfield	0.8	0.9	0.7	2.1	2.4	2.4
Goochland	0.9	1.0	0.7	2.4	2.6	2.6
Hanover*	0.9	0.9	0.9	2.3	2.4	2.4
Henrico	0.7	0.8	0.8	1.9	2.1	2.1
New Kent	0.9	1.0	1.0	2.5	2.7	2.7
Powhatan	0.8	1.0	1.0	2.4	2.8	2.8
Richmond	0.6	0.6	0.6	1.4	1.3	1.3
Region	**0.7**	**0.8**	**0.8**	**1.9**	**2.1**	**2.1**

Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

Did you know?

♦ Among the total number of 1.14 million autos in the region, 78% are for personal or individual use while 22% are other use.

♦ 95% of the vehicles in the region are powered by gasoline

♦ The Ford F-150 is the most popular vehicle garaged in the region.

♦ Hybrid gas/electric vehicles make up slightly more than 1.0 percent of personal vehicles on the road

♦ The average value of a personal vehicle in the region is $16,000

♦ Reflecting national trends, approximately one-half of the 16-19 age cohort have drivers' licenses.

2.4 School Enrollment

2.4.1 Private and Public K-12 Enrollment Trend 2012, 2017 and 2045

Changes in school enrollment are a natural represents of change in population, both in absolute terms of population growth, but also indicative of the changing dynamics of household characteristics. From 2012 to 2017, a 6.1% increase in total population yielded an increase of 4.8% in regional school enrollment. Similarly, the school enrollment in 2045 is expected to increase by 29.1% as a result of 29.5% growth of the population, compared with 2017 as shown in *Exhibit 14*.

Exhibit 14: Richmond Region School Enrollment by Locality 2012, 2017 and 2045

Jurisdiction	2012			2017			2045		
	Total	Public	Private	Total	Public	Private	Total	Public	Private
Charles City	732	732	0	650	650	0	617	617	0
Chesterfield	60,412	58,869	1,543	62,779	60,976	1,803	77,677	75,874	1,803
Goochland	2,648	2,322	326	2,925	2,629	296	4,182	3,886	296
Hanover	18,177	18,059	118	18,226	17,756	470	19,553	19,049	504
Henrico	55,587	50,704	4,883	57,860	52,727	5,133	74,880	69,747	5,133
New Kent	3,031	2,947	84	3,336	3,244	92	6,102	6,010	92
Powhatan	4,570	4,279	291	4,635	4,297	338	6,362	6,024	338
Richmond	26,400	20,855	5,545	29,536	23,202	6,334	42,990	36,656	6,334
Region	**171,557**	**158,767**	**12,790**	**179,947**	**165,481**	**14,466**	**232,363**	**217,863**	**14,500**

Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

The Richmond Region has 286 schools; 211 public schools and 75 private schools in 2017 shown in Exhibit 15. Three localities with a large population including Chesterfield County, Henrico County and the City of Richmond have a larger number of schools. In addition, most of the private schools are located in Henrico County and the City of Richmond. Apsent independent projections by private schools, enrolement in non-public schools is kept constant to 2045.

From the base year of 2017 to the future year of 2045, the projection of public-school enrollment based on calculations of the cohort school age population is shown in *Exhibit 14*:

- New Kent County is expected to have 6,000 public school students in 2045; this reflects 85.3% growth with an additional 2,800 students.

- Chesterfield County will still have the largest public-school enrollment in the region; the number is projected to 76,000 students including 15,000 new enrollments by 2045.

- Henrico County will have the largest growth. In public schools, 17,000 additional school enrollments will be added through 2045. Following Henrico County, Richmond City public school enrollment will grow by 58.0%.

- The rural counties in the Richmond Region are expected to have a substantial local increase in student population; all of the growth percentages will exceed 30% except for Charles City County, which remains relatively steady in enrollment with just a slight decrease.

Exhibit 15: Richmond Region Number of Schools by Type by Locality in 2017

Jurisdiction	Number of Schools		
	Total	Public	Private
Charles City	3	3	0
Chesterfield	73	63	10
Goochland	10	5	5
Hanover	20	16	4
Henrico	90	69	21
New Kent	5	4	1
Powhatan	7	6	1
Richmond	78	45	33
Region	286	211	75

Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

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Exhibit 16: Richmond Region Public School Enrollment by Locality 2012, 2017 and 2045

Jurisdiction	2012	2012-2017	2012-2017%	2017	2017-2045	2017-2045%	2045
Charles City	732	-82	-11.2%	650	-33	-5.1%	617
Chesterfield	58,869	2,107	3.6%	60,976	14,898	24.4%	75,874
Goochland	2,322	307	13.2%	2,629	1,257	47.8%	3,886
Hanover*	18,059	-303	-1.7%	17,756	1,293	7.3%	19,049
Henrico	50,704	2,023	4.0%	52,727	17,020	32.3%	69,747
New Kent	2,947	297	10.1%	3,244	2,766	85.3%	6,010
Powhatan	4,279	18	0.4%	4,297	1,727	40.2%	6,024
Richmond	20,855	2,347	11.3%	23,202	13,454	58.0%	36,656
Region	158,767	6,714	4.2%	165,481	52,382	31.7%	17,863

Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

Exhibit 17: Richmond Region Public School Enrollment by Locality 2012, 2017, and 2045
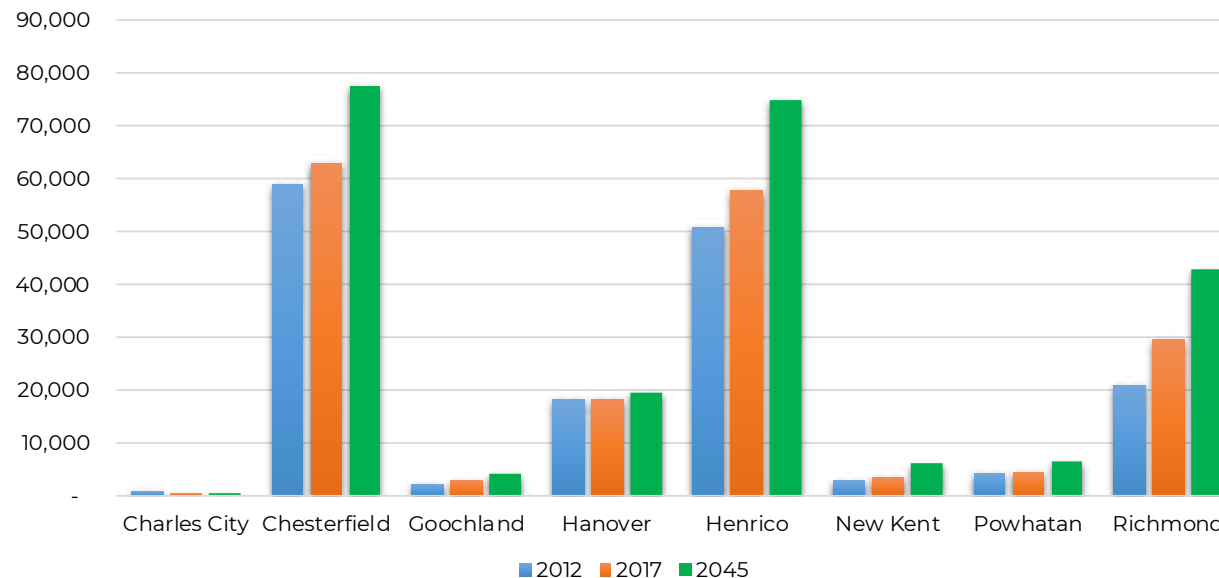
Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

2.4.2 College Enrollment

As of the fall of 2017, 29 Colleges/Universities are located in the Richmond region as shown in *Exhibit 18*. Except for the 10 community college campuses which have experienced a modest increase in enrollment, all other proprietary colleges and universities experienced an enrollment slide from 2012 to 2017. The overall decline was 4.6%, or roughly 3,700 students compared to 2012. *Exhibit 20* shows more details for each school enrollment status. The college enrollment decline trend also appears at the national level. According to the annual data released by National Student Clearinghouse Research Center, 2017 is the 6th consecutive year that college enrollment in the U.S. has decreased since 2011.

Exhibit 18: Richmond Region College Enrollment by School Type 2012, 2017

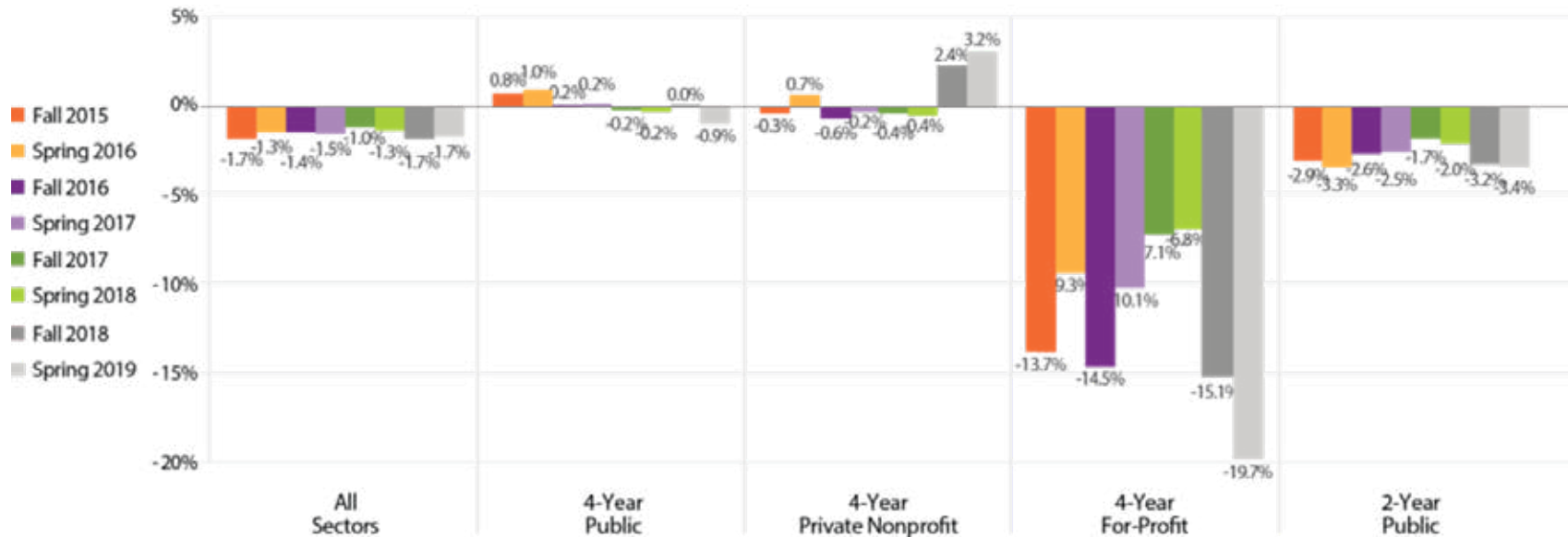| School Type	Number of Schools	Fall 2012	2012-2017	2012-2017 Percent	Fall 2017
Community College	10	27,660	874	3.2%	28534
Proprietary	11	6,710	-1,937	-28.9%	4773
University	8	45,615	-2,652	-5.8%	42963
Grand Total	**29**	**79,985**	**-3,715**	**-4.6%**	**76270**

Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

In fact, the number continues declining until 2019 based on the latest data as shown in *Exhibit 19* shown. Many reasons may explain this trend, with the 2008 recession being one of the major factors. The American Association of Community Colleges (AACC) indicates that since 2000 the number of community college enrollments had experienced a rapid increase until 2008; After it reached the peak in 2010, the total community college enrollment has started to slide down annually. From 2010 to 2017, the nation lost more than 1 million college students or roughly 14.4% in only 6 years. As the economy recovers, the college enrollment number is expected to grow as other research shows. The National Center for Education Statistics (NCES) published a report Projections of Education Statistics to 2026 in April 2018. The projection suggests that the total enrollment in degree-granting post-secondary institutions is expected to increase by 13% between fall 2015 and fall 2026.

Exhibit 19: National Enrollment Trends in Post-Secondary Education 2015-2019

NATIONAL ENROLLMENT TRENDS POST - SECONDARY EDUCATION 2015 - 2019

Source: National Student Clearinghouse Research Center
https://www.insidehighered.com/quicktakes/2019/05/30/college-enrollment-declines-continue

Source: https://www.aacc.nche.edu/wp-content/uploads/2019/08/Crisis-in-Enrollment-2019.pdf

Source: Hussar, W.J., and Bailey, T.M. (2018). Projections of Education Statistics to 2026 (NCES 2018-019). U.S. Department of Education, Washington, DC: National Center for Education Statistics   https://nces.ed.gov/pubs2018/2018019.pdf

Exhibit 20: Richmond Region College Enrollment by College 2012, 2017

TAZ	Jurisdiction	College/University	Type	Enrollment		2012-2017	2012-2017%
				Fall 2012	Fall 2017		
6	Richmond	Union Theological Seminary & Presbyterian School	Community College	118	87	-31	-26.3%
18	Richmond	Virginia Union University	University	1,678	1,662	-16	-1.0%
50	Richmond	J Sargeant Reynolds Community College	Community College	3,985	4,938	953	23.9%
56	Richmond	Virginia Commonwealth University (MCV)	University	4,320	4,148	-172	-4.0%
100	Richmond	Virginia Commonwealth University (MPC)	University	27,432	26,888	-544	-2.0%
113	Richmond	University of Richmond	University	4,348	4,023	-325	-7.5%
236	Henrico	Strayer College	Proprietary	951	389	-562	-59.1%
255	Henrico	ECPI College of Technology - Innsbrook	Proprietary	425	450	25	5.9%
267	Henrico	Bon Secours Memorial School of Nursing	Community College	322	514	192	59.6%
267	Henrico	The School of Medical Imaging	Community College	36	30	-6	-16.7%
272	Henrico	Stratford University	Proprietary	700	190	-510	-72.9%
273	Henrico	South University	Proprietary	633	617	-16	-2.5%
293	Henrico	UVA Richmond Center	University	200	50	-150	-75.0%
293	Henrico	VA Tech Richmond Center	University	172	61	-111	-64.5%
301	Henrico	J Sargeant Reynolds Community College	Community College	7,047	8,632	1,585	22.5%
316	Henrico	ECPI College of Technology - Medical Careers	Proprietary	278	278	0	0.0%
368	Henrico	Fortis College	Proprietary	534	279	-255	-47.8%
498	New Kent	Rappahannock Community College	Community College	-	100	100	NA
550	Ashland	Randolph Macon College	University	1,257	1,418	161	12.8%
659	Goochland	J Sargeant Reynolds Community College	Community College	1,169	531	-638	-54.6%
777	Chesterfield	Strayer College	Proprietary	700	573	-127	-18.1%
794	Chesterfield	Community College Workforce Alliance	Community College	4,838	5,555	717	14.8%
803	Chesterfield	Centura College	Proprietary	350	152	-198	-56.6%
804	Chesterfield	ITT Technical Institute - Richmond	Proprietary	585	-	-585	-100.0%
806	Chesterfield	John Tyler Community College	Community College	5,051	4,412	-639	-12.7%
818	Chesterfield	ECPI College of Technology	Proprietary	612	612	0	0.0%
846	Chesterfield	Bryant & Stratton College	Proprietary	942	1,233	291	30.9%
893	Chesterfield	John Tyler Community College	Community College	5,094	3,735	-1359	-26.7%
954	Chesterfield	Virginia State University	University	6,208	4,713	-1495	-24.1%
Region Total				**79,985**	**76,270**	**-3715**	**-4.6%**

Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

2.5 Employment

2.5.1 Employment Trends 2008-2045

Exhibit 21 shows employment statistics in Richmond region by locality from 2008 to 2045; 2008, 2012 and 2017 are the actual data while 2045 is projected.

Due to the impact of the 2008 Recession, the number of people employed first slightly fell starting in late of 2008 and then gained a slow but steady growth rate starting in 2012 mirroring national trends. As shown in *Exhibit 21.*, the region lost a total of 9,400 jobs from 2008 to 2012. Hanover County and Henrico County had the largest amount of job loss. Other localities also declined at different levels except for Chesterfield County which had a 3,000 jobs increase.

From 2012 to 2017, total employment for the region started to recover by adding 40,000 new jobs at an average annual rate of 1.5%. Each locality experienced a growth in employment. Charles City County had 250 new jobs leading with the highest percentage growth of 17.5%. Other localities which have higher than a 10 percent growth rate included Chesterfield County, Goochland County, Hanover County and Powhatan County.

From the base year of 2017 to the horizon year of 2045, the number of people employed in the region is expected to continue growing at an average annual rate of 0.8%; This indicates around 4,500 new jobs are estimated to be created in the regional market. Goochland County is expected to have the highest growth percentage at 47% with 6,500 new jobs. Chesterfield and Henrico are expected to add over 46,000 jobs each.

Exhibit 21: Richmond Region Employment by Locality 2008-2045

Jurisdiction	2008	2008-2012	2008-2012 %	2012	2012-2017	2008-2017 %	2017	2017-2045	2017-2045 %	2045
Charles City	1,550	(131)	-8.5%	1,419	249	17.5%	1,668	164	9.8%	1,832
Chesterfield	113,428	3,006	2.7%	116,434	14,686	12.6%	131,120	46,622	35.6%	177,742
Goochland	14,633	(2,124)	-14.5%	12,509	1,457	11.6%	13,966	6,541	46.8%	20,507
Hanover*	50,290	(4,402)	-8.8%	45,888	4,737	10.3%	50,625	15,234	30.1%	65,859
Henrico	181,906	(3,241)	-1.8%	178,665	12,575	7.0%	191,240	47,698	24.9%	238,938
New Kent	3,911	(258)	-6.6%	3,653	303	8.3%	3,956	2,023	51.1%	5,979
Powhatan	5,562	(156)	-2.8%	5,406	686	12.7%	6,092	1,436	23.6%	7,528
Richmond	148,380	(2,112)	-1.4%	146,268	5,776	3.9%	152,044	21,045	13.8%	173,089
Region	**519,660**	**(9,418)**	**-1.8%**	**510,242**	**40,469**	**7.9%**	**550,711**	**140,763**	**25.6%**	**691,474**

Source: 2008-2035, 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

Employment Projection for the Richmond Region, Chmura, April 2019

Exhibit 22: Richmond Region Employment 2008-2045
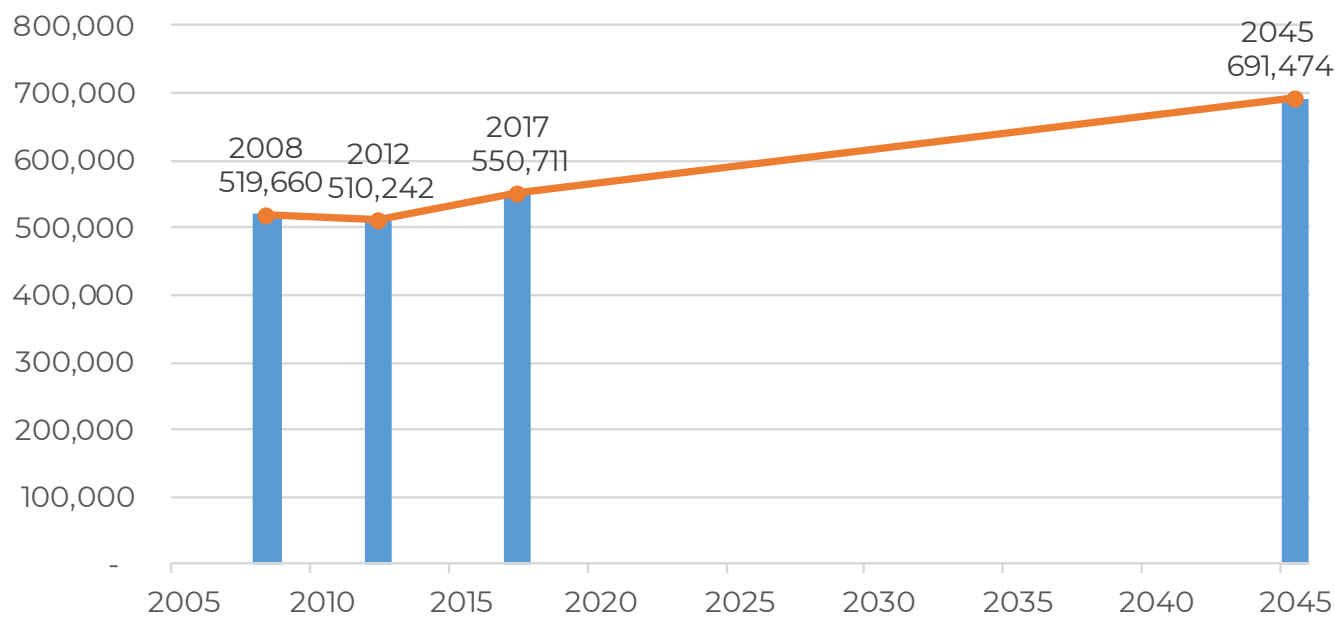
Source: 2008-2035, 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

2.5.2 Regional-Level of Employment by 2-Digit NAICS Code Change 2008-2017

Based on the dataset from the Virginia Employment Commission (VEC) 2nd quarter of 2017, each employer was identified by their 6-digit North American Industry Classification System (NAICS) Code. Grouped into 2-digit codes for the purpose of distinguishing between retail and non-retail, separate estimates showed that retail employers make up codes 44-45, 72 and 81, while the non-retail employers make up the balance of NAICS codes. Employment by type (Retail and non-retail employment) is one of the significant attributes for the travel demand model, which is used mostly for trip generation. For example, more shopping trips are assumed to be generated if a TAZ has more retail employees.

Exhibit 23 illustrates how the employment in each industry category declined, experienced moderate growth, or experienced high growth from 2008 to 2017. In the past nine years, the Richmond region experienced a 6.6% increase in total employment with 34,000 new jobs; 25% for retail and 75% for non-retail.

Exhibit 23: Summary of Employment by Industrial Sector 2008 to 2017

2008 to 2017		NAICS 2-Digit Code[1]	2008	2017	2008-2017	2008-2017%
Decline	51	Information	14,046	7,512	(6,534)	-46.5%
	31-33	Manufacturing	32,416	25,748	(6,668)	-20.6%
	21	Mining	337	268	(69)	-20.5%
	55	Management of Companies and Enterprises	25,628	21,249	(4,379)	-17.1%
	92	Public Administration	36,496	32,398	(4,098)	-11.2%
	52	Finance and Insurance	40,251	37,951	(2,300)	-5.7%
	44-45	Retail Trade	57,344	57,215	(129)	-0.2%
	71	Arts, Entertainment, and Recreation	12,969	12,967	(2)	-0.0%
Moderate Growth (0% to 15%)	42	Wholesale Trade	21,713	21,748	35	0.2%
	23	Construction	32,538	33,042	504	1.5%
	81	Other Services (except Public Administration)	17,193	17,861	668	3.9%
	53	Real Estate and Rental and Leasing	7,095	7,752	657	9.3%
	61	Educational Services	43,923	48,280	4,357	9.9%
	54	Professional, Scientific, and Technical Services	32,484	36,498	4,014	12.4%
High Growth (> than 15%)	62	Health Care and Social Assistance	64,818	77,978	13,160	20.3%
	72	Accommodation and Food Services	38,811	46,865	8,054	20.8%
	48-49	Transportation and Warehousing	15,549	20,059	4,510	29.0%
	22	Utilities	1,694	2,364	670	39.6%
	11	Agriculture, Forestry, Fishing and Hunting	691	1,008	317	45.9%
	56	Administrative , Support, Waste Management, Remediation Services	19,839	41,246	21,407	107.9%
Retail			113,348	121,941	8,593	7.6%
Non-Retail			402,426	428,770	26,344	6.5%
Region Total			515,835	550,009	34,174	6.6%

Source: Virginia Employment Commission 2008, 2012, and 2017

As evident from Exhibit 23, from 2008 to 2017 some of the industrial sectors have declined, some have had moderate growth, and some had high growth. After the 2008 recession, the Manufacturing and Information sectors had a considerable decline similar to reported national trends for manufacturing. Other sectors experienced growth such as those in Administrative and Support and Waste Management and Remediation Services (with 21,000 new jobs) and Health Care and Social Assistance (with 13,000 new jobs). As the impact of the 2008 recession mitigated, the job market has been slowly healing from 2012. In the past five years, 35,000 new jobs were brought to the region including 9,000 in retail and 26,000 in non-retail.

Exhibit 24: Richmond Region Employment by NAICS 2-Digit Code 2008, 2012 and 2012

	NAICS 2-Digit Code[1]	2008	2012	2017	2008-2010	2008-2012 %	2012-2017	2012-2017%	2008%	2012%	2017%	2008%-2012 %	2012%-2017 %
11	Agriculture, Forestry, Fishing, Hunting	691	688	1,008	-3	-0.4%	320	31.7%	0.1%	0.1%	0.2%	0.0%	0.0%
21	Mining	337	264	268	-73	-27.7%	4	1.5%	0.1%	0.1%	0.0%	-0.0%	-0.0%
22	Utilities	1,694	2,239	2,364	545	24.3%	125	5.3%	0.3%	0.4%	0.4%	0.1%	-0.0%
23	Construction	32,538	29,171	33,042	-3,367	-11.5%	3,871	11.7%	6.3%	5.7%	6.0%	-0.5%	0.3%
31-33	Manufacturing	32,416	24,499	25,748	-7,917	-32.3%	1,249	4.9%	6.2%	4.8%	4.7%	-1.4%	-0.1%
42	Wholesale Trade	21,713	21,343	21,748	-370	-1.7%	405	1.9%	4.2%	4.2%	3.9%	0.0%	-0.2%
44-45	Retail Trade	57,344	54,789	57,215	-2,555	-4.7%	2,426	4.2%	11.0%	10.7%	10.4%	-0.3%	-0.3%
48-49	Transportation & Warehousing	15,549	15,097	20,059	-452	-3.0%	4,962	24.7%	3.0%	3.0%	3.6%	-0.0%	0.7%
51	Information	14,046	8,340	7,512	-5,706	-68.4%	-828	-11.0%	2.7%	1.6%	1.4%	-1.1%	-0.3%
52	Finance & Insurance	40,251	35,633	37,951	-4,618	-13.0%	2,318	6.1%	7.7%	7.0%	6.9%	-0.8%	-0.1%
53	Real Estate, Rental & Leasing	7,095	6,649	7,752	-446	-6.7%	1,103	14.2%	1.4%	1.3%	1.4%	-0.1%	0.1%
54	Professional, Scientific, Technical Services	32,484	34,378	36,498	1,894	5.5%	2,120	5.8%	6.3%	6.7%	6.6%	0.5%	-0.1%
55	Management of Companies & Enterprises	25,628	20,594	21,249	-5,034	-24.4%	655	3.1%	4.9%	4.0%	3.9%	-0.9%	-0.2%
56	Administrative, Waste Management, Support, & Remediation Services	19,839	34,285	41,246	14,446	42.1%	6,961	16.9%	3.8%	6.7%	7.5%	2.9%	0.8%
61	Educational Services	43,923	49,530	48,280	5,607	11.3%	-1,250	-2.6%	8.5%	9.7%	8.8%	1.3%	-0.9%
62	Health Care & Social Assistance	64,818	70,899	77,978	6,081	8.6%	7,079	9.1%	12.5%	13.9%	14.2%	1.4%	0.3%
71	Arts, Entertainment, & Recreation	12,969	11,382	12,967	-1,587	-13.9%	1,585	12.2%	2.5%	2.2%	2.4%	-0.3%	0.1%
72	Accommodation & Food Services	38,811	40,195	46,865	1,384	3.4%	6,670	14.2%	7.5%	7.9%	8.5%	0.4%	0.6%
81	Other Services (except Public Admin.)	17,193	16,790	17,861	-403	-2.4%	1,071	6.0%	3.3%	3.3%	3.2%	-0.0%	-0.0%
92	Public Administration	36,496	33,477	32,398	-3,019	-9.0%	-1,079	-3.3%	7.0%	6.6%	5.9%	-0.5%	-0.7%
99	Other	3,825	-	702	-	-	-	-	-	-	-	-	-
	Retail	113,348	111,774	121,941	-1,574	-1.4%	10,167	9.1%	21.8%	21.9%	22.1%	0.1%	0.2%
	Non Retail	402,426	398,468	428,770	-7,783	-1.9%	30,302	7.1%	78.2%	78.1%	77.9%	-0.1%	-0.2%
	Total	519,660	510,242	550,711	-9,357	-1.8%	40,469	7.3%	100.0%	100.0%	100.0%	-	-

1. Retail: 44, 45, 72 and 81   2. Non-Retail: All other codes   Source: Virginia Employment Commission (2008, 2012 and 2017)

2.5.3   Locality-Level Employment by NAICS 2-Digit Code Change 2008-2017

This section addresses the major changes in employment by industrial sectors defined by NAICS 2-Digit Code at the locality level. Most follow a trend that employment experienced a slight decrease after 2008 Recession and then recovered gradually as shown in *Exhibit 25*. The shares of each sector by each year were also calculated but no change more than 5% was shown. The changes in some rural counties are insignificant, including the counties of Charles City, New Kent and Powhatan.

- Chesterfield County is one of the few localities with total employment growth after the 2008 Recession. Its total employment increased 3,000 with a 2.7% rate. Although retail employment still lost 900 jobs, the non-retail sector added nearly 5,000 jobs. The jobs in these sectors are mainly in Administrative and Support and Waste Management and Remediation Services (2,600 jobs), Educational Services (2,300 jobs), and Health Care and Social Assistance (1,300). With continuing employment growth in the past five years (2012 to 2017), almost 15,000 new jobs were created in Chesterfield and it is 12.6% more than 2012. New employment in retail services held a 3:1 ratio over non-retail employment. Over half of the new retail jobs occurred in Accommodation and Food Services adding 2,000 jobs. On the other side, non-retail employment had most growth in Transportation and Warehousing (almost doubled size from 5,000 jobs to 9,400 jobs) Administrative and Support and Waste Management and Remediation Services (3,000 jobs), and Health Care and Social Assistance (2,700 jobs).

- Goochland County's employment fluctuated from 2008 to 2017. It dropped 14% with 2,000 jobs lost and then recovered by 12% adding 1,500. The retail sector remained roughly the same with only a slight increase in jobs. The largest portion of non-retail employment loss from 2008 to 2012 is Finance and Insurance; 2,000 jobs in this section disappeared with a 35% slide. The sector in Public Administration also dropped from 1,600 jobs to 1,100 jobs.

- The total employment of Hanover County in 2017 was 50,000; it returned back to the same level of 2008 after 4,000 jobs lost. The employment lost was in three major categories including Construction (1,300 jobs), Management of Companies and Enterprises (1,300 jobs), and Arts, Entertainment, and Recreation (2,000 jobs). From 2012 to 2017, the Retail Trade sector led the largest growth from 6,400 jobs to 7300 jobs by 13%. Professional, Scientific, and Technical Services had the highest increase percentage, 45% with adding 700 jobs to the market.

- Henrico County lost less than 2%, around 3,000 jobs from 2008 to 2012. The aggregated decline (over 16,000 jobs) was felt mostly in Information (4,000 jobs), Finance and Insurance (2,500 jobs), Management of Companies and Enterprises (2,800 jobs), Public Administration (2,600 jobs), Manufacturing (4,200 jobs). Other industry sectors remained steady or had an increase (15,000 jobs) including Administrative and Support and Waste Management and Remediation Services (7,500 jobs), Educational Services (3,700 jobs), Health Care and Social Assistance (4,000 jobs).

- Following both regional and national trends, Richmond City also lost a large portion of employment from 2008 to 2012 in Manufacturing, Construction and Information. The total loss in these three sectors was 5,000 jobs. The Utilities in Richmond City doubled the number of jobs from 400 jobs to 800 jobs as well as Administrative and Support and Waste Management and Remediation Services from 4,500 jobs to 8,200 jobs. Arts, Entertainment, and Recreation also increased by 40% from 2,400 jobs to 3,700 jobs. After 2012, the total employment in Richmond experienced slow growth.

Exhibit 25: Richmond Region Employment by Locality by NAICS 2-Digit Code 2008, 2012 and 2017

NAICS 2-Digit Code		Charles City			Chesterfield			Goochland			Hanover		
		2008	2012	2017	2008	2012	2017	2008	2012	2017	2008	2012	2017
11	Agriculture, Forestry, Fishing & Hunting	74	64	108	126	77	147	84	75	61	227	319	567
21	Mining	31	19	23	55	19	31	86	77	98	90	83	52
22	Utilities	-	-	-	642	830	880	-	4	-	27	94	59
23	Construction	157	158	417	8,655	7,914	9,031	1,057	1,100	1,321	6,075	4,750	5,288
31-33	Manufacturing	235	299	336	9,069	8,278	8,393	343	340	429	3,478	3,161	3,589
42	Wholesale Trade	49	56	58	4,452	4,429	4,724	338	468	411	4,402	4,776	5,071
44-45	Retail Trade	68	82	64	17,219	16,766	17,773	428	464	532	6,453	6,416	7,271
48-49	Transportation & Warehousing	260	192	154	4,691	5,005	9,394	126	83	139	1,167	1,395	1,299
51	Information	8	7	9	2,212	1,966	1,682	12	12	27	630	503	628
52	Finance and Insurance	11	6	4	5,520	5,083	5,010	5,699	3,738	4,106	785	696	612
53	Real Estate and Rental & Leasing	3	5	6	1,516	1,241	1,399	77	140	128	550	519	552
54	Professional, Scientific, & Technical Services	11	19	41	5,848	6,506	7,355	229	464	409	1,627	1,505	2,180
55	Management of Companies & Enterprises	4	4	4	1,235	1,144	1,087	1,660	1,500	1,907	2,259	943	1,142
56	Administrative& Support & Waste Management & Remediation Services	85	66	67	4,789	7,363	10,325	380	445	584	1,861	2,632	2,932
61	Educational Services	257	226	150	10,474	12,748	11,185	777	681	720	3,796	4,118	4,066
62	Health Care & Social Assistance	50	39	32	11,779	13,077	15,749	565	676	646	4,971	5,199	5,749
71	Arts, Entertainment, & Recreation	68	60	51	2,671	2,670	3,080	498	417	405	4,368	2,351	2,552
72	Accommodation & Food Services	3	26	20	10,084	10,167	12,163	266	365	491	3,443	3,449	4,005
81	Other Services (except Public Administration)	34	11	12	4,605	4,083	4,710	368	383	337	1,647	1,652	1,693
92	Public Administration	119	80	112	6,865	7,068	6,846	1,579	1,077	1,210	2,027	1,327	1,236
99	Other	23		-	921		156	61		5	407		82
Retail		105	119	96	31,908	31,016	34,646	1,062	1,212	1,360	11,543	11,517	12,969
Non Retail		1,445	1,300	1,572	81,520	85,418	96,474	13,510	11,297	12,606	38,747	34,371	37,656
Total		1,550	1,419	1,668	113,428	116,434	131,120	14,572	12,509	13,966	50,290	45,888	50,625

1. Retail: 44-4W5, 72 and 81   Non-Retail: all other codes   Source: Virginia Employment Commission (2008, 2012 and 2017)

Exhibit 25(Contunued): Richmond Region Employment by Locality by NAICS 2-Digit Code 2008, 2012 and 2017

NAICS 2-Digit Code[1]		Henrico			New Kent			Powhatan			Richmond		
		2008	2012	2017	2008	2012	2017	2008	2012	2017	2008	2012	2017
11	Agriculture, Forestry, Fishing, & Hunting	96	88	61	56	27	32	28	38	26	-	-	6
21	Mining	-	8	6	4	-	-	22	18	26	49	40	32
22	Utilities	599	481	676	-	11	10	11	9	17	415	810	722
23	Construction	7,578	7,472	8,154	597	533	723	1,248	1,160	1,339	7,171	6,084	6,769
31-33	Manufacturing	10,096	5,932	6,945	171	178	186	193	189	257	8,831	6,122	5,613
42	Wholesale Trade	7,995	7,785	7,463	36	51	59	116	242	152	4,325	3,536	3,810
44-45	Retail Trade	23,745	22,238	22,609	430	442	479	408	396	739	8,593	7,985	7,748
48-49	Transportation & Warehousing	4,207	4,624	4,862	119	112	76	128	111	99	4,851	3,575	4,036
51	Information	7,915	3,918	3,270	18	23	22	18	19	9	3,233	1,892	1,865
52	Finance & Insurance	20,791	18,304	20,219	41	45	43	105	115	115	7,299	7,646	7,842
53	Real Estate & Rental & Leasing	2,953	3,137	3,765	26	19	22	43	37	41	1,927	1,551	1,839
54	Professional, Scientific, & Technical Services	13,964	14,272	15,039	89	59	105	239	273	366	10,477	11,280	11,003
55	Management of Companies & Enterprises	10,298	7,540	7,946	13	-	-	2	4	3	10,157	9,459	9,160
56	Administrative & Support & Waste Management & Remediation Services	7,843	15,288	18,140	167	107	186	258	219	438	4,456	8,165	8,574
61	Educational Services	8,710	12,456	12,488	516	482	514	927	853	831	18,466	17,966	18,326
62	Health Care & Social Assistance	22,753	26,668	27,956	391	469	473	296	235	303	24,013	24,536	27,070
71	Arts, Entertainment, & Recreation	2,399	2,020	2,744	367	283	161	196	213	174	2,402	3,368	3,800
72	Accommodation & Food Services	15,283	15,285	17,107	191	312	347	382	434	609	9,159	10,157	12,123
81	Other Services (except Public Administration)	5,341	5,492	6,161	111	121	122	216	261	229	4,871	4,787	4,597
92	Public Administration	8,292	5,657	5,409	402	379	388	667	580	303	16,545	17,309	16,894
99	Other	1,048	-	220	166	-	8	59	-	16	1,140	-w	215
Retail		44,369	43,015	45,877	732	875	948	1,006	1,091	1,577	22,623	22,929	24,468
Non Retail		137,537	135,650	145,363	3,179	2,778	3,008	4,556	4,315	4,515	125,757	123,339	127,576
Total		181,906	178,665	191,240	3,911	3,653	3,956	5,562	5,406	6,092	148,380	146,268	152,044

1. Retail: 44-45, 72 and 81   Non-Retail: all other codes   Source: Virginia Employment Commission (2008, 2012 and 2017)

2.5.4   Top 20 Employers in the Richmond Region

Exhibit 26 lists the Top 20 employers of the region in 2012 and 2017 based on employment. The total employment of these Top 20 employers in 2017 is 115,000, which is 20.8 % of the region's total. Educational Services is the largest industry sector which has over 36,000 jobs and makes up 31% of the Top 20.

Exhibit 26: Richmond Region Top 20 Employers by Employment 2012-2017

Employer	NAICS 2-Digit Code		2012		2017		Change
	Code	Classification	Rank	Employment	Rank	Employment	
Capital One	52	Finance and Insurance	1	10,163	1	11,555	0
VCU Health System	55	Management of Companies & Enterprises	5	7,497	2	11,448	+3
VA Commonwealth University	61	Educational Services	2	9,337	3	10,164	-1
Henrico County School Board	61	Educational Services	3	8,794	4	9,000	-1
Chesterfield County School Board	61	Educational Services	4	8,753	5	8,611	-1
Bon Secours Richmond Health System	62	Health Care & Social Assistance	6	5,951	6	8,050	0
Walmart	44-45	Retail Trade	13	4,050	7	4,940	+6
County of Henrico	22	Utilities	10	4,564	8	4,585	+2
Hospital Corporation of America (HCA, Inc.) of Virginia	54	Professional, Scientific, & Technical Services	7	5,711	9	4,541	-2
City of Richmond	22	Utilities	8	5,048	10	4,495	-2
Richmond City Public Schools	61	Educational Services	9	5,000	11	4,482	-2
County of Chesterfield	22	Utilities	11	4,546	12	4,127	-1
Kroger	44-45	Retail Trade	20	2,496	13	3,959	+7
Amazon	48-49	Transportation & Warehousing	NA	NA	14	3,798	NA
Altria	42	Wholesale Trade	12	4,324	15	3,751	-3
SunTrust	55	Management of Companies & Enterprises	18	2,572	16	3,722	+2
Anthem	55	Management of Companies & Enterprises	19	2,557	17	3,716	+2
Department of Defense	92	Public Administration	16	2,776	18	3,567	-2
Hanover County Public Schools	61	Educational Services	14	3,215	19	3,257	-5
Veterans Affairs	92	Public Administration	17	2,584	20	2,840	-3
Total				**99,938**		**114,608**	

Source: Virginia Employment Commission (2012, 2017) as classified by the VEC

3. Growth Areas

This section focuses on delineating concentrations of the region's population and employment and how the growth pattern would be expected to change in the future. The purpose of this exercise is to use the distribution of population and employment to better assist with the transportation planning process and to help frame the discussion of future trends in the region.

3.1 Population Density

Exhibit 27 and *Exhibit 28* show the population density in the Richmond Region for the years 2017 and 2045. This data is represented in the TAZ level and the density measurement provided is in population per square mile. Densities are shown in five different categories; density less than 500 people per square mile, which is generally considered as rural areas, density between 500 to 1,000 people per square mile which is considered as areas that may be urbanized soon, density between 1,000- 5,000 people per square mile which is considered as urbanized area and two categories for density from 5,000-15,000 people per square mile and density over 15,000 people per square mile which are considered as heavily urbanized area.

The 2017 density map shows the City of Richmond with the emerging development pattern of high population density ring with radiating spokes. An almost complete ring around the City of Richmond has developed around I-295 bypass and Route 288. A north-south and east-west development pattern has emerged based on Richmond being at the crossroads of several major thoroughfares (i.e., U.S. Routes 1, 60, 250, 301, and 360) and with I-64 and I-95 intersecting in Richmond. The southeastern portion of the region reveals a noticeable departure from the concentric ring pattern. This area is separated by a natural boundary, the James River. Route 895 provides a connection between the I-295 bypass and I-95 in this southeastern area. This highway connection could facilitate development in this area as shown in 2045 Population Density map and with Route 288, between Route 60 and I-64, will result in a circular development ring for the Richmond Region. The areas showing the greatest amount of population density changes are at the outskirts of the I-295 and Route 288 bypasses.

## 3.1.1   2017 Richmond Region Population Density

Exhibit 27: Richmond Region Population Density 2017
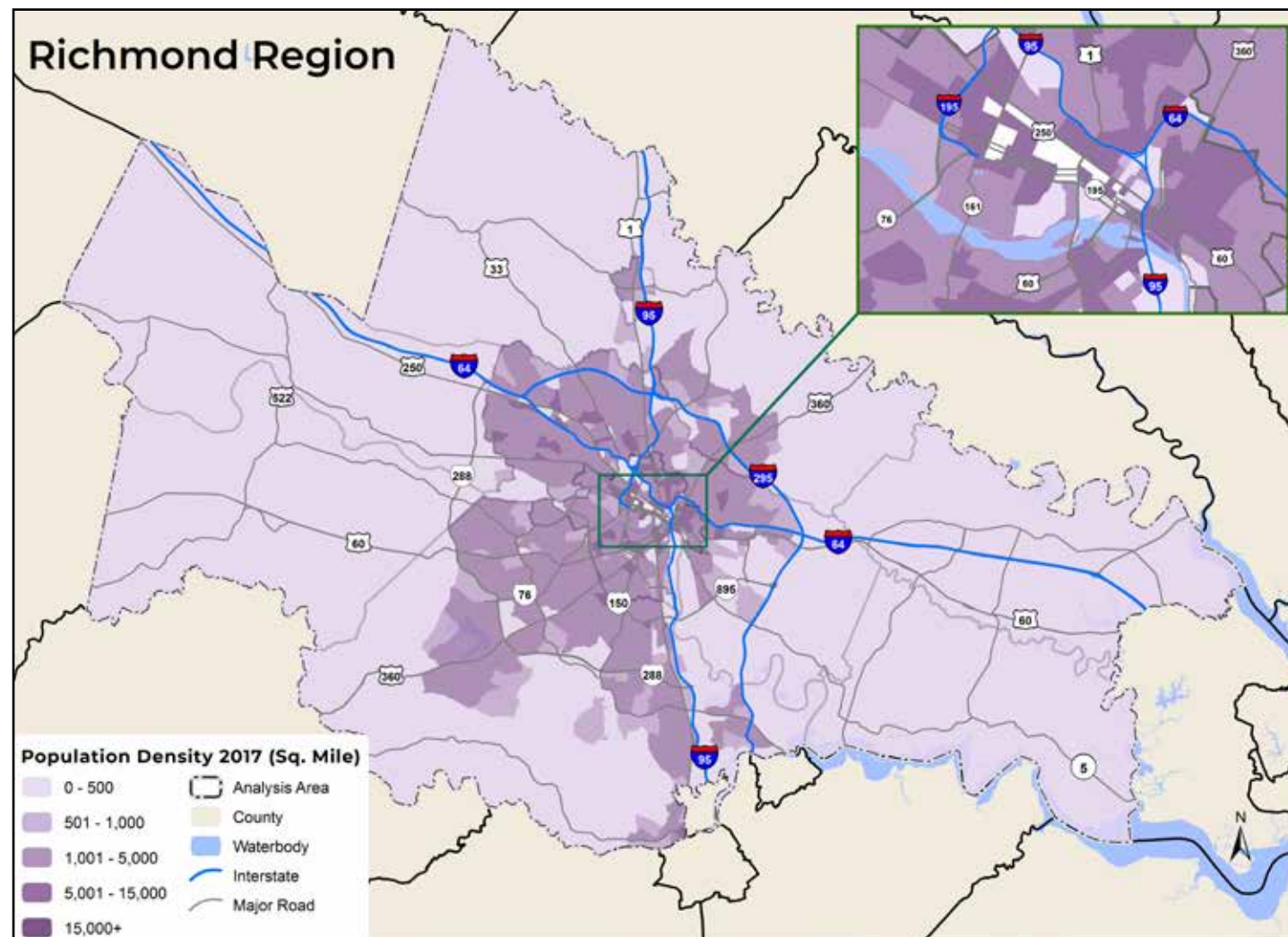
Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

3.1.2   2045 Richmond Region Population Density

Exhibit 28: Richmond Region Population Density 2045
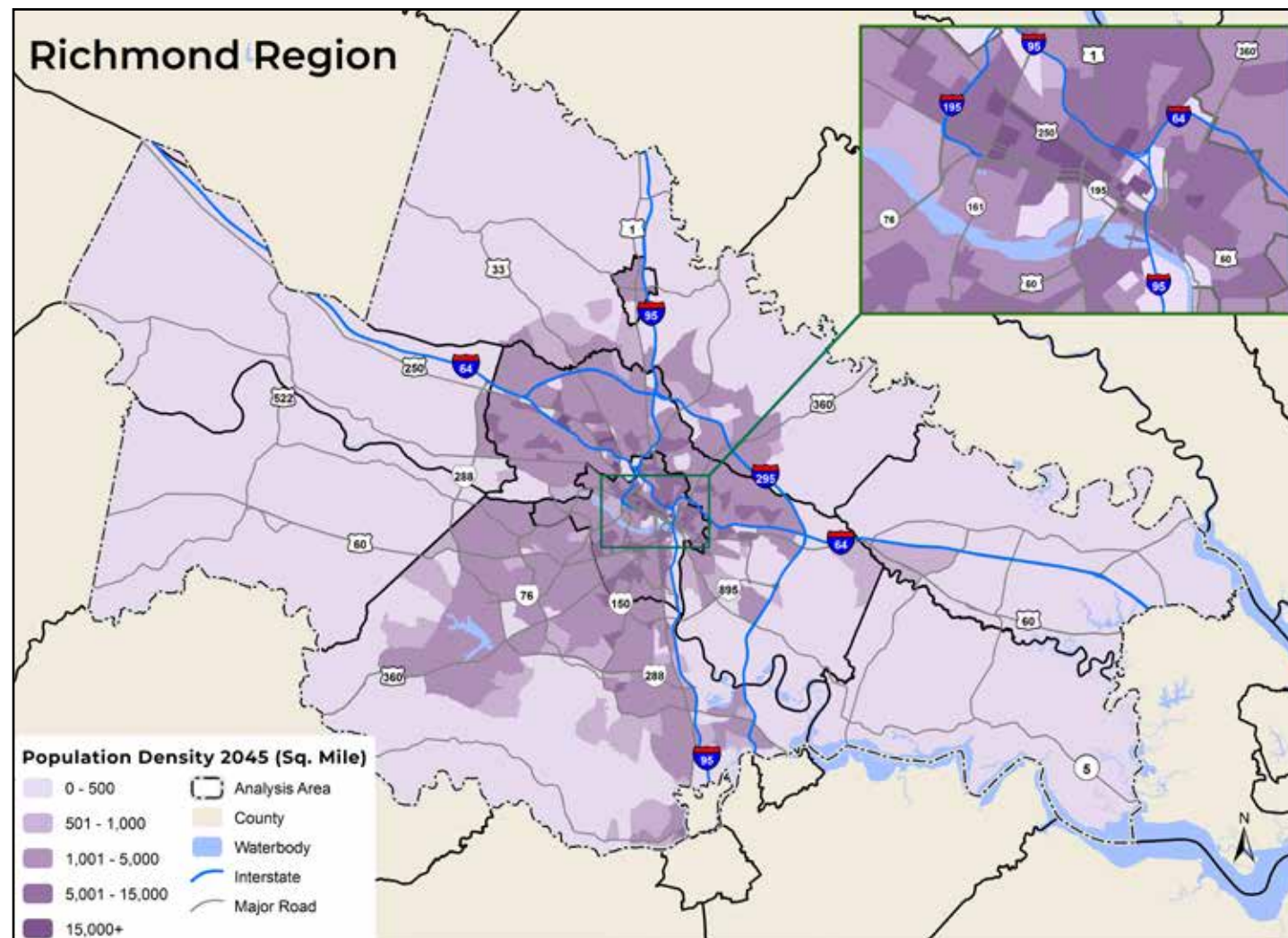
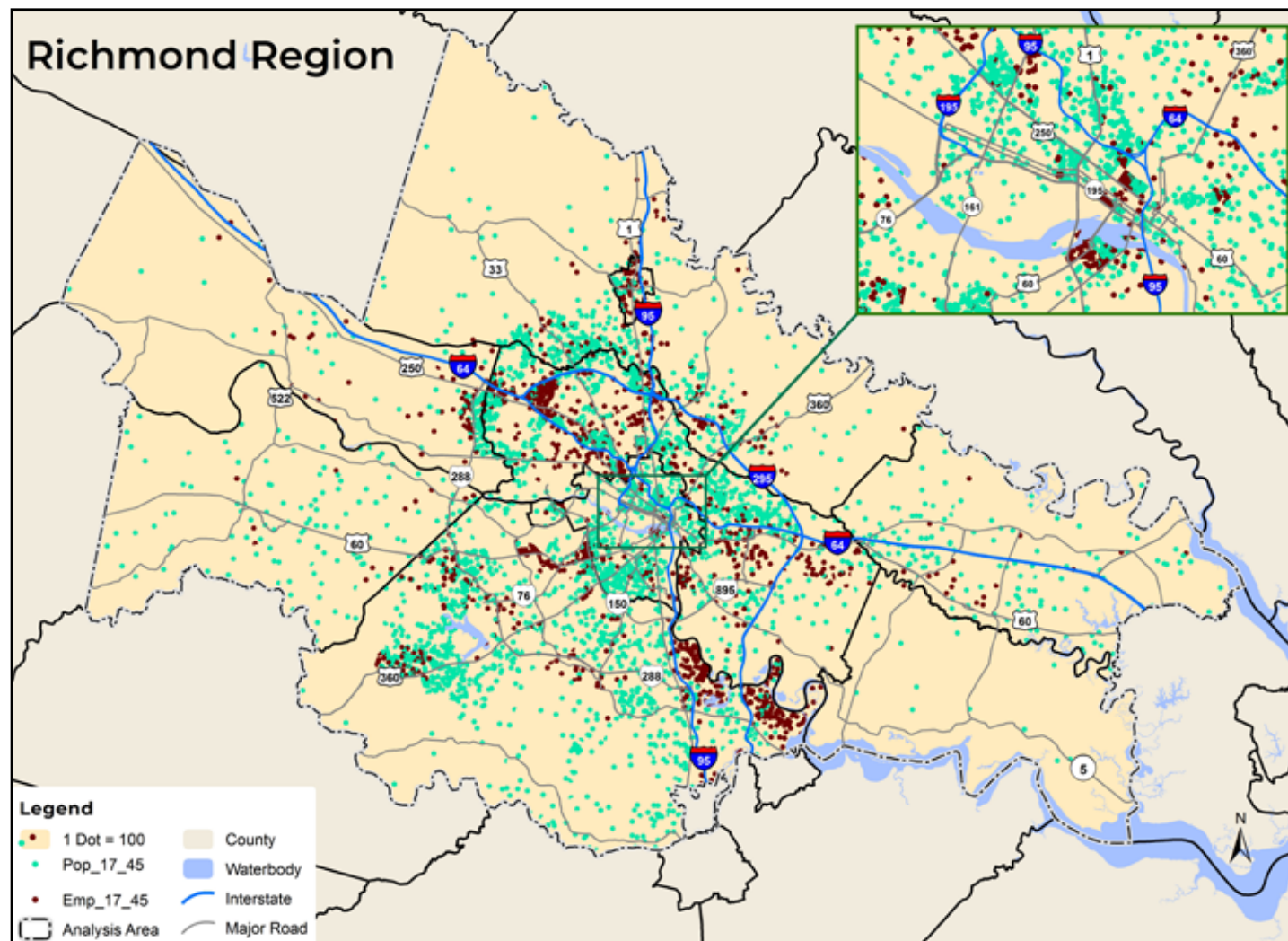Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

3.2 Employment Density

Exhibit 29 and *Exhibit 30* show the employment density in the Richmond Region for the year 2017 and 2045. This data is represented in the TAZ level and the density measurement provided is in employment or jobs per square mile. Employment densities are shown in five different categories:

- employment density less than 500

- employment density between 500 to 1000

- employment density between 1,000 to 5,000

- employment density between 5,000 to 10,000

- employment density over 10,000

The 2017 employment density map shows the existing high employment density areas in similar patterns as for population density. No longer does the downtown serve as the region's sole employment center. Instead, the percentage of employment is expanding toward the suburbs. Areas with prominent employment densities include downtown and VCU in the City of Richmond, Innsbrook, Short Pump and Henrico Government Center in Henrico, and Midlothian, Swift Creek, Ruffin Mill and Chesterfield Government Center in Chesterfield. Based on past trends, it is assumed for purposes of this report that employment growth will be oriented to the region's major transportation thoroughfares (mainly US 250, US 60, US 360 and US 1). Major employment density change due to employment growth are in TAZs adjacent to Broad Street in Henrico County, and in Midlothian in Chesterfield County. Town of Ashland and areas around I-295 in Hanover County also show major employment growth.

3.2.1   2017 Richmond Region Employment Density

Exhibit 29: Richmond Region Employment Density 2017
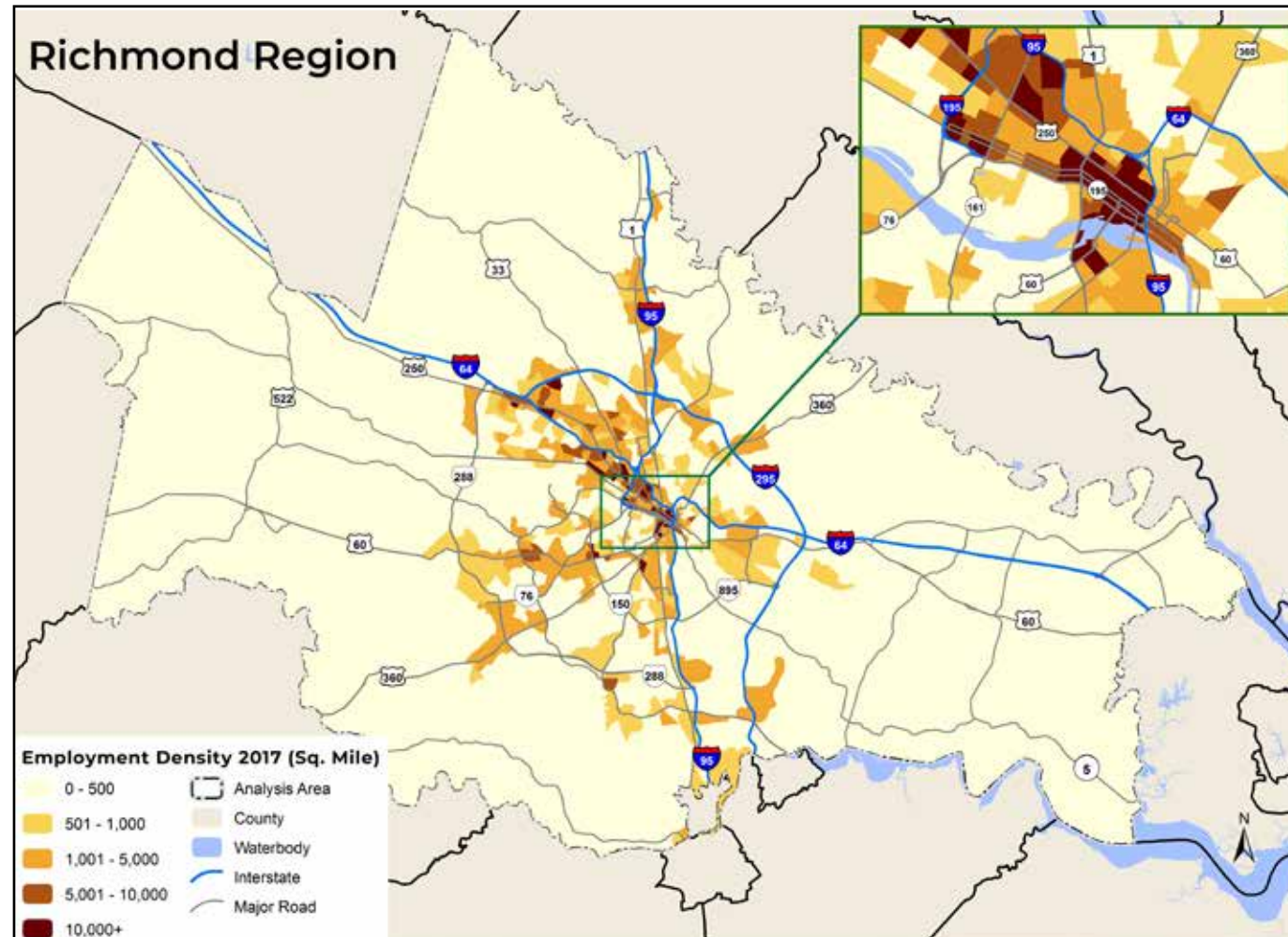
Source: 2017-2045 Socioeconomic Data Report, RRTPO, Septembr 2019

3.2.2   2045 Richmond Region Employment Density

EXHIBIT 30: Richmond Regional Emplyment Density 2045
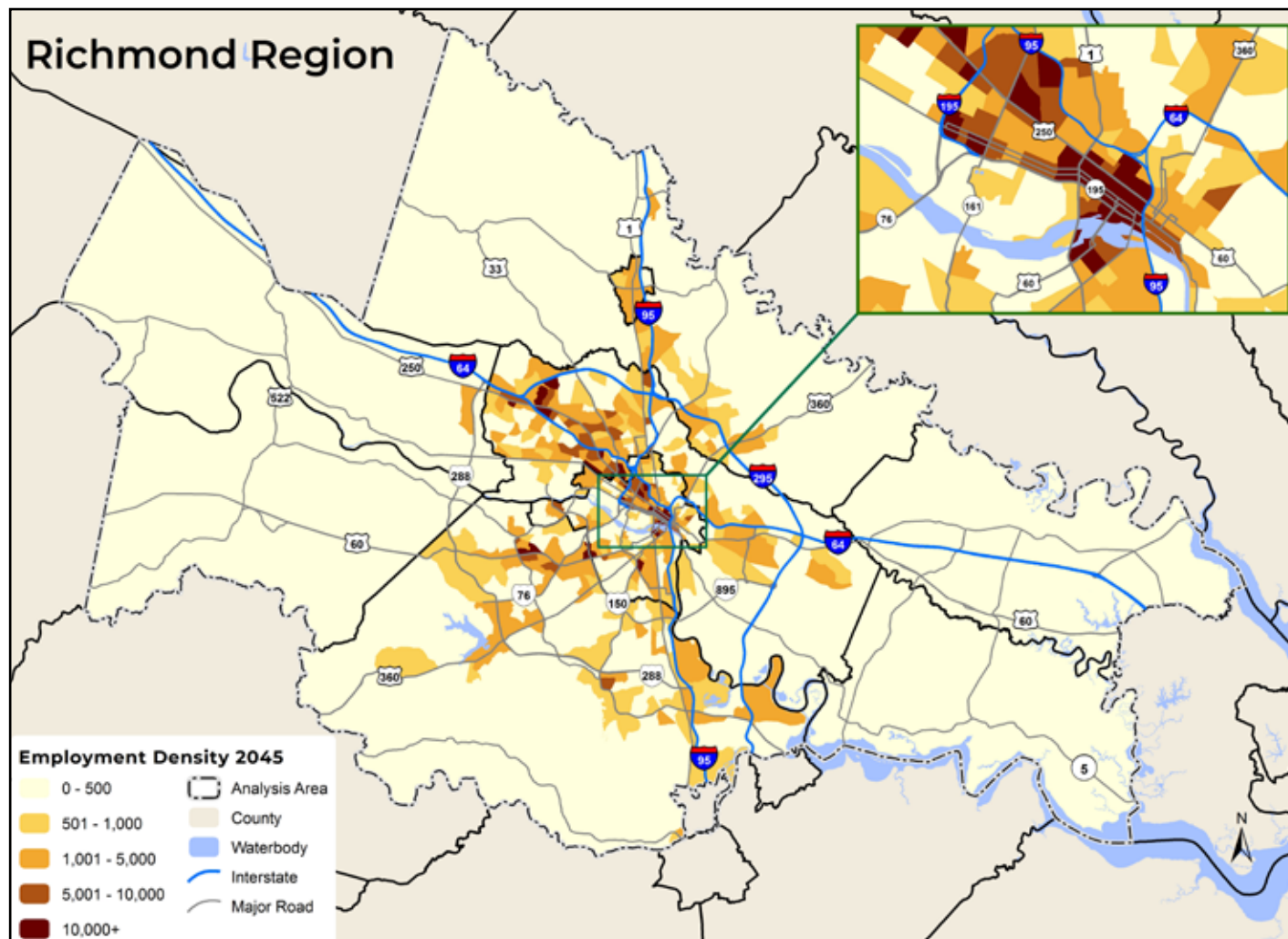
Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

3.3   Net Growth Population / Employment Net Growth 2017 - 2045

Exhibit 31 depicts the degree of change expected in population and employment from 2017 to 2045. One dot represents 100 units of net growth; green and red dots respectively represent population and employment. No single TAZ is expected to decrease in employment. It is worth noting that the locations of each dot may not necessarily depict actual location of growth. Data available at TAZ level are randomly generated by geospatial processing in ArcGIS. Although the distribution of those dots is estimated and conceptual, the map can still give us an understanding of future growth patterns.

It is obvious that both new population and employment start from a concentration in the downtown of Richmond City and then extend along the major corridors of the region following major routes north I-95, I-295, I-64, U.S. 60, U.S. 360, Route 288, Route 150 and then south I-w95. Some of the areas include denser dots and they are identified as existing or future activity centers.

Exhibit 31: Richmond Region Population and Employment Net Growth 2017-2045

Data Source: 2017-2045 Socioeconomic Data Report, Richmond Regional TPO, Sep 2019

4. Classification of Density Areas

In order to better understand the growth pattern of the region, the conceptual map of 2017 Population Density Areas was developed as shown in *Exhibit 33*. The classification of growth areas was identified through TAZ geographies using 2017 population density (Population by Sq. Mile). The population density criteria of each type are defined as follows:

- <u>Urban Core</u>: greater than 3,000 people per sq. mile

- <u>Suburbanized Areas</u>: between 1,000 and 3,000 people per sq. mile

- <u>Rural Areas</u>: less than 1,000 people per sq. mile

Based on these criteria, the 875 TAZs in Richmond Region were categorized into one of the three different types of areas. Some adjoining TAZs which may not strictly satisfy the standards were still included for the purpose of the final integrity and continuity of zones.

Exhibit 32 sums up the descriptive statistics for Urban, Suburban and Rural areas regarding population and employment from 2017 to 2045. The Richmond region is an area of approximately 2,200 sq. miles; 4% of the area, or 86 sq. miles are

Exhibit 32: Richmond Region Density Areas 2017-2045

Year	Area Type	Sq. Miles	Area%	Populaton	Population	Households	Households%	Autos	Autos %	Auto per person	Auto per HH	Employment	Employment %	Retail	Retail %	Non - Retail	Non - Retail%	Pop Density	Employment Density
2017	Urban	86	4%	371,234	34%	155,034	36%	240,159	27%	0.6	1.5	232,123	42%	4,583	37%	187,540	44%	4,298	2,687
	Suburban	314	14%	527,767	48%	20,534	47%	446,506	51%	0.8	2.2	226,160	41%	64,123	53%	162,037	38%	1,680	720
	Rural	1,796	82%	192,679	18%	71,958	17%	196,742	22%	1.0	2.7	92,428	17%	13,235	11%	79,193	18%	107	51
	Total	**2,196**	**100%**	**1,091,680**	**100%**	**427526**	**100%**	**683,407**	**100%**	**0.8**	**2.1**	**550,711**	**100%**	**121,941**	**100%**	**428,770**	**100%**	**497**	**251**
2045	Urban	86	4%	448,001	32%	188,115	34%	287,000	25%	0.6	1.5	266,402	39%	48,286	33%	218,116	40%	5,187	3,084
	Suburban	314	14%	665,079	47%	253,451	46%	562,576	49%	0.8	2.2	276,173	40%	7,358	52%	199,815	37%	2,117	879
	Rural	1,796	82%	300,150	21%	111,373	20%	299,535	26%	1.0	2.7	148,899	22%	20,897	14%	128,002	23%	167	83
	Total	**2,196**	**100%**	**1,413,230**	**100%**	**552,939**	**100%**	**1,149,111**	**100%**	**0.8**	**2.1**	**691,474**	**100%**	**145,541**	**100%**	**545,933**	**100%**	**643**	**315**

Data Source: 2017-2045 Socioeconomic Data Report, Richmond Regional TPO, Sep 2019

Note: The population Density unit is people per Sq. Mile; The Employment Density is jobs per Sq. Mile.

Richmond Regional
Transportation Planning Organization

defined as Urban, 14% of the area, or 314 sq. miles is suburbanized area, and 82 % of the area, or 1,800 sq. miles are classified as a rural area. As the region grows, all the acreage contained in all three areas will change based on changes in population/employment density character. For example, some areas in suburban will move in to urban and some areas of rural will be added to suburban. Staff found only less than five percent of suburban area is considered to

Exhibit 33: Richmond Region Density Areas 2017
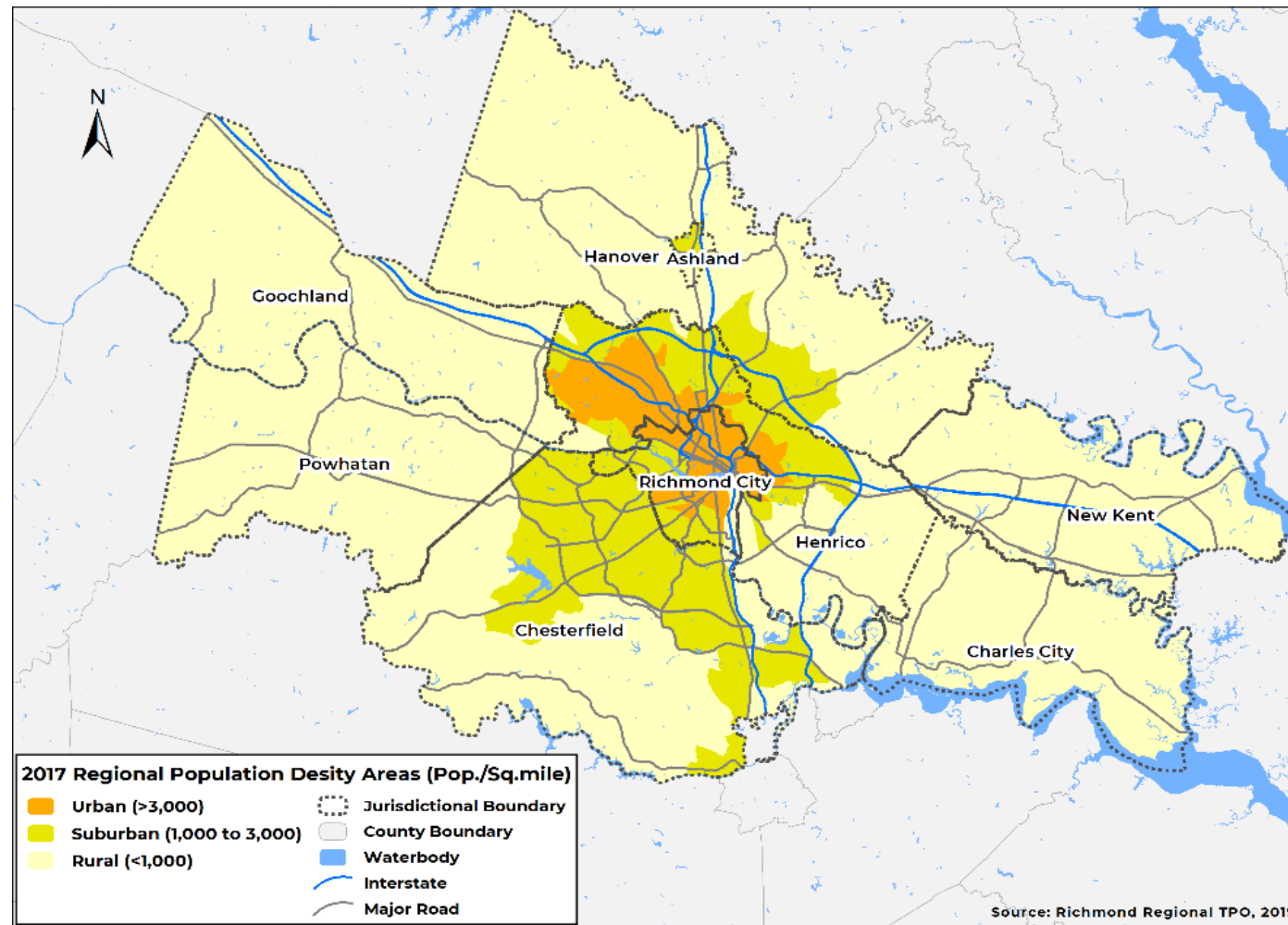
Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

become urban over the next 30 years and the boundaries of each type of density area will be slightly changed. For the purpose of better comparing each population and employment density character in 2017 and 2045, it has been assumed that 2045 density areas will stay the same as 2017.

4.1 Urban Core

The Urban Core mainly concentrates in the center of the Richmond region and contains 86.4 Sq. Miles in total as shown in *Exhibit 34*. Henrico County and Richmond City are the only two jurisdictions that make up the Urban Core area; 60% of which is in Henrico County and 40% in Richmond City. The Urban Core starts from the downtown of Richmond City and extends west along with I-64 corridor and US 250 to the West End and Short Pump of Henrico County.

Exhibit 34: Richmond Region Urban Core 2017-2045

Density Area Type	Jurisdiction	Sq. Miles	Area %	2017 Population	2017 - 2045	2017 - 2045 %	2045 Population	2017 Households	2017 - 2045	2017 - 2045 %	2045 Households	2017 Autos	2017 - 2045	2017 - 2045 %	2045 Autos	2017 Employment	2017 - 2045	2017 - 2045 %	2045 Employment
Urban	Henrico	51.6	60%	189,898	39,322	21%	229,220	74,557	15,858	21%	90,415	147,929	29,724	20%	177,653	101,966	16,611	16%	118,577
	Richmond	34.8	40%	181,336	37,445	21%	218,781	80,477	17,223	21%	97,700	92,230	17,117	19%	109,347	130,157	17,668	14%	147,825
	Total	86.4	100%	371,234	76,767	21%	448,001	155,034	33,081	21%	188,115	240,159	46,841	20%	287,000	232,123	34,279	15%	266,402

Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

In the base year of 2017, the Urban Core area of the Richmond region consists of a total of 155,000 households and 371,000 people, which is 34% of the region. The current population density is 4,300 people per sq. mile and employment density is 2,700 jobs per sq. mile. The total employment is 232,123 in the urban core, or 42% of the total employment of the region. In addition, 27% of the region's autos, or a total of 240,000 autos are registered to households in the Urban Core. The auto-ownership rate is 0.6 vehicles per person and 1.5 vehicles per household, the same as in 2012.

From 2017 to 2045 the population, employment and number of autos in the Urban Core are expected to increase by 20% by adding 77,000 people, 34,000 jobs, and 47,000 autos. For purposes of this analysis the auto-ownership rate of 2045 isassumes to remain at the same level as 2017. Based on those growth projections, the average population density would rise to 5,200 people per sq. mile and the employment density would reach 3,100 jobs per sq. mile.

4.2 Suburbanized Area

The Suburbanized Area is identified by areas where the population density of 2017 is between 1,000 to 3,000 people per sq. mile shown in *Exhibit 35*. It comprises 333 TAZs with a 314-sq. mile area; Chesterfield County accounts for 55% and the remaining 45% includes Hanover County, Henrico County and the City of Richmond. Starting with the outer boundary of the Urban Core, the suburban area streatches along the major corridors such as I-295, north/south I-95 and US 288/360, and expands north to I-295 with a portion of the Town of Ashland, east to U.S-288 and West Creek, south to Route 10 and VSU, and East to Richmond International Airport.

Exhibit 35: Richmond Region Suburbanized Area (2017-2045)

Density Area Type	Jurisdiction	Sq. Miles	Area %	2017 Population	2017 - 2045	2017 - 2045 %	2045 Population	2017 Households	2017 - 2045	2017 - 2045 %	2045 Households	2017 Autos	2017 - 2045	2017 - 2045 %	2045 Autos	2017 Employment	2017 - 2045	2017 - 2045 %	2045 Employment
Sub-urban	Chesterfield	172.6	55%	296,696	66,377	22%	363,073	108,982	24,228	22%	133,210	249,377	54,433	22%	303,810	102,988	16,997	17%	119,985
	Hanover	41.3	13%	64,377	9,536	15%	73,913	23,131	3,164	14%	26,295	52,693	7,816	15%	60,509	26,871	8,252	31%	35,123
	Henrico	77	25%	123,818	43,542	35%	167,360	49,194	17,555	36%	66,749	107,720	38,403	36%	146,123	78,977	21,813	28%	100,790
	Richmond	23.2	7%	42,876	17,857	42%	60,733	19,227	7,970	41%	27,197	36,716	15,418	42%	52,134	17,324	2,951	17%	20,275
	Total	314.1	100%	527,767	137,312	26%	665,079	200,534	52,917	26%	253,451	446,506	116,070	26%	562,576	226,160	50,013	22%	276,173

Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

In 2017 half of the population of the region dwelled in the Suburbanized Area; 528,000 people lived in 200,000 households. Nearly 300,000 people, or 60% of total, are contributed by Chesterfield County. The Suburban Area has over 50% of the region's share of autos, with a total of 447,000 automobiles, which translates to 0.8 autos/person or 2.2 autos/household rate. Close to the Urban Core, 226,000 jobs are in suburbs, which is over 40% of the total regional employment. The retail employment in this area exceeds 50% of the region's total with 64,000 jobs. The population density of the suburban area is 1,680 persons/sq. mile and employment density is 720 jobs sq. mile. There is a significant drop in the population/ employment density between suburban and urban area.

Looking forward to 2045, the projection shows population, households and autos will increase by 26%, while employment will experience 22% growth. These growth percentages are slightly larger than the urban core.

4.3 Rural Area

The rural area takes the PlanRVA (RRPDC) boundary as its outer boundary and includes the balance which is no catogories as urban and suburban areas: 82% of areas in the region are rural consisting of a total of 1,800 sq. smiles shown in *Exhibit 36*. Hanover County occupies 432 sq. miles with the biggest regional percentage of 24% while the City of Richmond has only 4.5 sq. miles that are considered as rural.

Exhibit 36: Richmond Region Rural Area 2017-2045

Density Area Type	Jurisdiction	Sq. Miles	Area %	2017 Population	2017 - 2045	2017 - 2045 %	2045 Population	2017 Households	2017 - 2045	2017 - 2045 %	2045 Households	2017 Autos	2017 - 2045	2017 - 2045 %	2045 Autos	2017 Employment	2017 - 2045	2017 - 2045 %	2045 Employment
Rural	Charles City	203.9	11%	7,126	1,414	20%	8,540	2,874	570	20%	3,444	8,672	1,719	20%	10,391	1,668	164	10%	1,832
	Chesterfield	264	15%	44,152	30,287	69%	74,439	15,613	10,597	68%	26,210	43,960	27,398	62%	71,358	28,132	29,625	105%	57,757
	Goochland	289.3	16%	23,536	10,202	43%	33,738	8,981	4,022	45%	13,003	23,485	10,220	44%	33,705	13,966	6,541	47%	20,507
	Hanover	432.3	24%	45,218	26,428	58%	71,646	17,116	9,012	53%	26,128	45,101	21,552	48%	66,653	23,754	6,982	29%	30,736
	Henrico	116.3	6%	21,567	12,075	56%	33,642	8,670	4,867	56%	13,537	23,592	13,244	56%	36,836	10,297	9,274	90%	19,571
	New Kent	223.3	12%	21,347	14,923	70%	36,270	8,008	5,674	71%	13,682	21,868	15,497	71%	37,365	3,956	2,023	51%	5,979
	Powhatan	262.2	15%	29,147	12,101	42%	41,248	10,442	4,655	45%	15,097	29,566	13,128	44%	42,694	6,092	1,436	24%	7,528
	Richmond	4.5	0%	586	41	7%	627	254	18	7%	272	498	35	7%	533	4,563	426	9%	4,989
	Total	1795.7	100%	192,679	107,471	56%	300,150	71,958	39,415	55%	111,373	196,742	102,793	52%	299,535	92,428	56,471	61%	148,899

Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

In the base year of 2017, population, households, autos and employment are all relatively less than found in the urban core and suburban areas. Rural areas only have 18% of the region's total population including 193,000 persons dwelling in 72,000 households. The average household size is 2.7. Moreover, 11% of total regional employment, or 92,000 jobs are located in the rural area. On the other side, the auto-ownership rates in rural areas are the highest with 2.7 autos per household. The population density and employment density are 107 and 51 respectively.

The growth pattern demographic characte of the rural area in the Richmond region is expected to be impressive in the next 28 years based on the estimates. All the demographic characteris are expected to increase over 50% in 2045. 39,000 new households with 107,000 in population are projected to be added in rural area; 103,000 new autos will make up the number of total autos in 2045 to nearly 300,000; 56,000 new jobs will be created in rural areas, which is larger than other density types of areas. The population density and employment density will respectively rise to 643 people per sq. mile and 315 jobs per sq. mile

4.4 Density Area Types by Locality

Exhibit 37 lists statistical changes from 2017 to 2045 of each density area type by locality. Four counties are completely rural including Charles City County, Goochland County, New Kent County and Powhatan County. 91% of the area in Hanover County is rural and the rest is suburban. They all have smaller amounts of population density and employment density. To be expected, Richmond City leads with the highest population/employment density in the region while Chesterfield County and Henrico County are not far behind.

Exhibit 37: Richmond Region Density Areas by Locality 2012-2045

Jurisdiction	Area Type	Sq. Miles	Area%	Population		HouseHolds		Autos		Employment		Population Density		Employment Density	
				2017	2045	2017	2045	2017	2045	2017	2045	2017	2045	2017	2045
Charles City	Rural	203.9	100%	7,126	8,540	2,874	3,444	8,672	10,391	1,419	1,668	35	42	7	8
Chesterfield	Suburban	172.6	40%	296,696	363,073	108,982	133,210	249,377	303,810	93,879	102,988	1,719	2,104	544	597
	Rural	264.0	60%	44,152	74,439	15,613	26,210	43,960	71,358	22,555	28,132	167	282	85	107
	Total	436.6	100%	340,848	437,512	124,595	159,420	293,337	375,168	116,434	131,120	781	1,002	267	300
Goochland	Rural	289.3	100%	23,536	33,738	8,981	13,003	23,485	33,705	12,509	13,966	81	117	43	48
Hanover	Suburban	41.3	10%	64,377	73,913	23,131	26,295	52,693	60,509	24,405	26,871	1,558	1,789	591	650
	Rural	432.3	100%	45,218	71,646	17,116	26,128	45,101	66,653	21,483	23,754	105	166	50	55
	Total	473.6	100%	109,595	145,559	40,247	52,423	97,794	127,162	45,888	50,625	231	307	97	107
Henrico	Urban	51.6	21%	189,898	229,220	74,557	90,415	147,929	177,653	95,391	101,966	3,681	4,443	1,849	1,977
	Rural	116.3	47%	21,567	33,642	8,670	13,537	23,592	36,836	9,428	10,297	186	289	81	89
	Suburban	77.0	31%	123,818	167,360	49,194	66,749	107,720	146,123	73,846	78,977	1,607	2,173	959	1,025
	Total	244.9	100%	335,283	430,222	132,421	170,701	279,241	360,612	178,665	191,240	1,369	1,757	730	781
New Kent	Rural	223.3	100%	21,347	36,270	8,008	13,682	21,868	37,365	3,653	3,956	96	162	16	18
Powhatan	Rural	262.2	100%	29,147	41,248	10,442	15,097	29,566	42,694	5,406	6,092	111	157	21	23
Richmond	Urban	34.8	56%	181,336	218,781	80,477	97,700	92,230	109,347	124,523	130,157	5,213	6,289	3,580	3,742
	Rural	4.5	7%	586	627	254	272	498	533	4,687	4,563	131	140	1,049	1,021
	Suburban	23.2	37%	42,876	60,733	19,227	27,197	36,716	52,134	17,058	17,324	1,848	2,618	735	747
	Total	62.5	100%	224,798	280,141	99,958	125,169	129,444	162,014	146,268	152,044	3,599	4,485	2,342	2,434
Grand Total		2196.2	100%	1,091,680	1,413,230	427,526	552,939	883,407	1,149,111	510,242	550,711	497	643	232	251

Note: The population Density unit is people per Sq. Mile; The Employment Density is jobs per Sq. Mile.

Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

5.   Regional Activity Centers

An Activity Center is a conceptual planning term that depicts areas based on concentratoions of population and employment density. A mixed-use urban area where the density of commercial or other land uses is highest is conducive to a variety of transportation options, including transit services. The size of different types of activity centers is variable based on the city or region's area size, population size, density area types (urban, suburban and rural), or its functions (shopping center, employment center, high-density residential area).

The main purpose for identifying activity centers is to provide a guideline when designing the best transportation service for areas that have denser population and employment and to better utilize and prioritize investment and funding for transportation or transit projects. The Virginia Department of Rail and Public Transportation (DRPT) published a report of Multi-modal System Design Guidelines in October 2013. Activity Density in this report is defined as one of the most important indicators of multi-modal centers. The number of residents plus jobs in an area are defined as activity units then divided by the acreage to calculate density. Moreover, the report also indicates a recommended six Multi-modal Center Types and Activity Density Ranges after analysing various types of existing and potential Multi-modal Centers in Virginia as shown in *Exhibit 38*.

Exhibit 38: Multimodal Center Standards by Activity Density

Activity Center Type	Activity Density [(Pop.+Emp)/Acre)]
P1 Rural or Village Center	2.13 or less
P2 Small Town or Suburban Center	2.13 to 6.63
P3 Medium Town or Suburban Center	6.63 to 13.75
P4 Large Town or Suburban Center	13.75 to 33.75
P5 Urban Center	33.75 to 70.0
P6 Urban Core	70.0 or more

Source: DRPT Multimodal System Design Guidelines, Oct 2013

PlanRVA staff adopted the guidelines with minor adjustments and then applied them to the Richmond region. The density of population and employment in both the 2017 base year and 2045 future year were considered in order to identify the potential activity centers for the next 2-3 decades. Major steps are summarized as follows:

- Calculate the Activity Density for each TAZ for 2017 and 2045:
  Activity Density (Year) = (Population + Employment)/Acres

- Calculate the midpoint of activity density from 2017 to 2045:
  Activity Density (Mid) = [Activity Density (2017) + Activity Density (2045)]/2

- Display the Activity Density (Mid) on the map and then based on the criteria of each density area type to identify the activity centers (See Table)

Exhibit 39: Richmond Region Activity Centers 2017-204

ID	Activity Centers	Type of Center	Acres	Population		Employment		Activity Units (Pop.+ Emp)		Emp/Pop Ratio		Activity Density [(pop.+emp)/acre)]		Activity Density Changes	
				2017	2045	2017	2045	2017	2045	2017	2045	2017	2045	2017-2045 Mid	2017-2045%
1	Richmond CBD	P5 Urban	3,327	53,093	69,028	89,462	103,294	142,555	172,322	1.7	1.5	42.8	51.8	47.3	20.9%
2	Staples Mill	P4 Suburban	1,359	5,335	10,567	24,22	26,522	29,757	37,089	4.6	2.5	21.9	27.3	24.6	24.6%
3	Midlothian East	P3 Suburban	2,514	13,271	18,372	12,988	18,539	26,259	36,911	1.0	1.0	10.4	14.7	12.6	40.6%
4	Stonebridge*	P3 Suburban	2,059	15,465	21,451	6,032	6,296	21,497	27,747	0.4	0.3	10.4	13.5	12.0	29.1%
5	Commerce Rd Ind. Area	P2 Suburban	1,475	1,483	1,740	4,974	5,101	6,457	6,841	3.4	2.9	4.4	4.6	4.5	5.9%
6	Sandston	P3 Suburban	4,580	18,445	26,718	11,869	14,585	30,314	41,303	0.6	0.5	6.6	9.0	7.8	36.3%
7	VA Center Commons	P3 Suburban	1,791	4,947	9,217	4,696	5,846	9,643	15,063	0.9	0.6	5.4	8.4	6.9	56.2%
8	Henrico Goverment	P4 Suburban	3,515	24,445	32,714	24,031	27,334	48,476	60,048	1.0	0.8	13.8	17.1	15.4	23.9%
9	Short Pump	P4 Suburban	5,015	26,073	29,440	44,624	55,317	70,697	84,757	1.7	1.9	14.1	16.9	15.5	19.9%
10	Midlothian West	P3 Suburban	2,756	10,715	11,038	15,723	20,594	26,438	31,632	1.5	1.9	9.6	11.5	10.5	19.6%
11	Midlothian Village*	P2 Suburban	4,826	15,622	20,836	5,350	5,753	20,972	26,589	0.3	0.3	4.3	5.5	4.9	26.8%
12	Swift Creek	P2 Suburban	7,648	22976	24,896	9,654	10,393	32,630	35,289	0.4	0.4	4.3	4.6	4.4	8.1%
13	Chesterfield Goverment	P3 Suburban	685	3,016	3,204	4,398	4,458	7,414	7,662	1.5	1.4	10.8	11.2	11.0	3.3%
14	US Defense Supply*	P3 Suburban	540	4,192	4,243	1,172	1,174	5,364	5,417	0.3	0.3	9.9	10.0	10.0	1.0%
15	VA State University*	P2 Suburban	2,285	8,237	9,324	1,571	1,575	9,808	10,899	0.2	0.2	4.3	4.8	4.5	11.1%
16	Meadowville	P2 Suburban	9,015	11,920	16,409	11,776	20,119	23,696	36,28	1.0	1.2	2.6	4.1	3.3	54.2%
17	Mechanicsville	P2 Suburban	1,583	4,272	5,629	4,878	5,570	9,150	11,199	1.1	1.0	5.8	7.1	6.4	22.4%
18	Kings Dominion*	P2 Suburban	796	3	13	2,134	2,313	2,137	2,326	711.3	177.9	2.7	2.9	2.8	8.8%
19	Ashland	P2 Small Town	1,865	5,335	6,737	3,814	7,147	9,149	13,884	0.7	1.1	4.9	7.4	6.2	51.8%
20	West Creek	P2 Suburban	2,937	774	5,584	5,667	8,544	6,441	14,128	7.3	1.5	2.2	4.8	3.5	119.3%

Source: 2012-2040 & 2017-2045 Socioeconomic Data Report, RRTPO, September 2019   *New Activity Center

A total of 20 activity centers were identified and numbered counter-clockwise in *Exhibit 39*, starting from the center of the region then following the radiating pattern of Urban, Suburban and Rural density areas. Five new activity centers including Stonebridge, Midlothian Village, US Defence Supply Center, Virginia State University and Kings Dominion have been added. *Exhibit 40* displays the existing characteristics of each activity center and how they are expected to grow in the future. The employment/population ratio is used primarily as a measure of the pace of job creation according to the Bureau of Labor Statistics (BLS). The 2045 projection shows that all of the 20 activity centers are generally expected to grow.

- The **Richmond Central Business District (CBD)** is the only P5 Urban Center in the region. It has the highest activity density (42.8 activity units per acre) and largest activity units including 53,000 people and 89,000 jobs. This represents 60% of jobs in the City and 16% of the region. The CBD activity density is projected to grow by 20% to 51.8 activity units per acre from 2017 to 2045.to increase 30% from 10.4 to 13.5 activity units per acre in 2045.

- The population of **Staples Mill** in 2045 will reach 10,000, which is two-times larger than in 2017. The geography area is mainly located in Henrico County and small portion of Richmond City.

- The **Stonebridge** area, as a new center located at the intersection of Chippenham Parkway and Midlothian Turnpike covers geography in both the City and Chesterfield County, currently has 15,000 people and 6,000 jobs and its activity density is projected

- The largest center is **Short Pump** in Henrico County.- covering 5,000 acres and consisting of 26,000 people and 45,000 jobs. The current activity density is 14.1 activity units per acre and is expected to reach 16.9 activity units with a 20% increase in 2045.

- **Midlothian West** covers 12% of total employment in Chesterfield and contains 16,000 jobs.

- **Midlothian Village** as a new activity center in Chesterfield is located at the intersection of Rt 288 and U.S. 60. It has been identified as a new center because of many on-going residential and commercial projects.

- **Swift Creek** with 7,650 acres is the largest activity center in area in acres

- **US Defence Supply Center's** activity density will stay approximately the same in the next 28 years.

- **VA Center Commons** population size is projected to be doubled in 2045 with 4,300 more people.

- **Kings Dominion** in Hanover County is basically viewed as an employment center since almost all the activity units are employment. It also has the highest employment/population ratio.

- The **Town of Ashland** is defined as P2 Small Town and has 5,000 people and 4,000 jobs. The current activity density is 4.9 activity units per acre. The number of jobs in this center is expected to be doubled in 2045; 3,300 new jobs will be created.

- Goochland County has only one activity center called **West Creek**. It now has around 800 people living there and 5,700 people working there, which is 41% of the total employment of the county. From 2017 to 2045, this area is estimated to experience huge growth. 4,800 people will move to this center while 2,900 new jobs will be added. The growth percentage of its activity density from 2017 to 2045 is projected to be 120%.

Exhibit 40: Richmond Region Activity Centers 2017-2045

ID	Activity Center
1	Richmond CBD
2	Staples Mill
3	Midlothian East
4	Stonebridge *
5	Commerce Road Ind. Area
6	Sandston
7	VA Center Commons
8	Henrico Goverment Center
9	Short Pump
10	Midlothian West
11	Midlothian Villiage *
12	Swift Creek
13	Chesterfield Goverment Center
14	U.S. Defense Supply *
15	VA State University *
16	Meadowville
17	Mechanicsville
18	Kings Dominion *
19	Ashland
20	West Creek
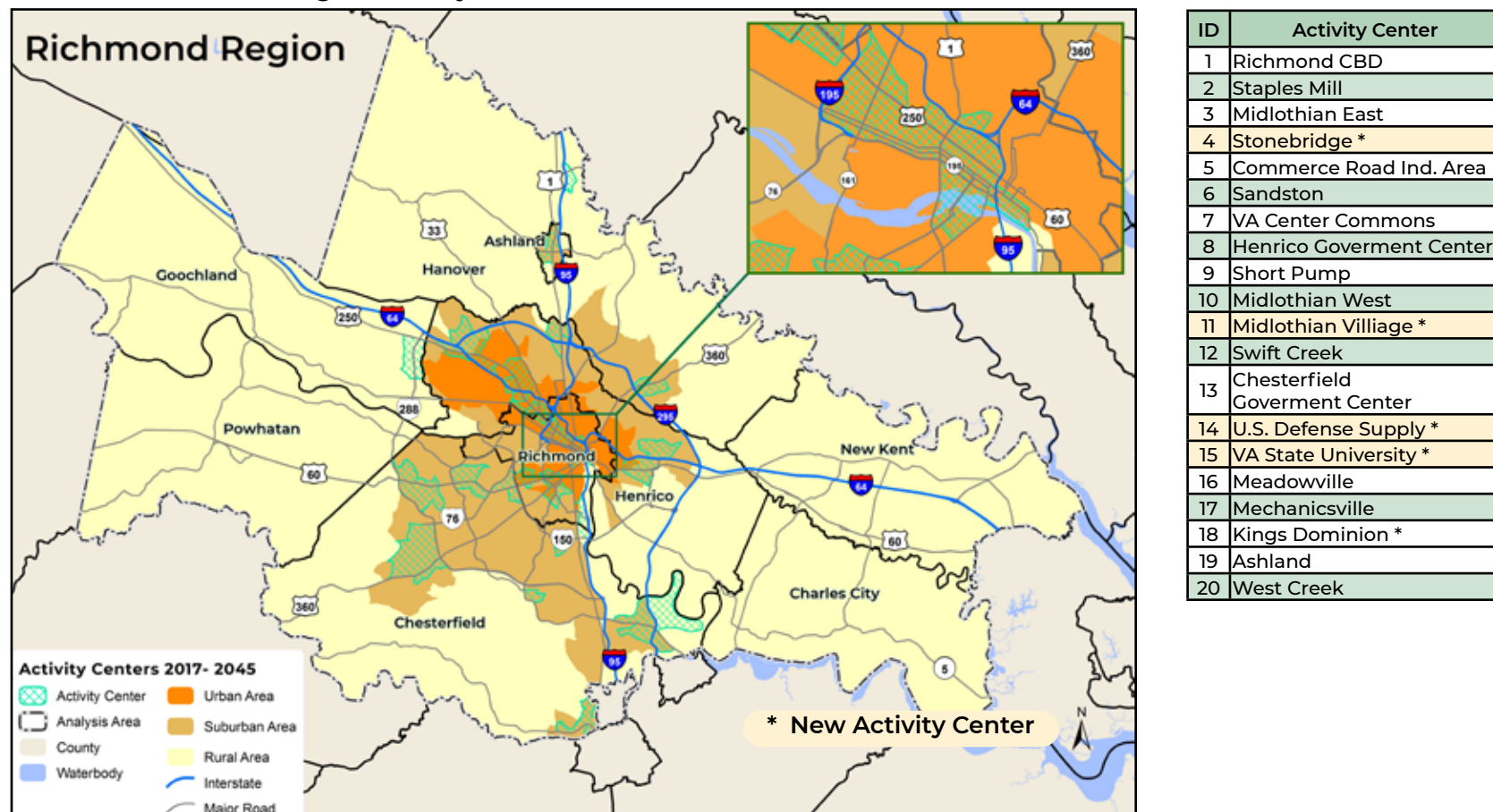
Source: 2017-2045 Socioeconomic Data Report, RRTPO, September 2019

6.   Environmental Justice

Based on the legal framework of Title VI of the Civil Rights Act of 1964 and Executive Order 12898, every Metropolitan Planning Organization (MPO) receiving federal funds is required to ensure that the most disadvantaged populations are protected from negative impacts and are best equipped to derive positive benfit during the planning process and evaluation. The process for including consideration for these special populations in planning is referred to as "Environmental Justice", or EJ for short. Those disadvantaged groups traditionally are defined as: Minority and Low-Income populations along with the social planning factors for special populations including Individuals with Disabilities, Zero Car Households, Elderly populations, and Limited English Proficiency (LEP) populations. The datasets for each category were accessed from 2013-2017 American Community Survey 5-Year Estimates from the U.S. Census Bureau and summarized as follows in *Exhibit 41*. The EJ concentration area of each EJ population group is depicted when its percentage exceeds its average percentage level of the region as a whole.

This section focuses on statistics of each EJ subject dataset. More detailed analysis will be incorporated into the ConnectRVA 2045. Further steps of analysis will entail developing a methodology to display the EJ index at TAZ level by aggregate data sets from the six environmental justice subjects with a defined weight. This EJ index, once developed, will be used to evaluate and score transportation projects, and for other planning purposes.

Exhibit 41: Richmond Region Environmental Justice Factors by Locality 2017

Environmental Justice Datasets	Dataset Level	Table
Minority Population	Block Group	Table B03002
Low Income Population	Census Tract	Table B17001
Individuals with Disabilities	Census Tract	Table B18101
Zero Car Households	Census Tract	Table B18101
Elderly Population	Block Group	Table B101001
Limited English Proficiency (LEP) Population	Census Tract	Table B16005

Source: 2013-2017 American Community Survey 5-Year Estimates

6.1   Minority Population

Minority populations are defined as persons who identify themselves as Black or African American, American Indian and Alaska Native, Asian, Hawaiian and Other Pacific Islanders, Hispanic or Latino and Native, Some other race alone, and Two or More races. In other words, Minority Population includes all people who have not identified themselves as White (Non- Hispanic or Latino and Single Race Alone) in US Census race and ethnicity questions.

The average percentage of minority population in Richmond region is 41.4% in 2017 and the total minority population is 440,000 as shown in *Exhibit 42*. Black or African American makes up 300,000, which is 70% of the total minority population. Hispanic or Latino is the second largest minority population group with 65,000 people, or 15% of the total.

Exhibit 42: Richmond Region Population by Race by Locality 2017

Jurisdiction	Total Population[1]	Not Hispanic or Latino and Single Race Alone							Hispanic or Latino	Minority
		White	Black or African American	American Indan and Alaska Native	Asian	Native Hawaian and Other Pacific Islander	Some other race alone	Two or more races		
Charles City	7,022	2,915	3,224	456	62	-	13	226	126	4,107
		41.5%	45.9%	6.5%	0.9%	0.0%	0.2%	3.2%	1.8%	58.5%
Chesterfield	335,594	210,795	75,068	747	11,562	85	942	8,711	27,684	124,799
		62.8%	22.4%	0.2%	3.4%	0.0%	0.3%	2.6%	8.2%	37.2%
Goochland	22,148	17,186	3,642	40	261	-	44	407	568	4,962
		77.6%	16.4%	0.2%	1.2%	0.0%	0.2%	1.8%	2.6%	22.4%
Hanover	103,218	87,131	9,331	150	1,537	25	132	2,026	2,886	16,087
		84.4%	9.0%	0.1%	1.5%	0.0%	0.1%	2.0%	2.8%	15.6%
Henrico	324,073	175,647	95,051	596	25,782	141	811	8,489	17,556	148,426
		54.2%	29.3%	0.2%	8.0%	0.0%	0.3%	2.6%	5.4%	45.8%
New Kent	20,523	16,326	2,336	185	203	-	32	843	598	4,197
		79.5%	11.4%	0.9%	1.0%	0.0%	0.2%	4.1%	2.9%	20.5%
Powhatan	28,364	23,989	3,135	80	76	27	19	464	574	4,375
		84.6%	11.1%	0.3%	0.3%	0.1%	0.1%	1.6%	2.0%	15.4%
Richmond	220,892	88,320	105,878	356	4,552	32	518	6,893	14,343	132,572
		40.0%	47.9%	0.2%	2.1%	0.0%	0.2%	3.1%	6.5%	60.0%
Region	**1,061,834**	**622,309**	**297,665**	**2,610**	**4,035**	**310**	**2,511**	**28,059**	**64,335**	**439,525**
		58.6%	**28.0%**	**0.2%**	**4.1%**	**0.0%**	**0.2%**	**2.6%**	**6.1%**	**41.4%**

1. Population for whom race is determined
Source: 2013-2017 American Community Survey 5-Year Estimates, Table B03002

For the localities, three minority population percentages are higher than the region's average including Charles City County, Henrico County and Richmond City as shown in *Exhibit 43*. Among this, Richmond City and Charles City County have two of the highest minority population percentages, at roughly 60%. Henrico County has the largest minority population, close to 150,000 people. On the other side, Hanover County and Powhatan County have lower percentages of approximately 15% minority population.

Eshibit 43: Percentages of Minority Population in Richmond Region by Locality 2017
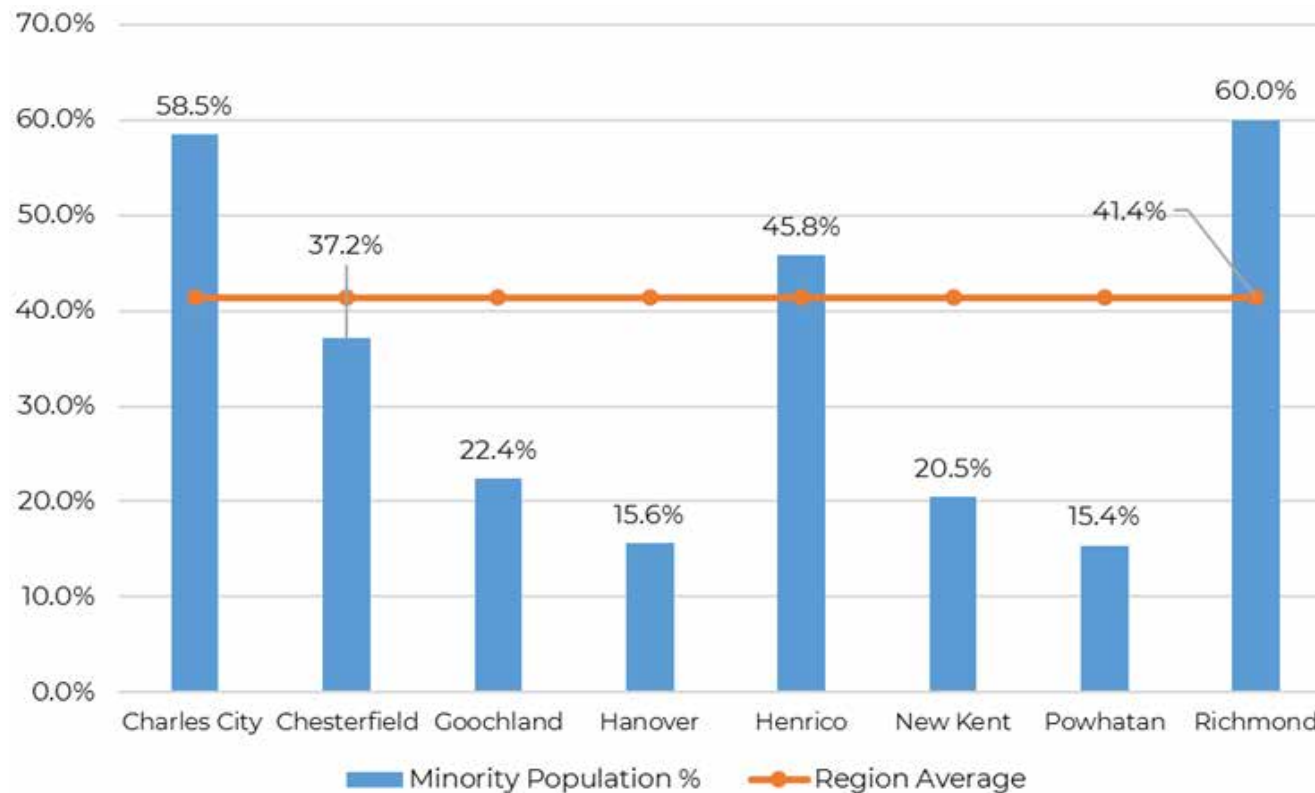
Source: 2013 - 2017 American Community Survey 5 - Year Estimates, Table B03002

Exhibit 44 illustrates minority population concentration areas at block group level. The areas with the highest concentration appear in Richmond City, eastern Henrico County, north-western Chesterfield County, a small portion of northern Hanover County, 288 east, and Charles City County.

Exhibit 44: Map of Richmond Region Minority Population at Census Tract Level 2017
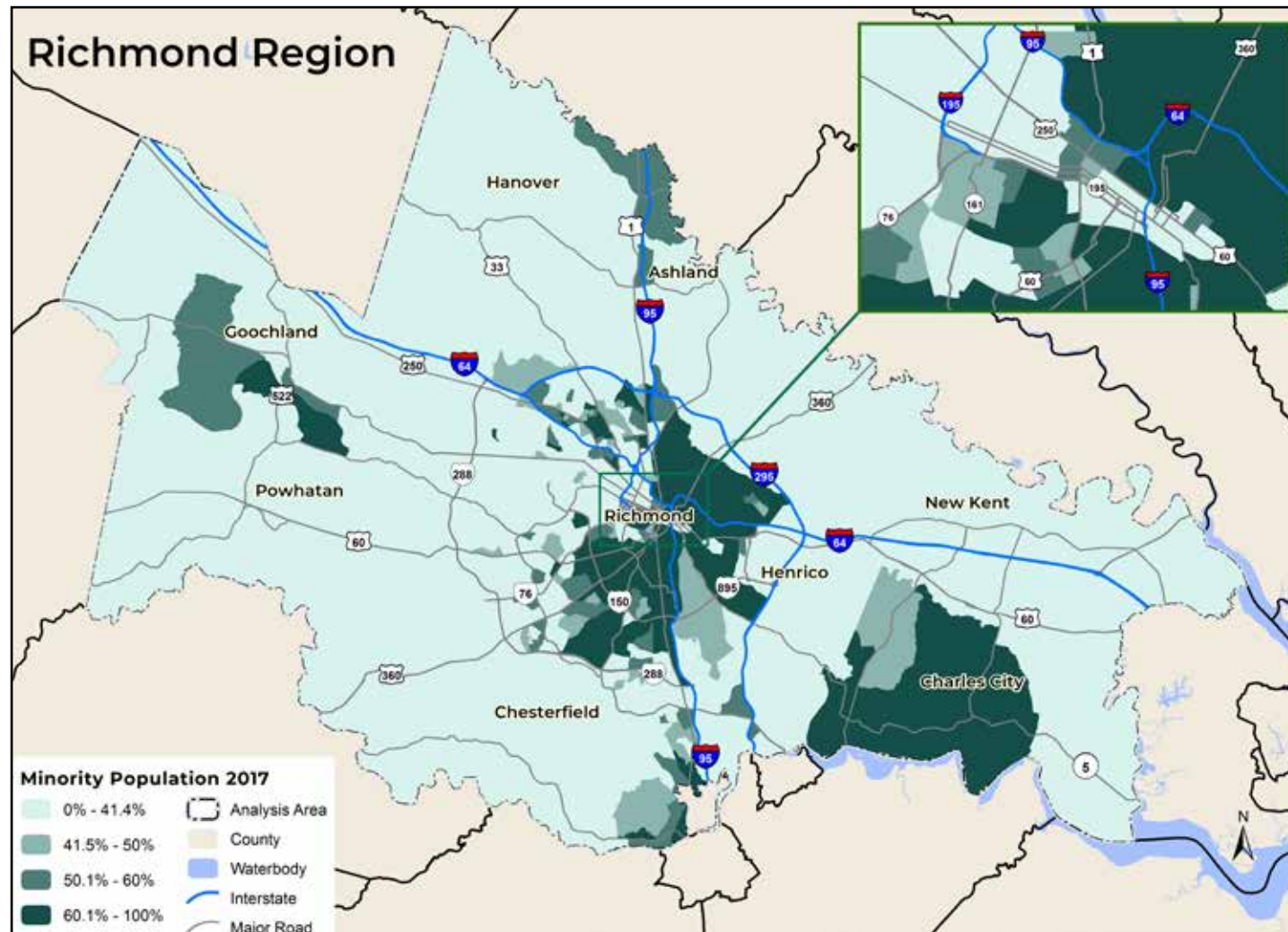
Source: 2013-2017 American Community Survey 5-Year Estimates, Table B0300

6.2 Low Income Population

The average percentage of the population classified as being Low Income or falling below the poverty level in the Richmond region is 11.62% shown in *Exhibit 45*. Richmond City has 53,000 people whose income in the past 12 months was below poverty level and has the highest poverty percentage, 25%. Charles City County is another locality which has a higher poverty percentage than the region level, 900 residents, or 13% shown in *Exhibit 46*. Henrico County has the second largest poverty population with 33,510 people and the percentage is ten percent.

Exhibit 45: Richmond Region Population Living in Poverty by Locality 2017

Jurisdiction	Total Population[1]	Income in the past 12 months below poverty level	Percentage
Charles City	6,994	923	13.2%
Chesterfield	331,055	23,707	7.2%
Goochland	20,998	1,120	5.3%
Hanover	101,303	5,832	5.8%
Henrico	321,074	33,510	10.4%
New Kent	19,899	1,017	5.1%
Powhatan	25,725	1,423	5.5%
Richmond	210,151	52,942	25.2%
Region	**1,037,199**	**120,474**	**11.6%**

1. Population for whom poverty status is determined
Source: 2013-2017 American Community Survey 5-Year Estimates, Table B17001

Household Median Income by locality is also used as a supplemental source to measure income levels shown in *Exhibit 47*. Since the Household Median Income of the Region is not directly available, the weighted mean of household median income by each locality was calculated. This amount is $67,000. Charles City County, Henrico County and the City of Richmond are below this weighted mean as shown in *Exhibit 48*.

Exhibit 49 shows how the Low-Income population is distributed in the region. The highest concentrations are in the central of City of Richmond, eastern Henrico County, the Town of Ashland, and Charles City County. This distribution pattern is similar to that of the minority population.

Exhibit 46: Percentage of Low to Moderate Income Households by Locality 2017
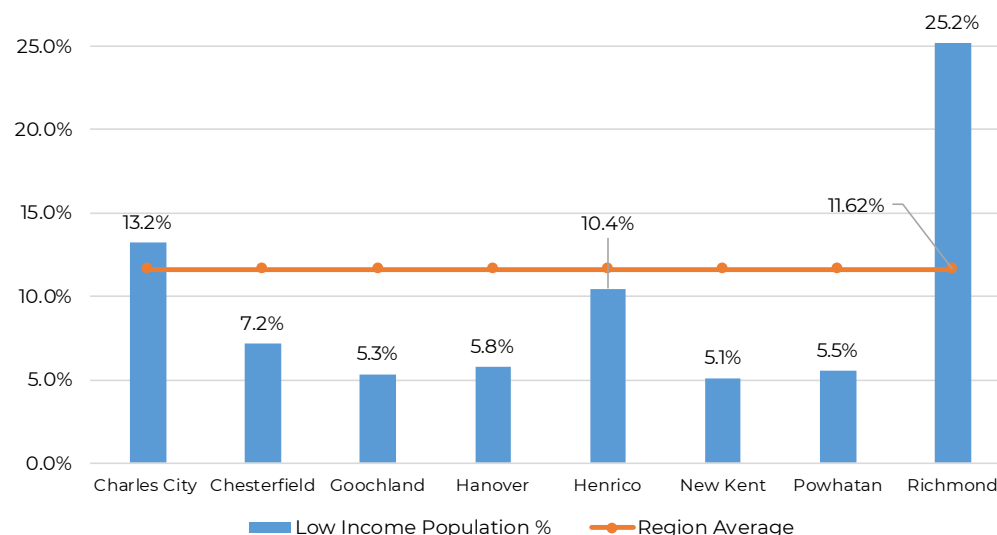
Data Source: 2013-2017 American Coummunity Survey 5-Year Estimates, Table B17001

Exhibit 47: Richmond Region Median Household Income by Locality 2017

Jurisdiction	Total Households[1]	Household Median Income
Charles City	2,899	$55,069
Chesterfield	120,907	$76,969
Goochland	8,257	$86,652
Hanover	38,208	$84,955
Henrico	126,115	$66,447
New Kent	7,555	$78,429
Powhatan	9,974	$80,441
Richmond	89,238	$42,356
Region	**NA**	**$ 66,927 ***

1. Households for whom median household income in the past 12 months (in 2017 inflation-adjusted dollars) is determined

  * This is calculated by weigted average of Household Median income from each Jurisdictions.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B19013

Exhibit 48: Median Household Income by Locality Relative to Region 2017
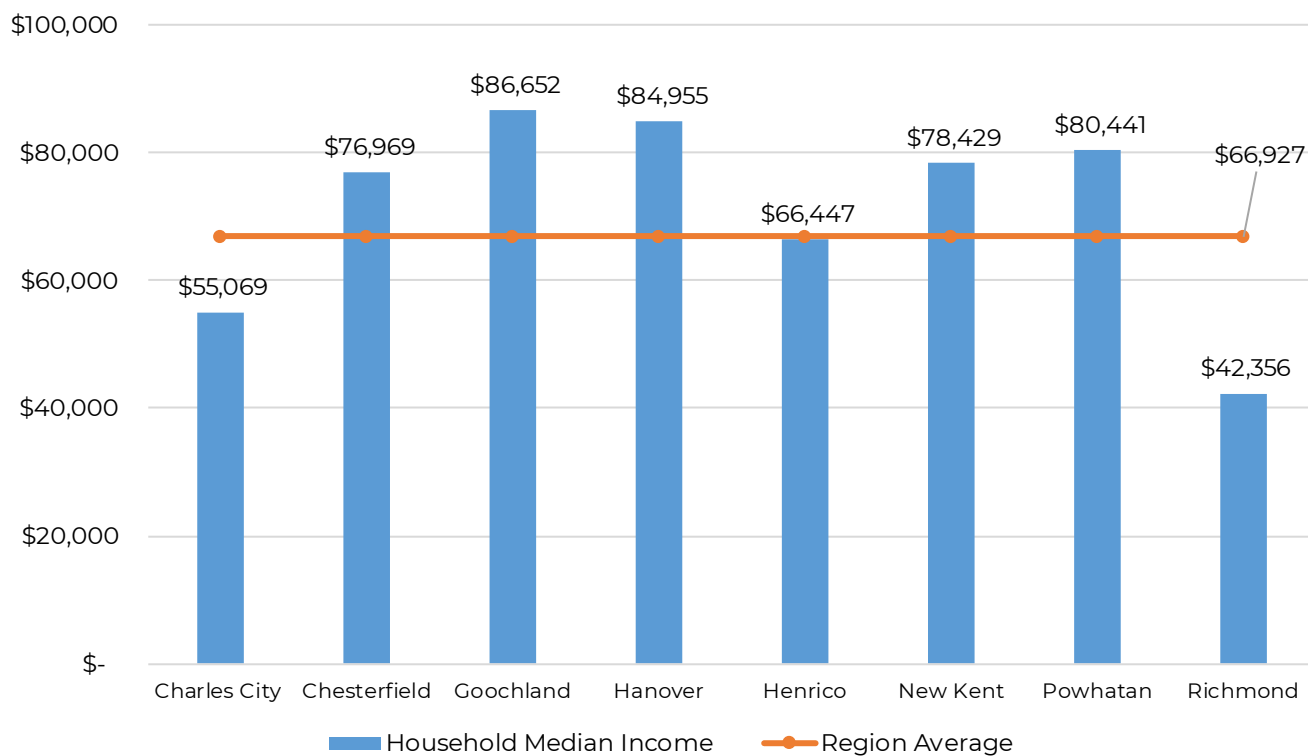
Source: 2013-2017 American Community Survey 5-Year Estimates, Table B19013

Exhibit 49: Map of Richmond Region Median Household Income at Census Tract Level 2017
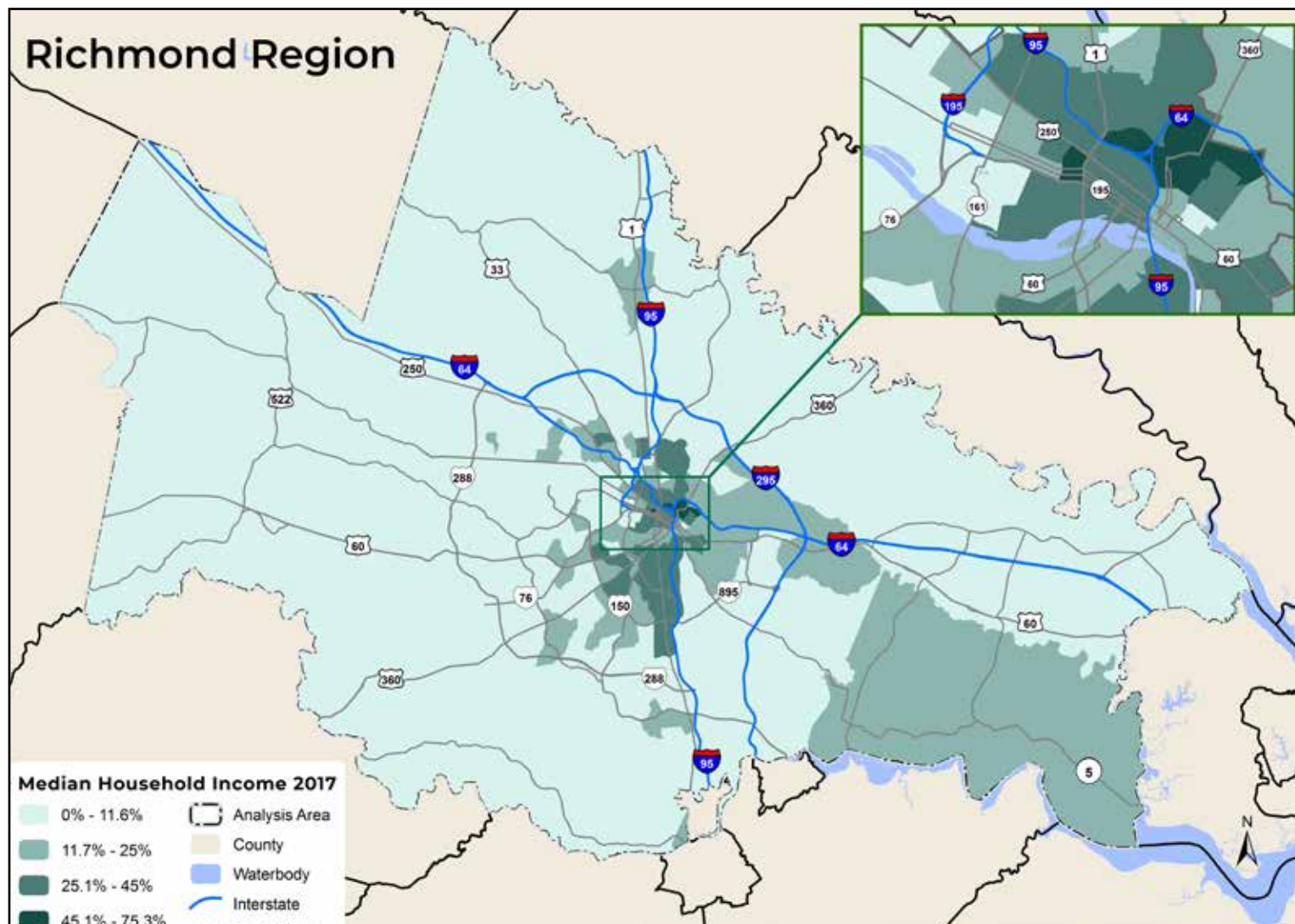
Source: 2013-2017 American Community Survey 5-Year Estimates, Table B19013

6.3   Individuals with Disabilities (Disability Status)

Disability Status is one of the crucial indicators to measure where the special transportation services are needed the most including public transit, para-transit and services by other providers. The percentage of persons with at least one disability is around 11.6% for the region. Of the 121,000 persons with a disability, 90% live in Chesterfield County, Henrico County and Richmond City as indicated in *Exhibit 50*. *Exhibit 51* shows three localities which have same or higher percentages include Charles City County, Goochland County and Richmond City.

Exhibit 50: Individuals with Disabilities by Locality Relative to Region 2017

Jurisdiction	Total Population[1]	Persons with a Disability	Percentage
Charles City	7,009	1,153	16.5%
Chesterfield	333,209	33,818	10.1%
Goochland	20,993	2,441	11.6%
Hanover	102,592	9,879	9.6%
Henrico	321,871	35,465	11.0%
New Kent	19,979	2,040	10.2%
Powhatan	25,757	2,661	10.3%
Richmond	218,218	33,923	15.5%
Region	**1,049,628**	**121,380**	**11.6%**

1. Population for whom disable status is determined

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B18101

Exhibit 51: Individuals with Disabilities by Locality Relative to Region 2017
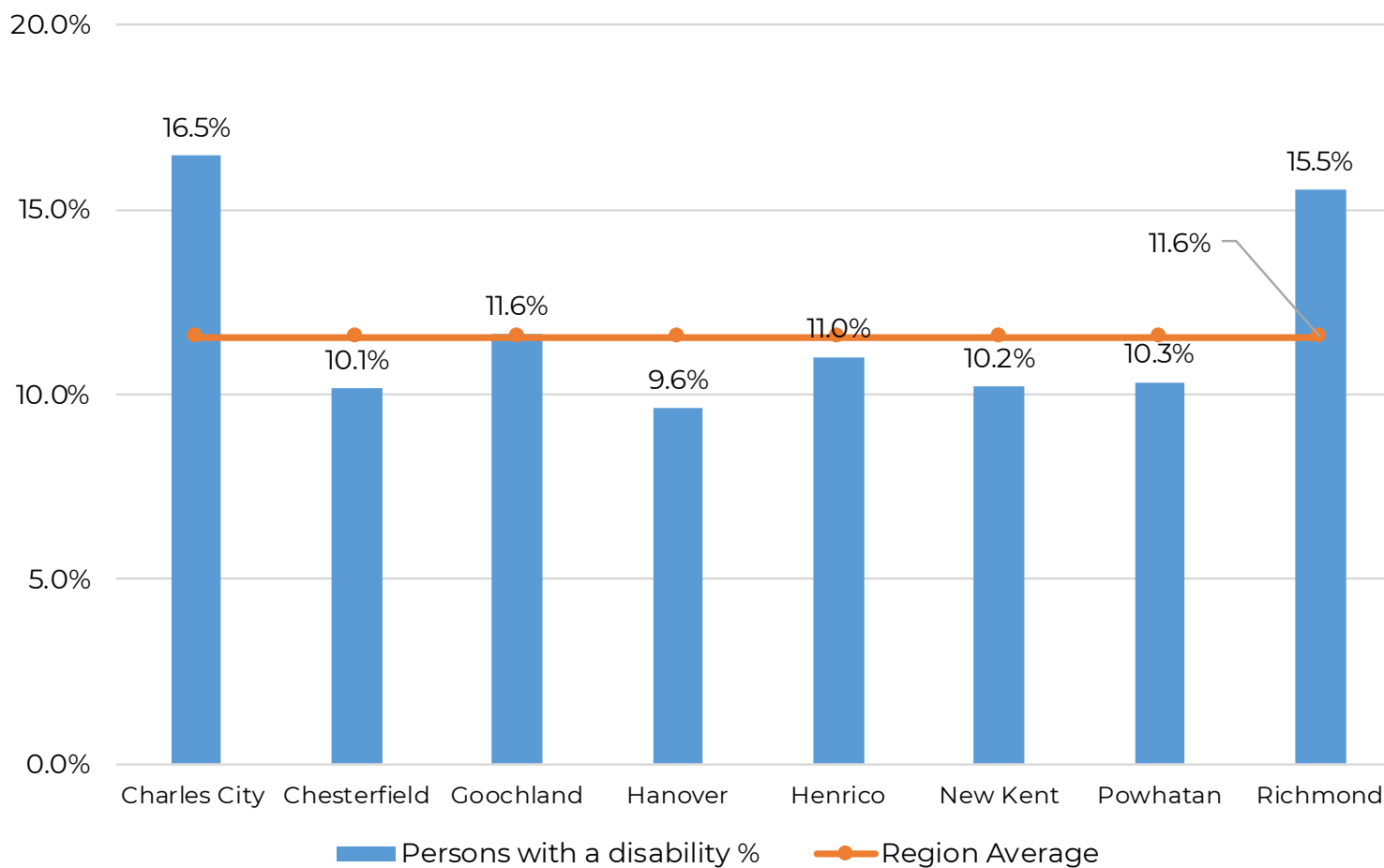
Source: 2013-2017 American Community Survey 5-Year Estimates, Table B18101

Exhibit 52 indicates the areas with highest disability percentage are located along the boundary of Richmond City, eastern Henrico County, Charles City County, the Town of Ashland, western Goochland County and Powhatan County.

Exhibit 52: Map of Richmond Region Disability Status at Census Tract Level 2017
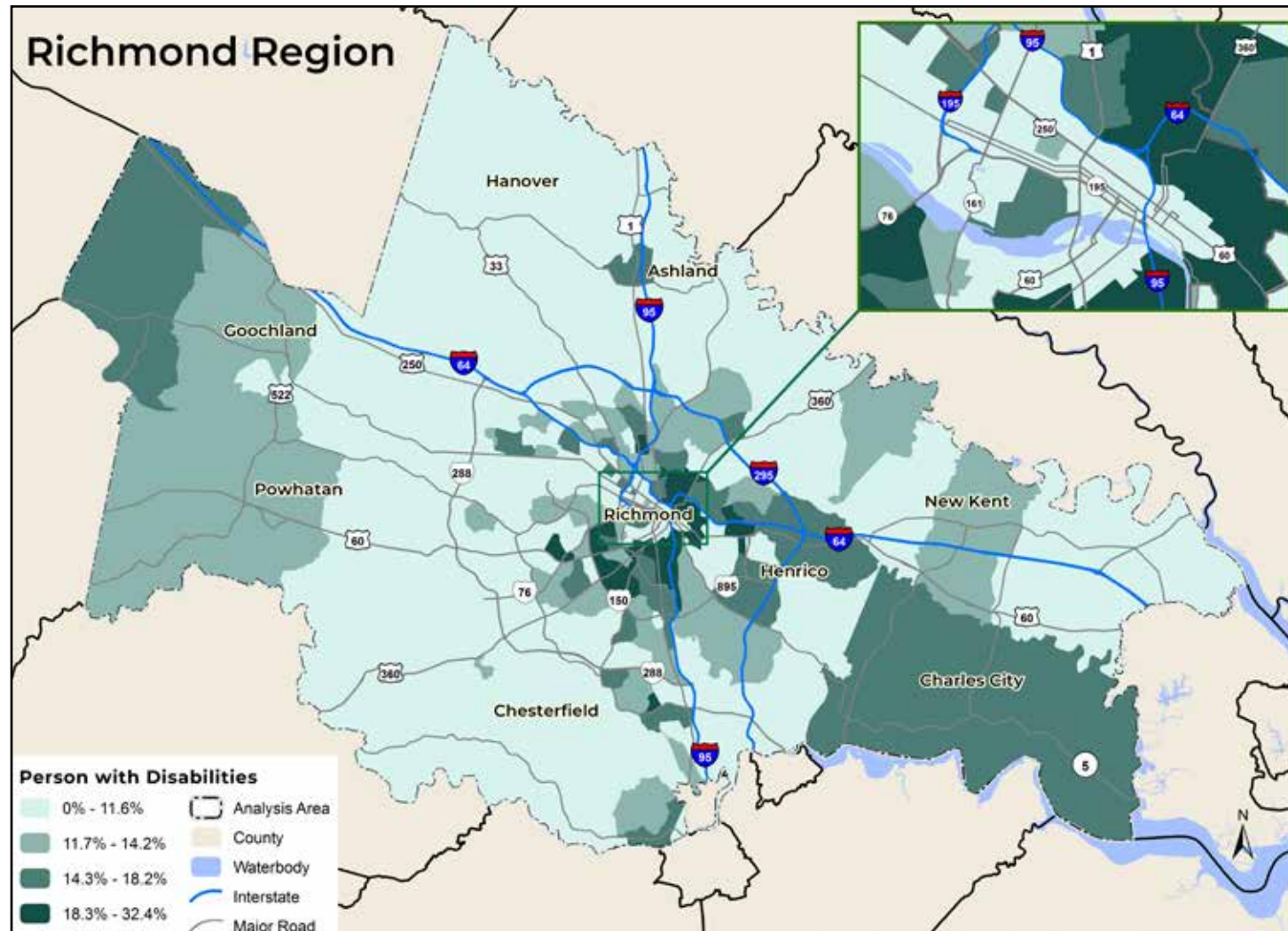
Source: 2013-2017 American Community Survey 5-Year Estimates, Table B18101

6.4   Zero-Car Households

Around 27,000 of the total 403,000 households in the Richmond region do not own a vehicle, an average regional percentage of Zero-Car Household of 6.8% as shown in *Exhibit 53* and *Exhibit 54*. Richmond City has the highest proportion of zero-car households, at 15,000 households, or 16.9%. In addition to the limited financial capability for car ownership, residents of the City of Richmond City have the opportunity for access to more transportation choices. As Exhibit 55 shows, the City of Richmond and Town of Ashland have the highest proportion of Zero-Car Households.

Exhibit 53: Richmond Region Zero Car Households by Locality 2017

Jurisdiction	Total Households[1]	Zero Car Households	Percentage of Zero Car Households
Charles City	2,899	131	4.5%
Chesterfield	120,907	3,497	2.9%
Goochland	8,257	169	2.0%
Hanover	38,208	1,174	3.1%
Henrico	126,115	7,042	5.6%
New Kent	7,555	173	2.3%
Powhatan	9,974	112	1.1%
Richmond	89,238	15,092	16.9%
Region	**403,153**	**27,390**	**6.8%**

1. Households for whom vehicle ownership status is determined

2. This does not include 1-person household with 1 vehicle available

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B18101

Exhibit 54: Zero Car Households by Locality Relative to Region 2017
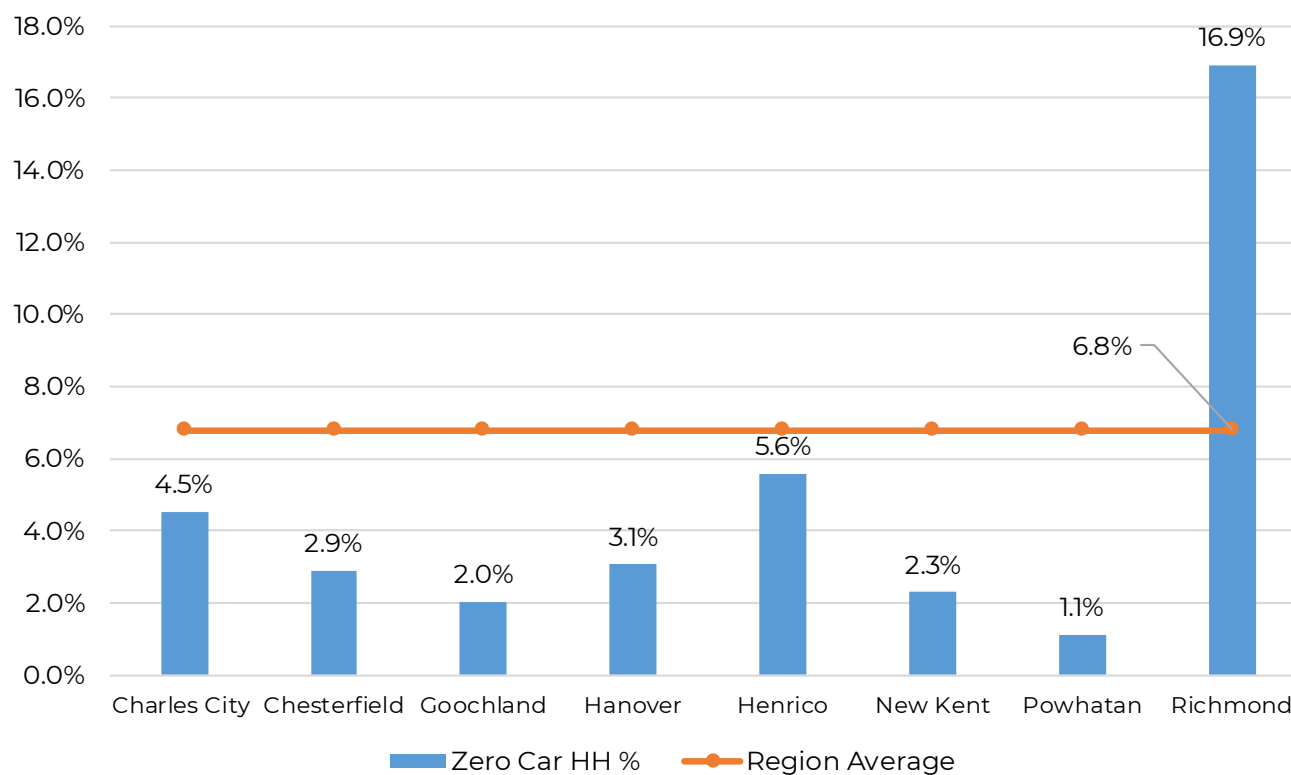
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B18101

Exhibit 55: Map of Richmond Region Zero Car Household at Census Tract Level 2017
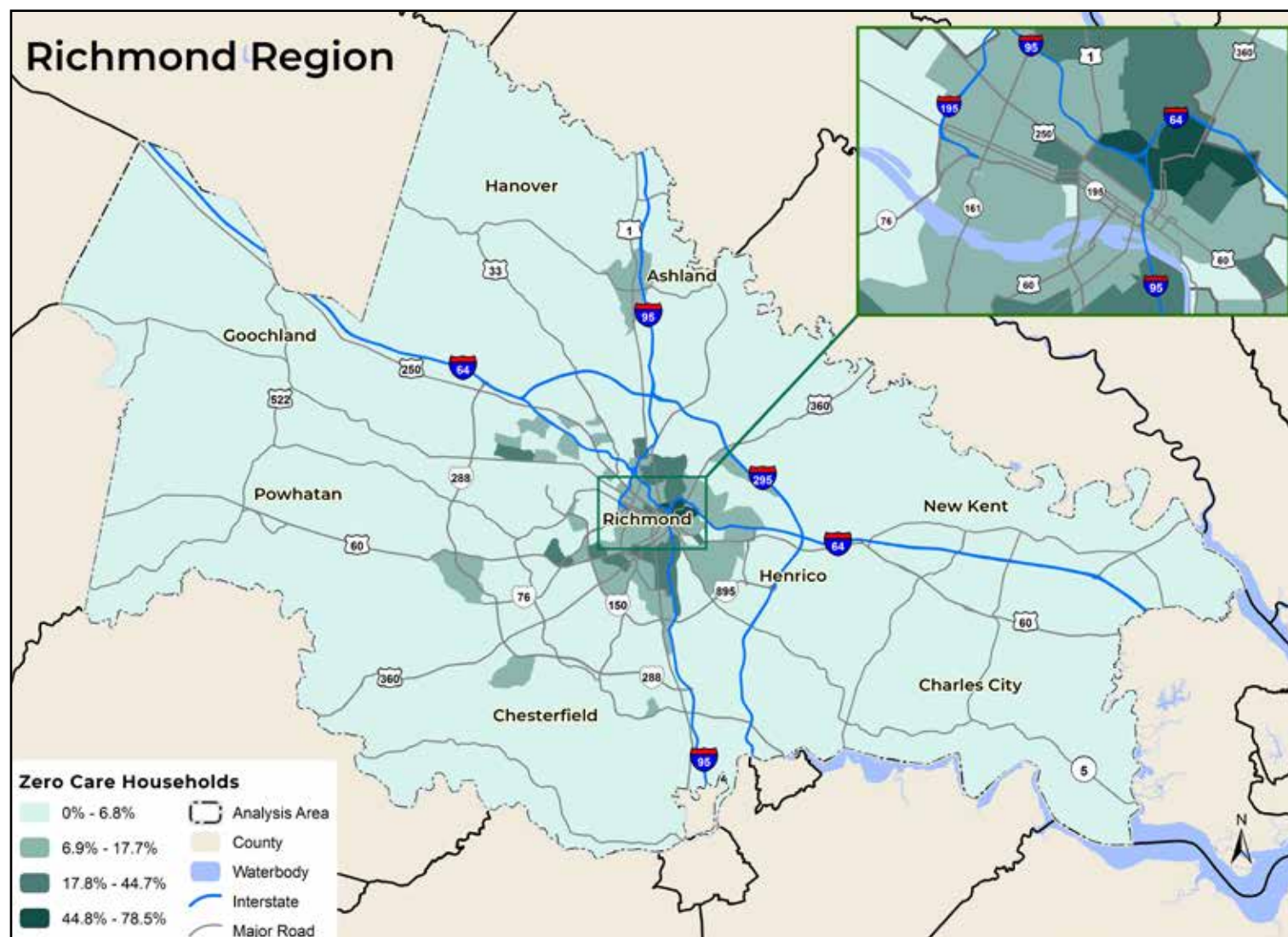
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B18101

6.5 Elderly Population

The population older than 65 years in the region was nearly 148,000 people in 2017 shown in *Exhibit 56*. The average elderly population in 2017 was 13.9% of the region, which is slightly higher than it was in 2013. Except for Chesterfield County and Richmond City with younger population, all other localities' elderly population percentages exceed the regional average shown in *Exhibit 57*. The rural counties including Charles City County and Goochland County have a population with 20% in the elderly cohort. *Exhibit 58* illustrates the elderly population distribution around the region. The highest concentration area of elderly population is mainly in the rural area of the region.

Exhibit 56: Richmond Region Elderly Population (Age ≥ 65) by Locality 2017

Jurisdiction	Total Population[1]	Population for Age ≥ 65	Age ≥ 65 %
Charles City	7,022	1,546	22.0%
Chesterfield	335,594	44,886	13.4%
Goochland	22,148	4,428	20.0%
Hanover	103,218	16,526	16.0%
Henrico	324,073	45,872	14.2%
New Kent	20,523	3,260	15.9%
Powhatan	28,364	4,688	16.5%
Richmond	220,892	26,622	12.1%
Region	**1,061,834**	**147,828**	**13.9%**

1. Population for whom age is determined

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B101001

Exhibit 57: Elderly Population (Age≥65) by Locality Relative to Region 2017

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B101001

Long Range
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Exhibit 58: Map of Richmond Region Elderly Population (Age ≥ 65) at Block Group Level 2017
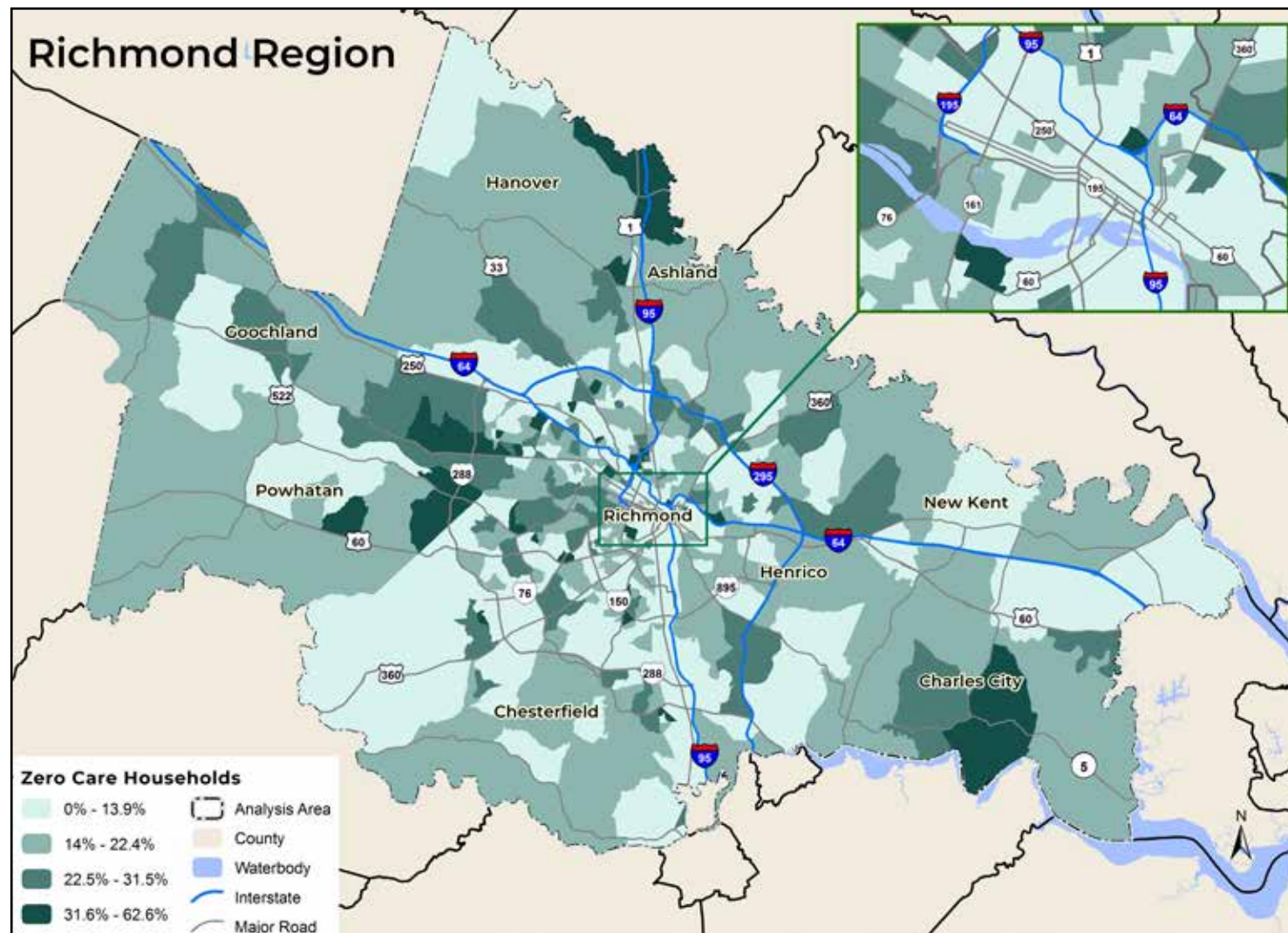
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B101001

6.6 Limited English Proficiency (LEP) Population

Limited English Proficiency, or LEP refers to individuals who do not speak English as their primary language and who have a limited ability to read, speak, write, or understand English. According to the data from the 2013-2017 American Community Survey 5-Year Estimates provided by the U.S. Census Bureau, the total LEP population in the Richmond region is around 21,000, or 2.1% of the total population shown in *Exhibit 59*. The majority of LEP individuals reside in Chesterfield County, Henrico County and Richmond City shown in *Exhibit 60*. In addition, those three localities' LEP rates are higher than the region's average level.

Exhibit 59: Richmond Region Population with Limited English Proficiency (LEP) by Locality 2017

Jurisdiction	Total Population[1]	Limited English Proficiency (LEP) Population	Percentage
Charles City	6,733	2	0.0%
Chesterfield	315,603	6,634	2.1%
Goochland	21,287	111	0.5%
Hanover	98,104	544	0.6%
Henrico	303,751	7,627	2.5%
New Kent	19,432	-	0.0%
Powhatan	27,186	35	0.1%
Richmond	207,499	5,700	2.7%
Region	**999,595**	**20,653**	**2.1%**

1. Population for whom limited English speaking status is determined

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B16005

Exhibit 60: Richmond Region Limited English Proficiency (LEP) Population by Locality 2017
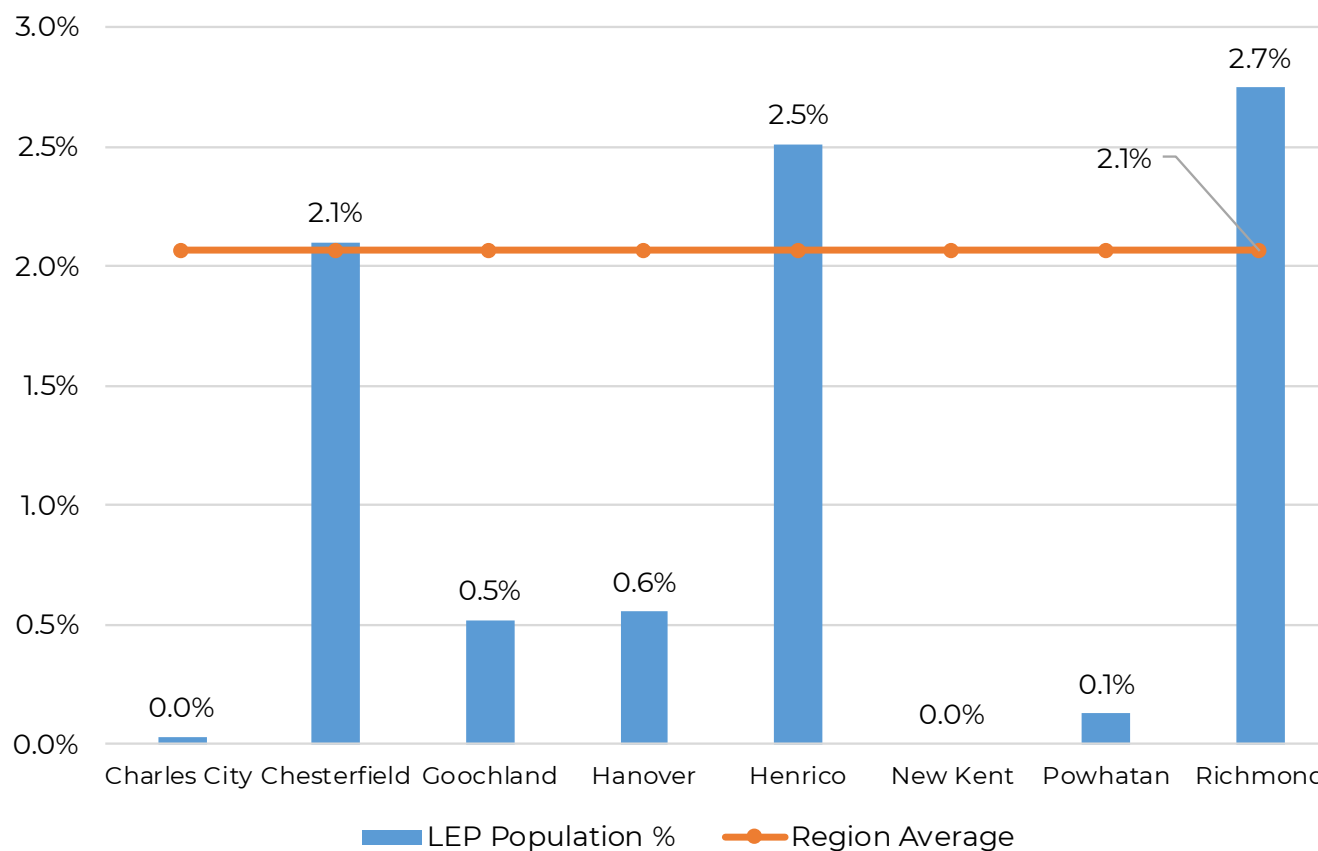
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B16005

Shown in *Exhibit 61*, the LEP population is mainly distributed within the suburbanized area, in the north-west of Henrico County, south of Richmond City, and the northeast of Chesterfield County.

Exhibit 61: Map of Richmond Region Limited English Proficiency (LEP) Population at Census Tract Level 2017
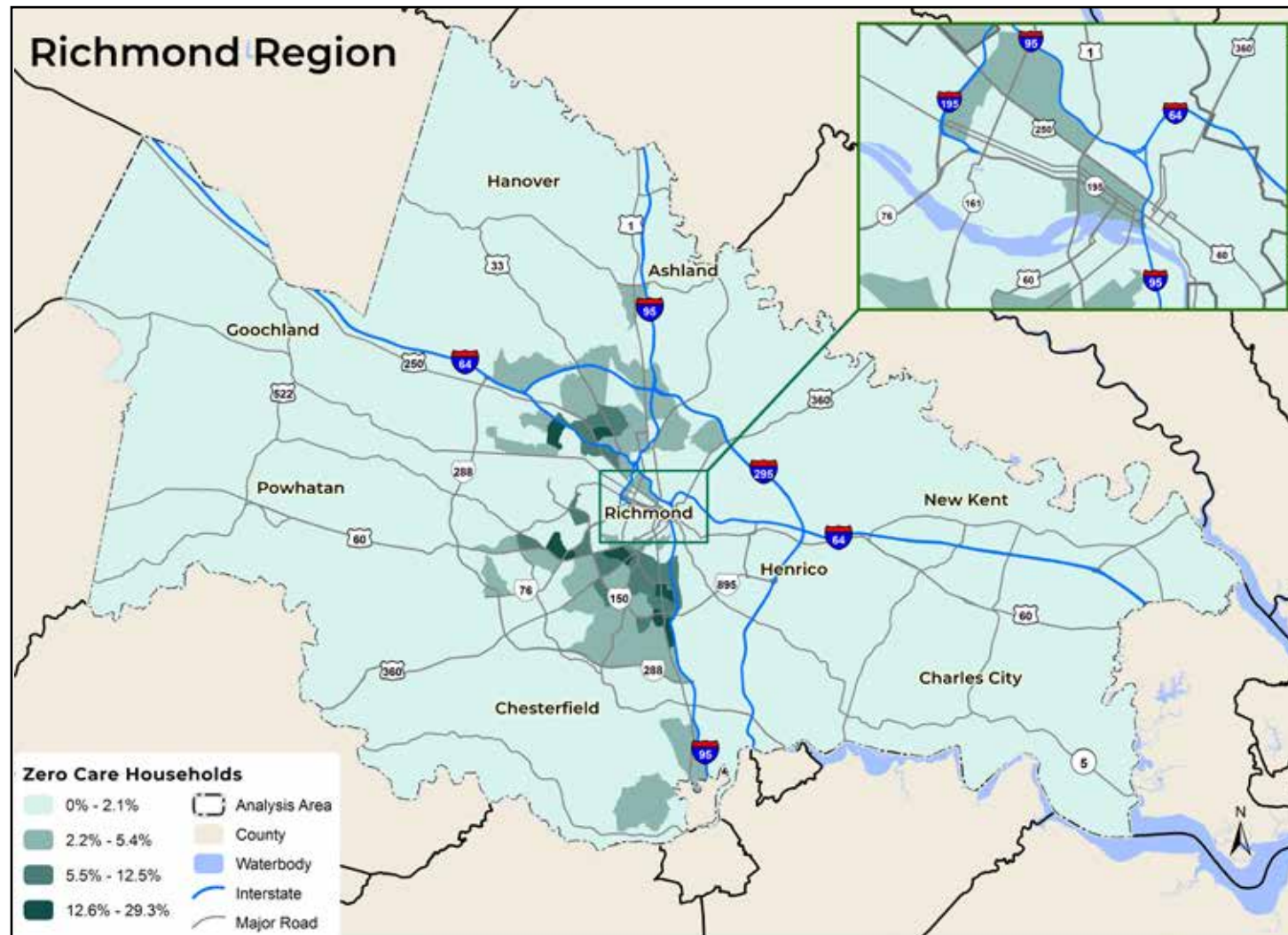
Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Table B16005

6.7   Conclusion

These EJ factors are independently displayed, but together will represent a major consideration for future transportation investments that effectively address inequitable access to jobs, community services, and other destinations throughout the region.   Equity-based project evaluation criterion is being developed as part of the long-range transportation planning process (ConnectRVA 2045) carefully considering all six (6) EJ factors as they relate to each other and provide indications of the degree of impact on potential to benefit specific marginalized populations.

The ConnectRVA 2045 process will also incorporate some degree of alternative scenario planning in order to start to envision different futures. These scenarios will consider adjustments in land uses, density patterns, travel modes, market factors, and future population control totals. The socioeconomic data analysis presented by this report provides a single scenario based on straight-line projections from the prior period, Census data, and locality input. Over the next 18 months the planning process will be aided by the Connect RVA 2045 steering committee and community outreach for input ranging from issue identification to setting priorities, identifying projects and exploring funding strategies.

List of Exhibits