

Virginia Coalition of Housing and Economic Development Researchers

Addressing the Impact of Housing for Virginia's Economy

A REPORT FOR VIRGINIA'S HOUSING POLICY ADVISORY COUNCIL
NOVEMBER 2017

Appendix Report 2:

Housing the Commonwealth's Future Workforce 2014-2024

Jeannette Chapman

Lisa Sturtevant

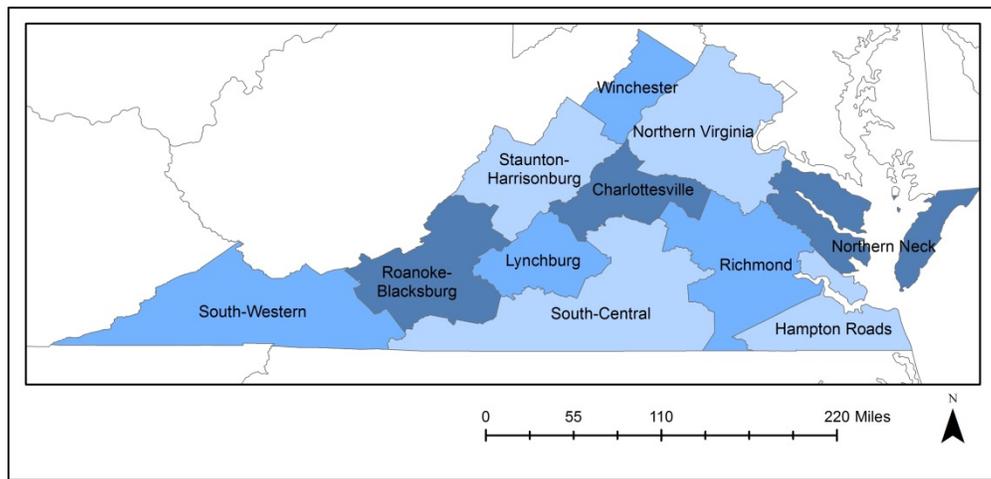
George Mason University

Center for Regional Analysis

Executive Summary

Between 2014 and 2024, the Commonwealth of Virginia will add 357,800 net new jobs. A sufficient supply of housing must be available for these new workers in order to support this level of employment growth—in the right locations, of the right types, and at affordable prices and rents. This analysis determines the amount of housing that will be needed by 2024 to accommodate new workers, as well as the type (single-family and multi-family), tenure (owner and renter), price or rent, and location of this housing. The analysis was conducted separately for 11 regions in Virginia (Figure E1).

Figure E1. Regions for Analysis of Housing Demand



Key Findings

- ✓ The analysis excludes three regions which are forecast to have no job growth between 2014 and 2024: The South-Western region, the South-Central region, and the Northern Neck region. The housing needs in these regions will be tied to factors other than job growth, which this model does not forecast.
- ✓ In the eight regions with job growth between 2014 and 2024, 225,600 new housing units will be needed to accommodate the new households formed by these workers. Just over half of this forecasted growth will be in the Northern Virginia region, with the Hampton Roads and Richmond regions accounting for an additional 36 percent of the total growth.
- ✓ Overall, Virginia will need 132,100 new ownership units and 93,500 rental units to house the new workers. Even though the majority of new households will be owners, the home ownership rate of new households will be lower than that of existing residents. The lowest rates of home ownership among new worker households will be in the Hampton Roads region (49.5 percent), the Roanoke-Blacksburg region (53.9 percent), and the Staunton-Harrisonburg region (54.5 percent).
- ✓ New worker households will be more likely to live in multi-family units than current households. Between 2014 and 2024, new workers will create demand for 60,600 new multi-family units, both ownership and rental. The demand will be concentrated in the Northern Virginia, Hampton Roads and Richmond regions.
- ✓ Of the new households, owners are forecast to have higher incomes relative to renters. However, 14,050 new owner households are forecast to earn less than \$25,000 per year, and can afford only homes that cost less than \$100,000. While these homes may be available in many regions, potential buyers are likely to have a difficult time finding a home that meets their needs in this price range.
- ✓ Based on forecast job growth over the 2014-2024 period, 23,500 new renter households will earn less than \$25,000 per year. These households will be able to afford rents up to \$625 a month. In many regions, these new households will have a difficult time finding housing that is affordable to them, as the market will not provide new rental apartments in this price range.
- ✓ An additional 33,800 new renter households are forecast to earn between \$25,000 and \$49,999, and could afford rents up to \$1,250 a month. These households may have a difficult time finding housing in this price range in the Northern Virginia, Richmond, and Hampton Roads regions.

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Forecasts of Housing Needed to Support Economic Growth

The following housing forecasts calculate new housing units that are needed in each region based on the region's net new workers, and do not include new units that may be needed for replacement workers or non-working households. As a result, these housing demand forecasts should be considered a lower bound of the region's future comprehensive housing needs. Estimates of employment growth by industry sector and by region form the basis of the housing demand forecasts, and assumptions about workers' wages, ages, and household composition are used to forecast the amount, type, and price of housing that each region will need over the 2014-2024 period.

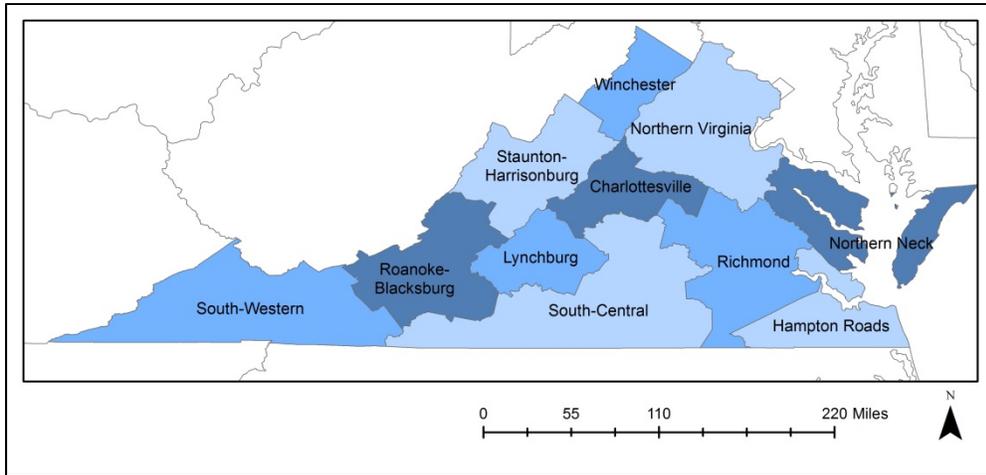
The analysis considers three main questions:

1. **How much additional housing will each region need to accommodate new workers?** The forecasts estimate the total number of housing units that will be needed to accommodate the net new workers between 2014 and 2024.
2. **What types of housing units will be needed?** These forecasts assess the demand for single-family (detached and attached/townhouse) and multi-family housing. The housing type is further divided by tenure (owner/renter), resulting in four mutually exclusive housing types— single-family owner, single-family renter, multi-family owner, and multi-family renter.
3. **What prices and rents will new workers be able to afford?** The forecasts take into account the wages of the new workers and the number of workers per household to determine the demand for housing at different price and rental levels.

I. The Commonwealth of Virginia

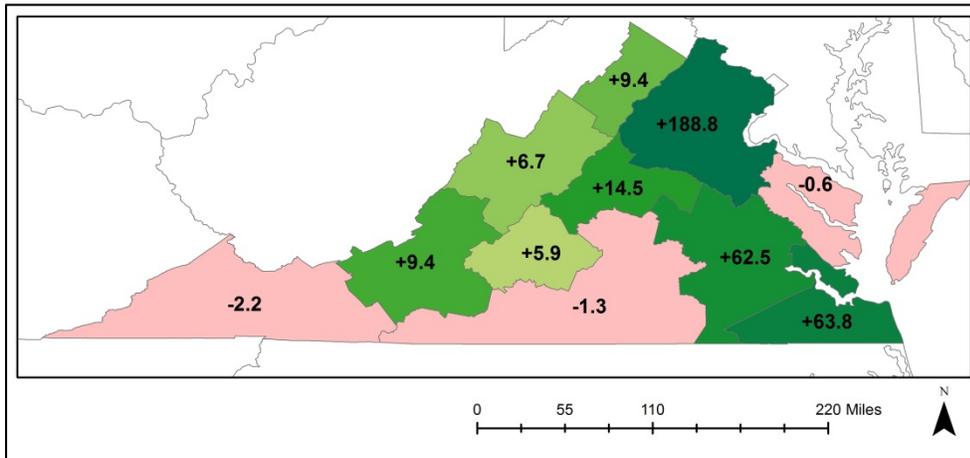
This report provides an analysis of the housing and economic markets for eleven regions of Virginia, which were determined by commuting patterns and metropolitan statistical area boundaries (Figure 1). The model uses projected job growth in each region to predict the net new housing needs within them.

Figure 1. Regions for Analysis of Housing Demand



Overall, the number of jobs in Virginia will increase by 9.2 percent from 2014 to 2024, or by 357,800 jobs. As shown in Figure 2, job growth is forecasted to be uneven through the Commonwealth. The Northern Virginia, Richmond, and Hampton Roads regions will add the largest number of jobs. High growth rates are expected in the Charlottesville region (+12.4 percent) and the Winchester region (+10.0 percent) as well.

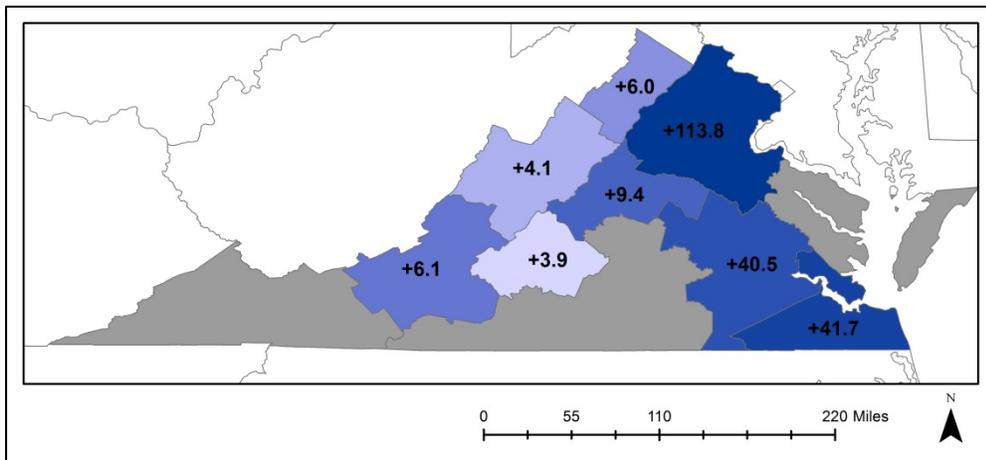
Figure 2. Employment Change, 2014-2024 (jobs, in thousands)



Source: IHS Economics, Hampton Roads Transportation Planning Organization, Richmond Regional Transportation Planning Organization, Metropolitan Washington Council of Governments, GMU Center for Regional Analysis

Three regions are projected to lose jobs: The South-Western region, the South-Central region and the Northern Neck region. The declines in these regions are modest, ranging from 2,200 jobs (-1.6 percent) in the South-Western region to a loss of just 600 jobs in the Northern Neck region (-1.1 percent). While the declines are slight, this model relies *exclusively* on the net increase in jobs to predict the *minimum* increase in housing demand from new worker-households. As these regions are forecast to have no net new workers, they are excluded from this analysis.¹ The demand from net new workers is only one component of housing demand, so this exclusion should not be interpreted to mean that these regions will not need new housing through 2024. These regions will need new housing to accommodate workers replacing retirees, and to accommodate the natural increase from existing residents, as well as new housing to replace older, outdated housing stock. These components are not examined within this report.

Figure 3. Housing Units Needed to Accommodate Net New Workers, 2014-2024 (homes, in thousands)



Source: GMU Center for Regional Analysis

Outside of the regions with job losses, Virginia will need to add 225,600 new homes to accommodate the demand from new workers. Over half of the overall growth will be in the Northern Virginia region, which will need 113,800 new homes. The Hampton Roads region will need 41,700 new units, and the Richmond region will need nearly as many (+40,550 homes). Combined, these three regions account for about 87 percent of the increase in both the number of jobs and the housing need to accommodate the new workers

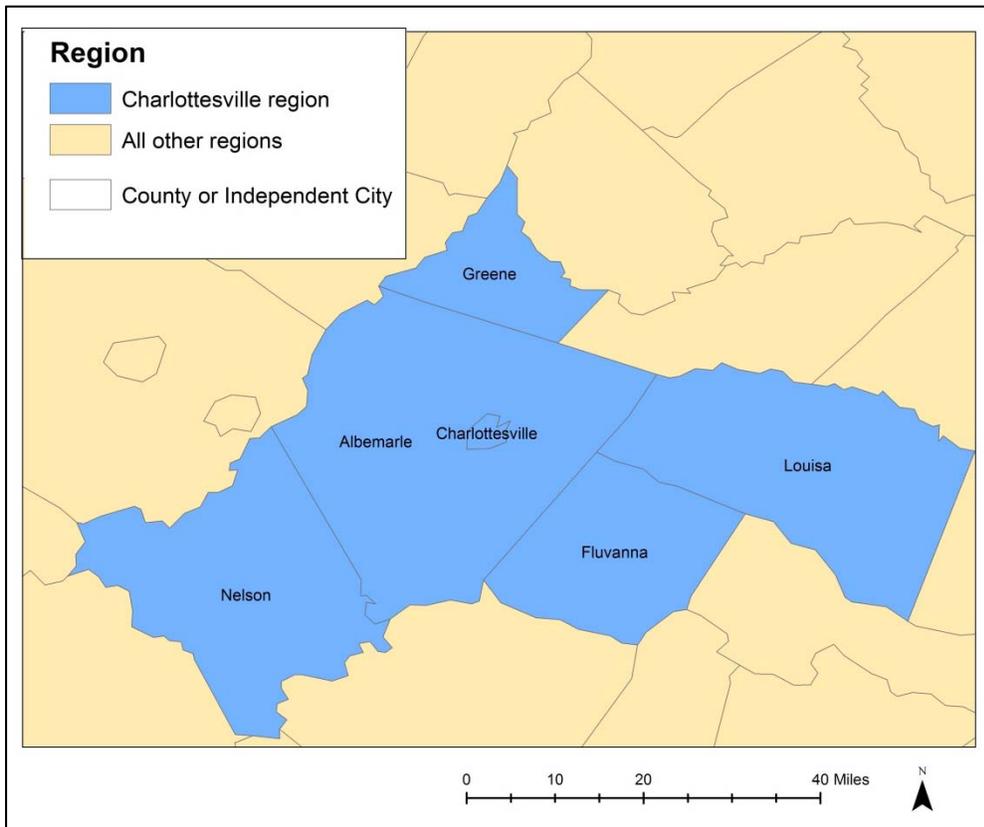
¹ The employment forecasts by sector for the three regions with jobs losses are included in the Appendix.

throughout the Commonwealth. Much of the need is concentrated near these employment-rich metropolitan areas, but significant growth will occur throughout Virginia. The industry sectors with predicted job growth varies by region, as do the incomes of the households formed by new workers.

II. The Charlottesville Region

In this report, the Charlottesville region consists of five counties and the City of Charlottesville, an independent city, as shown in Figure 4. As of 2014, this region had 116,500 jobs and 94,300 households. By 2024, the region will add 14,500 net new jobs (+12.4 percent) and will require another 9,400 housing units to accommodate the workers that will fill them.

Figure 4. Charlottesville Region



Between 2014 and 2024, the Charlottesville region will add 14,500 jobs for an increase of 12.4 percent (Table 1). The Charlottesville region has the second highest growth rate, behind Northern Virginia. The State & Local Government sector accounts for well over a third (37.9 percent) of the increase. This sector includes jobs at public universities, which encompass a wide range of wages. The Construction, Natural Resources & Mining sector has the second highest gains and the fastest growth rate during this time. The Professional &

Business Services and Educational & Health Services sectors also have significant increases, growing by 2,000 and 1,900 jobs, respectively. Two sectors are forecast to decline modestly. The Federal Government, which is forecast to decline throughout the Commonwealth, will decrease by 100 jobs in the Charlottesville region.

Other Services, which includes professional and civic associations, personal services and repair and maintenance, is expected to decrease by 100 jobs as well.

Table 1. Net New Job Growth by Industry, Charlottesville Region

	Jobs	% Increase
Construction, Natural Resources & Mining	2,300	41.3%
Manufacturing	600	11.1%
Transportation, Trade, & Utilities	500	2.9%
Information	500	21.8%
Financial Activities	200	5.3%
Professional & Business Services	2,000	13.8%
Educational & Health Services	1,900	14.6%
Leisure & Hospitality	1,100	8.7%
Other Services	(100)	-2.3%
Federal Government	(100)	-5.7%
State & Local Government	5,500	16.7%
Total	14,500	12.4%

Numbers may not sum due to rounding.

Source: IHS Economics, GMU Center for Regional Analysis

The new workers filling these jobs will be younger, on average, than current workers and will drive the types of households they form as well as the types of housing that they will occupy. These younger households have relatively lower incomes and different housing preferences than existing households.

The households formed by the net new workers are more likely to be renters and somewhat more likely to occupy multi-family houses than existing households. Even so, the majority of the new households are forecast to own single-family homes (Table 2). Of the 9,400 new households that will form in order to fill the new jobs, 5,550 are expected to be single-family owners. Over one-fifth (21.2 percent or 2,000 households) will rent a single-family home, and nearly as many (1,750 households) will rent in a multi-family building.

Table 2. Net New Households by Home Type, Charlottesville Region

	2014-2024 Change		Share of Current Households
	Households	Share of Net New Households	
Owned	5,650	60.1%	63.9%
Single-Family*	5,550	59.3%	62.7%
Multi-Family	100	0.9%	1.3%
Rented	3,750	39.9%	36.1%
Single-Family*	2,000	21.2%	19.5%
Multi-Family	1,750	18.6%	16.6%
Total	9,400	100.0%	100.0%

*Includes both single-family detached and single-family attached

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

Based on typical wages for the types of new jobs coming to the region, many new owner households may not be able to find homes that they can afford. Currently, 72.9 percent of owners live in a home valued at less than \$400,000. But 94.1 percent of new owner households will need a home that costs less than \$400,000 in order for that home to be affordable based on their earnings (Table 3). The largest potential gap will be for households earning between \$25,000 and \$74,999, who will need to find homes that cost between \$100,000 and \$299,999 to be able to afford them.

Table 3. Net New Households by Home Price Affordable to Net New Households, Charlottesville Region (2015 \$s)

	2014-2024 Change		Share of Current Owner Households
	Households	Share of New Owner Households	
Less than \$100,000	900	15.5%	9.7%
\$100,000-199,999	1,800	31.7%	23.6%
\$200,000-299,999	1,800	31.9%	23.6%
\$300,000-399,999	850	15.0%	16.0%
\$400,000+	350	5.9%	27.1%
Total	5,650	100.0%	100.0%

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

Similarly, some new renter households may have difficulty finding apartments at rents affordable to them. As shown in Table 4, about 1,200 new renter households will earn less than \$25,000, and need rental units below \$625 in order to spend less than 30 percent of their income on rent. An additional 1,500 renters will earn between \$25,000 and \$49,999, and can afford rents up to \$1,249.

Table 4. Net New Households by Rent Affordable to Net New Households Charlottesville Region (2015 \$s)

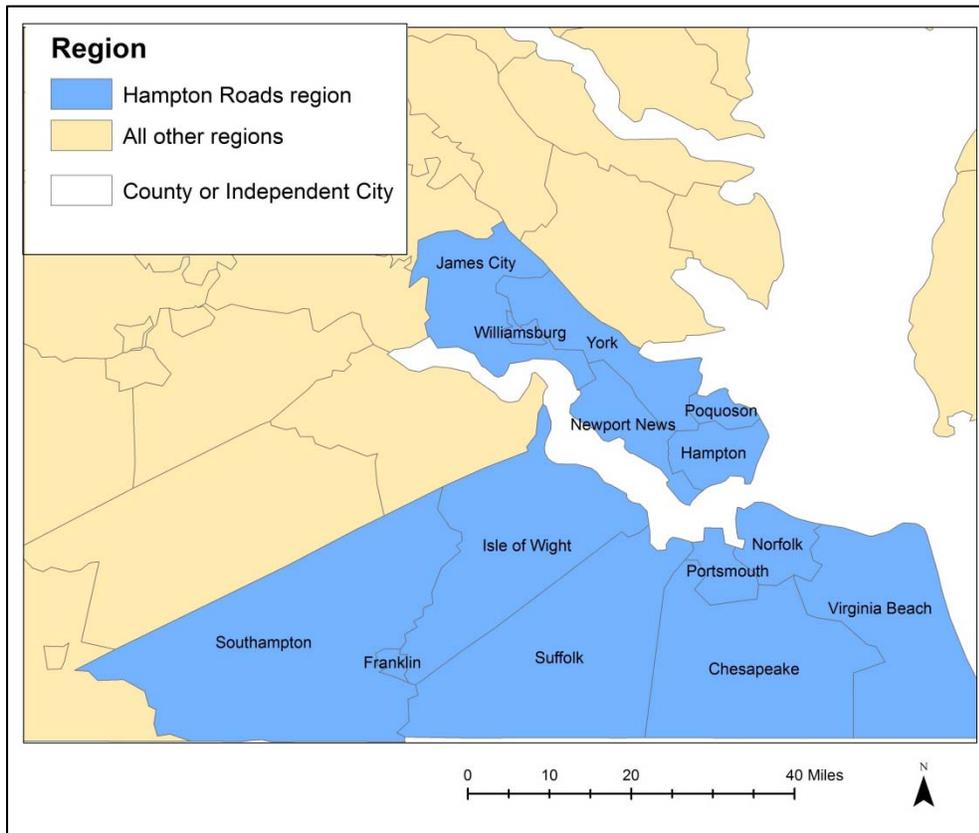
	2014-2024 Change		Share of Current Renter Households
	Households	Share of New Renter Households	
Less than \$625	1,200	32.5%	12.9%
\$625-1,249	1,500	40.2%	56.8%
\$1,250-1,314	700	19.1%	4.0%
\$1,315-1,749	250	6.8%	16.9%
\$1,750+	50	1.5%	9.3%
Total	3,750	100.0%	100.0%

Numbers may not sum due to rounding.
 Source: GMU Center for Regional Analysis

III. The Hampton Roads Region

The Hampton Roads region is composed of four counties and ten independent cities (Figure 5). In 2014, this region had 793,400 jobs and 614,600 households living in the region. By 2024, the region will add 63,800 net new jobs (+8.0 percent) and will require another 41,700 housing units to accommodate the workers to fill them.

Figure 5. Hampton Roads Region



The number of jobs in the Hampton Roads region is forecast to increase by 63,800 jobs, or 8.0 percent, between 2014 and 2024 (Table 5). The increase in the number of jobs is the second largest among Virginia regions. Professional & Business Service sector jobs account for about a third of the increase. These jobs tend to have above average wages, but also include administrative assistants and other support service jobs with more modest wages. The Construction, Natural Resources & Mining sector has the second largest gains, increasing by 12,700 jobs, followed by the Education & Health Services sector, increasing by 12,300 jobs. The

Federal Government is the only sector that is expected to have declines during this period. The decrease of 4,800 Federal jobs will reduce the Federal workforce by nearly ten percent.

Table 5. Net New Job Growth by Industry, Hampton Roads Region

	Jobs	% Increase
Construction, Natural Resources & Mining	12,700	38.2%
Manufacturing	1,700	3.0%
Transportation, Trade, & Utilities	5,100	4.0%
Information	900	8.0%
Financial Activities	2,400	6.5%
Professional & Business Services	21,100	20.4%
Educational & Health Services	12,300	11.9%
Leisure & Hospitality	4,200	5.0%
Other Services	300	0.9%
Federal Government	(4,800)	-9.6%
State & Local Government	6,300	6.1%
Total	63,800	8.0%

Numbers may not sum due to rounding.

Source: IHS Economics, Hampton Roads Transportation Planning Organization, GMU Center for Regional Analysis

Overall, the new workers filling these jobs will be younger than current workers. These workers may be relocating to Hampton Roads for a new job, or they may have grown up in the region and will be starting their careers. The age of these new workers drives the types of households they form as well as the types of housing that they will occupy. These younger households have relatively lower incomes and different housing preferences than existing households.

The households formed by the net new workers are far more likely to be renters or live in multi-family houses than the existing households (Table 6). Over half of the 41,700 new households will rent, including 11,850 households in multi-family units. Only 41.2 percent of current households are renters, with smaller shares of both single-family and multi-family renters than the new worker households. About 20,000 new households will want single-family ownership units, while relatively few will own a unit in a multi-family building.

Table 6. Net New Households by Home Type, Hampton Roads Region

	2014-2024 Change		Share of Current Households
	Households	Share of Net New Households	
Owned	20,600	49.5%	58.8%
Single-Family*	20,000	47.9%	57.0%
Multi-Family	650	1.5%	1.8%
Rented	21,050	50.5%	41.2%
Single-Family*	9,200	22.1%	17.1%
Multi-Family	11,850	28.5%	24.1%
Total	41,700	100.0%	100.0%

*Includes both single-family detached and single-family attached

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

The largest number of new owner households will earn between \$25,000 and \$49,999, and will be able to afford homes priced between \$100,000 and \$199,999 (Table 7). While some of these new households may have difficulty finding a unit at this price, a similar share of current households have been able to do so, which indicates that any mismatches will be minimal. However, 2,550 new owner households will be able to afford only homes that cost less than \$100,000, and inventory in this price range may be increasingly difficult to find.

Table 7. Net New Households by Home Price Affordable to Net New Households, Hampton Roads Region (2015 \$s)

	2014-2024 Change		Share of Current Owner Households
	Households	Share of New Owner Households	
Less than \$100,000	2,550	12.3%	9.3%
\$100,000-199,999	7,250	35.2%	30.1%
\$200,000-299,999	6,650	32.1%	29.2%
\$300,000-399,999	2,850	13.8%	16.1%
\$400,000+	1,350	6.6%	15.3%
Total	20,600	100.0%	100.0%

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

As shown in Table 8, the majority of new renters will earn over \$25,000, and will be likely to find apartments that will suit their needs based on the current distribution of rents. A gap is likely to increase for homes renting for less than \$625 per month, which would be affordable to households earning less than \$25,000. Over a quarter (26.7 percent or 5,600 households) of the new renter households formed by the new workers

will need rents of less than \$625. Households that are unable to find these units will spend more than 30 percent of their household income on rent.

Table 8. Net New Households by Rent Affordable to Net New Households, Hampton Roads Region (2015 \$s)

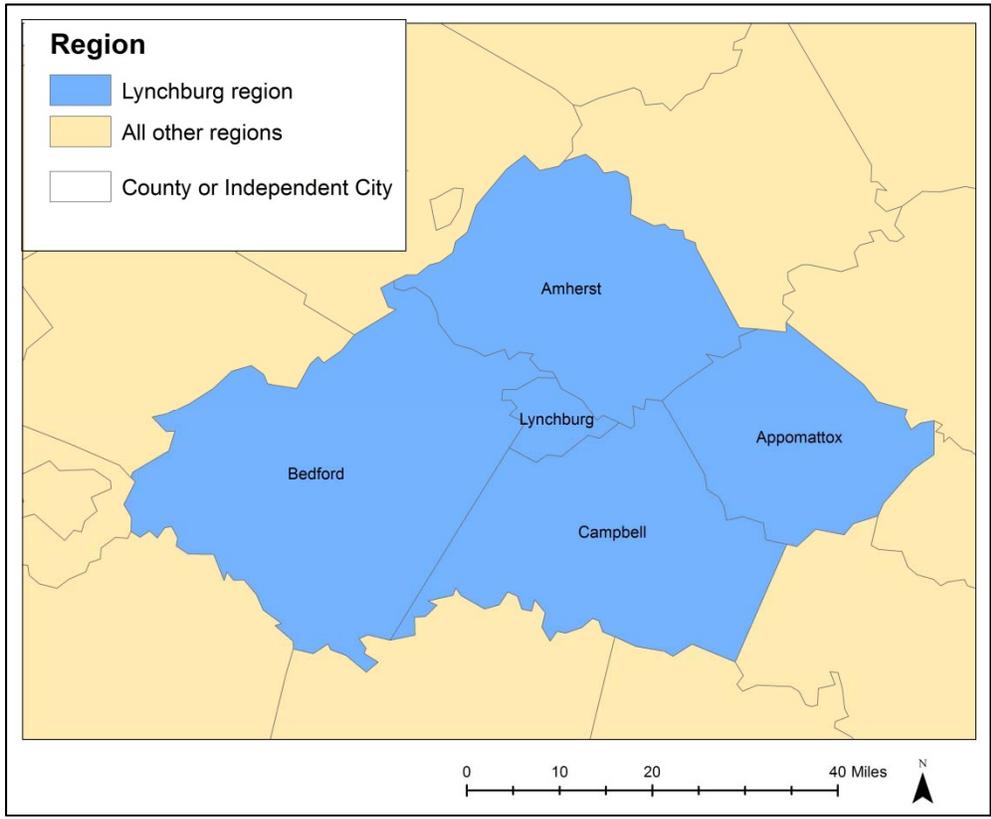
	2014-2024 Change		Share of Current Renter Households
	Households	Share of New Renter Households	
Less than \$625	5,600	26.7%	9.9%
\$625-1,249	9,850	46.7%	59.3%
\$1,250-1,314	4,450	21.1%	4.8%
\$1,315-1,749	950	4.5%	17.1%
\$1,750+	200	1.1%	8.9%
Total	21,050	100.0%	100.0%

Numbers may not sum due to rounding.
Source: GMU Center for Regional Analysis

IV. The Lynchburg Region

As shown in Figure 6, the Lynchburg region includes four counties and the City of Lynchburg. In 2014, this region had 103,600 jobs and 98,400 households. By 2024, the region will add 5,900 net new jobs (+5.6 percent) and will require another 3,950 housing units to accommodate the workers to fill them.

Figure 6. Lynchburg Region



By 2024, the Lynchburg region is forecast to have 109,500 jobs, an increase of 5,900 from 2014 (Table 9). Growth is concentrated in three sectors: Educational & Health Services (+1,500 jobs), Construction, Natural Resources & Mining (+1,300) and Leisure & Hospitality (+1,300). Three sectors will have modest declines, including the Federal Government and Financial Activities, which tend to have higher wages. The largest gains are in sectors with low- to mid-level wages.

Table 9. Net New Job Growth by Industry, Lynchburg Region

	Jobs	% Increase
Construction, Natural Resources & Mining	1,300	22.1%
Manufacturing	300	2.2%
Transportation, Trade, & Utilities	600	2.9%
Information	100	15.1%
Financial Activities	-25 to 0	-0.1%
Professional & Business Services	600	4.8%
Educational & Health Services	1,500	8.5%
Leisure & Hospitality	1,200	13.3%
Other Services	(400)	-8.8%
Federal Government	-25 to 0	-7.0%
State & Local Government	700	5.1%
Total	5,900	5.6%

Numbers may not sum due to rounding.

Source: IHS Economics, GMU Center for Regional Analysis

Overall, the new workers filling these jobs will be younger than current workers. These workers may be recent movers, perhaps staying after college, or may have grown up in the Lynchburg area and will be starting their careers. The age of these new workers drives the types of households they form as well as the types of housing that they will occupy. These younger households have relatively lower incomes and different housing preferences than existing households.

The households formed by the net new workers are far more likely to be renters than the existing households. As shown in Table 10, 3,950 new households will be formed by the workers filling net new jobs. Of these households, 1,650 are projected to be renters, or about 41.3 percent of the total. Currently, just 29.1 percent of the households in the Lynchburg region rent. About 1,000 of these new renter households will rent single-family units and the remaining 650 will demand multi-family units. Although the ownership rate of the new households is lower than among existing households, about 2,300 new worker households are likely to want single-family ownership units.

Table 10. Net New Households by Home Type, Lynchburg Region

	2014-2024 Change		Share of Current Households
	Households	Share of Net New Households	
Owned	2,300	58.7%	70.9%
Single-Family*	2,300	58.1%	70.2%
Multi-Family	<25	0.6%	0.7%
Rented	1,650	41.3%	29.1%
Single-Family*	1,000	24.9%	15.7%
Multi-Family	650	16.5%	13.4%
Total	3,950	100.0%	100.0%

*Includes both single-family detached and single-family attached
Numbers may not sum due to rounding.
Source: GMU Center for Regional Analysis

The largest share of new owner households will earn less than \$25,000, and will only be able to afford a home that costs less than \$100,000 (Table 11). Some of these 950 households may not be able to find homes at this price point. Currently, about 17,800 households own a home valued at less than \$100,000. Over the next decade, the turn-over in these units will create some opportunities for the new households to buy, but it will be less likely that new units will be created at this price point.

Table 11. Net New Households by Home Price Affordable to Net New Households, Lynchburg Region (2015 \$s)

	2014-2024 Change		Share of Current Owner Households
	Households	Share of New Owner Households	
Less than \$100,000	950	41.5%	25.5%
\$100,000-199,999	650	28.0%	39.0%
\$200,000-299,999	500	22.3%	19.9%
\$300,000-399,999	150	6.4%	6.8%
\$400,000+	50	1.9%	8.8%
Total	2,300	100.0%	100.0%

Numbers may not sum due to rounding.
Source: GMU Center for Regional Analysis

Likewise, the vast majority of new renter households will earn less than \$25,000 (Table 12). These 1,150 new renter households will be able to afford rents under \$625, and may have difficulty finding units. Currently, about 7,800 households rent for less than \$625, and the nearly 15 percent increase in demand for this product may be difficult to meet through new construction.

Table 12. Net New Households by Rent Affordable to Net New Households, Lynchburg Virginia Region (2015 \$s)

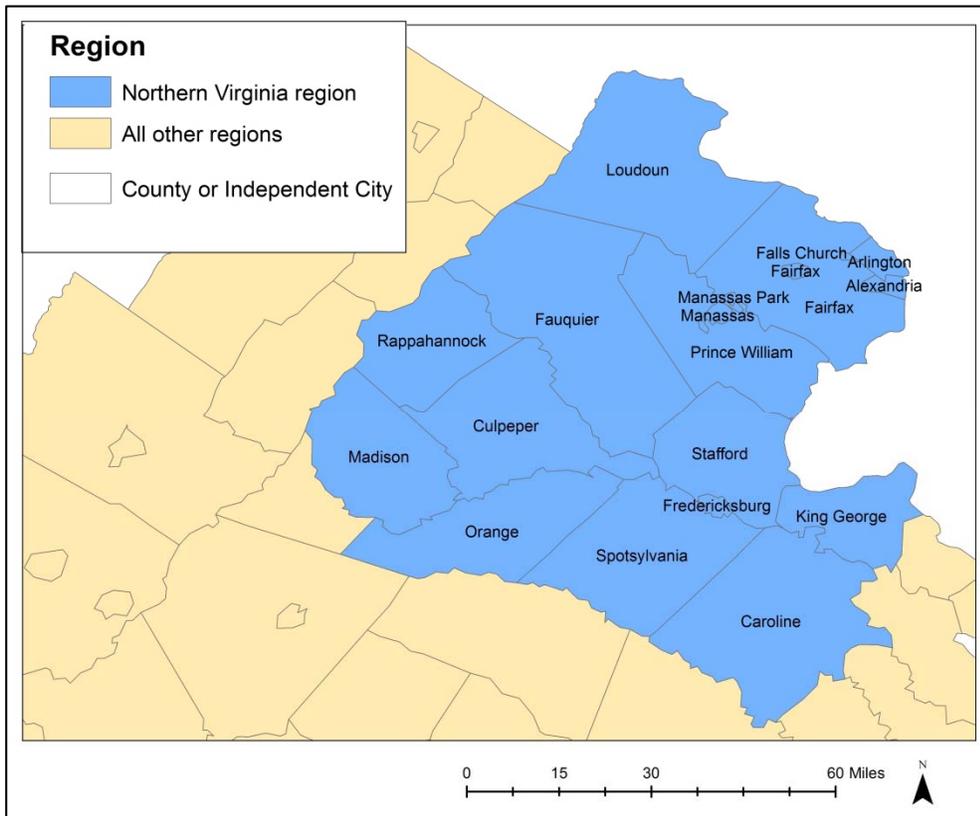
	2014-2024 Change		Share of Current Renter Households
	Households	Share of New Renter Households	
Less than \$625	1,150	70.4%	29.3%
\$625-1,249	350	20.6%	63.9%
\$1,250-1,314	100	7.1%	0.6%
\$1,315-1,749	50	1.7%	3.7%
\$1,750+	<25	0.2%	2.5%
Total	1,650	100.0%	100.0%

Numbers may not sum due to rounding.
 Source: GMU Center for Regional Analysis

V. The Northern Virginia Region

The Northern Virginia region includes 12 counties and six independent cities (Figure 7). In 2014, 1.4 million jobs were located in Northern Virginia and the region had over one million households. By 2024, the region will add 188,800 net new jobs (+13.3 percent) and will require another 113,850 housing units to accommodate the workers to fill them.

Figure 7. Northern Virginia Region



The Northern Virginia region is forecast to add 188,800 jobs, an increase of 13.3 percent. Over half the gains are in the Professional & Business Service sector, which includes a high share of well-paying technical jobs. The second largest increase is in the Education & Health Services sector (+28,900), followed by the Construction, Natural Resource & Mining sector (+22,800). Both the Federal Government and the Financial Activities sectors, which tend to command high wages, are projected to decline over this period. Northern Virginia is forecast to gain the most jobs and have the highest percentage increase of all Virginia regions between 2014 and 2024.

Table 13. Net New Job Growth by Industry, Northern Virginia Region

	Jobs	% Increase
Construction, Natural Resources & Mining	22,800	32.9%
Manufacturing	(900)	-3.6%
Transportation, Trade, & Utilities	7,100	3.4%
Information	4,800	11.5%
Financial Activities	(3,000)	-4.3%
Professional & Business Services	108,400	28.6%
Educational & Health Services	28,900	19.4%
Leisure & Hospitality	15,600	11.6%
Other Services	(700)	-0.9%
Federal Government	(9,800)	-10.9%
State & Local Government	14,900	9.9%
Total	188,800	13.3%

Numbers may not sum due to rounding.

Source: IHS Economics, Metropolitan Washington Council of Governments, GMU Center for Regional Analysis

Overall, the new workers filling these jobs will be younger than current workers. These workers may be relocating to the Northern Virginia region for a new job, or have grown up in the region and will be starting their careers. The age of these new workers drives the types of households they form as well as the types of housing that they will occupy. These younger households have relatively lower incomes and different housing preferences than existing households.

As shown in Table 14, the households formed by the net new workers are somewhat more likely to be renters than existing households. Despite the increased share of renters, the majority of net new households will be owners. Of the 113,850 new households coming to the region to fill net new jobs, 64,800 households will own single-family units. The second largest increase will be from multi-family renters. Nearly a quarter of new households will rent in multi-family units, requiring an additional 27,400 apartments within the Northern Virginia region.

Table 14. Net New Households by Home Type, Northern Virginia Region

	2014-2024 Change		Share of Current Households
	Households	Share of Net New Households	
Owned	70,600	62.0%	66.2%
Single-Family*	64,800	56.9%	60.8%
Multi-Family	5,750	5.1%	5.4%
Rented	43,250	38.0%	33.8%
Single-Family*	15,850	13.9%	11.8%
Multi-Family	27,400	24.1%	22.0%
Total	113,850	100.0%	100.0%

*Includes both single-family detached and single-family attached

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

As shown in Table 15, the new owner households forecast to come to the Northern Virginia will have relatively high incomes, but 16,550 new owner households will earn less than \$50,000 and will be able to afford only homes that cost less than \$200,000. Relatively few homes are currently valued in this range, and developing new products in this price range would be very difficult. These new owners will have great difficulty finding homes that are affordable to them, and many will end up spending more than 30 percent of their income on their mortgage.

Table 15. Net New Households by Home Price Affordable to Net New Households, Northern Virginia Region (2015 \$s)

	2014-2024 Change		Share of Current Owner Households
	Households	Share of New Owner Households	
Less than \$100,000	5,600	8.0%	3.9%
\$100,000-199,999	10,950	15.5%	8.1%
\$200,000-299,999	7,450	10.6%	15.3%
\$300,000-399,999	15,250	21.6%	18.5%
\$400,000+	31,300	44.4%	54.2%
Total	70,600	100.0%	100.0%

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

Currently, only 4.8 percent of all renters in Northern Virginia spend less than \$625 a month on rent (Table 16). Nearly one fifth (18.3 percent) of new renter households will be able to afford only those homes that rent for less than \$625. These 7,900 new households will have a difficult time finding an affordable unit.

Table 16. Net New Households by Rent Affordable to Net New Households, Northern Virginia Region (2015 \$s)

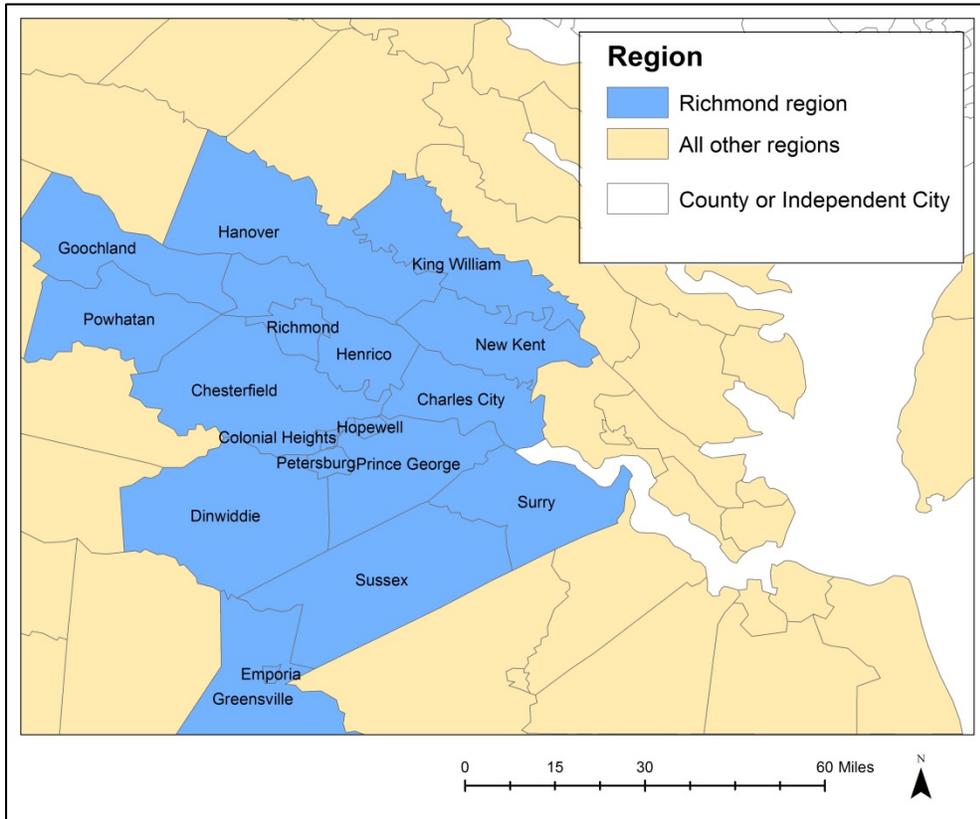
	2014-2024 Change		Share of Current Renter Households
	Households	Share of New Renter Households	
Less than \$625	7,900	18.3%	4.8%
\$625-1,249	12,250	28.3%	17.1%
\$1,250-1,314	6,800	15.7%	4.5%
\$1,315-1,749	9,350	21.6%	31.1%
\$1,750+	6,950	16.1%	42.6%
Total	43,250	100.0%	100.0%

Numbers may not sum due to rounding.
 Source: GMU Center for Regional Analysis

VI. The Richmond Region

The Richmond region includes 13 counties and five independent cities, including the City of Richmond (Figure 8). In 2014, this region had 644,500 jobs and 466,300 households. By 2024, the region will add 62,500 net new jobs (+9.7 percent) and will require another 40,550 housing units to accommodate the workers to fill them.

Figure 8. Richmond Region



By 2024, the Richmond region is expected to have 707,000 jobs. Compared to 2014, this is an increase of 9.7 percent, or 62,500 jobs. As shown in Table 17, the Professional & Business Services sector is forecast to lead the growth, adding 18,100 jobs, which includes both lower-paying support service and higher-paying technical positions. Construction, Natural Resources & Mining sector jobs will increase by 15,200, the fastest growing sector during this period. The Federal Government and Financial Activities sectors are expected to decline in the Richmond region. These two sectors are forecast to decline throughout most of the Commonwealth.

Table 17. Net New Job Growth by Industry, Richmond Region

	Jobs	% Increase
Construction, Natural Resources & Mining	15,200	46.2%
Manufacturing	100	0.4%
Transportation, Trade, & Utilities	6,000	5.0%
Information	900	11.0%
Financial Activities	(300)	-0.6%
Professional & Business Services	18,100	18.2%
Educational & Health Services	12,000	12.9%
Leisure & Hospitality	4,100	6.9%
Other Services	1,000	3.3%
Federal Government	(1,900)	-12.1%
State & Local Government	7,100	7.6%
Total	62,500	9.7%

Numbers may not sum due to rounding.

Source: IHS Economics, Richmond Regional Transportation Planning Organization, GMU Center for Regional Analysis

Overall, the new workers filling these jobs will be younger than current workers. These workers may be relocating for a job in the Richmond area, or may have grown up in the region and will be starting their careers. The age of these new workers drives the types of households they form as well as the types of housing that they will occupy. Younger households will have relatively lower incomes and different housing preferences than existing households.

The households formed by the net new workers are more likely to be renters than the existing households (Table 18). Over 40 percent of the 40,500 new households formed by new workers in the region will be renters. Currently, only 35.7 percent of households rent. Most of the new renter households will occupy multi-family units (8,950 households), but there will be a relatively large increase in the number of single-family renters. Single-family ownership will remain the largest component of the housing market in the Richmond region, with 23,400 new households expected to own single-family detached units.

Table 18. Net New Households by Home Type, Richmond Region

	2014-2024 Change		Share of Current Households
	Households	Share of Net New Households	
Owned	23,800	58.7%	64.3%
Single-Family*	23,400	57.7%	63.2%
Multi-Family	400	0.9%	1.1%
Rented	16,750	41.3%	35.7%
Single-Family*	7,800	19.3%	15.7%
Multi-Family	8,950	22.1%	20.1%
Total	40,550	100.0%	100.0%

*Includes both single-family detached and single-family attached

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

The homes that would be affordable to the new owner households that will come to Richmond to fill new jobs broadly mirror the current housing stock (Table 19). New owners will be somewhat more likely to demand homes priced between \$300,000 and \$399,999 than existing households, but the difference is slight.

Table 19. Net New Households by Home Price Affordable to Net New Households, Richmond Region (2015 \$s)

	2014-2024 Change		Share of Current Owner Households
	Households	Share of New Owner Households	
Less than \$100,000	2,150	9.0%	10.6%
\$100,000-199,999	8,850	37.1%	35.7%
\$200,000-299,999	6,700	28.1%	27.3%
\$300,000-399,999	4,600	19.4%	13.4%
\$400,000+	1,550	6.4%	13.0%
Total	23,800	100.0%	100.0%

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

As shown in Table 20, the new renter households will have more difficulty finding housing that is affordable to them. A quarter of new renters will be able to afford a maximum of \$625 in rent, but only 12.2 percent of current units rent in that range. Similar to other markets, new product in this price range may be difficult to build, forcing many of the new households to pay more than 30 percent of their income on rent.

Table 20. Net New Households by Rent Affordable to Net New Households, Richmond Region (2015 \$s)

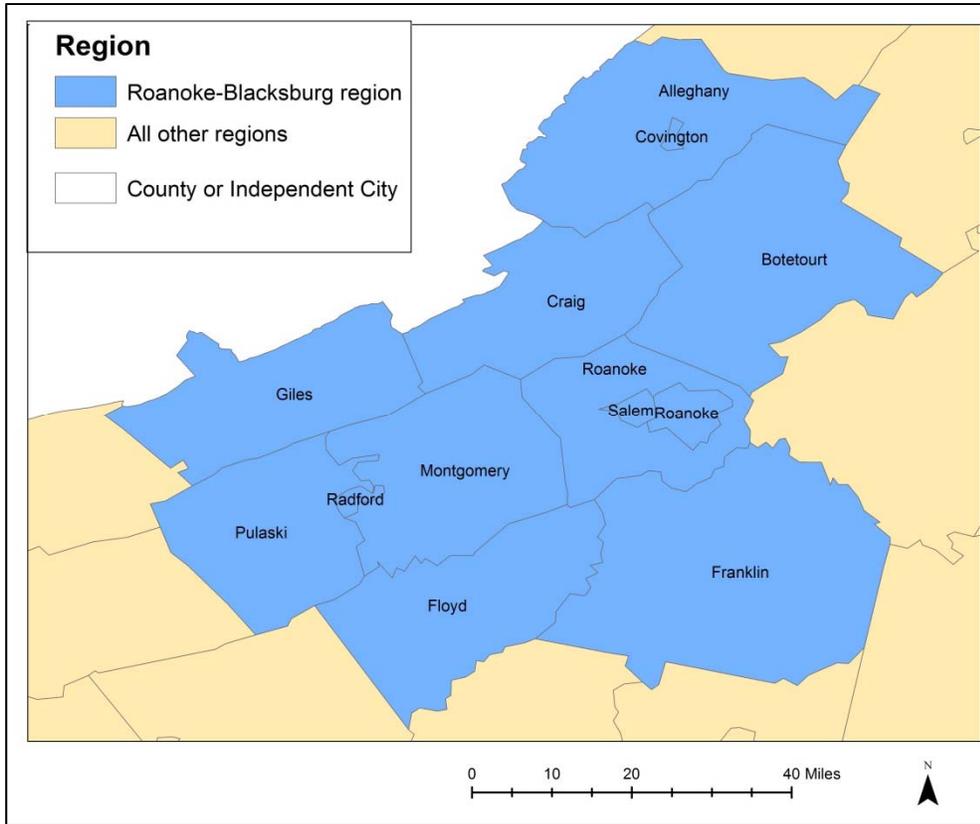
	2014-2024 Change		Share of Current Renter Households
	Households	Share of New Renter Households	
Less than \$625	4,200	25.2%	12.2%
\$625-1,249	7,750	46.3%	62.3%
\$1,250-1,314	3,350	19.9%	4.6%
\$1,315-1,749	1,200	7.1%	16.6%
\$1,750+	250	1.5%	4.3%
Total	16,750	100.0%	100.0%

Numbers may not sum due to rounding.
 Source: GMU Center for Regional Analysis

VII. The Roanoke-Blacksburg Region

As shown in Figure 9, the Roanoke-Blacksburg region includes nine counties and four independent cities. In 2014, this region had 245,900 jobs and 205,800 households. By 2024, the region will add 9,400 net new jobs (+3.8 percent) and will require another 6,100 housing units to accommodate the workers to fill them.

Figure 9. Roanoke-Blacksburg Region



Between 2014 and 2024, the number of jobs in the Roanoke-Blacksburg region is forecast to increase by 3.8 percent, or by 9,400 jobs (Table 21). Nearly a third of the increase is from the Construction, Natural Resources & Mining sector, which is forecast to add 3,000 jobs. The Educational & Health Services sector will increase by 2,700 jobs, while the Professional & Business Services sector will rise by 2,100 jobs. Four sectors in the region are forecast to decline. The largest decrease is in the Other Services sector (-1,100), which includes a broad range of firms providing personal services, repair and maintenance, and business and civic associations. The declines are expected to be less severe in the Federal Government (-600 jobs), Financial Activities (-200 jobs), and Transportation, Trade and Utilities (-200 jobs) sectors.

Table 21. Net New Job Growth by Industry, Roanoke-Blacksburg Region

	Jobs	% Increase
Construction, Natural Resources & Mining	3,000	27.3%
Manufacturing	1,100	3.7%
Transportation, Trade, & Utilities	(200)	-0.4%
Information	500	21.2%
Financial Activities	(200)	-2.1%
Professional & Business Services	2,100	7.5%
Educational & Health Services	2,700	7.7%
Leisure & Hospitality	700	3.0%
Other Services	(1,100)	-10.9%
Federal Government	(600)	-12.7%
State & Local Government	1,600	3.5%
Total	9,400	3.8%

Numbers may not sum due to rounding.

Source: IHS Economics, GMU Center for Regional Analysis

The new workers filling these jobs will be younger, on average, than current workers. These workers will either move to the region, perhaps staying after college, or have grown up in the area and will be starting their career. The age of these new workers drives the types of households they form as well as the types of housing that they will occupy. These younger households have relatively lower incomes and different housing preferences than existing households.

The households formed by the net new workers are significantly more likely to be renters and to live in multi-family houses than the existing households. As shown in Table 22, almost half (46.1 percent) of the 6,100 new households will be renters. Just over a third (34.3 percent) of current households rent. Over 1,500 new households will rent in multi-family units, while the remaining 1,300 renters will occupy single-family homes. The majority of new households will be owners, although the overall ownership rate of these new households is lower than existing households. Nearly all new owner households will prefer single-family homes, and very few will be in multi-family units.

Table 22. Net New Households by Home Type, Roanoke-Blacksburg Region

	2014-2024 Change		Share of Current Households
	Households	Share of Net New Households	
Owned			
Single-Family*	3,300	53.9%	65.7%
Multi-Family	3,250	53.2%	65.0%
	50	0.7%	0.7%
Rented			
Single-Family*	2,800	46.1%	34.3%
	1,300	21.1%	16.4%

Multi-Family	1,550	25.0%	18.0%
Total	6,100	100.0%	100.0%

*Includes both single-family detached and single-family attached
 Numbers may not sum due to rounding.
 Source: GMU Center for Regional Analysis

As shown in Table 23, the distribution of homes affordable to new households is similar to the current distribution. The demand for homes that cost less than \$100,000 will be slightly greater, as will the demand for homes priced between \$300,000 and \$400,000.

Table 23. Net New Households by Home Price Affordable to Net New Households, Roanoke-Blacksburg Region (2015 \$s)

	2014-2024 Change		Share of Current Owner Households
	Households	Share of New Owner Households	
Less than \$100,000	850	26.0%	22.8%
\$100,000-199,999	900	26.9%	40.0%
\$200,000-299,999	900	27.3%	18.6%
\$300,000-399,999	600	18.8%	9.4%
\$400,000+	<25	1.0%	9.3%
Total	3,300	100.0%	100.0%

Numbers may not sum due to rounding.
 Source: GMU Center for Regional Analysis

The new renter households will have lower incomes than the new owners, and likely will have more difficulty finding homes they can afford (Table 24). Over half of the new renters will earn less than \$25,000 and will be able to afford units that rent for less than \$625. These 1,650 new renters will likely have difficulty finding a unit that is affordable to them.

Table 24. Net New Households by Rent Affordable to Net New Households, Roanoke-Blacksburg Region (2015 \$s)

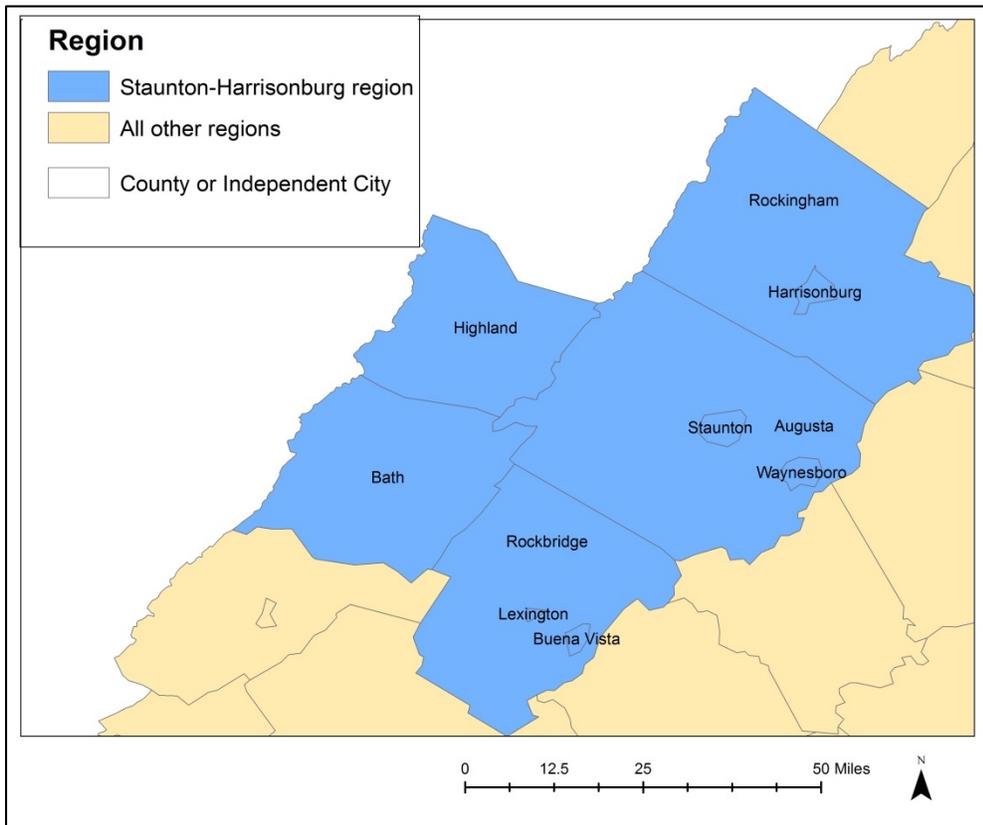
	2014-2024 Change		Share of Current Renter Households
	Households	Share of New Renter Households	
Less than \$625	1,650	59.0%	27.9%
\$625-1,249	750	25.7%	60.8%
\$1,250-1,314	300	10.4%	1.8%
\$1,315-1,749	100	4.2%	6.7%
\$1,750+	<25	0.6%	2.8%
Total	2,800	100.0%	100.0%

Numbers may not sum due to rounding.
 Source: GMU Center for Regional Analysis

VIII. The Staunton-Harrisonburg Region

The Staunton-Harrisonburg region includes five counties and five independent cities, including the cities of Staunton and Harrisonburg (Figure 10). In 2014, this region had 130,100 jobs and 112,200 households. By 2024, the region will add 6,700 net new jobs (+5.2 percent) and will require another 4,050 housing units to accommodate the workers to fill them.

Figure 10. Staunton-Harrisonburg Region



As shown in Table 25, the number of jobs in the Staunton-Harrisonburg region is forecast to increase by 6,700, or 5.2 percent. The gains are driven by the Construction, Natural Resources & Mining (+2,600 jobs) and the Educational & Health Services (+1,800 jobs) sectors. Combined, these two sectors account for over 65 percent of job growth. Three sectors are forecast to have fewer jobs in 2024 than in 2014. The largest decrease is in the Manufacturing sector (-500 jobs). Other Services, including personal services, repair and maintenance and business and civic associations, will decrease by 300 jobs. Employment in the Financial Activities sector will decrease slightly, falling by 100 jobs.

Table 25. Net New Job Growth by Industry, Staunton-Harrisonburg Region

	Jobs	% Increase
Construction, Natural Resources & Mining	2,600	37.0%
Manufacturing	(500)	-2.8%
Transportation, Trade, & Utilities	800	3.2%
Information	400	21.4%
Financial Activities	(100)	-1.3%
Professional & Business Services	800	9.3%
Educational & Health Services	1,800	9.2%
Leisure & Hospitality	400	2.6%
Other Services	(300)	-8.3%
Federal Government	<25	0.4%
State & Local Government	700	3.2%
Total	6,700	5.2%

Numbers may not sum due to rounding.

Source: IHS Economics, GMU Center for Regional Analysis

Overall, the new workers filling these jobs will be younger than current workers. These workers will either move to the region, perhaps staying after college, or have grown up in the region and are beginning their careers. The age of these new workers drives the types of households they form as well as the types of housing that they will occupy. These younger households have relatively lower incomes and different housing preferences than existing households.

The households formed by the net new workers are far more likely to be renters and somewhat more likely to occupy multi-family houses than the existing households. Of the 4,050 new households needed to fill the new jobs, about 1,850, or 45.6 percent, will be renters (Table 26). Only one-third (33.8 percent) of current households are renters. The largest increase will be in single-family renters, adding 1,100 new households by 2024. Single-family ownership will continue to be the largest share of housing units, although the ownership rate among the new households is expected to be lower than among existing households.

Table 26. Net New Households by Home Type, Staunton-Harrisonburg Region

	2014-2024 Change		Share of Current Households
	Households	Share of Net New Households	
Owned	2,200	54.5%	66.2%
Single-Family*	2,200	53.8%	65.5%
Multi-Family	50	0.7%	0.8%
Rented	1,850	45.5%	33.8%
Single-Family*	1,100	27.6%	18.9%
Multi-Family	750	17.9%	14.8%
Total	4,050	100.0%	100.0%

*Includes both single-family detached and single-family attached

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

As shown in Table 27, most new owner households are likely to earn less than \$50,000, and can afford a home that costs up to \$200,000. Some of these new households may have difficulty finding an affordable unit that suits their needs, but the projected housing demand generally reflects the current housing stock.

Table 27. Net New Households by Home Price Affordable to Net New Households, Staunton-Harrisonburg Region (2015 \$s)

	2014-2024 Change		Share of Current Owner Households
	Households	Share of New Owner Households	
Less than \$100,000	500	24.0%	18.1%
\$100,000-199,999	650	29.7%	35.4%
\$200,000-299,999	700	32.5%	26.2%
\$300,000-399,999	200	10.4%	11.9%
\$400,000+	100	3.4%	8.4%
Total	2,200	100.0%	100.0%

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

New renter households will have more difficulty finding units that are affordable to them compared to the new owners. About half will earn less than \$25,000, and could afford rents up to \$625. Currently, about a quarter of existing units rent in this range, and the increase in demand may be hard to meet through new construction.

Table 28. Net New Households by Rent Affordable to Net New Households, Staunton-Harrisonburg Region (2015 \$s)

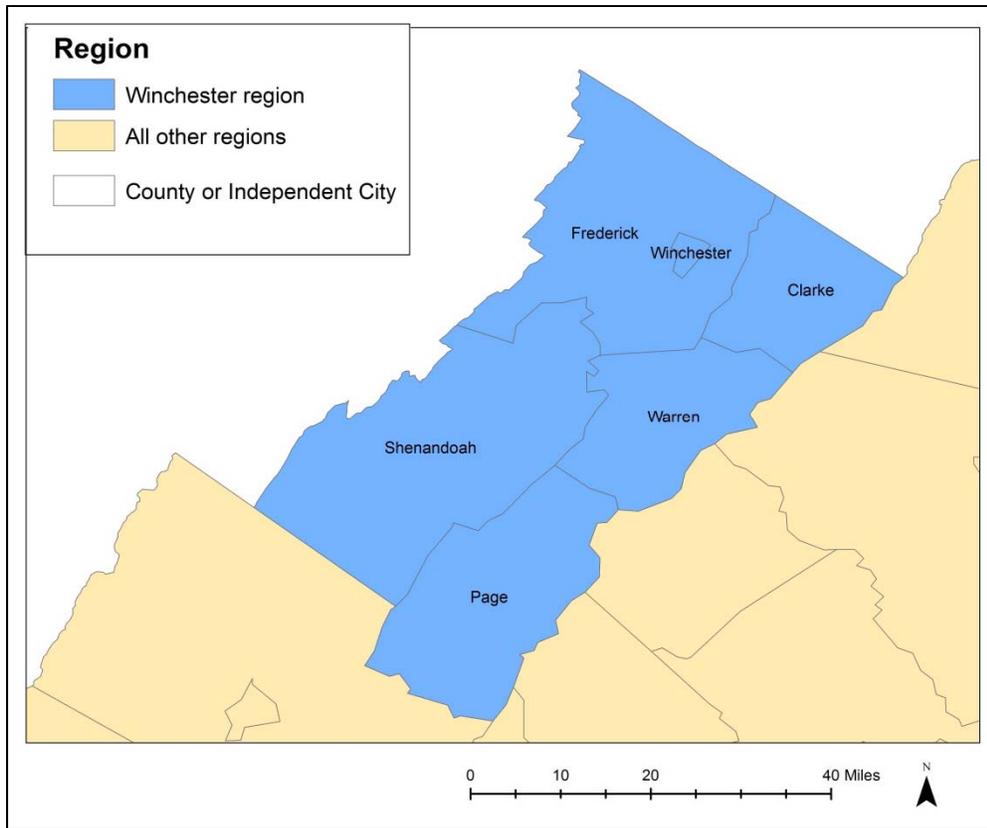
	2014-2024 Change		Share of Current Renter Households
	Households	Share of New Renter Households	
Less than \$625	900	49.1%	25.9%
\$625-1,249	650	36.4%	60.3%
\$1,250-1,314	200	10.8%	2.5%
\$1,315-1,749	50	3.0%	5.5%
\$1,750+	<25	0.7%	5.8%
Total	1,850	100.0%	100.0%

Numbers may not sum due to rounding.
 Source: GMU Center for Regional Analysis

IX. The Winchester Region

As shown in Figure 11, the Winchester region includes five counties and the City of Winchester. In 2014, this region had 93,700 jobs and 86,900 households. By 2024, the region will add 9,400 net new jobs (+10.0 percent) and will require another 6,050 housing units to accommodate the workers to fill them.

Figure 11. Winchester Region



By 2024, the Winchester region is expected to have 103,100 jobs. Compared to 2014, the region will add 9,400 jobs and increase 10.0 percent (Table 29). The percentage gain in the Winchester region is the third highest, behind the Northern Virginia and Charlottesville regions. The employment gains within the region are driven largely by the Educational & Health Services (+2,300) and the Construction, Natural Resources & Mining (+1,900) sectors. Similar to other regions in the Commonwealth, losses are expected in the Federal Government and Other Services sectors.

Table 29. Net New Job Growth by Industry, Winchester Region

	Jobs	% Increase
Construction, Natural Resources & Mining	1,900	39.7%
Manufacturing	900	7.5%
Transportation, Trade, & Utilities	1,400	7.6%
Information	400	50.2%
Financial Activities	400	10.9%
Professional & Business Services	1,700	18.5%
Educational & Health Services	2,300	14.9%
Leisure & Hospitality	200	1.7%
Other Services	(300)	-6.6%
Federal Government	(400)	-14.3%
State & Local Government	800	6.8%
Total	9,400	10.0%

Numbers may not sum due to rounding.

Source: IHS Economics, GMU Center for Regional Analysis

Overall, the new workers filling these jobs will be younger than current workers. These workers will either move to the region, or have grown up in Winchester and will be starting their careers. The age of these new workers drives the types of households they form as well as the types of housing that they will occupy. These younger households have relatively lower incomes and different housing preferences than existing households.

The households formed by the net new workers are significantly more likely to be renters than the existing households (Table 30). Of the 6,050 new households formed by the new workers, 39.3 percent will rent, compared to 29.5 percent of current households. Of the new renter households, 1,650 will occupy single-family homes and 750 will rent in multi-family units. Home ownership remains the largest share of the housing market, including 3,600 single-family owners.

Table 30. Net New Households by Home Type, Winchester Region

	2014-2024 Change		Share of Current Households
	Households	Share of Net New Households	
Owned	3,650	60.7%	70.5%
Single-Family*	3,600	59.9%	70.3%
Multi-Family	50	0.8%	0.3%
Rented	2,350	39.3%	29.5%
Single-Family*	1,650	27.0%	18.1%
Multi-Family	750	12.3%	11.3%
Total	6,050	100.0%	100.0%

*Includes both single-family detached and single-family attached
Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

As shown in Table 31, the distributions of homes that are affordable to the new owner households are in line with the current housing stock. The largest potential gap is for units priced between \$200,000 and \$299,999.

Table 31. Net New Households by Home Price Affordable to Net New Households, Winchester Region (2015 \$s)

	2014-2024 Change		Share of Current Owner Households
	Households	Share of New Owner Households	
Less than \$100,000	550	15.3%	14.5%
\$100,000-199,999	1,050	28.4%	29.3%
\$200,000-299,999	1,650	45.5%	27.4%
\$300,000-399,999	350	9.0%	15.6%
\$400,000+	50	1.8%	13.2%
Total	3,650	100.0%	100.0%

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

About 800 new renter households will earn less than \$25,000, and could afford rents up to \$625 (Table 32). While the region has existing units in this price range, adding units to the market at this price point may be difficult, making it increasingly problematic for the new renters to find units that are affordable to them.

Table 32. Net New Households by Rent Affordable to Net New Households, Winchester Region (2015 \$s)

	2014-2024 Change		Share of Current Renter Households
	Households	Share of New Renter Households	
Less than \$625	800	34.4%	20.3%
\$625-1,249	750	31.8%	62.2%
\$1,250-1,314	700	29.3%	2.2%
\$1,315-1,749	100	3.4%	10.8%
\$1,750+	<25	1.0%	4.6%
Total	2,350	100.0%	100.0%

Numbers may not sum due to rounding.

Source: GMU Center for Regional Analysis

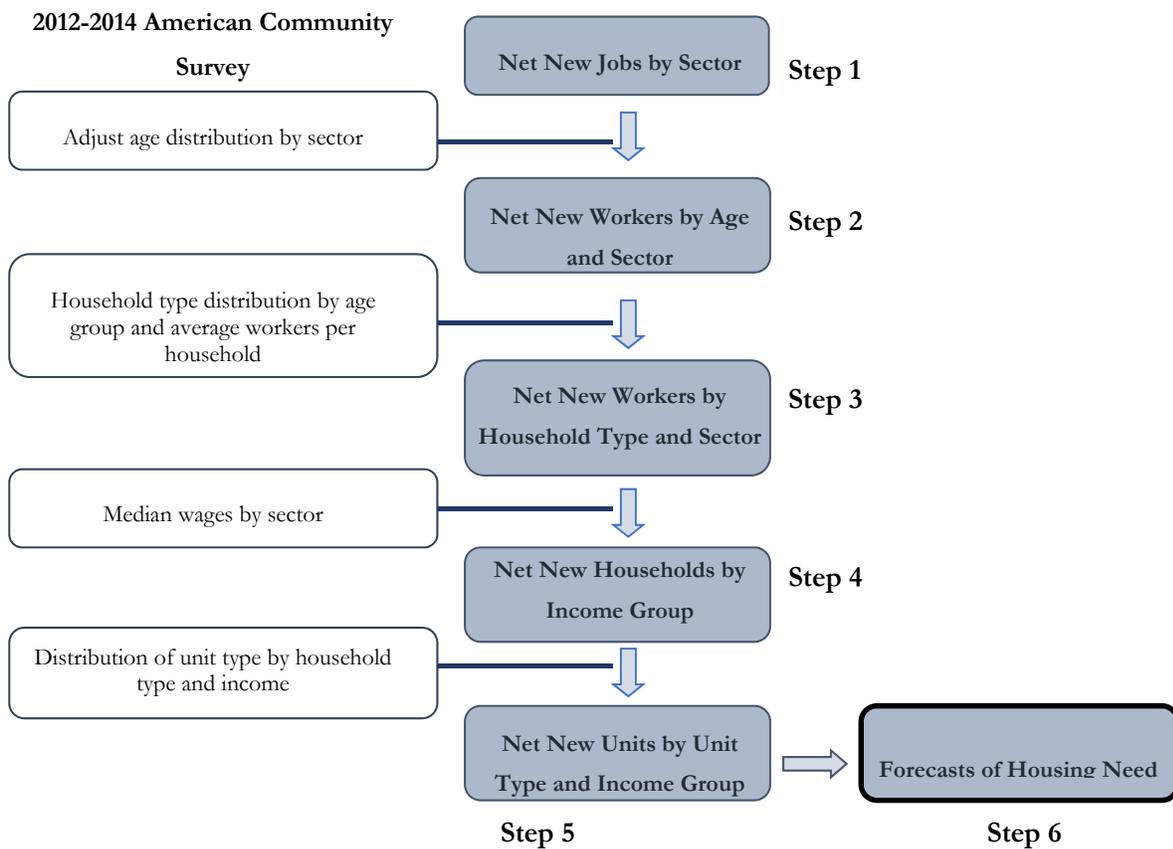
Appendix

Methodology

The housing demand forecasts generated by the Center for Regional Analysis are employment-driven forecasts of the need for housing, which build on research done for the Washington Metropolitan region in 2011, 2013 and 2015.

These forecasts link regional employment growth with the availability, location, and price of housing. Housing forecasts were generated for 8 of the 11 regions throughout the Commonwealth of Virginia. These housing forecasts are based on forecasts of job growth by industry sector for each region, and include an assessment of the amount and type of housing that would be needed to house each region's new workers.

Figure A1. Methodology for Forecasting Housing Needs



The Center conducted a six-step model for generating housing demand forecasts (see Figure A1). Each step in the process is important for modeling not only the overall demand for housing, but also the need for housing in different regions, of different types, and at different price/rent points. The characteristics of the housing units needed for the region's future workers depend on the age, household composition, and household income of new workers, which are all factors included in the analysis. This section briefly outlines the methodology and data used to derive the forecasts.

1. Determine job growth by industry

It is important to understand the types of jobs coming to the region so we can develop estimates of worker age and household income, which will determine household composition, housing types, and affordability levels. IHS Global Insight provides annual job forecasts by industry for every jurisdiction in Virginia, which were used as a base for the subsequent steps. The forecasts include payroll jobs only, excluding unincorporated, self-employed persons. Therefore, the Global Insight figures undercount the total employment activity in the region. The employment forecasts were revised to align more closely with those from the Metropolitan Washington Council of Governments, the Richmond Regional Transportation Planning Organization, or the Hampton Roads Transportation Planning Organization, if they differed significantly.

2. Assign net new jobs to workers by age category

Understanding the age distribution of the region's future workforce by industry sector is important for estimating housing demand, since the demand for different types of housing is strongly associated with individuals' ages. The first step in moving from jobs to housing demand is to estimate the age distribution of the net new workers. For each region and job sector, we assigned some share of the net new workers in each sector to one of three age groups: under 30, 30-44 or 45-64. We assumed no net new workers are aged 65 or older.

New workers will be somewhat younger than the existing workforce. We analyzed data from the 2012, 2013, and 2014 American Community Survey (an average of the 1-year Public Use Microdata Sample files) to estimate the age distribution of current workers for each industry sector. This analysis was done separately for each region.

We then adjusted the age distribution to account for the fact that net new workers would be younger by analyzing 2012-2014 ACS data on the age distribution of workers² who had recently moved in the region.

² For calculations using ACS data, a worker is defined as someone with a payroll job or was in incorporated self-employment.

Through this analysis, we found that recent movers were more likely to be 18-29 or 30-44 than existing workers. Recent movers were less likely to be 45-64.

3. Assign net new workers to a household type and sector

The process of assigning workers to households consisted of two steps: i) determining the type of household to which a worker is most likely to belong based on age and job sector, and then ii) calculating the average number of workers within each household type to determine the number of net new households.

i) Determine the household type

Age is an important determinant of housing demand largely because of the household composition implied by the ages of the individuals in the households. For example, workers under age 30 are more likely to live in one-person households or two adult-no children households and workers age 30 to 44 are more likely to live in households with children.

We assigned each net new worker in each sector to one of 11 household types based on the age group to which they were assigned in the previous analytic step. The 11 household types are listed below.

Table A1. Household Type

Household Size	Household Composition
1-person households	1 adult
2-person households	1 adult, 1 child
	2 adults
3-person households	1 adult, 2 child
	2 adults, 1 child
	3 adults
4+ person households	1 adult, 3+ children
	2 adults, 2+ children
	3 adults, 1+ children
	4+ adults, 1+ children
	4+ adults

We analyzed the current distribution of household types for each age group and for each region using the 2012-2014 ACS. For each region, we assessed the percent of workers under 30 who live in one-adult households, the percent who live in one-adult, one-child households and so on. From step 2 above, we know how many workers in each sector are in each age group (under 30, 30-44, and 45-64) for each region. We used the distribution of household types by age from the 2012-2014 ACS to assign workers in each sector and age group to a household type.

ii) Calculate the average number of workers per household

We then used the 2012-2014 ACS to calculate the average number of workers in each household. Because this forecast is for net new workers only, this average includes only households with a worker.

The average number of workers in each of the 11 household types is used to convert workers into households, which was calculated by dividing the total number of workers assigned to each household type by the average number of workers in each household type. (See Figure A2 for example.) This step assumes that workers who live in the same household also work in the same sector and region.

Figure A2. Example of Assigning Workers to Household Types

Assume there are 1,000 net new workers in the construction sector in a region who are between the ages of 30 and 44. From the 2009-2011 ACS, we have the household type distribution for people age 30 to 44 in that region, as shown in the second column of the table below. We use that distribution to assign the 1,000 net new construction workers to a household type, as shown in the fourth column of the table below. Then, we combine workers into households. For example, the 110 workers in the first row of the table above form 110 households, but the 160 workers in the third row form 113 households (160 workers / 1.41 workers per household). We repeat this process for all age groups and all sectors in each region.

Household Type	% of all 30-44 year olds in Fairfax County	Average No. of Workers	No. of Net New Construction Workers Age 30-44	No. of Net New Households Associated with New Construction Workers Age 30-44
1 adult	11%	1.00	110	110
1 adult, 1 child	2%	1.00	20	20
2 adults	16%	1.41	160	113
1 adult, 2 child	1%	1.00	10	10
2 adults, 1 child	15%	1.66	150	90
3 adults	4%	2.33	40	17
1 adult, 3+ children	1%	1.00	10	10
2 adults, 2+ children	30%	1.56	300	192
3 adults, 1+ children	9%	2.38	90	38
4+ adults, 1+ children	8%	3.57	80	22
4+ adults	3%	3.59	30	8

4. Calculate household income in net new households

Housing demand is driven by housing preferences, which are associated with age and household composition, but demand is also necessarily related to household income. We calculated median household incomes for all 11 household types and all industry sectors. Then, we tabulate the total number of households in each of five

income categories: less than \$25,000; \$25,000 – 49,999; \$50,000 – 74,999; \$75,000 – 99,999; and \$100,000 and greater.

We used the 2012-2014 ACS to calculate the median wages by industry and age group for each region. Using the median wage by industry and the average number of workers per household (assuming both are in the same industry), we calculate the household income for each household type and sector for each region. We then sum up—across sectors—the number of households in each of the six income categories for each of the ten household types. Thus, we have a count of the numbers of 1 adult households in each income group, the numbers of 1 adult, 1 child households in each income group, and so on.

5. Assign each household a unit type by income group

After step 4, we have a count of the number of households by household type and household income that are associated with net new job growth. Household type and household income are both associated with the type of housing demand. Therefore, we use these counts to estimate the need for four different types of housing units in six rent/price categories. The four housing unit types are: single-family (included single-family detached and townhouse/single-family attached) owner and renter, and multi-family owner and renter. The six rent/price categories are associated with the six income groups and represent the maximum rent or home price affordable to households in each income group.

We used the 2012-2014 ACS to run cross-tabulations of housing type (i.e. four types) by household composition (i.e. 11 household types) for each of the six income groups. The results of this analysis show the current distribution of housing types for different household types and household incomes. We ran this analysis for each region.

We then applied these distributions to the projected households for each region to estimate the need for housing by unit type and rent/price. This step assumes that housing preferences do not change in the future.

We made assumptions about the affordable price and rent levels for households in each income group. The maximum affordable rent was set as a percentage of household income. We assumed that rents would not exceed 30% of renters' income with incomes below \$50,000 and 21% of income for renters with incomes between \$50,000 and 99,999.

These rent percentages are based on standard definitions of housing burden for the lowest income group, and on an analysis of rents as a percentage of household income in the 2012-2014 ACS for the other income groups, knowing that higher income renters tend to spend a lower percentage of their income on rent than do

lower income renters. The housing price for homeowners was set at four times household income. Table A5 summarizes the maximum home prices and rents for each income group.

Table A2. Home Value and Monthly Rental Price

Household Income	Home Value	Rental Price (Monthly)
<\$25K	Less than \$100,000	Less than \$625
\$25-49k	\$100,000-\$199,999	\$625- \$1,249
\$50-74K	\$200,000-299,999	\$1,250-1,314
\$75-99K	\$300,000-399,999	\$1,315-1,749
\$100k+	\$400,000+	\$1,750+

Study Limitations

The demand for housing depends on many factors. Modeling housing demand necessarily involves making several simplifying assumptions, which excludes some of the complexity of housing need from the analysis. Some of the limitations of the research are described briefly in this section.

The housing demand forecasts exclude the housing needed to accommodate replacement workers, as well as other non-paid working households. This analysis excludes the housing needs for replacement workers resulting from the aging of the current workforce ages and retirement. Some retiring workers will leave the region, thus freeing up housing units for new or replacement workers. However, many of the retiring workers will stay in the region. As a result, the housing demand forecasts presented in this report understate the actual need for housing over the next 10 years.

It is assumed that there are no major shifts in the housing unit preferences of future cohorts, or in the direction of Federal policies related to homeownership. These forecasts are based on data on the housing characteristics of current residents by age group, household composition, and household income, in order to make estimates of future housing needs. This method assumes that there are no major changes in the housing unit preferences of future cohorts.

In addition, this research makes no assumptions about the direction of Federal policies related to homeownership which might make owning relatively less attractive or feasible over time. If there are major changes to the federal mortgage interest deduction, or to regulation related to down payment and other requirements for securing a home mortgage, then homeownership may be less desirable or less achievable for future workers. Thus, there could be a shift to a need for even more rental housing in the region.

It is assumed that workers' housing location choices are related solely to their place of work. These forecasts assume that all jobs created in the region will be held by a resident in the region. This is broadly true for each region, but many households do, and will continue to, commute across regional boundaries to jobs. Conversely, many Virginia residents, especially those living near the border, may hold a job in the District, Maryland, West Virginia or North Carolina and elsewhere. The job growth that occurs outside of the Commonwealth is not included here.

Geographies and Forecasts of Employment in Regions with No Demand from Net New Worker Households

The Northern Neck Region

Figure A3. Northern Neck Region

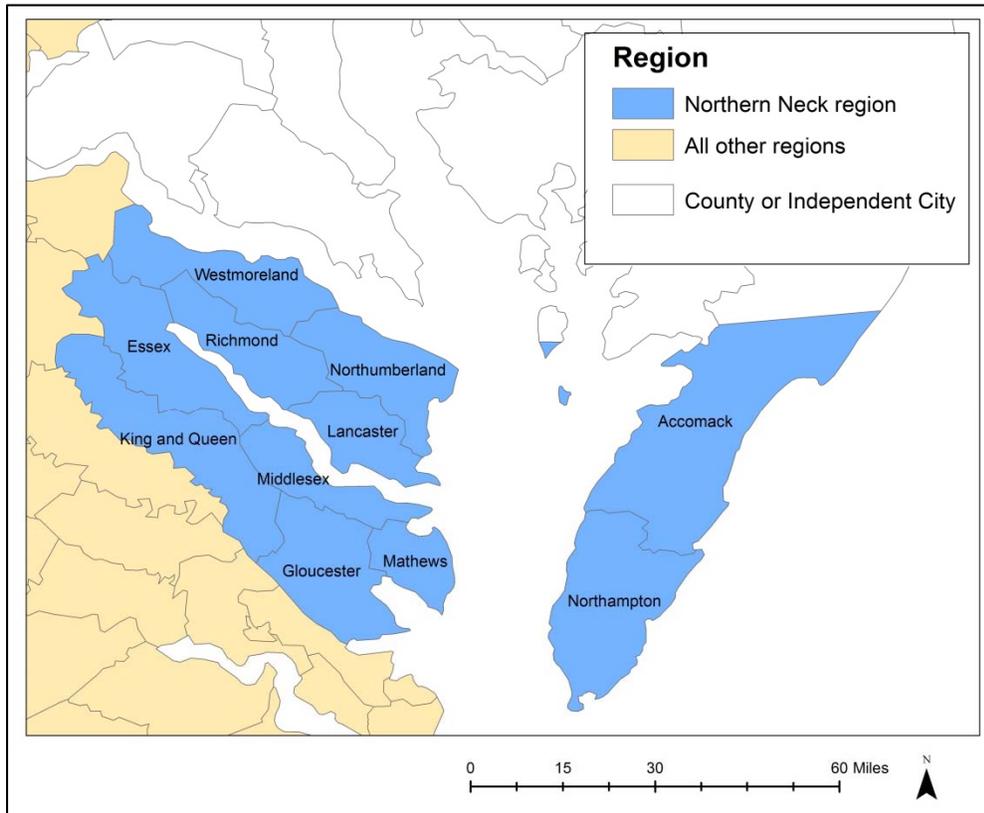


Table A3. Net New Job Growth by Industry, Northern Neck Region

	Jobs	% Increase
Construction, Natural Resources & Mining	1,800	54.5%
Manufacturing	-25 to 0	0.5%
Transportation, Trade, & Utilities	(500)	-5.4%
Information	200	67.9%
Financial Activities	(100)	-4.3%
Professional & Business Services	-25 to 0	1.2%
Educational & Health Services	(100)	-1.5%
Leisure & Hospitality	(800)	-16.4%
Other Services	(700)	-14.6%
Federal Government	(100)	-14.7%
State & Local Government	(500)	-4.7%
Total	(600)	-1.1%

Numbers may not sum due to rounding.

Source: IHS Economics, GMU Center for Regional Analysis

The South-Central Region

Figure A4. South-Central Region

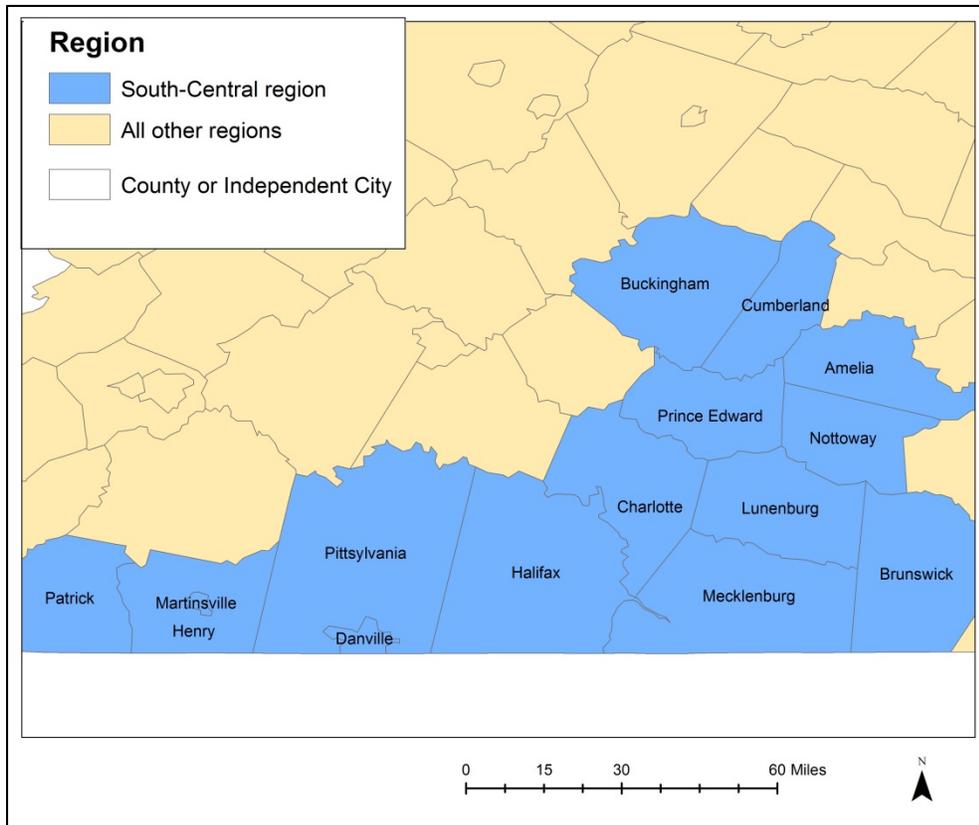


Table A4. Net New Job Growth by Industry, South-Central Region

	Jobs	% Increase
Construction, Natural Resources & Mining	3,200	59.5%
Manufacturing	600	3.2%
Transportation, Trade, & Utilities	(1,900)	-7.8%
Information	700	85.4%
Financial Activities	(100)	-3.1%
Professional & Business Services	(300)	-3.0%
Educational & Health Services	300	1.3%
Leisure & Hospitality	(1,700)	-18.9%
Other Services	(1,300)	-13.9%
Federal Government	(100)	-6.8%
State & Local Government	(700)	-2.9%
Total	(1,300)	-1.0%

Numbers may not sum due to rounding.

Source: IHS Economics, GMU Center for Regional Analysis

The South-Western Region

Figure A5. South-Western Region

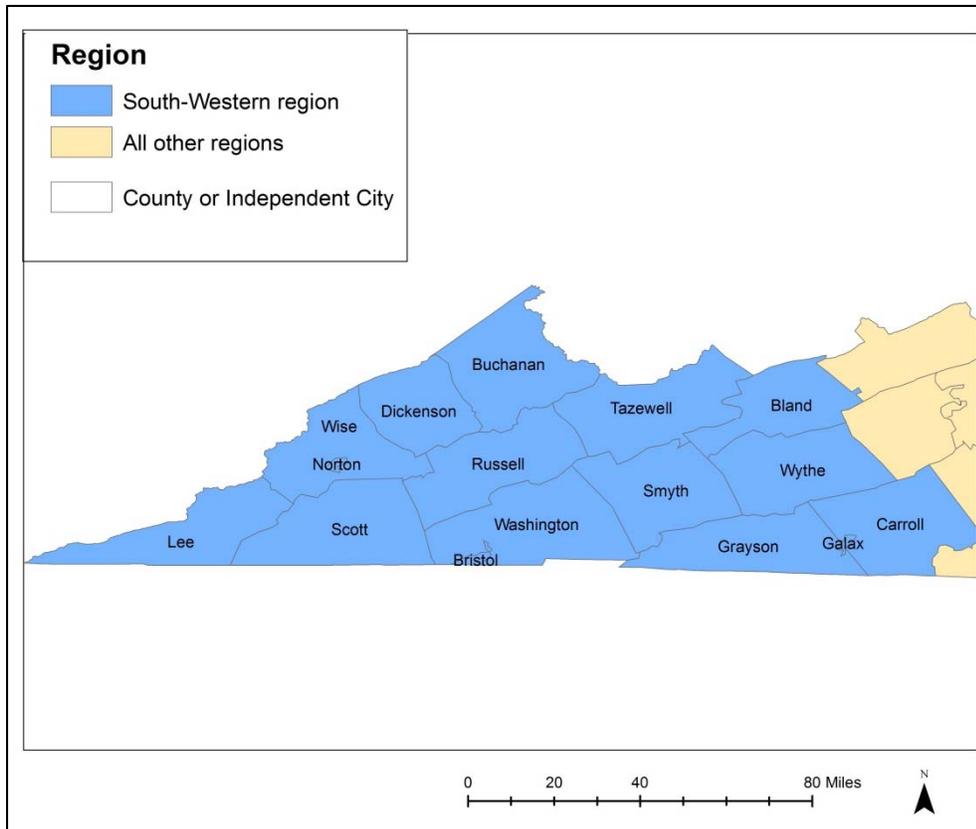


Table A5. Net New Job Growth by Industry, South-Western Region

	Jobs	%Increase
Construction, Natural Resources & Mining	3,400	38.1%
Manufacturing	900	4.9%
Transportation, Trade, & Utilities	(2,000)	-7.3%
Information	700	56.1%
Financial Activities	(300)	-6.8%
Professional & Business Services	-	-0.1%
Educational & Health Services	(300)	-1.6%
Leisure & Hospitality	(1,400)	-12.2%
Other Services	(1,300)	-17.8%
Federal Government	(200)	-11.0%
State & Local Government	(1,800)	-6.2%
Total	(2,200)	-1.6%

Numbers may not sum due to rounding.

Source: IHS Economics, GMU Center for Regional Analysis