VMTP 2025 Needs Assessment

Regional Needs Profile
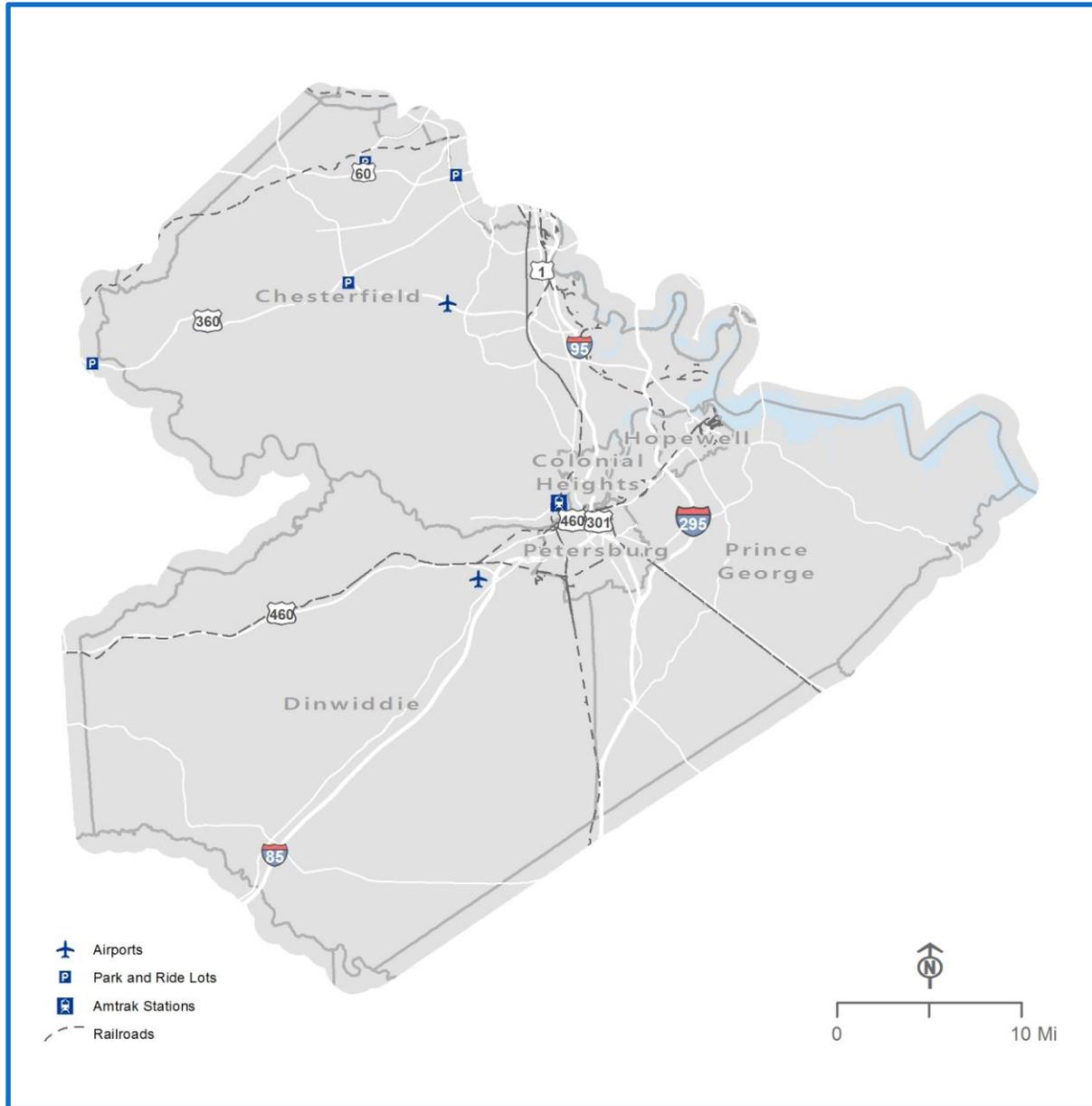
Tri-Cities Region

December 2015

1. NEEDS ASSESSMENT PURPOSE

The VMTP 2025 Needs Assessment framework is based on two principal objectives underlying transportation policy to enhance economic competitiveness. Based on the VTrans2040 Vision and policy directives from the Governor's office, the VMTP 2025 Needs Assessment is based on two principal objectives of transportation policy with the aim of enhancing economic competitiveness. These are 1) to attract and retain the 21st century workforce, and 2) to support goods movement for Virginia businesses.

This document is one portion of the overall Needs Assessment for regional Networks that deals with the Needs Assessment for the Tri-Cities Region. There is a separate document entitled "VMTP 2025 Needs Assessment: Regional Networks Introduction," that provides an overall introduction into the background and methodology of the Needs Assessments. In this document, details are provided on the 2025 Needs development process, as well as the economic factors shaping regional Transportation Needs. This introductory document provides a foundation for the regional needs described here. The focus of this Transportation Needs Assessment is to identify the Transportation Needs that are part of the Tri-Cities Regional Network, and that would support regional industries and workforces.

Defining a Regional Network
Transportation needs, as considered in the 2025 Needs Assessment, are defined as the gap between the transportation system in place currently that serves the current industries in a region, and the future transportation system needed to serve the desired future economy in the region. The gap between the transportation needs and economic conditions is the basis for the findings in this report. The following sections outline the Tri-Cities regional Economic Profile, regional Transportation Profile, and regional Transportation Needs profiles.

Defining a Regional Network
This portion of the VMTP 2025 Needs Assessment is for a Regional Network. For the purposes of the VMTP Needs Assessment, the final determination of Regional Networks will be developed as part of the outreach process in working with each region, as explained in the Regional Network Needs Assessment Introduction.

For the purpose of the needs analysis, the Tri-Cities Region consists of the City of Petersburg, the City of Hopewell, the City of Colonial Heights, the Dinwiddie County, Prince George County, and Chesterfield County.

2. Economic Profile

A. Introduction

The trends analysis conducted as part of the VTrans2040 Vision Plan showed strong indications that future economic success for both states and regions will hinge on attracting and retaining increasingly scarce talented workers, particularly from among the well-educated Millennials. In addition, future goods movements will be critical to supporting Virginia's current and emerging businesses. A key part of understanding emerging transportation needs statewide is understanding the current and future economic conditions in different parts of the state. The Needs Assessment therefore focuses on understanding the major economic dynamics of each region and using that understanding to shape transportation needs.

The Study Team used available data from state and national sources, as well as input from Tri-Cities stakeholders to identify an overall current economic profile for the region. The components of the current economic profiles layers together demographic and economic characteristics of the region. The Regional Profile incorporates the following baseline data for each region:

- Demographic Characteristics
- Top Industries by Employment, Output and Location Quotient
- Workforce Characteristics
- Top Employers
- Activity Centers, characteristics and travel markets (as defined by existing centers of employment as modified by input from stakeholders in each region)

B. Demographics

At a regional level, research regarding basic demographics was analyzed as a foundation for understanding regional economic dynamics. The economic and demographic data analyzed in this report support insights regarding which workforce and/or key age groups are currently present in the region. This information is important to inform potential types of investments to attract and retain the desired workforce.

Statewide Demographics

According to the Woods & Poole *2014 State Profile*, the current population in the state of Virginia is 8,185,867. By the year 2025, the Commonwealth of Virginia's population is projected to increase by between 1 million, to 1.5 million people. Statewide per-capita incomes are expected to rise 21%, from $44,765 to $54,226.

Table 1: Statewide Population Projections. Sources: Woods & Poole, Weldon Cooper.

Current Population (2012)	Weldon Cooper Projection (2025)	Woods &Poole Projection (2025)
8,185,867	9,203,977	9,740,553

Sources: Weldon Cooper Center for Public Service, Demographic Research Group, Intercensal Estimates for Virginia, Counties and Cities: 2010-2012, and Woods and Poole Economics, Incorporated, 2014 State Profile District of Columbia, Maryland, and Virginia. Washington DC

Regional Demographics

As evident in Table 2, substantial population growth is projected for the Tri-Cities Region. Projections estimate 8,000 new residents in the region by the year 2025. (Refer to Table 2).

Table 2: Bristol Region Population Projections.

Current Population (2012)	Weldon Cooper Projection (2025)
136,735	144,764

Sources: Weldon Cooper Center for Public Service, Demographic Research Group, Intercensal Estimates for Virginia, Counties and Cities: 2010-2012, and Woods and Poole Economics, Incorporated, 2014 State Profile District of Columbia, Maryland, and Virginia. Washington DC

Table 3 provides a closer look at population projections by jurisdiction within the Tri-Cities Region.

Table 3: County and City Population Projections.

Jurisdiction	Current Population (2012)	Weldon Cooper Projection (2025)	% Change (2012 – 2025)
Dinwiddie County	27,994	29,949	7%
Prince George County	36,941	38,497	4%
City of Colonial Heights	17,479	19,187	10%
City of Hopewell	22,348	24,209	8%
City of Petersburg	31,973	32,922	3%

Source: Weldon Cooper Center for Public Service, Demographic Research Group, Intercensal Estimates for Virginia, Counties and Cities: 2010-2012

According to the Woods and & Poole *2014 State Profile*, per-capita income for the region is expected to rise 18% (slightly less than the state average of 21%) from $34,836 to $41,135. Population growth is also projected to be accompanied by a demographic shift, with a higher percentage of the population over the age of 60.
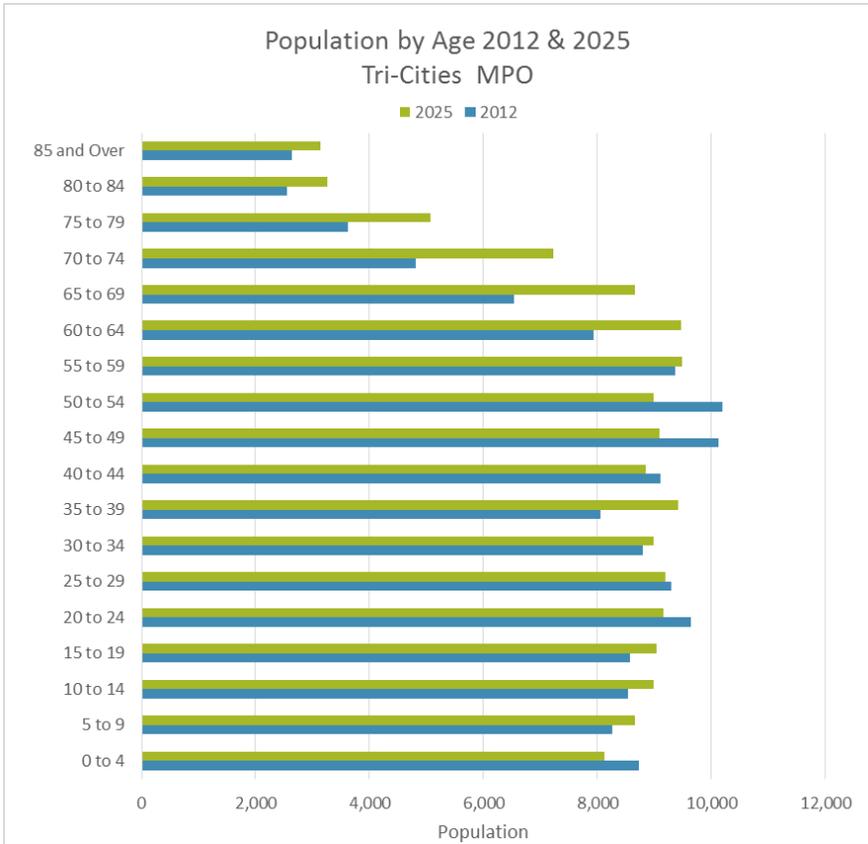
Figure 1: Population of Region 2000 in the years2012 and Projected for the year 2025.

Source: Weldon Cooper Center for Public Service, Demographic Research Group, Intercensal Estimates for Virginia, Counties and Cities: 2010-2012

C. Current Industry Strengths

The following economic measures were used to analyze the strength and characteristics of the current regional economy in the Tri-Cities Region.

Economic Sectors

The 20 industry sectors, as defined by The North American Industry Classification System (NAICS), have been grouped into three clusters – or broader economic groupings – based on the characteristics that support each industry's growth. These economic clusters are defined as local economic sectors, knowledge-based economic sectors, and freight-based economic sectors. Each economic cluster has different characteristics in terms of land use, commuting patterns, and other aspects of regional accessibility that are essential to attracting and retaining these businesses and their workforce. These different characteristics and each region's mix of economic clusters combine to create unique needs, opportunities and constraints related to transportation and accessibility. For example, a region with greater economic emphasis on manufacturing or warehousing will have a greater focus on freight intermodal needs than a region with stronger knowledge-type service industries such as financial services, where passenger intermodal needs would be a greater concern.

In addition to the unique characteristics of each cluster, there are also underlying principles with respect to land use density that relate to the different economic sectors and also to the suitability of different transportation modes. These relationships work differently in different regions, and will be applied in context for all 15 of the regional networks. When considering the output of all industries present in Tri-Cities Region, Figure 2 provides a summary of the predominance of each economic cluster, as analyzed by a methodology developed by the Study Team and used in all regional analyses throughout the state.

■ Local serving ■ Freight Dependent ■ Knowledge Focused
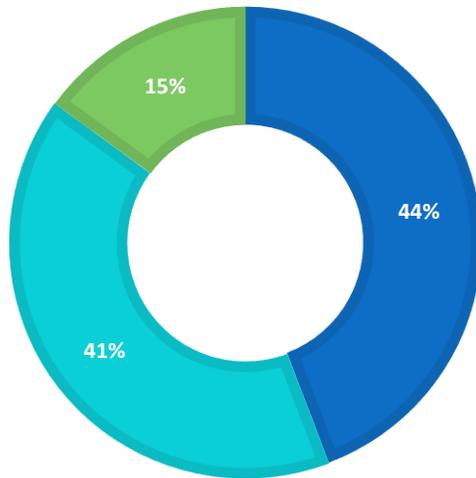
Figure 2: Top Sectors by Output (2012)
Source: IHS Global Insight, 2012.

The local services cluster is clearly the strongest in this region. Local services make up 65% of the economic output in the Tri-Cities Region. Conversely, the knowledge and freight-dependent clusters account for 13 and 22% of economic output, respectively. Each economic sector has different transportation characteristics and needs, as will be discussed below. The local services economic cluster, for example, is typically characterized by different peak commute times; customer traffic; trip-chaining destinations; and truck deliveries.

Top Industries by Output

Wholesale trade is the strongest industry in the Tri-Cities region when measured by economic output. This is due, potentially, to the significant warehousing and distribution activity in the region that may involve much wholesale trade. Retail Trade is the second largest industry by output. Mining, finance and insurance, and health care round out the top five industries in the region with the greatest economic output. (Refer to Table 4).

Table 4: Current Industries by Output.

Top Industries	NAICS Code	% of Output
Wholesale Trade	42	16%
Retail Trade	44 – 45	10%
Mining	21	9%
Finance and Insurance	52	8%
Health Care	62	8%

Source: IHS Global Insight Data, 2012

Top Industries by Employment

In the Tri-Cities Region, public administration, retail trade, health care, accommodation and food services, and manufacturing are the top industries by employment. (Refer to Table 5). The predominance of local serving industries as four of the top five industries suggests that the regional economy is predominantly a local service economy. One caveat to this is that government employment, such as Fort Lee, would fall under Public Administration. The employees at Fort Lee, however, are not involved in a local service activity.

Table 5: Current Top Industries by Employment.

Top Industries	NAICS Sector	% of Workforce
Public Administration	92	27%
Retail Trade	44-45	26%
Health Care	62	12%
Accommodation and Food Services	72	8%
Manufacturing	31-33	7%

Source: IHS Global Insight Data, 2012

Fort Lee is the largest employer in the region, with the Defense General Supply Center as the third largest employer, indicating the importance of logistics and supply chain management to the local economy. Likewise, the presence of Amazon and UPS in the top employers reinforces the importance of logistics, warehousing and distribution activity in the regional economy. DuPont is representative of the importance of large manufacturing in the region, which is also represented by other major manufactures such as Rolls-Royce and Honeywell.

Table 6: Current Top Employers.

Employers	Employees
Fort Lee Army Base	10,000 +
Amazon	2,500 – 4,999
Defense General Supply Center	2,500 – 4,999
DuPont	2,500 – 4,999
United Parcel Service	1,500 – 2,499

Sources: InfoUSA, supplemented with VEDP, VEC, and local data.

Top Industries by Location Quotient

Location quotient (LQ) is an economic measure, expressed as a ratio, which compares a region to a larger reference region according to some characteristic or asset. It is often used to quantify how

concentrated a particular industry, cluster, occupation, or demographic group is in a region, as compared to the nation, and can reveal what makes a particular region unique in comparison to the national average.

Location quotients for 20 different industry categories were calculated for the Tri-Cities Region. The industries listed in Table 7 have the highest LQ scores in the region. The score for professional services, for example, can be inferred to mean that these services are almost two times more concentrated in the region than in the entire nation, on average.

Table 7: Current Top Industries by Location Quotient

Top Industries	NAICS Sector	Location Quotient
Professional Services	54	1.82
Real Estate	53	1.60
Construction	23	1.46
Arts, Entertainment, and Recreation	71	1.31
Public Administration	92	1.26

Source: IHS Global Insight Data, 2012

D. Activity Center Analysis

An important part of the Needs Assessment at the regional level has been the identification and evaluation of economic activity centers. For the purposes of this analysis, activity centers are defined as areas of regional importance that have a high density of economic and social activity. Activity centers were first defined in draft form using employment location patterns. A GIS-based spatial analysis was conducted to determine which areas have the greatest relative density of jobs. Activity centers were then developed for these areas using Census block boundaries. Activity centers were revised, refined, or amended after discussing economic conditions with regional stakeholders. Activity centers such as Walthall, Crosspointe and Dinwiddie Airport were added through coordination with local stakeholders who had a knowledge of the regional significance of the activity in places were existing data sources had little information on employment. Figure 3 below shows the activity centers as blue circles. The activity centers are a tool in the development of each regional profile and do not have standing in the statewide planning and programming process such as Urban Development Areas; therefore the activity center definitions have no significance other than as a reference tool within the economic profiles.
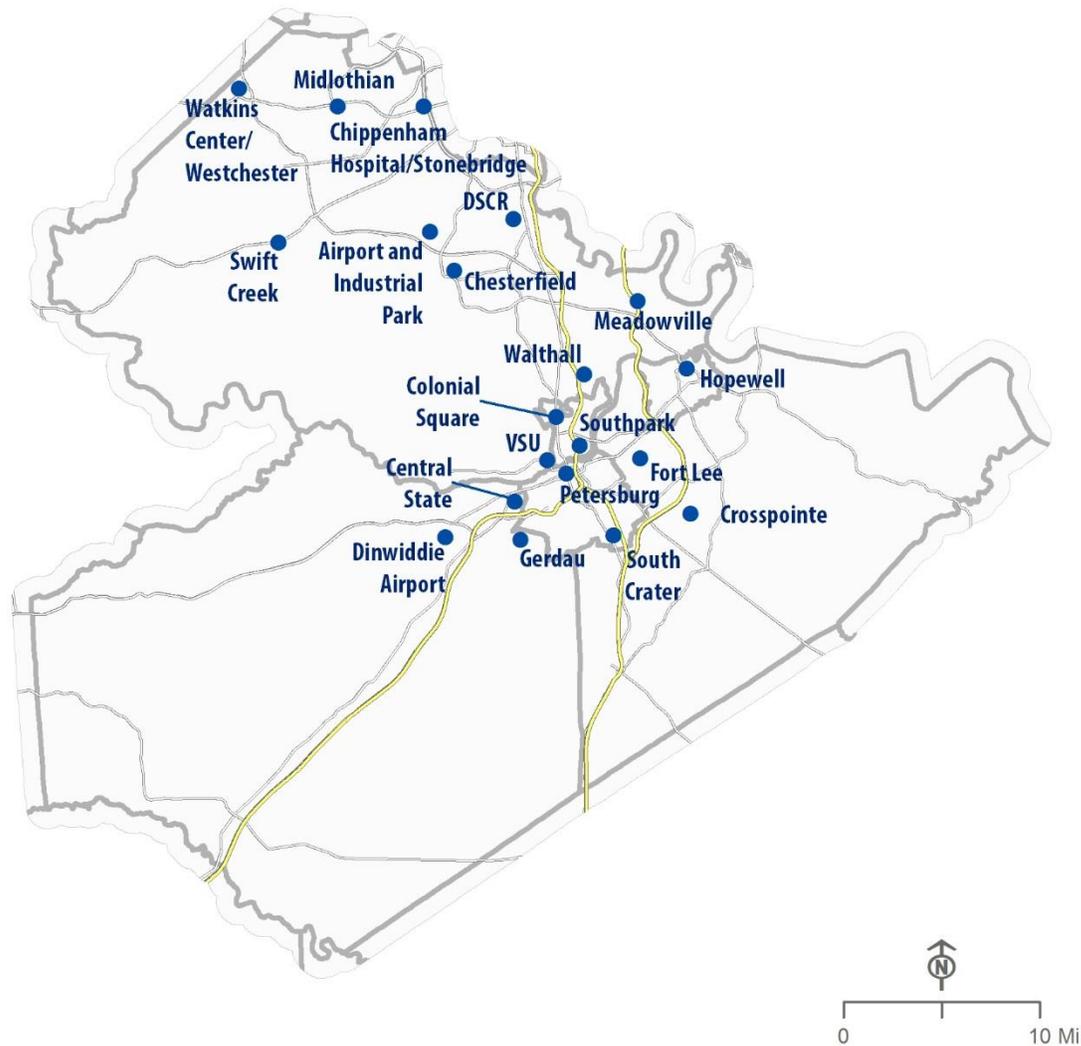
Figure 3: Map of Activity Centers based on Job Density and Stakeholder Input

Once activity centers were identified, the next step was to analyze the type and scale of economic activity that took place in those locations. Based on the categorization of jobs by NAICS code into the three economic clusters of local, freight, and knowledge economies, analysts developed charts that represented the breakdown of employment by industry sector in each activity center, and scaled those charts based on the number of jobs in each center relative to the other centers in the region. Figure 4 below shows the mapping of each activity center broken down by industry sector, and scaled by relative number of jobs.
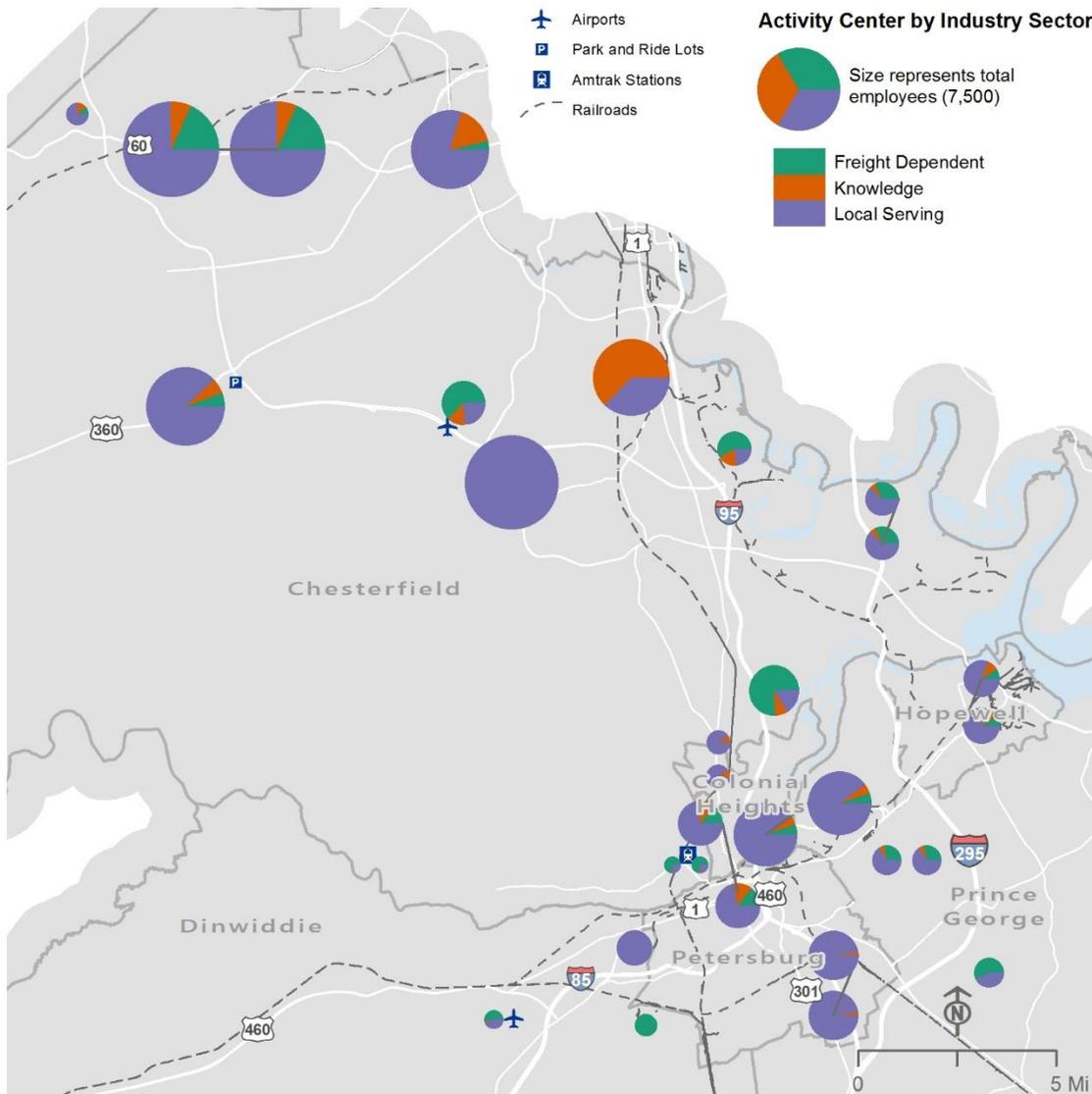
Figure 4: Activity Center Employment by Industry Sector.
Source: IHS Global Insight Data, 2012

E. Forecasted 2025 Industry and Employment Strengths

Through a series of work sessions with the Tri-Cities Region stakeholders, the Study Team used economic forecasts for 2025 and got input from stakeholders to determine the future desired economic profiles for each region. 2025 economic forecasts for employment by industry from third party data sources were the primary source for the future economic profiles. However, the intent of this process was not to presuppose Tri-Cities' economic future, but to allow input from stakeholders to affirm or modify these basic economic forecasts according to regional desires.

The future economic profiles were used as the basis for determining future transportation needs to support the future economic vision in the Tri-Cities Region. The basic economic datasets that were compiled include:

- Current Top Industries by Workforce, Output and Location Quotient
- Future Growth Industries
- Activity Center profiles
- Top Employers and Locations
- Economic Development Priorities

Substantial growth is forecasted for the Tri-Cities Region by 2025. According to statewide and national datasets used, the arts and entertainment and corporate management industries will see the highest percentage growth. Combined, they are expected to produce almost $5 billion more in 2025 than was produced in 2012.
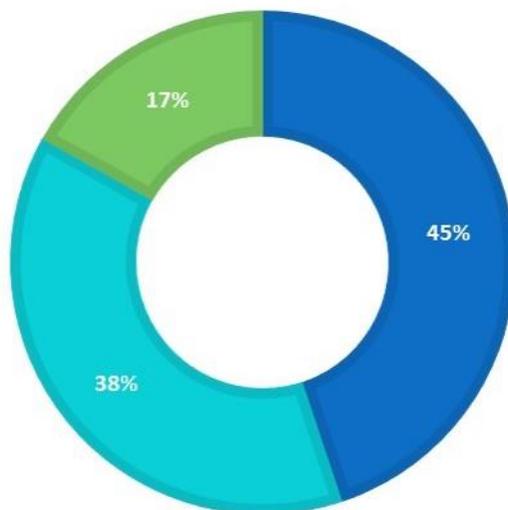
Figure 5: 2025 Industry Sectors by Output.
Source: IHS Global Insight Data, 2012

The local services sector will continue to be the largest portion of regional output, but is will be a smaller portion than it was in 2012. Local services will remain relatively unchanged in 2025, increasing from 44% to 45% of regional output. The knowledge sector will increase slightly from 15% of economic output in 2012 to 17% in 2025. Conversely, the freight-dependent clusters will account for a slightly smaller portion of the regional output, accounting for 38% of economic output.
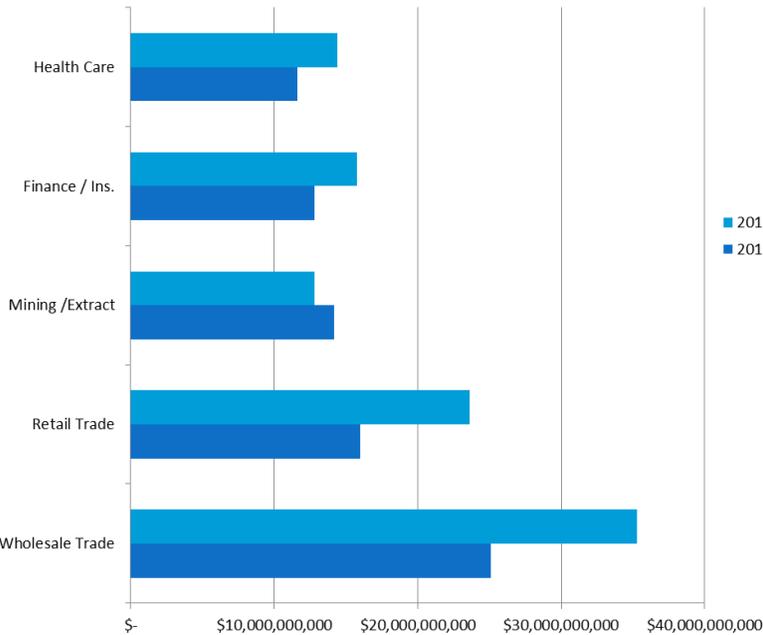
Figure 6: Top Industries by Output
Source: IHS Global Insight Data, 2012

The industries with the greatest share of regional output will continue to grow in 2025, with the exception of mining. In all industries combined, economic output in the Tri-Cities Region is expected to increase by $48.7 billion by 2025. (Refer to Figure 6).
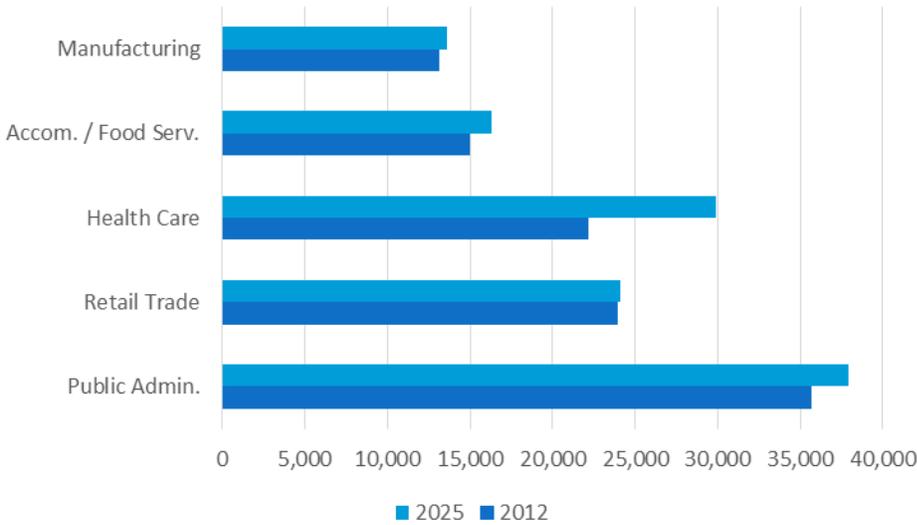
Figure 7: Top Industries by Employment.
Source: IHS Global Insight Data, 2012

The outlook for all the top industries by employment are expected to grow by 2025. Retail trade and manufacturing will grow only slightly while health care and social assistance will grow by 27%. Other industries with a high percentage of employment growth are construction, professional services, and the administrative sector.

Table 8: Top Industries by Employment.

Top Industries	NAICS Sector	% Change in Employment (2012-2025)
Health Care and Social Assistance	62	27%
Construction	23	26%
Professional Services	54	9%
Administrative Sector	56	9%
Public Administration	92	8%

Source: IHS Global Insight Data, 2012

3. TRANSPORTATION PROFILE

A. Introduction

The following section describes the transportation and accessibility measures that were developed to capture the workforce needs and the freight needs at a regional scale. This set of measures reflects regional transportation characteristics in the Tri-Cities Region such as typical commute times and overall travel reliability. The following categories of performance metrics that were used to create a regional transportation profile for the Tri-Cities Region:

- Commuting Patterns
- Accessibility to Employment
- Roadway Measures
- Freight Measures

B. Commuting Patterns

Regional Commuting Patterns

Commuting patterns in the Tri-Cities region show that there are large amounts of commuting between jurisdictions. As represented in Figure 5, a majority of workers in the Cities of Colonial Heights, Hopewell, and Petersburg and Dinwiddie County commute to a different jurisdiction within the Tri-Cities Region. The first jurisdiction that is an exception, Chesterfield County, the majority of workers either work within the County or commute to either the City of Richmond or Henrico County. The other exception in the region, Prince George County, a majority of workers commute either within the County or in another jurisdiction within the Tri-Cities Region.

Commuter Origin/Destination Flow
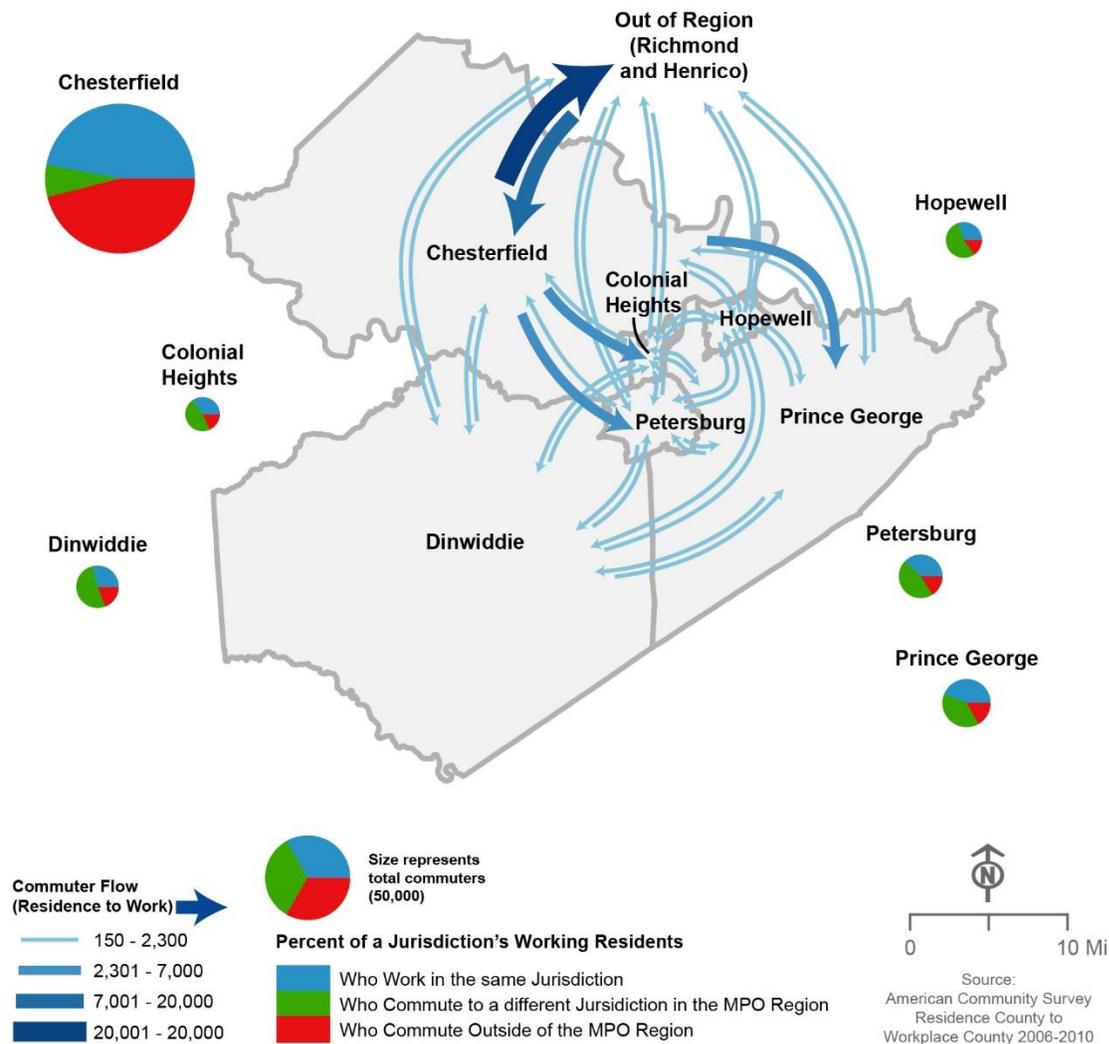
Figure 8: Regional Commuting Patterns.
Source: Census Commuting Data, 2006-2010

Activity Center Commuting Patterns

Equally important to the formation of a regional transportation profile for the Tri-Cities Region was the analysis of commuting patterns between activity centers. Figures 9 through 14 below provide insights into the commuting patterns for three of the activity centers in the Tri-Cities Region. Block groups are symbolized on a color scale from dark to light blue, with the darker shades representing the block groups with the largest number of commuters to the activity center analyzed within that map.

The data source used to analyze the origin of workers in activity centers was the LEHD Origin-Destination Employment Statistics (LODES) data from the United States Census Bureau. The data file provided the Census Block of the home and work locations for all persons working in the state of Virginia in 2011 based on Unemployment Insurance earnings data and Quarterly Census of Employment and

Wages (QCEW) data. The LODES data is not perfectly accurate as job and home locations can be misreported through the original data sources. In addition, the Census Bureau uses noise infusion and synthetic data methods to ensure confidentiality in the publically released data. For these reasons, the data have been aggregated and reported at the Census Block Group level in the following analysis.

As shown on the map, commutes to Crosspointe originate throughout the region, ranging from Prince George County to northern Chesterfield County. However, many of the trips originate along the I-95 and I-85 corridors. (Refer to Figure 89.
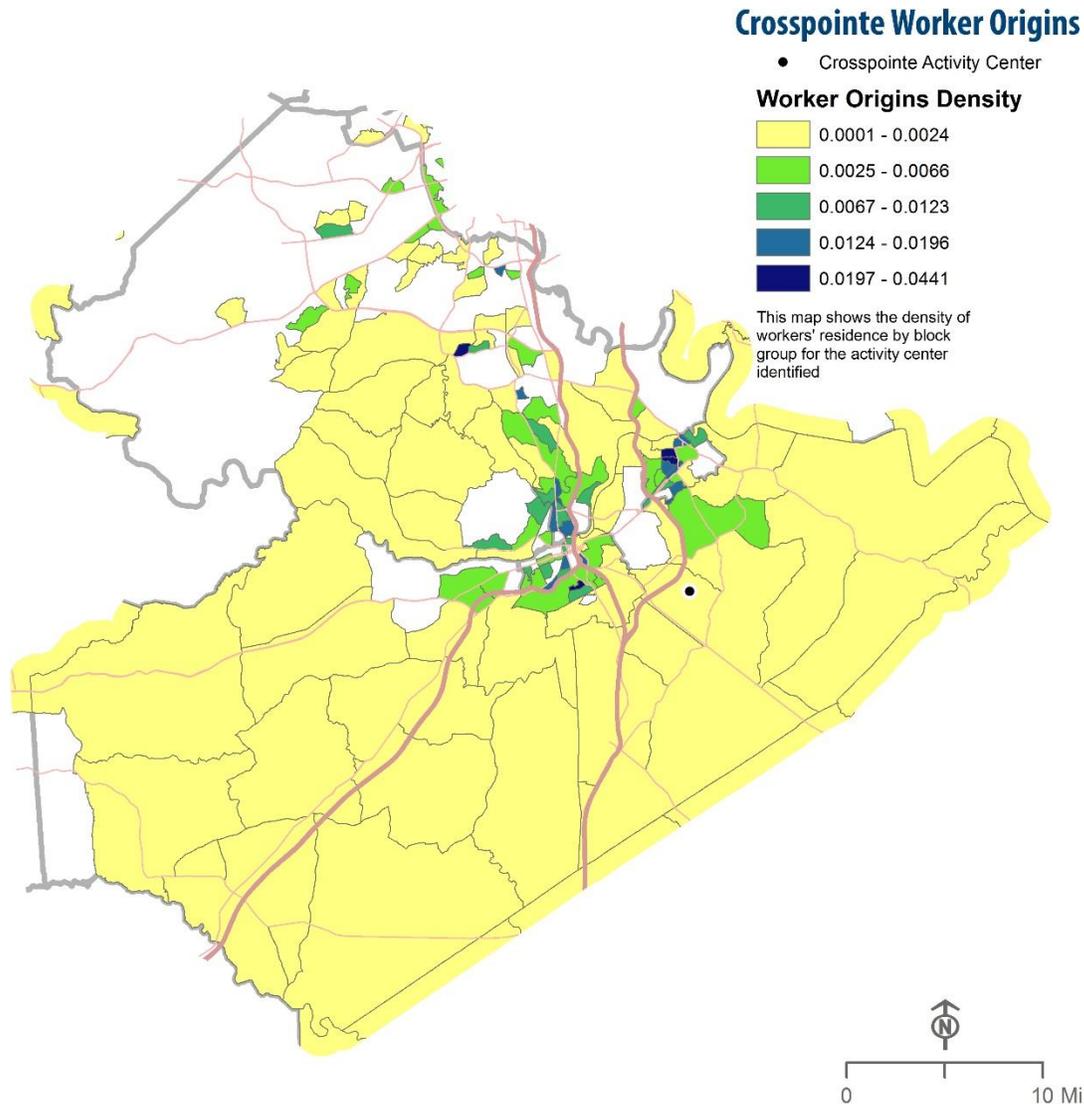
Figure 9: Commuting Patterns to Crosspointe Activity Center.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Similarly to the Crosspointe activity center, commutes to the Dinwiddie Airport originate throughout the region. (Refer to Figure 10). However, the commute patterns are strongly tied to I-95 and I-85.

Dinwiddie Airport Worker Origins

● Dinwiddie Airport Activity Center

Worker Origins Density

	0.0001 - 0.0008
	0.0009 - 0.0025
	0.0026 - 0.0060
	0.0061 - 0.0097
	0.0098 - 0.0166

This map shows the density of workers' residence by block group for the activity center identified
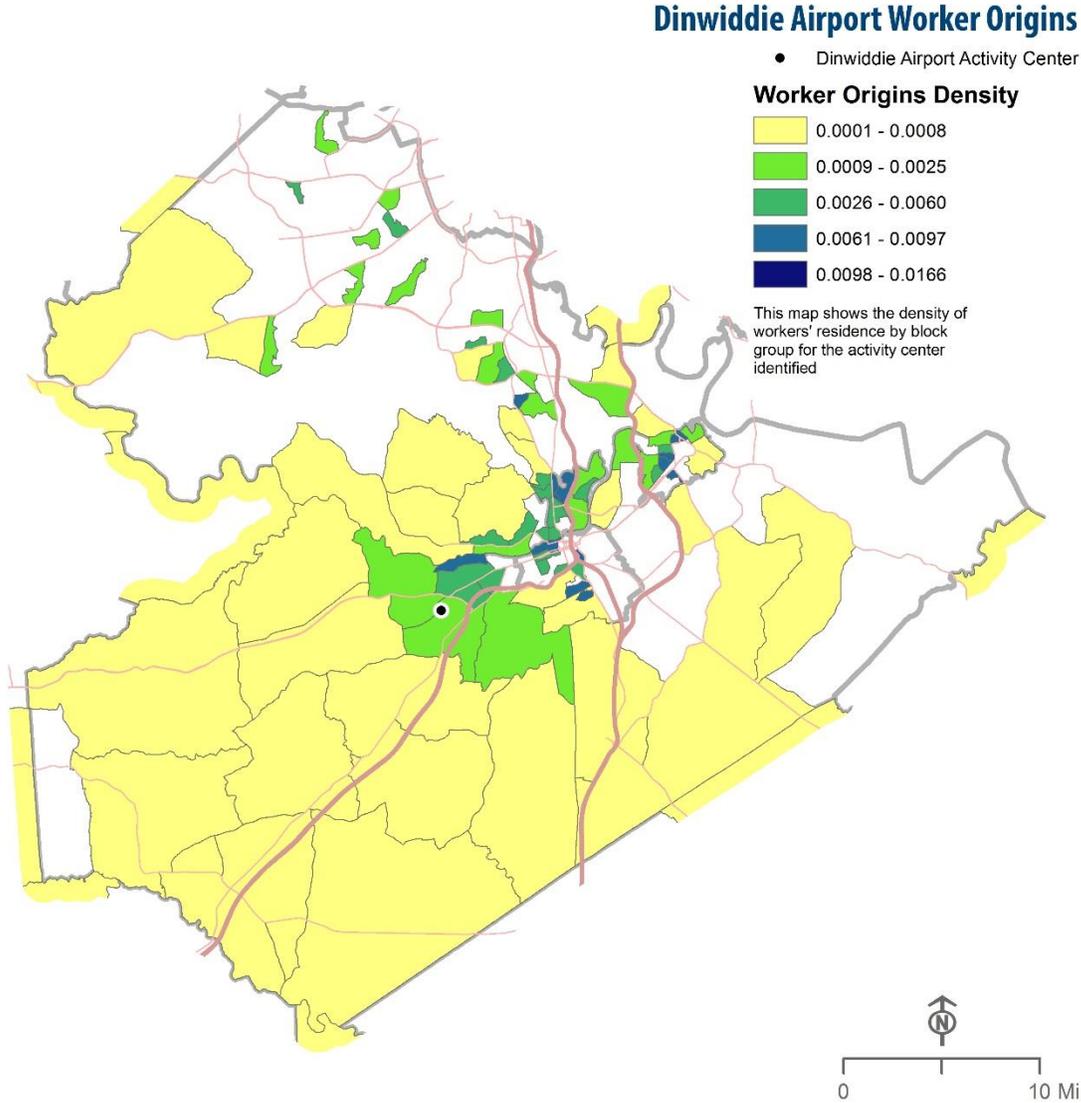
Figure 10: Commuting Patterns to Dinwiddie Airport Activity Center.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

The Fort Lee commute origins are concentrated around the activity center and northern Chesterfield. For these commuting patterns, I-95 and VA Route 288 are important for worker movements. (Refer to Figure 11).

Fort Lee Worker Origins

Figure 11: Commuting Patterns to Fort Lee Activity Center.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Commute origins to the Meadowville activity center, similarly to the aforementioned activity centers, are dispersed throughout the region. However, commutes are densest along I-95, I-295, and VA Route 288. (Refer to Figure 12).

Meadowville Worker Origins

- ● Meadowville Activity Center

Worker Origins Density

	0.0001 - 0.0055
	0.0056 - 0.0141
	0.0142 - 0.0304
	0.0305 - 0.0784
	0.0785 - 0.1387

This map shows the density of workers' residence by block group for the activity center identified
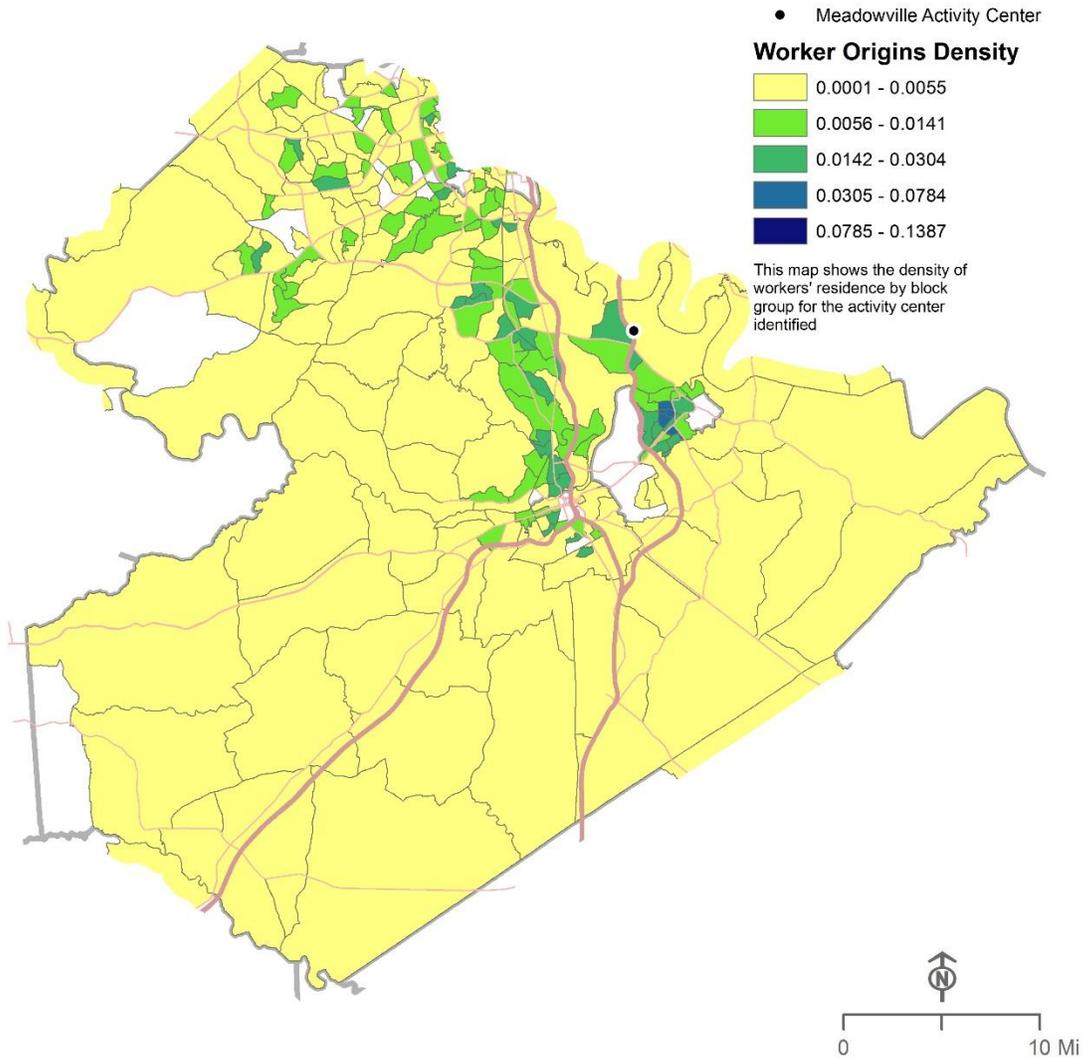
Figure 12: Commuting Patterns to Meadowville Activity Center.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

The commute origins to the Petersburg activity center are heavily concentrated in the Cities of Petersburg, Colonial Heights, and Hopewell.
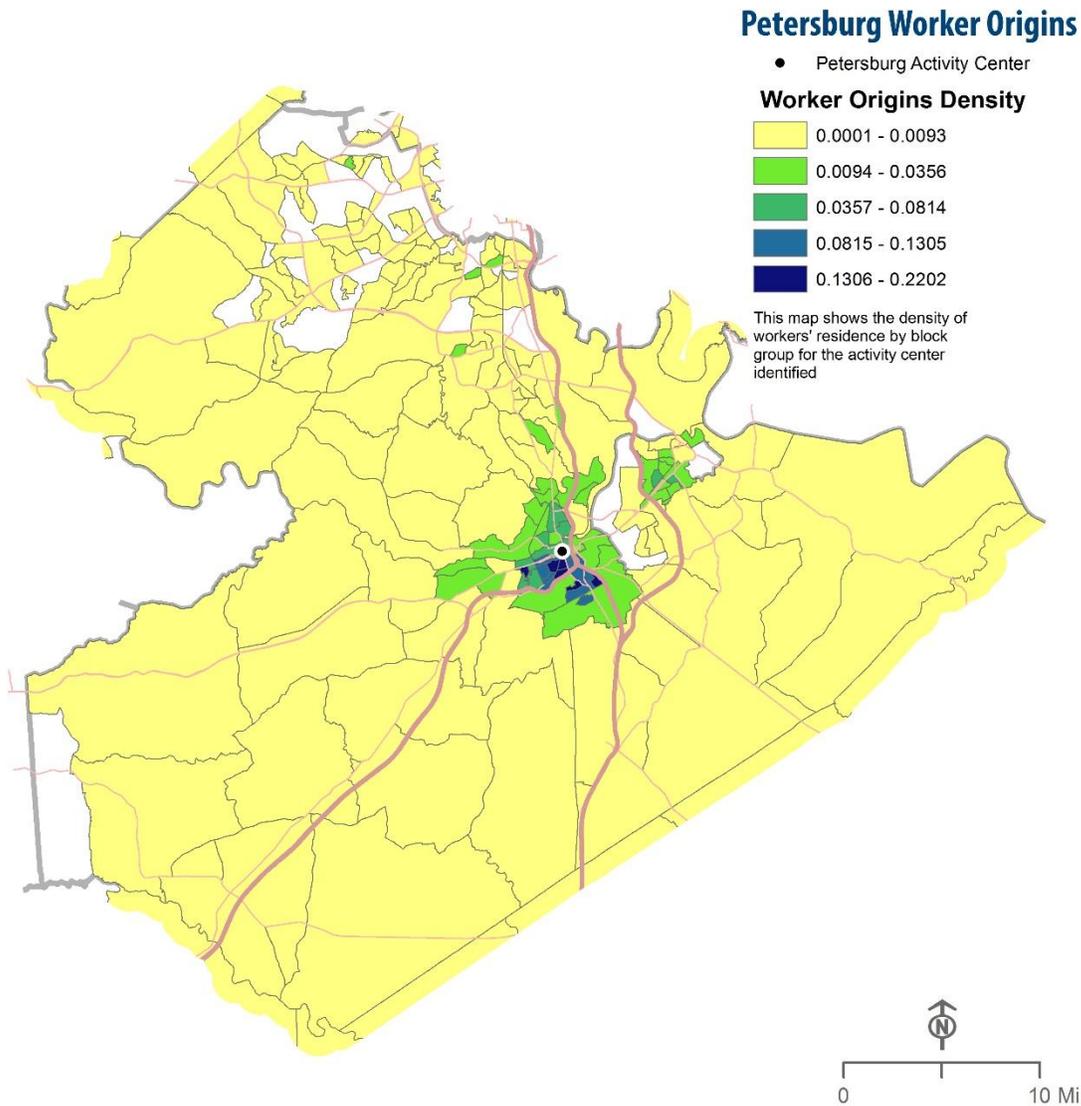
Figure 13: Commuting Patterns to Petersburg Activity Center.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Following a similar pattern to the Petersburg activity center, the commutes to the South Crater activity center are heavily concentrated in the Cities of Petersburg, Hopewell, and Colonial Heights. Conversely from the Petersburg activity center, there are a modest number of commutes originating in Chesterfield County.

South Crater Worker Origins

• South Crater Activity Center

Worker Origins Density

	0.0001 - 0.0041
	0.0042 - 0.0122
	0.0123 - 0.0261
	0.0262 - 0.0586
	0.0587 - 0.1160

This map shows the density of workers' residence by block group for the activity center identified
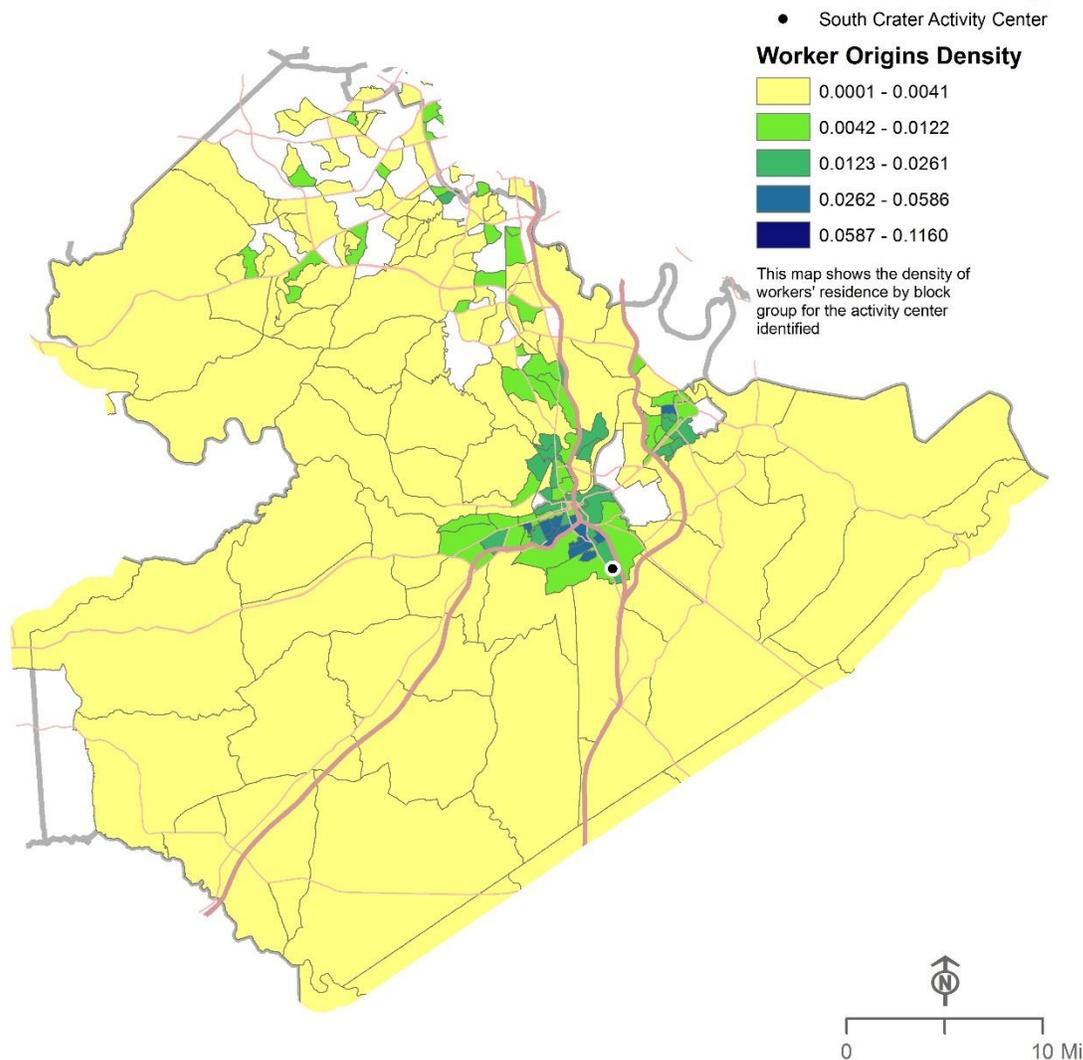
Figure 14: Commuting Patterns to South Crater Activity Center.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Mode Choice

In the Tri-Cities Region, the 85% of workers drive alone to work. For all jurisdictions in the region, carpooling is the second most prevalent option, accounting for 8% of the mode share. Public transit and walking accounted for 1% of the regional modal share. (Refer to Figure 15).
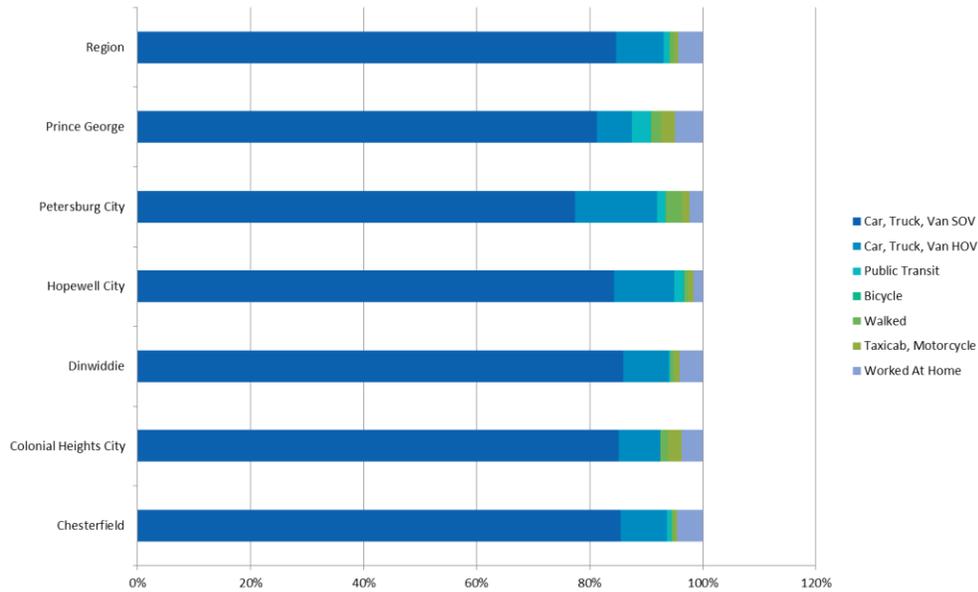
Figure 15: Mode Share Split by Jurisdiction.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Average Commute Times

In the Tri-Cities Region, average commute times range from 22 to 30 minutes among the various jurisdictions. (Refer to Table 9). Due to its density and proximity to employment centers, the City of Hopewell has the shortest average commute, while more rural areas, like Dinwiddie County, have longer commutes on average.

Table 9: Mean Commute Time by Jurisdiction.

Jurisdiction	Mean Commute Time (Minutes)
Chesterfield	27.0
City of Colonial Heights	22.4
Dinwiddie	30.2
City of Hopewell	23.4
City of Petersburg	23.9
Prince George County	24.1

Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Commutes of over 45 minutes account for 9% of regional commutes. Dinwiddie County has the highest percentage of workers who commute over 45 minutes at nearly 17%, this is twice as high as both the City of Colonial Heights and the City of Hopewell's rate of long commutes. (Refer to Figure 16).
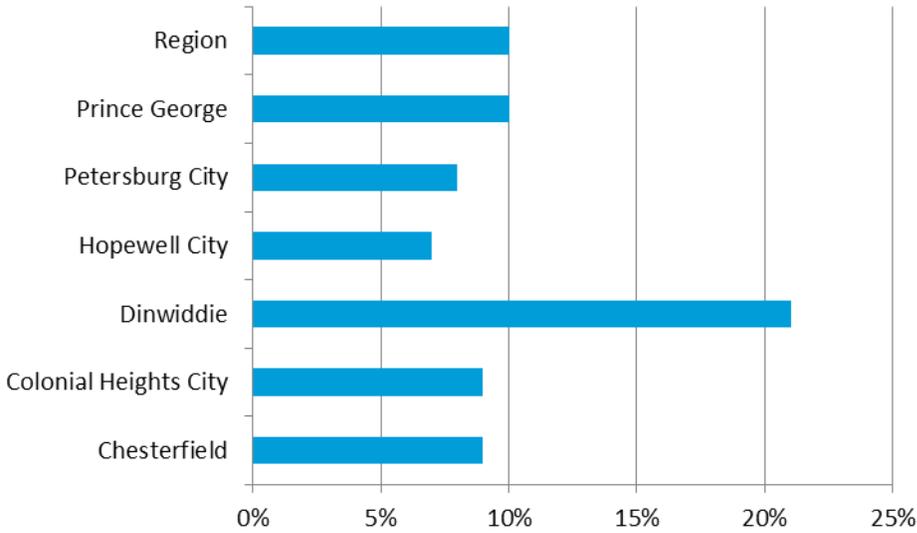
Figure 16: Percent of Commutes Long than 45 Minutes.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Figure 16 provides a closer look at where longer commutes originate. In the Cities of Hopewell, Petersburg, and Colonial Heights, commute times are below average for the region. Block groups on the rural fringes of the region, have much longer commutes than the regional average, as these areas have fewer jobs in close proximity, and less access to transportation networks than more developed areas.

Commute Time

● Activity Centers

Average Commute Time (Minutes)

- 10 - 20
- 21 - 26
- 26.4 (Average)
- 27 - 35
- 36 - 47

This map shows the Areas with average commute time above or below regional average. The regional average is 26.4 min. The formula is the Average Time divided by the Regional Average

Source:
American Community Survey
2009-2013 5 Year Estimate,
Table B08303
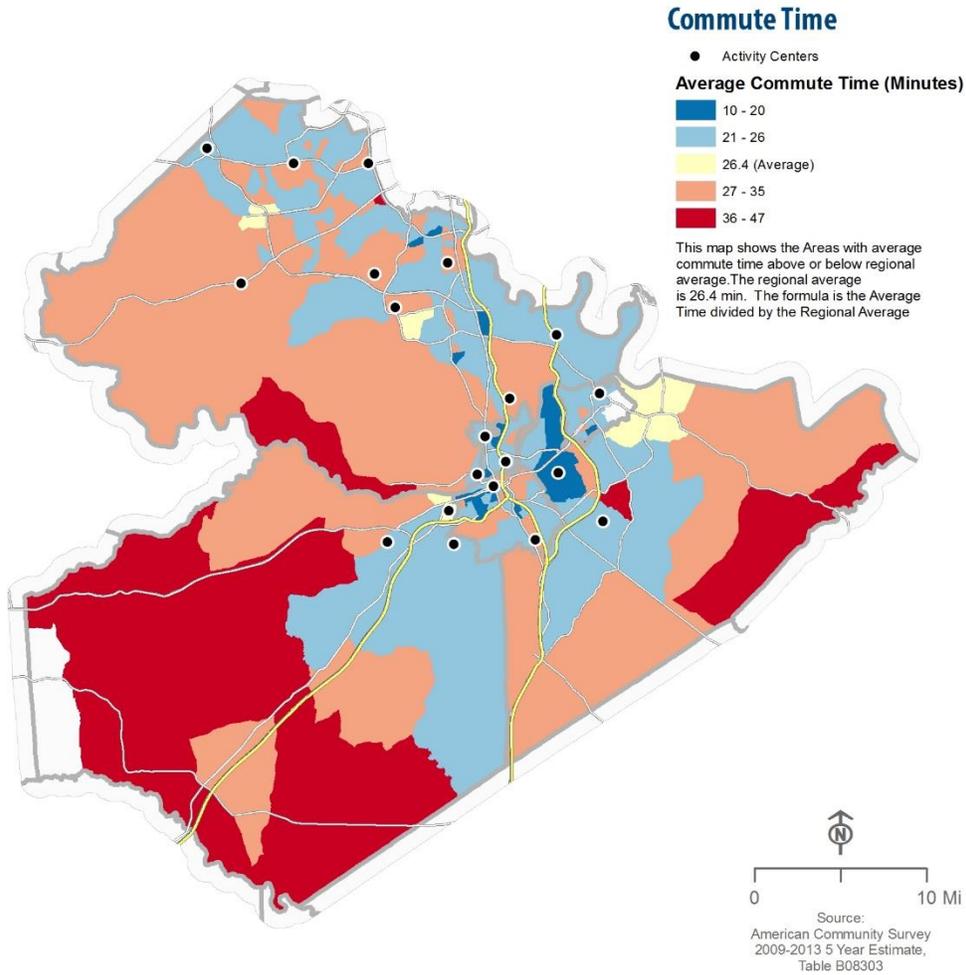
Figure 17: Tri-Cities Region Commute Times.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

C. Accessibility to Employment

As part of the transportation conditions assessment, a set of accessibility performance measures and attributes were developed to assess the workforce and freight accessibility at the general regional scale. This set of performance measures reflects regional characteristics such as travel times and the availability of multimodal transportation between activity centers. The accessibility to employment measure was calculated using an accessibility model developed by the consultant team that measures the number of jobs reachable in a given travel time, using actual travel times on a network, whether highway, transit or pedestrian. The total number of jobs accessible was also "distance decayed," that is the value of each job was decayed by a factor based on how long it took to travel to it. The distance decay factors were developed from traveler surveys that reflect actual preferences for travel to employment based on the length of the trip.

Auto Accessibility

Auto Accessibility in the Tri-Cities Region area is driven by two main factors: distance from activity centers, and distance from major arterial roadways. Accessibility for auto travel is measured as the number of jobs that can be reached within a 45 minute drive. The areas with the highest level of auto accessibility exist in Chesterfield County and the City of Colonial Heights. The auto accessibility scores were much lower in Prince George County, Dinwiddie County, the City of Petersburg, and the City of Hopewell. The accessibility to jobs is weighted by the population affected to provide further insight into the relative degree of access to employment for residents among areas of the region. (Refer to Figure 18).
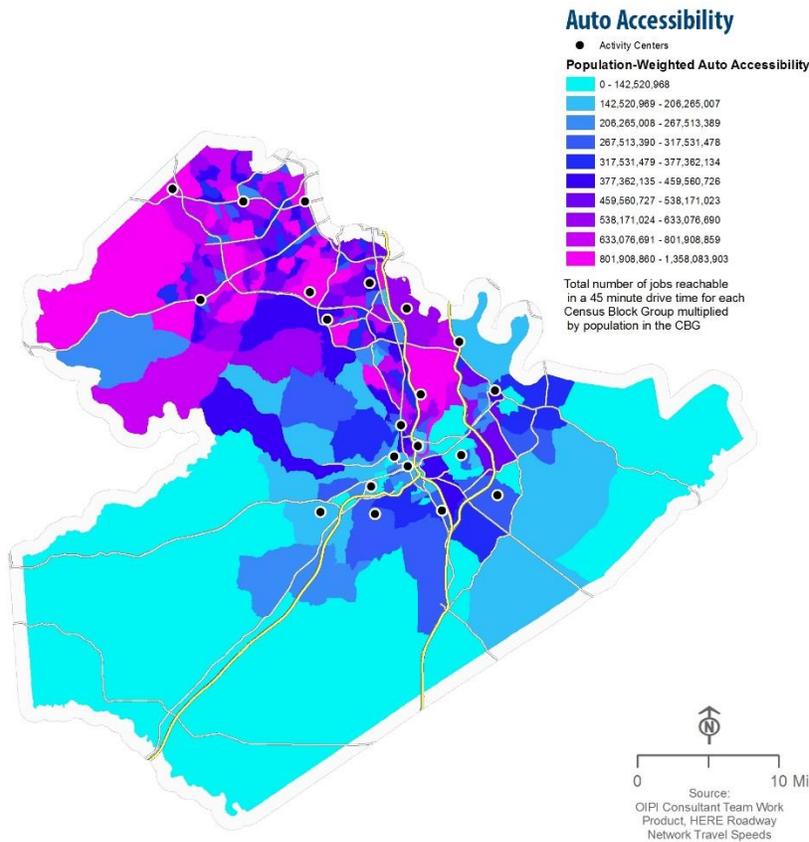
Figure 18: Auto Accessibility

Transit Accessibility

Outside of the City of Petersburg and northern Chesterfield County, there are few fixed-route transit options in the Tri-Cities Region. This is reflected not only in the low (fixed route) transit accessibility scores for large parts of the region, but also the low number of jobs accessible from the high scoring areas. Due to the lack of inter-city transit options in the region (other than demand response services), commuters using transit are restricted in their ability to reach regional jobs. (Refer to Figure 19).

Transit Accessibility

- Activity Centers

Population-Weighted Transit Accessibility
- 0
- 1 - 2,434,293
- 2,434,294 - 3,392,514
- 3,392,515 - 4,585,459
- 4,585,460 - 6,534,550
- 6,534,551 - 6,943,027
- 6,943,028 - 8,946,758
- 8,946,759 - 14,992,188
- 14,992,189 - 27,201,311
- 27,201,312 - 57,404,724

Total number of jobs reachable
in a 45 minute transit time for each
Census Block Group multiplied
by population in the CBG

0   10 Mi

Source:
OIPI Consultant Team
Work Product, Transit
Agency GTFS Data

Figure 19: Transit Accessibility

Walk Accessibility

Walk Accessibility in the area is largely determined by the mix of land use and density of development surrounding the origin of each trip. The areas of the Tri-Cities Region with the highest walk accessibility are north and central Chesterfield County, the City of Petersburg, the City of Hopewell, and the City of Colonial Heights. The high variability within even the highest scoring areas reflects the significance of land use and job density in determining walk accessibility. (Refer to Figure 20).

Walk Accessibility

● Activity Centers

Population-Weighted Walk Accessibility

- 0
- 1 - 36
- 37 - 266
- 267 - 1,049
- 1,050 - 2,954
- 2,955 - 6,263
- 6,264 - 11,624
- 11,625 - 22,383
- 22,384 - 56,410
- 56,411 - 8,917,507

Total number of jobs reachable
in a 45 minute walk time for each
Census Block Group multiplied
by population in the CBG

0 ———— 10 Mi

Source:
OIPI Consultant Team
Work Product
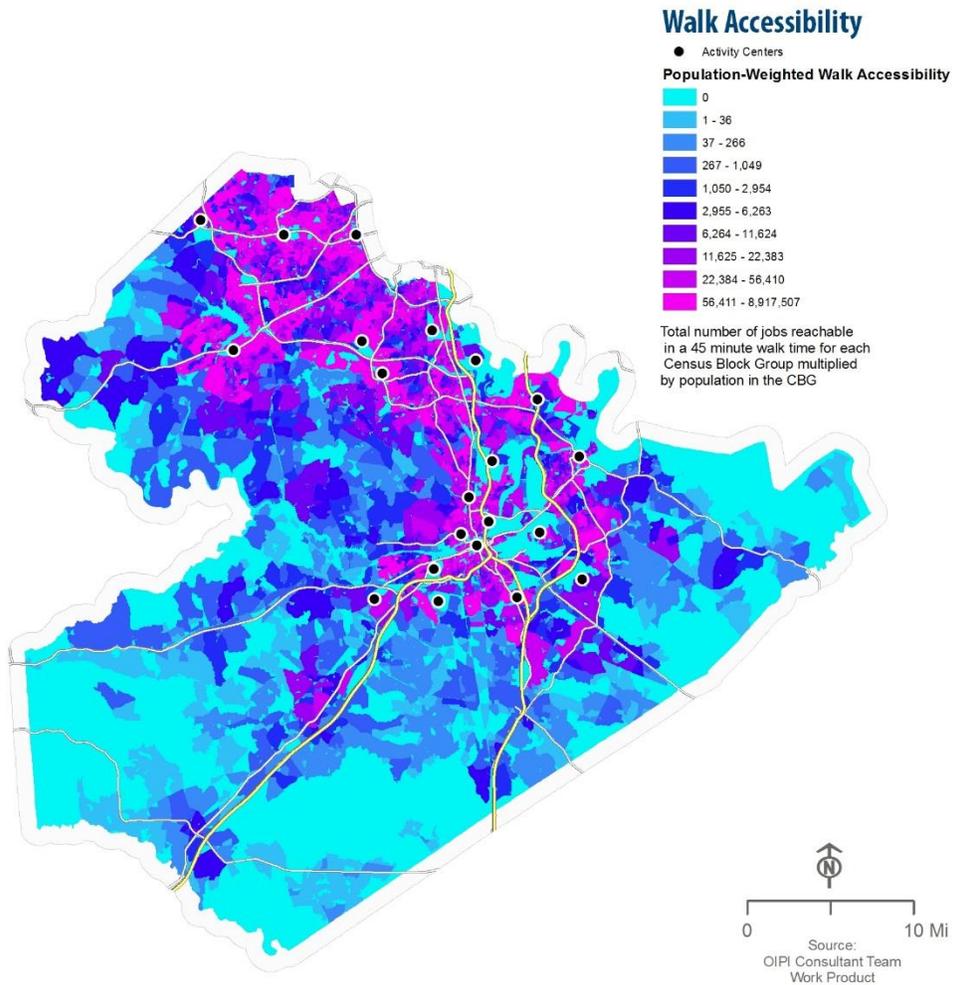
Figure 20: Walk Accessibility

Freight Accessibility

In addition to railways, US Route 460, I-95, I-85 and I-295 are the major corridors for freight movement throughout the region. Accessibility of freight origins to these roadways is dependent primarily on the proximity of the origin to highway access ramps. Most activity centers in the region are within an eight minute drive from a major arterial ramp. (Refer to Figure 21).

Access to Interstate or Principal Arterial Ramps

● Activity Centers

Blockgroup to Interstate or Principal Arterial Ramps

Drive Time (Minutes)

- 20.1 – 26.0
- 12.1 – 20.0
- 8.1 – 12.0
- 6.1 – 8.0
- 4.1 – 6.0
- 3.1 – 4.0
- 2.1 – 3.0
- 0.1 – 2.0

0   10 Mi

Source:
OIPI Consultant Team Work Product
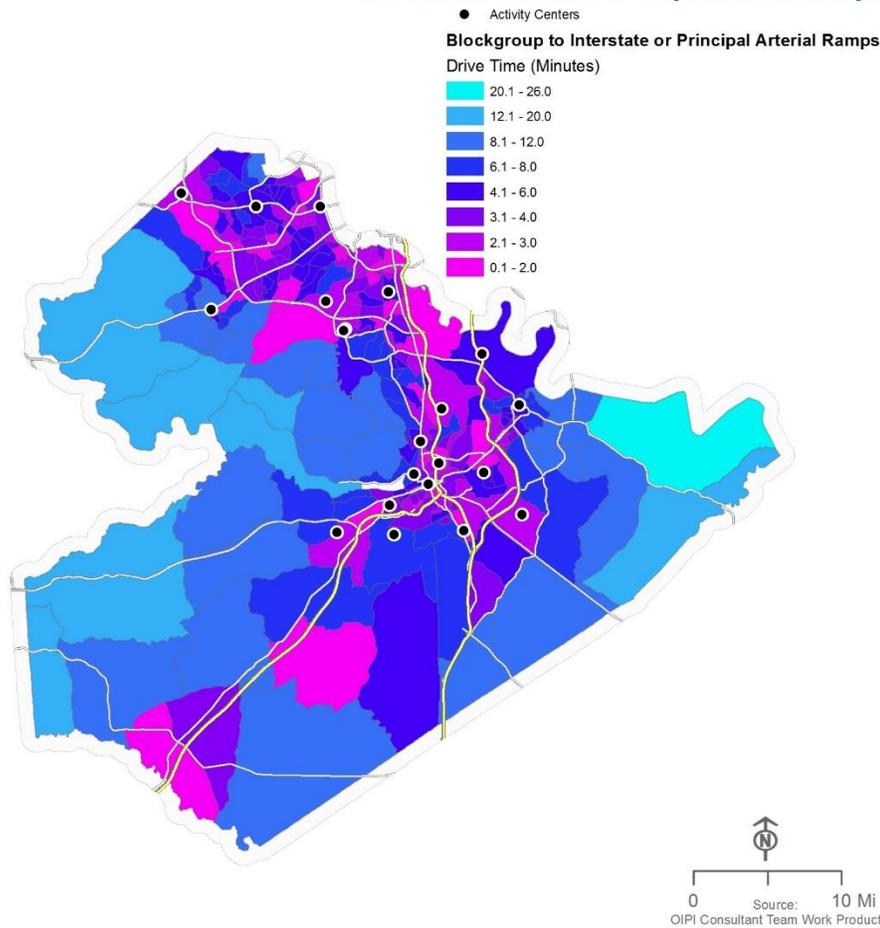
Figure 21: Access to Interstate and Principal Arterial Ramps

The location of warehouses and distribution centers is another important factor in the level of freight accessibility for the region. Most warehouses and distribution centers in the Tri-Cities Region are clustered around I-295, I-95, and US Route 460. Most areas within the Cities of Petersburg, Colonial Heights, and Hopewell, as well as Prince George County, have access to a warehouse or distribution center within a ten minute drive. (Refer to Figure 22).
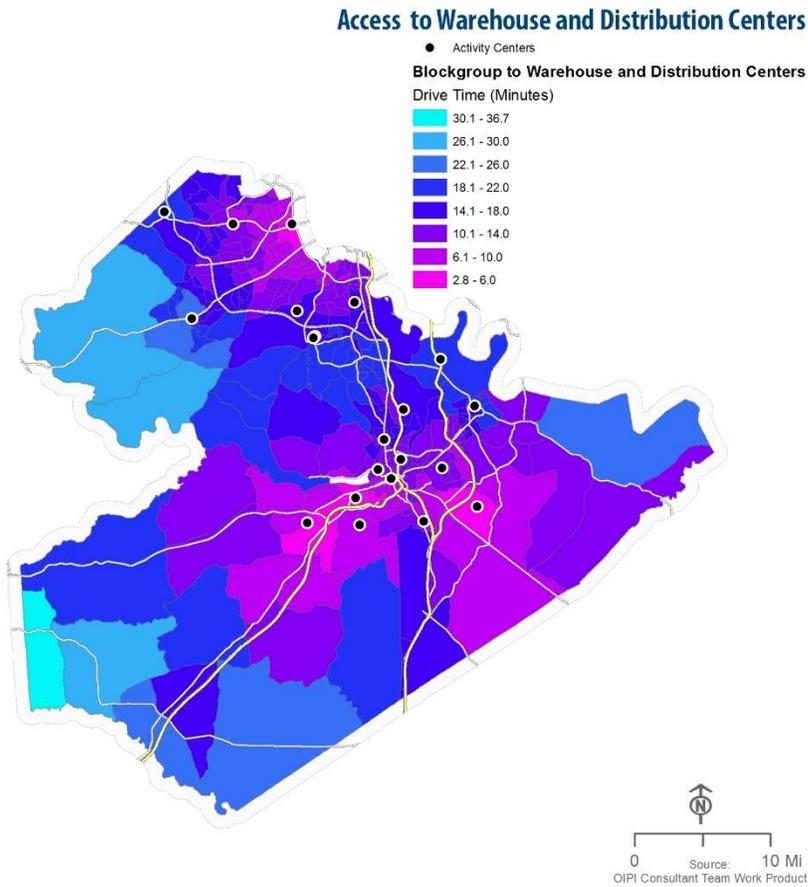
Figure 22: Access to Warehouses & Distribution Centers

Both CSX and Norfolk Southern operate freight rail lines that pass through the much of the Tri-Cities Region, including the City of Petersburg, Chesterfield County, and the City of Hopewell. Prince George County is served by Norfolk Southern only and the City of Colonial Heights is served by CSX only. Richmond International Airport is the closest major airport that handles large quantities of freight. It less than an hour drive to Richmond International Airport from most areas of the Tri-Cities Region. (Refer to Figure 23).

Access to International Airports

- Activity Centers

Blockgroup to International Airports
Drive Time (Minutes)

- 54.1 - 72.5
- 42.1 - 54.0
- 38.1 - 42.0
- 34.1 - 38.0
- 30.1 - 34.0
- 26.1 - 30.0
- 22.1 - 26.0
- 17.0 - 22.0

0   Source: 10 Mi
OIPI Consultant Team Work Product
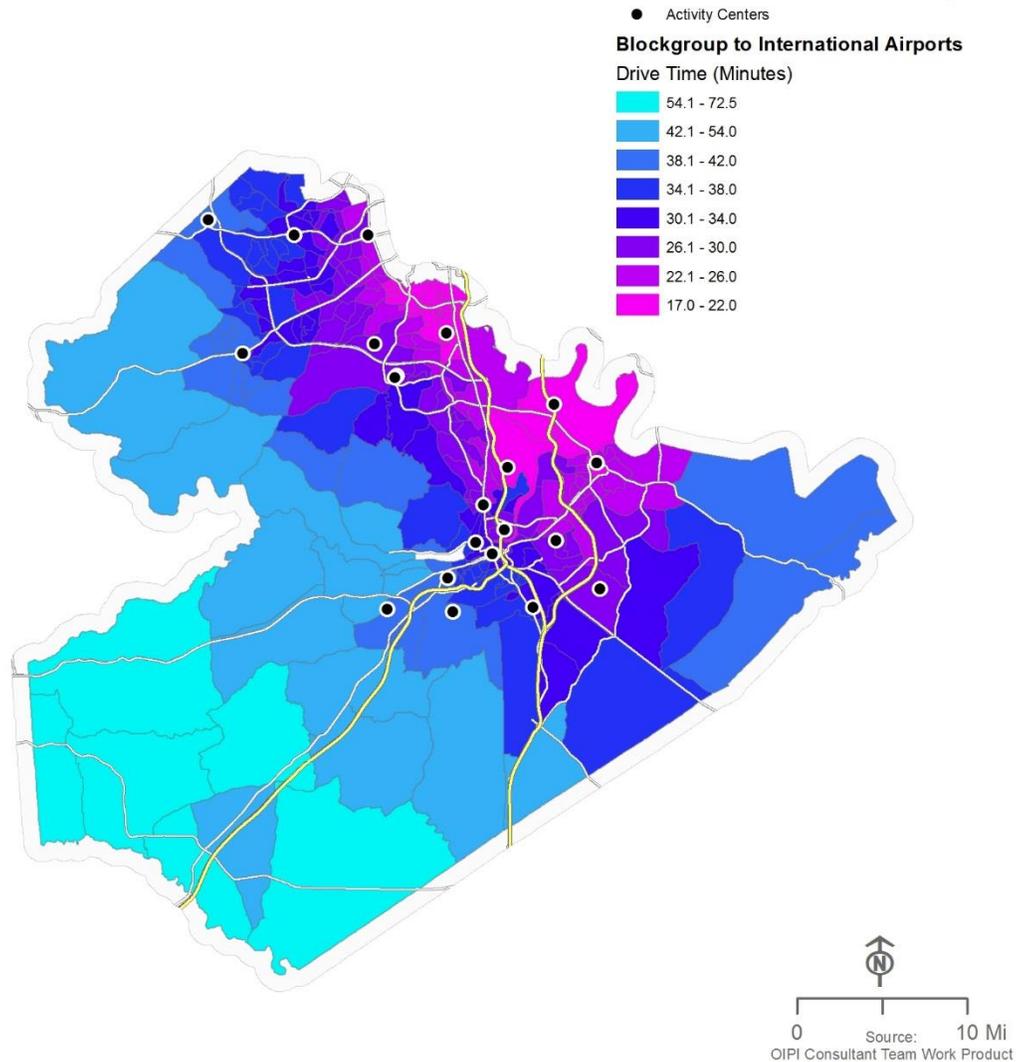
Figure 23: Access to International Airports

D. Roadway Measures

This assessment identified the transportation conditions in Tri-Cities Region based on a series of quantitative roadway measures. The findings in this section reflect corridor-level measures that are critical to access and mobility for people and freight.

Travel Time Reliability

Travel time reliability measures the frequency by which trips along a specified corridor are significantly delayed. The Reliability Index, as shown in Figure 18 below, is defined as the ratio of the median speed to the 90th percentile speed during the weekday AM peak period. Data for major roadways in the Tri-Cities Region were available for analysis. Overall, scores on the travel time reliability index indicated high travel time reliability for both corridors. The reliability index scores are higher in several locations along

US Route 1 in Dinwiddie County and various roadways in Chesterfield County, representing slightly lower levels of travel time reliability. There are, however, no areas of significant concern in either of the aforementioned areas. (Refer to Figure 24).
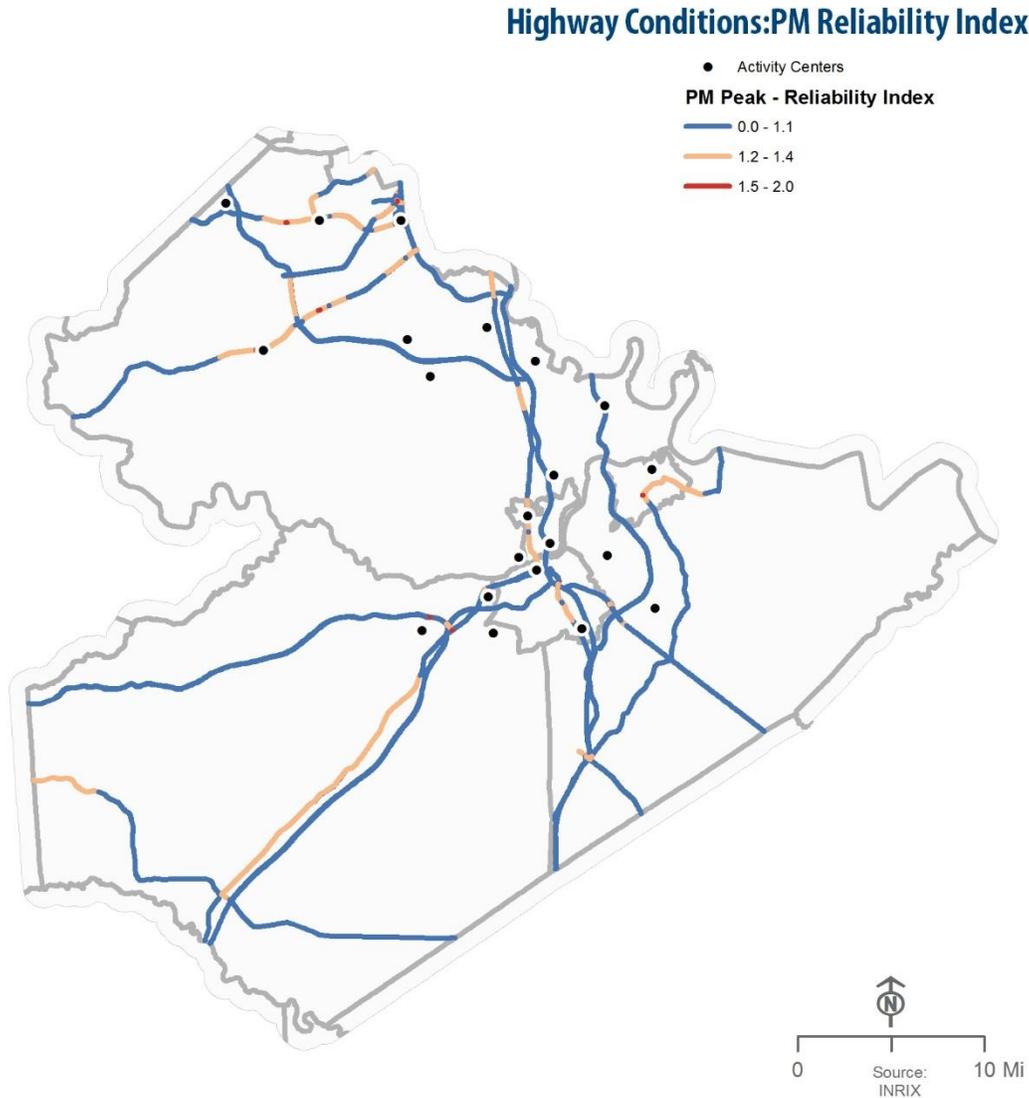
Figure 24: Travel Time Reliability

Percent of Time Congested

Congestion is an important determinant of roadway level of service. The percentage of time congested was calculated for evening peak times from 2013 to 2014 for major corridors in the region. According to the analysis, the major roadways do not have congestion issues. All major roadways analyzed are congested less than 5% of the time. (Refer to Figure 25).

Highway Conditions: PM Percent Time Congested

Legend:
- Activity Centers

PM Peak - Percent Time Congested
- 0% - 3.7%
- 3.8% - 17.7%
- 17.8% - 47.1%

PM peak percent time congested. A percentage of the time that a typical vehicle spent in significantly congested conditions in 2014. Significant congestion is defined as operating at speeds below 50% of the free-flow speed. The free-flow speed is measured as the 85th percentile overnight speed.

0   Source: INRIX   10 Mi

Figure 25: Percent of Time Congested

Median Speeds

Median speeds were calculated for major roadways in the region and are represented as the ratio of pm peak hour vehicle speeds and the speed limit for the PM peak period. Speeds greater than 1.0 indicate travel at speeds higher than the speed limit. The ratio of median speed to speed limit shows problems in congested areas like the I-95/I-85 Interchange and US 460 between I-95 and I-295. (Refer to Figure 26).

● Activity Centers

Ratio of Median Speed and Speed Limit

— 0.00 - 0.50
— 0.51 - 0.85
— 0.86 - 1.00
— >1

This map displays the ratio of pm peak hour vehicle speeds and the speed limit. Speeds greater than 1.0 indicate travel at speeds higher than the speed limit.

0   Source: INRIX   10 Mi

Figure 26: Median Speeds

D. Regional & Local Commodity Flows

Although not strictly an intra-regional issue, an understanding of commodity flows is one important piece of identifying and characterizing how transportation systems support regional businesses. Freight flows within, out of, and to the Tri-Cities Region support local businesses by moving goods to market and allowing business to access key material inputs. The measures below discuss modal dependence of freight commodities, as well as the top commodities in the region by monetary value, geographic destination, and tonnage.

Modal Dependence

The ability of goods and services to flow between industries and customers is the foundation of a functioning economy. Freight delivery is essential to enable input commodities to reach production locations, deliver intermediate goods, and also to deliver finished products to customers. Industry

output (sales) in this context can be considered to be "dependent on freight," since transportation is used to move products between buyers and suppliers.

This section assesses the relative reliance of different industries on modes, quantified in terms of dollars of freight-dependent industry output. In the Tri-Cities Region, an average of 88% of the dollar value of all goods that are moved through the region are moved by truck. Rail is the second most prevalent mode, carrying around 12% of the total dollar value of goods. Other modes of freight movement account for less than 1% of total dollar value goods. (Refer to Figure 27).
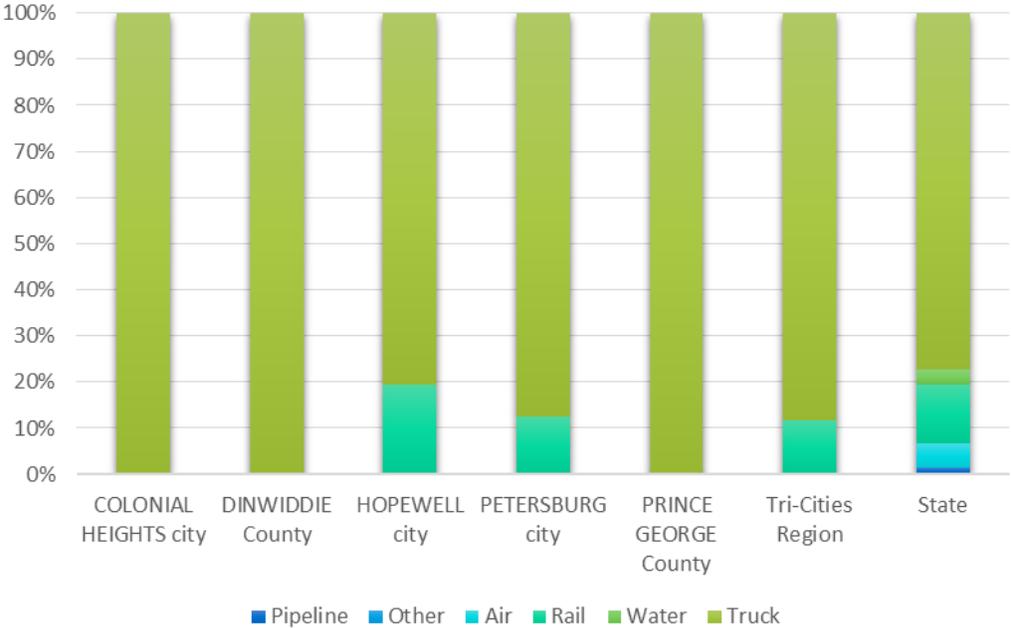
Figure 27: Comparison of Freight Modal Dependence
Source: TranSearch, 2012

Location quotients are used to compare the prominence of freight modes between the Tri-Cities Region, and the state as a whole. The Tri-Cities Region relies on trucks for freight movement 1.15 times more than the does the state as a whole. Rail and air transportation for goods is more common for the state on average than it is for the Tri-Cities Region. This reflects the greater density of freight rail lines in other portions of the state. Although the Tri-Cities Region is relatively close to the Richmond International Airport, about a half hour drive, air is not a common way of moving goods in the region. (Refer to Figure 28).
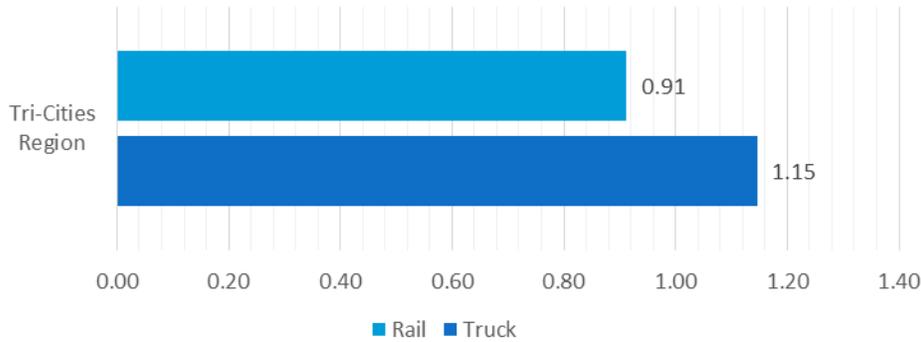
Figure 28: Location Quotient by Mode of Freight Travel
Source: TranSearch, 2012

Top Commodities

While the prior section addressed freight modal dependence on the basis of industry output, this section describes commodities shipped into and out of the region, as measured in terms of the dollar value and tonnage of each commodity group. Transportation equipment accounts for the most valuable freight moving into the Tri-Cities Region. Chemical products are the most valuable export from the Tri-Cities Region, accounting for over $2 billion worth of exports. Overall, the Tri-Cities Region imported over $5.4 billion worth of goods and exported $4.7 billion worth of goods, resulting in $7 million of net imports in 2012. (Refer to Figures 29 and 30).
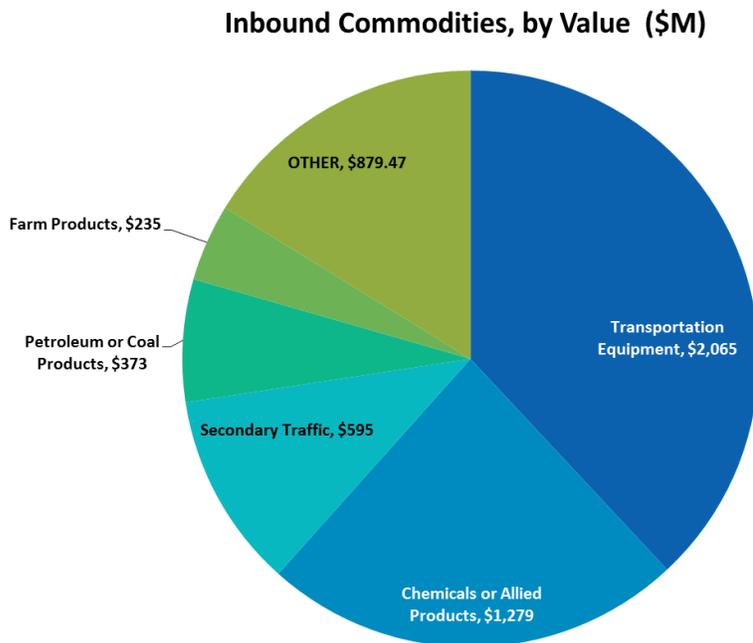
Figure 29: Top Freight Values by Commodities.
Source: TranSearch, 2012

Outbound Commodities, by Value ($M)

Food or Kindred Products, $175

Pulp, paper or Allied Products, $257

Primary Metal Products, $363

Secondary Traffic, $873

OTHER, $666

Chemicals or Allied Products, $2,362
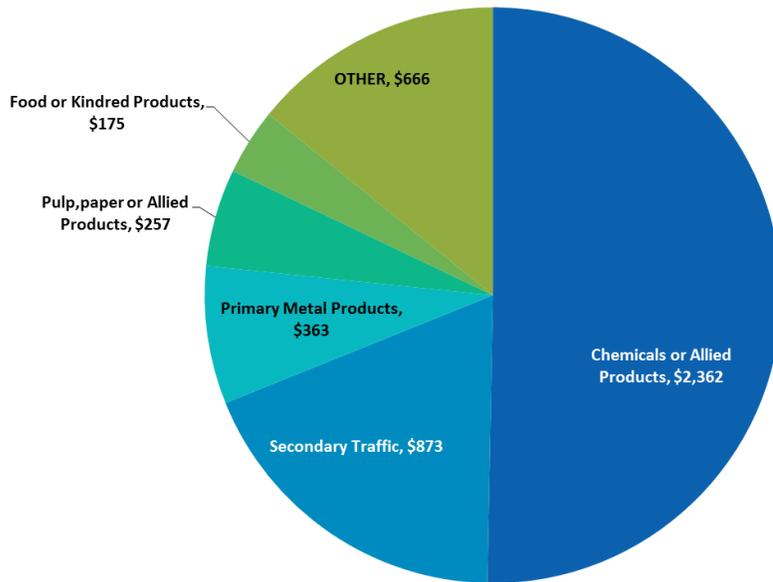
Figure 30: Top Freight Values by Commodities.
Source: TranSearch, 2012

In terms of both value and tonnage, the Tri-Cities Region exported more to the Southeast Region than any other region in the United States. In 2012, almost $1.2 billion dollars, or 1.8 million tons, of freight was exported to the Southeast. (Refer to Figure 31).
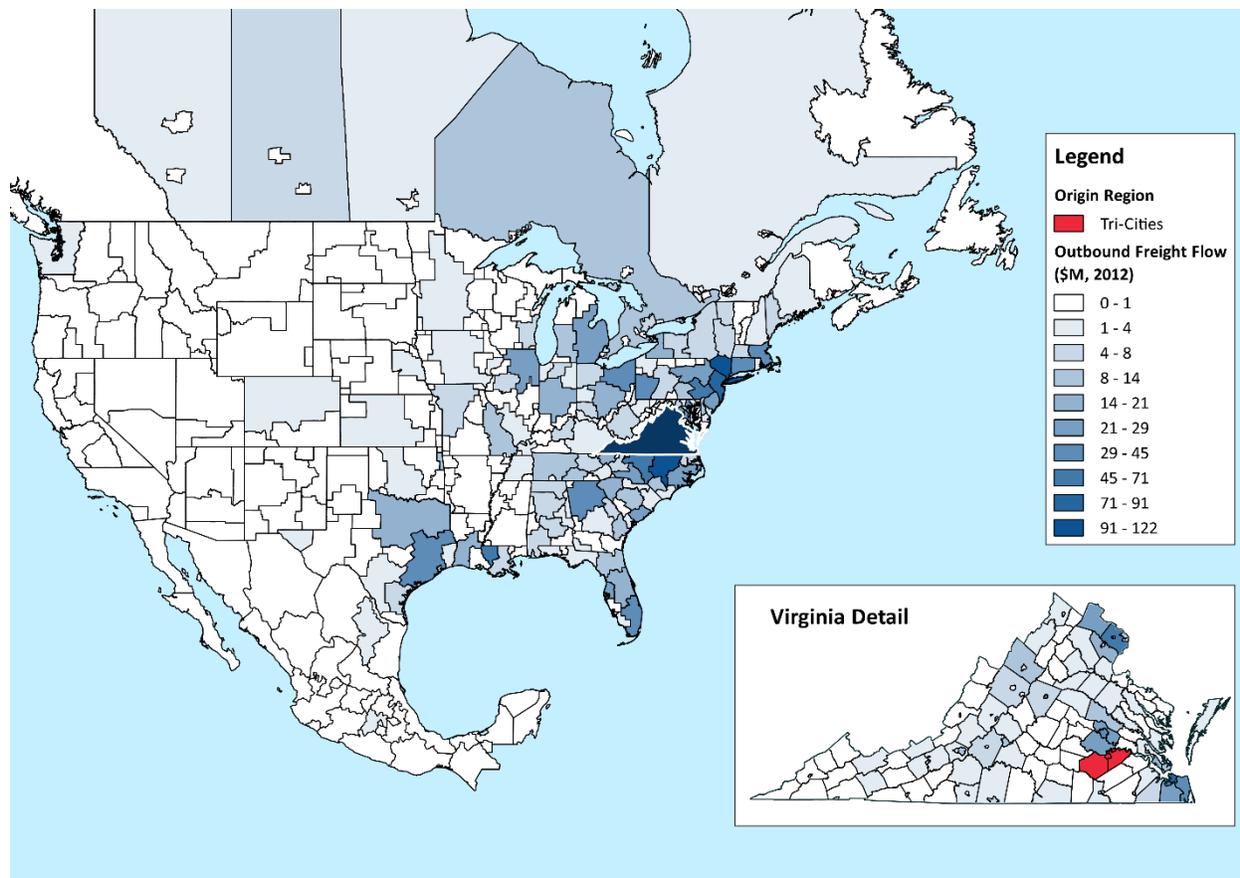
Figure 31: Top Freight Values by Region.
Source: TranSearch, 2012

The next figures present information on top commodities moved to and from the region, based on their tonnage. Considering freight movements both in terms of value and in terms of tonnage provide distinct perspectives for transportation planning. Value most directly relates to economic activity, while tonnage can serve as one indicator of likely wear and tear imposed on the transportation network by freight movement. When freight movements were analyzed by weight, nonmetallic minerals accounted for the largest share of freight movements imported into the region. Nonmetallic minerals and chemical or allied products account for the largest tonnage of freight exported from the Tri-Cities Region. (Refer to Figures 32 and 33).

Inbound Commodities, by Weight (000s of tons)

Petroleum or Coal Products, 435

OTHER, 1

Secondary Traffic, 464

Nonmetallic Minerals, 986

Waste or Scrap Materials, 623

Chemicals or Allied Products, 957
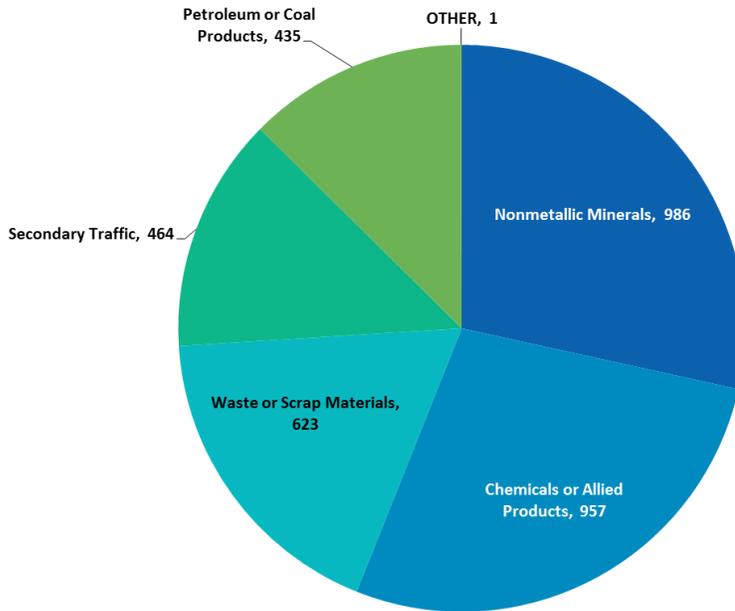
Figure 32: Top Commodities by Weight – Inbound.
Source: TranSearch, 2012

Outbound Commodities, by Weight (000s of tons)

Pulp,paper or Allied Products, 350

OTHER, 1

Clay,concrete,glass or Stone, 360

Secondary Traffic, 710

Nonmetallic Minerals, 3,075

Chemicals or Allied Products, 1,439
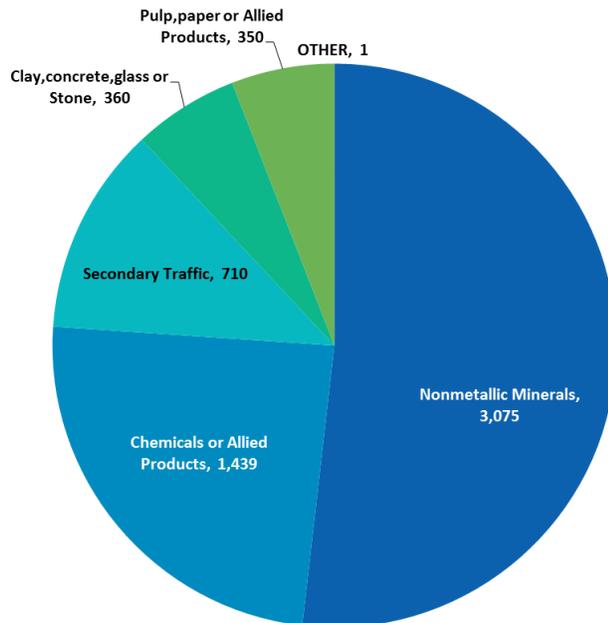
Figure 33: Top Commodities by Weight - Outbound.
Source: TranSearch, 2012

4. NEEDS PROFILE

A. Introduction

Based on the overall approach to the VMTP Needs Assessment, Transportation Needs will be identified as deficiencies or gaps in the transportation conditions that are most critical to each region's key future industries, with an emphasis on attracting and retaining the future workforce and supporting Virginia businesses' goods movement needs. The key economic and transportation conditions have been identified in the Economic and Transportation profiles above economic and transportation linkages are discussed at length in the Regional Network Needs Assessment Introduction.

The Needs Assessment relates current transportation conditions and deficiencies to key future industries and economic profiles. The Needs Assessment, however, does not propose specific projects to address the Transportation Needs in each region, since this should be done by MPOs, localities and other nominating entities when they put forward projects for potential funding programs, including those subject to HB2 screening. Instead, the VMTP Transportation Needs Assessment is intended to identify a set of regional Transportation Needs in order to be able to compare proposed projects to Needs. The Needs Assessment also uses a spatial analysis for the Region to provide observations about specific corridors, travel markets, and activity centers in addition to the regional profiles that will provide more detail regarding specific areas within the region around which some of the transportation needs are focused.

Needs have been identified based on both stakeholder input and on the analysis of economic and transportation conditions. In the first round of Regional Forums, held in May, 2015, the transportation and economic conditions were presented to groups of regional stakeholders. Following this, a discussion was held with the stakeholders to connect the transportation conditions to desired economic futures and begin identifying potential Needs.
These Needs were categorized into a series of five very broad types of capacity Needs:
1.   Corridor Reliability/Congestion
2.   Network Connectivity
3.   Transportation Demand management
4.   Modal Choice
5.   Walkable/Bikeable Places
Non-Capacity Needs (i.e. Safety, Operations and State of Good Repair Needs) were also recorded when they were identified from stakeholder input, although these were not the focus of the Regional Networks Needs Assessments. The potential Needs identified in the first Forum were analyzed by the OIPI teams against the economic and transportation data that was assembled for each region and, where data was found to support the proposed Needs, these Needs were included and documented. In addition, the Study Team analyzed all the overall assembled data for each region in order to identify additional Needs not identified in the Forum, to assemble a more complete picture of potential Transportation Needs in each region, with a particular focus on attracting and retaining the 21st century workforce needed for each region's 2025 economy.

B. Economic and Transportation Needs Correlation

The Study Team conducted a number of research efforts aimed at identifying key correlations between industries and their transportation needs, as described further in the introductory document, VMTP 2025 Needs Assessment: Regional Networks Introduction. These included national research of industry trends in workforce needs and goods movement needs and a national survey of site selection professionals conducted by the Southeastern Institute of Research. Based on the findings of this research, the following table outlines the key correlations between three broad industry sectors (Local, Knowledge and Freight sectors) and their general transportation needs. It should be noted that the table does not reflect that these industry sectors always have these and only these transportation needs. Individual industry types and individual business needs for transportation will vary and the table only represents where there were apparent correlations between industry sectors and basic categories of transportation needs.

Table 10: Economic and Transportation Correlation. Source: Summary correlations based on national research and survey of national Industry Site Selection Professionals conducted by OIPI Consultant Team.

Economic and Transportation Correlation Table			
	Local Sector	**Knowledge Sector**	**Freight Sector**
Highway Access	HIGH	HIGH	HIGH
Passenger Reliability	MED	HIGH	MED
Bottleneck Relief	MED	HIGH	HIGH
Freight Reliability	MED	MED	HIGH
Freight Accessibility	MED	LOW	HIGH
Network Connectivity	HIGH	HIGH	MED
Transportation Demand Management	LOW	MED	MED
Modal Choice	HIGH	HIGH	MED
Transit Access	MED	HIGH	MED
Active Transportation Options	MED	MED	LOW
Walkable Places	MED	HIGH	LOW

The above table of correlations was used to identify potential categories of Transportation Needs in the region by linking prominent regional economic sectors with anticipated Needs and comparing these to the general transportation conditions that currently exist, as described below.

C. General Regional Needs

As discussed in the Economic Profile above, when the 2025 Future Economic Profile was estimated for the Tri-Cities Virginia Region, it showed an expected decline in the share of output coming from freight-based sector and an increase for the knowledge-based sector. Furthermore, the healthcare sector is expected to see significant employment growth by 2025.

In addition, the local input received in the outreach to regional stakeholders and in local plans such as the Comprehensive Economic Development (CEDS) plan for the region indicate a strong desire in the region to support the burgeoning advanced manufacturing and logistics sector, particularly with respect to goods movement needs, but also to support the expected growth of the knowledge sector and its needs for reliable commuting and additional modal travel options. This translates into transportation needs such as freight accessibility and passenger reliability on the region's prime corridors, such as I-95, I-85 and US 460, and the passenger and freight rail corridors that generally parallel the highways. It also indicates the need for addressing any bottlenecks along these prime corridors to further support reliable travel for both commuters and goods movement. In addition, other key corridors that support activity centers in the region, such as Route 36 are important commuter routes and serve economic growth in Fort Lee, downtown Petersburg.

The forecasted growth in the knowledge economic sector for this region brings the potential for additional transportation needs. The Economic and Transportation correlations for the knowledge industry sector particularly point to improving modal choice, transit access and walkable places. The local economic sector also has important correlations with transit accessibility to support workforce access to these kinds of jobs. Therefore, transportation needs in the region should include expanding transit access, both within the region's economic activity centers, and between the centers. Fixed route transit exists in the region primarily within the City of Petersburg only. However, the expansion of knowledge-based and local-based sectors would benefit from both additional fixed route transit in the region and additional demand-response rural transit to provide better workforce access. Further support for the knowledge sector would also come from additional walkable places and modal options for walking and biking in the region.

The above represent general transportation needs for the region based on an analysis of its economic sectors and projected growth. More specific needs from a more detailed spatial analysis of the economic and transportation conditions in the region are described below.

D. Spatial Analysis of Regional Network Needs

Summary of Needs

Potential Needs were also developed by analyzing the economic and transportation data in the region from a spatial standpoint. This analysis included the potential Needs identified by stakeholders in the first Regional Forums, as well as new Needs that emerged from the spatial analysis of the data. These Needs were categorized into a series of very broad types of capacity Needs as described above. The spatial analysis of Needs consists of a Map of Needs, a table of identified Needs, and a Findings of Needs that summarizes the economic and transportation findings to support each identified Need. Each of these is summarized below.

Map of Needs

The map below summarizes the regional Transportation Needs according to Activity Centers and corridors. The Needs are summarized and color coded by general category. Each of the Needs is also numbered and keyed to the Finding of Needs table.

Findings of Needs

The table below lists each of the identified Transportation Needs in the Region, and describes the basis for each Need in terms of economic and transportation findings and data. The analysis of Regional Network Transportation Needs for the region was compiled into a table that identifies the following findings of need:

1. Category of Need
2. General Description of Need
3. Economic findings to support need
4. Transportation findings to support need

The findings to support the determination of need generally came from the statewide datasets of economic and transportation conditions summarized above. However, in cases where the statewide data is not of a fine enough grain or level of detail to accurately determine a Need, it was supplemented by locally obtained data from studies or plans. It is important to note that local plans and studies were not used to identify proposed projects as Needs, but only for supporting data to make an objective determination of need.

*Figure 34: Summary Needs Map for the Tri-Cities Region*

Tri-Cities Region Needs Summary

Needs Map

Activity Centers
Railroads

TYPES OF NEEDS

	REGION WIDE OR SITE SPECIFIC	CORRIDOR-BASED	ACTIVITY CENTER-BASED
COORRIDOR RELIABILITY/CONGESTION			
NETWORK CONNECTIVITY			
TRANSPORTATION DEMAND MANAGEMENT			
MODAL CHOICE			
WALKABLE/BIKEABLE PLACES			

Note that 2 or more Types of Needs are shown with multiple colors

Ⓐ NEEDS INDICATED BY LETTERS DESCRIBED IN NEEDS TABLE

0 ___ 5 Mi

Needs Table

A. I-95 & 85 Corridor Reliability & Connectivity

The I-95 & 85 Corridors are key regional arteries for the region and they handle commuter and freight traffic as well as connect the region to other parts of Virginia. Poor design characteristics and deficient access at the 95/85 interchange and adjacent interchanges causes reliability issues and limits access to the surrounding area including key activity centers like Downtown Petersburg and Fort Lee.

B. US 460 Corridor Reliability

US 460 is a key freight corridor connecting the region to the Port of Virginia and ensuring reliable freight movement on this corridor is key to ensuring that key activity centers like Crosspointe remain competitive.

C. North/South Rail Reliability and Connectivity

The North-South CSX Rail Lines through the region are critical freight and passenger corridors for inter-regional movement and suffer from congestion and unreliability. Passenger rail service is not well connected to the region as the main train station for the region is not well connected to regional multimodal options and is distant from major activity centers. Major rail yards have insufficient access to highways, limiting the potential for intermodal freight movement.

D. East/West Rail Reliability and Connectivity

The East-West NS Rail Line through the region is a critical freight and passenger corridor for inter-regional movement and suffers from congestion and unreliability. Rail yards have insufficient access to highways, limiting the potential for intermodal freight movement.

E. Mode Choice connecting Petersburg, Fort Lee and Hopewell

The Route 36 Corridor and parallel routes are key links connecting Downtown Petersburg with Fort Lee and Hopewell, some of the largest employment centers in the region. Expaning transit access along this corridor or parallel routes will better connect the most Knowledge heavy activity center in the region (Downtown Petersburg) to one of the largest employers in the region (Fort Lee) and to key workforce residential areas in Petersburg and Hopewell.

F. North/South Corridors Mode Choice

Three key activity centers (Downtown Petersburg, Southpark Mall and South Crater) are along a key north/south axis and better connecting these and other activity centers along this axis will connect key Knowledge activity centers and Local Service centers to key workforce residential areas in Petersburg and Colonial Heights.

G. Freight Access for Hopewell

Hopewell is home to major manufacturing and other freight-focused industries and therefore freight truck access is a critical requirement for continued economic competitiveness.

H. Mode Choice to and from Prince George and Dinwiddie

There are limited mode choice options for workforce living in Prince George and Dinwiddie to reach other activity centers in the region and likewise there is limited mode choice for workers to reach emerging activity centers in these counties from adjacent jurisdictions.

I. Various Activity Centers - Walkable Places

There are multiple activity centers that have limited pedestrian facilities or need improved pedestrian environments. Walkable places improves appeal to the future workforce, attraction for knowledge-based industries and reduces the reliance on vehicular travel.

J. Regional Need - Modal Choice

To support active transportation, crossings of major barriers such as the Appomatox River, Interstates and railroads need to accommodate bicycles and pedestrians. Constraints are widespread and create circuitous trips and sometimes unsurmountable obstacles. One example is that no crossing of the Appomatox River has dedicated bicycle lanes.

Figure 35: VMTP Icon Key

NEEDS ICONS

Corridor Reliability and Congestion

Network Connectivity

Transportation Demand Management

Modal Choices

Walkable/Bikeable Places

ECONOMIC ICONS

Local Service Sector

Freight Based Sector

Knowledge Based Sector

TRANSPORTATION ICONS

Commuting Patterns / Modes

Multimodal Access to Jobs

Highway Network Reliability

Highway Network Bottlenecks

Freight Networks / Commodity Flows

Conditions from Stakeholder Input

A. I-95 & 85 Corridor Reliability & Connectivity

NEED

The I-95 & I-85 Corridors are key regional arteries for the region and they handle commuter and freight traffic as well as connect the region to other parts of Virginia. Poor design characteristics and deficient access at key interchanges along I-95 & I-85 causes reliability issues and limits access to the surrounding area including key activity centers like Downtown Petersburg and Fort Lee.

ECONOMIC

The 95/85 interchange and surrounding interchange are critical to connecting nearly all activity centers in the region.

TRANSPORT.

The interchanges in this area are of poor design, leading to bottlenecks, limited access to surrounding activity centers and to safety problems.

B. US 460 Corridor Reliability

NEED

US 460 is a key freight corridor connecting the region to the Port of Virginia and ensuring reliable freight movement on this corridor is key to ensuring that key activity centers like Crosspointe remain competitive.

ECONOMIC

The Tri-Cities region has significant distribution and manufacturing that is reliant on good access to the Port of Virginia via US 460.

TRANSPORT.

The US 460 Corridor provides connectivity to I-295, I-95 and I-85 for key activity centers in the southwest portion of the region.

C. North/South Rail Reliability and Connectivity

NEED

The North-South CSX Rail Lines through the region are critical freight and passenger corridors for inter-regional movement and suffer from congestion and unreliability. Passenger rail service is not well connected to the region as the main train station for the region is not well connected to regional multimodal options. Major rail yards have insufficient access to highways, limiting the potential for intermodal freight movement.

ECONOMIC

Reliable freight movement and access to intermodal freight options along this corridor is critical to freight industries in the region. High-quality, reliable and accessible inter-city passenger service is critical to knowledge sector industries in the region.

TRANSPORT.

The CSX line in Virginia is identified as a key chokepoint in the freight and passenger rail system in the Virginia Statewide Multimodal Freight Study due to the heavy train traffic and limited capacity.

D. East/West Rail Reliability and Connectivity

NEED

The East-West NS Rail Line through the region is a critical freight and passenger corridor for inter-regional movement and suffers from congestion and unreliability. Rail yards have insufficient access to highways, limiting the potential for intermodal freight movement.

ECONOMIC

Reliable freight movement and access to intermodal freight options along this corridor is critical to freight industries in the region. High-quality, reliable and accessible inter-city passenger service is critical to knowledge sector industries in the region.

TRANSPORT.

The NS Heartland Corridor in Virginia is identified as a key chokepoint in the freight rail system in the Virginia Statewide Multimodal Freight Study due to the heavy train traffic and limited capacity.

E. Mode Choice connecting Petersburg, Colonial Heights, Fort Lee and Hopewell

NEED

The Routes 36 & 144 Corridors and parallel routes are key links connecting Downtown Petersburg, Colonial Heights, Fort Lee and Hopewell, some of the largest employment centers in the region. Expanding transit access along this corridor or parallel routes will better connect the most Knowledge heavy activity center in the region (Downtown Petersburg) to one of the largest employers in the region (Fort Lee) and to key workforce residential areas in Petersburg and Hopewell.

ECONOMIC

Supports major local and knowledge-based regional activity centers including Petersburg and Fort Lee, while enhancing access to local centers such as Hopewell and connecting workforce in Prince George and areas surrounding Fort Lee.

TRANSPORT.

Existing transit service between these activity centers is limited in frequency, service area and span of service.

F. North/South Corridors Mode Choice

NEED

Three key activity centers (Downtown Petersburg, Southpark Mall and South Crater) are along a key north/south axis and better connecting these and other activity centers along this axis will connect key Knowledge activity centers and Local Service centers to key workforce residential areas in Petersburg and Colonial Heights.

ECONOMIC

Supports major local and knowledge-based regional activity centers including Petersburg, while enhancing access to local centers such as South Crater and South Park and connecting workforce in surrounding areas to Petersburg.

TRANSPORT.

Existing transit service between these activity centers is limited in frequency, service area and span of service.

G. Freight Access for Hopewell

NEED

Hopewell is home to major manufacturing and other freight-focused industries and therefore freight truck access is a critical requirement for continued economic competitiveness.

ECONOMIC

The Hopewell activity center has significant distribution and manufacturing that is reliant on good highway access to reach I-295, I-95 and I-85.

TRANSPORT.

Last-mile access to freight-focused industries in Hopewell is an essential transportation issue in the area.

H. Mode Choice to and from Prince George and Dinwiddie

NEED

There are limited mode choice options for workforce living in Prince George and Dinwiddie to reach other activity centers in the region and likewise there is limited mode choice for workers to reach emerging activity centers in these counties from adjacent jurisdictions.

ECONOMIC

Supports major local and knowledge-based regional activity centers including Petersburg, while enhancing access to local centers such as South Crater and South Park and connecting workforce in surrounding areas to Petersburg. Also enhances workforce access to emerging activity centers in Prince George and Dinwiddie such as Crosspointe and Dinwiddie Airport.

TRANSPORT.

Existing transit service between these activity centers is limited in frequency, service area and span of service.

I. Various Activity Centers - Walkable Places

NEED

There are multiple activity centers that have limited pedestrian facilities or need improved pedestrian environments. Walkable places improves appeal to the future workforce, attraction for knowledge-based industries and reduces the reliance on vehicular travel.

ECONOMIC

Knowledge and local serving centers compete for the workforce segment that prioritizes walk and bike commutes and amenities.

TRANSPORT.

In addition to inhibiting transportation mode choice for trips that might otherwise be made by car, this need affects the mobility of non-drivers who desire access to these areas.

J. Regional Need - Modal Choice

NEED

To support active transportation options, crossings of major barriers such as the Appomattox River, Interstates and railroads need to accommodate bicycles and pedestrians. Constraints are widespread and create circuitous trips and sometimes unsurmountable obstacles. One example is that no crossing of the Appomattox River has dedicated bicycle lanes or pedestrian accommodations.

ECONOMIC

All activity centers with employees seeking a bicycle commute may be affected by this need. Knowledge and local serving centers appear the most likely to be affected, as they compete for the workforce segment that prioritizes walk and bike commutes and amenities.

TRANSPORT.

In addition to inhibiting transportation mode choice for trips that might otherwise be made by car, this need particularly affects the mobility of non-drivers in the region. It also affects recreational walking and bicycling in the region.