

Regional Study on Transportation Project Prioritization for Economic Development and Growth

FINAL REPORT

Roanoke Valley Transportation PLANNING ORGANIZATION
Staff to the REGIONALcommission

EDR GROUP

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EXECUTIVE SUMMARY

Overview

This report documents the work, findings, and recommendations of the *Regional Study on Transportation Project Prioritization for Economic Development and Growth*.

This study addresses the following goals:

- Improve understanding of alignment between regional transportation and economic development goals
- Identify regional transportation needs including previously documented needs, as well as additional or refined needs
- Develop a regional economic profile to highlight economic trends and conditions in the region, together with an identification of challenges, strengths, and potential opportunities
- Identify a small number of key transportation projects that merit a concerted push from the region based on their ability to advance regional economic development objectives

During the same period as this study, RVTPO engaged Transportation for America (T4America) in technical assistance on transportation performance management in order to successfully meet changing federal performance management requirements and use performance measures to advance regional goals. This study and the T4America technical assistance effort coincided at two workshops on November 29, 2017 and March 13, 2018 (Table 1).

Study Approach

Table 1 outlines the key deliverables and stakeholder engagement activities undertaken as part of the study process. The study was organized in five phases and was grounded in the RVTPO's adopted Framework for Prioritization, shown in Figure 1.

Transportation needs—defined as improvements necessary for the region to maintain its current economy and spur sustainable new economic growth—underlie all subsequent identification of priorities, solutions, and projects.

To develop and refine priorities, key input was provided by (1) the project steering committee, (2) regional economic development stakeholders, (3) the Roanoke Regional Chamber, and (4) the TPO's Policy Board.

Key findings of each phase of the study are summarized in the following section. The full stand-alone deliverables of the study are also included as part of this package: Technical Memorandum 1, Technical Memorandum 2, and the Public Information Brochure on Transportation Priorities developed to assist the region in educating residents, stakeholders, and policy-makers.

The *RVTPO Performance Management Recommendations Report*, developed by T4America with input from EDR Group, was submitted to RVTPO separately.

Table 1 Key Engagement Activities and Deliverables by Study Phase

Study Phase	Key Engagement Activities and Deliverables
Understand Economic Development and Transportation Goals and Needs	• November 29, 2017 Stakeholder Workshop and Steering Committee Meeting* • *Technical Memorandum 1*
Profile the Regional Economy	• *Technical Memorandum 2*
Refine Needs and Identify Strategies That Reflect Region's Economic Development Goals.	• January 4, 2018 Meeting with Roanoke Regional Chamber • January 18, 2018 Meeting with Economic Development Stakeholders • February 2, 2018 Steering Committee Meeting
Identify Transportation Priorities	• February 2018 Interactive Web Feedback on Draft Priorities from Steering Committee • Draft Public Information Brochure on Transportation Priorities • February 22, 2018 RVTPO Policy Board Meeting • March 13, 2018 Stakeholder Workshop and Steering Committee Meeting* • March 22, 2018 RVTPO Policy Board Meeting
Final Project Findings and Recommendations	• *Final Public Information Brochure on Transportation Priorities* • *Final Report* • *RVTPO Performance Management Recommendations Report*** • April 26, 2018 Approval of Study Deliverables by RVTPO Policy Board

**Conducted in coordination with T4America. **Developed by T4America with input from EDR Group.*

Figure 1 RVTPO Framework for Prioritization



Key Findings

Transportation and Economic Development Goals

Transportation infrastructure and system performance are critical to economic development. Businesses depend on access via the transportation system to workers and material inputs. They also rely on transportation to move goods along a supply chain to customers. Costs and reliability of transportation affect a business's "bottom line." Market access enabled by transportation affects the quality of labor or suppliers reachable by a business. Moreover, the efficiency of company operations can also be influenced by the effect of greater market reach enabled by transportation on productivity, enabling greater output for a given unit of input. Both the Commonwealth of Virginia, statewide, and the Roanoke region therefore apply an economic development lens to transportation planning and prioritization.

Virginia's long-range transportation planning process, *VTrans 2040*, asked how transportation can help in attracting and retaining the best workforce as well as help support freight that is key to the ability of Virginia businesses to operate and sell their goods to outside markets. Similarly, existing planning documents in the Roanoke region show an alignment of transportation and economic development goals. These goals, as encapsulated in the region's most recent long-range transportation plan (LRTP), *Vision 2040,* and in the recently adopted *Roanoke Valley-Alleghany Regional Comprehensive Economic Development Strategy (CEDS) 2017 Annual Update* center around four key areas:

- **Connectivity**: ensuring adequate connectivity both internally within the region and to outside markets, to support opportunities for people to access jobs, services, and activity centers, and to further facilitate the growth of high-wage industry clusters.
- **Competitiveness**: focusing on how well the transportation system supports business, addressing specific sectors like tourism, and focusing on a diverse business base that includes both large employers and entrepreneurial activity.

- **Maintenance:** the mandate to think as a region about long term care of the system as well as how to get the most value from the assets the region already has.
- **Sustainability:** recognizing the ample natural and cultural resources in the region and seeking to align transportation and economic development strategies to keep the region and its growth sustainable in the long run.

Building from an Understanding of Transportation Needs

VTrans 2040 defined a need as, "[T]he 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." This high-level concept of need can be further broken down into three components:

1. **Maintain** what is working well (requires an understanding of the current ways in which the economy of the region relies on transportation)
2. **Improve** existing elements that are essential but not working well (as identified through analysis of performance relative to standards of acceptability)
3. **Sustainably support** economic growth (based on an evaluation of emerging needs and a shared vision of the desired regional economic future)

In looking to define key regional needs, it helps to build on those that have already been identified. At the state level, the *VTrans 2040* Regional Needs Profile for the Roanoke Region[1] identified a need for more walkable and bike-able places in the region, particularly in activity centers. It also points to a need for reliability in major highway corridors as well as ways to better manage and get out ahead of congestion. The needs assessment recognized that the region is closely linked to others such as Lynchburg and Blacksburg/Christiansburg. From a multimodal perspective, the profile defines a need to strengthen the level of transit accessibility at and between major activity centers and addresses the multimodal opportunities presented by the new Amtrak service. Finally, the profile points to targeting local bottlenecks where they do occur.

RVTPO's *Vision 2040* plan has addressed needs from many different perspectives, but two stand out as relating to economic development: First is the identification of areas of emphasis within the Congestion Management Plan (CMP). This identification process addresses the notion of "Improving existing elements that are essential but not working well," introduced above. Figure 2 shows the top 10 CMP Areas of Emphasis. *Vision 2040* also introduced multimodal districts and centers in the region as a way of targeting the planning and implementation of integrated multi-modal transportation systems. This addresses the approach of "sustainably supporting economic growth." Table 2 summarizes the characteristics of multimodal districts and centers. These designations represent a way of recognizing locations where there is already potential for more modal balance and to build on that. The *Vision 2040* plan also noted there is significant overlap between these different types of focus areas or identification of needs. In these areas of overlap, strategies aimed at meeting the need for greater modal options can yield further benefits by assisting in congestion mitigation.

[1] http://www.vtrans.org/resources/vmtp_oct2015/DRAFT_RoanokeNeedsProfile_10_02_15.pdf

Figure 2 Congestion Management Plan Areas of Emphasis and "Watch List"[2]

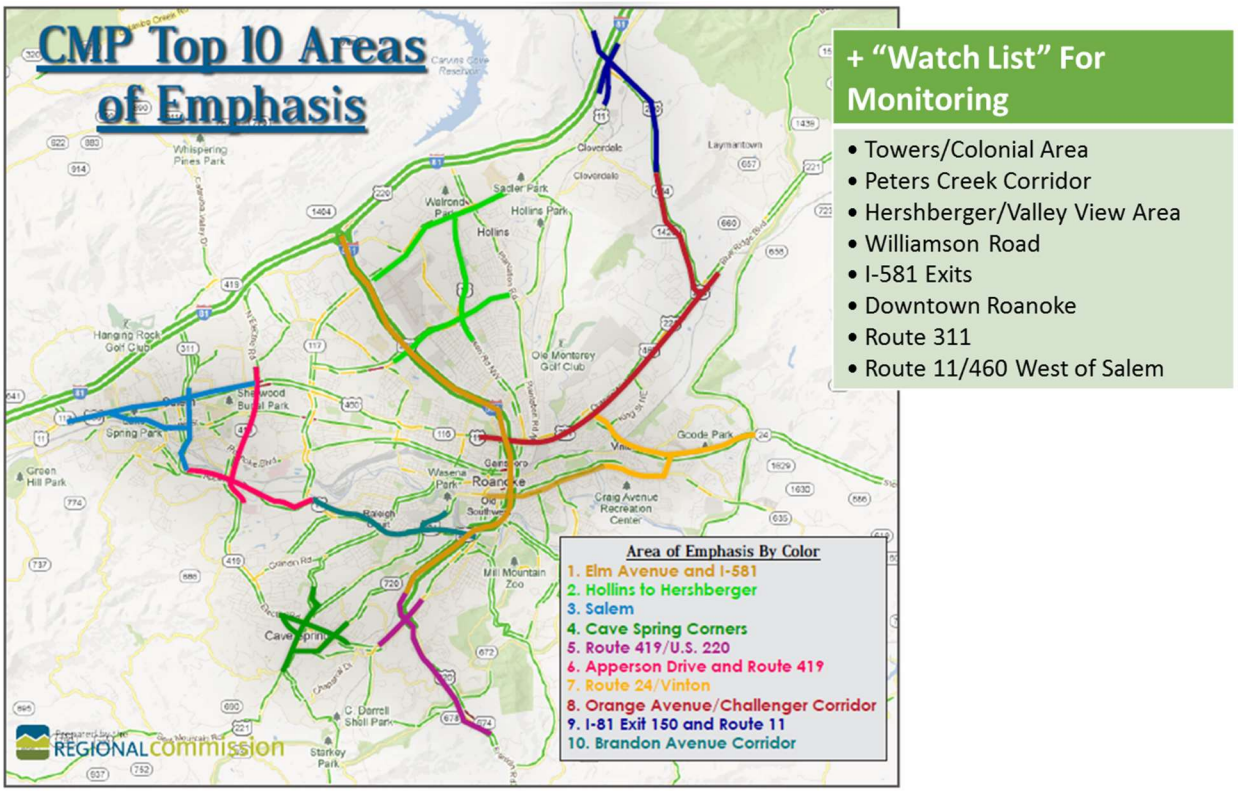


Table 2 Characteristics of Multimodal Districts and Centers[3]

Designation	Characteristics
Multimodal District	• Land use characteristics support multimodal travel (higher density, mixed-use) • Relatively easy to make trips without a car – as characterized through the number of bus routes and the existence of safe walking/biking paths (currently or proposed)
Multimodal Center	• A smaller area of even higher multimodal connectivity and more intense activity • Roughly equivalent to a 10-minute walk or a one-mile area

[2] http://rvarc.org/transportation/mpo-urban-transportation/long-range-plan/

[3] Adapted from http://rvarc.org/transportation/mpo-urban-transportation/long-range-plan/

Regional Economic Context

This study assembled information on the Roanoke Region, addressing (1) economic and demographic, and labor force trends; (2) key industries; (3) human capital, innovation, and livability; and (4) transportation conditions. While full detail can be found in Technical Memorandum 2, the data suggest the following observations about the region's economic context and competitive advantages and disadvantages:

- While the region is growing and has made meaningful gains in prosperity, it is still lagging Virginia and the nation with regard to certain indicators of overall economic development, including young adult population growth.
- The largest employment sectors in the region are: Health Care and Social Assistance, Government, Retail, Manufacturing, and Accommodation and Food Services. Manufacturing is key to bringing outside money into the economy, as are the sub-portions of Retail and Accommodations and Food Services that support tourism activity.
- The Roanoke region is competitive in several industry clusters, including: Transportation & Logistics; Electrical Equipment, Appliance & Component Manufacturing; Glass & Ceramics; Biomedical/Biotechnical (Life Sciences); Transportation Equipment Manufacturing; Mining; Chemicals & Chemical Based Products; Forest & Wood Products.
- One of the primary challenges facing the region is human capital—both in scale of the available workforce and in educational attainment. The region has struggled with attracting and retaining young people. Transportation can play a supporting role in addressing this challenge as there is growing evidence that young professionals (and to some extent retirees as well) are seeking "urban-like" communities that are more supportive of transit, walking, and biking.
- While the region still lags according to various indicators of innovation and entrepreneurship, there are positive signs of changes in their realm, including a rapid increase in recent years in venture capital investment in the Roanoke metro area.
- The Roanoke region competes well with other locations in terms of cost of living, which is a major component of livability.
- The region currently benefits from relatively low levels of congestion. However, there is a need to ensure that future growth does not erode this strength—by planning "for a future with mixed uses and multiple modes."
- Connectivity to surrounding regions, particularly the Blacksburg/Christiansburg area, is key to the continued competitiveness of the region and may require targeted improvement strategies. Amtrak passenger rail service is a new strength for the region that may present new opportunities. The region's growing tourism industry also presents new opportunities for strengthening the economy.
- The region is faced with a planning paradigm in which fiscal limitations mean very few large-scale transportation projects are likely to be built in the future, but big-picture regional decision making is nevertheless increasingly key to success. This points to transportation strategies that

focus on key corridors or forms of connectivity as a framework within which incremental improvements can be made over time.

Transportation Priorities

From an understanding of the region's strategic goals, transportation needs, and economic context, and with extensive input from regional stakeholders, the Roanoke regional priority needs shown in Figure 3 were identified as being key to the long-term economic development of the area.

Figure 3 Roanoke Regional Transportation Priorities



Each of these needs can be addressed through a variety of strategies, identified based on existing regional planning as well as specific suggestions from the project steering committee. Furthermore, specific implementation proposals for the identified strategies were collected in the form of "projects" or "studies." These represent incremental actionable items that address the overall RVTPO priorities. The fourth section of this report, "Roanoke Region Transportation Priorities for Economic Development and Growth," provides full detail on proposed strategies and projects. The RVTPO and its planning partners are committed to advancing these as part of ongoing regional prioritization. The outcome of this study, therefore, is a "living document" with needs, solutions, and individual projects to be further refined on an ongoing basis as part of the RVTPO's planning process.

Performance Measurement Moving Forward

Moving forward, RVTPO and its planning partners can further refine and advance regional transportation priorities through performance management. Specifically, the use of performance measures and related tools and data can help to:

- **Further identify project opportunities** that address identified needs. For example, VDOT's alternative intersections tool (VJuST) may be used to identify innovative intersection and interchange configurations to be evaluated for further study, analysis, and design.
- **Communicating the region's needs and the benefits of proposed investments** to build buy-in and support among elected leaders, other decision-makers, and the public.
- **Strengthen the prioritization process** through further incorporation of existing data and identification of any specific data gaps.

As the region works towards the establishment of performance measures, RVTPO can consider measures focused on the region's economic vitality. To weigh the relative impacts of projects on the region's economy, RVTPO could consider a range of measures beyond congestion-related metrics that can be used to relate transportation projects to economic development outcomes.

For example, some traditional indicators of business efficiency include travel time or operating costs accruing for freight or business travel. More sophisticated measures may include addressing issues of reliability improvements, changes in multimodal accessibility, and changes in intermodal connectivity. In addition, RVTPO may wish to consider measures related to broader issues of business attraction/retention and livability, such as indicators of alignment with existing economic development plans or the quality of pedestrian and bicycle amenities. Some regions and states specifically allocate points to projects that support economically disadvantaged communities, specific target industries, or locations where a region wishes to support reinvestment and growth. Similarly, if RVTPO determines that tourism is important to the regional economy, the region might focus on developing a measure that captures access to recreational and cultural destinations.

Measures of accessibility to destination are some of the most promising economic measures currently in use among leading transportation agencies. From the perspectives of businesses, access measures that have been shown to relate to firm productivity include: (a) the size of the labor market with access to the firm's site, and (b) the level of access to key passenger freight and intermodal facilities such as airports, intermodal rail facilities, and seaports.[4] A growing number of transportation agencies are implementing measures of accessibility, including VDOT. Some agencies also use accessibility metrics along with other performance indicators such as travel time and operating costs savings as inputs to subsequent economic impact modeling, based on empirically observed relationships between transportation conditions and industry growth.[5]

Additional detailed recommendations on how to align performance measures with economic development goals are included in the *RVTPO Performance Management Recommendations Report* (submitted separately).

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[4] Alstadt, Weisbrod, and Cutler. The Relationship of Transportation Access and Connectivity to Local Economic Outcomes: A Statistical Analysis. http://www.edrgroup.com/pdf/Alstadt-Weisbrod-Market%20Access-TRB-2012.pdf

[5] For example, using tools such as TREDIS.

Acknowledgements

Prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration, and the Virginia Department of Transportation.

The contents of this report reflect the views of the author(s) who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration, the Virginia Department of Transportation, or the Planning District Commission. This report does not constitute a standard, specification, or regulation.

FHWA or VDOT acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.



Regional Study on Transportation Project Prioritization for Economic Development and Growth

Technical Memorandum 1

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TO: Cristina Finch, Wayne Strickland, RVARC
FROM: Peter Plumeau, Naomi Stein, Adam Blair, EDR Group
DATE: December 21, 2017 *(Revised January 2, 2018)*
RE: Technical Memorandum #1 and Summary of Key Outcomes

This memo summarizes the findings of Task 1 of the *Regional Study on Transportation Project Prioritization for Economic Development and Growth*, "Relate Regional Transportation/Economic Development Goals and Document Undocumented Transportation Needs." We presented and discussed these findings at a November 29, 2017 stakeholder workshop and steering committee meeting in Roanoke. Also included is a summary of key meeting outcomes. The memo is structured into two parts:

- Part I summarizes the morning discussion at the stakeholder workshop which focused on the relationship between transportation and economic development, and the alignment between existing regional transportation and economic development goals.
- Part II summarizes the afternoon presentation and discussion at the steering committee meeting, which focused on transportation needs (documented and undocumented).

The Appendix contains tables listing the short and medium-term unconstrained Vision 2040 projects by mode.

PART I – TRANSPORTATION & ECONOMIC DEVELOPMENT

We reviewed the following questions with the stakeholders that attended the Transportation for America (T4A) workshop on November 29, 2017:

- How are transportation investment and economic development related?
- What are the Roanoke Valley's economic development goals?
- What are the Roanoke Valley's transportation investment goals?
- Where do the goals align?

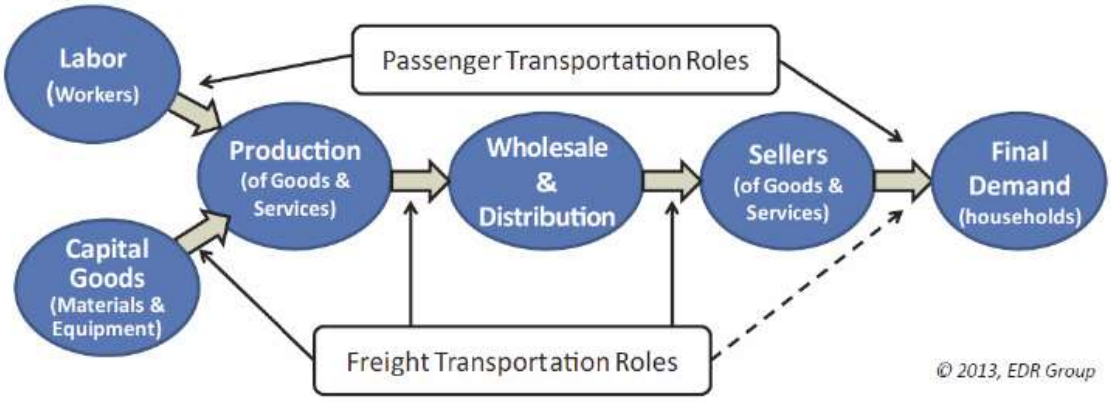
Transportation and Economic Development

Ms. Naomi Stein of EDR Group shared the relationship between transportation and economic development, as shown in Figure 1.

To produce goods and services, businesses need workers and material inputs—whether that's office paper or car parts. Their access to these inputs depends on the transportation system. Similarly, transportation is necessary to move goods along a supply chain through intermediate stages such as wholesale and distribution to the point of consumption by customers. Costs and reliability of the transportation system at points along this process affect a company's "bottom line" directly. Transportation can also affect the quality of labor or suppliers that a company can reach. Moreover, the efficiency of company operations can also be influenced by agglomeration economies wherein greater

market reach enabled by transportation allows for higher productivity (greater output for a given unit of input).

Figure 1 The Role of Transportation in the Economy



Ms. Stein also reminded the group of the explicitly economic perspective adopted by Virginia's Office of Intermodal Planning and Investment (OIPI) in the *VTrans 2040* Plan. As shown in Figure 2, the Commonwealth's long-range multimodal transportation plan approaches transportation needs by asking how transportation can help in attracting and retaining the best workforce as well as help support freight that is key to the ability of Virginia businesses to operate and sell their goods to outside markets.

Figure 2 VTrans 2040 Economic Perspective[1]





Comprehensive Economic Development Strategy Goals

Ms. Stein then provided an overview of the goals developed by the Roanoke region in the recently adopted Roanoke Valley-Alleghany Regional Comprehensive Economic Development Strategy (CEDS) 2017 Annual Update (shown in Table 1). The region seeks to diversify its economic base, develop, and maintain a skilled workforce, and ensure infrastructure (including transportation) is adequate to

[1] http://www.vtrans2040.com/

facilitate growth and trade. The CEDS goals also recognize the value of the region's existing strengths and defines a path that builds effectively from these strengths through sustainable growth and redevelopment.

Table 1 CEDS Goals[2]

Goal
Encourage regional economic vitality through an increasingly **diverse base of businesses** including entrepreneurial startups and large employers.
Develop and maintain a **skilled workforce** ready to meet the challenges presented by the creative economy.
Ensure the region has **adequate infrastructure** in place to facilitate the **growth of higher-wage industry clusters** and to ensure **connectivity** with regions nationally and globally.
Project a **positive identity** for the Roanoke Valley-Alleghany Region.
Improve the **Multimodal Transportation Network** of the Roanoke Valley-Alleghany Region
Seek to maintain and promote the region's **natural beauty** as well as its **cultural amenities**, and seek **sustainable growth** opportunities.
Seek to reuse existing underutilized commercial, institutional, and industrial properties and target them for **redevelopment**.
Seek to ensure that the region offers a strong and diverse mix of **housing** opportunities.
Address **resiliency** through coordination of the Regional Pre-Disaster Mitigation Plan and CEDS.

Transportation Goals

Transitioning into transportation planning, Ms. Stein presented the goals included in the region's most recent long-range transportation plan: *Vision 2040*. These goals are organized into five focus areas that also correspond to those included in *VTrans 2040*, as shown in Table 2.

Table 2 Transportation Goals[3]

Goal	Description
Economic Competitiveness and Prosperity	Invest in a transportation system that supports a robust and **diversified economy**, enables global **competitiveness, productivity, and efficiency**, and enhances **travel and tourism**.
Accessible and Connected Places	Provide opportunities for people to **access** jobs, services, and activity centers and for businesses to **access** distribution hubs and the region's workforce.
Safety and Security	Provide a **safe and secure** transportation system for all travel modes.
Proactive and Efficient System Management	Maintain the transportation system in **good condition** and leverage technology to **optimize** system performance and operations.

[2] http://rvarc.org/CEDS

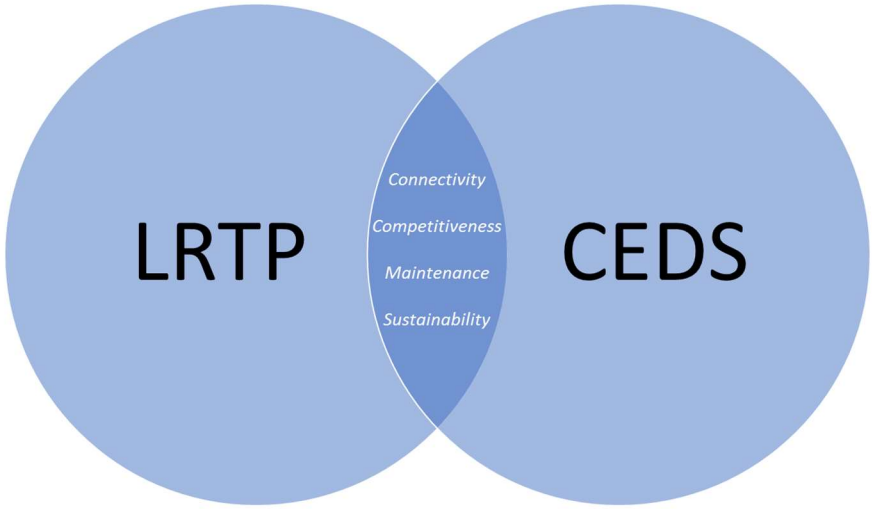
[3] http://rvarc.org/transportation/mpo-urban-transportation/long-range-plan/

Healthy Environment	Protect the **agricultural, natural, historic, and cultural environment**; preserve good air quality; minimize stormwater impacts and promote **active living through multimodal** transportation options.

Alignment

Ms. Stein presented the findings of EDR Group's review of the alignment between the CEDS and Vision 2040. The review identified four key areas of alignment: connectivity, competitiveness, maintenance, and sustainability (Figure 3).

Figure 3 Areas of Alignment Between CEDS and Vision 2040



Connectivity

The connectivity theme addresses the need to maintain connections within the region and with the broader global economy:

- **LRTP:** *"Provide opportunities for people to access jobs, services, and activity centers and for businesses to access distribution hubs and the region's workforce."*
- **CEDS:** *"… facilitate the growth of higher-wage industry clusters and to ensure connectivity with regions nationally and globally."*

Competitiveness

Competitiveness represents a focus in the region on how well the transportation system supports business, addressing specific sectors like tourism, and focusing on a diverse business base:

- **LRTP***: "Invest in a transportation system that supports a robust and diversified economy, enables global competitiveness, productivity, and efficiency, and enhances travel and tourism."*

- **CEDS***: "Encourage regional economic vitality through an increasingly diverse base of businesses including entrepreneurial startups and large employers."*

Maintenance

Maintenance refers to the mandate to think as a region about long term care of the system as well as how to get the most value from the assets the region already has:

- **LRTP***: "Maintain the transportation system in good condition and leverage technology to optimize system performance and operations."*
- **CEDS***: "Ensure the region has adequate infrastructure in place…Improve the Multimodal Transportation Network of the Roanoke Valley-Alleghany Region."*

Sustainability

Finally, the alignment area of sustainability recognizes the ample natural and cultural resources in the region and seeks to align transportation and economic development strategies to keep the region and its growth sustainable in the long run:

- **LRTP***: "Protect the agricultural, natural, historic, and cultural environment; preserve good air quality; minimize stormwater impacts and promote active living through multimodal transportation options."*
- **CEDS***: "Seek to maintain and promote the region's natural beauty as well as its cultural amenities, and seek sustainable growth opportunities."*

PART II – TRANSPORTATION NEEDS

The afternoon meeting of the steering committee sought to establish a baseline understanding of regional transportation needs that can support future prioritization of investment, planning, and advocacy efforts.

TPO Framework for Prioritization

Ms. Stein set the stage for the discussion by showing how transportation needs represent the foundation for the prioritization framework formally adopted by the TPO on February 23, 2017:

- Transportation Needs
- Priorities
- Solutions
- Projects
- Alignment Review

What is a Transportation Need?

Ms. Stein introduced the concept of a "transportation need" as that which is necessary for the region to:

1. Maintain its current economy, and
2. Spur sustainable new economic growth.

In this same vein, Ms. Stein presented the *VTrans 2040* definition used in the statewide needs assessment process:

> "[T]he 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 high-level concept of need can then be broken down into three components that help address the types of questions or analysis that can support needs identification:

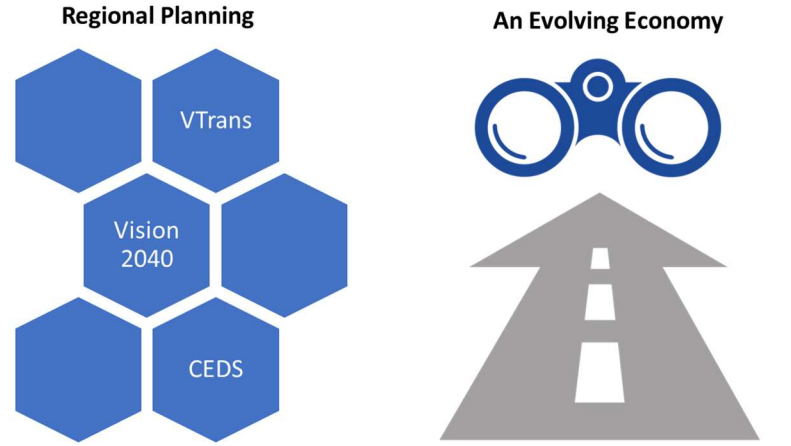
1. **Maintain** what is working well (requires an understanding of the current ways in which the economy of the region relies on transportation)
2. **Improve** existing elements that are essential but not working well (as identified through analysis of performance relative to standards of acceptability)
3. **Sustainably support** economic growth (based on an evaluation of emerging needs and a shared vision of the desired regional economic future)

Build on Previously Identified Needs

Ms. Stein also outlined the dual goals of the current study (Figure 4):

1. To build on the foundational understanding of needs already contained in various levels and types of plans in the region, and
2. To consider the implications of an evolving economy to further refine previously identified needs.

Figure 4 Two-Fold Approach to Needs[4]



VTrans 2040

Table 3 presents the needs identified in the *VTrans 2040* Regional Needs Profile for the Roanoke Region. OIPI led an effort to develop and implement a statewide transportation needs assessment process as part of the *VTrans 2040* Plan. A key purpose of the needs assessment is to serve as a screen for projects under the HB2 prioritization process. The process assessed transportation needs at three scales:

- Corridor of Statewide Significance (COSS)
- Regional Networks
- Urban Development Areas (UDA)

The Regional Networks scale corresponds most directly to the regional perspective of the TPO and is therefore the focus here.

Table 3 VTrans Needs: Roanoke Regional Network[5]

A. Walkable/Bikeable Places
Enhance regional and inter-regional walkability and bikeability at regional activity centers; in particular, focus on completing the regional greenway network and make last mile connections to existing and future greenways.
B. I-81/US 11 Reliability
The I-81/US 11 corridor and connected facilities serve as a major artery for regional freight and passenger movement. Ensuring reliability on the corridor is paramount to regional economic success.

[4] Icons created by Alexander Skowalsky and Musmellow from Noun Project

[5] http://www.vtrans.org/resources/vmtp_oct2015/DRAFT_RoanokeNeedsProfile_10_02_15.pdf

C. Regional TDM
The Roanoke region includes park-n-ride access and TDM programs and services. However, multiple activity centers and commuter oriented corridors would benefit from TDM programs that can help reduce the number of vehicles on the network and the individual burden of a long or congested commute.
D. Inter-Regional Network Connectivity
Roanoke's economy, and therefore passenger and freight movement, is closely linked to surrounding regions such as Lynchburg and Blacksburg/ Christiansburg. Increasing network connectivity between regions ensures local economic success.
E. Regional Mode Choice
Multiple activity centers in the region are underserved by transit. Providing multiple connections between major activity centers provides travel choices and improves regional connectivity. In particular, making multimodal connections with future Amtrak service will be key to the success of the region and to the new passenger rail service.
F. US 460 Reliability and Bottleneck Relief
There aren't major congestion issues in Roanoke, in relation to the rest of Virginia. However, bottlenecks do occur where some of the major arteries in the region converge; particularly relating to the US 460 corridor, parallel rail network, and the downtown and Tanglewood Mall activity centers. Addressing these bottlenecks is key to regional mobility and network fluidity.

The needs assessment identified a need for more walkable and bike-able places in the region, particularly in activity centers. It also points to need for reliability on major highway corridors as well as ways to better manage and get out ahead of congestion. The need assessment also recognized that the region is closely linked to others such as Lynchburg and Blacksburg/Christiansburg. From a multimodal perspective, the profile defines a need to strengthen the level of transit accessibility at and between major activity centers and addresses the multimodal opportunities presented by the new Amtrak service. Finally, the profile points to targeting local bottlenecks where they do occur.

Vision 2040

Ms. Stein then discussed the TPO's planning work, focusing on two specific types of analysis that have already been done in the region and incorporated into Vision 2040 that point to needs in the region. First is the identification of areas of emphasis within the Congestion Management Plan (CMP). This identification process addresses the notion of "Improving existing elements that are essential but not working well," introduced earlier in the discussion of transportation needs. Figure 5 shows the top 10 CMP Areas of Emphasis. The TPO identified these areas using a methodology that incorporated public input, analysis of google traffic data, an assessment of volume-to-capacity ratios as contained in the regional travel model, and field verification by TPO staff.

Vision 2040 also introduced the noteworthy concept designating multimodal districts and centers in the region as a way of targeting the planning and implementation of integrated multi-modal transportation systems. This addresses the previously defined needs approach of "sustainably supporting economic

growth." Table 4 summarizes the characteristics of multimodal districts and centers. These designations represent a way of recognizing locations where there is already potential for more modal balance and to build on that.

Figure 6 shows the currently designated districts and centers in the region. The Vision 2040 plan also noted there is significant overlap between these different types of focus areas or identification of needs, as described in Table 5. In these areas of overlap, strategies aimed at meeting the need for greater modal options can yield further benefits by assisting in congestion mitigation.

Figure 5 Congestion Management Plan Areas of Emphasis and "Watch List"[6]

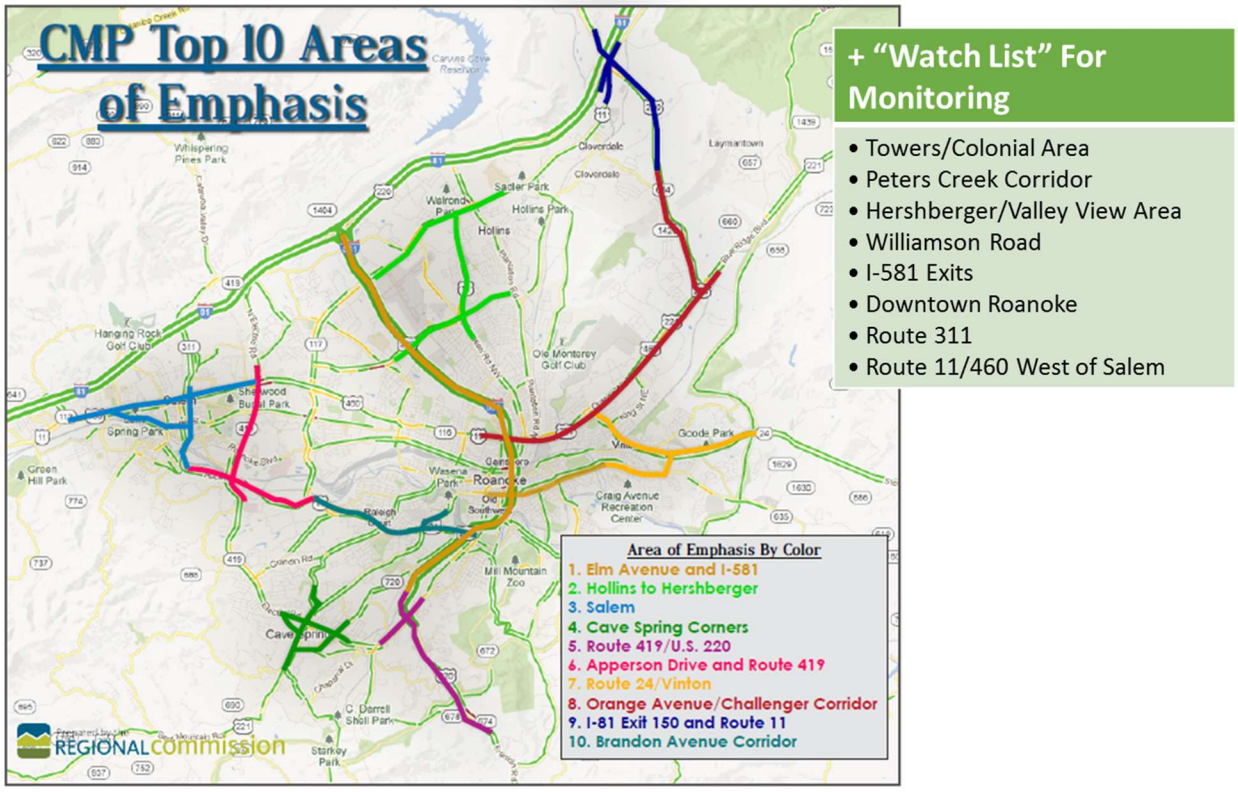


Table 4 Characteristics of Multimodal Districts and Centers[7]

Designation	Characteristics
Multimodal District	• Land use characteristics support multimodal travel (higher density, mixed-use)

[6] http://rvarc.org/transportation/mpo-urban-transportation/long-range-plan/

[7] Adapted from http://rvarc.org/transportation/mpo-urban-transportation/long-range-plan/

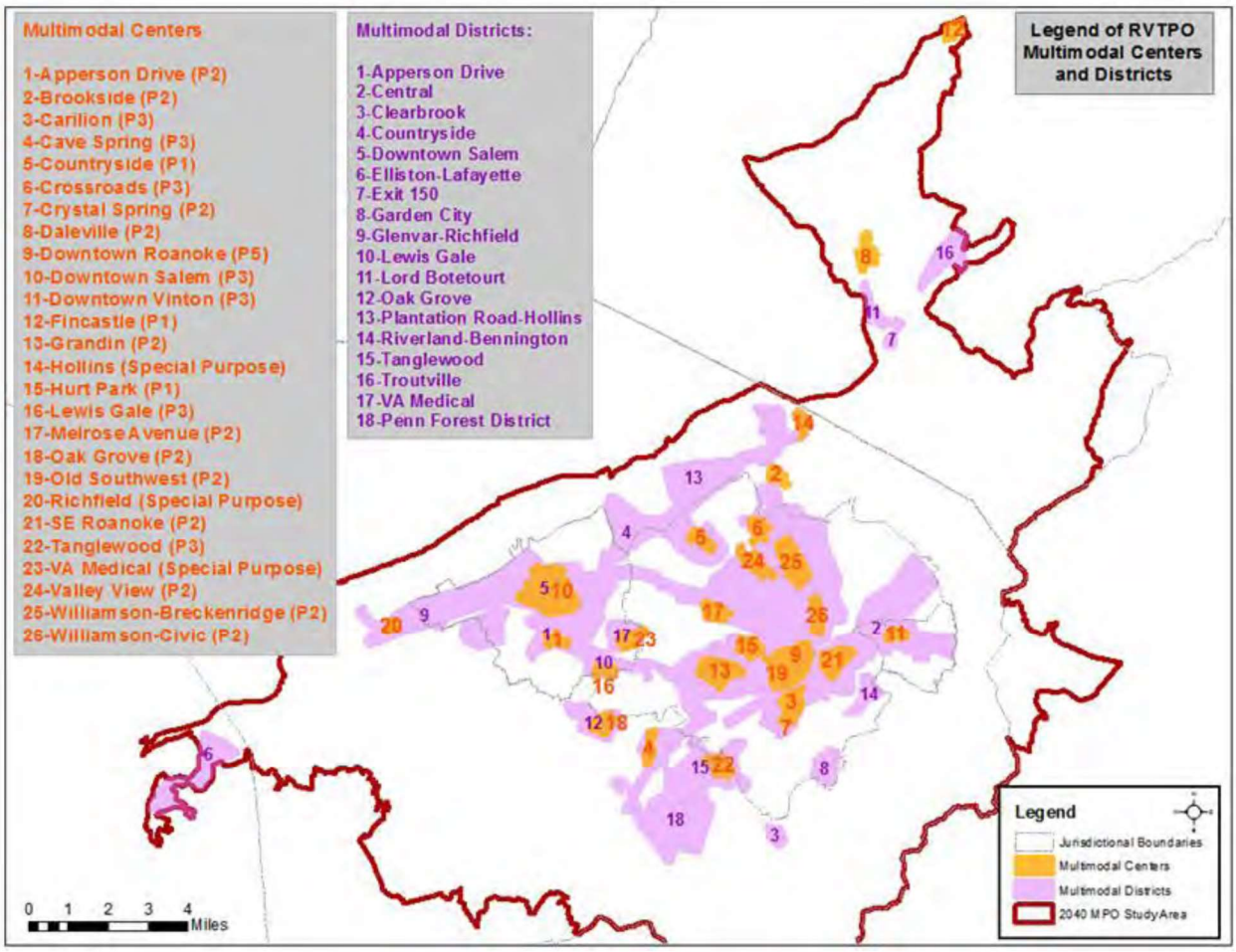
	• Relatively easy to make trips without a car – as characterized through the number of bus routes and the existence of safe walking/biking paths (currently or proposed)
Multimodal Center	• A smaller area of even higher multimodal connectivity and more intense activity • Roughly equivalent to a 10-minute walk or a one-mile area

Table 5 Overlap Between CMP Focus Areas and Multimodal Districts and Centers[8]

TOP 10 CMP AREAS OF EMPHASIS	CORRESPONDING MULTIMODAL DISTRICT	CORRESPONDING MULTIMODAL CENTER
Elm Avenue and I-581	Central District	Downtown Roanoke Center
Hollins to Hershberger	Plantation Road - Hollins District	Hollins Center
Salem	Downtown Salem District	Downtown Salem Center
Cave Spring Corners	Central District	Cave Spring Center
Route 419/U.S. 220	Tanglewood District, Clearbrook District	Tanglewood Center
Apperson Drive and Route 419	Apperson Drive District	Apperson Drive Center
Route 24/Vinton	Central District	Downtown Vinton Center
Orange Avenue/Challenger Corridor	Central District	N/A
I-81 Exit 150 and Route 11	Exit 150 District, Lord Botetourt District	Daleville Center
Brandon Avenue Corridor	Central District	Grandin Center

[8] http://rvarc.org/transportation/mpo-urban-transportation/long-range-plan/

Figure 6 Designated Multimodal Districts and Centers and the Roanoke Region[9]



An Evolving Economy

Ms. Stein concluded the presentation on needs by highlighting several trends, transitions, or evolutions identified in existing regional planning documents and by TPO staff that may to shape the way regional transportation needs evolve into the future. These include:

- Observations of millennial preferences that tend to favor more urbanized environments with multimodal mobility options
- The uncertain influence of technology including connected and automated vehicles and transportation network companies (e.g. Lyft, Uber)
- Growing interest in agri-tourism and medical-related tourism (tourism being dependent on interregional travel)
- The influence of an aging population

[9] http://rvarc.org/transportation/mpo-urban-transportation/long-range-plan/

- Concerns about an inadequate supply of talent and "brain drain" (i.e. challenges in retaining highly-educated, trained, and/or young persons within the region)
- Identified opportunities to cultivate student retention (including, potentially, livability-oriented transportation solutions such as transit-oriented development and shared mobility services)
- Recent successes in business growth: e.g. Altec (180 additional jobs), Eldor (350 new jobs), Community College Shared Services Center (200 new), Movie Screen Manufacturer (50 new), Ballast Point (175 new) Brewery, Virginia Tech – Carilion (1000 new), Deschutes (108 new) Breweries, AEP (102 additional)[10]

Key Outcomes: Group Discussion – Needs

Following the presentation, members of the Steering Committee engaged in a "brainstorm" session regarding regional transportation needs that can be traced to the region's understanding of desired economic development. The identified draft needs were refined and presented at the RVTPO Policy Board meeting on December 14, 2017. Table 6 displays these draft needs.

Beyond this preliminary identification of needs and priorities, the discussion also revealed a consensus opinion from the steering committee that the region wishes to get better at *'thinking big by thinking regionally'* and to put more concerted effort into developing strong regional transportation concepts that address economic development goals and can be effectively marketed or advocated.

Table 6 Draft Needs/Priorities

Category	Details
Draft Priority Transportation Needs/Problems	• Lack of travel time reliability between Roanoke/Blacksburg which is essential due to increasing worker/student flow • Lack of connectivity between the Roanoke-Blacksburg Regional Airport and Downtown Roanoke • Vehicle congestion on Route 460 East between Downtown Roanoke and Alternate 220 • Vehicle congestion on Route 220 South between Clearbrook and Route 419 due to people commuting toward Downtown Roanoke • Lack of transit access for residents in the City of Roanoke to jobs in surrounding areas • Lack of connectivity from transit to final destinations • Lack of trails/bikeways between destinations *(lower priority since region is already successful in getting funding)*
Other Possible Regional Transportation Priorities	• Lack of walkable mixed-use places throughout the region – i.e. "placemaking" environment. • Increasing vehicle congestion on Route 220 North between I-81 and Greenfield • Insufficient flight options at affordable prices from ROA.

[10] Figures provided by TPO Staff.

APPENDIX: SHORT/MEDIUM VISION 2040 PROJECTS

Ms. Stein shared the projects listed in Table 7 through Table 10 with the Steering Committee as a potential candidate list from which to select regional priorities. The listed projects are short or medium-term Vision 2040 unconstrained projects. These projects would require additional funding above the level currently anticipated in the region, and are targeted to address current or near- term needs.

Table 7 Highway Projects - Candidate Projects – S/M Vision 2040

Project	Jurisdiction
I-581 and Peters Creek Rd. Interchange Improvements	Roanoke County
Interchange Lighting at I-81 Exits 137-150	Multi-Jurisdictional
Route 115/Plantation Road Improvements	Roanoke County
Route 220 Expressway/Route 419 Interchange Improvement and Route 220 Acceleration Lane	Multi-Jurisdictional
Route 625/Hershberger Road Improvements	Roanoke County
Secondary Access Points from Rutrough Road and Road Circulation Improvements	Roanoke County
Walnut Avenue/8th Street Intersection Improvements	Town of Vinton

Table 8 Pedestrian/Bicycle Projects - Candidate Projects – S/M Vision 2040

Project	Jurisdiction
Apperson Drive Improvements	City of Salem
Braeburn Drive Improvements	City of Salem
Campbell Ave Improvements	City of Roanoke
Church Ave Improvements	City of Roanoke
Cove Road Improvements	City of Roanoke
Jefferson Street Improvements	City of Roanoke
King Street Improvements	City of Roanoke
Liberty Road Improvements	City of Roanoke
Lick Run Greenway	City of Roanoke
Memorial Ave Streetscape Improvements	City of Roanoke
Route 11 Bike/Pedestrian Improvements	Roanoke County
Route 221/Brambleton Ave Pedestrian Improvements	Roanoke County
Route 682/Garst Mill Road Improvements	Roanoke County
Virginia Ave/Route 24 Bicycle Improvements	Town of Vinton
West Main Street/Greenway Connection	Roanoke County

Table 9 Transit Projects - Candidate Projects – S/M Vision 2040

Project	Jurisdiction
Bus Stop Accessibility Improvements	Multi-Jurisdictional
Downtown Roanoke Intermodal Station	Multi-Jurisdictional
Roanoke County Transfer Facilities	Multi-Jurisdictional

Table 10 Intelligent Transportation Systems (ITS) Projects - Candidate Projects - S/M Vision 2040

Project	Jurisdiction
Comprehensive Traffic Intersection Improvements	Town of Vinton
Hardy Road Signal Coordination and Improvements	Town of Vinton



Regional Study on Transportation Project Prioritization for Economic Development and Growth

Technical Memorandum 2

Prepared for:

Roanoke Valley Transportation Planning Organization

313 Luck Ave SW, Roanoke, VA 24016

Prepared by:

Economic Development Research Group, Inc.

155 Federal Street, Suite 600, Boston, MA 02110

TO: Cristina Finch, Wayne Strickland, RVARC
FROM: Peter Plumeau, Naomi Stein, Adam Blair, EDR Group
DATE: January 15, 2018
RE: Technical Memorandum #2

INTRODUCTION

This memo summarizes the findings of Task 2 of the *Regional Study on Transportation Project Prioritization for Economic Development and Growth*, "Regional Economic Profile and Advantages/Disadvantages." This task draws primarily on existing information contained in the Vision 2040 Roanoke Valley Transportation plan and the Roanoke Valley-Alleghany Regional Comprehensive Economic Development Strategy (CEDS) 2017 Annual Update. Where relevant and readily available, it includes other supporting other data, including information from VTrans 2040. This profile synthesizes available information to provide new perspectives that a) reflect the understanding of economic development expressed by stakeholders at the November 29, 2017 stakeholder workshop; b) align with key factors that support business competitiveness, and c) focus specifically on the role of transportation in the context of broader economic development processes.

VISION FOR ECONOMIC DEVELOPMENT

At the November 29, 2017 workshop and steering committee meeting, regional stakeholders participated in a discussion of regional economic development goals and their relationship to transportation needs. This discussion identified and validated an alignment of goals from the region's CEDS and Vision 2040, including:

- **Connectivity**: ensuring adequate connectivity both internally within the region and to outside markets, to support opportunities for people to access jobs, services, and activity centers, and to further facilitate the growth of high-wage industry clusters.
- **Competitiveness**: focusing on how well the transportation system supports business, addressing specific sectors like tourism, and focusing on a diverse business base that includes both large employers and entrepreneurial activity.
- **Maintenance:** the mandate to think as a region about long term care of the system as well as how to get the most value from the assets the region already has.
- **Sustainability:** recognizing the ample natural and cultural resources in the region and seeking to align transportation and economic development strategies to keep the region and its growth sustainable in the long run.

Building on this vision, this memo presents data on economic conditions and trends in the region, as a basis for understanding challenges and opportunities moving forward. It also investigates key regional attributes that are known to affect private sector location and expansion decisions, including non-

transportation factors related to human capital, innovation, and livability, as well as transportation connectivity conditions.

REGIONAL ECONOMIC PROFILE

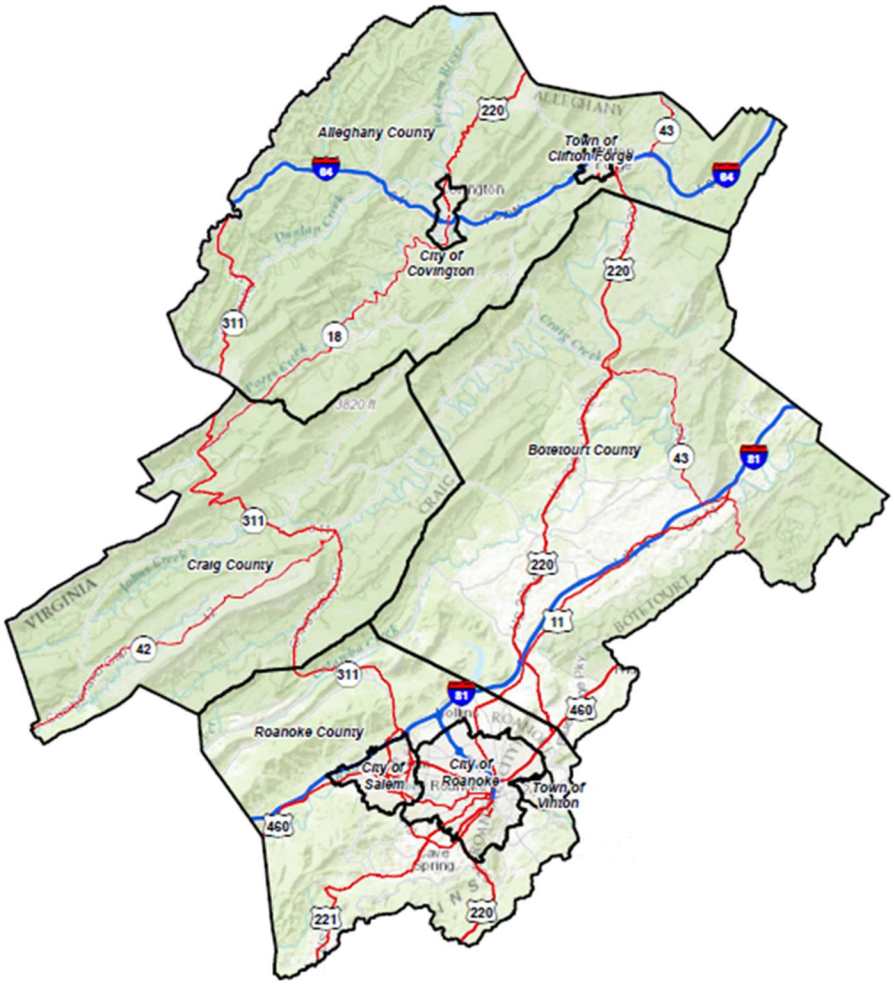
Study Region Definition(s)

This regional economic profile draws on data compiled from a variety of sources that in some cases adopt different, but overlapping, study region definitions. As shown in Figure 1, the CEDS study area includes the counties of Alleghany, Botetourt, Craig, and Roanoke, the Cities of Covington, Roanoke, and Salem, and the Towns of Clifton Forge and Vinton. The Vision 2040 Roanoke Valley Transportation plan, in accordance with federal MPO planning requirements, addresses a smaller geography that includes the census designated Urbanized Area centered around Roanoke and the area that is expected to be urbanized in the next 20 years.[1] The result is that the RVTPO boundary encompasses the Cities of Roanoke and Salem, the Town of Vinton, and the *urbanized* portions of the Counties of Bedford, Botetourt, Roanoke and Montgomery, as shown in Figure 2. Both the CEDS and Vision 2040 represent planning activities of the broader RVARC, which is a Virginia Planning District defined in accordance with state statute. The RVARC boundaries additionally encompass Franklin County and the Town of Rocky Mount as joint members. Figure 3 shows this broader geography and its correspondence with the study region for Vision 2040. Some data is tabulated at the level of the Metropolitan Statistical Area (MSA), which is similar to the RVARC service area expect that it excludes Allegheny County and Covington. Finally, for the purposes of its regional network needs analysis, VTrans 2040 defined the Roanoke Region as including Botetourt County, Roanoke County, the City of Roanoke, and the City of Salem.

Note that while these differing geographic definitions lend nuance to the interpretation of collected data, they also serve to highlight the significant interconnectedness of the broader Roanoke region.

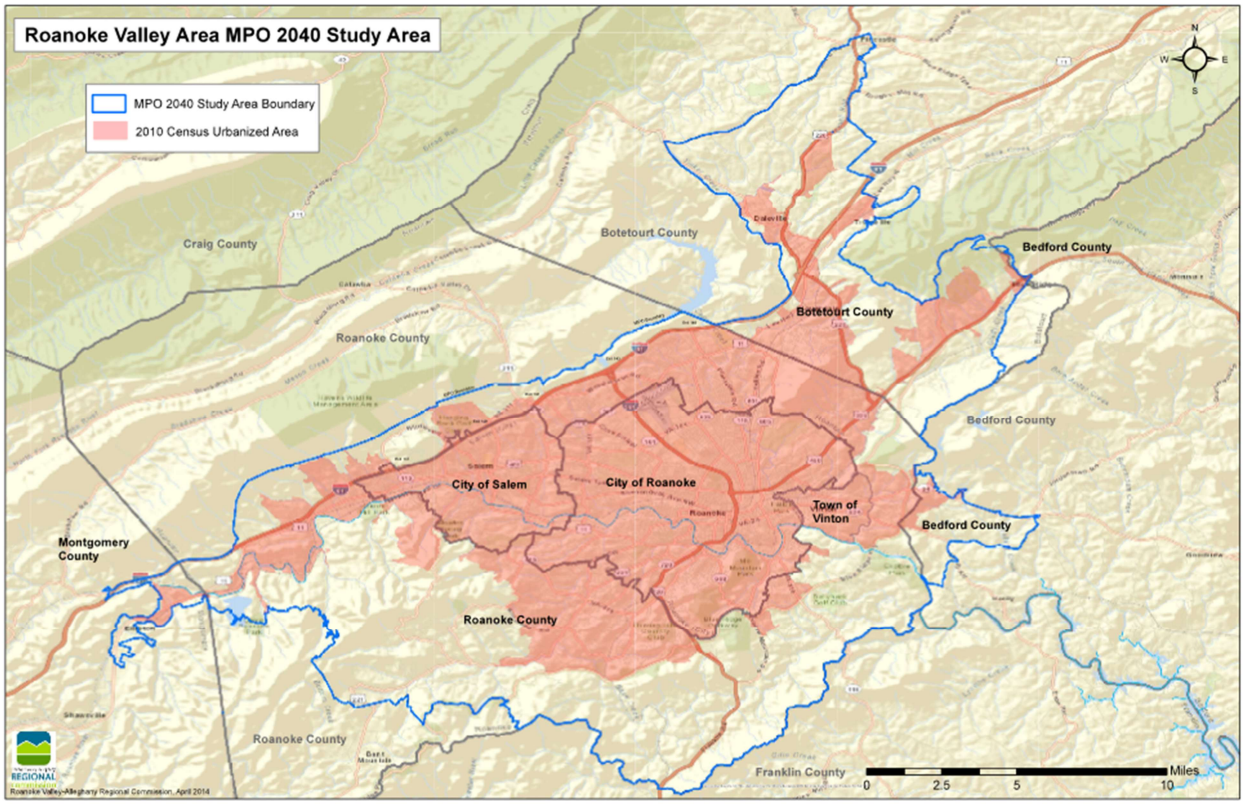
[1] http://rvarc.org/transportation/mpo-urban-transportation/

Figure 1 Roanoke Valley - Alleghany Region (CEDS)



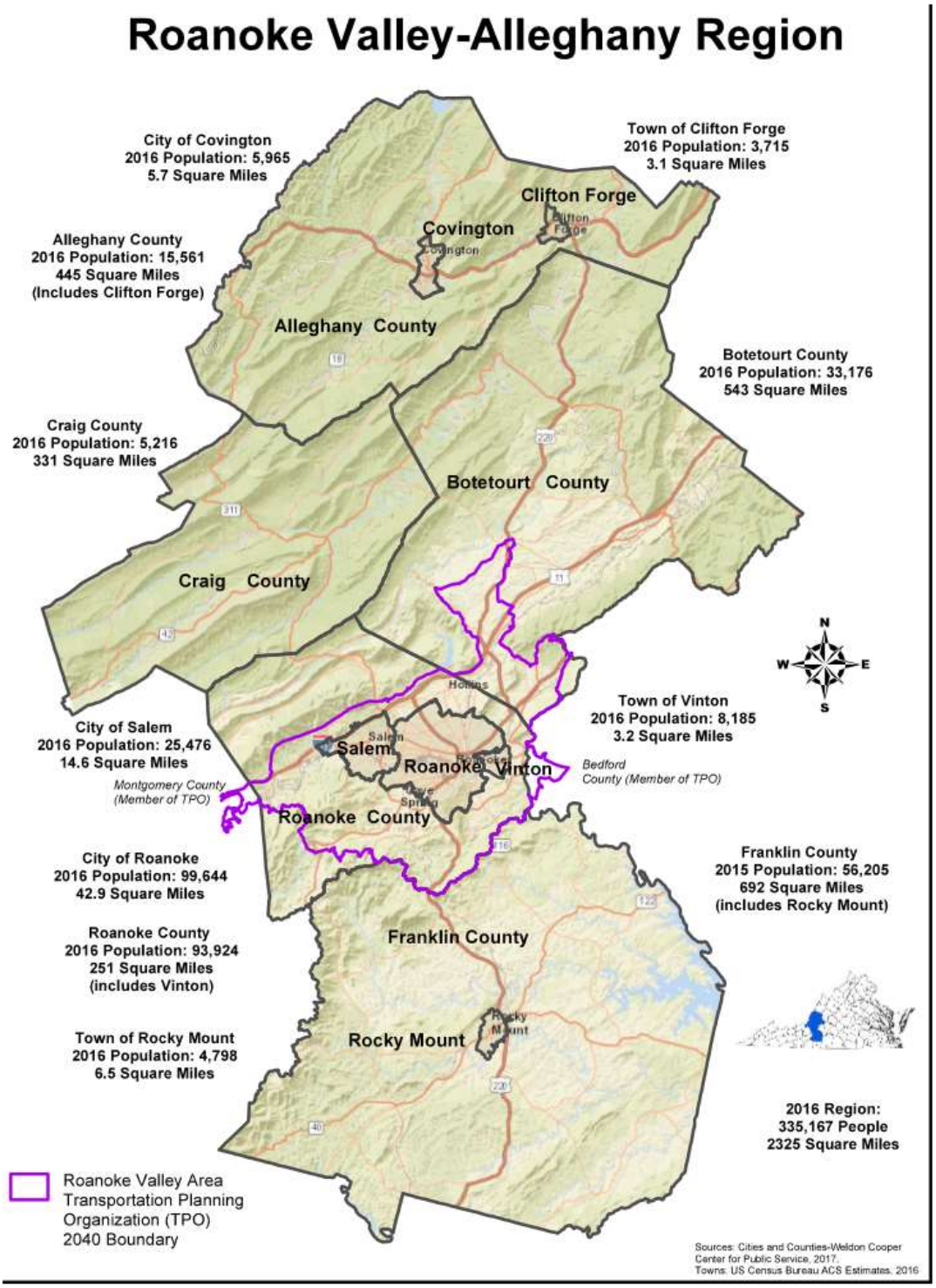
Source: Roanoke Valley-Alleghany Regional Comprehensive Economic Development Strategy 2017 Annual Update (2017 CEDS)

Figure 2 RVTPO Study Area Boundaries



Source: RVARC. http://rvarc.org/wp-content/uploads/2014/04/mpostudyarea.pdf

Figure 3 Roanoke Valley-Allegany Regional Commission (RVARC) Service Area



Source: RVARC. http://rvarc.org/wp-content/uploads/2017/09/pdcbasicpops.pdf

Economic Performance and Trends

The Roanoke Metropolitan Area (MSA) is the fourth largest in Virginia (Table 1). In terms of overall population growth, the Roanoke CEDS region has experienced slower growth in the period from 2000 to 2015 (5.0%) compared to the Commonwealth of Virginia as a whole (16.6%), as shown in Table 2. Within the region, some localities showed relatively strong growth from 2000-2015 (Botetourt County, Roanoke County, the City of Roanoke, and the Town of Vinton), while others lost population in the same period (Alleghany County, the City of Covington, and the Town of Clifton Forge).

Table 1 Ranking of Virginia Metropolitan Areas by Population (2016)

Metropolitan Statistical Area	Population
Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area	6,011,752
Virginia Beach-Norfolk-Newport News, VA-NC Metro Area	1,714,428
Richmond, VA Metro Area	1,258,158
Roanoke, VA Metro Area	**312,891**
Kingsport-Bristol-Bristol, TN-VA Metro Area	307,491
Lynchburg, VA Metro Area	258,062
Charlottesville, VA Metro Area	226,817
Blacksburg-Christiansburg-Radford, VA Metro Area	181,288
Winchester, VA-WV Metro Area	133,125
Harrisonburg, VA Metro Area	130,406
Staunton-Waynesboro, VA Metro Area	119,930

Source: 2012-2016 American Community Survey 5-Year Estimates

Table 2 Population Trends: CEDS Region Compared to Virginia

Locality		2000	2015	Change (2000-2015)
County	Alleghany*	12,926	12,227	-5.4%
	Botetourt	30,496	33,155	8.7%
	Craig	5,091	5,212	2.4%
	Roanoke**	77,996	85,471	9.6%
City	Covington	6,303	5,736	-9.0%
	Roanoke	94,911	98,736	4.0%
	Salem	24,747	25,165	1.7%
Town of Clifton Forge		4,289	3,839	-10.5%
Town of Vinton		7,782	8,162	4.9%
RVAR CEDS Region		**264,541**	**277,703**	**5.0%**
Virginia		**7,078,515**	**8,256,630**	**16.6%**

*Source: 2011-2015 5-Year Estimates, American Community and Survey Demographic and Housing Estimates, 2017 and US Census of Population, 2000, as cited in 2017 CEDS. * Excludes Town of Clifton Forge population. ** Excludes Town of Vinton population.*

From the perspective of growth in overall economic activity, as measured in terms of Gross Domestic Product, the Roanoke MSA grew 6% from 2013 to 2015, which is slightly slower than Virginia (7%) and the US overall (8.1%).

Table 3 Changes in GDP in Roanoke MSA, compared to Virginia and the US

Geography	2013	2014	2015	Change 2013-15
Roanoke MSA	$ 13,658	$ 14,004	$ 14,474	6.0%
Virginia Total	$ 449,502	$ 460,151	$ 481,084	7.0%
US Metro Portion	$ 14,967,434	$ 15,606,598	$ 16,202,029	8.2%
US Total	$ 16,576,808	$ 17,277,548	$ 17,919,651	8.1%

Source: Bureau of Economic Analysis, 2017, as cited in 2017 CEDS.

Median household income is increasing in the majority of localities within the region, as shown in Table 4. The City of Roanoke experienced the strongest income growth in recent years, exceeding that of Virginia as a whole.

Table 4 Median Household Income Trends Compared to Virginia

Locality		2006-2010 5-YR Estimate	2011-2015 5-YR Estimate	Percent Change
County	Alleghany	43,160	45,007	4.3%
	Botetourt	64,725	60,454	-6.6%
	Craig	51,291	44,330	-13.6%
	Roanoke	59,446	60,519	1.8%
City	Covington	35,277	34,746	-1.5%
	Roanoke	36,422	39,930	9.6%
	Salem	48,828	50,068	2.5%
Town of Clifton Forge		34,256	35,769	4.4%
Town of Vinton		42,467	45,271	6.6%
Virginia		61,406	65,015	5.9%

Source: U.S. Census Bureau, American Community Survey, as cited in 2017 CEDS.

Age is one significant variable used to understand labor force trends. Table 5 shows that the population of most of the localities in the CEDS region is on average older than that of the Commonwealth as a whole. According to the US Bureau of Labor Statistics, all localities in the CEDS region have experienced a stagnant or declining labor force in the period between 2012 and 2016, as shown in Table 6. The availability of human capital, therefore, is one of the significant challenges facing the region.

Table 5 Age Distribution as Compared to Virginia

Locality		Median Age	Percent of Population by Age					
			under 5	5 to 19	20 to 34	35 to 54	55 to 64	65 and older
County	Alleghany	47.2	5.0	16.7	14.2	25.9	15.0	23.2
	Botetourt	46.4	4.5	18.7	13.3	28.0	16.4	19.0
	Craig	47.1	5.7	18.9	12.7	28.1	13.8	21.0
	Roanoke	43.5	4.8	18.4	15.9	27.4	14.4	19.0
City	Covington	43.7	5.2	17.9	16.3	28.5	12.7	19.5
	Roanoke	38.0	7.2	16.8	21.9	26.3	13.2	14.7
	Salem	40.5	5.2	19.7	19.4	24.9	13.6	17.2
Town of Clifton Forge		44.9	6.1	18.7	14.8	23.7	14.4	22.3
Town of Vinton		39.3	4.7	21.2	18	26.1	11.7	18.3
Virginia		**37.6**	**6.2**	**19.2**	**21.2**	**27.6**	**12.4**	**13.2**

Source: 2011-2015 5-Year Estimates, American Community Survey Demographic and Housing Estimates, 2017, as cited in 2017 CEDS.

Table 6 Labor Force Trends Compared to Virginia

Locality		2012	2016	Change
County	Alleghany	7,805	6,932	-11.2%
	Botetourt	17,733	17,412	-1.8%
	Craig	2,466	2,399	-2.7%
	Roanoke	49,586	49,360	-0.5%
City	Covington	2,645	2,382	-9.9%
	Roanoke	49,669	49,160	-1.0%
	Salem	12,919	12,953	0.3%
Virginia		4,225,252	4,240,403	0.4%

Source: Bureau of Labor Statistics, 2017, as cited in 2017 CEDS.

Comparative Performance of Roanoke Region with U.S. Metro Areas Nationally

The Harvard University's Institute for Strategy and Competitiveness, through funding provided in part by the U.S. Department of Commerce, Economic Development Administration, maintains an open access data resource for studying the performance of regional economies: the US Cluster Mapping website (http://www.clustermapping.us/). The charts shown in Figure 5 were generated by that system and provide a snapshot of comparative performance and trends for the Roanoke MSA, relative to other regions in the United States. The dots with numbers inside them on each of the charts provide information on the ranking by percentile of the Roanoke MSA among all 917 U.S. metropolitan and micropolitan statistical areas, corresponding to the key shown in Figure 4. This data provides a supplementary understanding of the region's economic profile and performance within the context of the overall national economy:

- From 2001—2015, the region gained in GDP per capita but also dropped from the fourth to the fifth quintile of regions, meaning that growth has lagged other regions.

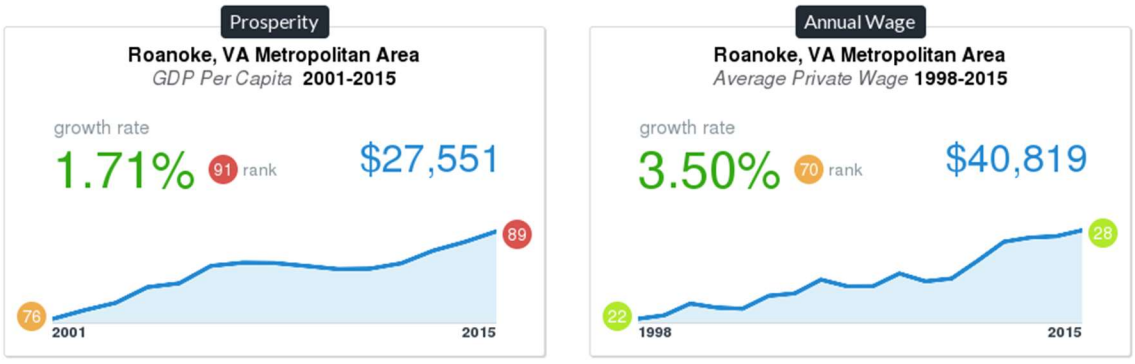
- Average private sector wages in the region also grew by 3.5% from 1998-2015. While this growth lags other regions in the U.S., the region benefited from already being (and remaining) in the top 30% of metro areas.
- Total private non-agricultural employment declined slightly between 1998 and 2015 and total population increased just slightly from 1998 to 2016.
- Nationally, the percentage of young adults (25 to 44) in the total population steadily declined from 1998-2016. However, for Roanoke, this decline has been steeper, and the current regional percentage (23.43%) is lower than the U.S. average (26.35%).
- Poverty increased in the region between 1998 and 2015. However, the region is still in the top 30% of metro areas with the lowest poverty rates and has a lower rate (13.12%) than the US as a whole (14.7%).

Figure 4 Percentile Key

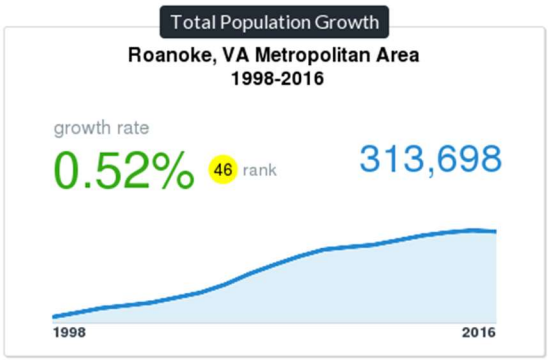


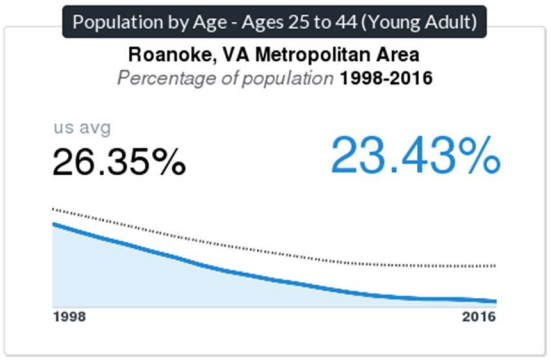
Source: U.S. Cluster Mapping (http://clustermapping.us), Institute for Strategy and Competitiveness, Harvard Business School. Copyright © 2014 President and Fellows of Harvard College. All rights reserved. Research funded in part by the U.S. Department of Commerce, Economic Development Administration.

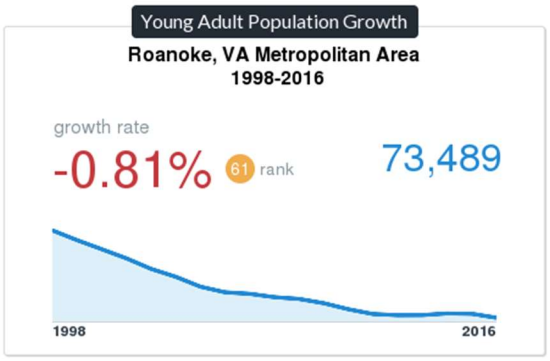
Figure 5 Economic Performance of the Roanoke MSA Compared to Other Regions in the U.S.













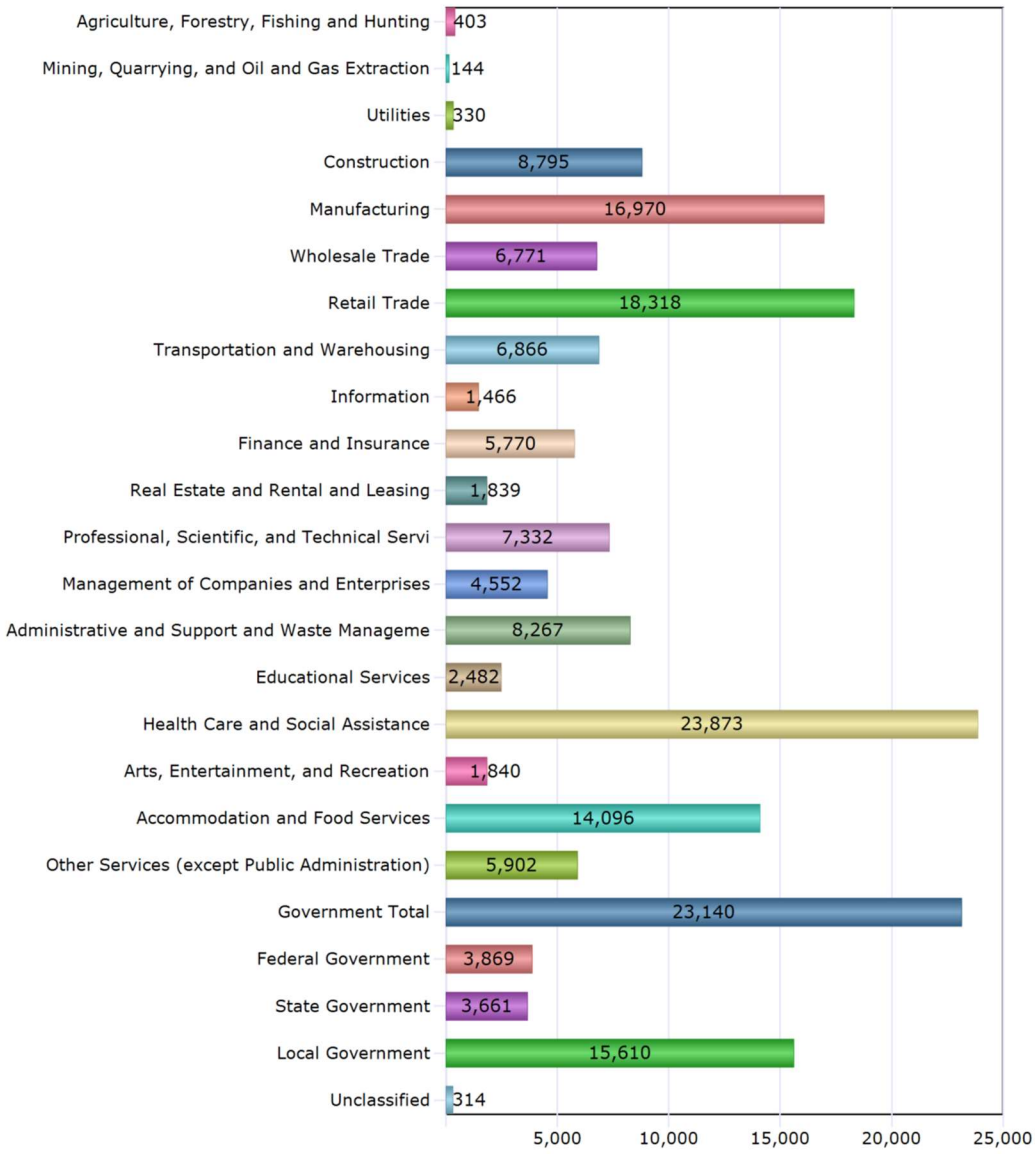
Source: U.S. Cluster Mapping (http://clustermapping.us), Institute for Strategy and Competitiveness, Harvard Business School. Copyright © 2014 President and Fellows of Harvard College. All rights reserved. Research funded in part by the U.S. Department of Commerce, Economic Development Administration.

Industry Composition and Clusters

Figure 6 shows the industry composition of employment in the Roanoke Valley Alleghany Region (corresponding to the RVARC service area shown in Figure 3). The largest employment sectors in the region are: Health Care and Social Assistance, Government, Retail, Manufacturing, and Accommodation and Food Services. Some of these are primarily local-serving in that they support the local needs of

regional residents and tend to growth with population. Health Care and Social Assistance and Government industries are classically local-serving.

Figure 6 Employment by Industry - Roanoke Valley-Alleghany RC



Source: Virginia Employment Commission, Economic Information & Analytics, Quarterly Census of Employment and Wages (QCEW), 2nd Quarter (April, May, June) 2017. As cited in Virginia Employment Commission: Virginia Community Profile, Roanoke Valley-Alleghany RC, January 2018. http://virginialmi.com/report_center/community_profiles/5109000305.pdf

Given the importance of tourism in the Roanoke region, businesses in Retail and Accommodations and Food Services are likely to serve a mix of local residents and travelers from elsewhere that visit and

spend money in the regional economy. Manufacturing, on the other hand, is what is sometimes called a "traded" industry. Manufacturing businesses produce goods that are then shipped out to broader markets, thus bringing outside money into the economy. Service sectors like Professional, Scientific, and Technical Services can also be considered traded industries if they serve outside markets.

> CLUSTERS ARE GROUPINGS OF NOT ONLY INDUSTRIES WITH SIMILAR PROCESSES BUT ALSO KEY SUPPLIERS AND OTHER RELATED INDUSTRIES FROM OTHER INDUSTRIAL SECTORS THAT TEND TO LOCATE IN THE SAME GENERAL PROXIMITY AND GAIN CERTAIN ADVANTAGES (SHARED WORKFORCE, KNOWLEDGE TRANSFER, ETC.) FROM DOING SO.
>
> - *Roanoke Valley-Alleghany Regional Comprehensive Economic Development Strategy*

All regional economies share certain commonalities in that they require population-serving businesses to support to local population by providing food, housing, transportation, shelter, etc. Where regions differ is in their developed specialties for goods and services that are exported elsewhere. These specialties can arise for many reasons ranging from proximity to natural resources, to a region's locational advantage with respect to specific global supply chains, or to concentrations of talent and innovation associated with research institutions. Regardless of their underlying initial cause, clustering dynamics tend to be self-reinforcing as businesses derive advantages from colocation with other similar companies, including:

> access to a broad pool of skilled workers with industry- or cluster-specific skills, access to suppliers and business customers, the ability to share ideas face-to-face with others who are working on similar business or technological problems, and access to educational, research, consulting, and engineering services that are specialized in the needs of the industry or cluster.[2]

By identifying industry clusters, economic development strategy can be tailored to support and build upon positive clustering dynamics and regional competitive advantages. Table 7 lists eight industry clusters in the Roanoke region that employ a disproportionately high number of workers relative to their share in the U.S., as indicated by a location quotient (LQ)[3] of greater than 1. For example, Transportation & Logistics and Electrical Equipment and Appliance & Component Manufacturing both account for approximately twice the average national proportion of employment in the region.

The identified clusters all share a significant level of reliance on freight transportation to support access to material input and the ability to move goods to market (with the possible exception of certain more

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[2] Helper, S., T. Krueger, and H. Wial. 2012. Locating American Manufacturing: Trends in the Geography of Production. Metropolitan Policy Program at Brookings. https://www.brookings.edu/wp-content/uploads/2016/06/0509_locating_american_manufacturing_report.pdf

[3] A location quotient (LQ) is an analytical statistic that measures a region's industrial specialization relative to a larger geographic unit (usually the nation). An LQ is computed as an industry's share of a regional total for some economic statistic (earnings, GDP by metropolitan area, employment, etc.) divided by the industry's share of the national total for the same statistic. https://www.bea.gov/faq/index.cfm?faq_id=478

service and research-oriented subsectors within the Life Sciences cluster). However, that is not to say that workforce issues and passenger transportation are irrelevant to these clusters. All parts of the national economy are becoming increasingly knowledge-oriented and dependent on access to skilled labor. Transportation supports the "people side of the equation" by ensuring people can reliably get to work, providing a diversity of mobility options to support quality of life, and by helping companies maintain connections with customers, suppliers, and collaborators through business travel.

Table 7 2012 Industry Clusters – Employment

Industry Cluster Description	Industry Cluster Employment LQ
Transportation & Logistics	2.02
Electrical Equipment, Appliance & Component Mfg	1.92
Glass & Ceramics	1.45
Biomedical/Biotechnical (Life Sciences)	1.28
Transportation Equipment Manufacturing	1.19
Mining	1.15
Chemicals & Chemical Based Products	1.08
Forest & Wood Products	1.03
Total All Industries	**1.00**

Source: US EDA, Innovation in American Regions, http://www.statsamerica.org/innovation/anydata/custom.asp, 2016. Detailed industry cluster definitions can be found at http://www.statsamerica.org/innovation/reports/detailed_cluster_definitions.pdf. As cited in 2017 CEDS.

Human Capital, Innovation, and Livability

Before addressing transportation conditions in the region, this section addresses other facets and inputs to regional competitiveness including human capital, innovation, and quality of life.

Educational attainment—usually described in terms of residents with a college degree—is often used as a proxy for the human capital inputs necessary for a competitive economy. In fact, educational attainment is consistently found to be the strongest predictor of regional employment growth.[4] Table 8 shows the educational attainment of the population that is aged 25 years and over in the region. Note that while conventional wisdom has often focused on attainment of a bachelor's degree or higher, recent research shows that attractive wage and job opportunities exist in STEM (science, technology, engineering, and math) fields for workers with a post-secondary certificate or associate's degree.[5]

[4] Literature supporting this notion is summarized in Edward Glaeser, *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier*, London, UK: Penguin, 2012.

[5] Jonathan Rothwell, "The Hidden STEM Economy," Metropolitan Policy Program, Brookings, https://www.brookings.edu/wp-content/uploads/2016/06/TheHiddenSTEMEconomy610.pdf

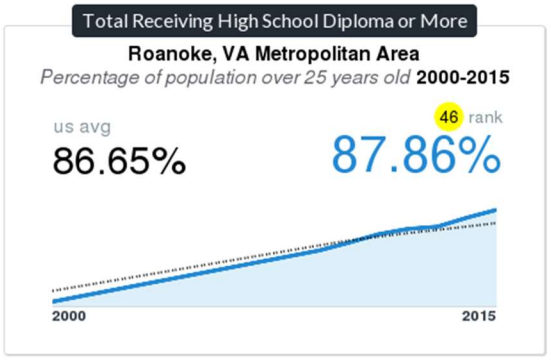
Table 8 Educational Attainment

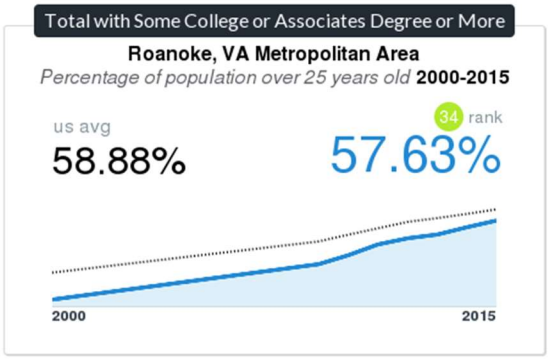
Geography	Population 25 years and over	% High School Degree or Higher	% Associate's Degree or Higher	% Bachelor's Degree or Higher
Alleghany County	11,778	83.6	24.3	15.7
Botetourt County	23,850	91.1	34.7	26.2
Craig County	3,849	89.6	21.5	14.7
Roanoke County	66,877	91.9	44.1	34.2
City of Covington	3,976	83.2	16.9	9.3
City of Roanoke	66,622	84.4	31.5	23.6
City of Salem	16,888	90	38.2	28.4
Virginia	**5,566,313**	**88.3**	**43.7**	**36.3**

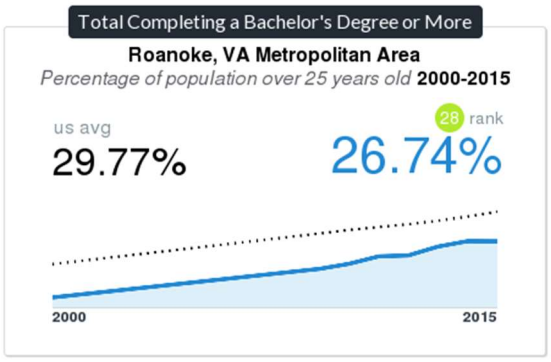
Source: 2011-2015 American Community Survey 5-Year Estimates, as cited in 2017 CEDS.

The red text in Table 8 points to localities in which educational attainment is lower than at the state level. With the exception of Roanoke County, the data show that the region lags the state in educational attainment at the level of an associate's degree or higher. Figure 7 shows a similar comparison of educational attainment in the Roanoke MSA to the rest of the U.S. In the period 2000-2015, Roanoke succeeded in surpassing the national average for those receiving a high school diploma or more. The metro area still lags behind the country in attainment of an associate's and bachelor's degrees (or more) but has nevertheless improved performance over time and ranks in the second quintile of U.S. metropolitan and micropolitan statistical areas.

Figure 7 Educational Attainment of the Roanoke MSA Compared to Other Regions in the U.S.







Source: U.S. Cluster Mapping (http://clustermapping.us), Institute for Strategy and Competitiveness, Harvard Business School. Copyright © 2014 President and Fellows of Harvard College. All rights reserved. Research funded in part by the U.S. Department of Commerce, Economic Development Administration.

Looking beyond educational attainment, those interested in economic development have also begun to dive deeper into the dynamics of innovation and entrepreneurships as drivers of overall economic growth. Table 9 compares the Roanoke region to the Commonwealth of Virginia according to two innovation indicators. The first shows that the region has establishments with on average more workers per firm than Virginia. Smaller average firm size is a good indicator of economic health in the long run. The second is a composite index developed by the Indiana Business Research Center for the U.S. Commerce Department's Economic Development Administration "to highlight factors that indicate a region is more or less ready to participate in the knowledge economy." Again, with respect to this measure, the region is ranked behind the State.

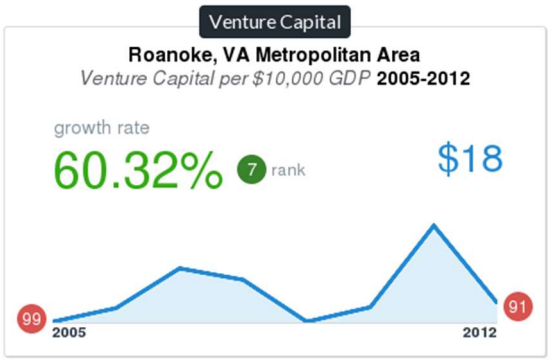
Table 9 Innovation Indicators: Roanoke Valley-Alleghany RC and Virginia

Indicator	Roanoke PDC	Virginia
Average establishment size (workers per firm)*	16.16	14.55
Innovation Index**	89.0	97.9

*Sources: *Virginia Employment Commission: Virginia Community Profile, Roanoke Valley-Alleghany RC, January 2018. http://virginialmi.com/report_center/community_profiles/5109000305.pdf . ** Indiana Business Research Center, for the U.S. Commerce Department's Economic Development Administration. http://www.statsamerica.org/innovation/innovation_index/region-select.html*

Figure 8 presents information on venture capital investment per $10,000 GDP in the Roanoke MSA, compared to other metropolitan and micropolitan statistical areas in the U.S. Venture capital is an important facilitator of the innovation dynamic and can help can drive regional start-up activity. While the data show that Roanoke is currently in the last quintile of U.S. regions with respect to this metric, the growth rate in venture capital investment the region experienced between 2005 and 2012 was the seventh fastest in the country—a promising trend for the regional economy.

Figure 8 Venture Capital Investment in the Roanoke MSA as Compared to Other U.S. Regions



Source: U.S. Cluster Mapping (http://clustermapping.us), Institute for Strategy and Competitiveness, Harvard Business School. Copyright © 2014 President and Fellows of Harvard College. All rights reserved. Research funded in part by the U.S. Department of Commerce, Economic Development Administration.

Another perspective on workforce as a key ingredient to economic development is the increased competition between regions for talent, based on overall quality of life. In this arena, rather than focusing only on attracting businesses, regions are also seeking to compete for the talent upon which those businesses rely. Table 10 reports on an indicator of quality of life—the Cost of Living Index, as computed by the Council for Community and Economic Research. Roanoke's index comes in at 90 (benchmarked against a national average of 100), which compares favorably with other cities. This cost of living index is a composite score which includes sub-indices of housing (89.0), transportation (86.3), misc. goods and services (88.3), grocery items (90.2), utilities (98.5), and health care (93.8).[6]

Table 10 Comparative Cost of Living Index

Region	Cost of Living Index
Roanoke, VA	90.0
National Average	100.0
Charleston, SC	101.0
Harrisonburg, VA	96.9
Charlottesville, VA	103.7
Atlanta, GA	99.9
Raleigh, NC	90.5
Washington, DC	146.8

Source: ACCRA, 2015 Annual Average Data, as cited in Roanoke Regional Chamber Greater Roanoke Virginia Statistical Guide, 2017, http://65.169.107.207/wp-content/uploads/2017/10/2017-Statistical-Guide-Web-Version.pdf

[6] ACCRA, 2015 Annual Average Data, as cited in Roanoke Regional Chamber Greater Roanoke Virginia Statistical Guide, 2017, http://65.169.107.207/wp-content/uploads/2017/10/2017-Statistical-Guide-Web-Version.pdf

TRANSPORTATION CONNECTIVITY CONDITIONS

This section discusses transportation connectivity conditions from two primary perspectives that are of direct relevance to business competitiveness: (1) Intra-Regional Connectivity and Labor Market Access, and (2) Inter-Regional Connectivity with Outside Markets.

Intra-Regional Connectivity and Labor Market Access

Table 11 reports commute times for those living in the Roanoke MSA compared to other metropolitan areas in Virginia that are closest in size to Roanoke. The data suggests that the Roanoke region benefits from relatively short commutes compared to the statewide average—a reflection in part of the lower levels of congestion experienced in the area.

Table 11 Mean Travel Time to Work (2016) for Roanoke and Comparison Regions

Geography	Mean Travel Time to Work
Richmond, VA Metro Area	25.0
Roanoke, VA Metro Area	23.3
Kingsport-Bristol-Bristol, TN-VA Metro Area	22.9
Lynchburg, VA Metro Area	23.7
Charlottesville, VA Metro Area	24.3
Virginia	**28.1**

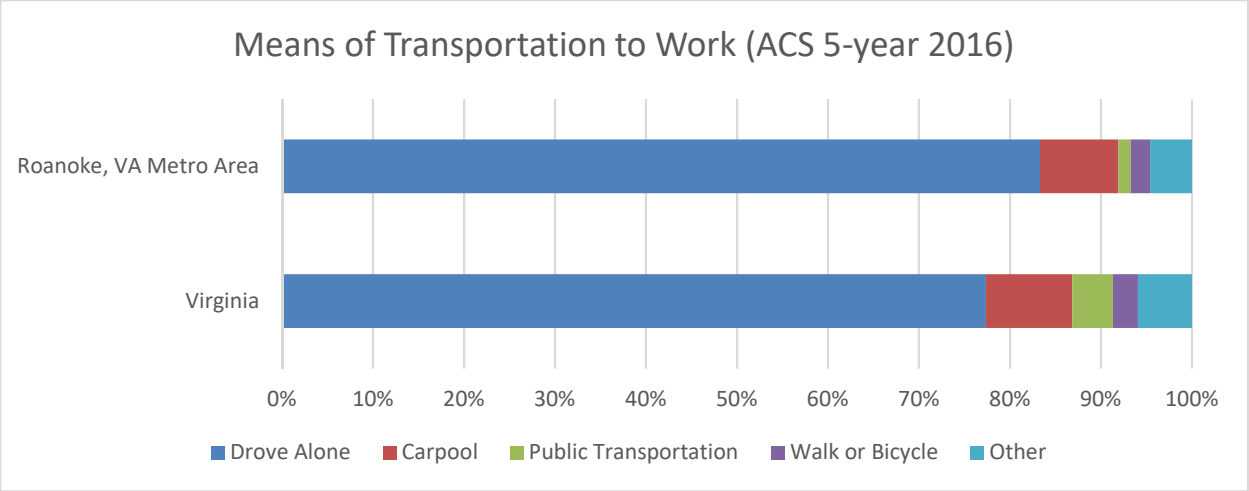
Source: 2012-2016 American Community Survey 5-Year Estimates

With respect to mode share, the Roanoke region is more dependent on personal vehicles for access to work than the state as a whole with 92% of people driving alone or carpooling to work in the region, compared to 87% statewide. Correspondingly its transit, walking, and biking shares are also lower (a total of 3% compared to 7% at the state level). Vision 2040, the region's LRTP, describes an anticipated greater importance of modal options for the future of the region:[7]

> The Roanoke Valley's population has not yet grown to a size where the primary reliance on driving for people or freight mobility has hampered quality of life or business, but with every new land development, it is important to plan for a future with mixed uses and multiple modes.

[7] Vision 2040: Roanoke Valley Transportation.

Figure 9 Commuting mode split, Roanoke MSA and Virginia

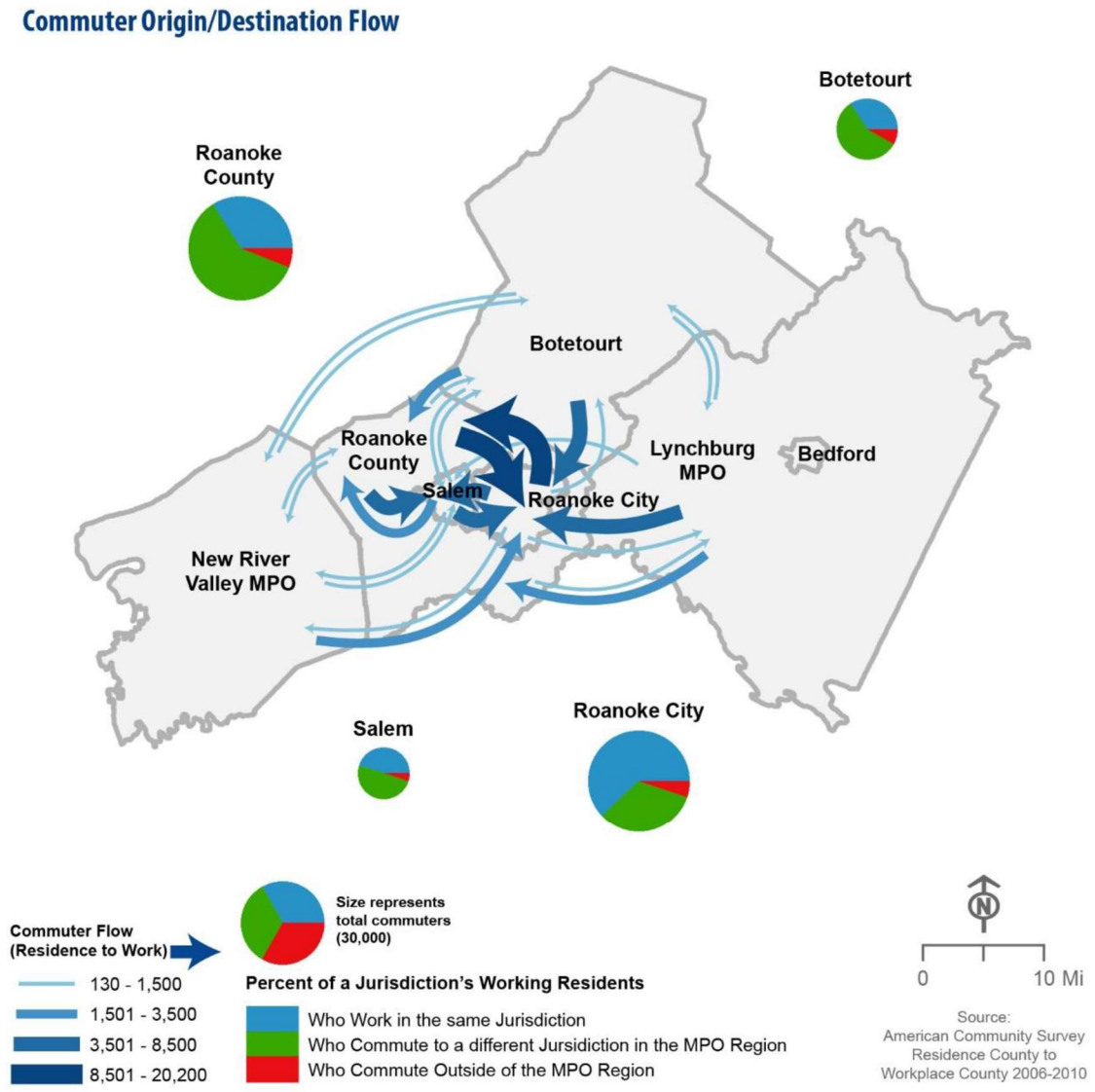


Source: 2012-2016 American Community Survey 5-Year Estimates

Figure 10 depicts regional commuting patterns in the Roanoke region. This graphic shows that the City of Roanoke is a major destination for workers, including from other neighboring MPO areas. It also shows that nearly 66% of those working in the City of Roanoke also live within the City limits. Overall, the labor market contains about 334,000 people located within a 40-minute drive of downtown Roanoke.[8]

[8] Estimates from ESRI Business Analyst Online.

Figure 10 Regional Commuting Patterns



Source: VMTP 2025 Needs Assessment, Roanoke Region, September 2015.

Inter-Regional Connectivity with Outside Markets

Businesses in the Roanoke region rely on the highways, rail network, and airports to maintain connections with outside markets. In fact, the VTrans Roanoke regional needs assessment highlighted connections to Lynchburg, to the east, and Blacksburg/ Christiansburg, to the west, as key to ensuring local economic success.[9] As a proxy for the overall scale of the buyer-supplier or one-day truck-delivery

[9] VMTP 2025 Needs Assessment, Roanoke Region, September 2015.

market, there are 3.38 million employees (an indicator of economic activity) located within a 3-hour drive of Roanoke.[10]

Table 12 reports annual enplanements at all commercial service airports in Virginia. Roanoke-Blacksburg Regional airport served approximately 305,000 enplanements (boardings) in 2016, up 2% from the previous year. The airport is the fifth busiest passenger airport in the state and the 156th nationally. The airport serves eight non-stop destinations with more than 40 scheduled flights daily.[11]

Table 12 Enplanements at Virginia Commercial Service Airports

Airport in Virginia	CY 16 Enplanements	CY 15 Enplanements	% Change	National Rank
Ronald Reagan Washington National	11,470,854	11,242,375	2%	23
Washington Dulles International	10,596,942	10,363,974	2%	26
Richmond International	1,777,648	1,740,391	2%	66
Norfolk International	1,602,631	1,515,200	6%	70
Roanoke-Blacksburg Regional/Woodrum Field	305,212	300,181	2%	156
Charlottesville-Albemarle	295,930	274,767	8%	158
Newport News/Williamsburg International	199,421	202,104	-1%	183
Lynchburg Regional/Preston Glenn Field	75,465	75,824	0%	249
Shenandoah Valley Regional	5,442	5,536	-2%	443

Source: FAA CY 16 Enplanements at All Commercial Service Airports (by Rank).
https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/

Rail service has historically been and continues to be a key face of the region's inter-regional connectivity. Roanoke lies at the convergence of multiple corridors owned by freight railroad Norfolk Southern. CSX also serves the region. Norfolk Southern has a "Thoroughbred Bulk Transfer Terminal" in Roanoke that provides rail-to-truck and truck-to-rail bulk transfer and distribution services. At present, the region does not have an intermodal container rail transfer terminal, although one has been proposed and analyzed near the intersection of two major Norfolk Southern (NS) freight corridors (Heartland and Crescent). The region is, however, within the service area of other existing intermodal terminals, and is close enough to the Port of Virginia for trucking to be more cost effective than rail at that distance.[12]

The introduction of new passenger rail to Roanoke is a key development in supporting the region's connections to outside markets. As of late 2017, Roanoke is the new end of the line for the Northeast Regional train.

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[10] Estimates from ESRI Business Analyst Online.

[11] http://www.roanokeairport.com/

[12] http://rvarc.org/wp-content/uploads/2015/09/Western-Virginia-Intermodal-Study-Final_RoanokeReport_LessAppendices-Final-Report-06-25-2015.pdf

Finally, inter-regional connectivity is important to the Roanoke region because of its role in supporting tourism and associated economic activity. According to estimates by the U.S. Travel Association developed for the Virginia Tourism Corporation, $751 million in spending by domestic visitors to the Roanoke region directly supported 7,037 jobs in 2016. This is 10% higher than in 2012 (Table 13). The regional CEDS associates an increase in tourism in part with the "advent of the new regional identity for tourism – 'Virginia's Blue Ridge.'"

Table 13 Jobs and Sales Supported by Domestic Visitors to the Roanoke Region (dollars in millions)

Locality		2012		2016		% Change	
		Jobs	Expenditures	Jobs	Expenditures	Jobs	Expenditures
County	Alleghany	352	$35	361	$36	3%	3%
	Botetourt	433	$51	462	$57	7%	11%
	Craig	46	$4	48	$4	4%	5%
	Roanoke	1,530	$151	1,742	$175	14%	16%
City	Covington	55	$5	54	$5	-2%	1%
	Roanoke	3,419	$373	3,616	$405	6%	9%
	Salem	682	$61	754	$68	11%	13%
Region Subtotal		**6,517**	**$680**	**7,037**	**$751**	**8%**	**10%**
Virginia		**210,020**	**$21,214**	**229,259**	**$23,700**	**9%**	**12%**

Source: Prepared by the U.S. Travel Association for the Virginia Tourism Corporation.
http://web.yesvirginia.org/localspending/localspending

Transportation-Related Insights from the CEDS SWOT Analysis

In support of identification of regional competitive advantages and disadvantages, Table 14 summarizes insights from the CEDS SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis that are directly or indirectly related to transportation. Of particular interest are the issues raised that relate to workforce availability and the influence of lifestyle, vibrancy, and image on the region's ability to attract and retain young professionals. Transportation can play a supporting role in addressing this challenge as there is growing evidence that young professionals (and to some extent retirees as well) are seeking communities that feel more urban and that are more supportive of transit, walking, and biking.

The CEDS SWOT analysis also notes a planning related regional weakness: "Lack of common vision, territorialism, fragmented governments, tunnel vision, we think small (risk-averse)," all of which points to a desire for more regional big-picture thinking.

Table 14 Transportation Related Insights from CEDS SWOT Analysis

Strengths	Weaknesses
• Geographic strengths – Mid Atlantic location, good road and rail access • Transportation overall (airports, roadways, railroad) – great airport • Vibrant downtowns and village centers • Amtrak service	• Changes in airline industry (number of flights, fares, destinations, cancelled flights, lack of reliability) out of Roanoke • Children grow up and leave (looking for employment, lifestyle) • Inadequate supply of talent in region to meet current and future workforce demand. • Lack of perceived "coolness" and vibrancy
Opportunities	**Threats**
• Leverage research and medical initiatives, including Virginia Tech Medical School and Research Institute • Expand the tourism sector (including medical conferences, agri-tourism) • Amtrak related services and businesses • Retention of students and young professionals, marketing to millennials, and focusing on economic and community development (e.g. infrastructure, housing, quality of life) • Redevelopment, repurposing, reuse • I-73* and Rail Intermodal Facility Concepts**	• Workforce availability • Aging infrastructure • Changing economy: technology shifts, corporate restructuring

*Source: Adapted from 2017 CEDS. *I-73 is a very long-term concept – partial preliminary engineering is the RVTPO's vision list, labeled long term. **The Western Virginia Intermodal Study found mixed evidence regarding this proposal and also offered alternative freight-oriented strategies.*[13]

Recap of Stakeholder Defined Needs

Table 15 displays draft regional transportation needs that can be traced to the region's understanding of desired economic development. These were developed by members of the project Steering Committee at the November 29, 2017 meeting and subsequently refined and presented at the RVTPO Policy Board meeting on December 14, 2017.

Beyond this preliminary identification of needs and priorities, the steering committee also revealed a consensus opinion that the region wishes to get better at *'thinking big by thinking regionally'* and to put more concerted effort into developing strong regional transportation concepts that address economic

[13] http://rvarc.org/wp-content/uploads/2015/09/Western-Virginia-Intermodal-Study-Final_RoanokeReport_LessAppendices-Final-Report-06-25-2015.pdf

development goals and can be effectively marketed or advocated. This is in alignment with the CEDS identified weakness of "lack of common vision" identified above.

Table 15 Draft Needs/Priorities

Category	Details
Draft Priority Transportation Needs/Problems	• Lack of travel time reliability between Roanoke/Blacksburg which is essential due to increasing worker/student flow • Lack of connectivity between the Roanoke-Blacksburg Regional Airport and Downtown Roanoke • Vehicle congestion on Route 460 East between Downtown Roanoke and Alternate 220 • Vehicle congestion on Route 220 South between Clearbrook and Route 419 due to people commuting toward Downtown Roanoke • Lack of transit access for residents in the City of Roanoke to jobs in surrounding areas • Lack of connectivity from transit to final destinations • Lack of trails/bikeways between destinations *(lower priority since region is already successful in getting funding)*
Other Possible Regional Transportation Priorities	• Lack of walkable mixed-use places throughout the region – i.e. "placemaking" environment. • Increasing vehicle congestion on Route 220 North between I-81 and Greenfield • Insufficient flight options at affordable prices from ROA.

Fiscal Environment

Vision 2040 highlights how the role of regional planning and transportation investment at RVTPO is changing and will continue to change, in response to the fact that:

1. SMART SCALE encourages greater regional decision-making, rather than more fragmented local decisions
2. "The vast majority of anticipated future funding will be used for maintenance rather than new construction. This will likely mean that very few large-scale new terrain transportation projects will be built in the future. Rather, many transportation projects will be smaller incremental improvements."

SYNTHESIS OF COMPETITIVE ADVANTAGES AND DISADVANTAGES

This memo has assembled available data information on the Roanoke Region, addressing (1) economic and demographic trends, including special attention to labor force trends; (2) key industries, with distinctions between population-serving and traded industries and consideration of clustering dynamics; (3) human capital, innovation, and livability; and (4) transportation conditions focused on intra- and inter-regional connectivity conditions that support business needs (e.g., the need to access quality labor,

move goods, and facilitate tourism). The data and information reviewed suggest the following observations about the region's competitive advantages and disadvantages:

- While the region is growing and has made meaningful gains in prosperity, it is still lagging Virginia and the nation with regard to certain indicators of overall economic development, including young adult population growth.
- The largest employment sectors in the region are: Health Care and Social Assistance, Government, Retail, Manufacturing, and Accommodation and Food Services. Manufacturing is key to bringing outside money into the economy, as are the sub-portions of Retail and Accommodations and Food Services that support tourism activity.
- The Roanoke region is competitive in several industry clusters, including: Transportation & Logistics; Electrical Equipment, Appliance & Component Manufacturing; Glass & Ceramics; Biomedical/Biotechnical (Life Sciences); Transportation Equipment Manufacturing; Mining; Chemicals & Chemical Based Products; Forest & Wood Products.
- One of the primary challenges facing the region is human capital—both in scale of the available workforce and in educational attainment. In particular, the region has struggled with attracting and retaining young people. Transportation can play a supporting role in addressing this challenge as there is growing evidence that young professionals (and to some extent retirees as well) are seeking communities that feel more urban and that are more supportive of transit, walking, and biking.
- While the region still lags according to various indicators of innovation and entrepreneurship, there are positive signs of changes in their realm, including a rapid increase in recent years in venture capital investment in the Roanoke metro area.
- The Roanoke region competes well with other locations in terms of cost of living, which is a major component of livability.
- The region at present benefits from relatively low levels of congestion. However, the region is cognizant of the need to ensure that future growth does not erode this strength—by planning "for a future with mixed uses and multiple modes."
- Connectivity to surrounding regions, particularly the Blacksburg/Christiansburg area, is key to the continued competitiveness of the region and may require targeted improvement strategies.
- Amtrak passenger rail service is a new strength for the region that may present new opportunities.
- The region's growing tourism industry presents new opportunities for strengthening the economy.
- The region is faced with a planning paradigm in which fiscal limitations mean very few large-scale transportation projects are likely to be built in the future, but big-picture regional decision making is nevertheless increasingly key to success. This may point to transportation strategies that focus on key corridors or forms of connectivity as a framework within which incremental improvements can be made over time.

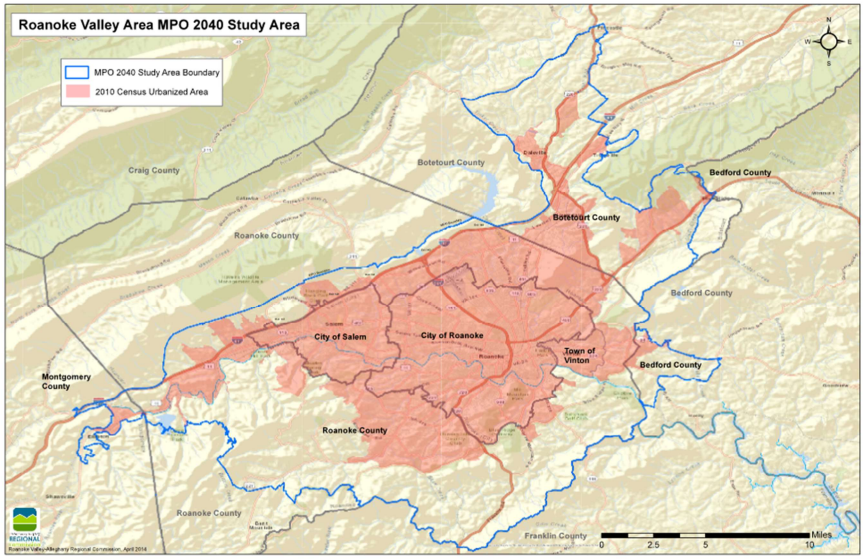
Roanoke Region Transportation Priorities for Economic Development and Growth

Roanoke Valley Transportation
PLANNING ORGANIZATION
Staffed by the
REGIONALcommission

March 29, 2018

Introduction

The Roanoke Valley Transportation Planning Organization (RVTPO) developed this document as part of the *Regional Study on Transportation Project Prioritization for Economic Development and Growth*.



Source: RVARC. http://rvarc.org/wp-content/uploads/2014/04/mpostudyarea.pdf

Project Purpose

The purpose of this study and resulting document is to identify key transportation priorities that will enhance the region's economic development opportunities.

Economic development and transportation go hand in hand. To produce goods and services, businesses need workers and material inputs—whether that's office paper or car parts. Their access to these inputs depends on the transportation system. Similarly, transportation is necessary to move goods along a supply chain through intermediate stages such as wholesale and distribution to the point of consumption by customers. Costs and reliability of the transportation system at points along this process affect a company's "bottom line" directly. Transportation can also affect the quality of labor or suppliers that a company can reach. Moreover, the efficiency of company operations can also be influenced by agglomeration economies wherein greater market reach enabled by transportation allows for higher productivity (greater output for a given unit of input).

Recognizing the importance of transportation to economic development, the RVTPO entered into this study with the goal of ***building regional consensus around a small number of transportation projects that merit a concerted push from the region based on their ability to advance regional economic development objectives***.

The Region's Transportation and Economic Development Goals

The Roanoke Region's transportation and economic development goals, as encapsulated in the region's most recent long-range transportation plan (LRTP), *Vision 2040,* and in the recently adopted *Roanoke Valley-Alleghany Regional Comprehensive Economic Development Strategy (CEDS) 2017 Annual Update*, are in alignment centering around four key areas: connectivity, competitiveness, maintenance, and sustainability.

Connectivity. The connectivity theme addresses the need to maintain connections within the region and with the broader global economy:

- **LRTP:** *"Provide opportunities for people to access jobs, services, and activity centers and for businesses to access distribution hubs and the region's workforce."*

- **CEDS:** *"… facilitate the growth of higher-wage industry clusters and to ensure connectivity with regions nationally and globally."*

Competitiveness. Competitiveness represents a focus in the region on how well the transportation system supports business, addressing specific sectors like tourism, and focusing on a diverse business base:

- **LRTP***: "Invest in a transportation system that supports a robust and diversified economy, enables global competitiveness, productivity, and efficiency, and enhances travel and tourism."*
- **CEDS***: "Encourage regional economic vitality through an increasingly diverse base of businesses including entrepreneurial startups and large employers."*

Maintenance. Maintenance refers to the mandate to think as a region about long term care of the system as well as how to get the most value from the assets the region already has:

- **LRTP***: "Maintain the transportation system in good condition and leverage technology to optimize system performance and operations."*
- **CEDS***: "Ensure the region has adequate infrastructure in place…Improve the Multimodal Transportation Network of the Roanoke Valley-Alleghany Region."*

Sustainability. The alignment area of sustainability recognizes the ample natural and cultural resources in the region and seeks to align transportation and economic development strategies to keep the region and its growth sustainable in the long run:

- **LRTP***: "Protect the agricultural, natural, historic, and cultural environment; preserve good air quality; minimize stormwater impacts and promote active living through multimodal transportation options."*
- **CEDS***: "Seek to maintain and promote the region's natural beauty as well as its cultural amenities, and seek sustainable growth opportunities."*

Regional Economic Context

Growth and Prosperity

The Roanoke Metropolitan Statistical Area (MSA) is the fourth largest in Virginia.[1] While the region is growing and has made meaningful gains in prosperity, it is still lagging Virginia and the nation with regard to certain indicators of overall economic development. Between 2000 and 2015, the population of the Roanoke Valley - Alleghany region grew 5%, which lagged an overall growth rate in Virginia of 16.6%.[2] Similarly, in terms of recent GDP growth, the Roanoke MSA is gaining more slowly than Virginia or the nation, increasing 6% from 2013 to 2015, compared to 8.1% for the US as a whole.[3] Gross Domestic Product (GDP) per capita is another indicator of regional prosperity; from 2001—2015, the Roanoke MSA gained in GDP per capita but also dropped from the fourth to the fifth quintile of regions, meaning that growth has lagged other regions.[4]

[1] 2012-2016 American Community Survey 5-Year Estimates
[2] 2011-2015 5-Year Estimates, American Community and Survey Demographic and Housing Estimates, 2017 and US Census of Population, 2000, as cited in 2017 CEDS
[3] Bureau of Economic Analysis, 2017, as cited in 2017 CEDS.
[4] U.S. Cluster Mapping (http://clustermapping.us), Institute for Strategy and Competitiveness, Harvard Business School.

Challenges

One of the primary challenges facing the Roanoke Region is limited human capital. Many of the localities in the region have seen a decline in the size of their labor force, compared to moderate increases at the state level.[5] Educational attainment, measured as the percentage of the population age 25 years and older with an Associate's Degree or higher, is also lower for most parts of the region (all but Roanoke County) when compared to Virginia as a whole.[6] In addition, the Roanoke region as a whole has struggled to maintain its young adult population growth. Nationally, the percentage of young adults (25 to 44) in the total population steadily declined from 1998-2016. However, for Roanoke, this decline has been steeper, and the current regional percentage (23.43%) is lower than the U.S. average (26.35%).[7]

Strengths and Opportunities

The Roanoke Region is poised to take advantage of several strengths and opportunities. While the region still lags in certain indicators of innovation and entrepreneurship such as average establishment size,[8] there are bright spots like the rapid recent growth in venture capital investment: The growth rate in venture capital investment the region experienced between 2005 and 2012 was the seventh fastest in the country.[9] In addition, the Roanoke region competes well with other locations in terms of cost of living, an important component of livability. According to the Cost of Living Index, as computed by the Council for Community and Economic Research, Roanoke comes in at 90, benchmarked against a national average of 100, or the index of other communities such as Charlottesville, VA (103.7) or Washington, DC (146.8).[10]

The region also benefits from relatively low levels of average congestion and manageable commutes. This highlights the importance of targeted intervention or preserve this current asset. As described in Vision 2040:

"The Roanoke Valley's population has not yet grown to a size where the primary reliance on driving for people or freight mobility has hampered quality of life or business, but with every new land development, it is important to plan for a future with mixed uses and multiple modes."

Finally, the regional CEDS identified a series of opportunities that the region seeks to capitalize on going forward, including proximity to Virginia Tech and its dynamic student population and research, increasing opportunities from tourism, the recent introduction of Amtrak service, and opportunities to better attract and retain students and young professionals through initiatives aimed at quality of life. **Each of these identified opportunities provide a basis for identification of transportation priority needs, solutions, and projects.**

Identification of Transportation Priorities

The process for identifying regional transportation priorities for the Roanoke area was grounded in the RVTPO's adopted Framework for Prioritization, shown in the following diagram. Transportation needs—defined as improvements necessary for the region to maintain its

[5] Bureau of Labor Statistics, 2017, as cited in 2017 CEDS.
[6] 2011-2015 American Community Survey 5-Year Estimates, as cited in 2017 CEDS.
[7] U.S. Cluster Mapping (http://clustermapping.us), Institute for Strategy and Competitiveness, Harvard Business School.
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[9] U.S. Cluster Mapping (http://clustermapping.us), Institute for Strategy and Competitiveness, Harvard Business School.
[10] ACCRA, 2015 Annual Average Data, as cited in Roanoke Regional Chamber Greater Roanoke Virginia Statistical Guide, 2017, http://65.169.107.207/wp-content/uploads/2017/10/2017-Statistical-Guide-Web-Version.pdf

current economy and spur sustainable new economic growth—underlie all subsequent identification of priorities, solutions, and projects.

Also, in developing and refining priorities, key input was provided by (1) the project steering committee, (2) regional economic development stakeholders, (3) the Roanoke Regional Chamber, and (4) the RVTPO's Policy Board.

RVTPO Framework for Prioritization





Regional Priorities

Regional priority needs are summarized in the figure below.



The following pages provide detail on the solutions and projects identified to address each of these four key regional needs. In some cases, additional studies or projects outside the Roanoke Valley are also identified.

Visual Key to Presentation of Priorities:

Need.

→ **Solution**

Project

Improve Connectivity between the Roanoke Valley and the New River Valley by:

- → **Widening/Improving I-81 between the Roanoke and New River Valleys (Exit 150-Exit 118)**
- → **Improving U.S. 460 traffic flow west of Salem to Christiansburg**
- → **Improving U.S. 460/Alt. 460 traffic flow around Downtown Salem**
- → **Improving and expanding transit options between the Roanoke Valley and New River Valley**





Specific Proposals:

→ Widening/Improving I-81 between the Roanoke and New River Valleys (Exit 150-Exit 118)

PRIORITY PROJECTS

1. Widen I-81 from 4 to 6 lanes between Exits 140 and 141
2. Widen I-81 SB from 2-3 lanes between Exit 150 and the Truck Weigh Station
3. Widen I-81 from 4 to 6 lanes between Exits 137 and 140

Following the above priority projects, widening I-81 from 4-6 lanes would be prioritized as follows: Exits 143-146, Exits 146-150, and Exits 132-137

STUDIES

- I-581/I-81 interchange
- Potential ITS and shoulder improvements to enable the use of I-81 shoulders as driving lanes during incidents and peak hours

SUPPORT FOR PROJECTS OUTSIDE THE TPO AREA

- Extend the VA Smart Road to connect to I-81



Improve Connectivity between the Roanoke Valley and the Lynchburg Area by:

- → **Reducing congestion on U.S. 460 and improving capacity between 11th Street and the TPO boundary**
- → **Pursuing opportunities for alternative intersections along U.S. 460 East**
- → **Improving capacity on US 220 Alt between I-81 and US 460 East**
- → **Improving and expanding transit options between the Roanoke Valley and Lynchburg Area**

Specific Proposals:

- → **Reducing congestion on U.S. 460 and improving capacity between 11th Street and the TPO boundary**

PRIORITY PROJECTS

4. Reconstruct U.S. 460 between 11th Street NE and Gus Nicks Blvd to increase capacity and operations



Orange Avenue/ U.S. 460 East

Improve Connectivity from Botetourt and Franklin Counties to the central Roanoke Valley localities by:

- → **Reducing congestion on U.S. 220 North of I-81 and South of Route 419 which may include widening and/or Super Street concepts**
- → **Pursuing opportunities for alternative intersections along U.S. 220/I-581**
- → **Improving and expanding transit options between Botetourt and Franklin Counties and the central Roanoke Valley localities**
- → **Construct I-73 between West Virginia and North Carolina**

Specific Proposals:

- → **Reducing congestion on U.S. 220 North of I-81 and South of Route 419 which may include widening and/or Super Street concepts**

PRIORITY PROJECTS

5. Construct a diverging diamond interchange with bike/pedestrian accommodation at Rt. 419/220
6. Reconfigure U.S. 220/International Parkway intersection to increase turning capacity and improve safety

SUPPORT FOR PROJECTS OUTSIDE THE TPO AREA

- U.S. 220/Franklin County Summit View Business Park intersection improvements

→ **Pursuing opportunities for alternative intersections along U.S. 220/I-581**

Route 11/I-81 Exit 150/Alt. 220 Roundabout



PRIORITY PROJECTS

7. Reconstruct the I-581/Peters Creek Rd. interchange to improve turning movements and access to Valleypointe Pkwy. and Thirlane Rd.

Improve Mobility within Urban Development Areas (UDAs) and Designated Growth Areas (DGAs) by:

→ **Expanding multimodal accommodations across the region to connect Central Business Districts, commercial and employment centers, institutions of higher learning, and transportation hubs.**

→ **Continuing to implement the Roanoke Valley Greenway Plan, Bikeway Plan, Pedestrian Plan, and Transit Plan**

A vision for Main Street in Downtown Salem



Reimagine 419: A distinct and vibrant new destination for businesses and residents that accommodates all travel modes



Specific Proposals:

→ **Continuing to implement the Roanoke Valley Greenway Plan, Bikeway Plan, Pedestrian Plan, and Transit Plan**

PRIORITY PROJECTS

8. Build the downtown Roanoke Intermodal Station (Amtrak, intercity bus, transit)

9. Construct high regional priority pedestrian projects located within the RVTPO's multimodal centers as documented in the Regional Pedestrian Vision Plan

   Examples include: Route 220 Appalachian Trail crossing, Williamson Road Streetscape, Main Street Streetscape in Downtown Salem, Route 419 sidewalk/streetscape in multiple activity centers, and Walnut Avenue at 8th Street

10. Complete the Roanoke River Greenway, followed by the Phase II Greenways: Tinker Creek, Hanging Rock/Mason Creek, Lick Run, and Glade Creek.

Roanoke Amtrak Platform





Next Steps

The RVTPO and its planning partners are committed to advancing the identified regional priorities as part of ongoing regional prioritization. This is intended to be a "living document" with needs, solutions, and individual projects refined as part of the RVTPO's planning process. The process is expected to include:

- Continued work to secure funding for identified priority projects and studies, whether through SMART SCALE or other appropriate funding mechanisms.
- Strategic bundling of projects and project components to ensure that desired improvements can be implemented as incremental opportunities arise.
- Incorporation of available performance data and tools to further identify project opportunities under the solution areas. For example, VDOT's alternative intersections tool (VJuST) may be used to identify and screen innovative intersection and

interchange configurations to be evaluated for further study, analysis and design.

- An ongoing commitment to ensuring projects represent the most effective use of limited funds to achieve specific performance outcomes.
- Subsequent strengthening of the prioritization process through further incorporation of existing data and identification of any specific data gaps.

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The contents of this report reflect the views of the author(s) who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration, the Virginia Department of Transportation, or the Planning District Commission. This report does not constitute a standard, specification, or regulation.

FHWA or VDOT acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

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