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2040 Long Range Transportation Plan

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Disclaimer

This report has been prepared in cooperation with, and financed in part, by the U.S. Department of Transportation - Federal Highway Administration, the Federal Transit Administration, the Virginia Department of Transportation, and the Virginia Department of Rail and Public Transportation. The contents of this report reflect the views of the Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO) and the Central Shenandoah Planning District Commission, which are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration, Federal Transit Administration, the Virginia Department of Transportation, or the Virginia Department of Rail and Public Transportation. This report is not a legal document, and does not constitute a standard, specification, or regulation. Although much care was taken to ensure the accuracy of information presented in this document, CSPDC does not guarantee the accuracy of this information.

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 improvement, 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.

Non-Discrimination Statement

The HRMPO ensures non-discrimination and equal employment in all programs and activities in accordance with Title VI and Title VII of the Civil Rights Act of 1964. If you have questions or concerns about your civil rights in regard to this project, or if you need special assistance for persons with disabilities or limited English proficiency, please contact the HRMPO. For more information, or to obtain a Title VI Complaint Form, see http://hrvampo.org/public-participation-title-vi or call (540) 885-5174.
RESOLUTION APPROVING THE HARRISONBURG-ROCKINGHAM
METROPOLITAN PLANNING ORGANIZATION (HRMPO)
2040 LONG RANGE TRANSPORTATION PLAN (LRTP)

WHEREAS, the Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO) Policy Board has developed the 2040 LRTP in accordance with federal and state planning guidelines and requirements; and

WHEREAS, the 2040 LRTP was developed by HRMPO staff, consultants and the Technical Advisory Committee (TAC), and reviewed by the TAC and Policy Board; and

WHEREAS, the 2040 LRTP included early stakeholder and public outreach, and was released for presentation to the public for comment at the Policy Board meeting, and duly advertised in the local media; and

WHEREAS, the HRMPO has documented all public comments, and all agency comments received have been addressed;

NOW, THEREFORE, BE IT RESOLVED, by the Harrisonburg-Rockingham Metropolitan Planning Organization Policy Board, that it does hereby approve for final adoption the 2040 LRTP on this 16th day of March 2017.

SIGNED:

[Signature]
Rick Chandler
Chairman
Harrisonburg-Rockingham Metropolitan Planning Organization

ATTEST:

[Signature]
Bonnie Riedesel
Administrator
Harrisonburg-Rockingham Metropolitan Planning Organization
RESOLUTION APPROVING THE HARRISONBURG-ROCKINGHAM MPO (HRMPO) 2040 LONG RANGE TRANSPORTATION PLAN AMENDMENT

WHEREAS, the Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO) Policy Board has developed the 2040 Long Range Transportation Plan (LRTP) Amendment in accordance with federal and state planning guidelines and requirements; and

WHEREAS, the 2040 LRTP Amendment was developed by HRMPO staff and the Technical Advisory Committee (TAC), and reviewed by the TAC and Policy Board; and

WHEREAS, the 2040 LRTP Amendment included early stakeholder and public outreach, and was released for public for comment by the Policy Board, and duly advertised in the local media; and

WHEREAS, the HRMPO has documented all public comments, and all agency comments received have been addressed;

NOW, THEREFORE BE IT RESOLVED by the Harrisonburg-Rockingham Metropolitan Planning Organization Policy Board, that it does hereby approve the 2040 LRTP Amendment.

Signed this 17th day of May 2018.

SIGNED:                                      ATTEST:

Rick Chandler, Chairman
Harrisonburg-Rockingham
Metropolitan Planning Organization
Policy Board

Bonnie S. Riedesel, Secretary/Treasurer
Harrisonburg-Rockingham
Metropolitan Planning Organization
Policy Board

HRMPO Resolution 18-2
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**Glossary**

**23 CFR, Part 450**
Title 23 Code of Federal Regulations, Part 450 is Federal regulations pertaining to statewide and metropolitan transportation planning.

**23 USC 134**
23 United States Code 134 is the part of the USC that governs the metropolitan transportation planning process.

**3C**
Employing a Continuing, Cooperative and Comprehensive (3C) planning process is a requirement for all MPOs as specified in 23 CFR 450.300.

**ADT**
Average Annual Daily Traffic is a measure used primarily in transportation planning and transportation engineering. It is the total volume of vehicle traffic of a highway or road for a year divided by 365 days.

**Accessibility**
Accessibility is the extent to which facilities are barrier-free and useable by persons with disabilities, including wheelchair users.

**ADA**
The Americans with Disabilities Act is a Federal law that requires public facilities, including transportation services, to be accessible to persons with disabilities, temporary disabilities and the conditions related to substance abuse.

**CIP**
A Capital Improvement Plan (Program) is a short-range plan; with usually no more than a ten year horizon. The plan identifies capital projects, equipment purchases, and a planning schedule for a local government entity. It serves as the primary mechanism for connecting comprehensive and strategic plan goals with the entity's annual budget.

**CLRP**
Developed and approved by the HRMPO, the Financially-Constrained Long Range Transportation Plan (CLRP) is a regional plan that includes all transportation projects and programs that the MPO realistically anticipates can be implemented over the next 25 years. In order to receive federal funding, transportation projects must be included in the CLRTP and the TIP.
CTB
The 17-member Commonwealth Transportation Board, appointed by the governor, establishes the administrative policies for Virginia’s transportation system. The CTB allocates highway funding to specific projects, locates and provides funding for airports, seaports and public transportation.

Environmental Justice
The 1994 Presidential Executive Order directs Federal agencies to identify and address the needs of minority and low-income populations in all programs, policies and activities.

Executive Order 12898
Executive Order 12898 mandates that federal agencies address equity and fairness or Environmental Justice toward low-income and minority populations.

Executive Order 13166
Executive Order 13166 mandates that federal agencies ensure that people who have Limited English Proficiency (LEP) have meaningful access to federally-conducted and/or funded programs and activities.

FAST Act
Fixing America’s Surface Transportation (FAST) Act, is the 2015 amendment of the U.S. Code Transportation section, and related federal funding bill.

FHWA
Within the U.S. Department of Transportation, the Federal Highway Administration is responsible for highway issues, including federal laws and regulations related to metropolitan transportation planning.

Fiscal Constraint
Ensuring that a given program or project can reasonably expect to receive funding within the time allotted for its implementation.

FTA
Within the U.S. Department of Transportation, the Federal Transit Administration is responsible for public transit issues, including federal laws and regulations related to metropolitan transportation planning.

HSIP
The Moving Ahead for Progress in the 21st Century Act (MAP-21) continued the Highway Safety Improvement Program (HSIP) as a core Federal-aid program. The goal of the program is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal lands.
ISTEA
Commonly called “Ice Tea,” the Intermodal Surface Transportation Efficiency Act of 1991 made broad changes in the way transportation decisions are made, emphasizing balance of transportation modes, strengthening public involvement and giving more power to metropolitan planning organizations.

MAP-21
Moving Ahead for Progress in the 21st Century Act was signed into law in 2012 and provides Federal funding authority for surface transportation programs at over $105 billion for fiscal years (FY) 2013 and 2014. MAP-21 is the first long-term highway authorization enacted since 2005.

MPO
Federal transportation laws and regulations require the establishment of a Metropolitan Planning Organization in every urbanized area of the U.S. with a population over 50,000. MPOs are responsible for meeting the federal metropolitan planning regulations for transportation.

Multimodal
A multimodal transportation system has the availability of multiple transportation options. A multimodal approach to transportation planning focuses on the most efficient way of getting people or goods from place to place, be it by truck, train, bicycle, automobile, airplane, bus, boat, foot and including telecommuting.

NHS
The National Highway System is an approximately 160,000 mile network consisting of the 42,500 miles of the Interstate system, plus other key roads and arterials through the United States. Designated by Congress in 1995 pursuant to a requirement of the Intermodal Surface Transportation Efficiency Act, the NHS is designed to provide an interconnected system of principal routes to serve major travel destinations and population centers.

Paratransit
Paratransit is defined as comparable transportation service required by the ADA of 1990 for individuals with disabilities who are unable to use fixed-route transportation systems.

Performance Measures
Indicators of how well the transportation system is performing with regard to such things as average speed, reliability of travel and accident rates. Used as feedback in the decision making process.

SAFETEA-LU
Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users is the 2005 amendment of the U.S. Code Transportation section and related federal funding bill.

Section 504 of the Rehabilitation Act of 1973
Section 504 of the Rehabilitation Act of 1973 states that no qualified disabled person shall, solely by reason of his disability, be excluded from participation in, be denied the benefits of or be subjected to discrimination.
under any program or activity that receives or benefits from federal financial assistance. This Act protects qualified individuals from discrimination based on their disability.

**SMART SCALE**
Virginia’s SMART SCALE (§33.2-214.1) is about picking the right transportation projects for funding and ensuring the best use of limited tax dollars. It is the method of scoring planned projects included in VTrans that are funded by HB 1887.

**SYIP**
Required by state law, the Six-Year Improvement Program is a six-year “programmatic document” that requires CTB approval and that portrays the state’s allocation of federal funds to transportation projects including the allocation and projected use of federal “obligated dollars” to those projects over the course of the first four years of the six year SYIP. The SYIP is produces and approved annually.

**TAC**
The Transportation Advisory Committee is a committee of local staff within the MPO responsible for communication and coordination between various policy boards and that takes action on issues in the transportation planning process.

**TAP**
MAP-21 created a funding category for projects that enhance the compatibility of transportation facilities with their surroundings. Examples of Transportation Alternatives projects include bicycle and pedestrian paths, restoration of rail depots or other historic transportation facilities, and acquisition of scenic or open space lands next to travel corridors.

**TAZ**
A Traffic Analysis Zone (TAZ) is the unit of geography most commonly used in conventional transportation planning models. The size of a zone varies, but for a typical metropolitan planning software, a zone of under 3000 people is common.

**TEA-21**
The Transportation Equity Act for the 21st Century is the legislation that reauthorized the federal reauthorization programs in 1998. TEA-21 retained and expanded most of the programs of ISTEA, in addition to greatly increasing overall funding for transportation.

**TDM**
Transportation Demand Management involves various services/strategies designed to reduce demand of roadways, including carpooling, vanpooling and telecommuting.
**TDP**
The Transit Development Plan is an intermediate-range transit plan (usually five years) that examines service, markets and funding to make specific recommendations for transit improvements.

**TIP**
The Transportation Improvement Program is a list of projects and programs that will be implemented over the next six years. In order to receive federal funding, transportation projects must be included in the CLRP and the TIP.

**Title VI Civil Rights Act of 1964**
Ensures that no person shall, on the grounds of race, color, sex, national origin, or physical handicap, be excluded from participation in, be denied benefits of, or be otherwise subjected to discrimination under any program receiving Federal assistance from the United States Department of Transportation.

**Transportation Disadvantaged**
Transportation disadvantaged are people who are unable to transport themselves or to purchase transportation due to disability, income status or age.

**UPWP**
MPOs must adopt and implement an annual work program and budget known as the Unified Planning Work Program. The UPWP identifies all activities to be undertaken by the MPO during the fiscal year which begins July 1st and ends the following June 30th.

**UZA**
The U.S. Census Bureau’s Urbanized Areas are defined by densely developed land, irrespective of local government boundaries, and encompass residential, commercial and other non-residential urban land uses.

**VDOT**
Virginia Department of Transportation is the agency responsible for statewide transportation facility planning, construction and maintenance. VDOT is separate from the Virginia Department of Rail and Public Transportation (VDRPT).

**VDRPT**
Virginia Department of Rail and Public Transportation is an agency under the Virginia Secretary of Transportation (as is VDOT) providing technical and financial assistance to Virginia’s public transit.

**VMT**
Vehicle Miles Traveled is the total number of miles driven by all vehicles within a given time period and geographic area, and it is used by regional transportation and environmental agencies for planning purposes. Since 1970, vehicle emissions have decreased even as vehicle miles traveled have increased.
V/C
Volume/Capacity ratio: A ratio >1 indicates the facility is carrying more traffic than it can handle and improvements may be needed.

VTRANS
VTrans2040 identifies multimodal needs across the Commonwealth. The plan focuses on the needs of the Commonwealth’s statewide network of Corridors of Statewide Significance, the multimodal regional networks that support travel within metropolitan regions, and improvements to promote locally designated Urban Development Areas (UDAs).
Executive Summary

This Long Range Transportation Plan (LRTP) is the third such document for the Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO), which was established in 2003 following the 2000 U.S. Census. It offers a model for collaborative, regional decision making about transportation needs, and lays the groundwork for future long range planning updates.

The HRMPO 2040 LRTP emphasizes the transportation system’s role in economic vitality for the region, and safety for all travelers on the network.

The HRMPO 2040 LRTP documents:

E-1: The background of the HRMPO and federal transportation planning law, purpose and context for the Plan, and compliance with Title VI, the Map-21, and the Americans with Disabilities Act (see Introduction and Chapter 1).

E-2: The public and stakeholder outreach and involvement process that accompanied development of the Plan, as well as the interagency consultations with resource agencies (see Chapter 2).

E-3: The existing land use and transportation conditions and deficiencies that help define future transportation needs for the region (see Chapter 3).

E-4: The development of a regional vision for 2040, and a set of multi-modal transportation needs to inform project selection (see Chapter 4).

E-5: The estimated costs to fund projects contained in the LRTP, and the estimated revenues available to fund projects over the life of the plan, i.e., through the year 2040 (see Chapter 5).

E-6: The project evaluation and ranking process that provided decision makers with objective, data-based indicators of project need and value (see Chapter 6).

E-7: The definition of a Constrained Long Range Plan (CLRP), which identifies projects and their year of expenditure and estimated cost, followed by a review of the Benefits and Burdens analysis (see Chapter 7).
E – 1 Transportation Plan Context, Purpose and Federal Requirements

As a result of the 2000 U.S. Census, the City of Harrisonburg, the towns of Bridgewater, Dayton and Mt. Crawford, and portions of the County of Rockingham, met the criteria to be defined as an urbanized area (UZA), which requires the formation of a Metropolitan Planning Organization (MPO) under federal law. The purpose of the 2040 HRMPO LRTP is to satisfy the metropolitan planning requirements of the federal transportation planning process and to establish an informed program for implementing priority transportation investments in the region. The 2040 LRTP replaces the 2035 LRTP, which was adopted on March 15, 2012.

Overview of Federal Laws & the Transportation Planning Process

The LRTP for the HRMPO was developed in accordance with the current federal transportation law known as the Moving Ahead for Progress in the 21st Century Act (MAP-21). In 2012, the MAP-21 amended the previous federal transportation law, Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2012. Together these two federal laws have shaped the way transportation investments are conceived, planned, funded, and implemented at the state and regional levels of government.

Compliance with Federal Regulations

A primary purpose of the LRTP is to establish compliance with all current federal laws and regulations. These regulations require all MPO’s to develop a Unified Planning Work Program (UPWP), a Transportation Improvement Program (TIP), and the LRTP. The LRTP’s goals as outlined in Chapter 6 are shaped by the involvement of the region’s citizens and stakeholders. Chapter 2 describes specific stakeholder and community outreach.

Federal Planning Factors

The MAP-21 identifies eight planning factors (23 CFR 450.316) which must be considered as part of the transportation planning process for all metropolitan areas. The HRMPO LRTP addresses these factors in the plan goals, existing conditions inventory, alternatives/scenario analysis, and the CLRP.

Title VI of the Civil Rights Act of 1964

The HRMPO is a sub-recipient of federal financial assistance, and is required to comply with Title VI and other federal non-discrimination laws. It is also required to provide an overview of how the HRMPO addresses Executive Order 12898 on Environmental Justice, as well as Executive Order 13166 on Limited English Proficiency (LEP), and how it complies with the Title VI plan. As part of addressing Environmental Justice, a Benefits and Burdens Analysis is included in Chapter 7, where the plan’s fiscally constrained projects are identified with respect to the location of underserved or potentially vulnerable population segments.

Americans with Disabilities Act (ADA)

Enacted in 1990, The Americans with Disabilities Act (ADA) prohibits discrimination on the basis of disability by public entities. A primary function of transportation is to deliver opportunities for basic mobility to society. The greatest challenge of the LRTP is to prioritize and implement a transportation network that is multimodal and inclusive of all users. Transportation facilities should be accessible to all...
users allowing full participation in society – including employment, school, commerce and recreation activities. It is vital that government strive to ensure that transportation systems are not only safe and efficient, but usable by all.

E – 2 Public Outreach, Stakeholder Involvement and Agency Consultations

The public and stakeholder outreach process focused on two large meetings. The first public meeting was held in December 2016. A final public meeting was held in February 2017 to present the draft LRTP to the public. Due to time constraints in adopting the final LRTP, only the first event is summarized in this chapter. Comments received at the February 2017 final public meeting are included in Appendix C.

The outreach process for the LRTP also includes consulting with state and federal resource management agencies on the identification of transportation needs and the selection of projects, which may affect the programs, lands, or policies over which they administer. Appendix B contains the letter used to contact each agency and the responses to the request for comment on the project evaluation and selection processes.

E – 3 Existing Conditions and Deficiencies

Existing conditions with regard to population, demographics, existing infrastructure, and transportation system performance help us identify existing deficiencies within the Harrisonburg-Rockingham MPO (HRMPO) planning area. The maps and tables in Chapter 3 illuminate demographic trends including higher-than-state average disabled, aging, and low-income populations that contrast with infrequent transit service and an incomplete non-motorized transportation network, and indicate deficiencies in the transportation system that future investments should address. Analysis of existing roadway and traffic conditions reveals adequate capacity on the region’s roadways, but heavy truck freight movement on the interstate system. Network gaps and deficiencies exist where key new connections need to be made, where anticipated growth will require reconstruction of an existing facility, and where transit service and bike and pedestrian facilities are missing.

E – 4 Multi-Modal Transportation Needs

Transportation needs are defined as the gap between existing deficiencies in the system and the 2040 vision for the region. Chapter 4 reviews how needs were identified by the public, and by the members of the LRTP Working Group, who applied their professional knowledge and reviewed data from the 2015 and 2040 travel demand model. A travel demand model is a computer-based forecasting tool used to estimate travel behavior and travel demand on the transportation network given a set of regional land-use, industry growth, and transportation related assumptions.
The 2040 estimates from the travel demand model were used as a guide to the LRTP Working Group in understanding generalized changes in conditions, where deficiencies may exist in the transportation network, and to evaluate the effects of different street improvement scenarios.

Safety
Safety deficiencies were identified through the statewide transportation plan, VTRANS 2040, under development by the Office of Intermodal Planning and Investment (OIPI).

Multi-Modal Needs
The Harrisonburg Department of Public Transportation’s (HDPT own planning document, the Transit Development Plan (TDP) will be adopted by reference as the transit plan for the MPO.

Bicycle and Pedestrian needs were drawn directly from the 2016 HRMPO Bicycle and Pedestrian Plan, which identifies the need to connect communities west of Harrisonburg, along the US 33 corridor, and along US 11 going north to Research Park to major corridors within the city.

E – 5 Revenue Projections and Project Cost Estimates
As a condition of receiving federal funding for transportation projects, MPOs are required to demonstrate that projects in the Long Range Transportation Plan (LRTP) are reasonably expected to be funded over the life of the plan. In Virginia, the traditional formula-based approach to allocating federal transportation funds has recently transitioned to a performance-based evaluation through SMART SCALE.

The HRMPO region has transportation needs that exceed revenue projections. Projects are prioritized, and the highest priorities are included in the Constrained Long Range Plan (CLRP). If additional funding becomes available during the life of the LRTP, projects included on the Vision (unfunded) List could be eligible to receive funding. The combined $108.3 million in anticipated highway and Transportation Alternatives funding, juxtaposed against the $1.11 billion in surface transportation needs over the next 25 years, represents a $985 million shortfall for the MPO region. Revenue and cost estimating methodologies are detailed in Chapter 5.

E – 6 Evaluating Transportation Investments
The HRMPO evaluated regional transportation investments using the following tools and methodologies:

- Goals and Objectives
- Travel Demand Model
- SMART SCALE-based evaluative tools

Goals and objectives are consistent with relevant federal, state, and local plans and legislation. With passage of the MAP-21, ten factors must be considered when a Metropolitan Planning Organization (MPO) develops the LRTP.
Chapter 6 describes two 2040 travel demand model scenarios that evaluate the congestion mitigation and mode share benefits of future projects. The Existing + Committed scenario, also referred to as the “No Build” scenario, is described in Chapter 4. The second 2040 scenario includes the additional construction projects in the Constrained Long Range Plan (CLRP) for which funding has not yet been identified, but which the MPO and localities intend to fund in the coming 25 years. The set of remaining projects for which the MPO expects to obtain construction funding is small, and the projects themselves are modest in scope. The 2040 CLRP travel demand model scenario thus shows only small improvements to system capacity and mode share as compared to the 2040 No-Build scenario.

The HRMPO has developed a methodology to evaluate future projects using an objective, data-driven process. The methodology ensures that projects meet transportation system needs over the next 25 years as well as recent MAP-21/FAST ACT federal rulemakings and state guidance related to performance-based planning and programming (PBPP). The LRTP Working Group emphasized the importance of evaluating projects using a methodology similar to that of the State’s SMART SCALE program in order to better understand how projects might score in SMART SCALE, which is now the main source of funding for transportation projects in the State.

E – 7 Definition of the Constrained Long Range Plan (CLRP)

The final requirement of the LRTP is a fiscally constrained list of projects. It illustrates what the MPO can finance over the life of the plan, and provides a realistic set of expectations for the general public. Of the 101 projects identified, four are fully funded in the current VDOT Six Year Improvement Program (SYIP). These projects represent $29.7 million in anticipated revenues. The additional projects in the CLRP reflect the additional $73.4 million that the MPO are expects to receive over the life of the Plan.

As part of the LRTP’s compliance with the Title VI Act, the project team performed a “Benefits and Burdens” analysis on the projects in the CLRP. Project locations were overlaid with U.S. Census data on the locations of underserved or minority populations in order to evaluate if projects would either unduly burden a certain population, or conversely, underserve a population. The analysis revealed that projects in the CLRP are equitably distributed across the MPO Planning Area, and proposed new construction, or capacity-adding projects seem unlikely to burden minority or underserved populations in their proposed alignments.
Chapter 1: Long-Range Transportation Plan

Context

1–1 Introduction
As a result of the 2000 U.S. Census, the City of Harrisonburg, the towns of Bridgewater, Dayton and Mt. Crawford, and portions of the County of Rockingham, met the criteria to be defined as an urbanized area (UZA), which requires the formation of a Metropolitan Planning Organization (MPO) under federal law. UZAs are defined as densely developed residential, commercial, and other nonresidential areas of 50,000 people or more. The Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO) was formed in April 2003. The HRMPO is housed with the Central Shenandoah Planning District Commission (CSPDC), which acts as the fiscal and administrative agent.

The HRMPO is governed by a Policy Board composed of elected and appointed officials representing the respective jurisdictions. The Policy Board appoints members to a Technical Advisory Committee that is charged with making recommendations to the Policy Board and providing assistance in reviewing issues related to regional transportation priorities and key technical or procedural matters in updating planning documents. Both bodies operate under a set of by-laws that define leadership responsibilities and terms.

The HRMPO’s partner agencies include the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Virginia Department of Transportation (VDOT), the Virginia Department of Rail and Public Transportation (VDRPT), and the Virginia Department of Aviation.

1 – 2 Purpose of the Plan
The 2040 Long Range Transportation Plan (LRTP) for the HRMPO outlines the goals, objectives, policies and improvements that are needed to maintain a safe and efficient multimodal transportation system for the movement of people and goods throughout the area in a manner that will enhance the economic, social and environmental qualities of the community. The 2040 LRTP replaces the 2035 LRTP, which was adopted on March 15, 2012.
1 – 3 Federal Laws and the Transportation Planning Process

The LRTP for the HRMPO has been developed in accordance with the current federal transportation law, the Moving Ahead for Progress in the 21st Century Act (MAP-21). The MAP-21 amended the previous Federal transportation law known as the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2012. This federal law shapes the way transportation investments are conceived, planned, funded, and implemented at the state and regional levels of government.

The Federal Transportation Planning Framework

As a part of requirements of the MAP-21, the MPO must meet the requirements of the federally-mandated transportation planning processes. These processes include the development of several documents:

1. The Unified Planning Work Program (UPWP) defines specific MPO planning activities and updated each year
2. The Transportation Improvement Program (TIP) that identifies transportation projects to be funded within the next six years.
3. The Long Range Transportation Plan that defines the long-range transportation needs and includes a fiscally-constrained list of projects that will be eligible for inclusion in the TIP. Through the LRTP, the MPO establishes the investment priorities of federal transportation. The LRTP is reviewed and updated every 5 years, and must cover at least a 20-year planning horizon. This plan uses a 25-year planning horizon.

Federal Transportation Planning Factors and the 3-C Agreement

Planning Factors

The MAP-21 identifies eight planning factors (23 CFR 450.316) which must be considered as part of the transportation planning process for all metropolitan areas. These planning factors were integrated into the development of the LRTP, and include the following:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;
- Increase the accessibility and mobility of people and for freight;
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

In compliance with MAP-21, the LRTP addresses these factors in the Plan goals, existing conditions inventory, alternatives/scenario analysis, and the CLRP. Strategic planning concepts were integrated throughout development of the LRTP to support development of a sustainable, multimodal, and cost-
effective transportation plan. These concepts include bicycle and pedestrian mobility, travel demand management, safety and security, and intermodal considerations, as well as the financial limitations for investing in these strategies. These comprehensive planning strategies align with the HRMPO planning goals and objectives and have shaped development of the CLRP.

3-C Agreement
Regional long-range transportation planning, by legislative definition must be:

- Comprehensive (including all modes)
- Cooperative (involving a broad array of stakeholders and other interested parties)
- Continuous (ever improving and evolving)

Planning efforts must reflect an overall purpose to efficiently move people and goods, while supporting regional land use and economic development plans and policies. This process directs cooperation with all levels of government to develop a plan which addresses long- and short-range multimodal goals and strategies for transportation improvements and priorities for the implementation of projects to fulfill those goals.

1 – 4 Compliance with Federal Regulation
A primary purpose of the LRTP is to establish the MPO’s compliance with all current federal laws and regulations.

Title VI of the Civil Rights Act of 1964
The HRMPO is a sub-recipient of federal financial assistance and is required to comply with Title VI and other federal non-discrimination laws as well as provide an overview of how the HRMPO addresses Executive Order 12898 on Environmental Justice as well as Executive Order 13166 on Limited English Proficiency (LEP) and complies with the Title VI plan. Detailed Environmental Justice guidelines and outreach strategies for protected classes are included in the HRMPO’s Public Participation Program. As part of addressing Environmental Justice, a Benefits and Burdens Analysis is included in Chapter 7, where the Plan’s fiscally constrained projects are identified with respect to the location of underserved or potentially vulnerable population segments. This analysis provides a tool for decision makers to gauge how projects and programs may impact social equity and environmental justice.

Americans with Disabilities Act (ADA)
Enacted in 1990, The Americans with Disabilities Act (ADA) prohibits discrimination by public entities on the basis of disability. A primary function of transportation is to deliver opportunities for basic mobility to society. The greatest challenge of the LRTP is to prioritize and implement a transportation network that is multimodal and inclusive of all users. Transportation facilities should be accessible to all users allowing full participation in society – including employment, school, commerce and recreation activities. It is vital that government strive to ensure that transportation systems are not only safe and efficient, but usable by all. Projects identified in the LRTP go through a subsequent, detailed ADA-compliance review process during the design and engineering stage of implementation.
Chapter 2: Public Outreach and Consultation

This chapter covers the public outreach and resource agency consultation processes for the LRTP. Seeking and incorporating input and comment from a diverse range of community members is integral to the long range planning process.

This chapter addresses:

2 – 1 Public Involvement Activities
2 – 2 Resource Agency Consultations

2 – 1 Public Involvement Activities

This section summarizes the public meeting that was held in December 2016. A final public meeting was held in February 2017 to present the draft Plan to the public. Due to time constraints in adopting the final LRTP, only the first event is summarized in this chapter. Comments received at the February 2017 final public meeting are included in Appendix C.

December 2016 Public Visioning Session

A public open house was held on December 7, 2016 to share existing conditions data and preliminary Constrained and Vision Lists of projects with the community. The open house was held in the Rockingham County Administrative Building’s Community Room between 4:00 pm and 6:00 pm. The Community Room is served by transit across Mason Street at the downtown transfer center.

Twenty-four (24) people attended the Open House, including a reporter from the Daily News Record. The event was covered on WHSV Channel 3 news the day of the event.

Participants were encouraged to fill out comment cards, or take home a postcard with contact information to share additional comments with the HRMPO.
Figure 1 Public Open House Flyer

Harrisonburg
Rockingham Metropolitan Planning Organization

2040 Long Range Transportation Plan Public Open House
Share your ideas about transportation in the region!

Wednesday, December 7, 2016
Public Open House
4:00PM—6:00PM
Rockingham County Government Center
Community Development Department’s Community Room
20 E. Gay Street, Harrisonburg, VA

The HRMPO is the regional transportation planning organization that supports the City of Harrisonburg, the Towns of Bridgewater, Dayton, and Mt. Crawford, and the surrounding portions of Rockingham County.

For more information contact the Central Shenandoah Planning District Commission
112 MacTanly Place, Staunton, VA 24401 (540) 885-5174 www.hrampo.org
2 – 2 Resource Agency Consultations

The outreach process for the LRTP also includes consulting with state and federal resource management agencies on the identification of transportation needs and the selection of projects, which may affect the programs, lands, or policies over which they administer.

FHWA provided the MPO with the following list of relevant resource agencies to contact during the consultation process:

Table 1 State and Federal Resource Agencies

<table>
<thead>
<tr>
<th>Federal Resource Agencies</th>
<th>State Resource Agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States Environmental Protection Agency (USEPA)</td>
<td>Virginia Department of Environmental Quality (VDEQ)</td>
</tr>
<tr>
<td>United States Army Corps of Engineers (USACE)</td>
<td>Virginia Marine Resources Commission (VMRC)</td>
</tr>
<tr>
<td>United States Department of Agriculture (USDA)</td>
<td>Virginia Clean Cities (VCC)</td>
</tr>
<tr>
<td>National Park Service (NPS)</td>
<td>Virginia Department of Conservation and Recreation (VDCR)</td>
</tr>
<tr>
<td>United States Fish and Wildlife (USFWS)</td>
<td>Virginia Department of Forestry (VDOF)</td>
</tr>
<tr>
<td>United States Geological Survey (USGS)</td>
<td>Virginia Department of Historic Resources (VDHR)</td>
</tr>
<tr>
<td>Federal Highway Administration (FHWA)</td>
<td>Virginia Department of Game and Inland Fisheries (VDGIF)</td>
</tr>
<tr>
<td>Federal Transit Administration (FTA)</td>
<td>Virginia Council of Indians (VCI)</td>
</tr>
</tbody>
</table>

Each agency was contacted with the letter included in Appendix B. Responses to the request for comment on the project evaluation and selection processes are also included in Appendix B.
Chapter 3: Existing Conditions

The purpose of this chapter is to summarize the existing conditions with regard to population, demographics, infrastructure, and transportation modes within the Harrisonburg-Rockingham MPO (HRMPO) planning area.

The HRMPO's transportation system is an integral part of the lives of residents, employees, business operators, and visitors to the area. How safely and efficiently the transportation system moves people and goods is directly related to quality of life. The physical transportation network is comprised of roads, public transportation (bus and rail), pedestrian and bicycle facilities, air transportation, and freight/passenger rail service.

Transportation networks function well when all travelers using a variety of modes can reach their destinations safely, with minimal travel delay, and when goods can be efficiently transported. Examining and understanding safety, roadway capacity, congestion, and heavy vehicle distribution provides an understanding of how well the region's transportation network performs.

This chapter contains a regional profile, including the following components:

3 – 1 Regional Context
3 – 2 Socio-Demographic Profile
3 – 3 Existing Transportation Network

3 – 1 Regional Context

The metropolitan planning area for the MPO includes the City of Harrisonburg, Towns of Bridgewater, Dayton, and Mt. Crawford, and the surrounding portions of Rockingham County (Map 1). Unless otherwise noted, when reference is made to Rockingham County, it represents the area within the MPO’s planning area. The HRMPO is located within the Shenandoah Valley, near destinations such as Skyline Drive, Blue Ridge Parkway, and Shenandoah National Park. The beautiful setting and convenient access to larger cities make the area a desirable place to live, work, and visit, and will likely contribute to its growth.

The City of Harrisonburg is the county seat of Rockingham County. Harrisonburg is a vibrant community with a diverse population. Harrisonburg’s walkable and bikeable downtown district showcases the City’s rich history, art, and culture. It is home to James Madison University, a public research university founded in 1908 with a total enrollment of 21,227 students. Eastern Mennonite University, a private liberal arts university, is also located within Harrisonburg and has a total enrollment of 1,880 students.
The Town of Bridgewater is located along the northern edge of the North River near the southern border of Rockingham County. It is home to Bridgewater College, a private liberal arts college with an undergraduate enrollment of 1,834 students.

The Town of Dayton is situated two miles south of Harrisonburg along Route 42 and is surrounded by prime agricultural farmland. Dayton’s rich history and proximity to other metropolitan areas make the Town an attractive location in which to live, work, and to visit.

Located in the heart of the Shenandoah Valley, Rockingham County is nestled between the Blue Ridge Mountains on the east and the Allegheny Mountains on the west. It is the third largest county in Virginia and the largest agricultural producing county in the state. Rockingham County includes the Town of Mount Crawford. Rockingham County is easily accessible via I-81 and is situated just 128 miles from Washington DC, 144 miles from Richmond, and approximately 60 miles from the Virginia Inland Port.

A note about data: for the purposes of the LRTP, the United States Census was the primary source of data to understand existing regional demographics. The UZA boundary is not contiguous with census tract limits, requiring that data be extrapolated relative to the size of the census tracts that intersect the boundary.

Map 1 shows the MPO Planning Area.
Population

Table 2 shows the population trends for the individual localities and the entire HRMPO planning region. The total population for the HRMPO planning area in 2015 was 81,409. The entire area of Rockingham County is not included within the MPO planning area boundary. Based upon Census tract data, the portion of Rockingham County (not including the towns) that falls within the boundary had a population of 18,714 in 2015. The entire HRMPO region has experienced rapid population growth since 2000. Overall, the MPO experienced a 33.1% increase over the last 15 years.

Map 2 on the following page illustrates the population density by block group for the HRMPO planning area.

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Harrisonburg</td>
<td>40,439</td>
<td>48,914</td>
<td>54,724</td>
<td>35.3%</td>
</tr>
<tr>
<td>Rockingham County</td>
<td>13,932</td>
<td>17,851</td>
<td>18,714</td>
<td>34.3%</td>
</tr>
<tr>
<td>Bridgewater</td>
<td>5,203</td>
<td>5,644</td>
<td>5,951</td>
<td>14.4%</td>
</tr>
<tr>
<td>Dayton</td>
<td>1,344</td>
<td>1,530</td>
<td>1,716</td>
<td>27.7%</td>
</tr>
<tr>
<td>Mt Crawford</td>
<td>254</td>
<td>433</td>
<td>442</td>
<td>74.0%</td>
</tr>
<tr>
<td>HRMPO</td>
<td>61,172</td>
<td>74,372</td>
<td>81,409</td>
<td>33.1%</td>
</tr>
</tbody>
</table>

2 Portion of Rockingham County within the MPO that does not include towns.
Employment

Travel generated by employers and employees contributes significantly to peak-time trips on a transportation network. That may include impacts on traffic volumes and traffic congestion, demands for new or upgraded access or infrastructure, or an opportunity for targeted investments in public transit.

Map 3 on the following page illustrates the number of jobs by traffic analysis zone (TAZ) within the MPO area.
Map 3 Number of Jobs by TAZ

Rockingham County

Harrisonburg

Dayton

Bridgewater

McCrawford

Helpful information:
- Map to be used for planning purposes only.
- Data Source(s):
  - Commonwealth of VA, USGS.
  - US Census Bureau, City of Harrisonburg, Rockingham County, VDOT.
3 – 2 Socio-Demographic Profile

Environmental Justice (EJ) is the overarching policy adopted in the United States for the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” As a result of such policies, there has been an increased need to incorporate EJ principles into the processes and products of transportation planning.

The following three federal acts and two executive orders define the principles of EJ, including the specific populations that are to be considered:

- The Civil Rights Act of 1964, Title VI, which prohibits discrimination on the basis of race, color, or national origin;
- The Age Discrimination Act of 1975, which prohibits discrimination on the basis of age;
- The Americans with Disabilities Act of 1990, along with the Americans with Disabilities Act Amendment Act of 2008, which prohibit discrimination on the basis of disabilities;
- Executive Order 12898 on Environmental Justice (1994), which protects minority and low income populations from disproportionately high and adverse impacts;
- Executive Order 13166 on Improving Access to Services for Persons with Limited English Proficiency (2000), which aims to improve access to services for persons who have limited English proficiency.

Title VI of the Civil Rights Act of 1964, established the foundation of EJ by stating as follows: No person in the United States shall on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

All recipients of federal aid are required to certify and the U.S Department of Transportation (USDOT) must ensure, non-discrimination under Title VI of the Civil Rights Act of 1964. For the purposes of long-range transportation planning, MPOs must specifically address EJ while developing and advancing transportation programs and projects.

In 1997, the USDOT issued its Order on Environmental Justice which expanded upon the EJ requirements of Executive Order 12898 and provided direction on implementation. Shortly thereafter, the Federal Highway Administration (FHWA) issued Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which highlight the three primary EJ objectives:

- To identify, address, minimize, mitigate, and (preferably) avoid disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations;
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process by providing public involvement opportunities and dissemination of information, including meaningful access to public information concerning the
human health or environmental impacts, when soliciting input from affected minority and low-income populations when considering alternatives during the planning and development of transportation infrastructure investments;

- To ensure that no person – particularly those of minority or low income populations – is excluded from participating in, denied the benefits of, or in any other way subjected to discrimination under any program or activity receiving federal assistance.

Additionally, the federal government has defined Minority and Low-Income populations as follows:

- Low-Income means a person whose median household income is at or below the Department of Labor poverty guidelines.
- Low-Income Population means any readily identifiable group of low-income persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity.
- Minority means a person who is:
  - Black: a person having origins in any of the black racial groups of Africa;
  - Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race;
  - Asian American: a person having origins in any of the original people from the Far East, Southeast Asia, or the Indian subcontinent;
  - American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition;
  - Native Hawaiian and Other Pacific Islander: people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- Minority Population means any readily identifiable group of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity.

In consideration of the EJ policies identified above, a geographic analysis was conducted to identify the locations and concentration of minority, low-income, and other traditionally underserved populations in the HRMPO planning area. For the purposes of this study, traditionally underserved also includes senior, non-English speaking, and zero-car household populations.

Datasets and mapping were assembled as a baseline inventory of demographic attributes for the following populations:

- Low-Income (below poverty line)
- Minority
- Senior (Elderly)
- Limited English proficiency
- Zero-car households
The primary and most comprehensive data source for information on these populations is the U.S Census Bureau (2015 American Community Survey 5-Year estimates). Demographic data was mapped at the Census tract level, as this was the most detailed geography available for all datasets. Demographic data was mapped at the Census tract level as this was the most detailed geography available for all datasets. Due to the larger land areas associated with Census tracts, the mapping illustrates certain demographics in terms of population percentages based on the area. A Census tract with a considerable land area in some instances, may be reporting demographic results based on a limited population, in terms of both size and location within said tract. Refer to the accompanying text of each map for the accurate population percentiles for each demographic based on Census information.

**Low Income**

Map 4 shows the percent of the population living below the poverty level. The percentage of the population below the poverty level was calculated by dividing the number of individuals living below the poverty level by the total population per block group. Data is from the U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates. Because some Census block groups extend beyond the MPO boundary, the data for these block groups does not perfectly reflect the demographic characteristics of the MPO.

The HRMPO regional average is 19.2%. By comparison, the statewide average is 11.8%. Within the HRMPO region, the areas with the greatest percentage of the population below the poverty level are concentrated in the central and southern portions of Harrisonburg and the southern and eastern portions of Rockingham County.

The percentage of the population living below the poverty line in some Census tracts may exceed the total percentage of the population for the region. For example, a block group in southeast Harrisonburg has between 70% and 83.5% of its population below the poverty line yet the total percentage of persons in poverty for the City of Harrisonburg is 32.5%. The data reported for this block group includes many students at JMU who may report little to no income while in school.

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4 U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates.
Minority Populations

Map 5 on the following page illustrates the concentrations of minority populations within the MPO region by census block. The racial/ethnic minority percentage of the population was calculated by subtracting the White Alone (non-Hispanic/Latino) from the total population per block group and then dividing that number by the total population. The average for the combined area of Rockingham County and the City of Harrisonburg is 17.5%. Data is from the U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates. Because some Census block groups extend beyond the MPO boundary, the data for these block groups does not perfectly reflect the demographic characteristics of the MPO.
Elderly Population

The regional average population of elderly persons (65 years and over) is 13.8% \(^5\), which is comparable to Virginia’s average of 13\% \(^6\). **Map 6** highlights areas with higher concentrations of the population over 65 years. The Elderly Population percentage was calculated by summing the populations of persons age 65 and older. That sum is then divided by the total population. Data is from the U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates. Because some Census block groups extend beyond the MPO boundary, the data for these block groups does not perfectly reflect the demographic characteristics of the MPO.

Aging populations have unique transportation needs that include a decreased use of automobiles and increasing need for alternative modes. Many seniors do not drive due to health, economic, or personal preference reasons. Other seniors do drive, but would prefer not to, if a convenient and frequent transit service were available to them. Age-restricted and assisted living communities are located throughout the region, many of which provide limited private transportation options for their residents. For communities located outside the City of Harrisonburg, public transportation options are limited.

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\(^{5}\) U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates.  
\(^{6}\) U.S. Census Quick Facts  
https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk
Language

Map 7 displays the percentage of the population (over age 5) that do not exclusively speak English, but speak it well, not well, or not at all. The regional average percentage of the population that does not exclusively speak English is 7%. Some Census tracts in the MPO have percent populations much higher than the regional average. For example, two census tracts within the City of Harrisonburg have between 30% to 35% of the population with Limited English Proficiency, which is likely due to Harrisonburg’s active refugee resettlement programs.

The Limited English Proficiency percentage was calculated by summing the populations of persons age 5 and older who do not speak English exclusively, but speak it well, not well, and not at all. That sum is then divided by the total population. Data is from the U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates. Because some Census block groups extend beyond the MPO boundary, the data for these block groups does not perfectly reflect the demographic characteristics of the MPO.
Zero Car Households

The areas with the highest numbers of households without vehicles are located in downtown Harrisonburg and southeast Bridgewater. James Madison University contributes to the high concentration of Zero Car Households in the area south of Harrisonburg’s downtown. Bridgewater College contributes to the higher concentration of Zero Car Households in the southeast portion of Bridgewater. Zero Car Households often experience job access challenges and rely heavily on transit service to meet their travel needs.

Map 8 on the following page illustrates the number of Zero Car Households by Census block group within the MPO planning area. The percentage of zero car households was calculated by dividing the sum of zero car households by the total number of households per block group. The average for the combined area of Rockingham County and the City of Harrisonburg is 6.91%. Data is from the U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates. Because some Census block groups extend beyond the MPO boundary, the data for these block groups does not perfectly reflect the demographic characteristics of the MPO.
Map 8 Percentage of Zero Car Households

Percentage of Zero Car Households by Block Group

Regional Average = 6.91%

- 0.00% - 6.91%
- 6.92% - 15.00%
- 15.01% - 20.00%
- 20.01% - 25.00%
- 25.01% - 39.75%

HRMPO Boundary
City Boundary
Town Boundary

Map to be used for planning purposes only.
Data Source(s):
Commonwealth of VA, USGS,
US Census Bureau, City of Harrisonburg,
Rockingham County, VDOT

112 MacTanley Place
Staunton, VA 24401
Phone (540) 885-5174
Fax (540) 885-2687
HRMPO.org
3 – 3 Existing Transportation Network

Roadway System

The transportation network within the HRMPO planning area includes a mix of road types, a public transportation system, and bicycle and pedestrian facilities. The efficiency and connectivity of the entire network will be evaluated in the document based on the coverage of roads, transit services, bicycle facilities, and sidewalks and walking trails. The City of Harrisonburg and Town of Bridgewater maintain their own roadway networks, while VDOT maintains all public roads within the County’s jurisdiction and Towns of Dayton and Mount Crawford.

One major interstate crosses the HRMPO planning area. Interstate 81 (I-81) runs generally south-north from east-central Tennessee to the Canadian border in New York. I-81 provides important connections to the City of Harrisonburg and nearby cities such as Staunton. Additionally, I-81 is a significant north-south corridor for freight and other travel between states up and down the East Coast.

Within the HRMPO planning area, there are six distinct functional classifications of roads: Interstate, Principal Arterial, Minor Arterial, Major Collector, Minor Collector, and Local. Each road is assigned a functional classification based on the road’s intended purpose, or role it plays in serving the flow of trips through a transportation network. Criteria used to assign a functional class to a road include types of trips being served, expected volumes, network characteristics, population center thresholds, and interval spacing. VDOT uses the functional classification to obtain funding for Highway Performance Monitoring System federal reporting and to establish construction priorities.

Map 9 depicts the functional classification of roadways within the MPO area.

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VDOT defines the functional classes as follows:

**Interstate**
- Highest traffic volume corridors
- Roads serving the longest trip desires
- Carry significant amounts of intra-area travel
- Does not provide land access and interconnects primarily with other classification routes

**Other Principal Arterials**
- Serve corridor movements of substantial state or interstate travel
- Provides an integrated network without stub connections

**Minor Arterial**
- Links cities and large towns (and other generators, such as major resorts)
- Spaces at such intervals so that all developed areas of the State are within a reasonable distance of an arterial highway
- Provide service to corridors with trip lengths and travel density greater than those served by collectors or local systems.
- Design should be expected to provide for relatively high overall speeds, with minimum interference to through movement

**Major Collector**
- Provide service to any county seat not on an arterial system, to larger towns not directly served by higher systems
- Link the above to nearby larger towns or routes of higher classification
- Serve the more important intra-county travel corridors

**Minor Collector**
- Spaced at intervals, consistent with population density
- To collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road
- Provide service to the remaining smaller communities
- Link local traffic generators with their rural hinterland

**Local**
- Serves primarily to provide direct access to adjacent land
- Provide service to travel over relatively short distance as compared to collectors or other higher systems
Transit

Harrisonburg adopted a Transit Development Plan (TDP) in March 2018. The TDP is a short-range transportation plan which outlines the services that the Harrisonburg Department of Public Transportation (HDPT) intends to implement during a ten-year planning horizon, estimates what resources will be needed, and what funding opportunities are likely to be available. Additionally, a Harrisonburg Transit Route Study was completed in June 2014 to evaluate a prospective new bus route and accompanying adjustments to existing bus routes serving the City of Harrisonburg.

HDPT provides public transportation services via fixed bus routes, para-transit, and coordination with James Madison University (JMU) and Eastern Mennonite University (EMU). Although a majority of transit service within the City is directed to these universities, the City of Harrisonburg also operates several routes (the “City Routes”), which enable residents, workers, and visitors to reach other major destinations throughout the City. HDPT provides the following services:

- **City Routes** – there are six routes, which operate year round and are focused on serving the residential and commercial areas of the City. These routes operate Monday through Saturday from early morning to evening.
- **JMU Focused Routes** – there are 25 routes, which primarily serve the JMU community and operate daily while JMU is in session. HDPT also operates a night campus shuttle, which runs in the evenings and operates near JMU while classes are in session.
- **Bridgewater/Dayton Shuttle** – operates Tuesdays and Thursdays and provides service between Harrisonburg, Bridgewater, and Dayton. The shuttle runs in the morning, mid-day, and by-demand in the early evening.
- **Special Shuttles** – HDPT operates four special routes that only operate while JMU is in session. The Church Shuttle runs Sunday morning and provides service to any house of worship in Harrisonburg. The football shuttle provides service for all home games from the housing complexes and hotels within the City. Two Sunday shuttles operate mid-day until Sunday night.

The Blue Ridge Community College (BRCC) also provides a shuttle which offers two routes. The BRCC South Shuttle provides service between Staunton and the BRCC Campus in Weyers Cave while the BRCC North Shuttle provides service from the campus to Harrisonburg through Bridgewater, Dayton, and Mt. Crawford.

The Central Shenandoah Planning District Commission (CSPDC) offers coordination assistance for ride sharing through its DRPT-funded Rideshare program. CSPDC offers free carpool and vanpool coordination and operates a Guaranteed Ride Home Program. Currently, there are six rideshare park and ride lots serving the HRMPO planning area.

Paratransit service is also provided within the HRMPO by the Valley Program for Aging Services (VPAS), Friendship Industries, Arc of Harrisonburg/Rockingham, and Pleasant View.

**Map 10** illustrates HDPT year-round and seasonal transit routes. Overall public transportation service within the HRMPO planning area is limited primarily to urbanized areas.
Bicycle Facilities

Existing bicycle facilities in the HRMPO planning area are clustered primarily in Harrisonburg. Map 11 depicts the existing bicycle facilities and shared use paths throughout the MPO area. The City of Harrisonburg is in the process of updating its Bicycle and Pedestrian Plan which provides a vision and framework for developing an interconnected bicycle and pedestrian network throughout the City. The update builds upon the 2010 Bicycle and Pedestrian Plan and provides a review of existing policies, projects, and recommendations for implementation. Rockingham County has adopted a countywide bicycle and pedestrian plan and the HRMPO has also adopted a bicycle and pedestrian plan for the urbanized area of Rockingham County that is included in the HRMPO planning area.

Current facility types include multi-use paths, bike lanes, and sharrows marked for shared lanes. Providing continuity of bicycle facilities across jurisdictional boundaries better serves the overall community. As the network grows, it can serve cyclists for commuting to work, school, recreation and other personal trips.

The initiatives of Harrisonburg and Rockingham County to create new facilities and modify existing ones to better accommodate cyclists is a response to overall growth in the HRMPO and a changing approach to mobility. Many of the roadways throughout the MPO lack paved shoulders for bicyclists. As population growth continues and bicycling becomes increasingly popular, further steps are needed to expand this mode of travel.

Map 11 shows existing bicycle and pedestrian facilities.
Pedestrian Facilities

As the primary pedestrian center in the HRMPO, downtown Harrisonburg has a sidewalk network that covers most of its streets. Moving outwards from downtown Harrisonburg, sidewalk connections become largely absent, occurring only sporadically with specific developments. This pattern is consistent with regional, statewide, and national historic trends where streets with sidewalks were mostly limited to urban centers. In the post-World War II era, until about 15 years ago, residential subdivisions, as well as commercial complexes and business/industrial parks, were often built without sidewalks, reflecting a belief that they were unnecessary.

Sidewalk and pathway facilities in support of pedestrian movement are now widely regarded as being a desirable and necessary part of mobility and accessibility. The MPO communities have worked to extend sidewalk and pedestrian facilities through federal grant programs offered through the Transportation Alternative Program (TAP) including traditional enhancement projects, and Safe Routes to Schools projects. The City of Harrisonburg has code requirements for the construction of sidewalks along the public street frontage of all developing properties. Rockingham County also requires sidewalks for new construction and reconstruction projects in all areas within the urban growth boundaries designated by the comprehensive plan or any other plan adopted by the county.

Topography is challenging for many locations in the urbanized area where bicycle or pedestrian facilities may not be easily accommodated in conjunction with the existing roadway network.

Outside the City of Harrisonburg, there are areas that have developed pedestrian networks including the area around Bridgewater College and Dayton. Both Bridgewater and Dayton have also established pedestrian networks connecting residential communities to the commercial areas surrounding Route 42.
Air and Rail Service

Airports
The Shenandoah Valley Regional Airport (SHD), located in Weyers Cave, offers scheduled air service. ViaAir offers daily nonstop service to Charlotte, North Carolina (CLT) and one-stop service to Orlando/Sanford (SFB). With low fares and fast, reliable service ViaAir makes connecting in Charlotte a more convenient and cost effective option than driving to another airport. ViaAir’s service to SFB is also an easy and affordable way to travel to Florida from the Valley. SHD offers a number of convenient ways to get to and from the airport including free airport parking, a door-to-door shuttle service between the airport and locations within the MPO, and several rental car options operating on-site.

Charlottesville Albemarle Airport (CHO) is located approximately 45 minutes from Harrisonburg and has scheduled service from five commercial carriers. Daily nonstop flights are offered to Washington Dulles, Charlotte, Atlanta, Philadelphia, New York LaGuardia, and Chicago.

Within the MPO area, there are also two private aviation airports. The first is Frank Field Airport located northwest of the City of Harrisonburg. The second is Bridgewater Airpark which is located south of the Town of Bridgewater.

Passenger Rail Service
The HRMPO is not served by passenger rail service; however, passenger rail service is available in nearby Staunton. Amtrak operates in downtown Staunton, but the frequency of service is somewhat limited and there is no intercity bus service between the HRMPO and Staunton.

Freight Rail Service
Class 1 freight rail service is provided by Norfolk Southern over its own rails. The Shenandoah Valley Railroad runs on its own tracks southeast of Harrisonburg in Pleasant Valley to Staunton and interchanges with Norfolk Southern on the north end of the line. The Chesapeake Western Branch of Norfolk Southern is a Class III short-line, which provides service from Elkton to Harrisonburg.

The HRMPO region has many opportunities to access rail facilities for moving freight. There are two transloading facilities in the City of Harrisonburg. Transloading facilities are used to transfer freight from one mode of transport to another and are critical to maintaining the intermodal freight network. Freight transported via semi-truck relies on local roadway networks to access inter-regional transportation networks –interstates and railroads. To maintain or expand the opportunities for intermodal freight connections, it is critical to maintain industrial zoning on parcels adjacent to the railroads. These sites provide additional opportunities for developing transloading facilities, or sidings, and the ability to move more freight via rail.

Norfolk Southern runs along the entire length of the Crescent Corridor and provides access to the Virginia Inland Port in Front Royal, as well as multiple junction points to other Norfolk Southern lines. The Crescent Corridor runs along the Appalachian Mountains in the western part of Virginia and is generally defined by Interstate 81. The Crescent Corridor serves as a major trucking and freight corridor along the east coast. Norfolk Southern is investing $2.5 billion throughout the Crescent Corridor across 11 states. Six projects have been identified in Virginia to ease congestion on Interstate 81 by displacing long distance...
freight carried by truck, including a speed improvement project at Elkton. The project was completed in 2015 and included adding passing tracks, as well as signal system work.

**Safety**

The number of crashes involving pedestrians, cyclists, and motor vehicles is an indicator of the safety of the road and intersections in the HRMPO. Crash data specifying the type, location, and severity of crashes can be used to identify the corridors and intersections in need of further study and improvements.

Crash data from the time period of 2012-2016 shown in Maps 12 and 13 indicate a general pattern of property damage and injury from vehicular crashes along the interstate, and major and minor arterials in the MPO area. The minor arterial and collector roads with larger numbers of property damage and injury crashes (Port Republic Road, for example) have been the subject of smaller area studies to identify operational improvements to address crashes; however, a more in-depth analysis of crash rates, crash type, and whether crashes are likely to be reduced based on improvements is required before specific corridors and intersections can be identified for improvements. This additional analysis is described in Chapter 4, Multi-Modal Transportation Needs.
Map 13  Crashes 2012-2016 Harrisonburg Detail

- Fatal Crash
- Injury Crash
- Pedestrian Fatal Crash
- Pedestrian Injury Crash
- Property Damage Crash

Map to be used for planning purposes only

Data Source(s):
- Commonwealth of VA, USGS
- US Census Bureau, City of Harrisonburg
- Rockingham County, VDOT

112 MacTarn Place
Staunton, VA 24401
Phone (540) 885-5174
Fax (540) 885-2687
HRMPO.org
Bridge Sufficiency

Bridge sufficiency ratings are based on the FHWA rating system, with ratings ranging from 0% (poor) to 100% (good). Factors in the ratings system include structural adequacy, whether the bridge is functionally obsolete, and the level of service provided to the public. Twelve bridges within the MPO boundary have a rating of less than 50 percent. Bridges with a sufficiency rating of less than 50 percent are eligible for federal replacement funds and bridges with a rating between 50 percent and 80 percent are eligible for repairs. Seven of these bridges are in the Rockingham County portion of the MPO, four are in Harrisonburg and one is in Bridgewater.

VDOT’s Six-Year Improvement Plan (SYIP) cites four bridges that are slated for replacement in the HRMPO. These bridges are both indicated on Map 14 and included in corresponding Table 3. Both the Route 33 WBL and EBL bridges in Harrisonburg are being replaced with $16.5 million allocated for FY 2018-2021 through HB1887 State of Good Repair. The third is the Route 257 bridge over Dry River with $1,325,000 allocated for FY 2017 and $2.5 million allocated for FY 2018-2019. The fourth is the Pleasant Valley Road bridge over Blacks Run in the City of Harrisonburg which has been fully funded for construction using revenue sharing.

<table>
<thead>
<tr>
<th>Route Number/Street Name</th>
<th>Crossing</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 11</td>
<td>Dry Fork</td>
<td>Rockingham County</td>
</tr>
<tr>
<td>Route 257</td>
<td>Dry River</td>
<td>Rockingham County</td>
</tr>
<tr>
<td>Silver Lake Road</td>
<td>Cooks Creek</td>
<td>Rockingham County</td>
</tr>
<tr>
<td>Meigs Lane</td>
<td>Route 42</td>
<td>Rockingham County</td>
</tr>
<tr>
<td>Friedens Church Road</td>
<td>Pleasant Run</td>
<td>Rockingham County</td>
</tr>
<tr>
<td>Scholars Road</td>
<td></td>
<td>Rockingham County</td>
</tr>
<tr>
<td>Route 42</td>
<td>North River</td>
<td>Bridgewater</td>
</tr>
<tr>
<td>Pleasant Valley Road</td>
<td>Blacks Run</td>
<td>Harrisonburg</td>
</tr>
<tr>
<td>Route 33 WBL</td>
<td>Norfolk Southern Rail</td>
<td>Harrisonburg</td>
</tr>
<tr>
<td>Route 33 EBL</td>
<td>Norfolk Southern Rail</td>
<td>Harrisonburg</td>
</tr>
<tr>
<td>Old Furnace Road</td>
<td>I-81</td>
<td>Harrisonburg</td>
</tr>
</tbody>
</table>

Bridges are inspected and maintained by the Bridge Division of VDOT. Their repair and reconstruction is funded with dedicated maintenance dollars and capital programs. Bridge sufficiency is included in the LRTP for informational purposes, or if a bridge project is included in the Six Year Improvement Program, but bridge projects are not included in the LRTP’s universe of potential transportation projects. This is the case for all maintenance activities overseen by VDOT.
Goods & Freight Movement

The relationship between freight activity and the roadway network throughout the HRMPO is strong and multifaceted. Agriculture and manufacturing comprise a good share of the region’s local economic base that relies on the efficient movement of goods, both inbound and outbound, to reach worldwide markets. An efficient transportation network is important to every sector of the economy, but certain sectors rely on the transportation system for freight movement. An efficient transportation network contributes to cost reduction for end users and the consumer.

The HRMPO region supports large manufacturing and industrial concentrations in the Shenandoah Valley and truck freight is the region’s most utilized method of goods movement by a significant margin. Within the MPO region, Interstate 81 is the primary north-south truck route, transporting goods within Virginia and beyond, with over three-quarters of the truck tonnage being pass-through freight per the Office of Intermodal Planning and Investment (OIPI) Multimodal Freight Study. In 2015, Interstate 81 carried approximately 55,000 trips per day, with 26% of that being truck traffic. Paralleling Interstate 81, Route 11 serves as a backup to the interstate, particularly when incidents occur. Route 11 supports 3-6% of truck trips throughout the urbanized area, mainly providing connectivity for local goods movement. Route 33, the region’s main east-west corridor, supports approximately 3-6% truck traffic. While much of the city’s street network has minimal truck traffic, the industrial area in the southern area of the City along Pleasant Valley Road supports approximately 10% truck trips per day.

<table>
<thead>
<tr>
<th>Facility</th>
<th>AADT</th>
<th>% Truck Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate 81</td>
<td>55,000</td>
<td>26%</td>
</tr>
<tr>
<td>Route 11 (Rte 257 to Rte 704)</td>
<td>12,000</td>
<td>4%</td>
</tr>
<tr>
<td>Route 11 (I-81 to Pleasant Hill Rd)</td>
<td>20,000</td>
<td>3%</td>
</tr>
<tr>
<td>Route 11 (Pleasant Hill Rd to Port Republic Rd)</td>
<td>18,000</td>
<td>3%</td>
</tr>
<tr>
<td>Route 11 (Port Republic Rd to S. Liberty St)</td>
<td>22,000</td>
<td>3%</td>
</tr>
<tr>
<td>Route 42 (Sunrise Ave to Grace St)</td>
<td>19,000</td>
<td>3%</td>
</tr>
<tr>
<td>Route 42 (5th St to Mt Clinton Pike)</td>
<td>11,000</td>
<td>6%</td>
</tr>
<tr>
<td>Route 42 (Rte 290 to NCL Dayton)</td>
<td>1,300</td>
<td>4%</td>
</tr>
<tr>
<td>Route 42 (Rte 257 to Rte 290)</td>
<td>1,800</td>
<td>4%</td>
</tr>
<tr>
<td>Route 42 (Mt Crawford Ave to North River Rd)</td>
<td>16,000</td>
<td>4%</td>
</tr>
<tr>
<td>Route 42 (Dinkel Ave to SCL Bridgewater)</td>
<td>7,500</td>
<td>4%</td>
</tr>
<tr>
<td>Pleasant Valley Road (SCL Harrisonburg to Rte 710)</td>
<td>4,100</td>
<td>9%</td>
</tr>
<tr>
<td>Mosby Road (Pike Church Rd to WCL Harrisonburg)</td>
<td>3,400</td>
<td>4%</td>
</tr>
<tr>
<td>Route 33 (WCL Harrisonburg to Waterman Dr)</td>
<td>9,100</td>
<td>3%</td>
</tr>
<tr>
<td>Route 33 (University Blvd to ECL Harrisonburg)</td>
<td>25,000</td>
<td>3%</td>
</tr>
<tr>
<td>Old Furnace Road (ECL Harrisonburg to Layman Trestle Rd)</td>
<td>1,800</td>
<td>3%</td>
</tr>
</tbody>
</table>
Maintaining roadways to accommodate truck traffic is critical to efficient goods movement and the region’s economic development success. Interstate highways are typically graded on several factors that affect goods movement within a particular area. For example, the International Roughness Index (IRI) measures the cumulative deviation from a smooth surface in inches per mile. The ranges of values correspond to the pavement condition as follows (IRI in inches per mile): very good (0 to 85); good (86 to 100); fair (111 to 140); poor (141 to 175); very poor (more than 175). There are also factors that consider bridge conditions that affect truck freight movement. Under that inventory, General Condition Ratings are provided in three levels, the lowest of which is “red.” Within the HRMPO area, pavement quality of Interstate 81 is in the very good category with an average IRI of 73.

**Bottlenecks**

Traffic congestion delays deliveries and can require carriers to make adjustments to their operating schedules, route pickups during off-peak hours or shift trucks from major primary routes to less congested secondary routes.

Virginia’s freight transportation consists of sections that are stressed or over capacity to the point that they are defined as bottlenecks. Bottlenecks prevent the efficient flow of freight within the system and throughout the commonwealth. Currently, Virginia’s primary freight transportation bottlenecks generally correspond to:

- Major urbanized regions with high levels of congestion
- Intersections of major highway arteries
- Rail system points where infrastructure provides inadequate freight transportation capacity or dimension, especially where growing freight and passenger needs must be accommodated over shared infrastructure

Currently, OIPI classifies the entire HRMPO area as a freight bottleneck that extends south towards Roanoke. The northern sections of Rockingham County which are outside of the MPO boundary are not included in the bottleneck areas of I-81.

**Distribution Centers**

Virginia continues to experience significant growth in large-scale warehousing development which is often associated with high-volume or “big box” importers. These importers rely upon uninterrupted flows of cargo through Virginia’s ports and then onto highway and rail connections. Fourteen major distribution centers are located along the I-81 Corridor from Bristol, VA to Winchester, VA. Three large distribution centers are located in the HRMPO area, the Walmart distribution center in Rockingham County, Marshall’s Distribution Center in Bridgewater, and RR Donnelley/Banta Books in Harrisonburg. There are also several smaller distribution centers that are located on-site for larger manufacturing facilities in Rockingham County that only serve those particular facilities.

**Improvement Strategies**

Accommodating freight truck movement within the HRMPO planning area is critical to ensure efficient freight and goods movement. Adding a third lane in each direction of I-81 could help alleviate freight bottlenecks while providing additional capacity for freight truck movement. Improving access to I-81 is also important for efficient truck movement. While I-81 is the primary corridor for truck movement within the HRMPO area, roads connecting this interstate to industrial sites, such as VA State Route 42 and US
Route 11 and 33 may experience increased truck traffic. Improving the I-81 exit and entry ramps will help to facilitate efficient access to and from the interstate and support goods movement. Additionally, intersection improvements in the local network such as widening radii to accommodate truck traffic, particularly in industrial areas, and continued evaluation of signal timing at key intersections should be considered. Improving east-west connections linking Route 42 with Route 11 will provide relief to Route 33, Route 257 and many secondary routes that currently exist. The recent completion of the Stone Spring Road/Southeast Connector project between Route 42 and Route 33 is an example of providing a better alternative to existing routes around the urban core of Harrisonburg and providing better alternatives to existing secondary routes that were not designed or intended for heavy traffic volumes and freight traffic. The widening of Route 11 between Route 704 and Pleasant Valley Road (a portion of which is funded through VDOT’s SmartScale program), along with interchange improvements at Exit 245 and Exit 247 will assist in freight mobility. Maintaining capacity and safety for freight trucks is key to supporting economic activity within the HRMPO area.

**Map 15** shows truck and rail freight corridors, as well as freight distribution centers in the MPO area.
Chapter 4: Multi-Modal Transportation Needs

This chapter describes the identification of transportation needs. Transportation needs are defined as the gap between existing deficiencies in the system and the 2040 vision for the region. For this planning process, needs were identified by the public and by the members of the LRTP Working Group, who applied their professional knowledge and reviewed data from the 2015 and 2040 travel demand model. The vision for the region is defined by the Goals and Objectives, found in Chapter 6.

A travel demand model is a computer-based forecasting tool used to estimate travel behavior and travel demand on the transportation network on a large, or macroscopic, scale given a set of regional land-use and transportation related assumptions. The HRMPO model inputs were calibrated to local traffic data, sociodemographic factors, travel behavior (such as the amount of travel and mode of transportation chosen), and other variables for the 2015 base year. To build the future conditions model, industry projections for 2040 population and employment in the HRMPO region were researched and, with knowledge from local planning officials, the most likely areas of growth were identified. The 2040 estimates from the travel demand model were then used to help planners understand which modes of transportation are likely to be utilized, where deficiencies may exist in the transportation network, and to evaluate the effects of different street improvement scenarios. While outputs from travel demand modeling are a useful planning tool in this regard, results are used only as a guide in understanding generalized changes in conditions given the programmed assumptions, with recognition of the model's limitations in predicting microscopic-scale changes.

This chapter addresses:
4 -1 Network Operating Conditions
4 - 2 Transit, Bicycle and Pedestrian, and TDM Needs

4 – 1 Network Operating Conditions

Capacity Needs

2015 Network

The 2015 base year scenario results derived from the HRMPO travel demand model were used to determine deficient roadway segments. Deficient segments were determined by analyzing volume of traffic on the roadway segments compared to the capacity of those segments, or the Volume to Capacity (V/C) ratio. For planning purposes, segments with a V/C ratio of 1 or greater were identified as capacity needs.

V/C ratios over 1 indicate that the roadway is carrying a daily volume of traffic that equals or exceeds its daily capacity. These include:
### Table 5 2015 Corridors Over Capacity

<table>
<thead>
<tr>
<th>Primary System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservoir St between South City Limits and Stone Spring Rd</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Urban System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bridgewater</strong></td>
</tr>
<tr>
<td>VA 42/Main St between W Bank St and Oakwood Dr</td>
</tr>
<tr>
<td><strong>Harrisonburg</strong></td>
</tr>
<tr>
<td>Reservoir St between Martin Luther King, Jr Way and Myers Ave and between University Blvd and South City Limits</td>
</tr>
<tr>
<td>Market Street between Court Square and High St</td>
</tr>
<tr>
<td>Port Republic Road between Crawford Ave and Devon Ln</td>
</tr>
<tr>
<td>High Street between 5th St and Martin Luther King, Jr. Way</td>
</tr>
<tr>
<td>Liberty St between Edom Rd and Kratzer Ave</td>
</tr>
</tbody>
</table>

Of these corridors, several are addressed by projects currently underway, or that will be constructed via the FY 2017-2022 Six Year Improvement Program. Those corridors with present-day capacity challenges that are not addressed by a current or future-funded project are of particular importance in the selection of projects for the 2040 CLRP. Map 16 illustrates the estimated Volume to Capacity ratio for the 2015 network.
2040 Existing + Committed Network

To understand 2040 network capacity needs, the LRTP working group developed future year socio-economic and employment data and assigned it specific areas of the MPO based on where growth is expected to occur. Assigning projected growth to specific zones allows the model to estimate where people will live and work, and how many trips will be generated in a given day.

The 2040 transportation network includes existing facilities, plus those for which funding is currently committed and a construction start date tentatively identified. This future year “Existing + Committed” scenario identifies system-wide capacity issues and specific over-capacity corridors in a scenario where population and job growth continues as projected, but no additional capacity-adding projects are built in the next 25 years.

Predictably, the 2040 Existing + Committed network shows more corridors and corridor segments operating at or over capacity as compared to 2015.

Corridors projected to operate at or over capacity during the peak hour in 2040 include:

Table 6 HRMPO Corridors Over Capacity in 2040

<table>
<thead>
<tr>
<th>System</th>
<th>Corridors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interstate System</strong></td>
<td></td>
</tr>
<tr>
<td>Interstate 81 Between Mile Marker 251 and the northern MPO boundary</td>
<td></td>
</tr>
<tr>
<td><strong>Primary System</strong></td>
<td></td>
</tr>
<tr>
<td>Spotswood Tr/US 33 eastbound between South City Limits and Stone Spring Rd</td>
<td></td>
</tr>
<tr>
<td><strong>Secondary System</strong></td>
<td></td>
</tr>
<tr>
<td>Port Republic Rd between Boyers Rd and Shen Lake Dr</td>
<td>Smithland Road from North City Limits to US 11</td>
</tr>
<tr>
<td><strong>Urban System</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Bridgewater</strong></td>
<td></td>
</tr>
<tr>
<td>Main St (VA 42) between W Bank St and Oakwood Dr</td>
<td>Oakwood Dr between Main St and Chester's Way</td>
</tr>
</tbody>
</table>
### Harrisonburg

<table>
<thead>
<tr>
<th>Harrisonburg</th>
<th>Harrisonburg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberty St between Edom Rd and Kratzer Ave</td>
<td>Smithland Rd between Old Furnace Rd and US 11</td>
</tr>
<tr>
<td>S Main St between South Ave and Martin Luther King, Jr. Way</td>
<td>N Main St (US 11) between Charles St and Kratzer Ave</td>
</tr>
<tr>
<td>Port Republic Rd between S Main St (US 11) and Devon Ln</td>
<td>Virginia Avenue (VA 42) between 5th St and Martin Luther King, Jr. Way</td>
</tr>
<tr>
<td>W Market Street (US 33) between Court Square and High St</td>
<td>S Main St (US 11) between Covenant Dr and Corporate Dr</td>
</tr>
<tr>
<td>Reservoir St between Myers Ave and Martin Luther King, Jr. Way</td>
<td>Chicago Ave between Waterman Dr and Mt. Clinton Pk</td>
</tr>
<tr>
<td>Linda Ln between E Market St (US 33) and Country Club Rd</td>
<td>Acorn Dr between Kratzer Rd and Mt. Clinton Pk</td>
</tr>
<tr>
<td>Reservoir St between Evelyn Byrd Ave and Foley Rd</td>
<td>Neff Ave between Medical Ave and Evelyn Byrd Ave</td>
</tr>
</tbody>
</table>

**Map 17** illustrates peak hour Volume to Capacity for the 2040 “No Build” scenario.
Map 17 HRMPO 2040 No Build Scenario Volume to Capacity

2040 No Build
- Free Flow (0 - 0.8)
- Mild Congestion (0.6 - 0.8)
- Congested (0.8 - 1)
- Over Capacity (> 1)

Map to be used for planning purposes only. Data Source(s): Commonwealth of VA, USGS, US Census Bureau, City of Harrisonburg, Rockingham County, VDOT.
Safety deficiencies were identified through the statewide transportation plan, VTRANS 2040, under development by the Office of Intermodal Planning and Investment (OIPI). This analysis considers serious injury and fatal crash sites between 2010 and 2012 and identifies the top 100 intersections and corridors based on Potential for Safety Improvement (PSI), a methodology that subtracts the predicted crash rate for the roadway type and volume from the actual number of serious injury and fatal crashes. Of the top 100 crashes sites/corridors in the VDOT Staunton Construction District, 10 of the intersections and 22 of the corridors are located in the HRMPO, including the second worst corridor in the VDOT District in Harrisonburg—Reservoir Street. The intersection with the highest PSI score in the MPO is West Market Street and Liberty Street. These crash sites and corridors are shown in Map 18. A comprehensive review of physical roadway deficiencies was not included in the study, as it would have yielded far more information than could be addressed in the LRTP. Instead, the safety analysis focused on crash data analysis with regard to the most serious or urgent safety concerns.
4 – 2 Transit, Bicycle and Pedestrian, and TDM Needs

Planning for a multimodal transportation system requires consideration of needs related to public transit, bicycle and pedestrian facilities, as well as the physical infrastructure to support Transportation Demand Management (TDM) programs like Park and Ride lots, ridesharing and other commuter transportation services.

Transit, bicycle/pedestrian and TDM needs and projects are addressed comprehensively in separate planning documents. A summary of those needs is included here.

Transit Needs

The Harrisonburg Department of Public Transportation (HDPT) completed its own planning document, the Transit Development Plan (TDP) in March 2018. HDPT and community members have identified the following needs for transit in the MPO area:

- Service to university students and transit-dependent populations will continue to be a primary need within the HRMPO area in order to maintain circulation on and around the JMU campus, and to provide access to jobs; however; job access needs in the County are not currently being met with fixed route transit service.
- Rockingham County and the Towns of Dayton, Bridgewater and Mt. Crawford populations will continue to age between 2015 and 2040. With an aging population comes new mobility needs, including paratransit service beyond the City limits.
- With continued residential growth in the County, especially southeast of the City of Harrisonburg, there is, and will continue to be a need for transit service for work and personal trips, especially along corridors such as Port Republic Road and Spotswood Trail, which currently experience some capacity issues that will also be prevalent in the year 2040.
- A Transfer Center at the Cloverleaf Shopping Center, a park and ride facility, and additional shelters and benches. HDPT also wants to improve the shelter at Walmart, and add shelters at Target, Squire Hill Apartments, Fox Hill Apartments, and Harrisonburg High School on the opposite side of Garber's Church Road.

The 2040 LRTP projects transit revenues for operating and capital costs over the life of the plan and adopts the 2018 Harrisonburg Department of Public Transportation TDP by reference to address more specific transit needs.

Bicycle and Pedestrian Needs

The HRMPO Bicycle and Pedestrian Plan, which was adopted in November, 2016, identifies a comprehensive list of regional non-motorized transportation needs and specific projects, while the City of Harrisonburg and Rockingham County each have their own Bicycle and Pedestrian Plan that addresses municipality-specific needs in even greater detail. Bicycle and pedestrian projects in the 2040 LRTP are drawn directly from the 2016 HRMPO Bicycle and Pedestrian Plan, which is available on the HRMPO website, and is incorporated here by reference.
The highest priority needs and associated projects from the 2016 HRMPO Bicycle and Pedestrian Plan are:

- Connections from communities west of Harrisonburg to major corridors within the City
- Connections along or adjacent to the US 33 Corridor from downtown Harrisonburg to the HRMPO boundary
- Development of the Cooks Creek and Blacks Run Greenway Trails from the Belmont neighborhood through Dayton and Bridgewater and along Blacks Run to connect to the Bluestone Trail
- Connections along US 11 north of downtown Harrisonburg to the Research Park

**TDM Needs**

Transportation Demand Management in the HRMPO focuses on providing longer distance commuters with the facilities and services they need to make a carpool, vanpool or transit trip feasible. In addition to the programmatic components like Guaranteed Ride Home and carpool matching, which are provided by the Central Shenandoah Planning District Commission, carpool participants and transit riders require a system of safe, convenient Park and Ride lots throughout the region.

Rockingham County hosts four Park and Ride lots:

- Mt. Crawford (Rockingham County) – 15 spaces located east of Mt. Crawford on Route 257 adjacent to I-81. This is the only park-and-ride location within the MPO area.
- Elkton – Tanyard Bridge Road (Rockingham County) – 25 spaces located on Tanyard Bridge Road east of Elkton at the intersection with Route 33. This Park-and-Ride lot is located outside the MPO area.
- Elkton – Blue and Gold Drive (Rockingham County) – 12 spaces located on Blue and Gold Drive at the intersection of U.S. 33 and U.S. 340, east of Elkton. This Park-and-Ride lot is located outside the MPO area.
- Massanutten (Rockingham County) – 35 spaces located across from the Massanutten Resort entrance at Route 33 and Mt. Olivet Church Road. This Park-and-ride lot is located outside the MPO area.

As noted above, the HRMPO hosts only one Park and Ride lot in Mt. Crawford, with no facilities in the City of Harrisonburg or serving JMU. The need for a Park and Ride lot adjacent to I-81 within the City is critical both for carpoolers, as well as for future inter-regional bus service between the metro Harrisonburg, Staunton, Waynesboro and Charlottesville areas as detailed in the 2016 Inter-regional Transit Study published by the Central Shenandoah Planning District Commission. Inter-regional transit requires Park and Ride lots on or close to the route where riders can park and catch the bus to complete their trip. Inter-regional transit from Harrisonburg to Charlottesville would not only serve commuters, but also those wishing to reach Amtrak, or Greyhound bus station.
Chapter 5: Cost & Revenue Analysis

This chapter explains the methodology for developing project cost estimates and revenue projections. Since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, MPOs have been required to demonstrate that estimated project costs do not exceed projected revenues. This federal requirement is complicated first by the lack of a multi-year federal transportation funding program, and second by Virginia’s shift from the traditional formula-based approach to allocating federal transportation funds to a performance-based evaluation through the SMART SCALE project funding program. Despite these challenges, the LRTP is required to include a financial plan that estimates revenues for identified transportation improvements.

The HRMPO region has transportation needs that far exceed revenue projections. If additional funding becomes available during the life of the LRTP, projects included on the Vision (unfunded) List could be eligible to receive funding. The Vision List is shown in Appendix A.

This chapter addresses:
5-1 Project Cost Estimates
5-2 Funding Sources
5-3 Anticipated Revenues

5 – 1 Project Cost Estimates

Planning level cost estimates were developed for projects identified in the HRMPO Constrained and Vision Lists. Draft estimates were derived from the following sources:

- VDOT Six Year Improvement Plan
- 2035 HRMPO Long Range Transportation Plan
- City of Harrisonburg, Rockingham County, and Town Comprehensive Plans

VDOT’s Statewide Planning Level Cost Estimating System Project cost estimates in the SYIP or the Comprehensive Plans were not revised. In some cases, funding has been previously allocated to established projects through the SYIP. In these instances, only the outstanding balance is included in the project cost for future budgeting purposes.

For projects that did not have a cost estimate developed in any public planning document, the project team used VDOT’s Statewide Planning Level Cost Estimating System to develop estimates. The program has year 2016 project costs that are inflated annually by 3% and assumes a future Year of Expenditure (YOE). This tool provides a high level estimate based on the type of facility being constructed/reconstructed, and includes an overall percentage for Preliminary Engineering (PE) costs. Right of way (RW) costs are also included based upon an overall percentage of project cost.

For the universe of projects identified in the Vision Plan for the HRMPO, the total cost is $1 billion.
5 – 2 Funding Sources

Transportation funding is available through federal, state, and local government entities for roadway, bike and pedestrian, and transit projects. The Commonwealth administers federal funds for roadway construction, bicycle/pedestrian facilities, transit operations and facilities, and major planning and/or environmental studies through a variety of programs. The 2015 federal transportation funding and authorization bill, Fixing America’s Surface Transportation (FAST) Act funds the following four major core programs for surface transportation projects pertinent to the HRMPO:

**Surface Transportation: Federal Funds**

*National Highway Performance Program (NHPP)*
The prior federal transportation legislation - MAP-21 – and the FAST Act expanded the National Highway System (NHS) to include principal arterial roadways that were not originally part of the NHS. The Enhanced National Highway System is now comprised of the interstate system, all principal arterials, and bridges on the NHS. The NHPP provides funding for construction, reconstruction, or operational improvement of portions of the highway; inspection costs for NHS infrastructure including bridges; bicycle and pedestrian infrastructure; safety improvements on the NHS; environmental restoration within NHS corridors; intelligent transportation system (ITS) improvements; and the construction of bus terminals servicing the NHS.

*Surface Transportation Program (STP)*
Projects eligible for funding include construction, reconstruction, or operational improvement for highways and local access roads; bridge projects on public roads and construction of bridges on federal-aid highways; highway and transit safety infrastructure improvements; bicycle and pedestrian infrastructure including recreational trails; and environmental restoration.

*Highway Safety Improvement Program (HSIP)*
The HSIP allocates funds to reduce traffic fatalities and injuries on public roads. Eligible projects for this funding include public surface transportation projects or projects that align with the State Strategic Highway Safety Plan (SHSP) to mitigate hazardous roads or resolve highway safety challenges.

*Transportation Alternatives (TAP) Program*
MAP-21 created and the FAST Act maintained the Transportation Alternatives Program to encompass preceding programs including Transportation Enhancements, Safe Routes to School, and Recreational Trails. Projects eligible for this funding include, but are not limited to, the planning, design, and construction of on- and off-road trails for non-motorized transportation; converting abandoned railroad corridors for non-motorized trails; and environmental mitigation activities. Surface Transportation: State Funding

Virginia matches federally funded programs with state gas tax revenues along with maintenance programs received by urban localities by means of a formula-based system. The Commonwealth also supports a Revenue Sharing program where local funds are matched dollar for dollar with state funds. Eligible projects must be identified in local Capital Improvement Programs (CIPs) or adopted Comprehensive Plans to be eligible to receive Revenue Sharing funds.
Surface Transportation: Local Funding  
Localities fund transportation projects primarily through general obligation bonds and general funds. Bond funds dedicate funding for long-term capital roadway projects. Local funding is also used to match federal and state funding sources. Local funding commitments are not accounted for in the fiscally constrained LRTP.

Public Transportation: Federal Funding

*Urbanized Area Formula Program (FTA Section 5307)*
This is a formula-based grant program allocated to urbanized areas for transit capital improvements, operating, and planning assistance for mass transit services. Funding is made available to designated recipients that must be public bodies with the legal authority to receive and dispense federal funds. Governors, responsible local officials, and public transit services are to designate a recipient to apply for, receive, and dispense funds for transportation management areas pursuant to 49USCA5307(a)(2). The Governor or Governor’s designee is the designated recipient for urbanized areas between 50,000 and 200,000.

Eligible activities include planning, engineering design and evaluation of transit projects and other technical transportation-related studies; capital investments in bus and bus-related activities such as replacement of buses, overhaul of buses, rebuilding of buses, crime prevention and security equipment and construction of maintenance and passenger facilities; and capital investments in new and existing fixed guideway systems including rolling stock, overhaul and rebuilding of vehicles, track, signals, communications, and computer hardware and software. All preventive maintenance and some Americans with Disabilities Act complementary paratransit service costs are considered capital costs.

For urbanized areas with populations less than 200,000, operating assistance is an eligible expense. In these areas, at least one percent of the funding apportioned to each area must be used for transit enhancement activities such as historic preservation, landscaping, public art, pedestrian access, bicycle access, and enhanced access for persons with disabilities.

*Transportation for Elderly Persons and Persons with Disabilities (Section 5310)*
This program provides formula funding to States and other eligible recipients including non-profit organizations and governmental authorities for the purpose of assisting private nonprofit groups in meeting the transportation needs of the elderly and persons with disabilities when the transportation service provided is unavailable, insufficient, or inappropriate to meeting these needs. Funds are obligated based on the annual program of projects included in a statewide grant application. The State agency ensures that local applicants and project activities are eligible and in compliance with Federal requirements, that private not-for-profit transportation providers have an opportunity to participate as feasible, and that the program provides for coordination of federally assisted transportation services assisted by other Federal sources. Once the FTA approves the application, funds are available for state administration of its program and for allocation to individual sub-recipients within the state. Funding is apportioned by formula based upon the number of elderly persons and persons with disabilities in each state according to the latest U.S. Census data.
Local Transit Funds
The City of Harrisonburg contributes to the local transit system. James Madison University, which is a primary transit customer, also contributes financially to the transit system operations. The transit system generates approximately $6 million on an annual basis. Transit fares between general ridership and paratransit ridership contribute approximately $115,000 in revenue to the transit system on an annual basis. James Madison University contributes approximately $1.5 million on an annual basis. As student growth has extended outside of the City and into adjacent Rockingham County, HDPT has contracted with certain student-based housing complexes to provide service. This is determined on a case-by-case basis. As student housing communities continue to expand beyond the City limits, it is anticipated that new contracts with communities will continue.

5 – 3 Projected Revenues

Highway Revenue
VDOT receives revenues from state and federal sources referred to as Highway Revenue. State sources of funding are derived from four primary sources: sales tax on motor fuels, motor vehicles sales and use tax, motor vehicle license fee, and state sales and use tax. In FY 2016, VDOT's annual revenues totaled $4.8 billion, when excluding the Northern Virginia Transportation Authority (NVTA) and Hampton Roads Trust Fund (HRTF). A large portion of the state’s annual budget is dedicated to the Highway Maintenance and Operating Fund (HMOF) which comprises approximately 38% of the annual budget. Approximately 37% of the annual operating fund is dedicated to the state’s construction program.

Transportation projects are sometimes financed using a combination of public and private funds. Financing from private entities is generally received through legally binding commitments made during the local property rezoning process to facilitate land development, known as proffers - voluntary cash or capital improvement payments from developers to local government to offset development impact - or as part of a Public Private Partnership (P3). Due to the uncertainty of how and where development might occur, the LRTP projections do not include private funding as a revenue source; however, the ultimate funding package for a project could include a combination of public and private funds. The MPO defers to the respective jurisdictions to work with the development community, and VDOT, to determine the rational nexus of need proportional to mitigate the impact of any specific development.

Projected revenues are a requirement of the federal transportation planning process to ensure that investments are based on realistically anticipated revenues. Historically, surface transportation revenues were tied to network facility type and distributed to localities through the original construction formula, 40% to the Primary System, 30% to the Secondary System, and 30% to the Urban System. Virginia’s SMART SCALE program replaces formula-based project funding with a competitive, project performance and outcome-based analysis to facilitate objective transportation decision making by the Commonwealth Transportation Board (CTB). As a result, it is difficult to assume that dedicated transportation funding will reach the HRMPO by formula in the future. Based on revenue trends from similarly sized MPOs in the Commonwealth of Virginia, it is projected that the HRMPO region will receive $76 million for surface transportation projects between 2016 and 2040. Inclusive of this figure, it is anticipated that $2.5 million
will be dedicated to eligible projects through the Transportation Alternatives (TA) Program. Prior SYIP allocations on active projects are also included in Table 7 below to reflect the total value of investments being made in the HRMPO during the planning period.

### Table 7 Total Anticipated Revenues 2016-2040

<table>
<thead>
<tr>
<th>Anticipated Revenues Category</th>
<th>Prior SYIP Allocations</th>
<th>Projected Revenues</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate Funding</td>
<td>$3,923,707</td>
<td>$25,790,860</td>
<td>$29,714,567</td>
</tr>
<tr>
<td>Primary Funding*</td>
<td>$18,296,217</td>
<td>$1,940,000</td>
<td>$20,236,217</td>
</tr>
<tr>
<td>Secondary Funding*</td>
<td>$4,348,960</td>
<td>$19,428,943</td>
<td>$23,777,903</td>
</tr>
<tr>
<td>Urban Funding</td>
<td>$3,174,933</td>
<td>$28,773,800</td>
<td>$31,948,733</td>
</tr>
<tr>
<td><strong>Surface Funding Subtotals</strong></td>
<td></td>
<td>$75,933,603</td>
<td><strong>$105,677,420</strong></td>
</tr>
<tr>
<td>Transportation Alternatives (TA) Funding</td>
<td>$190,000</td>
<td>$2,500,000</td>
<td>$2,690,000</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>$108,367,420</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Primary and Secondary Program funding is flexible and can be used to balance other programs.

The combined $108.3 million in anticipated highway and Transportation Alternatives funding, juxtaposed against the $1.1 billion in surface transportation needs over the next 25 years, represents a $985 million shortfall for the MPO region.

Fitting anticipated revenues to project cost estimates to create a Constrained Long Range Plan (CLRP) is addressed in Chapter 7, Constrained Long Range Plan.

### Transit Revenue

The Harrisonburg Department of Public Transportation (HDPT) is in the process of reviewing and updating the Transit Development Plan (TDP). A TDP is a State required study of the City’s transit service and helps identify transit service needs, prioritize improvements, and determine the resources required for implementing modified or new service. The plan also provides a foundation for requests for State funding. The TDP is updated every six years, and the State requires annual status updates. The current TDP was completed in March 2018. Based on the six-year projections in the HDPT Transit Development Plan (TDP), it is estimated that the HRMPO region will receive $60.4 million in funding through Section 5307 funding over the life of the LRTP. Section 5307 funding only comprises a portion of the HDPT budget. James Madison University provides a substantial portion of the annual budget, along with the City of Harrisonburg general fund and rider fares. Based on FY 2017 budget, the HDPT budget is $5.63 million. The graph below depicts revenue sources.
FTA determines funding for urbanized areas with a population less than 200,000 called the Small Transit Intensive Cities. This was first introduced in the 2007 SAFETEA-LU federal transportation bill where funds are apportioned to urbanized areas that meet or exceed the average level of service for all urbanized areas between 200,000 and 1,000,000. The urbanized areas must meet or exceed operating levels at industry standards in six performance categories, which include:

1. Passenger miles traveled per vehicle revenue mile,
2. Passenger miles traveled per vehicle revenue hour,
3. Vehicle revenue miles per capita,
4. Vehicle revenue hours per capita,
5. Passenger miles traveled per capita, and
6. Passengers per capita.

It should be acknowledged that, due to this performance-based approach, comparing one system with another system’s performance will result in varied federal revenue received from year to year, making it more difficult to forecast future revenues. Utilizing historical data from the current TDP, revenue projections were developed using historical averages and projecting them to 2040.
<table>
<thead>
<tr>
<th>Section 5307 Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2017</td>
</tr>
<tr>
<td>FY 2018</td>
</tr>
<tr>
<td>FY 2019</td>
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<tr>
<td>FY 2020</td>
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<td>FY 2021</td>
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<td>FY 2037</td>
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<tr>
<td>FY 2038</td>
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<tr>
<td>FY 2039</td>
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<tr>
<td>FY 2040</td>
</tr>
</tbody>
</table>

**Total Anticipated Federal Transit Revenues** $60,357,427

HDPT also programs and plans for capital replacements and improvements. The TDP and the City’s Capital Improvement Program (CIP) help inform these capital expenditures for the near future; however, the City anticipates additional costs over the life of the LRTP.

Near-term facility improvements include $70,000 for additional bus shelter facilities in various locations throughout the City, and $1,000,000 for a new transfer center downtown. The City has utilized a shopping center parking lot on the fringe of downtown in recent years to serve in this capacity, but there is a need to
transition to a permanent location better designed to accommodate transit needs. Facility improvements in out years assume the need for additional bus shelters or replacements, particularly as the pedestrian sidewalk network continues to expand.

### Table 9 Transit Capital Improvements

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Replacement Buses</th>
<th>Expansion Buses</th>
<th>Facility Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2017</td>
<td>$3,160,896</td>
<td>$65,000</td>
<td>$70,000</td>
</tr>
<tr>
<td>FY 2018</td>
<td>$66,500</td>
<td>$800,000</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>FY 2019</td>
<td>$3,140,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY 2020</td>
<td>$3,510,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY 2021</td>
<td>$280,000</td>
<td></td>
<td>$70,000</td>
</tr>
<tr>
<td>FY 2022</td>
<td>$2,910,000</td>
<td>$450,000</td>
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<tr>
<td>FY 2023</td>
<td>$3,500,000</td>
<td></td>
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<tr>
<td>FY 2024</td>
<td>$3,500,000</td>
<td>$900,000</td>
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<td>FY 2025</td>
<td>$3,500,000</td>
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<tr>
<td>FY 2026</td>
<td>$3,500,000</td>
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<td>$100,000</td>
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<td>FY 2027</td>
<td>$3,500,000</td>
<td>$1,000,000</td>
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<td>FY 2028</td>
<td>$3,500,000</td>
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<tr>
<td>FY 2029</td>
<td>$3,500,000</td>
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<td>FY 2030</td>
<td>$3,500,000</td>
<td>$1,000,000</td>
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<tr>
<td>FY 2031</td>
<td>$3,500,000</td>
<td></td>
<td>$100,000</td>
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<tr>
<td>FY 2032</td>
<td>$3,700,000</td>
<td></td>
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<tr>
<td>FY 2033</td>
<td>$3,700,000</td>
<td>$1,000,000</td>
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<td>FY 2034</td>
<td>$3,700,000</td>
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<td>FY 2035</td>
<td>$3,700,000</td>
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<tr>
<td>FY 2036</td>
<td>$3,700,000</td>
<td>$1,000,000</td>
<td>$100,000</td>
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<td>FY 2037</td>
<td>$3,700,000</td>
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<td>FY 2038</td>
<td>$3,700,000</td>
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<tr>
<td>FY 2039</td>
<td>$3,700,000</td>
<td>$1,000,000</td>
<td></td>
</tr>
<tr>
<td>FY 2040</td>
<td>$3,700,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>$74,705,000</td>
<td>$7,150,000</td>
<td>$1,370,000</td>
</tr>
</tbody>
</table>
Chapter 6: Evaluating Transportation Investments

Due to limited public funding available for roadway and bicycle and pedestrian projects, and for transit service, MPOs must objectively evaluate which projects best meet regional transportation goals, provide the greatest benefit, and are most cost effective.

This chapter addresses how the HRMPO evaluates regional transportation investments using the following tools and methodologies:

6 — 1 Goals and Objectives
6 — 2 Travel Demand Model
6 — 3 Project Evaluation Methodology

6 — 1 Goals and Objectives

Goals and objectives are essential components of the long range planning process used to guide the development of projects in the transportation area. The 2040 LRTP goals provide a basis for evaluating transportation plan alternatives by reflecting the intentions that the Plan is meant to achieve. The objectives provide additional specificity and focus for each associated goals. Combined they provide the policy framework for development and implementation of the 2040 LRTP.

Background

Goals and objectives should be consistent with relevant federal, state, and local plans and legislation. With passage of the MAP-21, the eight factors listed in Table 10, must be considered when a Metropolitan Planning Organization (MPO) develops the LRTP. The guidelines for MPOs were followed to provide a strong framework for transportation decisions.

Methodology

The goals and objectives were developed based on a review of relevant planning documents, including the Comprehensive Plans of the HRMPO jurisdictions and the Statewide Transportation Plan referred to as VTRANS 2040. Table 10 displays how LRTP policies and Transportation Improvement Program (TIP) evaluation criteria are related.
### Table 10 Applying the MAP-21 Planning Factors

<table>
<thead>
<tr>
<th>Federal Planning Factor</th>
<th>Federal Performance-Based Planning Goal Area</th>
<th>LRTP Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Emphasize the preservation of the existing transportation system</td>
<td>• Infrastructure Condition</td>
<td>• Optimize existing infrastructure for the safe and efficient movement of people and goods</td>
</tr>
<tr>
<td>• Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency</td>
<td>• Freight Movement</td>
<td>• Connect the land use and transportation decision-making processes</td>
</tr>
<tr>
<td>• Enhance travel and tourism</td>
<td>• Economic Vitality</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase the safety of the transportation system for motorized and non-motorized users</td>
<td>• Safety</td>
<td>• Improve the safety and security of the transportation system for all users</td>
</tr>
<tr>
<td>• Increase the security of the transportation system for motorized and non-motorized users</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Promote efficient system management and operation</td>
<td>• Congestion Reduction</td>
<td>• Optimize existing infrastructure for the safe and efficient movement of people and goods</td>
</tr>
<tr>
<td></td>
<td>• Reduced Project Delivery Delays</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• System Reliability</td>
<td></td>
</tr>
<tr>
<td>• Protect and enhance the environment, promote energy conservation, improve the quality of life, promote consistency between transportation improvements and State and local planned growth and economic development patterns</td>
<td>• Environmental Sustainability</td>
<td>• Enhance the quality of life of all residents</td>
</tr>
<tr>
<td>• Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation</td>
<td></td>
<td>• Connect the land use and transportation decision-making processes</td>
</tr>
</tbody>
</table>
• Increase the accessibility and mobility of people and for freight
• Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight

| Freight Movement and Economic Vitality |
| Make strategic investments to provide connectivity and accessibility throughout the HRMPO area |
| Increase mobility options through expansion of transit service and bicycle and pedestrian facilities |

**Consistency with Other Planning Documents**

In addition to the MAP-21, the Goals and Objectives should also be consistent with other state and local plans, such as local comprehensive plans and regional policy plans. In this way, the Goals and Objectives of the 2040 Long Range Transportation Plan support the planning efforts of local governments and agencies.

With input from the Working Group on where population and job growth are likely to take place in the next 25 years, staff and consultants calibrated the travel demand model to reflect the same land use assumptions the member jurisdictions use in their own Comprehensive Plans. MPO member jurisdictions also use the travel demand model to test their own future transportation and land use scenarios, ensuring consistency between the regional and local long range planning documents.
Goals and Objectives

**GOAL 1.0:** Make strategic investments to provide connectivity and accessibility throughout the HRMPO area.

Objective 1.1 Update the 2040 Long Range Transportation Plan a minimum of every five years to evaluate and provide for future needed transportation system links within the HRMPO region.

Objective 1.2 Emphasize connectivity and accessibility in new construction projects, in the reconstruction of existing facilities, and in on-going maintenance activities.

Objective 1.3 Consider federal, state and local energy conservation programs, goals, and objectives that may be incorporated into the plan.

**GOAL 2.0** Improve the safety and security of the transportation system for all users.

Objective 2.1 Focus on high accident areas for transportation improvements.

Objective 2.2 Reduce transportation related accidents, injuries, and deaths.

**Goal 3.0** Optimize existing infrastructure for the safe and efficient movement of people and goods

Objective 3.1 Develop a cooperative program to maintain existing transportation facilities in the HRMPO area

Objective 3.2 Encourage all transportation engineering studies and designs to consider the life cycle costs of capital investments.

Objective 3.3 Mitigate existing and future roadway deficiencies, based on level of service standards through a continuous roadway or transportation system improvement program.

Objective 3.4 Maximize the use of existing transportation facilities through the use of Transportation System Management (TSM), Transportation Demand Management (TDM), and Access Management strategies.
GOAL 4.0  Increase mobility options through expansion of transit service and bicycle and pedestrian facilities.

Objective 4.1  Develop and annually review the Transit Development Plan (TDP) to provide for improvements to public transit and Paratransit, as needed.

Objective 4.2  Ensure that funding is established for bicycle and pedestrian improvements.

GOAL 5.0  Connect the land use and transportation decision-making processes.

Objective 5.1  Review and update the 2040 Long Range Transportation Plan in order to evaluate the impact of future land use elements or changes within local government comprehensive plans.

Objective 5.2  Consider the overall social, land use compatibility, economic, energy, and environmental effects of transportation decisions in the development of the 2040 Long Range Transportation Plan.

Objective 5.3  Encourage local governments to develop a Transportation Corridor Management Plan (Right-of-Way or Thoroughfare Plan Map) based on local government comprehensive land use plans and the 2040 Long Range Transportation Plan.

Objective 5.4  Identify intermodal roadway linkages between major travel destinations such as airports and population concentrations that are operating, or will operate, below acceptable minimum levels of service and develop transportation and land use strategies to overcome these conditions.

Objective 5.5  Encourage local, regional, and state coordination on land use planning to promote transportation-efficient growth patterns.

GOAL 6.0  Enhance the quality of life of all residents.

Objective 6.1  Landscape transportation rights-of-way with native and/or “low-impact” vegetation on shoulders and medians, in order to conserve water, reduce pesticide use, conserve energy, and reduce costs by minimizing maintenance requirements.

Objective 6.2  Recommend that each local government implement bicycle and pedestrian improvements in major activity centers, and for accessing schools, parks, and libraries.
MAP-21/FAST ACT and Performance Based Planning and Performance Measures

In times of scarce resources for funding transportation projects, every dollar counts. The HRMPO has developed a methodology to evaluate projects using an objective, data-driven process as an ongoing product of the annual Unified Planning Work Program (UPWP) to ensure that the region meets its transportation system needs over the next 25 years.

The project evaluation methodology is connected to recent federal rulemaking and state guidance related to performance management measures. The HRMPO is committed to ensuring that the methodology and a subsequent performance management program meets both federal and state guidance.

6 – 2 2040 Travel Demand Model

The project team ran two 2040 travel demand model scenarios to evaluate the congestion mitigation and mode share benefits of future projects. The Existing + Committed scenario, also referred to as the “No Build” scenario, is described in Chapter 4.

The second 2040 scenario includes the additional construction projects in the Constrained Long Range Plan (CLRP) for which funding has not yet been identified, but which the MPO and localities intend to fund in the coming 25 years. As described in Chapter 5, projected funding available between 2016 and 2040 is limited, with most projected funds committed to projects included in the Existing + Committed (No-Build) scenario. The set of remaining projects for which the MPO expects to obtain construction funding is small, and the projects themselves are modest in scope. Therefore, the 2040 CLRP travel demand model scenario shows only small improvements to system capacity and mode share.

Map 19 displays the 2040 CLRP scenario Volume to Capacity ratios for the peak hour. This map corresponds to Maps 16 and 17 in Chapter 4, which illustrate the same information for the 2015 scenario and 2040 Existing + Committed scenario.
Table 11 provides a comparison of the 2015, 2040 Existing + Committed, and 2040 CLRP scenarios.

### Table 11 Travel Demand Model Scenarios Summary Data

<table>
<thead>
<tr>
<th>Network Summary</th>
<th>Parameter</th>
<th>2015</th>
<th>2040 No Build</th>
<th>2040 CLRP</th>
<th>2015 to 2040 CLRP % Change</th>
<th>2040 No Build to CLRP % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>81,411</td>
<td>110,965</td>
<td>110,965</td>
<td>36.30%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>43,418</td>
<td>62,976</td>
<td>62,976</td>
<td>45.05%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Vehicle Miles Traveled (VMT)</td>
<td>2,030,941</td>
<td>2,505,330</td>
<td>2,504,135</td>
<td>23.36%</td>
<td>-0.05%</td>
<td></td>
</tr>
<tr>
<td>Vehicle Hours Traveled (VHT)</td>
<td>54,991</td>
<td>74,045</td>
<td>73,796</td>
<td>34.65%</td>
<td>-0.34%</td>
<td></td>
</tr>
<tr>
<td>VMT per Capita</td>
<td>24.9</td>
<td>22.6</td>
<td>22.6</td>
<td>-9.50%</td>
<td>-0.05%</td>
<td></td>
</tr>
<tr>
<td>VHT per Capita</td>
<td>0.675</td>
<td>0.667</td>
<td>0.665</td>
<td>-1.21%</td>
<td>-0.34%</td>
<td></td>
</tr>
</tbody>
</table>

### Mode Choice Summary

<table>
<thead>
<tr>
<th>2015</th>
<th>2040 No Build</th>
<th>2040 CLRP</th>
<th>2015 to 2040 CLRP % Change</th>
<th>2040 No Build to CLRP % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Occupancy Vehicle</td>
<td>48.9%</td>
<td>48.1%</td>
<td>48.1%</td>
<td>-0.8%</td>
</tr>
<tr>
<td>High Occupancy Vehicle</td>
<td>30.3%</td>
<td>31.6%</td>
<td>31.6%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Transit</td>
<td>7.3%</td>
<td>7.0%</td>
<td>7.0%</td>
<td>-0.3%</td>
</tr>
<tr>
<td>Walk/Bike</td>
<td>13.5%</td>
<td>13.3%</td>
<td>13.3%</td>
<td>-0.2%</td>
</tr>
</tbody>
</table>

Between 2015 and 2040 in the CLRP scenario, Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT) both increase significantly; however this is due in large part to the expected 36% increase in the MPO’s population. VMT per capita decreases slightly in both 2040 scenarios, while the VHT per capita increase is a modest 8%. This data suggests that if future growth and development takes place in the same areas of the MPO as projected, then the CLRP projects will do a reasonable job of mitigating congestion at a region-wide scale as compared to the no build scenario.
The predicted increase in walking and bicycling trips in both 2040 scenarios is a positive outcome for congestion mitigation and general public health and wellness. The increase is generally attributable to a more dense land use pattern in 2040, where trip origins and destinations are proximate enough that a person might choose to make a trip on foot or by bike, rather than driving a car. Conversely, the 5.9% decrease in the transit mode share is attributable to more trip origins and destinations being located in areas of the MPO without current transit service. The 2040 scenarios do not assume additional transit service beyond what is currently offered.

6 — 3 Project Evaluation Methodology

The future performance of the transportation network as a whole is an important first step in evaluating transportation investments, but it does not provide information on the performance if individual projects. Following adoption of the Plan in March, 2017, staff began development of a performance-based project evaluation methodology as a first step toward meeting the performance-based planning and programming requirements of MAP-21 and the FAST Act. The Working Group also emphasized the importance of evaluating projects using a methodology similar to that of the State’s SMART SCALE program in order to better understand how projects might score in SMART SCALE, which is now the main source of funding for transportation projects in the State.

Table 10 illustrates how the LRTP Goals align with the MAP-21 Planning Factors and Performance-Based Planning Goal areas. Table 12 below illustrates how the LRTP Goals, performance measures and metrics also align with SMART SCALE. Using the measures and metrics listed here, MPO and VDOT staff evaluated both uncommitted projects in the Constrained Long Range Plan (CLRP), and a select list of projects from the Vision (unfunded) project list based on direction from the Working Group about local priorities. These Vision List projects for scoring are listed in Appendix A. Appendix D provides a ranked list of projects with scores from the Vision List and uncommitted CLRP projects. Appendix E lists those projects not selected for scoring and removed from the Vision List. These projects could be considered for inclusion in the Vision List or CLRP in a future LRTP update.
<table>
<thead>
<tr>
<th>Scoring Category</th>
<th>HRMPO LRTP Goal</th>
<th>SMART SCALE Measure</th>
<th>Proposed HRMPO Project Performance Metric</th>
<th>Application of Metrics</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Congestion Mitigation (7.5%)</strong></td>
<td>Make strategic investments to provide connectivity and accessibility (Goal 1)</td>
<td>Decrease in person hours of delay (100%)</td>
<td>Reduction in vehicle hours traveled (VHT) per capita (100%)</td>
<td>Before and After project change in VHT/Capita in 2040 Travel Demand Model.</td>
<td>Does project reduce Vehicle Hours Traveled/ Capita?</td>
</tr>
<tr>
<td><strong>Safety (25%)</strong></td>
<td>Improve safety and security (Goal 2)</td>
<td>Equivalent property damage only (EPDO) of fatal and injury crashes expected to reduced (50%)</td>
<td>Equivalent property damage only (EPDO) of fatal and injury crashes expected to reduced (50%)</td>
<td>See Pg 49-52 in Smart Scale Technical Guide.</td>
<td>Does project reduce number of Fatal and injury crashes?</td>
</tr>
<tr>
<td><strong>Accessibility (25%)</strong></td>
<td>Increase mobility options, expansion of transit service and bike/ped (Goal 4)</td>
<td>Increase access to jobs (60%)</td>
<td>Change in average job accessibility per person (60%)</td>
<td>See Pg 63-65 in Smart Scale Round 3 Technical Guide.</td>
<td>Does the project improve access to jobs?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase access to jobs for disadvantaged populations (20%)</td>
<td>Change in average job accessibility per person for disadvantaged populations (20%)</td>
<td>See Pg 63-65 in Smart Scale Round 3 Technical Guide.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase access to multimodal travel choices (20%)</td>
<td>Project includes transit, bicycle and/or pedestrian improvements (20%)</td>
<td>See Pg 66-67 in Smart Scale Technical Guide. Using a modified Table 8.2. *Not scaling the measure by # of non-SOV peak users.</td>
<td>Does the project enhance or create new connections between modes?</td>
</tr>
<tr>
<td><strong>Economic Development (25%)</strong></td>
<td>Optimize existing infrastructure for the safe and efficient movement of people and goods (Goal 3)</td>
<td>Project support for Economic Development (70%)</td>
<td>Decay weighted job growth adjacent to project (70%)</td>
<td>Points are based on the distance decay weighted quantity of 2015-2040 job growth adjacent to the project. Growth areas were predicted by the localities for travel demand model.</td>
<td>Does the project support job growth areas?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intermodal Access and Efficiency/ Tons of goods impacted (30%)</td>
<td>Intermodal access and efficiency/tons of goods impacted (30%)</td>
<td>See Table 10.5 in Smart Scale Technical guide pg. 75</td>
<td>Does the project enhance freight movement, access, efficiency?</td>
</tr>
<tr>
<td><strong>Environment (10%)</strong></td>
<td>Enhance the quality of life of all residents (Goal 6)</td>
<td>Air Quality and Environmental Effect (50%)</td>
<td>Air quality and environmental effect (50%)</td>
<td>See Pg 68-69 in Smart Scale Technical Guide. Using Table 9.2. *Not scaling the measure by # of non-SOV peak users.</td>
<td>Does the project have the potential to improve air quality or reduce greenhouse gas emissions?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impact to Natural and Cultural Resources (50%)</td>
<td>Amount of potentially impacted natural and cultural resource acres by the total 1/4 mile buffer area in acres (50%)</td>
<td>See Pg 70-72 in Smart Scale Technical Guide. *Not scaling based on benefits in other categories as explained on page 72.</td>
<td>Does the project minimize impact on natural and cultural resources within a 1/4 mile boundary?</td>
</tr>
<tr>
<td><strong>Land Use (7.5%)</strong></td>
<td>Connect the land use and transportation decision-making processes. (Goal 5)</td>
<td>Support of transportation-efficient land development (100%)</td>
<td>Reduction in vehicle miles traveled (VMT) per capita (100%)</td>
<td>Before and After project change in VMT/Capita in 2040 Travel Demand Model.</td>
<td>Does project reduce Vehicle Miles Traveled/ Capita?</td>
</tr>
</tbody>
</table>
Chapter 7: Constrained Long Range Plan

The final requirement of the LRTP is a fiscally constrained list of projects called The Constrained Long Range Plan. The plan includes projects the MPO can finance over the life of the plan, and provides a realistic set of expectations for the general public. In the spirit of full compliance with Title VI, CLRP projects should neither unduly burden, nor underserve the region’s minority and underserved populations. Minority and underserved populations are identified in Chapter 3, Existing Conditions and Deficiencies.

This chapter addresses:

7 – 1 The Constrained Long Range Plan
7 – 2 Social Equity and Environmental Justice Benefits and Burdens Analysis
7 – 3 Environmental Mitigation Measures

7 – 1 Constrained Long Range Plan

The Constrained Long Range Plan (CLRP) considers a total of 101 projects. However, it is not possible to fund all 101 transportation projects over the next 25 years with anticipated revenues. Projects not included in the Constrained Long Range Plan are identified as Vision Projects. A complete list of these projects is included in Appendix A. To fully fund the universe of projects identified as priorities in the Long Range Transportation Plan, the MPO would need to receive $985 million between 2016 and 2040.

Highway

Of the 101 projects identified, four are fully funded in the current VDOT Six Year Improvement Program (SYIP). These projects represent $29.7 million in anticipated revenues. The additional projects in the CLRP reflect the additional $73.4 million that the MPO area expects to receive over the life of the Plan. The CLRP projects are listed in Table 12.

Bicycle and Pedestrian Projects

Bicycle and pedestrian facilities are included in all the corridor improvement and new location projects in the CLRP. Additional high-priority, on and off-road bicycle and pedestrian facilities (including trails and greenways) are listed in the HRMPO Bicycle and Pedestrian Plan, which the LRTP adopts by reference. The projected $2.5 million Transportation Alternatives Program funding identified in Chapter 5 would be used to fund these projects.

Transit Projects

Transit revenues are formula funds for capital and operating costs. The revenues are included in the Revenues Summary in Chapter 5. Transit capital purchases and operating costs are reflected in the TDP.
Table 13 2040 Constrained Long Range Plan

<table>
<thead>
<tr>
<th>PROJECT ID</th>
<th>JURISDICTION</th>
<th>PROJECT NAME</th>
<th>PROJECT DESCRIPTION</th>
<th>TYPE</th>
<th>2016 COST ESTIMATE</th>
<th>YOE ESTIMATE</th>
<th>PRIOR ALLOCATIONS</th>
<th>BALANCE TO FINANCE (CLRP COST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>--</td>
<td>MPO</td>
<td>Interstate 81 interchanges</td>
<td>Safety and operations improvements (not specified)</td>
<td>Interchange</td>
<td>$17,361,391</td>
<td></td>
<td>$ 17,361,391</td>
<td></td>
</tr>
<tr>
<td>127</td>
<td>Harrisonburg</td>
<td>Interstate 81 - Exit 245 Improvements</td>
<td>Realign northbound off ramp with signal at Forest Hill Rd</td>
<td>Interchange</td>
<td>$ 3,923,707</td>
<td>$</td>
<td>$ 3,923,707</td>
<td>$</td>
</tr>
<tr>
<td>120</td>
<td>Harrisonburg</td>
<td>Interstate 81 - Exit 247</td>
<td>Create a signalized ramp connection for the Rt. 33 eastbound on-ramp for I-81 northbound. Construct a spur from the I-81 northbound off-ramp to Rt. 33 eastbound at the new signal. Reconfigure Rt. 33 from new northbound ramp spur to Linda Lane to channelize Rt. 33 eastbound left turn traffic prior to the existing I-81 northbound off-ramp</td>
<td>Interchange</td>
<td>$ 6,708,150</td>
<td>$ 6,708,150</td>
<td>$ 6,708,150</td>
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</tr>
<tr>
<td>122</td>
<td>Harrisonburg</td>
<td>Interstate 81 - Exit 243 IMR</td>
<td>Conduct IMR to identify project to mitigate congestion</td>
<td>Interchange</td>
<td>$ 1,721,319</td>
<td>$ 1,721,319</td>
<td>$ 1,721,319</td>
<td></td>
</tr>
</tbody>
</table>

**Total Interstate Allocated (2040 Revenue Projection + Prior Allocations)**

<p>|                      |               |               |                     |               | $29,714,567 | $0            |                                 |</p>
<table>
<thead>
<tr>
<th>PROJECT ID</th>
<th>JURISDICTION</th>
<th>PROJECT NAME</th>
<th>PROJECT DESCRIPTION</th>
<th>TYPE</th>
<th>2016 COST ESTIMATE</th>
<th>YOE ESTIMATE</th>
<th>PRIOR ALLOCATIONS</th>
<th>BALANCE TO FINANCE (CLRP COST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Rockingham</td>
<td>Route 257 South Extension, Rt 257 to Rte 42, (Don Litten Parkway)</td>
<td>4 lanes from Rt 257 to Rte 42</td>
<td>New Location (PE Only)</td>
<td>$1,940,000</td>
<td>$1,940,000</td>
<td>$1,940,000</td>
<td>$1,940,000</td>
</tr>
<tr>
<td>7</td>
<td>Rockingham</td>
<td>South Main St, SCL to Rt 704</td>
<td>Widen to a 4-lane rural major arterial facility with center lane and bicycle lanes</td>
<td>Corridor</td>
<td>$18,296,217</td>
<td>$</td>
<td>$18,296,217</td>
<td>$</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$20,236,217</td>
<td>$18,296,217</td>
<td>$1,940,000</td>
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<tr>
<td>Total Primary Allocated (2040 Revenue Projection + Prior Allocations)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$20,236,217</td>
<td></td>
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<td>$0</td>
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<tr>
<td>Secondary System</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>128</td>
<td>Rockingham</td>
<td>Reservoir Street, Harrisonburg ECL to Stone Spring Road</td>
<td>Widen to 5-lane arterial with raised median and wide shoulders</td>
<td>Corridor</td>
<td>$5,048,960</td>
<td>$700,000</td>
<td>$4,348,960</td>
<td>$ 700,000</td>
</tr>
<tr>
<td>126</td>
<td>Rockingham</td>
<td>Peach Grove Avenue Extension</td>
<td>Construct new 4 lane roadway with wide shoulders between Ridgedale/Greendale Road and Stone Spring Road</td>
<td>New Location</td>
<td>$4,927,500</td>
<td>$7,250,000</td>
<td>$</td>
<td>$7,250,000</td>
</tr>
<tr>
<td>PROJECT ID</td>
<td>JURISDICTION</td>
<td>PROJECT NAME</td>
<td>PROJECT DESCRIPTION</td>
<td>TYPE</td>
<td>2016 COST ESTIMATE</td>
<td>YOE ESTIMATE</td>
<td>PRIOR ALLOCATIONS</td>
<td>BALANCE TO FINANCE (CLRP COST)</td>
</tr>
<tr>
<td>------------</td>
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<td>------</td>
<td>--------------------</td>
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<td>-------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>130B</td>
<td>Rockingham</td>
<td>Switchboard Rd, NCL to Mt. Clinton Pike</td>
<td>Realign to intersect with Fort Lynne R and rebuild 2 lane improved rural section to remove curves and add wide shoulders</td>
<td>Corridor (PE ONLY)</td>
<td>$2,438,670</td>
<td>$2,438,670</td>
<td>$ -</td>
<td>$2,438,670</td>
</tr>
<tr>
<td>35</td>
<td>Rockingham</td>
<td>Dinkel Ave Rt 257, from ECL Bridgewater to Rt. 11</td>
<td>Widen to 4-lane rural median arterial</td>
<td>Corridor (PE ONLY)</td>
<td>$3,042,000</td>
<td>$3,042,000</td>
<td>$ -</td>
<td>$3,042,000</td>
</tr>
<tr>
<td>82B</td>
<td>Rockingham</td>
<td>Mount Crawford Avenue (from 0.23 mi east of Main Street to Bridgewater Town Limits)</td>
<td>Upgrade to an urban 2-lane facility with sidewalk</td>
<td>Corridor (PE ONLY)</td>
<td>$1,400,000</td>
<td>$1,400,000</td>
<td>$ -</td>
<td>$1,400,000</td>
</tr>
<tr>
<td>N/A</td>
<td>MPO</td>
<td>Special Projects</td>
<td>Implement various, currently unidentified items to support LRTP goals</td>
<td>Various</td>
<td>$ -</td>
<td>$4,598,273</td>
<td>$ -</td>
<td>$4,598,273</td>
</tr>
</tbody>
</table>

Total Secondary Allocated (2040 Revenue Projection + Prior Allocations) | $23,777,903 | $0
<table>
<thead>
<tr>
<th>PROJECT ID</th>
<th>JURISDICTION</th>
<th>PROJECT NAME</th>
<th>PROJECT DESCRIPTION</th>
<th>TYPE</th>
<th>2016 COST ESTIMATE</th>
<th>YOE ESTIMATE</th>
<th>PRIOR ALLOCATIONS</th>
<th>BALANCE TO FINANCE (CLRP COST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>82A</td>
<td>Bridgewater</td>
<td>Mount Crawford Avenue (from 0.23 mile east of Main Street to Bridgewater Town Limits)</td>
<td>Upgrade to urban 2-lane with sidewalk from 0.03 mi east of 42 for 0.2 miles to the east</td>
<td>Corridor</td>
<td>$1,305,000</td>
<td>$1,650,000</td>
<td>$</td>
<td>$1,650,000</td>
</tr>
<tr>
<td>105</td>
<td>Harrisonburg</td>
<td>Martin Luther King Jr Way Extension (from East Market Street to Country Club Road)</td>
<td>Extend MLK Jr. Way from East Market Street into Country Club Road. Create new intersection with Country Club Road and Country Club Court. Add sidewalk and bike facilities to Cantrell Avenue and Country Club Road</td>
<td>New Location</td>
<td>$6,087,200</td>
<td>$7,716,800</td>
<td>$</td>
<td>$7,716,800</td>
</tr>
<tr>
<td>15</td>
<td>Harrisonburg</td>
<td>Stone Spring Road - Erickson Avenue (from 0.1 mile west of Route 42 to WCL)</td>
<td>Widen to four lanes with center turn lane, bicycle lanes and sidewalk</td>
<td>Corridor</td>
<td>$7,065,000</td>
<td>$8,957,000</td>
<td>$</td>
<td>$8,957,000</td>
</tr>
<tr>
<td>8</td>
<td>Harrisonburg</td>
<td>Chicago Avenue (Mount Clinton Pike to Gay Street)</td>
<td>Intersection improvements &amp; bicycle lanes</td>
<td>Corridor</td>
<td>$7,930,000</td>
<td>$4,300,000</td>
<td>$</td>
<td>$4,300,000</td>
</tr>
<tr>
<td>130</td>
<td>Harrisonburg</td>
<td>Switchboard Road West Market Street to NCL</td>
<td>Widen/reconstruct as 4-lane divided major arterial and add bicycle lanes</td>
<td>Corridor</td>
<td>$4,596,000</td>
<td>$6,150,000</td>
<td>$</td>
<td>$6,150,000</td>
</tr>
<tr>
<td>PROJECT ID</td>
<td>JURISDICTION</td>
<td>PROJECT NAME</td>
<td>PROJECT DESCRIPTION</td>
<td>TYPE</td>
<td>2016 COST ESTIMATE</td>
<td>YOE ESTIMATE</td>
<td>PRIOR ALLOCATIONS</td>
<td>BALANCE TO FINANCE (CLRP COST)</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td>115</td>
<td>Harrisonburg</td>
<td>Improvements to Martin Luther King Jr Way (from South Main Street to 1000’ east of South Main Street)</td>
<td>Improvements to South Main Street and Martin Luther King Jr Way including turn lanes, signal modifications and a shared use path. Includes construction of a dedicated right turn lane on South Main Street for MLK Jr. Way</td>
<td>Corridor</td>
<td>$ 3,174,933</td>
<td>-</td>
<td>$ 3,174,933</td>
<td>$ -</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>$ 30,158,133</td>
<td>$ 28,773,800</td>
<td>$ 3,174,933</td>
<td>$ 28,773,800</td>
</tr>
<tr>
<td>Total Urban Allocated (2040 Revenue Projection + Prior Allocations)</td>
<td>$ 31,948,733</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>$ 0</td>
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</table>

**Transportation Alternatives (TA)**

<table>
<thead>
<tr>
<th>N/A</th>
<th>MPO-wide</th>
<th>Transportation Alternatives Projects</th>
<th>Bike/Ped</th>
<th>$2,500,000</th>
<th>$150,000</th>
<th>$2,690,000</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

- Interstate System Total Allocated (2040 Revenue Projection + Prior Allocations) $29,714,567
- Primary System Total Allocated (2040 Revenue Projection + Prior Allocations) $20,236,217
- Secondary System Total Allocated (2040 Revenue Projection + Prior Allocations) $23,777,903
- Urban System Total Allocated (2040 Revenue Projection + Prior Allocations) $31,948,733
- Transportation Alternatives Total Allocated (2040 Revenue Projection + Prior Allocations) $2,690,000

**TOTAL Surface Transportation Funding Allocated (2040 Revenue Projection + Prior Allocations) $108,367,420**
7 – 2 Social Equity and Environmental Justice Benefits and Burdens Analysis

A benefits and burdens analysis is a tool in the long-range transportation planning process that provides information on the social equity or environmental justice of a transportation investment plan or program. The analysis, which is applied to data on protected populations or groups, examines the potential for positive or negative impact (benefits and burdens) that a given transportation investment program could have on certain persons, demographic groups, or geographic locations. The analysis can also address environmental justice concerns by identifying the potential for disproportionate impacts on the population or groups of concern.

Benefits are the positive impacts from transportation investment such as enhancements in transportation services, increases in public safety, congestion relief, increased economic vitality, etc. Burdens, on the other hand, are the adverse effects of investment such as pollution, displacement of persons or businesses, diminution of economic vitality, congestion, or the denial, delay, or reduction of receipt of benefits.

Currently, no standardized methodology, or set of criteria has been established for assessing the benefits and burdens of transportation investments. Rather, the FHWA/FTA certification review process seeks evidence that MPOs have established a thoughtful process for assessing the regional benefits and burdens of transportation system investments, with specific consideration as to how these effects are distributed among different demographic and socio-economic groups. This includes evidence that there is a data collection process, and that the analytical process seeks to assess the benefit and impact distributions of the investments included in the long-range transportation plan.

Comparison of Population Characteristics in the MPO Region

Data from the 2015 American Community Survey was used to compare and contrast Harrisonburg and Rockingham County with the Commonwealth of Virginia and the U.S. **Table 13** illustrates this comparison of five protected populations.
It is notable that both major jurisdictions in the MPO region have a lower percentage of minorities compared to the Commonwealth. For poverty, Rockingham County aligns with the state average, while Harrisonburg’s percentage of the population living below the poverty level is more than double the state average. The County also has a higher percentage of elderly persons than the Commonwealth or the U.S, while the higher education population cohorts in the City skew that population well below the averages. For populations with Limited English Proficiency (LEP), the City also has a significantly higher percentage in comparison to the Commonwealth due to its status as a refugee resettlement community.

Analysis Framework for Fiscally Constrained Projects
For this analysis, five populations of concern were analyzed and mapped for the HRMPO Region.

These include:

- Persons Living in Poverty
- Minority Populations
- Elderly Populations
- Limited English Proficiency
- Zero Car Households

2015 Census data for each population was mapped in a range with 6 brackets to illustrate where concentrations of these populations exist.

The next step in the process involved a geographic overlay of planned transportation projects, using the fiscally constrained project list for the region. The projects listed in Table 12 include a wide geographic distribution and variety of transportation investments, including: intersection improvements, interchange improvements and corridor-wide improvements.
While the specific designs or environmental and community impact analyses do not exist for these planned projects, the geographic locations and general characteristics of each project facilitates inferences and observations about the potential for positive and negative effects on each of the populations of concern. The results of this geographic distribution analysis are presented in **Maps 21-25**. The maps show the locations of the projects from the CLRP. Based on the geographic analysis, the CLRP projects are not expected to result in a disproportionate impact on any of the five populations of concern.
Map 23 HRMPO 2040 CLRPL Projects and Elderly

Data Source(s):
- Commonwealth of VA.
- US Census Bureau.
- City of Harrisonburg.
- Rockingham County.
- VDOT.
Map 25 HRMPO 2040 CLRP Projects and Zero Car Households

Percentage of Zero Car Households by Block Group

Regional Average = 6.91%

- 0.00% - 6.91%
- 6.92% - 15.00%
- 15.01% - 20.00%
- 20.01% - 25.00%
- 25.01% - 39.75%

- CLR Project
- CLRP Project
- HRMPO Boundary
- City Boundary
- Town Boundary

Map to be used for planning purposes only.
Data Source(s):
- Commonwealth of VA, USGS
- US Census Bureau, City of Harrisonburg, Rockingham County, VDOT
7 – 3 Environmental Mitigation Measures

Mitigation measures are required where the potential for adverse impacts may result with a transportation project. Mitigation measures can include limiting project scope, rehabilitating/restoring the affected environmental/cultural feature, or avoidance entirely.

The LRTP considered the proximity of proposed transportation projects to the presence of cultural and environmental resources throughout the UZA. During the preliminary planning stage of all projects, they are evaluated for the potential to impact private property, historic/archaeological resources, threatened and endangered species, farmland, public recreational facilities, jurisdictional waters, land use, contaminated sites, and noise levels as required by federal, state and local laws/regulations.

Programmatic mitigation measures include the following elements:

- **Historic/Archaeologic Resources**: mitigation for impacts is accomplished through avoidance or scientific excavation and documentation. Surveys, including deep testing and evaluations on a case-by-case basis are developed in consultation with key stakeholders.

- **Wetlands**: where unavoidable, consultation occurs with various resource agencies to develop replacement wetlands within the affected watershed. There are also wetland banking programs where projects commit funding to offset impacts.

- **Floodplains**: transportation projects must accommodate impacted floodplains through either avoidance, or designing highway elements (e.g., bridge/culvert openings, etc.) that allow water to flow without increasing the regulated floodplain level. Any adjustments to the floodplain level must conform to requirements set forth by the Army Corps of Engineers that may result in requiring adjustments to FEMA-regulated flood maps.

- **Threatened & Endangered (T&E) Species**: transportation projects must review and consider the presence of T&E species in consultation with the US Fish and Wildlife Service (FWS), Virginia Department of Game and Inland Fisheries (DGIF), and the Division of Natural Heritage (DNH) within the Virginia Department of Conservation and Recreation (DCR). Biological and habitat assessments must be conducted to determine if T&E species are present. The project must either avoid the impact or consider mitigation to include relocation of species, time of year restrictions for construction, etc.

- **Marine Resources**: when impacts to fish and aquatic resources cannot be avoided, transportation projects are required to protect resources by effectively managing storm water runoff, incorporating design features that minimize impacts to fisheries or minimize disruption to natural cycles such as not working within waters during periods of spawning activities.

- **Surface and Ground Water**: projects that impact waters are required to obtain all necessary regulatory approvals, permits, and licenses for each project. Where avoidance is not available, mitigation measures are required to be addressed through design and construction. VDOT requires
completion of the Natural Resources Due Diligence Checklist (Form EQ-555) early in the design process.

- **Noise:** federal regulations require that VDOT determine and analyze anticipated noise impacts and alternative noise abatement measures for those impacts for specific types of highway construction projects. Noise impact studies are conducted to consider options for reducing noise levels along proposed federally funded highway improvement projects. FHWA has set forth project types that require noise abatement studies, but typically, these are projects where a new highway is constructed on a new location, or an existing highway’s alignment is adjusted substantially either horizontally or vertically.

- **Air Quality:** the Clean Air Act requires that transportation projects not result in or contribute to violation of the National Ambient Air Quality Standards, or delay timely attainment of them. NEPA requires that each federally funded transportation project be evaluated for its potential impact on air quality in the immediate vicinity of the project, known as a “hot spot” analysis. Each applicable project must demonstrate that sensitive populations will not be exposed to pollutant concentrations above an applicable air quality standard.

- **Hazardous Materials:** due diligence must be performed to determine any “recognized environmental conditions” (REC’s) on properties that will be acquired for the transportation project. REC’s can indicate a continuing release, past release, or a material threat of a release of a hazardous substance into the soil, groundwater, or surface water. When REC’s are determined to be present, the project is responsible for coordinating with appropriate environmental agencies to determine what regulatory requirements must be met or followed ahead of or during construction.

- **Public Recreational Resources (Section 4(f) properties):** the Department of Transportation Act of 1966 included a special provision stipulating that the FHWA and state DOTs cannot approve the use of land from publicly owned parks, recreational areas, wildlife refuges or public/private historical sites unless there is no feasible and prudent alternative to the use of the land and the action includes all possible planning to minimize harm to the property resulting from the use.

- **Right of Way Acquisition:** mitigation measures for impacted property owners, including minority and low-income populations should be considered, which may include avoidance, minimizing project scope, compensation and/or relocation. The Uniform Act must be adhered to for all federally-funded transportation projects.

Depending on complexity, size, and potential impacts, transportation projects with federal funding must be evaluated to determine three “classes of action” to determine how compliance with NEPA is implemented and documented. These include:

- **Categorical Exclusions (CE’s),** which are issued for transportation project actions that do not individually or cumulatively have a significant impact on the environment.
- Environmental Assessments (EA), which are prepared for transportation project actions in which the environmental impact is not clearly understood or established. Should environmental analysis at the interagency review process result in a finding of no significant impact to the quality of the environment, a Finding of No Significant Impact (FONSI) is issued.
- Environmental Impact Statements (EIS), which are prepared for projects where it is known and evident that a transportation project action will have a significant impact to the environment.