



LCPC



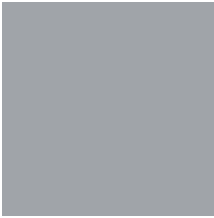
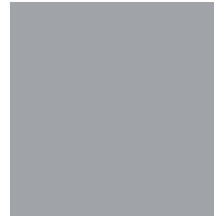
Cooper Carry



RRTA



LCPC



connects 2040

metropolitan transportation plan
for lancaster county, pa



Acknowledgements

Prepared by

Lancaster County Planning Commission
150 N. Queen Street, Suite 320
Lancaster, Pennsylvania 17603
(717) 299-8333
<https://lancastercountyplanning.org>

Lancaster County Board of Commissioners

Joshua G. Parsons
Chair

Ray D'Agostino
Vice-Chair

Craig E. Lehman

Funding for plan development was provided by the Pennsylvania Department of Transportation and the Federal Highway Administration.

Lancaster Transportation Technical Advisory Committee

Austin Beiler	Scott Haverstick	Representative Mike Sturla
Leida Cooper	Ralph Hutchison	Bill Swiernik
Jennifer Crobak	Terry Martin	Michelle Tarquino
Justin Evans	Cindy McCormick	Heather Valudes
Jeff Glisson	Meribeth Raves	Maureen Westcott
Kate Gonick	Lisa Riggs	Alice Yoder

Metropolitan Transportation Plan Advisory Committee

The MTP Advisory Committee includes the Lancaster Transportation Technical Advisory Committee members and these community stakeholder representatives.

Matt Boyer	Thomas Rudzinski	Marshall Snively
Larry Cohen	Ron Schlegel	Matt Sternberg
Brian Miller		

Lancaster County Transportation Coordinating Committee

Senator Ryan Aument	Representative Mindy Fee	Constantine Mandros
Benjamin Bamford	Edward Fisher	Terry Martin
Stephen Campbell	Karl Graybill	Ray Marvin
Jessica Clark	Scott Haverstick	Marshall Snively
Faith Craig	Tom Jones	Mayor Danene Sorace
Jennifer Crobak	Gretchen Karr	Alice Yoder
Ray D'Agostino	Mike Keiser	Daniel Zimmerman
David Eberly	Dave Kilmer	

Lancaster County Planning Commission

connects2040 Project Team

Scott Standish
Executive Director

Robert Bini, AICP
Director for Transportation Planning

Lauri Ahlskog, AICP
Senior Transportation Planner

Kristiana Barr
Senior Transportation Planner

Gary Jones
Transportation Planner

Samuel McMinn
Transportation Planning Technician

Marie Quigg
Graphic Arts Specialist

intentionally blank

About connects2040

The Lancaster County Metropolitan Planning Organization (MPO) is the federally designated decision-making body for all transportation projects and programs that utilize federal funding. As a condition of receiving federal funds for transportation programs and projects, the MPO must adopt and maintain an up-to-date Metropolitan Transportation Plan (MTP), which means it must be reviewed and updated, as needed, every four years.

This document, *connects2040*, replaces the MPO's previous plan, which was adopted in 2016. The 2040 plan satisfies the federal requirements for metropolitan transportation plans, but differs from the prior plan in two key ways:

- Strategies recommended by the plan are closely integrated with land use concepts and planning tools in *places 2040: thinking beyond boundaries*, Lancaster County's comprehensive plan; and
- Public, municipal, and stakeholder outreach was aimed at enhancing collaboration in plan development and implementation, consistent with PennDOT's [PennDOT Connects](#) program.

connects2040 outreach gauged the public's opinions on eight broad policy areas that could be the focus of the plan's goals and strategies. These eight areas were:

- Safety;
- Reliable Travel;
- Transportation Choices;
- Environmental Protection;

- System Maintenance;
- Critical Connections;
- Performance Goals; and
- Quality of Service.

Numerous factors were weighed in developing the plan's recommended strategies and implementation steps. Among these were:

- Public and municipal feedback;
- Consistency with federal requirements, including performance management goals and targets;
- System condition data and information;
- Transportation needs to support implementation of *places 2040: thinking beyond boundaries*; and
- Available funding.

This information and the resulting *connects2040* MTP are explored in the following pages.

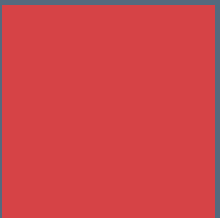
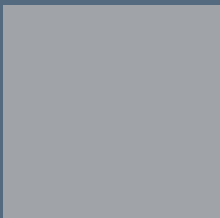
Lancaster County Planning Commission (LCPC) staff led the development of the MTP in coordination with the Federal Highway Administration (FHWA) Pennsylvania Division, PennDOT Central Office, and PennDOT Engineering District 8-0 under the guidance and direction of the MTP Advisory Committee.

The Lancaster MPO expects to adopt the MTP at its June 22, 2020, meeting.

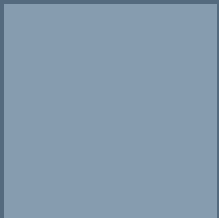
Table of Contents

Acknowledgements.....	2
About <i>connects2040</i>	5
TRENDS AND ISSUES	8
Socio-Economics	9
Roadway Network	14
Functional Classification	16
Roadway Condition	18
Roadway Safety	20
State-Owned Bridges	22
Local Bridges	24
Public Transit.....	26
Rail Freight	28
Active Transportation.....	30
Aviation	32
Goods Movement.....	34
System Management & Operations	36
Resiliency.....	38
PUBLIC PARTICIPATION	40
Public Survey	41
PERFORMANCE MEASURES	44
PM-1: Safety Measures.....	45
PM-2: System Condition Measures.....	46
PM-3: System Performance Measures	47
REVENUE FORECAST	48
Projected Funding	49

TECHNICAL FOCUS AREAS	52
Introduction	53
Evaluating Low-Cost Operational Strategies	54
Understanding our Travel Connections	64
Exploring the Impact of Land Use on Our Transportation System	80
 STRATEGIC DIRECTIONS	 90
Introduction	91
Safety	92
Reliable Travel	94
System Maintenance	96
Transportation Choices	98
Environmental Protection and Mitigation	102
Critical Connections	104
Quality of Service	106
Performance Goals	108
Plan Implementation in Action	109
 APPENDICES	 112
Appendix A: Project Listing	113
Appendix B: 2021 Transit TIP	130
Appendix C: Air Quality Conformity Analysis	143
Appendix D: Environmental Justice Analysis	198
Appendix E: System Performance Reports	216
Appendix F: Community Health Overview	232
Appendix G: Survey Results and Public Comments	238
Appendix H: Environmental Resource Stakeholders Meeting Summaries	263
Appendix I: Stakeholder Focus Group Summary	280
Appendix J: References and Resources	284



LCPC



LCPC



LNP/Dan Marschka

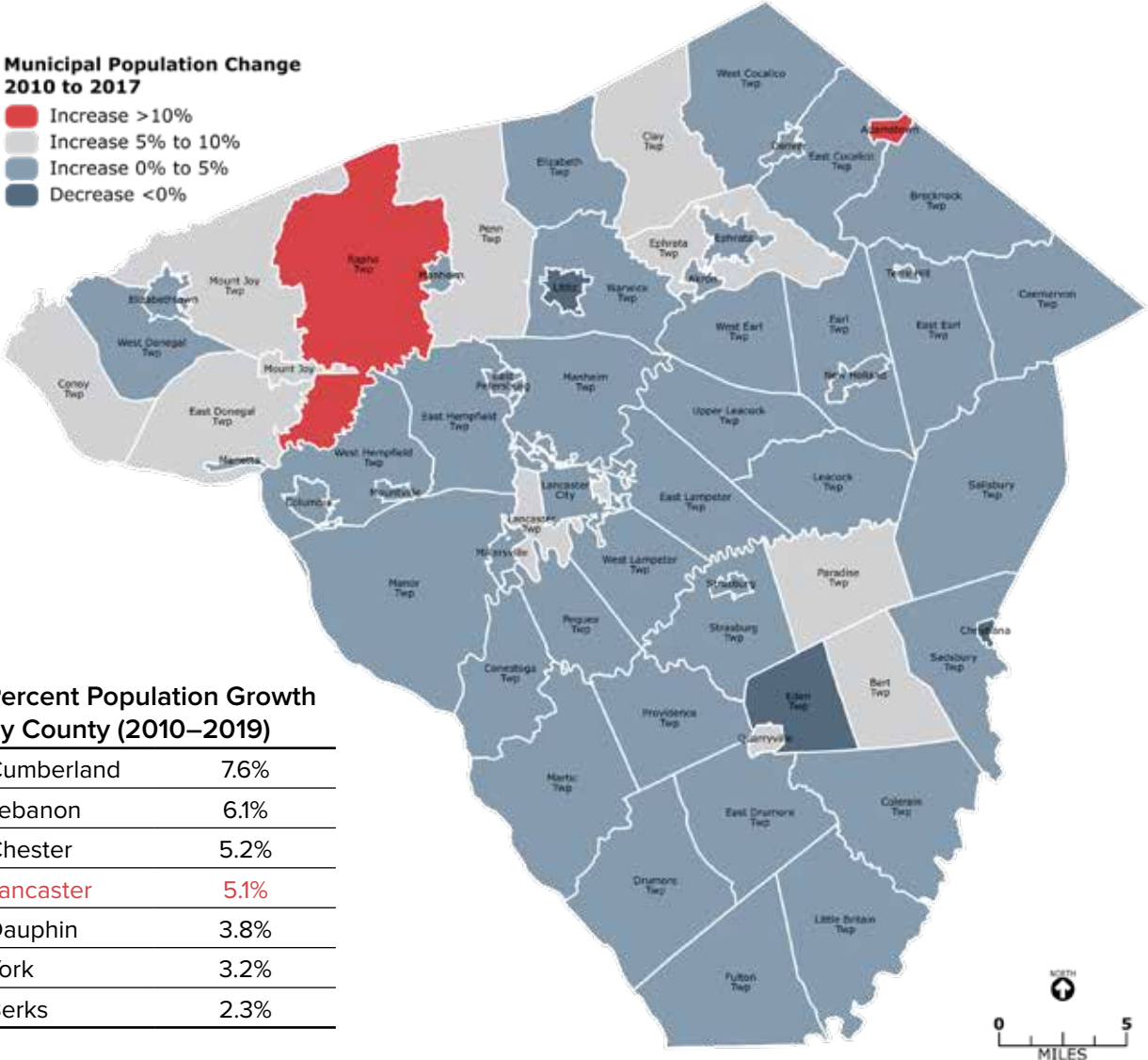
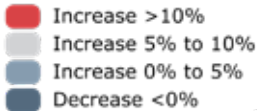
TRENDS AND ISSUES

Socio-Economics

Our Growing Population and Workforce

- Lancaster County’s population is 545,724.¹ The county has added 65,000 people since 2000. The growth rate has slowed from just over 10 percent from 2000 to 2010 to just over 3 percent during the 2010s. Our population is also diversifying, with a growing number of people of Hispanic, Asian, and other backgrounds.
- Almost all of our communities are growing. Since 2010, all but three of Lancaster County’s 60 municipalities have registered increases in estimated total population. The accompanying map depicts population growth rates.
- When compared to surrounding counties, Lancaster County’s 5.1 percent population growth from 2010 to 2019 is lower than Cumberland and Lebanon counties. Chester County experienced similar growth to Lancaster, at 5.2 percent.
- Lancaster County is expected to add 114,000 residents by 2040.
- By 2040, more than one in five residents will be over the age of 65, an estimated 164,000 persons.
- According to Elizabethtown College researchers, Lancaster County has the largest settlement of the Plain Sect population in the United States, exceeding 38,000 in 2019.² This number continues to grow and includes all populations that travel primarily by horse-and-buggy.

Municipal Population Change 2010 to 2017

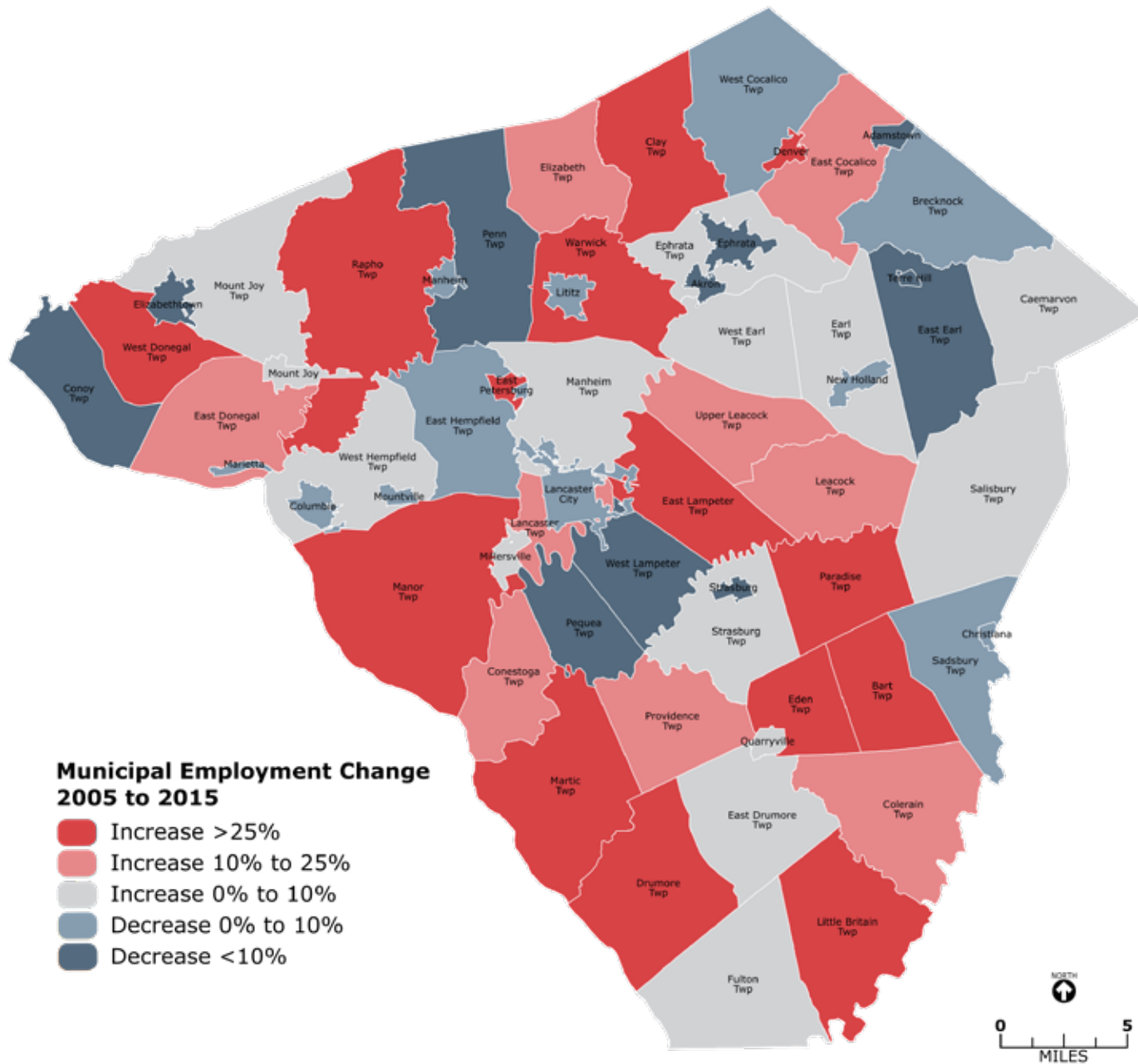


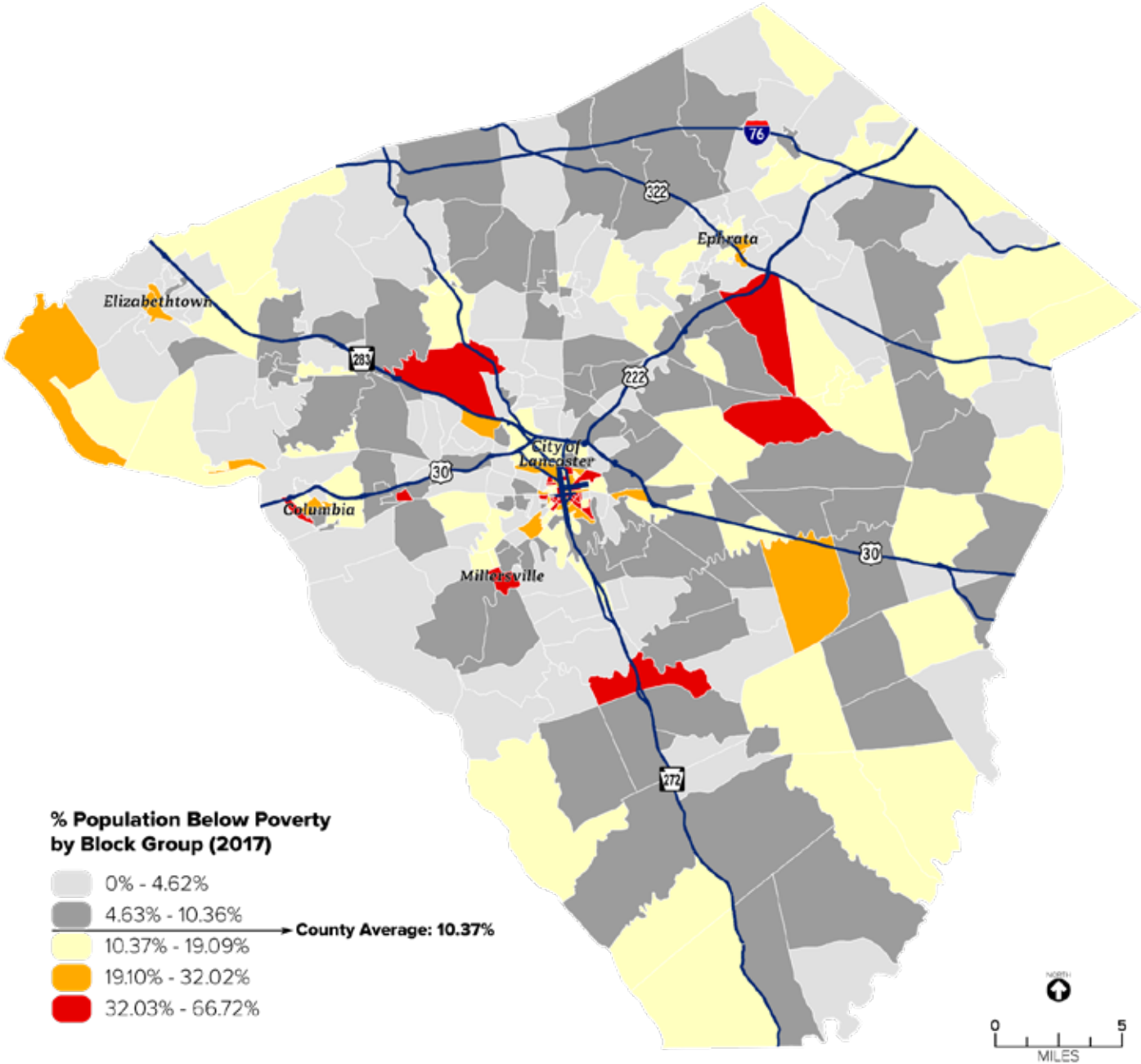
Percent Population Growth by County (2010–2019)

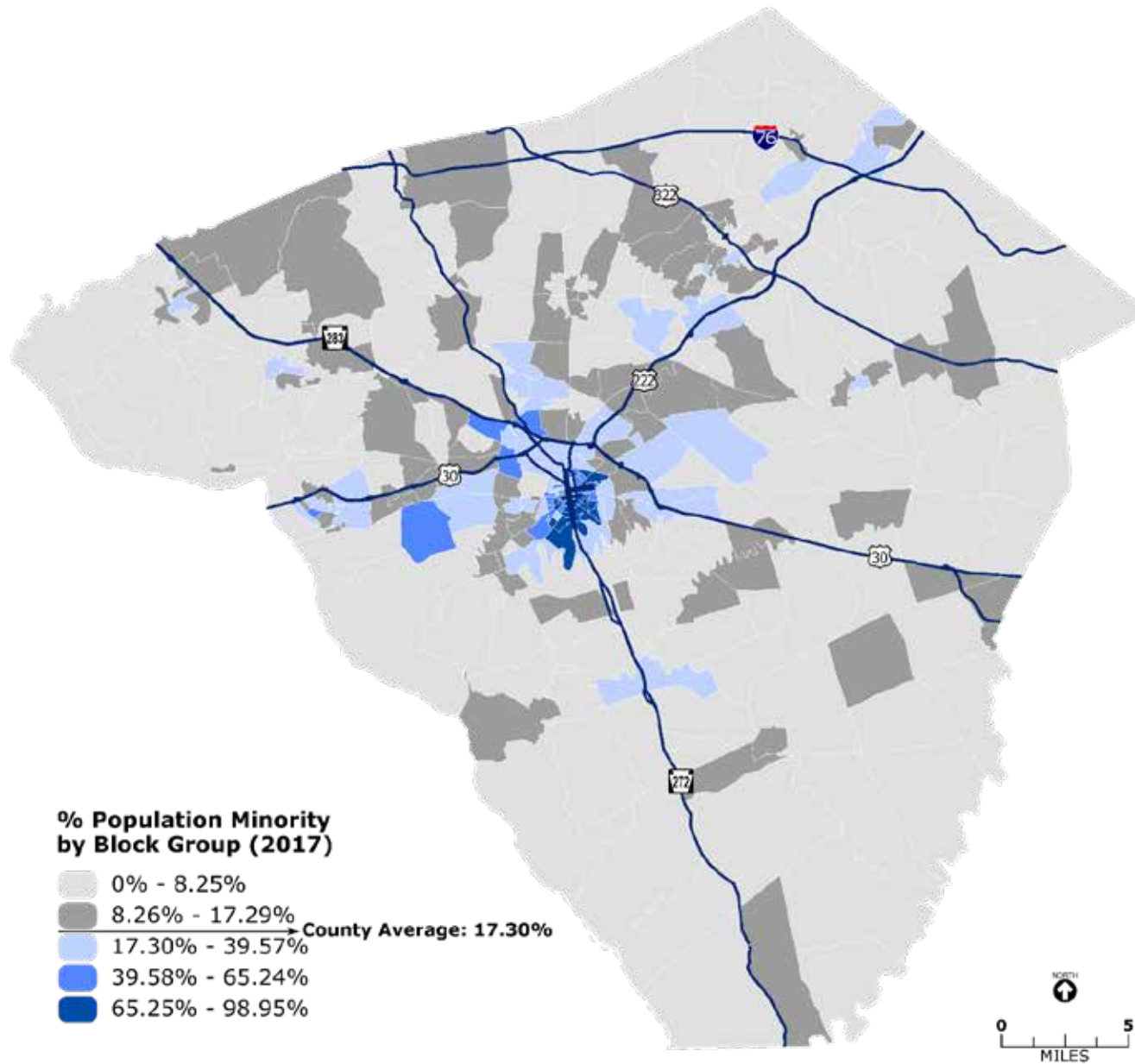
Cumberland	7.6%
Lebanon	6.1%
Chester	5.2%
Lancaster	5.1%
Dauphin	3.8%
York	3.2%
Berks	2.3%



¹ July 2019 estimate
² “Twelve Largest Amish Settlements, 2019.” Young Center for Anabaptist and Pietist Studies, Elizabethtown College. <http://groups.etown.edu/amishstudies/statistics/twelve-largest-settlements-2019/>









LCPC



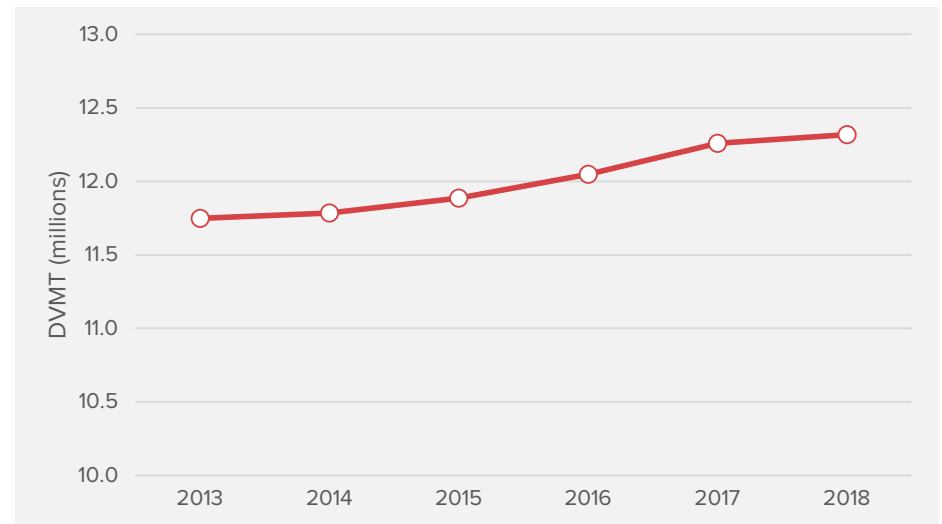
RRTA

What do these socio-economic trends mean for transportation planning?

- As one of the fastest growing counties in the state, Lancaster County will see increased demand on its transportation system as residents, commuters, and visitors travel in and out of the county. This increase in the county's traveling public emphasizes the need to maintain its transportation infrastructure in a state of good repair to support growth over time.
- As Lancaster and surrounding counties continue to grow, there will be additional demands on the transportation system. A growing population will require more transportation capacity and services, with a growing consumer market generating a greater demand for travel and trip-making in general.
- An increase in senior citizens translates to a need for more public transportation services, and a highway system that is more predictable to use, with greater reflectivity, maintenance and protection of traffic in work zones, and improved signage, among other considerations.
- Identification of Environmental Justice (EJ) populations will enable the MPO to use that data to inform its investment strategies and project selection, even as it evaluates the benefits and burdens of its proposed programs on these population groups.
- The travel needs and safety of Plain Sect populations continue to be an important consideration of the MPO throughout the transportation planning process.

Roadway Network

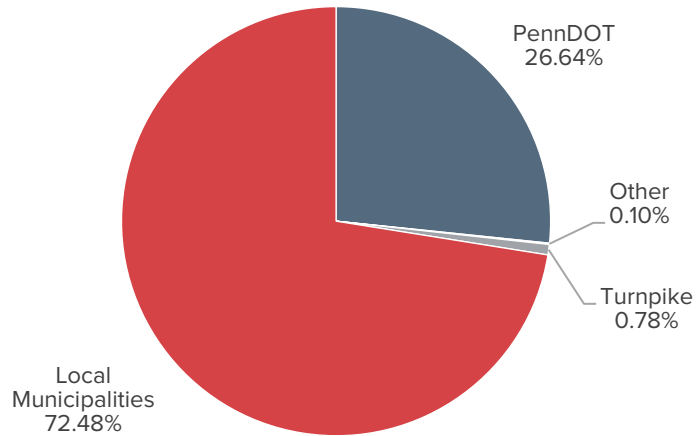
Travel on our county’s roadways has steadily increased, averaging 12.3 million miles—daily.



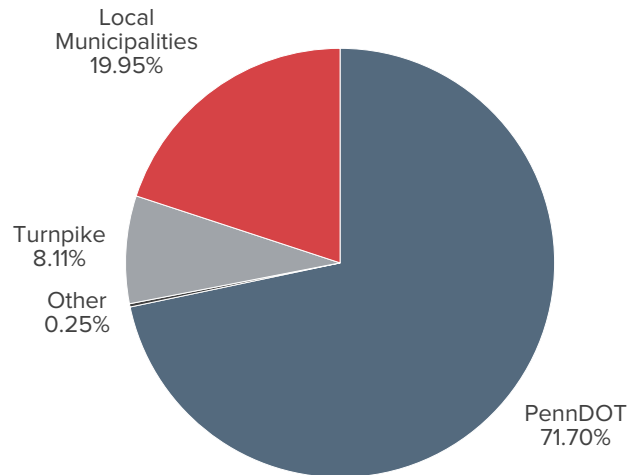
Daily Vehicle Miles of Travel (DVMT), 2013–2018

Overview

- Lancaster County has Pennsylvania’s second-largest roadway network, with more than 3,908 linear miles of roadway. Approximately one quarter of this network is owned and maintained by PennDOT, while three-quarters is owned by local government.
- Consistent with a growing population, total travel demand on the county’s roadways has steadily increased over the past five years, averaging 12.3 million miles, daily.
- Only 907 linear miles of the county’s roadways are on the Federal-Aid System. Of this network, nearly 197 linear miles of roadway are locally owned.
- Lancaster County’s roadway network includes nearly 31 linear miles of the Pennsylvania Turnpike, the county’s only Interstate.
- The National Highway System (NHS) includes Interstate 76, as well as US 30, US 222, US 322, PA 41, PA 72, PA 272, and PA 283. The NHS in Lancaster County comprises only 4.7 percent of the network, but accommodates 44 percent of all travel, attesting to its importance for mobility.
- In February 2019, FHWA certified portions of US 222 as a Critical Rural Freight Corridor (CRFC), making the roadway eligible for National Highway Freight Program (NHFP) funding. This allows the MPO to prioritize and program these dollars toward highway projects that will improve freight movement and efficiency through the corridor.



Linear Miles of Roadway by Owner, 2018



Travel Demand on Roadways by Owner, 2018

Just over a quarter of Lancaster County roadways are PennDOT-owned, but those major routes handle nearly three-quarters of all traffic.

What do these roadway network trends mean for transportation planning?

- In a growing county such as Lancaster, roadways serve as the backbone of the county’s transportation system.
- The passage of the FAST Act in December 2015 put an increased emphasis on the National Highway Performance Program (NHPP). Of the county’s 3,908-mile network, only 184 miles are eligible for NHPP funding. These include the county’s roadways functionally classified as principal arterials (i.e., PA 283, US 30, US 222, PA 272).
- The FAST Act also placed an increased emphasis on freight planning. The designation and certification of CRFCs gives Lancaster County an important starting point in planning for priority freight networks. The CRFCs link the county’s major shippers and receivers to national freight networks and, by extension, the global economy. They are the most vital roadways supporting the movement of freight.

Functional Classification

Lancaster County Roadways by Functional Class

Functional Classification	Linear Miles	Percentage of Network	FHWA-Recommended Urban System*
Principal Arterial: Interstate	30.6	0.8%	1–2%
Principal Arterial: Other Freeways and Expressways	20.0	0.5%	0–2%
Principal Arterial: Other Principal Arterial	99.7	2.6%	2–5%
Minor Arterial	291.2	7.5%	3–7%
Major Collector	456.7	11.8%	7–13%
Minor Collector	234.3	6.1%	7–13%
Local Road: State-Owned	143.7	70.1%	67–76%
Local Road: Municipal-Owned	2,586.6		
Total	3,896.8		

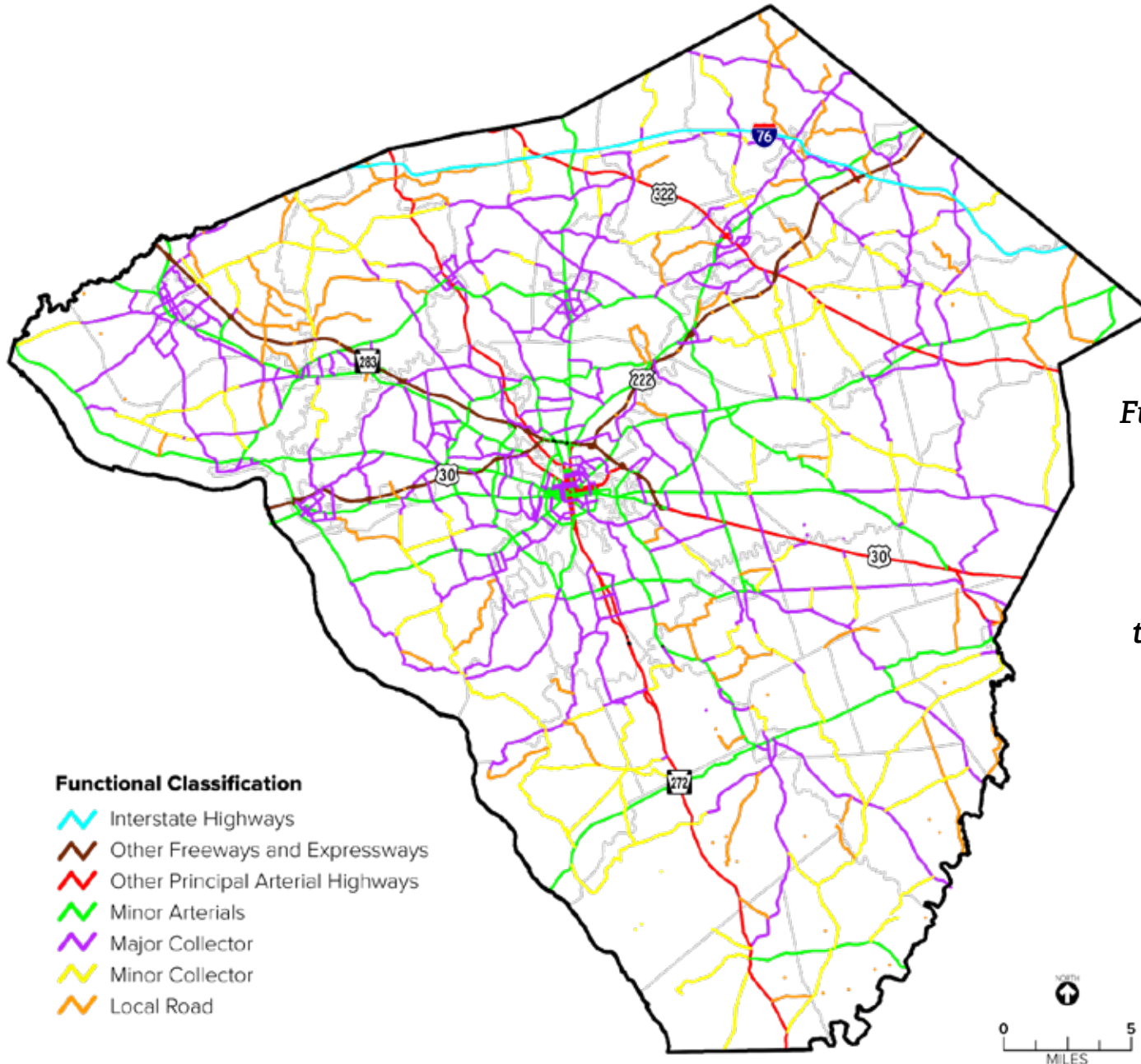
*FHWA developed a [Highway Functional Classification guidebook](#) (updated in September 2017) that established recommended ranges of mileage and VMT on the different functional classifications in urban and rural areas. The ranges above reflect recommendations for an urban system (areas with a population greater than 50,000 people).

Overview

- Lancaster County recently updated its functional classification and has worked with PennDOT for many years in maintaining its classification scheme.
- All roadways provide two functions, in varying proportions: mobility (moving through an area efficiently) and accessibility (connecting to driveways of residences and businesses). Interstates, for example, offer high mobility but low accessibility, whereas local streets primarily provide access.
- Functional class represents an important nexus between transportation planning and land use planning.

What do these functional classification facts mean for transportation planning?

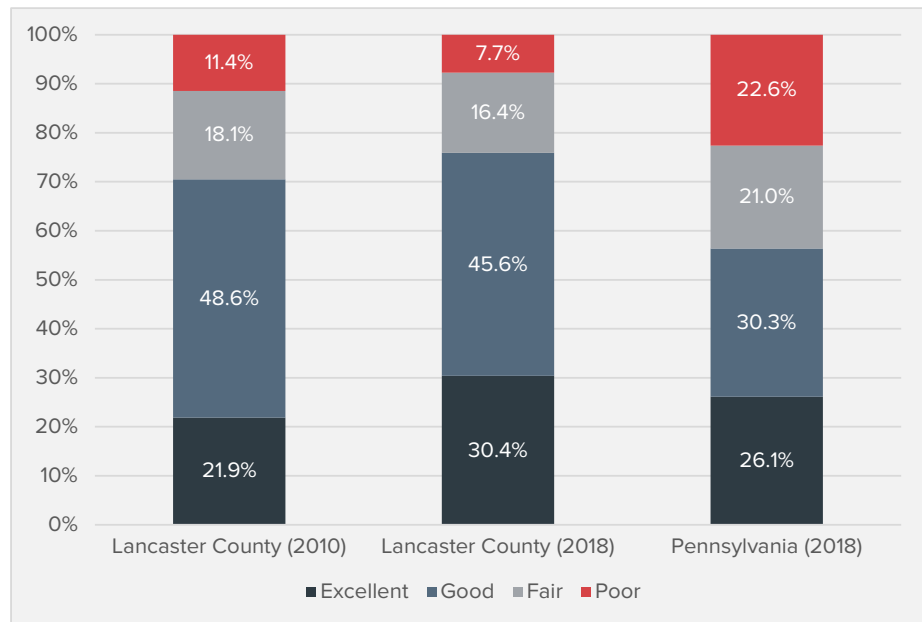
- Functional classification helps determine eligibility for many federal funding sources and supports greater potential for future funding. As such, maintaining functional class will be important for Lancaster County, particularly in light of increased federal emphasis on NHPP roadways.
- The county’s small share of NHPP-eligible roadways, including Interstates and principal arterials, underscores the importance of the MPO keeping its functional classification system up to date in order to leverage maximum funding potential.



Functional class indicates a roadway's primary purpose—the degree to which it moves travelers through an area quickly (as Interstates do) or provides access to driveways (as local streets do).

Roadway Condition

Our roadways are, overall, in better condition than they were in 2010—and they are significantly better on average than the state’s roadways as a whole.



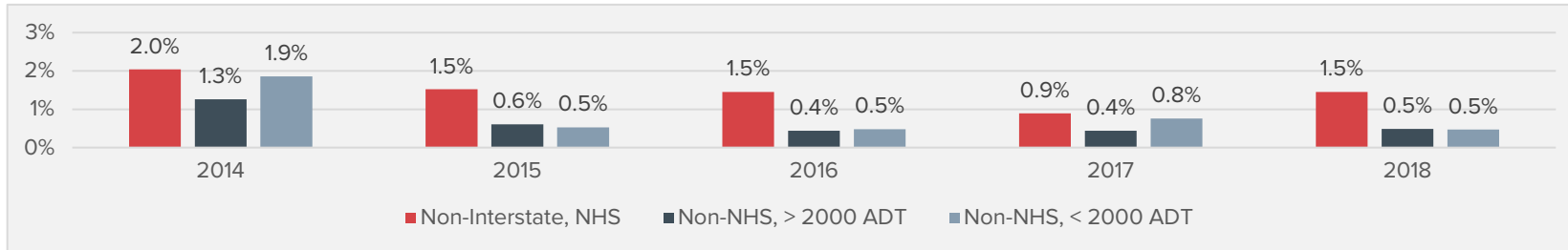
**Roadway Condition by IRI Rating
Lancaster County and Pennsylvania, 2010, 2018**

Overview

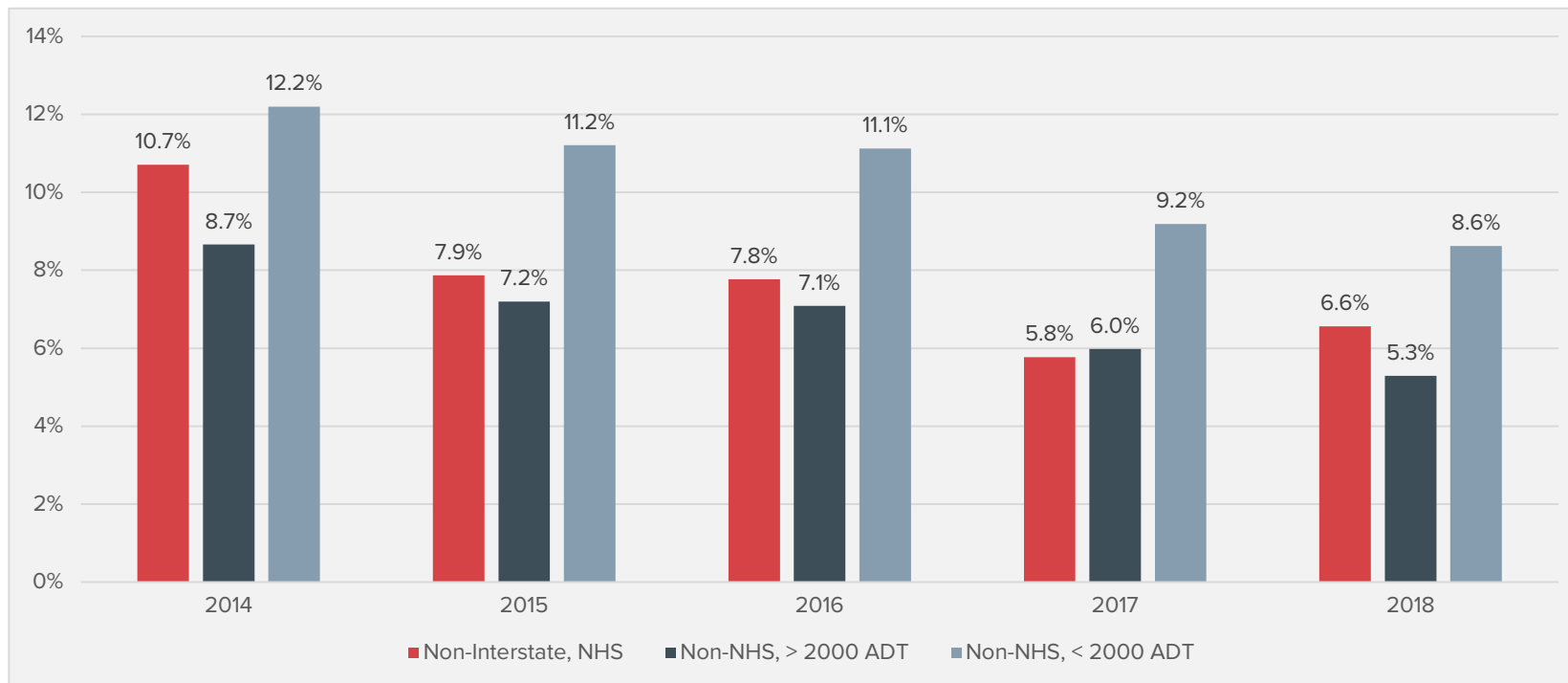
- PennDOT has organized the state’s roadways into Business Plan Networks, including 1) Interstates, 2) NHS, Non-Interstate, 3) Non-NHS, > 2,000 Average Daily Traffic (ADT), and 4) Non-NHS, < 2,000 ADT.
- OPI, or Overall Pavement Index, is a measure of a roadway’s pavement condition, while IRI (International Roughness Index) is a measure of the roughness of the pavement surface.
- Higher-order networks such as the non-Interstate NHS have the best pavement conditions among the business plan networks. NHS, non-Interstates in Lancaster County are currently rated as 1.45 percent poor in OPI, and 6.56 percent poor in IRI.
- When measured in IRI ratings, Lancaster County exhibited a 40 percent increase in “excellent” pavement miles from 2010 to 2018. “Poor” condition pavement miles have decreased by 32 percent since 2010.

What do these roadway condition trends mean for transportation planning?

- When compared to Pennsylvania overall, pavement condition in Lancaster County compares favorably for the non-NHS networks; however, the county’s non-Interstate NHS pavement conditions compare similarly to statewide figures.
- These pavement condition trends indicate a greater need for roadway resurfacing for non-Interstate NHS routes. Between 2017 and 2018, there was a substantial increase in “poor” OPI, from 0.89 percent to 1.45 percent.
- Continued collaboration among Lancaster County, PennDOT, and local municipalities is vital in identifying roadways on the transportation network in need of resurfacing, reconstruction, or preservation activities.
- PennDOT and the Lancaster MPO are moving away from a “worst-first” approach toward addressing infrastructure condition in favor of a “lowest life-cycle cost” approach. This approach is federally mandated and puts greater emphasis on timely maintenance for system preservation. This lowest life-cycle cost approach will not only extend the life of Lancaster County’s bridges and pavements, it lowers the total annual cost of maintaining each asset and allows the effective allocation of financial resources. The MPO will need to continue coordinating with its partners at PennDOT on this new approach in the development of future Transportation Improvement Plans (TIP).

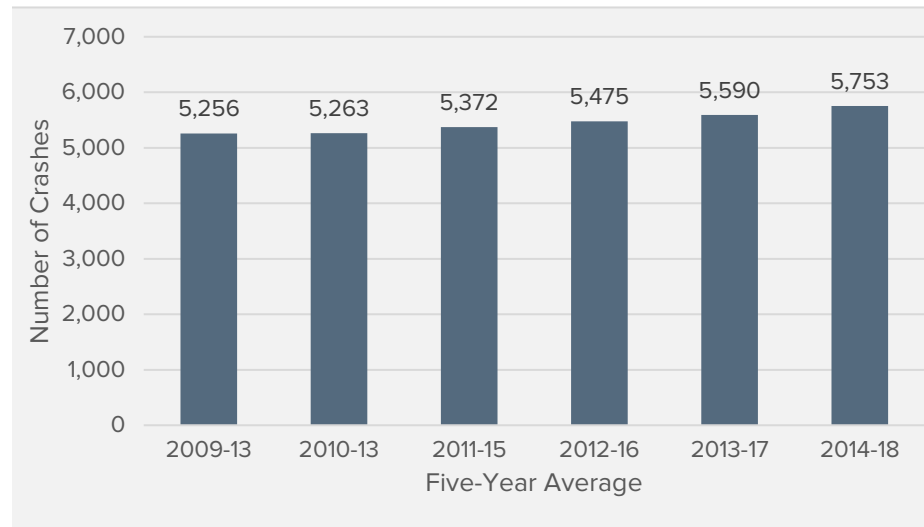


Lancaster County: Percentage "Poor" OPI by Business Plan Network, 2014–2018

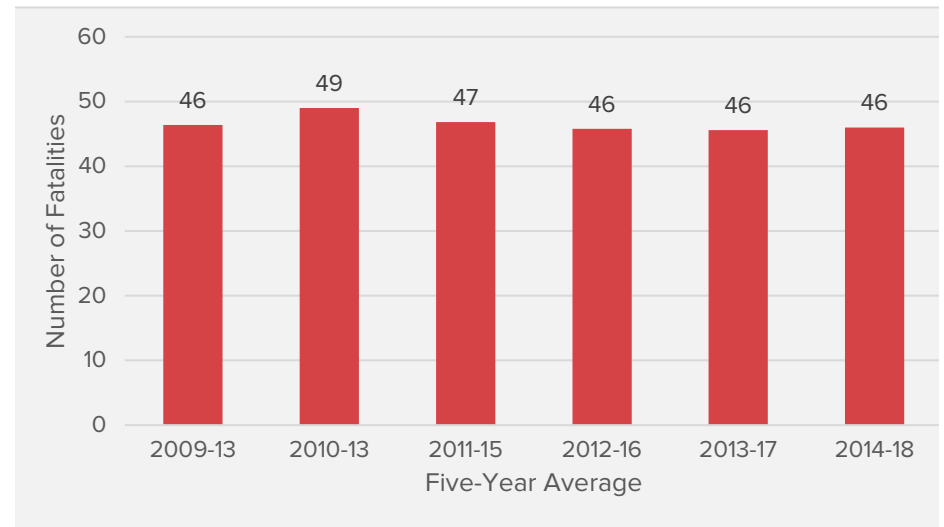


Pennsylvania: Percentage "Poor" OPI by Business Plan Network, 2014–2018

Roadway Safety



Total Lancaster County Vehicle Crashes by Five-Year Average, 2009–2018



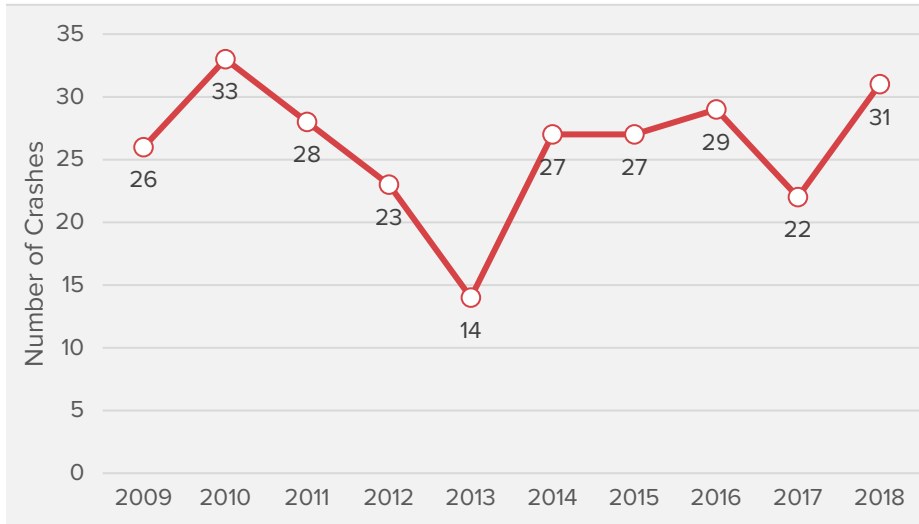
Total Lancaster County Crash Fatalities by Five-Year Average, 2009–2018

Overview

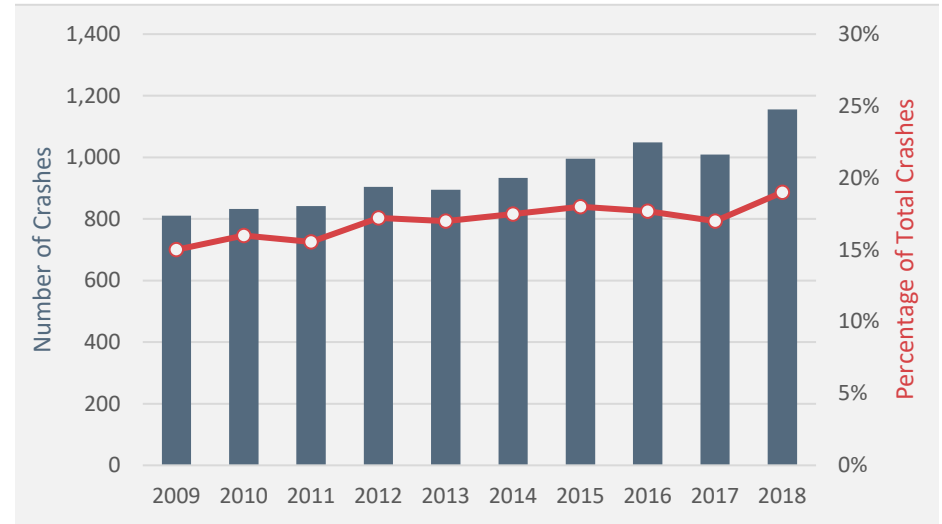
- Safety is a top priority of both Lancaster County and PennDOT. The Department has a goal to reduce average fatalities and serious injuries in support of the national effort to end fatalities on our roadways within the next 30 years.³
- For the five-year period ending 2018, the county has averaged nearly 5,800 crashes a year, and 46 fatalities. The total number of crashes has been increasing, while the number of fatalities has remained fairly steady since 2009.

- Incidents involving motorized vehicles and horse-and-buggy travelers have been on the rise since 2013, reaching a high of 31 crashes in 2018. Many of these crashes are angle or rear-end crashes.
- The total number of crashes among drivers age 65 or over has been steadily increasing in Lancaster County. Age is now a factor in nearly 20 percent of all crashes within the county.
- Lancaster County averaged 62 bicycle-involved crashes and one bicyclist fatality per year over the last decade. The county also averaged 132 pedestrian-involved crashes and six pedestrian fatalities. Both bicyclist and pedestrian fatalities have been increasing in the county. While the total number of bicycle-involved crashes has been decreasing, pedestrian-involved crashes have been on the rise.

³ The National Highway Traffic Safety Administration is committed to eliminating traffic deaths within 30 years.



Lancaster County Horse-and-Buggy Crashes, 2009–2018



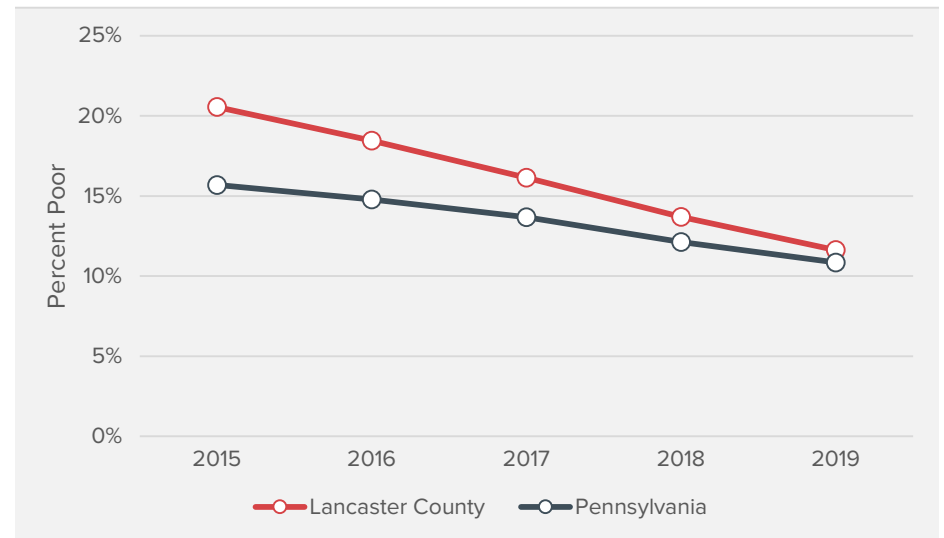
Total and Percentage of Crashes Involving a Senior Driver (Age 65+), 2009–2018

What do these safety trends mean for transportation planning?

- Fully attaining state and national goals related to safety will rely on the implementation of autonomous vehicle technology, which is anticipated to be implemented in the mid- to late-2020s—well within the planning time horizon of the MTP. As connected and autonomous vehicle technologies are implemented, fatality reduction goals will increase.
- Improved safety performance will also require improvements in highway design, driver behavior, and enforcement.
- Pennsylvania adopted an anti-texting law in 2012; younger drivers are the most likely to be distracted at the time of a fatal crash. Many additional strategies need to be implemented to reduce roadway-related fatalities and injuries, including engineering countermeasures, public information programs, and increased enforcement.
- Improvements in highway safety depend on the efforts of many organizations and individuals. **Efforts to address safety for older drivers must remain, given the county’s increasing population of senior citizens.**
- Conflicts between motorized vehicles and buggies remain a serious concern in Lancaster County and the focus of increased safety efforts. Improvements such as increased shoulder widths on primary Plain Sect routes would create safer distances between these modes.
- The Lancaster County Active Transportation Plan (ATP) maintains an implementation goal of improving safety for bicycle and pedestrian modes through education, awareness, and enforcement. The MTP’s goals align with this effort and support the ATP’s implementation.

State-Owned Bridges

Bridge condition has been improving, on average, with a decreasing percentage of bridges rated “poor.”



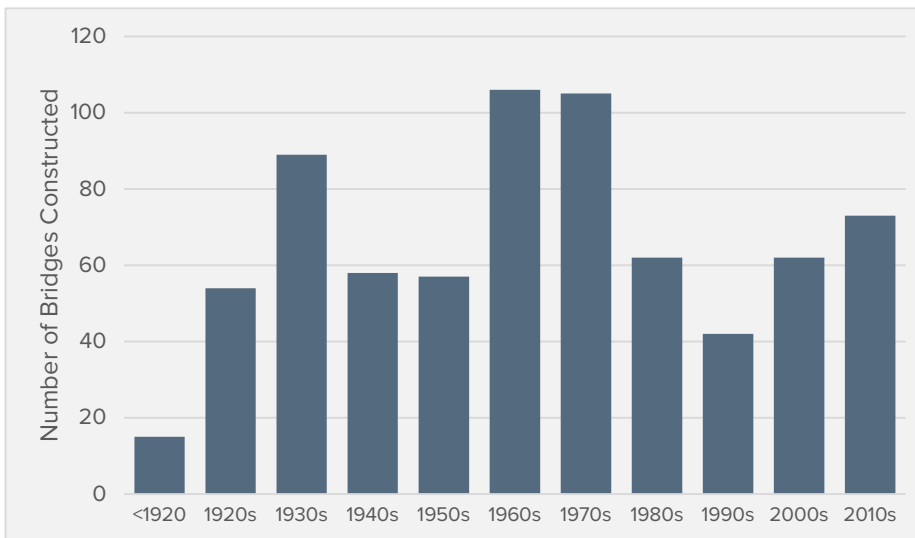
Percentage of State-Owned Bridges Rated “Poor,” Lancaster County and Pennsylvania, 2015–2019

Overview

- There are 723 state-owned bridges longer than 8 feet in Lancaster County.
- Of these structures, 81 (11.2 percent) are rated as being in “poor” condition. This compares to the state average of 10.4 percent “poor.”
- The more meaningful measure is the share of bridge deck area in “poor” condition. Within Lancaster County, this rate is 4.06 percent, compared to a state average of 6.6 percent.
- Twenty of these structures are weight-restricted (posted), while none are closed.
- The average age of a state-owned bridge in Pennsylvania is 55. Within Lancaster County, the average age is 66.
- Bridge construction activity has increased in recent years. There have been 73 new state bridges constructed within Lancaster County just since 2010—more than in any of the previous three decades. PennDOT’s \$889 million Rapid Bridge Replacement (RBR) project began in 2015 to replace 558 bridges across the state—greatly bolstering PennDOT’s efforts to address poor bridges.
- The percentage of poor condition state bridges continues to decrease, from a 2015 rate of 21 percent to 11 percent by 2020. This reduction reflects the successful work of Lancaster County and PennDOT to program state bridge projects.



Most bridges are expected to last 50 years. The majority of our state-owned structures are well beyond this “design life.”



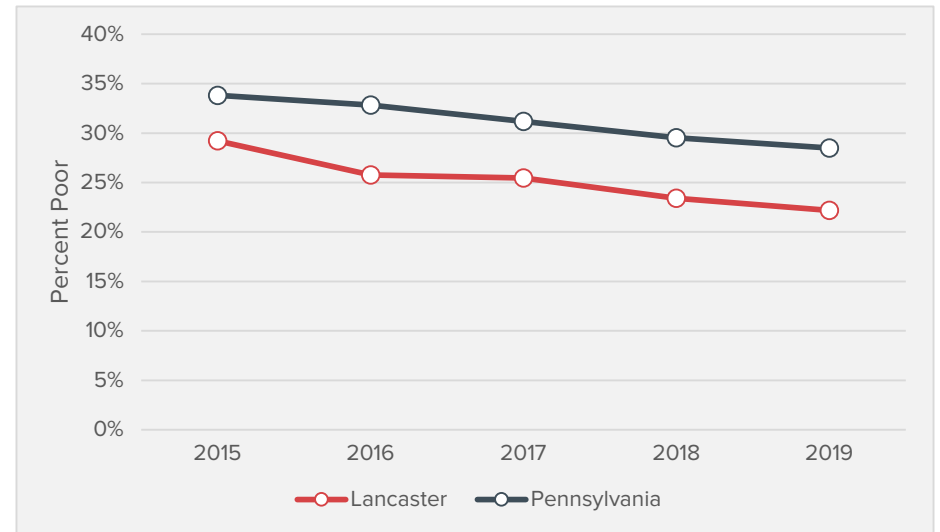
State-Owned Bridges by Decade Constructed, Lancaster County

What do these state bridge trends mean for transportation planning?

- As the county’s bridge inventory continues to age, Lancaster County will be faced with a greater stock of bridges that are maturing and will require increasing maintenance and rehabilitation attention. Nearly 30 percent of the county’s bridges were built in the 1950s and 1960s. Maintenance needs will accelerate as the bridges that were built during this era continue to age and deteriorate to the point where rehabilitation or replacement is required. The MPO and PennDOT will continue working together to maintain the county’s bridges in a state of good repair.
- Posted and closed bridges can negatively impact emergency response, goods movement, overall mobility, and commerce. While these structures are typically on lower-order roadways, they are still important factors in the county’s economy and for overall community mobility that, in appropriate locations, includes pedestrian and bicycle use.

Local Bridges

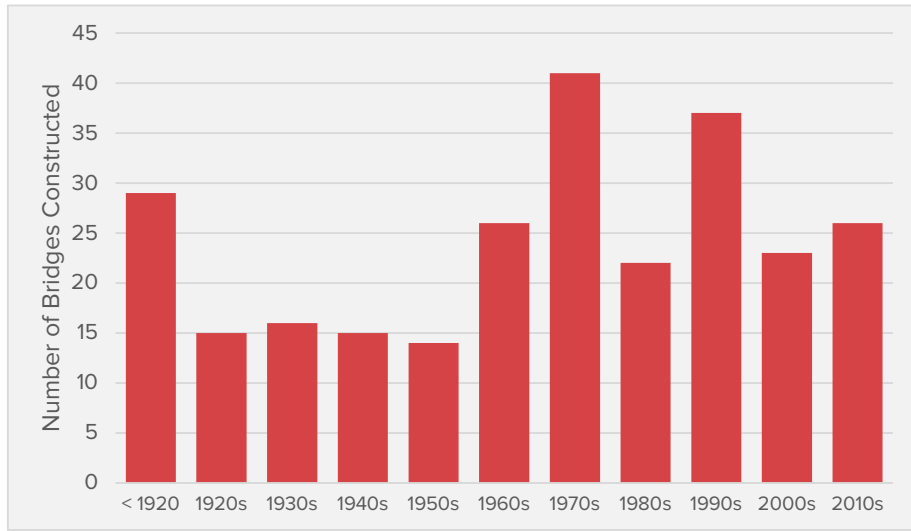
Our local bridges are, overall, in worse condition than our state-owned bridges, but are better than the statewide average.



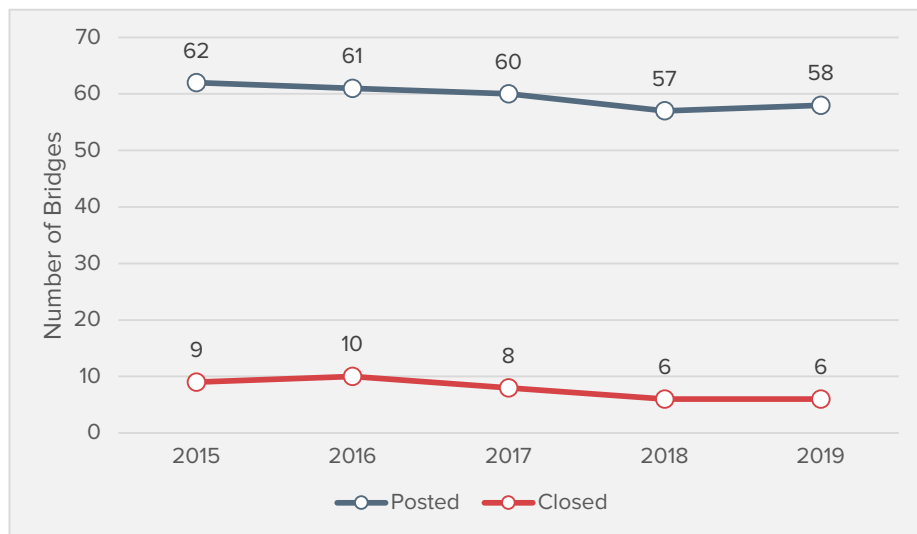
Percentage of Local Bridges Rated “Poor,” Lancaster County and Pennsylvania, 2015–2019

Overview

- There are 264 locally owned bridges greater than 20 feet long throughout Lancaster County.
- Of this number, 61 are posted and five are closed. Of these bridges, 21 are historic covered bridges and two are masonry arches.
- The average locally owned bridge in Lancaster County is 55 years old. Statewide, the average age is 59.
- The condition of locally owned bridges is improving, with the number rated as “poor” now at 59, down from a 2015 figure of 78.
- The share of poor locally owned bridges by deck area is now at 17.5 percent, compared to a 2015 rate of 25.6 percent. Statewide, the rate is 23.6 percent.



Local Bridges by Decade Constructed, Lancaster County



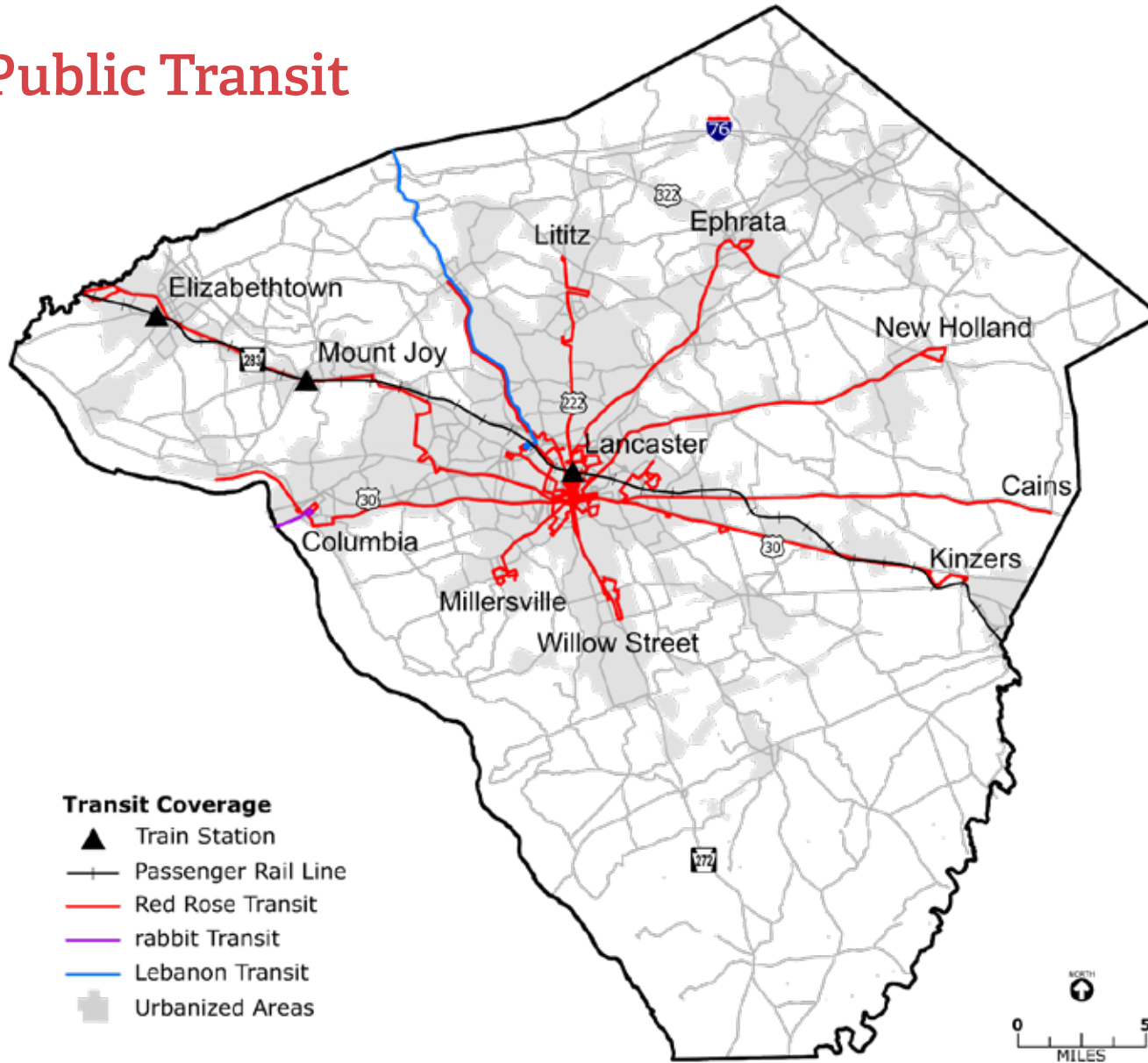
Posted and Closed Bridges Local Bridges, Lancaster County, 2015–2019

Our historic bridges are a cherished part of Lancaster County’s identity. Preserving them requires proactive policy and budgeting decisions.

What do these local bridge trends mean for transportation planning?

- Posted and closed bridges can negatively impact emergency response, overall mobility, and commerce. While these structures are on lower-order roadways, they are still important factors in the county’s economy and for overall community mobility that, in appropriate locations, includes pedestrian and bicycle use.
- The County has a plan for closing and removing some county-owned bridges because their very low volumes cannot justify the cost of maintaining the structures.
- Maintaining historic bridges is an intentional land use policy decision that supports the tourism industry as well as Lancaster County’s unique identity.
- Local bridges are typically ineligible for federal funds—except for the Off-System Bridge program, which establishes criteria for funding improvements for bridges that are not on the Federal-Aid System. PennDOT is required to apply 15 percent of its annual allocations to these bridges. Lancaster County will continue to assist its partners at the municipal level in identifying applicable funding sources to address the needs of local bridges.
- Maintaining bridge infrastructure is a high cost to the County and its municipalities. Actions such as closing bridges, state turn-backs, and similar infrastructure decisions are potential ways of optimizing the use of municipal transportation dollars.

Public Transit



Overview

- Three main types of transit are available to the public within Lancaster County—fixed-route bus service, shared-ride service, and passenger rail. Approximately 249,000 county residents live within ¾ miles of a passenger train station or a bus route.
- South Central Transit Authority (SCTA) provides fixed-route bus service along 18 routes across Lancaster County under the operating name “Red Rose Transit.” In Fiscal Year (FY) 2019, Red Rose Transit ridership totaled 1.8 million trips.
- rabbitransit and Lebanon Transit (LT) also operate one fixed route each for trips into Lancaster. rabbitransit’s Route 12 links York to Columbia. LT’s *Saturday Special* makes stops in Manheim, East Petersburg, and the Park City Center mall.
- SCTA also provides shared-ride services for Lancaster County, transporting seniors and individuals with disabilities within the county. In FY 2019, “Red Rose Access” made more than 292,000 door-to-door trips.

Lancaster County’s three Amtrak stations have been modernized through a series of major improvement projects while retaining their historic character.



- Amtrak’s Keystone Corridor traverses the county, with stations in Elizabethtown, Mount Joy, and Lancaster. During FY 2018, these three train stations accounted for more than 700,000 trips on the Keystone Corridor line. This is up from an FY 2014 total of 684,522.
- A series of major projects has been completed in recent years at the county’s three train stations, totaling \$62.2 million. These improvements have included bicycle and pedestrian access improvements as well as landmark station construction and historic station restoration.

What do these public transportation trends mean for transportation planning?

- Public transportation in Lancaster County provides a basic mobility service for those who choose to ride, who do not own a car, or who are unable to drive. A reliable and efficient system that connects to businesses, recreation, and natural areas will influence economic development and relocation, and encourage development and investment in our urban communities.
- Integrating bicycle and pedestrian accommodations encourages public transit ridership. Growth in ridership helps reduce traffic congestion and air quality problems, especially in urban areas.
- Riders on shared-ride buses are primarily residents 65 years of age and older. As Lancaster County’s senior citizen population continues to increase, shared-ride services will be in greater demand to support seniors’ mobility and quality of life.

Rail Freight

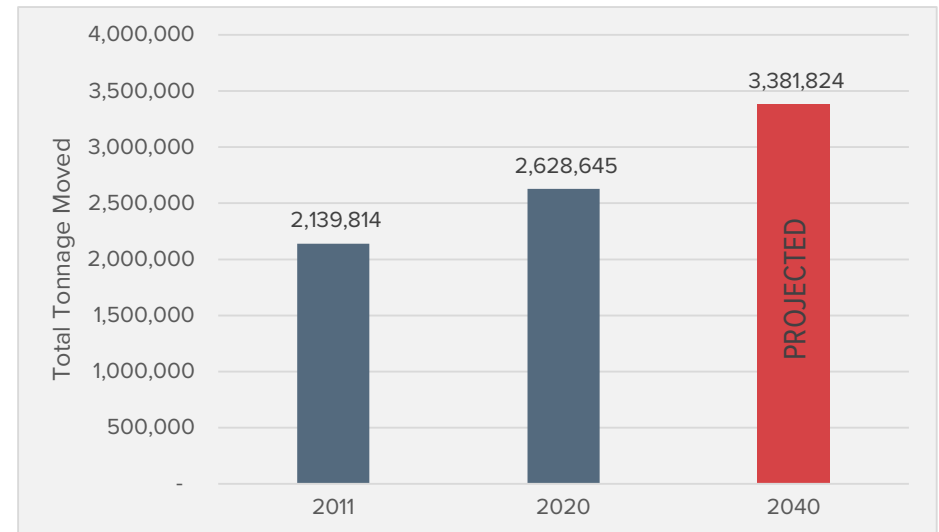


Chris Sauer

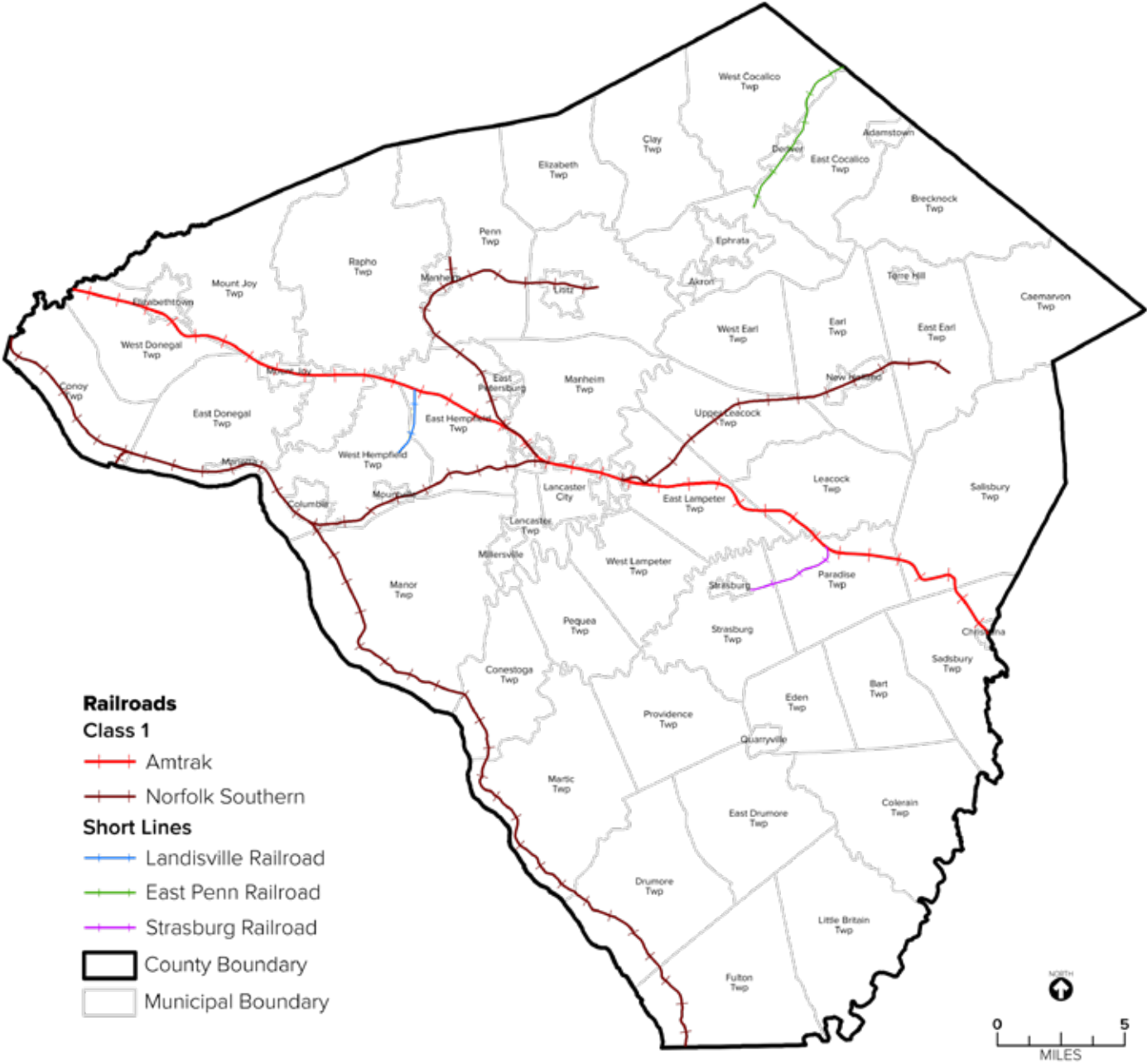
Overview

- In the South-Central Pennsylvania region, rail freight shipment depends primarily on Amtrak’s Keystone Corridor, which accommodates passenger trains during the day and freight rail at night.
- There are four Class I railroads in the region: Norfolk Southern (NS), CSX Transportation, Canadian National, and Canadian Pacific. NS is by far the largest freight rail service in the county, serving more than 100 customers daily.
- The Dillerville Rail Yard is the largest NS facility in Lancaster County. In 2013, NS completed relocation of the rail yard farther west in the City of Lancaster.

Freight trains in Lancaster County run primarily on the Keystone Corridor, owned by Amtrak.



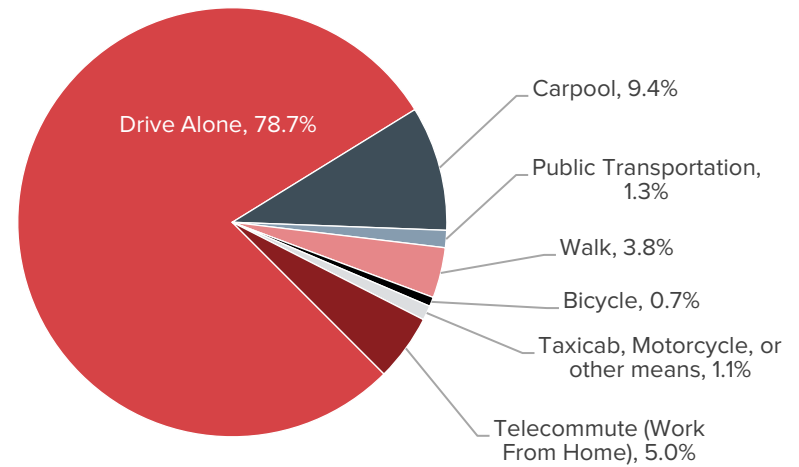
Freight Movement by Rail (Tons), Lancaster County, 2011–2040



What do these rail freight trends mean for transportation planning?

- Rail freight transportation is an essential component of the county’s economic competitiveness and sustained economic growth—preserving and restoring rail infrastructure is a priority.
- Railroads connect Lancaster County businesses to the global economy and have the added benefit of removing trucks from the county’s roadways. This lessens congestion and helps preserve our roadway pavements.
- Pennsylvania—as a significant rail state with 64 operating railroads—has enacted public funding programs through its Rail Freight Assistance Program (RFAP) and Rail Transportation Assistance Program (RTAP). PennDOT’s Bureau of Rail Freight administers these grants annually based on available funding.
- Lancaster County will continue to seek opportunities to use public funding to enhance rail connectivity and accessibility when it is in the public interest.

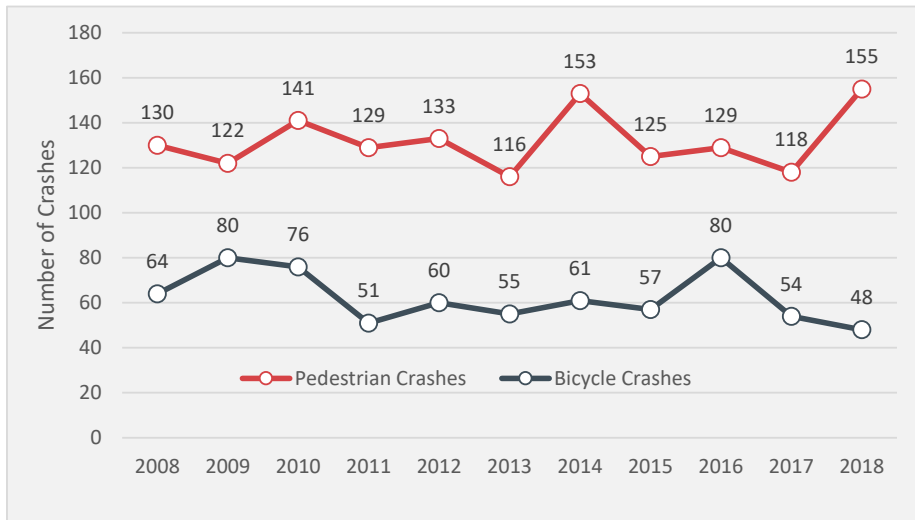
Active Transportation



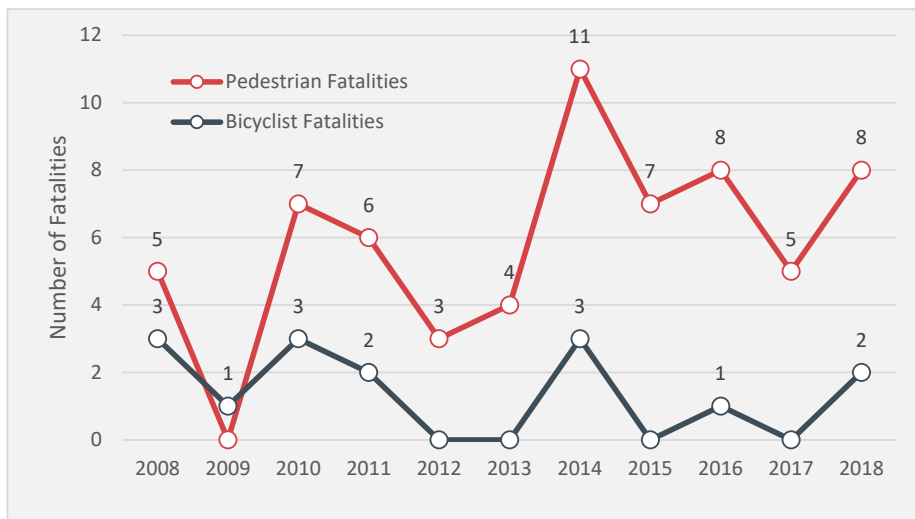
Commuting Trips by Mode, Lancaster County, 2017

Overview

- In April 2019, Lancaster County MPO adopted its [Active Transportation Plan](#) (ATP). The ATP promotes collaborative agency relationships to identify active transportation opportunities and prioritize non-motorized infrastructure investments. These opportunities are prioritized based on the ATP’s established mobility hubs and cohesive county-wide active transportation network.
- The ATP is a key component of the MTP’s development, as it assists in the overall prioritization of investments within the county. Through the PennDOT Connects process, the MTP’s vision for active transportation opportunities can be considered as part of project delivery.
- The Lancaster County bikeway and trail network comprises more than 215 miles of on-road designated routes, paved trails, unpaved trails, and state bike routes (BicyclePA Routes J-1 and S).
- According to the 2013-2017 American Community Survey (ACS), bicycle travel in the county constituted 0.7 percent of journey-to-work trips, while 3.8 percent of the county’s resident workers walked to work. Though data on bicycle and pedestrian travel is becoming increasingly available through GPS-related data sources, obtaining better information on these modes will be key to meeting the needs of these travelers.
- Lancaster County recorded 155 pedestrian crashes during 2018, the highest number of these incidents within the previous 10 years. The county has averaged 132 pedestrian crashes and six pedestrian fatalities over the past decade.
- The county recorded 48 bicycle crashes in 2018—the lowest number of these incidents in a decade. Lancaster County averaged 62 bicycle crashes and one bicycle fatality each year of the decade ending in 2018.



Bicycle and Pedestrian Crashes, Lancaster County, 2008–2018



Bicycle and Pedestrian Fatalities, Lancaster County, 2008–2018

What do these active transportation trends mean for transportation planning?

- Commuter and transit-based bicycle infrastructure is limited throughout the county; however, recreational facilities are available. Incorporating this infrastructure improvement into TIP cycles and zoning and land development ordinances will allow for expansion and completion of sidewalk and bikeway networks. Downtown Lancaster City has instituted a program of installing bicycle lanes and bike-sharing stations to connect local businesses with residential areas.
- Prioritizing connections to parks and natural areas, as well as to large employers and commercial areas, has and will continue to encourage use of bicycle and pedestrian modes of travel.
- Lancaster County features large trail networks that link urban areas in the county and destinations beyond. Efficient, safe networks are important features that bolster property values and enhance quality of life by providing greater opportunities for outdoor recreation. Completing trail gaps and improving accessibility will increase the use and value of these networks.
- Addressing safety issues such as high traffic speeds, lack of bicycle lanes and facilities, and poor maintenance are necessary to assist in the development of bicycle and pedestrian networks that contribute to the livability, safety, and health of Lancaster County and its communities.
- The MPO will need better data to effectively plan for the transportation system needs of pedestrians and bicyclists. This data can be acquired through emerging commercial sources and through a program of pedestrian and bicyclist counts administered by the MPO.

Aviation

Overview

- Within Lancaster County are two private-use airports and three public-use airports. The public airports are Lancaster Airport, Donegal Springs Airpark, and Smoketown Airport.
- Lancaster Airport experienced a 31 percent increase in passenger enplanements from 2017 to 2018.
- The three public-use airports supported nearly 118,000 total operations in 2018. Most of these operations took place at Lancaster Airport, with nearly 80,000 take-offs and landings in 2018.
- Local general aviation activities (which do not include commercial air transport of passengers or cargo) accounted for 50 percent of the total take-offs and landings in 2018: 42 percent itinerant general aviation, 5 percent military (delivery of logistical supply using military aircraft), and 3 percent air taxi operations.
- In addition to general and commercial aviation, the county’s airports are used for various activities including skydiving and parachuting, flight schooling, and aerial sightseeing. Some airports are also used for aircraft maintenance, pipeline patrolling, and aerial photography.
- Further connectivity to international destinations is available in neighboring Dauphin County via Harrisburg International Airport (MDT).

What do these aviation trends mean for transportation planning?

- Airport Hazard Zoning protects public safety as well as the viability of Lancaster County’s airports. The airport hazard areas⁴ of the county’s three public-use airports are made up of 16 municipalities, of which 13 have adopted Act 164 Airport Hazard Zoning. Lancaster County can assist these municipalities in enacting this important tool.
- Other factors that are important to airport preservation are broad community support, Airport Master Plans, zoning, and ensuring the compatibility of future development. The preservation of local aviation facilities is important in connecting local businesses to the global market. They bring jobs and positive economic impact to Lancaster County.
- Passengers flying into Lancaster Airport via Southern Airways Express can intermodally connect to destinations across Lancaster County and beyond. Using public transit or a rental vehicle, travelers can experience all that Lancaster County has to offer. Utilizing Amtrak service, travelers can also access surrounding regions, including Philadelphia and Harrisburg. It is important that Lancaster County continues to sustain these intermodal offerings and plan for adequate connections between modes (e.g., Lancaster Airport to Lancaster Amtrak Station).

⁴ Airport Hazard Areas are areas of land or water where an airport hazard might be established, if not prevented (<https://definitions.uslegal.com/a/airport-hazard-area/>).

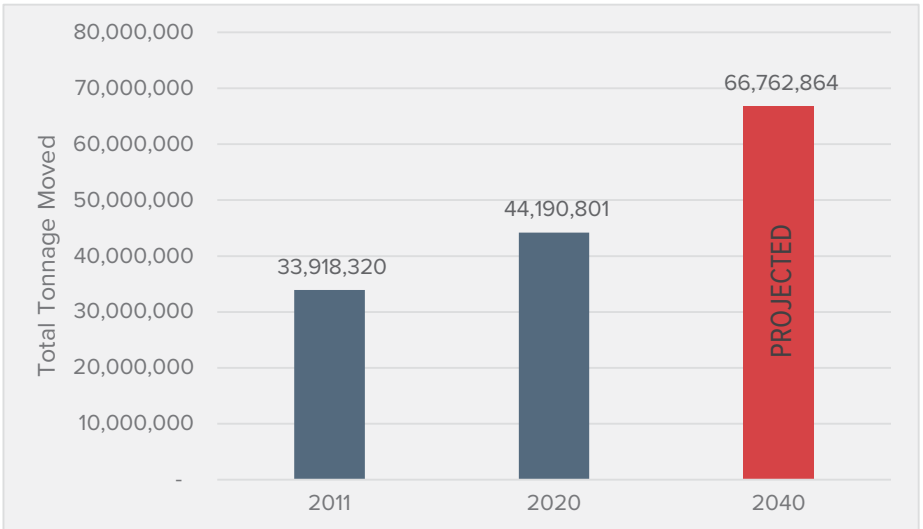
***Airport hazard zoning restricts the height of surrounding development—
for safety and to preserve airspace needed for take-offs and landings.***

Airport Hazard Zoning Status of Lancaster County’s Public-Use Airports

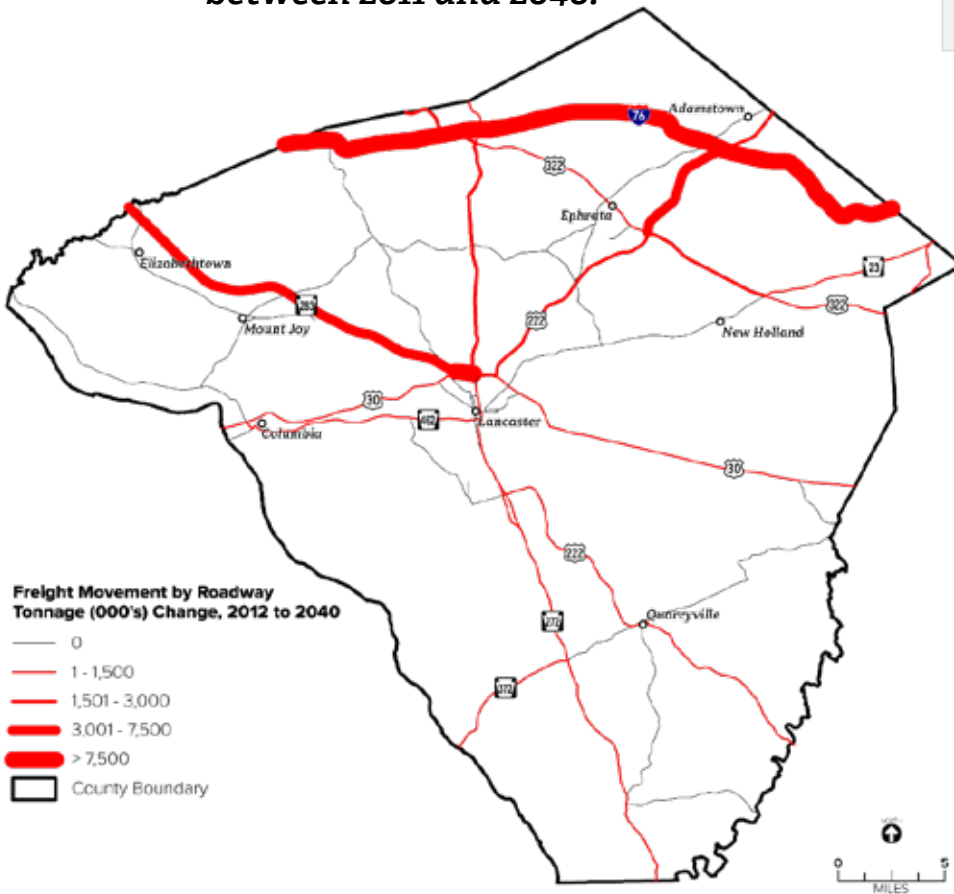
Airport	Runway Length (ft)	Number of Annual Operations	Neighboring Municipality	Airport Hazard Zoning in Place?
Lancaster Airport	6,933	79,488	Penn Township	Yes
			East Lampeter Township	Yes
			Manheim Township	Yes
			Mountville Borough	No
			East Petersburg Borough	Yes
			Lititz Borough	Yes
			Upper Leacock Township	Yes
			Warwick Township	Yes
			West Hempfield Township	Yes
			West Earl Township	Yes
			Rapho Township	Yes
East Hempfield Township	Yes			
Smoketown Airport	2,400	26,512	East Lampeter Township	Yes
			Upper Leacock Township	Yes
			Leacock Township	Yes
Donegal Springs Airpark	3,250	12,000	East Donegal Township	No
			Conoy Township	No
			West Donegal Township	Yes

Goods Movement

The volume of freight moved in our county by truck is expected to double between 2011 and 2040.

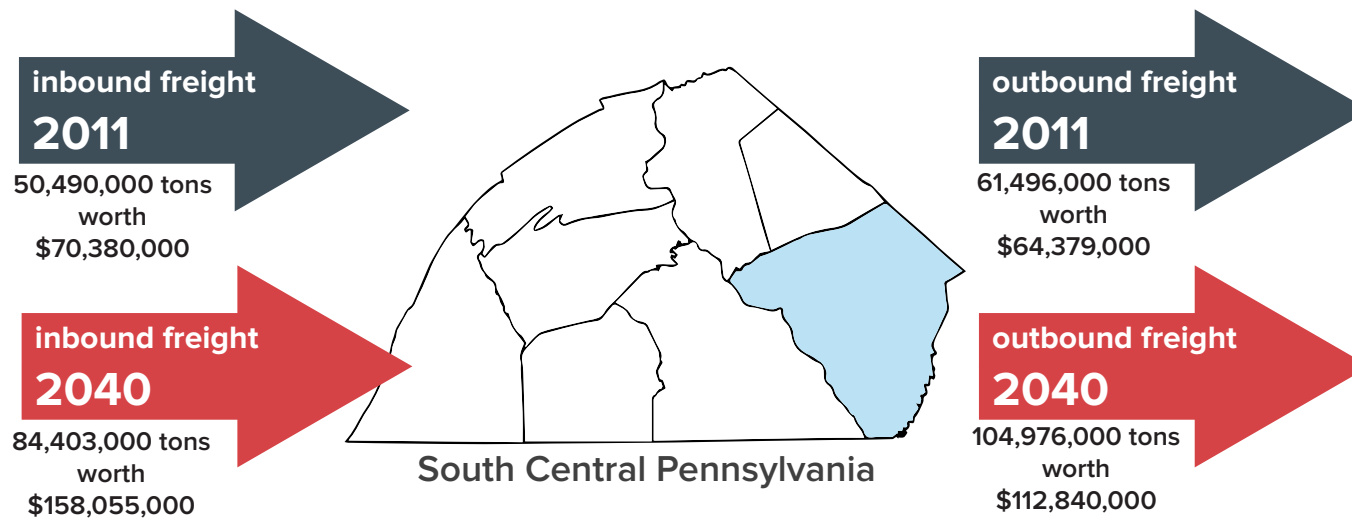


Freight Movement by Truck (Tons), Lancaster County, 2011–2040



Overview

- According to the most recent data from IHS Global Insight (2011), Lancaster County generated 36 million tons of freight valued at \$32 million that year. In 2040, freight movement is projected to reach 70 million tons with a \$65 million value. The Pennsylvania Turnpike (I-76) and PA 283 are expected to experience large tonnage increases by 2040, as shown on the accompanying map.
- The county’s top exported commodity is prepared or canned feed, followed by mineral wool and miscellaneous food preparations. Lancaster County’s top import commodity is petroleum refining products, at 901,277 tons. Field crops are the second-most-imported commodity, with nearly 600,000 tons coming into the county in 2011.
- Approximately 95 percent of Lancaster County’s commodities are moved by truck while the remaining 5 percent is moved by rail.
- Martin Limestone is the county’s top freight-generating company, shipping nearly 1.9 million tons annually. Other significant freight-generating companies include Manheim Auto Auction (1.6 million tons) and Rohrer’s Quarry Inc (622,000 tons).



What do these goods movement trends mean for transportation planning?

- Given Lancaster County’s regional position and its proximity to the global economic gateways of New York, New Jersey, Philadelphia, and Baltimore, increasing freight growth continues to be a major force affecting the safety and operation of the county’s transportation system.
- Transportation infrastructure in Lancaster County will be expected to accommodate 70 million tons of freight per year by 2040, doubling the tonnage the system is currently moving. The county will need an adequate investment strategy to ensure its freight infrastructure is in a state of good repair by allocating resources to critical freight corridors. Investing transportation funding in freight-related improvements such as generous turning radii, lane widening, and improved shoulders (particularly on first- and last-mile corridors) can improve the efficiency of freight movement through Lancaster County.
- Trucking will continue to be the dominant mode of freight movement in the county through the plan horizon year of 2045, causing significant impact on the county’s highway and bridge system. Ongoing planning for key freight networks such as the National Highway Freight Network and designated Critical Urban and Critical Rural Freight Corridors must continue to be a priority. Prioritizing investment of any future allocations of National Highway Freight Program funds could assist in ensuring safety and good condition on critical freight routes.
- In order to thoroughly understand freight-related modal movement on the transportation network and related safety and condition needs, Lancaster County must continue to engage freight stakeholders and the economic development community.

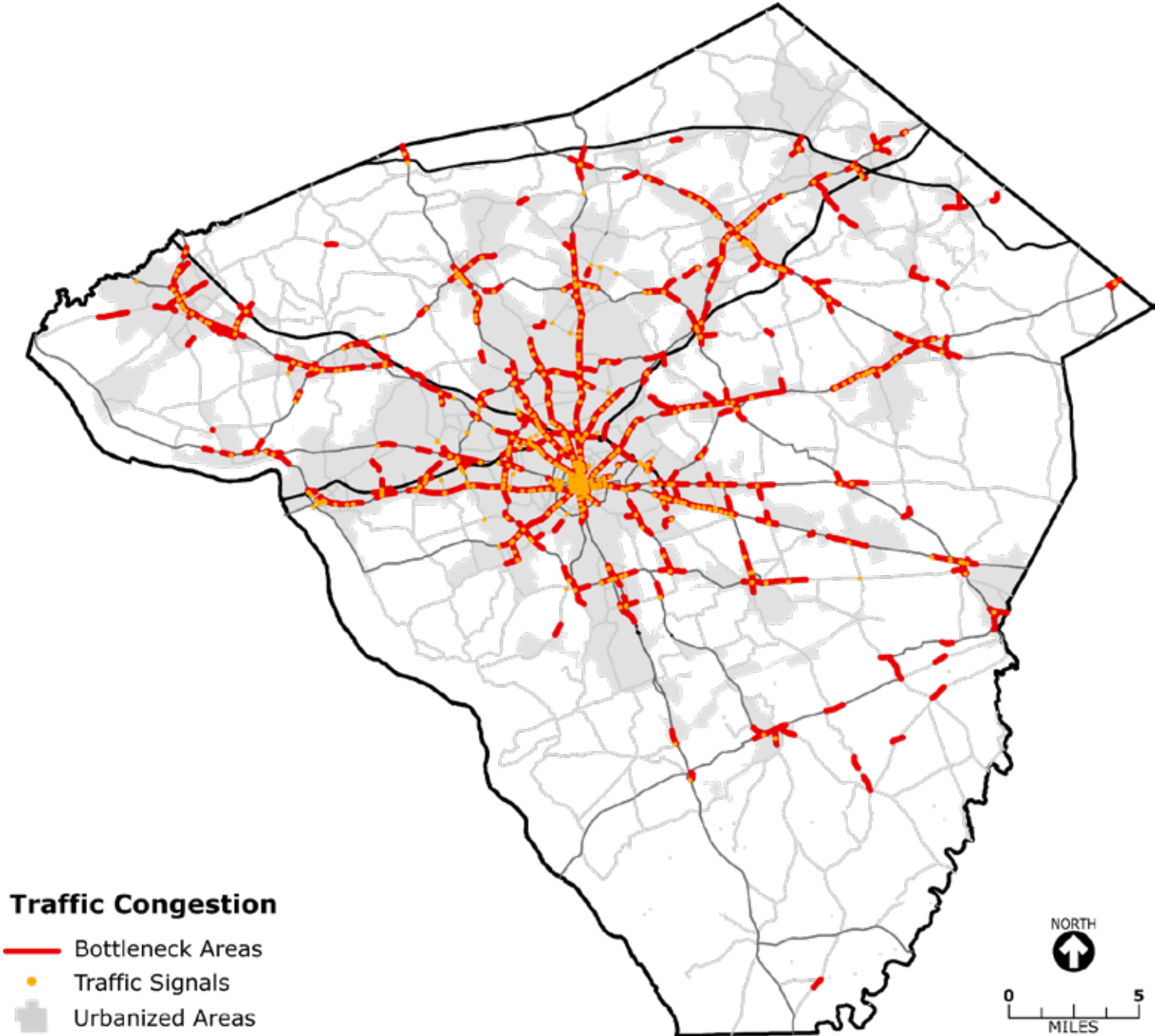
System Management & Operations

Overview

- As PennDOT and Lancaster County continue to operate within an increasingly constrained funding environment, there will be a growing need to emphasize operational improvements over capacity-building (handling more travelers on existing roadways).
- This is known as Transportation Systems Management & Operations (TSMO).
- Lancaster County presents multiple challenges in planning for operations, given its role as a tourist destination and its seasonal influx of tourist-related traffic.
- The county’s many trip-generating colleges and universities, tourist destinations, and commercial and retail destinations underscore the high importance of operations planning—as does output from the county’s Congestion Management Process (CMP), public feedback about congestion, and the policy, financial, and technical infeasibility of building more roadways.
- There are nearly 183 linear miles of National Highway System routes throughout the county, underscoring the need for good traffic incident management during times of road closures due to incidents or inclement weather.
- There are 503 signalized intersections in Lancaster County. Many municipalities may not have the funding to properly maintain their traffic signals.
- The update of the MTP precedes an update of the region’s 13-year-old Regional Operations Plan (ROP). Lancaster County continues to be an involved partner in developing the ROP and this valuable input will be reflected as part of the plan recommendations.

What do these operations trends mean for transportation planning?

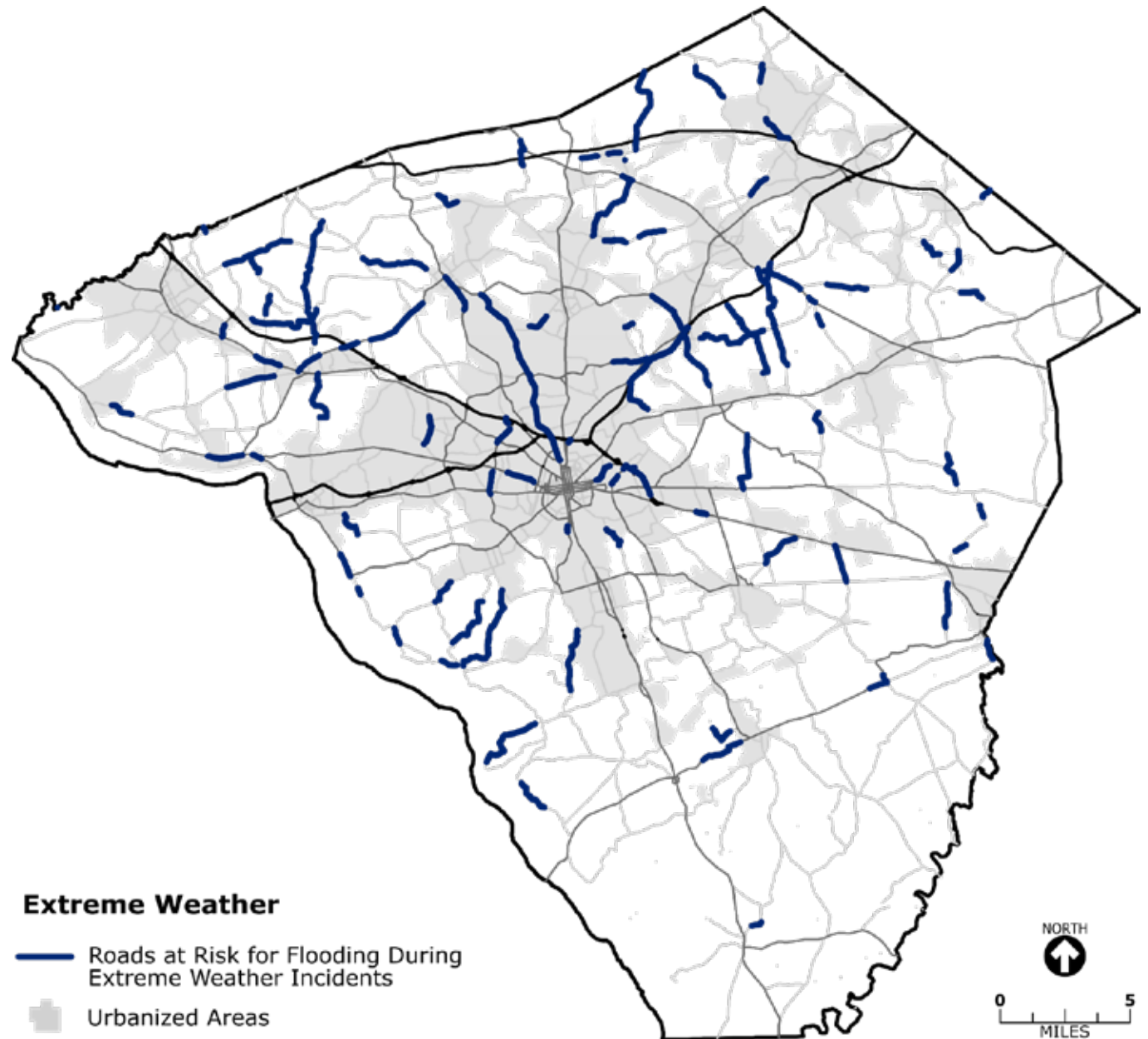
- The issues and concerns identified in this plan update should be considered as the regional ROP is being updated. Recommendations from the updated regional ROP will be considered in future MTP updates.
- Most of Lancaster County’s highly congested corridors (with a Travel Time Index greater than 2) and bottlenecks are also signalized corridors. This presents the opportunity to introduce new signal technologies—adaptive and connected signals—or revisit those technologies already implemented to ensure they are functioning properly.
- Through continued utilization of PennDOT’s Local Technical Assistance Program (LTAP), Lancaster County can emphasize the importance of routine signal re-timings and provide its municipal partners the opportunity to gain expertise in maintaining their signal systems.
- Operations planning has the potential to improve the reliability and predictability of travel throughout the county—critical considerations for goods movement and winter maintenance.
- Reliability of the county’s roadways is critically important to supply chains, as shippers and carriers require a reliable network for reducing shipping delays, and thus lowering costs to consumers. Winter conditions can create unsafe road conditions as well as alter driver behavior. Through the retiming of signals and timely road clearing procedures, reliability of travel can continue to be dependable while keeping travelers safe during and after these weather conditions.



Resiliency

Overview

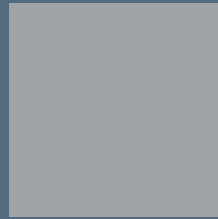
- As part of the FAST Act, states and MPOs are required to address resiliency—one of the 10 federal planning factors. Resiliency is defined by FHWA as “the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.” FHWA continues to focus transportation infrastructure resiliency efforts on climate change and extreme weather.
- To date, four of Pennsylvania’s MPOs and RPOs, including neighboring York County, have undertaken initiatives to address resiliency as part of their planning programs.



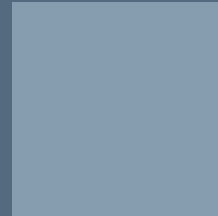
- In 2017, PennDOT completed its Extreme Weather Vulnerability Study, which was the start of a multi-phase effort to anticipate potential impacts of extreme weather on the state's transportation infrastructure. Through this effort, PennDOT and its partners at the Turnpike Commission, FEMA, and MPO/RPO regions were able to identify roadways vulnerable to extreme weather events and climate change impacts.
- Several of Lancaster County's major arterials have been identified as vulnerable roadways, including Fruitville Pike, PA 772, PA 897, and portions of US 30 and US 322.

What do these resiliency trends mean for transportation planning?

- Lancaster County should consider incorporating resiliency into the MPO's project prioritization process. Ongoing coordination with federal, state, and local environmental agencies is critical in prioritizing improvements to these vulnerable locations.
- Lancaster County should partner with its municipalities and PennDOT to identify where stormwater infrastructure is lacking or could be improved on roadways with high levels of vulnerability in extreme rain and snow events. This reduces the need for emergency roadwork on critical highways and bridges and the need for emergency funds due to flood damage.



LCPC



LCPC

LCPC

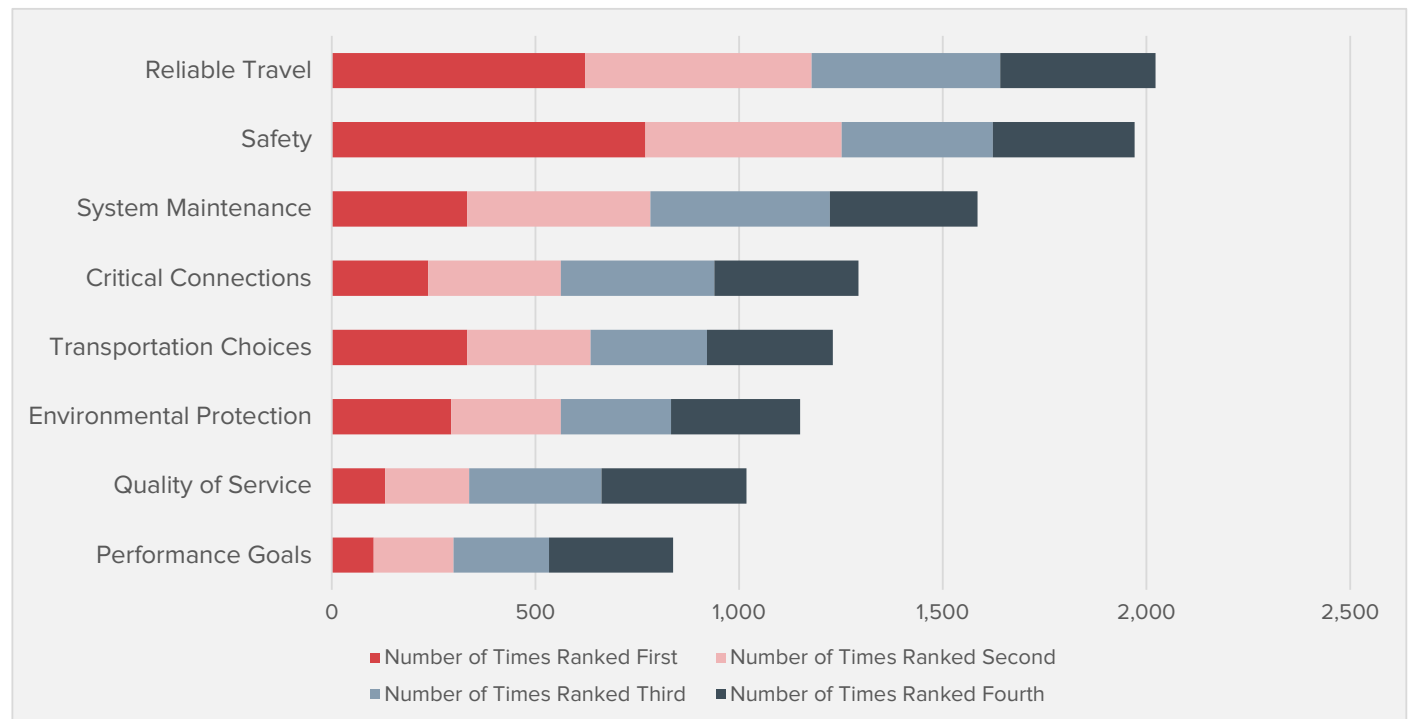
PUBLIC PARTICIPATION

Public Survey

Overview

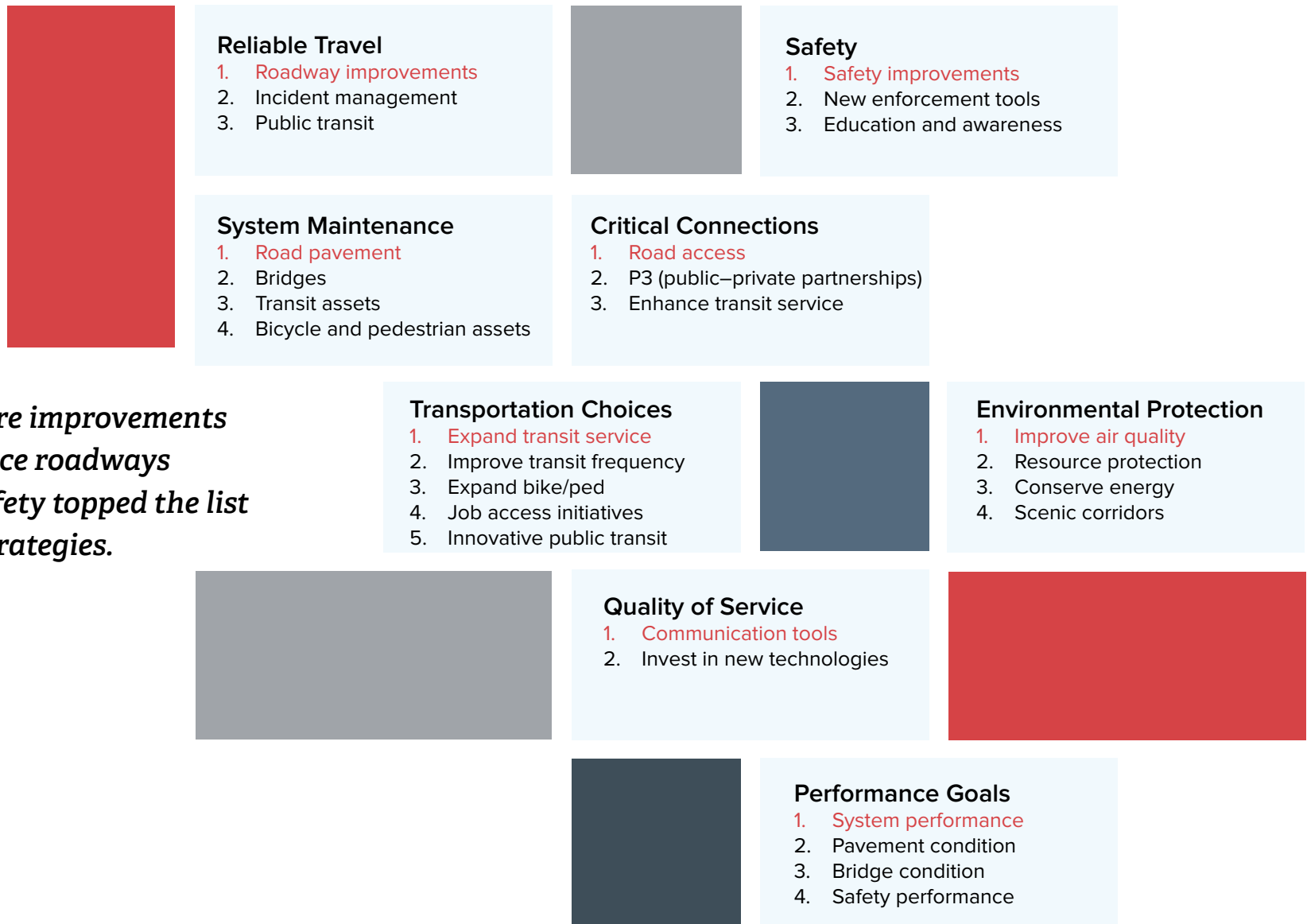
- The Lancaster County Planning Commission (LCPC) launched a six-week public survey via MetroQuest on December 31, 2019.
- LCPC distributed a press release and the survey received significant coverage through various local media outlets.
- Paper copies of the survey were distributed to a variety of locations throughout the county in an effort to reach a diverse audience. Both the online and paper survey were available in English and Spanish.
- “Intercept” surveys were conducted via electronic tablets at locations throughout the county such as the Lancaster Amtrak station.
- In total, 2,838 people completed the MTP survey.
- The survey had three parts: rank your top four transportation priorities out of eight possible; rate various strategies to address the selected priorities; and distribute a \$100 hypothetical budget among eight transportation funding categories.

Safety and reliable travel are the top transportation priorities of survey participants.

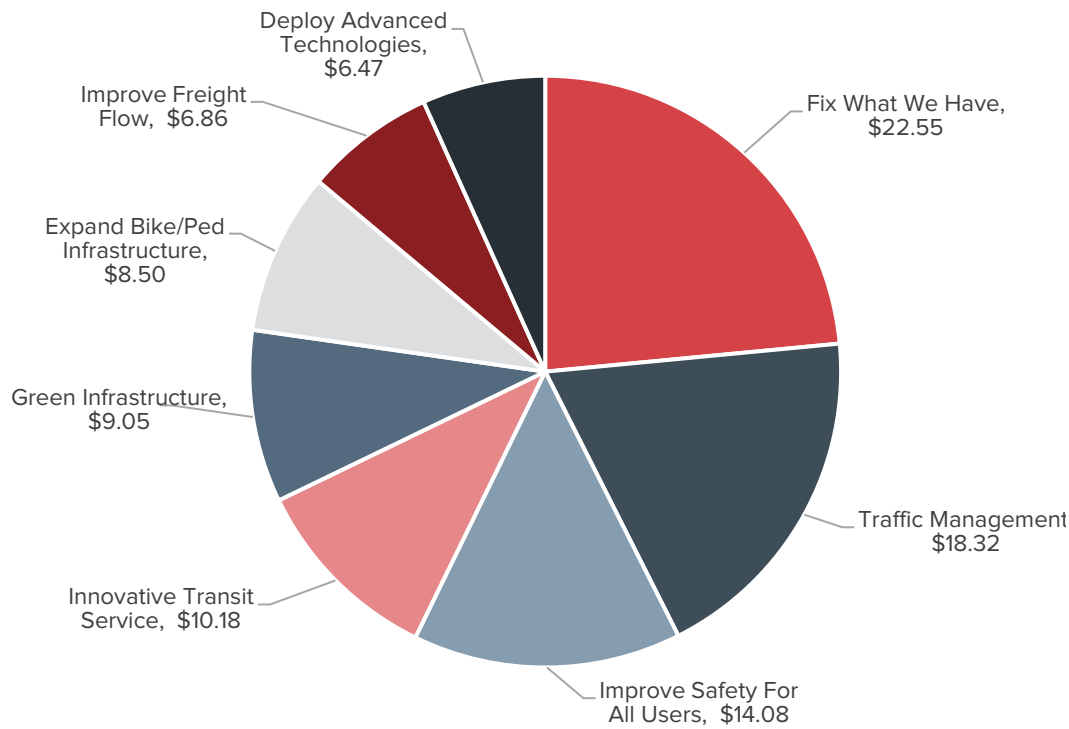


Survey Results: Ranked Priorities

Survey Results: What are your preferred strategies for each priority area?

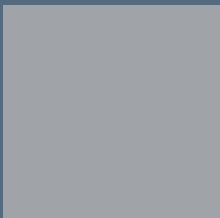


Infrastructure improvements to enhance roadways and overall safety topped the list of strategies.

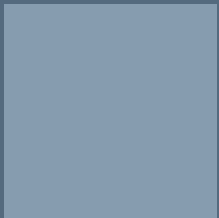


Survey participants “spent” the most money on fixing the infrastructure the county already has—an average of almost \$23 out of the \$100 hypothetical budget.

Survey Results: How would you allocate a hypothetical transportation budget of \$100?



LNP/Dan Marschka



LCPC

LNP/Blaine Shahan

PERFORMANCE MEASURES

Overview

- The Moving Ahead for Progress in the 21st Century (MAP-21) Act and its successor, the Fixing America’s Surface Transportation (FAST) Act, emphasize achieving measurable outcomes to ensure the effective use of federal transportation funds. Both pieces of legislation established a series of performance measures.
- Performance measures have been identified for Safety (PM-1), System Condition (PM-2), and System Performance (PM-3). The Lancaster MPO agreed to support the state PM-1 targets established by PennDOT through formal action taken on February 24, 2020, as they have done annually since 2018.
- The Lancaster County MPO also agreed to support the state PM-2 and PM-3 targets established by PennDOT through formal action taken on September 24, 2018.
- The Federal Highway Administration (FHWA) will annually determine whether PennDOT has met or has made significant progress toward meeting the established targets.
- The Lancaster MPO’s system performance report for 2018 (the most current information available) is provided in Appendix E. With the adoption of subsequent MTPs, the Lancaster County MPO will include a system performance report measuring the progress the MPO has made in meeting system performance targets.
- In *connects2040* and future MTP updates, the Lancaster MPO will provide progress reports on federal system performance targets. The current reports can be found in Appendix E.

PM-1: Safety Measures

Performance Measure	Five-Year Rolling Averages	
	Baseline 2014-2018	Target 2016-2020
Number of Fatalities	48.4	44.2
Fatality Rate	1.100	0.985
Number of Serious Injuries	193.6	243.2
Serious Injury Rate	4.399	5.422
Number of Non-Motorized Fatalities and Serious Injuries	39.4	45.3

Assumption: Vehicle-Miles Traveled (VMT) increases 1% each year starting in 2018.

Subsequent transportation plans will evaluate Lancaster County’s performance against these statewide targets.

PM-2: System Condition Measures

Interstate Pavements

Performance Measure	2017 Baseline	2019 2-year Target	2021 4-year Target
Percentage in Good Condition	67.2%	n/a	60.0%
Percentage in Poor Condition	0.4%	n/a	2.0%

NHS Non-Interstate Pavements

Performance Measure	2017 Baseline	2019 2-year Target	2021 4-year Target
Percentage in Good Condition	36.8%	35.0%	33.0%
Percentage in Poor Condition	2.3%	4.0%	5.0%

NHS Bridges

Performance Measure	2017 Baseline	2019 2-year Target	2021 4-year Target
Percentage in Good Condition	25.6%	25.8%	26.0%
Percentage in Poor Condition	5.5%	5.6%	6.0%

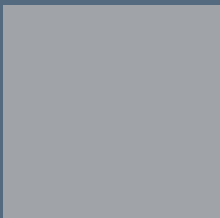
PM-3: System Performance Measures

Performance Measure	2017 Baseline*	2019 2-year Target	2021 4-year Target
Interstate Reliability	89.8%	89.8%	89.8%
NHS Non-Interstate Reliability	87.4%	n/a	87.4%
Truck Reliability Index	1.34	1.34	1.34

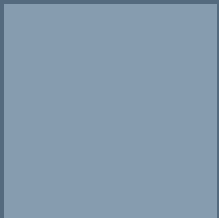
*Baseline estimated using RITIS data extract from May 8, 2018

What do these performance measures mean for transportation planning?

- The MAP-21 and FAST Acts introduced a strategic approach—using system information to make investment and policy decisions. It is intended to help MPOs make the best investment decisions to optimize results.
- The Lancaster MPO is operating in a fiscally constrained environment. With limited funding, the MPO seeks to maximize its return on investment. The introduction of performance measurement in its long-range planning allows the MPO to more effectively assess and report on the impact of its \$52.1 million average annual investment (2015-2020) in the county's transportation system.
- The Lancaster MPO will continue to collaborate with PennDOT and FHWA on performance measurement, especially as PennDOT completes its two-year progress report to FHWA by October 2020.



Wagman



RRTA



LCPC

REVENUE FORECAST

Projected Funding

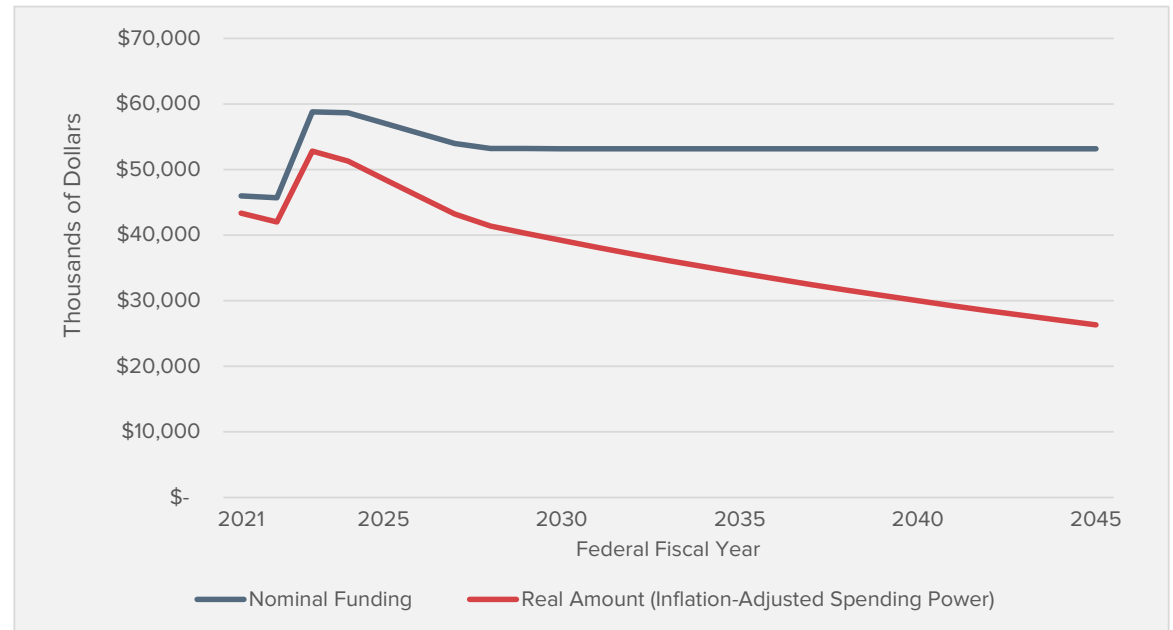
Overview

- FHWA requires long-range transportation plans to include an estimate of the amount of revenue the MPO can reasonably expect to receive over the life of the plan—in this case, through 2045.
- Financial guidance released by PennDOT in August 2019 provides the best available estimate of projected revenue over the 25-year plan period.
- Lancaster County currently receives 3.8 percent of total state highway/bridge base funding.
- No new state funding acts or increases in current funding to the state's Motor License Fund are anticipated.
- As a conservative forecast, the MTP assumes that future federal surface transportation funding reauthorizations will provide no funding increases over the FAST Act, which expires in September 2020.
- Competitive PennDOT grant programs such as Green-Light-Go and the Multimodal Transportation Program were excluded from the revenue forecast.
- The MTP assumes an estimated \$1.33 billion in total revenue over the 25-year life of the plan period. The 2021 TYP represents \$671 million of this amount, leaving a balance of \$691 million that will be programmed with a mix of highway, bridge, and safety projects. The anticipated breakdown among categories will be based in part on PennDOT Financial Guidance documentation, and yields 53 percent to Highway, 37 percent to Bridge, and 10 percent to Safety projects.



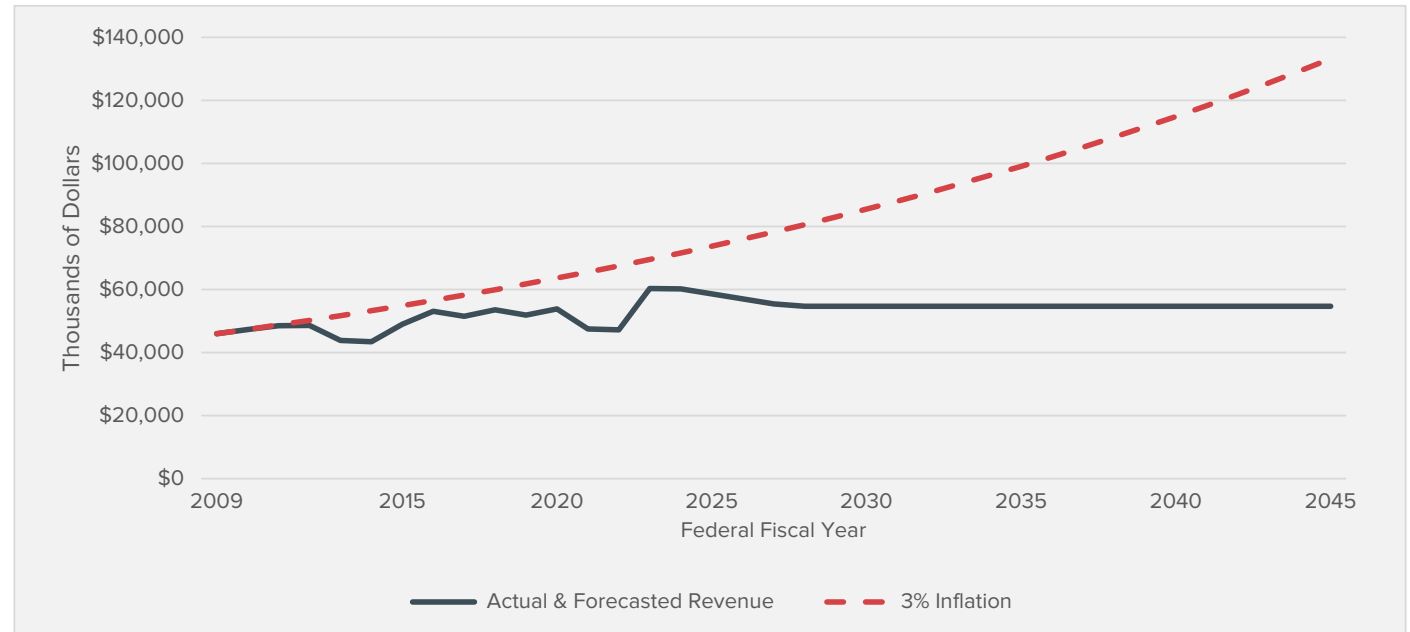
Our transportation funding is expected to stay relatively flat.

But when you consider how inflation reduces purchasing power, we'll effectively have decreasing resources.



Lancaster County MPO Projected Transportation Funding

If our transportation funding were keeping up with inflation, it would track closely with the red dotted line.



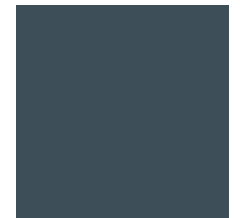
Lancaster County MPO Funding against 3% Inflation

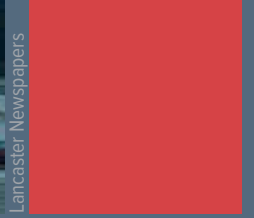
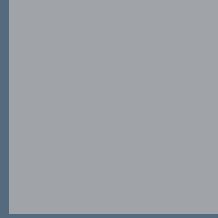
What do these funding projections mean for transportation planning?

- In response to requirements from the FAST Act, PennDOT has prioritized strategic investment in the Interstate system. The increase in funding is needed to address the system’s maintenance backlog, modernization, and strategic capacity improvements.
- This investment is currently \$450 million per year. The amount is expected to increase by \$50 million per year until it reaches \$1 billion in Federal Fiscal Year 2028.
- The shift in investment to the Interstates will have stark impacts on available revenue for the remainder of the system.
- Over the previous six federal fiscal years, the Lancaster MPO averaged \$52.1 million annually in available base transportation funding. Over the 25-year period of the plan, the average increases to only \$53.3 million in today’s dollars.
- Inflation will reduce the Lancaster MPO’s buying power. The MTP is financially constrained to \$1.3 billion through 2045. After adjusting for inflation, its real value decreases to \$925 million.
- The county’s draft 2021 Transportation Improvement Program (TIP) represents a total investment of \$218 million—a reduction of about \$1 million from the 2019 TIP. This reduced funding level is expected to continue, short of any new state or federal funding legislation.
- The projects shown as part of the 2021 TYP are considered funded projects, or within the MPO’s financial constraint. Projects that appear in Appendix A as “illustrative” are not currently funded. The MPO will consider the candidates from the illustrative list as future programs are being developed.

Projected Revenue

Period	2021-24	2025-32	2033-45	Total 2021-45
Amount (\$000s)	\$218,236	\$452,853	\$691,634	\$1,362,724





Lancaster Newspapers



Chris Sauer

LCPC

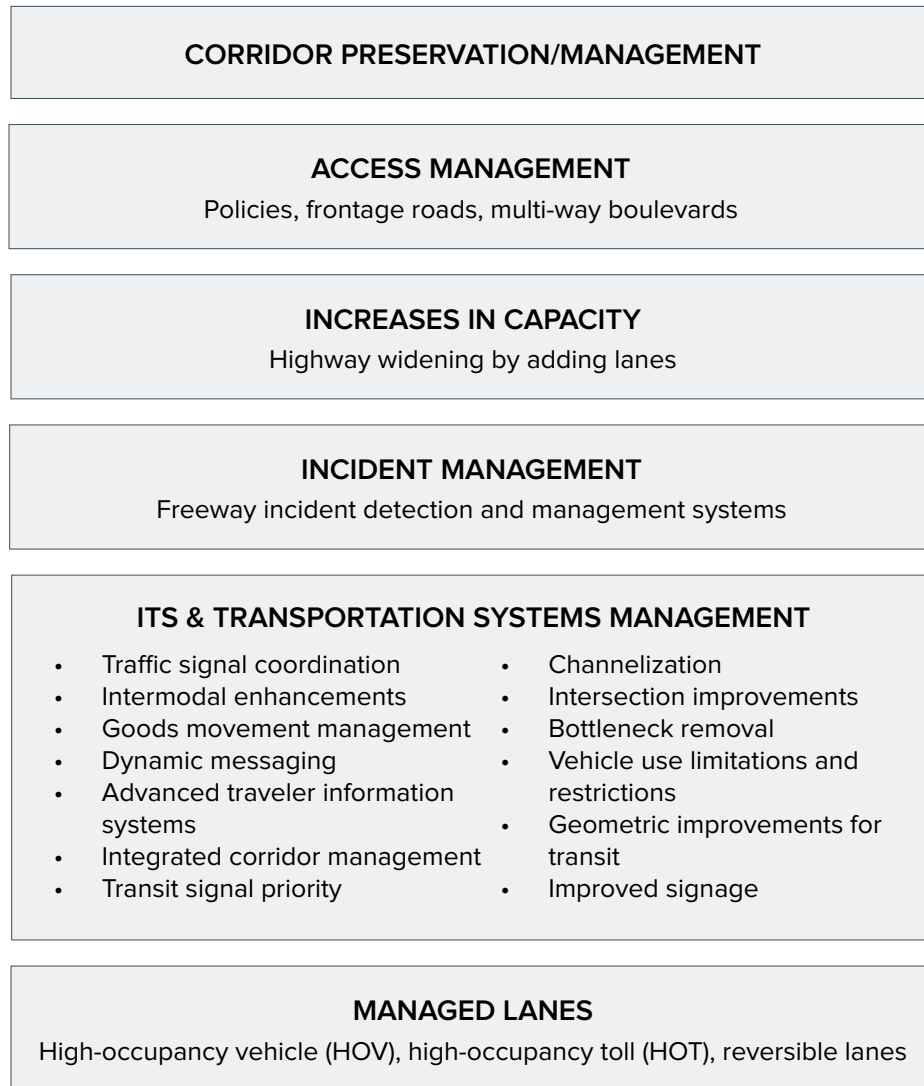
TECHNICAL FOCUS AREAS

Introduction

The Lancaster MTP development process included focus-area analyses and data assessments to help inform our MTP strategic directions, provide ideas on strategies, guide the prioritization of future investments, provide linkages to our *places2040* comprehensive plan, and establish a basis for monitoring strategies and system performance. The MTP focus areas are:

Evaluating Operational Strategies	Analyzing Travel Connections	Exploring Land Use and Transportation Connections
<p>This section addresses planning for Transportation Systems Management and Operations (TSMO). With our funding constraints and priorities related to maintaining our existing transportation infrastructure, lower-cost operational strategies continue to be emphasized by PennDOT and the Lancaster MPO as a primary strategy for addressing our regional congestion and safety issues. In addition, new technology advancements are providing a greater array of tools and strategies for consideration.</p>	<p>Through advances in communications technology, planners and analysts now have more data than ever to use in evaluating travel patterns for both personal and commercial vehicle trips. This section of the MTP provides more information on the county’s existing travel patterns. The resulting outcomes have critical planning implications for all types of transportation, as they relate to long-distance travel, freight movement, commuter patterns, tourism traffic, and active transportation.</p>	<p><i>places2040</i> provides a vision of more compact land use development within our county. Through scenario planning, our MPO makes use of available tools including the South Central Regional Travel Model to help assess what impact our land use decisions may have on our transportation system. Understanding how our vision of land use affects vehicle travel, congestion, and transit is needed as we continue to advance the concepts and methods outlined in <i>places2040</i>.</p>

Evaluating Low-Cost Operational Strategies



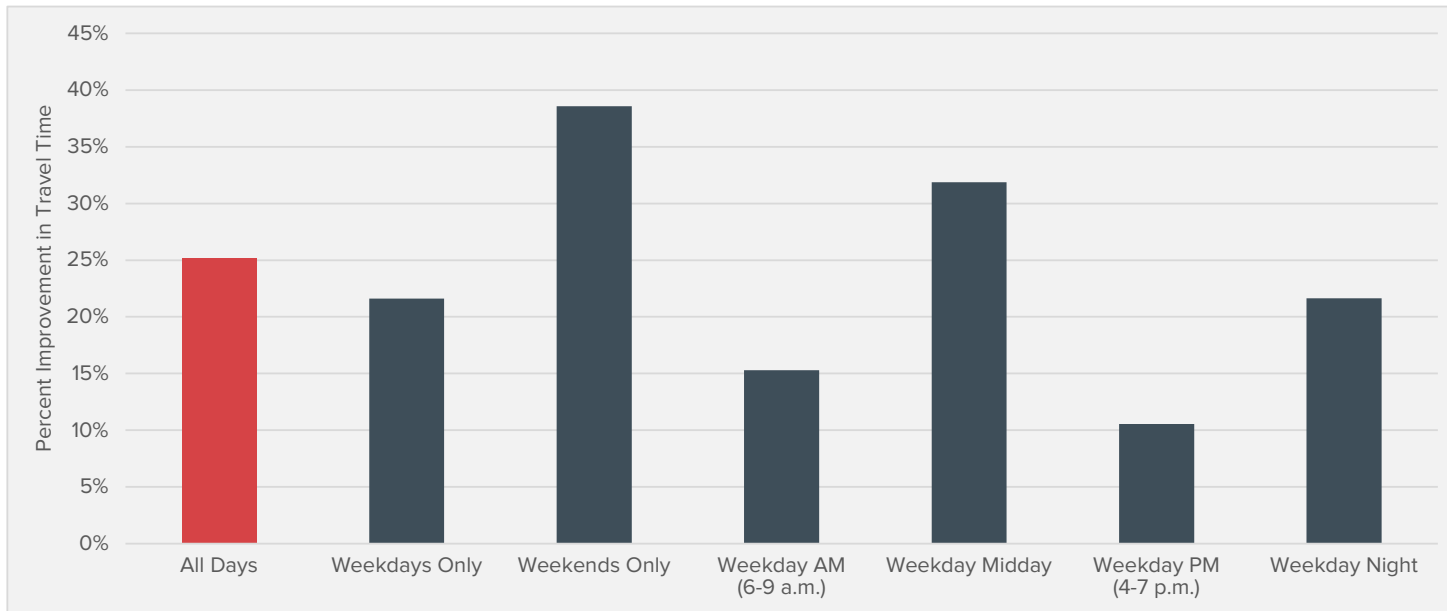
Sample Operational Management Strategies

Operational improvements enable the existing roadways to handle more traffic, more efficiently. Another plus—they are relatively affordable compared to constructing new highways.

Overview

- Transportation System Management and Operation (TSMO) strategies provide money-saving solutions that can relieve congestion and optimize infrastructure investments.
- Compared to traditional capital investments such as constructing additional roads, TSMO solutions can provide high returns on relatively low-cost projects.
- The graphic to the left provides examples of TSMO strategies. Traffic signal timing and coordination improvements are common low-cost strategies.
- PennDOT is currently working on a Regional Operations Plan (ROP) to identify appropriate strategies for various corridors. The ROP complements PennDOT’s TSMO program by establishing the regional approach to traffic operations and sets the stage for implementation of TSMO strategies.⁵

⁵ More information on the ROP is available at: <https://www.penndot.gov/ProjectAndPrograms/operations/Pages/TSMO-Eastern-Region.aspx>



Adaptive Signal Technology Benefits on Lititz Pike, Lancaster County

Adaptive signals automatically adjust “green light” time to keep traffic flowing optimally, even at rush hour.

Signal Technology Improvement Strategies

- New technology enables signal timing projects to produce even greater benefits.
- Automated Traffic Signal Performance Measures (ATSPMs) is a strategy that PennDOT is working to integrate across the state. Cameras and other detectors at the intersection collect information on traffic volumes, speeds, and delay. These metrics assist traffic engineers in optimizing signal timings.
- Adaptive Traffic Signals automatically adjust the timing of green-light cycles according to current traffic conditions. Like ATSPMs, they are constantly collecting data about approaching vehicles and creating new timing sequences to enhance traffic flow.
- Adaptive signal technology was implemented in Lancaster County on Lititz Pike in 2015 and on Harrisburg Pike in 2016. The technology has also been implemented in nearby counties, including York County on US 30. PennDOT continues to evaluate the benefits of this technology as well as data processing enhancements to further improve traffic operations.
- PennDOT operates the District 8 Regional Traffic Management Center (RTMC), which covers Lancaster County. The RTMC provides centralized

staff to monitor traffic conditions using available video cameras and initiate response plans to incidents. The RTMC can provide information to motorists through digital message signs (DMS) or through other online methods. Establishing fiber optic connections between the RTMC and traffic signals provides opportunities to remotely modify signal timings to address incidents or other events and capture camera images of current traffic conditions. These connections do not currently exist within the county but are an important recommendation moving forward.

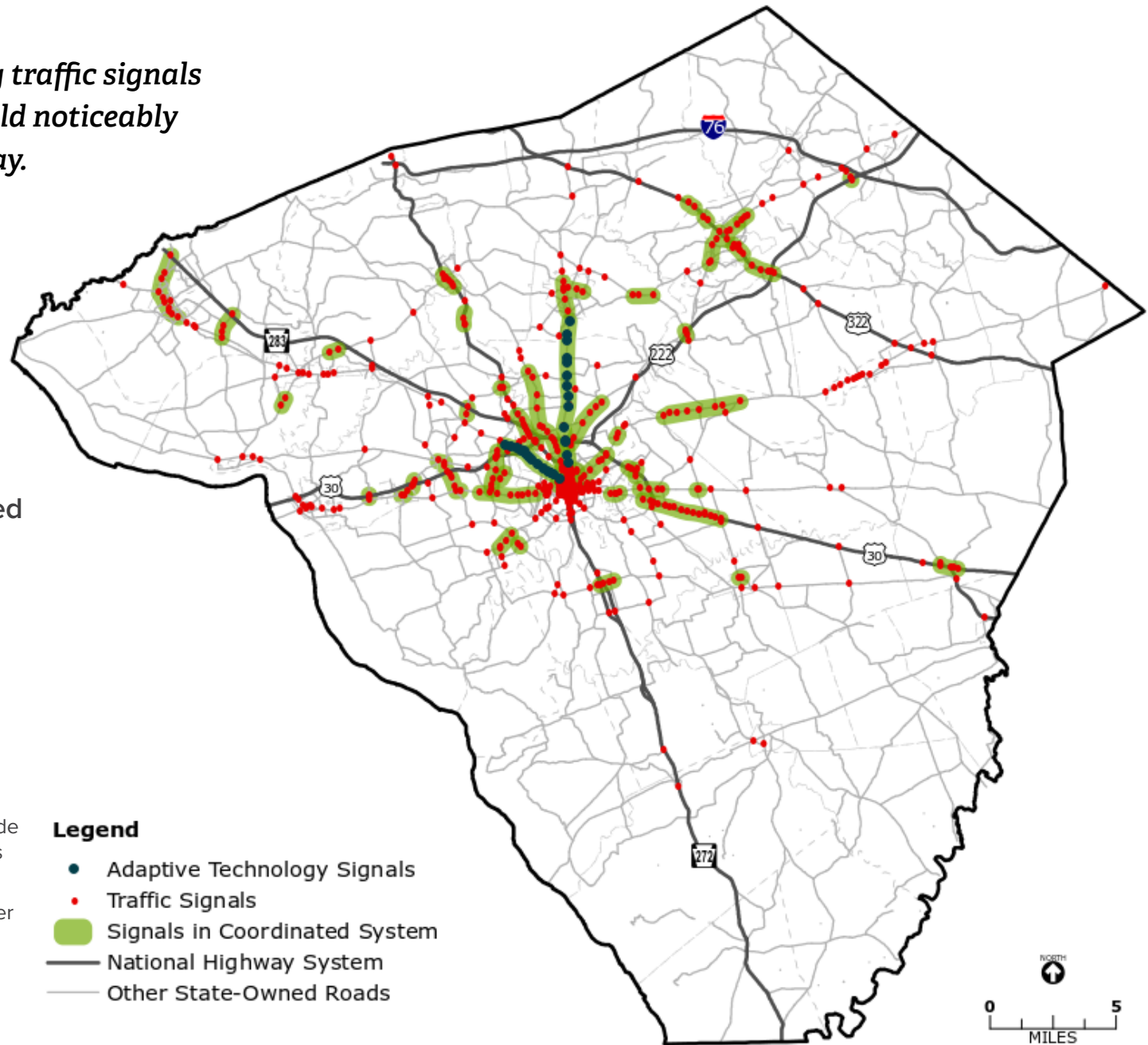
Signal Technology Benefits

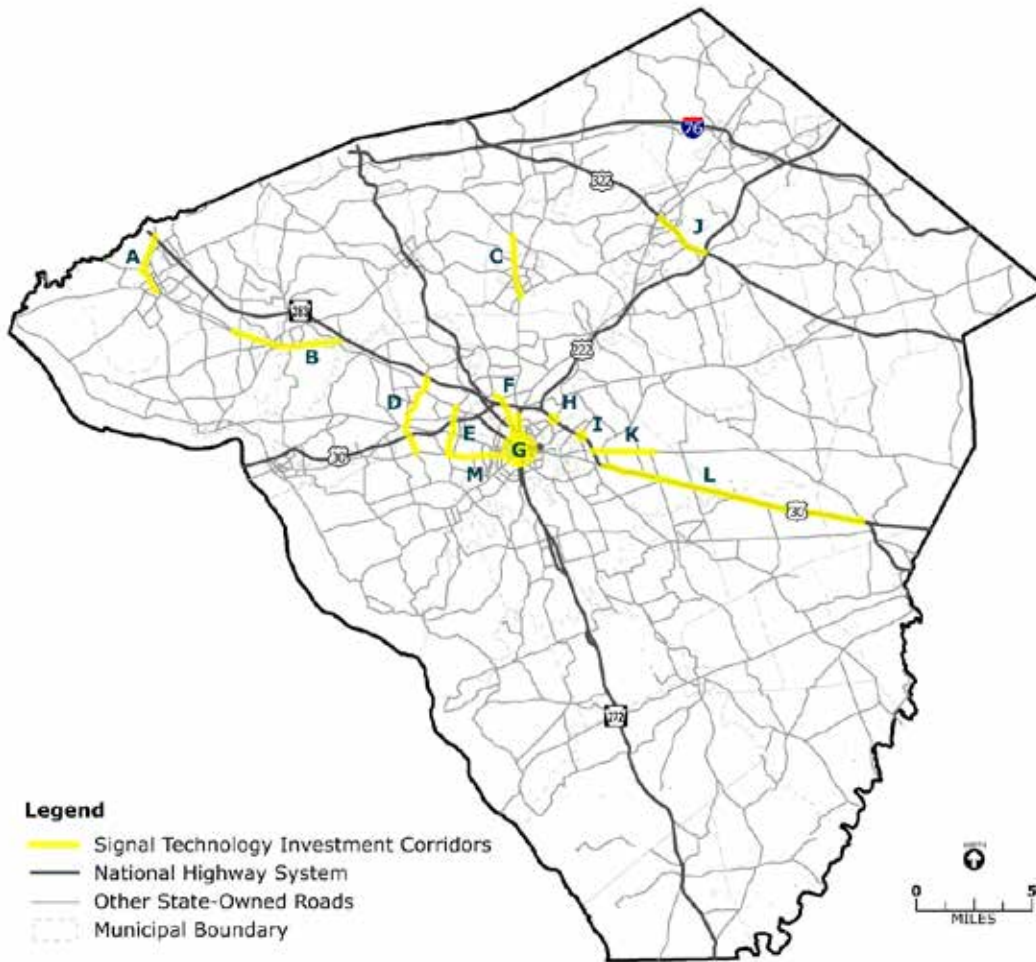
- Based on available data, the Lancaster MPO continues to monitor the impacts of completed signal improvement projects. Understanding these benefits is important for evaluating potential signal technology benefits in other corridors.
- Travel time data obtained by PennDOT has been used to measure the benefits of adaptive signal technology implemented along Lititz Pike. The chart highlights the percentage benefits for different day and time periods.
- Signal technology has provided a nearly 25 percent improvement in average daily travel time through this corridor. The benefits are highest during times of variable traffic or outside of the typical morning and evening commute times.

Updating or fine-tuning traffic signals along busy routes could noticeably reduce delay.

Opportunities for Improved Signal Operations

- There are 503 traffic signals in Lancaster County, as shown on the map. Many of those are currently part of coordinated systems (i.e., signal timings are connected).
- In addition to our coordinated signal systems, new signal technology, including ATSPMs and adaptive signals, may provide additional benefits to operations and corridor congestion levels.
- Both PennDOT and the Lancaster MPO continue to evaluate potential opportunities and locations to integrate enhanced signal technology.





Corridors for Signal Technology Investment

Map ID	Corridor	Strategies under Consideration*	Priority Rank**
A	PA 230 Elizabethtown	ATSPMs; Flashing yellow arrow for NB left at 743/283 ramps	
B	PA 230 Mt Joy	ATSPMs; RTMC Signal Control	
C	PA 501 Lititz	ATSPMs; RTMC Signal Control	
D	Centerville Rd	To be determined	4
E	PA 741	Upgrade signal timers; RTMC Signal Control	
F	PA 72 Fruitville Pike	ATSPMs; RTMC Signal Control	3
G	Downtown Signals	ATSPMs; RTMC Signal Control; Prioritize timing for transit	2
H	New Holland Ave	RTMC Signal Control	
I	Greenfield Rd	Ramp metering on WB on-ramp	
J	US 322	To be determined	
K	PA 340	To be determined	5
L	US 30	RTMC Signal Control for E. Lampeter signals	1
M	PA 462	To be determined	

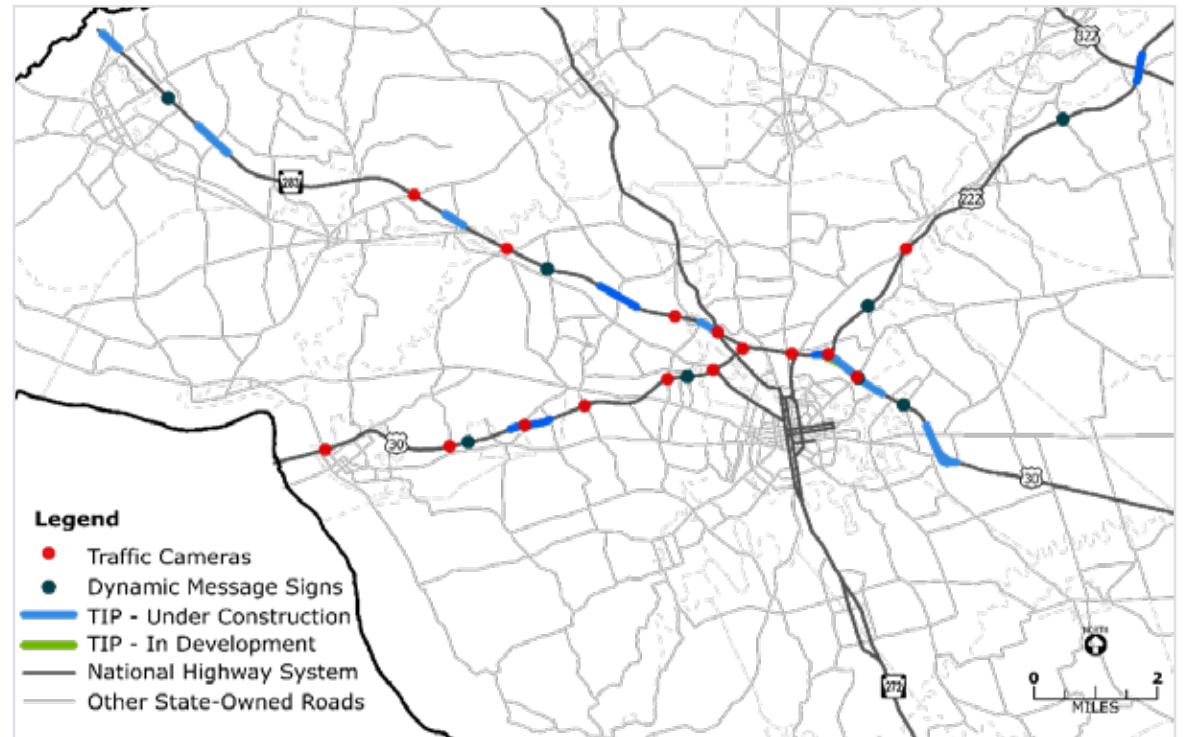
*Strategies under consideration in the Regional Operations Plan (ROP)
 **Priority rank (top five) based on potential congestion benefit as determined through analytical assessment using FHWA's TOPS-BC tool.
 ATSPMs = Automated Traffic Signal Performance Measures
 RTMC = Regional Traffic Management Center

Target Areas for Signal Technology Strategies

- Potential areas for signal technology strategies have been assessed in PennDOT's Eastern Region ROP and through additional assessments completed by the Lancaster MPO.
- The map highlights key opportunities and target areas for signal technology improvements within the county. Utilizing FHWA sketch planning tools,⁶ each of these roadway segments was analyzed to determine the potential travel time savings that could be expected with implementation of these strategies. The analyses utilized existing roadway characteristics, traffic volumes, and existing congestion levels. Corridors with the highest priority levels are noted in the table.

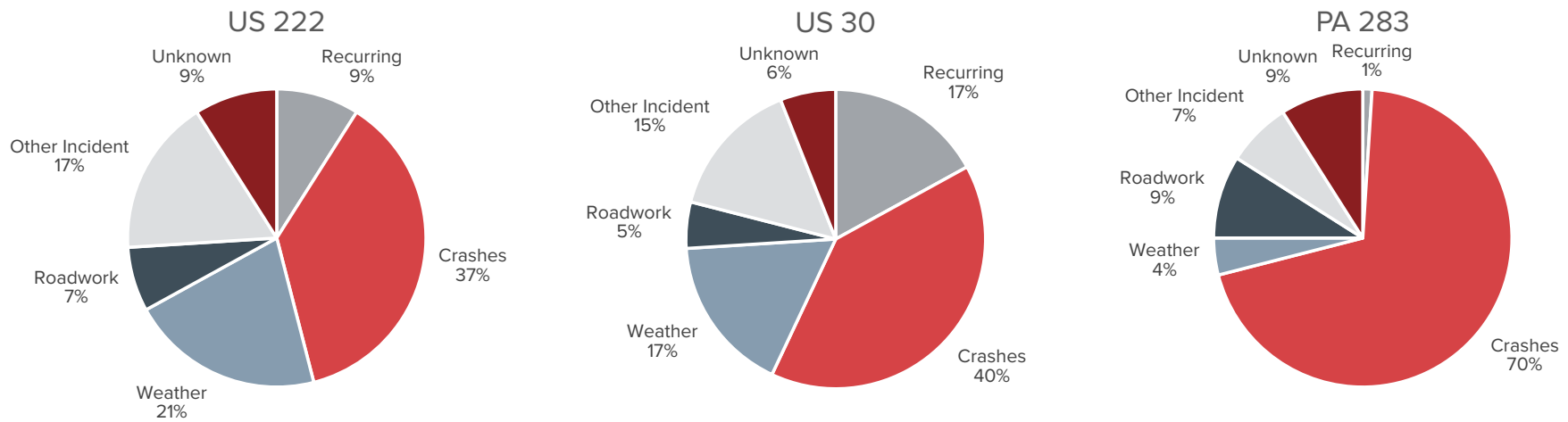
6 FHWA Tool for Operations Benefit Cost Analysis: <https://ops.fhwa.dot.gov/plan4ops/topsbctool/index.htm>

Incident management rapidly addresses crashes and other problems to safeguard those involved and get traffic moving as soon as possible.



Incident Management Strategies

- Recurring congestion takes place virtually every day when and where typical traffic demand exceeds the existing roadway capacity. Non-recurring congestion is caused by irregular events such as crashes, roadway hazards, highway construction, adverse weather, and special events. Both types of congestion need to be addressed in different ways to effectively deal with the full spectrum of congestion.
- Incident management consists of a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents and restore traffic flow as safely and quickly as possible.
- Strategies include dynamic message signs (DMS), incident response patrol teams, direction from regional traffic management centers (RTMCs), and road weather information systems (RWIS). Often these strategies are grouped under the category of Intelligent Transportation Systems (ITS).
- Applied effectively, such strategies can reduce the duration and impacts of traffic incidents and improve the safety of motorists, crash victims, and emergency responders.
- Over the last decade, significant efforts have been made to improve ITS infrastructure within Lancaster County. The map highlights current ITS infrastructure and projects currently underway or anticipated to begin in the next four years.



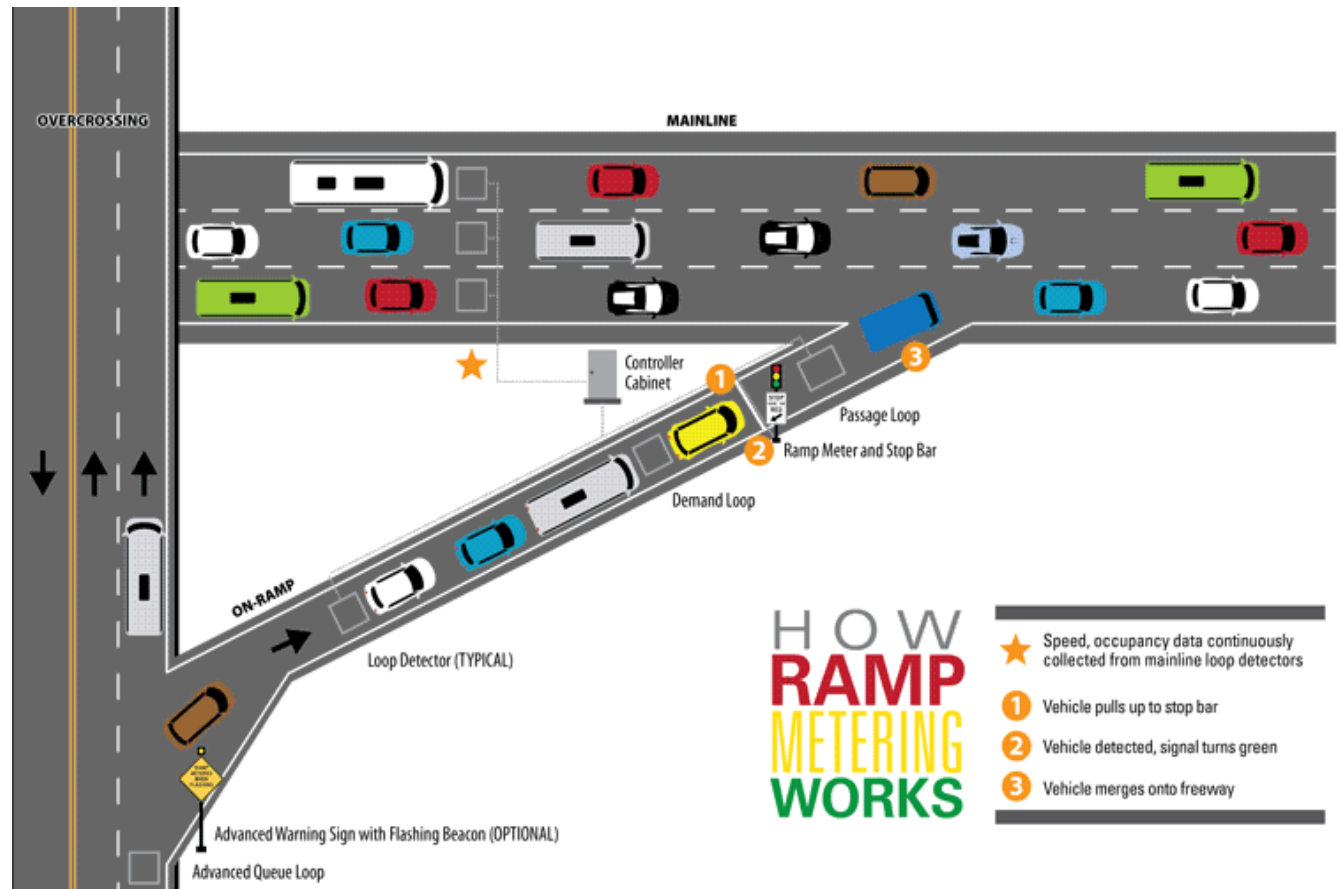
Congestion Causes for Corridors with Highest Percentage of Non-Recurring Delay

Evaluating Areas for Future Incident Management Investment

- The Lancaster MPO is working with PennDOT to better understand congestion causes on key corridors within the region. The corridors with the highest percentages of non-recurring congestion are priority areas for incident management strategies.
- The majority of traffic delay on US 222, US 30, and PA 283 is related to crashes. The pie charts provide the estimated congestion causes for these corridors based on analyses of PennDOT data.
- For these corridors, some incident management practices are in place but studies are underway to assess improvements to infrastructure and communication.

Crashes are the primary cause of delay on our most congested roadways.

Ramp metering reduces gridlock by spacing out merging vehicles.



Ramp metering example

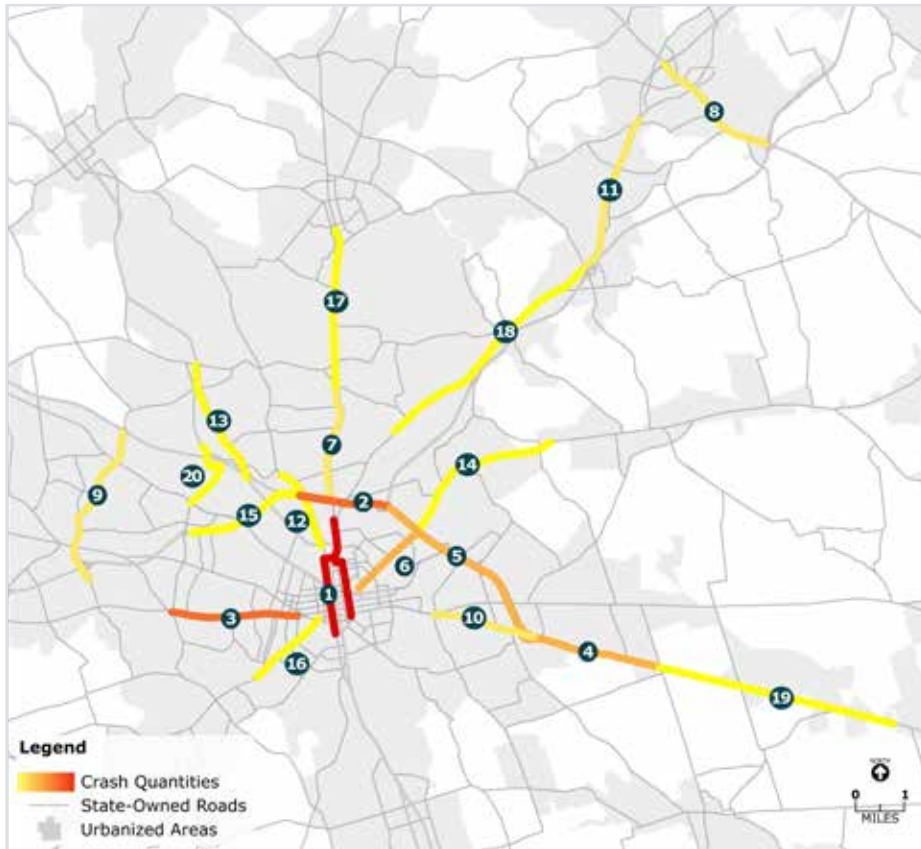
Source: FHWA (https://ops.fhwa.dot.gov/freewaygmt/ramp_metering/about.htm)



Queue warning example

Source: FHWA (<https://www.fhwa.dot.gov/publications/publicroads/14marapr/06.cfm>)

- Initial recommendations have included US 30 queue warning from PA 462 to PA 283, ramp metering at the US 30/Greenfield Road interchange, and additional ITS infrastructure along US 30 in the outlet shopping areas.
- Queue Warning Systems are used to alert motorists approaching congested work zones, predictable bottlenecks, or areas with sight distance limitations. These systems typically consist of Portable Changeable Message Signs (PCMS) in advance of a series of roadside sensors. When stopped or slowing vehicles are detected by these sensors, warning messages are displayed on the PCMS, alerting motorists of the impending traffic conditions.



Corridors with the Highest Number of Crashes

Corridors with the Highest Number of Crashes

Rank	Corridor
1	Prince, Queen, Church, and Lime Streets
2	US 30 from Fruitville Pike to US 222
3	PA 462 (Columbia Avenue)
4	US 30 from Oakview Road to PA 896
5	US 30 from US 222 to Oakview Road
6	PA 23 from Lancaster City to US 30
7	PA 501 from US 30 to Valley Road
8	US 322 from PA 272 to US 222
9	Centerville Road from US 30 to PA 462
10	PA 462 from PA 340 to US 30

- The Lancaster MPO continues to evaluate other corridors for potential ITS infrastructure, including other non-freeway roadways with high numbers of crashes. The map highlights the top 20 corridors which have the largest number of crashes in Lancaster County. Improvements at these locations may be integrated with the signal technology improvements discussed previously (e.g., special timings during incidents).
- In addition, other ITS strategies are being evaluated for special events including the Pennsylvania Renaissance Faire and the Field of Screams in October.

ITS strategies can help address recurring congestion as well as that due to special events.

Learn more on connected vehicle technology from USDOT's website:
https://www.its.dot.gov/research_areas/connected_vehicle.htm

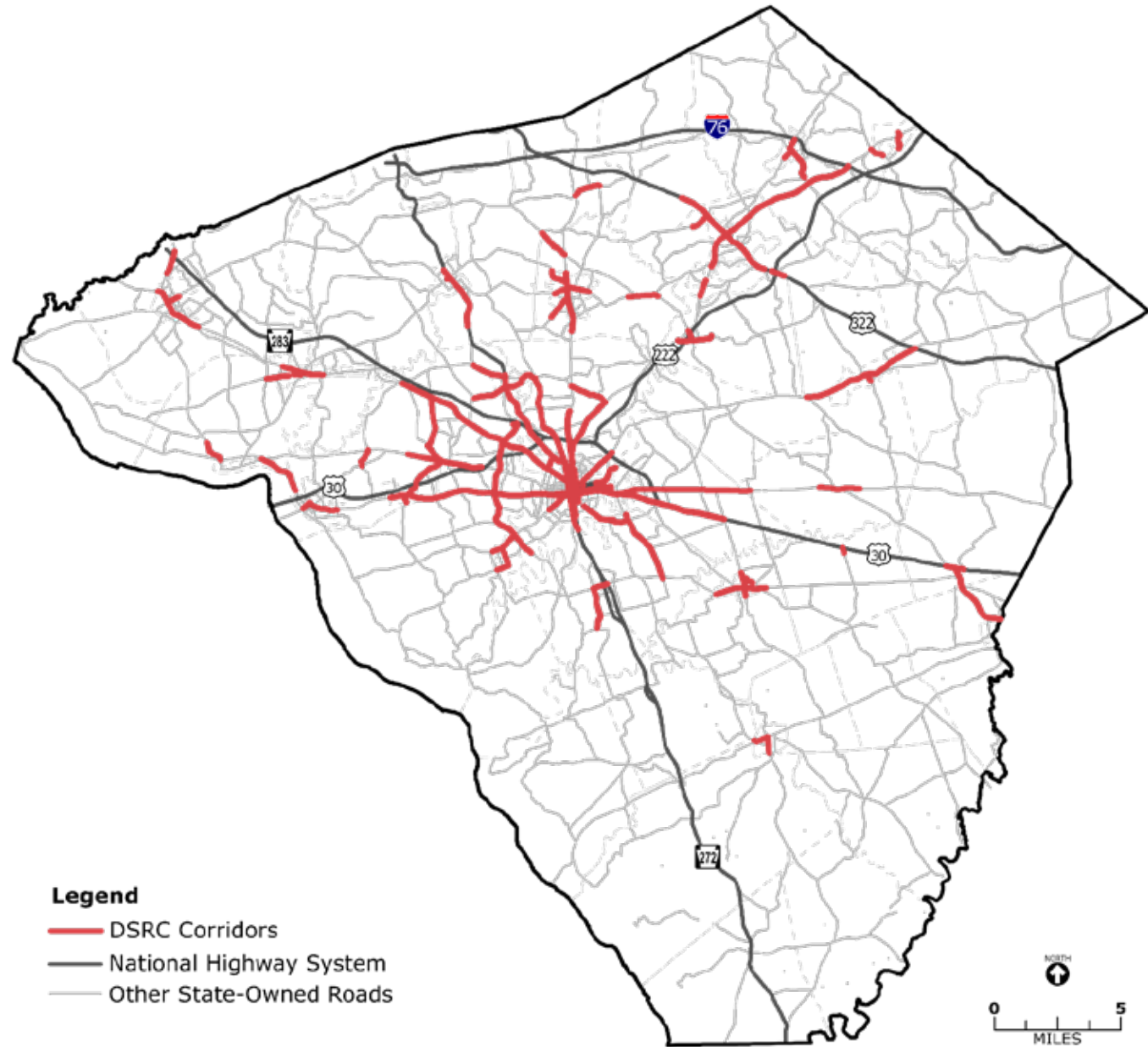


Example Connected Vehicle Technology Strategies

Source: USDOT

Other Future Technologies

- Emerging technologies that improve safety and traffic flow may significantly alter how Lancaster County's transportation system operates over the next 25 years. Some examples of emerging technology include commercial trucks driving in connected "platoons," driverless transit vehicles, and highly autonomous and/or connected private automobiles.
- These developments could reduce crashes and injuries while increasing existing roadway capacity and reducing traffic congestion. These technologies are rapidly evolving, so it is impossible to predict their specific impact over the 25-year plan period.
- While autonomous vehicle technology is forthcoming, connected vehicle technology is a nearer-term opportunity. This technology has the capability to operate under three different types of connections: vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and vehicle-to-everything (V2X). The illustration depicts how vehicles can be connected to existing transportation infrastructure such as traffic signals.



Priority Corridors for DRSC Technology

- In 2019, the [MPO Guide for Implementing Digital Short-Range Communication \(DSRC\) Technology](#) in PennDOT District 8-0 was developed. The study identified corridors for future DSRC implementation (shown on the map) by evaluating roadways with traffic signals as well as high crash rates at signalized intersections. Future efforts will integrate these priority corridors with the CMP and planned regional TIP/MTP projects to refine and prioritize a list of corridors that exhibit the greatest opportunities for installation of this technology.

Understanding our Travel Connections



Focus Topics for the MTP Connections Assessment

Overview

- Information is essential when it comes to making good investment decisions related to our transportation system. Knowing how and why people travel in our region helps us evaluate transportation needs, identify multimodal strategies, and prioritize investments.
- “Big Data” sources along with U.S. Census household and employment data are being used to help us better understand our travel connections within the region across multiple transportation plan focus topics as shown above.

Understanding the Data Sources

- Streetlight, Inc. is a company that sells information about where trips begin and end. This includes millions of data points from navigation systems in both personal and commercial vehicles and cell phones that are combined and scrubbed to remove any personal information. The data

was purchased for vehicle trips that start, end, or travel through Lancaster County in 2018. In the future, more information will be available on other modes, such as bicycling and walking trips.

- To evaluate regional connections using Streetlight data, 33 regional zones were created within Lancaster County. These zones represent Lancaster City, boroughs, and other combinations of townships. Trips from outside the county are grouped into nine boundary zones that tell us generally where the trips entered or left the county.
- The U.S. Census Bureau has many resources for information about households and demographics. The Census Longitudinal Employer-Household Dynamics (LEHD) produces several data products that can be used to characterize workforce travel connections. The information is synthesized from unemployment insurance earnings data as well as census employment and wage data.

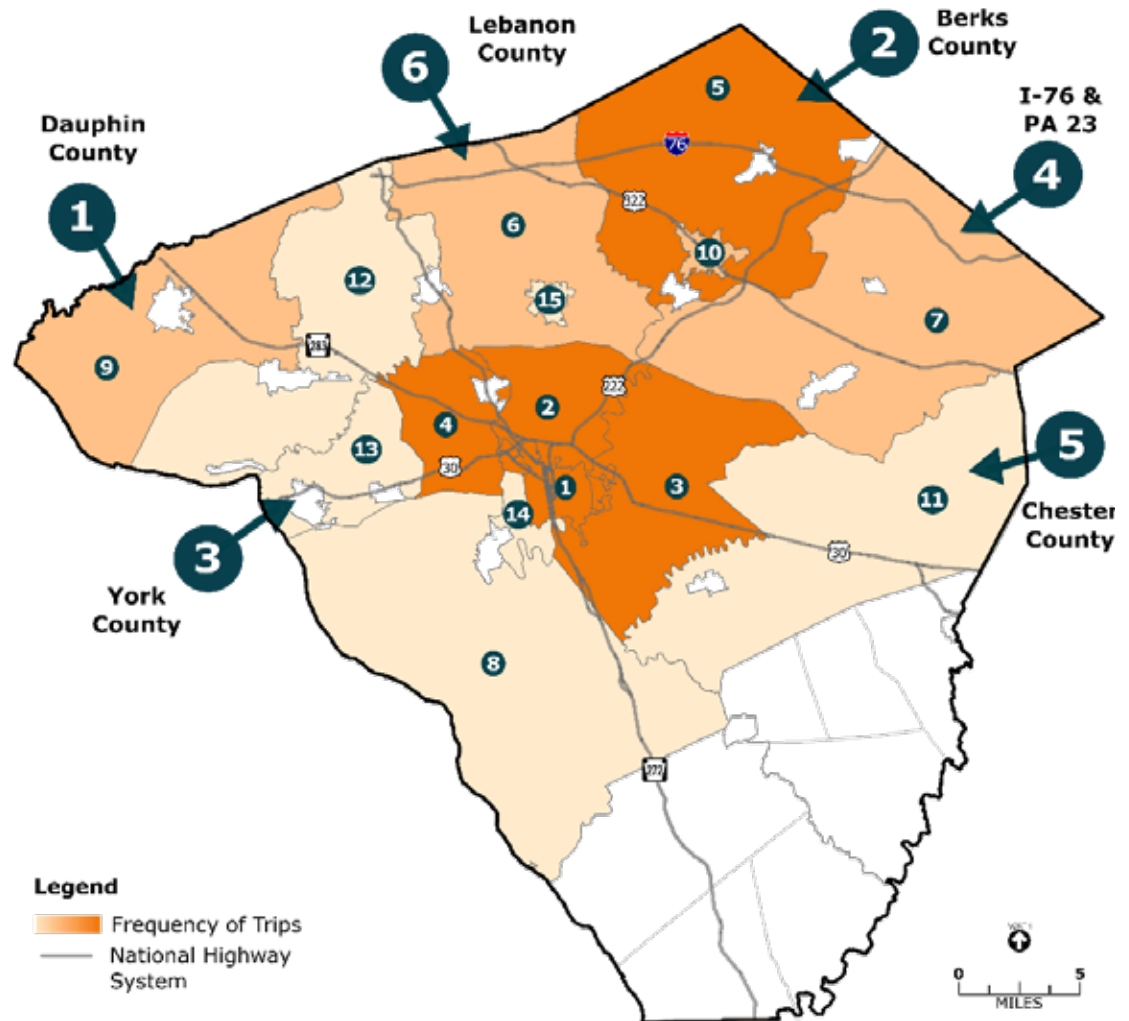
Weekday Trip Characteristics

Key Trip Generators

- Most weekday personal vehicle trips are generated in and around Lancaster City, as illustrated on the map. The city and Manheim Township are the top trip origins and destinations.
- The northern areas of Lancaster County also show higher numbers of trips than other rural sections of the county, most likely influenced by connections to the Pennsylvania Turnpike, Ephrata, and Adamstown.
- Dauphin and Berks counties are the top connections for weekday trips destined to or originating from areas outside of Lancaster County. There are a significant number of commuters between the Harrisburg region and Lancaster.

Purpose and Timing of Trips

- The charts on page 67 present the distribution of weekday vehicle trips by trip purpose and time of day. At least 22 percent of total trips are attributed to the home–work daily commute, which correlates to the 20 percent of trips occurring during the morning peak period.
- Higher non-home trips (i.e., those starting and ending away from home) are seen in the urbanized areas and are most likely attributable to lunch trips and trip chaining for shopping and other services.
- Trips by time period are relatively consistent across the county. Trips to or from Dauphin County reflect a higher percentage of trips in the morning hours, ranging from 25 to 30 percent.

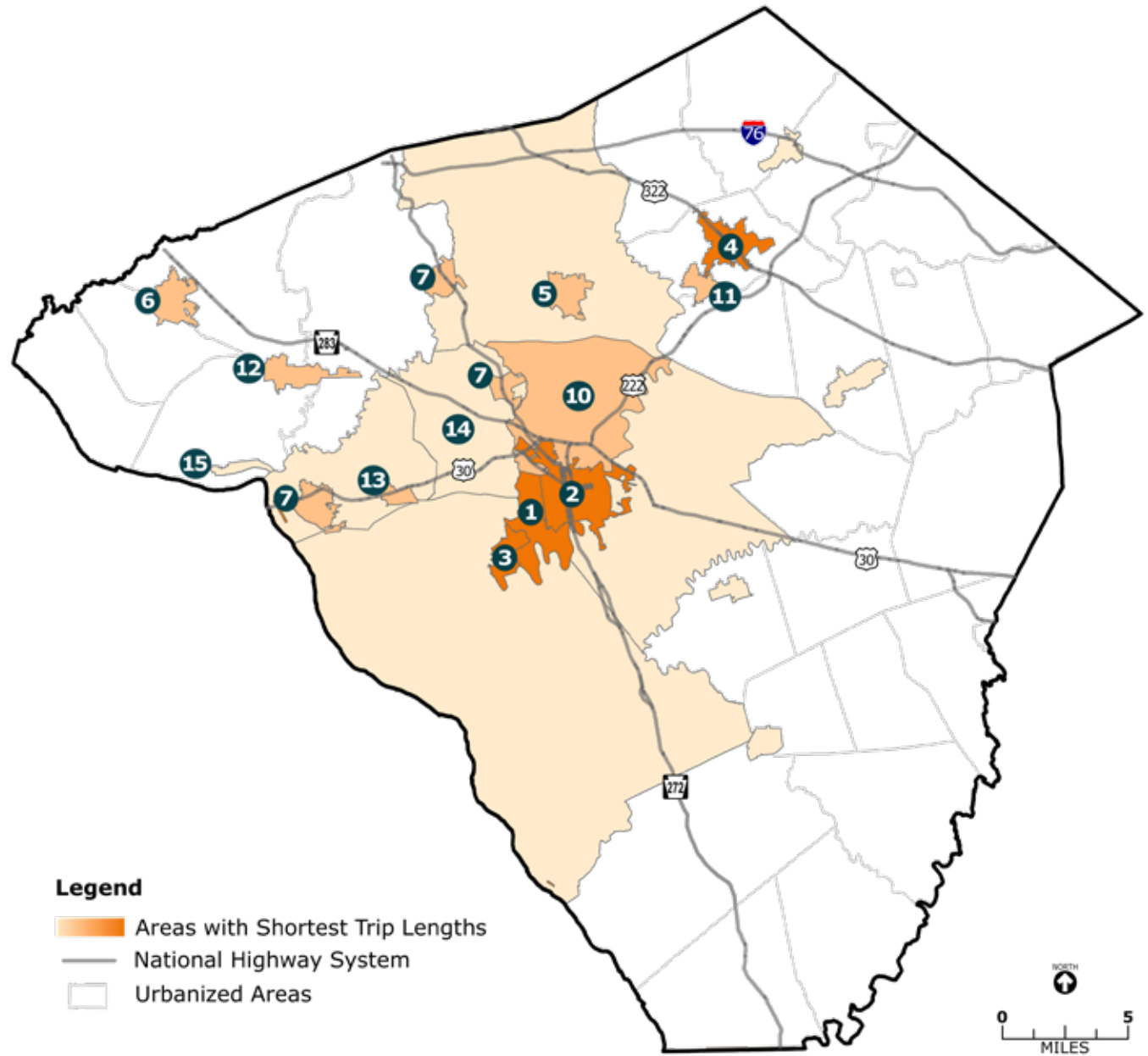


Ranking of Trips by Zone

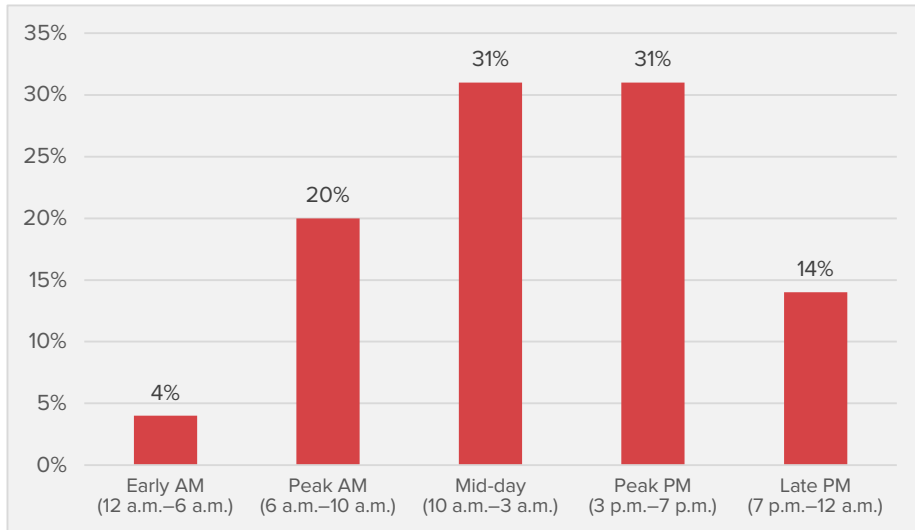
Mixed land uses, such as homes and shops in close proximity, allow shorter trips.

Distance of Trips

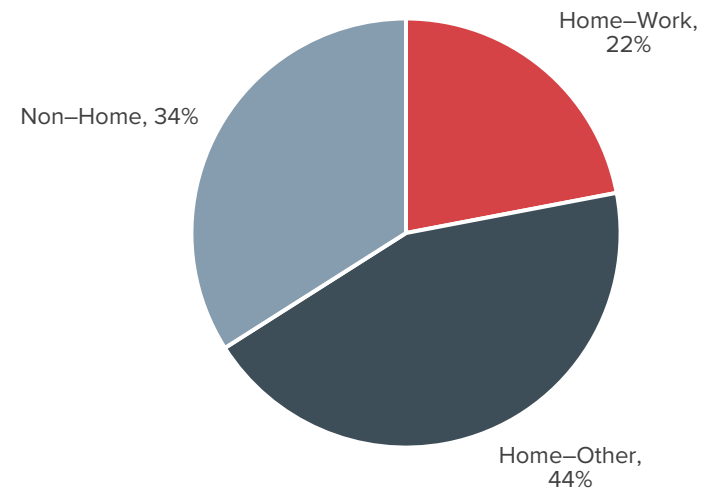
- The map illustrates the areas that have the shortest trip lengths over the entire day. The city and boroughs rank the highest in the percentage of trips that are of shorter average distance. In Lancaster City, approximately 60 to 70 percent of the vehicle trips are less than five miles.
- Areas with shorter trip distances are typically those that have mixed land uses. Housing within the vicinity of employment centers, shopping, recreation, and other services can greatly reduce the distances of travel.
- *places2040* emphasizes the need to focus future housing and employment growth within the city, boroughs, and abutting urbanized growth areas.



Areas with the Shortest Trip Lengths



Trips by Time of Day



Trips by Purpose

What does the data tell us?

- The trip data justifies investments in our urbanized areas and our key out-of-county connections to Dauphin, Berks, and York counties.
- We should broaden our focus to operational and other improvements that may also benefit travel during the mid-day time period. As discussed previously, signal technology can have significant benefits in addressing travel times outside the normal morning and evening peak hour commute times.
- Where and how people are working has changed in recent years—perhaps influenced by more people teleworking than ever before. This trend could further impact the purpose and timing of trips throughout our county. These issues need to be evaluated as we think about the cost-effectiveness of planned transportation strategies.
- The data provides context for potential benefits of mixed-use development in providing opportunities for housing, employment, and a range of shopping and services in one location to potentially reduce trip distances and the number of non-home vehicle trips.
- There are opportunities to identify multimodal alternatives for travel in our county’s urbanized areas and boroughs. Vehicle trips are shorter in these areas. Are there ways we can divert those travelers to other means of travel that include transit, biking, and walking? Or can we identify ways to further evaluate our land use mix to reduce the need for these numbers of short trips?

Commuting Connections

Regional Assessment

- Census LEHD data (2017) indicates that 66 percent of Lancaster County’s employed residents work in Lancaster County. About 34 percent of county residents are employed outside of Lancaster County. In 2002, it was estimated that about 24 percent of residents worked outside the county, indicating an increasing trend over the last two decades.
- Similarly, nearly 69 percent of Lancaster County’s workforce lives within the county and about 31 percent lives outside the county. This percentage of workers coming from outside Lancaster County has also grown since 2002.

Regional Assessment of Commuting Patterns

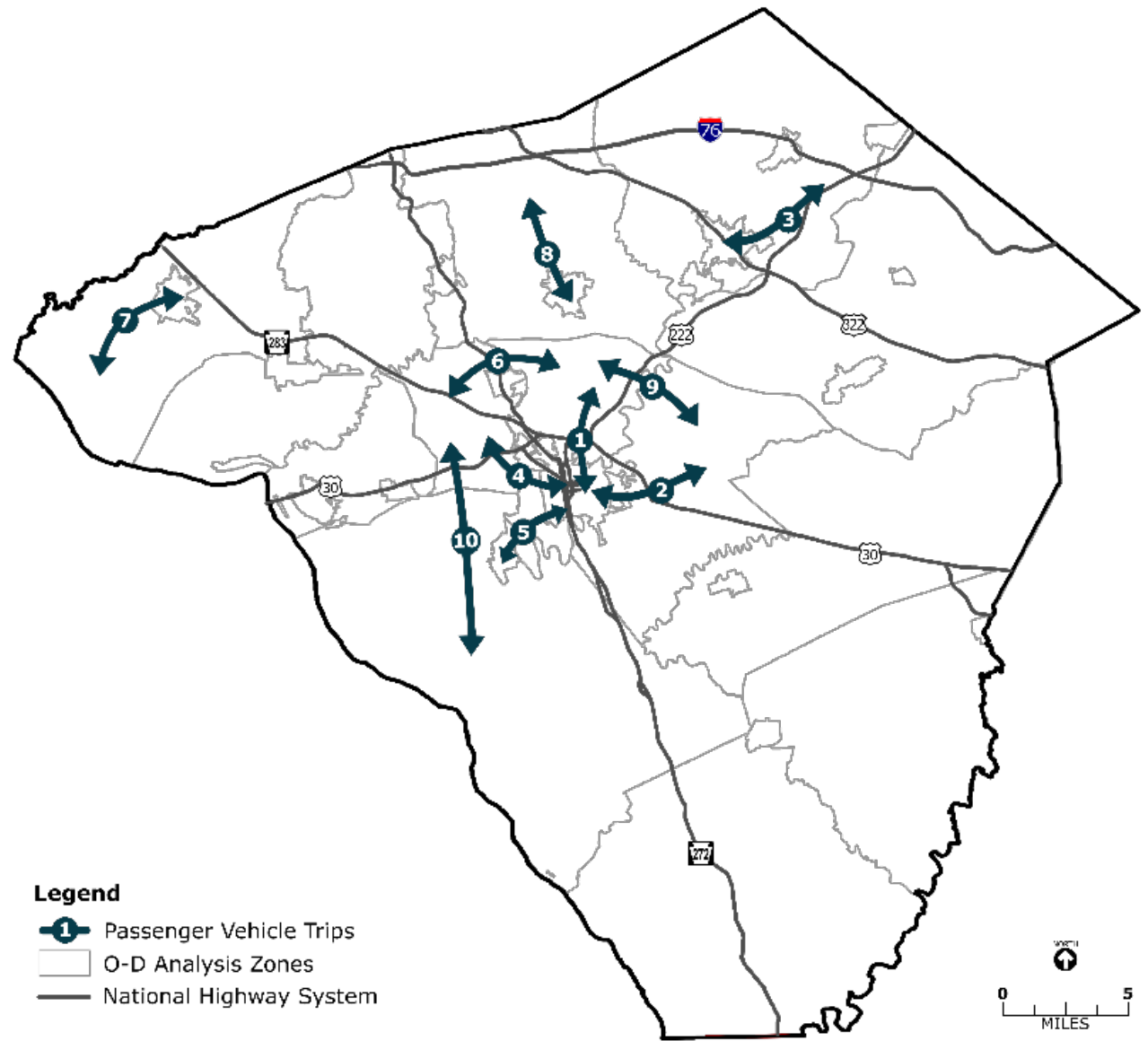
Lancaster Workers		
	Count	Percentage
Total Employed in Lancaster County	228,985	100%
Employed in County, Residing Elsewhere	70,937	31%
Employed in and Residing in County	158,048	69%
Lancaster Residents		
	Count	Percentage
Total Residing in Lancaster County	237,770	100%
Residing in County, Working Elsewhere	79,722	34%
Residing in and Employed in County	158,048	66%

Top Commuting Connections in County

- The tables highlight the top commuting connections for those working or living outside of Lancaster County based on U.S. Census LEHD data.
- The StreetLight data has also been used to assess vehicle commuting connections within the county. These connections relate primarily to travel occurring in the morning and evening peak periods during a typical weekday.
- Based on the data, the greatest number of commuting connections start and end in the same regional analysis zone. These include, in order of number of trips:
 1. Lancaster City
 2. East and West Lampeter Township
 3. Manheim Township
 4. East Hempfield Township
- Key intermunicipal commuting connections within the county have also been assessed and ranked. The map on the following page highlights the top connections based on the number of commuters. The strongest intermunicipal commuting connections are shown on the accompanying table.
- *places2040* emphasizes establishing better connections among our city, towns, and boroughs, referred to as “priority places.” The strongest connections between these priority places is currently (in order from most to least commute trips):
 1. Millersville Borough to Lancaster City
 2. Lititz Borough to Lancaster City
 3. East Petersburg Borough to Lancaster City
 4. Ephrata Borough to Lancaster City
 5. Manheim Borough to Lancaster City

Top Ten Intermunicipal Commuting Connections

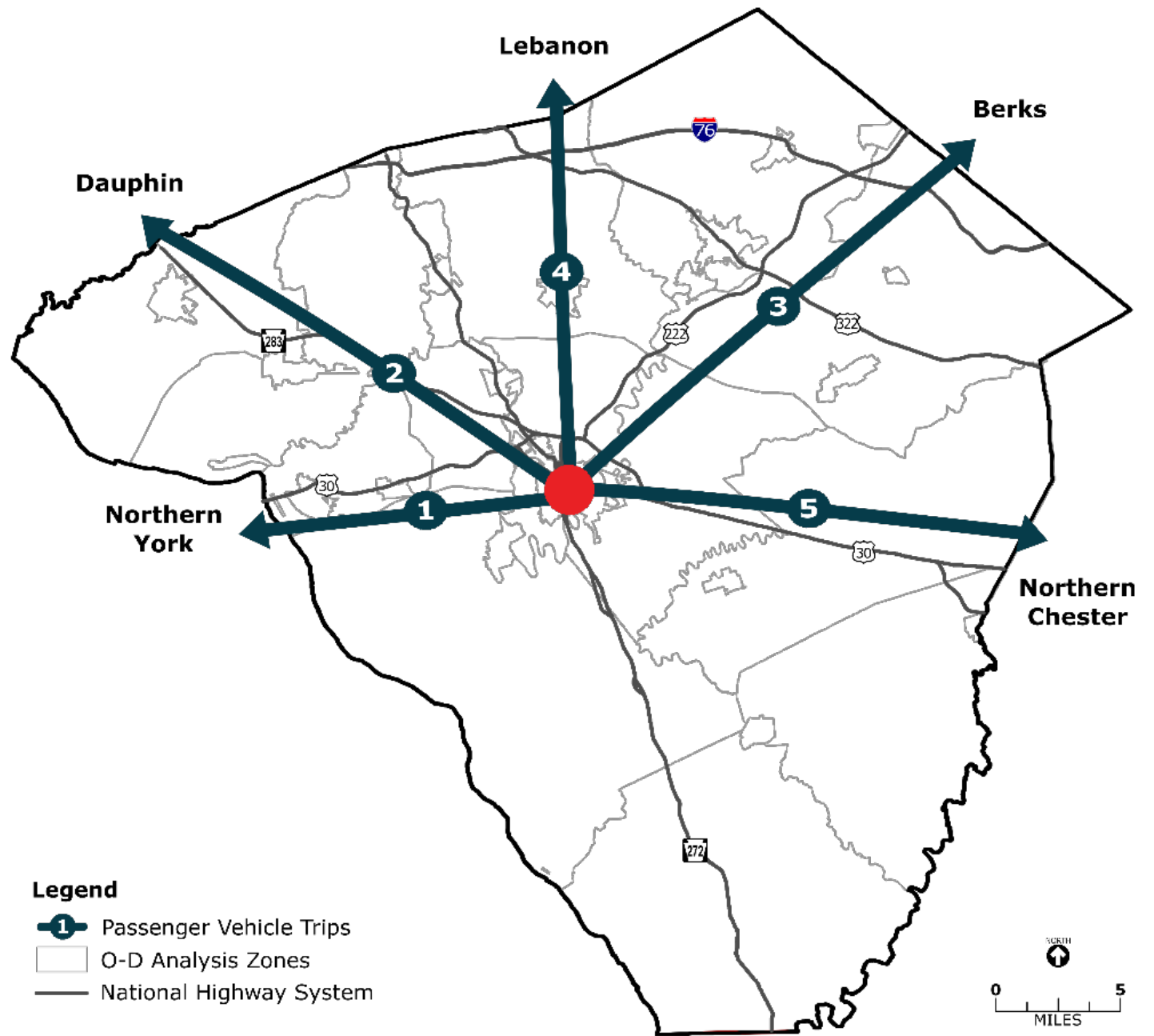
Rank	Commute-Connected Municipal Pairs	
1	Lancaster City	Manheim Township
2	Lancaster City	East & West Lampeter Townships
3	Ephrata Borough	East & West Cocalico, Ephrata, Clay Townships
4	Lancaster City	East Hempfield Township
5	Lancaster City	Lancaster Township
6	East Hempfield Twp	Manheim Township
7	Elizabethtown Borough	Mount Joy, East & West Donegal, Conroy Twps
8	Lititz Borough	Warwick, Penn, Elizabeth Townships
9	Manheim Township	East & West Lampeter Townships
10	East Hempfield Township	Millersville, Manor, Conestoga, Martic, Pequea, Providence Townships



Highest-Ranking Commuting Connections

Longer Commute Connections

- Lancaster City is the primary destination for county residents' commuting trips. The city is also the primary destination for commuting from neighboring counties. The map and tables on the following page show the highest-ranked commuting connections from outside Lancaster County. The origin-destination data indicates that nearly 75 percent of out-of-county commute trips to Lancaster City are from Dauphin, York, and Berks counties via key routes such as US 30, PA 283, and US 222, respectively.



Top Out-of-County Commute Connections to Lancaster City

Lancaster Commuting Connections with Other Counties

Lancaster Residents Working in Other Counties

Rank	County of Employment	Percentage of Lancaster Residents
1	Dauphin	4.7%
2	York	4.4%
3	Chester	4.1%
4	Berks	3.2%
5	Montgomery	2.3%
6	Lebanon	1.9%
7	Cumberland	1.5%
8	Philadelphia	1.4%
9	Delaware	1.3%
10	Lehigh	0.8%

Lancaster Workers Residing in Other Counties

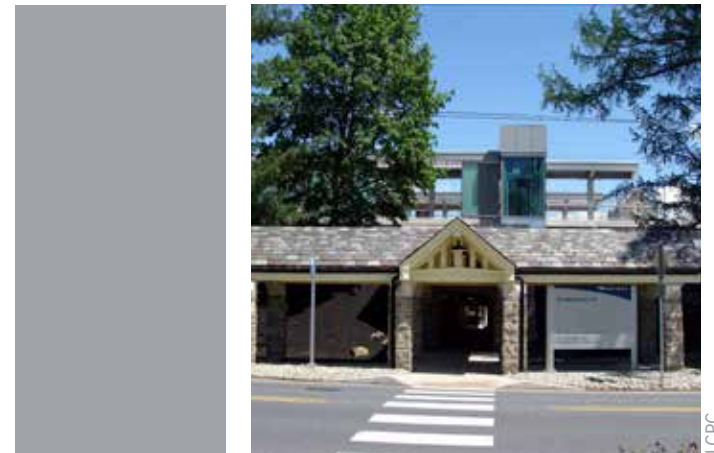
Rank	County of Residence	Percentage of Lancaster Workers
1	York	5.3%
2	Berks	4.3%
3	Lebanon	3.3%
4	Chester	2.6%
5	Dauphin	2.2%
6	Montgomery	1.1%
7	Cumberland	1.0%
8	Philadelphia	1.0%
9	Bucks	0.6%
10	Lehigh	0.6%

How Can This Data be Used?

- Understanding commuting connections provides the MPO important information that can be used in assessing and prioritizing our regional investments in our MTP and TIP programs.
- The information can also be integrated into our active transportation and transit development plans to inform the selection of focus corridors for further study.
- Providing these baseline assessments will help us understand and monitor future land use changes and their potential impacts on the transportation system.



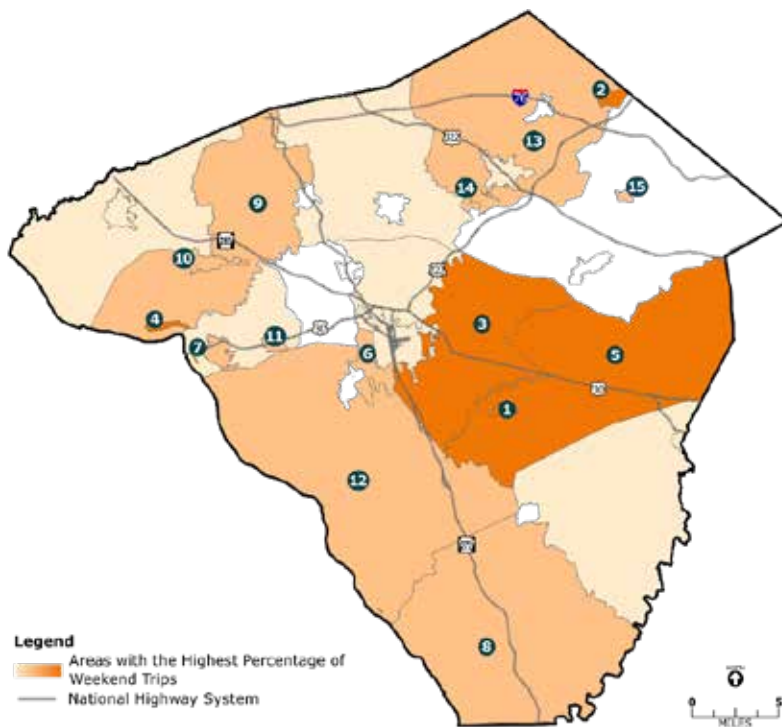
LCPC



LCPC



Shutterstock



Areas with Highest Percentage of Weekend Trips

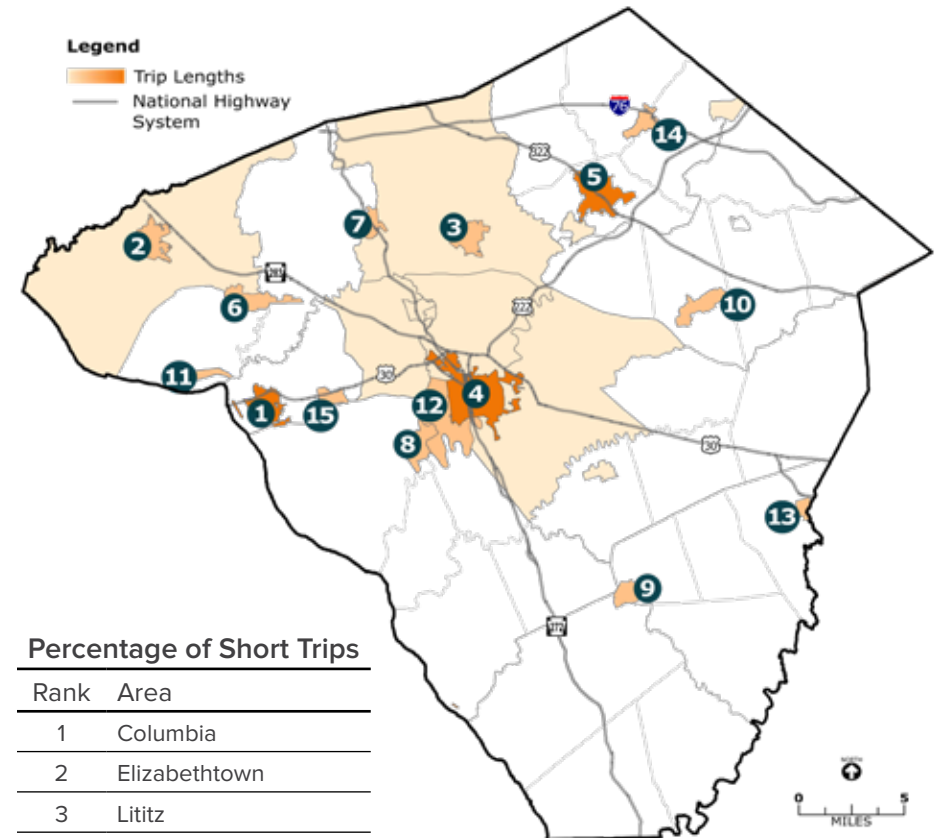
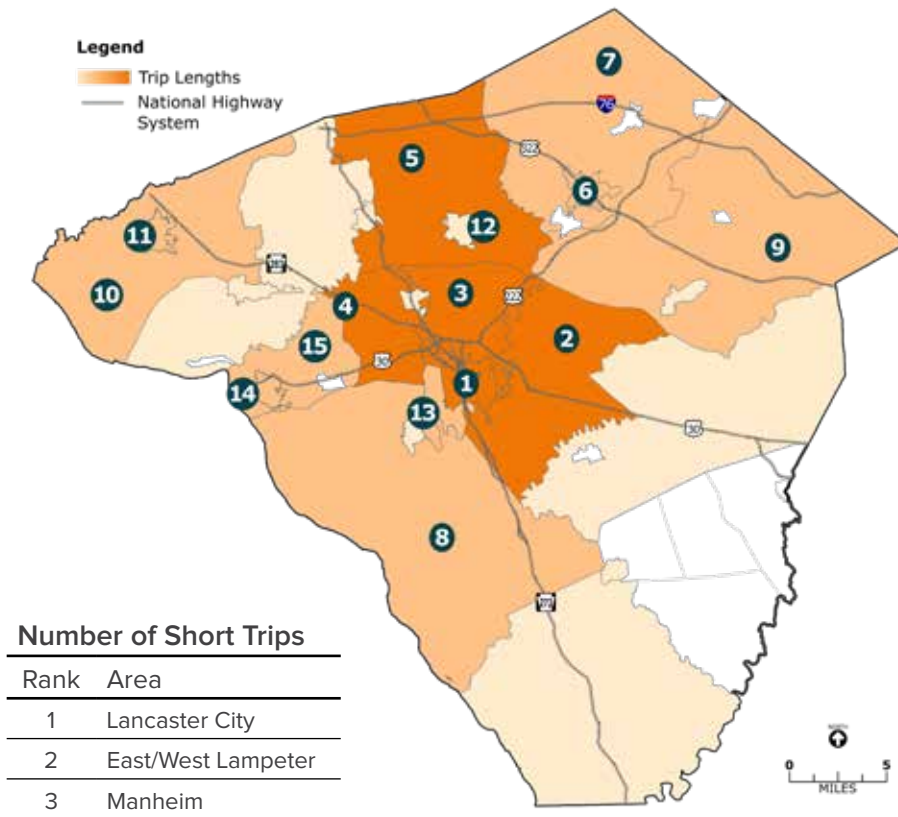
Tourism

Evaluating Weekend Trips

- An evaluation of weekend travel connections was conducted to better identify key tourism connections from nearby counties.
- The map highlights areas within the county that have the highest percentage of weekend trips as compared to weekday trips. The top areas include (in order from highest to lowest):
 1. Strasburg Borough
 2. Adamstown
 3. East-West Lampeter Townships
 4. Columbia Borough
- It is difficult to discern the home location for many of the tourist trips as visitors often stop at multiple locations for their visits. As such, these intermediate destinations skew the data to short-distance trips.
- For trips destined to the US 30 outlet and attractions corridor, the primary out-of-county origins include US 30 (Chester County), followed by Berks County (US 222) and Dauphin County (PA 283).

Building upon Existing Data

- More information is needed to better understand our tourism connections. The MPO will continue to work with Discover Lancaster to better understand who is visiting our county. Targeted surveys during key travel months may garner better information on our region’s visitors and help identify opportunities to improve their access to these destinations.



Areas with Highest Percentage of Short Trips (less than two miles long)

Active Transportation

Opportunities for Reducing VMT

- The available origin-destination information only reflects vehicle trips. However, the data can provide insights into regions and corridors where bicycle and pedestrian infrastructure may provide the most opportunity for reducing vehicle travel. In the future, emerging commercial data sources and pedestrian and bicycle counts done by the MPO may provide additional information that can inform these analyses. The figure above

identifies areas within the county with the highest number of vehicle trips that are 0-2 miles long.

- Lancaster City and East and West Lampeter Townships are the three areas with the highest number of short vehicle trips. When ranked on a percentage basis, Columbia, Elizabethtown, and Lititz have the highest percentage of short vehicle trips.

Percentage of Personal Trips by Length for Average Day										
Location	Corridor	Distance								
		0-1 mi	1-2 mi	2-5 mi	5-10 mi	10-20 mi	20-30 mi	30-40 mi	40-50 mi	50+ mi
PA 501 - Lititz Pike	1B	0%	1%	20%	37%	31%	8%	2%	1%	1%
	2	1D	2%	8%	22%	29%	29%	7%	1%	1%
PA 272 - Oregon Pike	2B	1%	3%	22%	28%	29%	10%	4%	1%	1%
	2D	0%	1%	7%	19%	49%	16%	5%	1%	1%
PA 23 - New Holland Pike/Avenue	3D	1%	4%	11%	22%	42%	15%	4%	1%	1%
PA 340 - Old Philadelphia Pike	4B	1%	2%	1%	22%	32%	19%	9%	3%	1%
US 30	5D	0%	0%	5%	23%	41%	22%	7%	1%	1%
	5E	1%	4%	13%	22%	25%	19%	11%	4%	1%
King Street (PA462 East)	6A	1%	5%	36%	32%	18%	6%	1%	1%	1%
US 222/PA 272 - Willow Street Pike	7A	0%	1%	15%	30%	27%	17%	5%	3%	1%
PA 741 - Rohrerstown Road	8B	1%	3%	18%	29%	32%	12%	3%	1%	1%
	4	8C	2%	6%	20%	28%	28%	11%	3%	1%
	8D	1%	3%	18%	29%	32%	12%	3%	1%	1%
PA 462/PA 441 - Columbia Avenue	5	9A	2%	5%	29%	37%	21%	4%	1%	0%
PA 23 - Marietta Pike	10B	1%	3%	23%	40%	27%	5%	1%	0%	1%
Harrisburg Pike (SR 4020)	11D	0%	2%	25%	35%	27%	7%	2%	1%	1%
Manheim Pike (PA 72)	12C	1%	5%	20%	28%	29%	12%	3%	1%	1%
PA 896/PA 741	14C	1%	4%	19%	20%	32%	14%	6%	4%	1%
PA 41	15A	1%	2%	11%	15%	27%	20%	12%	11%	2%
PA 999 & SR 3029 - Millersville Pike, George/Frederick Sts.	16B	0%	2%	34%	39%	18%	4%	1%	0%	1%
PA 230/PA 743	17A	1%	3%	20%	43%	22%	7%	2%	1%	1%
State Road/ Centerville Road	18B	0%	3%	22%	31%	34%	8%	1%	0%	0%
PA 462 & SR 1002 - King and Orange Streets	1	19C	5%	15%	34%	25%	14%	5%	1%	1%
US 222 - Prince, Queen, Church & Lime	3	20B	2%	8%	28%	23%	22%	11%	3%	2%
US 322	21C	0%	2%	5%	21%	41%	19%	9%	2%	1%

CMP Corridors with the Highest Number of Short Trips

- Trips less than two miles long were also evaluated for the priority corridors identified in the Lancaster County Congestion Management Process (CMP). The analysis identified focus corridors (highlighted to the left) where active transportation can serve a larger role in replacing short vehicle trips, indicating increased potential for bicycle and pedestrian infrastructure.

Building upon Existing Data

- Lancaster’s Active Transportation Plan has provided a comprehensive assessment of bicycle and pedestrian needs within the county.
- The MPO will continue to integrate existing and future data to help determine the priority of potential investments. More data is needed on existing active transportation connections, including where current bicycle and pedestrian activity occurs.

Environmental Justice

Travel Connections Vital to Low-Income Residents

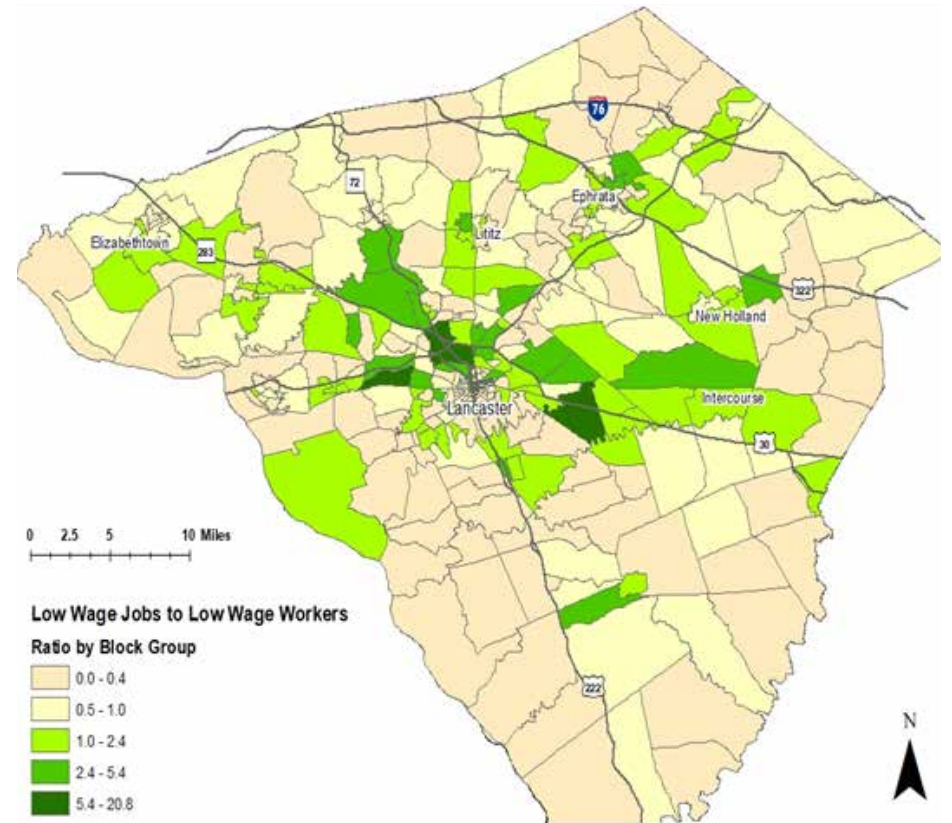
- Transportation decisions must consider the needs of our low-income and minority populations. Typically, these needs are identified through public outreach efforts related to the MTP and through a benefits and burdens analysis of the transportation program.
- The origin-destination travel data has been integrated with U.S. Census demographic data. This allows for an evaluation of key connections for vehicular travel to and from locations with low-income populations.
- Many of the low-income connections mirror that of the general commuting assessment. As expected, these connections are primarily between the urbanized townships and Lancaster City. The accompanying table highlights the top five low-income travel connections.

Access to Low-Wage Jobs

- Census employment statistics have been assessed to compare the number of low-wage jobs to low-wage workers in Lancaster County. The map highlights key areas in the county where there are more low-wage jobs than workers. It is anticipated these areas may be important destinations for our low-income population. Some key locations include:
 - Park City Mall and shopping locations along Fruitville Pike
 - US 30 outlets
 - Industrial locations along US 30 in East Hempfield Township

How Can This Data Be Used?

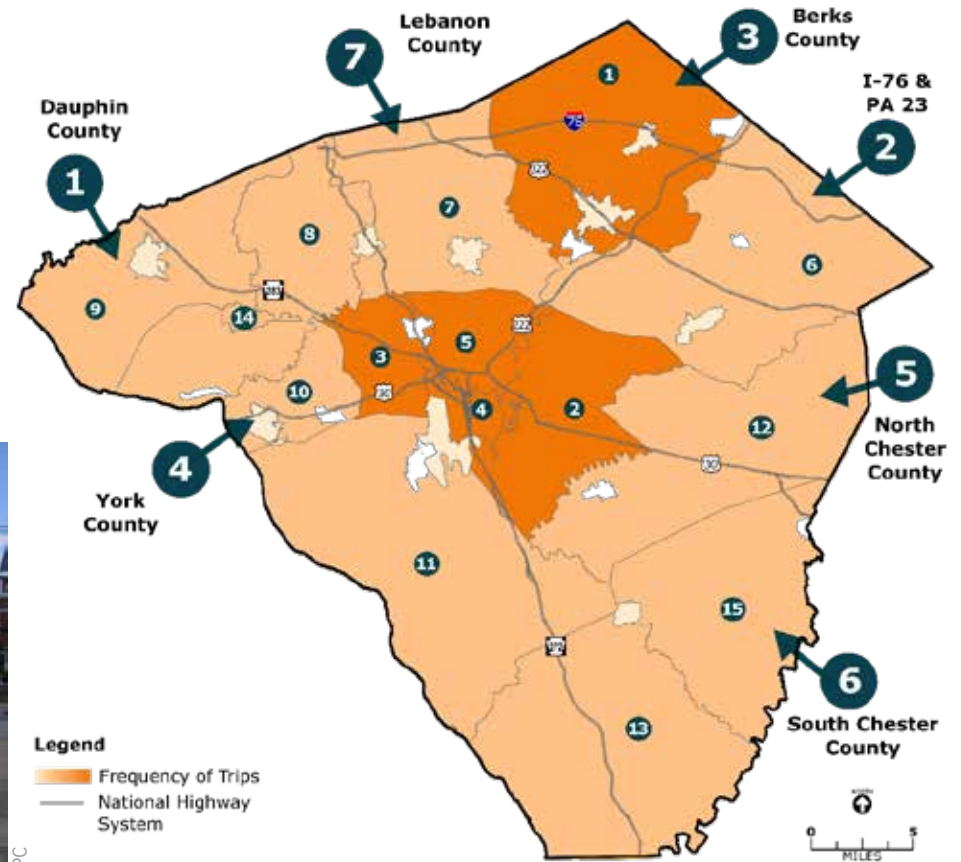
- Current programmed investments can be evaluated to determine whether they support access to areas of need by low-income or minority populations, as part of the Lancaster MPO’s environmental justice requirements.
- The data will also be used to evaluate service connections for public transit and other multimodal options to better connect these workers to job opportunities. It can also be used to evaluate the important links between housing, jobs, and transportation as a way of implementing key policies in *places2040*. The policies are aimed at reducing people’s reliance on the automobile and making it easier to walk, use a bicycle, or take transit.



Important Areas of Connection for Low-Wage Workers

Top Five Low-Income Travel Connections

Rank	Municipal Pairs
1	Lancaster City Manheim Township
2	Lancaster City East & West Lampeter Townships
3	Lancaster City East Hempfield Township
4	Lancaster City Lancaster Township
5	East Hempfield Twp Manheim Township



Ranked Locations for Truck Trips

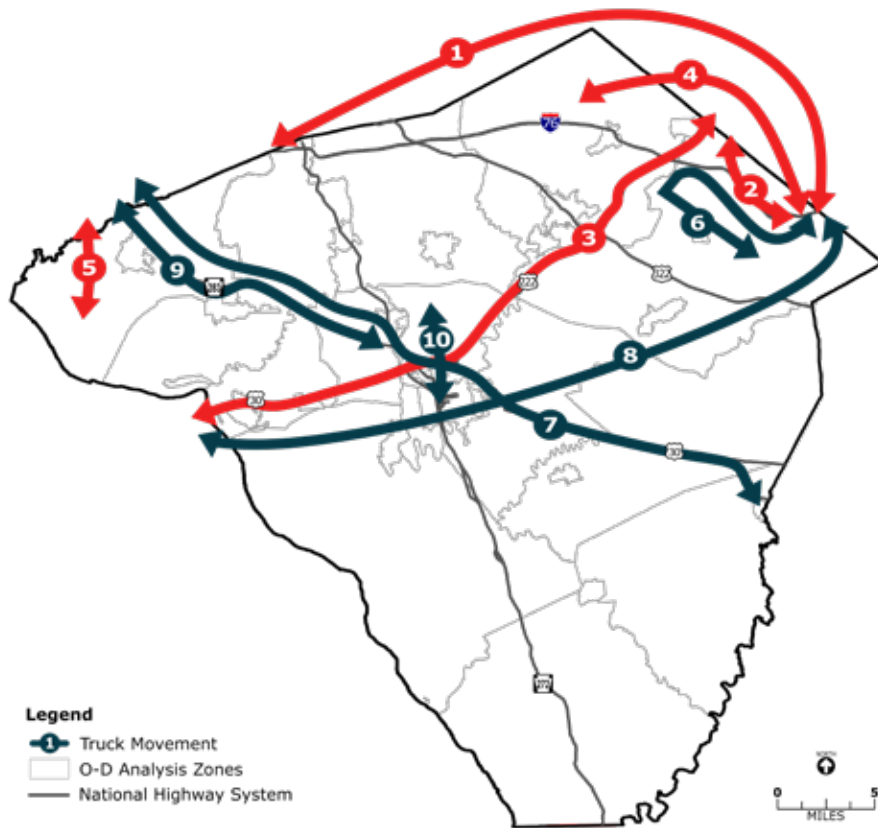
Freight

Truck Trip Characteristics

- Streetlight data on commercial trips was used to examine truck trips that enter, pass through, and/or originate in Lancaster County. These commercial trips encompass tractor-trailers, box trucks, and all commercial vehicles that are used in the transport and delivery of goods.
- The map illustrates ranked locations of truck trips within the county. Most truck trips are concentrated near Lancaster City and in the northern section

- of the county near the Pennsylvania Turnpike interchange. Most truck trips from outside the region enter from Dauphin County, the Pennsylvania Turnpike, or from Berks County.
- Further investigations based on employment data for freight-related companies can be used to identify specific locations within each area.

As expected, the data shows that freight movement relies heavily on the Pennsylvania Turnpike, US 222, PA 283, and US 30.



Top Truck Connections

Top Ten Truck Connections

Rank	Location Pairs
1	PA Turnpike/PA 23 Dauphin County (I-76)
2	PA Turnpike/PA 23 Berks County (US 222)
3	York (US 30) Berks County (US 222)
4	East & West Cocalico, Ephrata Townships PA Turnpike/PA 23
5	Conoy, West Donogal, Mount Joy Townships Dauphin County (PA 283)
6	PA Turnpike/PA 23 Earl, East & West Earl, Caernarvo Townships
7	Chester County (PA 41) Dauphin County (PA 283)
8	PA Turnpike/PA 23 York County (US 30)
9	East Hempfield Township Dauphin County (PA 283)
10	Manheim Township Lancaster City

Truck Trip Connections

- The top regional truck movement connections are summarized in the map and table. A large number of truck trips travel through the county on the Pennsylvania Turnpike. The data indicates that freight movements rely heavily on the US 222, PA 283, and US 30 corridors.
- Key connections such as the Pennsylvania Turnpike and US 222 are vital for freight commodity movement within the county. The Lancaster MPO will continue to monitor the traffic signal at Colonel Howard Blvd. and US

222 for safety and congestion issues. ITS strategies along our county’s freeways will be important in reducing truck-related crashes and ensuring that diversion route information is quickly provided to trucks when incidents do occur. In coordination with PennDOT, our MPO continues to monitor our freeway ramp merges to ensure that signing, acceleration-deceleration lanes, and speeds support the safe and efficient movement of our county’s automobiles and trucks.

Top Inbound and Outbound Freight Connections

Outbound Freight from Lancaster County by Value

Rank	Destination Region	Value
1	New York portion of NY–Newark BEA	\$2,422,282,225
2	New Jersey portion of NY–Newark BEA	\$1,781,537,662
3	Massachusetts portion of Boston BEA	\$902,912,192
4	Dauphin County, PA	\$654,346,162
5	Hudson County, NJ	\$474,753,698
6	Kings County, NY	\$460,727,099
7	Bucks County, PA	\$386,973,290
8	Montgomery County, PA	\$370,434,112
9	Virginia portion of Washington–Baltimore BEA	\$304,928,650
10	Connecticut portion of NY–Newark BEA	\$288,213,935

Outbound Freight from Lancaster County by Weight

Rank	Destination Region	Tons
1	New Jersey portion of NY–Newark BEA	1,621,711
2	New York portion of NY–Newark BEA	1,558,322
3	New Castle County, DE	1,439,164
4	Chester County, PA	1,330,395
5	Berks County, PA	946,183
6	New Jersey portion of Philadelphia BEA	649,066
7	Montgomery County, PA	587,542
8	Virginia portion of Washington–Baltimore BEA	472,636
9	Philadelphia County, PA	362,119
10	Maryland portion of Washington–Baltimore BEA	358,962

Inbound Freight to Lancaster County by Value

Rank	Source Region	Value
1	Dauphin County, PA	\$1,207,847,143
2	New Jersey portion of NY–Newark BEA	\$1,059,888,781
3	New York portion of NY–Newark BEA	\$601,593,993
4	Gloucester County, NJ	\$582,383,439
5	Non-CMA Quebec	\$576,311,548
6	Massachusetts portion of Boston BEA	\$503,691,166
7	Union County, NJ	\$483,513,248
8	Hudson County, NJ	\$466,639,338
9	Ohio portion of Cleveland BEA	\$378,003,857
10	Illinois portion of Chicago BEA	\$273,915,551

Inbound Freight to Lancaster County by Weight

Rank	Source Region	Tons
1	York County, PA	4,580,797
2	Dauphin County, PA	1,878,967
3	Cumberland County, PA	870,767
4	New Jersey portion of NY–Newark BEA	817,666
5	Gloucester County, NJ	661,890
6	New York portion of NY–Newark BEA	377,967
7	Illinois portion of Chicago BEA	325,724
8	Virginia portion of Washington–Baltimore BEA	322,461
9	Lycoming County, PA	298,052
10	Delaware County, PA	285,701

Source: Transearch Data (PennDOT); BEA = Bureau of Economic Analysis Region

- Understanding the type of commodities and destinations will also be useful in understanding and planning for freight needs within the county. PennDOT has obtained commercially available commodity flow data that provides more information on the flow of commodities from Lancaster County to other regions of the country. The tables highlight the commodity

connections and the key interactions with the New York metropolitan area and nearby counties. The MPO continues to evaluate the data to determine the types of commodities transported from our region. The tables on the following page provide the top commodities produced by and imported to Lancaster County.

Freight Commodities Produced and Imported

Outbound Freight from Lancaster County by Value

Rank	Commodity	Value
1	Warehouse and Distribution Center	\$1,521,961,874
2	Rail Intermodal Drayage to Ramp	\$938,489,758
3	Dairy Products	\$871,253,750
4	Miscellaneous Plastic Products	\$764,146,199
5	Cereal Preparations	\$557,698,544
6	Miscellaneous Food Preparations, N.E.C	\$489,300,665
7	Farm Machinery or Equipment	\$448,626,012
8	Aluminum or Alloy Basic Shapes	\$436,390,690
9	Candy or Other Confectionary	\$414,112,620
10	Live Poultry	\$372,010,936

Inbound Freight to Lancaster County by Value

Rank	Commodity	Value
1	Warehouse and Distribution Center	\$2,022,930,736
2	Rail Intermodal Drayage from Ramp	\$1,297,106,284
3	Processed Milk	\$929,646,827
4	Petroleum Refining Products	\$822,757,931
5	Paper	\$617,305,759
6	Primary Aluminum Smelter Products	\$541,103,604
7	Miscellaneous Field Crops	\$324,350,574
8	Motor Vehicles	\$297,044,619
9	Primary Iron or Steel Products	\$257,662,522
10	Drugs	\$255,666,206

Note: Commodity groups provided are based on the Standard Transportation Commodity Codes (STCC). The warehouse, distribution center, and rail intermodal categories represent a range of commodities and/or unspecified or miscellaneous goods, much of which is being transported to a distribution center, an intermodal terminal, or to a customer.



How Can This Data be Used?

- The movement of freight is an important part of the regional economy. Information on freight connections will continue to be used to identify and evaluate freight needs and strategies and to prioritize transportation investments. The information can be shared with our freight stakeholders in discussions regarding our county’s freight corridors, locations where our region’s trucks experience the most congestion, and first- and last-mile connections to important freight facilities.

Exploring the Impact of Land Use on Our Transportation System



GROWING RESPONSIBLY

- Grow where we are already growing
- Build more compactly and efficiently
- Prioritize redevelopment and infill in Urban Growth Areas
- Manage the use of large tracts of vacant land in Urban Growth Areas
- Limit large-lot suburban development in rural areas

Implementing *places2040*, the Lancaster County Comprehensive Plan

Transportation and land use are closely linked. In fact, land use has a greater impact on transportation than almost any other factor. *places2040*, the Lancaster County comprehensive plan, looks at land-use planning holistically, emphasizing the need to break down the traditional silos between land use and transportation. In particular, the plan notes that the pattern of development has a significant impact on the transportation network. Decisions about jobs and housing have a considerable effect on our road network, on transit usage, and on pedestrians and bicyclists.

places2040 envisions more compact and efficient land use supported by a balanced multimodal transportation system, with a focus on directing growth into designated growth areas. To implement that vision, the plan provides a three-pronged strategy focusing on:

- Five “big ideas” (goals) and 26 policies (“what we need to do differently” to achieve these goals);
- The Lancaster County Future Land Use and Transportation Map, which outlines a planning approach focusing on seven character zones (a land-use transect) and “priority places” (communities, corridors, and landscapes that county residents said were important to them); and
- Seven catalytic tools and strategies with the greatest potential to move us toward the future that county residents want to see.

The Lancaster County Planning Commission is working with public, private, and nonprofit partners to put these strategies into action. Key stakeholders include municipalities, authorities, and school districts, as well as “Partners for Place”—27 countywide and regional agencies and organizations that provide guidance and input into the implementation process.

The big ideas and policies are the overarching focus of implementation, but every action step at the countywide, regional, and local level should take character zones and priority places into account, and seek opportunities to maximize the use of the seven catalytic tools and strategies.

The Big Ideas from *places2040*

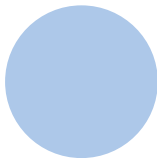
As noted on the preceding page, *places2040* identifies five big ideas or goals for implementation, which are broken down into 26 policies. The big ideas are listed here, together with the policies most relevant to transportation.



Creating Great Places

The purpose of this idea is to create safe and attractive environments that improve our quality of life—and ensure the success and sustainability of our economy.

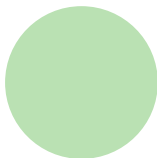
- Design communities that put people first
- Create a mix of uses in our communities and corridors
- Find new and innovative ways to reduce congestion



Connecting People, Place, & Opportunity

This idea—and Growing Responsibly—are the ideas with the most relevance to transportation planning. *places2040* says, “We need to work harder to connect people with each other and the places around them—students with schools, workers with jobs, and jobs with housing. Simply put, it should be easier for residents and visitors to get around. By maximizing connections, we make everything more efficient, and create more opportunities for interaction.”

- Create more places to hike, bike, play, and enjoy nature
- Make it easier for residents and visitors to get around without a car
- Connect housing, jobs, schools, transportation, and other destinations



Taking Care of What We Have

Lancaster County residents have made it clear that protecting our natural, historic, and cultural heritage should be a consideration in all that we do.

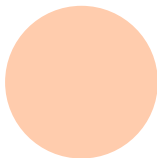
- Improve water quality and work together on stormwater management
- Use existing buildings and maintain public infrastructure



Growing Responsibly

places2040 notes that “We need to consider where development happens, when it happens, and what form it takes . . . we need to improve the pattern of growth and ensure that we develop in a more compact, efficient, and fiscally responsible way.”

- Grow where we’re already growing
- Prioritize redevelopment and infill in Urban Growth Areas
- Build more compactly and efficiently



Thinking Beyond Boundaries

This big idea is so important, it’s the subtitle for *places2040*. All public input for the plan highlighted the importance of working together to solve the challenges in front of us. Transportation networks and other systems don’t follow municipal or school district boundaries, so the solutions we develop should focus on collaboration.

- Integrate place-based thinking into all future planning initiatives
- Break down the traditional silos that limit our effectiveness
- Make planning and regulation more efficient, consistent, and regional

TECHNICAL PLANNING FOCUS AREAS



The Lancaster County Future Land Use and Transportation Map

The map on the following page illustrates how the 5 big ideas and 26 policies in *places2040* can be applied on the ground. To develop this map, county residents considered the potential impacts of three different scenarios: Trend, Balance (the previous county comprehensive plan), and Places. Residents chose the Places scenario.

The resulting Lancaster County Future Land Use and Transportation map illustrates three place-based strategies for implementing the plan's goals: character zones (a land-use transect), priority places (important communities, corridors, and landscapes), and planning areas (different regions of the county).

Character Zones

These seven zones are broad categories that reflect different land-use patterns in Lancaster County: Natural, Agriculture, Rural Community, Suburban, Urban, Urban Core, and Special District. Several of these zones are also broken into subzones. Transportation improvements should be geared toward the specific conditions and needs in each of these areas, and should be applied consistently within each zone, wherever it exists across the county.

Priority Places

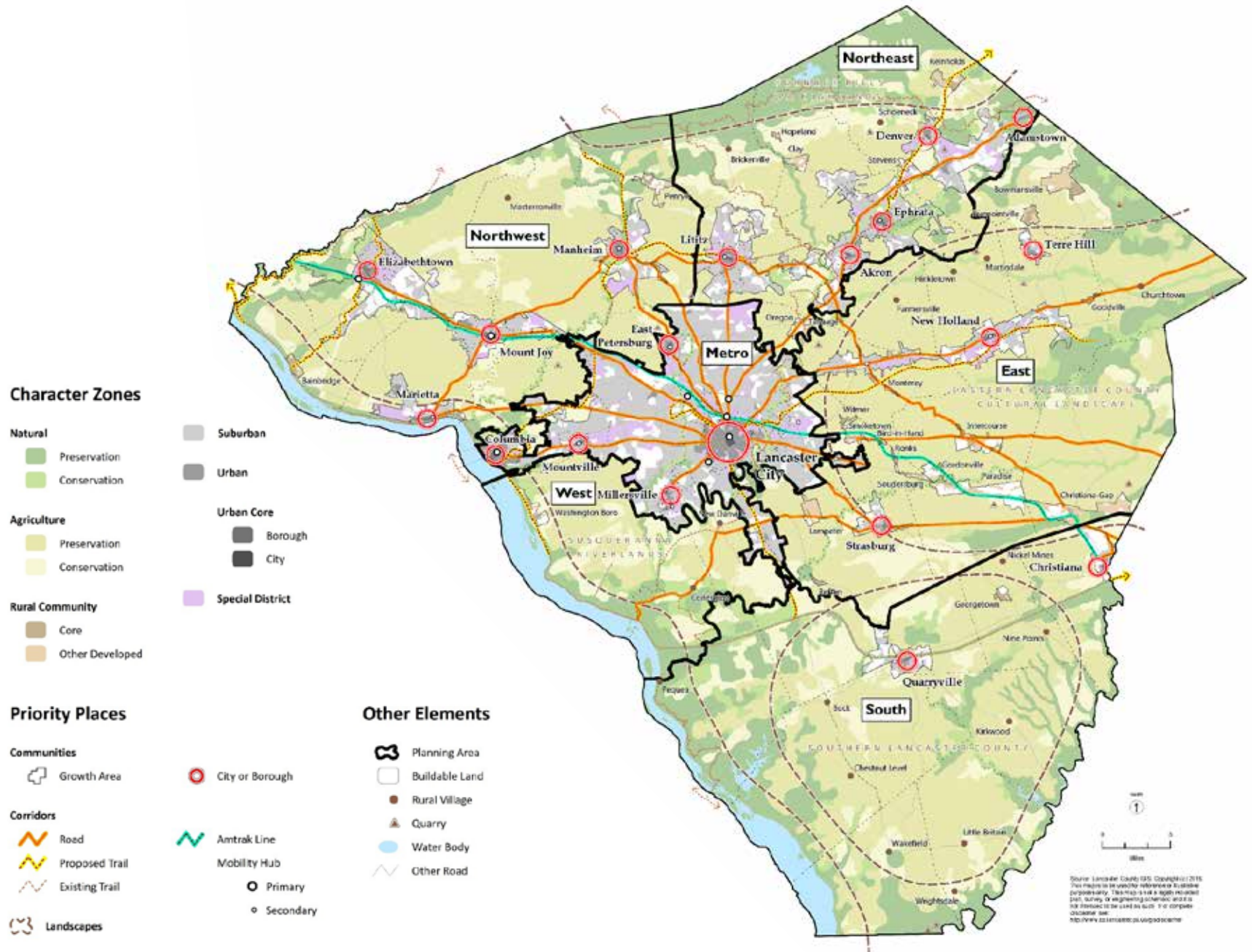
These are communities, corridors, and landscapes that Lancaster County residents said should be our focus for the next several years. Transportation corridors are a key aspect of priority places, and they include certain roads

(congested corridors as well as county and state scenic byways), regional trails, the Keystone Corridor (Amtrak), and mobility hubs identified in the Red Rose Transit Authority's Transit Development Plan Update (2014).

Landscapes may have an impact on transportation, as well. The map highlights the Susquehanna River corridor, Southern Lancaster County, the Eastern Lancaster County cultural landscape, and the Furnace Hills (PA Highlands). Each landscape has special characteristics that should be considered when making decisions about transportation infrastructure. For example, buggy traffic is an important concern in Eastern Lancaster County.

Planning Areas

The Lancaster County Planning Commission has identified six "place-based planning areas" for the purposes of analysis and the delivery of planning services. These regions include the Metro area (Lancaster City and surrounding suburbs) and five others that radiate outward from there. The boundaries of the Metro area are defined by the Urban Growth Area that surrounds the city; the others generally follow growth area boundaries or municipal boundaries. These planning areas should be another important consideration in implementing the goals of the MTP.





Catalytic Tools and Strategies

While any number of steps could make Lancaster County a better place to live, work, and play, *places2040* calls on stakeholders to focus their energy on a few specific items, listed below. As the plan notes, if nothing else happens to move us ahead, the broad adoption of these tools and strategies will move the plan forward. Much of what we do in transportation planning should also be geared toward implementing these tools.

- Place-Based Planning
- Simplify Zoning
- Official Maps
- Complete Streets
- Infrastructure
- Collaborate
- Align Resources

Lancaster County Planning Commission staff have organized teams of internal and external partners to develop countywide implementation strategies for each of these tools. Staff are also exploring opportunities to implement them on a regional basis within the place-based planning areas, and all of the commission's public, private, and nonprofit partners are playing a key role in that effort.

Applying *places2040* Implementation Strategies in the MTP

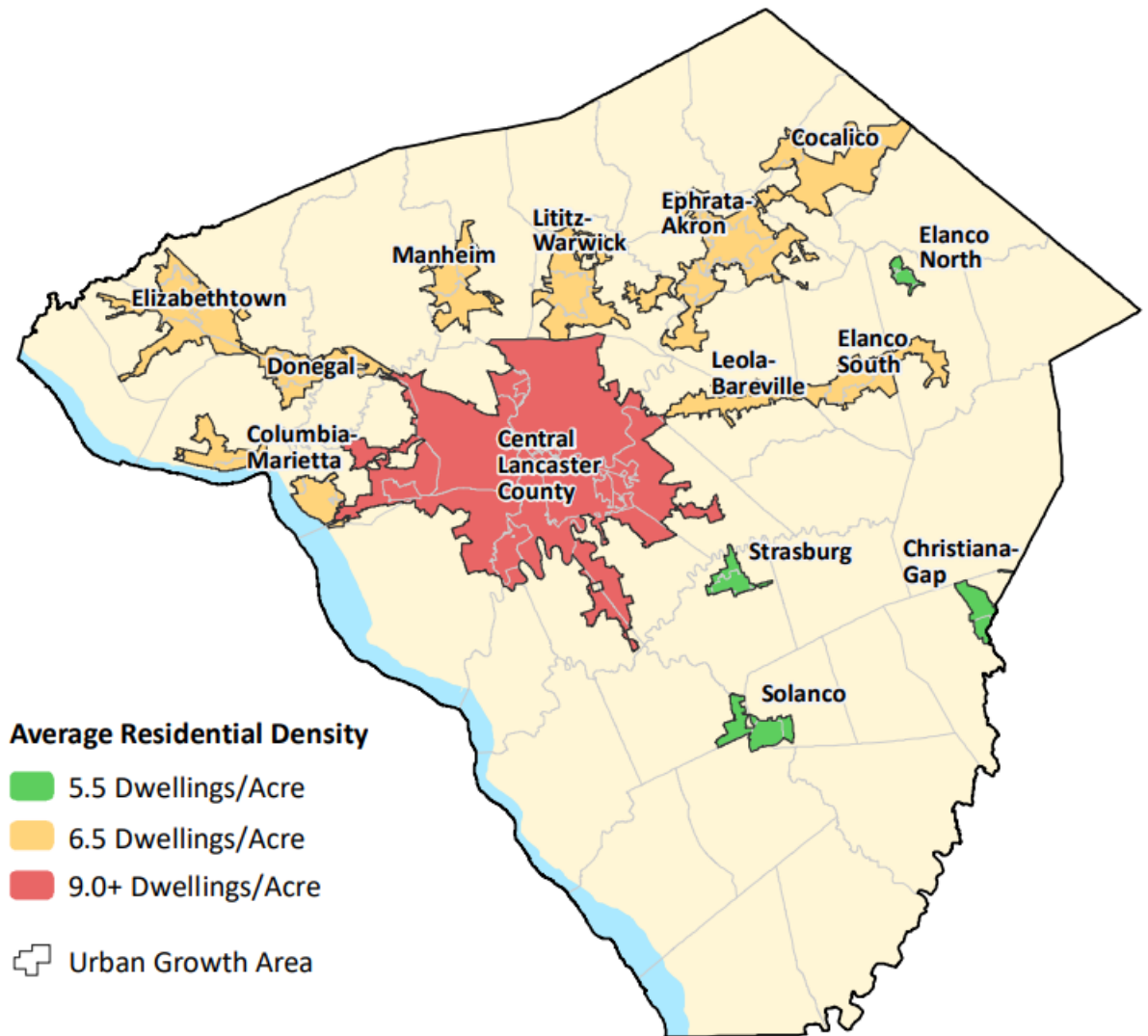
The MTP looks to build on the principles in *places2040* and conduct exploratory analyses to evaluate the impact of the *places2040* land-use scenario on transportation demand and performance. The analyses also aim to compare the potential benefits of land use changes to road improvement projects proposed in the transportation program and previous corridor studies.

Defining Our Land Use Vision Scenario

- The *places2040* land use scenario is based on the concept of preserving farmland and natural areas by increasing density in the county’s urban areas. The scenario focuses on increases to housing density as a whole but scales that density on a regional basis as illustrated on the map. In urban areas, the scenario ensures that water and sewer infrastructure keep pace with growth needs.
- The *places2040* future growth scenario has been compared to the land use vision and forecast used to develop the previous MTP. This scenario also provides emphasis on growth in urbanized areas, but to a lesser degree than *places2040*. Both scenarios forecast the same total population and employment, but the differences lie in how land uses are allocated within the county.

Tools and Data

- The land use scenarios have been incorporated into the South Central Regional Travel Demand Model, a tool available to the MPO for planning purposes. This regional travel model estimates traffic volume on the county’s roads based on input household and employment information, a simulated roadway and transit network, and assumptions on trip-making and travel behavior.
- Performance measures produced from the travel model include vehicle miles of travel (VMT), vehicle hours of delay (VHD), roadway daily traffic volumes, and transit ridership. These measures are used to evaluate and compare the impacts of the *places2040* land use scenario. VMT is a measure of the amount of travel (number and distance of vehicle trips). It has become an important measure in tracking our efforts to reduce fuel dependency and greenhouse gas emissions. Vehicle delay is the measure of time a vehicle spends in traffic congestion.



Target Densities for Lancaster County Urban Growth Areas (*places2040*)



thinking beyond boundaries

LAND USE VISION IMPACTS

Land use can have significant effects on our transportation system. Achieving the *places2040* vision and goals would result in:

Pros

- Fewer vehicle trips
- Shorter trip distances
- Increased transit ridership
- Reduced vehicle delay
- Reduced congestion on some arterials, including US 30 (East Lampeter)

Cons

- More traffic concentrated on freeways, access roads, and ramps
- Increased congestion on PA 501

Improving access to the region’s suburbs and boroughs to the north of the city will require further attention.

Evaluating Scenario Impacts

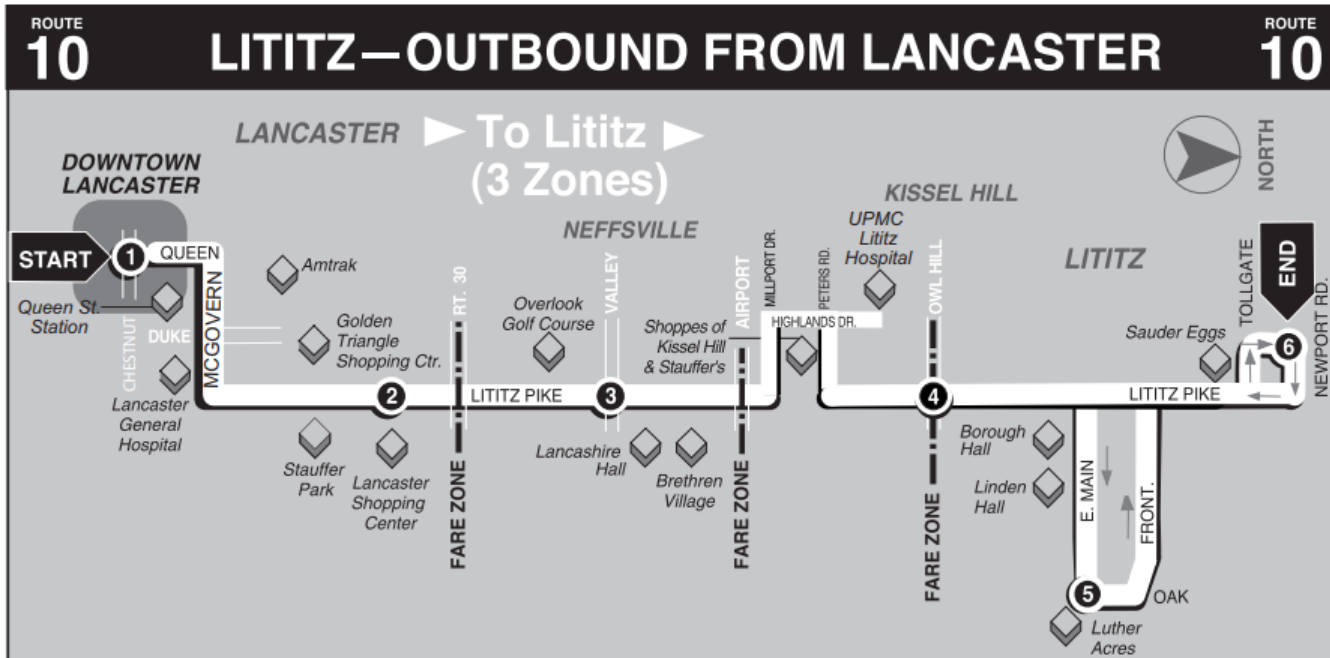
- The regional travel model was run for both land use scenarios. The impacts of the *places2040* scenario over the baseline trend are shown in the graphic to the left.
- Under the *places2040* scenario, more compact development results in a reduced number of vehicle trips, shorter trip distances, increased transit usage, and a reduction in total vehicle delay.

Evaluating VMT Reduction

- The analysis indicates that the *places2040* land use scenario could reduce VMT by 3 percent regionally, which equates to over 370,000 VMT a year.
- Many of our planned TIP and MTP projects will have limited impacts on VMT. Commuter Services of Pennsylvania rideshare program is an example of a Transportation Demand Management (TDM) strategy that can reduce VMT. In one day, this rideshare program estimates it reduces VMT in Lancaster County by 3,000. In contrast, ensuring compact development in our county can provide more than 100 times that benefit.

Evaluating Delay Reduction

- As the region grows in population, more vehicle travel will further degrade the operation of the county’s road system. Concentrating land use in urban areas can greatly reduce vehicle trips, but it can also create more congestion unless other measures are taken to mitigate that impact, such as creating more connections between major roadways.
- The *places2040* scenario analyses indicate an overall reduction in vehicle delay over the baseline trend. These reductions are primarily attributed to concentrating more vehicle trips near freeways, including PA 283, US 222, and US 30. These roads currently have more capacity to address traffic volume growth than other county roads. Completed and planned incident management strategies as well as strategies to improve bicycle and pedestrian travel along these corridors would provide additional benefits under the *places2040* land use vision.
- However, under the *places2040* scenario, some roads may become more congested. Key access roads to freeways may become of greater concern (both due to congestion and safety), including near Ephrata and Elizabethtown. The modeling analysis projects worsened congestion on PA 501 as the northern suburbs and Lititz continue to grow. Within the model, traffic congestion becomes significant enough to divert travelers to nearby local roads in an effort to reach Lancaster City. Further emphasis will be needed to assess strategies to improve access to the region’s suburbs and boroughs north of the city. These may include technology strategies as discussed in previous sections or improvements to other multimodal travel options, including transit.



RRTA Route 10 (Lititz)

Encouraging compact development simultaneously encourages transit ridership, which may support additional service.

Evaluating Transit Increases

- More compact development results in potential increases in Red Rose Transit Authority (RRTA) riders. The modeling exercise was based on the current fixed-route bus system. Additional route changes and/or service enhancements may provide even more ridership changes under the *places2040* scenario.
- Transit ridership is projected to increase by nearly 1,000 riders (about a 6 percent increase) under *places2040*, a desirable result. The largest increase (nearly 25 percent) of ridership is expected on RRTA Route 10 (Lititz). These results are influenced by more compact development in combination with the traffic congestion on PA 501. Increases of 10 percent or more are also forecasted on RRTA Route 3 (Park City), Route 20 (Greenfield), and Route 21 (Gap).

We'll need to take a comprehensive approach toward addressing congestion and mobility.



Benefits of Our Transportation Investments

Scenario	VMT Impact	Delay Impact	Transit Impact
<i>places2040</i> Land Use Vision	-3%	-8%	6%
TIP/TYP Projects	0%	-11%	0%
Exploratory Projects	0%	-9%	0%

Comparing Land Use Benefits of Our Planned Projects

- The MTP and the TIP outline significant investment in transportation projects that will improve safety, reduce congestion, and maintain our infrastructure.
- The regional travel model was used to assess planned TIP and MTP investments focused on improving traffic congestion. These include interchange improvements on US 30 at US 222, limited additions to capacity on some of our most congested corridors, and lane additions on US 222.
- The analysis also includes other “exploratory” projects which are currently not funded in the MTP. These include improvements recommended in the SR283/230 Corridor Study and a proposed interchange reconfiguration at US 222 and Colonel Howard Boulevard. The table highlights the benefits of our planned projects within the county in comparison to the *places2040* land use vision impacts.
- Improving the capacity of our transportation infrastructure can provide significant benefits in traffic delay if targeted at the right locations. However, these projects do not reduce our regional travel or improve our multimodal options.
- Ultimately, these results highlight the need for a comprehensive approach toward addressing congestion and accessibility. Investments in our transportation system are needed, but there are also other tools that can help address some of our county’s transportation needs, including better land use management. These land use management approaches can reduce our vehicle travel, expand multimodal usage, and reduce our regional emissions.



LCPC



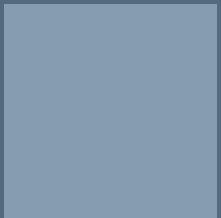
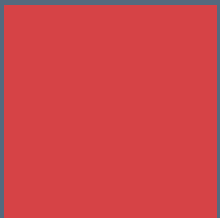
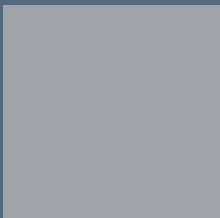
Lancaster Newspapers



RRTA

Integrating to Our Strategic Directions

- The exploratory analyses conducted for the MTP have provided important insights on how land use can impact our transportation system. The compact development emphasized through *places2040* has been demonstrated to provide travel benefits comparable to the millions of dollars spent on roadway capacity improvement projects. However, compact development can also create more traffic and congestion on some of our key urban travel routes that are already at their limits.
- The MPO needs to understand these implications and ensure that investments are coordinated with the county's land use vision. This will require continued monitoring of how and where the region is growing, adjusting the *places2040* vision based on recent trends, and prioritizing roadway and other multimodal corridors that support the land use vision. Scenario planning using our regional tool and data sets, along with important stakeholder insights, will be valuable in defining prioritization criteria that have direct linkages to *places2040* and subsequent vision updates.



STRATEGIC DIRECTIONS

Introduction

The MTP is more than a list of projects—it also contains the policies and action items needed to help the county achieve its vision. The implementation of *connects2040* will be guided by several overarching principles that provide a framework for plan implementation. These are listed below and directly mirror the policy areas that were used to gauge public opinion through the MPO’s surveys:

- **Safety**
- **Reliable Travel**
- **System Maintenance**
- **Transportation Choices**
- **Environmental Protection**
- **Critical Connections**
- **Quality of Service**
- **Performance Goals**

The strategies presented within this section are consistent with and build upon policies previously adopted in other county plans, including *places2040*, the Active Transportation Plan (ATP), the Congestion Management Process (CMP), the South Central Transit Authority’s Transit

Development Plan, and public feedback. The MTP’s implementation will guide the activities of the MPO, its partners at the local, county, state, and federal levels, and the public.

Public responses to the MPO’s MetroQuest survey for *connects2040* support the strategic directions of the plan by placing the most emphasis on safety, reliable travel, and system maintenance. When prioritizing program spending, the public’s choices reflected the same three policy areas as priorities, but in a slightly different order: fixing the existing infrastructure (system maintenance), traffic management (reliable travel), and safety. Interestingly, the public’s survey responses recognized the difficult choices the MPO faces in providing a balanced program—because no potential implementation strategy received less than three stars out of five. As a result, plan implementation addresses some needs in all the policy areas, while focusing more significant efforts on strategies to affect safety, reliable travel, and system maintenance, consistent with public sentiment. The Lancaster MPO will continue to work with stakeholders at the local, state, and federal levels and the public to make the plan’s vision a reality.



connects
2040
metropolitan transportation plan
for lancaster county, pa

OUR TRANSPORTATION VISION

**Equitably meet the mobility
needs of residents, businesses,
and visitors while strengthening
the unique identity of
Lancaster County through an
environmentally responsible,
safe, and reliable multimodal
transportation system.**

Safety



Safety is the highest priority of PennDOT and the Lancaster MPO. Overall, transportation-related injuries and fatalities continue to decline, though crashes and fatalities involving pedestrians and bicyclists have increased. While improvements to the system and vehicle safety have contributed to some positive trends, there remain concerns with the rise of distracted driving and crashes involving senior citizens. The Lancaster MPO works with PennDOT to reduce serious injuries and fatalities and will continue to collaborate with PennDOT District 8-0 on tools and methods to improve safety for all transportation users.



Work cooperatively with PennDOT District 8-0 to develop and implement new safety tools.

PennDOT District 8-0 recently developed a Network Screening Factor tool that identifies segments of highway corridors and intersections with high crash histories. This tool is used to prioritize these locations for Highway Safety Improvement Program funding. The Lancaster MPO will work cooperatively with PennDOT District 8-0 to implement this tool and to develop additional tools and methods for prioritizing and implementing safety improvements.



Improve Traffic Incident Management.

The County will seek to improve the emergency response capabilities of those who are responding to and clearing incidents from the county's roadways. Other efforts include improving ITS infrastructure, including weather information systems and dynamic messaging signs. New data and tools have provided valuable insight into incident management by understanding causes of non-recurring congestion. These include crashes, weather, and road construction. Within Lancaster County, most existing congestion occurs due to these non-recurring causes. The US 30, US 222, and PA 283 corridors experience the most non-recurring delay.



Advocate for comprehensive traffic safety messaging in local communities.

The Lancaster MPO will work with local stakeholders, other MPOs, and PennDOT to advance regional and statewide efforts to create traffic safety education marketing campaigns for all road users.

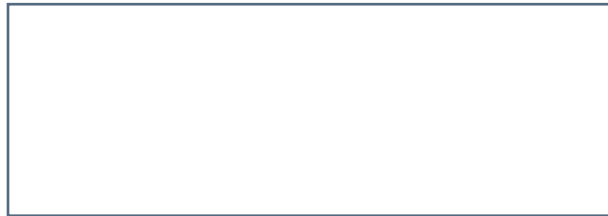
Provide safety improvements on roads most frequented by Plain Sect travelers.

Lancaster County has a notable Plain Sect population with distinct and unique transportation needs. This has long been recognized, as evidenced by the MPO’s cooperation with the Amish Safety Committee several years ago to develop the Horse and Buggy Driver’s Manual. There has been substantial growth in Amish travel, particularly in the county’s eastern and western regions. Truck traffic has increased on county roads that are also heavily frequented by Plain Sect travelers using buggies and bicycles, and walking. The MPO will continue to work with the Plain Sect communities to provide wider shoulders and safer intersection crossings on roads that they have identified as priorities, such as US 30, PA 741, PA 772, and PA 896.

Provide improvements that increase safety for non-motorized users.

The county has experienced an increase in bicycle and pedestrian injuries and fatalities. The MPO will seek to improve conditions for non-motorized users by working with PennDOT to implement key recommendations from the county’s ATP and important, low-cost opportunities to improve non-motorized safety and connectivity. The MPO should ensure non-motorized safety is incorporated into programmed projects, when feasible.

Reliable Travel



Measuring and improving the reliability of travel is an activity that was recognized by the federal government with the passage of the FAST Act. The reliability of travel is particularly important for the county’s shippers and carriers in an economy that features just-in-time delivery to a greater degree and increasingly shorter supply chains. Pennsylvania and Lancaster County’s transportation funding picture also dictates that PennDOT and the MPO invest more heavily in system operations in order to extract the greatest amount of efficiency from existing system capacity without resorting to expensive capacity-adding projects.



Implement the results of the 2020 Congestion Management Process (CMP) as well as the results of future updates.

Work on the county’s most recent Congestion Management Process was completed earlier in 2020. The County will plan for the implementation of strategic safety and operational improvements at targeted locations, such as adaptive traffic signals on highly congested corridors.



Implement operational improvements to improve travel reliability.

The MPO should evaluate the applicability and ability to implement other Transportation System Management and Operations (TSMO) strategies to improve travel reliability. Some of these strategies may include, but are not limited to:

- Corridor preservation and management;
- Access management;
- Intermodal enhancements;
- Goods movement management;
- Managed lanes (examples include high occupancy vehicle lanes, reversible lanes, and hard shoulder running); and
- Strategic additions of capacity.

Implementation of these types of improvements should be coordinated with the Eastern ROP and previous county-wide studies such as the Route 283/230 Corridor Study. They should be prioritized based on those improvements that will be most effective for Lancaster County.



Improve our understanding of the causes of congestion.

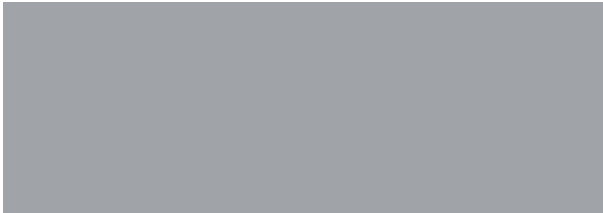
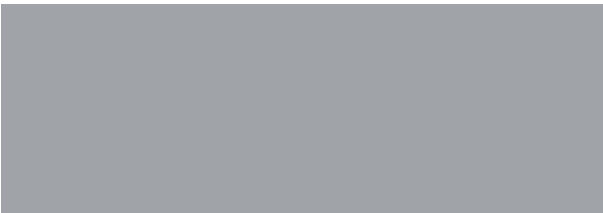
Implement new technology to improve safety and reduce congestion.

The MPO should further explore PennDOT’s data on estimated causes of congestion after it has been refined and released to better understand how it can be used for making decisions on reducing recurring and non-recurring congestion.

The MPO should prioritize the corridors identified for future Dedicated Short-Range Communication (DSRC) implementation from a Lancaster County lens, consistent with the following statement from the DSRC report:

“Future efforts will integrate these corridors with the CMP and planned regional TIP/ MTP projects to refine and prioritize a list of corridors that exhibit the greatest opportunities for installation of this technology.”

System Maintenance



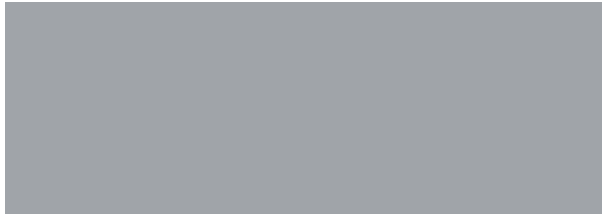
Planning agencies and departments of transportation alike are moving away from addressing transportation assets merely from a “worst-first” approach to one that is oriented toward “lowest life-cycle cost.” This entails timely maintenance in order to maintain transportation assets at a high performing level, as opposed to allowing them to deteriorate, when replacement would be much more expensive. PennDOT has developed new asset management tools in recent years that will allow PennDOT and MPOs to be able to be more strategic in programming maintenance dollars.

Prioritize transportation systems management and operations (TSMO).

The operational needs identified in this plan should be considered as the PennDOT Regional Operations Plan (ROP) is updated in 2020. Recommendations from the new ROP will be considered in future MTP updates. The Lancaster MPO will increase its involvement with regional operations planning and explore local operations planning post-ROP.

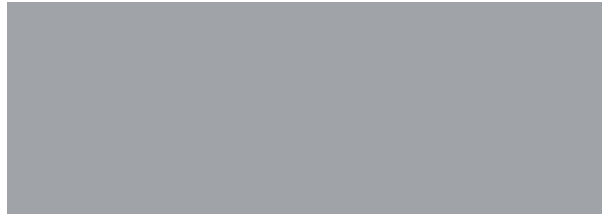
Invest in bridge maintenance.

The Lancaster MPO will continue to work with PennDOT District 8-0 to fund and plan for routine bridge maintenance activities. A regular investment in maintenance will reduce the need for large, one-time investments in necessary rehabilitation or replacement projects. The goal is to extend the useful life of an asset and prevent costly emergency repair situations. A source of sustainable funding for bridge maintenance should be identified and programmed on future TIPs. PennDOT is developing a Web-based asset management planning tool that will be accessible by the MPO. It will include the county’s unconstrained needs by each highway category on PennDOT’s Business Plan Networks, consistent with asset management principles in the Pennsylvania Transportation Asset Management Plan (TAMP).



Collaborate with the County and its municipalities to fund local bridge needs.

Local bridges are commonly ineligible for federal transportation funds, except for the Off-System Bridge program. It establishes criteria for funding improvements to bridges that are not on the Federal-Aid System. PennDOT is required to apply 15 percent of its annual funding allocation to these bridges. The Lancaster MPO will assist its municipal partners in addressing these local bridge needs by maintaining a list of priority off-system bridges to refer to when federal funding is available. If additional funding sources are identified, local governments will be notified. The MPO will also monitor a policy study currently underway by the state Transportation Advisory Committee (TAC) that will identify strategies for assisting municipalities with bridge maintenance needs.



Invest in pavement preservation and maintenance.

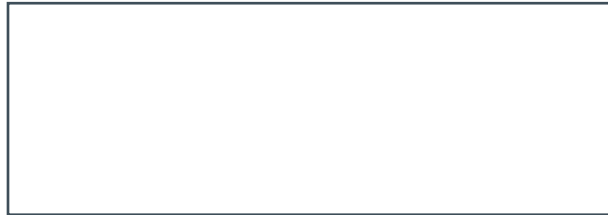
The Lancaster MPO will continue to work with PennDOT District 8-0 to fund and plan for resurfacing and pavement preservation activities. A regular investment in maintaining roadway pavements will reduce the need for large investments in roadway reconstruction projects. It will also reduce the need for road closures and lengthy detours. As stated in the Bridge Maintenance item, PennDOT's forthcoming asset management planning tool will include the county's unconstrained needs by each highway category on PennDOT's Business Plan Networks.



Explore cooperative management of traffic signals.

The MPO will consider opportunities for regional cooperation to manage traffic signals along priority, multi-municipal corridors consistent with needs identified through the Congestion Management Process. This could be a more efficient and cost-effective way to install upgraded signal technology such as adaptive or coordinated signals for a regional impact on traffic operations.

Transportation Choices



The county’s comprehensive plan, *places2040*, emphasizes the importance of the form and density of development in expanding the range of transportation options. The Lancaster Active Transportation Plan provides specific actions needed to expand the options for pedestrians, bicyclists, and access to transit. This plan seeks to encourage mode choice and reduce reliance on the private automobile. Technical analysis has identified corridors throughout the county where trip distances are shorter and could be accommodated by various modes of transportation.



Develop an updated Human Services Transportation Plan.


In April 2019, a group of community leaders came together to develop an asset inventory of existing community resources for people with special transportation needs. The aim was to identify the most pressing gaps in our county transportation system, and to recommend possible short-term and long-term solutions. A summary of the Lancaster County Transportation Stakeholder Working Group was prepared and is provided in Appendix I.

Building upon the work of the Lancaster County Transportation Working Group, the Lancaster MPO and South Central Transit Authority (SCTA) will define their roles in implementation through creating an updated Human Services Transportation Plan (HSTP) in 2021-2022. During the Human Services Transportation planning process, the transportation needs already identified will be assessed and strategies will be considered in the context of limited funding opportunities.



Modernize public transportation access to jobs and services along key corridors.

The MPO will share the results of the MTP’s technical and environmental justice analysis with SCTA in evaluating the potential for capturing new riders along corridors that typically serve shorter trips. This action includes evaluating transit service in high priority areas for future development growth, as identified in *places2040*.




Work with the Lancaster County Active Transportation Advisory Committee (ATAC) to implement the Active Transportation Plan.

Active transportation has been identified as a critical component to achieving the County's *places2040* vision. The County will work with ATAC, municipalities, and other stakeholders to prioritize and implement the recommendations in the Lancaster Active Transportation Plan. These activities will include actions in the following priority areas identified in the plan:


- Connect the transportation network;
- Implement Complete Streets and consider all users in infrastructure design;
- Improve safety through education, awareness and enforcement;
- Encourage everyone to walk and bike; and
- Align resources and work collaboratively to implement active transportation priorities.

Additional information on the Active Transportation Plan can be found at: <https://lancastercountyplanning.org/DocumentCenter/View/1090/Chapter-7-Implementation>.



Encourage and promote development that supports use of multimodal and active transportation options, including transit, walking, and bicycling.

The MPO will continue to ensure future development projects provide adequate bicycle and pedestrian accommodations and connectivity in support of the Active Transportation Plan. The MPO will also encourage the use of transit-oriented development within the county and ensure new developments coordinate with SCTA with regard to potential transit service.



Work with municipalities to implement park-and-ride lots in preferred locations.

Analysis of travel patterns in the county indicates several places that could serve as effective locations for park-and-ride lots, including current informal park-and-ride lots in Mount Joy and East Cocalico townships. *places2040*, the ATP, and the SCTA Transit Development Plan all include mobility hubs that could incorporate park-and-ride lots as one element of providing a comprehensive set of mobility options. The County should work with municipalities in these locations, and where determined appropriate, implement park-and-ride lots through the land development process and/or through partnership with the South Central Transit Authority (SCTA).



Continue support of Commuter Services of Pennsylvania and other community ridesharing programs through planning coordination and funding. Promote the Commuter Services “Emergency Ride Home” program.

Lancaster County is one of 13 counties that support Commuter Services of Pennsylvania in connecting workers with rides. The County provides a share of its CMAQ funding to help maintain the service. The MPO will also provide support by educating the county’s public transit users and commuters about the “Emergency Ride Home” program provided by Commuter Services.



Support PennDOT in improving passenger rail (Amtrak) throughout Lancaster County.

PennDOT and Amtrak have worked together for many years to improve passenger rail service to and from Lancaster County. More than 700,000 trips are made annually from the county’s three Amtrak stations: Elizabethtown, Lancaster, and Mount Joy.



Identify existing transit gaps and coordinate with the necessary agencies on feasible, cost-effective solutions.

The County should work with Red Rose Transit Authority and other transit/ridesharing partners to identify public transportation gaps. Increased focus should be placed on areas where residents and commuters are lacking non-single-occupancy-vehicle (SOV) access to mobility hubs, employment centers, and essential services.



Coordinate with DCNR and other agencies to fund and close trail gaps.

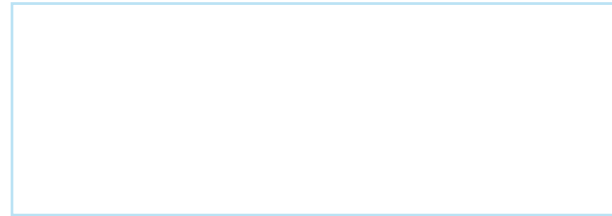
Consistent with *places2040*, implement regional and local plans that reduce the transportation impacts of land use.

Not only do trails provide an opportunity for outdoor recreation, they can also provide a means of transportation or a commuting connection. By promoting DCNR’s grant programs, the MPO can assist the County and local municipalities in securing funding for trail gap closures.

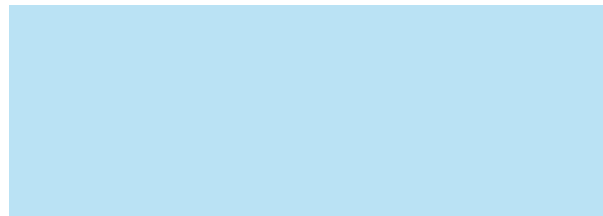
In urbanized areas, *places2040* encourages land use patterns that increase density and provide the opportunity for people to work, shop, dine, socialize, exercise, recreate, and worship in close proximity to where they live. Analysis discussed previously in the “Exploring the Impact” section shows that by implementing the “places” scenario, the positive effects on the transportation system will be cumulatively greater than trying to improve that system through physical infrastructure improvements alone. These effects reduce the number of vehicle trips, shorten the distance of trips, foster an increase in transit usage, and reduce travel delay on the existing highway

system. Through its efforts to develop planning-area implementation strategies, the County will work with public, private, and nonprofit partners to implement place-based approaches that can achieve these results. The County and its partners will also work to implement the seven catalytic tools and strategies in *places2040*. Two of these tools in particular, official maps and complete streets, are critical to the success of the *places2040* scenario. Official maps are helpful in creating interconnected street networks, and complete streets can ensure that our street system safely and efficiently accommodates all modes and all users.

Environmental Protection and Mitigation

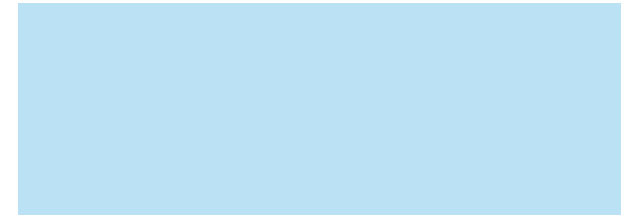


Lancaster County possesses important community, historic, and natural resources that contribute to its quality of life and public health. The MTP considers the role that transportation plays not only in improving access and mobility, but also in how our infrastructure and transportation services interact with Lancaster County's environmental resources. As part of the MTP update, the MPO followed a robust process for engaging representatives of environmental resource agencies and determining the measure of direct and indirect impacts the LRTP's projects would have. The following mitigation strategies will be pursued by the MPO and its partners.



Incorporate resiliency considerations into planning.

Consideration should be taken in incorporating resiliency into the MPO's project prioritization process. Ongoing coordination with federal, state, and local environmental agencies is critical in prioritizing these vulnerable locations. Lancaster County should partner with its municipalities and PennDOT to identify where stormwater infrastructure is lacking or could be improved on roadways with high levels of vulnerability in extreme rain and snow events. This reduces the need for emergency roadwork on critical highways and bridges and the need for emergency funds due to flood damage.



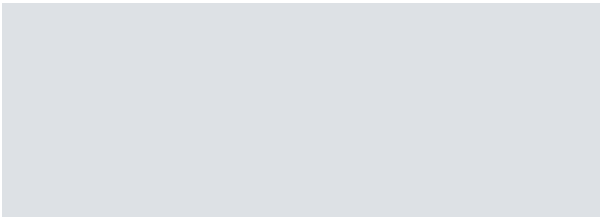
Formalize an environmental resource agency stakeholder group.

The Lancaster MPO will outline a process to foster greater collaboration with federal, state, and local environmental resource stakeholder agencies. The goal for this effort is to develop and implement a long-term strategy that will inform future iterations of the Lancaster County Planning Commission's Metropolitan Transportation Plan by integrating environmental resource agencies' respective plans. Utilizing the Federal Highway Administration's (FHWA) Eco-Logical approach as a guide, ongoing communication with participating environmental stakeholders will identify environmental priority areas and potential impacts of TIP projects on the county's environmental resources.

For more information on FHWA's Eco-Logical approach, please visit: https://www.environment.fhwa.dot.gov/env_initiatives/eco-logical.aspx



Cooper Carry



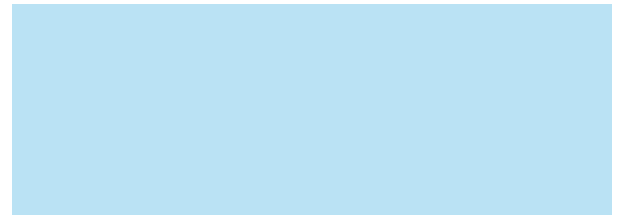
LCPC



LCPC

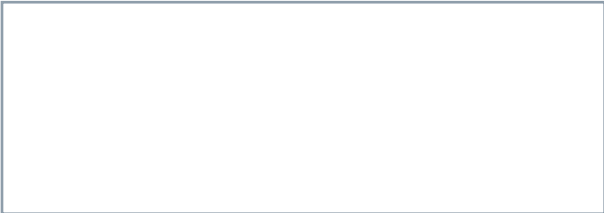


Shutterstock



LCPC

Critical Connections



The MPO used the MTP update process to gain an improved understanding of the regional connections throughout the county and surrounding areas. This includes areas of analysis related to tourism travel, active transportation, freight, long-distance connections, and commuting trips. More than half of Lancaster County’s workers also reside in the county.



Evaluate corridors that have the highest potential for active transportation improvements.

The MTP’s technical analysis uncovered many corridors where trip-making entailed a higher number of shorter trips (i.e., trips less than two miles in length). Corridors with a high number of these trip types show potential for bicycle and pedestrian infrastructure. Areas of the county where these corridors are more prevalent naturally include Lancaster City and East and West Lampeter townships. It will be important for the TIP development process to evaluate the need for and the potential to include bicycle, pedestrian, and transit-related improvements in project selection and development.



Implement the recommendations of the MPO Guide for Implementing Digital Short-Range Communication (DSRC) technology.

Lancaster County joined with its counterparts in South Central Pennsylvania to identify corridors for future DSRC implementation by evaluating roadways with traffic signals as well as crash rates at signalized intersections. Criteria will need to be developed to select the corridors for the implementation of this technology. Vehicle technologies and communication (V2X) will be an important precursor to eventual vehicle automation.



Review functional classification system.

Lancaster County and PennDOT have functionally classified the county’s roadways according to the type of travel they are intended to serve. The current functional classification should be reviewed before the next MTP update to better align with FHWA guidance and identify any associated opportunities for funding eligibility, particularly for National Highway Performance Program (NHPP)-eligible roadways. Based on FHWA’s recommendation during the MPO’s most recent Certification Review (2018), the MPO will reexamine the number of miles of locally owned roads on its designated portion of the National Highway System.



Elevate Critical Urban and Critical Rural Freight Corridors as a focus for future freight planning.

During 2017, Lancaster County identified several candidate roadway segments for consideration as federally-certified Critical Rural and Critical Urban Freight Corridors. PennDOT evaluated Lancaster County’s proposals and submitted a listing to FHWA for consideration and certification. Certified segments were included on the federal National Highway Freight Network (NHFN). Roadways comprising this network are eligible for federal freight funding and grants. Lancaster County segments that were not certified by FHWA are not eligible for National Highway Freight Program (NHFP) funding, but are priorities for freight movement planning, regardless of their federal status.



LCPC

Quality of Service



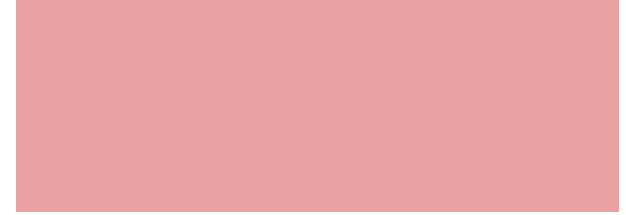
In addition to MTP actions directed toward system improvement, other strategies deal more directly with the institutional aspects of improving the planning and programming process. These can include leveraging transportation funding made possible by Act 89 of 2013, for example, and improving the MPO’s existing planning processes.



Work cooperatively with PennDOT District 8-0 on the development of new tools to improve the selection of projects that reduce congestion and improve air quality or enhance system maintenance and preservation.

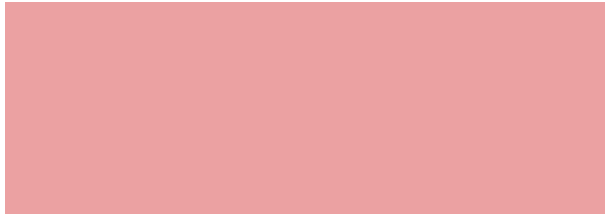
Like the selection of safety projects, the selection of projects under the Congestion Mitigation and Air Quality Improvement (CMAQ) Program must meet certain program criteria to be funded from this category of funds. The MPO will work with PennDOT to develop tools to improve the prioritization and selection of projects for CMAQ funding.

Several categories of funds can be used to pay for system maintenance and preservation projects. The MPO will work with PennDOT to develop tools or methods to improve the selection of system maintenance projects.



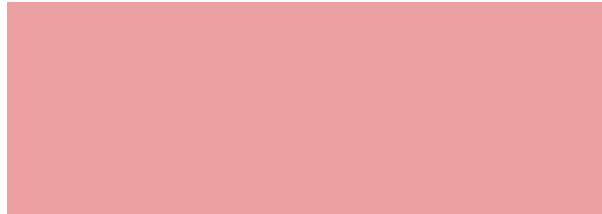
Improve the TIP update process.

The Lancaster MPO will work with PennDOT District 8-0 and its TIP Update Subcommittee to refine the “project pipeline” process to select candidate projects each TIP update cycle. This may include accepting municipal needs anytime through the MPO website instead of a formal solicitation process before the formal TIP update process begins. These procedural changes could also incorporate input that could be used as part of the PennDOT Connects process. The MPO will also consider developing a scoring system to empirically evaluate future candidate projects based on criteria from both the FAST Act and County-derived sources. One important consideration in evaluating future candidate projects should be the degree to which they reflect regional or intermunicipal collaboration and coordination.



Increase input from the economic development community.

To better understand freight-related movement and its impact on the transportation network beyond Lancaster County, local stakeholders must be engaged with the Lancaster MPO. They provide important insight into the current and future transportation needs of the business community. When addressing system-wide issues such as congestion and safety, existing freight stakeholders as well as upcoming economic development opportunities should be considered.



Undertake a freight study.

Continued economic development in Lancaster County and beyond will only increase demand on and impacts to the county’s infrastructure, particularly its highway and bridge system. PennDOT is currently developing regional freight plan guidance and developing freight planning data for use by the state’s MPOs. The Lancaster MPO participated in a regional freight study in 2002, but that study is now outdated. Updating it is essential to understanding current and projected regional goods movement and planning for these freight transportation needs. The MTP’s analysis of commercial trip-making provides a good starting point to plan for the needs of the county’s shippers and carriers.



Identify additional funding opportunities.

The Lancaster MPO will work with stakeholders to identify new transportation funding opportunities, including but not limited to those available via federal initiatives such as the Better Utilizing Investments to Leverage Development (BUILD) discretionary grants, state initiatives such as Act 89, and PennDOT’s public–private partnerships (P3) program.

Performance Goals

The Lancaster County MPO will consider using federal transportation performance measures and other criteria in evaluating future candidate projects. Criteria related to safety, condition, and reliability (among others) can be used to quantify the merits of candidate projects as they are being considered for future programs. Use of these criteria will never completely replace human judgment but can serve as valuable planning tools to help ensure the County is programming only the best projects within its limited funding environment.



LCPC

Plan Implementation in Action

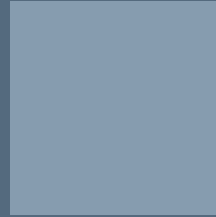
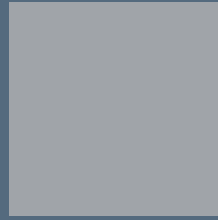
The Lancaster MPO collaborates with PennDOT on the development of the Commonwealth's Twelve-Year Program (TYP). The project list that accompanies this plan represents the Lancaster MPO's portion of the statewide program. The first four years of the TYP are the MPO's Transportation Improvement Program (TIP) and provide the most direct means by which the MTP is implemented. The complete list of TYP projects for the Lancaster MPO, including the 2021–2024 TIP, is provided in Appendix A. The following are example projects from the TIP that provide investments in the three policy areas rated as most important by the public—safety, reliable travel, and system maintenance—and that ultimately will help Lancaster County achieve its transportation vision.

Sample Transportation Improvement Program (TIP) Projects

TIP Project Name	Description	Cost	Policy Area Supported
30/462 Interchange Improvements	Improvements at the US30/PA462 interchange in East Lampeter Township (final design and construction)	\$15,949,951	Safety
US 30 Improvements	Intersection and safety improvements on Lincoln Highway/US30 from Hartman Bridge Road/PA896 to Newport Road/PA774 in Paradise, East Lampeter, Leacock, and Salisbury Townships (construction)	\$2,736,000	Safety
US 322/US 222 Intersection Improvements	Construction of a diverging diamond interchange at US322 and US222 in Ephrata Township (construction)	\$6,593,303	Safety
Fruitville Pike Intersection Improvements	Intersection improvements at the intersections of Fruitville Pike and Temperance Hill Road and Fruitville Pike and Holly Tree Road in Penn Township (preliminary engineering, final design and construction)	\$1,485,000	Safety
Strasburg Pike Improvements	Improvements at the intersection of Strasburg Pike and Rockvale Road in East and West Lampeter Townships (preliminary engineering, final design, utilities, ROW, and construction)	\$1,663,000	Safety
McGovernville Road Interchange Improvements	Interchange improvements at McGovernville Road/PA283 in East Hempfield Township (preliminary engineering)	\$682,000	Safety
Main Street Traffic Signal Improvements	Traffic signal improvements at the intersection of PA 72/Manheim Pike and PA 722 in East Petersburg Borough	\$1,212,000	Reliability
US 222/US30 Interchange Improvements	Improvements at the US222/US30 interchange in Manheim, Warwick and West Earl Townships	\$48,268,304	Reliability
PA272 and SR8032 Improvements @ Schaum's Corner interchange area	Ramp Improvements, turn lanes, thru lanes and signalization on PA272 and north and southbound on and off ramps for US222 in West Earl Township	\$1,600,000	Reliability

Sample Transportation Improvement Program (TIP) Projects

TIP Project Name	Description	Cost	Policy Area Supported
Centerville Rd Interchange	Interchange reconstruction on Centerville Road (T-408) over US 30 in East Hempfield Township	\$8,834,242	Reliability
Centerville Road Widening	Widen Centerville Road to 5 lanes from Marietta Avenue/PA23 to Columbia Avenue/PA462 in East Hempfield Township	\$8,547,302	Reliability
Marietta Avenue over NS	Bridge Replacement on Marietta Avenue over Norfolk Southern Railroad in East Hempfield Township (construction)	\$1,036,000	System Maintenance
PA 72 over Chickies Creek	Bridge Preservation on Lancaster Road over Chickies Creek in Penn Township (construction)	\$650,000	System Maintenance
Veteran's Memorial Bridge Rehab	Bridge rehabilitation on the Veteran's Memorial Bridge/PA462 over the Susquehanna River in West Hempfield Township and Columbia Borough (construction)	\$19,217,541	System Maintenance
Rife Run Bridge	Bridge Rehabilitation on W. High Street/PA772 over Rife Run in Manheim Borough	\$1,800,000	System Maintenance
Rothsville Road Resurface	Resurfacing on Rothsville Road from PA 501 (Broad Street) to West of Hollywood Avenue in Warwick Township and Lititz Borough	\$1,730,000	System Maintenance
Kleinfeltersville Road Bridge Replacement	Bridge replacement on Kleinfeltersville Road over a tributary to Middle Creek in Clay Township	\$510,000	System Maintenance
Cedar Street Bridge Replacement	Bridge Replacement on Cedar Street over Lititz Run in Lititz Borough (municipally owned bridge)	\$827,987	System Maintenance



APPENDICES

Appendix A: Project Listing

APPENDICES

2021-2024 TIP

MPMS	S.R.	Project Name	Description	Municipality	Phase	Cost	Project Type
112615		Enola Low Grade Trail - eastern section	Conversion of an abandoned rail line into a multi-use trail including improvements to the trail surface, drainage, signage, trail head	Bart, Eden, and Sadsbury Townships	C	\$1,200,000	Bike/Ped
114216		Water Street Bicycle Blvd 2 SGT	Intersection improvements including street markings, signage, mid-block speed cushions, bike boxes, curb extensions, pedestrian refuge islands, vegetated curb extensions, and signal retimings from Vine Street to Harrisburg Avenue	City of Lancaster	C	\$1,618,400	Bike/Ped
114217		Riverfront to Downtown Streetscape Connection SGT	Mill and overlay, remove and replace sidewalk and 2 foot brick strip installed on both sides of the street on Walnut Street from Third Street to North front Street. ADA ramp and street trees on Third Street from Walnut Street to Locust Street.	Columbia Borough	C	\$867,100	Bike/Ped
114218		Strasburg Pike to Oakview Road Trail SGT	Construction of a multiuse trail from Flory Park to S. Oakview Road	East Lampeter Township	C	\$1,011,700	Bike/Ped
TOTAL BIKE/PED						\$4,697,200	
78906	1044	Little Muddy Creek Bridge Replacement	Bridge replacement on Red Run Road over Little Muddy Creek	Brecknock Township	C	\$1,000,000	Bridge
79025	1019	California Rd Bridge #1 Replacement	Bridge replacement on California Road over a Tributary of Conestoga River	Caernarvon Township	C	\$570,000	Bridge
19916	372	South Bridge Street Bridge	Bridge replacement on South Bridge Street over Williams Run	Christiana Borough	C	\$2,630,000	Bridge
91267	1035	Kleinfeltersville Rd Bridge Replacement	Bridge replacement on Kleinfeltersville Road over a tributary to Middle Creek	Clay Township	C	\$510,000	Bridge
91326	2014	Coopers Run Bridge Replacement	Bridge replacement on Maple Shade Road over Coopers Run	Colerain Township	C	\$484,000	Bridge
101074	3017	Safe Harbor Rd Bridge Preservation	Bridge preservation on Safe Harbor Road over Conestoga River	Conestoga Township	C	\$943,328	Bridge

Key to Phases: P=Preliminary Engineering, F=Final Design, U=Utilities, R=Right-of-Way, C=Construction, S=Study

2021-2024 TIP

MPMS	S.R.	Project Name	Description	Municipality	Phase	Cost	Project Type
90342	441	River Road Bridge Replacement	Bridge replacement on River Road/PA441 over a Tributary to Susquehanna River, just north of Spruce Street	Conoy Township	C	\$775,000	Bridge
91261	441	River Road Bridge #2 Improvement	Bridge replacement on River Road/PA441 over a tributary to the Susquehanna River , approximately 900 feet north of Bainbridge Rd	Conoy Township	C	\$796,000	Bridge
110475	7405	Weaver Road Bridge replacement	Bridge replacement of Weaver Road Bridge over Cocalico Creek - (Municipal owned bridge)	Denver Borough	FUC	\$2,860,000	Bridge
101036	1901	Gristmill Road Bridge Replacement	Bridge replacement on Grist Mill Road over Conestoga River, just north of Mill Road	Earl Township	C	\$3,373,500	Bridge
101009	1030	Stevens Road Bridge Rehabilitation	Bridge rehabilitation of Stevens Road over Cocalico Creek	East Cocalico Township	C	\$2,300,000	Bridge
100531	23	Marietta Avenue over NS	Bridge Replacement on Marietta Avenue over Norfolk Southern Railroad	East Hempfield Township	C	\$1,036,000	Bridge
20053	7214	Holland Street Bridge Removal	Removal of Holland Street bridge over Amtrak in Salunga	East Hempfield Township	C	\$500,000	Bridge
87535	30	US30 Bridge Improvements	Bridge replacement/rehabilitation on US 30 (Lincoln Highway) over tributary to Pequea Creek	East Lampeter Township	C	\$580,000	Bridge
100592	1003	Horseshoe Rd over Amtrak	Bridge Preservation of Horseshoe Road over Amtrak Railroad	East Lampeter Township	C	\$823,401	Bridge
84016	3028	Pitney Road bridge over Amtrak	Bridge rehabilitation on Pitney Road over Amtrak	East Lampeter Township	C	\$1,626,538	Bridge
87564	1026	Hopeland Rd Bridge Replacement	Bridge replacement on Hopeland Road Bridge over Furnace Run	Elizabeth Township	C	\$630,000	Bridge
101002	1020	Meadow Valley Road Bridge Replacement	Bridge replacement on Meadow Valley Road over Meadow Run	Ephrata Township	C	\$500,000	Bridge
110487	7218	Trout Run Road Bridge Improvement	Bridge rehabilitation/replacement on Trout Run Road over Indian Run (Municipal owned bridge)	Ephrata Township	P	\$417,919	Bridge

APPENDICES

2021-2024 TIP

MPMS	S.R.	Project Name	Description	Municipality	Phase	Cost	Project Type
94754	7219	Peters Creek Road Bridge Replacement	Bridge replacement on Peters Creek Road over Peters Creek	Fulton Township	C	\$528,846	Bridge
100543	741	Millersville Road Bridge Improvements	Bridge Improvements on PA 741 (Millersville Road) over Conestoga River	Lancaster Township	C	\$1,420,545	Bridge
94747	7409	Cedar Street Bridge Replacement	Bridge Replacement on Cedar Street over Lititz Run - (Municipal owned bridge)	Lititz Borough	C	\$827,987	Bridge
19862	772	Rife Run Bridge	Bridge Rehabilitation on W. High Street/PA772 over Rife Run	Manheim Borough	C	\$1,800,000	Bridge
94924	30	US 30 bridge over Fruitville Pike	Bridge preservation on US30 over Fruitville Pike	Manheim Township	FU	\$387,000	Bridge
101004	1029	Butter Rd bridge Preservation	Bridge preservation on Butter Road over Kurtz Run	Manheim Township	C	\$184,971	Bridge
89288	7101	Rohrerstown Road Bridge	Bridge replacement on Rohrerstown Road over the Little Conestoga Creek - (Municipal owned bridge)	Manheim Township	FUC	\$2,070,340	Bridge
90852	441	Water Street Bridge Replacement	Bridge replacement on PA 441/Water Street over Schumans Run	Manor Township	C	\$1,300,000	Bridge
115004	372	Norman Wood Bridge Study	Study to determine rehabilitation/replacement of the Norman Wood bridge	Martic Township	S	\$500,000	Bridge
91336	3018	Martic Heights Drive Bridge Replacement	Bridge replacement on Martic Heights Drive over a tributary of Tucquan Creek	Martic Township	C	\$150,000	Bridge
91338	3038	Bridge Valley Road Bridge Replacement	Bridge replacement on Bridge Valley Road over a branch of Pequea Creek	Martic Township	PC	\$525,000	Bridge
20149	4033	Meadow View/Milton Grove Rd Bridge Replacement	Bridge replacement on Meadow View/Milton Grove Rd over Little Chickies Creek	Mount Joy and Rapho Townships	FRC	\$2,847,068	Bridge
90854	230	Market Street Bridge	Bridge improvement on Market Street over tributary to Conoy Creek	Mount Joy Township	PC	\$500,000	Bridge

2021-2024 TIP

MPMS	S.R.	Project Name	Description	Municipality	Phase	Cost	Project Type
87553	741	Strasburg Road Bridge Replacement	Bridge replacement on Strasburg Road/PA741 over Eshleman's Run, just east of Keneagy Hill Rd	Paradise Township	C	\$350,000	Bridge
94751	7226	Pequea Valley Road Bridge Replacement	Bridge Replacement on Pequea Valley Road over Pequea Creek - (County owned bridge)	Paradise Township	URC	\$1,650,000	Bridge
101300	72	PA 72 over Chickies Creek	Bridge Preservation of Lancaster Road over Chickies Creek	Penn Township	C	\$650,000	Bridge
87500	30	Lincoln Hwy Bridge # 3	Bridge Improvements on US 30/Lincoln Highway over Houston Run, west of Brackbill Road	Salisbury Township	FURC	\$1,200,000	Bridge
87550	2031	Walnut Run Road Bridge Replacement	Bridge replacement on Walnut Run Road over Pequea Creek	Strasburg Township	C	\$770,000	Bridge
87538	772	West Orange Street Bridge	Bridge replacement on West Orange Street over a storm drain at Pfautz Avenue	Warwick Township	C	\$550,000	Bridge
63227	1053	Greenville Road Bridge Replacement	Replacement of Greenville Road/S. Peartown Road bridge over Cocalico Creek, south of Blue Lake Road	West Cocalico Township	C	\$2,054,000	Bridge
78995	4003	Kinderhook Rd bridge Replacement	Bridge replacement on Kinderhook Road over Chickies Creek	West Hempfield Township	FURC	\$3,925,000	Bridge
79020	462	Veteran's Memorial Bridge Rehab	Bridge rehabilitation on the Veteran's Memorial Bridge/ PA462 over the Susquehanna River	West Hempfield Township and Columbia Borough	C	\$19,217,541	Bridge
TOTAL BRIDGE						\$65,763,984	
94572		Rideshare Program	Ridesharing, Vanpooling Programs, and Transit Coordination - Commuter Services of PA	Countywide	P	\$1,408,088	Congestion Reduction
114206	741	McGovernville Road Interchange Improvements	Interchange improvements at McGovernville Road/PA283	East Hempfield Township	P	\$682,000	Congestion Reduction
64767	4057	Centerville Rd Interchange	Interchange reconstruction on Centerville Road (T-408) over US 30	East Hempfield Township	C	\$8,834,242	Congestion Reduction
101505		Centerville Road Widening	Widen Centerville Road to 5 lanes from Marietta Avenue/ PA23 to Columbia Avenue/PA462	East Hempfield Township	FC	\$8,547,302	Congestion Reduction

APPENDICES

2021-2024 TIP

MPMS	S.R.	Project Name	Description	Municipality	Phase	Cost	Project Type
107807	30	US30/Harrisburg Pike Interchange Improvements	Interchange Improvements at US30/Harrisburg Pike Interchange	East Hempfield Township	C	\$4,000,000	Congestion Reduction
112882		Walnut Street Extension	Extension of Walnut Street from US30 to a new connection with Benjamin Franklin Blvd.	East Lampeter Township	C	\$4,200,000	Congestion Reduction
80119	72	Main Street Traffic Signal improvements	Traffic signal improvements at the intersection of PA 72/ Manheim Pike and PA 722	East Petersburg Borough	PFC	\$1,212,000	Congestion Reduction
109618	222	US 222 Reconstruction/ Widening 1	Reconstruct and widen US 222 to six lanes from US 30 to north of Jake Landis Interchange	Manheim Township	PFURC	\$11,647,596	Congestion Reduction
109620	222	US 222 Reconstruction/ Widening 2	Reconstruct and widen US 222 to six lanes from north of Jake Landis Interchange to PA 772	Manheim, Warwick and West Earl Townships	PFUR	\$4,500,986	Congestion Reduction
97013	222	US 222/US30 Interchange Improvements	Improvements at the US222/US30 interchange	Manheim, Warwick, and West Earl Townships	C	\$48,268,304	Congestion Reduction
20119		Brunnerville/ Newport Road Intersection Improvements	Addition of left turn lanes on 3 approaches, box culvert widening, signal upgrades at the intersection of Brunnerville Road and Newport Road	Warwick Township	C	\$902,833	Congestion Reduction
113877	272	PA272 and SR8032 Improvements @ Schaum's Corner interchange area	Ramp Improvements, turn lanes, thru lanes and signalization on PA272 and north and southbound on and off ramps for US222	West Earl Township	C	\$1,600,000	Congestion Reduction
TOTAL CONGESTION REDUCTION						\$95,803,351	
114225	1011	New Holland Borough RR Crossings	Installation of railroad warning devices at various locations	New Holland Borough	C	\$1,500,000	Railroad Crossings
TOTAL RAILROAD CROSSING						\$1,500,000	
87823		TAP Reserve	Transportation Alternatives Program (TAP) Reserve	Reserve	C	\$1,680,000	Reserve
87825		HSIP Reserve	Highway Safety Improvement Program Reserve (HSIP)	Reserve	C	\$3,409,000	Reserve
87826		Bridge Reserve	Bridge Reserve	Reserve	C	\$433,665	Reserve
87832		CMAQ Reserve	Congestion, Mitigation, Air Quality Reserve (CMAQ)	Reserve	C	\$4,394,961	Reserve

2021-2024 TIP

MPMS	S.R.	Project Name	Description	Municipality	Phase	Cost	Project Type
87848		Delivery/ Consult Assist	Delivery/Consultant Reserve	Reserve	PC	\$2,400,000	Reserve
93151		Smart Growth Transportation Program	Smart Growth Transportation (SGT) Program Reserve	Reserve	C	\$2,502,800	Reserve
110972		Planning Assistance Reserve	Technical and engineering-related activities, local project delivery technical assistance (including project management for projects delivered under open-end contract with the District and studies), PennDOT Connects support, LRTP, Public Participation Plan	Countywide	PC	\$100,000	Reserve
110973		Active Transportation Plan Implementation	Trail-related technical and engineering-related activities, local project delivery technical assistance, and possible matching funds for grants from other agencies	Countywide	PC	\$100,000	Reserve
TOTAL RESERVE						\$15,020,426	
91030	300	PA 283 Diamond Grinding 1	Diamond Grinding on PA 283 from Dauphin County Line to East High Street	Mount Joy Township and Elizabethtown Borough	C	\$1,650,000	Roadway Reconstruction/Resurfacing
96331	772	Rothsville Road Resurface	Resurfacing on Rothsville Road from PA 501 (Broad Street) to West of Hollywood Avenue	Warwick Township and Litiz Borough	C	\$1,730,000	Roadway Reconstruction/Resurfacing
TOTAL ROADWAY						\$3,380,000	
110502	30	30/462 Interchange Improvements	Improvements at the US30/PA462 interchange	East Lampeter Township	FC	\$15,949,951	Safety
90491	322	US322/US222 Intersection Improvements	Construction of a diverging diamond interchange at US322 and US222	Ephrata Township	C	\$6,593,303	Safety
114325	772	Fruitville Pike Intersection Improvements	Intersection improvements at the intersections of Fruitville Pike and Temperance Hill Road and Fruitville Pike and Holly Tree Road	Penn Township	PFC	\$1,485,000	Safety
114205	2029	Strasburg Pike Improvements	Improvements at the intersection of Strasburg Pike and Rockvale Road	East and West Lampeter Townships	PFURC	\$1,757,000	Safety

APPENDICES

2021-2024 TIP

MPMS	S.R.	Project Name	Description	Municipality	Phase	Cost	Project Type
97250	30	US 30 Improvements	Intersection and safety improvements on Lincoln Highway/US30 from Hartman Bridge Road/PA896 to Newport Road/PA774	Paradise, East Lampeter, Leacock, and Salisbury Townships	C	\$2,736,000	Safety
TOTAL SAFETY						\$28,521,254	
110507	222	PA324/US222/ Fairview Ave Intersection Improvements	Intersection improvements/roundabout at the Intersection of S. Prince St. and New Danville Pk and Fairview Ave	City of Lancaster, Lancaster Twp, and West Lampeter Twp	FC	\$3,200,000	Traffic Signals/ Intersection Improvements
106587	30	ITS Phase 4	Installation of Highway Advisory Radio (HAR) or equivalent technology at these highway interchange locations: 222/322, 283/MT. JOY, 283/722, 30/STONY BATTERY, 30/340 & 30/222 for incident response	East Hempfield, East Lampeter, Ephrata, Manheim, West Earl, and West Hempfield Townships	C	\$500,000	Traffic System Management/ ITS
TOTAL TRAFFIC						\$3,700,000	
TOTAL 2021-2024 TIP						\$218,386,215	

2025-2028 TYP (Second Four Years of Twelve-Year Program)

MPMS	S.R.	Project Name	Description	Municipality	Phase	Cost	Project Type
20149	4033	Meadow View/Milton Grove Rd Bridge Replacement	Bridge replacement on Meadow View/Milton Grove Rd over Little Chickies Creek	Mount Joy and Rapho Townships	FRC	\$2,226,932	Bridge
79020	462	Veteran's Memorial Bridge Rehab	Bridge rehabilitation on the Veteran's Memorial Bridge/PA 462 over the Susquehanna River	West Hempfield Township and Columbia Borough	C	\$44,974,080	Bridge
79102	7218	Mohler Church Rd. bridge Rehabilitation	Bridge rehabilitation/replacement on Mohler Church Road over Cocalico Creek	Ephrata Township	PFR	\$584,528	Bridge
94924	30	US 30 bridge over Fruitville Pike	Bridge preservation on US 30 over Fruitville Pike	Manheim Township	FU	\$5,500,000	Bridge
110487	7218	Trout Run Road Bridge Improvement	Bridge rehabilitation/replacement on Trout Run Road over Indian Run (Municipal owned bridge)	Ephrata Township	P	\$1,379,006	Bridge
Total Bridge						\$54,664,546	
97013	222	US 222/US30 Interchange Improvements	Improvements at the US 222/US 30 interchange	Manheim, Warwick, and West Earl Townships	C	\$8,329,000	Congestion Reduction
109618	222	US 222 Reconstruction/Widening 1	Reconstruct and widen US 222 to six lanes from US 30 to north of Jake Landis Interchange	Manheim Township	PFURC	\$82,127,676	Congestion Reduction
109620	222	US 222 Reconstruction/Widening 2	Reconstruct and widen US 222 to six lanes from north of Jake Landis Interchange to PA 772	Manheim, Warwick and West Earl Townships	PFUR	\$52,860,651	Congestion Reduction
114206	741	McGovernville Road Interchange Improvements	Interchange improvements at McGovernville Road/PA283	East Hempfield Township	P	\$5,871,000	Congestion Reduction
Total Congestion Reduction						\$149,188,327	
114225	1011	New Holland Borough RR Crossings	Installation of railroad warning devices at various locations	New Holland Borough	C	\$525,000	Railroad Crossings
Total Railroad Crossings						\$525,000	
87823	0	TAP Reserve	Transportation Alternatives Program (TAP) Reserve	Reserve	C	\$1,680,000	Reserve
87825	0	HSIP Reserve	Highway Safety Improvement Program Reserve (HSIP)	Reserve	C	\$5,449,000	Reserve

APPENDICES

2025-2028 TYP (Second Four Years of Twelve-Year Program)

MPMS	S.R.	Project Name	Description	Municipality	Phase	Cost	Project Type
87826	0	Bridge Reserve	Bridge Reserve	Reserve	C	\$9,716,304	Reserve
Total Reserve						\$16,845,304	
100383	272	Nottingham Road Resurfacing	Road resurfacing on PA 272 (Nottingham Road) from US 222 (Robert Fulton Highway) to Little Britain Road	Fulton and Little Britain Townships	P	\$50,000	Roadway Resurface
Total Roadway Resurface						\$50,000	
110502	30	30/462 Interchange Improvements	Improvements at the US30/PA462 interchange	East Lampeter Township	FC	\$18,769,214	Safety
Total Safety						\$18,769,214	
TOTAL 2nd FOUR YEARS						\$240,042,391	

2029-2032 TYP (Third Four Years of Twelve-Year Program)

S.R.	MPMS	Project Title	Phase	Cost	Project Type
10	78833	Twin County Road Bridge	PC	6,200,000	Bridge
23	101282	Marietta Avenue Bridge PM	PC	650,000	Bridge
23	101295	New Holland Pk Bridge PM	PC	582,000	Bridge
23	101318	New Holland Pike/ US 30	PC	2,572,000	Bridge
30	101307	US 30 over Lititz Pike	PC	3,270,000	Bridge
30	101316	US 30/Little Conestoga	PC	2,678,000	Bridge
222	100439	US 222/Conowingo Creek	PC	951,000	Bridge
222	100458	US 222/Beaver Creek	PC	682,000	Bridge
222	100536	US 222 over US 30	C	1,004,000	Bridge
222	100598	US 222 S/Muddy CR	C	751,000	Bridge
222	101020	US 222 N/Muddy Creek	C	751,000	Bridge
222	101034	US 222 N/Little Muddy Cr	C	403,000	Bridge
222	101328	US 222 SB Bridge PM	PC	552,000	Bridge
272	97263	N Reading over Muddy Cr	C	2,077,000	Bridge
322	101103	US 322 over Cocalico Cr	PC	997,000	Bridge
322	101105	US 322/Trib to Conestoga	PC	682,000	Bridge
340	101106	Old Phila Pike/Mill Creek	PC	981,000	Bridge
340	101279	Old Phila Pike over US30	PC	1,775,000	Bridge
372	101120	East State Street Bridge	PC	2,040,000	Bridge
441	101122	Water Street/Stamens Run	FC	1,185,000	Bridge
462	93581	PA 462 Little Conestoga	PC	998,000	Bridge
741	101125	Bridge Street over AMTRAK	C	900,000	Bridge
743	101128	Maytown Road over AMTRAK	PC	898,000	Bridge
772	100567	Mount Joy Road Bridge PM	PC	377,000	Bridge
772	100570	Newport Rd over SR 6023 Br PM	PC	3,371,000	Bridge
772	101129	Mt Joy Rd/Little Chiques	PC	1,170,000	Bridge
772	101132	Mount Joy Road/PA 283	PC	1,761,000	Bridge
772	101135	Newport Road/Cocalico Cr	PC	1,067,000	Bridge
772	101305	State Street over Groffs	C	681,000	Bridge
896	101140	Georgetown Rd over AMTRAK	PC	683,000	Bridge

APPENDICES

2029-2032 TYP (Third Four Years of Twelve-Year Program)

S.R.	MPMS	Project Title	Phase	Cost	Project Type
897	101141	W Main St/Cocalico Cr	PC	442,000	Bridge
1001	101272	Greenfield Rd over US 30	PC	1,475,000	Bridge
1003	100595	Quarry Road Bridge PM	PC	1,434,000	Bridge
1007	91264	Centerville Road Bridge	PC	1,721,000	Bridge
1010	87541	East Main Street Bridge	PC	1,035,000	Bridge
1013	101145	Peters Road over Mill Cre	PC	2,192,000	Bridge
1013	101148	Cider Mill Rd/Conestoga	PC	275,000	Bridge
1020	78890	Br Rpl SR 1020-Middle Crk	PC	3,888,000	Bridge
1024	87701	Lincoln Road Bridge	PC	1,875,000	Bridge
1035	101151	SR 1035 over Middle Cr	PC	1,073,000	Bridge
1037	91269	Speedwell Forge Road BR	PC	682,000	Bridge
1037	101153	SR 1037 over Hammer Cr	PC	454,000	Bridge
1044	100530	Red Run Rd/Muddy Cr	PC	4,797,000	Bridge
1044	101018	North Churchtown Rd Brdg	PC	491,000	Bridge
1046	101022	Fivepointville Rd Bridge	PC	1,058,000	Bridge
1046	101033	Maple Grove Rd Bridge PM	PC	493,000	Bridge
1047	101155	Church Street/Cocalico Cr	PC	829,000	Bridge
1051	94765	1051 over Stony Run Creek	C	909,000	Bridge
1061	87524	Willow Street Bridge	PC	1,955,000	Bridge
1090	101158	Willow Road Bridge PM	C	1,730,000	Bridge
1092	101159	Hartman Station Br. PM	C	2,547,000	Bridge
2007	101038	Lloyd Road Bridge PM	P	150,000	Bridge
2007	101044	Spruce Grove Road Bridge	P	150,000	Bridge
2011	78978	BrRpl SR2011-TBWBOctor.Cr	FC	917,000	Bridge
2014	91327	Maple Shade Road Bridge	PC	403,000	Bridge
2015	91395	Pumping Station Road BR	PC	1,422,000	Bridge
2015	101161	May Post Office Road Brdg	PC	529,000	Bridge
2019	101055	North Church St Brdg PM	PC	604,000	Bridge
2019	101263	Main Street/ Groff Run	PC	462,000	Bridge
2029	19763	Wheatland Mills Bridge	PC	2,707,000	Bridge

2029-2032 TYP (Third Four Years of Twelve-Year Program)

S.R.	MPMS	Project Title	Phase	Cost	Project Type
2029	87555	Bunker Hill Bridge	PC	620,000	Bridge
2029	101061	Bunker Hill Rd Bridge PM	PC	1,285,000	Bridge
2031	101267	Walnut Run Road Bridge	PC	368,000	Bridge
2033	87545	Leacock Road Bridge	PFURC	5,537,000	Bridge
2035	101271	Queen Road over Pequea Cr	PC	718,000	Bridge
2039	101063	Gypsy Hill Road Bridge PM	PC	907,000	Bridge
3008	101069	Cardinal Road Bridge PM	PC	491,000	Bridge
3015	101273	Cinder Road Bridge	PC	880,000	Bridge
3016	100436	Fairview Rd/Beaver Cr	PC	950,000	Bridge
3017	87540	River Road Bridge	PC	1,001,000	Bridge
3017	101077	River Road Bridge PM	PC	1,663,000	Bridge
3017	101275	Safe Harbor Road Bridge	PC	300,000	Bridge
3017	101280	Safe Harbor Road Bridge	P	150,000	Bridge
3017	101281	Safe Harbor Rd/Indian Run	P	150,000	Bridge
3018	101284	Truce Road Bridge	PC	663,000	Bridge
3027	87542	Walnut Hill Bridge	PC	676,000	Bridge
3027	101127	Walnut Hill Rd Bridge PM	PC	672,000	Bridge
3028	101287	Lampeter Road/Mill Creek	PC	853,000	Bridge
3030	101130	Long Ln over Stehman Run	PC	391,000	Bridge
3036	101290	Franklin Rd/Strickler Run	PC	529,000	Bridge
3040	101136	Smithville Road Bridge PM	PC	460,000	Bridge
4001	101144	Spooky Nook Rd ovr Amtrak	C	1,513,000	Bridge
4002	87537	Donegal Springs Rd Bridge	C	981,000	Bridge
4002	101294	Donegal Springs Road Brdg	P	150,000	Bridge
4004	87559	Stackstown Road Bridge	PC	680,000	Bridge
4004	101150	Stackstown Road Bridge PM	PC	592,000	Bridge
4008	101152	Elizabethtown Road Bridge	PC	383,000	Bridge
4008	101157	Elizabethtown Rd Bridge 2	P	150,000	Bridge
4008	101296	East High St over PA 283	PC	961,000	Bridge
4018	87508	West Harrisburg Avenue Br	PC	3,187,000	Bridge

APPENDICES

2029-2032 TYP (Third Four Years of Twelve-Year Program)

S.R.	MPMS	Project Title	Phase	Cost	Project Type
4019	101162	Bossler Rd over Conoy Crk	PC	425,000	Bridge
4020	91107	Chickies Creek Bridge	C	6,281,000	Bridge
4020	101264	Harrisburg Pike Bridge PM	PC	2,041,000	Bridge
4025	101298	Colebrook Rd over Amtrak	PC	2,419,000	Bridge
4026	101301	Old Line Rd over Rife Run	PC	907,000	Bridge
4037	101302	Bellaire Rd/Conewago Cr	PC	680,000	Bridge
4041	101039	Ridge Road over PA 283	PC	1,354,000	Bridge
7218	79102	Mohler Church Road over Cocalico Creek	C	1,053,631	Bridge
7410	110483	S. Oak St Bridge	P	349,500	Bridge
			Total Bridge	124,759,131	
222	109620	US 222 Reconstruction 2	C	43,214,000	Congestion Reduction
			Total Congestion Reduction	43,214,000	
1040	97251	Colonel Howard Blvd Imp	PFURC	16,089,000	Interchange
4020	80930	US30/Hbg Pike Interchange	C	2,340,000	Interchange
4020	80931	Hbg. Pike Corridor Improv	P	150,000	Interchange
			Total Interchange	18,579,000	
23	94912	PA 23 / PA 741 Int. Imp.	C	3,026,000	Intersection
			Total Intersection	3,026,000	
0	87823	TAP Line Item	C	1,681,000	Reserve
0	87825	HSIP Line Item	C	11,319,000	Reserve
0	87826	Bridge Reserve	C	5,164,551	Reserve
			Total Reserve	18,164,551	
2041	93088	Lancaster City Resurface	C	5,068,000	Road
			Total Road	5,068,000	
				TOTAL 2029-2032 TYP	212,810,682

2033-2045 Illustrative Projects

Municipality	Project	Funding Category
Caernarvon Township	PA Routes 10 & 23	Safety
East Lampeter Township	Strasburg Pike & Millport Road left turn lane	Highway
East Lampeter Township	SR 462 Bridge	Bridge
East Lampeter Township	Route 30 Bypass westbound OPP to NHP	Highway
Manheim Borough	Market Square	Highway
Manheim Borough	Main Street/PA 72 through Manheim Borough	Highway
Mount Joy Township	283 Cloverleaf Interchange	Highway
Mount Joy Township	Hershey and Beverly Intersection	Safety
Salisbury Township	Route 41/741 Bridge	Highway
Caernarvon Township	Traffic Calming	Highway
Caernarvon Township	Sidewalks	Highway
Christiana Borough	4-way stop	Highway
Columbia Borough	Bridge Street Intersection	Highway
Columbia Borough	Walnut Street Intersection hazards	Safety
East Hempfield Township	Good Drive Safety and Capacity Upgrades	Highway
East Hempfield Township	Lititz Road and SR 72 Intersection Safety Improvement Upgrades	Safety
East Hempfield Township	Rohrerstown Road Safety and Capacity Upgrades	Highway
East Hempfield Township	Spooky Nook and SR 283 Interchange	Highway
East Lampeter Township	Greenfield Road Underpass	Bridge
East Lampeter Township	Horseshoe Road Underpass	Bridge
East Lampeter Township	Desired Signalized Intersection 30 East & Millstream Road	Highway
East Lampeter Township	Lincoln Highway East Western Gateway Safety and Multimodal Corridor Improvements	Highway
East Lampeter Township	New Holland Pike traffic east of Landis Valley Road	Highway
East Lampeter Township	Old Philadelphia Pike Bridge over Mill Creek	Bridge
East Lampeter Township	Old Philadelphia Pike Pedestrian Facilities and Center Left Turn Lane	Highway
East Lampeter Township	Strasburg Pike from LHE to Millport Road	Highway
Elizabeth Township	US 322 and PA 501 Intersection	Highway
Elizabeth Township	Reifsnnyder Road and PA 501 & Brubaker Valley Road Intersection	Highway
Elizabethtown Borough	Campus Road, Groff Avenue, South Mount Joy Street	Highway
Ephrata Borough	ADA Compliant Sidewalk Width	Highway

APPENDICES

2033-2045 Illustrative Projects

Municipality	Project	Funding Category
Ephrata Borough	Church Avenue Walkability	Highway
Ephrata Borough	Meadow Valley Road Pedestrian Passage	Highway
Ephrata Borough	Pedestrian Crossings at Multi-Use Trails	Highway
Ephrata Borough	Rail Trail Extension	Highway
Ephrata Borough	South Oak Street Bridge	Bridge
Ephrata Borough	SR 322 Corridor	Highway
Ephrata Borough	Streets in Flood Plains	Highway
Ephrata Borough	ADA Accessibility at Crossings	Highway
Lancaster City	Highland Avenue	Highway
Lancaster City	Queen and Farnum Intersection	Highway
Lancaster City	Walnut and Ranck Intersection	Highway
Lancaster City	Two-way conversions	Highway
Lititz Borough	Rail Trail Extension	Highway
Lititz Borough	Truck Traffic PA 72 Relocation Study	Highway
Lititz Borough	NS Runabout and Broad Street Crossing Elimination	Highway
Manheim Township	Pinetown Road over Lititz Run Bridge	Bridge
Manor Township	741 and Charlestown Road Intersection	Highway
Marietta Borough	Route 441 and Furnace Road	Highway
Marietta Borough	Bank Street to Robert Mower Drive	Highway
Marietta Borough	Route 441 Bridge	Bridge
Marietta Borough	Maytown Pedestrian Connection	Highway
Mount Joy Borough	Rerouting of 772	Highway
Paradise and Salisbury Townships	Route 741	Highway
Paradise Township	South Vintage Road	Highway
Providence Township	Route 222	Highway
Rapho Township	Pedestrian Connectivity	Highway
Warwick Township	PA 501 Bike/Ped	Highway
Warwick Township	RRTA Route 10	Transit
West Donegal Township	Intersection traffic concerns	Highway
West Earl Township	East Main Street and Charles Place Intersection	Highway

2033-2045 Illustrative Projects

Municipality	Project	Funding Category
West Lampeter Township	Long Rifle Road to Gypsy Hill Road to Lampeter Road	Highway
West Lampeter Township	Beaver Valley Pike and Penn Grant Road	Highway
West Lampeter Township	Lampeter Road	Highway
West Lampeter Township	Willow Street Pike North, Penn rant Road to Wynwood Drive to Long Lane	Highway
West Lampeter Township	Beaver Valley Pike and Village Road	Highway

Appendix B: 2021 Transit TIP

FFY 2021-2024 Transit TIP

MPMS	Project Title	Project Description	Cost	Project Type
102410	Operating Assistance	Funds provided by PennDOT in FFY 2021, 2021, 2022 and 2023 and used by SCTA to fund the operation of the public transportation service in Lancaster County	\$28,894,384	Operating Assistance
102414	Queen St Station I Upgrade	Queen Street Station (QSS) opened for service in August 2005. This project provides for the targeted investment in the rehabilitation and upgrade of Station facilities and equipment that have reached the end of their useful life or are needed for the efficient operation of the facility. The infrastructure and operating system improvements will include but are not limited to the rehabilitation of the HVAC and sprinkler systems; security improvements; sidewalk; passenger amenities; and rehabilitation of retaining walls. This is a continuation of the project completed in 2017.	\$2,000,000	Facility Construction/Upgrades
102417	ADA Services	As provided for under federal guidelines, this project funds the cost of providing ADA paratransit service complementary to existing fixed route service up to ten percent (10%) of SCTA's annual allocation of federal transit 5307 funds to the Lancaster urbanized area. SCTA is programming 10% of its annual allocation for ADA services in Lancaster County. The costs incurred in FFY 2021, 2022, 2023 and 2024 are funded at an 80% Federal and 20% Non-federal level.	\$2,328,000	ADA Services
102425	Computer/Security Upgrade	Project provides for the planned upgrades and expansion of the SCTA computer software/hardware and security systems to support SCTA Lancaster operations and changing technologies. Computer hardware/software and security equipment that has reached the end of its useful life will also be replaced.	\$115,000	IT/Communications/Security
102426	Purchase Maintenance Equipment	SCTA has in place a program providing for the annual purchase of maintenance equipment to replace equipment that has reached the end of its useful life. Additional maintenance equipment will be purchased to support the maintenance of SCTA's buses and facilities based on the components on the new buses that are received and to support the required maintenance on facility structures and equipment. The Maintenance Equipment projected for purchase include, but are not limited to, Queen Street Station Parking Garage Sweeper, skid loader, scissor lift and pressure washer.	\$135,000	Operations & Support Equipment
110255	Paratransit Facility	The project provides for land acquisition and the design and construction of a new operating facility for the Lancaster paratransit system and for the maintenance and enclosed storage of the paratransit fleet.	\$7,007,750	Facility Construction/Upgrades
110263	Upgrade AVL System	SCTA's AVL system uses GPS technology to track the location of each bus operating on any given route. This information is used to monitor bus operations. Customers are able to track real-time bus information through RRTA's Bus Finder system. This project provides for an upgrade to the AVL system that has exceeded its useful service life and based on technology changes and SCTA operating/customer needs.	\$1,000,000	Operations & Support Equipment

APPENDICES

FFY 2021-2024 Transit TIP

MPMS	Project Title	Project Description	Cost	Project Type
110266	Fare Collection Equipment	This project provides for the upgrade/replacement of the fareboxes on the Lancaster fixed route buses and the fare collection support equipment that have exceeded their useful life. The purchase of new fareboxes will also enable SCTA to purchase fareboxes that reflect current technology	\$1,000,000	Operations & Support Equipment
110268	Purchase Paratransit Vans	SCTA has in place a program providing for the annual replacement of vehicles in the shared ride fleet that reached the end of their useful life. The programmed FFY 2021 5307 funds will be used to purchase seventeen (17) paratransit vehicles for SCTA's Lancaster Shared Ride Service. Vehicles purchased in 2016 will be replaced.	\$1,350,000	Paratransit Vehicles
110270	Purchase One (1) Bus	SCTA has in place a program providing for the planned replacement of buses that have exceeded their useful life . The programmed FFY 2021 5339 funds will be used towards the purchase of one (1) electric hybrid bus for SCTA's Lancaster fixed route bus operation. The hybrid buses are expected to have a positive impact on SCTA's operating costs. The bus purchased will replace a 2010 vehicle that has reached the end of its 12 year useful life.	\$705,000	Fixed Route Buses
110273	Purchase Paratransit Vans	SCTA has in place a program providing for the annual replacement of vehicles in the shared ride fleet that reached the end of their useful life. The programmed FFY 2022 5307 funds will be used to purchase eleven (11) paratransit vehicles for SCTA's Lancaster Shared Ride Service. Vehicles purchased in 2017 will be replaced.	\$910,000	Paratransit Vehicles
110274	Operations Center Upgrade	The rehabilitation of the Erick Road Operations Center was completed in 2010. This project will upgrade infrastructure and operating systems to ensure the facility will achieve its useful life and is operating efficiently. The improvements will include but are not limited to the upgrade of HVAC equipment; security gates upgrades; and replacement of Above Ground Storage Tanks installed in 1997.	\$1,562,500	Facility Construction/Upgrades
110276	TDP Update	A Transit Development Plan Update reviews existing service, current demographics and projected plans to develop short-term and long-term service improvement plans. SCTA updates its Transit Development Plan every five (5) years. This project will provide funding for the next update.	\$250,000	Planning
110277	Purchase Office Equipment	SCTA has in place a program providing for the regular replacement of office equipment that has exceeded it useful life, such as a copier purchased in 2014, or for the purchase of new or additional office equipment or furniture to support the operation of an efficient office.	\$50,000	Operations & Support Equipment
110278	Purchase One (1) Bus	SCTA has in place a program providing for the planned replacement of buses that have exceeded their useful life . The programmed FFY 2022 5339 funds will be used towards the purchase one (1) electric hybrid bus for SCTA's Lancaster fixed route bus operation. The hybrid bus is expected to have a positive impact on SCTA's operating costs. This bus will replace a 2013 vehicle that has reached the end of its 12 year useful life.	\$705,000	Fixed Route Buses

FFY 2021-2024 Transit TIP

MPMS	Project Title	Project Description	Cost	Project Type
113395	Access to Jobs Program	The Access to Jobs program funds the cost of providing shared ride service to qualified employees who are unable to use fixed route bus service to complete one leg of their trip to or from their place of employment.	\$1,000,000	Access to Jobs
114355	Computer Hardware/ Software and Communications/ Security	Project provides for the planned upgrades and expansion of the SCTA computer software/hardware, communications and security systems to support SCTA Lancaster operations and changing technologies. Computer hardware/software, communications and security equipment that has reached the end of its useful life will also be replaced.	\$115,000	IT/Communications/ Security
114356	Replace Bus Wash	Each fixed route bus is washed at the end of the day after its use in service. This project provides funds to replace Bus Wash equipment exceeding its useful service life.	\$250,000	Operations & Support Equipment
114358	Replace Communications Equipment	Radio communications between the Lancaster Operations Center and buses in service is critical. This project provides funds to replace/upgrade radios and communications support equipment exceeding its useful service life.	\$400,000	IT/Communications/ Security
114362	Purchase Paratransit Van	SCTA has in place a program providing for the annual replacement of vehicles in the shared ride fleet that reached the end of their useful life. The programmed FY 2023 5307 funds will be used to purchase thirteen (13) paratransit vehicles for SCTA's Lancaster Shared Ride Service. Vehicles purchased in 2018 will be replaced.	\$1,200,000	Paratransit Vehicles
114363	Purchase One (1) Bus	SCTA has in place a program providing for the planned replacement of buses that have exceeded their useful life . The programmed FFY 2023 5339 funds will be used towards the purchase of one (1) electric hybrid bus for SCTA's Lancaster fixed route bus operation. The hybrid buses are expected to have a positive impact on SCTA's operating costs. The bus purchased will replace a 2013 vehicle that has reached the end of its 12 year useful life.	\$705,000	Fixed Route Buses
114364	Purchase Two (2) Buses	SCTA has in place a program providing for the planned replacement of buses that have exceeded their useful life . The programmed FFY 2024 5339 funds will be used towards the purchase of two (2) electric hybrid buses for SCTA's Lancaster fixed route bus operation. The hybrid buses are expected to have a positive impact on SCTA's operating costs. The buses purchased will replace a 2013 and a 2015 bus that has reached the end of its 12 year useful life.	\$705,000	Fixed Route Buses
114365	Purchase Three (3) Buses	SCTA has in place a program providing for the planned replacement of buses that have exceeded their useful life . The programmed FFY 2024 5307 funds will be used towards the purchase of three (3) electric hybrid buses for SCTA's Lancaster fixed route bus operation. The hybrid buses are expected to have a positive impact on SCTA's operating costs. The buses purchased will replace 2015 buses that has reached the end of their 12 year useful life.	\$1,731,750	Fixed Route Buses

APPENDICES

FFY 2021-2024 Transit TIP

MPMS	Project Title	Project Description	Cost	Project Type
114366	Purchase Paratransit Vans	SCTA has in place a program providing for the annual replacement of vehicles in the shared ride fleet that reached the end of their useful life. The programmed FFY 2024 5307 funds will be used to purchase nine (9) paratransit vehicles for SCTA's Lancaster Shared Ride Service. Vehicles purchased in 2018 will be replaced.	\$800,000	Paratransit Vehicles
114367	Replace the Vacuum System	SCTA has in place a program providing for the annual purchase of maintenance equipment to replace equipment that has reached the end of its useful life. This project provides funds to replace the Bus Vacuum System equipment used to clean the buses. The current equipment will have exceeded its useful service life.	\$150,000	Operations & Support Equipment
114368	Replace 2005 Tow Truck	SCTA has in place a program providing for the planned replacement of service vehicles that have exceeded their useful life . The programmed FY 2024 funds will be used toward the purchase of a tow truck to replace a 2005 tow truck that is beyond its useful service life.	\$300,000	Service Vehicles
TOTAL PROGRAMMED AMOUNT			\$55,369,384	

Red Rose Transit Authority State of Good Repair Capital Improvement Program

Fiscal Year	Capital Needs				Total	Projected Federal Funding	Federal Shortfall	Buses/Vans
		Federal	State	Local				
		80.00%	19.36%	0.65%				
2019	REPLACE 6 - 2007 BUSES - HYBRIDS	\$3,456,000	\$836,352	\$27,864	\$4,320,000		\$720,000	
	REPLACE TELEPHONE SYSTEM	\$60,000	\$14,520	\$484	\$75,000		\$77,900	
	COMPUTER HARDWARE/ SOFTWARE	\$24,000	\$5,808	\$194	\$30,000			
	REPLACE 1 SUPERVISORY VEHICLE	\$21,600	\$5,227	\$174	\$27,000			
	REPLACE 1 MAINTENANCE VEHICLE	\$38,400	\$9,293	\$310	\$48,000			
	TOTAL	\$3,600,000	\$871,200	\$29,025	\$4,500,000	\$4,558,940	\$958,940	
2020	REPLACE 3 2008 BUSES - HYBRIDS	\$1,779,840	\$430,721	\$14,350	\$2,224,800		\$77,900	
	REPLACE 13-2014 - PARATRANSIT VANS	\$810,160	\$196,059	\$6,532	\$1,012,700		\$741,600	
	REPLACE 2 SUPERVISORY VEHICLES	\$48,000	\$11,616	\$387	\$60,000			
	SR FACILITY	\$800,000	\$193,600	\$6,450	\$1,000,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$3,438,000	\$831,996	\$27,719	\$4,297,500	\$4,558,940	\$2,079,880	
2021	REPLACE 10-2015 - PARATRANSIT VANS	\$641,896	\$155,339	\$5,175	\$802,370		\$80,237	
	REPLACE TOW MOTOR	\$24,000	\$5,808	\$194	\$30,000		\$763,848	
	UPGRADE AVL SYSTEM	\$800,000	\$193,600	\$6,450	\$1,000,000			
	TDP UPDATE PLAN	\$120,000	\$29,040	\$968	\$150,000			
	COMPUTER HARDWARE/ SOFTWARE	\$24,000	\$5,808	\$194	\$30,000			
	REPLACE COPIER -2012	\$24,000	\$5,808	\$194	\$30,000			
	UPGRADE PARKING GARAGE	\$400,000	\$96,800	\$3,225	\$500,000			

APPENDICES

Red Rose Transit Authority State of Good Repair Capital Improvement Program

Fiscal Year	Capital Needs	Federal	State	Local	Total	Projected Federal Funding	Federal Shortfall	Buses/Vans
	SHOP EQUIPMENT	\$80,000	\$19,360	\$645	\$100,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$2,113,896	\$511,563	\$17,043	\$2,642,370	\$4,558,940	\$4,524,924	
2022	REPLACE 17 - PARATRANSIT VANS	\$1,123,960	\$271,998	\$9,062	\$1,404,950			\$82,644
	REPLACE 1 2010 BUS - HYBRIDS	\$629,411	\$152,317	\$5,075	\$786,763			\$786,763
	REPLACE ABOVE GROUND TANKS (1997)	\$800,000	\$193,600	\$6,450	\$1,000,000			
	REPLACE OFFICE FURNITURE	\$40,000	\$9,680	\$323	\$50,000			
	PURCHASE (20) BUS SHELTERS	\$200,000	\$48,400	\$1,613	\$250,000			
	REPLACE COPIER -2014	\$24,000	\$5,808	\$194	\$30,000			
	REPLACE GARAGE SWEEPER	\$40,000	\$9,680	\$323	\$50,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$2,857,371	\$691,484	\$23,038	\$3,571,713	\$4,558,940	\$6,226,493	
2023	REPLACE 11-2017 - PARATRANSIT VANS	\$749,086	\$181,279	\$6,040	\$936,358			\$85,123
	REPLACE SKID LOADER	\$40,000	\$9,680	\$323	\$50,000			\$810,366
	COMPUTER HARDWARE/ SOFTWARE	\$28,000	\$6,776	\$226	\$35,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$817,086	\$197,735	\$6,588	\$1,021,358	\$4,558,940	\$9,968,347	
2024	REPLACE 13-2018 - PARATRANSIT VANS	\$911,842	\$220,666	\$7,352	\$1,139,803			\$87,677
	REPLACE 3 2012 BUSES BYBRIDS	\$2,003,226	\$484,781	\$16,151	\$2,504,032			\$834,677
	REPLACE BUS WASH	\$200,000	\$48,400	\$1,613	\$250,000			
	REPLACE FAREBOX SYSTEM	\$800,000	\$193,600	\$6,450	\$1,000,000			

Red Rose Transit Authority State of Good Repair Capital Improvement Program

Fiscal Year	Capital Needs	Federal	State	Local	Total	Projected Federal Funding	Federal Shortfall	Buses/Vans
	REPLACE COMMUNICATIONS EQUIP.	\$200,000	\$48,400	\$1,613	\$250,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$4,115,068	\$995,846	\$33,178	\$5,143,835	\$4,558,940	\$10,412,219	
2025	REPLACE 22-2019/2020 - PARATRANSIT VANS	\$1,589,411	\$384,637	\$12,815	\$1,986,764			\$90,307
	REPLACE 2 2013 BUSES BYBRIDS	\$1,375,548	\$332,883	\$11,090	\$1,719,435			\$859,718
	REPLACE BUS VACUUM SYSTEM	\$120,000	\$29,040	\$968	\$150,000			
	REPLACE 2005 TOW TRUCK	\$240,000	\$58,080	\$1,935	\$300,000			
	QSS PHASE I UPGRADES	\$400,000	\$96,800	\$3,225	\$500,000			
	COMPUTER HARDWARE/ SOFTWARE	\$32,000	\$7,744	\$258	\$40,000			
	REPLACE RADIO SYSTEM	\$120,000	\$29,040	\$968	\$150,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$3,876,959	\$938,224	\$31,258	\$4,846,199	\$4,558,940	\$11,094,200	
2026	REPLACE 10-2021 - PARATRANSIT VANS	\$744,133	\$180,080	\$6,000	\$930,167			\$93,017
	SHOP EQUIPMENT	\$80,000	\$19,360	\$645	\$100,000			\$885,509
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$824,133	\$199,440	\$6,645	\$1,030,167	\$4,558,940	\$14,829,007	
2027	REPLACE 17-2022 - PARATRANSIT VANS	\$1,302,978	\$315,321	\$10,505	\$1,628,722			\$95,807
	REPLACEMENT 10-2015 BUSES - HYBRIDS	\$7,296,596	\$1,765,776	\$58,829	\$9,120,745			\$912,074
	REPLACE 2-SUPERVISORY VEHICLE (2017)	\$56,000	\$13,552	\$452	\$70,000			
	COMPUTER HARDWARE/ SOFTWARE	\$32,000	\$7,744	\$258	\$40,000			

APPENDICES

Red Rose Transit Authority State of Good Repair Capital Improvement Program

Fiscal Year	Capital Needs	Federal	State	Local	Total	Projected Federal Funding	Federal Shortfall	Buses/Vans
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$8,687,573	\$2,102,393	\$70,044	\$10,859,467	\$4,558,940	\$10,700,373	
2028	REPLACE 11-2023 - PARATRANSIT VANS	\$868,396	\$210,152	\$7,001	\$1,085,495			\$98,681
	REPLACEMENT 4-2016 BUSES - HYBRIDS	\$3,006,197	\$727,500	\$24,237	\$3,757,747			\$939,437
	REPLACE SUPERVISORY VEHICLE (2018)	\$24,000	\$5,808	\$194	\$30,000			
	REPLACE 1-2018 MAINTENANCE VEHICLE	\$56,000	\$13,552	\$452	\$70,000			
	REPLACE COPIER 2021	\$32,000	\$7,744	\$258	\$40,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$3,986,594	\$964,756	\$32,142	\$4,983,242	\$4,558,940	\$11,272,720	
2029	REPLACE 13-2024 - PARATRANSIT VANS	\$1,057,075	\$255,812	\$8,523	\$1,321,344			\$101,642
	REPLACE 8 2017 BUSES HYBRID	\$6,192,767	\$1,498,650	\$49,929	\$7,740,958			\$967,620
	REPLACE 2-2019 SUPERVISORY VEHICLES	\$56,000	\$13,552	\$452	\$70,000			
	REPALCE 1-2019 MAINTENANCE VEHICLE	\$48,000	\$11,616	\$387	\$60,000			
	REPLACE HIGH LIFT	\$24,000	\$5,808	\$194	\$30,000			
	TDP UPDATE PLAN	\$160,000	\$38,720	\$1,290	\$200,000			
	COMPUTER HARDWARE/ SOFTWARE	\$32,000	\$7,744	\$258	\$40,000			
	UPGRADES SOLAR PANELS	\$800,000	\$193,600	\$6,450	\$1,000,000			
	REPLACE COPIER 2022	\$32,000	\$7,744	\$258	\$40,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$8,401,842	\$2,033,246	\$67,740	\$10,502,302	\$4,558,940	\$7,429,818	

Red Rose Transit Authority State of Good Repair Capital Improvement Program

Fiscal Year	Capital Needs	Federal	State	Local	Total	Projected Federal Funding	Federal Shortfall	Buses/Vans
2030	REPLACE 22-2025 - PARATRANSIT VANS	\$1,842,563	\$445,900	\$14,856	\$2,303,204			\$104,691
	REPLACE 5 2018 BUSES HYBRIDS	\$3,986,594	\$964,756	\$32,142	\$4,983,242			\$996,648
	REPLACE 2-2020 SUPERVISORY VEHICLES	\$56,000	\$13,552	\$452	\$70,000			
	FACILITY UPGRADES	\$1,600,000	\$387,200	\$12,900	\$2,000,000			
	REPLACE PORTABLE LIFTS	\$120,000	\$29,040	\$968	\$150,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$7,605,157	\$1,840,448	\$61,317	\$9,506,446	\$4,558,940	\$4,383,601	
2031	REPLACE 10-2026 - PARATRANSIT VANS	\$862,655	\$208,762	\$6,955	\$1,078,318			\$107,832
	REPLACE 6 2019 BUSES HYBRIDS	\$4,927,430	\$1,192,438	\$39,727	\$6,159,287			\$1,026,548
	QSS PHASE II - UPGRADES	\$800,000	\$193,600	\$6,450	\$1,000,000			
	COMPUTER HARDWARE/ SOFTWARE	\$32,000	\$7,744	\$258	\$40,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$6,622,084	\$1,602,544	\$53,391	\$8,277,605	\$4,558,940	\$2,320,457	
2032	REPLACE 17-2027 - PARATRANSIT VANS	\$1,510,508	\$365,543	\$12,178	\$1,888,135			\$111,067
	PURCHASE (20) BUS SHELTERS	\$240,000	\$58,080	\$1,935	\$300,000			\$1,057,344
	SHOP EQUIPMENT	\$80,000	\$19,360	\$645	\$100,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$1,830,508	\$442,983	\$14,758	\$2,288,135	\$4,558,940	\$5,048,889	
2033	REPLACE 11-2028 - PARATRANSIT VANS	\$1,006,709	\$243,624	\$8,117	\$1,258,387			\$114,399

APPENDICES

Red Rose Transit Authority State of Good Repair Capital Improvement Program

Fiscal Year	Capital Needs	Federal	State	Local	Total	Projected Federal Funding	Federal Shortfall	Buses/Vans
	REPLACE 3 2021 BUSES HYBRIDS	\$2,613,755	\$632,529	\$21,073	\$3,267,194			\$1,089,065
	COMPUTER HARDWARE/ SOFTWARE	\$40,000	\$9,680	\$323	\$50,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$3,660,464	\$885,832	\$29,512	\$4,575,580	\$4,558,940	\$5,947,365	
2034	REPLACE 13-2029 - PARATRANSIT VANS	\$1,225,440	\$296,556	\$9,880	\$1,531,800			\$117,831
	REPLACE 1 2022 BUSES HYBRIDS	\$897,389	\$217,168	\$7,235	\$1,121,737			\$1,121,737
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$2,122,829	\$513,725	\$17,115	\$2,653,536	\$4,558,940	\$8,383,476	
2035	REPLACE 22-2030 - PARATRANSIT VANS	\$2,136,036	\$516,921	\$17,222	\$2,670,045			\$121,366
	QSS PHASE I UPGRADES	\$800,000	\$193,600	\$6,450	\$1,000,000			\$1,155,389
	COMPUTER HARDWARE/ SOFTWARE	\$40,000	\$9,680	\$323	\$50,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$2,976,036	\$720,201	\$23,994	\$3,720,045	\$4,558,940	\$9,966,380	
2036	REPLACE 10-2031 - PARATRANSIT VANS	\$1,000,053	\$242,013	\$8,063	\$1,250,066			\$125,007
	REPLACE 3 2024 BUSES BYBRIDS	\$2,856,121	\$691,181	\$23,027	\$3,570,151			\$1,190,050
	REPLACE BUS WASH	\$200,000	\$48,400	\$1,613	\$250,000			
	REPLACE FAREBOX SYSTEM	\$800,000	\$193,600	\$6,450	\$1,000,000			
	REPLACE COMMUNICATIONS EQUIP.	\$200,000	\$48,400	\$1,613	\$250,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				

Red Rose Transit Authority State of Good Repair Capital Improvement Program

Fiscal Year	Capital Needs	Federal	State	Local	Total	Projected Federal Funding	Federal Shortfall	Buses/Vans
	TOTAL	\$5,056,174	\$1,223,594	\$40,765	\$6,320,217	\$4,558,940	-\$497,234	
2037	REPLACE 17-2032 - PARATRANSIT VANS	\$1,751,093	\$423,764	\$14,118	\$2,188,866			\$128,757
	REPLACE 2 2025 BUSES BYBRIDS	\$1,961,203	\$474,611	\$15,812	\$2,451,504			\$1,225,752
	REPLACE BUS VACUUM SYSTEM	\$120,000	\$29,040	\$968	\$150,000			
	REPLACE 2005 TOW TRUCK	\$240,000	\$58,080	\$1,935	\$300,000			
	QSS PHASE I UPGRADES	\$1,600,000	\$387,200	\$12,900	\$2,000,000			
	COMPUTER HARDWARE/ SOFTWARE	\$32,000	\$7,744	\$258	\$40,000			
	REPLACE RADIO SYSTEM	\$120,000	\$29,040	\$968	\$150,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$5,824,296	\$1,409,480	\$46,958	\$7,280,370	\$4,558,940	-\$1,265,356	
2038	REPLACE 11-2033 - PARATRANSIT VANS	\$1,167,052	\$282,427	\$9,409	\$1,458,815			\$132,620
	REPLACEMENT 10-2027 BUSES - HYBRIDS	\$10,100,195	\$2,444,247	\$81,433	\$12,625,244			\$1,262,524
	REPLACE 1-2028 MAINTENANCE VEHICLE	\$60,000	\$14,520	\$484	\$75,000			
	REPLACE 2 -2028 SUPERVISORY VEHICLES	\$56,000	\$13,552	\$452	\$70,000			
	SHOP EQUIPMENT	\$80,000	\$19,360	\$645	\$100,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$11,463,247	\$2,774,106	\$92,422	\$14,329,058	\$4,558,940	-\$6,904,307	
2039	REPLACE 13-2034 - PARATRANSIT VANS	\$1,420,620	\$343,790	\$11,454	\$1,775,775.58			\$136,598
	REPLACEMENT 10-202027 BUSES - HYBRIDS	\$10,403,201	\$2,517,575	\$83,876	\$13,004,001			\$1,300,400

APPENDICES

Red Rose Transit Authority State of Good Repair Capital Improvement Program

Fiscal Year	Capital Needs	Federal	State	Local	Total	Projected Federal Funding	Federal Shortfall	Buses/Vans
	REPLACE 1-2029 MAINTENANCE VEHICLE	\$60,000	\$14,520	\$484	\$75,000			
	REPLACE 2-2029-SUPERVISORY VEHICLES	\$60,000	\$14,520	\$484	\$75,000			
	COMPUTER HARDWARE/SOFTWARE	\$32,000	\$7,744	\$258	\$40,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$11,975,821	\$2,898,149	\$96,555	\$14,969,776	\$4,558,940	-\$7,416,881	
2040	REPLACE 22-2035 - PARATRANSIT VANS	\$2,476,251	\$599,253	\$19,965	\$3,095,313.43			\$140,696
	REPLACEMENT 4-202028 BUSES - HYBRIDS	\$10,715,297	\$2,593,102	\$86,392	\$13,394,121			\$1,339,412
	REPLACE 2-2030-SUPERVISORY VEHICLE	\$64,000	\$15,488	\$516	\$80,000			
	COMPUTER HARDWARE/SOFTWARE	\$32,000	\$7,744	\$258	\$40,000			
	PREVENTIVE MAINTENANCE	\$0	\$0	\$0				
	TOTAL	\$13,287,547	\$3,215,586	\$107,131	\$16,609,434	\$4,558,940	-\$8,728,607	
	GRAND TOTAL	\$115,142,685	\$27,864,530	\$928,338	\$143,928,356			

Appendix C: Air Quality Conformity Analysis

Air Quality Conformity Analysis Report

Lancaster MPO 2021-2024 TIP and 2045 MTP

National Ambient Air Quality Standards (NAAQS) Addressed:

- The Lancaster, PA 2008 8-Hour Ozone Nonattainment Area
- The Lancaster, PA 2006 24-Hour PM_{2.5} Maintenance Area

Prepared By:

The Lancaster County Planning Commission and
Pennsylvania Department of Transportation
for the
The Lancaster County Transportation Coordinating Committee

Public Review: April 28, 2020 – May 28, 2020

MPO Approval: June 22, 2020

April 2020

Table of Contents

Overview	1
Background on Transportation Conformity.....	1
Report Contents.....	2
National Ambient Air Quality Standard Designations.....	2
Final Particulate Matter	2
Ozone	3
Interagency Consultation.....	4
Analysis Methodology and Data	5
Key MOVES Input Data	7
Analysis Process Details	13
Conformity Analysis Results.....	18
Conformity Determination.....	22
Resources.....	23
Highway Vehicle Emissions Analysis Glossary	24

Table of Exhibits

Exhibit 1: Summary of Attachments	2
Exhibit 2: Local Data Inputs Used for Conformity Runs.....	6
Exhibit 3: Emission Calculation Process	7
Exhibit 4: Socioeconomic Growth Assumptions to the Travel Model	8
Exhibit 5: MOVES Source Types and HPMS Vehicle Groups	10
Exhibit 6: PPSUITE Speed/Emission Estimation Procedure.....	15
Exhibit 7: Emission Factor vs. Speed Variances (VOC, NOx, and PM _{2.5}).....	16
Exhibit 8: MOVES Run Specification File Parameter Settings	18
Exhibit 9: 8-Hour Ozone Motor Vehicle Emission budgets.....	19
Exhibit 10: Annual PM _{2.5} Motor Vehicle Emission Budgets.....	19
Exhibit 11: Transportation Conformity Analysis Years.....	20
Exhibit 12: Ozone Emission Analysis Results and Conformity Test.....	21
Exhibit 13: Annual PM _{2.5} Emission Analysis Results and Conformity Test.....	22

Summary of Attachments

Attachment A: Project List

Attachment B: Detailed Emission Results

Attachment C: Sample MOVES Input Files

Overview

This report provides an analysis of the air quality implications of the Lancaster County Transportation Coordinating Committee (LCTCC) MPO 2021-2024 Transportation Improvement Program (TIP) and 2045 Metropolitan Transportation Plan (MTP). The analysis demonstrates transportation conformity under the 2008 8-hour ozone National Ambient Air Quality Standard (NAAQS) and the 2006 24-hour PM_{2.5} NAAQS. The air quality conformity analysis reflects an assessment of the regionally significant, non-exempt transportation projects included in both the TIP and the MTP.

This document replaces the previously approved conformity demonstration of the TIP and MTP, and ensures that the findings meet all current criteria established by the U.S. Environmental Protection Agency (EPA) for the applicable NAAQS. A new conformity determination has been completed to provide a regional forecast of emissions based on planned air quality significant projects and the latest available planning assumptions.

Background on Transportation Conformity

Transportation conformity is a way to ensure that federal funding and approval are awarded to transportation activities that are consistent with air quality goals. Under the Clean Air Act (CAA), transportation and air quality modeling procedures must be coordinated to ensure that the TIP and the MTP are consistent with the area's applicable State Implementation Plan (SIP). The SIP is a federally approved and enforceable plan by which each area identifies how it will attain and/or maintain the health-related primary and welfare-related secondary NAAQS.

In order to receive transportation funding and approvals from the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA), state and local transportation agencies must demonstrate that the plans, programs, or projects meet the transportation conformity requirements of the CAA as set forth in the transportation conformity rule. Under the transportation conformity rule, transportation plans are expected to conform to the applicable SIP in nonattainment or maintenance areas. The integration of transportation and air quality planning is intended to ensure that transportation plans, programs, and projects will not:

- Cause or contribute to any new violation of any applicable NAAQS.
- Increase the frequency or severity of any existing violation of any applicable NAAQS.
- Delay timely attainment of any applicable NAAQS, any required interim emissions reductions, or other NAAQS milestones.

The transportation conformity determination includes an assessment of future highway emissions for defined analysis years, including the end year of the MTP. Emissions are estimated using the latest available planning assumptions and available analytical tools, including EPA's latest approved on-highway mobile sources emissions model, the Motor Vehicle Emission Simulator (MOVES). The conformity determination provides a tabulation of the analysis results for applicable precursor pollutants, showing that the required conformity test was met for each analysis year.

Report Contents

This document includes a summary of the methodology and data assumptions used for the conformity analysis. As shown in **Exhibit 1**, attachments containing additional detail have been provided with the document. In addition, modeling input and output files have been reviewed by the Environmental Protection Agency (EPA) Region III and the Pennsylvania Department of Environmental Protection (DEP).

EXHIBIT 1: SUMMARY OF ATTACHMENTS

Attachment	Title	Description
A	Project List	Provides a list of regionally significant highway projects that have been updated or added to the TIP and MTP.
B	Detailed Emission Results	Provides a detailed summary of emissions by roadway type.
C	MOVES Sample Run Specification	Provides example MOVES data importer (XML) and run specification (MRS) files.

National Ambient Air Quality Standard Designations

The CAA requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment. A nonattainment area is any area that does not meet the primary or secondary NAAQS. Once a nonattainment area meets the standards and additional redesignation requirements in the CAA [Section 107(d)(3)(E)], EPA will designate the area as a maintenance area.

Lancaster County is designated as a nonattainment area under the 2008 8-hour ozone NAAQS and a maintenance area under the 2006 24-hour PM_{2.5} NAAQS. The county is in attainment for all other current ozone and PM_{2.5} NAAQS. Transportation conformity requires nonattainment and maintenance areas to demonstrate that all future transportation projects will not prevent an area from reaching its air quality attainment goals.

Final Particulate Matter

Fine particulate matter (PM_{2.5}) can be emitted directly into the atmosphere (sources include exhaust and dust from brake and tire wear) or formed in the atmosphere by combinations of precursor pollutants (secondary formation). Sulfates and nitrates are two types of pollutants that contribute to secondary formation. Sulfate emissions are a result of power plant and industry emissions, while nitrate emissions result from automobiles, power plants, and other combustion sources. Scientific studies have shown a significant correlation between exposure to fine particulates and severe health issues such as heart disease, lung disease, and premature death.

The pollutants that could be analyzed in the conformity analysis are: [1] direct PM_{2.5} emissions (tail pipe emissions, brake and tire wear), [2] re-entrained road dust, and [3] precursors nitrogen oxides (NO_x), volatile organic compounds (VOC), sulfur oxides (SO_x) and ammonia (NH₃). The EPA has ruled that until

the EPA or DEP find that other precursor pollutants are significant contributors, and a SIP revision is approved stating such findings, direct PM_{2.5} emissions and NO_x are the only pollutants that must be analyzed for transportation conformity (40 CFR 93.119(f)(8)–(10)).

1997 Annual PM_{2.5} and 2006 24-hour PM_{2.5} Standards

The EPA published the 1997 annual PM_{2.5} NAAQS on July 18, 1997, (62 FR 38652), with an effective date of September 16, 1997. An area is in nonattainment of this standard if the 3-year average of the annual mean PM_{2.5} concentrations (for designated monitoring sites within an area) exceed 15.0 micrograms per cubic meter (µg/m³). Lancaster County was designated as a nonattainment area under the 1997 annual PM_{2.5} NAAQS, effective April 5, 2005 (70 FR 944).

The EPA published the 2006 24-hour PM_{2.5} NAAQS on October 17, 2006, (71 FR 61144), with an effective date of December 18, 2006. The rulemaking strengthened the 1997 24-hour standard of 65 µg/m³ (62 FR 38652) to 35 µg/m³ and retained the 1997 annual PM_{2.5} NAAQS of 15 µg/m³. An area is in nonattainment of the 2006 24-hour PM_{2.5} NAAQS if the 98th percentile of the annual 24-hour concentrations, averaged over three years, is greater than 35 µg/m³. Lancaster County was designated as a nonattainment area under the 2006 24-hour PM_{2.5} NAAQS, effective December 14, 2009 (74 FR 58688).

A redesignation request and maintenance plan applicable to both the 1997 annual and 2006 24-hour PM_{2.5} NAAQS was approved by EPA and effective July 16, 2015 (80 FR 42050). The maintenance plan includes 2017 and 2025 PM_{2.5} and NO_x mobile vehicle emission budgets (MVEBs) for transportation conformity purposes.

EPA took final action on the *“Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements”* rule on August 24, 2016 (81 FR 58010 effective on October 24, 2016). In that rulemaking, EPA finalized the option that revokes the 1997 primary annual PM_{2.5} NAAQS in areas that are in attainment or maintenance of that NAAQS. After revocation, areas no longer have to expend resources on CAA air quality planning and conformity determination requirements associated with the 1997 annual PM_{2.5} NAAQS.

2012 Annual PM_{2.5} Standard

The EPA published the 2012 annual PM_{2.5} NAAQS on January 15, 2013, (78 FR 3086), with an effective date of March 18, 2013. The EPA revised the annual PM_{2.5} NAAQS by strengthening the standard from 15 µg/m³ to 12 µg/m³. An area is in nonattainment of this standard if the 3-year average of the annual mean PM_{2.5} concentrations for designated monitoring sites in an area is greater than 12.0 µg/m³. On December 18, 2014, EPA issued final designations for the standard that were revised on April 7, 2015 (80 FR 18535). Lancaster County is designated in attainment of the standard.

Ozone

Ozone is formed by chemical reactions occurring under specific atmospheric conditions. Precursor pollutants that contribute to the formation of ozone include VOC and NO_x, both of which are components

of vehicle exhaust. VOCs may also be produced through the evaporation of vehicle fuel, as well as by displacement of vapors in the gas tank during refueling. By controlling VOC and NO_x emissions, ozone formation can be mitigated.

1997 and 2008 8-hour Ozone NAAQS

The EPA published the 1997 8-hour ozone NAAQS on July 18, 1997, (62 FR 38856), with an effective date of September 16, 1997. An area was in nonattainment of the 1997 8-hour ozone NAAQS if the 3-year average of the individual fourth highest air quality monitor readings, averaged over 8 hours throughout the day, exceeded the NAAQS of 0.08 parts per million (ppm). On May 21, 2013, the EPA published a rule revoking the 1997 8-hour ozone NAAQS, for the purposes of transportation conformity, effective one year after the effective date of the 2008 8-hour ozone NAAQS area designations (77 FR 30160). As of July 20, 2013, Lancaster County no longer needs to demonstrate conformity to the 1997 8-hour ozone NAAQS. However, future SIP revisions must address EPA's anti-backsliding requirements.

The EPA published the 2008 8-hour Ozone NAAQS on March 27, 2008, (73 FR 16436), with an effective date of May 27, 2008. EPA revised the ozone NAAQS by strengthening the standard to 0.075 ppm. Thus, an area is in nonattainment of the 2008 8-hour ozone NAAQS if the 3-year average of the individual fourth highest air quality monitor readings, averaged over 8 hours throughout the day, exceeds the NAAQS of 0.075 ppm. Lancaster County was designated as a nonattainment area under the 2008 8-hour ozone NAAQS, effective July 20, 2012 (77 FR 30088). Effective June 3, 2016, EPA determined that Lancaster County has attained the 2008 ozone NAAQS by the applicable attainment date. This determination of attainment does not constitute a redesignation to attainment. Redesignations require states to meet a number of additional statutory criteria, including the EPA approval of a state plan demonstrating maintenance of the air quality standard for 10 years after redesignation.

2015 8-hour Ozone NAAQS

In October 2015, based on its review of the air quality criteria for ozone and related photochemical oxidants, the EPA revised the primary and secondary NAAQS for ozone to provide requisite protection of public health and welfare, respectively (80 FR 65292). The EPA revised the levels of both standards to 0.070 ppm, and retained their indicators, forms (fourth-highest daily maximum, averaged across three consecutive years) and averaging times (eight hours). On October 16, 2018 (83 FR 52163), EPA established designations for the 2015 8-hour ozone NAAQS. Lancaster County was designated in attainment of the standard.

Interagency Consultation

As required by the federal transportation conformity rule, the conformity process includes a significant level of cooperative interaction among federal, state, and local agencies. For this air quality conformity analysis, interagency consultation was conducted as required by the Pennsylvania Conformity SIP. This included conference call(s) or meeting(s) of the Pennsylvania Transportation-Air Quality Work Group

(including the Pennsylvania Department of Transportation (PennDOT), DEP, EPA, FHWA, FTA and representatives from larger MPOs within the state).

Meetings and conference calls were conducted on October 23, 2019 and February 4, 2020 to review all input planning assumptions, methodologies and analysis years.

Analysis Methodology and Data

This transportation conformity analysis was conducted using EPA's MOVES model, which is the official model for estimating emissions from highway vehicles for SIP emission inventories and transportation conformity (75 FR 9411), effective March 2, 2010. MOVES2014a has been used for this conformity determination and is the latest approved model version for SIP and transportation conformity purposes (79 FR 60343).

Planning assumptions are updated following EPA and FHWA joint guidance (EPA420-B-08-901) that clarifies the implementation of the latest planning assumption requirements in 40 CFR 92.110. This analysis utilizes the latest available traffic, vehicle fleet and environmental data to estimate regional highway emissions. Pennsylvania updates state-level planning assumptions on a 3-year cycle and this information is integrated into the conformity analyses. The last triennial update included the integration of 2017 traffic and fleet data.

The analysis methodology and data inputs for this analysis were developed through interagency consultation and used available EPA guidance documents that included:

- *Policy Guidance on the Use of MOVES2014 for State Implementation Plan Development, Transportation Conformity, and Other Purposes*, US EPA Office of Air and Radiation, EPA-420-B-14-008, July 2014.
- *MOVES2014a User Guide*, US EPA Office of Transportation and Air Quality, EPA-420-B-15-095, November 2015.
- *MOVES2014 and MOVES2014a, and MOVES2014b Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity*. US EPA Assessment and Standard Division, Office of Transportation and Air Quality, EPA-420-B-18-039, August 2018.

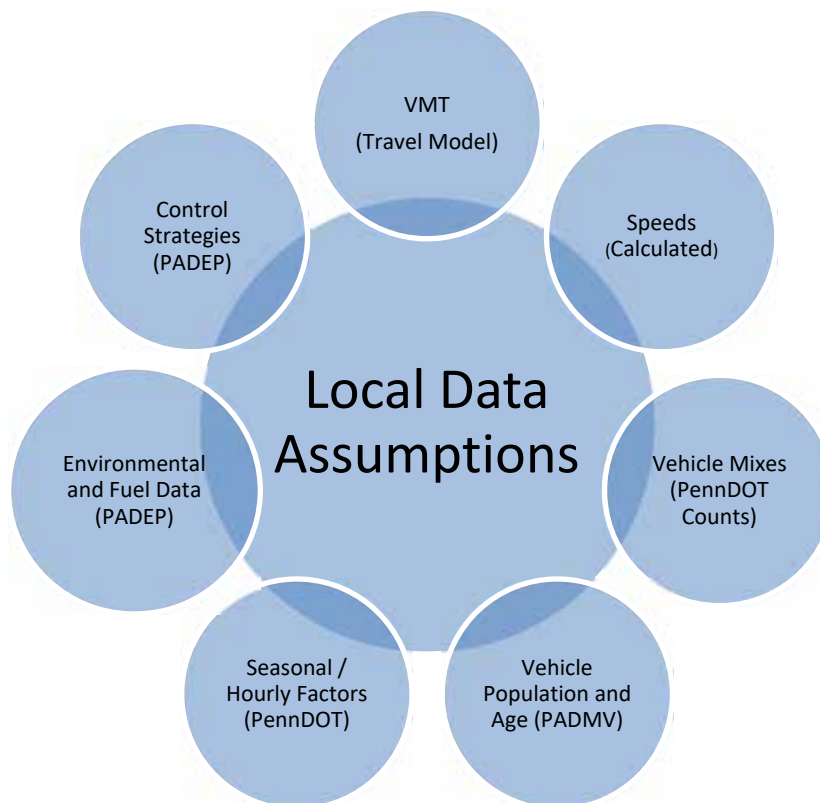
A mix of local and national default (internal to MOVES) data are used in the analysis. As illustrated in **Exhibit 2**, local data has been used for data items that have a significant impact on emissions, including: vehicle miles of travel (VMT), vehicle population, congested speeds, and vehicle type mix, as well as environmental and fuel assumptions. Local data inputs to the analysis process reflect the latest available planning assumptions using information obtained from PennDOT, DEP and other local/national sources.

The methodology used for this analysis is consistent with the methodology used to develop SIP inventories. This includes the use of the traffic data from PennDOT's Roadway Management System (RMS) and custom post-processing software (PPSUITE) to calculate hourly speeds and prepare key traffic input files to the MOVES emission model.

PPSUITE consists of a set of programs that perform the following functions:

- Analyzes highway operating conditions.
- Calculates highway speeds.
- Compiles VMT and vehicle type mix data.
- Prepares MOVES runs and processes MOVES outputs.

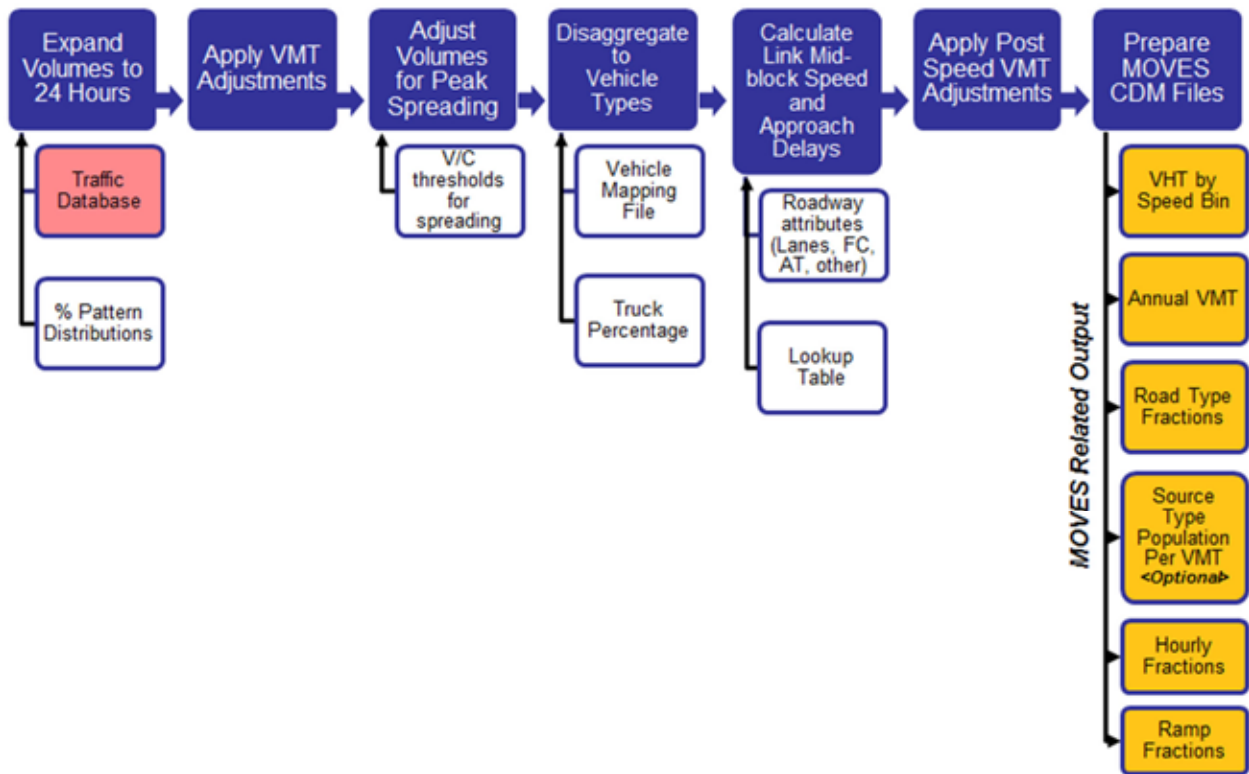
EXHIBIT 2: LOCAL DATA INPUTS USED FOR CONFORMITY RUNS



PPSUITE is a widely used and accepted tool for estimating speeds and processing emissions rates. The PPSUITE tool has been used for developing on-highway mobile source inventories in SIP revisions, control strategy analyses, and conformity analyses in other states. The software was developed to utilize accepted transportation engineering methodologies. The PPSUITE process is integral to producing traffic-related input files to the MOVES emission model. **Exhibit 3** summarizes the key functions of PPSUITE within the emission calculation process. Other MOVES input files are prepared externally to the PPSUITE software, including vehicle population, vehicle age, environmental and fuel input files.

The CENTRAL software is also used in this analysis. CENTRAL is a menu-driven software platform that executes the PPSUITE and MOVES processes in batch mode. The CENTRAL software allows users to execute runs for a variety of input options and integrates custom MYSQL steps into the process. CENTRAL provides important quality control and assurance steps, including file naming and storage automation.

EXHIBIT 3: EMISSION CALCULATION PROCESS



Key MOVES Input Data

A large number of inputs to MOVES are needed to fully account for the numerous vehicle and environmental parameters that affect emissions. These inputs include traffic flow characteristics, vehicle descriptions, fuel parameters, I/M program parameters and environmental variables. MOVES includes a default national database of meteorology, vehicle fleet, vehicle activity, fuel and emission control program data for every county; EPA, however, cannot certify that the default data is the most current or best available information for any specific area. As a result, local data, where available, is recommended for use when conducting a regional conformity analysis. A mix of local and default data is used for this analysis. These data items are discussed in the following sections.

Travel Demand Model

The roadway data input to emissions calculations for this conformity analysis is based on information from the region's travel demand forecasting model. The travel demand model estimates roadway volumes based on input demographic forecasts and expected changes to the transportation roadway network.

The travel demand model follows the basic "four-step" travel demand forecasting process and utilizes the Cube Voyager (TP+) software platform. The model was recently updated in 2020 to include the Lancaster, Harrisburg and York MPO areas in the south-central region. The network contains attributes such as

distance, number of lanes, area type, facility type, free flow speed, capacity of the lane, and location of traffic signals. The model updates included a revalidation of the travel model to 2018-2019 traffic conditions. Using the projected traffic volume data from the model, conditions were evaluated for all applicable future analysis years. All significant air quality projects from the TIP and MTP were coded into the travel demand model.

Transit data was also generated as part of the travel demand model. Existing fixed transit routes and their associated attributes (i.e., stops, headways, fares, and speeds) are included within a transit subroutine. Ridership estimates generated by this subroutine are fed back into the model stream as part of the overall network processing.

Traffic forecasts were projected based on the socioeconomic and land use data projections developed by Lancaster County Planning Commission. This data includes total population, households, and employment. **Exhibit 4** summarizes the socioeconomic data for the base year and horizon years of the MTP. Socioeconomic data for other analysis years were forecasted using interpolation.

EXHIBIT 4: SOCIOECONOMIC GROWTH ASSUMPTIONS TO THE TRAVEL MODEL

County	Year	Population	Household	Total Employment
Lancaster	2018	539,687	201,312	245,114
	2024	581,867	218,735	251,791
	2025	588,888	221,620	252,873
	2035	636,674	240,644	263,955
	2045	681,986	260,492	274,991

The travel model network and assigned traffic volumes are processed by PPSUITE to prepare the traffic inputs needed to run the MOVES emission model. The following information is extracted from the model for emission calculations:

- Lanes
- Roadway capacity
- Distance
- Daily traffic volume
- Type of area abutting the roadway (e.g. urban, suburban, rural, etc.)
- Type of roadway facility (e.g. interstate, arterial, collector, local, etc.)

Other Supporting Traffic Data

Other traffic data is used to adjust and disaggregate traffic volumes. Key sources used in these processes include the following:

- *Highway Performance Monitoring System (HPMS VMT)*: According to EPA guidance, baseline inventory VMT computed from the regional travel model must be adjusted to be consistent with HPMS VMT totals. The VMT contained in the HPMS reports are considered to represent average annual daily traffic (AADT), an average of all days in the year, including weekends and holidays. Adjustment factors were calculated as part of the model's validation process. These factors are used to adjust locally modeled roadway data VMT to be consistent with the reported HPMS totals, and are applied to all county and facility group combinations within the region. These adjustments are important to account for local roadway VMT not represented within the regional travel demand model.
- *Seasonal Factors*: The traffic volumes estimated from the regional travel demand model are adjusted to summer or average monthly conditions (as needed for annual processing), using seasonal adjustment factors prepared by PennDOT's Bureau of Planning and Research (BPR) in their annual traffic data report published on the BPR website (<http://www.dot.state.pa.us/> Search: Research and Planning). The seasonal factors are also used to develop MOVES daily and monthly VMT fraction files, allowing MOVES to determine the portion of annual VMT that occurs in each month of the year.
- *Hourly Patterns*: Speeds and emissions vary considerably depending on the time of day. In order to produce accurate emission estimates, it is important to estimate the pattern by which roadway volume varies by breaking the data down into hourly increments. Pattern data is in the form of a percentage of the daily volumes for each hour. Distributions are provided for all the counties within the region and by each facility type grouping. The hourly pattern data has been developed from 24-hour vehicle count data compiled by PennDOT's BPR, using the process identified in PennDOT's annual traffic data report. The same factors are also used to develop the MOVES hourly fraction file.

Vehicle Class

Emission rates within MOVES also vary significantly by vehicle type. MOVES produces emission rates for thirteen MOVES vehicle source input types. VMT, however, is input to MOVES by five HPMS vehicle groups (note that passenger cars and light trucks are grouped for input to MOVES2014a). **Exhibit 5** summarizes the distinction between each classification scheme.

EXHIBIT 5: MOVES SOURCE TYPES AND HPMS VEHICLE GROUPS

<u>SOURCE TYPES</u>		<u>HPMS Class Groups</u>	
11	Motorcycle	10	Motorcycle
21	Passenger Car	25	Passenger Car
31	Passenger Truck	25	Passenger/Light Truck
32	Light Commercial Truck	40	Buses
41	Intercity Bus	50	Single Unit Trucks
42	Transit Bus	60	Combination Trucks
43	School bus		
51	Refuse Truck		
52	Single Unit Short-haul Truck		
53	Single Unit Long-haul Truck		
54	Motor Home		
61	Combination Short-haul Truck		
62	Combination Long-haul Truck		

The emissions estimation process includes a method to disaggregate the traffic volumes to the thirteen source types and then to recombine the estimates to the five HPMS vehicle classes. Vehicle type pattern data is used by PPSUITE to distribute the hourly roadway segment volumes among the thirteen MOVES source types. Similar to the 24-hour pattern data, this data contains percentage splits to each source type for every hour of the day. The vehicle type pattern data is developed from several sources of information:

- PennDOT truck percentages from the Roadway Management System (RMS) database.
- Hourly distributions for trucks and total traffic compiled by PennDOT's BPR.
- Transit data from PennDOT and the National Transit Database (NTD) Transit Profiles (<https://www.ntdprogram.gov>).
- School bus registration data from PennDOT's Bureau of Motor Vehicles Registration Database.

Vehicle type percentages are also input into the capacity analysis section of PPSUITE to adjust the speeds in response to truck volume. Larger trucks take up more roadway space compared to an equal number of cars and light trucks, which is accounted for in the speed estimation process by adjusting capacity using information from the Transportation Research Board's fifth edition of the *Highway Capacity Manual*. (<http://hcm.trb.org/>).

Vehicle Ages

Vehicle age distributions are input to MOVES for each of the thirteen source types. These distributions reflect the percentage of the vehicle fleet falling under each vehicle model year (MY), to a maximum age of 31 years. The vehicle age distributions were prepared from the most recently available registration download from PennDOT's Bureau of Motor Vehicles Registration Database. Due to data limitations, information for light duty vehicles, intercity bus and motor home (including source types 11, 21, 31, 32,

41 and 54) was used as local data for MOVES inputs, while the rest of heavy-duty vehicles (including source types 42, 43, 51, 52, 53, 61, and 62) used the MOVES national default data. The registration data download is based on MOBILE6.2 vehicle categories. The data was converted to source types using the EPA convertor spreadsheets provided with the MOVES emission model.

Vehicle Population

The vehicle population information, including the number and age of vehicles, impacts forecasted start and evaporative emissions within MOVES. Similar to vehicle ages, MOVES requires vehicle populations for each of the thirteen source type categories. County vehicle registration data was used to estimate vehicle population for light-duty vehicles, transit buses, and school buses. Other heavy-duty vehicle population values were based on VMT for each source type using the vehicle mix and pattern data discussed previously. PPSUITE automatically applies MOVES default ratios of VMT and source type population (e.g. the number of miles per vehicle by source type) to the local VMT estimates to produce vehicle population.

For the preparation of source type population for other required conformity analysis years, base values were adjusted using forecast population and household data for the area. Growth rates were limited so as to not exceed the VMT growth assumptions.

Meteorology Data

Average monthly minimum temperatures, maximum temperatures, and humidity values are consistent with the regional State Implementation Plan (SIP) modeling conducted by DEP. The data was obtained from WeatherBank, Inc. EPA's MOBILE6.2-MOVES meteorological data convertor spreadsheet (<http://www.epa.gov/oms/models/moves/tools.htm>) was used to prepare the hourly temperature inputs needed for the MOVES model, based on the available data.

Fuel Parameters

The MOVES default fuel formulation and fuel supply data were reviewed and updated based on available local volumetric fuel property information. The gasohol market penetration and Reid Vapor Pressure (RVP) values were updated, but MOVES default data was used for the remaining parameters. Key assumptions include:

- 10.0 RVP used for summer months [Local data].
- 10% and 15% ethanol used throughout the year with MOVES defaults market shares [vary by year].

I/M Program Parameters

The inspection maintenance (I/M) program inputs to the MOVES model are based on previous and current programs within each county (all PA I/M programs are based on county boundaries). All analysis years include Pennsylvania's statewide I/M program. The default I/M program parameters included in MOVES were examined for each county and necessary changes were made to the default parameters to match the actual local program.

The I/M program requirements vary by region (five regions) and include on-board diagnostics (OBD) technology that uses the vehicle's computer for model years 1996 and newer to identify potential engine and exhaust system problems that could affect emissions. The program, named PAOBDII, is implemented by region as follows:

- *Philadelphia Region* - Bucks, Chester, Delaware, Montgomery and Philadelphia Counties
[Includes tailpipe exhaust testing using ASM2015 or equipment for pre-1996 vehicles up to 25 years old]
- *Pittsburgh Region* - Allegheny, Beaver, Washington and Westmoreland Counties.
[Includes tailpipe exhaust testing using PA 97 equipment for pre-1996 vehicles up to 25 years old]
- *South Central and Lehigh Valley Region* - Berks, Cumberland, Dauphin, Lancaster, Lebanon, Lehigh, Northampton and York Counties.
[Gas cap and visual inspection only]
- *North Region* - Blair, Cambria, Centre, Erie, Lackawanna, Luzerne, Lycoming, and Mercer Counties.
[Gas cap and visual inspection only]
- *Other 42 Counties* – Includes the remaining 42 counties not included above.
[Visual inspection only]

Other Vehicle Technology and Control Strategy Data

Current federal vehicle emissions control and fuel programs are incorporated into the MOVES software. These include the National Program standards covering vehicles MY2012-MY2025. Modifications of default emission rates are required to reflect the early implementation of the National Low Emission Vehicle (NLEV) Program in Pennsylvania. To reflect these impacts, EPA has released instructions and input files that can be used to model these impacts.

The Pennsylvania Clean Vehicles (PCV) Program, adopted in 1998, incorporates the California Low Emission Vehicle Regulations (CA LEV) by reference. The PCV Program allowed automakers to comply with the NLEV program as an alternative to this Pennsylvania program until MY2006. Beginning with MY2008, all "new" passenger cars and light-duty trucks with a gross vehicle weight rating (GVWR) of 8,500 pounds or less sold/leased and titled in Pennsylvania must be certified by the California Air Resources Board (CARB) or be certified for sale in all 50 states. For this program, a "new" vehicle is a qualified vehicle with an odometer reading less than 7,500 miles. DEP and PennDOT both work with the public, including manufacturers, vehicle dealers and consumers, to ensure that vehicles sold and purchased in Pennsylvania or vehicles purchased from other states by Pennsylvania residents comply with the requirements of the PCV Program, in order to be titled in Pennsylvania. Additionally, PennDOT ensures that paperwork for title and registration includes proof of CARB- or 50-state emission certification or that the vehicle owner qualifies for an exemption to the requirements, as listed on PennDOT's MV-9 form and in the PCV Program regulation. When necessary, information from PennDOT's title and registration process may be used to audit vehicle title transactions to determine program compliance.

The impacts of this program are modeled for all analysis years beyond 2008 using the same instructions and tools downloaded for the early NLEV analysis. EPA provided input files to reflect state programs

similar to the CA LEV, as amended, program. Modifications to those files were made to reflect a 2008 program start date for Pennsylvania.

Analysis Process Details

The previous sections have summarized the input data used for computing speeds and emission rates for this conformity analysis. This section explains how PPSUITE and MOVES use that input data to produce emission estimates. **Exhibit 6** provides a more detailed overview of the PPSUITE analysis procedure using the available traffic data information described in the previous sections.

VMT Preparation

Producing an emissions inventory with PPSUITE requires a process of disaggregation and aggregation. Data is available and used on a very detailed scale – individual roadway segments for each of the 24 hours of the day. This data needs to be processed individually to determine the distribution of vehicle hours of travel (VHT) by speed and then aggregated by vehicle class to determine the input VMT to the MOVES emission model. Key steps in the preparation of VMT include:

- *Assemble VMT* - The regional travel demand model contains the roadway segments, distances and travel volumes needed to estimate VMT. PPSUITE processes each segment by simply multiplying the assigned travel volume by the distance to obtain VMT.
- *Apply Seasonal Adjustments* – PPSUITE adjusts the traffic volumes to the appropriate analysis season. These traffic volumes are assembled by PPSUITE and extrapolated over the course of a year to produce the annual VMT file input to MOVES.
- *Disaggregate to Hours* - After seasonal adjustments are applied, the traffic volumes are distributed to each hour of the day. This allows for more accurate speed calculations (effects of congested hours) and allows PPSUITE to prepare the hourly VMT and speeds for input to MOVES.
- *Peak Spreading* - After distributing the daily volumes to each hour of the day, PPSUITE identifies hours that are unreasonably congested. For those hours, PPSUITE then spreads a portion of the volume to other hours within the same peak period, thereby approximating the “peak spreading” that normally occurs in such over-capacity conditions. This process also helps prevent hours with unreasonably congested speeds from disproportionately impacting emission calculations.
- *Disaggregation to Vehicle Types* - EPA requires VMT estimates to be prepared by the six HPMS vehicle groups, reflecting specific local characteristics. As described in the previous section, the hourly volumes are disaggregated into thirteen MOVES source types based on data from PennDOT and the National Transit Database (NTD), in combination with MOVES defaults. The thirteen MOVES source types are then recombined into six HPMS vehicle classes.
- *Apply HPMS VMT Adjustments* - Volumes must also be adjusted to account for differences with the HPMS VMT totals, as described in previous sections. VMT adjustments are provided as inputs to PPSUITE and are applied to each of the roadway segment volumes. VMT adjustments are also applied to runs for future years.

Speed Estimation

Emissions for many pollutants (including VOC and NO_x) vary significantly with travel speed. VOC emissions generally decrease as speed increases, while NO_x emissions decrease at low speeds and increase at higher speeds, as illustrated in **Exhibit 7**. Because emissions are so sensitive to speed changes, EPA recommends special attention be given to developing reasonable and consistent speed estimates. EPA also recommends that VMT be disaggregated into subsets that have roughly equal speeds, with separate emission factors for each subset. At a minimum, speeds should be estimated separately by road type.

The computational framework used for this analysis meets and exceeds the recommendation above relating to speed estimates. Speeds are individually calculated for each roadway segment and hour. Rather than accumulating the roadway segments into a particular road type and calculating an average speed, each individual link hourly speed is represented in the MOVES vehicle hours of travel (VHT) by a speed bin file. This MOVES input file allows the specification of a distribution of hourly speeds. For example, if 5% of a county's arterial VHT operates at 5 mph during the AM peak hour and the remaining 95% operates at 65 mph, this can be represented in the MOVES speed input file. For the roadway vehicle emissions calculations, speed distributions are input to MOVES by road type and source type for each hour of the day.

To calculate speeds, PPSUITE first obtains initial capacities (i.e., how much volume the roadway can serve before heavy congestion) and free-flow speeds (speeds assuming no congestion) from a speed/capacity lookup table. As described previously, this data contains default roadway information indexed by the area and facility type codes. For areas with known characteristics, values can be directly coded to the database and the speed/capacity default values can be overridden. For most areas where known information is unavailable, the speed/capacity lookup tables provide valuable default information regarding speeds, capacities, signal characteristics, and other capacity adjustment information used for calculating congested delays and speeds. The result of this process is an estimated average travel time for each hour of the day for each highway segment. The average travel time multiplied by traffic volume produces vehicle hours of travel (VHT).

EXHIBIT 6: PPSUITE SPEED/EMISSION ESTIMATION PROCEDURE

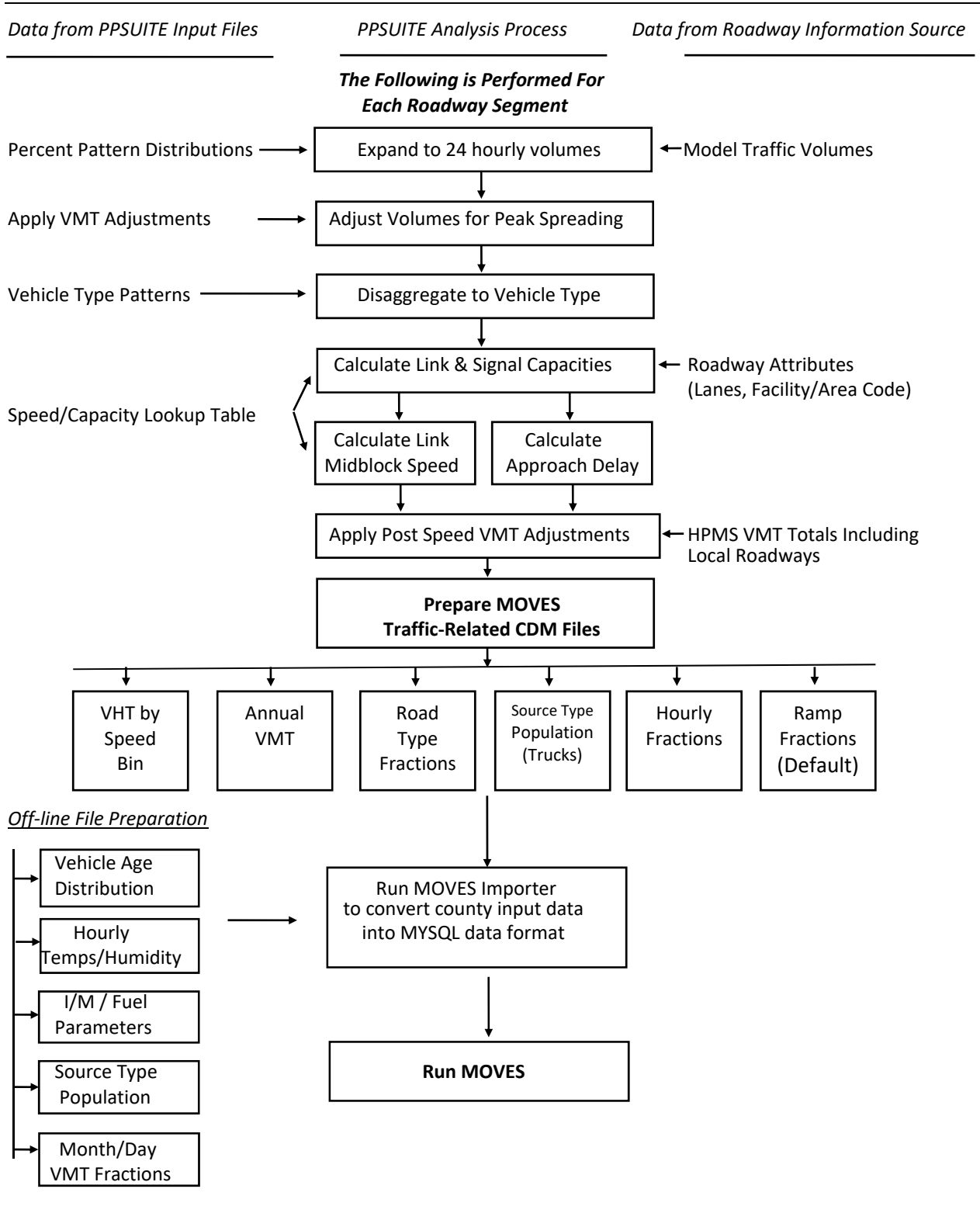
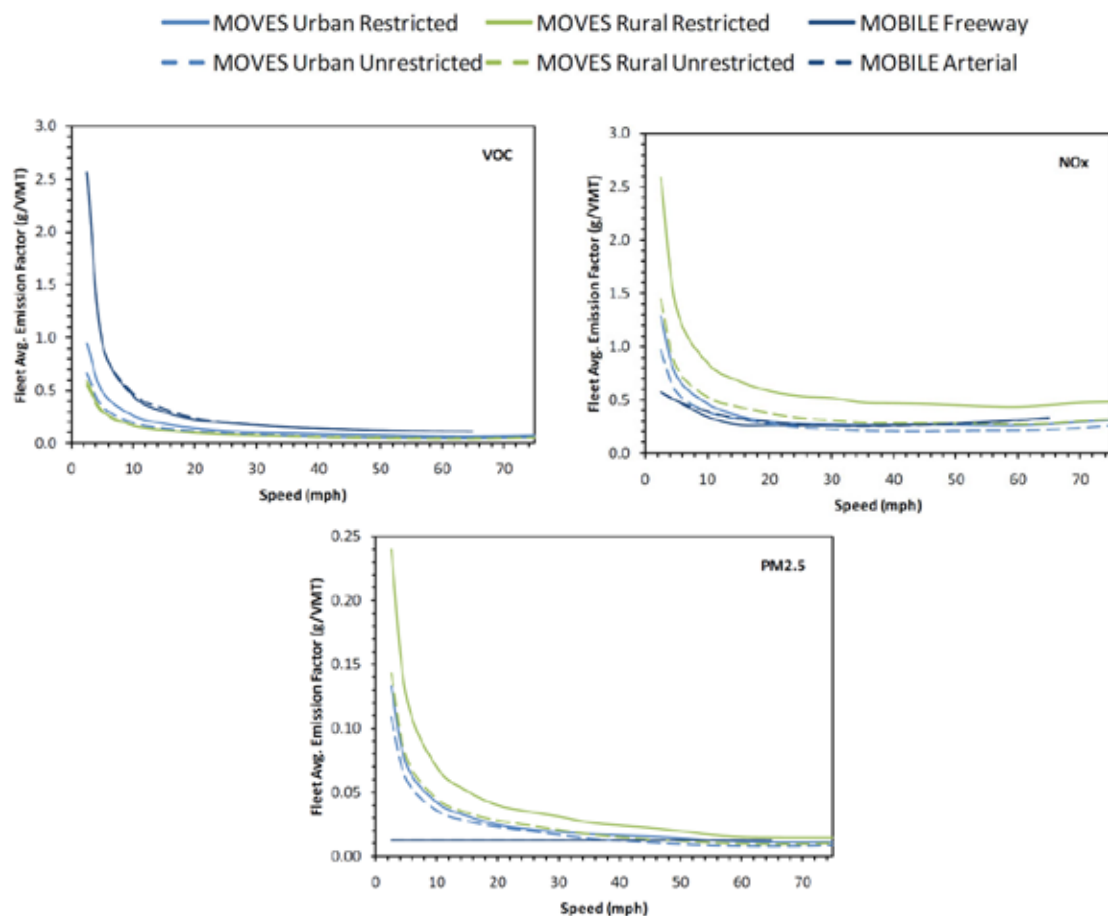


EXHIBIT 7: EMISSION FACTOR VS. SPEED VARIANCES (VOC, NO_x, AND PM_{2.5})



Source: Figure 3 from *Implications of the MOVES2010 Model on Mobile Source Emission Estimates*, Air & Waste Management Association, July 2010.

Developing the MOVES Traffic Input Files

The PPSUITE software is responsible for producing the following MOVES input files during any analysis run:

- VMT by HPMS vehicle class.
- VHT by speed bin.
- Road type distributions.
- Hourly VMT fractions.
- Ramp fractions.

These files are text formatted files with a *.csv extension. The files are provided as inputs within the MOVES County Data Manager (CDM) and are described below:

- **VMT Input File:** VMT is the primary traffic input affecting emission results. The roadway segment distances and traffic volumes are used to prepare estimates of VMT. PPSUITE performs these calculations and outputs the MOVES annual VMT input file to the County Data Manager (CDM). The annual VMT is computed by multiplying the RMS or travel model roadway adjusted VMT by 365 days (366 days in a leap year).
- **VHT by Speed Bin File:** As described in the previous section, the PPSUITE software prepares the MOVES VHT by speed bin file, which summarizes the distribution of speeds across all links into each of the 16 MOVES speed bins for each hour of the day by road type. This robust process is consistent with the methods and recommendations provided in EPA's technical guidance for the MOVES2014 model (<http://www.epa.gov/otag/models/moves/>) and ensures that MOVES emission rates are used to the fullest extent.
- **Road Type Distributions:** Within MOVES, typical drive cycles and associated operating conditions vary by roadway type. MOVES defines five different roadway types as follows:
 - 1 Off-Network.
 - 2 Rural Restricted Access.
 - 3 Rural Unrestricted Access.
 - 4 Urban Restricted Access.
 - 5 Urban Unrestricted Access.

For this analysis, the MOVES road type distribution file is automatically generated by PPSUITE using defined equivalencies. The off-network road type includes emissions from vehicle starts, extended idling, and evaporative emissions. Off-network activity in MOVES is primarily determined by the Source Type Population input.

- **Ramp Fractions:** Since ramps are not directly represented within the regional travel demand model, the assumption is that 8% of total Freeway VHT is Ramp VHT, consistent with EPA's technical guidance.

MOVES Runs

After computing speeds and aggregating VMT and VHT, PPSUITE prepares traffic-related inputs needed to run EPA's MOVES software. Additional required MOVES inputs are prepared externally from the processing software and include temperatures, I/M program parameters, fuel characteristics, vehicle fleet age distributions, and source type population. The MOVES county importer is run in batch mode. This program converts all data files into the MYSQL format used by the MOVES model. At that point, a MOVES run specification file (*.mrs) is created which specifies options and key data locations for the run. The MOVES run is then executed in batch mode. A summary of key MOVES run specification settings is shown in **Exhibit 8**. MOVES can be executed using either an inventory or rate-based approach. For this analysis, MOVES is applied using the *inventory-based* approach. Using this approach, actual VMT and population are provided as inputs to the model; MOVES is responsible for producing the total emissions for the region.

EXHIBIT 8: MOVES RUN SPECIFICATION FILE PARAMETER SETTINGS

Parameter	Setting
MOVES Version	MOVES2014a
MOVES Default Database Version	MOVESDB20161117
Scale	COUNTY
Analysis Mode	Inventory
Time Span	Annual Runs: Single MOVES run with 12-month inputs including all days and hours July Weekday Runs: July month, Weekday, 24 hours
Time Aggregation	Hour
Geographic Selection	County [FIPS]
Vehicle Selection	All source types Gasoline, Diesel, CNG, E85
Road Type	All road types including off-network
Pollutants and Processes	All PM _{2.5} categories, VOC, NO _x
Database selection	Early NLEV database PA-Specific CA LEV database
General Output	Units: Emission = grams; Distance = miles; Time = hours; Energy = Million BTU
Output Emissions	Time = Month, Emissions by Process ID, Source Type and Road Type

Conformity Analysis Results

Transportation conformity analyses of the current TIP and MTP have been completed for Lancaster County. The analyses were performed according to the requirements of the Federal transportation conformity rule at 40 CFR Part 93, Subpart A. The analyses utilized the methodologies, assumptions and data as presented in previous sections. Interagency consultation has been used to determine applicable emission models, analysis years and emission tests.

Emission Tests

There are currently no approved SIP MVEBs for the Lancaster MPO Area under 2008 8-hour Ozone NAAQS. However, the Lancaster MPO Area has an approved SIP revision establishing MVEBs under the 1997 8-hour ozone NAAQS using MOVES (78 FR 78263). As required, the approved budgets are used for the

ozone conformity test. The ozone conformity analysis has been conducted to evaluate emissions in comparison to the applicable ozone MVEBs summarized in **Exhibit 9**.

EXHIBIT 9: 8-HOUR OZONE MOTOR VEHICLE EMISSION BUDGETS

County / Pollutant	2009 Budget (tons/day)	2018 Budget (tons/day)
VOC	14.29	10.14
NOx	35.18	20.57

On July 16, 2015, EPA approved the Commonwealth of Pennsylvania’s request to redesignate Lancaster County to attainment for the 1997 annual and 2006 24-hour PM_{2.5} NAAQS (80 FR 42050). The MVEBs provided in the maintenance plans for the county are summarized in **Exhibit 10**.

EXHIBIT 10: ANNUAL PM_{2.5} MOTOR VEHICLE EMISSION BUDGETS

County / Pollutant	2017 Budget (tons/year)	2025 Budget (tons/year)
PM _{2.5}	249	185
NOx	6,916	4,447

Analysis Years

Section 93.119(g) of the Federal Transportation Conformity Regulations requires that emissions analyses be conducted for specific analysis years as follows:

- A near-term year, one to five years in the future.
- The last year of the MTP’s forecast period.
- Attainment year of the standard if within timeframe of TIP and MTP.
- An intermediate year or years such that if there are two years in which analysis is performed, the two analysis years are no more than ten years apart.

All analysis years were determined through the interagency consultation process. **Exhibit 11** provides the analysis years used for this conformity analysis.

EXHIBIT 11: TRANSPORTATION CONFORMITY ANALYSIS YEARS

Analysis Year	Description
2024	Last Year of TIP
2025	Budget Year
2035	Interim Year
2045	Horizon Year of MTP

Components of the PM_{2.5} Regional Emissions Analysis

PM_{2.5} can be the result of either direct or indirect emissions. Direct transportation emissions can be the result of brake or tire-wear, particulates in exhaust emissions, or dust raised by on-road vehicles or construction equipment. Possible indirect transportation related emissions of PM_{2.5} include: NH₃, NO_x, SO_x, and VOC.

The EPA has ruled that regional analysis of direct PM_{2.5} emissions must include both exhaust and brake/tire-wear emissions. EPA's current regulations specify that road dust should be included in the regional analysis of direct PM_{2.5} emissions only if the EPA or the state air agency have found it to be a significant contributor to the region's nonattainment. Neither the EPA nor the state air agency have determined road dust to be a significant contributor in the nonattainment area for this conformity determination.

Until a SIP revision is approved proving that NO_x is insignificant, EPA's current regulations state that indirect PM_{2.5} emissions must be analyzed for NO_x. Conversely, VOC, SO_x and NH₃ must be analyzed only if the state(s) or the EPA determines one or more of these pollutants significant. Therefore, NO_x is the only indirect PM_{2.5} component analyzed for the nonattainment area in this conformity determination.

Regionally Significant Highway Projects

For the purposes of conformity analysis, model highway networks are created for each analysis year. For the horizon years, regionally significant projects from the MTP were coded onto the networks. Detailed assessments were only performed for those new projects which may have a significant effect on emissions in accordance with 40 CFR Parts 51 and 93. Only those projects which would increase capacity or significantly impact vehicular speeds were considered. Projects such as bridge replacements and roadway restoration projects, which constitute the majority of the TIP and MTP list, have been excluded from consideration since they are considered exempt under 40 CFR 93.126-127. A list of highway projects is shown in **Attachment A**.

Analysis Results

An emissions analysis has been completed for the 2008 8-hour ozone NAAQS and the 2006 24-hour PM_{2.5} NAAQS. The results of the analysis are summarized in the tables below. Forecast years have been estimated using the procedures and assumptions provide in this conformity report. A detailed emission summary is also provided in **Attachment B**. Example MOVES importer (XML) and run specification (MRS) files are provided in **Attachment C**.

2008 Ozone NAAQS

Exhibit 12 summarizes the Lancaster County ozone emission results for a summer weekday in each analysis year. The analysis year emission results are compared to the 2018 emission budgets in **Exhibit 9**. All years satisfy the conformity budget test for ozone since the analysis results are below the budgets established in the regional maintenance plan.

EXHIBIT 12: OZONE EMISSION ANALYSIS RESULTS AND CONFORMITY TEST
(Summer Weekday)

Pollutant	2018 BUDGET (tons/day)	2024 (tons/day)	2025 (tons/day)	2035 (tons/day)	2045 (tons/day)
VOC	10.14	4.99	4.63	3.06	2.60
NO _x	20.57	8.44	7.70	4.48	4.45
Conformity Result		Pass	Pass	Pass	Pass

2006 24-hour PM_{2.5} NAAQS

Exhibit 13 summarizes the Lancaster County annual PM_{2.5} and NO_x emissions. Emissions are compared against the available 2017 and 2025 SIP MVEBs listed in **Exhibit 10**. The results illustrate that projected emissions are below the applicable MVEBs.

Exhibit 13: ANNUAL PM_{2.5} EMISSION ANALYSIS RESULTS AND CONFORMITY TEST
(Annual)

Pollutant	2024 (tons/year)	2025 (tons/year)	2035 (tons/year)	2045 (tons/year)
PM _{2.5}	123	116	78	73
NO _x	2,961	2,702	1,622	1,628
MVEB - PM _{2.5}	249	185	185	185
MVEB - NO _x	6,916	4,447	4,447	4,447
Conformity Result	Pass	Pass	Pass	Pass

Conformity Determination

Financial Constraint

The planning regulations, Sections 450.322(b)(11) and 450.324(e), require the transportation plan to be financially constrained while the existing transportation system is being adequately operated and maintained. Only projects for which construction and operating funds are reasonably expected to be available are included. The LCTCC MPO, in conjunction with PennDOT, FHWA and FTA, has developed an estimate of the cost to maintain and operate existing roads, bridges and transit systems in the Lancaster MPO Area and have compared the cost with the estimated revenues and maintenance needs of the new roads over the same period. The TIP and MTP have been determined to be financially constrained.

Public Participation

The TIP and MTP have undergone the public participation requirements as well as the comment and response requirements according to the procedures established in compliance with 23 CFR part 450, LCTCC Public Participation Plan, and Pennsylvania's Conformity SIP. The draft document was made available for a 30-day public review and comment period.

Conformity Statement

The conformity rule requires that the TIP and MTP conform to the applicable SIP(s) and be adopted by the MPO/RPO before any federal agency may approve, accept, or fund projects. Conformity is determined by applying criteria outlined in the transportation conformity regulations to the analysis.

The TIP and MTP for the Lancaster MPO Area are found to conform to the applicable air quality SIP(s) or EPA conformity requirements. This finding of conformity positively reflects on the efforts of the LCTCC and its partners in meeting the regional air quality goals, while maintaining and building an effective transportation system.

Resources

MOVES Model

Modeling Page within EPA's Office of Mobile Sources Website contains a downloadable model, MOVES users guide and other information. See (<http://www.epa.gov/omswww/models.htm>)

Policy Guidance on the Use of MOVES2014 for State Implementation Plan Development, Transportation Conformity, and Other Purposes, US EPA Office of Air and Radiation, EPA-420-B-14-008, July 2014.

MOVES2014a User Guide, US EPA Office of Transportation and Air Quality, EPA-420-B-15-095, November 2015.

MOVES2014 and MOVES2014a, and MOVES2014b Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity. US EPA Assessment and Standard Division, Office of Transportation and Air Quality, EPA-420-B-18-039, August 2018.

Traffic Engineering

Highway Capacity Manual, fifth edition (HCM2010), Transportation Research Board, presents current knowledge and techniques for analyzing the transportation system.

Traffic Data Collection and Factor Development Report, 2014 Data, Pennsylvania Department of Transportation, Bureau of Planning and Research.

Highway Vehicle Emissions Analysis Glossary

AADT: Average Annual Daily Traffic, average of ALL days.

CAA: Clean Air Act as amended.

CARB: California Air Resources Board.

CFR: Code of Federal Regulations.

County Data Manager (CDM): User interface developed to simplify importing specific local data for a single county or a user-defined custom domain without requiring direct interaction with the underlying MySQL database in the MOVES emission model.

Emission rate or factor: Expresses the amount of pollution emitted per unit of activity. For highway vehicles, this is usually expressed in grams of pollutant emitted per mile driven.

FC: Functional code. Applied to road segments to identify their type (freeway, local, etc.).

FHWA: Federal Highway Administration.

FR: Federal Register.

FTA: Federal Transit Administration.

Growth factor: Factor used to convert volumes to future years.

HPMS: Highway Performance Monitoring System.

I/M: Vehicle emissions inspection/maintenance programs are required in certain areas of the country. The programs ensure that vehicle emission controls are in good working order throughout the life of the vehicle. The programs require vehicles to be tested for emissions. Most vehicles that do not pass must be repaired.

MOVES: Motor Vehicle Emission Simulator. The latest model EPA has developed to estimate emissions from highway vehicles.

MVEB: motor vehicle emissions budget.

Pattern data: Extrapolations of traffic patterns (such as how traffic volume on road segment types varies by time of day, or what kinds of vehicles tend to use a road segment type) from segments with observed data to similar segments.

PPSUITE: Post-Processor for Air Quality. A set of programs that estimate speeds and prepares MOVES inputs and processes MOVES outputs.

Road Type: Functional code, applied in data management to road segments to identify their type (rural/urban highways, rural/urban arterials, etc.).

RMS: Roadway Management System.

Source Type: One of thirteen vehicle types used in MOVES modeling.

VHT: Vehicle hours traveled.

VMТ: Vehicle miles traveled. In modeling terms, it is the simulated traffic volumes multiplied by link length.

ATTACHMENT A

Project List

*Lancaster County Transportation Conformity Analysis
2021 TIP and 2045 MTP*

The following TIP/MTP air quality significant highway projects are included in this analysis:

MPMS	Name	Description
FY 2021-2024 TIP		
64767	US 30/Centerville Road Interchange	Interchange improvements in East Hempfield Twp
90491	US222/322 Interchange Improvement	Diverging Diamond Interchange at the US Route 222/322 Interchange in Ephrata Township, Lancaster County
97013	US 30/US 222 Interchange Improvements	Interchange Improvements at US 30 and US 222 Interchange in Manheim Township, Lancaster County.
101505	Centerville Road	Widen to 5 lanes from PA 23 to PA 462 in E. Hempfield Twp.
109618	US 222 Reconstruction/Widening 1	Reconstruct and widen US 222 to six lanes from US 30 to north of Jake Landis Interchange
109620	US 222 Reconstruction/Widening 2	Reconstruct and widen US 222 to six lanes from north of Jake Landis Interchange to PA 772
110502	US 30 Interchange Improvement	Upgrade signalized intersections and lane configurations near US 30/PA 462
110507	PA324/US222/Fairview Ave	Intersection Improvement at the Intersection of S. Prince St. and New Danville Pk and Fairview Ave
112882	Walnut Street Extension	New two lane roadway along with bicycle and pedestrian accommodations from the interchange of US 30 and PA 23 to the Pennsylvania College of Health Sciences at Greenfield Road in East Lampeter Township
114205	Strasburg Pike Improvements	Installing a roundabout at the intersection of Strasburg Pike (SR 2029) and Rockvale Road in West Lampeter Township
114206	McGovernsville Road Improvements	Installing a roundabout at the intersection of McGovernville Rd (PA 741) and the on/off ramp of PA 283 in Manheim Township
114325	Fruitville Pike Intersection Improvements	Intersection improvements at the intersection of Fruitville Pike and Temperance Hill Road and Holly Tree Road to upgrade signals, improve signal timings and geometric improvements in Penn Township
Lancaster MTP Projects		
80931	Harrisburg Pike Corridor Improvements	Widening to add capacity, resurfacing and additional signals with signal coordination on the Harrisburg Pike (SR 4020) Corridor in the City of Lancaster and Manheim Township
94912	PA 23 / PA 741 Intersection Improvements	Adding turn lanes and improving signalization on PA-23 (Marietta Avenue) from Good Drive to PA-741 in East Hempfield Township

ATTACHMENT B

Detailed Emission Results

Detailed Emission Results for Ozone Analysis

2024 Ozone by Road Type

County	Road Type	Summer Day VMT	Speed (mph)	Emissions (Tons/Day)	
				VOC	NOx
Lancaster	Off-Network	N/A	N/A	3.747	2.576
	Rural Restricted	1,233,366	63.5	0.080	0.645
	Rural UnRestricted	2,914,245	41.9	0.205	0.972
	Urban Restricted	3,905,750	58.7	0.256	1.832
	Urban UnRestricted	7,887,225	28.8	0.700	2.413
	<i>Subtotal</i>	<i>15,940,586</i>		<i>4.987</i>	<i>8.439</i>
Off-Model Project Emission Benefits				0.000	0.000
Region Total		15,940,586	(Kg/Day)	4.987	8.439
				4,524	7,655

2024 Ozone by Source Type

County	Source Type	Summer Day VMT	Emissions (Tons/Day)		
			VOC	NOx	
Lancaster	Motorcycle	98,616	0.273	0.067	
	Passenger Car	7,824,897	1.468	0.855	
	Passenger Truck	4,995,794	2.174	2.183	
	Light Commercial Truck	1,286,374	0.565	0.639	
	Intercity Bus	2,419	0.001	0.012	
	Transit Bus	25,440	0.007	0.080	
	School Bus	6,718	0.003	0.018	
	Refuse Truck	28,713	0.003	0.059	
	Single Unit Short-haul Truck	601,593	0.151	0.623	
	Single Unit Long-haul Truck	33,786	0.005	0.036	
	Motor Home	20,184	0.022	0.043	
	Combination Short-haul Truck	245,990	0.025	0.517	
	Combination Long-haul Truck	770,063	0.290	3.307	
	<i>Subtotal</i>	<i>15,940,586</i>	<i>4.987</i>	<i>8.439</i>	
Off-Model Project Emission Benefits			0.000	0.000	
Region Total		15,940,586	(Kg/Day)	4.987	8.439
				4,524	7,655

2024 Ozone by Emission Process

County	Emission Process	Emissions (Tons/Day)	
		VOC	NOx
Lancaster	Running Exhaust	0.725	5.861
	Start Exhaust	1.774	1.636
	Brakewear	0.000	0.000
	Tirewear	0.000	0.000
	Evap Permeation	0.362	0.000
	Evap Fuel Vapor Venting	0.810	0.000
	Evap Fuel Leaks	1.108	0.000
	Crankcase Running Exhaust	0.011	0.002
	Crankcase Start Exhaust	0.023	0.000
	Crankcase Extended Idle Exhaust	0.002	0.000
	Extended Idle Exhaust	0.161	0.902
Auxiliary Power Exhaust	0.011	0.038	
	<i>Subtotal</i>	<i>4.987</i>	<i>8.439</i>
Off-Model Project Emission Benefits		0.000	0.000
Region Total		4.987	8.439
	(Kg/Year)	4,524	7,655

2025 Ozone by Road Type

County	Road Type	Summer Day VMT	Speed (mph)	Emissions (Tons/Day)	
				VOC	NOx
Lancaster	Off-Network	N/A	N/A	3.480	2.412
	Rural Restricted	1,259,232	63.6	0.073	0.590
	Rural UnRestricted	2,919,316	42.2	0.186	0.864
	Urban Restricted	3,951,574	58.7	0.234	1.660
	Urban UnRestricted	7,989,953	28.6	0.656	2.171
	<i>Subtotal</i>	<i>16,120,075</i>		<i>4.629</i>	<i>7.696</i>
Off-Model Project Emission Benefits				0.000	0.000
Region Total		16,120,075	(Kg/Day)	4.629	7.696
				4,200	6,982

2025 Ozone by Source Type

County	Source Type	Summer Day VMT	Emissions (Tons/Day)		
			VOC	NOx	
Lancaster	Motorcycle	99,708	0.274	0.067	
	Passenger Car	7,911,616	1.424	0.797	
	Passenger Truck	5,051,141	1.955	1.880	
	Light Commercial Truck	1,300,614	0.505	0.561	
	Intercity Bus	2,472	0.001	0.011	
	Transit Bus	25,756	0.006	0.072	
	School Bus	6,785	0.002	0.016	
	Refuse Truck	29,060	0.003	0.054	
	Single Unit Short-haul Truck	609,265	0.137	0.578	
	Single Unit Long-haul Truck	34,218	0.005	0.034	
	Motor Home	20,445	0.020	0.039	
	Combination Short-haul Truck	249,116	0.022	0.477	
	Combination Long-haul Truck	779,876	0.276	3.110	
	<i>Subtotal</i>	<i>16,120,075</i>	<i>4.629</i>	<i>7.696</i>	
Off-Model Project Emission Benefits			0.000	0.000	
Region Total		16,120,075	(Kg/Day)	4.629	7.696
				4,200	6,982

2025 Ozone by Emission Process

County	Emission Process	Emissions (Tons/Day)	
		VOC	NOx
Lancaster	Running Exhaust	0.635	5.283
	Start Exhaust	1.551	1.464
	Brakewear	0.000	0.000
	Tirewear	0.000	0.000
	Evap Permeation	0.335	0.000
	Evap Fuel Vapor Venting	0.788	0.000
	Evap Fuel Leaks	1.119	0.000
	Crankcase Running Exhaust	0.009	0.002
	Crankcase Start Exhaust	0.020	0.000
	Crankcase Extended Idle Exhaust	0.001	0.000
	Extended Idle Exhaust	0.159	0.907
Auxiliary Power Exhaust	0.012	0.040	
	<i>Subtotal</i>	<i>4.629</i>	<i>7.696</i>
Off-Model Project Emission Benefits		0.000	0.000
Region Total		4.629	7.696
	(Kg/Year)	4,200	6,982

Lancaster County Transportation Conformity Analysis
2021 TIP and 2045 MTP

2035 Ozone by Road Type

County	Road Type	Summer Day VMT	Speed (mph)	Emissions (Tons/Day)	
				VOC	NOx
Lancaster	Off-Network	N/A	N/A	2.274	1.730
	Rural Restricted	1,555,918	63.6	0.051	0.357
	Rural UnRestricted	3,140,390	41.6	0.122	0.425
	Urban Restricted	4,461,762	58.7	0.151	0.915
	Urban UnRestricted	8,598,800	26.9	0.465	1.054
	Subtotal	17,756,870		3.062	4.480
Off-Model Project Emission Benefits				0.000	0.000
Region Total		17,756,870	(Kg/Day)	3.062	4.480
				2,778	4,064

2035 Ozone by Source Type

County	Source Type	Summer Day VMT	Emissions (Tons/Day)		
			VOC	NOx	
Lancaster	Motorcycle	109,591	0.282	0.073	
	Passenger Car	8,695,770	0.898	0.410	
	Passenger Truck	5,551,793	1.238	0.658	
	Light Commercial Truck	1,429,533	0.311	0.195	
	Intercity Bus	2,690	0.000	0.005	
	Transit Bus	29,080	0.002	0.035	
	School Bus	7,412	0.001	0.007	
	Refuse Truck	32,583	0.002	0.040	
	Single Unit Short-haul Truck	683,219	0.082	0.420	
	Single Unit Long-haul Truck	38,379	0.002	0.026	
	Motor Home	22,926	0.011	0.018	
	Combination Short-haul Truck	279,385	0.013	0.345	
	Combination Long-haul Truck	874,509	0.221	2.250	
	Subtotal	17,756,870	3.062	4.480	
Off-Model Project Emission Benefits			0.000	0.000	
Region Total		17,756,870	(Kg/Day)	3.062	4.480
				2,778	4,064

2035 Ozone by Emission Process

County	Emission Process	Emissions (Tons/Day)	
		VOC	NOx
Lancaster	Running Exhaust	0.307	2.750
	Start Exhaust	0.701	0.638
	Brakewear	0.000	0.000
	Tirewear	0.000	0.000
	Evap Permeation	0.171	0.000
	Evap Fuel Vapor Venting	0.505	0.000
	Evap Fuel Leaks	1.189	0.000
	Crankcase Running Exhaust	0.002	0.000
	Crankcase Start Exhaust	0.009	0.000
	Crankcase Extended Idle Exhaust	0.000	0.000
	Extended Idle Exhaust	0.161	1.032
	Auxiliary Power Exhaust	0.017	0.059
	Subtotal	3.062	4.480
Off-Model Project Emission Benefits		0.000	0.000
Region Total		3.062	4.480
	(Kg/Year)	2,778	4,064

Lancaster County Transportation Conformity Analysis
2021 TIP and 2045 MTP

2045 Ozone by Road Type

County	Road Type	Summer Day VMT	Speed (mph)	Emissions (Tons/Day)	
				VOC	NOx
Lancaster	Off-Network	N/A	N/A	1.856	1.805
	Rural Restricted	1,866,484	63.6	0.049	0.378
	Rural UnRestricted	3,329,073	41.0	0.109	0.386
	Urban Restricted	4,964,692	58.7	0.137	0.902
	Urban UnRestricted	9,357,988	25.5	0.447	0.979
	Subtotal	19,518,237		2.598	4.451
Off-Model Project Emission Benefits				0.000	0.000
Region Total		19,518,237	(Kg/Day)	2.598	4.451
				2,357	4,038

2045 Ozone by Source Type

County	Source Type	Summer Day VMT	Emissions (Tons/Day)		
			VOC	NOx	
Lancaster	Motorcycle	120,257	0.309	0.080	
	Passenger Car	9,542,108	0.770	0.350	
	Passenger Truck	6,092,114	0.910	0.401	
	Light Commercial Truck	1,568,648	0.233	0.126	
	Intercity Bus	3,008	0.000	0.003	
	Transit Bus	32,374	0.002	0.037	
	School Bus	8,185	0.001	0.006	
	Refuse Truck	36,301	0.002	0.044	
	Single Unit Short-haul Truck	761,270	0.087	0.458	
	Single Unit Long-haul Truck	42,744	0.002	0.028	
	Motor Home	25,546	0.011	0.016	
	Combination Short-haul Truck	311,286	0.015	0.378	
	Combination Long-haul Truck	974,394	0.256	2.522	
	Subtotal	19,518,237	2.598	4.451	
Off-Model Project Emission Benefits			0.000	0.000	
Region Total		19,518,237	(Kg/Day)	2.598	4.451
				2,357	4,038

2045 Ozone by Emission Process

County	Emission Process	Emissions (Tons/Day)	
		VOC	NOx
Lancaster	Running Exhaust	0.275	2.646
	Start Exhaust	0.478	0.502
	Brakewear	0.000	0.000
	Tirewear	0.000	0.000
	Evap Permeation	0.123	0.000
	Evap Fuel Vapor Venting	0.361	0.000
	Evap Fuel Leaks	1.143	0.000
	Crankcase Running Exhaust	0.001	0.000
	Crankcase Start Exhaust	0.006	0.000
	Crankcase Extended Idle Exhaust	0.000	0.000
	Extended Idle Exhaust	0.190	1.230
	Auxiliary Power Exhaust	0.021	0.072
	Subtotal	2.598	4.451
Off-Model Project Emission Benefits		0.000	0.000
Region Total		2.598	4.451
	(Kg/Year)	2,357	4,038

Detailed Emission Results for Annual PM_{2.5} Analysis**2024 Annual PM_{2.5} by Road Type**

County	Road Type	Annual VMT	Speed (mph)	Emissions (Tons/Year)	
				NOx	PM _{2.5}
Lancaster	Off-Network	N/A	N/A	962.51	20.80
	Rural Restricted	379,082,153	63.5	223.00	8.50
	Rural UnRestricted	869,285,526	41.9	325.10	16.67
	Urban Restricted	1,251,640,738	58.7	659.55	27.27
	Urban UnRestricted	2,331,658,121	28.8	790.60	50.14
	<i>Subtotal</i>	<i>4,831,666,537</i>		<i>2,960.76</i>	<i>123.38</i>
Off-Model Project Emission Benefits				0.00	0.00
Region Total		4,831,666,537	(Kg/Year)	2,960.76	123.38
				2,685,958	111,925

2024 Annual PM_{2.5} by Source Type

County	Source Type	Annual VMT	Emissions (Tons/Year)	
			NOx	PM _{2.5}
Lancaster	Motorcycle	29,836,712	24.86	0.87
	Passenger Car	2,367,461,904	329.70	26.67
	Passenger Truck	1,511,501,986	757.67	30.56
	Light Commercial Truck	389,198,640	218.87	8.31
	Intercity Bus	631,301	3.43	0.14
	Transit Bus	7,894,147	27.72	0.72
	School Bus	2,084,588	6.21	0.36
	Refuse Truck	8,825,359	20.68	0.84
	Single Unit Short-haul Truck	185,074,610	210.16	9.34
	Single Unit Long-haul Truck	10,388,496	12.35	0.57
	Motor Home	6,209,316	15.07	0.69
	Combination Short-haul Truck	75,654,269	180.36	6.80
	Combination Long-haul Truck	236,905,210	1,153.68	37.50
	<i>Subtotal</i>	<i>4,831,666,537</i>	<i>2,960.76</i>	<i>123.38</i>
Off-Model Project Emission Benefits			0.00	0.00
Region Total		4,831,666,537	2,960.76	123.38
		(Kg/Year)	2,685,958	111,925

2024 Annual PM_{2.5} by Emission Process

County	Emission Process	Emissions (Tons/Year)	
		NOx	PM _{2.5}
Lancaster	Running Exhaust	1,997.62	63.90
	Start Exhaust	634.07	17.83
	Brakewear	0.00	20.34
	Tirewear	0.00	8.47
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	0.63	9.87
	Crankcase Start Exhaust	0.03	0.18
	Crankcase Extended Idle Exhaust	0.06	0.43
	Extended Idle Exhaust	315.02	1.58
Auxiliary Power Exhaust	13.33	0.77	
	<i>Subtotal</i>	<i>2,960.76</i>	<i>123.38</i>
Off-Model Project Emission Benefits		0.00	0.00
Region Total		2,960.76	123.38
	(Kg/Year)	2,685,958	111,925

Lancaster County Transportation Conformity Analysis
2021 TIP and 2045 MTP

2025 Annual PM_{2.5} by Road Type

County	Road Type	Annual VMT	Speed (mph)	Emissions (Tons/Year)	
				NOx	PM _{2.5}
Lancaster	Off-Network	N/A	N/A	904.68	19.85
	Rural Restricted	385,974,737	63.6	203.21	7.88
	Rural UnRestricted	868,866,211	42.2	288.65	15.42
	Urban Restricted	1,262,865,596	58.7	595.80	25.22
	Urban UnRestricted	2,355,492,120	28.6	709.47	47.81
	<i>Subtotal</i>	<i>4,873,198,664</i>		<i>2,701.80</i>	<i>116.18</i>
Off-Model Project Emission Benefits				0.00	0.00
Region Total		4,873,198,664	(Kg/Year)	2,701.80	116.18
				2,451,036	105,396

2025 Annual PM_{2.5} by Source Type

County	Source Type	Annual VMT	Emissions (Tons/Year)		
			NOx	PM _{2.5}	
Lancaster	Motorcycle	30,087,705	25.00	0.88	
	Passenger Car	2,387,383,396	310.03	26.16	
	Passenger Truck	1,524,215,750	654.59	29.46	
	Light Commercial Truck	392,469,240	192.35	8.04	
	Intercity Bus	630,050	3.14	0.13	
	Transit Bus	7,982,857	25.12	0.66	
	School Bus	2,103,066	5.69	0.32	
	Refuse Truck	8,920,771	18.85	0.75	
	Single Unit Short-haul Truck	186,917,920	194.28	8.53	
	Single Unit Long-haul Truck	10,507,752	11.52	0.52	
	Motor Home	6,271,943	13.72	0.62	
	Combination Short-haul Truck	76,424,734	165.81	6.17	
	Combination Long-haul Truck	239,283,480	1,081.71	33.94	
	<i>Subtotal</i>	<i>4,873,198,664</i>	<i>2,701.80</i>	<i>116.18</i>	
Off-Model Project Emission Benefits			0.00	0.00	
Region Total		4,873,198,664	(Kg/Year)	2,701.80	116.18
				2,451,036	105,396

2025 Annual PM_{2.5} by Emission Process

County	Emission Process	Emissions (Tons/Year)	
		NOx	PM _{2.5}
Lancaster	Running Exhaust	1,796.60	58.15
	Start Exhaust	574.62	17.06
	Brakewear	0.00	20.60
	Tirewear	0.00	8.55
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	0.53	9.03
	Crankcase Start Exhaust	0.03	0.17
	Crankcase Extended Idle Exhaust	0.05	0.40
	Extended Idle Exhaust	315.91	1.41
Auxiliary Power Exhaust	14.07	0.81	
<i>Subtotal</i>		<i>2,701.80</i>	<i>116.18</i>
Off-Model Project Emission Benefits		0.00	0.00
Region Total		2,701.80	116.18
	(Kg/Year)	2,451,036	105,396

Lancaster County Transportation Conformity Analysis
2021 TIP and 2045 MTP

2035 Annual PM_{2.5} by Road Type

County	Road Type	Annual VMT	Speed (mph)	Emissions (Tons/Year)	
				NOx	PM _{2.5}
Lancaster	Off-Network	N/A	N/A	678.82	13.46
	Rural Restricted	476,913,257	63.6	123.18	4.85
	Rural UnRestricted	933,771,607	41.6	142.69	10.13
	Urban Restricted	1,425,915,055	58.7	329.66	14.76
	Urban UnRestricted	2,534,938,525	26.9	348.09	35.25
	<i>Subtotal</i>	<i>5,371,538,443</i>		<i>1,622.44</i>	<i>78.46</i>
Off-Model Project Emission Benefits				0.00	0.00
Region Total		5,371,538,443		1,622.44	78.46
			(Kg/Year)	1,471,855	71,175

2035 Annual PM_{2.5} by Source Type

County	Source Type	Annual VMT	Emissions (Tons/Year)	
			NOx	PM _{2.5}
Lancaster	Motorcycle	33,090,221	27.19	0.94
	Passenger Car	2,625,623,000	184.49	21.27
	Passenger Truck	1,676,322,568	249.48	22.41
	Light Commercial Truck	431,637,060	72.42	5.84
	Intercity Bus	699,634	1.34	0.05
	Transit Bus	9,005,064	12.18	0.35
	School Bus	2,295,131	2.37	0.09
	Refuse Truck	10,000,309	13.88	0.50
	Single Unit Short-haul Truck	209,766,310	141.30	6.18
	Single Unit Long-haul Truck	11,786,382	8.72	0.36
	Motor Home	7,038,313	6.38	0.28
	Combination Short-haul Truck	85,775,042	119.87	3.94
	Combination Long-haul Truck	268,499,410	782.81	16.25
	<i>Subtotal</i>	<i>5,371,538,443</i>	<i>1,622.44</i>	<i>78.46</i>
	Off-Model Project Emission Benefits			0.00
Region Total		5,371,538,443	1,622.44	78.46
			1,471,855	71,175

2035 Annual PM_{2.5} by Emission Process

County	Emission Process	Emissions (Tons/Year)	
		NOx	PM _{2.5}
Lancaster	Running Exhaust	943.59	26.85
	Start Exhaust	298.66	11.42
	Brakewear	0.00	23.38
	Tirewear	0.00	9.45
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	0.03	5.31
	Crankcase Start Exhaust	0.01	0.12
	Crankcase Extended Idle Exhaust	0.00	0.26
	Extended Idle Exhaust	359.43	0.47
	Auxiliary Power Exhaust	20.72	1.20
	<i>Subtotal</i>	<i>1,622.44</i>	<i>78.46</i>
Off-Model Project Emission Benefits		0.00	0.00
Region Total		1,622.44	78.46
		1,471,855	71,175

Lancaster County Transportation Conformity Analysis
2021 TIP and 2045 MTP

2045 Annual PM_{2.5} by Road Type

County	Road Type	Annual VMT	Speed (mph)	Emissions (Tons/Year)	
				NOx	PM _{2.5}
Lancaster	Off-Network	N/A	N/A	715.07	8.91
	Rural Restricted	572,107,029	63.6	130.96	4.91
	Rural UnRestricted	990,851,849	41.0	130.65	9.63
	Urban Restricted	1,586,643,648	58.7	325.99	13.94
	Urban UnRestricted	2,758,101,673	25.5	325.57	35.70
	<i>Subtotal</i>	<i>5,907,704,200</i>		<i>1,628.25</i>	<i>73.09</i>
Off-Model Project Emission Benefits				0.00	0.00
Region Total		5,907,704,200	(Kg/Year)	1,628.25	73.09
				1,477,120	66,310

2045 Annual PM_{2.5} by Source Type

County	Source Type	Annual VMT	Emissions (Tons/Year)		
			NOx	PM _{2.5}	
Lancaster	Motorcycle	36,329,762	29.90	1.04	
	Passenger Car	2,882,676,604	169.69	19.57	
	Passenger Truck	1,840,432,592	167.65	17.47	
	Light Commercial Truck	473,889,970	50.54	4.79	
	Intercity Bus	782,423	1.02	0.04	
	Transit Bus	10,033,461	12.76	0.37	
	School Bus	2,536,854	2.27	0.08	
	Refuse Truck	11,164,000	15.39	0.55	
	Single Unit Short-haul Truck	233,878,590	154.37	6.89	
	Single Unit Long-haul Truck	13,129,716	9.57	0.39	
	Motor Home	7,847,818	5.73	0.29	
	Combination Short-haul Truck	95,622,179	131.56	4.31	
	Combination Long-haul Truck	299,380,230	877.80	17.30	
		<i>Subtotal</i>	<i>5,907,704,200</i>	<i>1,628.25</i>	<i>73.09</i>
Off-Model Project Emission Benefits			0.00	0.00	
Region Total		5,907,704,200	(Kg/Year)	1,628.25	73.09
				1,477,120	66,310

2045 Annual PM_{2.5} by Emission Process

County	Emission Process	Emissions (Tons/Year)	
		NOx	PM _{2.5}
Lancaster	Running Exhaust	913.17	21.51
	Start Exhaust	261.51	6.59
	Brakewear	0.00	26.55
	Tirewear	0.00	10.44
	Evap Permeation	0.00	0.00
	Evap Fuel Vapor Venting	0.00	0.00
	Evap Fuel Leaks	0.00	0.00
	Crankcase Running Exhaust	0.01	5.68
	Crankcase Start Exhaust	0.01	0.08
	Crankcase Extended Idle Exhaust	0.00	0.30
	Extended Idle Exhaust	428.35	0.49
Auxiliary Power Exhaust	25.20	1.46	
	<i>Subtotal</i>	<i>1,628.25</i>	<i>73.09</i>
Off-Model Project Emission Benefits		0.00	0.00
Region Total		1,628.25	73.09
	(Kg/Year)	1,477,120	66,310

ATTACHMENT C

Sample MOVES Data Importer (XML) Input File and Run Specification (MRS) Input File

(Sample for 2024 July Weekday and Annual Runs)

MOVES County Data Manager Importer File – July Weekday Run (MOVESIMPORTER.XML)

```

<moves>
  <importer mode="county" >
    <filters>
      <geographicselections>
        <geographicselection type="COUNTY" key="42071" description="PENNSYLVANIA - LANCASTER County"/>
      </geographicselections>
      <timespan>
        <year key="2024"/>
        <month id="07"/>
        <day id="2"/>
        <day id="5"/>
        <beginhour id="1"/>
        <endhour id="24"/>
        <aggregateBy key="Hour"/>
      </timespan>
      <onroadvehicleselections>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="62" sourcetype="Combination Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="61" sourcetype="Combination Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="41" sourcetype="Intercity Bus"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="32" sourcetype="Light Commercial Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="54" sourcetype="Motor Home"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="11" sourcetype="Motorcycle"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="21" sourcetype="Passenger Car"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="31" sourcetype="Passenger Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="51" sourcetype="Refuse Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="43" sourcetype="School Bus"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="53" sourcetype="Single Unit Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="52" sourcetype="Single Unit Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="42" sourcetype="Transit Bus"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="62" sourcetype="Combination Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="61" sourcetype="Combination Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="41" sourcetype="Intercity Bus"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="32" sourcetype="Light Commercial Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="54" sourcetype="Motor Home"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="11" sourcetype="Motorcycle"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="21" sourcetype="Passenger Car"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="31" sourcetype="Passenger Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="51" sourcetype="Refuse Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="43" sourcetype="School Bus"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="53" sourcetype="Single Unit Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="52" sourcetype="Single Unit Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="42" sourcetype="Transit Bus"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="62" sourcetype="Combination Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="61" sourcetype="Combination Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="41" sourcetype="Intercity Bus"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="32" sourcetype="Light Commercial Truck"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="54" sourcetype="Motor Home"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="11" sourcetype="Motorcycle"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="21" sourcetype="Passenger Car"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="31"

```

Lancaster County Transportation Conformity Analysis
 2021 TIP and 2045 MTP

```

sourcetyname="Passenger Truck"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="51" sourcetyname="Refuse
Truck"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="43" sourcetyname="School
Bus"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="53" sourcetyname="Single
Unit Long-haul Truck"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="52" sourcetyname="Single
Unit Short-haul Truck"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="42" sourcetyname="Transit
Bus"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="62" sourcetyname="Combination Long-haul
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="61" sourcetyname="Combination Short-haul
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="41" sourcetyname="Intercity Bus"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="32" sourcetyname="Light Commercial
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="54" sourcetyname="Motor Home"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="11" sourcetyname="Motorcycle"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="21" sourcetyname="Passenger Car"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="31" sourcetyname="Passenger Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="51" sourcetyname="Refuse Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="43" sourcetyname="School Bus"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="53" sourcetyname="Single Unit Long-haul
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="52" sourcetyname="Single Unit Short-haul
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="42" sourcetyname="Transit Bus"/>
</onroadvehicseleselections>
</offroadvehicseleselections>
</offroadvehicseleselections>
</offroadvehicseleselections>
</offroadvehicseleselections>
</roadtypes>
  <roadtype roadtypeid="1" roadtypename="Off-Network"/>
  <roadtype roadtypeid="2" roadtypename="Rural Restricted Access"/>
  <roadtype roadtypeid="3" roadtypename="Rural Unrestricted Access"/>
  <roadtype roadtypeid="4" roadtypename="Urban Restricted Access"/>
  <roadtype roadtypeid="5" roadtypename="Urban Unrestricted Access"/>
</roadtypes>
</filters>
<databaseselection servername="localhost" databasename="42071_2024_07_05_2024_Julwkd_OZ_Lanc_mi"/>
<agedistribution>
  <description><![CDATA[]]></description>
  <parts>
    <sourceTypeAgeDistribution>
<filename>C:\SCRM_MOVES\IN_AQ\MOVES\AgeDistribution\MOVES2014a\17Reg_RepCty\2024\42011_2024_SourceTypeAgeDistribution.csv
</filename>
    </sourceTypeAgeDistribution>
  </parts>
</agedistribution>
<avgspeeddistribution>
  <description><![CDATA[]]></description>
  <parts>
    <avgSpeedDistribution>
<filename>C:\SCRM_MOVES\Run24_Julwkd_OZ_Lanc\AQ\JULY\42071_2024_07_05_2024_Julwkd_OZ_Lanc\CDM\avgSpeedDistribution.c
sv</filename>
    </avgSpeedDistribution>
  </parts>
</avgspeeddistribution>
<imcoverage>
  <description><![CDATA[]]></description>
  <parts>

```

```

    <imcoverage>
      <filename>C:\SCRM_MOVES\IN_AQ\MOVES\IM\MOVES2014a\42000_2024_IMCoverage.csv</filename>
    </imcoverage>
  </parts>
</imcoverage>
<fuel>
  <description><![CDATA[]]></description>
  <parts>
    <FuelSupply>
      <filename>C:\SCRM_MOVES\IN_AQ\MOVES\Fuel\MOVES2014a\42000_fuelsupply_14a_PGH_RVP10.csv</filename>
    </FuelSupply>
    <FuelFormulation>
      <filename>C:\SCRM_MOVES\IN_AQ\MOVES\Fuel\MOVES2014a\42000_FuelFormulation_14a_PGH_RVP10.csv</filename>
    </FuelFormulation>
    <FuelUsageFraction>
      <filename>C:\SCRM_MOVES\IN_AQ\MOVES\Fuel\MOVES2014a\MOVESDefaults\42000_FuelUsageFraction_14a.csv</filename>
    </FuelUsageFraction>
    <AVFT>
      <filename></filename>
    </AVFT>
  </parts>
</fuel>
  <zonemonthhour>
    <description><![CDATA[]]></description>
    <parts>
      <zoneMonthHour>
        <filename>C:\SCRM_MOVES\IN_AQ\MOVES\Meteorology\2008\42071_2008_met.csv</filename>
      </zoneMonthHour>
    </parts>
  </zonemonthhour>
  <roadtypedistribution>
    <description><![CDATA[]]></description>
    <parts>
      <roadTypeDistribution>
        <filename>C:\SCRM_MOVES\Run24_Julwkd_OZ_Lanc\\AQ\JULY\\42071_2024_07_05_2024_Julwkd_OZ_Lanc\CDM\roadTypeDistribution.csv</filename>
      </roadTypeDistribution>
    </parts>
  </roadtypedistribution>
  <sourcetypepopulation>
    <description><![CDATA[]]></description>
    <parts>
      <sourceTypeYear>
        <filename>C:\SCRM_MOVES\Run24_Julwkd_OZ_Lanc\\AQ\JULY\\42071_2024_07_05_2024_Julwkd_OZ_Lanc\CDM\SourceTypePopulation.csv</filename>
      </sourceTypeYear>
    </parts>
  </sourcetypepopulation>
  <rampfraction>
    <description><![CDATA[]]></description>
    <parts>
      <roadType>
        <filename>C:\SCRM_MOVES\IN_AQ\MOVES\RampFraction\rampfraction_defaults.csv</filename>
      </roadType>
    </parts>
  </rampfraction>
  <vehicletypevmt>
    <description><![CDATA[]]></description>
    <parts>
      <hpmsVTypeYear>
        <filename>C:\SCRM_MOVES\Run24_Julwkd_OZ_Lanc\\AQ\JULY\\42071_2024_07_05_2024_Julwkd_OZ_Lanc\CDM\hpmsVTypeYear.csv</filename>
      </hpmsVTypeYear>
      <monthvmtfraction>

```


*Lancaster County Transportation Conformity Analysis
2021 TIP and 2045 MTP*

```

<filename>C:\SCRM_MOVES\IN_AQ\MOVES\MonthDayHourFractions\2017_MonthFraction\42071_2017_MonthVMTFraction.csv</filename>
  </monthvmtfraction>
  <dayvmtfraction>
<filename>C:\SCRM_MOVES\IN_AQ\MOVES\MonthDayHourFractions\2017_DayFraction\42071_2017_dayvmtfraction.csv</filename>
  </dayvmtfraction>
  <hourvmtfraction>
<filename>C:\SCRM_MOVES\Run24_Julwkd_OZ_Lanc\\AQ\JULY\\42071_2024_07_05_2024_Julwkd_OZ_Lanc\CDM\hourvmtfraction.csv</fi
lename>
  </hourvmtfraction>
  </parts>
  </vehicletypevmt>
<starts>
  <description><![CDATA[]]></description>
  <parts>
    <startsPerDay>
<filename></filename>
  </startsPerDay>
  <startsHourFraction>
<filename></filename>
  </startsHourFraction>
  <startsSourceTypeFraction>
<filename></filename>
  </startsSourceTypeFraction>
  <startsMonthAdjust>
<filename></filename>
  </startsMonthAdjust>
  <importStartsOpModeDistribution>
<filename></filename>
  </importStartsOpModeDistribution>
  <Starts>
<filename></filename>
  </Starts>
  </parts>
</starts>
<hotelling>
  <description><![CDATA[]]></description>
  <parts>
    <hotellingActivityDistribution>
<filename></filename>
  </hotellingActivityDistribution>
  <hotellingHours>
<filename></filename>
  </hotellingHours>
  </parts>
</hotelling>
<onroadretrofit>
  <description><![CDATA[]]></description>
  <parts>
    <onRoadRetrofit>
      <filename></filename>
    </onRoadRetrofit>
  </parts>
</onroadretrofit>
<generic>
  <description><![CDATA[]]></description>
  <parts>
    <anytable>
      <tablename>regioncounty</tablename>
<filename>C:\SCRM_MOVES\IN_AQ\MOVES\Fuel\MOVES2014a\MOVESDefaults\42000_RegionCounty_MOVES2014aDefaults.csv</filename>
  </anytable>
  </parts>
</generic>
  </importer>
</moves>

```

Lancaster County Transportation Conformity Analysis 2021 TIP and 2045 MTP

MOVES Run Specification File – July Weekday Run (MOVESRUN.MRS)

```

<runspec version="MOVES2014a-20161117">
<description><![CDATA[MOVES2014A RunSpec Created by CENTRAL4 Scenario: LANC 2024 JULWKD 2024_JulwkD_OZ_Lanc Emission Inventory
with user's data]]></description>

  <models>
    <model value="ONROAD"/>
  </models>
<modelscale value="INV"/>
<modeldomain value="SINGLE"/>
<geographicselections>
  <geographicselection type="COUNTY" key="42071" description="PENNSYLVANIA - LANCASTER County"/>
</geographicselections>
<timespan>
  <year key="2024"/>
<month id="07"/>
<day id="5"/>
  <beginhour id="1"/>
  <endhour id="24"/>
<aggregateBy key="Hour"/>
</timespan>
<onroadvehicleselections>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="11" sourcetyname="Motorcycle"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="21" sourcetyname="Passenger Car"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="31" sourcetyname="Passenger
Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="32" sourcetyname="Light Commercial
Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="11" sourcetyname="Motorcycle"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="21" sourcetyname="Passenger Car"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="31" sourcetyname="Passenger Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="32" sourcetyname="Light Commercial Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="11" sourcetyname="Motorcycle"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="21" sourcetyname="Passenger Car"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="31" sourcetyname="Passenger Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="32" sourcetyname="Light Commercial Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="11" sourcetyname="Motorcycle"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="21" sourcetyname="Passenger Car"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="31" sourcetyname="Passenger Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="32" sourcetyname="Light Commercial Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="41" sourcetyname="Intercity Bus"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="42" sourcetyname="Transit Bus"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="43" sourcetyname="School Bus"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="41" sourcetyname="Intercity Bus"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="42" sourcetyname="Transit Bus"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="43" sourcetyname="School Bus"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="41" sourcetyname="Intercity Bus"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="42" sourcetyname="Transit Bus"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="43" sourcetyname="School Bus"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="41" sourcetyname="Intercity Bus"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="42" sourcetyname="Transit Bus"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="43" sourcetyname="School Bus"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="51" sourcetyname="Refuse Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="52" sourcetyname="Single Unit Short-
haul Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="53" sourcetyname="Single Unit Long-
haul Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="54" sourcetyname="Motor Home"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="61" sourcetyname="Combination
Short-haul Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="62" sourcetyname="Combination
Long-haul Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="51" sourcetyname="Refuse Truck"/>

```

Lancaster County Transportation Conformity Analysis
 2021 TIP and 2045 MTP

```

<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="52" sourcetyname="Single Unit Short-haul Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="53" sourcetyname="Single Unit Long-haul Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="54" sourcetyname="Motor Home"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="61" sourcetyname="Combination Short-haul Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="62" sourcetyname="Combination Long-haul Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="51" sourcetyname="Refuse Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="52" sourcetyname="Single Unit Short-haul Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="53" sourcetyname="Single Unit Long-haul Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="54" sourcetyname="Motor Home"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="61" sourcetyname="Combination Short-haul Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="62" sourcetyname="Combination Long-haul Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="51" sourcetyname="Refuse Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="52" sourcetyname="Single Unit Short-haul Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="53" sourcetyname="Single Unit Long-haul Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="54" sourcetyname="Motor Home"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="61" sourcetyname="Combination Short-haul Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="62" sourcetyname="Combination Long-haul Truck"/>
</onroadvehicleselections>
<offroadvehicleselections>
</offroadvehicleselections>
<offroadvehiclesccs>
</offroadvehiclesccs>
<roadtypes separateramps="false">
  <roadtype roadtypeid="1" roadtyname="Off-Network" modelCombination="M1"/>
  <roadtype roadtypeid="2" roadtyname="Rural Restricted Access" modelCombination="M1"/>
  <roadtype roadtypeid="3" roadtyname="Rural Unrestricted Access" modelCombination="M1"/>
  <roadtype roadtypeid="4" roadtyname="Urban Restricted Access" modelCombination="M1"/>
  <roadtype roadtypeid="5" roadtyname="Urban Unrestricted Access" modelCombination="M1"/>
</roadtypes>
<pollutantprocessassociations>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="1" processname="Running Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="15" processname="Crankcase Running Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="16" processname="Crankcase Start Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="17" processname="Crankcase Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen (NOx)" processkey="91" processname="Auxiliary Power Exhaust"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="1" processname="Running Exhaust"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="12" processname="Evap Fuel Vapor Venting"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="13" processname="Evap Fuel Leaks"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="15" processname="Crankcase Running Exhaust"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="16" processname="Crankcase Start Exhaust"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="17" processname="Crankcase Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="1" processname="Running Exhaust"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="12" processname="Evap Fuel Vapor Venting"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="13" processname="Evap Fuel Leaks"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="15" processname="Crankcase

```

```

Running Exhaust"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="16" processname="Crankcase Start Exhaust"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="17" processname="Crankcase Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="1" processname="Running Exhaust"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="12" processname="Evap Fuel Vapor Venting"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="13" processname="Evap Fuel Leaks"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="15" processname="Crankcase Running Exhaust"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="16" processname="Crankcase Start Exhaust"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="17" processname="Crankcase Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="91" processname="Auxiliary Power Exhaust"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="91" processname="Auxiliary Power Exhaust"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="91" processname="Auxiliary Power Exhaust"/>
<pollutantprocessassociation pollutantkey="79" pollutantname="Non-Methane Hydrocarbons" processkey="11" processname="Evap Permeation"/>
<pollutantprocessassociation pollutantkey="1" pollutantname="Total Gaseous Hydrocarbons" processkey="11" processname="Evap Permeation"/>
<pollutantprocessassociation pollutantkey="87" pollutantname="Volatile Organic Compounds" processkey="11" processname="Evap Permeation"/>
</pollutantprocessassociations>
<databaseselections>
<databaseselection servername="localhost" databasename="MOVES2014_early_NLEV" description=""/>
<databaseselection servername="localhost" databasename="MOVES2014_calevii08" description=""/>
</databaseselections>
<inputdatabase servername="" databasename="" description=""/>
<uncertaintyparameters uncertaintymodeenabled="false" numberofrunspersimulation="0" numberofsimulations="0"/>
<geographicoutputdetail description="COUNTY"/>
<outputemissionsbreakdownselection>
<modelyear selected="false"/>
<fueltype selected="false"/>
<fuelsubtype selected="false"/>
<emissionprocess selected="true"/>
<onroadoffroad selected="true"/>
<roadtype selected="true"/>
<sourceusetype selected="true"/>
<movesvehicletype selected="false"/>
<onroadsc selected="false"/>
<offroadsc selected="false"/>
<estimateuncertainty selected="false" numberOfIterations="2" keepSampledData="false" keepIterations="false"/>
<sector selected="false"/>
<engtechid selected="false"/>
<hpclass selected="false"/>
</outputemissionsbreakdownselection>
<outputdatabase servername="localhost" databasename="42071_2024_07_05_2024_Julwkd_OZ_Lanc_mo" description=""/>
<outputtimestep value="Hour"/>
<outputvmtdata value="true"/>
<outputsho value="true"/>
<outputsh value="true"/>
<outputshp value="true"/>

```

Lancaster County Transportation Conformity Analysis
 2021 TIP and 2045 MTP

```

<outputshidling value="true"/>
<outputstarts value="true"/>
<outputpopulation value="true"/>
<scaleinputdatabase servername="localhost" databasename="42071_2024_07_05_2024_Julwkd_OZ_Lanc_mi" description=""/>
<pmsize value="0"/>
<outputfactors>
  <timefactors selected="true" units="Hours"/>
  <distancefactors selected="false" units="Miles"/>
  <massfactors selected="false" units="Grams" energyunits="Million BTU"/>
</outputfactors>
<savedata>
</savedata>
<donotexecute>
</donotexecute>
<generatordatabase shouldsave="false" servername="" databasename="" description=""/>
  <donotperformfinalaggregation selected="false"/>
<lookuptableflags scenarioid="" truncateoutput="false" truncateactivity="false"/>
  <internalcontrolstrategies>
<internalcontrolstrategy
classname="gov.epa.otaq.moves.master.implementation.ghg.internalcontrolstrategies.rateofprogress.RateOfProgressStrategy"><![CDATA[
useParameters                                     No
]]></internalcontrolstrategy>
  </internalcontrolstrategies>
</runspec>

```

MOVES County Data Manager Importer File – Annual Run (MOVESIMPORTER.XML)

```

<moves>
  <importer mode="county" >
    <filters>
      <geographicselections>
        <geographicselection type="COUNTY" key="42071" description="PENNSYLVANIA - LANCASTER County"/>
      </geographicselections>
      <timespan>
        <year key="2024"/>
        <month id="00"/>
        <day id="2"/>
        <day id="5"/>
        <beginhour id="1"/>
        <endhour id="24"/>
        <aggregateBy key="Hour"/>
      </timespan>
      <onroadvehicleselections>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="62" sourcetype="Combination Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="61" sourcetype="Combination Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="41" sourcetype="Intercity Bus"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="32" sourcetype="Light Commercial Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="54" sourcetype="Motor Home"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="11" sourcetype="Motorcycle"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="21" sourcetype="Passenger Car"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="31" sourcetype="Passenger Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="51" sourcetype="Refuse Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="43" sourcetype="School Bus"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="53" sourcetype="Single Unit Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="52" sourcetype="Single Unit Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="42" sourcetype="Transit Bus"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="62" sourcetype="Combination Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="61" sourcetype="Combination Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="41" sourcetype="Intercity Bus"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="32" sourcetype="Light Commercial Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="54" sourcetype="Motor Home"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="11" sourcetype="Motorcycle"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="21" sourcetype="Passenger Car"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="31" sourcetype="Passenger Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="51" sourcetype="Refuse Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="43" sourcetype="School Bus"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="53" sourcetype="Single Unit Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="52" sourcetype="Single Unit Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="42" sourcetype="Transit Bus"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="62" sourcetype="Combination Long-haul Truck"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="61" sourcetype="Combination Short-haul Truck"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="41" sourcetype="Intercity Bus"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="32" sourcetype="Light Commercial Truck"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="54" sourcetype="Motor Home"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="11" sourcetype="Motorcycle"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="21" sourcetype="Passenger Car"/>
        <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="31"

```

Lancaster County Transportation Conformity Analysis
 2021 TIP and 2045 MTP

```

sourcetyname="Passenger Truck"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="51" sourcetyname="Refuse
Truck"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="43" sourcetyname="School
Bus"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="53" sourcetyname="Single
Unit Long-haul Truck"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="52" sourcetyname="Single
Unit Short-haul Truck"/>
  <onroadvehicseleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="42" sourcetyname="Transit
Bus"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="62" sourcetyname="Combination Long-haul
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="61" sourcetyname="Combination Short-haul
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="41" sourcetyname="Intercity Bus"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="32" sourcetyname="Light Commercial
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="54" sourcetyname="Motor Home"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="11" sourcetyname="Motorcycle"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="21" sourcetyname="Passenger Car"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="31" sourcetyname="Passenger Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="51" sourcetyname="Refuse Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="43" sourcetyname="School Bus"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="53" sourcetyname="Single Unit Long-haul
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="52" sourcetyname="Single Unit Short-haul
Truck"/>
  <onroadvehicseleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="42" sourcetyname="Transit Bus"/>
</onroadvehicseleselections>
</offroadvehicseleselections>
</offroadvehicseleselections>
</offroadvehicseleselections>
</offroadvehicseleselections>
</roadtypes>
  <roadtype roadtypeid="1" roadtypename="Off-Network"/>
  <roadtype roadtypeid="2" roadtypename="Rural Restricted Access"/>
  <roadtype roadtypeid="3" roadtypename="Rural Unrestricted Access"/>
  <roadtype roadtypeid="4" roadtypename="Urban Restricted Access"/>
  <roadtype roadtypeid="5" roadtypename="Urban Unrestricted Access"/>
</roadtypes>
</filters>
<databaseselection servername="localhost" databasename="42071_2024_00_25_2024_Ann_PM_Lanc_mi"/>
<agedistribution>
  <description><![CDATA[]]></description>
  <parts>
    <sourceTypeAgeDistribution>
<filename>C:\SCRM_MOVES\IN_AQ\MOVES\AgeDistribution\MOVES2014a\17Reg_RepCty\2024\42011_2024_SourceTypeAgeDistribution.csv
</filename>
    </sourceTypeAgeDistribution>
  </parts>
</agedistribution>
<avgspeeddistribution>
  <description><![CDATA[]]></description>
  <parts>
    <avgSpeedDistribution>
<filename>C:\SCRM_MOVES\Run24_Ann_PM_Lanc\\AQ\ANNUAL\\42071_2024_00_25_2024_Ann_PM_Lanc\CDM\avgSpeedDistribution.csv
v</filename>
    </avgSpeedDistribution>
  </parts>
</avgspeeddistribution>
<imcoverage>
  <description><![CDATA[]]></description>
  <parts>

```



```

    <imcoverage>
      <filename>C:\SCRM_MOVES\IN_AQ\MOVES\IM\MOVES2014a\42000_2024_IMCoverage.csv</filename>
    </imcoverage>
  </parts>
</imcoverage>
<fuel>
  <description><![CDATA[]]></description>
  <parts>
    <FuelSupply>
      <filename>C:\SCRM_MOVES\IN_AQ\MOVES\Fuel\MOVES2014a\42000_fuelsupply_14a_PGH_RVP10.csv</filename>
    </FuelSupply>
    <FuelFormulation>
      <filename>C:\SCRM_MOVES\IN_AQ\MOVES\Fuel\MOVES2014a\42000_FuelFormulation_14a_PGH_RVP10.csv</filename>
    </FuelFormulation>
    <FuelUsageFraction>
      <filename>C:\SCRM_MOVES\IN_AQ\MOVES\Fuel\MOVES2014a\MOVESDefaults\42000_FuelUsageFraction_14a.csv</filename>
    </FuelUsageFraction>
    <AVFT>
      <filename></filename>
    </AVFT>
  </parts>
</fuel>
  <zonemonthhour>
    <description><![CDATA[]]></description>
    <parts>
      <zoneMonthHour>
        <filename>C:\SCRM_MOVES\IN_AQ\MOVES\Meteorology\2008\42071_2008_met.csv</filename>
      </zoneMonthHour>
    </parts>
  </zonemonthhour>
  <roadtypedistribution>
    <description><![CDATA[]]></description>
    <parts>
      <roadTypeDistribution>
        <filename>C:\SCRM_MOVES\Run24_Ann_PM_Lanc\\AQ\ANNUAL\\42071_2024_00_25_2024_Ann_PM_Lanc\CDM\roadTypeDistribution.csv</filename>
      </roadTypeDistribution>
    </parts>
  </roadtypedistribution>
  <sourcetypepopulation>
    <description><![CDATA[]]></description>
    <parts>
      <sourceTypeYear>
        <filename>C:\SCRM_MOVES\Run24_Ann_PM_Lanc\\AQ\ANNUAL\\42071_2024_00_25_2024_Ann_PM_Lanc\CDM\SourceTypePopulation.csv</filename>
      </sourceTypeYear>
    </parts>
  </sourcetypepopulation>
  <rampfraction>
    <description><![CDATA[]]></description>
    <parts>
      <roadType>
        <filename>C:\SCRM_MOVES\IN_AQ\MOVES\RampFraction\rampfraction_defaults.csv</filename>
      </roadType>
    </parts>
  </rampfraction>
  <vehicletypevmt>
    <description><![CDATA[]]></description>
    <parts>
      <hpmsVTypeYear>
        <filename>C:\SCRM_MOVES\Run24_Ann_PM_Lanc\\AQ\ANNUAL\\42071_2024_00_25_2024_Ann_PM_Lanc\CDM\hpmsVTypeYear.csv</filename>
      </hpmsVTypeYear>
      <monthvmtfraction>

```

*Lancaster County Transportation Conformity Analysis
2021 TIP and 2045 MTP*

```

<filename>C:\SCRM_MOVES\IN_AQ\MOVES\MonthDayHourFractions\2017_MonthFraction\42071_2017_MonthVMTFraction.csv</filename>
  </monthvmtfraction>
  <dayvmtfraction>
    <filename>C:\SCRM_MOVES\IN_AQ\MOVES\MonthDayHourFractions\dayvmtfraction_avgday.csv</filename>
  </dayvmtfraction>
  <hourvmtfraction>
<filename>C:\SCRM_MOVES\Run24_Ann_PM_Lanc\\AQ\ANNUAL\\42071_2024_00_25_2024_Ann_PM_Lanc\CDM\hourvmtfraction.csv</fil
ename>
  </hourvmtfraction>
  </parts>
</vehicletypevmt>
<starts>
  <description><![CDATA[]]></description>
  <parts>
    <startsPerDay>
<filename></filename>
    </startsPerDay>
    <startsHourFraction>
<filename></filename>
    </startsHourFraction>
    <startsSourceTypeFraction>
<filename></filename>
    </startsSourceTypeFraction>
    <startsMonthAdjust>
<filename></filename>
    </startsMonthAdjust>
    <importStartsOpModeDistribution>
<filename></filename>
    </importStartsOpModeDistribution>
    <Starts>
<filename></filename>
    </Starts>
  </parts>
</starts>
<hotelling>
  <description><![CDATA[]]></description>
  <parts>
    <hotellingActivityDistribution>
<filename></filename>
    </hotellingActivityDistribution>
    <hotellingHours>
<filename></filename>
    </hotellingHours>
  </parts>
</hotelling>
<onroadretrofit>
  <description><![CDATA[]]></description>
  <parts>
    <onRoadRetrofit>
      <filename></filename>
    </onRoadRetrofit>
  </parts>
</onroadretrofit>
<generic>
  <description><![CDATA[]]></description>
  <parts>
    <anytable>
      <tablename>regioncounty</tablename>
<filename>C:\SCRM_MOVES\IN_AQ\MOVES\Fuel\MOVES2014a\MOVESDefaults\42000_RegionCounty_MOVES2014aDefaults.csv</filename>
    </anytable>
  </parts>
</generic>
  </importer>
</moves>

```

Lancaster County Transportation Conformity Analysis 2021 TIP and 2045 MTP

MOVES Run Specification File – Annual Run (MOVESRUN.MRS)

```

<runspec version="MOVES2014a-20161117">
<description><![CDATA[MOVES2014A RunSpec Created by CENTRAL4 Scenario: LANC 2024 ANNAVAVG 2024_Ann_PM_Lanc Emission Inventory
with user's data]]></description>
  <models>
    <model value="ONROAD"/>
  </models>
<modelscale value="INV"/>
  <modeldomain value="SINGLE"/>
  <geographicselections>
    <geographicselection type="COUNTY" key="42071" description="PENNSYLVANIA - LANCASTER County"/>
  </geographicselections>
  <timespan>
    <year key="2024"/>
    <month id="1"/>
    <month id="2"/>
    <month id="3"/>
    <month id="4"/>
    <month id="5"/>
    <month id="6"/>
    <month id="7"/>
    <month id="8"/>
    <month id="9"/>
    <month id="10"/>
    <month id="11"/>
    <month id="12"/>
    <day id="2"/>
    <day id="5"/>
    <beginhour id="1"/>
    <endhour id="24"/>
  <aggregateBy key="Hour"/>
  </timespan>
  <onroadvehicleselections>
    <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="11" sourcetyname="Motorcycle"/>
    <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="21" sourcetyname="Passenger Car"/>
    <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="31" sourcetyname="Passenger
Truck"/>
    <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="32" sourcetyname="Light Commercial
Truck"/>
    <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="11" sourcetyname="Motorcycle"/>
    <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="21" sourcetyname="Passenger Car"/>
    <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="31" sourcetyname="Passenger Truck"/>
    <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="32" sourcetyname="Light Commercial Truck"/>
    <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="11" sourcetyname="Motorcycle"/>
    <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="21" sourcetyname="Passenger Car"/>
    <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="31" sourcetyname="Passenger Truck"/>
    <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="32" sourcetyname="Light Commercial Truck"/>
    <onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="11" sourcetyname="Motorcycle"/>
    <onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="21" sourcetyname="Passenger Car"/>
    <onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="31" sourcetyname="Passenger Truck"/>
    <onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="32" sourcetyname="Light Commercial Truck"/>
    <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="41" sourcetyname="Intercity Bus"/>
    <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="42" sourcetyname="Transit Bus"/>
    <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="43" sourcetyname="School Bus"/>
    <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="41" sourcetyname="Intercity Bus"/>
    <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="42" sourcetyname="Transit Bus"/>
    <onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="43" sourcetyname="School Bus"/>
    <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="41" sourcetyname="Intercity Bus"/>
    <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="42" sourcetyname="Transit Bus"/>
    <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="43" sourcetyname="School Bus"/>
    <onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="41" sourcetyname="Intercity Bus"/>
    <onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="42" sourcetyname="Transit Bus"/>
    <onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="43" sourcetyname="School Bus"/>
    <onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="51" sourcetyname="Refuse Truck"/>

```

Lancaster County Transportation Conformity Analysis
 2021 TIP and 2045 MTP

```

<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="52" sourcetyname="Single Unit Short-haul Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="53" sourcetyname="Single Unit Long-haul Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="54" sourcetyname="Motor Home"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="61" sourcetyname="Combination Short-haul Truck"/>
<onroadvehicleselection fueltypeid="3" fueltypedesc="Compressed Natural Gas (CNG)" sourcetypeid="62" sourcetyname="Combination Long-haul Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="51" sourcetyname="Refuse Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="52" sourcetyname="Single Unit Short-haul Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="53" sourcetyname="Single Unit Long-haul Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="54" sourcetyname="Motor Home"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="61" sourcetyname="Combination Short-haul Truck"/>
<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="62" sourcetyname="Combination Long-haul Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="51" sourcetyname="Refuse Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="52" sourcetyname="Single Unit Short-haul Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="53" sourcetyname="Single Unit Long-haul Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="54" sourcetyname="Motor Home"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="61" sourcetyname="Combination Short-haul Truck"/>
<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="62" sourcetyname="Combination Long-haul Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="51" sourcetyname="Refuse Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="52" sourcetyname="Single Unit Short-haul Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="53" sourcetyname="Single Unit Long-haul Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="54" sourcetyname="Motor Home"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="61" sourcetyname="Combination Short-haul Truck"/>
<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="62" sourcetyname="Combination Long-haul Truck"/>
</onroadvehicleselections>
<offroadvehicleselections>
</offroadvehicleselections>
<offroadvehiclesccs>
</offroadvehiclesccs>
<roadtypes separateramps="false">
  <roadtype roadtypeid="1" roadtypename="Off-Network" modelCombination="M1"/>
  <roadtype roadtypeid="2" roadtypename="Rural Restricted Access" modelCombination="M1"/>
  <roadtype roadtypeid="3" roadtypename="Rural Unrestricted Access" modelCombination="M1"/>
  <roadtype roadtypeid="4" roadtypename="Urban Restricted Access" modelCombination="M1"/>
  <roadtype roadtypeid="5" roadtypename="Urban Unrestricted Access" modelCombination="M1"/>
</roadtypes>
<pollutantprocessassociations>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="1" processname="Running Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="15" processname="Crankcase Running Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="16" processname="Crankcase Start Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="17" processname="Crankcase Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="3" pollutantname="Oxides of Nitrogen (NOx)" processkey="91" processname="Auxiliary Power Exhaust"/>
<pollutantprocessassociation pollutantkey="118" pollutantname="Composite - NonECPM" processkey="1" processname="Running Exhaust"/>
<pollutantprocessassociation pollutantkey="118" pollutantname="Composite - NonECPM" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="118" pollutantname="Composite - NonECPM" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="118" pollutantname="Composite - NonECPM" processkey="91" processname="Auxiliary Power Exhaust"/>
<pollutantprocessassociation pollutantkey="112" pollutantname="Elemental Carbon" processkey="1" processname="Running Exhaust"/>
<pollutantprocessassociation pollutantkey="112" pollutantname="Elemental Carbon" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="112" pollutantname="Elemental Carbon" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="112" pollutantname="Elemental Carbon" processkey="91" processname="Auxiliary Power Exhaust"/>
<pollutantprocessassociation pollutantkey="119" pollutantname="H2O (aerosol)" processkey="1" processname="Running Exhaust"/>

```

```

<pollutantprocessassociation pollutantkey="119" pollutantname="H2O (aerosol)" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="119" pollutantname="H2O (aerosol)" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="119" pollutantname="H2O (aerosol)" processkey="91" processname="Auxiliary Power Exhaust"/>
<pollutantprocessassociation pollutantkey="110" pollutantname="Primary Exhaust PM2.5 - Total" processkey="1" processname="Running Exhaust"/>
<pollutantprocessassociation pollutantkey="110" pollutantname="Primary Exhaust PM2.5 - Total" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="110" pollutantname="Primary Exhaust PM2.5 - Total" processkey="15" processname="Crankcase Running Exhaust"/>
<pollutantprocessassociation pollutantkey="110" pollutantname="Primary Exhaust PM2.5 - Total" processkey="16" processname="Crankcase Start Exhaust"/>
<pollutantprocessassociation pollutantkey="110" pollutantname="Primary Exhaust PM2.5 - Total" processkey="17" processname="Crankcase Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="110" pollutantname="Primary Exhaust PM2.5 - Total" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="110" pollutantname="Primary Exhaust PM2.5 - Total" processkey="91" processname="Auxiliary Power Exhaust"/>
<pollutantprocessassociation pollutantkey="116" pollutantname="Primary PM2.5 - Brakewear Particulate" processkey="9" processname="Brakewear"/>
<pollutantprocessassociation pollutantkey="117" pollutantname="Primary PM2.5 - Tirewear Particulate" processkey="10" processname="Tirewear"/>
<pollutantprocessassociation pollutantkey="115" pollutantname="Sulfate Particulate" processkey="1" processname="Running Exhaust"/>
<pollutantprocessassociation pollutantkey="115" pollutantname="Sulfate Particulate" processkey="2" processname="Start Exhaust"/>
<pollutantprocessassociation pollutantkey="115" pollutantname="Sulfate Particulate" processkey="90" processname="Extended Idle Exhaust"/>
<pollutantprocessassociation pollutantkey="115" pollutantname="Sulfate Particulate" processkey="91" processname="Auxiliary Power Exhaust"/>
  </pollutantprocessassociations>
  <databaseselections>
<databaseselection servername="localhost" databasename="MOVES2014_early_NLEV" description=""/>
<databaseselection servername="localhost" databasename="MOVES2014_calevii08" description=""/>
  </databaseselections>
  <inputdatabase servername="" databasename="" description=""/>
  <uncertaintyparameters uncertaintymodeenabled="false" numberofrunspersimulation="0" numberofsimulations="0"/>
<geographicoutputdetail description="COUNTY"/>
  <outputemissionsbreakdownselection>
<modelyear selected="false"/>
<fueltype selected="false"/>
<fuelsubtype selected="false"/>
<emissionprocess selected="true"/>
  <onroadoffroad selected="true"/>
<roadtype selected="true"/>
<sourceusetype selected="true"/>
  <movesvehicletype selected="false"/>
<onroadscscc selected="false"/>
  <offroadscscc selected="false"/>
  <estimateuncertainty selected="false" numberOfIterations="2" keepSampledData="false" keepIterations="false"/>
  <sector selected="false"/>
  <engtechid selected="false"/>
  <hpclass selected="false"/>
  </outputemissionsbreakdownselection>
  <outputdatabase servername="localhost" databasename="42071_2024_00_25_2024_Ann_PM_Lanc_mo" description=""/>
<outputtimestep value="Hour"/>
<outputtimestep value="Month"/>
  <outputvmtdata value="true"/>
  <outputsho value="true"/>
  <outputsh value="true"/>
  <outputshp value="true"/>
  <outputshidling value="true"/>
  <outputstarts value="true"/>
  <outputpopulation value="true"/>
  <scaleinputdatabase servername="localhost" databasename="42071_2024_00_25_2024_Ann_PM_Lanc_mi" description=""/>
  <pmsize value="0"/>
  <outputfactors>

```

Lancaster County Transportation Conformity Analysis
2021 TIP and 2045 MTP

```
<timefactors selected="true" units="Hours"/>
<distancefactors selected="false" units="Miles"/>
<massfactors selected="false" units="Grams" energyunits="Million BTU"/>
</outputfactors>
<savedata>
</savedata>
<donotexecute>
</donotexecute>
<generatordatabase shouldsave="false" servername="" databasename="" description=""/>
  <donotperformfinalaggregation selected="false"/>
<lookuptableflags scenarioid="" truncateoutput="false" truncateactivity="false"/>
  <internalcontrolstrategies>
<internalcontrolstrategy
classname="gov.epa.otaq.moves.master.implementation.ghg.internalcontrolstrategies.rateofprogress.RateOfProgressStrategy"><![CDATA[
useParameters                               No
]]></internalcontrolstrategy>
  </internalcontrolstrategies>
</runspec>
```

Appendix D: Environmental Justice Analysis

Lancaster County MPO 2021-2024 Transportation Improvement Program (TIP) Environmental Justice Benefits and Burdens Analysis

Introduction

Environmental Justice (EJ) refers to the implementation of Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which directs procedures to be put in place to identify and address any disproportionately high and adverse human health or environmental effects on minority and low-income population groups. The fundamental principles of EJ can be defined as:

- To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, on 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.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, or national origin. More importantly for this analysis, Executive Order (EO) 12898 requires Federal agencies to achieve environmental justice by identifying and addressing disproportionately high and adverse human health or environmental effects, including the interrelated social and economic effects of their programs, policies, and activities, on minority populations and low-income populations in the United States. This requirement applies to the Lancaster County MPO as a recipient of federal funding, and recognizes the importance given to addressing the needs of low income and minority populations as outlined in the Metropolitan Transportation Planning regulations (23 CFR 450).

Based on the Office of Management and Budget (OMB) Policy Directive 15, *Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity*, issued in 1997, five minimum categories were established to address data on race. They are:

Black -- a person having origins in any of the black racial groups of Africa.

Hispanic -- a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

Asian -- a person having origins in any of the original peoples of 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 and who maintains cultural identification through tribal affiliation or community recognition.

Native Hawaiian or Other Pacific Islander -- a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

APPENDICES

In addition, low income persons are defined as follows:

Low-Income -- a person whose household income (or in the case of a community or group, whose median household income) is at or below the U.S. Department of Health and Human Services poverty guidelines.

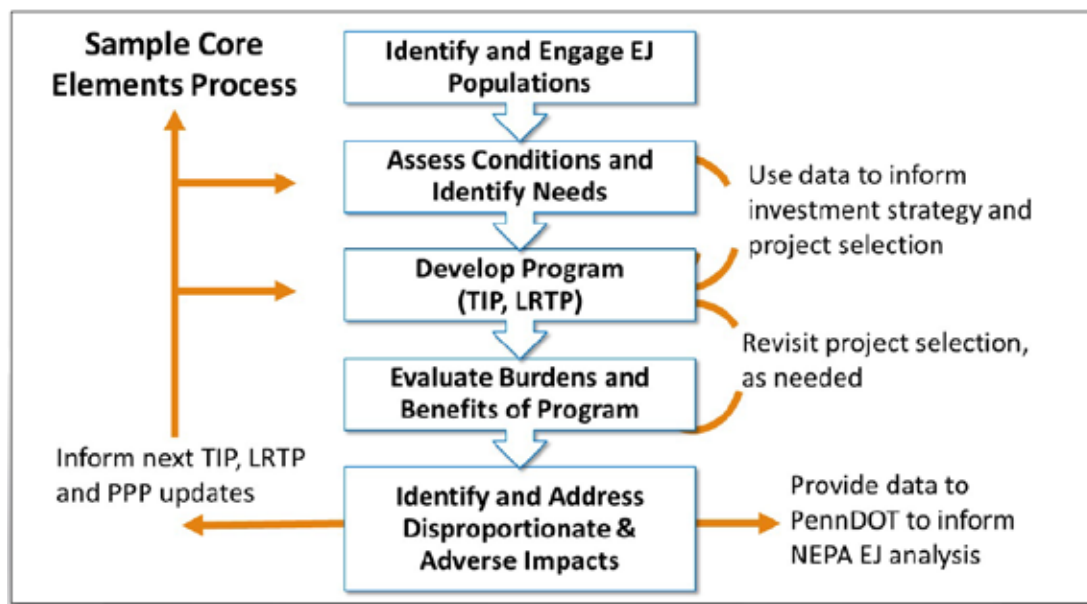
EO 12898, and the DOT and FHWA Orders on Environmental Justice (EJ) address persons belonging to any of these groups, and these groups as they apply to Lancaster County are the basis for this analysis.

Core Elements Process

In the development of 2021-2024 Transportation Improvement Program (TIP), the Lancaster County MPO conducted an Environmental Justice Benefits and Burdens analysis using the Core Elements Methodology that has been recommended by FHWA and FTA:

1. Identify Environmental Justice populations
2. Assess conditions and identify needs
3. Evaluate burdens and benefits
4. Identify and address disproportionate and adverse impacts and inform future planning efforts

Core Elements Process Steps



The identification of these populations is essential to establishing effective strategies for engaging them in the transportation planning process. When meaningful opportunities for interaction are established, the transportation planning process can effectively draw upon the perspectives of communities to identify existing transportation needs, localized deficiencies, and the demand for transportation services. Mapping of these populations not only provides a baseline for assessing impacts of the transportation improvement program, but also aids in the development of an effective public involvement program.

Fundamentally, the principles of Environmental Justice are aimed at preventing the denial of, reduction in or significant delay in the receipt of benefits by minority and low-income populations. The establishment of transportation funding as a performance measure is consistent with this principle by supporting the evaluation of funding priorities considered for *connects2040*, including the four-year TIP. Mapping and analyzing transportation funding can assist in making the prioritization process more open, transparent, and accountable to the public. In developing this funding performance measure, the core issue is whether the types of projects and the total project investment are equitably distributed throughout Lancaster County.

APPENDICES

Identifying Minority and Low-Income Populations

A statistical analysis of Lancaster County was performed to determine thresholds of population, minority population, and low-income population. If necessary, project alternatives will be developed to prevent disproportionately high or adverse effects on any identified minority or low-income populations.

Minority population is defined as any readily identifiable group of Black, Hispanic, Asian American, American Indian, and Alaskan Native who live in geographic proximity and who would be similarly affected by any proposed FHWA program, policy, or activity. Based on 2017 American Community Survey (ACS) Data, the average minority population rate in Lancaster County is 17.3 percent as shown in **Table 1**.

The low-income population is defined as any readily identifiable group of persons at or below the Department of Health and Human Services poverty guidelines who live in a geographic proximity who would be similarly affected by a proposed FHWA program, policy, or activity. The average poverty rate based on the status of all ages in the 2017 ACS Data for Lancaster County is 10.4 percent.

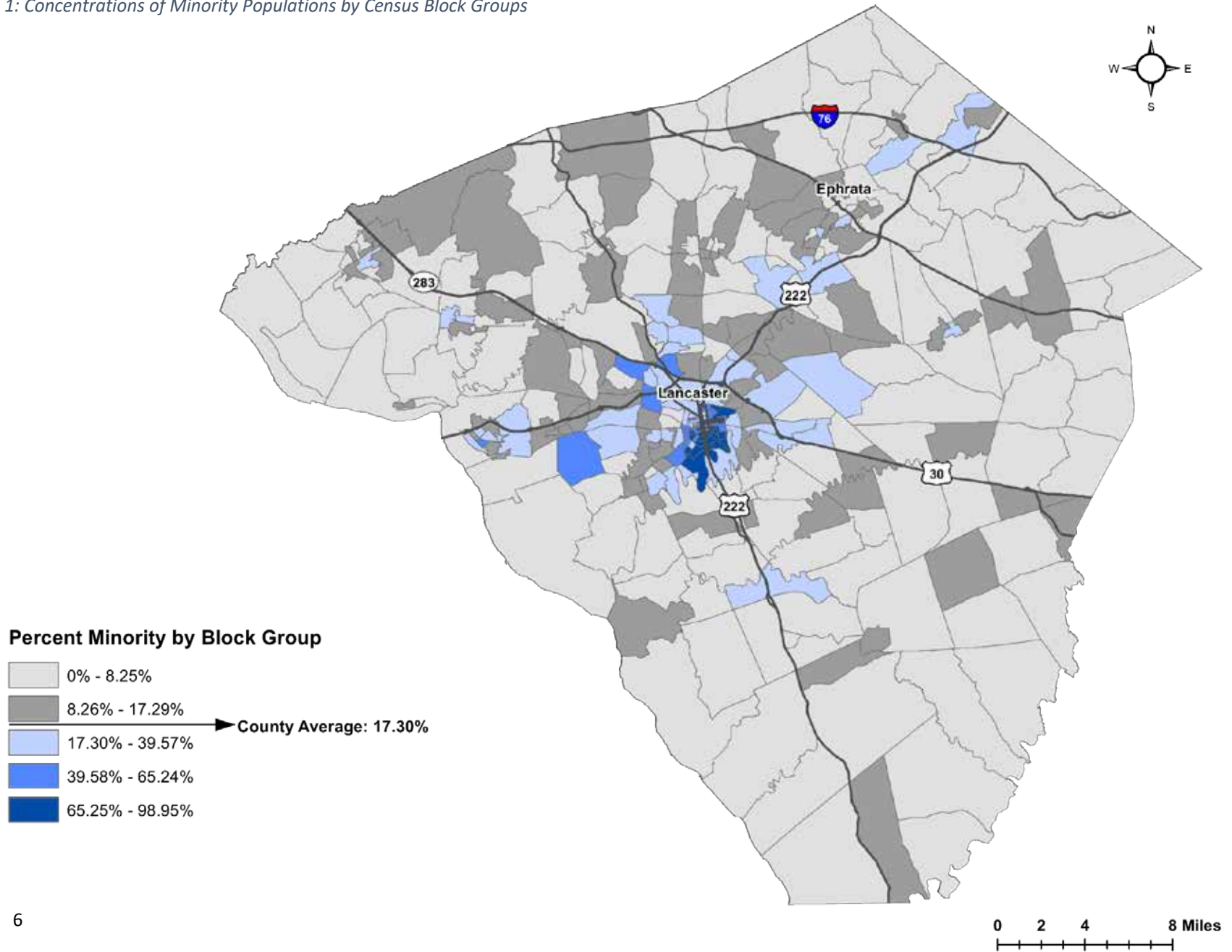
Table 1: Profile of Minority and Low-Income Populations, 2017

Demographic Indicator	Lancaster County, Pennsylvania	
	County Population	County Percentage
Total	536,494	
White, Non-Hispanic	443,708	82.71%
Minority	92,786	17.29%
Black or African American, Non-Hispanic	19,261	3.59%
American Indian and Alaska Native, Non-Hispanic	520	0.10%
Asian alone, Non-Hispanic	11,423	2.13%
Native Hawaiian and Other Pacific Islander, Non-Hispanic	29	0.01%
Some other race, Non-Hispanic	448	0.08%
Two or more races, Non-Hispanic	7,313	1.36%
Hispanic	53,792	10.03%
Low-Income Households	19,116	9.74%
Low-Income Population	54,244	10.37%
Other Potentially Disadvantaged Populations		
Limited English Proficiency (LEP)	30,640	6.12%
Persons with a Disability	62,231	11.74%
Female Head of Household with Child	10,488	5.28%
Elderly (65 years or older)	89,833	16.74%
Carless Households	19,064	9.60%

The maps on the following pages depict the locations of Environmental Justice populations and households in Lancaster County. **Figure 1** shows the concentrations of minority populations by census block groups based on 2013-2017 ACS data. **Figure 2** shows the concentrations of households below the poverty threshold by census block groups., also based on 2013-2017 ACS data. **Figure 3** shows concentrations of minority populations by the density of those populations throughout the County. **Figure 4** shows the concentrations of low-income populations by the density of those populations throughout the County.

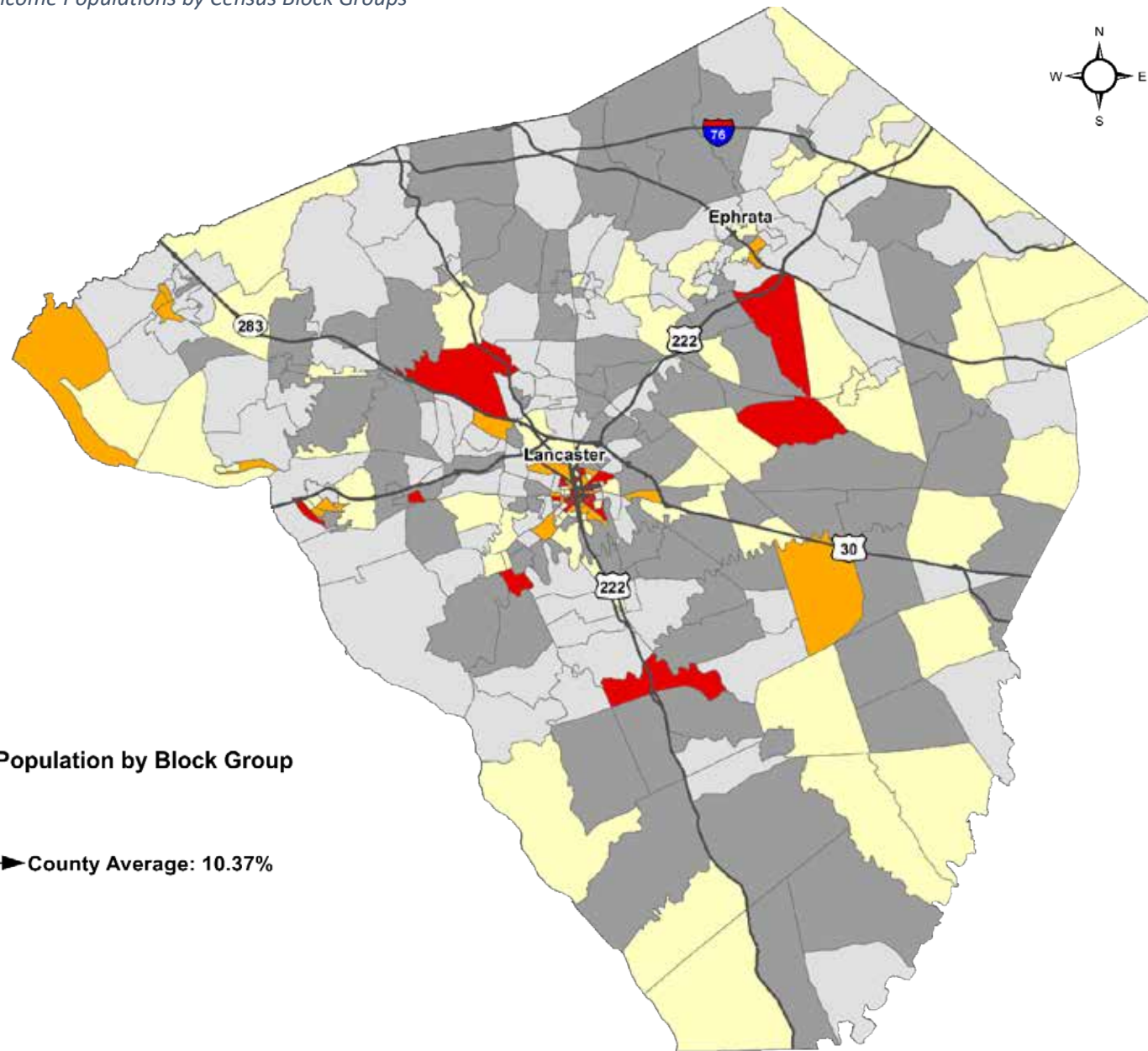
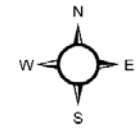
APPENDICES

Figure 1: Concentrations of Minority Populations by Census Block Groups



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

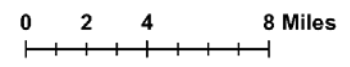
Figure 2: Concentrations of Low-Income Populations by Census Block Groups



Percent Low-Income Population by Block Group

- 0% - 4.62%
- 4.63% - 10.36%
- 10.37% - 19.09%
- 19.1% - 32.02%
- 32.03% - 66.72%

→ **County Average: 10.37%**



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

Figure 3: Concentrations of Minority Populations by Population Density

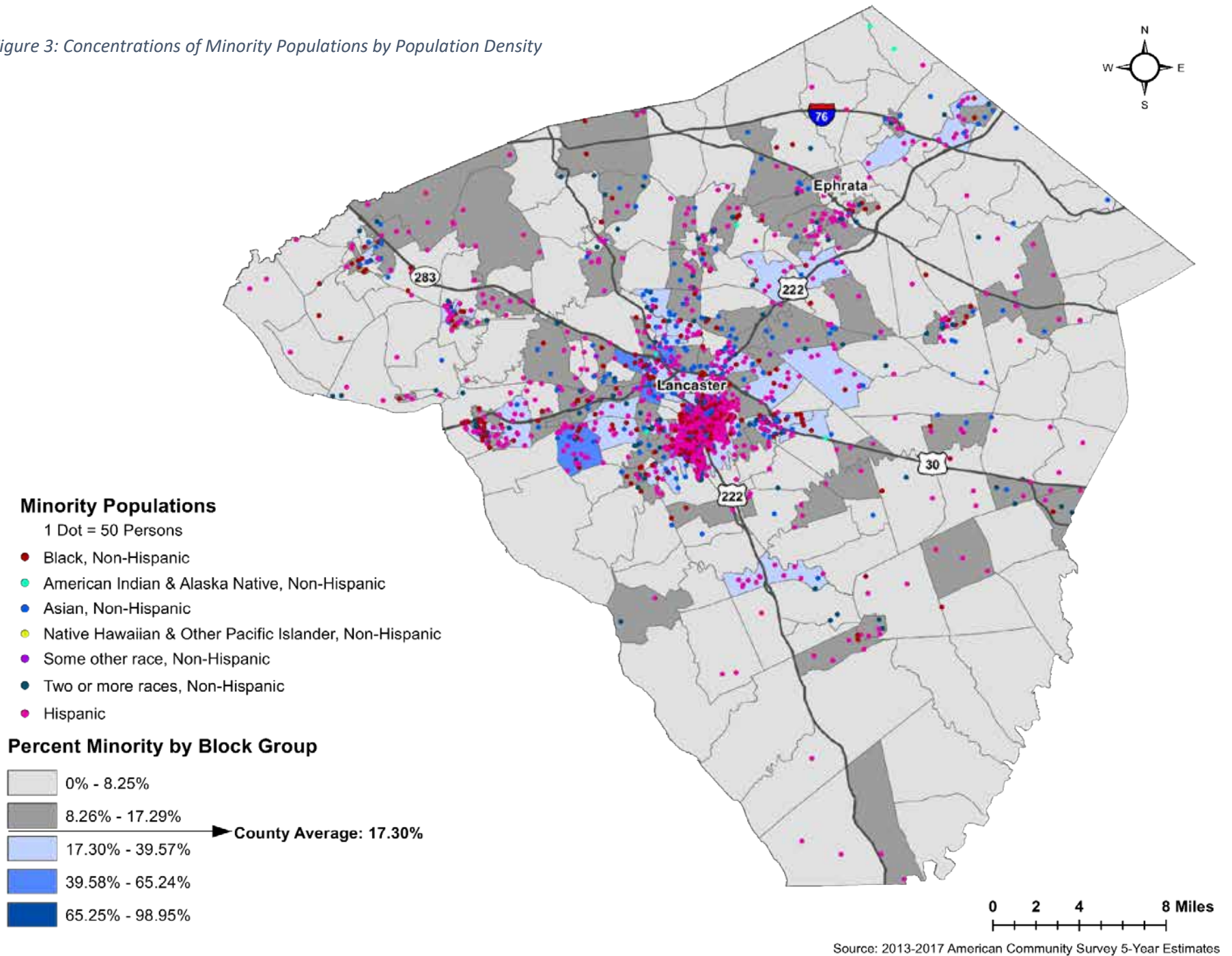
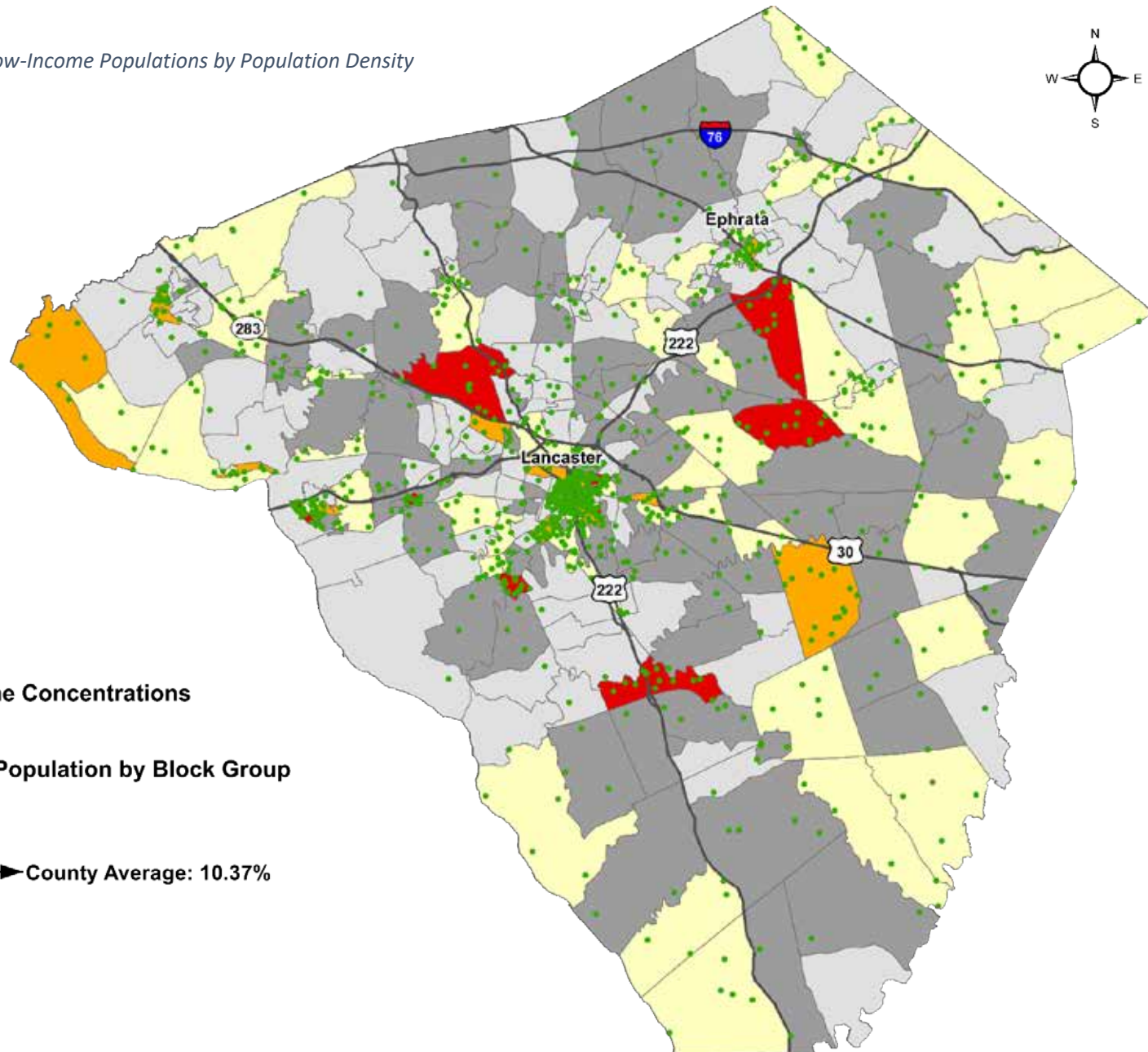
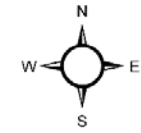


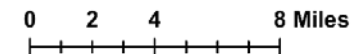
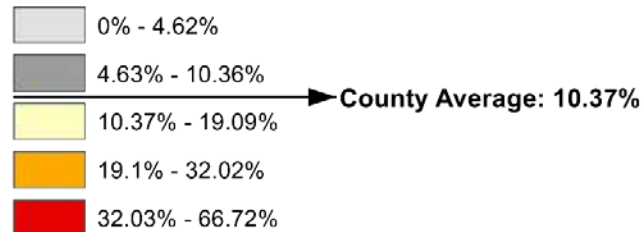
Figure 4: Concentrations of Low-Income Populations by Population Density



Persons in Low-Income Concentrations

• 1 Dot = 50 Persons

Percent Low-Income Population by Block Group



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

APPENDICES

2021-2024 Transportation Improvement Program

As part of the 2021-2024 Transportation Improvement Program (TIP), Lancaster County MPO reviewed transportation projects located in areas that were determined to be “high minority” or “high low-income.” “High minority” refers to census block groups that have a concentration of minority persons that is greater than or equal to the Lancaster County regional average of 17.3 percent. “High low-income” refers to census block groups that have a concentration of low-income persons that is greater than or equal to the Lancaster County regional average of 10.37 percent.

The 2021-2024 TIP was analyzed to determine whether the distribution of transportation spending throughout the County was having disproportionately high or adverse impacts on locations with significant concentrations of minority or low-income populations. Projects from the 2021-2024 TIP for Lancaster County MPO have a total value of **\$218,386,215**.

Table 2: TIP Projects and Costs by Project Type

Project Type	# of Projects	% Projects	Cost	% Cost
Bike/Ped	4	5%	\$4,697,200	2.2%
Bridge	41	55%	\$65,763,984	30.1%
Congestion Reduction	12	15%	\$95,803,351	43.9%
Railroad Crossing	1	1%	\$1,500,000	0.7%
Reserve Line Item	8	11%	\$15,020,426	6.9%
Roadway Reconstruction/Resurfacing	2	3%	\$3,380,000	1.5%
Safety Projects	5	7%	\$28,521,254	13.1%
Traffic Signals/Intersection Improvements	1	1%	\$3,200,000	1.5%
Traffic System Management/ITS	1	1%	\$500,000	0.2%
Total	75	100%	\$218,386,215	100%

This TIP is weighted heavily by the Statewide Investment Plan toward spending on bridge improvements and construction, consistent with the current statewide priority to address poor condition bridges. Bridges located in minority and low-income population areas targeted for improvement will likely be a benefit or burden dependent upon the use of the bridge, access to major roadways, bicycle and pedestrian access, and other important factors of consideration. Project priorities in future TIP cycles may change once the problems with poor condition bridges are addressed.

The TIP also shows significant investment in congestion reduction. These projects include interchange improvements, roadway widening/adding of capacity, and roadway extensions. Within this project category, the County continues to support the Commuter Services ridesharing program, which will allow for more efficient movement of all resident workers within Lancaster County. Most of these projects are taking place on the county's major arterials. Improvement projects located within minority and low-income population areas could pose benefit by increasing the efficiency of traffic movement from these areas but could experience burdens due to the extent of construction impacts.

The below table summarizes the dollar value of projects according to project type and geographic proximity to high minority and low-income populations. Projects affecting several population concentrations (i.e. one high minority, one high in low-income population) had costs split amongst those concentrations.

There was a total investment of \$53.6 million (26.5 percent of the TIP) in high minority, \$22.1 million (11 percent of the TIP) in high low-income areas, and \$66.3 million (33 percent of the TIP) in both high minority and high low-income areas.

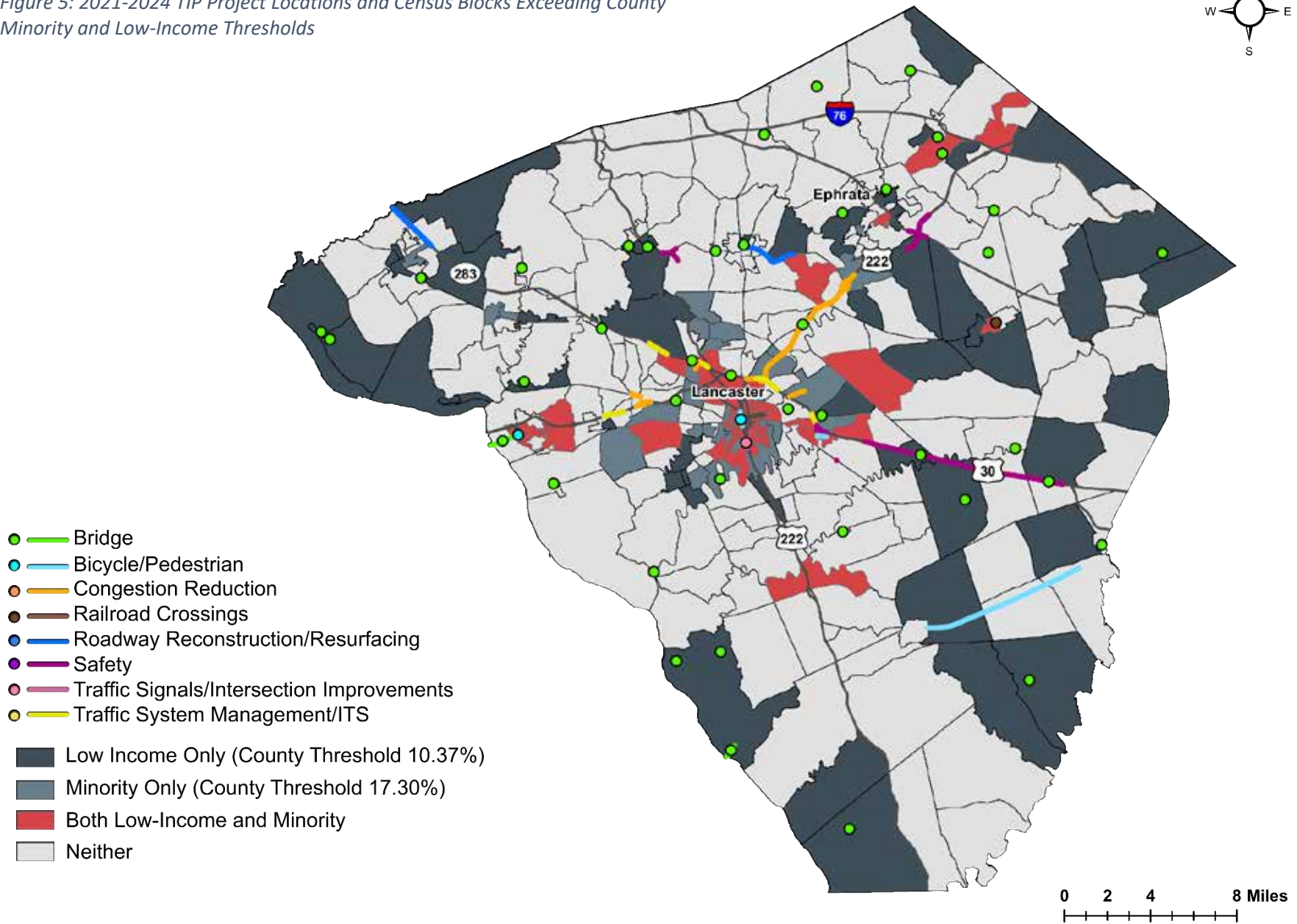
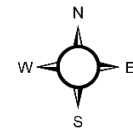
Table 3: Dollar Value of TIP Projects by Type in High Minority and Low-Income Populations

Project Category	Minority Only	Low-Income Only	Both Minority and Low-income	Neither Minority nor Low-income	Lancaster County MPO Total
BRIDGE	\$823,401	\$10,736,833	\$7,230,340	\$46,973,410	\$65,763,984
	2.4%	39.1%	7.3%	51.2%	
BICYCLE/PEDESTRIAN		\$1,033,550	\$3,063,650	\$600,000	\$4,697,200
		22.1%	65.2%	12.7%	
CONGESTION REDUCTION	\$52,783,543	\$404,000	\$31,470,645	\$9,737,075	\$94,395,263¹
	55.9%	0.5%	33.3%	10.3%	
RAILROAD CROSSINGS				\$1,500,000	\$1,500,000
				100%	
HIGHWAY (RECONSTRUCTION/RESURFACING)		\$1,690,000	\$1,690,000		\$3,380,000
		50%	50%		
SAFETY	\$7,974,975	\$4,951,151	\$8,886,975	\$6,701,151	\$28,521,254
	28%	17.4%	31.2%	23.4%	
TRAFFIC SIGNALS/INTERSECTION IMPROVEMENTS			\$3,200,000		\$3,200,000
			100%		
TRAFFIC SYSTEM MANAGEMENT/ITS	\$125,000	\$125,000	\$125,000	\$125,000	\$500,000
	25%	25%	25%	25%	
TOTAL PROJECTIONS	\$53,606,944	\$22,069,136	\$66,314,136	\$59,967,485	\$201,957,701²
	26.5%	10.9%	32.8%	29.7%	100%

¹ Does not include Commuter Services Rideshare Program, totaling \$1,408,888

² Does not include County Reserve Line Items totaling \$15,020,426 or Commuter Services Rideshare Program, totaling \$1,408,088. Total TIP cost is \$218,386,215.

Figure 5: 2021-2024 TIP Project Locations and Census Blocks Exceeding County Minority and Low-Income Thresholds



Source: 2013-2017 American Community Survey 5-Year Estimates
Lancaster County GIS

APPENDICES

Condition Assessment

In order to analyze benefits and adverse effects, the MPO examined existing conditions of transportation assets throughout the county and safety performance relative to the minority and low-income populations. The use of these tables going forward allow the MPO to track performance relative to the number of non-motorized crashes, poor condition bridges, and mileage of poor condition pavement in the county, and identify performance disparities between minority and low-income populations and populations that are not minority or low-income.

Lancaster County currently has 145 bridges in poor condition. Of those bridges, 18, or 12%, are located within High Minority block groups and 54, or 37%, are within High Low-Income block groups.

Table 4: Distribution of Poor Condition Bridges by Minority Population Intervals

<i>Population/Asset</i>	Percent Minority Population Intervals					<i>Total</i>
	0% -8.25%	8.26% -17.29%	17.3% -39.57%	39.58% -65.24%	65.25% -98.95%	
Poor Condition Bridge Count	96	31	16	1	1	145
Percentage	66.2%	21.4%	11.0%	0.7%	0.7%	100%
Total Population	232,838	151,225	85,465	38,145	28,821	536,494
Total Population (in %)	43.4%	28.2%	15.9%	7.1%	5.4%	100%
Minority Population	8,882	19,134	22,560	19,736	22,474	92,786
Minority Population (in %)	9.6%	20.6%	24.3%	21.3%	24.2%	17%

Source: 2013-2017 ACS, PennDOT

Table 5: Distribution of Poor Condition Bridges by Low-Income Population Intervals

<i>Population/Asset</i>	Percent Low-Income Population Intervals					<i>Total</i>
	0% -4.62%	4.63% -10.36%	10.37% -19.09%	19.1% -32.02%	32.03% -66.72%	
Poor Condition Bridge Count	36	55	37	9	8	145
Percentage	24.8%	37.9%	25.5%	6.2%	5.5%	100%
Total Population	176,063	179,392	116,117	33,832	31,090	536,494
Total Population (in %)	32.8%	33.4%	21.6%	6.3%	5.8%	100%
Low-Income Population	17,293	11,385	9,306	8,127	8,133	54,244
Low-Income Population (in %)	31.9%	21.0%	17.2%	15.0%	15.0%	10%

Source: 2013-2017 ACS, PennDOT

The pavement condition charts below indicate 16.3% of poor pavement mileage in Lancaster County is located in High Minority block groups and 46.7% is located in High Low-Income block groups.

Table 6: Distribution of Poor Pavement Mileage by Minority Population Intervals

Population/Asset	Percent Minority Population Intervals					Total
	0% -8.25%	8.26% -17.29%	17.3% -39.57%	39.58% -65.24%	65.25% -98.95%	
Poor Pavement Mileage	52.72	20.46	8.32	2.61	3.27	87.38
Percentage	60.3%	23.4%	9.5%	3.0%	3.7%	100%
Total Population	232,838	151,225	85,465	38,145	28,821	536,494
Total Population (in %)	43.4%	28.2%	15.9%	7.1%	5.4%	100%
Minority Population	8,882	19,134	22,560	19,736	22,474	92,786
Minority Population (in %)	9.6%	20.6%	24.3%	21.3%	24.2%	17%

Source: 2013-2017 ACS, PennDOT

Table 7: Distribution of Poor Pavement Mileage by Low-Income Population Intervals

Population/Asset	Percent Low-Income Population Intervals					Total
	0% -4.62%	4.63% -10.36%	10.37% -19.09%	19.1% -32.02%	32.03% -66.72%	
Poor Pavement Mileage	21.35	25.15	27.52	10.30	3.06	87.38
Percentage	24.4%	28.8%	31.5%	11.8%	3.5%	100%
Total Population	176,063	179,392	116,117	33,832	31,090	536,494
Total Population (in %)	32.8%	33.4%	21.6%	6.3%	5.8%	100%
Low-Income Population	17,293	11,385	9,306	8,127	8,133	54,244
Low-Income Population (in %)	31.9%	21.0%	17.2%	15.0%	15.0%	10%

Source: 2013-2017 ACS, PennDOT

APPENDICES

Higher percentages of bicycle and pedestrian crashes in the county take place within block groups of larger populations. 57.1% of crashes occur in High Minority block groups while 57.7% of crashes occur in High Low-Income block groups. The distribution of these crashes is shown in the tables below.

Table 8: Distribution of Bicyclist and Pedestrian Related Crashes by Minority Population Intervals

<i>Population/Asset</i>	Percent Minority Population Intervals					<i>Total</i>
	0% -8.25%	8.26% -17.29%	17.3% -39.57%	39.58% -65.24%	65.25% -98.95%	
Bike-Pedestrian Crash Count	247	168	240	160	152	967
Percentage	25.5%	17.4%	24.8%	16.5%	15.7%	100%
Total Population	232,838	151,225	85,465	38,145	28,821	536,494
Total Population (in %)	43.4%	28.2%	15.9%	7.1%	5.4%	100%
Minority Population	8,882	19,134	22,560	19,736	22,474	92,786
Minority Population (in %)	9.6%	20.6%	24.3%	21.3%	24.2%	17%

Source: 2013-2017 ACS, PennDOT

Table 9: Distribution of Bicyclist and Pedestrian Related Crashes by Low Income Population Intervals

<i>Population/Asset</i>	Percent Low-Income Population Intervals					<i>Total</i>
	0% -4.62%	4.63% -10.36%	10.37% -19.09%	19.1% -32.02%	32.03% -66.72%	
Bike-Pedestrian Crash Count	178	232	230	138	189	967
Percentage	18.4%	24.0%	23.8%	14.3%	19.5%	100%
Total Population	176,063	179,392	116,117	33,832	31,090	536,494
Total Population (in %)	32.8%	33.4%	21.6%	6.3%	5.8%	100%
Low-Income Population	17,293	11,385	9,306	8,127	8,133	54,244
Low-Income Population (in %)	31.9%	21.0%	17.2%	15.0%	15.0%	10%

Source: 2013-2017 ACS, PennDOT

Evaluation of environmental justice benefits and burdens in the MPO's regional transportation planning is an evolving process. Anticipated changes to funding requirements, performance-based planning and programming requirements, and regional needs will continue to be incorporated in the environmental justice analysis. Success in improving the impact of the environmental justice benefits and burdens analysis on transportation decision-making will also depend on the continued outreach to minority and low-income communities and improving their access to information on transportation benefits and burdens.

In summary, the TIP is not expected to create any disproportionately high or adverse effects on Lancaster County's EJ populations. Over 70% of the TIP budget is being invested in communities that have significant low income or minority populations. The planned projects are expected to benefit communities through improved safety, reduced congestion and bridges in better condition. Communities may experience some burdens during the construction process, but no lasting disruptions or adverse effects are expected from the 2021 TIP.

Appendix E: System Performance Reports

Transportation Performance Management

The Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act established new requirements for performance management to promote the most efficient investment of Federal transportation funds. Performance-based planning ensures that the Pennsylvania Department of Transportation (PennDOT), Metropolitan Planning Organizations (MPOs) and Rural Planning Organizations (RPOs) collectively invest Federal transportation funds efficiently towards achieving national goals.

Transportation Performance Management (TPM) is a strategic approach that uses data to make investment and policy decisions to achieve national performance goals. [23 CFR 490](#) outlines the national performance goal areas for the Federal-aid program and requires the Federal Highway Administration (FHWA) to establish specific performance measures for the system that address these national goal areas.

Performance Based Planning and Programming

Pennsylvania continues to follow a Performance Based Planning and Programming (PBPP) process, with a focus on collaboration between PennDOT, FHWA, and MPOs/RPOs at the county and regional levels. These activities are carried out as part of a cooperative, continuing, and comprehensive (3C) planning process that guides the development of PBPP documents that include:

- Lancaster's Metropolitan Transportation Plan, Congestion Management Process, and Transportation Improvement Program (TIP) for both highways and transit;
- South Central Transit Authority's Transit Asset Management Plan; and
- PennDOT's Regional Operations Plan for the Eastern Regional Traffic Management Center.

The above documents in combination with data resources including PennDOT's bridge and pavement management systems, crash databases, historical travel time archives, and the Congestion Mitigation and Air Quality Improvement Program (CMAQ) public access system provide the resources to monitor federal performance measures and evaluate needs across the state. Based on these resources, PennDOT and MPOs/RPOs have worked together to set performance measure targets that guide state and regional investment decisions. Aligning goals and performance objectives among FHWA, PennDOT and MPOs/RPOs provides a common framework for decision-making.

The Lancaster MPO cooperates with PennDOT in developing and sharing information on the key elements of the PBPP process, including the selection and reporting of performance targets.

Evaluating Performance Management

PM-1: Safety Performance Measures

The Lancaster MPO agreed to support the state PM-1 targets established by PennDOT through formal action taken on February 24, 2020, as they have done annually since 2018. The baseline values and targets for PM-1 are shown below:

Statewide Targets

Performance Measure	5-year Rolling Averages		
	TARGET 2016-2020	ACTUAL 2016-2020	BASELINE 2014-2018
Number of Fatalities	1,171.9		1182.0
Fatality Rate	1.148		1.169
Number of Serious Injuries	4,400.3		3839.6
Serious Injury Rate	4.309		3.797
Number of Non-motorized Fatalities and Serious Injuries	781.7		679

* Future VMT estimated to be 0.5% higher per year starting in 2019

Lancaster MPO Supporting Values

Performance Measure	5-year Rolling Averages		
	TARGET	ACTUAL	BASELINE
	2016-2020	2016-2020	2014-2018
Number of Fatalities	44.2		48.4
Fatality Rate	0.985		1.100
Number of Serious Injuries	243.2		193.6
Serious Injury Rate	5.422		4.399
Number of Non-motorized Fatalities and Serious Injuries	45.3		39.4

* Future VMT estimated to be 0.5% higher per year starting in 2019

Lancaster MPO Fatality Numbers

Actual Fatality Numbers							1% Reduction from 2018	
2012	2013	2014	2015	2016	2017	2018	2019	2020
47	45	62	48	44	43	45	44.6	44.2

Baseline (5-year average, 2014 to 2018) = 48.4

Target (5-year average, 2016 to 2020) = 44.2

Preliminary data for 2018 indicates that, for Pennsylvania, the previous target of a 2% reduction in fatalities and severe injuries was not met. As a result, PennDOT will submit an implementation plan that identifies gaps, and develops strategies, action steps and best practices that PennDOT Central Office, PennDOT District 8-0 and the Lancaster MPO will use to improve safety performance. For 2020, the safety goal has been revised to target a 1% reduction in fatalities and serious injuries as a more realistic target based on prior history and the trends resulting from five-year rolling averages of safety data. PennDOT's plan must also include financial and performance reviews. In February 2020, the MPO voted to support PennDOT's new safety targets, as outlined above.

In developing the draft TIP, Lancaster MPO worked closely with PennDOT District 8-0 to strengthen efforts to program projects that would ensure progress toward meeting the

established safety targets. This is reflected in a four-step process to identify the candidate safety projects that would have the highest anticipated benefit to achieving the safety targets with specific emphasis on best use of limited financial resources and improving safety performance. The four steps involved:

- Use of PennDOT’s Network Screening Factors for corridors and intersections to identify high priority candidates for safety improvements;
- Matching the high priority candidates with locally identified transportation safety candidates;
- Developing preliminary design options and planning level cost estimates for addressing the identified safety issues; and
- Calculating the cost/benefit of the proposed projects to determine if they satisfied Highway Safety Improvement Program criteria for funding eligibility.

The highway safety projects identified in the Metropolitan Transportation Plan for the first four years of the Twelve-Year Program and the 2021-2024 TIP (2021 TIP) were selected on the basis that they satisfied the eligibility criteria. In the 2021 TIP, five projects totaling \$28,521,254 have been specifically identified as safety improvements. Details on these projects can be found in Appendix A under the Safety project type. In addition, at least one other major project, the McGovernville Road Interchange Improvements that provides significant safety benefits is included on the TIP but funded at \$682,000 for preliminary engineering with sources other than HSIP funds. HSIP funds may be used for construction.

PM-2: System Condition Measures

PennDOT has developed Pavement and Bridge Asset Management Systems through its Transportation Asset Management Plan. In brief, these systems are based on a ‘lowest practical life cycle cost’ approach to project programming. The goal of this approach is sustaining a desired ‘state of good repair’ over the life cycle of each asset. PennDOT has developed pavement and bridge asset management targets to meet Federal performance-based planning and programming requirements. Like with the safety targets, the MPO has not established its own targets but has agreed to program projects in support of PennDOT’s pavement and bridge asset management targets. As a result, pavement and bridge preservation projects on the draft 2021-2024 TIP have been cooperatively selected between PennDOT and the MPO as the projects that apply the recommended treatment needed at the right time to maintain the transportation system in a state of good repair. If needed, PennDOT will adjust the four-year pavement and bridge targets based on the midterm system performance report that is due from PennDOT to FHWA by October 1, 2020.

The most recent 2018 pavement and bridge performance reports address the system condition elements for Lancaster County that PennDOT is monitoring on the MPO's behalf to document progress in achieving pavement and bridge performance targets. The reports are provided on the following pages in this section.

2018 Performance Measures Annual Report -- Pavements

Lancaster

Current MAP-21 Pavement Performance by Business Plan Network (Based on Total PA Miles)

Business Plan Network	MAP-21 Pavement Performance Measure										Missing (Max 5%)	
	Good				Fair		Poor				Miles	%
	Miles	%	2020 Target	2022 Target	Miles	%	Miles	%	2020 Target	2022 Target		
Interstate	-	-	-	-	-	-	-	-	-	-	-	-
NHS, Non-Interstate	117.3	57.83%	50%	36%	84.1	41.48%	1.4	0.69%	3%	3%	4.9	2.37%

- MAP-21 pavement performance measures required for FHWA reporting include four distress components which translate to good, fair, or poor condition scores. See table on reverse of this page for distresses and thresholds. Three conditions apply to each pavement type. A pavement segment is considered in good condition if all three distress components are rated as good. A pavement segment is considered in poor condition if two or more of its three distress components are rated as poor.
- FHWA requires that no more than 5 percent of a state's NHS Interstate lane-miles be in poor condition. Additionally, state DOTs are required to establish targets.
- FHWA has not established a minimum condition for NHS non-Interstate roadways, but requires the state DOT to establish targets.
- FHWA requires that no more than 5 percent of a state's mileage be unreported or missing.
- Conditions are assessed and analyzed for pavement "sections" that cannot exceed 0.10 miles in length, which differs from PennDOT's historic segment level data.
- MAP-21 performance measures apply to all Interstate and NHS Non-Interstate miles in PA, regardless of ownership. Therefore, PA Turnpike and local-owned miles are in Statewide totals, but not in each District's totals. Local-owned miles are included in MPO/RPO totals as appropriate.
- MAP-21 rulemaking requires that states develop and implement a risk-based asset management plan to achieve and sustain a state of good repair over the life cycle of transportation assets and to improve or preserve the condition of the NHS. Asset Management encompasses two related means of doing so: making infrastructure last as long as reasonably possible, and keeping up on preservation activities to minimize costlier major repairs. Together, these practices extend the life of assets and reduce the cost of maintaining them in the desired state of good repair. This is known as operating the network at the lowest life-cycle cost (LLCC).
- MAP-21 performance measures are not to drive planning and programming, but rather be an indication of performance achieved by states operating at the LLCC.

Current Pavement Smoothness (IRI) Summary by Business Plan Network (Based on PennDOT Miles)

Business Plan Network	Excellent		Good		Fair		Poor		Median IRI	Tested Seg-Mi
	Seg-Mi	%	Seg-Mi	%	Seg-Mi	%	Seg-Mi	%		
Interstate	-	-	-	-	-	-	-	-	-	0.0
NHS, Non-Interstate	87.9	41.71%	95.5	45.35%	18.4	8.74%	8.9	4.20%	80	210.7
Non-NHS, ≥ 2000 ADT	179.8	32.48%	271.3	49.02%	78.1	14.10%	24.4	4.40%	115	553.5
Non-NHS, < 2000 ADT	68.8	20.03%	137.6	40.07%	84.8	24.68%	52.3	15.22%	153	343.5
Total - Roadway	336.5	30.38%	504.5	45.55%	181.2	16.36%	85.5	7.72%	119	1,107.7

Current Overall Pavement Index (OPI) Summary by Business Plan Network (Based on PennDOT Miles)

Business Plan Network	Excellent		Good		Fair		Poor		Median OPI
	Seg-Mi	%	Seg-Mi	%	Seg-Mi	%	Seg-Mi	%	
Interstate	-	-	-	-	-	-	-	-	-
NHS, Non-Interstate	43.2	20.81%	152.5	73.37%	9.1	4.36%	3.0	1.45%	92
Non-NHS, ≥ 2000 ADT	207.0	37.61%	248.1	45.09%	92.5	16.80%	2.7	0.49%	88
Non-NHS, < 2000 ADT	156.9	45.71%	176.4	51.40%	8.3	2.42%	1.6	0.47%	85
Total - Roadway	407.1	36.96%	577.0	52.39%	109.8	9.97%	7.4	0.67%	88

Total Miles

PennDOT Seg-Mi	PA Miles
0.0	0.0
213.1	207.8
557.1	
345.0	
1,101.2	

- The IRI and OPI data presented herein is segment level.
- For the Interstate and NHS, Non-Interstate Business Plan Networks, the IRI and OPI data is for 2018. For the Non-NHS Business Plan Networks, the IRI and OPI data for recent year captured, either 2017 or 2018.
- PennDOT has historically classified Good Interstate IRI as ≤100, and Poor Interstate IRI as >150; for NHS Non-Interstate, Good is ≤120 and Poor is >170. This practice is maintained in the IRI data presented herein, but differs from the MAP-21 definitions defined in the table on the reverse of this page.

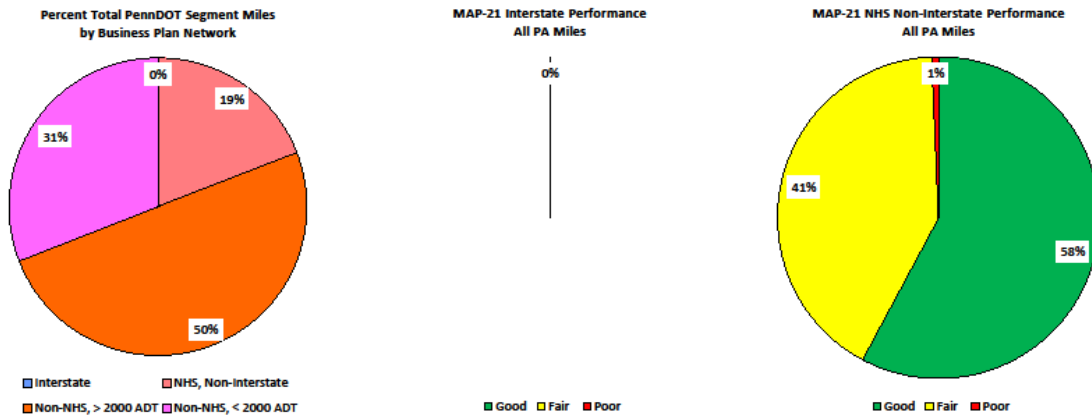
Current Out-Of-Cycle (OOC) Assessment by Business Plan Network (Based on PennDOT Miles)

Business Plan Network	High Level Bituminous		Low Level Bituminous				Concrete				Potentially Past DSL
	Seg-Mi	OOC Mi ¹	Seg-Mi	OOC Mi ²	OOC Mi ³	Total	Seg-Mi	OOC Mi ⁴	OOC Mi ⁵	Total	Seg-Mi
Interstate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHS, Non-Interstate	185.22	27.14	0.00	0.00	0.00	0.00	43.27	1.08	5.68	1.08	26.83
Non-NHS, ≥ 2000 ADT	544.10	219.02	2.87	2.04	0.00	2.04	7.65	1.13	3.09	1.13	
Non-NHS, < 2000 ADT	216.03	47.89	128.04	19.95	35.27	19.95	0.14	0.00	0.00	0.00	
Total - Roadway	945.35	294.05	130.91	22.00	35.27	22.00	51.07	2.21	8.77	2.21	

- Out-Of-Cycle Categories:
 - High Level Bituminous Pavement with Age > 12 Years or > 17 Years with Interim Surface Seal
 - Low Level Bituminous Surface with Age > 7 Years
 - Low Level Bituminous Pavement with Age > 20 Years or no Structural Layers
 - Concrete Pavements with Age > 30 Years
 - Concrete Pavements with Age > 20 Years and No Concrete Pavement Restoration (CPR)
- Total Low Level OOC represents the miles that are OOC for either Category 2 or 3. Segments that are OOC for both categories are not double counted. Total Concrete OOC represents the miles that are OOC for either Category 4 or 5. Segments that are OOC for both categories are not double counted.
- Pavement Potentially Past Design Service Life is defined a pavement structure age greater than 40 years, and OOC according to any of the categories. This indicates that, even though the surface is OOC, the pavement may be in need of more than resurfacing or CPR due to it's overall age.

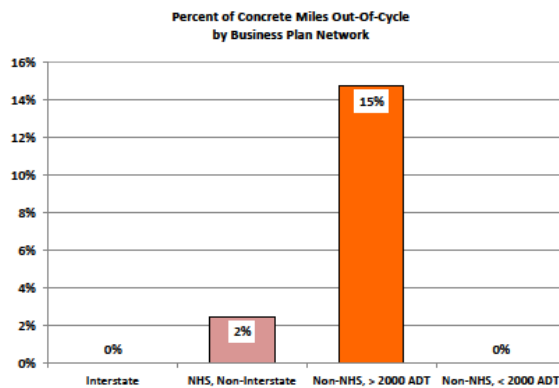
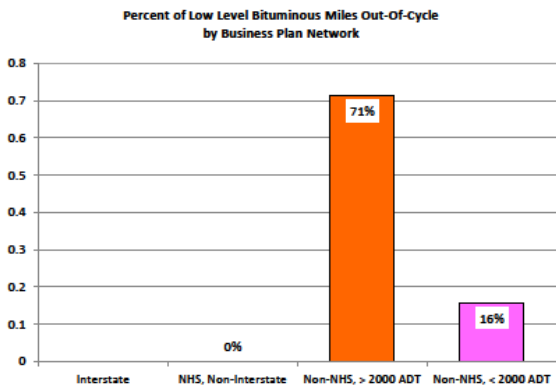
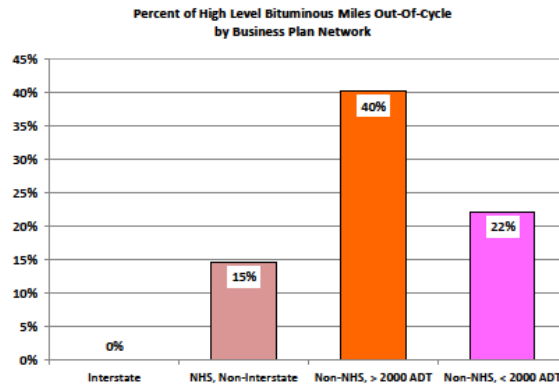
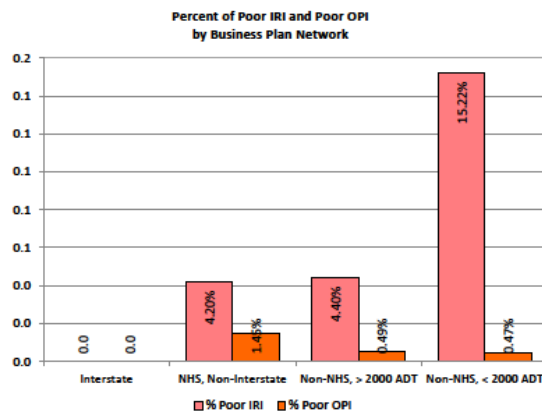
2018-MPO/RPO, 7/25/2019

The IRI miles and Total PennDOT miles include bridge lengths.
 The Total PA miles, used for MAP-21, do not include bridge lengths.
 The Treatment Network miles do not include bridge lengths.



MAP-21 Pavement Conditions and Thresholds

Rating	Good	Fair	Poor
IRI (inches/mile)	<95	95-170	>170
Cracking Percentage	<5	CRCP: 5-10 Jointed: 5-15	CRCP: >10 Jointed: >15
Rutting (inches)	<0.20	Asphalt: 5-20 0.20-0.40	Asphalt: >20 >0.40
Faulting (inches)	<0.10	0.10-0.15	>0.15



End of Calendar Year 2018 Performance Measures Annual Report – Bridges

Lancaster

MAP-21 Bridge Performance by Business Plan Network (Based on all NHS Bridge Owners Greater than or Equal to 20' in Length)

MAP-21 Bridge Performance Measure												
Business Plan Network	Good				Fair				Poor			
	Count	Count %	Deck Area (Msf)	Deck Area %	Count	Count %	Deck Area (Msf)	Deck Area %	Count	Count %	Deck Area (Msf)	Deck Area %
Interstate	4	19.05%	0.019	14.17%	17	80.95%	0.116	85.83%	0	0.00%	0.000	0.00%
NHS, Non-Interstate	25	24.27%	0.313	20.82%	74	71.84%	1.167	77.75%	4	3.88%	0.022	1.43%
Total NHS	29	23.39%	0.332	20.27%	91	73.39%	1.283	78.41%	4	3.23%	0.022	1.32%

Total NHS Deck Area Poor %	Map-21 Goal	End of Year 2018 Value	2019 Target	2021 Target
	10.00%	1.32%	2.00%	3.25%

Business Plan Network	Count	Deck Area (Msf)
Interstate	21	0.135
NHS, Non-Interstate	103	1.501
Total NHS	124	1.636

- MAP-21 bridge data is assessed and analyzed by National Bridge Inventory Standards (Bridges 20' and greater), which differs from PennDOT's 8' and greater reporting.
- MAP-21 performance measures apply to all Interstate and NHS Non-Interstate bridges in PA, regardless of ownership. Therefore, PA Turnpike and local-owned bridges are included in totals.

- MAP-21 bridge performance measures required for FHWA reporting include good, fair, or poor condition scores for each bridge. A bridge is considered to be in good condition if the minimum condition rating of the deck, superstructure, substructure, or culvert ratings is 9, 8, or 7, fair if the minimum condition rating is 6 or 5, and poor if the minimum condition rating is 4 or less.
- FHWA requires that no more than 10 percent of a state's total NHS Bridge Deck Area be in poor condition. Additionally, state DOTs are required to establish biennial targets for poor deck area.
- FHWA has not established a minimum condition for Interstate only bridges or NHS non-Interstate bridges, but requires the state DOT to establish targets.
- FHWA requires that no more than 5 percent of a state's bridge data be unreported or missing.
- MAP-21 rulemaking requires that states develop and implement a risk-based asset management plan to achieve and sustain a state of good repair over the life cycle of the asset to improve or preserve the condition of the NHS. Asset Management encompasses two related means of doing so: making infrastructure last as long as reasonably possible through keeping up on preservation activities to minimize costlier major repairs, and utilizing a structure for its entire service life. These practices allow the department to operate to lowest life cycle cost (LLCC) on the network level.
- MAP-21 performance measures are not to explicitly drive planning and programming, but rather be an indication of performance achieved by states operating at the LLCC.

End of Calendar Year 2018 Status of Bridges (Based on 8' and greater)

Business Plan Network	Total Bridge Count	Total Deck Area (Msf)	Aver. Bridge DA (sf)	Closed Bridges	Posted Bridges	Poor Count	% Poor by Count	Poor-Deck Area (Msf)	% Poor by Deck Area	Non-Poor Bridges with a "5" Condition Rating
State >8'; Interstate/Ramps	0	0.0000	0	0	0	0	0.00%	0.0000	0.00%	0
State >8'; NHS (non-Interstate)	139	1.5243	10,966	0	0	7	5.04%	0.0237	1.56%	48
State >8'; non-NHS > 2000 ADT	333	1.5246	4,578	0	4	33	9.91%	0.0795	5.22%	118
State >8'; non-NHS < 2000 ADT	251	0.5129	2,043	4	15	48	19.12%	0.0623	12.15%	71
Total - State Bridges (>8')	723	3.5617	4,926	4	19	88	12.17%	0.1655	4.65%	237
Local>20'	265	0.4681	1,767	6	58	60	22.64%	0.0880	18.79%	77

Reducing Rate of Deterioration through Investment (Non-Replacement) (Based on 8' and greater)

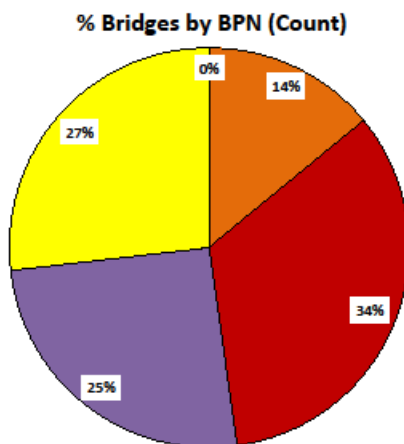
Business Plan Network	Annual New Poor Count (Poor "on")	Annual New Poor Count (Poor "off")	Annual New Poor DA (Poor "on")	Annual New Poor DA (Poor "off")	Preservation (million\$)	Preservation (#bridges)
State >8'; Interstate/Ramps	0	0	0.00%	0.00%	\$0.00	0
State >8'; NHS (non-Interstate)	0	1	0.00%	0.10%	\$2.34	4
State >8'; non-NHS > 2000 ADT	0	4	0.16%	0.42%	\$7.69	10
State >8'; non-NHS < 2000 ADT	4	9	0.47%	2.81%	\$0.72	5
Total - State Bridges (>8')	4	14	0.14%	0.63%	\$10.74	19
Local>20'	2	7	0.33%	2.84%	\$0.00	0

MAP-21 Bridge Performance (Based on all NHS Bridge Owners Greater than or Equal to 20' in Length)

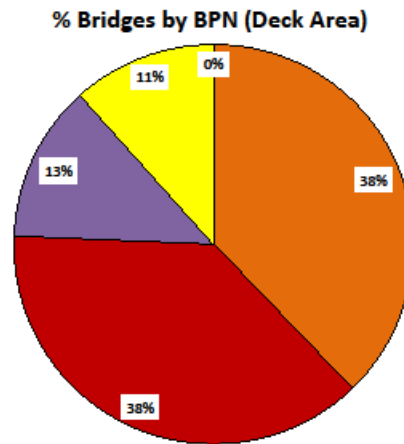


End of Calendar Year 2018 Status of Bridges in Region (Based on 8' and greater)

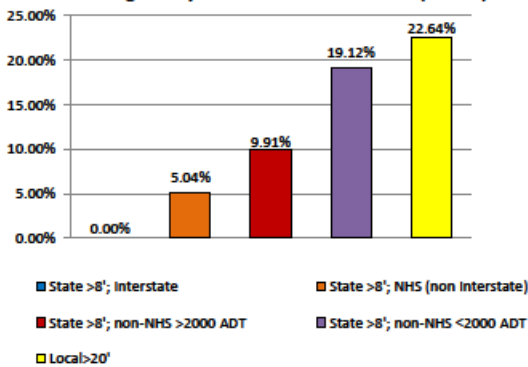
PennDOT Data 8' and Greater By Business Plan Network



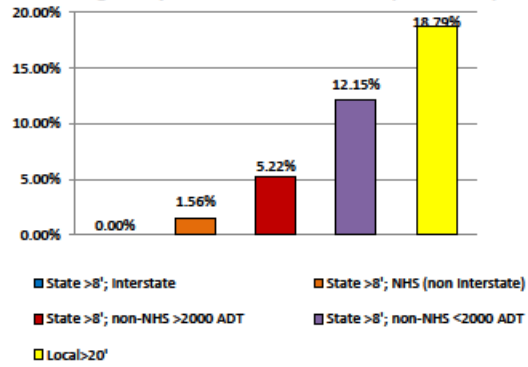
PennDOT Data 8' and Greater By Business Plan Network



Poor Bridge % by Business Plan Network (Count)



Poor Bridge % by Business Plan Network (Deck Area)



Based on a general categorization of projects, the 2021-2024 TIP allocates approximately \$31 million of discretionary STP/STU funding for projects directed at maintaining the highway and bridge system in a state of good repair. This represents 14.2% of the total amount of \$218.4 million programmed on the TIP for all projects. These improvements represent 30 of 75 total improvements on the TIP or 40%. Details on these projects can be found in Appendix A under the Bridge and Roadway Construction and Resurfacing project types.

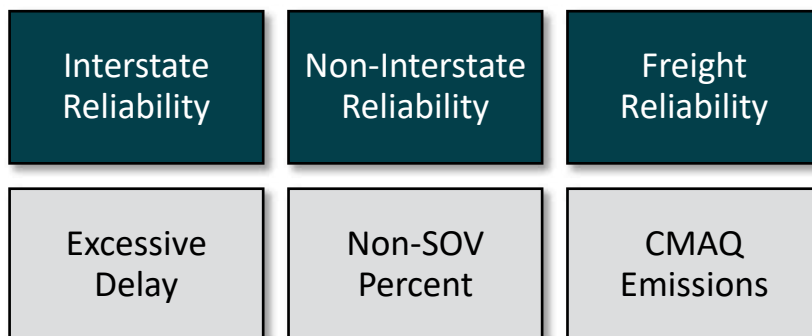
Maintenance of the existing system is identified among the top three priorities in the MTP following safety and reliable travel. The MPO fully expects that the level of funding and the number of improvements identified will contribute to achieving the pavement and bridge condition targets established by PennDOT and supported by the MPO. This expectation is reinforced by the cooperative effort between PennDOT District 8-0 and the MPO in selecting the pavement and bridge projects that provide the necessary treatment at the required time and at the most practicable cost as identified by the District's asset management system.

PM-3: System Performance Measures

The Federal Highway Administration (FHWA) has established a set of performance measures for State Departments of Transportation (State DOTs) and MPOs to use as required by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act.

Specific measures are required to assess the performance of the Interstate and non-Interstate National Highway System (NHS); freight movement on the Interstate System; and traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program as highlighted in Exhibit 1. These system performance measures are collectively referred to as the "PM-3 measures". They include measures of traffic reliability, excessive traffic delay, the number of persons not commuting in single-occupant vehicles (Non-SOV), and emission benefits of transportation projects funded through the CMAQ program. The delay, Non-SOV and CMAQ emissions measures are addressed within the *Lancaster County MPO's CMAQ Performance Plan*¹ and currently only apply to the very small MPO portion of the Philadelphia urbanized area.

¹ <https://lancastercountyplanning.org/AgendaCenter/ViewFile/Agenda/11262018-280> (See Item 8 Attachment)

Exhibit 1: PM-3 Federal Performance Measures

The concept of travel time reliability is an important component of the PM-3 measures. Reliability measures the consistency or dependability in travel times, as measured from day to day or across different times of day. For more information on traffic reliability measures, see FHWA's Travel Time Reliability brochure.²

PennDOT and the Lancaster MPO are currently tracking yearly average values for the federal PM-3 reliability performance measures. These measures include:

- Reliability Percentage (for Interstates and Non-Interstates) - Based on percent of person-miles traveled on the Interstate system or non-Interstate system that are reliable (using a measure referred to as the Level of Travel Time Reliability or LOTTR). The higher the percentage, the better the reliability. For example, 100% means that travel times are very reliable for nearly all times of the year.
- Truck Travel Time Reliability Index - The higher the index, the worse the reliability. For example, a value of 1.30 means truck travel times can be 30% higher than average times.

At this time, only statewide targets have been established for the travel time reliability measures by PennDOT. The Lancaster MPO must only assess and monitor their regional reliability measures and work towards supporting PennDOT's statewide goals.

The RITIS website platform has been established to evaluate the MPO's performance related to the federal PM-3 reliability measures. As illustrated in Exhibit 2, below, the 2017 and 2018 performance measures by month and year indicate a relatively stable trend. Values have remained better than the overall statewide targets.

The federal performance measures only apply to the County's National Highway System (NHS) roadways. The Lancaster NHS roads include:

- Interstate: I-76 (Turnpike)
- Non-Interstate: US 30, US 222, US 322, PA 283, PA 72 and PA 41

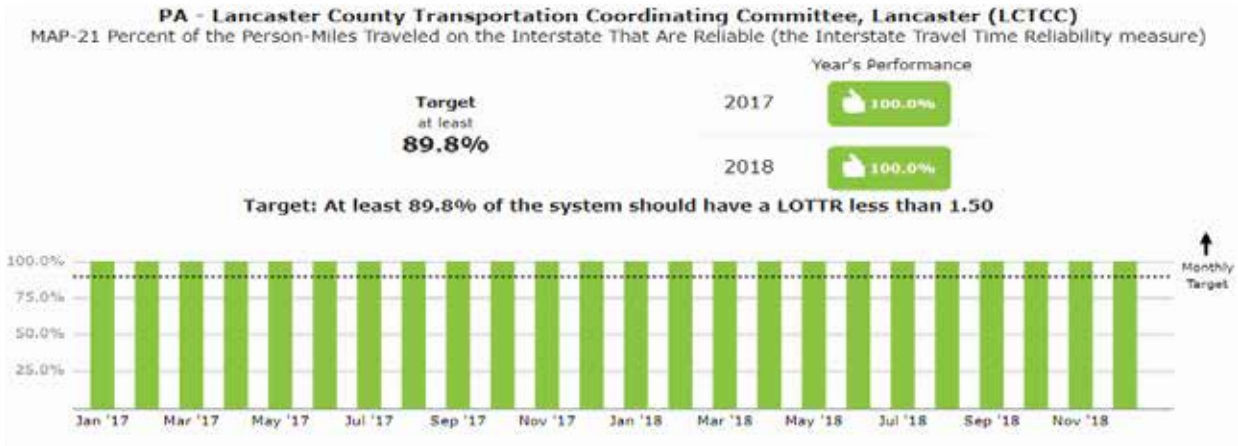
² https://ops.fhwa.dot.gov/publications/tt_reliability/brochure/ttr_brochure.pdf

The federal measures provide a means to track overall progress in reducing or maintaining traffic congestion at no worse than current levels on NHS roads in support of PennDOT’s statewide goals and targets. It is a required process that must be incorporated into the MPO’s TIP and MTP. Traffic congestion occurs on many roads outside of the NHS system and the federal performance measures, alone, do not provide enough information to identify all regional issues and needs related to traffic congestion. As a result, the Lancaster County CMP incorporates more detailed traffic congestion assessments that can be integrated into the MTP and support project identification and prioritization.

[continued next page]

Exhibit 2: Federal Reliability and Truck Travel Index Values for Lancaster County

(2017-2018 Federal Measure Reports – Source RITIS)



To aid Lancaster County in maintaining a stable trend in the PM-3 measures, the MPO through its Congestion Management Process (CMP) has evaluated regional congestion bottlenecks in the form of both congested corridor segments and high-volume intersections. This information has been used to assess and rank locations for use by PennDOT District 8-0 and the MPO in making cooperative project selection decisions for the MTP and the TIP.

The 2021-2024 TIP allocates \$99.5 million to 14 projects that are aimed at reducing congestion and improving system performance. This represents 45.6% of the total TIP investment. Based on a general categorization of projects, approximately \$16.8 million or 16.9% of this amount is STP/STU funding. Additionally, \$14.7 million or 14.8% of funding to address congestion is Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds. Details on these projects can be found in Appendix A under the Congestion Reduction, Traffic Signal/Intersection Improvement and Traffic System Management/ITS project types.

The MPO fully expects that the level of funding and the number of improvements aimed at improving travel reliability and system performance will contribute to achieving the system performance targets established by PennDOT and supported by the MPO. This expectation is reinforced by the cooperative effort between PennDOT District 8-0 and the MPO in selecting the congestion reduction and system performance improvement projects based on the Congestion Management Process, locally identified needs and travel data.

Transit Performance Measures

In July 2016, FTA issued a final rule requiring transit agencies to maintain and document minimum Transit Asset Management (TAM) standards, policies, procedures, and performance targets. The TAM process requires agencies to annually set performance measure targets and report performance against those targets. Required measures for the South Central Transit Authority (SCTA) are:

- Rolling Stock – Percentage past the Useful Life Benchmark (ULB) (age only)
- Equipment – Percentage of service vehicles past the ULB (age only)
- Facilities – Percentage of passenger/parking and admin/maintenance facilities that are below a 3 on the Transit Economic Recovery Model (TERM) Scale

Performance targets, and how those targets translate into project prioritization, is the focus of TAM plans. SCTA adopted a TAM Plan in 2018 that addresses the performance measures and targets outlined above. The goal of the TAM Plan is for SCTA to reach and maintain a state of good repair for all its capital assets. To reach this goal, there must be performance measures in place to monitor all SCTA's capital assets to determine when the state of good repair is reached. SCTA has evaluated the condition of its assets in the four categories outlined above and annually publishes a report on the condition of its assets and updates its performance targets for the upcoming year. SCTA most recently updated its performance targets in

September 2019 as follows (scale of 1 to 5 on the TERM scale, with 5 being excellent, 4 good, and 3 adequate):

<u>ASSET CLASS</u>	<u>PERFORMANCE GOAL</u>
FACILITIES	4
VEHICLES	4
EQUIPMENT	3

All transit agencies are required to utilize Pennsylvania’s transit Capital Planning Tool (CPT) as part of their capital planning process and integrate it into their TAM process. The CPT is an asset management and capital planning application that works as the central repository for all Pennsylvania transit asset and performance management activities.

Transit agencies update CPT data annually to provide a current picture of asset inventory and performance. From this data, PennDOT BPT updates performance targets for both the statewide inventory of Tier II agencies and for each individual agency in the plan based on two primary elements: the prior year’s performance and anticipated/obligated funding levels. PennDOT BPT then reports this information to FTA and shares it with the MPOs/RPOs, along with investment information on priority capital projects anticipated for the following year. Agencies that are Tier I or non-participating Tier II use similar CPT data to set independent TAM performance targets and report these directly to the MPOs/RPOs.

Consistent with available resources and in coordination with the PennDOT BPT, transit agencies are responsible for submitting projects consistent with the CPT for the development of the transit portion of the Program. This will ensure that projects identified on the TIP are consistent with the TAM approach and respective TAM plans.

Appendix F: Community Health Overview

Community Health Overview

Background

Parks and trails give us places to stay active. Sidewalks gives us space to safely walk and roll. Highways full of cars and trucks pollute the air we breathe. What we do as a community affects our individual health. The health of Lancaster County is part of the conversation when creating policies, plans, and projects. In this way, Lancaster County community embraces a "health in all policies" approach.

Transportation affects health in four major ways: active transportation, safety, air quality, and connections to resources. When designed well, transportation systems can improve the health and well-being of our community. However, negative health effects related to the transportation system often hurt the most vulnerable members of the community, such as people living in poverty, children, older adults, and those with disabilities.(1)

Active Transportation and Physical Activity

Physical activity and active transportation have declined compared to previous generations, according to the Centers for Disease Control and Prevention (CDC). The lack of physical activity is a major contributor to the steady rise in rates of obesity, diabetes, heart disease, stroke and other chronic health conditions.

In Lancaster County, 69% of adults, 34% of teens, and 30% of children K-6 are overweight or obese.(2) Obesity is one of the most important contributors to preventable chronic diseases in the United States, including diabetes and heart disease. Overall, 11% of adults and 25% of Medicare beneficiaries in Lancaster County have diabetes, a leading cause of death in the United States.(3) Heart disease and stroke are in the top four leading causes of death in Pennsylvania.(4) In Lancaster County, 12% of adults over age 35 have experienced a heart attack, coronary heart disease, or stroke. (5)

The cost estimate of health care expenses for obesity related diseases ranges between \$147 billion and \$210 billion per year. In addition, obesity contributes to absenteeism and lower productivity at work, costing employers \$506 per obese worker per year. (6)

Currently, the transportation infrastructure across the United States focuses on motor vehicle travel. Many Americans feel that it is unsafe to walk and bicycle in their neighborhoods because of traffic and the lack of sidewalks, crosswalks, and bicycle facilities. Most Lancaster County residents have limited access to other transportation options. The percentage of commuters who walk and bike to work is very low: 77.9% of commuters drive alone to work, while only 3.8% of commuters walk to work and 0.7% bicycle to work. (7)

Transportation planning can help people lead more active lifestyles by increasing the number of opportunities for them to move between places without driving. The CDC recommends that active transportation systems connect the places where people live, learn, work, shop, and play by providing safe and convenient walking and bicycling facilities. Using smart growth design principles can also reduce the distance between destinations people need to travel during their daily activities.

The following strategies are recommended by the CDC for supporting active transportation through transportation policies and practices:

- Promote safe and convenient opportunities for physical activity by improving infrastructure such as well-lit sidewalks and paths, safe roadway crossings, and bicycle infrastructure.
- Provide incentives for municipalities or regions that reduce vehicle miles traveled per capita and increase walking, bicycling, and use of public transit.
- Provide local officials with tools to implement Complete Streets, which provide safe and convenient options for all street users.
- Bring health, transportation and community planners together to develop pedestrian and bicycle master plans.
- Work with state and local officials to integrate and enforce use of pedestrian and bicycle design guidelines and evidence-based safety standards.
- Explore opportunities for increasing availability of funds for establishing active transportation initiatives.
- Develop and implement policies that encourage transit-oriented and mixed-use developments.

Safety and Injury Prevention

Motor vehicle crashes are a leading cause of serious and fatal injuries for many age groups. Pedestrians and bicyclists are even more likely to die in crashes compared with those who travel by motor vehicle. Public transportation has historically been safer than highway travel in light duty vehicles, but highway travel is growing more quickly than other modes of travel across the country. (8)

By providing other transportation options and improving roadway facilities, transportation agencies can reduce the incidence of motor vehicle crashes. This includes:

- Protect pedestrians and bicyclists from motor vehicle crashes by implementing traffic calming measures and designing streets to reduce motor vehicle speeds.
- Implement multimodal level of service indicators as performance measures for roadways that include measurements of pedestrian, bicyclists, and public transportation operability.
- Correct existing hazards and enhance infrastructure for pedestrians and bicyclists.
- Coordinate with health officials to consider health impacts as part of transportation planning using health impact assessments (HIAs) and safety audits.

Cleaner Air

Motor vehicle emissions have decreased significantly over the past 30 years. However, air pollution from motor vehicles continues to harm the environment and contributes to health problems such as asthma and heart disease. Air pollution from the transportation system is one of the largest contributors to unhealthy air quality in the United States. (9) In Lancaster County, 11% of adults and 12% of children have asthma. (10, 11) Asthma in young children is a serious public health problem and leads to missed days of school, limited activities, emergency department visits, and hospitalizations.

Improving the efficiency of the transportation system and supporting cleaner vehicles and fuels can improve air quality. National and state-level policies can encourage retrofitting of high-emissions vehicles, strengthen vehicle inspections standards, and incentivize consumers to buy more efficient vehicles. (12)

The following local and community strategies are recommended to improve air quality:

- Improve active transportation and public transportation modes and encourage consumers to use these modes.
- Set specific goals to reduce vehicle miles traveled per capita.

- Promote cross-sector data collection and data sharing between the transportation and health sectors.
- Build staff capacity to evaluate the health implications of policy decisions and conduct health impact assessments on proposed policies and projects.
- Provide training on the intersection of health and transportation for local officials, key staff, and community members.
- Collaborate with other sectors to collect public input on decisions that affect health and well-being.

Recommended Performance Measures

The Transportation and Health Tool (THT) was developed by the U.S. Department of Transportation and the Centers for Disease Control and Prevention to enable practitioners to easily measure the health impacts of transportation systems. This tool provides data for Lancaster County and other municipal statistical areas about the transportation environment and safety, active transportation, air quality, and connectivity to destinations. In addition to the indicators in the THT, local data is available for important measures of progress, such as miles of pedestrian and bicycle facilities.

In total, there are 8 recommended health indicators to measure the health impact of the Lancaster County transportation system:

- Percentage of commuters using various modes, including bicycling, walking, and use of public transportation;
- Vehicle miles traveled (VMT) per capita;
- Public transportation trips per capita;
- Land use mix index score;
- Road traffic fatalities (motor vehicle, bicycle, and pedestrian) per 100,000 residents;
- Miles of bicycle lanes, sidewalks, and shared use paths;
- Presence of complete streets policies; and
- Use of funds for bicycle and pedestrian improvements.

See the link below to find health indicator values for the Lancaster, PA metropolitan statistical area.

<https://www.transportation.gov/transportation-health-tool/indicators>

References

- ¹ US Department of Transportation. Transportation and Health <https://www.transportation.gov/mission/health/literature-and-resources>
- ² Pennsylvania Behavioral Risk Factor Surveillance System, 2016-2018; Pennsylvania Department of Health, Bureau of Community Health Systems, Division of School Health, 2017-2018.
- ³ Pennsylvania Behavioral Risk Factor Surveillance System, 2016-2018
- ⁴ Centers for Disease Control and Prevention. Stats for the State of PA, 2017.
- ⁵ Pennsylvania Behavioral Risk Factor Surveillance System, 2016-2018
- ⁶ Trust for America's Health and the Robert Wood Johnson Foundation. The State of Obesity. 2016.
- ⁷ American Community Survey 5-year Estimates, 2014-2018
- ⁸ Centers for Disease Control and Prevention. CDC Recommendations for Improving Health Through Transportation Policy, 2015.
- ⁹ Centers for Disease Control and Prevention. CDC Recommendations for Improving Health Through Transportation Policy, 2015.
- ¹⁰ Pennsylvania Behavioral Risk Factor Surveillance System, 2015-2017
- ¹¹ Pennsylvania Department of Health, Bureau of Community Health Systems, Division of School Health, 2017-2018
- ¹² Centers for Disease Control and Prevention. CDC Recommendations for Improving Health Through Transportation Policy, 2015.
- ¹³ Ibid.
- ¹⁴ Perspectives on Psychological Science. "Loneliness and Social Isolation as Risk Factors for Mortality: A Meta-Analytic Review." 2015.
- ¹⁵ U.S. Department of Transportation. Transportation and Health. 2016.
 - ¹⁶ Association of State and Territorial Health Officials. Health in All Policies Implementation Strategies. <http://www.astho.org/Programs/Health-in-All-Policies/Environmental-Health-in-All-Policies/HiAP-Implementation-Strategies/>.

Appendix G: Survey Results and Public Comments

MetroQuest Survey Results

Overview

Outreach to Lancaster County residents is an important part of the MTP update process. The Lancaster County connects2040 survey was developed to collect valuable input from the public regarding local transportation priorities, projects, and budgets. The responses received guided MTP development, particularly the strategic directions and implementation section.

Survey Participation

The Lancaster County connects2040 survey was released in late December 2019 and ran through mid-February 2020. Survey participation peaked at the start of the survey period and again at the end of January. In total, 2,837 people participated in the survey – both online and paper versions. The following demographic questions were asked at the end of the survey.

How would you describe yourself?

Many survey respondents (2,064) self-described as a County resident, public official, non-profit representative, consultant, or non-resident. Most respondents were County residents (1,789 or 87%). Some respondents were non-profit representatives (102 or 5%). Few respondents were public officials (64 or 3%) or non-residents (62 or 3%). Even fewer respondents were consultants (47 or 2%).

What is your age?

Many survey respondents (2,123) provided their age group – under 18 years, 18 to 24 years, 25 to 44 years, 45 to 64 years, or 65 years and over. The largest age group of respondents was 45 to 64 years old (938 or 44%). The second largest age group of respondents was 25 to 44 years old (702 or 33%). A fifth of respondents were in the 65 years and over age group (420). A small portion of respondents were in the 18 to 24 years old age group (62 or 3%). Only 1 respondent reported being under 18 years old.

What is your ethnic background?

Many survey respondents (2,018) self-identified their racial or ethnic group. Most respondents were White (1,852 or 92%). Some respondents self-described as “other” (64 or 3%) and Hispanic, Latino or of Spanish origin (51 or 2.5%). Few respondents self-described as African American or Black (27 or 1%), Asian (13 or 0.6%), Native Hawaiian or other Pacific Islander (5 or 0.25%), American Indian or Alaska Native (3 or 0.15%), and Middle Eastern or North African (3 or 0.15%).

What is your home zip code?

111 different home zip codes were provided.
The most frequent responses are listed in the table below.

Home Zip Codes of Respondents		
Zip Code	Area	# of Responses
17603	West & SW Lancaster City; Lancaster Twp; Parts of E Hempfield, Manor, Pequea	455
17601	Neffsville	341
17602	East & SE Lancaster City; Parts of E & W Lampeter	213
17543	Lititz	203
17022	Elizabethtown	79
17552	Mount Joy	74
17522	Ephrata	73
17545	Manheim	56
17538	Salunga-Landisville	55
17512	Columbia	51
17584	Willow Street	37
17551	Millersville	34
17540	Leacock-Leola-Bareville	31
17557	New Holland	26
17517	Denver	25
17554	Mountville	25
17566	Quarryville	21
17516	Conestoga	19
17520	East Petersburg	19
17578	Stevens	15
17569	Reinholds	13
17560	New Providence	11
17579	Strasburg	11
17501	Akron	10

What is your work/school zip code?

152 different work or school zip codes were provided.
The most frequent responses are listed in the table below.

Work/School Zip Codes of Respondents		
Zip Code	Area	# of Responses
17603	West & SW Lancaster City; Lancaster Twp; Parts of E Hempfield, Manor, Pequea	369
17601	Neffsville	354
17602	East & SE Lancaster City; Parts of E & W Lampeter	248
17543	Lititz	143
17522	Ephrata	59
17022	Elizabethtown	49
17552	Mount Joy	38
17545	Manheim	36
17604	Lancaster – Harrisburg Pk	35
17538	Salunga-Landisville	33
17551	Millersville	32
17557	New Holland	30
17512	Columbia	26
17584	Willow Street	22
17517	Denver	19
17101	Harrisburg - Downtown	16
17540	Leacock-Leola-Bareville	15
17566	Quarryville	15
17057	Middletown	14
17520	East Petersburg	12
17554	Mountville	12
17120	Harrisburg - Capitol Complex	11
17033	Hershey	10
17110	Harrisburg – North	8

Transportation Priorities by Rank

Survey participants ranked their top four transportation priorities out of eight options. See the priorities listed in the table below.

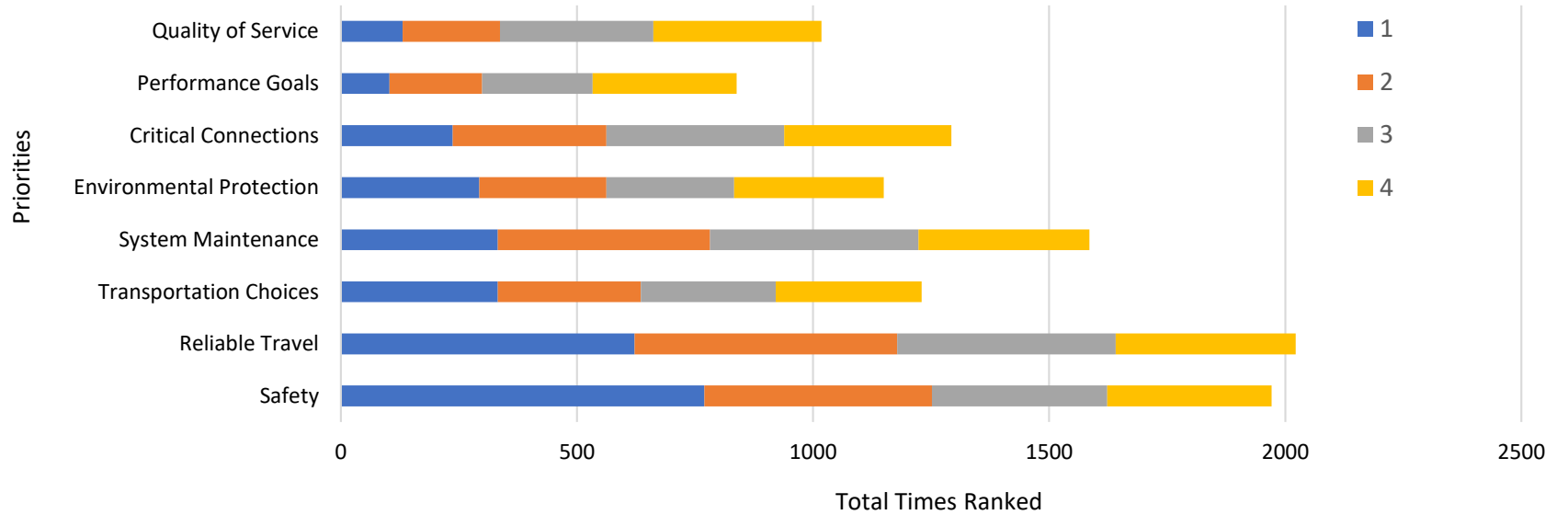
Reliable Travel was ranked as a top four priority by respondents the most number of times (2,022). Safety was ranked as a top four priority by respondents the second most number of times (1,971). Performance Goals was ranked as a top four priority by respondents the least number of times (838).

Safety was ranked as the number one priority of respondents more times than any other option (770). Reliable travel was ranked as the number one priority of respondents the second most number of times (622). Performance goals was ranked as the number one priority of respondents the least number of times out of all options (103).

The highest rank is 1, so small averages are better than high ones. Based on average rank, participants identified safety (2.15) and reliable travel (2.30) as their top transportation priorities. Performance goals (2.88) and quality of service (2.89) were the lowest priorities of participants by average rank.

Priorities	Definitions
Safety	Reduce crashes and user conflicts to make it easier to get around. In 2018, a total of 40 people - including 8 pedestrians and 2 bicyclists - were killed in Lancaster County crashes.
Performance Goals	Keep pavement and bridges safe and in a state of good repair to help Lancaster County achieve its federal and state goals.
Quality of Service	Increase driver, transit rider, bicyclist, and pedestrian satisfaction with the operation of Lancaster County's transportation system.
Critical Connections	Improve access to major employment and commercial centers through key road extensions, transit service expansions, and better walking and biking connections.
System Maintenance	Keep existing roads, bridges, and other transportation assets in good condition.
Transportation Choices	Make it easier to get around Lancaster County without owning or using an automobile by riding transit, biking, or walking.
Environmental Protection	Design transportation infrastructure that is sensitive to Lancaster County's unique environmental resources.
Reliable Travel	Reduce travel delays and generally make it easier to predict how long it will take to get to places throughout Lancaster County.

Priorities distributed by ranking



How Often Each Priority was Ranked

Safety	1	770
	2	482
	3	371
	4	348
	Times Ranked	1,971
	Average Rank	2.15
Performance Goals	1	103
	2	196
	3	234
	4	305
	Times Ranked	838
	Average Rank	2.88
Quality of Service	1	131
	2	206
	3	325
	4	356
	Times Ranked	1,018
	Average Rank	2.89
Critical Connections	1	237
	2	325
	3	377
	4	354
	Times Ranked	1,293
	Average Rank	2.66

System Maintenance	1	332
	2	450
	3	441
	4	362
	Times Ranked	1,585
	Average Rank	2.53
Transportation Choices	1	332
	2	303
	3	286
	4	309
	Times Ranked	1,230
	Average Rank	2.47
Environmental Protection	1	293
	2	269
	3	271
	4	317
	Times Ranked	1,150
	Average Rank	2.53
Reliable Travel	1	622
	2	556
	3	463
	4	381
	Times Ranked	2,022
	Average Rank	2.30

Priority Strategies by Average Rating

After ranking their top four priorities, respondents were asked to rate possible strategies to address their top priorities. Each priority had two to five strategies listed and described for respondents to review. They rated each strategy from one-star to five-stars, with one being a less desirable strategy and five being a more desirable strategy. No strategy had an average rating of less than 3-stars. A higher average rating is more significant. However, there were strategies rated significantly above the others within each priority.

Priorities	Strategies	Strategy Definitions
Safety	Education and Awareness	Invest in local motorist, pedestrian, and bicyclist safety education and support regional public service announcement (PSA) campaigns.
	New Enforcement Tools	Invest in technology to address dangerous driving behavior, such as automated speed enforcement cameras in work zones or automated red light enforcement cameras at key signalized intersections.
	Safety Improvements	Invest in targeted safety improvements such as modern roundabouts or high-visibility crosswalk treatments at high crash locations.
Performance Goals	Safety Performance	Reduce the number and rate of fatalities and serious injuries for all road users in Lancaster County.
	Bridge Condition	Meet targets for bridge deck area in good condition and poor condition.
	Pavement Condition	Meet targets for interstate and non-interstate pavement in good condition and poor condition.
	System Performance	Improve travel time reliability, peak hour travel delay, and poor air quality.
Quality of Service	Invest in New Technologies	Invest in infrastructure for new technologies, such as electric vehicle charging stations, vehicle-to-network communications, and self-driving vehicles.
	Communication Tools	Share crashes and other incident information by investing in regional, real-time traffic information-sharing infrastructure and services like 511-PA, electronic messaging signs, and smartphone applications.
Critical Connections	Enhance Transit Service	Expand access to jobs and critical services through innovative transit service, such as on-demand shuttle service and vanpool programs.
	P3 (Public-Private Partnerships)	Pursue public private partnership (P3) opportunities to fund road improvements and transit service to regional employers.
	Road Access	Connect neighboring commercial or residential developments to each other and public roadways for expanded bicyclist, pedestrian, transit user, and motorist access.

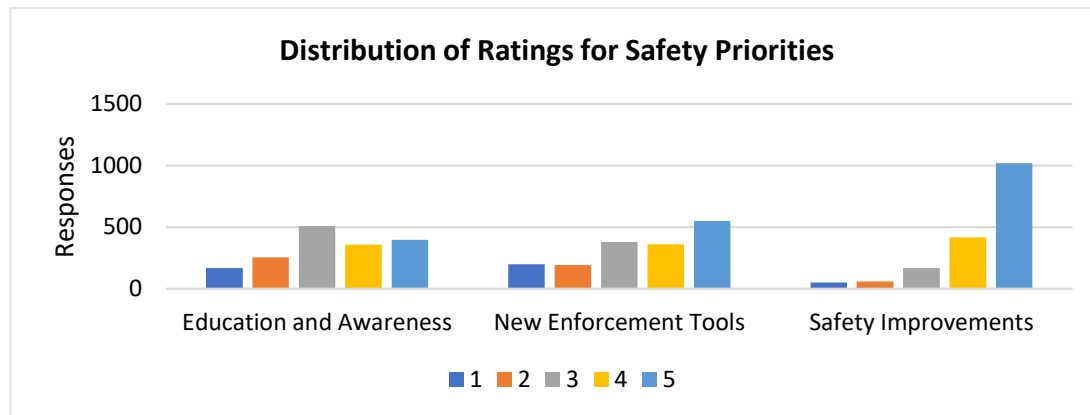
System Maintenance	Bike and Pedestrian Assets	Repair, maintain, or replace existing bicycle and pedestrian facilities and infrastructure, such as bike lanes, bike racks, crosswalks, and sidewalks.
	Transit Assets	Repair, maintain, or replace aging rail and bus transit equipment, facilities, and vehicles.
	Bridges	Prioritize bridges that have been closed or have a posted weight restriction.
	Road Pavement	Maintain existing roadway pavement through routine work performed by municipalities and PennDOT.
Transportation Choices	Innovative Public Transit	Use a smartphone application to request shuttle service within designated areas.
	Job Access Initiatives	Support carpool, vanpool, and other efforts to connect residents with access to employment.
	Expand Bike/Ped	Create new connections, improve marked crossings, and install new facilities, infrastructure and treatments both off-road and on-road.
	Improve Transit Frequency	Increase the number of bus and passenger train trips per day.
	Expand Transit Service	Expand the area covered by fixed route transit service so that more residents can access jobs and services.
Environmental Protection	Scenic Corridors	Enhance and preserve the character of scenic transportation corridors through corridor plans and the implementation of plan recommendations.
	Conserve Energy	Encourage the use of non-motorized transportation, public transit, and electric or fuel-efficient personal vehicles through strategic incentives, improvements, and outreach.
	Resource Protection	Ensure transportation investments are sensitive to local environmental resources and protect native wildlife during project development and construction.
	Improve Air Quality	Reduce congestion through improved traffic flow and alternative transportation choices to reduce emissions, particularly from single-occupant vehicles and heavy trucks.
Reliable Travel	Public Transit	Discourage single-occupant vehicle trips to work while encouraging transit ridership and improving transit on-time performance through dedicated bus lanes during rush hour in key congested corridors.
	Incident Management	Share crashes and other incident information through investments in regional, real-time traffic information-sharing infrastructure and services like 511-PA, electronic messaging signs, and smartphone applications.
	Roadway Improvements	Install dedicated turning lanes, interchange improvements, and traffic signal technology to improve traffic flow.

Average Rating of Strategy Favorability by Priority Area

Safety	Education and Awareness	3.3
	New Enforcement Tools	3.5
	Safety Improvements	4.3
Performance Goals	Safety Performance	4.2
	Bridge Condition	4.3
	Pavement Condition	4.3
	System Performance	4.5
Quality of Service	Invest in New Technologies	3.3
	Communication Tools	3.6
Critical Connections	Enhance Transit Service	3.6
	P3 (Public-Private Partnerships)	3.7
	Road Access	4.1
System Maintenance	Bike and Pedestrian Assets	3.0
	Transit Assets	3.5
	Bridges	3.9
	Road Pavement	4.6
Transportation Choices	Innovative Public Transit	3.8
	Job Access Initiatives	3.9
	Expand Bike/Ped	3.9
	Improve Transit Frequency	4.1
	Expand Transit Service	4.3
Environmental Protection	Scenic Corridors	4.0
	Conserve Energy	4.3
	Resource Protection	4.5
	Improve Air Quality	4.6
Reliable Travel	Public Transit	3.2
	Incident Management	3.6
	Roadway Improvements	4.6

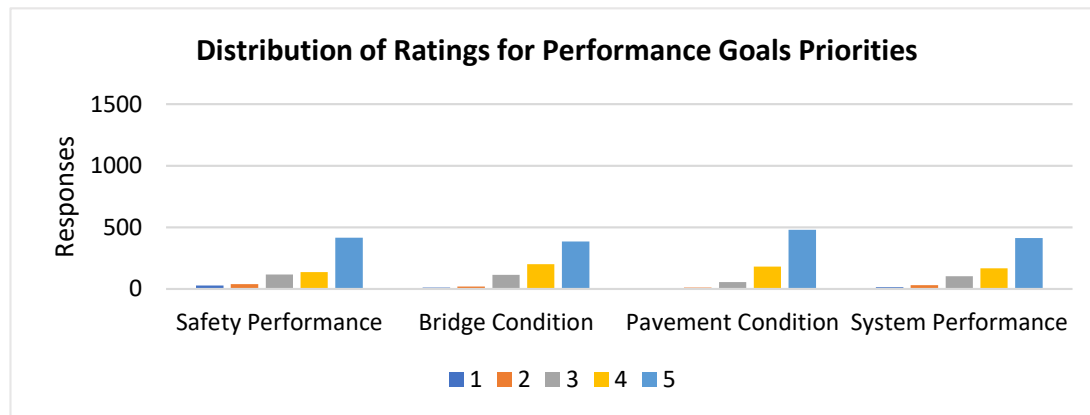
Safety

To address safety, respondents favored safety improvements (4.3 average). New enforcement tools (3.5 average) as well as education and awareness (3.3 average) received more varied ratings.



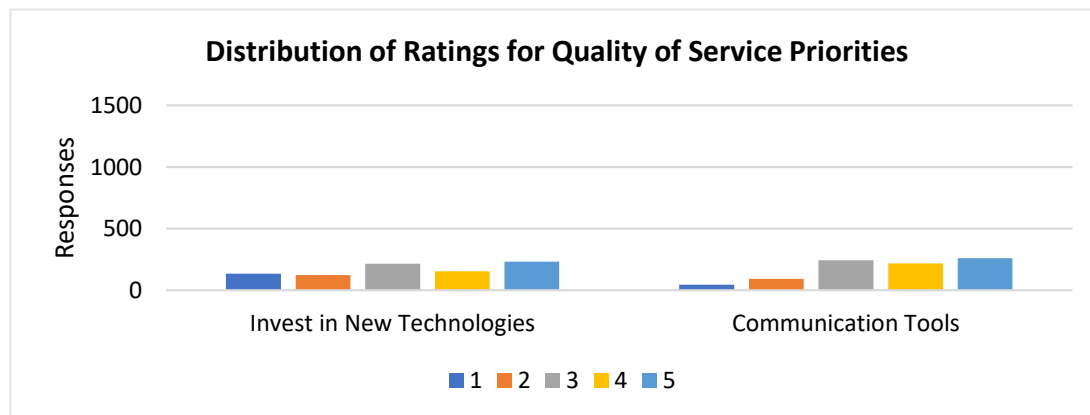
Performance Goals

All performance goals strategies were highly rated by respondents with average ratings over 4. The highest average rating is for system performance (4.5), followed closely by pavement condition (4.5) and bridge condition (4.5). Safety performance was also a popular strategy (4.2 average).



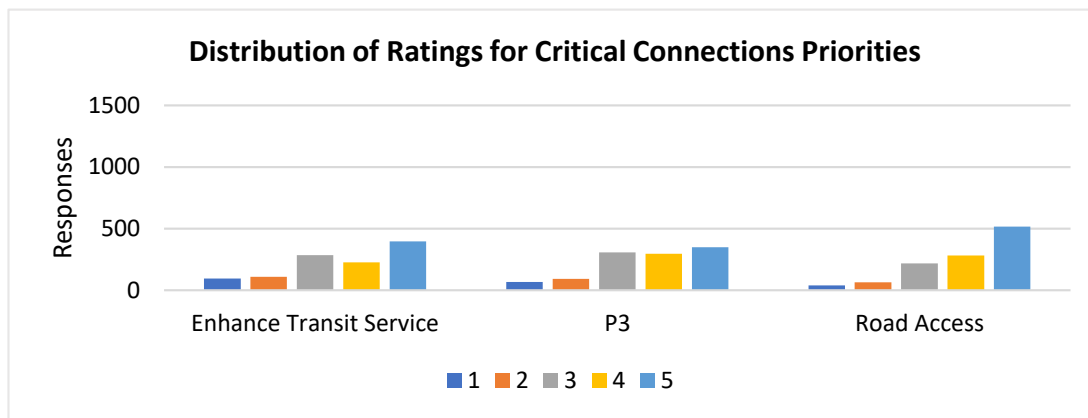
Quality of Service

The distribution of ratings for strategies to improve quality of service were varied. Communication tools (3.6 average) was slightly favored over invest in new technologies (3.3 average).



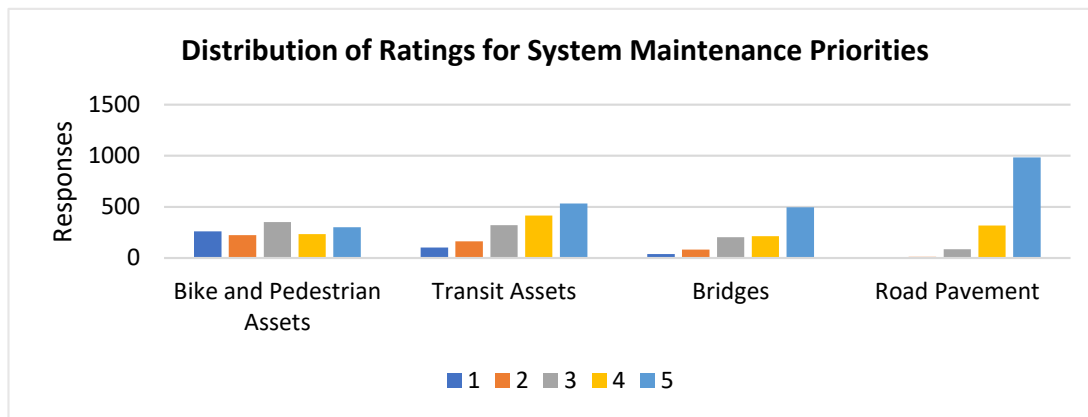
Critical Connections

For strategies to support critical connections, respondents rated road access (4.1 average) the highest in comparison to public-private partnerships (3.7 average) or enhance transit service (3.6 average).



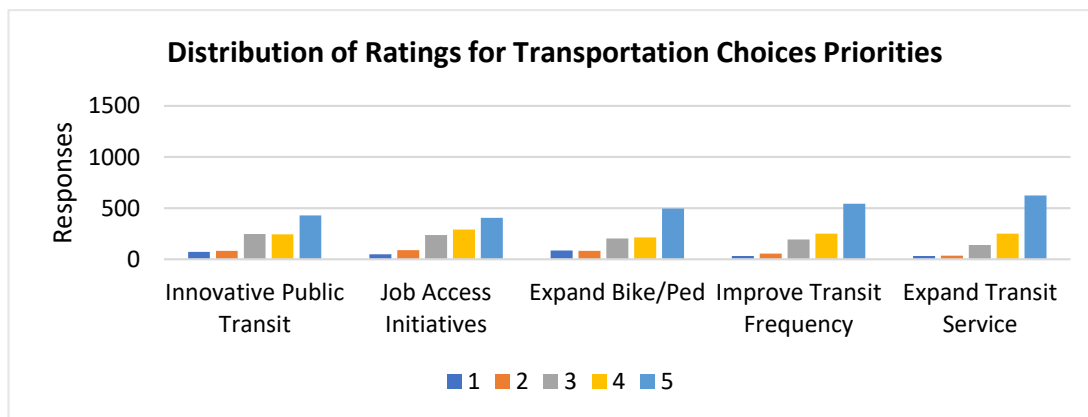
System Maintenance

Strategies to improve system maintenance focused on bike and pedestrian assets, transit assets, bridges, and road pavement. Respondents highly rated a focus on road pavement (4.6 average). Bridges (3.9 average) and transit (3.5 average) were favorably rated. The distribution of ratings for bike and pedestrian assets was more varied (3.0 average) than other strategies.



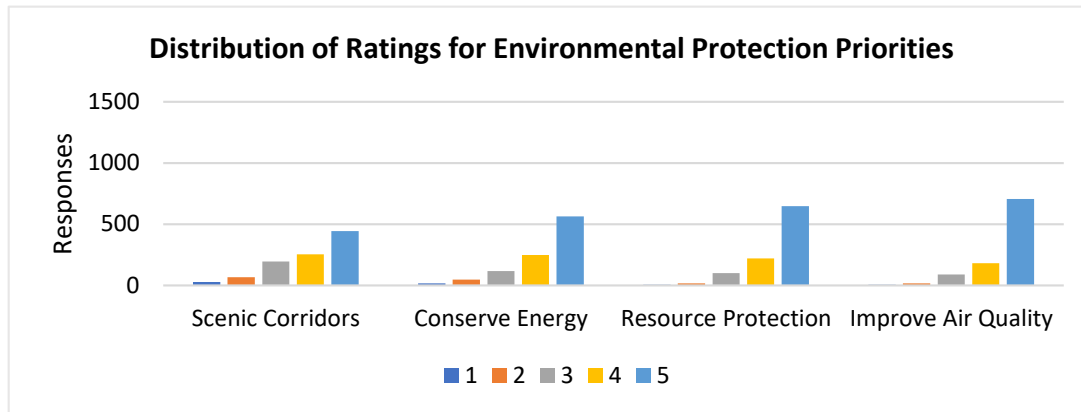
Transportation Choices

Respondents highly rated expanding transit service (4.3 average), followed closely by improving transit frequency (4.1 average). Other transportation choice strategies were similarly rated – expand bike/ped (3.9 average), job access initiatives (3.9), and innovative public transit (3.8 average).



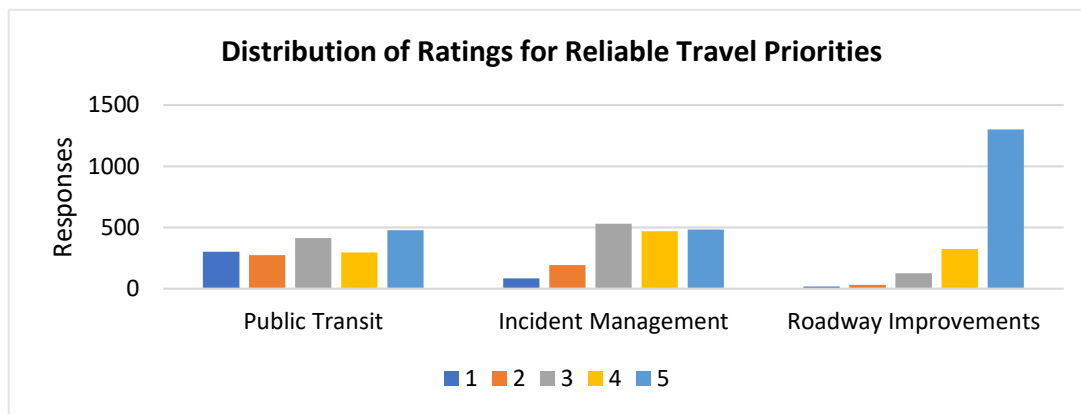
Environmental Protection

All strategies were highly rated by respondents with average ratings over 4. The highest average rating is for air quality improvements (4.6), followed closely by resource protection (4.5). Conserve energy (4.3 average) and scenic corridors (4.0 average) were also popular strategies.



Reliable Travel

Respondents highly rated roadway improvements for more reliable travel (4.6 average). The distribution of ratings for incident management (3.6 average) and public transit (3.2 average) were less skewed, more varied.



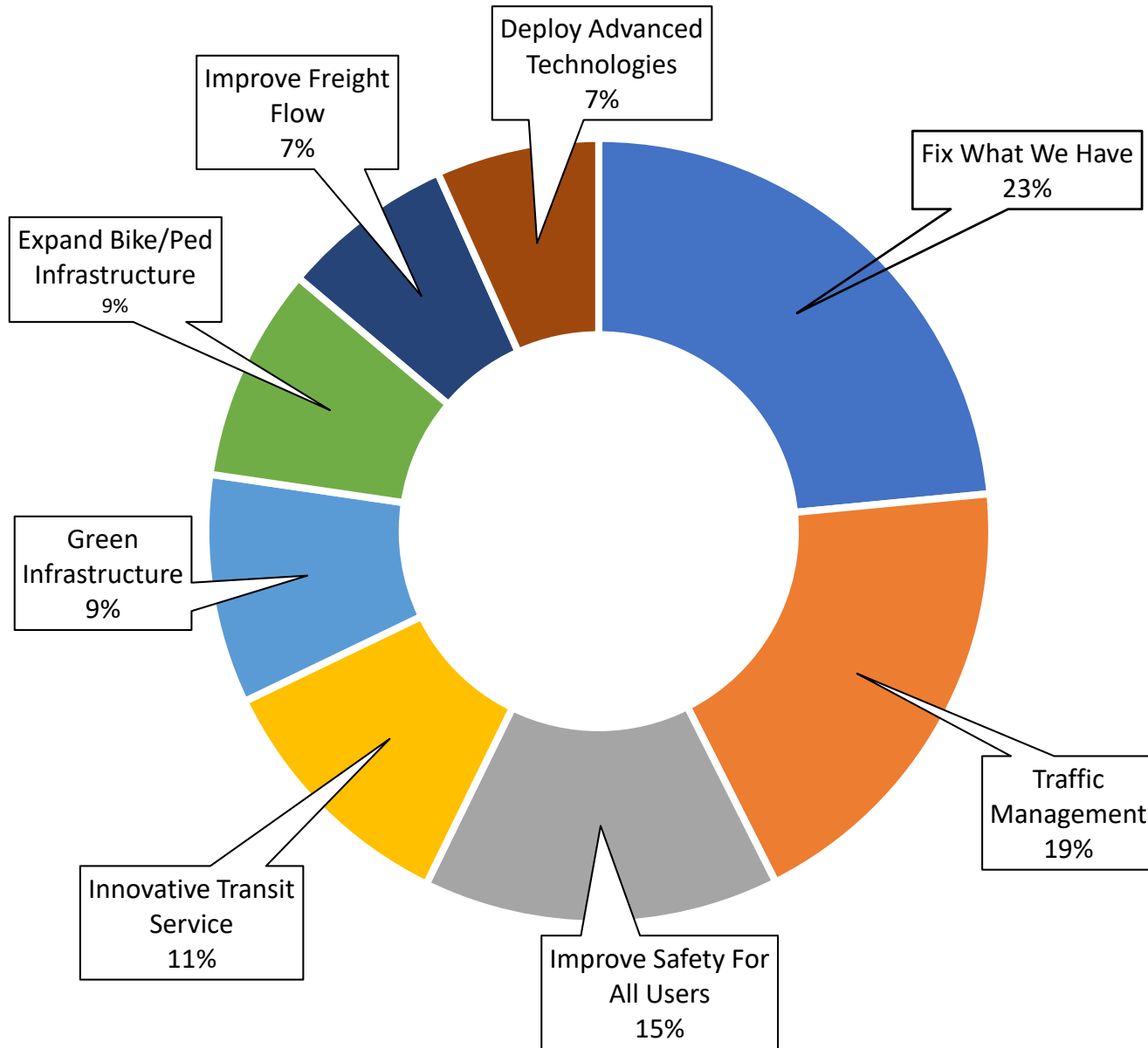
Budget Allocation

Survey participants were asked how they would spend \$100 on transportation in Lancaster County. Anywhere from \$0 to \$100 could be distributed to the eight categories show in the table below.

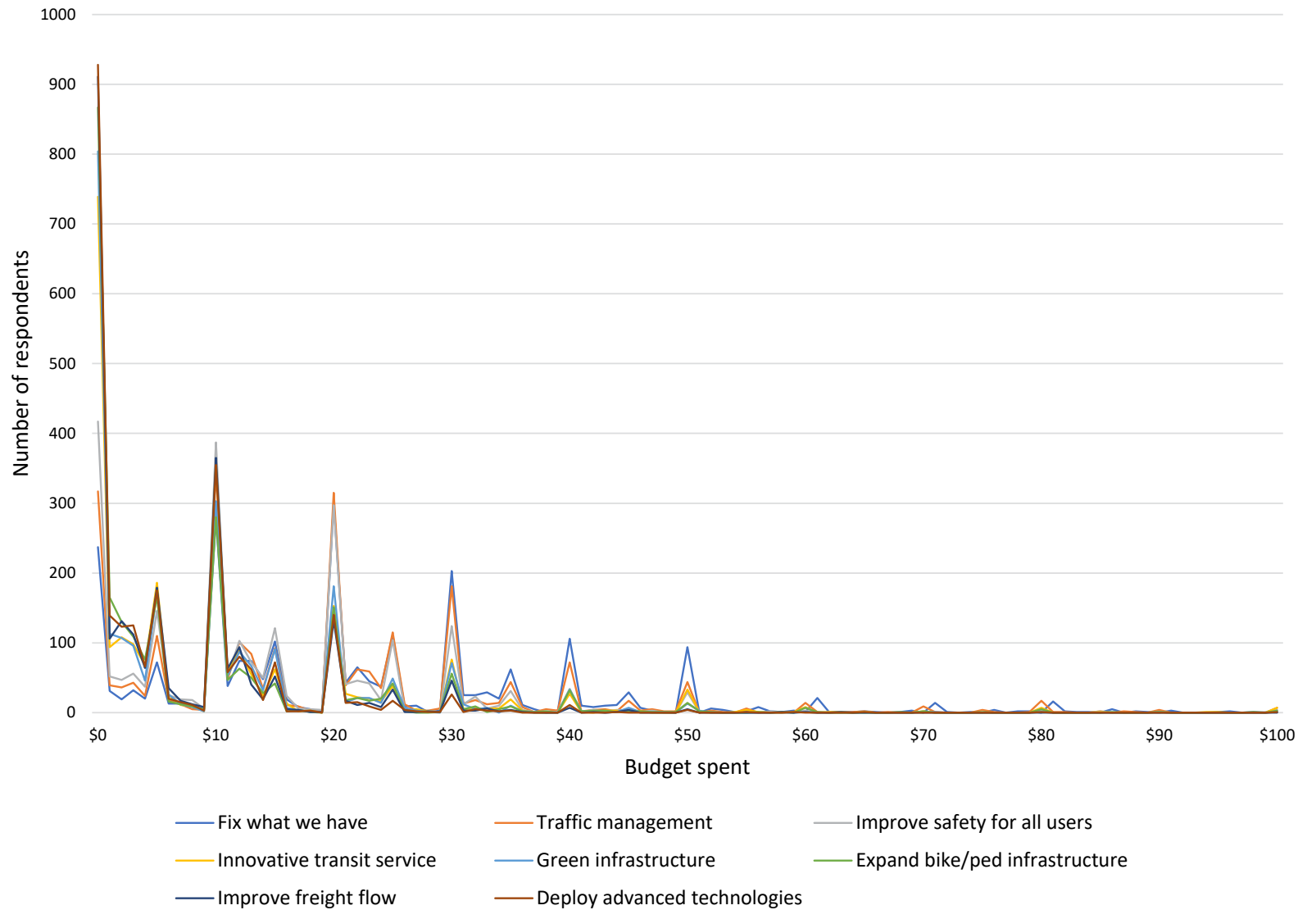
An average of \$29.81 was spent on the ‘fix what we have’ category to repair or replace damaged roads, bridges, and other infrastructure. Traffic management received an average of \$24.92 from respondents to improve traffic flow on existing roads through critical road connections, local land use regulations, traffic signal technology, and electronic messaging signs. The funding category of ‘improve safety for all users’ had an average of \$20.07 spent by respondents to reduce crashes and user conflicts to make it easier to get around through targeted safety improvements, education and awareness campaigns, and new enforcement tools. The lowest average amount of budget received from respondents was ‘deploy advanced technologies’ at \$10.68 to invest in infrastructure for new technologies, such as electric vehicle charging stations, vehicle-to-network communications, and self-driving vehicles.

Funding Categories	Definitions
Fix what we have	Repair or replace damaged roads, bridges, and other infrastructure.
Traffic management	Improve traffic flow on existing roads through critical road connections, local land use regulations, traffic signal technology, and electronic messaging signs.
Improve safety for all users	Reduce crashes and user conflicts to make it easier to get around through targeted safety improvements, education and awareness campaigns, and new enforcement tools.
Innovative transit service	Key service enhancements to reach jobs and residents, facility upgrades at high ridership stations and stops, and test service innovations like bus lanes or on-demand shuttles.
Green infrastructure	Integrate stormwater management facilities, plantings, street trees, and public gathering spaces into street projects to improve air and water quality, reduce pavement and runoff, and connect wildlife habitats.
Expand bike/ped infrastructure	Create new connections, improve marked crossings, and install new facilities, infrastructure and treatments both off-road and on-road.
Improve freight flow	Resolve traffic bottlenecks and low bridge clearances, add truck climbing lanes to steep highways, and consider regional truck parking needs.
Deploy advanced technologies	Invest in infrastructure for new technologies, such as electric vehicle charging stations, vehicle-to-network communications, and self-driving vehicles.

Average Amount of \$100 Budget Allocated to Each Funding Category



Distribution of Respondents by Funding Category



39

Comments

Summary of Comments Received through Survey

- The Public Survey allowed for respondents to send in comments along with question answers.
- Some comments give opinions about transportation and land use in the county:
 - 8 express a desire for road capacity projects, while 1 cautions against them
 - 4 call for less land development to decrease traffic
 - 3 ask for better road maintenance
- A few comments included broader ideas for the transportation system. Four suggest adding a beltway to divert North-South traffic around Lancaster, while another recommends turning PennDOT's greenspace into protected habitat for bees and other pollinators

Figure X: Roads Most Often Mentioned in Comments



1 in 3

Call for Improvements to Specific Intersections or Streetlights



17.9%

Call for Improvements in Accessibility

- including better sidewalks for wheelchair use, simplified messaging, and transportation options for the poor and the elderly.



15.4%

Call for Increased or Continued Public Transit

**Connects 2040:
Metropolitan Transportation Plan for Lancaster County PA
Public Comments and Responses**

(Listed in the order the comment was received)

Comment:

From: Bill Sauers <wsauers@manheimtownship.org>

Sent: Friday, March 27, 2020 11:16 AM

To: Bini, Robert E <RBini@co.lancaster.pa.us>

Cc: Phil Mellott <pmellott@manheimtownship.org>; Sean P. Molchany <smolchany@manheimtownship.org>

Subject: [EXTERNAL] Plaza Boulevard Bridge over Amtrak and Norfolk Southern Railroads

Bob,

Manheim Township is looking for grant funding options to help cover the major rehabilitation work needed at this structure as defined in a recent NBIS Bridge Inspection Report. Being a primary entry point to the Park City Mall from Manheim Pike we would like to develop an approach that takes care of the immediate issue related to the railings along with the longer term maintenance needs of this structure.



The bridge parapets are now rated at 2 by PennDOT based on their newly revised criteria in Pub 100A. A Priority 2 Code recommends “Adjusting Schedule As Needed” to perform the recommended rehabilitative work.

The ratings for the bridge railings changed dramatically at this bridge since the last inspection as a result of PennDOT changing its Bridge Inspection rating guidelines for the sidewalk and pedestrian railings. We received the report from Mackin Engineering Company in January of 2020 and supplemented their findings with a more comprehensive cost estimate that was prepared by Township Engineer, C. S. Davidson (attached). We also asked C.S. Davidson to confirm with PennDOT that their recommended repair would elevate the rating for this feature to an acceptable level in future inspections by the State. Attached is a memo from PennDOT concurring that the minimum repair would raise the rating to an acceptable level.

Here is some information on the above referenced bridge in Manheim Township for your use:
 Last BMIS Inspection 10/29/19 by Mackin Engineering Company for PennDOT.

APPENDICES

Plaza Boulevard over Amtrak and Norfolk Southern Railroads
BMS ID: 36 7101 3000 5052
BRKEY: 21825

Year Built: 1970
Structure Length: 293'
Structure Width: 64'-6"
Load Rating: N/A
Lane Restrictions: N/A
Scour Critical Rating: N/A
Structure Type: Steel Stringers with cover plates

Estimated Maintenance Cost by C.S. Davidson: \$400,000* - \$1,300,000* (The minimum cost is to just complete the upgrade to the railings – The higher costs are to perform needed superstructure and deck repairs and rehabilitation while upgrading the railing to extend the life of the structure).

**cost does not include engineering, permitting, right-of-way easements, construction overhead, and construction inspection, which will add significantly to the total cost of rehabilitating the structure. To fully replace the entire structure, the costs would likely exceed \$4,000,000.*

Please let me know what Manheim Township can do to get this work added to the TIP list or other grant funding source in the near future.

Thanks for your help in this matter.

William Sauers, P.E., Engineer
Manheim Township
1840 Municipal Drive
Lancaster, PA 17601
717-569-6406, Extension 1116

Response:

In your March email regarding the Plaza Boulevard Bridge, you indicated that the Township is seeking a two-pronged approach to addressing needs for this bridge. For the long term, we are adding the bridge to our illustrative list of projects for the Metropolitan Transportation

Plan. This means that it is currently not funded but has passed the first hurdle and is eligible for funding by being included in this list. We'll continue to work with PennDOT District 8-0 for opportunities to move it up on the priority list. We recognize, as you pointed out, the importance of the location and heavy usage that this bridge receives.

We've also asked the District for guidance on a short term solution to addressing the railings but have not yet received a response. We'll circle back with them for more information and let you know as soon as we hear anything. Have they provided you directly with any additional guidance?

Further Comment On the Topic Above:

From: Bill Sauers <wsauers@manheimtownship.org>

Sent: Tuesday, May 26, 2020 11:55 AM

To: Bini, Robert E <RBini@co.lancaster.pa.us>

Cc: Phil Mellott <pmellott@manheimtownship.org>; Sean P. Molchany <smolchany@manheimtownship.org>; Ahlskog, Lauri <AhlskogL@co.lancaster.pa.us>

Subject: [EXTERNAL] RE: Plaza Boulevard Bridge over Amtrak and Norfolk Southern Railroads

Hi Bob,

Thanks for getting this bridge project added to the list.

No. PennDOT has not provided any further guidance on the railing issue.

After my email to you in late March, I was contacted by Mackin Engineering Company (MEC) that the October NBIS Inspection they performed was a "Routine" type inspection, however, they did not have permits in place with the Railroads to inspect the underside of the bridge over the railroad tracks.

In late March 2020 MEC began work on completing the inspection of the spans requiring permits. During these inspections they found a crack in the web of one of the beams on March 31, 2020. As a result, it was assigned a Priority Code 1 - Critical Structural Deficiency. This type of deficiency requires repairs be made by the Township within 6 months. We engaged our Township Engineer, C. S. Davidson to complete a "Plan of Action" and design the repair and submit it to the District. The work to repair the web of the beam is relatively straight forward. The major problem is with access and coordinating with the railroads.

Finding a qualified General Contractor to complete this repair has been challenging. Most I have spoken to just don't want to deal with the railroads for such a small amount of repair work to the cracked beam. So far we have one quote of \$89,000 which is very high and are awaiting a

APPENDICES

second quote to get the repairs done. The actual work might take a total of 2 to 3 days to complete but it's all the other "stuff" affiliated with the coordination over the rail lines that I believe has the GC concerned and adversely affecting the pricing.

I offer this information because nothing associated with work on this bridge is cheap and it is in need of being funded for a major bridge maintenance/repair project. It also highlights that we now have railings with a rating of 2 and a cracked web of a stringer with a rating of 1. To pour \$500,000 into this bridge's railings and the repair of a beam without taking care of the underlying primary structural problems is a misuse of critical infrastructure dollars in my opinion. I ask that this bridge be designated for funding in the near term in light of our most recent inspection finding. The bridge is beginning to tell us things about its condition at age 50. It will be less costly to address maintenance work now rather than continuing to let it deteriorate and deal with a replacement later.

I look forward to hearing from you in this regard and hope that we can be elevated in the priority on the TIP list.

Best regards,
Bill

Response:

Thank you very much for the update. We'll share this information right away with the District and see what we can do.

Comment:

From: Christine Kaufman christine.kaufman@lanhc.org

To: Bini, Robert E RBini@co.lancaster.pa.us

Subject:Transportation

Sent: Fri 5/1/2020 4:36 PM

Hello,

I wanted to comment on the MTP plan. I have lived in Lancaster city for over 25 years and watched the car/truck traffic increase to an unbearable degree. Continuing to build parking garages to accommodate more car traffic is not sustainable due to the narrow streets and historic nature of the city. In order to preserve walkability, decrease pedestrian deaths, and maintain the livability of the city, we must prioritize pedestrian and bike traffic. With COVID 19 closures, we have seen how decreased traffic can benefit the overall environment and safety of the city. As a result, more people are biking and walking. Some steps we can take now are to close off some streets to traffic, similar to what many European cities have instituted, such as Spain, Germany and many others. Provide easy access shuttle service from the Burle parking lot, or other large parking areas. Continue to create biking options on all city streets (we don't all live on Walnut, college, or in the west part of the city).

Work with lyft or uber to provide a public transportation option to people that is convenient, efficient and inexpensive, instead of running big buses. These ideas are all are much cheaper options than parking garages, which are now sitting empty and unused, and are better overall for the health of the city.

Thank you for your time and I look forward to hearing more about transportation improvements.

Response:

Thank you for your comments. We will share your suggestions with PennDOT and the City of Lancaster for consideration as bicycle and pedestrian infrastructure expansion and improvements are considered.

Comments:

From: Terry Good <terryg@saudereggs.com>

Sent: Wednesday, May 13, 2020 11:50 AM

To: Kathleen.carver@kci.com; Bini, Robert E <RBini@co.lancaster.pa.us>

Subject: [EXTERNAL] MTP

Good Morning, I read your email and had a recommendation but thought best to run it by both of you first before replying to all on the email. Three of us on the email sit on the Pennsylvania Motor Truck Association (PMTA) board for the Lancaster chapter. I was thinking that a survey could be emailed to all members of the chapter. My only concern was that obviously you will get a view from only trucking companies. I think the amount of emails could be around 800 for the chapter, not sure how many companies it represents but it's plenty.

Your thoughts?

Terry Good

Vice President

Human Resources | Transportation

Corp: 800-242-9664 ext: 7478

Cell: 717-333-8356 | TerryG@SauderEggs.com

Website: www.saudereggs.com

Response:

Hi Terry,

Great to hear from you. Let me offer a few thoughts. We struggle sometimes to reach all of the stakeholders that we'd like so your idea is certainly intriguing. If we heard from 800 of your constituents, we'd be setting records for public input!

We conducted a survey about six months ago when we began to put together our new Metropolitan Transportation Plan (MTP) and it was very successful as a picture of the attitudes of the general public on our transportation system. From the way the survey was structured, it would be hard to distill out views of likely PMTA members. Now, we're at the phase where we've developed a draft MTP and would like the public to tell us whether or not they think it reflects what they told us. Unfortunately, the schedule and our resources don't afford us the luxury of doing another survey. So as an option, we're hoping folks would review the draft plan and offer their feedback.

One approach would be for the three PMTA members in this email group (which was our business/shippers group) to take a look at some key sections and offer comments. We would have no objection if you shared it with all of your members but I'm not sure how productive that would be in the couple weeks we have remaining in the public review period. If you'd like to review key sections and provide feedback, here is a list of specific portions of the MTP that include discussion that I believe would be relevant to issues that are important to PMTA members:

- Pp. 14-15, Roadway Network (freight network references),
- Pp. 28-29, Rail Freight,
- Pp. 34-35, Goods Movement (in particular the last bullet on page 35 about engaging freight stakeholders),
- P. 36, Transportation System Management and Operations (discussion about critical issues of reliability for goods movement),
- Pp. 52, Technical Focus Areas, discussion on a variety of issues that impact the condition and function of our highway network but of particular interest may be the section on Low Cost Operational Strategies on page 54 and the section on Understanding Our Travel Connections on page 64.
- Pp. 76-79, Specific technical focus on the characteristics of truck trips on our network,
- P. 90, Strategic Directions, this section includes broad-ranging recommendations on projects and activities that will help us implement our priorities for the MTP. Of particular interest might be the following items:
 - page 92, Improve Traffic Incident Management,
 - pages 94-95 on improving travel reliability,
 - page 96 on TSMO,
 - page 98 on access to jobs,
 - page 104 on improving technology on major corridors,
 - 105 on critical freight corridors, and
 - page 107 on input from the economic development community and a freight study.

Here's the link to the MTP: www.lancompo.org/public-review

Hopefully, this isn't more information than you wanted because I suspect it would be simpler if we just gave you a short survey to react to.

But, we truly welcome feedback in whatever way you think it is most feasible to provide it and to continue the conversation on some of the things I've highlighted.

Comments:

From: Bauer, Christopher <cbauer@mcmahonassociates.com>

Sent: Thursday, May 28, 2020 8:31 AM

To: Bini, Robert E <RBini@co.lancaster.pa.us>

Subject: [EXTERNAL] Draft Metropolitan Transportation Pan

Bob,

I think the plan is well prepared, I don't have any formal comments, only a request for the third four year period in the TYP, can a bridge key or BMS number be added so that it is easier to identify the individual bridges.

Thanks

-CHRIS

Christopher K. Bauer, P.E., PTOE | Associate & General Manager - Camp Hill Office

O: 717.975.0295 x 6108

C: 717.512.9585

D: 717.980.3100

415 Fallowfield Road, Suite 301

Camp Hill, PA 17011

Response:

Thank you, Chris! Much appreciated. We'll see what we can do about adding an identifier.

Comment (transcription of letter received from Ephrata Township):

June 3, 2020

RE: 2021-2024 TIP and Long-Range Transportation Plan

Mohler Church Road Bridge and Trout Run Road Bridge

Dear Ms. Ahlskog:

Ephrata Township is very pleased that the Trout Run Road bridge replacement is listed as a project on the 2012-2024 TIP for Preliminary Engineering in 2024 with construction in 2026 and that the Mohler Church Road bridge is listed as a project on the Long-Range Transportation Plan for Preliminary Engineering in 2026 with construction in 2029.

The Township has received numerous calls from residents questioning when the one-lane Mohler Church Road bridge will be replaced. Traffic volumes on Mohler Church Road continue to increase due to development and the use of Mohler Church Road as an alternate route around Ephrata. In addition to the bridge being one lane, the alignment of the bridge is very poor. There is a large food distribution warehouse, Denver Wholesale Foods, on the south side of the bridge that generates significant traffic that uses the bridge. Over the past several years the bridge has been hit by numerous trucks resulting in expensive repairs to the guiderails and parapet walls. It is our concern that the bridge will be damaged to the point it will have to be closed until repaired or replaced.

We are requesting that the County consider switching the timing of the two Ephrata Township bridges. Our request is that the Mohler Church Road bridge be listed on the 2012-2024 TIP for preliminary engineering in 2024 and construction in 2026 and the Trout Run Road bridge be listed on the Long Range Transportation Plan for Preliminary engineering in 2026 and construction in 2029.

If you have any questions, please feel free to contact me.

Sincerely
Steven A. Sawyer
Ephrata Township Manager

Response:

Thank you for your letter. We will coordinate with PennDOT to determine if the Mohler Church Road bridge project can be advanced.

Appendix H: Environmental Resource Stakeholders Meeting Summaries

About

The development of *connects2040* included input from local, state, and federal environmental stakeholders. The project team invited environmental agencies to learn about the MTP process and share their perspectives on transportation and environmental concerns in Lancaster County. Meetings were held with stakeholders on January 7, 2020, and May 19, 2020, and additional meetings are planned in the near future to develop an agreed-upon process for addressing environmental mitigation for projects on the MPO's Transportation Improvement Program. The Lancaster MPO looks forward to continued input from the environmental community as the plan is put into action. An overview of the environmental buffer analysis process being discussed is provided later in this section.

Environmental Stakeholder Meeting Minutes

Date	Tuesday, January 7, 2020
Time	10:00 AM – 11:30 AM
Location	Public Safety Training Center, 101 Champ Blvd., Manheim, PA Training Room 102
Attendees	LCPC: Bob Bini; Lauri Ahlskog; Kristiana Barr; Mark Huber
	Federal Resource Agencies: John Gible (US Army Corps of Engineers); Jennifer Kagel (US Fish and Wildlife Service)
	State Resource Agencies: Lori Yeich (PA DCNR); Officer Jeffrey Schmidt (PA Fish and Boat Commission); Bruce Metz (PA Game Commission; Tracey Librandi-Mumma (PA Game Commission); John Gardosik (PHMC); Brandon Dean (PennDOT District 8-0); Trish Newdeck (PennDOT District 8-0)
	Local Resource Agencies: Ruth Hocker (City of Lancaster, Bureau of Stormwater Management); Allyson Gibson (Lancaster Clean Water Partners); Jenn Teson (Lancaster Conservancy); Matt Krepper (Lancaster County Agricultural Preserve Board); Jeff Swinehart (Lancaster Farmland Trust); Mike LaSala (LandStudies, LLC); Kelly Gutshall (LandStudies, LLC); Sam Feibel (Water Science Institute)
	Consulting Team: Brian Funkhouser; Casey Bottiger; Katie Carver

Introduction to the 2045 MTP

- The Metropolitan Transportation Plan is in the process of a substantial update, which will have a “three-prong” approach.
 - **Improve integration of the MTP with Lancaster County’s comprehensive plan - *places 2040*.** The comprehensive plan presents a strategy that will assist in preserving the most valuable assets in Lancaster County.
 - **Uphold compliance with federal regulations.** The plan will focus on a 25-year horizon, include short- and long-range strategies, and address the 10 planning factors identified in federal planning regulations. The plan must be updated every four years.
 - **Integrate the PennDOT Connects process.** The PennDOT Connects policy emphasizes the importance of local collaboration into the transportation planning process – holding conversations about how transportation decisions are made, which transportation projects are prioritized, and how these projects can be enhanced to improve quality

of life in the communities of Lancaster County.

- The current MTP has an undersupplied environmental mitigation section with a standard description of environmental resources and an overview of what environmental needs should be addressed. Specific mitigation strategies have yet to be defined. Lancaster County MPO would like to develop a meaningful conversation with the resource agency representatives about environmental mitigation in the transportation planning process.
- An online survey is open until February 9, 2020. The survey has received 1,700 responses to date. Meeting attendees are encouraged to share the survey link with their constituents (<https://connects2040.metroquest.com/>).

Linkage between Environmental Resources and Transportation Planning

- **FHWA’s Eco-logical Approach.** FHWA worked with several stakeholder agencies to develop *Eco-logical*, an ecosystem approach to environmental mitigation. This nine-step approach embodies a conversation amongst individuals with specific resource interests to determine the best framework and strategies to address environmental mitigation in the transportation planning process. Several themes and questions come out of this approach:
 - **What is our planned approach to managing these important environmental resources? How do we improve project delivery timeframes?** Lancaster County has some projects that have been in the planning stages for ten years or longer, waiting for permitting approvals. Not only do these delays drive up project costs, but this suspends the resolution of transportation needs of the community.
- **“Have you been involved in planning projects of this type? What are the benefits of involvement in this process?”**
 - Faster, streamlined, and coordinated approvals
 - Mitigation offsets
 - Understanding where projects are in the watershed and if the projects are designed to constrain flows
 - Consistency with environmental goals including water quality
- **“What procedures and processes have you been involved in with other MPO counterparts? We would like to learn lessons from other interactions.”**
 - **Carlisle Borough and PennDOT** worked on a **Letort Spring Run project** that has proven successful. Interest was expressed in having similar projects coordinated and implemented in Lancaster County to address water quality concerns with road crossings. The Letort Spring Run project was part of the Carlisle Redevelopment Plan and was coordinated with PennDOT Central Office (Daryl St. Clair).
 - **Maryland State Highway Administration** assessed bridges and crossings holistically within the drainage area of a local watershed. Based on these assessment findings, crossings were adjusted, improving overall water quality.

Discussion of Proposed Framework

- The **purpose of convening the Environmental Stakeholder Group** is to come to a consensus on the highest priority resources that the County should protect and establish a framework for making those decisions.
- **“Are there any examples from your previous work with other agencies that have used this approach?”**
 - Lancaster Clean Water Partners’ development of a **watershed planning approach for Lancaster County** involved a wide-ranging outreach effort.
 - It was recommended to compile an inventory of plans, identifying where the data is housed and identify overlaps.
 - **PennDOT District 8-0 is developing an inventory of environmental resources.** The process involves identification of historic landscapes and historic districts that may be impacted during the TIP development process – identifying the resources before establishing strategies. This inventory will be regularly updated.

Existing Data Review and Identification of Data Gaps

- **Pennsylvania Local Parks (DCNR)**
 - All local parks in the state are identified in this layer. It would provide the opportunity to analyze the impacts of transportation projects and ensure the parks are not negatively impacted. This layer would also assist in identifying stormwater opportunities.
- **Historic Streams and Roadways (PHMC)**
 - Historic stream locations can indicate localized flooding potential in most urban areas.
 - Historic roadway locations can allow visualization of where stream crossings and dams may have been.
- There should be a focus on the **urban growth areas in the context of the watershed.** Future development will have impacts downstream.
- **PEMA and FEMA Flooding Layers**
 - Some municipalities are looking at PEMA and FEMA plans for flooding information. They are incorporating this information into subdivision and land development ordinances and are starting to work with DCNR on riparian buffer projects.
- **Pennsylvania Watershed Resource Registry**
 - Sponsored by EPA
- **Mitigation Offsets (Army Corps of Engineers)**

- In a lot of cases, other agencies put a crossing or pipeline in place, causing impacts to local waterways. There is a need for mitigation strategies to be put into place to offset these impacts. It would be useful to consult with the Army Corps of Engineers on where to implement these strategies, rather than going to a bank.
- **Source Water Protection Areas**
 - There are many source water protection areas identified in Lancaster County. There is an emergency response system in place for when spills occur.
- **Bridge and Culvert Task Force**
 - This task force meets to discuss bridge and culvert standards. It was recommended to have a discussion with PennDOT Central Office, Department of Environmental Protection and other regional agency offices about these standards.
- **Dirt, Gravel and Low Volume Road Program (PA Department of Agriculture)**
 - Dirt and gravel roads are significant contributors to non-point source pollution. The program informs and empowers local control to stop pollution from these roads. This program is distributed by State Conservation Commission to participating conservation districts in the state.
- **Stormwater is crossing agricultural roadways – is the intent to help correct some of these issues like water quality, erosion, etc.?**
 - These issues would be addressed on a case by case basis. It is currently being discussed whether it would be better to incorporate different solutions based on a larger scale or a project specific basis. These types of concerns could be part of the PennDOT Connects process when discussing future projects.
 - **It was recommended to extend the mitigation region and look at a county wide scale or watershed area scale to identify the larger environmental concerns.**
 - **Calvert County Ditch project process.** When a transportation improvement was underway, MDOT would reach out to local governments. During this project, it was discovered that there had been a farmer farming up to the right-of-way. MDOT made an agreement with the farmer to complete part of the improvement on the farmer’s property.
- **Is one of the goals of the plan to issue those recommendations to all municipalities or all projects?** The hope is to keep the conversation going in the future to identify strategies for the county to employ. Between now and the plan adoption in June, the County would like to outline a process to continue collaboration with the resource agencies and improve the process institutionally and procedurally. The PennDOT Connects policy is an opportunity for other agencies to be involved in the planning stages of a project (i.e., trail projects). DCNR noted that they have resources to help the local communities implement trail projects.

- **Additional considerations included:**
 - For wetlands and streams, Lancaster County does not have a mitigation bank.
 - Looking at the entire county landscape, analyzing all environmental resources for a county-wide scale may not have a lot of wildlife value to it when compared to site specific analysis.

Final Thoughts and Review of Next Steps

- An **environmental buffer analysis** will be completed using the MTP's list of projects to identify resource impacts. The projects included in the buffer analysis will be the TIP list along with possible longer-term projects that won't necessarily be funded during this TIP cycle but could be funded in the future. Mitigation strategies will be developed after this analysis is complete.
 - **Pennsylvania Natural Diversity Inventory (PNDI)** lists project buffers used for various categories and could be used as a starting point in the buffer analysis.
- **Agency Coordination Meeting (ACM) presentation** – It was suggested to provide better project details and/or concepts being included in the plan and TIP. The agency professionals might have more localized knowledge that could help you determine the environmental budget for a project and recommend resources to address those needs. This would help with the streamlining of project delivery.
- At future meetings, the environmental resource agencies will have a more meaningful indication of resource impacts due to transportation projects, which will advance the conversation regarding what type of strategies need to be developed and adopted.
 - Conference calls should be considered as an approach for future meetings, with ample review time for documents/resources ahead of the meeting

Environmental Buffer Analysis Process

A Long-term Strategy for Implementing an Ecosystem Approach to Environmental Mitigation

At the first meeting of the Environmental Resources Stakeholder Group (the Group) for Lancaster County's Metropolitan Transportation Plan (MTP), discussion focused on working with the Group to develop a long-term strategy for implementing an ecosystem approach to environmental mitigation for transportation projects. This concept builds on a Federal Highway Administration initiative named Eco-Logical that focuses on sustaining or restoring ecological systems and their functions and values rather than addressing individual resources in an isolated fashion. If implemented successfully, this effort could help to achieve several objectives, including:

- Implementing places2040 Big Ideas of Taking Care of What We Have and Growing Responsibly by providing focus on ecosystem health and connectivity;
- Creating greater certainty about appropriate solutions to environmental mitigation in the transportation project development process; and
- Improving transparency for the information that is used in making decisions about environmental resources in the transportation project development process.

The MTP will provide the foundation for implementing a long-term strategy to address environmental mitigation in the transportation project development process, though full development of the strategy will extend beyond the development of the MTP now underway. The long-term strategy could yield several key results, including:

- Collaborative partnerships,
- Integrated plans,
- Common understanding of potential effects,
- Jointly determined priorities, and
- Predictable and adaptive management of resources.

How Do We Get There? Steps to Implementing a Long-term Strategy

Implementing a long-term strategy will involve two parts. The first part will be the application of an environmental buffer analysis to proposed transportation projects from the MTP and the 2021-2024 Transportation Improvement Program (TIP) and represents an interim step to developing a more complete, long-term environmental mitigation strategy.

Development and implementation of a long-term strategy would be led by the Lancaster MPO working with environmental resource stakeholders. During this part of the process to develop environmental mitigation strategies, stakeholders would work through a series of steps designed to find common ground for decision-making that might include:

- Learning about others' project work, resource knowledge and expertise;
- Identifying relevant management plans developed by stakeholder groups;
- Integrating plans to develop a common understanding of the location and potential resource impacts of proposed actions;
- Assessing the potential effects of project actions on overall resources;
- Establishing and prioritizing opportunities for avoiding, mitigating or minimizing impacts of project decisions;
- Documenting the results;
- Implementing projects consistent with the strategy; and
- Monitoring success.

For now, we are focusing on the first part of implementing the long-term strategy, which is completion of an environmental buffer analysis.

Proposed Environmental Buffer Analysis Process

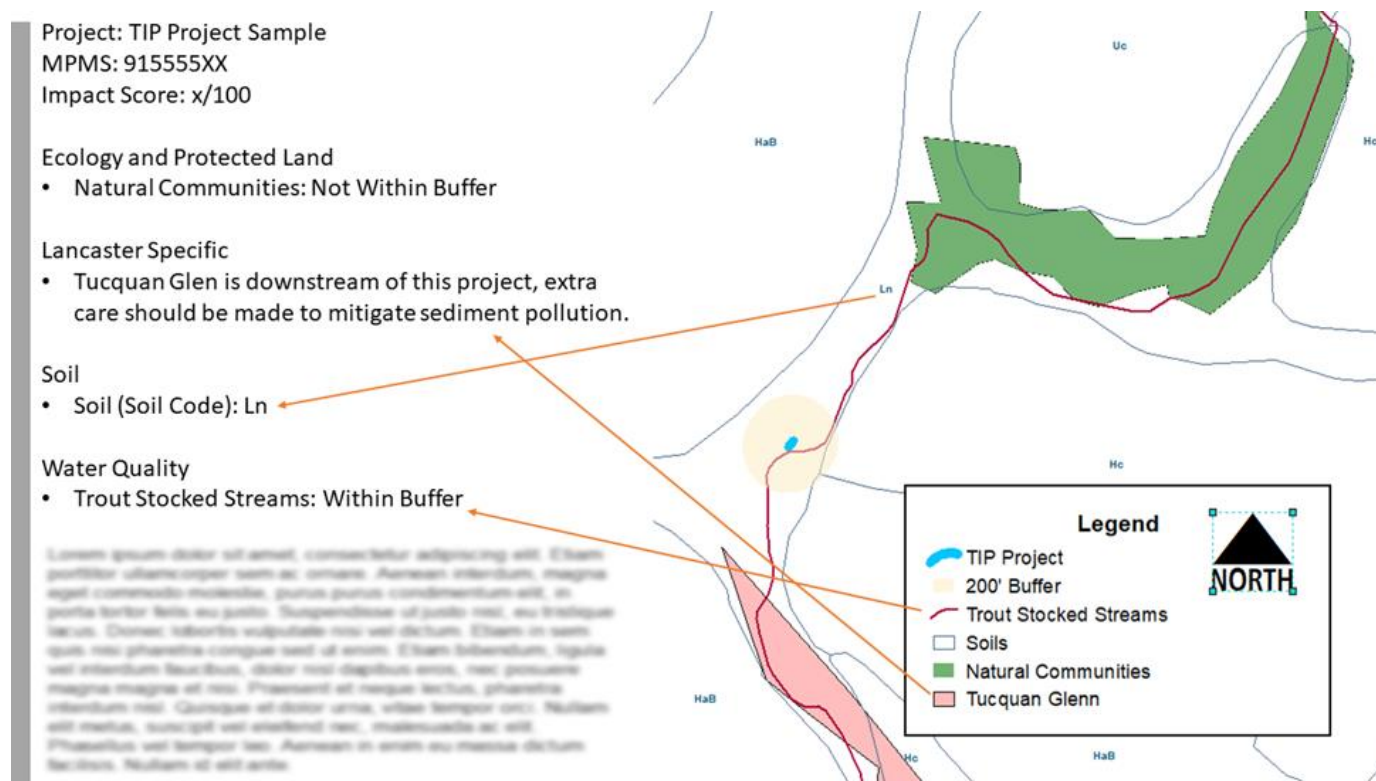
The goal of the Environmental Buffer Analysis is to provide information to environmental resource agencies and other interested environmental resource stakeholders on potential impacts of TIP projects on the County's environmental resources. This information will be used in a collaborative process among the County, PennDOT, and environmental resource agencies and stakeholders to determine mitigation strategies among competing resources. When implemented, the process will create a report for each TIP project that details its potential impact on County environmental resources based on proximity to the various resources.

Project Environmental Impact Reports

The project reports will be generated by using Geographic Information System (GIS) mapping software to detect whether a project is close enough to each environmental resource to warrant review and action. TIP road or bridge projects can be graphically represented on a map as a line or a dot. Buffer areas would be created around a project based on anticipated distances needed to protect different environmental resources, with this information stored in GIS layers. When a resource layer lies within its buffer for a project it will be identified along with the attributes of that resource as important to consider in prioritizing the resource and developing a mitigation strategy. This will be particularly important when multiple resources may be potentially impacted by a project.

Some of the County's environmental resources have local significance that might not be recognized by other resource inventories or PennDOT policies. Places like Tucquan Glen, Lititz Springs Park, and the White Cliffs of Conoy are of special significance, and the reports will include an analysis of effects that the TIP projects could have on resources such as these.

Report Sample Visual Representation



Environmental Resource Agency/Stakeholder Input

As of now, LCPC has 73 layers of environmental resources that could be used in this analysis. These layers are organized into 5 categories:

- Ecology and Protected Land
- Lancaster Specific
- Soil
- Waste and Pollution
- Water Quality

Stakeholder input is needed on the following:

- Suggested buffer widths for analyzing potential effects on specific environmental resources;
- Critical resource protection issues to be aware of during TIP project development;
- Resources on our list that you believe may not be impacted by TIP project development; and
- Other environmental resources that are not represented in our current list of important environmental resources but should be considered.

Lancaster County 2040 Metropolitan Transportation Plan
Environmental Stakeholder Meeting Summary

Project	MPO 2045 Metropolitan Transportation Plan
Date	Tuesday, May 19, 2020
Time	10:00 AM – 12:00 PM
Location	LifeSize App
Attendees	LCPC: Bob Bini; Kristiana Barr; Sam McMinn; Mark Huber
	Resource Agencies: Kate Gonick (Lancaster Conservancy); Kelly Gutshall (LandStudies, LLC); Beth Raves (PennDOT Central Office); Bryan Van Sweden (PHMC); Trish Newdeck (PennDOT District 8-0); Tracey Librandi Mumma (PA Game Commission); Brandon Dean (PennDOT District 8-0); John Gardosik (PHMC); Ruth Hocker (City of Lancaster, Bureau of Stormwater Management); Chris Thompson (Lancaster County Conservation District); Allyson Gibson (Lancaster Clean Water Partners)
	McCormick Taylor: Michelle Goddard; Virginia Bailey
	Consulting Team: Brian Funkhouser; Casey Bottiger; Katie Carver

Welcome and Introductions

- Bob Bini welcomed everyone and provided a brief overview of the Lancaster MPO as well as the MTP development and TIP update processes.

A Long-Term Approach to Environmental Mitigation for Transportation Projects

- Bob provided a brief overview of the Federal Highway Administration’s Eco-Logical Approach
 - The Eco-Logical approach was designed to account for the needs and views of all players in the transportation planning process and project development.
 - The MPO would like to implement some aspects of this approach in order to establish a close tie with some of the Big Ideas in places2040, the Lancaster County comprehensive plan. This includes:
 - Taking Care of What We Have, and
 - Growing Responsibly.
 - LCPC is sensitive about recognizing the valuable features within the county. As the county continues to grow, LCPC would like to preserve those features – focusing on maintaining overall ecosystem health as plans are developed and projects are implemented.
 - By working with the resource agencies, LCPC would like to improve transparency in the planning and project development processes. This coordination allows the MPO to develop appropriate solutions for environmental mitigation and provide greater focus on environmental impacts when making transportation decisions.
- Bob then provided an overview of the key anticipated results of the Eco-Logical approach. These include:
 - Collaborative partnerships
 - Integrated plans
 - Common understanding of potential effects
 - Jointly determined priorities
 - Predictable and adaptive resource management
 - Development and implementation of a long-term strategy
- Bob also discussed some steps to development and implementation, which serve as building blocks to implementing this approach:
 - Information gathering is completed by learning about other agencies’ project work, resource knowledge and expertise as well as identifying relevant management plans developed by stakeholder groups.
 - An actual strategy would then be developed by:
 - Integrating plans to develop a common understanding of location and potential resource impacts of proposed actions
 - Establishing and prioritizing opportunities for avoiding, mitigating or minimizing impacts of project decisions
 - Assessing potential effects of project actions on overall resources
 - Once a strategy is in place, the implementation and feedback loop would occur to ensure the strategy is successful. The MPO and its environmental stakeholder partners would regularly evaluate the program to ensure goals are achieved.

Proposed Environmental Buffer Analysis Process

Bob introduced the proposed environmental buffer analysis process – an interim step to developing a more complete, long-term

environmental mitigation strategy. Projects will be represented by a line or a point. By using GIS software, buffers will be placed around transportation projects and environmental resource impacts that may warrant review and action can be detected. These “hits” can be used to identify priorities for mitigation.

- **Application of Buffer Analysis**
 - The buffer analysis will be applied to MTP projects that are included in the 2021-24 TIP that includes over 70 projects scheduled for implementation during that time.
- **Analysis Goals**
 - The analysis will provide information to environmental resource stakeholders regarding the potential environmental impacts of TIP projects.
 - The results of the analysis will be used in a collaborative process among Lancaster County, PennDOT, and the environmental resource stakeholders to determine mitigation strategies among competing resources. These results will detail potential impacts based on resource proximity to projects.
- **Buffer Analysis Layers Review**
 - LCPC currently has 73 environmental resource layers, which have been sorted into into five categories:
 - Ecology and Protected Land
 - Lancaster Specific
 - Soil
 - Waste and Pollution
 - Water Quality
 - The listing of layers was displayed for participants to review. The following questions and concepts were posed for consideration:
 - Suggested buffer widths for analyzing potential effects on specific resources
 - Critical resource protection issues to be aware of during TIP project development
 - Resources on the list that may not be impacted by TIP project development
 - Other environmental resources to be considered that are currently not represented in the current list of resources
 - The following feedback was provided regarding the buffer analysis process:
 - Protected lands are important to consider, as they can cause issues with condemnation due to deed or title restrictions. There are protocols to address those concerns. Most of these lands are protected by the Lancaster Conservancy, and PA Department of Conservation and Natural Resources input is required when considering transportation projects.
 - Federal regulation requires the MPO to address environmental mitigation in our MTP. During the MPO’s Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) Certification Review in 2018, it was noted that the MPO’s current plan does not address mitigation as well as it could. As a result, Lancaster County would like to identify mitigation activities and establish processes to carry out those activities through

broadly applicable policies and strategies.

- If an arbitrary buffer width is selected, it is not going to meet the needs surrounding state game lands. Buffer widths will need to be selected carefully. The MPO should consider issues that are important to the Pennsylvania Game Commission and evaluate buffers on a case by case basis.
- The buffer analysis is a good idea; however, buffer sizes need to be evaluated on a case by case basis. Depending on the hydrology and quality of a certain creek or stream, buffer sizes could be larger or smaller in various areas along a creek.
 - A buffer width has not been established yet. The MPO will need to do something regarding environmental mitigation during this plan update that improves on the past plan. This could be done by learning more about what type of plans have been developed to protect these valuable resources and how those concepts can be applied in conjunction with our MTP.
- Clean Water Partners is also identifying mitigation opportunities at this time and could be coordinated with this effort.
- Invasive plant proliferation is seen a lot in various transportation corridors, and biodiversity is critical in areas adjacent to these corridors.
- Stroud Water Research Center in Chester County has completed studies on buffer widths to mitigate nutrient run off from roadways and farm fields.
- The term “buffer” is a little confusing – as it won’t be as critical when it goes through a floodplain or sensitive area, but it could be critical in other areas.
 - The buffer analysis is a GIS mapping exercise and buffer widths can be adjusted based on the specific resource. This is an attempt to look at potential environmental resource impacts based on physical distances from transportation projects. These buffers would be placed around a line or a point and we would see what resources are crossed when they are layered over the digital buffer.
- Sam McMinn provided a demonstration of the buffer analysis and the following feedback was provided:
 - When project development begins, all environmental resources that could be impacted by the project need to be reviewed through the NEPA process. This review is currently not as holistic in the project delivery stages.
 - At the PennDOT Districts, buffer widths are project dependent – buffers for bridges are different than those used for resurfacing projects. By looking at different project types and determining buffers that way, the District can stay conservative in the project delivery phases.

Project Environmental Impact Reports

Bob provided an overview of the project environmental impact reports, which will serve as the output of the buffer analysis. These reports would be generated for the MTP TIP projects as the analysis is completed.

- In the short term, LCPC would like to develop these reports for the TIP and share them with the resource agencies. All issues detected would need to be evaluated thoroughly and decisions would be made on how to mitigate them in the project development process.

- In order to get a more thorough understanding of the issues faced by the resource agencies on a regular basis, various resource agency representatives may be asked to provide an overview of their resource of interest and how concerns get addressed through their planning efforts.

Overview of Lancaster MPO Draft MTP and Draft 2021-2024 Transportation Improvement Program (TIP)

Bob provided an overview of the MTP and TIP public review period. He noted specific sections that highlight environmental concepts. Bob also mentioned that these direct interactions with the resource agencies throughout the plan development process would take place of the Agency Coordination Meeting (ACM).

The following feedback was provided:

- A lot of work is being done with the Department of Environmental Protection (DEP) Countywide Action Plan related to water quality. A report card has been developed and stormwater Best Management Practices (BMP) projects have also been identified. This could work closely with this effort as it would be a shame to create something from scratch solely for transportation.
 - Bob mentioned that is really important information that we may want to cover in a future meeting of this group. It speaks to the long-term and effective implementation of this process. The MPO will not be substituting their work for the work of other agencies.
- Clean Water Partners is responsible for improving quality of the streams and creeks within the County. They have developed a Water Implementation Plan that serves as a blueprint for specific mitigation goals and identifies the sectors and agencies responsible for achieving those goals. It may not provide direct guidance to the environmental resource analysis, but it shows an opportunity for collaboration.
- Pennsylvania Historical and Museum Commission (PHMC) would like to offer their assistance as they have worked with Lancaster County on previous Long Range Transportation Plans (LRTPs) by identifying and clarifying what cultural resources may be affected by transportation projects. PHMC has a partnership with PennDOT to provide services directly to MPOs. One of the resources particularly affected in areas like Lancaster County are rural historic districts. For example, if a bridge was built within the rural historic district within a certain time frame, it could be considered a historic resource and would need to be addressed as part of the National Historic Preservation Act.
- McCormick Taylor is working with PennDOT Central Office to evaluate Agency Coordination Meetings (ACMs). They have been interviewing MPOs and RPOs on how they approach the environmental resource process in their Long Range Transportation Plan (LRTP) development. MPOs like Lancaster and the Harrisburg Area Transportation Study (HATS) have been taking a different approach using environmental committees rather than attending ACM.

Next Steps and Adjournment

- The LCPC Staff will follow up with all the resource agencies to solicit presentations of agency viewpoints at the next virtual meeting.

Bob thanked everyone for attending and the meeting was adjourned at 11:32 AM.

Appendix I: Stakeholder Focus Group Summary

Stakeholder Focus Group Summary

Overview

The Lancaster County MPO hosted a series of focus group meetings during the week of September 23, 2019. Each focus group was oriented to a specific transportation topic or stakeholder group. These topics included: active transportation; emergency response; the Plain Sect community; municipal officials; underserved populations; shippers and businesses; and transit and human services. All groups provided thorough and valuable input, which guided the development of policies, programs, and projects included in *connects2040*, the Lancaster County 2040 Metropolitan Transportation Plan.

Key Themes

- A desired focus on all travel modes with less reliability on the automobile – promoting public transportation and ridesharing, bicycles, walkability, etc.
- Attendees expressed concerns over congestion and the role of interchange conditions and improper timing of signals.
- Freight movement in downtown areas (such as the boroughs and the City) and obstacles for efficient deliveries
- Innovative solutions, such as new technologies and modernization, should be explored
- Land use, population growth, and transportation linkages
- There should be collaboration and transparency between the MPO, PennDOT, local governments, and stakeholders throughout the transportation planning and decision-making process, including decisions on how funds are spent.
- Attendees expressed concerns over the safety of Plain Sect buggies and their co-existence with other transportation modes

What Did They “Love”?

- Increased emphasis on alternative modes of transportation including:
 - New bicycle and pedestrian lanes and facilities
 - Improvements to Amtrak’s Keystone Corridor
 - Transit, which has a solid foundation in the county
 - Commuter Services and the education the program provides
 - Walkability, particularly in downtown areas
 - Increased ADA and curb cut improvements throughout the county
- Congestion-reducing projects have been implemented successfully:

- Construction of the Columbia and Strasburg bypasses; Gap reconfiguration
- Improved signal timings along Route 501; Route 30 from Greenfield Road to Route 896
- Transportation considerations are made with new land developments:
 - Accessibility (e.g. access management, connectivity, roadway geometry)
 - Improved pedestrian accommodations (e.g. crosswalks, sidewalks, etc.)
- Major developments are being concentrated along major routes.

What Do They Want To “Change”?

- Improve, modernize public transportation access for jobs and services where needs are present: e.g., areas with carless households during non-peak hours, rural areas, and direct routes to employment centers.
- Construct more sidewalks around the county to improve pedestrian connectivity, improve the visibility of bicycle/pedestrian infrastructure to motorists, and close trail gaps.
- Congestion is a growing concern on all major arteries as well as interchanges:
 - The short distance to merge onto highways is a challenge for safe, efficient traffic movements at interchanges across Lancaster County.
 - Route 30 was the most frequently mentioned as a congested route in group discussions.
 - Roherstown Road (SR 741), Centerville Road, and Good Drive experience congestion since they are detours for traffic on the major routes. SR 741 also experiences conflicts with rail traffic.
- Lane reconfiguration, interchange design, and signal retiming are desired to improve congestion in some areas. York Road at Route 401 was highlighted as an area where signal retiming is desired.
- Freight planning efforts should be prioritized for the county. Trucks are being routed through downtowns of boroughs. Congestion on some major routes and local roadway restrictions delay or negatively impact deliveries.
- Coordinate with land developers and determine traffic impacts of new land developments prior to construction. There is a recent trend of developments being constructed with not a lot of regard for transportation needs of all modes.
- Long term parking strategies are desired for Downtown Lancaster City. Attendees expressed concerns about poor wayfinding signage for parking facilities as well as motorists “circling the Downtown” to access parking facilities. Suggestions included additional garages, replace aging garages, shuttle services in and out of downtown job centers. Off street parking is too close to intersections, posing safety concerns.

- Plain Sect buggies are not able to operate well and conflict with other modes on the road. Shoulders are insufficient and rumble strips are an obstacle for them. Specific corridors identified with this issue include Routes 30, 741, 772, and 896. The upcoming Radcliff Bridge replacement will cause a significant detour for the Plain Sect community.
- There is a need for improved consideration of the Plain Sect community in County transportation planning. Some of these considerations include travel concerns and horse/buggy safety.
- There was an expressed desire by the Municipal Officials focus group for further coordination, collaboration and transparency throughout the planning process and decisions on how transportation dollars are spent. The relationship between PennDOT and municipalities need to be improved as some municipal officials still think that PennDOT does not care about their input.

Top Challenges and Trends with Influences on Lancaster County's Transportation System

- Equal focus on all modes of transportation (e.g. bicycles, pedestrians, Plain Sect buggies, trucks, etc.) and shifting away from the heavy focus on automobiles.
- Innovation and innovative solutions such as planning for and the use of emerging technologies when addressing transportation related needs and concerns
- One of the challenges expressed was not having as many major thoroughfares across the county going in the East-West direction, causing impacts to the surrounding roads and posing a challenge for freight movement in that direction.
- Attendees from several groups mentioned fiscal constraint regulations and funding availability at the state and Federal levels as a major challenge. All MPO long-range transportation plans must meet Federal fiscal constraint guidelines. Attendees were concerned about a new Federal infrastructure bill being passed to follow the current one, expiring in 2020 and the impacts it has on both Federal and state transportation dollars.
- Continued population growth and an aging population.
- Autonomous vehicles, ridesharing services like Uber and Lyft, emerging technologies
- Attendees applauded the positive trend of using stormwater practices along highways. One of these practices noted by the Underserved Populations focus group was “green infrastructure” – an approach to stormwater management (e.g. tree planting, rain gardens) that harvests stormwater runoff, improves water quality, and reduces the need of surface materials that are water resistant such as asphalt and concrete and stone.
- Improvement of coordination between the MPO, PennDOT, local government agencies, stakeholders, and special interest groups through the transportation planning process.

Appendix J: References and Resources

References and Resources

- [places2040: thinking beyond boundaries – Lancaster County’s Comprehensive Plan](#)
- [Lancaster Active Transportation Plan](#)
- [South Central Transit Authority \(SCTA\) Transit Development Plan](#)
- [County Bridge Capital Improvement Program](#)
- [MPO Guide for Implementing DSRC Technology in District 8-0](#)
- [Lancaster County Transportation Working Group Summary](#)

